FUNCTIONAL SERVICING REPORT

CARANTANIA INVESTMENTS (BT) INC.

PROPOSED RESIDENTIAL DEVELOPMENT

BOLTON SOUTH HILL DEVELOPMENT AREA
9229 5th SIDEROAD

TOWN OF CALEDON
REGIONAL MUNICIPALITY OF PEEL

PROJECT No. 20036

Revised OCTOBER 2021

RAND ENGINEERING CORPORATION
5285 SOLAR DRIVE
MISSISSAUGA, ONTARIO
L4W 5B8

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1.0 INTRODUCTION

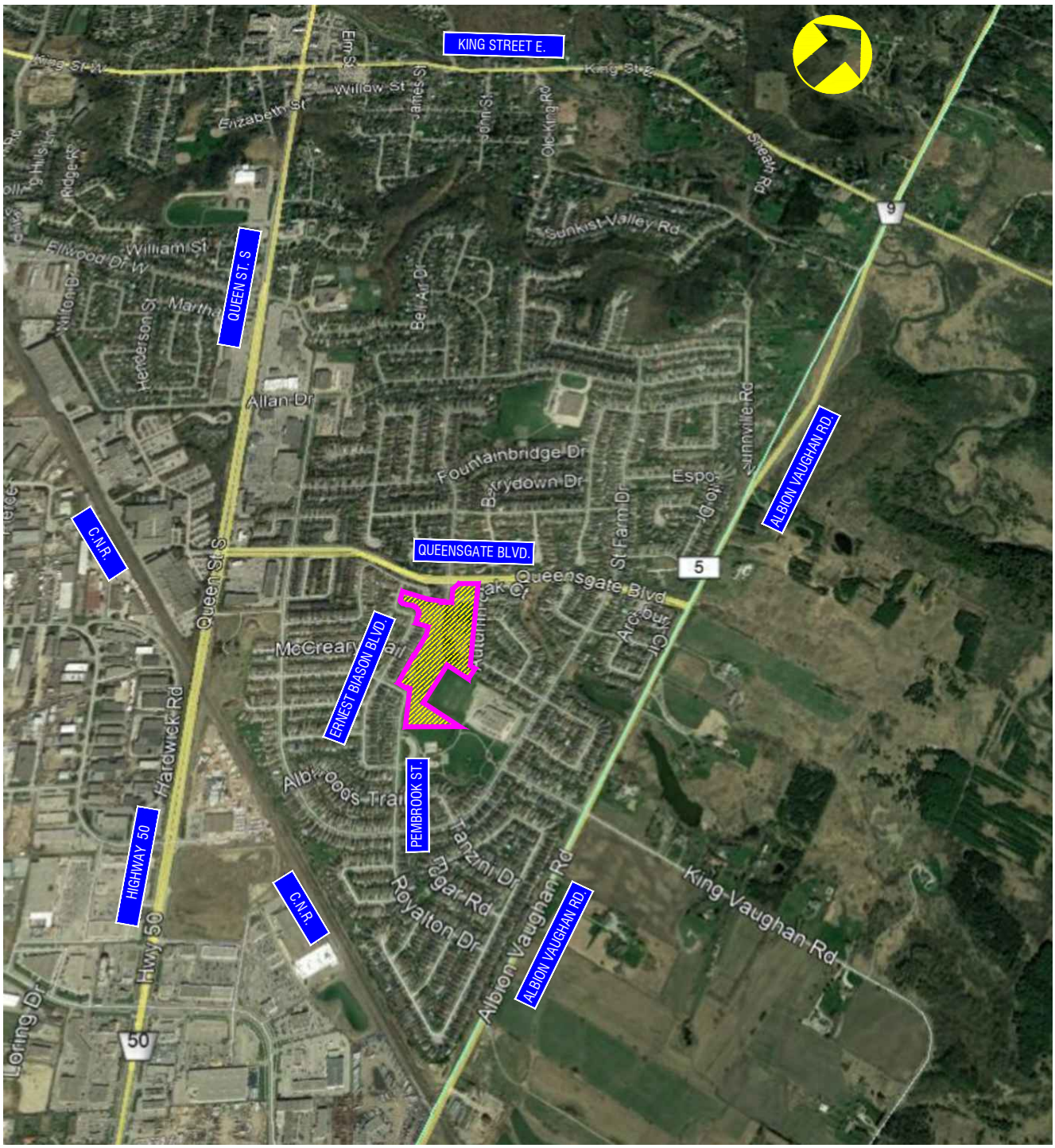
RAND Engineering Corporation has been retained by Carantania Investments (BT) Inc. to complete a Functional Servicing Report (FSR) for a proposed residential development located within the Bolton South Hill Development Area in the Town of Caledon and Regional Municipality of Peel. The property encompasses a total area of 4.49 ha and is located within Registered Plans 43M-1210, 43M-1306, 43M-1365 and on Parts of Lots 5 and 6, Concession 7, Geographic Township of Albion.

The proposed Draft Plan of Subdivision for the Carantania property was prepared by KLM Planning Partners Inc. on December 8, 2020. The development is comprised of 84 single detached units and a park block.

As shown in Figure 1, the site is located within the boundaries of Queensgate Boulevard to the north, Earnest Biason Boulevard to the west, and Autumn Oak Court to the east. The property is bounded to the west and south by the Gates of Bolton Phase 4 residential subdivision (21T-96004, Registered Plan 43M-1306) and to the east by the Southridge Meadows Phases 1 and 2 residential subdivision (21T-92003c, Registered Plans 43M-1210 and 43M-1216).

The purpose of this report is to provide stormwater, sanitary and water servicing requirements for the proposed development. The recommended grading and servicing plans have been prepared in accordance with the design criteria of the Town of Caledon, Toronto Region Conservation Authority (TRCA) and Regional Municipality of Peel.

The information provided in this report is intended to assist the municipality and other regulatory agencies in their review of the draft plan application for the Carantania development.



LEGEND

SUBJECT DEVELOPMENT

CARANTANIA INVESTMENTS (BT) INC.

TOWN OF CALEDON

PROJECT No. 20036

LOCATION PLAN

FIGURE No. 1

NOT TO SCALE

RAND ENGINEERING CORPORATION

R:\20\20036\036 Figures for Report\2021-02-10\Figure 1_Location Plan.dwg Feb 17, 2021 - 11:49am
Layout: Figure 1

2.0 BACKGROUND INFORMATION

The following is a list of the background studies and reference documents used in the preparation of this report:

- **Aquafor Beech Ltd.,** *"Stormwater Management Report – Gates of Bolton – Phase III & Phase IV – Draft Plan 21T-96004"* (SWMR), March 1998.

- **Aquafor Beech Ltd.,** *"1113486 Ontario Limited (South Hill Village) - Storm Drainage Area Plan – As Constructed, Sheet 2A"*, August 15, 1999.

- **Aquafor Beech Ltd.**, "*Gates of Bolton – Phase IV – 21T-96004 – As Constructed Engineering Drawings*", November 2004.

- **Caledon Hills Engineering Ltd.**, "*Southridge Meadows Phases 1 & 2, 21T-92003c – As Constructed Engineering Drawings*", November 2000.

- **EXP Services Inc.**, *"Queensgate Blvd. and Pembrook St. Geotechnical Investigation, Caledon, Ontario*, October 7, 2020.

- **Falby Burnside & Associates Ltd.,** *"Functional Design Report for Stormwater Management Ponds 2 & 3, Bolton South Hill Development Area, Town of Caledon"* January 1995.

