FUNCTIONAL SERVICING REPORT

PROPOSED COLUMBIA SQUARE MIXED-USE DEVELOPMENT

14245 HIGHWAY 50
TOWN OF CALEDON, REGION OF PEEL

Project No.: 21-0012CA **January 2022**

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1.0 INTRODUCTION

1.1 Study Objectives and Location

This Functional Servicing Report has been prepared in support of a proposed Official Plan Amendment (OPA) and Zoning By-Law Amendment (ZBA) for lands located northeast of the Columbia Way and Highway 50 intersection, in the Town of Caledon, Regional Municipality of Peel. The civic address of the subject property is 14245 Highway 50. The site is proposed to be developed in four phases (1A, 1B, 2, and 3), which include residential and commercial land uses.

The overall site can be legally described as Part 2 of Plan 43R-38843, Town of Caledon (Settlement Area of Bolton), Regional Municipality of Peel. The subject property is located within the boundaries of Castlederg Sideroad to the north, Highway 50 to the west, Mount Hope Road to the east and Columbia Way to the south. The site is within the jurisdiction of the Toronto and Region Conservation Authority (TRCA). A Site location plan is provided in Figure 1-1.

The following report provides information regarding site servicing and stormwater management for the subject development while ensuring compatibility with services already in place. The report will also address comments raised by regulatory agencies (i.e., Region of Peel, Town of Caledon and TRCA).

1.2 Existing Condition

The site is irregular in shape with an area of approximately 3.3 ha. Currently the site is vacant and appears to be used for agricultural purposes. To the east of the site is an existing school (St. Michael Catholic Secondary School). To the south is Kingsview Drive, and a residential development opposite Columbia Way, to the west is a Town Works Yard opposite Highway 50, and to the north is vacant/agricultural land. There appears to be four driveway entrances to the site: three along Columbia Way and one along Highway 50.

The subject site was included in the design of the infrastructure for the existing residential subdivision south of Columbia Way. Previous designs considered the site as part of a 5.3 ha commercial area. This suggests that for a 3.30 ha parcel of commercial land, the intended population for the site that was included in the design of existing infrastructure is approximately 165 people (50 people per hectare * 3.30 ha = 165 people).

1.3 Proposed Development

The subject development of approximately 3.30 hectares, located in the community of Bolton and is municipally addressed as 14245 Highway 50, Caledon, Ontario. The subject site is subdivided into four phases (1A, 1B, 2 and 3). Phases 1A and B, located on the north portion of the site, is proposed to contain three and six townhouse blocks, respectively, with private laneways and on-grade parking. Phase 2, located on the southwest corner of the site, is proposed to contain a plaza with two mixed-use buildings (ground floor commercial podium with residential on upper floors), amenity areas, and parking facilities (both on-grade and below ground). Phase 3, located on the southeast corner of the site, is proposed to contain a retirement residence and parking facilities (both on-grade and below ground).

Two private roadways are proposed through the subject site to provide vehicular access between blocks and phases. A primary vehicular access is proposed on Columbia Way, approximately 100 metres east of Highway 50. A secondary vehicular access is proposed on Highway 50, approximately 150 metres north of Columbia Way. A proposed site plan is provided in Appendix A.

The anticipated design population is as summarized in Table 1-1 and was determined using Region of Peel design criteria.

Table 1-1: Anticipated Design Population

Description	Units	Area (ha)	Population
Phase 1A – Townhouse Units	24	0.72*	126
Phase 1B – Townhouse Units	118	0.68	119
Phase 2 – Mixed-Use Comm./Residential	244	1.29	613
Phase 3 – Retirement Residence	159	0.61	290
Total	545	3.30	1,148

* Includes 0.22 ha laneway

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LEGEND

SITE LOCATION

FIGURE 1-1

SITE LOCATION PLAN
COLOMBIA SQUARE
CALEDON, ON.

21-0012CA	JANUARY 2022	SCALE: N.T.S.

1.4 References

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

- **A & A environmental Consultants Inc.**, *Geotechnical Engineering Report, Residential property Located at 14245 Highway 50, Caledon, Ontario*, October 26, 2021.
- **A & A environmental Consultants Inc.**, *Small Scale Hydrogeological Assessment, Residential property Located at 14245 Highway 50, Caledon, Ontario*, November 4, 2021.
- **Aecom**, *Engineering Drawings*, dated June 2012.
- **Anton Kikas Limited**, *Engineering drawings*, dated February 1992.
- **KFA Architects and Planners**, Phase 1-3 *Columbia Square Combined Site Plan*, dated July 20, 2021.
- **MMM Group**, *Servicing Investigation Letter, Bolton secondary School, Town of Caledon, File No: 10-06629*, dated July 13, 2006.
- **MMM Group**, *Site Servicing Plan, St. Michael Secondary School*, dated November 2008.
- **R-PE Surveying Ltd.**, *Topographic Survey*, dated July 13, 2021.
- **Region of Peel – Public Works Water and Wastewater Program Planning**, *Bolton Residential Expansion, Analysis in Support of the Regional Official Plan Amendment*, dated June 8, 2016.
- **Region of Peel**, *Public Works Design, Specifications & Procedures Manual, dated March 2017.*
- **Town of Caledon**, *Site Plan Control Manual: Submission Package*, August 2019.
- **Town of Caledon**, *Development Standards Manual, Version 5.0*, 2019.
- **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.

2.0 STORMWATER MANAGEMENT

2.1 Existing Conditions

2.1.1 Topography and Drainage

Review of existing site conditions was carried out using a topographical survey. The topographical information was obtained from a detailed survey completed by R-OE Surveying Ltd., in July 2021.

The subject site is located within the Humber River Watershed, as illustrated in the 2012 TRCA Stormwater Management Criteria. The site is located in an area where quantity flood control is not required. On-site controls may still be required depending on the available infrastructure.

The site generally drains in a southerly direction towards the intersection of Columbia Way and Highway 50. The elevation range on site varies from 269.5 at the northeast corner, to 259.9 at the southwest corner. This suggests a topographic range of approximately 9.6 m. Figure 2-1 provides an illustration of the existing drainage conditions.

Existing peak flows from the site were estimated using the Rational Method. The time of concentration was determined using the Bransby Williams Method. Table 2-1 provides a summary of the pre-development peak flows for the site. The flows are based on an area of 3.30 ha and runoff coefficient of 0.25. Calculations are provided in Appendix C.

Table 2-1: Pre-Development Peak Flow Summary

Storm Event	Peak Flow (m^3/s)
2-yr	0.106
5-yr	0.145
10-yr	0.178
25-yr	0.215
50-yr	0.244
100-yr	0.274

2.1.2 Existing Storm Drainage Infrastructure

Both Columbia Way and Highway 50 have rural cross-sections adjacent the site, meaning that runoff is conveyed via roadside ditches and culverts. The areas east, and south of Columbia Way have been developed, and therefore there is existing drainage infrastructure in the vicinity. Existing infrastructure includes:

- Two existing 350 mm diameter culverts along the north side of Columbia Way to convey flow westerly, beneath driveways.
- An existing 400 mm diameter culvert along the north side of Columbia Way to convey flow westerly underneath a driveway.
- An existing 1200 mm diameter culvert at the southwest corner of the site that conveys flow southerly beneath Columbia Way.
- An existing 1050 mm diameter storm sewer along Kingsview Drive, east of the site, which extends 1.5 m north of Columbia Way street-line.

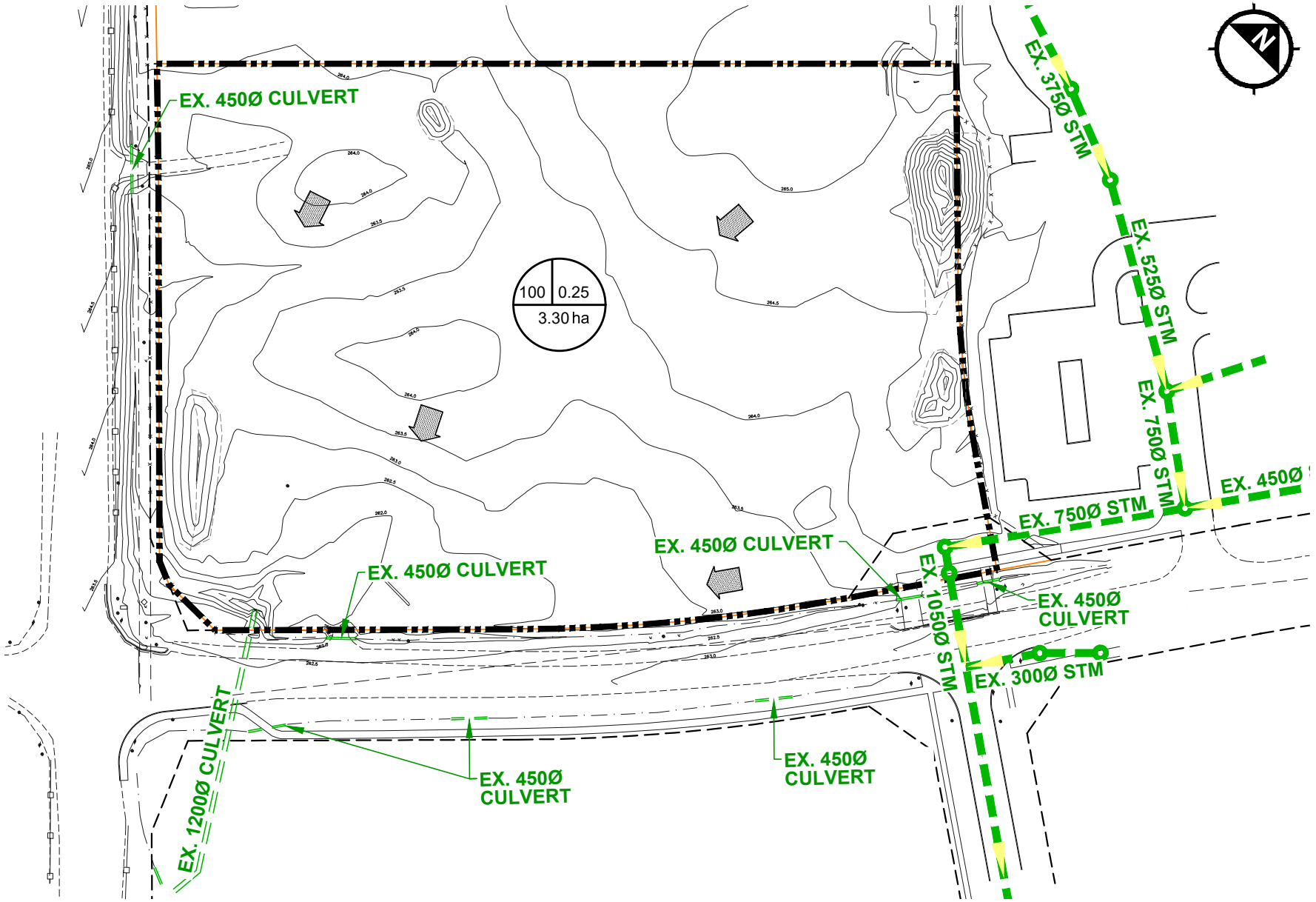
The existing 1050 mm storm sewer was constructed with a slope of 0.36% (designed at 0.5%) and has a capacity of 1.709 m^3/s. A report prepared by MMM indicates that this storm sewer was designed to accommodate 9.70 ha north of Columbia way, but this area was not delineated. Existing infrastructure is shown schematically in Figure 2-1.

There is an existing SWM Pond downstream of the site. The SWM Pond is located south of Columbia Way, between Taylorwood Avenue and St. Michael's Crescent. This pond provides water quantity and quality control for its respective catchment area.

2.1.3 Soil Conditions

A geotechnical investigation of the subsurface conditions of the subject property was carried out by A & A Environmental Consultants Inc. and the results of the investigation are provided in the October 2021 report.

The results of the investigation indicate that the soil stratigraphy of the site consists of a 0.0 m to 0.1 m layer of topsoil. Native material consists of deposits of silt & clay with trace gravel and/or sand across the site from 0.1 m to 13.5 m below grade. A clayey silt layer with some sand and trace gravel was found at depths of 13.5 m to 17.9 m below grade. Groundwater elevations ranged from 260.7 to 262.6 masl. The A & A study results will be used at the final design stage.



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LEGEND

- EXISTING STORM SEWER
- EXISTING CULVERT
- EXISTING CONTOUR
- OVERLAND FLOW DIRECTION

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

FIGURE 2-1
EXISTING DRAINAGE PLAN
COLUMBIA SQUARE

21-0012CA	JAN. 2022	SCALE: NTS

2.2 Stormwater Design Criteria

Stormwater management design criteria for the proposed development were established through a review of regulatory agency design standards, along with background design information for the existing subdivision and stormwater management pond. The relevant stormwater management guidelines are listed below.

Town of Caledon Criteria:

- Local storm sewers shall be designed using the Rational Method and based on a 5-year storm return frequency:

$$Q = C\ i\ A\ /\ 360$$

Where: Q = Flow Rate (m^3/s)
C = Runoff Coefficient
i = Rainfall Intensity (mm/hr)
A = Drainage Area (ha)

- Rainfall Intensity calculations for storm sewer design will be based on the Town of Caledon standard IDF relationships, and will be calculated as follows:

$$i = A\ /\ (t_C + B)^C$$

Where: A, B, C are constants per Table 2-1 below
t_C = Time of Concentration (min.), with a minimum time of 10 min.

Table 2-2: Rainfall Intensity Equation Coefficients

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

- Acceptable flow velocities within storm sewer shall be between 0.75m/s and 4.0m/s for

pipes flowing full. Super-critical flows will not be accepted.

- Minimum pipe slope shall be 0.40% (unless adequate self-cleansing velocity is confirmed).
- Minimum pipe size for storm sewer main lines is 300 mm.

TRCA Criteria:

- Enhanced (Level 1) water quality protection (80% TSS removal).
- Minimum retention of the first 5 mm of rainfall for water balance and erosion control.

2.3 Proposed Stormwater Management

The proposed stormwater management system has been designed in accordance with Town of Caledon and TRCA guidelines. The intent of the design is to ensure conformance with the overall stormwater management plan for the area and ensure no negative impacts to adjacent properties and infrastructure. A stormwater management plan is required to address mitigation measures with respect to quantity control, quality control, erosion control and water balance. In general, the proposed stormwater manage system will use on-site controls in accordance with the design of existing infrastructure.

It is noted that the site will be developed in phases. While this FSR demonstrates the serviceability of all phases, each phase will require a SWM report during the detailed design stages of the project.

