

1095 Kingston Road Ltd. c/o Resident

FUNCTIONAL SERVICING AND STORMWATER MANAGEMENT REPORT

**1095 Kingston Road
Zoning Bylaw Amendment Application
Version: 1st Submission**

Date: March 24, 2025



EXECUTIVE SUMMARY

This Functional Servicing and Stormwater Management Report ('FSSR') has been prepared to support a Zoning Bylaw Amendment ('ZBA') application for the site municipally known as 1095 Kingston Road, Pickering, Ontario, L1V 1T9 (referred to as 'the site') and is owned by 1095 Kingston Road Ltd. The report has been prepared on behalf of the applicant Resident (or 'client').

The overall proposed 2.08 ha site is to include 2 Residential buildings, each building having two towers and connected via a podium. There is a 14m MTO setback along the south borders of the site adjacent to Highway 401. A 12m-14m wide municipal servicing easement exists along the west and rear of the property, between the MTO setback and the proposed development. An additional 6m wide Regional multi-use path is proposed to run adjacent to the Regional servicing easement. Currently, a rail corridor flanks the site to the west, Kingston Road to the north and Dixie Road to the east. For clarity, the built form is as follows:

- Building 1A: 35 storey tower - residential use building (295 units),
- Building 1B: 35 storey tower - residential use building (295 units).
- Building 1 Podium: 8 storey podium - residential use building (131 units).
- Building 2A: 35 storey tower - residential use building (319 units).
- Building 2B: 35 storey tower - residential use building (319 units).
- Building 2 Podium: 6 storey podium - residential use building (133 Units)

The re-development will provide for 1,492 new residential units and multi-leveled parking both below grade in the underground (1 level) and above grade in a parking deck.

Water Servicing:

The adjacent municipal roadways contain watermain lines that are of a typical size to service the proposed development. The domestic and fire flow water demands were calculated in accordance with Region of Durham criteria and FUS methodology (2020). The flow test was completed on the existing 300mm diameter watermain on Dixie Road. The results of the test indicate that the municipal water distribution system can support the proposed development. To satisfy the requirements of the OBC for buildings exceeding 84m in height, a secondary fire service is required to the site. To facilitate a redundant fire source, a new 300mm dia. municipal watermain is proposed to extend approximately 90m westward along Kingston Road.

Sanitary Servicing:

An existing Regional sanitary trunk sewer (1050mm dia.) is currently located within a municipal servicing easement which flanks the rear of the subject site. A SUE investigation confirmed that the site currently drains to the Regional sanitary trunk sewer in the municipal easement. The development proposal will result in an increase in the equivalent population and peak flow to the City's sewer system, with new connections into the Regional sanitary trunk sewer. Based on discussions with Regional works staff, the sanitary trunk sewer has sufficient capacity to accept the additional flows and a sewer capacity assessment is not required.

Stormwater Servicing:

An existing Municipal storm sewer exists in Kingston Road and Dixie Road. A SUE investigation confirmed that the site currently drains to two separate storm outlets via an existing onsite private storm sewer. Approximately 1.23ha of the site outlets to the existing storm sewer in Kingston Road and the other 0.85ha outlets to the existing storm sewer Dixie Road. The proposed site will have an onsite storm sewer to collect rainwater through a series of area drains and catchbasins which direct drainage to both of the existing storm outlet, Kingston Road and Dixie Road. The proposed sites stormwater will be controlled and released to allowable predevelopment flows according to their respective outlets. Quantity control will be provided through a stormwater management tank located in the P1 underground. Quality control will be provided by a treatment unit at each storm outlet. The required 5mm water balance requirement will be captured and retained onsite within the stormwater management tank located in the P1 underground and re-used for onsite irrigation.

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Appendix A: Site Plan, Topographic Survey, Locates
 Appendix B: Watermain Demand, Hydrant Flow Test, FUS Calculations
 Appendix C: Sanitary Flow Calculations, Correspondence with Regional Works Staff
 Appendix D: Stormwater Management Modelling and Calculations

INTRODUCTION

1.1 BACKGROUND

This Functional Servicing and Stormwater Management Report ('FSSR') has been prepared to support a Zoning Bylaw Amendment ('ZBA') application for the site municipally known as 1095 Kingston Road, Pickering, Ontario, L1V 1T9 (referred to as 'the site') and is owned by 1095 Kingston Road Ltd. The report has been prepared on behalf of the applicant Resident (or 'client').

The existing site consists of a single storey retail plaza building with multiple units. The remainder of the site consists of paved parking areas with some minimal landscaping along the west perimeter of the site. The existing site access is from three separate vehicular entrances off Dixie Road.

The overall proposed 2.08 ha site is to include 2 Residential buildings, each building having two towers and connected via a podium. There is a 14m MTO setback along the south borders of the site adjacent to Highway 401. A 12m-14m wide municipal servicing easement exists along the west and south flanks of the property, between the MTO setback and the proposed development. An additional 6m wide Regional multi-use path is proposed to run adjacent to the Regional servicing easement. For clarity, the built form is as follows:

- Building 1A: 35 storey tower - residential use building (295 units),
- Building 1B: 35 storey tower - residential use building (295 units).
- Building 1 Podium: 8 storey podium - residential use building (131 units).
- Building 2A: 35 storey tower - residential use building (319 units).
- Building 2B: 35 storey tower - residential use building (319 units).
- Building 2 Podium: 6 storey podium - residential use building (133 Units)

The re-development will provide for 1,492 new residential units and multi-leveled parking both below grade in the underground (1 level) and above grade in a parking deck.

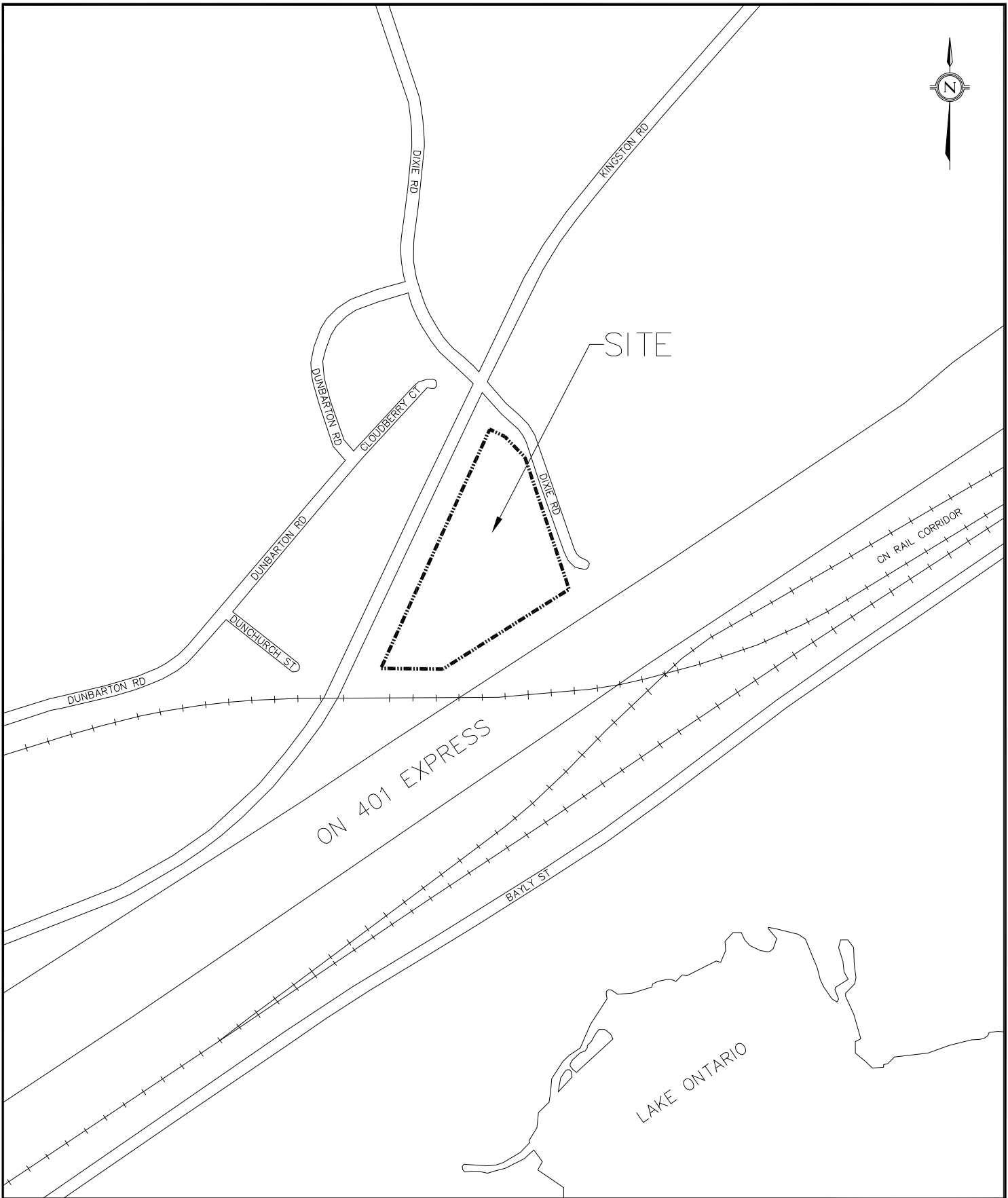
The proposed development will be constructed in a single phase.

The proposed development is bound by Kingston Road to the north, a CN Rail track and corridor to the west, Highway 401 to the south, and Dixie Road to the east. Refer to **Figure 1 – Site Location** for illustrations of the subject site within the context of its surroundings.

1.2 STUDY PARAMETERS

This servicing assessment is based on:

- Topological Survey, By Holding Jones Vanderveen Inc., dated November 6, 2023
- Buried Utility Map, by Mark It Located Inc, dated January 12, 2024
- Design Specifications for Sanitary Sewers, The Regional Municipality of Durham, Works Department, April 2023.
- Design Specifications for Watermain, The Regional Municipality of Durham, Works Department, April 2023.
- Engineering Design Criteria, Storm Sewers and Appurtenances, Pickering, January 2020.
- Plan and Profile Drawings, City of Pickering.
- Existing Site Servicing and Site Grading Plan drawings, Sabourin Kimble & Associates Limited, dated January 12, 1994
- Fire Underwriters Survey, 2020
- Architectural Plans, by Quadrangle Architects Limited
- Hydrant Flow Tests, by Lozzi Aqua Check, dated Oct 16, 2024.



SITE LOCATION PLAN

counterpoint
ENGINEERING

COUNTERPOINT ENGINEERING INC.
8395 Jane St., Suite 100, Vaughan, ON L4K 5Y2 Phone 905.326.1404 Fax 905.326.1405

**DEVELOPMENT PROJECT
AT 1095 KINGSTON RD**

PICKERING, ONTARIO, CANADA

DRAWING BY: DD	DATE: FEBRUARY 2025
CHECKED BY: GD	PROJECT NO.: 23062
SCALE: N.T.S.	FIGURE NO.: 1

WATER SUPPLY

1.3 EXISTING WATER SUPPLY

The adjacent municipal roadways contain available watermain servicing, as follows:

- Kingston Road:
 - 300mm diameter distribution watermain, South side of Kingston Road and continues east of Dixie Road but terminates westward at the intersection with Dixie Road
- Dixie Road:
 - 300mm diameter distribution watermain, East side of Dixie Road and terminates at the cul-de-sac at the south end of Dixie Road

Three existing municipal fire hydrants are available adjacent to the subject property along the Dixie Road Frontage.

1.4 PROPOSED WATER SUPPLY

The site is proposed to have 1 watermain connection to service the private development. The private connection is to be serviced, from the existing 300mm diameter watermain in Dixie Road, by a 200mm diameter fire service and one independent 150mm diameter domestic connection. The private servicing will also require a second dedicated fire connection as required by the Ontario Building Code (“OBC”) since the proposed buildings are above 84m high.

However, the secondary fire connection is not able to service the site independently of the proposed connections as required by the Region and the OBC. This is due to the Dixie Road watermain terminating at the cul-de-sac and no available existing watermain in Kingston Road along the frontage of the site.

Discussions with Regional Works staff identified a possible solution with the future development of the lands to the east of Dixie Road which propose to loop the existing 300mm dia. Dixie Road watermain through the future extension of Walnut Lane. However, the timing of this watermain loop is unknown and an alternative solution should be explored to provide a viable servicing option in the case the proposed development commences ahead of the Walnut Lane extension.

To determine a viable solution, the Regional water distribution mapping was studied to develop alternative servicing options. Upon detailed review, it was determined that to mitigate the lack of an adequate secondary firemain source, a new 300mm dia. municipal watermain is proposed to extend along the north side of the Kingston Road ROW. The new municipal watermain will extend approximately 90m westward and terminate with a hydrant and valve at the end of the line. This new watermain can act independently from the proposed site service connection allowing for adequate fire servicing provisions for the site. Refer to drawing **CSP1-Concept Servicing Plan** for the location and configuration of the proposed municipal watermain.

The watermain connections are broken down as follows in **Table 1**:

Table 1: Proposed Water Connection Locations

TOWER/BLDG.	MUNICIPAL MAIN	CONNECTION TYPE	2 ND FIRE CONNECTION (> 84M HIGH)	DOM. LATERAL SIZES (MM)	FIRE LATERAL SIZES (MM)
All Towers + Podium	Dixie Road – Ex. 300mm dia. & Kingston Road – prop. 300mm dia.	Tapping sleeve connection from 300mm dia. Distribution main	Yes	150	200

Refer to drawing **CSP1-Concept Servicing Plan** for the site servicing layout.

The Region of Durham’s design criteria states that the water demand used for watermain size selection should be sufficient to satisfy, the greater of, the maximum day demand plus the fire flow or the maximum hour demand. Fire flow for the residential area will not be less than 4500 L/min, delivered with a residential pressure of not less than 140kPa or 275kPa under normal operating conditions. Fire demand was calculated as per the Fire Under Survey (FUS).

Domestic water demands were calculated using a per capita rate of 190 litres/person/day and peaked in accordance with proposed land use. The proposed land use will contain 1,492 residential units, generating an equivalent residential population of 2,912 persons. The fire demand for both Building 1 and Building 2 was calculated and the largest required fire flow between the two buildings would govern. Fire Under Survey (FUS) parameters were determined based on the 2020 Water Supply for Public Fire Protection guidelines. FUS fire demands were tabulated for each building on the site. The governing parameters were then used to calculate the water demand for the site. The governing building on site is Building 1. The resulting domestic and fire flow demands for the entire site are as follows in Table 2: Summary of Water Demand. Full calculations can be seen in **Appendix B**.

Table 2: Summary of Water Demands

DAILY DEMAND (L/S)	MAX. DAY DEMAND(L/S)	PEAK HOUR (L/S)	FIRE FLOW (L/S)	MAX. DAY + FF (L/S)
6.40	8.32	16.01	166.67	174.99

A hydrant flow test was completed by Lozzi Aqua Check on October 16, 2024 on the existing 300mm diameter watermain in Dixie Road. The results are as follows in **Table 3**:

Table 3: Hydrant Flow Test Results

TEST NO.	WATERMAIN	STATIC PRESSURE (PSI)	FLOW AT 20PSI (L/S)	GREATER THAN DEMAND?
1	Dixie Road – 300mm	79	387.67	Yes

As such, for each connection, the available flow in the municipal system at 20 psi/140 kPa exceeds the calculated maximum day plus fire flow demand rate. The municipal water systems can sufficiently support the proposed development. Refer to **Appendix B** for all water demand calculations and flow test results.

GROUNDWATER MANAGEMENT

A Permit to Take Water (PTTW) from the Ontario Ministry of the Environment, Conservation and Parks (MECP) is required for short term water taking over 400 m³/day. An Environmental Activity and Sector Registry (EASR) is required from the MECP for short term water taking between 50 m³/day and 400 m³/day. Groundwater taking from a proposed building structure by means of a PWDS will require a PTTW when water taking is greater than **50m³/day**. Additionally, a Discharge Permit is required from the City of Pickering for temporary and long-term discharges to the municipal sewer system.

A hydrogeological investigation was prepared by Grounded Engineering Inc., dated March 2025 for the proposed development

1.5 SHORT TERM (CONSTRUCTION)

Quantity – Maximum construction groundwater rates are expected to be approximately **1,638,000 L/day (18.96 L/s)** for the site assuming a raft foundation. This rate can be reduced to approximately **378,000 L/day (4.38 L/s)** if a conventional slab/grade beam foundation is chosen. These rates include the removal of a 25mm rainfall event over the area of the excavation for the development site. At the time of construction, the dewatering values represent an open excavation across the entirety of the proposed development site (single phase construction). The total short-term groundwater rate is less than the post-development sanitary release flows to the sanitary sewer outlet (**42.9 L/s**). The short-term discharge to the sanitary sewer system will cease before the site is occupied.

Quality – The sampled groundwater currently meets the allowable concentrations for discharge to the sanitary sewer.

The hydrogeological report has been provided under a separate cover as part of the submission.

1.6 LONG TERM DISCHARGE

Quantity – The report indicates the lowest elevation of the private water drainage system (PWDS) is above the highest elevation of the ground water and therefore no ground water will enter the system. However, infiltrated stormwater from rainfall events is expected to enter the PWDS. A long-term discharge rate of **20,000 L/day (0.23 L/s)** is estimated for the entire development site and consist solely of infiltrated

stormwater. A permit with the Municipality will be required for the Long-Term Discharge of Private Water. A Permit to Take Water (PTTW) is not required to be obtained from the MECP for the site considering the estimated long-term discharge is less than **50m³/day**.

The owner will utilize a sub-floor Permanent Drainage System (PDS). Foundation drainage will be collected in a sump and discharge to the Dixie Road storm sewer via the Storm Control Maintenance Access. A groundwater sump pump capable of discharging the required **0.23 L/s** of infiltrated ground water will be sized by a mechanical engineer at the time of SPA. This rate has been considered in the stormwater analysis (under **Section 1.12**) for the purpose of capacity analysis.

Quality – The report indicated that only infiltrated stormwater will be collected by the PWDS and therefore groundwater quality samples do not apply. Infiltrated stormwater is considered clean runoff. A sampling port will be installed at ground level to ensure quality and quantity control is maintained.

1.7 SOURCE WATER PROTECTION

According to available source water protection mapping (Durham Region Official Plan Map 2G) a small portion of the site at the northeast corner is located within a Highly Vulnerable Aquifer ('HVA'). According to Regional data, the site is not designated as a High-Risk Land Use and is therefore subject to the following criteria:

- I. Policy 10.8 (a)(iii) – Snow storage is required to be located on impervious surfaces that drain to the storm sewer system and prevent salt run-off into the soil.
- II. Policy 10.13(g) – A Salt Management Plan will be required at the site plan approval stage.

Considering the HVA is only a small portion of the corner of the site and the site is not designated as High-Risk, the impact from the development is expected to be minimal. Please refer to the Hydro-Geotechnical report prepared by Grounded Engineering (provided under sperate cover) for additional details regarding source water protection and impacts to the HVA.

Mitigation – Regarding policy items I & II above, site servicing will be designed to mitigate the effects of salt runoff onsite. The traveled portions of the development (roads/sidewalks) which are vulnerable to salt runoff are all proposed to be captured by the sites stormwater management system which discharges to the municipal storm sewer network. Additionally, the developed portion of the site is contained within the footprint of the underground parking structure meaning any snow storage onsite capable of producing salt runoff, if by-passing the site storm system, will ultimately filter to the P1 slab drainage system rather than the soil beneath the foundation. Specified snow storage locations will be identified by the architect on the site plan.

SANITARY SERVICING

1.8 EXISTING SANITARY SERVICING

The site is currently serviced by one private 150mm sanitary service connection to the existing 1050mm dia. Regional sanitary trunk sewer located at the rear of the subject site and directly flows eastward. The existing sanitary service ultimately discharges a flow of 3.37 L/s to the existing 1050mm sanitary sewer. Refer to **Appendix C** for detailed calculations of the sites existing sanitary discharge.

1.9 PROPOSED SANITARY SERVICING

The proposed development is to have one 250mm diameter sanitary connection into the existing 1050mm dia. Regional sanitary trunk sewer that is located in an easement at the rear of the site. Refer to drawing **CSP1-Concept Servicing Plan** for the site servicing layout.

Table 3: Proposed Sanitary Connection Locations

TOWER/BLDG.	MUNICIPAL MAIN
Private Development	Ex. Regional Sanitary Trunk Sewer – 250mm dia. Service

The proposed development will contain 1,492 total units, generating an equivalent residential population of 2,912 persons. The breakdown of generated sanitary flows from the subject development is as follows in **Table 4**. The net increase in peak flow to the Municipal sewer system is **39.6 L/s**. Refer to **Appendix C** for detailed sanitary calculations.

Table 4: Summary of Sanitary Flows

TOWER/BLDG.	CONNECTION	UNITS	COMMERCIAL AREA (SQ.M.)	EQUIV. RESI POP	PEAK FLOW (L/S)	TOTAL FLOW INCL INFILTRATION (L/S)
Building 1	Trunk Sewer - Easement	721	0	1,392	21.99	42.90
Building 2	Trunk Sewer - Easement	771	0	1,519	23.79	
Total		1,492	0	2,912		

A downstream sanitary sewer capacity analysis is not required for this development because its proposed sanitary service connection is directly into the ex. 1050 sanitary Trunk sewer. per discussions with Region of Durham Works staff, the ex. sanitary sewer is understood to have sufficient capacity to accommodate the wastewater flows from this development. Refer to correspondence included in **Appendix C**.

STORMWATER SERVICING

1.10 EXISTING STORMWATER DRAINAGE

There are two storm sewer systems that service the adjacent municipal roads and properties. Firstly, Kingston Road contains a combination of rural roadside ditches and municipal storm sewers. The drainage from Kingston Road along the frontage of the site drains into the roadside ditch and is conveyed westward to a ditch inlet catchbasin ("DICB"). This DICB is connected to a 650mm dia. Storm sewer that crosses under the CN rail bridge and continues westward. Secondly, there is a storm sewer system in Dixie Road which collects drainage and conveys flows eastward through a servicing easement at the rear of 1099 Kingston Road. This sewer eventually outlets through a headwall into a drainage ditch along the MTO corridor.

The site in its existing condition drains to both storm sewer outlets mentioned above. The north and west portion of the site is collected via onsite catchbasins and conveyed through the private sewer network out to the DICB at the end of the ditch in Kingston Road. The south and east portions of the site are collected via onsite catchbasins and conveyed through the private sewer network out to the existing 525mm dia. Storm sewer in Dixie Road. No existing onsite controls are identified on the site. Refer to **Figure 2: Pre-development Drainage Area Figure** for the existing conditions drainage of catchment area Ex. 100 and Ex. 101.

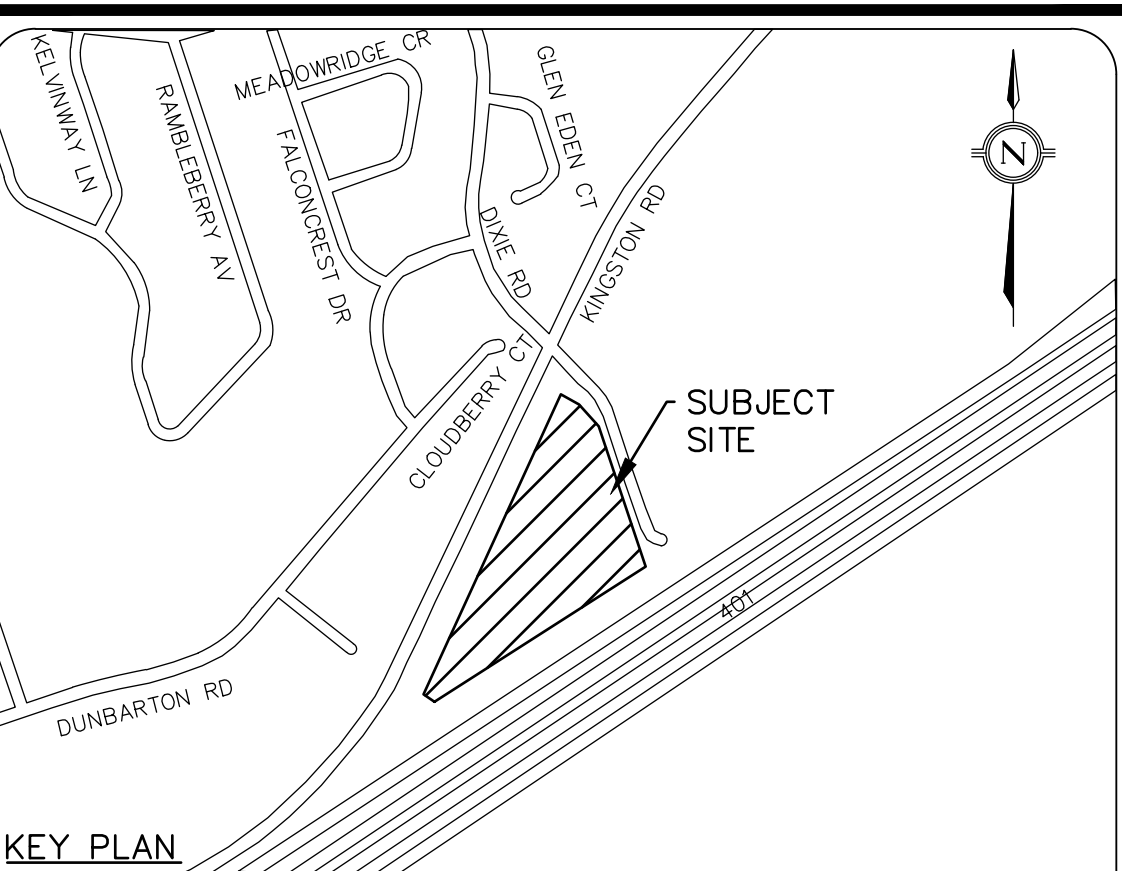
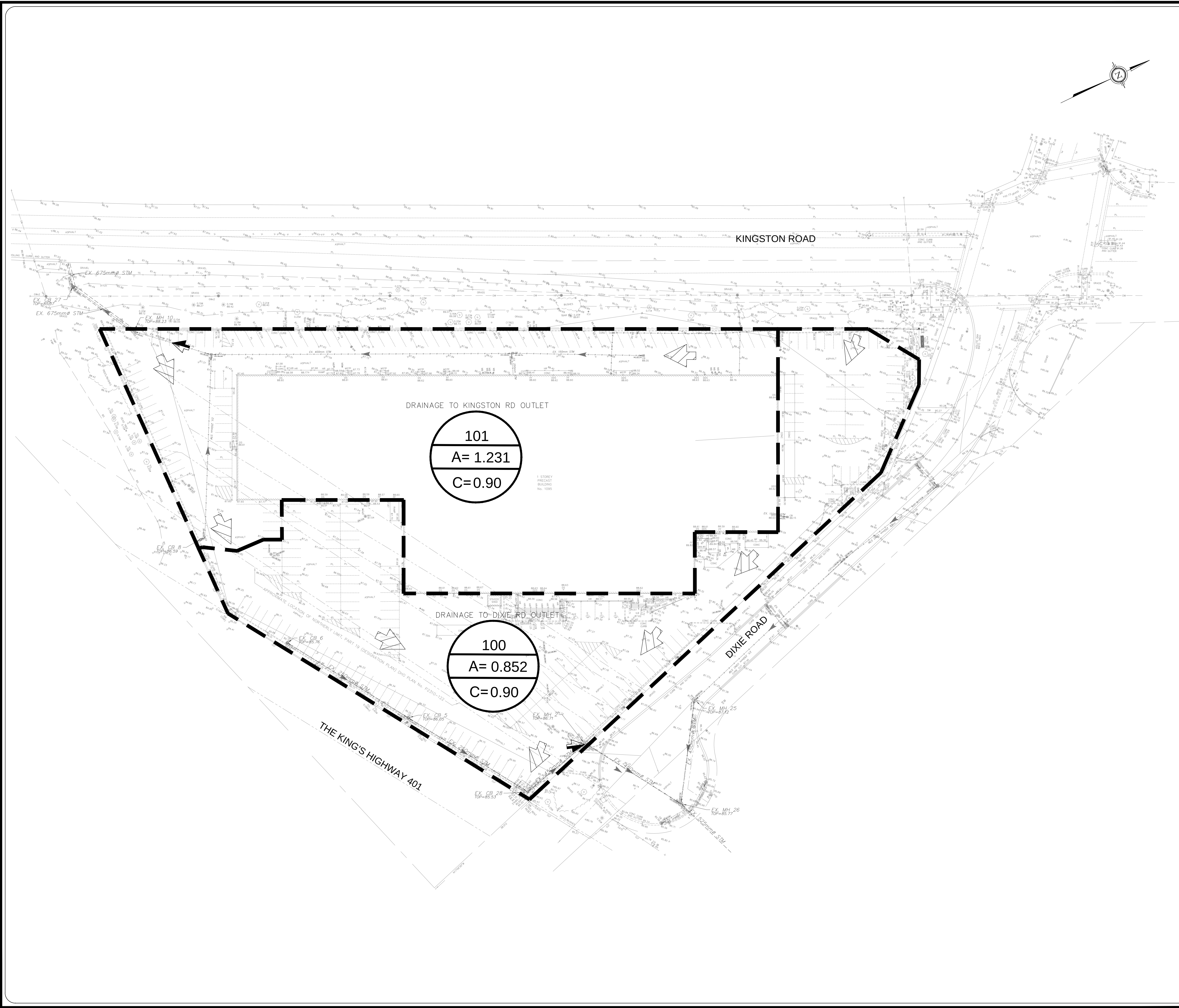
1.11 STORMWATER MANAGEMENT CRITERIA

The French's Bay watershed does not currently have a watershed hydrology study. In accordance with TRCA's Flood Flow Criteria, quantity control is not established for the area. However, the City of Pickering has identified the requirement to control post to pre-development peak flows for the 2 to 100-yr storm events. In addition, the Regional storm event will be assessed to satisfy the MTO criteria.

