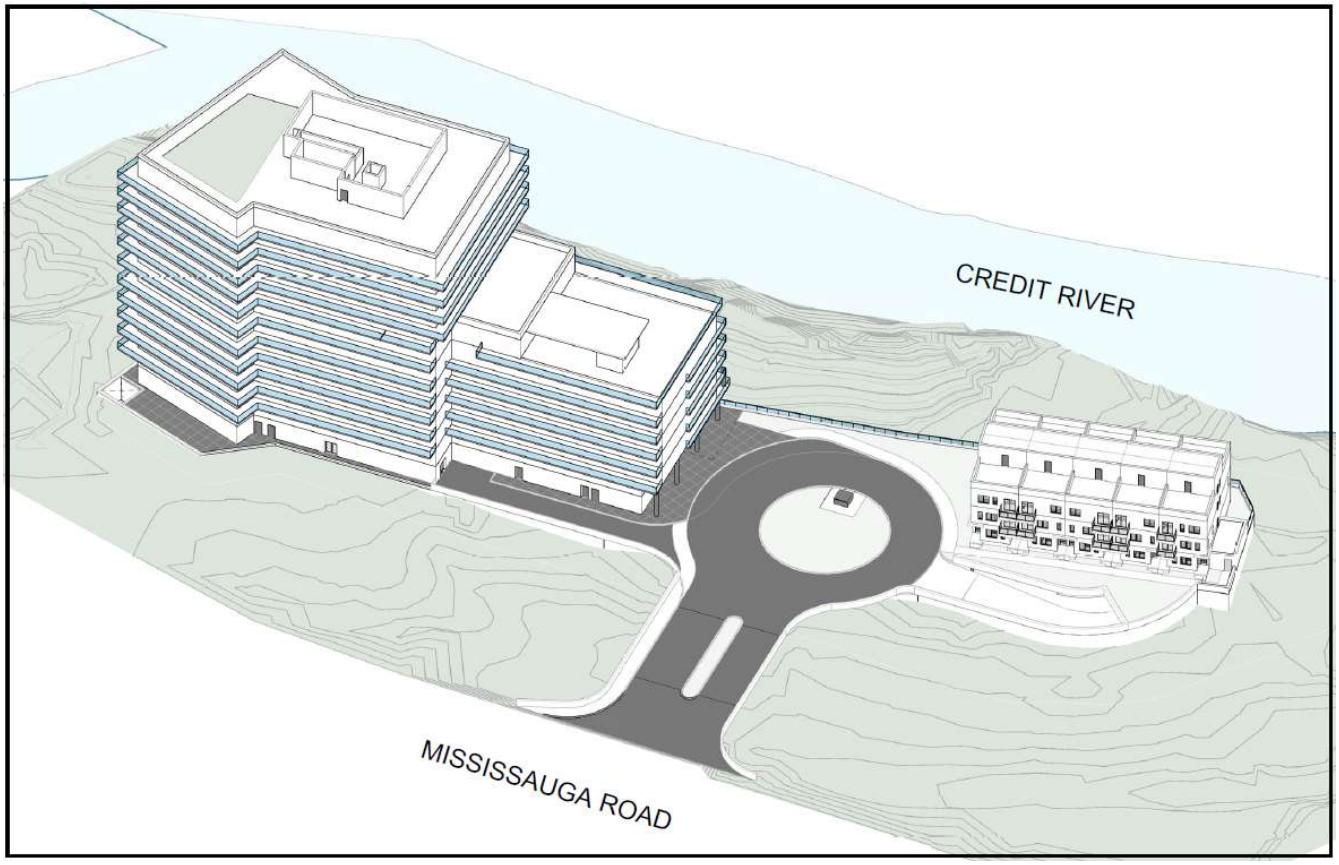
2935 & 2955 MISSISSAUGA ROAD

FUNCTIONAL SERVICING REPORT

OCTOBER 23, 2023
PROJECT 20-697



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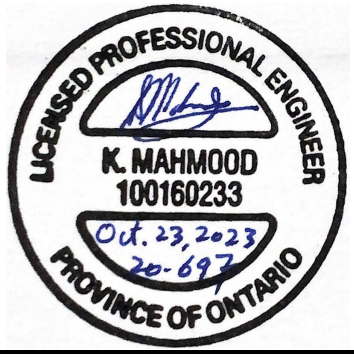

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Limitations

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2935 & 2955 MISSISSAUGA ROAD
FUNCTIONAL SERVICING REPORT

1.0 INTRODUCTION

Greck and Associates Limited has been retained by 590816 Ontario Inc. (The Client) to prepare a Functional Servicing Report (FSR) for 2935 & 2955 Mississauga Road in Mississauga, Ontario (Subject Property) in support of the proposed site plan application.

This report provides an overview of the current proposed development plan and examines their functional serviceability, including requirements and proposed conceptual design works related to:

- General site grading
- Water Supply
- Sanitary sewer servicing
- Stormwater management; and
- Construction erosion and sediment control

This functional servicing report has been prepared in accordance with accepted engineering practices and criteria from the governing approval agencies including the City of Mississauga (City), Region of Peel (Region), Credit Valley Conservation (CVC), and applicable provincial policy and guidelines. Following the submission and review of this document, detailed design plans, including supporting reports and drawings, will be prepared and submitted to the above noted agencies for review and approval, as required.

1.1 BACKGROUND

1.1.1 SITE LOCATION AND DESCRIPTION

The subject property comprises of two properties, 2935 & 2955 Mississauga Road, and is located in the City of Mississauga, east of the Dundas Street West and Mississauga Road intersection, see **Figure 1**. The subject property is 2.13ha in size and consists of undeveloped/unimproved, vegetated land. The property is bound by Mississauga Road to the south, a residential estate lot to the east, Sawmill Creek to the west, and Credit River to the north. Two topographic surveys were conducted: the survey of the subject property was completed by Tarasick Mcmillan Kubicki Limited on December 10th 2019, and an additional survey of the sanitary trunk infrastructure and surrounding topography located east of Dundas Road and north of the Sawmill Creek outfall was completed by

Calder Engineering Limited on March 8th 2021. The information from both surveys have been combined into the topographic survey plan by Tarasick Mcmillan Kubicki Limited and provided in **Appendix A**. The existing property slopes southeast, with an average slope of 4.7%.

The historical alignment of Sawmill Creek was conveyed from the intersection of Dundas Street and Mississauga Road east across the subject property, then directed north to discharge into the Credit River. This alignment has now been altered so that Sawmill Creek is no longer conveyed through the subject property, and discharges into the Credit River near the north limit of the subject property via an extensive outfall. A ditch was also constructed during this time that runs parallel to Mississauga Road to service local drainage from the subject property and Mississauga Road. This ditch wraps around the south and east limits of the subject property and discharges into the Credit River near the east corner of the subject property.

1.1.2 SOIL CONDITIONS

A geotechnical investigation report was completed by Terraprobe on September 4, 2008, and an addendum was completed on March 30, 2010. The work included drilling and sampling a total of four (4) boreholes near the north valley slope, and ten (10) boreholes near the east and south slopes. The soil conditions consist primarily of the following:

- A surficial topsoil layer varying in thickness from 150mm to 200mm, encountered at seven (7) boreholes.
- A surficial Earth Fill layer varying in thickness from 0.8m to 1m, encountered at five (5) boreholes.
- Native Soils was encountered at the surface at two (2) boreholes, and encountered beneath the Earth Fill or Topsoil layer for the other boreholes. The native soils consist of clayey to sandy silt, to sand and silt to silty sand till. This layer extended to the bottom of all boreholes at depths varying from about 1.2m to 3.0m below grade.

Groundwater levels were measured at all boreholes during their respective studies on August 28, 2008 and March 17, 2010. The groundwater measurements taken on August 28, 2008 were taken on site two weeks after the completion of drilling, and the measurements taken on March 17, 2010 were taken onsite immediately after the completion of drilling. A maximum groundwater elevation of 97.6m, was measured at a depth of 0.5m below surface, at Borehole 1603 located at the south limit of the site, and a minimum groundwater elevation of 96.0m, was measured at a depth of 6.1m below surface, at Borehole 1 located at the north limit of the site.

A test pit investigation was also conducted by Terraprobe on July 22 and 27, 2015 to determine soil percolation rates. Four (4) test pits were dug within the subject property, and the percolation rates determined ranged from 20 min/cm to 35 min/cm.

For more details, see the geotechnical investigation report, the addendum, and the test pit investigation memo prepared by Terraprobe provided under a separate cover.

1.1.3 FLOOD AND EROSION HAZARDS, AND ECOLOGICAL CONSIDERATIONS

Several studies have been completed to determine the development limits pertaining to flood and erosion hazards, and natural habitat with respect to the requirements, guidelines and polices of CVC. The following studies have been completed to date and can be found under a separate cover:

- 2-D hydraulic assessment of Sawmill Creek completed on May 19 2023 by Greck
- The geotechnical investigation report and the addendum were completed on September 4 2008 and March 30 2010, respectively, by Terraprobe
- The EIS was completed on May 6 2021 by Palmer

The valley feature and the woodland govern the development limits of the property. The Credit River regulatory floodplain of 98.18m with 0.3m of vertical freeboard was found to be smaller than the valley feature and the woodland governed development limits. It was also found that the Sawmill Creek spill area will not affect the proposed development. In accordance with the studies, a 10m setback is provided from the long-term stable top of slope (LTSTOS), which define the north and west development limits, and a variable buffer from the delineated woodland dripline is provided, ranging from 1.8m to 13.7m, which define the south and east development limits.

Considering all development setbacks, the total development area is 1.06ha, which was used for the purposes of watermain and sanitary servicing design for the proposed development.

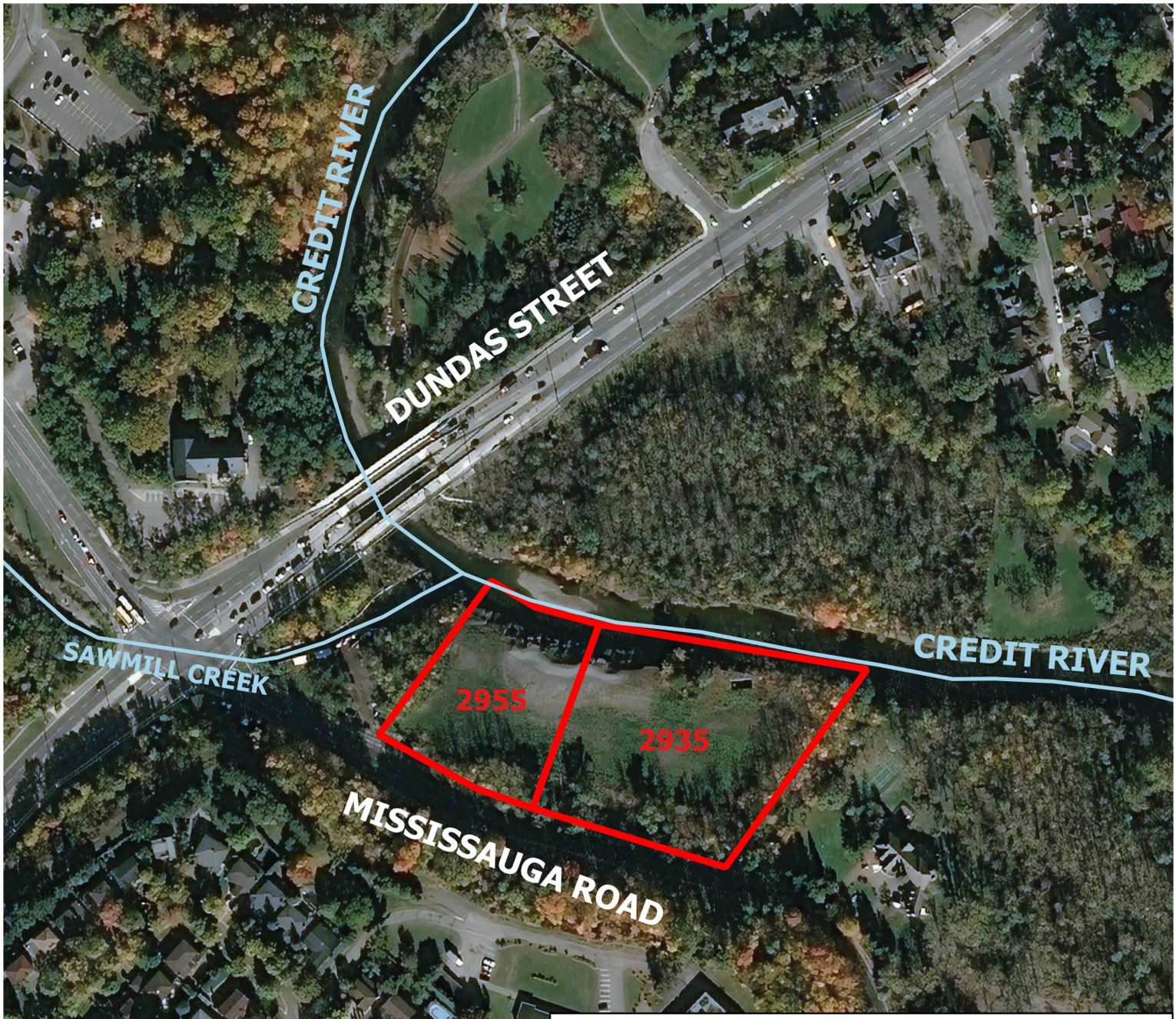


Figure 1: Site Location Plan

2935, 2955 Mississauga Road, City of Mississauga
Project No.20-697

0 50 100 m

N

NAD 1983 UTM Zone 17N

Legend

- 2935, 2955 Mississauga Road - Approximate Property Limits
- Watercourse

Greck

April 2021

Basemap Image Bing Maps 2021

2.0 PROPOSED DEVELOPMENT

The proposed development is a mixed-use residential complex consisting of a 12-storey condo building, fifteen 3-storey stack townhouses, and a driveway with a roundabout providing access to the buildings. The development area for the site has been subdivided into two areas: 0.51 ha is associated with the condo development, and 0.55ha associated with the townhouses, for a total development area of 1.06ha. A site plan, prepared by Caricari Lee Architects, of the proposed development can be found in **Appendix A** and the proposed development population statistics can be found in **Table 2-1**.

TABLE 2-1: PROPOSED DEVELOPMENT POPULATION BREAKDOWN

Type of Development	Population Density *	Number of Units	Equivalent Population
Condo	3.0 persons per unit	196	588
Townhouses	3.3 persons per unit	15	50

* As per Region of Peel, Development Charges Background Study, December 2020

The proposed development will be serviced by extending and utilizing existing municipal sanitary and water services. Water services laterals will be provided by directly tapping into the existing 400mm diameter watermain on Dundas Street. Sanitary servicing will be provided by tapping into the 2250mm diameter sanitary trunk sewer on the east side of the property which crosses underneath the Credit River.

3.0 SITE GRADING

In general, after review of the topographic survey, the proposed grading is to generally maintain positive drainage from the proposed building towards the existing and proposed ditches. The majority of the proposed development will drain to the existing ditch that wraps around the south and east limits of the property, while landscaping and grassed areas on the north and west side of the building will drain towards a swale that drains to the west limit of the property. Earthmoving is required, to varying degrees, in order to achieve the municipal design criteria and accommodate the development form. Given existing topography and the proposed development plan, an overall fill is required. Only minor earth works are proposed within the provided setback buffers.

A grading plan has been provided in **Drawing GP1**, see **Appendix G**. The plan will follow municipal design standards, as required considering the following key design factors:

- Provide positive drainage from above ground structures/buildings,
- Match external grades,
- Meet minimum and maximum grades for landscape, roadways and swales,

- Achieve municipal lot grading criteria,
- Provide safe overland flow relief,
- Provide sufficient cover for underground infrastructure,
- Minimize requirements for retaining walls and
- Minimize grading and earthworks where necessary.

4.0 ROAD ACCESS

Road access to the proposed condo and townhouses will be facilitated by a singular 15.5m wide private roadway via Mississauga Road. In accordance with the City of Mississauga Standard 2220.010, Pavement and Road Base Design Requirements, the minimum pavement structure for the proposed road will be as follows in **Table 4-1**:

TABLE 4-1: PAVEMENT STRUCTURE

Material	***Thickness (mm)***
Asphalt	
Surface Course (HL3)	40
Basecourse (HL8)	85
Total Asphalt Depth	125
Base	
Granular A Base (OPSS 1010)	200
Granular B Type 1 Sub-Base (OPSS 1010)	235
Total Driveway Depth	**560**

The proposed road access will require the removal of an existing double inlet catchbasin on Mississauga Road. This will be replaced by two new double inlet catchbasins, DCB1 and DCB2, at both sides of the proposed driveway. Drainage collected by DCB1 and DCB2 will discharge uncontrolled into the ditch to the north via a 300mm diameter catchbasin outlet.

The details of the pavement structure is to be confirmed by the geotechnical consultant during detailed design, and detailed traffic planning will be provided by others as required.

5.0 WATER SERVICING

This section serves to provide anticipated water demands and required fire flow calculations in support of functional servicing.

5.1 WATER SUPPLY AND APPURTENANCES

As-built records as per the External Peel Asset Locator (EPAL) from the Region of Peel indicate that an existing 150mm diameter and 400mm diameter watermains are located

on Mississauga Road and Dundas Street West respectively. Email correspondence with the Region (provided in **Appendix B**) confirmed the following:

- As the development is classified as a high-density residential area, a minimum 300mm diameter watermain is required according to sizing standards from the Region of Peel;
- The development is not permitted to connect to the existing 150mm diameter watermain on Mississauga Road; and
- The Region of Peel has confirmed that the existing 400mm diameter watermain on Dundas Street has sufficient capacity to service the proposed development.

To service the proposed development, approximately 121m length of the existing 150mm diameter watermain, from the subject property to the 400mm diameter watermain on Dundas Street connection, will be replaced by a new 300mm diameter watermain. A single 200mm diameter watermain will provide the fire water service for the proposed development for fire protection. A tee and secondary 150mm diameter supply line branched at the property line will provide a domestic water supply for the condominium building. Both lines will include valves located at the property. The fire water service will have a backflow preventer per Region of Peel standards and a water meter will be located in the mechanical room on the domestic line within the building's basement level.

The domestic water service for the stacked townhouses for this project will be provided by teeing off a 200mm diameter watermain connected to the proposed 300mm diameter watermain, located near the proposed hydrant. This strategic approach ensures that we meet the internal looping criteria outlined in the Region of Peel standard STD 1-8-2, enhancing water supply reliability and redundancy within our development.

Hydrants shall be located within 90m horizontally of any portion of a building perimeter that is required to face a street. The fire department connection for an automatic sprinkler system shall be located so that the distance from the fire department connection to a hydrant is not more than 45m and located on the outside of a building adjacent to a street or an access route, not less than 300mm and not more than 900mm above ground level, and provided with two 65mm hose connections with female swivel hose couplings (as per Ontario Building Code Section 3.2.5.16).

The nearest existing hydrant is located on Mississauga Road, across the subject property approximately 270m southeast of the Mississauga Road and Dundas Street intersection. This hydrant is located farther than 45m from the proposed building fire department connection as required by the Ontario Building Code Section 3.2.5.16. Therefore, a new private hydrant is proposed within the development near the driveway access, as per Region of Peel Standard Drawing 1-8-3. Please see **Drawing SP1** for the Servicing Plan provided in **Appendix G**, for the proposed watermain and hydrant layout.

A detailed fire protection plan for the building will be undertaken during detailed design and supplemented by the building's mechanical engineer or fire system design consultant.

5.1.1 DOMESTIC WATER DEMANDS

The design criteria used to determine water demands were based on Region of Peel *Watermain Design Criteria - June 2010, Development Charges Background Study-December 2010,* and the Fire Underwriters Survey, as required. The proposed development includes a mixed-use residential complex consisting of a 12-storey condo building, fifteen 3-storey stack townhouses, and a driveway with a roundabout providing access to the building. Average Day Demand (ADD), Maximum Day Demand (MDD), and Peak Hour Demand (PHD) factors were calculated using demand peaking factors and population values as per Table 2 in Section 2.3 of the Region of Peel *Watermain Design Criteria*.

Based on the 12-story condominium building consisting of 196 units, and fifteen 3-storey stack townhouses, the proposed development has a theoretical design population of 638.

The estimated domestic water system demands for the proposed development of the subject property is summarized below in **Table 5-1**.

TABLE 5-1: PROJECT DOMESTIC WATER DEMANDS

Water Demand Rate	280 L/capita/day
Population Density	15 Units @ 3.3 persons/unit – Townhouses 196 Units @ 3.0 person per unit - Condo
Theoretical Population	638
Maximum Day Factor	2.0
Peak Hour Factor	3.0
Average Daily Demand (ADD)	123.96 L/min (2.07 L/s)
Maximum Daily Demand (MDD)	247.92 L/min (4.13 L/s)
Peak Hour Daily Demand (PHD)	371.88 L/min (6.20 L/s)

A detailed breakdown of the calculated demands can be found in **Appendix E**.

5.1.2 FIRE FLOW DEMANDS

Fire demands have been calculated using the *Water Supply for Public Fire Protection* (2020) prepared by Fire Underwriters survey (FUS). Detailed fire flow calculations are provided in **Appendix C**, and the results are summarized below in **Table 5-2**.

TABLE 5-2: RECOMMENDED FIRE FLOW

Proposed Building	Recommended Fire Flow (L/s)
Residential	116.67

From the fire flow calculations, it was determined that the recommended fire flow of 116.67 L/s is required for the proposed development.

5.1.3 TOTAL WATER DEMAND

Based on the total residential water demand and the fire flow requirements, the fire flow plus MDD is 120.80 L/s (116.67 L/s + 4.13 L/s).

6.0 SANITARY SERVICING

This section serves to provide anticipated sanitary demands and an overview of the proposed sanitary servicing in support of functional servicing.

There is no existing sanitary sewer servicing Mississauga Road, therefore, sanitary servicing will be provided for the proposed development by connecting to existing sanitary infrastructure located to the south of Dundas Street, which consists of a 2250mm diameter sanitary trunk sewer that runs southeast along the east side of the Mississauga Road. The existing 2250mm diameter sanitary trunk runs along Credit River and crosses the Credit River to the south of Dundas Street near the east limit of the development. The sanitary trunk sewer then continues to the south parallel to Mississauga Road.

Preliminary correspondence with the Region confirmed that the sanitary sewer to the south of Dundas Street has sufficient capacity to service the development and that only a gravity pipe connection would be permitted. See email correspondence with the Region is provided in **Appendix B**.

Greck has worked diligently for comprehensive discussion and consultation with the Region of Peel regarding the sanitary servicing for the subject development. The Region of Peel has recommended connecting the proposed sanitary servicing to the existing 2250mm diameter trunk sewer at existing sanitary manhole EX. SAN MH24, which is conveniently located on the private property to the east of our development site. Refer to email correspondence with the Region is provided in **Appendix B**. This recommendation aligns perfectly with both the Region's infrastructure plans and our project's goals, ensuring the efficient and regulatory compliance of sanitary services for our development. This strategic alignment not only fosters the seamless integration of our project within the existing regional infrastructure but also underscores our commitment to sustainable and responsible development practices.

For the purposes of sanitary connection, an 8-meter wide easement is being proposed to facilitate the connection of our development to the existing 2250mm diameter trunk sewer. It's important to note that we have adhered to the minimum cover depth requirements as per the Region of Peel standards. This ensures that the integrity and safety of the sewer system are maintained while accommodating the sanitary needs of our development. This sanitary easement, while passing through neighboring land parcels, has been designed with utmost consideration for minimizing any impact on adjacent properties, harmonizing our project's goals with responsible infrastructure development, and meeting all regional standards for compliance. We remain committed to a collaborative and sustainable approach that benefits both our development and the surrounding community.

A sampling sanitary maintenance manhole MH1A has been proposed at the future property line as per Region of Peel standard STD 2-4-3. Detailed cross sections and profiles showing the proposed sanitary sewer connection from existing sanitary manhole EX. SAN MH24, and the existing sanitary trunk sewer, to the proposed connection to the building are provided in **Drawing SP1**, see **Appendix G**.

6.1.1 SANITARY DESIGN PARAMETERS

The sanitary design parameters, as outlined in **Table 6-1,** for the proposed development are based on the municipal design criteria from the Region of Peel *Sanitary Sewer Design Criteria:*

TABLE 6-1 : SANITARY DESIGN PARAMETERS

Population Densities	Townhouses -15 Units @ 3.3 persons/unit Condo – 196 Units @ 3.0 person per unit
Area	Townhouses – 0.55ha Condo – 0.51ha
Population	638
Unit Domestic Sewage Flows	302.8 L/cap/day
Infiltration Rate	0.0002 m^3/s/ha
Minimum Flow Velocity	0.75 m/s
Maximum Flow Velocity	3.5 m/s
Minimum Sewer Pipe	250 mm dia.
Minimum Sewer Pipe Grade	0.5%
Minimum Sewer Depth of Cover (road)	2.50 m (min)
Minimum Sewer Depth of Cover (valley)	1.40 m (min)

6.1.2 SANITARY DEVELOPMENT DEMANDS

The sanitary demand has been calculated using the design parameters as described in **Section 6.1.1** and the results are summarized in **Table 6-2** below.

TABLE 6-2: PROPOSED RE-DEVELOPMENT SANITARY DEMAND SUMMARY

Area (ha)	Population (persons)	Average Daily Flow (L/s)	Harmon Peaking Factor	Peak Daily Flow* (L/s)	Infiltration Rate (L/s)	Total Design Flow (L/s)
1.06	638	2.24	3.92	13.00	0.49	13.49

*The Peak Daily Flow was calculated to be 8.76L/s. However, as per Region Standard Drawing 2-9-2, domestic sewage flow for less than 1000 persons should be 0.013m^3/s

The proposed development will produce a total sanitary demand of 13.49 L/s. Detailed sanitary development calculations can be found in the sanitary sewer design sheet provided in **Appendix D**.

7.0 DRAINAGE

Provided in this section is an outline of the preliminary drainage strategy for the proposed site plan and areas affected by the development. The proposed design will be in accordance with the City, Region, CVC, and MOECP standards and guidelines.

7.1 EXISTING DRAINAGE

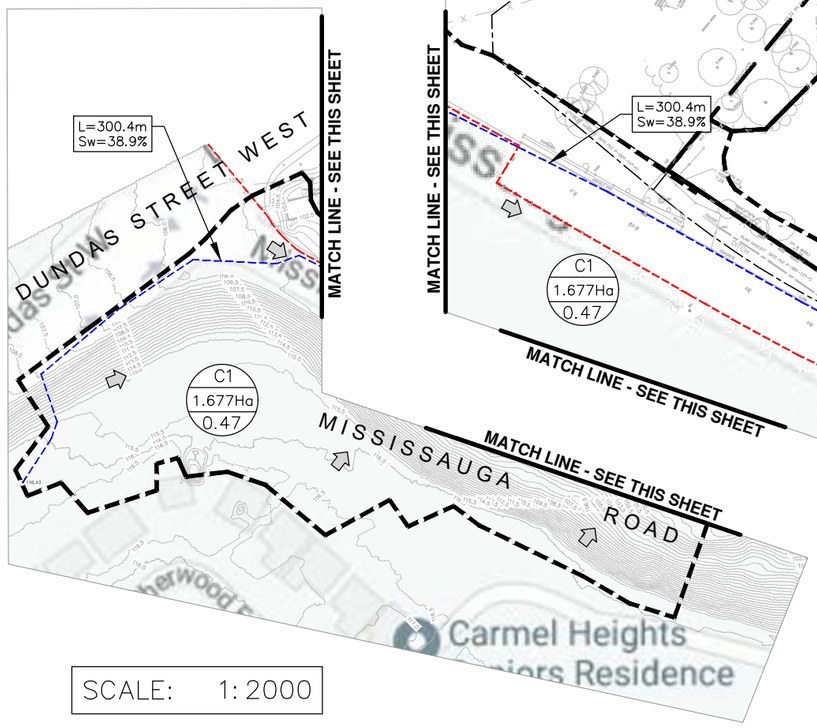
The existing drainage patterns are characterized by four (4) drainage areas: Area A1, B1, C2 and D1. Please see **Figure 2** below for the pre-development drainage area plan. Area D1 consists of the future development limits, while Area A1, B1, and C2 represents external drainage areas, that drain towards the proposed development. Area A1, B1, C2 and D1 is currently undeveloped/unimproved, vegetated land which currently drains in the southeast direction towards a ditch that wraps around the south and east limits of the property, ultimately directing runoff to the Credit River. Drainage area C1 represents a portion of external drainage via Mississauga Road draining towards the proposed access apron.

A summary of the pre-development land cover is provided below in **Table 7-1**.

TABLE 7-1: PRE-DEVELOPMENT LAND-USE SUMMARY

Surface	Runoff Coeff.	Area A1 (m^2)	Area B1 (m^2)	Area C2 (m^2)	Area D1 (m^2)	Coverage
Vegetated-Lawn	0.25	580	485	2204	8168	100%

The overall runoff coefficient of Area A1, B1, C2 and D1 was calculated to be 0.25 based on the City of Mississauga Development Requirements Manual, dated November 2020. For more details, please see **Appendix E**.



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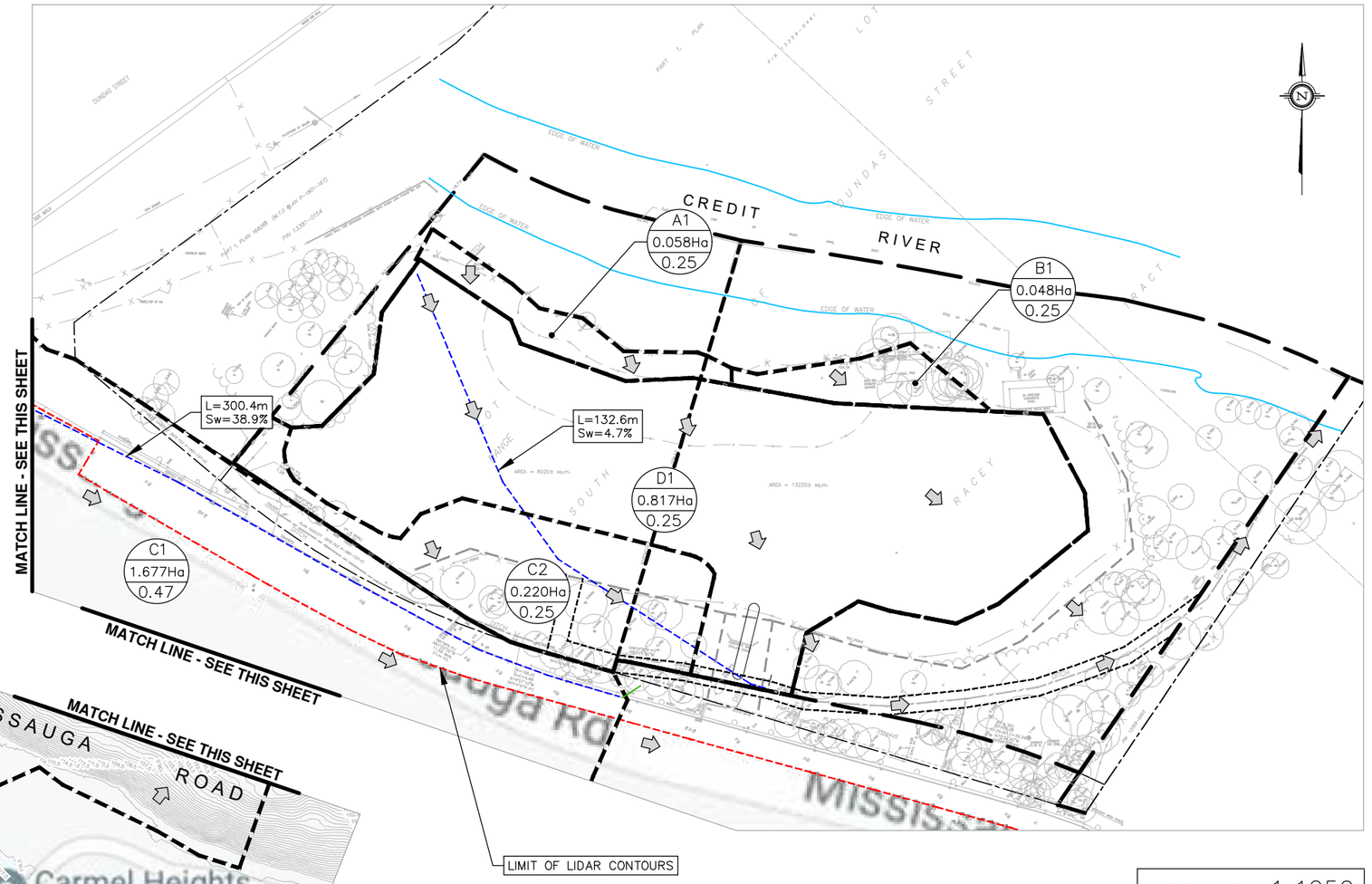

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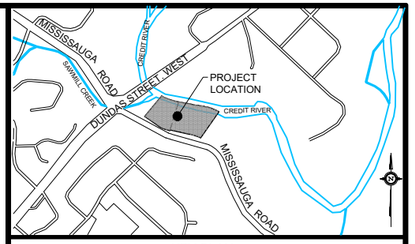
EXISTING CONDITIONS						
	ROOF (m^2)	DRIVEWAY (m^2)	HARDSCAPE (m^2)	GRASSED (m^2)	TOTAL (m^2)	RUNOFF COEFFICIENT
AREA A1	0.00	0.00	0.00	580.05	580.05	0.25
AREA B1	0.00	0.00	0.00	484.97	484.97	0.25
AREA C1	0.00	0.00	5595.38	11179.60	16774.98	0.47
AREA C2	0.00	0.00	0.00	2204.18	2204.18	0.25
AREA D1	0.00	0.00	0.00	8168.26	8168.26	0.25



KEY PLAN
N.T.S.

- MAJOR OVERLAND FLOW DIRECTION
- MAJOR CONTOUR LABEL – EXISTING
- MINOR CONTOUR LABEL – EXISTING
- STORM DRAINAGE BOUNDARY/LIMIT OF DEVELOPMENT
- LIMIT OF RIGHT-OF-WAY
- EDGE OF WATER
- PROPERTY LINE
- FUTURE PROPERTY LINE
- LOT LINE
- LONGEST TRAVEL PATH
- FOREST DRIP LINE
- EXISTING DITCH

A1 / 0.676Ha / 0 — DENOTES AREA NUMBER; DENOTES AREA IN HECTARES; DENOTES PERCENT IMPERVIOUS

BENCHMARK

BENCHMARK: CITY OF MISSISSIAUGA No. 58
ELEVATION = 108.293m
LOCATION: CITY OF MISSISSAUGA
DATED: DEC 10, 2019

COMPLETED BY:
TARASICK McMILLAN KUBICKI LTD.
ONTARIO LAND SURVEYORS
4181 SLADVIEW CRESCENT, UNIT 42, MISSISSAUGA,
ONTARIO L5L 2R2
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CLIENT NAME:
590816 ONTARIO INC.
2616 CYNARA ROAD
MISSISSAUGA, ON L5B 2R7

PROJECT NAME:
2935 & 2955 MISSISSAUGA ROAD
MISSISSAUGA, ON

EXISTING STORM DRAINAGE AREAS

DESIGNED BY: E.P.	SCALES:	PROJECT No.	20-697
CHECKED BY: E.G.	HORIZONTAL: AS SHOWN	DRAWING No.	FIG-2
DRAWN BY: K.M.	VERTICAL: N/A	SHEET No.	1
DATE: OCT 10, 2023	SHEET SIZE: 11"x17"		

7.1.1 EXTERNAL DRAINAGE AREA

LiDAR topographic information titled LiDAR DTM GTA 2015 Package B was obtained from Land Information Ontario to conduct an external drainage assessment. The subject property receives external drainage from the southwest side of the subject property. The external drainage area is delineated as Area C1 as illustrated in the pre-development drainage area plan provided in **Figure 2.** Area C1 consists of forested areas and the Mississauga Road right of way. Mississauga Road is superelevated, directing runoff from the forested areas and the Mississauga Road right of way northeast towards catchbasins placed along the east side of Mississauga Road. The catchbasin leads discharge directly towards the ditch that wraps around the south and east limits of the subject property.

A summary of the external drainage area land cover is provided below in **Table 7-2**. External land-use areas were estimated using aerial topography via Google Earth.

TABLE 7-2: EXTERNAL DRAINAGE AREA LAND-USE SUMMARY

Surface	Runoff Coeff.	Area C1 (m^2)	Coverage
Asphalt/Hardscape	0.90	5595	33%
Vegetated-Lawn	0.25	11180	67%
Total	0.47	16775	100%

7.2 PROPOSED DRAINAGE

Under proposed conditions, the subject site has been delineated into seven (7) drainage areas: Area A1, A2, B1, B2, C2, D1, and D2. Please see **Figure 3** below for the post-development drainage area plan.

Area D1 and D2 consists of the proposed development. Area D1 consists of a mixed-use residential complex consisting of a 12-storey condo building, fifteen 3-storey stack townhouses, and the majority of the driveway with a roundabout providing access to the building. Runoff from Area D1 is collected by roof drains and floor drains which will drain to the building's internal storm sewer system and connects to the external storm sewer system at the south side of the proposed condo building. Runoff from the storm sewers ultimately discharge overland onto a rip-rap apron spreader near the south limit of the site and sheet flows through vegetated areas towards the existing ditch that wraps around the south and east limits of the property. Area D2 consists of the remaining portion of the driveway which is serviced by catchbasins and outlets to the existing ditch that wraps around the south and east limits of the property.