2.3.1 Quantity control

The site is in a sub-watershed that does not require quantity controls; however it is proposed to reduce peak flows to protect existing infrastructure from being overwhelmed. To be consistent with adjacent SWM designs, it is proposed to control peak flows to 180 L/s/ha. Therefore, the allowable release rate for the entire site is 0.594 m^3/s (180 L/s/ha * 3.30 ha / 1000 L/m^3 = 0.594 m^3/s).

The site is proposed to be developed in stages and therefore allowable release rates were determined for each phase. This will allow each phase to have its own flow controls and storage requirement. The allowable release rates are as summarized in Table 2-3 and account for uncontrolled flow areas (Area 4 in Figure 2-2). There is approximately 0.22 ha of uncontrolled area, generating a peak flow of 108 L/s during a 100-year storm.

100-yr Storage volumes for each Phase were calculated using the Rational Method. Storage requirements for each phase are summarized in Table 2-4. Calculations are provided in Appendix C.

Table 2-3: Summary of Allowable Release Rates

Phase	Area (ha)	Allowable Release Rate* (L/s)
1A	0.50	78.9
1B	0.68	107.3
2	1.29	203.5
3	0.61	96.2
4	0.22	108.1*
Total	3.30	594.0

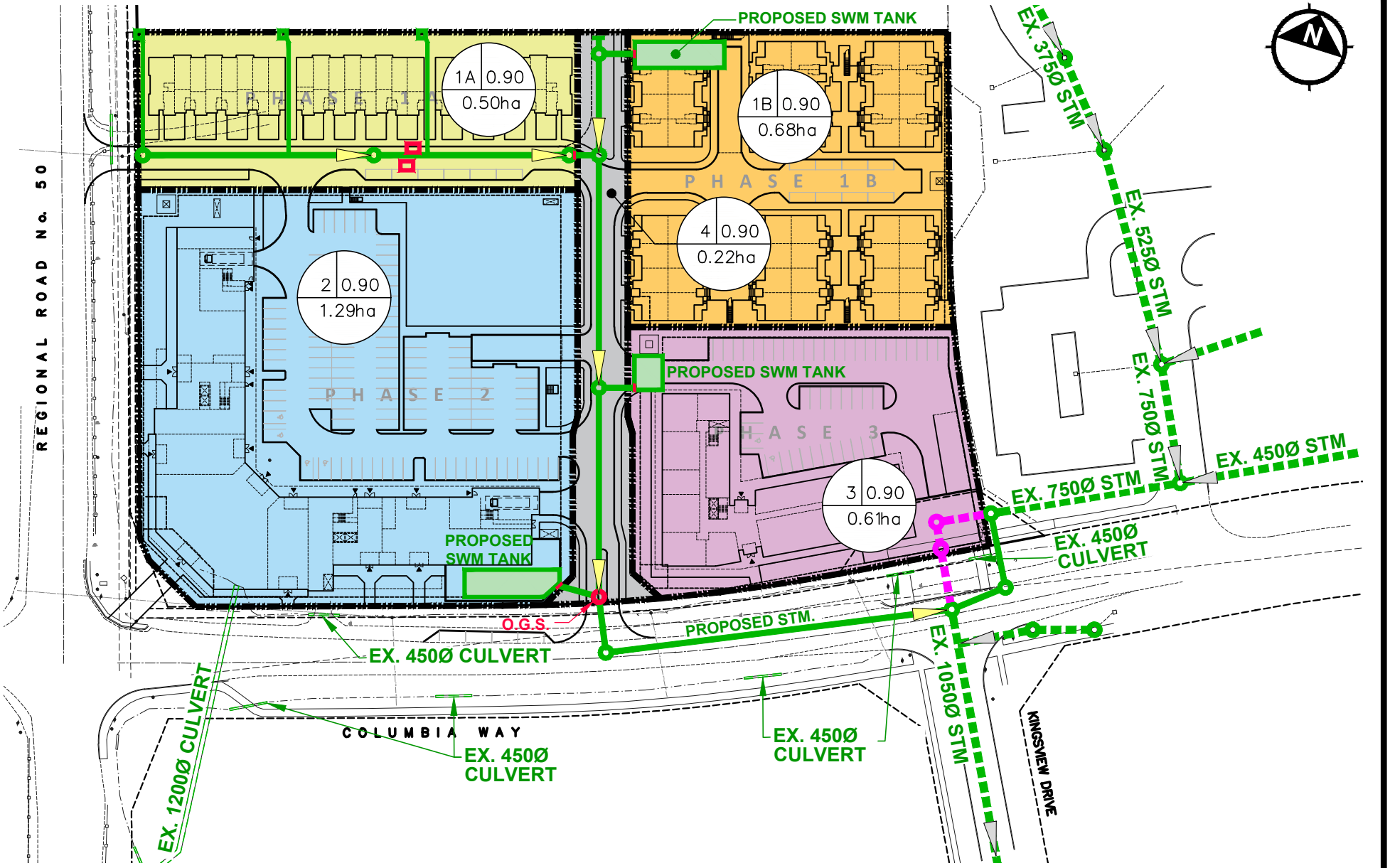
* Indicates uncontrolled flow

Table 2-4: Summary of Storage Requirements

Phase No.	Area (ha)	Required Storage (m^3/s)
1A	0.72	123.0
1B	0.68	167.3
2	1.29	317.4
3	0.61	150.1
4	0.22	NA
Total	3.30	757.8

NA – not applicable

Anticipated SWM tank and orifice locations are shown schematically on Figure 2-2. Additional details are provided on the Functional Engineering Drawings in Appendix F. Pipe and orifice sizes will be provided during the detailed design stage.



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LEGEND

- EXISTING STORM SEWERS
- PROPOSED STORM SEWERS
- EXISTING SEWER TO BE REMOVED
- PROPOSED ORIFICE LOCATION
- OIL-GRIT SEPARATOR
- FULL-CAPTURE INLET
- UNCONTROLLED DRAINAGE AREA

AREA I.D. | RUNOFF COEFF. | DRAINAGE AREA

- PHASE 1A
- PHASE 1B
- PHASE 2
- PHASE 3
- PROPOSED SWM TANK

FIGURE 2-2
PROPOSED DRAINAGE PLAN
COLUMBIA SQUARE

21-0012CA	JAN. 2022	SCALE: NTS

As shown on the drawings, there are a couple of lengths of existing storm sewer that will need to be reconfigured to accommodate Phase 3. The storm sewers that will be realigned are currently servicing the adjacent school to the east and are located at the Kingsview Drive and Columbia Way intersection. The realignment will be address during the details design stage for Phase 3 and presented in a SWM Report.

2.3.2 Quality Control

Water quality control is proposed using the existing SWM Pond located south of Columbia Way, between Taylorwood Avenue and St. Michael's Crescent. This pond was sized to provide 80% TSS removal for its catchment area.

In addition to the SWM Pond, an oil and grit separator (OGS) at the outlet of the site. More specifically a Stormceptor model EFO12 is proposed. The OGS unit was sized to provide 80% TSS removal. The Stormceptor sizing report is provided in Appendix C.

Despite being designed for 80% TSS removal, credit for 50% removal is generally given from conservation authorities and municipalities. The OGS should be considered as pre-treatment of runoff prior to discharging it into the existing system.

2.3.3 Site Grading and Drainage

The grading design for the site was produced based on a topographic survey prepared by R-PE Surveying Ltd, dated July 2021. Existing elevations are proposed to be matched along all property lines, and in general the site will be graded for containment of runoff within the site boundaries. Proposed internal grades will be set to ensure that maximum surface ponding will not exceed 0.30m at catchbasin low points, in the event of total blockage of any storm inlet. Flows from storms up to the 100-year event are proposed to be contained within the site without overflow. For emergency situations (i.e., storms exceeding the 100-year event or failure of the internal drainage system), an over-land flow route has been established to ensure that surface flows will exit the site directly onto Columbia Way via the site entrances.

The proposed drainage scheme is illustrated in Figure 2-2. Preliminary grading plans are provided in Appendix F.

2.3.4 Water Balance

A water balance analysis was prepared by A & A Consultants Inc. and presented in a hydrogeological report. Based on this analysis, an infiltration deficit of 4,569.7 m^3 per year was estimated as a result of the proposed development.

In accordance with TRCA criteria for sites less than 5 ha, it is proposed to retain 5 mm of rainfall on-site for every event to mitigate the infiltration deficit. As mentioned previously, the site is proposed to be developed in phases. Therefore, each phase will require a separate water balance mitigation strategy. For the purpose of water balance mitigation, Areas 1A and 4 will be combined. Retention volume requirements for each phase are provided in Table 2-5.

Table 2-5: Summary of Water Balance Mitigation Retention Requirements

Phase	Area (ha)	Runoff Coefficient	Volume Required (m^3)
1A	0.72*	0.90	32.4
1B	0.68	0.90	30.6
2	1.29	0.90	58.0
3	0.61	0.90	27.5
Total	3.30	0.90	148.5

* Includes 0.22 ha from Area 4

In Phase 1A it is proposed to utilize rear-yard infiltration trenches to retain 5 mm of rainfall. The proposed dimensions for the trench are 1.0 m wide, 1.0 m depth, and 118 m long. This suggests a retention volume of 47.1 m^3 (1.0 m * 1.0 m * 118 m * 0.4 porosity = 47.2 m^3). The infiltration trench should be a minimum of 1.0 m above the high-water table. Infiltration testing should be completed in support of the detailed design of the infiltration trench.

The remainder of the site (Phases 1B, 2, and 3) will have an underground parking structure underneath, making infiltration-type LID measures infeasible. For this reason, it is proposed to provide additional storage in each SWM tank. The additional water stored in each tank will be used for irrigation or grey water uses (e.g. toilet flushes).

3.0 SANITARY SERVICING

3.1 Existing Sanitary Infrastructure

The development of the existing subdivision south of Columbia Way included the construction of an existing sanitary sewer system. A 250 mm diameter sanitary sewer is located along Kingsview drive and extends 1.5 m north of the Columbia Way ROW. Based on available servicing reports, this sanitary sewer was designed to accommodate the site with a commercial land use. A 3.3 ha site with commercial land use would have a design population of 165 people (3.30 ha * 50 p/ha = 165 people).

3.2 Design Criteria

The sanitary sewer design and flow calculations are based on the following Region of Peel guidelines:

- Domestic sewage flow rate is 302.8 L/cap/day.
- Infiltration rate is 0.2 L/s/ha of gross area.
- Harmon Peaking Factor, K is $1 + 14/ (4 + P^{0.5})$, where P is population in thousands.
- Population density is based on Table 1-14 in the *Engineering Design Criteria & Standard Drawings*, dated 2013, which includes the following:
    - Apartments 475 persons/ha or 2.7 ppu
    - Commercial 75 persons/ha
    - Row Dwellings 175 persons/ha

3.3 Proposed Sanitary servicing

It is proposed to collect wastewater from each phase of the development, via a network of gravity sewers, and convey it to the existing sanitary sewer along Kingsview Drive. As mentioned previously, the existing system accounted for 3.30 ha of commercial area, with a design population of 165 people. Given that the proposed design population for the site is 1,148 people, an analysis will be required to confirm available capacity in the existing system to accommodate the additional population.

It is noted however, that the design population for Phase 1A is less than 165. Therefore, there should be available capacity to accommodate Phase 1A. The remaining phases can move

forward upon confirmation of available capacity. Anticipated flows from the site are provided in Table 3-1. Calculations are provided in Appendix D. Proposed sanitary servicing is shown in the Functional Servicing Plan provided in Appendix F.

Table 3-1: Summary of Anticipated Sanitary Flows

Phase	Design population	Average Flow (L/s)	Peak Flow (L/s)	Infiltration Flow (L/s)	Total Flow (L/s)
1A	126	0.4	1.5	0.1	1.6
1B	119	0.4	1.5	0.3	1.8
2	613	2.1	7.9	0.3	8.2
3	290	1.0	3.8	0.1	3.9
Total	1,148	3.9	14.7	0.8	15.5

As shown on Dwg. FS-01, realignment of the existing sanitary sewer network at the Columbia Way and Kingsview drive intersection is required to accommodate Phase 3.

4.0 Water Supply Servicing

4.1 Existing Water Supply Infrastructure

The development of the existing subdivision south of Columbia Way included the construction of an existing watermain network. Existing watermains in the vicinity of the site include the following:

- 400 mm diameter PVC watermain along the south side of Columbia Way. This watermain extends from Highway 50 to an existing valve chamber east of Kingsview Drive.
- 400 mm diameter watermain along the east side of Kingsview Drive. This watermain extends 1.5 m north of the Columbia Way ROW.
- 400 mm diameter watermain along the east side of Highway 50 south of Columbia Way.

The existing water supply infrastructure is shown on the Functional Servicing Plan provided in Appendix F.

4.2 Design Criteria

The water demand used for watermain size selection should be equal to the Fire Flow Demand plus the Maximum Day Demand or the Maximum Hour Demand, whichever is greater. The following guidelines should be used in the design calculations for water supply as per Region of Peel's design criteria.

Typical Water Demand Criteria:

- Average Consumption Rate is:
    - 280 L/cap/day for residential areas
    - 300 L/cap/day for ICI areas
- Maximum Day Demand Factor is:
    - 2.0 for residential areas
    - 1.4 for ICI areas
- Peak Hour Demand Factor is 3.0
- Fire Protection demand calculated as per FUS

Pressure:

- Minimum pressure for Maximum Day and Fire Flow demand is 140 kPa (20 psi).
- Minimum pressure for Peak Hour demand is 275 kPa (40 psi).
- Maximum pressure under static loading is 690 kPa (100 psi).

4.3 Proposed Water Supply Servicing

The water distribution system for the proposed development will be designed in accordance with current Region of Peel standards. The proposed layout of the water distribution network for the development is shown on Drawing FS-01 – Functional Servicing Plan, included in Appendix F.

Drawing FS-01 illustrates the water distribution network together with other underground services, including proposed fire hydrant locations. The proposed internal network will generally consist of fire and domestic watermains. The sizes and locations of proposed watermains within the subject property will be verified at the time of detailed engineering design.

The preliminary water and fire flow demand analysis is summarized in Table 4-1. Calculations are included in Appendix E.

Table 4-1: Preliminary Water Demands

Phase	Population	Average Day Demand (L/s)	Max. Day Demand (L/s)	Peak Hour Demand (L/s)	Fire Flow + Max. Day (L/s)
1A	126	0.4	0.8	1.2	217.5
1B	119	0.4	0.8	1.2	150.8
2	613	2.0	4.0	6.0	254.0
3	290	0.9	1.9	2.8	118.5
Total	1,148	3.7	7.5	11.2	257.4

As shown on Dwg. FS-01, realignment of existing watermains at the Columbia Way and Kingsview drive intersection is required to accommodate Phase 3.

