FUNCTIONAL SERVICING AND STORMWATER MANAGEMENT REPORT

RESIDENTIAL DEVELOPMENT

4 STOREY RESIDENTIAL BUILDING

15, 21, 27 SHORE STREET
TOWN OF CALEDON

APPLICATION FILE NUMBERS:
TOWN: PRE-2023-0116
PRE-2023-0274

Project No.: 24-0002CA **September 2024**

Revision	*Date*	*Description*
0	*SEP 2024*	*First Submission*
1		
2		

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1.0 INTRODUCTION

1.1 Study Objectives and Location

This Functional Servicing and Stormwater Management Report has been prepared in support of a 4-storey apartment building with a basement on 15, 21, 27 Shore Street, located west of Queen Street South (Highway #50) and north of Elwood Drive West. The site can be legally described as being located within Registered Plan BOL-7, with the following parts:

- Municipal No. 27 – PIN 14322-0319(LT)
- Municipal No. 21 – PIN 14322-0320(LT)
- Municipal No. 15 – PIN 14322-0321 (LT)

The subject property is bounded by Shore Street to the South, Oak Street to the West, Queen Street South to the East, and William Street to the North. A site location plan is provided in Figure 1-1.

The following report provided information regarding site servicing and stormwater management for the subject development while ensuring compatibility with surrounding lands. The report will also address concerns and comments raised by Regulatory Agencies (i.e Town of Caledon (Town), Region of Peel (Region), Toronto & Region Conservation Authority (TRCA), Ministry of Environment (MOE)

1.2 Existing Conditions

The site is roughly a rectangular shape covering a total area of 0.21 ha. Currently the site is occupied by 3 single-family residential homes, one for each municipal address mentioned above. The current properties consist of asphalt driveways, landscaping features, sheds, grassed area, and minor retaining walls internal to the property.

In general, vehicle access to the site is provided by existing driveway entrances fronting Shore Street. The subject property only has fronting on Shore Street and Shore Street is bounded by Oak Street to the West and Highway 50 to the east.

The subject property is bounded by residential lands to the north adjacent to the property, residential lands to the west across Oak Street, commercial lands to the east adjacent to the property, and commercial lands to the south across Shore Street.

Shore Street is currently an un-urbanized 6.7 m wide road within an approximately 15 m right-of-way. Shore Street has a roadside ditch and driveway culverts on the north side and no road side ditch on the south side. No sidewalk exists on Shore Street on either side. The nearest sidewalk is where Shore Street intersects Highway 50.

The existing property is currently split drainage with the front half of the lots draining to the roadside ditches uncontrolled and the back yards drainage towards the north property line and being conveyed from there by existing means.

1.3 Proposed Development

The proposed development will consist of development of the subject property (Internal Works) and urbanization of Shore Street (External Works).

1.3.1 Internal Works

The internal works will involve removing all internal aboveground structures, underground structures, pavement structures, retaining walls internal to the property, fencing, underground servicing, landscaping, accessory structures, and any other underground utilities as required.

Once all removed, the proposed development will consist of constructing a 4-storey residential apartment building (19 residential units) with a basement, a new surface parking lot, retaining walls, storm sewer infrastructure, sanitary servicing, and watermain servicing, and landscaping features.

The main vehicle access to the propose development will be provided by two new 6.0 m wide driveways fronting Shore Street. Pedestrian access will be provided by constructing a new 1.5 m wide sidewalk as part of external works. Please refer to Site Plan prepared by FC Architects in **Appendix A** for more details.

The Shore Street right-of-way External works are described in Section 1.3.2 below.

1.3.2 External Works

The external works will consist of urbanizing Shore Street in its entirety to be a curb and gutter road with its own minor storm sewer system including catch basins and storm sewer mains. The new road will be as per Town Standard Drawing 202. The new road will have an edge of pavement width of 7.9 m and come with a new 1.5 m wide concrete sidewalk on the north side along the subject property line connecting to the existing sidewalk on Highway 50.

A new storm sewer main will be installed to convey the storm run-off for the 5 year storm event from the new right-of-way and to convey the controlled storm run-off from the subject property. All storm above beyond the 5-year storm event will be conveyed by the major overland flow route towards Highway 50.

It is to be noted that the external works will involve a 1.5 m widening of the right-of-way on the north property line. As such the ultimate property line is to be 1.5 m away from the existing property line.

The limit of the urbanization will be from Oak Street to the existing curb and gutter on Highway 50. As shown in the Site Grading Plan in **Appendix F**

1.4 Proposed Design Populations

Based on the site plan, the site is to remain entirely residential. The proposed development design population as per Region of Peel criteria is provided below in Table 1-1. The total proposed design population considered for 15, 21, 27 Shore Street is 52 persons.

Table 1-1: Population Estimate

Land Use	Site Area**	Population Density (Large)	Population Density (Small)	Large Unit	Small Unit	Design Population*
Residential	0.21	3.1 / large unit	1.7 / small unit	14	5	52
Total Design Population	**0.21**	3.1 / large unit	1.7 / small unit	**14**	**5**	**52**

*Population and unit estimates are based on the population densities set out by the Region of Peel - Linear Waste Water Standards (2023) - Section 2.1.2. The resulting populations have been used for engineering design capacity purposes only, and therefore may not be consistent with proposed planning populations for the development.
**Unit Counts based on the latest Site Plan.

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LEGEND

SITE BOUNDARY

FIGURE 1-1
SITE LOCATION PLAN

4-STOREY RESIDENTIAL BUILDING
15, 21, 27 SHORE STREET
CALEDON, ON

24-0002CA	JULY 2024	N.T.S.

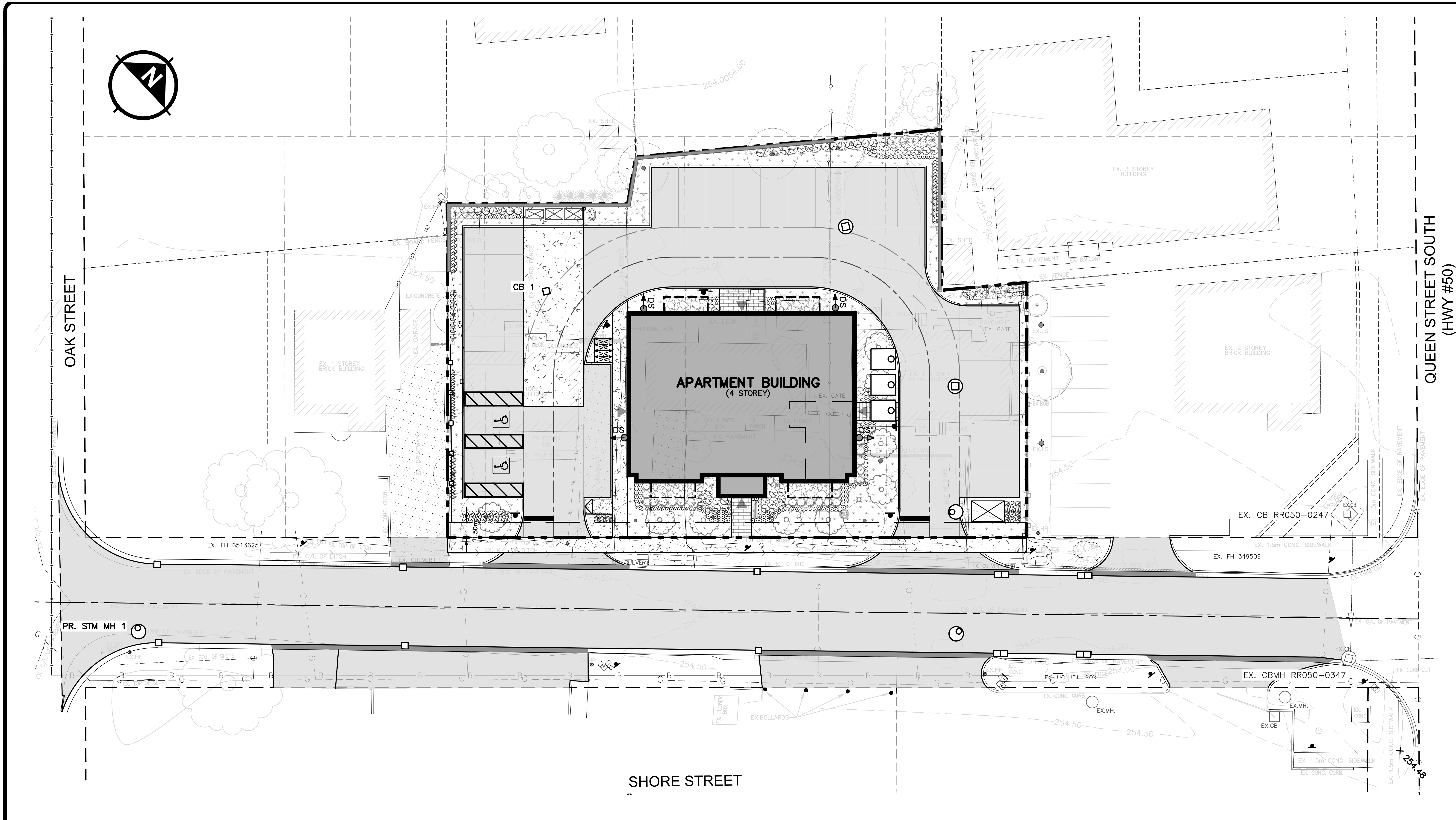

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FIGURE 1-2
SITE DEVELOPMENT PLAN

4-STOREY RESIDENTIAL BUILDING
15, 21, 27 SHORE STREET
CALEDON, ON

24-0001BR	JULY 2024	SCALE 1:350

1.5 Background References

The following material has been reviewed during the preparation of this report:

- Guido Papa Surveying, *Topographic Survey,* dated August 11, 2023
- Fausto Cortese Architects., Site Plan dated August, 2024
- Soil Engineers Ltd., Geotechnical Report dated July 2024
- **Toronto and Region Conservation Authority**, *Stormwater Management Criteria*, August 2012.
- **Toronto and Region Conservation Authority/Credit Valley Conservation**, *Low Impact Development Stormwater Management Planning and Design Guide*, 2010.
- Ministry of the Environment, *Stormwater Management Planning and Design Manual*, dated March 2003.
- **Region of Peel**, *Linear Waste Water Standards,* dated March 2024
- **Region of Peel,** *Linear Infrastructure – Watermain Design Criteria,* dated June 2010
- **Town of Caledon –** Development Standards Manual, Version 5.0, dated 2019.

2.0 Stormwater Management

2.1 Existing Conditions

2.1.1 Internal Works Topography and Drainage

In general, the existing site is graded to be split drainage. The front half of the existing houses drain via overland sheet flow into the roadside ditch along the north side of Shore Street and while the backyard drain via overland sheet flow towards the north property line and are conveyed away once outside the subject property limits. All of the site's overland sheet flows are ultimately captured by storm inlets at the intersection of Shore Street and Highway 50, as shown in the Engineering Drawings in Appendix F. The major overland flow route for Shore Street drains into Highway 50 to the east.

The site is relatively flat with and average slope of 2.4% for the rear of lots from the back of the houses to the north east property corner and an average slope of 1.6% from the front of the houses towards Shore Street.

Based on available topographic information, the existing site drainage area has been delineated and presented on Figure 2-1.

2.1.2 Existing Storm Drainage Infrastructure

As-builts drawings were obtained through Region of Peel and were used to identify the following stormwater infrastructure in proximity of the site.

- There is no existing storm sewer infrastructure within the Shore Street right-of-way
- A 375 mm diameter concrete storm sewer that extends from Highway 50 towards Shore Street and terminate at CBMH RR050-347

2.1.3 External Works Topography and Drainage

Shore Street is a relatively flat road that is graded at approximately 0.75% to the east towards Shore Street. There is no existing storm sewer infrastructure within Shore Street and all storm run-off drains via overland sheet flow into the CBMH RR050-0347 and CB RR050-0247 (as referenced by the Region's External Peel Asset Locator) at the northwest corner of Shore Street and Highway 50 intersection.

2.1.4 Soil Conditions

A Geotechnical Report was prepared by Soil Engineers Ltd, dated July 2024. As part of the report / investigation a series of boreholes and groundwater monitoring wells were installed on-site. Based on the results of the monitoring period, groundwater elevations were found to range between 1.1 metres below ground surface (mbgs) to 5.5 mbgs consistent with elevations 253.0 m to 248.6 m depending on the monitoring well location. Furthermore, hydraulic in-situ values and percolation times were calculated for the soils screened. The coefficient of permeability was calculated to be $1x10^{-7}$ cm / s. The percolation time for the soils within the subject property limit was 100 min / cm which translate to a drawdown rate of 6 mm / hour.

Based on the field investigations, soil types on site ranged from earth fill near the surface to primarily silty clay / silty clay till across the entire site. Please refer to the geotechnical report in **Appendix B** for more details.

2.2 Stormwater Management Design Criteria

The stormwater management design criteria applicable to the proposed development was established through a review of regulatory agency design standards. The relevant stormwater management design criteria and regulatory bodies are summarized in this section.

Town of Caledon Criteria

- Quantity Control - Post-development runoff at the proposed discharge location shall be limited to the 5-year pre-development conditions or to within the existing capacity of the receiving storm sewer, which ever is less..

- Quality Control – To be provided in accordance with MECP, and Town requirements. For residential developments, on-site quality control to be provided via an Jellyfish Oil grit separator located just upstream of the property line manhole. 80% TSS removal required for water quality protection.

- Rainfall intensities should be derived from the IDF curves as outlined in Town Standard No. 103 with information as presented in the following table:

Table 2-1: Town of Caledon IDF Curve Parameters

RETURN PERIOD	A	B	C
2-Year	1070	0.8759	7.85
5-Year	1593	0.8789	11
10-Year	2221	0.9080	12
25-Year	3158	0.9335	15
50-Year	3886	0.9495	16
100-Year	4688	0.9624	17

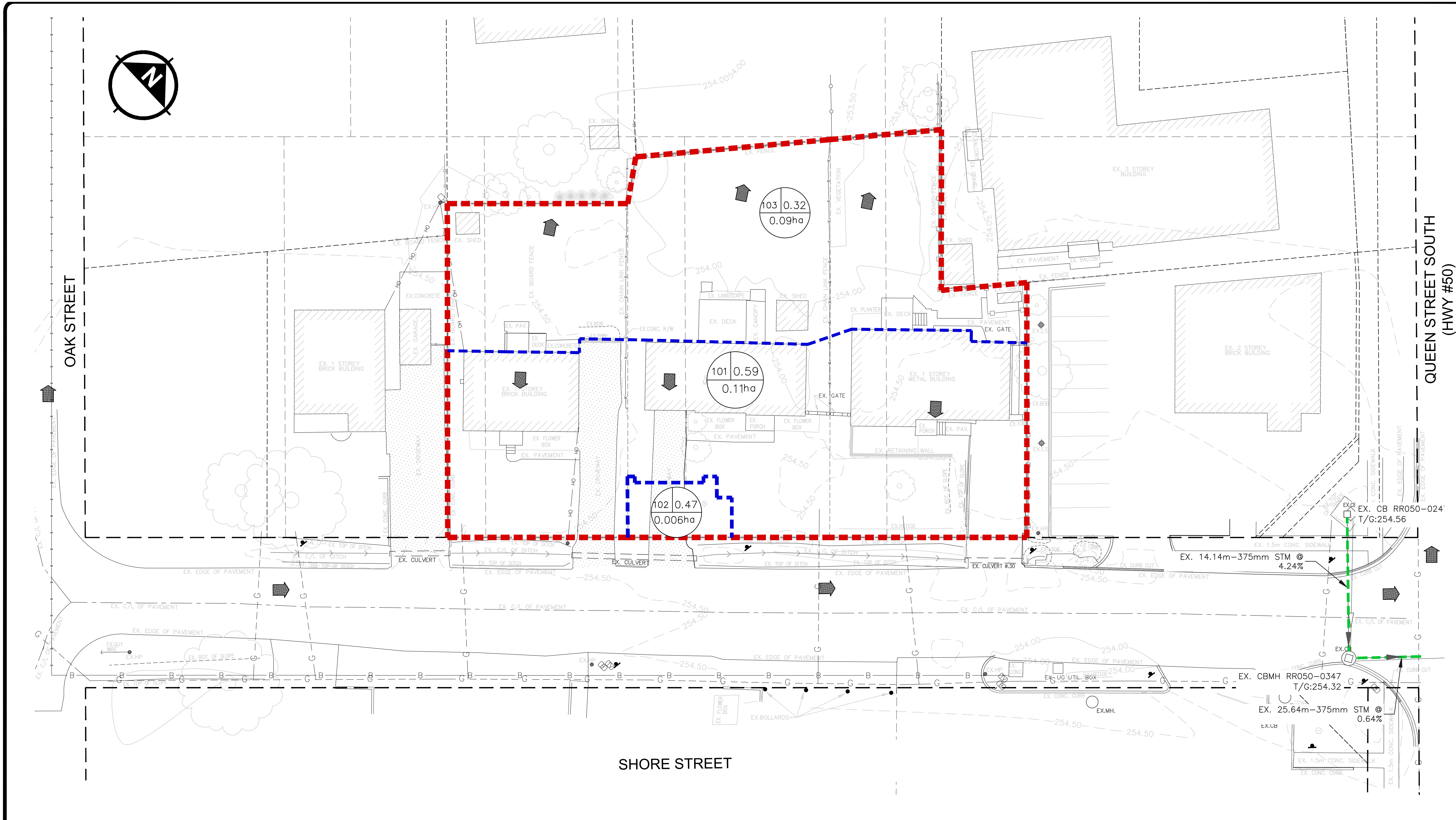
**Values as per Town Std No 103.*

The average rainfall intensity shall be calculated using the equation:

$$(i = A * B / (t + c))$$

Where:

i = rainfall intensity (mm/hr)
t = Time of concentration (hours)



LEGEND

DEVELOPMENT BOUNDARY

DRAINAGE BOUNDARY

EXISTING STM. SEWER

EMERGENCY OVERLAND FLOW ROUTE

DRAINAGE AREA

AREA I.D. | 100 | 0.50 | RUNOFF COEFF.

1.00ha DRAINAGE AREA

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FIGURE 2-1
EX. SITE STORM DRAINAGE PLAN

4-STOREY RESIDENTIAL BUILDING
15, 21, 27 SHORE STREET
CALEDON, ON

24-0001BR	JULY 2024	SCALE 1:350

2.3 Proposed Site Grading and Drainage

2.3.1 Internal Works

The predevelopment drainage conditions are to be altered to have the site be self contained and reduce the run-off being directed to the north property line.

To achieve a self contained site the north property line grades will be raised via the use of retaining walls. All run-off will be directed to the minor storm conveyance system within the site and major flow will be towards Shore Street via the east driveway entrance. The site promotes a major flow route towards Shore Street with a maximum ponding depth of 0.30 m.

The at-grade areas will be captured and drained via catch basins or catch basin manholes to a control manhole with an orifice plate where flows will be attenuated before draining off-site to the future Shore Street storm sewer. A jellyfish filter unit, will be provided upstream of the site control manhole, located inside the property line. Note that the proposed storm sewer system within Shore Street has been designed as part of external works as discussed earlier in this report.

The roof runoff from proposed building will drain underground into rainwater harvesting cisterns (Graf Platin 3000 L x 3) and in the event the cisterns are full, the roof run-off will drain into the site's control manhole via an overflow pipe. All downspouts will come equipped with a leaf filter, an overflow pipe and an aboveground splash pad as a safeguard.

2.3.2 External Works

As part of the urbanization of Shore Street a minor storm sewer system is proposed within the Shore Street right-of-way to convey the minor flows (up to the 5-year event) from the Shore Street roadway drainage area and the controlled flows from subject property.

The proposed storm sewer system size will match the existing 375 mm storm sewer's size that extends from Highway 50 towards Shore Street and will connect to the existing CBMH RR050-347.

The major overland flow route for Shore Street is to be maintained and will continue to drain towards Highway 50. The proposed grading for the urbanization proposes a maximum ponding depth 0.30 m for the major overland flow route as per Town of Caledon design criteria.

Please refer to Figure 2-3 for the proposed drainage area plan for the proposed storm sewer with in the Shore Street right-of-way

2.4 Proposed Stormwater Management Plan

The proposed stormwater management system will be designed in accordance with Town of Caledon and TRCA guidelines. The intent of the design is to maintain existing drainage conditions to the extent possible, while adhering to the quantity control criteria set out by both the aforementioned criteria.

During the design process, low impact development (LID) measures were evaluated as part of the storm water management strategy; the TRCA LID SWM planning and Design Guide was used as a reference. The following LID measure is being utilized:

- Surface Storage: All required quantity storage to attenuate the 100-year post-development to the 5-year pre-development will be provided via surface storage. The surface storage will have a maximum ponding depth of 0.30 m and the limits of the surface storage are shown within the Site Grading Plan in **Appendix F.**

- Rainwater Harvesting: To provide the erosion control volume / 5 mm retention on site, rainwater harvesting is proposed. All roof-runoff will drain into the rainwater harvesting cisterns before being re-used on site.

Other LID options such as , green roofs, permeable pavement, and swales were not utilized given the development design and space constraints.

2.5 Internal Works Water Quantity Control

In accordance with the Town design criteria, it is proposed to control site post development flows to match pre-development levels for all storm events up to and including the 100-year event.

Each storm event scenario from the 2-year to the 100-year was modelled using the Rational Method and using the Town IDF curves as per Town Std No. 103. This was done in order to establish the site’s maximum permissible post-development rate into the proposed storm sewer system.

2.5.1 Pre-development Flows

The existing drainage pattern within the proposed development limits is characterized by three (3) drainage areas: Area 101, 102, and 103

Area 101 consists of the 3 detached single family homes, accessory structures, surface asphalt parking, and landscaped area. Area 101 represents the area that currently drains uncontrolled to Shore Streeet and will be self-contained and controlled in the proposed condition

Area 102 consists of asphalt parking and landscaped area. This area will continue to drain uncontrolled into the Shore Street right-of-way in post-development conditions.

Area 103 consists of all landscaped area. This area will continue to drain uncontrolled towards the north property line in post-development conditions.

Please see Figure 2-1 for the pre-development drainage area plan. The 0.21 ha subject property is currently serviced via overland sheet flow drainage towards the neighbouring municipal right-of-ways.

A summary of the pre-development land cover is provided below in Table 2-2.

Table 2-2: Pre-development land use Summary

Surface	Area 101 (m^2)	Area 102 (m^2)	Area 103 (m^2)	Total Coverage
Asphalt	171.00	19.30	0	9.2%
Roof	372.60	0	17.16	18.9%
Hardscape	36.00	0	79.36	5.6%
Landscape	522.62	37.0	811.78	66.3%
% Impervius	53%	34%	11%	34%
Runoff Coefficient	0.59	0.47	0.32	0.47

The total imperviousness of the existing site was calculated to be 34% and the corresponding runoff coefficient was calculated to be 0.47 based on Town of Caledon Engineering Standards. For more detailed calculations please see **Appendix E**.

IDF parameters from the Town Standard No. 103 were used to calculate the existing site's peak runoff. These IDF curves are a function of the time of concentration; the minimum time of concentration of 10 minutes was used for the development area.

The pre-development peak runoff flows determined for Catchment 101 based on the above model parameters are summarized in Table 2-3.

Table 2-3: Pre-development Peak Runoff Rate

Return Period	Intensity	Area 101 – Runoff Aea = 0.195ha (C=0.46)	Area 102 – Runoff Aea = 0.006 ha (C=0.47)	Area 101 – Runoff Aea = 0.006 ha (C=0.25)
	(mm/hr)	(L/s)	(L/s)	(L/s)
2-yr	52.5	9.5	0.4	4.2
5-yr	66.7	12.1	0.5	5.4
10-yr	91.7	16.6	0.7	7.4
25-yr	117.9	21.4	0.9	9.5
50-yr	141.9	25.7	1.1	11.4
100-yr	167.1	**30.3**	**1.2**	**13.5**

2.5.2 Post Development Flows

The proposed drainage pattern within the proposed development is characterized by three (3) drainage areas. Area 201, 202, and 203.

Area 201 consists of the 4-storey residential building, surface parking, landscaped areas, concrete walkways, and retaining walls. This area is self-contained is controlled before being discharged into the proposed Shore Street Storm Serwer.

Area 202 consists of concrete walkways and landscaped area and drains uncontrolled to the Shore Street right-of-way. The uncontrolled flow from this area is reduced from 1.2 L/s to 0.9 L/s during the 100-year storm event.

Area 203 consists of all landscaped area. This area continues to drain uncontrolled to the north property line. In the proposed condition, the area draining uncontrolled to the North Property Line is reduced from 0.9 ha to 0.06 ha. This represents a decrease in the uncontrolled flow from 13.5 L/s in pre-development condition to 0.7 L/s in the post-development condition during the

100-year storm event.

The proposed development will be serviced by a minor storm system that has been sized to the capture and convey the 5-year storm event and drain into the proposed storm sewer with in Shore Street part of the external works.

A summary of the post-development land cover is provided below is Table 2-4.

Table 2-4: Post-development land use summary

Surface	Area 201 (m^2)	Area 202 (m^2)	Area 203 (m^2)	Total Coverage
Asphalt	1055.04	0	0	51.0%
Roof	423.43	0	0	20.5%
Hardscape	114.8	8.0	0	5.9%
Landscape	358.74	48.60	58.83	22.6%
% Impervius	82%	14%	0%	77%
Runoff Coefficient	0.78	0.34	0.25	0.75

The total imperviousness of the proposed site was calculated to be 77% and the corresponding runoff coefficient was calculated to be 0.75 based on Town of Caledon Engineering Standards. . For more detailed calculations please see **Appendix E**.

IDF parameters from the Town Standard No. 103 were used to calculate the existing site's peak runoff. These IDF curves are a function of the time of concentration; the minimum time of concentration of 10 minutes was used for the development area.

The post-development peak runoff flows determined for all drainage areas based on the above parameters are summarized in **Table 2-5.**

Table 2-5: Post-development Peak Runoff Rate

Return Period	Intensity	Area 201 – Runoff Aea = 0.195ha (C=0.78)*	Area 202 – Runoff Aea = 0.006 ha (C=0.34)	Area 203 – Runoff Aea = 0.006 ha (C=0.25)
	(mm/hr)	(L/s)	(L/s)	(L/s)
2-yr	52.5	22.2	0.3	0.2
5-yr	66.7	28.2	0.4	0.3
10-yr	91.7	38.8	0.5	0.4
25-yr	117.9	49.9	0.6	0.5
50-yr	141.9	60.1	0.8	0.6
100-yr	167.1	**70.7**	**0.9**	**0.7**

*Note: Post-dev. flows are to be attenuated to the 5-year pre-development level for this catchment.

The post development peak flows presented in Table 2-5 represent the target peak flows to be maintained for each of the target design storm events to proposed storm sewer system from the proposed development area. As a result, surface storage is being proposed to attenuate the 100-year post development flows to the 5-year pre-development flows.

2.5.3 Water Quantity Plan

Based on the pre-development flows outlined in Table 2-3, the post development 100-year flow rate will be controlled to the 5-year predevelopment flow rate, as summarised in Table 2-6 below.

Table 2-6: Allowable Release Rate

Post Development Flow (100-year) (L/s)	Pre-Development Flows to Shore Street (5-year) (L/s)	**Post-Development Uncontrolled Flows to Shore Street (L/s)**	**Allowable Post Development Release Rate (L/s)**
70.7 (Area 201)	12.6 (Areas 101+102)	0.9 (Area 202)	11.7

The 100-year event post-development flow of 70.7 L/s will be controlled to the maximum release rate of 11.7 L/s.

To attenuate the 100-year post development flow to the 5-year pre-development flow, an orifice plate will be utilized on the control manhole upstream of the Jellyfish Filter unit. An orifice diameter of 65 mm with a debris screen is proposed and will require water storage of approximately 55.39 cubic metres.

Table 2-7 demonstrates the provided post-development flow and required water quantity storage within the underground stormwater management facility.
Please see **Appendix E** for detailed calculations.

Table 2-7: Orifice Control and Required Storage

Post Development Flow (100-year) (L/s)	Allowable Post Development Release Rate (L/s)	**Orifice Diameter (mm)**	**Actual Provided Post-development flow (L/s)**	**Required Water Quantity Storage (m3)**
70.7	11.7	65	10.4	55.39

The required water quantity storage will be provided by surface storage. The site has been graded to provide the required 55.39 cubic metres within asphalt parking area with a maximum ponding depth of 0.30 m.

Please see Table 2-8 below for the Water Quantity Storage Summary. Detailed calculations for the facility stage storage are provided in **Appendix E** and refer to the Site Grading Plan in **Appendix F** for more details.

Table 2-8: Water Quantity Storage Summary

Structure	**Top of Grate Elev.**	**Max Ponding Elev.**	**Total Surface Storage Area(m^2)**	**Provided Water Quantity Storage (m^3)**	**Required Water Quantity Storage (m^3)**
CB1	254.15	254.25	194.50	6.5	-
CBMH 1	254.00	254.25	295.04	24.6	-
CBMH 2 (w/ Orifice)	253.95	254.25	243.83	24.4	-
Total	-	254.25	733.37	55.45	55.39

2.5.4 Extended Detention Control

As per TRCA criteria, urban developments are to provide a minimum extended detention of the 5mm rainfall event over the entire site.

Given the total post development impervious site area of 0.16 ha an extended detention volume of 8.0 cubic metres will be required for the 5 mm rainfall event.
`

Extended detention will be provided by the underground rainwater harvesting cisterns that will only collect roof-runoff. Table 2-9 summarises the extended detention volume within the cisterns. Please refer to **Appendix E** for detailed calculations.

Table 2-9: Summary of Extended Detention

Drainage Area	Required Detention Storage (m^3)*	Cistern Volume (m^3)	Cistern Count	Provided Extended Detention Storage. (m^3)
0.16 ha	8.0	3.0	3	9.0

*5mm Volume = Imp. Area (ha) x 5mm x 10 (conversion factor)

The water stored within the rainwater cistern will be re-used on site in one of the following two ways.

1. Landscaping / irrigation
2. Grey-water re-use

The details of the water re-use application will be determined during detailed design.

As the Geotechnical report identified silty clay soils with a high ground water table and a n infiltration rate of 6 mm / hour. As per the TRCA's August 2012 Stormwater design guidelines, infiltration-based LIDs are suitable for sites where the infiltration rate is at least 12 mm/hr. As a result of the anticipated soil's performance with respect to the percolation of site runoff, infiltration measures were not considered feasible for the subject property.

2.6 External Works Water Quantity Plan

As the existing storm run-off is conveyed uncontrolled to the inlets at CBMH RR050-347 and CB RR050-247 and the major overland flow drains towards the east to the Highway 50 right-of-way. No quantity controlled are proposed the right-of-way storm sewer and the major overland flow route will continue to drain towards highway 50. Please refer to Figure 2-3 for the Shore Street drainage area plan.

The proposed Shore Street storm sewer has been sized to convey the 5-year storm event.

A storm sewer design sheet for the proposed Shore Street sewer has been provided in **Appendix E** for reference.

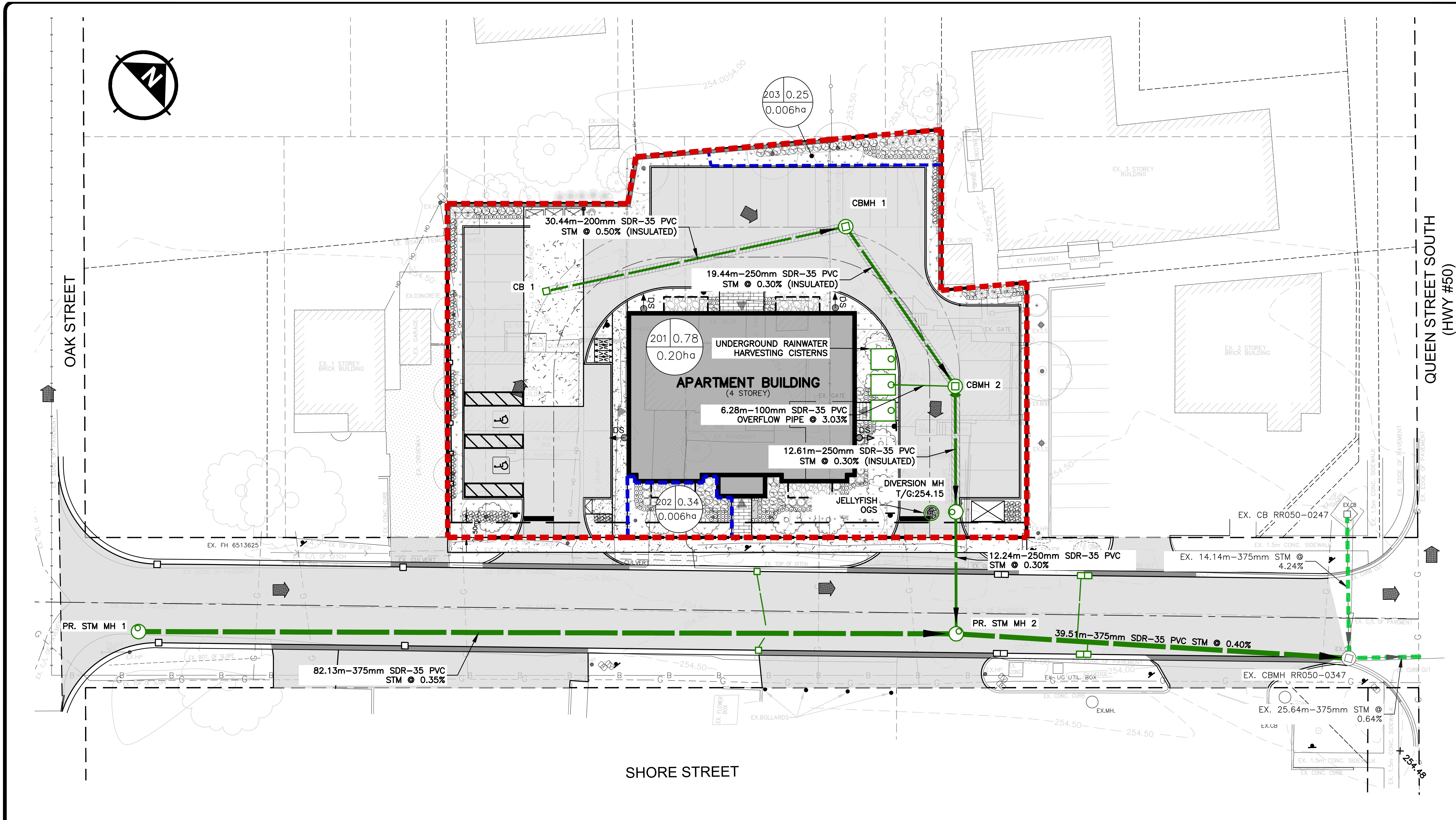
2.7 Internal Works Water Quality Control

As per the Town of Caledon design criteria, site runoff must be treated to meet an enhanced level of quality control (removal of 80% TSS). The proposed site will consist of a combination of roof, driveable paved surfaces, pervious landscaped areas, and concrete walkways.

The proposed treatment to obtain the required water quality control consists of a Jellfyfish (JF4-1-1) OGS unit sized to provide the 80% TSS removal for the entire site before being discharged into the proposed storm sewer with Shore Street right-of-way.

2.8 External Works Water Quality Control

As the existing storm run-off is conveyed untreated to the inlets at CBMH RR050-347 and CB RR050-247 and the major overland flow drains towards the east to the Highway 50 right-of-way. No quality controlled are proposed the right-of-way storm sewer and the major overland flow route will continue to drain towards highway 50. Please refer to Figure 2-3 for the Shore Street drainage area plan.



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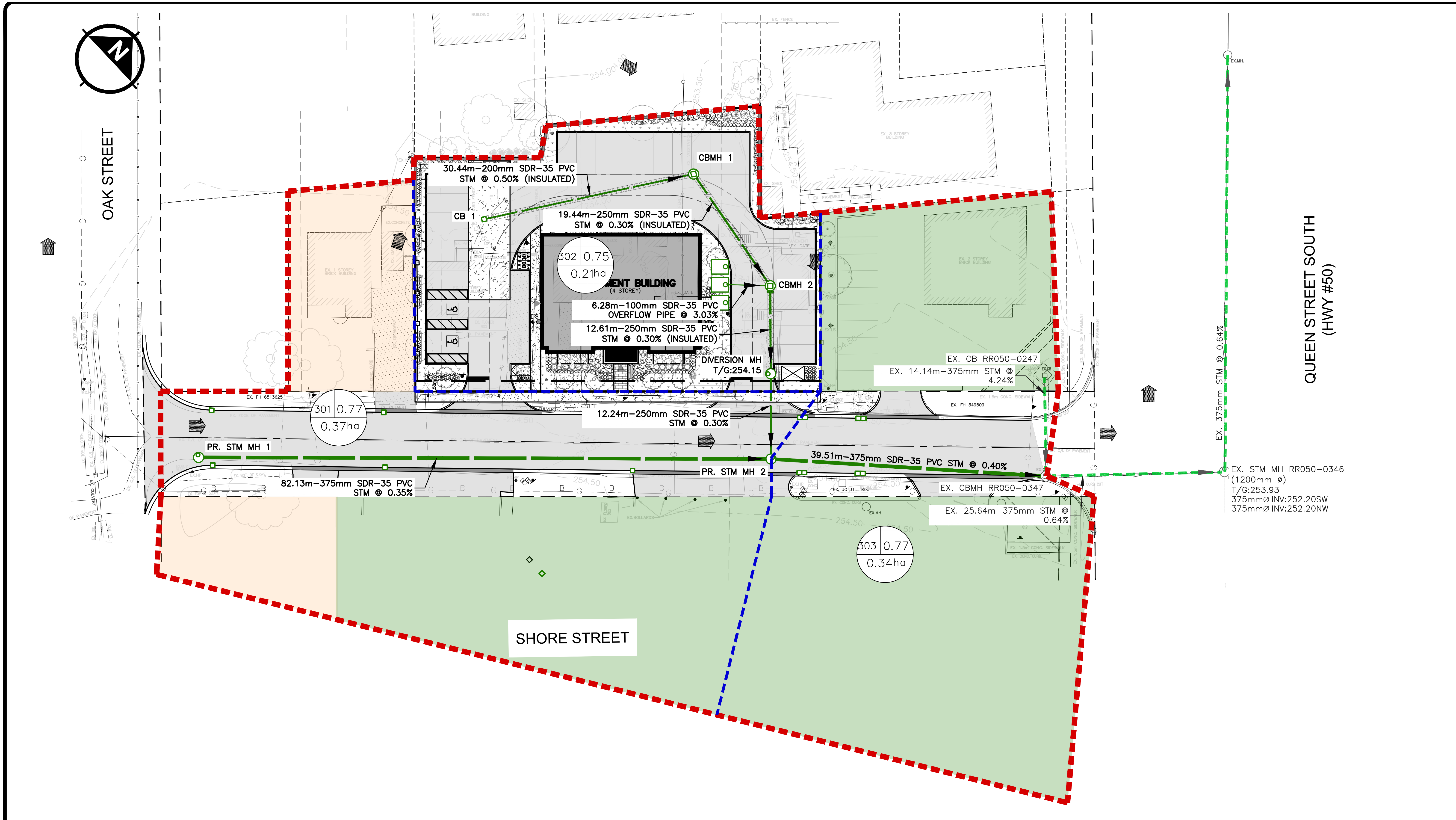
LEGEND
DEVELOPMENT BOUNDARY
DRAINAGE BOUNDARY
EXISTING STM. SEWER
PROPOSED STM. SEWER
EMERGENCY OVERLAND FLOW ROUTE

DRAINAGE AREA
AREA I.D. 100 | RUNOFF COEFF. 0.50 | DRAINAGE AREA 1.00ha

FIGURE 2-2
PR. SITE STORM DRAINAGE PLAN
4-STOREY RESIDENTIAL BUILDING
15, 21, 27 SHORE STREET
CALEDON, ON

24-0001BR	JULY 2024	SCALE 1:350



LEGEND

- DEVELOPMENT BOUNDARY
- DRAINAGE BOUNDARY
- EXISTING STM. SEWER
- PROPOSED STM. SEWER
- EMERGENCY OVERLAND FLOW ROUTE
- RESIDENTIAL AREA
- COMMERCIAL AREA

DRAINAGE AREA
AREA I.D. 100 | 0.50 RUNOFF COEFF.
1.00ha DRAINAGE AREA

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FIGURE 2-3
SHORE STREET STORM DRAINAGE PLAN
4-STOREY RESIDENTIAL BUILDING
15, 21, 27 SHORE STREET
CALEDON, ON

24-0001BR	JULY 2024	SCALE 1:500

3.0 Sanitary Servicing

3.1 Existing Sanitary Sewers

Region records were used to identify any existing Region wastewater infrastructure adjacent to the proposed development.

- A 200 mm diameter Sanitary Sewer within the Shore Street right-of-way. As shown in Region As-built Drawing #22534-D

- The 200 mm diameter Sanitary Sewer in Shore Street connects to a 300 mm diameter Sanitary Sewer within the Highway 50 right-of-way.

