VALDOR ENGINEERING INC.
Municipal • Land Development • Water Resources
Site Development • Project Management • Contract Administration
Consulting Engineers – est. 1992

571 Chrislea Road, Unit 4, 2nd Floor,
Vaughan, ON L4L 8A2
TEL (905) 264-0054
FAX (905) 264-0069
info@valdor-engineering.com
www.valdor-engineering.com

FUNCTIONAL SERVICING / STORMWATER MANAGEMENT REPORT

Proposed High-Rise Mixed-Use Development

2172 Wyecroft Road
Town of Oakville
Region of Halton

August 2025

Prepared For: **NBIM 2172 Wyecroft LP**

File: **24123**

VALDOR WATER RESOURCES

s:\projects\2024\24123\report\revision 0 - Jul 2025\24123 FSR Jul 2025.doc

TABLE OF CONTENTS

TABLE OF CONTENTS (Continued)

LIST OF TABLES

LIST OF FIGURES

TABLE OF CONTENTS (Continued)

LIST OF APPENDICES

LIST OF DRAWINGS

1.0 INTRODUCTION

Valdor Engineering Inc. has been retained by the NBIM 2172 Wyecroft LP to provide consulting engineering services for the proposed high-rise mixed-use development on 2172 Wyecroft Road located at the south side of Wyecroft Road, west of Third Line within the Bronte GO Station Major Transit Station Area (MTSA) of the Town of Oakville as indicated in **Figure 1.**

1.1 Existing Conditions

The subject site is approximately 2.362 hectares in size and is located on the south-west side of the Bronte GO Station, south-east of Wyecroft Road, north-east of 2192 Wyecroft Road and north-west of the existing rail tracks that run through the Bronte GO Station adjacent to the subject site.

The site is currently occupied by three one-storey concrete block buildings that currently serve as generic industrial workspaces for multiple businesses and consists mainly of asphalt parking fronting Wyecroft Road with minimal landscape area covering the site.

1.2 Proposed Development

The proposed development of 2172 Wyecroft Road will include two development blocks (Block A and Block B), and two municipal roads (Street “A” with a 16.0m Right of Way, and Street “B” with a 20.0m Right of Way). Block A contains a 35 storey building (Tower A) and a 32 Storey Building (Tower B) connected with a 7 storey shared podium. Block B has a 28 storey building (Tower C) and a 25 Storey Building (Tower D) connected with a 7 storey shared podium. Each building structure on the development blocks will include four levels of underground parking for tenants and workers, have a combined total of 1,630 residential units, and a combined ground floor of 2495.3 m^2 of commercial space and 999.6 m^2 of office space. A copy of the architectural site plan is included in **Appendix ‘A’** together with the equivalent population calculation in **Table A1**. The development statistics are also summarized in **Table 1**.

Table 1. Development Statistics

	Area (Ha)	**Residential Units** (No.)	**Commercial Floor Area** (m^2)	**Office Floor Area** (m^2)	**Equivalent Population**
Block A (Towers A & B)	0.936	903	1,464.5	999.6	1,888
Block B (Towers C & D)	1.029	727	1030.8	0	2,074
Streets “A” & Street “B”	0.397	-	-	-	-
TOTAL	**2.362**	**1630**	**2495.3**	**999.6**	**3,961**

The Town of Oakville has completed a study of the Bronte GO Station and surrounding area, known as a Major Transit Station Area, or MTSA. The study developed an Area Specific Plan for the Bronte GO MTSA to create a complete, transit-supportive community that accommodates future population and employment growth and development around the Bronte GO station. This report references the Bronte GO MTSA

Stormwater Management Functional Servicing Study completed by Wood Environment & Infrastructure Solutions Inc. dated August 20, 2020.

1.3 Purpose of Report

This Functional Servicing and Stormwater Management Report outlines the engineering design elements for the proposed development, including water supply, sanitary sewers, storm sewers and stormwater management. It has been prepared to address the necessary technical criteria for the Town of Oakville, Region of Halton and the Conservation Halton's review of the Official Plan Amendment, Zoning By-law Amendment and Draft Plan of Subdivision applications.

This report was prepared based on a review of the architectural building designs for the proposed development, a site visit, review of municipal plans and a review of the detailed topographic survey. A **Functional Grading Plan** (Dwg FGP-1), a **Functional Servicing Plan** (FSP-1), a **Functional Drainage Plan** (Dwg FDP-1), and a Functional **Erosion and Sediment Control Plan** (Dwg FESC-1) are included in **Appendix "I"** of this report.

2.0 WATER SUPPLY

The Region of Halton is responsible for the treatment and distribution of water to residences and businesses throughout the urban area of the Region. The Region owns, maintains and operates several water treatment and distribution systems including the South Halton Water Distribution System which services the Town of Oakville.

The Region's service areas are categorized by pressure zone and its relationship to the overall system operation. Due to the gradual rise in ground elevation northerly from the shore of Lake Ontario to the lake-based service area boundary in Milton and Halton Hills 401 Corridor, separate pressure zones have been established. Each pressure zone spans an elevation difference of approximately 30m and is identified by the local municipality that it services. Oakville is serviced by four primary pressure zones being O1, O2, O3, and O4, with sub-pressure zones fed through isolated supply points.

The subject site is located within Pressure Zone O2 which services lands which generally have ground elevations between 97.2 m and 133.7 m east of Bronte Creek. The Davis Pumping station supplies water to Pressure Zone O2 and pumps water up to the Eighth Line Booster station and Eighth Line Reservoir and Pumping Station to feed the upper zones in Oakville. The Eighth Line Reservoir provides storage and maintains pressure control. A plan indicating the limits of the various pressure districts in the Region is included in **Appendix "B"**.

The following is a summary of the water servicing analysis for the subject site.

2.1 Domestic Demand

The average domestic water demand for the proposed development was calculated using the following Region of Halton engineering design criteria:

Average Day Demand:	275 L/person/day
Maximum Day Demand Factor:	2.25
Peak Hour Demand Factor:	4.00
Equivalent Population:	2000 persons/ha (Apts within MTSA) 90 persons/ha (Light Commercial)

Based on the above, it is anticipated that the development will have an average domestic demand of 756.5 L/min. A detailed tabulation of the equivalent population is provided in **Table A1** of **Appendix "A"** and domestic water demand calculation is detailed in **Table B1** of **Appendix "B"**. The population and demands are summarized in **Table 2** below.

Table 2. Domestic Water Demand

	Equivalent Population (Persons)	**Average Day Demand** (L/min)	**Maximum Day Demand** (L/min)	**Peak Hour Demand** (L/min)	**Fire Flow** (L/min)	**Maximum Day Plus Fire Flow** (L/min)	**Maximum Day Plus Fire Flow** (L/s)
Block 'A'	1,872	357.5	804.4	1,430.0	7,000	7,804.4	130.1
Block 'B'	2,058	393.0	884.3	1,572.1	6,000	6,884.3	114.7
Non-Residential	32	6.0	13.5	13.5	7,000	7,013.5	116.9
TOTAL	**3,962**	**756.5**	**1,702.2**	**3,015.6**	**7,000**	**8,702.2**	**145.0**

2.2 Water Service Connections

Each development block will be serviced with an individual domestic water service for each tower within the block. In accordance with the Halton Region Standards, the domestic water services will each have a valve at the street line.

With regards to fire lines, since all of the proposed towers are above the height of 84m, in accordance to OBC 3.2.9.7 (4), the proposed structure on each development block shall be served by two fire lines. In accordance with the Halton Region Standards, the fire line services will each have a valve at the street line.

A copy of the Halton Region standard detail for the water service connection is included in **Appendix "B"**. The locations of the proposed water service connections are indicated in **Figure 2**.

2.3 Fire Protection

The fire flow required for the proposed buildings was calculated using the criteria indicated in the *Water Supply for Public Fire Protection Manual, 2020*, by the Fire Underwriters Survey (FUS). The calculation incorporates various parameters such as coefficient for fire-resistant construction, an area reduction accounting for a fire-resistant (one hour rating) protection, a reduction for low-hazard occupancies, an adjustment for sprinkler protection system, and a factor for neighbouring building proximity.

Based on the floor areas, the minimum fire suppression flows required is 7,000 L/min for the proposed building on Block A, and 6,000 L/min for the proposed building on Block B.

This fire flow plus the maximum day demand must be available at the nearest hydrant with a minimum pressure of 140 KPa (20.3 psi). The calculation of the required fire flows for each block is provided in **Tables B2** and **Table B3** which are contained in **Appendix "B"**.

Each of the proposed buildings will have a sprinkler system for fire protection with a Siamese connection. Fire hydrants are required such that the principle building entrances and the Siamese connections are within the required 90m and 45m as set out in the Ontario Building Code. Based on the location of the Siamese connections and principle entrances, there are municipal fire hydrants within the required distances along proposed Street A, Street B, and a private hydrant will be required on the Block B land to provide sufficient coverage. The location of the existing and proposed municipal fire hydrants, proposed private fire hydrant, and the Siamese connections are illustrated in **Figure 2**. A copy of the OPSD fire hydrant detail is included in **Appendix "B"**.

Pressure and flow testing was conducted by Hydratest Ltd. on November 13, 2024 at the closest municipal fire hydrants to obtain existing flows as well as residual and static pressure to determine if the existing infrastructure can provide the required fire suppression. Based on the test result, the required fire flow plus maximum day demand for the subdivision of 8,702.2 L/min is available at a residual pressure of approximately 322.0 kPa (46.7 psi), which is greater than the minimum pressure of 140 kPa (20.3 psi) and therefore there is sufficient capacity to support the development. The calculation of the available pressure at the required fire flow plus maximum day demand is provided in **Table B4** which is contained in **Appendix "B"** together with the hydrant flow test results.

2.4 Water Meters

Since the parking garage extends under the entire site area within the development blocks, the private domestic water service and fire line will enter the mechanical rooms on the P1 parking garage level. There will be a separate mechanical room for each building which will each contain a water meter. These water meters are to be purchased from the Town. The location of the proposed water meters is illustrated in **Figure 2**.

2.5 Municipal Watermains

Existing watermains in the vicinity of the site include a 300mm diameter watermain on Wyecroft Road. The subject site will be serviced by connecting to the existing Wyecroft Road watermain and constructing a 300mm diameter watermain along the west side of Street "A" and west side of Street "B". The proposed watermain will terminate at the south end of Street "B" with a plug.

Based on the Bronte GO MTSA Stormwater Management Functional Servicing Study, the proposed municipal watermain is anticipated to be extended further to the southeast along Street "B" to service the future developments to the southeast of the subject development.

3.0 WASTEWATER SERVICING

Halton Region is responsible for the collection and treatment of wastewater in Oakville as well as Burlington, Milton and Halton Hills. The wastewater collection systems generally consist of relatively small diameter (200 and 250mm) local gravity sewers which are connected to larger sub trunks and trunk sewers. In areas which are topographically difficult to service by gravity, the Region operates wastewater pumping stations and their forcemains. The Region operates several wastewater treatment plants (WWTPs) including Burlington Skyway, Mid-Halton, Oakville Southwest and Oakville Southeast. The subject site is within the drainage shed of the Oakville Southwest WWTP which is located on the north side of Lakeshore Road West by the shoreline of Lake Ontario.

A plan indicating the various sanitary service areas are included in **Appendix "C"**. The following is a summary of the wastewater servicing analysis for the subject site.

3.1 Wastewater Loading

The wastewater analysis for the subject site was completed using the design criteria stipulated in the Region of Halton engineering design guidelines which include the following parameters:

Average Daily Flow: 275 L/person/day (Residential)
24750 L/ha/day (Commercial)

Extraneous Flow: 0.286 L/s/Ha (Infiltration)

Peaking Factor: $$M = 1 + \frac{14}{4 + \sqrt{P}}$$

Where: M = Harmon Peaking Factor
p = Population in thousands

Equivalent Population: 90 persons per ha (Light Commercial Areas)
2000 persons/ha (Apts within MTSA)

Based on the Region of Halton's criteria the sewage flow was calculated for the existing upstream and proposed sanitary loadings. The detailed calculations for existing and proposed conditions are provided in **Tables C1**, which is included in **Appendix "C"** and the total flow from the proposed condition is summarized in **Table 3** below.

Table 3. Wastewater Loading Summary

	Overall Area (Ha)	Equivalent Population (Persons)	Harmon Peaking Factor	Average Daily Flow (L/s)	Infiltration Rate (L/s)	Total Flow (L/s)
Block ‘A’ (Towers ‘A’ & ‘B’)	-	1,872	3.61	5.96	-	21.50
Block ‘B’ (Towers ‘C’ & ‘D’)	-	2,058	3.58	6.55	-	23.42
Commercial	-	32	4.35	9.02	-	39.26
Infiltration	2.362	-	-	-	0.68	0.68
TOTAL	**2.362**	**3,962**	**-**	**21.52**	**0.68**	**84.86**

3.2 Sanitary Service Connections

Each development block will be serviced by one sanitary service connection with a manhole located at the street line. The existing sanitary service connection will be abandoned in accordance with the requirements of the Halton Region.

A control maintenance hole will be provided at the street line from which the sewer will extend to the site and up to the building where it will enter the underground parking garage.

3.3 Municipal Sanitary Sewers

Existing sewers in the vicinity of the site include a 200mm diameter sanitary sewer on Wyecroft Road, and a 300mm diameter sanitary sewer within a 7.6m wide easement that across the southeast corner of the subject site. The existing 300mm diameter in the easement will need to be rerouted to accommodate the proposed buildings on the subject site.

Sanitary drainage for the subdivision will be conveyed by the proposed 300mm diameter sanitary sewer on Street “A” and within the proposed servicing easement on the east side of Block B. The sanitary drainage will outlet to the existing 300mm diameter sanitary sewer within the easement to the southeast of the subject site. The existing and proposed sanitary sewers are illustrated in **Figure 3**.

3.4 Downstream Sanitary Sewer Capacity

A downstream sanitary sewer analysis has been carried out to assess the capacity of the existing and proposed sanitary sewers from the subject site to the existing 525mm diameter trunk sewer located southwest of the subject site. A design sheet has been completed based on the design drawings with plan and profiles from the Town’s and Region’s record. A sanitary catchment area figure is provided in **Figure C1** in **Appendix “C”**.

Based on the design sheet, minor surcharging was observed in the last two legs of 300mm diameter sanitary sewer before the trunk connection point under the post-development condition. However, given these existing sewers located within the easement are deep, the hydraulic grade line (HGL) of the sewers will be well below the finished grade and the existing buildings on the neighbouring property downstream of the site will not be impacted by this minor surcharge. A hydraulic model will be conducted to further assess the level of surcharge in the system. The design sheets are provided in **Table C2** and **Table C3** in **Appendix "C"**.

4.0 STORM DRAINAGE

The subject site is located within the Bronte Creek watershed. The Bronte Creek spans 48 km, and resides within the Halton Region, the creek starts from a western downstream connection into Lake Ontario and originates in Morriston. The Bronte Creek watershed covers approximately 311 km^2 of land and includes portions of Milton and Oakville. This creek drains into Lake Ontario with its outlet located south of the intersection of Bronte Road and Lakeshore Road West in downtown Oakville. The Halton Conservation is responsible for eight watersheds, including Sixteen Mile Creek, all of which ultimately drain into Lake Ontario. A map of the various watersheds in Conservation Halton's jurisdiction is contained in **Appendix "D"**.

In accordance with Town standards, a major / minor system storm conveyance concept has been incorporated into the functional servicing design for the subject development. The following sections provide a brief summary of the storm drainage components:

4.1 Drainage Area

Under pre-development condition, the subject site encompass sheet drains to the southeast and is captured by multiple on-site catchbasins and eventually released by an existing headwall near the southeast corner. Storm runoff is collected by existing ditches running to the southeast of the subject site and is conveyed towards an existing 1500mm diameter culvert which runs underneath the existing rail tracks and conveyed by existing storm sewer which runs toward Speers Road. The subject site is contained within Network 'E' as stated by Bronte GO MTSA Stormwater Management Functional Servicing Study. The runoff will then be collected by a proposed future stormwater management facility (E1) close to 2172 Speers Road. The Network 'E' limits and proposed stormwater management facility can be viewed in **Figure 8**. The excerpts from the Bronte GO MTSA Stormwater Management Functional Servicing Study are included in **Appendix "E"**.

4.2 Minor System Design

As per the Town engineering design criteria, the proposed development is to be serviced with a minor storm sewer system that is designed to convey runoff from the 5-year storm event. The rainfall intensity values, *I*, are calculated in accordance with the Town of Oakville standards as follows:

$$I_5 = \frac{1170}{(t+5.8)^{0.843}} = 114.2 \qquad I_{100} = \frac{2150}{(t+5.7)^{0.861}} = 220.8$$

The peak flows are calculated using the following formula:

$Q = R \times A \times I \times 2.778$

where: Q = peak flow (L/s)
A = area in hectares (Ha)
I = rainfall intensity (mm/hr)
R = composite runoff coefficient
t = time of concentration (10 min)

The rainfall intensity duration frequency (IDF) curve data for the Town of Oakville are included in **Appendix "D"**. A schematic design of the minor storm sewer system is illustrated in **Figure 6**.

The proposed development will be serviced by the proposed municipal storm sewers which will capture and convey runoff from the proposed road allowances and proposed development blocks within the site limit. The proposed storm sewers will discharge outlet to the existing ditches to the southeast of the site via a proposed headwall. The drainage will be conveyed by the existing 1500mm diameter culvert that leads into the municipal storm system on Speers Road.

Each development block will have a storm service connection with a control manhole located at the street line. The internal storm drain system will be routed within the underground parking garage to capture roof drainage from the towers and podiums, and to collect drainage from the driveways, walkways and landscaped areas at ground level. The internal drainage system will be designed at the building permit stage by the project mechanical engineer.

4.3 Major System Design

The major system will generally be comprised of an overland flow route along the municipal road network directing drainage to a safe outlet. This major system will convey flows which are in excess of the capacity of the minor storm sewer system. The major system flow route is illustrated in **Figure 5** and drains towards the southeast limit of the subject site towards the existing ditches.

4.4 Foundation Drainage

The proposed buildings will be connected through a multi-level underground parking structure that will require weeping tile at the foundation level. As is typical with this type of development, the foundations will be deeper than the municipal storm sewer and therefore sump pumps will be required. The sump pump is to be fitted with a back flow preventer and will discharge to the on-site stormwater management tank of the development blocks. Based on the Preliminary Geotechnical Investigation and Hydrogeological Assessment completed by Pinchin Ltd. dated April 13, 2022, the long-term discharge will be 40,348 L/day (0.47 L/s). The on-site SWM tank for each development block will be oversized to accommodate this discharge rate. The foundation drain sump pump is to be designed by the mechanical engineer and indicated on the mechanical plans at the building permit design stage.

The excerpts of the supplementary hydrogeological report are included in **Appendix "G"**.

4.5 Roof Drainage

The proposed buildings will have flat roof designs that will require roof drains. These roof drains will be collected by the building's internal storm drain system which will discharge to the site storm sewer system. The roof drain system is to be designed by the mechanical engineer and indicated on the mechanical plans at the building permit design stage. Roof top stormwater detention is not required and therefore control flow roof drains are not required, as noted in **Section 5.1** of this report.

5.0 STORMWATER MANAGEMENT

The stormwater management design for the site is to meet the criteria of the Town of Oakville and Conservation Halton as follows:

- Stormwater quantity control is to be provided on the development blocks to control discharge from 100-year post development rate to the 5-year pre-development rate.
- Level 1 (Enhanced) stormwater quality treatment is to be provided to achieve 80% TSS removal for the development blocks and proposed municipal roads.
- Water balance measures are to be implemented on-site to ensure that a minimum of 5 mm of rainfall depth is infiltrated or re-used.

Based on the foregoing, the following is a summary of the stormwater mitigation measures that are to be incorporated into the design:

5.1 Quantity Control

Stormwater quantity control is typically implemented to minimize potential for downstream flooding, stream bank erosion and overflows of infrastructure. The impact of the proposed development has been analyzed as follows:

5.1.1 Pre-development Flow

Pre-development surfaces consist primarily of existing concrete 1-storey buildings, the paved driveway and parking lot, and landscaped areas, which indicate that the existing site condition is very impervious with a composite runoff coefficient of 0.85. The pre-development surface conditions are illustrated in **figure 4**.

The calculation of the pre-development 5-year and 100-year peak flows are provided in **Table E1-1 and E2-1** within **Appendix "E"** and summarized within **Table 4** below.

Table 4: Storm Drainage Peak Flows

Building	**Area** (Ha)	**Un-mitigated 5-Year Peak Flows**		**Un-mitigated 100-Year Peak Flows**		**Mitigated Flows (100-Year Peak)** (L/s)
		Pre-Dev (L/s)	**Post-Dev** (L/s)	**Pre-Dev** (L/s)	**Post-Dev** (L/s)	
Block A	0.936	253.7	238.4	446.1	419.2	204.5
Block B	1.029	278.9	254.6	490.4	447.6	251.2
Municipal ROW	0.397	107.6	98.6	189.2	173.4	173.4
Total	**2.362**	**640.3**	**591.6**	**1125.6**	**1040.2**	**629.1**

5.1.2 Post-development Flow: Un-mitigated

Based on a review of the architect's preliminary site plan, the post-development surface conditions for this site are illustrated in **Figure 5**. The surfaces are mainly the proposed building roofs, paved roadways, paved driveways, and landscape areas. Based on these surfaces, the proposed development is less impervious than the existing site conditions with the composite runoff coefficient of the subdivision decreasing from 0.85 to 0.79.

Based on the area of the proposed surfaces, the post-development hydrological condition was calculated in accordance with the equations presented in **Section 4.2** of this report, assuming no mitigation measures will be implemented. The un-mitigated 5-year and 100-year peak post-development flow rates are calculated on **Table E1-2 and E2-2** within **Appendix "E"** and summarized in **Table 4** above. A comparison of the rates in the 100-year post-development peak flows to the 5-year pre-development peak flows of the development blocks indicates that the un-mitigated post-development peak flows will be higher than the pre-development rate.

5.1.3 Post-development Flow: Mitigated

Given that the runoff from the site will be captured and directed to the proposed municipal storm sewer on Street "A" and Street "B", the 100-year post-development peak flow from Block A and Block B of the subdivision is to be controlled to the 5-year pre-development rate and therefore mitigation measures are necessary. In order to control discharge, it is proposed to install orifice restrictors at the outlets of both Block A and Block B and provide on-site storage in the form of stormwater tanks within the P1 levels of the underground parking structures.

The stormwater quantity control was modelled using the modified rational method. This method calculates the storage volume using the composite runoff coefficient and the target rate. Through an iterative assessment of various orifice sizes, underground storage configurations and high-water levels, the detention systems were developed for both Block A and Block B.

The post-development mitigated hydrologic condition for Block B was calculated using the orifice discharge equation and is summarized in **Tables E1-3 and E1-4** within **Appendix "E"**. A comparison of the mitigated 100-year peak flows and 5-year pre-development peak flows in **Table 4** indicates that the mitigated post-development 100-year peak flow has been controlled to 251.2 L/s, which is less than the 5-year pre-development rate of 278.9 L/s. Based on the above and using a 250mm diameter orifice tube, a storage volume of 111.4 m^3 will be required in a stormwater management tank contained within the underground parking structure.

The post-development mitigated hydrologic condition for Block A was calculated using the orifice discharge equation and is summarized in **Tables E2-3 and E2-4** within **Appendix "E"**. A comparison of the mitigated 100-year peak flows and 5-year pre-development peak flows in **Table 4** indicates that the mitigated post-development 100-year peak flow has been controlled to 204.5 L/s, which is less than the 5-year pre-development rate of 253.7 L/s. Based on the above and using a 250mm diameter orifice tube, a storage volume of 120.3 m^3 will be required in a stormwater management tank contained within the underground parking structure.

The required storage volumes and available storage volumes are provided in **Tables E1-5** to **Table E1-8** and **Table E2-5** to **Table E2-8** which are included in **Appendix "E"** together with a summary provided in **Tables E1 and E2**. The locations of the stormwater detention tanks and orifice restrictor are provided in **Figure 6**.

Roof top stormwater detention is not required for either proposed building, therefore control flow roof drains are not required.

As indicated in the last column of **Table 4**, the overall 100-year mitigated release rate of the subdivision will be 629.1 L/s, which is less than the 5-year pre-development flow of 640.3 L/s. As a result, the stormwater quantity control requirements are achieved for the subdivision.

With regards to the proposed municipal right-of-way's (Street "A" and Street "B"), since the runoff coefficient under the post-development condition will be less than the pre-development condition, the storm runoff from the ROWs for 5-to 100-year under the post-development condition will be all less than the corresponding flow rates under the pre-development condition. Given the storm runoff from the development blocks will be overcontrolled to the 5-year pre-development flow, stormwater quantity control is not warranted for the municipal ROWs.

A design sheet has been completed to confirm the capacity of the proposed storm sewers in the municipal ROWs, the design sheet is provided in **Table E4** in **Appendix "E"**.

With regards to the Town's restrictions regarding the depth of surface ponding, given that all the detention volumes will be provided underground, there will be no surface ponding for storm events up to and including the 100-year storm. In addition, the first-floor elevation of the proposed building will be a minimum of 0.30 m higher than the 100-year high water level.

5.2 Quality Control

The long-term stormwater quality control goal is to achieve the federal, provincial and municipal water and sediment quality objectives in the local watercourses. In addition to the many pameters of concern, the primary water quality constituent that needs to be controlled is Total Suspended Solids (TSS). Based on the City's criteria, stormwater quality control for the subject site is to be designed to achieve "Enhanced" protection (Level 1 treatment) with a minimum total suspended solid removal efficient (TSS) of 80%.

Several on-site mitigation measures are available to treat runoff including oil / grit separators (OGS), filter systems, infiltration trenches, permeable pavement and grass swales. For this project, the site design incorporates OGS for development blocks, and OGS supplemented with infiltration LIDs to form a treatment train approach for municipal roads.

In order to achieve the "Enhanced" protection level (Level 1 treatment), which entails 80% total suspended solids (TSS) removal, an oil / grit separator is proposed for both Block A and Block B located downstream of the on-site SWM tanks. The OGS for the municipal roads will be located upstream of the proposed headwall. Separators are generally implemented on relatively small sites and are typically in the form of pre-cast concrete maintenance hole with a deep sump with a special insert which diverts low flows to a lower chamber to capture and store oil and grit from the storm drainage discharge from the site. The insert diverts high flow away from the lower chamber to ensure that captured pollutants do not scour or re-suspend.

For this application, a Storm*ceptor*® type oil / grit separators manufactured by Imbrium Systems Inc. has been selected. The separators have been sized in accordance with manufacturer's recommendation. Based on the simulations, a Storm*ceptor*® Model has been chosen which, based on the catchment areas and imperviousness of the site area, have the capability of providing a TSS removal rate of greater than 80% to satisfy the Level 1 treatment requirement. The site area, Storm*ceptor*® model and TSS removal rates have been provided in **Table 5** below. The imperviousness calculations of each site area are provided in **Tables F2-4** within **Appendix "F"**.

Table 5: Stormwater Quality Control Summary

Site Area	Mitigation Measure	TSS Removal Rate (%)
Block A (Towers A & B)	Storm*ceptor*® OGS EFO5	83
Block B (Towers C & D)	Storm*ceptor*® OGS EFO5	82
Streets "A" & "B"	Storm*ceptor*® OGS EFO4 & Infiltration LID	97

Based on the Bronte GO MTSA Stormwater Management Functional Servicing Study, it is recommended that the treatment train includes the proposed 25mm source controls in the form of Low Impact Development (LID) best management practices to mitigate the impacts to stormwater runoff water quality. Therefore, infiltration LIDs are proposed at the street catchbains within the municipal road allowances to form a treatment train approach and supplement the OGS for additional TSS removal.

The runoff collected by the street catchbasins will be directed to the LIDs in the form of StormTank^{TM} units by Brentwood Industries Inc. for infiltration. These units are commercially available modular storage system comprised of polypropylene top, bottom and side panels and PVC columns, all of which are assembled on site to create the storage chamber. These ST-12 modular units, which have a 95.5% void ratio, have a unit size of 0.914m long x 0.457m wide with a height of 0.457m. The manufacture details are included in **Appendix “G”**.

The locations of the oil / grit separators and infiltration LIDs are provided in **figure 6**. The oil / grit separator sizing reports and standard details are included in **Appendix “F”**. The quality treatment train calculations are provided in **Table F4** within **Appendix “F”** and summarized in **Table 6** below.

Table 6: Stormwater Quality Summary

Surface Type	Area (Ha)	Effective TSS	% Area of ROW	Overall TSS Removal
Pavement Area	0.312	0%	78.6%	0.0%
Landscape Area	0.085	80%	21.4%	17.1%
Sub-Total (Before LID)	**0.397**		**100.0%**	**17.1%**
Infiltration LID provides 70% removal rate to the remaining possible TSS removal of 82.9% (ie. 100%-17.1%)		70%		58.0%
Sub-Total (After LID / Before OGS)	**0.397**		**100.0%**	**75.1%**
Oil/Grit Separator provides additional 88% removal rate (based on sizing report) to the remaining possible TSS removal of 24.9% (i.e 100.0%- 75.1%)		88%		21.9%
Total	**0.397**		**100.0%**	**97.0%**

5.3 Water Balance

In accordance with the requirements of the Town of Oakville and Halton Conservation, water balance is to be addressed such that a minimum of a 5 mm rainfall depth is to be retained on site and either infiltrated or re-used. The objective of this criteria is to capture and manage annual rainfall on-site to preserve the pre-development hydrology.

Low Impact Development (LID) measures such as infiltration trenches, bio-retention swales, green roof systems and permeable pavers are implemented as source and conveyance stormwater management controls to promote infiltration and pollutant removal on a local site by site basis. These measures rely on eliminating the direct connection between impervious surfaces such as roofs, roads, parking areas, and the storm drainage system, as well as the promotion of infiltration on each development or redevelopment site.

The benefits from LID stormwater management practices are generally focused on the more frequent storm events (5mm rainfall events) of lower volumes as opposed to the less frequent storm events (e.g. 100 year storm) with higher volumes. It is also recognized that the forms of LID which promote infiltration or filtration through a granular medium also provide thermal mitigation for storm runoff. LID measures can be implemented to varying degrees based upon the available area given the proposed land use and development form and the soil infiltration capacity.

A review of the architect's site plan, the underground parking structure covers virtually the entire land of Block A and Block B. Therefore, infiltration trenches and permeable pavers are not feasible on the development blocks.

The runoff volume to be retained is calculated based on the site area with an adjustment for initial abstraction to reflect the retention benefits of the green roof. The stormwater runoff volume is calculated using the following formula:

$V = A \times (D - Ia)$ where: V = runoff volume (m^3)
A = site area (m^2)
D = rainfall depth (0.005m)
Ia = initial abstraction

V = 9,360 m^2 x (0.005 – 0.001470) = 33.04 m^3 (Block A)
V = 10,290 m^2 x (0.005 – 0.001704) = 33.92 m^3 (Block B)

Based on the impervious areas on site, the required water balance volume is 33.0 m^3 for Block A and 33.9 m^3 for Block B.

Given that infiltration is not feasible within the development blocks due to the extent of the underground parking garages, stormwater re-use is proposed in the form of landscape irrigation. In this regard, each development block will have an irrigation system for the landscaped areas which can be designed to draw water from the retention tanks which has the added benefit of reducing consumption of municipal water. The irrigation system will require a back-up connection to the municipal water service for dry weather conditions when volumes in the retention tank may not be available. The required volumes will be retained in the base of the stormwater detention tanks located on the P1 level of underground parking garage. The water balance calculations for the development blocks are provided in **Table G1** and **Table G2** in **Appendix "G"**.

With respect to the proposed municipal road allowance, infiltration LIDs are proposed at each of the street catchabasins to address the water balance requirement. As indicated in **Section 5.2** of this report, the infiltration LID will provide additional quality control of the storm runoff collected by the street catchbains. The Brentwood tanks will provide the required storage for infiltration. Given the quality control requirement of retaining 25mm of rainfall is greater than the 5mm water balance requirement, the quality control requirement will govern the infiltration LID sizing. The excess water from the infiltration

LID will be directed to the adjacent street catchbasins so that the surplus runoff will be able to escape once the cells are full.

The Hydrogeological Investigation prepared by Pinchin Ltd. dated April 13, 2022 determined the permeability of the soils as well as the groundwater levels. In this regard, the infiltration rate of the soils was estimated to be 64.0 mm/hr based on a conversion of the hydraulic conductivity as indicated in **Table G3** in **Appendix "G"**, and the ground water table ranges from 2.86m to 9.31m below existing grade. The hydrogeological also indicated that the subject site is underlaid by bedrock ranging from 1.7m to 1.8m below existing grade. Based on the MOE Stormwater Management Planning & Design Manual, the clearance from the bottom of the infiltration LID to the bedrock and groundwater table should be at least 1.0m, the infiltration trench will therefore be located beside the proposed street catchbasins on Street "B" wherever possible as the best effort approach. The sizing calculations of the infiltration LIDs are included in **Table G4** to **Table G8** in **Appendix "G"**.

The water balance summary for the subdivision is provided in **Table 7**. The locations of the infiltration LIDs are indicated in **Figure 6**.

Table 7: Water Balance Summary

Parcel	Rainfall Depth (mm)	Volume to be Retained (m^3)	Mitigation Measure
Block A (Building A & B)	5	33.0	Cistern for Rainwater Reuse
Block B (Building C & D)	5	33.9	Cistern for Rainwater Reuse
Municipal ROW	25	39.8	Infiltration LID at Street CBs
Total:		**106.7**	

6.0 VEHICULAR & PEDESTRIAN ACCESS

The site plan has been developed with consideration for efficient and safe access and circulation of both vehicular and pedestrian traffic. The following is a summary of the facilities:

6.1 Regional & Municipal Roads

Wyecroft Road is under the jurisdiction of the Town of Oakville has two through lanes and plus turn lanes at intersections.

The proposed development at 2172 Wyecroft Road will include Street "A" off Wyecroft Road and extend to proposed Street "B" to complete the local road network in the subdivision. Street "A" will have a 16.0m wide road allowance with a 5.1m pavement width. Street "B" will have a 20.0m wide road allowance with a 9.5m pavement width. A copy of the original Town Standard Street Section STD 7-1a and STD 7-1 are included in **Appendix "H"**.

6.2 Driveways & Parking Lots

Driveway access to the development site will provide full movements to the proposed municipal road extensions. The driveways will provide access to the underground parking structure, ground level visitor parking, and will also serve service vehicles such as garbage collection and delivery vehicles. The driveway width and curb radius for the driveway entrances are to be as per Town Standard 10-2 which is included in **Appendix "H"**.

6.3 Sidewalks & Walkways

Internal pedestrian access will be provided by walkways to safely guide residents to the various buildings within the development site with connections to the municipal sidewalks. Street "A" will include a sidewalk along the southwest side of the street and Street "B" will include sidewalks on both sides of the street. Walkways will be provided around the perimeter of each building that connect to multiple entrances for access to Wyecroft Road, and proposed retail, underground parking garage or main lobby of the proposed buildings.

7.0 GRADING

As is typical with all developments, re-grading of the site is required to varying degrees to achieve the municipal design criteria. Based on a review of the topographic survey, the site can be described as relatively flat and therefore no significant difficulty is anticipated in achieving the municipal criteria.

The grading design will be governed by the following factors:

- Meet the City's vertical road design parameters with respect to minimum 0.50% and maximum 5.0% slopes and various vertical curve parameters.
- Provide an overland flow route to direct drainage to a safe outlet.
- Match existing grades along the perimeter of the subdivision.
- Create boulevard grades along the Metropolitan Road within the range of 2 to 4%.

The subject site is to be graded in accordance with the municipal grading criterion which dictates that road grades are to range from 0.5% to 5.0% and that sodded yard areas are to range from 2.0% to 5.0%. For large grade differentials, a maximum slope 3H : 1V can be used for sodded embankments. In areas where space is limited, retaining walls can be utilized to accommodate grade differentials. The road boulevards are to be graded to the standard 2% cross fall. The preliminary grading design is provided on the Functional Grading Plan (Dwg FGP-1) in **Appendix "I"**. Based on the preliminary design no significant difficulty is anticipated in achieving the municipal criteria.

8.0 EROSION & SEDIMENT CONTROL DURING CONSTRUCTION

Construction activity, especially operations involving the handling of earthen material, dramatically increases the availability of particulate matter for erosion and transport by surface drainage. In order to mitigate the adverse environmental impacts caused by the release of silt-laden stormwater runoff into receiving watercourses, measures for erosion and sediment control (ESC) are required for construction sites.

The impact of construction on the environment is recognized by the Greater Golden Horseshoe Area Conservation Authorities. Their document titled “Erosion & Sediment Control Guidelines for Urban Construction” provides guidance for the preparation of effective erosion and sediment control plans.

Control measures must be selected that are appropriate for the erosion potential of the site and it is important that they be implemented and modified on a staged basis to reflect the site activities. Furthermore, their effectiveness decreases with sediment loading and therefore inspection and maintenance is required. The selection, implementation, inspection and maintenance of the control features are summarized as follows:

8.1 Control Measures

On moderately sized sites, measures for erosion and sediment control typically include the use of silt fencing, a mud mat and sediment traps. The following is a description of the sediment controls to be implemented on the subject site:

- **Silt Fences** are to be installed adjacent to all property limits subject to drainage from the development area prior to topsoil stripping and in other locations, such as at the bases of topsoil stockpiles.
- **Mud Mat** is to be installed at the construction entrance prior to commencing earthworks to minimize the tracking of mud onto municipal roads.
- **Sediment Traps** are to be installed at all catch basin and area drain locations once the storm sewer system has been constructed to prevent silt laden runoff from entering the municipal storm sewer system.

8.2 Construction Sequencing

The following is the scheduling of construction activities with respect to sediment controls:

1. Install the hoarding and silt fences prior to any other activities on the site.
2. Construct a temporary mud mat for construction access.
3. Install sediment traps in all street catch basins in the vicinity of the site.
4. Install the shoring, excavate for the underground parking garage and dispose of earth material off site.
5. Construct the foundation and underground parking garage.
6. Construct the superstructure of the building and complete the cladding, rough-ins and finishes.
7. Install the service connections.
8. Construct the new municipal roads including sidewalks and driveway entrances.
9. Restore all disturbed areas with final landscape plantings and paving materials.
10. Upon stabilization of all disturbed areas, remove sediment controls.

8.3 ESC Inspection & Maintenance

In order to ensure that the erosion and sediment control measures operate effectively, they are to be regularly monitored, and they will require periodic cleaning (e.g., removal of accumulated silt), maintenance and/or re-construction.

Inspections of all of the erosion and sediment controls on the construction site should be undertaken with the following frequency:

- On a weekly basis
- After every rainfall event
- After significant snow melt events
- Prior to forecasted rainfall events

If damaged control measures are found, they should be repaired and/or replaced within 48 hours. Site inspection staff and construction managers should refer to the Erosion and Sediment Control Inspection Guide (2008) prepared by the Greater Golden Horseshoe Area Conservation Authorities. This Inspection Guide provides information related to the inspection reporting, problem response and proper installation techniques.

9.0 SUMMARY

Based on the discussions contained herein, the proposed multiple high-rise mixed-use development can be adequately serviced with full municipal services (watermain, sanitary and storm) in accordance with the standards of the Town of Oakville, Region of Halton, and Conservation Halton as follows:

Water

- The proposed subdivision will require a maximum day plus fire flow of 8,702.2 L/s at 140 kPa.
- Existing watermains in the vicinity of the site include a 300mm diameter watermain on Wyecroft Road. The subject site will be serviced by connecting to the existing Wyecroft Road watermain and constructing a 300mm diameter watermain along the west side of Street “A” and west side of Street “B”. The proposed watermain will terminate at the south end of Street “B” with a plug.
- Based on the Bronte GO MTSA Stormwater Management Functional Servicing Study, the proposed municipal watermain is anticipated to be extended further to the southeast along Street “B” to service the future developments to the southeast of the subject development.
- Based on a fire hydrant flow test, the existing watermain will have sufficient pressure to service the proposed development.
- Each building in each development block will be provided with a service connection which will include a fire line and a domestic water service. In accordance with the Region Standards, the domestic water services will each have a valve at the street line. The proposed buildings will have two separate fire line connections because their heights are more than 84m in accordance with the OBC.

Waste Water

- The subject development will generate a total wastewater flow of 84.86 L/s.
- Existing sewers in the vicinity of the site include a 200mm diameter sanitary sewer on Wyecroft Road, and a 300mm diameter sanitary sewer within a 7.6m wide easement that across the southeast corner of the subject site. The existing 300mm diameter in the easement will need to be rerouted to accommodate the proposed buildings on the subject site.
- Sanitary drainage for the subdivision will outlet to the existing sanitary sewer on within the easement to the south of the subject site. It will drain towards the existing 525mm diameter trunk sewer located within the easement to the southwest of the subject site.
- Each development block will have one sanitary service connection with a manhole located at the street line. The existing sanitary service connection will be abandoned in accordance with the requirements of the Halton Region.
- Based on downstream sanitary sewer capacity design sheet, it was determined that some of the downstream sanitary sewers within the easement before the trunk connection are surcharging under post-development conditions. The level of surcharging will be further assessed using the hydraulic model.

Storm Drainage and Stormwater Management

- Through the implementation of detention tanks located on the P1 levels of the development blocks, the post-development 100-year release rate will be reduced to the 5-year rate at the pre-development rates for Block A and Block B. In this regard a total storage volume within the subdivision of 231.7 m^3 will be required to control the flow to 629.1 L/s, which will be less than the allowable release rate of 640.3 L/s.
- The long-term groundwater will be discharged to the on-site stormwater management tank of the development blocks. Based on the Preliminary Geotechnical Investigation and Hydrogeological Assessment, the long-term discharge will be 40,348 L/day (0.47 L/s). The on-site SWM tank for each development block will be oversized to accommodate this discharge rate.
- With regards to the proposed municipal right-of-way's (Street "A" and Street "B"), since the runoff coefficient under the post-development condition will be less than the pre-development condition, stormwater quantity control for the municipal ROW is not warranted.
- Each development block will have an OGS Stormceptor by Imbrium Systems Corporation to treat stormwater discharge. These units have been designed to provide a TSS removal rate of 80%. With regards to the proposed municipal road, runoff will be treated by a treatment train approach where the OGS Stormceptor Model EFO4 will be supplemented by LID measures in the form of infiltration LID at each of the proposed street catchbasins on Street "B" to achieve an overall 97% of TSS removal.
- With regards to water balance, the 5mm rainfall event for the development block and 25mm rainfall event for the municipal roads will require a total retention volume of 106.7 m^3 for the subdivision. Given that infiltration is not feasible within the development blocks due to the extent of the underground parking garages, re-use is proposed in the form of landscape irrigation. With regards to the proposed municipal road allowance, the proposed infiltration LIDs at each of the street catchbasin on Street "B" will provide sufficient infiltration volume to address water balance.
- Based on a review of the hydrogeological report, the subject site is underlaid by bedrock ranging from 1.7m to 1.8m below existing grade. Based on the MOE Stormwater Management Planning & Design Manual, the clearance from the bottom of the infiltration LID to the bedrock and groundwater table should be at least 1.0m, the infiltration trench will therefore be located beside the proposed street catchbasins on Street "B" wherever possible as the best effort approach.
- The stormwater management system is to be inspected and maintained in accordance with the recommendations contained in this report.

Vehicle & Pedestrian Access

- The proposed development at 2172 Wyecroft Road will include Street "A" off Wyecroft Road and extend to proposed Street "B" to complete the local road network in the subdivision. Street "A" will have a 16.0m wide road allowance with a 5.1m pavement width. Street "B" will have a 20.0m wide road allowance with a 9.5m pavement width.
- Driveway access to the development site will provide full movements to the proposed municipal road extensions. The driveways will provide access to the underground

parking structure, ground level visitor parking, and will also serve service vehicles such as garbage collection and delivery vehicles.

- Internal pedestrian access will be provided by walkways to safely guide residents to the various buildings within the development site with connections to the municipal sidewalks. Street “A” will include a sidewalk along the southwest side of the street and Street “B” will include sidewalks on both sides of the street. Walkways will be provided around the perimeter of each building that connect to multiple entrances for access to Wyecroft Road, and proposed retail, underground parking garage or main lobby of the proposed buildings.

Grading

- Based on the existing topography and the preliminary grading design, no significant difficulties are anticipated in achieving the municipal grading design standards. The detailed grading design will be prepared and the subdivision engineering design stage and at the site plan application stage for the individual development blocks.

Erosion & Sediment Control During Construction

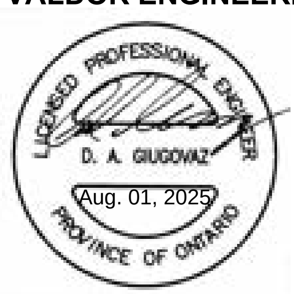
- Erosion and sediment controls are to be implemented during construction to prevent silt laden runoff from leaving the site in accordance with the “Erosion & Sediment Control Guidelines for Urban Construction” (2019).

10.0 REFERENCES & BIBLIOGRAPHY

- Town of Oakville, **Development Engineering Procedures and Guidelines Manual**, January 2011.
- Wood Environment & Infrastructure Solutions, **Bronte GO MTSA: Area Specific Plan, Appendix I - Stormwater Management Functional Servicing Study**, August 20, 2020.
- Wood Environment & Infrastructure Solutions, **Bronte GO MTSA: Area Specific Plan, Appendix L -** Preliminary Functional Water and Wastewater Study, March 5, 2021.
- Halton Region, **Design Criteria, Contract Specifications and Standard Drawings**, May 2014, Version 2.0.
- Ministry of Environment, **Stormwater Management Planning & Design Manual**, March 2003.
- Greater Golden Horseshoe Area Conservation Authorities, **Erosion & Sediment Control Guidelines for Urban Construction**, 2019.
- Fire Underwriters Survey, Water Supply for Public Fire Protection, 2020.
- Ministry of Municipal Affairs & Housing, **Ontario Building Code**, 2024.
- Pinchin Ltd. **Preliminary Geotechnical Investigation and Hydrogeological Assessment**, April 2022.

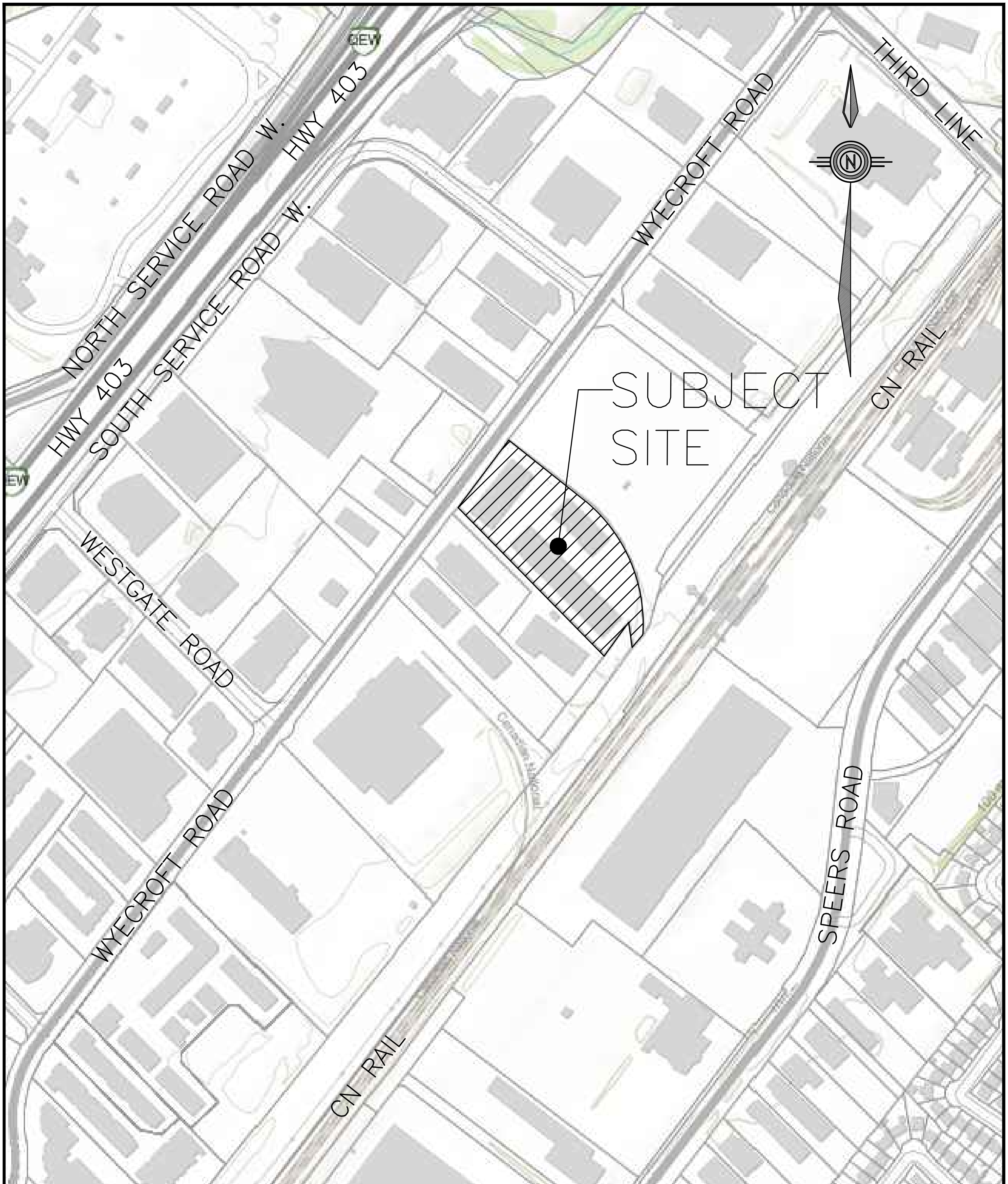
Respectfully Submitted,

VALDOR ENGINEERING INC.



David Giugovaz, P.Eng.
Senior Project Manager

905-264-0054 x 224
dgiugovaz@valdor-engineering.com



PROPOSED MIXED–USE DEVELOPMENT
2172 WYECROFT ROAD
TOWN OF OAKVILLE

VALDOR ENGINEERING INC.
Consulting Engineers - Project Managers
571 CHRISLEA ROAD, UNIT 4, 2nd FLOOR WOODBRIDGE, ONTARIO, L4L 5T9
TEL (905)264-0054, FAX (905)264-0069
E-MAIL: info@valdor-engineering.com
www.valdor-engineering.com

SCALE	N.T.S.	CKD. BY	D.G.	DWG.	FIGURE 1
DATE	AUGUST 2025	DRAWN BY	A.M	PROJECT	24123

LEGEND:

	PROPERTY LINE
	EX. VALVE AND BOX
	EX. FIRE HYDRANT
	PROP. MAIN WATER VALVE
	PROP. FIRE HYDRANT
BP	PROP. BACKFLOW PREVENTER
M	PROP. WATER METER

PROJECT

PROPOSED MIXED–USE DEVELOPMENT
2172 WYECROFT ROAD
TOWN OF OAKVILLE

WATER SERVICING PLAN

VALDOR ENGINEERING INC.
Consulting Engineers - Project Managers
571 CHRISLEA ROAD, UNIT 4, 2ND FLOOR, VAUGHAN, ONTARIO, L4L 8A2
TEL (905) 264-0054, FAX (905) 264-0069
E-MAIL: info@valdor-engineering.com
www.valdor-engineering.com

PREPARED BY A.M.	CKD. BY D.G.
SCALE N.T.S.	DATE AUGUST 2025
PROJECT 24123	DWG. FIGURE 2

N:\Projects\2024\24123\Drawings\Working\24123 - Figures.dwg, Fig-2, 2025-08-01 3:43:51 PM, amckeracher, DWG To PDF.pc3, ANSI full bleed B (11.00 x 17.00 Inches), 1:25.4

LEGEND:

	PROPERTY LINE
	PROPOSED SANITARY SEWER
	EXISTING SANITARY SEWER
	PROPOSED SANITARY MANHOLE
	EXISTING SANITARY MANHOLE

PROJECT

PROPOSED MIXED–USE DEVELOPMENT
2172 WYECROFT ROAD
TOWN OF OAKVILLE

SANITARY SERVICING PLAN

VALDOR ENGINEERING INC.
Consulting Engineers - Project Managers
571 CHRISLEA ROAD, UNIT 4, 2ND FLOOR, VAUGHAN, ONTARIO, L4L 8A2
TEL (905) 264-0054, FAX (905) 264-0069
E-MAIL: info@valdor-engineering.com
www.valdor-engineering.com

PREPARED BY A.M.	CKD. BY D.G.
SCALE N.T.S.	DATE AUGUST 2025
PROJECT 24123	DWG. FIGURE 3

N:\Projects\2024\24123\Drawings\Working\24123 - Figures.dwg, Fig-3, 2025-08-01 3:45:03 PM, amckeracher, DWG To PDF.pc3, ANSI full bleed B (11.00 x 17.00 Inches), 1:25.4

LEGEND:

PROPERTY LINE

ROOF

PERVIOUS

IMPERVIOUS

OVERLAND FLOW ROUTE

1.650 / 0.29 — CATCHMENT AREA (HA) / RUNOFF COEFFICIENT

PRE–DEVELOPMENT AREA SUMMARY

LAND USE	AREA (Ha.)	RC	COMPOSITE RC
ROOF	0.845	0.85	0.85
IMPERVIOUS	1.395	0.90	
PERVIOUS	0.122	0.35	
TOTAL	2.362		

PROJECT

PROPOSED MIXED–USE DEVELOPMENT
2172 WYECROFT ROAD
TOWN OF OAKVILLE

PRE–DEVELOPMENT DRAINAGE CONDITION

VALDOR ENGINEERING INC.
Consulting Engineers - Project Managers
571 CHRISLEA ROAD, UNIT 4, 2ND FLOOR, VAUGHAN, ONTARIO, L4L 8A2
TEL (905) 264-0054, FAX (905) 264-0069
E-MAIL: info@valdor-engineering.com
www.valdor-engineering.com

PREPARED BY A.M.	CKD. BY D.G.
SCALE N.T.S.	DATE AUGUST 2025
PROJECT 24123	DWG. FIGURE 4

POST–DEVELOPMENT ROW AREA

LAND USE	AREA (Ha.)	RC	COMPOSITE RC
ROOF	0.000	0.85	0.78
IMPERVIOUS	0.312	0.90	
PERVIOUS	0.085	0.35	
TOTAL	0.397		

POST–DEVELOPMENT BLOCK A AREA

LAND USE	AREA (Ha.)	RC	COMPOSITE RC
ROOF	0.619	0.85	0.80
IMPERVIOUS	0.207	0.90	
PERVIOUS	0.110	0.35	
TOTAL	0.936		

POST–DEVELOPMENT BLOCK B AREA

LAND USE	AREA (Ha.)	RC	COMPOSITE RC
ROOF	0.493	0.85	0.78
IMPERVIOUS	0.355	0.90	
PERVIOUS	0.181	0.35	
TOTAL	1.029		

POST–DEVELOPMENT AREA SUMMARY OVERALL SITE

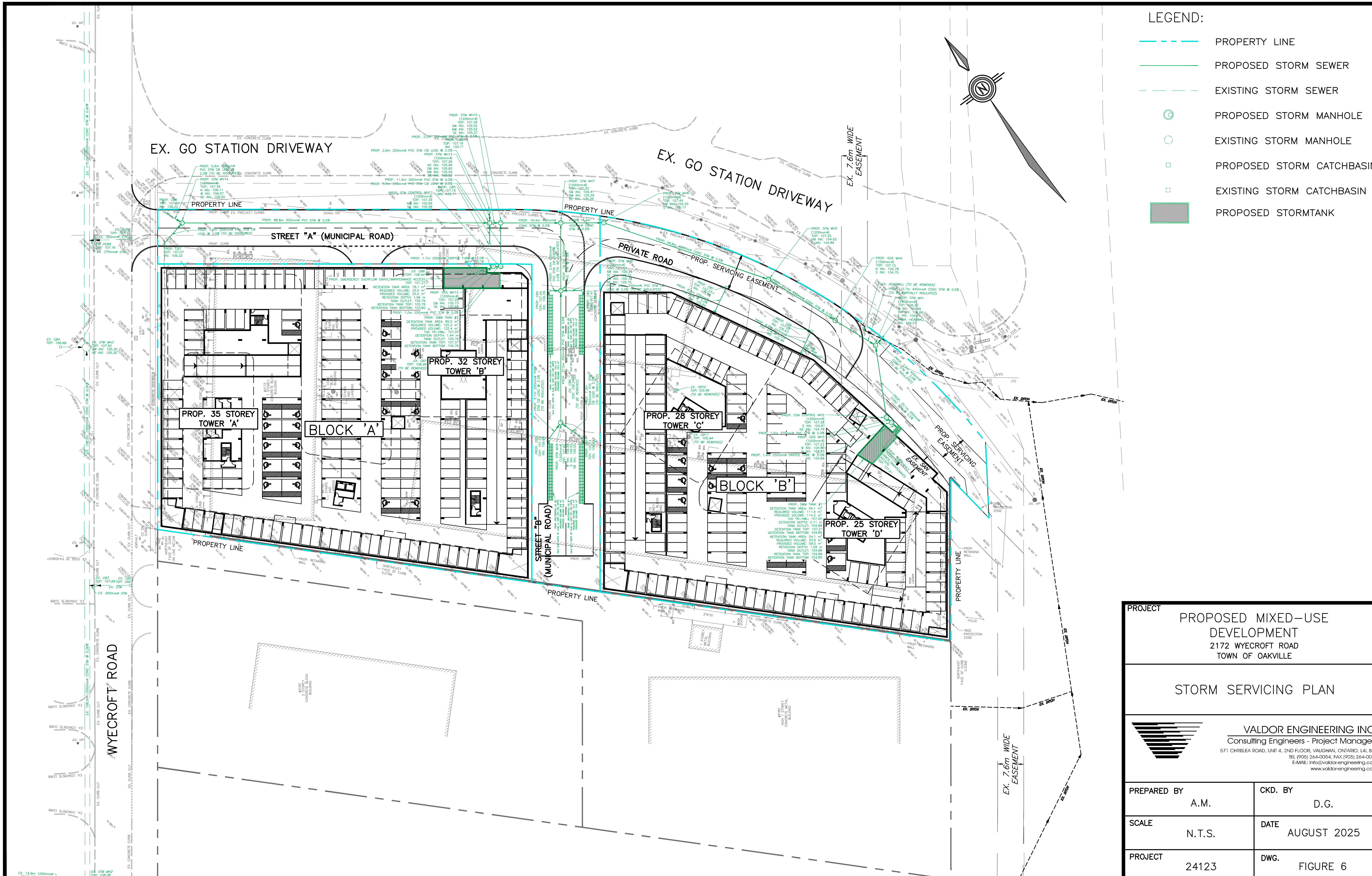
LAND USE	AREA (Ha.)	RC	COMPOSITE RC
ROOF	1.112	0.85	0.79
IMPERVIOUS	0.884	0.90	
PERVIOUS	0.366	0.35	
TOTAL	2.362		

PROJECT
PROPOSED MIXED–USE DEVELOPMENT
2172 WYECROFT ROAD
TOWN OF OAKVILLE

POST–DEVELOPMENT DRAINAGE CONDITION

VALDOR ENGINEERING INC.
Consulting Engineers - Project Managers
571 CHRISLEA ROAD, UNIT 4, 2ND FLOOR, VAUGHAN, ONTARIO, L4L 8A2
TEL (905) 264-0054, FAX (905) 264-0069
E-MAIL: info@valdor-engineering.com
www.valdor-engineering.com

PREPARED BY A.M.	CKD. BY D.G.
SCALE N.T.S.	DATE AUGUST 2025
PROJECT 24123	DWG. FIGURE 5



PROJECT

PROPOSED MIXED-USE DEVELOPMENT

2172 WYECROFT ROAD

TOWN OF OAKVILLE

STORM SERVICING PLAN

VALDOR ENGINEERING INC.

Consulting Engineers - Project Managers

571 CHRISLEA ROAD, UNIT 4, 2ND FLOOR, VAUGHAN, ONTARIO, L4L 8A2

TEL (905) 264-0054, FAX (905) 264-0069

E-MAIL: info@valdor-engineering.com

www.valdor-engineering.com

PREPARED BY: A.M.	CKD. BY: D.G.
SCALE: N.T.S.	DATE: AUGUST 2025
PROJECT: 24123	DWG.: FIGURE 6

PROJECT

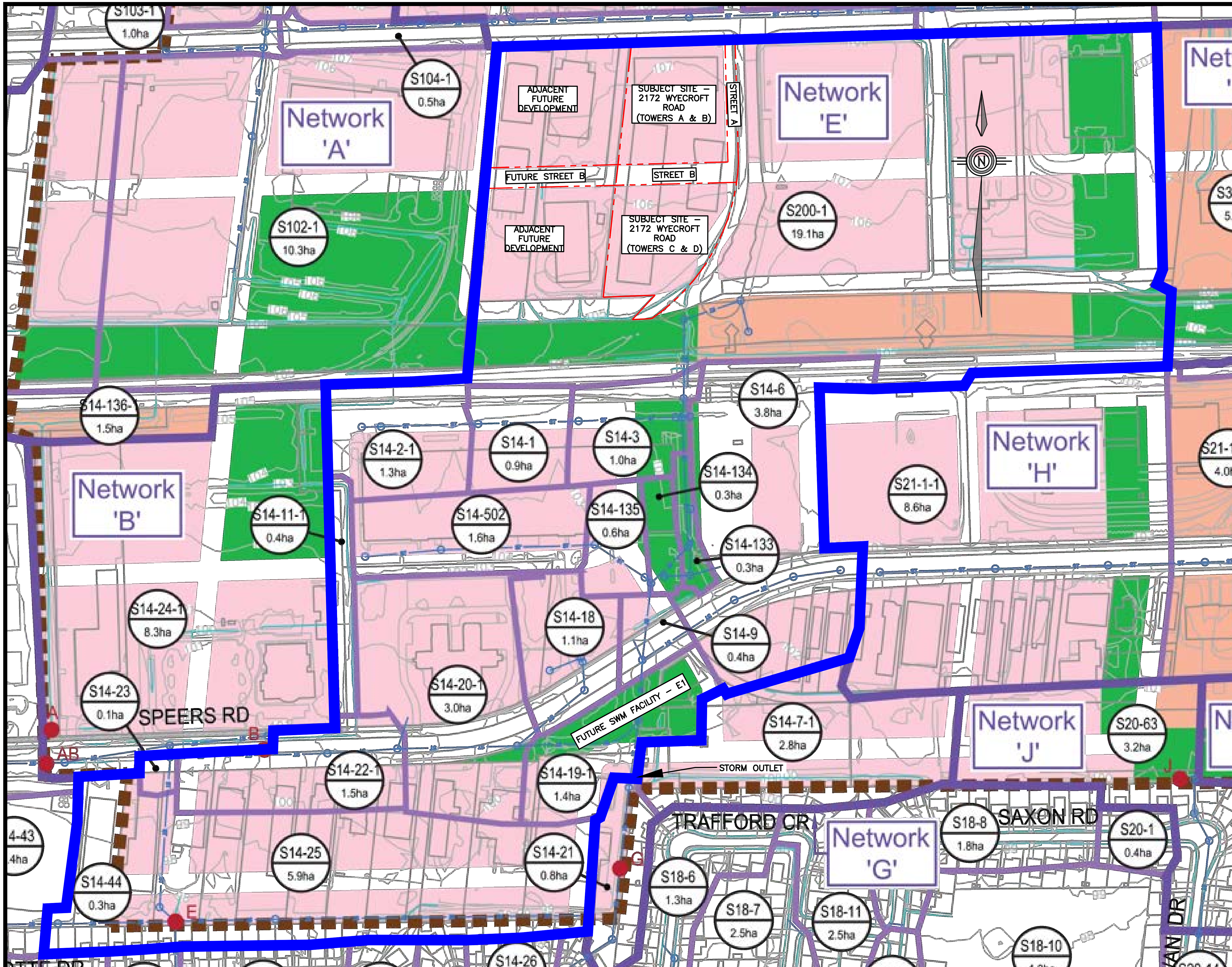
PROPOSED MIXED–USE DEVELOPMENT
2172 WYECROFT ROAD
TOWN OF OAKVILLE

STORM CATCHMENT AREAS

VALDOR ENGINEERING INC.
Consulting Engineers - Project Managers
571 CHRISLEA ROAD, UNIT 4, 2ND FLOOR, VAUGHAN, ONTARIO, L4L 8A2
TEL (905) 264-0054, FAX (905) 264-0069
E-MAIL: info@valdor-engineering.com
www.valdor-engineering.com

PREPARED BY A.M.	CKD. BY D.G.
SCALE N.T.S.	DATE AUGUST 2025
PROJECT 24123	DWG. FIGURE 7

N:\Projects\2024\24123\Drawings\Working\24123 - Figures.dwg, Fig-7, 2025-08-01 3:47:30 PM, amckeracher, DWG To PDF.pc3, ANSI full bleed B (11.00 x 17.00 Inches), 1:25.4



LEGEND:

	PROPERTY LINE
	MIXED USE AREA
	EMPLOYMENT AREA
	PARK
S10–1 6.0ha	SUBCATCHMENT ID# / SUBCATCHMENT AREA
	NETWORK "E" BOUNDARY
	SUBCATCHMENT BOUNDARY
	WATERCOURSE
100	CONTOUR (1m)
ST	STORM SEWER SYSTEM

PROJECT

PROPOSED MIXED–USE DEVELOPMENT
2172 WYECROFT ROAD
TOWN OF OAKVILLE

NETWORK 'E' CATCHMENT AREAS

VALDOR ENGINEERING INC.
Consulting Engineers - Project Managers
571 CHRISLEA ROAD, UNIT 4, 2ND FLOOR, VAUGHAN, ONTARIO, L4L 8A2
TEL (905) 264-0054, FAX (905) 264-0069
E-MAIL: info@valdor-engineering.com
www.valdor-engineering.com

PREPARED BY A.M.	CKD. BY D.G.
SCALE N.T.S.	DATE AUGUST 2025
PROJECT 24123	DWG. FIGURE 8

APPENDIX "A"

Architectural Site Plans

PROJECT INFORMATION

BUILDING SETBACKS	REQUIRED	PROVIDED
NORTH SETBACK	3.0M	3.0M
SOUTH SETBACK	7.5M	7.5M
EAST SETBACK	3.0M	5.49M
WEST SETBACK	3.0M	3.0M

SITE AREA BREAKDOWN

AREA TYPE	m²	ft²
BLOCK A	9,374.7	100,908.1
BLOCK B	8,119.8	87,400.8
R.O.W.	6,120.8	65,884.0
TOTAL SITE AREA (GROSS AREA)	23,615.3	254,192.9

Last Updated: Wednesday, 02 July 2025 15:02:18 PM

PROJECT **NET** SITE AREA

BLDG	SITE AREA	m²	ft²
BLDG A+B+C+D	TOTAL NET SITE AREA (BLOCK A + BLOCK B)	17,494.5	188,308.9
	TOTAL PROPOSED GFA	143,113.2	1,540,458.0
	F.S.I OF PROPOSED DEVELOPMENT	8.18 x SITE AREA	

Last Updated: Wednesday, 02 July 2025 14:48:58 PM

PROJECT **GROSS** SITE AREA

BLDG	SITE AREA	m²	ft²
BLDG A+B+C+D	**GROSS** SITE AREA (BLOCK A + BLOCK B + R.O.W.)	23,615.3	254,192.9
	TOTAL PROPOSED GFA	143,113.2	1,540,458.0
	F.S.I OF PROPOSED DEVELOPMENT	6.06 x SITE AREA	

Last Updated: Wednesday, 02 July 2025 14:58:26 PM

GROSS FLOOR AREA SUMMARY

* Based on Net Site Area
** Based on Gross Site Area

BLDG	USE		GFA		FSI*	FSI**
			m²	ft²		
BLDG A+B	RETAIL		1,379.3	14,847	0.08	0.06
	INSTITUTIONAL		1,014.8	10,923	0.06	0.04
	SUBTOTAL NON-RESIDENTIAL		2,394.1	25,770	0.14	0.10
	RESIDENTIAL	892 UNITS	76,122.2	819,373	4.35	3.22
	TOTAL		**78,516.3**	**845,143**	**4.49**	**3.32**

Last Updated: Wednesday, 02 July 2025 15:08:25 PM

AMENITY AREAS REQUIRED & PROVIDED

	TYPE	REQUIRED			PROVIDED		
		RATIO	m²	ft²	RATIO	m²	ft²
BLDG A+B	INDOOR AMENITY	2.00 m²/UNIT	1,784.0	19,203	1.86 m²/UNIT	1,659.2	17,859
	OUTDOOR AMENITY	2.00 m²/UNIT	1,784.0	19,203	2.32 m²/UNIT	2,076.9	22,355
	TOTAL AMENITY	**4.00 m²/UNIT**	**3,568.0**	**38,406**	**4.18 m²/UNIT**	**3,736.0**	**40,214**

Last Updated: Wednesday, 02 July 2025 14:04:26 PM

GROSS FLOOR AREA DEFINITION

TOWN OF OAKVILLE ZONING BY-LAW NO.2014-014

Floor Area, Gross

means the total area of all of the floors in a building measured from the exterior faces of the exterior walls, but shall not include an attic, basement or mechanical penthouse.