5.0 SUMMARY

This report outlines the proposed servicing and stormwater management scheme for the proposed mixed-use development located at 14245 Highway 50, north of Columbia Way, in the Town of Caledon. The following is a summary of the conclusions and recommendations of this report:

Stormwater Management

- Post-development peak flows are proposed to be controlled to 180 L/s/ha for storms up to, and including, the 100-year event. Flow control is proposed to be achieved using flow restrictors and a combination of underground pipe storage and storm chamber storage.
- Water quality control is provided by the Columbia Way SWM Pond. An OGS unit (EFO12) is proposed to provide pre-treatment for runoff prior to being discharged into the existing storm sewer system.
- Retention of 5mm of rainfall for water balance mitigation is proposed to be achieved through limited soil infiltration via rear-yard infiltration trenches in Phase 1A. Additional storage volume is proposed to be provided in the SWM tanks for re-use in Phases 1B, 2, and 3.
- Realignment of the existing storm sewers at the Kingsview Drive and Columbia Way intersection will be required to accommodate Phase 3.

Sanitary Servicing

- Sanitary servicing is proposed via connection to the existing system along Kingsview Drive. There should be sufficient capacity available to service Phase 1A. Additional analysis is required prior to the remaining phases being constructed.
- Realignment of the existing sanitary sewers at the Kingsview Drive and Columbia Way intersection will be required to accommodate Phase 3.

Water Supply Servicing

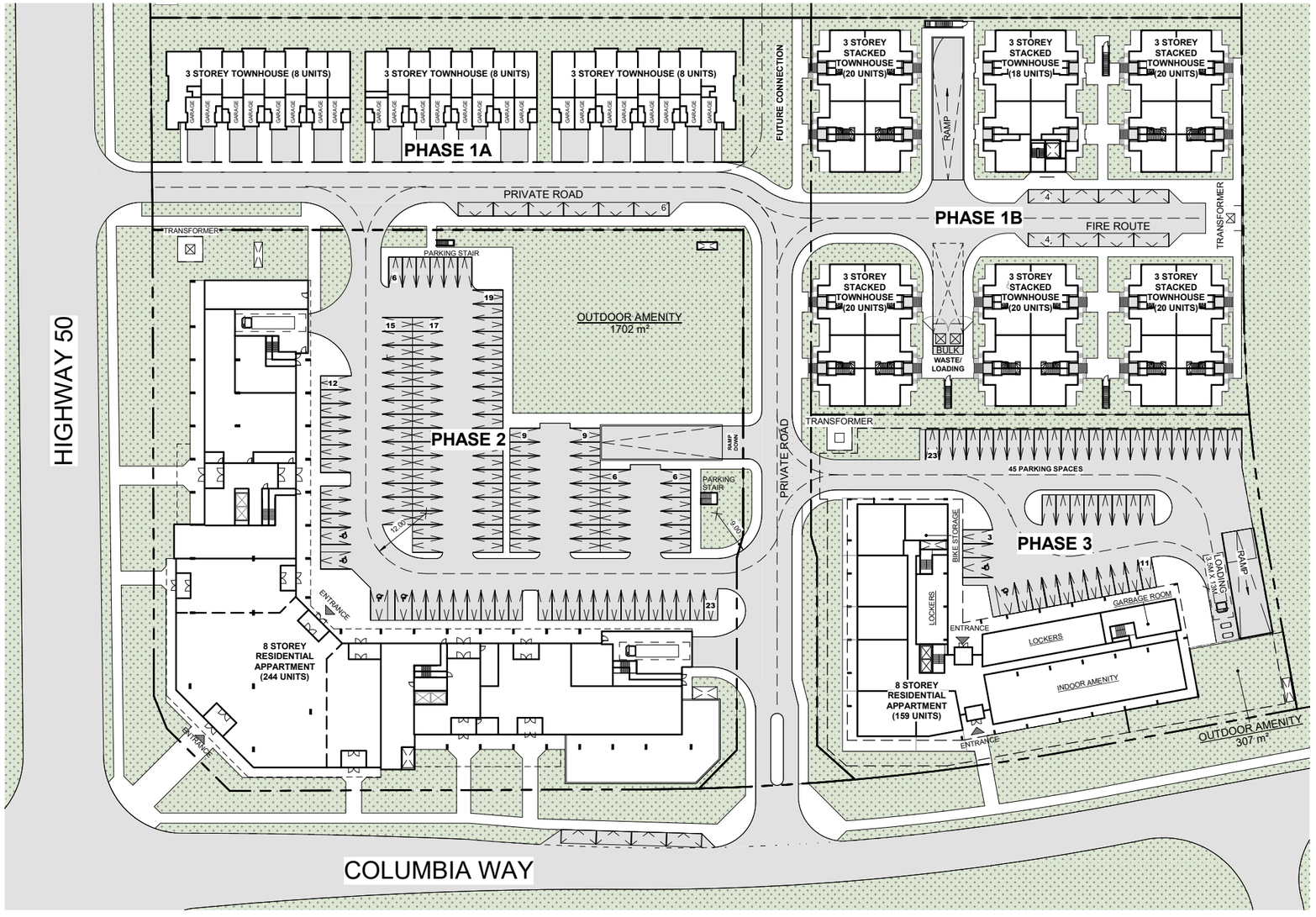
- Water supply servicing is proposed via connection to the existing 400 mm diameter watermain along Columbia Way.
- Realignment of existing watermains at the Kingsview Drive and Columbia Way intersection will be required to accommodate Phase 3.

Respectfully Submitted,

Urbanworks Engineering Corporation

Michael Paulo, P.Eng.
Principal

Appendix A: Proposed Site Plan



PHASES 1-3 - SITE AREA						
m2	sq.ft	FSI	ha	Units/ha	acre	Units/acre
33013.27	355,352	1.67	3.30	165.1	8.16	66.8

TOTAL PHASE 1 - SITE AREA						
m2	sq.ft	FSI	ha	Units/ha	acre	Units/acre
13728.14	147,768	1.14	1.37	51.0	3.39	41.9

PHASE 2 - SITE AREA						
m2	sq.ft	FSI	ha	Units/ha	arce	Units/acre
13183.3	141,904	1.84	1.32	185.1	3.26	74.9

PHASE 3 - SITE AREA						
m2	sq.ft	FSI	ha	Units/ha	arce	Units/Acre
6101.79	65,679.06	2.52	0.61	114.7	1.51	46.4

SITE GROSS FLOOR AREA		
Phase 1	GFA	15586.0 m²
	Units	142
	Required Parking	261
	Provided Parking	259
Phase 2	GFA	24312.0 m²
	Units	244
	Required Parking	519
	Provided Parking	471
Phase 3	GFA	15365.0 m²
	Units	159
	Required Parking	278
	Provided Parking	288
Combined	Total GFA	55263.0 m²
	Total Unit Count	545
	Total Required Parking	1057
	Total Provided Parking	1018

GENERAL SITE STATISTICS	
Gross Construction Area (m²)	23,814
Exclusions (m²)	8,228
Gross Floor Area (m²)	15,586
UNIT STATISTICS	
Total Number of Units	142
Average Unit GFA (m2)	109.8
Average Unit GFA (Sq.ft)	1,181.5
PARKING	
Required Parking	261
Underground Parking	197
Private Garage Parking	48
Surface Parking	14
Total Parking	259

GENERAL SITE STATISTICS		
Construction Area Total (m²)		37,755
Parking Level GCA (m²)		11,838
Condo Unit GCA (m²)		19,301
Condo Amenity/Service GCA (m²)		4,782
Retail GCA (m²)		1,834
Exclusions		13,443
Gross Floor Area (m2)		24,312
UNIT STATISTICS		
Total Number of Units		244
Average Unit GFA (m2)		79.1
Average Unit GFA (Sq.ft)		851.5
PARKING		
Required Retail Parking	1 Space/ 20 m²	92
Required Residential Parking	1.5 Spaces/Unit	366
Required Visitor Parking	0.25 Spaces/Unit	61
Total Parking Required		519
Underground Parking		349
Surface Level Parking		122
Total Parking Provided		471

GENERAL SITE STATISTICS		
Gross Construction Area Total (m²)		26,075
Parking Level GCA (m²)		10,157
Residential Unit GCA (m²)		12,716
Residential Amenity/Service GCA (m²)		3,202
Retail GCA (m²)		-
Exclusions		10,710
Gross Floor Area (m²)		15,365
UNIT STATISTICS		
Total Number of Units		159
Average Unit GFA (m2)		80.0
Average Unit GFA (Sq.ft)		860.8
PARKING		
Required Resident Parking	1.5 Spaces/Unit	239
Required Visitor Parking	0.25 Spaces/Unit	40
Total Required Parking		**278**
Underground Parking		243
Above grade Parking		45
Total Parking Provided		**288**

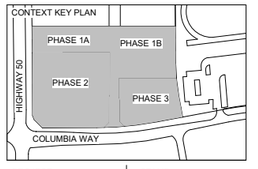
COLUMBIA SQUARE

BOLTON, ONTARIO

No.	Description	Date
1	ISSUED FOR REVIEW	2021/07/12
A	ISSUED FOR REVIEW	2021/07/20

HALF SCALE

DRAFT



PROJECT NORTH

N

STAMP

CLIENTS:

WYNDCLIFFE DEVELOPMENTS INC.

KFA architects + planners inc.

PROJECT NO:	20065
SCALE:	1 : 500
DATE:	Issue Date
DRAWN BY:	RVW

DRAWING TITLE:

PHASE 1-3
COMBINED SITE PLAN

DRAWING NO

SD002

Appendix B: Background Information

DUFFERIN-PEEL CATHOLIC DISTRICT SCHOOL BOARD

40 Matheson Boulevard West, Mississauga Ontario L5R 1C5 • Tel: (905) 890-1221 • Fax: (905) 890-1557

DATE: **November 8, 2006**

TO: Alan Young, Weston Consulting Group Inc.

FROM: Beth Bjarnason, Manager of Planning

RE: **Servicing Investigation for Columbia Way**

Please find attached a copy of the Servicing Investigation undertaken for the Board related to St. Michael Secondary School.

Marshall Macklin Monaghan
PROJECT MANAGERS · ENGINEERS · SURVEYORS · PLANNERS

MARSHALL MACKLIN MONAGHAN LIMITED
701 Rossland Road East, Suite 201, Whitby, ON, Canada L1N 8Y9
Telephone: 905-668-3022 Facsimile: 905-668-9443
Web: www.mmm.ca

July 13, 2006
File: 10-06629

Mr Ken MacSporran
Moffet and Duncan Architects Inc
5052 Dundas Street West
Islington, Ontario M9A 1B9

Dear Mr. MacSporran

Subject: Servicing Investigation
Bolton Secondary School
Town of Caledon

As requested we have undertaken a Servicing Investigation for a potential school site in the Town of Caledon The Dufferin-Peel Catholic District School Board is considering a new secondary school site in Bolton. The school site is located on the north side of Columbia Way, east of Kingsview Drive (which is the first street east of Highway 50). Currently, there is no development on the north side of Columbia Way The proposed school site is 6.1 ha in size (roughly 200m x 300m). The attached figure shows the location of the proposed school block and other potential development north of Columbia Way.

This investigation has been conducted for the sole purpose of determining the location and capacity of existing municipal services and utilities adjacent to the site This investigation does not consider any of the planning issues related to this site as this is beyond the scope of work.

The following services/utilities have been reviewed in this investigation:

- Watermain
- Sanitary Sewers
- Storm sewers
- Gas
- Hydro
- Bell
- Cable TV
- Sidewalks

We have discussed each of these services with the various utilities and approval agencies and have been advised of the following:

Watermain

The Region of Peel has provided a copy of an engineering drawing (Project No. 350E-86, Drawing No. 24311-D) which was prepared for the subdivision located on the south side of

Columbia Way. A copy of this drawing is attached for information purposes. This drawing shows that a 400mm concrete watermain, located on the east side of Kingsview Drive, has been constructed across Columbia Way to the north side. This watermain is plugged 1.5m north of the north streetline and is intended to be extended when development proceeds north of Columbia Way. A 400mm diameter watermain is of sufficient size to service the lands north of Columbia Way, including the school site

Sanitary Sewer

As part of the development of the subdivision located south of Columbia Way, the sanitary sewer was extended across Columbia Way to the north boulevard. A sanitary manhole has been constructed 1.5m north of the north streetline. The sanitary sewer is a 250mm diameter pipe constructed at 0.57%. This sewer has a capacity of 46.8 l/s.