Region As-built Drawing #22534-D has been provided in **Appendix A** for reference.

3.2 Proposed Sanitary Servicing

Sanitary servicing for the proposed development will be provided by connection a new 150 mm diameter sanitary service lateral to the existing 200 mm diameter sanitary sewer within the Shore Street right-of-way. The new sanitary service will come with sanitary sampling manhole at the ultimate property line as per Region Standard Drawing 2-5-3. The proposed 150 mm diameter sanitary service will utilize a minimum slope of 2%.

Refer to **Drawing SS-01** for the Site Servicing Plan in **Appendix F** for the proposed sanitary servicing design.

3.3 Design Criteria

The sanitary design parameters, as outlined in Table 3-1, for the proposed development are based on the municipal design criteria as outlined in *Region of Peel, Linear Wastewater Standards*, dated March 2023:

Table 3-1: Proposed Sanitary Design Parameters

Parameter	Value
Population Density (Large Apartment)	**3.1 person / large unit**
Population Density (Small Apartment)	**1.7 person / small unit**
Large Unit Count	**14**
Small Unit Count	**5**
Site Area	**0.21 ha**
Total Institutional Population	52
Unit Institutional Flow Rates	270 L/cap/day
Infiltration Rate	0.26 L/s/ha
Extraneous Flow	0.28 L/s/mh
Minimum Actual Flow Velocity	0.75 m/s
Maximum Full Flow Velocity	3.0 m/s
Minimum Sewer Lateral Grade	2.00%
Minimum Sewer Depth of Cover	2.3m

3.4 Sanitary Development Demands

The Sanitary demands for existing and proposed conditions have been calculated using *Region of Peel, Linear Wastewater Standards*, dated March 2023, and the results are summarized below in Table 3-2 and Table 3-3

A capacity analysis on the existing 200 mm diameter sanitary sewer within the Shore Street right-of-way was completed under pre-development conditions to assess available flow capacity.

Table 3-2: Shore Street Sanitary Sewer – Existing Conditions

Land Use	Area (ha)	Pop.	Average Flow (L/s)	Peak Factor	Peak Flow (L/s)	Infiltration+ Extran. Flows (L/s)	Total Sanitary Peak Flow (L/s)	% Full
Mixed	0.93	42	0.14	4.00	0.54	0.52	**1.07**	**2.7**

In existing conditions, the existing 200 mm diameter sanitary sewer experience a total design flow of 1.07 L/s. Detailed Sanitary calculations can be found in the Sanitary Sewer Design Sheet – Existing Conditions provided in **Appendix D**

Table 3-3: Proposed Site Sanitary Flow Estimate

Land Use	Area (ha)	Population	Average Flow (L/s)	Peak Factor	Peak Flow (L/s)	Infiltration +Extran. Flows (L/s)	Total Sanitary Peak Flow (L/s)
Residential	0.21	42	0.18	4.00	0.70	0.05	**1.03**

The proposed development will produce a total sanitary demand of 1.03 L/s in the proposed condition. Detailed Sanitary calculations can be found in the Sanitary Sewer Design Sheet – Proposed Conditions provided in **Appendix D**

Table 3-4: Shore Street Sanitary Sewer - Proposed Conditions

Land Use	Area (ha)	Pop.	Average Flow (L/s)	Peak Factor	Peak Flow (L/s)	Infiltration+ Extran. Flows (L/s)	Total Sanitary Peak Flow (L/s)	% Full
Mixed	0.93	81	0.27	4.00	1.07	0.52	**1.59**	**4.1**

With the construction of the proposed development and the removal of the 3 single-family homes, the existing 200 mm diameter sanitary sewer on Shore Street will experience a total peak flow of 1.59 L/s versus the 1.07 L/s in pre-development conditions. This will increase its percent full from 2.7% in existing conditions to 4.1% in proposed conditions. Based on these calculations, no upgrades to the existing sanitary sewer infrastructure will be required.

4.0 Water Supply Servicing

4.1 Existing Water Supply Infrastructure

Region records were used to identify any existing Region Water infrastructure adjacent to the proposed development. Based on the as-built information, the existing municipal watermain infrastructure adjacent to the proposed development is as follows:

- A 150mm diameter watermain within the Shore Street right-of-way
- Existing 20 mm diameter water service laterals for each of the 3 lots within the Subject property limits.

Existing fire hydrant location near the subject property is as follows:

- Fire hydrant (#6513625) located in the north boulevard of Shore Street and located approximately 18 m west of the south west property corner. This existing fire hydrant is connected to the existing 150 mm diameter watermain within Shore Street.
- Fire hydrant (#309549) located in the north boulevard of Shore Street and located approximately 25 m west of the south east property corner. This extisting fire hydrant is connected to the existing 150 mm diameter watermain within Shore Street.

4.2 Proposed Water Supply Servicing

Proposed domestic and fire water servicing for the subject property will be provided by connecting a new fire water service and domestic water service for to the existing 150 mm diameter watermain within Shore Street. The existing water service laterals are to be abandoned as per Region requirements.

The fire water service will be 150 mm diameter and be installed as per Region Standard Drawing 1-8-3 and connect to the existing 150 mm diameter watermain within Shore Street with a cut-in-place tee. The proposed fire water service design will also consist of a detector check valve in chamber, a private fire hydrant, and valves at the ultimate property line. The fire water service will be capped 1.0 m away from the building foundation for continuation by others.

Domestic water supply will be provided by a 100 mm diameter domestic water service that tees off the 150 mm fire water service lateral as per Region Standard Drawing 1-8-3. Thedomestic water service will be capped 1.0 m away from the building foundation for continuation by others.

A fire hydrant is proposed within the subject property to provide the required 90m fire hydrant coverage for all building perimeters. The proposed hydrant will connect to the internal 150mm fire water service with a 150mm fire hydrant lead, be privately owned, and be privately maintained. The proposed fire hydrant will be a maximum of 8.8 m away from the furthest Siamese connection.

Please refer to **Drawing SS-01** in **Appendix F** for the proposed water servicing layout.

4.3 Design Criteria

The water main design parameters, as outlined in Table 4-1, for the proposed development are based on the municipal design criteria as outlined in **Region of Peel,** *Linear Infrastructure – Watermain Design Criteria,* dated June 2010

Table 4-1: Proposed Watermain Design Parameters

Parameter	Value
Population Density (Large Apartment)	**3.1 persons / unit**
Population Density (Small Apartment)	**1.7 persons / unit**
Large Apartments	**14**
Small Apartment	**5**
Site Area	**0.21 ha**
Total Residential Population	52
Unit Institutional Demand Rates	280 L/cap/day
Maximum Day Factor	2.0

4.4 Domestic Water Demands

The design criteria outlined above was used to determine to total domestic water demand for the subject property in proposed conditions.

Average day demand (ADD), Maximum day demand (MDD), and Peak Hour Demand (PHD) factors were calculated using demand peaking factors and population values as outlined above.

The estimated domestic water demand for the proposed development of the subject property are summarised below in **Table 4-2**.

Table 4-2: Proposed Domestic Water Demand

Parameter	Value
Population Density (Large Aparment)	**3.1 persons / unit**
Population Density (Small Apartment)	**1.7 persons / unit**
Large Apartments	**14**
Small Apartments	**5**
Site Area	**0.21 ha**
Total Institutional Population	52
Unit Institutional Demand Rates	280 L/cap/day
Average Daily Demand	10.09 L/min (0.17 L/s)
Maximum Day Demand	20.18 L/min (0.34 L/s)
Peak Hour Demand	30.28 L/min (0.50 L/s)

A detailed breakdown of the calculated demand can be found in **Appendix C.**

4.5 Fire Flow Demands

Fire flow demands have been calculated using Water Supply for Public Fire Protection (2020) prepared by the Fire Underwriters Survey (FUS).

Fire flow demands were calculated for the proposed 4-storey apartment building. As part of the FUS calculations, the following construction factors were assumed for the proposed 4-storey apartment building.

- Type III Ordinary Construction – C value of 1.0
- Limited Combustible Occupancy – 15% reduction to the base fire flow
- Sprinkler system with standard water supply – 40% reduction to the base fire flow
- Calculated exposure factor of 14%

Detailed fire flow calculations are provided in **Appendix C** and summarized below in **Table 4-3**.

Table 4-3: Proposed Fire Flow Demand

Building	Fire Flow Demand (5) (L/min)	Fire Flow Demand (5) (L/s)
Proposed 4 storey apartment building	5000	83.33

From the fire flow calculations, it was determined that the recommended fire flow of 5000 L/min 83.33 L/s) is required for the proposed development.

A hydrant flow test was conducted by BA Fire Safety on June 21, 2024, at 1:30 PM on existing fire hydrant #6513625. The results indicate an available maximum flow of 4163 GPM (262.6 L/s) at a residual pressure of 20 psi. This is higher than the calculated required fire flow demand of 83.33 L/s.

Therefore, sufficient fire flow is available for the proposed development. The results of the hydrant flow test can be found in **Appendix C.**

4.6 Total Water Demand

Based on the total water demand and the fire flow requirements, the proposed demand will be the Maximum Day Demand plus the Fire Flow demand. **Table 4-3** below outlines the total water demand for the proposed development, detailed calculations can be found in **Appendix C**.

Table 4-4: Total Water Supply Demands

Land Use	Expected Population (1)	Average Day Demand (2) (L/s)	Peak Hour Demand (3) (L/s)	Max. Day Demand (4) (L/s)	Fire Flow Demand (L/s)	Max Day + Fire (L/s)
Residential	52	0.17	0.50	0.37	83.33	83.67

Note:

(1) Expected population based on population estimate in Section 1.4
(2) Based on average day consumption rate as 280 l/cap/day
(3) Based on peak hour factor as 3
(4) Based on maximum day factor as 2

Based on the assessment of the calculated total water demand (83.67 L/s) and the hydrant flow test, it is confirmed that the existing 150mm diameter watermain on Shore Street has sufficient pressure and flow to service the proposed development.

5.0 Erosion & Sediment Control Measures

A preliminary Erosion and Sediment Control (ESC) Plan for the proposed development will be prepared in accordance with TRCA and City requirements as part of the detailed design phase.

The proposed erosion and sediment control works during construction will consider of the following:

- temporary silt fences;
- individual catch basin silt sacks, within the subject property and on Guru Nanak Street:
- mud mats at the construction access point;
- one (1) topsoil stockpile, equipped with silt fencing;
- one (1) equipment staging and refuelling area, equipped with silt fencing
- Siltsoxx check dams

6.0 SUMMARY

This report outlines the desired stormwater management and servicing scheme for the proposed development at 15, 21, 27 Shore Street, Caledon, ON. The following summarizes the conclusions and recommendations of this report:

Stormwater Management

- Control of captured post development site flows to the 5-year pre-development level for all storm events up to and including the 100-year storm is proposed to meet site quantity control criteria in accordance with Town SWM criteria. Detention storage is required to achieve this requirement and will be provided using surface storage.
- Retention of 5 mm of rainfall for erosion control through rainwater harvesting
- Quality control will be provided by a Jellyfish Filter unit (JF4-1-1).

Sanitary Servicing

- Sanitary servicing to be provided by a 150mm sanitary service lateral connecting to the existing 200 mm sanitary sewer within Shore Street. A new sanitary sampling manhole is provided for the proposed building at the ultimate property line.

Water Supply Servicing

- Domestic water service will be provided by a new 100m m domestic water service for the proposed 4 storey apartment building. The domestic water service will tee off the 150 mm diameter fire water service as per Region Standard drawing 1-8-3.
- Fire water service will be provided by a 150mm fire water service that will connect to the existing 150 mm diameter watermain within Shore Street with a cut-in-place tee and valve.
- Private hydrant is to be installed within the subject property limits and is approximately 8.8 m away from the Siamese Connection and provides 90m hydrant coverage to all building perimeters within the subject property.

We believe that the above study and materials are satisfactory to address the concerns of reviewing agencies with this proposed development. Should there be any comments regarding the materials of this report, please contact the undersigned.

Respectfully Submitted,

Urbanworks Engineering Corporation

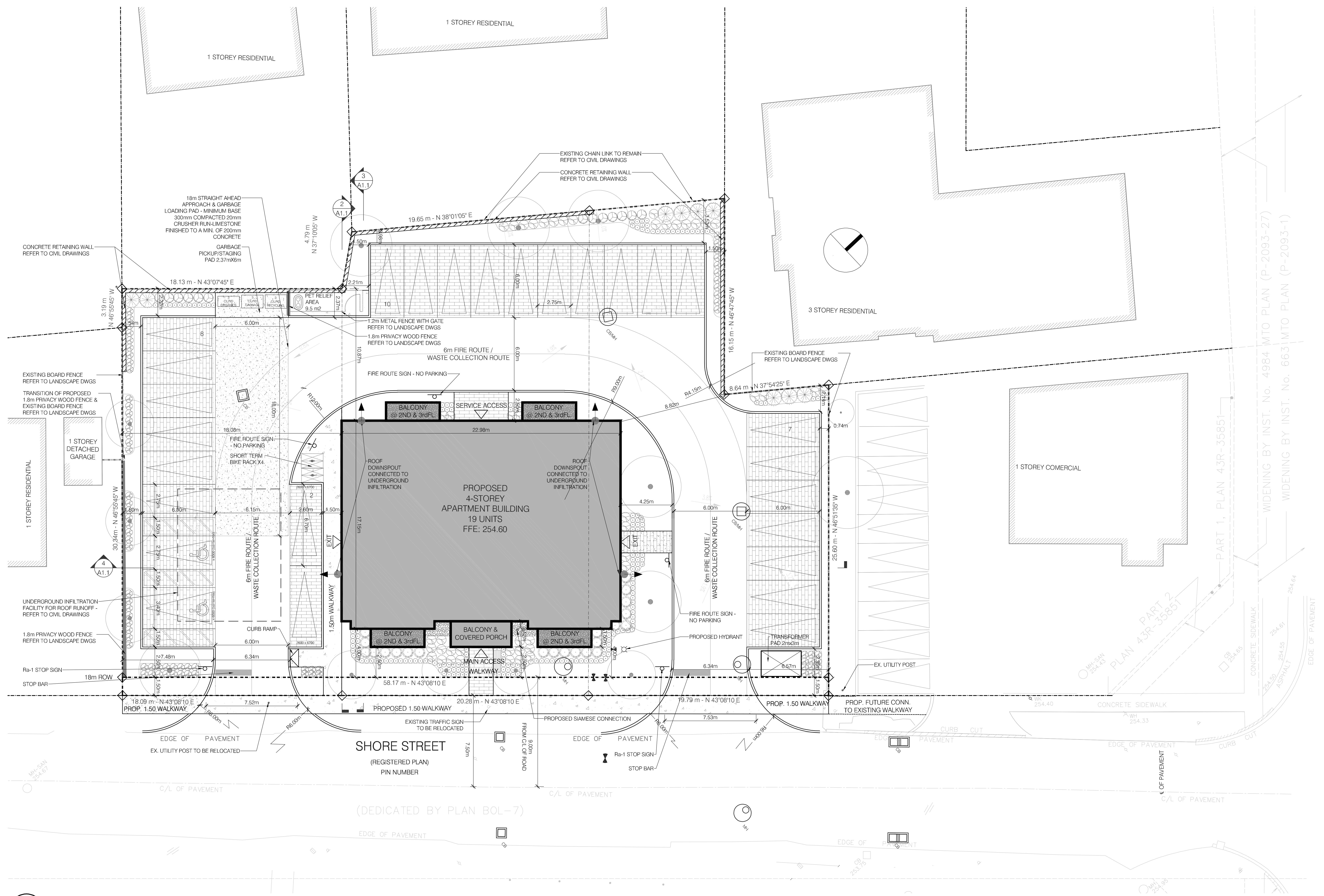
Giancarlo Volpe, P.Eng., M.Eng.
Project Engineer

Deven Verma, EIT
Project Manager

APPENDIX A

SITE PLAN, TOPOGRAPHIC SURVEY, AND REGION AS-BUILT

SITE PLAN



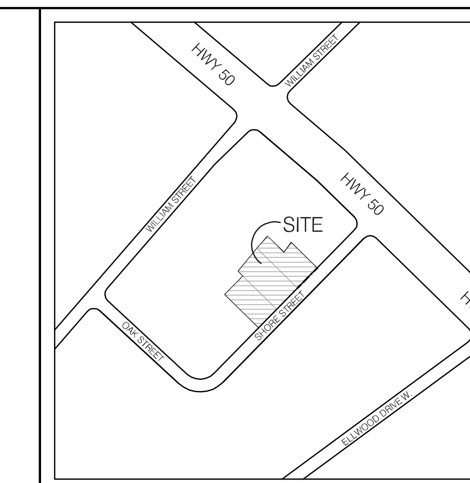
1 SITE PLAN
A100 SCALE: 1:250

SITE PLAN LEGEND

CB	DENOTES CATCHBASIN REFER TO CIVIL DWGS
CB/MH	DENOTES CATCHBASIN/MANHOLE REFER TO CIVIL DWGS
MH	DENOTES MANHOLE REFER TO CIVIL DWGS
	DENOTES BIKE STORAGE
	DENOTES TREES/PLANTS REFER TO LANDSCAPE DWGS
	DENOTES WASTE RECEPTACLE
	DENOTES UNIT PAVING REFER TO LANDSCAPE DWGS
	DENOTES CONCRETE PAVING REFER TO LANDSCAPE DWGS
	DENOTES RETAINING WALL REFER TO LANDSCAPE DWGS

SITE DEVELOPMENT

	EXISTING	REQUIRED	PROPOSED
ZONE	C255 & R1	RM	RM-XXXX
TOTAL LOT AREA		925.00 m2	2067.32 m2
TOTAL LOT AREA - AFTER ROAD WIDENING		925.00 m2	1980.00 m2
LOT FRONTAGE		30.00 m	58.17 m
COVERAGE		20%	19.64% (388.83m2)
MAX. HEIGHT		12.20 m	13.87 m
FRONT SETBACK		(9.00 m MIN.)	4.00 m
REAR SETBACK		(7.50 m MIN.)	10.87 m
LEFT SIDEYARD		(7.50 m MIN.)	18.08 m
RIGHT SIDEYARD		(7.50 m MIN.)	8.82 m
NUMBER OF UNITS		-	19
PARKING RATE		34 (1.75 PER UNIT)	27 (1.42 PER UNIT)
PARKING SETBACK		6m	2.50m
DRIVEWAY SETBACK		0.5m	6.57m (E) 7.48m (W)
LANDSCAPED AREA		45%	21.2% (420m2)
LANDSCAPED BUFFER		3m	VARIES (SEE SITE PLAN)
PRIVACY YARD DEPTH (1st FLOOR WINDOWS)		5m	VARIES (SEE SITE PLAN)
PLAY FACILITY AREA		4% (82.67m2)	0m2
AMENITIES (UNDERGROUND)		-	126m2
SHORT-TERM BIKE ST.		-	4
LONG-TERM BIKE ST.		-	10 (0.5/Unit)
NET RESIDENTIAL AREA		-	1,225.66 m2 13,193 SF
GFA		-	1,557.39 m2 16,764 SF
DENSITY (UNIT / HECTARE)		-	96
FSI (GFA / LOT AREA)		-	0.78



KEY PLAN

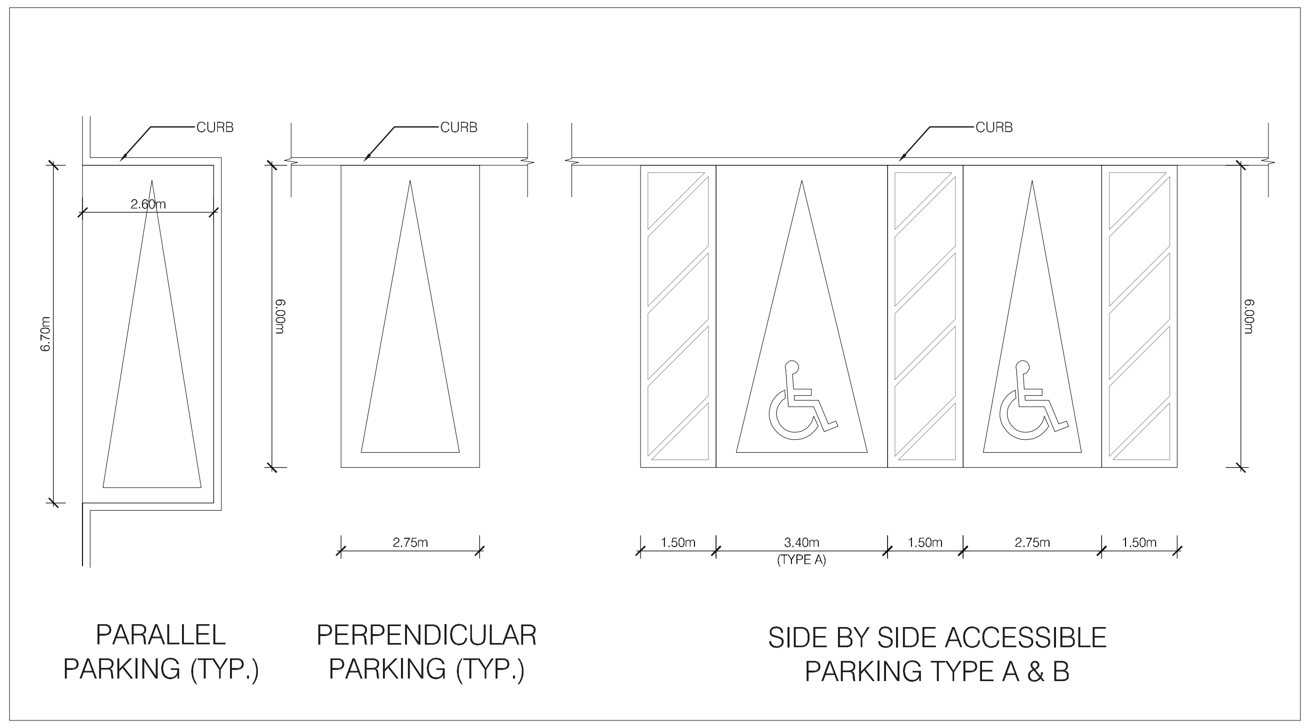
No.	DESCRIPTION	DATE
9	ISSUED FOR COORDINATION	2024-07-10
8	ISSUED FOR COORDINATION	2024-06-24
7	ISSUED FOR REVIEW	2024-02-20
6	ISSUED FOR PAC	2023-11-13
5	ISSUED FOR CLIENT REVIEW	2023-11-08
4	ISSUED FOR CLIENT REVIEW	2023-10-31
3	ISSUED FOR CLIENT REVIEW	2023-09-21
2	ISSUED FOR CLIENT REVIEW	2023-08-24
1	ISSUED FOR PAC	2023-05-11
#	REV. DESCRIPTION	YYYY-MM-DD
	REVISIONS	

ISSUED FOR CONSTRUCTION
ISSUED FOR BID
ISSUED FOR BUILDING PERMIT
ISSUED FOR SITE PLAN APPROVAL
SUBMITTALS

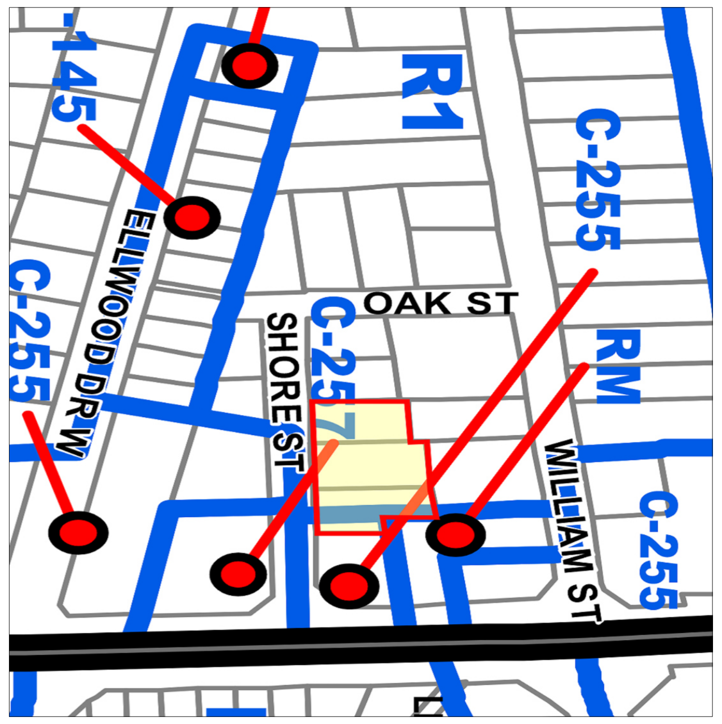
CONTRACTORS MUST CHECK AND VERIFY ALL DIMENSIONS AND CONDITIONS ON THE PROJECT AND MUST REPORT ANY DISCREPANCIES TO THE DESIGNER BEFORE PROCEEDING WITH CONSTRUCTION.

THIS DRAWING MUST NOT BE USED FOR CONSTRUCTION PURPOSES UNTIL SEALED AND SIGNED BY THE DESIGNER.

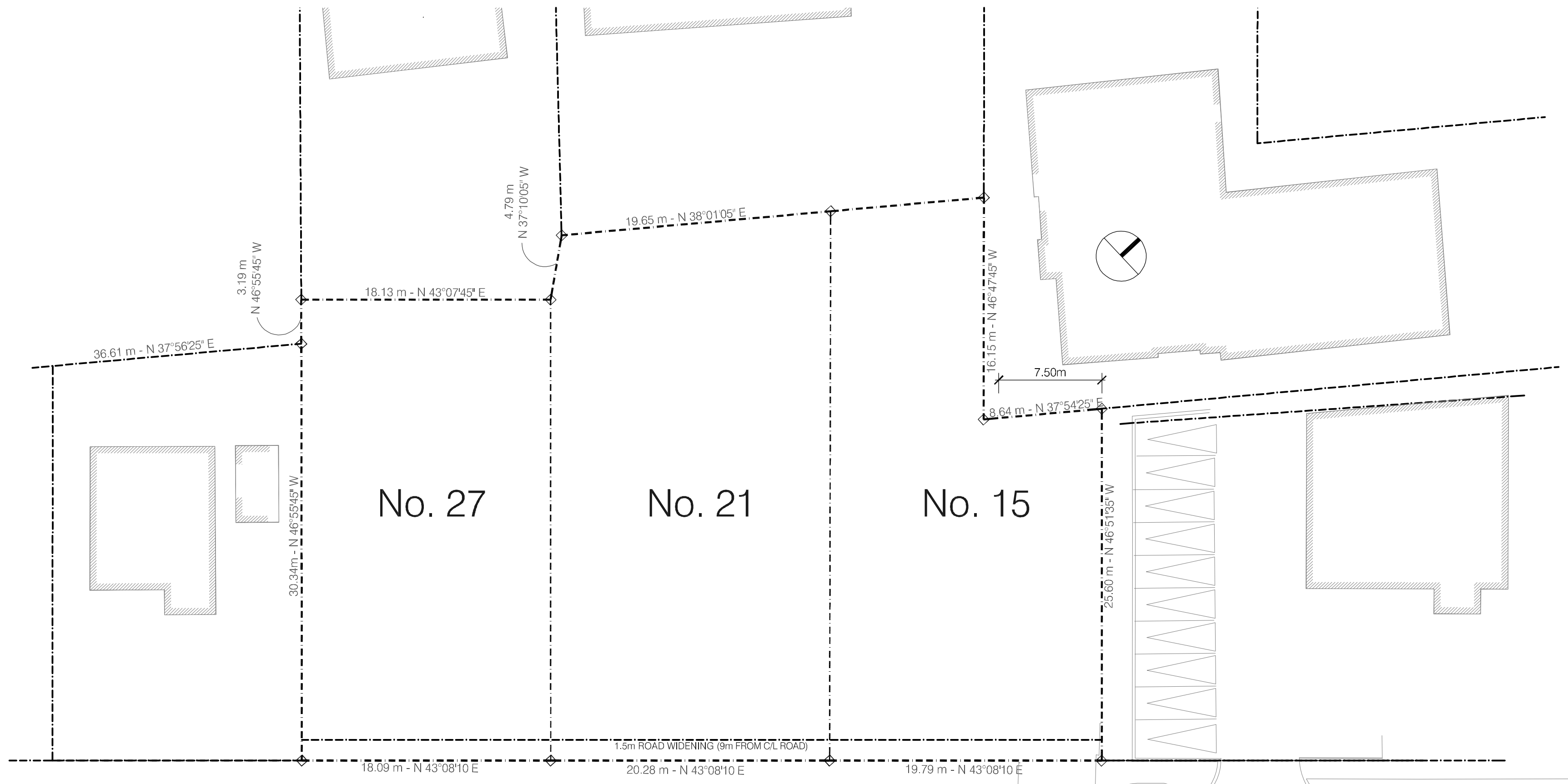
DO NOT SCALE DRAWINGS.



2 PARKING STANDARDS
A100 SCALE: 1:150



3 ZONING MAP
A100 SCALE: NTS



4 LOT FABRIC
A100 SCALE: 1:500

FAUSTO CORTESE ARCHITECTS
3590 RUTHERFORD RD. UNIT 7
VAUGHAN, ONTARIO, L4H 3T8
416-806-7000
FCORTESE@FCARCHITECTS.CA

DRAWING:
PROPOSED
MULTI-UNIT RESIDENTIAL
ON
15, 21, 27 SHORE ST.
BOLTON, ON

CALEDON

DRAWING:
SITE PLAN
–
—
PLOTTED: N/A

DATE: 12/08/2024	PROJECT No: 2023-04
SCALE: AS NOTED	DRAWING No: A100
DRAWN BY: S.H. / REVIEWED BY: F.C.	

FILE NAME: SHORE STREET - SITE PLAN - 2024-08-XREVS
PLOT SCALE: 1=

TOPOGRAPHIC SURVEY

PART 2 - SURVEY REPORT
PIN 14322-0321(LT)

- DESCRIPTION
  MUNICIPALLY KNOWN AS No. 15 SHORE STREET
  PART OF LOTS 12 AND 13, ON BLOCK 6
  REGISTERED PLAN BOL-7
  TOWN OF CALEDON
  REGIONAL MUNICIPALITY OF PEEL
- REGISTERED EASEMENTS AND/OR RIGHTS-OF-WAY
  -NONE
- ZONING COMPLIANCE
  NO INVESTIGATION WITH RESPECT TO MUNICIPAL ZONING REQUIREMENT HAS BEEN MADE IN CONNECTION WITH THIS REPORT.
- ADDITIONAL REMARKS
  - THE FENCES ARE AS SHOWN ON THE SURVEY PLAN.
  - MONUMENTS SHOWN AS "WIT" ARE WITNESS MONUMENTS AND ARE NOT AT THE PROPERTY CORNER.

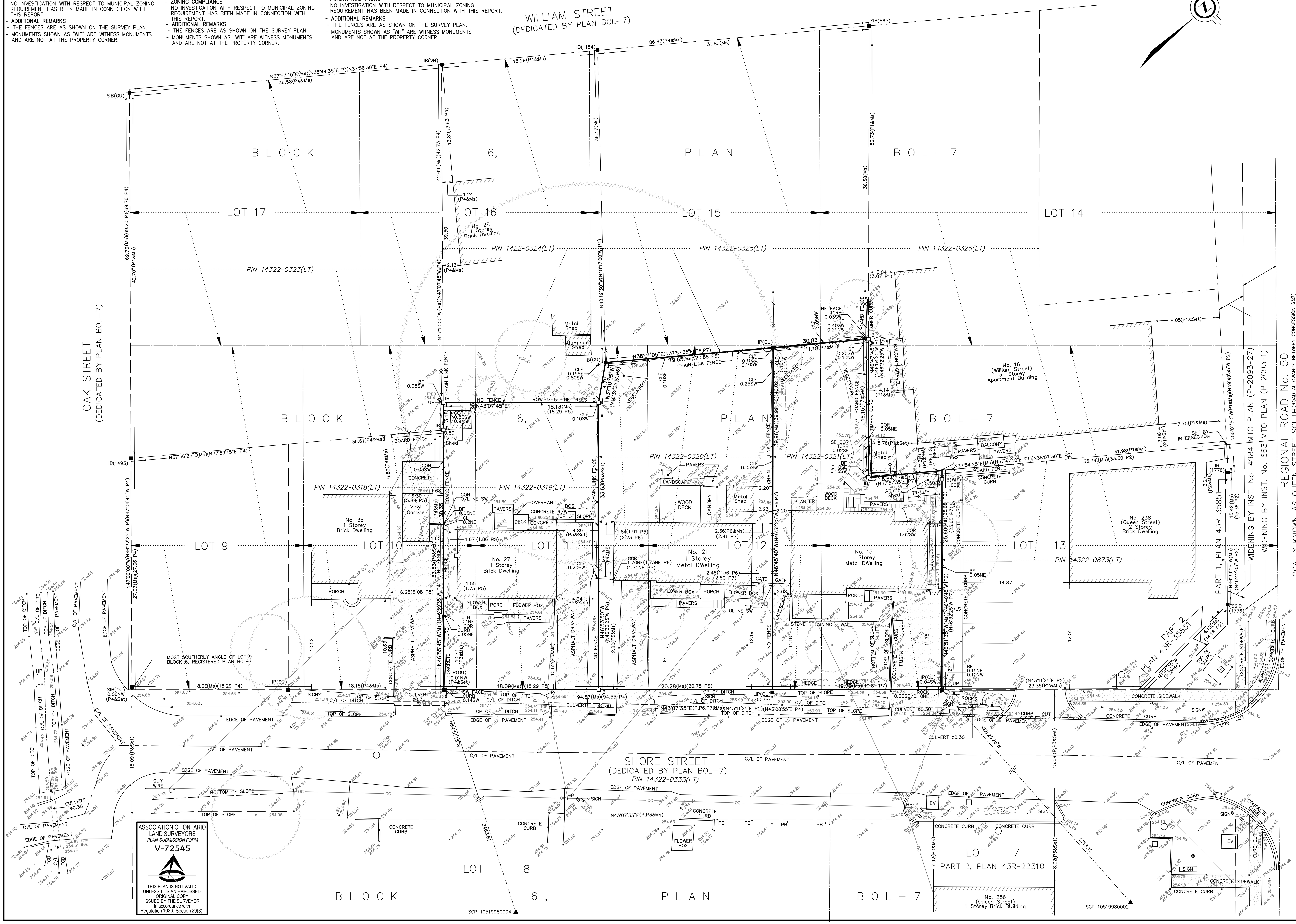
PART 2 - SURVEY REPORT
PIN 14322-0320(LT)

- DESCRIPTION
  MUNICIPALLY KNOWN AS No. 21 SHORE STREET
  PART OF LOTS 11 AND 12, ON BLOCK 6
  REGISTERED PLAN BOL-7
  TOWN OF CALEDON
  REGIONAL MUNICIPALITY OF PEEL
- REGISTERED EASEMENTS AND/OR RIGHTS-OF-WAY
  -NONE
- ZONING COMPLIANCE
  NO INVESTIGATION WITH RESPECT TO MUNICIPAL ZONING REQUIREMENT HAS BEEN MADE IN CONNECTION WITH THIS REPORT.
- ADDITIONAL REMARKS
  - THE FENCES ARE AS SHOWN ON THE SURVEY PLAN.
  - MONUMENTS SHOWN AS "WIT" ARE WITNESS MONUMENTS AND ARE NOT AT THE PROPERTY CORNER.

PART 2 - SURVEY REPORT
PIN 14322-0319(LT)

- DESCRIPTION
  MUNICIPALLY KNOWN AS No. 27 SHORE STREET
  PART OF LOTS 10 AND 11, ON BLOCK 6
  REGISTERED PLAN BOL-7
  TOWN OF CALEDON
  REGIONAL MUNICIPALITY OF PEEL
- REGISTERED EASEMENTS AND/OR RIGHTS-OF-WAY
  -NONE
- ZONING COMPLIANCE
  NO INVESTIGATION WITH RESPECT TO MUNICIPAL ZONING REQUIREMENT HAS BEEN MADE IN CONNECTION WITH THIS REPORT.
- ADDITIONAL REMARKS
  - THE FENCES ARE AS SHOWN ON THE SURVEY PLAN.
  - MONUMENTS SHOWN AS "WIT" ARE WITNESS MONUMENTS AND ARE NOT AT THE PROPERTY CORNER.

METRIC DISTANCES AND/OR COORDINATES SHOWN ON THIS PLAN ARE IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048.



SURVEYOR'S REAL PROPERTY REPORT

PART 1 - PLAN OF SURVEY OF PART OF LOTS 10, 11, 12 AND 13 BLOCK 6 REGISTERED PLAN BOL-7

GEOGRAPHIC TOWNSHIP OF BOLTON
NOW IN THE
TOWN OF CALEDON
REGIONAL MUNICIPALITY OF PEEL
SCALE 1 : 200

5 0 5 10 metres

GUIDO PAPA SURVEYING
A DIVISION OF J.D. BARNES LTD

GEODETIC

ELEVATIONS SHOWN ON THIS PLAN ARE RELATED TO GEODETIC DATUM AND ARE DERIVED FROM THE TOWN OF CALEDON BENCH MARK No 758057 HAVING A PUBLISHED ELEVATION OF 251.929 METRES.

LEGEND:

■	DENOTES	SURVEY MONUMENT FOUND
□	DENOTES	SURVEY MONUMENT SET
SIB	DENOTES	STANDARD IRON BAR
SSIB	DENOTES	SHORT STANDARD IRON BAR
IB	DENOTES	IRON BAR
IP	DENOTES	IRON PIPE
OU	DENOTES	ORIGIN UNKOWN
WIT	DENOTES	WITNESS
Ms	DENOTES	MEASURED
PL	DENOTES	REGISTERED PLAN BOL-7
P1	DENOTES	PLAN OF SURVEY BY ROBERT STEPHENSON, O.L.S. DATED DECEMBER 12, 1967
P2	DENOTES	PLAN 43R-35851
P3	DENOTES	PLAN 43R-22310
P4	DENOTES	SRPR BY VAN HARTEN SURVEYING INC. O.L.S. DATED DECEMBER 13, 2021 (PROJECT No. 30324-21)
P5	DENOTES	PLAN OF SURVEY BY BROWNE, CAVELL AND ASSOCIATES O.L.S. DATED NOVEMBER 28, 1956 (REFERENCE: 20-213)
P6	DENOTES	PLAN OF SURVEY BY JOHN C. MOORE, O.L.S. DATED JULY 29, 1980
P7	DENOTES	PLAN OF SURVEY BY BROWNE, CAVELL AND ASSOCIATES O.L.S. DATED JANUARY 16, 1956
1184	DENOTES	E. BIASON, O.L.S.
865	DENOTES	DONALD P. McLEAN, O.L.S.
1493	DENOTES	YOUNG & YOUNG SURVEYING INC., O.L.S.
1776	DENOTES	BELA KAPOSI O.L.S.
VH	DENOTES	DAVID J. PESCE O.L.S.
SRPR	DENOTES	SURVEYOR'S REAL PROPERTY REPORT
COR	DENOTES	CORNER
BF	DENOTES	BOARD FENCE
CLF	DENOTES	CHAIN LINK FENCE
TCRB	DENOTES	TIMBER CURB
CRB	DENOTES	CURB
CLH	DENOTES	CENTRELINE OF HEDGE
D/S	DENOTES	DOOR SILL
G/S	DENOTES	GARAGE SILL
WW	DENOTES	WINDOW WELL
EV	DENOTES	ELECTRIC VAULT
OL	DENOTES	ON LINE
-OC-	DENOTES	OVERHEAD WIRES AND CABLES
N,S,E,W	DENOTES	NORTH, EAST, SOUTH, WEST
□ CB	DENOTES	CATCHBASIN
○ MH	DENOTES	MANHOLE
○ MH-SAN	DENOTES	SANITARY MANHOLE
• PB	DENOTES	BOLLARD
• HP	DENOTES	HYDRO POLE
• LS	DENOTES	LIGHT STANDARD
TPED	DENOTES	TELEPHONE PEDESTAL
CPED	DENOTES	CABLE TV PEDESTAL
WH	DENOTES	FIRE HYDRANT
WK	DENOTES	WATER KEY
WV	DENOTES	WATER VALVE
ZZ	DENOTES	GUY WIRE
	DENOTES	TREE CONIFEROUS
	DENOTES	TREE DECIDUOUS
⊗	DENOTES	SHRUB

NOTES

BEARINGS ARE UTM GRID, DERIVED FROM SPECIFIED CONTROL POINTS (SCPs) 10519980004 AND 10519980002, UTM ZONE 17, NAD83 (CSRS)(2010).

DISTANCES ARE GROUND AND CAN BE CONVERTED TO GRID BY MULTIPLYING BY THE COMBINED SCALE FACTOR OF 0.999694.

FOR BEARING COMPARISONS, A ROTATION OF 1°01'50" COUNTER-CLOCKWISE WAS APPLIED TO BEARINGS ON P1.

FOR BEARING COMPARISONS, A ROTATION OF 1°07'25" COUNTER-CLOCKWISE WAS APPLIED TO BEARINGS ON P,P6,P7.

