DILLON | COUNTERPOINT LAND DEVELOPMENT

2679264 Ontario Inc.

Stormwater Management and Sanitary Servicing Report

5259 Tecumseh Road East Redevelopment – Zoning By-Law Amendment

September 2026 – 24-7395

Submitted by
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1.0 Introduction

Dillon Consulting Limited (Dillon) was retained by 2679264 Ontario Inc., to prepare a stormwater management (SWM) and sanitary servicing strategy in support of the planning approvals process for the proposed redevelopment of 5259 Tecumseh Road East in the City of Windsor (Windsor), Ontario (referred to as 'the site'). As shown on **Figure 1**, the site is located on the south side of the Tecumseh Road East, north of Adstoll Avenue, east of Buckingham Drive, and west of Ecole St. Thérèse.



Figure 1: Project Site Location

As shown on the site concept plan attached in Appendix A, the 1.22 ha site is divided into two parts; 0.45 ha along the north end of the property bordering Tecumseh Road East, and 0.77 ha along the south end of the site bordering Adstoll Avenue. For the purposes of this submission, this report addresses the sanitary and SWM strategy for the 0.77 ha development area (hereafter referred to as the subject development site) along the southern end of the property. It is anticipated that a separate sanitary and SWM design and submission will be completed for the northern future development area.

1.1 References

The following items were referred to while conducting the current analysis:

- Rose / Adstoll / Princess Storm Relief Sewer Final Report (City of Windsor, 1999);
- Stormwater Management Planning and Design Manual (Ministry of the Environment (MOE, 2003);
- City of Windsor Development Manual (2015);
- City of Windsor – Sewer and Coastal Flood Protection Master Plan (SMP) InfoWorks ICM Model (2020);
- Windsor/Essex Region Stormwater Manual (WERSM, 2024);
- Design Criteria for Sanitary Sewers, Storm Sewers and Forcemains (MECP, 2023);
- 5259 Tecumseh Road E. Site Plan (Provided in Appendix A);
- City of Windsor Open Data Portal; and
- Ontario Building Code.

2.0 Stormwater Management Design

2.1 Stormwater Management Design Criteria

The SWM design criteria was developed based on the guidance presented in the WERSM and Stormwater Management Planning and Design Manual (MOE, 2003).

2.1.1 Minor System Conveyance

The minor drainage system (storm sewers) is to be designed to convey the 1:5-year design storm event and maintain a hydraulic grade line (HGL) at least 0.30 m below ground surface.

2.1.2 Major System Conveyance

The major drainage system (overland) is to be designed to contain runoff on the site for all storm events. Surface ponding depths on the site are to be maintained below 0.30 m during the 1:100-year event and achieve a freeboard of 0.30 m from proposed building openings. Storage depths during the Urban Stress Test (UST) are to be maintained below proposed finished building openings.

2.1.3 Quality Control

Runoff produced by the site is required to be treated to a "Normal" protection level, which is defined by the removal of 70% of total suspended solids (TSS) on an average annual basis.

2.1.4 Quantity Control

The allowable stormwater release rate of the subject development site is governed by the level of service design of the receiving storm sewer on Adstoll Avenue. The allowable release rate for this site is calculated based on the City of Windsor Rose / Adstoll / Princess Storm Relief Sewer Final Report (1999), which presents an allotted flow from the subject site area to the receiving storm sewer.

The following design storm events were used for the analysis:

- 1:5-year, 4 hour design storm using Chicago distribution with a 15 minute time interval and a total rainfall depth of 49.5 mm;
- 1:100-year, 4 hour design storm using Chicago distribution with a 15 minute time interval with a total rainfall depth of 81.6 mm. Used to assess the major system HGL corresponds to a maximum surface ponding of 0.3 m depth;
- 1:100-year, 24 hour design storm using SCS Type-II distribution with a 2 hour time interval and a total rainfall depth of 108 mm. Used to assess the major system HGL corresponds to a maximum surface ponding of 0.3 m depth; and

- Urban Stress Test Storm Event representative of the 1:100-year, 24 hour design storm Chicago distribution with 15 minute time interval and an additional 42 mm uniformly distributed, with a total rainfall depth of 150 mm.

2.2 Methodology and Development

Assessment of hydrologic and hydraulic conditions for the subject development site under a developed conditions was undertaken using available existing documentation and PCSWMM modelling.

2.2.1 Existing Conditions

The 0.77 ha subject development site currently consists of a building, parking lot and grassed area. Based on the ERCA soil mapping data, the soil characteristics for subject development site area is composed of Brookston Clay Loam which has a hydrologic soil group (HSG) D classification (Table A-3.7.7, WERSM). The infiltration parameters for the existing condition model have been selected based on this soil type criteria.

2.2.2 Allowable Release Rate

Based on a review of the Rose/Adstoll/Princess sewer design report (1999), the allowable release rate for the subject development site has been calculated based on the capacity of the receiving 1500mm diameter (60") storm sewer on Adstoll Avenue. The 1999 design report indicates an approximate 9.65 acres (3.91 ha) area contributing to the receiving storm sewer, which consists of a portion of the subject development site, the adjacent property, the Adstoll right-of-way (ROW), and property south of the Adstoll ROW, as shown in **Appendix B**.

Based on drainage areas presented for the Adstoll storm sewer, approximately 0.44 ha of the subject development site is considered in the original storm design plan. This was used to determine the allowable release rate to the receiving Adstoll storm sewer. The rational method was used for the allowable release rate calculation using the contributing 0.44 ha drainage area and storm parameters presented within the 1999 design report.

Using the existing condition land use parameters below in **Table 1**, an allowable release rate for the subject development site was estimated to be 18 L/s. Calculations are provided in **Appendix C**.

Table 1: Existing Conditions Allowable Flow Rate

Attribute	Development
Allowable Contributing Area (ha)	0.44
Runoff Coefficient 'C'	0.20
Flow Time (min)	20
Allowable Release Rate (L/s)	18

2.2.3 Post-Development Conditions

Assessment of hydrologic and hydraulic conditions for the proposed condition for the subject development site was undertaken using the PCSWMM 2024 software distributed by CHI. PCSWMM is a modelling software for stormwater, wastewater, and watershed systems which provides a graphic user interface (GUI) for the United States Environment Protection Agency's Stormwater Management Model (EPA SWMM).

The stormwater assessment for this development was completed using the Green-Ampt infiltration method for the hydrologic calculations and the dynamic wave routing method for the hydraulic calculations.

Under proposed conditions, the site will cover a total of 0.77 ha and will consist of a multi-unit residential building, parking lot, sidewalk, and grassed area.

2.2.3.1 Sub-Catchment Parameters

Sub-catchment attributes for the subject development site were selected based on the WERSM and summarized in **Table 2** below. Additional details of the modelling parameters and other model details for proposed conditions are provided in the **Appendix D**.

Table 2: Post Development Sub-Catchment Parameters

Attribute	Development
Land Use	Residential
Area (ha)	0.77
Flow Length* (m)	150
Imperviousness (%)	90
Slope (%)	0.5
Manning's n Impervious	0.013
Manning's n Pervious	0.15
Depression Storage Impervious (mm)	2.5
Depression Storage Pervious (mm)	7.5

Infiltration: Suction Head (mm)	180
Infiltration: Conductivity (mm/hr)	0.5
Infiltration: Initial Deficit (fraction)	0.1

** Maximum flow path to outlet*

2.2.3.2 Tail Water Conditions

The tail water (TW) time series for the storm outlet for the subject development site (Adstoll Avenue storm Sewer Maintenance Hole 7R5833) was extracted from the Windsor SMP InfoWorks ICM model (as approved to be used by the City). Elevation vs time graphs representative of dynamic water levels at this location were used for the model simulation during the Chicago 1:5-year 4 hour, 1:100-year 4 hour, SCS Type II 1:100-year 24 hour, and UST events. These hydrographs were assigned to the outfall in the model to represent the tail water in the Adstoll Avenue storm sewer. **Figure 2** below shows the graphical representation of the TW time series for each storm event.

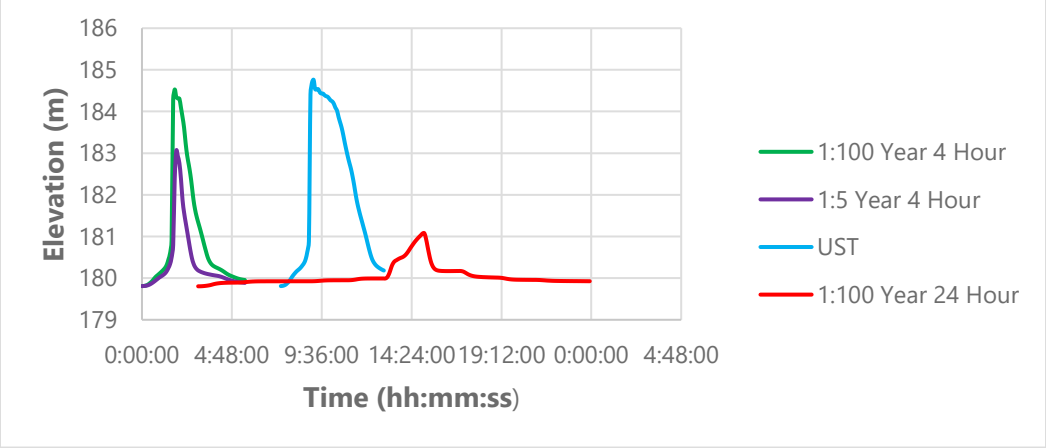


Figure 2: Tail Water Time Series at MH 7R5833

2.3 Post Development Condition Analysis

2.3.1 Water Quantity Control

The SWM for the subject development site was designed to control post-development flows to the allowable release rate for all events up to and including the 1:100-year design and UST storm events. As outlined in Section 2.2.2, the allowable release rate has been estimated as 18 L/s. Stormwater detention for the subject development site will be provided using a combination of underground and surface storage within the proposed parking lot. Note that the depth of storage will not exceed 0.30 m within the parking lot areas.

To meet the allowable release rate and stormwater quantity control requirements, it is recommended to utilize an ADS MC-3500 unit to provide approximately 300m3 storage. Details of the underground storage system are provided in **Appendix E**. Based on preliminary grading plan, approximately 345m3 of parking lot surface storage is available up to a ponding depth of 0.3m measured above the lowest catch basin elevation of 184.05 m for the subject development site.

A summary of the hydrologic and hydraulic analysis is provided in **Table 3**.

Table 3: Summary of Model Results Under Proposed Conditions

Design Storm Event	Storm Distribution Type	surface storage volume (m^3)/Storage Depth (m)	Underground Storage Volume (m^3)	Controlled Peak flow from Site (L/s)	Target Flow (L/s)
1:5-year, 4 hour	Chicago	0	278	15	18
1:100-year, 4 hour	Chicago	183 (0.20 m)	300	18	
1:100-year, 24 hour	SCS Type II	37 (0.08m)	300	17	
UST	Chicago	226 (0.23 m)	300	18	

Based on the model results, it is estimated that during governing 1:100 year, 4-hour Chicago storm event, a maximum storage of 488 m3 can be used to maintain a maximum outflow rate of 18 L/s. Water levels are shown to be maintained within the maximum ponding depth of 0.30 m up to and including the Urban Stress Test design storm event.

A HydroVex Vertical Vortex Flow Regulator is proposed to control peak discharge from the subject development site to the 1500 mm (60 in.) diameter Adstoll Avenue storm sewer. It is anticipated that a 100 VHV 1 unit will be required to limit flows to a maximum release rate of 18 L/s. For the proposed conditions PCSWMM model, the flow regulator is modelled according to performance curves provided within manufacturer specifications. The specifications for the flow regulator unit are provided in **Appendix E**.

Proposed condition modelling details are provided in **Appendix D**.

2.3.2 Water Quality Treatment

As discussed in **Section 2.1.3**, the site will be required to meet Normal Protection Level water quality treatment (70% TSS removal). It is proposed that an oil and grit separator (OGS) unit be used to meet this target. An FD-4HC model has been sized by ADS for this site and the sizing document is provided in **Appendix E**.

3.0 Sanitary Servicing Design

3.1 Existing Conditions

The subject property does not have an active sanitary service connection. Available sanitary outlets for the site include:

- A 450 mm combined sewer located within the 4.27 m (14') wide alley along the western property limit.
- A 250 mm sanitary sewer located along Adstoll Avenue to the south.

It should be noted that the 250 mm sanitary sewer along Adstoll Avenue is currently capped east of the subject property and does not extend across the site's frontage.

Through discussions with the City of Windsor, it was determined that the existing sanitary sewer along Adstoll Avenue can provide sanitary servicing for the proposed development (Refer to **Appendix B**). The future development area to the north will remain serviced via its existing connection to the 900 mm combined sewer on Tecumseh Road East.

A conveyance capacity assessment was completed for the downstream receiving sanitary sewer network to evaluate the potential impacts of the proposed development relative to existing conditions. Hydraulic capacity for the receiving sanitary sewer network is governed by the 450 mm diameter sanitary sewer at MH 7S5094, located along Tecumseh Road East. Per the City's direction, the analysis also evaluated the first downstream combined sewer overflow (CSO) control location at MH 7C25. The purpose of this assessment is to compare existing and proposed peak dry weather flows, hydraulic grade lines (HGL), and sewer capacities.

Table 4 below summarizes the design parameters used to assess the system. All criteria were established in accordance with the City of Windsor Development Manual (2015) and the MECP Design Criteria for Sanitary Sewers, Storm Sewers and Forcemains (2023).

Table 4: Sanitary Design Criteria

CRITERIA	CITY OF WINDSOR DEVELOPMENT MANUAL
Hydraulic Sewer Sizing	Manning's Equation
Population Densities	Based on the 2021 Census data provided by the City
Average Daily Sewage	0.0042 L/sec/capita
Peaking Factor	City of Windsor Ultimate Flow Factors
Extraneous Flow	0.28 L/sec/Ha
Manning's Roughness Coefficient 'n'	0.013
Minor Loss Coefficient (K)	1.0

To determine the existing peak sanitary flow incoming at MH 7S5094, the total contributing drainage area was delineated. Population counts for each drainage area were established using Census data provided by the City of Windsor. Refer to **Appendix F**, **Figure 1.0** for the tributary drainage area boundaries.

3.1.1 Isolated Manhole Assessment – MH 7C25

As-built drawings show that the downstream 250 mm combined sewer overflow currently has a reverse slope, with the pipe invert at MH 7S5095 (178.960) sitting higher than at MH 7C25 (178.878). To understand how this CSO behaves under peak conditions, MH 7C25 was assessed in isolation, evaluating whether peak incoming flows are fully accommodated by the downstream pipe or if the system head causes surcharging and a spill over the weir.

Under existing peak flow conditions at MH 7C25, hydraulic losses force the water surface elevation in MH 7C25 to rise to 179.134, exceeding the weir crest by 0.006m. Under these conditions, CSO pipe conveys 65.6 L/s, while the weir experiences a minor overflow discharge of 1.2 L/s. This demonstrates that weir activation occurs under peak flow conditions independent of any additional downstream backwater effects.

Refer to **Appendix F**, **Page 1** for the isolated conditions calculations.

3.1.2 Existing Downstream Backwater and HGL Analysis

To determine the existing Hydraulic Grade Line at MH 7C25 under peak flow conditions, a backwater analysis was completed. The analysis begins at MH 7S18, where the 450 mm trunk sewer discharges into a 675 mm sewer. Free-flowing downstream conditions were assumed, establishing the starting boundary HGL at the pipe obvert elevation of the receiving 675 mm trunk sewer.

Cumulative head losses, including continuous pipe friction and manhole minor losses, were calculated at each sewer run and manhole moving upstream toward MH 7C25. These accumulated energy losses create surcharging throughout the downstream system. By the time flow reaches MH 7S5095, the tailwater HGL rises to 178.030, which remains 0.93 m below the downstream CSO pipe invert, indicating that downstream backwater conditions do not impact the weir overflow at MH 7C25 under existing peak conditions.

Although the isolated assessment in **Section 3.1.1** indicates a 1.2 L/s weir discharge and a 65.6 L/s CSO conveyance, the downstream backwater and HGL analysis assumes the total peak flow is conveyed entirely through the 250 mm CSO pipe to provide a more conservative estimate of HGL surcharging while simplifying the calculations.

Existing conditions calculations are provided in **Appendix F** (**Pages 2–3**). For the plan view layout of the analyzed sewer network, refer to **Figure 1.0** in **Appendix F**.

3.2 Proposed Conditions

The proposed development consists of a 4-storey multi-unit residential building including a driveway, parking lot, garage, sidewalks, and landscaped areas. The development is proposed to connect to the Adstoll Avenue system. This will require the extension of the 250 mm sanitary trunk sewer westerly to the front of the subject property to facilitate a new service connection.

The sanitary peak flow from the proposed development has been estimated in accordance with the City of Windsor Development Manual (May 2015). However, for the population density, a value of 2 persons per unit has been used, aligning with values accepted in recent residential developments within the City of Windsor. As a result, the ultimate design population was estimated to be 150 persons, and the ultimate sanitary flow was estimated to be 4.55 L/s.

A summary of the site-specific sanitary flow parameters is presented in **Table 5**.

Table 5: Proposed Sanitary Flow Parameters (Subject Site)

Parameter	Value
Total Population	150 People
Residential Sewage Flow	0.0042 L/sec/capita
Infiltration	0.28 L/sec/ha
Ultimate Flow Factor	6

3.2.1 Proposed Downstream Backwater and HGL Analysis

To assess the impact of the proposed development on the receiving infrastructure, the tributary areas were adjusted by reassigning the subject site's area from the MH 7S5095W catchment to MH 7S16, incorporating an additional population of 150 persons. It should be noted that the tributary population assigned to MH 7S5095W was not modified following the drainage area adjustment, as the site currently consists of a parking lot, generating zero additional population. Refer to **Appendix F**, **Figure 2.0** for the updated sanitary tributary areas.

Downstream capacity and tailwater assessments were completed following the methodology outlined in **Section 3.1.2**. The additional flow slightly elevates the HGL at MH 7S5095 from 178.030 to 178.066, which remains 0.89 m below the downstream CSO pipe invert. This analysis indicates that the addition of the proposed development is not anticipated to result in significant hydraulic impacts, surcharging, or increased overflow risks to the municipal sanitary infrastructure.

Additionally, MH 7C25 was re-evaluated in isolation to account for the reduction in contributing drainage area resulting from the flow diversion. Under this re-calculated scenario, the water level elevation at MH 7C25 remains unchanged at 179.134. However, due to the reduced drainage area, flow conveyed through the CSO pipe decreases slightly to 65.5 L/s, while the discharge over the weir decreases to 1.1 L/s.

Refer to **Appendix F**, **Pages 4** to **6** for the proposed conditions calculations.

3.3 Sensitivity Analysis – SCFPMP Extraneous Flow Criteria

A sensitivity analysis was conducted to evaluate hydraulic system behavior under the recommended extraneous flow allowance of 1.0 L/s/ha, in accordance with the City of Windsor Sewer Surcharging and Flooding Protection Master Plan (SCFPMP).

3.3.1 Isolated Manhole Assessment – MH 7C25

An assessment of MH 7C25 was completed in isolation, using the SCFPMP extraneous flow rate of 1.0 L/s/ha, evaluating whether peak incoming flows are fully accommodated by the downstream pipe or if the system head causes surcharging and a spill over the weir.

Under existing peak flow conditions at MH 7C25, hydraulic losses force the water surface elevation in MH 7C25 to rise to 179.199, exceeding the weir crest. This indicates that the CSO doesn't have the capacity to fully convey the peak flow and that there is weir activation even before accounting for downstream backwater restrictions.

Refer to **Appendix G**, **Page 1** for the isolated conditions calculations.

3.3.2 Existing Downstream Backwater and HGL Analysis

To evaluate the existing Hydraulic Grade Line at MH 7C25 under existing peak flow conditions, a backwater analysis was completed, as detailed in **Section 3.1.2**.

Under these conditions, the energy losses create surcharging throughout the downstream system. By the time flow reaches MH 7S5095, the HGL rises to 179.264, exceeding the weir invert and surcharging into MH 7C25.

The flow split at MH 7C25 was determined by iteratively balancing the total incoming peak sanitary flow against the head-dependent discharge of both the restricted CSO pipe and the overflow weir. Surcharging from the downstream system drives the HGL at MH 7C25 up to 179.271 m (0.143 m above the weir crest), increasing weir overflow, resulting in a total weir discharge of 131 L/s, which represents an additional 8 L/s of overflow beyond the peak flow generated from upstream of MH 7C25.

Refer to **Appendix G**, **Page 2** to **3** for the existing conditions calculations.

3.3.3 Proposed Conditions Analysis

To assess the impact of the proposed development on the receiving infrastructure, the tributary areas were adjusted and the downstream sewers evaluated as detailed in **Section 3.2.1**. The analysis indicates that the additional flow slightly elevates the HGL at MH 7C25 from 179.271 to 179.273, resulting in a minor increase in weir overflow discharge from 131 L/s to 134 L/s.

It is worth noting that this sensitivity analysis represents a very conservative evaluation. The calculations use the 1.0 L/s/ha extraneous flow rate recommended in the City of Windsor SCFPMP while applying the more conservative peaking factors from the City of Windsor Development Manual rather than standard Harmon's formula values.

Under these conservative assumptions, while the weir experiences overflow under both existing and proposed conditions, the impact of the proposed development is minimal, increasing the HGL by only 0.002 m and weir discharge by 3 L/s. This indicates that the addition of the proposed development is not anticipated to result in significant hydraulic impacts to the municipal sanitary infrastructure.

Refer to **Appendix F**, **Page 4** to **5** for the proposed conditions calculations.

4.0 Conclusion

The SWM design for the subject development has considered only the 0.77 ha southern portion of the lands and meets the established SWM criteria laid out in the WERSM, and no negative impacts due to the site development are anticipated in the receiving Adstoll Avenue storm sewer.

The proposed SWM strategy is as follows:

- The proposed subject site will have a maximum allowable release rate of 18 L/s into the existing Adstoll storm sewer. This allowable release rate will be achieved using a Hydrovex Vertical Vortex Flow Regulator (100-VHV-1) unit;
- Storage on site will be achieved through a combination of approximately 300m3 of underground storage and 345m3 of surface storage; and
- Water quality control will be achieved through the use of an OGS unit sized to achieve 70% TSS removal over an average annual basis.

The conveyance capacity and backwater assessment indicate that the downstream receiving sanitary sewer network is expected to adequately accommodate the sanitary flows from the proposed development. Including the proposed development results in no significant impacts on system capacity.

To facilitate sanitary servicing for the 0.77 ha development, it is recommended to install a new private drain connection. This will require an extension of the existing 250 mm sanitary trunk sewer along Adstoll Avenue to the subject property's frontage.

This report is respectfully submitted for review and approval. Contact the undersigned should you have questions or require additional information.