Area A1 and B1 consists of the drainage area outside of the development limits, and Area A2 and B2 represents the drainage area located between the proposed development and the erosion or ecological hazard limits, designated as a “buffer” zone. The land cover for Area A1, A2, B1, and B2 consists of vegetated and landscaped areas which drain south towards the proposed development.

Runoff generated from Area A1 and A2 are intercepted by a proposed swale that runs along the north to west perimeter of the development, conveying drainage to the west towards an existing 1.1m diameter concrete culvert outlet at the west limit of the site, which discharges into the Sawmill Creek outfall. This increases flows directed to the concrete culvert outlet compared to existing conditions. However, the 100-year flow rate generated from Area A1 and A2 is 17.9L/s, which is minimal, and is considered to have a negligible impact to erosion and the conveyance capacity of the existing outlet. The slope from the swale outlet to the existing culvert outlet is 9%, therefore, to protect the steep valley slopes from erosion, a 0.3m deep, 150mm diameter rip-rap apron spreader is still proposed at the ditch outlet to mitigate erosion.

The runoff from Area B1 and B2 is conveyed along the north to east limit of development by a proposed swale, which naturally drains to the east towards the existing ditch that wraps around the south and east limits of the property, ultimately directing runoff to the Credit River.

Area C2 is to remain mostly unchanged under proposed conditions, with only minor grading proposed. Area C2 consists of forested area which drains southeast towards the culvert under the proposed driveway. The proposed culvert is sized to accommodate runoff from both drainage areas C1, C2, D1, and D2. For culvert sizing calculations please see **Section 7.2.3** below.

A summary of the post-development land cover is provided below in **Table 7-3.**

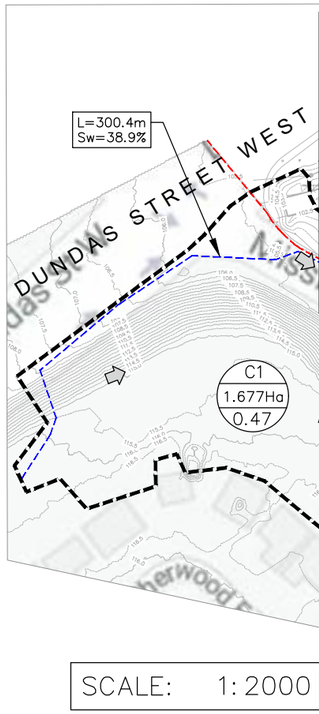
TABLE 7-3: POST-DEVELOPMENT LAND-USE SUMMARY

Surface	Runoff Coeff.	A1 (m^2)	A2 (m^2)	B1 (m^2)	B2 (m^2)	C2 (m^2)	D1 (m^2)	D2 (m^2)	Coverage
Roof	0.90	0	0	0	0	0	2144	0	19%
Asphalt	0.90	0	0	0	0	0	765	310	9%
Hardscape	0.90	0	0	0	0	0	1328	0	12%
Vegetated-Lawn	0.25	580	1511	485	1338	2204	734	38	60%
Total	0.51	580	1511	485	1338	2204	4972	348	100%

The overall runoff coefficient of the proposed site was calculated to be 0.51 based on the City of Mississauga Development Requirements Manual dated November 2020. For more details, please see **Appendix E**.

The proposed storm sewers and swales are sized for the 100-year event, the storm sewer design sheet and swale capacity calculations are provided in **Appendix E**.

The proposed storm sewer outfall servicing all impervious development area is to be protected with 0.5m thick, 150mm diameter rip-rap apron which has been sized for the 100-year runoff generated from Area D1. For more rip-rap sizing details please see **Appendix E**.



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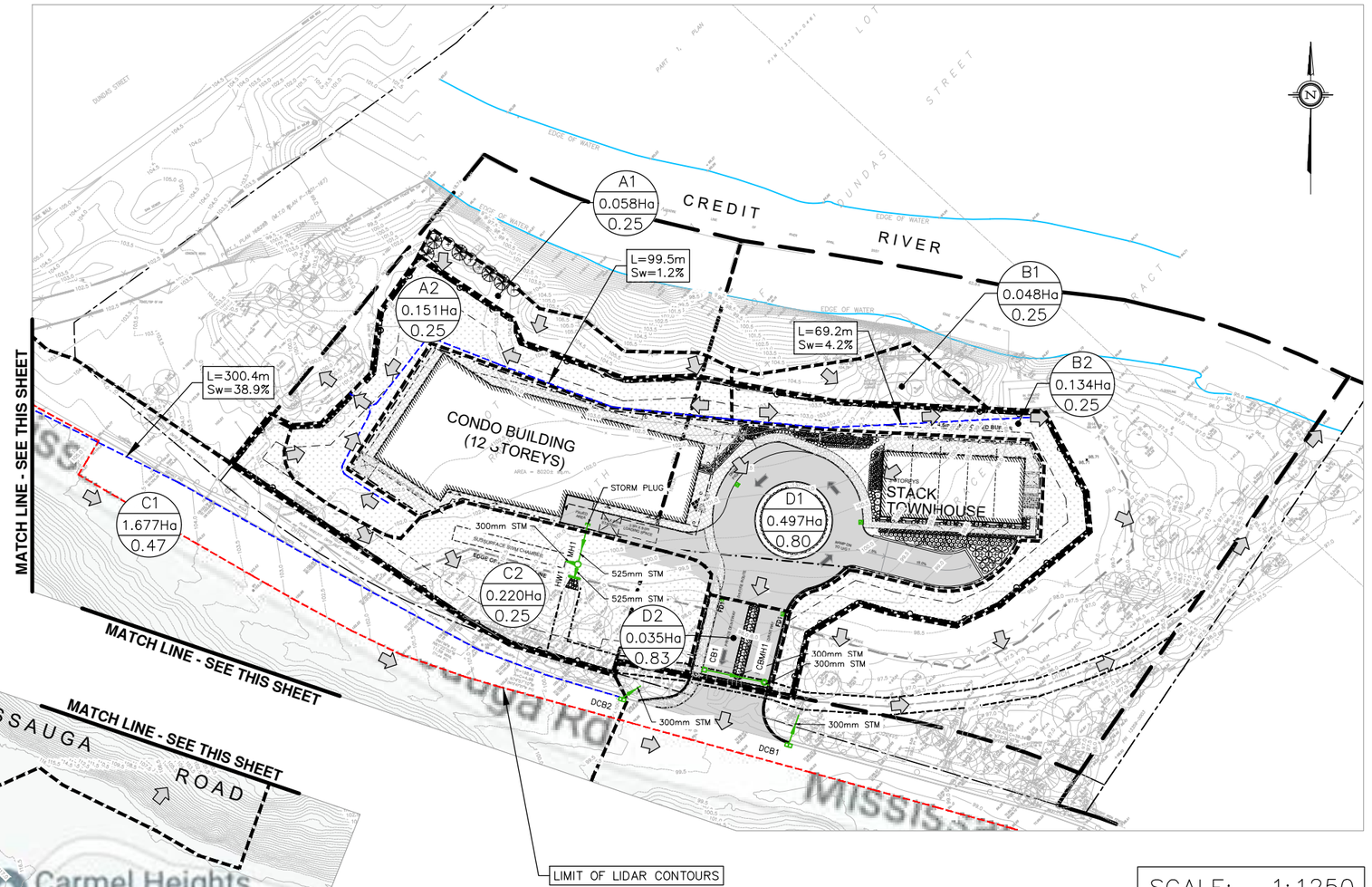

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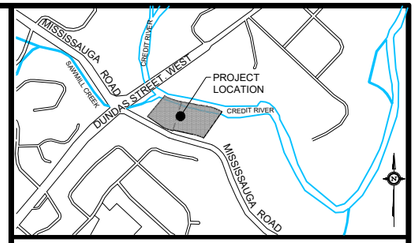
PROPOSED CONDITIONS						
	ROOF (m^2)	DRIVEWAY (m^2)	HARDSCAPE (m^2)	GRASSED (m^2)	TOTAL (m^2)	RUNOFF COEFFICIENT
AREA A1	0.00	0.00	0.00	580.05	580.05	0.25
AREA A2	0.00	0.00	0.00	1510.97	1510.97	0.25
AREA B1	0.00	0.00	0.00	484.97	484.97	0.25
AREA B2	0.00	0.00	0.00	1337.81	1337.81	0.25
AREA C1	0.00	0.00	5595.38	11179.60	16774.98	0.47
AREA C2	0.00	0.00	0.00	2204.18	2204.18	0.25
AREA D1	2144.47	764.94	1328.27	734.20	4971.88	0.80
AREA D2	0.00	309.66	0.00	37.94	347.60	0.83



KEY PLAN
N.T.S.

- MAJOR OVERLAND FLOW DIRECTION
- MAJOR CONTOUR LABEL – EXISTING
- MINOR CONTOUR LABEL – EXISTING
- STORM DRAINAGE BOUNDARY/LIMIT OF DEVELOPMENT
- LIMIT OF RIGHT-OF-WAY
- EDGE OF WATER
- PROPERTY LINE
- FUTURE PROPERTY LINE
- LOT LINE
- LONGEST TRAVEL PATH
- PROP. CONCRETE RETAINING WALL
- PARKING GARAGE / CONCRETE WALL
- FOREST DRIP LINE
- EXISTING DITCH
- MH1 STORM MANHOLE
- FD FLOOR DRAIN
- CB SINGLE CATCHBASIN
- DCB DOUBLE CATCHBASIN
- A1 / 0.676Ha / 0 — DENOTES AREA NUMBER / DENOTES AREA IN HECTARES / DENOTES PERCENT IMPERVIOUS

BENCHMARK

BENCHMARK: CITY OF MISSISSIAUAGA No. 58
ELEVATION = 108.293m
LOCATION: CITY OF MISSISSAUGA
DATED: DEC 10, 2019

COMPLETED BY:
TARASICK McMILLAN KUBICKI LTD.
ONTARIO LAND SURVEYORS
4181 SLADVIEW CRESCENT, UNIT 42, MISSISSAUGA,
ONTARIO L5L 2R2
(905) 569-8849

Greck
5770 Highway 7, Woodbridge, Ontario, L4L 1T8 www.greck.ca

CLIENT NAME:
590816 ONTARIO INC.
2616 CYNARA ROAD
MISSISSAUGA, ON L5B 2R7

PROJECT NAME:
2935 & 2955 MISSISSAUGA ROAD
MISSISSAUGA, ON

PROPOSED STORM DRAINAGE AREAS

DESIGNED BY: E.P.	SCALES:		PROJECT No. 20-697
CHECKED BY: E.G.	HORIZONTAL:	1:1000	DRAWING No. FIG-3
DRAWN BY: K.M.	VERTICAL:	N/A	SHEET No. 2
DATE: OCT 10, 2023	SHEET SIZE:	11"x17"	

7.2.1 EXTERNAL DRAINAGE

The land cover and drainage path of external drainage Area C1 remains unchanged under post-development conditions. The external drainage area is delineated as Area C1 as illustrated in the post-development drainage area plan provided in **Figure 3**. The runoff generated from Area C1 is collected by the proposed double ditch inlet catchbasin (DCB2) located on Mississauga Road at the west side of the new driveway. The catchbasin lead discharges directly to the existing ditch, towards Area C2. Drainage from Area C1 and C2 is then conveyed underneath the new driveway via a proposed 675mm diameter CSP culvert. For culvert sizing calculations please see **Section 7.2.3** below.

7.2.2 PRE AND POST DEVELOPMENT FLOW COMPARISON

In accordance with the City of Mississauga Design Requirements, runoff flows are to be calculated using the Rational Method. The equation is as follows: Q = 0.0028 C I A. The rational method equation is based on the runoff coefficient (C), drainage area in hectares (A), and rainfall intensity in mm/hr (I).

IDF values were used from the City of Mississauga Development Requirements to generate the rainfall intensity for the 2-year and 100-year storm event. These IDF curves are a function of the time of concentration, therefore, in order to determine rainfall intensity, the time of concentration is required to be calculated. Depending on the runoff coefficient of the drainage area, Bransby or the Airport method is used to calculate the time of concentration. Detailed calculations are provided in **Appendix E**.

Calculated pre-development and post-development flows are summarized below in **Table 7-4**.

TABLE 7-4: PRE-DEVELOPMENT AND POST-DEVELOPMENT FLOW COMPARISON

Existing			Proposed		
Drainage Area	**2- year (L/s)**	**100-year (L/s)**	**Drainage Area**	**2- year (L/s)**	**100-year (L/s)**
A1+B1+D1	33.1	97.3	**A1 + A2**	6.1	18.1
			B2 + B2	7.8	22.8
			D1 + D2	71.3	209.4
C1 + C2	200.3	584.1	**C1 + C2**	200.3	584.1
Total	**233.4**	**681.3**	**Total**	**285.5**	**834.4**

Table 7-4 shows that there is a net increase in peak runoff due to the increase in impervious area (building area).

Capacity calculations were completed to ensure all proposed swales can convey the 100-year flow generated from their respective drainage areas. See **Appendix E** for capacity calculations.

7.2.3 DRIVEWAY CULVERT

A driveway is proposed to provide access to the proposed development from Mississauga Road. Fill works are required in the existing ditch to accommodate the proposed driveway. To provide safe conveyance of flows underneath the driveway, a culvert was sized to convey the 100-year flow from Area C1, C2, D1, and D2. The 100-year flow was calculated using the Modified Rational Method, and a hydraulic assessment was conducted on PCSWMM to determine an appropriate culvert size. The above analyses assume that the entirety of runoff from 100-year storm event is conveyed towards the proposed culvert. This is conservative, as discharge from Drainage Area C1 would be conveyed via major overland flow in a southeast direction down Mississauga Road. See **Appendix E** for the proposed driveway culvert sizing calculations.

The summary of the culvert sizing assessment is provided in **Table 7-5** below, and the PCSWMM modelling can be provided upon request.

TABLE 7-5: DRIVEWAY CULVERT SIZING SUMMARY

Drainage Area (ha)	100-year flow (L/s)	Freeboard Provided (m)
2.4	793.4	0.60

The proposed culvert is a 21m long 675mm diameter CSP pipe with a slope of 5.2%, an upstream invert elevation of 98.16m, and a downstream invert elevation of 97.08m. The 100-year flow will be contained within the existing ditch and provide a 0.60m freeboard from the proposed driveway crown.

8.0 STORMWATER MANAGEMENT

The following SWM criteria is to be addressed in accordance with regulatory policy:

- Water quality
- Water quantity
- Erosion control
- Water balance

The proposed SWM strategy includes considerations for water quality control, erosion control, and water balance for the site. The proposed SWM strategy includes a treatment train approach featuring the following SWM controls:

- OGS unit
- Underground stormwater chambers
- Rip-rap flow spreader, and a vegetated filter strip

Runoff generated from the building, and the driveway will be collected by the building's internal storm sewer system where runoff is treated by a proposed Oil and Grit Separator (OGS) unit, then conveyed to the external storm sewer system connection at the south side of the building, which drains to underground infiltration chambers. When the chambers are at capacity, the stormwater is redirected to the storm sewer outlet, where runoff discharges overland onto a rip-rap apron spreader and sheet flows through vegetated areas towards the existing ditch that wraps around the south and east limits of the property, which ultimately discharges into Credit River. This process is discussed in greater detail in the following sections below.

8.1 WATER QUALITY

The required suspended solids removal treatment is MOE Enhanced Protection Level (Level 1). This corresponds to a long-term average removal of 80% of total suspended solids (TSS). Water quality volumes (WQV) were determined from Table 3.2 of the Ministry of Environment Stormwater Management Planning and Design Manual. The required WQV is a function of percent imperviousness of the drainage area, see **Table 8-1**.

Stormwater from the development will be characterized by runoff from roofs, hardscape areas, landscape areas, and the driveway. The main contaminants of concern being:

- Suspended sediments
- Phosphorous
- Other (oil, grease, gas, temperature)

Roof drainage and other hardscape areas other than a driveway or roadway are considered clean and therefore, require no quality controls. Runoff from the driveway and areas with vehicular traffic contribute the most contaminants including oils and grit. Most notably during a rainfall's first flush. As such, water quality controls are only required for the driveway areas within Area D1 and D2. However, to be conservative, the entirety of Area D1 and D2 was considered for the water quality volume calculation summarized in **Table 8-1**.

TABLE 8-1: WATER QUALITY VOLUME SUMMARY

Drainage Area (Area D1 and D2)	5319m^2
Imperviousness	85%
Unitary Volume (to achieve 80% TSS removal)	39.8m^3/ha
Required Water Quality Volume	21.2m^3

A treatment train approach is proposed for capturing and treating contaminated runoff from Area D1:

- First, driveway runoff is captured by floor drains which is conveyed to the building's internal storm sewer system and treated by a Stormceptor EF6 OGS unit (or approved equivalent) proposed within the building, which will provide stormwater treatment by trapping free oils and floatable solids and settling any captured sediment, prior to discharge towards the external storm sewer system. The OGS has been sized to provide 60% TSS removal based on the CA ETV Size Distribution. To be conservative, it is assumed that the OGS will only provide 50% TSS removal.

- Secondly, the CULTEC Recharger 330XLHD underground infiltration chambers (or approved equivalent) will capture and retain stormwater, from the internal building storm sewer system for infiltration. The infiltration chambers have been designed with a sump such that the WQV is retained and infiltrated. A total volume of 24.1m^3 is infiltrated within 48 hours, exceeding the WQV requirement of 21.2m^3 for Area D1 and D2. The infiltration chamber only services Area D1 but is conservatively sized to account for Area D2. Once the infiltration chamber is at capacity, stormwater is redirected towards the storm sewer outlet. More details on the infiltration chambers are provided in **Section 8.3**.

- Thirdly, the storm sewer system discharges into the existing ditch that wraps around the south and east limits of the property via a rip-rap flow spreader. The

existing ditch is vegetated, which acts as vegetated filter strip which will provide a tertiary opportunity for sediment capture and deposition before discharging into the Credit River.

The OGS, infiltration chamber, and vegetated filter strip will provide a total of 95% TSS removal for Area D1.

Runoff generated from Area D2 will be collected by catchbasins, and outlet into the existing ditch that wraps around the south and east limits of the property. A debris/sediment trap is proposed in CB1 and CBMH1 to prevent suspended solids from entering the outlet pipe and allow it to settle within the sump of the catchbasin. A 600mm deep sump is proposed at CB1 and CBMH1 to allow for the settling of debris and sediment. If maintained, sediment traps and catchbasin filters can provide 50% TSS removal. Details regarding the catchbasin filters and sediment traps will be provided in detailed design.

The proposed water quality controls for Area D1 and D2 will provide an average % TSS removal of 92% which exceeds the required 80% TSS removal.

Specific details regarding the OGS sizing report, infiltration chambers, and water quality calculations are provided in **Appendix E** and the drawings located in **Appendix G**.

8.2 WATER QUANTITY

As per the Credit Valley Conservation Stormwater Management Criteria dated August 2012, the subject property ultimately drains to a segment of the Credit River, where quantity controls are not required, and therefore is not proposed on site.

8.3 EROSION CONTROL

The CVC Erosion Control Criteria requires that 5mm of on-site retention be provided for impervious surfaces. Based on a total development impervious area of 4547m^2 (Proposed Drainage Area D1 and D2), this equates to a required retention volume of 22.7m^3. Erosion controls will be provided for D1 by the proposed infiltration chambers. No erosion controls are proposed for Area D2, however, to compensate for this, the proposed infiltration chambers are oversized.

See **Table 8-2** below for a summary of erosion control volume requirements and the storage provided by the infiltration chambers during the 5mm storm event.

TABLE 8-2: EROSION CONTROL VOLUME SUMMARY

Area	Impervious Area (m^2)	Required Volume (m^3)	Provided Volume (m^3)
Area D1 and D2	4547	22.7	24.1

The proposed infiltration chambers will provide a total of 24.1m^3 of subsurface storage. This is greater than the required retention volume of 22.7m^3.

24 units of the CULTEC Recharger 330XLHD chambers (or approved equivalent) occupying an area of 90.8m^2, are proposed on the southwest corner of the development, which provides 24.1m^3 of subsurface storage. Erosion control and infiltration chamber sizing calculations are provided in **Appendix E**.

Based on the test pit investigation conducted by Terraprobe on July 22 and 27, 2015, the percolation rates determined on site ranged from 20 min/cm to 35 min/cm. To be conservative, a 35 min/cm (17mm/hr) percolation rate was used for drawdown calculations. In addition to this, a 2.5 factor of safety was applied to the percolation rate which resulted in a design percolation rate of 7mm/hr. The underground infiltration chambers will infiltrate the 24.1m^3 in 46 hours which meets the maximum drawdown time of 48 hours required by CVC. Drawdown time calculations are provided in **Appendix E**.

8.4 WATER BALANCE

Urbanization increases impervious cover which, if left unmitigated, results in a decrease in infiltration. This infiltration reduces groundwater recharge and soil moisture replenishment. It also reduces stream baseflow needed for sustaining aquatic life. Therefore, it is important to maintain the natural hydrologic cycle. Groundwater recharge helps maintain aquifer water levels and supports significant watershed features that are necessary components to the maintenance of a healthy watershed. As a result, a water balance analysis is required to estimate the pre-development and post-development infiltration and runoff.

The subject property is located within an Environmentally Sensitive Area as classified by the City, and CVC. Therefore, according to CVC SWM Water Balance criteria, the pre-development groundwater recharge rates are to be maintained. As such, a site-specific water balance assessment is required.

A site-specific water balance was completed for the development area delineated by Area A2, B2, D1, and D2, using the MOE's "Stormwater Management Planning and Design Manual", March 2003. This approach uses the method developed by Thornthwaite and Mather.

A summary of the pervious and impervious areas is provided below in **Table 8-3**

TABLE 8-3: EXISTING AND PROPOSED LAND COVER

Area	Existing (m^2)	Proposed (m^2)
Pervious	8168	3621
Impervious	0	4547

The parameters used for the water balance analysis are provided in **Table 8-4**.

TABLE 8-4: MOE WATER BALANCE INFILTRATION PARAMETERS

	Comment	Factor
Topography	Hilly Land	0.1
Soils	Open Sandy Loam	0.2
Cover	Cultivated Land	0.1

A total deficit volume of 366.4m^3/year will not be infiltrated into the ground given the proposed development plan and resulting change in pervious cover. As such, this annual volume must be balanced and infiltrated back into the ground under proposed conditions.

The water balance target of 366.4m^3/year will be provided through the subsurface infiltration chambers throughout the property.

The infiltration chambers have been sized to capture 5mm of rainfall to meet erosion control requirements, which represents approximately 55% of all rainfall events in a given year (City of Toronto Wet Weather Flow Management Guidelines Figure 1b, November 2006).

An impervious annual surplus of 726mm was applied due to the lack of evapotranspiration on impervious areas such as roofs or driveways, however, it is assumed 10% of the precipitation is evaporated.

Based on an annual impervious surplus factor of 726mm per year, the annual infiltration volume towards the infiltration chambers equates to 1774m^3 per year with a total site-wide infiltration of 2065m^3. However, a factor of safety of 1.5 was applied to the total infiltrated chamber volume, in the event that infiltration does not occur as efficiently, due to soil saturation, partially full chambers from previous rainfall events, or unexpected in-situ soil conditions. This equates to an annual chamber infiltration volume of 1242m^3 for a total site-wide infiltration of 1474m^3, therefore exceeding pre-development conditions.

A summary of the infiltration volumes is provided in **Figure 8.1**.

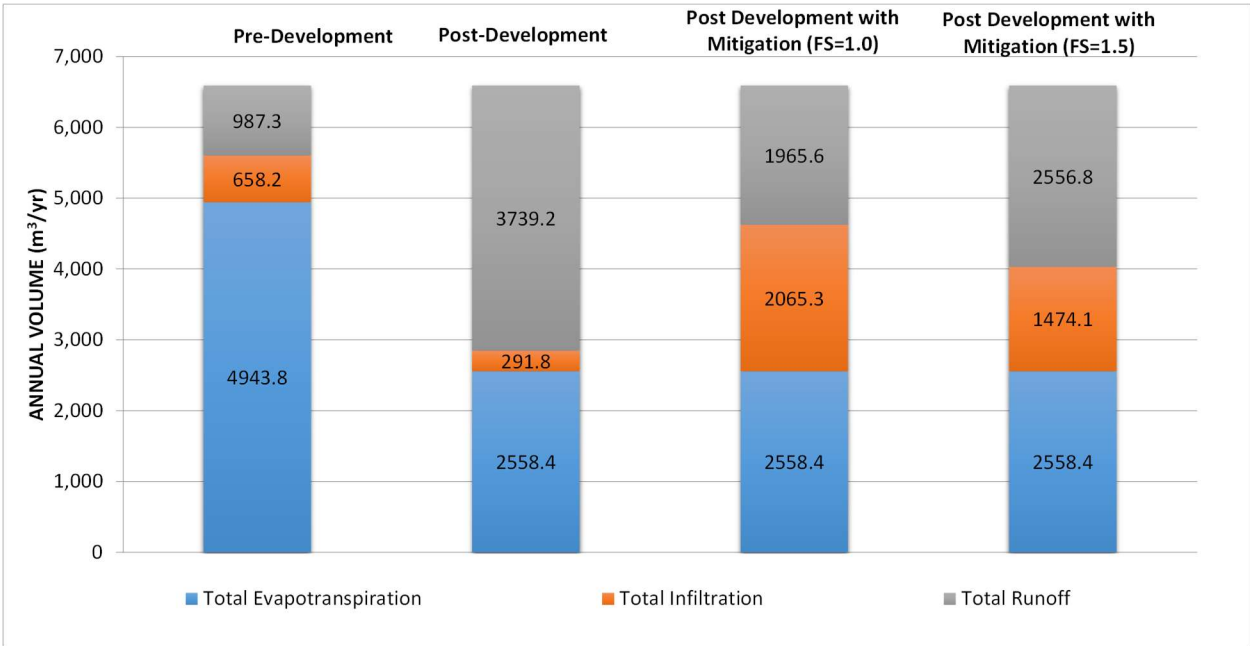


FIGURE 8.1: WATER BALANCE SUMMARY

As such, the application of the infiltration chambers achieves a net increase in overall infiltration, which meets CVC's criteria of maintaining pre-development infiltration levels. For water balance calculations, please see **Appendix E**.

8.5 OPERATIONS AND MAINTENANCE

The rate at which sediments enter the system will determine the longevity and performance of the proposed treatment train. Overtime, sediment will fill the sumps of the catchbasins, catchbasin manholes, storm manholes, and with improper maintenance and care, can overflow and clog the storm sewer system. The OGS unit will also have to be maintained in order to prevent a reduction in performance. Therefore, regularly scheduled inspection and maintenance is recommended in order to prolong the longevity and performance of the treatment train. The following items are recommended:

- The driveway, hardscaped areas, and riprap apron spreaders should be regularly inspected for debris and trash accumulation on the surface and disposed of as necessary.
- The sumps of the catchbasins, catchbasin manholes, storm manhole, and the OGS unit should be inspected every six months for the first year to determine the pollutant accumulation rate. In subsequent years, inspections can be based on

observations. The sumps are recommended to be cleaned using a vacuum truck annually.

- Maintenance for the underground chambers should be minimal if the upstream OGS is inspected and cleaned regularly. Therefore, maintenance for the underground chambers should not be required. However, scheduled inspections are still recommended to assess the underground chambers for any sediment build up. Visual inspections can be done by accessing upstream MH1 or the proposed chamber inspection ports. If the depth of sediment within the chambers is in excess of 3 inches, the chambers must be cleaned out. This can be done by backflushing and vacuuming the chambers with high pressure water using a culvert cleaning nozzle from upstream MH1.

If maintenance is required, the maintenance of the catchbasin, catchbasin manhole, storm manhole, and OGS unit should be coordinated and scheduled at the same time. After the first year, it is recommended to inspect all the above items on an annual basis (rip rap apron, catchbasin manholes, catchbasins, storm manholes, OGS unit, and underground chambers).

See **Appendix F** for operation and maintenance guides, checklists and recommendations provided by the suppliers for additional information.

9.0 EROSION AND SEDIMENT CONTROL

Erosion and sediment controls (ESC) will be implemented for all construction activities, including topsoil striping, material stockpiling, pavement construction, and grading operations. Design details will include a phased approach to minimize disturbance including considerations for restoration. Significant site excavation is anticipated during construction due to the 2 levels of proposed underground parking. During this time, a combination of sediment traps and pumping to silt sacks are proposed to dewater the site accounting for clean groundwater seepage and rainfall. Considering the size of the building footprint, during building construction, heavy duty silt fencing and local dewatering will be the main controls for sediment control as exposed earth will be minimal, if not contained within the excavation pit. The groundwater seepage rate and the required pumping rate will be determined in detailed design by consulting with the hydrogeological engineer.

An Erosion and Sediment Control Plan will be provided during detailed design.

10.0 CONCLUSIONS

As presented in this report, the proposed development will meet the following municipal and provincial standards and regulations specified for:

- General site grading;
- Water distribution
- Sanitary sewer servicing;
- Utilities
- Stormwater management; and
- Construction erosion and sediment controls

In summary, it has been determined that the development can be serviced with existing and proposed infrastructure that is in accordance with policies and guidelines required by the City of Mississauga and other regulating agencies.

11.0 REFERENCES

City of Mississauga – Development Requirements Manual – November 2020

Credit Valley Conservation – Stormwater Management Criteria- August 2012

Fire Underwriters Survey – Water Supply for Public Fire Protection - 1999

Ministry of the Environment – Stormwater Management Planning and Design Manual – March 2003

Ministry of the Environment – Design Guidelines for Drinking Water Systems – 2008

Ministry of the Environment – Design Guidelines for Sewage Works – 2008

Region of Peel – Sanitary Sewer Design Criteria – March 2017

Region of Peel – Watermain Design Criteria – June 2010

APPENDIX A

Site Plan and Topographic Survey

APPENDIX B

Region of Peel Correspondence

APPENDIX C

Watermain Calculations

APPENDIX D

Sanitary Calculations

APPENDIX E

Stormwater Management Calculations

APPENDIX F

Operation and Maintenance Guidelines

APPENDIX G

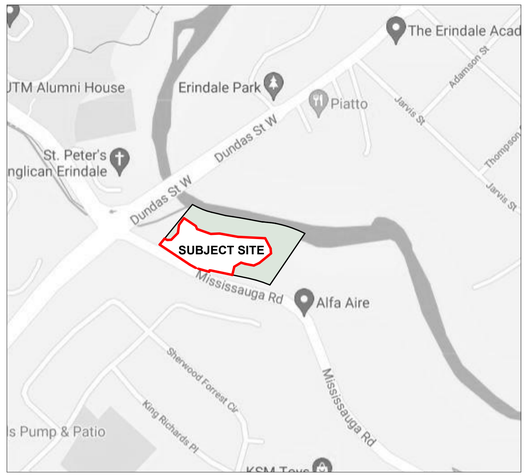
Engineering Drawings

APPENDIX H

Engineering Drawings

APPENDIX A

Site Plan and Topographic Survey

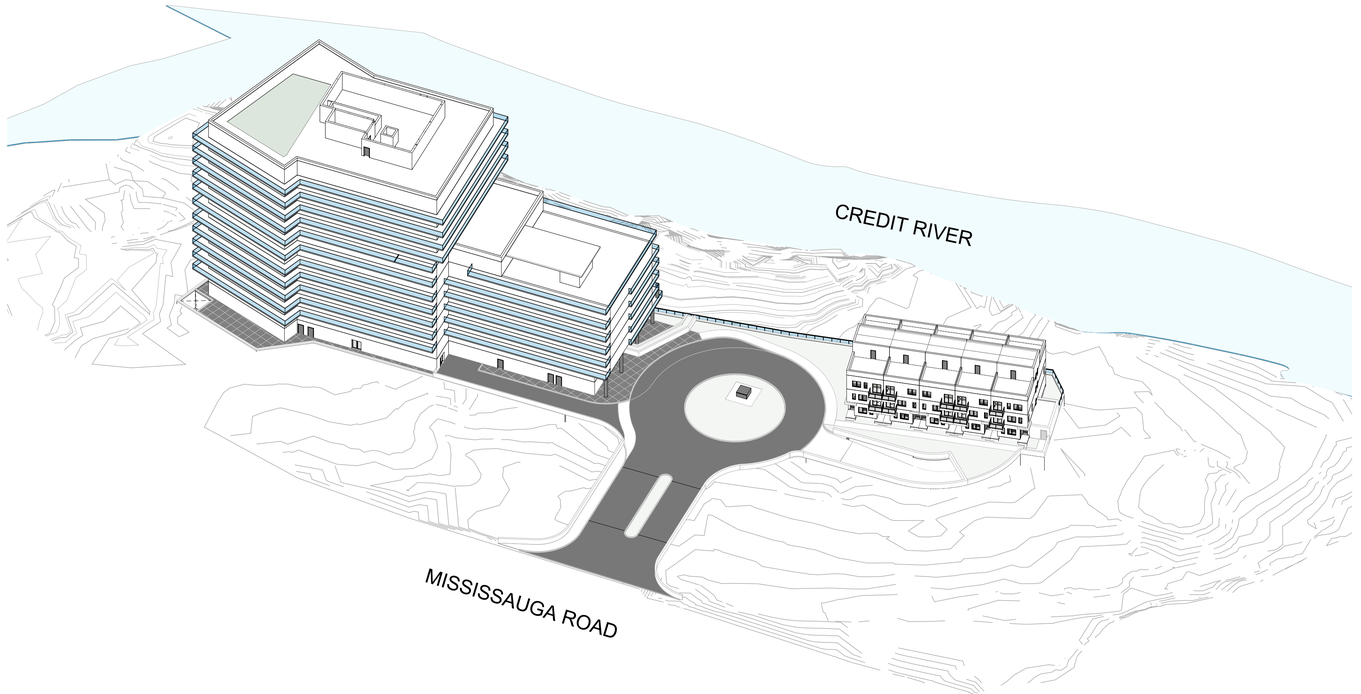


N

LOCATION MAP

DD DRAWING LIST

NO.	NAME
A 0.00	COVER SHEET
A 0.01	PROJECT STATISTICS
A 1.00	EXISTING SURVEY
A 1.30	CONTEXT PLAN / SITE PLAN (ROOF)
A 1.31	SITE PLAN (GROUND)
A 2.01	U/G LEVEL P3
A 2.02	U/G LEVEL P2
A 2.03	U/G LEVEL P1
A 2.04	LEVELS 1 + MEZZANINE
A 2.05	LEVELS 2 & 3-6
A 2.06	LEVELS 7 & 8
A 2.07	LEVELS 9-12 & MECH P/H
A 2.08	ROOF PLAN
A 2.10	TOWNHOUSE FLOOR PLANS
A 3.01	CONDO ELEVATIONS
A 3.10	TOWNHOUSE ELEVATIONS
A 4.01	SITE SECTION
A 5.01	VIEW FROM NORTH LOOKING SOUTH-WEST
A 5.02	VIEW FROM NORTH LOOKING SOUTH
A 5.03	VIEW FROM SOUTH LOOKING NORTH-EAST



2935 & 2955 MISSISSAUGA ROAD
MISSISSAUGA, ONTARIO

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113 Miranda Avenue
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www.caricarilee.com
CLA

PROJECT NAME
Mississauga Condo Development
2935 & 2955 Mississauga Road, Mississauga, Ontario

DRAWING TITLE
COVER SHEET

No.	Date:	Issued / Revision:	By:
01	2021/06/10	ISSUED FOR REZONING	

CONTRACTOR TO VERIFY ALL DIMENSIONS ON THE SITE AND REPORT ANY DICREPANCIES TO THE ARCHITECT BEFORE PROCEEDING WITH THE WORK.

ALL DRAWINGS ARE THE PROPERTY OF THE ARCHITECT AND MUST BE RETURNED AT THE COMPLETION OF THE WORK.

THIS DRAWING IS NOT TO BE USED FOR CONSTRUCTION UNTIL COUNTERSIGNED.