For a high school site of 6.1ha, the expected peak flow would be approximately 8 l/s. Including the 5.3 ha commercial area and the 3.1 ha residential area, the total expected peak flow for the lands north of Columbia Way would be approximately 29 l/s. To be conservative we have assumed the residential block would be developed as medium density. If it is developed as low density the total expected peak flow from the lands north of Columbia Way would be reduced to about 21.51 l/s. Therefore it would appear that this sewer has the necessary capacity to accommodate the school site. We have requested additional information from the Region on the existing system located south of Columbia Way in order to confirm that available capacity exists in the downstream sewers. The Region has indicated that they will be able to provide this information to us in one to two weeks

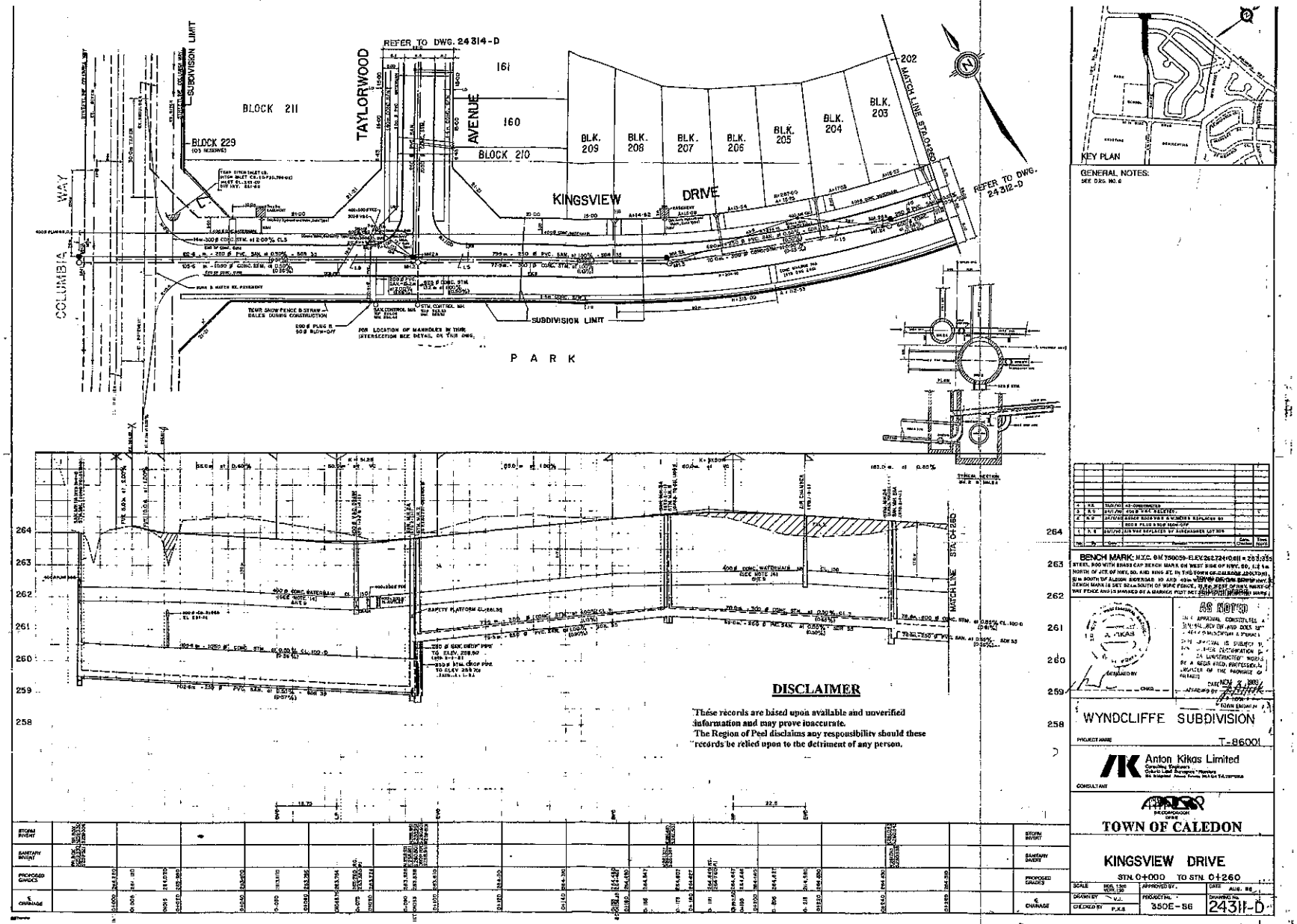
Storm Sewer

Similar to sanitary, when the development south of Columbia Way was designed, it included the extension of a storm sewer across Columbia Way to the north side of the road. A storm manhole has been constructed 1.5m north of the north streetline of Columbia Way. The storm sewer is a 1050mm diameter sewer constructed at 0.36% (designed at 0.50%). This sewer has a capacity of 1,709 l/s. The Town of Caledon has indicated that the Stormwater Management Report includes an external drainage area north of Columbia Way of 9.70 ha. However the boundaries of this area were not identified

The Town has advised that they will require on-site SWM controls consisting of:

- Roof top controls with a maximum release rate of 42 l/s/ha.
- 100 year maximum release rate for site is 180 l/s/ha.

To achieve these maximum release rates it will be necessary to design the parking lot grading to provide surface storage. The required amount of storage will be determined at detailed design.



KEY PLAN

GENERAL NOTES:
SEE DRG. NO. 0

BENCH MARK: M.T.C. BM 750059-ELEV 262.724 (CGH) = 263.135
STEEL ROD WITH BRASS CAP BENCH MARK ON WEST SIDE OF HWY. 50, 1.2 m NORTH OF JCT. OF HWY. 50, KING ST. IN THE TOWN OF CALEDON (BOLTON).
0.9 m SOUTH OF ALDEN AVENUE, 10 AND 40 m NORTH OF DRIVEWAY ENTRANCE AND 5 m EAST OF HWY. 50. BENCH MARK IS SET 82 m SOUTH OF WIRE FENCE, 10.5 m WEST OF SIGN, WEST OF WAY FENCE AND IS MARKED BY A MARKER POST SET 250 mm ABOVE GROUND.

AS NOTED

DISCLAIMER

These records are based upon available and unverified information and may prove inaccurate.
The Region of Peel disclaims any responsibility should these records be relied upon to the detriment of any person.

WYNDCLIFFE SUBDIVISION
PROJECT NAME
T-86001

Anton Kikas Limited
CONSULTANT

TOWN OF CALEDON

KINGSVIEW DRIVE
STN. 0+000 TO STN. 0+260

SCALE	APPROVED BY	DATE
HOR. 1:300 VERT. 1:60		AUG. 86
DRAWN BY: M.J.	PROJECT No. 350E-86	Drawing No. 24311-D
CHECKED BY: P.K.S		

Gas

We spoke with Mr. Jim Arnott and Ms. Beverly Poersch of Enbridge. There is an existing 4" (100mm) gas main located in the north boulevard of Columbia Way. They have indicated that they have no concerns with providing service to the school site.

Hydro

We spoke with Mr. Bob Harper of Hydro One. There is an existing overhead hydro line located on the north side of Columbia Way across the frontage of the proposed school site. The existing line is a 3 phase 27.6 kV line. Hydro One advised that they can provide for a peak load of 1000 KVA from the school. A pole mounted transformer can be provided to reduce the hydro flow to 500 KVA. If greater transformation is required then a pad mount transformer located on the school property will be required.

Bell Canada

We spoke with Mr. Ron Blair of Bell Canada. Currently they do not have any service within the north boulevard of Columbia Way. All of their facility is located within the subdivision on the south side. They also have an existing line on the east side of Highway 50. They indicated that they could provide service to the school by either installing a road crossing at Kingsview Drive or by installing a new line on the hydro poles along the north side of Columbia Way from Highway 50. Therefore, Bell service can be made to this site.

Cable TV

We spoke with Mr. Carston Schunelle of Rogers. There is an existing fibre optic node located at the southwest corner of Kingsview Avenue and Columbia Way. In addition, a conduit has been pre-installed across Columbia Way to the north side. This will facilitate the northward extension of a fibre optic line to the lands north of Columbia Way. Therefore, there are no issues with servicing the school site with Cable TV.

Sidewalks

There are currently no sidewalks constructed on Columbia Way. There is a sidewalk constructed on the west side of Kingsview Avenue which extends to Columbia Way. This provides pedestrian access to Columbia Way for the existing subdivision located to the south. In the future, there will be sidewalks constructed on both sides of Columbia Way. The Town currently has no plans for constructing any sidewalks on Columbia Way. This will occur in due course as development advances in this area.

The location of the above services are illustrated on Figure No. 1.

Site Topography

Based on the draft copy of the topographic survey prepared by Young & Young Surveying Inc. the west half of the site is relatively flat and the east half of the site slopes off toward the environmentally protected lands and ultimately to an eastern tributary of the Humber River.

The as-built storm and sanitary sewer inverts are both noted as 259.33m on the attached engineering drawing. There appears to be a 0.611m adjustment noted in the benchmark description on that drawing. In comparing the centerline road elevation at Columbia Way and Kingsview Drive there also appears to be a difference of about 0.60m to 0.70m between the topo survey and the engineering drawing. The draft topo survey shows a lower elevation at this intersection which means the as-built inverts relative to the current topo survey may be closer to 258.70m

It is assumed that the school building will be located on the western portion of the site adjacent to Kingsview Drive. The average ground elevation on the western half of the site is about 264.50m. Assuming the first floor elevation will also be around 264.50m, there will not be any issue with providing sanitary and storm connections to this building (i.e. FFE will be more than 5.0m higher than existing invert elevations)

It is expected that the east half of the site will be developed as the track and field. Storm drainage from this area will need to sheet drain to the east as the elevations are too low to be picked up by the storm sewer. It is not expected that any quantity or quality controls will be required for this area as it will be predominantly a grassed area.

Summary

All of the necessary services for the proposed school in Bolton are located at the intersection of Kingsview Drive and Columbia Way and/or within the north boulevard of Columbia Way across the frontage of the school block.

Since all of the services are located in close proximity to the site it will not be necessary to extend services very far. We have queried the Municipality on whether or not they will require the services to be extended north along the future extension of Kingsview Drive (north of Columbia Way) to the centre of the school block. They have indicated that it is too premature to say whether this will be required or not. They will not respond until they see a site plan submission.

Therefore, in terms of external servicing costs we would suggest an allowance be carried to extend the storm, sanitary and water services a short distance north (say 20m) and then into the site. We suggest the following allowances be carried for external municipal servicing.

- Storm - $50,000
- Sanitary - $25,000
- Water - $10,000

A temporary easement across the land owners property will be required for these services.

We trust this servicing investigation provides the information needed at this time. Please call if you have any questions

Yours very truly

MARSHALL MACKLIN MONAGHAN LIMITED

Craig A. Rose, C.E.T.
Design Manager
Durham Region Office

CAR:sg
Encl

L:\V4\2006\06629\lets\client\k MacSporran Serv Invst School Site July 13 06 doc

Appendix C: Stormwater Management Calculations

urbanworks
ENGINEERING CORPORATION

Prepared By: M.P.

Rational Method
Pre-Development Flow Calculation

Columbia Square
File No.: 21-0012CA
Date: December 2021

Time of Concentration Calculation (Bransby Williams)

Area Number	Area (ha)	C	Flow Length (m)	ΔH (m)	Slope (%)	Time of Concentration (minutes)
Pre-A1	3.30	0.25	284	9.6	3.4%	**28.3**

Rational Method Calculation

Event 2 yr
IDF Data Set Town of Caledon
A = 1070.00
B = 7.850
C = 0.8759

Area Number	A (ha)	C	AC	Tc (min)	I (mm/h)	Q (m3/s)	Q (L/s)
Pre-A1	3.30	0.25	0.83	28	46.2	0.106	105.9

Event 5yr
IDF Data Set Town of Caledon
A = 1593.00
B = 11.000
C = 0.8789

Area Number	A (ha)	C	AC	Tc (min)	I (mm/h)	Q (m3/s)	Q (L/s)
Pre-A1	3.30	0.25	0.83	28	63.2	0.145	144.9

Event 10yr
IDF Data Set City of Brampton
A = 2221.00
B = 12.000
C = 0.9080

Area Number	A (ha)	C	AC	Tc (min)	I (mm/h)	Q (m3/s)	Q (L/s)
Pre-A1	3.30	0.25	0.83	28	77.5	0.178	177.5

urbanworks
ENGINEERING CORPORATION

Prepared By: M.P.

Rational Method
Pre-Development Flow Calculation

Columbia Square
File No.: 21-0012CA
Date: December 2021

Time of Concentration Calculation

Area Number	Area (ha)	C	Flow Length (m)	ΔH (m)	Slope (%)	Time of Concentration (minutes)
Pre-A1	3.30	0.25	284	9.6	3.4%	**28.3**

Rational Method Calculation

Event 25 yr
IDF Data Set Town of Caledon
A = 3158.00
B = 15.000
C = 0.9335

Area Number	A (ha)	C	AC	Tc (min)	I (mm/h)	Q (m3/s)	Q (L/s)
Pre-A1	3.30	0.25	0.83	28	93.7	0.215	214.8

Event 50yr
IDF Data Set Town of Caledon
A = 3886.00
B = 16.000
C = 0.9495

Area Number	A (ha)	C	AC	Tc (min)	I (mm/h)	Q (m3/s)	Q (L/s)
Pre-A1	3.30	0.25	0.83	28	106.3	0.244	243.5

Event 100yr
IDF Data Set City of Brampton
A = 4688.00
B = 17.000
C = 0.9624

Area Number	A (ha)	C	AC	Tc (min)	I (mm/h)	Q (m3/s)	Q (L/s)
Pre-A1	3.30	0.25	0.83	28	119.5	0.274	273.8

urbanworks ENGINEERING CORPORATION

Prepared by: M.P.

ALLOWABLE RELEASE RATE CALCULATION
ENTIRE SITE

Columbia Square, Caledon
File No.: 21-0012CA
Date: Jan 2022

Gross Allowable Release Rate

Allowable Release Rate =	180	L/s/ha
Area =	3.30	ha
Q =	594.0	L/s

Uncontrolled Flow

Area ID =	4
Area (ha) =	0.22
C =	0.90
Tc (minutes) =	10

Return Period	a	b	c	Intensity (mm/hr)	Flow (L/s)
2-yr	1070	7.85	0.8759	85.7	47.1
5-yr	1593	11	0.8789	109.7	60.3
10-yr	2221	12	0.908	134.2	73.8
25-yr	3158	15	0.9335	156.5	86.1
50-yr	3886	16	0.9495	176.2	96.9
100-yr	4688	17	0.9624	196.5	108.1

Net Allowable Release Rate

Return Period	Allowable Release Rate	Uncontrolled Flow	Net Allowable Release Rate	Revised Unit Flow Rate
	(L/s)	(L/s)	(L/s)	(L/s/ha)
100-yr	594.0	108.1	485.9	158

urbanworks
ENGINEERING CORPORATION

Prepared by: M.P.