Yours truly,

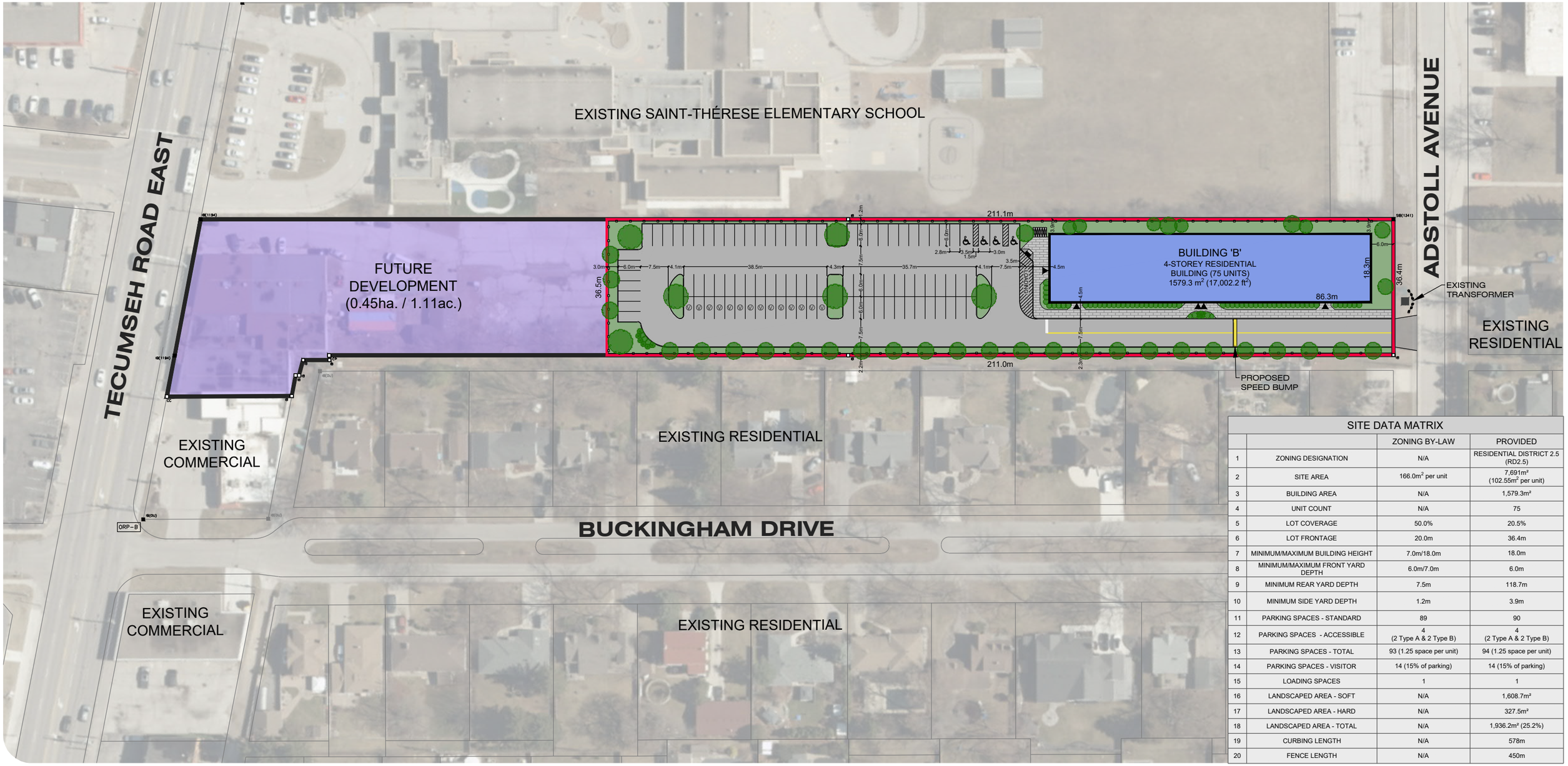
Dillon Consulting Limited



Ryan Langlois, P.Eng.	Kyle Edmunds, P.Eng.
Water Resources Engineer	Civil Engineer

Appendix A

5259 Tecumseh Road East Figures



SITE DATA MATRIX			
		ZONING BY-LAW	PROVIDED
1	ZONING DESIGNATION	N/A	RESIDENTIAL DISTRICT 2.5 (RD2.5)
2	SITE AREA	166.0m² per unit	7,691m² (102.55m² per unit)
3	BUILDING AREA	N/A	1,579.3m²
4	UNIT COUNT	N/A	75
5	LOT COVERAGE	50.0%	20.5%
6	LOT FRONTAGE	20.0m	36.4m
7	MINIMUM/MAXIMUM BUILDING HEIGHT	7.0m/18.0m	18.0m
8	MINIMUM/MAXIMUM FRONT YARD DEPTH	6.0m/7.0m	6.0m
9	MINIMUM REAR YARD DEPTH	7.5m	118.7m
10	MINIMUM SIDE YARD DEPTH	1.2m	3.9m
11	PARKING SPACES - STANDARD	89	90
12	PARKING SPACES - ACCESSIBLE	4 (2 Type A & 2 Type B)	4 (2 Type A & 2 Type B)
13	PARKING SPACES - TOTAL	93 (1.25 space per unit)	94 (1.25 space per unit)
14	PARKING SPACES - VISITOR	14 (15% of parking)	14 (15% of parking)
15	LOADING SPACES	1	1
16	LANDSCAPED AREA - SOFT	N/A	1,608.7m²
17	LANDSCAPED AREA - HARD	N/A	327.5m²
18	LANDSCAPED AREA - TOTAL	N/A	1,936.2m² (25.2%)
19	CURBING LENGTH	N/A	578m
20	FENCE LENGTH	N/A	450m

2679264 ONTARIO INC.
5259 TECUMSEH ROAD EAST
REDEVELOPMENT

CONCEPT PLAN
FIGURE 1.0

APPLICANT'S LAND HOLDING (1.22ha. / 3.01ac.)

SUBJECT SITE (0.77ha. / 1.90ac.)

PROPOSED MULTIPLE RESIDENTIAL BUILDING (75 UNITS)

FUTURE DEVELOPMENT (0.45ha. / 1.11ac.)

PROPOSED SIDEWALK

PROPOSED LANDSCAPE

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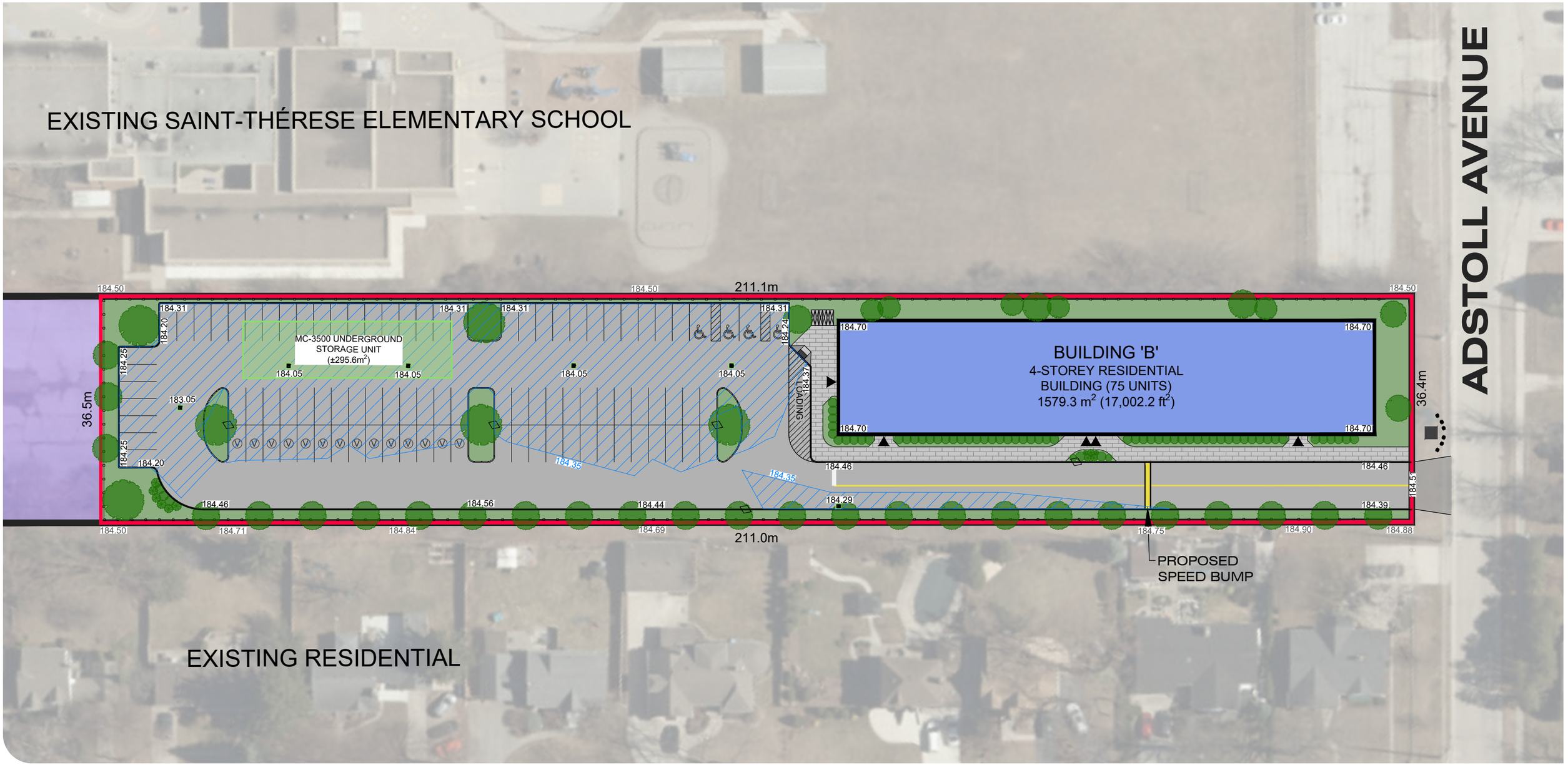
MAP/DRAWING INFORMATION
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ALL DIMENSIONS AND BOUNDARY INFORMATION SHOULD BE VERIFIED BY AN O.L.S PRIOR TO CONSTRUCTION.

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DESIGNED BY: ESB

SCALE: 1:1000 (11x17)

COUNTERPOINT LAND DEVELOPMENT BY | DILLON CONSULTING

PROJECT: 24-7395
STATUS: FINAL
DATE: 02/11/2026



2679264 ONTARIO INC.
5259 TECUMSEH ROAD EAST
REDEVELOPMENT

PRELIMINARY GRADING PLAN
FIGURE 2.0

SUBJECT SITE
PROPOSED MULTIPLE RESIDENTIAL BUILDING (75 UNITS)
FUTURE DEVELOPMENT
PROPOSED SIDEWALK
PROPOSED LANDSCAPE
184.05 PROPOSED GRADE
PROPOSED CATCHBASIN
184.35 PROPOSED PONDING EXTENTS
PROPOSED UNDERGROUND STORAGE UNIT

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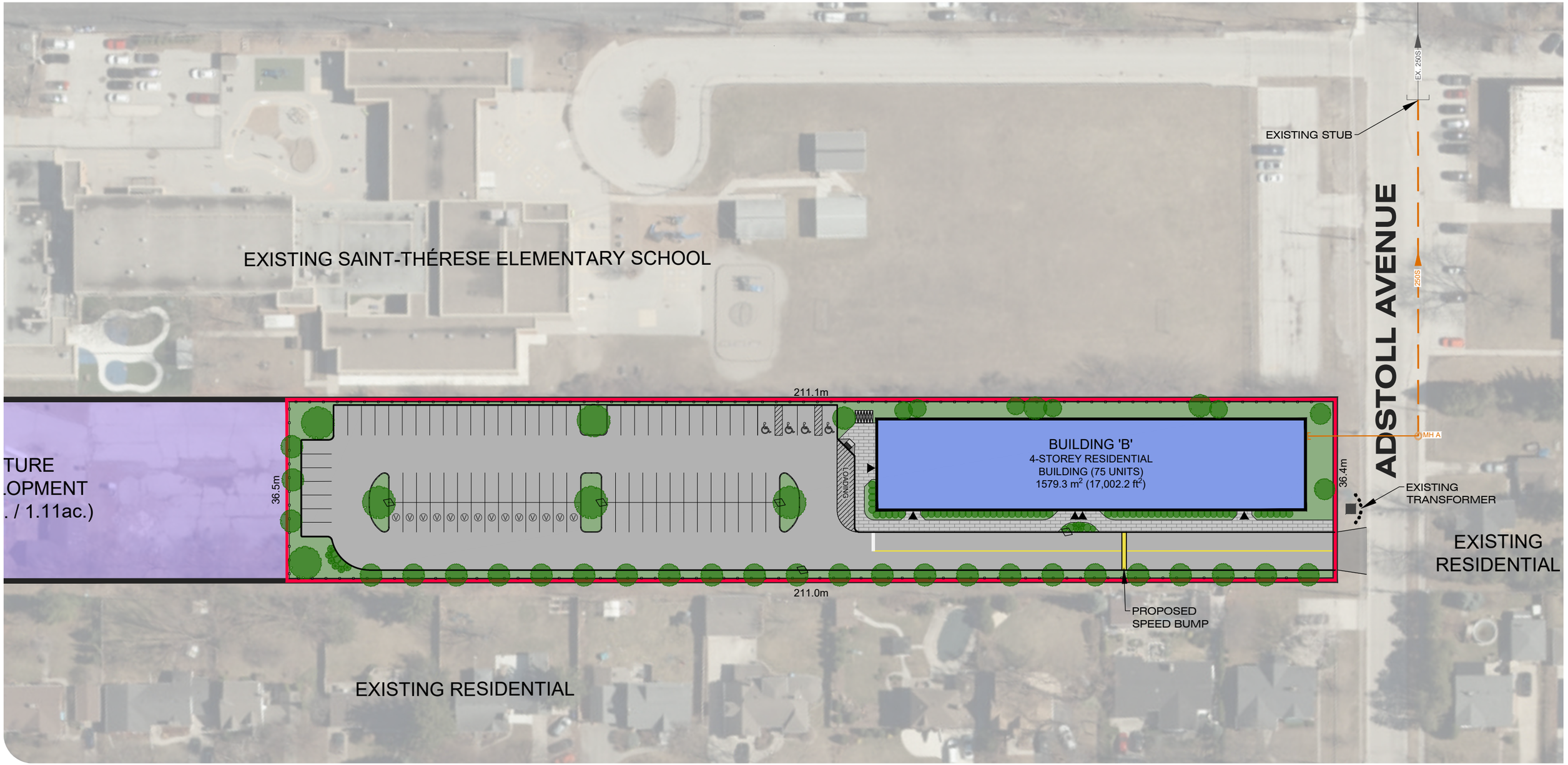
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CHECKED BY:
DESIGNED BY: JW

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PROJECT: 24-7395
STATUS: FINAL
DATE: 05/14/2026



2679264 ONTARIO INC.
5259 TECUMSEH ROAD EAST
REDEVELOPMENT

SANITARY EXTENSION FIGURE
FIGURE 3.0

SUBJECT SITE

PROPOSED MULTIPLE RESIDENTIAL BUILDING (75 UNITS)

FUTURE DEVELOPMENT

PROPOSED SIDEWALK

PROPOSED LANDSCAPE

EX. 250S — EXISTING SANITARY SEWER

250S — PROPOSED SANITARY SEWER

MH A — PROPOSED SANITARY MANHOLE

PROPOSED UNDERGROUND STORAGE UNIT

File Location:
c:\pw working directory\projects 2024\dillon_32jw\d0124389\247395-02-preliminary servicing.dwg
May, 15, 2026 11:27 AM

SOURCE: THE COUNTY OF ESSEX INTERACTIVE MAPPING (2025)

MAP/DRAWING INFORMATION
THIS DRAWING IS FOR INFORMATION PURPOSES ONLY.
ALL DIMENSIONS AND BOUNDARY INFORMATION SHOULD BE VERIFIED BY AN O.L.S PRIOR TO CONSTRUCTION.

CREATED BY: JW
CHECKED BY:
DESIGNED BY: JW

SCALE: 1:750 (11x17)

N W E S

COUNTERPOINT LAND DEVELOPMENT BY | DILLON CONSULTING

PROJECT: 24-7395
STATUS: FINAL
DATE: 05/14/2026

Appendix B

Correspondence with the City of Windsor and Adstoll Storm Sewer Design Documentation

Bagchi, Aakash <abagchi@dillon.ca>

5259 Tecumseh Road East Development - Sanitary Sewer Outlet

Paramo, Juan <jparamo@citywindsor.ca> Mon, May 13, 2024 at 2:50 PM
To: "Lesani, Samane" <slesani@dillon.ca>
Cc: Aakash Bagchi <abagchi@dillon.ca>

Hi Samane,

Servicing to the sanitary sewer on Adstoll will be supported, however, the sewer would need to be extended to the frontage of the property. A long sanitary service connection to 7SP2221 will not be supported.

Thanks,

Juan Paramo, P.Eng. | Development Engineer

Engineering Department - Development Division

350 City Hall Square West | Suite 210 | Windsor, ON | N9A 6S1

519-255-6267 Ext. 6353

www.citywindsor.ca

From: Lesani, Samane <slesani@dillon.ca>
Sent: May 13, 2024 2:12 PM
To: Paramo, Juan <jparamo@citywindsor.ca>
Cc: Aakash Bagchi <abagchi@dillon.ca>
Subject: Re: 5259 Tecumseh Road East Development - Sanitary Sewer Outlet

CAUTION: This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Hi Juan,

I wanted to follow up on my previous email dated May 7, 2024. Can you please confirm that connecting the sanitary sewer from the subject site (5259 Tecumseh Road East, Windsor) to the sanitary node 7SP2221 on Adstoll Avenue will be acceptable to the City?

Thanks,

Samane

On Tue, May 7, 2024 at 4:45 PM Lesani, Samane <slesani@dillon.ca> wrote:

> Hi Juan,
>
> Dillon is working on a development at 5259 Tecumseh Road East, Windsor. Details for the site and consultation comments are in the snapshot below.
>
> 1040 Lake Laguna Court
> Windsor, Ontario
>
> Attention: Imad Najjar
>
> Dear Mr. Najjar,
>
> **RE:** **PRE-SUBMISSION CONSULTATION FOR ZONING BYLAW AMENDMENT AND SITE PLAN CONTROL PROPOSALS**
> **File No.:** PS-048/19
> **Applicant:** Imad Najjar
> **Location:** 5259 Tecumseh Road East, 0 Adstoll Avenue
> (Roll No. 070-570-06701-0000, 070-570-06702-0000)
>
> Based on City of Windsor's comments, a sanitary sewer study is required for the development. We wanted to confirm the sanitary outlet for this study with the aim of expediting approvals.
>
> The plan is to connect the sanitary sewer from the subject site to the sanitary node 7SP2221 on Adstoll Avenue. Can you confirm that this approach will be acceptable to the City?
>
> Thank you,
>
> Samane
>
> --

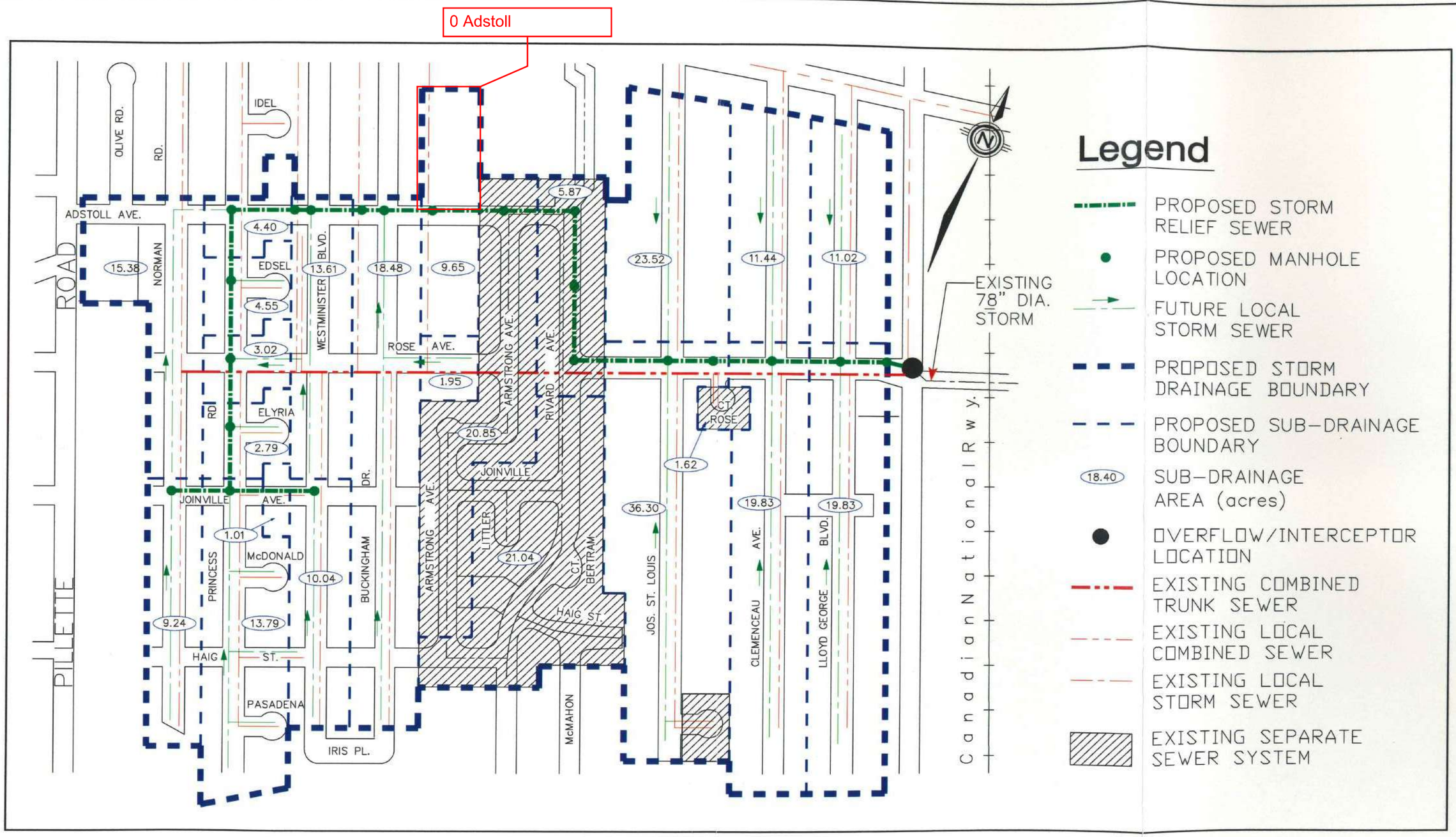
Samane Lesani
Dillon Consulting Limited
235 Yorkland Boulevard Suite 800
Toronto, Ontario, M2J 4Y8
T - 416.229.4646 ext. 2013
slesani@dillon.ca
www.dillon.ca

–

Samane Lesani
Dillon Consulting Limited
235 Yorkland Boulevard Suite 800
Toronto, Ontario, M2J 4Y8
T - 416.229.4646 ext. 2013
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ROSE / ADSTOLL / PRINCESS STORM RELIEF SEWER
PREFERRED DESIGN

FIGURE 4

Rose Street Drainage Area
From : Jefferson
To : Norman
Project # : Final Design

Designed by : Wade Bondy
Date : 8-Aug-97

Runoff Coefficients:

Parks/Playgrounds :	0.2	Apartments :	0.6
Single/Duplex Homes :	0.35	Commercial/Indus	0.7
Row Housing :	0.5	Paved :	0.95

Storm Relief Sewer

Upstream Ground Elevation : 608.50
Permissible Upstream Invert Elevation : 602.25 (5 ' cover)

Street	From	To	Land Use	Area 'A' (Acres)	Total Area (acres)	Runoff Coef. 'C'	Incr. A*C	Lateral A*C	Total A*C	Flow Time (min.) Sect.	Flow Time (min.) Accum.	Intensity (in/hr)	Req'd 'Q' (cfs)	Pipe Size (in.)	Slope (%)	n	Capacity (cfs)	Velocity (fps)	Length (ft)	Flow Time (min)	US Invert Elev. (ft)	DS Invert Elev. (ft)
Westminster	M1	M2	Residential	2.68	2.68	0.35	0.94	0.00	0.94	0.00	20.00	3.125	***2.93***	***15***	***0.230***	0.013	***3.10***	2.52	100	0.66	602.05	601.82
	M2	M3	Residential	3.40	6.08	0.35	1.19	0.00	2.13	0.66	20.66	3.074	***6.54***	***21***	***0.180***	0.013	***6.72***	2.79	400	2.39	601.66	600.94
	M3	M4	Residential	3.96	10.04	0.35	1.39	0.00	3.51	2.39	23.05	2.904	***10.20***	***24***	***0.210***	0.013	***10.37***	3.30	400	2.02	600.78	599.94
Joinville	M4	M5	Residential	1.01	11.05	0.35	0.35	0.00	3.87	2.02	25.07	2.774	***10.73***	***27***	***0.120***	0.013	***10.73***	2.70	460	2.84	599.24	598.69
	N4	M5	Residential	0.00	9.24	0.35	0.00	3.23	3.23	2.49	27.87	2.611	***8.44***	***27***	***0.080***	0.013	***8.76***	2.20	290	2.19	599.92	599.69
Princess	M5	M6	Residential	2.79	36.87	0.35	0.98	4.83	12.90	2.19	30.07	2.497	***32.22***	***42***	***0.110***	0.013	***33.37***	3.47	350	1.68	598.44	598.05
	M6	M7	Residential	3.02	39.89	0.35	1.06	0.00	13.96	1.68	31.75	2.415	***33.72***	***48***	***0.060***	0.013	***35.19***	2.80	390	2.32	597.55	597.32
	M7	M7T	Residential	4.55	44.44	0.35	1.59	0.00	15.55	2.32	34.07	2.312	***35.96***	***48***	***0.070***	0.013	***38.00***	3.02	450	2.48	593.16	592.84
	M7T	M8	Residential	4.40	48.84	0.35	1.54	0.00	17.09	2.48	36.55	2.210	***37.78***	***48***	***0.070***	0.013	***38.00***	3.02	420	2.31	592.84	592.55
Adstoll	M8	M9	Residential	15.38	64.22	0.35	0.00	5.03	22.12	2.31	38.87	2.123	***46.98***	***54***	***0.070***	0.013	***52.03***	3.27	400	2.04	592.30	592.02
	M9	M9T	Residential	0.00	64.22	0.35	0.00	0.00	22.12	2.04	40.90	2.052	***45.41***	***54***	***0.070***	0.013	***52.03***	3.27	51	0.26	592.02	591.98
	M9T	M10T	Residential	13.61	77.83	0.35	4.76	0.00	26.89	0.26	41.16	2.044	***54.95***	***60***	***0.050***	0.013	***58.24***	2.97	195	1.10	591.98	591.89
	M10T	M10	Residential	0.00	77.83	0.35	0.00	0.00	26.89	1.10	42.26	2.008	***53.98***	***60***	***0.050***	0.013	***58.24***	2.97	190	1.07	591.89	591.79
	M10	M11	Residential	20.43	98.26	0.35	7.15	0.00	34.04	1.07	43.33	1.974	***67.19***	***60***	***0.075***	0.013	***71.33***	3.63	155	0.71	591.63	591.52
	M11	M12	Res / Park	9.65	107.91	*0.23*	2.22	0.00	36.26	0.71	44.04	1.952	***70.77***	***60***	***0.080***	0.013	***73.66***	3.75	500	2.22	591.36	590.96
	M12	M13	Residential	20.85	128.76	*0.34*	7.09	0.00	43.35	2.22	46.26	1.887	***81.77***	***66***	***0.065***	0.013	***85.61***	3.60	280	1.30	590.80	590.61
Rivard	M13	M14	Residential	5.87	134.63	0.35	2.05	0.00	45.40	1.30	47.55	1.850	***84.01***	***66***	***0.070***	0.013	***88.85***	3.74	845	3.77	590.36	589.77
Rose	M14	M15	Residential	21.04	155.67	*0.33*	0.00	7.15	52.55	3.77	51.32	1.753	***92.10***	***66***	***0.080***	0.013	***94.98***	4.00	540	2.25	589.52	589.09
	M15	M15T	Residential	59.82	215.49	0.35	0.00	16.56	69.11	2.25	53.57	1.699	***117.42***	***66***	***0.125***	0.013	***118.73***	5.00	210	0.70	588.93	588.67
	M15T	M16	Residential	1.62	217.11	0.35	0.57	0.00	69.68	0.70	54.27	1.683	***117.27***	***66***	***0.125***	0.013	***118.73***	5.00	350	1.17	588.67	588.23
	M16	M17	Residential	31.27	248.38	0.35	0.00	10.94	80.62	1.17	55.44	1.657	***133.58***	***66***	***0.170***	0.013	***138.46***	5.83	355	1.02	588.07	587.47
	M17	M18	Residential	30.85	279.23	0.35	0.00	10.80	91.42	1.02	56.45	1.635	***149.46***	***66***	***0.210***	0.013	***153.89***	6.48	260	0.67	587.31	586.76
	M18	7C1207	Residential	0.00	279.23	0.35	0.00	0.00	91.42	0.67	57.12	1.621	***148.17***	***66***	***0.200***	0.013	***150.18***	6.32	50	0.13	586.60	586.50