SCALE	1 : 5000
PROJECT NO.	20001
DATE	OCT 2023
DRAWN BY	MNG
CHECKED BY	CLA

NORTH:

DRAWING NO.
A 0.00

12/20/2023 1:00:08 PM

SITE STATISTICS:

	EXISTING:	PROPOSED:
ZONING	G1 & G2	RA4-XX
OFFICIAL PLAN DESIGNATION	GREENLANDS	RESIDENTIAL: HIGH DENSITY
BUILDING TYPE	n/a	RESIDENTIAL CONDO + STACKED TOWNS
LOT FRONTAGE	30.0 m (MIN.)	139.80 m
SITE AREA		
TOTAL SITE AREA		21,270.66 m²
GREENLANDS		10,898.82 m²
NET SITE AREA		**(1.037184 ha) 10,371.84 m²**

	REQUIRED / PERMITTED:	PROPOSED:
LOT COVERAGE	n/a	2,353.40 m² = 22.7%
LANDSCAPED AREA	40% (MIN.) = 4,148.74 m²	5,592.7 m² = 53.9%
PAVED AREA	n/a	2,425.74 m² = 23.4%

SETBACKS:

SETBACKS	REQUIRED / PERMITTED:	PROPOSED:
BUILDING SETBACKS	REFER TO BUILDING HEIGHT AND SETBACK DIAGRAM	
BALCONY ENCROACHMENT	1.0 m (MAX.) INTO ANY REQUIRED YARD	0.01 m
ABOVE GRADE PARKING STRUCTURE	7.5 m (MIN.)	5.09 m
BELOW GRADE PARKING STRUCTURE	3.0 m (MIN.)	5.09 m
WASTE ENCLOSURE / LOADING AREA	10.0 m (MIN.) TO A STREET LINE	27.16 m
LANDSCAPE BUFFERS		
ABUTTING A STREET LINE	4.5 m (MIN.)	4.5 m
ABUTTING GREENLANDS	4.5 m (MIN.)	4.5 m
ALONG ANY OTHER LOT LINES	3.0 m (MIN.)	3.0 m
LOADING	1 SPACE (3.5m x 9.0m)	1 SPACE (3.5m x 9.0m)

BUILDING STATISTICS:

	REQUIRED / PERMITTED:	PROPOSED:
FLOOR SPACE INDEX (FSI)	1.0 (MIN.) TO 1.8 (MAX.)	CONDO FSI = 1.60
		STACKED TH FSI = 0.16
		TOTAL FSI = 1.76
GROSS FLOOR AREA (GFA)	10,686.61 m² (MIN.) to 19,235.89 m² (MAX.)	CONDO GFA = 16,579.30 m²
		STACKED TH GFA = 1,648.00 m²
		TOTAL GFA = 18,227.30 m²
BUILDING HEIGHT	18 STOREYS or 56.0m (MAX.)	CONDO = 12 STOREYS (47.05 m)
		STACKED TH'S = 3 STOREYS (13.05 m)

***NOTES:**
REQUIRED / PERMITTED IS BASED ON THE PROPOSED (RA4) ZONING, AND NOT THE CURRENT (G1 & G2) ZONING.

AMENITY AREA:

AMENITY AREA	REQUIRED:	PROPOSED:
TOTAL AMENITY AREA	5.6 m² / UNIT = 1,097.6 m² (MIN.)	1,257.8 m²
AMENITY IN ONE CONTIGUOUS AREA	50% OF REQUIRED = 548.8 m² (MIN.)	634.2 m²
OUTDOOR AT-GRADE AMENITY AREA	55.0 m² (MIN.)	112.3 m²

PARKING REQUIRED:

PARKING REQUIRED	UNITS	RATIO	SPACES REQUIRED
CONDO VISITOR PARKING	196	0.20 / UNIT	39 VISITOR SPACES
CONDO RESIDENT PARKING	121 (1B / 1B+D)	1.10 / 1B UNIT	133 SPACES
	56 (2B / 2B+D)	1.10 / 2B UNIT	62 SPACES
	19 (3B / 3B+D)	1.10 / 3B UNIT	21 SPACES
	196 TOTAL UNITS		**216 RESIDENT SPACES**
SUB-TOTAL CONDO PARKING REQUIRED			**255 SPACES**
STACKED TH VISITOR PARKING	15	0.25 / UNIT	4 VISITOR SPACES
STACKED TH RESIDENT PARKING	15 (2B)	1.50 / 2B UNIT	23 RESIDENT SPACES
SUB-TOTAL STACKED TH PARKING REQUIRED			**27 SPACES**
TOTAL VISITOR PARKING			43 VISITOR SPACES
TOTAL RESIDENT PARKING			239 RESIDENT SPACES
TOTAL (CONDO + STACKED TH COMBINED) PARKING REQUIRED			**282 SPACES**
BARRIER-FREE SPACES REQUIRED	4% OF REQUIRED VISITOR PARKING		2 B/F SPACES

PARKING PROVIDED:

	STANDARD SPACES	BARRIER-FREE SPACES	TOTAL SPACES
U/G LEVEL P1	104	2	106
U/G LEVEL P2	107	0	107
U/G LEVEL P3	107	0	107
TOTAL PARKING PROVIDED	**318**	**2**	**320**

BICYCLE PARKING REQUIRED:

	RATIO	SPACES
LONG-TERM SPACES	0.60 SPACES / UNIT	127
SHORT-TERM SPACES	0.05 SPACES / UNIT	11
TOTAL BICYCLE PARKING SPACES REQUIRED		**138**

BICYCLE PARKING PROVIDED:

LEVEL	SPACES
LEVEL 1	44
U/G LEVEL P1	14
U/G LEVEL P2	40
U/G LEVEL P3	40
TOTAL BICYCLE PARKING SPACES PROVIDED	**138**

STORAGE LOCKERS PROVIDED:

LEVEL	SPACES
U/G LEVEL P1	26
U/G LEVEL P2	31
U/G LEVEL P3	55
TOTAL STORAGE LOCKERS PROVIDED	**112**

UNIT BREAKDOWN:

CONDO UNIT BREAKDOWN	1B	1B+D	2B	2B+D	3B	3B+D	TOTAL	
LEVEL 1	0	0	8	0	3	0	11	
LEVEL 2	2	12	3	2	2	0	21	
LEVEL 3	2	12	3	2	2	0	21	
LEVEL 4	2	12	3	2	2	0	21	
LEVEL 5	2	12	3	2	2	0	21	
LEVEL 6	2	12	3	2	2	0	21	
LEVEL 7	2	6	2	2	1	0	13	
LEVEL 8	3	4	3	0	1	0	11	
LEVEL 9	3	6	4	0	1	0	14	
LEVEL 10	3	6	4	0	1	0	14	
LEVEL 11	3	6	4	0	1	0	14	
LEVEL 12	3	6	4	0	1	0	14	
TOTAL CONDO UNITS (BY TYPE)	**27**	**94**	**44**	**12**	**19**	**0**	**196 UNITS**	**UNITS / HECTARE**
TOTAL CONDO UNITS (BY BEDROOMS)	**121**		**56**		**19**			188.98
TOTAL STACKED TOWNHOUSE UNITS							**15 UNITS**	14.46
TOTAL (CONDO + STACKED TH COMBINED) UNITS							**211 UNITS**	**203.44**

CONDO GROSS FLOOR AREA (GFA)

Level	Area
U/G LEVEL P3	69.1 m²
U/G LEVEL P2	69.1 m²
U/G LEVEL P1	119.2 m²
LEVEL 1 (102.15)	1,026.4 m²
LEVEL 1A (MEZZ)	980.8 m²
LEVEL 2	1,631.6 m²
LEVEL 3	1,631.6 m²
LEVEL 4	1,631.6 m²
LEVEL 5	1,631.6 m²
LEVEL 6	1,631.6 m²
LEVEL 7	1,074.1 m²
LEVEL 8	858.5 m²
LEVEL 9	1,056.0 m²
LEVEL 10	1,056.0 m²
LEVEL 11	1,056.0 m²
LEVEL 12	1,056.0 m²
TOTAL GFA (CONDO)	16,579.3 m²

CONDO TOTAL FLOOR AREA (TFA)

Level	Area
U/G LEVEL P3	4,701.0 m²
U/G LEVEL P2	4,701.0 m²
U/G LEVEL P1	4,701.0 m²
LEVEL 1 (102.15)	1,672.4 m²
LEVEL 1A (MEZZ)	1,059.2 m²
LEVEL 2	1,701.4 m²
LEVEL 3	1,701.4 m²
LEVEL 4	1,701.4 m²
LEVEL 5	1,701.4 m²
LEVEL 6	1,701.4 m²
LEVEL 7	1,325.6 m²
LEVEL 8	1,108.6 m²
LEVEL 9	1,108.6 m²
LEVEL 10	1,108.6 m²
LEVEL 11	1,108.6 m²
LEVEL 12	1,108.6 m²
MECH P/H	273.4 m²
TOTAL TFA (CONDO)	32,483.6 m²

TH BLOCK AREA (TFA + GFA)

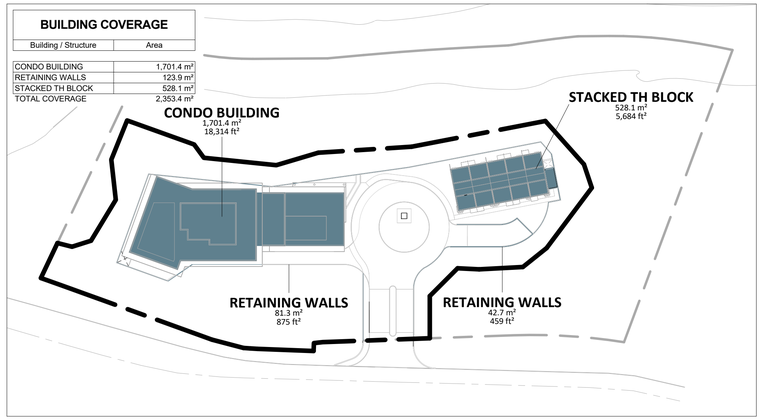
TH Level	Area
TH LEVEL 1	482.3 m²
TH LEVEL 2	500.1 m²
TH LEVEL 3	500.1 m²
TH ROOF DECK	165.5 m²
TOTAL TFA + GFA (TH BLOCK)	1,648.0 m²

CONDO AMENITY AREA

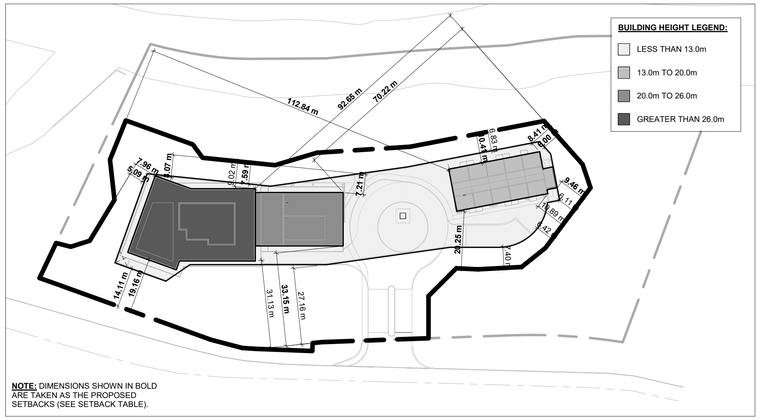
Level	Area
INDOOR AMENITY	
LEVEL 1 (102.15)	123.7 m²
LEVEL 7	175.7 m²
LEVEL 8	197.5 m²
	496.9 m²
OUTDOOR AMENITY	
LEVEL 1 (102.15)	112.3 m²
LEVEL 7	458.5 m²
LEVEL 8	195.0 m²
	765.8 m²
TOTAL AMENITY	1,262.7 m²

STACKED TH PRIVATE ROOF DECKS

TH Level	Area
OUTDOOR AMENITY	
TH ROOF DECK	334.6 m²
	334.6 m²



1 **BUILDING COVERAGE DIAGRAM**
1 : 1000



2 **HEIGHT & SETBACK DIAGRAM**
1 : 1000

REQUIRED AND PROPOSED BUILDING SETBACKS:

FRONT YARD SETBACK	REQUIRED / PERMITTED:	PROPOSED:
EQUAL OR LESS THAN 13.0m IN HEIGHT	7.5 m (MIN.)	14.11 m
13.0m TO 20.0m IN HEIGHT	8.5 m (MIN.)	20.25 m
20.0m TO 26.0m IN HEIGHT	9.5 m (MIN.)	33.15 m
GREATER THAN 26.0m IN HEIGHT	10.5 m (MIN.)	19.16 m

EXTERIOR SIDE YARD SETBACK	REQUIRED / PERMITTED:	PROPOSED:
EQUAL OR LESS THAN 13.0m IN HEIGHT	7.5 m (MIN.)	4.79 m
13.0m TO 20.0m IN HEIGHT	8.5 m (MIN.)	112.84 m
20.0m TO 26.0m IN HEIGHT	9.5 m (MIN.)	n/a
GREATER THAN 26.0m IN HEIGHT	10.5 m (MIN.)	7.96 m

INTERIOR SIDE YARD SETBACK	REQUIRED / PERMITTED:	PROPOSED:
EQUAL OR LESS THAN 13.0m IN HEIGHT	4.5 m (MIN.)	6.00 m
13.0m TO 20.0m IN HEIGHT	6.0 m (MIN.)	8.41 m
20.0m TO 26.0m IN HEIGHT	7.5 m (MIN.)	70.22 m
GREATER THAN 26.0m IN HEIGHT	9.0 m (MIN.)	92.65 m

REAR YARD SETBACK	REQUIRED / PERMITTED:	PROPOSED:
EQUAL OR LESS THAN 13.0m IN HEIGHT	7.5 m (MIN.)	7.59 m
13.0m TO 20.0m IN HEIGHT	10.0 m (MIN.)	10.41 m
20.0m TO 26.0m IN HEIGHT	12.5 m (MIN.)	7.21 m
GREATER THAN 26.0m IN HEIGHT	15.0 m (MIN.)	8.07 m

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Mississauga Condo Development
2935 & 2955 Mississauga Road, Mississauga, Ontario

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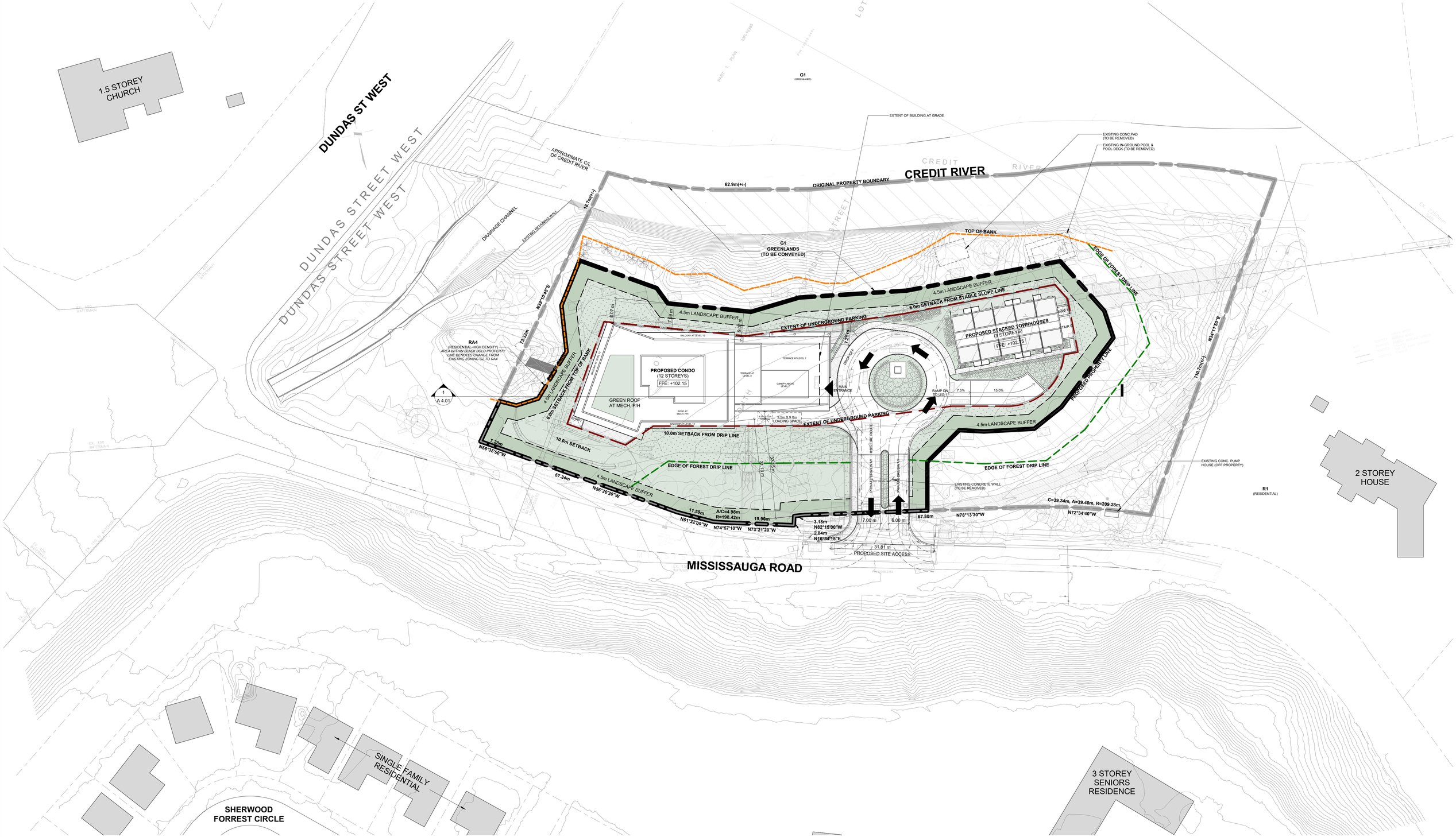

1 **CONTEXT PLAN / SITE PLAN (ROOF)**
1 : 500

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CONTEXT PLAN / SITE PLAN (ROOF)

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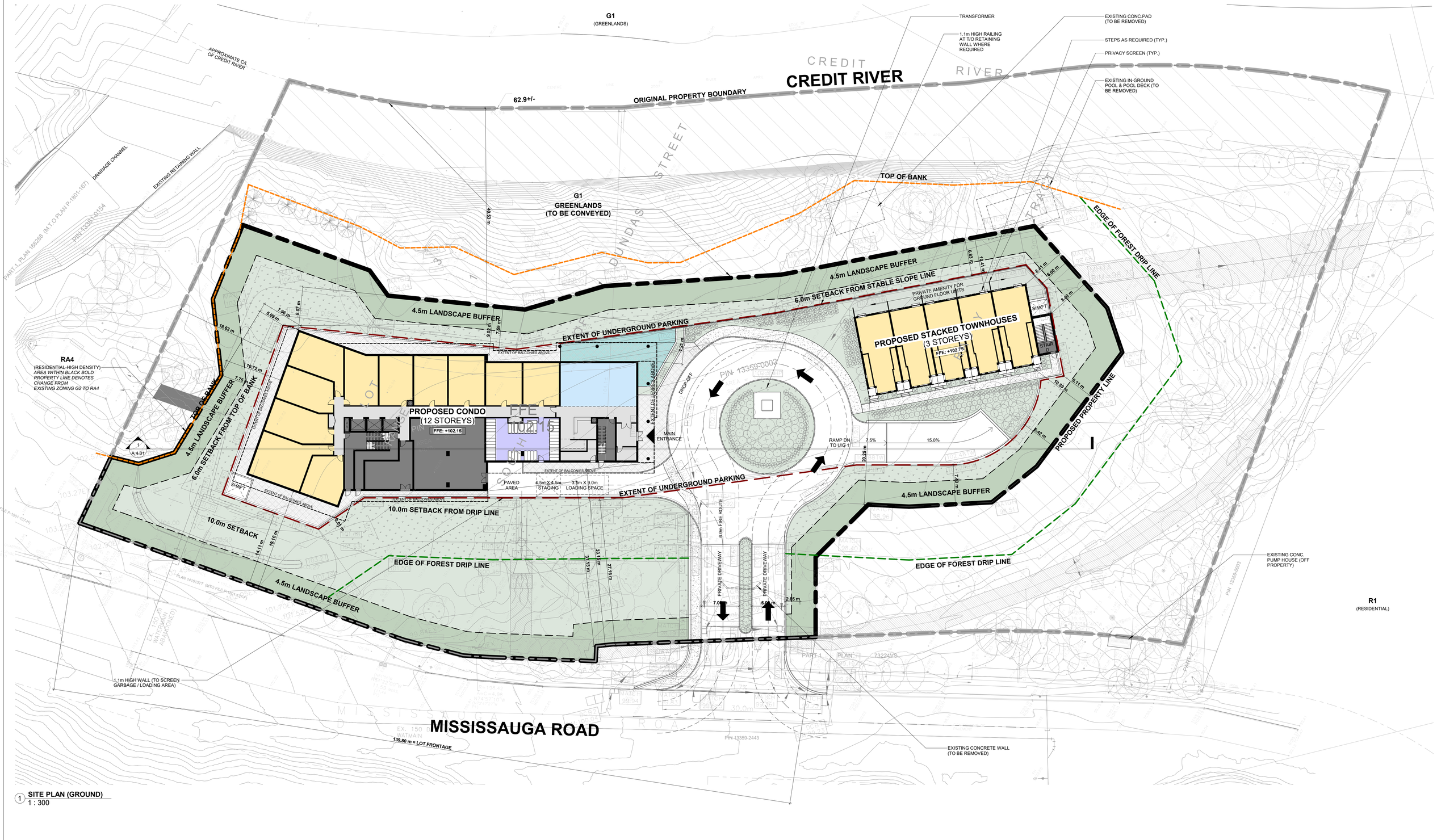

1 **SITE PLAN (GROUND)**
1 : 300

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SITE PLAN (GROUND)

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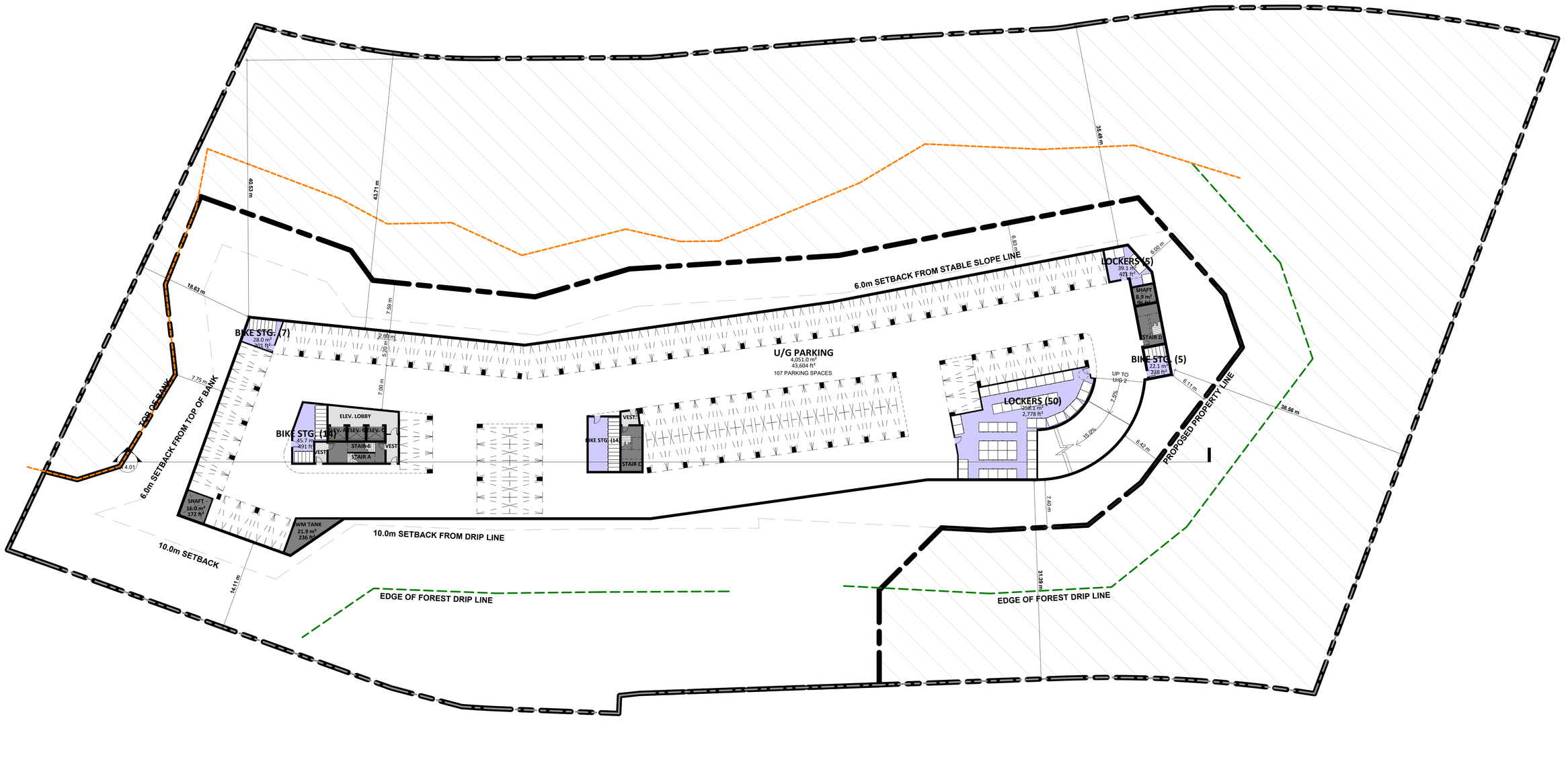

1 **U/G LEVEL P3**
1 : 300

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U/G LEVEL P3

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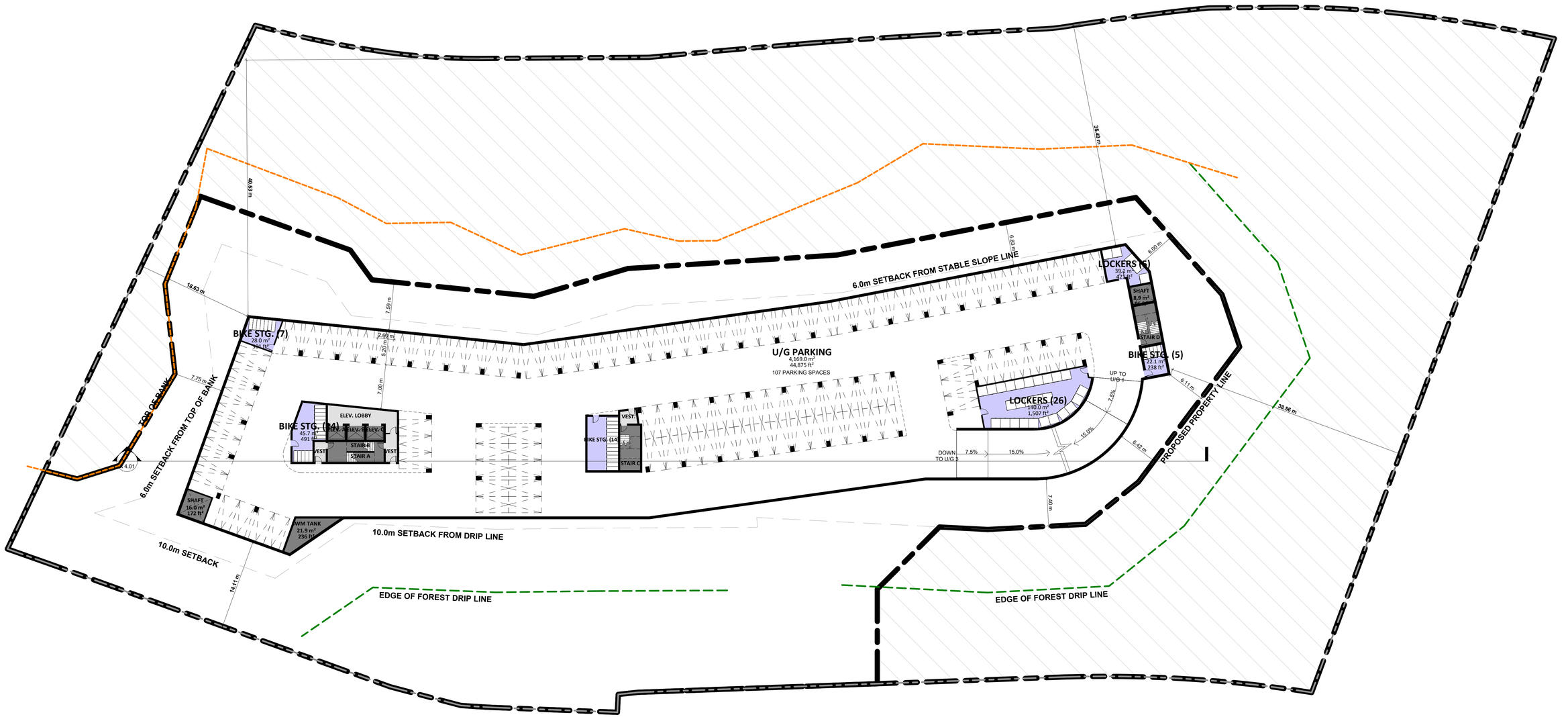

1 **U/G LEVEL P2**
1 : 300

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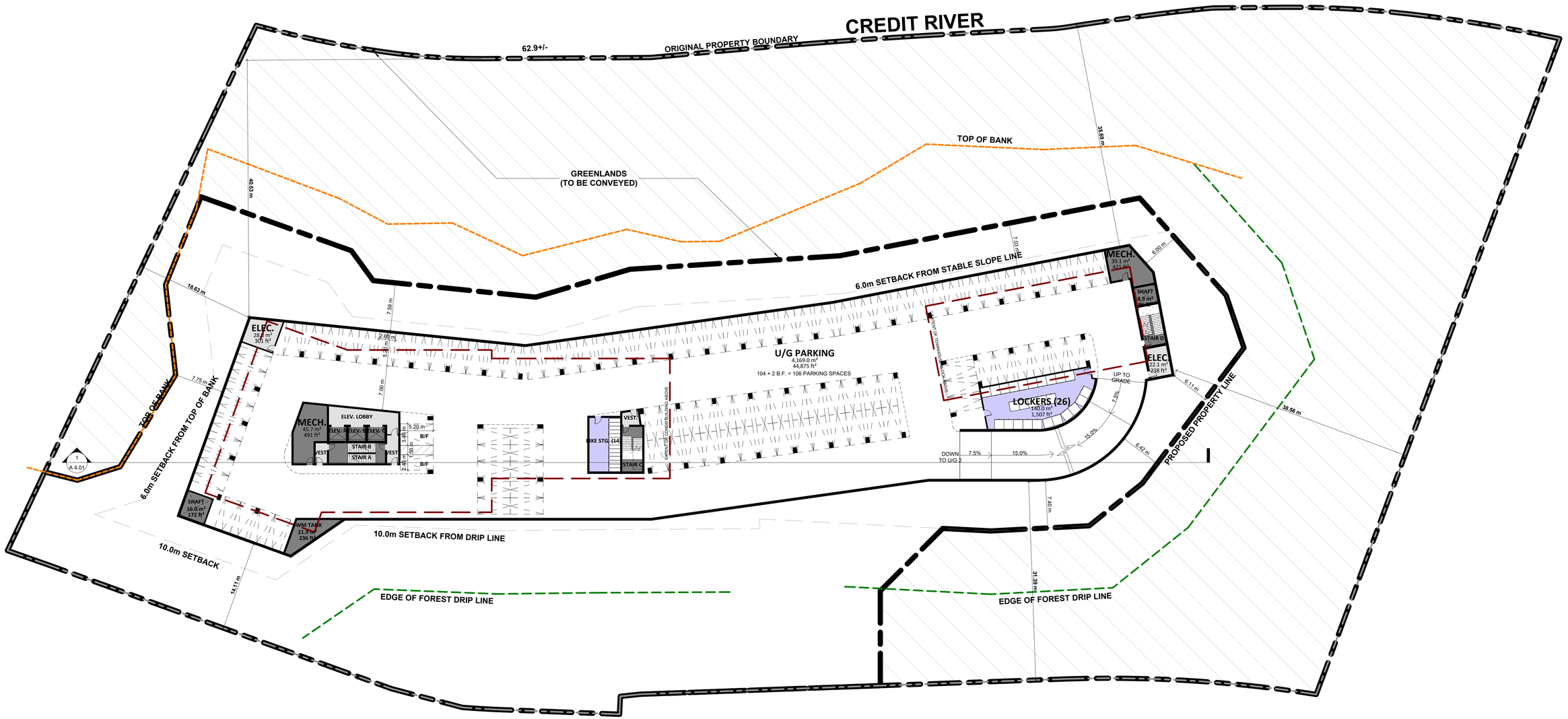

1 U/G LEVEL P1
1 : 300

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U/G LEVEL P1

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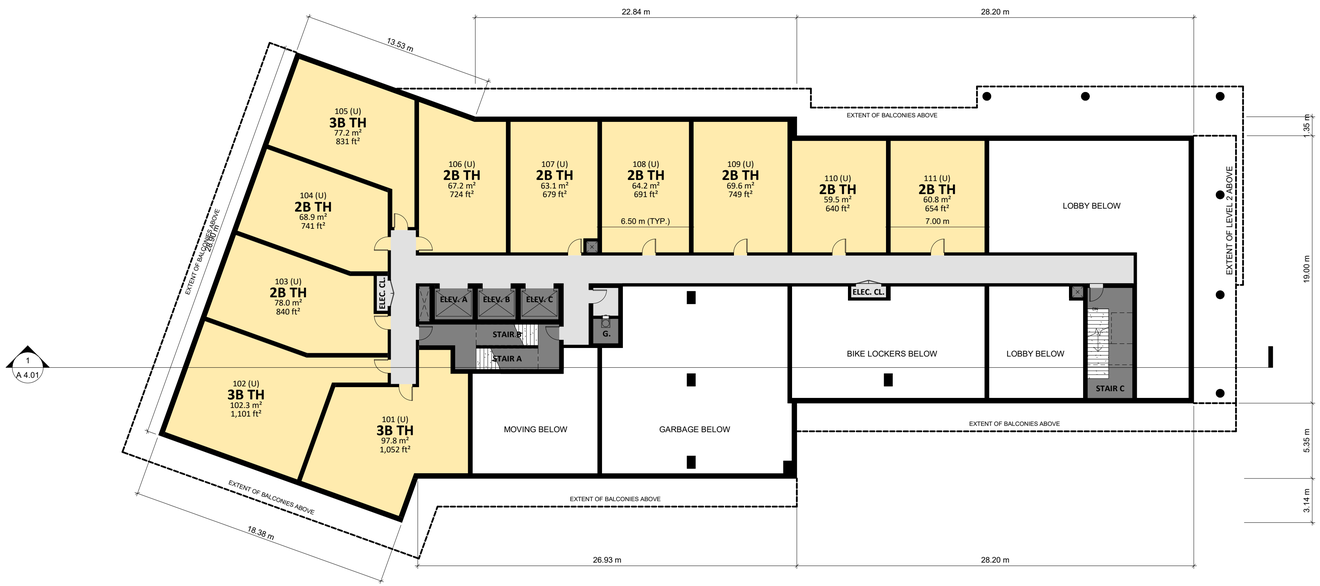
1 **LEVEL 1**
1 : 200



2 **LEVEL 1A (CONDO MEZZ)**
1 : 200

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LEVELS 1 + MEZZANINE

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1 **LEVEL 2**
1 : 200

2 **LEVEL 3-6**
1 : 200

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LEVELS 2 & 3-6

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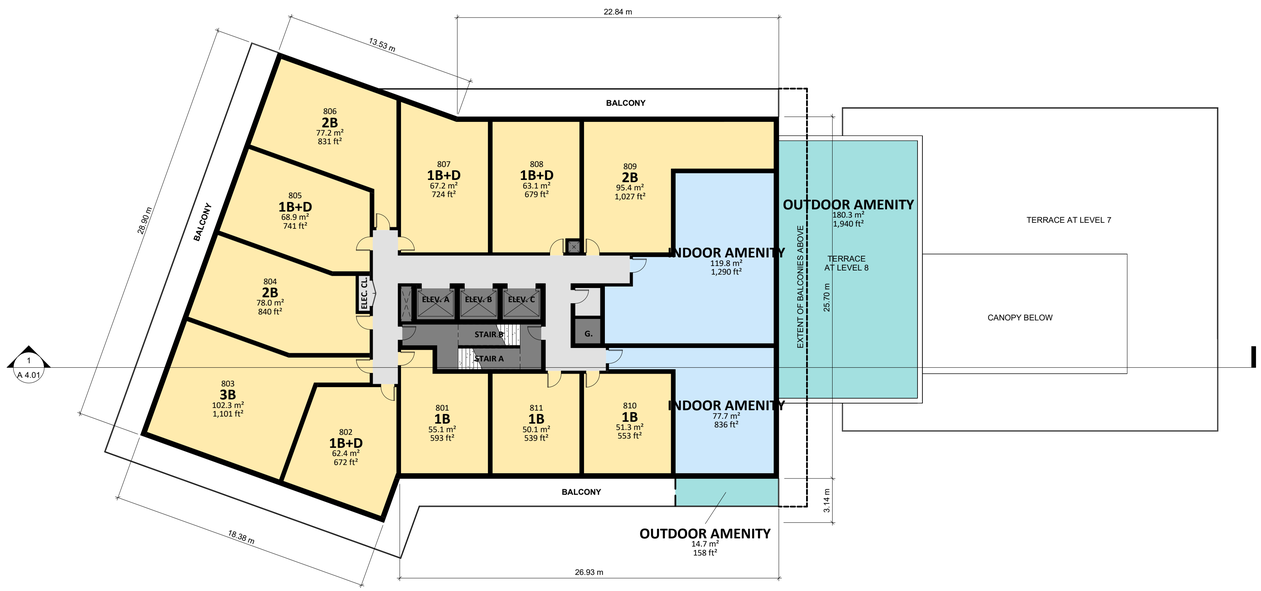
1 **LEVEL 7**
1 : 200