- **Falby Burnside & Associates Ltd.,** *"Final Design Brief for Master Drainage Ponds 2 & 3, Bolton South Hill Development Area, Town of Caledon"*, May 1996.

- **Region of Peel**, *"Public Works, Design, Specifications & Procedures Manual"*, September 2007.

- **Town of Caledon**, "*Development Standards Manual*", 2019.

- **TRCA, CVC**, *"Low Impact Development Stormwater Management Planning and Design Guide"*, 2010.

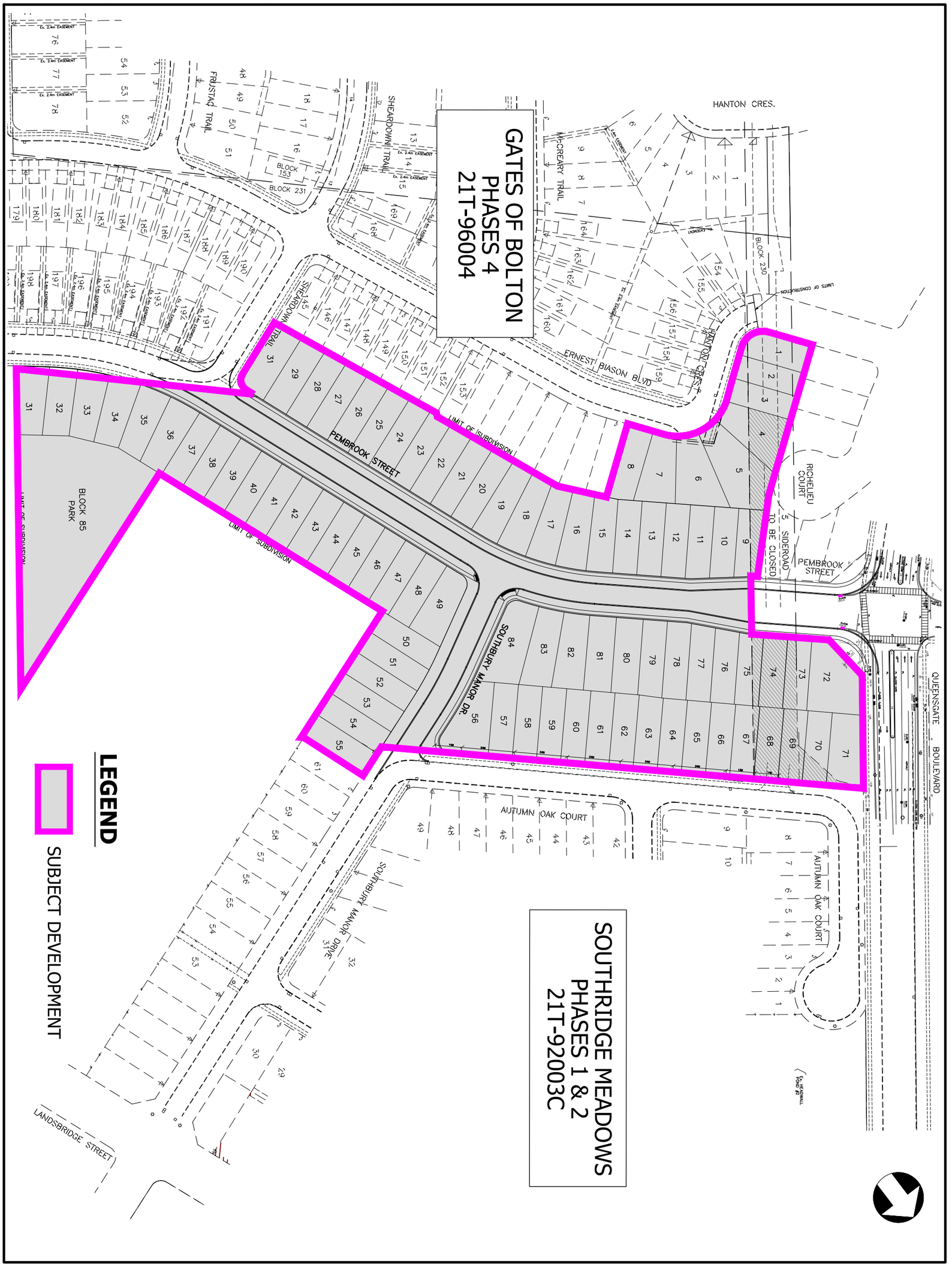
3.0 PROPOSED DEVELOPMENT

The general layout of the proposed 4.49 ha Carantania development is shown in Figure 2. The Draft Plan of Subdivision for the property was prepared by KLM Planning Partners Inc. on December 8, 2020. The proposed development consists of the following:

- 84 freehold single detached units
- 1 park area (Block 85)
- 20 and 26 m wide rights-of-way

Figure 2 shows that the proposed development will eliminate a portion of the existing 5th Sideroad right-of-way on the north portion of the site. Primary access to the development will be provided via Pembrook Street from the north and south, and Southbury Manor Drive from the east.

R:\20\20036\036 Figures for Report\2021-02-10\Figure 2_Development Plan.dwg | Feb 17, 2021 - 11:16am



CARANTANIA INVESTMENTS (BT) INC.

FIGURE No. 2

NOT TO SCALE

CITY OF CALEDON

DEVELOPMENT PLAN

PROJECT No. 20036

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4.0 EXISTING CONDITIONS

4.1 Topography and Drainage

A review of the property's site conditions was carried out using topographic information and site inspection. Topographic information for the property and immediate surrounding area was obtained from the detailed survey plan completed on October 23, 2020, by Holding Jones Vanderveen Inc.