Outlet Elevation : **586.50**

0 Adstoll within this catchment

Heung, Anthony <aheung@dillon.ca>

Fwd: Information Request: Stormwater Design Parameters (1650mm Storm sewer Pipe) - File PC-042/25 (0 Adstoll & 5259 Tecumseh Rd E)

Langlois, Ryan <rlanglois@dillon.ca> Thu, Jan 15, 2026 at 3:02 PM
To: Anthony Heung <aheung@dillon.ca>

Ryan Langlois, P.Eng.
Associate
Dillon Consulting Limited
1 Riverside Drive West, 12th floor
Windsor, Ontario, N9A 5K3
T - 519.948.5000 ext. 3230
rlanglois@dillon.ca
www.dillon.ca

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Platinum member

------- Forwarded message -------
From: **Paramo, Juan** <jparamo@citywindsor.ca>
Date: Thu, Dec 4, 2025 at 10:24 AM
Subject: RE: Information Request: Stormwater Design Parameters (1650mm Storm sewer Pipe) - File PC-042/25 (0 Adstoll & 5259 Tecumseh Rd E)
To: Tavana, Ehsan <etavana@dillon.ca>
Cc: Ryan Langlois <rlanglois@dillon.ca>, Wilson, Ian <IWilson@citywindsor.ca>

Good morning Ehsan,

As requested, please see attached the Rose/Adstoll/Princess Storm Relief Sewer design files. Based on a preliminary review of the Final Report (March, 1999), please note:

- Only a portion of the proposed development site was allocated to the storm sewer on Adstoll Avenue.
- The trunk storm sewer design criteria are outlined in the same report, including:
  - Rational Method runoff coefficients (C values)
  - Peak flow estimates based on a 5-year design storm and a 20-minute inlet time

Wherever possible, design criteria from the March 1999 report should be used to estimate the development's allowable release rate.

Disclaimer: The City of Windsor makes no representation regarding the completeness or accuracy of the data within the digital files provided. The consulting engineer may need to independently confirm information within the provided materials.

Thanks,

Juan Paramo, P.Eng. | Development Engineer

Engineering Department - Development Division

350 City Hall Square West | Suite 210 | Windsor, ON | N9A 6S1

519-255-6267 Ext. 6353

www.citywindsor.ca

From: Tavana, Ehsan <etavana@dillon.ca>
Sent: November 26, 2025 4:34 PM
To: Paramo, Juan <jparamo@citywindsor.ca>
Cc: Ryan Langlois <rlanglois@dillon.ca>
Subject: Information Request: Stormwater Design Parameters (1650mm Storm sewer Pipe) - File PC-042/25 (0 Adstoll & 5259 Tecumseh Rd E)

You don't often get email from etavana@dillon.ca. Learn why this is important

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Hi Juan,

I am writing regarding the Stage 2 Planning Consultation comments for the proposed development at 0 Adstoll Avenue & 5259 Tecumseh Road East (File No: PC-042/25).

In the engineering comments regarding the storm sewer connection, it was noted that the release rate should be reduced based on a lower existing runoff coefficient. To ensure our Stormwater Management Report aligns with the City's infrastructure capacity and historical design parameters, we require some clarification regarding the existing 1650mm storm sewer pipe on Adstoll Avenue.

Could you please send us any final design files and storm drainage area plans showing what areas were considered for the 1650mm storm sewer design (circa 2004)? We are specifically looking for:

1. **Storm Drainage Area Plans:** Documentation showing the catchment boundaries and whether our site was included in the contributing area calculations.
2. **Design Calculations:** Information regarding the specific site runoff coefficient (C) attributed to this property during that design phase.

Understanding what was considered "existing" at the time of the pipe's installation—and reviewing these plans—will help us determine the appropriate allowable discharge rate and whether the trunk was sized to accommodate the runoff from the site as it existed in 2004.

Thank you for your assistance.

Best regards,

Ehsan Tavana

–

Ehsan Tavana
Dillon Consulting Limited
235 Yorkland Boulevard Suite 700
Toronto, Ontario, M2J 4Y8
T - 416.229.4646 ext. 2032
etavana@dillon.ca
www.dillon.ca

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Rose-Adstoll-Princess Storm Relief Sewer - Final Report (1999).pdf
10825K

Appendix C

Existing Condition Calculations – Stormwater Assessment

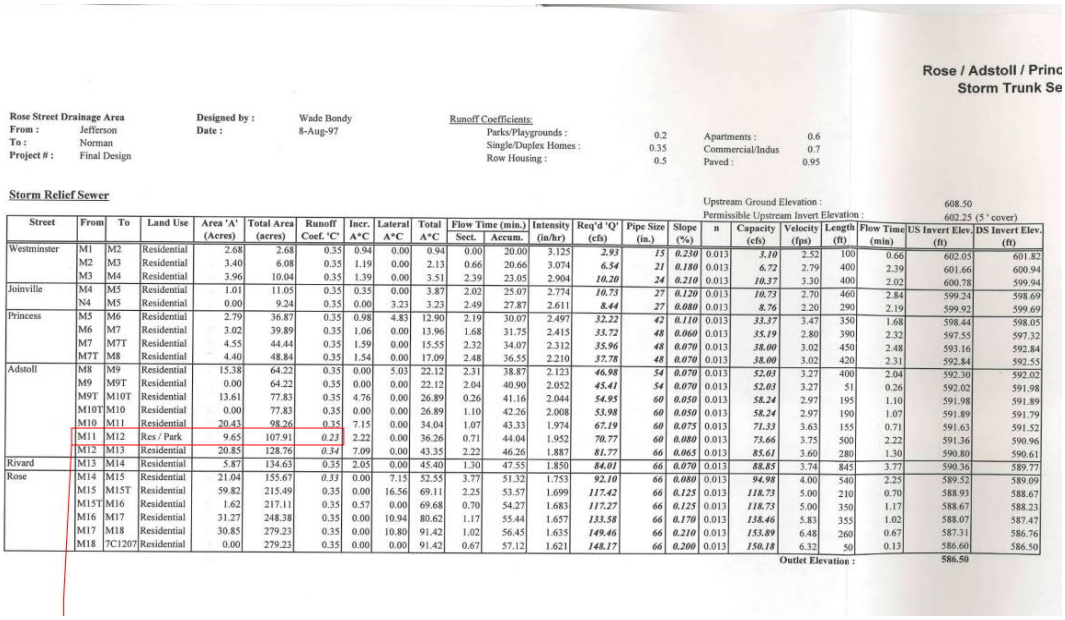
Allowable Flow Rate Estimation
Rational Method

From Rose/Adstoll/Princess storm sewer design

Subcatchment Parameters				**Release Rates**	
				1:5 year Event	
Area No.	Area	C5yr	Time	Intensity	Allowable Release Rate
	(ha)		(min)	(mm/hr)	(L/s)
ADSTOLL DRAINAGE AREA	3.900	0.23	22	70.80	176.55
SITE CONTRIBUTION	0.440	0.20	20	75.35	18.43

Specific Site Flow Calculations (2026)

	AREA (HA)	5yr Q (L/s)
SITE CONTRIBUTION	0.440	18.43



Rose / Adstoll / Princ
Storm Trunk Se

Rose Street Drainage Area
From : Jefferson
To : Norman
Project # : Final Design

Designed by : Wade Bondy
Date : 8-Aug-97

Runoff Coefficients:
Parks/Playgrounds : 0.2
Single/Duplex Homes : 0.35
Row Housing : 0.5
Apartments : 0.6
Commercial/Indus 0.7
Paved : 0.95

Storm Relief Sewer

Upstream Ground Elevation : 608.50
Permissible Upstream Invert Elevation : 602.25 (5 ' cover)

Street	From	To	Land Use	Area 'A' (Acres)	Total Area (acres)	Runoff Coef. 'C'	Incr. A*C	Lateral A*C	Total A*C	Flow Time (min.) Sect.	Flow Time (min.) Accum.	Intensity (in/hr)	Req'd 'Q' (cfs)	Pipe Size (in.)	Slope (%)	n	Capacity (cfs)	Velocity (fps)	Length (ft)	Flow Time (min)	US Invert Elev. (ft)	DS Invert Elev. (ft)
Westminster	M1	M2	Residential	2.68	2.68	0.35	0.94	0.00	0.94	0.00	20.00	3.125	*2.93*	*15*	*0.230*	0.013	*3.10*	2.52	100	0.66	602.05	601.82
	M2	M3	Residential	3.40	6.08	0.35	1.19	0.00	2.13	0.66	20.66	3.074	*6.54*	*21*	*0.180*	0.013	*6.72*	2.79	400	2.39	601.66	600.94
	M3	M4	Residential	3.96	10.04	0.35	1.39	0.00	3.51	2.39	23.05	2.904	*10.20*	*24*	*0.210*	0.013	*10.37*	3.30	400	2.02	600.78	599.94
Joinville	M4	M5	Residential	1.01	11.05	0.35	0.35	0.00	3.87	2.02	25.07	2.774	*10.73*	*27*	*0.120*	0.013	*10.73*	2.70	460	2.84	599.24	598.69
	N4	M5	Residential	0.00	9.24	0.35	0.00	3.23	3.23	2.49	27.87	2.611	*8.44*	*27*	*0.080*	0.013	*8.76*	2.20	290	2.19	599.92	599.69
Princess	M5	M6	Residential	2.79	36.87	0.35	0.98	4.83	12.90	2.19	30.07	2.497	*32.22*	*42*	*0.110*	0.013	*33.37*	3.47	350	1.68	598.44	598.05
	M6	M7	Residential	3.02	39.89	0.35	1.06	0.00	13.96	1.68	31.75	2.415	*33.72*	*48*	*0.060*	0.013	*35.19*	2.80	390	2.32	597.55	597.32
	M7	M7T	Residential	4.55	44.44	0.35	1.59	0.00	15.55	2.32	34.07	2.312	*35.96*	*48*	*0.070*	0.013	*38.00*	3.02	450	2.48	593.16	592.84
	M7T	M8	Residential	4.40	48.84	0.35	1.54	0.00	17.09	2.48	36.55	2.210	*37.78*	*48*	*0.070*	0.013	*38.00*	3.02	420	2.31	592.84	592.55
Adstoll	M8	M9	Residential	15.38	64.22	0.35	0.00	5.03	22.12	2.31	38.87	2.123	*46.98*	*54*	*0.070*	0.013	*52.03*	3.27	400	2.04	592.30	592.02
	M9	M9T	Residential	0.00	64.22	0.35	0.00	0.00	22.12	2.04	40.90	2.052	*45.41*	*54*	*0.070*	0.013	*52.03*	3.27	51	0.26	592.02	591.98
	M9T	M10T	Residential	13.61	77.83	0.35	4.76	0.00	26.89	0.26	41.16	2.044	*54.95*	*60*	*0.050*	0.013	*58.24*	2.97	195	1.10	591.98	591.89
	M10T	M10	Residential	0.00	77.83	0.35	0.00	0.00	26.89	1.10	42.26	2.008	*53.98*	*60*	*0.050*	0.013	*58.24*	2.97	190	1.07	591.89	591.79
	M10	M11	Residential	20.43	98.26	0.35	7.15	0.00	34.04	1.07	43.33	1.974	*67.19*	*60*	*0.075*	0.013	*71.33*	3.63	155	0.71	591.63	591.52
	M11	M12	Res / Park	9.65	107.91	*0.23*	2.22	0.00	36.26	0.71	44.04	1.952	*70.77*	*60*	*0.080*	0.013	*73.66*	3.75	500	2.22	591.36	590.96
	M12	M13	Residential	20.85	128.76	*0.34*	7.09	0.00	43.35	2.22	46.26	1.887	*81.77*	*66*	*0.065*	0.013	*85.61*	3.60	280	1.30	590.80	590.61
Rivard	M13	M14	Residential	5.87	134.63	0.35	2.05	0.00	45.40	1.30	47.55	1.850	*84.01*	*66*	*0.070*	0.013	*88.85*	3.74	845	3.77	590.36	589.77
Rose	M14	M15	Residential	21.04	155.67	*0.33*	0.00	7.15	52.55	3.77	51.32	1.753	*92.10*	*66*	*0.080*	0.013	*94.98*	4.00	540	2.25	589.52	589.09
	M15	M15T	Residential	59.82	215.49	0.35	0.00	16.56	69.11	2.25	53.57	1.699	*117.42*	*66*	*0.125*	0.013	*118.73*	5.00	210	0.70	588.93	588.67
	M15T	M16	Residential	1.62	217.11	0.35	0.57	0.00	69.68	0.70	54.27	1.683	*117.27*	*66*	*0.125*	0.013	*118.73*	5.00	350	1.17	588.67	588.23
	M16	M17	Residential	31.27	248.38	0.35	0.00	10.94	80.62	1.17	55.44	1.657	*133.58*	*66*	*0.170*	0.013	*138.46*	5.83	355	1.02	588.07	587.47
	M17	M18	Residential	30.85	279.23	0.35	0.00	10.80	91.42	1.02	56.45	1.635	*149.46*	*66*	*0.210*	0.013	*153.89*	6.48	260	0.67	587.31	586.76
	M18	7C1207	Residential	0.00	279.23	0.35	0.00	0.00	91.42	0.67	57.12	1.621	*148.17*	*66*	*0.200*	0.013	*150.18*	6.32	50	0.13	586.60	586.50

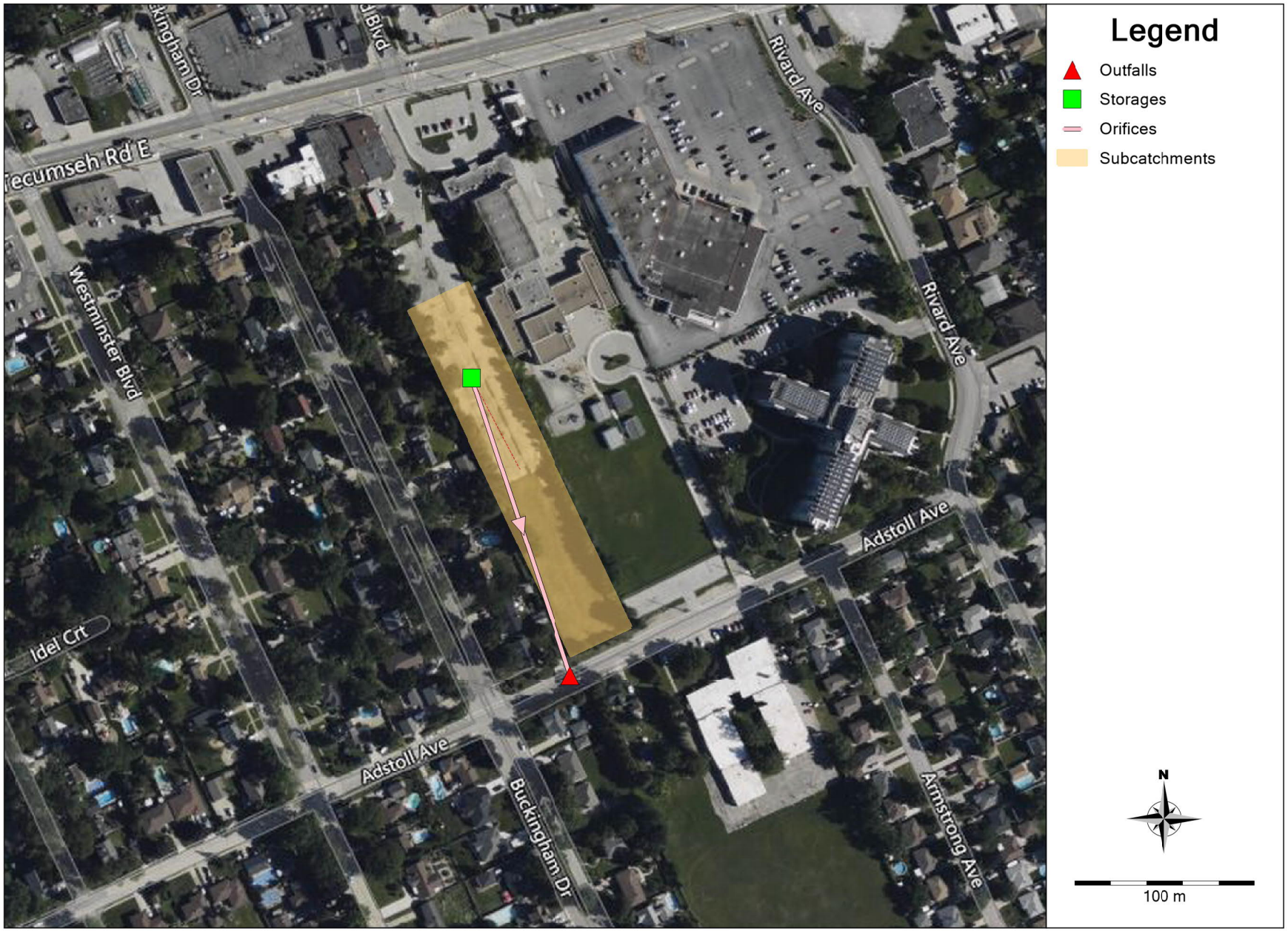
Outlet Elevation : 586.50

Subject Site falls in this catchment

Appendix D

PCSWMM Model Schematic and Proposed Conditions Results

Post-Development Model Schematic



```
[TITLE]

[OPTIONS]
;;Options            Value
;;------------------ ------------
FLOW_UNITS           CMS
INFILTRATION         GREEN_AMPT
FLOW_ROUTING         DYNWAVE
LINK_OFFSETS         ELEVATION
MIN_SLOPE            0
ALLOW_PONDING        NO
SKIP_STEADY_STATE    NO

START_DATE           09/20/2021
START_TIME           00:00:00
REPORT_START_DATE    09/20/2021
REPORT_START_TIME    00:00:00
END_DATE             09/22/2021
END_TIME             12:00:00
SWEEP_START          01/01
SWEEP_END            12/31
DRY_DAYS             0
REPORT_STEP          00:01:00
WET_STEP             00:05:00
DRY_STEP             00:05:00
ROUTING_STEP         5
RULE_STEP            00:00:00

INERTIAL_DAMPING     PARTIAL
NORMAL_FLOW_LIMITED  BOTH
FORCE_MAIN_EQUATION  H-W
VARIABLE_STEP        0.75
LENGTHENING_STEP     0
MIN_SURFAREA         0
MAX_TRIALS           8
HEAD_TOLERANCE       0.0015
SYS_FLOW_TOL         5
LAT_FLOW_TOL         5
MINIMUM_STEP         0.5
THREADS              6

[EVAPORATION]
;;Type          Parameters
;;------------- ----------
CONSTANT         0.0
DRY_ONLY         NO

[RAINGAGES]
;;               Rain      Time     Snow     Data
;;Name           Type      Intrvl   Catch    Source
;;-------------- --------- -------- -------- ----------
Raingage1        INTENSITY 0:15     1        TIMESERIES UST

[SUBCATCHMENTS]
;;                                                Total    Pcnt.             Pcnt.
Curb     Snow
;;Name           Raingage         Outlet           Area     Imperv   Width    Slope
Length   Pack
```

```
;;-------------- ---------------- ---------------- -------- -------- -------- -----
--- -------- --------
S1               Raingage1        SU2              0.77     90       51.333   0.5
0

[SUBAREAS]
;;Subcatchment   N-Imperv   N-Perv     S-Imperv   S-Perv     PctZero    RouteTo
PctRouted
;;-------------- ---------- ---------- ---------- ---------- ---------- ----------
----------
S1               0.013      0.15       2.5        7.5        0          OUTLET

[INFILTRATION]
;;Subcatchment   Suction    HydCon     IMDmax
;;-------------- ---------- ---------- ----------
S1               180        0.5        0.1

[OUTFALLS]
;;               Invert     Outfall    Stage/Table      Tide
;;Name           Elev.      Type       Time Series      Gate     Route To
;;-------------- ---------- ---------- ---------------- -------- ----------------
7R5833           179.713    TIMESERIES Tailwater_100Y4H NO

[STORAGE]
;;               Invert   Max.       Init.      Storage    Curve
Evap.
;;Name           Elev.    Depth      Depth      Curve      Params
Frac.    Infiltration parameters
;;-------------- -------- ---------- ---------- ---------- --------- --------- ----
---- -------- -------- -----------------------
;Real Rim Elevation = 184.05
SU2              182.05   2.3        0          TABULAR     MC_3500_300m3
0        0

[ORIFICES]
;;               Inlet            Outlet           Orifice      Crest      Disch.
Flap Open/Close
;;Name           Node             Node             Type         Height     Coeff.
Gate Time
;;-------------- ---------------- ---------------- ------------ ---------- --------
-- ---- ----------
;Control Flow
Orifice          SU2              7R5833           BOTTOM       182.05     0.62
YES      0

[XSECTIONS]
;;Link           Shape        Geom1            Geom2      Geom3      Geom4
Barrels
;;-------------- ------------ ---------------- ---------- ---------- ---------- ---
-------
Orifice          CIRCULAR     0.075            0          0          0

[CURVES]
;;Name           Type       X-Value    Y-Value
;;-------------- ---------- ---------- ----------
MC_3500_300m3    Storage    0          121.96
MC_3500_300m3               0.03       121.96
MC_3500_300m3               0.05       121.96
MC_3500_300m3               0.08       121.96
```