2 **LEVEL 8**
1 : 200

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DRAWING TITLE
LEVELS 7 & 8

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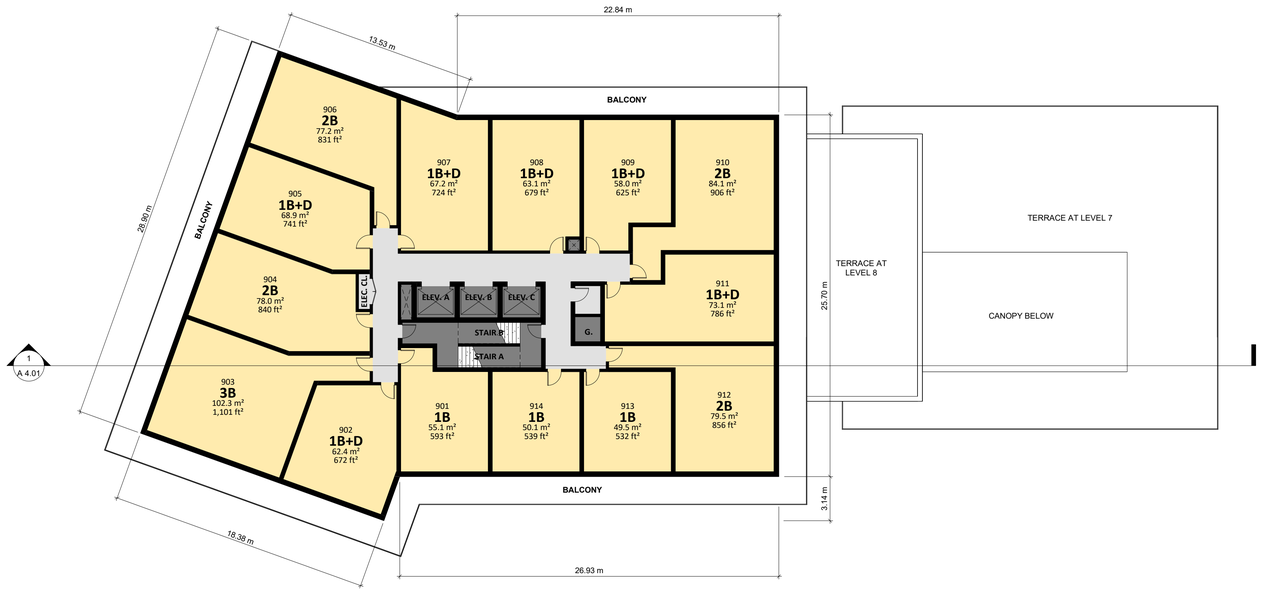
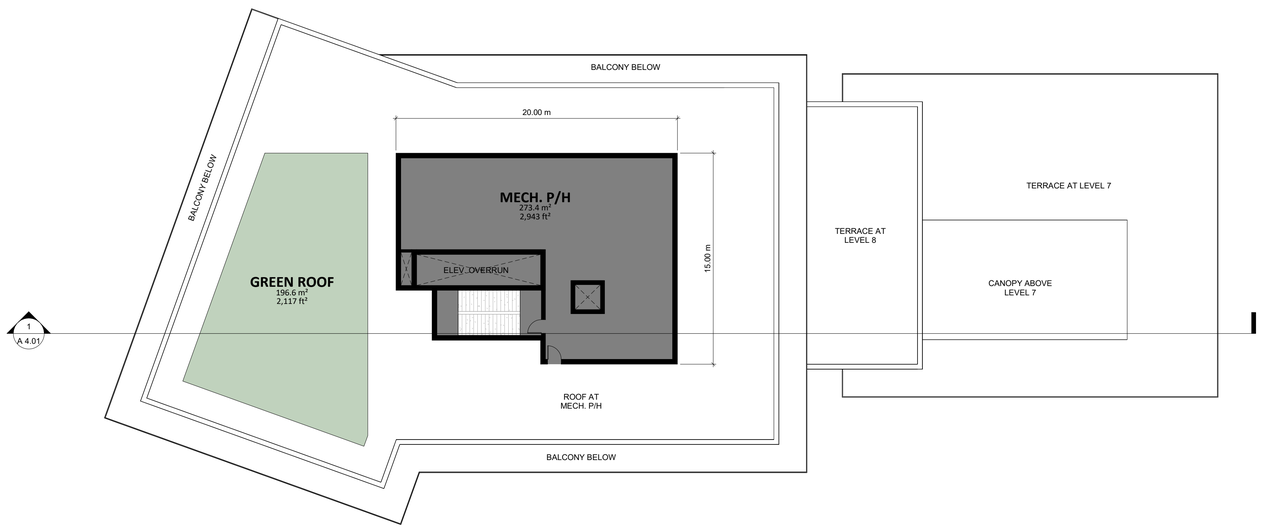


1 **LEVEL 9 - 12**
1 : 200



2 **MECH P/H**
1 : 200

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DRAWING TITLE
LEVELS 9-12 & MECH P/H

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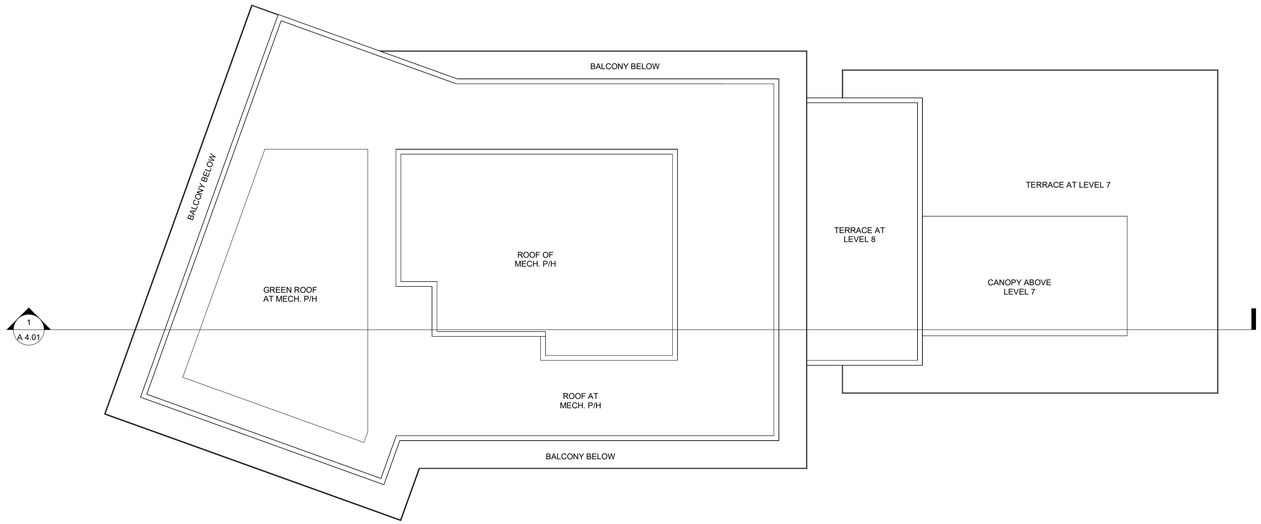

1 **T/O MECH P/H**
1 : 200

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Mississauga Condo Development
2935 & 2955 Mississauga Road, Mississauga, Ontario

DRAWING TITLE
ROOF PLAN

No.	Date:	Issued / Revision:	By:
01	2021/06/10	ISSUED FOR REZONING	

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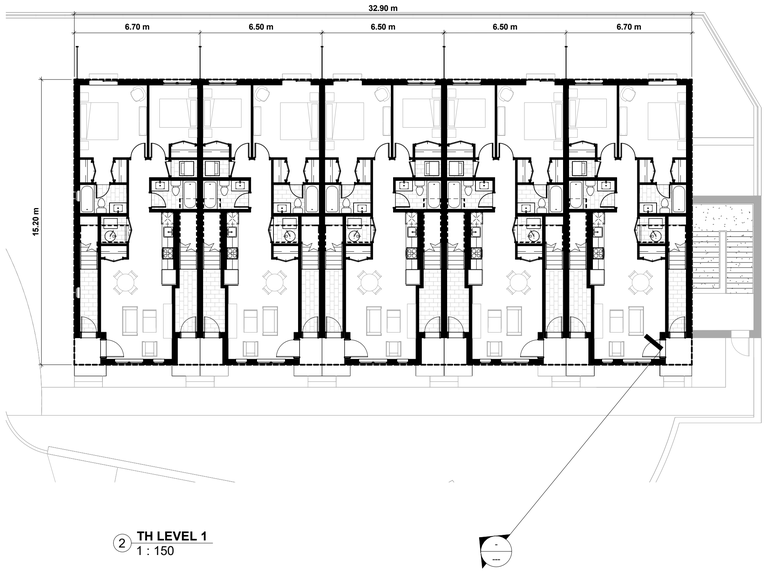
A 2.08

10/26/2023 1:30:01 PM



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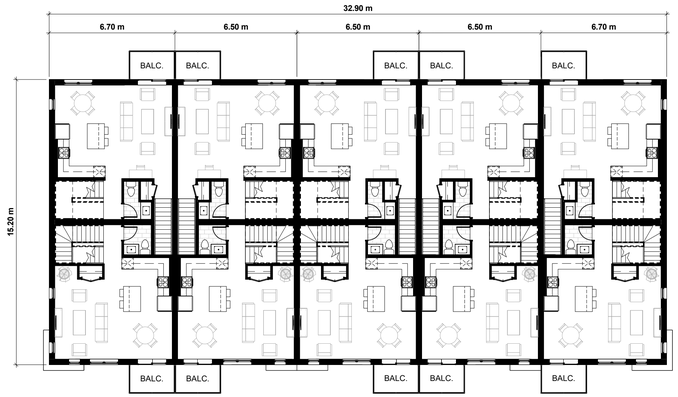

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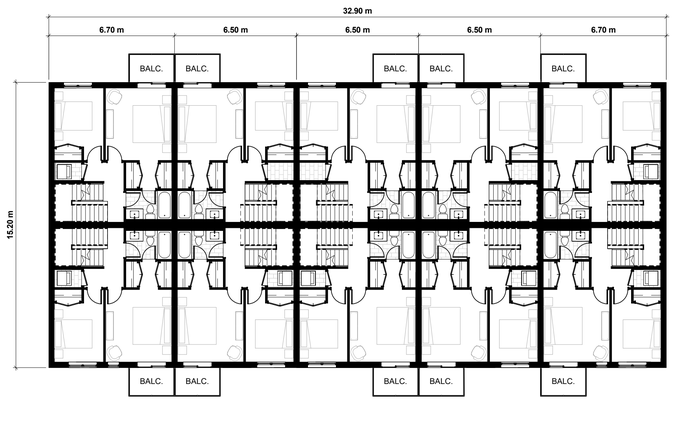

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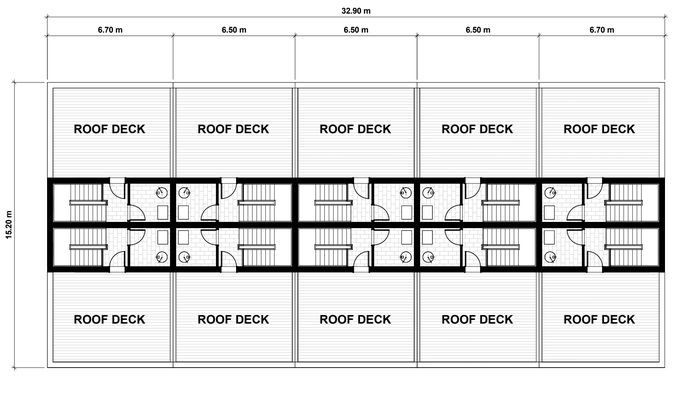

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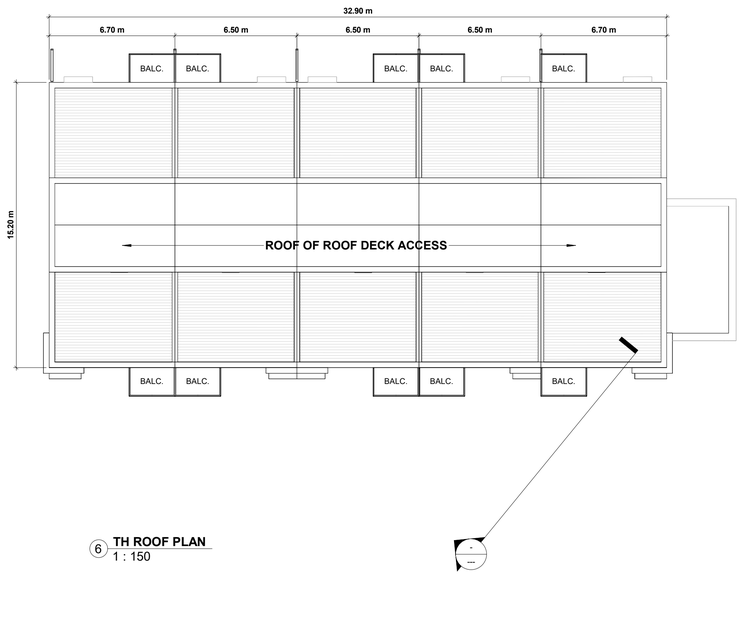

6 **TH ROOF PLAN**
1 : 150

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DRAWING TITLE
TOWNHOUSE FLOOR PLANS

No.	Date	Issued / Revision:	By:
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DRAWING NO.
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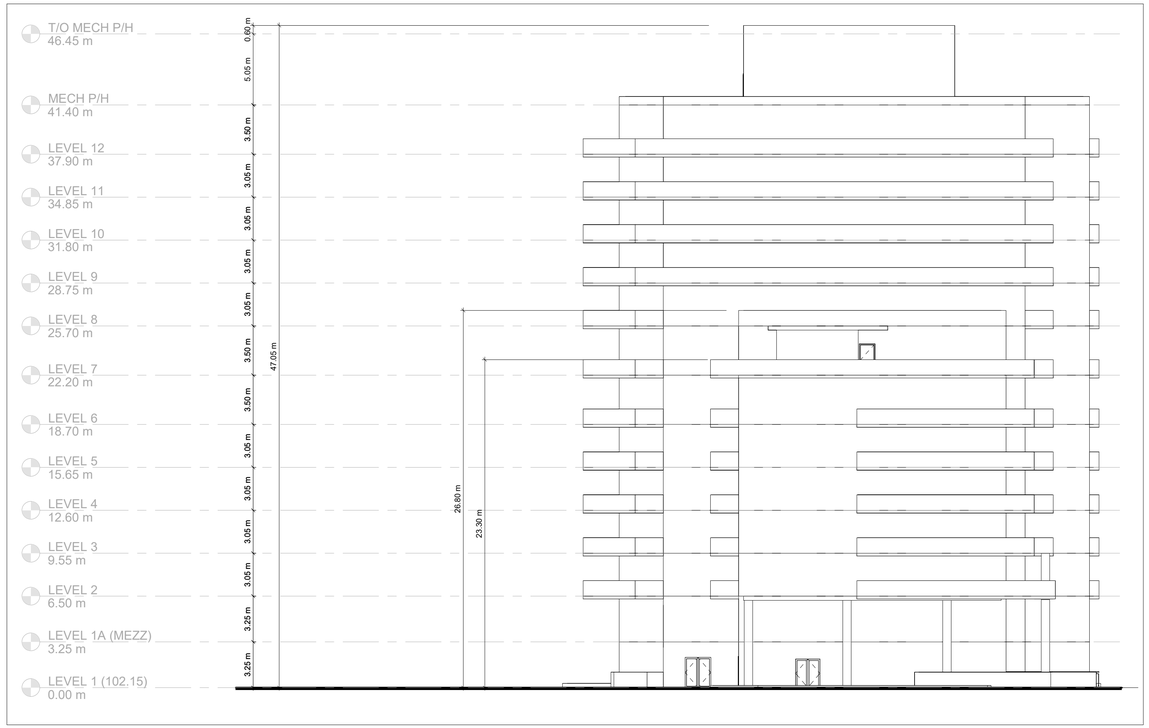

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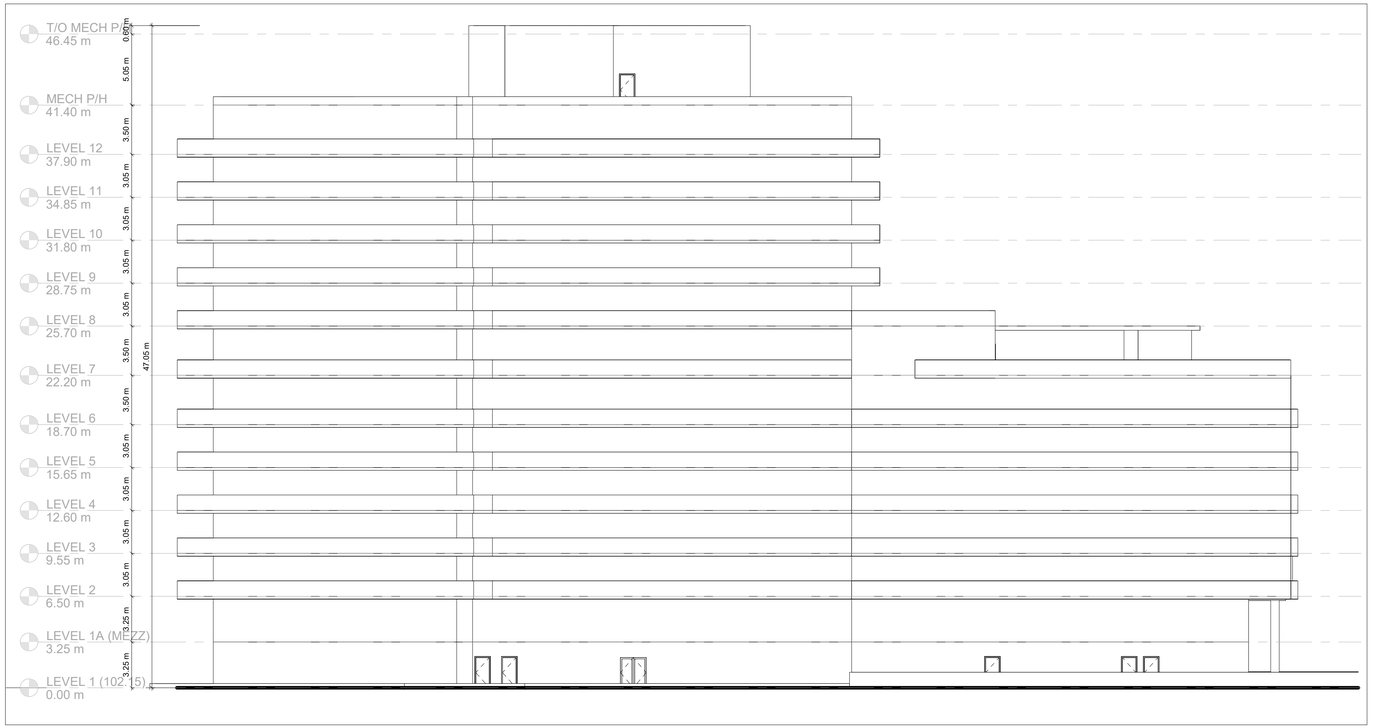

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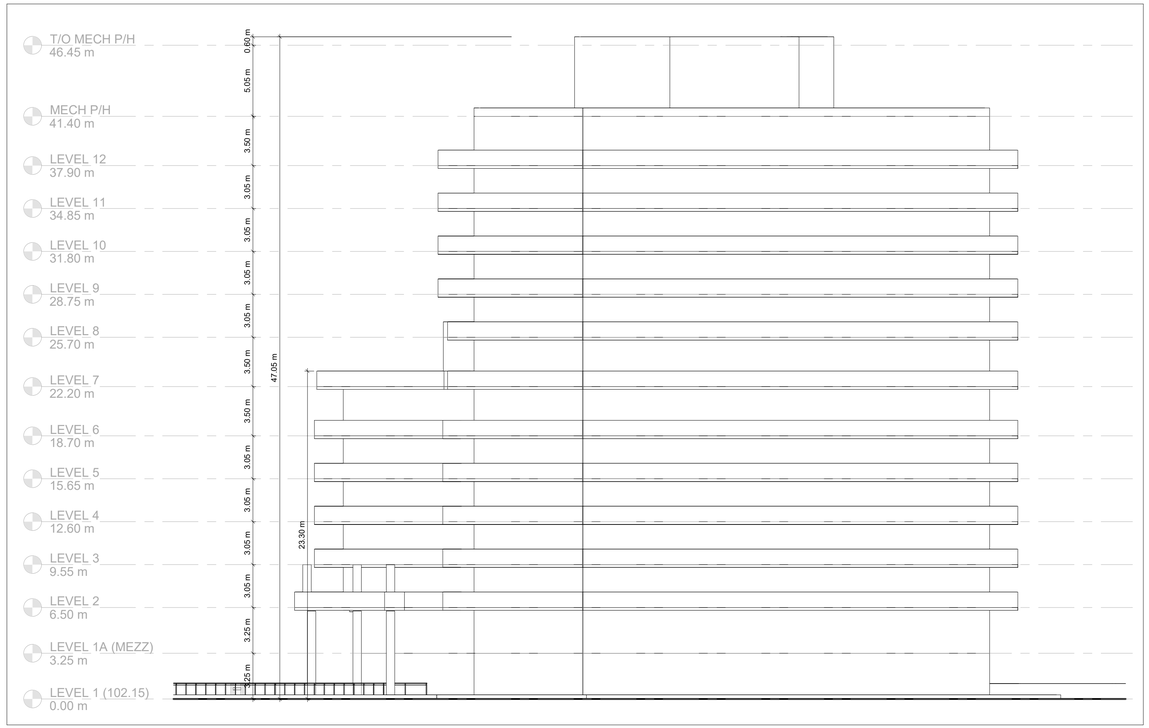

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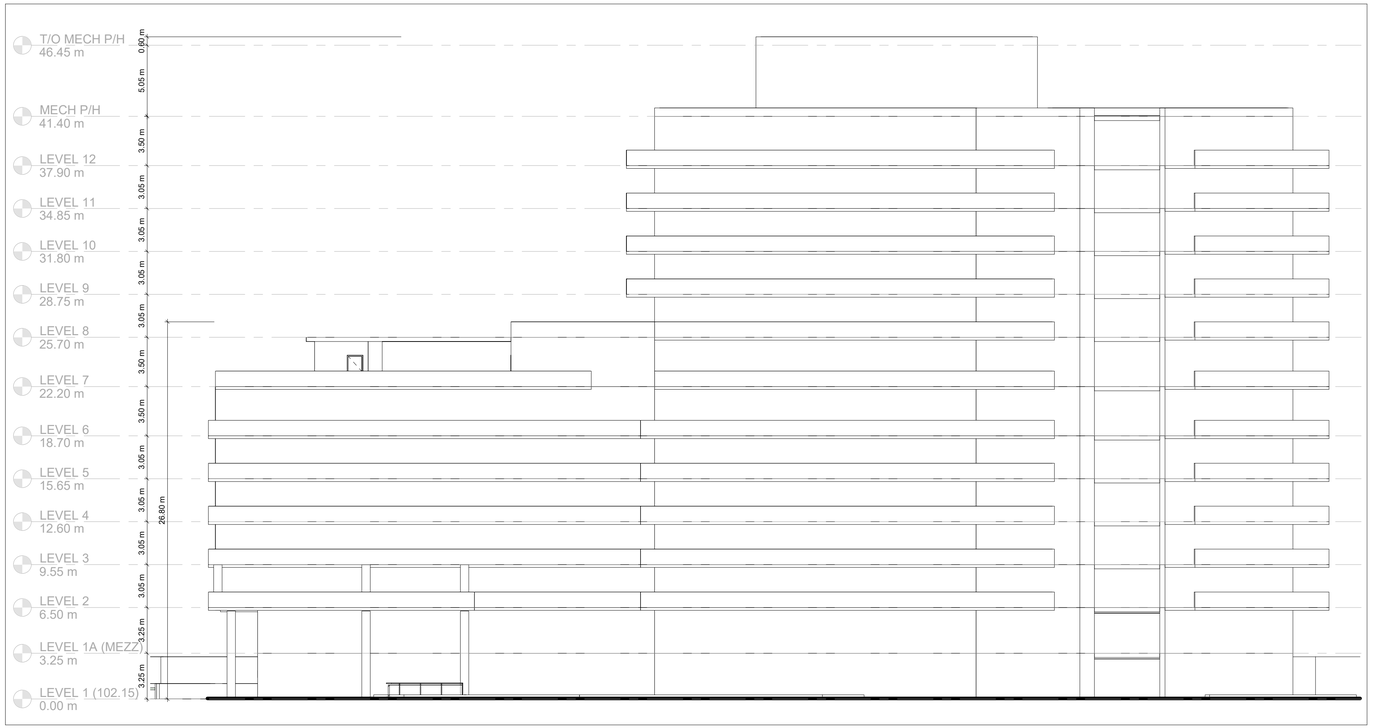

4 **NORTH ELEVATION**
1 : 200

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Mississauga Condo Development
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DRAWING TITLE
CONDO ELEVATIONS

No.	Date:	Issued / Revision:	By:
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DATE	OCT 2023
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NORTH:

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A 3.01

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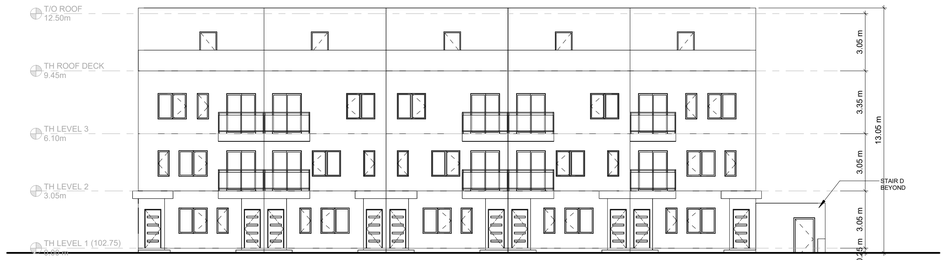

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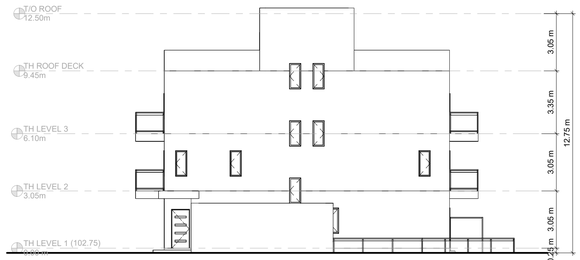

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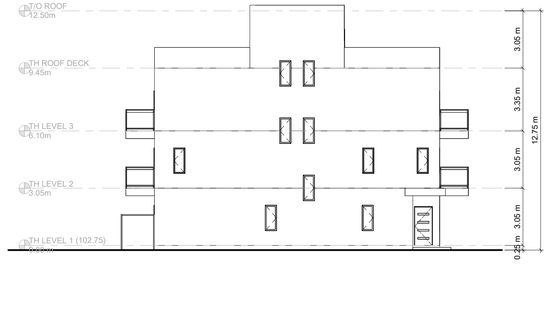
1 : 150



4 **STACKED TH - WEST ELEVATION**
1 : 150

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DRAWING TITLE
TOWNHOUSE ELEVATIONS

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DRAWING NO.
A 3.10

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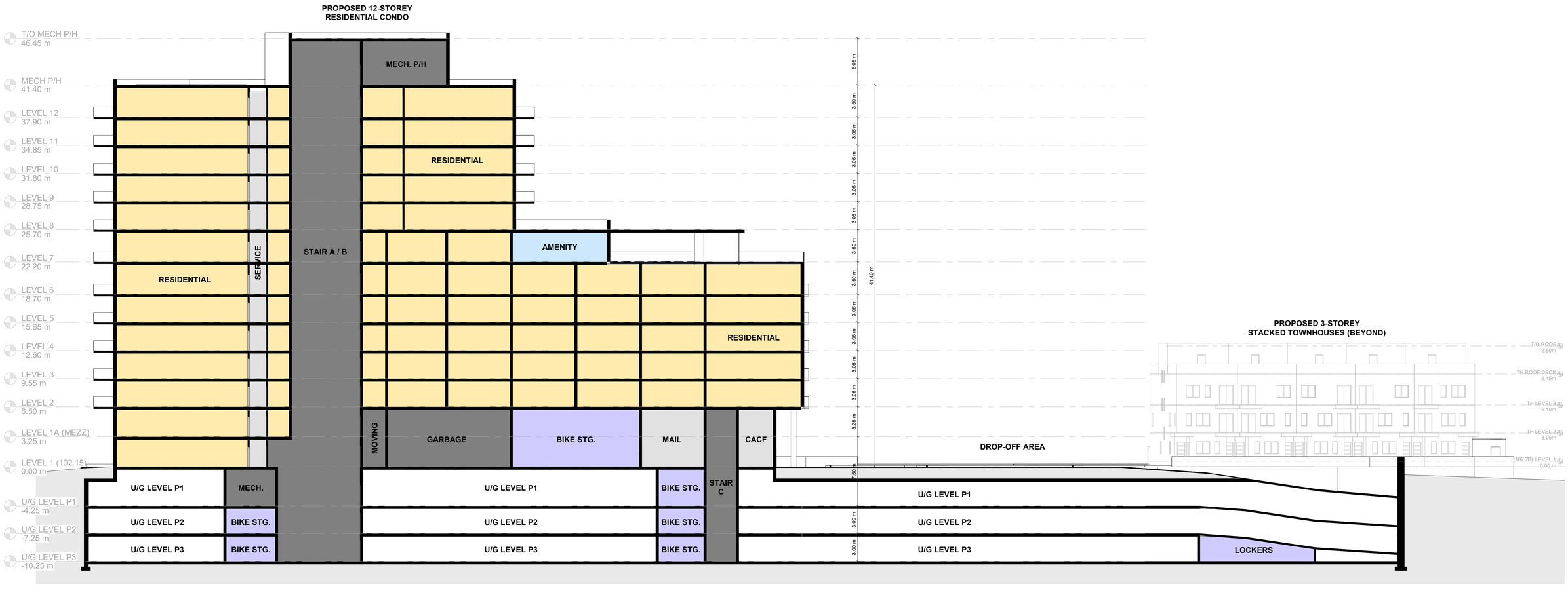

1 **SITE SECTION 1**
1 : 200

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DRAWING TITLE
SITE SECTION

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A 4.01

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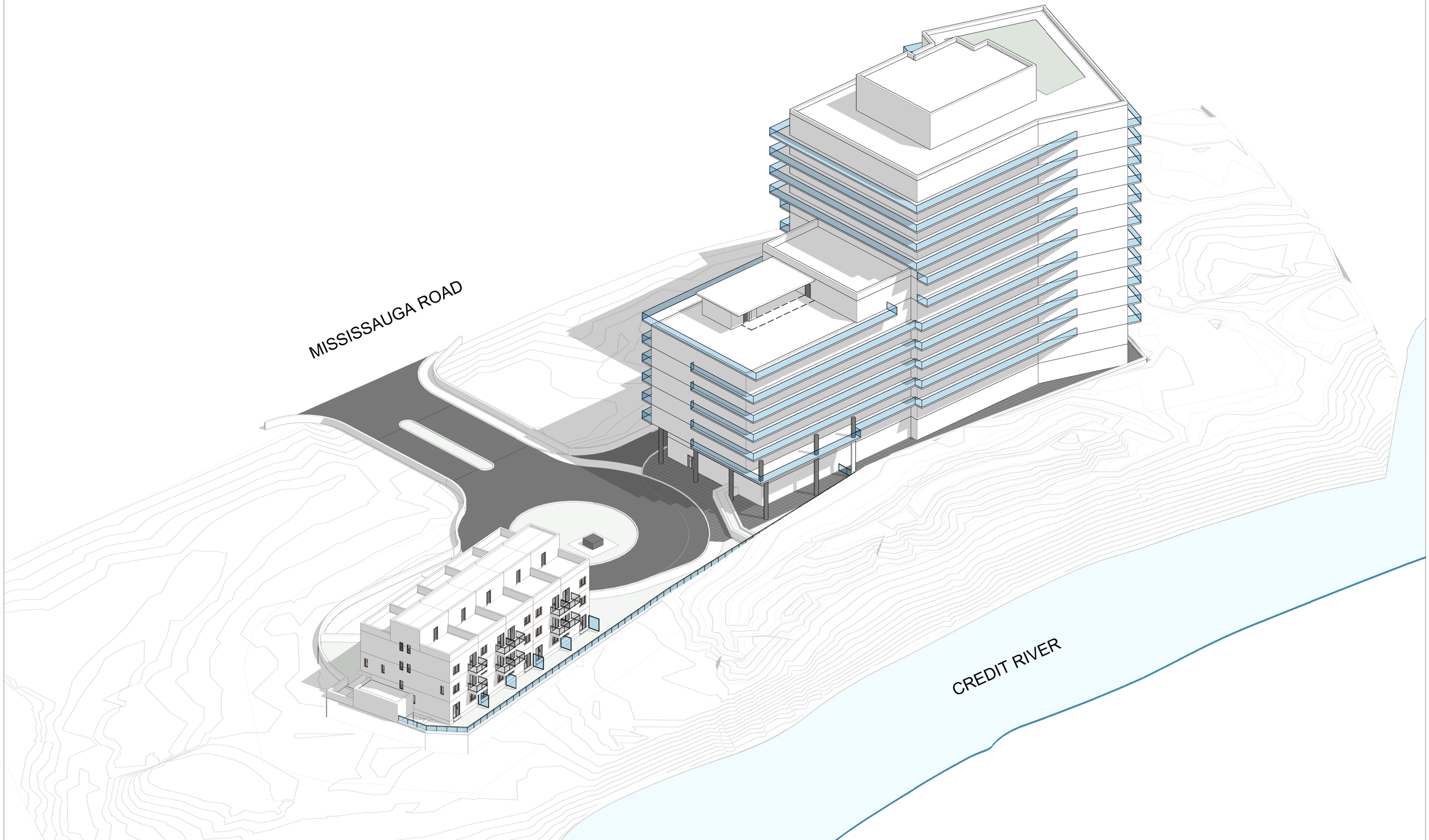

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DRAWING TITLE
VIEW FROM NORTH LOOKING SOUTH-WEST

No.	Date	Issued / Revision:	By:
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SCALE	
PROJECT NO.	20001
DATE	OCT 2023
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NORTH:

DRAWING NO.
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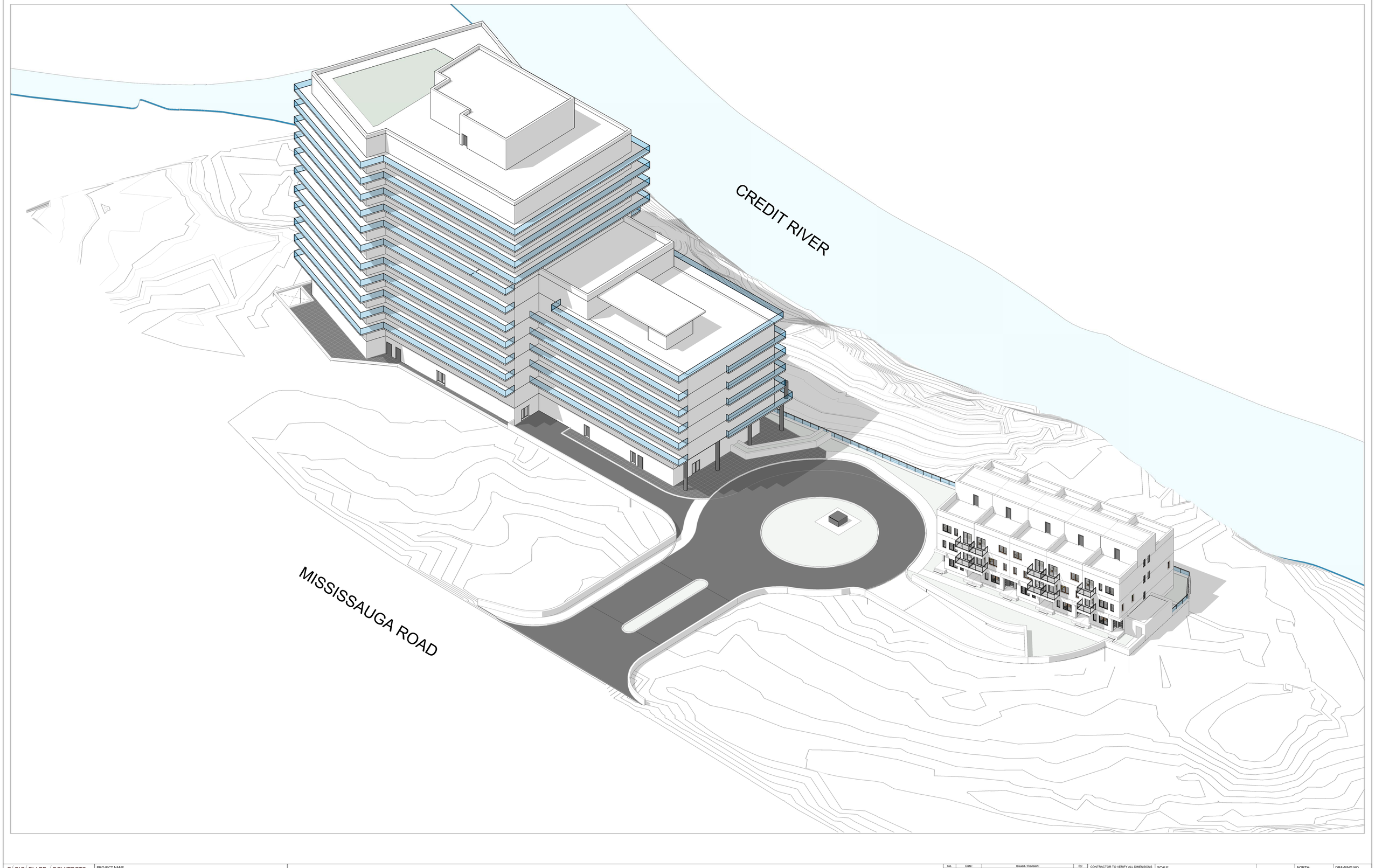

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PROJECT NAME
Mississauga Condo Development
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DRAWING TITLE
VIEW FROM NORTH LOOKING SOUTH

No.	Date:	Issued / Revision:	By:
01	2021/06/10	ISSUED FOR REZONING	

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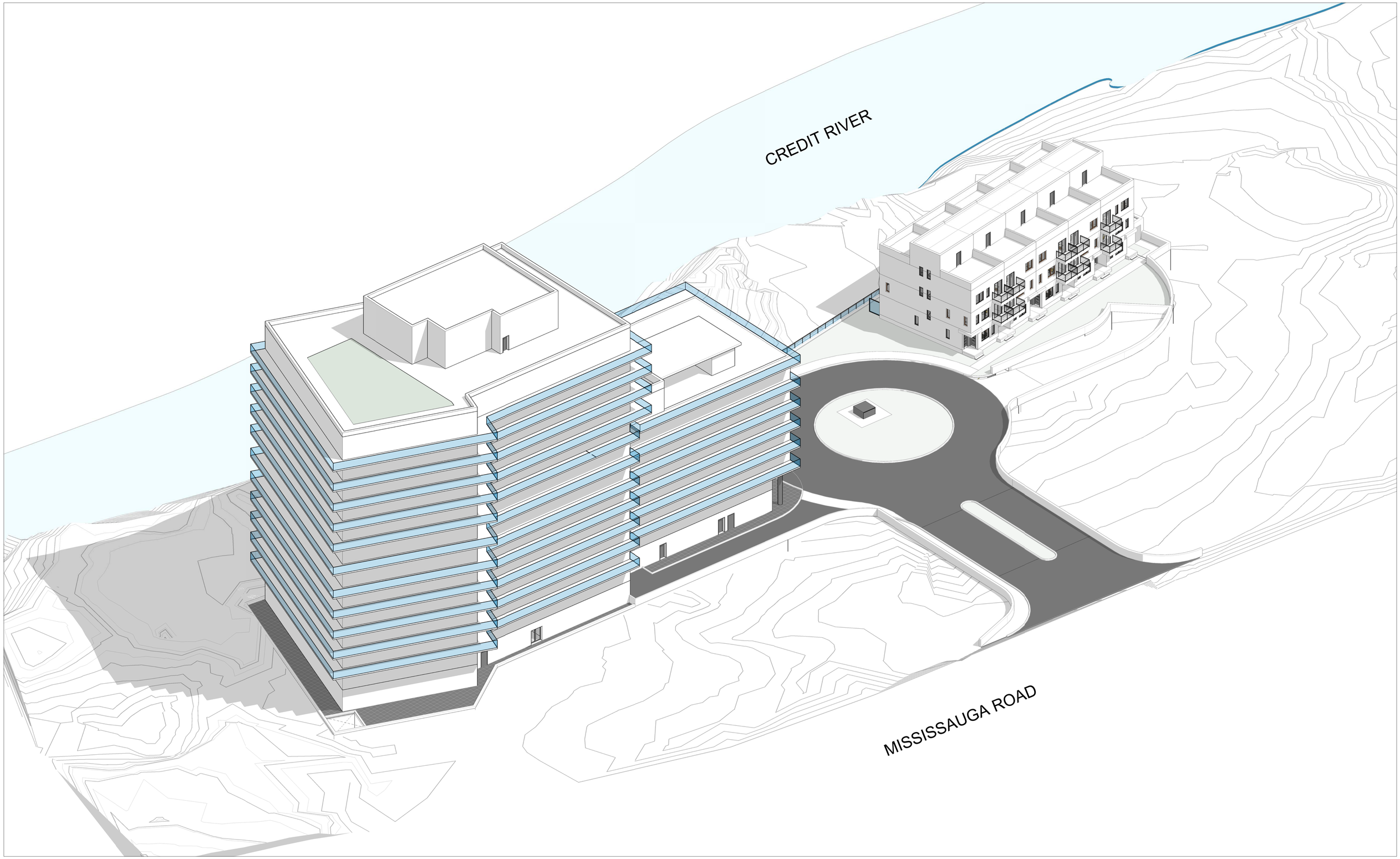
DRAWING NO.
A 5.02

10/20/2023 1:51:37 PM



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PROJECT NAME
Mississauga Condo Development
2935 & 2955 Mississauga Road, Mississauga, Ontario

DRAWING TITLE
VIEW FROM SOUTH LOOKING NORTH-EAST

No.	Date	Issued / Revision:	By:
01	2021/06/10	ISSUED FOR REZONING	

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PROJECT NO.	20001
DATE	OCT 2023
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A 5.03

10/20/2023 1:30:15 PM

PLAN OF TOPOGRAPHY OF

PART OF LOTS 3 AND 4, RANGE 1, SOUTH OF DUNDAS STREET RACEY TRACT

(ORIGINALLY IN TOWNSHIP OF TORONTO)

CITY OF MISSISSAUGA

REGIONAL MUNICIPALITY OF PEEL

SCALE 1 : 300

5 0 5 10 15 20 metres

TARASICK, McMILLAN LIMITED
ONTARIO LAND SURVEYORS

© COPYRIGHT, 2019

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

ELEVATION NOTE

ELEVATIONS ARE REFERRED TO CITY OF MISSISSAUGA DATUM AND WERE DERIVED FROM CITY OF MISSISSAUGA BENCHMARK No. 58, HAVING A PUBLISHED ELEVATION OF 108.293 metres.