Modified Rational Method - 100 Year Storage
AREA 1A

Columbia Square
File No.: 21-0012CA
Date: Jan 2022

Drainage Areas A1 Post

Area =	**0.50**	ha
"C" =	**0.90**	
AC1=	**0.45**	
Tc =	**10.0**	min
Time Increment =	**5.0**	min
Release Rate =	**78.9**	l/s
Max.Storage Required =	**123.0**	m^3
Max Ponding Depth =	**0.00**	m
Head Elevation =	**0.00**	m

100 Year	
a=	4688.00
b=	17.000
c=	0.9624

(1)	(2)	(3)	(4)	(5)	(6)
Time (min)	**Rainfall Intensity (mm/hr)**	**Storm Runoff (m^3/s)**	**Runoff Volume (m^3)**	**Released Volume (m^3)**	**Required Storage Volume (m^3)**
		(3) = [(2)*AC1]/360	(4) = (3)*(1)*60	(5) = [(R2) / 1000]*(1)*60	(6) = (4)-(5)
10.0	196.5	0.246	147.40	47.33	100.07
15.0	166.9	0.209	187.75	70.99	116.76
20.0	145.1	0.181	217.69	94.66	123.03
25.0	128.5	0.161	240.87	118.32	122.54
30.0	115.3	0.144	259.38	141.99	117.40
35.0	104.6	0.131	274.56	165.65	108.91
40.0	95.7	0.120	287.25	189.31	97.93
45.0	88.3	0.110	298.03	212.98	85.05
50.0	82.0	0.102	307.33	236.64	70.69
55.0	76.5	0.096	315.44	260.31	55.13
60.0	71.7	0.090	322.58	283.97	38.61
65.0	67.5	0.084	328.93	307.63	21.30
70.0	63.7	0.080	334.62	331.30	3.32
75.0	60.4	0.076	339.75	354.96	0.00
80.0	57.4	0.072	344.41	378.63	0.00
85.0	54.7	0.068	348.65	402.29	0.00
90.0	52.2	0.065	352.54	425.96	0.00
95.0	50.0	0.062	356.13	449.62	0.00
100.0	47.9	0.060	359.44	473.28	0.00
105.0	46.0	0.058	362.51	496.95	0.00
110.0	44.3	0.055	365.38	520.61	0.00
115.0	42.7	0.053	368.05	544.28	0.00
120.0	41.2	0.051	370.55	567.94	0.00
125.0	39.8	0.050	372.90	591.61	0.00
130.0	38.5	0.048	375.12	615.27	0.00
135.0	37.3	0.047	377.20	638.93	0.00
140.0	36.1	0.045	379.18	662.60	0.00
145.0	35.0	0.044	381.05	686.26	0.00
150.0	34.0	0.043	382.82	709.93	0.00
155.0	33.1	0.041	384.51	733.59	0.00
160.0	32.2	0.040	386.12	757.25	0.00
165.0	31.3	0.039	387.65	780.92	0.00

urbanworks
ENGINEERING CORPORATION

Prepared by: M.P.

Modified Rational Method - 100 Year Storage
AREA 1B

Columbia Square
File No.: 21-0012CA
Date: Jan 2022

Drainage Areas A1 Post

Area =	**0.68**	ha
"C" =	**0.90**	
AC1=	**0.61**	
Tc =	**10.0**	min
Time Increment =	**5.0**	min
Release Rate =	**107.3**	l/s
Max.Storage Required =	**167.3**	m^3
Max Ponding Depth =	**0.00**	m
Head Elevation =	**0.00**	m

100 Year	
a=	4688.00
b=	17.000
c=	0.9624

(1)	(2)	(3)	(4)	(5)	(6)
Time (min)	**Rainfall Intensity (mm/hr)**	**Storm Runoff (m^3/s)**	**Runoff Volume (m^3)**	**Released Volume (m^3)**	**Required Storage Volume (m^3)**
		(3) = [(2)*AC1]/360	(4) = (3)*(1)*60	(5) = [(R2) / 1000]*(1)*60	(6) = (4)-(5)
10.0	196.5	0.334	200.47	64.37	136.10
15.0	166.9	0.284	255.34	96.55	158.79
20.0	145.1	0.247	296.06	128.73	167.33
25.0	128.5	0.218	327.58	160.92	166.66
30.0	115.3	0.196	352.76	193.10	159.66
35.0	104.6	0.178	373.40	225.28	148.12
40.0	95.7	0.163	390.66	257.47	133.19
45.0	88.3	0.150	405.32	289.65	115.67
50.0	82.0	0.139	417.97	321.83	96.14
55.0	76.5	0.130	429.00	354.02	74.98
60.0	71.7	0.122	438.71	386.20	52.51
65.0	67.5	0.115	447.35	418.38	28.97
70.0	63.7	0.108	455.08	450.57	4.52
75.0	60.4	0.103	462.06	482.75	0.00
80.0	57.4	0.098	468.39	514.93	0.00
85.0	54.7	0.093	474.17	547.12	0.00
90.0	52.2	0.089	479.46	579.30	0.00
95.0	50.0	0.085	484.33	611.48	0.00
100.0	47.9	0.081	488.84	643.67	0.00
105.0	46.0	0.078	493.02	675.85	0.00
110.0	44.3	0.075	496.91	708.03	0.00
115.0	42.7	0.073	500.55	740.22	0.00
120.0	41.2	0.070	503.95	772.40	0.00
125.0	39.8	0.068	507.15	804.58	0.00
130.0	38.5	0.065	510.16	836.77	0.00
135.0	37.3	0.063	513.00	868.95	0.00
140.0	36.1	0.061	515.68	901.13	0.00
145.0	35.0	0.060	518.23	933.32	0.00
150.0	34.0	0.058	520.64	965.50	0.00
155.0	33.1	0.056	522.93	997.68	0.00
160.0	32.2	0.055	525.12	1029.87	0.00
165.0	31.3	0.053	527.20	1062.05	0.00

urbanworks
ENGINEERING CORPORATION

Prepared by: M.P.

Modified Rational Method - 100 Year Storage
AREA 2

Columbia Square
File No.: 21-0012CA
Date: Jan 2022

Drainage Areas A1 Post

Area =	**1.29**	ha
"C" =	**0.90**	
AC1=	**1.16**	
Tc =	**10.0**	min
Time Increment =	**5.0**	min
Release Rate =	**203.5**	l/s
Max.Storage Required =	**317.4**	m^3
Max Ponding Depth =	**0.00**	m
Head Elevation =	**0.00**	m

100 Year	
a=	4688.00
b=	17.000
c=	0.9624

(1)	(2)	(3)	(4)	(5)	(6)
Time (min)	**Rainfall Intensity (mm/hr)**	**Storm Runoff (m^3/s)**	**Runoff Volume (m^3)**	**Released Volume (m^3)**	**Required Storage Volume (m^3)**
		(3) = [(2)*AC1]/360	(4) = (3)*(1)*60	(5) = [(R2) / 1000]*(1)*60	(6) = (4)-(5)
10.0	196.5	0.634	380.30	122.11	258.19
15.0	166.9	0.538	484.40	183.16	301.24
20.0	145.1	0.468	561.64	244.21	317.43
25.0	128.5	0.414	621.43	305.27	316.16
30.0	115.3	0.372	669.21	366.32	302.89
35.0	104.6	0.337	708.36	427.38	280.99
40.0	95.7	0.309	741.10	488.43	252.67
45.0	88.3	0.285	768.92	549.48	219.44
50.0	82.0	0.264	792.91	610.54	182.37
55.0	76.5	0.247	813.83	671.59	142.24
60.0	71.7	0.231	832.26	732.64	99.62
65.0	67.5	0.218	848.65	793.70	54.95
70.0	63.7	0.206	863.32	854.75	8.57
75.0	60.4	0.195	876.56	915.80	0.00
80.0	57.4	0.185	888.57	976.86	0.00
85.0	54.7	0.176	899.52	1037.91	0.00
90.0	52.2	0.168	909.56	1098.97	0.00
95.0	50.0	0.161	918.81	1160.02	0.00
100.0	47.9	0.155	927.36	1221.07	0.00
105.0	46.0	0.148	935.29	1282.13	0.00
110.0	44.3	0.143	942.67	1343.18	0.00
115.0	42.7	0.138	949.57	1404.23	0.00
120.0	41.2	0.133	956.03	1465.29	0.00
125.0	39.8	0.128	962.09	1526.34	0.00
130.0	38.5	0.124	967.80	1587.39	0.00
135.0	37.3	0.120	973.19	1648.45	0.00
140.0	36.1	0.116	978.28	1709.50	0.00
145.0	35.0	0.113	983.10	1770.56	0.00
150.0	34.0	0.110	987.68	1831.61	0.00
155.0	33.1	0.107	992.04	1892.66	0.00
160.0	32.2	0.104	996.18	1953.72	0.00
165.0	31.3	0.101	1000.14	2014.77	0.00

urbanworks
ENGINEERING CORPORATION

Prepared by: M.P.

Modified Rational Method - 100 Year Storage
AREA 3

Columbia Square
File No.: 21-0012CA
Date: Jan 2022

Drainage Areas A1 Post

Area =	**0.61**	ha
"C" =	**0.90**	
AC1=	**0.55**	
Tc =	**10.0**	min
Time Increment =	**5.0**	min
Release Rate =	**96.2**	l/s
Max.Storage Required =	**150.1**	m^3
Max Ponding Depth =	**0.00**	m
Head Elevation =	**0.00**	m

100 Year	
a=	4688.00
b=	17.000
c=	0.9624

(1)	(2)	(3)	(4)	(5)	(6)
Time (min)	**Rainfall Intensity (mm/hr)**	**Storm Runoff (m^3/s)**	**Runoff Volume (m^3)**	**Released Volume (m^3)**	**Required Storage Volume (m^3)**
		(3) = [(2)*AC1]/360	(4) = (3)*(1)*60	(5) = [(R2) / 1000]*(1)*60	(6) = (4)-(5)
10.0	196.5	0.300	179.83	57.74	122.09
15.0	166.9	0.255	229.06	86.61	142.45
20.0	145.1	0.221	265.58	115.48	150.10
25.0	128.5	0.196	293.86	144.35	149.50
30.0	115.3	0.176	316.45	173.22	143.23
35.0	104.6	0.160	334.96	202.09	132.87
40.0	95.7	0.146	350.44	230.96	119.48
45.0	88.3	0.135	363.60	259.83	103.77
50.0	82.0	0.125	374.94	288.70	86.24
55.0	76.5	0.117	384.84	317.57	67.26
60.0	71.7	0.109	393.55	346.44	47.11
65.0	67.5	0.103	401.30	375.31	25.98
70.0	63.7	0.097	408.24	404.18	4.05
75.0	60.4	0.092	414.50	433.05	0.00
80.0	57.4	0.088	420.17	461.93	0.00
85.0	54.7	0.083	425.35	490.80	0.00
90.0	52.2	0.080	430.10	519.67	0.00
95.0	50.0	0.076	434.48	548.54	0.00
100.0	47.9	0.073	438.52	577.41	0.00
105.0	46.0	0.070	442.27	606.28	0.00
110.0	44.3	0.068	445.76	635.15	0.00
115.0	42.7	0.065	449.02	664.02	0.00
120.0	41.2	0.063	452.07	692.89	0.00
125.0	39.8	0.061	454.94	721.76	0.00
130.0	38.5	0.059	457.64	750.63	0.00
135.0	37.3	0.057	460.19	779.50	0.00
140.0	36.1	0.055	462.60	808.37	0.00
145.0	35.0	0.053	464.88	837.24	0.00
150.0	34.0	0.052	467.04	866.11	0.00
155.0	33.1	0.050	469.10	894.98	0.00
160.0	32.2	0.049	471.06	923.85	0.00
165.0	31.3	0.048	472.93	952.72	0.00

Stormceptor®

FORTERRA

Stormceptor® EF Sizing Report

STORMCEPTOR®
ESTIMATED NET ANNUAL SEDIMENT (TSS) LOAD REDUCTION

01/10/2022

Province:	Ontario
City:	Caledon
Nearest Rainfall Station:	TORONTO INTL AP
Climate Station Id:	6158731
Years of Rainfall Data:	20

Site Name:	

Drainage Area (ha):	3.3
% Imperviousness:	100.00

Runoff Coefficient 'c': 0.90

Particle Size Distribution:	Fine
Target TSS Removal (%):	80.0

Project Name:	Columbia Square
Project Number:	21-0012CA
Designer Name:	Michael Paulo
Designer Company:	Urbanworks Engineering Corporation
Designer Email:	mpaulo@urbanworkseng.com
Designer Phone:	416-503-4500
EOR Name:	
EOR Company:	
EOR Email:	
EOR Phone:	

Required Water Quality Runoff Volume Capture (%):	90.00
Estimated Water Quality Flow Rate (L/s):	96.61
Oil / Fuel Spill Risk Site?	Yes
Upstream Flow Control?	Yes
Upstream Orifice Control Flow Rate to Stormceptor (L/s):	594.00
Peak Conveyance (maximum) Flow Rate (L/s):	594.00
Site Sediment Transport Rate (kg/ha/yr):	

Net Annual Sediment (TSS) Load Reduction Sizing Summary

Stormceptor Model	TSS Removal Provided (%)
EFO4	44
EFO6	59
EFO8	70
EFO10	77
EFO12	84

Recommended Stormceptor EFO Model: EFO12

Estimated Net Annual Sediment (TSS) Load Reduction (%): 84

Water Quality Runoff Volume Capture (%): > 90

imbrium

THIRD-PARTY TESTING AND VERIFICATION

►**Stormceptor® EF and Stormceptor® EFO** are the latest evolutions in the Stormceptor® oil-grit separator (OGS) technology series, and are designed to remove a wide variety of pollutants from stormwater and snowmelt runoff. These technologies have been third-party tested in accordance with the Canadian ETV **Procedure for Laboratory Testing of Oil-Grit Separators** and performance has been third-party verified in accordance with the **ISO 14034 Environmental Technology Verification (ETV)** protocol.

PERFORMANCE

►**Stormceptor® EF and EFO** remove stormwater pollutants through gravity separation and floatation, and feature a patent-pending design that generates positive removal of total suspended solids (TSS) throughout each storm event, including high-intensity storms. Captured pollutants include sediment, free oils, and sediment-bound pollutants such as nutrients, heavy metals, and petroleum hydrocarbons. Stormceptor is sized to remove a high level of TSS from the frequent rainfall events that contribute the vast majority of annual runoff volume and pollutant load. The technology incorporates an internal bypass to convey excessive stormwater flows from high-intensity storms through the device without resuspension and washout (scour) of previously captured pollutants. Proper routine maintenance ensures high pollutant removal performance and protection of downstream waterwavs.

PARTICLE SIZE DISTRIBUTION (PSD)

►The **Canadian ETV PSD** shown in the table below was used, or in part, for this sizing. This is the identical PSD that is referenced in the Canadian ETV ***Procedure for Laboratory Testing of Oil-Grit Separators*** for both sediment removal testing and scour testing. The Canadian ETV PSD contains a wide range of particle sizes in the sand and silt fractions, and is considered reasonably representative of the particle size fractions found in typical urban stormwater runoff.