MC_3500_300m3	0.1	121.96
MC_3500_300m3	0.13	121.96
MC_3500_300m3	0.15	121.96
MC_3500_300m3	0.18	121.96
MC_3500_300m3	0.2	121.96
MC_3500_300m3	0.23	121.96
MC_3500_300m3	0.25	249.41
MC_3500_300m3	0.28	248.26
MC_3500_300m3	0.3	247.48
MC_3500_300m3	0.33	246.72
MC_3500_300m3	0.36	245.88
MC_3500_300m3	0.38	245.07
MC_3500_300m3	0.41	244.18
MC_3500_300m3	0.43	243.27
MC_3500_300m3	0.46	242.3
MC_3500_300m3	0.48	241.27
MC_3500_300m3	0.51	240.2
MC_3500_300m3	0.53	239.08
MC_3500_300m3	0.56	237.91
MC_3500_300m3	0.58	236.66
MC_3500_300m3	0.61	235.36
MC_3500_300m3	0.63	234.02
MC_3500_300m3	0.66	232.5
MC_3500_300m3	0.69	231
MC_3500_300m3	0.71	229.43
MC_3500_300m3	0.74	227.75
MC_3500_300m3	0.76	225.96
MC_3500_300m3	0.79	224.09
MC_3500_300m3	0.81	222.14
MC_3500_300m3	0.84	220.07
MC_3500_300m3	0.86	217.91
MC_3500_300m3	0.89	215.63
MC_3500_300m3	0.91	213.24
MC_3500_300m3	0.94	210.71
MC_3500_300m3	0.97	208
MC_3500_300m3	0.99	205.16
MC_3500_300m3	1.02	202.16
MC_3500_300m3	1.04	198.9
MC_3500_300m3	1.07	195.48
MC_3500_300m3	1.09	191.73
MC_3500_300m3	1.12	187.76
MC_3500_300m3	1.14	183.36
MC_3500_300m3	1.17	178.51
MC_3500_300m3	1.19	173.06
MC_3500_300m3	1.22	166.83
MC_3500_300m3	1.24	158.89
MC_3500_300m3	1.27	146.69
MC_3500_300m3	1.3	136.55
MC_3500_300m3	1.32	132.58
MC_3500_300m3	1.35	128.97
MC_3500_300m3	1.37	124.02
MC_3500_300m3	1.4	121.96
MC_3500_300m3	1.42	121.96
MC_3500_300m3	1.45	121.96
MC_3500_300m3	1.47	121.96
MC_3500_300m3	1.5	121.96
MC_3500_300m3	1.52	121.96

```
MC_3500_300m3               1.55       121.96
MC_3500_300m3               1.57       121.96
MC_3500_300m3               1.6        121.96
MC_3500_300m3               1.63       121.96
MC_3500_300m3               1.65       121.96
MC_3500_300m3               1.68       121.96
MC_3500_300m3               1.6801     7
MC_3500_300m3               2          7
MC_3500_300m3               2.3        2558.2

[TIMESERIES]
;;Name           Date       Time       Value
;;-------------- ---------- ---------- ----------
100Y4H                      0:00       3.95
100Y4H                      0:15       4.87
100Y4H                      0:30       6.36
100Y4H                      0:45       9.19
100Y4H                      1:00       16.45
100Y4H                      1:15       46.45
100Y4H                      1:30       143.67
100Y4H                      1:45       32.45
100Y4H                      2:00       17.25
100Y4H                      2:15       11.53
100Y4H                      2:30       8.62
100Y4H                      2:45       6.87
100Y4H                      3:00       5.71
100Y4H                      3:15       4.89
100Y4H                      3:30       4.28
100Y4H                      3:45       3.81
100Y4H                      4:00       0

5Y4H                        0:00       2.58
5Y4H                        0:15       3.13
5Y4H                        0:30       4.02
5Y4H                        0:45       5.66
5Y4H                        1:00       9.76
5Y4H                        1:15       26.72
5Y4H                        1:30       88.4
5Y4H                        1:45       18.73
5Y4H                        2:00       10.21
5Y4H                        2:15       6.99
5Y4H                        2:30       5.33
5Y4H                        2:45       4.31
5Y4H                        3:00       3.64
5Y4H                        3:15       3.15
5Y4H                        3:30       2.78
5Y4H                        3:45       2.49
5Y4H                        4:00       0

SCS_typeII_100Y24H            0:00       0
SCS_typeII_100Y24H            2:00       1.08
SCS_typeII_100Y24H            4:00       1.62
SCS_typeII_100Y24H            6:00       1.62
SCS_typeII_100Y24H            8:00       2.16
SCS_typeII_100Y24H            10:00      3.24
SCS_typeII_100Y24H            12:00      25.92
SCS_typeII_100Y24H            14:00      8.64
```

SCS_typeII_100Y24H	16:00	3.24
SCS_typeII_100Y24H	18:00	2.16
SCS_typeII_100Y24H	20:00	1.62
SCS_typeII_100Y24H	22:00	1.62
SCS_typeII_100Y24H	24:00	1.08

Tailwater_100Y4H	0:00	179.809052
Tailwater_100Y4H	0:05	179.811523
Tailwater_100Y4H	0:10	179.818161
Tailwater_100Y4H	0:15	179.829193
Tailwater_100Y4H	0:20	179.849411
Tailwater_100Y4H	0:25	179.877335
Tailwater_100Y4H	0:30	179.909821
Tailwater_100Y4H	0:35	179.948898
Tailwater_100Y4H	0:40	179.996628
Tailwater_100Y4H	0:45	180.037643
Tailwater_100Y4H	0:50	180.06955
Tailwater_100Y4H	0:55	180.102356
Tailwater_100Y4H	1:00	180.136429
Tailwater_100Y4H	1:05	180.171463
Tailwater_100Y4H	1:10	180.210617
Tailwater_100Y4H	1:15	180.256821
Tailwater_100Y4H	1:20	180.329941
Tailwater_100Y4H	1:25	180.450775
Tailwater_100Y4H	1:30	180.594101
Tailwater_100Y4H	1:35	180.903503
Tailwater_100Y4H	1:40	184.294067
Tailwater_100Y4H	1:45	184.530365
Tailwater_100Y4H	1:50	184.347931
Tailwater_100Y4H	1:55	184.314713
Tailwater_100Y4H	2:00	184.307114
Tailwater_100Y4H	2:05	184.092545
Tailwater_100Y4H	2:10	183.865295
Tailwater_100Y4H	2:15	183.611908
Tailwater_100Y4H	2:20	183.236938
Tailwater_100Y4H	2:25	182.938797
Tailwater_100Y4H	2:30	182.723572
Tailwater_100Y4H	2:35	182.496902
Tailwater_100Y4H	2:40	182.202148
Tailwater_100Y4H	2:45	181.883774
Tailwater_100Y4H	2:50	181.654892
Tailwater_100Y4H	2:55	181.482635
Tailwater_100Y4H	3:00	181.344482
Tailwater_100Y4H	3:05	181.212418
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Tailwater_100Y4H	3:40	180.359924
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Tailwater_100Y4H	3:50	180.287827
Tailwater_100Y4H	3:55	180.266449
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Tailwater_100Y4H	4:35	180.091125
Tailwater_100Y4H	4:40	180.071426
Tailwater_100Y4H	4:45	180.054581
Tailwater_100Y4H	4:50	180.038834
Tailwater_100Y4H	4:55	180.023682
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TW_100Y24H_Modified	16:35:00	180.169601
TW_100Y24H_Modified	16:40:00	180.170013
TW_100Y24H_Modified	16:45:00	180.170471
TW_100Y24H_Modified	16:50:00	180.170868
TW_100Y24H_Modified	16:55:00	180.171188
TW_100Y24H_Modified	17:00:00	180.171417
TW_100Y24H_Modified	17:05:00	180.167313
TW_100Y24H_Modified	17:10:00	180.155838
TW_100Y24H_Modified	17:15:00	180.137238
TW_100Y24H_Modified	17:20:00	180.114395
TW_100Y24H_Modified	17:25:00	180.093018
TW_100Y24H_Modified	17:30:00	180.07547
TW_100Y24H_Modified	17:35:00	180.06192
TW_100Y24H_Modified	17:40:00	180.051666
TW_100Y24H_Modified	17:45:00	180.043976
TW_100Y24H_Modified	17:50:00	180.038284
TW_100Y24H_Modified	17:55:00	180.034027
TW_100Y24H_Modified	18:00:00	180.030716
TW_100Y24H_Modified	18:05:00	180.028061
TW_100Y24H_Modified	18:10:00	180.025833
TW_100Y24H_Modified	18:15:00	180.023926
TW_100Y24H_Modified	18:20:00	180.022232
TW_100Y24H_Modified	18:25:00	180.020767
TW_100Y24H_Modified	18:30:00	180.019409
TW_100Y24H_Modified	18:35:00	180.018127
TW_100Y24H_Modified	18:40:00	180.016891
TW_100Y24H_Modified	18:45:00	180.015717
TW_100Y24H_Modified	18:50:00	180.014603
TW_100Y24H_Modified	18:55:00	180.013535
TW_100Y24H_Modified	19:00:00	180.012543
TW_100Y24H_Modified	19:05:00	180.010773
TW_100Y24H_Modified	19:10:00	180.007629
TW_100Y24H_Modified	19:15:00	180.002975
TW_100Y24H_Modified	19:20:00	179.996826
TW_100Y24H_Modified	19:25:00	179.989746
TW_100Y24H_Modified	19:30:00	179.982803
TW_100Y24H_Modified	19:35:00	179.97673
TW_100Y24H_Modified	19:40:00	179.971878
TW_100Y24H_Modified	19:45:00	179.968185
TW_100Y24H_Modified	19:50:00	179.965485
TW_100Y24H_Modified	19:55:00	179.963562
TW_100Y24H_Modified	20:00:00	179.962219
TW_100Y24H_Modified	20:05:00	179.961273
TW_100Y24H_Modified	20:10:00	179.960617
TW_100Y24H_Modified	20:15:00	179.960098
TW_100Y24H_Modified	20:20:00	179.959702
TW_100Y24H_Modified	20:25:00	179.959396
TW_100Y24H_Modified	20:30:00	179.959137

TW_100Y24H_Modified	20:35:00	179.958908
TW_100Y24H_Modified	20:40:00	179.958466
TW_100Y24H_Modified	20:45:00	179.958176
TW_100Y24H_Modified	20:50:00	179.957947
TW_100Y24H_Modified	20:55:00	179.957794
TW_100Y24H_Modified	21:00:00	179.957672
TW_100Y24H_Modified	21:05:00	179.957153
TW_100Y24H_Modified	21:10:00	179.956039
TW_100Y24H_Modified	21:15:00	179.954254
TW_100Y24H_Modified	21:20:00	179.952103
TW_100Y24H_Modified	21:25:00	179.9496
TW_100Y24H_Modified	21:30:00	179.946793
TW_100Y24H_Modified	21:35:00	179.943924
TW_100Y24H_Modified	21:40:00	179.941238
TW_100Y24H_Modified	21:45:00	179.938904
TW_100Y24H_Modified	21:50:00	179.936966
TW_100Y24H_Modified	21:55:00	179.935425
TW_100Y24H_Modified	22:00:00	179.934204
TW_100Y24H_Modified	22:05:00	179.933243
TW_100Y24H_Modified	22:10:00	179.93248
TW_100Y24H_Modified	22:15:00	179.931854
TW_100Y24H_Modified	22:20:00	179.931335
TW_100Y24H_Modified	22:25:00	179.930893
TW_100Y24H_Modified	22:30:00	179.930481
TW_100Y24H_Modified	22:35:00	179.930115
TW_100Y24H_Modified	22:40:00	179.929764
TW_100Y24H_Modified	22:45:00	179.929443
TW_100Y24H_Modified	22:50:00	179.929138
TW_100Y24H_Modified	22:55:00	179.928864
TW_100Y24H_Modified	23:00:00	179.928619
TW_100Y24H_Modified	23:05:00	179.928391
TW_100Y24H_Modified	23:10:00	179.928162
TW_100Y24H_Modified	23:15:00	179.927933
TW_100Y24H_Modified	23:20:00	179.927704
TW_100Y24H_Modified	23:25:00	179.927444
TW_100Y24H_Modified	23:30:00	179.927139
TW_100Y24H_Modified	23:35:00	179.926788
TW_100Y24H_Modified	23:40:00	179.926468
TW_100Y24H_Modified	23:45:00	179.926193
TW_100Y24H_Modified	23:50:00	179.925949
TW_100Y24H_Modified	23:55:00	179.925781

TW_5y4H	0:00	179.814041
TW_5y4H	0:05	179.820084
TW_5y4H	0:10	179.831314
TW_5y4H	0:15	179.847748
TW_5y4H	0:20	179.869034
TW_5y4H	0:25	179.89418
TW_5y4H	0:30	179.921768
TW_5y4H	0:35	179.951096
TW_5y4H	0:40	179.981537
TW_5y4H	0:45	180.010986
TW_5y4H	0:50	180.035843
TW_5y4H	0:55	180.059784
TW_5y4H	1:00	180.087875
TW_5y4H	1:05	180.122787
TW_5y4H	1:10	180.175171

TW_5y4H	1:15	180.247406
TW_5y4H	1:20	180.336639
TW_5y4H	1:25	180.494949
TW_5y4H	1:30	180.79631
TW_5y4H	1:35	182.390549
TW_5y4H	1:40	183.059357
TW_5y4H	1:45	182.925934
TW_5y4H	1:50	182.757401
TW_5y4H	1:55	182.383118
TW_5y4H	2:00	181.878052
TW_5y4H	2:05	181.57518
TW_5y4H	2:10	181.340591
TW_5y4H	2:15	181.121231
TW_5y4H	2:20	180.892441
TW_5y4H	2:25	180.673096
TW_5y4H	2:30	180.481995
TW_5y4H	2:35	180.351913
TW_5y4H	2:40	180.270401
TW_5y4H	2:45	180.219498
TW_5y4H	2:50	180.185715
TW_5y4H	2:55	180.1642
TW_5y4H	3:00	180.146835
TW_5y4H	3:05	180.132172
TW_5y4H	3:10	180.119659
TW_5y4H	3:15	180.108765
TW_5y4H	3:20	180.099457
TW_5y4H	3:25	180.091293
TW_5y4H	3:30	180.083557
TW_5y4H	3:35	180.07634
TW_5y4H	3:40	180.069748
TW_5y4H	3:45	180.063461
TW_5y4H	3:50	180.057465
TW_5y4H	3:55	180.050476
TW_5y4H	4:00	180.041046
TW_5y4H	4:05	180.029175
TW_5y4H	4:10	180.015549
TW_5y4H	4:15	180.000626
TW_5y4H	4:20	179.984573
TW_5y4H	4:25	179.970474
TW_5y4H	4:30	179.957077
TW_5y4H	4:35	179.945892
TW_5y4H	4:40	179.935501
TW_5y4H	4:45	179.925781
TW_5y4H	4:50	179.91748
TW_5y4H	5:00	179.910141
TW_5y4H	5:05	179.904236
TW_5y4H	5:10	179.898544
TW_5y4H	5:15	179.893967
TW_5y4H	5:20	179.889832
TW_5y4H	5:25	179.885559
TW_UST_Modified	7:25:00	179.809052
TW_UST_Modified	7:30:00	179.813171
TW_UST_Modified	7:35:00	179.823486
TW_UST_Modified	7:40:00	179.841309
TW_UST_Modified	7:45:00	179.871979
TW_UST_Modified	7:50:00	179.911819

TW_UST_Modified	7:55:00	179.957855
TW_UST_Modified	8:00:00	180.019424
TW_UST_Modified	8:05:00	180.07103
TW_UST_Modified	8:10:00	180.116272
TW_UST_Modified	8:15:00	180.158203
TW_UST_Modified	8:20:00	180.19194
TW_UST_Modified	8:25:00	180.224258
TW_UST_Modified	8:30:00	180.264236
TW_UST_Modified	8:35:00	180.313126
TW_UST_Modified	8:40:00	180.36853
TW_UST_Modified	8:45:00	180.46492
TW_UST_Modified	8:50:00	180.63588
TW_UST_Modified	8:55:00	180.884048
TW_UST_Modified	9:00:00	184.41153
TW_UST_Modified	9:05:00	184.694611
TW_UST_Modified	9:10:00	184.761185
TW_UST_Modified	9:15:00	184.536682
TW_UST_Modified	9:20:00	184.527267
TW_UST_Modified	9:25:00	184.536438
TW_UST_Modified	9:30:00	184.459473
TW_UST_Modified	9:35:00	184.431534
TW_UST_Modified	9:40:00	184.432022
TW_UST_Modified	9:45:00	184.392151
TW_UST_Modified	9:50:00	184.368149
TW_UST_Modified	9:55:00	184.354263
TW_UST_Modified	10:00:00	184.310577
TW_UST_Modified	10:05:00	184.264969
TW_UST_Modified	10:10:00	184.240097
TW_UST_Modified	10:15:00	184.184067
TW_UST_Modified	10:20:00	184.089432
TW_UST_Modified	10:25:00	184.024048
TW_UST_Modified	10:30:00	183.87056
TW_UST_Modified	10:35:00	183.738419
TW_UST_Modified	10:40:00	183.609558
TW_UST_Modified	10:45:00	183.437271
TW_UST_Modified	10:50:00	183.247726
TW_UST_Modified	10:55:00	183.070786
TW_UST_Modified	11:00:00	182.906296
TW_UST_Modified	11:05:00	182.756302
TW_UST_Modified	11:10:00	182.616013
TW_UST_Modified	11:15:00	182.435074
TW_UST_Modified	11:20:00	182.232391
TW_UST_Modified	11:25:00	181.999084
TW_UST_Modified	11:30:00	181.803055
TW_UST_Modified	11:35:00	181.641647
TW_UST_Modified	11:40:00	181.495117
TW_UST_Modified	11:45:00	181.358643
TW_UST_Modified	11:50:00	181.220886
TW_UST_Modified	11:55:00	181.082458
TW_UST_Modified	12:00:00	180.933319
TW_UST_Modified	12:05:00	180.77684
TW_UST_Modified	12:10:00	180.633636
TW_UST_Modified	12:15:00	180.506821
TW_UST_Modified	12:20:00	180.415817
TW_UST_Modified	12:25:00	180.353333
TW_UST_Modified	12:30:00	180.306442
TW_UST_Modified	12:35:00	180.272644

TW_UST_Modified	12:40:00	180.245026
TW_UST_Modified	12:45:00	180.221588
TW_UST_Modified	12:50:00	180.20076
TW_UST_Modified	12:55:00	180.182419
UST	0:00	2.41
UST	0:15	2.43
UST	0:30	2.45
UST	0:45	2.46
UST	1:00	2.48
UST	1:15	2.51
UST	1:30	2.53
UST	1:45	2.55
UST	2:00	2.58
UST	2:15	2.61
UST	2:30	2.64
UST	2:45	2.67
UST	3:00	2.71
UST	3:15	2.74
UST	3:30	2.79
UST	3:45	2.83
UST	4:00	2.88
UST	4:15	2.94
UST	4:30	3
UST	4:45	3.07
UST	5:00	3.15
UST	5:15	3.23
UST	5:30	3.33
UST	5:45	3.45
UST	6:00	3.59
UST	6:15	3.75
UST	6:30	3.94
UST	6:45	4.18
UST	7:00	4.49
UST	7:15	4.89
UST	7:30	5.43
UST	7:45	6.2
UST	8:00	7.41
UST	8:15	9.56
UST	8:30	14.29
UST	8:45	32.01
UST	9:00	145.13
UST	9:15	48.51
UST	9:30	23.13
UST	9:45	15.08
UST	10:00	11.35
UST	10:15	9.23
UST	10:30	7.88
UST	10:45	6.94
UST	11:00	6.25
UST	11:15	5.73
UST	11:30	5.32
UST	11:45	4.99
UST	12:00	4.72
UST	12:15	4.49
UST	12:30	4.29
UST	12:45	4.12

```
UST                     13:00      3.98
UST                     13:15      3.85
UST                     13:30      3.74
UST                     13:45      3.63
UST                     14:00      3.54
UST                     14:15      3.46
UST                     14:30      3.39
UST                     14:45      3.32
UST                     15:00      3.26
UST                     15:15      3.2
UST                     15:30      3.15
UST                     15:45      3.1
UST                     16:00      3.05
UST                     16:15      3.01
UST                     16:30      2.97
UST                     16:45      2.93
UST                     17:00      2.9
UST                     17:15      2.87
UST                     17:30      2.84
UST                     17:45      2.81
UST                     18:00      2.78
UST                     18:15      2.76
UST                     18:30      2.73
UST                     18:45      2.71
UST                     19:00      2.69
UST                     19:15      2.67
UST                     19:30      2.65
UST                     19:45      2.63
UST                     20:00      2.61
UST                     20:15      2.59
UST                     20:30      2.57
UST                     20:45      2.56
UST                     21:00      2.54
UST                     21:15      2.53
UST                     21:30      2.51
UST                     21:45      2.5
UST                     22:00      2.49
UST                     22:15      2.47
UST                     22:30      2.46
UST                     22:45      2.45
UST                     23:00      2.44
UST                     23:15      2.43
UST                     23:30      2.42
UST                     23:45      2.41
UST                     24:00      0

[REPORT]
;;Reporting Options
INPUT      YES
CONTROLS   NO
SUBCATCHMENTS ALL
NODES ALL
LINKS ALL

[TAGS]

[MAP]
```

```
DIMENSIONS       338403.0429      4685564.57055    338533.8131      4685816.30445
UNITS            Meters

[COORDINATES]
;;Node           X-Coord          Y-Coord
;;-------------- ---------------- ----------------
7R5833           338493.764       4685586.013
SU2              338442.891       4685752.208

[VERTICES]
;;Link           X-Coord          Y-Coord
;;-------------- ---------------- ----------------

[POLYGONS]
;;Subcatchment   X-Coord          Y-Coord
;;-------------- ---------------- ----------------
S1               338527.869       4685611.953
S1               338494.615       4685597.222
S1               338408.987       4685790.099
S1               338442.319       4685804.862
S1               338527.869       4685611.953

[SYMBOLS]
;;Gage           X-Coord          Y-Coord
;;-------------- ---------------- ----------------
```

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.013)

****
Element Count
****
Number of rain gages 1
Number of subcatchments ... 1
Number of nodes 2
Number of links 1
Number of pollutants 0
Number of land uses 0

****
Raingage Summary
****

Name	Data Source	Data Type	Recording Interval
Raingage1	5Y4H	INTENSITY	15 min.

****
Subcatchment Summary
****

Name	Area	Width	%Imperv	%Slope	Rain Gage	Outlet
S1	0.77	51.33	90.00	0.5000	Raingage1	SU2

****
Node Summary
****

Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
7R5833	OUTFALL	179.71	0.00	0.0	
SU2	STORAGE	182.05	2.30	0.0	

****
Link Summary
****

Name	From Node	To Node	Type	Length	% Slope	Roughness
Orifice	SU2	7R5833	ORIFICE			

****
Cross Section Summary

```
  *********************
                                        Full     Full     Hyd.     Max.   No. of
Full
  Conduit          Shape                Depth     Area     Rad.    Width  Barrels
Flow
  ---------------------------------------------------------------------------
------


  ***********************************************************
  NOTE: The summary statistics displayed in this report are
  based on results found at every computational time step,
  not just on results from each reporting time step.
  ***********************************************************

  ****************
  Analysis Options
  ****************
  Flow Units ............... CMS
  Process Models:
    Rainfall/Runoff ........ YES
    RDII ................... NO
    Snowmelt ............... NO
    Groundwater ............ NO
    Flow Routing ........... YES
    Ponding Allowed ........ NO
    Water Quality .......... NO
  Infiltration Method ...... GREEN_AMPT
  Flow Routing Method ...... DYNWAVE
  Surcharge Method ......... EXTRAN
  Starting Date ............ 09/20/2021 00:00:00
  Ending Date .............. 09/22/2021 12:00:00
  Antecedent Dry Days ...... 0.0
  Report Time Step ......... 00:01:00
  Wet Time Step ............ 00:05:00
  Dry Time Step ............ 00:05:00
  Routing Time Step ........ 5.00 sec
  Variable Time Step ....... YES
  Maximum Trials ........... 8
  Number of Threads ........ 1
  Head Tolerance ........... 0.001500 m


  **************************        Volume         Depth
  Runoff Quantity Continuity     hectare-m            mm
  **************************     ---------       -------
  Total Precipitation ......         0.038        49.475
  Evaporation Loss .........         0.000         0.000
  Infiltration Loss ........         0.001         1.780
  Surface Runoff ...........         0.035        45.683
  Final Storage ............         0.002         2.252
  Continuity Error (%) .....        -0.485


  **************************        Volume        Volume
  Flow Routing Continuity        hectare-m      10^6 ltr
```

**************************	---------	---------
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	0.035	0.352
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	0.000	0.000
External Outflow	0.035	0.352
Flooding Loss	0.000	0.000
Evaporation Loss	0.000	0.000
Exfiltration Loss	0.000	0.000
Initial Stored Volume	0.000	0.000
Final Stored Volume	0.000	0.000
Continuity Error (%)	0.000	

****
Time-Step Critical Elements
****
None

****
Highest Flow Instability Indexes
****
All links are stable.

****
Routing Time Step Summary
****
Minimum Time Step	:	4.50 sec
Average Time Step	:	5.00 sec
Maximum Time Step	:	5.00 sec
Percent in Steady State	:	0.00
Average Iterations per Step	:	2.00
Percent Not Converging	:	0.00

****
Subcatchment Runoff Summary
****

Subcatchment	Total Precip mm	Total Runon mm	Total Evap mm	Total Infil mm	Imperv Runoff mm	Perv Runoff mm	Total Runoff 10^6 ltr	Total Runoff CMS	Peak Runoff	Runoff Coeff
S1	49.47	0.00	0.00	1.78	42.48	3.20	45.68	0.35	0.18	0.923

****

Node Depth Summary

Node	Type	Average Depth Meters	Maximum Depth Meters	Maximum HGL Meters	Time of Max Occurrence days hr:min	Reported Max Depth Meters
7R5833	OUTFALL	0.33	4.82	184.53	0 01:45	4.82
SU2	STORAGE	0.13	1.45	183.50	0 02:41	1.45

Node Inflow Summary

Node	Type	Maximum Lateral Inflow CMS	Maximum Total Inflow CMS	Time of Max Occurrence days hr:min	Lateral Inflow Volume 10^6 ltr	Total Inflow 10^6 ltr	Flow Balance Error Percent
7R5833	OUTFALL	0.000	0.015	0 02:42	0	0.352	0.000
SU2	STORAGE	0.177	0.177	0 01:45	0.352	0.352	0.000

Node Surcharge Summary

No nodes were surcharged.