FSI DEFINITION

TOWN OF OAKVILLE ZONING BY-LAW NO.2014-014

Floor Space Index (FSI)

means the gross floor area of all buildings on a lot divided by the *lot area.*

GROSS FLOOR AREA BREAKDOWN

BLDG A

FLOOR	# OF UNITS	RESIDENTIAL						TOTAL RESIDENTIAL		RETAIL				TOTAL RETAIL		INSTITUTIONAL		TOTAL GFA (TFA - EXCLUSIONS)	
		SALEABLE		COMMON		INDOOR AMENITY				RETAIL		RETAIL SERVICE				DAYCARE			
		m²	ft²	m²	ft²	m²	ft²	m²	ft²	m²	ft²	m²	ft²	m²	ft²	m²	ft²	m²	ft²
U/G 4																			
U/G 3																			
U/G 2																			
U/G 1																			
FLOOR 01	4	226.6	2,439	994.1	10,700	281.9	3,035	1,502.6	16,174	453.1	4,877	58.1	625	511.2	5,503	1,014.8	10,923	3,028.6	32,600
MEZZANINE				1,725.3	18,571			1,725.3	18,571									1,725.3	18,571
FLOOR 02	29	2,124.0	22,862	389.9	4,197			2,513.9	27,059									2,513.9	27,059
FLOOR 03	29	2,124.1	22,863	389.9	4,197			2,513.9	27,060									2,513.9	27,060
FLOOR 04	29	2,124.1	22,863	389.9	4,197			2,513.9	27,060									2,513.9	27,060
FLOOR 05	29	2,124.1	22,863	389.9	4,197			2,513.9	27,060									2,513.9	27,060
FLOOR 06	29	2,124.1	22,863	389.9	4,197			2,513.9	27,060									2,513.9	27,060
FLOOR 07	5	316.4	3,406	118.5	1,275	350.8	3,776	785.8	8,458									785.8	8,458
FLOOR 08	10	675.6	7,273	108.7	1,170			784.4	8,443									784.4	8,443
FLOOR 09	10	675.6	7,273	108.7	1,170			784.4	8,443									784.4	8,443
FLOOR 10	10	675.6	7,273	108.7	1,170			784.4	8,443									784.4	8,443
FLOOR 11	10	675.6	7,273	108.7	1,170			784.4	8,443									784.4	8,443
FLOOR 12	10	675.6	7,273	108.7	1,170			784.4	8,443									784.4	8,443
FLOOR 13	10	675.6	7,273	108.7	1,170			784.4	8,443									784.4	8,443
FLOOR 14	10	675.6	7,273	108.7	1,170			784.4	8,443									784.4	8,443
FLOOR 15	10	675.6	7,273	108.7	1,170			784.4	8,443									784.4	8,443
FLOOR 16	10	675.6	7,273	108.7	1,170			784.4	8,443									784.4	8,443
FLOOR 17	10	675.6	7,273	108.7	1,170			784.4	8,443									784.4	8,443
FLOOR 18	10	675.6	7,273	108.7	1,170			784.4	8,443									784.4	8,443
FLOOR 19	10	675.6	7,273	108.7	1,170			784.4	8,443									784.4	8,443
FLOOR 20	10	675.6	7,273	108.7	1,170			784.4	8,443									784.4	8,443
FLOOR 21	10	675.6	7,273	108.7	1,170			784.4	8,443									784.4	8,443
FLOOR 22	10	675.6	7,273	108.7	1,170			784.4	8,443									784.4	8,443
FLOOR 23	10	675.6	7,273	108.7	1,170			784.4	8,443									784.4	8,443
FLOOR 24	10	675.6	7,273	108.7	1,170			784.4	8,443									784.4	8,443
FLOOR 25	10	675.6	7,273	108.7	1,170			784.4	8,443									784.4	8,443
FLOOR 26	10	675.6	7,273	108.7	1,170			784.4	8,443									784.4	8,443
FLOOR 27	10	675.6	7,273	108.7	1,170			784.4	8,443									784.4	8,443
FLOOR 28	10	675.6	7,273	108.7	1,170			784.4	8,443									784.4	8,443
FLOOR 29	10	675.6	7,273	108.7	1,170			784.4	8,443									784.4	8,443
FLOOR 30	10	675.6	7,273	108.7	1,170			784.4	8,443									784.4	8,443
FLOOR 31	10	675.6	7,273	108.7	1,170			784.4	8,443									784.4	8,443
FLOOR 32	10	675.6	7,273	108.7	1,170			784.4	8,443									784.4	8,443
FLOOR 33	10	675.6	7,273	108.7	1,170			784.4	8,443									784.4	8,443
FLOOR 34	10	675.6	7,273	108.7	1,170			784.4	8,443									784.4	8,443
FLOOR 35	10	675.6	7,273	108.7	1,170			784.4	8,443									784.4	8,443
MPH (TOWER A)																			
TOTAL	434	30,081.389	323,793.511	7,831.387	84,296.385	632.772	6,811.108	38,545.548	414,901.004	453.131	4,877.459	58.081	625.174	511.211	5,502.633	1,014.791	10,923.128	40,071.550	431,326.765
TOTAL (ROUNDED)	434	30,081.4	323,794	7,831.4	84,296	632.8	6,811	38,545.5	414,901	453.1	4,877	58.1	625	511.2	5,503	1,014.8	10,923	40,071.6	431,327

Last Updated: Wednesday, 02 July 2025 13:53:32 PM

AMENITY AREA BREAKDOWN

FLOOR	OUTDOOR AMENITY	
	m²	ft²
FLOOR 07	2,076.9	22,355
TOTAL	2,076.876	22,355.321
TOTAL (ROUNDED)	2,076.9	22,355

BALCONY AND PRIVATE TERRACE BREAKDOWN

FLOOR	AREA			
	BALCONY		PRIVATE TERRACE	
	m²	ft²	m²	ft²
U/G 4				
U/G 3				
U/G 2				
U/G 1				
FLOOR 01			21.9	236
MEZZANINE				
FLOOR 02	153.9	1,656	134.5	1,447
FLOOR 03	239.0	2,572		
FLOOR 04	239.0	2,572		
FLOOR 05	239.0	2,572		
FLOOR 06	239.0	2,572		
FLOOR 07			310.4	3,341
FLOOR 08	100.8	1,085		
FLOOR 09	100.8	1,085		
FLOOR 10	100.8	1,085		
FLOOR 11	100.8	1,085		
FLOOR 12	100.8	1,085		
FLOOR 13	100.8	1,085		
FLOOR 14	100.8	1,085		
FLOOR 15	100.8	1,085		
FLOOR 16	100.8	1,085		
FLOOR 17	100.8	1,085		
FLOOR 18	100.8	1,085		
FLOOR 19	100.8	1,085		
FLOOR 20	100.8	1,085		
FLOOR 21	100.8	1,085		
FLOOR 22	100.8	1,085		
FLOOR 23	100.8	1,085		
FLOOR 24	100.8	1,085		
FLOOR 25	100.8	1,085		
FLOOR 26	100.8	1,085		
FLOOR 27	100.8	1,085		
FLOOR 28	100.8	1,085		
FLOOR 29	100.8	1,085		
FLOOR 30	100.8	1,085		
FLOOR 31	100.8	1,085		
FLOOR 32	100.8	1,085		
FLOOR 33	100.8	1,085		
FLOOR 34	100.8	1,085		
FLOOR 35	100.8	1,085		
MPH (TOWER A)				
TOTAL	3,932.861	42,332.982	466.802	5,024.617
TOTAL (ROUNDED)	3,932.9	42,333	466.8	5,025

Last Updated: Wednesday, 02 July 2025 11:59:57 AM

GROSS FLOOR AREA BREAKDOWN

BLDG B

FLOOR	# OF UNITS	RESIDENTIAL						TOTAL RESIDENTIAL		RETAIL				TOTAL RETAIL		TOTAL GFA (TFA - EXCLUSIONS)	
		SALEABLE		COMMON		INDOOR AMENITY				RETAIL		RETAIL SERVICE					
		m²	ft²	m²	ft²	m²	ft²	m²	ft²	m²	ft²	m²	ft²	m²	ft²	m²	ft²
U/G 4																	
U/G 3																	
U/G 2																	
U/G 1																	
FLOOR 01	14	962.7	10,362	726.1	7,816	605.1	6,514	2,294.0	24,692	845.7	9,103	22.4	241	868.1	9,344	3,162.1	34,036
MEZZANINE		694.1	7,471	71.3	768			765.4	8,239							765.4	8,239
FLOOR 02	33	2,154.7	23,193	633.4	6,818			2,788.1	30,011							2,788.1	30,011
FLOOR 03	33	2,154.8	23,194	633.4	6,818			2,788.1	30,011							2,788.1	30,011
FLOOR 04	33	2,154.8	23,194	633.4	6,818			2,788.1	30,011							2,788.1	30,011
FLOOR 05	33	2,154.8	23,194	633.4	6,818			2,788.1	30,011							2,788.1	30,011
FLOOR 06	33	2,154.8	23,194	633.4	6,818			2,788.1	30,011							2,788.1	30,011
FLOOR 07	4	266.9	2,873	103.3	1,112	421.3	4,534	791.5	8,519							791.5	8,519
FLOOR 08	11	688.1	7,407	103.3	1,112			791.4	8,519							791.4	8,519
FLOOR 09	11	688.1	7,407	103.3	1,112			791.4	8,519							791.4	8,519
FLOOR 10	11	688.1	7,407	103.3	1,112			791.4	8,519							791.4	8,519
FLOOR 11	11	688.1	7,407	103.3	1,112			791.4	8,519							791.4	8,519
FLOOR 12	11	688.1	7,407	103.3	1,112			791.4	8,519							791.4	8,519
FLOOR 13	11	688.1	7,407	103.3	1,112			791.4	8,519							791.4	8,519
FLOOR 14	11	688.1	7,407	103.3	1,112			791.4	8,519							791.4	8,519
FLOOR 15	11	688.1	7,407	103.3	1,112			791.4	8,519							791.4	8,519
FLOOR 16	11	688.1	7,407	103.3	1,112			791.4	8,519							791.4	8,519
FLOOR 17	11	688.1	7,407	103.3	1,112			791.4	8,519							791.4	8,519
FLOOR 18	11	688.1	7,407	103.3	1,112			791.4	8,519							791.4	8,519
FLOOR 19	11	688.1	7,407	103.3	1,112			791.4	8,519							791.4	8,519
FLOOR 20	11	688.1	7,407	103.3	1,112			791.4	8,519							791.4	8,519
FLOOR 21	11	688.1	7,407	103.3	1,112			791.4	8,519							791.4	8,519
FLOOR 22	11	688.1	7,407	103.3	1,112			791.4	8,519							791.4	8,519
FLOOR 23	11	688.1	7,407	103.3	1,112			791.4	8,519							791.4	8,519
FLOOR 24	11	688.1	7,407	103.3	1,112			791.4	8,519							791.4	8,519
FLOOR 25	11	688.1	7,407	103.3	1,112			791.4	8,519							791.4	8,519
FLOOR 26	11	688.1	7,407	103.3	1,112			791.4	8,519							791.4	8,519
FLOOR 27	11	688.1	7,407	103.3	1,112			791.4	8,519							791.4	8,519
FLOOR 28	11	688.1	7,407	103.3	1,112			791.4	8,519							791.4	8,519
FLOOR 29	11	688.1	7,407	103.3	1,112			791.4	8,519							791.4	8,519
FLOOR 30	11	688.1	7,407	103.3	1,112			791.4	8,519							791.4	8,519
FLOOR 31	11	688.1	7,407	103.3	1,112			791.4	8,519							791.4	8,519
FLOOR 32	11	688.1	7,407	103.3	1,112			791.4	8,519							791.4	8,519
MPH (TOWER B)																	
TOTAL	458	29,900.466	321,846.081	6,649.758	71,577.433	1,026.393	11,048.012	37,576.618	404,471.526	845.711	9,103.166	22.408	241.196	868.119	9,344.362	38,444.737	413,815.888
TOTAL (ROUNDED)	458	29,900.5	321,846	6,649.8	71,577	1,026.4	11,048	37,576.6	404,472	845.7	9,103	22.4	241	868.1	9,344	38,444.7	413,816

Last Updated: Wednesday, 02 July 2025 13:55:00 PM

AMENITY AREA BREAKDOWN

OUTDOOR AMENITY	
m²	ft²

BALCONY AND PRIVATE TERRACE BREAKDOWN

FLOOR	AREA EXCLUSIONS			
	BALCONY		PRIVATE TERRACE	
	m²	ft²	m²	ft²
U/G 4				
U/G 3				
U/G 2				
U/G 1				
FLOOR 01			76.5	824
MEZZANINE	43.9	472		
FLOOR 02	175.6	1,890	174.6	1,880
FLOOR 03	279.0	3,003		
FLOOR 04	279.0	3,003		
FLOOR 05	279.0	3,003		
FLOOR 06	279.0	3,003		
FLOOR 07			100.7	1,084
FLOOR 08	88.2	950		
FLOOR 09	88.2	950		
FLOOR 10	88.2	950		
FLOOR 11	88.2	950		
FLOOR 12	88.2	950		
FLOOR 13	88.2	950		
FLOOR 14	88.2	950		
FLOOR 15	88.2	950		
FLOOR 16	88.2	950		
FLOOR 17	88.2	950		
FLOOR 18	88.2	950		
FLOOR 19	88.2	950		
FLOOR 20	88.2	950		
FLOOR 21	88.2	950		
FLOOR 22	88.2	950		
FLOOR 23	88.2	950		
FLOOR 24	88.2	950		
FLOOR 25	88.2	950		
FLOOR 26	88.2	950		
FLOOR 27	88.2	950		
FLOOR 28	88.2	950		
FLOOR 29	88.2	950		
FLOOR 30	88.2	950		
FLOOR 31	88.2	950		
FLOOR 32	88.2	950		
MPH (TOWER B)				
TOTAL	3,541.135	38,116.481	351.824	3,787.007
TOTAL (ROUNDED)	3,541.1	38,116	351.8	3,787

Last Updated: Wednesday, 02 July 2025 12:07:20 PM

TURNER FLEISCHER

67 Lesmill Road
Toronto, ON, M3B 2T8
T 416 425 2222
turnerfleischer.com

#	DATE	DESCRIPTION	BY
1	2025-06-30	ISSUED FOR OPA, ZBA, DPoS	CFU

PROJECT

PROPOSED MIXED-USE DEVELOPMENT

2172 Wyecroft Road, Oakville, ON

DRAWING

STATISTICS

PROJECT NO. 23.230P01

PROJECT DATE 2024/06/27

DRAWN BY CCA

CHECKED BY CFU

SCALE 1 : 1

DRAWING NO. RZ002

REV. 1

2025-07-02 3:38:22 PM

GROSS FLOOR AREA SUMMARY

* Based on Net Site Area
** Based on Gross Site Area

BLDG	USE		GFA		FSI*	FSI**
			m²	ft²		
BLDG C+D	RETAIL		967.4	10,413	0.06	0.04
	SUBTOTAL NON-RESIDENTIAL		967.4	10,413	0.06	0.04
	RESIDENTIAL	724 UNITS	63,629.5	684,903	3.64	2.70
	TOTAL		**64,596.9**	**695,315**	**3.69**	**2.74**

Last Updated: Wednesday, 02 July 2025 15:09:26 PM

AMENITY AREAS REQUIRED & PROVIDED

	TYPE	REQUIRED			PROVIDED		
		RATIO	m²	ft²	RATIO	m²	ft²
BLDG C+D	INDOOR AMENITY	2.00 m²/UNIT	1,448.0	15,586	1.92 m²/UNIT	1,393.6	15,000
	OUTDOOR AMENITY	2.00 m²/UNIT	1,448.0	15,586	3.47 m²/UNIT	2,518.0	27,104
	TOTAL AMENITY	**4.00 m²/UNIT**	**2,896.0**	**31,172**	**5.40 m²/UNIT**	**3,911.6**	**42,104**

Last Updated: Wednesday, 02 July 2025 14:04:41 PM

GROSS FLOOR AREA BREAKDOWN

	FLOOR	# OF UNITS	RESIDENTIAL: SALEABLE		RESIDENTIAL: COMMON		RESIDENTIAL: INDOOR AMENITY		TOTAL RESIDENTIAL		RETAIL: RETAIL		RETAIL: RETAIL SERVICE		TOTAL RETAIL		TOTAL GFA (TFA - EXCLUSIONS)	
			m²	ft²	m²	ft²	m²	ft²	m²	ft²	m²	ft²	m²	ft²	m²	ft²	m²	ft²
BLDG C	U/G 4				9.2	99			9.2	99							9.2	99
	U/G 3																	
	U/G 2																	
	U/G 1				9.2	99			9.2	99							9.2	99
	FLOOR 01	13	837.7	9,017	939.3	10,111	387.2	4,168	2,164.2	23,296	931.5	10,027	35.9	386	967.4	10,413	3,131.6	33,708
	MEZZANINE		772.9	8,319	106.9	1,151			879.8	9,471							879.8	9,471
	FLOOR 02	29	2,044.1	22,002	879.1	9,463			2,923.2	31,465							2,923.2	31,465
	FLOOR 03	29	2,044.1	22,002	879.1	9,463			2,923.2	31,465							2,923.2	31,465
	FLOOR 04	29	2,044.1	22,002	879.1	9,463			2,923.2	31,465							2,923.2	31,465
	FLOOR 05	29	2,044.1	22,002	879.1	9,463			2,923.2	31,465							2,923.2	31,465
	FLOOR 06	29	2,044.1	22,002	879.1	9,463			2,923.2	31,465							2,923.2	31,465
	FLOOR 07	4	266.9	2,873	103.3	1,112	421.3	4,534	791.5	8,519							791.5	8,519
	FLOOR 08	11	688.1	7,407	103.3	1,112			791.4	8,519							791.4	8,519
	FLOOR 09	11	688.1	7,407	103.3	1,112			791.4	8,519							791.4	8,519
	FLOOR 10	11	688.1	7,407	103.3	1,112			791.4	8,519							791.4	8,519
	FLOOR 11	11	688.1	7,407	103.3	1,112			791.4	8,519							791.4	8,519
	FLOOR 12	11	688.1	7,407	103.3	1,112			791.4	8,519							791.4	8,519
	FLOOR 13	11	688.1	7,407	103.3	1,112			791.4	8,519							791.4	8,519
	FLOOR 14	11	688.1	7,407	103.3	1,112			791.4	8,519							791.4	8,519
	FLOOR 15	11	688.1	7,407	103.3	1,112			791.4	8,519							791.4	8,519
	FLOOR 16	11	688.1	7,407	103.3	1,112			791.4	8,519							791.4	8,519
	FLOOR 17	11	688.1	7,407	103.3	1,112			791.4	8,519							791.4	8,519
	FLOOR 18	11	688.1	7,407	103.3	1,112			791.4	8,519							791.4	8,519
	FLOOR 19	11	688.1	7,407	103.3	1,112			791.4	8,519							791.4	8,519
	FLOOR 20	11	688.1	7,407	103.3	1,112			791.4	8,519							791.4	8,519
	FLOOR 21	11	688.1	7,407	103.3	1,112			791.4	8,519							791.4	8,519
	FLOOR 22	11	688.1	7,407	103.3	1,112			791.4	8,519							791.4	8,519
	FLOOR 23	11	688.1	7,407	103.3	1,112			791.4	8,519							791.4	8,519
	FLOOR 24	11	688.1	7,407	103.3	1,112			791.4	8,519							791.4	8,519
	FLOOR 25	11	688.1	7,407	103.3	1,112			791.4	8,519							791.4	8,519
	FLOOR 26	11	688.1	7,407	103.3	1,112			791.4	8,519							791.4	8,519
	FLOOR 27	11	688.1	7,407	103.3	1,112			791.4	8,519							791.4	8,519
	FLOOR 28	11	688.1	7,407	103.3	1,112			791.4	8,519							791.4	8,519
	TOTAL	**393**	**26,548.393**	**285,764.643**	**7,732.499**	**83,231.967**	**808.471**	**8,702.314**	**35,089.363**	**377,698.925**	**931.517**	**10,026.774**	**35.859**	**385.982**	**967.376**	**10,412.756**	**36,056.739**	**388,111.681**
	TOTAL (ROUNDED)	**393**	**26,548.4**	**285,765**	**7,732.5**	**83,232**	**808.5**	**8,702**	**35,089.4**	**377,699**	**931.5**	**10,027**	**35.9**	**386**	**967.4**	**10,413**	**36,056.7**	**388,112**

Last Updated: Wednesday, 02 July 2025 13:56:27 PM

AMENITY AREA BREAKDOWN

FLOOR	OUTDOOR AMENITY	
	m²	ft²
U/G 4		
U/G 3		
U/G 2		
U/G 1		
FLOOR 01		
MEZZANINE		
FLOOR 02		
FLOOR 03		
FLOOR 04		
FLOOR 05		
FLOOR 06		
FLOOR 07	2,518.0	27,104
FLOOR 08		
FLOOR 09		
FLOOR 10		
FLOOR 11		
FLOOR 12		
FLOOR 13		
FLOOR 14		
FLOOR 15		
FLOOR 16		
FLOOR 17		
FLOOR 18		
FLOOR 19		
FLOOR 20		
FLOOR 21		
FLOOR 22		
FLOOR 23		
FLOOR 24		
FLOOR 25		
FLOOR 26		
FLOOR 27		
FLOOR 28		
TOTAL	**2,518.014**	**27,103.691**
TOTAL (ROUNDED)	**2,518.0**	**27,104**

BALCONY AND PRIVATE TERRACE BREAKDOWN

FLOOR	AREA EXCLUSIONS: BALCONY		PRIVATE TERRACE		EXCLUSION TOTAL	
	m²	ft²	m²	ft²	m²	ft²
U/G 4					7,321.3	78,806
U/G 3					7,330.5	78,905
U/G 2					7,330.5	78,905
U/G 1					7,003.6	75,386
FLOOR 01			70.3	757	70.3	757
MEZZANINE			53.5	576	53.5	576
FLOOR 02	227.9	2,453			227.9	2,453
FLOOR 03	227.9	2,453			227.9	2,453
FLOOR 04	227.9	2,453			227.9	2,453
FLOOR 05	227.9	2,453			227.9	2,453
FLOOR 06	227.9	2,453			227.9	2,453
FLOOR 07			80.7	868	80.7	868
FLOOR 08	88.2	950			88.2	950
FLOOR 09	88.2	950			88.2	950
FLOOR 10	88.2	950			88.2	950
FLOOR 11	88.2	950			88.2	950
FLOOR 12	88.2	950			88.2	950
FLOOR 13	88.2	950			88.2	950
FLOOR 14	88.2	950			88.2	950
FLOOR 15	88.2	950			88.2	950
FLOOR 16	88.2	950			88.2	950
FLOOR 17	88.2	950			88.2	950
FLOOR 18	88.2	950			88.2	950
FLOOR 19	88.2	950			88.2	950
FLOOR 20	88.2	950			88.2	950
FLOOR 21	88.2	950			88.2	950
FLOOR 22	88.2	950			88.2	950
FLOOR 23	88.2	950			88.2	950
FLOOR 24	88.2	950			88.2	950
FLOOR 25	88.2	950			88.2	950
FLOOR 26	88.2	950			88.2	950
FLOOR 27	88.2	950			88.2	950
FLOOR 28	88.2	950			88.2	950
TOTAL	**2,992.335**	**32,209.242**	**204.440**	**2,200.574**	**32,182.704**	**346,411.896**
TOTAL (ROUNDED)	**2,992.3**	**32,209**	**204.4**	**2,201**	**32,182.7**	**346,412**

Last Updated: Wednesday, 02 July 2025 12:12:58 PM

GROSS FLOOR AREA BREAKDOWN

	FLOOR	# OF UNITS	RESIDENTIAL: SALEABLE		RESIDENTIAL: COMMON		RESIDENTIAL: INDOOR AMENITY		TOTAL GFA (TFA - EXCLUSIONS)	
			m²	ft²	m²	ft²	m²	ft²	m²	ft²
BLDG D	U/G 4									
	U/G 3									
	U/G 2									
	U/G 1									
	FLOOR 01	14	809.4	8,712	825.6	8,887	163.8	1,764	1,798.8	19,363
	MEZZANINE		368.5	3,967	1,374.5	14,795			1,743.0	18,762
	FLOOR 02	23	1,422.0	15,306	570.3	6,139			1,992.3	21,445
	FLOOR 03	23	1,422.0	15,306	570.3	6,139			1,992.3	21,445
	FLOOR 04	23	1,422.0	15,306	570.3	6,139			1,992.3	21,445
	FLOOR 05	23	1,422.0	15,306	570.3	6,139			1,992.3	21,445
	FLOOR 06	23	1,422.0	15,306	570.3	6,139			1,992.3	21,445
	FLOOR 07	4	266.9	2,873	103.3	1,112	421.3	4,534	791.5	8,519
	FLOOR 08	11	688.1	7,407	103.3	1,112			791.4	8,519
	FLOOR 09	11	688.1	7,407	103.3	1,112			791.4	8,519
	FLOOR 10	11	688.1	7,407	103.3	1,112			791.4	8,519
	FLOOR 11	11	688.1	7,407	103.3	1,112			791.4	8,519
	FLOOR 12	11	688.1	7,407	103.3	1,112			791.4	8,519
	FLOOR 13	11	688.1	7,407	103.3	1,112			791.4	8,519
	FLOOR 14	11	688.1	7,407	103.3	1,112			791.4	8,519
	FLOOR 15	11	688.1	7,407	103.3	1,112			791.4	8,519
	FLOOR 16	11	688.1	7,407	103.3	1,112			791.4	8,519
	FLOOR 17	11	688.1	7,407	103.3	1,112			791.4	8,519
	FLOOR 18	11	688.1	7,407	103.3	1,112			791.4	8,519
	FLOOR 19	11	688.1	7,407	103.3	1,112			791.4	8,519
	FLOOR 20	11	688.1	7,407	103.3	1,112			791.4	8,519
	FLOOR 21	11	688.1	7,407	103.3	1,112			791.4	8,519
	FLOOR 22	11	688.1	7,407	103.3	1,112			791.4	8,519
	FLOOR 23	11	688.1	7,407	103.3	1,112			791.4	8,519
	FLOOR 24	11	688.1	7,407	103.3	1,112			791.4	8,519
	FLOOR 25	11	688.1	7,407	103.3	1,112			791.4	8,519
	TOTAL	**331**	**20,940.890**	**225,405.963**	**7,014.137**	**75,499.578**	**585.113**	**6,298.112**	**28,540.141**	**307,203.654**
	TOTAL (ROUNDED)	**331**	**20,940.9**	**225,406**	**7,014.1**	**75,500**	**585.1**	**6,298**	**28,540.1**	**307,204**

Last Updated: Wednesday, 02 July 2025 13:57:47 PM

AMENITY AREA BREAKDOWN

FLOOR	OUTDOOR AMENITY	
	m²	ft²
U/G 4		
U/G 3		
U/G 2		
U/G 1		
FLOOR 01		
MEZZANINE		
FLOOR 02		
FLOOR 03		
FLOOR 04		
FLOOR 05		
FLOOR 06		
FLOOR 07		
FLOOR 08		
FLOOR 09		
FLOOR 10		
FLOOR 11		
FLOOR 12		
FLOOR 13		
FLOOR 14		
FLOOR 15		
FLOOR 16		
FLOOR 17		
FLOOR 18		
FLOOR 19		
FLOOR 20		
FLOOR 21		
FLOOR 22		
FLOOR 23		
FLOOR 24		
FLOOR 25		
TOTAL		
TOTAL (ROUNDED)		

BALCONY AND PRIVATE TERRACE BREAKDOWN

FLOOR	AREA EXCLUSIONS: BALCONY		PRIVATE TERRACE	
	m²	ft²	m²	ft²
U/G 4				
U/G 3				
U/G 2				
U/G 1				
FLOOR 01			71.3	768
MEZZANINE			27.1	292
FLOOR 02	169.5	1,824		
FLOOR 03	169.5	1,824		
FLOOR 04	169.5	1,824		
FLOOR 05	169.5	1,824		
FLOOR 06	169.5	1,824		
FLOOR 07			80.0	861
FLOOR 08	88.2	950		
FLOOR 09	88.2	950		
FLOOR 10	88.2	950		
FLOOR 11	88.2	950		
FLOOR 12	88.2	950		
FLOOR 13	88.2	950		
FLOOR 14	88.2	950		
FLOOR 15	88.2	950		
FLOOR 16	88.2	950		
FLOOR 17	88.2	950		
FLOOR 18	88.2	950		
FLOOR 19	88.2	950		
FLOOR 20	88.2	950		
FLOOR 21	88.2	950		
FLOOR 22	88.2	950		
FLOOR 23	88.2	950		
FLOOR 24	88.2	950		
FLOOR 25	88.2	950		
TOTAL	**2,435.425**	**26,214.711**	**178.518**	**1,921.557**
TOTAL (ROUNDED)	**2,435.4**	**26,215**	**178.5**	**1,922**

Last Updated: Wednesday, 02 July 2025 12:14:20 PM

2025-07-02 3:38:24 PM

TURNER FLEISCHER

67 Lesmill Road
Toronto, ON, M3B 2T8
T 416 425 2222
turnerfleischer.com

#	DATE	DESCRIPTION	BY
1	2025-06-30	ISSUED FOR OPA, ZBA, DPoS	CFU

PROJECT

PROPOSED MIXED-USE DEVELOPMENT

2172 Wyecroft Road, Oakville, ON

DRAWING

STATISTICS

PROJECT NO.
23.230P01

PROJECT DATE
2024/06/27

DRAWN BY
CCA

CHECKED BY
CFU

SCALE
1 : 1

DRAWING NO.
RZ003

REV.
1

UNIT MIX

BLDG	FLOOR	SALEABLE 1B	1B+D	2B	2B+D	3B	3B+D	TOTAL	AVG. UNIT SIZE m²	ft²
BLDG A+B	FLOOR 01	9			1	1	7	18	104.6	1,126
	FLOOR 02	23	18	9	8	4		62	69.0	743
	FLOOR 03	23	18	9	8	4		62	69.0	743
	FLOOR 04	23	18	9	8	4		62	69.0	743
	FLOOR 05	23	18	9	8	4		62	69.0	743
	FLOOR 06	23	18	9	8	4		62	69.0	743
	FLOOR 07	4	2	3				9	64.8	698
	FLOOR 08	8	3	8	2			21	64.9	699
	FLOOR 09	8	3	8	2			21	64.9	699
	FLOOR 10	8	3	8	2			21	64.9	699
	FLOOR 11	8	3	8	2			21	64.9	699
	FLOOR 12	8	3	8	2			21	64.9	699
	FLOOR 13	8	3	8	2			21	64.9	699
	FLOOR 14	8	3	8	2			21	64.9	699
	FLOOR 15	8	3	8	2			21	64.9	699
	FLOOR 16	8	3	8	2			21	64.9	699
	FLOOR 17	8	3	8	2			21	64.9	699
	FLOOR 18	8	3	8	2			21	64.9	699
	FLOOR 19	8	3	8	2			21	64.9	699
	FLOOR 20	8	3	8	2			21	64.9	699
	FLOOR 21	8	3	8	2			21	64.9	699
	FLOOR 22	8	3	8	2			21	64.9	699
	FLOOR 23	8	3	8	2			21	64.9	699
	FLOOR 24	8	3	8	2			21	64.9	699
	FLOOR 25	8	3	8	2			21	64.9	699
	FLOOR 26	8	3	8	2			21	64.9	699
	FLOOR 27	8	3	8	2			21	64.9	699
	FLOOR 28	8	3	8	2			21	64.9	699
	FLOOR 29	8	3	8	2			21	64.9	699
	FLOOR 30	8	3	8	2			21	64.9	699
	FLOOR 31	8	3	8	2			21	64.9	699
	FLOOR 32	8	3	8	2			21	64.9	699
	FLOOR 33	3	1	4	2			10	67.6	727
	FLOOR 34	3	1	4	2			10	67.6	727
	FLOOR 35	3	1	4	2			10	67.6	727
	SUBTOTAL	337	170	260	97	21	7	892	67.2	724
	TOTAL UNITS	507		357		28		892		
	UNIT MIX	37.8%	19.1%	29.1%	10.9%	2.4%	0.8%	100.0%		
	UNIT MIX TOTAL	56.8%		40.0%		3.1%		100.0%		
	AVG UNIT SIZE (m²)	52.8	63.3	74.1	87.9	118.2	166.5	67.2		
	AVG UNIT SIZE (ft²)	568	681	798	946	1,272	1,793	724		
	AVG UNIT SIZE TOTAL (m²)	56.3		77.8		130.3		67.2		
	AVG UNIT SIZE TOTAL (ft²)	606		838		1,402		724		

Last Updated: Wednesday, 02 July 2025 14:23:19 PM

UNIT MIX

BLDG	FLOOR	SALEABLE 1B	1B+D	2B	2B+D	3B	3B+D	TOTAL	AVG. UNIT SIZE m²	ft²
BLDG A+B+C+D	FLOOR 01	17	1	1	3	7	16	45	103.8	1,118
	FLOOR 02	51	27	15	15	6		114	67.9	731
	FLOOR 03	51	27	15	15	6		114	67.9	731
	FLOOR 04	51	27	15	15	6		114	67.9	731
	FLOOR 05	51	27	15	15	6		114	67.9	731
	FLOOR 06	51	27	15	15	6		114	67.9	731
	FLOOR 07	6	6	5				17	65.7	707
	FLOOR 08	18	7	16	2			43	63.7	686
	FLOOR 09	18	7	16	2			43	63.7	686
	FLOOR 10	18	7	16	2			43	63.7	686
	FLOOR 11	18	7	16	2			43	63.7	686
	FLOOR 12	18	7	16	2			43	63.7	686
	FLOOR 13	18	7	16	2			43	63.7	686
	FLOOR 14	18	7	16	2			43	63.7	686
	FLOOR 15	18	7	16	2			43	63.7	686
	FLOOR 16	18	7	16	2			43	63.7	686
	FLOOR 17	18	7	16	2			43	63.7	686
	FLOOR 18	18	7	16	2			43	63.7	686
	FLOOR 19	18	7	16	2			43	63.7	686
	FLOOR 20	18	7	16	2			43	63.7	686
	FLOOR 21	18	7	16	2			43	63.7	686
	FLOOR 22	18	7	16	2			43	63.7	686
	FLOOR 23	18	7	16	2			43	63.7	686
	FLOOR 24	18	7	16	2			43	63.7	686
	FLOOR 25	18	7	16	2			43	63.7	686
	FLOOR 26	13	5	12	2			32	64.1	690
	FLOOR 27	13	5	12	2			32	64.1	690
	FLOOR 28	13	5	12	2			32	64.1	690
	FLOOR 29	8	3	8	2			21	64.9	699
	FLOOR 30	8	3	8	2			21	64.9	699
	FLOOR 31	8	3	8	2			21	64.9	699
	FLOOR 32	8	3	8	2			21	64.9	699
	FLOOR 33	3	1	4	2			10	67.6	727
	FLOOR 34	3	1	4	2			10	67.6	727
	FLOOR 35	3	1	4	2			10	67.6	727
	SUBTOTAL	682	298	449	134	37	16	1616	66.5	716
	TOTAL UNITS	980		583		53		1616		
	UNIT MIX	42.2%	18.4%	27.8%	8.3%	2.3%	1.0%	100.0%		
	UNIT MIX TOTAL	60.6%		36.1%		3.3%		100.0%		
	AVG UNIT SIZE (m²)	53.0	63.7	74.6	87.9	122.6	157.1	66.5		
	AVG UNIT SIZE (ft²)	571	685	803	947	1,320	1,691	716		
	AVG UNIT SIZE TOTAL (m²)	56.2		77.7		133.0		66.5		
	AVG UNIT SIZE TOTAL (ft²)	605		836		1,432		716		

Last Updated: Wednesday, 02 July 2025 14:23:57 PM

UNIT MIX

BLDG	FLOOR	SALEABLE 1B	1B+D	2B	2B+D	3B	3B+D	TOTAL	AVG. UNIT SIZE m²	ft²
BLDG C+D	FLOOR 01	8	1	1	2	6	9	27	103.3	1,112
	FLOOR 02	28	9	6	7	2		52	66.7	717
	FLOOR 03	28	9	6	7	2		52	66.7	717
	FLOOR 04	28	9	6	7	2		52	66.7	717
	FLOOR 05	28	9	6	7	2		52	66.7	717
	FLOOR 06	28	9	6	7	2		52	66.7	717
	FLOOR 07	2	4	2				8	66.7	718
	FLOOR 08	10	4	8				22	62.6	673
	FLOOR 09	10	4	8				22	62.6	673
	FLOOR 10	10	4	8				22	62.6	673
	FLOOR 11	10	4	8				22	62.6	673
	FLOOR 12	10	4	8				22	62.6	673
	FLOOR 13	10	4	8				22	62.6	673
	FLOOR 14	10	4	8				22	62.6	673
	FLOOR 15	10	4	8				22	62.6	673
	FLOOR 16	10	4	8				22	62.6	673
	FLOOR 17	10	4	8				22	62.6	673
	FLOOR 18	10	4	8				22	62.6	673
	FLOOR 19	10	4	8				22	62.6	673
	FLOOR 20	10	4	8				22	62.6	673
	FLOOR 21	10	4	8				22	62.6	673
	FLOOR 22	10	4	8				22	62.6	673
	FLOOR 23	10	4	8				22	62.6	673
	FLOOR 24	10	4	8				22	62.6	673
	FLOOR 25	10	4	8				22	62.6	673
	FLOOR 26	5	2	4				11	62.6	673
	FLOOR 27	5	2	4				11	62.6	673
	FLOOR 28	5	2	4				11	62.6	673
	SUBTOTAL	345	128	189	37	16	9	724	65.6	706
	TOTAL UNITS	473		226		25		724		
	UNIT MIX	47.7%	17.7%	26.1%	5.1%	2.2%	1.2%	100.0%		
	UNIT MIX TOTAL	65.3%		31.2%		3.5%		100.0%		
	AVG UNIT SIZE (m²)	53.2	64.2	75.4	88.1	128.4	149.8	65.6		
	AVG UNIT SIZE (ft²)	573	691	812	948	1,382	1,612	706		
	AVG UNIT SIZE TOTAL (m²)	56.2		77.5		136.1		65.6		
	AVG UNIT SIZE TOTAL (ft²)	605		834		1,465		706		

Last Updated: Wednesday, 02 July 2025 14:24:31 PM

VEHICULAR PARKING PROVIDED

BLDG	FLOOR	USE RESIDENTIAL	VISITOR	TOTAL
BLDG A+B	U/G 1	67	154	221
	U/G 2	254		254
	U/G 3	254		254
	U/G 4	227		227
	TOTAL	802	154	956

Last Updated: Wednesday, 02 July 2025 14:25:14 PM

VEHICULAR PARKING PROVIDED

BLDG	FLOOR	USE RESIDENTIAL	VISITOR	TOTAL
BLDG C+D	U/G 1	59	128	187
	U/G 2	215		215
	U/G 3	215		215
	U/G 4	182		182
	TOTAL	671	128	799

Last Updated: Wednesday, 02 July 2025 14:25:06 PM

ACCESSIBLE PARKING PROVIDED*

*Two(2) parking spaces + 2% of the total number of parking spaces provided.

BLDG	FLOOR	USE RESIDENTIAL	VISITOR	TOTAL
BLDG A+B	U/G 1	2	4	6
	U/G 2	5		5
	U/G 3	5		5
	U/G 4	5		5
	TOTAL	17	4	21

Last Updated: Wednesday, 02 July 2025 14:25:35 PM

ACCESSIBLE PARKING PROVIDED*

*Two(2) parking spaces + 2% of the total number of parking spaces provided.

BLDG	FLOOR	USE RESIDENTIAL	VISITOR	TOTAL
BLDG C+D	U/G 1	1	4	5
	U/G 2	5		5
	U/G 3	5		5
	U/G 4	5		5
	TOTAL	16	4	20

Last Updated: Wednesday, 02 July 2025 14:25:44 PM

BICYCLE PARKING - PROVIDED

BLDG	FLOOR	RETAIL SHORT TERM	RETAIL LONG TERM	RETAIL SUB TOTAL	RESIDENTIAL SHORT TERM	RESIDENTIAL LONG TERM	RESIDENTIAL SUB TOTAL	INSTITUTIONAL SHORT TERM	INSTITUTIONAL LONG TERM	INSTITUTIONAL SUB TOTAL	TOTAL
BLDG A+B	FLOOR 01	2		2				2		2	4
	MEZZANINE				223	669	892				892
	TOTAL	2		2	223	669	892	2		2	896
	% OF HORIZONTAL = 10.6%										

Last Updated: Wednesday, 02 July 2025 14:26:52 PM

BICYCLE PARKING - PROVIDED

BLDG	FLOOR	RETAIL SHORT TERM	RETAIL LONG TERM	RETAIL SUB TOTAL	RESIDENTIAL SHORT TERM	RESIDENTIAL LONG TERM	RESIDENTIAL SUB TOTAL	TOTAL
BLDG C+D	FLOOR 01	2		2				2
	MEZZANINE				184	540	724	724
	TOTAL	2		2	184	540	724	726
	% OF HORIZONTAL = 10.9%							

Last Updated: Wednesday, 02 July 2025 14:26:34 PM

BICYCLE PARKING - MINIMUM REQUIRED

BLDG	USE	RESIDENTIAL RATIO	RESIDENTIAL SPACES	RETAIL RATIO	RETAIL SPACES	INSTITUTIONAL RATIO	INSTITUTIONAL SPACES	TOTAL
BLDG A+B	SHORT TERM	0.25/UNIT	223	1/1000m2	2	1/500m2	2	227
	LONG TERM	0.75/UNIT	669	-	0	-	0	669
	TOTAL		892		2		2	896

Last Updated: Wednesday, 02 July 2025 14:27:04 PM

BICYCLE PARKING - MINIMUM REQUIRED

BLDG	USE	RESIDENTIAL RATIO	RESIDENTIAL SPACES	RETAIL RATIO	RETAIL SPACES	TOTAL
BLDG C+D	SHORT TERM	0.25/UNIT	181	1/1000m2	1	182
	LONG TERM	0.75/UNIT	543	-	0	543
	TOTAL		724		1	725

Last Updated: Wednesday, 02 July 2025 14:26:43 PM

TURNER FLEISCHER

67 Lesmill Road
Toronto, ON, M3B 2T8
T 416 425 2222
turnerfleischer.com

#	DATE	DESCRIPTION	BY
1	2025-06-30	ISSUED FOR OPA, ZBA, DPoS	CFU

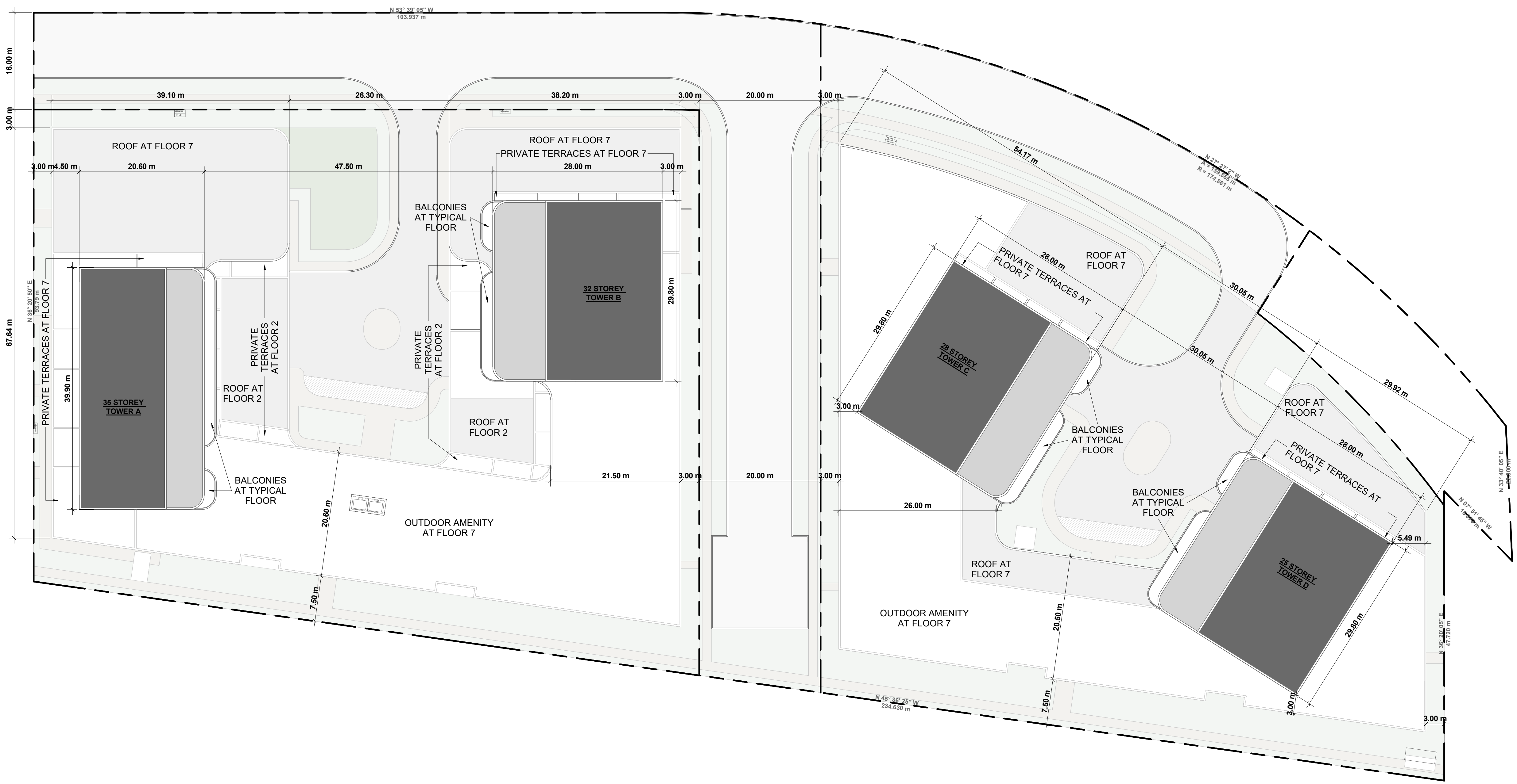
PROJECT
PROPOSED MIXED-USE DEVELOPMENT
2172 Wyecroft Road, Oakville, ON

DRAWING
STATISTICS

PROJECT NO. 23.230P01
PROJECT DATE 2024/06/27
DRAWN BY CCA
CHECKED BY CFU
SCALE 1 : 1

DRAWING NO. RZ004
REV. 1

2025-07-02 3:38:26 PM



TURNER FLEISCHER

67 Lesmill Road
Toronto, ON, M3B 2T8
T 416 425 2222
turnerfleischer.com

#	DATE	DESCRIPTION	BY

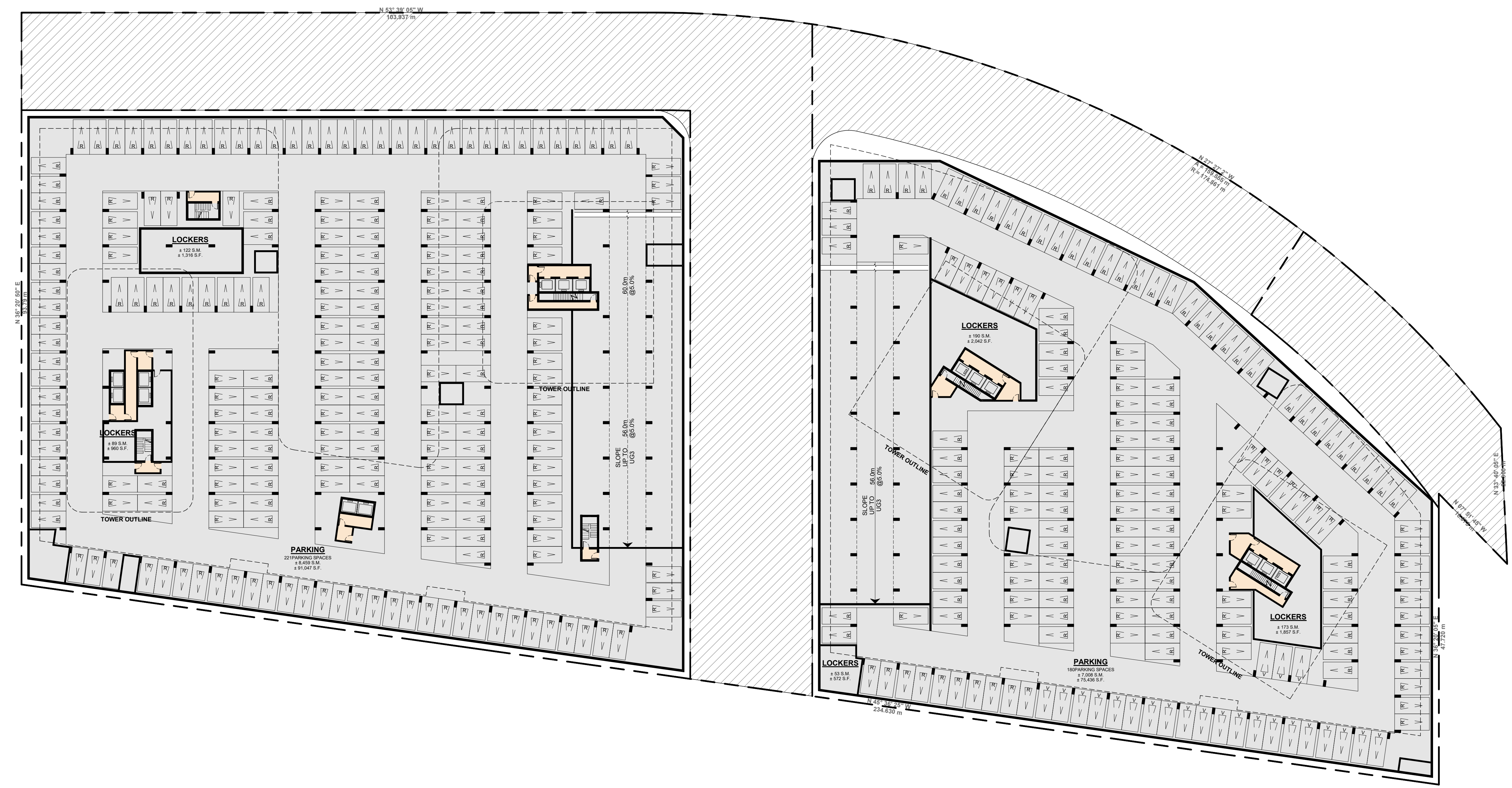
PROJECT
2172 Wyecroft Road, Oakville, ON

DRAWING
SITE PLAN / ROOF PLAN

PROJECT NO.	23.230P01
PROJECT DATE	2024/06/27
DRAWN BY	CCA
CHECKED BY	CFU
SCALE	1 : 350

DRAWING NO.: RZ006
REV.:

2025-03-10 7:37:31 PM



TURNER
FLEISCHER

67 Lesmill Road
Toronto, ON, M3B 2T8
T 416 425 2222
turnerfleischer.com

#	DATE	DESCRIPTION	BY

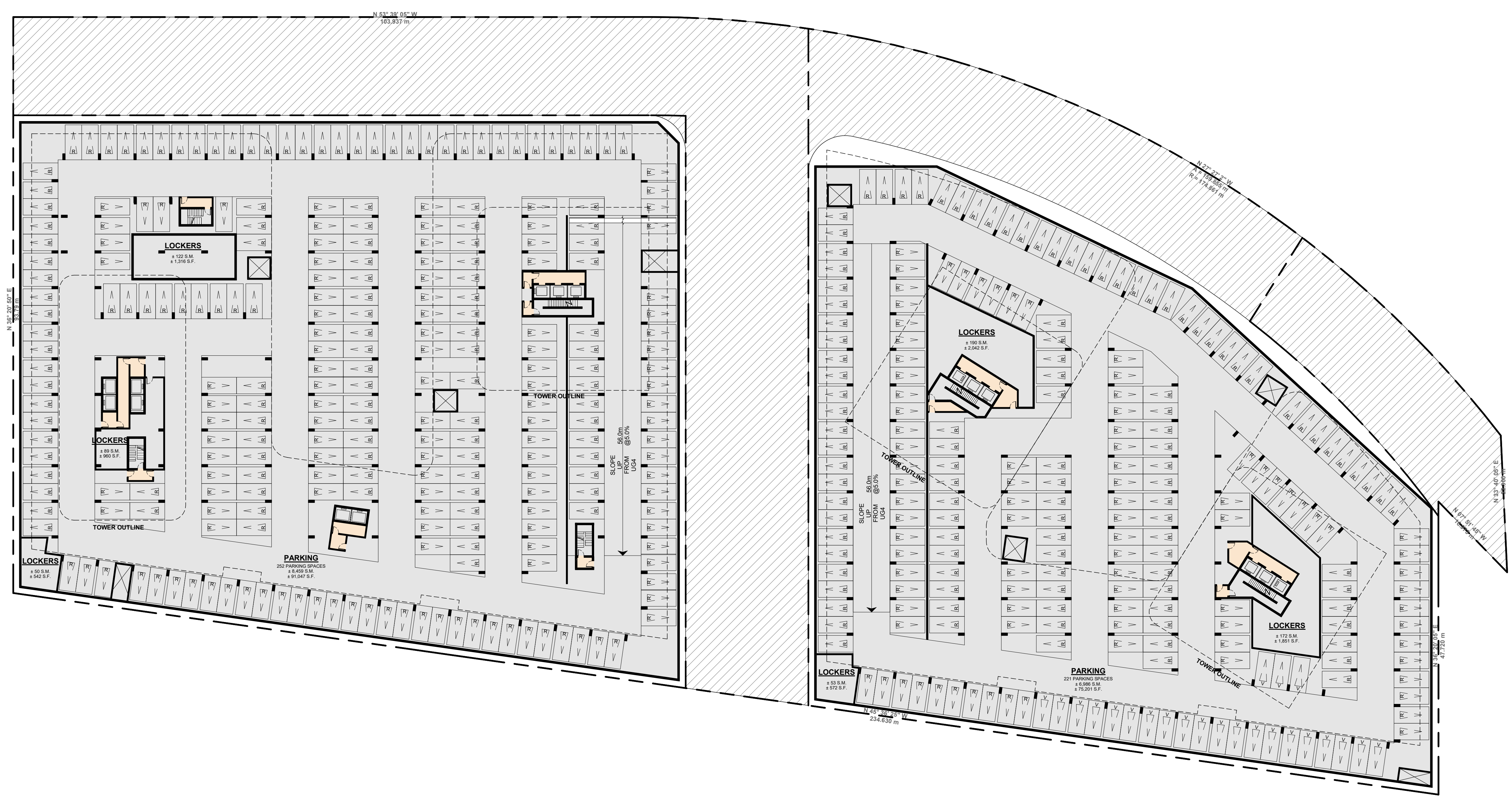
PROJECT
2172 Wyecroft Road, Oakville, ON

DRAWING
UNDERGROUND LEVEL 04

PROJECT NO.	23.230P01
PROJECT DATE	2024/06/27
DRAWN BY	CCA
CHECKED BY	CFU
SCALE	1 : 350

DRAWING NO. RZ100
REV.

2025-03-10 7:37:33 PM



TURNER FLEISCHER

67 Lesmill Road
Toronto, ON, M3B 2T8
T 416 425 2222
turnerfleischer.com

#	DATE	DESCRIPTION	BY

PROJECT

2172 Wyecroft Road, Oakville, ON

DRAWING

UNDERGROUND LEVEL 03

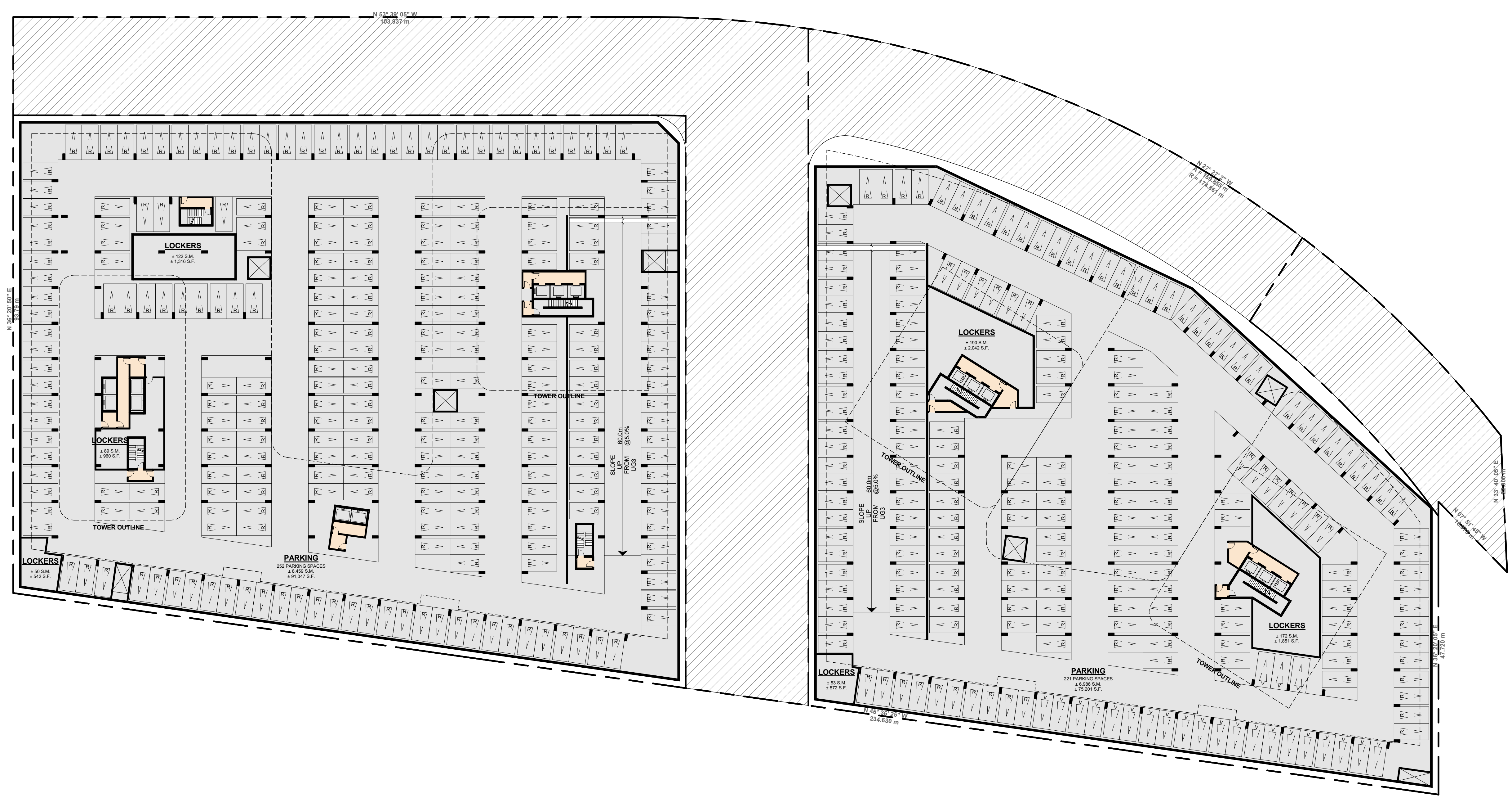
PROJECT NO.	23.230P01
PROJECT DATE	2024/06/27
DRAWN BY	CCA
CHECKED BY	CFU
SCALE	1 : 350

N

DRAWING NO. RZ101

REV.

2025-03-10 7:37:33 PM



TURNER FLEISCHER

67 Lesmill Road
Toronto, ON, M3B 2T8
T 416 425 2222
turnerfleischer.com

#	DATE	DESCRIPTION	BY

PROJECT

2172 Wyecroft Road, Oakville, ON

DRAWING

UNDERGROUND LEVEL 02

PROJECT NO.
23.230P01

PROJECT DATE
2024/06/27

DRAWN BY
CCA

CHECKED BY
CFU

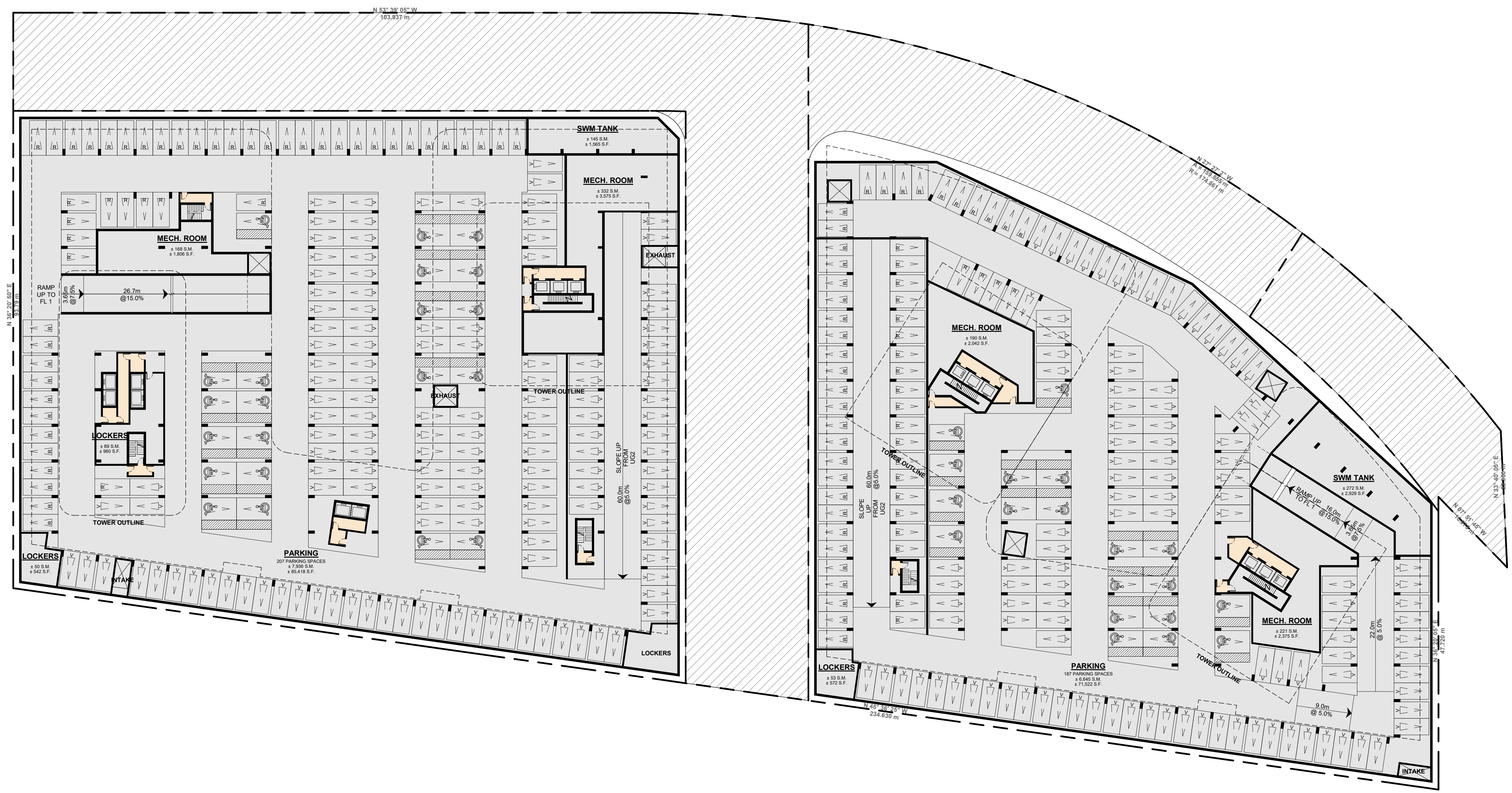
SCALE
1 : 350

N

DRAWING NO.
RZ102

REV.

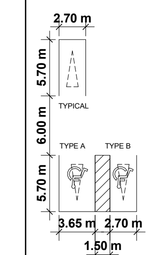
2025-03-10 7:37:34 PM



TURNER FLEISCHER

67 Lesmill Road
Toronto, ON, M3B 2T8
T 416 425 2222
turnerfleischer.com

PARKING STANDARDS



#	DATE	DESCRIPTION	BY

PROJECT
2172 Wyecroft Road, Oakville, ON

DRAWING
UNDERGROUND LEVEL 01

PROJECT NO.	23.230P01
PROJECT DATE	2024/06/27
DRAWN BY	CCA
CHECKED BY	CFU
SCALE	1 : 350

DRAWING NO. RZ103
REV.