The following stormwater management criteria were established for the project, based on City design criteria:

- Quantity Control: control all storm events, up to the 100-year design storm event, to the calculated allowable release rate (refer to **Section Error! Reference source not found.2**).
- Quality Control: provide quality control on discharged stormwater such that 80% of total suspended solids ('TSS') are captured on an annual basis.
- Water Balance: infiltrate or re-use runoff generated from a 5mm storm event.

There may be runoff from rainstorms that exceeds the capacity of City's storm sewer service connections. Therefore, the proposed site plan design shall be responsible for providing flood protection or a safe overland flow route for the proposed development without causing damage to the adjacent public and private properties. Overland flow, in excess of the 100-yr storm event will discharge primarily to the site's storm outlets; the MTO Corridor and partially to the Kingston Road and Dixie Road right-of-way. Existing drainage patterns on adjacent properties shall not be altered and stormwater runoff from the subject development shall not be directed to drain onto adjacent properties.



LEGEND

- 100 AREA ID
- A=0.16 DRAINAGE AREA (HECTARES)
- C=0.9 RUNOFF COEFFICIENT
- DRAINAGE AREA BOUNDARY WITHIN THE SITE
- PROPERTY LINE
- LIMIT OF UNDERGROUND
- EXISTING STORM SEWER
- EXISTING STORM MH
- EXISTING CATCHBASIN
- EX. OVERLAND ROUTE FLOW (MAJOR)
- EX. OVERLAND ROUTE FLOW (MINOR)

LEGAL & TOPOGRAPHY

PROVIDED BY: HOLDING JONES VANDERVEEN INC.
1700 LANGSTAFF ROAD, SUITE 1002
VAUGHAN, ON, L4K 3S3
PHONE: 905-650-4000

BENCHMARK AND ELEVATION

ELEVATIONS ARE GEODETIC AND REFERRED TO MINISTRY OF NATURAL RESOURCES AND FORESTRY COSINE BENCHMARK NO. 00820188081 AND HAVING A PUBLISHED ELEVATION OF 84.112 METERS.

02.	ISSUED FOR ZBA #1	24/03/2025	G.D.
01.	ISSUED FOR COORDINATION	18/02/2025	G.D.
No.	REVISIONS/ISSUED	DATE	BY CITY

counterpoint 
ENGINEERING
COUNTERPOINT ENGINEERING INC.
6395 Jane St., Suite 100, Vaughan, ON L4K 3T2 Phone 905.326.1464 Fax 905.326.1405

ENGINEER'S STAMP

APPLICANT:

1095 KINGSTON ROAD LIMITED
22 ST CLAIR AVE E, SUITE 1203
TORONTO, ON M4T 2S5
PHONE: 416 932 6634
CONTACT: NIK PAPAPETROU

SITE LOCATION:

1095 KINGSTON ROAD
PICKERING, ON L1V B15

SITE PLAN FILE No.:

PRE-DEVELOPMENT DRAINAGE FIGURE			
DESIGNED BY: G.D.	CHECKED BY: J.Y.	DATE: DECEMBER 02, 2024	
DRAWING BY: G.D.	CHECKED BY: G.D.	PROJECT NO.	23062
SWM BY: L.R.	CHECKED BY: Y.K.	DRAWING NO.	FIGURE 2
SCALE: 1:500m	0m 10m 20m 30m		

1.12 ALLOWABLE RELEASE RATE

The allowable release rates for the site should be based on existing conditions to match post-development discharge from the site to pre-development levels for the typical range of storm events. Due to the presence of long-term infiltrated stormwater discharge as mentioned in **Section 1.6**, a total of 0.23 L/s was removed from the allowable release rates during design. A Visual OTTHYMO model was set up to model the existing and proposed conditions. Refer to **Table 5** and **Appendix D** for allowable release rate calculations.

Table 5: Allowable Release Rates

STORM EVENT	DIXIE ROAD OUTLET (L/S)	KINGSTON ROAD OUTLET (L/S)
2	46	66
5	59	85
10	68	98
25	79	114
50	88	127
100	96	139

To maintain existing drainage patterns, the new development will continue to utilize the existing outlets in the post-development condition. Both catchment areas, 100 and 101's composite runoff coefficient under existing conditions is 0.90. Furthermore, it has been confirmed that there are no external areas draining to the site and the site currently has no quantity control.

In accordance with the Amberlea Creek Hydrology Study by Aquafor Beech Limited conducted in 2005, Amberlea Creek Watershed was modelled as soil group B (CN=71). Further soil and groundwater information will be available at detailed design

1.13 PROPOSED STORM SERVICING

The site is proposed to have its own storm sewer network which will conveying flows to the sites existing storm outlets. As mentioned in **Section 1.10** above, the site has two existing storm outlets. One outlet to the existing storm sewer in Dixie Road and the second to the existing storm sewer in Kingston Road.

The onsite storm drainage has been subdivided into three distinct contributing areas. Firstly, the south half of the site, which includes Building 1 (Tower 1A, Tower 1B and Podium 1), the storm water will be directed to the Kingston Road storm outlet (area **200**). Secondly, the north half of the site, which includes Building 2 (Tower 2A, Tower 2B and Podium 2) as well as the POPS and site drive isle, the storm water will be directed to the Dixie Road storm outlet (area **201**). Thirdly, the East portion of the site, which includes the Regional servicing easement, Regional multi-use path and MTO setback, the storm water will be directed to the Dixie Road storm outlet through the existing onsite storm system and remain uncontrolled (area **202**). Refer to **Figure 3: Post-Development Drainage Area Figure** for the proposed conditions drainage of catchment areas **200**, **201**, and **202**.

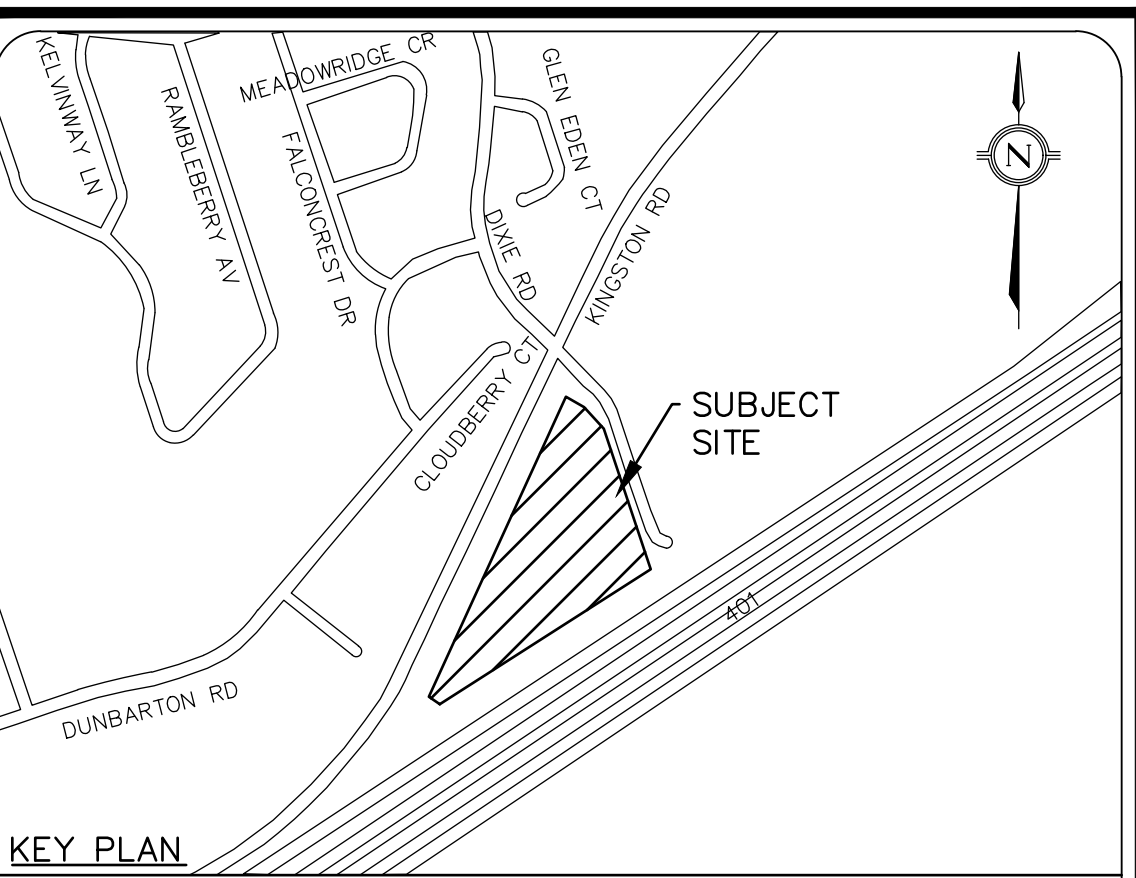
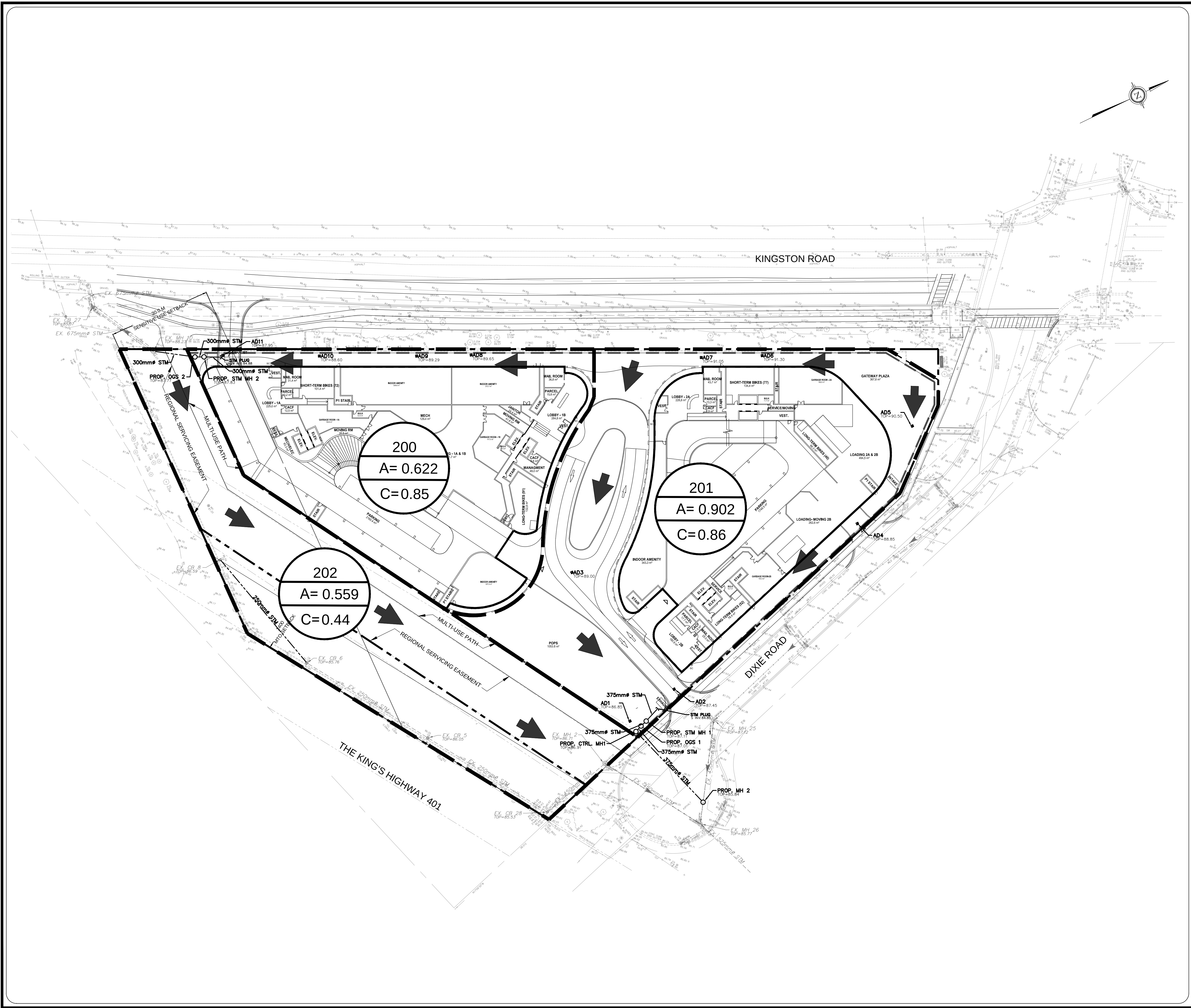
The proposed underground limit of the site covers majority of the developable area (**200 & 201**), so the majority of stormwater will be captured by area drains and conveyed internally through the building via mechanical plumbing system. These drains will be directed to two separate storm sewer outlets, based on literature above, located in the P1 level of the underground. The Kingston Road outlet does not require detention storage and will convey flows from the internal system to the control maintenance hole onsite. The Dixie Road outlet requires stormwater be directed to the stormwater management tank located in the P1 underground where it is stored and released through the control maintenance hole at the allowable rate for the block outlined in **Section 1.12**.

Additionally, within the bounds of area **202** exists a 14.0m MTO setback limit and Regional easements. No development is allowed within this area, however, the stormwater runoff needs to be captured and conveyed to the municipal stormwater system. To meet SWM criteria, the runoff from area **202** is proposed to be conveyed with existing site topography and collected in existing catchbasins which connect into the existing municipal storm sewer network in Dixie Road. This infrastructure is existing and easily decommissioned should the MTO expropriate the land at a future date.

Refer to drawing **CSP1-Concept Servicing Plan** for the storm sewer serving design concept.

The post-development drainage areas are as follows, per **Figure 3: Post-Development Drainage Area Figure**:

- Area **200** (Building 1): 0.622 ha, controlled drainage directed to existing Kingston Road storm outlet.
- Area **201** (Building 2): 0.902 ha, controlled drainage directed to existing Dixie Road storm outlet.
- Area **202** (MTO Setback and Regional Easements): 0.559 ha, un-controlled drainage directed to existing Dixie Road storm outlet.



LEGEND

BLOCK C1
A= 0.60
C=85%

AREA ID
DRAINAGE AREA (HECTARES)
IMPERVIOUSNESS (%)

DRAINAGE AREA BOUNDARY WITHIN THE SITE

DRAINAGE AREA BOUNDARY EXTERNAL TO THE SITE

EXISTING STORM SEWER

EXISTING STORM MH

EXISTING CATCHBASIN

EXISTING PROPERTY LINE

LIMIT OF UNDERGROUND

PROPOSED STORM SEWER

PROPOSED STORM MH/OGS/CB/DCI

PROP. OVERLAND ROUTE FLOW

LEGAL & TOPOGRAPHY
PROVIDED BY: HOLDING JONES VANDERVEEN INC.
1700 LANGSTAFF ROAD, SUITE 1002
VAUGHN, ON, L4K 3S3
PHONE: 905-660-4000

BENCHMARK AND ELEVATION
ELEVATIONS ARE GEODETIC AND REFERRED TO MINISTRY OF NATURAL RESOURCES AND FORESTRY COSINE BENCHMARK NO. 00B20186081 AND HAVING A PUBLISHED ELEVATION OF 84.112 METERS.

02.	ISSUED FOR ZBA #1	24/03/2025	G.D.
01.	ISSUED FOR COORDINATION	18/02/2025	G.D.
No.	REVISIONS/ISSUED	DATE	BY CITY

counterpoint 
ENGINEERING
COUNTERPOINT ENGINEERING INC.
8395 Jane St., Suite 100, Vaughan, ON L4K 5Y2 Phone 905.326.1404 Fax 905.326.1405

ENGINEER'S STAMP

APPLICANT:
1095 KINGSTON ROAD LIMITED
22 ST CLAIR AVE E, SUITE 1203
TORONTO, ON M4T 2S5
PHONE: 416 932 6634
CONTACT: NIK PAPAPETROU

SITE LOCATION:
1095 KINGSTON ROAD
PICKERING, ON L1V B15

SITE PLAN FILE No.:

POST-DEVELOPMENT DRAINAGE FIGURE

DESIGNED BY: G.D.	CHECKED BY: J.Y.	DATE: DECEMBER 02, 2024
DRAWING BY: G.D.	CHECKED BY: G.D.	PROJECT NO. 23062
SWM BY: L.R.	CHECKED BY: Y.K.	DRAWING NO. FIGURE 3

SCALE: 1:500m

0m 10m 20m 30m

1.14 STORMWATER QUANTITY CONTROL

The VISUAL-OTTHYMO Version ('VO6') Model has been employed to analyse the 2-year to 100-year storm events for the preliminary post-development conditions. The design storm events used in this analysis are based on the 12-hour AES storm hyetographs. The proposed site development drainage area of 2.083ha (e.g., consisting of 1.524ha developable site area and 0.559ha MTO Setback Block) has been modelled in VO6 using the STANHYD command with the Modified SCS formula for areas with impervious areas, while the NASHYD command was used to model the MTO Block. The ROUTE RESERVOIR command has been used to model the SWM underground storage.

1.14.1 Kingston Road Outlet

As mentioned in **section 1.13**, catchment Area **200** drains towards the Kingston Road's outlet. Due to the proposed grading, the catchment area has decreased greatly, from 1.231ha to 0.622ha. The presence of landscape within catchments **200** and **201** has also brought the composite runoff coefficient down to 0.85 and 0.86, respectively. As a result of these changes, the uncontrolled outflow from catchment **200** are well below the pre-development conditions, refer to **Table 6**. Therefore, this catchment does not require any quantity control.

Table 6: Kingston Road outlet flows

STORM EVENT	PRE-DEVELOPMENT PEAK FLOW (L/S)	POST-DEVELOPMENT PEAK FLOWS (L/S)
2	66	32
5	85	41
10	98	48
25	114	56
50	127	62
100	139	68

1.14.2 Dixie Road Outlet

The MTO Setback block will contribute uncontrolled peak flows to the outlet, while the development catchment **201** will be controlled to levels that will meet the quantity control criteria through underground storage. Considering there will be only one outflow control, the quantity control facility will be designed to provide enough capacity such that the post-development 100-year peak flow is discharged at a pre-development 5-year release rate. This represents the most conservative volumetric requirements given significant overcontrol. Refer to **Table 7** and **Appendix D** for supporting calculations.

On this basis, the proposed approach will provide significant overcontrol of stormwater that is above and beyond the established criteria.

Table 7: Dixie Road Outlet - Quantity Control and Volumetric Requirements

CATCHMENT AREA	UNCONTROLLED 100-YR PEAK FLOW (L/S)	STORAGE PROVIDED (M ³)	CONTROLLED 100-YR PEAK FLOW (L/S)	TOTAL 100-YR Q POST-DEV (L/S)	TOTAL 5-YR Q PRE-DEV (L/S)
201	99	450	27	59	59
202	33	-	-		

At the detail design stage, a multi-control approach will be analyzed and with its implementation, the size of storage tanks will decrease. For example, a vertical vortex flow regulator control installed downstream of the underground storage unit may be able to achieve the post-development to pre-development control for all storm events with lesser volume.

The 100-yr post-development release rates are below the allowable release rates. This approach also preserves capacity for both short-term and long-term groundwater discharge, as detailed in **Sections 1.5** and **1.6**, thereby satisfying the City's Quantity Control Criteria. There is no major flow discharging from the development blocks as they are controlling the 100-year storm event to drain to minor system.

1.14.3 Regional Storm Conveyance

The regional storm was assessed for both pre- and post-development conditions to satisfy an MTO requirement. Refer to **Table 8** and **Appendix D** for model results and detailed output.

Due to the high imperviousness of the pre-development site and the implementation of landscape at the MTO Setback block, the Regional storm event release rate under the proposed design decreased considerably.

Table 8: Regional Storm Conveyance Summary

SCENARIO	AREA (HA)	TOTAL REGIONAL STORM RELEASE RATE (L/S)
Pre-development to Dixie Road	0.852	125
Post-development to Dixie Road	1.461	115
Pre-development to Kingston Road	1.231	181
Post-development to Kingston Road	0.622	91

1.15 PROPOSED QUALITY CONTROLS

The subject site will be required to provide quality control on discharged stormwater such that 80% of total suspended solids ('TSS') are captured on an annual basis.

Quality control devices such as oil/grit separator ('OGS') units will be proposed at the controlled storm connections for areas **200** and **201**. Preliminary sizing has been completed and will be verified at detailed design. Refer to drawing **CSP1-Concept Servicing Plan**. For area **201**, the Stormceptor EFO4 unit will be located upstream of the proposed stormwater management tank whilst at area **200**, a EFO5 unit will be located upstream of the outlet. Refer to **Appendix D** for quality units sizing.

1.16 WATER BALANCE

The subject site will be required to meet the water balance criteria. The minimum run-off retention requirement is to retain all run-off generated from a small design event, typically classified as a 5mm event.

The water retention volume required for the site is calculated to be **81.0 m³**. Refer to **Table 9** for detailed calculations. The 0.559 ha area of the MTO Setback Block is intended to consist of landscape areas therefore run-off will be infiltrated at similar rates as landscape areas for small storm events.

Table 9: Water Balance Requirements – Volumetric Summary

CATCHMENT AREA	AREA (HA)	RC	% OF TOTAL AREA	BLOCK TARGET (5MM OVER IMP-HA)	TOTAL VOLUME (M ³)
200	0.622	0.85	30%	59%	28.9
201	0.902	0.86	43%	31%	42.5
202	0.559	0.44	27%	-	9.6
Total Site	2.083				81.0

The water balance targets will be achieved through providing retention storage within the underground storage tank below the invert of the tank outlet. The retained water from the site will be reused through landscape irrigation or infiltration. Details regarding water recycling usage will be provided at SPA stage.

CONCLUSIONS

This FSSR presents a site servicing strategy for the proposed development that addresses the requirements of the applicable regulatory agencies and provides the basis for detailed servicing design.

We trust this report sufficiently addresses the site servicing requirements and allows for approval of a Zoning Bylaw Amendment ('ZBA') application. Should there be any questions or comments, please feel free to contact the undersigned.

Sincerely,

Counterpoint Land Development by Dillon Consulting Limited



Gian-Micheal Di Luca, P.Eng
Associate
Direct: 416.886.1075
Email: gidiluca@counterpointeng.com

A handwritten signature in black ink that reads "Leticia M. N. Rodrigues".