Node Flooding Summary

No nodes were flooded.

Storage Volume Summary

Node	Type	Average Volume 1000 m³	Avg Pcnt	Evap Pcnt	Exfil Pcnt	Maximum Volume 1000 m³	Max Pcnt	Time of Max Occurrence	Maximum Outflow

Storage Unit	1000 m3	Full	Loss	Loss	1000 m3	Full	days hr:min	CMS
SU2	0.025	4	0	0	0.278	40	0	02:41	0.015

****
Outfall Loading Summary
****

Outfall Node	Flow Freq Pcnt	Avg Flow CMS	Max Flow CMS	Total Volume 10^6 ltr
7R5833	23.90	0.007	0.015	0.352
System	23.90	0.007	0.015	0.352

****
Link Flow Summary
****

Link	Type	Maximum |Flow| CMS	Time of Max Occurrence days hr:min	Maximum |Veloc| m/sec	Max/ Full Flow	Max/ Full Depth
Orifice	ORIFICE	0.015	0 02:42			

****
Flow Classification Summary
****

Conduit	Adjusted /Actual Length	Fraction of Time in Flow Class: Dry	Up Dry	Down Dry	Sub Crit	Sup Crit	Up Crit	Down Crit	Norm Ltd	Inlet Ctrl

****
Conduit Surcharge Summary
****

No conduits were surcharged.

Analysis begun on: Wed May 20 14:36:08 2026

Analysis ended on: Wed May 20 14:36:08 2026
Total elapsed time: < 1 sec

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.013)

****
Element Count
****
Number of rain gages 1
Number of subcatchments ... 1
Number of nodes 2
Number of links 1
Number of pollutants 0
Number of land uses 0

****
Raingage Summary
****

Name	Data Source	Data Type	Recording Interval
Raingage1	SCS_typeII_100Y24H	INTENSITY	120 min.

****
Subcatchment Summary
****

Name	Area	Width	%Imperv	%Slope	Rain Gage	Outlet
S1	0.77	51.33	90.00	0.5000	Raingage1	SU2

****
Node Summary
****

Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
7R5833	OUTFALL	179.71	0.00	0.0	
SU2	STORAGE	182.05	2.30	0.0	

****
Link Summary
****

Name	From Node	To Node	Type	Length	% Slope	Roughness
Orifice	SU2	7R5833	ORIFICE			

****
Cross Section Summary

```
  *********************
                                        Full     Full     Hyd.     Max.   No. of
Full
  Conduit          Shape                Depth     Area     Rad.    Width  Barrels
Flow
  ---------------------------------------------------------------------------
------


  ***********************************************************
  NOTE: The summary statistics displayed in this report are
  based on results found at every computational time step,
  not just on results from each reporting time step.
  ***********************************************************

  ****************
  Analysis Options
  ****************
  Flow Units ............... CMS
  Process Models:
    Rainfall/Runoff ........ YES
    RDII ................... NO
    Snowmelt ............... NO
    Groundwater ............ NO
    Flow Routing ........... YES
    Ponding Allowed ........ NO
    Water Quality .......... NO
  Infiltration Method ...... GREEN_AMPT
  Flow Routing Method ...... DYNWAVE
  Surcharge Method ......... EXTRAN
  Starting Date ............ 09/20/2021 00:00:00
  Ending Date .............. 09/22/2021 12:00:00
  Antecedent Dry Days ...... 0.0
  Report Time Step ......... 00:01:00
  Wet Time Step ............ 00:05:00
  Dry Time Step ............ 00:05:00
  Routing Time Step ........ 5.00 sec
  Variable Time Step ....... YES
  Maximum Trials ........... 8
  Number of Threads ........ 1
  Head Tolerance ........... 0.001500 m


  *************************        Volume         Depth
  Runoff Quantity Continuity     hectare-m            mm
  *************************     ---------       -------
  Total Precipitation ......         0.083       108.000
  Evaporation Loss .........         0.000         0.000
  Infiltration Loss ........         0.003         3.534
  Surface Runoff ...........         0.079       102.263
  Final Storage ............         0.002         2.255
  Continuity Error (%) .....        -0.048


  *************************        Volume        Volume
  Flow Routing Continuity        hectare-m      10^6 ltr
```

**************************	---------	---------
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	0.079	0.787
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	0.000	0.000
External Outflow	0.079	0.787
Flooding Loss	0.000	0.000
Evaporation Loss	0.000	0.000
Exfiltration Loss	0.000	0.000
Initial Stored Volume	0.000	0.000
Final Stored Volume	0.000	0.000
Continuity Error (%)	0.033	

****
Time-Step Critical Elements
****
None

****
Highest Flow Instability Indexes
****
All links are stable.

****
Routing Time Step Summary
****
Minimum Time Step	:	4.50 sec
Average Time Step	:	5.00 sec
Maximum Time Step	:	5.00 sec
Percent in Steady State	:	0.00
Average Iterations per Step	:	2.00
Percent Not Converging	:	0.00

****
Subcatchment Runoff Summary
****

Subcatchment	Total Precip mm	Total Runon mm	Total Evap mm	Total Infil mm	Imperv Runoff mm	Perv Runoff mm	Total Runoff 10^6 ltr	Peak Runoff CMS	Runoff Coeff
S1	108.00	0.00	0.00	3.53	94.99	7.27	102.26	0.79	0.947

****

Node Depth Summary
****

Node	Type	Average Depth Meters	Maximum Depth Meters	Maximum HGL Meters	Time of Max Occurrence days hr:min	Reported Max Depth Meters
7R5833	OUTFALL	0.33	4.82	184.53	0 01:45	4.82
SU2	STORAGE	0.29	2.08	184.13	0 16:01	2.08

****
Node Inflow Summary
****

Node	Type	Maximum Lateral Inflow CMS	Maximum Total Inflow CMS	Time of Max Occurrence days hr:min	Lateral Inflow Volume 10^6 ltr	Total Inflow 10^6 ltr	Flow Balance Error Percent
7R5833	OUTFALL	0.000	0.017	0 16:01	0	0.787	0.000
SU2	STORAGE	0.055	0.055	0 14:00	0.787	0.787	0.033

****
Node Surcharge Summary
****

No nodes were surcharged.

****
Node Flooding Summary
****

No nodes were flooded.

****
Storage Volume Summary
****

Node	Type	Average Volume 1000 m³	Avg Pcnt	Evap Pcnt	Exfil Pcnt	Maximum Volume 1000 m³	Max Pcnt	Time of Max Occurrence	Maximum Outflow

Storage Unit	1000 m3	Full	Loss	Loss	1000 m3	Full	days hr:min	CMS
SU2	0.052	7	0	0	0.337	49	0	16:01	0.017

****
Outfall Loading Summary
****

Outfall Node	Flow Freq Pcnt	Avg Flow CMS	Max Flow CMS	Total Volume 10^6 ltr
7R5833	48.82	0.007	0.017	0.787
System	48.82	0.007	0.017	0.787

****
Link Flow Summary
****

Link	Type	Maximum |Flow| CMS	Time of Max Occurrence days hr:min	Maximum |Veloc| m/sec	Max/ Full Flow	Max/ Full Depth
Orifice	ORIFICE	0.017	0 16:01			

****
Flow Classification Summary
****

Conduit	Adjusted /Actual Length	Fraction of Time in Flow Class: Dry	Up Dry	Down Dry	Sub Crit	Sup Crit	Up Crit	Down Crit	Norm Ltd	Inlet Ctrl

****
Conduit Surcharge Summary
****

No conduits were surcharged.

Analysis begun on: Wed May 20 14:35:32 2026

Analysis ended on: Wed May 20 14:35:32 2026
Total elapsed time: < 1 sec

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.013)

****
Element Count
****
Number of rain gages 1
Number of subcatchments ... 1
Number of nodes 2
Number of links 1
Number of pollutants 0
Number of land uses 0

****
Raingage Summary
****

Name	Data Source	Data Type	Recording Interval
Raingage1	100Y4H	INTENSITY	15 min.

****
Subcatchment Summary
****

Name	Area	Width	%Imperv	%Slope	Rain Gage	Outlet
S1	0.77	51.33	90.00	0.5000	Raingage1	SU2

****
Node Summary
****

Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
7R5833	OUTFALL	179.71	0.00	0.0	
SU2	STORAGE	182.05	2.30	0.0	

****
Link Summary
****

Name	From Node	To Node	Type	Length	% Slope	Roughness
Orifice	SU2	7R5833	ORIFICE			

****
Cross Section Summary

```
  *********************
                                        Full     Full     Hyd.     Max.   No. of
Full
  Conduit          Shape                Depth     Area     Rad.    Width  Barrels
Flow
  ---------------------------------------------------------------------------
------


  ***********************************************************
  NOTE: The summary statistics displayed in this report are
  based on results found at every computational time step,
  not just on results from each reporting time step.
  ***********************************************************

  ****************
  Analysis Options
  ****************
  Flow Units ............... CMS
  Process Models:
    Rainfall/Runoff ........ YES
    RDII ................... NO
    Snowmelt ............... NO
    Groundwater ............ NO
    Flow Routing ........... YES
    Ponding Allowed ........ NO
    Water Quality .......... NO
  Infiltration Method ...... GREEN_AMPT
  Flow Routing Method ...... DYNWAVE
  Surcharge Method ......... EXTRAN
  Starting Date ............ 09/20/2021 00:00:00
  Ending Date .............. 09/22/2021 12:00:00
  Antecedent Dry Days ...... 0.0
  Report Time Step ......... 00:01:00
  Wet Time Step ............ 00:05:00
  Dry Time Step ............ 00:05:00
  Routing Time Step ........ 5.00 sec
  Variable Time Step ....... YES
  Maximum Trials ........... 8
  Number of Threads ........ 1
  Head Tolerance ........... 0.001500 m


  *************************        Volume         Depth
  Runoff Quantity Continuity     hectare-m            mm
  *************************     ---------       -------
  Total Precipitation ......         0.063        81.588
  Evaporation Loss .........         0.000         0.000
  Infiltration Loss ........         0.001         1.836
  Surface Runoff ...........         0.060        77.897
  Final Storage ............         0.002         2.252
  Continuity Error (%) .....        -0.488


  *************************        Volume        Volume
  Flow Routing Continuity        hectare-m      10^6 ltr
```

**************************	---------	---------
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	0.060	0.600
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	0.000	0.000
External Outflow	0.060	0.600
Flooding Loss	0.000	0.000
Evaporation Loss	0.000	0.000
Exfiltration Loss	0.000	0.000
Initial Stored Volume	0.000	0.000
Final Stored Volume	0.000	0.000
Continuity Error (%)	0.049	

****
Time-Step Critical Elements
****
None

****
Highest Flow Instability Indexes
****
All links are stable.

****
Routing Time Step Summary
****

Minimum Time Step	:	4.50 sec
Average Time Step	:	5.00 sec
Maximum Time Step	:	5.00 sec
Percent in Steady State	:	0.00
Average Iterations per Step	:	2.00
Percent Not Converging	:	0.00

****
Subcatchment Runoff Summary
****

Subcatchment	Total Precip mm	Total Runon mm	Total Evap mm	Total Infil mm	Imperv Runoff mm	Perv Runoff mm	Total Runoff 10^6 ltr	Total Runoff CMS	Peak Runoff	Runoff Coeff
S1	81.59	0.00	0.00	1.84	71.52	6.37	77.90	0.60	0.30	0.955

****

Node Depth Summary

Node	Type	Average Depth Meters	Maximum Depth Meters	Maximum HGL Meters	Time of Max Occurrence days hr:min	Reported Max Depth Meters
7R5833	OUTFALL	0.33	4.82	184.53	0 01:45	4.82
SU2	STORAGE	0.28	2.20	184.25	0 02:52	2.20

Node Inflow Summary

Node	Type	Maximum Lateral Inflow CMS	Maximum Total Inflow CMS	Time of Max Occurrence days hr:min	Lateral Inflow Volume 10^6 ltr	Total Inflow Volume 10^6 ltr	Flow Balance Error Percent
7R5833	OUTFALL	0.000	0.018	0 02:52	0	0.6	0.000
SU2	STORAGE	0.299	0.299	0 01:45	0.6	0.6	0.049

Node Surcharge Summary

No nodes were surcharged.

Node Flooding Summary

No nodes were flooded.

Storage Volume Summary

Storage Unit	Average Volume	Avg Pcnt	Evap Pcnt	Exfil Pcnt	Maximum Volume	Max Pcnt	Time of Max Occurrence	Maximum Outflow

Storage Unit	1000 m3	Full	Loss	Loss	1000 m3	Full	days hr:min	CMS
SU2	0.054	8	0	0	0.483	70	0	02:52	0.018

****
Outfall Loading Summary
****

Outfall Node	Flow Freq Pcnt	Avg Flow CMS	Max Flow CMS	Total Volume 10^6 ltr
7R5833	30.23	0.009	0.018	0.600
System	30.23	0.009	0.018	0.600

****
Link Flow Summary
****

Link	Type	Maximum |Flow| CMS	Time of Max Occurrence days hr:min	Maximum |Veloc| m/sec	Max/ Full Flow	Max/ Full Depth
Orifice	ORIFICE	0.018	0 02:52			

****
Flow Classification Summary
****

Conduit	Adjusted /Actual Length	Fraction of Time in Flow Class: Dry	Up Dry	Down Dry	Sub Crit	Sup Crit	Up Crit	Down Crit	Norm Ltd	Inlet Ctrl

****
Conduit Surcharge Summary
****

No conduits were surcharged.

Analysis begun on: Wed May 20 14:34:17 2026

Analysis ended on: Wed May 20 14:34:18 2026
Total elapsed time: 00:00:01

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.013)

****
Element Count
****
Number of rain gages 1
Number of subcatchments ... 1
Number of nodes 2
Number of links 1
Number of pollutants 0
Number of land uses 0

****
Raingage Summary
****

Name	Data Source	Data Type	Recording Interval
Raingage1	UST	INTENSITY	15 min.

****
Subcatchment Summary
****

Name	Area	Width	%Imperv	%Slope	Rain Gage	Outlet
S1	0.77	51.33	90.00	0.5000	Raingage1	SU2

****
Node Summary
****

Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
7R5833	OUTFALL	179.71	0.00	0.0	
SU2	STORAGE	182.05	2.30	0.0	

****
Link Summary
****

Name	From Node	To Node	Type	Length	% Slope	Roughness
Orifice	SU2	7R5833	ORIFICE			

****
Cross Section Summary

```
  *********************
                                        Full     Full     Hyd.     Max.   No. of
Full
  Conduit          Shape                Depth     Area     Rad.    Width  Barrels
Flow
  -------------------------------------------------------------------------------
------


  ***********************************************************
  NOTE: The summary statistics displayed in this report are
  based on results found at every computational time step,
  not just on results from each reporting time step.
  ***********************************************************

  ****************
  Analysis Options
  ****************
  Flow Units ............... CMS
  Process Models:
    Rainfall/Runoff ........ YES
    RDII ................... NO
    Snowmelt ............... NO
    Groundwater ............ NO
    Flow Routing ........... YES
    Ponding Allowed ........ NO
    Water Quality .......... NO
  Infiltration Method ...... GREEN_AMPT
  Flow Routing Method ...... DYNWAVE
  Surcharge Method ......... EXTRAN
  Starting Date ............ 09/20/2021 00:00:00
  Ending Date .............. 09/22/2021 12:00:00
  Antecedent Dry Days ...... 0.0
  Report Time Step ......... 00:01:00
  Wet Time Step ............ 00:05:00
  Dry Time Step ............ 00:05:00
  Routing Time Step ........ 5.00 sec
  Variable Time Step ....... YES
  Maximum Trials ........... 8
  Number of Threads ........ 1
  Head Tolerance ........... 0.001500 m


  **************************        Volume         Depth
  Runoff Quantity Continuity     hectare-m            mm
  **************************     ---------       -------
  Total Precipitation ......         0.115       149.985
  Evaporation Loss .........         0.000         0.000
  Infiltration Loss ........         0.003         3.748
  Surface Runoff ...........         0.111       144.371
  Final Storage ............         0.002         2.254
  Continuity Error (%) .....        -0.259


  **************************        Volume        Volume
  Flow Routing Continuity        hectare-m      10^6 ltr
```

**************************	---------	---------
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	0.111	1.112
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	0.000	0.000
External Outflow	0.111	1.110
Flooding Loss	0.000	0.000
Evaporation Loss	0.000	0.000
Exfiltration Loss	0.000	0.000
Initial Stored Volume	0.000	0.000
Final Stored Volume	0.000	0.000
Continuity Error (%)	0.161	

****
Time-Step Critical Elements
****
None

****
Highest Flow Instability Indexes
****
All links are stable.

****
Routing Time Step Summary
****
Minimum Time Step	:	4.50 sec
Average Time Step	:	5.00 sec
Maximum Time Step	:	5.00 sec
Percent in Steady State	:	0.00
Average Iterations per Step	:	2.00
Percent Not Converging	:	0.00

****
Subcatchment Runoff Summary
****

Subcatchment	Total Precip mm	Total Runon mm	Total Evap mm	Total Infil mm	Imperv Runoff mm	Perv Runoff mm	Total Runoff 10^6 ltr	Total Runoff CMS	Peak Runoff Coeff
S1	149.99	0.00	0.00	3.75	133.08	11.29	144.37	1.11	0.30	0.963

****

Node Depth Summary

Node	Type	Average Depth Meters	Maximum Depth Meters	Maximum HGL Meters	Time of Max Occurrence days hr:min	Reported Max Depth Meters
7R5833	OUTFALL	0.33	4.82	184.53	0 01:45	4.82
SU2	STORAGE	0.48	2.23	184.28	0 10:45	2.23

Node Inflow Summary

Node	Type	Maximum Lateral Inflow CMS	Maximum Total Inflow CMS	Time of Max Occurrence days hr:min	Lateral Inflow Volume 10^6 ltr	Total Inflow Volume 10^6 ltr	Flow Balance Error Percent
7R5833	OUTFALL	0.000	0.018	0 10:45	0	1.11	0.000
SU2	STORAGE	0.301	0.301	0 09:15	1.11	1.11	0.161

Node Surcharge Summary

No nodes were surcharged.

Node Flooding Summary

No nodes were flooded.

Storage Volume Summary

Node	Average Volume	Avg Pcnt	Evap Pcnt	Exfil Pcnt	Maximum Volume	Max Pcnt	Time of Max Occurrence	Maximum Outflow

Storage Unit	1000 m3	Full	Loss	Loss	1000 m3	Full	days hr:min	CMS
SU2	0.094	14	0	0	0.526	76	0	10:45	0.018

****
Outfall Loading Summary
****

Outfall Node	Flow Freq Pcnt	Avg Flow CMS	Max Flow CMS	Total Volume 10^6 ltr
7R5833	52.15	0.010	0.018	1.110
System	52.15	0.010	0.018	1.110

****
Link Flow Summary
****

Link	Type	Maximum |Flow| CMS	Time of Max Occurrence days hr:min	Maximum |Veloc| m/sec	Max/ Full Flow	Max/ Full Depth
Orifice	ORIFICE	0.018	0 10:45			

****
Flow Classification Summary
****

Conduit	Adjusted /Actual Length	Fraction of Time in Flow Class: Dry	Up Dry	Down Dry	Sub Crit	Sup Crit	Up Crit	Down Crit	Norm Ltd	Inlet Ctrl

****
Conduit Surcharge Summary
****

No conduits were surcharged.

Analysis begun on: Wed May 20 14:29:08 2026

Analysis ended on: Wed May 20 14:29:08 2026
Total elapsed time: < 1 sec

Appendix E

SWM Design Details

ADS OGS Sizing Summary

Project Name:	5259 Tecumseh Road East
Consulting Engineer:	Dillon Consulting Limited
Location:	Tecumseh, ON
Sizing Completed By:	Kyle Robinson

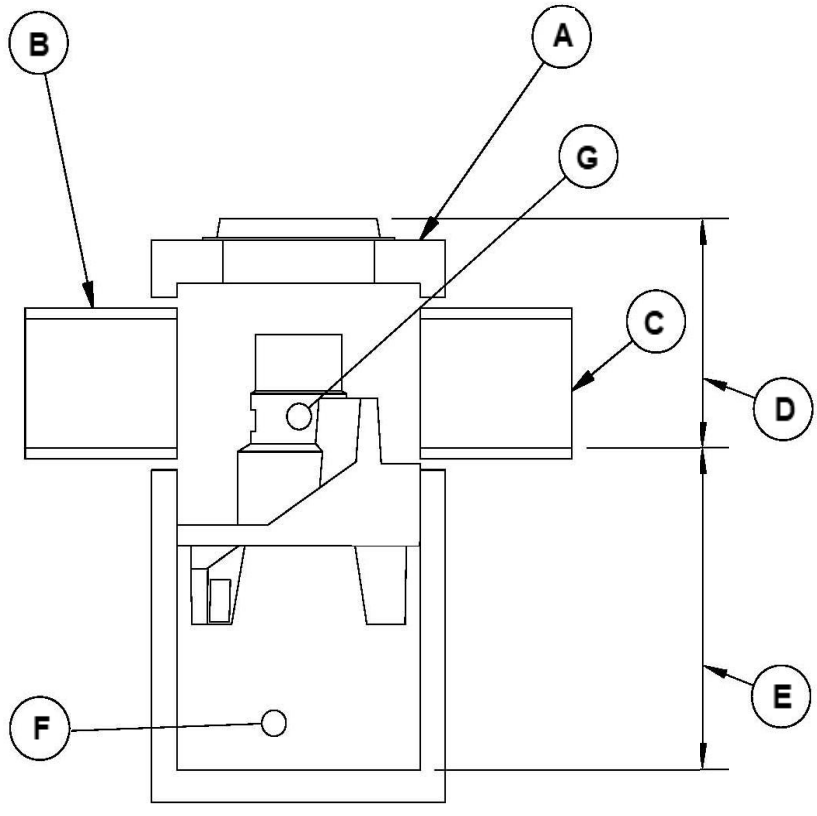
Email: kyle.robinson@adspipe.com

Treatment Requirements		
Treatment Goal:	Normal (MOE)	
Selected Parameters:	70% TSS	90% Volume
Selected Unit:	**FD-4HC**	

Site Details	
Site Area:	0.77 ha
% Impervious:	90%
Rational C:	0.84
Rainfall Station:	Windsor, ONT
Particle Size Distribution:	Fine
Peak Flowrate:	---

Summary of Results		
Model	**TSS Removal**	**Volume Treated**
FD-4HC	79.0%	>90%
FD-5HC	83.0%	>90%
FD-6HC	85.0%	>90%
FD-8HC	90.0%	>90%
FD-10HC	93.0%	>90%

FD-4HC Specification	
Unit Diameter (A):	1,200 mm
Inlet Pipe Diameter (B):	mm
Outlet Pipe Diameter (C):	mm
Height, T/G to Outlet Invert (D):	0 mm
Height, Outlet Invert to Sump (E):	**1518 mm**
Sediment Storage Capacity (F):	**0.5 m³**
Oil Storage Capacity (G):	723 L
Max. Pipe Diameter:	600 mm
Peak Flow Capacity:	510 L/s



Site Elevations:	
Rim Elevation:	0.000
Inlet Pipe Elevation:	0.000
Outlet Pipe Elevation:	0.000

Notes:

Removal efficiencies are based on NJDEP Test Protocols and independently verified.

All units supplied by ADS have numerous local, provincial, and international certifications (copies of which can be provided upon request). The design engineer is responsible for ensuring compliance with applicable regulations.