2025-03-10 7:37:35 PM

TURNER FLEISCHER

67 Lesmill Road
Toronto, ON, M3B 2T8
T 416 425 2222
turnerfleischer.com

#	DATE	DESCRIPTION	BY
1	2025-06-30	ISSUED FOR OPA, ZBA, DPoS	CFU

PROJECT

PROPOSED MIXED-USE DEVELOPMENT

2172 Wyecroft Road, Oakville, ON

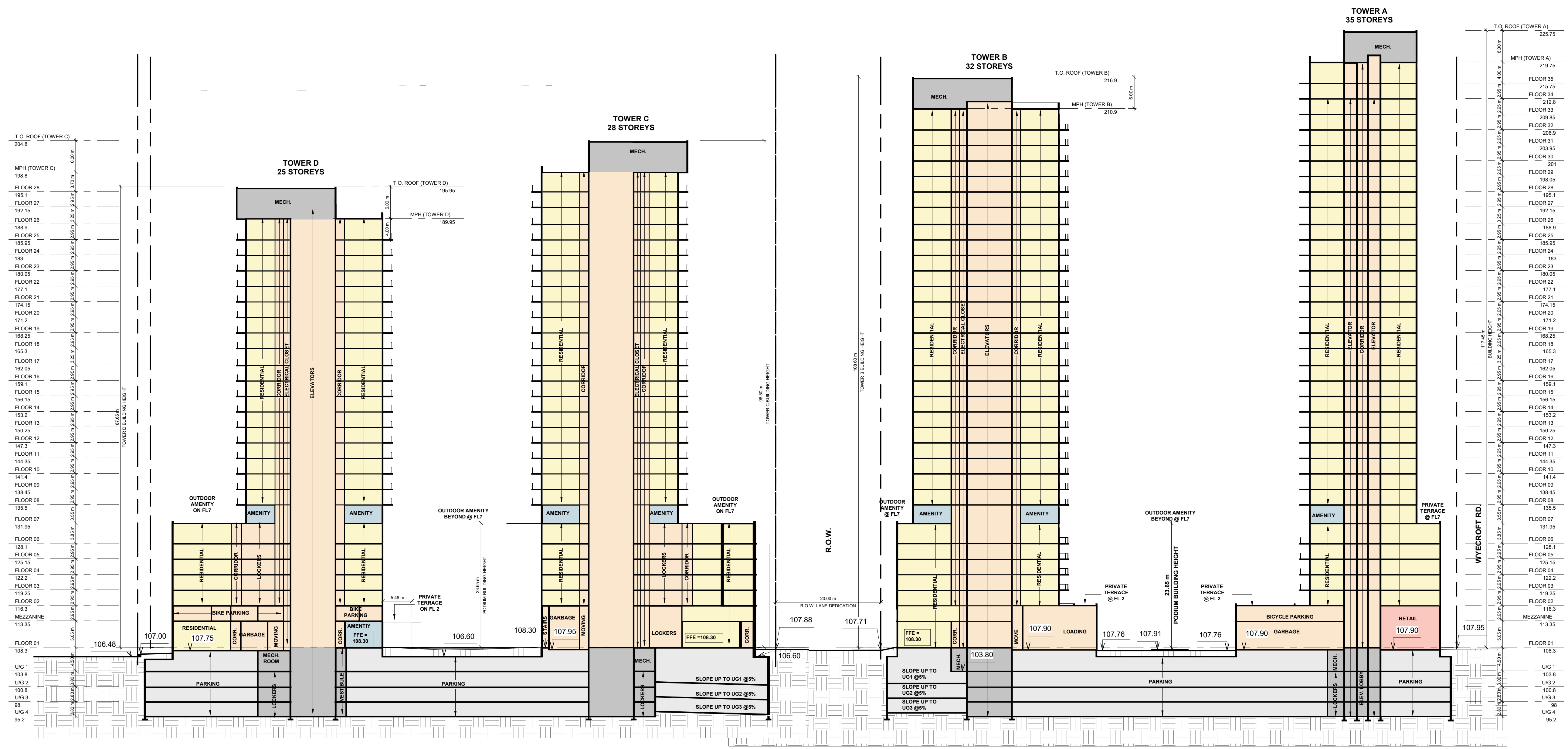
DRAWING

FLOOR 01

PROJECT NO.: 23.230P01
PROJECT DATE: 2024/06/27
DRAWN BY: CCA
CHECKED BY: CFU
SCALE: 1:350

DRAWING NO.: RZ151
REV.: 1

2025-07-11 8:25:44 AM



2 PARCEL B EAST-WEST SECTION
RZ401 1 : 400

1 PARCEL A EAST-WEST SECTION
RZ401 1 : 400

2025-06-27 11:04:41 AM

TURNER FLEISCHER

67 Lesmill Road
Toronto, ON, M3B 2T8
T 416 425 2222
turnerfleischer.com

#	DATE	DESCRIPTION	BY
1	2025-06-30	ISSUED FOR OPA, ZBA, DPoS	CFU

PROJECT
PROPOSED MIXED-USE DEVELOPMENT
2172 Wyecroft Road, Oakville, ON

DRAWING
BUILDING SECTIONS

PROJECT NO.
23.230P01
PROJECT DATE
2024/06/27
DRAWN BY
NMU
CHECKED BY
NMC
SCALE
1 : 400

DRAWING NO.
RZ401
REV.
1

VALDOR ENGINEERING INC.
571 Chrislea Road, Unit 4, 2nd floor, Woodbridge, ON L4L 8A2
Tel: 905-264-0054 Fax: 905-264-0069 info@valdor-engineering.com
www.valdor-engineering.com

TABLE: A1

EQUIVALENT POPULATION

In accordance to City of Toronto's Design Criteria for Sewers and Watermains

Project Name: **2172 Wyecroft Road, Oakville, ON**
File: 24123
Date: July 2025

Apartments within MTSA, Urban Growth Areas (Person/Hectare): 2000
Light Commercial Areas (Person/Hectare): 90

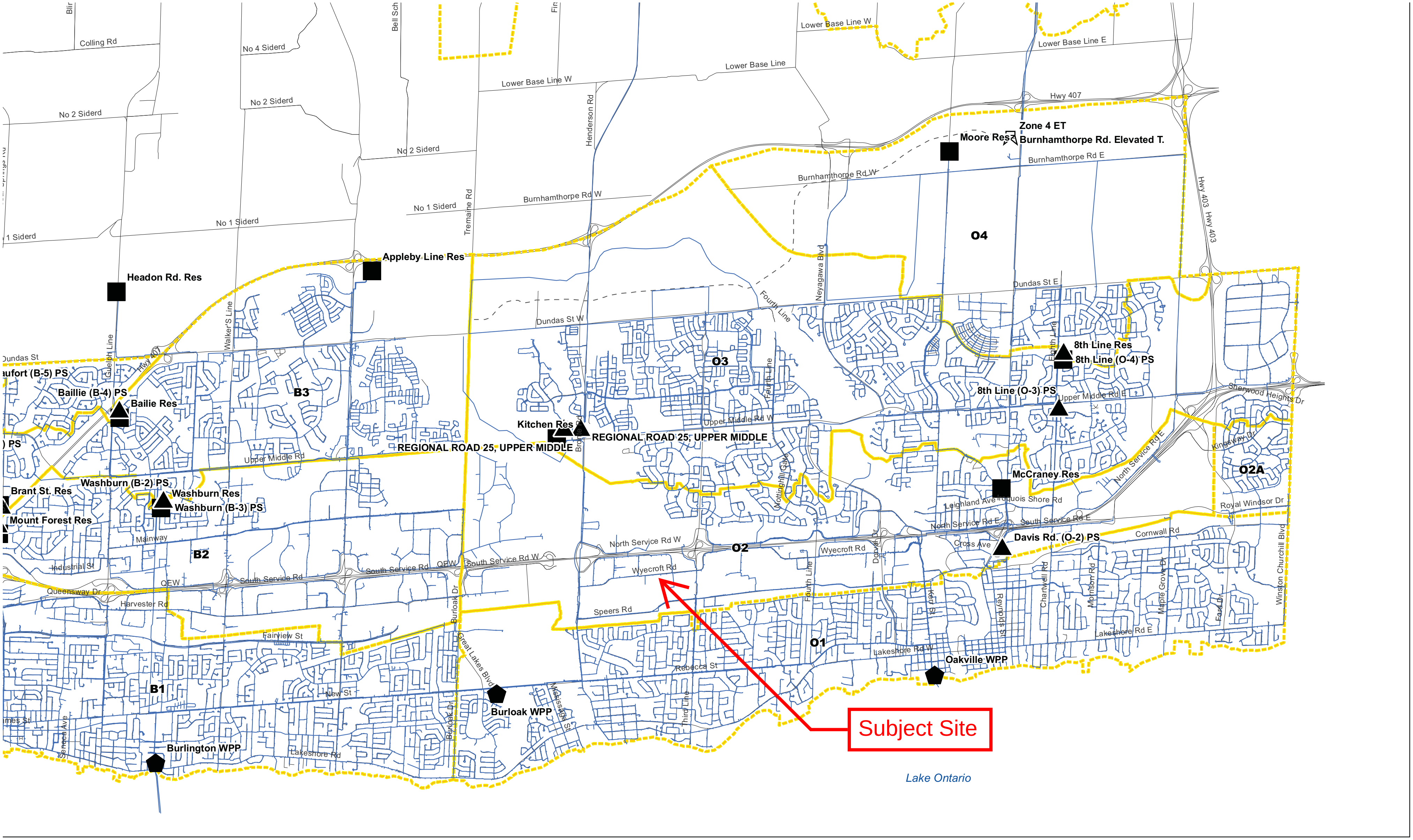
Criteria		**Area (ha)**	**Equivalent Population**
Proposed Re-Development			
Block 'A' (Towers 'A' & 'B')	2000 persons/ha	0.936	1,872.0
Block 'B' (Towers 'C' & 'D')	2000 persons/ha	1.029	2,058.0
Light Commercial+Office Areas	90 persons/ha	0.349	31.5
Sub-Total:			**3961**

Existing Condition			
Existing Industrial	125 persons/ha	2.362	295.3
Sub-Total:			**295**

Total Increase / Decrease:		**3666**

APPENDIX “B”

Water Demand Calculations & Details



Halton Region
Existing Water Distribution System
Figure 12

AECOM

11 Oct 2011
1:40,000
60114062-287-W

VALDOR ENGINEERING INC.
571 Chrislea Road, Unit 4, 2nd Floor, Woodbridge, ON L4L 8A2
Tel: 905-264-0054 Fax: 905-264-0069 info@valdor-engineering.com
www.valdor-engineering.com

TABLE B1

Project Name: **2172 Wyecroft Road, Town of Oakville**
File: 24123
Date: July 2025

Water Consumption Demand

Criteria:

Residential:		
Apartments within MTSA, Urban Growth Areas =	2000	Persons per ha
Average Daily Demand =	0.275	cu.m per capita
Maximum Day Demand Peaking Factor =	2.25	
Maximum Hour Demand Peaking Factor (Residential) =	4.00	
Maximum Hour Demand Peaking Factor (Commercial) =	2.25	
Site Area =	2.362	Ha
Non-Residential:		
Light Commercial Areas =	90	Persons per ha
Commercial+Office Floor Area =	0.349	Ha
Maximum Day Demand Peaking Factor =	2.25	
Maximum Hour Demand Peaking Factor =	2.25	

Phase	Equivalent Population	Domestic Demand (L/min)	Maximum Day Demand (L/min)	Peak Hour Demand (L/min)
Existing	*295*	*56.3*	*126.8*	*126.8*
Block 'A' (Towers 'A' & 'B')	1872	357.5	804.4	1430.0
Block 'B' (Towers 'C' & 'D')	2058	393.0	884.3	1572.1
Light Commercial+Office Areas	32	6.0	13.5	13.5
Increase	**3666.5**	**700.2**	**1575.4**	**2888.9**
Total	**3962**	**756.5**	**1702.2**	**3015.6**

VALDOR ENGINEERING INC.
571 Chrislea Road, Unit 4, 2nd floor, Woodbridge, ON L4L 8A2
Tel: 905-264-0054 Fax: 905-264-0069 info@valdor-engineering.com
www.valdor-engineering.com

Table: B2

REQUIRED FIRE FLOW CALCULATION

In accordance to Water Supply for Public Fire Protection, Fire Underwriters Survey 2020

Project Name: **2172 Wyecroft Road, Oakville, ON**
File: 24123
Date: July 2025

Notes: **BLOCK 'A'**
PODIUM FOR 'TOWERS 'A' & 'B'

Type of Construction - Non-Combustible

$C =$ 0.8

For a building classified with a Construction Coefficient below 1.0, the area shall be the total area of the largest floor plus 25% of each of the two immediately adjoining floors (assuming vertical openings and exterior vertical communications are properly protected):

Floor	Area (sq.m)	%	
Largest Floor Area	5,302	100%	(2nd Floor)
Adjacent Upper Adjoining Floor Area	5,302	25%	(3rd Floor)
Adjacent Lower Adjoining Floor Area	5,302	25%	(1st Floor)
$A =$	7,953	sq.m	

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

$F =$ 15,696 L/min

$F =$ 16,000 (to nearest 1,000 Lmin)

Occupancy Factor

		Charge
Type:	Residential	-15%
	$f_1 =$	-15%

$F' = F \times (1+f_1)$

$F' =$ 13,600 L/min

Sprinkler Credit

		Charge
NFPA 13 Sprinkler Standard:	YES	-30%
Standard Water Supply:	YES	-10%
Fully Supervised System:	YES	-10%
Total Charge to Fire Flow:	$f_2 =$	-50%

Exposure Factor

		Charge	
North Side - Distance to Building (m):	Over 30m	0%	
East Side - Distance to Building (m):	Over 30m	0%	
South Side - Distance to Building (m):	20.1 to 30m	0%	
West Side - Distance to Building (m):	Over 30m	0%	
	$f_3 =$	0%	(maximum of 75%)

$F'' = F' + F' \times f_2 + F' \times f_3$

$F'' =$ 6,800 L/min

REQUIRED FIRE FLOW

$F'' =$ **7,000** **L/min** (to nearest 1,000 L/min)

VALDOR ENGINEERING INC.
571 Chrislea Road, Unit 4, 2nd floor, Woodbridge, ON L4L 8A2
Tel: 905-264-0054 Fax: 905-264-0069 info@valdor-engineering.com
www.valdor-engineering.com

Table: B3

REQUIRED FIRE FLOW CALCULATION

In accordance to Water Supply for Public Fire Protection, Fire Underwriters Survey 2020

Project Name: **2172 Wyecroft Road, Oakville, ON**
File: 24123
Date: July 2025

Notes: **BLOCK 'B'**
PODIUM FOR 'TOWERS 'C' & 'D'

Type of Construction - Non-Combustible
$C =$ 0.8

For a building classified with a Construction Coefficient below 1.0, the area shall be the total area of the largest floor plus 25% of each of the two immediately adjoining floors (assuming vertical openings and exterior vertical communications are properly protected):

Floor	Area (sq.m)	%	
Largest Floor Area	4,916	100%	(2nd Floor)
Adjacent Upper Adjoining Floor Area	4,916	25%	(3rd Floor)
Adjacent Lower Adjoining Floor Area	4,916	25%	(1st Floor)
$A =$	7,373	sq.m	

$F = 220\,C\,\sqrt{A}$
$F =$ 15,113 L/min
$F =$ 15,000 (to nearest 1,000 Lmin)

Occupancy Factor

		Charge
Type:	Residential	-15%
	$f_1 =$	-15%

$F' = F \text{ x } (1+f_1)$
$F' =$ 12,750 L/min

Sprinkler Credit

		Charge
NFPA 13 Sprinkler Standard:	YES	-30%
Standard Water Supply:	YES	-10%
Fully Supervised System:	YES	-10%
Total Charge to Fire Flow:	$f_2 =$	-50%

Exposure Factor

		Charge	
North Side - Distance to Building (m):	20.1 to 30m	0%	
East Side - Distance to Building (m):	Over 30m	0%	
South Side - Distance to Building (m):	Over 30m	0%	
West Side - Distance to Building (m):	Over 30m	0%	
	$f_3 =$	0%	(maximum of 75%)

$F'' = F' + F' \text{ x } f_2 + F' \text{ x } f_3$
$F'' =$ 6,375 L/min

REQUIRED FIRE FLOW
$F'' =$ **6,000** **L/min** (to nearest 1,000 L/min)

VALDOR ENGINEERING INC.
571 Chrislea Road, Unit 4, 2nd floor, Woodbridge, ON L4L 8A2
Tel: 905-264-0054 Fax: 905-264-0069 info@valdor-engineering.com
www.valdor-engineering.com

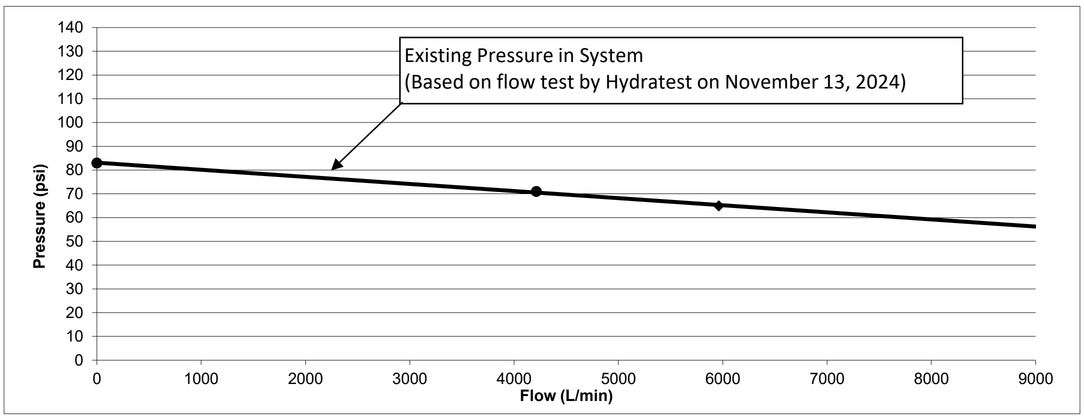
TABLE: B4

Water Supply Calculation

Project Name: **2172 Wyecroft Road, Oakvile, ON**
File: 24123
Date: July 2025

Hydrant Flow Test Results
Residual Location: 2172 Wyecroft Road

Number of Outlets & Orifice Size	Flow (US GPM)	Flow (L/min)	Residual Pressure (psi)
0	0	0	83
1 x 2 1/2	1113	4213	71
2 x 2 1/2	1575	5962	65



$$Q_r = Q_t \times \left(\frac{P_s - Pr}{P_s - Pt}\right)^{0.54}$$

Re-aranged to: $\mathrm{P_r} = \mathrm{P_s} - (Ps - Pt)\sqrt[0.54]{Q_r/Q_t}$

Where,
Q_r= Projected Flow Rate at the Desired Pressure
Q_t= Flow Rate from Flow Test
P_s= Static Pressure
P_r= Desired Residual Pressure
P_t= Residual Presure inTest

Q_t=	5962	L/min
P_t=	65	psi
P_s=	83	psi

Maximum Day Domestic Demand =	1702.2	L/min	(from Domestic Demand Calculation)
Domestic Peak Hour Flow to Satisfy (Q_{r2})=	3015.6	L/min	(from Domestic Demand Calculation)
Fire Flow Requirement =	7,000	L/min	(from Fire Flow Calculation)
Fire Flow + Max Day (Q_{r1})=	8,702	L/min	
Minimum Req. Pressure for Fire-Flow =	140	kPa	
=	20.3	psi	
System Provided Pressure at min. firelow + max. day (P_{r1})=	46.7	psi	
System Provided Pressure at Peak Hour Flow (P_{r2})=	77.9	psi	

HYDRATEST

JOB NO. ______________________ DATE: November 13, 2024

LOCATION 2172 Wyecroft Rd. Oakville, ON

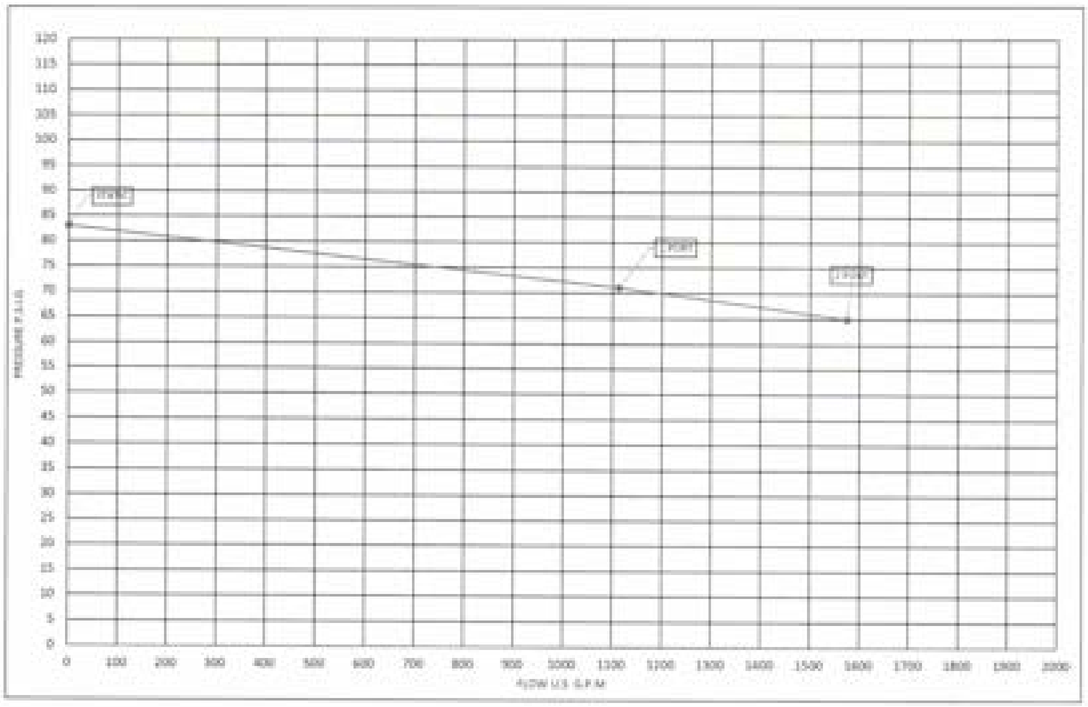
TIME OF TEST 9:15 AM

LOCATION OF TEST (FLOW) 2192 Wyecroft Rd. (Hyd2541)

(RESIDUAL) 2172 Wyecroft Rd. (Hyd2542)

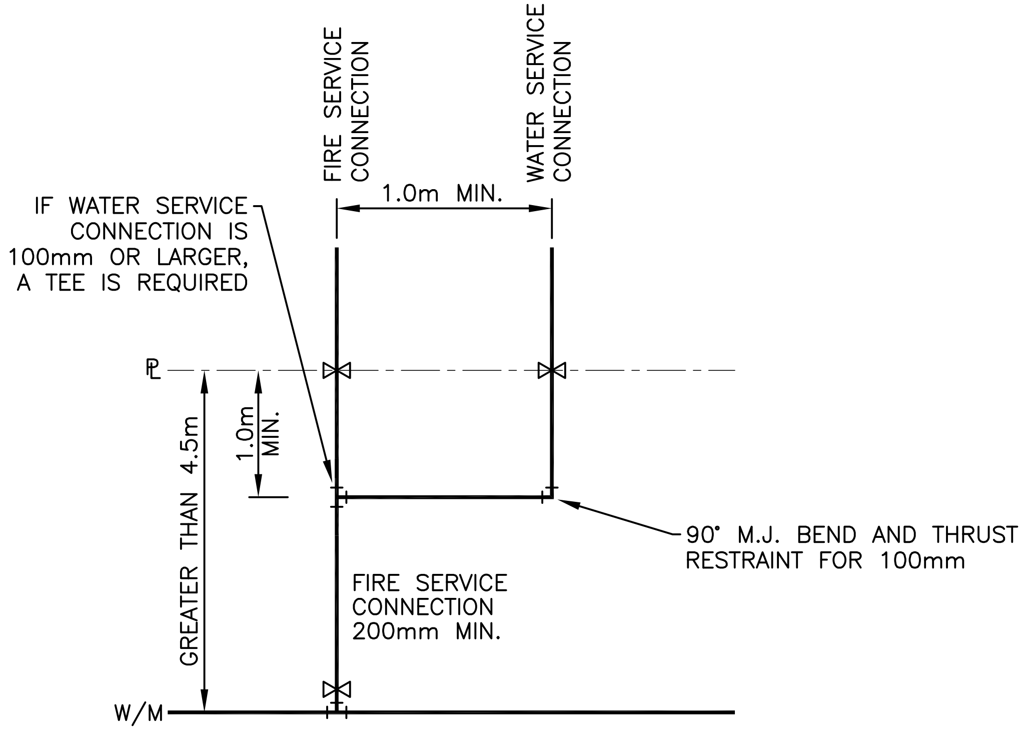
MAIN SIZE: 300mm DI STATIC PRESSURE: 83

Number of Outlets & Orifice Size	Pitot Presure	Flow (USGPM)	Residual Pressure
1 X 2 1/2" PORT	44	1113	71
2 X 2 1/2" PORTS	22	1575	65

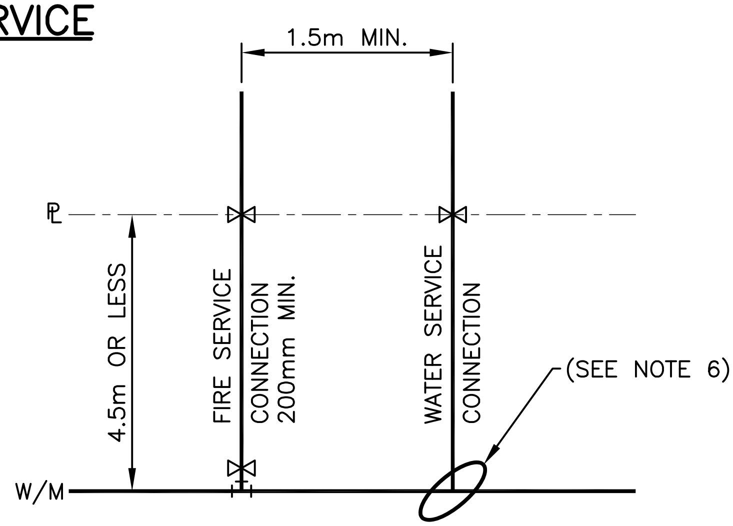


COMMENTS: Class "AA" Hydrant- Light Blue

Authorized Signature: ______________________ Hydratest Signature: ______________________



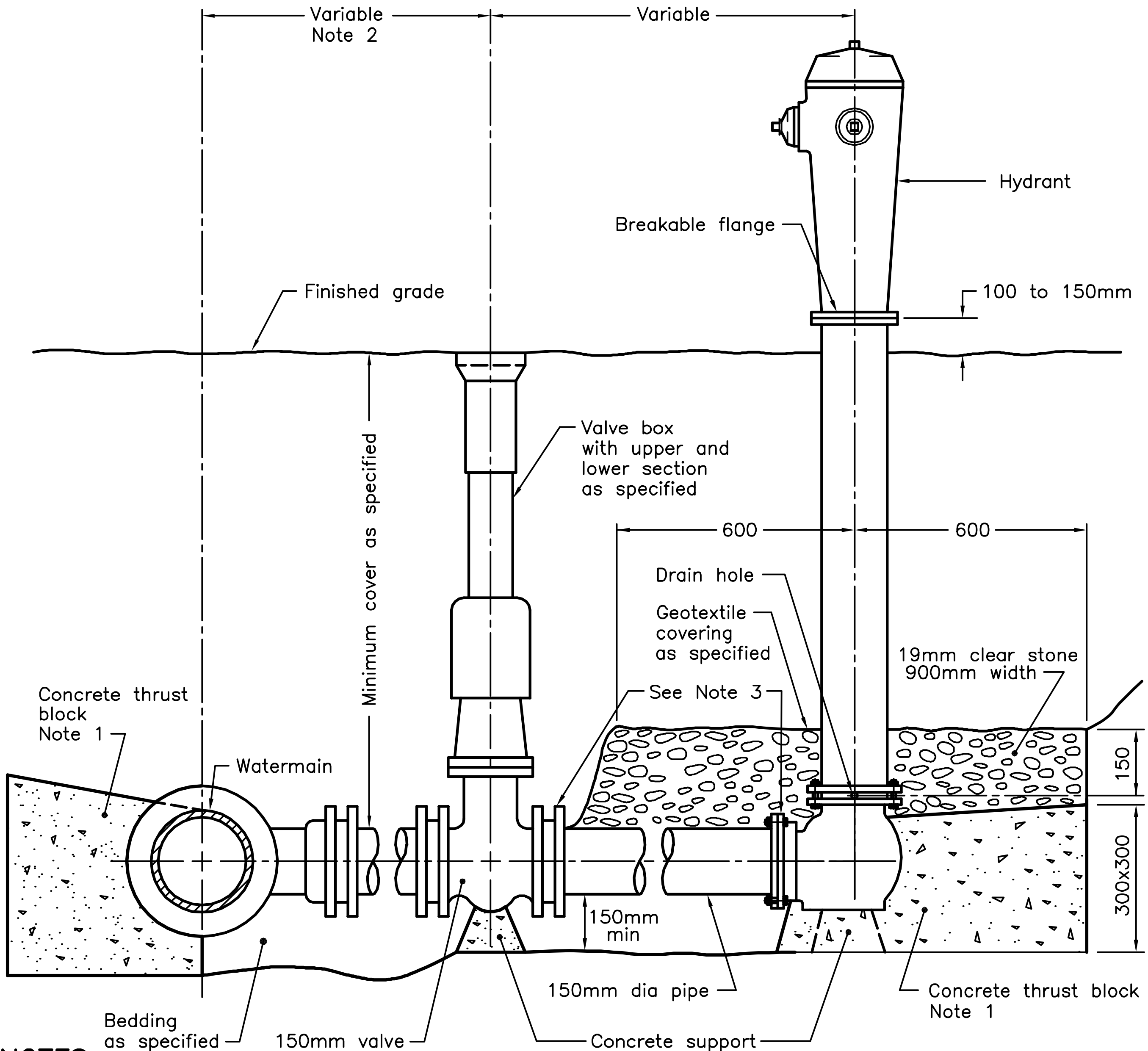
GREATER THAN 4.5m SERVICE



LESS THAN 4.5m SERVICE

NOTES
1. COMPRESSION TYPE FITTINGS ONLY. NO SOLDERED JOINTS ARE PERMITTED BEFORE THE WATER METER.
2. WATER SERVICE CONNECTION 25, 38, 50 TO BE TYPE 'K' SOFT COPPER, 100 AND LARGER TO BE PVC OR DI.
3. FIRE SERVICE CONNECTION TO BE MIN. 200mm.
4. IF THE WATERMAIN IS 4.5m OR LESS FROM THE PROPERTY LINE, THEN 2 SEPARATE CONNECTIONS ARE REQUIRED.
5. TAPPING SLEEVE TO BE PRESSURE TESTED BY CONTRACTOR BEFORE MAIN IS TAPPED.
6. ALL SERVICE CONNECTIONS TO PVC PIPE REQUIRE SADDLES. ALL SERVICE CONNECTIONS 50mm OR LESS TO HAVE A MAIN STOP, CURB STOP AND BOX. ALL SERVICES GREATER THAN 50mm REQUIRE A TAPPING SLEEVE AND VALVE OR AN ANCHOR TEE WITH A GATE VALVE AND BOX AT THE MAIN IN ADDITION TO A PROPERTY LINE GATE VALVE AND BOX.
7. ALL GATE VALVES TO HAVE VALVE BOXES.
8. ALL DIMENSIONS IN MILLIMETRES UNLESS OTHERWISE NOTED.

THE REGIONAL MUNICIPALITY OF HALTON PUBLIC WORKS DEPARTMENT	Date: August 2018	Rev. 2	NTS
WATER SERVICE AND FIRE SERVICE CONNECTION INSTALLATIONS	REGION STANDARD RH 409.010		



NOTES:

1 All concrete thrust blocks shall be poured against undisturbed ground.

2 When specified, for watermains 400mm and less, locate valve within 1.0m of centreline of watermain. Retaining and restraining devices shall be utilized. For watermains 600mm and over, bolt valve with flanged end directly to flanged tee.

3 When specified, retaining and restraining devices shall be utilized, in addition to thrust blocks.

A Bond breaker shall be used between the concrete and the fittings and appurtenances.

B Bolts and nuts for buried flange to flange connections shall be stainless steel.

C When required, flange of standpipe extensions shall not be in frost zone.

D This OPSD shall be read in conjunction with OPSD 1103.010 and 1103.020.

E Backfill material within 500mm of service box shall be native or imported, as specified.

F All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2013	Rev 2
HYDRANT INSTALLATION		
	OPSD 1105.010	

APPENDIX "C"

Wastewater Calculations & Details

Halton Region Wastewater Collection and Facilities

Pumping Station

RMOHID, PS NAME, ADDRESS	RMOHID, PS NAME, ADDRESS
1, ARMSTRONG AV PS, 131 ARMSTRONG AV	61, MCCULOUGH CR PS , 32 MCCULOUGH CR
2, GOLLOP CR PS, 14 GOLLOP CR	62, GARDINER DR PS, 21 GARDINER DR
3, LYNDEN CL PS, 40 LYNDEN CL	63, CINDEBARKE TERR PS, CINDEBARKE TERR
4, MOORE PARK PS, 39 MOORE PARK CR	64, MARINE DR PS, 2285 MARINE DR
5, AGNES ST PS, AGNES ST	65, CORONATION PARK PS, LAKESHORE RD
6, KINGHAM HILL PS, 242 KINGHAM RD	66, BELVEDERE DR PS, 60 BELVEDERE DR
7, WATER ST PS, 130 WATER ST	67, PS NO. 17 , 105 APPLEBY PL
8, CEDARBERRY PS, 2262 CEDARBERRY CT	68, PS NO. 7, 447 INDIAN RD
9, CARRINGTON PL PS, 2352 CARRINGTON PL	69, PS NO. 11, 1189 BELLVIEW ST
10, CHANCERY LN PS, 2286 CHANCERY LN	70, PS NO. 16, 535 STILLWATER CR
11, ENNISCLARE PS, 8 ENNISCLARE DR	71, PS NO. 15, 1094 UNSWORTH AV
12, NINTH LINE PS, 1539 LAKESHORE RD	72, PS NO. 14, 124 NORTHSHORE BV
13, BEL AIR ESTATES PS, 54 BEL AIR DR	73, PS NO. 18, 614 BAYSHORE BV
14, ARGYLE DR PS, 1034 ARGYLE DR	74, PS NO. 19, 761 GRANDVIEW AV
15, RAYMAR PL PS, 59 RAYMAR PL	75, OVERTON PL PS, 250 OVERTON PL
16, FIRST ST PS, 20 FIRST ST	76, JOHN ST PS, 68 JOHN ST
17, GAIRLOCH GARDENS PS, 1302 LAKESHORE RD	77, PS NO. 24, 1261 SPRING GARDENS RD
18, NAVY ST PS, 1 NAVY ST	78, PROVIDENCE RD PS, 2175 PROVIDENCE RD
20, LAKEWOOD DR PS, 231 LAKEWOOD DR	79, RIVERBANK WY PS, RIVERBANK WY
21, WALKER ST PS, 10 WALKER ST	80, NORVAL PS, 464 GUELPH ST
22, PRIVATE, 200 LAKESHORE RD W	81, REBECCA STORAGE TANK, FELAN AV
23, BIRCHHILL LN PS, 39 BIRCHHILL LN	82, MILTON WWTP, 161 FULTON ST
24, WESTDALE RD PS, 135 WESTDALE RD	83, MAIN ST PS, 238 MAIN ST
25, LAKESHORE RD W PS, 1385 LAKESHORE RD W	84, BOYNE PS, 5400 REGIONAL RD 25
26, TIMBER LN PS, 2 TIMBER LN	85, NORTH HALTON PS, 2115 NORTH SERVICE RD W
27, HIXON ST PS, 1334 HIXON ST	86, MIDBLOCK ARTERIAL PS, THIRD LI
28, BRONTE YACHT CLUB PS, 2505 LAKESHORE RD	87, 16 MILE CREEK PS, 280 OLD UPPER MIDDLE RD
29, WEST RIVER ST PS, 51 WEST RIVER ST	88, LAURIER PS, 509 COMMERCIAL ST
30, PS NO. 21, 5151 NEW ST	92, GARDEN TRAILS PS, GENISTA DR
31, PS NO. 8 , 5390 LAKESHORE RD	97, HALTON HILLS PS 1, 11429 STEELES AV
32, PS NO. 6, 5061 LAKESHORE RD	99, JOSHUA CREEK PS, 2313 ROCK POINT DRIVE
33, PS NO. 1, 2137 LAKESHORE RD	100, 10 SR PS, 14515 10 SIDE ROAD
34, PS NO. 9, 3241 LAKESHORE RD	101, UNKNOWN, UNKNOWN
35, PS NO. 10, 4281 LAKESHORE RD	102, UNKNOWN, UNKNOWN
36, LEACHATE STATION, 1548 KING RD	103, TREMAINE PS, UNKNOWN
37, PS NO. 12, 604 EDGEWATER CR	104, HALTON HILLS PS 2, 12420 STEELES AV
38, PS NO. 20, 834 SPRING GARDENS RD	105, APPLEBY STORM PS, 2200 APPLEBY LINE
40, PS NO. 22, 89 OAKLANDS PARK CT	106, JAMES SNOW STORM PS , 255 JAMES SNOW PARKWAY
41, PS NO. 3, 836 DANFORTH PL	501, UNKNOWN, UNKNOWN
42, CHARTWELL RD PS, 16 CHARTWELL RD	503, PRIVATE, LAKESHORE RD
43, MORRISON HEIGHTS PS, 1152 MORRISON HEIGHTS DR	505, PRIVATE, UNKNOWN
44, CUMNOCK CR PS, 1271 CUMNOCK CR	909, BEACHWAY PARK , UNKNOWN
45, WEAVER AV PS, 1380 WEAVER AV	910, PRIVATE, UNKNOWN
46, RIVERSIDE DR PS, 265 RIVERSIDE DR	912, PROPOSED PS, UNKNOWN
47, SHEPHERD RD PS, 10 SHEPHERD RD	913, PRIVATE, 448 LAKESHORE RD
48, PS NO. 13, 305 CARDINAL AV	914, GLEN WILLIAMS PS, UNKNOWN
49, LEACHATE STATION, 1548 KING RD	
50, SHELDON CREEK PS, 3251 LAKESHORE RD	
52, SHOREWOOD PL PS, SHOREWOOD PL	
53, LAKEVIEW PS, 104 ELIZABETH DR	
54, PS NO. 4, 59 OAKLAND PARK CT	
55, THIRD LI PS, 2069 NORTH SERVICE RD	
56, STIRLING DR PS, 1203 STIRLING DR	
57, PS NO. 5, 374 NORTHSHORE BV	
58, PRIVATE, MOUNTAINVIEW RD	
59, LEACHATE STATION 2, ARMSTRONG AV	
60, LEACHATE STATION 1, ARMSTRONG AV	

Wastewater Main

- Discharge main
- Forcemain
- Gravity main

Facilities

WasteWater Treatment Plant

NAME, ADDRESS

ACTON WASTEWATER TREATMENT PLANT, 202 CHURCHILL RD. S.
BURLINGTON SKYWAY WASTEWATER TREATMENT PLANT, 1125 LAKESHORE RD.
GEORGETOWN WASTEWATER TREATMENT PLANT, 275 MOUNTAINVIEW RD. S.
MID-HALTON WASTEWATER TREATMENT PLANT, 2195 NORTH SERVICE RD. W.
MILTON WASTEWATER TREATMENT PLANT, 161 FULTON ST.
OAKVILLE SOUTHEAST WASTEWATER TREATMENT PLANT, 2477 LAKESHORE RD. E.
OAKVILLE SOUTHWEST WASTEWATER TREATMENT PLANT, 1385 LAKESHORE RD. W.

Storage Tank

NAME, ADDRESS

HALTON BIOSOLIDS MANAGEMENT CENTRE, 4449 25 HIGHWAY

Wet Well

RMOHID, NAME, ADDRESS

18, MID-BLOCK ARTERIAL PS, THIRD LI
19, GLEN WILLIAMS PS WET WELL, UNKNOWN

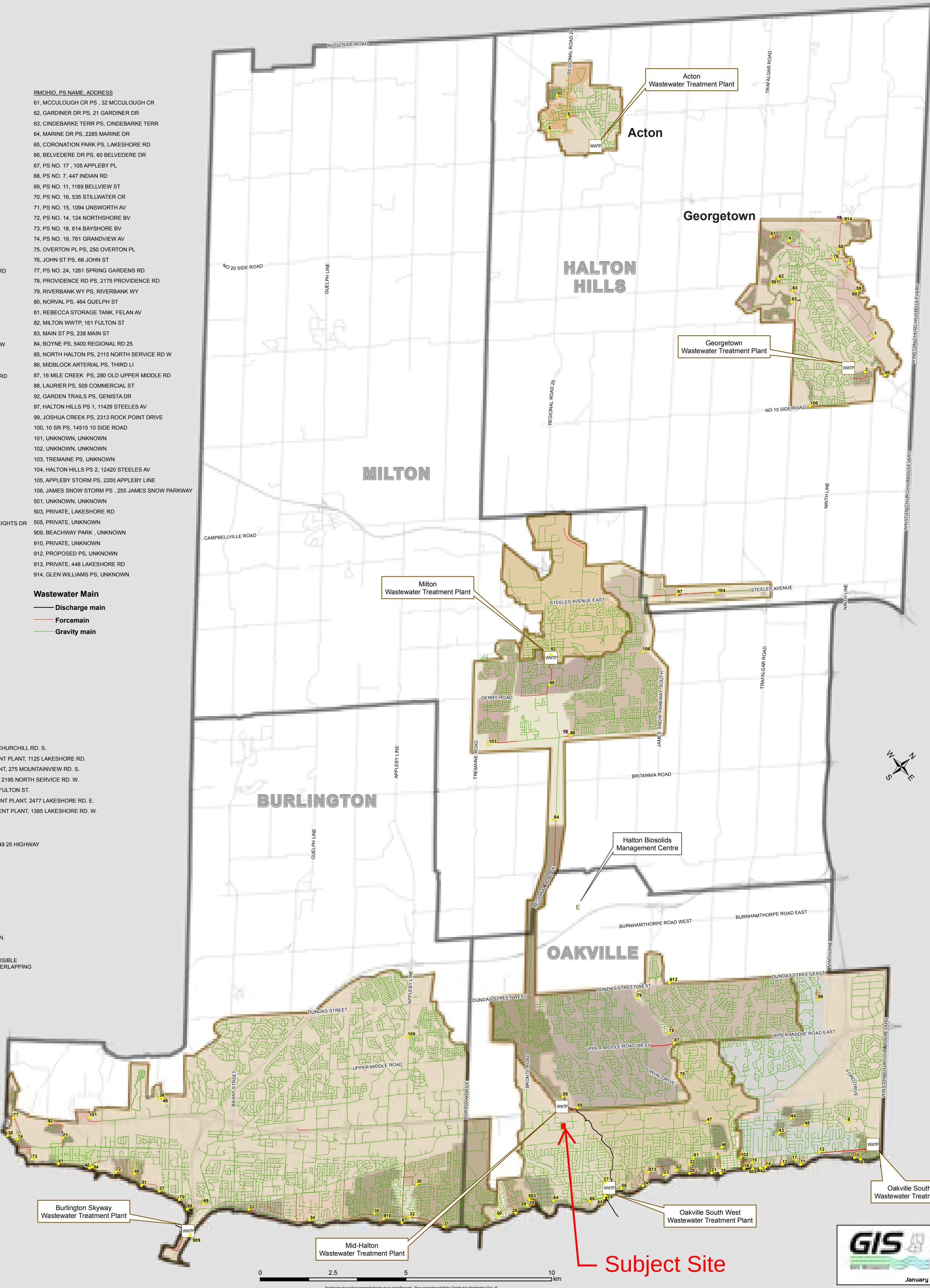
Drainage Area

Pumping Station

PUMPING STATION DRAINAGE AREAS ARE REPRESENTED BY VARIOUS SHADES OF BROWN.

WasteWater Treatment Plant

PLEASE NOTE: ONLY THE BOUNDARY WILL BE VISIBLE IF PUMPING STATION DRAINAGE AREAS ARE OVERLAPPING THE TREATMENT PLANT DRAINAGE AREA.



REGIONAL MUNICIPALITY OF HALTON, ITS EMPLOYEES, OFFICERS AND AGENTS ARE NOT RESPONSIBLE FOR ANY ERRORS, OMISSIONS OR INACCURACIES, WHETHER DUE TO THEIR NEGLIGENCE OR OTHERWISE. ALL INFORMATION SHOULD BE VERIFIED.

January 2012

VALDOR ENGINEERING INC.
571 Chrislea Road, Unit 4, 2nd floor, Woodbridge, ON L4L 8A2
Tel: 905-264-0054 Fax: 905-264-0069 info@valdor-engineering.com
www.valdor-engineering.com

TABLE: C1

Prop. Wastewater Loading Calculation

Project Name: **2172 Wyecroft Road, Oakville, ON**
File: 24123
Date: July 2025

Criteria:

Peak flow design parameters

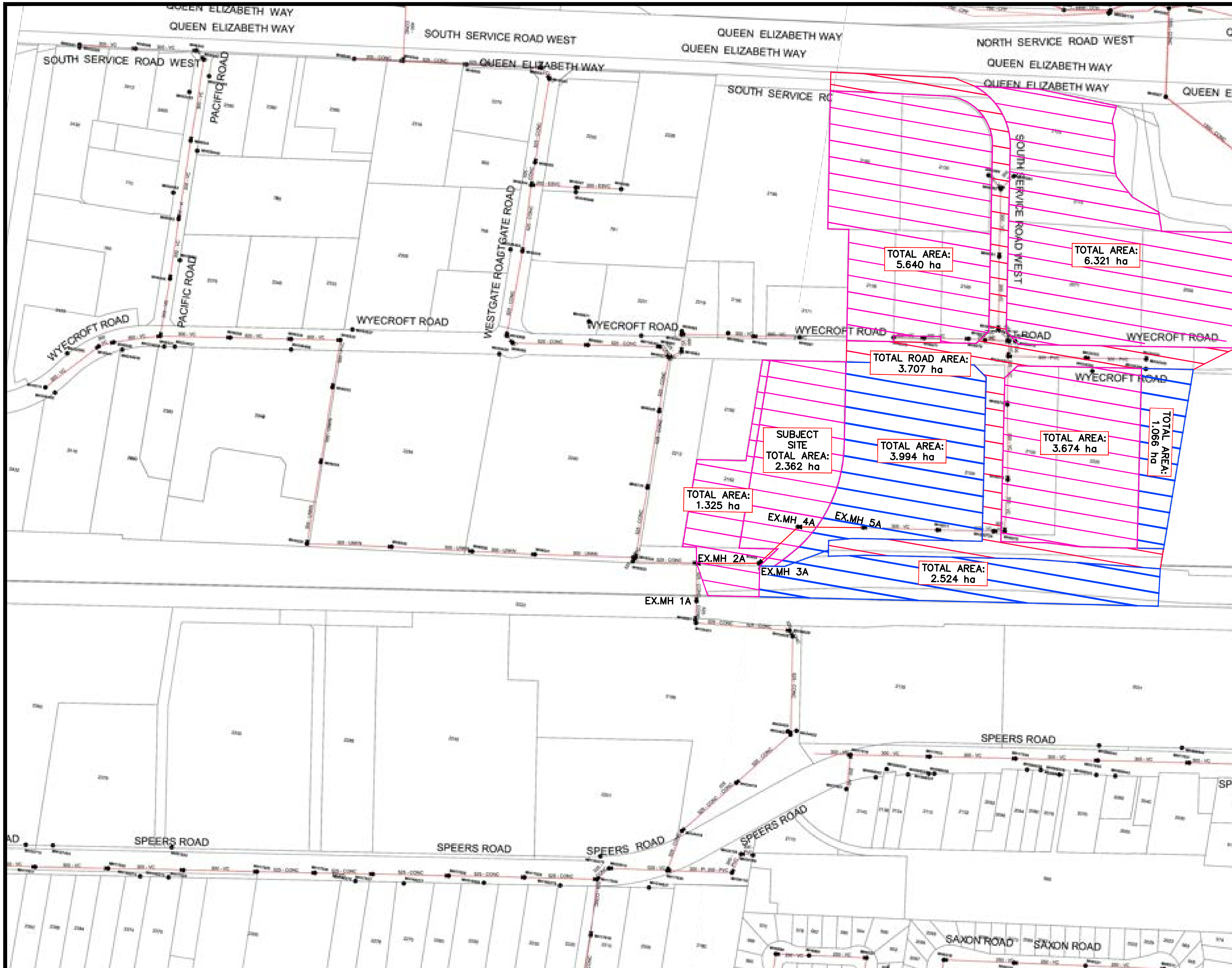
Light Commercial Areas	90	Persons per ha.
Apartments within MTSA, Urban Growth Areas	2000	Persons per ha.
Total Site Area	2.362	ha.
Infiltration Rate:	0.286	L/s/ha.
Avg. Flow Rate (Residential)	0.275	cu.m per capita
Avg. Flow Rate (Commerical)	24.75	cu.m per capita

Harmon Formula (M) = (M) = 1+(14/(4+P^0.5))

where P is equivalent population in thousands

$$Q = Q_{Average} \; x \, M + I$$

	Site Area (ha.)	Equivalent Population (Persons)	Harmon Peaking Factor	Average Daily Flow (L/s)	Infiltration (L/s)	Total Flow (L/s)
Block 'A' (Towers 'A' & 'B')	-	1872	3.61	5.96	-	21.50
Block 'B' (Towers 'C' & 'D')	-	2058	3.58	6.55	-	23.42
Light Commercial+Office Areas	-	32	4.35	9.02	-	39.26
Infiltration	2.362	-	-	-	0.68	0.68
TOTAL						84.86



LEGEND:

PARKING LOT LAND TYPE

ROAD LAND TYPE

INDUSTRIAL LAND TYPE

EXISTING SANITARY SEWER LINE

EXISTING SANITARY SEWER MH

PROJECT

PROPOSED MIXED-USE DEVELOPMENT
2172 WYECROFT ROAD
TOWN OF OAKVILLE

UPSTREAM SANITARY CATCHMENT AREAS

VALDOR ENGINEERING INC.
Consulting Engineers - Project Managers
571 CHRISLEA ROAD, UNIT 4, 2ND FLOOR, VAUGHAN, ONTARIO, L4L 8A2
TEL (905) 264-0054, FAX (905) 264-0069
E-MAIL: info@valdor-engineering.com
www.valdor-engineering.com

PREPARED BY A.M.	CKD. BY D.G.
SCALE N.T.S.	DATE AUGUST 2025
PROJECT 24123	DWG. FIGURE C1

TABLE: C2

Type of Development	Equivalent Population Density		Type of Development	Max Peaking Factor
Apartments (over 6 stories high)	2000	person/ha	Residential	4
Light Industrial Areas	125	person/ha	Industrial	2.25

Infiltration Rate:	0.286	L/s/ha

$$M = 1 + \frac{14}{4+\sqrt{P}} \text{ where P in 1000's}$$

$$Q(p) = \frac{P \times q \times M}{86.4} \text{ in (l/s)}$$

$$Q(i) = i \times A \text{ in (l/s)}$$

$$Q(d) = Q(p) + Q(i) \text{ in (l/s)}$$

TOWN OF OAKVILLE ENGINEERING DEPARTMENT

SANITARY SEWER DESIGN SHEET

PRE-DEVELOPMENT CONDITION

Consultant:

Valdor Engineering Inc.

571 Chrislea Road, Unit 4, 2nd Floor, Vaughan, Ontario, L4L 8A2

Tel: 905-264-0054 Fax: 905-264-0069 info@valdor-engineering.com

Design: **A. McKeracher** Date: July, 2025

Checked: **D. Giugovaz, P.Eng**

Approved: **D. Giugovaz, P.Eng**

Sheet: 1 of 2

Street	from M.H.	to M.H.	Number of Appartment Units	Population (Apartments) (person)	Apartment Lots Area (ha)	Industrial Institutional Commercial Gross Lot Area (ha)	Population P (Person)	Accum. Population P (person)	Peaking Factor M	Industrial Institutional Commercial Flow (l/s)	Peak Flow Q(p) (l/s)	Infiltration Area (ha)	Accum. Area (ha)	Extraneous Flow Q(i) (l/s)	Design Flow Q(d) (l/s)	Pipe Length L (m)	Pipe Diameter d (mm)	Pipe Slope S (%)	Nominal Pipe Full Flow Cap. Q(f), (l/s)	Pipe Full Flow Vel. V(f) (m/s)	Actual Velocity V(a) (m/s)	Q(d) / Q(f)	COMMENTS
Upstream SAN Sewer	**Upstream**	**Ex. MH.5A**	-	-	-	26.926	3366	3366	2.25	10.71	24.10	26.926	26.926	7.70	31.81	91.3	300	0.43%	63.41	0.091	0.091	0.50	Ex. SAN Sewer
Ex. SAN Easement	**Ex. MH.5A**	**Ex. MH.4A**	-	-	-	0.000	0	3366	2.25	10.71	24.10	0.00	26.926	7.70	31.81	91.1	300	0.35%	57.21	0.082	0.084	0.56	Ex. SAN Sewer
Ex. SAN Easement	**Ex. MH.4A**	**Ex. MH.3A**	-	-	-	2.362	295	3661	2.25	11.65	26.22	2.362	29.288	8.38	34.60	65.7	300	0.40%	61.16	0.087	0.090	0.57	Ex. SAN Sewer
Ex. SAN Easement	**Ex. MH.3A**	**Ex. MH.2A**	-	-	-	1.325	166	3827	2.25	12.18	27.41	1.325	30.613	8.76	36.16	76.5	300	0.39%	60.39	0.086	0.090	0.60	Ex. SAN Sewer

Type of Development	Sewage Flow Rate	
Apartments (over 6 stories high)	0.000003183	m^3/person/s
Light Industrial Areas	0.000003183	m^3/person/s

No.	REVISION	DATE	AUTH

Town of Oakville

Engineering and Public Works Department

SANITARY SEWER DESIGN SHEET

SCALE:	N.T.S.	DATE:	July, 2025
DRAWN BY:	A.M	DWG. No. 1	

TABLE: C3

Type of Development	Equivalent Population Density		Type of Development	Max Peaking Factor
Apartments (over 6 stories high)	2000	person/ha	Residential	4
Light Industrial Areas	125	person/ha	Industrial	2.25

Infiltration Rate:	0.286	L/s/ha

$$M = 1 + \frac{14}{4+\sqrt{P}} \quad \text{where P in 1000's}$$

$$Q(p) = \frac{P \times q \times M}{86.4} \quad \text{in } (l/s)$$

$$Q(i) = i \times A \quad \text{in } (l/s)$$

$$Q(d) = Q(p) + Q(i) \quad \text{in } (l/s)$$

TOWN OF OAKVILLE ENGINEERING DEPARTMENT
SANITARY SEWER DESIGN SHEET

POST-DEVELOPMENT CONDITION

Consultant:
Valdor Engineering Inc.
571 Chrislea Road, Unit 4, 2nd Floor, Vaughan, Ontario, L4L 8A2
Tel: 905-264-0054 Fax: 905-264-0069 info@valdor-engineering.com

Design: **A. McKeracher** Date: July, 2025
Checked: **D. Giugovaz, P.Eng**
Approved: **D. Giugovaz, P.Eng**
Sheet: 2 of 2

Street	from M.H.	to M.H.	Apartment Lot (ha)	Population (Apartments) (person)	Total Residential Flow (l/s)	Industrial Institutional Commercial Gross Lot Area (ha)	Population P (person)	Accum. Population P (person)	Peaking Factor M	Industrial Institutional Commercial Flow (l/s)	Peak Flow Q(p) (l/s)	Infiltration Area (ha)	Accum. Area (ha)	Extraneous Flow Q(i) (l/s)	Design Flow Q(d) (l/s)	Pipe Length L (m)	Pipe Diameter d (mm)	Pipe Slope S (%)	Nominal Pipe Full Flow Cap. Q(f), (l/s)	Pipe Full Flow Vel. V(f) (m/s)	Actual Velocity V(a) (m/s)	Q(d) / Q(f)	COMMENTS
Ex. SAN Easement	**Ex. MH.5A**	**Prop. MH.4A**	-	-	-	26.926	3366	3366	2.25	10.71	24.10	26.926	26.926	7.70	31.81	64.9	300	0.35%	57.21	0.082	0.084	55.6%	Tapped-in Sewer
Prop. Servicing Easement	**Prop. MH.5A**	**Prop. MH.4A**	0.936	1872	5.96	0.349	32	1904	3.60	-	21.47	1.333	1.333	0.38	21.85	30.0	300	1.00%	96.70	0.138	0.112	22.6%	
Prop. Servicing Easement	**Prop. MH.4A**	**Prop. MH.2A**	-	-	-	-	-	5269	3.22	-	45.57	0.049	28.308	8.10	53.67	30.0	300	0.50%	68.38	0.098	0.108	78.5%	
Prop. San Service (For Tower's 'C' & 'D')	**Prop. MH.3A**	**Prop. MH.2A**	1.029	2058	6.55	-	-	7327	3.09	-	20.22	1.029	1.029	0.29	20.52	9.1	300	2.00%	136.76	0.196	0.140	15.0%	
Prop. Servicing Easement	**Prop. MH.2A**	**Prop. MH.1A**	-	-	-	-	-	7327	3.09	-	65.79	0.030		0.00	65.79	16.5	300	0.50%	68.38	0.098	0.111	96.2%	
Prop. SAN Easement	**Prop. MH.1A**	**Ex. MH.3A**	-	-	-	-	-	7327	3.09	-	65.79	0.074	0.074	0.02	65.82	8.5	300	0.40%	61.16	0.087	0.089	107.6%	
Ex. SAN Easement	**Ex. MH.3A**	**Ex. MH.2A**	-	-	-	-	-	7327	3.09	-	65.79	1.325	1.399	0.40	66.19	76.5	300	0.39%	60.39	0.086	0.088	109.6%	Ex. Sewer

Type of Development	Sewage Flow Rate	
Apartments (over 6 stories high)	0.000003183	m^3/person/s
Light Industrial Areas	0.000003183	m^3/person/s

No.	REVISION	DATE	AUTH

Town of Oakville

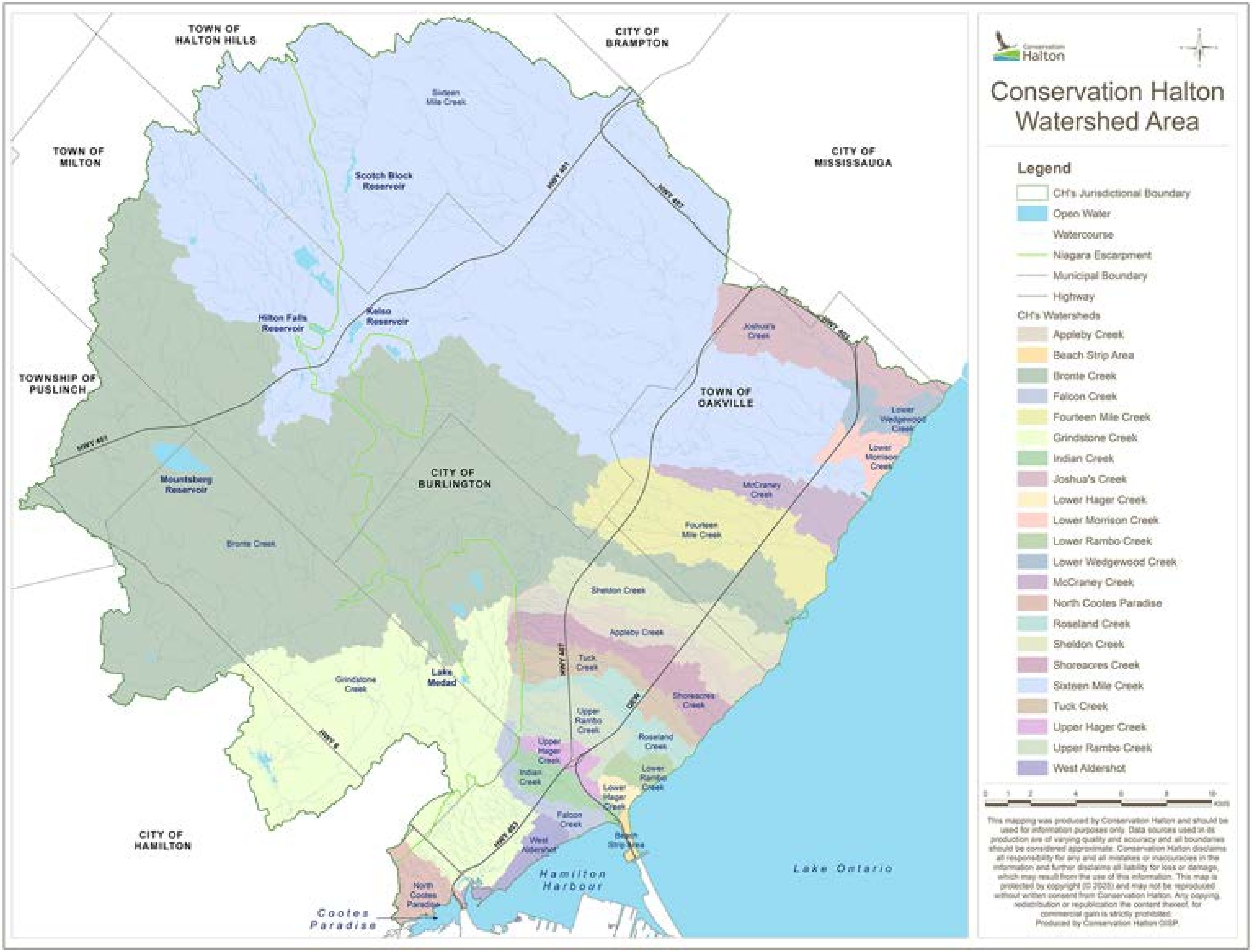
Engineering and Public Works Department

SANITARY SEWER DESIGN SHEET

SCALE:	N.T.S.	DATE:	July, 2025
DRAWN BY:	A.M	DWG. No. 1	

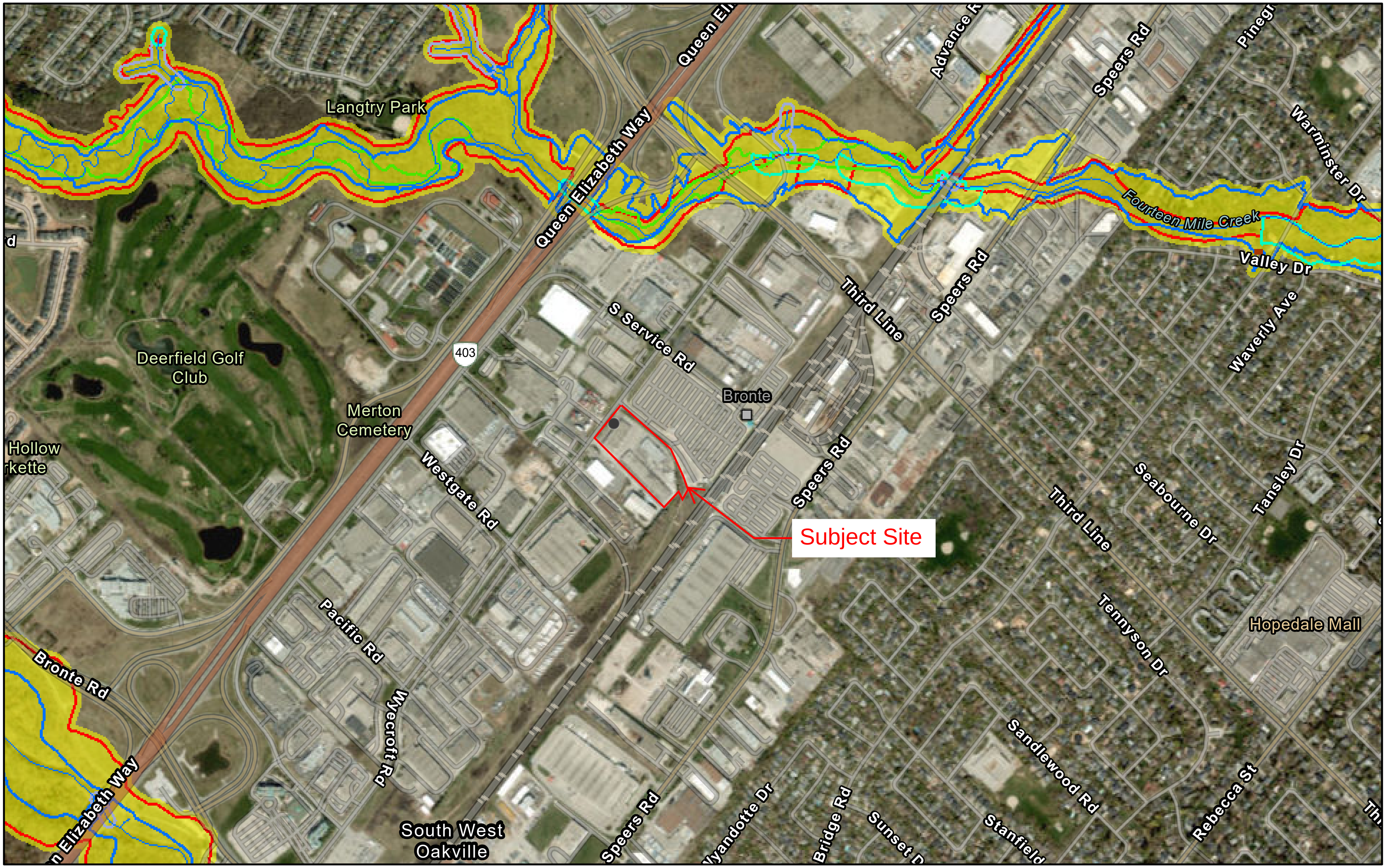
APPENDIX "D"

Watershed Map, Regulation Mapping & IDF Data



Conservation Halton
Conservation Halton Watershed Area
Legend
CH's Jurisdictional Boundary
Open Water
Watercourse
Niagara Escarpment
Municipal Boundary
Highway
CH's Watersheds
Appleby Creek
Beach Strip Area
Bronte Creek
Falcon Creek
Fourteen Mile Creek
Grindstone Creek
Indian Creek
Joshua's Creek
Lower Hager Creek
Lower Morrison Creek
Lower Rambo Creek
Lower Wedgewood Creek
McCraney Creek
North Cootes Paradise
Roseland Creek
Sheldon Creek
Shoreacres Creek
Sixteen Mile Creek
Tuck Creek
Upper Hager Creek
Upper Rambo Creek
West Aldershot
0 1 2 4 6 8 10
This mapping was produced by Conservation Halton and should be used for information purposes only. Data sources used in its production are of varying quality and accuracy and all boundaries should be considered approximate. Conservation Halton disclaims all responsibility for any and all mistakes or inaccuracies in the information and further disclaims all liability for loss or damage, which may result from the use of this information. This map is protected by copyright (© 2020) and may not be reproduced without written consent from Conservation Halton. Any copying, redistribution or republication the content thereof, for commercial gain is strictly prohibited.
Produced by Conservation Halton GISP.
TOWN OF HALTON HILLS
CITY OF BRAMPTON
TOWN OF MILTON
CITY OF MISSISSAUGA
TOWNSHIP OF PUSLINCH
TOWN OF OAKVILLE
CITY OF BURLINGTON
CITY OF HAMILTON
Sixteen Mile Creek
Scotch Block Reservoir
Hilton Falls Reservoir
Kelso Reservoir
Mountsberg Reservoir
Bronte Creek
Grindstone Creek
Lake Medad
Joshua's Creek
Lower Wedgewood Creek
Lower Morrison Creek
McCraney Creek
Fourteen Mile Creek
Sheldon Creek
Appleby Creek
Tuck Creek
Shoreacres Creek
Upper Rambo Creek
Roseland Creek
Upper Hager Creek
Indian Creek
Lower Rambo Creek
Lower Hager Creek
Falcon Creek
West Aldershot
Beach Strip Area
North Cootes Paradise
Cootes Paradise
Hamilton Harbour
Lake Ontario
HWY 401
HWY 407
HWY 403
HWY 6
QEW

Conservation Halton Regulation Mapping



15/07/2025, 14:46:35

- Approximate Regulation Limit
- Shoreline 100 year Flood Elevation Hazard
- Shoreline Dynamic Beach Hazard
- Shoreline Hazard
- Stable Top of Bank (STOB) Hazard
- Wetland Hazard
- Spill Zone Hazards
- Floodplain Hazard
- Headwater Floodplain Hazard
- Meander Belt Hazard
- Consult Conservation Halton
- Spill Arrows
- Spill Lines

Waterflow
- Non-Regulated
- Regulated
- Conservation Halton

1:18,056

0 0.1 0.2 0.4 mi

0 0.17 0.35 0.7 km

Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community, Conservation Halton, 2025,

Conservation Halton, 2023

Conservation Halton, 2023

Table 3.1 INTENSITY-DURATION-FREQUENCY VALUES

Duration (minutes)	**2 Year** <<<<<<<<	**5 Year** Rainfall	**10 Year** Intensity	**25 Year** (mm / hr)	**50 Year** >>>>>>>>	**100 Year** >>>>>>>>
5	117	164	194	233	262	291
10	80	108	126	149	166	183
15	65	90	107	129	145	160
30	41	58	69	83	93	103
60	25	35	41	48	54	60
120	15	20	23	27	30	33
360	6.1	8.1	9.4	11	12	13
720	3.6	4.6	5.3	6.2	6.8	7.5
1,440	2	2.5	2.9	3.4	3.7	4.1

* Values as recorded at " AES Toronto (Bloor Street) Gauge ".

Formulations for Rainfall Intensity (Based on above IDF Table values)

$$I_{2\ \text{year}} = 725 / (tc + 4.8)^{0.808}$$

$$I_{5\ \text{year}} = 1170 / (tc + 5.8)^{0.843}$$

$$I_{10\ \text{year}} = 1400 / (tc + 5.8)^{0.848}$$

$$I_{25\ \text{year}} = 1680 / (tc + 5.6)^{0.851}$$

$$I_{50\ \text{year}} = 1960 / (tc + 5.8)^{0.861}$$

$$I_{100\ \text{year}} = 2150 / (tc + 5.7)^{0.861}$$

APPENDIX "E"

Stormwater Quantity Control Calculations

VALDOR ENGINEERING INC.
File: 24123
July 2025

TABLE E1: SWM TANK #1 STORAGE AND DISCHARGE SUMMARY - BLOCK 'B' (TOWERS 'C' & 'D')

PROJECT: **2172 WYECROFT ROAD, CITY OF OAKVILLE**

AREA No.	DRAINAGE AREA (Ha)	5 YEAR HWL (m)	100 YEAR HWL (m)	ORIFICE					STORAGE		
									REQUIRED		AVAILABLE
				LOCATION	INVERT (m)	DIAMETER (mm)	5 YEAR RELEASE (L/s)	100 YEAR RELEASE (L/s)	5 YR (cu.m.)	100 YR (cu.m.)	(cu.m.)
TOWERS C & D	1.029	105.91	107.00	MH.3	104.89	250	168.7	251.2	54.7	111.4	114.2
TOTAL	**1.029**										
		Actual Release Rate (L/s)					**168.7**	**251.2**			
		Allowable Release Rate (L/s)					**278.9**	**278.9**			

VALDOR ENGINEERING INC.
File: 24123
July 2025

TABLE: E1-1

PROJECT: **2172 WYECROFT ROAD, CITY OF OAKVILLE**

PRE-DEVELOPMENT PEAK FLOW CALCULATION - BLOCK 'B' (TOWERS C & D)

Site Area = A = 2.362 Ha

COMPOSITE R CALCULATION	A	R	A*R
PERVIOUS	0.122	0.35	0.0427
IMPERVIOUS	1.395	0.90	1.2555
ROOF	0.845	0.85	0.7183
TOTAL	2.362	0.85	

5 Year Pre-Development Flow

I =1170 / (Tc+5.8)^0.843 where I = Rainfall Rate (mm/hr)

T = 10 minutes
I = 114.21 mm/hr
R = 0.85 (composite)
N = 2.78

Q = R x A x I x N 5 year Q = 640.3 L/s

5 year $Q_{PRO-RATE}$ = 278.9 L/s

100 Year Pre-Development Flow

I = 2150/ (Tc+5.7)^0.861 where I = Rainfall Rate (mm/hr)

T = 10 minutes
I = 200.80 mm/hr
R = 0.85 (composite)
N = 2.78

Q = R x A x I x N 100 year Q = 1125.6 L/s

100 year $Q_{PRO-RATE}$ = 490.4 L/s

VALDOR ENGINEERING INC.