FOR BEARING COMPARISONS, A ROTATION OF 0°00'35" CLOCKWISE WAS APPLIED TO BEARINGS ON P3.

INTEGRATION DATA

SPECIFIED CONTROL POINTS (SCPs): UTM ZONE 17, NAD83 (ORIGINAL).

COORDINATES TO A RURAL ACCURACY PER SECTION 14 (2) OF O.REG 216/10.

POINT ID	EASTING	NORTHING
SCP 10519980002	604 592.72	4 858 634.89
SCP 10519980004	604 071.30	4 857 620.44

COORDINATES CANNOT, IN THEMSELVES, BE USED TO RE-ESTABLISH CORNERS OR BOUNDARIES SHOWN ON THIS PLAN.

THE RESULTANT TIE BETWEEN SCP 10519980004 AND SCP 10519980002 IS 1140.96 N27°12'10"E

NOTES

THIS REPORT HAS BEEN PREPARED FOR "FAUSTO CORTESE ARCHITECTS " AND GUIDO PAPA SURVEYING - A DIVISION OF J.D. BARNES LTD. ACCEPTS NO RESPONSIBILITY FOR USE BY OTHER PARTIES.

GUIDO PAPA SURVEYING - A DIVISION OF J.D. BARNES LTD. IS NOT LIABLE FOR USE OF THIS REPORT BY ANY PARTY OR PARTIES FOR FUTURE TRANSACTIONS OR FOR ANY UNRELATED PURPOSES.

THIS REPORT REFLECTS CONDITIONS AT TIME OF SURVEY. UPDATING MAY BE REQUIRED TO ISSUE ADDITIONAL COPIES SUBSEQUENT TO DATE OF THE SURVEYOR'S CERTIFICATE.

SURVEYOR'S CERTIFICATE

I CERTIFY THAT:

1. THIS SURVEY AND PLAN ARE CORRECT AND IN ACCORDANCE WITH THE SURVEYS ACT, THE SURVEYORS ACT AND THE REGULATIONS MADE UNDER THEM.
2. THE SURVEY WAS COMPLETED ON AUGUST 4, 2023.

AUGUST 11, 2023
DATE

VALERIO G. PAPA
ONTARIO LAND SURVEYOR

GUIDO PAPA SURVEYING
A Division of J. D. Barnes Limited
SURVEYING MAPPING GIS
9135 KEELE ST., UNIT B7, VAUGHAN, ON L4K 0J4
T: (289) 553-5961 F: (289) 553-5986 www.jdbarnes.com

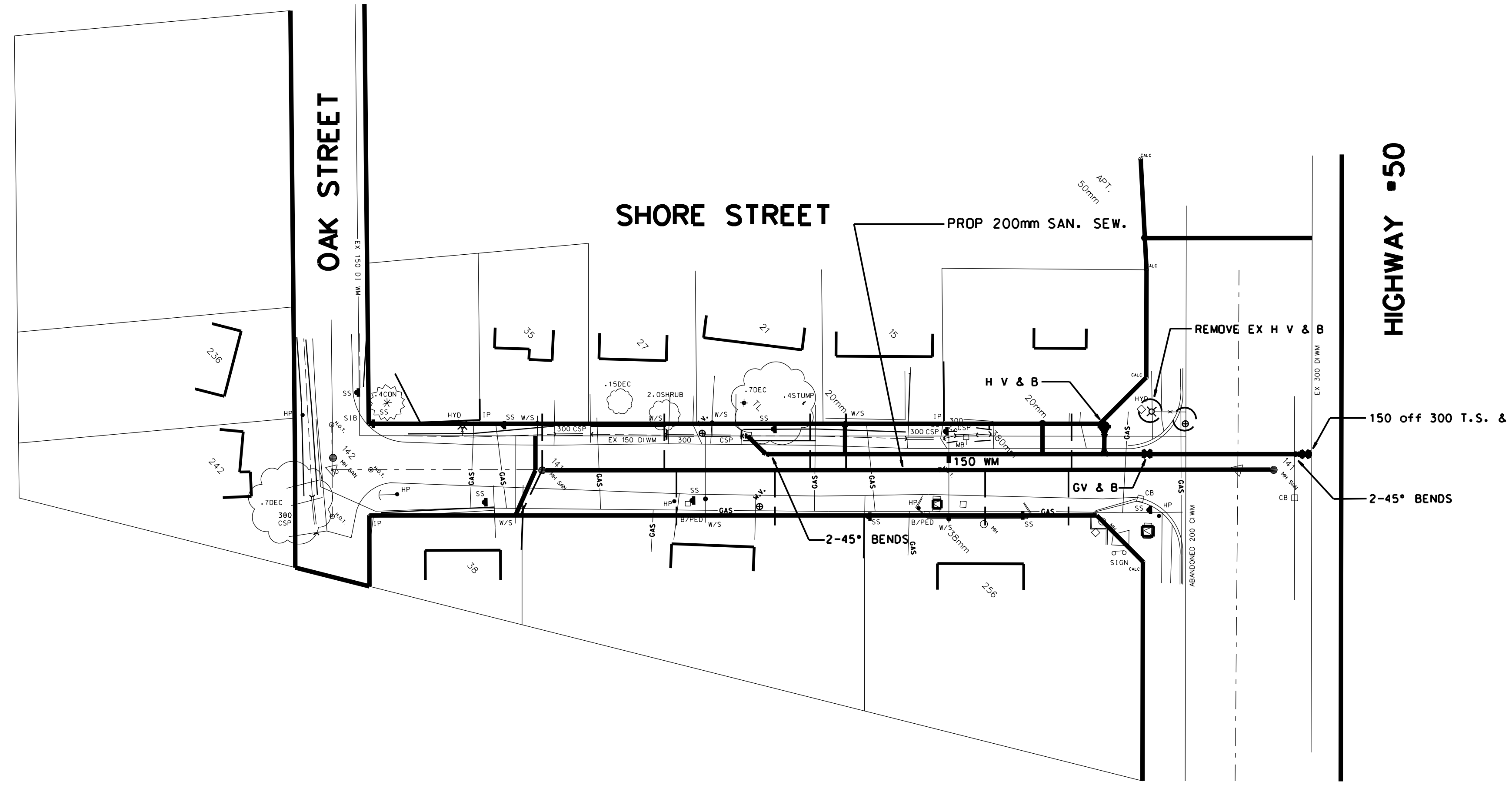
DRAWN BY:	CHECKED BY:	REFERENCE NO.:
H.S.	V.G.P.	23-18-550-00

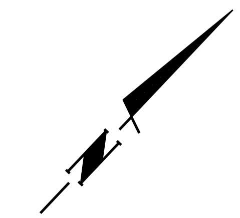
FILE: G:\Jobs\2023\23-18-550-00 Fausto Cortese - Shore Street\Drawing\23-18-550-00.dgn

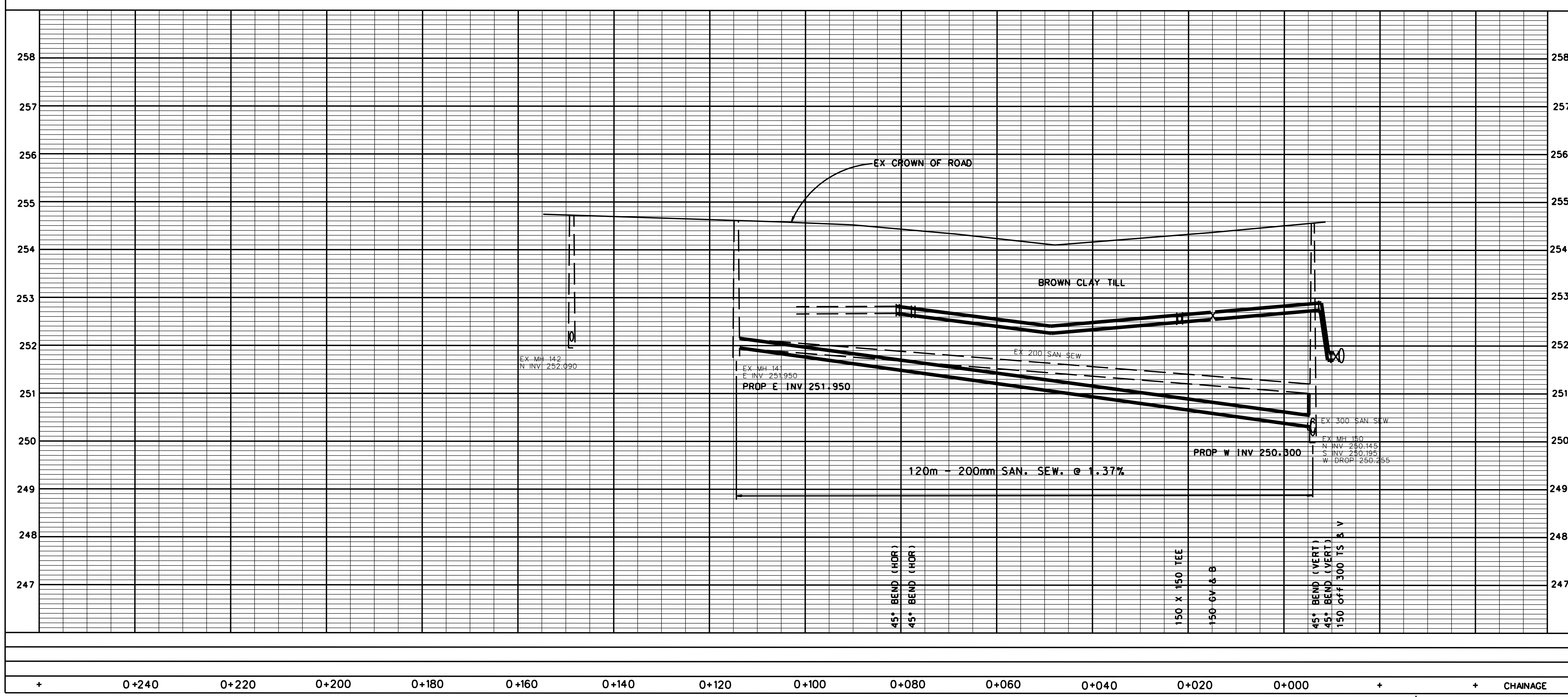
REGION AS-BUILT

SERVICE DATA					
SERVICE	DATE	INIT.	SERVICE	DATE	INIT.
SAN SEWERS			GAS MAINS		
STORM SEWERS			BELL U/G CABLE		
WATERMAINS			HYDRO U/G CABLE		
TRANSIT			ONT. HYDRO		
PARKS & REC.			CTV		
ONT. CLEAN WATER					

REVISIONS		
DATE	DETAILS	INIT.
SEPT 97	AS CONSTRUCTED	EWK







General Notes

- ALL DRIVEWAYS ASPHALT UNLESS OTHERWISE NOTED.
- ALL SERVICE LOCATIONS ARE APPROXIMATE AND MUST BE LOCATED ACCURATELY IN THE FIELD

DENOTES BUILDING - NOT LOCATED

DENOTES BUILDING LOCATED

TYPE 'B' BEDDING UNLESS OTHERWISE NOTED (SAN)

B.M. NO. ELEV.

THE CONTRACTOR IS RESPONSIBLE FOR LOCATING AND PROTECTING ALL EXISTING UTILITIES PRIOR TO AND DURING CONSTRUCTION LOCATION OF EXISTING UTILITIES APPROXIMATE ONLY, TO BE VERIFIED IN FIELD BY CONTRACTOR.

DESIGNED BY ____ ____ ____ __CHKD.____

APPROVED BY ____ ____ ____ ____ ____

NOTICE TO CONTRACTOR

48 HOURS PRIOR TO COMMMENCING WORK NOTIFY THE FOLLOWING

THE REGIONAL MUNICIPALITY OF PEEL
CITY OF MISSISSAUGA WORKS DEPT.
CITY OF BRAMPTON WORKS DEPT.
TOWN OF CALEDON WORKS DEPT.
BELL TELEPHONE COMPANY
CONSUMERS GAS COMPANY
MINISTRY OF TRANSPORTATION
ONTARIO CLEAN WATER AGENCY
HYDRO ELECTRIC POWER COMM. OF ONTARIO
HYDRO ELECTRIC COMM. CITY OF MISSISSAUGA
HYDRO ELECTRIC COMM. CITY OF BRAMPTON
CABLE TELEVISION

10m 0 10 20 30m HORIZONTAL SCALE

1m 0 1 2 3m VERTICAL SCALE

Region of Peel
Public Works

SHORE STREET

PROP. SANITARY SEWER

Sta. 0+000 **To Sta.** 0+000

LOTS	AREA C-12	PROJECT NO. 97-2250
CHECKED BY	DRAWN BY EWK	
DATE DEC 96	SHEET 1 OF 1	PLAN NO. 22534-D

APPENDIX B

GEOTECHNICAL REPORT

GEOTECHNICAL REPORT

Soil Engineers Ltd.
CONSULTING ENGINEERS
GEOTECHNICAL • ENVIRONMENTAL • HYDROGEOLOGICAL • BUILDING SCIENCE
90 WEST BEAVER CREEK ROAD, SUITE 100, RICHMOND HILL, ONTARIO L4B 1E7 · TEL: (416) 754-8515 · FAX: (905) 881-8335

BARRIE	MISSISSAUGA	OSHAWA	NEWMARKET	MUSKOKA	HAMILTON
TEL: (705) 721-7863	TEL: (905) 542-7605	TEL: (905) 440-2040	TEL: (905) 853-0647	TEL: (705) 721-7863	TEL: (905) 777-7956
FAX: (705) 721-7864	FAX: (905) 542-2769	FAX: (905) 725-1315	FAX: (905) 881-8335	FAX: (705) 721-7864	FAX: (905) 542-2769

A REPORT TO
BOLTON SHORE HOLDINGS LTD.

A GEOTECHNICAL INVESTIGATION FOR
PROPOSED 4-STOREY BUILDING WITH BASEMENT

15, 21 AND 27 SHORE STREET

TOWN OF CALEDON

REFERENCE NO. 2404-S107

JULY 2024

DISTRIBUTION

Digital copy - Bolton Shore Holdings Ltd.
Digital copy - Blackthorn Development Corp.

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TABLES

ENCLOSURES

1.0 INTRODUCTION

In accordance with a written authorization dated April 19, 2024, from Mr. Mark Cancian of Bolton Shore Holdings Ltd., a geotechnical investigation was carried out at 15, 21 and 27 Shore Street in the Town of Caledon.

The purpose of the investigation was to reveal the subsurface conditions and determine the engineering properties of the disclosed soils for the construction of a 4-storey apartment building with a basement. The geotechnical findings and recommendations for the proposed development are presented in this report.

2.0 SITE AND PROJECT DESCRIPTION

The site is situated on Halton till plain, where the drift dominates the soil stratigraphy. In places, lacustrine sand, silt, clay and drift which has been reworked by the water action of Peel Ponding (glacial lake) have modified the drift stratigraphy.

The investigation was carried out within the properties of 15, 21 and 27 Shore Street in the Town of Caledon. The combined property consists of 3 residential dwellings with associated driveway and landscape areas. The grading within the study area is relatively flat.

A review of the Site Plan prepared by Fausto Cortese Architects dated March 8, 2024, indicates that the existing dwellings will be demolished to make way for a new 4-storey building with basement. It will be provided with on-grade parking, access driveway and landscape areas.

3.0 FIELD WORK

The field work, consisted of 4 boreholes extending to depths of 8.1 and 8.5 m below grade, was completed on May 29 and 30, 2024, at the locations shown on the Borehole and Monitoring Well Location Plan, Drawing No. 1.

The boreholes were advanced at intervals to the sampling depths by a compact track-mounted drill rig equipped with solid stem augers and split spoons for soil sampling. Standard Penetration Tests, using the procedures described on the enclosed “List of Abbreviations and Terms”, were performed at the sampling depths. The results are recorded as the Standard Penetration Resistance (or ‘N’ values) of the subsoil. The relative density of the non-cohesive strata and the consistency of the cohesive strata are inferred from the 'N' values. Split-spoon samples were recovered for soil classification and laboratory testing.

Upon completion of borehole drilling, monitoring wells were installed in 3 of the 4 boreholes to facilitate a hydrogeological assessment. Details of the monitoring wells are presented in the borehole logs.

The field work was supervised and the findings were recorded by a Geotechnical Technician. The ground elevation at each of the borehole location was obtained using the Global Navigation Satellite System (GNSS).

4.0 SUBSURFACE CONDITIONS

Detailed descriptions of the subsurface conditions are presented on the Borehole Logs, comprising Figures 1 to 4 inclusive. The revealed stratigraphy is plotted in the Subsurface Profiles, Drawing No. 2. The engineering properties of the disclosed soils are discussed herein.

The investigation has disclosed that beneath the topsoil and a layer of earth fill, the site is generally underlain by a stratum of silty clay, with a localized deposit of silty clay till.

4.1 Topsoil

The revealed topsoil is approximately 8 to 10 cm in thickness. Thicker topsoil layers may be contacted beyond the borehole locations. The topsoil is void of engineering value and must be stripped for site development.

4.2 Earth Fill

A layer of earth fill, extending to a depth of 0.8 m below the prevailing ground surface, was encountered in all boreholes. It is dark brown in colour and consists of silty clay, with a variable amount of topsoil and rootlets.

The natural water content of the samples was determined and the results are plotted on the Borehole Logs; the values range from 23% to 33%, with a median of 28%. The high water content value indicates the presence of topsoil.

The obtained 'N' values range from 5 to 10, with a median of 8 blows per 30 cm of penetration, indicating that the fill was likely placed with non-uniform compaction.
Due to its unknown history and non-uniform density, the earth fill is not suitable to support any structures sensitive to settlement. It must be subexcavated, sorted free of deleterious material and organics and properly recompacted in layers.

4.3 Silty Clay/Silty Clay Till

The silty clay is the predominant soil in the revealed stratigraphy. It contains traces of sand and gravel, with occasional silt seams. The silty clay till was encountered beneath the topsoil and earth fill, overlying the silty clay in Borehole 3. It consists of a random mixture of particle sizes ranging from clay to gravel, with the silt and clay being the dominant fraction. A grain size analysis was performed on a representative sample each of the silty clay and silty clay till. The results are plotted on Figures 5 and 6, respectively.

The obtained 'N' values range from 8 to 45 blows per 30 cm of penetration, with a median of 23 blows per 30 cm of penetration, indicating the clay/clay till is stiff to hard, being generally very stiff in consistency. The 'N' values of 8 and 9 were encountered near the ground surface where the soil has been weathered.

Atterberg Limits were determined on a sample each of the clay till and clay sample. The till sample has liquid limit of 34% and plastic limit of 18%, while the clay has a liquid limit of 41% and plastic limit of 21%, indicating the clay till is low in plasticity while the clay is medium in plasticity.

The natural water content of the soil samples ranges between 16% and 29%, at a median of 22%, showing a moist to very moist, generally moist condition.

The engineering properties of the clay till deposit are given below:

- High frost susceptibility and low water erodibility.
- The clay till will be stable in relatively steep slopes; however, prolonged exposure will allow the sand seams to slough, which may lead to local sliding.

5.0 GROUNDWATER CONDITION

All boreholes remained dry upon completion of the field work.

Monitoring wells were installed at Boreholes 1, 2 and 3. Two rounds of stabilized groundwater levels were recorded in the monitoring wells and are summarized in Table 1.

Table 1 - Groundwater Levels in Monitoring Wells

Borehole No.	Ground Elevation (m)	Well Depth (m)	Measured Groundwater Level					
			Jun 11, 2024		Jun 24, 2024		July 9, 2024	
			Depth (m)	El. (m)	Depth (m)	El. (m)	Depth (m)	El. (m)
1	254.1	7.6	5.5	248.6	4.6	249.5	2.6	251.5
2	254.1	7.6	1.3	252.8	1.1	253.0	1.4	252.7
3	254.5	7.6	1.8	252.7	1.8	252.7	1.9	252.6

The groundwater level recorded in the monitoring wells ranges from 1.1 to 5.5 m below the ground surface, or El. 248.6 to 253.0 m.

Additional groundwater assessment will be presented in the hydrogeological assessment report, to be presented under separate cover.

6.0 DISCUSSION AND RECOMMENDATIONS

The investigation has disclosed that beneath the topsoil and a layer of earth fill extending to a depth of 0.8 m below the prevailing ground surface, the site is underlain by a stratum of silty clay, stiff to hard consistency. A localized deposit of very stiff silty clay till was also encountered overlying the silty clay at one borehole.

All boreholes remained dry on completion of the field work. Three rounds of groundwater levels in the monitoring wells were recorded and the results range from El. 248.6 to 253.0 m. Further groundwater assessment will be presented in the hydrogeological assessment report, to be provided under separate cover.

The proposed development will consist of a 4-storey apartment building with a conventional basement. The geotechnical recommendations appropriate for the design and construction of the development are presented herein. One must be aware that the subsurface conditions may vary between boreholes. Should subsurface variances become apparent during construction, a geotechnical engineer must be consulted.

6.1 Site Preparation

The existing topsoil and earth fill must be removed for site development.

After demolition of the existing structures, the debris must be removed and disposed of off-site. The cavity must be inspected by the geotechnical engineer before building construction. Any disturbed soils and earth fill should also be removed. Where it is free of topsoil inclusions and deleterious materials, it can be stockpiled on site for reuse. It should be compacted to 98% Standard Proctor Dry Density (SPDD).

6.2 Foundation

The proposed development will consist of a 4-storey building with a conventional basement. The basement elevation will likely be approximately 3.0 m below the prevailing ground surface. The new building foundation placed on sound, natural soil with conventional spread and strip footings can be designed using the following net bearing pressures:

- Maximum Bearing Pressure at Serviceability Limit State (SLS) = 250 kPa
- Factored Bearing Pressure at Ultimate Limit State (ULS) = 400 kPa

The total and differential settlements of structures designed using the bearing pressure at SLS are estimated within 25 mm and 20 mm, respectively.

During construction, the foundation subgrade should be inspected by the geotechnical engineer or a senior geotechnical technician to ensure that the revealed conditions are compatible with the foundation design requirements.

Foundations exposed to weathering should have at least 1.2 m of earth cover for protection against frost action.

If groundwater seepage is encountered in excavation, the foundation must be poured immediately after subgrade inspection or the subgrade should be protected by a concrete mud-slab immediately after exposure. This will prevent construction disturbance and costly rectification of the bearing subsoil.

The building foundation should meet the requirements specified in the latest Ontario Building Code and the structures should be designed to resist an earthquake force using Site Classification ‘D’ (stiff soil).

6.3 **Basement Structure**

The perimeter walls should be designed to sustain a lateral earth pressure calculated using the soil parameters stated in Section 6.7. Any applicable surcharge loads adjacent to the basement must also be considered in the wall design.

Due to the low permeability of the silty clay and clay till, the basement floor of the proposed building can be dampproofed and provided with a drainage system (Drawing No. 3). If groundwater is encountered during basement excavation, floor subdrains will be required, and a vapour barrier should be placed at the crown level of the subdrain to prevent upfiltration of soil moisture that may wet the floor. All the subdrain should be encased in a fabric filter to protect them against blockage by silting. These measures can be further assessed during construction.

The subgrade should consist of sound native soils or well compacted earth fill, the floor slab should be constructed on a granular base of at least 15 cm thick, consisting of 19-mm Crusher-Run Limestone (CRL), or equivalent, compacted to 100% SPDD.

The elevator pit, which normally extends below the floor level, should be designed as a submerged 'tank' structure with waterproofed pit walls and pit floor.

The grading around the building structure must be such that it directs runoff away from the structure.

6.4 **Underground Services**

The underground services should be founded on sound native soil or properly compacted inorganic earth fill. Where weathered soil is encountered, it should be subexcavated and replaced with the bedding material, compacted to at least 98% SPDD.

A Class 'B' bedding is recommended for the underground services construction. It should consist of compacted 19-mm CRL, or equivalent, as approved by a geotechnical engineer.

The pipe joints into the manholes and catch basins must be leak-proof to prevent the migration of fines through the joints. Openings to subdrains and catch basins should be shielded with a fabric filter to prevent blockage by silting.

A soil cover having a thickness at least equal to the diameter of the pipe should be in place at all times after pipe installation, to prevent pipe floatation when the trench is deluged with water derived from precipitation.

6.5 Backfilling in Trenches and Excavated Areas

The backfill in service trenches should be compacted to at least 98% SPDD, particularly below concrete floor subgrade and in the zone within 1.0 m below the pavement. The material should be compacted with the water content at 2% to 3% drier than the optimum. The lifts must be limited to 20 cm or less (before compaction).

As a general guide, the typical water content values of the revealed soils for Standard Proctor compaction are presented in Table 2.

Table 2 - Estimated Water Content for Compaction of On-Site Material

Soil Type	Determined Natural Water Content (%)	Water Content (%) for Standard Proctor Compaction	
		100% (optimum)	Range for 95% or +
Earth Fill	23 to 33 (median 28)	15	13 to 20
Silty Clay Till/Silty Clay	16 to 29 (median 22)	15 to 21	13 to 25

The in-situ clay and clay till are generally suitable for use as trench backfill. Where they are too wet, they will require aeration by spreading them thinly in dry, warm weather. The till should be sorted free of oversized boulders (over 15 cm in size) before use as backfill. The existing fill must be sorted free of topsoil inclusions and deleterious materials, if any, prior to its use as structural backfill.

In normal construction practice, the problem areas of pavement settlement largely occur adjacent to manholes, catch basins, services crossings, foundation walls and columns, it is recommended that a sand backfill should be used.

The narrow trenches for services crossings should be cut at 1 vertical:2 horizontal so that the backfill in the trenches can be effectively compacted. Otherwise, soil arching in the trenches will prevent achievement of the proper compaction. In confined areas where the desired slope cannot be achieved or the operation of a proper kneading-type roller cannot be facilitated, imported sand fill, which can be appropriately compacted by using a smaller vibratory compactor, must be used.

6.6 Pavement Design

The pavement design for the parking area and fire route is presented in Table 3.

Table 3 - Pavement Design

Course	Thickness (mm)	OPS Specifications
Asphalt Surface	40	HL3
Asphalt Binder	65	HL8
Granular Base	150	Granular 'A'
Granular Sub-base Light-Duty/Parking Heavy-Duty/Fire Route	 300 450	Granular 'B'

In preparation of pavement subgrade, all compressible material should be removed. The final subgrade must be proof-rolled. Any soft spot identified must be rectified by subexcavation and replacing with selected dry inorganic material. The subgrade within 1.0 m below the underside of the granular sub-base must be compacted to at least 98% SPDD, with the water content at 2% to 3% drier than its optimum.

All the granular bases should be compacted in 150 to 200 mm lifts to 100% SPDD.

An intercept subdrain system should be installed along the perimeter of the parking area where surface runoff may drain onto the pavement. In paved areas, catch basins with stub drains in all four directions should be provided. The stub drains and subdrains should drain into the catch basin through filter-sleeved weepers. The invert of the subdrains should be at least 0.4 m beneath the underside of the granular sub-base and should be backfilled with free-draining granular material.

6.7 Soil Parameters

The recommended soil parameters for the project design are given in Table 4.

Table 4 - Soil Parameters

Unit Weight and Bulk Factor	**Bulk Unit Weight** γ **(kN/m^3)**	**Estimated Bulk Factor** Loose	**Estimated Bulk Factor** Compacted
Silty Clay Till	22.0	1.30	1.05
Earth Fill/Silty Clay	20.5	1.25	1.00

Lateral Earth Pressure Coefficients	**Active** K_a	**At Rest** K_o	**Passive** K_p
Silty Clay	0.39	0.56	2.56
Silty Clay Till	0.33	0.50	3.00

Effective Shear Strength Parameters	**Cohesion c' (kPa)**	**Angle of Internal Friction, ϕ'**
Silty Clay	5	26°
Silty Clay Till	5	30°

Coefficient of Permeability (K) and Percolation Time (T)	**K (cm/sec)**	**T (min/cm)**
Silty Clay/Silty Clay Till	10^{-7}	100

Coefficients of Friction	
Between Concrete and Granular Base	0.50
Between Concrete and Sound Native Soils	0.35

6.8 Excavation

Excavation should be carried out in accordance with Ontario Regulation 213/91. The types of soils are classified in Table 4.

Table 5 - Classification of Soils for Excavation

Material	Type
Sound Silty Clay/Silty Clay Till	2
Earth Fill and Weathered Soils	3

In the silty clay and clay till, any perched groundwater yield can be collected and removed by conventional pumping from sumps. The yield is expected to be small and limited.

Excavation into the till with boulders will require extra effort and the use of properly equipped heavy-duty excavator.

Prospective contractors may be asked to asses the subsurface conditions by digging test pits to the intended depth of excavation. These test pits should be allowed to remain open for a few hours to asses the trenching conditions and the dewatering requirement for excavation.

7.0 LIMITATIONS OF REPORT

This report was prepared by Soil Engineers Ltd. for the account of Bolton Shore Holdings Ltd. and for review by the designated consultants, financial institutions, government agencies and contractors. The material in the report reflects the judgment of Kelvin Hung, P.Eng., and Bernard Lee, P.Eng., in light of the information available to it at the time of preparation.

Use of the report is subject to the conditions and limitations of the contractual agreement. Any use which a Third Party makes of this report, and/or any reliance on decisions to be made based on it is the responsibility of such Third Parties. Soil Engineers Ltd. accepts no responsibility for damages, if any, suffered by any Third Party as a result of decisions made or actions based on this report.

SOIL ENGINEERS LTD.

LICENSED PROFESSIONAL ENGINEER
7/18/24
K. W. K. HUNG
100124295
KH
PROVINCE OF ONTARIO

Kelvin Hung, P.Eng.

Bernard Lee, P.Eng.
KH/BL

LIST OF ABBREVIATIONS AND DESCRIPTION OF TERMS

The abbreviations and terms commonly employed on the borehole logs and figures, and in the text of the report, are as follows:

SAMPLE TYPES

AS	Auger sample
CS	Chunk sample
DO	Drive open (split spoon)
DS	Denison type sample
FS	Foil sample
RC	Rock core (with size and percentage recovery)
ST	Slotted tube
TO	Thin-walled, open
TP	Thin-walled, piston
WS	Wash sample

PENETRATION RESISTANCE

Standard Penetration Resistance or 'N' Value:

The number of blows of a 63.5 kg hammer falling from a height of 76 cm required to advance a 51 mm outer diameter drive open sampler 30 cm into undisturbed soil, after an initial penetration of 15 cm.

Plotted as '○'

Dynamic Cone Penetration Resistance:

A continuous profile showing the number of blows per each 30 cm of penetration of a 51 mm diameter, 90° point cone driven by a 63.5 kg hammer falling from a height of 76 cm.

Plotted as '—•—'

WH	Sampler advanced by static weight
PH	Sampler advanced by hydraulic pressure
PM	Sampler advanced by manual pressure
NP	No penetration

SOIL DESCRIPTION

Cohesionless Soils:

'N' (blows/30 cm)	Relative Density
0 to 4	very loose
4 to 10	loose
10 to 30	compact
30 to 50	dense
>50	very dense

Cohesive Soils:

Undrained Shear Strength (kPa)	'N' (blows/30 cm)	Consistency
<12	<2	very soft
12 to <25	2 to <4	soft
25 to <50	4 to <8	firm
50 to <100	8 to <15	stiff
100 to 200	15 to 30	very stiff
>200	>30	hard

Method of Determination of Undrained Shear Strength of Cohesive Soils:

x 0.0 Field vane test in borehole; the number denotes the sensitivity to remoulding

△ Laboratory vane test

METRIC CONVERSION FACTORS

1 ft = 0.3048 m
1 inch = 25.4 mm
1 lb = 0.454 kg
1 ksf = 47.88 kPa

JOB NO.: 2404-S107

LOG OF BOREHOLE: 1

FIGURE NO.: 1

PROJECT DESCRIPTION: Proposed 4-Storey Apartment with Basement

METHOD OF BORING: Solid-Stem Augers

PROJECT LOCATION: 15, 21 and 27 Shore Street, Town of Caledon

DRILLING DATE: May 30, 2024

El. (m) / Depth (m)	SOIL DESCRIPTION	Sample Number	Type	N-Value	Moisture Content (%)	WATER LEVEL
254.1	Ground Surface					
0.0	7.6 cm TOPSOIL Dark brown EARTH FILL silty clay occ. rootlets and topsoil inclusions	1	DO	7	24	Dry on completion
253.3 / 0.8	Stiff to hard SILTY CLAY brown / grey traces of sand and gravel occ. silt seams	2	DO	8	23	
		3	DO	31	20	
		4	DO	39	21	
		5	DO	45	21	
		6	DO	20	21	
		7	DO	20	25	
		8	DO	28		
245.6 / 8.5	END OF BOREHOLE	9	DO	25	19	

Chart scales: Dynamic Cone (blows/30 cm) 10 30 50 70 90; Shear Strength (kN/m²) 50 100 150 200; Penetration Resistance (blows/30 cm) 10 30 50 70 90; Atterberg Limits PL LL; Moisture Content (%) 10 20 30 40; Depth Scale (m) 0–10.

Installed 50 mm Ø monitoring well to 7.6 m
completed with 3.1 m screen
Sand backfill from 4.0 m to 7.6 m
Bentonite seal from 0.0 m to 4.0 m
Provided with a steel monument casing

Soil Engineers Ltd.

JOB NO.: 2404-S107

LOG OF BOREHOLE: 2

FIGURE NO.: 2

PROJECT DESCRIPTION: Proposed 4-Storey Apartment with Basement

METHOD OF BORING: Solid-Stem Augers

PROJECT LOCATION: 15, 21 and 27 Shore Street, Town of Caledon

DRILLING DATE: May 29, 2024

El. (m) / Depth (m)	SOIL DESCRIPTION
254.1	Ground Surface
0.0	7.6 cm TOPSOIL
	Dark brown EARTH FILL silty clay occ. rootlets and topsoil inclusions
253.3 / 0.8	Stiff to hard SILTY CLAY traces of sand and gravel occ. silt seams; brown / grey
246.0 / 8.1	END OF BOREHOLE

SAMPLES Number	Type	N-Value	Moisture Content (%)
1	DO	10	29
2	DO	9	25
3	DO	24	20
4	DO	26	23
5	DO	37	21
6	DO	22	25
7	DO	14	29
8	DO	21	20

Depth Scale (m): 0 – 10

Dynamic Cone (blows/30 cm): 10 30 50 70 90

Shear Strength (kN/m²): 50 100 150 200

Penetration Resistance (blows/30 cm): 10 30 50 70 90

Atterberg Limits PL LL

Moisture Content (%): 10 20 30 40

WATER LEVEL: Dry on completion

Installed 50 mm Ø monitoring well to 7.6 m
completed with 3.1 m screen
Sand backfill from 4.0 m to 7.6 m
Bentonite seal from 0.0 m to 4.0 m
Provided with a steel monument casing

Soil Engineers Ltd.

JOB NO.: 2404-S107

LOG OF BOREHOLE: 3

FIGURE NO.: 3

PROJECT DESCRIPTION: Proposed 4-Storey Apartment with Basement

METHOD OF BORING: Solid-Stem Augers

PROJECT LOCATION: 15, 21 and 27 Shore Street, Town of Caledon

DRILLING DATE: May 29, 2024

El. (m) / Depth (m)	SOIL DESCRIPTION	Sample Number	Type	N-Value	Depth Scale (m)	Penetration Resistance (blows/30 cm)	Moisture Content (%)	Atterberg Limits (PL–LL)	WATER LEVEL
254.5	Ground Surface								
0.0	10 cm TOPSOIL	1A			0				
	Dark brown EARTH FILL silty clay occ. rootlets and topsoil inclusions	1B	DO	5			23		
253.7 / 0.8	Brown, very stiff SILTY CLAY TILL some sand, a trace of gravel	2	DO	21	1		16	PL–LL	
253.0 / 0.8	Very stiff to hard	3	DO	28			22		
		4	DO	42	2		21		
		5	DO	35	3		22		
	SILTY CLAY				4				Dry on completion
	brown / grey	6	DO	23			24		
	traces of sand and gravel occ. silt seams				5, 6				
		7	DO	23			22		
		8	DO	22	7		28		
246.4 / 8.1	END OF BOREHOLE				8				

Installed 50 mm Ø monitoring well to 7.6 m
completed with 3.1 m screen
Sand backfill from 4.0 m to 7.6 m
Bentonite seal from 0.0 m to 4.0 m
Provided with a flush mounted cover

Legend: ● Dynamic Cone (blows/30 cm) 10 30 50 70 90; ✕ Shear Strength (kN/m²) 50 100 150 200; ○ Penetration Resistance (blows/30 cm) 10 30 50 70 90; Atterberg Limits PL LL; ● Moisture Content (%) 10 20 30 40

Soil Engineers Ltd.

JOB NO.: 2404-S107

LOG OF BOREHOLE: 4

FIGURE NO.: 4

PROJECT DESCRIPTION: Proposed 4-Storey Apartment with Basement

METHOD OF BORING: Solid-Stem Augers

PROJECT LOCATION: 15, 21 and 27 Shore Street, Town of Caledon

DRILLING DATE: May 29, 2024

El. (m) / Depth (m)	SOIL DESCRIPTION	Sample Number	Type	N-Value	Depth Scale (m)	Moisture Content (%)	WATER LEVEL
254.3	Ground Surface						
0.0	7.6 cm TOPSOIL				0		
	Dark brown EARTH FILL silty clay occ. rootlets and topsoil inclusions	1	DO	8		33	
253.5 / 0.8	Very stiff to hard	2	DO	29	1	20	
		3	DO	31	2	22	
		4	DO	26		23	
	SILTY CLAY	5	DO	22	3	25	
					4		Dry on completion
		6	DO	23	5	25	
	traces of sand and gravel occ. silt seams						
	brown / grey				6		
		7	DO	20	7	26	
		8	DO	23	8	21	
246.2 / 8.1	END OF BOREHOLE				9		
					10		

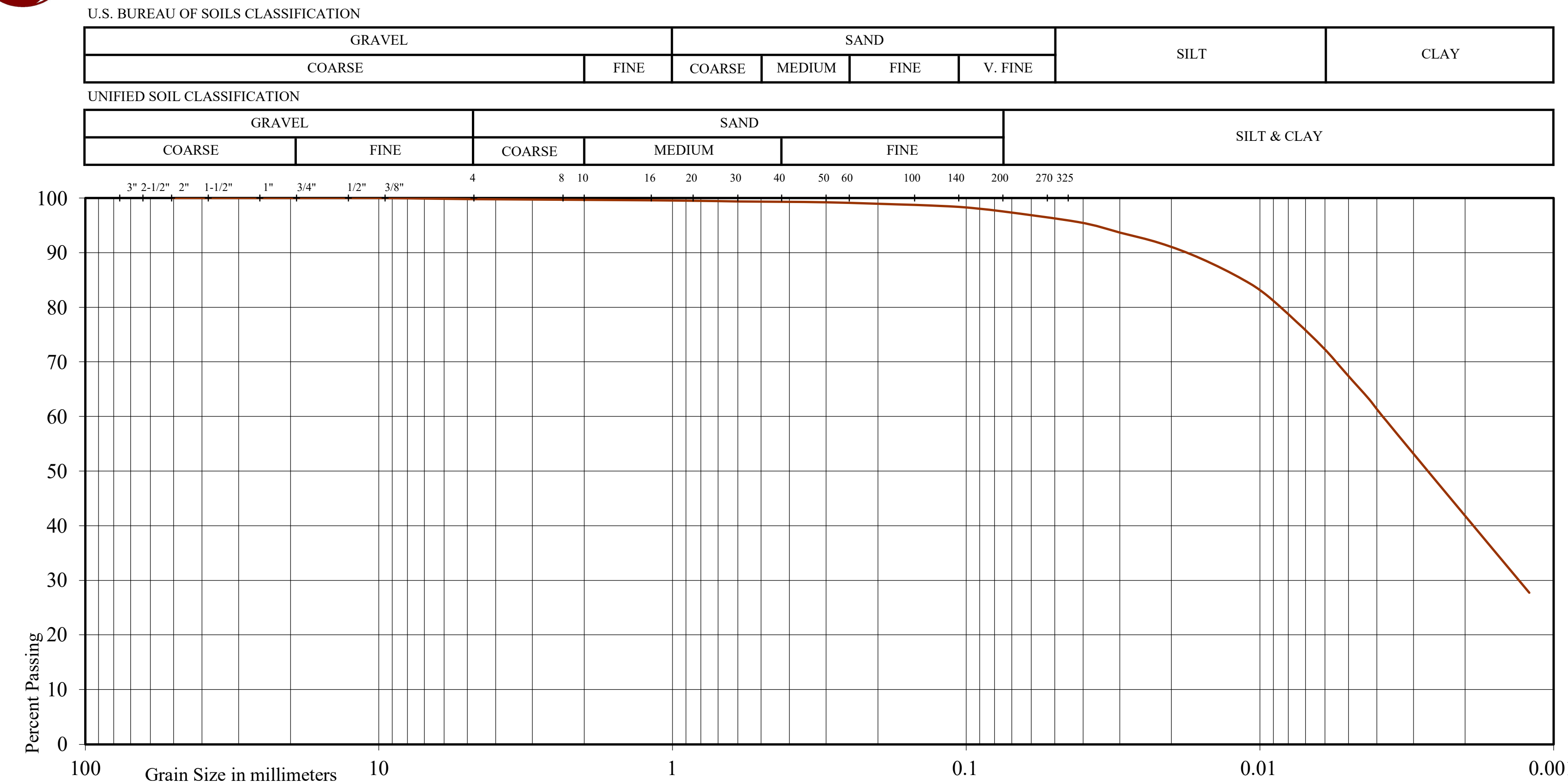
Chart scales: Dynamic Cone (blows/30 cm) 10 30 50 70 90; Shear Strength (kN/m²) 50 100 150 200; Penetration Resistance (blows/30 cm) 10 30 50 70 90; Atterberg Limits PL LL; Moisture Content (%) 10 20 30 40

Soil Engineers Ltd.