CAUTION: TO OBTAIN GEODETIC ELEVATIONS (1978 RE-ADJUSTMENT), SUBTRACT 0.12 m FROM THE VALUES SHOWN HEREON.

BEARING NOTE

BEARINGS ARE ASTRONOMIC AND ARE REFERRED TO THE NORTHWESTERLY LIMIT OF SURVEY BY RADY-PENTEK & EDWARD SURVEYING LTD, DATED NOV. 1, 1999, HAVING A BEARING OF N39°10'45"E.

LEGEND

■	DENOTES	SURVEY MONUMENT FOUND
IB	DENOTES	IRON BAR
SIB	DENOTES	STANDARD IRON BAR
SSIB	DENOTES	SHORT STANDARD IRON BAR
TC	DENOTES	TOP OF CURB
BC	DENOTES	BOTTOM OF CURB
CCT	DENOTES	CURB CUT
MH	DENOTES	MANHOLE
CB	DENOTES	CATCH BASIN
WUP	DENOTES	WOOD UTILITY POLE
WV	DENOTES	WATER VALVE
INV.	DENOTES	INVERT
BB	DENOTES	BELL BOX
P1	DENOTES	PLAN 73224VS
P2	DENOTES	PLAN BY RADY-PENTEK & EDWARD SURVEYING LTD. DATED NOV. 1, 1999
0.20øD	DENOTES	DECIDUOUS TREE WITH TRUNK DIAMETER
0.20øC	DENOTES	CONIFEROUS TREE WITH TRUNK DIAMETER

TREE CANOPIES ARE DRAWN TO SCALE.

WSG	DENOTES	GREEN WOOD STAKE
WSO	DENOTES	ORANGE WOOD STAKE
(green dashed line)	DENOTES	FOREST DRIPLINE (GREEN STAKES)
(red dashed line)	DENOTES	TOP OF BANK (ORANGE STAKES)

SANITARY MANHOLE MEASURED ON AUGUST 17, 2020.

FOREST DRIPLINE AND TOP OF BANK STAKED OUT BY CREDIT VALLEY CONSERVATION ON JANUARY 24, 2020.

SURVEYOR'S CERTIFICATE

I CERTIFY THAT :

1. THE FIELD SURVEY REPRESENTED ON THIS PLAN WAS COMPLETED DECEMBER 9, 2019

DECEMBER 10, 2019
DATE

BORYS KUBICKI
ONTARIO LAND SURVEYOR

TARASICK McMILLAN KUBICKI LIMITED
ONTARIO LAND SURVEYORS
4181 SLADEVIEW CRESCENT, UNIT 42, MISSISSAUGA, ONTARIO L5L 5R2
TEL: (905) 569-8849 FAX: (905) 569-3160
E-MAIL: tmcm@bellnet.ca

DRAWN BY: Z. N./ A. W | FILE No. 4871-08-T-E

4871-19-T.dwg

APPENDIX B

Region of Peel Correspondence

Khalid Mahmood

From: Sniatenchuk, Bernadette <bernadette.sniatenchuk@peelregion.ca>
Sent: June 7, 2022 8:03 PM
To: Khalid Mahmood
Subject: OZ-22-006M - FSR revision - 2935 and 2955 Mississauga

Hi Khalid, nice to speak with you today. I noticed a discrepancy with the number of units. The Project Statistics plan states that there are 196 units and 20 units in the stacked Towns, with a total of 216 units. The FSR indicates in table 2-1, appendix E and the design sheet that there are 187 units in the building. Can you please revise the calculations to reflect the correct unit count.

Since you'll be revising the flows, we also recommend, for the design flow calculations, please consider the following PPU's, which are found in the Region of Peel 2020 DC Background Study:

- ☒Large Apartments (larger than 750 square feet) – 3.0
- ☒Small Apartments (equal to or less than 750 square feet) – 1.6

If you use these PPU's you'll have a smaller population and less flow. Using the person/ha is in our design criteria but your proposal does not take up all the space on the property. Analyzing a flow closer to the actual flow would be beneficial for the design of the connections.

The DARC proposal was slightly different, this proposal has been revised to include stacked towns which calls for our standard 1-8-2, looping. Please also include this standard in your design moving forward.

I requested hydrant flow tests with my comments to Deven on the DARC, however I know there are no hydrants (off the 400mm) near by. When I send the report for modelling will ask which hydrants they would prefer to have the tests done.

I will also ask about drainage to the manhole on the 2250mm sanitary sewer located on private property to the back.

Once you update the flows as per the correct units, please send the revised FSR back to me and I'll send it for modelling.
Thanks!

Bernadette Sniatenchuk, B.Sc.
Project Manager – Servicing Connections

Planning & Development Services
Public Works, Region of Peel
10 Peel Centre Drive, Suite B, 4th Floor
Brampton, On L6T 4B9
Mobile: 647-285-5919

In response to the emergence of the novel coronavirus, the Region of Peel is implementing various measures to protect our customers, employees and workplaces. Development Services will endeavour to maintain the continuity of our business operations, however delays in service may still be experienced. We appreciate your patience during this time.

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Elliot Pai

From: Sniatenchuk, Bernadette <bernadette.sniatenchuk@peelregion.ca>
Sent: December 23, 2020 3:40 PM
To: Deven Verma
Cc: Razao, Ricardo
Subject: DI-19-078M modelling results

Hi Deven, Here are the modelling results for the proposal associated with DI-19-078M:

Wastewater:
There is no existing municipal sanitary sewer on Mississauga Road. You inquired about a forcemain proposal however, so I'm just going to reiterate that we do not have any standards for forcemains within the road allowance and therefore we will not accept a forcemain. We will accept gravity only. The transition from forcemain to gravity shall occur on private side so that the sampling maintenance hole at the property does not experience the velocities from the forcemain. The property line sampling maintenance hole will accept flow by gravity. The Region only permits connections to sanitary trunk sewer maintenance holes where there is no other option available.

There are no future wastewater capital and masterplan projects planned in the vicinity of the proposed development. The calculated peak wet weather flow if 9.8L/s. The demand table submitted indicated that connection point is Existing MH 3T and it appears to be existing manhole on the 1050mm sanitary trunk along Mississauga Road, shown on as-constructed drawing C11328. The existing wastewater system has sufficient capacity to receive the proposed flows and we recommend connection to maintenance hole SA MH2T on the 1050mm Trunk Sewer along Mississauga Road instead of SAMH3T.

I found some emails in the system that you sent to Wastewater inquiring about the inverts for the manholes on the 1050mm trunk sewer around the time I had sent this site for modelling. I saw that my colleague, Bogdan, referred you to our Operations staff. What was the outcome of that? Please keep me in the loop regarding this. In future, if you have any questions related to the servicing of this site, please let me know.

Water:
As I mentioned previously, this type of development requires connection to a minimum size municipal watermain of 300mm and there is currently a 150mm watermain within Mississauga Road. This development would not be permitted to connect to the 150mm watermain on Mississauga Road. There are no future water capital and masterplan projects planned in the vicinity of the proposed development. The closest existing municipal watermain is the 400mm watermain on Dundas Street and modelling has confirmed that there is capacity in this watermain to service the proposed development. The 150mm watermain cannot be removed as it is servicing an existing resident. We recommend that you investigate connection to the 400mm watermain on Dundas. I suggest pulling the records for the intersection of Mississauga Road and Dundas and investigating the ownership/status of the lands between the subject site and the Roads. PUCC may be required.

When this proposal is submitted under a formal planning application, we will require a complete FSR (I sent the link earlier this year) which should include a servicing plan and a hydrant flow test. We will analyse the servicing proposal in further detail.

Thanks and I hope you have a happy holiday!
Bernadette Sniatenchuk, B.Sc.
Project Manager – Servicing Connections

Development Services, Public Works, Region of Peel
10 Peel Centre Drive, Suite B, 4th Floor
Brampton, On L6T 4B9
e-mail: bernadette.sniatenchuk@peelregion.ca
Phone: 905-791-7800, ext.8589
Mobile: 647-285-5919

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APPENDIX C

Watermain Calculations

FIRE FLOW CALCULATIONS - PROPOSED APARTMENTS

PROJECT: 2935, 2955 Mississauga Road
LOCATION: Mississauga
DATE: August 29, 2023

DESIGNED BY: Deven Verma, EIT
REVIEWED BY: Khalid Mahmood, P.Eng.

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

NOTE Table based on procedures and figures from the Water Supply for Public Fire Protection - Fire Underwriters Survey of Canada, 2020.

Exposure distance factor max adjustment is 75%

Type of building construction is non combustible as confirmed by architect.

Two largest adjoining floors Floor Area (Floor # and #3) (m2)	3263.2
50% of Floor Area of Floors above Floor #3, up to eight floors. (Floor #3-#6) (m2)	3413.7
Total Floor Area considered for fire flow (A) (m2)	6676.9

A = Two largest adjoinoing floors plus 50 percent of each of any floors immediately above them up to eight.

Manual Input

PROPOSED RESIDENTIAL UNIT

Step	Description	Term	Options		Multiplier Associated with Option	Value used	Unit	Total Fire Flow (L/min)
1	Frame Use for Construction of Unit	**Building Material**						
		Coefficient related to type of construction (C) (Note: C value is based on the wood frame types of construction as confirmed by the architect)	Wood Frame		1.5	1.0*	N/A	N/A
			Ordinary Construction		1			
			Non-Combustible Construction		0.8			
			Fire Resistive materials		0.6			
2	Number of Storeys	Number of floors (Largest floor pair + upto eight floors above them)				7.0	N/A	N/A
3	Floor Area (A)	Total Floor Area (A) - Two largest adjoinoing floors plus 50 percent of each of any floors immediately above them up to eight (m²)				6,676.9*	(m²)	N/A
		Average Floor Measurements	Square Feet (ft²)		0.093	953.8*		
			Square Metres (m²)		1			
			Hectares (ha)		10,000			
4	Fire Flow	Required fire flow without reductions or increases (rounded to the nearest 1000 L/min:					L/min	18,000
5	Combustibility of Building Contents	**Reductions / Increases From Factors Affecting Burning**						
		Occupancy content hazard reduction or surcharge Factor	Non-Combustible		-0.25	-0.15	N/A	-2,700
			Limited Combustible		-0.15			
			Combustible		0.00			
			Free Burning		0.15			
			Rapid Burning		0.25			
6	Building Equipped with Sprinklers	Sprinkler Reduction Factor	Complete Automatic Sprinklers		-0.50	-0.50	N/A	-9,000
			Adequate Automatic Sprinklers		-0.30			
			None		0.00			
7	Separation Distance Between Buildings	Exposure Distance Factor *	North Separation	45m+	0.00	0.05	N/A	900
			South Separation	45m+	0.00			
			East Separation	30.1 to 45m	0.05			
			West Separation	45m+	0.00			
8	Required Fire Flow	**Total Required Fire Flow Rounded to the Nearest 1000 L/min:**						**7,000**
		Total Required Fire Flow in L/s:						116.67
		Duration of Fire Flow (hrs):						2.00
		Required Volume of Fire Flow (m³):						840

*Floor areas confirmed with the architect (Architecture Unfolded.). Coefficient for type of construciton (C) is for wood frame construction as confimred by the architect.

Separation Distance Factor as per Fire Underwriters Survey of Canada, 2020

Seperation	*Charge*	*Seperation*	*Charge*
0 to 3m	*25%*	*20.1 to 30m*	*10%*
3.1 to 10m	*20%*	*30.1 to 45m*	*5%*
10.1m to 20m	*15%*		

Acceptable Fire Flow ranges as per Fire Underwriters Survey of Canada, 2020

2,000 Lpm < F < 45,000 Lpm; therefore acceptable

Note: For types of construction that do not fall within the categories given, coefficients shall not be greater than 1.5 nor less than 0.6 and may be determined by interpolation between consecutive construction types as listed above. Construction types are defined in the Appendix.

NOTE: THIS IS ONLY PRELIMINARY AND SUBJECT TO CHANGE BASED ON ARCHITECTURAL AND MECHANICAL DESIGN. THIS IS ONLY FOR AN ESTIMATE AS WE DO NOT CLAIM TO BE FIRE PROTECTION EXPERTS.

FIRE FLOW CALCULATIONS - PROPOSED STACKED TOWNHOUSES

PROJECT: 2935, 2955 Mississauga Road
LOCATION: Mississauga
DATE: August 29, 2023

DESIGNED BY: Deven Verma, EIT
REVIEWED BY: Khalid Mahmood, P.Eng.

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

NOTE Table based on procedures and figures from the Water Supply for Public Fire Protection - Fire Underwriters Survey of Canada, 2020.

Exposure distance factor max adjustment is 75%

Type of building construction is wood frame as confirmed by architect.

Two largest adjoining floors Floor Area (Floor 1 # and #2) (m2)	1000.2
50% of Floor Area of Floors above Floor #2, up to eight floors. (Floor #3 to #5) (m2)	82.8
Total Floor Area considered for fire flow (A) (m2)	1083.0

A = Two largest adjoinoing floors plus 50 percent of each of any floors immediately above them up to eight.

Manual Input

PROPOSED RESIDENTIAL UNIT

Step	Description	Term	Options		Multiplier Associated with Option	Value used	Unit	Total Fire Flow (L/min)
		Building Material						
1	Frame Use for Construction of Unit	Coefficient related to type of construction (C) (Note: C value is based on the wood frame types of construction as confirmed by the architect)	Wood Frame		1.5	1.5*	N/A	N/A
			Ordinary Construction		1			
			Non-Combustible Construction		0.8			
			Fire Resistive materials		0.6			
2	Number of Storeys	Number of floors (Largest floor pair + upto eight floors above them)				3.0	N/A	N/A
3	Floor Area (A)	Total Floor Area (A) - Two largest adjoinoing floors plus 50 percent of each of any floors immediately above them up to eight (m²)				1,083.0*	(m²)	N/A
		Average Floor Measurements	Square Feet (ft²)		0.093	361.0*		
			Square Metres (m²)		1			
			Hectares (ha)		10,000			
4	Fire Flow	Required fire flow without reductions or increases (rounded to the nearest 1000 L/min:					L/min	11,000
		Reductions / Increases From Factors Affecting Burning						
5	Combustibility of Building Contents	Occupancy content hazard reduction or surcharge Factor	Non-Combustible		-0.25	-0.15	N/A	-1,650
			Limited Combustible		-0.15			
			Combustible		0.00			
			Free Burning		0.15			
			Rapid Burning		0.25			
6	Building Equipped with Sprinklers	Sprinkler Reduction Factor	Complete Automatic Sprinklers		-0.50	-0.50	N/A	-5,500
			Adequate Automatic Sprinklers		-0.30			
			None		0.00			
7	Separation Distance Between Buildings	Exposure Distance Factor *	North Separation	45m+	0.00	0.05	N/A	550
			South Separation	45m+	0.00			
			East Separation	45m+	0.00			
			West Separation	30.1 to 45m	0.05			
8	Required Fire Flow	**Total Required Fire Flow Rounded to the Nearest 1000 L/min:**						**4,000**
		Total Required Fire Flow in L/s:						66.67
		Duration of Fire Flow (hrs):						1.50
		Required Volume of Fire Flow (m³):						360

*Floor areas confirmed with the architect (Architecture Unfolded.). Coefficient for type of construciton (C) is for wood frame construction as confimred by the architect.

Separation Distance Factor as per Fire Underwriters Survey of Canada, 2020

Seperation	*Charge*	*Seperation*	*Charge*
0 to 3m	*25%*	*20.1 to 30m*	*10%*
3.1 to 10m	*20%*	*30.1 to 45m*	*5%*
10.1m to 20m	*15%*		

Acceptable Fire Flow ranges as per Fire Underwriters Survey of Canada, 2020

2,000 Lpm < F < 45,000 Lpm; therefore acceptable

Note: For types of construction that do not fall within the categories given, coefficients shall not be greater than 1.5 nor less than 0.6 and may be determined by interpolation between consecutive construction types as listed above. Construction types are defined in the Appendix.

NOTE: THIS IS ONLY PRELIMINARY AND SUBJECT TO CHANGE BASED ON ARCHITECTURAL AND MECHANICAL DESIGN. THIS IS ONLY FOR AN ESTIMATE AS WE DO NOT CLAIM TO BE FIRE PROTECTION EXPERTS.

WATER DEMAND CALCULATIONS

PROJECT: 2935, 2955 Mississauga Road
LOCATION: Mississauga
DATE: August 29, 2023

DESIGNED BY: Deven Verma, EIT
REVIEWED BY: Khalid Mahmood, P.Eng.

Greck

Manual Input
Automatic Output
Total Demand

Design Parameters

Residential		
Townhouse Units	15	(Architect)
Number of Condo Units	196	(Architect)
Person per Unit (Townhouse)	3.3	(Region of Peel, Development Charges Background Study, December 2020, Chapter 3, Section 4)
Person per Unit (Apartment)	3.0	(Region of Peel, Development Charges Background Study, December 2020, Chapter 3, Section 4)
Total Population	638	
Average Daily flow (L/cap/day):	280	(Region of Peel, Watermain Design Criteria Section 2.3 Table 1)
Maximum Day Factor:	2.00	(Region of Peel, Watermain Design Criteria Section 2.3 Table 1)
Peak Hour Factor:	3.00	(Region of Peel, Watermain Design Criteria Section 2.3 Table 1)
Fire Flow Demand - Proposed Apartment Building (L/min)	7,000	Calculated (Fire underwriters survey, 2020)
Fire Flow Demand - Proposed Stacked Townhouses) (L/min)	4,000	Calculated (Fire underwriters survey, 2020)
Fire Flow Demand - Considered for Development (L/min)	7000	Calculated (Fire underwriters survey, 2020)
Fire Flow Demand - Considered for Development (L/sec)	116.67	Calculated (Fire underwriters survey, 2020)

Notes: Fire Flow calculated based on Fire Underwriters Survey (2020), calculations attached.

Total Water Demand - Proposed Building

Total Population	Average Daily Demand (ADD)		Max. Daily Demand (MDD)		Peak Hour Demand (PHD)		Fire Flow Demand (FFD)		MDD +FFD	Total Water Demand*	
#	(L/day)	(L/min)	(L/day)	(L/min)	(L/day)	(L/min)	(L/Min)	(L/s)	(L/min)	(L/min)	(L/s)
638	178,500.00	123.96	357,000.00	247.92	535,500.00	371.88	7,000.00	116.67	7,247.92	7,247.92	120.80

* Total water demand is the higher of MDD+Fire flow or Peak Hour Demand

APPENDIX D

Sanitary Calculations

Region of Peel
SANITARY SEWER DESIGN SHEET

Project / Subdivision : 2935, 2955 Mississauga Road
Prepared by: Deven Verma
Last Revised: October 10, 2023

Consulting Engineer : Greck and Associates Limited
Checked by: Khalid Mahmood, P. Eng

Project No.: 20-697

Design Parameters

			Residential Sanitary Demand =	302.8 L/cap/day (Region STD DWG 2-9-2)
Residential Density (Townhouse) =	3.3 person/unit	Region DC Study Dec 2020, Ch 3, Sect 4		0.0035 L/cap/s
Residential Density (Apartments) =	3.0 person/unit	Region DC Study Dec 2020, Ch 3, Sect 4		
Manning 'n' =	0.013			
Extran. Flow (general allowance)	0.20 l/s/ha	Region Sect 2.3		
Extran. Flow (manhole)	0.28 l/s/mh	Region Sect 2.3		
Uncertaintity Factor=	1			

Design Equations

Q(p) = peak population flow (L/s)
Q(i) = i x A = peak extraneous flow (L/s)
Q(c) = c x A / 86.4 = peak commercial flow (L/s)
Q(li) = li x A / 86.4 = peak light industrial flow (L/s)
Q(d) = Q(p) + Q(I)+Q(m) = peak design flow (L/s)

P = population
M = peaking factor (Harmon) M (Min) = 2
P = p x # units / 1000
$M = 1 + 14 / (4 + P^{1/2})$

Manning's Equation
$Qcap = 1/n*A*R^{0.67}S^{0.5}$
Q = (P x q x M) / 86.4

Notes/Comments: Minimum Allowable Actual Velocity 0.6 m/s, Max 3 m/s. **. Apartment population to be higher of 475/ ha or 2.7 person per unit**

References: Region of Peel Sanitary Sewer Design Criteria (Region), March 2017 REV (0.9 (CS)

Location			Individual Values				Cumulative Values					Cumulative Flow Data				Sewer Data (TBD)							
Area ID	From	To	Residential Stacked Townhouses Area	Residential Apartment Building Area	Residential Units (Apartments)	Residential Population	Residential Townhouse Area (Ha)	Residential Apartment Area (Ha)	Residential Units (Apartments)	Total Population	Residential P.F.	Population Peak Flow (L/s)	Peak Extran. Flow (General Allowance) (L/s)	Peak Extraneous Flow (Manhole) (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)	#	cap.		A(a)	#	P	M(r)	Q(P)	Q(I)	Q(m)	Q(d)	(m)	(mm)		(%)	(L/s)	(m/s)	(m/s)	%
PRIVATE : Stacked Townhomes	BLDG	SAN PLUG	0.55		15	50	0.55			50	4.31	0.76	0.11		0.87								
PRIVATE : CONDOMINIUM BUILDING "A"	BLDG	SAN PLUG		0.51	196	588	0.55	0.51	196	638	3.92	8.76	0.10		8.86								
PRIVATE	SAN PLUG	MH1A					0.55	0.51	196	638	3.92	8.76*	0.21	0.28	9.25*	7.59	200	PVC	1.00	32.80	1.04	0.90	28.2
												13.00			13.49								
OUTLET	MH1A	EX. SAN MH24					0.55	0.51	196	638	3.92	13.0	0.21	0.28	13.49	115.35	250	PVC	0.50	42.05	0.86	0.76	32.1

NOTE: *Region STD DWG 2-9-2 Note 3 : Domestic sewage flow for less than 1000 persons shall be 0.013 m3/s (13 l/s). 13.49 l/s used as value for total sanitary demand as per region standards.

APPENDIX E

Stormwater Management Calculations

CITY OF MISSISSAUGA
STORM SEWER DESIGN SHEET

Project / Subdivision : 2935 & 2955 Mississauga Road, Mississauga

Consulting Engineer : Greck and Associates Limited

Project No.: 20-704

Prepared by: Elliot Pai

Checked by: Khalid Mahmood, P.Eng

Last Revised: October 10, 2023

Design Parameters (5 Year Storm)

A = drainage area (ha)	T_{init}(hr)=	0.167
C = runoff coefficient	A=	820
T_c = time of concentration	B=	4.600
	C=	0.780

Design Parameters (100 Year Storm)

A = drainage area (ha)	T_{init}(hr)=	0.167
C = runoff coefficient	A=	1450
T_c = time of concentration	B=	4.900
	C=	0.780

Manning's (n): 0.013

System to be Designed for: 100 Year Storm

Design Equations

$$I = \frac{A}{(t + B)^C}$$

$$Q = 2.78 \times A \times C \times I$$

Location				Drainage Area Characteristics						Rainfall / Runoff			Sewer Data							
Street	Area ID	From	To	Area	Area	Cum. Area	Runoff Coeff. R	AR in Section	Cum. AR	Time of Concentratio	Rainfall Intensity	Runoff Q	Pipe Diameter	Pipe Length	Grade	Total Flow (Q Max)	% FULL	Full Flow Velocity	V (Actual)	Sect. Time	Accum. Time
		MH #	MH #	(m2)	(ha)	(ha)				(min)	(mm/hr)	m3/sec	(mm)	(m)	(%)	(m3/s)	%	(m/s)	(m/s)	(Min)	(Min)
	D1	Building	MH1	4,972	0.50	0.50	0.80	0.40	0.40	15.00	140.69	0.194	525	9.70	0.50	0.30	63.9%	1.40	1.49	0.11	15.11
		MH1	HW1		0.00	0.50	0.00	0.00	0.40	15.11	140.09	0.194	525	3.16	0.50	0.30	63.7%	1.40	1.49	0.04	15.14
	D2	CB1	CBMH1	348.00	0.03	0.03	0.83	0.03	0.03	15.00	140.69	0.014	300	14.16	2.00	0.14	10.3%	1.93	1.24	0.19	15.19
		CBMH1	RETAINING WALL OUTLET		0.00	0.03	0.00	0.00	0.03	15.19	139.65	0.011	300	1.21	2.00	0.14	8.1%	1.96	1.17	0.02	15.21

Site Characteristics
Site: 2935, 2955 Mississauga Road
October 13, 2023

Pre-Development

Land-Use	Impervious Ratio	Area A1 (m^2)	Area B1 (m^2)	Area C2 (m^2)	Area D1 (m^2)	Total (m^2)
Roof	1.00	0	0	0	0	0
Asphalt Driveway	1.00	0	0	0	0	0
Hardscape	1.00	0	0	0	0	0
Grassed area	0.00	580	485	2204	8168	11437
Total		580	485	2204	8168	11437
	% Impervious =	0%	0%	0%	0%	0%
	Runoff Coefficient* =	0.25	0.25	0.25	0.25	0.25

Post-Development

Land-Use	Impervious Ratio	Area A1 (m^2)	Area A2 (m^2)	Area B1 (m^2)	Area B2 (m^2)	Area C2 (m^2)	Area D1 (m^2)	Area D2 (m^2)	Total (m^2)
Roof	1.00	0	0	0	0	0	2144	0	2144
Asphalt Driveway	1.00	0	0	0	0	0	765	310	1075
Hardscape	1.00	0	0	0	0	0	1328	0	1328
Grassed area	0.00	580	1511	485	1338	2204	734	38	6890
Total		580	1511	485	1338	2204	4972	348	11437
	% Impervious =	0%	0%	0%	0%	0%	85%	89%	40%
	Runoff Coefficient* =	0.25	0.25	0.25	0.25	0.25	0.80	0.83	0.51

Drainage Area to Proposed Driveway Culvert (External Drainage Area C1 + Area C2 + Area D1 + Area D2)

Land-Use	Impervious Ratio	Area C1 (m^2)	Area C2 (m^2)	Area D1 (m^2)	Area D2 (m^2)	Total (m^2)
Roof	1.00	0	0	2144	0	2144
Asphalt Driveway	1.00	0	0	765	310	1075
Hardscape	1.00	5595	0	1328	0	6924
Grassed area	0.00	11180	2204	734	38	14156
Total		16775	2204	4972	348	24299
	% Impervious =	33%	0%	85%	89%	42%
	Runoff Coefficient* =	0.47	0.25	0.80	0.83	0.52

* Total Imperviouness (TIMP) Conversion Equation: $TIMP = \frac{C - 0.25}{0.65}$ linearly Interpolated based on a 0.25 runoff for pervious areas and 0.9 runoff for impervious areas

Peak Runoff Assessment
Site: 2935, 2955 Mississauga Road
October 13, 2023

Time of Concentration Calculations

Time of Concentration

Airport

If Runoff Coefficient < 0.4

$$T_c = \frac{3.26\,(1.1 - C)\,L^{0.5}}{S_w^{0.33}}$$

where, L = Flow length (m)
Sw = slope (%)
C = Runoff Coefficient

Bransby

If Runoff Coefficient > 0.4

$$T_c = \frac{0.057\,L}{S_w^{0.2}\,A^{0.1}}$$

where, L = Flow length (m)
Sw = slope (%)
A = Area (ha)

Existing

Area	Runoff Coefficient	Method	Length (m)	Area (ha)	S (%)	T (min)
Area A1 + B1 + D1	0.25	Airport	132.6	0.923	4.70	19.15
Area C1 + C2	0.44	Bransby	300.4	1.898	38.90	7.72

Proposed

Area	Runoff Coefficient	Method	Length (m)	Area (ha)	S (%)	T (min)
Area A1 + A2	0.25	Airport	99.5	0.209	1.20	26.03
Area B1 + B2	0.25	Airport	69.2	0.182	4.20	14.36
Area C1 + C2	0.44	Bransby	300.4	1.898	38.90	7.72
Area D1 + D2	0.81	Bransby	-	0.532	-	15.00

* Majority of Area D1 is roof or driveway area, which is serviced by floor drains. Therefore, the post-development time of concentration was assumed to be the minimum inlet time of 15 minutes as per City of Mississauga Design Criteria

Peak Runoff Assessment

2 year Rainfall Intensity, I = $610 (T+4.6)^{0.78}$

100 year Rainfall Intensity, I = $1450 (T+4.9)^{0.78}$

T = Time of Concentration

Peak Runoff, Q = 2.78 ACI / 1000

C = Runoff Coefficient

A = Area (ha)

I = Rainfall Intensity (mm/hr)

a correctional factor of 1.25 as been applied to the 100 year peak runoff calculation

Existing

Drainage Area	Area (ha)	Intensity (mm/hr)		Runoff Coefficient		Peak Runoff (L/s)	
		2 Year	100 Year	2 Year	100 Year	2 Year	100 Year
Area A1 + B1 + D1	0.923	52	121	0.25	0.25	33.1	97.3
Area C1 + C2	1.898	86	201	0.44	0.44	200.3	584.1
					Total	233.4	681.3

Proposed

Drainage Area	Area (ha)	Intensity (mm/hr)		Runoff Coefficient		Peak Runoff (L/s)	
		2 Year	100 Year	2 Year	100 Year	2 Year	100 Year
Area A1 + A2	0.209	42	100	0.25	0.25	6.1	18.1
Area B1 + B2	0.182	61	144	0.25	0.25	7.8	22.8
Area D1 + D2	0.532	60	141	0.81	0.81	71.3	209.4
Area C1 + C2	1.898	86	201	0.44	0.44	200.3	584.1
					Total	285.5	834.4

Capacity calculations for storm sewer directing runoff to the underground storage chambers

The stormsewers directing runoff to the underground storage chambers are to be sized for the water quality storm event, the 25mm storm event

MOE SWM Planning & Design Manual Equation 4.9: 25mm Storm Intensity

i =	43C + 5.9	
Area D1 Runoff Coefficient =	0.80	
Intensity =	40.5	mm/hr

MOE SWM Planning & Design Manual Equation 4.8: 25mm Storm Intensity

Q =	CiA/360	
Runoff Coefficient =	0.80	
Intensity =	40.47	mm/hr
Drainage Area (Area D1) =	0.50	ha
Q =	0.04	m^3/s
Q =	44.94	L/s

Stormsewer Sizing to underground storage chambers

Pipe Size =	300.00	mm
Slope =	0.50%	
Manning's roughness =	0.013	
Area =	0.071	m^2
Perimeter =	0.942	m
Hydraulic Radius =	0.075	m
Capacity =	0.07	m^3/s

Erosion Assessment of Area A1 + A2 swale outlet

Determine velocity of flows for rip rap protection at swale discharge towards valley slope (Area A1 + A2)

Spillway Length =	3	m
Weir Coefficient =	1.84	
Weir Equation:	$Q = C L H^{3/2}$	
H =	0.022	m
Flow Area =	0.07	m^2
Flow Velocity =	0.27	m/s

Flow velocities do not exceed 1.5 m/s, therefore rip rap protection is not required. However as a precaution, 150mm diameter riprap with 300mm depth is proposed

Erosion Control/Infiltration Targets
Site: 2935, 2955 Mississauga Road
October 13, 2023

Erosion Control / Infiltration Target Volume Calculations

The 5mm volume is required to be infiltrated throughout the development (Area D1+D2).
Runoff from Area D1 directed to the underground infiltration chambers.
Runoff from Area D2 are uncontrolled

Impervious Development Area (Area D1 + D2) =	4547.34	m^2	
Erosion Control Volume Required =	Total Drainage Area X 5mm		as per CVC erosion control criteria
Erosion Control Volume Required =	**22.74**	**m^3**	
Total Volume Infiltrated =	LID Storage		
Storage provided by LIDs (Infiltration Chambers) =	24.1	m^3	
Total Volume Infiltrated =	**24.1**	m^3	

Infiltration Chamber Storage
Site: 2935, 2955 Mississauga Road
October 13, 2023

CULTEC underground chamber depth-storage-drawdown time table

Infiltration Rate* =	17	mm/hr
Infiltration Rate (2.5 Factor of Safety) =	7	mm/hr

*The minimum percolation rate reported from the Test Pit Investigation completed by Terraprobe dated September 22, 2015
**Obtained from the Recharger 330XLHD Incremental Storage Volumes

Depth (m)	Water Surface Elevation (m)	Cum. Volume (m^3)**	Drawdown Time (hr)	
1.08	100.67	60.89	133	
1.05	100.64	59.97	131	
1.03	100.62	59.05	130	
1.00	100.59	58.12	129	
0.98	100.57	57.20	127	
0.95	100.54	56.28	126	
0.93	100.51	55.36	122	
0.91	100.50	54.90	120	
0.89	100.48	53.92	116	
0.86	100.45	52.85	113	
0.84	100.43	51.68	109	
0.81	100.40	50.40	105	
0.79	100.38	49.04	101	
0.76	100.35	47.62	98	
0.74	100.32	46.14	94	
0.71	100.30	44.61	90	
0.69	100.27	43.05	87	
0.66	100.25	41.45	83	
0.64	100.22	39.82	79	
0.61	100.20	38.16	76	
0.58	100.17	36.47	72	
0.56	100.15	34.76	68	
0.53	100.12	33.02	64	*MAXIMUM WSEL BEFORE STORMWATER IS REDIRECTED TO OUTLET
0.51	100.10	31.24	61	
0.48	100.07	29.46	57	
0.46	100.04	27.67	53	
0.43	100.02	25.87	50	
0.41	99.99	24.06	46	*maximum storage provided
0.38	99.97	22.25	42	
0.36	99.94	20.44	39	
0.33	99.92	18.61	35	
0.30	99.89	16.75	31	
0.28	99.87	14.89	27	
0.25	99.84	13.03	24	
0.23	99.82	11.16	20	
0.20	99.79	9.29	16	
0.18	99.77	7.42	13	
0.15	99.74	5.53	9	
0.13	99.71	4.61	7	
0.10	99.69	3.69	6	
0.08	99.66	2.77	4	
0.05	99.64	1.84	3	
0.03	99.61	0.92	1	
0.00	99.59	0.00	0	

Area D1, D2: Treatment Train TSS Removal Calculations

Site: 2935, 2955 Mississauga Road

October 13, 2023

Area D1

LID	Initial Loading	TSS Removal Efficiency	Remaining TSS Loading
OGS	1.00	50.00%	0.50
Infiltration Chambers	0.50	80.00%	0.10
Vegetated Filter Strip	0.10	50.00%	0.05

Total Removal Efficiency = 95.00%

The OGS unit was sized for 50% TSS removal (see OGS Sizing Report)

The Low Impact Development Stormwater Management Planning and Design Guide by TRCA and CVC reports a TSS removal of 70% - 90% provided by infiltration trench. Therefore a median value of 80% was used

The Low Impact Development Stormwater Management Planning and Design Guide by TRCA and CVC reports a TSS removal of 20% - 80% provided by vegetated filter strips. Therefore a median value of 50% was used

Quality Control
Site: 2935, 2955 Mississauga Road
October 13, 2023

Provide Enhanced Treatment (80% TSS)

Water Quality Volume

Area	Total Area (m^2)	Runoff Coefficient	% Impervious = (C-0.25) / 0.65	Water Quality Volume* (m^3/ha)	Water Quality Volume* (m^3)
D1+D2	5319	0.81	85%	39.8	21.2

*as per Table 3.2 of MOE SWM Planning and Design Manual for infiltration

Overall TSS Removal Provided for Area D1 and D2

Area	Drainage Area	% TSS Removal
D1	4971.9	95%
D2	347.6	50%
	Averaged % TSS Removal =	92%

Culvert Outlet Rip-Rap Protection Calculator

Rip-Rap Stone Sizing Quantifier

Reference: U.S. Department of Transportation (Federal Highway Administration)
https://www.fhwa.dot.gov/engineering/hydraulics/pubs/06086/hec14.pdf

Details:

Culvert Properties

Flow from Area D1 + D2, Q (m3/s):	0.209
Culvert Diameter, D (m):	0.525
Tailwater depth, TW (m):	0.21
Acceleration due to gravity, g (m/s2)	9.81

$$D_{50} = 0.2\,D\left(\frac{Q}{\sqrt{g}D^{2.5}}\right)^{4/3}\left(\frac{D}{TW}\right)$$

If TW/D < 0.4D = 0.4D, otherwise = 1D. Tailwater depth should be limited to between 0.4D and 1.0D. If tailwater is unknown, use 0.4D. TW = 0.4D

Rip-Rap Outlet Control Results:

Calculated D50 (mm) =	61
Proposed D50 (mm) =	**150**
Apron Length (m) =	2.1
Apron Depth (m) =	0.5
Apron Width (m) =	3.0

Class	D_{50} (mm)	D_{50} (in)	Apron Length*	Apron Depth***
1	125	5	4D	$3.5D_{50}$
2	150	6	4D	$3.3D_{50}$
3	250	10	5D	$2.4D_{50}$
4	350	14	6D	$2.2D_{50}$
5	500	20	7D	$2.0D_{50}$
6	550	22	8D	$2.0D_{50}$

*D is the culvert rise.