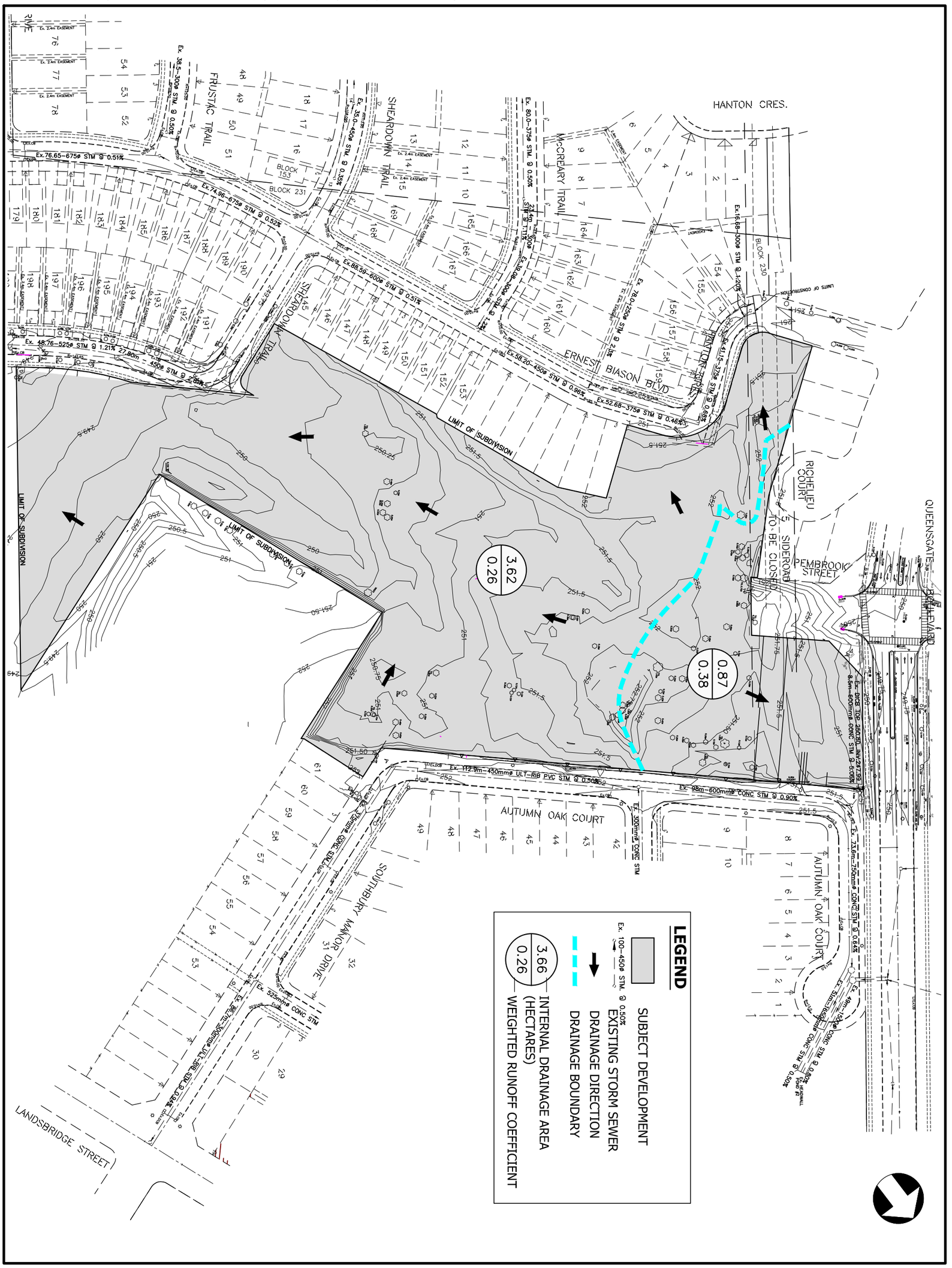
A single detached residential unit with a swimming pool is located on the property. The remainder of the property is vacant land consisting of an open field with scattered trees in the north and central parts of the property. As shown in Figure 3, the ground surface is moderate in slope (0 to 6%). A review of the topographic conditions indicates that property has a local high point on the northern portion of the site. From that highpoint the grade falls in all directions. Most of the site, however, drains in a southerly direction. The topographic relief across the property is approximately 3 metres.

As shown in Figure 3, the following existing storm sewers are located in the vicinity of the site:

- A storm sewer system on Autumn Oak Court with the pipe diameters ranging from 450 mm to 750 mm.
- Seven (7) pre-installed servicing connections on the west side of Autumn Court.
- A 375 mm diameter storm sewer on Southbury Manor Drive.
- A storm sewer system on Pembrook Street with the pipe diameters ranging from 450 mm to 525 mm.
- A storm sewer system on Earnest Biason Boulevard with the pipe diameters ranging from 375 mm to 600 mm.

All drainage within the Cantarania property and surrounding area is tributary to the existing drainage systems of the Gates of Bolton Subdivision and the Southridge Meadows Subdivision.

R:\20\20036\036 Figures for Report\2021-02-10\Figure 3_ Existing Drainage Conditions.dwg | Oct 15, 2021 - 3:51pm



CARANTANIA INVESTMENTS (BT) INC.

FIGURE No. 3

NOT TO SCALE

CITY OF CALEDON

EXISTING DRAINAGE CONDITIONS

PROJECT No. 20036

RAND ENGINEERING CORPORATION

The drainage areas internal to the property have been discretized as follows (refer to Figure 3):

- 3.62 ha drains southerly to the existing storm sewer system along Pembrook Street and Sheardown Trail within the Gates of Bolton subdivision,

- 0.87 ha drains northerly towards the Queensgate Boulevard right-of-way.

4.2 Soils

A review of the Carantania property's subsurface site conditions was carried out using the geotechnical information for the property provided in the October 2020 *"Geotechnical Investigation"*, prepared by EXP Services Inc.

Five boreholes were advanced throughout the site during the investigation. The results of the investigation indicate that the soil stratigraphy of the site consists of 0.08 m to 0.10 m layer of topsoil over fill extending to depths of approximately 0.7 m to 1.8 m. A native sandy silt till was observed beneath the fill to depths of 2.3 to 4.1 m below existing grade in Boreholes 1 through 4. Clayey silt till exists below the sandy silt till.

The groundwater was measured at approximately 2.2 m below grade in the southern part of property (Borehole No. 5), whereas the monitoring well installed in Borehole No. 2 remained dry. It has been reported that the groundwater likely originates from the more pervious seams within the glacial till deposits.

5.0 STORMWATER MANAGEMENT PLAN

The storm drainage system for the Carantania development has been designed in accordance with the standards and requirements of the Town of Caledon and TRCA. The information pertaining to the water quality, erosion and quantity control from the site has been obtained from the following documents:

- "*Stormwater Management Report - Gates of Bolton – Phase III & IV – Draft Plan 21T-96004*", prepared by Aquafor Beech Ltd., dated 1998.
- *"Final Design Brief for Master Drainage Ponds 2 & 3, Bolton South Hill Development Area, Town of Caledon"*, prepared by Falby Burnside & Associates Ltd., dated May 1996.

5.1 Stormwater Management Criteria

The following storm drainage criteria have been adopted for the stormwater conveyance system within the proposed development:

- The minor drainage system within the proposed development should be designed for the 10-Year storm event using the Rational Method and the Town of Caledon's IDF curves.

- The major drainage system should be designed to convey flows from the 100-Year design storm. The major system should be contained within road allowances and designated easements.

- Runoff from roof leaders within residential lots should discharge to surface pre-cast splash pads and be directed towards pervious areas.

- On-site detention of the first 5mm of runoff from the entire site impervious surface area is required to address the water balance.

- Water quality, erosion and quantity control for the subject property will be provided within the existing SWM Ponds 13, 14 and 17.

5.2 Minor and Major Drainage Systems

As shown in Figure 4, the drainage from the 4.49 ha Carantania development will be conveyed to the existing storm sewer system within the adjacent Southridge Meadows subdivision (1.04 ha) and Gates of Bolton – Phase IV subdivision (3.45 ha), to the east and south, respectively.

The details of the proposed drainage system are shown on Drawing No. ST-1 – Preliminary Storm Drainage Plan and Drawing No. GP-1 – Preliminary Servicing Plan, included in the back pocket of this report. As shown on Drawing No. ST-1, the proposed storm sewer system from the subject development will be connected to the existing storm sewer system as follows:

- The residential lots 18-30 and 31-49 located along the Pembrook St. extension will be serviced via the proposed 375 mm – 450 mm diameter storm sewers connected to the existing 450 mm diameter sewer at the Pembrook St. to the south.