Soil Engineers Ltd.

GRAIN SIZE DISTRIBUTION

Reference No: 2404-S107



Project: Proposed 4-Storey Apartment with Basement

Location: 15, 21 and 27 Shore Street, Town of Caledon

Borehole No: 2

Sample No: 7

Depth (m): 6.4

Elevation (m): 247.7

Liquid Limit (%) = 41

Plastic Limit (%) = 21

Plasticity Index (%) = 20

Moisture Content (%) = 29

Estimated Permeability (cm./sec.) = 10^{-7}

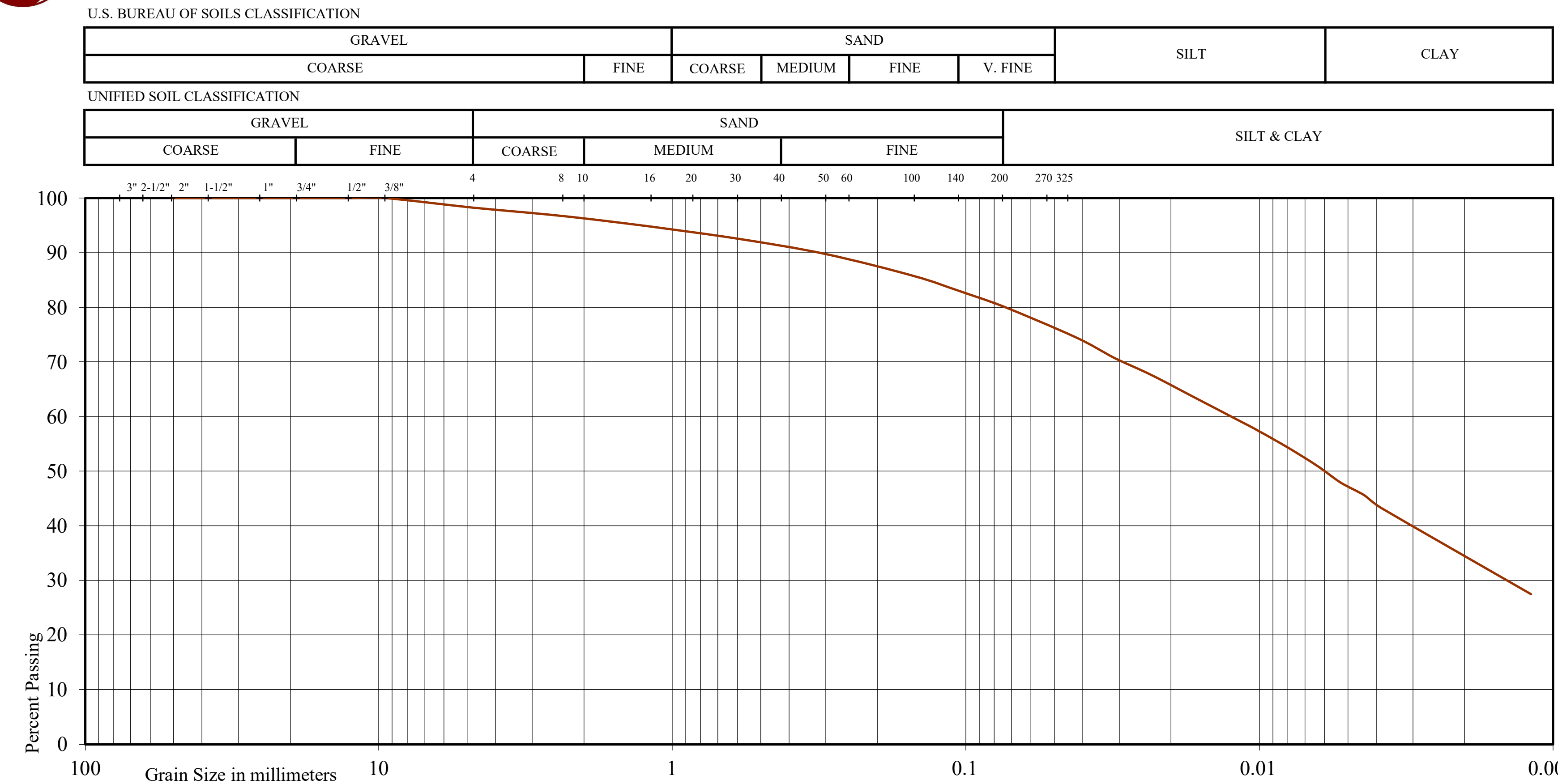
Classification of Sample [& Group Symbol]: SILTY CLAY
a trace of fine sand

Figure: 5

Soil Engineers Ltd.

GRAIN SIZE DISTRIBUTION

Reference No: 2404-S107



Project: Proposed 4-Storey Apartment with Basement

Location: 15, 21 and 27 Shore Street, Town of Caledon

Borehole No: 3

Sample No: 2

Depth (m): 1.0

Elevation (m): 253.5

Liquid Limit (%) = 34

Plastic Limit (%) = 18

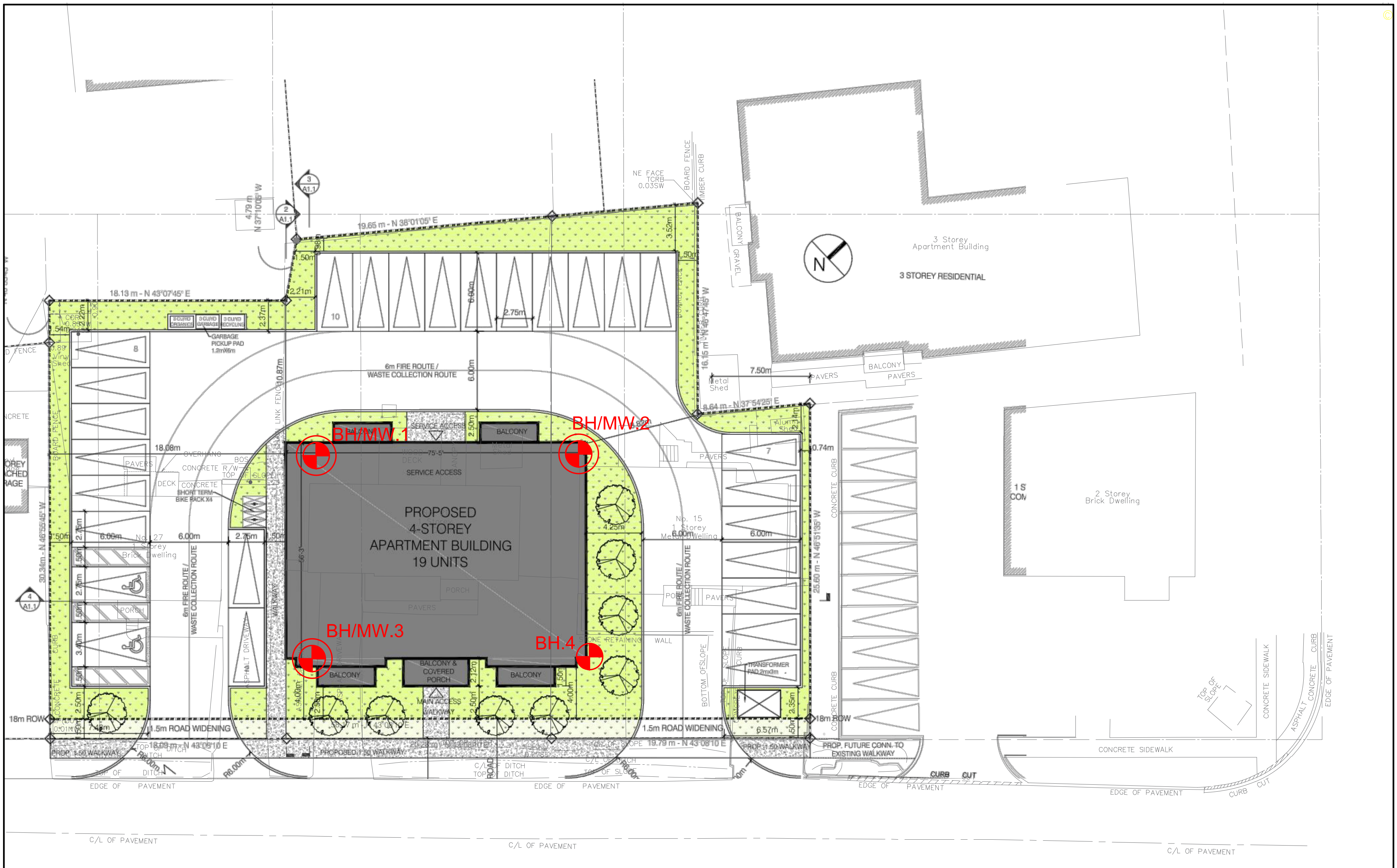
Plasticity Index (%) = 16

Moisture Content (%) = 16

Estimated Permeability (cm./sec.) = 10^{-7}

Classification of Sample [& Group Symbol]:	SILTY CLAY TILL some sand, a trace of gravel

Figure: 6



LEGEND

- Borehole with monitoring well
- Borehole

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90 WEST BEAVER CREEK ROAD, SUITE #100, RICHMOND HILL, ONTARIO L4B 1E7 · TEL: (416) 754-8515 · FAX: (905) 881-8335

BOREHOLE AND MONITORING WELL LOCATION PLAN

SITE: 15, 21 and 27 Shore Street, Town of Caledon

DESIGNED BY: -	**CHECKED BY:** -	**DWG NO.:** 1
SCALE: 1:400	**REF. NO.:** 2404-S107	**DATE:** June 2024
REV -		

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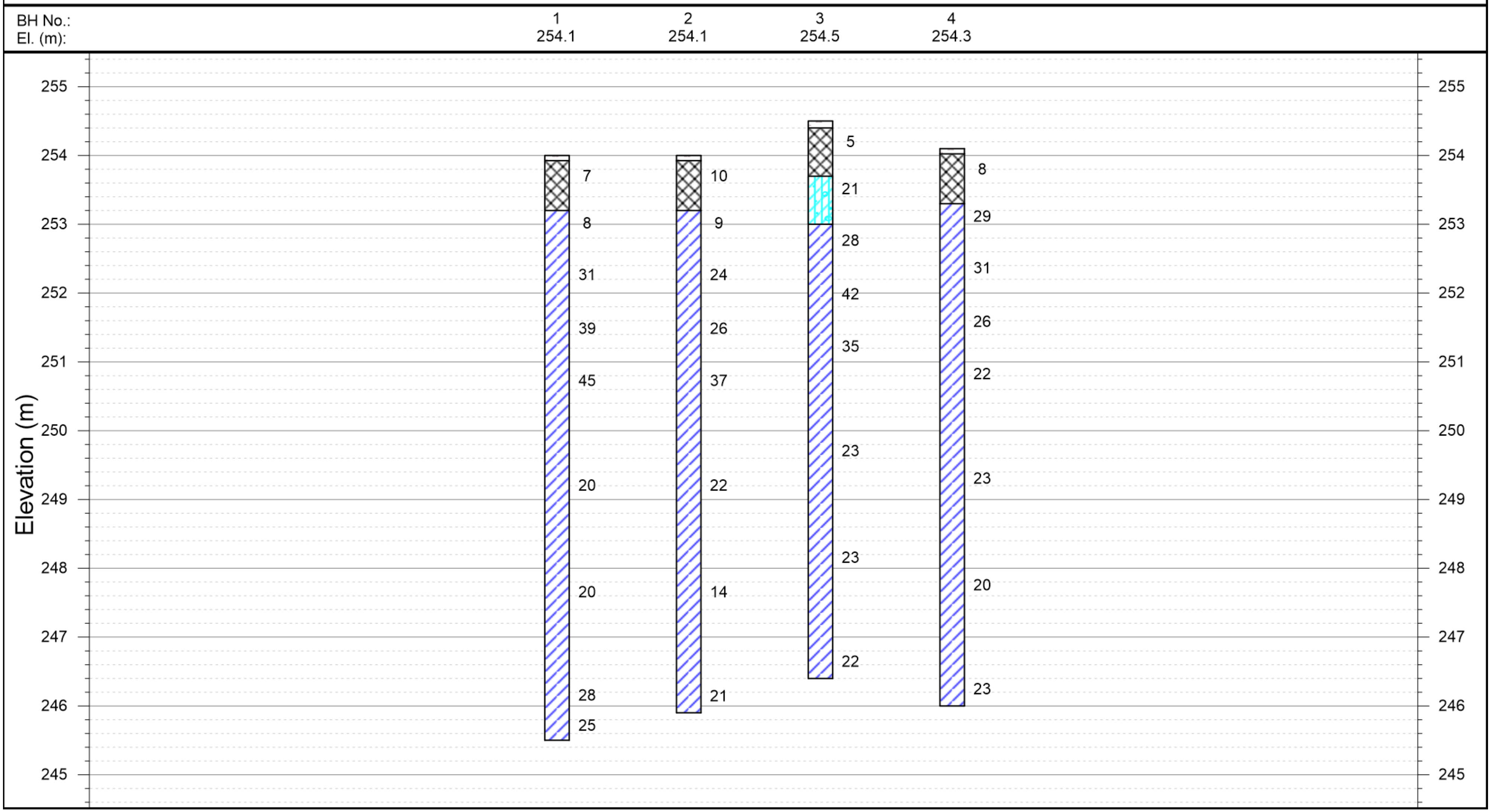
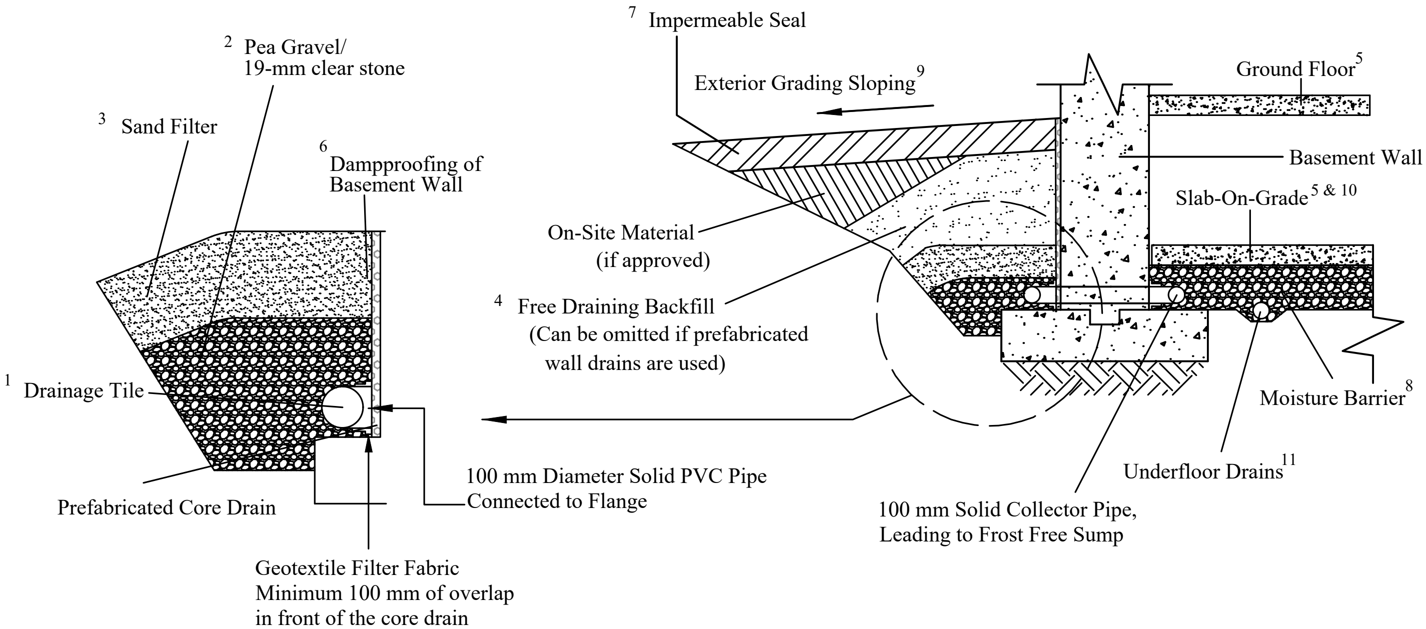
SUBSURFACE PROFILE
DRAWING NO. 2
SCALE: AS SHOWN

JOB NO.: 2404-S107
REPORT DATE: June 2024
PROJECT DESCRIPTION: Proposed 4-Storey Apartment with Basement
PROJECT LOCATION: 15, 21 and 27 Shore Street, Town of Caledon

LEGEND

TOPSOIL FILL SILTY CLAY SILTY CLAY TILL





NOTES:

1. **Drainage tile**: consists of 100 mm (4") diameter weeping tile or equivalent perforated pipe leading to a positive sump or outlet. Invert to be at minimum of 150 mm (6") below underside of basement floor slab.

2. **Pea gravel**: at 150 mm (6") on the top and sides of drain. If drain is not placed on concrete footing, provide 100 mm (4") of pea gravel below drain. The pea gravel may be replaced by 19-mm clear stone provided that the drain is covered by a porous geotextile membrane of Terrafix 270R or equivalent.

3. **Filter material**: consists of C.S.A. fine concrete aggregate. A minimum of 300 mm (12") on the top and sides of gravel. This may be replaced by an approved porous geotextile membrane of Terrafix 270R or equivalent.

4. **Free-draining backfill**: OPSS Granular 'B' or equivalent, compacted to 95% to 98% (maximum) Standard Proctor dry density. Do not compact closer than 1.8 m (6') from wall with heavy equipment. This may be replaced by on-site material if prefabricated wall drains (Miradrain) extending from the finished grade to the bottom of the basement wall are used.

5. **Do not backfill** until the wall is supported by the basement floor slab and ground floor framing, or adequate bracing.

6. **Dampproofing** of the basement wall is required before backfilling

7. **Impermeable backfill seal** of compacted clay, clayey silt or equivalent. If the original soil in the vicinity is a free-draining sand, the seal may be omitted.

8. **Moisture barrier**: 19-mm CRL or equivalent. The thickness of this layer should be 150 mm (6") minimum.

9. **Exterior Grade**: slope away from basement wall on all the sides of the building.

10. **Slab-On-Grade** should not be structurally connected to walls or foundations.

11. **Underfloor drains***should be placed in parallel rows at 6 to 8 m (20'-25') centre, on 100 mm (4") of pea gravel with 150 mm (6") of pea gravel on top and sides. The spacing should be at least 300 mm (12") between the underside of the floor slab and the top of the pipe. The drains should be connected to positive sumps or outlets. Do not connect the underfloor drains to the perimeter drains.

*Underfloor drains can be deleted where not required.

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90 WEST BEAVER CREEK ROAD, SUITE #100, RICHMOND HILL, ONTARIO L4B 1E7 · TEL: (416) 754-8515 · FAX: (905) 881-8335

Permanent Perimeter Drainage System

SITE: 15, 21 and 27 Shore Street, Town of Caledon

DESIGNED BY: K.L.	**CHECKED BY:** B.L.	**DWG NO.:** 3	
SCALE: N.T.S.	**REF. NO.:** 2404-S107	**DATE:** June 2024	**REV** -

APPENDIX C

WATER DEMAND CALCULATIONS

WATER SUPPLY CALCULATION

urbanworks
ENGINEERING CORPORATION

PROJECT: 15,21,27 Shore Street, Caledon
FILE No.: 24-0002CA
DATE: 2024-06-11
PREPARED BY: DV

Fire Flow (residential)	83.33	L/s
Demand (residential)	280	L/cap/day *
Max Day Factor	2	*
Peak Hour Factor	3	*
Units (Large)	14	
Units (Small)	5	
Density (Large)	3.1	cap / unit *
Density (Small	1.7	cap / unit *
Population	52	

Calculated as per FUS 2020

* Per Region of Peel Water Main Design Criteria (June 2010) - Table 1

AVERAGE-DAY DEMAND

Land Use	Units (Large)	Units (small)	Density (large p/unit)	Density (small p/unit)	Population	Avg. Day Demand (L/s)
Residential	14	5	3.1 p/unit	1.7 p/unit	52	0.17

MAXIMUM-DAY DEMAND + FIRE FLOW

Land Use	Avg. Day Demand (L/s)	Peak Hour Demand Factor*	Peak Hour Demand (L/s)	Max. Day Demand Factor*	Max. Day Demand (L/s)	Max. Day Demand + Fire Flow (L/s)
Residential	0.17	3.0	0.50	2.0	0.34	**83.67**

* Per Region of Peel Water Main Design Criteria (June 2010) - Table 1

FIRE FLOW CALCULATION

PROJECT: 15,21,27 Shore Street, Caledon
FILE No.: 24-0002CA
DATE: 2024-06-11
PREPARED BY: DV

Calculation of required fire flow is based on the Fire Underwriters Survey (FUS), Water Supply for Fire Protection publication, 2020

$$F = 220C\sqrt{A}$$

Where: F = Requied fire flow (L/min.)

C = Coefficient related to the type of construction

1.5	**Type V**	Wood Frame Construction
0.8	**Type IV-A**	Mass Timber Construction
0.9	**Type IV-B**	Mass Timber Construction
1.0	**Type IV-C**	Mass Timber Construction
1.5	**Type IV-D**	Mass Timber Construction
1.0	**Type III**	Ordinary Construction
0.8	**Type II**	Noncombustible Construction
0.6	**Type I**	Fire Resistive Construction

A = Total floor area (m^2)

Includes all storeys, but excluding basements at least 50% below grade.

* For fire-resistive buildings, consider the 2 largest adjoining floors plus 50% of each of any floors immediately above up to 8, when vertical openings are inadequately protected.

If the vertical openings and exterior vertical communications are properly protected (one hour rating), consider only the area of the largest floor plus 25% of eachh of the 2 immediately adjoining floors.

Adjustments to the calculated fire flow can be made based on occupancy, sprinkler protection and exposure to other structures. The table below summarizes the adjustments made to the basic fire flow demand.

			1		2			3		4		Final Adjusted		
Building	Area "A"	C	Base Fire Flow		Occupancy			Sprinkler		Exposure		Fire Flow		
	(m2)		(L/min)	(L/s)	%	Fire Flow Adjustment (L/min)	Adjusted Flow (L/min)	%	Fire Flow Adjustment (L/min)	%	Fire Flow Adjustment (L/min)	Final Fire Flow (L/min)	Rounded Fire Flow (L/min)	(L/s)
Site	1557.4	1	8682	144.7	-15	-1302	7380	-40	-2952	14%	1033	5461	5000	83.33

Note - Total GFA = 1557.4 square metres
GFA estimated based on site plan prepared by FC Architects Inc., dated February 20, 2024

(2) Occupancy

Non-Combustible	-25%
Limited Combustible	**-15%**
Combustible	no change
Free Burning	15%
Rapid Burning	25%

(3) Spinkler

It is assumed that the building will have a
Sprinkler system (-30%)
Additional credit for standard water supply (-10%)

(4) Exposure - Type III - Unprotected

Face	Distance	Length Height Factor	Exposure Factor
North	30+m	92	0%
East	10.1 to 20 m	69	6%
South	20.1 to 30 m	92	5%
West	20.1 to 30 m	69	3%
Total Exposure (max 75%)			14%

Calculate for all sides and all buildings.

Distance	Max
0 to 3 m	25%
3.1 to 10 m	20%
10.1 to 20 m	15%
20.1 to 30 m	10%
30.1+m	0%

HYDRANT FLOW TEST REPORT

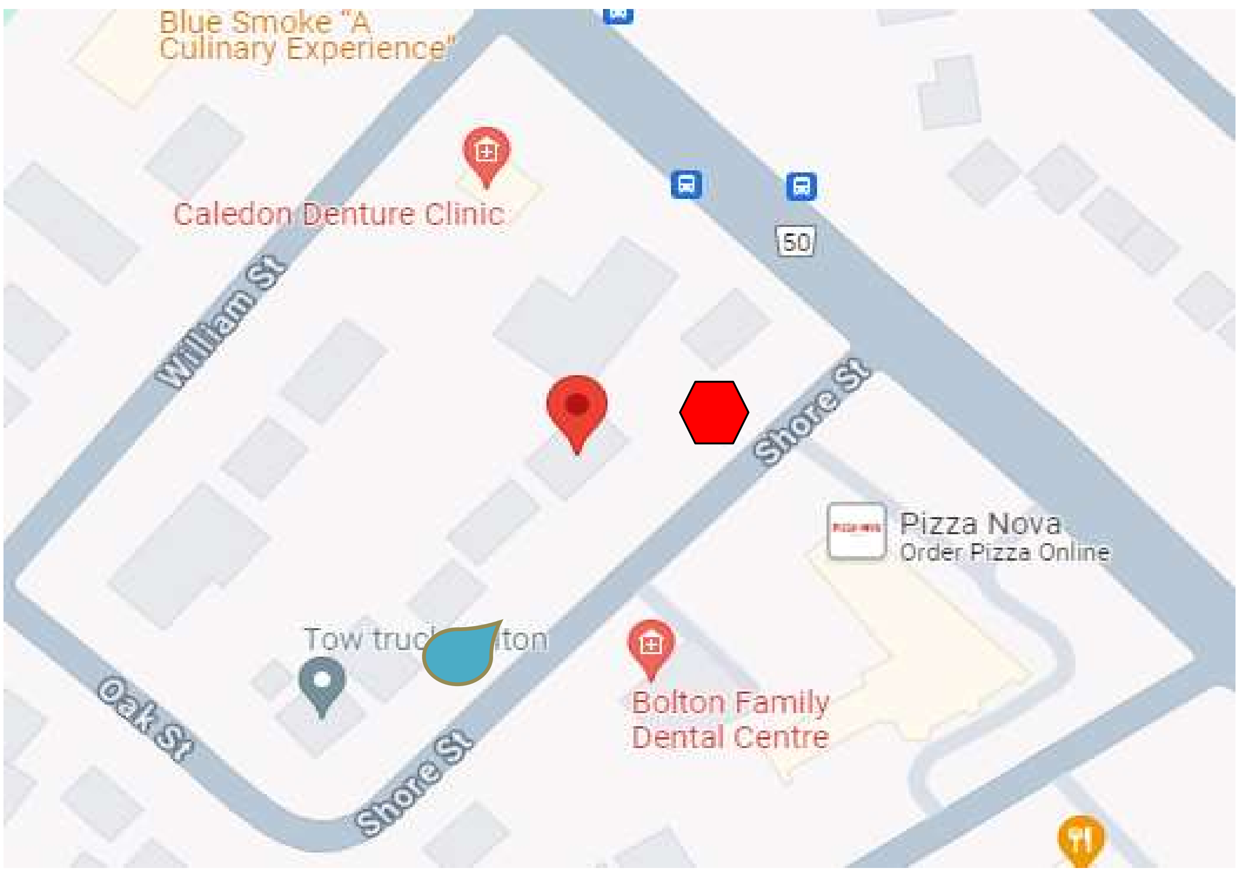
GENERAL INFORMATION:

PROJECT ID	1527SS	TESTED BY:	AA
CLIENT NAME	**Deven Verma**	DATE	**June 21-24**
BUILDING ADDRESS	**15-27 Shore Street**	TIME	**1:30:00 PM**
	Caledon, Ontario		

WATER MAIN INFORMATION:

MAIN SIZE / MATERIAL	**NA**
CONFIGURATION	**Looped**

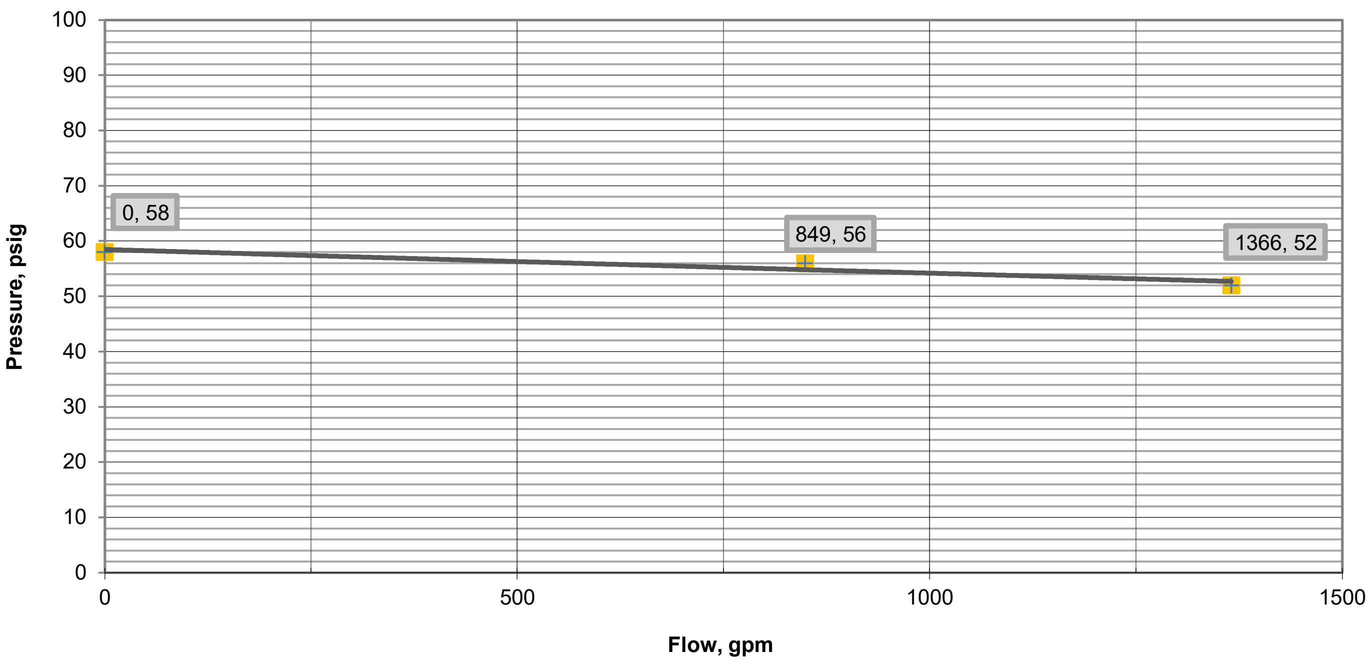
HYDRANT LOCATION:



LEGEND: STATIC HYDRANT RESIDUAL HYDRANT

FINAL RESULTS:

Test #	Number of Outlets	Orifice Size (in)	Pitot Reading (psig)	Equivlnt Flow (usgpm)	Total Flow (usgpm)	Projected flow at 20psi (usgpm)	Gauge Pressure (psig)	Discharge Coef'nt
Static	N/A	N/A	N/A	N/A	**0**	N/A	**58**	N/A
1	1	2.47	34	849	**849**	4163	**56**	0.8
2	2	2.47	22	683	**1366**	3700	**52**	0.8



Note: Report is in accordance with applicable bylaw standards and NFPA 291 Recommended Practice for Water Flow Testing and Marking of Hydrants

APPENDIX D

SANITARY DEMAND CALCULATIONS AND SINGLE USE DEMAND TABLE

SANITARY DEMAND CALCULATIONS

Region of Peel
SANITARY SEWER DESIGN SHEET - EXISTING CONDITIONS

urbanworks ENGINEERING CORPORATION

Project / Subdivision : 15,21,27 Shore Street, Caledon
Prepared by: Deven Verma
Last Revised: June 11, 2024

Consulting Engineer : Urbanworks Engineering Corporation
Checked by: Taras Dumyn, P. Eng
Project No.: 24-0002CA

Design Parameters

Manning 'n' =	0.013	
Infiltration flow =	0.28 L/s/mh	Region of Peel - Linear Waste Water Standards (2023) - Section 2.5.2
Extran. Flow (i)=	0.26 L/s/ha	Region of Peel - Linear Waste Water Standards (2023) - Section 2.5.2
Density (Detached)	4.2 person / unit	Region of Peel - Linear Waste Water Standards (2023) - Table 2-2
Density (large apartment)	3.1 person / unit	Region of Peel - Linear Waste Water Standards (2023) - Table 2-2
Density (small apartment)	1.7 person / unit	Region of Peel - Linear Waste Water Standards (2023) - Table 2-2
Density (Commercial)	50 person / ha	Region of Peel - Linear Waste Water Standards (2023) - Section 2.1.2

Residential Flow Rate 290 L/cap/day (Region)
Non-Residential Flow Rate 270 L/cap/day (Region)

Notes/Comments:

Design Equations

Q(P) = peak population flow (L/s)
Q (P)= (P x q x M) / 86.4 — peak population flow
Q(i)= number of mh * 0.28 l/s/mh — peak infiltration flow
Q(e)= area (ha) * 0.26 l/s/ha — peak extraneous flow
Q(d) = Q(p) + Q(e) + Q(i) — peak design flow
Qcap = $1/n \times A \times R^{0.67} S^{0.5}$ — Manning's Equation

$$M = 1 + \frac{14}{4 + (P/1000)^{0.5}}$$

min = 2
max = 4

References: Town of Newmarket, Engineering Design Standards and Criteria, August 2019

Location			Individual Values							Cumulative Values					Flow Data					Sewer Data							
Street	From	To	Gross Area	Commercial area	Detached Units	Large Apartments	Small Aparments	Commercial Population	Residential Population	Commercial Population	Residential Population	Total Population	Area	Peaking Factor	Peak Commercial Flow (L/s)	Peak Residential Flow (L/s)	Peak Infiltration Flow (L/s)	Peak Extraneous Flow (L/s)	Total Design Flow (L/s)	Length	Pipe Size	Type of Pipe	Grade	Full Flow Capacity (Qcap)	Full Flow Velocity	Actual Velocity	%Full
	MH #	MH #	(Ha)	(Ha)	(ea.)	(ea.)	(ea.)	(cap)	(cap)	(ea.)	(cap)	cap	Ha	M	Q(c)	Q(r)	Q (i)	Q(e)	Q(d)	(m)	(mm)		(%)	(L/s)	(m/s)	(m/s)	%
Shore Street	1651195	309324	0.93	0.42	5	-	-	21	21	21	21	42	0.93	4.00	0.26	0.28	0.28	0.24	1.07	120.00	200	PVC	1.40	38.81	1.24	0.53	2.7

Region of Peel
SANITARY SEWER DESIGN SHEET - PROPOSED CONDITIONS

urbanworks ENGINEERING CORPORATION

Project / Subdivision : 15,21,27 Shore Street, Caledon **Prepared by:** Deven Verma **Last Revised:** June 11, 2024

Consulting Engineer : Urbanworks Engineering Corporation **Checked by:** Taras Dumyn, P. Eng

Project No.: 24-0002CA

Design Parameters

Manning 'n' =	0.013	
Infiltration flow =	0.28 L/s/mh	Region of Peel - Linear Waste Water Standards (2023) - Section 2.5.2
Extran. Flow (i)=	0.26 L/s/ha	Region of Peel - Linear Waste Water Standards (2023) - Section 2.5.2
Density (Detached)	4.2 person / unit	Region of Peel - Linear Waste Water Standards (2023) - Table 2-2
Density (large apartment)	3.1 person / unit	Region of Peel - Linear Waste Water Standards (2023) - Table 2-2
Density (small apartment)	1.7 person / unit	Region of Peel - Linear Waste Water Standards (2023) - Table 2-2
Density (Commercial)	50 person / ha	Region of Peel - Linear Waste Water Standards (2023) - Section 2.1.2

Residential Flow Rate 290 L/cap/day (Region)

Non-Residential Flow Rate 270 L/cap/day (Region)

Notes/Comments:

Design Equations

Q(P) = peak population flow (L/s)

Q (P)= (P x q x M) / 86.4 peak population flow

Q(i)= number of mh * 0.28 l/s/mh peak infiltration flow

Q(e)= area (ha) * 0.26 l/s/ha peak extraneous flow

Q(d) = Q(p) + Q(e) + Q(i) peak design flow

$$M = 1 + \frac{14}{4 + (P/1000)^{0.5}}$$ min = 2, max = 4

Qcap = $1/n \times A \times R^{0.67} S^{0.5}$ Manning's Equation

References: Town of Newmarket, Engineering Design Standards and Criteria, August 2019

Location			Individual Values							Cumulative Values					Flow Data					Sewer Data							
Street	From	To	Gross Area	Commercial area	Detached Units	Large Apartments	Small Aparments	Commercial Population	Residential Population	Commercial Population	Residential Population	Total Population	Area	Peaking Factor	Peak Commercial Flow (L/s)	Peak Residential Flow (L/s)	Peak Infiltration Flow (L/s)	Peak Extraneous Flow (L/s)	Total Design Flow (L/s)	Length	Pipe Size	Type of Pipe	Grade	Full Flow Capacity (Qcap)	Full Flow Velocity	Actual Velocity	%Full
	MH #	MH #	(Ha)	(Ha)	(ea.)	(ea.)	(ea.)	(cap)	(cap)	(ea.)	(cap)	cap	Ha	M	Q(c)	Q(r)	Q (i)	Q(e)	Q(d)	(m)	(mm)		(%)	(L/s)	(m/s)	(m/s)	%
Proposed Development	BLDG	Inspection MH	0.21	-	-	14	5	-	52	-	52	52	0.21	4.00	-	0.70	0.28	0.05	1.03	4.00	150	PVC	2.00	21.54	1.22	0.62	4.8
Proposed Development	Inspection MH	Main	-	-	-	-	-	-	-	-	52	52	0.21	4.00	-	0.70	0.28	0.05	1.03	9.00	150	PVC	2.00	21.54	1.22	0.62	4.8
Shore Street	1651195	309324	0.72	0.42	2	-	-	21	8	21	60	81	0.93	4.00	0.26	0.81	0.28	0.24	1.59	120.00	200	PVC	1.40	38.81	1.24	0.60	4.1

=proposed sewer

=existing sewer

SINGLE USE DEMAND TABLE

Water and Wastewater Modelling Demand Table - Site Plan applications

Version - January 2023

		units	persons
Proposed Residential[1)]			
	Singles/Semis	0	0
	townhouses	0	0
	large apartments (>750sqft)	14	44
	small apartments (<=750sqft)	5	8
Total Proposed Residential			52
Proposed Institutional Population[2)]			n/a
Proposed Employment Population[3)]			n/a
Total			52

Proposed GFA (commercial/retail) (sqm)	n/a

WATER CONNECTION

Hydrant flow test				
	Hydrant flow test locations [4)]	FH (#6513625) on Shore Street, Caledon		
		Pressure (kPa)	Flow (in l/s)	Time
	Minimum water pressure	386.1	53.36	June 21, 2024 1:30 PM
	Maximum water pressure	400	0	June 21, 2024 1:30 PM

No.	Water demands				
		Demand (in l/s)			
	Demand type	Use 1 [6)]	Use 2 [6)]	Use 3 [6)]	Total
1	Average day flow	0.17			0.17
2	Maximum day flow	0.34			0.34
3	Peak hour flow	0.50			0.50
4	Fire flow [5)]	83.33			83.33
Analysis					
5	Maximum day plus fire flow	83.67			83.67

WASTEWATER CONNECTION

		Discharge Location[7)]	Flow
6	Wastewater sewer effluent (in l/s)	new connection between EX. MH 1651195 and 309324	1.03
7	Wastewater sewer effluent (in l/s)		
8	Wastewater sewer effluent (in l/s)		
9	Total Wastewater sewer effluent (in l/s)		1.03

1) For the design flow calculations, please consider the following PPU's, which are found in the Region of Peel 2020 DC Background Study

☐Singles/Semi – 4.2

☐Multiples (Townhouses) – 3.4
☐Large Apartments (larger than 750 square feet) – 3.0
☐Small Apartments (equal to or less than 750 square feet) – 1.6

[2)] refer to Region of Peel design criteria

[3)] For the commercial and industrial design flow calculations, please use your site specific estimated population or the most current Ontario Building Code Occupant Load determination

[4)] Please include the graphs associated with the hydrant flow test information table

[4)] Hydrant flow tests should be performed within 2 years of submisison to the Region.
The Region will not permit hydrant flow tests during the winter, please check with the Region for scheduling

[5)] Please reference the Fire Underwriters Survey Document

[6)] Please identify the flows for each use type, if applicable

[7)] Please include drainage plan for mutliple discharge locations

The calculations should be based on the development proposal
All required calculations must be submitted with the demand table submission
Table shall include Professional Engineer's signature and stamp
Site servicing concept shall be included

This table will be deemed complete when all the above is submitted and/or included. Modelling will commence with a complete table.