Particle Size (µm)	Percent Less Than	Particle Size Fraction (µm)	Percent
1000	100	500-1000	5
500	95	250-500	5
250	90	150-250	15
150	75	100-150	15
100	60	75-100	10
75	50	50-75	5
50	45	20-50	10
20	35	8-20	15
8	20	5-8	10
5	10	2-5	5
2	5	<2	5

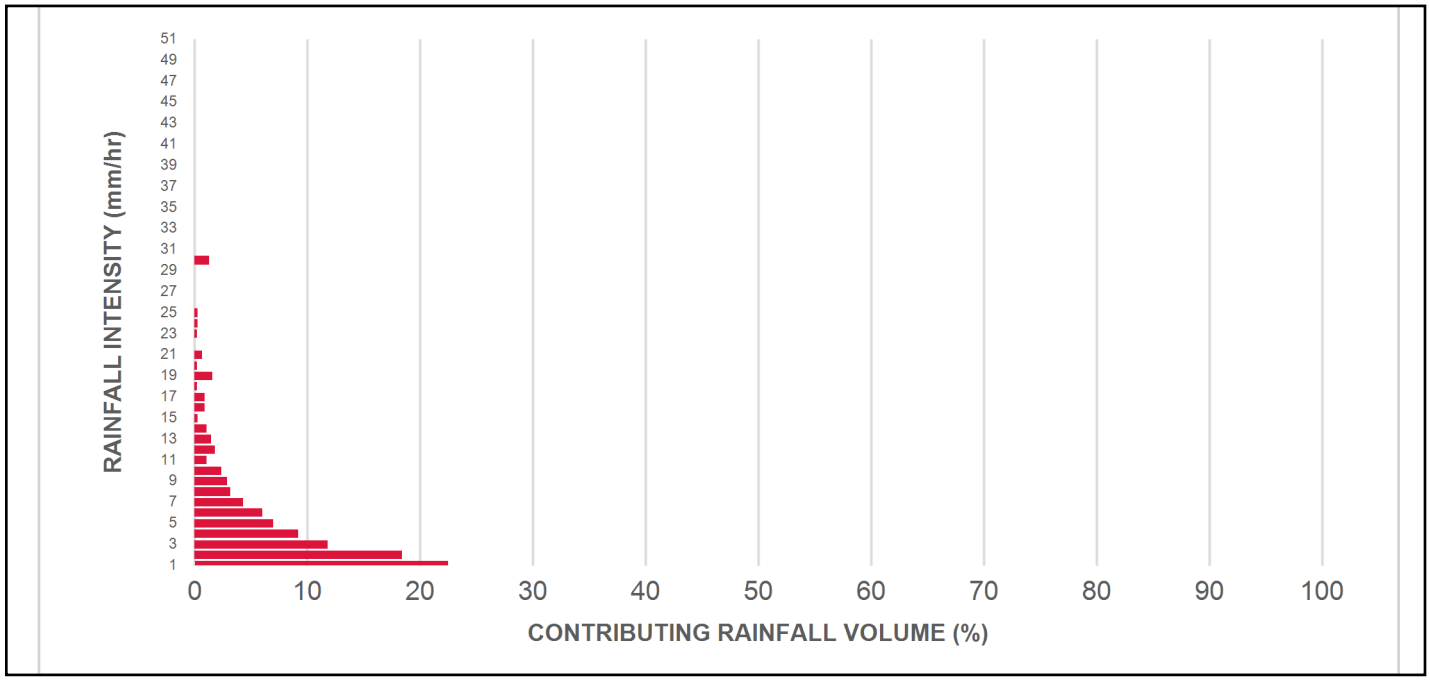
imbrium

Upstream Flow Controlled Results

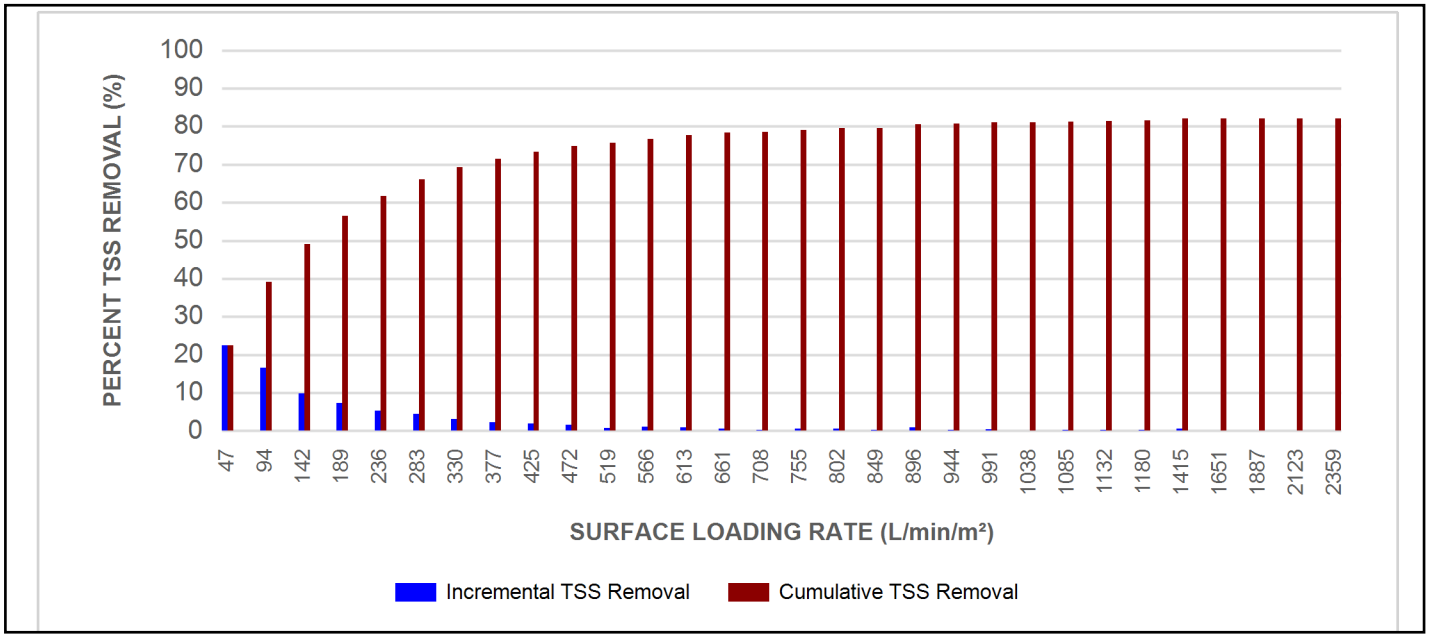
Rainfall Intensity (mm / hr)	Percent Rainfall Volume (%)	Cumulative Rainfall Volume (%)	Flow Rate (L/s)	Flow Rate (L/min)	Surface Loading Rate (L/min/m²)	Removal Efficiency (%)	Incremental Removal (%)	Cumulative Removal (%)
1	22.5	22.5	8.26	495.0	40.0	100	22.5	22.5
2	18.4	40.9	16.51	991.0	79.0	91	16.8	39.3
3	11.8	52.7	24.77	1486.0	119.0	88	10.3	49.7
4	9.2	61.9	33.03	1982.0	159.0	83	7.7	57.3
5	7.0	68.9	41.28	2477.0	198.0	78	5.5	62.8
6	6.0	74.9	49.54	2972.0	238.0	76	4.5	67.4
7	4.3	79.2	57.80	3468.0	277.0	74	3.2	70.6
8	3.2	82.4	66.05	3963.0	317.0	72	2.3	72.8
9	2.9	85.3	74.31	4459.0	357.0	71	2.1	74.9
10	2.4	87.7	82.57	4954.0	396.0	69	1.6	76.6
11	1.1	88.7	90.82	5449.0	436.0	67	0.7	77.3
12	1.8	90.5	99.08	5945.0	476.0	66	1.2	78.5
13	1.5	92.1	107.34	6440.0	515.0	64	1.0	79.5
14	1.1	93.1	115.59	6936.0	555.0	62	0.7	80.1
15	0.3	93.5	123.85	7431.0	594.0	60	0.2	80.3
16	0.9	94.3	132.11	7926.0	634.0	60	0.5	80.8
17	0.9	95.3	140.36	8422.0	674.0	60	0.5	81.4
18	0.2	95.5	148.62	8917.0	713.0	59	0.1	81.5
19	1.6	97.1	156.88	9413.0	753.0	59	1.0	82.4
20	0.2	97.3	165.13	9908.0	793.0	59	0.1	82.6
21	0.7	98.0	173.39	10403.0	832.0	58	0.4	83.0
22	2.0	100.0	181.65	10899.0	872.0	58	1.2	84.1
23	0.2	100.2	189.90	11394.0	912.0	58	0.1	84.3
24	0.3	100.5	198.16	11890.0	951.0	58	0.2	84.4
25	0.3	100.8	206.42	12385.0	991.0	57	0.2	84.6
30	1.3	102.0	247.70	14862.0	1189.0	53	0.7	85.3
35	-2.0	100.0	288.98	17339.0	1387.0	49	N/A	84.3
40	0.0	100.0	330.26	19816.0	1585.0	43	0.0	84.3
45	0.0	100.0	371.55	22293.0	1783.0	38	0.0	84.3
50	0.0	100.0	412.83	24770.0	1982.0	34	0.0	84.3
Estimated Net Annual Sediment (TSS) Load Reduction =								**84 %**

Climate Station ID: 6158731 *Years of Rainfall Data*: 20

RAINFALL DATA FROM TORONTO INTL AP RAINFALL STATION



INCREMENTAL AND CUMULATIVE TSS REMOVAL FOR THE RECOMMENDED STORMCEPTOR® MODEL



Maximum Pipe Diameter / Peak Conveyance

Stormceptor EF / EFO	Model Diameter		Min Angle Inlet / Outlet Pipes	Max Inlet Pipe Diameter		Max Outlet Pipe Diameter		Peak Conveyance Flow Rate	
	(m)	(ft)		(mm)	(in)	(mm)	(in)	(L/s)	(cfs)
EF4 / EFO4	1.2	4	90	609	24	609	24	425	15
EF6 / EFO6	1.8	6	90	914	36	914	36	990	35
EF8 / EFO8	2.4	8	90	1219	48	1219	48	1700	60
EF10 / EFO10	3.0	10	90	1828	72	1828	72	2830	100
EF12 / EFO12	3.6	12	90	1828	72	1828	72	2830	100

SCOUR PREVENTION AND ONLINE CONFIGURATION

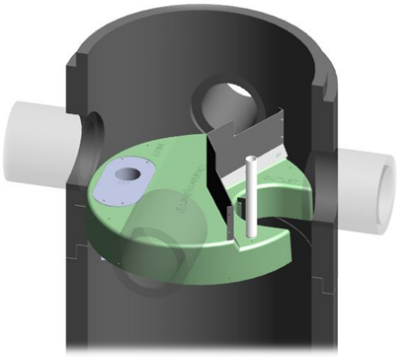
►**Stormceptor® EF and EFO** feature an internal bypass and superior scour prevention technology that have been demonstrated in third-party testing according to the scour testing provisions of the Canadian ETV **Procedure for Laboratory Testing of Oil-Grit Separators**, and the exceptional scour test performance has been third-party verified in accordance with the ISO 14034 ETV protocol. As a result, Stormceptor EF and EFO are approved for online installation, eliminating the need for costly additional bypass structures, piping, and installation expense.

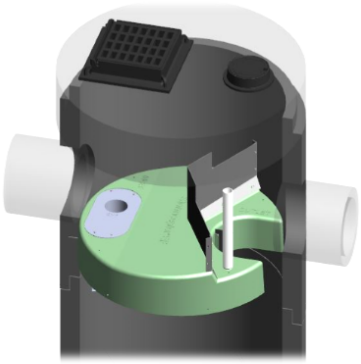
DESIGN FLEXIBILITY

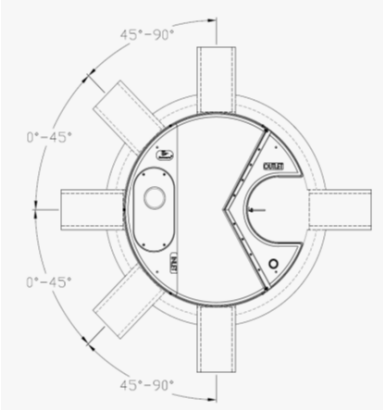
►**Stormceptor® EF** and **EFO** offers design flexibility in one simplified platform, accepting stormwater flow from a single inlet pipe or multiple inlet pipes, and/or surface runoff through an inlet grate. The device can also serve as a junction structure, accommodate a 90-degree inlet-to-outlet bend angle, and can be modified to ensure performance in submerged conditions.

OIL CAPTURE AND RETENTION

►While Stormceptor® EF will capture and retain oil from dry weather spills and low intensity runoff, **Stormceptor® EFO** has demonstrated superior oil capture and greater than 99% oil retention in third-party testing according to the light liquid re-entrainment testing provisions of the Canadian ETV **Procedure for Laboratory Testing of Oil-Grit Separators**. Stormceptor EFO is recommended for sites where oil capture and retention is a requirement.







INLET-TO-OUTLET DROP

Elevation differential between inlet and outlet pipe inverts is dictated by the angle at which the inlet pipe(s) enters the unit.

0° - 45° : The inlet pipe is 1-inch (25mm) higher than the outlet pipe.

45° - 90° : The inlet pipe is 2-inches (50mm) higher than the outlet pipe.

HEAD LOSS

The head loss through Stormceptor EF is similar to that of a 60-degree bend structure. The applicable K value for calculating minor losses through the unit is 1.1. For submerged conditions the applicable K value is 3.0.

Pollutant Capacity

Stormceptor EF / EFO	Model Diameter		Depth (Outlet Pipe Invert to Sump Floor)		Oil Volume		Recommended Sediment Maintenance Depth *		Maximum Sediment Volume *		Maximum Sediment Mass **	
	(m)	(ft)	(m)	(ft)	(L)	(Gal)	(mm)	(in)	(L)	(ft^3)	(kg)	(lb)
EF4 / EFO4	1.2	4	1.52	5.0	265	70	203	8	1190	42	1904	5250
EF6 / EFO6	1.8	6	1.93	6.3	610	160	305	12	3470	123	5552	15375
EF8 / EFO8	2.4	8	2.59	8.5	1070	280	610	24	8780	310	14048	38750
EF10 / EFO10	3.0	10	3.25	10.7	1670	440	610	24	17790	628	28464	78500
EF12 / EFO12	3.6	12	3.89	12.8	2475	655	610	24	31220	1103	49952	137875

*Increased sump depth may be added to increase sediment storage capacity

** Average density of wet packed sediment in sump = 1.6 kg/L (100 lb/ft^3)

Feature	Benefit	Feature Appeals To
Patent-pending enhanced flow treatment and scour prevention technology	Superior, verified third-party performance	Regulator, Specifying & Design Engineer
Third-party verified light liquid capture and retention for EFO version	Proven performance for fuel/oil hotspot locations	Regulator, Specifying & Design Engineer, Site Owner
Functions as bend, junction or inlet structure	Design flexibility	Specifying & Design Engineer
Minimal drop between inlet and outlet	Site installation ease	Contractor
Large diameter outlet riser for inspection and maintenance	Easy maintenance access from grade	Maintenance Contractor & Site Owner

STANDARD STORMCEPTOR EF/EFO DRAWINGS

For standard details, please visit http://www.imbriumsystems.com/stormwater-treatment-solutions/stormceptor-ef

STANDARD STORMCEPTOR EF/EFO SPECIFICATION

For specifications, please visit http://www.imbriumsystems.com/stormwater-treatment-solutions/stormceptor-ef

STANDARD PERFORMANCE SPECIFICATION FOR "OIL GRIT SEPARATOR" (OGS) STORMWATER QUALITY TREATMENT DEVICE

PART 1 – GENERAL

1.1 WORK INCLUDED

This section specifies requirements for selecting, sizing, and designing an underground Oil Grit Separator (OGS) device for stormwater quality treatment, with third-party testing results and a Statement of Verification in accordance with ISO 14034 Environmental Management – Environmental Technology Verification (ETV).