Leticia M. N. Rodrigues, EIT.
Water Resources Designer
Direct: 905.326.1404
Email: lmnrodrigues@counterpointeng.com

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APPENDIX A
Site Plan
Topographic Survey
Locates

PROJECT STATISTICS SUMMARY		
Municipal Address:	1095 Kingston Road, Pickering, ON	
Gross Site Area	(sm)	20,901
Net Site Area (Gross Site Area - Sight Triangle)		20,834
Zoning By-law	= City Centre By-law 7553/17	
Average Grade	=	89.34 (m)
Building 1 Height (Storeys): (excl. Mech Penthouse)	35	
Building 2 Height (Storeys): (excl. Mech Penthouse)	35	
Building 1 Height (m): (excl. Mech Penthouse)	114.36	
Building 2 Height (m): (excl. Mech Penthouse)	112.81	
	(sm)	
Net Floor Area (less required Amenity)		98,184
Floor Space Index (FSI)		4.71
Number of Residential Suites		1,492
Total Residential Interior Amenity Space Provided		3,000
Total Residential Exterior Amenity Space Provided		2,985
Vehicular Parking Provided: Long-Term Residential	920	
Vehicular Parking Provided: Combined Visitor & Retail	223	
Vehicular Parking Provided: Total	1,143	
Bicycle Parking Total Required	895	
Bicycle Parking Total Provided	895	
Total Loading Spaces Provided	4	

GREEN ROOF STATISTICS		
GENERAL PROJECT DESCRIPTION		PROPOSED
TOTAL GROSS FLOOR AREA		98,184 m ²
AVAILABLE ROOF SPACE CALCULATION		PROPOSED
TOTAL ROOF AREA (m ²)		10,053 m ²
AREA OF RESIDENTIAL PRIVATE TERRACES (m ²)		1,893.1 m ²
ROOFTOP OUTDOOR AMENITY SPACE, IF IN A RESIDENTIAL BUILDING (m ²)		2,240 m ²
AREA OF RENEWABLE ENERGY DEVICES (m ²)		0.0 m ²
TOWERS/ROOF AREA WITH FLOOR PLATE LESS THAN 700 m ²		0.0 m ²
TOTAL AVAILABLE ROOF SPACE (m ²)		5,920.9 m ²
GREEN ROOF COVERAGE	REQUIRED	PROPOSED
COVERAGE OF AVAILABLE ROOF SPACE (m ²)	2,980 m ²	2,980 m ²
COVERAGE OF AVAILABLE ROOF SPACE (%)	50 %	50 %

Green Roof Stats

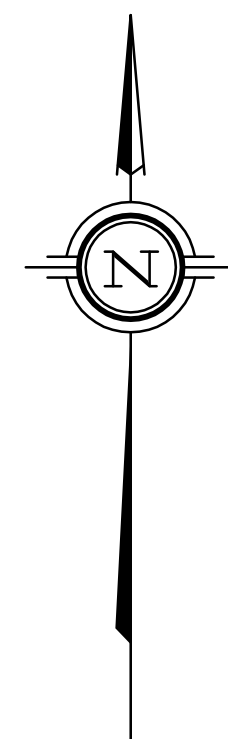


1 A001.S CONTEXT PLAN 1:4000

RESIDENTIAL BUILDING ACCESSIBILITY CHECKLIST		
#	ITEM	COMMENTS
11	Site Plan	A101.5, A201.5
12	Stairways min. 1500mm wide (DOPS)	A103.5, A201.5, A202.5, A203.5
13	Passage according to DOPS - Type A - min. 3400mm, Access Aisle - min. 1500mm	A103.5, A201.5, A202.5, A203.5
14	Passage Leading Zone (min. 2400mm x 1800mm), overhead clearance min. 3000mm AFF	A101.5, A201.5
15	Clear ramps min. 1500mm wide + handrails, TMS	Refer to Landscape Depts.
16	Overhead clearance min. 1500mm AFF	A101.5, A201.5
17	Path - visible, firm, slip resistant	Refer to Landscape Depts.
18	Min. 1100mm path of travel (min. 1800mm x 1800mm slip/space every 30m)	A101.5, A201.5
21	Parking Levels	A103.5, A201.5, A202.5, A203.5, A204.0, A205.0, A206.0, A207.0, A208.0, A209.0, A210.0, A211.0, A212.0, A213.0, A214.0, A215.0, A216.0, A217.0, A218.0, A219.0, A220.0, A221.0, A222.0, A223.0, A224.0, A225.0, A226.0, A227.0, A228.0, A229.0, A230.0, A231.0, A232.0, A233.0, A234.0, A235.0, A236.0, A237.0, A238.0, A239.0, A240.0, A241.0, A242.0, A243.0, A244.0, A245.0, A246.0, A247.0, A248.0, A249.0, A250.0, A251.0, A252.0, A253.0, A254.0, A255.0, A256.0, A257.0, A258.0, A259.0, A260.0, A261.0, A262.0, A263.0, A264.0, A265.0, A266.0, A267.0, A268.0, A269.0, A270.0, A271.0, A272.0, A273.0, A274.0, A275.0, A276.0, A277.0, A278.0, A279.0, A280.0, A281.0, A282.0, A283.0, A284.0, A285.0, A286.0, A287.0, A288.0, A289.0, A290.0, A291.0, A292.0, A293.0, A294.0, A295.0, A296.0, A297.0, A298.0, A299.0, A300.0, A301.0, A302.0, A303.0, A304.0, A305.0, A306.0, A307.0, A308.0, A309.0, A310.0, A311.0, A312.0, A313.0, A314.0, A315.0, A316.0, A317.0, A318.0, A319.0, A320.0, A321.0, 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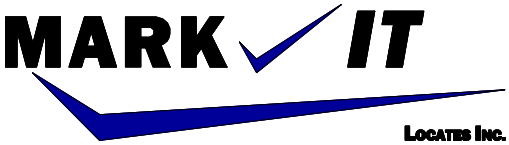
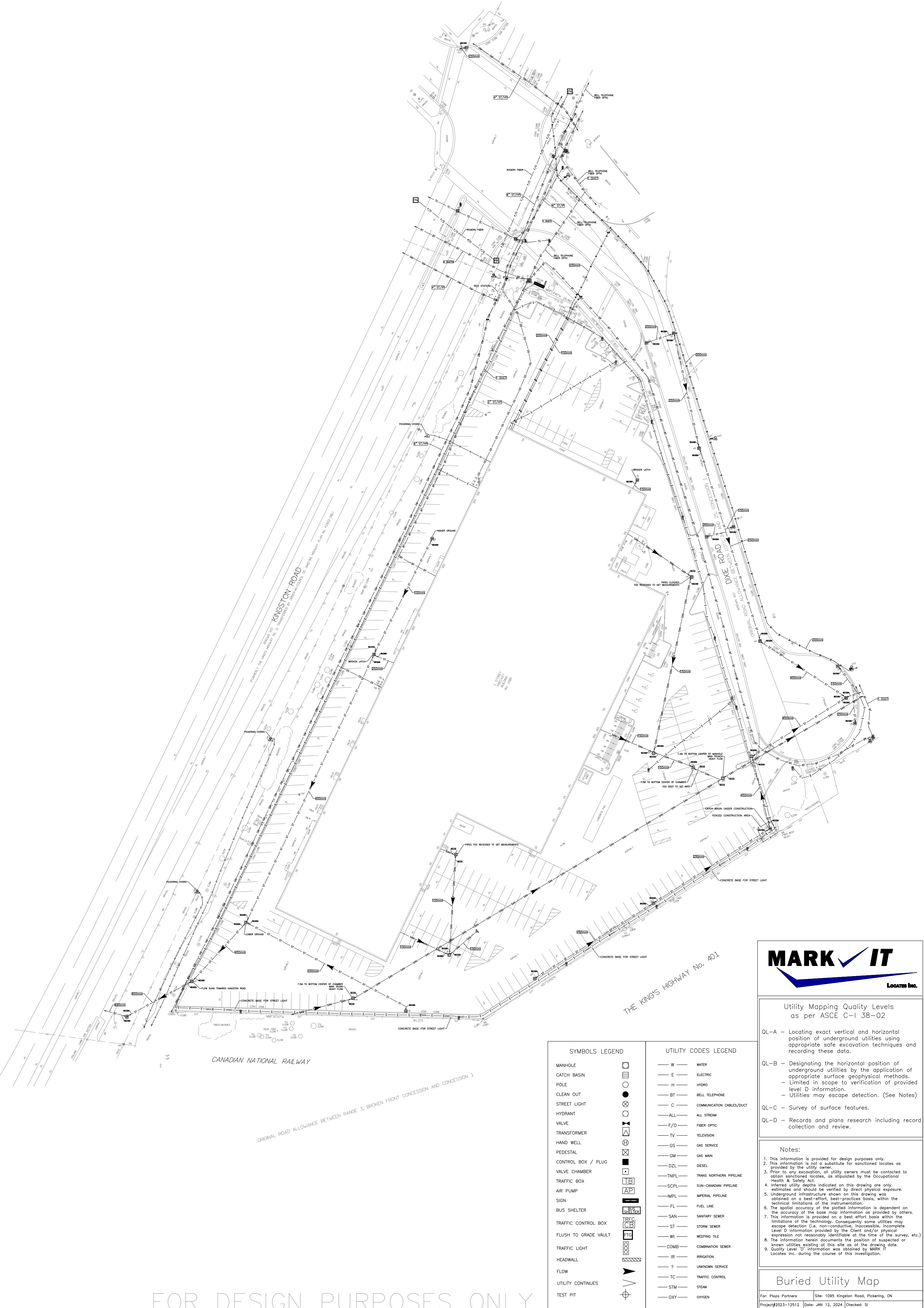
BRK	DEMOTES	BOARDS	BOARD FENCE
BRT	DEMOTES	BOTTOM	BOTTOM OF SLOPE
BUX	DEMOTES	BUSH	BUSH SHELTER
BY	DEMOTES	BELL	BELL BOU
CB	DEMOTES	CATCH BASIN	CATCH BASIN
CDL	DEMOTES	CONCRETE DOLLARD	CONCRETE DOLLARD
CDB	DEMOTES	CHURN	CHURN IN HIGH BASIN
CDF	DEMOTES	CHAIN LINK FENCE	CHAIN LINK FENCE
CJ	DEMOTES	CLONG	CLONG
CPR	DEMOTES	CONCRETE PILLAR	CONCRETE PILLAR
CST	DEMOTES	CONCRETE	CONCRETE
CS	DEMOTES	CONCRETE WALL	CONCRETE WALL
DD	DEMOTES	DEAD END	DEAD END
DD	DEMOTES	DEADEND DOOR SILL	DEADEND DOOR SILL
DI	DEMOTES	DOOR	DOOR
DS	DEMOTES	FINISHED	FINISHED DOOR SILL
DR	DEMOTES	GARBAGE IN	GARBAGE IN
GR	DEMOTES	GAS METER	GAS METER
GM	DEMOTES	GUARD RAIL	GUARD RAIL
GV	DEMOTES	GAS VALVE	GAS VALVE
GW	DEMOTES	GRASS	GRASS
GW	DEMOTES	GRASS	GRASS
GW	DEMOTES	GRASS	GRASS
HPL	DEMOTES	HYDRO PUMP	HYDRO PUMP
HR	DEMOTES	HYDRO PUMP WITH LIGHT	HYDRO PUMP WITH LIGHT
HR	DEMOTES	HYDRO PUMP WITH LIGHT AND TRANSFORMER	HYDRO PUMP WITH LIGHT AND TRANSFORMER
HR	DEMOTES	META HALL RAIL	META HALL RAIL
HR	DEMOTES	HYDRO PUMP ON CONCRETE PAD	HYDRO PUMP ON CONCRETE PAD
HY	DEMOTES	HAND WELL	HAND WELL
ICV	DEMOTES	IRRIGATION CONTROL VALVE	IRRIGATION CONTROL VALVE
IS	DEMOTES	INTERLOCKED BRICK	INTERLOCKED BRICK
LS	DEMOTES	LIGHT STANDARD	LIGHT STANDARD
MB	DEMOTES	MANHOLE	MANHOLE
MD	DEMOTES	MANHOLE	MANHOLE
MD	DEMOTES	MECHANICAL LIFT	MECHANICAL LIFT
MSTP	DEMOTES	METAL STEPS AND LANDING	METAL STEPS AND LANDING
ND	DEMOTES	NEEDING	NEEDING
OCW	DEMOTES	ORNAMENTAL CONCRETE PILLAR	ORNAMENTAL CONCRETE PILLAR
OW	DEMOTES	OVERHEAD WIRE	OVERHEAD WIRE
OW	DEMOTES	PAINT JUNK	PAINT JUNK
PD	DEMOTES	PLASTIC PIPE	PLASTIC PIPE
PS	DEMOTES	PREDICTOR SIGNAL	PREDICTOR SIGNAL
S	DEMOTES	STONE RETAINING WALL	STONE RETAINING WALL
SW	DEMOTES	CONCRETE SIDEWALK	CONCRETE SIDEWALK
TL	DEMOTES	TRUCK	TRUCK
TS	DEMOTES	TRAFFIC LIGHT	TRAFFIC LIGHT
TS	DEMOTES	TRAFFIC LIGHT PLATE	TRAFFIC LIGHT PLATE
TX	DEMOTES	TOP OF SLOPE	TOP OF SLOPE
UC	DEMOTES	UTILITY COVER	UTILITY COVER
UT	DEMOTES	UTILITY BOX	UTILITY BOX
WP	DEMOTES	WOOD POST	WOOD POST
W	DEMOTES	WATER WHEEL	WATER WHEEL
VO	DEMOTES	WEDDING TREE	WEDDING TREE
W	DEMOTES	CONIFEROUS TREE	CONIFEROUS TREE
W	DEMOTES	SHRUBS	SHRUBS
W	DEMOTES	DIRECTION OF FLOW	DIRECTION OF FLOW
W	DEMOTES	ACCESSIBLE PARKING SPACE	ACCESSIBLE PARKING SPACE
W	DEMOTES	OVERHEAD OF UTILITY LINES	OVERHEAD OF UTILITY LINES



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Utility Mapping Quality Levels
as per ASCE C-1 38-02

- QL-A - Locating exact vertical and horizontal position of underground utilities using appropriate safe excavation techniques and recording these data.
- QL-B - Designating the horizontal position of underground utilities by the application of appropriate surface geophysical methods.
- Limited in scope to verification of provided level D information.
 - Utilities may escape detection. (See Notes)
- QL-C - Survey of surface features.
- QL-D - Records and plans research including record collection and review.

Notes:

1. This information is provided for design purposes only.
2. This information is not a substitute for sanctioned locates as provided by the utility owner.
3. Prior to any excavation, all utility owners must be contacted to obtain sanctioned locates, as stipulated by the Occupational Health & Safety Act.
4. Inferred utility depths indicated on this drawing are only estimates and should be verified by direct physical exposure.
5. Underground infrastructure shown on this drawing was obtained on a best-effort, best-practices basis, within the technical limitations of the instrumentation.
6. The spatial accuracy of the plotted information is dependent on the accuracy of the base map information as provided by others.
7. This information is provided on a best effort basis within the limitations of the technology. Consequently some utilities may escape detection (i.e. non-conductive, inaccessible, incomplete Level D information provided by the Client and/or physical expression not reasonably identifiable at the time of the survey, etc.)
8. The information herein documents the position of suspected or known utilities existing at this site as of the drawing date.
9. Quality Level "D" information was obtained by MARK IT Locates Inc. during the course of this investigation.

Buried Utility Map

For: Plaza Partners Site: 1095 Kingston Road, Pickering, ON
Project#2023-12512 Date: JAN 12, 2024 Checked: SI

SYMBOLS LEGEND

- MANHOLE
CATCH BASIN
POLE
CLEAN OUT
STREET LIGHT
HYDRANT
VALVE
TRANSFORMER
HAND WELL
PEDESTAL
CONTROL BOX / PLUG
VALVE CHAMBER
TRAFFIC BOX
AIR PUMP
SIGN
BUS SHELTER
TRAFFIC CONTROL BOX
FLUSH TO GRADE VAULT
TRAFFIC LIGHT
HEADWALL
FLOW
UTILITY CONTINUES
TEST PIT

UTILITY CODES LEGEND

- W — WATER
E — ELECTRIC
H — HYDRO
BT — BELL TELEPHONE
C — COMMUNICATION CABLES/DUCT
ALL — ALL STREAM
F/O — FIBER OPTIC
TV — TELEVISION
GS — GAS SERVICE
GM — GAS MAIN
DZL — DIESEL
TNPL — TRANS NORTHERN PIPELINE
SCPL — SUN-CANADIAN PIPELINE
IMPL — IMPERIAL PIPELINE
FL — FUEL LINE
SAN — SANITARY SEWER
ST — STORM SEWER
WT — WEEPING TILE
COMB — COMBINATION SEWER
IR — IRRIGATION
? — UNKNOWN SERVICE
TC — TRAFFIC CONTROL
STM — STEAM
OXY — OXYGEN

FOR DESIGN PURPOSES ONLY

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APPENDIX B

Watermain Demand

Hydrant Flow Test

FUS Calculations

Counterpoint Engineering Inc.

WATER DEMANDS BY BLOCK AND BUILDING

Project: 1095 Kingston
Project No: 23062
Location: Pickering

Per Capita Demand

Single Family	310 litres/person/day
Multi-Unit	190 litres/person/day

Retail/Residential Population Criteria

1 Bedroom	1.5 ppu
2 Bedroom	2.5 ppu
3 Bedroom	3.5 ppu
Townhouse	3 ppu
Commercial/Retail	86 persons/ha
Office	3.3 persons/100m ²
Parkland	10 persons/Ha ³

Unit and Floor Area Breakdown

POPULATION AND AVERAGE DAY DEMANDS SUMMAR													
Building #	1 Bedroom Units	2 Bedroom Units	3 Bedroom Units	Townhouse	Total Residential Units*	Parkland Populations	Total Residential Population	Residential Average Demand	Office (m ²)	Total Office Population	Office Average Demand	Retail/ Commercial (m ²)	Retail/ Commercial Average Demand (28m ³ /ha/day)
	1.5 persons/unit	2.5 persons/unit	3.5 persons/unit	3.0 persons/unit	Units	Persons	Equivalent Population	L/s	Area	Equivalent Population	L/s	Area	L/s
1 (A,B,Pod)	481	171	69	0	721	0	1392	3.06	-	0.0	0.00	0	0.00
2 (A,B, Pod)	486	208	77	0	771	0	1520	3.34	-	0.0	0.00	-	0.00
Site Total	967	379	146	0	1,492	0.00	2,912	6.40	0	0	0	0	0.00

*Note: total units rounded up due to rounding when applying unit mix ratio percentages.

Peaking Factors

Land Use	Minimum Hour	Maximum Hour	Maximum Day
Apartment	0.84	2.50	1.30
Commercial	0.84	1.20	1.10
Industrial	0.84	1.90	1.10
Institutional	0.84	1.90	1.10

Summary of Demands

Daily Water Demand (L/sec)	Max Day Water Demand (L/sec)	Peak Hour Water Demand (L/sec)	Fire Demand Required (L/sec)	Max Day plus Fire Demand (L/sec)
6.40	8.32	16.01	166.67	174.99

Project: 1095 Kingston
Building: Building 1
Project No: 23062
Location: Pickering

A) Determine the Construction Coefficient (C). Refer to pages 20, 21.

Construction Type, see pages 20 and 21 for definitions: Type II Noncombustible Construction
Construction Coefficient (C): 0.8

B) Determine the Total Effective Floor Area (A). Refer to pages 22, 23.

Based on the Construction Type and associated Construction Coefficient:
Are any vertical openings unprotected? Yes
Take two largest adjoining floor areas plus 50% of the sum of all floor areas immediately above them up to a maximum of eight
Total Effective Floor Area (A): 21,950 m²

C) Calculate the Required Fire Flow (RFF), rounded to nearest 1,000 LPM. = 220 √ 26,000 L/min

D) Determine the decrease or increase for the Occupancy Contents Adjustment Factor. Apply to value obtained in C. Refer to pages 24 to 26.

Contents, see Page 24 for definitions and Pages 25-26 for examples: Noncombustible
Adjustment Factor: -25%
Adjusted Required Fire Flow: 19,500 L/min

E) Determine decrease for having Automatic Sprinkler Protection, if warranted. Refer to pages 27 to 29.

Automatic Sprinkler System Design
Installed and Designed to NFPA 13 Standard? Yes [30% Reduction]
Water Supply standard for both system and fire department hose lines? Yes [10% Reduction]
Fully supervised system? Yes [10% Reduction]
Does the sprinkler system have complete building coverage? Yes
Reduction for Automatic Sprinkler Protection: 50%
9,750 L/min

F) Determine the total Exposure Adjustment Charge for exposures. Refer to pages 30 to 32.

Building Face	Distance to Exposure (m)	Length-Height Factor (L.H.F.)	L.H.F. Bracket	Bldg Type	Reduction Notes		Charge
North	Greater than 30m	0	0-20	Type V	None applicable.	=	0%
East	10.1-20m	2555	Over 100	Type I-II (2)	Site bldg. and exposed bldg. fully protected with automatic sprinkler system. [100% Reduction]	=	0%
South	Greater than 30m	0	0-20	Type V	None applicable.	=	0%
West	Greater than 30m	0	0-20	Type V	None applicable.	=	0%
Total Exposure Charge:							0%

Increase for Exposure Adjustment Charge: 0 L/min

G) Final Calculation of Required Fire Flow. Subtract the value obtained in E from the answer obtained in D, then add the value obtained in F.

F =	10,000	L/min
F =	2,642	GPM
F =	166.7	L/s

Project: 1095 Kingston
Building: Building 2
Project No: 23062
Location: Pickering

A) Determine the Construction Coefficient (C). Refer to pages 20, 21.

Construction Type, see pages 20 and 21 for definitions: Type II Noncombustible Construction
Construction Coefficient (C): 0.8

B) Determine the Total Effective Floor Area (A). Refer to pages 22, 23.

Based on the Construction Type and associated Construction Coefficient:
Are any vertical openings unprotected? Yes
Take two largest adjoining floor areas plus 50% of the sum of all floor areas immediately above them up to a maximum of eight
Total Effective Floor Area (A): 15,813 m²

C) Calculate the Required Fire Flow (RFF), rounded to nearest 1,000 LPM. = 220 √ 22,000 L/min

D) Determine the decrease or increase for the Occupancy Contents Adjustment Factor. Apply to value obtained in C. Refer to pages 24 to 26.

Contents, see Page 24 for definitions and Pages 25-26 for examples: Noncombustible
Adjustment Factor: -25%
Adjusted Required Fire Flow: 16,500 L/min

E) Determine decrease for having Automatic Sprinkler Protection, if warranted. Refer to pages 27 to 29.

Automatic Sprinkler System Design
Installed and Designed to NFPA 13 Standard? Yes [30% Reduction]
Water Supply standard for both system and fire department hose lines? Yes [10% Reduction]
Fully supervised system? Yes [10% Reduction]
Does the sprinkler system have complete building coverage? Yes
Reduction for Automatic Sprinkler Protection: 50%
8,250 L/min

F) Determine the total Exposure Adjustment Charge for exposures. Refer to pages 30 to 32.

Building Face	Distance to Exposure (m)	Length-Height Factor (L.H.F.)	L.H.F. Bracket	Bldg Type	Reduction Notes		Charge
North	Greater than 30m	0	0-20	Type V	None applicable.	=	0%
East	Greater than 30m	0	0-20	Type III-IV (2)	None applicable.	=	0%
South	Greater than 30m	0	0-20	Type V	None applicable.	=	0%
West	10.1-20m	2555	Over 100	Type I-II (2)	Site bldg. and exposed bldg. fully protected with automatic sprinkler system. [100% Reduction]	=	0%
Total Exposure Charge:							0%

Increase for Exposure Adjustment Charge: 0 L/min

G) Final Calculation of Required Fire Flow. Subtract the value obtained in E from the answer obtained in D, then add the value obtained in F.

F =	9,000	L/min
F =	2,378	GPM
F =	150.0	L/s

Counterpoint Engineering Inc.

NFPA Theoretical Flow Calculations

Project: 1095 Kingston
Project No: 23062
Flow Hydrant: 2nd hydrant south of Kingston Road on Dixie Road.
Residual Hydrant: Hydrant at the corner of Kingston Road and Dixie Road.

Based on National Fire Protection Association Guidelines, the available flow at the minimum residual pressure of 20psi can be calculated based on the observed flow at the observed pressure readings, as follows:

$$Q_F = 29.83 \times c \times d^2 \times p^{0.5}, \text{ where}$$

Q_F = observed flow (US GPM)

c = hydrant nozzle coefficient (0.90 - 0.95)

d = nozzle diameter (in)

p = observed pitot pressure

$$Q_R = Q_F \times h_F^{0.54} / h_R^{0.54}, \text{ where}$$

Q_R = available flow

Q_F = observed flow (US GPM)

h_F = drop from measured static to desired baseline pressure

h_R = drop from measured static to measured residual pressure

Based on flow test results obtained by *Lozzi Aqua Check, May 20, 2022.*

$c =$	0.9
$d =$	2.5 in
number of ports =	2
$p =$	44

$Q_F =$ 2226 US GPM

Measured Static Pressure = 79 psi

Measured Residual Pressure = 70 psi

Desired Residual Pressure = 20 psi, minimum per City of Toronto design criteria

$Q_R =$

6145 US GPM
23,260 L/min
387.67 L/s

 per fire connection

Lozzi Aqua Check

Massimo Lozzi

12307 Woodbine Ave, P.O. Box 519

Cell: 416 990-2131

Gormley, ON L0H 1G0

E-mail: lozziaquacheck@gmail.com

Hydrant Flow Test Form

Job Location: 1095 Kingston Rd, Pickering

Date: October 16, 2024

Time of Test: 9:00 am

Location of Flow Hydrant: Second hydrant south of Kingston Rd on Dixie Rd.

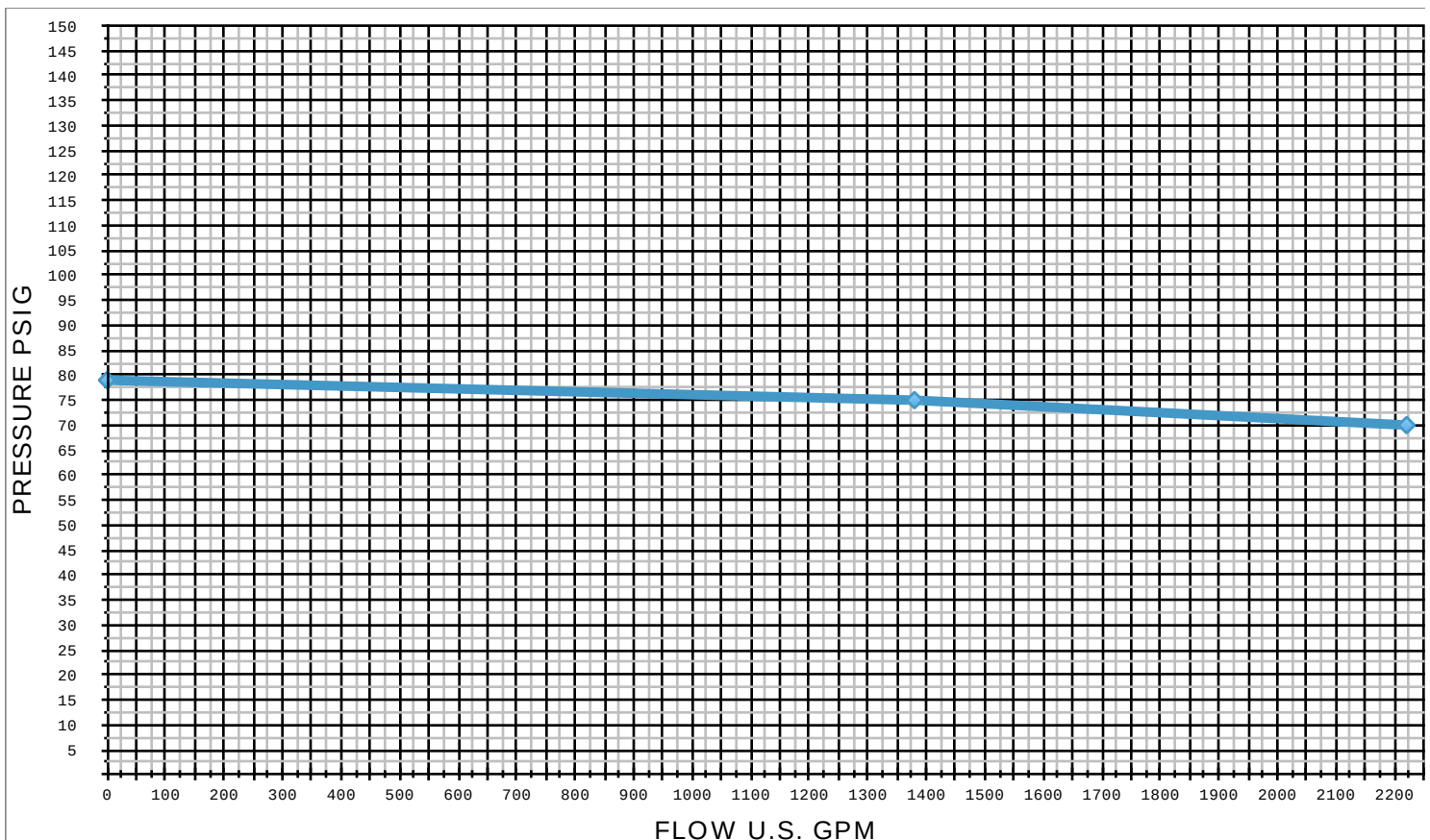
Residual: Hydrant at corner of Kingston Rd and Dixie Rd.