APPENDIX E

STORMWATER MANAGEMENT CALCULATIONS AND JELLYFISH SIZING REPORT

SITE CHARACTERISTICS

PROJECT: 15,21,27 Shore Street, Caledon
FILE No.: 24-0002CA
DATE: 2024-09-23
PREPARED BY: DV

urbanworks ENGINEERING CORPORATION

Pre-Development

Land Use	Impervious Ratio (I)	Area 101 (m^2)	Area 102 (m^2)	Area 103 (m^2)	Total Drainage Area (m2)	% Coverage
Asphalt Driveway	1	171.00	19.30	0.00	190.30	9.2%
Roof	1	372.60	0	17.16	389.76	18.9%
Hardscape	1	36.00	0	79.36	115.36	5.6%
Landscape	0	522.62	37	811.78	1371.40	66.3%
Total		1102.22	56.60	908.30	2067.12	100%
		1102.22				
Impervious Ratio		0.53	0.34	0.11	0.34	
Runoff coefficient = (0.25*(1- i)+ 0.9i) =		0.59	0.47	0.32	0.47	

Post-Development

Land Use	Impervious Ratio (I)	Area 201 (m^2)	Area 202 (m^2)	Area 203 (m^2)	Total Drainage Area (m2)	% Coverage
Asphalt Driveway	1	1055.04	0	0.00	1055.04	51.0%
Roof	1	423.43	0	0.00	423.43	20.5%
Hardscape	1	114.48	8.00	0.00	122.48	5.9%
Landscape	0	358.74	48.60	58.83	466.17	22.6%
Total		1951.69	56.60	58.83	2067.12	100.0%
Impervious Ratio		0.82	0.14	0.00	0.77	
Runoff coefficient = (0.25 * (1- i)+ 0.9i) =		0.78	0.34	0.25	0.75	

PEAK FLOW CALCULATION: RATIONAL METHOD
PRE-DEVELOPMENT CONDITION

PROJECT: 15,21,27 Shore Street, Caledon
FILE No.: 24-0002CA
DATE: 2024-09-23
PREPARED BY: DV

urbanworks ENGINEERING CORPORATION

IDF DATA SET:	Town Std. No. 103		
STORM EVENT	**COEFFICIENTS**		
	A	**B**	**C**
2 YR.	1070	0.8759	7.85
5 YR.	1593	0.8789	11
10 YR.	2221	0.908	12
25 YR.	3158	0.9335	15
50 YR.	3886	0.9495	16
100 YR.	4688	0.9624	17

Rainfall Intensity: $I = A * B / (t_{c+C})$

Peak Flow: $Q = 0.00278 * (C \cdot I \cdot A)$

Min. Inlet Time: *Tc = 10.0min.*

STORM EVENT	AREA I.D.	AREA (ha)	C	A x C	Tc (min.)	I (mm/hr)	Q (m^3/s)	Q (L/s)
2 YR.	101	0.1102	0.59	0.065	10.0	52.5	0.0095	9.5
5 YR.	101	0.1102	0.59	0.065	10.0	66.7	0.0121	12.1
10 YR.	101	0.1102	0.59	0.065	10.0	91.7	0.0166	16.6
25 YR.	101	0.1102	0.59	0.065	10.0	117.9	0.0214	21.4
50 YR.	101	0.1102	0.59	0.065	10.0	141.9	0.0257	25.7
100 YR.	101	0.1102	0.59	0.065	10.0	167.1	0.0303	30.3

STORM EVENT	AREA I.D.	AREA (ha)	C	A x C	Tc (min.)	I (mm/hr)	Q (m^3/s)	Q (L/s)
2 YR.	102	0.0057	0.47	0.003	10.0	52.5	0.000	0.4
5 YR.	102	0.0057	0.47	0.003	10.0	66.7	0.000	0.5
10 YR.	102	0.0057	0.47	0.003	10.0	91.7	0.001	0.7
25 YR.	102	0.0057	0.47	0.003	10.0	117.9	0.001	0.9
50 YR.	102	0.0057	0.47	0.003	10.0	141.9	0.001	1.1
100 YR.	102	0.0057	0.47	0.003	10.0	167.1	0.001	1.2

STORM EVENT	AREA I.D.	AREA (ha)	C	A x C	Tc (min.)	I (mm/hr)	Q (m^3/s)	Q (L/s)
2 YR.	103	0.0908	0.32	0.029	10.0	52.5	0.0042	4.2
5 YR.	103	0.0908	0.32	0.029	10.0	66.7	0.0054	5.4
10 YR.	103	0.0908	0.32	0.029	10.0	91.7	0.0074	7.4
25 YR.	103	0.0908	0.32	0.029	10.0	117.9	0.0095	9.5
50 YR.	103	0.0908	0.32	0.029	10.0	141.9	0.0114	11.4
100 YR.	103	0.0908	0.32	0.029	10.0	167.1	0.0135	13.5

PEAK FLOW CALCULATION: RATIONAL METHOD
POST-DEVELOPMENT CONDITION

urbanworks ENGINEERING CORPORATION

PROJECT: 15,21,27 Shore Street, Caledon
FILE No.: 24-0002CA
DATE: 2024-09-23
PREPARED BY: DV

IDF DATA SET:	Town Std. No. 103		
STORM EVENT	COEFFICIENTS		
	A	B	C
2 YR.	1070	0.8759	7.85
5 YR.	1593	0.8789	11
10 YR.	2221	0.908	12
25 YR.	3158	0.9335	15
50 YR.	3886	0.9495	16
100 YR.	4688	0.9624	17

Rainfall Intensity: $I = A * B / (t_{c+C})$
Peak Flow: $Q = 0.00278 * (C \cdot I \cdot A)$
Min. Inlet Time: $Tc = 10.0min.$

STORM EVENT	AREA I.D.	AREA (ha)	C	A x C	Tc (min.)	I (mm/hr)	Q (m^3/s)	Q (L/s)
2 YR.	201	0.1952	0.78	0.152	10.0	52.5	0.0222	22.2
5 YR.	201	0.1952	0.78	0.152	10.0	66.7	0.0282	28.2
10 YR.	201	0.1952	0.78	0.152	10.0	91.7	0.0388	38.8
25 YR.	201	0.1952	0.78	0.152	10.0	117.9	0.0499	49.9
50 YR.	201	0.1952	0.78	0.152	10.0	141.9	0.0601	60.1
100 YR.	201	0.1952	0.78	0.152	10.0	167.1	0.0707	70.7

STORM EVENT	AREA I.D.	AREA (ha)	C	A x C	Tc (min.)	I (mm/hr)	Q (m^3/s)	Q (L/s)
2 YR.	202	0.0057	0.34	0.002	10.0	52.5	0.000	0.3
5 YR.	202	0.0057	0.34	0.002	10.0	66.7	0.000	0.4
10 YR.	202	0.0057	0.34	0.002	10.0	91.7	0.000	0.5
25 YR.	202	0.0057	0.34	0.002	10.0	117.9	0.001	0.6
50 YR.	202	0.0057	0.34	0.002	10.0	141.9	0.001	0.8
100 YR.	202	0.0057	0.34	0.002	10.0	167.1	0.001	0.9

STORM EVENT	AREA I.D.	AREA (ha)	C	A x C	Tc (min.)	I (mm/hr)	Q (m^3/s)	Q (L/s)
2 YR.	203	0.0059	0.25	0.001	10.0	52.5	0.0002	0.2
5 YR.	203	0.0059	0.25	0.001	10.0	66.7	0.0003	0.3
10 YR.	203	0.0059	0.25	0.001	10.0	91.7	0.0004	0.4
25 YR.	203	0.0059	0.25	0.001	10.0	117.9	0.0005	0.5
50 YR.	203	0.0059	0.25	0.001	10.0	141.9	0.0006	0.6
100 YR.	203	0.0059	0.25	0.001	10.0	167.1	0.0007	0.7

ALLOWABLEL RELEASE RATE CALCULATION: RATIONAL METHOD

Uncontrolled Flow

PROJECT: 15,21,27 Shore Street, Caledon
FILE No.: 24-0002CA
DATE: 2024-09-23
PREPARED BY: DV

=Total Target Flow rate in proposed conditions

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Existing Conditions - All existing areas are uncontrolled

	To Shore Street	To Shore Street	To North P/L	
Return Period	**Area A101 (L/s)**	**Area A102 (L/s)**	**Area A103 (L/s)**	**Total Flow (L/s)**
2	9.5	0.4	4.2	14.1
5	12.1	0.5	5.4	17.9
10	16.6	0.7	7.4	24.7
25*	21.4	0.9	9.5	31.7
50*	25.7	1.1	11.4	38.2
100*	30.3	1.2	13.5	45.0

Proposed Conditions

	To Shore Street	To Shore Street Uncontrolled	To North P/L Uncontrolled	
Return Period	**Area A201 (L/s)**	**Area A202 (L/s)**	**Area A203 (L/s)**	**Total Flow (L/s)**
2	22.2	0.3	0.2	22.5
5	28.2	0.4	0.3	28.6
10	38.8	0.5	0.4	39.3
25*	49.9	0.6	0.5	50.5
50*	60.1	0.8	0.6	60.8
100*	70.7	0.9	0.7	71.6

Allowable Release Rate

$$Q = Q_{PRE} - Q_U$$

Where: Q = Allowable Post-Development Release Rat (100-Year)
Q_{PRE} = Pre-Development Flow (5-Year)
Q_U = Post-Development Uncontrolled Flow (100-Year)

Pre-Development Flow to Shore Street (Areao 101 + 102)	Post-Development Uncontrolled Flows to Shore Street (Area 202)	Allowable Post-Dev. Release Rate Q (L/s)
12.6	0.9	11.7

Area 202 and 203 will remain uncontrolled and Area 201 will be controlled to a max of 11.7 L/s

ORIFICE CONTROL SIZING CALCULATION

PROJECT: 15,21,27 Shore Street, Caledon
FILE No.: 24-0002CA
DATE: 2024-09-23
PREPARED BY: DV

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Orifice Control Equation

$$Q = C \bullet A \bullet (2gh)^{0.5}$$

Where: Q = Flow Rate
C = Discharge Coefficient
C (tube) = 0.80
C (plate) = 0.62
A = Orifice Area
g = Acceleration Due to Gravity = 9.81 m/s^2
h = Head

Orifice Diameter (mm)	65
High Water Elev. (m)	254.250
Orifice Invert Elev. (m)	252.910
Flow Rate (L/s) Required	11.7
Flow Rate (L/s) Provided	10.4

Orifice to come with debris screen (welded wire cage)

Orifice Center Elev. (m)	*252.94*
Head (m)	*1.308*
C	*0.62*
Orifice Area (m^2)	*0.0033*

STORMWATER STORAGE & RELEASE CALCULATION

100-YEAR STORM

PROJECT:	15,21,27 Shore Street, Caledon
FILE No.:	24-0002CA
DATE:	2024-09-23
PREPARED BY:	DV

DRAINAGE AREA I.D.	201		**IDF DATA SET:**	Town Std. No. 103		
DRAINAGE AREA (ha)	0.195		**STORM**	**COEFFICIENTS**		
RUNOFF COEFF. (C)	0.78		**EVENT**	**A**	**B**	**C**
A x C	0.152		2 YR.	1070	0.8759	7.85
TOTAL A x C	0.152		5 YR.	1593	0.8789	11
TIME OF CONCENTRATION	10.0	min.	10 YR	2221	0.908	12
TIME STEP	1.0	min.	25 YR.	3158	0.9335	15
CONTROLLED RELEASE RATE (Q_C)	0.0104	m^3/s	50 YR.	3886	0.9495	16
MAX. STORAGE REQUIRED	55.39	m^3	100 YR.	4688	0.9624	17

T	*I = A * B / (tc + C)*	$Q_R=(C\cdot I\cdot A)*0.00278$	$V_R = Q_R \cdot T \cdot 60$	$V_C = Q_C \cdot T \cdot 60$	$V = V_R - V_C$
TIME (min.)	**RAINFALL INTENSITY (mm/hr)**	**RUNOFF (m^3/s)**	**RUNOFF VOL. (m^3)**	**CONTROLLED RELEASE VOL. (m^3)**	**STORAGE VOL. (m^3)**
10	167.1	0.071	42.43	6.25	36.17
11	161.1	0.068	45.00	6.88	38.12
12	155.6	0.066	47.40	7.50	39.90
13	150.4	0.064	49.64	8.13	41.51
14	145.5	0.062	51.73	8.75	42.98
15	141.0	0.060	53.69	9.38	44.32
16	136.7	0.058	55.54	10.00	45.54
17	132.7	0.056	57.27	10.63	46.65
18	128.9	0.055	58.91	11.25	47.66
19	125.3	0.053	60.46	11.88	48.58
20	121.9	0.052	61.92	12.50	49.41
21	118.7	0.050	63.30	13.13	50.17
22	115.7	0.049	64.62	13.75	50.86
23	112.8	0.048	65.87	14.38	51.49
24	110.0	0.047	67.05	15.01	52.05
25	107.4	0.045	68.18	15.63	52.55
26	104.9	0.044	69.26	16.26	53.01
27	102.5	0.043	70.29	16.88	53.41
28	100.3	0.042	71.27	17.51	53.77
29	98.1	0.042	72.22	18.13	54.08
30	96.0	0.041	73.12	18.76	54.36
31	94.0	0.040	73.98	19.38	54.60
32	92.1	0.039	74.81	20.01	54.80
33	90.2	0.038	75.60	20.63	54.97
34	88.5	0.037	76.37	21.26	55.11
35	86.8	0.037	77.10	21.88	55.22
36	85.1	0.036	77.81	22.51	55.30
37	83.6	0.035	78.49	23.13	55.35
38	82.0	0.035	79.14	23.76	55.38
39	80.6	0.034	79.77	24.38	55.39
40	79.2	0.033	80.38	25.01	55.38
41	77.8	0.033	80.97	25.63	55.34
42	76.5	0.032	81.54	26.26	55.28
43	75.2	0.032	82.09	26.88	55.21
44	74.0	0.031	82.63	27.51	55.12
45	72.8	0.031	83.14	28.13	55.01
46	71.6	0.030	83.64	28.76	54.88
47	70.5	0.030	84.12	29.39	54.74
48	69.4	0.029	84.59	30.01	54.58
49	68.4	0.029	85.04	30.64	54.41

PROVIDED UNDERGROUND STORAGE CALCULATION

PROJECT: 15,21,27 Shore Street, Caledon
FILE No.: 24-0002CA
DATE: 2024-09-23
PREPARED BY: DV

urbanworks ENGINEERING CORPORATION

100-YEAR MAX. STORAGE REQUIRED	55.39 m^3	(100 Year)
100-YEAR SURFACE STORAGE PROVIDED	55.45 m^3	(ELEV. 254.25)

Note:
Underground pipe and structure storage not used in surface storage calculations

Structure ID	CB1	CBMH1	CBMH2
Top of Grate	**254.15**	**254.00**	**253.95**
Max Ponding Elev.	**254.25**	**254.25**	**254.25**
Max Ponding Depth	**0.10**	**0.25**	**0.30**
Max Ponding Area (m2)	194.50	295.04	243.83

	CB1	CBMH1	CBMH2	Total Surface	
Flood Elev. (m)	Surface Storage Volume (m^3)	Surface Storage Volume (m^3)	Surface Storage Volume (m^3)	Storage Volume (m^3)	Notes
253.950	0.0	0.0	0.0	0.00	
253.960	0.0	0.0	0.8	0.81	
253.970	0.0	0.0	1.6	1.63	
253.980	0.0	0.0	2.4	2.44	
253.990	0.0	0.0	3.3	3.25	
254.000	0.0	0.0	4.1	4.06	
254.010	0.0	1.0	4.9	5.86	
254.020	0.0	2.0	5.7	7.66	
254.030	0.0	3.0	6.5	9.45	
254.040	0.0	3.9	7.3	11.25	
254.050	0.0	4.9	8.1	13.05	
254.060	0.0	5.9	8.9	14.84	
254.070	0.0	6.9	9.8	16.64	
254.080	0.0	7.9	10.6	18.43	
254.090	0.0	8.9	11.4	20.23	
254.100	0.0	9.8	12.2	22.03	
254.110	0.0	10.8	13.0	23.82	
254.120	0.0	11.8	13.8	25.62	
254.130	0.0	12.8	14.6	27.42	
254.140	0.0	13.8	15.4	29.21	
254.150	0.0	14.8	16.3	31.01	
254.160	0.6	15.7	17.1	33.45	
254.170	1.3	16.7	17.9	35.90	
254.180	1.9	17.7	18.7	38.34	
254.190	2.6	18.7	19.5	40.79	
254.200	3.2	19.7	20.3	43.23	
254.210	3.9	20.7	21.1	45.68	
254.220	4.5	21.6	21.9	48.12	
254.230	5.2	22.6	22.8	50.56	
254.240	5.8	23.6	23.6	53.01	
254.250	6.5	24.6	24.4	55.45	*100-Year Storage Level*

EROSION CONTROL / INFILTRATION CALCULATIONS

PROJECT: 15,21,27 Shore Street, Caledon
FILE No.: 24-0002CA
DATE: 2024-09-23
PREPARED BY: DV

Erosion Control / Infiltration Target Volume Calculations

Minimum 5mm volume from the new impervious areas is required to be infiltrated throughout the development
Runoff from roof leaders to be directed to infiltration facility

Post-development impervious surfaces = 1593.0 m^2

Erosion Control Volume Required = Total Impervious Drainage Area X 5mm
Erosion Control Volume Required = 8.0 m^3

Total Volume Retained On Site = LID Storage

Storage provided by Undergronud Tank = 9.0 m^3
Total Volume Retained = 9.0 m^3

Storage Facility LID Volume Calculations - Landscaping / Irrigation Use

<u>Drawdown Time</u>

I = infiltration rate* = 6 mm/hr
*As reported by Geotechnical Report by Soil Engineers Ltd, dated July 19, 2024

Infitlration rate is insufficient to support any infiltration measure within the site. Erosion Control to be accomplished with water re-use.

d = height of chambers = 350 mm
Vr = storage void ratio = 0.96

t = $d\,V_r / i$
t = 56.00 hours

more than the maximum draw down time of 48 hours.

<u>Rain Water Harvesting - Landscaping/Irrigation or Grey Water Re-use</u>

Graf Platin 3000 L (x3) Rainwater Cistern= 9 m^3 Higher than the required Erosion Control Volume of 8.0 m3

STORM SEWER DESIGN SHEET

15, 21, 27 SHORE STREET

TOWN OF CALEDON

urbanworks ENGINEERING CORPORATION

PROJECT No.: 24-0002CA
DATE: 2024-09-23
DESIGNED BY: Deven Verma
CHECKED BY: Giancarlo Volpe

		Coeff.	5-Year
Rainfall Intensity:	*I = A * B / (tc + C)*		
Design Flow:	*Q = (C · I · A)*2.778*	*a*	*1593*
Pipe Roughness:	*n = 0.013*	*b*	*0.8789*
Min. Inlet Time:	*t = 10.0min.*	*c*	*11.000*

System to be designed for *5 year Storm*

: Indicates controlled flow after orifice in outlet structure

AREA I.D.	LOCATION	STRUCTURE FROM	STRUCTURE TO	AREA (ha) A	RUNOFF COEFF. C_5	AREA RUNOFF A x C_5	RUNOFF ACCUM. A x C_5	Tc (min.)	RAINFALL INT.(mm/hr) i_5	DESIGN FLOWS 5-YEAR FLOW Q_5 (m^3/s)	DESIGN FLOWS TOTAL Q_{TOTAL} (m^3/s)	PIPE DATA LENGTH (m)	SIZE (mm)	PIPE MAT.	GRADE (%)	Q_{FULL} (m^3/s)	V_{FULL} (m/s)	V_{ACTUAL} (m/s	TIME SECT. TIME (min.)	TOTAL TIME (min.)	CAPACITY CHECK Q_{DESIGN} / Q_{FULL}	COMMENTS
	SITE	CB1	CBMH1	0.11	0.82	0.089	0.089	10	66.67	0.017	0.017	30.4	200	PVC	0.50	0.023	0.74	0.83	0.69	10.69	71.2%	
		CBMH1	CBMH2 (CONTROL)	0.05	0.74	0.035	0.124	10.69	64.56	0.022	0.022	19.5	250	PVC	0.30	0.033	0.66	0.74	0.49	11.18	68.2%	
		CBMH2 (CONTROL)	DIVERSION MH	0.05	0.64	0.030	0.154	11.18	63.13	0.010	0.010	12.6	250	PVC	0.30	0.033	0.66	0.53	0.32	11.49	31.9%	FLOW CONTROLLED TO 10.4 L/s AFTER ORIFICE PLATE
		DIVERSION MH	PR. STM MH 2				0.154	11.49	62.24	0.010	0.010	12.2	250	PVC	0.30	0.033	0.66	0.53	0.31	11.80	31.9%	

Urbanworks Engineering Corporation
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STORM SEWER DESIGN SHEET
SHORE STREET
TOWN OF CALEDON

urbanworks ENGINEERING CORPORATION

PROJECT No.: 24-0002CA
DATE: 2024-09-23
DESIGNED BY: Deven Verma
CHECKED BY: Giancarlo Volpe

		Coeff.	5-Year
Rainfall Intensity:	$I = A * B / (tc + C)$	a	1593
Design Flow:	$Q = (C \cdot I \cdot A)*2.778$	b	0.8789
Pipe Roughness:	$n = 0.013$	c	11.000
Min. Inlet Time:	$t = 10.0$min.		

System to be designed for 5 year Storm

: Indicates controlled flow after orifice in outlet structure

AREA I.D.	LOCATION	STRUCTURE FROM	STRUCTURE TO	AREA (ha) A	RUNOFF COEFF. C_5	AREA RUNOFF $A \times C_5$	RUNOFF ACCUM. $A \times C_5$	Tc (min.)	RAINFALL INT.(mm/hr) i_5	DESIGN FLOWS 5-YEAR FLOW Q_5 (m^3/s)	DESIGN FLOWS TOTAL Q_{TOTAL} (m^3/s)	PIPE DATA LENGTH (m)	SIZE (mm)	PIPE MAT.	GRADE (%)	Q_{FULL} (m^3/s)	V_{FULL} (m/s)	V_{ACTUAL} (m/s	TIME SECT. TIME (min.)	TOTAL TIME (min.)	CAPACITY CHECK Q_{DESIGN} / Q_{FULL}	COMMENTS
301	SHORE STREET	PR. STM MH 1	PR. STM MH 2	0.37	0.77	0.286	0.286	10	66.67	0.053	0.053	82.1	375	PVC	0.35	0.104	0.94	0.95	1.46	11.46	51.0%	
302	SUBJECT PROPERTY	SITE	PR. STM MH2	0.21	-	-	-	-	-	0.010	0.010	12.2	250	PVC	0.30	0.033	0.66	0.53	-	-	31.9%	Flow from subject property controlled to 10.4 L/s
303	SHORE STREET	PR. STM MH 2	CBMH RR050-0347	0.34	0.77	0.261	0.547	11.46	62.34	0.105	0.105	39.5	375	PVC	0.40	0.111	1.00	1.10	0.66	12.11	94.8%	

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JELLYFISH SIZING REPORT

STANDARD OFFLINE Jellyfish Filter Sizing Report

Project Information

Date	Thursday, September 12, 2024
Project Name	15, 21, 27 Shore St.
Project Number	24-0002CA
Location	Caledon

Jellyfish Filter Design Overview

This report provides information for the sizing and specification of the Jellyfish Filter. When designed properly in accordance to the guidelines detailed in the Jellyfish Filter Technical Manual, the Jellyfish Filter will exceed the performance and longevity of conventional horizontal bed and granular media filters.

Please see ***www.ImbriumSystems.com*** *for more information.*

Jellyfish Filter System Recommendation

The Jellyfish Filter model JF4-1-1 is recommended to meet the water quality objective by treating a flow of 7.6 L/s, which meets or exceeds 90% of the average annual rainfall runoff volume based on 18 years of TORONTO CENTRAL rainfall data for this site. This model has a sediment capacity of 85 kg, which meets or exceeds the estimated average annual sediment load.

Jellyfish Model	Number of High-Flo Cartridges	Number of Draindown Cartridges	Manhole Diameter (m)	Treatment Flow Rate (L/s)	Sediment Capacity (kg)
JF4-1-1	1	1	1.2	7.6	85

The Jellyfish Filter System

The patented Jellyfish Filter is an engineered stormwater quality treatment technology featuring unique membrane filtration in a compact stand-alone treatment system that removes a high level and wide variety of stormwater pollutants. Exceptional pollutant removal is achieved at high treatment flow rates with minimal head loss and low maintenance costs. Each lightweight Jellyfish Filter cartridge contains an extraordinarily large amount of membrane surface area, resulting in superior flow capacity and pollutant removal capacity.

Maintenance

Regular scheduled inspections and maintenance is necessary to assure proper functioning of the Jellyfish Filter. The maintenance interval is designed to be a minimum of 12 months, but this will vary depending on site loading conditions and upstream pretreatment measures. Quarterly inspections and inspections after all storms beyond the 5-year event are recommended until enough historical performance data has been logged to comfortably initiate an alternative inspection interval.

Please see ***www.ImbriumSystems.com*** *for more information.*

Thank you for the opportunity to present this information to you and your client.

Performance

Jellyfish efficiently captures a high level of Stormwater pollutants, including:

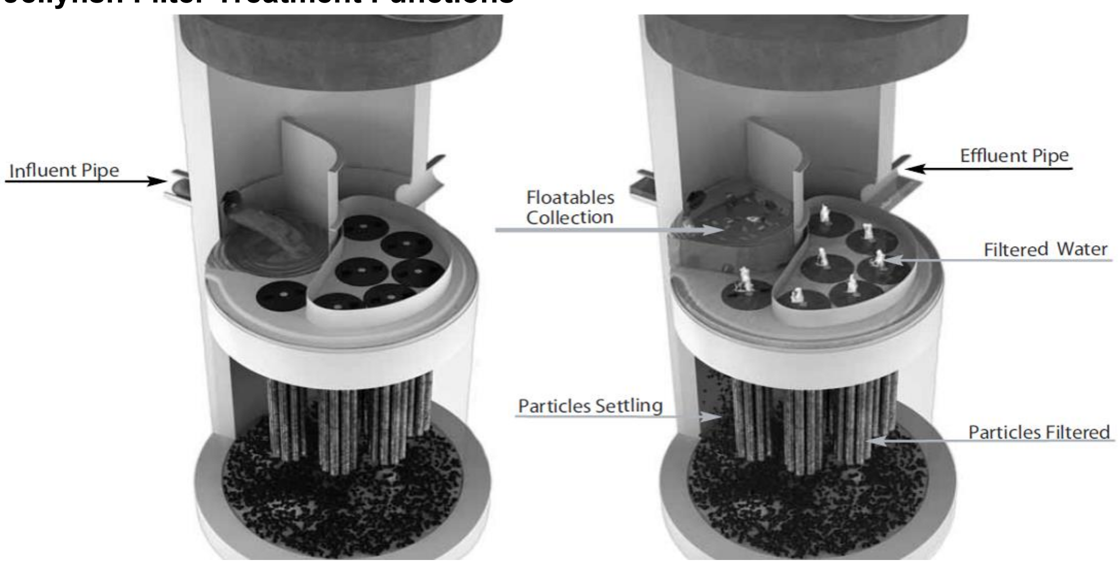
- ☑ 89% of the total suspended solids (TSS) load, including particles less than 5 microns
- ☑ 77% TP removal & 51% TN removal
- ☑ 90% Total Copper, 81% Total Lead, 70% Total Zinc
- ☑ Particulate-bound pollutants such as nutrients, toxic metals, hydrocarbons and bacteria
- ☑ Free oil, Floatable trash and debris

Field Proven Peformance

The Jellyfish filter has been field-tested on an urban site with 25 TAPE qualifying rain events and field monitored according to the TAPE field test protocol, demonstrating:

- A median TSS removal efficiency of 90%, and a median SSC removal of 99%;
- The ability to capture fine particles as indicated by an effluent d50 median of 3 microns for all monitotred storm events, and a median effluent turbidity of 5 NTUs;
- A median Total Phosphorus removal of 77%, and a median Total Nitrogen removal of 51%.

Jellyfish Filter Treatment Functions



Pre-treatment and Membrane Filtration

Jellyfish® Filter

Project Information

Date:	Thursday, September 12, 2024
Project Name:	15, 21, 27 Shore St.
Project Number:	24-0002CA
Location:	Caledon

Designer Information

Company:	Urbanworks Engineering Corp.
Contact:	Deven Verma
Phone #:	

Notes

Rainfall

Name:	TORONTO CENTRAL
State:	ON
ID:	100
Record:	1982 to 1999
Co-ords:	45°30'N, 90°30'W

Drainage Area

Total Area:	0.2 ha
Imperviousness:	82%

Upstream Detention

Peak Release Rate:	n/a
Pretreatment Credit:	n/a

Design System Requirements

Flow Loading	90% of the Average Annual Runoff based on 18 years of TORONTO CENTRAL rainfall data:	**5.2 L/s**
Sediment Loading	Treating 90% of the average annual runoff volume, 988 m³, with a suspended sediment concentration of 60 mg/L.	**59 kg**

Recommendation

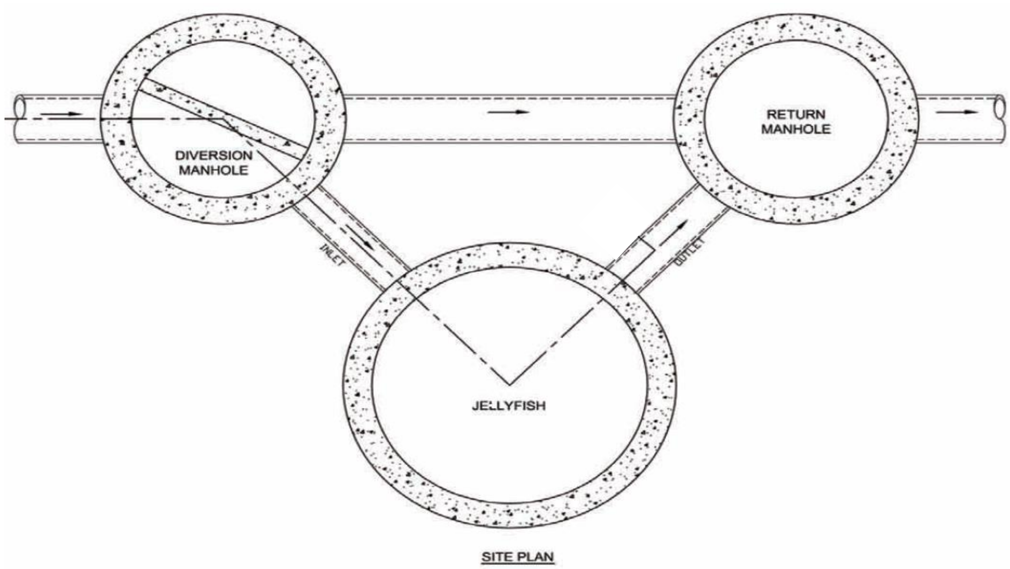
The Jellyfish Filter model JF4-1-1 is recommended to meet the water quality objective by treating a flow of 7.6 L/s, which meets or exceeds 90% of the average annual rainfall runoff volume based on 18 years of TORONTO CENTRAL rainfall data for this site. This model has a sediment capacity of 85 kg, which meets or exceeds the estimated average annual sediment load.

Jellyfish Model	Number of High-Flo Cartridges	Number of Draindown Cartridges	Manhole Diameter (m)	Wet Vol Below Deck (L)	Sump Storage (m³)	Oil Capacity (L)	Treatment Flow Rate (L/s)	Sediment Capacity (kg)
JF4-1-1	**1**	**1**	**1.2**	**2313**	**0.34**	**379**	**7.6**	**85**
JF4-2-1	2	1	1.2	2313	0.34	379	12.6	142
JF6-3-1	3	1	1.8	5205	0.79	848	17.7	199
JF6-4-1	4	1	1.8	5205	0.79	848	22.7	256
JF6-5-1	5	1	1.8	5205	0.79	848	27.8	313
JF6-6-1	6	1	1.8	5205	0.79	848	28.6	370
JF8-6-2	6	2	2.4	9252	1.42	1469	35.3	398
JF8-7-2	7	2	2.4	9252	1.42	1469	40.4	455
JF8-8-2	8	2	2.4	9252	1.42	1469	45.4	512
JF8-9-2	9	2	2.4	9252	1.42	1469	50.5	569
JF8-10-2	10	2	2.4	9252	1.42	1469	50.5	626
JF10-11-3	11	3	3.0	14456	2.21	2302	63.1	711
JF10-12-3	12	3	3.0	14456	2.21	2302	68.2	768
JF10-12-4	12	4	3.0	14456	2.21	2302	70.7	796
JF10-13-4	13	4	3.0	14456	2.21	2302	75.7	853
JF10-14-4	14	4	3.0	14456	2.21	2302	78.9	910
JF10-15-4	15	4	3.0	14456	2.21	2302	78.9	967
JF10-16-4	16	4	3.0	14456	2.21	2302	78.9	1024
JF10-17-4	17	4	3.0	14456	2.21	2302	78.9	1081
JF10-18-4	18	4	3.0	14456	2.21	2302	78.9	1138
JF10-19-4	19	4	3.0	14456	2.21	2302	78.9	1195
JF12-20-5	20	5	3.6	20820	3.2	2771	113.6	1280
JF12-21-5	21	5	3.6	20820	3.2	2771	113.7	1337
JF12-22-5	22	5	3.6	20820	3.2	2771	113.7	1394
JF12-23-5	23	5	3.6	20820	3.2	2771	113.7	1451
JF12-24-5	24	5	3.6	20820	3.2	2771	113.7	1508
JF12-25-5	25	5	3.6	20820	3.2	2771	113.7	1565
JF12-26-5	26	5	3.6	20820	3.2	2771	113.7	1622
JF12-27-5	27	5	3.6	20820	3.2	2771	113.7	1679

Jellyfish® Filter

Jellyfish Filter Design Notes

- Typically the Jellyfish Filter is designed in an offline configuration, as all stormwater filter systems will perform for a longer duration between required maintenance services when designed and applied in off-line configurations. Depending on the design parameters, an optional internal bypass may be incorporated into the Jellyfish Filter, however note the inspection and maintenance frequency should be expected to increase above that of an off-line system. Speak to your local representative for more information.



Jellyfish Filter Typical Layout

- Typically, 18 inches (457 mm) of driving head is designed into the system, calculated as the difference in elevation between the top of the diversion structure weir and the invert of the Jellyfish Filter outlet pipe. Alternative driving head values can be designed as 12 to 24 inches (305 to 610mm) depending on specific site requirements, requiring additional sizing and design assistance.
- Typically, the Jellyfish Filter is designed with the inlet pipe configured 6 inches (150 mm) above the outlet invert elevation. However, depending on site parameters this can vary to an optional configuration of the inlet pipe entering the unit below the outlet invert elevation.
- The Jellyfish Filter can accommodate multiple inlet pipes within certain restrictions.
- While the optional inlet below deck configuration offers 0 to 360 degree flexibility between the inlet and outlet pipe, typical systems conform to the following:

Model Diameter (m)	Minimum Angle Inlet / Outlet Pipes	Minimum Inlet Pipe Diameter (mm)	Minimum Outlet Pipe Diameter (mm)
1.2	**62º**	**150**	**200**
1.8	59º	200	250
2.4	52º	250	300
3.0	48º	300	450
3.6	40º	300	450

- The Jellyfish Filter can be built at all depths of cover generally associated with conventional stormwater conveyance systems. For sites that require minimal depth of cover for the stormwater infrastructure, the Jellyfish Filter can be applied in a shallow application using a hatch cover. The general minimum depth of cover is 36 inches (915 mm) from top of the underslab to outlet invert.
- If driving head caclulations account for water elevation during submerged conditions the Jellyfish Filter will function effectively under submerged condtions.
- Jellyfish Filter systems may incorporate grated inlets depending on system configuration.
- For sites with water quality treatment flow rates or mass loadings that exceed the design flow rate of the largest standard Jellyfish Filter manhole models, systems can be designed that hydraulically connect multiple Jellyfish Filters in series or alternatively Jellyfish Vault units can be designed.

STANDARD SPECIFICATION
STORMWATER QUALITY – MEMBRANE FILTRATION TREATMENT DEVICE

PART 1 – GENERAL

1.1 WORK INCLUDED

Specifies requirements for construction and performance of an underground stormwater quality membrane filtration treatment device that removes pollutants from stormwater runoff through the unit operations of sedimentation, floatation, and membrane filtration.

1.2 REFERENCE STANDARDS

ASTM C 891: Specification for Installation of Underground Precast Concrete Utility Structures
ASTM C 478: Specification for Precast Reinforced Concrete Manhole Sections
ASTM C 443: Specification for Joints for Concrete Pipe and Manholes, Using Rubber Gaskets
ASTM D 4101: Specification for Copolymer steps construction

CAN/CSA-A257.4-M92
Joints for Circular Concrete Sewer and Culvert Pipe, Manhole Sections and Fittings Using Rubber Gaskets

CAN/CSA-A257.4-M92
Precast Reinforced Circular Concrete Manhole Sections, Catch Basins and Fittings

Canadian Highway Bridge Design Code

1.3 SHOP DRAWINGS

Shop drawings for the structure and performance are to be submitted with each order to the contractor. Contractor shall forward shop drawing submittal to the consulting engineer for approval. Shop drawings are to detail the structure's precast concrete and call out or note the fiberglass (FRP) internals/components.

1.4 PRODUCT SUBSTITUTIONS

No product substitutions shall be accepted unless submitted 10 days prior to project bid date, or as directed by the engineer of record. Submissions for substitutions require review and approval by the Engineer of Record, for hydraulic performance, impact to project designs, equivalent treatment performance, and any required project plan and report (hydrology/hydraulic, water quality, stormwater pollution) modifications that would be required by the approving jurisdictions/agencies. Contractor to coordinate with the Engineer of Record any applicable modifications to the project estimates of cost, bonding amount determinations, plan check fees for changes to approved documents, and/or any other regulatory requirements resulting from the product substitution.

1.5 HANDLING AND STORAGE

Prevent damage to materials during storage and handling.

PART 2 – PRODUCTS

2.1 GENERAL

2.1.1 The device shall be a cylindrical or rectangular, all concrete structure (including risers), constructed from precast concrete riser and slab components or monolithic precast structure(s), installed to conform to ASTM C 891 and to any required state highway, municipal or local specifications; whichever is more stringent. The device shall be watertight.

2.1.2 Cartridge Deck The cylindrical concrete device shall include a fiberglass deck. The rectangular concrete device shall include a coated aluminum deck. In either instance, the insert shall be bolted and sealed watertight inside the precast concrete chamber. The deck shall serve as: (a) a horizontal divider between the lower treatment zone and the upper treated effluent zone; (b) a deck for attachment of filter cartridges such that the membrane filter elements of each cartridge extend into the lower treatment zone; (c) a platform for maintenance workers to service the filter cartridges (maximum manned weight = 450 pounds (204 kg)); (d) a conduit for conveyance of treated water to the effluent pipe.

2.1.3 Membrane Filter Cartridges Filter cartridges shall be comprised of reusable cylindrical membrane filter elements connected to a perforated head plate. The number of membrane filter elements per cartridge shall be a minimum of eleven 2.75-inch (70-mm) diameter elements. The length of each filter element shall be a minimum 15 inches (381 mm). Each cartridge shall be fitted into the cartridge deck by insertion into a cartridge receptacle that is permanently mounted into the cartridge deck. Each cartridge shall be secured by a cartridge lid that is threaded onto the receptacle, or similar mechanism to secure the cartridge into the deck. The maximum treatment flow rate of a filter cartridge shall be controlled by an orifice in the cartridge lid, or on the individual cartridge itself, and based on a design flux rate (surface loading rate) determined by the maximum treatment flow rate per unit of filtration membrane surface area. The maximum design flux rate shall be 0.21 gpm/ft² (0.142 lps/m²).

Each membrane filter cartridge shall allow for manual installation and removal. Each filter cartridge shall have filtration membrane surface area and dry installation weight as follows (if length of filter cartridge is between those listed below, the surface area and weight shall be proportionate to the next length shorter and next length longer as shown below):

Filter Cartridge Length (in / mm)	Minimum Filtration Membrane Surface Area (ft2 / m2)	Maximum Filter Cartridge Dry Weight (lbs / kg)
15	106 / 9.8	10.5 / 4.8
27	190 / 17.7	15.0 / 6.8
40	282 / 26.2	20.5 / 9.3
54	381 / 35.4	25.5 / 11.6

2.1.4 Backwashing Cartridges The filter device shall have a weir extending above the cartridge deck, or other mechanism, that encloses the high flow rate filter cartridges when placed in their respective cartridge receptacles within the cartridge deck. The weir, or other mechanism, shall collect a pool of filtered water during inflow events that backwashes the high flow rate cartridges when the inflow event subsides. All filter cartridges and membranes shall be reusable and allow for the use of filtration membrane rinsing procedures to restore flow capacity and sediment capacity; extending cartridge service life.