Project Name:	5259 Tecumseh Road East
Consulting Engineer:	Dillon Consulting Limited
Location:	Tecumseh, ON

Net Annual Removal Efficiency Summary: FD-4HC

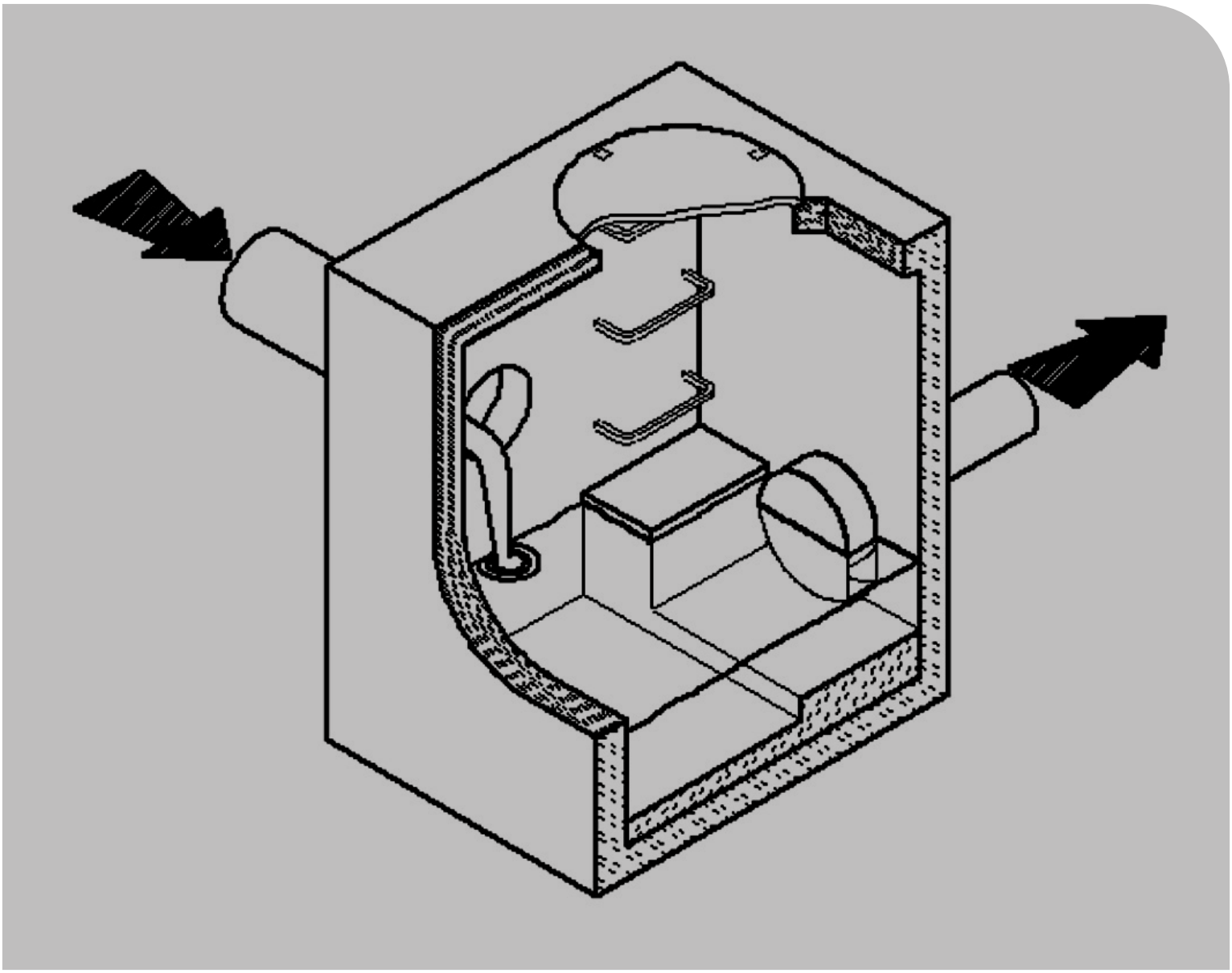
Rainfall Intensity[1]	Fraction of Rainfall[1]	FD-4HC Removal Efficiency[2]	Weighted Net-Annual Removal Efficiency
mm/hr	%	%	%
3.00	13.2%	88.9%	11.7%
4.00	9.6%	86.6%	8.3%
5.00	7.5%	84.8%	6.4%
6.00	6.0%	83.4%	5.0%
7.00	4.8%	82.2%	3.9%
8.00	4.1%	81.2%	3.3%
9.00	3.6%	80.3%	2.9%
10.00	3.2%	79.5%	2.5%
11.00	2.8%	78.8%	2.2%
12.00	2.5%	78.2%	2.0%
15.00	6.6%	76.6%	5.1%
20.00	8.3%	74.5%	6.2%
25.00	5.8%	73.0%	4.2%
30.00	4.6%	71.8%	3.3%
35.00	3.8%	70.7%	2.7%
40.00	2.9%	69.9%	2.0%
45.00	2.4%	69.1%	1.7%
50.00	1.8%	68.4%	1.2%
65.00	6.6%	66.8%	4.4%
Total Net Annual Removal Efficiency:			79.0%
Total Runoff Volume Treated:			99.9%

Notes:

(1) Based on Windsor/Essex Region Stormwater Manual 2018, Table 3.4.1.5

(2) Based on third party verified data and appoximating the removal of a PSD similar to the STC Fine distribution

(3) Rainfall adjusted to 5 min peak intensity based on hourly average.



VEOLIA

HYDROVEX® VHV/SVHV
Vertical Vortex Flow Regulator
CSO, SSO, Stormwater Management

WATER TECHNOLOGIES

HYDROVEX® VHV / SVHV Vertical Vortex Flow Regulator

Application

One of the major problems of urban wet weather flow management is the runoff generated by heavy rainfall. During a storm event, uncontrolled flows may overload the drainage system and cause flooding. Wear and deterioration on the network are increased dramatically as a result of increased flow velocities. In a combined sewer system, the wastewater treatment plant will experience a significant increase in flows during storms, thereby losing its treatment efficiency. A simple means of managing excessive storm water runoff is to control the flows at their point of origin, the manhole.

The HYDROVEX® VHV / SVHV line of vortex flow regulators is ideal for point source control of low to medium stormwater flows in manholes, catch basins and other retention structures. The HYDROVEX® VHV / SVHV design is based on the fluid mechanics principle of the forced vortex. The discharge is controlled by an air-filled vortex which reduces the effective water passage area without physically reducing orifice size. This effect grants precise flow regulation without the use of moving parts or electricity, and allows for larger inlet and outlet openings compared to the basic orifice. Although the concept is quite simple, many years of research and testing have been invested to optimize the performance of our vortex technology.

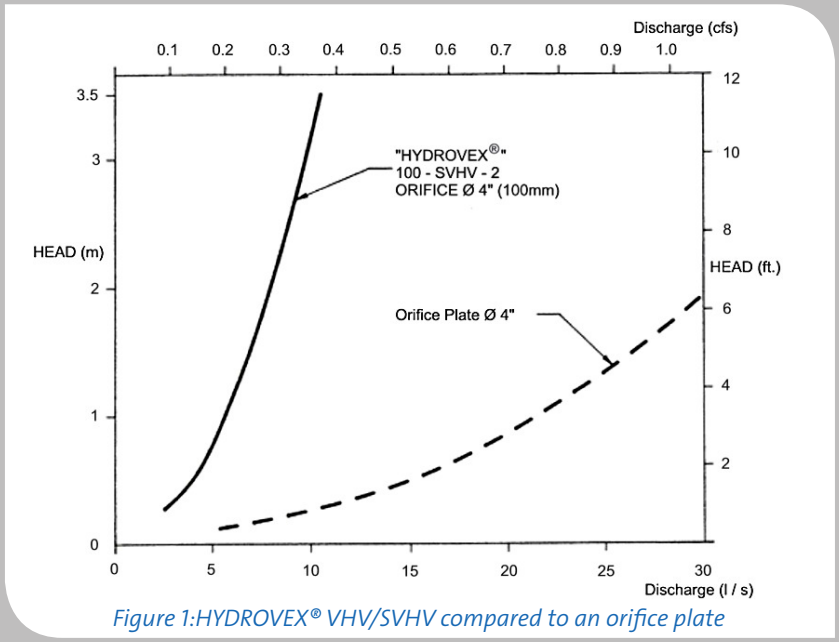


Figure 1:HYDROVEX® VHV/SVHV compared to an orifice plate

Vortex valves have openings typically 4 to 6 times larger than an orifice plate for the same design. Larger opening sizes decrease the chance of blockage caused by sediments and debris found in storm water flows. Figure 1 shows the discharge curve of a vortex regulator compared to an equally sized orifice plate. For an identical opening size, the flow is approximately four times smaller than the orifice plate for the same upstream water pressure.

Advantages

- Large inlet/outlet openings reduce the chance of clogging
- Openings typically 4-6 times larger than the basic orifice (Figure 1)
- Outlet orifice always equal or larger than inlet
- Ideal for precise control of low to medium stormwater flow applications
- Submerged inlet for floatables control
- No moving parts or electricity required
- Durable and robust stainless steel construction
- Minimal maintenance
- Easy to install

Selection

Selecting a VHV/SVHV regulator is easily achieved using Figure 3. Each selection is made using the maximum allowable flow rate and the maximum allowable upstream water pressure (head). The area in which the design point falls will designate the required model. The maximum design head is defined as the difference between the maximum upstream water level and the invert of the outlet pipe. All selections should be verified by a John Meunier Inc. representative prior to fabrication.

Design example:

- Maximum discharge: 6 L/s (0.2 cfs)*
- Maximum design head 2m (6.56 ft.)**
- Using Figure 3, model 75 VHV-1 is selected

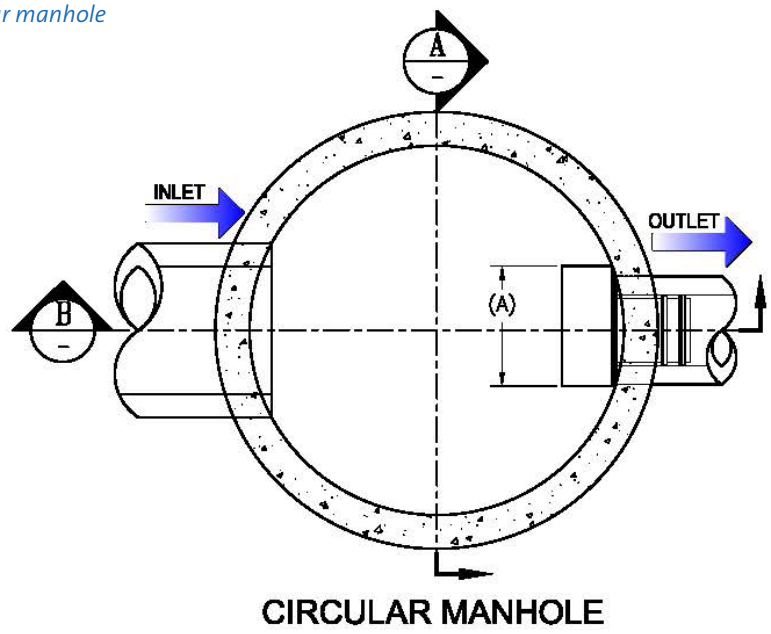
**The selection chart provided assumes free flowing downstream conditions. Should the outlet pipe be >80% full at design flow, a larger pipe diameter should be used. In the above example, the minimum outlet pipe diameter and slope would be 150mm (6in), 0.3%.*

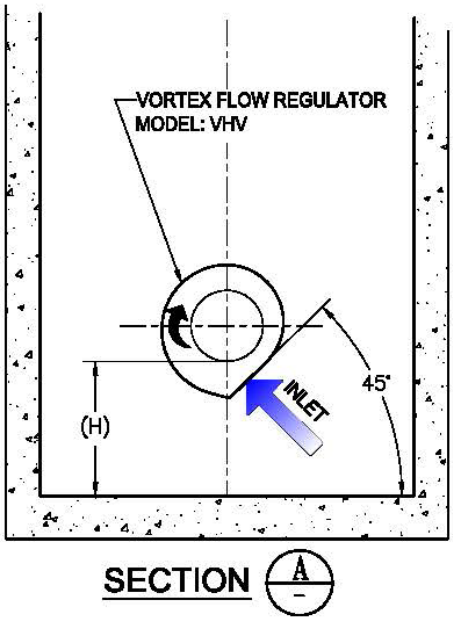
***The design head is defined as the difference between the maximum upstream water level and the outlet pipe invert.*

The HYDROVEX® VHV / SVHV vortex flow regulators can be installed in circular or square manholes. The table below lists the minimum dimensions and clearances required for each regulator model. It is imperative to respect the minimum clearances shown to ensure ease of installation and proper functioning of the regulator.

Model	Regulator Diameter A (mm) [in]	CIRCULAR Minimum Manhole Diameter B (mm) [in]	SQUARE Minimum Chamber Width B (mm) [in]	Minimum Outlet Pipe Diameter C (mm) [in]	Minimum Clearance H (mm) [in]
25 SVHV-1	125 [5]	600 [24]	600 [24]	150 [6]	150 [6]
32 SVHV-1	150 [6]	600 [24]	600 [24]	150 [6]	150 [6]
40 SVHV-1	200 [8]	600 [24]	600 [24]	150 [6]	150 [6]
50 VHV-1	150 [6]	600 [24]	600 [24]	150 [6]	150 [6]
75 VHV-1	250 [10]	600 [24]	600 [24]	150 [6]	150 [6]
100 VHV-1	325 [13]	900 [36]	600 [24]	150 [6]	200 [8]
125 VHV-2	275 [11]	900 [36]	600 [24]	150 [6]	200 [8]
150 VHV-2	350 [14]	900 [36]	600 [24]	150 [6]	225 [9]
200 VHV-2	450 [18]	1200 [48]	900 [36]	200 [8]	300 [12]
250 VHV-2	575 [23]	1200 [48]	900 [36]	250 [10]	350 [14]
300 VHV-2	675 [27]	1600 [64]	1200 [48]	250 [10]	400 [16]
350 VHV-2	800 [32]	1800 [72]	1200 [48]	300 [12]	500 [20]

Figure 2a: Minimum dimensions and clearances, circular manhole





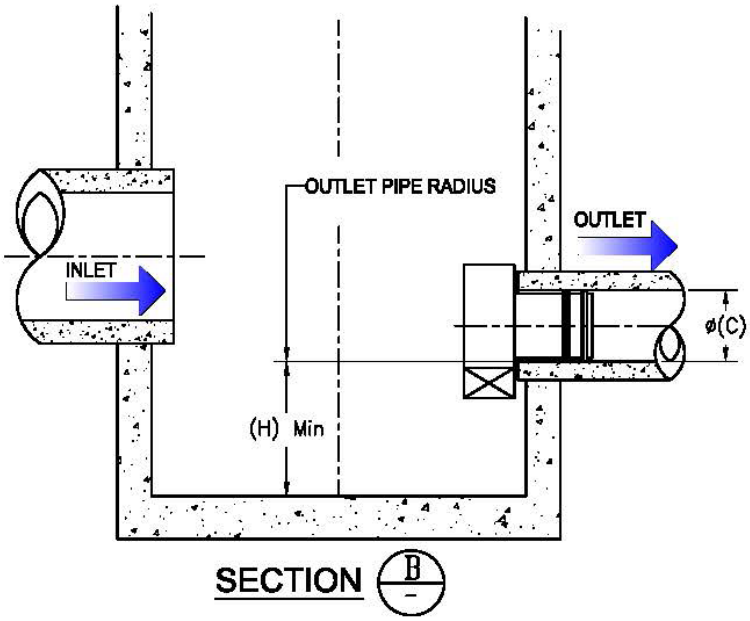
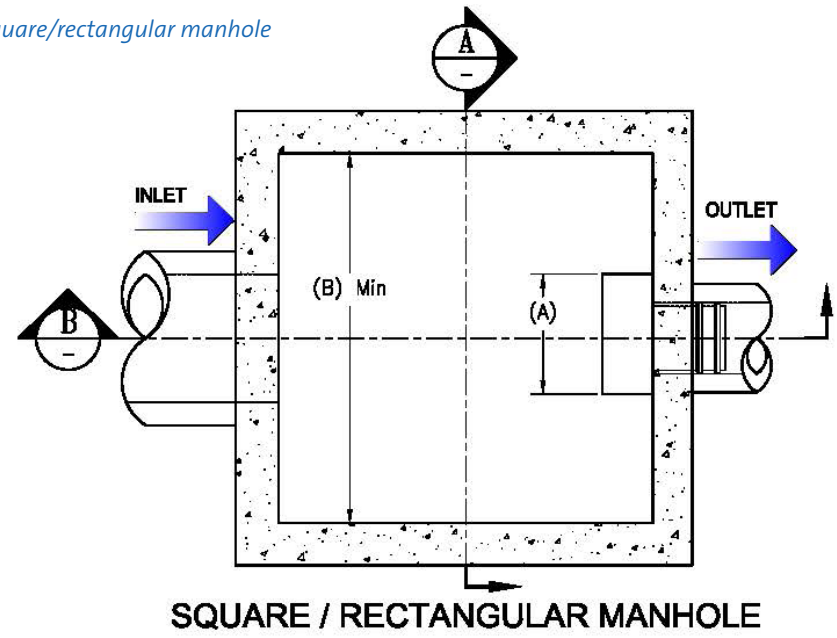
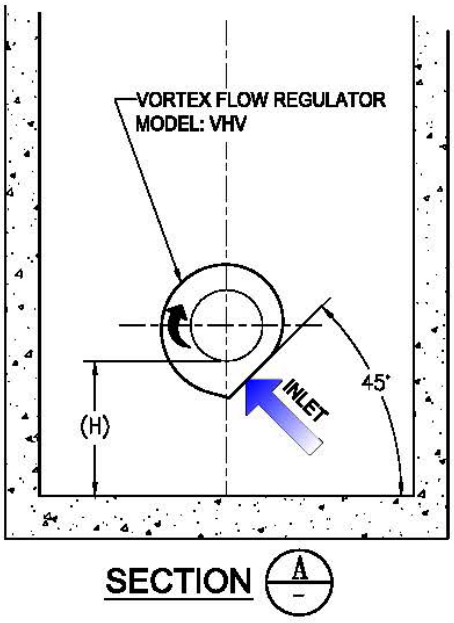
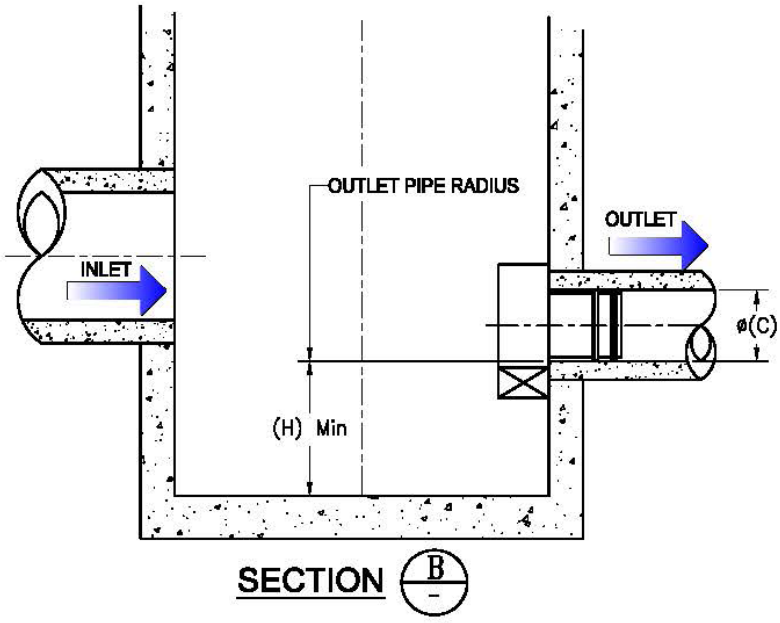


Figure 2b: Minimum dimensions and clearances, square/rectangular manhole







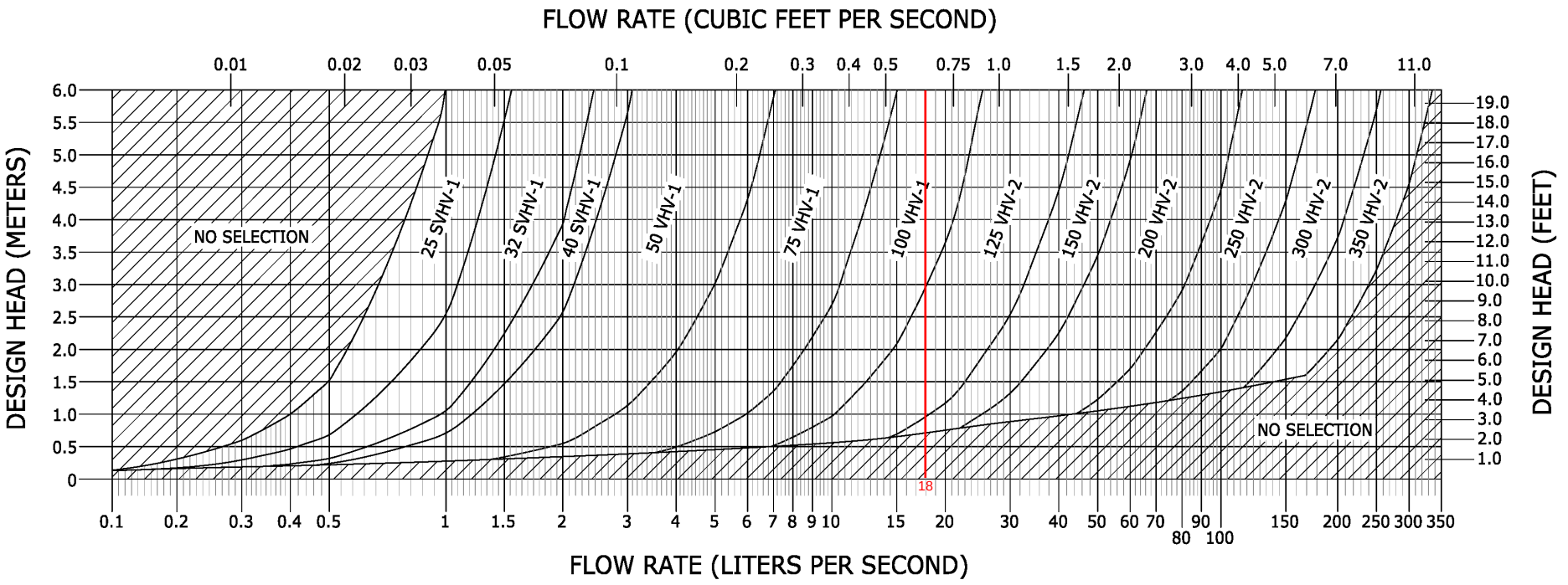


Figure 3 : HYDROVEX® VHV/SVHV Selection Chart

Options

A variety of options are available for the HYDROVEX® VHV / SVHV vortex flow regulators, including:

- Type O: extended inlet for odor control
- FV-VHV: sliding plate mounted
- Gooseneck: for shallow or no sump installations
- Vent: for low slope applications

DT: roof drainage applications

Specifications

In order to specify a HYDROVEX® VHV/SVHV flow regulator, the following parameters must be clearly indicated:

- Model number, ex: 75-VHV-1
- Outlet pipe diameter and type, ex: ø 150mm [6”], SDR 35
- Design discharge rate, ex: 6.0 L/s [0.21 CFS]
- Design head, ex: 2.0 m [6.56 ft] *
- Manhole diameter, ex: ø 900 mm [ø 36”]
- Minimum clearance “H”, ex: 150 mm [6 in]
- Construction material type (304 stainless steel standard)

**The design head is defined as the difference between the maximum upstream water level and the outlet pipe invert.*

Installation

The installation of a HYDROVEX® VHV/SVHV flow regulator can be accomplished quickly and does not require any special tools. The sleeve of the vortex flow regulator is simply inserted into the outlet pipe of the manhole and the unit is then secured to the concrete wall using the supplied anchor.

Maintenance

HYDROVEX® regulators are designed to minimize maintenance requirements. We recommend a periodic visual inspection in order to ensure that the unit is free of debris. The manhole sump beneath the unit should be inspected and cleaned with a vacuum truck periodically to remove accumulated sediments.

Guaranty

The HYDROVEX® line of VHV / SVHV regulators are guaranteed against both design and manufacturing defects for a period of 5 years after sale. The unit will be modified or replaced should it be found to be defective within the guarantee period.

Resourcing the world

Veolia Water Technologies

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cso@veolia.com • www.veoliawatertechnologies.ca

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User Inputs

Chamber Model:	MC-3500
Outlet Control Structure:	Yes
Project Name:	Croation_Centre
Engineer:	Mansi Dhaked
Project Location:	Ontario
Measurement Type:	Metric
Required Storage Volume:	285.01 cubic meters.
Stone Porosity:	40%
Stone Foundation Depth:	229 mm.
Stone Above Chambers:	305 mm.
Design Constraint Dimensions:	(10.01 m. x 35.01 m.)