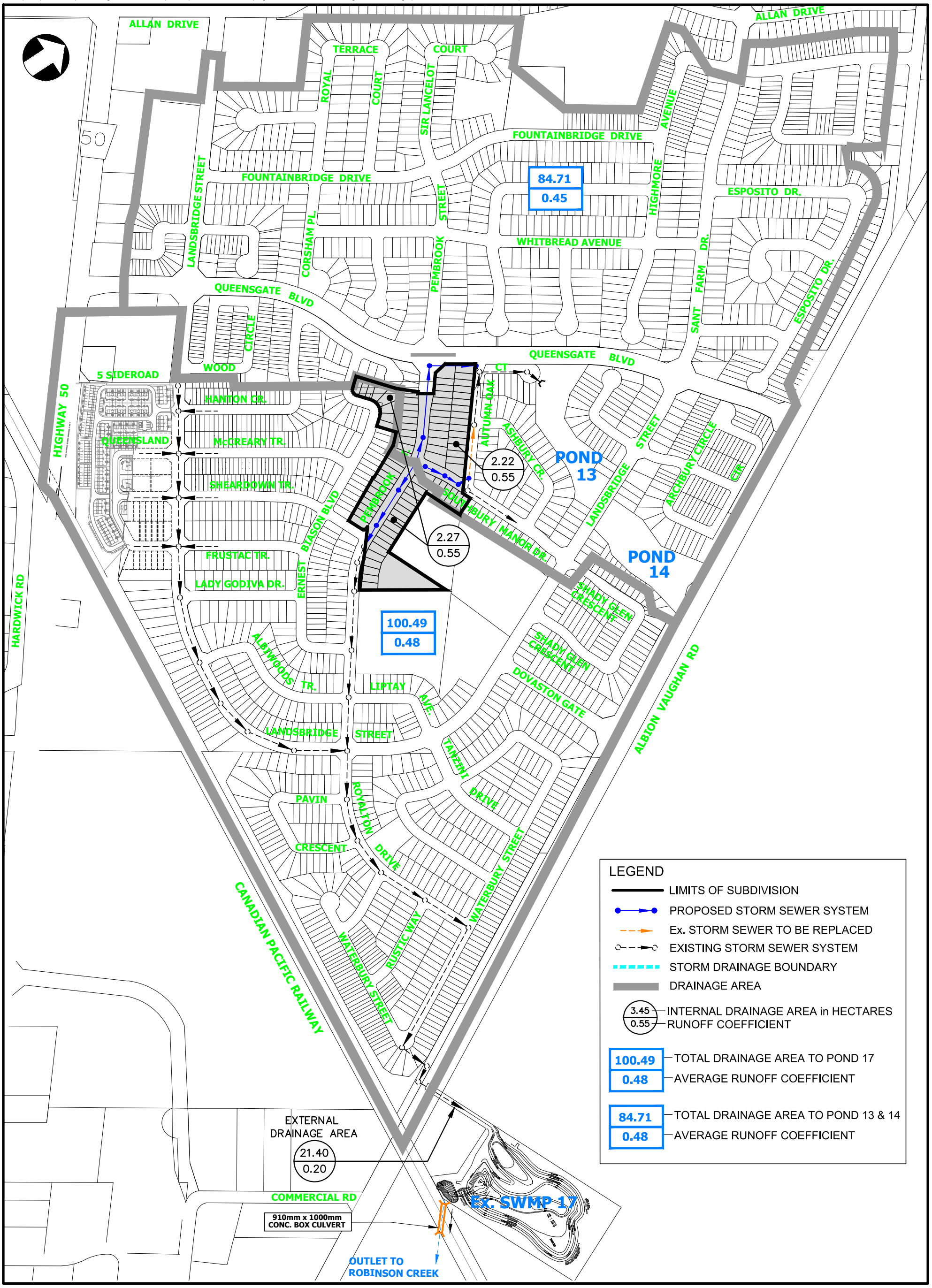
- The residential lots 9-17 and 72-84 located along the Pembrook St. extension will be serviced via the proposed 300 mm – 525 mm diameter storm sewers on Pembrook St. The sewer will be connected to the existing 750 mm diameter sewer on Autumn Oak Crt. via a proposed 525 mm diameter sewer within a 3.0 m drainage easement along the northern property boundary.

- The residential lots 50-55 located along the Southbury Manor Dr. extension will be serviced via a proposed 300 mm - 375 mm diameter storm sewers. The Southbury Manor Dr. sewer will be connected to a 600 mm diameter storm sewer on Autumn Oak Crt. which replace the existing 450 mm diameter sewer.

- The residential lots 56-71 fronting Autumn Oak Crt. will be serviced via existing pre-installed and proposed storm servicing connections to the proposed 600 mm diameter storm sewer on Autumn Oak Crt. which will replace the existing 450 mm diameter sewer. The pre-installed servicing connections will be investigated whether they meet the Town's latest standards.

- The residential lots 1-8, fronting Hanton Cres. and Earnest Biason Blvd. will be serviced via the existing 375 mm diameter storm sewer.

R:\20\20036\036 Figures for Report\2021-02-10\Figure 4_Stm Drainage Plan.dwg | Oct 18, 2021 - 2:41pm



CARANTANIA INVESTMENTS (BT) INC.

FIGURE No. 4

TOWN OF CALEDON

STORM DRAINAGE PLAN

SCALE 1:6,000

PROJECT No. 20036

RAND ENGINEERING CORPORATION

A preliminary drainage system design for the Carantania development has been prepared in conjunction with the servicing and grading design for the site. Post-development storm drainage from the site will be managed using a combination of minor (storm sewers) and major (overland) systems.

The minor drainage system within the proposed development should be designed for the 10-Year storm event using the Rational Method and the Town of Caledon's IDF curves. The major drainage system should be designed to convey flows from the 100-Year design storm. Preliminary storm sewer design sheet for the development is included in Appendix A.

The capacity of the existing storm sewer system receiving the post-development flows from the Carantania development and 100-year Hydraulic Grade Line analysis will be conducted at the final design stage.

5.3 Water Quantity and Quality Control

The development lies within the limits of the drainage areas of multiple existing SWM Ponds; Pond 13 & 14 to the east, and Pond 17 located 150 m northeast of the CP Rail line and Albion-Vaughan Road intersection. The site and associated SWM Ponds are located within the Humber River Watershed.

5.3.1 SWM Ponds 13 and 14

The drainage from the northern portion of the site will be conveyed easterly towards SWM Ponds 13 and 14 (formerly known as Ponds 2 and 3, respectively. SWM Pond 13 is located 150 m east of the subject property and south of Queensgate Blvd., within the Southridge Meadows subdivision 21T-92003c. SWM Pond 14 is located further downstream, to the east. Refer to Figure 4 to see the pond locations.

The design details for the two existing facilities were provided in a report titled "*Final Design Brief for Master Drainage Ponds 2 & 3, Bolton South Hill Development Area, Town of Caledon*", prepared by Falby Burnside & Associates, dated May 1996.

SWM Ponds 13 and 14 operate as cascading on-line facilities and were designed to provide water quality, erosion, and quantity control for an approximately 85.0 ha drainage area, including approximately 2.51 ha from the subject property. The facilities discharge into a tributary of the Main Humber River.

SWM Pond 13 is a dry detention facility designed for flood storage. SWM Pond 14 was designed as a wet facility with extended detention, to provide quality and erosion control as well as flood storage. Both ponds were designed to provide water quantity control for storms up to and including the 100-year event. Ponds 13 and 14 are also designed to convey safely the Regional storm flows.

Based on the preliminary servicing design, the contributing drainage area from the Carantania subdivision will be reduced to 2.22 ha. As a result, the total drainage area to SWM Ponds 13 and 14 will be reduced to approximately 84.71 ha.

5.3.2 SWM Pond 17

As shown in Figure 4, the southern portion of the Carantania development will drain towards SWM Pond 17 (formerly known as Pond 4), which is located approximately 150 m northeast of the CP Rail line and Albion-Vaughan Road intersection. The SWM facility drains to Robinson Creek via a 910 mm x 1000 mm concrete box culvert under the CP Rail line. Design details for the existing SWM Pond 17 were provided in the *"Stormwater Management Report – Gates of Bolton – Phase III & Phase IV – Draft Plan 21T-96004"* prepared by Aquafor Beech Ltd. in March 1998.