2.1.5 Maintenance Access to Captured Pollutants The filter device shall contain an opening(s) that provides maintenance access for removal of accumulated floatable pollutants and sediment, removal of and replacement of filter cartridges, cleaning of the sump, and rinsing of the deck. Access shall have a minimum clear vertical clear space over all of the filter cartridges. Filter cartridges shall be able to be lifted straight vertically out of the receptacles and deck for the entire length of the cartridge.

2.1.6 Bend Structure The device shall be able to be used as a bend structure with minimum angles between inlet and outlet pipes of 90-degrees or less in the stormwater conveyance system.

2.1.7 Double-Wall Containment of Hydrocarbons The cylindrical precast concrete device shall provide double-wall containment for hydrocarbon spill capture by a combined means of an inner wall of fiberglass, to a minimum depth of 12 inches (305 mm) below the cartridge deck, and the precast vessel wall.

2.1.8 Baffle The filter device shall provide a baffle that extends from the underside of the cartridge deck to a minimum length equal to the length of the membrane filter elements. The baffle shall serve to protect the membrane filter elements from contamination by floatables and coarse sediment. The baffle shall be flexible and continuous in cylindrical configurations, and shall be a straight concrete or aluminum wall in rectangular configurations.

2.1.9 Sump The device shall include a minimum 24 inches (610 mm) of sump below the bottom of the cartridges for sediment accumulation, unless otherwise specified by the design engineer. Depths less than 24 inches may have an impact on the total performance and/or longevity between cartridge maintenance/replacement of the device.

2.2 PRECAST CONCRETE SECTIONS

All precast concrete components shall be manufactured to a minimum live load of HS-20 truck loading or greater based on local regulatory specifications, unless otherwise modified or specified by the design engineer, and shall be watertight.

2.3 JOINTS All precast concrete manhole configuration joints shall use nitrile rubber gaskets and shall meet the requirements of ASTM C443, Specification C1619, Class D or engineer approved equal to ensure oil resistance. Mastic sealants or butyl tape are not an acceptable alternative.

2.4 GASKETS Only profile neoprene or nitrile rubber gaskets in accordance to CSA A257.3-M92 will be accepted. Mastic sealants, butyl tape or Conseal CS-101 are not acceptable gasket materials.

2.5 FRAME AND COVER Frame and covers must be manufactured from cast-iron or other composite material tested to withstand H-20 or greater design loads, and as approved by the local regulatory body. Frames and covers must be embossed with the name of the device manufacturer or the device brand name.

2.6 DOORS AND HATCHES If provided shall meet designated loading requirements or at a minimum for incidental vehicular traffic.

2.7 CONCRETE All concrete components shall be manufactured according to local specifications and shall meet the requirements of ASTM C 478.

2.8 FIBERGLASS The fiberglass portion of the filter device shall be constructed in accordance with the following standard: ASTM D-4097: Contact Molded Glass Fiber Reinforced Chemical Resistant Tanks.

2.9 STEPS Steps shall be constructed according to ASTM D4101 of copolymer polypropylene, and be driven into preformed or pre-drilled holes after the concrete has cured, installed to conform to applicable sections of state, provincial and municipal building codes, highway, municipal or local specifications for the construction of such devices.

2.10 INSPECTION All precast concrete sections shall be inspected to ensure that dimensions, appearance and quality of the product meet local municipal specifications and ASTM C 478.

PART 3 – PERFORMANCE

3.1 GENERAL

3.1.1 Verification – The stormwater quality filter must be verified in accordance with ISO 14034:2016 Environmental management – Environmental technology verification (ETV).

3.1.2 Function - The stormwater quality filter treatment device shall function to remove pollutants by the following unit treatment processes; sedimentation, floatation, and membrane filtration.

3.1.3 Pollutants - The stormwater quality filter treatment device shall remove oil, debris, trash, coarse and fine particulates, particulate-bound pollutants, metals and nutrients from stormwater during runoff events.

3.1.4 Bypass - The stormwater quality filter treatment device shall typically utilize an external bypass to divert excessive flows. Internal bypass systems shall be equipped with a floatables baffle, and must avoid passage through the sump and/or cartridge filtration zone.

3.1.5 Treatment Flux Rate (Surface Loading Rate) – The stormwater quality filter treatment device shall treat 100% of the required water quality treatment flow based on a maximum design treatment flux rate (surface loading rate) across the membrane filter cartridges of 0.21 gpm/ft^2 (0.142 lps/m^2).

3.2 FIELD TEST PERFORMANCE

At a minimum, the stormwater quality filter device shall have been field tested and verified with a minimum 25 TARP qualifying storm events and field monitoring shall have been conducted according to the TARP 2009 NJDEP TARP field test protocol, and have received NJCAT verification.

3.2.1 Suspended Solids Removal - The stormwater quality filter treatment device shall have demonstrated a minimum median TSS removal efficiency of 85% and a minimum median SSC removal efficiency of 95%.

3.2.2 Runoff Volume – The stormwater quality filter treatment device shall be engineered, designed, and sized to treat a minimum of 90 percent of the annual runoff volume determined from use of a minimum 15-year rainfall data set.

3.2.3 Fine Particle Removal - The stormwater quality filter treatment device shall have demonstrated the ability to capture fine particles as indicated by a minimum median removal efficiency of 75% for the particle fraction less than 25 microns, an effluent d_{50} of 15 microns or lower for all monitored storm events.

3.2.4 Turbidity Reduction - The stormwater quality filter treatment device shall have demonstrated the ability to reduce the turbidity from influent from a range of 5 to 171 NTU to an effluent turbidity of 15 NTU or lower.

3.2.5 Nutrient (Total Phosphorus & Total Nitrogen) Removal - The stormwater quality filter treatment device shall have demonstrated a minimum median Total Phosphorus removal of 55%, and a minimum median Total Nitrogen removal of 50%.

3.2.6 Metals (Total Zinc & Total Copper) Removal - The stormwater quality filter treatment device shall have demonstrated a minimum median Total Zinc removal of 55%, and a minimum median Total Copper removal of 85%.

3.3 INSPECTION and MAINTENANCE

The stormwater quality filter device shall have the following features:

3.3.1 Durability of membranes are subject to good handling practices during inspection and maintenance (removal, rinsing, and reinsertion) events, and site specific conditions that may have heavier or lighter loading onto the cartridges, and pollutant variability that may impact the membrane structural integrity. Membrane maintenance and replacement shall be in accordance with manufacturer's recommendations.

3.3.2 Inspection which includes trash and floatables collection, sediment depth determination, and visible determination of backwash pool depth shall be easily conducted from grade (outside the structure).

3.3.3 Manual rinsing of the reusable filter cartridges shall promote restoration of the flow capacity and sediment capacity of the filter cartridges, extending cartridge service life.

3.3.4 The filter device shall have a minimum 12 inches (305 mm) of sediment storage depth, and a minimum of 12 inches between the top of the sediment storage and bottom of the filter cartridge tentacles, unless otherwise specified by the design engineer. Variances may have an impact on the total performance and/or longevity between cartridge maintenance/replacement of the device.

3.3.5 Sediment removal from the filter treatment device shall be able to be conducted using a standard maintenance truck and vacuum apparatus, and a minimum one point of entry to the sump that is unobstructed by filter cartridges.

3.3.6 Maintenance access shall have a minimum clear height that provides suitable vertical clear space over all of the filter cartridges. Filter cartridges shall be able to be lifted straight vertically out of the receptacles and deck for the entire length of the cartridge.

3.3.7 Filter cartridges shall be able to be maintained without the requirement of additional lifting equipment.

PART 4 – EXECUTION

4.1 INSTALLATION

4.1.1 PRECAST DEVICE CONSTRUCTION SEQUENCE

The installation of a watertight precast concrete device should conform to ASTM C 891 and to any state highway, municipal or local specifications for the construction of manholes, whichever is more stringent. Selected sections of a general specification that are applicable are summarized below.

4.1.1.1 The watertight precast concrete device is installed in sections in the following sequence:

- aggregate base
- base slab
- treatment chamber and cartridge deck riser section(s)
- bypass section
- connect inlet and outlet pipes
- concrete riser section(s) and/or transition slab (if required)
- maintenance riser section(s) (if required)
- frame and access cover

4.1.2 The precast base should be placed level at the specified grade. The entire base should be in contact with the underlying compacted granular material. Subsequent sections, complete with joint seals, should be installed in accordance with the precast concrete manufacturer's recommendations.

4.1.3 Adjustment of the stormwater quality treatment device can be performed by lifting the upper sections free of the excavated area, re-leveling the base, and re-installing the sections. Damaged sections and gaskets should be repaired or replaced as necessary to restore original condition and watertight seals. Once the stormwater quality treatment device has been constructed, any/all lift holes must be plugged watertight with mortar or non-shrink grout.

4.1.4 Inlet and Outlet Pipes Inlet and outlet pipes should be securely set into the device using approved pipe seals (flexible boot connections, where applicable) so that the structure is watertight, and such that any pipe intrusion into the device does not impact the device functionality.

4.1.5 Frame and Cover Installation Adjustment units (e.g. grade rings) should be installed to set the frame and cover at the required elevation. The adjustment units should be laid in a full bed of mortar with successive units being joined using sealant recommended by the manufacturer. Frames for the cover should be set in a full bed of mortar at the elevation specified.

4.2 MAINTENANCE ACCESS WALL
In some instances the Maintenance Access Wall, if provided, shall require an extension attachment and sealing to the precast wall and cartridge deck at the job site, rather than at the precast facility. In this instance, installation of these components shall be performed according to instructions provided by the manufacturer.

4.3 FILTER CARTRIDGE INSTALLATION Filter cartridges shall be installed in the cartridge deck only after the construction site is fully stabilized and in accordance with the manufacturer's guidelines and recommendations. Contractor to contact the manufacturer to schedule cartridge delivery and review procedures/requirements to be completed to the device prior to installation of the cartridges and activation of the system.

PART 5 – QUALITY ASSURANCE

5.1 FILTER CARTRIDGE INSTALLATION Manufacturer shall coordinate delivery of filter cartridges and other internal components with contractor. Filter cartridges shall be delivered and installed complete after site is stabilized and unit is ready to accept cartridges. Unit is ready to accept cartridges after is has been cleaned out and any standing water, debris, and other materials have been removed. Contractor shall take appropriate action to protect the filter cartridge receptacles and filter cartridges from damage during construction, and in accordance with the manufacturer's recommendations and guidance. For systems with cartridges installed prior to full site stabilization and prior to system activation, the contractor can plug inlet and outlet pipes to prevent stormwater and other influent from entering the device. Plugs must be removed during the activation process.

5.2 INSPECTION AND MAINTENANCE

5.2.1 The manufacturer shall provide an Owner's Manual upon request.

5.2.2 After construction and installation, and during operation, the device shall be inspected and cleaned as necessary based on the manufacturer's recommended inspection and maintenance guidelines and the local regulatory agency/body.

5.3 REPLACEMENT FILTER CARTRIDGES When replacement membrane filter elements and/or other parts are required, only membrane filter elements and parts approved by the manufacturer for use with the stormwater quality filter device shall be installed.

END OF SECTION

GENERAL NOTES:

1. ALL WORKS ARE TO BE CONSTRUCTED IN ACCORDANCE WITH CURRENT TOWN OF CALEDON, REGION OF PEEL, AND OPSD STANDARD DRAWINGS AND SPECIFICATIONS. REFERENCE TO STANDARD DRAWINGS SHALL MEAN THE STANDARD DRAWINGS OF THE CORPORATION OF THE TOWN OF CALEDON, UNLESS NOTED OTHERWISE AND THESE SHALL BE THE REVISION IN EFFECT AS OF THE DATE OF THE TOWN'S APPROVAL OF THE CONSTRUCTION DRAWINGS.
2. THE LOCATION AND ELEVATION OF ALL EXISTING SERVICES AND UTILITIES ARE TO BE VERIFIED IN THE FIELD BY THE CONTRACTOR AT THEIR EXPENSE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE REPAIR OF EXISTING UTILITIES DISTURBED DURING CONSTRUCTION.
3. ALL DIMENSIONS SHALL BE CHECKED AND VERIFIED IN THE FIELD BY THE CONTRACTOR PRIOR TO THE CONSTRUCTION AND HE SHALL REPORT ANY DISCREPANCIES IMMEDIATELY TO THE ENGINEER.
4. ALL AREAS DISTURBED BY THE CONTRACTOR DURING THE CONSTRUCTION OF WORKS SHOWN HEREON SHALL BE RESTORED TO ORIGINAL CONDITION OR BETTER. ALL GRASS AND VEGETATION COVERED AREAS SHALL BE RESTORED BY PLACING 150mm OF APPROVED TOPSOIL AND SOD TO ESTABLISH A GRASS COVER TO THE SATISFACTION OF THE TOWN AND THE REGIONAL MUNICIPALITY OF PEEL.
5. THE NOTES ON THIS SHEET APPLY TO ALL WORKS UNDER THIS CONTRACT UNLESS OTHERWISE NOTED ON THE PLAN & PROFILE AND/OR DETAIL DRAWINGS.
6. WHERE THE STABILITY, SAFETY OR FUNCTION OF THE EXISTING ROADWAY OR UNDERGROUND FACILITIES MAY BE IMPAIRED DUE TO THE CONTRACTOR'S METHOD OF OPERATIONS, THE CONTRACTOR SHALL PROVIDE SUCH PROTECTION AS MAY BE REQUIRED INCLUDING SHEETING, SHORING AND DRIVING OF PILES WHERE NECESSARY, TO PREVENT DAMAGE TO SUCH WORKS OR PROPOSED WORKS. CONSTRUCTION FOR SHORING, BRACING AND PROTECTION SCHEMES SHALL CONFORM TO THE SPECIFICATIONS O.P.S.S. 538 AND O.P.S.S. 539.
7. THE CONTRACTOR WILL BE RESPONSIBLE FOR ADDITIONAL BEDDING OR ADDITIONAL STRENGTH PIPE IF THE MAXIMUM TRENCH WIDTH AS SPECIFIED BY OPSD IS EXCEEDED.
8. ALL SEWERS CONSTRUCTED WITH GRADES 0.50% OR LESS, SHALL BE INSTALLED WITH LASER AND CHECKED PRIOR TO BACKFILLING.
9. THE MAXIMUM TRENCH WIDTH FOR PIPES UP TO AND INCLUDING 450mm DIAMETER SHALL BE A TOTAL OF THE OUTSIDE DIAMETER OF THE PIPE, 150mm CLEARANCE ON EACH SIDE OF THE PIPE AND AN ALLOWANCE FOR SHEETING AND BRACING AS REQUIRED BY THE OCCUPATIONAL HEALTH AND SAFETY ACT. FOR PIPES 475mm DIAMETER UP TO AND INCLUDING 750mm DIAMETER, THE CLEARANCE SHALL BE 200mm ON EACH SIDE OF THE PIPE. FOR ALL PIPES IN EXCESS OF 750mm, THE CLEARANCE SHALL BE 300mm ON EACH SIDE OF THE PIPE. WHERE SPECIFIED TRENCH WIDTH IS EXCEEDED, THE CONTRACTOR MAY BE REQUIRED TO PROVIDE ADDITIONAL BEDDING, A DIFFERENT TYPE OF BEDDING OR HIGHER STRENGTH PIPE AT HIS OWN EXPENSE AND SHALL ALSO BE RESPONSIBLE FOR EXTRA TEMPORARY ANDOR PERMANENT REPAIRS MADE NECESSARY BY WIDENED TRENCH.
10. ALL CONSTRUCTION SIGNAGE MUST CONFORM TO ONTARIO TRAFFIC MANUAL, BOOK 7.
11. ALL CONSTRUCTION WORKS SHALL BE CARRIED OUT IN ACCORDANCE WITH THE REQUIREMENTS OF THE OCCUPATIONAL HEALTH AND SAFETY ACT AND REGULATIONS FOR CONSTRUCTION PROJECTS.
12. AN ASPHALT PRESERVATIVE SEALER SUCH AS RE-CLAMITE (OR OTHER APPROVED EQUIVALENT) SHALL BE APPLIED AFTER THE ONE-YEAR MAINTENANCE PERIOD FOR THE TOP COURSE ASPHALT.
13. ANY EROSION EXPERIENCED ALONG THE VALLEY LAND SLOPES THROUGHOUT THE CONSTRUCTION AND WARRANTY PERIOD OF THIS DEVELOPMENT SHALL BE CORRECTED BY THE DEVELOPER TO THE SATISFACTION OF THE PLANNING, DESIGN AND DEVELOPMENT DEPARTMENT.
14. ALL HEADWALLS, WINGWALLS AND OTHER EXPOSED CONCRETE STRUCTURES SHALL BE TREATED WITH A COMMERCIALLY AVAILABLE FORM LINER OR NATURAL STONE FACING. THE DEVELOPERS CONSULTING ENGINEER SHALL SUBMIT THE PROPOSED TREATMENT TO PLANNING, DESIGN AND DEVELOPMENT DEPARTMENT FOR APPROVAL PRIOR TO CONSTRUCTION. DAYTON SUPERIOR PART No. 1502 SVM IS ACCEPTABLE TO THE TOWN OF CALEDON.
15. THE EDGES OF ALL RIP RAP SPLASH PADS AND OUTLET WEIRS SHALL BE FINISHED IN CURVED NATURALIZED PATTERNS. STRAIGHT LINES WILL NOT BE ACCEPTED.
16. THE LOCATION OF ALL UNDERGROUND AND ABOVEGROUND UTILITIES AND STRUCTURES ARE NOT NECESSARILY SHOWN ON THESE DRAWINGS, AND, WHERE SHOWN, THE ACCURACY OF THE LOCATION OF SUCH UTILITIES AND STRUCTURES ARE NOT GUARANTEED. BEFORE STARTING WORK, THE CONTRACTOR SHALL INFORM HIMSELF OF THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES, AND SHALL ASSUME ALL LIABILITY FOR DAMAGE TO THEM. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL UTILITY LOCATES PRIOR TO COMMENCING CONSTRUCTION.
17. ALL AREAS DISTURBED BY THE CONTRACTOR DURING CONSTRUCTION OF THE WORKS SHOWN HEREON SHALL BE RESTORED TO ORIGINAL CONDITION OR BETTER. ALL GRASS AND VEGETATION COVERED AREAS SHALL BE RESTORED TO EXISTING CONDITIONS OR BETTER
18. ALL PIPE SIZES IN MILLIMETRES AND ALL DISTANCES IN METRES UNLESS OTHERWISE INDICATED.
19. STORM SEWER MANHOLES SHALL BE IN ACCORDANCE WITH OSPD 701.010 FOR 1200mm, OPSD 701.011 FOR 1500mm, OPSD 701.012 FOR 1800mm, OPSD 701.013 FOR 2400mm, OPSD 701.014 FOR 3000mm AS NOTED ON DRAWINGS.
20. SITE PROPERTY LINES MUST MATCH EXISTING ELEVATIONS.
21. A UTILITY CLEARANCE RADIUS OF 1.2 METERS BETWEEN THE PROPOSED DRIVEWAY ENTRANCE CURB RETURN AND ALL ABOVE GROUND UTILITIES MUST BE MAINTAINED.
22. ALL CONCRETE AND PLASTIC SEWER PIPES SHALL HAVE RUBBER GASKET JOINTS.
23. ALL PLASTIC SEWERS SHALL BE CONSTRUCTED WITH BEDDING IN ACCORDANCE WITH OPSD 802.030 OR 802.010 UNLESS OTHERWISE NOTED.
24. PLASTIC SEWER PIPES SHALL BE CONSTRUCTED WITH ULTRA RIB OR APPROVED EQUAL UP TO THE MAXIMUM DIAMETER OF 600mm.
25. NO PVC PIPE SHALL BE USED ON ARTERIAL AND PARKWAY ROADS.
26. SINGLE CATCH BASIN LEADS TO BE 250mm UNLESS OTHERWISE NOTED. DOUBLE CATCHBASIN LEADS TO BE 300mm UNLESS OTHERWISE NOTED. ALL CATCHBASIN LEADS TO BE EITHER C-14-ES MINIMUM OR PVC TYPE SDR 28.
27. ALL TRENCH CUTS THROUGH ASPHALT WILL BE REPAIRED WITH A MINIMUM OF 1.0m BEYOND THE EDGE OF THE FULL CUT DEPTH.
28. SEWER MAINTENANCE HOLE FRAME AND COVERS TO BE AS PER O.P.S.D. 401.010 TYPE A TV, STAMPED "SANITARY", "STORM" ANDOR "FDC" AS APPROPRIATE.
29. MAINTENANCE HOLE AND CATCHBASIN ADJUSTMENT UNITS SHALL BE A MAXIMUM OF 300mm IN HEIGHT AND THREE UNITS.
30. GRANULAR BACKFILL AROUND MAINTENANCE HOLES, CATCHBASINS AND VALVE CHAMBERS SHALL BE GRANULAR 'B' COMPACTED BY MECHANICAL MEANS TO A MINIMUM OF 100% STANDARD PROCTOR DENSITY.
31. RISERS ARE REQUIRED ON ALL STORM AND SANITARY CONNECTIONS WHERE COVER ON THE MAIN SEWER EXCEEDS 4.5m AS PER O.P.S.D. 1006.020.
32. EROSION AND SEDIMENT CONTROLS TO BE IN PLACE PRIOR TO START OF ANY CONSTRUCTION, AND MUST BE MAINTAINED AT ALL TIMES, IN ACCORDANCE WITH THE APPROVED EROSION AND SEDIMENT CONTROL PLAN.
33. ROAD OCCUPANCY / ACCESS PERMIT MUST BE OBTAINED 48 HOURS PRIOR TO COMMENCING ANY WORKS WITHIN THE MUNICIPAL ROAD ALLOWANCE.
34. THE APPLICANT, APPLICANT'S REPRESENTATIVE, CONSULTANT, CONTRACTOR AND SUB CONTRACTORS ARE RESPONSIBLE TO ENSURE THAT THEIR DESIGN MATERIALS AND CONSTRUCTION PRACTICES CONFORM TO THE LATEST REGION OF PEEL STANDARDS, SPECIFICATIONS, MATERIALS AND DESIGN CRITERIA, POSTED ON REGION OF PEEL'S WEBSITE (www.peelregion.ca/pw/standards). IN THE ABSENCE OF REGION SPECIFICATIONS, THE ONTARIO PROVINCIAL STANDARD SPECIFICATIONS (OPSS) SHALL APPLY.
35. ALL WORKS SHALL BE COMPLETED IN ACCORDANCE WITH THE "OCCUPATIONAL HEALTH AND SAFETY ACT". THE GENERAL CONTRACTOR SHALL BE DEEMED THE CONSTRUCTOR AS DEFINED IN THE ACT.
36. THE CONTRACTOR AT THEIR EXPENSE SHALL VERIFY THE LOCATION, DIMENSION AND ELEVATION OF ALL EXISTING SERVICES AND UTILITIES IN THE FIELD.
37. PRIOR TO EXCAVATION OR BORING CONTRACTOR AT THEIR EXPENSE SHALL EXPOSE AND VERIFY THE LOCATION AND ELEVATION OF ALL EXISTING UTILITIES AND SERVICES TO BE CROSSED AND MUST NOTIFY THE DESIGN ENGINEER AND THE AGENCY FIELD INSPECTOR AND/OR PROJECT MANAGER IMMEDIATELY, IN WRITING, OF ANY NO CONFLICTS OR DISCREPANCIES. CONTRACTOR SHALL BE RESPONSIBLE FOR EXPOSING THE EXISTING UTILITIES FAR ENOUGH IN ADVANCE OF CONSTRUCTION TO MAKE NECESSARY DESIGN MODIFICATIONS FOR REVIEW AND APPROVAL, IF REQUIRED, WITHOUT DELAYING THE WORK.
38. THE CONTRACTOR, AT THEIR EXPENSE AND TO THE SATISFACTION OF THE REGION OF PEEL, SHALL BE RESPONSIBLE FOR THE RESTORATION AND THE REPAIR OF THE EXISTING UTILITIES AND ALL AREAS BEYOND THE PLAN OF SUBDIVISION DISTURBED DURING CONSTRUCTION.
39. THE SUPPORT OF ALL UTILITIES SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF THE AUTHORITY HAVING JURISDICTION.
40. ALL BACKFILL FOR SEWERS, WATERMAINS AND UTILITIES ON THE ROAD ALLOWANCE MUST BE MECHANICALLY COMPACTED.
41. ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE SPECIFIED

GRADING NOTES:

1. ALL AREAS BEYOND THE LIMIT OF WORK, WHICH ARE DISTURBED DURING CONSTRUCTION, SHALL BE RESTORED TO THE SATISFACTION OF THE TOWN OF CALEDON AND THE REGION OF PEEL.
2. CONTRACTOR TO MATCH EXISTING GRADES AT ALL PROPERTY LINES EXCEPT AS NOTED.
3. EXCAVATION, FILL AND COMPACTION TO BE IN ACCORDANCE WITH RECOMMENDATIONS PROVIDED IN GEOTECHNICAL REPORT PREPARED BY SOIL ENGINEERS LTD., DATED JULY 2024.
4. DRIVEWAYS ARE TO HAVE A MINIMUM SEPARATION OF 0.6m AT CURBS AND SHALL NOT CROSS THE PROJECTION OF THE PROPERTY LINE.
5. THE HOUSE TYPE AND DRIVEWAY LOCATION SHALL NOT BE CHANGED WITHOUT TOWN OF CALEDON APPROVAL.
6. DRIVEWAYS SHALL BE GRADED AT A MINIMUM 2% AND A MAXIMUM 8% SLOPE.
7. A MINIMUM HORIZONTAL CLEAR SEPARATION OF 1.5m BETWEEN TRANSFORMERS AND DRIVEWAY EDGES AND 1.2m FOR OTHER STREET FURNITURE SHALL BE MAINTAINED.
8. DOWNSPOUT LOCATIONS INDICATED ON SITE GRADING PLANS.
9. FOOTINGS TO BE FOUNDED IN UNDISTURBED NATIVE SOIL OR, IF LOCATED IN ENGINEERED FILL, FOUNDATIONS SHALL BE IN ACCORDANCE WITH THE RECOMMENDATIONS OF, AND CERTIFIED IN THE FIELD BY, A GEOTECHNICAL ENGINEER.
10. A MINIMUM 150mm TOPSOIL SHALL BE PROVIDED IN ALL LANDSCAPED AREAS.
11. ALL LOT GRADING MUST COMPLY WITH TOWN OF CALEDON STANDARDS.
12. ALL OPEN SPACE BLOCKS AND VALLEY LANDS SHALL BE MAINTAINED FREE OF GARBAGE AND CONSTRUCTION DEBRIS BY THE DEVELOPER UNTIL ASSUMPTION OF THE SUBDIVISION BY THE TOWN OF CALEDON.
13. SINGLE STAGE CURB AND CUTTER TO OPSD 600.040
14. TWO STAGE CURB AND GUTTER TO OPSD 600.070
15. SIDEWALKS TO COMPLY TO OPSD 310.010 AND ARE TO BE 1.5m WIDE AND AS PER TOWN STD DWG 102 FOR CONCRETE THICKNESSES
16. 100mm SUBDRAIN TO BE AS PER TOWN STD DWG 218
17. ALL NATIVE SUBGRADE TO BE COMPACTED TO 95% SPMDD AND SHALL BE PROOF ROLLED
18. NON-COMPRESSIBLE BACKFILL WILL BE USED DURING REBUILDING, ADJUSTING, OR ANY OTHER APPLICABLE CATCHBASIN OR MAINTENANCE HOLE WORKS.
19. CURB AND SIDEWALK CONCRETE SHALL BE 32 MPa AT 28 DAYS WITH 7% +/- 1.5% ENTRAINED AIR AND NOT LESS THAN 355 kg/m3 OF CEMENT (PER OPSS 315 AND 353)

ROADS, SIDEWALK, AND WALKWAY NOTES:

1. CATCHBASIN, MAINTENANCE HOLE AND VALVE CHAMBER COVERS SHALL BE SET FLUSH TO BASE COURSE ASPHALT LEVEL AND ADJUSTED TO GRADE PRIOR TO INSTALLING TOP COURSE OF ASPHALT.
2. AT ALL ENTRANCES TO THE SITE, THE ROAD CURB AND SIDEWALK WILL BE CONTINUOUS THROUGH THE DRIVEWAY . THE DRIVEWAY GRADE WILL BE COMPATIBLE WITH THE EXISTING SIDEWALK AND A CURB DEPRESSION WILL BE PROVIDED FOR AT EACH ENTRANCE. ACCESS CONSTRUCTION AS PER TOWN OF CALEDON STANDARD 237.
3. SIDEWALKS SHALL BE AS PER TOWN STD DWG 102 WITH CONCRETE TO CONFORM TO O.P.S.S. 351.
4. UNSHRINKABLE FILL TO BE USED FOR CUTS UNDER EXISTING ROADS AND SHALL EXTEND TO SUBGRADE LEVEL UNLESS OTHERWISE NOTED IN THE ROAD OCCUPANCY PERMIT.
5. THE SERVICE CONNECTION TRENCH WITHIN THE TRAVELED PORTION OF THE ROAD ALLOWANCE SHALL BE BACKFILLED IN ACCORDANCE WITH THE REQUIREMENTS OF THE ROAD OCCUPANCY ACCESS PERMIT APPLICATION.
6. THE CONTRACTOR SHALL REINSTATE THE ROAD PORTION OF THE MUNICIPAL RIGHT-OF-WAY TO MATCH THE EXISTING DESIGN.
7. THE ROAD SHALL BE KEPT CLEAR OF MUD, DIRT AND DEBRIS AT ALL TIMES AND MUST BE CLEANED AT A MINIMUM OF TWO TIMES PER WEEK, AS REQUIRED OR AT THE DIRECTION OF THE TOWN OF CALEDON.

RESTORATION NOTES:

1. ALL WORK SHALL BE SUBJECT TO THE CONDITIONS AND TOWN OF CALEDON AND REGION OF PEEL STANDARD SPECIFICATIONS.
2. ALL DISTURBED GRASS AREAS SHALL BE RESTORED WITH TOPSOIL AND SOD TO ORIGINAL CONDITION OR BETTER.
3. ALL AREAS DISTURBED BY THE CONTRACTOR DURING THE CONSTRUCTION OF WORKS SHOWN HEREON SHALL BE RESTORED TO ORIGINAL CONDITION OR BETTER. ALL GRASS AND VEGETATION COVERED AREAS SHALL BE RESTORED BY PLACING 300mm OF APPROVED TOPSOIL AND SOD TO ESTABLISH A GRASS COVER TO THE SATISFACTION OF THE TOWN AND THE REGIONAL MUNICIPALITY OF PEEL
4. ALL ASPHALT PAVEMENT AND ALL CONCRETE SIDEWALK AND CURB AND GUTTER SHALL BE SAW CUT PRIOR TO REMOVAL.
5. ALL DISTURBED ASPHALT PAVEMENT SHALL BE RESTORED WITH GRANULAR AND HOT LAID ASPHALT MATCHING THE EXISTING LAYERS AND DEPTHS USING HL8 FOR THE BASE AND HL3 FOR THE TOP LIFT. THE EXISTING ASPHALT SHALL BE SAW CUT AND REMOVED (FULL DEPTH) A MIN. DISTANCE OF 300mm FROM THE FACE OF THE TRENCH.
6. TRENCH BACKFILL WITHIN THE RIGHT OF WAY SHALL BE AS PER THE REQUIREMENTS UNDER THE ROAD OCCUPANCY PERMIT.
7. ALL TRENCH CUTS THROUGH ASPHALT WILL BE REPAIRED WITH A MINIMUM OF 1.0m BEYOND THE EDGE OF THE FULL CUT DEPTH.

STORM SEWER NOTES:

1. ALL SEWER PIPE UP TO AND INCLUDING 450 mm DIAMETER SHALL BE EQUAL TO CSA SPECIFICATIONS A257.1 CL3 OR LATEST AMENDMENT UNLESS OTHERWISE NOTED.
2. ALL SEWER PIPE 525 mm DIAMETER AND LARGER SHALL BE EQUAL TO CSA SPECIFICATION A257.2 OR LATEST AMENDMENT UNLESS OTHERWISE NOTED.
3. PIPE MATERIAL TO BE REINFORCED CONCRETE WITH A STRENGTH OF 50 N/mm CERTIFIED TO CSA STANDARD A247.2-1982 CLASS 50-D OR PVC CERTIFIED TO CSA STANDARDS 182.2 AND 182.4.
4. TYPE 'B' BEDDING TO BE USED FOR ALL STORM SEWERS AS PER OPSD 802.030 AND IF UNSUITABLE BEDDING CONDITIONS OCCUR, CAREFUL PREPARATION AND STRENGTHENING OF THE TRENCH BASE PRIOR TO SEWER INSTALLATION MAY BE REQUIRED.
4. ALL DROP STRUCTURES SHALL CONFORM WITH OPSD 1003.010 AND 1003.020.
5. STORM MANHOLE FRAME AND COVERS SHALL BE PER OPSD 401.01. STORM SEWER MANHOLES SHALL BE IN ACCORDANCE WITH OSPD 701.010 FOR 1200mm, OPSD 701.011 FOR 1500mm, OPSD 701.012 FOR 1800mm, OPSD 701.013 FOR 2400mm, OPSD 701.014 FOR 3000mm AS NOTED ON DRAWINGS.
6. ALL SEWER & WATERMAIN CROSSINGS TO HAVE A MIN. 0.50m CLEARANCE BETWEEN THE INVERT OF THE HIGHER PIPE AND OBVERT OF THE LOWER PIPE.
7. WITHIN THE TOWN'S RIGHT-OF-WAY, STORM SEWERS AND STORM SEWER CONNECTIONS MUST BE CONCRETE, OR APPROVED EQUAL, WITH TYPE "B" BEDDING THROUGHOUT. THE STRENGTH OF THE CONCRETE PIPE MUST BE AS PER TOWN STANDARD 341 AND AS FOLLOWS; MINIMUM 65-D FOR REINFORCED PIPE AND MINIMUM FOR ES FOR NON-REINFORCED PIPE.
8. STORM SEWER PIPES CONNECTING TO THE TOWN'S STORM SEWER SHALL NOT BE SMALLER THAN 200mm.
9. ALL STORM SERVICE CONNECTIONS TO DWELLINGS SHALL BE 125mm DIAMETER (SINGLE) AND 150mm DIAMETER (DOUBLE) P.V.C. SDR-28 LAID AT A MINIMUM SLOPE OF 2%, AND SHALL BE ONLY WHITE IN COLOUR.
11. ALL SERVICE CONNECTIONS TO BE MARKED WITH A 50mm x 100mm WOOD STAKE, PROJECTING 1.0m ABOVE THE GROUND, WITH THE TOP 300mm PAINTED ORANGE.
12. SINGLE CATCHBASINS TO BE PRECAST CONCRETE WITH STEEL FRAME AND GRATE CONFORMING TO O.P.S.D. 705.010 AND O.P.S.D. 400.010. DOUBLE CATCHBASINS TO BE PRECAST CONCRETE WITH STEEL FRAME AND GRATE CONFORMING TO O.P.S.D. 705.020 AND O.P.S.D. 400.020.
13. CONTRACTOR SHALL ENSURE THAT THE LOW POINT OF CURBS COINCIDE WITH THE LOCATION OF CATCHBASINS INSTALLED AT ROADWAY SAG AREAS.
14. CATCHBASIN CONNECTIONS TO THE CURB SUBDRAIN SYSTEM TO BE IN ACCORDANCE WITH O.P.S.D. 216.021.
15. SINGLE CATCHBASIN LEADS TO BE A MINIMUM OF 250mm LAID AT A MINIMUM SLOPE OF 2% UNLESS OTHERWISE NOTED. DOUBLE CATCHBASIN LEADS TO BE 300mm LAID AT A MINIMUM SLOPE OF 2% UNLESS OTHERWISE NOTED. ALL CATCHBASIN LEADS TO BE EITHER C-P.V.C. SDR-35 UNLESS OTHERWISE NOTED.
16. ROAD CATCHBASIN LEAD INVERTS TO BE 1.5m BELOW GRATE ELEVATION, UNLESS OTHERWISE REQUIRED FOR POSITIVE DRAINAGE TO MAIN LINE SEWER.
17. STORM MAINTENANCE HOLE BENCHING AND PIPE OPENING DETAILS TO BE AS PER O.P.S.D. 701.021.

DRIVEWAYS

1. A. ALL NEW AND RESTORED RESIDENTIAL DRIVEWAYS MUST BE PAVED FROM CURB TO STREET LINE, OR CURB TO SIDEWALKS WHERE EXISTING.
2. DRIVEWAY SLOPES SHALL BE AT A MINIMUM OF 2% AND A MAXIMUM OF 8%.
3. DRIVEWAYS SHOULD BE PERPENDICULAR TO THE CURB WHERE POSSIBLE.
4. DRIVEWAYS WITH CURVATURES SHALL HAVE A MINIMUM RADIUS OF 7.3 m..
6. WIDTHS OF DEPRESSED CURB FOR DRIVEWAYS SHALL BE AS FOLLOWS:

SINGLE DRIVEWAY	3.5m PLUS 0.3m SLOPES
DOUBLE DRIVEWAY	6.0m PLUS 0.3m SLOPES
SHARED DOUBLE DRIVEWAY FOR SEMI-DETACHED	7.3m PLUS 0.3mSLOPES
TRIPLE DRIVEWAY	8.5m PLUS 0.3m SLOPES

7. WHERE POSSIBLE, A 0.6m SEPARATION SHALL BE PROVIDED BETWEEN DRIVEWAYS
8. THE MINIMUM CLEAR DISTANCE BETWEEN THE EDGE OF DRIVEWAYS AND A UTILITY STRUCTURE SHALL BE 1.2m.
9. LOTS WITH WIDTHS LESS THAN 11.0m WILL HAVE COUPLED DRIVEWAYS. LOTS WITH WIDTHS OF 11.00m TO 11.99m SHALL HAVE EVERY SECOND DRIVEWAY PAIR UNCOUPLED, WHERE DRAINAGE CONDITIONS ALLOW. ALL DRIVEWAYS ON LOTS WIDER THAN 12.0m ARE TO BE UNCOUPLED.
10. ALL NEW OR RESTORED RESIDENTIAL DRIVEWAYS WILL HAVE THE FOLLOWING PAVEMENT STRUCTURE:

- 25mm HL3 ASPHALT
- 50mm HL8 ASPHALT
- 150mm OF 19mm DIA. CRUSHER RUN LIMESTONE.