Main Size: 250 mm

Static Pressure: 79 psi

	Number of Outlets & Orifice Size	Pitot Pressure (psi)	Flow (U.S. G.P.M.)	Residual Pressure (psi)
1.	Static	0	0	79
2.	1 x 2 ½	68	1380	75
3.	2 x 2 ½	44	2221	70

Note: Flow test conducted in accordance with NFPA



Lozzi Aqua Check

Massimo Lozzi

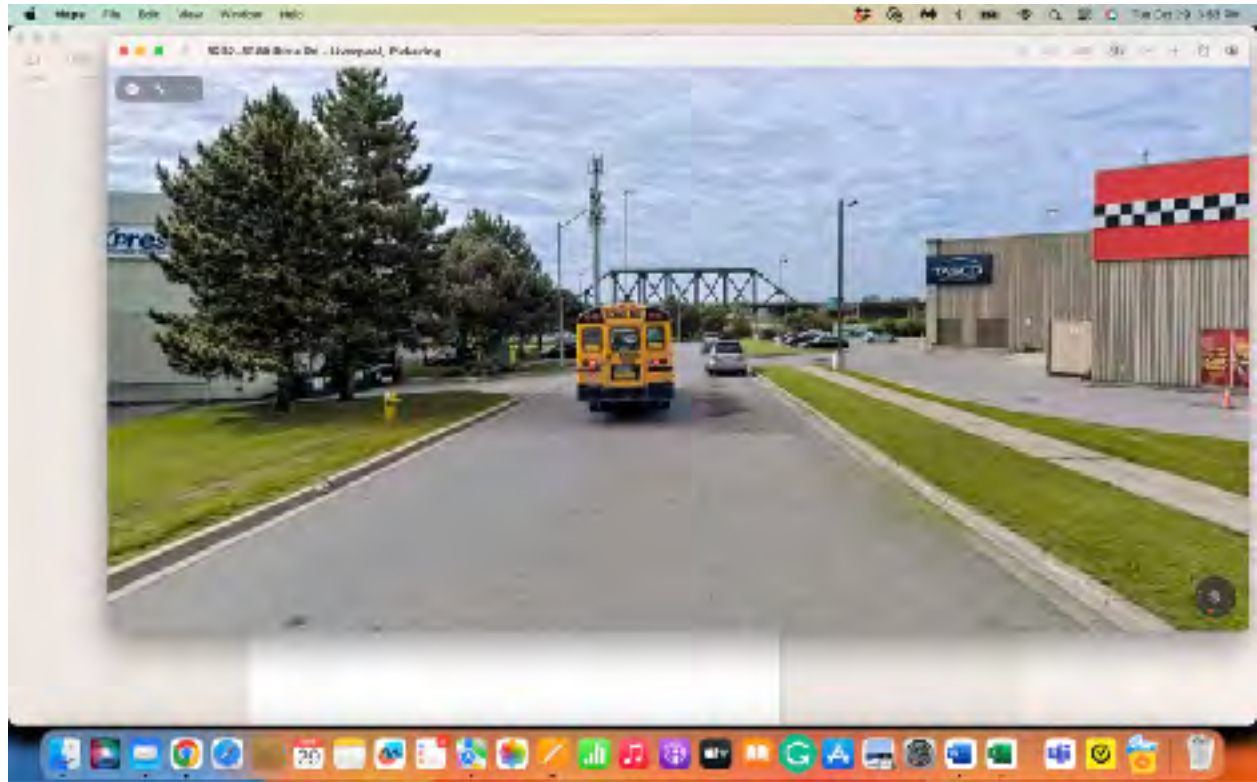
12307 Woodbine Ave, P.O. Box 519

Cell: 416 990-2131

Gormley, ON L0H 1G0

E-mail: lozziaquacheck@gmail.com

Site Map



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APPENDIX C

Sanitary Flow Calculation

Counterpoint Engineering Inc.

Sanitary Flow

Project: 1095 Kingston
Project No: 23062
Location: Pickering
Site Area: 2.090 ha

Existing Sanitary Flow

As per Design Specifications for Sanitary Sewers, Regional municipality of Durham dated April 2021

Design Flow: 180 m³/gross floor area ha/day (2.08 L/s/day) including infiltration and peaking effect

Existing Site Building Areas

Building A	8363.9	m ²

Commercial/Office Average flow	180	m ³ /ha/day	*based on gross floor area including infiltration and peaking
	2.08	L/s/ha	
Infiltration	0.26	litres/second/ha	
Retail/Commercial Flow		1.74	L/s
Infiltration		0.54	L/s
Existing Total Peak Flow		3.37	L/s

Counterpoint Engineering Inc.
Proposed Sanitary Flow

Project: 1095 Kingston
Project No: 23062
Location: Pickering
Site Area: 2.090 ha

Proposed Sanitary Flow Calculations
Design flow = average daily dry weather flow x peaking factor + infiltration

Persons Per Unit and per Land Use

Townhouse	3 ppu
1BR/1BR+Den	1.5 ppu
2BR/2BR+Den/	2.5 ppu
3BR/3BR+Den	3.5 ppu

Peak flow Design Parameters

Residential	
Average flow	364 litres/person/day
Commercial	
Average flow	2.08 litres/second/ha
Parkland	10 Persons/ha
Infiltration	0.26 litres/second/ha

Harmon Peaking Factor
PF = 1 + (14/(4+(P/1000)^{1/2}))

Phase/Building	Residential Units				Population 1BR / 1B + D	Population 2BR / 2BR + D	Population 3BR / 3BR + D	Parkland Populations	Total Population	Harmon Peaking Factor	Total Residential Flow	Area (Ha)	Infiltration Rate	Retail		Total Residential Flow
	1B / 1B+D	2B / 2B + D	3B / 3B+D	Total Units										Area (m2)	Total Flow Retail (L/s)	
Building 1A	189	80	26	295	284	200	91		575					0	0.00	
Building 2A	189	79	27	295	284	198	95		577					0	0.00	
Building 1 Podium	103	12	16	131	155	30	58		243					0	0.00	
Building 1 Subtotal	481	171	69	721	722	428	243		1393	3.70	21.73	1.05	0.27	0	0.00	22.00
Building 2A	203	87	29	319	305	218	102		625					0	0.00	
Building 2B	203	87	29	319	305	218	102		625					0	0.00	
Building 2 Podium	80	34	19	133	120	85	67		272					0	0.00	
Subtotal	486	208	77	771	729	520	270		1519	3.68	23.52	1.05	0.27	0	0.00	23.79
Consolidated	967	379	146	1492.4	1,451	948	513	0	2,912	3.45	42.37	2.09	0.54	0	0.00	42.91

Net increase in flow from Existing (L/s)
39.54

Public Folder Viewer 2

From: Claire Wallis-South <Claire.Wallis-South@durham.ca>
Sent: February 4, 2025 3:48 PM
To: Di Luca, Gian-Michael
Cc: Peter Castellan
Subject: 1095 Kingston Rd (2024-P-MISC 23) - Servicing Questions

Hi Gian-Michael.

See below for responses to your questions.

1. A sanitary capacity assessment is likely not required as we are connecting directly into the trunk, however, your team will confirm.

A sanitary capacity analysis is not required. Capacity in the downstream sewer will be monitored and analyzed by the Region as necessary.

2. The requested watermain loop from Dixie Court to Walnut Lane may not be feasible due to long term development goals for the neighbouring developments. Your team will follow up internally with any other solutions.

As stated in our pre-consultation comments, it is recommended that the development be supported by a secondary, looped water supply. Should an opportunity to loop the system become available as development of the subject property proceeds, we may request a solution. Until a secondary water supply is available to support the full build-out of this proposed development, the Region may limit water servicing on a tower-by-tower basis.

Thank you,

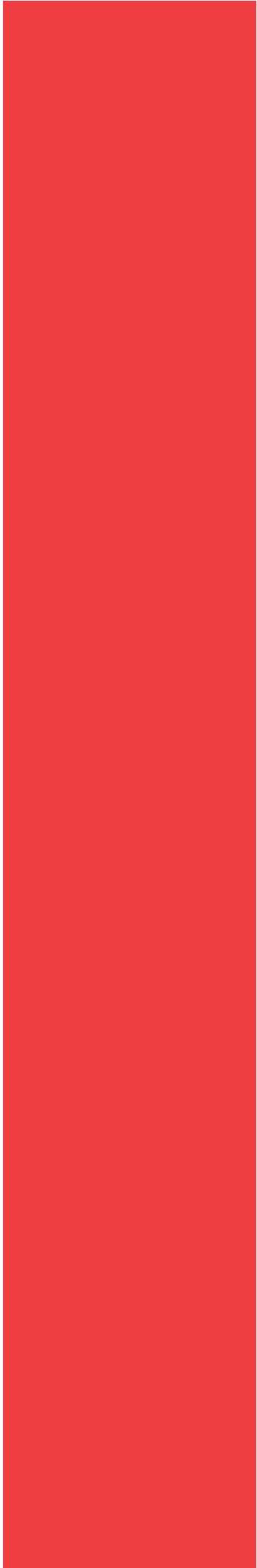
Claire Wallis-South | Works Technician
Works Department | Development Approvals
The Regional Municipality of Durham
claire.wallis-south@durham.ca | 905-668-4113 extension 3904

From: Di Luca, Gian-Michael <gdiluca@counterpointeng.com>
Sent: January 27, 2025 11:14 AM
To: Claire Wallis-South <Claire.Wallis-South@durham.ca>; Peter Castellan <Peter.Castellan@Durham.ca>
Subject: Re: 1095 Kingston Road - Pickering_Regional Services Discussion @ Wed, Nov 27, 2024 10:30am – 11:00am (GMT-05)

CAUTION: This email is from an external source. Verify sender before opening links and attachments.

Hi Claire and Peter,

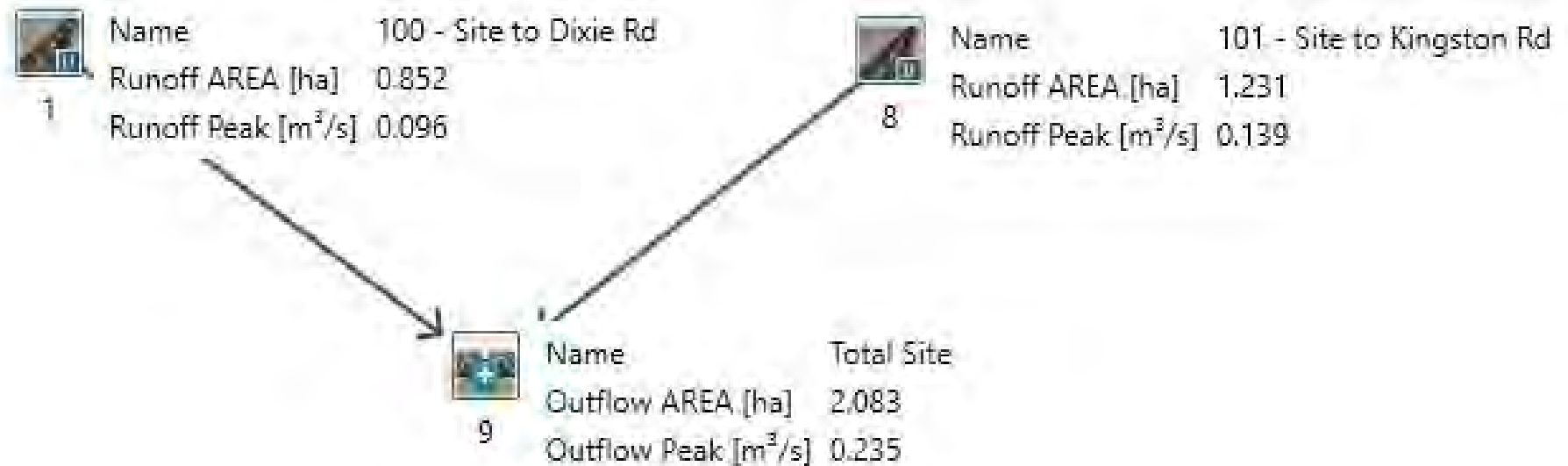
I just wanted to update you both. The client has since revised the site plan a bit to resolve some pre-con comments from the City and they will be proceeding as a single phase for this submission.

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APPENDIX D

Stormwater Management Modelling and Calculations

PRE-DEVELOPMENT VO MODEL SCHEMATIC



Pre-Dev Schematics

=====

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V   V   I   SSSSS U   U   A   L           (v 6.2.2019)
V   V   I   SS    U   U   A A   L
V   V   I   SS    U   U   AAAAA L
V   V   I   SS    U   U   A   A   L
VV      I   SSSSS UUUUU A   A   LLLLL

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000   TTTTT TTTTT H   H   Y   Y   M   M   000   TM
O   O   T       T   H   H   Y   Y   MM MM   O   O
O   O   T       T   H   H   Y       M   M   O   O
000       T       T   H   H   Y       M   M   000

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***** D E T A I L E D O U T P U T *****

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Summary filename:

C:\Users\21yk\AppData\Local\Civica\XH5\946992b3-465d-43ba-a8b8-ff4639fd3c\ceabf153-f07d-4cec-b323-8735ee3bb953\scenari

DATE: 02-26-2025

TIME: 03:45:02

USER: LETICIA M. N. RODRIGUES

COMMENTS: 2 - 100 year storm events, 12-hour AES storm hyetographs.

```

*****
** SIMULATION : 10 Year 12 Hour AES (Bloor, T **
*****

```

| READ STORM |

Filename: C:\Users\21yk\AppData

Pre-Dev Schematics

ata\Local\Temp\

0bac4a66-5d40-4b92-bea6-b2458219cd99\049ade39

Ptotal= 62.71 mm

Comments: 10 Year 12 Hour AES (Bloor, TRCA)

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.00	0.00	3.25	10.66	6.50	4.39	9.75	0.63
0.25	0.63	3.50	10.66	6.75	4.39	10.00	0.63
0.50	0.63	3.75	10.66	7.00	4.39	10.25	0.63
0.75	0.63	4.00	10.66	7.25	2.51	10.50	0.63
1.00	0.63	4.25	28.84	7.50	2.51	10.75	0.63
1.25	0.63	4.50	28.84	7.75	2.51	11.00	0.63
1.50	0.63	4.75	28.84	8.00	2.51	11.25	0.63
1.75	0.63	5.00	28.84	8.25	1.25	11.50	0.63
2.00	0.63	5.25	8.15	8.50	1.25	11.75	0.63
2.25	3.76	5.50	8.15	8.75	1.25	12.00	0.63
2.50	3.76	5.75	8.15	9.00	1.25		
2.75	3.76	6.00	8.15	9.25	0.63		
3.00	3.76	6.25	4.39	9.50	0.63		

CALIB

STANDHYD (0001)

ID= 1 DT= 5.0 min

Area (ha)= 0.85

Total Imp(%)= 99.00 Dir. Conn.(%)= 99.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.84	0.01
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	75.37	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	0.00	3.167	3.76	6.250	8.15	9.33	0.63
0.167	0.00	3.250	3.76	6.333	4.39	9.42	0.63
0.250	0.00	3.333	10.66	6.417	4.39	9.50	0.63
0.333	0.63	3.417	10.66	6.500	4.39	9.58	0.63
0.417	0.63	3.500	10.66	6.583	4.39	9.67	0.63
0.500	0.63	3.583	10.66	6.667	4.39	9.75	0.63
0.583	0.63	3.667	10.66	6.750	4.39	9.83	0.63
0.667	0.63	3.750	10.66	6.833	4.39	9.92	0.63
0.750	0.63	3.833	10.66	6.917	4.39	10.00	0.63

Pre-Dev Schematics

0.833	0.63	3.917	10.66	7.000	4.39	10.08	0.63
0.917	0.63	4.000	10.66	7.083	4.39	10.17	0.63
1.000	0.63	4.083	10.66	7.167	4.39	10.25	0.63
1.083	0.63	4.167	10.66	7.250	4.39	10.33	0.63
1.167	0.63	4.250	10.66	7.333	2.51	10.42	0.63
1.250	0.63	4.333	28.84	7.417	2.51	10.50	0.63
1.333	0.63	4.417	28.84	7.500	2.51	10.58	0.63
1.417	0.63	4.500	28.84	7.583	2.51	10.67	0.63
1.500	0.63	4.583	28.84	7.667	2.51	10.75	0.63
1.583	0.63	4.667	28.84	7.750	2.51	10.83	0.63
1.667	0.63	4.750	28.84	7.833	2.51	10.92	0.63
1.750	0.63	4.833	28.84	7.917	2.51	11.00	0.63
1.833	0.63	4.917	28.84	8.000	2.51	11.08	0.63
1.917	0.63	5.000	28.84	8.083	2.51	11.17	0.63
2.000	0.63	5.083	28.84	8.167	2.51	11.25	0.63
2.083	0.63	5.167	28.84	8.250	2.51	11.33	0.63
2.167	0.63	5.250	28.84	8.333	1.25	11.42	0.63
2.250	0.63	5.333	8.15	8.417	1.25	11.50	0.63
2.333	3.76	5.417	8.15	8.500	1.25	11.58	0.63
2.417	3.76	5.500	8.15	8.583	1.25	11.67	0.63
2.500	3.76	5.583	8.15	8.667	1.25	11.75	0.63
2.583	3.76	5.667	8.15	8.750	1.25	11.83	0.63
2.667	3.76	5.750	8.15	8.833	1.25	11.92	0.63
2.750	3.76	5.833	8.15	8.917	1.25	12.00	0.63
2.833	3.76	5.917	8.15	9.000	1.25	12.08	0.63
2.917	3.76	6.000	8.15	9.083	1.25	12.17	0.63
3.000	3.76	6.083	8.15	9.167	1.25	12.25	0.63
3.083	3.76	6.167	8.15	9.250	1.25		

Max.Eff.Inten.(mm/hr)= 28.84 13.94
over (min) 5.00 10.00
Storage Coeff. (min)= 3.55 (ii) 5.39 (ii)
Unit Hyd. Tpeak (min)= 5.00 10.00
Unit Hyd. peak (cms)= 0.26 0.16

TOTALS

PEAK FLOW (cms)= 0.07 0.00 0.068 (iii)
TIME TO PEAK (hrs)= 5.08 5.25 5.25
RUNOFF VOLUME (mm)= 61.71 22.71 61.32
TOTAL RAINFALL (mm)= 62.71 62.71 62.71
RUNOFF COEFFICIENT = 0.98 0.36 0.98

CALIB
STANDHYD (0008)
ID= 1 DT= 5.0 min

Area (ha)= 1.23
Total Imp(%)= 99.00 Dir. Conn.(%)= 99.00

Surface Area (ha)= IMPERVIOUS 1.22 PERVIOUS (i) 0.01

Pre-Dev Schematics

Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	90.59	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	0.00	3.167	3.76	6.250	8.15	9.33	0.63
0.167	0.00	3.250	3.76	6.333	4.39	9.42	0.63
0.250	0.00	3.333	10.66	6.417	4.39	9.50	0.63
0.333	0.63	3.417	10.66	6.500	4.39	9.58	0.63
0.417	0.63	3.500	10.66	6.583	4.39	9.67	0.63
0.500	0.63	3.583	10.66	6.667	4.39	9.75	0.63
0.583	0.63	3.667	10.66	6.750	4.39	9.83	0.63
0.667	0.63	3.750	10.66	6.833	4.39	9.92	0.63
0.750	0.63	3.833	10.66	6.917	4.39	10.00	0.63
0.833	0.63	3.917	10.66	7.000	4.39	10.08	0.63
0.917	0.63	4.000	10.66	7.083	4.39	10.17	0.63
1.000	0.63	4.083	10.66	7.167	4.39	10.25	0.63
1.083	0.63	4.167	10.66	7.250	4.39	10.33	0.63
1.167	0.63	4.250	10.66	7.333	2.51	10.42	0.63
1.250	0.63	4.333	28.84	7.417	2.51	10.50	0.63
1.333	0.63	4.417	28.84	7.500	2.51	10.58	0.63
1.417	0.63	4.500	28.84	7.583	2.51	10.67	0.63
1.500	0.63	4.583	28.84	7.667	2.51	10.75	0.63
1.583	0.63	4.667	28.84	7.750	2.51	10.83	0.63
1.667	0.63	4.750	28.84	7.833	2.51	10.92	0.63
1.750	0.63	4.833	28.84	7.917	2.51	11.00	0.63
1.833	0.63	4.917	28.84	8.000	2.51	11.08	0.63
1.917	0.63	5.000	28.84	8.083	2.51	11.17	0.63
2.000	0.63	5.083	28.84	8.167	2.51	11.25	0.63
2.083	0.63	5.167	28.84	8.250	2.51	11.33	0.63
2.167	0.63	5.250	28.84	8.333	1.25	11.42	0.63
2.250	0.63	5.333	8.15	8.417	1.25	11.50	0.63
2.333	3.76	5.417	8.15	8.500	1.25	11.58	0.63
2.417	3.76	5.500	8.15	8.583	1.25	11.67	0.63
2.500	3.76	5.583	8.15	8.667	1.25	11.75	0.63
2.583	3.76	5.667	8.15	8.750	1.25	11.83	0.63
2.667	3.76	5.750	8.15	8.833	1.25	11.92	0.63
2.750	3.76	5.833	8.15	8.917	1.25	12.00	0.63
2.833	3.76	5.917	8.15	9.000	1.25	12.08	0.63
2.917	3.76	6.000	8.15	9.083	1.25	12.17	0.63
3.000	3.76	6.083	8.15	9.167	1.25	12.25	0.63
3.083	3.76	6.167	8.15	9.250	1.25		

```

Pre-Dev Schematics
Max.Eff.Inten.(mm/hr)= 28.84      13.94
over (min)           5.00      10.00
Storage Coeff. (min)= 3.96 (ii)   5.81 (ii)
Unit Hyd. Tpeak (min)= 5.00      10.00
Unit Hyd. peak (cms)= 0.24      0.15

                                *TOTALS*
PEAK FLOW      (cms)= 0.10      0.00      0.098 (iii)
TIME TO PEAK   (hrs)= 5.17      5.25      5.25
RUNOFF VOLUME  (mm)= 61.71      22.71      61.32
TOTAL RAINFALL (mm)= 62.71      62.71      62.71
RUNOFF COEFFICIENT = 0.98      0.36      0.98

```

```

-----
| ADD HYD ( 0009) |
| 1 + 2 = 3 |
-----
          AREA      QPEAK      TPEAK      R.V.
          (ha)      (cms)      (hrs)      (mm)
ID1= 1 ( 0001):  0.85  0.068  5.25  61.32
+ ID2= 2 ( 0008):  1.23  0.098  5.25  61.32
=====
ID = 3 ( 0009):  2.08  0.166  5.25  61.32

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

V   V   I   SSSSS  U   U   A   L           (v 6.2.2019)
V   V   I   SS    U   U   A A  L
V   V   I   SS    U   U   AAAAA L
V   V   I   SS    U   U   A   A  L
VV    I   SSSSS  UUUUU  A   A  LLLLL

000  TTTTT  TTTTT  H   H   Y   Y  M   M  000  TM
0  0  T      T  H   H   Y Y  MM MM  0  0
0  0  T      T  H   H   Y   M   M  0  0
000  T      T  H   H   Y   M   M  000

```

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***** D E T A I L E D O U T P U T *****

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Output filename:

Pre-Dev Schematics

C:\Users\21yk\AppData\Local\Civica\XH5\946992b3-465d-43ba-a8b8-ff4639dfd3c\b609958e-acc6-4219-8ea4-4a85255e5fb9\scenari

Summary filename:

C:\Users\21yk\AppData\Local\Civica\XH5\946992b3-465d-43ba-a8b8-ff4639dfd3c\b609958e-acc6-4219-8ea4-4a85255e5fb9\scenari

DATE: 02-26-2025

TIME: 03:45:02

USER:

COMMENTS: _____

 ** SIMULATION : 100 Year 12 Hour AES (Bloor, **

READ STORM	Filename: C:\Users\21yk\AppData\Local\Temp\0bac4a66-5d40-4b92-bea6-b2458219cd99\72bd5dd2
Ptotal= 88.54 mm	Comments: 100 Year 12 Hour AES (Bloor, TRCA)

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.00	0.00	3.25	15.05	6.50	6.20	9.75	0.89
0.25	0.89	3.50	15.05	6.75	6.20	10.00	0.89
0.50	0.89	3.75	15.05	7.00	6.20	10.25	0.89
0.75	0.89	4.00	15.05	7.25	3.54	10.50	0.89
1.00	0.89	4.25	40.71	7.50	3.54	10.75	0.89
1.25	0.89	4.50	40.71	7.75	3.54	11.00	0.89
1.50	0.89	4.75	40.71	8.00	3.54	11.25	0.89
1.75	0.89	5.00	40.71	8.25	1.77	11.50	0.89
2.00	0.89	5.25	11.51	8.50	1.77	11.75	0.89
2.25	5.31	5.50	11.51	8.75	1.77	12.00	0.89
2.50	5.31	5.75	11.51	9.00	1.77		
2.75	5.31	6.00	11.51	9.25	0.89		
3.00	5.31	6.25	6.20	9.50	0.89		

CALIB

Pre-Dev Schematics

| STANDHYD (0001) | Area (ha)= 0.85
| ID= 1 DT= 5.0 min | Total Imp(%)= 99.00 Dir. Conn.(%)= 99.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.84	0.01
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	75.37	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	0.00	3.167	5.31	6.250	11.51	9.33	0.89
0.167	0.00	3.250	5.31	6.333	6.20	9.42	0.89
0.250	0.00	3.333	15.05	6.417	6.20	9.50	0.89
0.333	0.89	3.417	15.05	6.500	6.20	9.58	0.89
0.417	0.89	3.500	15.05	6.583	6.20	9.67	0.89
0.500	0.89	3.583	15.05	6.667	6.20	9.75	0.89
0.583	0.89	3.667	15.05	6.750	6.20	9.83	0.89
0.667	0.89	3.750	15.05	6.833	6.20	9.92	0.89
0.750	0.89	3.833	15.05	6.917	6.20	10.00	0.89
0.833	0.89	3.917	15.05	7.000	6.20	10.08	0.89
0.917	0.89	4.000	15.05	7.083	6.20	10.17	0.89
1.000	0.89	4.083	15.05	7.167	6.20	10.25	0.89
1.083	0.89	4.167	15.05	7.250	6.20	10.33	0.89
1.167	0.89	4.250	15.05	7.333	3.54	10.42	0.89
1.250	0.89	4.333	40.71	7.417	3.54	10.50	0.89
1.333	0.89	4.417	40.71	7.500	3.54	10.58	0.89
1.417	0.89	4.500	40.71	7.583	3.54	10.67	0.89
1.500	0.89	4.583	40.71	7.667	3.54	10.75	0.89
1.583	0.89	4.667	40.71	7.750	3.54	10.83	0.89
1.667	0.89	4.750	40.71	7.833	3.54	10.92	0.89
1.750	0.89	4.833	40.71	7.917	3.54	11.00	0.89
1.833	0.89	4.917	40.71	8.000	3.54	11.08	0.89
1.917	0.89	5.000	40.71	8.083	3.54	11.17	0.89
2.000	0.89	5.083	40.71	8.167	3.54	11.25	0.89
2.083	0.89	5.167	40.71	8.250	3.54	11.33	0.89
2.167	0.89	5.250	40.71	8.333	1.77	11.42	0.89
2.250	0.89	5.333	11.51	8.417	1.77	11.50	0.89
2.333	5.31	5.417	11.51	8.500	1.77	11.58	0.89
2.417	5.31	5.500	11.51	8.583	1.77	11.67	0.89
2.500	5.31	5.583	11.51	8.667	1.77	11.75	0.89
2.583	5.31	5.667	11.51	8.750	1.77	11.83	0.89
2.667	5.31	5.750	11.51	8.833	1.77	11.92	0.89
2.750	5.31	5.833	11.51	8.917	1.77	12.00	0.89