File: 24123

July 2025

TABLE: E1-2

PROJECT: **2172 WYECROFT ROAD, CITY OF OAKVILLE**

POST-DEVELOPMENT PEAK FLOW CALCULATION - BLOCK 'B' (TOWERS C & D)

Area = A = 1.029 Ha

COMPOSITE R CALCULATION

	A	R	A*R
PERVIOUS	0.181	0.35	0.0634
IMPERVIOUS	0.355	0.90	0.3195
ROOF	0.493	0.85	0.4191
TOTAL	1.029	0.78	

5 Year Post-Development Flow

I =1170 / (Tc+5.8)^0.843 where I = Rainfall Rate (mm/hr)

T = 10 minutes
I = 114.2 mm/hr
R= 0.78 (composite)
N = 2.78

Q = R x A x I x N 5 year Q = 254.6 L/s

100 Year Post-Development Flow

I = 2150/ (Tc+5.7)^0.861 where I = Rainfall Rate (mm/hr)

T = 10 minutes
I = 200.8 mm/hr
R= 0.78 (composite)
N = 2.78

Q = R x A x I x N 100 year Q = 447.6 L/s

VALDOR ENGINEERING INC.
File: 24123
July 2025

TABLE: E1-3

CONTROL ORIFICE DESIGN - BLOCK 'B' (TOWERS C & D)
100 Year Storm

Orifice Pipe Location	=	MH.3		
Orifice Coefficient (C)	=	0.82	(Tube)	
Acceleration due to gravity (g)	=	9.81	(m/s/s)	
Orifice Invert	=	104.89	(m)	
High Water Level	=	107.00	(m)	100 Year
Orifice diameter	=	250	(mm)	
Cross section area of orifice (A)	=	0.0491	(sq.m.)	
Head (H)	=	1.99	(m)	
Actual Discharge (Q) (C x A x (2 x g x H)^0.5)	=	251.20	(L/s)	

VALDOR ENGINEERING INC.
File: 24123
July 2025

TABLE: E1-4

CONTROL ORIFICE DESIGN - BLOCK 'B' (TOWERS C & D)
5 Year Storm

Orifice Pipe Location	=	MH.3		
Orifice Coefficient (C)	=	0.82	(Tube)	
Acceleration due to gravity (g)	=	9.81	(m/s/s)	
Orifice Invert	=	104.89	(m)	
High Water Level	=	105.91	(m)	5 Year
Orifice diameter	=	250	(mm)	
Cross section area of orifice (A)	=	0.0491	(sq.m.)	
Head (H)	=	0.89	(m)	
Actual Discharge (Q) (C x A x (2 x g x H)^0.5)	=	168.67	(L/s)	

VALDOR ENGINEERING INC.
File: 24123
July 2025

TABLE: E1-5

Storage Volume Calculations - Rational Method - Block 'B' (Towers C & D)
100-year Storm - Oakville

PROJECT: 2172 WYECROFT ROAD, CITY OF OAKVILLE

Total Area (ha)	1.029
Composite Runoff Coefficient	0.78
Maximum Discharge Through Orifice (L/s)	251.2
Groundwater Discharge Rate (L/day) (from Hydrogeological Report)	40348
Groundwater Discharge (L/s)	0.5
Discharged Volume per 5 min Interval (cu.m)	75.4

Time (min)	Intensity (mm/hr)	Groundwater Discharge (cu.m)	Runoff Volume (cu.m)	Discharged Volume (cu.m)	Storage Volume (cu.m)
0	0.0	0.140	0.000	0.140	0.000
5	4.4	0.140	2.940	3.080	0.000
10	4.8	0.140	3.208	3.348	0.000
15	5.4	0.140	3.609	3.749	0.000
20	6.1	0.140	4.076	4.216	0.000
25	7.0	0.140	4.678	4.818	0.000
30	8.3	0.140	5.546	5.687	0.000
35	10.2	0.140	6.816	6.956	0.000
40	13.2	0.140	8.821	8.961	0.000
45	18.6	0.140	12.429	12.570	0.000
50	31.4	0.140	20.983	21.123	0.000
55	82.0	0.140	54.797	54.937	0.000
60	279.3	0.140	186.642	75.359	111.423
65	108.5	0.140	72.505	72.645	0.000
70	55.6	0.140	37.155	37.295	0.000
75	36.1	0.140	24.124	24.264	0.000
80	26.3	0.140	17.575	17.715	0.000
85	20.5	0.140	13.699	13.839	0.000
90	16.8	0.140	11.227	11.367	0.000
95	14.2	0.140	9.489	9.629	0.000
100	12.3	0.140	8.219	8.360	0.000
105	10.8	0.140	7.217	7.357	0.000
110	9.6	0.140	6.415	6.555	0.000
115	8.7	0.140	5.814	5.954	0.000
120	8.0	0.140	5.346	5.486	0.000
125	7.3	0.140	4.878	5.018	0.000
130	6.8	0.140	4.544	4.684	0.000
135	6.3	0.140	4.210	4.350	0.000
140	5.9	0.140	3.943	4.083	0.000
145	5.6	0.140	3.742	3.882	0.000
150	5.2	0.140	3.475	3.615	0.000
155	5.0	0.140	3.341	3.481	0.000
160	4.7	0.140	3.141	3.281	0.000
165	4.5	0.140	3.007	3.147	0.000
170	4.3	0.140	2.873	3.014	0.000
175	4.1	0.140	2.740	2.880	0.000
180	3.9	0.140	2.606	2.746	0.000

Total Storage Volume Required (cu.m) **111.4**

VALDOR ENGINEERING INC.

File: 24123

July 2025

TABLE: E1-6

Storage Volume Calculations - Rational Method - Block 'B' (Towers C & D)
5-year Storm - Oakville

PROJECT: 2172 WYECROFT ROAD, CITY OF OAKVILLE

Total Area (ha)	1.029
Composite Runoff Coefficient	0.78
Maximum Discharge Through Orifice (L/s)	168.7
Groundwater Discharge Rate (L/day) (from Hydrogeological Report)	40348
Groundwater Discharge (L/s)	0.5
Discharged Volume per 5 min Interval (cu.m)	50.6

Time (min)	Intensity (mm/hr)	Groundwater Discharge (cu.m)	Runoff Volume (cu.m)	Discharged Volume (cu.m)	Storage Volume (cu.m)
0	0.0	0.140	0.000	0.140	0.000
5	2.9	0.140	1.938	2.078	0.000
10	3.2	0.140	2.138	2.278	0.000
15	3.5	0.140	2.339	2.479	0.000
20	4.0	0.140	2.673	2.813	0.000
25	4.6	0.140	3.074	3.214	0.000
30	5.4	0.140	3.609	3.749	0.000
35	6.5	0.140	4.344	4.484	0.000
40	8.4	0.140	5.613	5.753	0.000
45	11.6	0.140	7.752	7.892	0.000
50	19.0	0.140	12.697	12.837	0.000
55	48.2	0.140	32.210	32.350	0.000
60	157.4	0.140	105.183	50.602	54.721
65	63.3	0.140	42.300	42.440	0.000
70	33.3	0.140	22.253	22.393	0.000
75	21.9	0.140	14.635	14.775	0.000
80	16.2	0.140	10.826	10.966	0.000
85	12.8	0.140	8.554	8.694	0.000
90	10.5	0.140	7.017	7.157	0.000
95	8.9	0.140	5.947	6.088	0.000
100	7.8	0.140	5.212	5.352	0.000
105	6.9	0.140	4.611	4.751	0.000
110	6.2	0.140	4.143	4.283	0.000
115	5.6	0.140	3.742	3.882	0.000
120	5.1	0.140	3.408	3.548	0.000
125	4.7	0.140	3.141	3.281	0.000
130	4.4	0.140	2.940	3.080	0.000
135	4.1	0.140	2.740	2.880	0.000
140	3.9	0.140	2.606	2.746	0.000
145	3.6	0.140	2.406	2.546	0.000
150	3.4	0.140	2.272	2.412	0.000
155	3.3	0.140	2.205	2.345	0.000
160	3.1	0.140	2.072	2.212	0.000
165	3.0	0.140	2.005	2.145	0.000
170	2.8	0.140	1.871	2.011	0.000
175	2.7	0.140	1.804	1.944	0.000
180	2.6	0.140	1.737	1.878	0.000

Total Storage Volume Required (cu.m) **54.7**

VALDOR ENGINEERING INC.
File: 24123
July 2025

TABLE: E1-7

100 YEAR AVAILABLE UNDERGROUND STORAGE
BLOCK 'B' (TOWERS C & D)

	AREA (sq.m.)	**TANK OUTLET** (m)	**HIGH WATER ELEVATION** (m)	**Storage Depth** (m)	**AVAILABLE STORAGE** (cu.m)
SWM TANK	54.1	104.89	107.00	2.11	114.2
SUB-TOTAL					**114.2**

STORAGE PROVIDED:	**114.2**

100 YEAR STORAGE REQUIRED:	**111.4**

VALDOR ENGINEERING INC.
File: 24123
July 2025

TABLE: E1-8

5 YEAR AVAILABLE UNDERGROUND STORAGE
BLOCK 'B' (TOWERS C & D)

	AREA (sq.m.)	**TANK OUTLET** (m)	**HIGH WATER ELEVATION** (m)	**Storage Depth** (m)	**AVAILABLE STORAGE** (cu.m)
SWM TANK	54.1	104.89	105.91	1.02	55.2
SUB-TOTAL					**55.2**

STORAGE PROVIDED:	**55.2**

5 YEAR STORAGE REQUIRED:	**54.7**

VALDOR ENGINEERING INC.
File: 24123
July 2025

TABLE E2: SWM TANK #2 STORAGE AND DISCHARGE SUMMARY - BLOCK 'A' (TOWERS 'A' & 'B')

PROJECT: **2172 WYECROFT ROAD, CITY OF OAKVILLE**

AREA No.	DRAINAGE AREA (Ha)	5 YEAR HWL (m)	100 YEAR HWL (m)	ORIFICE					STORAGE		
									REQUIRED		AVAILABLE
				LOCATION	INVERT (m)	DIAMETER (mm)	5 YEAR RELEASE (L/s)	100 YEAR RELEASE (L/s)	5 YR (cu.m.)	100 YR (cu.m.)	(cu.m.)
TOWERS A & B	0.936	106.45	107.20	MH.12	105.76	250	134.0	204.5	58.4	120.3	122.4
TOTAL	**0.936**										
		Actual Release Rate (L/s)					**134.0**	**204.5**			
		Allowable Release Rate (L/s)					**253.7**	**253.7**			

VALDOR ENGINEERING INC.
File: 24123
July 2025

TABLE: E2-1

PROJECT: **2172 WYECROFT ROAD, CITY OF OAKVILLE**

PRE-DEVELOPMENT PEAK FLOW CALCULATION - BLOCK 'A' (TOWERS A & B)

Site Area = A = 2.362 Ha

COMPOSITE R CALCULATION	A	R	A*R
PERVIOUS	0.122	0.35	0.0427
IMPERVIOUS	1.395	0.90	1.2555
ROOF	0.845	0.85	0.7183
TOTAL	2.362	0.85	

5 Year Pre-Development Flow

I =1170 / (Tc+5.8)^0.843 where I = Rainfall Rate (mm/hr)

T = 10 minutes
I = 114.21 mm/hr
R = 0.85
N = 2.78

Q = R x A x I x N 5 year Q = 640.3 L/s

5 year $Q_{PRO-RATE}$= 253.7 L/s

100 Year Pre-Development Flow

I = 2150/ (Tc+5.7)^0.861 where I = Rainfall Rate (mm/hr)

T = 10 minutes
I = 200.80 mm/hr
R = 0.85 0
N = 2.78

Q = R x A x I x N 100 year Q = 1125.6 L/s

100 year $Q_{PRO-RATE}$= 446.1 L/s

VALDOR ENGINEERING INC.
File: 24123
July 2025

TABLE: E2-2

PROJECT: **2172 WYECROFT ROAD, CITY OF OAKVILLE**

POST-DEVELOPMENT PEAK FLOW CALCULATION - BLOCK 'A' (TOWERS A & B)

Area = A = 0.936 Ha

COMPOSITE R CALCULATION

	A	R	A*R
PERVIOUS	0.110	0.35	0.0385
IMPERVIOUS	0.207	0.90	0.1863
ROOF	0.619	0.85	0.5262
TOTAL	0.936	0.80	

5 Year Post-Development Flow

I =1170 / (Tc+5.8)^0.843 where I = Rainfall Rate (mm/hr)

T = 10 minutes
I = 114.2 mm/hr
R= 0.80
N = 2.78

Q = R x A x I x N 5 year Q = 238.4 L/s

100 Year Post-Development Flow

I = 2150/ (Tc+5.7)^0.861 where I = Rainfall Rate (mm/hr)

T = 10 minutes
I = 200.8 mm/hr
R= 0.80 0
N = 2.78

Q = R x A x I x N 100 year Q = 419.2 L/s

VALDOR ENGINEERING INC.
File: 24123
July 2025

TABLE: E2-3

CONTROL ORIFICE DESIGN - BLOCK 'A' (TOWERS A & B)
100 Year Storm

Orifice Pipe Location	=	MH.12		
Orifice Coefficient (C)	=	0.82	(Tube)	
Acceleration due to gravity (g)	=	9.81	(m/s/s)	
Orifice Invert	=	105.76	(m)	
High Water Level	=	107.20	(m)	100 Year
Orifice diameter	=	250	(mm)	
Cross section area of orifice (A)	=	0.0491	(sq.m.)	
Head (H)	=	1.32	(m)	
Actual Discharge (Q) (C x A x (2 x g x H)^0.5)	=	204.45	(L/s)	

VALDOR ENGINEERING INC.
File: 24123
July 2025

TABLE: E2-4

CONTROL ORIFICE DESIGN - BLOCK 'A' (TOWERS A & B)
5 Year Storm

Orifice Pipe Location	=	MH.12		
Orifice Coefficient (C)	=	0.82	(Tube)	
Acceleration due to gravity (g)	=	9.81	(m/s/s)	
Orifice Invert	=	105.76	(m)	
High Water Level	=	106.45	(m)	5 Year
Orifice diameter	=	250	(mm)	
Cross section area of orifice (A)	=	0.0491	(sq.m.)	
Head (H)	=	0.56	(m)	
Actual Discharge (Q) (C x A x (2 x g x H)^0.5)	=	134.02	(L/s)	

VALDOR ENGINEERING INC.
File: 24123
July 2025

TABLE: E2-5

Storage Volume Calculations - Rational Method - Block 'A' (Towers A & B)
100-year Storm - Oakville

PROJECT: 2172 WYECROFT ROAD, CITY OF OAKVILLE

Total Area (ha)	0.936
Composite Runoff Coefficient	0.80
Maximum Discharge Through Orifice (L/s)	204.5
Groundwater Discharge Rate (L/day) (from Hydrogeological Report)	40348
Groundwater Discharge (L/s)	0.5
Discharged Volume per 5 min Interval (cu.m)	61.3

Time (min)	Intensity (mm/hr)	Groundwater Discharge (cu.m)	Runoff Volume (cu.m)	Discharged Volume (cu.m)	Storage Volume (cu.m)
0	0.0	0.140	0.000	0.140	0.000
5	4.4	0.140	2.753	2.894	0.000
10	4.8	0.140	3.004	3.144	0.000
15	5.4	0.140	3.379	3.519	0.000
20	6.1	0.140	3.817	3.957	0.000
25	7.0	0.140	4.381	4.521	0.000
30	8.3	0.140	5.194	5.334	0.000
35	10.2	0.140	6.383	6.523	0.000
40	13.2	0.140	8.260	8.401	0.000
45	18.6	0.140	11.640	11.780	0.000
50	31.4	0.140	19.650	19.790	0.000
55	82.0	0.140	51.315	51.455	0.000
60	279.3	0.140	174.784	61.336	113.587
65	108.5	0.140	67.898	61.336	6.702
70	55.6	0.140	34.794	34.934	0.000
75	36.1	0.140	22.591	22.731	0.000
80	26.3	0.140	16.458	16.598	0.000
85	20.5	0.140	12.829	12.969	0.000
90	16.8	0.140	10.513	10.653	0.000
95	14.2	0.140	8.886	9.026	0.000
100	12.3	0.140	7.697	7.837	0.000
105	10.8	0.140	6.759	6.899	0.000
110	9.6	0.140	6.008	6.148	0.000
115	8.7	0.140	5.444	5.584	0.000
120	8.0	0.140	5.006	5.146	0.000
125	7.3	0.140	4.568	4.708	0.000
130	6.8	0.140	4.255	4.395	0.000
135	6.3	0.140	3.942	4.083	0.000
140	5.9	0.140	3.692	3.832	0.000
145	5.6	0.140	3.504	3.645	0.000
150	5.2	0.140	3.254	3.394	0.000
155	5.0	0.140	3.129	3.269	0.000
160	4.7	0.140	2.941	3.081	0.000
165	4.5	0.140	2.816	2.956	0.000
170	4.3	0.140	2.691	2.831	0.000
175	4.1	0.140	2.566	2.706	0.000
180	3.9	0.140	2.441	2.581	0.000

Total Storage Volume Required (cu.m) **120.3**

VALDOR ENGINEERING INC.
File: 24123
July 2025

TABLE: E2-6

Storage Volume Calculations - Rational Method - Block 'A' (Towers A & B)
5-year Storm - Oakville

PROJECT: 2172 WYECROFT ROAD, CITY OF OAKVILLE

Total Area (ha)	0.936
Composite Runoff Coefficient	0.80
Maximum Discharge Through Orifice (L/s)	134.0
Groundwater Discharge Rate (L/day) (from Hydrogeological Report)	40348
Groundwater Discharge (L/s)	0.5
Discharged Volume per 5 min Interval (cu.m)	40.2

Time (min)	Intensity (mm/hr)	Groundwater Discharge (cu.m)	Runoff Volume (cu.m)	Discharged Volume (cu.m)	Storage Volume (cu.m)
0	0.0	0.140	0.000	0.140	0.000
5	2.9	0.140	1.815	1.955	0.000
10	3.2	0.140	2.003	2.143	0.000
15	3.5	0.140	2.190	2.330	0.000
20	4.0	0.140	2.503	2.643	0.000
25	4.6	0.140	2.879	3.019	0.000
30	5.4	0.140	3.379	3.519	0.000
35	6.5	0.140	4.068	4.208	0.000
40	8.4	0.140	5.257	5.397	0.000
45	11.6	0.140	7.259	7.399	0.000
50	19.0	0.140	11.890	12.030	0.000
55	48.2	0.140	30.163	30.303	0.000
60	157.4	0.140	98.500	40.205	58.435
65	63.3	0.140	39.613	39.753	0.000
70	33.3	0.140	20.839	20.979	0.000
75	21.9	0.140	13.705	13.845	0.000
80	16.2	0.140	10.138	10.278	0.000
85	12.8	0.140	8.010	8.150	0.000
90	10.5	0.140	6.571	6.711	0.000
95	8.9	0.140	5.570	5.710	0.000
100	7.8	0.140	4.881	5.021	0.000
105	6.9	0.140	4.318	4.458	0.000
110	6.2	0.140	3.880	4.020	0.000
115	5.6	0.140	3.504	3.645	0.000
120	5.1	0.140	3.192	3.332	0.000
125	4.7	0.140	2.941	3.081	0.000
130	4.4	0.140	2.753	2.894	0.000
135	4.1	0.140	2.566	2.706	0.000
140	3.9	0.140	2.441	2.581	0.000
145	3.6	0.140	2.253	2.393	0.000
150	3.4	0.140	2.128	2.268	0.000
155	3.3	0.140	2.065	2.205	0.000
160	3.1	0.140	1.940	2.080	0.000
165	3.0	0.140	1.877	2.017	0.000
170	2.8	0.140	1.752	1.892	0.000
175	2.7	0.140	1.690	1.830	0.000
180	2.6	0.140	1.627	1.767	0.000

Total Storage Volume Required (cu.m) **58.4**

VALDOR ENGINEERING INC.
File: 24123
July 2025

TABLE: E2-7

100 YEAR AVAILABLE UNDERGROUND STORAGE
BLOCK 'A' (TOWERS A & B)

	AREA (sq.m.)	TANK OUTLET (m)	HIGH WATER ELEVATION (m)	Storage Depth (m)	AVAILABLE STORAGE (cu.m)
SWM TANK	85	105.76	107.20	1.44	122.4
SUB-TOTAL					**122.4**

STORAGE PROVIDED:	**122.4**

100 YEAR STORAGE REQUIRED:	**120.3**

TABLE: E2-8

5 YEAR AVAILABLE UNDERGROUND STORAGE
BLOCK 'A' (TOWERS A & B)

	AREA (sq.m.)	**TANK OUTLET** (m)	**HIGH WATER ELEVATION** (m)	**Storage Depth** (m)	**AVAILABLE STORAGE** (cu.m)
SWM TANK	85	105.76	106.45	0.69	58.6
SUB-TOTAL					**58.6**

STORAGE PROVIDED:	**58.6**

5 YEAR STORAGE REQUIRED:	**58.4**

VALDOR ENGINEERING INC.
File: 24123
July 2025

Project: 2172 WYECROFT ROAD, CITY OF OAKVILLE

TABLE E3: PROPOSED STREET 'A' & 'B' FLOWS

DRAINAGE CONDITION	**5 YEAR FLOW** (L/s)	**10 YEAR FLOW** (L/s)	**25 YEAR FLOW** (L/s)	**50 YEAR FLOW** (L/s)	**100 YEAR FLOW** (L/s)
PRE-DEVELOPMENT	107.6	127.0	152.8	171.5	189.2
POST-DEVELOPMENT	98.6	116.4	140.0	157.2	173.4

VALDOR ENGINEERING INC.
File: 24123
July 2025

TABLE E3-1

PROJECT: **2172 WYECROFT ROAD, CITY OF OAKVILLE**

PRE-DEVELOPMENT PEAK FLOW CALCULATION (STREET 'A' & 'B')

	Area (A)	R
Rooftop	0.845	0.85
Pervious Area	0.122	0.35
Impervious Area	1.395	0.90
Total Area:	2.362	0.85

5 Year Pre-Development Flow

I = 1170/((T+5.8)^0.843) where I = Rainfall Rate (mm/hr)

I = Rainfall Rate (mm/hr)

T = 10 minutes
I = 114.2 mm/hr
5 yr R = 0.85 (composite)
N = 2.78

Q = R x A x I x N

5 year Q = 640.3 L/s
5 year $Q_{PRO-RATE}$ = 107.6 L/s

10 Year Pre-Development Flow

I = 1170/((T+5.8)^0.843) where I = Rainfall Rate (mm/hr)

I = Rainfall Rate (mm/hr)

T = 10 minutes
I = 134.8 mm/hr
5 yr R = 0.85 (composite)
N = 2.78

Q = R x A x I x N

10 year Q = 755.6 L/s
10 year $Q_{PRO-RATE}$ = 127.0 L/s

25 Year Pre-Development Flow

I = 1170/((T+5.8)^0.843) where I = Rainfall Rate (mm/hr)

I = Rainfall Rate (mm/hr)

T = 10 minutes
I = 162.2 mm/hr
5 yr R = 0.85 (composite)
N = 2.78

Q = R x A x I x N

25 year Q = 909.1 L/s
25 year $Q_{PRO-RATE}$ = 152.8 L/s

50 Year Pre-Development Flow

I = 1170/((T+5.8)^0.843) where I = Rainfall Rate (mm/hr)

I = Rainfall Rate (mm/hr)

T = 10 minutes
I = 182.1 mm/hr
5 yr R = 0.85 (composite)
N = 2.78

Q = R x A x I x N

50 year Q = 1020.6 L/s
50 year $Q_{PRO-RATE}$ = 171.5 L/s

100 Year Pre-Development Flow

I = 2150/((T+5.7)^0.861) where I = Rainfall Rate (mm/hr)

I = Rainfall Rate (mm/hr)

T = 10 minutes
I = 200.8 mm/hr
100 yr R = 0.85
N = 2.78

Q = R x A x I x N

100 year Q = 1125.6 L/s
100 year $Q_{PRO-RATE}$ = 189.2 L/s

TABLE E3-2

PROJECT: **2172 WYECROFT ROAD, CITY OF OAKVILLE**

POST-DEVELOPMENT PEAK FLOW CALCULATION
(STREET 'A' & 'B')

	Area (A)	R
Rooftop	0.000	0.85
Pervious Area	0.085	0.35
Impervious Area	0.312	0.90
Total Area:	0.397	0.78

5 Year Pre-Development Flow

I = 1170/((T+5.8)^0.843) where I = Rainfall Rate (mm/hr)

I = Rainfall Rate (mm/hr)

T = 10 minutes
I = 114.2 mm/hr
5 yr R = 0.78 (composite)
N = 2.78

Q = R x A x I x N **5 year Q = 98.6 L/s**

10 Year Pre-Development Flow

I = 1170/((T+5.8)^0.843) where I = Rainfall Rate (mm/hr)

I = Rainfall Rate (mm/hr)

T = 10 minutes
I = 134.8 mm/hr
5 yr R = 0.78 (composite)
N = 2.78

Q = R x A x I x N **10 year Q = 116.4 L/s**

25 Year Pre-Development Flow

I = 1170/((T+5.8)^0.843) where I = Rainfall Rate (mm/hr)

I = Rainfall Rate (mm/hr)

T = 10 minutes
I = 162.2 mm/hr
5 yr R = 0.78 (composite)
N = 2.78

Q = R x A x I x N **25 year Q = 140.0 L/s**

50 Year Pre-Development Flow

I = 1170/((T+5.8)^0.843) where I = Rainfall Rate (mm/hr)

I = Rainfall Rate (mm/hr)

T = 10 minutes
I = 182.1 mm/hr
5 yr R = 0.78 (composite)
N = 2.78

Q = R x A x I x N **50 year Q = 157.2 L/s**

100 Year Pre-Development Flow

I = 2150/((T+5.7)^0.861) where I = Rainfall Rate (mm/hr)

I = Rainfall Rate (mm/hr)

T = 10 minutes
I = 200.8 mm/hr
100 yr R = 0.78
N = 2.78

Q = R x A x I x N
100 year Q = 173.4 L/s

Consultant:

VALDOR ENGINEERING INC.

571 Chrislea Road, Unit 4, 2nd Floor, Woodbridge, Ontario, L4L 8A2
Tel: 905-264-0054 Fax: 905-264-0069 info@valdor-engineering.com

City of Peterborough
Engineering and Public Works Department
S T O R M S E W E R D E S I G N S H E E T

TABLE E4

Design: A.McKeracher, B.Eng.
Checked: D. Giugovaz, P.Eng
Approved: D. Giugovaz, P.Eng
Date: July, 2025

Project Name: Proposed Mixed-use Development
Project No: 24123

5 year IDF Curve: I=1170/(T+5.8)^0.843

Street	FROM MH	TO MH	A (ha)	R	A x R	Accum. A x R	Tc (min)	5 Year I (mm/hr)	5yr Design Flow Qd (m^3/s)	Size of Pipe (mm)	Grade (%)	Nominal Capacity Qc (m^3/s)	Full Flow Velocity (m/s)	Length (m)	Time in Sect. (min)	Total Time (min)	Qd / Qc	Remarks
STREET "A"	CB.8	MH.14	0.008	0.90	0.007	0.007	10.0	114.2	0.00	250	2.00	0.084	1.73	5.6	0.054	10.1	3%	
STREET "A"	CB.7	MH.14	0.015	0.73	0.011	0.011	10.0	114.2	0.00	250	2.00	0.084	1.73	7.5	0.072	10.1	4%	
STREET "A"	MH.14	MH.13	0.000	0.00	0.000	0.018	10.1	113.8	0.01	300	0.50	0.068	0.98	88.8	1.514	11.6	8%	
STREET "A"	CB.6	MH.13	0.080	0.88	0.070	0.070	10.0	114.2	0.02	250	2.00	0.084	1.73	2.6	0.025	10.0	27%	
STREET "A"	CB.5	MH.13	0.119	0.81	0.096	0.096	10.0	114.2	0.03	250	2.00	0.084	1.73	5.5	0.053	10.1	36%	
STREET "A"	MH.13	MH.10	0.000	0.00	0.000	0.185	11.6	105.4	0.05	300	0.50	0.068	0.98	2.0	0.034	11.6	79%	
TOWERS 'A' & 'B'	STM TANK.2	OGS MH.12	0.000	0.00	0.000	0.000	10.0	114.2	0.05	250	2.00	0.084	1.73	1.7	0.016	10.0	62%	Proposed Orifice #2
TOWERS 'A' & 'B'	OGS MH.12	CTRL MH.11	0.000	0.00	0.000	0.000	10.0	114.1	0.05	250	2.00	0.084	1.73	1.0	0.010	10.0	62%	
TOWERS 'A' & 'B'	CTRL MH.11	MH.10	0.000	0.00	0.000	0.000	10.0	114.1	0.05	300	0.50	0.068	0.98	11.5	0.196	10.2	76%	
STREET "A"	MH10	MH.7	0.000	0.00	0.000	0.185	11.6	105.2	0.11	450	0.50	0.202	1.28	16.4	0.214	11.8	53%	
STREET "B"	CB.2	MH.9	0.043	0.74	0.032	0.032	10.0	114.2	0.06	250	2.00	0.084	1.73	5.1	0.049	10.0	74%	
STREET "B"	CB.1	MH.9	0.044	0.74	0.033	0.033	10.0	114.2	0.01	250	2.00	0.084	1.73	7.3	0.070	10.1	12%	
STREET "B"	MH.9	MH.8	0.000	0.00	0.000	0.064	10.1	113.8	0.02	300	1.30	0.110	1.58	37.5	0.396	10.5	18%	
STREET "B"	CB.4	MH.8	0.044	0.75	0.033	0.033	10.0	114.2	0.01	250	2.00	0.084	1.73	2.5	0.024	10.0	12%	
STREET "B"	CB.3	MH.8	0.044	0.74	0.033	0.033	10.0	114.2	0.01	250	2.00	0.084	1.73	5.5	0.053	10.1	12%	
STREET "B"	MH.8	MH.7	0.000	0.00	0.000	0.130	10.5	111.4	0.04	300	0.50	0.068	0.98	18.7	0.319	10.8	59%	
PRIVATE ROAD	MH.7	MH.6	0.000	0.00	0.000	0.315	11.8	104.1	0.14	450	0.50	0.202	1.28	11.4	0.148	12.0	71%	
PRIVATE ROAD	MH.6	MH.5	0.000	0.00	0.000	0.315	12.0	103.4	0.14	450	0.50	0.202	1.28	49.8	0.648	12.6	71%	
PRIVATE ROAD	MH.5	OGS MH.4	0.000	0.00	0.000	0.315	12.6	100.3	0.14	450	0.50	0.202	1.28	27.7	0.360	13.0	69%	
PRIVATE ROAD	OGS MH.4	MH.1	0.000	0.00	0.000	0.315	13.0	98.7	0.14	450	0.50	0.202	1.28	6.6	0.086	13.1	69%	
TOWERS 'C' & 'D'	STM TANK.1	OGS MH.3	0.000	0.00	0.000	0.000	10.0	114.2	0.11	250	2.00	0.084	1.73	1.0	0.010	10.0	132%	Proposed Orifice #1
TOWERS 'C' & 'D'	OGS MH.3	CTRL MH.2	0.000	0.00	0.000	0.000	10.0	114.2	0.11	375	2.00	0.248	2.27	1.0	0.007	10.0	45%	
TOWERS 'C' & 'D'	CTRL MH.2	MH.1	0.000	0.00	0.000	0.000	10.0	114.1	0.11	450	0.50	0.202	1.28	20.1	0.262	10.3	55%	
PRIVATE ROAD	MH.1	HEADWALL	0.000	0.00	0.000	0.315	13.1	98.3	0.25	450	2.00	0.403	2.56	2.0	0.013	13.1	62%	Proposed Storm Outfall

RUNOFF COEFFICIENTS (R)

0.70 : SINGLE RESIDENTIAL (DETACHED)
0.75 : MEDIUM DENSITY (TOWNHOUSES)
0.85 : HIGH DENSITY (CONDO/HIGH RISE)
0.90 : INDUSTRIAL AND COMMERCIAL
0.75 : INSTITUTIONAL
0.35 : PARKS

No.	REVISION	DATE	AUTH

City of Peterborough
Engineering and Public Works Department

STORM SEWER DESIGN SHEET

SCALE:	N.T.S.		DATE: JULY 2025
DRAWN BY:	A.M		DWG. No. 1

Memo

To: David Sajecki, Sajecki Planning

From: Ron Scheckenberger and Patrick MacDonald

Date: August 20, 2020

File: TPB196008

Re: **Bronte GO MTSA Stormwater Management Functional Servicing Study, Town of Oakville**

1. INTRODUCTION

This stormwater management (SWM) functional servicing study has been undertaken to evaluate the impact of the proposed redevelopment of the area surrounding the existing Bronte Go Station in the Town of Oakville proposed to be a major transit centre and thereby establish the influence on the existing stormwater infrastructure, and from this advance a framework for future stormwater management. The total drainage area, including external drainage areas of 203 ha (+/-), has multiple outlets to the existing Town of Oakville storm sewer system and also directly discharges to the Fourteen Mile Creek. The existing land uses of the study area of 148.3 ha (+/-) (ref. Figure 1) include commercial, industrial and employment areas which have been proposed to be converted to mixed use, employment lands, and parks in the vicinity of the Bronte Go Station.

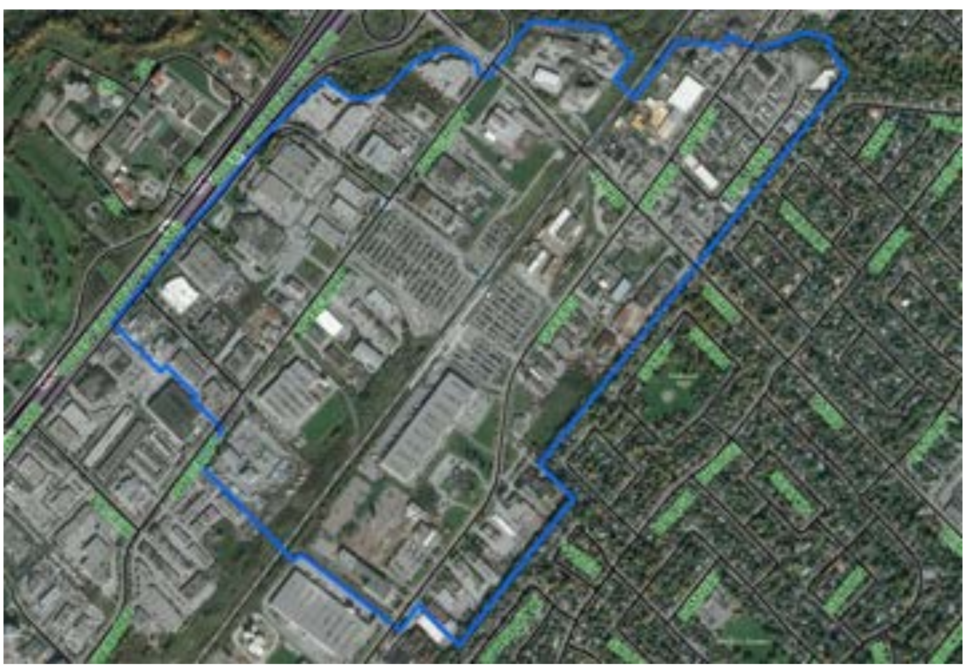


Figure 1 - Study Area Location Plan

Table 3.3. Outlet Summary for the Drainage Networks withing the Study Area

Outlet Name	Contributing Drainage Area (ha)	Imperv. (%)	Outlet Description
A	30.92	80.34	Inlet to storm sewer system from an open channel, north of Speers Road at the western limit of the study area.
B	5.57	77.82	Storm sewer manhole on Speers Road approximately 200 m (+/-) from the western limit of the study area; the storm sewer is conveyed west to Bronte Creek.
AB	42.59	79.71	The confluence of drainage areas A and B on Speers Road at the western limit of the study area; the storm sewer is conveyed west to Bronte Creek. The reported peak flow rates for this outlet is a combination of the major and minor system.
C	64.52	46.90	Two (2) outfalls for the storm sewer conveyed easterly on Wyecroft Road; one (1) outfall is located on the west side of the Third Line Bridge over Fourteen Mile Creek, one (1) outfall is located on the east side of the Third Line Bridge over Fourteen Mile Creek. A major system outlet has not been identified for this network.
D	2.17	92.66	The runoff from the drainage area is conveyed directly to Fourteen Mile Creek; storm sewer infrastructure has not been provided for this location.
E	44.68	75.13	Storm sewer manhole in an easement between Speers Road and Wyandotte Drive, near the south western limit of the study. A small swale is also assumed to be located at this outlet. The storm sewer is conveyed south to Bronte Creek. The reported peak flow rates for this outlet is a combination of the major and minor system. There is a split in the minor system for this network with the secondary outlet conveyed to network G.
F	6.12	71.24	The storm sewer is conveyed northerly on Third Line to the outfall on the east side of the Third Line bridge over Fourteen Mile Creek.
G	3.54	74.03	Storm sewer manhole in an easement between Speers Road and Vyner Crescent, west of Trafford Crescent. A small swale is also assumed to be located at this outlet. The storm sewer is conveyed south to Bronte Creek. The reported peak flow rates for this outlet is a combination of the major and minor system.
H	23.82	80.59	Storm sewer outfall on Speers Road at Fourteen Mile Creek at the eastern limit of the study area. A spill from the road to the creek is anticipated at this outlet and as such the reported peak flow rates for this outlet is a combination of the major and minor system.
I	5.87	73.51	The runoff from the drainage area is conveyed directly to Fourteen Mile Creek; storm sewer infrastructure has not been provided for this location.

Outlet Name	Contributing Drainage Area (ha)	Imperv. (%)	Outlet Description
J	3.46	71.26	Storm sewer manhole in the rear yard of the residential area at Swan Drive and Saxon Road, conveyed south to Rebecca Street and to Fourteen Mile Creek.
K	3.53	74.34	Storm sewer manhole on Third Line, South of Speers Road, conveyed south to Rebecca Street and to Fourteen Mile Creek.
L	6.23	80.18	Storm sewer outfall on Wallace Road at Fourteen Mile Creek at the eastern limit of the study area. A spill from the road to the creek is anticipated at this outlet and as such the reported peak flow rates for this outlet is a combination of the major and minor system.
M	1.39	61.31	The runoff from the drainage area is conveyed directly to Fourteen Mile Creek; storm sewer infrastructure has not been provided for this location.
N	1.39	70.83	The runoff from the drainage area is conveyed directly to Fourteen Mile Creek; storm sewer infrastructure has not been provided for this location.

As noted in Table 3.3, there are fourteen (14) drainage networks that correspond to the fourteen (14) identified outlets, however, an additional outlet has been added for the assessment, outlet AB. This outlet is located at a confluence downstream of the outlets A and B for drainage networks A and B. Outlet AB and has been added to demonstrate the impacts to the flow conveyance of the existing and future conditions scenarios. Furthermore, an external drainage area is conveyed to this outlet and has been accounted for in the reported peak flow rates, however the external area is not conveyed through the study area.

Four (4) networks, Networks I, M, and N, are located adjacent to Fourteen Mile Creek and have been assumed to convey runoff directly to Fourteen Mile Creek as existing storm sewer infrastructure has not been provided for these networks. Drawings depicting Network D indicate that the storm runoff from the network is routed to Fourteen Mile Creek (ref. Ander Engineering and Associates Limited, January 1980).

The peak flow rates at five (5) of the outlets, AB, E, G, H, and L, have been calculated and reported as a combination of the major and minor system while the peak flow rates conveyed to the remaining nine (9) outlets have been reported as the individual major or minor systems. This has been done as the runoff is conveyed to both systems and the peak flow rates would not be an accurate account if only one of the systems were used. Additionally, tailwater conditions due to capacity constraints of downstream pipes at the outlets of the study area have been identified in the Stormwater Master Plan which cause the storm sewers to surcharge. Surcharging of the storm sewers is anticipated to occur and would induce greater flow conveyed to the major system where a major system has been identified.

3.5 Existing Conditions Hydrologic Results

The existing conditions modelling has been used to generate target peak flow rates at the respective drainage outlets. The hydrologic analyses have applied the town's 2-100 year 24 Hr Chicago design storm events. The total outlet peak flow rates from each corresponding network to their identified outlet is presented in Table 3.4.

deficiencies. These deficiencies in the study area or downstream of the outlets should not be worsened due to the impact of the proposed redevelopment within the study area; as noted for the minor system, the town may also consider over-control in selected networks to reduce or eliminate off-site issues through re-development.

5.3 Level of Risk

The Stormwater Master Plan PCSWMM modelling results for the 5 year and 100 year piped minor system and the 100 year major system were reviewed to establish criteria and categories for corresponding level of risk for the drainage systems within the focus area. Table 5.1 summarizes the levels of risk.

Table 5.1. Level of Risk Established in the Stormwater Master Plan

Level of Risk	Criteria
High	Flooding to private property from the storm sewers through basement or foundation drain connections
Medium	Overland flooding of private property due to flooded roadways
Low	Storm sewers surcharging to the surface where there are no basement or foundation drain connections

Based on the foregoing performance criteria and the level of risk criteria, areas with basement connected storm sewers with performance deficiencies pose the greatest risk to the directly connected private properties. Recommendations in the Stormwater Master Plan included prioritizing the areas with these deficiencies for mitigation. As such, impacts from the proposed redevelopment to the storm sewer systems with direct lateral connections have been prioritized to ensure they meet or exceed the existing conditions based on the peak flow rates conveyed to the study area outlets.

6. PROPOSED CONDITIONS WITH STORMWATER MANAGEMENT

6.1 Recommendations from Stormwater Master Plan

The Stormwater Master Plan provided a prioritized set of short term and long term works to provide improvements to overall system performance. The alternative assessment combined “grey” and “green” solutions to be tailored to the specific conditions and requirements of each network. Grey infrastructure solutions focused on solutions to mitigate the existing drainage system deficiencies. The grey infrastructure solutions included the following combination of system improvements:

- Inlet control devices
- Upsizing storm sewers
- Online/Offline storage facilities
- Piped Diversions
- Reprofiling roadways

While not specifically identified in the Stormwater Master Plan, another solution for mitigating drainage system performance would be to overcontrol runoff through upstream quantity SWM facilities in redeveloping areas. Downstream receivers would benefit especially where the downstream storm sewers have been identified to have conveyance capacity constraints, such as those beyond the Bronte GO MTSA study area.

The Stormwater Master Plan recommended implementing source controls through green infrastructure for all public lands (roadway reconstructions) and private future re-development to mitigate the impacts due to climate change and intensification. The implementation of source controls, such as Low Impact Development Best Management Practices (LID BMPs), can promote infiltration and reduce runoff conveyed to the municipal storm sewer system. LID BMPs have been recommended to capture 25 mm of precipitation and be implemented for reconstructed streets (public) and urbanizing land (private) to maintain “existing” flood risk (LOS) for storm sewers. In addition to addressing the impacts due to climate change and intensification, the Stormwater Master Plan recommended as part of the town’s water quality management plan that source controls and other best practices be used to remediate current and future impacts to stormwater runoff water quality. This would also include the town’s roadways at the time of re-construction. Larger redevelopment blocks (> 5ha) would typically be able to support stand-alone stormwater management facilities, whereas smaller re-development parcels, including individual lots would typically be required to provide a suite of best practices or a treatment train approach to improve site runoff water quality.

6.2 On-site and Off-site Capacity Constraints

The Stormwater Master Plan has been reviewed to identify the on-site and off-site capacity constraints from the study area and summarized in Table 6.1 and shown graphically on Drawing 3.

Table 6.1. On-site and Off-Site Capacity Constraint Summary

Outlet	On-site and Off-site Capacity Constraints
A, B, AB	The Speers Road storm sewer has been identified for upgrades in the Stormwater Master Plan to mitigate the major system flood risk during the 100 year storm event.
C	The storm sewer outlets to Fourteen Mile Creek; the 5 year design storm water surface elevation in the creek is greater than the outfall invert elevation.
D	No constraints as it has been assumed the surface runoff is conveyed to Fourteen Mile Creek and infrastructure has not been identified.
E	The Wyandotte Drive storm sewer and downstream storm sewers have been identified for upgrades in the Stormwater Master Plan to mitigate minor system surcharging during the 5 and 100 year events in basement connected areas. The storm sewers in the vicinity of 2189 Speers Road, within Network E, have been identified for upgrades.
F	The storm sewer outlets to Fourteen Mile Creek; the 5 year design storm water surface elevation in the creek is greater than the outfall invert elevation.
G	The Vyner Crescent storm sewer and downstream storm sewers have been identified for upgrades in the Stormwater Master Plan to mitigate minor system surcharging during the 5 and 100 year events in basement connected areas.
H	The storm sewer outlets to Fourteen Mile Creek; the 5 year design storm water surface elevation in the creek is greater than the outfall invert elevation.
I	No constraints as it has been assumed the surface runoff is conveyed to Fourteen Mile Creek and infrastructure has not been identified.
J	The storm sewer outlets to Swann Drive; no capacity constraints have been identified immediately downstream of the outlet.
K	The Third Line storm sewer within Network K and downstream storm sewers have been identified for upgrades in the Stormwater Master Plan to mitigate minor system surcharging during the 5 and 100 year events in basement connected areas.

Outlet	On-site and Off-site Capacity Constraints
L	The Wallace Road storm sewer within Network L has been identified for upgrades in the Stormwater Master Plan to mitigate the major system flood risk during the 100 year storm event.
M	No constraints as it has been assumed the surface runoff is conveyed to Fourteen Mile Creek and infrastructure has not been identified.
N	No constraints as it has been assumed the surface runoff is conveyed to Fourteen Mile Creek and infrastructure has not been identified.

The capacity constraints to the storm sewers with basement connections were prioritized for mitigation in the Stormwater Master Plan (Wood, June 2020). This includes the storm sewers which receive drainage from outlets E, G, and K noted in Table 6.1. The identified capacity constraints have been used to guide the application of SWM quantity control for the proposed conditions scenario.

6.3 25 mm Source Control Results

The application of 25 mm source controls to the redeveloping area per the Stormwater Master Plan has been simulated in the PCSWMM model for the study area to provide both a water quality and quantity benefit. The source controls have only been applied to the subcatchments within the study area and not the downstream drainage areas. The resulting peak flow rates from each outlet have been summed and presented in Table 6.2. The difference between the existing conditions and proposed conditions with source control peak flow rates are provided in Table 6.3.

Table 6.2. Proposed Conditions with 25 mm Source Controls Peak Flow Rates (m^3/s)

Outlet	Storm Event Return Period (Year)					
	2	5	10	25	50	100
A	1.09	2.64	3.44	5.13	5.56	5.97
B	0.59	2.19	2.81	3.51	3.98	4.44
AB	2.59	4.87	6.28	8.26	9.58	7.22
C	1.18	2.62	3.27	4.86	5.72	6.50
D	0.16	0.54	0.82	1.11	1.28	1.44
E	2.20	3.76	4.27	4.80	5.13	5.46
F	0.18	0.37	0.46	0.57	0.60	0.71
G	0.67	2.49	2.80	3.12	3.28	3.41
H	1.23	2.35	2.89	3.32	3.69	4.11
I	1.14	1.68	2.03	2.50	2.84	3.17
J	0.22	0.80	1.03	1.29	1.47	1.65
K	0.26	0.97	1.29	1.70	1.97	2.23
L	0.20	0.47	0.65	0.89	0.90	0.91
M	0.09	0.32	0.46	0.60	0.68	0.76
N	0.09	0.34	0.48	0.61	0.69	0.77

Table 6.3. Difference Between the Existing Conditions and Proposed Conditions with 25 mm Source Controls Peak Flow Rates

Outlet	Storm Event Return Period (Year)											
	2		5		10		25		50		100	
	(m^3/s)	(%)	(m^3/s)	(%)	(m^3/s)	(%)	(m^3/s)	(%)	(m^3/s)	(%)	(m^3/s)	(%)
A	-1.98	-64.5	-1.78	-40.2	-1.82	-34.6	-0.64	-11.1	-0.61	-9.8	-0.53	-8.2
B	-0.55	-48.4	+0.52	+31.5	+0.82	+40.8	+1.07	+43.7	+1.23	+44.6	+1.38	+45.3
AB	-2.20	-45.9	-1.50	-23.6	-0.83	-11.7	-0.26	-3.0	-0.20	-2.0	-4.26	-37.1
C	-2.51	-68.1	-2.58	-49.6	-2.74	-45.6	-2.14	-30.6	-1.85	-24.4	-1.57	-19.4
D	-0.30	-64.7	-0.12	-18.0	+0.03	+4.3	+0.15	+15.9	+0.20	+18.7	+0.25	+20.6
E	-1.50	-40.7	-0.40	-9.5	-0.10	-2.3	-0.54	-10.2	-0.33	-6.1	-0.48	-8.1
F	-0.12	-40.9	-0.21	-36.3	-0.24	-34.3	-0.29	-33.9	-0.57	-48.9	-0.49	-40.9
G	-1.74	-72.4	-0.11	-4.1	+0.28	+11.3	0.00	+0.1	+0.05	+1.5	+0.05	+1.5
H	-1.19	-49.4	-0.57	-19.6	-0.39	-12.0	-0.42	-11.3	-0.34	-8.5	-0.18	-4.2
I	+0.10	+9.4	+0.14	+8.9	+0.16	+8.4	+0.18	+7.9	+0.20	+7.7	+0.22	+7.4
J	-0.45	-67.2	-0.19	-19.6	-0.18	-14.8	-0.19	-13.0	-0.21	-12.3	-0.22	-11.6
K	-0.54	-68.0	-0.23	-19.2	-0.18	-12.0	-0.12	-6.6	-0.10	-4.7	-0.07	-3.2
L	-0.30	-60.2	-0.31	-39.9	-0.24	-27.5	-0.02	-2.1	-0.01	-0.7	-0.05	-5.2
M	-0.13	-59.9	-0.01	-4.2	+0.05	+12.5	+0.08	+16.0	+0.09	+15.5	+0.09	+14.2
N	-0.16	-64.3	-0.04	-11.2	+0.02	+3.5	+0.04	+7.0	+0.04	+6.9	+0.05	+6.2

The application of 25 mm source controls would mitigate the peak flow rate increases due to the proposed conditions increased imperviousness and or drainage area for outlets F, H and L. While the peak flow rates for the outlets B, D, G, I, M, and N have been reduced, they would not be fully mitigated to meet the existing conditions peak flow rates. The networks contributing to these outlets thereby would require further quantity control to offset the impacts due to proposed conditions.

6.4 Proposed SWM Quantity Control Facilities

Additional analyses have been completed to determine the approximate volume (size) of stormwater management facilities required to provide post-to-pre control at the locations with anticipated increases in peak flow rates. For this assessment, routing elements representing six (6) individual SWM facilities have been added to the proposed conditions model with SWM and 25 mm source controls scenario (SWM scenario). The storage-discharge relationship for the respective SWM facilities has been iteratively modified until satisfactory post-to-pre control has been achieved at the respective outlets. The proposed SWM facility locations are depicted on Drawing 3 and summarized in Table 6.4.

For the purpose of this assessment, the SWM quantity control locations have been established as subsurface storage facilities to coincide with the existing storm water infrastructure elevations. Through this approach, the available developable area in the Bronte GO MTSA would not be impacted, especially if the storage facilities are constructed in proposed parks, where they are less likely to interfere with other subsurface utilities. Additionally, if they are constructed within the proposed parks, the subsurface storage facilities can be centralized for the contributing drainage area and serve a greater number of properties including private and public properties such as the municipal ROW. This would also alleviate the requirement for individual property owners to provide on-site detention such as roof top storage or parking lot storage, which can lead to operational and administrative issues for the town, as well as substantially increase the costs of roadway reconstruction. Alternatives to underground tanks in new parks would be surface storage systems (open ponds), however these would directly impact land use utility, hence have not been recommended for the study area.

Table 6.4. SWM Facility Volume Summary

Outlet	Volume (m^3)	Potential for Over Control	Location
A		Yes	Park
B	4109	Yes	Mixed Use
C			
D	266		Employment
E	5702	Yes	Park
F			
G			
H			
I	1136		Park
J		Yes	Park
K		Yes	Park
L			
M	91		Employment
N	75		Employment

As noted in Table 6.4, the proposed SWM facility for Network B has been sized with a proposed volume of 4109 m^3 to control the peak flow rate during the 100 year storm event. The size/volume of this facility is influenced by considerable downstream tail water conditions which will need to be reviewed during the next stages of planning and design for the study. The proposed SWM facility volume may be reduced should the tailwater conditions be mitigated.

The currently recommended location for the SWM facilities would be in parks where it is less likely that the SWM facility would interfere with other underground utilities. However, the shallow depth of the existing storm sewer system in Network B of 2.14 m (+/-) and the limited slope of the network may not provide for sufficient cover for the proposed SWM facility to be located in the proposed park and conveyed to the outlet. Due to this constraint, the Network B proposed SWM facility has been suggested to be placed in the mixed use land use parcel where it would receive runoff from both private and public property. Due to the proposed location in the proposed mixed use parcel, an easement over the SWM facility would likely be required by the town to maintain access. The appropriate location should be investigated further during the next stages of planning and design for the study.

Similar to the proposed Network B SWM facility, the proposed Network E SWM facility, with a proposed volume of 5702 m^3 for the 100 year storm event, is influenced by undersized storm sewer which will need to be reviewed during future phases of the study. The proposed SWM facility volume may be reduced should the undersized storm sewers be mitigated.

A SWM facility has been added to the PCWMM model to mitigate the proposed condition peak flow rate increases in Network G; there is a split in the storm sewer at the location of the proposed SWM facility with a 900 mm diameter pipe conveyed to Network G and a 975 mm diameter pipe conveyed to Outlet E. The SWM facility has been proposed upstream of the storm sewer split, which would benefit Network G in addition to Network E. The increase in peak flow rate at Outlet G is due to the reduction of capacity constraints in the storm sewer. The recommended location for the SWM facility is the proposed park on the south side of Speers Road in Network E, as it is less likely that it would interfere with other underground infrastructure and a park has not been proposed for Network G. Existing storm sewer infrastructure is conveyed through the proposed park which would provide for greater ease of implementation. Furthermore, the SWM facility would receive runoff from both private and public municipal ROW property as a centralized storage location.

The proposed SWM facilities for Networks D, I, M, and N, have all been sized to mitigate the proposed condition peak flow rates conveyed to Fourteen Mile Creek. The volumes provided in Table 6.4 have been sized to offset the proposed increase in 100 year storm event peak flow rates. The proposed land use of Networks D, M, and N are employment, and there is no alternative to place the SWM facility in a park at these locations. However, a park has been proposed for Network I, which is the proposed location for that SWM facility in that network.

Over controlling the peak flow rates from the proposed SWM facilities for Networks B and E could potentially assist in mitigating the downstream capacity issues beyond the study area. Notwithstanding, the SWM facilities would likely need to be considerably larger than those currently proposed with lower release rates to provide meaningful benefit. As noted in Table 6.4, additional over controlled SWM facilities could be added to Networks A, J, K, and a second SWM facility in Network E to provide additional relief to the downstream storm sewers which are exceeding their capacity. These networks have been selected, as parks have been proposed in these networks, which would provide greater ease of implementation and future maintenance.

Following the addition and iteration of the proposed SWM facilities, the peak flow rates for the proposed conditions with SWM and 25 mm source controls have been extracted and provided in Table 6.5, while the difference to the existing conditions peak flow rates has been provided in Table 6.6.

Table 6.5. Proposed Conditions with SWM and 25 mm Source Controls Peak Flow Rates (m^3/s)

Outlet	Storm Event Return Period (Year)					
	2	5	10	25	50	100
A	1.09	2.64	3.44	5.13	5.56	5.97
B	0.26	0.66	1.11	2.09	2.45	2.69
AB	2.73	5.38	6.23	7.08	7.44	7.94
C	1.18	2.62	3.27	4.86	5.72	6.50
D	0.13	0.37	0.53	0.73	0.95	1.14
E	1.43	3.67	4.08	4.66	5.07	5.41
F	0.18	0.37	0.46	0.57	0.60	0.71
G	0.45	1.32	1.93	2.43	2.56	2.68
H	1.23	2.35	2.89	3.32	3.69	4.11
I	0.62	0.97	1.21	1.56	1.81	2.02
J	0.22	0.80	1.03	1.29	1.47	1.65
K	0.26	0.97	1.29	1.70	1.97	2.23
L	0.20	0.47	0.65	0.89	0.90	0.91
M	0.08	0.23	0.34	0.50	0.59	0.68
N	0.08	0.25	0.36	0.55	0.65	0.73

Table 6.6. Difference Between the Existing Conditions and Proposed Conditions with SWM and 25 mm Source Controls Peak Flow Rates

Outlet	Storm Event Return Period (Year)											
	2		5		10		25		50		100	
	(m^3/s)	(%)	(m^3/s)	(%)	(m^3/s)	(%)	(m^3/s)	(%)	(m^3/s)	(%)	(m^3/s)	(%)
A	-1.98	-64.5	-1.78	-40.2	-1.82	-34.6	-0.64	-11.1	-0.61	-9.8	-0.53	-8.2
B	-0.88	-77.0	-1.00	-60.3	-0.89	-44.5	-0.35	-14.3	-0.30	-11.0	-0.36	-11.9
AB	-2.06	-43.0	-0.99	-15.5	-0.88	-12.3	-1.44	-16.9	-2.33	-23.9	-3.53	-30.8
C	-2.51	-68.1	-2.58	-49.6	-2.74	-45.6	-2.14	-30.6	-1.85	-24.4	-1.57	-19.4
D	-0.33	-71.8	-0.29	-44.6	-0.26	-33.3	-0.23	-24.1	-0.13	-11.7	-0.05	-4.3
E	-2.27	-61.4	-0.49	-11.9	-0.30	-6.7	-0.69	-12.9	-0.40	-7.3	-0.53	-8.9
F	-0.12	-40.9	-0.21	-36.3	-0.24	-34.3	-0.29	-33.9	-0.57	-48.9	-0.49	-40.9
G	-1.96	-81.2	-1.28	-49.3	-0.58	-23.1	-0.69	-22.1	-0.67	-20.8	-0.67	-20.1
H	-1.19	-49.4	-0.57	-19.6	-0.39	-12.0	-0.42	-11.3	-0.34	-8.5	-0.18	-4.2
I	-0.42	-40.2	-0.57	-36.8	-0.66	-35.1	-0.76	-32.9	-0.83	-31.4	-0.93	-31.5
J	-0.45	-67.2	-0.19	-19.6	-0.18	-14.7	-0.19	-13.0	-0.21	-12.3	-0.22	-11.6
K	-0.54	-68.0	-0.23	-19.2	-0.18	-12.0	-0.12	-6.6	-0.10	-4.7	-0.07	-3.2
L	-0.30	-60.2	-0.31	-39.9	-0.24	-27.5	-0.02	-2.1	-0.01	-0.7	-0.05	-5.2
M	-0.15	-65.7	-0.10	-31.1	-0.07	-16.7	-0.02	-2.9	0.00	+0.1	+0.01	+1.1
N	-0.18	-69.1	-0.13	-34.0	-0.10	-20.9	-0.02	-3.5	0.00	-0.1	+0.01	+1.2

The simulated peak flow rate differences in Table 6.6 between the existing and proposed conditions with SWM and 25 mm source controls demonstrate decreases in the peak flow rates to less than those for the existing conditions for each storm event at each outlet location. The exceptions to this would be during the 100 year storm events at outlets M and N which each have simulated peak flow rate increases of 0.01 m3/s; this is considered an acceptable increase and would not significantly impact the downstream receiver. The proposed SWM facilities for Networks B and E would result in overcontrolled peak flow rates at outlets B, E, and G, and could likely be further refined/optimized at the next stages of planning and design for the study. However, the existing capacity constraints in these networks would need to be considered to refine the storage volumes and peak flow rates.

6.5 Water Quality Recommendations

The extent of the existing land use conditions water quality treatment is uncertain at this time due to limited available water quality SWM data. However, existing SWM facilities providing water quality control are not present in the study area and it is anticipated that there are likely existing oil-grit-separators (OGS) located on private property which have not been identified. Notwithstanding, the OGS units would likely need to be replaced during the reconstruction of the proposed roads/sites which would provide an opportunity to enact a treatment train approach to providing water quality treatment. It is recommended that the treatment train include the proposed 25 mm source controls in the form of LID BMPs to mitigate the impacts to stormwater runoff water quality, as recommended in the Stormwater Master Plan. The 25 mm source controls may not be sufficient to address the impacts to water quality as a standalone treatment which could be supplemented with new OGS units and/or other equivalent treatment. The proposed water quality treatment approach can be addressed through future planning and design as information becomes available regarding the existing water quality treatment practices.

The treatment train approach has been recommended rather than alternative water quality treatment methods such as wet quality control facilities. The grading of wet quality control facilities would likely not be feasible due to the depth of the existing storm sewer infrastructure which would have to be conveyed to a facility and then to an appropriate outlet. Furthermore, there is more than one outlet in the study area and several centralized wet facilities (as many as 14 +/-) would be required to provide the necessary treatment for the study area, potentially reducing the developable area.

7. CONCLUSIONS AND RECOMMENDATIONS

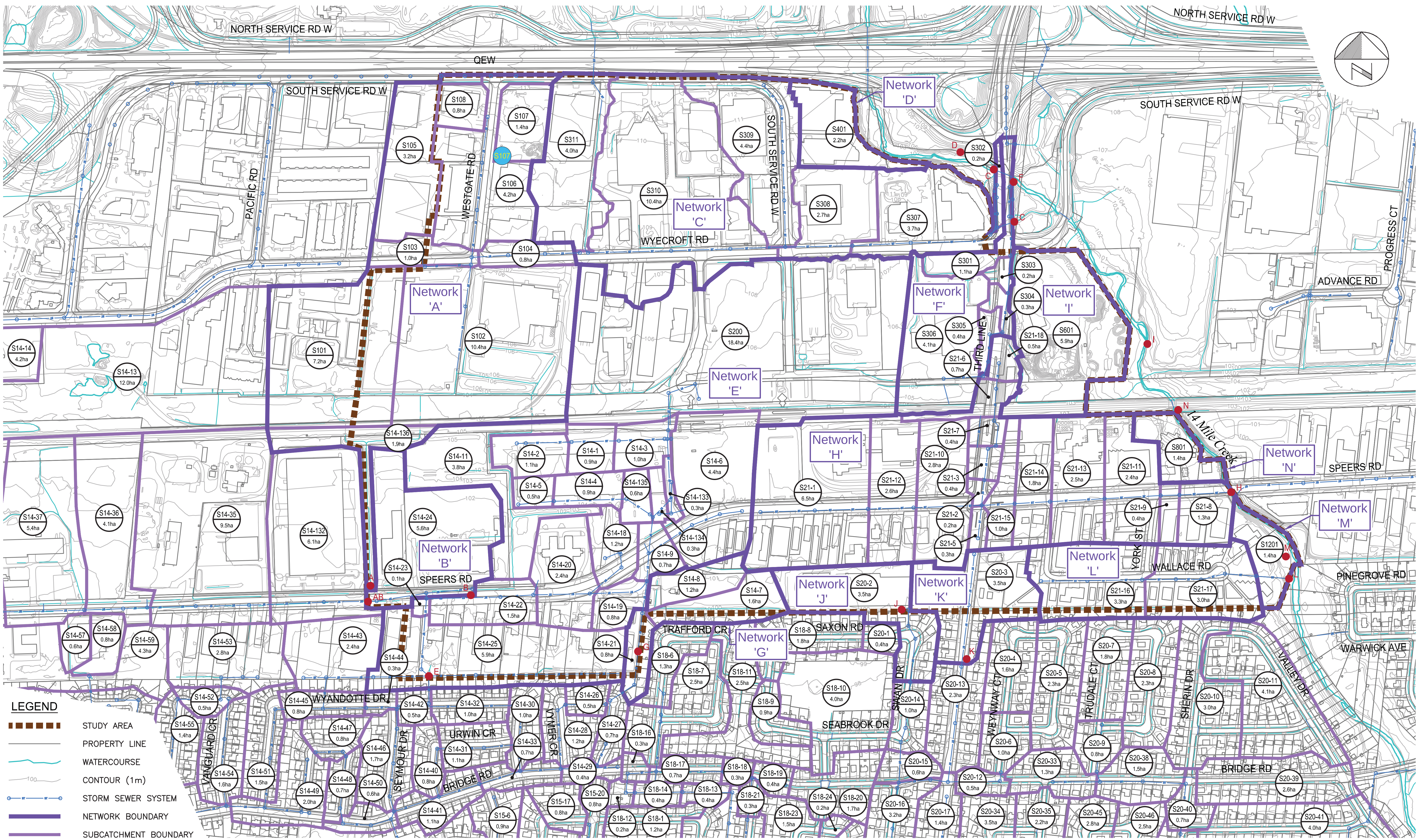
The assessment and analysis documented herein has provided a detailed understanding of the existing drainage system for the Bronte GO MTSA study area within the Town of Oakville. A PCSWMM hydrologic-hydraulic model has been refined/updated from the model developed for the Town of Oakville Stormwater Master Plan to represent the existing land use conditions scenario. The 2-100 year design storm event peak flow rates at the identified outlets have been used to establish baseline conditions for comparison to the proposed land use conditions scenario. The proposed land use conditions have been reviewed and updated accordingly to reflect the Proposed Land Uses (Phase 2) for the study area (Sajecki Planning, July 2020) with refinements to the subcatchments and networks made as necessary to reflect potential future drainage patterns. The imperviousness of the proposed conditions scenario has been shown to decrease for the overall study area due to the proposed addition of several designated parks or open space areas. The imperviousness values applied to the existing conditions scenario have been validated to confirm their acceptability while also validating the comparable decrease in imperviousness for the proposed land use conditions.

Despite the overall decrease in imperviousness within the study area, selected outlets have simulated peak flow rate increases due to increases in drainage area and/or imperviousness. SWM quantity controls are thereby required to offset the predicted peak flow rate increases. Following through with the recommendation from the Stormwater Master Plan for source controls on all redeveloped public and private land, 25 mm source controls have been proposed and simulated accordingly for all subcatchments within the study area. The 25 mm source controls have been shown to be sufficient to achieve peak flow rates below existing conditions at three (3) of the outlets requiring SWM.

Six (6) outlets require additional SWM controls in the form of storage facilities which have been assessed using the PCSWMM model. The facilities have been sized to mitigate the impacts due to the proposed conditions so that the peak flow rates are at or below the existing conditions peak flow rates. Two (2) of the proposed SWM facilities are impacted due to storm sewer capacity constraints identified in the Stormwater Master Plan and the proposed 100 year storage volumes could be refined should the capacity constraints be mitigated. The SWM facilities have been recommended to be subsurface storage facilities located in the proposed parks to maintain the developable area in the Bronte GO MTSA, coincide with existing storm sewer infrastructure elevations, and provide centralized storage locations.

The Stormwater Master Plan identified capacity constraints downstream of the study area which may be mitigated if the proposed SWM facilities are over controlled and additional SWM facilities/increased volume are applied to the study area.

The status of the current degree/extent of stormwater quality treatment for the study area is uncertain due to limited data. However, it has been assumed that if any OGS units are present on the existing property parcels that these would likely need to be replaced during the redevelopment of the study area. A treatment train approach with the use of LID BMP source controls could provide the required water quality treatment for the stormwater runoff.