SWM Pond 17 was constructed in 1998 as part of the Gates of Bolton subdivision. The facility was designed to provide water quality and quantity control storms up to and including the 100-year event for approximately 100.2 ha drainage area, including approximately 1.98 ha portion of the subject property. Based on the preliminary servicing design, the contributing drainage area from the Carantania subdivision will increase to 2.27 ha. As a result, the total drainage area to SWM Pond 17 will increase to approximately 100.49 ha.

5.4 Hydrogeology and Water Balance

The hydrogeological conditions and water balance analysis for the study lands was conducted by R.J. Burnside in the February 2021 *"Carantania Investments (BT) Inc. - Hydrogeological Assessment and Water Balance Report"*.

The water balance analysis results showed a pre-development infiltration volume of approximately 4,000 m^3/year. Under post-development conditions, the potential infiltration volume could be reduced to approximately 2,200 m^3/year without mitigation. With the proposed LID practices, the annual infiltration volume would be approximately 3,460 m^3/year, representing 86% of the pre-development volumes.

5.5 Low Impact Development Practices

Based on the R.J. Burnside and Associates Ltd. recommendations and current TRCA objectives related to water balance, the following Low Impact Development (LID) practices are recommended:

1. Runoff from roof leaders will be discharged to surface pre-cast splash pads and directed towards lawns,

2. The depth of topsoil on the lots will be increased from the typical 150 mm to 300 mm,

3. Provision of rear-yard infiltration trenches at suitable locations.

The proposed storm drainage system for the development will include on-site detention of 5 mm of precipitation over the contributing impervious area to address the TRCA water balance requirement. The storage requirements will be achieved via an implementation of infiltration trenches and thicker topsoil. The evaluation of the site conditions for the suitable location of the infiltration trenches will be conducted by R. J. Burnside and the design details for the proposed LID practices will be provided at the final design stage.

6.0 EROSION AND SEDIMENT CONTROL

Erosion and sediment control measures to be implemented during and following construction will comply with the December 2006 *"Erosion and Sediment Control Guideline for Urban Construction"* prepared by the Greater Golden Horseshoe Area Conservation Authorities and recommendations from the Town of Caledon engineering staff. The details of the proposed erosion and sediment control works will be provided at the final design stage.

Prior to the initiation of grading or stripping of topsoil a Fill Permit Application will be submitted to the Town of Caledon. The permit will include detailed Erosion and Sediment Control Plans, and Construction Management Plan. The Construction Management Plan will include information related to the required mitigation measures for the noise/dirt and air quality for the adjacent neighborhood.

7.0 SANITARY SERVICING PLAN

The sanitary servicing plan for the proposed development is shown on Drawing No. GP-1, included in the back pocket of this report. The sanitary servicing network within the proposed development has been designed as a conventional gravity system in accordance with the Region of Peel standards. The sizes and locations of sanitary sewers within the subject property will be verified at the time of detailed engineering design.

Preliminary sanitary design calculations for the development are included in Appendix B.

As shown on Drawing No. GP-1, the sanitary flow from the subject property will be connected to the existing sanitary sewer system as follows:

- The residential lots located along Autumn Oak Court will be connected to the existing 250 mm diameter sanitary on Autumn Oak Court via pre-installed and proposed servicing connections. The pre-installed servicing connections will be investigated whether they meet the Town's latest standards.

- The residential lots located along the Pembrook St. extension will be serviced via the proposed 250 mm diameter sanitary sewer connected to the existing 250 mm diameter sewer on Pembrook St.

- The residential lots located along the Southbury Manor Dr. extension will be serviced via a proposed 250 mm diameter sanitary sewer.

- The residential lots fronting Hanton Cres. and Earnest Biason Blvd. will be serviced via the existing 250 mm diameter storm sewer.

The sanitary flows from the proposed development will be conveyed via the existing 250 mm diameter sewer located along Pembrook Street, and ultimately to the 675 mm diameter sanitary trunk sewer on Highway 50.

Wastewater demands were estimated using Region of Peel guidelines and are summarized in Table 1.

Table 1
Summary of Wastewater Demands

Land Use	Population	Average Flow (L/s)	Peak Flow (L/s)	Infiltration (L/s)	Total Flow (L/s)
Residential	349	1.2	5.0	0.9	5.9

***** Based on a site area of 4.49 ha and flow rate of 0.2 L/s/ha

8.0 WATER DISTRIBUTION PLAN

The subject property will be serviced within Pressure Zone 6 of the Region of Peel's Lake Based Water Supply System. The layout of the network is outlined on Drawing No. GP-1, provided in the back pocket of this report.

As shown on Drawing No. GP-1, the proposed water servicing system from the Carantania development will be connected to the existing water servicing network as follows:

- The residential lots located along Autumn Oak Crt. will be serviced via the existing 300 mm diameter watermain on Autumn Oak Crt.

- The residential lots located along the Pembrook St. extension will be serviced via the proposed 200 mm diameter watermain.

- The residential lots located along the Southbury Manor Drive extension will be serviced via the proposed 200 mm diameter watermain.

- The residential lots fronting Hanton Cres. and Earnest Biason Blvd. will be serviced via the existing 200 mm diameter watermain.

The sizes and locations of proposed watermains within the subject property will be verified at the time of detailed engineering design. The water distribution system for the proposed development will be designed in accordance with current Region of Peel standards.

Anticipated water demands were estimated and are summarized in Table 2. Population and flow estimates were determined using Region of Peel guidelines. The proposed water distribution network is supported by the preliminary design calculations provided in Appendix C.

Table 2
Summary of Anticipated Water Supply Demands

Land Use	Population	Ave. Day Demand (L/s)	Max. Day Demand (L/s)	Max. Hour Demand (L/s)
Low Density Res.	349	1.1	2.3	3.4

Fire flow demand is conservatively estimated as follows:

- 150 L/s for residential land use

Therefore, the estimated maximum day + fire flow demand is approximately 152.3 L/s.

9.0 GRADING PLAN

A preliminary grading plan for the Carantania development has been prepared in conjunction with the preliminary storm and sanitary design for the subject development, and with consideration of the existing grading for the adjacent lands.

The site's grading has been designed to generally follow the existing topography and provide adequate cover for the underground services. As such, site drainage is split. Approximately 1.04 ha drains towards the Gates of Bolton subdivision (Registered Plan 43M-1306). The remainder of the site (approximately 3.45 ha) drains easterly towards the Southridge Meadows subdivision (Registered Plans 43M-1210 and 43M-1216).

The property's grading is outlined on the Preliminary Grading Plans (Drawing Nos. GR-1 and GR-2) provided in the back pocket of this report.

10.0 CONCLUSIONS

Based on the findings of this study, it is concluded that:

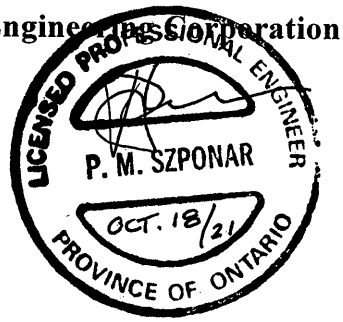
1. A technical assessment of the municipal servicing requirements indicates that the development plan may be adequately serviced by the proposed storm drainage, sanitary and water distribution systems.

2. A detailed Stormwater Management Implementation Report will be prepared in conjunction with the final engineering design.

This report is being submitted to the Town of Caledon, TRCA and Regional Municipality of Peel in support of the Draft Plan Application for the Carantania subdivision.

Respectfully Submitted,

RAND Engineering Corporation



P. Szponar, P. Eng.

APPENDIX A. STORM SEWER DESIGN SHEET

TOWN OF CALEDON

DEVELOPMENT: CARANTANIA DEVELOPMENTS
CONSULTANT: RAND ENGINEERING CORP.