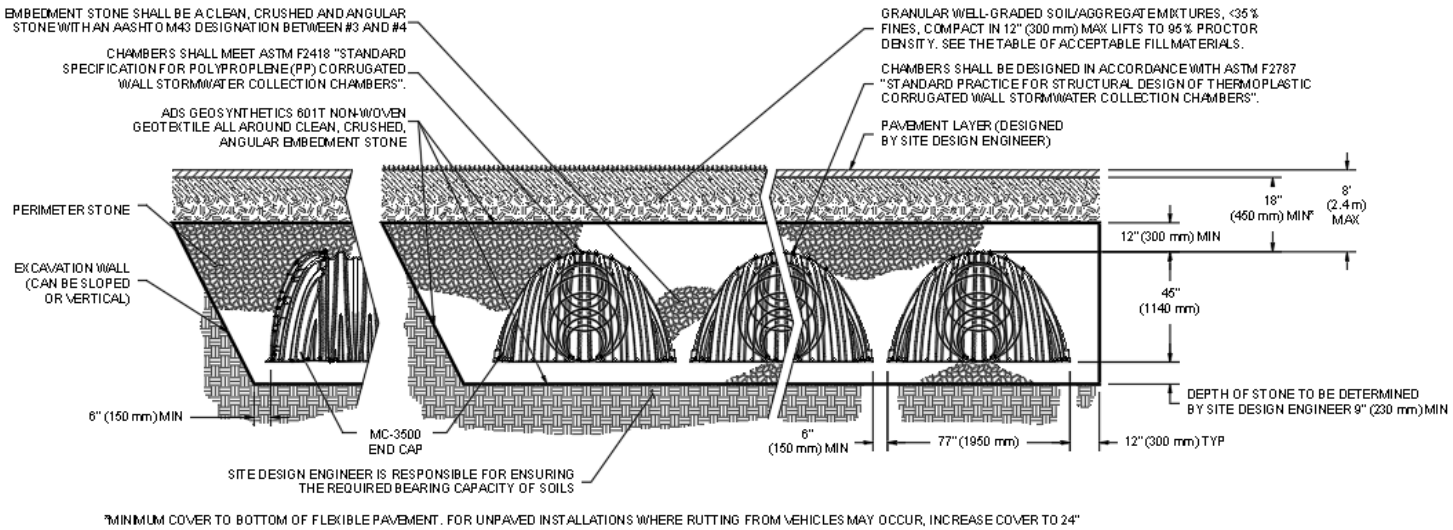
Results

System Volume and Bed Size

Installed Storage Volume:	299.24 cubic meters.
Storage Volume Per Chamber:	3.12 cubic meters.
Number Of Chambers Required:	53
Number Of End Caps Required:	8
Chamber Rows:	4
Maximum Length:	33.58 m.
Maximum Width:	9.08 m.
Approx. Bed Size Required:	295.57 square meters.
Average Cover Over Chambers:	0.629 m.

System Components

Amount Of Stone Required (0% Overage):	328 cubic meters
(Cubic yard to ton factor:1.4):	599.1 tons
Volume Of Excavation (Not Including Fill):	496 cubic meters
Total Non-woven Geotextile Required:	887 square meters
Woven Geotextile Required (excluding Isolator Row):	74 square meters
Woven Geotextile Required (Isolator Row):	102 square meters
Total Woven Geotextile Required:	175 square meters
Impervious Liner Required:	0 square meters



Project:

Chamber Model -	MC-3500	
Units -	Metric	
Number of Chambers -	53	
Number of End Caps -	8	
Voids in the stone (porosity) -	40	%
Base of Stone Elevation -	182.05	m
Amount of Stone Above Chambers -	305	mm
Amount of Stone Below Chambers -	229	mm

Area of System- 304.9064 sq.meters Min. Area - 256.08 sq.meters

☑ Include Perimeter Stone in Calculations

☑ Click for Stage Area Data

☑ Click to Invert Stage Area Data

Click Here for Imperial

StormTech MC-3500 Cumulative Storage Volumes

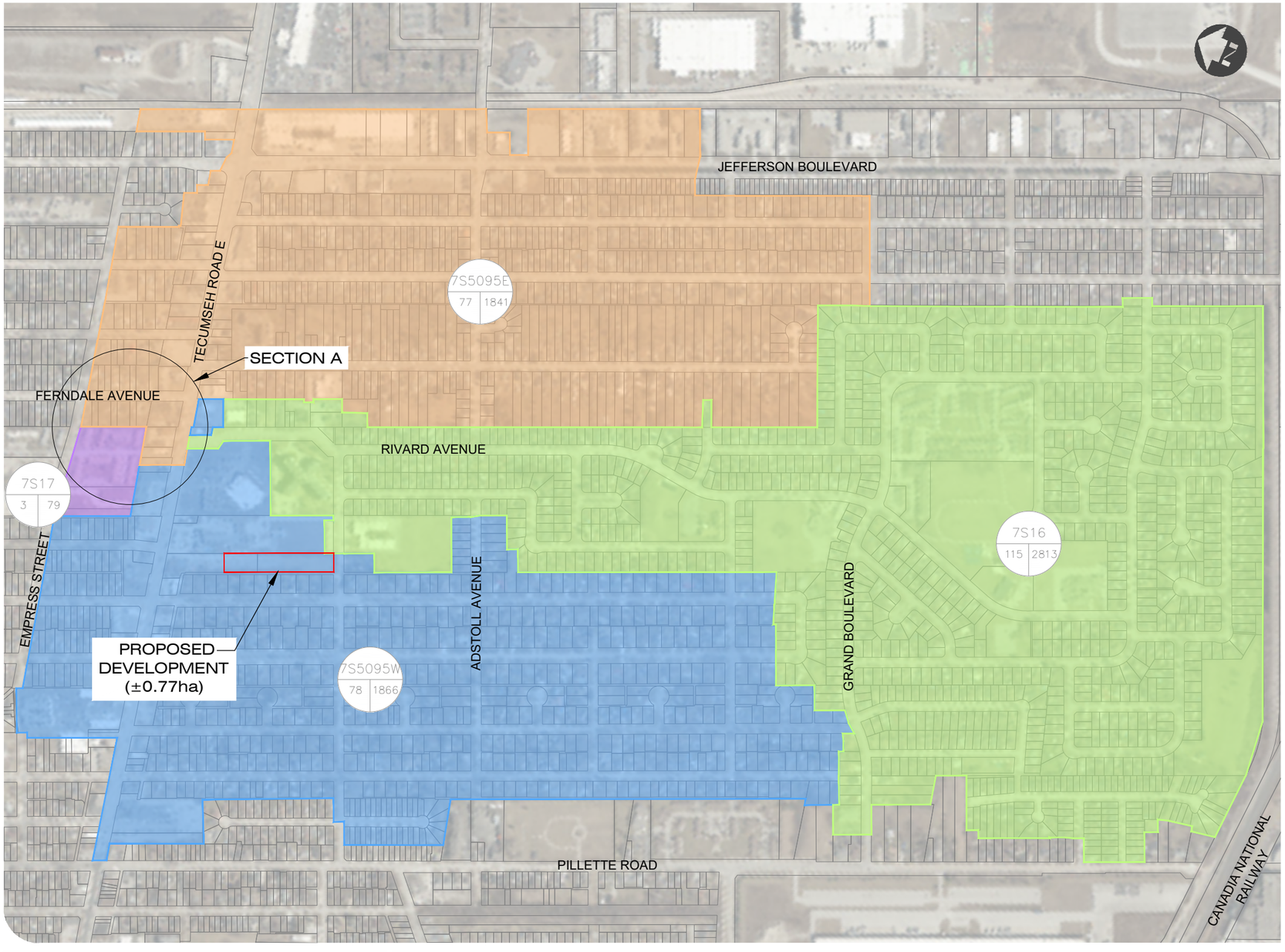
Height of System (mm)	Incremental Single Chamber (cubic meters)	Incremental Single End Cap (cubic meters)	Incremental Chambers (cubic meters)	Incremental End Cap (cubic meters)	Incremental Stone (cubic meters)	Incremental Ch, EC and Stone (cubic meters)	Cumulative System (cubic meters)	Elevation (meters)
1676	0.000	0.000	0.00	0.00	3.10	3.10	305.49	183.73
1651	0.000	0.000	0.00	0.00	3.10	3.10	302.40	183.70
1626	0.000	0.000	0.00	0.00	3.10	3.10	299.30	183.68
1600	0.000	0.000	0.00	0.00	3.10	3.10	296.20	183.65
1575	0.000	0.000	0.00	0.00	3.10	3.10	293.10	183.62
1549	0.000	0.000	0.00	0.00	3.10	3.10	290.01	183.60
1524	0.000	0.000	0.00	0.00	3.10	3.10	286.91	183.57
1499	0.000	0.000	0.00	0.00	3.10	3.10	283.81	183.55
1473	0.000	0.000	0.00	0.00	3.10	3.10	280.71	183.52
1448	0.000	0.000	0.00	0.00	3.10	3.10	277.61	183.50
1422	0.000	0.000	0.00	0.00	3.10	3.10	274.52	183.47
1397	0.000	0.000	0.00	0.00	3.10	3.10	271.42	183.45
1372	0.002	0.000	0.09	0.00	3.06	3.15	268.32	183.42
1346	0.005	0.001	0.29	0.01	2.98	3.28	265.17	183.40
1321	0.008	0.001	0.44	0.01	2.92	3.37	261.89	183.37
1295	0.011	0.001	0.61	0.01	2.85	3.47	258.53	183.35
1270	0.019	0.002	1.03	0.02	2.68	3.73	255.06	183.32
1245	0.029	0.002	1.54	0.02	2.47	4.04	251.33	183.29
1219	0.035	0.003	1.88	0.02	2.34	4.24	247.30	183.27
1194	0.040	0.004	2.13	0.03	2.23	4.40	243.06	183.24
1168	0.045	0.004	2.36	0.03	2.14	4.53	238.66	183.22
1143	0.048	0.005	2.56	0.04	2.06	4.66	234.13	183.19
1118	0.052	0.005	2.74	0.04	1.98	4.77	229.47	183.17
1092	0.055	0.006	2.91	0.05	1.92	4.87	224.70	183.14
1067	0.058	0.006	3.06	0.05	1.85	4.97	219.83	183.12
1041	0.060	0.007	3.20	0.05	1.80	5.05	214.87	183.09
1016	0.063	0.007	3.34	0.06	1.74	5.13	209.82	183.07
991	0.065	0.008	3.46	0.06	1.69	5.21	204.68	183.04
965	0.068	0.008	3.58	0.06	1.64	5.28	199.47	183.02
940	0.070	0.008	3.69	0.07	1.59	5.35	194.19	182.99
914	0.072	0.009	3.79	0.07	1.55	5.42	188.83	182.96
889	0.073	0.009	3.89	0.07	1.51	5.48	183.42	182.94
864	0.075	0.009	3.99	0.08	1.47	5.53	177.94	182.91
838	0.077	0.010	4.07	0.08	1.44	5.59	172.41	182.89
813	0.078	0.010	4.16	0.08	1.40	5.64	166.82	182.86
787	0.080	0.011	4.24	0.08	1.37	5.69	161.17	182.84
762	0.081	0.011	4.32	0.09	1.34	5.74	155.48	182.81
737	0.083	0.011	4.39	0.09	1.31	5.78	149.74	182.79
711	0.084	0.012	4.46	0.09	1.28	5.83	143.96	182.76
686	0.085	0.012	4.52	0.09	1.25	5.87	138.13	182.74
660	0.086	0.012	4.58	0.10	1.23	5.91	132.26	182.71
635	0.088	0.012	4.64	0.10	1.20	5.94	126.36	182.69
610	0.089	0.013	4.70	0.10	1.18	5.98	120.41	182.66
584	0.090	0.013	4.75	0.10	1.16	6.01	114.44	182.63
559	0.091	0.013	4.80	0.11	1.13	6.04	108.42	182.61
533	0.091	0.014	4.85	0.11	1.11	6.07	102.38	182.58
508	0.092	0.014	4.89	0.11	1.10	6.10	96.31	182.56
483	0.093	0.014	4.94	0.11	1.08	6.13	90.21	182.53
457	0.094	0.014	4.98	0.11	1.06	6.15	84.08	182.51
432	0.095	0.015	5.02	0.12	1.04	6.18	77.93	182.48
406	0.095	0.015	5.06	0.12	1.03	6.20	71.75	182.46
381	0.096	0.015	5.09	0.12	1.01	6.22	65.54	182.43
356	0.097	0.015	5.12	0.12	1.00	6.25	59.32	182.41
330	0.097	0.015	5.16	0.12	0.99	6.27	53.07	182.38
305	0.098	0.016	5.19	0.12	0.97	6.29	46.81	182.35
279	0.099	0.016	5.22	0.13	0.96	6.31	40.52	182.33
254	0.099	0.017	5.26	0.13	0.94	6.33	34.22	182.30
229	0.000	0.000	0.00	0.00	3.10	3.10	27.88	182.28
203	0.000	0.000	0.00	0.00	3.10	3.10	24.78	182.25
178	0.000	0.000	0.00	0.00	3.10	3.10	21.68	182.23
152	0.000	0.000	0.00	0.00	3.10	3.10	18.59	182.20
127	0.000	0.000	0.00	0.00	3.10	3.10	15.49	182.18
102	0.000	0.000	0.00	0.00	3.10	3.10	12.39	182.15
76	0.000	0.000	0.00	0.00	3.10	3.10	9.29	182.13
51	0.000	0.000	0.00	0.00	3.10	3.10	6.20	182.10
25	0.000	0.000	0.00	0.00	3.10	3.10	3.10	182.08

Stage Area Data

Depth (meter)	Elevation (meter)	Area (m²)	Area (hectare)
1.68	183.73	121.96	0.0122
1.65	183.70	121.96	0.0122
1.63	183.68	121.96	0.0122
1.60	183.65	121.96	0.0122
1.57	183.62	121.96	0.0122
1.55	183.60	121.96	0.0122
1.52	183.57	121.96	0.0122
1.50	183.55	121.96	0.0122
1.47	183.52	121.96	0.0122
1.45	183.50	121.96	0.0122
1.42	183.47	121.96	0.0122
1.40	183.45	121.96	0.0122
1.37	183.42	124.02	0.0124
1.35	183.40	128.97	0.0129
1.32	183.37	132.58	0.0133
1.30	183.35	136.55	0.0137
1.27	183.32	146.69	0.0147
1.24	183.29	158.89	0.0159
1.22	183.27	166.83	0.0167
1.19	183.24	173.06	0.0173
1.17	183.22	178.51	0.0179
1.14	183.19	183.36	0.0183
1.12	183.17	187.76	0.0188
1.09	183.14	191.73	0.0192
1.07	183.12	195.48	0.0195
1.04	183.09	198.90	0.0199
1.02	183.07	202.16	0.0202
0.99	183.04	205.16	0.0205
0.97	183.02	208.00	0.0208
0.94	182.99	210.71	0.0211
0.91	182.96	213.24	0.0213
0.89	182.94	215.63	0.0216
0.86	182.91	217.91	0.0218
0.84	182.89	220.07	0.0220
0.81	182.86	222.14	0.0222
0.79	182.84	224.09	0.0224
0.76	182.81	225.96	0.0226
0.74	182.79	227.75	0.0228
0.71	182.76	229.43	0.0229
0.69	182.74	231.00	0.0231
0.66	182.71	232.50	0.0233
0.63	182.69	234.02	0.0234
0.61	182.66	235.36	0.0235
0.58	182.63	236.66	0.0237
0.56	182.61	237.91	0.0238
0.53	182.58	239.08	0.0239
0.51	182.56	240.20	0.0240
0.48	182.53	241.27	0.0241
0.46	182.51	242.30	0.0242
0.43	182.48	243.27	0.0243
0.41	182.46	244.18	0.0244
0.38	182.43	245.07	0.0245
0.36	182.41	245.88	0.0246
0.33	182.38	246.72	0.0247
0.30	182.35	247.48	0.0247
0.28	182.33	248.26	0.0248
0.25	182.30	249.41	0.0249
0.23	182.28	121.96	0.0122
0.20	182.25	121.96	0.0122
0.18	182.23	121.96	0.0122
0.15	182.20	121.96	0.0122
0.13	182.18	121.96	0.0122
0.10	182.15	121.96	0.0122
0.08	182.13	121.96	0.0122
0.05	182.10	121.96	0.0122
0.03	182.08	121.96	0.0122

Appendix F

Existing and Proposed Conditions Calculations – Sanitary Assessment



SECTION A



2679264 ONTARIO INC.
5259 TECUMSEH ROAD EAST
REDEVELOPMENT

SANITARY DRAINAGE AREAS EXISTING
FIGURE 1.0

SUBJECT SITE

7S5095W - DRAINAGE AREA

7S16 - DRAINAGE AREA

7S5095W - DRAINAGE AREA

7S17 - DRAINAGE AREA

A2
0.67 0.50
DRAINAGE AREA ID
RUNOFF–COEFFICIENT
DRAINAGE AREA (Ha)

EXISTING SANITARY SEWER AND MANHOLE

EXISTING COMBINED SEWER AND MANHOLE

EXISTING STORM SEWER AND MANHOLE

File Location:
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SOURCE: THE COUNTY OF ESSEX INTERACTIVE MAPPING (2023)

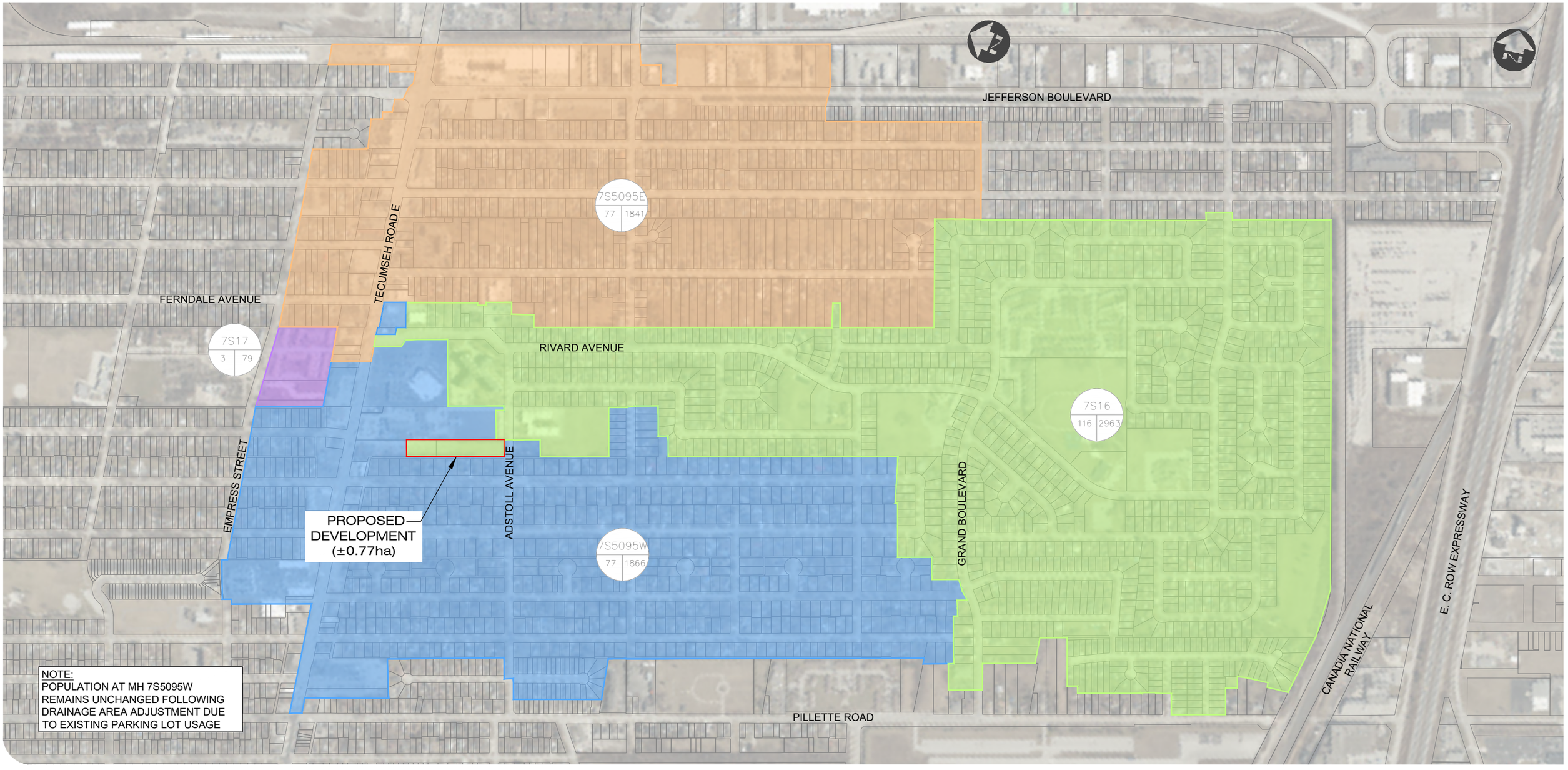
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ALL DIMENSIONS AND BOUNDARY INFORMATION SHOULD BE VERIFIED BY AN O.L.S PRIOR TO CONSTRUCTION.

CREATED BY: JW
CHECKED BY: KNE
DESIGNED BY: JW

SCALE: CUSTOM (11x17)

DILLON CONSULTING

PROJECT: 24-7395
STATUS: FINAL
DATE: 07/27/2026



2679264 ONTARIO INC.
5259 TECUMSEH ROAD EAST
REDEVELOPMENT

SANITARY DRAINAGE AREAS PROPOSED
FIGURE 2.0

SUBJECT SITE

7S5095W - DRAINAGE AREA

7S16 - DRAINAGE AREA

7S5095W - DRAINAGE AREA

7S17 - DRAINAGE AREA

A2
0.67 0.50
DRAINAGE AREA ID
RUNOFF–COEFFICIENT
DRAINAGE AREA (Ha)

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July, 27, 2026 11:15 AM

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CREATED BY: JW
CHECKED BY: KNE
DESIGNED BY: JW

SCALE: CUSTOM (11x17)

DILLON CONSULTING

PROJECT: 24-7395
STATUS: FINAL
DATE: 07/24/2026

DILLON CONSULTING	Sanitary Flow Calculations	Project:	5259 Tecumseh Road East Redevelopment	No.:	24-7395	
	Existing Conditions CSO Analysis	By:	JW	Date:	9/8/2026	Page:
		Checked:	KNE	Scenario:	Existing	1

Expected Flow

	MH 7C25	
Average Daily Flow	0.0042	L/cap/sec
Subject Site	77.71	Ha
Population*	1,866	People
Infiltration	0.28	L/s/Ha
Peaking Factor - CoW	**5.75**	<<
Peaking Factor - Harmon's	3.61	
Average Daily Flow	7.84	L/s
Peak Flow	**66.822**	**L/s**

* Population is based on the 2021 Census data provided by the City of Windsor.

** Using the most conservative value between the Harmon's Formula and the City of Windsor Table

Combined Sewer Overflow (CSO) Analysis

A capacity evaluation was conducted at MH 7C25 to establish the head-discharge relationship between the downstream 250 mm CSO and the 179.128 m overflow weir prior to incorporating downstream backwater impacts.

Q_{Total} = 0.067 m^3/s
Weir Invert = 179.128 m
Pipe Downstream Inv = 178.960 m

$$Q_{Total} = Q_{Weir} + Q_{Pipe}$$

Q_{pipe}

Diameter (D) = 250 *mm*
Length (L) = 6.80 *m*
A_{out} = 0.049 m^2
K = 1.0
n = 0.013

Continuous Pipe Friction Loss

Measures the pressure loss caused by water rubbing against the interior walls over the length of the pipe. It is derived from Manning's Equation:

$$h_f = \frac{10.29 * n^2 * Q^2 * L}{D^{5.333}}$$

$$h_f = \frac{10.29 * 0.013^2 * Q^2 * 6.8}{0.25^{5.333}} = 19.21 * Q^2$$

Minor Loss

Account for energy losses at manholes:

$$h_m = K * \left(\frac{v^2}{2 * g}\right)$$

$$h_m = 1.0 * \left(\frac{Q^2}{2 * 9.81 * 0.049^2}\right) = 21.23 * Q^2$$

$$\Delta EGL = h_f + h_m = 40.44 * Q^2$$

$$Q_{pipe} = \sqrt{\frac{\Delta EGL}{40.44}} = \sqrt{\frac{E_w - 178.96}{40.44}}$$

Q_{weir}

C = 1.84
L = 1.325 m

$$Q_{weir} = C * L * H^{1.5}$$

$$Q_{weir} = 2.438 * (E_w - 179.128)^{1.5}$$

Water Elevation

$$Q_{Total} = 2.438 * (E_w - 179.128)^{1.5} + \sqrt{\frac{E_w - 178.96}{40.44}}$$

E_w =	**179.134**	**m**	
Q_{Pipe} =	**0.066**	***m^3/s***	**65.632** ***L/s***
Q_{Weir} =	**0.001**	***m^3/s***	**1.191** ***L/s***

DILLON CONSULTING	Sanitary Flow Calculations	Project:	5259 Tecumseh Road East Redevelopment	No.:	24-7395	
	Existing Conditions HGL Analysis (Infiltration = 0.28)	By:	JW	Date:	9/8/2026	Page:
		Checked:	KNE	Scenario:	Existing	2

Expected Flow

	MH 7S17		MH 7S5094		MH 7S5095		MH 7C25	
Average Daily Flow	0.0042	L/cap/sec	0.0042	L/cap/sec	0.0042	L/cap/sec	0.0042	L/cap/sec
Subject Site	272.63	Ha	269.65	Ha	154.83	Ha	77.71	Ha
Population*	6,599	People	6,520	People	3,707	People	1,866	People
Infiltration **	0.28	L/s/Ha	0.28	L/s/Ha	0.28	L/s/Ha	0.28	L/s/Ha
Peaking Factor - CoW	**4.50**	<<	**4.50**	<<	**5.20**	<<	**5.75**	<<
Peaking Factor - Harmon's	3.13		3.14		3.36		3.61	
Average Daily Flow	27.72	L/s	27.38	L/s	15.57	L/s	7.84	L/s
Peak Flow	**201.06**	**L/s**	**198.73**	**L/s**	**124.31**	**L/s**	**66.82**	**L/s**

* Population is based on the 2021 Census data provided by the City of Windsor.