**Reference: U.S. Department of Transportation (Federal Highway Administration)

Irregular Shaped Channel Rating Curve Design Sheet

Site : 2935, 2955 Mississauga Road, Mississauga

-INPUT -

CHANNEL SLOPE =	0.0050	(m/m)
Left Slope Low Channel =	3	# of horiz/vert [x]
Right Slope Low Channel =	3	# of horiz/vert [y]
Left Slope High Channel =	3.000	# of horiz/vert [w]
Right Slope High Channel =	3.000	# of horiz/vert [z]
Elev. Top of Left Bank Low Channel =	0	
Elev. Top of Right Bank Low Channel =	0	
'n' Channel Base =	0.035	
'n' Left Low Channel Wall =	0.035	
'n' Right Low Channel Wall =	0.035	
'n' Left High Channel Wall =	0.035	
'n' Right High Channel Wall=	0.035	
Width of Low Channel Base (m) =	0	

Notes:
- V-Swale Conveying Major Drainage from Area A1 and A2
- The v-swale has a minimum slope of 0.5%, 3:1 side slopes and a min. depth of 0.15m
- Area A1 + A2 = 100-year flow of 18.1L/s
- The proposed V-swale has a capacity of 0.023m^3/s
- Therefore, the proposed v-swale has sufficient capacity to convey major flows

FLOW DEPTH INCRIMENT 0.01

Flow Depth (m)	Flow Area (sq m)	Wetted Perimeter (m)	Equiv. 'n'	Hydr. Radius (m)	Velocity (m/s)	Q (cms)	Area Calculations					Wetted Perimeter				
							Base (sq.m)	Low Left (sq.m)	Low Righ (sq.m)	High Left (sq.m)	High Righ (sq.m)	Base (m)	Low Left (m)	Low Righ (m)	High Left (m)	High Right (m)
0.000	0.00	0.00	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	0.00	0.000	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.00
0.010	0.00	0.06	0.035	0.005	0.06	0.000	0.00	0.000	0.000	0.000	0.000	0.00	0.00	0.00	0.03	0.03
0.020	0.00	0.13	0.035	0.009	0.09	0.000	0.00	0.000	0.000	0.001	0.001	0.00	0.00	0.00	0.06	0.06
0.030	0.00	0.19	0.035	0.014	0.12	0.000	0.00	0.000	0.000	0.001	0.001	0.00	0.00	0.00	0.09	0.09
0.040	0.00	0.25	0.035	0.019	0.14	0.001	0.00	0.000	0.000	0.002	0.002	0.00	0.00	0.00	0.13	0.13
0.050	0.01	0.32	0.035	0.024	0.17	0.001	0.00	0.000	0.000	0.004	0.004	0.00	0.00	0.00	0.16	0.16
0.060	0.01	0.38	0.035	0.028	0.19	0.002	0.00	0.000	0.000	0.005	0.005	0.00	0.00	0.00	0.19	0.19
0.070	0.01	0.44	0.035	0.033	0.21	0.003	0.00	0.000	0.000	0.007	0.007	0.00	0.00	0.00	0.22	0.22
0.080	0.02	0.51	0.035	0.038	0.23	0.004	0.00	0.000	0.000	0.010	0.010	0.00	0.00	0.00	0.25	0.25
0.090	0.02	0.57	0.035	0.043	0.25	0.006	0.00	0.000	0.000	0.012	0.012	0.00	0.00	0.00	0.28	0.28
0.100	0.03	0.63	0.035	0.047	0.26	0.008	0.00	0.000	0.000	0.015	0.015	0.00	0.00	0.00	0.32	0.32
0.110	0.04	0.70	0.035	0.052	0.28	0.010	0.00	0.000	0.000	0.018	0.018	0.00	0.00	0.00	0.35	0.35
0.120	0.04	0.76	0.035	0.057	0.30	0.013	0.00	0.000	0.000	0.022	0.022	0.00	0.00	0.00	0.38	0.38
0.130	0.05	0.82	0.035	0.062	0.32	0.016	0.00	0.000	0.000	0.025	0.025	0.00	0.00	0.00	0.41	0.41
0.140	0.06	0.89	0.035	0.066	0.33	0.019	0.00	0.000	0.000	0.029	0.029	0.00	0.00	0.00	0.44	0.44
0.150	0.07	0.95	0.035	0.071	0.35	0.023	0.00	0.000	0.000	0.034	0.034	0.00	0.00	0.00	0.47	0.47
0.160	0.08	1.01	0.035	0.076	0.36	0.028	0.00	0.000	0.000	0.038	0.038	0.00	0.00	0.00	0.51	0.51
0.170	0.09	1.08	0.035	0.081	0.38	0.033	0.00	0.000	0.000	0.043	0.043	0.00	0.00	0.00	0.54	0.54
0.180	0.10	1.14	0.035	0.085	0.39	0.038	0.00	0.000	0.000	0.049	0.049	0.00	0.00	0.00	0.57	0.57
0.190	0.11	1.20	0.035	0.090	0.41	0.044	0.00	0.000	0.000	0.054	0.054	0.00	0.00	0.00	0.60	0.60
0.200	0.12	1.26	0.035	0.095	0.42	0.050	0.00	0.000	0.000	0.060	0.060	0.00	0.00	0.00	0.63	0.63
0.210	0.13	1.33	0.035	0.100	0.43	0.057	0.00	0.000	0.000	0.066	0.066	0.00	0.00	0.00	0.66	0.66
0.220	0.15	1.39	0.035	0.104	0.45	0.065	0.00	0.000	0.000	0.073	0.073	0.00	0.00	0.00	0.70	0.70
0.230	0.16	1.45	0.035	0.109	0.46	0.073	0.00	0.000	0.000	0.079	0.079	0.00	0.00	0.00	0.73	0.73
0.240	0.17	1.52	0.035	0.114	0.47	0.082	0.00	0.000	0.000	0.086	0.086	0.00	0.00	0.00	0.76	0.76
0.250	0.19	1.58	0.035	0.119	0.49	0.091	0.00	0.000	0.000	0.094	0.094	0.00	0.00	0.00	0.79	0.79
0.260	0.20	1.64	0.035	0.123	0.50	0.102	0.00	0.000	0.000	0.101	0.101	0.00	0.00	0.00	0.82	0.82
0.270	0.22	1.71	0.035	0.128	0.51	0.112	0.00	0.000	0.000	0.109	0.109	0.00	0.00	0.00	0.85	0.85
0.280	0.24	1.77	0.035	0.133	0.53	0.124	0.00	0.000	0.000	0.118	0.118	0.00	0.00	0.00	0.89	0.89
0.290	0.25	1.83	0.035	0.138	0.54	0.136	0.00	0.000	0.000	0.126	0.126	0.00	0.00	0.00	0.92	0.92
0.300	0.27	1.90	0.035	0.142	0.55	0.149	0.00	0.000	0.000	0.135	0.135	0.00	0.00	0.00	0.95	0.95
0.310	0.29	1.96	0.035	0.147	0.56	0.162	0.00	0.000	0.000	0.144	0.144	0.00	0.00	0.00	0.98	0.98
0.320	0.31	2.02	0.035	0.152	0.57	0.177	0.00	0.000	0.000	0.154	0.154	0.00	0.00	0.00	1.01	1.01

Irregular Shaped Channel Rating Curve Design Sheet

Site : 2935, 2955 Mississauga Road, Mississauga

-INPUT -

CHANNEL SLOPE =	0.0170	(m/m)
Left Slope Low Channel =	3	# of horiz/vert [x]
Right Slope Low Channel =	3	# of horiz/vert [y]
Left Slope High Channel =	3.000	# of horiz/vert [w]
Right Slope High Channel =	3.000	# of horiz/vert [z]
Elev. Top of Left Bank Low Channel =	0	
Elev. Top of Right Bank Low Channel =	0	
'n' Channel Base =	0.035	
'n' Left Low Channel Wall =	0.035	
'n' Right Low Channel Wall =	0.035	
'n' Left High Channel Wall =	0.035	
'n' Right High Channel Wall=	0.035	
Width of Low Channel Base (m) =	0	

Notes:
- V-Swale Conveying Major Drainage from Area B1 and B2
- The v-swale has a minimum slope of 1.7%, 3:1 side slopes and a min. depth of 0.15m
- Area B1 + B2 = 100-year flow of 22.8L/s
- The proposed V-swale has a capacity of 0.043m^3/s
- Therefore, the proposed v-swale has sufficient capacity to convey major flows

FLOW DEPTH INCRIMENT 0.01

Flow Depth (m)	Flow Area (sq m)	Wetted Perimeter (m)	Equiv. 'n'	Hydr. Radius (m)	Velocity (m/s)	Q (cms)	Area Calculations					Wetted Perimeter				
							Base (sq.m)	Low Left (sq.m)	Low Righ (sq.m)	High Left (sq.m)	High Righ (sq.m)	Base (m)	Low Left (m)	Low Righ (m)	High Left (m)	High Right (m)
0.000	0.00	0.00	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	0.00	0.000	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.00
0.010	0.00	0.06	0.035	0.005	0.11	0.000	0.00	0.000	0.000	0.000	0.000	0.00	0.00	0.00	0.03	0.03
0.020	0.00	0.13	0.035	0.009	0.17	0.000	0.00	0.000	0.000	0.001	0.001	0.00	0.00	0.00	0.06	0.06
0.030	0.00	0.19	0.035	0.014	0.22	0.001	0.00	0.000	0.000	0.001	0.001	0.00	0.00	0.00	0.09	0.09
0.040	0.00	0.25	0.035	0.019	0.27	0.001	0.00	0.000	0.000	0.002	0.002	0.00	0.00	0.00	0.13	0.13
0.050	0.01	0.32	0.035	0.024	0.31	0.002	0.00	0.000	0.000	0.004	0.004	0.00	0.00	0.00	0.16	0.16
0.060	0.01	0.38	0.035	0.028	0.35	0.004	0.00	0.000	0.000	0.005	0.005	0.00	0.00	0.00	0.19	0.19
0.070	0.01	0.44	0.035	0.033	0.38	0.006	0.00	0.000	0.000	0.007	0.007	0.00	0.00	0.00	0.22	0.22
0.080	0.02	0.51	0.035	0.038	0.42	0.008	0.00	0.000	0.000	0.010	0.010	0.00	0.00	0.00	0.25	0.25
0.090	0.02	0.57	0.035	0.043	0.46	0.011	0.00	0.000	0.000	0.012	0.012	0.00	0.00	0.00	0.28	0.28
0.100	0.03	0.63	0.035	0.047	0.49	0.015	0.00	0.000	0.000	0.015	0.015	0.00	0.00	0.00	0.32	0.32
0.110	0.04	0.70	0.035	0.052	0.52	0.019	0.00	0.000	0.000	0.018	0.018	0.00	0.00	0.00	0.35	0.35
0.120	0.04	0.76	0.035	0.057	0.55	0.024	0.00	0.000	0.000	0.022	0.022	0.00	0.00	0.00	0.38	0.38
0.130	0.05	0.82	0.035	0.062	0.58	0.029	0.00	0.000	0.000	0.025	0.025	0.00	0.00	0.00	0.41	0.41
0.140	0.06	0.89	0.035	0.066	0.61	0.036	0.00	0.000	0.000	0.029	0.029	0.00	0.00	0.00	0.44	0.44
0.150	0.07	0.95	0.035	0.071	0.64	0.043	0.00	0.000	0.000	0.034	0.034	0.00	0.00	0.00	0.47	0.47
0.160	0.08	1.01	0.035	0.076	0.67	0.051	0.00	0.000	0.000	0.038	0.038	0.00	0.00	0.00	0.51	0.51
0.170	0.09	1.08	0.035	0.081	0.70	0.060	0.00	0.000	0.000	0.043	0.043	0.00	0.00	0.00	0.54	0.54
0.180	0.10	1.14	0.035	0.085	0.72	0.070	0.00	0.000	0.000	0.049	0.049	0.00	0.00	0.00	0.57	0.57
0.190	0.11	1.20	0.035	0.090	0.75	0.081	0.00	0.000	0.000	0.054	0.054	0.00	0.00	0.00	0.60	0.60
0.200	0.12	1.26	0.035	0.095	0.77	0.093	0.00	0.000	0.000	0.060	0.060	0.00	0.00	0.00	0.63	0.63
0.210	0.13	1.33	0.035	0.100	0.80	0.106	0.00	0.000	0.000	0.066	0.066	0.00	0.00	0.00	0.66	0.66
0.220	0.15	1.39	0.035	0.104	0.83	0.120	0.00	0.000	0.000	0.073	0.073	0.00	0.00	0.00	0.70	0.70
0.230	0.16	1.45	0.035	0.109	0.85	0.135	0.00	0.000	0.000	0.079	0.079	0.00	0.00	0.00	0.73	0.73
0.240	0.17	1.52	0.035	0.114	0.88	0.151	0.00	0.000	0.000	0.086	0.086	0.00	0.00	0.00	0.76	0.76
0.250	0.19	1.58	0.035	0.119	0.90	0.169	0.00	0.000	0.000	0.094	0.094	0.00	0.00	0.00	0.79	0.79
0.260	0.20	1.64	0.035	0.123	0.92	0.187	0.00	0.000	0.000	0.101	0.101	0.00	0.00	0.00	0.82	0.82
0.270	0.22	1.71	0.035	0.128	0.95	0.207	0.00	0.000	0.000	0.109	0.109	0.00	0.00	0.00	0.85	0.85
0.280	0.24	1.77	0.035	0.133	0.97	0.228	0.00	0.000	0.000	0.118	0.118	0.00	0.00	0.00	0.89	0.89
0.290	0.25	1.83	0.035	0.138	0.99	0.250	0.00	0.000	0.000	0.126	0.126	0.00	0.00	0.00	0.92	0.92
0.300	0.27	1.90	0.035	0.142	1.02	0.274	0.00	0.000	0.000	0.135	0.135	0.00	0.00	0.00	0.95	0.95
0.310	0.29	1.96	0.035	0.147	1.04	0.299	0.00	0.000	0.000	0.144	0.144	0.00	0.00	0.00	0.98	0.98
0.320	0.31	2.02	0.035	0.152	1.06	0.326	0.00	0.000	0.000	0.154	0.154	0.00	0.00	0.00	1.01	1.01

Climate Data								Pervious Area			Impervious Area		
Month	**Days in the month**	**Hours of Sunlight*** **	**Mean Temperature****	**Heat Index**	**Potential Evapo-transpiration ***	**Daylight Correction Value**	**Total Precipitation** ***	**Adjusted Potential Evapo-transpiration ##**	**Surplus**	**Deficit**	**Evaporation**	**Surplus**	**Deficit**
			(T) #	**I**	**mm/month**		**mm**	**mm**	**mm**	**mm**	**mm**	**mm**	**mm**
January	31	9.3	-4.7	0.00	0.0	0.80	59.8	0.00	59.8	0.0	6.0	53.8	0.0
February	28	10.5	-3.9	0.00	0.0	0.82	46.7	0.00	46.7	0.0	4.7	42.0	0.0
March	31	12.1	0.1	0.00	0.3	1.04	54.4	0.31	54.1	0.0	5.4	49.0	0.0
April	30	13.6	6.4	1.45	28.4	1.13	65.2	32.19	33.0	0.0	6.5	58.7	0.0
May	31	14.7	12.3	3.91	58.2	1.27	73.9	73.69	0.2	0.0	7.4	66.5	0.0
June	30	15	17.7	6.78	86.8	1.25	71.0	108.53	0.0	37.5	7.1	63.9	0.0
July	31	14.8	20.9	8.72	104.2	1.27	75.8	132.80	0.0	57.0	7.6	68.2	0.0
August	31	14.2	20.1	8.22	99.8	1.22	78.3	122.07	0.0	43.8	7.8	70.5	0.0
September	30	13.1	15.6	5.60	75.6	1.09	73.5	82.50	0.0	9.0	7.4	66.2	0.0
October	31	10.7	9.3	2.56	42.8	0.92	70.0	39.45	30.5	0.0	7.0	63.0	0.0
November	30	9.7	4.0	0.71	17.0	0.81	79.3	13.70	65.6	0.0	7.9	71.4	0.0
December	31	8.8	-1.3	0.00	0.0	0.76	58.8	0.00	58.8	0.0	5.88	52.9	0.0
TOTAL	365			38.0	513.1		**807**	**605**	**348.8**	**147**	**80.7**	**726.0**	**0**

Notes

* PET = 16 [10 T / I]^{a}

where, $\alpha = (675 * 10^{-9} * I^3) - (771 * 10^{-7} * I^2) + (1792 * 10^{-5} * I) + 0.49239 = 1.077$

**Canadian Climate Normals 1981-2010 Station Data - Oakville Southeast WPCP - located 6.84km southwest of the site, https://climate.weather.gc.ca/climate_normals/results_1981_2010_e.html?searchType=stnProx&txtRadius=25&selCity=&selPark=&optProxType=custom&txtCentralLatDeg=43&txtCentralLatMin=32&txtCentralLatSec=32.85&txtCentralLongDeg=79&txtCentralLongMin=39&txtCentralLongSec=24.81&txtLatDecDeg=&txtLongDecDeg=&stnID=4846&dispBack=0

***Canadian Climate Normals 1981-2010 Station Data - Toronto Lester B. Pearson Int'l A - located 15.13km southwest of the site, https://climate.weather.gc.ca/climate_normals/results_1981_2010_e.html?searchType=stnProx&txtRadius=25&selCity=&selPark=&optProxType=custom&txtCentralLatDeg=43&txtCentralLatMin=32&txtCentralLatSec=32.85&txtCentralLongDeg=79&txtCentralLongMin=39&txtCentralLongSec=24.81&txtLatDecDeg=&txtLongDecDeg=&stnID=5097&dispBack=0

Pervious Surplus: **201.5** **mm**

Impervious Surplus: **726.0** **mm**

Assumes 10% of rainfall is evaporated (no evapotranspiration occurs)

Impervious Factor = 0.10

Water Balance Design Sheet — **Pre-Development**

Site : 2935, 2955 Mississauga Road
Mississauga, Ontario

October 13, 2023

Existing Drainage Area
Area D1

Catchment Parameter	Units	Perv	Imperv	Total
Area	m^2	8168.3	0.0	8168.3
Pervious Area	m^2	8168.3	0.0	8168.3
Impervious Area	m^2	0.0	0.0	0.0
Infiltration Factors				
Topography		0.1	0.1	0.10
Soil		0.2	0.2	0.20
Land Cover		0.1	0.1	0.10
MOE Infiltration Factor		0.40	0.40	0.40
Actual Infiltration Factor		0.40	0.00	0.40
Runoff Coefficient		0.25	0.90	0.25
Runoff from Impervious Surfaces*		0%	0%	0%
Inputs (per Unit Area)				
Precipitation	mm/yr	807	807	807
Run- on	mm/yr	0	0	0
Other	mm/yr	0	0	0
Total Inputs	mm/yr	807	807	807
Outputs (per Unit Area)				
Precipitation Surplus	mm/yr	201	726	
Net Surplus	mm/yr	0	0	
Total Evapotranspiration	**mm/yr**	**605**	**81**	
Infiltration	mm/yr	81	0	
Rooftop Infiltration	mm/yr	0	0	
Total Infiltration	**mm/yr**	**81**	**0**	
Runoff Pervious Areas	mm/yr	121	726	
Runoff Impervious Areas	mm/yr	0	0	
Total Runoff	**mm/yr**	**121**	**726**	
Total Outputs	**mm/yr**	**807**	**807**	
Difference (input - output)	mm/yr	0	0	
Inputs (Volumes)				
Precipitation	m^3/yr	6589	0	6589
Run-on	m^3/yr	0	0	0
Other Inputs	m^3/yr	0	0	0
Total Inputs	m^3/yr	6589	0	6589
Outputs (Volumes)				
Precipitation Surplus	m^3/yr	1646	0	1646
Net Surplus	m^3/yr	0	0	0
Total Evapotranspiration	**m^3/yr**	**4944**	**0**	**4944**
Infiltration	m^3/yr	658	0	658
Rooftop Infiltration	m^3/yr	0	0	0
Total Infiltration	**m^3/yr**	**658**	**0**	**658**
Runoff Pervious Areas	m^3/yr	987	0	987
Runoff Impervious Areas	m^3/yr	0	0	0
Total Runoff	**m^3/yr**	**987**	**0**	**987**
Total Outputs	**m^3/yr**	**6589**	**0**	**6589**
Difference (input - output)	m^3/yr	0	0	0

Water Balance Design Sheet — **Post Development**

Site : 2935, 2955 Mississauga Road
Mississauga, Ontario

October 13, 2023

		Proposed Drainage Area						
		Area A2 + B2		Area D1		Area D2		
Catchment Parameter	**Units**	**Perv**	**Imperv**	**Perv**	**Imperv**	**Perv**	**Imperv**	**Total**
Area	m^2	2848.8	0.0	734.2	4237.7	37.9	309.7	8168.3
Pervious Area	m^2	2848.8	0.0	734.2	0.0	37.9	0.0	3620.9
Impervious Area	m^2	0.0	0.0	0.0	4237.7	0.0	309.7	4547.3
Infiltration Factors								
Topography		0.1	0.1	0.1	0.1	0.1	0.1	0.10
Soil		0.2	0.2	0.2	0.2	0.2	0.2	0.20
Land Cover		0.1	0.1	0.1	0.1	0.1	0.1	0.10
MOE Infiltration Factor		0.40	0.40	0.40	0.40	0.40	0.40	0.40
% Impervious		0%	0%	0%	100%	0%	100%	56%
Actual Imperv Factor		0.40	0.40	0.40	0.00	0.40	0.00	0.18
Inputs (per Unit Area)								
Precipitation	mm/yr	807	807	807	807	807	807	
Run- on	mm/yr	0	0	0	0	0	0	
Other	mm/yr	0	0	0	0	0	0	
Total Inputs	mm/yr	807	807	807	807	807	807	
Outputs (per Unit Area)								
Precipitation Surplus	mm/yr	201	726	201	726	201	726	
Net Surplus	mm/yr	201	726	201	726	201	726	
Total Evapotranspiration	**mm/yr**	**605**	**81**	**605**	**81**	**605**	**81**	
Infiltration	mm/yr	81	290	81	0	81	0	
LID Infiltration	mm/yr	0	0	0	0	0	0	
Total Infiltration	**mm/yr**	**81**	**290**	**81**	**0**	**81**	**0**	
Runoff Pervious Areas	mm/yr	121	436	121	0	121	0	
Runoff Impervious Areas	mm/yr	0	0	0	726	0	726	
Total Runoff	**mm/yr**	**121**	**436**	**121**	**726**	**121**	**726**	
Total Outputs	**mm/yr**	**807**	**807**	**807**	**807**	**807**	**807**	
Difference (input - output)	mm/yr	0	0	0	0	0	0	
Inputs (Volumes)								
Precipitation	m^3/yr	2298	0	592	3419	31	250	6589
Run-on	m^3/yr	0	0	0	0	0	0	0
Other Inputs	m^3/yr	0	0	0	0	0	0	0
Total Inputs	m^3/yr	2298	0	592	3419	31	250	6589
Outputs (Volumes)								
Precipitation Surplus	m^3/yr	574	0	148	3077	8	225	4031
Net Surplus	m^3/yr	574	0	148	3077	8	225	4031
Total Evapotranspiration	**m^3/yr**	**1724**	**0**	**444**	**342**	**23**	**25**	**2558**
Infiltration	m^3/yr	230	0	59	0	3	0	292
Rooftop Infiltration	m^3/yr	0	0	0	0	0	0	0
Total Infiltration	**m^3/yr**	**230**	**0**	**59**	**0**	**3**	**0**	**292**
Runoff Pervious Areas	m^3/yr	344	0	89	0	5	0	438
Runoff Impervious Areas	m^3/yr	0	0	0	3077	0	225	3302
Total Runoff	**m^3/yr**	**344**	**0**	**89**	**3077**	**5**	**225**	**3739**
Total Outputs	**m^3/yr**	**2298**	**0**	**592**	**3419**	**31**	**250**	**6589**
Difference (input - output)	m^3/yr	0	0	0	0	0	0	0

Water Balance Design Sheet — **Post Development with SWM, FS = 1.0**

Site : 2935, 2955 Mississauga Road
Mississauga, Ontario

October 13, 2023

		Proposed Drainage Area						
		Area A2 + B2		Area D1		Area D2		
Catchment Parameter	**Units**	**Perv**	**Imperv**	**Perv**	**Imperv**	**Perv**	**Imperv**	**Total**
Area	m^2	2848.8	0.0	734.2	4237.7	37.9	309.7	8168.3
Pervious Area	m^2	2848.8	0.0	734.2	0.0	37.9	0.0	3620.9
Impervious Area	m^2	0.0	0.0	0.0	4237.7	0.0	309.7	4547.3
Infiltration Factors								
Topography		0.1	0.1	0.1	0.1	0.1	0.1	0.10
Soil		0.2	0.2	0.2	0.2	0.2	0.2	0.20
Land Cover		0.1	0.1	0.1	0.1	0.1	0.1	0.10
MOE Infiltration Factor		0.40	0.40	0.40	0.40	0.40	0.40	0.40
% Impervious		0%	0%	0%	100%	0%	100%	56%
Actual Imperv Factor		0.40	0.40	0.40	0.00	0.40	0.00	0.18
Inputs (per Unit Area)								
Precipitation	mm/yr	807	807	807	807	807	807	
Run- on	mm/yr	0	0	0	0	0	0	
Other	mm/yr	0	0	0	0	0	0	
Total Inputs	mm/yr	807	807	807	807	807	807	
Outputs (per Unit Area)								
Precipitation Surplus	mm/yr	201	726	201	726	201	726	
Net Surplus	mm/yr	201	726	201	726	201	726	
Total Evapotranspiration	**mm/yr**	**605**	**81**	**605**	**81**	**605**	**81**	
Infiltration	mm/yr	81	290	81	0	81	0	
LID Infiltration	mm/yr	0	0	111	399	0	0	
Total Infiltration	**mm/yr**	**81**	**290**	**191**	**399**	**81**	**0**	
Runoff Pervious Areas	mm/yr	121	436	10	0	121	0	
Runoff Impervious Areas	mm/yr	0	0	0	327	0	726	
Total Runoff	**mm/yr**	**121**	**436**	**10**	**327**	**121**	**726**	
Total Outputs	**mm/yr**	**807**	**807**	**807**	**807**	**807**	**807**	
Difference (input - output)	mm/yr	0	0	0	0	0	0	
Inputs (Volumes)								
Precipitation	m^3/yr	2298	0	592	3419	31	250	6589
Run-on	m^3/yr	0	0	0	0	0	0	0
Other Inputs	m^3/yr	0	0	0	0	0	0	0
Total Inputs	m^3/yr	2298	0	592	3419	31	250	6589
Outputs (Volumes)								
Precipitation Surplus	m^3/yr	574	0	148	3077	8	225	4031
Net Surplus	m^3/yr	574	0	148	3077	8	225	4031
Total Evapotranspiration	**m^3/yr**	**1724**	**0**	**444**	**342**	**23**	**25**	**2558**
Infiltration	m^3/yr	230	0	59	0	3	0	292
LID Infiltration	m3/yr	0	0	81	1692	0	0	1774
Total Infiltration	**m^3/yr**	**230**	**0**	**141**	**1692**	**3**	**0**	**2065**
Runoff Pervious Areas	m^3/yr	344	0	7	0	5	0	356
Runoff Impervious Areas	m^3/yr	0	0	0	1385	0	225	1609
Total Runoff	**m^3/yr**	**344**	**0**	**7**	**1385**	**5**	**225**	**1966**
Total Outputs	**m^3/yr**	**2298**	**0**	**592**	**3419**	**31**	**250**	**6589**
Difference (input - output)	m^3/yr	0	0	0	0	0	0	0

**55% of rainfall events are less than 5mm - FS = 1.0

Water Balance Design Sheet — **Post Development with SWM, FS = 1.5**

Site : 2935, 2955 Mississauga Road
Mississauga, Ontario

October 13, 2023

		Proposed Drainage Area						
		Area A2 + B2		Area D1		Area D2		
Catchment Parameter	**Units**	**Perv**	**Imperv**	**Perv**	**Imperv**	**Perv**	**Imperv**	**Total**
Area	m^2	2848.8	0.0	734.2	4237.7	37.9	309.7	8168.3
Pervious Area	m^2	2848.8	0.0	734.2	0.0	37.9	0.0	3620.9
Impervious Area	m^2	0.0	0.0	0.0	4237.7	0.0	309.7	4547.3
Infiltration Factors								
Topography		0.1	0.1	0.1	0.1	0.1	0.1	0.10
Soil		0.2	0.2	0.2	0.2	0.2	0.2	0.20
Land Cover		0.1	0.1	0.1	0.1	0.1	0.1	0.10
MOE Infiltration Factor		0.40	0.40	0.40	0.40	0.40	0.40	0.40
% Impervious		0%	0%	0%	100%	0%	100%	56%
Actual Imperv Factor		0.40	0.40	0.40	0.00	0.40	0.00	0.18
Inputs (per Unit Area)								
Precipitation	mm/yr	807	807	807	807	807	807	
Run- on	mm/yr	0	0	0	0	0	0	
Other	mm/yr	0	0	0	0	0	0	
Total Inputs	mm/yr	807	807	807	807	807	807	
Outputs (per Unit Area)								
Precipitation Surplus	mm/yr	201	726	201	726	201	726	
Net Surplus	mm/yr	201	726	201	726	201	726	
Total Evapotranspiration	**mm/yr**	**605**	**81**	**605**	**81**	**605**	**81**	
Infiltration	mm/yr	81	290	81	0	81	0	
LID Infiltration	mm/yr	0	0	74	266	0	0	
Total Infiltration	**mm/yr**	**81**	**290**	**154**	**266**	**81**	**0**	
Runoff Pervious Areas	mm/yr	121	436	47	0	121	0	
Runoff Impervious Areas	mm/yr	0	0	0	460	0	726	
Total Runoff	**mm/yr**	**121**	**436**	**47**	**460**	**121**	**726**	
Total Outputs	**mm/yr**	**807**	**807**	**807**	**807**	**807**	**807**	
Difference (input - output)	mm/yr	0	0	0	0	0	0	
Inputs (Volumes)								
Precipitation	m^3/yr	2298	0	592	3419	31	250	6589
Run-on	m^3/yr	0	0	0	0	0	0	0
Other Inputs	m^3/yr	0	0	0	0	0	0	0
Total Inputs	m^3/yr	2298	0	592	3419	31	250	6589
Outputs (Volumes)								
Precipitation Surplus	m^3/yr	574	0	148	3077	8	225	4031
Net Surplus	m^3/yr	574	0	148	3077	8	225	4031
Total Evapotranspiration	**m^3/yr**	**1724**	**0**	**444**	**342**	**23**	**25**	**2558**
Infiltration	m^3/yr	230	0	59	0	3	0	292
LID Infiltration	m3/yr	0	0	113	1128	0	0	1242
Total Infiltration	**m^3/yr**	**230**	**0**	**113**	**1128**	**3**	**0**	**1474**
Runoff Pervious Areas	m^3/yr	344	0	35	0	5	0	383
Runoff Impervious Areas	m^3/yr	0	0	0	1949	0	225	2173
Total Runoff	**m^3/yr**	**344**	**0**	**35**	**1949**	**5**	**225**	**2557**
Total Outputs	**m^3/yr**	**2298**	**0**	**592**	**3419**	**31**	**250**	**6589**
Difference (input - output)	m^3/yr	0	0	0	0	0	0	0

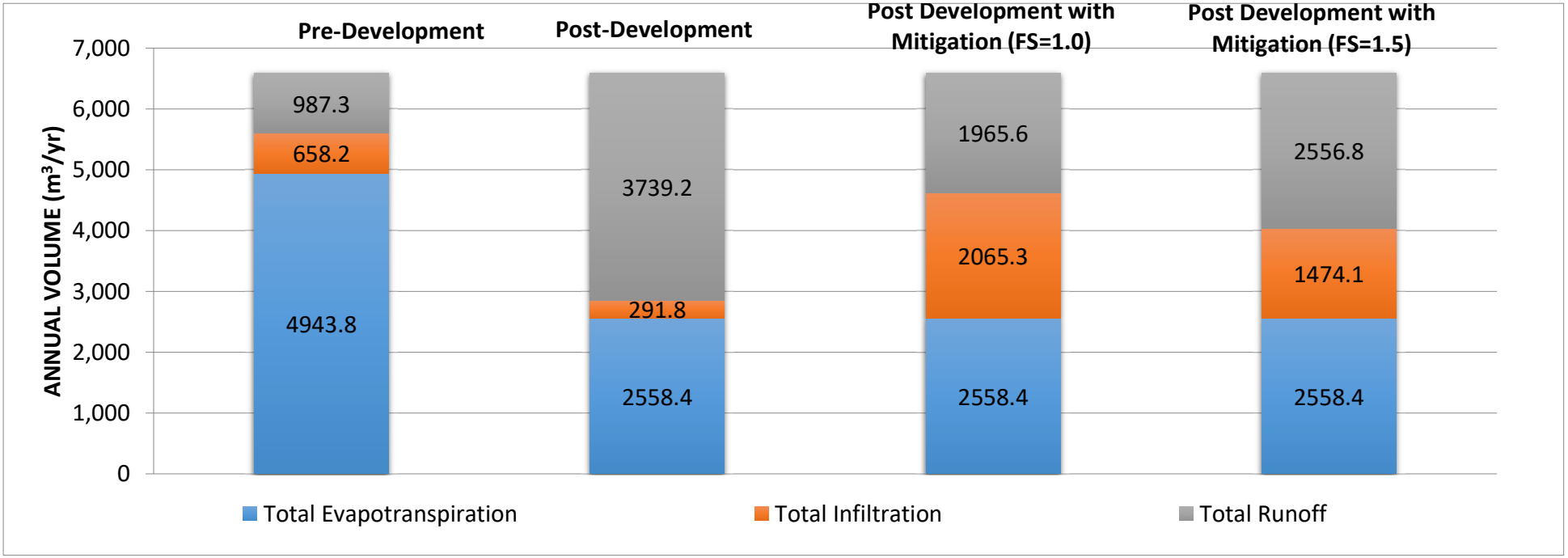
**55% of rainfall events are less than 5mm - FS = 1.5