Pre-Dev Schematics

2.833	5.31	5.917	11.51	9.000	1.77	12.08	0.89
2.917	5.31	6.000	11.51	9.083	1.77	12.17	0.89
3.000	5.31	6.083	11.51	9.167	1.77	12.25	0.89
3.083	5.31	6.167	11.51	9.250	1.77		

Max.Eff.Inten.(mm/hr)=	40.71	23.95
over (min)	5.00	5.00
Storage Coeff. (min)=	3.09 (ii)	4.70 (ii)
Unit Hyd. Tpeak (min)=	5.00	5.00
Unit Hyd. peak (cms)=	0.27	0.22

TOTALS

PEAK FLOW (cms)=	0.10	0.00	0.096 (iii)
TIME TO PEAK (hrs)=	5.08	5.25	5.25
RUNOFF VOLUME (mm)=	87.54	39.71	87.06
TOTAL RAINFALL (mm)=	88.54	88.54	88.54
RUNOFF COEFFICIENT =	0.99	0.45	0.98

CALIB	
STANDHYD (0008)	Area (ha)= 1.23
ID= 1 DT= 5.0 min	Total Imp(%)= 99.00 Dir. Conn.(%)= 99.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	1.22	0.01
Dep. Storage (mm)=	1.00	1.50
Average Slope (%)=	1.00	2.00
Length (m)=	90.59	40.00
Mannings n =	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	0.00	3.167	5.31	6.250	11.51	9.33	0.89
0.167	0.00	3.250	5.31	6.333	6.20	9.42	0.89
0.250	0.00	3.333	15.05	6.417	6.20	9.50	0.89
0.333	0.89	3.417	15.05	6.500	6.20	9.58	0.89
0.417	0.89	3.500	15.05	6.583	6.20	9.67	0.89
0.500	0.89	3.583	15.05	6.667	6.20	9.75	0.89
0.583	0.89	3.667	15.05	6.750	6.20	9.83	0.89
0.667	0.89	3.750	15.05	6.833	6.20	9.92	0.89
0.750	0.89	3.833	15.05	6.917	6.20	10.00	0.89
0.833	0.89	3.917	15.05	7.000	6.20	10.08	0.89
0.917	0.89	4.000	15.05	7.083	6.20	10.17	0.89
1.000	0.89	4.083	15.05	7.167	6.20	10.25	0.89
1.083	0.89	4.167	15.05	7.250	6.20	10.33	0.89

Pre-Dev Schematics

1.167	0.89	4.250	15.05	7.333	3.54	10.42	0.89
1.250	0.89	4.333	40.71	7.417	3.54	10.50	0.89
1.333	0.89	4.417	40.71	7.500	3.54	10.58	0.89
1.417	0.89	4.500	40.71	7.583	3.54	10.67	0.89
1.500	0.89	4.583	40.71	7.667	3.54	10.75	0.89
1.583	0.89	4.667	40.71	7.750	3.54	10.83	0.89
1.667	0.89	4.750	40.71	7.833	3.54	10.92	0.89
1.750	0.89	4.833	40.71	7.917	3.54	11.00	0.89
1.833	0.89	4.917	40.71	8.000	3.54	11.08	0.89
1.917	0.89	5.000	40.71	8.083	3.54	11.17	0.89
2.000	0.89	5.083	40.71	8.167	3.54	11.25	0.89
2.083	0.89	5.167	40.71	8.250	3.54	11.33	0.89
2.167	0.89	5.250	40.71	8.333	1.77	11.42	0.89
2.250	0.89	5.333	11.51	8.417	1.77	11.50	0.89
2.333	5.31	5.417	11.51	8.500	1.77	11.58	0.89
2.417	5.31	5.500	11.51	8.583	1.77	11.67	0.89
2.500	5.31	5.583	11.51	8.667	1.77	11.75	0.89
2.583	5.31	5.667	11.51	8.750	1.77	11.83	0.89
2.667	5.31	5.750	11.51	8.833	1.77	11.92	0.89
2.750	5.31	5.833	11.51	8.917	1.77	12.00	0.89
2.833	5.31	5.917	11.51	9.000	1.77	12.08	0.89
2.917	5.31	6.000	11.51	9.083	1.77	12.17	0.89
3.000	5.31	6.083	11.51	9.167	1.77	12.25	0.89
3.083	5.31	6.167	11.51	9.250	1.77		

Max.Eff.Inten.(mm/hr)=	40.71	23.95
over (min)	5.00	10.00
Storage Coeff. (min)=	3.45 (ii)	5.06 (ii)
Unit Hyd. Tpeak (min)=	5.00	10.00
Unit Hyd. peak (cms)=	0.26	0.16

TOTALS

PEAK FLOW (cms)=	0.14	0.00	0.139 (iii)
TIME TO PEAK (hrs)=	5.08	5.25	5.25
RUNOFF VOLUME (mm)=	87.54	39.71	87.06
TOTAL RAINFALL (mm)=	88.54	88.54	88.54
RUNOFF COEFFICIENT =	0.99	0.45	0.98

ADD HYD (0009)				
1 + 2 = 3				

	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0001):	0.85	0.096	5.25	87.06
+ ID2= 2 (0008):	1.23	0.139	5.25	87.06
=====				
ID = 3 (0009):	2.08	0.235	5.25	87.06

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

Pre-Dev Schematics

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```
V  V  I  SSSSS  U  U  A  L          (v 6.2.2019)
V  V  I  SS    U  U  A A  L
V  V  I  SS    U  U  AAAAA L
V  V  I  SS    U  U  A  A  L
  VV  I  SSSSS  UUUUU  A  A  LLLLL
```

```
  000  TTTTT  TTTTT  H  H  Y  Y  M  M  000  TM
O  O  T  T  H  H  Y  Y  MM MM  O  O
O  O  T  T  H  H  Y  M  M  O  O
  000  T  T  H  H  Y  M  M  000
```

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***** D E T A I L E D O U T P U T *****

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\V02\voin.dat

Output filename:

C:\Users\21yk\AppData\Local\Civica\XH5\946992b3-465d-43ba-a8b8-ff4639fd3c\11be03
a-ee1c-4716-af70-0179a08a989d\scenari

Summary filename:

C:\Users\21yk\AppData\Local\Civica\XH5\946992b3-465d-43ba-a8b8-ff4639fd3c\11be03
a-ee1c-4716-af70-0179a08a989d\scenari

DATE: 02-26-2025

TIME: 03:45:02

USER:

COMMENTS: _____

** SIMULATION : 2 Year 12 Hour AES (Bloor, TR **

Pre-Dev Schematics

READ STORM	Filename: C:\Users\21yk\AppData\Local\Temp\0bac4a66-5d40-4b92-bea6-b2458219cd99\19034d4
Ptotal= 42.00 mm	Comments: 2 Year 12 Hour AES (Bloor, TRCA)

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.00	0.00	3.25	7.14	6.50	2.94	9.75	0.42
0.25	0.42	3.50	7.14	6.75	2.94	10.00	0.42
0.50	0.42	3.75	7.14	7.00	2.94	10.25	0.42
0.75	0.42	4.00	7.14	7.25	1.68	10.50	0.42
1.00	0.42	4.25	19.32	7.50	1.68	10.75	0.42
1.25	0.42	4.50	19.32	7.75	1.68	11.00	0.42
1.50	0.42	4.75	19.32	8.00	1.68	11.25	0.42
1.75	0.42	5.00	19.32	8.25	0.84	11.50	0.42
2.00	0.42	5.25	5.46	8.50	0.84	11.75	0.42
2.25	2.52	5.50	5.46	8.75	0.84	12.00	0.42
2.50	2.52	5.75	5.46	9.00	0.84		
2.75	2.52	6.00	5.46	9.25	0.42		
3.00	2.52	6.25	2.94	9.50	0.42		

CALIB	Area (ha)= 0.85
STANDHYD (0001)	Total Imp(%)= 99.00 Dir. Conn.(%)= 99.00
ID= 1 DT= 5.0 min	

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.84	0.01
Dep. Storage (mm)=	1.00	1.50
Average Slope (%)=	1.00	2.00
Length (m)=	75.37	40.00
Mannings n =	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----							
TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	0.00	3.167	2.52	6.250	5.46	9.33	0.42
0.167	0.00	3.250	2.52	6.333	2.94	9.42	0.42
0.250	0.00	3.333	7.14	6.417	2.94	9.50	0.42
0.333	0.42	3.417	7.14	6.500	2.94	9.58	0.42
0.417	0.42	3.500	7.14	6.583	2.94	9.67	0.42
0.500	0.42	3.583	7.14	6.667	2.94	9.75	0.42
0.583	0.42	3.667	7.14	6.750	2.94	9.83	0.42
0.667	0.42	3.750	7.14	6.833	2.94	9.92	0.42

Pre-Dev Schematics

0.750	0.42	3.833	7.14	6.917	2.94	10.00	0.42
0.833	0.42	3.917	7.14	7.000	2.94	10.08	0.42
0.917	0.42	4.000	7.14	7.083	2.94	10.17	0.42
1.000	0.42	4.083	7.14	7.167	2.94	10.25	0.42
1.083	0.42	4.167	7.14	7.250	2.94	10.33	0.42
1.167	0.42	4.250	7.14	7.333	1.68	10.42	0.42
1.250	0.42	4.333	19.32	7.417	1.68	10.50	0.42
1.333	0.42	4.417	19.32	7.500	1.68	10.58	0.42
1.417	0.42	4.500	19.32	7.583	1.68	10.67	0.42
1.500	0.42	4.583	19.32	7.667	1.68	10.75	0.42
1.583	0.42	4.667	19.32	7.750	1.68	10.83	0.42
1.667	0.42	4.750	19.32	7.833	1.68	10.92	0.42
1.750	0.42	4.833	19.32	7.917	1.68	11.00	0.42
1.833	0.42	4.917	19.32	8.000	1.68	11.08	0.42
1.917	0.42	5.000	19.32	8.083	1.68	11.17	0.42
2.000	0.42	5.083	19.32	8.167	1.68	11.25	0.42
2.083	0.42	5.167	19.32	8.250	1.68	11.33	0.42
2.167	0.42	5.250	19.32	8.333	0.84	11.42	0.42
2.250	0.42	5.333	5.46	8.417	0.84	11.50	0.42
2.333	2.52	5.417	5.46	8.500	0.84	11.58	0.42
2.417	2.52	5.500	5.46	8.583	0.84	11.67	0.42
2.500	2.52	5.583	5.46	8.667	0.84	11.75	0.42
2.583	2.52	5.667	5.46	8.750	0.84	11.83	0.42
2.667	2.52	5.750	5.46	8.833	0.84	11.92	0.42
2.750	2.52	5.833	5.46	8.917	0.84	12.00	0.42
2.833	2.52	5.917	5.46	9.000	0.84	12.08	0.42
2.917	2.52	6.000	5.46	9.083	0.84	12.17	0.42
3.000	2.52	6.083	5.46	9.167	0.84	12.25	0.42
3.083	2.52	6.167	5.46	9.250	0.84		

Max.Eff.Inten.(mm/hr)= 19.32 7.10
over (min) 5.00 10.00
Storage Coeff. (min)= 4.16 (ii) 6.33 (ii)
Unit Hyd. Tpeak (min)= 5.00 10.00
Unit Hyd. peak (cms)= 0.24 0.15

TOTALS

PEAK FLOW (cms)= 0.05 0.00 0.045 (iii)
TIME TO PEAK (hrs)= 5.17 5.25 5.25
RUNOFF VOLUME (mm)= 41.00 11.37 40.70
TOTAL RAINFALL (mm)= 42.00 42.00 42.00
RUNOFF COEFFICIENT = 0.98 0.27 0.97

CALIB
STANDHYD (0008)
ID= 1 DT= 5.0 min

Area (ha)= 1.23
Total Imp(%)= 99.00 Dir. Conn.(%)= 99.00

IMPERVIOUS PERVIOUS (i)

Pre-Dev Schematics

Surface Area	(ha)=	1.22	0.01
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	90.59	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	0.00	3.167	2.52	6.250	5.46	9.33	0.42
0.167	0.00	3.250	2.52	6.333	2.94	9.42	0.42
0.250	0.00	3.333	7.14	6.417	2.94	9.50	0.42
0.333	0.42	3.417	7.14	6.500	2.94	9.58	0.42
0.417	0.42	3.500	7.14	6.583	2.94	9.67	0.42
0.500	0.42	3.583	7.14	6.667	2.94	9.75	0.42
0.583	0.42	3.667	7.14	6.750	2.94	9.83	0.42
0.667	0.42	3.750	7.14	6.833	2.94	9.92	0.42
0.750	0.42	3.833	7.14	6.917	2.94	10.00	0.42
0.833	0.42	3.917	7.14	7.000	2.94	10.08	0.42
0.917	0.42	4.000	7.14	7.083	2.94	10.17	0.42
1.000	0.42	4.083	7.14	7.167	2.94	10.25	0.42
1.083	0.42	4.167	7.14	7.250	2.94	10.33	0.42
1.167	0.42	4.250	7.14	7.333	1.68	10.42	0.42
1.250	0.42	4.333	19.32	7.417	1.68	10.50	0.42
1.333	0.42	4.417	19.32	7.500	1.68	10.58	0.42
1.417	0.42	4.500	19.32	7.583	1.68	10.67	0.42
1.500	0.42	4.583	19.32	7.667	1.68	10.75	0.42
1.583	0.42	4.667	19.32	7.750	1.68	10.83	0.42
1.667	0.42	4.750	19.32	7.833	1.68	10.92	0.42
1.750	0.42	4.833	19.32	7.917	1.68	11.00	0.42
1.833	0.42	4.917	19.32	8.000	1.68	11.08	0.42
1.917	0.42	5.000	19.32	8.083	1.68	11.17	0.42
2.000	0.42	5.083	19.32	8.167	1.68	11.25	0.42
2.083	0.42	5.167	19.32	8.250	1.68	11.33	0.42
2.167	0.42	5.250	19.32	8.333	0.84	11.42	0.42
2.250	0.42	5.333	5.46	8.417	0.84	11.50	0.42
2.333	2.52	5.417	5.46	8.500	0.84	11.58	0.42
2.417	2.52	5.500	5.46	8.583	0.84	11.67	0.42
2.500	2.52	5.583	5.46	8.667	0.84	11.75	0.42
2.583	2.52	5.667	5.46	8.750	0.84	11.83	0.42
2.667	2.52	5.750	5.46	8.833	0.84	11.92	0.42
2.750	2.52	5.833	5.46	8.917	0.84	12.00	0.42
2.833	2.52	5.917	5.46	9.000	0.84	12.08	0.42
2.917	2.52	6.000	5.46	9.083	0.84	12.17	0.42
3.000	2.52	6.083	5.46	9.167	0.84	12.25	0.42
3.083	2.52	6.167	5.46	9.250	0.84		

Pre-Dev Schematics

Max.Eff.Inten.(mm/hr)=	19.32	7.10	
over (min)	5.00	10.00	
Storage Coeff. (min)=	4.65 (ii)	6.81 (ii)	
Unit Hyd. Tpeak (min)=	5.00	10.00	
Unit Hyd. peak (cms)=	0.22	0.14	
			TOTALS
PEAK FLOW (cms)=	0.07	0.00	0.066 (iii)
TIME TO PEAK (hrs)=	5.25	5.25	5.25
RUNOFF VOLUME (mm)=	41.00	11.37	40.70
TOTAL RAINFALL (mm)=	42.00	42.00	42.00
RUNOFF COEFFICIENT =	0.98	0.27	0.97

ADD HYD (0009)				
1 + 2 = 3				

	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0001):	0.85	0.045	5.25	40.70
+ ID2= 2 (0008):	1.23	0.066	5.25	40.70
=====				
ID = 3 (0009):	2.08	0.111	5.25	40.70

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

FINISH

V V I SSSSS U U A L (v 6.2.2019)
V V I SS U U A A L
V V I SS U U AAAAA L
V V I SS U U A A L
VV I SSSSS UUUUU A A LLLLL

000 TTTTT TTTTT H H Y Y M M 000 TM
O O T T H H Y Y MM MM O O
O O T T H H Y M M O O
000 T T H H Y M M 000

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Pre-Dev Schematics

***** D E T A I L E D O U T P U T *****

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\V02\voin.dat

Output filename:

C:\Users\21yk\AppData\Local\Civica\XH5\946992b3-465d-43ba-a8b8-ff4639fdfd3c\0537fbb7-beb6-4842-bddb-53d257b63f48\scenari

Summary filename:

C:\Users\21yk\AppData\Local\Civica\XH5\946992b3-465d-43ba-a8b8-ff4639fdfd3c\0537fbb7-beb6-4842-bddb-53d257b63f48\scenari

DATE: 02-26-2025

TIME: 03:45:01

USER:

COMMENTS: _____

** SIMULATION : 25 Year 12 Hour AES (Bloor, T **

READ STORM	Filename: C:\Users\21yk\AppData\Local\Temp\0bac4a66-5d40-4b92-bea6-b2458219cd99\56aba7b2
Ptotal= 73.10 mm	Comments: 25 Year 12 Hour AES (Bloor, TRCA)

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.00	0.00	3.25	12.43	6.50	5.12	9.75	0.73
0.25	0.73	3.50	12.43	6.75	5.12	10.00	0.73
0.50	0.73	3.75	12.43	7.00	5.12	10.25	0.73
0.75	0.73	4.00	12.43	7.25	2.92	10.50	0.73
1.00	0.73	4.25	33.63	7.50	2.92	10.75	0.73
1.25	0.73	4.50	33.63	7.75	2.92	11.00	0.73
1.50	0.73	4.75	33.63	8.00	2.92	11.25	0.73
1.75	0.73	5.00	33.63	8.25	1.46	11.50	0.73
2.00	0.73	5.25	9.50	8.50	1.46	11.75	0.73
2.25	4.39	5.50	9.50	8.75	1.46	12.00	0.73
2.50	4.39	5.75	9.50	9.00	1.46		
2.75	4.39	6.00	9.50	9.25	0.73		

Pre-Dev Schematics

3.00 4.39 | 6.25 5.12 | 9.50 0.73 |

| CALIB |
| STANDHYD (0001) | Area (ha)= 0.85
| ID= 1 DT= 5.0 min | Total Imp(%)= 99.00 Dir. Conn.(%)= 99.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.84	0.01
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	75.37	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

----- TRANSFORMED HYETOGRAPH -----

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	0.00	3.167	4.39	6.250	9.50	9.33	0.73
0.167	0.00	3.250	4.39	6.333	5.12	9.42	0.73
0.250	0.00	3.333	12.43	6.417	5.12	9.50	0.73
0.333	0.73	3.417	12.43	6.500	5.12	9.58	0.73
0.417	0.73	3.500	12.43	6.583	5.12	9.67	0.73
0.500	0.73	3.583	12.43	6.667	5.12	9.75	0.73
0.583	0.73	3.667	12.43	6.750	5.12	9.83	0.73
0.667	0.73	3.750	12.43	6.833	5.12	9.92	0.73
0.750	0.73	3.833	12.43	6.917	5.12	10.00	0.73
0.833	0.73	3.917	12.43	7.000	5.12	10.08	0.73
0.917	0.73	4.000	12.43	7.083	5.12	10.17	0.73
1.000	0.73	4.083	12.43	7.167	5.12	10.25	0.73
1.083	0.73	4.167	12.43	7.250	5.12	10.33	0.73
1.167	0.73	4.250	12.43	7.333	2.92	10.42	0.73
1.250	0.73	4.333	33.63	7.417	2.92	10.50	0.73
1.333	0.73	4.417	33.63	7.500	2.92	10.58	0.73
1.417	0.73	4.500	33.63	7.583	2.92	10.67	0.73
1.500	0.73	4.583	33.63	7.667	2.92	10.75	0.73
1.583	0.73	4.667	33.63	7.750	2.92	10.83	0.73
1.667	0.73	4.750	33.63	7.833	2.92	10.92	0.73
1.750	0.73	4.833	33.63	7.917	2.92	11.00	0.73
1.833	0.73	4.917	33.63	8.000	2.92	11.08	0.73
1.917	0.73	5.000	33.63	8.083	2.92	11.17	0.73
2.000	0.73	5.083	33.63	8.167	2.92	11.25	0.73
2.083	0.73	5.167	33.63	8.250	2.92	11.33	0.73
2.167	0.73	5.250	33.63	8.333	1.46	11.42	0.73
2.250	0.73	5.333	9.50	8.417	1.46	11.50	0.73

Pre-Dev Schematics

2.333	4.39	5.417	9.50	8.500	1.46	11.58	0.73
2.417	4.39	5.500	9.50	8.583	1.46	11.67	0.73
2.500	4.39	5.583	9.50	8.667	1.46	11.75	0.73
2.583	4.39	5.667	9.50	8.750	1.46	11.83	0.73
2.667	4.39	5.750	9.50	8.833	1.46	11.92	0.73
2.750	4.39	5.833	9.50	8.917	1.46	12.00	0.73
2.833	4.39	5.917	9.50	9.000	1.46	12.08	0.73
2.917	4.39	6.000	9.50	9.083	1.46	12.17	0.73
3.000	4.39	6.083	9.50	9.167	1.46	12.25	0.73
3.083	4.39	6.167	9.50	9.250	1.46		

Max.Eff.Inten.(mm/hr)=	33.63	17.82
over (min)	5.00	10.00
Storage Coeff. (min)=	3.33 (ii)	5.07 (ii)
Unit Hyd. Tpeak (min)=	5.00	10.00
Unit Hyd. peak (cms)=	0.26	0.16

TOTALS

PEAK FLOW (cms)=	0.08	0.00	0.079 (iii)
TIME TO PEAK (hrs)=	5.08	5.25	5.25
RUNOFF VOLUME (mm)=	72.10	29.24	71.67
TOTAL RAINFALL (mm)=	73.10	73.10	73.10
RUNOFF COEFFICIENT =	0.99	0.40	0.98

CALIB	
STANDHYD (0008)	Area (ha)= 1.23
ID= 1 DT= 5.0 min	Total Imp(%)= 99.00 Dir. Conn.(%)= 99.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	1.22	0.01
Dep. Storage (mm)=	1.00	1.50
Average Slope (%)=	1.00	2.00
Length (m)=	90.59	40.00
Mannings n =	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	0.00	3.167	4.39	6.250	9.50	9.33	0.73
0.167	0.00	3.250	4.39	6.333	5.12	9.42	0.73
0.250	0.00	3.333	12.43	6.417	5.12	9.50	0.73
0.333	0.73	3.417	12.43	6.500	5.12	9.58	0.73
0.417	0.73	3.500	12.43	6.583	5.12	9.67	0.73
0.500	0.73	3.583	12.43	6.667	5.12	9.75	0.73
0.583	0.73	3.667	12.43	6.750	5.12	9.83	0.73

Pre-Dev Schematics

0.667	0.73	3.750	12.43	6.833	5.12	9.92	0.73
0.750	0.73	3.833	12.43	6.917	5.12	10.00	0.73
0.833	0.73	3.917	12.43	7.000	5.12	10.08	0.73
0.917	0.73	4.000	12.43	7.083	5.12	10.17	0.73
1.000	0.73	4.083	12.43	7.167	5.12	10.25	0.73
1.083	0.73	4.167	12.43	7.250	5.12	10.33	0.73
1.167	0.73	4.250	12.43	7.333	2.92	10.42	0.73
1.250	0.73	4.333	33.63	7.417	2.92	10.50	0.73
1.333	0.73	4.417	33.63	7.500	2.92	10.58	0.73
1.417	0.73	4.500	33.63	7.583	2.92	10.67	0.73
1.500	0.73	4.583	33.63	7.667	2.92	10.75	0.73
1.583	0.73	4.667	33.63	7.750	2.92	10.83	0.73
1.667	0.73	4.750	33.63	7.833	2.92	10.92	0.73
1.750	0.73	4.833	33.63	7.917	2.92	11.00	0.73
1.833	0.73	4.917	33.63	8.000	2.92	11.08	0.73
1.917	0.73	5.000	33.63	8.083	2.92	11.17	0.73
2.000	0.73	5.083	33.63	8.167	2.92	11.25	0.73
2.083	0.73	5.167	33.63	8.250	2.92	11.33	0.73
2.167	0.73	5.250	33.63	8.333	1.46	11.42	0.73
2.250	0.73	5.333	9.50	8.417	1.46	11.50	0.73
2.333	4.39	5.417	9.50	8.500	1.46	11.58	0.73
2.417	4.39	5.500	9.50	8.583	1.46	11.67	0.73
2.500	4.39	5.583	9.50	8.667	1.46	11.75	0.73
2.583	4.39	5.667	9.50	8.750	1.46	11.83	0.73
2.667	4.39	5.750	9.50	8.833	1.46	11.92	0.73
2.750	4.39	5.833	9.50	8.917	1.46	12.00	0.73
2.833	4.39	5.917	9.50	9.000	1.46	12.08	0.73
2.917	4.39	6.000	9.50	9.083	1.46	12.17	0.73
3.000	4.39	6.083	9.50	9.167	1.46	12.25	0.73
3.083	4.39	6.167	9.50	9.250	1.46		

Max.Eff.Inten.(mm/hr)=	33.63	17.82
over (min)	5.00	10.00
Storage Coeff. (min)=	3.72 (ii)	5.46 (ii)
Unit Hyd. Tpeak (min)=	5.00	10.00
Unit Hyd. peak (cms)=	0.25	0.16

TOTALS

PEAK FLOW (cms)=	0.11	0.00	0.114 (iii)
TIME TO PEAK (hrs)=	5.08	5.25	5.25
RUNOFF VOLUME (mm)=	72.10	29.24	71.67
TOTAL RAINFALL (mm)=	73.10	73.10	73.10
RUNOFF COEFFICIENT =	0.99	0.40	0.98

| ADD HYD (0009) |
| 1 + 2 = 3 |

AREA QPEAK TPEAK R.V.

Pre-Dev Schematics

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-----
              (ha)      (cms)      (hrs)      (mm)
ID1= 1 ( 0001):  0.85   0.079    5.25    71.67
+ ID2= 2 ( 0008):  1.23   0.114    5.25    71.67
=====
ID = 3 ( 0009):  2.08   0.194    5.25    71.67

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

V  V  I  SSSSS  U  U  A  L              (v 6.2.2019)
V  V  I  SS    U  U  A  A  L
V  V  I  SS    U  U  AAAAA L
V  V  I  SS    U  U  A  A  L
VV    I  SSSSS  UUUUU  A  A  LLLLL

```

```

000  TTTTT  TTTTT  H  H  Y  Y  M  M  000  TM
O  O  T    T    H  H  Y  Y  MM MM  O  O
O  O  T    T    H  H  Y    M  M  O  O
000    T    T    H  H  Y    M  M  000

```

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***** D E T A I L E D O U T P U T *****

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\V02\voin.dat

Output filename:

C:\Users\21yk\AppData\Local\Civica\XH5\946992b3-465d-43ba-a8b8-ff4639fd3c\1f2605a
f-81e9-4882-9c26-bd8f3b7774ee\scenari

Summary filename:

C:\Users\21yk\AppData\Local\Civica\XH5\946992b3-465d-43ba-a8b8-ff4639fd3c\1f2605a
f-81e9-4882-9c26-bd8f3b7774ee\scenari

DATE: 02-26-2025

TIME: 03:45:02

USER:

COMMENTS: _____

Pre-Dev Schematics

** SIMULATION : 5 Year 12 Hour AES (Bloor, TR **

READ STORM	Filename: C:\Users\21yk\AppData\Local\Temp\0bac4a66-5d40-4b92-bea6-b2458219cd99\6ae99da1
Ptotal= 54.38 mm	Comments: 5 Year 12 Hour AES (Bloor, TRCA)

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.00	0.00	3.25	9.25	6.50	3.81	9.75	0.54
0.25	0.54	3.50	9.25	6.75	3.81	10.00	0.54
0.50	0.54	3.75	9.25	7.00	3.81	10.25	0.54
0.75	0.54	4.00	9.25	7.25	2.18	10.50	0.54
1.00	0.54	4.25	25.02	7.50	2.18	10.75	0.54
1.25	0.54	4.50	25.02	7.75	2.18	11.00	0.54
1.50	0.54	4.75	25.02	8.00	2.18	11.25	0.54
1.75	0.54	5.00	25.02	8.25	1.09	11.50	0.54
2.00	0.54	5.25	7.07	8.50	1.09	11.75	0.54
2.25	3.26	5.50	7.07	8.75	1.09	12.00	0.54
2.50	3.26	5.75	7.07	9.00	1.09		
2.75	3.26	6.00	7.07	9.25	0.54		
3.00	3.26	6.25	3.81	9.50	0.54		

CALIB	Area (ha)= 0.85
STANDHYD (0001)	Total Imp(%)= 99.00 Dir. Conn.(%)= 99.00
ID= 1 DT= 5.0 min	

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.84	0.01
Dep. Storage (mm)=	1.00	1.50
Average Slope (%)=	1.00	2.00
Length (m)=	75.37	40.00
Mannings n =	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	0.00	3.167	3.26	6.250	7.07	9.33	0.54

Pre-Dev Schematics

0.167	0.00	3.250	3.26	6.333	3.81	9.42	0.54
0.250	0.00	3.333	9.25	6.417	3.81	9.50	0.54
0.333	0.54	3.417	9.25	6.500	3.81	9.58	0.54
0.417	0.54	3.500	9.25	6.583	3.81	9.67	0.54
0.500	0.54	3.583	9.25	6.667	3.81	9.75	0.54
0.583	0.54	3.667	9.25	6.750	3.81	9.83	0.54
0.667	0.54	3.750	9.25	6.833	3.81	9.92	0.54
0.750	0.54	3.833	9.25	6.917	3.81	10.00	0.54
0.833	0.54	3.917	9.25	7.000	3.81	10.08	0.54
0.917	0.54	4.000	9.25	7.083	3.81	10.17	0.54
1.000	0.54	4.083	9.25	7.167	3.81	10.25	0.54
1.083	0.54	4.167	9.25	7.250	3.81	10.33	0.54
1.167	0.54	4.250	9.25	7.333	2.18	10.42	0.54
1.250	0.54	4.333	25.02	7.417	2.18	10.50	0.54
1.333	0.54	4.417	25.02	7.500	2.18	10.58	0.54
1.417	0.54	4.500	25.02	7.583	2.18	10.67	0.54
1.500	0.54	4.583	25.02	7.667	2.18	10.75	0.54
1.583	0.54	4.667	25.02	7.750	2.18	10.83	0.54
1.667	0.54	4.750	25.02	7.833	2.18	10.92	0.54
1.750	0.54	4.833	25.02	7.917	2.18	11.00	0.54
1.833	0.54	4.917	25.02	8.000	2.18	11.08	0.54
1.917	0.54	5.000	25.02	8.083	2.18	11.17	0.54
2.000	0.54	5.083	25.02	8.167	2.18	11.25	0.54
2.083	0.54	5.167	25.02	8.250	2.18	11.33	0.54
2.167	0.54	5.250	25.02	8.333	1.09	11.42	0.54
2.250	0.54	5.333	7.07	8.417	1.09	11.50	0.54
2.333	3.26	5.417	7.07	8.500	1.09	11.58	0.54
2.417	3.26	5.500	7.07	8.583	1.09	11.67	0.54
2.500	3.26	5.583	7.07	8.667	1.09	11.75	0.54
2.583	3.26	5.667	7.07	8.750	1.09	11.83	0.54
2.667	3.26	5.750	7.07	8.833	1.09	11.92	0.54
2.750	3.26	5.833	7.07	8.917	1.09	12.00	0.54
2.833	3.26	5.917	7.07	9.000	1.09	12.08	0.54
2.917	3.26	6.000	7.07	9.083	1.09	12.17	0.54
3.000	3.26	6.083	7.07	9.167	1.09	12.25	0.54
3.083	3.26	6.167	7.07	9.250	1.09		

Max.Eff.Inten.(mm/hr)=	25.02	11.03
over (min)	5.00	10.00
Storage Coeff. (min)=	3.75 (ii)	5.71 (ii)
Unit Hyd. Tpeak (min)=	5.00	10.00
Unit Hyd. peak (cms)=	0.25	0.15

TOTALS

PEAK FLOW (cms)=	0.06	0.00	0.059 (iii)
TIME TO PEAK (hrs)=	5.08	5.25	5.25
RUNOFF VOLUME (mm)=	53.38	17.85	53.02
TOTAL RAINFALL (mm)=	54.38	54.38	54.38
RUNOFF COEFFICIENT =	0.98	0.33	0.97

Pre-Dev Schematics

 | CALIB |
 | STANDHYD (0008) | Area (ha)= 1.23
 | ID= 1 DT= 5.0 min | Total Imp(%)= 99.00 Dir. Conn.(%)= 99.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	1.22	0.01
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	90.59	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

----- TRANSFORMED HYETOGRAPH -----

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	0.00	3.167	3.26	6.250	7.07	9.33	0.54
0.167	0.00	3.250	3.26	6.333	3.81	9.42	0.54
0.250	0.00	3.333	9.25	6.417	3.81	9.50	0.54
0.333	0.54	3.417	9.25	6.500	3.81	9.58	0.54
0.417	0.54	3.500	9.25	6.583	3.81	9.67	0.54
0.500	0.54	3.583	9.25	6.667	3.81	9.75	0.54
0.583	0.54	3.667	9.25	6.750	3.81	9.83	0.54
0.667	0.54	3.750	9.25	6.833	3.81	9.92	0.54
0.750	0.54	3.833	9.25	6.917	3.81	10.00	0.54
0.833	0.54	3.917	9.25	7.000	3.81	10.08	0.54
0.917	0.54	4.000	9.25	7.083	3.81	10.17	0.54
1.000	0.54	4.083	9.25	7.167	3.81	10.25	0.54
1.083	0.54	4.167	9.25	7.250	3.81	10.33	0.54
1.167	0.54	4.250	9.25	7.333	2.18	10.42	0.54
1.250	0.54	4.333	25.02	7.417	2.18	10.50	0.54
1.333	0.54	4.417	25.02	7.500	2.18	10.58	0.54
1.417	0.54	4.500	25.02	7.583	2.18	10.67	0.54
1.500	0.54	4.583	25.02	7.667	2.18	10.75	0.54
1.583	0.54	4.667	25.02	7.750	2.18	10.83	0.54
1.667	0.54	4.750	25.02	7.833	2.18	10.92	0.54
1.750	0.54	4.833	25.02	7.917	2.18	11.00	0.54
1.833	0.54	4.917	25.02	8.000	2.18	11.08	0.54
1.917	0.54	5.000	25.02	8.083	2.18	11.17	0.54
2.000	0.54	5.083	25.02	8.167	2.18	11.25	0.54
2.083	0.54	5.167	25.02	8.250	2.18	11.33	0.54
2.167	0.54	5.250	25.02	8.333	1.09	11.42	0.54
2.250	0.54	5.333	7.07	8.417	1.09	11.50	0.54
2.333	3.26	5.417	7.07	8.500	1.09	11.58	0.54
2.417	3.26	5.500	7.07	8.583	1.09	11.67	0.54

Pre-Dev Schematics

2.500	3.26	5.583	7.07	8.667	1.09	11.75	0.54
2.583	3.26	5.667	7.07	8.750	1.09	11.83	0.54
2.667	3.26	5.750	7.07	8.833	1.09	11.92	0.54
2.750	3.26	5.833	7.07	8.917	1.09	12.00	0.54
2.833	3.26	5.917	7.07	9.000	1.09	12.08	0.54
2.917	3.26	6.000	7.07	9.083	1.09	12.17	0.54
3.000	3.26	6.083	7.07	9.167	1.09	12.25	0.54
3.083	3.26	6.167	7.07	9.250	1.09		

Max.Eff.Inten.(mm/hr)=	25.02	11.03
over (min)	5.00	10.00
Storage Coeff. (min)=	4.19 (ii)	6.15 (ii)
Unit Hyd. Tpeak (min)=	5.00	10.00
Unit Hyd. peak (cms)=	0.24	0.15

TOTALS

PEAK FLOW (cms)=	0.08	0.00	0.085 (iii)
TIME TO PEAK (hrs)=	5.17	5.25	5.25
RUNOFF VOLUME (mm)=	53.38	17.85	53.02
TOTAL RAINFALL (mm)=	54.38	54.38	54.38
RUNOFF COEFFICIENT =	0.98	0.33	0.98

ADD HYD (0009)					
1 + 2 = 3					

	AREA	QPEAK	TPEAK	R.V.	
	(ha)	(cms)	(hrs)	(mm)	
ID1= 1 (0001):	0.85	0.059	5.25	53.02	
+ ID2= 2 (0008):	1.23	0.085	5.25	53.02	
=====					
ID = 3 (0009):	2.08	0.144	5.25	53.02	

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

=====

V V I SSSSS U U A L (v 6.2.2019)
V V I SS U U A A L
V V I SS U U AAAAA L
V V I SS U U A A L
VV I SSSSS UUUUU A A LLLLL

000 TTTTT TTTTT H H Y Y M M 000 TM
O O T T H H Y Y MM MM O O
O O T T H H Y M M O O
000 T T H H Y M M 000

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Pre-Dev Schematics

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***** D E T A I L E D O U T P U T *****

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\V02\voin.dat

Output filename:

C:\Users\21yk\AppData\Local\Civica\XH5\946992b3-465d-43ba-a8b8-ff4639fd3c\0d9c619f-425a-4277-8d2f-1f231b07e49d\scenari

Summary filename:

C:\Users\21yk\AppData\Local\Civica\XH5\946992b3-465d-43ba-a8b8-ff4639fd3c\0d9c619f-425a-4277-8d2f-1f231b07e49d\scenari

DATE: 02-26-2025

TIME: 03:45:01

USER:

COMMENTS: _____

** SIMULATION : 50 Year 12 Hour AES (Bloor, T **

READ STORM	Filename: C:\Users\21yk\AppData\Local\Temp\0bac4a66-5d40-4b92-bea6-b2458219cd99\587398f2
Ptotal= 80.82 mm	Comments: 50 Year 12 Hour AES (Bloor, TRCA)

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.00	0.00	3.25	13.74	6.50	5.66	9.75	0.81
0.25	0.81	3.50	13.74	6.75	5.66	10.00	0.81
0.50	0.81	3.75	13.74	7.00	5.66	10.25	0.81
0.75	0.81	4.00	13.74	7.25	3.23	10.50	0.81
1.00	0.81	4.25	37.17	7.50	3.23	10.75	0.81
1.25	0.81	4.50	37.17	7.75	3.23	11.00	0.81
1.50	0.81	4.75	37.17	8.00	3.23	11.25	0.81
1.75	0.81	5.00	37.17	8.25	1.62	11.50	0.81

Pre-Dev Schematics

2.00	0.81	5.25	10.50	8.50	1.62	11.75	0.81
2.25	4.85	5.50	10.50	8.75	1.62	12.00	0.81
2.50	4.85	5.75	10.50	9.00	1.62		
2.75	4.85	6.00	10.50	9.25	0.81		
3.00	4.85	6.25	5.66	9.50	0.81		

CALIB	
STANDHYD (0001)	Area (ha)= 0.85
ID= 1 DT= 5.0 min	Total Imp(%)= 99.00 Dir. Conn.(%)= 99.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.84	0.01
Dep. Storage (mm)=	1.00	1.50
Average Slope (%)=	1.00	2.00
Length (m)=	75.37	40.00
Mannings n =	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	0.00	3.167	4.85	6.250	10.50	9.33	0.81
0.167	0.00	3.250	4.85	6.333	5.66	9.42	0.81
0.250	0.00	3.333	13.74	6.417	5.66	9.50	0.81
0.333	0.81	3.417	13.74	6.500	5.66	9.58	0.81
0.417	0.81	3.500	13.74	6.583	5.66	9.67	0.81
0.500	0.81	3.583	13.74	6.667	5.66	9.75	0.81
0.583	0.81	3.667	13.74	6.750	5.66	9.83	0.81
0.667	0.81	3.750	13.74	6.833	5.66	9.92	0.81
0.750	0.81	3.833	13.74	6.917	5.66	10.00	0.81
0.833	0.81	3.917	13.74	7.000	5.66	10.08	0.81
0.917	0.81	4.000	13.74	7.083	5.66	10.17	0.81
1.000	0.81	4.083	13.74	7.167	5.66	10.25	0.81
1.083	0.81	4.167	13.74	7.250	5.66	10.33	0.81
1.167	0.81	4.250	13.74	7.333	3.23	10.42	0.81
1.250	0.81	4.333	37.17	7.417	3.23	10.50	0.81
1.333	0.81	4.417	37.17	7.500	3.23	10.58	0.81
1.417	0.81	4.500	37.17	7.583	3.23	10.67	0.81
1.500	0.81	4.583	37.17	7.667	3.23	10.75	0.81
1.583	0.81	4.667	37.17	7.750	3.23	10.83	0.81
1.667	0.81	4.750	37.17	7.833	3.23	10.92	0.81
1.750	0.81	4.833	37.17	7.917	3.23	11.00	0.81
1.833	0.81	4.917	37.17	8.000	3.23	11.08	0.81
1.917	0.81	5.000	37.17	8.083	3.23	11.17	0.81

Pre-Dev Schematics

2.000	0.81	5.083	37.17	8.167	3.23	11.25	0.81
2.083	0.81	5.167	37.17	8.250	3.23	11.33	0.81
2.167	0.81	5.250	37.17	8.333	1.62	11.42	0.81
2.250	0.81	5.333	10.50	8.417	1.62	11.50	0.81
2.333	4.85	5.417	10.50	8.500	1.62	11.58	0.81
2.417	4.85	5.500	10.50	8.583	1.62	11.67	0.81
2.500	4.85	5.583	10.50	8.667	1.62	11.75	0.81
2.583	4.85	5.667	10.50	8.750	1.62	11.83	0.81
2.667	4.85	5.750	10.50	8.833	1.62	11.92	0.81
2.750	4.85	5.833	10.50	8.917	1.62	12.00	0.81
2.833	4.85	5.917	10.50	9.000	1.62	12.08	0.81
2.917	4.85	6.000	10.50	9.083	1.62	12.17	0.81
3.000	4.85	6.083	10.50	9.167	1.62	12.25	0.81
3.083	4.85	6.167	10.50	9.250	1.62		

Max.Eff.Inten.(mm/hr)=	37.17	20.83
over (min)	5.00	5.00
Storage Coeff. (min)=	3.20 (ii)	4.87 (ii)
Unit Hyd. Tpeak (min)=	5.00	5.00
Unit Hyd. peak (cms)=	0.27	0.22

TOTALS

PEAK FLOW (cms)=	0.09	0.00	0.088 (iii)
TIME TO PEAK (hrs)=	5.08	5.25	5.25
RUNOFF VOLUME (mm)=	79.82	34.37	79.36
TOTAL RAINFALL (mm)=	80.82	80.82	80.82
RUNOFF COEFFICIENT =	0.99	0.43	0.98

CALIB	
STANDHYD (0008)	Area (ha)= 1.23
ID= 1 DT= 5.0 min	Total Imp(%)= 99.00 Dir. Conn.(%)= 99.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	1.22	0.01
Dep. Storage (mm)=	1.00	1.50
Average Slope (%)=	1.00	2.00
Length (m)=	90.59	40.00
Mannings n =	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	0.00	3.167	4.85	6.250	10.50	9.33	0.81
0.167	0.00	3.250	4.85	6.333	5.66	9.42	0.81

Pre-Dev Schematics

0.250	0.00	3.333	13.74	6.417	5.66	9.50	0.81
0.333	0.81	3.417	13.74	6.500	5.66	9.58	0.81
0.417	0.81	3.500	13.74	6.583	5.66	9.67	0.81
0.500	0.81	3.583	13.74	6.667	5.66	9.75	0.81
0.583	0.81	3.667	13.74	6.750	5.66	9.83	0.81
0.667	0.81	3.750	13.74	6.833	5.66	9.92	0.81
0.750	0.81	3.833	13.74	6.917	5.66	10.00	0.81
0.833	0.81	3.917	13.74	7.000	5.66	10.08	0.81
0.917	0.81	4.000	13.74	7.083	5.66	10.17	0.81
1.000	0.81	4.083	13.74	7.167	5.66	10.25	0.81
1.083	0.81	4.167	13.74	7.250	5.66	10.33	0.81
1.167	0.81	4.250	13.74	7.333	3.23	10.42	0.81
1.250	0.81	4.333	37.17	7.417	3.23	10.50	0.81
1.333	0.81	4.417	37.17	7.500	3.23	10.58	0.81
1.417	0.81	4.500	37.17	7.583	3.23	10.67	0.81
1.500	0.81	4.583	37.17	7.667	3.23	10.75	0.81
1.583	0.81	4.667	37.17	7.750	3.23	10.83	0.81
1.667	0.81	4.750	37.17	7.833	3.23	10.92	0.81
1.750	0.81	4.833	37.17	7.917	3.23	11.00	0.81
1.833	0.81	4.917	37.17	8.000	3.23	11.08	0.81
1.917	0.81	5.000	37.17	8.083	3.23	11.17	0.81
2.000	0.81	5.083	37.17	8.167	3.23	11.25	0.81
2.083	0.81	5.167	37.17	8.250	3.23	11.33	0.81
2.167	0.81	5.250	37.17	8.333	1.62	11.42	0.81
2.250	0.81	5.333	10.50	8.417	1.62	11.50	0.81
2.333	4.85	5.417	10.50	8.500	1.62	11.58	0.81
2.417	4.85	5.500	10.50	8.583	1.62	11.67	0.81
2.500	4.85	5.583	10.50	8.667	1.62	11.75	0.81
2.583	4.85	5.667	10.50	8.750	1.62	11.83	0.81
2.667	4.85	5.750	10.50	8.833	1.62	11.92	0.81
2.750	4.85	5.833	10.50	8.917	1.62	12.00	0.81
2.833	4.85	5.917	10.50	9.000	1.62	12.08	0.81
2.917	4.85	6.000	10.50	9.083	1.62	12.17	0.81
3.000	4.85	6.083	10.50	9.167	1.62	12.25	0.81
3.083	4.85	6.167	10.50	9.250	1.62		

Max.Eff.Inten.(mm/hr)=	37.17	20.83
over (min)	5.00	10.00
Storage Coeff. (min)=	3.58 (ii)	5.25 (ii)
Unit Hyd. Tpeak (min)=	5.00	10.00
Unit Hyd. peak (cms)=	0.26	0.16

TOTALS

PEAK FLOW (cms)=	0.13	0.00	0.127 (iii)
TIME TO PEAK (hrs)=	5.08	5.25	5.25
RUNOFF VOLUME (mm)=	79.82	34.37	79.36
TOTAL RAINFALL (mm)=	80.82	80.82	80.82
RUNOFF COEFFICIENT =	0.99	0.43	0.98

Pre-Dev Schematics

ADD HYD (0009)				
1 + 2 = 3				

	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0001):	0.85	0.088	5.25	79.36
+ ID2= 2 (0008):	1.23	0.127	5.25	79.36
=====				
ID = 3 (0009):	2.08	0.214	5.25	79.36

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

PRE-DEVELOPMENT VO MODEL SCHEMATIC (REGIONAL STORM EVENT)



Pre-Dev Schematics - Regional

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V   V   I   SSSSS U   U   A   L           (v 6.2.2019)
V   V   I   SS    U   U   A A   L
V   V   I   SS    U   U   AAAAA L
V   V   I   SS    U   U   A   A   L
VV      I   SSSSS UUUUU A   A   LLLLL

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000   TTTTT TTTTT H   H   Y   Y   M   M   000   TM
O   O   T       T   H   H   Y Y   MM MM   O   O
O   O   T       T   H   H   Y   M   M   O   O
000       T       T   H   H   Y   M   M   000

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***** D E T A I L E D O U T P U T *****

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\V02\voin.dat

Output filename:

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a-5729-4447-ad63-e7a9b60d14c6\scenari

Summary filename:

C:\Users\21yk\AppData\Local\Civica\XH5\946992b3-465d-43ba-a8b8-ff4639fd3c\ea9175e
a-5729-4447-ad63-e7a9b60d14c6\scenari

DATE: 02-26-2025

TIME: 03:50:55

USER:LETICIA M. N. RODRIGUES

COMMENTS: REGIONAL STORM EVENT

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*****
** SIMULATION : Hazel                      **
*****

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| READ STORM |

Filename: C:\Users\21yk\AppData

Pre-Dev Schematics - Regional

ata\Local\Temp\

24dda73d-911a-4d22-b35e-c225d55dd2fc\05ba0a93

Ptotal=212.00 mm

Comments: Hazel

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.00	6.00	3.00	13.00	6.00	23.00	9.00	53.00
1.00	4.00	4.00	17.00	7.00	13.00	10.00	38.00
2.00	6.00	5.00	13.00	8.00	13.00	11.00	13.00

CALIB

STANDHYD (0001)

ID= 1 DT= 5.0 min

Area (ha)= 0.85

Total Imp(%)= 99.00 Dir. Conn.(%)= 99.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.84	0.01
Dep. Storage (mm)=	1.00	0.00
Average Slope (%)=	1.00	2.00
Length (m)=	75.37	40.00
Mannings n =	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00

Pre-Dev Schematics - Regional

1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Max.Eff.Inten.(mm/hr)= 53.00 44.58
over (min) 5.00 5.00
Storage Coeff. (min)= 2.78 (ii) 4.23 (ii)
Unit Hyd. Tpeak (min)= 5.00 5.00
Unit Hyd. peak (cms)= 0.28 0.24

TOTALS

PEAK FLOW (cms)= 0.12 0.00 0.125 (iii)
TIME TO PEAK (hrs)= 9.75 10.00 10.00
RUNOFF VOLUME (mm)= 211.00 142.34 210.31
TOTAL RAINFALL (mm)= 212.00 212.00 212.00
RUNOFF COEFFICIENT = 1.00 0.67 0.99

CALIB
STANDHYD (0008)
ID= 1 DT= 5.0 min
Area (ha)= 1.23
Total Imp(%)= 99.00 Dir. Conn.(%)= 99.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	1.22	0.01
Dep. Storage (mm)=	1.00	0.00
Average Slope (%)=	1.00	2.00
Length (m)=	90.59	40.00
Mannings n =	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr

Pre-Dev Schematics - Regional

0.083	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Max.Eff.Inten.(mm/hr)=	53.00	44.58
over (min)	5.00	5.00
Storage Coeff. (min)=	3.10 (ii)	4.55 (ii)
Unit Hyd. Tpeak (min)=	5.00	5.00
Unit Hyd. peak (cms)=	0.27	0.23

TOTALS

PEAK FLOW (cms)=	0.18	0.00	0.181 (iii)
TIME TO PEAK (hrs)=	9.83	10.00	10.00
RUNOFF VOLUME (mm)=	211.00	142.34	210.31
TOTAL RAINFALL (mm)=	212.00	212.00	212.00
RUNOFF COEFFICIENT =	1.00	0.67	0.99

Pre-Dev Schematics - Regional

ADD HYD (0009)					
1 + 2 = 3					

		AREA	QPEAK	TPEAK	R.V.
		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0001):		0.85	0.125	10.00	210.31
+ ID2= 2 (0008):		1.23	0.181	10.00	210.31
=====					
ID = 3 (0009):		2.08	0.306	10.00	210.31

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

FINISH

POST-DEVELOPMENT VO MODEL SCHEMATIC



Post-Dev Schematics

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V   V   I   SSSSS U   U   A   L           (v 6.2.2019)
V   V   I   SS    U   U   A A   L
V   V   I   SS    U   U   AAAAA L
V   V   I   SS    U   U   A   A   L
VV      I   SSSSS UUUUU A   A   LLLLL
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000   TTTTT TTTTT H   H   Y   Y   M   M   000   TM
O   O   T       T   H   H   Y Y   MM MM   O   O
O   O   T       T   H   H   Y   M   M   O   O
000       T       T   H   H   Y   M   M   000
```

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***** D E T A I L E D O U T P U T *****

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\V02\voin.dat

Output filename:

C:\Users\21LR\AppData\Local\Civica\XH5\946992b3-465d-43ba-a8b8-ff4639fd3c\598c920a-e33e-419d-9950-e7e4390ba4f7\scenari

Summary filename:

C:\Users\21LR\AppData\Local\Civica\XH5\946992b3-465d-43ba-a8b8-ff4639fd3c\598c920a-e33e-419d-9950-e7e4390ba4f7\scenari

DATE: 02-26-2025

TIME: 01:03:44

USER: LETICIA M. N. RODRIGUES

COMMENTS: 2-100 year storm events, 12-hour AES storm hyetographs.