STORM DRAINAGE DESIGN CHART (10 YEAR STORM)
FOR CIRCULAR DRAINS FLOWING FULL

DATE: Oct. 2021
SHEET No. : 1 of 1

LOCATION					DRAINAGE				RUNOFF				PIPE SELECTION							PROFILE							
	FROM		TO																		UPSTREAM				DOWNSTREAM			
STREET / BLOCK	MH No.	Sta.	MH No.	Sta.	A ha.	C	AXC	Cumml. AXC	Tc external min	Cumml. Tc (Ti=10.0min.) min	I (10) mm/hr	Q (10) m^3/s	Pipe L m	Pipe So m/m	Pipe Diam. Mm	Actual Capacity (full) m^3/s	^ V Change in Velocity m/s (Max 0.6)	Time of Flow min	Minor Losses m	Fall in Sewer m.	Surface Elev. m	Inv. Elev. m	Cover m	Surface Elev. m	Inv. Elev. m	Cover m	Percent Pipe Utilization
PEMBROOK ST.	**1**		**2**		0.30	0.55	0.17	0.17	10.00	10.75	134.2	0.06	**43.5**	**0.50**	**300**	0.07	0.97	0.75		0.22							90%
"	**2**		**3**		0.97	0.55	0.53	0.70	10.75	11.38	130.1	0.25	**68.0**	**1.00**	**450**	0.28	1.79	0.63		0.68							89%
"	**3**		**4**		0.41	0.55	0.23	0.92	11.38	11.94	126.9	0.33	**55.5**	**0.70**	**525**	0.36	1.66	0.56		0.39							91%
EASEMENT	**4**		**5**		0.00	-	0.00	0.92	11.94	12.74	124.3	0.32	**80.0**	**0.70**	**525**	0.36	1.66	0.80		0.56							89%
EX. AUTUMN OAK COURT	**5**		**EX. 4**		0.00	-	0.00	0.92	12.74	12.77	120.6	0.31	**7.0**	**5.06**	**600**	1.38	4.88	0.02		0.35							22%
SOUTHBURY MANOR DR.	**6**		**7**		0.26	0.55	0.14	0.14	10.00	10.51	134.2	0.05	**35.0**	**0.70**	**300**	0.08	1.14	0.51		0.25							66%
"	**7**		**8**		0.23	0.55	0.13	0.27	10.51	11.05	131.4	0.10	**36.0**	**0.50**	**375**	0.12	1.12	0.53		0.18							79%
"	**8**		**9**		0.00	-	0.00	0.27	11.05	11.15	128.6	0.10	**10.0**	**1.00**	**375**	0.18	1.59	0.11		0.10							55%
EX. AUTUMN OAK COURT	**9**		**EX. 2**		0.67	0.55	0.37	0.64	11.15	12.28	128.1	0.23	**104.0**	**0.50**	**600**	0.43	1.53	1.13		0.52							52%
EX. ASHBURY CRES.			**EX. 2**		0.15	0.55	0.08	0.08	10.00	10.52	134.2	0.03	**40.9**	**0.91**	**300**	0.09	1.30	0.52		0.37							33%
EX. AUTUMN OAK COURT	**EX. 2**		**EX. 4**		0.45	0.55	0.25	0.97	12.28	13.07	122.7	0.33	**98.0**	**0.90**	**600**	0.58	2.06	0.79		0.88							57%
"	**EX. 4**		**EX. 5**		0.44	0.55	0.24	2.13	13.07	13.68	119.1	0.71	**73.6**	**0.64**	**750**	0.89	2.01	0.61		0.47							79%
PEMBROOK ST.	**1**		**10**		0.45	0.55	0.25	0.25	10.00	10.77	134.2	0.09	**52.0**	**0.50**	**375**	0.12	1.12	0.77		0.26							74%
"	**10**		**11**		0.74	0.55	0.41	0.65	10.77	11.46	130.0	0.24	**74.0**	**1.00**	**450**	0.28	1.79	0.69		0.74							83%
"	**11**		**EX. 111**		0.33	0.55	0.18	0.84	11.46	11.78	126.6	0.29	**42.0**	**1.50**	**450**	0.35	2.19	0.32		0.63							84%
SHEARDOWN TRAIL	**EX. CBs**		**EX. 111**		0.24	0.55	0.13	0.13																			
PEMBROOK ST.	**EX. 111**		**EX. 112**		0.39	0.55	0.21	1.18	11.78	11.93	125.0	0.41	**27.8**	**2.81**	**450**	0.48	3.00	0.15		0.78							86%
							3.32	3.32																			

APPENDIX B. PRELIMINARY SANITARY SERVICING DESIGN CALCULATIONS

Sanitary Flow Calculation from Site

Project No. 20036

Proposed Carantania Residential Development, Town of Caledon, Region of Peel

Development Area:	4.487	ha
Infiltration Rate:	0.2	l/ha/sec
Generation Rate:	302.8	l/person/day‡

Estimated Site Discharge

Land Use	Units	Area (ha)	Pop. Density (p.p.u.)†	Pop. Density (person/ha)†	Population	Ave Flow (L/s)	Harmon's Peaking Factor	Peak Flow (L/s)	Infiltration (L/s)	Total Flow (L/s)
Res. Low Density (single detached)	84		4.15		349	1.22	4.05	4.95		**4.95**
Total					**349**	**1.22**	**4.05**	**4.95**	**0.90**	**5.85**

† As per Region of Peel Design Criteria

APPENDIX C. PRELIMINARY WATER SERVICING DESIGN CALCULATIONS

PROJECT: Carantania Residential Development
PROJECT #: 20036
DATE: 2021-02-11

WATER DEMAND DESIGN ANALYSIS

REGION OF PEEL DESIGN CRITERIA

Watermains to be sized based of the greater of: 1. Maximum Day Demand plus Fire Flow or
2. Peak Hour Demand

Water Demand Design Criteria

Average Day Demand - Residential	**280**	**L/cap/d**
Maximum Day Factor - Residential	**2.0**	
Peak Hour Factor - Res. and Inst.	**3.0**	