HGL Calculation

Starting Boundary Condition at MH 7S18

The 450 mm pipe ends at MH 7S18 and empties into a larger pipe. Assuming free-flowing, non-surcharged downstream conditions. Starting hydraulic grade line is the obvert of the pipe leaving MH 7S18

Lower Invert =	176.080	m
Pipe Diameter =	0.675	m
Starting HGL =	**176.755**	**m**

Hydraulic Grade Line Equation

EGL at MH 7S18

Diameter (D) =	450	*mm*
Q =	0.201	m^3/s
n =	0.013	
A =	0.159	m^2
v =	1.264	m/s
$v^2/2g$ =	0.081	m
$EGL_{7S18\ at\ the\ start\ of\ 450mm}$ =	**176.836**	**m**

$$HGL = EGL - \frac{v^2}{2 * g}$$

$$EGL_{up} = EGL_{down} + h_f + \sum h_m$$

Continuous Pipe Friction Loss

Measures the pressure loss caused by water rubbing against the interior walls over the length of the pipe. It is derived from Manning's Equation:

$$h_f = \frac{10.29 * n^2 * Q^2 * L}{D^{5.333}}$$

Minor Loss

Account for energy losses at manholes:

$$h_m = K * \left(\frac{v^2}{2 * g}\right)$$

Sewer Run	MH 7S18 to 7S17	
Diameter (D) =	450	*mm*
Length (L) =	103.63	*m*
Q =	0.201	m^3/s
n =	0.013	
h_f =	**0.515**	***m***

Manhole	7S17	
Q_{out} =	0.201	m^3/s
n =	0.013	
A_{out} =	0.159	m^2
v_{out} =	1.264	m/s
$v^2/2g$ =	0.081	m
K =	1	
h_m =	**0.081**	**m**

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EGL_{7S17} =	**177.433**	**m**			
HGL_{7S17} =	**177.352**	***m***			
Sewer Run	MH 7S17 to 7S5094		Manhole	7S5094	
Diameter (D) =	450	*mm*	Q_{out} =	0.199	m^3/s
Length (L) =	101.57	*m*	n =	0.013	
Q =	0.199	m^3/s	A_{out} =	0.159	m^2
n =	0.013		v_{out} =	1.250	m/s
h_f =	**0.493**	*m*	$v^2/2g$ =	0.080	m
			K =	1	
			h_m =	**0.080**	**m**
EGL_{7S5094} =	**178.006**	**m**			
HGL_{7S5094} =	**177.926**	***m***			
Sewer Run	MH 7S5094 to 7S5095		Manhole	7S5095	
Diameter (D) =	675	*mm*	Q_{out} =	0.124	m^3/s
Length (L) =	112.5	*m*	n =	0.013	
Q =	0.124	m^3/s	A_{out} =	0.358	m^2
n =	0.013		v_{out} =	0.347	m/s
h_f =	**0.025**	*m*	$v^2/2g$ =	0.006	m
			K =	1	
			h_m =	**0.006**	**m**
EGL_{7S5095} =	**178.036**	**m**			
HGL_{7S5095} =	**178.030**	***m***			
CSO Invert =	178.960	m			
Weir Invert =	179.128	m			

DILLON CONSULTING	Sanitary Flow Calculations	Project:	5259 Tecumseh Road East Redevelopment	No.:	24-7395	
	Proposed Conditions HGL Analysis (Infiltration = 0.28)	By:	JW	Date:	9/8/2026	Page:
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Expected Flow

	MH 7S17		MH 7S5094		MH 7S5095		MH 7C25	
Average Daily Flow	0.0042	L/cap/sec	0.0042	L/cap/sec	0.0042	L/cap/sec	0.0042	L/cap/sec
Subject Site	272.63	Ha	269.65	Ha	154.06	Ha	76.94	Ha
Population*	6,749	People	6,670	People	3,707	People	1,866	People
Infiltration **	0.28	L/s/Ha	0.28	L/s/Ha	0.28	L/s/Ha	0.28	L/s/Ha
Peaking Factor - CoW	**4.50**	<<	**4.50**	<<	**5.20**	<<	**5.75**	<<
Peaking Factor - Harmon's	3.12		3.13		3.36		3.61	
Average Daily Flow	28.35	L/s	28.01	L/s	15.57	L/s	7.84	L/s
Peak Flow	**203.89**	**L/s**	**201.57**	**L/s**	**124.10**	**L/s**	**66.61**	**L/s**

* Population is based on the 2021 Census data provided by the City of Windsor.

HGL Calculation

Starting Boundary Condition at MH 7S18

The 450 mm pipe ends at MH 7S18 and empties into a larger pipe. Assuming free-flowing, non-surcharged downstream conditions. Starting hydraulic grade line is the obvert of the pipe leaving MH 7S18

Lower Invert =	176.080	m
Pipe Diameter =	0.675	m
Starting HGL =	**176.755**	**m**

Hydraulic Grade Line Equation

EGL at MH 7S18

Diameter (D) =	450	*mm*
Q =	0.204	m^3/s
n =	0.013	
A =	0.159	m^2
v =	1.282	m/s
$v^2/2g$ =	0.084	m
$EGL_{7S18\ at\ the\ start\ of\ 450mm}$ =	**176.839**	**m**

$$HGL = EGL - \frac{v^2}{2 * g}$$

$$EGL_{up} = EGL_{down} + h_f + \sum h_m$$

Continuous Pipe Friction Loss

Measures the pressure loss caused by water rubbing against the interior walls over the length of the pipe. It is derived from Manning's Equation:

$$h_f = \frac{10.29 * n^2 * Q^2 * L}{D^{5.333}}$$

Minor Loss

Account for energy losses at manholes:

$$h_m = K * \left(\frac{v^2}{2 * g}\right)$$

Sewer Run	MH 7S18 to 7S17	
Diameter (D) =	450	*mm*
Length (L) =	103.63	*m*
Q =	0.204	m^3/s
n =	0.013	
h_f =	**0.530**	***m***

Manhole	7S17	
Q_{out} =	0.204	m^3/s
n =	0.013	
A_{out} =	0.159	m^2
v_{out} =	1.282	m/s
$v^2/2g$ =	0.084	m
K =	1	
h_m =	**0.084**	**m**

DILLON CONSULTING	Sanitary Flow Calculations	Project:	5259 Tecumseh Road East Redevelopment	No.:	24-7395	
	Proposed Conditions HGL Analysis (Infiltration = 0.28)	By:	JW	Date:	9/8/2026	Page:
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EGL_{7S17} =	**177.452**	**m**			
HGL_{7S17} =	**177.368**	***m***			
Sewer Run	MH 7S17 to 7S5094		Manhole	7S5094	
Diameter (D) =	450	*mm*	Q_{out} =	0.202	m^3/s
Length (L) =	101.57	*m*	n =	0.013	
Q =	0.202	m^3/s	A_{out} =	0.159	m^2
n =	0.013		v_{out} =	1.267	m/s
h_f =	**0.507**	*m*	$v^2/2g$ =	0.082	m
			K =	1	
			h_m =	**0.082**	**m**
EGL_{7S5094} =	**178.041**	**m**			
HGL_{7S5094} =	**177.960**	***m***			
Sewer Run	MH 7S5094 to 7S5095		Manhole	7S5095	
Diameter (D) =	675	*mm*	Q_{out} =	0.124	m^3/s
Length (L) =	112.5	*m*	n =	0.013	
Q =	0.124	m^3/s	A_{out} =	0.358	m^2
n =	0.013		v_{out} =	0.347	m/s
h_f =	**0.025**	*m*	$v^2/2g$ =	0.006	m
			K =	1	
			h_m =	**0.006**	**m**
EGL_{7S5095} =	**178.072**	**m**			
HGL_{7S5095} =	**178.066**	***m***			
CSO Invert =	178.960	m			
Weir Invert =	179.128	m			

Expected Flow

	MH 7C25	
Average Daily Flow	0.0042	L/cap/sec
Subject Site	76.94	Ha
Population*	1,866	People
Infiltration **	0.28	L/s/Ha
Peaking Factor - CoW	**5.75**	<<
Peaking Factor - Harmon's	3.61	
Average Daily Flow	7.84	L/s
Peak Flow	**66.607**	**L/s**

* Population is based on the 2021 Census data provided by the City of Windsor.

** Infiltration of 1.0 L/sec/ha was considered in peak flow calculation as recommended by City of Windsor SCFPMP report.

Combined Sewer Overflow (CSO) Analysis

A capacity evaluation was conducted at MH 7C25 to establish the head-discharge relationship between the downstream 250 mm CSO and the 179.128 m overflow weir prior to incorporating downstream backwater impacts.

Q_{Total} = 0.067 m^3/s
Weir Invert = 179.128 m
Pipe Downstream Inv = 178.960 m

$$Q_{Total} = Q_{Weir} + Q_{Pipe}$$

Q_{pipe}

Diameter (D) = 250 *mm*
Length (L) = 6.80 *m*
A_{out} = 0.049 m^2
K = 1.0
n = 0.013

Continuous Pipe Friction Loss

Measures the pressure loss caused by water rubbing against the interior walls over the length of the pipe. It is derived from Manning's Equation:

$$h_f = \frac{10.29 * n^2 * Q^2 * L}{D^{5.333}}$$

$$h_f = \frac{10.29 * 0.013^2 * Q^2 * 6.8}{0.25^{5.333}} = 19.21 * Q^2$$

Minor Loss

Account for energy losses at manholes:

$$h_m = K * \left(\frac{v^2}{2 * g}\right)$$

$$h_m = 1.0 * \left(\frac{Q^2}{2 * 9.81 * 0.049^2}\right) = 21.23 * Q^2$$

$$\Delta EGL = h_f + h_m = 40.44 * Q^2$$

$$Q_{pipe} = \sqrt{\frac{\Delta EGL}{40.44}} = \sqrt{\frac{E_w - 178.96}{40.44}}$$

Q_{weir}

C = 1.84
L = 1.325 m

$$Q_{weir} = C * L * H^{1.5}$$

$$Q_{weir} = 2.438 * (E_w - 179.128)^{1.5}$$

Water Elevation

$$Q_{Total} = 2.438 * (E_w - 179.128)^{1.5} + \sqrt{\frac{E_w - 178.96}{40.44}}$$

E_w =	**179.134**	**m**	
Q_{Pipe} =	**0.066**	***m^3/s***	**65.546** ***L/s***
Q_{Weir} =	**0.001**	***m^3/s***	**1.061** ***L/s***

Appendix G

Sensitivity Analysis – SCFPMP Extraneous Flow Criteria

DILLON CONSULTING	Sanitary Flow Calculations	Project:	5259 Tecumseh Road East Redevelopment	No.:	24-7395	
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Expected Flow	MH 7C25	
Average Daily Flow	0.0042	L/cap/sec
Subject Site	77.71	Ha
Population*	1,866	People
Infiltration **	1	L/s/Ha
Peaking Factor - CoW	**5.75**	<<
Peaking Factor - Harmon's	3.61	
Average Daily Flow	7.84	L/s
Peak Flow	**122.773**	**L/s**

* Population is based on the 2021 Census data provided by the City of Windsor.

** Infiltration of 1.0 L/sec/ha was considered in peak flow calculation as recommended by City of Windsor SCFPMP report.

Combined Sewer Overflow (CSO) Analysis

A capacity evaluation was conducted at MH 7C25 to establish the head-discharge relationship between the downstream 250 mm CSO and the 179.128 m overflow weir prior to incorporating downstream backwater impacts.

Q_{Total} =	0.12	m^3/s
Weir Invert =	179.128	m
Pipe Downstream Inv =	178.960	m

$$Q_{Total} = Q_{Weir} + Q_{Pipe}$$

Q_{pipe}

Diameter (D) =	250	*mm*
Length (L) =	6.80	*m*
A_{out} =	0.049	m^2
K =	1.0	
n =	0.013	

Continuous Pipe Friction Loss

Measures the pressure loss caused by water rubbing against the interior walls over the length of the pipe. It is derived from Manning's Equation:

$$h_f = \frac{10.29 * n^2 * Q^2 * L}{D^{5.333}}$$

$$h_f = \frac{10.29 * 0.013^2 * Q^2 * 6.8}{0.25^{5.333}} = 19.21 * Q^2$$

Minor Loss

Account for energy losses at manholes:

$$h_m = K * \left(\frac{v^2}{2 * g}\right)$$

$$h_m = 1.0 * \left(\frac{Q^2}{2 * 9.81 * 0.049^2}\right) = 21.23 * Q^2$$

$$\Delta EGL = h_f + h_m = 40.44 * Q^2$$

$$Q_{pipe} = \sqrt{\frac{\Delta EGL}{40.44}} = \sqrt{\frac{E_w - 178.96}{40.44}}$$

Q_{weir}

C =	1.84	
L =	1.325	m

$$Q_{weir} = C * L * H^{1.5}$$

$$Q_{weir} = 2.438 * (E_w - 179.128)^{1.5}$$

Water Elevation

$$Q_{Total} = 2.438 * (E_w - 179.128)^{1.5} + \sqrt{\frac{E_w - 178.96}{40.44}}$$

E_w =	**179.199**	**m**
Q_{Pipe} =	**0.077**	**m^3/s**
Q_{Weir} =	**0.046**	**m^3/s**

Expected Flow

Drainage Area*	MH 7S17	MH 7S5094	MH 7S5095	MH 7C25
Average Daily Flow	0.0042 L/cap/sec	0.0042 L/cap/sec	0.0042 L/cap/sec	0.0042 L/cap/sec
Subject Site	194.92 Ha	191.94 Ha	77.12 Ha	77.71 Ha
Population**	4,733 People	4,654 People	1,841 People	1,866 People
Infiltration ***	1 L/s/Ha	1 L/s/Ha	1 L/s/Ha	1 L/s/Ha
Peaking Factor - CoW	**4.92** <<	**4.92** <<	**5.75** <<	**5.75** <<
Peaking Factor - Harmon's	3.27	3.27	3.61	3.61
Average Daily Flow	19.88 L/s	19.55 L/s	7.73 L/s	7.84 L/s
Peak Flow	**292.72 L/s**	**288.11 L/s**	**121.58 L/s**	**122.77 L/s**

* Excluding Drainage area and population from the comined sewer from MH 7C25
** Population is based on the 2021 Census data provided by the City of Windsor.
*** Infiltration of 1 L/sec/ha was considered in peak flow calculation as recommended by City of Windsor SCFPMP report.

Peak Sanitary Flow - Including Flows From Combined Sewer

Q_{7C25} =	-0.008	m^3/s	MH 7C25 to 7S5095
Q_{7S5095} =	0.113	m^3/s	MH 7S5095 to 7S5094
Q_{7S5094} =	0.280	m^3/s	MH 7S5094 to 7S17
Q_{7S17} =	0.284	m^3/s	MH 7S17 to 7S18

Starting Boundary Condition at MH 7S18

The 450 mm pipe ends at MH 7S18 and empties into a larger pipe. Assuming free-flowing, non-surcharged downstream conditions. Starting hydraulic grade line is the obvert of the pipe leaving MH 7S18

Lower Invert =	176.080	m
Pipe Diameter =	0.675	m
Starting HGL =	**176.755**	**m**

Hydraulic Grade Line Equation - Working Upstream

EGL at MH 7S18

Diameter (D) =	450	*mm*
Q =	0.284	m^3/s
n =	0.013	
A =	0.159	m^2
v =	1.787	m/s
$v^2/2g$ =	0.163	m
$EGL_{7S18\ at\ the\ start\ of\ 450mm}$ =	**176.918**	**m**

$$HGL = EGL - \frac{v^2}{2 * g}$$

$$EGL_{up} = EGL_{down} + h_f + \sum h_m$$

Continuous Pipe Friction Loss

Measures the pressure loss caused by water rubbing against the interior walls over the length of the pipe. It is derived from Manning's Equation:

$$h_f = \frac{10.29 * n^2 * Q^2 * L}{D^{5.333}}$$

Minor Loss

Account for energy losses at manholes:

$$h_m = K * \left(\frac{v^2}{2 * g}\right)$$

Sewer Run	MH 7S18 to 7S17
Diameter (D) =	450 *mm*
Length (L) =	103.63 *m*
Q =	0.284 m^3/s
n =	0.013
h_f =	**1.029** ***m***

Manhole	7S17
Q_{out} =	0.284 m^3/s
n =	0.013
A_{out} =	0.159 m^2
v_{out} =	1.787 m/s
$v^2/2g$ =	0.163 m
K =	1
h_m =	**0.163 m**

EGL_{7S17} =	**178.110**	**m**
HGL_{7S17} =	**177.947**	***m***

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Sewer Run	MH 7S17 to 7S5094	Manhole	7S5094
Diameter (D) =	450 *mm*	Q_{out} =	0.280 m^3/s
Length (L) =	101.57 *m*	n =	0.013
Q =	0.280 m^3/s	A_{out} =	0.159 m^2
n =	0.013	v_{out} =	1.758 m/s
h_f =	**0.976** *m*	$v^2/2g$ =	0.158 m
		K =	1
		h_m =	**0.158 m**

EGL_{7S5094} =	**179.244 m**
HGL_{7S5094} =	**179.086 *m***

Sewer Run	MH 7S5094 to 7S5095	Manhole	7S5095
Diameter (D) =	675 *mm*	Q_{out} =	0.113 m^3/s
Length (L) =	112.5 *m*	n =	0.013
Q =	0.113 m^3/s	A_{out} =	0.358 m^2
n =	0.013	v_{out} =	0.316 m/s
h_f =	**0.020** *m*	$v^2/2g$ =	0.005 m
		K =	1
		h_m =	**0.005 m**

EGL_{7S5095} =	**179.269 m**
HGL_{7S5095} =	**179.264 *m***

Sewer Run	(Q_{pipe}) MH 7S5095 to 7C25	Manhole	7C25
Diameter (D) =	250 *mm*	Q_{out} =	-0.008 m^3/s
Length (L) =	5.50 *m*	n =	0.013
Q =	-0.008 m^3/s	A_{out} =	0.049 m^2
n =	0.013	v_{out} =	-0.173 m/s
h_f =	**0.001** *m*	$v^2/2g$ =	0.002 m
		K =	1
		h_m =	**0.002 m**

EGL_{7C25} =	**179.272 m**
HGL_{7C25} =	**179.271 *m***

Flow over Weir

Q_{total} =	0.123 m^3/s	$Q_{Total} = Q_{Weir} + Q_{Pipe}$
Weir Invert =	179.128 m	
C =	1.84	$Q_{weir} = C * L * H^{1.5} = 2.438 * (HGL_{7C25} - 179.128)^{1.5}$
L =	1.325 m	
Q_{weir} =	**0.131 m^3/s**	
H =	**0.143 m**	
HGL_{7C25} =	**179.271 m**	

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		Checked:	KNE	Scenario:	Proposed	4

Expected Flow

Drainage Area*	MH 7S17		MH 7S5094		MH 7S5095		MH 7C25	
Average Daily Flow	0.0042	L/cap/sec	0.0042	L/cap/sec	0.0042	L/cap/sec	0.0042	L/cap/sec
Subject Site	195.69	Ha	192.71	Ha	77.12	Ha	76.94	Ha
Population**	4,883	People	4,804	People	1,841	People	1,866	People
Infiltration ***	1	L/s/Ha	1	L/s/Ha	1	L/s/Ha	1	L/s/Ha
Peaking Factor - CoW	**4.92**	<<	**4.92**	<<	**5.75**	<<	**5.75**	<<
Peaking Factor - Harmon's	3.25		3.26		3.61		3.61	
Average Daily Flow	20.51	L/s	20.18	L/s	7.73	L/s	7.84	L/s
Peak Flow	**296.59**	**L/s**	**291.98**	**L/s**	**121.58**	**L/s**	**122.00**	**L/s**

* Excluding Drainage area and population from the comined sewer from MH 7C25

** Population is based on the 2021 Census data provided by the City of Windsor.

*** Infiltration of 1 L/sec/ha was considered in peak flow calculation as recommended by City of Windsor SCFPMP report.

Peak Sanitary Flow - Including Flows From Combined Sewer

Q_{7C25} =	-0.012	m^3/s	MH 7C25 to 7S5095
Q_{7S5095} =	0.109	m^3/s	MH 7S5095 to 7S5094
Q_{7S5094} =	0.280	m^3/s	MH 7S5094 to 7S17
Q_{7S17} =	0.284	m^3/s	MH 7S17 to 7S18

Starting Boundary Condition at MH 7S18

The 450 mm pipe ends at MH 7S18 and empties into a larger pipe. Assuming free-flowing, non-surcharged downstream conditions. Starting hydraulic grade line is the obvert of the pipe leaving MH 7S18

Lower Invert =	176.080	m
Pipe Diameter =	0.675	m
Starting HGL =	**176.755**	**m**

Hydraulic Grade Line Equation - Working Upstream

EGL at MH 7S18

Diameter (D) =	450	*mm*
Q =	0.284	m^3/s
n =	0.013	
A =	0.159	m^2
v =	1.788	m/s
$v^2/2g$ =	0.163	m
$EGL_{7S18\ at\ the\ start\ of\ 450mm}$ =	**176.918**	**m**

$$HGL = EGL - \frac{v^2}{2 * g}$$

$$EGL_{up} = EGL_{down} + h_f + \sum h_m$$

Continuous Pipe Friction Loss

Measures the pressure loss caused by water rubbing against the interior walls over the length of the pipe. It is derived from Manning's Equation:

$$h_f = \frac{10.29 * n^2 * Q^2 * L}{D^{5.333}}$$

Minor Loss

Account for energy losses at manholes:

$$h_m = K * \left(\frac{v^2}{2 * g}\right)$$

Sewer Run	MH 7S18 to 7S17	
Diameter (D) =	450	*mm*
Length (L) =	103.63	*m*
Q =	0.284	m^3/s
n =	0.013	
h_f =	**1.030**	***m***

Manhole	7S17	
Q_{out} =	0.284	m^3/s
n =	0.013	
A_{out} =	0.159	m^2
v_{out} =	1.788	m/s
$v^2/2g$ =	0.163	m
K =	1	
h_m =	**0.163**	**m**

EGL_{7S17} =	**178.111**	**m**
HGL_{7S17} =	**177.948**	***m***

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Sewer Run	MH 7S17 to 7S5094	Manhole	7S5094
Diameter (D) =	450 *mm*	Q_{out} =	0.280 m^3/s
Length (L) =	101.57 *m*	n =	0.013
Q =	0.280 m^3/s	A_{out} =	0.159 m^2
n =	0.013	v_{out} =	1.759 m/s
h_f =	**0.977** *m*	$v^2/2g$ =	0.158 m
		K =	1
		h_m =	**0.158 m**

EGL_{7S5094} = 179.247 m
HGL_{7S5094} = 179.089 *m*

Sewer Run	MH 7S5094 to 7S5095	Manhole	7S5095
Diameter (D) =	675 *mm*	Q_{out} =	0.109 m^3/s
Length (L) =	112.5 *m*	n =	0.013
Q =	0.109 m^3/s	A_{out} =	0.358 m^2
n =	0.013	v_{out} =	0.306 m/s
h_f =	**0.019** *m*	$v^2/2g$ =	0.005 m
		K =	1
		h_m =	**0.005 m**

EGL_{7S5095} = 179.270 m
HGL_{7S5095} = 179.266 *m*

Sewer Run	(Q_{pipe}) MH 7S5095 to 7C25	Manhole	7C25
Diameter (D) =	250 *mm*	Q_{out} =	-0.012 m^3/s
Length (L) =	5.50 *m*	n =	0.013
Q =	-0.012 m^3/s	A_{out} =	0.049 m^2
n =	0.013	v_{out} =	-0.249 m/s
h_f =	**0.002** *m*	$v^2/2g$ =	0.003 m
		K =	1
		h_m =	**0.003 m**

EGL_{7C25} = 179.276 m
HGL_{7C25} = 179.273 *m*

Flow over Weir

Q_{total} =	0.122 m^3/s
Weir Invert =	179.128 m
C =	1.84
L =	1.325 m
Q_{weir} =	**0.134 m^3/s**
H =	**0.145 m**
HGL_{7C25} =	**179.273 m**

$$Q_{Total} = Q_{Weir} + Q_{Pipe}$$

$$Q_{weir} = C * L * H^{1.5} = 2.438 * (HGL_{7C25} - 179.128)^{1.5}$$