```
*****
** SIMULATION : 10 Year 12 Hour AES (Bloor, T **
*****
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| READ STORM |

Filename: C:\Users\21LR\AppData

Post-Dev Schematics

ata\Local\Temp\

28207173-d642-49c7-a0c9-cddca95e4676\049ade39

Ptotal= 62.71 mm

Comments: 10 Year 12 Hour AES (Bloor, TRCA)

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.00	0.00	3.25	10.66	6.50	4.39	9.75	0.63
0.25	0.63	3.50	10.66	6.75	4.39	10.00	0.63
0.50	0.63	3.75	10.66	7.00	4.39	10.25	0.63
0.75	0.63	4.00	10.66	7.25	2.51	10.50	0.63
1.00	0.63	4.25	28.84	7.50	2.51	10.75	0.63
1.25	0.63	4.50	28.84	7.75	2.51	11.00	0.63
1.50	0.63	4.75	28.84	8.00	2.51	11.25	0.63
1.75	0.63	5.00	28.84	8.25	1.25	11.50	0.63
2.00	0.63	5.25	8.15	8.50	1.25	11.75	0.63
2.25	3.76	5.50	8.15	8.75	1.25	12.00	0.63
2.50	3.76	5.75	8.15	9.00	1.25		
2.75	3.76	6.00	8.15	9.25	0.63		
3.00	3.76	6.25	4.39	9.50	0.63		

CALIB

NASHYD (0034)

ID= 1 DT= 5.0 min

Area (ha)= 0.56 Curve Number (CN)= 71.0

Ia (mm)= 5.00 # of Linear Res.(N)= 3.00

U.H. Tp(hrs)= 0.20

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	0.00	3.167	3.76	6.250	8.15	9.33	0.63
0.167	0.00	3.250	3.76	6.333	4.39	9.42	0.63
0.250	0.00	3.333	10.66	6.417	4.39	9.50	0.63
0.333	0.63	3.417	10.66	6.500	4.39	9.58	0.63
0.417	0.63	3.500	10.66	6.583	4.39	9.67	0.63
0.500	0.63	3.583	10.66	6.667	4.39	9.75	0.63
0.583	0.63	3.667	10.66	6.750	4.39	9.83	0.63
0.667	0.63	3.750	10.66	6.833	4.39	9.92	0.63
0.750	0.63	3.833	10.66	6.917	4.39	10.00	0.63
0.833	0.63	3.917	10.66	7.000	4.39	10.08	0.63
0.917	0.63	4.000	10.66	7.083	4.39	10.17	0.63
1.000	0.63	4.083	10.66	7.167	4.39	10.25	0.63
1.083	0.63	4.167	10.66	7.250	4.39	10.33	0.63
1.167	0.63	4.250	10.66	7.333	2.51	10.42	0.63
1.250	0.63	4.333	28.84	7.417	2.51	10.50	0.63

Post-Dev Schematics

1.333	0.63	4.417	28.84	7.500	2.51	10.58	0.63
1.417	0.63	4.500	28.84	7.583	2.51	10.67	0.63
1.500	0.63	4.583	28.84	7.667	2.51	10.75	0.63
1.583	0.63	4.667	28.84	7.750	2.51	10.83	0.63
1.667	0.63	4.750	28.84	7.833	2.51	10.92	0.63
1.750	0.63	4.833	28.84	7.917	2.51	11.00	0.63
1.833	0.63	4.917	28.84	8.000	2.51	11.08	0.63
1.917	0.63	5.000	28.84	8.083	2.51	11.17	0.63
2.000	0.63	5.083	28.84	8.167	2.51	11.25	0.63
2.083	0.63	5.167	28.84	8.250	2.51	11.33	0.63
2.167	0.63	5.250	28.84	8.333	1.25	11.42	0.63
2.250	0.63	5.333	8.15	8.417	1.25	11.50	0.63
2.333	3.76	5.417	8.15	8.500	1.25	11.58	0.63
2.417	3.76	5.500	8.15	8.583	1.25	11.67	0.63
2.500	3.76	5.583	8.15	8.667	1.25	11.75	0.63
2.583	3.76	5.667	8.15	8.750	1.25	11.83	0.63
2.667	3.76	5.750	8.15	8.833	1.25	11.92	0.63
2.750	3.76	5.833	8.15	8.917	1.25	12.00	0.63
2.833	3.76	5.917	8.15	9.000	1.25	12.08	0.63
2.917	3.76	6.000	8.15	9.083	1.25	12.17	0.63
3.000	3.76	6.083	8.15	9.167	1.25	12.25	0.63
3.083	3.76	6.167	8.15	9.250	1.25		

Unit Hyd Qpeak (cms)= 0.107

PEAK FLOW (cms)= 0.018 (i)

TIME TO PEAK (hrs)= 5.250

RUNOFF VOLUME (mm)= 20.587

TOTAL RAINFALL (mm)= 62.710

RUNOFF COEFFICIENT = 0.328

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB			
STANDHYD (0030)		Area (ha)=	0.90
ID= 1 DT= 5.0 min		Total Imp(%)=	94.00 Dir. Conn.(%)= 94.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.85	0.05
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	77.55	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

Post-Dev Schematics

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	3.76	6.250	8.15	9.33	0.63
0.167	0.00	3.250	3.76	6.333	4.39	9.42	0.63
0.250	0.00	3.333	10.66	6.417	4.39	9.50	0.63
0.333	0.63	3.417	10.66	6.500	4.39	9.58	0.63
0.417	0.63	3.500	10.66	6.583	4.39	9.67	0.63
0.500	0.63	3.583	10.66	6.667	4.39	9.75	0.63
0.583	0.63	3.667	10.66	6.750	4.39	9.83	0.63
0.667	0.63	3.750	10.66	6.833	4.39	9.92	0.63
0.750	0.63	3.833	10.66	6.917	4.39	10.00	0.63
0.833	0.63	3.917	10.66	7.000	4.39	10.08	0.63
0.917	0.63	4.000	10.66	7.083	4.39	10.17	0.63
1.000	0.63	4.083	10.66	7.167	4.39	10.25	0.63
1.083	0.63	4.167	10.66	7.250	4.39	10.33	0.63
1.167	0.63	4.250	10.66	7.333	2.51	10.42	0.63
1.250	0.63	4.333	28.84	7.417	2.51	10.50	0.63
1.333	0.63	4.417	28.84	7.500	2.51	10.58	0.63
1.417	0.63	4.500	28.84	7.583	2.51	10.67	0.63
1.500	0.63	4.583	28.84	7.667	2.51	10.75	0.63
1.583	0.63	4.667	28.84	7.750	2.51	10.83	0.63
1.667	0.63	4.750	28.84	7.833	2.51	10.92	0.63
1.750	0.63	4.833	28.84	7.917	2.51	11.00	0.63
1.833	0.63	4.917	28.84	8.000	2.51	11.08	0.63
1.917	0.63	5.000	28.84	8.083	2.51	11.17	0.63
2.000	0.63	5.083	28.84	8.167	2.51	11.25	0.63
2.083	0.63	5.167	28.84	8.250	2.51	11.33	0.63
2.167	0.63	5.250	28.84	8.333	1.25	11.42	0.63
2.250	0.63	5.333	8.15	8.417	1.25	11.50	0.63
2.333	3.76	5.417	8.15	8.500	1.25	11.58	0.63
2.417	3.76	5.500	8.15	8.583	1.25	11.67	0.63
2.500	3.76	5.583	8.15	8.667	1.25	11.75	0.63
2.583	3.76	5.667	8.15	8.750	1.25	11.83	0.63
2.667	3.76	5.750	8.15	8.833	1.25	11.92	0.63
2.750	3.76	5.833	8.15	8.917	1.25	12.00	0.63
2.833	3.76	5.917	8.15	9.000	1.25	12.08	0.63
2.917	3.76	6.000	8.15	9.083	1.25	12.17	0.63
3.000	3.76	6.083	8.15	9.167	1.25	12.25	0.63
3.083	3.76	6.167	8.15	9.250	1.25		

Max. Eff. Inten. (mm/hr)=	28.84	13.94
over (min)	5.00	10.00
Storage Coeff. (min)=	3.61 (ii)	7.47 (ii)
Unit Hyd. Tpeak (min)=	5.00	10.00
Unit Hyd. peak (cms)=	0.25	0.13

TOTALS

PEAK FLOW (cms)=	0.07	0.00	0.070 (iii)
TIME TO PEAK (hrs)=	5.08	5.25	5.25

Post-Dev Schematics

RUNOFF VOLUME	(mm)=	61.71	22.71	59.37
TOTAL RAINFALL	(mm)=	62.71	62.71	62.71
RUNOFF COEFFICIENT	=	0.98	0.36	0.95

RESERVOIR(0033)	OVERFLOW IS OFF			
IN= 2---> OUT= 1				
DT= 5.0 min				
	OUTFLOW	STORAGE	OUTFLOW	STORAGE
	(cms)	(ha.m.)	(cms)	(ha.m.)
	0.0000	0.0000	0.0270	0.0450

	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
INFLOW : ID= 2 (0030)	0.902	0.070	5.25	59.37
OUTFLOW: ID= 1 (0033)	0.902	0.019	6.25	58.91

PEAK FLOW REDUCTION [Qout/Qin](%)= 27.00
TIME SHIFT OF PEAK FLOW (min)= 60.00
MAXIMUM STORAGE USED (ha.m.)= 0.0315

ADD HYD (0032)	AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0033):	0.90	0.019	6.25	58.91
+ ID2= 2 (0034):	0.56	0.018	5.25	20.59
=====				
ID = 3 (0032):	1.46	0.036	5.25	44.25

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB	Area	(ha)=	0.62	
STANDHYD (0035)	Total Imp(%)=	93.00	Dir. Conn.(%)=	93.00
ID= 1 DT= 5.0 min				

	IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.58
Dep. Storage	(mm)=	1.00
Average Slope	(%)=	1.00
Length	(m)=	64.39
Mannings n	=	0.013

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

Post-Dev Schematics

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	3.76	6.250	8.15	9.33	0.63
0.167	0.00	3.250	3.76	6.333	4.39	9.42	0.63
0.250	0.00	3.333	10.66	6.417	4.39	9.50	0.63
0.333	0.63	3.417	10.66	6.500	4.39	9.58	0.63
0.417	0.63	3.500	10.66	6.583	4.39	9.67	0.63
0.500	0.63	3.583	10.66	6.667	4.39	9.75	0.63
0.583	0.63	3.667	10.66	6.750	4.39	9.83	0.63
0.667	0.63	3.750	10.66	6.833	4.39	9.92	0.63
0.750	0.63	3.833	10.66	6.917	4.39	10.00	0.63
0.833	0.63	3.917	10.66	7.000	4.39	10.08	0.63
0.917	0.63	4.000	10.66	7.083	4.39	10.17	0.63
1.000	0.63	4.083	10.66	7.167	4.39	10.25	0.63
1.083	0.63	4.167	10.66	7.250	4.39	10.33	0.63
1.167	0.63	4.250	10.66	7.333	2.51	10.42	0.63
1.250	0.63	4.333	28.84	7.417	2.51	10.50	0.63
1.333	0.63	4.417	28.84	7.500	2.51	10.58	0.63
1.417	0.63	4.500	28.84	7.583	2.51	10.67	0.63
1.500	0.63	4.583	28.84	7.667	2.51	10.75	0.63
1.583	0.63	4.667	28.84	7.750	2.51	10.83	0.63
1.667	0.63	4.750	28.84	7.833	2.51	10.92	0.63
1.750	0.63	4.833	28.84	7.917	2.51	11.00	0.63
1.833	0.63	4.917	28.84	8.000	2.51	11.08	0.63
1.917	0.63	5.000	28.84	8.083	2.51	11.17	0.63
2.000	0.63	5.083	28.84	8.167	2.51	11.25	0.63
2.083	0.63	5.167	28.84	8.250	2.51	11.33	0.63
2.167	0.63	5.250	28.84	8.333	1.25	11.42	0.63
2.250	0.63	5.333	8.15	8.417	1.25	11.50	0.63
2.333	3.76	5.417	8.15	8.500	1.25	11.58	0.63
2.417	3.76	5.500	8.15	8.583	1.25	11.67	0.63
2.500	3.76	5.583	8.15	8.667	1.25	11.75	0.63
2.583	3.76	5.667	8.15	8.750	1.25	11.83	0.63
2.667	3.76	5.750	8.15	8.833	1.25	11.92	0.63
2.750	3.76	5.833	8.15	8.917	1.25	12.00	0.63
2.833	3.76	5.917	8.15	9.000	1.25	12.08	0.63
2.917	3.76	6.000	8.15	9.083	1.25	12.17	0.63
3.000	3.76	6.083	8.15	9.167	1.25	12.25	0.63
3.083	3.76	6.167	8.15	9.250	1.25		

Max. Eff. Inten. (mm/hr)=	28.84	13.94
over (min)	5.00	10.00
Storage Coeff. (min)=	3.23 (ii)	7.35 (ii)
Unit Hyd. Tpeak (min)=	5.00	10.00
Unit Hyd. peak (cms)=	0.27	0.13

TOTALS

PEAK FLOW (cms)=	0.05	0.00	0.048 (iii)
TIME TO PEAK (hrs)=	5.08	5.25	5.25

Post-Dev Schematics

RUNOFF VOLUME	(mm)=	61.71	22.71	58.98
TOTAL RAINFALL	(mm)=	62.71	62.71	62.71
RUNOFF COEFFICIENT	=	0.98	0.36	0.94

```

-----
| RESERVOIR( 0036) | OVERFLOW IS OFF
| IN= 2---> OUT= 1 |
| DT= 5.0 min      |
-----
      OUTFLOW      STORAGE      |      OUTFLOW      STORAGE
      (cms)        (ha.m.)      |      (cms)        (ha.m.)
      0.0000      0.0000      |      0.0700      0.0020

```

	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
INFLOW : ID= 2 (0035)	0.622	0.048	5.25	58.98
OUTFLOW: ID= 1 (0036)	0.622	0.048	5.25	58.97

PEAK FLOW REDUCTION [Qout/Qin](%)= 99.87
 TIME SHIFT OF PEAK FLOW (min)= 0.00
 MAXIMUM STORAGE USED (ha.m.)= 0.0014

```

V  V  I  SSSSS  U  U  A  L  (v 6.2.2019)
V  V  I  SS    U  U  A  A  L
V  V  I  SS    U  U  AAAAA  L
V  V  I  SS    U  U  A  A  L
VV   I  SSSSS  UUUUU  A  A  LLLLL

000  TTTTT  TTTTT  H  H  Y  Y  M  M  000  TM
O  O  T  T  H  H  Y  Y  MM MM  O  O
O  O  T  T  H  H  Y  M  M  O  O
000  T  T  H  H  Y  M  M  000

```

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***** D E T A I L E D O U T P U T *****

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\V02\voin.dat

Output filename:

C:\Users\21LR\AppData\Local\Civica\XH5\946992b3-465d-43ba-a8b8-ff4639fdfd3c\062be33
 6-76aa-4381-bc47-31e5d2a8f24b\scenari

Summary filename:

Post-Dev Schematics

C:\Users\21LR\AppData\Local\Civica\XH5\946992b3-465d-43ba-a8b8-ffa4639fd3c\062be33
6-76aa-4381-bc47-31e5d2a8f24b\scenari

DATE: 02-26-2025

TIME: 01:03:44

USER:

COMMENTS: _____

** SIMULATION : 100 Year 12 Hour AES (Bloor, **

READ STORM	Filename: C:\Users\21LR\AppData\Local\Temp\28207173-d642-49c7-a0c9-cddca95e4676\72bd5dd2
Ptotal= 88.54 mm	Comments: 100 Year 12 Hour AES (Bloor, TRCA)

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.00	0.00	3.25	15.05	6.50	6.20	9.75	0.89
0.25	0.89	3.50	15.05	6.75	6.20	10.00	0.89
0.50	0.89	3.75	15.05	7.00	6.20	10.25	0.89
0.75	0.89	4.00	15.05	7.25	3.54	10.50	0.89
1.00	0.89	4.25	40.71	7.50	3.54	10.75	0.89
1.25	0.89	4.50	40.71	7.75	3.54	11.00	0.89
1.50	0.89	4.75	40.71	8.00	3.54	11.25	0.89
1.75	0.89	5.00	40.71	8.25	1.77	11.50	0.89
2.00	0.89	5.25	11.51	8.50	1.77	11.75	0.89
2.25	5.31	5.50	11.51	8.75	1.77	12.00	0.89
2.50	5.31	5.75	11.51	9.00	1.77		
2.75	5.31	6.00	11.51	9.25	0.89		
3.00	5.31	6.25	6.20	9.50	0.89		

CALIB	Area (ha)= 0.56	Curve Number (CN)= 71.0
NASHYD (0034)	Ia (mm)= 5.00	# of Linear Res.(N)= 3.00
ID= 1 DT= 5.0 min	U.H. Tp(hrs)= 0.20	

Post-Dev Schematics

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----							
TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	0.00	3.167	5.31	6.250	11.51	9.33	0.89
0.167	0.00	3.250	5.31	6.333	6.20	9.42	0.89
0.250	0.00	3.333	15.05	6.417	6.20	9.50	0.89
0.333	0.89	3.417	15.05	6.500	6.20	9.58	0.89
0.417	0.89	3.500	15.05	6.583	6.20	9.67	0.89
0.500	0.89	3.583	15.05	6.667	6.20	9.75	0.89
0.583	0.89	3.667	15.05	6.750	6.20	9.83	0.89
0.667	0.89	3.750	15.05	6.833	6.20	9.92	0.89
0.750	0.89	3.833	15.05	6.917	6.20	10.00	0.89
0.833	0.89	3.917	15.05	7.000	6.20	10.08	0.89
0.917	0.89	4.000	15.05	7.083	6.20	10.17	0.89
1.000	0.89	4.083	15.05	7.167	6.20	10.25	0.89
1.083	0.89	4.167	15.05	7.250	6.20	10.33	0.89
1.167	0.89	4.250	15.05	7.333	3.54	10.42	0.89
1.250	0.89	4.333	40.71	7.417	3.54	10.50	0.89
1.333	0.89	4.417	40.71	7.500	3.54	10.58	0.89
1.417	0.89	4.500	40.71	7.583	3.54	10.67	0.89
1.500	0.89	4.583	40.71	7.667	3.54	10.75	0.89
1.583	0.89	4.667	40.71	7.750	3.54	10.83	0.89
1.667	0.89	4.750	40.71	7.833	3.54	10.92	0.89
1.750	0.89	4.833	40.71	7.917	3.54	11.00	0.89
1.833	0.89	4.917	40.71	8.000	3.54	11.08	0.89
1.917	0.89	5.000	40.71	8.083	3.54	11.17	0.89
2.000	0.89	5.083	40.71	8.167	3.54	11.25	0.89
2.083	0.89	5.167	40.71	8.250	3.54	11.33	0.89
2.167	0.89	5.250	40.71	8.333	1.77	11.42	0.89
2.250	0.89	5.333	11.51	8.417	1.77	11.50	0.89
2.333	5.31	5.417	11.51	8.500	1.77	11.58	0.89
2.417	5.31	5.500	11.51	8.583	1.77	11.67	0.89
2.500	5.31	5.583	11.51	8.667	1.77	11.75	0.89
2.583	5.31	5.667	11.51	8.750	1.77	11.83	0.89
2.667	5.31	5.750	11.51	8.833	1.77	11.92	0.89
2.750	5.31	5.833	11.51	8.917	1.77	12.00	0.89
2.833	5.31	5.917	11.51	9.000	1.77	12.08	0.89
2.917	5.31	6.000	11.51	9.083	1.77	12.17	0.89
3.000	5.31	6.083	11.51	9.167	1.77	12.25	0.89
3.083	5.31	6.167	11.51	9.250	1.77		

Unit Hyd Qpeak (cms)= 0.107

PEAK FLOW (cms)= 0.033 (i)

TIME TO PEAK (hrs)= 5.250

Post-Dev Schematics

RUNOFF VOLUME (mm)= 37.192
TOTAL RAINFALL (mm)= 88.540
RUNOFF COEFFICIENT = 0.420

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

| CALIB |
| STANDHYD (0030) | Area (ha)= 0.90
| ID= 1 DT= 5.0 min | Total Imp(%)= 94.00 Dir. Conn.(%)= 94.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.85	0.05
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	77.55	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

----- TRANSFORMED HYETOGRAPH -----

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	0.00	3.167	5.31	6.250	11.51	9.33	0.89
0.167	0.00	3.250	5.31	6.333	6.20	9.42	0.89
0.250	0.00	3.333	15.05	6.417	6.20	9.50	0.89
0.333	0.89	3.417	15.05	6.500	6.20	9.58	0.89
0.417	0.89	3.500	15.05	6.583	6.20	9.67	0.89
0.500	0.89	3.583	15.05	6.667	6.20	9.75	0.89
0.583	0.89	3.667	15.05	6.750	6.20	9.83	0.89
0.667	0.89	3.750	15.05	6.833	6.20	9.92	0.89
0.750	0.89	3.833	15.05	6.917	6.20	10.00	0.89
0.833	0.89	3.917	15.05	7.000	6.20	10.08	0.89
0.917	0.89	4.000	15.05	7.083	6.20	10.17	0.89
1.000	0.89	4.083	15.05	7.167	6.20	10.25	0.89
1.083	0.89	4.167	15.05	7.250	6.20	10.33	0.89
1.167	0.89	4.250	15.05	7.333	3.54	10.42	0.89
1.250	0.89	4.333	40.71	7.417	3.54	10.50	0.89
1.333	0.89	4.417	40.71	7.500	3.54	10.58	0.89
1.417	0.89	4.500	40.71	7.583	3.54	10.67	0.89
1.500	0.89	4.583	40.71	7.667	3.54	10.75	0.89
1.583	0.89	4.667	40.71	7.750	3.54	10.83	0.89
1.667	0.89	4.750	40.71	7.833	3.54	10.92	0.89
1.750	0.89	4.833	40.71	7.917	3.54	11.00	0.89
1.833	0.89	4.917	40.71	8.000	3.54	11.08	0.89
1.917	0.89	5.000	40.71	8.083	3.54	11.17	0.89
2.000	0.89	5.083	40.71	8.167	3.54	11.25	0.89

Post-Dev Schematics

2.083	0.89	5.167	40.71	8.250	3.54	11.33	0.89
2.167	0.89	5.250	40.71	8.333	1.77	11.42	0.89
2.250	0.89	5.333	11.51	8.417	1.77	11.50	0.89
2.333	5.31	5.417	11.51	8.500	1.77	11.58	0.89
2.417	5.31	5.500	11.51	8.583	1.77	11.67	0.89
2.500	5.31	5.583	11.51	8.667	1.77	11.75	0.89
2.583	5.31	5.667	11.51	8.750	1.77	11.83	0.89
2.667	5.31	5.750	11.51	8.833	1.77	11.92	0.89
2.750	5.31	5.833	11.51	8.917	1.77	12.00	0.89
2.833	5.31	5.917	11.51	9.000	1.77	12.08	0.89
2.917	5.31	6.000	11.51	9.083	1.77	12.17	0.89
3.000	5.31	6.083	11.51	9.167	1.77	12.25	0.89
3.083	5.31	6.167	11.51	9.250	1.77		

Max.Eff.Inten.(mm/hr)= 40.71 23.95
over (min) 5.00 10.00
Storage Coeff. (min)= 3.14 (ii) 6.51 (ii)
Unit Hyd. Tpeak (min)= 5.00 10.00
Unit Hyd. peak (cms)= 0.27 0.14

TOTALS

PEAK FLOW (cms)= 0.10 0.00 0.099 (iii)
TIME TO PEAK (hrs)= 5.08 5.25 5.25
RUNOFF VOLUME (mm)= 87.54 39.71 84.67
TOTAL RAINFALL (mm)= 88.54 88.54 88.54
RUNOFF COEFFICIENT = 0.99 0.45 0.96

RESERVOIR(0033)
IN= 2---> OUT= 1
DT= 5.0 min

OVERFLOW IS OFF

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
0.0000	0.0000	0.0270	0.0450

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0030)	0.902	0.099	5.25	84.67
OUTFLOW: ID= 1 (0033)	0.902	0.027	6.25	84.20

PEAK FLOW REDUCTION [Qout/Qin](%)= 27.05
TIME SHIFT OF PEAK FLOW (min)= 60.00
MAXIMUM STORAGE USED (ha.m.)= 0.0448

ADD HYD (0032)
1 + 2 = 3

AREA	QPEAK	TPEAK	R.V.
------	-------	-------	------

Post-Dev Schematics

	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0033):	0.90	0.027	6.25	84.20
+ ID2= 2 (0034):	0.56	0.033	5.25	37.19
=====				
ID = 3 (0032):	1.46	0.059	5.25	66.22

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB	
STANDHYD (0035)	Area (ha)= 0.62
ID= 1 DT= 5.0 min	Total Imp(%)= 93.00 Dir. Conn.(%)= 93.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.58	0.04
Dep. Storage (mm)=	1.00	1.50
Average Slope (%)=	1.00	2.00
Length (m)=	64.39	40.00
Mannings n =	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	0.00	3.167	5.31	6.250	11.51	9.33	0.89
0.167	0.00	3.250	5.31	6.333	6.20	9.42	0.89
0.250	0.00	3.333	15.05	6.417	6.20	9.50	0.89
0.333	0.89	3.417	15.05	6.500	6.20	9.58	0.89
0.417	0.89	3.500	15.05	6.583	6.20	9.67	0.89
0.500	0.89	3.583	15.05	6.667	6.20	9.75	0.89
0.583	0.89	3.667	15.05	6.750	6.20	9.83	0.89
0.667	0.89	3.750	15.05	6.833	6.20	9.92	0.89
0.750	0.89	3.833	15.05	6.917	6.20	10.00	0.89
0.833	0.89	3.917	15.05	7.000	6.20	10.08	0.89
0.917	0.89	4.000	15.05	7.083	6.20	10.17	0.89
1.000	0.89	4.083	15.05	7.167	6.20	10.25	0.89
1.083	0.89	4.167	15.05	7.250	6.20	10.33	0.89
1.167	0.89	4.250	15.05	7.333	3.54	10.42	0.89
1.250	0.89	4.333	40.71	7.417	3.54	10.50	0.89
1.333	0.89	4.417	40.71	7.500	3.54	10.58	0.89
1.417	0.89	4.500	40.71	7.583	3.54	10.67	0.89
1.500	0.89	4.583	40.71	7.667	3.54	10.75	0.89
1.583	0.89	4.667	40.71	7.750	3.54	10.83	0.89
1.667	0.89	4.750	40.71	7.833	3.54	10.92	0.89
1.750	0.89	4.833	40.71	7.917	3.54	11.00	0.89
1.833	0.89	4.917	40.71	8.000	3.54	11.08	0.89
1.917	0.89	5.000	40.71	8.083	3.54	11.17	0.89

Post-Dev Schematics

2.000	0.89	5.083	40.71	8.167	3.54	11.25	0.89
2.083	0.89	5.167	40.71	8.250	3.54	11.33	0.89
2.167	0.89	5.250	40.71	8.333	1.77	11.42	0.89
2.250	0.89	5.333	11.51	8.417	1.77	11.50	0.89
2.333	5.31	5.417	11.51	8.500	1.77	11.58	0.89
2.417	5.31	5.500	11.51	8.583	1.77	11.67	0.89
2.500	5.31	5.583	11.51	8.667	1.77	11.75	0.89
2.583	5.31	5.667	11.51	8.750	1.77	11.83	0.89
2.667	5.31	5.750	11.51	8.833	1.77	11.92	0.89
2.750	5.31	5.833	11.51	8.917	1.77	12.00	0.89
2.833	5.31	5.917	11.51	9.000	1.77	12.08	0.89
2.917	5.31	6.000	11.51	9.083	1.77	12.17	0.89
3.000	5.31	6.083	11.51	9.167	1.77	12.25	0.89
3.083	5.31	6.167	11.51	9.250	1.77		

Max.Eff.Inten.(mm/hr)= 40.71 23.95
over (min) 5.00 10.00
Storage Coeff. (min)= 2.81 (ii) 6.40 (ii)
Unit Hyd. Tpeak (min)= 5.00 10.00
Unit Hyd. peak (cms)= 0.28 0.14

TOTALS

PEAK FLOW (cms)= 0.07 0.00 0.068 (iii)
TIME TO PEAK (hrs)= 5.08 5.25 5.25
RUNOFF VOLUME (mm)= 87.54 39.71 84.19
TOTAL RAINFALL (mm)= 88.54 88.54 88.54
RUNOFF COEFFICIENT = 0.99 0.45 0.95

RESERVOIR(0036)
IN= 2---> OUT= 1
DT= 5.0 min

OVERFLOW IS OFF

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
0.0000	0.0000	0.0700	0.0020

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0035)	0.622	0.068	5.25	84.19
OUTFLOW: ID= 1 (0036)	0.622	0.068	5.25	84.18