Water Balance Summary Sheet

Site : 2935, 2955 Mississauga Road
Mississauga, Ontario

October 13, 2023

	Units	Pre-Development	Post-Development	Change (Pre- to Post-)	Post Development with Mitigation (FS=1.0)	Post Development with Mitigation (FS=1.5)	Change (Pre- to Post-Mitigation)
Inputs (Volumes)							
Precipitation	m^3/yr	6589.3	6589.3	0%	6589.3	6589.3	0%
Run-on	m^3/yr	0.0	0.0	0%	0.0	0.0	0%
Other Inputs	m^3/yr	0.0	0.0	0%	0.0	0.0	0%
Total Inputs		**6589**	**6589**	0%	**6589**	**6589**	0%
Outputs (Volumes)							
Precipitation Surplus	m^3/yr	1645.5	4031.0	145%	4031.0	4031.0	145%
Net Surplus	m^3/yr	0.0	4031.0	0%	4031.0	4031.0	0%
Total Evapotranspiration	**m^3/yr**	4943.8	2558.4	-48%	2558.4	2558.4	-48%
Infiltration	m^3/yr	658.2	291.8	-56%	291.8	291.8	-56%
LID Infiltration	m^3/yr	0.0	0.0	0%	1773.5	1241.5	0%
Total Infiltration	**m^3/yr**	**658.2**	**291.8**	-56%	**2065.3**	**1474.1**	214%
Runoff Pervious Areas	m^3/yr	987.3	437.7	-56%	356.3	383.4	-64%
Runoff Impervious Areas	m^3/yr	0.0	3301.5	0%	1609.3	2173.4	0%
Total Runoff	**m^3/yr**	**987.3**	**3739.2**	279%	**1965.6**	**2556.8**	99%
Total Outputs	**m^3/yr**	6589.3	6589.3	0%	6589.3	6589.3	0%



CULTEC Stormwater Design Calculator

Date:	October 13, 2023

Project Number:	20-697

Project Information:

2935, 2955 Mississauga Road
2935, 2955 Mississauga Road
Mississauga
Ontario
Canada

Calculations Performed By:

Elliot Pai
Greck and Associates Limited
Unit 3, 5770 Highway 7
Woodbridge Ontario
L4L 1T8
Canada
289-657-9797
epai@greck.ca

RECHARGER 330XLHD

Recharger 330XLHD Chamber Specifications

Height	**775**	mm
Width	**1321**	mm
Length	**2.59**	meters
Installed Length	**2.13**	meters
Bare Chamber Volume	**1.48**	cu. meters
Installed Chamber Volume	**2.24**	cu. meters

Breakdown of Storage Provided by Recharger 330XLHD Stormwater System

Within Chambers	**36.12**	cu. meters
Within Feed Connectors	**-**	cu. meters
Within Stone	**24.75**	cu. meters
Total Storage Provided	**60.9**	**cu. meters**
Total Storage Required	60.00	cu. meters

Materials List

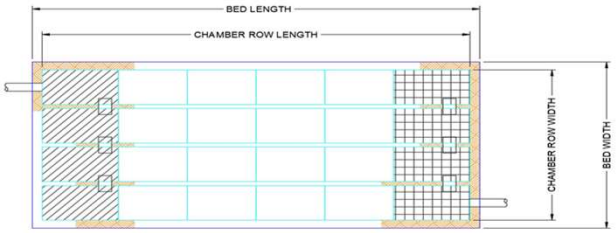
Recharger 330XLHD

Total Number of Chambers Required	**24**	**pieces**
Separator Row Chambers	**12**	pieces
Starter Chambers	**2**	pieces
Intermediate Chambers	**20**	pieces
End Chambers	**2**	pieces
HVLV FC-24 Feed Connectors	**2**	pieces
CULTEC No. 410 Non-Woven Geotextile	**308**	sq. meters
CULTEC No. 4800 Woven Geotextile	**34**	meters
Stone	**62**	cu. meters

Separator Row Qty Included in Total

Based on 2 Internal Manifolds

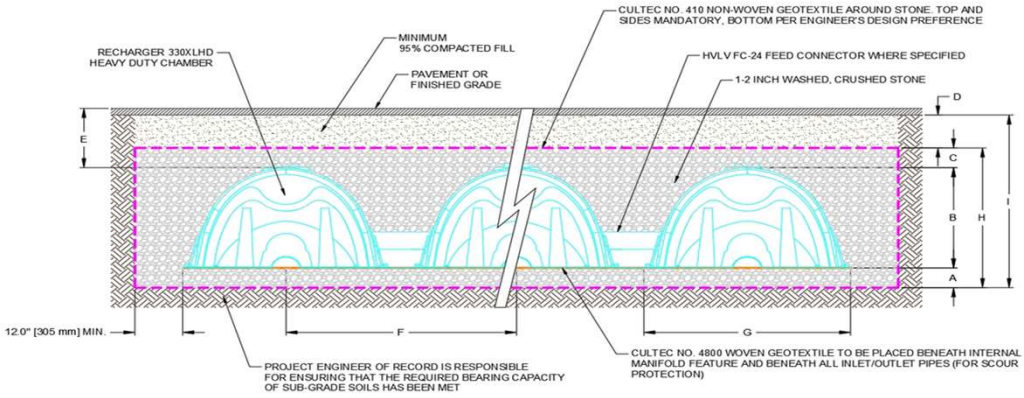
Bed Detail



Bed Layout Information

Number of Rows Wide	**2**	pieces
Number of Chambers Long	**12**	pieces
Chamber Row Width	**2.79**	meters
Chamber Row Length	**26.06**	meters
Bed Width	**3.40**	meters
Bed Length	**26.67**	meters
Bed Area Required	**90.77**	sq. meters
Length of Separator Row	**26.06**	meters

Bed detail for reference only. Not project specific. Not to scale.



Conceptual graphic only. Not job specific.

Cross Section Table Reference

A	Depth of Stone Base	**152**	mm
B	Chamber Height	**775**	mm
C	Depth of Stone Above Units	**152**	mm
D	Depth of 95% Compacted Fill	**254**	mm
E	Max. Depth Allowed Above the Chamber	**3.66**	meters
F	Chamber Width	**1321**	mm
G	Center to Center Spacing	**1.47**	meters
H	Effective Depth	**1.08**	meters
I	Bed Depth	**1.33**	meters

Stormceptor®

Rinker MATERIALS™

Stormceptor® EF Sizing Report

Imbrium® Systems
ESTIMATED NET ANNUAL SEDIMENT (TSS) LOAD REDUCTION

10/13/2023

Province:	Ontario
City:	Mississauga
Nearest Rainfall Station:	TORONTO CITY
Climate Station Id:	6158355
Years of Rainfall Data:	20

Site Name:	

Drainage Area (ha):	0.53
% Imperviousness:	85.00

Runoff Coefficient 'c': 0.81

Particle Size Distribution:	CA ETV
Target TSS Removal (%):	60.0

Required Water Quality Runoff Volume Capture (%):	90.00
Estimated Water Quality Flow Rate (L/s):	13.87
Oil / Fuel Spill Risk Site?	No
Upstream Flow Control?	No
Peak Conveyance (maximum) Flow Rate (L/s):	
Influent TSS Concentration (mg/L):	
Estimated Average Annual Sediment Volume (L/yr):	297

Project Name:	2935, 2955 Mississauga Road
Project Number:	20-697
Designer Name:	Elliot Pai
Designer Company:	Greck and Associates Ltd.
Designer Email:	epai@greck.ca
Designer Phone:	289-657-9797
EOR Name:	
EOR Company:	
EOR Email:	
EOR Phone:	

Net Annual Sediment (TSS) Load Reduction Sizing Summary

Stormceptor Model	TSS Removal Provided (%)
EF4	57
EF6	63
EF8	66
EF10	68
EF12	69

Recommended Stormceptor EF Model: EF6

Estimated Net Annual Sediment (TSS) Load Reduction (%): 63

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.

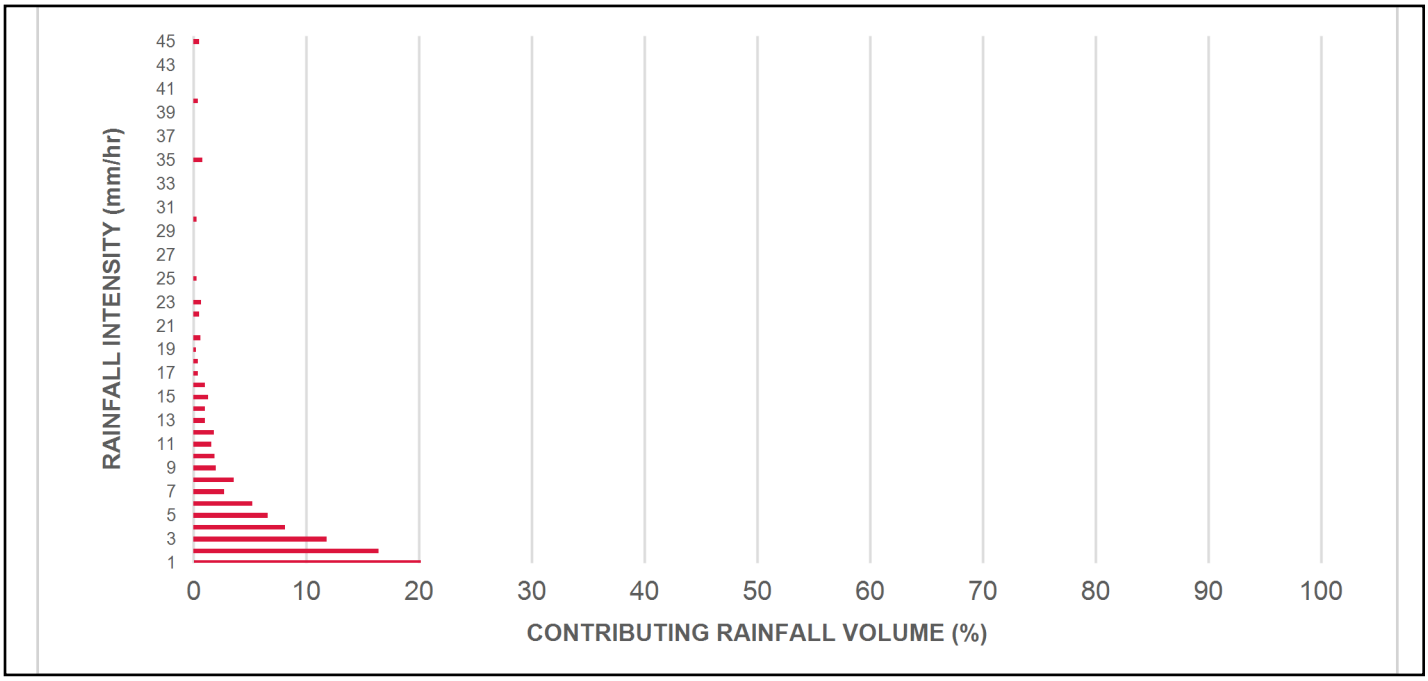
Particle Size (µm)	Percent Less Than	Particle Size Fraction (µm)	Percent
1000	100	500-1000	5
500	95	250-500	5
250	90	150-250	15
150	75	100-150	15
100	60	75-100	10
75	50	50-75	5
50	45	20-50	10
20	35	8-20	15
8	20	5-8	10
5	10	2-5	5
2	5	<2	5

Stormceptor® EF Sizing Report

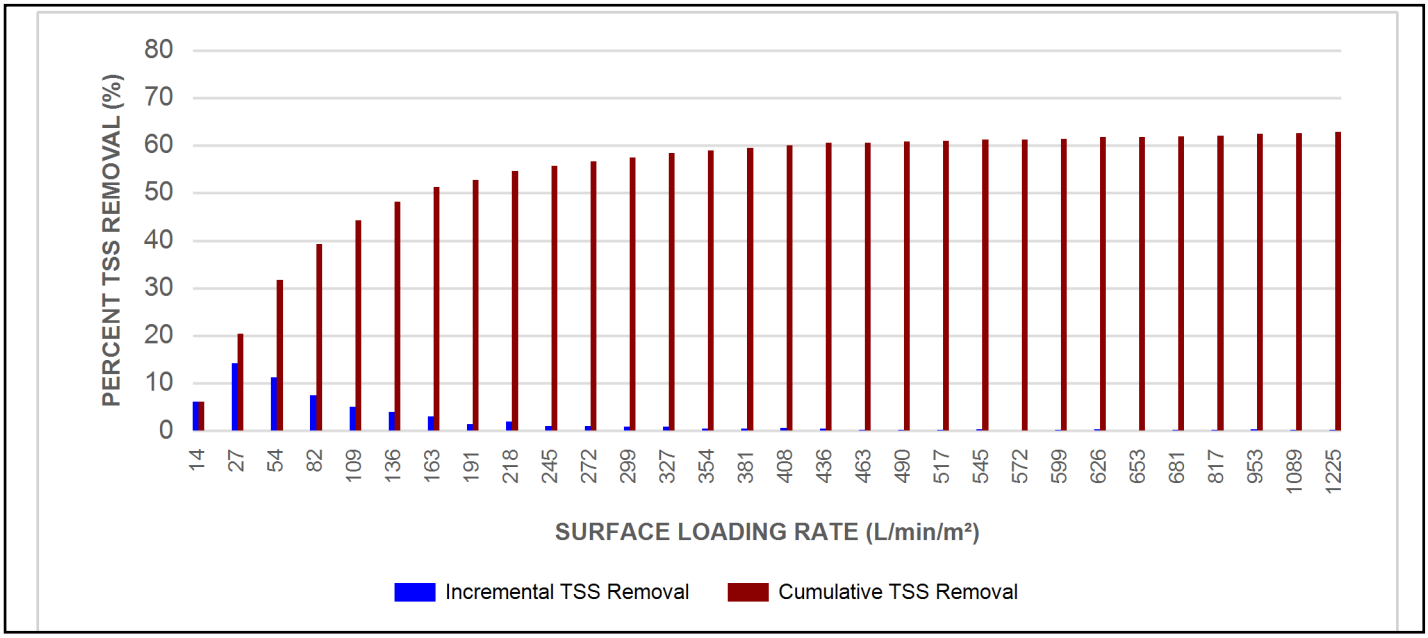
Rainfall Intensity (mm / hr)	Percent Rainfall Volume (%)	Cumulative Rainfall Volume (%)	Flow Rate (L/s)	Flow Rate (L/min)	Surface Loading Rate (L/min/m²)	Removal Efficiency (%)	Incremental Removal (%)	Cumulative Removal (%)
0.50	8.7	8.7	0.60	36.0	14.0	70	6.1	6.1
1.00	20.2	28.9	1.19	72.0	27.0	70	14.2	20.4
2.00	16.4	45.3	2.39	143.0	54.0	69	11.3	31.7
3.00	11.8	57.1	3.58	215.0	82.0	64	7.5	39.2
4.00	8.1	65.2	4.77	286.0	109.0	62	5.1	44.3
5.00	6.6	71.9	5.97	358.0	136.0	60	4.0	48.2
6.00	5.2	77.1	7.16	430.0	163.0	57	3.0	51.2
7.00	2.7	79.8	8.35	501.0	191.0	55	1.5	52.7
8.00	3.6	83.4	9.55	573.0	218.0	54	1.9	54.6
9.00	2.0	85.4	10.74	644.0	245.0	53	1.1	55.7
10.00	1.9	87.3	11.93	716.0	272.0	52	1.0	56.7
11.00	1.6	88.9	13.13	788.0	299.0	51	0.8	57.5
12.00	1.8	90.7	14.32	859.0	327.0	50	0.9	58.4
13.00	1.0	91.6	15.51	931.0	354.0	50	0.5	58.9
14.00	1.0	92.7	16.71	1003.0	381.0	49	0.5	59.4
15.00	1.3	93.9	17.90	1074.0	408.0	48	0.6	60.0
16.00	1.0	95.0	19.10	1146.0	436.0	48	0.5	60.5
17.00	0.4	95.3	20.29	1217.0	463.0	47	0.2	60.6
18.00	0.4	95.7	21.48	1289.0	490.0	47	0.2	60.8
19.00	0.2	95.9	22.68	1361.0	517.0	47	0.1	60.9
20.00	0.6	96.5	23.87	1432.0	545.0	47	0.3	61.2
21.00	0.0	96.5	25.06	1504.0	572.0	46	0.0	61.2
22.00	0.5	97.0	26.26	1575.0	599.0	46	0.2	61.4
23.00	0.7	97.7	27.45	1647.0	626.0	46	0.3	61.8
24.00	0.0	97.7	28.64	1719.0	653.0	46	0.0	61.8
25.00	0.3	98.0	29.84	1790.0	681.0	46	0.1	61.9
30.00	0.3	98.3	35.80	2148.0	817.0	45	0.1	62.0
35.00	0.8	99.1	41.77	2506.0	953.0	44	0.3	62.4
40.00	0.4	99.5	47.74	2864.0	1089.0	45	0.2	62.5
45.00	0.5	100.0	53.71	3222.0	1225.0	47	0.2	62.8
Estimated Net Annual Sediment (TSS) Load Reduction =								**63 %**

Climate Station ID: 6158355 *Years of Rainfall Data*: 20

RAINFALL DATA FROM TORONTO CITY 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

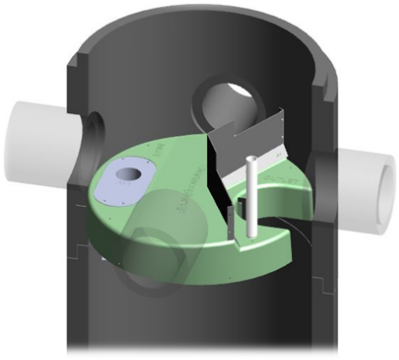
►**Stormceptor® EF and EFO** feature an internal bypass and superior scour prevention technology that have been demonstrated in third-party testing according to the scour testing provisions of the Canadian ETV **Procedure for Laboratory Testing of Oil-Grit Separators**, and the exceptional scour test 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.

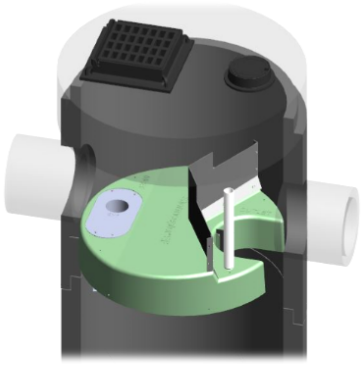
DESIGN FLEXIBILITY

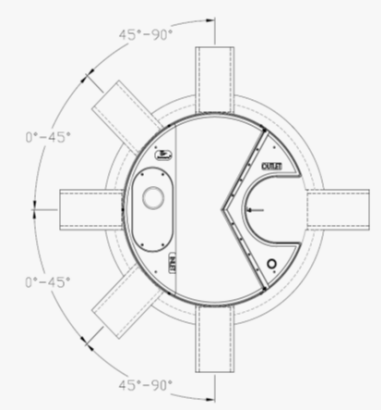
►**Stormceptor® EF** and **EFO** offers design flexibility in one simplified platform, accepting stormwater flow from a single inlet pipe or multiple inlet pipes, and/or surface runoff through an inlet grate. The device can also serve as a junction structure, accommodate a 90-degree inlet-to-outlet bend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

Table of TSS Removal vs Surface Loading Rate Based on Third-Party Test Results
Stormceptor® EF

SLR (L/min/m²)	TSS % REMOVAL	SLR (L/min/m²)	TSS % REMOVAL	SLR (L/min/m²)	TSS % REMOVAL	SLR (L/min/m²)	TSS % REMOVAL
1	70	660	46	1320	48	1980	35
30	70	690	46	1350	48	2010	34
60	67	720	45	1380	49	2040	34
90	63	750	45	1410	49	2070	33
120	61	780	45	1440	48	2100	33
150	58	810	45	1470	47	2130	32
180	56	840	45	1500	46	2160	32
210	54	870	45	1530	45	2190	31
240	53	900	45	1560	44	2220	31
270	52	930	44	1590	43	2250	30
300	51	960	44	1620	42	2280	30
330	50	990	44	1650	42	2310	30
360	49	1020	44	1680	41	2340	29
390	48	1050	45	1710	40	2370	29
420	48	1080	45	1740	39	2400	29
450	48	1110	45	1770	39	2430	28
480	47	1140	46	1800	38	2460	28
510	47	1170	46	1830	37	2490	28
540	47	1200	47	1860	37	2520	27
570	46	1230	47	1890	36	2550	27
600	46	1260	47	1920	36	2580	27
630	46	1290	48	1950	35	2600	26

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 of the OGS shall be determined by use of a minimum ten (10) years of local historical rainfall data provided by Environment Canada. Sizing shall also be determined by use of the sediment removal performance data derived from the ISO 14034 ETV third-party verified laboratory testing data from testing conducted in accordance with the Canadian ETV protocol Procedure for Laboratory Testing of Oil-Grit Separators, as follows:

3.2.1 Sediment removal efficiency for a given surface loading rate and its associated flow rate shall be based on sediment removal efficiency demonstrated at the seven (7) tested surface loading rates specified in the protocol, ranging 40 L/min/m^2 to 1400 L/min/m^2, and as stated in the ISO 14034 ETV Verification Statement for the OGS device.

3.2.2 Sediment removal efficiency for surface loading rates between 40 L/min/m^2 and 1400 L/min/m^2 shall be based on linear interpolation of data between consecutive tested surface loading rates.

3.2.3 Sediment removal efficiency for surface loading rates less than the lowest tested surface loading rate of 40 L/min/m^2 shall be assumed to be identical to the sediment removal efficiency at 40 L/min/m^2. No extrapolation shall be allowed that results in a sediment removal efficiency that is greater than that demonstrated at 40 L/min/m^2.

3.2.4 Sediment removal efficiency for surface loading rates greater than the highest tested surface loading rate of 1400 L/min/m^2 shall assume zero sediment removal for the portion of flow that exceeds 1400 L/min/m^2, and shall be calculated using a simple proportioning formula, with 1400 L/min/m^2 in the numerator and the higher surface loading rate in the denominator, and multiplying the resulting fraction times the sediment removal efficiency at 1400 L/min/m^2.

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.

APPENDIX F

Operation and Maintenance Guidelines

Inspection and Maintenance

CULTEC recommends inspection of the Separator Row to be performed every six months for the first year of service. Future inspection frequency can be adjusted based upon previous inspection observations. However annual inspections are recommended. Inspection of the Separator Row can be achieved via an inspection port riser installed during construction. This inspection port riser will connect the top of the Separator Row chambers to finished grade with a removable lid. Alternatively the Separator Row may be inspected via the manhole(s) located at the end(s) of the Separator Row. However this method of inspection requires confined space entry. If entry into the manhole is required, all local and OSHA rules for confined space entries must be strictly followed.

To inspect:

- Remove the inspection port lid from the floor box frame.
- Remove the riser pipe cap.
- With a flashlight and stadia rod, measure the depth of sediment.
- Record results in a maintenance log.
- When depth of sediment exceeds 3” (76 mm), use the JetVac procedure described below.

The JetVac process utilizes a high pressure water nozzle controlled from the surface. The high pressure nozzle is introduced down the Separator Row via the access manhole(s). The high pressure water cleans all sediment and debris from the Separator Row as the nozzle is retrieved. Captured pollutants are flushed into the sumped access manhole for vacuuming. This process is repeated until the Separator Row is completely free of sediment and debris. A small diameter culvert cleaning nozzle is recommended for this procedure.

High pressure water nozzle

Cleaning Separator Row and pipes with high pressure water nozzle

SEPARATOR ROW: Separator Row prior to cleaning

ADJACENT ROW: When the Separator Row is working properly, the adjacent rows will not show signs of sediment.

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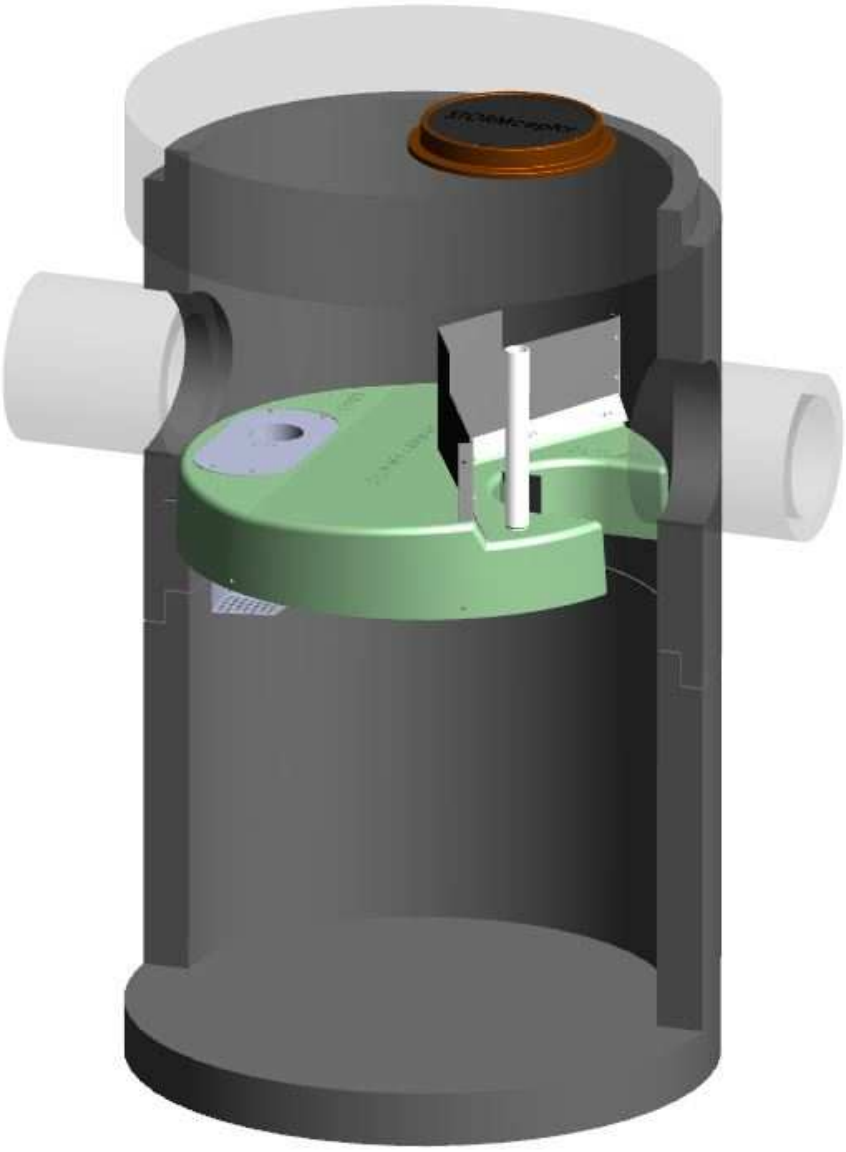
Stormceptor® EF

Owner's Manual



Stormceptor is protected by one or more of the following patents:

Canadian Patent No. 2,137,942
Canadian Patent No. 2,180,305
Canadian Patent No. 2,327,768
Canadian Patent No. 2,694,159
Canadian Patent No. 2,697,287
U.S. Patent No. 6,068,765
U.S. Patent No. 6,371,690
U.S. Patent No. 7,582,216
U.S. Patent No. 7,666,303
Australia Patent No. 693.164
Australia Patent No. 729,096
Australia Patent No. 2008,279,378
Australia Patent No. 2008,288,900
Japanese Patent No. 5,997,750
Japanese Patent No. 5,555,160
Korean Patent No. 0519212
Korean Patent No. 1451593
New Zealand Patent No. 583,008
New Zealand Patent No. 583,583
South African Patent No. 2010/00682
South African Patent No. 2010/01796
Patent pending

Table of Contents:

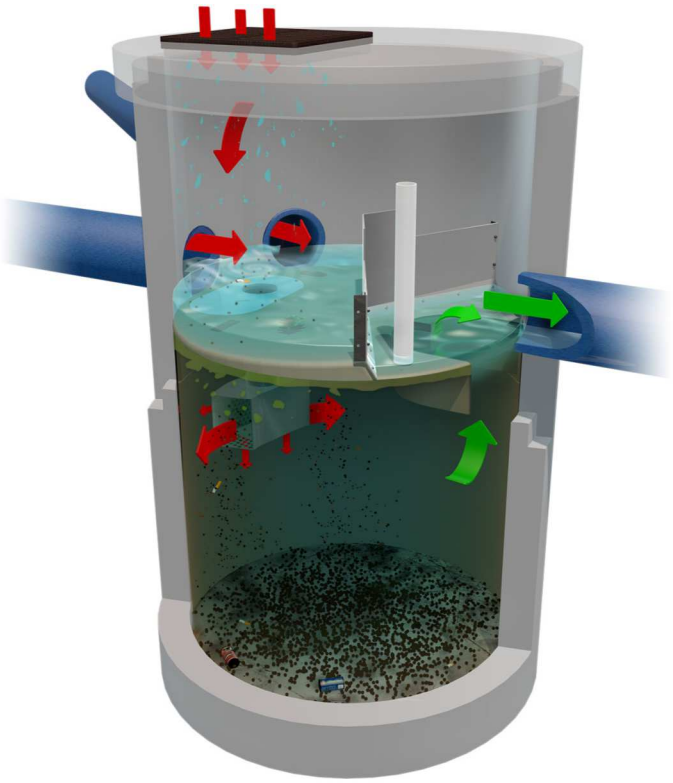
OVERVIEW

Stormceptor® EF is a continuation and evolution of the most globally recognized oil grit separator (OGS) stormwater treatment technology - ***Stormceptor®***. Also known as a hydrodynamic separator, the enhanced flow Stormceptor EF is a high performing oil grit separator that effectively removes a wide variety of pollutants from stormwater and snowmelt runoff at flow rates higher than the original Stormceptor. Stormceptor EF captures and retains sediment (TSS), free oils, gross pollutants and other pollutants that attach to particles, such as nutrients and metals. Stormceptor EF's patent-pending treatment and scour prevention platform ensures sediment is retained during all rainfall events.

Stormceptor EF offers design flexibility in one simplified platform, accepting stormwater flow from a single inlet pipe, multiple inlet pipes, and/or from the surface through an inlet grate. Stormceptor EF can also serve as a junction structure, accommodate a 90-degree inlet to outlet bend angle, and be modified to ensure performance in submerged conditions. With its scour prevention and internal bypass, Stormceptor EF can be installed online, eliminating the need for costly additional bypass structures.

OPERATION

- Stormwater enters the Stormceptor upper chamber through the inlet pipe(s) or a surface inlet grate. A specially designed insert reduces the influent velocity by creating a pond upstream of the insert's weir. Sediment particles immediately begin to settle. Swirling flow sweeps water, sediment, and floatables across the sloped surface of the insert to the inlet opening of the drop pipe, where a strong vortex draws water, sediment, oil, and debris down the drop pipe cone.
- Influent exits the cone into the drop pipe duct. The duct has two large rectangular outlet openings as well as perforations in the backside and floor of the duct. Influent is diffused through these various opening in multiple directions and at low velocity into the lower chamber.
- Free oils and other floatables rise up within the channel surrounding the central riser pipe and are trapped beneath the insert, while sediment settles to the sump. Pollutants are retained for later removal during maintenance cleaning.
- Treated effluent enters the outlet riser, moves upward, and discharges to the top side of the insert downstream of the weir, where it flows out the outlet pipe.
- During intense storm events with very high influent flow rates, the pond height on the upstream side of the weir may exceed the height of the weir, and the excess flow passes over the top of the weir to the downstream side of the insert, and exits through the outlet pipe. This internal bypass feature allows for in-line installation, avoiding the cost of additional bypass structures. During bypass, the pond separates sediment from all incoming flows, while full treatment in the lower chamber continues at the maximum flow rate.
- Stormceptor EF's patent-pending enhanced flow and scour prevention technology ensures pollutants are captured and retained, allowing excess flows to bypass during infrequent, high intensity storms.



COMPONENTS

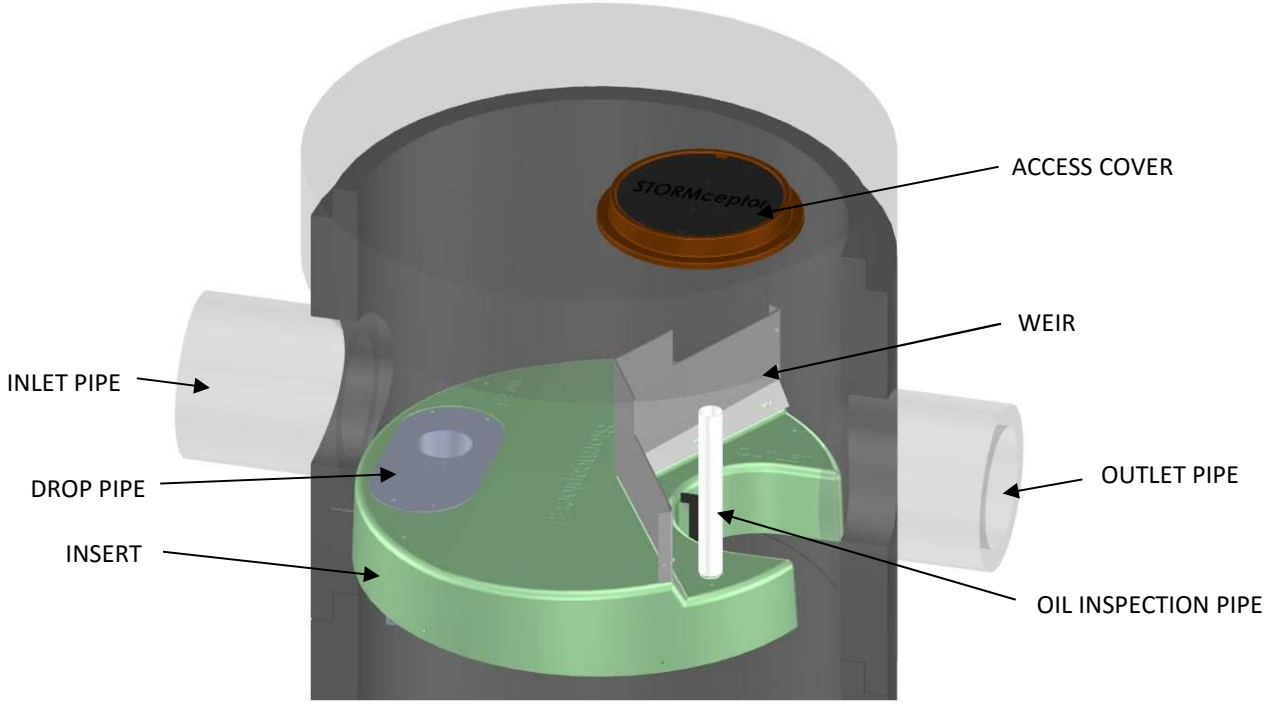


Figure 1

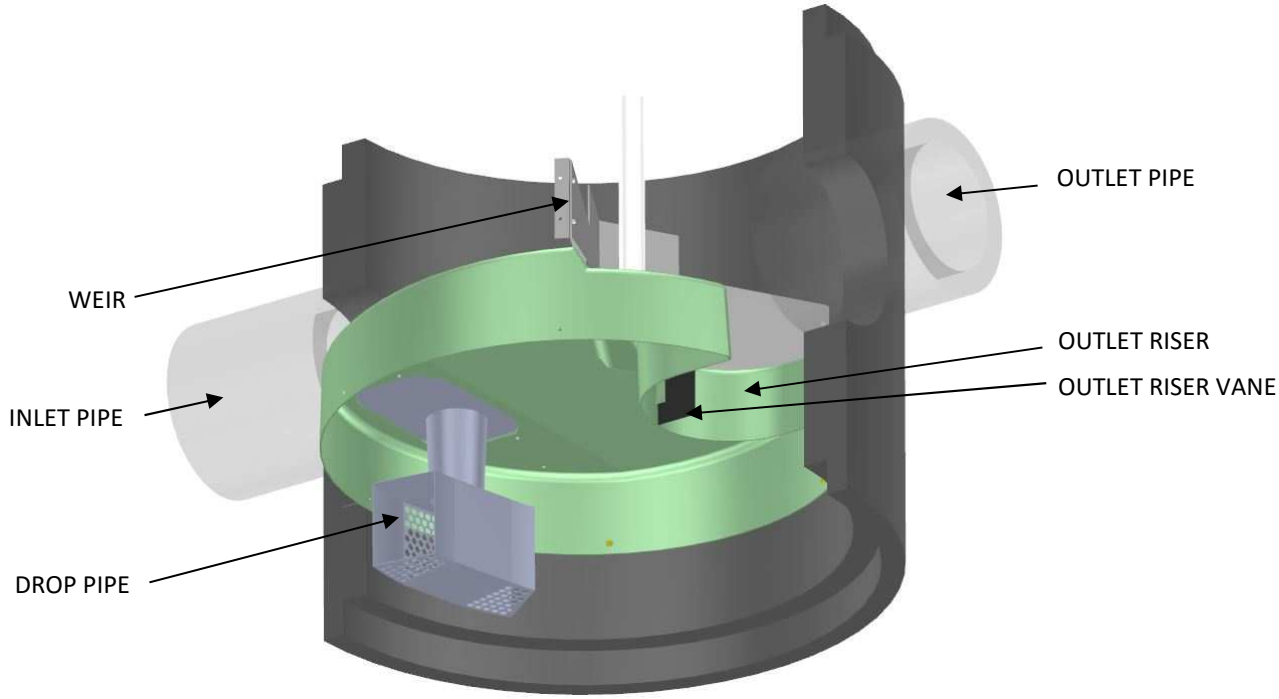


Figure 2

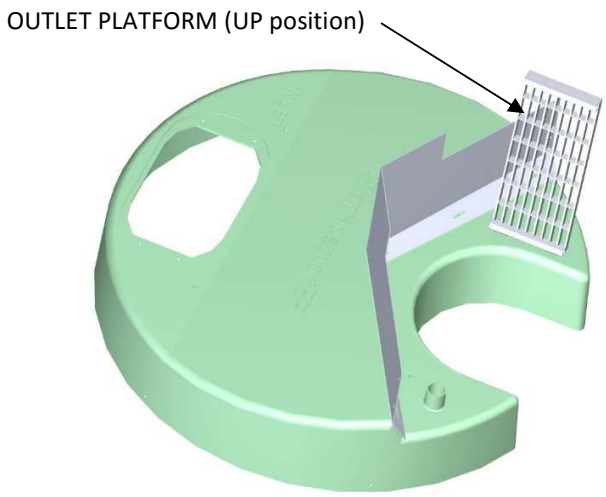


Figure 3A

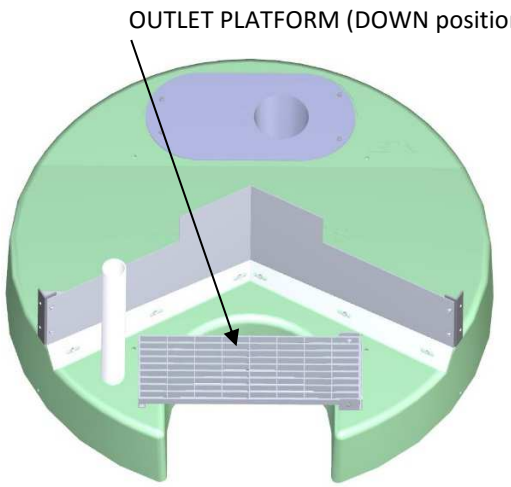


Figure 3B

- **Insert** – separates vessel into upper and lower chambers, and provides double-wall containment of hydrocarbons
- **Weir** – creates stormwater ponding and driving head on top side of insert
- **Drop pipe** – conveys stormwater and pollutants into the lower chamber
- **Outlet riser** – conveys treated stormwater from the lower chamber to the outlet pipe, and provides primary inspection and maintenance access into the lower chamber
- **Outlet riser vane** – prevents formation of a vortex in the outlet riser during high flow rate conditions
- **Outlet platform (optional)** – safety platform in the event of manned entry into the unit
- **Oil inspection pipe** – primary access for measuring oil depth

PRODUCT DETAILS

METRIC DIMENSIONS AND CAPACITIES

Table 1

Stormceptor Model	Inside Diameter (m)	Minimum Surface to Outlet Invert Depth (mm)	Depth Below Outlet Pipe Invert (mm)	Wet Volume (L)	Sediment Capacity [1] (m^3)	Hydrocarbon Storage Capacity [2] (L)	Maximum Flow Rate into Lower Chamber [3] (L/s)	Peak Conveyance Flow Rate [4] (L/s)
EF4 / EFO4	1.22	915	1524	1780	1.19	265	22.1 / 10.4	425
EF6 / EFO6	1.83	915	1930	5070	3.47	610	49.6 / 23.4	990
EF8 / EFO8	2.44	1219	2591	12090	8.78	1070	88.3 / 41.6	1700
EF10 / EFO10	3.05	1219	3251	23700	17.79	1670	138 / 65	2830
EF12 / EFO12	3.66	1524	3886	40800	31.22	2475	198.7 / 93.7	2830

[1] Sediment Capacity is measured from the floor to the bottom of the drop pipe cone. Sediment Capacity can be increased to accommodate specific site designs and pollutant loads. Contact your local representative for assistance.
[2] Hydrocarbon Storage Capacity is measured from the bottom of the outlet riser to the underside of the insert. Hydrocarbon Storage Capacity can be increased to accommodate specific site designs and pollutant loads. Contact your local representative for assistance.
[3] EF Maximum Flow Rate into Lower Chamber is based on a maximum surface loading rate (SLR) into the lower chamber of 1135 L/min/m^2.
EFO Maximum Flow Rate into Lower Chamber is based on a maximum surface loading rate (SLR) into the lower chamber of 535 L/min/m^2.
[4] Peak Conveyance Flow Rate is limited by a maximum velocity of 1.5 m/s.