Population Equivalents

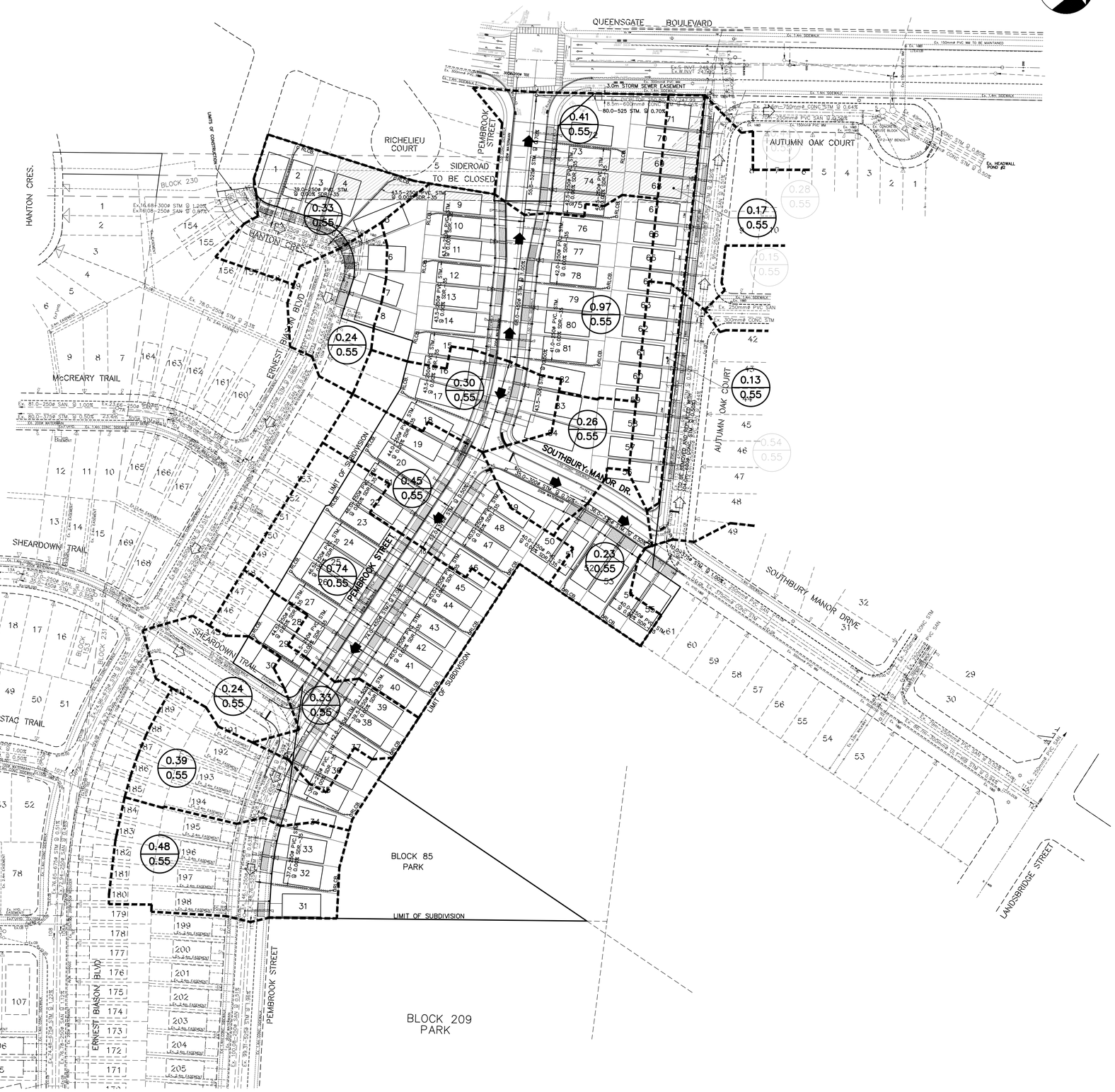
Res. Low Density (single detached)	**4.15**	**ppu**

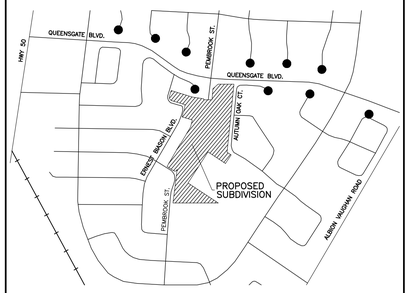
Water System Demand

Proposed Development		**Units #**	**Area (ha)**	**Population**	**Ave. Day Flow (L/s)**	**Max Day Demand (L/s)**	**Max Hour Demand (L/s)**
Res. Low Density (single detached)		**84**		**349**	**1.13**	**2.26**	**3.39**
	Total	**84**	**0.00**	**349**	**1.13**	**2.26**	**3.39**

Fire Flow Demand

	Fire Flow	
Residential	**150.00**	**L/s**
Maximum Day Demand + Fire Flow	**152.26**	**L/s**
Peak Hour Demand Flow	**3.39**	**L/s**





KEY PLAN N.T.S.

LEGEND

- MAJOR OVERLAND FLOW DIRECTION
- EXISTING MAJOR OVERLAND FLOW DIRECTION
- MINOR STORM DRAINAGE AREA
- 0.40 / 0.55 — DRAINAGE AREA IN HECTARES (Ha.) / DESIGN RUN-OFF COEFFICIENT
- 0.40 / 0.55 — Ex. DRAINAGE AREA IN HECTARES (Ha.) / Ex. DESIGN RUN-OFF COEFFICIENT

No.	By	Date	Revision	Cons. Checked	Town Approved

TOWN OF CALEDON
APPROVED AS NOTED

THIS APPROVAL CONSTITUTES A GENERAL REVIEW AND DOES NOT CERTIFY DIMENSIONAL ACCURACY

THIS APPROVAL IS SUBJECT TO FURTHER CERTIFICATION OF THE "AS RECORDED" WORKS BY A PROFESSIONAL ENGINEER OF THE PROVINCE OF ONTARIO

DATE: _____ APPROVED BY: _____

PRINT NAME: _____

BENCH MARK:
ELEVATIONS ARE GEODETIC AND ARE REFERRED TO MTO BENCHMARK No. 00819758056, HAVING AN ELEVATION OF 251.263 METRES.

Originally Approved By The Region of Peel

CARANTANIA INVESTMENTS (BT) INC.

RAND ENGINEERING
5285 Solar Drive
Mississauga, ON
Canada, L4W 5B8
Tel: 905.625.9500