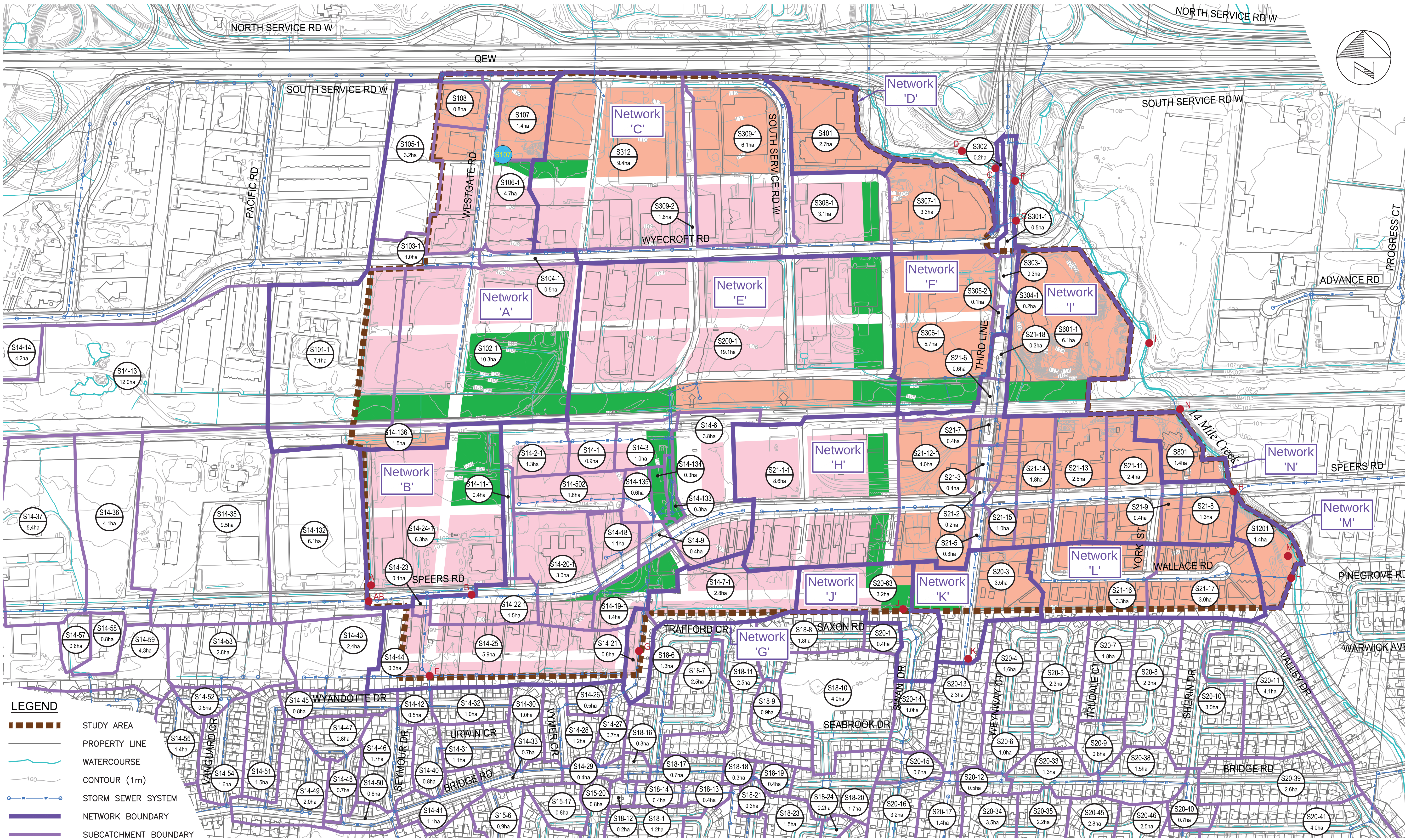


Path: I:\TPB196008 – BronteGO\06_DES-ENG\01_CAD\02_DWGS\05_WR\01_PROJ\FigWR1 SubCatch-EX.dwg

Plotted By: richard.bartolo
Last Saved By: richard.bartolo
Plotted: 2020-08-11
Last Saved: 2020-08-11

SCALE VALID ONLY FOR 24"x36" VERSION

BRONTE GO MTSA SAJECKI PLANNING	EXISTING STORM DRAINAGE SUBCATCHMENT PLAN	wood.	Scale 1:3500 0 50 100 200 Consultant File No. TPB196008 Drawing No. WR1



LEGEND

STUDY AREA
PROPERTY LINE
WATERCOURSE
CONTOUR (1m)
STORM SEWER SYSTEM
NETWORK BOUNDARY
SUBCATCHMENT BOUNDARY
S14-2 SUBCATCHMENT ID#
1.1ha SUBCATCHMENT AREA
A FLOW NODE AND REFERENCE ID#
S107 EXISTING SWM FACILITY AND REFERENCE ID#

FUTURE LAND USE

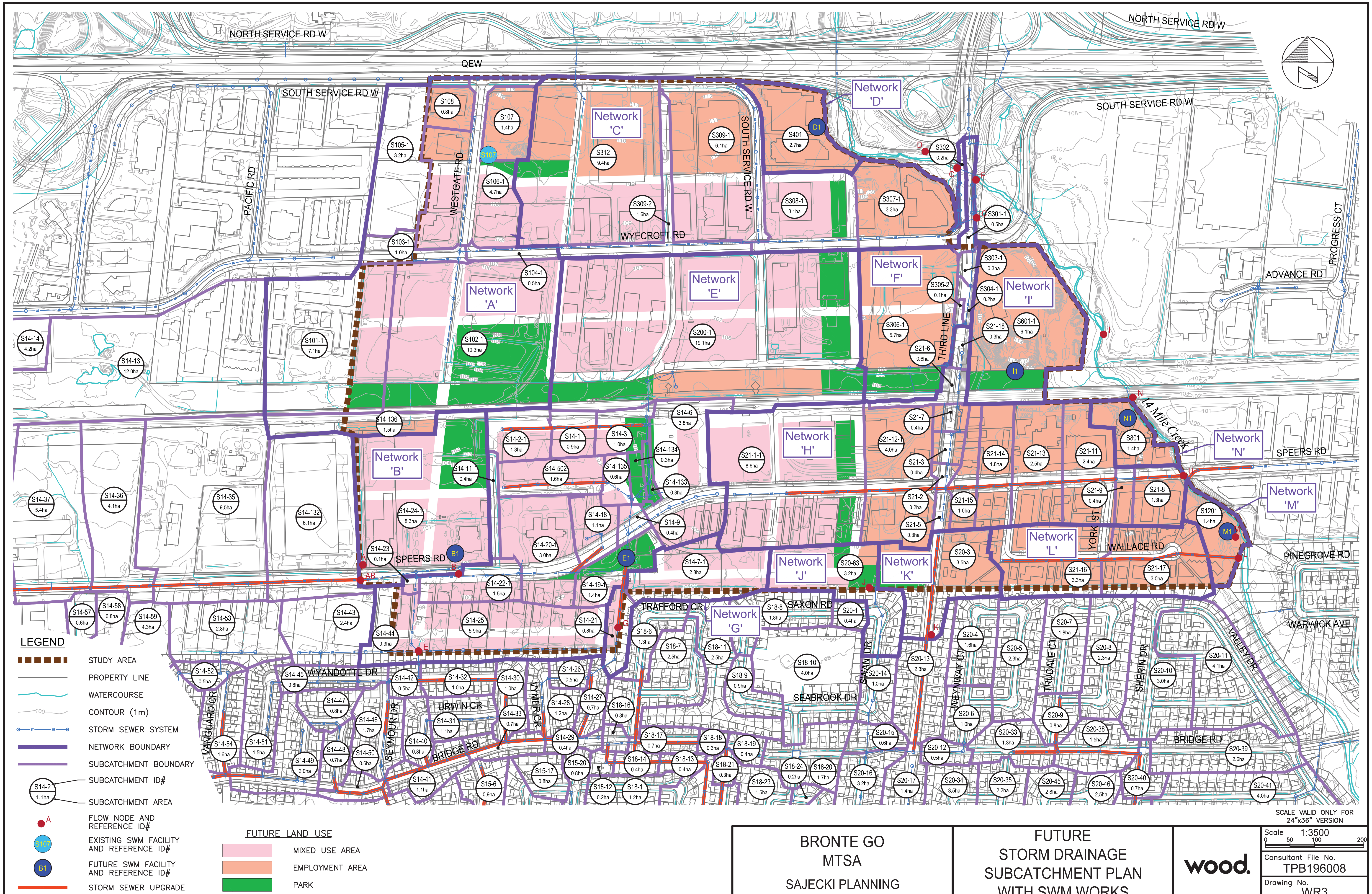
MIXED USE AREA
EMPLOYMENT AREA
PARK

SCALE VALID ONLY FOR 24"x36" VERSION

BRONTE GO MTSA SAJECKI PLANNING	FUTURE STORM DRAINAGE SUBCATCHMENT PLAN	wood.	Scale 1:3500 Consultant File No. TPB196008 Drawing No. WR2

Path: I:\TPB196008 - BronteGO\06_DES-ENG\01_CAD\02_DWGS\05_WR\01_PROJ\FigWR2 SubCatch-FT.dwg

Plotted By: richard.bartolo
Last Saved By: richard.bartolo
Plotted: 2020-08-11
Last Saved: 2020-08-11



NORTH SERVICE RD W
QEW
SOUTH SERVICE RD W
PACIFIC RD
WESTGATE RD
WYECROFT RD
SOUTH SERVICE RD W
THIRD LINE
ADVANCE RD
PROGRESS CT
SPEERS RD
14 Mile Creek
YORK ST
WALLACE RD
PINEGROVE RD
WARWICK AVE
VALLEYDR
TRAFFORD CR
SAXON RD
SEABROOK DR
SWAN DR
WEYNWAY CT
TRUDALE CT
SHERIN DR
BRIDGE RD
WYANDOTTE DR
URWIN CR
VYMER CR
SEYMOUR DR
VANGUARD CR
Network 'A'
Network 'B'
Network 'C'
Network 'D'
Network 'E'
Network 'F'
Network 'G'
Network 'H'
Network 'I'
Network 'J'
Network 'K'
Network 'L'
Network 'M'
Network 'N'
LEGEND
STUDY AREA
PROPERTY LINE
WATERCOURSE
CONTOUR (1m)
STORM SEWER SYSTEM
NETWORK BOUNDARY
SUBCATCHMENT BOUNDARY
S14-2 1.1ha
SUBCATCHMENT ID#
SUBCATCHMENT AREA
FLOW NODE AND REFERENCE ID#
EXISTING SWM FACILITY AND REFERENCE ID#
FUTURE SWM FACILITY AND REFERENCE ID#
STORM SEWER UPGRADE
FUTURE LAND USE
MIXED USE AREA
EMPLOYMENT AREA
PARK
SCALE VALID ONLY FOR 24"x36" VERSION
BRONTE GO
MTSA
SAJECKI PLANNING
FUTURE
STORM DRAINAGE
SUBCATCHMENT PLAN
WITH SWM WORKS
wood.
Scale 1:3500
0 50 100 200
Consultant File No.
TPB196008
Drawing No.
WR3
Plotted By: richard.bartolo
Last Saved By: richard.bartolo
Plotted: 2020-08-19
Last Saved: 2020-08-19
Path: I:\TPB196008 – BronteGO\06_DES-ENG\01_CAD\02_DWGS\05_WR\01_PROJ\2020-08\FigWR3 SubCatch-FT(SWM).dwg

APPENDIX "F"

Stormwater Quality Control Calculations

VALDOR ENGINEERING INC.
File: 24123 **TABLE F1**
July 2025

OIL / GRIT SEPARATOR SIZING - BLOCK A (TOWERS A & B)

Site Area = A = 0.936 Ha

Surface Type	**Runoff Coeff**	**Area (Ha)**
Pervious Area	0.35	0.110
Impervious Area	0.90	0.207
Roof Area	0.85	0.619
	0.80	**0.936**

Imperviousness

% Impervious = (Runoff Coefficient - 0.20) / 0.7 x 100

% Impervious = 86.0 %

VALDOR ENGINEERING INC.
File: 24123 **TABLE F2**
July 2025

OIL / GRIT SEPARATOR SIZING - BLOCK B (TOWERS C & D)

Site Area = A = 1.029 Ha

Surface Type	Runoff Coeff	Area (Ha)
Pervious Area	0.35	0.181
Impervious Area	0.90	0.355
Roof Area	0.85	0.493
	0.78	**1.029**

Imperviousness

% Impervious = (Runoff Coefficient - 0.20) / 0.7 x 100

% Impervious = 82.8 %

OIL / GRIT SEPARATOR SIZING - STREET "A" & STREET "B"

Site Area = A = 0.397 Ha

Surface Type	**Runoff Coeff**	**Area (Ha)**
Pervious Area	0.35	0.085
Impervious Area	0.90	0.312
Roof Area	0.85	0.000
	0.78	**0.397**

Imperviousness

% Impervious = (Runoff Coefficient - 0.20) / 0.7 x 100

% Impervious = 83.2 %

VALDOR ENGINEERING INC. **TABLE: F4**
File: 24123
July 2025

STORMWATER QUALITY CALCULATIONS

OVERALL TSS REMOVAL - TREATMENT TRAIN APPROACH

Drainage to Street CB Infiltration LID

Surface Type	Area (Ha)	Effective TSS Removal	% Area	Weighted Overall TSS Removal
Pavement Area (Before LID)	0.312	0%	78.6%	0.0%
Landscape Area (Before LID)	0.085	80%	21.4%	17.1%
Total (Before LID)	0.397		100.0%	**17.1%**
Infiltration LID provides 70% removal rate to the remaining possible TSS removal of 82.9% (ie. 100%-17.1%)		70%		**58.0%**
Total (After LID)	0.397		100.0%	**75.1%**

Drainage to Oil /Grit Separator (Includes Drainage from Infiltration LIDs)

Surface Type	Area (Ha)	Effective TSS Removal	% Area	Weighted Overall TSS Removal
Pavement Area, Landscape Area (to Street CB Infiltration LID)	0.397	75%	100.0%	75.1%
Total (Before Oil / Grit Separator)	0.397		100.0%	**75.1%**
Oil / Grit Separator (EFO4) provides 88% (based on the manufacture sizing report) removal rate to the remaining possible TSS removal of 24.9% (ie. 100%-75.1%).		88%		**21.9%**
Total (After Oil / Grit Separator)	0.397		100.0%	**97.0%**

Stormceptor EF Sizing Report

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

07/09/2025

Province:	Ontario
City:	Oakville
Nearest Rainfall Station:	HAMILTON RBG CS
Climate Station Id:	6153301
Years of Rainfall Data:	20

Project Name:	2172 Wyecroft Road - Block A
Project Number:	24123
Designer Name:	Alexander McKeracher
Designer Company:	Valdor Engineering Consulting
Designer Email:	amckeracher@valdor-engineering.com
Designer Phone:	905-264-0054
EOR Name:	
EOR Company:	
EOR Email:	
EOR Phone:	

Site Name:	2172 Wyecroft Road

Drainage Area (ha):	0.94
% Imperviousness:	86.00

Runoff Coefficient 'c': 0.81

Particle Size Distribution:	Fine
Target TSS Removal (%):	80.0
Required Water Quality Runoff Volume Capture (%):	90.00
Estimated Water Quality Flow Rate (L/s):	24.01
Oil / Fuel Spill Risk Site?	Yes
Upstream Flow Control?	Yes
Upstream Orifice Control Flow Rate to Stormceptor (L/s):	204.45
Peak Conveyance (maximum) Flow Rate (L/s):	
Influent TSS Concentration (mg/L):	200
Estimated Average Annual Sediment Load (kg/yr):	957
Estimated Average Annual Sediment Volume (L/yr):	778

Net Annual Sediment (TSS) Load Reduction Sizing Summary

Stormceptor Model	TSS Removal Provided (%)
EFO4	76
EFO5	83
EFO6	87
EFO8	93
EFO10	96
EFO12	98

Recommended Stormceptor EFO Model:	**EFO5**
Estimated Net Annual Sediment (TSS) Load Reduction (%):	**83**
Water Quality Runoff Volume Capture (%):	**> 90**

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 waterways.

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.

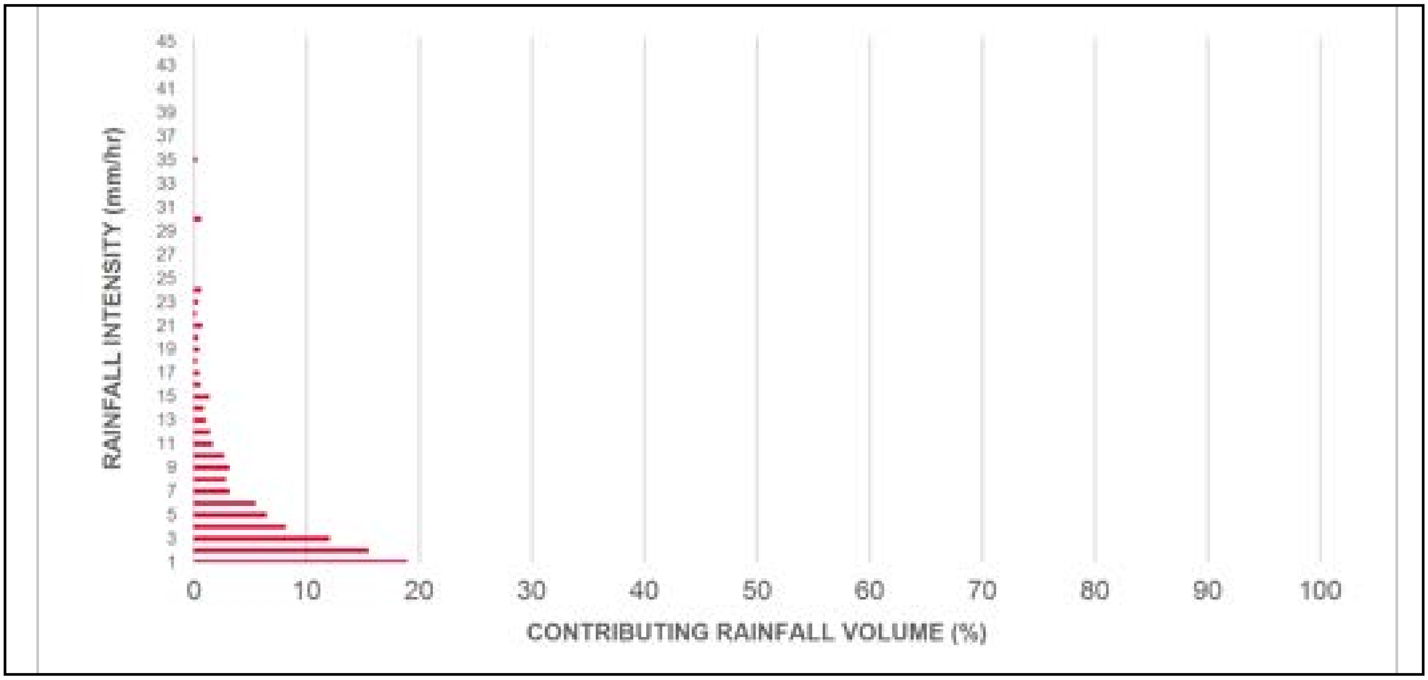
Particle Size (μm)	Percent Less Than	Particle Size Fraction (μm)	Percent
1000	100	500-1000	5
500	95	250-500	5
250	90	150-250	15
150	75	100-150	15
100	60	75-100	10
75	50	50-75	5
50	45	20-50	10
20	35	8-20	15
8	20	5-8	10
5	10	2-5	5
2	5	<2	5

Upstream Flow Controlled Results

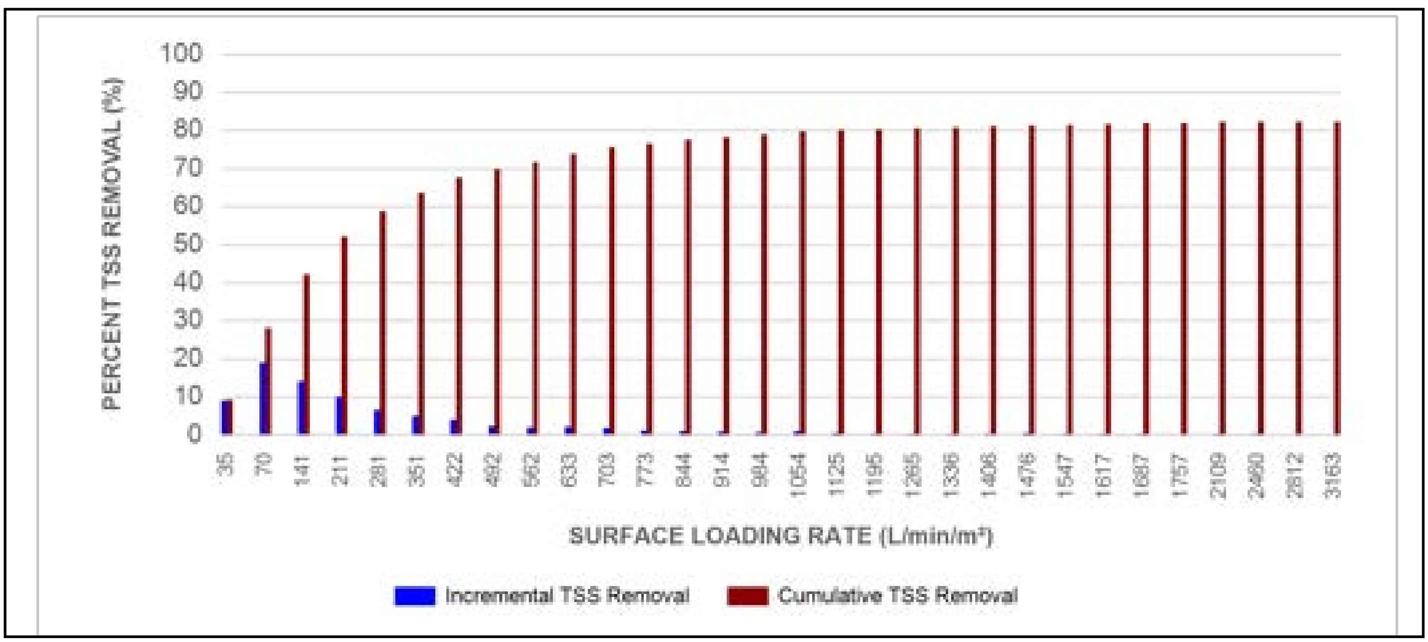
Rainfall Intensity (mm / hr)	Percent Rainfall Volume (%)	Cumulative Rainfall Volume (%)	Flow Rate (L/s)	Flow Rate (L/min)	Surface Loading Rate (L/min/m²)	Removal Efficiency (%)	Incremental Removal (%)	Cumulative Removal (%)
0.50	9.1	9.1	1.07	64.0	35.0	100	9.1	9.1
1.00	19.0	28.0	2.13	128.0	70.0	100	19.0	28.0
2.00	15.5	43.5	4.26	256.0	141.0	91	14.1	42.1
3.00	12.1	55.6	6.40	384.0	211.0	83	10.0	52.1
4.00	8.2	63.8	8.53	512.0	281.0	79	6.5	58.6
5.00	6.5	70.4	10.66	640.0	351.0	76	5.0	63.6
6.00	5.5	75.9	12.79	768.0	422.0	73	4.0	67.6
7.00	3.2	79.0	14.93	896.0	492.0	70	2.2	69.8
8.00	2.9	81.9	17.06	1024.0	562.0	66	1.9	71.7
9.00	3.2	85.2	19.19	1151.0	633.0	64	2.1	73.8
10.00	2.7	87.9	21.32	1279.0	703.0	64	1.7	75.5
11.00	1.7	89.6	23.46	1407.0	773.0	63	1.1	76.6
12.00	1.5	91.1	25.59	1535.0	844.0	63	0.9	77.6
13.00	1.1	92.2	27.72	1663.0	914.0	62	0.7	78.2
14.00	0.9	93.1	29.85	1791.0	984.0	62	0.6	78.8
15.00	1.4	94.5	31.99	1919.0	1054.0	60	0.8	79.7
16.00	0.6	95.1	34.12	2047.0	1125.0	59	0.4	80.0
17.00	0.5	95.6	36.25	2175.0	1195.0	57	0.3	80.3
18.00	0.3	95.9	38.38	2303.0	1265.0	56	0.2	80.5
19.00	0.5	96.4	40.52	2431.0	1336.0	54	0.3	80.8
20.00	0.4	96.8	42.65	2559.0	1406.0	52	0.2	81.0
21.00	0.8	97.6	44.78	2687.0	1476.0	50	0.4	81.3
22.00	0.2	97.8	46.91	2815.0	1547.0	48	0.1	81.4
23.00	0.4	98.2	49.04	2943.0	1617.0	45	0.2	81.6
24.00	0.7	98.9	51.18	3071.0	1687.0	44	0.3	81.9
25.00	0.0	98.9	53.31	3199.0	1757.0	42	0.0	81.9
30.00	0.7	99.7	63.97	3838.0	2109.0	35	0.3	82.2
35.00	0.3	100.0	74.63	4478.0	2460.0	30	0.1	82.3
40.00	0.0	100.0	85.29	5118.0	2812.0	26	0.0	82.3
45.00	0.0	100.0	95.96	5757.0	3163.0	24	0.0	82.3
							Estimated Net Annual Sediment (TSS) Load Reduction =	**82 %**

Climate Station ID: 6153301 *Years of Rainfall Data*: 20

RAINFALL DATA FROM HAMILTON RBG CS 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
EF5 / EFO5	1.5	5	90	762	30	762	30	710	25
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

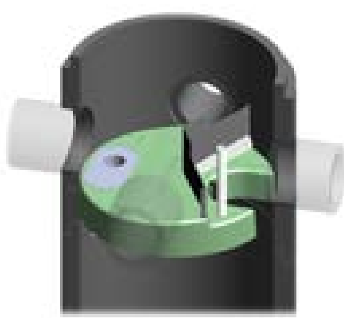
►**Stormceptor® EF and EFO** feature an internal bypass and superior scour prevention technology that have been demonstrated in third-party testing according to the scour testing provisions of the Canadian ETV **Procedure for Laboratory Testing of Oil-Grit Separators**, and the exceptional scour test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

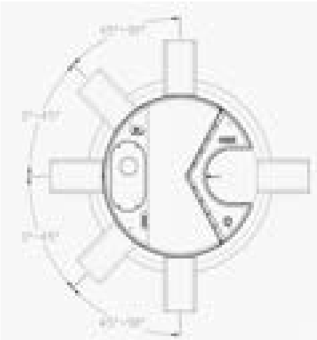
DESIGN FLEXIBILITY

►**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)	(ft³)	(kg)	(lb)
EF4 / EFO4	1.2	4	1.52	5.0	265	70	203	8	1190	42	1904	5250
EF5 / EFO5	1.5	5	1.62	5.3	420	111	305	10	2124	75	2612	5758
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/ft³)

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

STANDARD STORMCEPTOR EF/EFO DRAWINGS

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

STANDARD STORMCEPTOR EF/EFO SPECIFICATION

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

STANDARD PERFORMANCE SPECIFICATION FOR "OIL GRIT SEPARATOR" (OGS) STORMWATER QUALITY TREAMENT 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
	5 ft (1524 mm) Diameter OGS Units:	1.95 m^3 sediment / 420 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.

3.4 LIGHT LIQUID RE-ENTRAINMENT SIMULATION TESTING

The OGS device shall have Canadian ETV or ISO 14034 ETV Verification of completed third-party Light Liquid

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

3.4.1 For an OGS device to be an acceptable stormwater treatment device on a site where vehicular traffic occurs and the potential for an oil or fuel spill exists, the OGS device must have reported verified performance results of greater than 99% cumulative retention of LDPE plastic beads for the five specified surface loading rates (ranging 200 L/min/m^2 to 2600 L/min/m^2) in accordance with the Light Liquid Re-entrainment Simulation Testing within the Canadian ETV Program's **Procedure for Laboratory Testing of Oil-Grit Separators.** However, an OGS device shall not be allowed if the Light Liquid Re-entrainment Simulation Testing was performed with screening components within the OGS device that are effective at retaining the LDPE plastic beads, but would not be expected to retain light liquids such as oil and fuel.

Stormceptor® EF Sizing Report

Imbrium® Systems
ESTIMATED NET ANNUAL SEDIMENT (TSS) LOAD REDUCTION 07/09/2025

Province:	Ontario
City:	Oakville
Nearest Rainfall Station:	HAMILTON RBG CS
Climate Station Id:	6153301
Years of Rainfall Data:	20

Project Name:	2172 Wyecroft Road - Block B
Project Number:	24123
Designer Name:	Alexander McKeracher
Designer Company:	Valdor Engineering Consulting
Designer Email:	amckeracher@valdor-engineering.com
Designer Phone:	905-264-0054
EOR Name:	
EOR Company:	
EOR Email:	
EOR Phone:	

Site Name:	2172 Wyecroft Road

Drainage Area (ha):	1.029
% Imperviousness:	82.80

Runoff Coefficient 'c': 0.79

Particle Size Distribution:	Fine
Target TSS Removal (%):	80.0
Required Water Quality Runoff Volume Capture (%):	90.00
Estimated Water Quality Flow Rate (L/s):	25.67
Oil / Fuel Spill Risk Site?	Yes
Upstream Flow Control?	Yes
Upstream Orifice Control Flow Rate to Stormceptor (L/s):	251.20
Peak Conveyance (maximum) Flow Rate (L/s):	
Influent TSS Concentration (mg/L):	200
Estimated Average Annual Sediment Load (kg/yr):	996
Estimated Average Annual Sediment Volume (L/yr):	810

Net Annual Sediment (TSS) Load Reduction Sizing Summary

Stormceptor Model	TSS Removal Provided (%)
EFO4	75
EFO5	82
EFO6	86
EFO8	92
EFO10	96
EFO12	98

Recommended Stormceptor EFO Model:	**EFO5**
Estimated Net Annual Sediment (TSS) Load Reduction (%):	**82**
Water Quality Runoff Volume Capture (%):	**> 90**

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 waterways.

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.

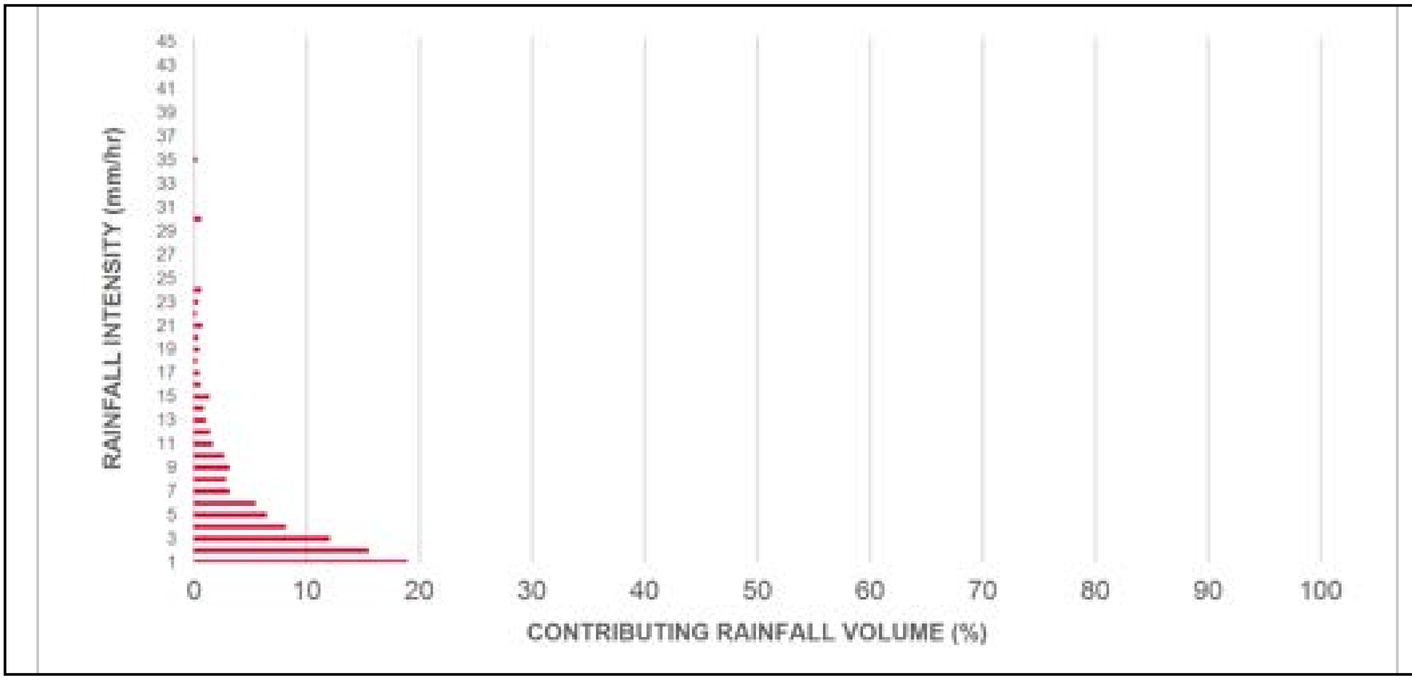
Particle Size (µm)	Percent Less Than	Particle Size Fraction (µm)	Percent
1000	100	500-1000	5
500	95	250-500	5
250	90	150-250	15
150	75	100-150	15
100	60	75-100	10
75	50	50-75	5
50	45	20-50	10
20	35	8-20	15
8	20	5-8	10
5	10	2-5	5
2	5	<2	5

Upstream Flow Controlled Results

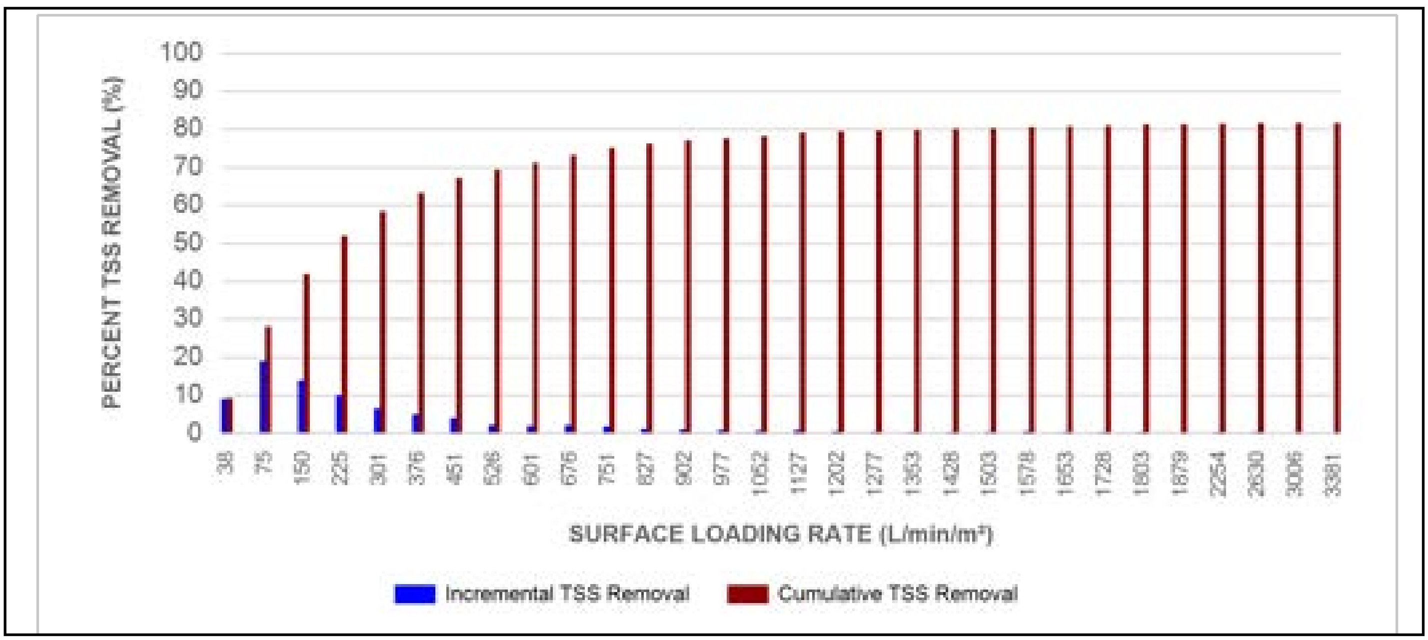
Rainfall Intensity (mm / hr)	Percent Rainfall Volume (%)	Cumulative Rainfall Volume (%)	Flow Rate (L/s)	Flow Rate (L/min)	Surface Loading Rate (L/min/m²)	Removal Efficiency (%)	Incremental Removal (%)	Cumulative Removal (%)
0.50	9.1	9.1	1.14	68.0	38.0	100	9.1	9.1
1.00	19.0	28.0	2.28	137.0	75.0	100	19.0	28.0
2.00	15.5	43.5	4.56	274.0	150.0	89	13.9	41.9
3.00	12.1	55.6	6.84	410.0	225.0	82	9.9	51.9
4.00	8.2	63.8	9.12	547.0	301.0	78	6.4	58.3
5.00	6.5	70.4	11.40	684.0	376.0	75	4.9	63.2
6.00	5.5	75.9	13.68	821.0	451.0	72	3.9	67.1
7.00	3.2	79.0	15.96	957.0	526.0	68	2.2	69.3
8.00	2.9	81.9	18.23	1094.0	601.0	65	1.9	71.2
9.00	3.2	85.2	20.51	1231.0	676.0	64	2.1	73.2
10.00	2.7	87.9	22.79	1368.0	751.0	63	1.7	75.0
11.00	1.7	89.6	25.07	1504.0	827.0	63	1.1	76.1
12.00	1.5	91.1	27.35	1641.0	902.0	62	0.9	77.0
13.00	1.1	92.2	29.63	1778.0	977.0	62	0.7	77.6
14.00	0.9	93.1	31.91	1915.0	1052.0	60	0.6	78.2
15.00	1.4	94.5	34.19	2051.0	1127.0	59	0.8	79.0
16.00	0.6	95.1	36.47	2188.0	1202.0	57	0.3	79.4
17.00	0.5	95.6	38.75	2325.0	1277.0	55	0.3	79.6
18.00	0.3	95.9	41.03	2462.0	1353.0	53	0.2	79.8
19.00	0.5	96.4	43.31	2598.0	1428.0	52	0.3	80.1
20.00	0.4	96.8	45.59	2735.0	1503.0	49	0.2	80.3
21.00	0.8	97.6	47.87	2872.0	1578.0	47	0.4	80.6
22.00	0.2	97.8	50.15	3009.0	1653.0	44	0.1	80.7
23.00	0.4	98.2	52.42	3145.0	1728.0	43	0.2	80.9
24.00	0.7	98.9	54.70	3282.0	1803.0	41	0.3	81.2
25.00	0.0	98.9	56.98	3419.0	1879.0	39	0.0	81.2
30.00	0.7	99.7	68.38	4103.0	2254.0	33	0.2	81.4
35.00	0.3	100.0	79.78	4787.0	2630.0	28	0.1	81.5
40.00	0.0	100.0	91.17	5470.0	3006.0	24	0.0	81.5
45.00	0.0	100.0	102.57	6154.0	3381.0	22	0.0	81.5
Estimated Net Annual Sediment (TSS) Load Reduction =								**82 %**

Climate Station ID: 6153301 *Years of Rainfall Data*: 20

RAINFALL DATA FROM HAMILTON RBG CS RAINFALL STATION



INCREMENTAL AND CUMULATIVE TSS REMOVAL FOR THE RECOMMENDED STORMCEPTOR® MODEL



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
EF5 / EFO5	1.5	5	90	762	30	762	30	710	25
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

Maximum Pipe Diameter / Peak Conveyance

SCOUR PREVENTION AND ONLINE CONFIGURATION

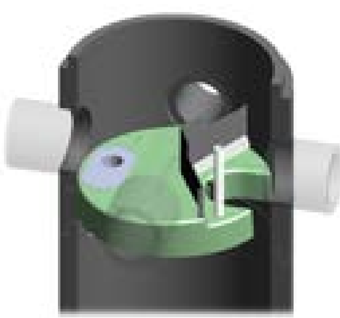
►**Stormceptor® EF and EFO** feature an internal bypass and superior scour prevention technology that have been demonstrated in third-party testing according to the scour testing provisions of the Canadian ETV **Procedure for Laboratory Testing of Oil-Grit Separators**, and the exceptional scour test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

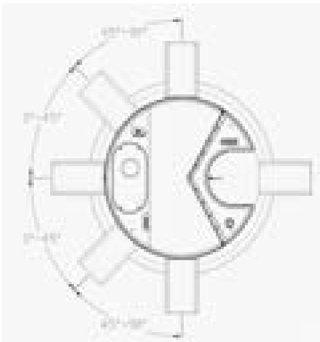
DESIGN FLEXIBILITY

►**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)	(ft³)	(kg)	(lb)
EF4 / EFO4	1.2	4	1.52	5.0	265	70	203	8	1190	42	1904	5250
EF5 / EFO5	1.5	5	1.62	5.3	420	111	305	10	2124	75	2612	5758
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/ft³)

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

STANDARD STORMCEPTOR EF/EFO DRAWINGS

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

STANDARD STORMCEPTOR EF/EFO SPECIFICATION

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

STANDARD PERFORMANCE SPECIFICATION FOR
"OIL GRIT SEPARATOR" (OGS) STORMWATER QUALITY TREAMENT 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
	5 ft (1524 mm) Diameter OGS Units:	1.95 m^3 sediment / 420 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.

3.4 LIGHT LIQUID RE-ENTRAINMENT SIMULATION TESTING

The OGS device shall have Canadian ETV or ISO 14034 ETV Verification of completed third-party Light Liquid

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

3.4.1 For an OGS device to be an acceptable stormwater treatment device on a site where vehicular traffic occurs and the potential for an oil or fuel spill exists, the OGS device must have reported verified performance results of greater than 99% cumulative retention of LDPE plastic beads for the five specified surface loading rates (ranging 200 L/min/m^2 to 2600 L/min/m^2) in accordance with the Light Liquid Re-entrainment Simulation Testing within the Canadian ETV Program's **Procedure for Laboratory Testing of Oil-Grit Separators.** However, an OGS device shall not be allowed if the Light Liquid Re-entrainment Simulation Testing was performed with screening components within the OGS device that are effective at retaining the LDPE plastic beads, but would not be expected to retain light liquids such as oil and fuel.

Stormceptor® EF Sizing Report

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

07/09/2025

Province:	Ontario
City:	Oakville
Nearest Rainfall Station:	HAMILTON RBG CS
Climate Station Id:	6153301
Years of Rainfall Data:	20

Project Name:	2172 Wyecroft Road - Streets "A" & "B"
Project Number:	24123
Designer Name:	Alexander McKeracher
Designer Company:	Valdor Engineering Consulting
Designer Email:	amckeracher@valdor-engineering.com
Designer Phone:	905-264-0054
EOR Name:	
EOR Company:	
EOR Email:	
EOR Phone:	

Site Name:	2172 Wyecroft Road
Drainage Area (ha):	0.40
% Imperviousness:	83.20

Runoff Coefficient 'c': 0.79

Particle Size Distribution:	Fine
Target TSS Removal (%):	80.0
Required Water Quality Runoff Volume Capture (%):	90.00
Estimated Water Quality Flow Rate (L/s):	10.01
Oil / Fuel Spill Risk Site?	Yes
Upstream Flow Control?	No
Peak Conveyance (maximum) Flow Rate (L/s):	
Influent TSS Concentration (mg/L):	200
Estimated Average Annual Sediment Load (kg/yr):	418
Estimated Average Annual Sediment Volume (L/yr):	339

Net Annual Sediment (TSS) Load Reduction Sizing Summary

Stormceptor Model	TSS Removal Provided (%)
EFO4	88
EFO5	92
EFO6	95
EFO8	98
EFO10	99
EFO12	100

Recommended Stormceptor EFO Model: EFO4

Estimated Net Annual Sediment (TSS) Load Reduction (%): 88

Water Quality Runoff Volume Capture (%): > 90

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 waterways.

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.

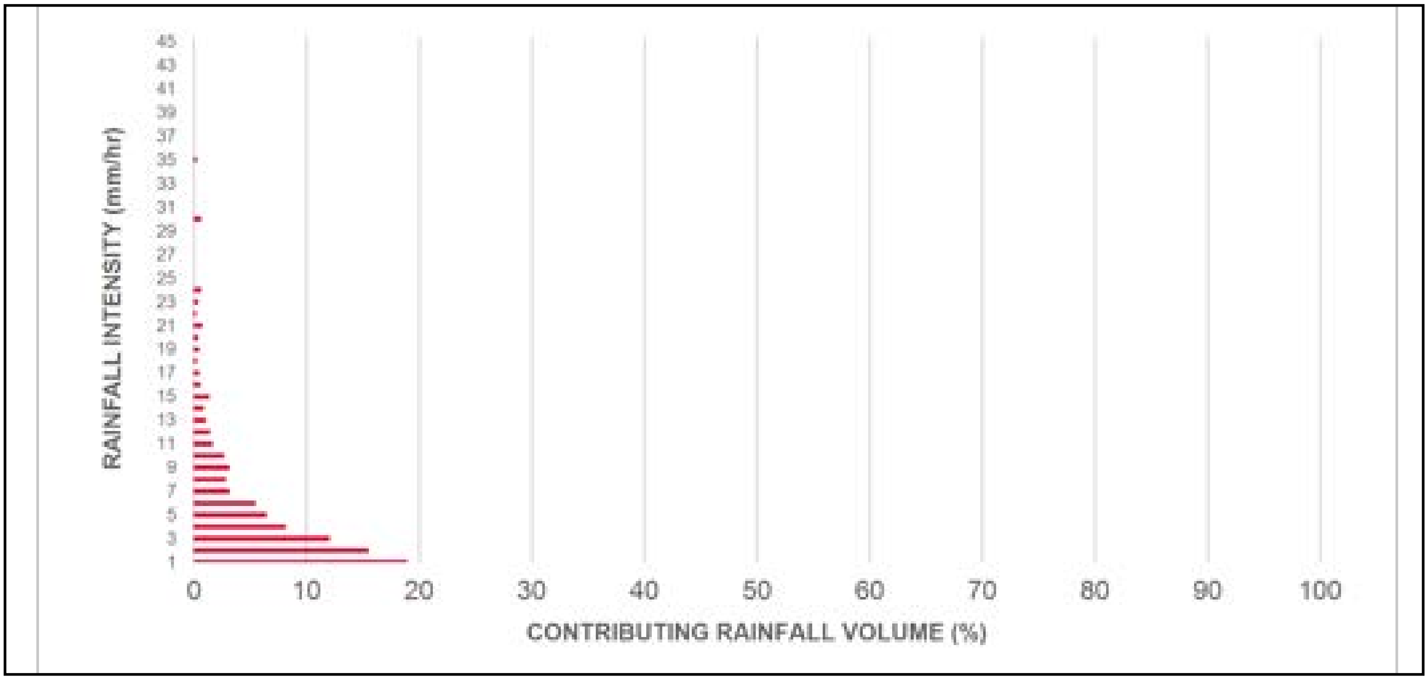
Particle Size (µm)	Percent Less Than	Particle Size Fraction (µm)	Percent
1000	100	500-1000	5
500	95	250-500	5
250	90	150-250	15
150	75	100-150	15
100	60	75-100	10
75	50	50-75	5
50	45	20-50	10
20	35	8-20	15
8	20	5-8	10
5	10	2-5	5
2	5	<2	5

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	9.1	9.1	0.44	27.0	22.0	100	9.1	9.1
1.00	19.0	28.0	0.89	53.0	44.0	100	19.0	28.0
2.00	15.5	43.5	1.78	107.0	89.0	98	15.3	43.3
3.00	12.1	55.6	2.67	160.0	133.0	92	11.1	54.4
4.00	8.2	63.8	3.55	213.0	178.0	87	7.1	61.6
5.00	6.5	70.4	4.44	267.0	222.0	82	5.4	66.9
6.00	5.5	75.9	5.33	320.0	267.0	80	4.4	71.3
7.00	3.2	79.0	6.22	373.0	311.0	78	2.5	73.8
8.00	2.9	81.9	7.11	427.0	355.0	76	2.2	76.0
9.00	3.2	85.2	8.00	480.0	400.0	74	2.4	78.4
10.00	2.7	87.9	8.89	533.0	444.0	72	2.0	80.4
11.00	1.7	89.6	9.78	587.0	489.0	70	1.2	81.6
12.00	1.5	91.1	10.66	640.0	533.0	68	1.0	82.6
13.00	1.1	92.2	11.55	693.0	578.0	66	0.7	83.3
14.00	0.9	93.1	12.44	747.0	622.0	64	0.6	83.9
15.00	1.4	94.5	13.33	800.0	667.0	64	0.9	84.8
16.00	0.6	95.1	14.22	853.0	711.0	64	0.4	85.2
17.00	0.5	95.6	15.11	906.0	755.0	63	0.3	85.5
18.00	0.3	95.9	16.00	960.0	800.0	63	0.2	85.7
19.00	0.5	96.4	16.89	1013.0	844.0	63	0.3	86.0
20.00	0.4	96.8	17.77	1066.0	889.0	62	0.2	86.3
21.00	0.8	97.6	18.66	1120.0	933.0	62	0.5	86.7
22.00	0.2	97.8	19.55	1173.0	978.0	62	0.1	86.9
23.00	0.4	98.2	20.44	1226.0	1022.0	61	0.3	87.1
24.00	0.7	98.9	21.33	1280.0	1066.0	60	0.4	87.5
25.00	0.0	98.9	22.22	1333.0	1111.0	59	0.0	87.5
30.00	0.7	99.7	26.66	1600.0	1333.0	54	0.4	87.9
35.00	0.3	100.0	31.10	1866.0	1555.0	47	0.2	88.1
40.00	0.0	100.0	35.55	2133.0	1777.0	41	0.0	88.1
45.00	0.0	100.0	39.99	2400.0	2000.0	37	0.0	88.1
Estimated Net Annual Sediment (TSS) Load Reduction =								**88 %**

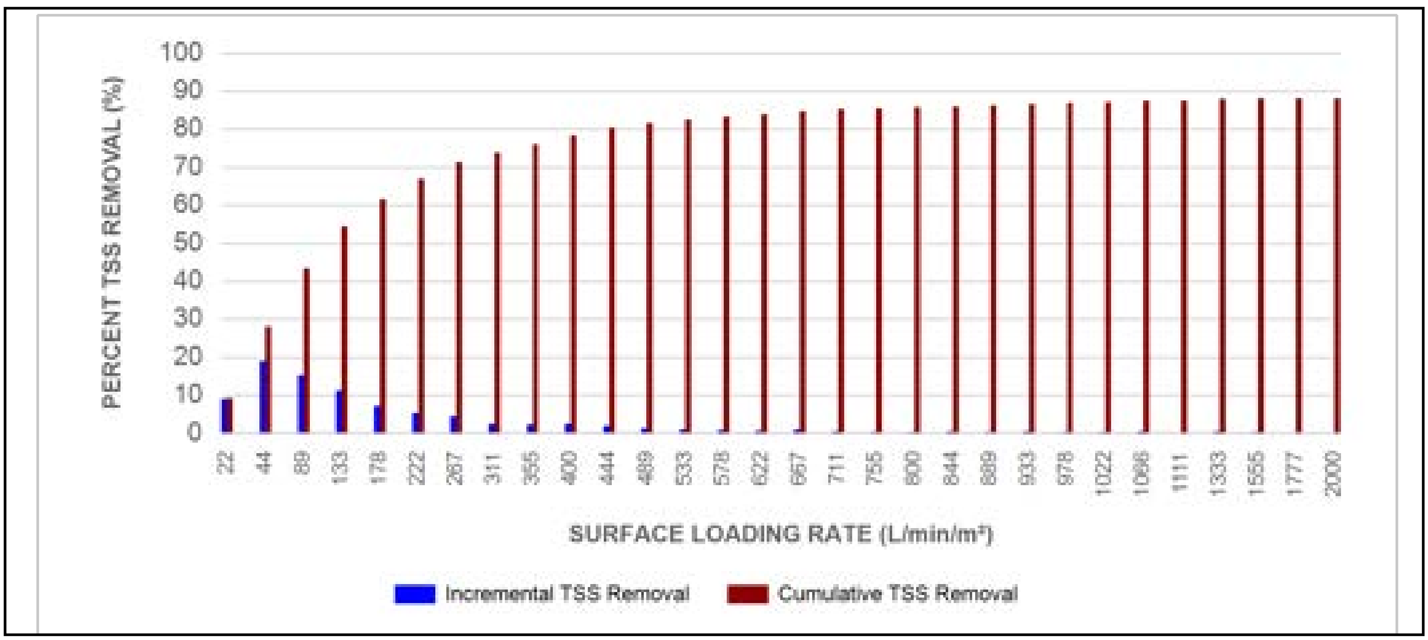
Climate Station ID: 6153301 *Years of Rainfall Data*: 20

imbrium

RAINFALL DATA FROM HAMILTON RBG CS 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
EF5 / EFO5	1.5	5	90	762	30	762	30	710	25
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

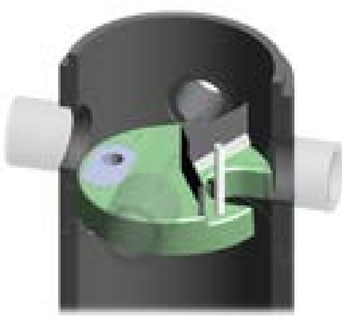
►**Stormceptor® EF and EFO** feature an internal bypass and superior scour prevention technology that have been demonstrated in third-party testing according to the scour testing provisions of the Canadian ETV **Procedure for Laboratory Testing of Oil-Grit Separators**, and the exceptional scour test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

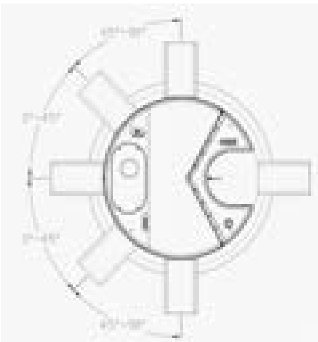
DESIGN FLEXIBILITY

►**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
EF5 / EFO5	1.5	5	1.62	5.3	420	111	305	10	2124	75	2612	5758
EF6 / EFO6	1.8	6	1.93	6.3	610	160	305	12	3470	123	5552	15375
EF8 / EFO8	2.4	8	2.59	8.5	1070	280	610	24	8780	310	14048	38750
EF10 / EFO10	3.0	10	3.25	10.7	1670	440	610	24	17790	628	28464	78500
EF12 / EFO12	3.6	12	3.89	12.8	2475	655	610	24	31220	1103	49952	137875

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

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

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

STANDARD STORMCEPTOR EF/EFO DRAWINGS

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

STANDARD STORMCEPTOR EF/EFO SPECIFICATION

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

STANDARD PERFORMANCE SPECIFICATION FOR "OIL GRIT SEPARATOR" (OGS) STORMWATER QUALITY TREAMENT 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
	5 ft (1524 mm) Diameter OGS Units:	1.95 m^3 sediment / 420 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.**

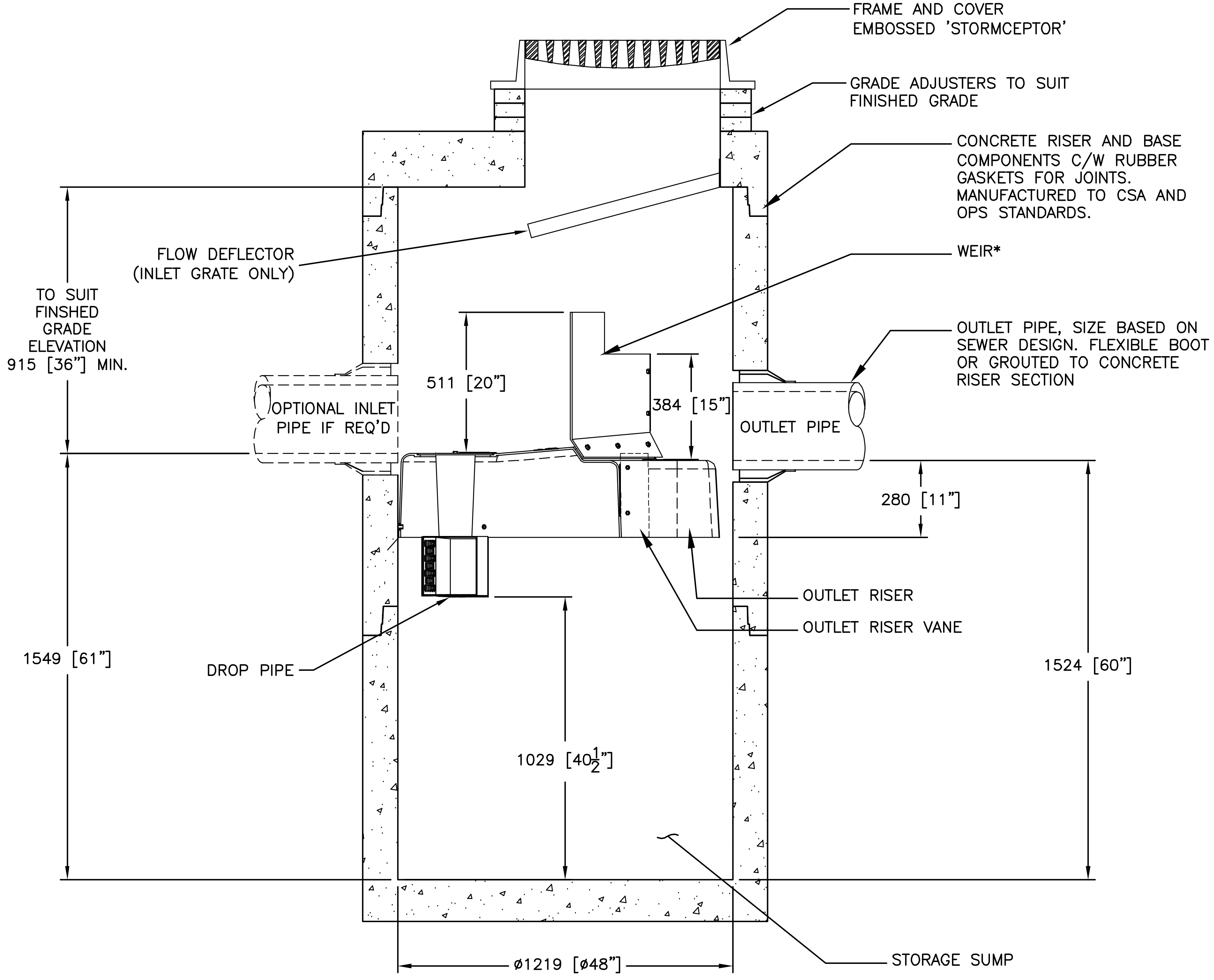
3.3.1 To be acceptable for on-line installation, the OGS device must demonstrate an average scour test effluent concentration less than 10 mg/L at each surface loading rate tested, up to and including 2600 L/min/m^2.

3.4 LIGHT LIQUID RE-ENTRAINMENT SIMULATION TESTING

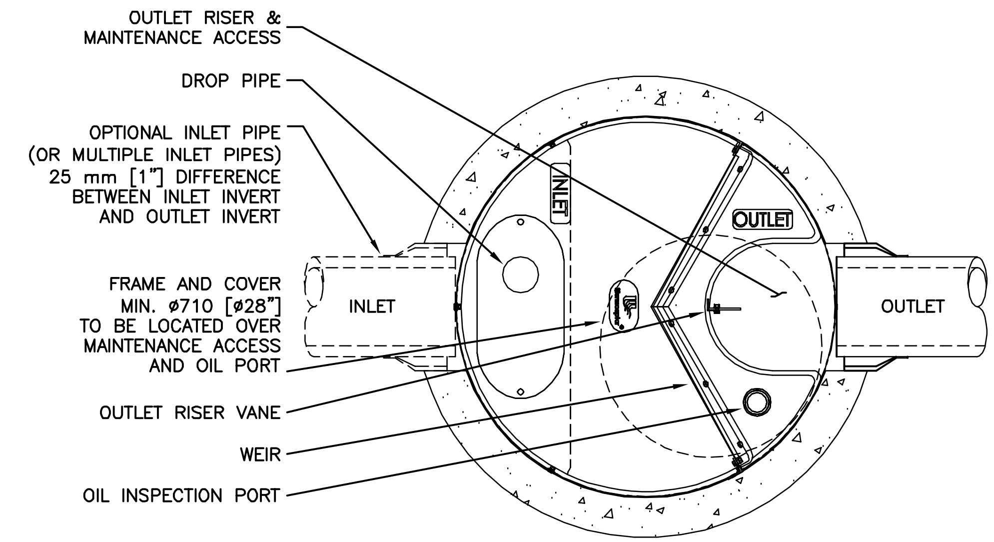
The OGS device shall have Canadian ETV or ISO 14034 ETV Verification of completed third-party Light Liquid

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

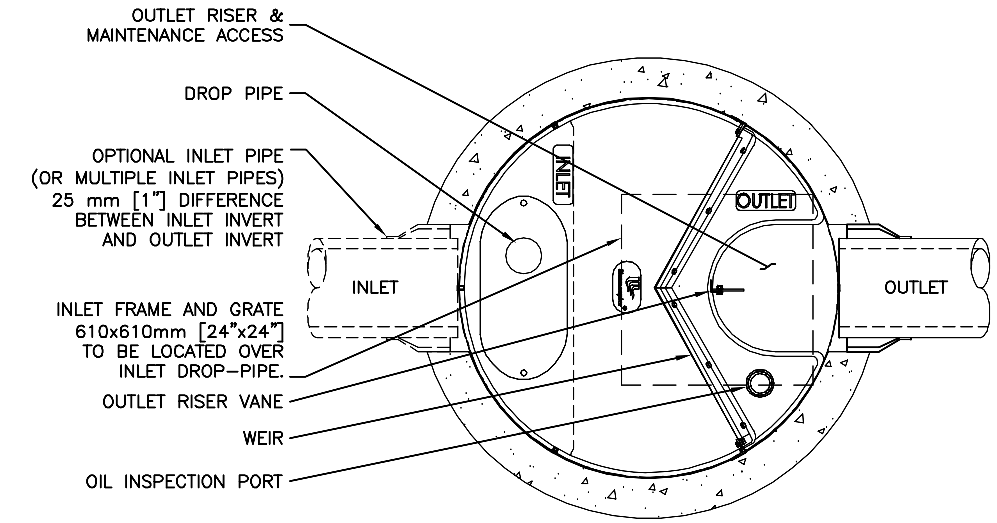
3.4.1 For an OGS device to be an acceptable stormwater treatment device on a site where vehicular traffic occurs and the potential for an oil or fuel spill exists, the OGS device must have reported verified performance results of greater than 99% cumulative retention of LDPE plastic beads for the five specified surface loading rates (ranging 200 L/min/m^2 to 2600 L/min/m^2) in accordance with the Light Liquid Re-entrainment Simulation Testing within the Canadian ETV Program's **Procedure for Laboratory Testing of Oil-Grit Separators.** However, an OGS device shall not be allowed if the Light Liquid Re-entrainment Simulation Testing was performed with screening components within the OGS device that are effective at retaining the LDPE plastic beads, but would not be expected to retain light liquids such as oil and fuel.



SECTION VIEW



PLAN VIEW (STANDARD)



PLAN VIEW (INLET TOP)

FOR SITE SPECIFIC DRAWINGS PLEASE CONTACT YOUR LOCAL STORMCEPTOR REPRESENTATIVE. SITE SPECIFIC DRAWINGS ARE BASED ON THE BEST AVAILABLE INFORMATION AT THE TIME. SOME FIELD REVISIONS TO THE SYSTEM LOCATION OR CONNECTION PIPING MAY BE NECESSARY BASED ON AVAILABLE SPACE OR SITE CONFIGURATION REVISIONS. ELEVATIONS SHOULD BE MAINTAINED EXCEPT WHERE NOTED ON BYPASS STRUCTURE (IF REQUIRED).

GENERAL NOTES:

* MAXIMUM SURFACE LOADING RATE (SLR) INTO LOWER CHAMBER THROUGH DROP PIPE IS 1135 L/min/m^2 (27.9 gpm/ft^2) FOR STORMCEPTOR EF4 AND 535 L/min/m^2 (13.1 gpm/ft^2) FOR STORMCEPTOR EFO4 (OIL CAPTURE CONFIGURATION). WEIR HEIGHT IS 150 mm (6 INCH) FOR EF04.

1. ALL DIMENSIONS INDICATED ARE IN MILLIMETERS (INCHES) UNLESS OTHERWISE SPECIFIED.
2. STORMCEPTOR STRUCTURE INLET AND OUTLET PIPE SIZE AND ORIENTATION SHOWN FOR INFORMATIONAL PURPOSES ONLY.
3. UNLESS OTHERWISE NOTED, BYPASS INFRASTRUCTURE, SUCH AS ALL UPSTREAM DIVERSION STRUCTURES, CONNECTING STRUCTURES, OR PIPE CONDUITS CONNECTING TO COMPLETE THE STORMCEPTOR SYSTEM SHALL BE PROVIDED AND ADDRESSED SEPARATELY.
4. DRAWING FOR INFORMATION PURPOSES ONLY. REFER TO ENGINEER'S SITE/UTILITY PLAN FOR STRUCTURE ORIENTATION.
5. NO PRODUCT SUBSTITUTIONS SHALL BE ACCEPTED UNLESS SUBMITTED 10 DAYS PRIOR TO PROJECT BID DATE, OR AS DIRECTED BY THE ENGINEER OF RECORD.

INSTALLATION NOTES

A. ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD.
B. CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE STRUCTURE (LIFTING CLUTCHES PROVIDED)
C. CONTRACTOR WILL INSTALL AND LEVEL THE STRUCTURE, SEALING THE JOINTS, LINE ENTRY AND EXIT POINTS (NON-SHRINK GROUT WITH APPROVED WATERSTOP OR FLEXIBLE BOOT)
D. CONTRACTOR TO TAKE APPROPRIATE MEASURES TO PROTECT THE DEVICE FROM CONSTRUCTION-RELATED EROSION RUNOFF.
E. DEVICE ACTIVATION, BY CONTRACTOR, SHALL OCCUR ONLY AFTER SITE HAS BEEN STABILIZED AND THE STORMCEPTOR UNIT IS CLEAN AND FREE OF DEBRIS.

STANDARD DETAIL
NOT FOR CONSTRUCTION

SITE SPECIFIC DATA REQUIREMENTS

STORMCEPTOR MODEL	EF4				
STRUCTURE ID					*
WATER QUALITY FLOW RATE (L/s)					*
PEAK FLOW RATE (L/s)					*
RETURN PERIOD OF PEAK FLOW (yrs)					*
DRAINAGE AREA (HA)					*
DRAINAGE AREA IMPERVIOUSNESS (%)					*
PIPE DATA:	I.E.	MAT'L	DIA	SLOPE %	HGL
INLET #1	*	*	*	*	*
INLET #2	*	*	*	*	*
OUTLET	*	*	*	*	*

* PER ENGINEER OF RECORD

The design and information shown on this drawing is provided as a service to the project owner, engineer and contractor by Imbrium Systems ("Imbrium"). Neither this drawing, nor any part thereof, may be used, reproduced or modified in any manner without the prior written consent of Imbrium. Failure to comply is done at the user's own risk and Imbrium expressly disclaims any liability or responsibility for such use.

If discrepancies between the supplied information upon which the drawing is based and actual field conditions are encountered as site work progresses, these discrepancies must be reported to Imbrium immediately for re-evaluation of the design. Imbrium accepts no liability for designs based on missing, incomplete or inaccurate information supplied by others.

MARK	DATE	REVISION DESCRIPTION	BY
0	5/26/17	INITIAL RELEASE	JSK
1	6/8/18	UPDATES	JSK
####	####	####	####
####	####	####	####
####	####	####	####

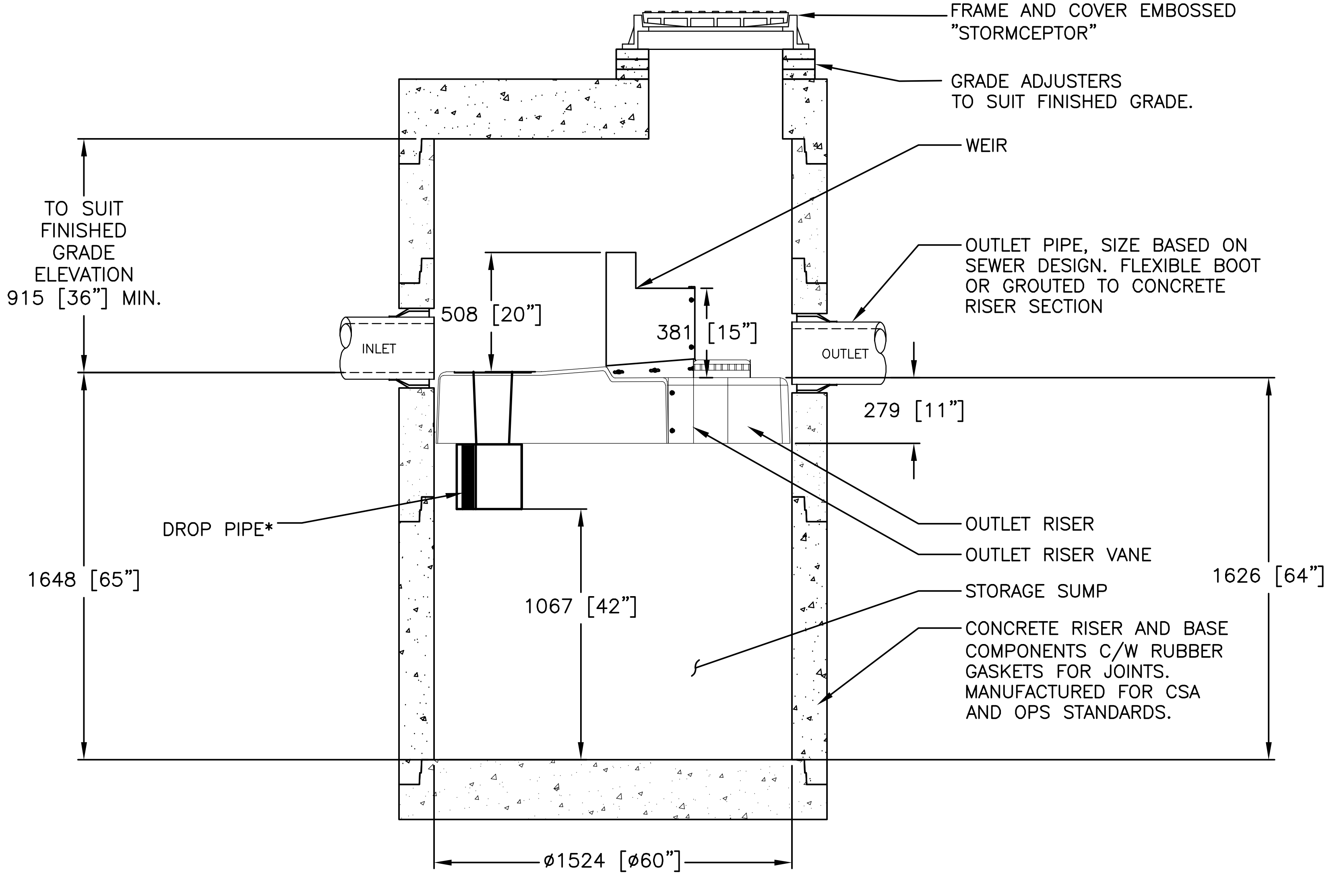
Stormceptor® EF

SCALE = NTS

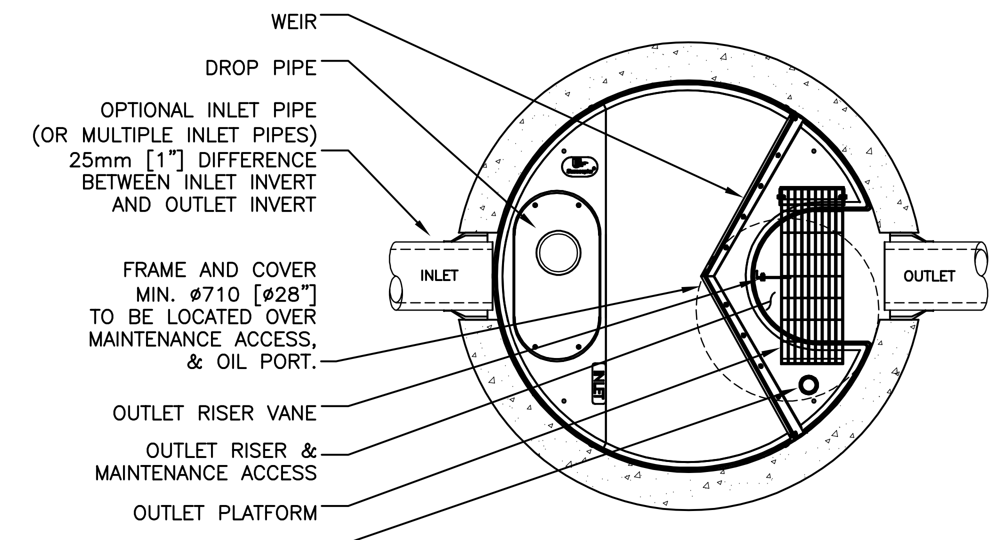
imbrium

DATE: 5/26/2017	
DESIGNED: JSK	DRAWN: JSK
CHECKED: BSF	APPROVED: SP
PROJECT No.: EF4	SEQUENCE No.: *
SHEET: 1 OF 1	

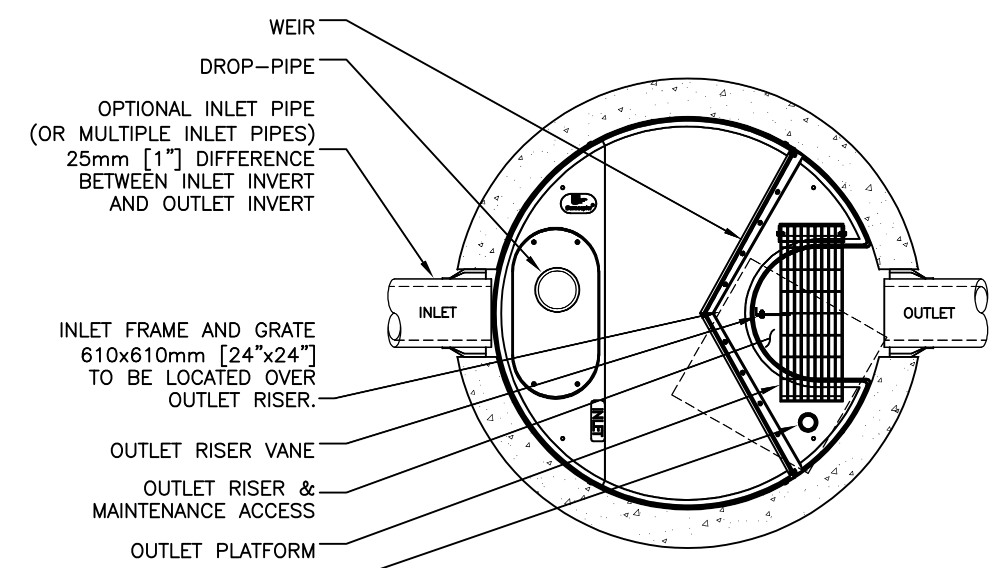
DRAWING NOT TO BE USED FOR CONSTRUCTION



SECTION VIEW



PLAN VIEW (STANDARD)



PLAN VIEW (INLET TOP)

GENERAL NOTES:

* MAXIMUM SURFACE LOADING RATE (SLR) INTO LOWER CHAMBER THROUGH DROP PIPE IS 1135 L/min/m^2 (27.9 gpm/ft^2) FOR STORMCEPTOR EF5 AND 535 L/min/m^2 (13.1 gpm/ft^2) FOR STORMCEPTOR EFO5 (OIL CAPTURE CONFIGURATION).