1.2 REFERENCE STANDARDS & PROCEDURES

ISO 14034:2016 Environmental management – Environmental technology verification (ETV)

Canadian Environmental Technology Verification (ETV) Program's **Procedure for Laboratory Testing of Oil-Grit Separators**

1.3 SUBMITTALS

1.3.1 All submittals, including sizing reports & shop drawings, shall be submitted upon request with each order to the contractor then forwarded to the Engineer of Record for review and acceptance. Shop drawings shall detail all OGS components, elevations, and sequence of construction.

1.3.2 Alternative devices shall have features identical to or greater than the specified device, including: treatment chamber diameter, treatment chamber wet volume, sediment storage volume, and oil storage volume.

1.3.3 Unless directed otherwise by the Engineer of Record, OGS stormwater quality treatment product substitutions or alternatives submitted within ten days prior to project bid shall not be accepted. All alternatives or substitutions submitted shall be signed and sealed by a local registered Professional Engineer, based on the exact same criteria detailed in Section 3, in entirety, subject to review and approval by the Engineer of Record.

PART 2 – PRODUCTS

2.1 OGS POLLUTANT STORAGE

The OGS device shall include a sump for sediment storage, and a protected volume for the capture and storage of petroleum hydrocarbons and buoyant gross pollutants. The minimum sediment & petroleum hydrocarbon storage capacity shall be as follows:

2.1.1	4 ft (1219 mm) Diameter OGS Units:	1.19 m^3 sediment / 265 L oil
	6 ft (1829 mm) Diameter OGS Units:	3.48 m^3 sediment / 609 L oil
	8 ft (2438 mm) Diameter OGS Units:	8.78 m^3 sediment / 1,071 L oil
	10 ft (3048 mm) Diameter OGS Units:	17.78 m^3 sediment / 1,673 L oil
	12 ft (3657 mm) Diameter OGS Units:	31.23 m^3 sediment / 2,476 L oil

PART 3 – PERFORMANCE & DESIGN

3.1 GENERAL

The OGS stormwater quality treatment device shall be verified in accordance with ISO 14034:2016 Environmental management – Environmental technology verification (ETV). The OGS stormwater quality treatment device shall

remove oil, sediment and gross pollutants from stormwater runoff during frequent wet weather events, and retain these pollutants during less frequent high flow wet weather events below the insert within the OGS for later removal during maintenance. The Manufacturer shall have at least ten (10) years of local experience, history and success in engineering design, manufacturing and production and supply of OGS stormwater quality treatment device systems, acceptable to the Engineer of Record.

3.2 SIZING METHODOLOGY

The OGS device shall be engineered, designed and sized to provide stormwater quality treatment based on treating a minimum of 90 percent of the average annual runoff volume and a minimum removal of an annual average 60% of the sediment (TSS) load based on the Particle Size Distribution (PSD) specified in the sizing report for the specified device. Sizing shall be determined using historical rainfall data and a sediment removal performance curve derived from the actual third-party verified laboratory testing data. The OGS device shall also have sufficient annual sediment storage capacity as specified and calculated in Section 2.1.

3.3 CANADIAN ETV or ISO 14034 ETV VERIFICATION OF SCOUR TESTING

The OGS device shall have Canadian ETV or ISO 14034 ETV Verification of third-party scour testing conducted in accordance with the Canadian ETV Program's **Procedure for Laboratory Testing of Oil-Grit Separators.**

3.3.1 To be acceptable for on-line installation, the OGS device must demonstrate an average scour test effluent concentration less than 10 mg/L at each surface loading rate tested, up to and including 2600 L/min/m^2.

3.4 LIGHT LIQUID RE-ENTRAINMENT SIMULATION TESTING

The OGS device shall have Canadian ETV or ISO 14034 ETV Verification of completed third-party Light Liquid Re-entrainment Simulation Testing in accordance with the Canadian ETV **Program's Procedure for Laboratory Testing of Oil-Grit Separators,** with results reported within the Canadian ETV or ISO 14034 ETV verification. This re-entrainment testing is conducted with the device pre-loaded with low density polyethylene (LDPE) plastic beads as a surrogate for light liquids such as oil and fuel. Testing is conducted on the same OGS unit tested for sediment removal to assess whether light liquids captured after a spill are effectively retained at high flow rates.

3.4.1 For an OGS device to be an acceptable stormwater treatment device on a site where vehicular traffic occurs and the potential for an oil or fuel spill exists, the OGS device must have reported verified performance results of greater than 99% cumulative retention of LDPE plastic beads for the five specified surface loading rates (ranging 200 L/min/m2 to 2600 L/min/m2) in accordance with the Light Liquid Re-entrainment Simulation Testing within the Canadian ETV Program's **Procedure for Laboratory Testing of Oil-Grit Separators.**However, an OGS device shall not be allowed if the Light Liquid Re-entrainment Simulation Testing was performed with screening components within the OGS device that are effective at retaining the LDPE plastic beads, but would not be expected to retain light liquids such as oil and fuel.

Appendix D: Sanitary Calculations

SANITARY FLOW CALCULATION

ESTIMATED SITE DISCHARGE

PROJECT: Columbia Square, Caledon
FILE No.: 21-0012CA
DATE: Dec 2021
PREPARED BY: MP

Site Area	3.30	ha
Infiltration Rate	0.20	L/s/ha *
Sewage Generation Rate	302.8	L/cap/day *

* Per Region of Peel Criteria

PROPOSED CONDITION

Land Use	**Units**	**Area** (ha)	**Density** (ppu or p/ha)	Population	Avg. Flow (L/s)	**Peaking Factor**	Peak Flow (L/s)	**Infilt.** (L/s)	Total Flow (L/s)
Ph. 1A Townhouse	24	0.72	175 p/ha	126	0.4	3.76	1.5	0.1	1.6
Ph. 1B Townhouse	118	0.68	175 p/ha	119	0.4	3.76	1.5	0.3	1.8
Ph. 2 Apartment	244	1.29	475 p/ha	613	2.1	3.76	7.9	0.3	8.2
Ph. 3 Apartment	159	0.61	475 p/ha	290	1.0	3.76	3.8	0.1	3.9
Total	545	3.30	NA	1148	3.9	3.76	14.7	0.8	15.5

Appendix E: Water Supply Calculations

PROJECT: Columbia Square

PROJECT #: 21-0012CA

DATE: 07-Jan-22

WATER DEMAND DESIGN ANALYSIS

REGION OF PEEL DESIGN CRITERIA

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

Water Demand Design Criteria

Average Day Demand - Residential	280 L/cap/d
Average Day Demand - Commercial	300 L/cap/d
Maximum Day Factor - Residential	2.0
Maximum Day Factor - Commercial	1.4
Peak Hour Factor - Res. and Inst.	3.0

Population Equivalents

Townhouse Development	175 ppu
Future Mid-Rise Development	475 ppha
Commercial Development	50 ppha

Water System Demand

Land Use	Units #	Area (ha)	Population	Ave. Day Flow (L/s)	Max Day Demand (L/s)	Max Hour Demand (L/s)	Fire Flow Demand (L/s)	Max Day + Fire Flow (L/s)
PHASE 1A								
Townhouses	24	0.720	126	0.41	0.82	1.23	216.67	217.48
PHASE 1B								
Townhouses	118	0.680	119	0.39	0.77	1.16	150.00	150.77
PHASE 2								
Mixed-Use Comm./Residential	244	1.290	613	1.99	3.97	5.96	250.00	253.97
PHASE 3								
Retirement Residence	159	0.610	290	0.94	1.88	2.82	116.67	118.54
TOTAL		3.300	1148	3.72	7.44	11.16	250.00	257.44

Fire Flow Demand

	Fire Flow
FUS Calculation	250.00 L/s
Maximum Day Demand + Fire Flow	257.44 L/s
Peak Hour Demand Flow	11.16 L/s

FIRE FLOW CALCULATION

PROJECT: Columbia Square
FILE No.: 21-0012CA
DATE: January 2022
PREPARED BY: MP

Calculation of required fire flow is based on the Fire Underwriters Survey (FUS), Water Supply for Fire Protection publication, 1999.

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

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

C = Coefficient related to the type of construction

- 1.5 for wood frame construction (combustible)
- 1.0 for ordinary construction (brick/masonry walls, with combustible floor & interior)
- 0.8 for non-combustible construction (unprotected metal structural components, masonry or metal walls)
- 0.6 for fire-resistive construction (fully protected frame, floors, roof)

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)	%	Fire Flow Adjustment (L/min)	%	Fire Flow Adjustment (L/min)	Final Fire Flow (L/min)	Rounded Fire Flow (L/min)	(L/s)
PHASE 1A													
West Block	833.4	1	6351	105.9	-15	-953	0	0	40%	2540	7939	8000	133
Mid Block	779.55	1	6142	102.4	-15	-921	0	0	55%	3378	8599	9000	150
East Block	1728	1	9145	152.4	-15	-1372	0	0	55%	5030	12803	13000	217
PHASE 1B													
Northwest	840	1	6376	106.3	-15	-956	0	0	50%	3188	8608	9000	150
North	840	1	6376	106.3	-15	-956	0	0	60%	3826	9245	9000	150
Northeast	840	1	6376	106.3	-15	-956	0	0	60%	3826	9245	9000	150
Southwest	840	1	6376	106.3	-15	-956	0	0	45%	2869	8289	8000	133
South	840	1	6376	106.3	-15	-956	0	0	45%	2869	8289	8000	133
Southeast	840	1	6376	106.3	-15	-956	0	0	50%	3188	8608	9000	150
PHASE 2													
Building	5410.5	1	16182	269.7	-15	-2427	-30	-4855	35%	5664	14564	15000	250
PHASE 3													
Building	2467.5	1	10928	182.1	-15	-1639	-30	-3278	10%	1093	7103	7000	117

GFA for townhouse blocks estimated based on site plan prepared by MBTW WAI dated March 4, 2021

(2) Occupancy	
Non-Combustible	-25%
Limited Combustible	**-15%**
Combustible	no change
Free Burning	15%
Rapid Burning	25%