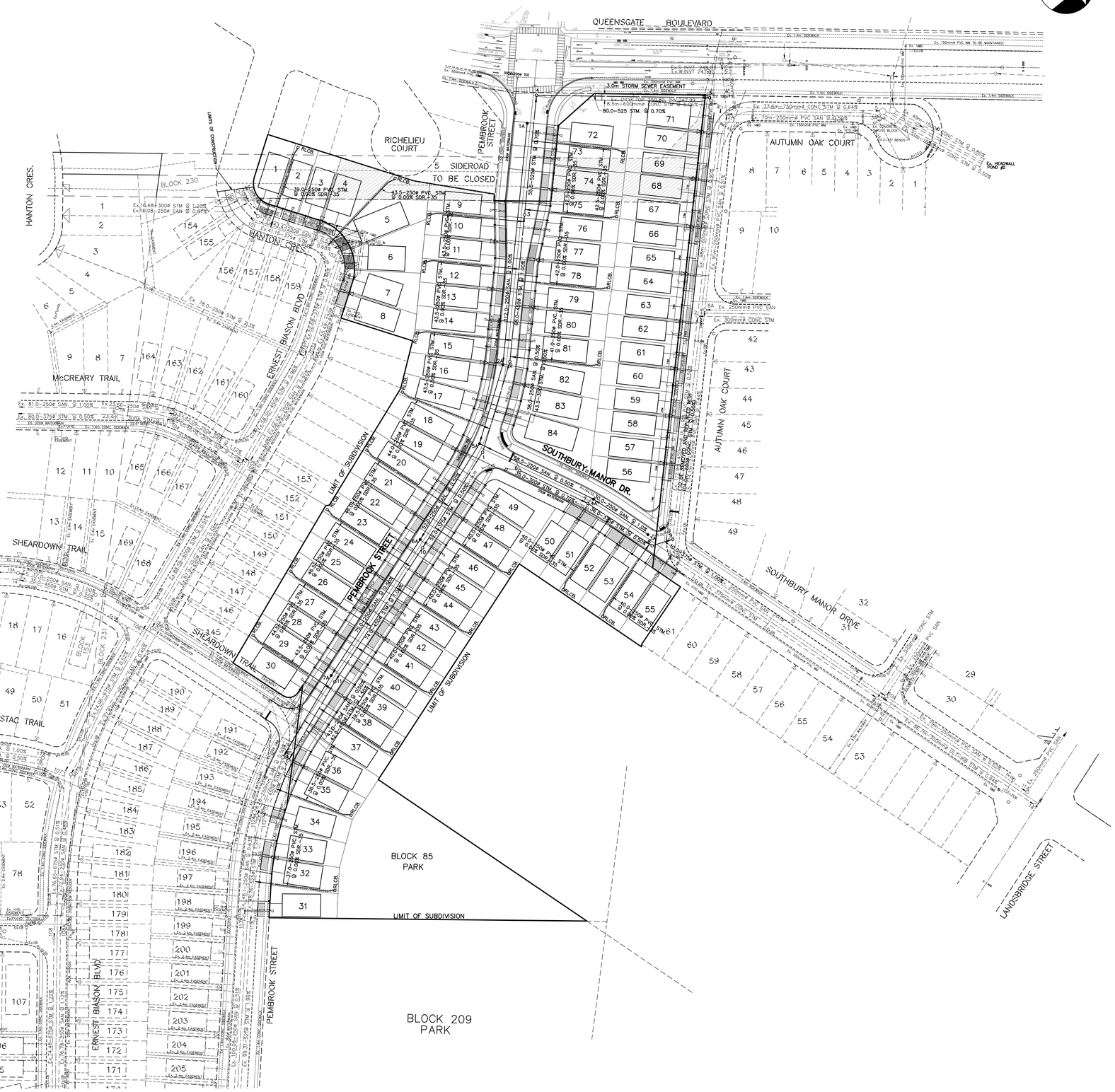
Region of Peel
Public Works

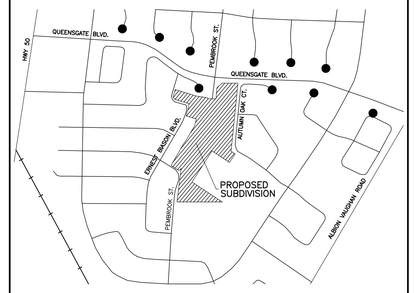
TOWN OF CALEDON

PRELIMINARY STORM DRAINAGE PLAN

Scale	1:1000		Project No. 20036
Designed By	T.A.	Drawn By ACAD	Drawing No. ST-1
Checked By	T.A.	Date FEBRUARY 2021	

R:\20\20036\036-ST-01(Storm Drainage Plan).dwg Oct 18, 2021 - 2:31pm





KEY PLAN N.T.S.

LEGEND

- DENOTES SANITARY MANHOLE
- DENOTES STORM MANHOLE
- DENOTES CATCHBASIN MANHOLE
- DENOTES SINGLE CATCHBASIN
- DENOTES DOUBLE CATCHBASIN
- DENOTES VALVE AND BOX
- DENOTES HYDRANT AND VALVE

No.	By	Date	Revision	Cons. Checked	Town Approved

TOWN OF CALEDON
APPROVED AS NOTED

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Region of Peel
Public Works

TOWN OF CALEDON

PRELIMINARY SERVICING PLAN

Scale	1:1000		Project No. 20036
Designed By	T.A.	Drawn By ACAD	Drawing No. GP-1
Checked By	T.A.	Date FEBUARY 2021	

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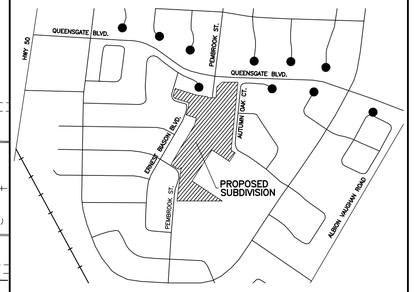

KEY PLAN N.T.S.

LEGEND

200.00	PROPOSED ELEVATION
(200.00)	EXISTING ELEVATION
[259.47]	TEMP. ELEVATION
238	EXISTING CONTOUR
	DENOTES DRAINAGE DIRECTION
	SANITARY MANHOLE
	STORM MANHOLE
	SINGLE CATCHBASIN
	DOUBLE CATCHBASIN
	HYDRANT & VALVE
	VALVE & BOX

No.	By	Date	Revision	Cons. Checked	Town Approved

TOWN OF CALEDON
APPROVED AS NOTED

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Region of Peel
Public Works

TOWN OF CALEDON

PRELIMINARY GRADING PLAN

Scale	1:500		Project No. 20036
Designed By	T.A.	Drawn By	ACAD
Checked By	T.A.	Date	FEBUARY 2021
			Drawing No. GR-1

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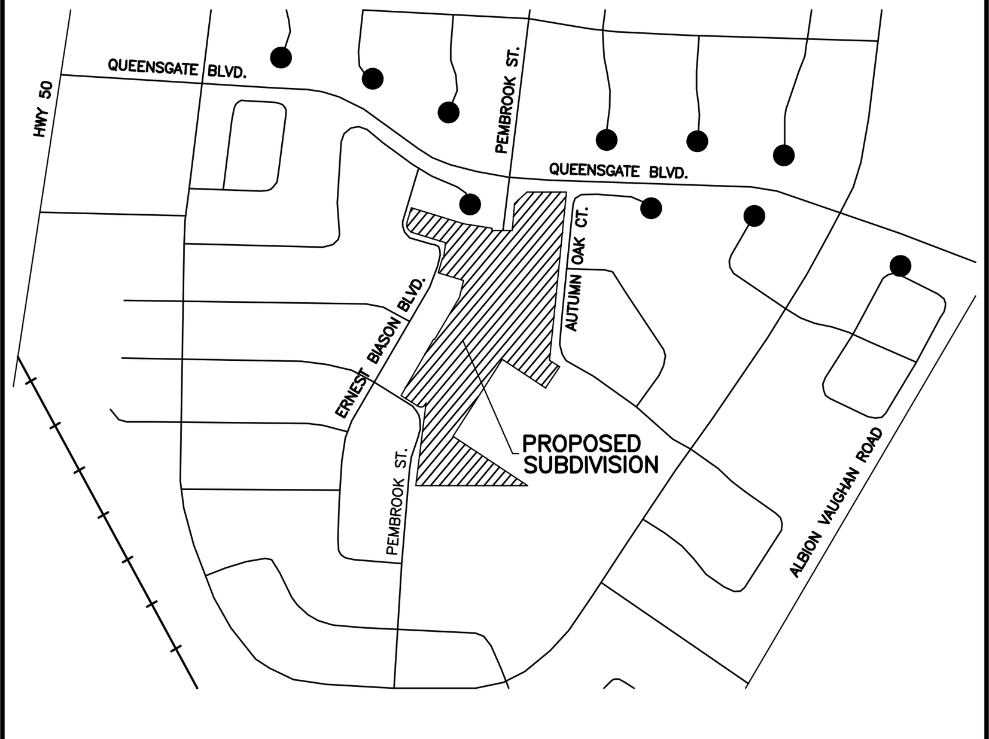

KEY PLAN N.T.S.

LEGEND

200.00	PROPOSED ELEVATION
(200.00)	EXISTING ELEVATION
[259.47]	TEMP. ELEVATION
238	EXISTING CONTOUR
	DENOTES DRAINAGE DIRECTION
●	SANITARY MANHOLE
○	STORM MANHOLE
□	SINGLE CATCHBASIN
	DOUBLE CATCHBASIN
	HYDRANT & VALVE
⊗	VALVE & BOX

No.	By	Date	Revision	Cons. Checked	Town Approved

TOWN OF CALEDON
APPROVED AS NOTED

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Public Works

TOWN OF CALEDON

PRELIMINARY GRADING PLAN

Scale	1:500	Project No.	20036
Designed By	T.A.	Drawn By	ACAD
Checked By	T.A.	Date	FEBUARY 2021
Drawing No.	GR-2		

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