TREE PRESERVATION NOTES:

1. ALL EXISTING TREES WHICH ARE TO REMAIN SHALL BE FULLY PROTECTED WITH TREE PRESERVATION ZONE (TPZ) ERECTED OR IN ACCORDANCE WITH ARBORIST REPORT PRIOR TO THE COMMENCEMENT OF CONSTRUCTION.
2. THE CONTRACTOR SHALL TAKE EVERY PRECAUTION NECESSARY TO PREVENT DAMAGE TO TREES OR SHRUBS TO BE RETAINED.
3. NO CONSTRUCTION ACTIVITY, GRADE CHANGES, TREATMENT OR EXCAVATION OF ANY KIND IS PERMITTED WITHIN THE TPZ. THE TPZ MUST REMAIN UNDISTURBED AT ALL TIMES.
4. THE TPZ SHALL REMAIN IN PLACE UNTIL ALL SITE WORK HAS BEEN COMPLETED, AND MAY NOT BE REMOVED, RELOCATED OR OTHERWISE ALTERED WITHOUT THE WRITTEN PERMISSION OF A CONSULTING ARBORIST OR LANDSCAPE ARCHITECT.
5. ANY TREESHRUB MARKED FOR PRESERVATION WHICH IS DAMAGED OR HAS DIED AS A RESULT OF CONTRACTOR NEGLIGENCE SHALL EITHER BE REPLACED WITH A SPECIMEN OF EQUIVALENT SPECIES AND SIZE OR MONETARILY COMPENSATED FOR.
6. ANY TREES DESIGNATED FOR REMOVAL SHALL HAVE THE STUMPS COMPLETELY EXCAVATED AND REMOVED FROM THE SITE

WATERMAIN NOTES:

1. THE REGION OF PEEL SHALL CONDUCT THE OPERATION OF EXISTING VALVES AND HYDRANTS IF REQUIRED.
2. CONTRACTOR MUST USE BATTER BOARD OR ROD-AND-LEVEL METHOD FOR WATERMAIN INSTALLATION.
3. ALL WATERMAINS SHALL HAVE 1.70m MINIMUM COVER FOR URBAN ROAD DESIGN AND 2.1m MINIMUM COVER FOR RURAL ROAD DESIGN.
4. ALL WATERMAINS SHALL MAINTAIN A MINIMUM 1.5m CLEARANCE FROM ALL MANHOLES AND CATCH BASINS, WHERE APPLICABLE.
5. FOR WATERMAINS CROSSING OVER OR UNDER SEWERS A MINIMUM 0.5m VERTICAL CLEARANCE SHALL BE PROVIDED.
6. FOR WATERMAIN CROSSING A SANITARY SEWER, WATERMAIN JOINTS ARE TO BE OFFSET A MINIMUM OF 2.5m HORIZONTALLY FROM THE CENTERLINE OF THE SANITARY SEWER.
7. WATERMAIN BEDDING SHOULD BE AS PER DWG 1-5-1.
8. WATERMAINS TO BE INSTALLED TO GRADES AS SHOWN ON APPROVED PLANS, COPY OF GRADE SHEET MUST BE SUPPLIED TO THE REGION OF PEEL INSPECTOR PRIOR TO COMMENCEMENT OF WORK.
9. ANY JOINT DEFLECTION SHALL BE 50% OF MANUFACTURER'S SPECIFICATIONS. PIPE BARREL DEFLECTION IS PROHIBITED.
10. FIRE HYDRANTS SHALL BE INSTALLED AS PER REGION STD. DWG. 1-6-1 OR 1-6-2 WITH FLANGE SET BETWEEN 50mm AND 150mm ABOVE FINISHED GRADE.
11. ALL HYDRANTS SHALL HAVE 1.2m MINIMUM HORIZONTAL CLEARANCE FROM ALL OTHER UTILITIES AND STRUCTURES MEASURED FROM THE NEAREST POINT OF THE STRUCTURE.
12. MECHANICAL RESTRAINERS ARE REQUIRED FOR ALL FITTINGS, VALVES, DEAD ENDS, CAPS AND HYDRANTS ON ALL PVC WATERMAINS; MINIMUM RESTRAINED PIPE LENGTH AS PER REGION'S STANDARD DRAWING 1-5-9.
13. STAINLESS STEEL NUTS AND BOLTS ARE TO BE USED ON ALL METALLIC FITTINGS AND JOINT RESTRAINTS.
14. ALL METALLIC VALVES, FITTINGS, THROUGH WALL METAL PIPING AND JOINT RESTRAINTS TO BE C/W DENSO PASTE, DENSO MASTIC & DENSO TAPE OR APPROVED EQUAL APPLIED TO MANUFACTURER'S RECOMMENDATIONS.
15. WHERE PLASTIC PIPE IS USED, INSTALL A 12 GAUGE TWU STRANDED COPPER, LIGHT COLOURED, PLASTIC COATED TRACER WIRE ATTACHED TO THE PIPE WITH APPROVED WIRE SPLICE. THE WIRE SHOULD BE BROUGHT TO THE SURFACE AT EACH SERVICE & VALVE BOX AND HYDRANT VALVES.
16. 50mm DIAMETER WATERMAIN SHALL BE TYPE K SOFT COPPER. WATERMAIN INSTALLATION IN CUL-DE-SACS AS PER REGION STD. DWG. 1-7-4.
17. A PHYSICAL SEPARATION MUST BE MAINTAINED AT ALL CONNECTION POINTS OF NEW WATERMAIN TO THE EXISTING SYSTEM UNTIL BACTERIOLOGICAL TESTS HAVE PASSED, AS PER STD. DWG 1-7-7 AND 1-7-8.
18. PROVISION FOR FLUSHING OF NEW WATERMAINS PRIOR TO TESTING MUST BE PROVIDED WITH AT LEAST 50mm OUTLET ON WATERMAINS SMALLER THAN 300mm IN DIAMETER, AND MINIMUM 100mm OUTLET ON WATERMAINS 300mm AND LARGER. COPPER WATERMAINS ARE TO HAVE FLUSHING POINTS AT THE END, THE SAME SIZE AS THE WATERMAIN, AS PER STD. DWG. 1-7-7 AND 1-7-8.
19. ALL SERVICE CONNECTIONS TO PVC PIPES ARE TO BE MADE USING APPROVED WIDE BAND SERVICE SADDLE. DIRECT TAPPING IS NOT ALLOWED.
20. ALL WATER SERVICES SHALL BE MINIMUM 25mm DIA NOMINAL COPPER PIPE SIZE OR 32mm DIA POLYETHYLENE PIPE. IN GENERAL, NON METALLIC SERVICES SHALL BE ONE SIZE LARGER THAN THE NOMINAL COPPER PIPE SIZE AS PER LATEST APPROVED REGIONAL PRODUCT LIST AND SIZES C/W TRACER WIRE. NEW WATER SERVICES SHALL BE PRESSURE TESTED TOGETHER WITH THE WATER MAIN. FOLLOWING TESTING THE CONTRACTOR SHALL OPERATE EACH WATER SERVICE TO VERIFY FULL FLOW AND PRESSURE AT THE CURB STOP TO THE SATISFACTION OF THE REGION OF PEEL. CONTRACTOR TO MAKE CONNECTIONS TO HOMES AFTER THE WATERMAIN HAS BEEN SWABBED, PRESSURE TESTED, FLUSHED AND DISINFECTED TO THE SATISFACTION OF THE REGION OF PEEL.
21. THE MINIMUM LATERAL DISTANCE BETWEEN WATER SERVICES AND OTHER UTILITIES SHALL BE 1.2m.
22. ALL RESIDENTIAL WATER SERVICE BOXES/CURB STOPS SHALL BE INSTALLED WITHIN SODDED AREAS WITH MINIMUM DISTANCE OF 1.0 METRES FROM THE EDGE OF THE DRIVEWAY, BE FLUSH WITH GRADE AND ACCESSIBLE AT ALL TIME.
23. VALVE AND BOXES SHALL BE CAST IRON SLIDING TYPE, COMPLETED WITH VALVE GUIDE PLATES AND INSTALLED AS PER REGION STD. 1-3-8. MAINLINE VALVES TO BE RESTRAINED AS PER REGION STD. 1-3-3A. VALVES SHALL OPEN TO THE LEFT (COUNTER-CLOCKWISE)
24. ALL WATER SERVICES BOXES SHOULD BE "LEAD FREE" AS PER REGION'S MATERIAL SPECIFICATIONS.
25. THE REGION WILL COMPLETE THE NECESSARY WATER TESTING (PRESSURE TEST, FLUSHING, CHLORINATION AND SAMPLING). CONTRACTOR MAY PROCEED WITH HIS OWN PRESSURE TEST AND FLUSHING PRIOR TO REGION'S TESTING.
26. ALL METALLIC WATER PIPES INCLUDING 'K' COPPER WATER SERVICES, INSTALLED OR REPAIRED, SHALL HAVE ZINC ANODE AS PER REGION OF PEEL STANDARD 1-7-1, OPSS422 AND OPSD 1109.011 AND TO CONFORM TO ASTM B-418 TYPE.
27. ALL WATERMAIN PIPE DELIVERED ON SITE SHALL HAVE MANUFACTURER'S PLUGS AND STORED SO THAT NO DEBRIS ENTERS THE PIPE. NO WATERMAIN IS TO BE INSTALLED UNTIL NIGHT PLUG IS ON SITE. NIGHT PLUG TO BE USED EVERY TIME WORK IS STOPPED.
28. ALL TEMPORARY WATERMAINS AND APPURTENANCES SHALL BE TESTED TO THE SAME STANDARDS AS NEWLY INSTALLED WATERMAINS.

WATERMAIN IN FILL AREA NOTES:

1. NO WATERMAIN TO BE LAID ON FILL UNTIL THE FIELD DENSITY TEST REPORTS HAVE BEEN SUBMITTED TO AND APPROVED BY THE REGION OF PEEL OR THE CONSULTING ENGINEER.
2. PIPE JOINTS DEFLECTIONS ARE NOT ALLOWED IN FILL AREA.
3. JOINS SHALL BE MECHANICALLY RESTRAINED THE WHOLE LENGTH.
4. ALL HYDRANTS, TEE, BRANCH VALVES AND HORIZONTAL BENDS ARE TO BE MECHANICALLY RESTRAINED WITH TIE RODS.
5. IN EXISTING MUNICIPAL RIGHT-OF-WAY OR EASEMENT, FILL TO BE PLACED TO 600mm MINIMUM ABOVE THE OBVERT OF THE WATERMAIN AND 300mm EITHER SIDE COMPACTED TO MINIMUM 100% STANDARD PROCTOR DENSITY IN 300mm-LIFTS; AND THEREAFTER, FOR EVERY 300mm LIFT ALONG THE CENTERLINE, AND 1.5m TO EITHER SIDE, OF WATERMAIN AT MAXIMUM INTERVAL OF 30.0m TEST RESULTS MUST BE SUBMITTED TO AND APPROVED BY THE CONSULTANT OR AGENCY.

SUBMISSION DRAWING

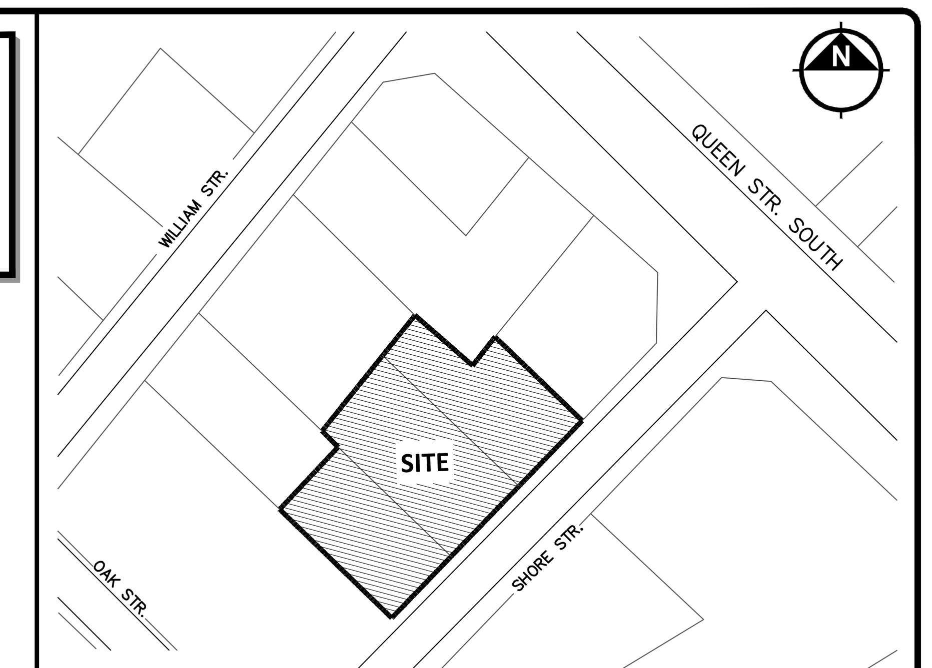
NOT TO BE USED FOR CONSTRUCTION

SANITARY SEWER NOTES:

1. ALL SANITARY SEWERS BEDDING AS PER REGION STD. 2-3-1
2. MAINLINE SANITARY SEWER PIPE SIZE SHALL BE MINIMUM 250mm IN DIAMETER INSTALLED AT THE APPROVED DESIGN GRADE. PIPE CLASS AND APPURTENANCE AS PER REGION'S SPECIFICATIONS.
3. ALL SEWERS CONSTRUCTED WITH GRADE 0.5% OR LESS SHALL BE APPROVED BY THE ENGINEER AND THE AGENCY PROJECT MANAGER OR DESIGNATE AND BE INSTALLED WITH LASER AND CHECKED PRIOR TO BACKFILL.
4. MINIMUM SANITARY SEWER PIPE SLOPE FOR THE LAST LEG SHALL BE 1% AND DESIRABLE SLOPE OF 2%
5. ALL MANHOLES SHALL BE AS PER REGION STD. DWG, 2-5-2, 2-5-3, 2-5-4, 2-5-5, AND 2-5-6 AND BENCHING AS PER STD 2-5-20.
6. FRAME AND COVERS SHALL BE PER REGION STD. DWG 2-5-13, 2-6-1 TO 2-6-8.
7. MANHOLE STEPS OR LADDERS SHALL BE AS PER REGION STD. DWG 2-6-9 TO 2-6-11.
8. MANHOLES DEEPER THAN 5.0m MUST BE EQUIPPED WITH SAFETY PLATFORMS, AS PER STD 2-6-13 AND 2-6-14.
9. MANHOLE DROP STRUCTURES SHALL BE AS PER REGION STD. DWG 2-5-26 AND 2-5-27.
10. SANITARY SERVICE LATERALS SHALL BE MINIMUM 125mm DIAMETER.
    A. SANITARY SERVICE SHALL BE LOWER THAN AND TO THE RIGHT OF STORM SERVICE AT THE PROPERTY LINE WHEN FACING THE LOT FROM THE STREET.
    B. CONNECTIONS TO SEWERS SHALL BE MADE WITH MANUFACTURED TEES OR WYES WHERE APPLICABLE AND SHALL BE COLOUR CODED AS NON-WHITE, AS PER STD. DWG 2-4-1 TO 2-4-7.

TRAFFIC SIGNS AND SIGNALS ON REGIONAL ROADS NOTES:

1. ALL REQUIRED TRAFFIC SIGNS, WHETHER REGULATORY, WARNING, TEMPORARY OR GUIDE/DIRECTION IN NATURE SHALL BE INSTALLED IN ACCORDANCE WITH THE STANDARDS SPECIFICATIONS AND LEGISLATION CONTAINED IN THE OTM MANUALS, THE HTA, AND REGION OF PEEL TRAFFIC BY-LAW
2. ELECTRICAL WORKS SHALL CONFORM THE ONTARIO PROVINCIAL STANDARD (O.P.S) DRAWINGS AND THE REGION OF PEEL STANDARD DRAWINGS AND SPECIFICATIONS.
3. TRAFFIC CONTROLLERS MUST BE INSTALLED AS PER APPROVED LOCATIONS EQUIPMENT MUST NOT ENCROACH ON PRIVATE PROPERTY WITHOUT PERMISSION TO ENTER, EASEMENT, PERMANENT OR TEMPORARY UNDERTAKINGS.



KEY PLAN
N.T.S.

SUBMISSION HISTORY

No.	ISSUED FOR	DATE
1	ISSUED FOR FIRST SUBMISSION	24/09/24

REVISIONS

No.	DESCRIPTION	BY	DATE

BENCHMARK NOTE:
ELEVATIONS SHOWN ARE RELATED TO GEODETIC DATUM AND ARE DERIVED FROM TOWN OF CALEDON BENCH MARK NO. 758057 HAVING A PUBLISHED ELEVATION OF 251.929m.

SURVEY COMPLETED BY:

GUIDO PAPA SURVEYING
9135 KEELE STREET, UNIT B7
VAUGHAN, ONTARIO
L4K 0J4

GUIDO PAPA REF. NO. 23-18-550-00

SURVEY COMPLETED ON:

AUGUST 11, 2023

CONSULTANT

LICENSED PROFESSIONAL ENGINEER
T. DUMYN
100072175
SEPT.25,2024
PROVINCE OF ONTARIO

MUNICIPAL APPROVAL

APPROVED AS TO FORM IN RELIANCE UPON THE PROFESSIONAL SKILL AND ABILITY OF URBANWORKS ENGINEERING CORP. AS TO DESIGN AND SPECIFICATION.

DIRECTOR OF DEVELOPMENT ENGINEERING
DAN TERZIEVSKI

DATE

urbanworks
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MULTI-UNIT RESIDENTIAL DEVELOPMENT
SHORE STREET URBANIZATION

15,21,27 SHORE STREET, CALEDON

Region of Peel
working with you

TOWN OF CALEDON

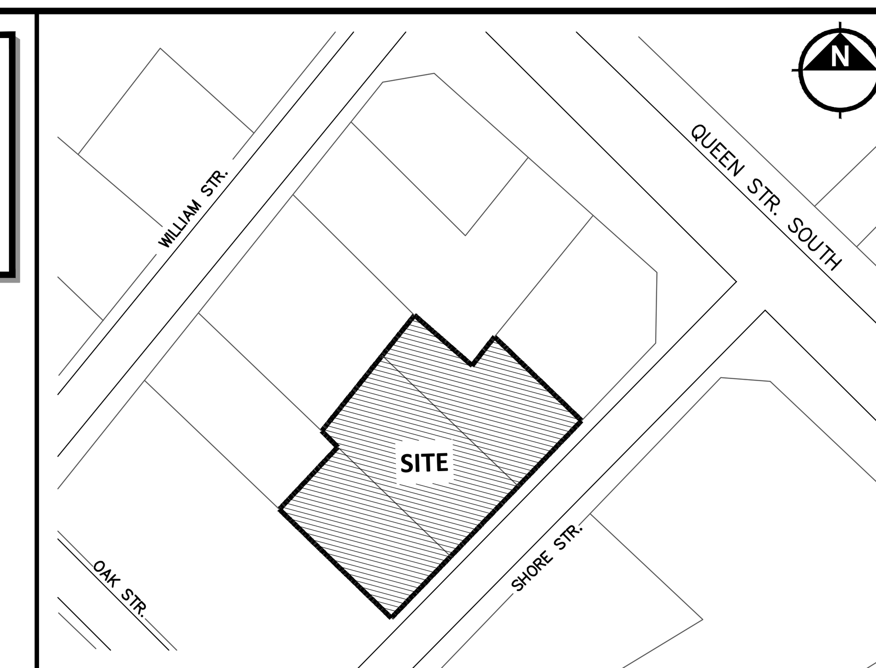
SCALE
0 2.5 5 7.5 10 12.5 15 17.5 20 22.5 25m

GENERAL NOTES

TOWN FILE: PRE-2023-0116 PRE-2023-0274		PROJECT No. 24-0002CA	
REGION FILE:			
DATE: SEP 24, 2024	DESIGNED BY: DV	DWG. No. GN-01	
SCALE:	DRAWN BY: DV		
	CHECKED BY: TD		

SUBMISSION DRAWING

NOT TO BE USED FOR CONSTRUCTION



KEY PLAN
N.T.S.

- LIMIT OF SUBJECT PROPERTY
- ROAD WIDENING SET BACK / ULTIMATE PROPERTY LINE
- VALVE AND BOX
- HYDRANT
- CB CATCH BASIN
- DCB DOUBLE INLET CATCHBASIN
- SANITARY MANHOLE
- STORM MANHOLE
- CATCH BASIN MANHOLE
- DETECTOR CHECK VALVE IN CHAMBER
- CONCRETE WALKWAY
- LANDSCAPED AREAS
- DS DOWNSPOUT (C/W OVERFLOW VALVE)
- GRADE BREAK
- MAJOR OVERLAND FLOW
- TRAFFIC SIGN (REFER TO ARCHITECTURAL DWG FOR DETAILS)
- MAX. SURFACE STORAGE PONDING EXTENTS (ELEV. 254.22)

SUBMISSION HISTORY

No.	ISSUED FOR	DATE
1	ISSUED FOR FIRST SUBMISSION	24/09/24

REVISIONS

No.	DESCRIPTION	BY	DATE

BENCHMARK NOTE:
ELEVATIONS SHOWN ARE RELATED TO GEODETIC DATUM AND ARE DERIVED FROM TOWN OF CALEDON BENCH MARK NO. 758057 HAVING A PUBLISHED ELEVATION OF 251.929m.

SURVEY COMPLETED BY:

GUIDO PAPA SURVEYING
9135 KEELE STREET, UNIT B7
VAUGHAN, ONTARIO
L4K 0J4

GUIDO PAPA REF. NO. 23-18-550-00

SURVEY COMPLETED ON:

AUGUST 11, 2023

CONSULTANT

LICENSED PROFESSIONAL ENGINEER
T. DUMYN
100072175
SEPT.25,2024
PROVINCE OF ONTARIO

MUNICIPAL APPROVAL

APPROVED AS TO FORM IN RELIANCE UPON THE PROFESSIONAL SKILL AND ABILITY OF URBANWORKS ENGINEERING CORP. AS TO DESIGN AND SPECIFICATION.

DIRECTOR OF DEVELOPMENT ENGINEERING
DAN TERZIEVSKI

DATE

urbanworks
ENGINEERING CORPORATION
1945 Dundas Street E., Unit 200, Mississauga, ON, L4X 2T8
general@urbanworkseng.com | www.urbanworkseng.com | 905-901-0224

MULTI-UNIT RESIDENTIAL DEVELOPMENT
SHORE STREET URBANIZATION

15,21,27 SHORE STREET, CALEDON

Region of Peel
working with you

TOWN OF CALEDON

SCALE
0 2.5 5 7.5 10 12.5 15 17.5 20 22.5 25m

REMOVALS PLAN

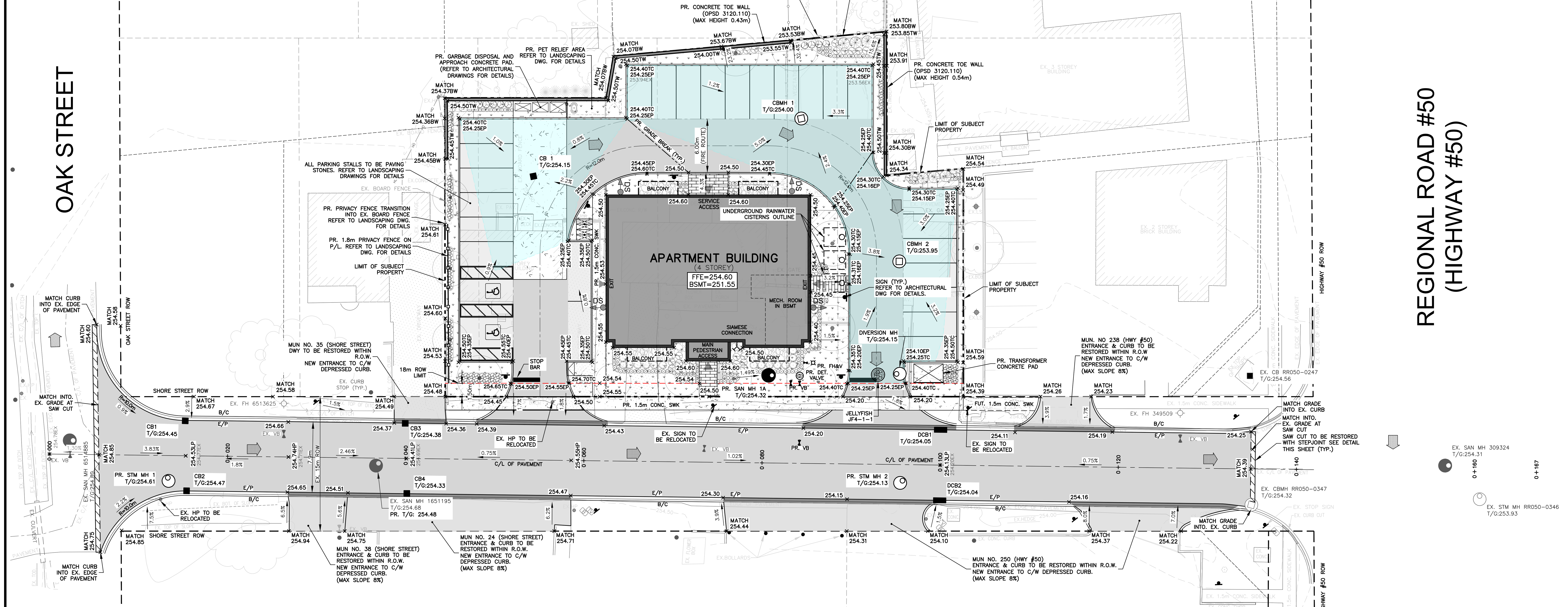
TOWN FILE: PRE-2023-0116 PRE-2023-0274	PROJECT No. 24-0002CA
REGION FILE:	

DATE: SEP 24, 2024	DESIGNED BY: DV	DWG. No. RE-01
SCALE: 1:250	DRAWN BY: DV	
	CHECKED BY: TD	

SUBMISSION DRAWING

NOT TO BE USED FOR CONSTRUCTION

STORAGE TABLE – SURFACE STORAGE		
DESCRIPTION	PROVIDED STORAGE	REQUIRED STORAGE
SURFACE STORAGE MAX EL. 254.25	55.4 m^3	55.2 m^3



SHORE STREET

SHORE STREET TO BE URBANIZED AS PER TOWN STD DWG 202
GRADING TO BE CONFIRMED DURING DETAILED DESIGN

GRADING NOTES:

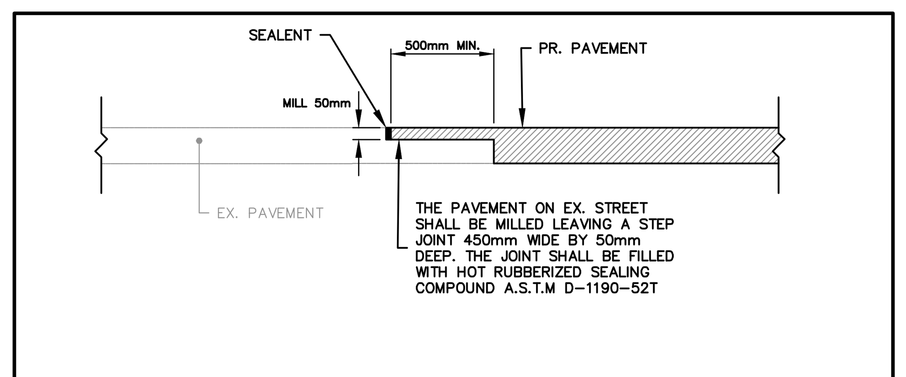
1. WITHIN SUBJECT PROPERTY LIMITS BARRIER CURB TO OPSD 600.110
2. CURB AND GUTTER WITHIN SHORE STREET RIGHT–OF–WAY TO BE OPSD 600.040
3. PARKING STALLS TO BE PAVING STONES. REFER TO LANDSCAPING DRAWINGS FOR DETAILS
4. TOP OF CURB ELEVATIONS 0.15m ABOVE EDGE OF PAVEMENT ELEVATIONS SHOWN
5. ALL BOULEVARDS WITHIN SHORE STREET R.O.W TO BE REGRADED TO NEW BACK OF CURB WITH 300mm OF TOPSOIL AND NURSERY SOD.

SERVICING NOTE:

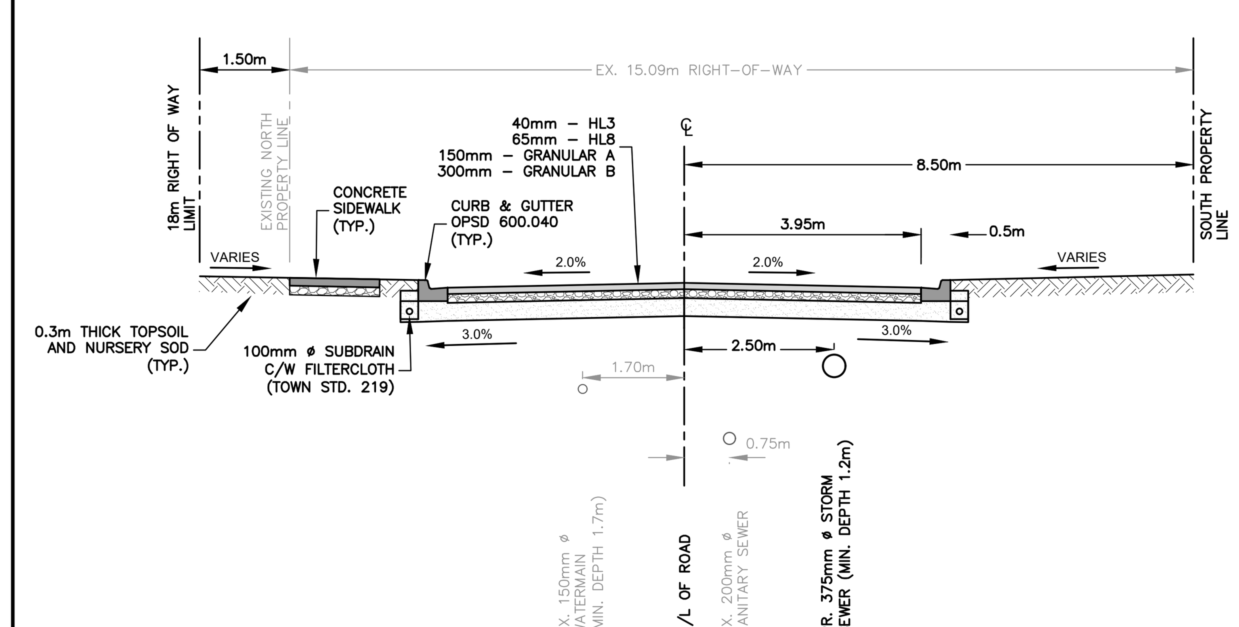
1. ALL ROOF DRAINS TO CONNECT TO UNDERGROUND INFILTRATION FACILITY SHOWN

GENERAL NOTES:

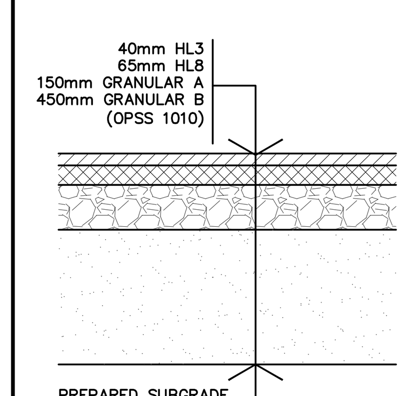
1. THIS DRAWING TO BE READ IN CONJUNCTION WITH THE APPROVED ARCHITECTURAL AND LANDSCAPE PLANS.
2. THE LOCATION OF ALL UNDERGROUND AND ABOVEGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON ENGINEERING DRAWINGS, AND WHERE SHOWN THE ACCURACY OF THE LOCATION AND ELEVATION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. PRIOR TO COMMENCING CONSTRUCTION, THE CONTRACTOR SHALL VERIFY EXACT LOCATION AND ELEVATION OF SUCH UTILITIES AND STRUCTURES AND SHALL ASSUME ALL LIABILITIES OF DAMAGE.
3. ALL DIMENSIONS SHALL BE CHECKED AND VERIFIED IN THE FIELD BY THE CONTRACTOR PRIOR TO CONSTRUCTION AND ANY DISCREPANCIES SHALL BE REPORTED IMMEDIATELY TO THE ENGINEER. DETAILS ARE NOT TO BE SCALED FROM THE DRAWINGS.
4. THE WORK AREA SHALL BE ISOLATED FROM PUBLIC ACCESS AT ALL TIMES. OPEN EXCAVATIONS SHALL BE BACKFILLED OR PLATED AT THE END OF EACH WORK DAY. ALL CONSTRUCTION WORKS SHALL BE CARRIED OUT IN ACCORDANCE WITH THE REQUIREMENTS OF THE OCCUPATIONAL HEALTH AND SAFETY ACT AND REGULATIONS FOR CONSTRUCTION PROJECTS.



TYPICAL STEP JOINT DETAIL
SCALE 1:25

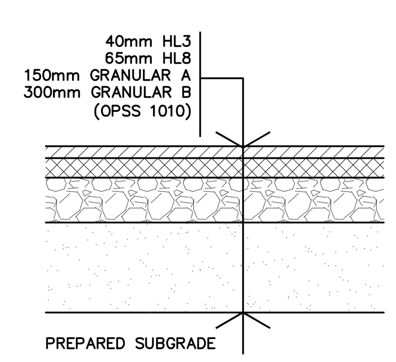


TYPICAL ROAD SECTION
SCALE 1:100



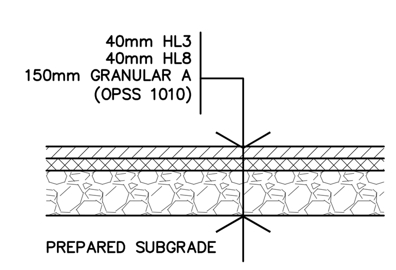
PAVEMENT STRUCTURE (PARKING LOT)
SCALE 1:20

REFER TO GEOTEHCNICAL REPORT BY SOIL ENGINEERTS LTD. DATED JULY 2024



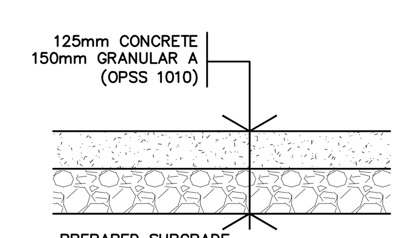
PAVEMENT STRUCTURE (SHORE STREET)
SCALE 1:20

AS PER TOWN STD DWG 201. TO BE CONFIRMED BY GEOTECHNICAL ENGINEER DURING DETAILED DESIGN.



PAVEMENT STRUCTURE (EX. RESIDENTIAL DRIVEWAY RESTORATION)
SCALE 1:20

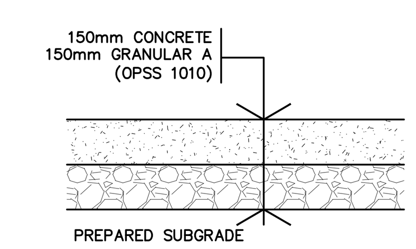
AS PER TOWN STD DWG 201. TO BE CONFIRMED BY GEOTECHNICAL ENGINEER DURING DETAILED DESIGN.



NOTES:

1. CONCRETE SHALL BE AS PER OPSS 1350 AND A MINIMUM CEMENT CONTENT OF 355 kg/m3
2. JOINTS TO BE INSTALLED AS FOLLOWS:
   - 2.1. "DUMMY" JOINTS AT 1.5m SPACING
   - 2.2. "EXPANSION" JOINTS AT 6.0m SPACING OR AT ANY DIRECTIONAL CHANGE

CONCRETE SIDEWALK (AS PER TOWN STD 102)
SCALE 1:20



NOTES:

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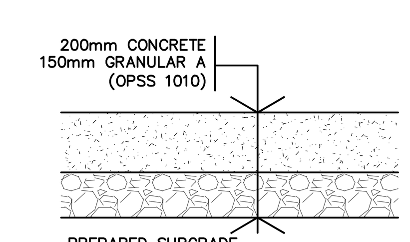
2. JOINTS TO BE INSTALLED AS FOLLOWS:
   - 2.1. "DUMMY" JOINTS AT 1.5m SPACING
   - 2.2. "EXPANSION" JOINTS AT 6.0m SPACING OR AT ANY DIRECTIONAL CHANGE

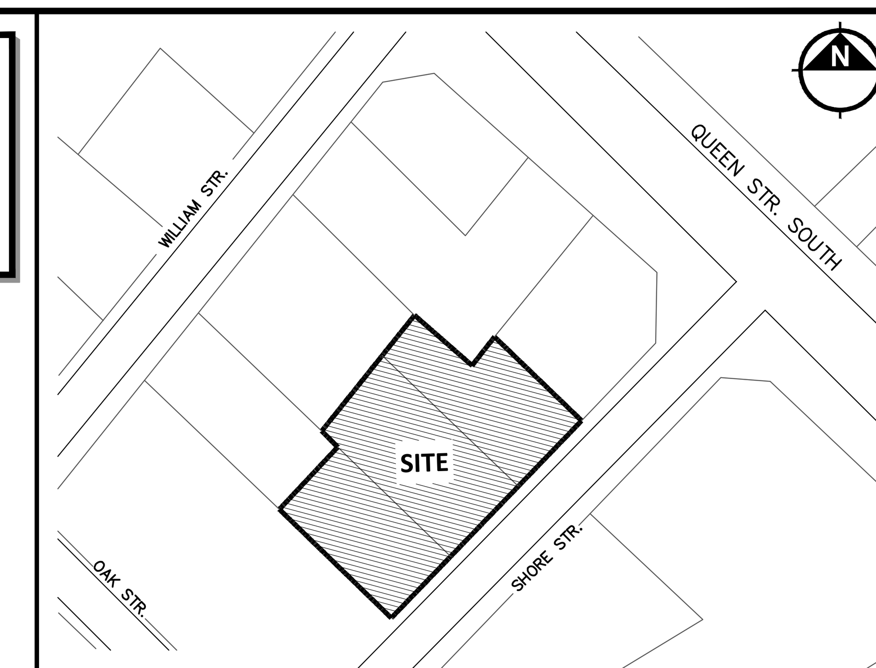
CONCRETE SIDEWALK STRUCTURE RESIDENTIAL DRIVEWAY ENTRANCE (AS PER TOWN STD 102)
SCALE 1:20



NOTES:

1. CONCRETE SHALL BE AS PER OPSS 1350 AND A MINIMUM CEMENT CONTENT OF 355 kg/m3
2. JOINTS TO BE INSTALLED AS FOLLOWS:
   - 2.1. "DUMMY" JOINTS AT 1.5m SPACING
   - 2.2. "EXPANSION" JOINTS AT 6.0m SPACING OR AT ANY DIRECTIONAL CHANGE

CONCRETE SIDEWALK STRUCTURE COMMERCIAL DRIVEWAY ENTRANCE (AS PER TOWN STD 102)
SCALE 1:20



KEY PLAN
N.T.S.

- LIMIT OF SUBJECT PROPERTY
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- VALVE AND BOX
- HYDRANT
- CB — CATCH BASIN
- DCB — DOUBLE INLET CATCHBASIN
- SANITARY MANHOLE
- STORM MANHOLE
- CATCH BASIN MANHOLE
- DETECTOR CHECK VALVE IN CHAMBER
- CONCRETE WALKWAY
- LANDSCAPED AREAS
- DS — DOWNSPOUT (C/W OVERFLOW VALVE)
- GRADE BREAK
- MAJOR OVERLAND FLOW
- MAX. SURFACE STORAGE PONDING EXTENTS (ELEV. 254.25)
- TRAFFIC SIGN (REFER TO ARCHITECTURAL DWG FOR DETAILS)

SUBMISSION HISTORY		
No.	ISSUED FOR	DATE
1	ISSUED FOR FIRST SUBMISSION	24/09/24

REVISIONS			
No.	DESCRIPTION	BY	DATE

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SURVEY COMPLETED BY:

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VAUGHAN, ONTARIO
L4K 0J4

GUIDO PAPA REF. NO. 23–18–550–00

SURVEY COMPLETED ON:

AUGUST 11, 2023

CONSULTANT

LICENSED PROFESSIONAL ENGINEER
T. DUMYN
100072175
SEPT.25,2024
PROVINCE OF ONTARIO

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DIRECTOR OF DEVELOPMENT ENGINEERING
DAN TERZIEVSKI

DATE

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1945 Dundas Street E., Unit 200, Mississauga, ON, L4X 2T8
general@urbanworkseng.com | www.urbanworkseng.com | 905-901-0224

MULTI-UNIT RESIDENTIAL DEVELOPMENT SHORE STREET URBANIZATION

15,21,27 SHORE STREET, CALEDON

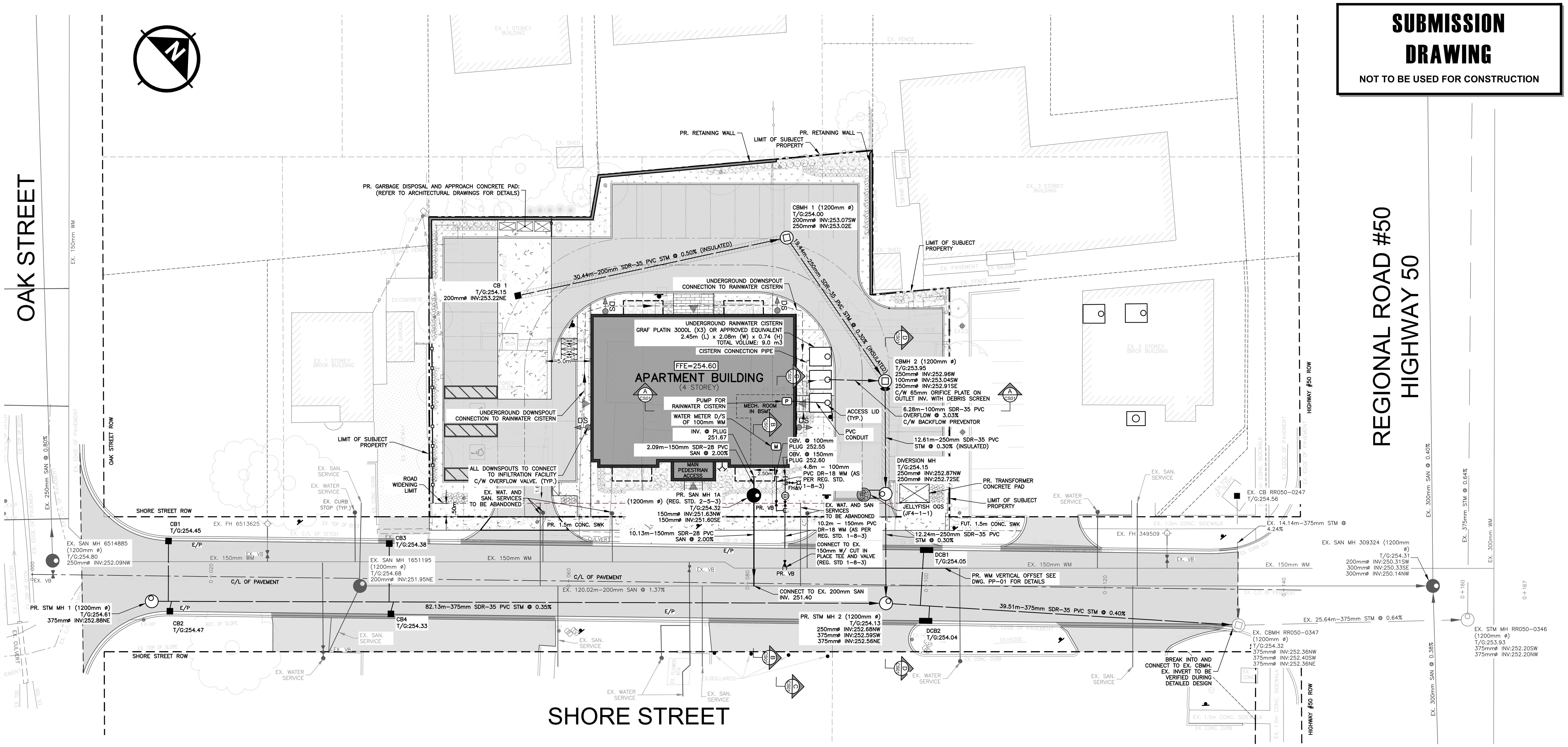
Region of Peel working with you

TOWN OF CALEDON

SCALE 0 2.5 5 7.5 10 12.5 15 17.5 20 22.5 25m

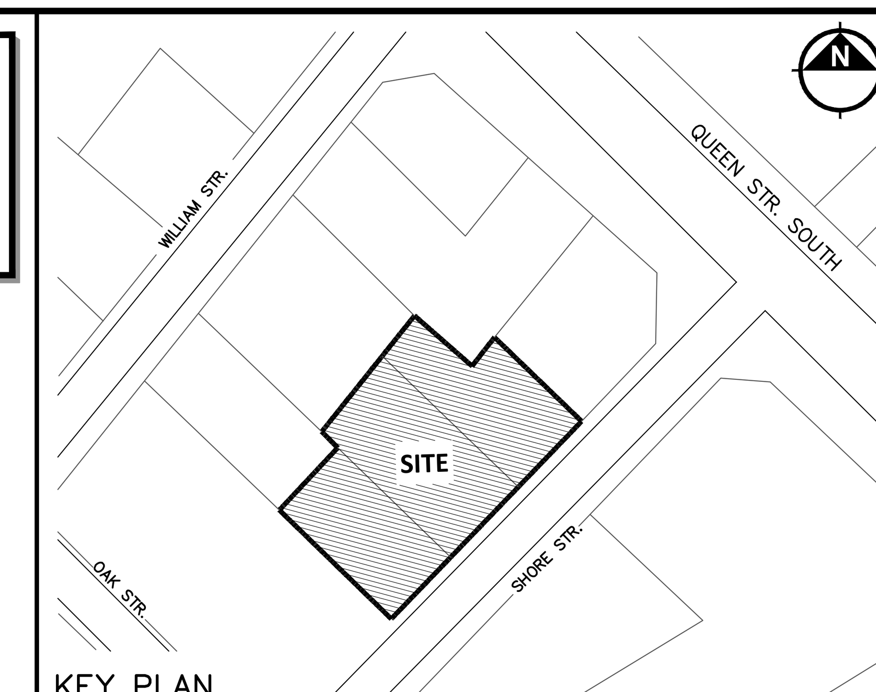
SITE GRADING PLAN

TOWN FILE: PRE–2023–0116 PRE–2023–0274	PROJECT No. 24-0002CA
REGION FILE:	
DATE: SEP 24, 2024	DESIGNED BY: DV
SCALE: 1:250	DRAWN BY: DV
	CHECKED BY: TD
DWG. No.	SG-01



SUBMISSION DRAWING

NOT TO BE USED FOR CONSTRUCTION



KEY PLAN
N.T.S.