1. ALL DIMENSIONS INDICATED ARE IN MILLIMETERS (INCHES) UNLESS OTHERWISE SPECIFIED.
2. STORMCEPTOR STRUCTURE INLET AND OUTLET PIPE SIZE AND ORIENTATION SHOWN FOR INFORMATIONAL PURPOSES ONLY.
3. UNLESS OTHERWISE NOTED, BYPASS INFRASTRUCTURE, SUCH AS ALL UPSTREAM DIVERSION STRUCTURES, CONNECTING STRUCTURES, OR PIPE CONDUITS CONNECTING TO COMPLETE THE STORMCEPTOR SYSTEM SHALL BE PROVIDED AND ADDRESSED SEPARATELY.
4. DRAWING FOR INFORMATION PURPOSES ONLY. REFER TO ENGINEER'S SITE/UTILITY PLAN FOR STRUCTURE ORIENTATION.
5. NO PRODUCT SUBSTITUTIONS SHALL BE ACCEPTED UNLESS SUBMITTED 10 DAYS PRIOR TO PROJECT BID DATE, OR AS DIRECTED BY THE ENGINEER OF RECORD.

INSTALLATION NOTES

A. ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD.
B. CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE STRUCTURE (LIFTING CLUTCHES PROVIDED)
C. CONTRACTOR WILL INSTALL AND LEVEL THE STRUCTURE, SEALING THE JOINTS, LINE ENTRY AND EXIT POINTS (NON-SHRINK GROUT WITH APPROVED WATERSTOP OR FLEXIBLE BOOT)
D. CONTRACTOR TO TAKE APPROPRIATE MEASURES TO PROTECT THE DEVICE FROM CONSTRUCTION-RELATED EROSION RUNOFF.
E. DEVICE ACTIVATION, BY CONTRACTOR, SHALL OCCUR ONLY AFTER SITE HAS BEEN STABILIZED AND THE STORMCEPTOR UNIT IS CLEAN AND FREE OF DEBRIS.

FOR SITE SPECIFIC DRAWINGS PLEASE CONTACT YOUR LOCAL STORMCEPTOR REPRESENTATIVE. SITE SPECIFIC DRAWINGS ARE BASED ON THE BEST AVAILABLE INFORMATION AT THE TIME. SOME FIELD REVISIONS TO THE SYSTEM LOCATION OR CONNECTION PIPING MAY BE NECESSARY BASED ON AVAILABLE SPACE OR SITE CONFIGURATION REVISIONS. ELEVATIONS SHOULD BE MAINTAINED EXCEPT WHERE NOTED ON BYPASS STRUCTURE (IF REQUIRED).

STANDARD DETAIL
NOT FOR CONSTRUCTION

SITE SPECIFIC DATA REQUIREMENTS

STORMCEPTOR MODEL	EF5				
STRUCTURE ID	*				
WATER QUALITY FLOW RATE (L/s)	*				
PEAK FLOW RATE (L/s)	*				
RETURN PERIOD OF PEAK FLOW (yrs)	*				
DRAINAGE AREA (HA)	*				
DRAINAGE AREA IMPERVIOUSNESS (%)	*				
PIPE DATA:	I.E.	MAT'L	DIA	SLOPE %	HGL
INLET #1	*	*	*	*	*
INLET #2	*	*	*	*	*
OUTLET	*	*	*	*	*

* PER ENGINEER OF RECORD

MARK	DATE	REVISION DESCRIPTION	BY
####	####	####	####
####	####	####	####
####	####	####	####
####	####	####	####
0	08/22/24	INITIAL RELEASE	EC

Stormceptor® EF

SCALE = NTS

imbrium®

407 FAIRVIEW DRIVE, WHITBY, ON L1N 3A9

DATE: 8/22/2024

DESIGNED: JSK | DRAWN: EC

CHECKED: BSF | APPROVED:

PROJECT No.: EF5 | SEQUENCE No.: *

SHEET: 1 OF 1

C:\USERS\ERIC.CARMONA-EPP\ONEDRIVE - THE QUIKRETE COMPANIES\DESKTOP\EF5 EXTRA\EF5-DETAIL.DWG 8/22/2024 4:31 PM

◆ Verification Statement ◆ Verification Statement ◆ Verification Statement ◆

VERIFICATION STATEMENT

GLOBE Performance Solutions

Verifies the performance of

Stormceptor® EF4 and EFO4 Oil-Grit Separators

Developed by Imbrium Systems, Inc.,
Whitby, Ontario, Canada

In accordance with

ISO 14034:2016

Environmental management —
Environmental technology verification (ETV)

John D. Wiebe, PhD
Executive Chairman
GLOBE Performance Solutions

November 10, 2017
Vancouver, BC, Canada

Verification Body
GLOBE Performance Solutions
404 – 999 Canada Place | Vancouver, B.C | Canada |V6C 3E2

Technology description and application

The Stormceptor® EF4 and EFO4 are treatment devices designed to remove oil, sediment, trash, debris, and pollutants attached to particulates from Stormwater and snowmelt runoff. The device takes the place of a conventional manhole within a storm drain system and offers design flexibility that works with various site constraints. The EFO4 is designed with a shorter bypass weir height, which accepts lower surface loading rate into the sump, thereby reducing re-entrainment of captured free floating light liquids.

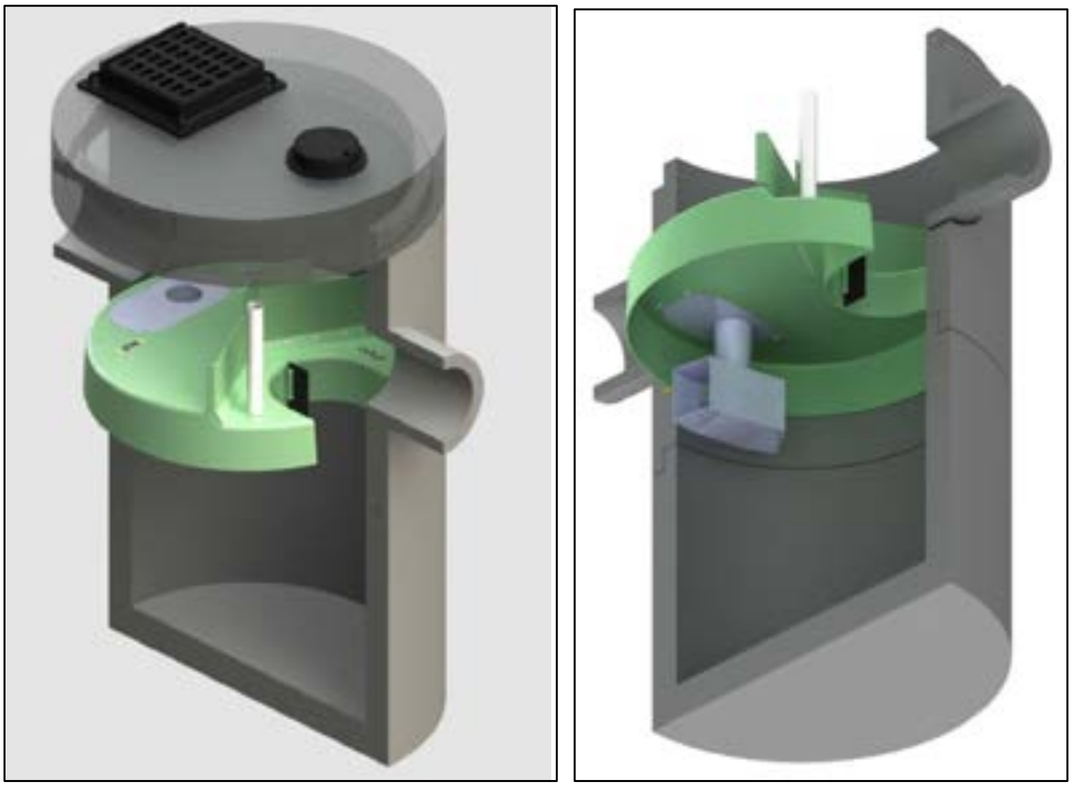


Figure 1. Graphic of typical inline Stormceptor® unit and core components.

Stormwater and snowmelt runoff enters the Stormceptor® EF/EFO's upper chamber through the inlet pipe(s) or a surface inlet grate. An insert divides the unit into lower and upper chambers and incorporates a weir to reduce influent velocity and separate influent (untreated) from effluent (treated) flows. Influent water ponds upstream of the insert's weir providing driving head for the water flowing downwards into the drop pipe where a vortex pulls the water into the lower chamber. The water diffuses at lower velocities in multiple directions through the drop pipe outlet openings. Oil and other floatables rise up and are trapped beneath the insert, while sediments undergo gravitational settling to the sump's bottom. Water from the sump can exit by flowing upward to the outlet riser onto the top side of the insert and downstream of the weir, where it discharges through the outlet pipe.

Maximum flow rate into the lower chamber is a function of weir height and drop pipe orifice diameter. The Stormceptor® EF and EFO are designed to allow a surface loading rate of 1135 L/min/m² (27.9 gal/min/ft²) and 535 L/min/m² (13.1 gal/min/ft²) into the lower chamber, respectively. When prescribed surface loading rates are exceeded, ponding water can overtop the weir height and bypass the lower treatment chamber, exiting directly through the outlet pipe. Hydraulic testing and scour testing demonstrate that the internal bypass effectively prevents scour at all bypass flow rates. Increasing the bypass flow rate does not increase the orifice-controlled flow rate into the lower treatment chamber where sediment is stored. This internal bypass feature allows for in-line installation, avoiding the cost of additional bypass structures. During bypass, treatment continues in the lower chamber at the maximum flow rate. The Stormceptor® EFO's lower design surface loading rate is favorable for minimizing re-entrainment and washout of captured light liquids. Inspection of Stormceptor® EF and EFO devices is performed from grade by inserting a sediment probe through the outlet riser and an oil dipstick through the oil inspection pipe. The unit can be maintained by using a vacuum hose through the outlet riser.

Performance conditions

The data and results published in this Technology Fact Sheet were obtained from the testing program conducted on the Imbrium Systems Inc.'s Stormceptor® OGS device, in accordance with the Procedure for Laboratory Testing of Oil-Grit Separators (Version 3.0, June 2014). The Procedure was prepared by the Toronto and Region Conservation Authority (TRCA) for Environment Canada's Environmental Technology Verification (ETV) Program. A copy of the Procedure may be accessed on the Canadian ETV website at www.etvcanada.ca.

Performance claim(s)

Capture test [a]:

During the capture test, the Stormceptor® EF OGS device, with a false floor set to 50% of the manufacturer's recommended maximum sediment storage depth and a constant influent test sediment concentration of 200 mg/L, removes 70, 64, 54, 48, 46, 44, and 49 percent of influent sediment by mass at surface loading rates of 40, 80, 200, 400, 600, 1000, and 1400 L/min/m^2, respectively.

Stormceptor® EFO, with a false floor set to 50% of the manufacturer's recommended maximum sediment storage depth and a constant influent test sediment concentration of 200 mg/L, removes 70, 64, 54, 48, 42, 40, and 34 percent of influent sediment by mass at surface loading rates of 40, 80, 200, 400, 600, 1000, and 1400 L/min/m^2, respectively.

Scour test [a]:

During the scour test, the Stormceptor® EF and Stormceptor® EFO OGS devices, with 10.2 cm (4 inches) of test sediment pre-loaded onto a false floor reaching 50% of the manufacturer's recommended maximum sediment storage depth, generate corrected effluent concentrations of 4.6, 0.7, 0, 0.2, and 0.4 mg/L at 5-minute duration surface loading rates of 200, 800, 1400, 2000, and 2600 L/min/m^2, respectively.

Light liquid re-entrainment test [a]:

During the light liquid re-entrainment test, the Stormceptor® EFO OGS device with surrogate low-density polyethylene beads preloaded within the lower chamber oil collection zone, representing a floating light liquid volume equal to a depth of 50.8 mm over the sedimentation area, retained 100, 99.5, 99.8, 99.8, and 99.9 percent of loaded beads by mass during the 5-minute duration surface loading rates of 200, 800, 1400, 2000, and 2600 L/min/m^2.

[a] The claim can be applied to other units smaller or larger than the tested unit as long as the untested units meet the scaling rule specified in the Procedure for Laboratory of Testing of Oil Grit Separators (Version 3.0, June 2014)

Performance results

The test sediment consisted of ground silica (1 – 1000 micron) with a specific gravity of 2.65, uniformly mixed to meet the particle size distribution specified in the testing procedure. The *Procedure for Laboratory Testing of Oil Grit Separators* requires that the three sample average of the test sediment particle size distribution (PSD) meet the specified PSD percent less than values within a boundary threshold of 6%. The comparison of the average test sediment PSD to the CETV specified PSD in Figure 2 indicates that the test sediment used for the capture and scour tests met this condition.

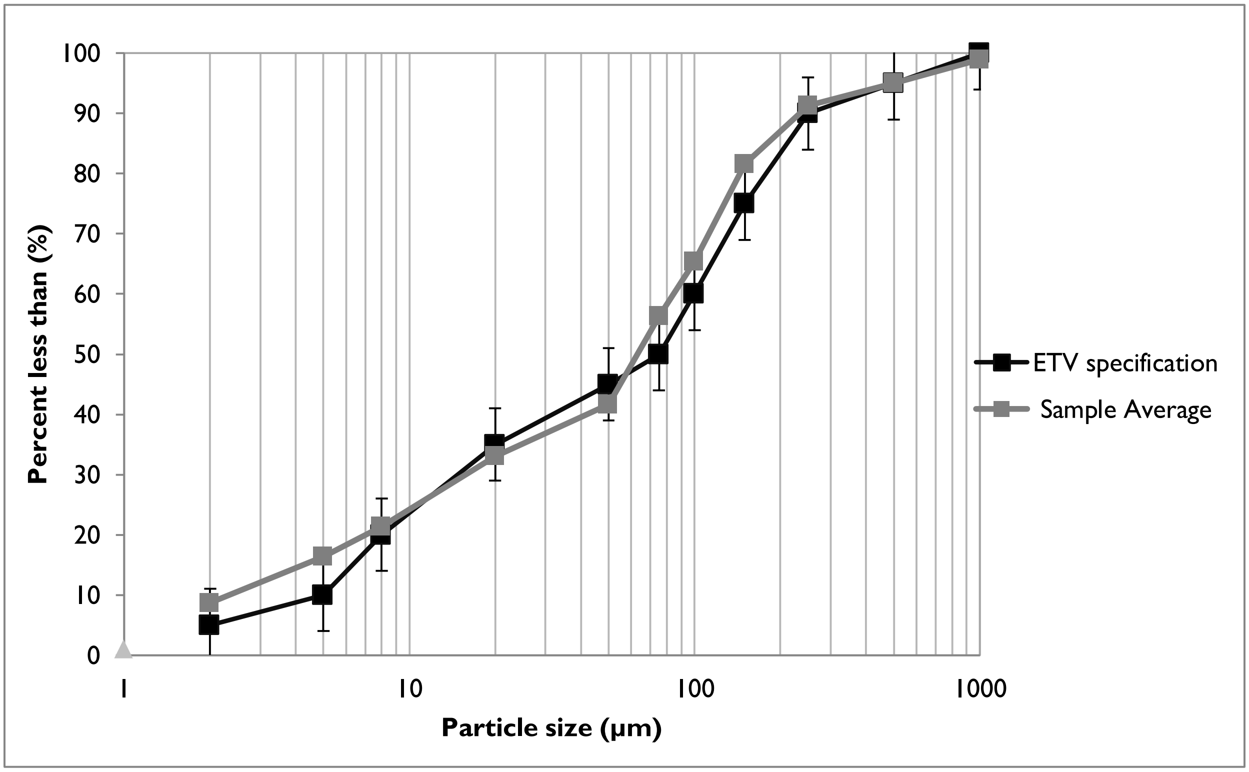


Figure 2. The three sample average particle size distribution (PSD) of the test sediment used for the capture and scour test compared to the specified PSD.

The capacity of the device to retain sediment was determined at seven surface loading rates using the modified mass balance method. This method involved measuring the mass and particle size distribution of the injected and retained sediment for each test run. Performance was evaluated with a false floor simulating the technology filled to 50% of the manufacturer's recommended maximum sediment storage depth. The test was carried out with clean water that maintained a sediment concentration below 20 mg/L. Based on these conditions, removal efficiencies for individual particle size classes and for the test sediment as a whole were determined for each of the tested surface loading rates (Table 1). Since the EF and EFO models are identical except for the weir height, which bypasses flows from the EFO model at a surface loading rate of 535 L/min/m² (13.1 gpm/ft²), sediment capture tests at surface loading rates from 40 to 400 L/min/m² were only performed on the EF unit. Surface loading rates of 600, 1000, and 1400 L/min/m² were tested on both units separately. Results for the EFO model at these higher flow rates are presented in Table 2.

In some instances, the removal efficiencies were above 100% for certain particle size fractions. These discrepancies are not unique to any one test laboratory and may be attributed to errors relating to the blending of sediment, collection of representative samples for laboratory submission, and laboratory analysis of PSD. Due to these errors, caution should be exercised in applying the removal efficiencies by particle size fraction for the purposes of sizing the tested device (see Bulletin # CETV 2016-11-0001). The results for "all particle sizes by mass balance" (see Table 1 and 2) are based on measurements of the total injected and retained sediment mass, and are therefore not subject to blending, sampling or PSD analysis errors.

Table 1. Removal efficiencies (%) of the EF4 at specified surface loading rates

Particle size fraction (µm)	Surface loading rate (L/min/m^2)						
	40	80	200	400	600	1000	1400
>500	90	58	58	100*	86	72	100*
250 - 500	100*	100*	100	100*	100*	100*	100*
150 - 250	90	82	26	100*	100*	67	90
105 - 150	100*	100*	100*	100*	100*	100*	100
75 - 105	100*	92	74	82	77	68	76
53 - 75	Undefined [a]	56	100*	72	69	50	80
20 - 53	54	100*	54	33	36	40	31
8 - 20	67	52	25	21	17	20	20
5 – 8	33	29	11	12	9	7	19
<5	13	0	0	0	0	0	4
All particle sizes by mass balance	**70.4**	**63.8**	**53.9**	**47.5**	**46.0**	**43.7**	**49.0**

[a] An outlier in the feed sample sieve data resulted in a negative removal efficiency for this size fraction.
* Removal efficiencies were calculated to be above 100%. Calculated values ranged between 101 and 171% (average 128%). See text and Bulletin # CETV 2016-11-0001 for more information.

Table 2. Removal efficiencies (%) of the EFO4 at surface loading rates above the bypass rate of 535 L/min/m^2

Particle size fraction (µm)	Surface loading rate (L/min/m^2)		
	600	1000	1400
>500	89	83	100*
250 - 500	90	100*	92
150 - 250	90	67	100*
105 - 150	85	92	77
75 - 105	80	71	65
53 - 75	60	31	36
20 - 53	33	43	23
8 - 20	17	23	15
5 – 8	10	3	3
<5	0	0	0
All particle sizes by mass balance	**41.7**	**39.7**	**34.2**

* Removal efficiencies were calculated to be above 100%. Calculated values ranged between 103 and 111% (average 107%). See text and Bulletin # CETV 2016-11-0001 for more information.

Figure 3 compares the particle size distribution (PSD) of the three sample average of the test sediment to the PSD of the sediment retained by the EF4 at each of the tested surface loading rates. Figure 4 shows the same graph for the EFO4 unit at surface loading rates above the bypass rate of 535 L/min/m^2.

As expected, the capture efficiency for fine particles in both units was generally found to decrease as surface loading rates increased.

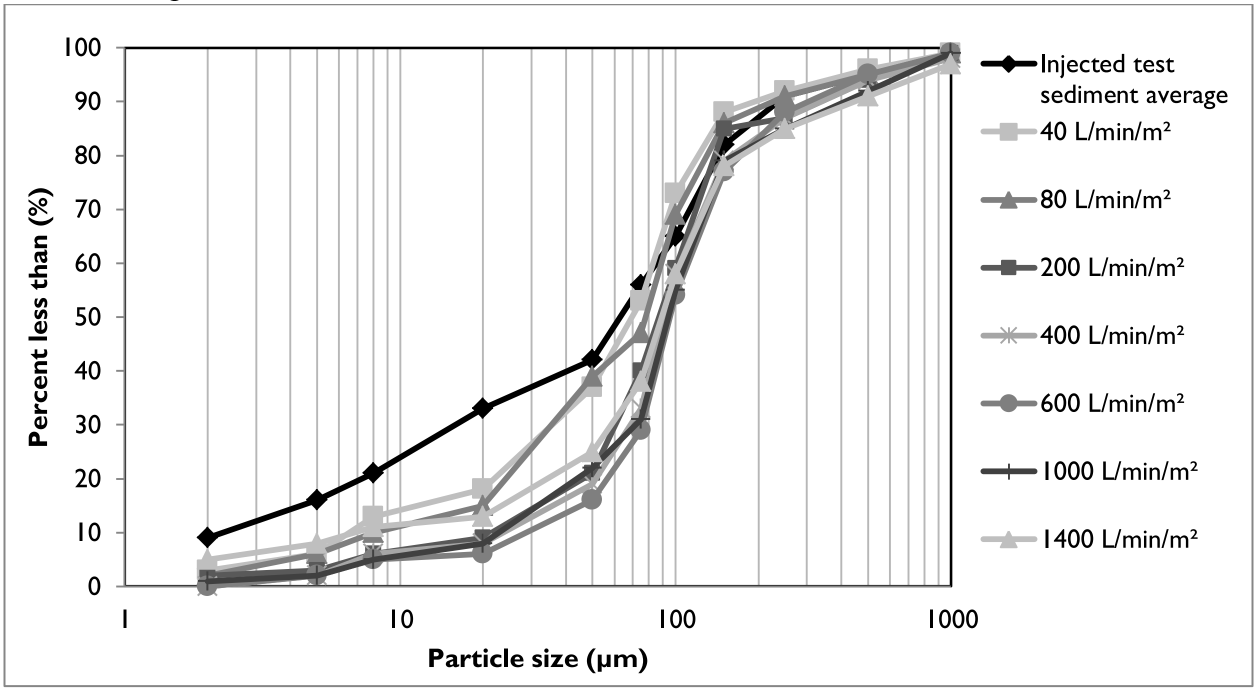


Figure 3. Particle size distribution of sediment retained in the EF4 in relation to the injected test sediment average.

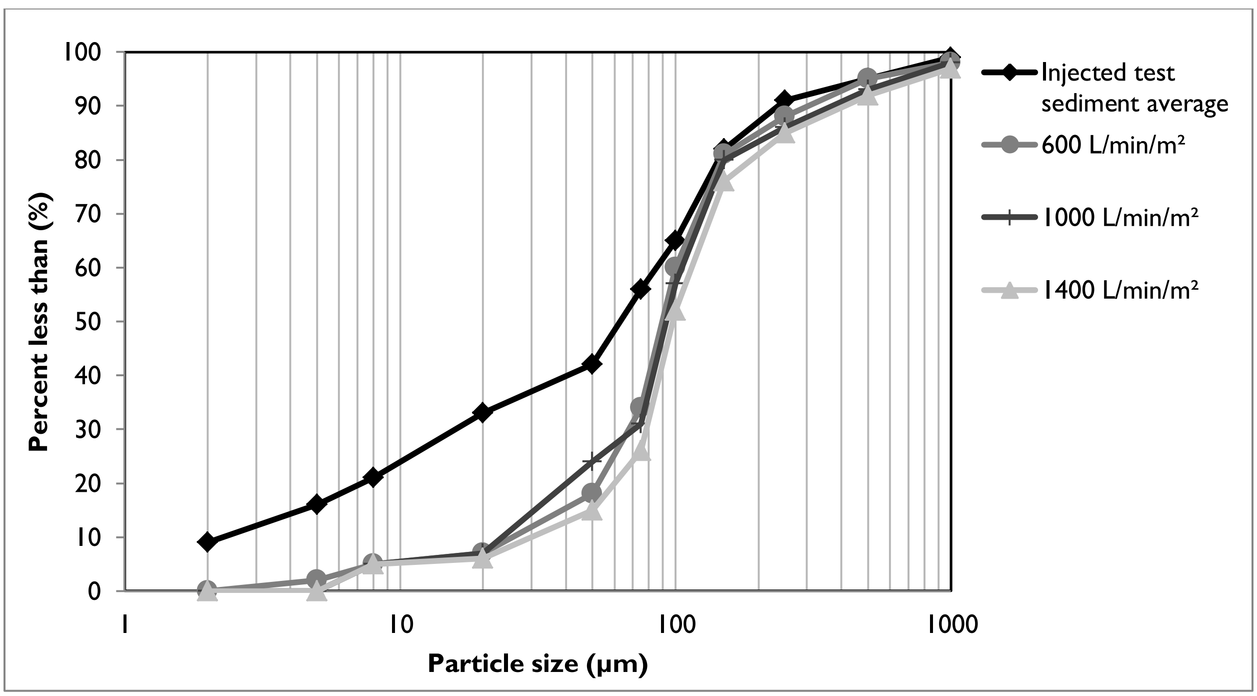


Figure 4. Particle size distribution of sediment retained in the EFO4 in relation to the injected test sediment average at surface loading rates above the bypass rate of 535 L/min/m²

Table 4 shows the results of the sediment scour and re-suspension test for the EF4 unit. The EFO4 was not tested as it was reasonably assumed that scour rates would be lower given that flow bypass occurs at a lower surface loading rate. The scour test involved preloading 10.2 cm of fresh test sediment into the sedimentation sump of the device. The sediment was placed on a false floor to mimic a device filled to 50% of the maximum recommended sediment storage depth. Clean water was run through the device at five surface loading rates over a 30 minute period. Each flow rate was maintained for 5 minutes with a one minute transition time between flow rates. Effluent samples were collected at one minute sampling intervals and analyzed for Suspended Sediment Concentration (SSC) and PSD by recognized methods. The effluent samples were subsequently adjusted based on the background concentration of the influent water. Typically, the smallest 5% of particles captured during the 40 L/min/m^2 sediment capture test is also used to adjust the concentration, as per the method described in Bulletin # CETV 2016-09-0001. However, since the composites of effluent concentrations were below the Reporting Detection Limit of the Laser Diffraction PSD methodology, this adjustment was not made. Results showed average adjusted effluent sediment concentrations below 5 mg/L at all tested surface loading rates.

It should be noted that the EF4 starts to internally bypass water at 1135 L/min/m^2, potentially resulting in the dilution of effluent concentrations, which would not normally occur under typical field conditions because the field influent concentration would contain a much higher sediment concentration than during the lab test. Recalculation of effluent concentrations to account for dilution at surface loading rates above the bypass rate showed sediment effluent concentrations to be below 1.6 mg/L.

Table 4. Scour test adjusted effluent sediment concentration.

Run	Surface loading rate (L/min/m^2)	Run time (min)	Background sample concentration (mg/L)	Adjusted effluent suspended sediment concentration (mg/L) [a]	Average (mg/L)
1	200	1:00	<RDL	11.9	4.6
		2:00		7.0	
		3:00		4.4	
		4:00		2.2	
		5:00		1.0	
		6:00		1.2	
2	800	7:00	<RDL	1.1	0.7
		8:00		0.9	
		9:00		0.6	
		10:00		1.4	
		11:00		0.1	
		12:00		0	
3	1400	13:00	<RDL	0	0
		14:00		0.1	
		15:00		0	
		16:00		0	
		17:00		0	
		18:00		0	
4	2000	19:00	1.2	0.2	0.2
		20:00		0	
		21:00		0	
		22:00		0.7	
		23:00		0	

		24:00		0.4	
5	2600	25:00	1.6	0.3	0.4
		26:00		0.4	
		27:00		0.7	
		28:00		0.4	
		29:00		0.2	
		30:00		0.4	

[a] The adjusted effluent suspended sediment concentration represents the actual measured effluent concentration minus the background concentration. For more information see Bulletin # CETV 2016-09-0001.

The results of the light liquid re-entrainment test used to evaluate the unit's capacity to prevent re-entrainment of light liquids are reported in Table 5. The test involved preloading 58.3 L (corresponding to a 5 cm depth over the collection sump area of 1.17m^2) of surrogate low-density polyethylene beads within the oil collection skirt and running clean water through the device continuously at five surface loading rates (200, 800, 1400, 2000, and 2600 L/min/m^2). Each flow rate was maintained for 5 minutes with approximately 1 minute transition time between flow rates. The effluent flow was screened to capture all re-entrained pellets throughout the test.

Table 5. Light liquid re-entrainment test results for the EFO4.

Surface Loading Rate (L/min/m2)	Time Stamp	Amount of Beads Re-entrained			
		Mass (g)	Volume (L)[a]	% of Pre-loaded Mass Re-entrained	% of Pre-loaded Mass Retained
200	62	0	0	0.00	100
800	247	168.45	0.3	0.52	99.48
1400	432	51.88	0.09	0.16	99.83
2000	617	55.54	0.1	0.17	99.84
2600	802	19.73	0.035	0.06	99.94
Total Re-entrained		295.60	0.525	0.91	--
Total Retained		32403	57.78	--	99.09
Total Loaded		32699	58.3	--	--

[a] Determined from bead bulk density of 0.56074 g/cm^3

Variances from testing Procedure

The following minor deviations from the *Procedure for Laboratory Testing of Oil-Grit Separators* (Version 3.0, June 2014) have been noted:

1. During the capture test, the 40 L/min/m^2 and 80 L/min/m^2 surface loading rates were evaluated over 3 and 2 days respectively due to the long duration needed to feed the required minimum of 11.3 kg of test sediment into the unit at these lower flow rates. Pumps were shut down at the end of each intermediate day, and turned on again the following morning. The target flow rate was re-established within 30 seconds of switching on the pump. This procedure may have allowed sediments to be captured that otherwise may have exited the unit if the test was

continuous. On the basis of practical considerations, this variance was approved by the verifier prior to testing.

2. During the scour test, the coefficient of variation (COV) for the lowest flow rate tested (200 L/min/m^2) was 0.07, which exceeded the specified limit of 0.04 target specified in the OGS Procedure. A pump capable of attaining the highest flow rate of 3036 L/min had difficulty maintaining the lowest flow of 234 L/min but still remained within +/- 10% of the target flow and is viewed as having very little impact on the observed results. Similarly, for the light liquid re-entrainment test the COV for the flow rate of the 200 L/min/m^2 run was 0.049, exceeding the limit of 0.04, but is believed to introduce negligible bias.

3. Due to pressure build up in the filters, the runs at 1000 L/min/m^2 for the Stormceptor® EF4 and 1000 and 1400 L/min/m^2 for the Stormceptor® EFO4 were slightly shorter than the target. The run times were 54, 59 and 43 minutes respectively, versus targets of 60 and 50 minutes. The final feed samples were timed to coincide with the end of the run. Since >25 lbs of sediment was fed, the shortened time did not invalidate the runs.

Verification

The verification was completed by the Verification Expert, Toronto and Region Conservation Authority, contracted by GLOBE Performance Solutions, using the International Standard ***ISO 14034:2016 Environmental management -- Environmental technology verification (ETV)***. Data and information provided by Imbrium Systems Inc. to support the performance claim included the following: Performance test report prepared by Good Harbour Laboratories, and dated September 8, 2017; the report is based on testing completed in accordance with the Procedure for Laboratory Testing of Oil-Grit Separators (Version 3.0, June 2014).

What is ISO14034:2016 Environmental management – Environmental technology verification (ETV)?

ISO 14034:2016 specifies principles, procedures and requirements for environmental technology verification (ETV), and was developed and published by the *International Organization for Standardization (ISO)*. The objective of ETV is to provide credible, reliable and independent verification of the performance of environmental technologies. An environmental technology is a technology that either results in an environmental added value or measures parameters that indicate an environmental impact. Such technologies have an increasingly important role in addressing environmental challenges and achieving sustainable development.

For more information on the Stormceptor® EF4 and EFO4 please contact:

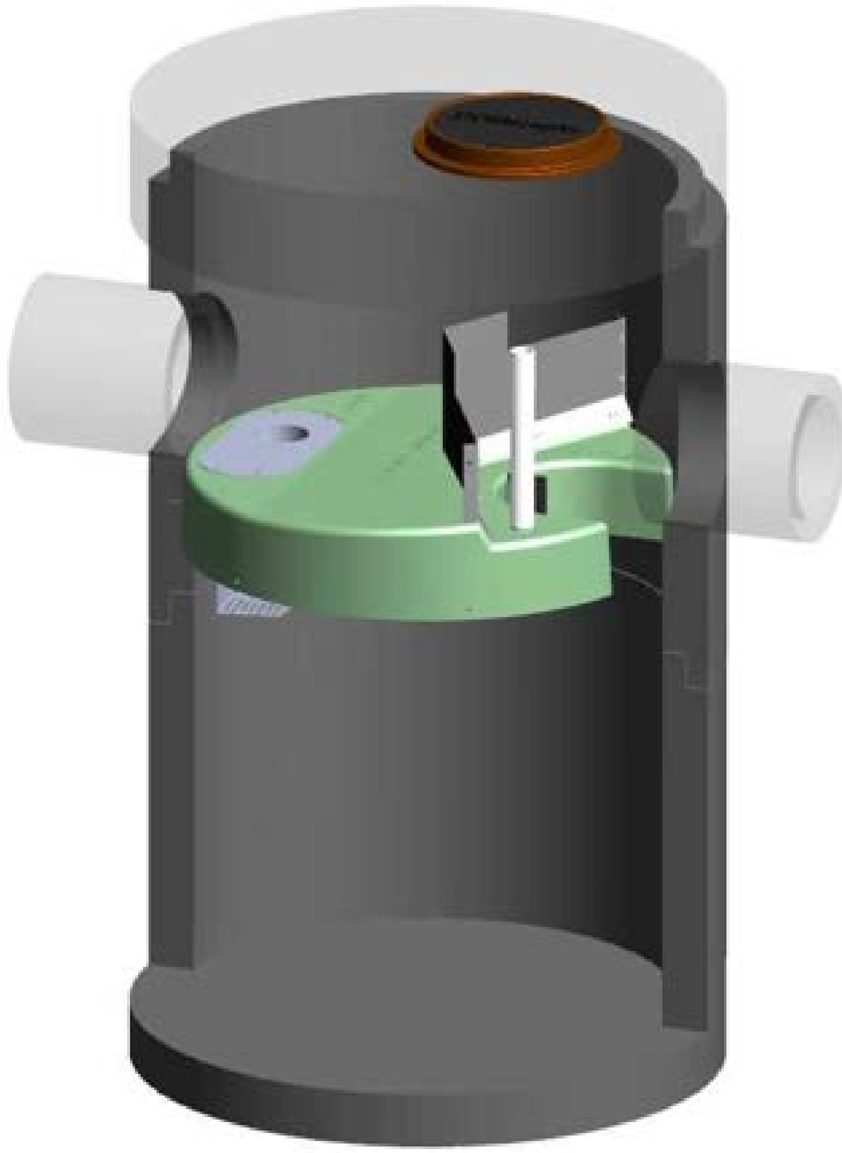
Imbrium Systems, Inc.
407 Fairview Drive
Whitby, ON
L1N 3A9, Canada
Tel: 416-960-9900
info@imbriumsystems.com

For more information on ISO 14034:2016 / ETV please contact:

GLOBE Performance Solutions
World Trade Centre
404 – 999 Canada Place
Vancouver, BC
V6C 3E2 Canada
Tel: 604-695-5018 / Toll Free: 1-855-695-5018
etv@globeperformance.com

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:

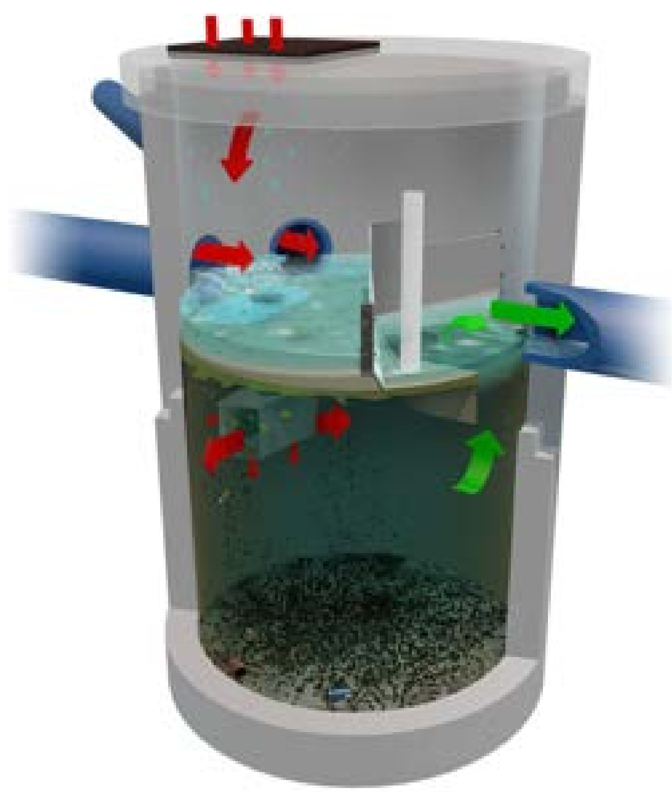
OVERVIEW

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

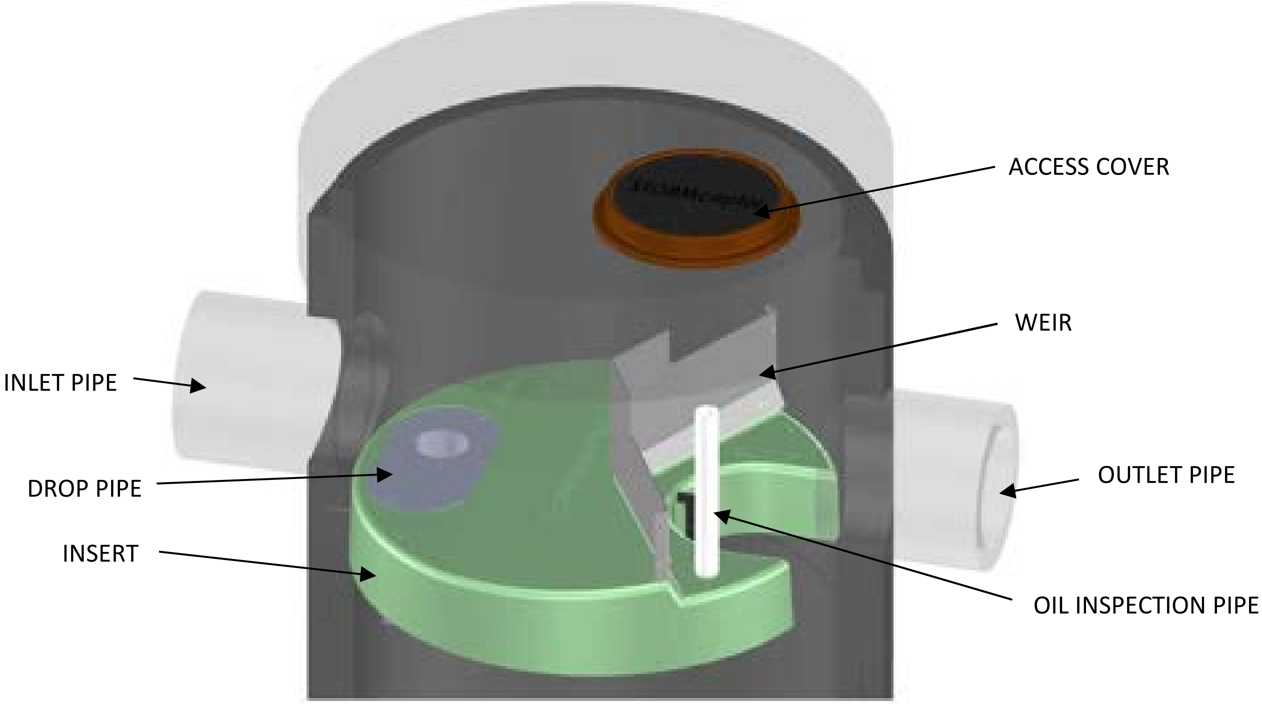


Figure 1

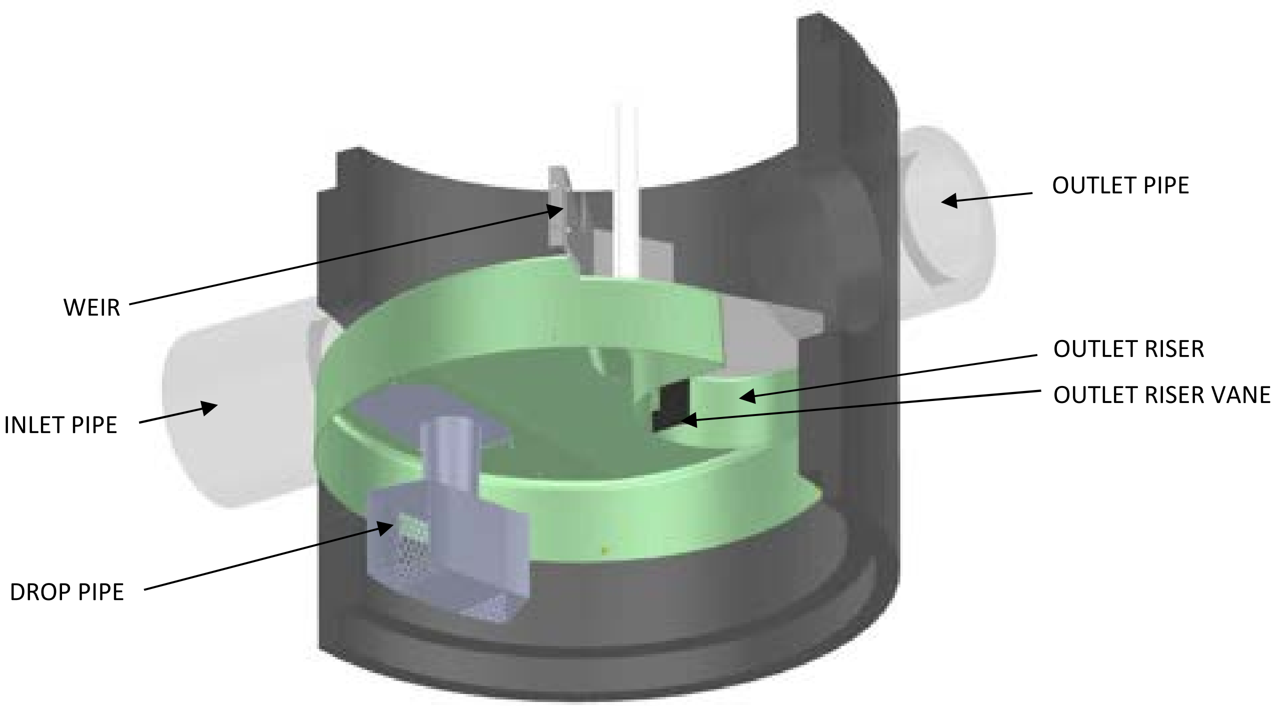


Figure 2

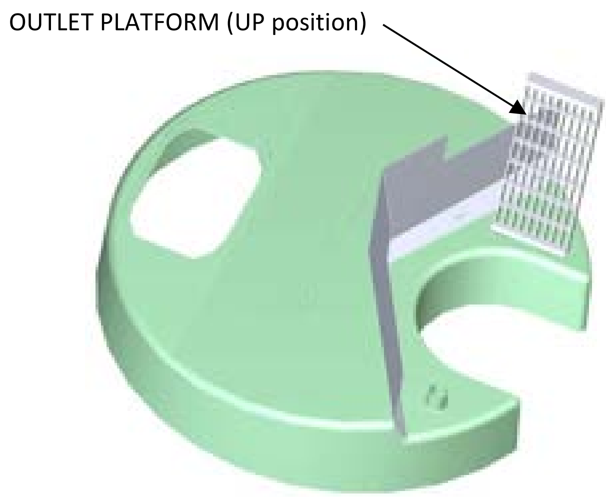


Figure 3A

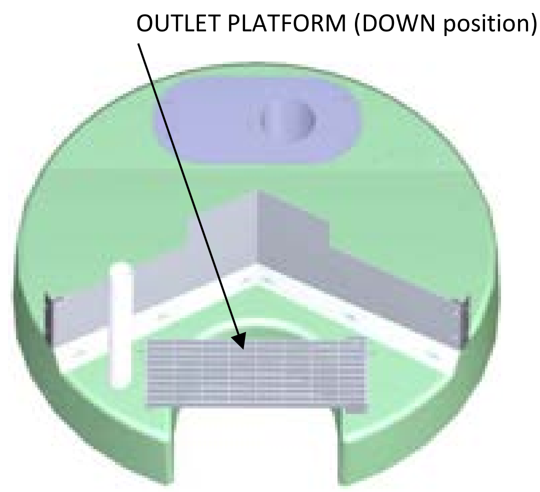


Figure 3B

- **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**.

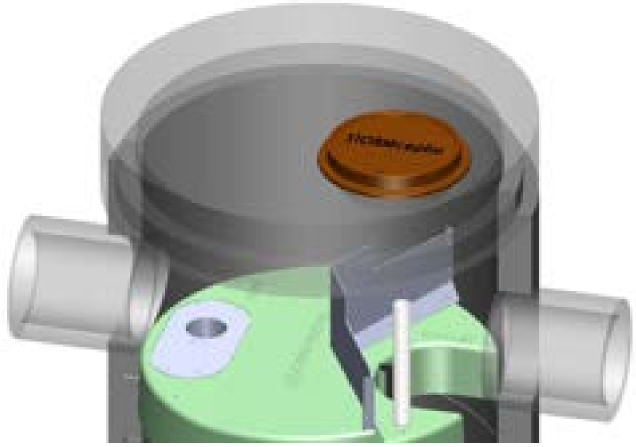


Figure 4

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**.

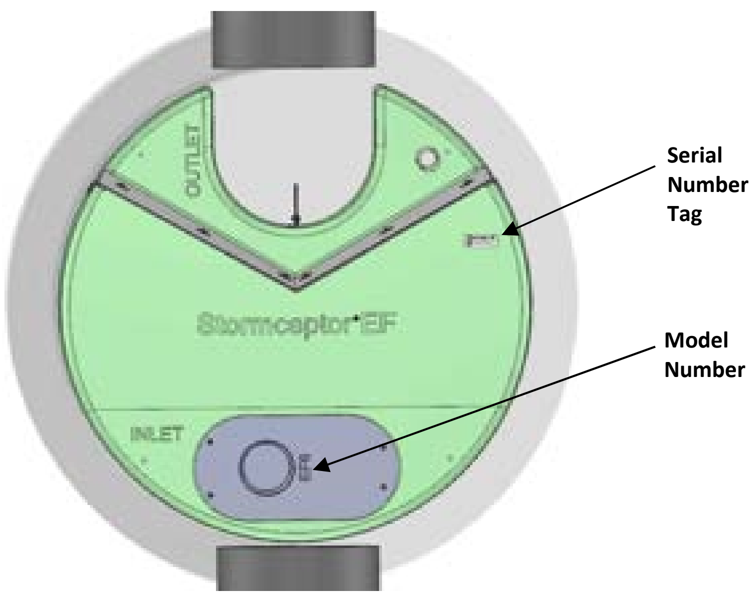


Figure 5

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.

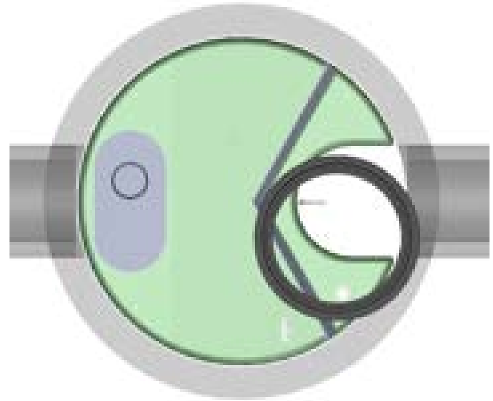


Figure 6

- 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.

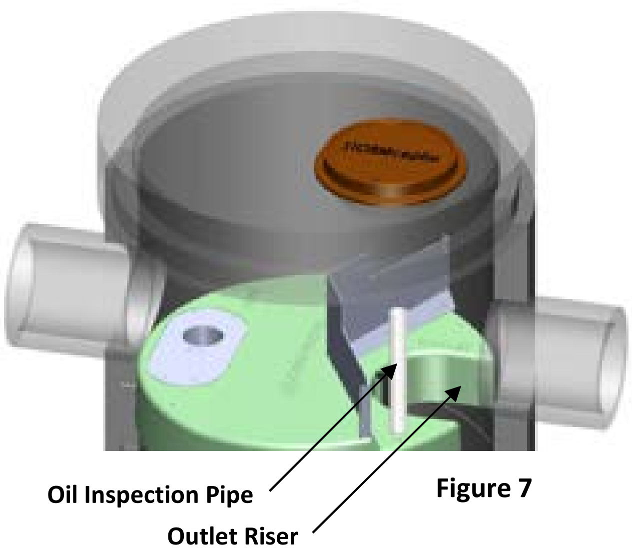


Figure 7

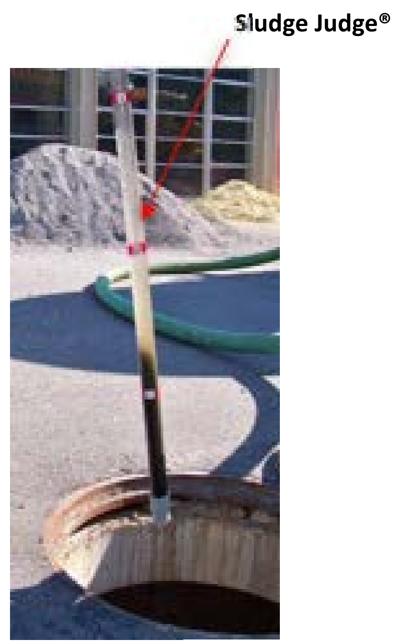


Figure 8

- 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

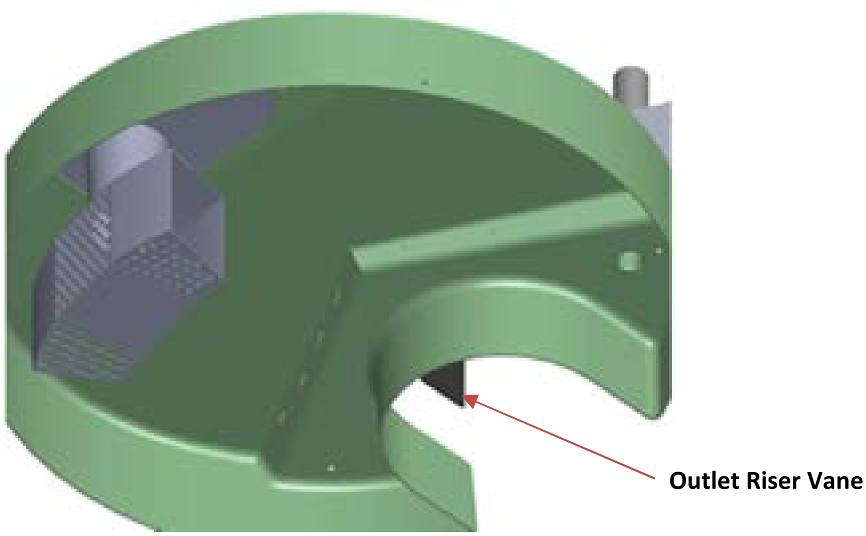


Figure 10

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.

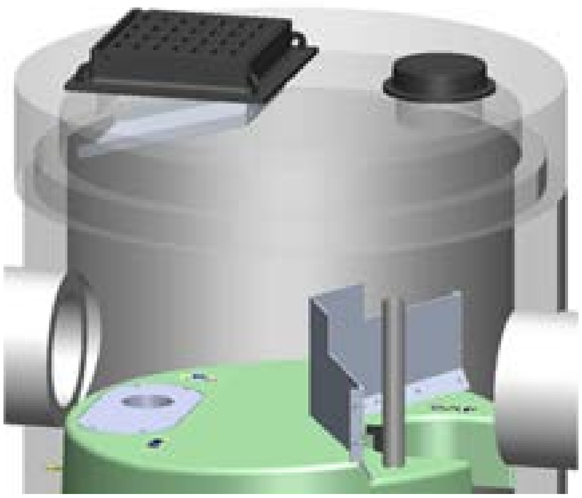
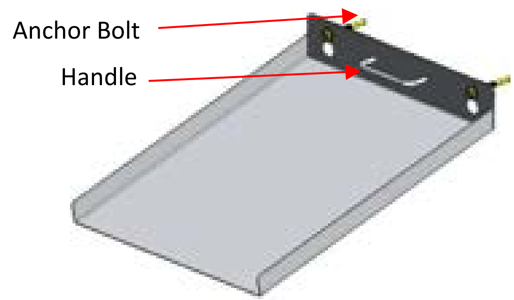


Figure 11

How to Remove:

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



Removable Flow Deflector

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.

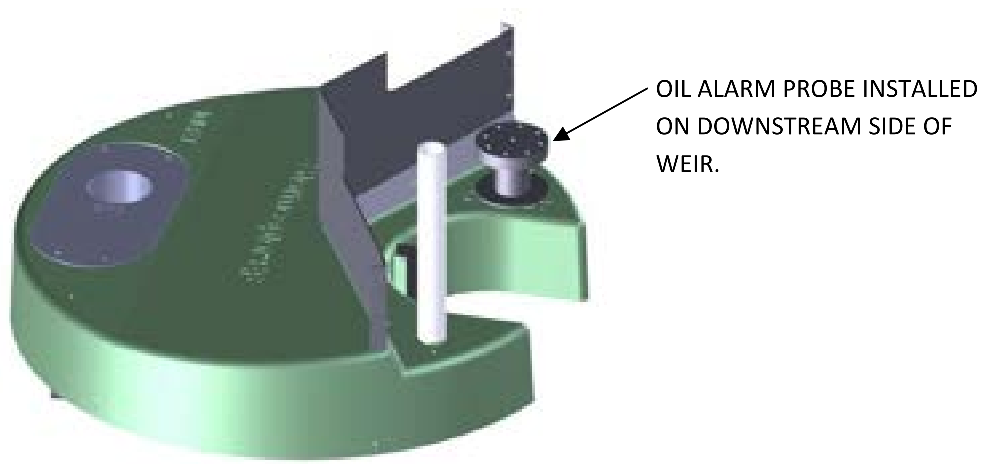


Figure 12

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**.

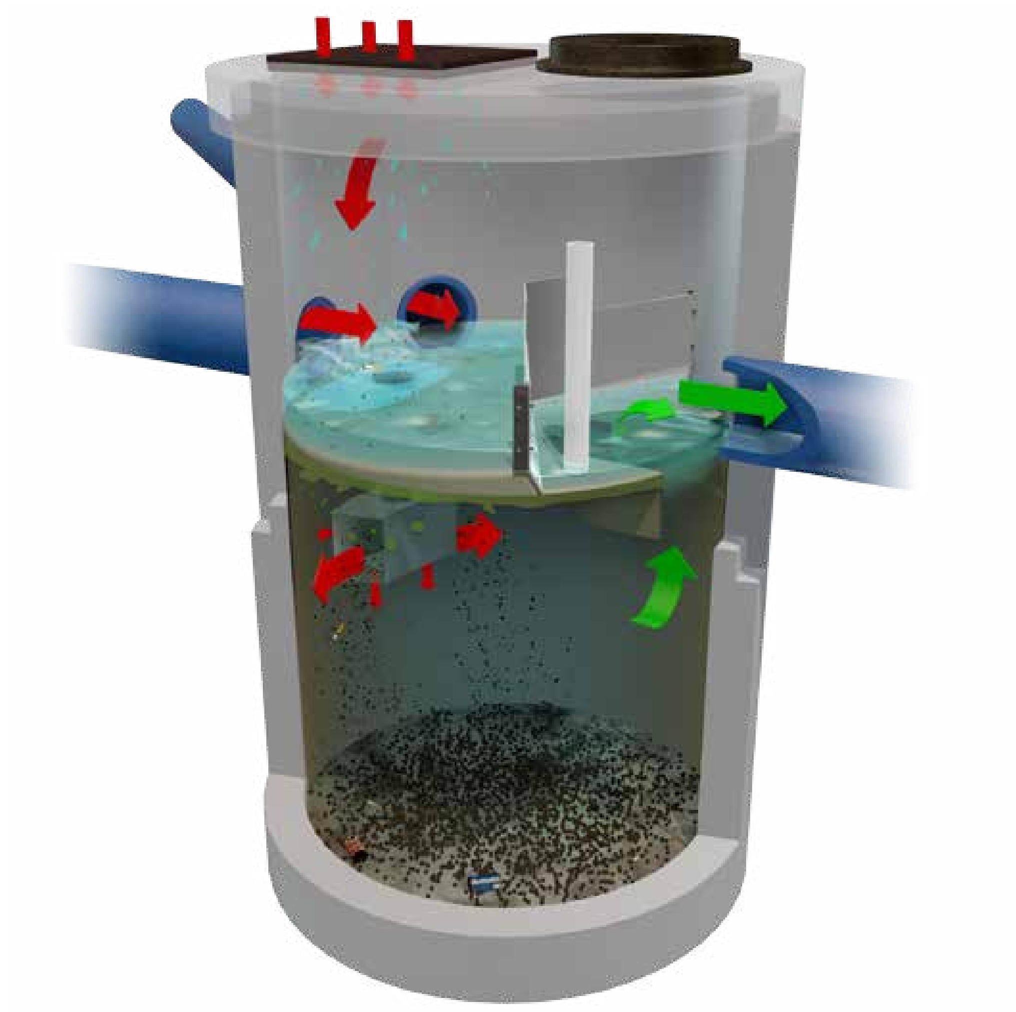
Imbrium Systems Inc. & Imbrium Systems LLC

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

Stormceptor® EF

Technical Manual



imbrium®

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 higher flow rates as compared to 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 technology and internal bypass 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 technology 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 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 online 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.
- **Refer to components identified in Figures 1 and 2 to understand the Stormceptor EF operation.**

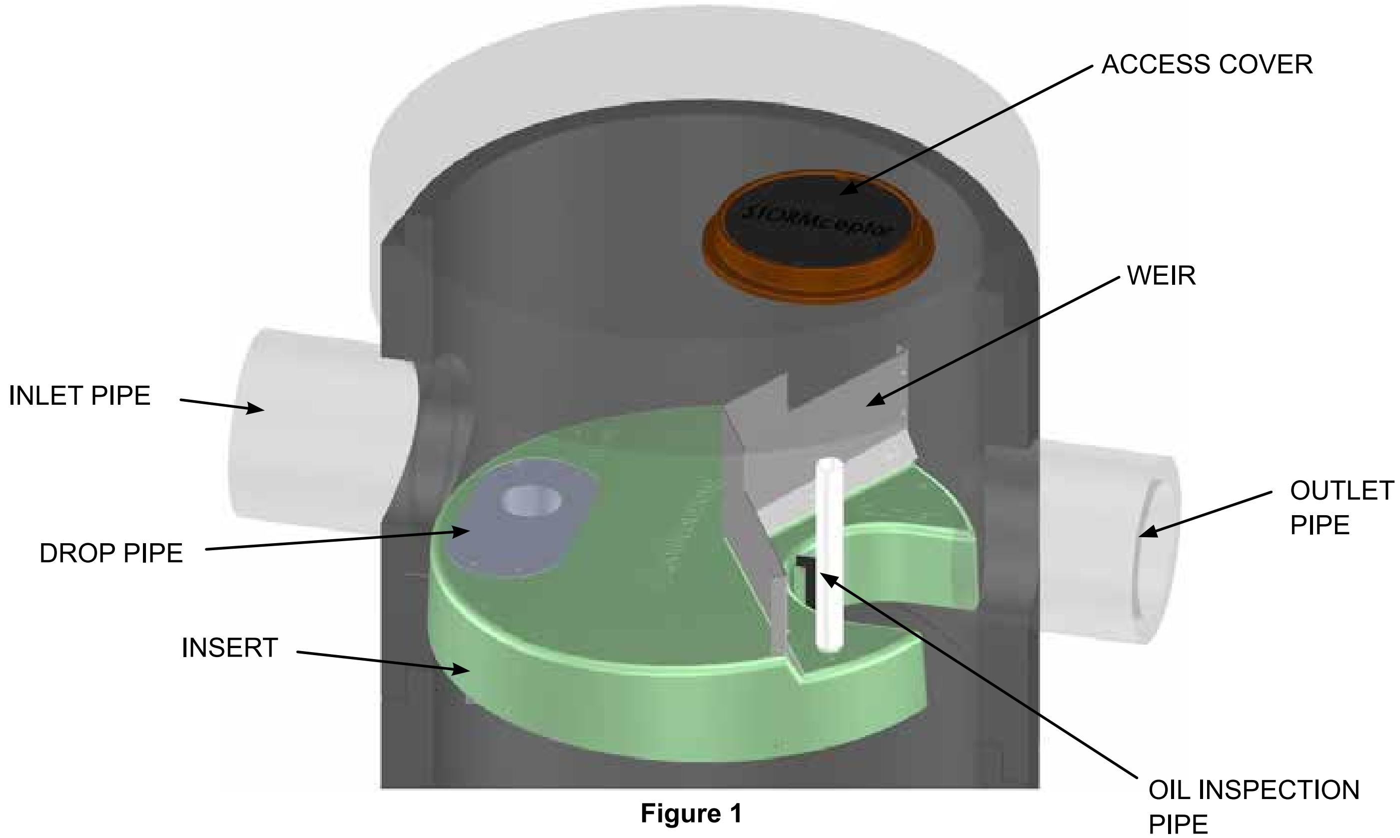


Figure 1

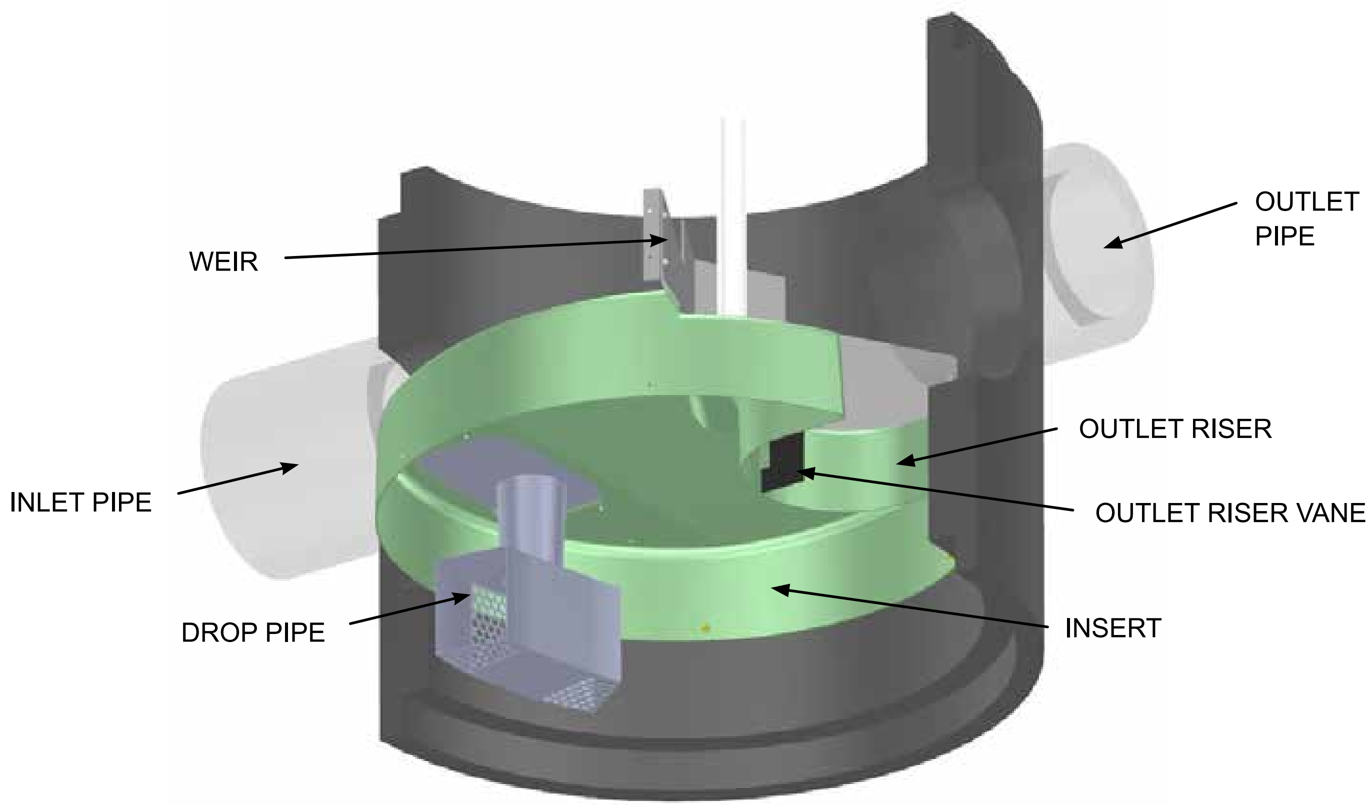


Figure 2

FEATURES AND BENEFITS

FEATURE	BENEFITS
Patent-pending enhanced flow, TSS treatment technology	Superior, verified third-party performance
Scour prevention with an internal bypass	Validated online installation and cost savings
Third-party verified light liquid capture (oil) and retention (Stormceptor EFO)	Proven performance for fuel/oil hotspot locations
Functions as bend, junction or inlet structure	Cost savings & design flexibility
Minimal drop between inlet and outlet	Site installation ease
Large diameter outlet riser for inspection and maintenance	Easy maintenance access from grade

APPLICATIONS

Stormceptor EF is designed as an 'at source' solution for commercial and industrial sites, urban environments, and residential developments. Stormceptor EF is ideal for:

- Pretreatment of wet ponds, filters, infiltration systems, bioretention, and other Low Impact Development (LID) applications
- Commercial sites
- Manufacturing/Industrial sites
- Residential developments
- Fueling stations, convenience stores, fast food restaurants
- Roads and highways
- Airports, seaports, and military bases
- Hydrocarbon spill, high pollutant load hotspots (Stormceptor EFO)

PRODUCT DETAILS

METRIC DIMENSIONS AND CAPACITIES								
Stormceptor Model	Inside Diameter	Minimum Surface to Outlet Invert Depth	Depth Below Outlet Pipe Invert	Wet Volume	Sediment Capacity[1]	Hydrocarbon Storage Capacity[2]	Maximum Flow Rate into Lower Chamber[3]	Peak Conveyance Flow Rate[4]
	(m)	(mm)	(mm)	(L)	(m^3)	(L)	(L/s)	(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

U.S. DIMENSIONS AND CAPACITIES								
Stormceptor Model	Inside Diameter	Minimum Surface to Outlet Invert Depth	Depth Below Outlet Pipe Invert	Wet Volume	Sediment Capacity[1]	Hydrocarbon Storage Capacity[2]	Maximum Flow Rate into Lower Chamber[3]	Peak Conveyance Flow Rate[4]
	(ft)	(in)	(in)	(gal)	(ft^3)	(gal)	(cfs)	(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 1135 L/min/m^2 (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 535 L/min/m^2 (13.1 gpm/ft^2).
4. Peak Conveyance Flow Rate is limited by a maximum velocity of 1.5 m/s (5 fps).