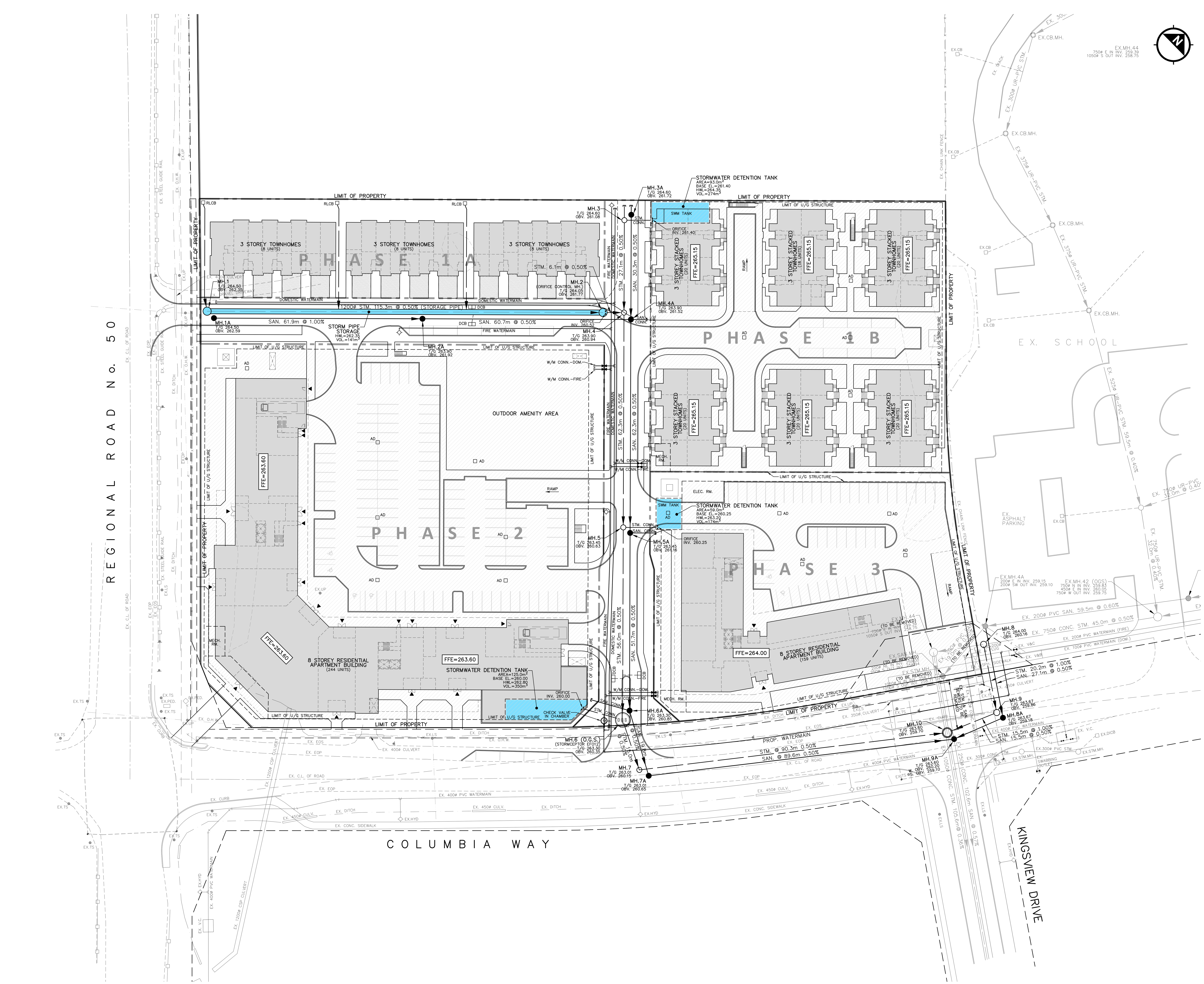
(3) Spinkler

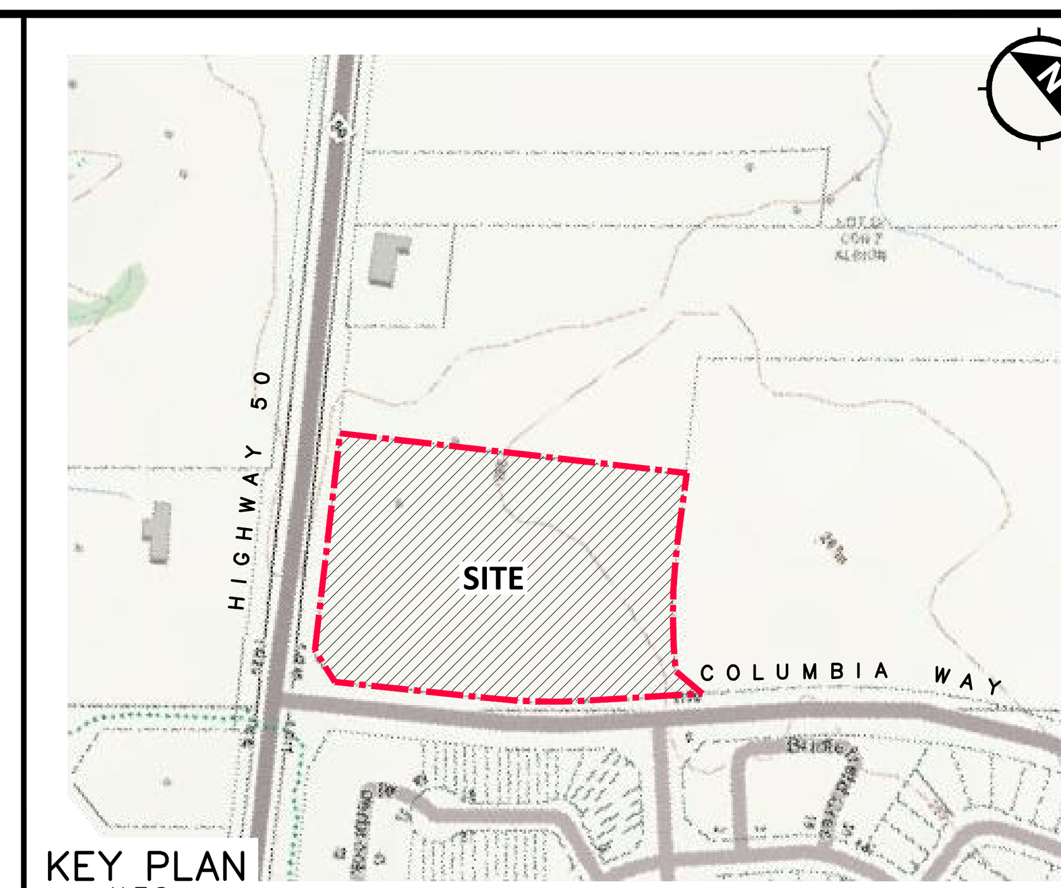
It is assumed Phases 2 and 3 will have a sprinkler system

(4) Exposure	
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 to 45 m	5%
> 45 m	0%

Calculate for all sides and all buildings.

Appendix F: Functional Engineering Drawings





KEY PLAN
N.T.S.

LEGEND

- DENOTES VALVE AND CHAMBER
- DENOTES VALVE AND BOX
- DENOTES HYDRANT
- AD DENOTES AREA DRAIN
- CB DENOTES SINGLE CATCHBASIN
- DCB DENOTES DOUBLE CATCHBASIN
- DENOTES SANITARY MANHOLE
- DENOTES STORM MANHOLE
- DENOTES EXTERIOR ENTRANCE
- (1) DENOTES PIPE CROSSING
- DENOTES PROPOSED BUILDING
- DENOTES PROPOSED BUILDING STRUCTURE BELOW GRADE
- DENOTES STORMWATER STORAGE TANK

NOT FOR CONSTRUCTION

THE DESIGN PRESENTED ON THIS DRAWING IS PRELIMINARY, AND HAS BEEN PREPARED IN SUPPORT OF A FUNCTIONAL SERVICING STUDY FOR THE SUBJECT SITE. THIS DRAWING IS NOT TO BE USED FOR CONSTRUCTION

DRAWING LIST	
FS–01	FUNCTIONAL SERVICING PLAN
FG–01	FUNCTIONAL GRADING PLAN
FSC–1	FUNCTIONAL EROSION & SEDIMENT CONTROL PLAN
D–01	DETAILS

SUBMISSION HISTORY

No.	ISSUED FOR	DATE
1.	ISSUED FOR ZBA 1ST SUBMISSION	JAN.10,2022

REVISIONS

No.	DESCRIPTION	BY	DATE

BENCHMARK NOTE:

ELEVATIONS ARE GEODETIC AND ARE REFERRED TO THE VERTICAL BENCH MARK NUMBER 00819758060 HAVING AN ORTHOMETRIC ELEVATION OF 269.667 METRES. ELEVATIONS ARE REFERENCED TO THE CANADIAN GEODETIC VERTICAL DATUM OF 1928, 1978 ADJUSTMENT (CGVD–1928:1978).

TABLET IS SET HORIZONTALLY IN THE NORTHWEST FACE OF A CONCRETE SILO, BELOW STEEL RING LADDER, 49cm ABOVE GRADE. SILO LOCATED ON THE EAST SIDE OF HWY. 50, 3.3km NORTH OF JCT OF HWY.50 AND KING STREET IN THE TOWN OF CALEDON (BOLTON), 1.0km SOUTH OF ALBION SIDEROAD 15 AND 68cm EAST OF CENTERLINE OF HWY.50.

CONSULTANT

LICENSED PROFESSIONAL ENGINEER
T. DUMYN
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JAN.10,2022
PROVINCE OF ONTARIO

MUNICIPAL APPROVAL

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COLUMBIA SQUARE

14245 HIGHWAY 50, BOLTON, ON.

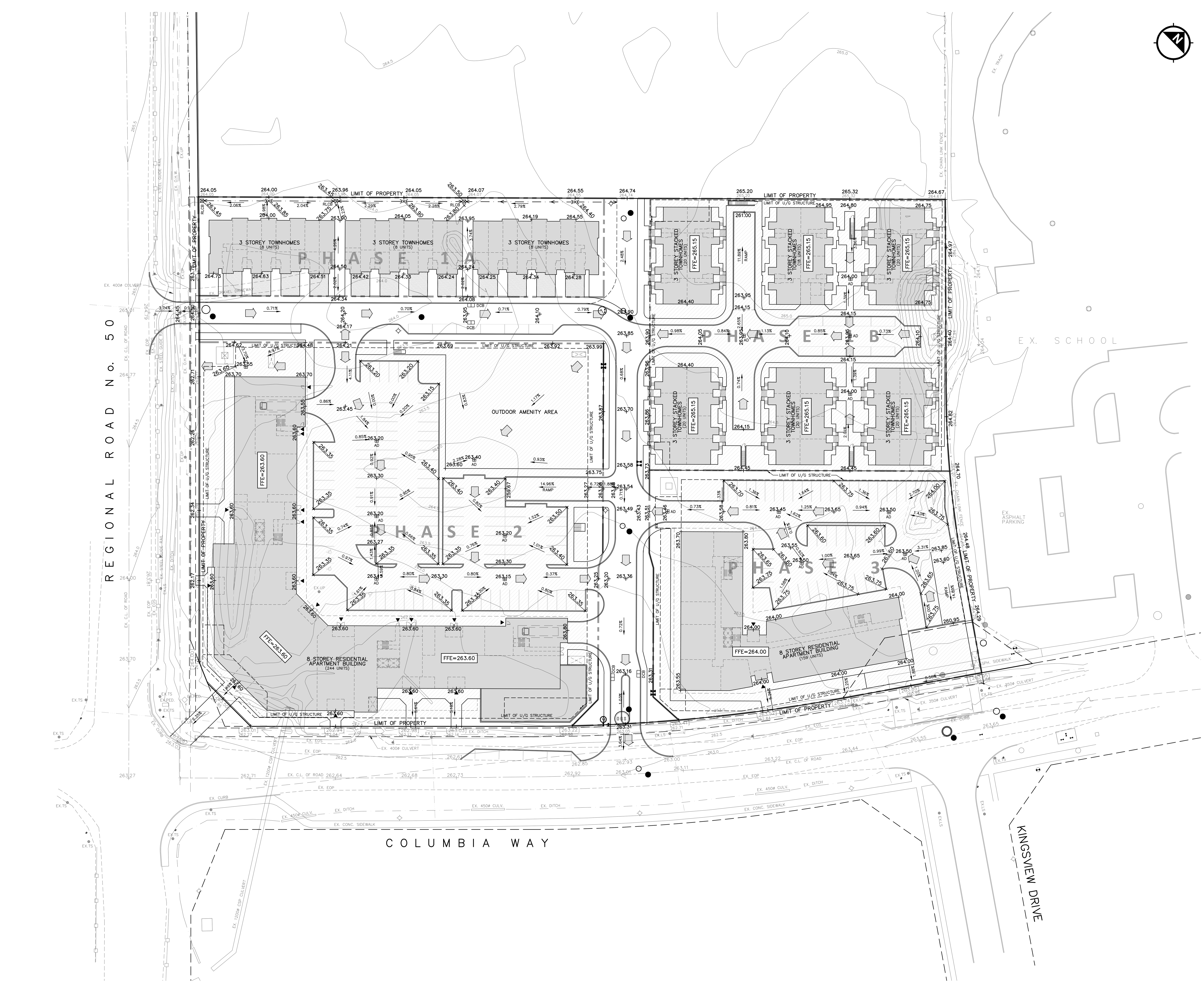
Region of Peel working with you

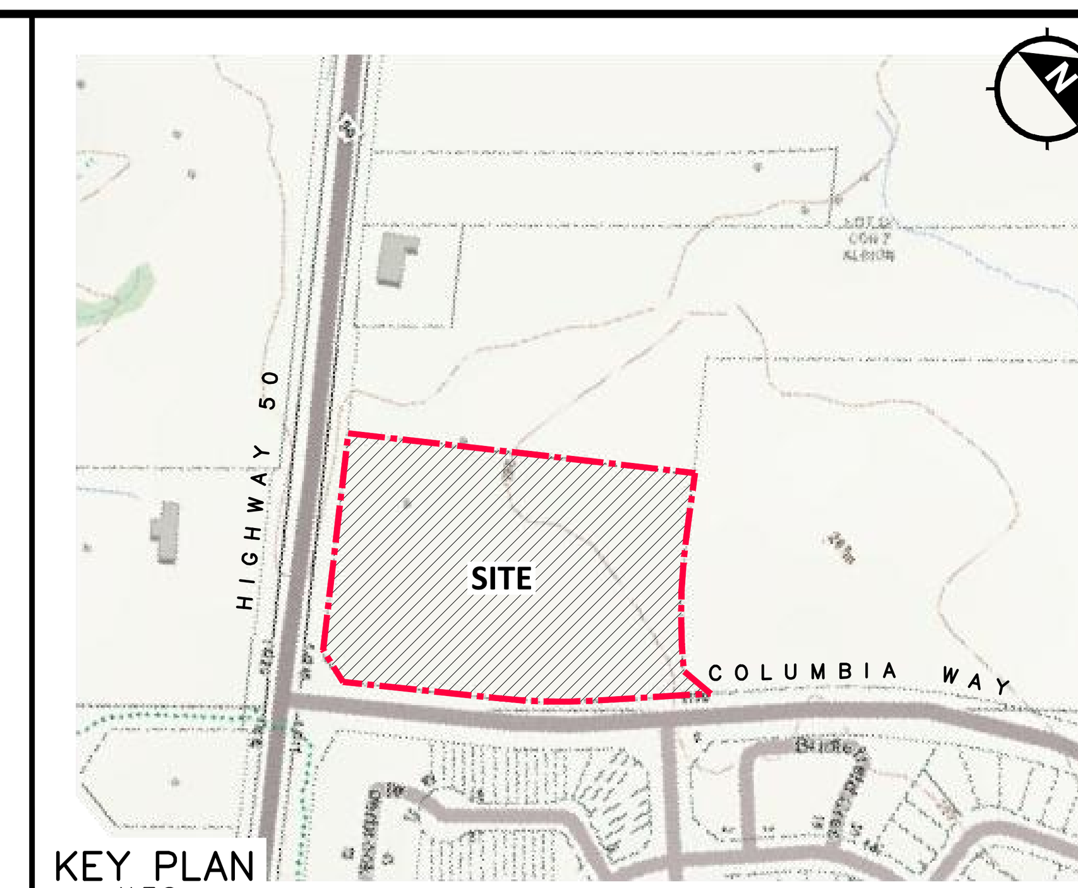
TOWN OF CALEDON

SCALE
0 5 10 15 20 25 30 35 40 45 50m

FUNCTIONAL SERVICING PLAN

TOWN FILE:		PROJECT No.	21-0012CA
REGION FILE:			
DATE: JAN. 10, 2022	DESIGNED BY: T.D.	DWG. No.	FS-01
SCALE: 1:500	DRAWN BY: T.D.		
	CHECKED BY: M.M.		





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N.T.S.

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- DENOTES STORM MANHOLE
- DENOTES EXTERIOR ENTRANCE
- DENOTES PROPOSED BUILDING
- DENOTES PROPOSED BUILDING STRUCTURE BELOW GRADE
- 189.52 DENOTES PROPOSED ELEVATION
- 190.14 DENOTES EXISTING ELEVATION
- [189.52] DENOTES FUTURE ELEVATION
- 188.5 DENOTES EXISTING CONTOUR
- DENOTES OVERLAND FLOW ROUTE

NOT FOR CONSTRUCTION

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14245 HIGHWAY 50, BOLTON, ON.

Region of Peel
working with you

TOWN OF CALEDON

SCALE
0 5 10 15 20 25 30 35 40 45 50m

FUNCTIONAL GRADING PLAN

TOWN FILE:		PROJECT No.	21-0012CA
REGION FILE:			
DATE: JAN. 10, 2022	DESIGNED BY: T.D.	DWG. No.	FG-01
SCALE: 1:500	DRAWN BY: T.D.		
	CHECKED BY: M.M.		