LIMIT OF SUBJECT PROPERTY
VALVE AND BOX
HYDRANT
WATER MAIN
CB CATCH BASIN
DCB DOUBLE INLET CATCHBASIN
SANITARY MANHOLE
SANITARY SEWER
STORM MANHOLE
STORM SEWER
CATCH BASIN MANHOLE
DETECTOR CHECK VALVE IN CHAMBER
CONCRETE WALKWAY
LANDSCAPED AREAS
DS DOWNSPOUT (C/W OVERFLOW VALVE)
TRAFFIC SIGN (REFER TO ARCHITECTURAL DWG FOR DETAILS)
MAJOR OVERLAND FLOW

SUBMISSION HISTORY

No.	ISSUED FOR	DATE
1	ISSUED FOR FIRST SUBMISSION	24/09/24

REVISIONS

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9135 KEELE STREET, UNIT B7
VAUGHAN, ONTARIO
L4K 0J4

GUIDO PAPA REF. NO. 23-18-550-00

SURVEY COMPLETED ON:

AUGUST 11, 2023

CONSULTANT

LICENSED PROFESSIONAL ENGINEER
T. DUMYN
100072175
SEPT.25,2024
PROVINCE OF ONTARIO

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DIRECTOR OF DEVELOPMENT ENGINEERING
DAN TERZIEVSKI

DATE

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1945 Dundas Street E., Unit 200, Mississauga, ON, L4X 2T8
general@urbanworkseng.com | www.urbanworkseng.com | 905-901-0224

MULTI-UNIT RESIDENTIAL DEVELOPMENT
SHORE STREET URBANIZATION

15,21,27 SHORE STREET, CALEDON

Region of Peel working with you

TOWN OF CALEDON

SCALE 0 2.5 5 7.5 10 12.5 15 17.5 20 22.5 25m

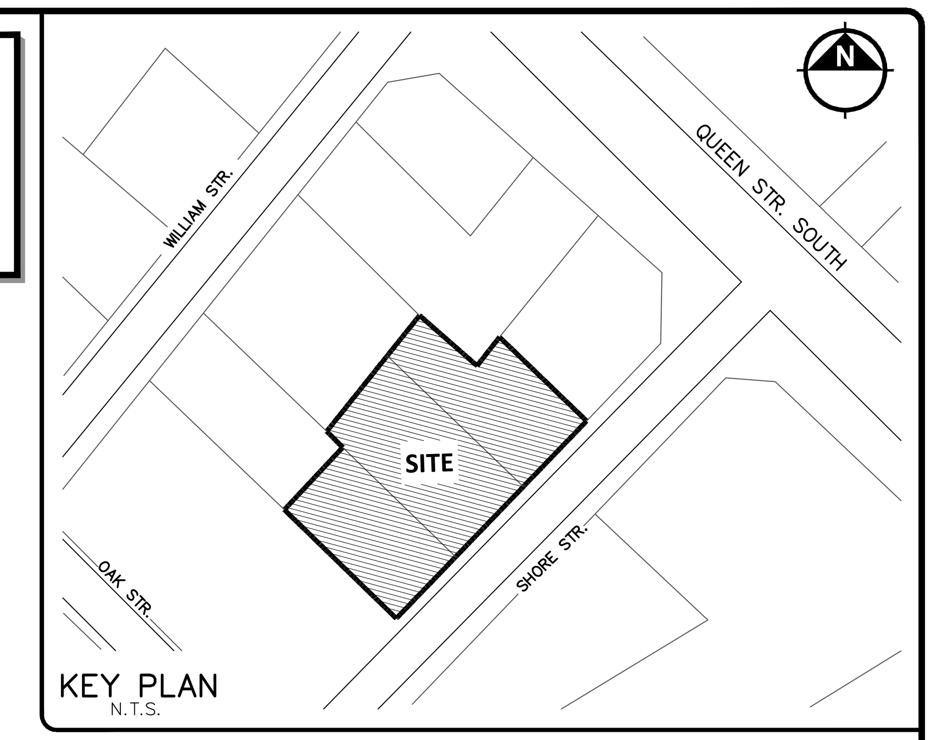
SITE SERVICING PLAN

TOWN FILE: PRE-2023-0116
PRE-2023-0274
REGION FILE:

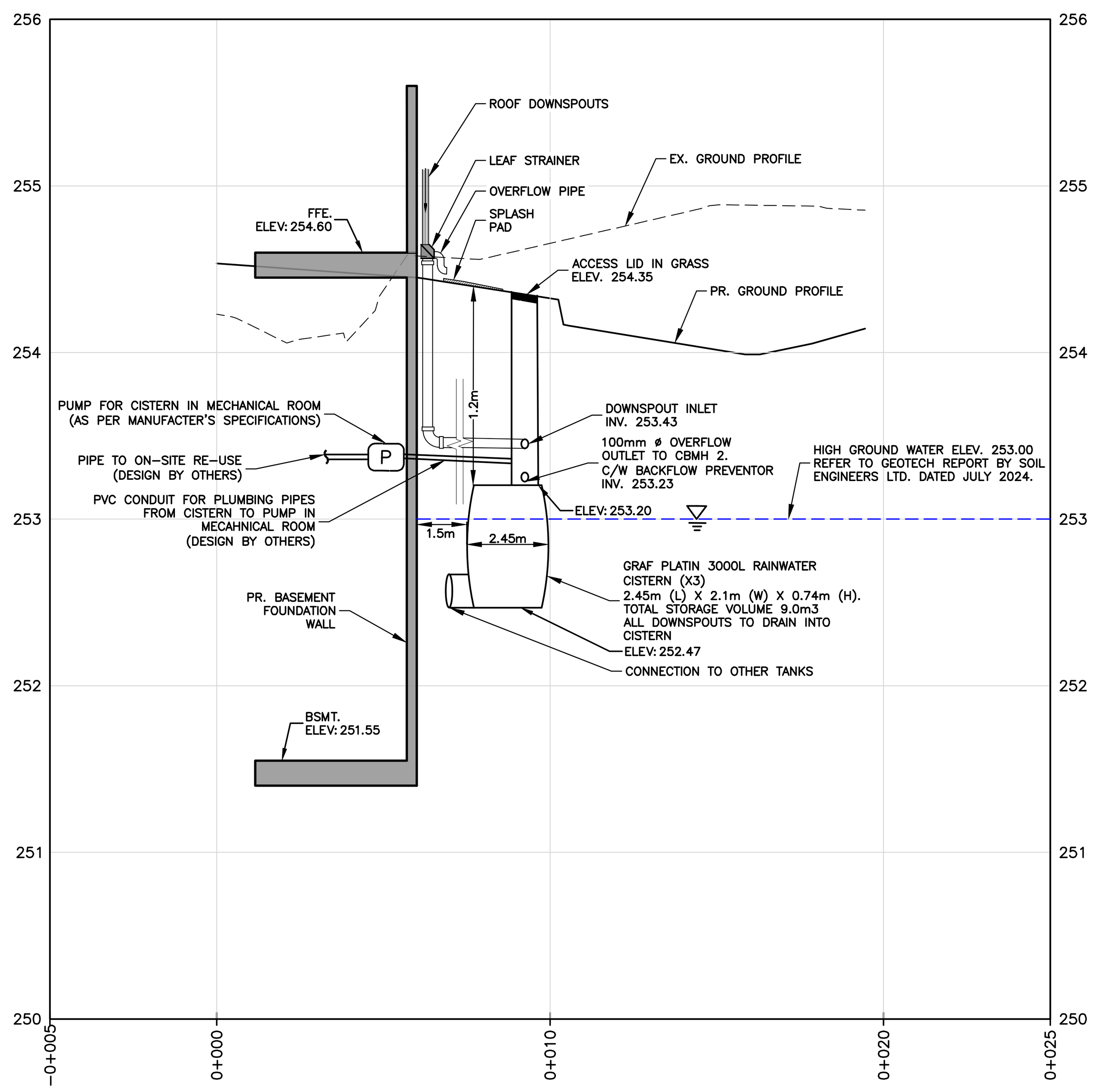
PROJECT No. 24-0002CA

DATE: JUN 2024
SCALE: 1:250
DESIGNED BY: DV
DRAWN BY: DV
CHECKED BY: TD

DWG. No. SS-01

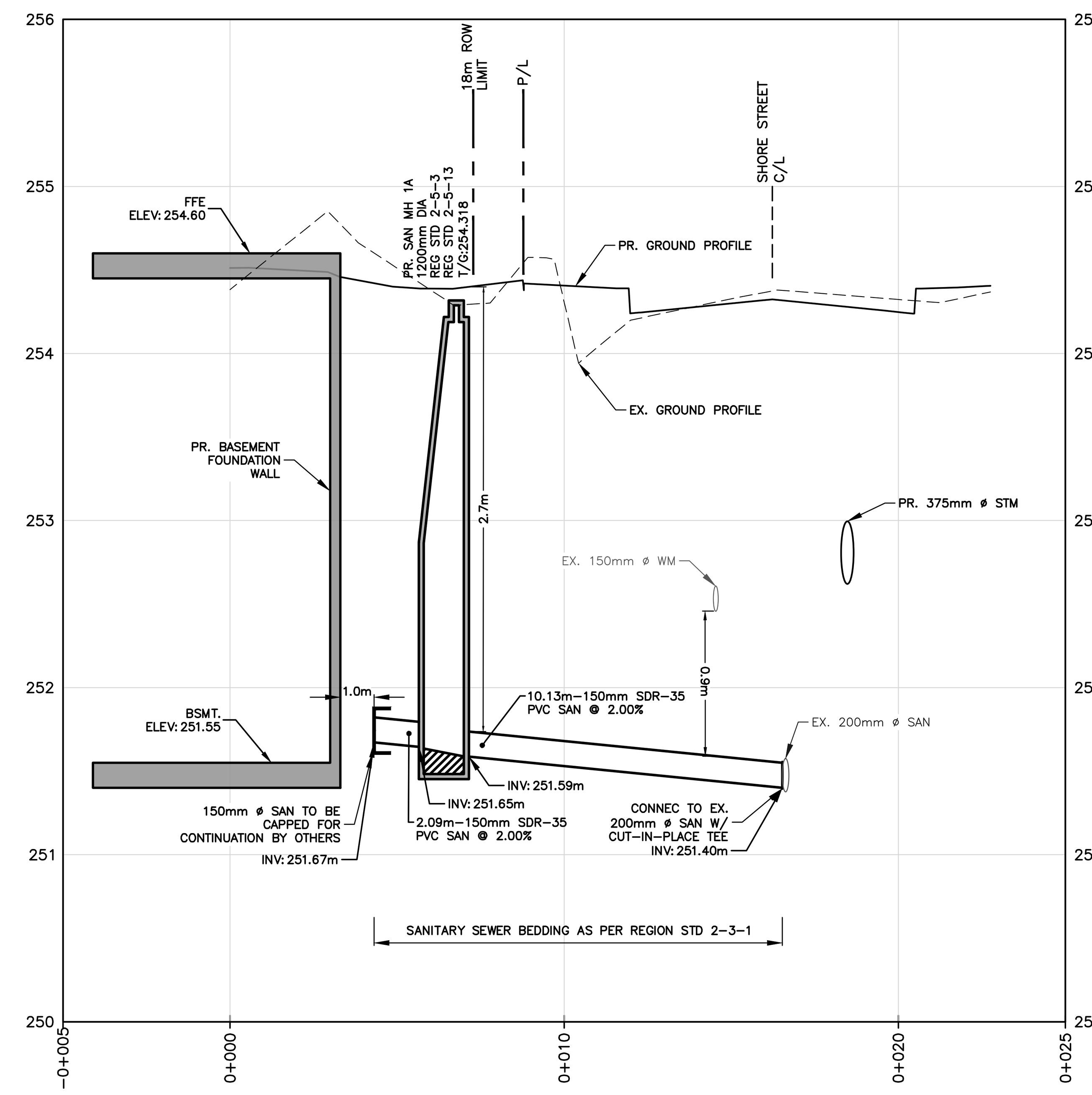


KEY PLAN
N.T.S.



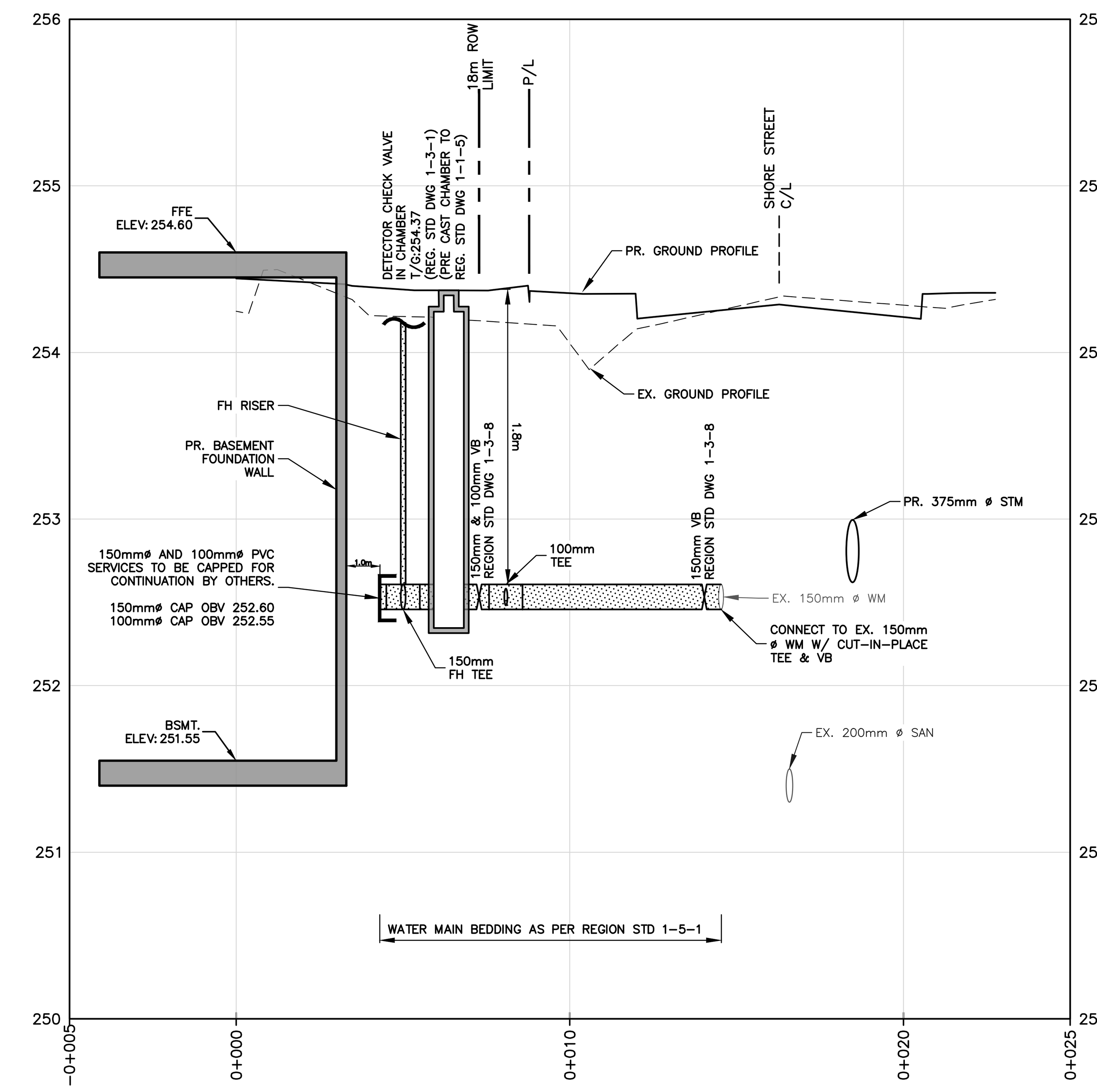
SECTION A-A : RAIN WATER STORAGE FACILITY

H SCALE: 1:150 V SCALE : 1:30



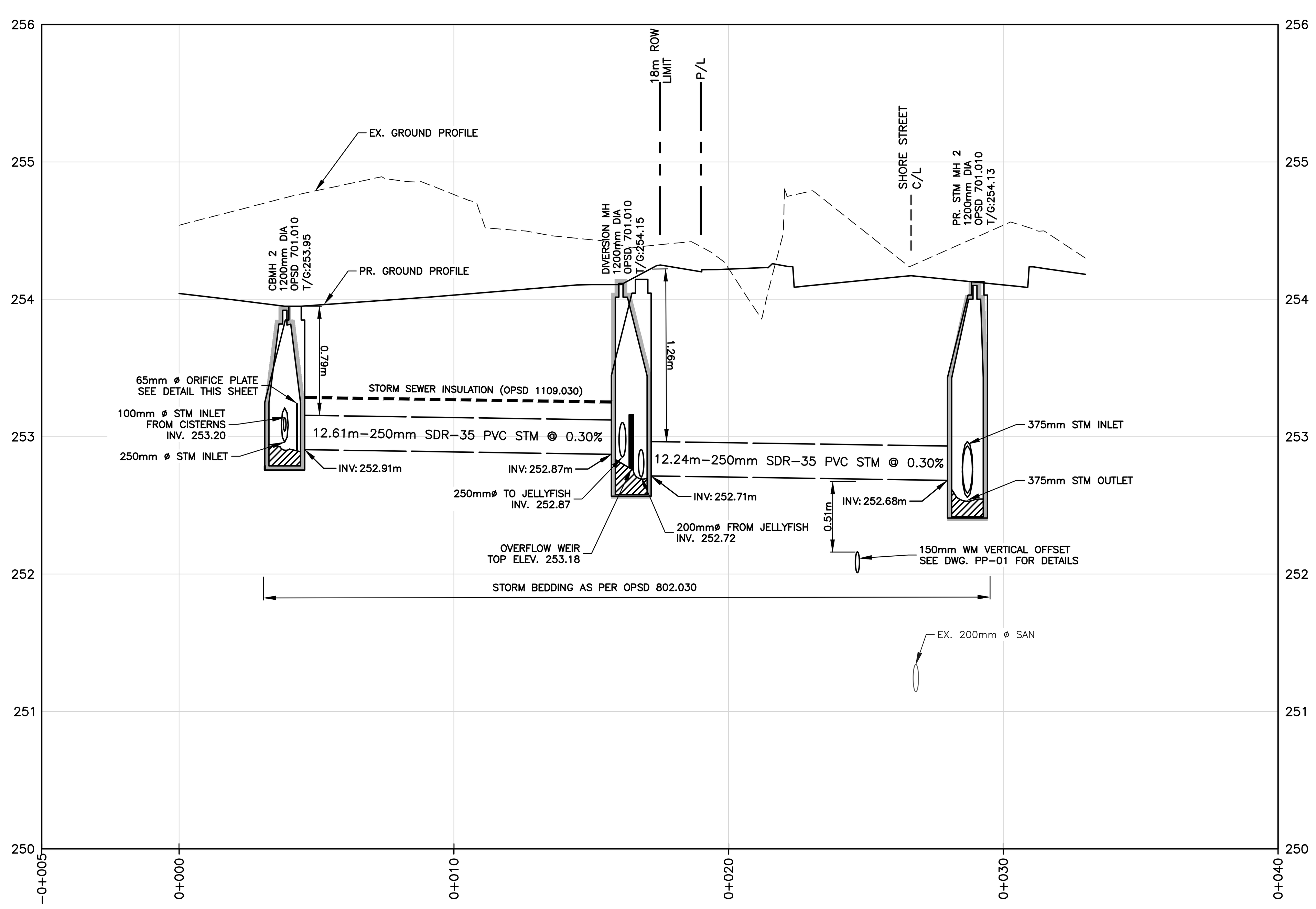
SECTION B-B : SANITARY SERVICE

H SCALE: 1:150 V SCALE : 1:30



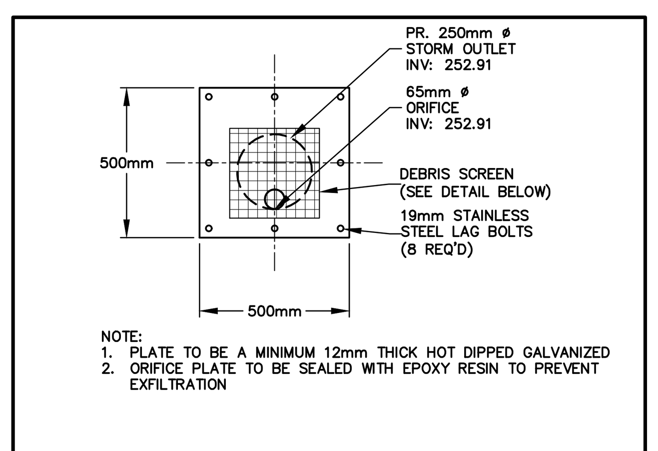
SECTION C-C: WATER SERVICE

H SCALE: 1:150 V SCALE : 1:30



SECTION D-D : STORM SERVICE

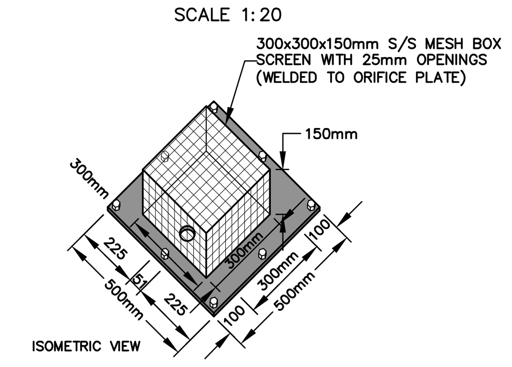
H SCALE: 1:150 V SCALE : 1:30



NOTE:
1. PLATE TO BE A MINIMUM 12mm THICK HOT DIPPED GALVANIZED
2. ORIFICE PLATE TO BE SEALED WITH EPOXY RESIN TO PREVENT EXFILTRATION

CBMH 2
ORIFICE PLATE DETAIL

SCALE 1:20



ORIFICE PLATE
DEBRIS SCREEN

SCALE 1:20

SUBMISSION HISTORY

No.	ISSUED FOR	DATE
1	ISSUED FOR FIRST SUBMISSION	24/09/24

REVISIONS

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VAUGHAN, ONTARIO
L4K 0J4

GUIDO PAPA REF. NO. 23-18-550-00

SURVEY COMPLETED ON:
AUGUST 11, 2023

CONSULTANT

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SEPT.25.2024
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SHORE STREET URBANIZATION

15,21,27 SHORE STREET, CALEDON

Region of Peel
working with you

TOWN OF CALEDON

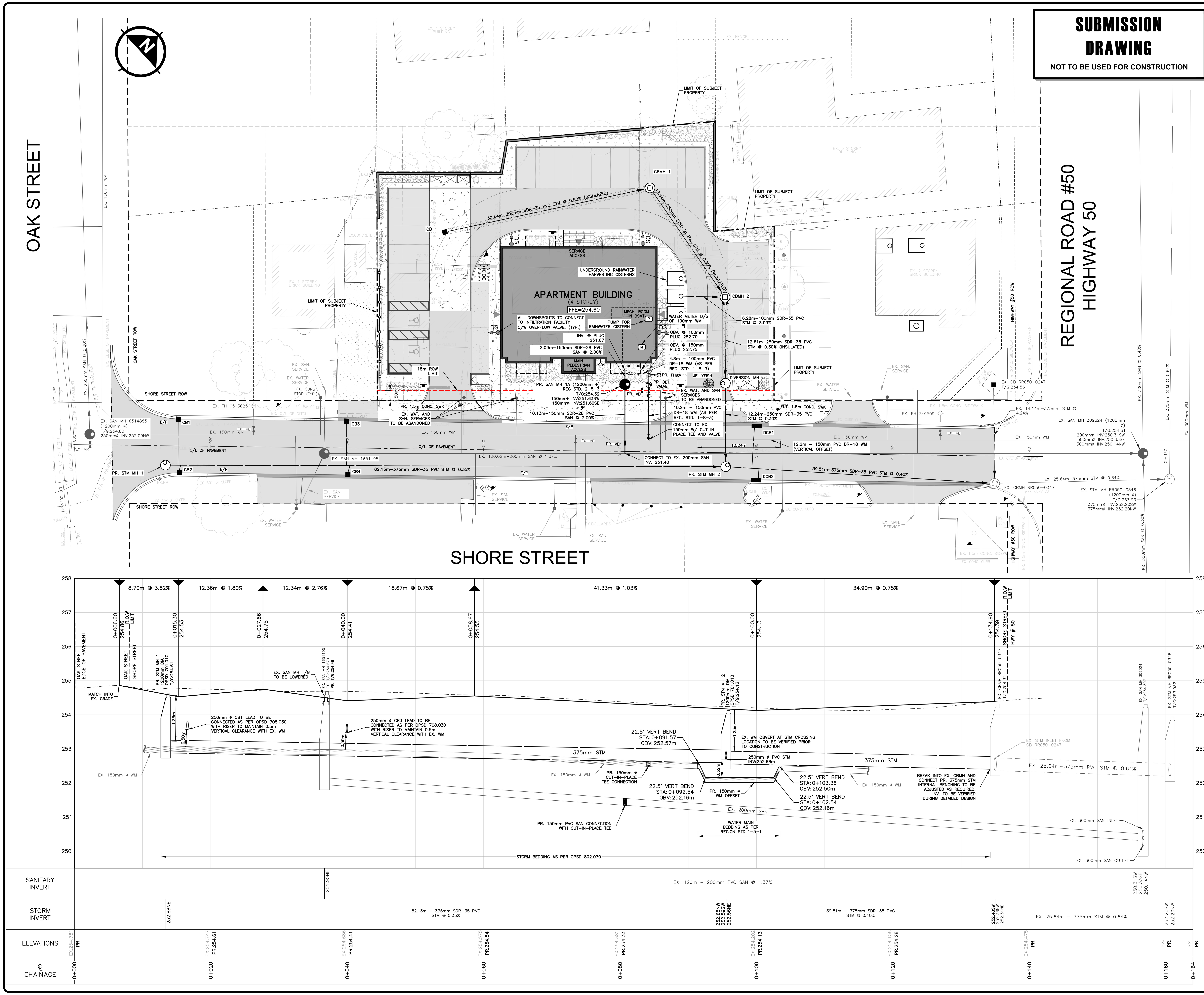
SCALE
0 2.5 5 7.5 10 12.5 15 17.5 20 22.5 25m

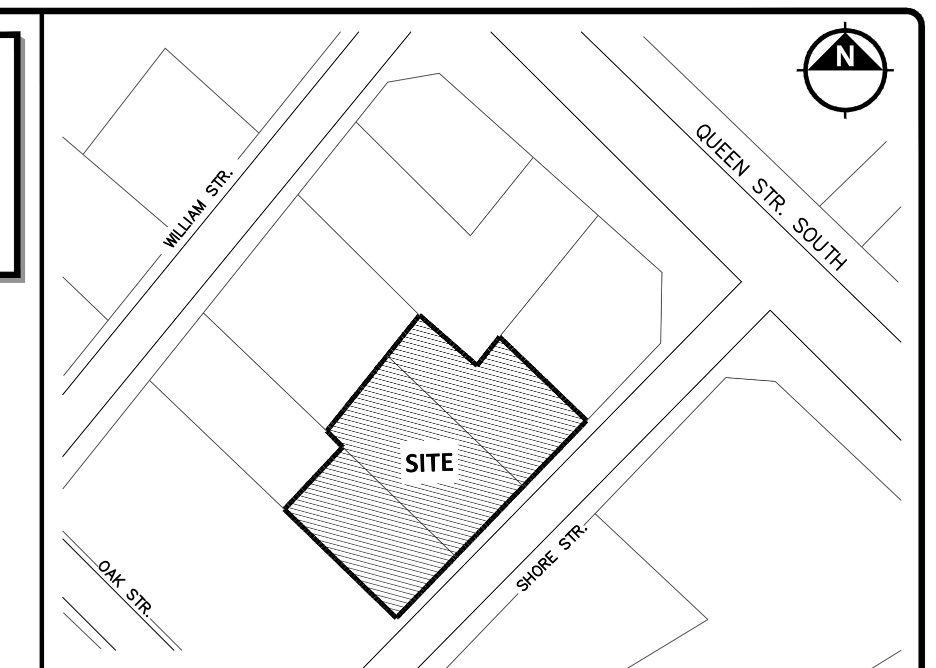
CROSS SECTIONS

TOWN FILE: PRE-2023-0116 PRE-2023-0274		PROJECT No.	
REGION FILE:		24-0002CA	
DATE: SEP 24, 2024	DESIGNED BY: DV	DWG. No.	
SCALE: AS NOTED	DRAWN BY: DV	CS-01	
	CHECKED BY: TD		

SUBMISSION DRAWING

NOT TO BE USED FOR CONSTRUCTION





KEY PLAN
N.T.S.

LIMIT OF SUBJECT PROPERTY
VALVE AND BOX
HYDRANT
WATER MAIN
CB CATCH BASIN
DCB DOUBLE INLET CATCHBASIN
SANITARY MANHOLE
SANITARY SEWER
STORM MANHOLE
STORM SEWER
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DETECTOR CHECK VALVE IN CHAMBER
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DS DOWNSPOUT (C/W OVERFLOW VALVE)
TRAFFIC SIGN (REFER TO ARCHITECTURAL DWG FOR DETAILS)
GRADE BREAK
MAJOR OVERLAND FLOW

SUBMISSION HISTORY

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DIRECTOR OF DEVELOPMENT ENGINEERING
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urbanworks ENGINEERING CORPORATION

MULTI-UNIT RESIDENTIAL DEVELOPMENT
SHORE STREET URBANIZATION
15,21,27 SHORE STREET, CALEDON

Region of Peel working with you

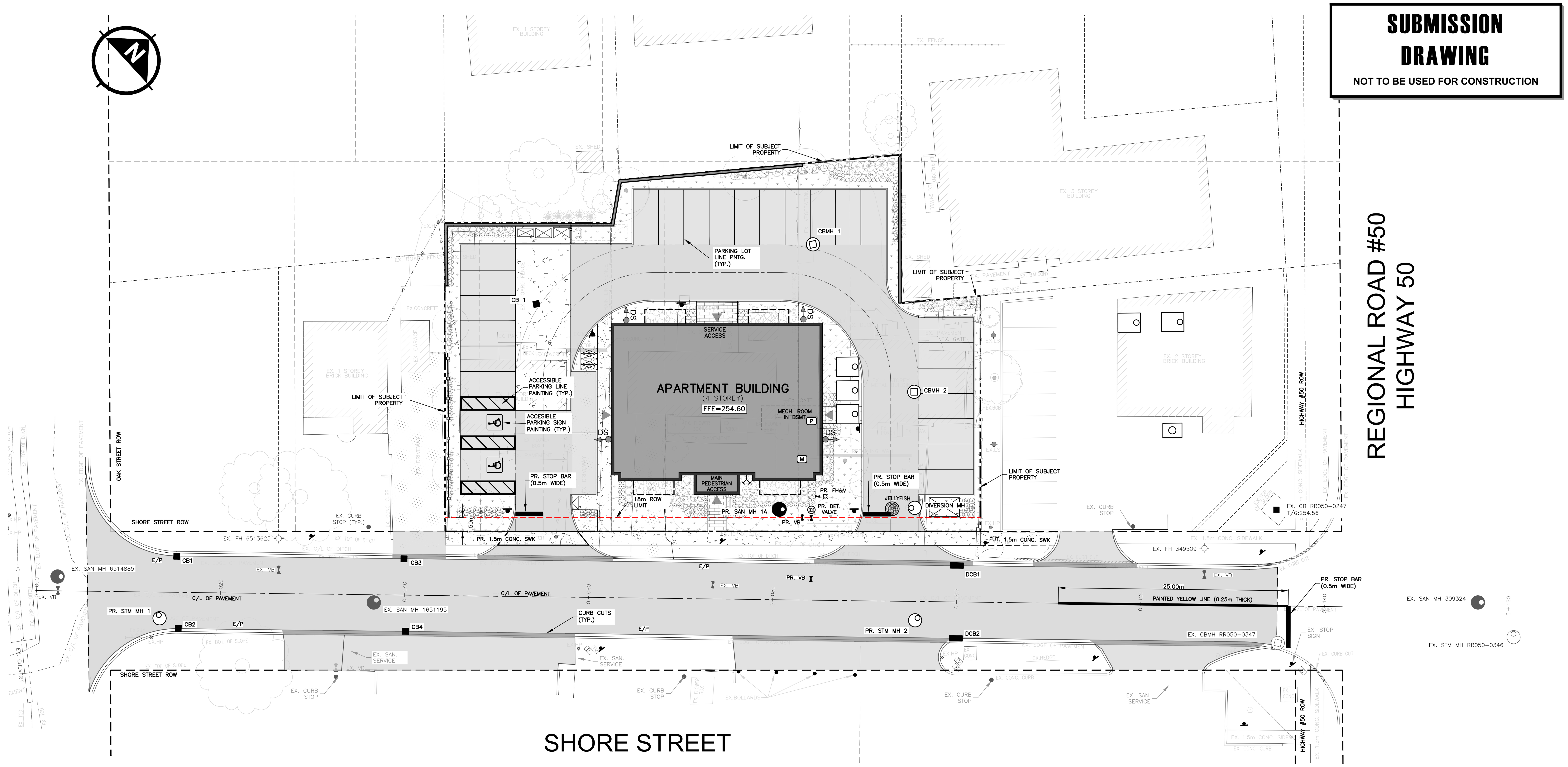
TOWN OF CALEDON

SCALE

0 2.5 5 7.5 10 12.5 15 17.5 20 22.5 25m

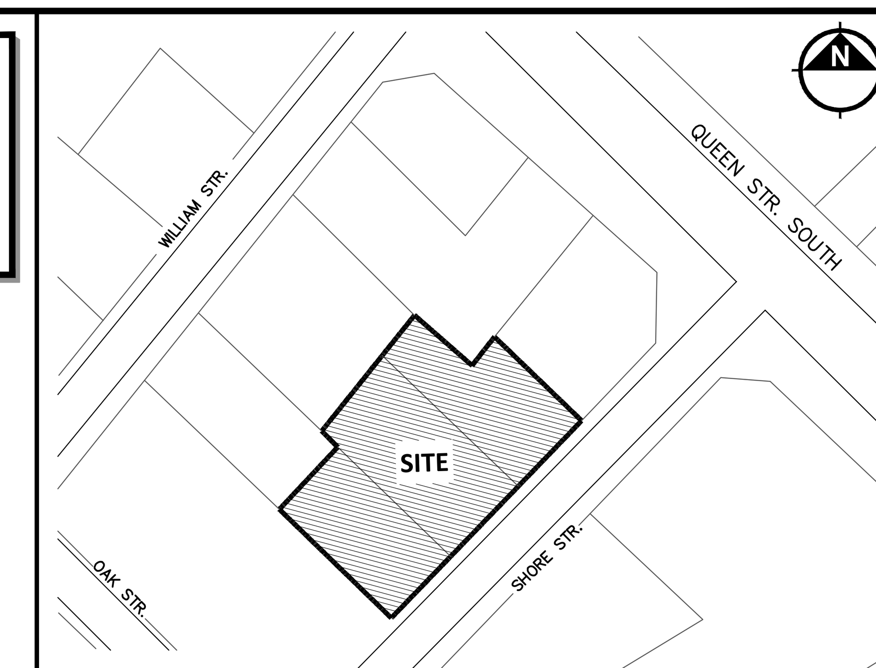
SHORE STREET PLAN AND PROFILE
STA: 0+000.00 TO 0+164.00

TOWN FILE: PRE-2023-0116 PRE-2023-0274		PROJECT No.	
REGION FILE:		24-0002CA	
DATE: SEP 24, 2024	DESIGNED BY: DV	DWG. No.	
SCALE: HORZ. 1:250 VERT. 1:50	DRAWN BY: DV	PP-01	
	CHECKED BY: TD		



SUBMISSION DRAWING

NOT TO BE USED FOR CONSTRUCTION



KEY PLAN
N.T.S.

LIMIT OF SUBJECT PROPERTY
VALVE AND BOX
HYDRANT
CB CATCH BASIN
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DETECTOR CHECK VALVE IN CHAMBER
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DS DOWNSPOUT (C/W OVERFLOW VALVE)
GRADE BREAK
MAJOR OVERLAND FLOW
TRAFFIC SIGN (REFER TO ARCHITECTURAL DWG FOR DETAILS)

PAVEMENT MARKING NOTE:3

ALL PAVEMENT MARKING AND LINE PAINTINGS TO BE AS PER OTM BOOK 11 - PAVEMENT, HAZARD, AND DELINEATION MARKINGS

SUBMISSION HISTORY

No.	ISSUED FOR	DATE
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T. DUMYN
100072175
SEPT.25,2024
PROVINCE OF ONTARIO

MUNICIPAL APPROVAL

APPROVED AS TO FORM IN RELIANCE UPON THE PROFESSIONAL SKILL AND ABILITY OF URBANWORKS ENGINEERING CORP. AS TO DESIGN AND SPECIFICATION.

DIRECTOR OF DEVELOPMENT ENGINEERING
DAN TERZIEVSKI

DATE

urbanworks ENGINEERING CORPORATION

MULTI-UNIT RESIDENTIAL DEVELOPMENT
SHORE STREET URBANIZATION
15,21,27 SHORE STREET, CALEDON

Region of Peel working with you
TOWN OF CALEDON

SCALE 0 2.5 5 7.5 10 12.5 15 17.5 20 22.5 25m

PAVEMENT MARKING PLAN

TOWN FILE: PRE-2023-0116 PRE-2023-0274		PROJECT No.	
REGION FILE:		24-0002CA	
DATE: SEP 24, 2024	DESIGNED BY: DV	DWG. No.	
SCALE: HORZ. 1:250	DRAWN BY: DV	PM-01	
	CHECKED BY: TD		

APPENDIX F

ENGINEERING DRAWINGS