UNIT DESIGN

Sizing Methodology

Stormceptor® EF and Stormceptor® EFO are sized using local historical rainfall data for the site of interest, specific site parameters, and a performance curve for TSS removal derived from third-party testing conducted in accordance with the Canadian Environmental Technology Verification (ETV) Program's ***Procedure for Laboratory Testing of Oil-Grit Separators***. Every Stormceptor unit is designed to achieve the specified target TSS removal, however, for sites where oil/fuel capture and retention is an additional specified water quality objective Stormceptor EFO is the proper selection. The sizing methodology includes various considerations, including:

- Site parameters
- Local historical rainfall data
- Capture of the Canadian ETV particle size distribution
- Requirements for oil/fuel capture and retention
- Performance results from third-party testing and verification

State, provincial, and local regulatory agencies and municipalities may have specific sizing and design criteria for stormwater treatment systems such as OGS devices. To ensure proper sizing and design, contact your local Stormceptor representative for sizing and design assistance or visit www.imbriumsystems.com for more information.

ONLINE APPLICATION

Stormceptor EF's internal bypass and patent-pending scour prevention technology has demonstrated very effective retention of pollutants in third-party testing and verification following the Canadian ETV's ***Procedure for Laboratory Testing of Oil-Grit Separators***. Sediment scour prevention demonstrated an effluent concentration of less than 10 mg/L for sediment particles ranging from 1 to 1,000 microns, even during peak influent flow rates associated with infrequent high intensity storm events. While Stormceptor EF will capture oil, only the Stormceptor EFO configuration has been third-party tested and verified to retain greater than 99% of captured oil.

Based on these verified performance attributes, the most efficient and widely accepted application of Stormceptor EF is an online configuration, which allows all upstream conveyance flows to enter and exit the unit. The online application eliminates the need for costly additional bypass structures, piping and installation expense.

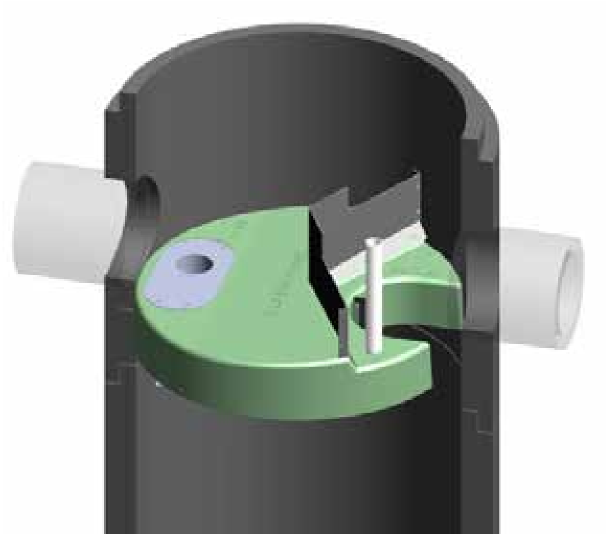


Figure 3

FLOW ENTRANCE OPTIONS

Single Inlet Pipe – A common design which includes one inlet pipe and one outlet pipe. A 90-degree (maximum) bend is also accepted with this configuration. **Example seen in Figure 3**.

MAXIMUM PIPE DIAMETER		
MODEL	INLET	OUTLET
	(in / mm)	(in / mm)
EF4 / EFO4	24 / 610	24 / 610
EF6 / EFO6	36 / 915	36 / 915
EF8 / EFO8	48 / 1220	48 / 1220
EF10 / EFO10	72 / 1828	72 / 1828
EF12 / EFO12	72 / 1828	72 / 1828

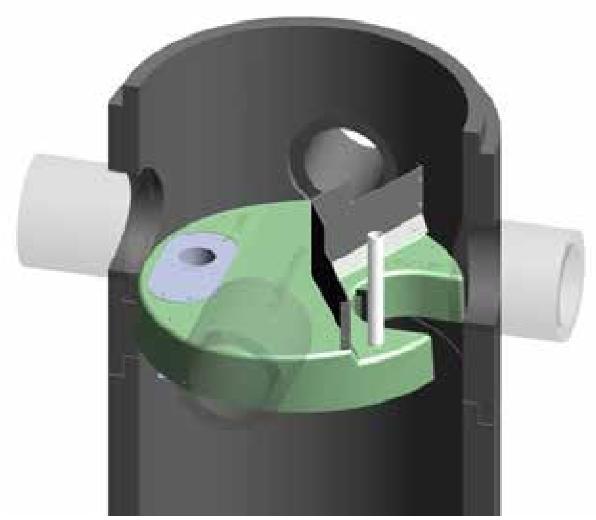


Figure 4

Multiple Inlet Pipes – Allows for multiple inlet pipes of various diameters to enter the unit. **Example seen in Figure 4**.

MAXIMUM PIPE DIAMETER		
MODEL	INLET	OUTLET
	(in / mm)	(in / mm)
EF4 / EFO4	18 / 457	24 / 610
EF6 / EFO6	30 / 762	36 / 915
EF8 / EFO8	42 / 1067	48 / 1220
EF10 / EFO10	60 / 1524	72 / 1828
EF12 / EFO12	60 / 1524	72 / 1828

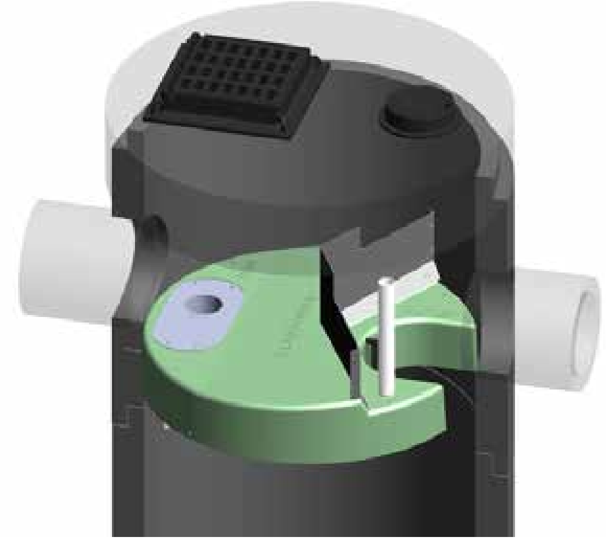


Figure 5

Inlet Grate – Allows surface runoff to enter the unit from grade. The inlet grate option can also be used in conjunction with one inlet pipe or multiple inlet pipes. A removable flow deflector is added in the Stormceptor EF4/EFO4. **Example seen in Figure 5**.

MAXIMUM PIPE DIAMETER		
MODEL	INLET	OUTLET
	(in / mm)	(in / mm)
EF4 / EFO4	24 / 610	24 / 610
EF6 / EFO6	36 / 915	36 / 915
EF8 / EFO8	48 / 1220	48 / 1220
EF10 / EFO10	72 / 1828	72 / 1828
EF12 / EFO12	72 / 1828	72 / 1828

INLET-TO-OUTLET DROP

Elevation differential between the inlet and outlet pipe inverts is dictated by the angle at which the inlet pipe(s) enters the unit (**illustration seen in Figure 6**).

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.

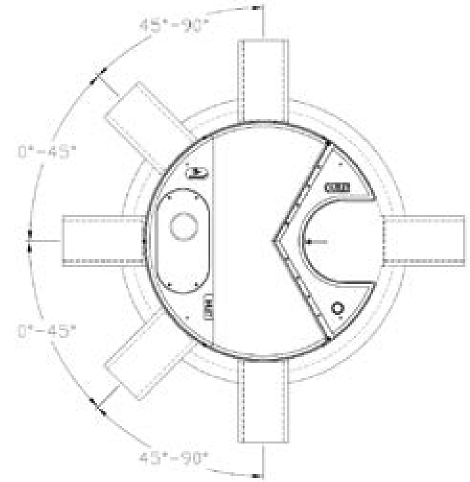


Figure 6

SUBMERGED (TAILWATER) DESIGN

Submerged or tailwater conditions are defined as standing water above the insert elevation during zero-runoff conditions. A weir height modification allows Stormceptor EF to operate under submerged conditions. The following information is necessary to properly design Stormceptor EF for the submerged condition:

- Stormceptor top of grade elevation
- Stormceptor outlet pipe invert elevation
- Standing water elevation

NOTE: The maximum weir height for Stormceptor EF is 48 inches (1200 mm). Contact your local Stormceptor representative for design assistance.

LIVE LOAD

Stormceptor EF is typically designed for local highway truck loading. In instances where other live loads are required, Stormceptor EF can be customized to meet the necessary structural requirements. Contact your local Stormceptor representative for design assistance.

SHALLOW COVER

Stormceptor EF is typically designed with a minimum depth of burial to the outlet invert based on the diameter of the inlet and outlet pipes. A common minimum burial depth to the outlet invert is 48 inches (1.2 meters). In instances where there may be site constraints to the depth of burial contact your local Stormceptor representative for design assistance.

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.

ABOVE-GROUND INSTALLATIONS

Stormceptor EF can be designed as a free-standing above-ground unit, constructed of fiberglass as illustrated in **Figure 7**. These customized units are lightweight and can be installed within a building footprint, providing structural support and installation advantages. Contact your local Stormceptor representative for design assistance.

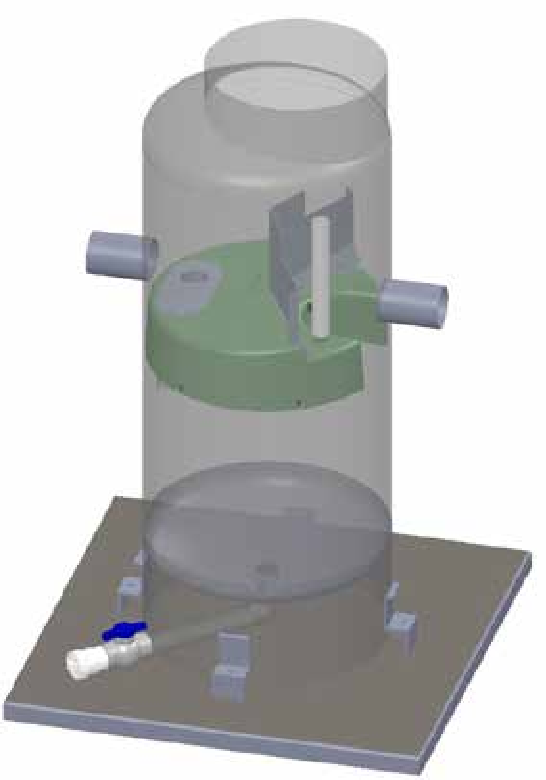


Figure 7

PERFORMANCE VERIFICATION TESTING

Stormceptor EF has been third-party performance tested according to the Canadian Environmental Technical Verification (ETV) Procedure for ***Laboratory Testing of Oil-Grit Separators***, and has received ISO 14034 Environmental Management – Environmental Technology Verification (ETV).

For more information, please visit www.imbriumsystems.com or contact your local Stormceptor representative.

INSTALLATION

For installation details, please visit www.imbriumsystems.com and refer to the Stormceptor EF Installation Guideline or contact your local Stormceptor representative.

INSPECTION AND MAINTENANCE

As with any stormwater treatment device, periodic inspection and maintenance of Stormceptor EF is required for long-term performance.

Inspection and maintenance is performed from grade without entering the unit. 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. Visual inspections of the insert can be performed to ensure there is no damage or blockages. A beneficial feature of Stormceptor EF in comparison to many other treatment practices is that once it is maintained, Stormceptor EF is functionally restored to its original condition.

When maintenance is required, a standard vacuum truck is used to remove the pollutants (sediment and floatables) from the lower chamber of the unit through the outlet riser. When an appreciable amount of oil or other hydrocarbons is present, these floatable pollutants can be removed by hydrovac from the water surface. Should an oil/fuel spill occur, or presence of oil/fuel be identified within the unit, it should be cleaned immediately by a licensed liquid waste hauler.

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, location, and transportation distance(s).

For more details on inspection and maintenance refer to the Stormceptor EF Owner's Manual at www.imbriumsystems.com.

HYDROCARBON CAPTURE AND RETENTION

Stormceptor EFO
Stormceptor is often installed on high-traffic pollutant hotspots where hydrocarbon spill potential exists.

The technology platform of Stormceptor EFO is the same as Stormceptor EF, however the maximum surface loading rate into the lower chamber is restricted to a lower value with Stormceptor EFO, thereby ensuring excellent oil retention. Third-party testing in accordance with the Light Liquid Re-entrainment testing provisions within the Canadian ETV protocol ***Procedure for Laboratory Testing of Oil-Grit Separators*** demonstrated greater than 99% oil retention. Stormceptor EFO is engineered to capture and retain free floating oil/chemical/fuel spills, not emulsified hydrocarbons.

Oil Sheen

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 EFO may still be functioning as intended.

Disposal

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

Oil Level Alarm

As an added safeguard, an oil level alarm is available as an optional feature for Stormceptor EFO. This is an electronic monitoring system designed to trigger a visual and audible alarm when a preset level of oil is captured in the lower chamber. The oil level alarm is installed as illustrated in **Figure 8**.

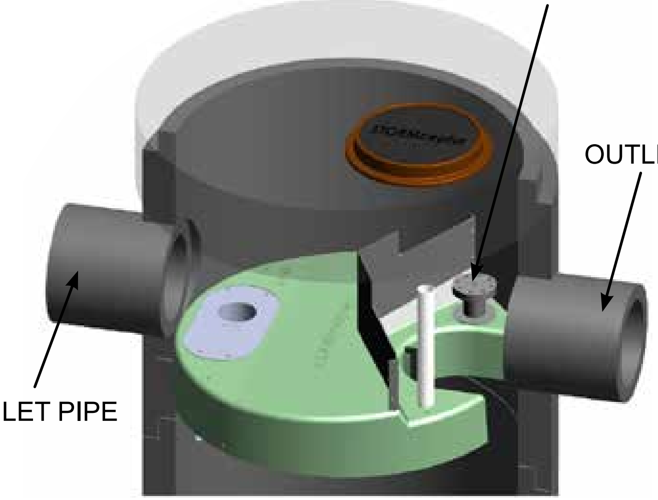


Figure 8

ADDITIONAL POLLUTANT STORAGE CAPACITY

Stormceptor EF/EFO can be easily modified to increase sediment storage capacity by extending the depth of the lower chamber. Stormceptor EFO can be modified to increase hydrocarbon storage capacity by extending the outlet riser, thereby providing the storage volumes depicted in the table below.

STORMCEPTOR EFO STORAGE VOLUME		
Stormceptor EFO Model	**Standard Hydrocarbon Storage Capacity [1]**	**Extended Hydrocarbon Storage Capacity [1,2]**
	(L / gal)	**(L / gal)**
EFO4	265 / 70	395 / 105
EFO6	610 / 160	1615 / 425
EFO8	1070 / 280	4340 / 1145
EFO10	1670 / 440	NA
EFO12	2475 / 655	NA

1. Hydrocarbon Storage Capacity is measured from the bottom of the outlet riser to the underside of the insert.
2. Distance from bottom of the extended outlet riser to top of the sediment maintenance depth is 914 mm (36 in).
   NA –Not available in these model sizes

Additional hydrocarbon storage capacity can be added with a draw off tank.

Contact your local Stormceptor representative for additional information and design assistance.

HEALTH AND SAFETY

For all aspects of installation and inspection/maintenance, OSHA and appropriate local regulations should be followed to ensure safe practice.

Contact

888-279-8826 / 416-960-9900

info@imbriumsystems.com

www.imbriumsystems.com

imbrium®

IM_STC_EF_11/17

APPENDIX "G"

Water Balance & Retention Calculations

VALDOR ENGINEERING INC. **TABLE: G1**
File: 24130
July 2025

BLOCK A (TOWERS A & B) WATER BALANCE CALCULATIONS

1. INITIAL ABSTRACTION

Surface Type	Area (Ha)		Init. Abstract. (mm)
Pervious Area	0.110		5.0
Roof Area	0.619		1.0
Impervious Area	0.207		1.0
Total	**0.936**		**1.470**

2. STORAGE VOLUME REQUIRED

Total Area of Towers 'A' & 'B' (A) =	9360	sq.m.
Target Retention Depth (D) =	0.005	m
Overall Initial Abstractions (I) =	0.001470	m
Storage Volume Required = V = A x (D - I) =	**33.04**	cu.m.

Based on the above, a retention tank with at least the required volume is to be provided for rainwater re-use.

3. TANK SIZE

Underground storage tank retention volume sizing

Surface Area of Tank (A) =	18.10	sq.m
Height (H) =	1.96	m
Provided Volume = AxH **=**	**35.48**	cu.m

VALDOR ENGINEERING INC. **TABLE: G2**
File: 24130
July 2025

BLOCK B (TOWERS C & D) WATER BALANCE CALCULATIONS

1. INITIAL ABSTRACTION

Surface Type	Area (Ha)		Init. Abstract. (mm)
Pervious Area	0.181		5.0
Roof Area	0.493		1.0
Impervious Area	0.355		1.0
Total	**1.029**		**1.704**

2. STORAGE VOLUME REQUIRED

Total Area of Towers 'C' & 'D' (A) =	10290	sq.m.
Target Retention Depth (D) =	0.005	m
Overall Initial Abstractions (I) =	0.001704	m
Storage Volume Required = V = A x (D - I) =	**33.92**	cu.m.

Based on the above, a retention tank with at least the required volume is to be provided for rainwater re-use.

3. TANK SIZE

Underground storage tank retention volume sizing

Surface Area of Tank (A) =	54.10	sq.m
Height (H) =	1.09	m
Provided Volume = AxH **=**	**58.97**	cu.m

VALDOR ENGINEERING INC. **TABLE G3**
File: 24123
July 2025

PERCOLATION RATE CALCULATIONS

Hydraulic Conductivity, $\mathbf{K_{fs}}$ = 0.00016 to 0.00072 **m/s**
Hydraulic Conductivity, $\mathbf{K_{fs}}$ = 0.00016 **m/s**
(Lower of range used to be conservative) 0.016 **cm/s**

Source: *Hydrogeological Assessment - Proposed Sports Dome, Havergal College by Cambium Inc.*

Approximate relationships between hydraulic conductivity, percolation time and infiltration rate

Hydraulic Conductivity, K_{fs} (centimetres/second)	Percolation Time, T (minutes/centimetre)	Infiltration Rate, 1/T (millimetres/hour)
0.1	2	300
0.01	4	150
0.001	8	75
0.0001	12	50
0.00001	20	30
0.000001	50	12

Source: Ontario Ministry of Municipal Affairs and Housing (OMMAH). 1997. Supplementary Guidelines to the Ontario Building Code 1997. SG-6 Percolation Time and Soil Descriptions. Toronto, Ontario.

Hydraulic Conductivity, K_{fs} (**cm/s**)		Infiltration Rate (mm/hr)	
x_3	0.1	y_3	300
x_2	0.016	y_2	**160.00**
x_1	0.01	y_1	150

By using Liner Interpolation Equation:

$$y_2 = \frac{(x_2 - x_1)(y_3 - y_1)}{(x_3 - x_1)} + y_1$$

Safety Factor: 2.5

Based on Table C2 in Appendix C of the Low Impact Development Stormwater Management Planning and Design Guide, 2010

Ratio of Mean Measured Infiltration Rates[1]	Safety Correction Factor[2]
≤ 1	2.5
1.1 to 4.0	3.5
4.1 to 8.0	4.5
8.1 to 16.0	6.5
16.1 or greater	8.5

Source: Wisconsin Department of Natural Resources. 2004. Conservation Practice Standards. Site Evaluation for Stormwater Infiltration (1002). Madison, WI.

Notes:
1. Ratio is determined by dividing the geometric mean measured infiltration rate at the proposed bottom elevation of the BMP by the geometric mean measured infiltration rate of the least permeable soil horizon within 1.5 metres below the proposed bottom elevation of the BMP.
2. The design infiltration rate is calculated by dividing the geometric mean measured infiltration rate at the proposed bottom elevation of the BMP by the safety correction factor.

Design Infiltration Rate: **64.00 mm/hr**

VALDOR ENGINEERING INC.
File: 24123
July 2025

TABLE: G4

WATER QUALITY CALCULATIONS: INFILTRATION LID SIZING (BASED ON 25mm QUALITY TREATMENT)

LID Location	Drainage Area (ha)	[1]Retention Volume Require (m^3)	LID Design				Retention Volume Provided (m^3)
Street catchbasin Infiltration LID			**Length (m)**	**Width (m)**	**Height (m)**	**Void Ratio**	
CB 1	0.044	10.1	17.37	1.37	0.46	0.955	10.4
CB 2	0.043	9.8	16.46	1.37	0.46	0.955	9.9
CB 3	0.044	9.9	17.37	1.37	0.46	0.955	10.4
CB 4	0.044	10.0	17.37	1.37	0.46	0.955	10.4
Site Total	**0.175**	**39.8**					**41.1**

Notes:
1) The retention volume required is based on a rainfall depth of 25 mm, assuming initial abstractions based on catchment areas.
2) The length of the infiltration trench at each catchbasin locations varies as indicated on the site servicing plan, **drawing: FSP-1**.

VALDOR ENGINEERING INC.
File: 24123 **TABLE G5**
July 2025

WATER BALANCE CALCULATIONS - INFILTRATION LID #1

1. INITIAL ABSTRACTION CALCULATION (CB 1)

Surface Type	Area (Ha)	Runoff Coefficient	Init. Abstract. (mm)
Landscape Area	0.013	0.35	5.00
Roof Area	0.000	0.85	1.00
Impervious	0.031	0.90	1.00
Total	**0.044**	**0.74**	**2.2**

2. VOLUME TO RETAIN

A = Area =	443	sq.m.
Target Retention Depth (D) =	0.025	m
Abstractions (I) =	0.00219	m
Required Volume to Retain = A x (D - I) =	**10.1**	cu.m.

3. INFILTRATION LID SIZE

Percolation Rate (P) =	64.00	mm/hr
Maximum Retention Time (T) =	72	hours
Max Infiltration Trench Height Allowable (D) = (PT/(1000*S)) =	1.50	m

*MOE recommend max depth of 1.5m

Drawdown Time at Selected Trench Height

T = (*d* / P) x 1000 =	23	hours

LID Size (19x3 Units of ST-18 Brentwood Infiltration Tanks)

Tank Base Area (A) =	23.8	sq.m
Tank Height, D =	0.46	m
Tank Length, L (36" per unit) =	17.37	m (19 units)
Tank Width, W (18" per unit) =	1.37	m (3 units)
Void Ratio =	0.955	
Volume =	**10.4**	cu.m.

VALDOR ENGINEERING INC.
File: 24123 **TABLE G6**
July 2025

WATER BALANCE CALCULATIONS - INFILTRATION LID #2

1. INITIAL ABSTRACTION CALCULATION (CB 2)

Surface Type	Area (Ha)	Runoff Coefficient	Init. Abstract. (mm)
Landscape Area	0.012	0.35	5.00
Roof Area	0.000	0.85	1.00
Impervious	0.031	0.90	1.00
Total	**0.043**	**0.74**	**2.1**

2. VOLUME TO RETAIN

A = Area =	428	sq.m.
Target Retention Depth (D) =	0.025	m
Abstractions (I) =	0.00214	m
Required Volume to Retain = A x (D - I) =	**9.8**	cu.m.

3. INFILTRATION LID SIZE

Percolation Rate (P) =	64.00	mm/hr
Maximum Retention Time (T) =	72	hours
Max Infiltration Trench Height Allowable (D) = (PT/(1000*S)) =	1.50	m

*MOE recommend max depth of 1.5m

Drawdown Time at Selected Trench Height

T = (*d* / P) x 1000 =	23	hours

LID Size (18x3 Units of ST-18 Brentwood Infiltration Tanks)

Tank Base Area (A) =	22.6	sq.m
Tank Height, D =	0.46	m
Tank Length, L (36" per unit) =	16.46	m (18 units)
Tank Width, W (18" per unit) =	1.37	m (3 units)
Void Ratio =	0.955	
Volume =	**9.9**	cu.m.

VALDOR ENGINEERING INC.
File: 24123 **TABLE G7**
July 2025

WATER BALANCE CALCULATIONS - INFILTRATION LID #3

1. INITIAL ABSTRACTION CALCULATION (CB 3)

Surface Type	Area (Ha)	Runoff Coefficient	Init. Abstract. (mm)
Landscape Area	0.013	0.35	5.00
Roof Area	0.000	0.85	1.00
Impervious	0.031	0.90	1.00
Total	**0.044**	**0.74**	**2.2**

2. VOLUME TO RETAIN

A = Area =	436	sq.m.
Target Retention Depth (D) =	0.025	m
Abstractions (I) =	0.00217	m
Required Volume to Retain = A x (D - I) =	**9.9**	cu.m.

3. INFILTRATION LID SIZE

Percolation Rate (P) =	64.00	mm/hr
Maximum Retention Time (T) =	72	hours
Max Infiltration Trench Height Allowable (D) = (PT/(1000*S)) =	1.50	m

*MOE recommend max depth of 1.5m

Drawdown Time at Selected Trench Height

T = (*d* / P) x 1000 =	23	hours

LID Size (19x3 Units of ST-18 Brentwood Infiltration Tanks)

Tank Base Area (A) =	23.8	sq.m
Tank Height, D =	0.46	m
Tank Length, L (36" per unit) =	17.37	m (19 units)
Tank Width, W (18" per unit) =	1.37	m (3 units)
Void Ratio =	0.955	
Volume =	**10.4**	cu.m.

VALDOR ENGINEERING INC.
File: 24123 **TABLE G8**
July 2025

WATER BALANCE CALCULATIONS - INFILTRATION LID #4

1. INITIAL ABSTRACTION CALCULATION (CB 4)

Surface Type	Area (Ha)	Runoff Coefficient	Init. Abstract. (mm)
Landscape Area	0.012	0.35	5.00
Roof Area	0.000	0.85	1.00
Impervious	0.031	0.90	1.00
Total	**0.044**	**0.75**	**2.1**

2. VOLUME TO RETAIN

A = Area =	436	sq.m.
Target Retention Depth (D) =	0.025	m
Abstractions (I) =	0.00212	m
Required Volume to Retain = A x (D - I) =	**10.0**	cu.m.

3. INFILTRATION LID SIZE

Percolation Rate (P) =	64.00	mm/hr
Maximum Retention Time (T) =	72	hours
Max Infiltration Trench Height Allowable (D) = (PT/(1000*S)) =	1.50	m

*MOE recommend max depth of 1.5m

Drawdown Time at Selected Trench Height

$T = (d\ /\ P) \times 1000$ =	23	hours

LID Size (19x3 Units of ST-18 Brentwood Infiltration Tanks)

Tank Base Area (A) =	23.8	sq.m
Tank Height, D =	0.46	m
Tank Length, L (36" per unit) =	17.37	m (19 units)
Tank Width, W (18" per unit) =	1.37	m (3 units)
Void Ratio =	0.955	
Volume =	**10.4**	cu.m.

FINAL

Preliminary Geotechnical Investigation and Hydrogeological Assessment – Proposed Mid to High-Rise Development

2172 Wyecroft Road, Oakville, Ontario

Prepared for:

Northbridge Capital Inc.
1220 Yonge Street, Suite 40
Toronto, Ontario M4T 1W1

April 13, 2022

Pinchin File: 305120

The depth and elevation of the bedrock at the borehole locations is summarized in the following table.

Borehole ID	Ground Surface Elevation (m)	Depth to Bedrock (mbgs)	Top of Bedrock Elevation (m)
BH1	71.5	1.8[2]	69.7[2]
BH2	71.4	1.7[1]	69.7[1]
BH3	70.1	1.8[1]	68.3[1]
BH4	70.1	1.7[1]	68.4[1]
BH5	69.5	1.8[1]	67.7[1]
BH6	69.2	1.8[2]	67.4[2]

[1] Inferred top of bedrock
[2] Inferred and confirmed top of bedrock by rock coring

The Total Core Recovery (TCR) of the cored bedrock ranged from 95 to 100 percent and the Rock Quality Designation (RQD) ranged from 79 to 100 percent indicating good to excellent quality bedrock.

5.2 Hydraulic Conductivity Estimates

Rising head hydraulic conductivity (K-) tests were undertaken at four shallow monitoring wells (Boreholes BH1, BH2, BH4 and BH6). A summary of the estimated K-values are presented below.

Monitoring Well	Well Screen Interval (mbgs)	Soil Composition	K (cm/sec)
BH1	6.5 – 9.6	Shale	3.0×10^{-5}
BH2	3.0 – 6.1	Shale	1.6×10^{-4}
BH4	3.0 – 6.1	Shale	7.2×10^{-4}
BH6	6.5 – 9.6	Shale	2.3×10^{-6}
Geometric mean			5.3×10^{-5}

The estimated hydraulic conductivity of the shale bedrock ranges from 2.3×10^{-6} cm/sec to 7.2×10^{-4} cm/sec, with a geometric mean of 5.3×10^{-5} cm/sec.

5.3 Water Level Elevations and Groundwater Flow Regime

As mentioned, a total of six monitoring wells were installed at the Site, all of which were completed in shale due to the presence of shallow bedrock at depths of approximately 1.7 and 1.8 mbgs (Elevation 67.4 to 69.7 m). It should be noted that the elevations were based on WGS84 datum.

Groundwater level measurements were conducted on March 8 and 10, 2022. A summary of the well construction and measured water levels are presented below.

Monitoring Well	Ground Elevation (m)	Well Screen Interval (mbgs)	March 8, 2022		March 10, 2022	
			Groundwater Level (mbgs)	Groundwater Elevation (m)	Groundwater Level (mbgs)	Groundwater Elevation (m)
BH1	71.46	6.5 – 9.6	3.15	68.31	3.39	68.07
BH2	71.44	3.0 – 6.1	3.97	67.47	3.96	67.48
BH3	70.09	3.0 – 6.1	3.03	67.06	3.00	67.09
BH4	70.09	3.0 – 6.1	3.20	66.89	3.19	66.90
BH5	69.47	3.0 – 6.1	2.86	66.61	2.86	66.61
BH6	69.21	6.5 – 9.6	3.93	65.28	9.31	59.90

As presented above, the groundwater levels measured in shallow monitoring wells (Boreholes BH2 to BH5) ranged from 2.86 mbgs to 3.97 mbgs, with an average of 3.26 mbgs, and the converted elevations ranged from 66.61 m at Borehole BH/MW5 to 67.48 m at Borehole BH/MW2. The groundwater levels measured in the deep monitoring wells (Boreholes BH1 and BH6) ranged from 3.15 mbgs to 9.31 mbgs, and the elevations ranged from 59.90 m to 68.31 m. It should be noted that the water level measured on March 10, 2022 at BH6 may be not representative, because this well showed very slow recovery and was purged dry on March 8, 2022.

Based on the data obtained on March 10, 2022, a groundwater elevation contour map was prepared as shown on Figure 4, and the shallow groundwater flow direction was inferred to be generally to the southeast.

5.4 Groundwater Quality

One groundwater sample was obtained on March 10, 2022 from Borehole BH1 to evaluate the water quality with reference to the Halton Region Sewer Use By-Law parameter criteria, for storm sewer and sanitary sewer discharge.

The groundwater sample was submitted to and analyzed by Bureau Veritas Laboratories (BV). BV has been accredited by Canadian Association For Laboratory Accreditation Inc. (CALA). The analytical results are provided in Appendix III.

The above total volume estimates, assuming that one bulk excavation will be undertaken for one or two of the assumed two-level underground structures, and including a Safety Factor of 2 times, indicate the following:

1) The total discharge of groundwater and stormwater for one underground structure is above the threshold for an Environmental Activity Sector Registration (EASR) requirement for construction dewatering of more than 50,000 L/day (50 m^3/day) and below the threshold limit of 400,000 L/day (400 m^3/day) for a Permit-to-Taka-Water (PTTW) requirement. As a result, an EASR registration will be required for the construction of the proposed buildings with associated underground parking structures in different open-cut stages.
2) The total discharge of groundwater and stormwater for two underground structures is above the threshold for an Environmental Activity Sector Registration (EASR) requirement for construction dewatering of more than 50,000 L/day (50 m^3/day) and also above the threshold limit of 400,000 L/day (400 m^3/day) for a Permit-to-Taka-Water (PTTW) requirement. As a result, a PTTW will be required for the construction of the proposed buildings with associated underground parking structures at the same open cut stages.

As noted above, It is expected that each underground structure will be constructed independently.

6.3.4 Dewatering Estimates – Groundwater Inflow – Operations

The same calculation methodology for short-term dewatering estimate was used for the long-term dewatering estimate, except for employing a different target groundwater level approximately 0.2 m below the two-level basement slab elevation. The following parameters were employed:

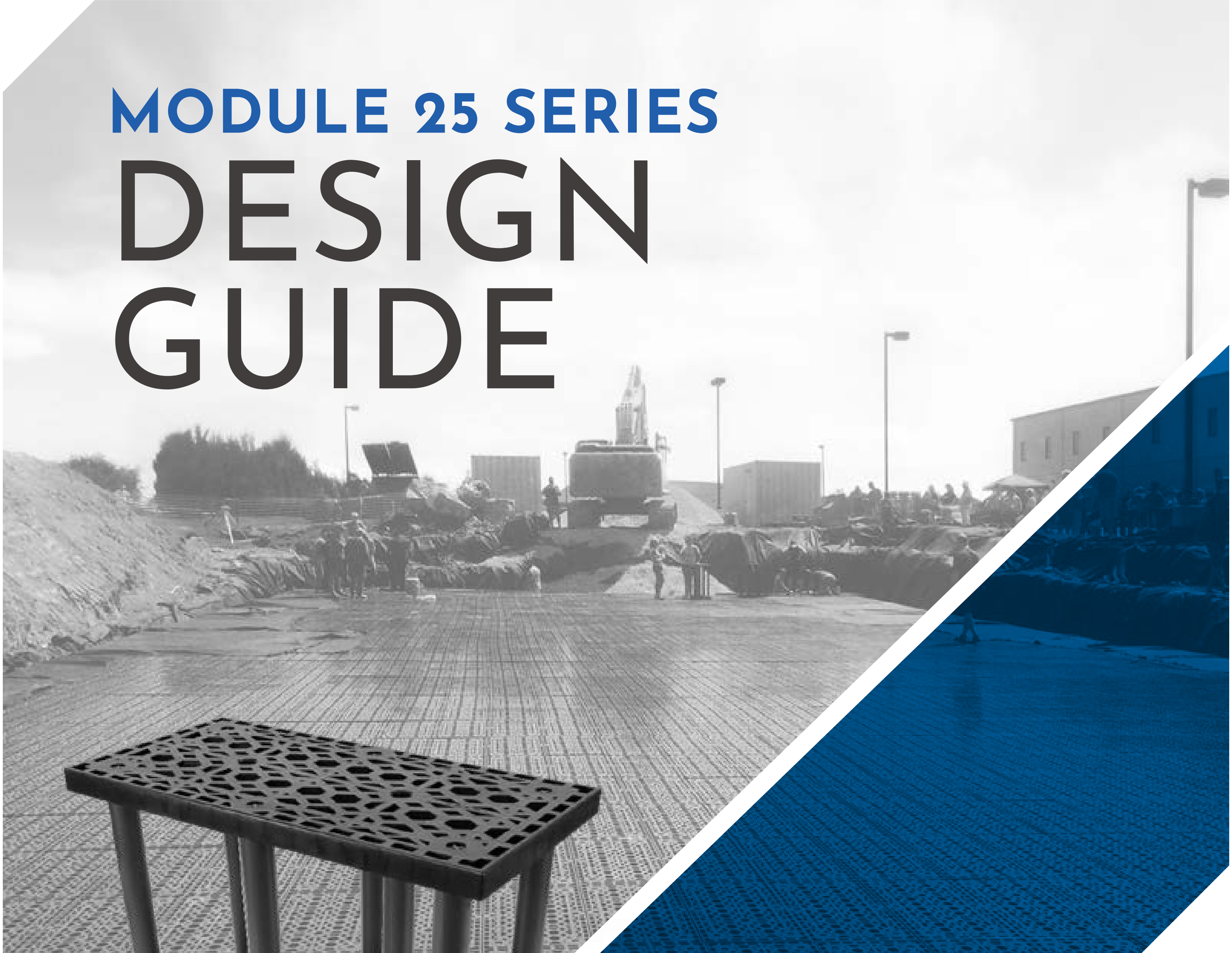
- Underground Structure Footprint Area: 7,530 m^2; and
- Target Water Level: 6.2 mbgs (0.2 m below basement slab).

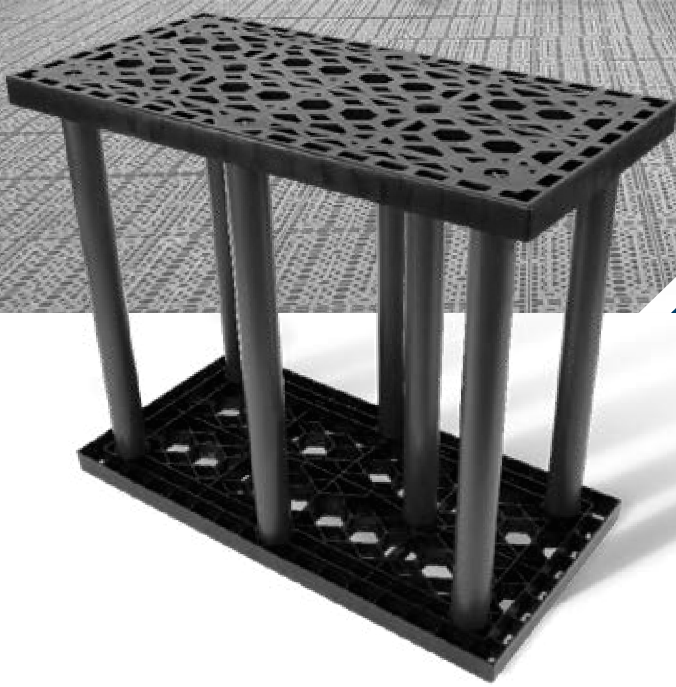
The estimated long-term dewatering rate and zone of influence are presented below.

Footprint Area (m^2)	Initial Water Level (masl)	Target Water Level (masl)	K-Estimate (cm/sec)	Estimated Zone of Influence (m from edge of Excavation)	Dewatering Rate (without safety factor) (L/day)	Dewatering Rate Estimate with safety factor of 2 or 100% (L/day)
7,530	3.26	6.2	5.3×10^{-5}	6	10,087	20,174
Total for two underground parking structures					20,174	40,348

MODULE 25 SERIES

DESIGN GUIDE





STORMTANK®

Expect Results™

A BRAND OF BRENTWOOD

CONTENT

GENERAL NOTES

1. Brentwood recommends that the installing contractor contact either Brentwood or the local distributor prior to installation of the system to schedule a pre-construction meeting. This meeting will ensure that the installing contractor has a firm understanding of the installation instructions.
2. All systems must be designed and installed to meet or exceed Brentwood's minimum requirements. Although Brentwood offers support during the design, review, and construction phases of the Module system, it is the ultimate responsibility of the Engineer of Record to design the system in full compliance with all applicable engineering practices, laws, and regulations.
3. Brentwood requires a minimum cover of 24" (610 mm) and/or a maximum Module invert of 11' (3.35 m). Additionally, a minimum 6" (152 mm) leveling bed, 12" (305 mm) side backfill, and 12" (305 mm) top backfill are required on every system.
4. Brentwood recommends a minimum bearing capacity and subgrade compaction for all installations. If site conditions are found not to meet any design requirements during installation, the Engineer of Record must be contacted immediately.
5. All installations require a minimum two layers of geotextile fabric. One layer is to be installed around the Modules, and another layer is to be installed between the stone/soil interfaces.
6. Stone backfilling is to follow all requirements of the most current installation instructions.
7. The installing contractor must apply all protective measures to prevent sediment from entering the system during and after installation per local, state, and federal regulations.
8. The StormTank® Module carries a Limited Warranty, which can be accessed at www.stormtank.com.

About Brentwood

Brentwood is a global manufacturer of custom and proprietary products and systems for the construction, consumer, medical, power, transportation, and water industries. A focus on plastics innovation, coupled with diverse production capabilities and engineering expertise, has allowed Brentwood to build a strong reputation for thermoplastic molding and solutions development.

Brentwood's product and service offerings continue to grow with an ever-increasing manufacturing presence. By emphasizing customer service and working closely with clients throughout the design, engineering, and manufacturing phases of each project, Brentwood develops forward-thinking strategies to create targeted, tailored solutions.

StormTank® Module

The StormTank Module is a strong, yet lightweight, alternative to other subsurface systems and offers the largest void space (up to 97%) of any subsurface stormwater storage unit on the market. The Modules are simple to assemble on site, limiting shipping costs, installation time, and labor. Their structural PVC columns pressure fit into the polypropylene top/bottom platens, with side panels inserted around the perimeter of the system. This open design and lack of internal walls make the Module system easy to clean compared to other subsurface box structures. When properly designed, applied, installed, and maintained, the Module system has been engineered to achieve a 50-year lifespan.

Technical Support

Brentwood's knowledgeable distributor network and in-house associates emphasize customer service and support by partnering with customers to extend the process beyond physical material supply. These trained specialists are available to assist in the review of proposed systems, conversions of alternatively designed systems, or to resolve any potential concerns before, during, and after the design process. To provide the best assistance, it is recommended that associates be provided with a site plan and cross-sections that include grading, drainage structures, dimensions, etc.

Applications

The Module system can be utilized for detention, infiltration, capture and reuse, and specialty applications across a wide range of industries, including the commercial, residential, and recreational segments. The product's modular design allows the system to be configured in almost any shape (even around utilities) and to be located under almost any pervious or impervious surface.

Module Selection

Brentwood manufactures the Module in six different heights (Table 1) that can be stacked uniformly up to two Modules high. This allows for numerous height configurations up to 6' (1.83 m) tall. The Modules can be buried up to a maximum invert of 11' (3.35 m) and require a minimum cover of 24" (610 mm) for load rating. When selecting the proper Module, it is important to consider the minimum required cover, any groundwater or limiting zone restrictions, footprint requirements, and all local, state, and federal regulations.

Table 1: Nominal StormTank® Module Specifications

MODEL SPEC	ST-12	ST-18	ST-24	ST-30	ST-33	ST-36
Height	12" (305 mm)	18" (457 mm)	24" (610 mm)	30" (762 mm)	33" (838 mm)	36" (914 mm)
Void Space	93.70%	95.5%	96.0%	96.5%	96.9%	97.0%
Storage Capacity	4.21 ft³ (0.12 m³)	6.54 ft³ (0.18 m³)	8.64 ft³ (0.24 m³)	10.86 ft³ (0.31 m³)	11.99 ft³ (0.34 m³)	13.10 ft³ (0.37 m³)
Min. Installed Capacity*	6.91 ft³ (0.20 m³)	9.15 ft³ (0.26 m³)	11.34 ft³ (0.32 m³)	13.56 ft³ (0.38 m³)	14.69 ft³ (0.42 m³)	15.80 ft³ (0.45 m³)
Weight	17.56 lb (7.97 kg)	22.70 lb (10.30 kg)	26.30 lb (11.93 kg)	29.50 lb (13.38 kg)	31.30 lb (14.20 kg)	33.10 lb (15.01 kg)

(*) Minimum Installed Capacity includes the leveling bed, Module, and top backfill storage capacity for one Module. Stone storage capacity is based on 40% void space. Side backfill storage is not included.

3.0 MANUFACTURING STANDARDS

Brentwood selects material based on long-term performance needs. To ensure long-term performance and limit component deflection over time (creep), Brentwood selected polyvinyl chloride (PVC) for the Module's structural columns and a virgin polypropylene (PP) blend for the top/bottom and side panels. PVC provides the largest creep resistance of commonly available plastics, and therefore, provides the best performance under loading conditions. Materials like polyethylene (HDPE) and recycled PP have lower creep resistance and are not recommended for load-bearing products and applications.

Materials:

Brentwood's proprietary PVC and PP copolymer resins have been chosen specifically for utilization in the StormTank® Module. The PVC is blended in house by experts and is a 100% blend of post-manufacturing/pre-consumer recycled material. Both materials exhibit structural resilience and naturally resist the chemicals typically found in stormwater runoff.

Methods:

Injection Molding

The Module's top/bottom platens and side panels are injection molded, using proprietary molds and materials. This allows Brentwood to manufacture a product that meets structural requirements while maintaining dimensional control, molded-in traceability, and quality control.

Extrusion

Brentwood's expertise in PVC extrusion allows the structural columns to be manufactured in house. The column extrusion includes the internal structural ribs required for lateral support.

Quality Control

Brentwood maintains strict quality control in order to ensure that materials and the final product meet design requirements. This quality assurance program includes full material property testing in accordance with American Society for Testing and Materials (ASTM) standards, full-part testing, and process testing in order to quantify product performance during manufacturing. Additionally, Brentwood conducts secondary finished-part testing to verify that design requirements continue to be met post-manufacturing.

All Module parts are marked with traceability information that allows for tracking of manufacturing. Brentwood maintains equipment at all manufacturing locations, as well as at its corporate testing lab, to ensure all materials and products meet all requirements.

4.0 STRUCTURAL RESPONSE

Structural Design

The Module has been designed to resist loads calculated in accordance with the American Association of State Highway and Transportation Official's (AASHTO) Load and Resistance Factor Design (LRFD) Bridge Design manual. This fully factored load includes a multiple presence factor, dynamic load allowance, and live load factor to account for real-world situations. This loading was considered when Brentwood developed both the product and installation requirements. The developed minimum cover ensures the system maintains an adequate resistance factor for the design truck (HS-20) and HS-25 loads.

Full-Scale Product Testing

Engineers at Brentwood's in-house testing facility have completed full-scale vertical and lateral tests on the Module to evaluate product response. To date, Brentwood continues in-house testing in order to evaluate long-term creep effects.

Fully Installed System Testing

Brentwood's dedication to providing a premier product extends to fully installed testing. Through a partnership with Queen's University's GeoEngineering Centre in Kingston, Ontario, Brentwood has conducted full-scale installation tests of single- and double-stacked Module systems to analyze short- and long-term performance. Testing includes short-term ultimate limit state testing under fully factored AASHTO loads and minimum installation cover, lateral load testing, long-term performance and lifecycle testing utilizing time-temperature superposition, and load resistance development. Side backfill material tests were also performed to compare the usage of sand, compacted stone, and uncompacted stone.

5.0 FOUNDATION

The foundation (subgrade) of the subsurface storage structure may be the most important part of the Module system installation as this is the location where the system applies the load generated at the surface. If the subgrade lacks adequate support or encounters potential settlement, the entire system could be adversely affected. Therefore, when implementing an underground storage solution, it is imperative that a geotechnical investigation be performed to ensure a strong foundation.

Considerations & Requirements:

Bearing Capacity

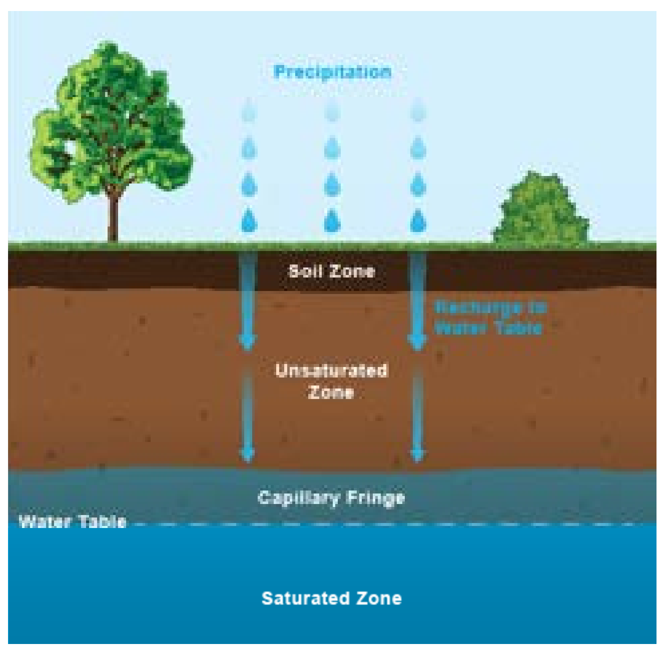
The bearing capacity is the ability of the soil to resist settlement. In other words, it is the amount of weight the soil can support. This is important versus the native condition because the system is replacing earth, and even though the system weighs less than the earth, the additional load displacement of the earth is not offset by the difference in weight.

Using the Loading and Resistance Factor Design (LRFD) calculation for bearing capacity, Brentwood has developed a conservative minimum bearing capacity table (see Appendix). The Engineer of Record shall reference this table to assess actual cover versus the soil bearing required for each unit system.

Soil Profile

Limiting Zones

Limiting zones are conditions in the underlying soils that can affect the maximum available depth for installation and can reduce the strength and stability of the underlying subgrade. The three main forms of limiting zones are water tables, bedrock, and karst topography. It is recommended that a system be offset a minimum of 12" (305 mm) from any limiting zones.



Water Table Zones

Compaction

Soil compaction occurs as the soil particles are pressed together and pore space is eliminated. By compacting the soils to 95% (as recommended by Brentwood), the subgrade strength will increase, in turn limiting both the potential for the soil to move once installed and for differential settlement to occur throughout the system. If designing the specific compaction requirement, settlement should be limited to less than 1" (25 mm) through the entire subgrade and should not exceed a 1/2" (13 mm) of differential settlement between any two adjacent units within the system over time.

Mitigation

If a minimum subgrade bearing capacity cannot be achieved because of weak soil, a suitable design will need to be completed by a Geotechnical Engineer. This design may include the over-excavation of the subgrade and an engineered fill or slurry being placed. Additional material such as geogrid or other products may also be required. Please contact a Geotechnical Engineer prior to selecting products or designing the subgrade.

Geotextile Fabric

The 6-ounce geotextile fabric is recommended to be installed between the soil and stone interfaces around the Modules to prevent soil migration.

Leveling Bed

The leveling bed is constructed of 6"-thick (152 mm) angular stone (Table 2). The bed has not been designed as a structural element but is utilized to provide a level surface for the installation of the system and provide an even distribution of load to the subgrade.

Stone Backfill

The stone backfill is designed to limit the strain on the product through displacement of load and ensure the product's longevity. Therefore, a minimum of 12"-wide (305 mm) angular stone must be placed around all sides of the system. In addition, a minimum layer of 12" (305 mm) angular stone is required on top of the system. All material is to be placed evenly in 12" (305 mm) lifts around and on top of the system and aligned with a vibratory plate compactor.

Table 2: Approved Backfill Material

Material Location	Description	AASHTO M43 Designation	ASTM D2321 Class	Compaction/Density
Finished Surface	Topsoil, hardscape, stone, concrete, or asphalt per Engineer of Record	N/A	N/A	Prepare per engineered plans
Suitable Compactable Fill	Well-graded granular soil/aggregate, typically road base or earthen fill (maximum 4" particle size)	56, 57, 6, 67, 68	I & II III (Earth Only)	Place in maximum 12" lifts to a minimum 90% standard proctor density
Top Backfill	Crushed angular stone placed between Modules and road base or earthen fill	56, 57, 6, 67, 68	I & II	Plate vibrate to provide evenly distributed layers
Side Backfill	Crushed angular stone placed between earthen wall and Modules	56, 57, 6, 67, 68	I & II	Place and plate vibrate in uniform 12" lifts around the system
Leveling Bed	Crushed angular stone placed to provide level surface for installation of Modules	56, 57, 6, 67, 68	I & II	Plate vibrate to achieve level surface

Impermeable Liner

In designs that prevent runoff from infiltrating into the surrounding soil (detention or reuse applications) or groundwater from entering the system, an impermeable liner is required. When incorporating a liner as part of the system, Brentwood recommends using a manufactured product such as a PVC liner. This can be installed around the Modules themselves or installed around the excavation (to gain the benefit of the void space in the stone) and should include an underdrain system to ensure the basin fully drains. This liner is installed with a layer of geotextile fabric on both sides to prevent puncture, in accordance with manufacturer recommendations.

Stormwater runoff must be able to move readily in and out of the StormTank® Module system. Brentwood has developed numerous means of connecting to the system, including inlet/outlet ports and direct abutment to a catch basin or endwall. All methods of connection should be evaluated as each one may offer a different solution. Brentwood has developed drawings to assist with specific installation methods, and these are available at www.stormtank.com.

Inlet/Outlet and Pipe Connections

To facilitate easy connection to the system, Brentwood manufactures two inlet/outlet ports. They are 12" (305 mm) and 14" (356 mm), respectfully, and utilize a flexible coupling connection to the adjoining pipe.

Another common installation method is to directly connect the pipe to the system. In order to do this, an opening is cut into the side panels, the pipe is inserted, and then the system is wrapped in geotextile fabric. When utilizing this connection method, the pipe must be located a minimum of 3" (76 mm) from the bottom of the system. This provides adequate clearance for the bottom platen and the required strength in the remaining side panel. To maintain the required clearances or reduce pipe size, it may be necessary to connect utilizing a manifold system.

Direct Abutment

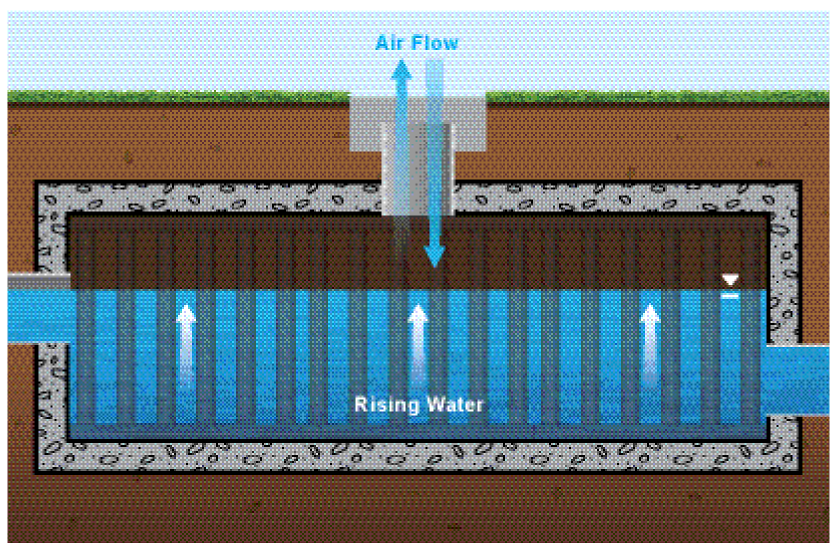
The system can also be connected by directly abutting Modules to a concrete catch basin or endwall. This allows for a seamless connection of structures in close proximity to the system and eliminates the need for numerous pipe connections. When directly abutting one of these structures, remove any side panels that fully abut the structure, and make sure it is flush with the system to prevent material migration into the structure.

Underdrain

Underdrains are typically utilized in detention applications to ensure the system fully drains since infiltration is limited or prohibited. The incorporation of an underdrain in a detention application will require an impermeable liner between the stone-soil interface.

Cleanout Ports

Brentwood understands the necessity to inspect and clean a subsurface system and has designed the Module without any walls to allow full access. Brentwood offers three different cleanout/observation ports for utilization with the system. The ports are made from PVC, provide an easy means of connection, and are available in 6" (152 mm), 8" (203 mm) and 10" (254 mm) diameters. The 10" (254 mm) port is sized to allow access to the system by a vacuum truck suction hose for easy debris removal. It is recommended that ports be located a maximum of 30' (9.14 m) on center to provide adequate access, ensure proper airflow, and allow the system to completely fill.



Ventilation and Air Flow

8.0 PRETREATMENT

Removing pollutants from stormwater runoff is an important component of any stormwater management plan. Pretreatment works to prevent water quality deterioration and also plays an integral part in allowing the system to maintain performance over time and increase longevity. Treatment products vary in complexity, design, and effectiveness, and therefore, should be selected based on specific project requirements.

Typical Stormwater System

Catch Basin → **Inlet Piping** → **Pretreatment** → **Storage Basin** → **Outlet Structure**

Pretreatment: STORMTANK SHIELD

Storage Basin: STORMTANK SHIELD & MODULE

StormTank® Shield

Brentwood's StormTank Shield provides a low-cost solution for stormwater pretreatment. Designed to improve sumped inlet treatment, the Shield reduces pollutant discharge through gross sediment removal and oil/water separation. For more information, please visit www.stormtank.com.

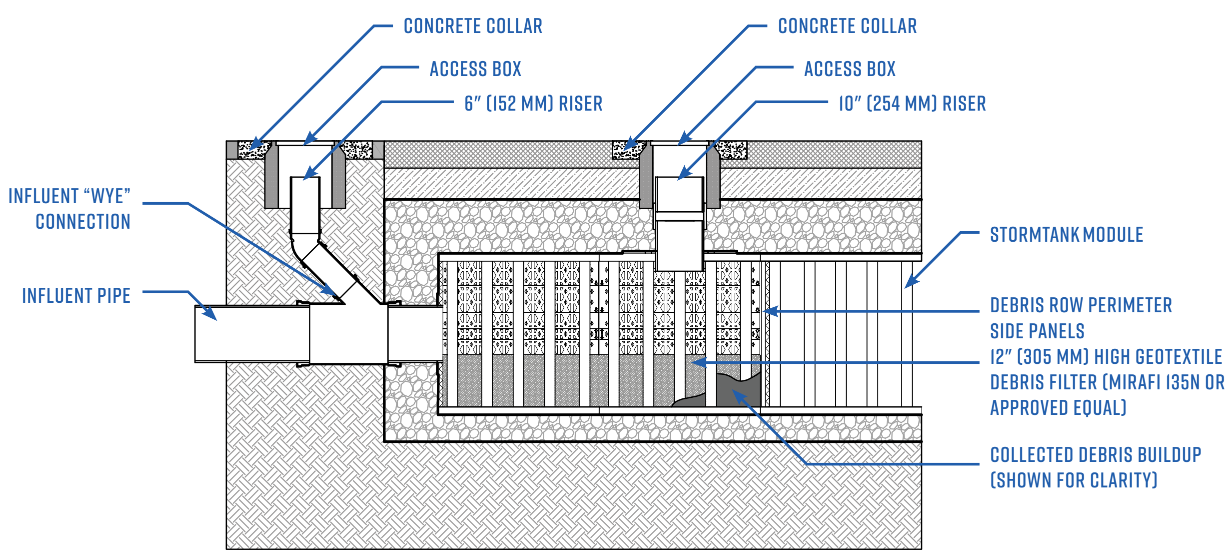
Debris Row (Easy Cleanout)

An essential step of designing, installing, and maintaining a subsurface system is preventing debris from entering the storage. This can be done by incorporating debris rows (or bays) at the inlets of the system to prevent debris from entering the rest of the system.

The debris row is built into the system utilizing side panels with a 12" (305 mm) segment of geotextile fabric. This allows for the full basin capacity to be utilized while storing any debris in an easy-to-remove location. To calculate the number of side panels required to prevent backing up, the opening area of the side panels on the area above the geotextile fabric has been calculated and compared to the inflow pipe diameter.

Debris row cleanout is made easy by including 10" (254 mm) suction ports, based on the length of the row, and a 6" (152 mm) saddle connection to the inflow pipe. If the system is directly abutting a catch basin, the saddle connection is not required, and the flush hose can be inserted through the catch basin. Debris is then flushed from the inlet toward the suction ports and removed.

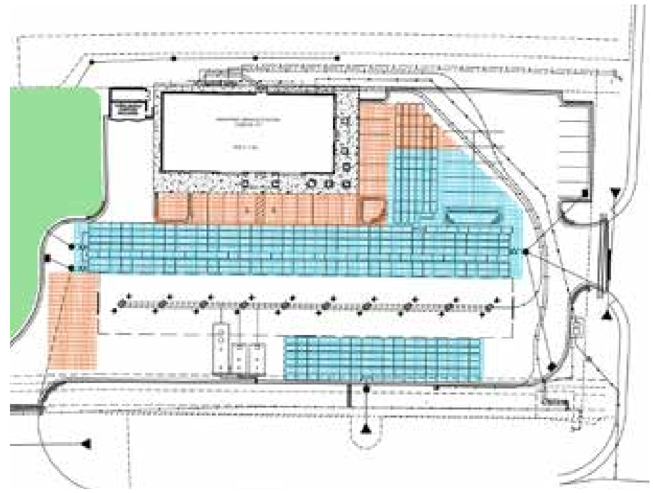
Brentwood has developed drawings and specifications that are available at www.stormtank.com to illustrate the debris row configuration and layouts.



Debris Row Section Detail

9.0 ADDITIONAL CONSIDERATIONS

Many variable factors, such as the examples below, must be taken into consideration when designing a StormTank® Module system. As these considerations require complex calculations and proper planning, please contact Brentwood or your local distributor to discuss project-specific requirements.



Site Plan Module Layout Adaptability
(StormTank Modules shown in blue)

Adaptability

The Modules can be arranged in custom configurations to meet tight site constraints and to provide different horizontal and edge configurations. Modules can also be stacked, to a maximum 2 units tall, to meet capacity needs and can be buried to a maximum invert of 11’ (3.35 m) to allow for a stacked system or deeper burial.

Adjacent Structures

The location of adjacent structures, especially the location of footings and foundations, must be taken into consideration as part of system design. The foundation of a building or retaining wall produces a load that is transmitted to a footing and then applied to the surface below. The footing is intended to distribute the line load of the wall over a larger area without increasing the larger wall’s thickness. The reason this is important is because the load the footing is applying to the earth is distributed through the earth and could potentially affect a subsurface system as either a vertical load to the top of the Module or a lateral load to the side of the Module.

Based on this increased loading, it is recommended that the subsurface system either maintain a distance away from the foundation, footing equal to the height between the Module invert and structure invert of the system, or the foundation or footing extend at a minimum to the invert of the subsurface system. By locating the foundation away from the system or equal to the invert, the loading generated by the structure does not get transferred onto the system. It is recommended that all adjacent structures be completed prior to the installation of the Modules to prevent construction loads from being imparted on the system.

Adjacent Excavation

The subsurface system must be protected before, during, and after the installation. Once a system is installed, it is important to remember that excavation adjacent to the system could potentially cause the system to become unstable. The uniform backfilling will evenly distribute the lateral loads to the system and prohibit the system from becoming unstable and racking from unequal loads. However, it is recommended that any excavation adjacent to a system remain a minimum distance away from the system equal to the invert. This will provide a soil load that is equal to the load applied by the opposite side of the installation. If the excavation is to exceed the invert of the system, additional analysis may be necessary.

Sloped Finished Grade

Much like adjacent excavation, a finished grade with a differential cover could potentially cause a subsurface system to become disproportionately loaded. For example, if one side of the system has 10’ (3.05 m) of cover and the adjacent side has 24” (610 mm) of cover, the taller side will generate a higher lateral load, and the opposite side may not have an equal amount of resistance to prevent a racking of the system. Additional evaluation may be required when working on sites where the final grade around a system exceeds 5%.

Description

Proper inspection and maintenance of a subsurface stormwater storage system are vital to ensuring proper product functioning and system longevity. It is recommended that during construction the contractor takes the necessary steps to prevent sediment from entering the subsurface system. This may include the installation of a bypass pipe around the system until the site is stabilized. The contractor should install and maintain all site erosion and sediment per Best Management Practices (BMP) and local, state, and federal regulations.

Once the site is stabilized, the contractor should remove and properly dispose of erosion and sediment per BMP and all local, state, and federal regulations. Care should be taken during removal to prevent collected sediment or debris from entering the stormwater system. Once the controls are removed, the system should be flushed to remove any sediment or construction debris by following the maintenance procedure outlined below.

During the first service year, a visual inspection should be completed during and after each major rainfall event, in addition to semi-annual inspections, to establish a pattern of sediment and debris buildup. Each stormwater system is unique, and multiple criteria can affect maintenance frequency. For example, whether or not a system design includes inlet protection or a pretreatment device has a substantial effect on the system's need for maintenance. Other factors include where the runoff is coming from (hardscape, gravel, soil, etc.) and seasonal changes like autumn leaves and winter salt.

During and after the second year of service, an established annual inspection frequency, based on the information collected during the first year, should be followed. At a minimum, an inspection should be performed semi-annually. Additional inspections may be required at the change of seasons for regions that experience adverse conditions (leaves, cinders, salt, sand, etc).

Maintenance Procedures

Inspection:

1. Inspect all observation ports, inflow and outflow connections, and the discharge area.
2. Identify and log any sediment and debris accumulation, system backup, or discharge rate changes.
3. If there is a sufficient need for cleanout, contact a local cleaning company for assistance.

Cleaning:

1. If a pretreatment device is installed, follow manufacturer recommendations.
2. Using a vacuum pump truck, evacuate debris from the inflow and outflow points.
3. Flush the system with clean water, forcing debris from the system.
4. Repeat steps 2 and 3 until no debris is evident.

System Sizing Calculation

This section provides a brief description of the process required to size the StormTank® Module system. If you need additional assistance in determining the required number of Modules or assistance with the proposed configuration, it is recommended that you contact Brentwood or your local distributor. Additionally, Brentwood's volume calculator can help you to estimate the available storage volumes with and without stone storage. This tool is available at *www.stormtank.com*.

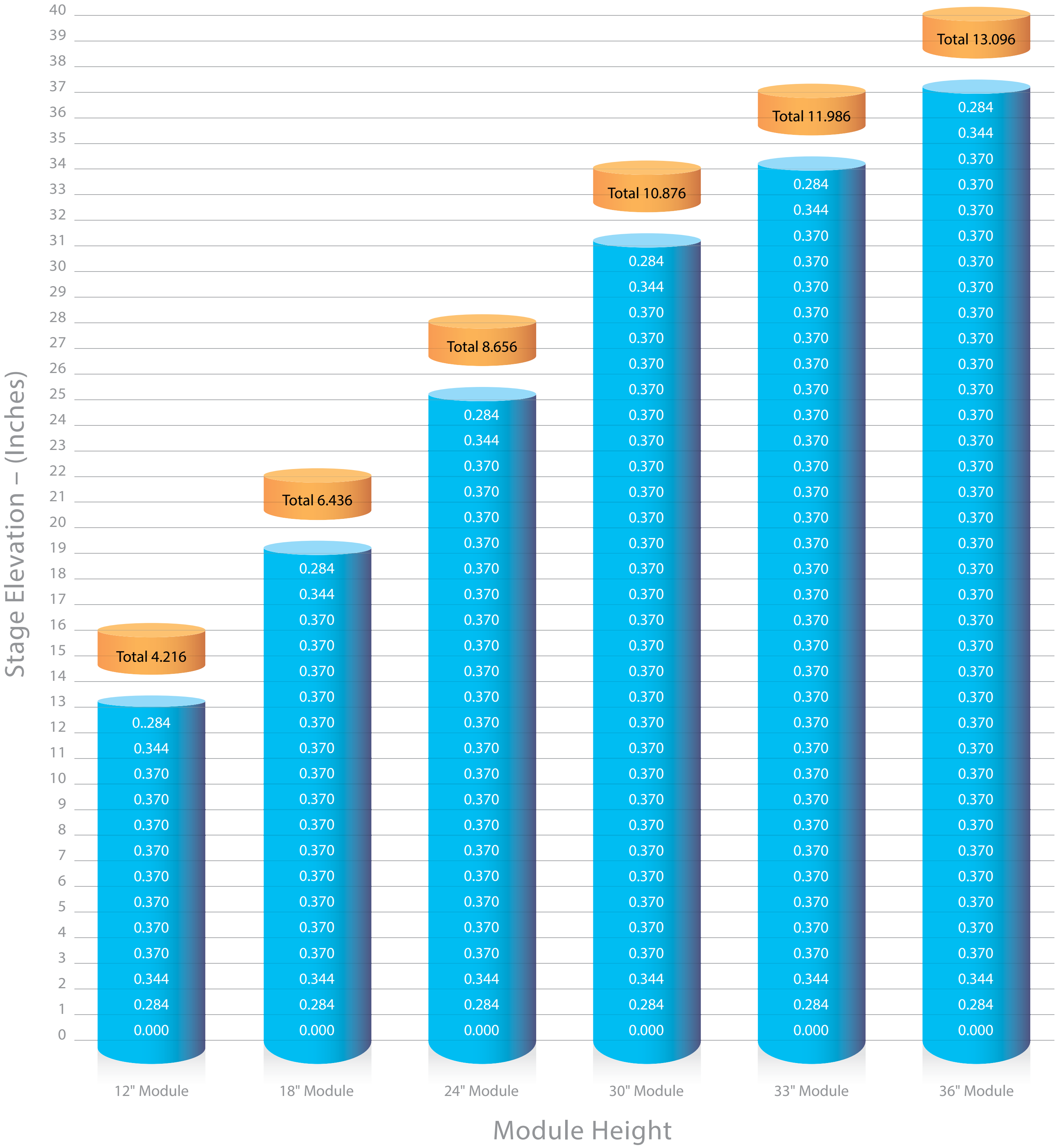
1. Determine the required storage volume (Vs):
It is the sole responsibility of the Engineer of Record to calculate the storage volume in accordance with all local, state, and federal regulations.

2. Determine the required number of Modules (N):
If the storage volume does not include stone storage, take the total volume divided by the selected Module storage volume. If the stone storage is to be included, additional calculations will be required to determine the available stone storage for each configuration.