U.S. DIMENSIONS AND CAPACITIES

Table 2

Stormceptor Model	Inside Diameter (ft)	Minimum Surface to Outlet Invert Depth (in)	Depth Below Outlet Pipe Invert (in)	Wet Volume (gal)	Sediment Capacity [1] (ft^3)	Hydrocarbon Storage Capacity [2] (gal)	Maximum Flow Rate into Lower Chamber [3] (cfs)	Peak Conveyance Flow Rate [4] (cfs)
EF4 / EFO4	4	36	60	471	42	70	0.78 / 0.37	15
EF6 / EFO6	6	36	76	1339	123	160	1.75 / 0.83	35
EF8 / EFO8	8	48	102	3194	310	280	3.12 / 1.47	60
EF10 / EFO10	10	48	128	6261	628	440	4.87 / 2.30	100
EF12 / EFO12	12	60	153	10779	1103	655	7.02 / 3.31	100

[1] Sediment Capacity is measured from the floor to the bottom of the drop pipe cone. Sediment Capacity can be increased to accommodate specific site designs and pollutant loads. Contact your local representative for assistance.
[2] Hydrocarbon Storage Capacity is measured from the bottom of the outlet riser to the underside of the insert. Hydrocarbon Storage Capacity can be increased to accommodate specific site designs and pollutant loads. Contact your local representative for assistance.
[3] EF Maximum Flow Rate into Lower Chamber is based on a maximum surface loading rate (SLR) into the lower chamber of 27.9 gpm/ft^2.
EFO Maximum Flow Rate into Lower Chamber is based on a maximum surface loading rate (SLR) into the lower chamber of 13.1 gpm/ft^2.
[4] Peak Conveyance Flow Rate is limited by a maximum velocity of 5 fps.

IDENTIFICATION

Each Stormceptor EF/EFO unit is easily identifiable by the trade name ***Stormceptor***® embossed on the access cover at grade as shown in **Figure 3**. The tradename ***Stormceptor***® is also embossed on the top of the insert upstream of the weir as shown in **Figure 3**.

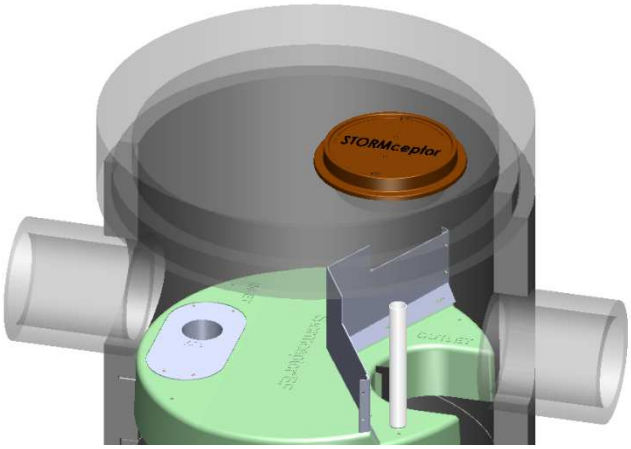


Figure 4

The specific Stormceptor EF/EFO model number is identified on the top of the aluminum Drop Pipe as shown in **Figure 4**. The unit serial number is identified on the top of the insert upstream of the weir as shown in **Figure 4**.

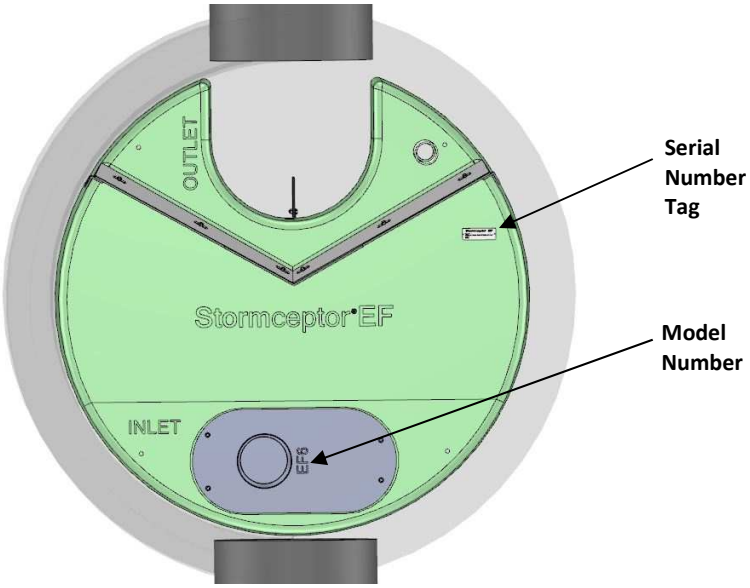


Figure 5

INSPECTION AND MAINTENANCE

It is very important to perform regular inspection and maintenance. Regular inspection and maintenance ensures maximum operation efficiency, keeps maintenance costs low, and provides continued of natural waterways.

Quick Reference

- Typical inspection and maintenance is performed from grade
- Remove manhole **cover(s)** or **inlet grate** to access insert and lower chamber
  NOTE: EF4/EFO4 requires the removal of a **flow deflector** beneath inlet grate
- Use Sludge Judge® or similar sediment probe to check sediment depth through the **outlet riser**
- Oil dipstick can be inserted through the **oil inspection pipe**
- Visually inspect the **insert** for debris, remove debris if present
- Visually inspect the **drop pipe** opening for blockage, remove blockage if present
- Visually inspect **insert** and **weir** for damage, schedule repair if needed
- Insert vacuum hose and jetting wand through the outlet riser and extract sediment and floatables
- Replace flow deflector (EF4/EFO4), inlet grate, and cover(s)
- **NOTE:** If the unit has an **outlet platform**, the outlet platform is typically in the UP position (see Figure 3A) for normal treatment conditions, and for inspection and maintenance. If manned entry into the unit is required, the outlet platform must first be placed in the DOWN position (see Figure 3B). After manned entry is completed, return the outlet platform to the UP position for treatment.

When is inspection needed?

- Post-construction inspection is required prior to putting the Stormceptor into service.
- Routine inspections are recommended during the first year of operation to accurately assess pollutant accumulation.
- Inspection frequency in subsequent years is based on the maintenance plan developed in the first year.
- Inspections should also be performed immediately after oil, fuel, or other chemical spills.

What equipment is typically required for inspection?

- Manhole access cover lifting tool
- Oil dipstick / Sediment probe with ball valve (typically ¾-inch to 1-inch diameter)
- Flashlight
- Camera
- Data log / Inspection Report
- Safety cones and caution tape
- Hard hat, safety shoes, safety glasses, and chemical-resistant gloves

When is maintenance cleaning needed?

- If the post-construction inspection indicates presence of construction sediment of a depth greater than a few inches, maintenance is recommended at that time.
- For optimum performance and normal operation the unit should be cleaned out once the sediment depth reaches the recommended maintenance sediment depth, see **Table 3**.
- Maintain immediately after an oil, fuel, or other chemical spill.

Table 3

Recommended Sediment Depths for Maintenance Service*	
MODEL	Sediment Depth (in/mm)
EF4 / EFO4	8 / 203
EF6 / EFO6	12 /305
EF8 / EFO8	24 / 610
EF10 / EFO10	24 / 610
EF12 / EFO12	24 / 610

* Based on a minimum distance of 40 inches (1,016 mm) from bottom of outlet riser to top of sediment bed

The frequency of inspection and maintenance may need to be adjusted based on site conditions to ensure the unit is operating and performing as intended. Maintenance costs will vary based on the size of the unit, site conditions, local requirements, disposal costs, and transportation distance.

What equipment is typically required for maintenance?

- Vacuum truck equipped with water hose and jet nozzle
- Small pump and tubing for oil removal
- Manhole access cover lifting tool
- Oil dipstick / Sediment probe with ball valve (typically ¾-inch to 1-inch diameter)
- Flashlight
- Camera
- Data log / Inspection Report
- Safety cones
- Hard hats, safety shoes, safety glasses, chemical-resistant gloves, and hearing protection for service providers
- Gas analyzer, respiratory gear, and safety harness for specially trained personnel if confined space entry is required (adhere to all OSHA / CCOSH standards)

What conditions can compromise Stormceptor performance?

- Presence of construction sediment and debris in the unit prior to activation
- Excessive sediment depth beyond the recommended maintenance depth
- Oil spill in excess of the oil storage capacity
- Clogging or restriction of the drop pipe inlet opening with debris
- Downstream blockage that results in a backwater condition

Maintenance Procedures

- Maintenance should be conducted during dry weather conditions when no flow is entering the unit.
- Stormceptor is maintained from grade through a standard surface manhole access cover or inlet grate.
- In the case of submerged or tailwater conditions, extra measures are likely required, such as plugging the inlet and outlet pipes prior to conducting maintenance.
- Inspection and maintenance of upstream catch basins and other stormwater conveyance structures is also recommended to extend the time between future maintenance cycles.

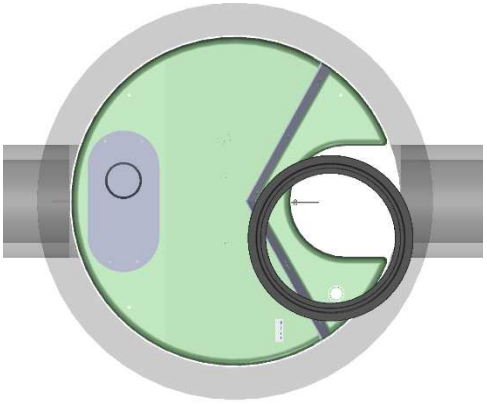


Figure 6

- Sediment depth inspections are performed through the **Outlet Riser** and oil presence can be determined through the **Oil Inspection Pipe**.
- Oil presence and sediment depth are determined by inserting a Sludge Judge® or measuring stick to quantify the pollutant depths.

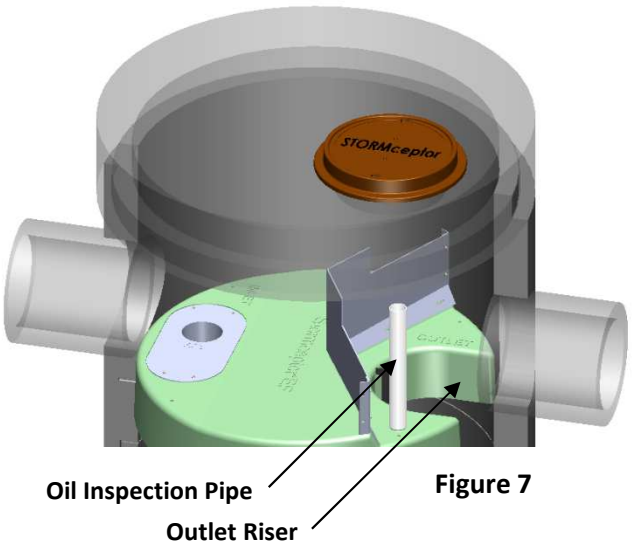


Figure 7

Figure 8

- Visually inspect the insert, weir, and drop pipe inlet opening to ensure there is no damage or blockage.
- **NOTE:** If the unit has an **outlet platform**, the outlet platform is typically in the UP position (see Figure 3A) for normal treatment conditions, and for inspection and maintenance. If manned entry into the unit is required, the outlet platform must first be placed in the DOWN position (see Figure 3B). After manned entry is completed, return the outlet platform to the UP position for treatment.

- When maintenance is required, a standard vacuum truck is used to remove the pollutants from the lower chamber of the unit through the **Outlet Riser**.

Figure 9

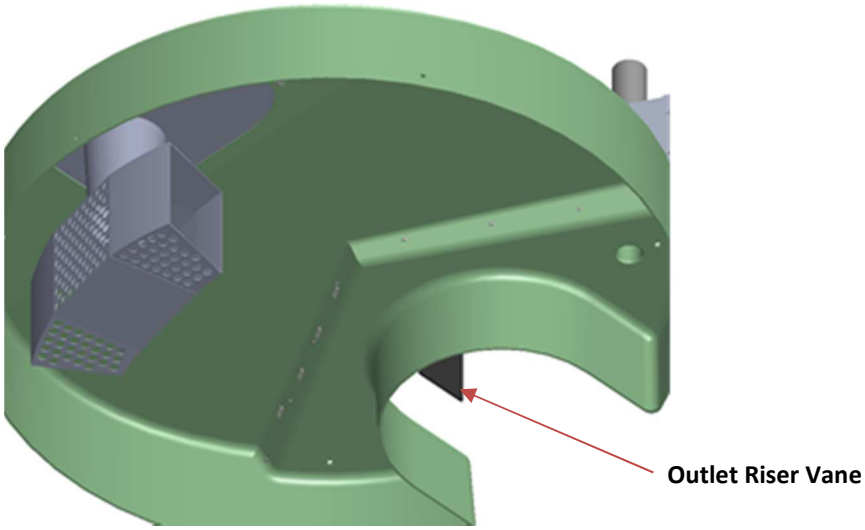
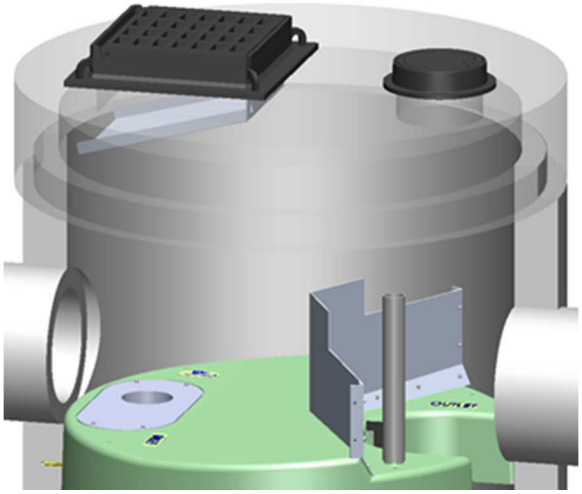


Figure 10

NOTE: The Outlet Riser Vane is durable and flexible and designed to allow maintenance activities with minimal, if any, interference.

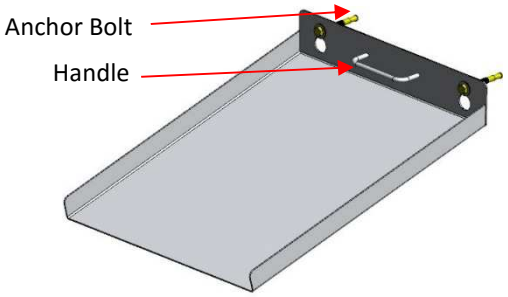
Removable Flow Deflector

- Top grated inlets for the Stormceptor EF4/EFO4 model requires a removable flow deflector staged underneath a 24-inch x 24-inch (600 mm x 600 mm) square inlet grate to direct flow towards the inlet side of the insert, and avoid flow and pollutants from entering the outlet side of the insert from grade. The EF6/EFO6 and larger models do not require the flow deflector.



How to Remove:

1. Loosen anchor bolts
2. Pull up and out using the handle



Removable Flow Deflector

Figure 11

Hydrocarbon Spills

Stormceptor is often installed on high pollutant load hotspot sites with vehicular traffic where hydrocarbon spill potential exists. Should a spill occur, or presence of oil be identified within a Stormceptor EF/EFO, it should be cleaned immediately by a licensed liquid waste hauler.

Disposal

Maintenance providers are to follow all federal, state/ provincial, and local requirements for disposal of material.

Oil Sheens

When oil is present in stormwater runoff, a sheen may be noticeable at the Stormceptor outlet. An oil rainbow or sheen can be noticeable at very low oil concentrations (< 10 mg/L). Despite the appearance of a sheen, Stormceptor EF/EFO may still be functioning as intended.

Oil Level Alarm

To mitigate spill liability with 24/7 detection, an electronic monitoring system can be employed to trigger a visual and audible alarm when a pre-set level of oil is captured within the lower chamber or when an oil spill occurs. The oil level alarm is available as an optional feature to include with Stormceptor EF/EFO as shown in **Figure 11**. For additional details about the Oil Level Alarm please visit http://www.imbriumsystems.com/stormwater-treatment-solutions/stormceptor-systems.

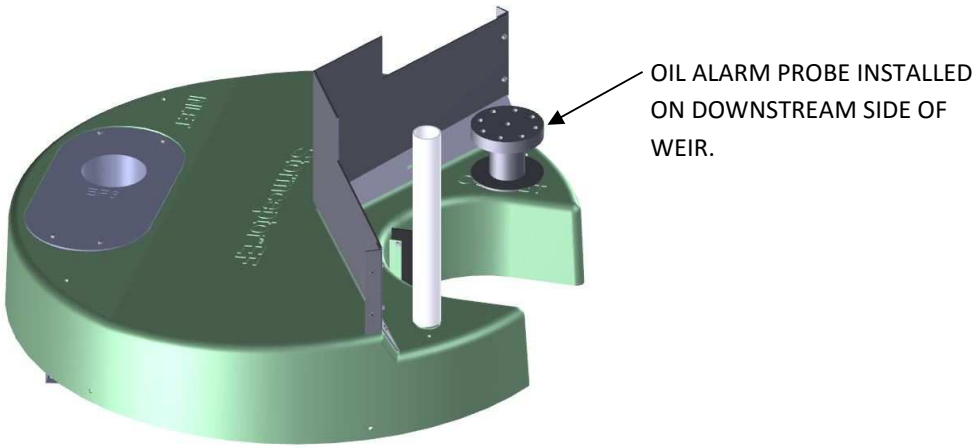


Figure 12

Replacement Parts

Stormceptor has no moving parts to wear out. Therefore inspection and maintenance activities are generally focused on pollutant removal. Since there are no moving parts during operation in a Stormceptor, broken, damaged, or worn parts are not typically encountered. However, if replacement parts are necessary, they may be purchased by contacting your local Stormceptor representative.

Stormceptor Inspection and Maintenance Log

Stormceptor Model No: _____

Serial Number: _____

Installation Date: _____

Location Description of Unit: _____

Recommended Sediment Maintenance Depth: _____

DATE	SEDIMENT DEPTH (inch or mm)	OIL DEPTH (inch or mm)	SERVICE REQUIRED (Yes / No)	MAINTENANCE PERFORMED	MAINTENANCE PROVIDER	COMMENTS

Other Comments:

Contact Information

Questions regarding Stormceptor EF/EFO can be addressed by contacting your local Stormceptor representative or by visiting our website at **www.stormceptor.com.**

Imbrium Systems Inc. & Imbrium Systems LLC

Canada	1-416-960-9900 / 1-800-565-4801
United States	1-301-279-8827 / 1-888-279-8826
International	+1-416-960-9900 / +1-301-279-8827

www.imbriumsystems.com
www.stormceptor.com
info@imbriumsystems.com

APPENDIX G

Engineering Drawings

PLAN OF TOPOGRAPHY OF
PART OF LOTS 3 AND 4,
RANGE 1,
SOUTH OF DUNDAS STREET
RACEY TRACT
(ORIGINALLY IN TOWNSHIP OF TORONTO)
CITY OF MISSISSAUGA
REGIONAL MUNICIPALITY OF PEEL

DUNDAS STREET WEST

CREDIT RIVER

MISSISSAUGA ROAD

CONDO BUILDING
(12 STOREYS)
FFE 102.15

3 STOREYS
STACK TOWNHOUSE
FFE 102.75

4.5m LANDSCAPED BUFFER

REGULATORY FLOODLINE AS PER CVC FLOODPLAIN MAPPING BY GOLDER, 2005 ELEV. 98.18

REGULATORY FLOODLINE AS PER CVC FLOODPLAIN MAPPING BY GOLDER, 2005, +0.3m FREEBOARD ELEV. 98.48

PROPOSED RIP-RAP EROSION CONTROL, MIN 3.0m (W) X 9.0m(L), 150mm ø D50, 0.30m THICK RIP-RAP STONE TO BE USED.

PROPOSED RIP-RAP EROSION CONTROL AND SPREADER TO FAN OUT 3:1 (MAX) FROM HEADWALL, MIN 3.0m (W) X 2.1m(L), 150mm ø D50 RIP-RAP STONE TO BE USED, 0.50m THICK

LINE OF BUILDING EXTENT

LONG TERM STABLE TOP OF BANK

EX. CONCRETE PAD (TO BE REMOVED)

EX. IN-GROUND POOLE AND POOL DECK (TO BE REMOVED)

PROP. SWALE

PROP. SHRUB (TYP.)

PROP. RAILING

PROP. PLANTER

EXHAUST AIR SHAFT

PROP. GRADE BREAK

PROP. SCENIC BERM

DETECTOR CHECK VALVE IN CHAMBER

SUBSURFACE SWM CHAMBER

MATCH OF FOREST DRIP LINE

FOREST DRIP LINE

PROP. CONCRETE WALL / PARKING GARAGE

PROP. TRANSFORMER

EXTENT OF UNDERGROUND PARKING

PROP. TREE (TYP.)

PROP. 8m WIDE SANITARY EASEMENT

PROP. 4m WIDE STORM EASEMENT

PROP. RETAINING WALL (TYP) (BY OTHERS)

APPROX. GRADING LIMIT FOR CONSTRUCTION OF HEAD WALL

PROP. 675mm CSP CULVERT

MH1A RIM=98.79

CB1 RIM:100.26

COMH1 RIM:100.09

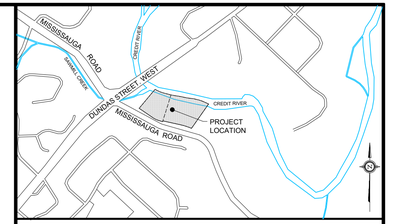
DCB2 RIM:100.04

DCB1 RIM:99.23

MH1 RIM:101.30

MH2 RIM:101.10

FOR CONTINUATION SEE THIS SHEET



KEY PLAN
N.T.S.

LEGEND

EXISTING	PROPOSED	
MH1A	MH1A	SANITARY MANHOLE
	FD	FLOOR DRAIN TO INTERNAL OGS
CB	CB	SINGLE CATCHBASIN
DCB	DCB	DOUBLE CATCHBASIN
HYD&V	HYD&V	FIRE HYDRANT
VB	VB	VALVE & BOX
		SLOPE LINE (3:1 MAX)
		CURRENT PROPERTY LIMIT
		FUTURE PROPERTY LIMIT
		SWALE
		LIMIT OF BUILDING EXTENT
		RIGHT OF WAY
		LOT LINE
X X		CHAIN LINK FENCE
		CURB/SIDEWALK
		CONCRETE RETAINING WALL
		PARKING GARAGE / CONCRETE WALL
		FOREST DRIPLINE
		PROP. GRASSED SURFACE
		PROP. PAVERS SURFACE
		PROP. ASPHALT SURFACE
		PROP. CONCRETE SURFACE
		REGULATORY FLOODLINE
		REGULATORY FLOODLINE +0.30m FREEBOARD

NOTES

1. ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE NOTED.
2. ALL DIMENSIONS SHALL BE CHECKED AND VERIFIED IN THE FIELD BY THE CONTRACTOR PRIOR TO ANY CONSTRUCTION, AND ANY DISCREPANCIES SHALL BE REPORTED IMMEDIATELY TO THE ENGINEER.
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BENCHMARK

BENCHMARK: CITY OF MISSISSAUGA No. 58
ELEVATION = 108.293m
LOCATION: CITY OF MISSISSAUGA
DATED: DEC 10, 2019
DESCRIPTION: ON THE WEST FACE AT THE NORTH CORNER OF A SPRINGBANK ARTS CENTER#3057 ON THE EAST SIDE OF MISSISSAUGA ROAD, 198m +/- NORTH OF DUNDAS ST.
COMPLETED BY:
TARASICK McMILLAN KUBICKI LTD.
ONTARIO LAND SURVEYORS
4181 SLADVIEW CRESCENT, UNIT 42, MISSISSAUGA, ONTARIO L5L 2R2
(905) 569-8849

NO.	REVISION	DATE	BY	APPROVED
01	ISSUED FOR FIRST SUBMISSION	2021/04/26	K.M.	
02	ISSUED FOR SECOND SUBMISSION	2023/10/23	K.M.	

SUBMISSION DRAWING
NOT TO BE USED FOR CONSTRUCTION

Greck
5770 Highway 7
Woodbridge, Ontario
L4L 1T8

LICENSED PROFESSIONAL ENGINEER
K. MAHMOOD
100160233
Oct. 23, 2023
PROVINCE OF ONTARIO

CLIENT NAME:
590816 ONTARIO INC.
2616 CYNARA ROAD
MISSISSAUGA, ON L5B 2R7

PROJECT NAME:
2935 & 2955 MISSISSAUGA ROAD
MISSISSAUGA, ON

GRADING PLAN

NOTE:

THE EXISTING (NOT DESTROYED) CITY OF MISSISSAUGA BENCH MARK NUMBER, ELEVATION, AND LOCATION/DESCRIPTION USED TO ESTABLISH THE ELEVATION ON THE PLAN IS AS FOLLOWS: "ELEVATIONS ARE REFERRED TO THE CITY OF MISSISSAUGA BENCHMARK NO. 58 LOCATED ON THE WEST FACE AT THE NORTH CORNER OF A SPRINGBANK ARTS CENTRE#3057 ON THE EAST SIDE OF MISSISSAUGA ROAD,198M +/- NORTH OF DUNDAS STREET WEST HAVING A PUBLISHED ELEVATION OF 108.293m.

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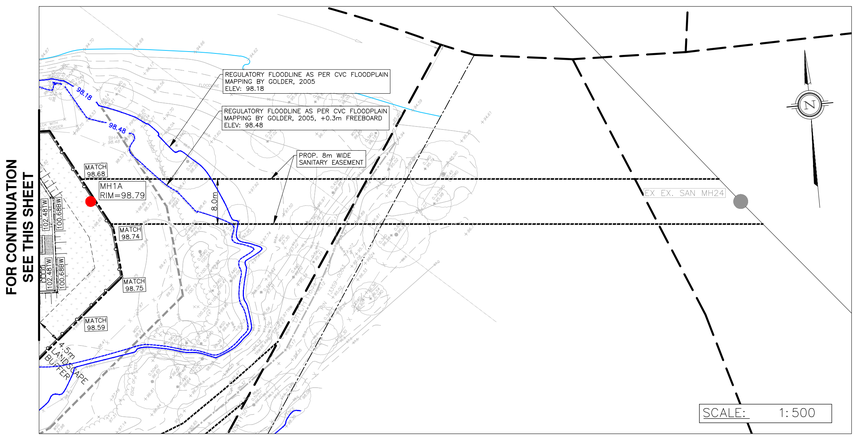

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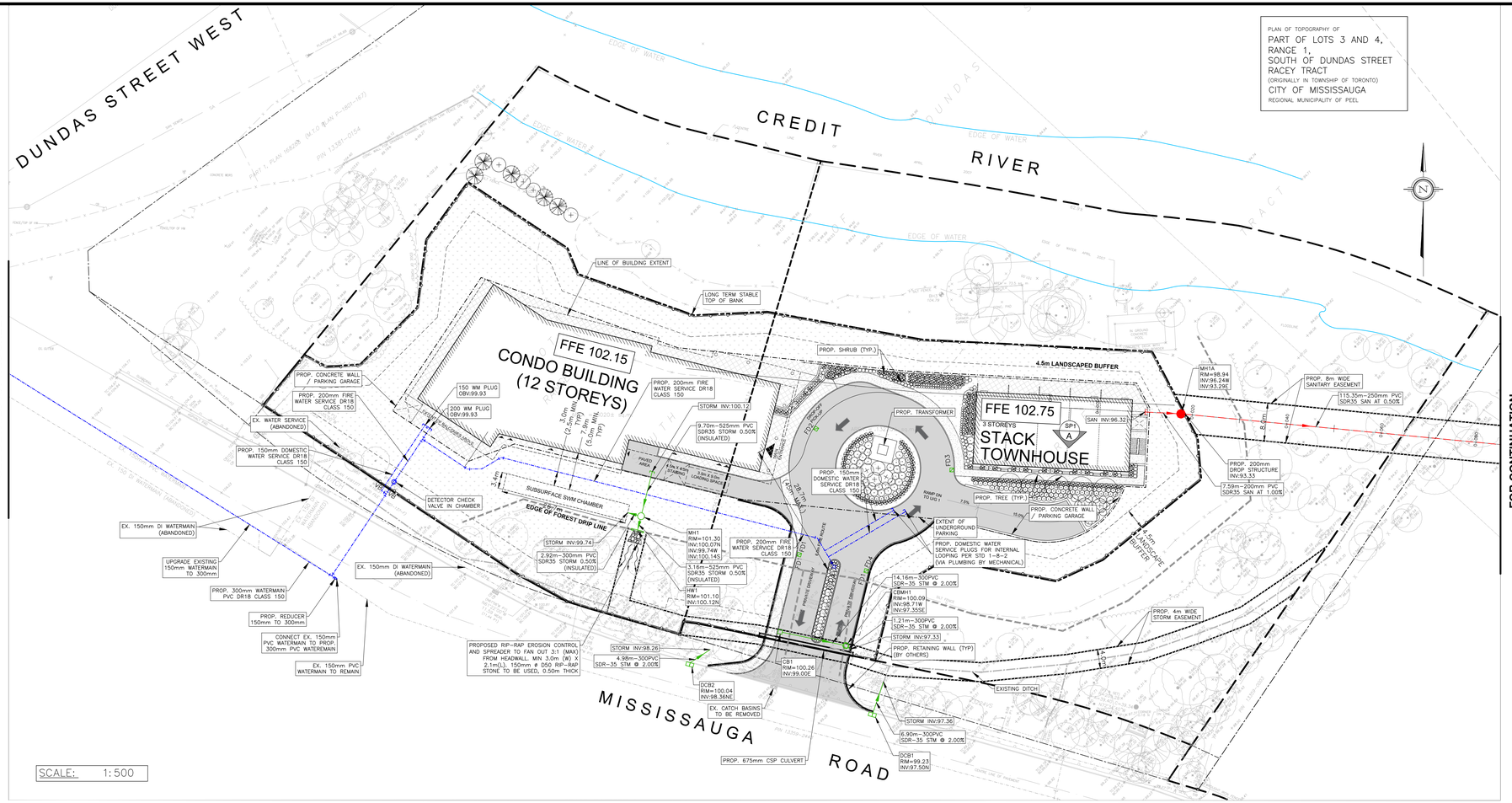
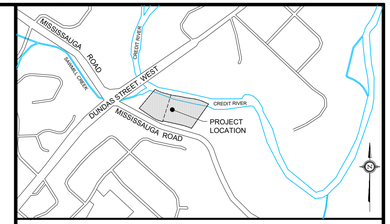
DESIGNED BY: E.P./K.M.	SCALES:	PROJECT No.	20-697
CHECKED BY: E.G.	HORIZONTAL: 1:500	DRAWING No.	GP1
DRAWN BY: K.M.	VERTICAL: N/A	SHEET No.	01
DATE: APR 26, 2021	SHEET SIZE: 24"x36"		

Z:\Projects\2020\20-697 - 2935, 2955 Mississauga Road\05_Drawings\CAD\GRADING\20-697 GRADING PLAN.dwg

Date Plotted: 10/23/2023 10:09:23 AM



PLAN OF TOPOGRAPHY OF
PART OF LOTS 3 AND 4, RANGE 1, SOUTH OF DUNDAS STREET RACEY TRACT
(ORIGINALLY IN TOWNSHIP OF TORONTO)
CITY OF MISSISSAUGA
REGIONAL MUNICIPALITY OF PEEL



KEY PLAN
N.T.S.

LEGEND

EXISTING	PROPOSED	
MH1	MH1	STORM MANHOLE
MH1A	MH1A	SANITARY MANHOLE
	FD	FLOOR DRAIN TO INTERNAL OGS
CB	CB	SINGLE CATCHBASIN
DCB	DCB	DOUBLE CATCHBASIN
HYD&V	HYD&V	FIRE HYDRANT
VB	VB	VALVE & BOX
		SLOPE LINE (3:1 MAX)
		CURRENT PROPERTY LIMIT
		FUTURE PROPERTY LIMIT
		SWALE
		RIGHT OF WAY
		LOT LINE
		CHAIN LINK FENCE
		CURB/SIDEWALK
		CONCRETE RETAINING WALL
		PARKING GARAGE / CONCRETE WALL
		STORM SEWER
		SANITARY SEWER
		WATERMAIN
		FOREST DRIPLINE
		PROP. GRASSED SURFACE
		PROP. PAVERS SURFACE
		PROP. ASPHALT SURFACE
		PROP. CONCRETE SURFACE

NOTES

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5770 Highway 7
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LICENSED PROFESSIONAL ENGINEER
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MISSISSAUGA, ON L5B 2R7

PROJECT NAME:
2935 & 2955 MISSISSAUGA ROAD
MISSISSAUGA, ON

SERVICING PLAN

DESIGNED BY: E.P./K.M.	SCALES:	PROJECT No.	20-697
CHECKED BY: E.G.	HORIZONTAL: AS NOTED	DRAWING No.	SP1
DRAWN BY: K.M.	VERTICAL: AS NOTED	SHEET No.	02
DATE: APR 26, 2021	SHEET SIZE: 24"x36"		

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