3. Determine the required volume of stone (Vstone):
The system requires a minimum 6" (152 mm) leveling bed, 12" (305 mm) backfill around the system, and 12" (305 mm) top backfill utilizing 3/4" (19 mm) angular clean stone. Therefore, take the area of the system times the leveling bed and the top backfill. Once that value is determined, add the volume based on the side backfill width times the height from the invert of the Modules to the top of the Modules.

4. Determine the required excavation volume (Vexcv):
Utilizing the area of the system, including the side backfill, multiply by the depth of the system including the leveling bed. It is noted that this calculation should also include any necessary side pitch or benching that is required for local, state, or federal safety standards.

5. Determine the required amount of geotextile (G):
The system utilizes a multiple layer system of geotextile fabric. Therefore, two calculations are required to determine the necessary amount of geotextile. The first layer surrounds the entire system (including all backfill), and the second layer surrounds the Module system only. It is recommended that an additional 20% be included for waste and overlap.


Stage Elevation – (Inches)
Total 4.216
Total 6.436
Total 8.656
Total 10.876
Total 11.986
Total 13.096
12" Module
18" Module
24" Module
30" Module
33" Module
36" Module
Module Height

11.2 MATERIAL QUANTITY WORKSHEET

Project Name: By:

Location: Date:

System Requirements

Required Storage	ft^3 (m^3)
Number of Modules	Each
Module Storage	ft^3 (m^3)
Stone Storage	ft^3 (m^3)
Module Footprint	ft^2 (m^2) Number of Modules x 4.5 ft^2 (0.42 m^2)
System Footprint w/ Stone	ft^2 (m^2) Module Footprint + 1 ft (0.3048 m) to each edge
Stone	Tons (kg) Leveling Bed + Side Backfill + Top Backfill
Volume of Excavation	yd^3 (m^3) System Footprint w/ Stone x Total Height
Area of Geotextile	yd^2 (m^2) Wrap around Modules + Wrap around Stone/Soil Interface

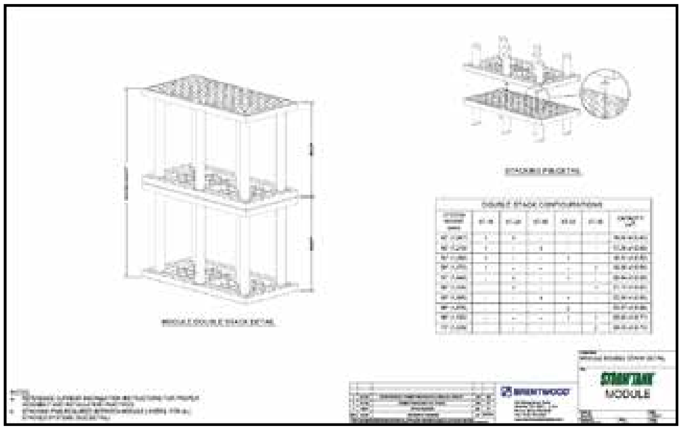
System Cost

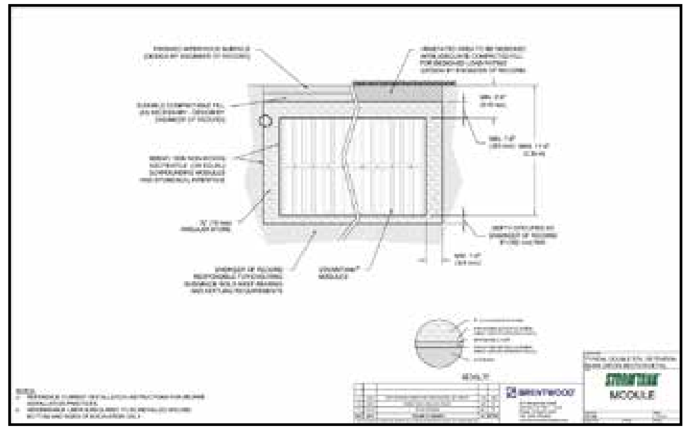
	Quantity		Unit Price			Total
Modules	ft^3 (m^3)	**X**	$	ft^3 (m^3)	**=**	$
Stone	Tons (kg)	**X**	$	Tons (kg)	**=**	$
Excavation	yd^3 (m^3)	**X**	$	yd^3 (m^3)	**=**	$
Geotextile	yd^2 (m^2)	**X**	$	yd^2 (m^2)	**=**	$
					Subtotal =	$
					Tons =	$

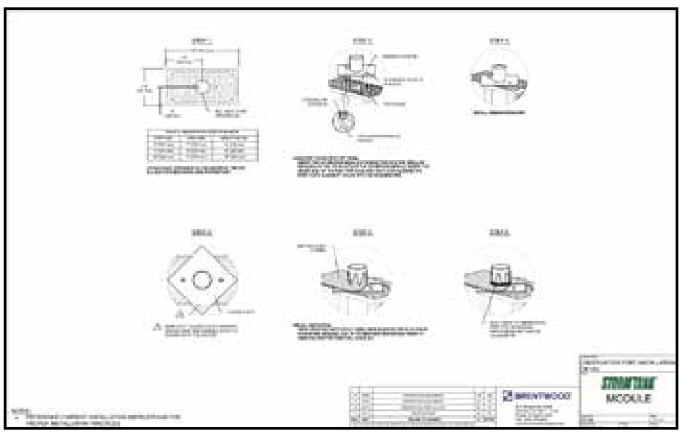
Material costs may not include freight.
Please contact Brentwood or your local distributor for this information.

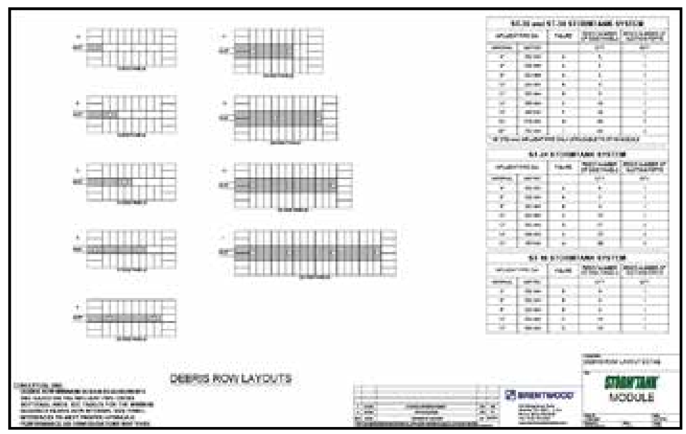
12.0 DETAIL DRAWINGS

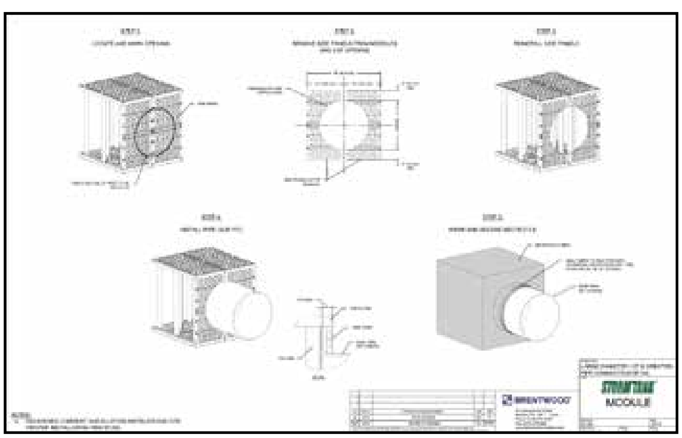
Brentwood has developed numerous drawings for utilization when specifying a StormTank® Module system. Below are some examples of drawings available at www.stormtank.com.

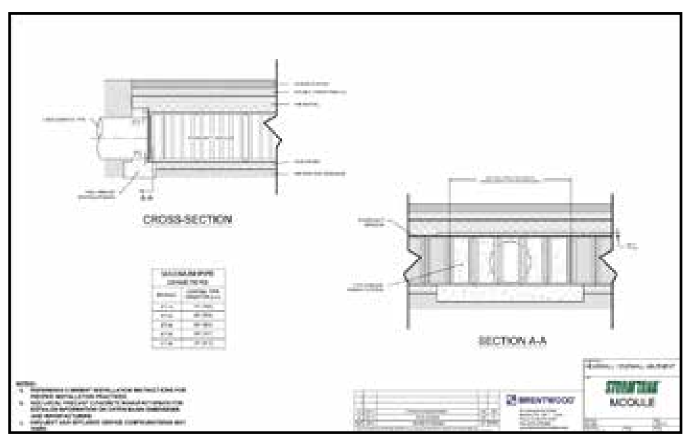












13.0 SPECIFICATIONS

1) General

a) This specification shall govern the implementation, performance, material, and fabrication pertaining to the subsurface stormwater storage system. The subsurface stormwater storage system shall be manufactured by Brentwood Industries, Inc., 500 Spring Ridge Drive, Reading, PA 19610 (610.374.5109), and shall adhere to the following specification at the required storage capacities.

b) All work is to be completed per the design requirements of the Engineer of Record and to meet or exceed the manufacturer's design and installation requirements.

2) Subsurface Stormwater Storage System Modules

a) The subsurface stormwater storage system shall be constructed from virgin polypropylene and 100% recycled PVC to meet the following requirements:

i) High-Impact Polypropylene Copolymer Material

(1) Injection molded, polypropylene, top/bottom platens and side panels formed to a dimension of 36" (914 mm) long by 18" (457 mm) wide [nominal].

ii) 100% Recycled PVC Material

(1) PVC conforming to ASTM D-1784 Cell Classification 12344 b-12454 B.

(2) Extruded, rigid, and 100% recycled PVC columns sized for applicable loads as defined by Section 3 of the AASHTO LRFD Bridge Design Specifications and manufactured to the required length per engineer-approved drawings.

iii) Platens and columns are assembled on site to create Modules, which can be uniformly stacked up to two Modules high, in vertical structures of variable height (custom for each project).

iv) Modular stormwater storage units must have a minimum 95% void space and be continuously open in both length and width, with no internal walls or partitions.

3) Submittals

a) Only systems that are approved by the engineer will be allowed.

b) At least 10 days prior to bid, submit the following to the engineer to be considered for pre-qualification to bid:

i) A list of materials to be provided for work under this article, including the name and address of the materials producer and the location from which the materials are to be obtained.

ii) Three hard copies of the following:

(1) Shop drawings.

(2) Specification sheets.

(3) Installation instructions.

(4) Maintenance guidelines.

c) Subsurface Stormwater Storage System Component Samples for review:

i) Subsurface stormwater storage system Modules provide a single 36" (914 mm) long by 18" (457 mm) wide, height as specified, unit of the product for review.

ii) Sample to be retained by owner.

d) Manufacturers named as acceptable herein are not required to submit samples.

4) Structural Design

a) The structural design, backfill, and installation requirements shall ensure the loads and load factors specified in the AASHTO LRFD Bridge Design Specifications, Section 3 are met.

b) Product shall be tested under minimum installation criteria for short-duration live loads that are calculated to include a 20% increase over the AASHTO Design Truck standard with consideration for impact, multiple vehicle presences, and live load factor.

c) Product shall be tested under maximum burial criteria for long-term dead loads.

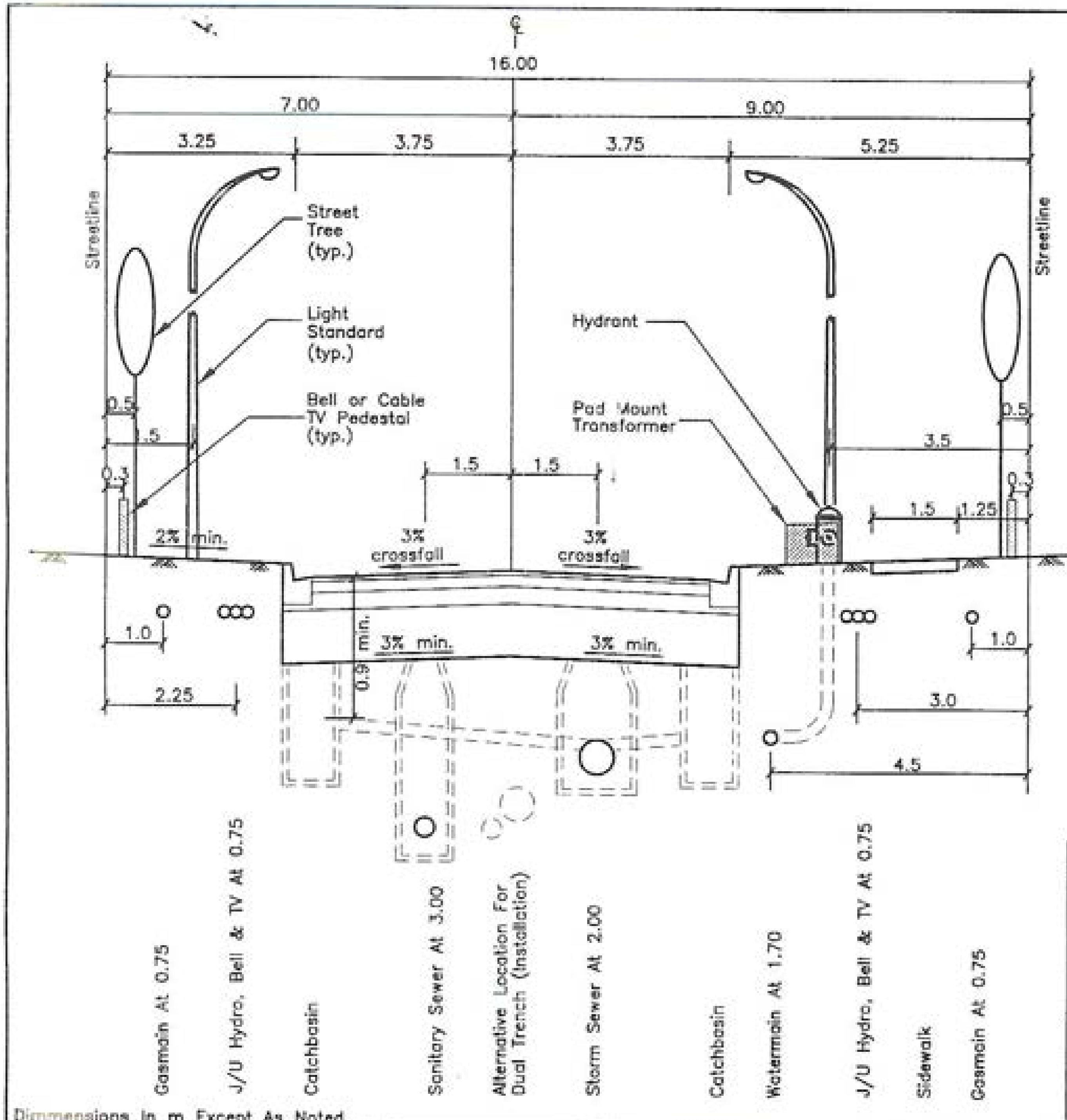
d) The engineer may require submission of third-party test data and results in accordance with items 4b and 4c to ensure adequate structural design and performance.

Cover		HS-25 (Unfactored)		HS-25 (Factored)	
English (in)	Metric (mm)	English (ksf)	Metric (kPa)	English (ksf)	Metric (kPa)
24	610	1.89	90.45	4.75	227.43
25	635	1.82	86.96	4.53	216.90
26	660	1.75	83.78	4.34	207.80
27	686	1.69	80.88	4.16	199.18
28	711	1.63	78.24	3.99	191.04
29	737	1.58	75.82	3.84	183.86
30	762	1.54	73.62	3.70	177.16
31	787	1.50	71.60	3.57	170.93
32	813	1.46	69.75	3.45	165.19
33	838	1.42	68.06	3.34	159.92
34	864	1.39	66.51	3.24	155.13
35	889	1.36	65.10	3.14	150.34
36	914	1.33	63.80	3.05	146.03
37	940	1.31	62.62	2.97	142.20
38	965	1.29	61.54	2.90	138.85
39	991	1.26	60.55	2.83	135.50
40	1,016	1.25	59.65	2.76	132.15
41	1,041	1.23	58.54	2.70	129.28
42	1,067	1.21	58.09	2.67	127.84
43	1,092	1.20	57.42	2.60	124.49
44	1,118	1.19	56.81	2.55	122.09
45	1,143	1.18	56.26	2.50	119.70
46	1,168	1.16	55.77	2.46	117.79
47	1,194	1.16	55.33	2.42	115.87
48	1,219	1.15	54.94	2.39	114.43
49	1,245	1.14	54.59	2.36	113.00
50	1,270	1.13	54.29	2.33	111.56
51	1,295	1.13	54.03	2.30	110.12
52	1,321	1.12	53.80	2.27	108.69
53	1,346	1.12	53.62	2.25	107.73
54	1,372	1.12	53.46	2.23	106.77
55	1,397	1.11	53.34	2.21	105.82
56	1,422	1.11	53.24	2.19	104.86
57	1,448	1.11	53.18	2.17	103.90
58	1,473	1.11	53.14	2.16	103.42
59	1,499	1.11	53.12	2.14	102.46
60	1,524	1.11	53.13	2.13	101.98
61	1,549	1.11	53.16	2.12	101.51
62	1,575	1.11	53.21	2.11	101.03
63	1,600	1.11	53.28	2.10	100.55
64	1,626	1.11	53.37	2.09	100.07
65	1,651	1.12	53.48	2.08	99.59
66	1,676	1.12	53.61	2.08	99.59
67	1,702	1.12	53.75	2.07	99.11
68	1,727	1.13	53.91	2.07	99.11
69	1,753	1.13	54.08	2.06	98.63

Cover		HS-25 (Unfactored)		HS-25 (Factored)	
English (in)	Metric (mm)	English (ksf)	Metric (kPa)	English (ksf)	Metric (kPa)
70	1,778	1.13	54.26	2.06	98.63
71	1,803	1.14	54.46	2.06	98.63
72	1,829	1.14	54.67	2.06	98.63
73	1,854	1.15	54.90	2.06	98.63
74	1,880	1.15	55.13	2.06	98.63
75	1,905	1.16	55.38	2.06	98.63
76	1,930	1.16	55.64	2.06	98.63
77	1,956	1.17	55.90	2.06	98.63
78	1,981	1.17	56.18	2.06	98.63
79	2,007	1.18	56.46	2.07	99.11
80	2,032	1.19	56.76	2.07	99.11
81	2,057	1.19	57.06	2.07	99.11
82	2,083	1.20	57.37	2.08	99.59
83	2,108	1.20	57.69	2.08	99.59
84	2,134	1.21	58.02	2.09	100.07
85	2,159	1.22	58.35	2.09	100.07
86	2,184	1.23	58.69	2.10	100.55
87	2,210	1.23	59.04	2.11	101.03
88	2,235	1.24	59.39	2.11	101.03
89	2,261	1.25	59.75	2.12	101.51
90	2,286	1.26	60.11	2.13	101.98
91	2,311	1.26	60.48	2.13	101.98
92	2,337	1.27	60.86	2.14	102.46
93	2,362	1.28	61.24	2.15	102.94
94	2,388	1.29	61.62	2.16	103.42
95	2,413	1.30	62.01	2.17	103.90
96	2,438	1.30	62.41	2.18	104.38
97	2,464	1.31	62.81	2.19	104.86
98	2,489	1.32	63.21	2.20	105.34
99	2,515	1.33	63.62	2.21	105.82
100	2,540	1.34	64.03	2.22	106.29
101	2,565	1.35	64.45	2.23	106.77
102	2,591	1.35	64.87	2.24	107.25
103	2,616	1.36	65.29	2.25	107.73
104	2,642	1.37	65.72	2.27	108.69
105	2,667	1.38	66.15	2.28	109.17
106	2,692	1.39	66.58	2.29	109.65
107	2,718	1.40	67.02	2.30	110.12
108	2,743	1.41	67.45	2.31	110.60
109	2,769	1.42	67.90	2.33	111.56
110	2,794	1.43	68.34	2.34	112.04
111	2,819	1.44	68.79	2.35	112.52
112	2,845	1.45	69.24	2.36	113.00
113	2,870	1.46	69.69	2.38	113.96
114	2,896	1.47	70.15	2.39	114.43

APPENDIX “H”

Road & Driveway Details



Notes

1. For additional notes and asphalt requirements refer to STD. 7–2.
2. STD. 7–1A applies to local residential streets serving less than 100 dwelling units.
3. Sidewalk may be deleted on a cul-de-sac without a park or walkway connection.
4. If sidewalk is required on both sides of the street, use STD. 7–1B.
5. 2m daylight triangles required at intersections.
6. Curb and Gutter is STD. 6–1 unless otherwise approved.

TOWN OF OAKVILLE

STANDARD STREET SECTION FOR 16m ROAD ALLOWANCE

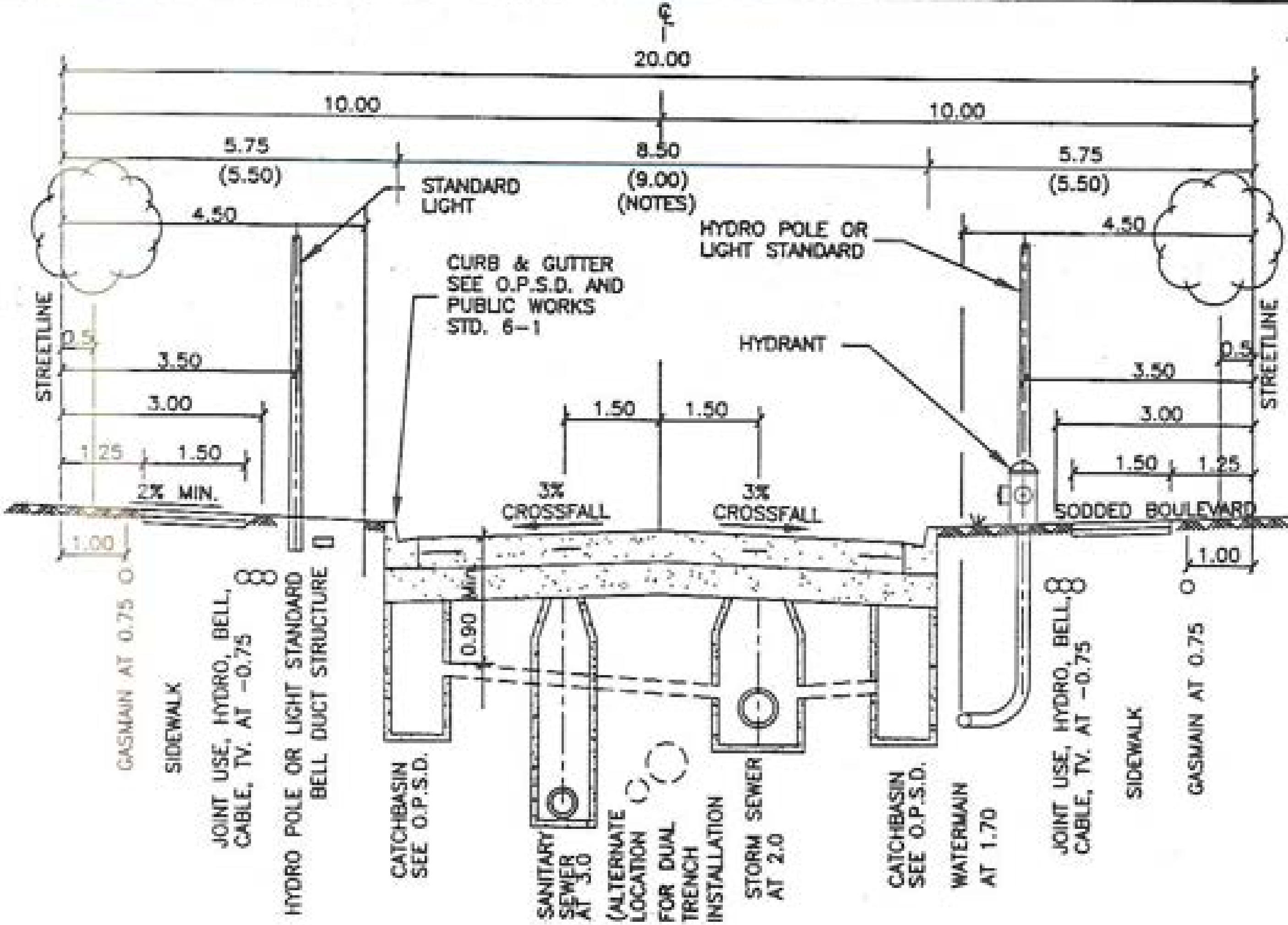
APPROVED

DIRECTOR OF PUBLIC WORKS

STD. 7–1A

REVISION DATE

MARCH 22, 2001



GENERAL NOTES:

1.-THE ELEVATION AT STREET LINE FOR LOT DRAINAGE SHALL BE 150mm HIGHER THAN THE FINISHED ROAD CROWN.
2.-GRANULAR 'B' SUB-BASE THICKNESSES MAY BE REDUCED BY 75mm WHEN GROUND CONDITIONS CONSIDERED SUITABLE BY THE DIRECTOR OF PUBLIC WORKS.
3.-MAXIMUM ROAD GRADIENT 7%.
4.-ALL MATERIAL TO MEET ONTARIO PROVINCIAL STANDARD SPECIFICATIONS.
5.-WATERMAINS AND SANITARY SEWERS TO CONFORM TO LATEST REGIONAL MUNICIPALITY OF HALTON SPECIFICATIONS AND REQUIREMENTS.
6.-ALL DRIVEWAYS BETWEEN CURB AND SIDEWALKS TO BE ASPHALTED.
7.-IF ANY TRENCH AFFECTS EITHER THE ROADWAY OR CURBS, THEN COMPACTED GRANULAR 'B' MATERIAL WILL BE RE-QUIRED FOR THE BACKFILL.
8.-9.00m PAVEMENT TO BE USED ON MINOR COLLECTOR AND LOCAL INDUSTRIAL ROADS.
9.-TOP COURSE ASPHALTIC CONCRETE SHALL BE ADDED TO THE ROAD ONLY AFTER ADJACENT BUILDINGS (HOMES, INDUSTRIAL, COMMERCIAL, ETC.) HAVE BEEN CONSTRUCTED AND OR ONLY WITH THE SPECIFIC CONSENT OF THE DIRECTOR OF PUBLIC WORKS.
10.-FULL LENGTH SUB-DRAINS ARE TO BE INSTALLED.
11.-AN EXTRA 150mm THICKNESS OF GRANULAR 'B' SHALL BE ADDED AT ARTERIAL AND INDUSTRIAL ROAD INTERSECTIONS. THIS EXTRA DEPTH SHALL BE EXTENDED FOR A MINIMUM OF 15mm FROM THE PROPERTY LINE OF THE INTERSECTING STREET.
12.-SUB-GRADE CROSS-FALL SHALL BE 3 PERCENT.
13.-SODDING REQUIREMENTS TO CONFORM TO OPSS 570 AND 571.

ASPHALT REQUIREMENTS:

A.-INDUSTRIAL AND COLLECTOR ROADS OR BUS ROUTES
40mm HL 3
80mm HL 8

B.-RESIDENTIAL ROADS (NO BUSES)
40mm HL 3
50mm HL 8

C.-DRIVEWAYS
50mm DRIVEWAYS MIX ASPHALT (HL-3A)

GRANULAR BASE REQUIRED:

A.-ALL ROADS
150mm OF GRANULAR 'A' MATERIAL
350mm OF GRANULAR 'B' SUB-BASE (SEE NOTE 2)

B.-DRIVEWAYS
150mm OF 19mm CRUSHER RUN STONE

DIMENSIONS IN m EXCEPT AS NOTED

MUNICIPALITY: TOWN OF OAKVILLE	
STANDARD STREET SECTION FOR 20m ROAD ALLOWANCE	
APPROVED DIRECTOR OF PUBLIC WORKS	STD. 7-2 REVISION DATE MAY 1, 2003

DRIVEWAY BY – LAW NUMBER 1988-220
ACCESS GUIDELINES

LAND USE	ROAD TYPE	ENTRANCE WIDTH AT PROPERTY LINE	RADIUS	GUIDE FOR # OF ACCESSES
LOW DENSITY RESIDENTIAL	MAJOR	SINGLE 5m DOUBLE 7m TRIPLE 9m	NONE	18m FRONTAGE OR LESS –1 OVER 18m FRONTAGE –2
	MINOR	SINGLE 3.5m DOUBLE 6.5m TRIPLE 9m	NONE	18m FRONTAGE OR LESS –1 OVER 18m FRONTAGE –2
MULTIPLE RESIDENTIAL	MAJOR	7.5m – 9.0m	6.0m–7.5m	LESS THAN 60–75 UNITS 1–1 EMERGENCY MORE THAN 60–70 UNITS 2 DEPENDS CONFIGURATION
	MINOR	7.5m	4.5m–6.0m	
MINOR COMMERCIAL (FLOOR AREA UP TO 2000 sq.m)	MAJOR	7.5m – 9.0m	6.0m–9.0m	MINIMUM 45m SPACING BETWEEN ACCESSES
	MINOR	7.5m – 9.0m		MINIMUM 30m SPACING BETWEEN ACCESSES
MAJOR COMMERCIAL (OVER 2000 sq.m)	MAJOR	DIVIDED DRIVEWAY (UP TO 15.0m)	9.0m–10.5m	MINIMUM 60m SPACING BETWEEN ACCESSES
	MINOR	UNDIVIDED DRIVEWAY (9.0m–10.5m)	7.5m–12.0m	MINIMUM 30m SPACING BETWEEN ACCESSES
INDUSTRIAL	ALL	AS REQUIRED FOR TRUCK MOVEMENTS MAXIMUM 12.0m	MAXIMUM 15.0m	30m FRONTAGE –1 FULL OR 2 MUTUALS 30m–60m FRONTAGE –2 FULL (30m SPACING) OVER 60m – AS REQUIRED(30m SPACING)

MAJOR–MAJOR ARTERIALS, MINOR ARTERIALS, INDUSTRIAL ARTERIALS, COLLECTORS WITHIN 75m OF INTERSECTION WITH ANY ARTERIAL ROAD.

MINOR–LOCALS, RESIDENTIAL COLLECTORS.

PERMISSIBLE DRIVEWAY GRADES
INDUSTRIAL, COMMERCIAL AND MULTIPLE RESIDENTIAL:–MAXIMUM 5%–WITHIN 7.5m OF STREETLINE
–MAXIMUM 10%–BALANCE OF SITE (15% IF HEATED OR COVERED)

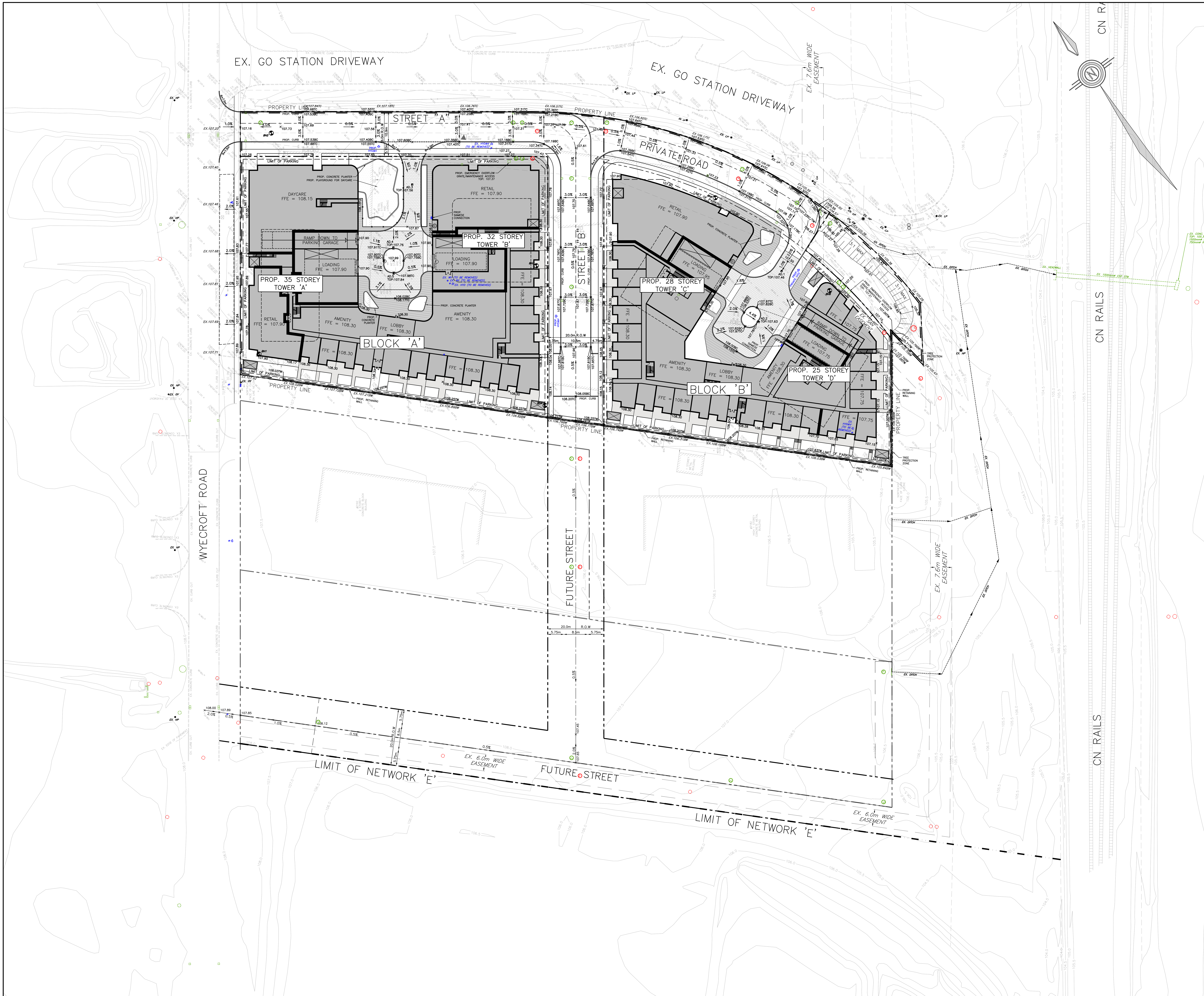
LOW DENSITY RESIDENTIAL–FOR PRIVATE DRIVEWAYS, ON MINOR STREETS: RECOMMENDED 10% MAXIMUM.

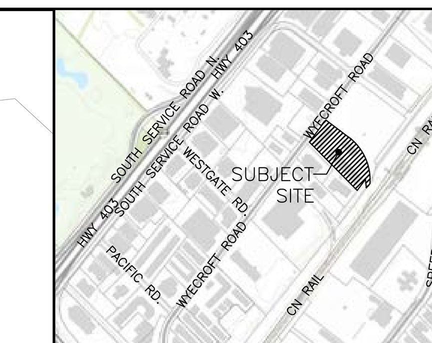
NOTE:
FOR URBAN ROADWAYS, ROAD CURB IS TO BE EXTENDED (DEPRESSED) ACROSS ALL DRIVEWAYS UNLESS DRIVEWAY IS SIGNALIZED.

MUNICIPALITY: TOWN OF OAKVILLE	
DRIVEWAY ENTRANCE CRITERIA (BY–LAW 1988–220 AS AMENDED)	
APPROVED A/ DIRECTOR OF PUBLIC WORKS	STD.10–2
	REVISION DATE MAY 1, 2003

APPENDIX "I"

Functional Grading Plan, Functional Servicing Plan, Functional Drainage Plan & Functional Erosion and Sediment Control Plan





KEY PLAN
N.T.S

LEGEND:

+EX.301.08	EXISTING ELEVATION
	PROPERTY LINE
	PROPOSED DRAINAGE BREAK
2%	DRAINAGE FLOW DIRECTION AND SLOPE
+301.08	PROPOSED ELEVATION
FFE	FINISHED FLOOR ELEVATION
	EX. MANHOLE
	EX. CATCHBASIN
	PROP. SANITARY MANHOLE
	PROP. STORM MANHOLE
	PROP. CATCHBASIN
	EX. VALVE AND BOX
	EX. FIRE HYDRANT
	PROP. MAIN WATER VALVE
	PROP. FIRE HYDRANT
	EXTERIOR DOOR LOCATION
	ON-SITE BOREHOLE

NOTE:
THIS PLAN HAS BEEN PREPARED TO DEMONSTRATE FEASIBILITY OF THE PROPOSED DEVELOPMENT WITH RESPECT TO GRADING IN CONJUNCTION WITH THE ZONING BY-LAW AMENDMENT APPLICATION. DETAILED GRADING DESIGN WILL BE PREPARED AT THE SITE PLAN APPLICATION STAGE.

CONVERSION NOTE:

DISTANCES AND COORDINATES SHOWN HEREON ARE IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048.

BEARINGS NOTE:

BEARINGS SHOWN HEREON ARE GRID DERIVED FROM GPS OBSERVATIONS OF OBSERVED REFERENCE POINTS 'A' AND 'B' USING THE LEICA SMARTNET RTK NETWORK AND ARE REFERRED TO THE 6' UTM COORDINATE SYSTEM, ZONE 17, CENTRAL MERIDIAN 81 0' WEST LONGITUDE. (NAD 83 (CSRS)(2010)).

DISTANCES SHOWN HEREON ARE GROUND DISTANCES AND CAN BE CONVERTED TO GRID DISTANCES BY MULTIPLYING BY A COMBINED SCALE FACTOR OF 0.999739.

ELEVATIONS NOTE:

ELEVATIONS SHOWN HEREON ARE GEODETIC AND ARE REFERRED TO TOWN OF OAKVILLE BENCH MARK NO.101 HAVING AN ELEVATION OF 115.838 METRES.

NO.	DATE	REVISIONS	BY
1.	AUG. 01/25	ISSUED FOR ZBA SUBMISSION	D.G

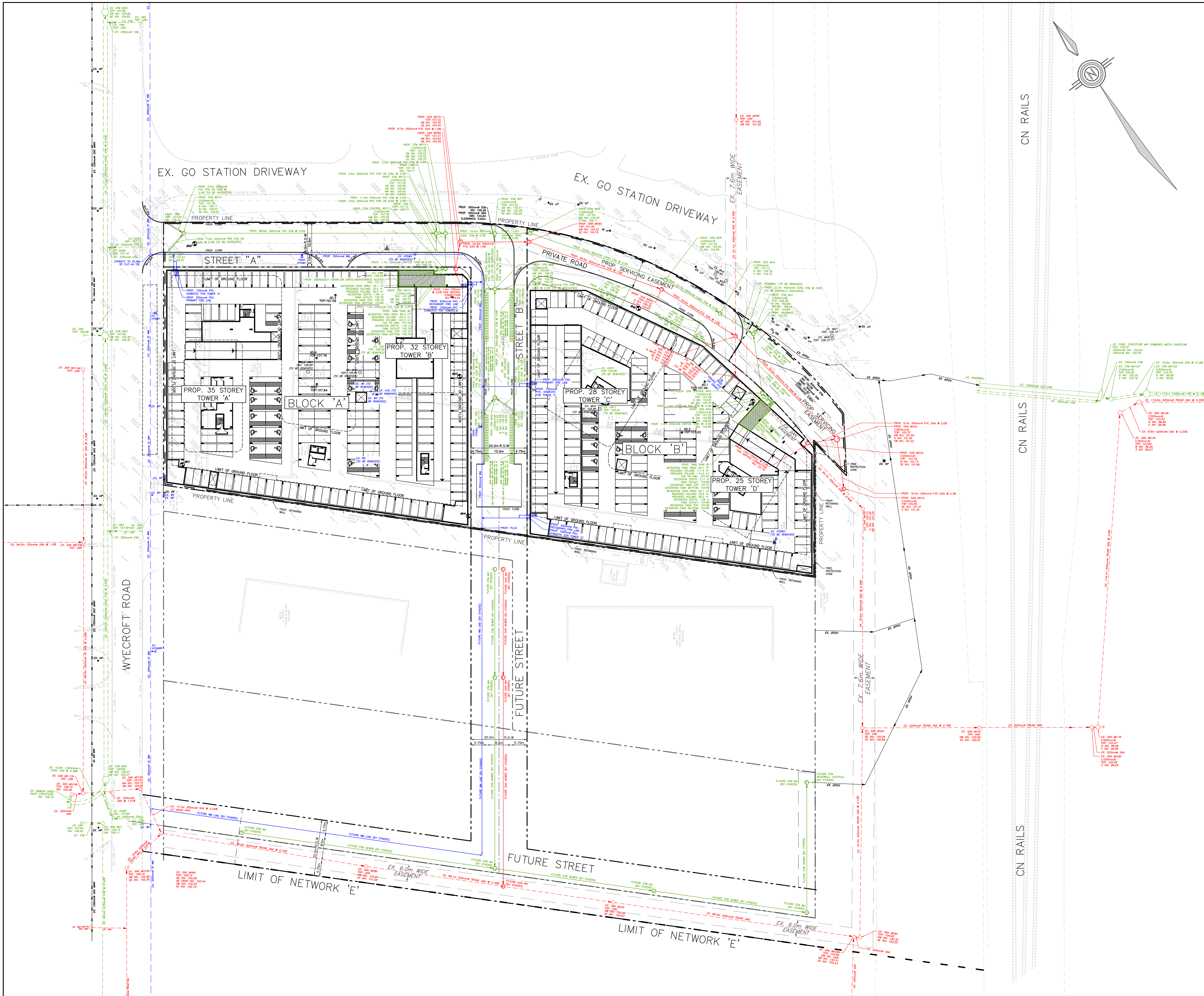
PRELIMINARY

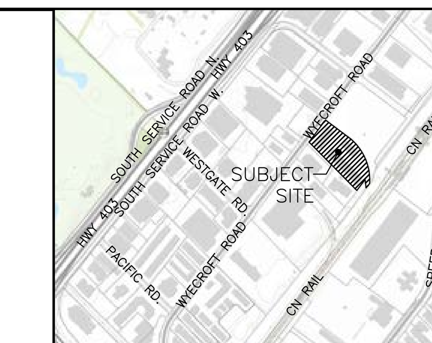
VALDOR ENGINEERING INC.
Consulting Engineers - Project Managers
571 CHRISLEA ROAD, UNIT 4, 2ND FLOOR, WOODBRIDGE, ONTARIO, L4L 8A2
TEL (905)264-0054, FAX (905)264-0069
E-MAIL: info@valdor-engineering.com
www.valdor-engineering.com

PROPOSED MIXED-USED DEVELOPMENT
2172 WYECROFT ROAD
CITY OF OAKVILLE

FUNCTIONAL GRADING PLAN

SCALE	DATE OF DWG.	PROJECT NO.
1:400	AUG. 01/25	24123
DRAWN BY A.M	DRAWING NO. FSG-1	
CHKD BY D.G		





KEY PLAN
N.T.S

LEGEND:

- PROPERTY LINE
- EXISTING GAS LINE
- EX. MANHOLE
- EX. CATCHBASIN
- PROP. SANITARY MANHOLE
- PROP. STORM MANHOLE
- PROP. CATCHBASIN
- EX. VALVE AND BOX
- EX. FIRE HYDRANT
- PROP. MAIN WATER VALVE
- PROP. FIRE HYDRANT
- BP PROP. BACKFLOW PREVENTER
- M PROP. WATER METER
- GW EXISTING GUY WIRE
- HP EXISTING HYDRO POLE
- EXISTING TRANSFORMER
- ON-SITE BOREHOLE

NOTE:
THIS PLAN HAS BEEN PREPARED TO DEMONSTRATE FEASIBILITY OF THE PROPOSED DEVELOPMENT WITH RESPECT TO SERVICING IN CONJUNCTION WITH THE ZONING BY-LAW AMENDMENT APPLICATION. DETAILED SERVICING DESIGN WILL BE PREPARED AT THE SITE PLAN APPLICATION STAGE.

CONVERSION NOTE:

DISTANCES AND COORDINATES SHOWN HEREON ARE IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048.

BEARINGS NOTE:

BEARINGS SHOWN HEREON ARE GRID DERIVED FROM GPS OBSERVATIONS OF OBSERVED REFERENCE POINTS 'A' AND 'B' USING THE LEICA SMARTNET RTK NETWORK AND ARE REFERRED TO THE 6' UTM COORDINATE SYSTEM, ZONE 17, CENTRAL MERIDIAN 81 0' WEST LONGITUDE. (NAD 83 (CSRS)(2010)).

DISTANCES SHOWN HEREON ARE GROUND DISTANCES AND CAN BE CONVERTED TO GRID DISTANCES BY MULTIPLYING BY A COMBINED SCALE FACTOR OF 0.999739.

ELEVATIONS NOTE:

ELEVATIONS SHOWN HEREON ARE GEODETIC AND ARE REFERRED TO TOWN OF OAKVILLE BENCH MARK NO.101 HAVING AN ELEVATION OF 115.838 METRES.

NO.	DATE	REVISIONS	BY
1.	AUG. 01/25	ISSUED FOR ZBA SUBMISSION	D.G

PRELIMINARY

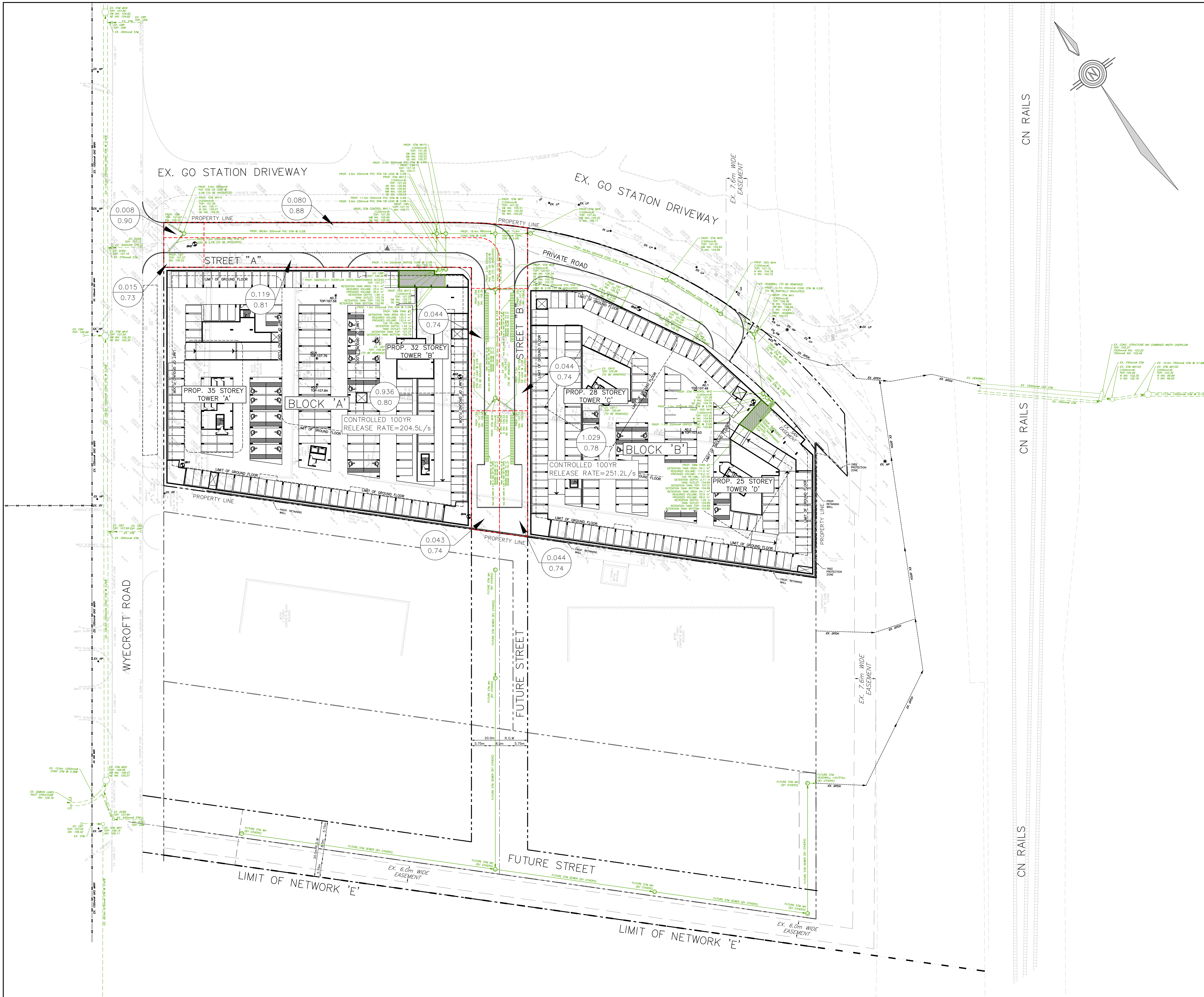
VALDOR ENGINEERING INC.
Consulting Engineers - Project Managers
571 CHRISLEA ROAD, UNIT 4, 2ND FLOOR, WOODBRIDGE, ONTARIO, L4L 8A2
TEL (905)264-0054, FAX (905)264-0069
E-MAIL: info@valdor-engineering.com
www.valdor-engineering.com

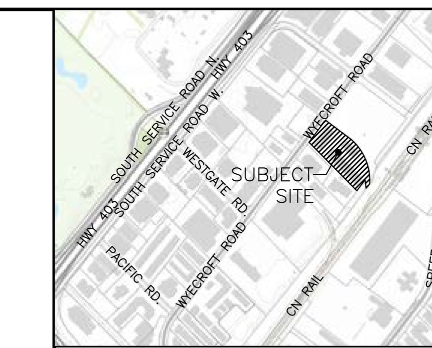
PROPOSED MIXED-USED DEVELOPMENT
2172 WYECROFT ROAD
CITY OF OAKVILLE

FUNCTIONAL SERVICING PLAN

SCALE	DATE OF DWG.	PROJECT NO.
1:400	AUG. 01/25	24123

DRAWN BY	DRAWING NO.
A.M	FSP-1
CHKD BY D.G	





KEY PLAN
N.T.S

LEGEND:

- PROPERTY LINE
- EXISTING GAS LINE
- EX. MANHOLE
- EX. CATCHBASIN
- PROP. SANITARY MANHOLE
- PROP. STORM MANHOLE
- PROP. CATCHBASIN
- EX. VALVE AND BOX
- EX. FIRE HYDRANT
- PROP. MAIN WATER VALVE
- PROP. FIRE HYDRANT
- PROP. BACKFLOW PREVENTER
- PROP. WATER METER
- CW EXISTING GUY WIRE
- HP EXISTING HYDRO POLE
- EXISTING TRANSFORMER
- ON-SITE BOREHOLE
- PROP. DRAINAGE BREAK

NOTE:
THIS PLAN HAS BEEN PREPARED TO DEMONSTRATE FEASIBILITY OF THE PROPOSED DEVELOPMENT WITH RESPECT TO DRAINAGE IN CONJUNCTION WITH THE ZONING BY-LAW AMENDMENT APPLICATION.
DETAILED DRAINAGE DESIGN WILL BE PREPARED AT THE SITE PLAN APPLICATION STAGE.

CONVERSION NOTE:

DISTANCES AND COORDINATES SHOWN HEREON ARE IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048.

BEARINGS NOTE:

BEARINGS SHOWN HEREON ARE GRID DERIVED FROM GPS OBSERVATIONS OF OBSERVED REFERENCE POINTS 'A' AND 'B' USING THE LEICA SMARTNET RTK NETWORK AND ARE REFERRED TO THE 6' UTM COORDINATE SYSTEM, ZONE 17, CENTRAL MERIDIAN 81 0' WEST LONGITUDE. (NAD 83 (CSRS)(2010)).

DISTANCES SHOWN HEREON ARE GROUND DISTANCES AND CAN BE CONVERTED TO GRID DISTANCES BY MULTIPLYING BY A COMBINED SCALE FACTOR OF 0.999739.

ELEVATIONS NOTE:

ELEVATIONS SHOWN HEREON ARE GEODETIC AND ARE REFERRED TO TOWN OF OAKVILLE BENCH MARK NO.101 HAVING AN ELEVATION OF 115.838 METRES.

NO.	DATE	REVISIONS	BY
1.	AUG. 01/25	ISSUED FOR ZBA SUBMISSION	D.G

PRELIMINARY

VALDOR ENGINEERING INC.
Consulting Engineers - Project Managers
571 CHRISLEA ROAD, UNIT 4, 2ND FLOOR, WOODBRIDGE, ONTARIO, L4L 8A2
TEL (905)264-0054, FAX (905)264-0069
E-MAIL: info@valdor-engineering.com
www.valdor-engineering.com

PROPOSED MIXED-USED DEVELOPMENT
2172 WYECROFT ROAD
CITY OF OAKVILLE

FUNCTIONAL DRAINAGE PLAN

SCALE	DATE OF DWG.	PROJECT NO.
1:400	AUG. 01/25	24123

DRAWN BY: A.M
CHKD BY: D.G
DRAWING NO.: FDP-1

SEDIMENT CONTROL NOTES

1. ALL SEDIMENT AND EROSION CONTROL MEASURES SHALL BE INSTALLED AND IN PROPER WORKING ORDER PRIOR TO CONSTRUCTION ACTIVITIES. THE EXACT LOCATION TO BE DETERMINED IN THE FIELD.
2. ALL CONSTRUCTION VEHICLES SHALL EXIT/ENTER THE SITE VIA THE TEMPORARY CONSTRUCTION ACCESS MUD MAT.
3. THE CONTRACTOR SHALL PREVENT MUD TRUCKING ONTO EXISTING RIGHTS–OF WAY AND SHALL PROVIDE FOR CLEAN UP AT HIS OWN EXPENSE AS DIRECTED BY ENGINEER.
4. ALL EROSION AND SEDIMENT CONTROL MEASURES SHALL BE ROUTINELY INSPECTED INCLUDING AFTER EVERY RAINFALL, MAINTAINED IN PROPER WORKING ORDER AND CLEANED PERIODICALLY.
5. CONTRACTOR TO STABILIZE THE SITE AS SOON AS POSSIBLE BY REESTABLISHING VEGETATIVE GROUND COVER AND AVOIDING BARE SOIL AREAS. ALL AREAS (INCLUDING STOCKPILES) WHERE SITE IMPROVEMENTS ARE NOT EXPECTED TO OCCUR IMMEDIATELY SHALL BE REVEGETATED WITH 100mm OF TOPSOIL AND HYDROSEEDED.
6. CONSTRUCTION OPERATIONS SHALL BE CARRIED OUT IN SUCH A MANNER THAT EROSION AND WATER POLLUTION SHALL BE MINIMIZED.
7. EROSION AND SEDIMENT CONTROLS ARE TO BE INSTALLED, INSPECTED AND MAINTAINED IN ACCORDANCE WITH THE EROSION & SEDIMENT CONTROL GUIDELINE FOR URBAN CONSTRUCTION (DEC. 2006) AND THE INSPECTION GUIDE (2008) PREPARED BY THE GREATER GOLDEN HORSESHOE CONSERVATION AUTHORITIES.

SPECIAL PRECAUTIONS

1. ESC FENCING, SILT FENCE OR EROSION CONTROL BLANKETS SHOULD BE WILDLIFE–FRIENDLY AND NOT INCORPORATE MESH REINFORCEMENT, AS THIS HAS BEEN FOUND TO ENTRAP SMALL WILDLIFE (BIRDS, MAMMALS, REPTILES, AMPHIBIANS, ETC.). OPEN–WEAVE NATURAL FIBRE PRODUCTS ARE AVAILABLE WHICH WOULD BE SUITABLE. ALTERNATIVELY, MESH SIZES < 6 MM (1/4") OR > 50 MM (2") REDUCE THE RISK TO WILDLIFE, AS VERY SMALL MESH OPENINGS PREVENT WILDLIFE FROM BECOMING ENTANGLED, WHILE LARGE MESH OPENINGS ALLOW MOST SMALL WILDLIFE TO PASS THROUGH UNHARMED. UNWOVEN MATERIALS ARE ALSO SUITABLE.
2. CONSTRUCTION SHOULD BE AVOIDED DURING UNUSUALLY WET, RAINY OR WINTER THAW CONDITIONS.
3. WASH, REFUEL AND SERVICE MACHINERY AND STORE FUEL AND OTHER MATERIALS FOR THE MACHINERY A MINIMUM DISTANCE OF 30 M AWAY FROM THE WATER OR ANY DRAINAGE PATHWAYS TO PREVENT DELETERIOUS SUBSTANCES FROM ENTERING THE WATER.
4. MACHINERY IS TO ARRIVE ON SITE IN A CLEAN CONDITION (INCLUDING FREE OF MUD/SOIL/DIRT FROM OTHER LOCATIONS; INCLUDING CLEAN WHEELS/TIRES/TRACKS) AND IS TO BE MAINTAINED FREE OF FLUID LEAKS.
5. IN ORDER TO REDUCE THE SPREAD OF INVASIVE SPECIES, EQUIPMENT SHOULD BE THOROUGHLY CLEANED BEFORE BEING BROUGHT ONSITE AND BEFORE LEAVING SITE. PLEASE PLAN A CLEANING STATION AT OR NEAR THE MUD–MAT FOR THIS PURPOSE. FOR GUIDANCE IN THIS REGARD, PLEASE REFER TO THE CLEAN EQUIPMENT PROTOCOL FOR INDUSTRY AVAILABLE ONLINE: (HTTP://WWW.ONTARIOINVASIVEPLANTS.CA/FILES/CLEANEQUIPMENTPROTOCOL_MAR15 2013_D3.PDF)
6. KEEP AN EMERGENCY SPILL KIT ON SITE IN CASE OF FLUID LEAKS OR SPILLS FROM MACHINERY.

CONSTRUCTION STAGING NOTES

STAGE 1: EARTHWORKS

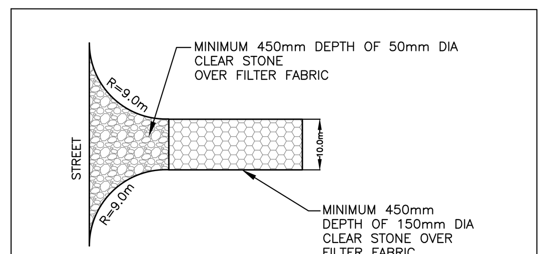
1. INSTALL SILT FENCE AROUND PERIMETER OF SITE.
2. CONSTRUCT THE MUD MAT FOR CONSTRUCTION ACCESS WITH A LOCKABLE GATE.
3. INSTALL SILTATION PROTECTION ON STREET CATCHBASINS IN THE VICINITY OF THE SITE ON BOTH REGIONAL AND LOCAL ROADS.
4. CLEAR THE SITE AND DISPOSE ALL DEBRIS OFF SITE.
5. ESTABLISH ROUGH GRADE OF SITE ROADWAYS AND DWELLING FOUNDATIONS.
6. SWEEP THE STREET REGULARLY TO ENSURE THAT THE ROAD PAVEMENT IS CLEAR OF ANY MUD TRACKING.

STAGE 2: SITE SERVICING

1. INSTALL THE SERVICE CONNECTIONS AND SITE SERVICING.
2. CAP THE UPSTREAM END OF SEWERS DURING CONSTRUCTION TO ENSURE THAT SILT AND DEBRIS DOES NOT ENTER THE MUNICIPAL SYSTEMS.
3. UPON INSTALLATION OF CATCHBASINS AND AREA DRAINS, PROTECT WITH SEDIMENT TRAPS.
4. SWEEP THE STREET REGULARLY TO ENSURE THAT THE ROAD PAVEMENT IS CLEAR OF ANY MUD TRACKING.
5. COMPLETE BOULEVARD GRADING AND STABILIZE ALL GROUND SURFACES WITH LANDSCAPE AND HARDSCAPE MATERIALS.
6. ONCE ALL SURFACES ARE STABILIZED, REMOVE THE SEDIMENT CONTROLS.
7. CLEAN THE STORMWATER DETENTION TANK, MANHOLES AND CATCHBASINS AND DISPOSE ALL SILT AND DEBRIS OFF SITE.

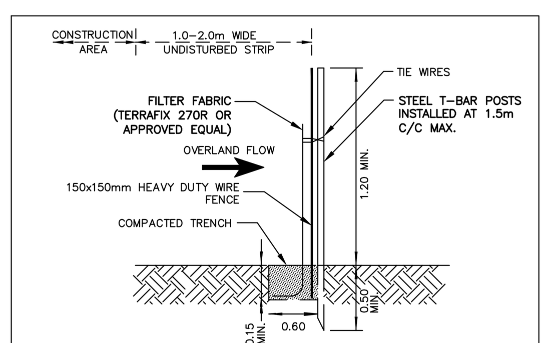
STAGE 3: HOUSE CONSTRUCTION

1. MUD MAT INSTALLED DURING ESC STAGE–1 TO BE REMOVED ONCE THE PRIVATE LANEWAYS ARE COMPLETED WITH BASE ASPHALT
2. REGULAR FLUSHING AND SWEEPING OF THE PRIVATE LANES IS TO BE UNDERTAKEN TO ENSURE THAT SILT IS NOT TRACKED OFF SITE
3. SILT FENCE IS TO BE INSPECTED REGULARLY AND REPAIRED/MAINTAINED AS NECESSARY
4. CATHBASIN SILT TRAPS ARE TO BE INSPECTED AND MAINTAINED REGULARLY UPON COMPLETION OF HOUSE CONSTRUCTION
5. LOTS ARE TO BE STABILIZED WITH SOD AND DRIVEWAYS ARE TO BE PAVED

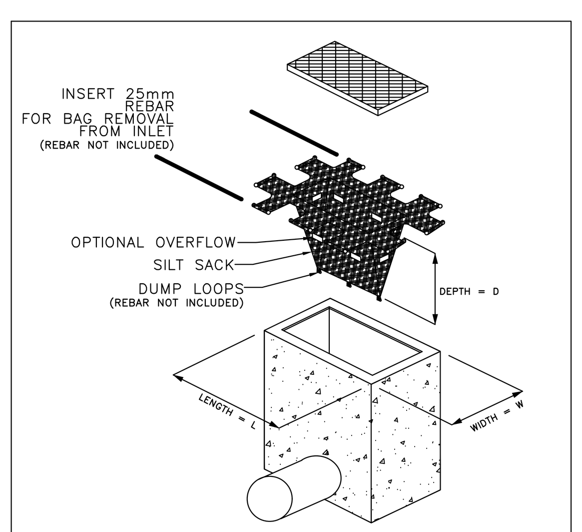


NOTE:
1. MUD MAT TO BE INSTALLED AT THE TEMPORARY CONSTRUCTION ACCESS LOCATION.
2. GRANULAR MATERIAL TO BE PERIODICALLY REPLACED AS IT BECOMES CONTAMINATED

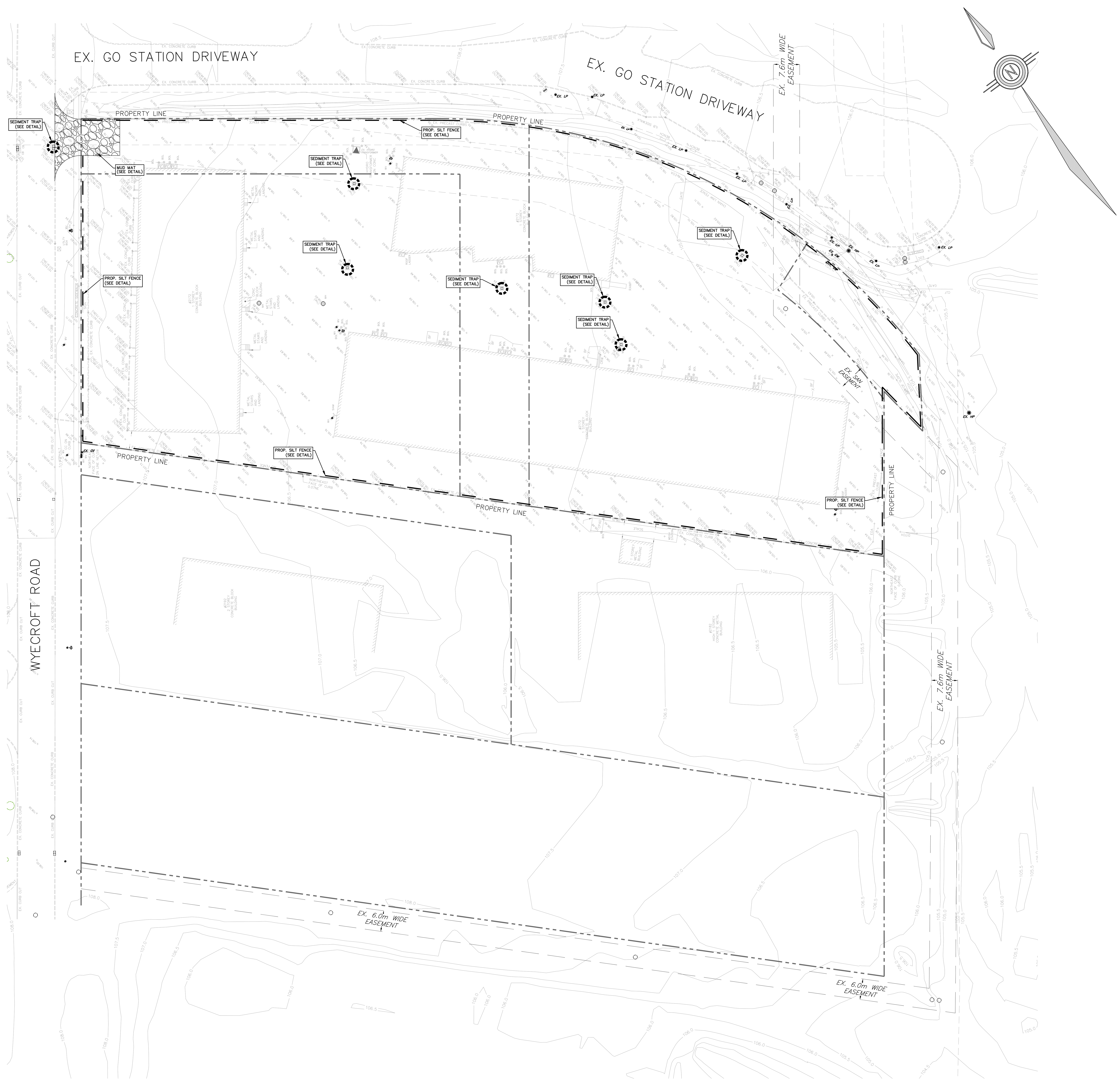
MUD MAT DETAIL
N.T.S.

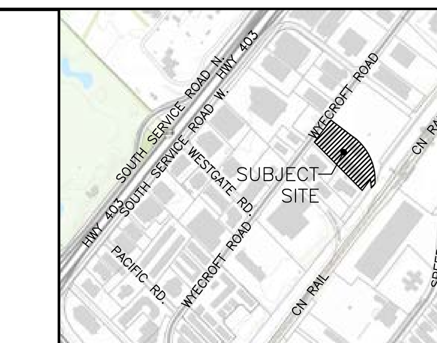


SILT FENCE DETAIL
SCALE N.T.S.



SILTATION CONTROL FOR STANDARD STREET CATCHBASIN
(SILT SACK)





KEY PLAN
N.T.S

LEGEND:

- SEDIMENT TRAP
- SILT FENCE
- PROPERTY LINE
- STORM MANHOLE
- AREA DRAIN
- CATCHBASIN
- SANITARY MANHOLE
- VALVE AND BOX
- VALVED HYDRANT

NOTE:
THIS PLAN HAS BEEN PREPARED TO DEMONSTRATE FEASIBILITY OF THE PROPOSED DEVELOPMENT WITH RESPECT TO EROSION SEDIMENT CONTROL IN CONJUNCTION WITH THE ZONING BY–LAW AMENDMENT APPLICATION.
DETAILED EROSION SEDIMENT CONTROL DESIGN WILL BE PREPARED AT THE SITE PLAN APPLICATION STAGE.

CONVERSION NOTE:

DISTANCES AND COORDINATES SHOWN HEREON ARE IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048.

BEARINGS NOTE:

BEARINGS SHOWN HEREON ARE GRID DERIVED FROM GPS OBSERVATIONS OF OBSERVED REFERENCE POINTS 'A' AND 'B' USING THE LEICA SMARTNET RTK NETWORK AND ARE REFERRED TO THE 6' UTM COORDINATE SYSTEM, ZONE 17, CENTRAL MERIDIAN 81 0' WEST LONGITUDE. (NAD 83 (CSRS)(2010)).

DISTANCES SHOWN HEREON ARE GROUND DISTANCES AND CAN BE CONVERTED TO GRID DISTANCES BY MULTIPLYING BY A COMBINED SCALE FACTOR OF 0.999739.

ELEVATIONS NOTE:

ELEVATIONS SHOWN HEREON ARE GEODETIC AND ARE REFERRED TO TOWN OF OAKVILLE BENCH MARK NO.101 HAVING AN ELEVATION OF 115.838 METRES.

NO.	DATE	REVISIONS	BY
1.	AUG. 01/25	ISSUED FOR ZBA SUBMISSION	D.G

PRELIMINARY

VALDOR ENGINEERING INC.
Consulting Engineers - Project Managers
571 CHRISLEA ROAD, UNIT 4, 2ND FLOOR, WOODBRIDGE, ONTARIO, L4L 8A2
TEL (905)264-0054, FAX (905)264-0069
E-MAIL: info@valdor-engineering.com
www.valdor-engineering.com

PROPOSED MIXED–USED DEVELOPMENT
2172 WYECROFT ROAD
CITY OF OAKVILLE

FUNCTIONAL EROSION SEDIMENT CONTROL PLAN

SCALE	DATE OF DWG.	PROJECT NO.
1:400	AUG. 01/25	24123
DRAWN BY A.M	DRAWING NO. FESC–1	
CHKD BY D.G		