PEAK FLOW REDUCTION [Qout/Qin](%)= 99.86
TIME SHIFT OF PEAK FLOW (min)= 0.00
MAXIMUM STORAGE USED (ha.m.)= 0.0019

V V I SSSSS U U A L (v 6.2.2019)
V V I SS U U A A L

Post-Dev Schematics

V V I SS U U AAAAA L
V V I SS U U A A L
VV I SSSSS UUUUU A A LLLLL

000 TTTTT TTTTT H H Y Y M M 000 TM
0 0 T T H H Y Y MM MM 0 0
0 0 T T H H Y M M 0 0
000 T T H H Y M M 000

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***** D E T A I L E D O U T P U T *****

Input filename: C:\Program Files (x86)\Visual OTTHYM0 6.2\V02\voin.dat

Output filename:

C:\Users\21LR\AppData\Local\Civica\XH5\946992b3-465d-43ba-a8b8-ff4639fd3c\33bcbal
c-82bc-4409-9355-b66bafc106cb\scenari

Summary filename:

C:\Users\21LR\AppData\Local\Civica\XH5\946992b3-465d-43ba-a8b8-ff4639fd3c\33bcbal
c-82bc-4409-9355-b66bafc106cb\scenari

DATE: 02-26-2025

TIME: 01:03:44

USER:

COMMENTS: _____

** SIMULATION : 2 Year 12 Hour AES (Bloor, TR **

| READ STORM |
Ptotal= 42.00 mm

Filename: C:\Users\21LR\AppData
ata\Local\Temp\
28207173-d642-49c7-a0c9-cddca95e4676\319034d4
Comments: 2 Year 12 Hour AES (Bloor, TRCA)

TIME RAIN | TIME RAIN | TIME RAIN | TIME RAIN

Post-Dev Schematics

hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.00	0.00	3.25	7.14	6.50	2.94	9.75	0.42
0.25	0.42	3.50	7.14	6.75	2.94	10.00	0.42
0.50	0.42	3.75	7.14	7.00	2.94	10.25	0.42
0.75	0.42	4.00	7.14	7.25	1.68	10.50	0.42
1.00	0.42	4.25	19.32	7.50	1.68	10.75	0.42
1.25	0.42	4.50	19.32	7.75	1.68	11.00	0.42
1.50	0.42	4.75	19.32	8.00	1.68	11.25	0.42
1.75	0.42	5.00	19.32	8.25	0.84	11.50	0.42
2.00	0.42	5.25	5.46	8.50	0.84	11.75	0.42
2.25	2.52	5.50	5.46	8.75	0.84	12.00	0.42
2.50	2.52	5.75	5.46	9.00	0.84		
2.75	2.52	6.00	5.46	9.25	0.42		
3.00	2.52	6.25	2.94	9.50	0.42		

CALIB			
NASHYD (0034)	Area (ha)=	0.56	Curve Number (CN)= 71.0
ID= 1 DT= 5.0 min	Ia (mm)=	5.00	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)=	0.20	

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	0.00	3.167	2.52	6.250	5.46	9.33	0.42
0.167	0.00	3.250	2.52	6.333	2.94	9.42	0.42
0.250	0.00	3.333	7.14	6.417	2.94	9.50	0.42
0.333	0.42	3.417	7.14	6.500	2.94	9.58	0.42
0.417	0.42	3.500	7.14	6.583	2.94	9.67	0.42
0.500	0.42	3.583	7.14	6.667	2.94	9.75	0.42
0.583	0.42	3.667	7.14	6.750	2.94	9.83	0.42
0.667	0.42	3.750	7.14	6.833	2.94	9.92	0.42
0.750	0.42	3.833	7.14	6.917	2.94	10.00	0.42
0.833	0.42	3.917	7.14	7.000	2.94	10.08	0.42
0.917	0.42	4.000	7.14	7.083	2.94	10.17	0.42
1.000	0.42	4.083	7.14	7.167	2.94	10.25	0.42
1.083	0.42	4.167	7.14	7.250	2.94	10.33	0.42
1.167	0.42	4.250	7.14	7.333	1.68	10.42	0.42
1.250	0.42	4.333	19.32	7.417	1.68	10.50	0.42
1.333	0.42	4.417	19.32	7.500	1.68	10.58	0.42
1.417	0.42	4.500	19.32	7.583	1.68	10.67	0.42
1.500	0.42	4.583	19.32	7.667	1.68	10.75	0.42
1.583	0.42	4.667	19.32	7.750	1.68	10.83	0.42
1.667	0.42	4.750	19.32	7.833	1.68	10.92	0.42

Post-Dev Schematics

1.750	0.42	4.833	19.32	7.917	1.68	11.00	0.42
1.833	0.42	4.917	19.32	8.000	1.68	11.08	0.42
1.917	0.42	5.000	19.32	8.083	1.68	11.17	0.42
2.000	0.42	5.083	19.32	8.167	1.68	11.25	0.42
2.083	0.42	5.167	19.32	8.250	1.68	11.33	0.42
2.167	0.42	5.250	19.32	8.333	0.84	11.42	0.42
2.250	0.42	5.333	5.46	8.417	0.84	11.50	0.42
2.333	2.52	5.417	5.46	8.500	0.84	11.58	0.42
2.417	2.52	5.500	5.46	8.583	0.84	11.67	0.42
2.500	2.52	5.583	5.46	8.667	0.84	11.75	0.42
2.583	2.52	5.667	5.46	8.750	0.84	11.83	0.42
2.667	2.52	5.750	5.46	8.833	0.84	11.92	0.42
2.750	2.52	5.833	5.46	8.917	0.84	12.00	0.42
2.833	2.52	5.917	5.46	9.000	0.84	12.08	0.42
2.917	2.52	6.000	5.46	9.083	0.84	12.17	0.42
3.000	2.52	6.083	5.46	9.167	0.84	12.25	0.42
3.083	2.52	6.167	5.46	9.250	0.84		

Unit Hyd Qpeak (cms)= 0.107

PEAK FLOW (cms)= 0.009 (i)

TIME TO PEAK (hrs)= 5.250

RUNOFF VOLUME (mm)= 9.707

TOTAL RAINFALL (mm)= 42.000

RUNOFF COEFFICIENT = 0.231

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB
STANDHYD (0030)
ID= 1 DT= 5.0 min

Area (ha)= 0.90

Total Imp(%)= 94.00 Dir. Conn.(%)= 94.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.85	0.05
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	77.55	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	0.00	3.167	2.52	6.250	5.46	9.33	0.42
0.167	0.00	3.250	2.52	6.333	2.94	9.42	0.42

Post-Dev Schematics

0.250	0.00	3.333	7.14	6.417	2.94	9.50	0.42
0.333	0.42	3.417	7.14	6.500	2.94	9.58	0.42
0.417	0.42	3.500	7.14	6.583	2.94	9.67	0.42
0.500	0.42	3.583	7.14	6.667	2.94	9.75	0.42
0.583	0.42	3.667	7.14	6.750	2.94	9.83	0.42
0.667	0.42	3.750	7.14	6.833	2.94	9.92	0.42
0.750	0.42	3.833	7.14	6.917	2.94	10.00	0.42
0.833	0.42	3.917	7.14	7.000	2.94	10.08	0.42
0.917	0.42	4.000	7.14	7.083	2.94	10.17	0.42
1.000	0.42	4.083	7.14	7.167	2.94	10.25	0.42
1.083	0.42	4.167	7.14	7.250	2.94	10.33	0.42
1.167	0.42	4.250	7.14	7.333	1.68	10.42	0.42
1.250	0.42	4.333	19.32	7.417	1.68	10.50	0.42
1.333	0.42	4.417	19.32	7.500	1.68	10.58	0.42
1.417	0.42	4.500	19.32	7.583	1.68	10.67	0.42
1.500	0.42	4.583	19.32	7.667	1.68	10.75	0.42
1.583	0.42	4.667	19.32	7.750	1.68	10.83	0.42
1.667	0.42	4.750	19.32	7.833	1.68	10.92	0.42
1.750	0.42	4.833	19.32	7.917	1.68	11.00	0.42
1.833	0.42	4.917	19.32	8.000	1.68	11.08	0.42
1.917	0.42	5.000	19.32	8.083	1.68	11.17	0.42
2.000	0.42	5.083	19.32	8.167	1.68	11.25	0.42
2.083	0.42	5.167	19.32	8.250	1.68	11.33	0.42
2.167	0.42	5.250	19.32	8.333	0.84	11.42	0.42
2.250	0.42	5.333	5.46	8.417	0.84	11.50	0.42
2.333	2.52	5.417	5.46	8.500	0.84	11.58	0.42
2.417	2.52	5.500	5.46	8.583	0.84	11.67	0.42
2.500	2.52	5.583	5.46	8.667	0.84	11.75	0.42
2.583	2.52	5.667	5.46	8.750	0.84	11.83	0.42
2.667	2.52	5.750	5.46	8.833	0.84	11.92	0.42
2.750	2.52	5.833	5.46	8.917	0.84	12.00	0.42
2.833	2.52	5.917	5.46	9.000	0.84	12.08	0.42
2.917	2.52	6.000	5.46	9.083	0.84	12.17	0.42
3.000	2.52	6.083	5.46	9.167	0.84	12.25	0.42
3.083	2.52	6.167	5.46	9.250	0.84		

Max.Eff.Inten.(mm/hr)=	19.32	7.10
over (min)	5.00	10.00
Storage Coeff. (min)=	4.23 (ii)	8.77 (ii)
Unit Hyd. Tpeak (min)=	5.00	10.00
Unit Hyd. peak (cms)=	0.24	0.12

TOTALS

PEAK FLOW (cms)=	0.05	0.00	0.047 (iii)
TIME TO PEAK (hrs)=	5.17	5.25	5.25
RUNOFF VOLUME (mm)=	41.00	11.37	39.22
TOTAL RAINFALL (mm)=	42.00	42.00	42.00
RUNOFF COEFFICIENT =	0.98	0.27	0.93

Post-Dev Schematics

RESERVOIR(0033)
IN= 2---> OUT= 1
DT= 5.0 min

OVERFLOW IS OFF

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
0.0000	0.0000	0.0270	0.0450

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0030)	0.902	0.047	5.25	39.22
OUTFLOW: ID= 1 (0033)	0.902	0.013	6.25	38.76

PEAK FLOW REDUCTION [Qout/Qin](%)= 26.88
TIME SHIFT OF PEAK FLOW (min)= 60.00
MAXIMUM STORAGE USED (ha.m.)= 0.0208

ADD HYD (0032)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0033):	0.90	0.013	6.25	38.76
+ ID2= 2 (0034):	0.56	0.009	5.25	9.71
=====				
ID = 3 (0032):	1.46	0.021	5.25	27.64

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB
STANDHYD (0035)
ID= 1 DT= 5.0 min

Area (ha)= 0.62
Total Imp(%)= 93.00 Dir. Conn.(%)= 93.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.58	0.04
Dep. Storage (mm)=	1.00	1.50
Average Slope (%)=	1.00	2.00
Length (m)=	64.39	40.00
Mannings n =	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	2.52	6.250	5.46	9.33	0.42
0.167	0.00	3.250	2.52	6.333	2.94	9.42	0.42
0.250	0.00	3.333	7.14	6.417	2.94	9.50	0.42

Post-Dev Schematics

0.333	0.42	3.417	7.14	6.500	2.94	9.58	0.42
0.417	0.42	3.500	7.14	6.583	2.94	9.67	0.42
0.500	0.42	3.583	7.14	6.667	2.94	9.75	0.42
0.583	0.42	3.667	7.14	6.750	2.94	9.83	0.42
0.667	0.42	3.750	7.14	6.833	2.94	9.92	0.42
0.750	0.42	3.833	7.14	6.917	2.94	10.00	0.42
0.833	0.42	3.917	7.14	7.000	2.94	10.08	0.42
0.917	0.42	4.000	7.14	7.083	2.94	10.17	0.42
1.000	0.42	4.083	7.14	7.167	2.94	10.25	0.42
1.083	0.42	4.167	7.14	7.250	2.94	10.33	0.42
1.167	0.42	4.250	7.14	7.333	1.68	10.42	0.42
1.250	0.42	4.333	19.32	7.417	1.68	10.50	0.42
1.333	0.42	4.417	19.32	7.500	1.68	10.58	0.42
1.417	0.42	4.500	19.32	7.583	1.68	10.67	0.42
1.500	0.42	4.583	19.32	7.667	1.68	10.75	0.42
1.583	0.42	4.667	19.32	7.750	1.68	10.83	0.42
1.667	0.42	4.750	19.32	7.833	1.68	10.92	0.42
1.750	0.42	4.833	19.32	7.917	1.68	11.00	0.42
1.833	0.42	4.917	19.32	8.000	1.68	11.08	0.42
1.917	0.42	5.000	19.32	8.083	1.68	11.17	0.42
2.000	0.42	5.083	19.32	8.167	1.68	11.25	0.42
2.083	0.42	5.167	19.32	8.250	1.68	11.33	0.42
2.167	0.42	5.250	19.32	8.333	0.84	11.42	0.42
2.250	0.42	5.333	5.46	8.417	0.84	11.50	0.42
2.333	2.52	5.417	5.46	8.500	0.84	11.58	0.42
2.417	2.52	5.500	5.46	8.583	0.84	11.67	0.42
2.500	2.52	5.583	5.46	8.667	0.84	11.75	0.42
2.583	2.52	5.667	5.46	8.750	0.84	11.83	0.42
2.667	2.52	5.750	5.46	8.833	0.84	11.92	0.42
2.750	2.52	5.833	5.46	8.917	0.84	12.00	0.42
2.833	2.52	5.917	5.46	9.000	0.84	12.08	0.42
2.917	2.52	6.000	5.46	9.083	0.84	12.17	0.42
3.000	2.52	6.083	5.46	9.167	0.84	12.25	0.42
3.083	2.52	6.167	5.46	9.250	0.84		

Max.Eff.Inten.(mm/hr)= 19.32 7.10
over (min) 5.00 10.00
Storage Coeff. (min)= 3.79 (ii) 8.63 (ii)
Unit Hyd. Tpeak (min)= 5.00 10.00
Unit Hyd. peak (cms)= 0.25 0.12

TOTALS

PEAK FLOW (cms)= 0.03 0.00 0.032 (iii)
TIME TO PEAK (hrs)= 5.08 5.25 5.25
RUNOFF VOLUME (mm)= 41.00 11.37 38.92
TOTAL RAINFALL (mm)= 42.00 42.00 42.00
RUNOFF COEFFICIENT = 0.98 0.27 0.93

Post-Dev Schematics

| RESERVOIR(0036) |
| IN= 2---> OUT= 1 |
DT= 5.0 min

OVERFLOW IS OFF

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
0.0000	0.0000	0.0700	0.0020

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0035)	0.622	0.032	5.25	38.92
OUTFLOW: ID= 1 (0036)	0.622	0.032	5.25	38.92

PEAK FLOW REDUCTION [Qout/Qin](%)= 99.88
TIME SHIFT OF PEAK FLOW (min)= 0.00
MAXIMUM STORAGE USED (ha.m.)= 0.0009

=====

V V I SSSSS U U A L (v 6.2.2019)
V V I SS U U A A L
V V I SS U U AAAAA L
V V I SS U U A A L
VV I SSSSS UUUUU A A LLLLL

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O O T T H H Y M M O O
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***** D E T A I L E D O U T P U T *****

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\V02\voin.dat

Output filename:

C:\Users\21LR\AppData\Local\Civica\XH5\946992b3-465d-43ba-a8b8-ff4639fd3c\eb2f46e
d-4c3a-4b01-9575-0b61b8d3fa51\scenari

Summary filename:

C:\Users\21LR\AppData\Local\Civica\XH5\946992b3-465d-43ba-a8b8-ff4639fd3c\eb2f46e
d-4c3a-4b01-9575-0b61b8d3fa51\scenari

DATE: 02-26-2025

TIME: 01:03:44

Post-Dev Schematics

USER:

COMMENTS: _____

 ** SIMULATION : 25 Year 12 Hour AES (Bloor, T **

READ STORM	Filename: C:\Users\21LR\AppData Local\Temp\ 28207173-d642-49c7-a0c9-cddca95e4676\56aba7b2
Ptotal= 73.10 mm	Comments: 25 Year 12 Hour AES (Bloor, TRCA)

TIME	RAIN	TIME	RAIN	'	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	'	hrs	mm/hr	hrs	mm/hr
0.00	0.00	3.25	12.43		6.50	5.12	9.75	0.73
0.25	0.73	3.50	12.43		6.75	5.12	10.00	0.73
0.50	0.73	3.75	12.43		7.00	5.12	10.25	0.73
0.75	0.73	4.00	12.43		7.25	2.92	10.50	0.73
1.00	0.73	4.25	33.63		7.50	2.92	10.75	0.73
1.25	0.73	4.50	33.63		7.75	2.92	11.00	0.73
1.50	0.73	4.75	33.63		8.00	2.92	11.25	0.73
1.75	0.73	5.00	33.63		8.25	1.46	11.50	0.73
2.00	0.73	5.25	9.50		8.50	1.46	11.75	0.73
2.25	4.39	5.50	9.50		8.75	1.46	12.00	0.73
2.50	4.39	5.75	9.50		9.00	1.46		
2.75	4.39	6.00	9.50		9.25	0.73		
3.00	4.39	6.25	5.12		9.50	0.73		

CALIB	
NASHYD (0034)	Area (ha)= 0.56 Curve Number (CN)= 71.0
ID= 1 DT= 5.0 min	Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= 0.20

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

----- TRANSFORMED HYETOGRAPH -----

TIME	RAIN	TIME	RAIN	'	TIME	RAIN	TIME	RAIN
------	------	------	------	---	------	------	------	------

Post-Dev Schematics

hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	0.00	3.167	4.39	6.250	9.50	9.33	0.73
0.167	0.00	3.250	4.39	6.333	5.12	9.42	0.73
0.250	0.00	3.333	12.43	6.417	5.12	9.50	0.73
0.333	0.73	3.417	12.43	6.500	5.12	9.58	0.73
0.417	0.73	3.500	12.43	6.583	5.12	9.67	0.73
0.500	0.73	3.583	12.43	6.667	5.12	9.75	0.73
0.583	0.73	3.667	12.43	6.750	5.12	9.83	0.73
0.667	0.73	3.750	12.43	6.833	5.12	9.92	0.73
0.750	0.73	3.833	12.43	6.917	5.12	10.00	0.73
0.833	0.73	3.917	12.43	7.000	5.12	10.08	0.73
0.917	0.73	4.000	12.43	7.083	5.12	10.17	0.73
1.000	0.73	4.083	12.43	7.167	5.12	10.25	0.73
1.083	0.73	4.167	12.43	7.250	5.12	10.33	0.73
1.167	0.73	4.250	12.43	7.333	2.92	10.42	0.73
1.250	0.73	4.333	33.63	7.417	2.92	10.50	0.73
1.333	0.73	4.417	33.63	7.500	2.92	10.58	0.73
1.417	0.73	4.500	33.63	7.583	2.92	10.67	0.73
1.500	0.73	4.583	33.63	7.667	2.92	10.75	0.73
1.583	0.73	4.667	33.63	7.750	2.92	10.83	0.73
1.667	0.73	4.750	33.63	7.833	2.92	10.92	0.73
1.750	0.73	4.833	33.63	7.917	2.92	11.00	0.73
1.833	0.73	4.917	33.63	8.000	2.92	11.08	0.73
1.917	0.73	5.000	33.63	8.083	2.92	11.17	0.73
2.000	0.73	5.083	33.63	8.167	2.92	11.25	0.73
2.083	0.73	5.167	33.63	8.250	2.92	11.33	0.73
2.167	0.73	5.250	33.63	8.333	1.46	11.42	0.73
2.250	0.73	5.333	9.50	8.417	1.46	11.50	0.73
2.333	4.39	5.417	9.50	8.500	1.46	11.58	0.73
2.417	4.39	5.500	9.50	8.583	1.46	11.67	0.73
2.500	4.39	5.583	9.50	8.667	1.46	11.75	0.73
2.583	4.39	5.667	9.50	8.750	1.46	11.83	0.73
2.667	4.39	5.750	9.50	8.833	1.46	11.92	0.73
2.750	4.39	5.833	9.50	8.917	1.46	12.00	0.73
2.833	4.39	5.917	9.50	9.000	1.46	12.08	0.73
2.917	4.39	6.000	9.50	9.083	1.46	12.17	0.73
3.000	4.39	6.083	9.50	9.167	1.46	12.25	0.73
3.083	4.39	6.167	9.50	9.250	1.46		

Unit Hyd Qpeak (cms)= 0.107

PEAK FLOW (cms)= 0.024 (i)
 TIME TO PEAK (hrs)= 5.250
 RUNOFF VOLUME (mm)= 26.935
 TOTAL RAINFALL (mm)= 73.100
 RUNOFF COEFFICIENT = 0.368

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

Post-Dev Schematics

CALIB
STANDHYD (0030)
ID= 1 DT= 5.0 min

Area (ha)= 0.90
Total Imp(%)= 94.00 Dir. Conn.(%)= 94.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.85	0.05
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	77.55	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	0.00	3.167	4.39	6.250	9.50	9.33	0.73
0.167	0.00	3.250	4.39	6.333	5.12	9.42	0.73
0.250	0.00	3.333	12.43	6.417	5.12	9.50	0.73
0.333	0.73	3.417	12.43	6.500	5.12	9.58	0.73
0.417	0.73	3.500	12.43	6.583	5.12	9.67	0.73
0.500	0.73	3.583	12.43	6.667	5.12	9.75	0.73
0.583	0.73	3.667	12.43	6.750	5.12	9.83	0.73
0.667	0.73	3.750	12.43	6.833	5.12	9.92	0.73
0.750	0.73	3.833	12.43	6.917	5.12	10.00	0.73
0.833	0.73	3.917	12.43	7.000	5.12	10.08	0.73
0.917	0.73	4.000	12.43	7.083	5.12	10.17	0.73
1.000	0.73	4.083	12.43	7.167	5.12	10.25	0.73
1.083	0.73	4.167	12.43	7.250	5.12	10.33	0.73
1.167	0.73	4.250	12.43	7.333	2.92	10.42	0.73
1.250	0.73	4.333	33.63	7.417	2.92	10.50	0.73
1.333	0.73	4.417	33.63	7.500	2.92	10.58	0.73
1.417	0.73	4.500	33.63	7.583	2.92	10.67	0.73
1.500	0.73	4.583	33.63	7.667	2.92	10.75	0.73
1.583	0.73	4.667	33.63	7.750	2.92	10.83	0.73
1.667	0.73	4.750	33.63	7.833	2.92	10.92	0.73
1.750	0.73	4.833	33.63	7.917	2.92	11.00	0.73
1.833	0.73	4.917	33.63	8.000	2.92	11.08	0.73
1.917	0.73	5.000	33.63	8.083	2.92	11.17	0.73
2.000	0.73	5.083	33.63	8.167	2.92	11.25	0.73
2.083	0.73	5.167	33.63	8.250	2.92	11.33	0.73
2.167	0.73	5.250	33.63	8.333	1.46	11.42	0.73
2.250	0.73	5.333	9.50	8.417	1.46	11.50	0.73
2.333	4.39	5.417	9.50	8.500	1.46	11.58	0.73
2.417	4.39	5.500	9.50	8.583	1.46	11.67	0.73
2.500	4.39	5.583	9.50	8.667	1.46	11.75	0.73

Post-Dev Schematics

2.583	4.39	5.667	9.50	8.750	1.46	11.83	0.73
2.667	4.39	5.750	9.50	8.833	1.46	11.92	0.73
2.750	4.39	5.833	9.50	8.917	1.46	12.00	0.73
2.833	4.39	5.917	9.50	9.000	1.46	12.08	0.73
2.917	4.39	6.000	9.50	9.083	1.46	12.17	0.73
3.000	4.39	6.083	9.50	9.167	1.46	12.25	0.73
3.083	4.39	6.167	9.50	9.250	1.46		

Max.Eff.Inten.(mm/hr)= 33.63 17.82
over (min) 5.00 10.00
Storage Coeff. (min)= 3.39 (ii) 7.02 (ii)
Unit Hyd. Tpeak (min)= 5.00 10.00
Unit Hyd. peak (cms)= 0.26 0.14

TOTALS

PEAK FLOW (cms)= 0.08 0.00 0.082 (iii)
TIME TO PEAK (hrs)= 5.08 5.25 5.25
RUNOFF VOLUME (mm)= 72.10 29.24 69.53
TOTAL RAINFALL (mm)= 73.10 73.10 73.10
RUNOFF COEFFICIENT = 0.99 0.40 0.95

RESERVOIR(0033)
IN= 2---> OUT= 1
DT= 5.0 min

OVERFLOW IS OFF

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
0.0000	0.0000	0.0270	0.0450

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0030)	0.902	0.082	5.25	69.53
OUTFLOW: ID= 1 (0033)	0.902	0.022	6.25	69.06

PEAK FLOW REDUCTION [Qout/Qin](%)= 27.02
TIME SHIFT OF PEAK FLOW (min)= 60.00
MAXIMUM STORAGE USED (ha.m.)= 0.0368

ADD HYD (0032)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0033):	0.90	0.022	6.25	69.06
+ ID2= 2 (0034):	0.56	0.024	5.25	26.93
=====				
ID = 3 (0032):	1.46	0.045	5.25	52.94

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

Post-Dev Schematics

CALIB	
STANDHYD (0035)	Area (ha)= 0.62
ID= 1 DT= 5.0 min	Total Imp(%)= 93.00 Dir. Conn.(%)= 93.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.58	0.04
Dep. Storage (mm)=	1.00	1.50
Average Slope (%)=	1.00	2.00
Length (m)=	64.39	40.00
Mannings n =	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----							
TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	0.00	3.167	4.39	6.250	9.50	9.33	0.73
0.167	0.00	3.250	4.39	6.333	5.12	9.42	0.73
0.250	0.00	3.333	12.43	6.417	5.12	9.50	0.73
0.333	0.73	3.417	12.43	6.500	5.12	9.58	0.73
0.417	0.73	3.500	12.43	6.583	5.12	9.67	0.73
0.500	0.73	3.583	12.43	6.667	5.12	9.75	0.73
0.583	0.73	3.667	12.43	6.750	5.12	9.83	0.73
0.667	0.73	3.750	12.43	6.833	5.12	9.92	0.73
0.750	0.73	3.833	12.43	6.917	5.12	10.00	0.73
0.833	0.73	3.917	12.43	7.000	5.12	10.08	0.73
0.917	0.73	4.000	12.43	7.083	5.12	10.17	0.73
1.000	0.73	4.083	12.43	7.167	5.12	10.25	0.73
1.083	0.73	4.167	12.43	7.250	5.12	10.33	0.73
1.167	0.73	4.250	12.43	7.333	2.92	10.42	0.73
1.250	0.73	4.333	33.63	7.417	2.92	10.50	0.73
1.333	0.73	4.417	33.63	7.500	2.92	10.58	0.73
1.417	0.73	4.500	33.63	7.583	2.92	10.67	0.73
1.500	0.73	4.583	33.63	7.667	2.92	10.75	0.73
1.583	0.73	4.667	33.63	7.750	2.92	10.83	0.73
1.667	0.73	4.750	33.63	7.833	2.92	10.92	0.73
1.750	0.73	4.833	33.63	7.917	2.92	11.00	0.73
1.833	0.73	4.917	33.63	8.000	2.92	11.08	0.73
1.917	0.73	5.000	33.63	8.083	2.92	11.17	0.73
2.000	0.73	5.083	33.63	8.167	2.92	11.25	0.73
2.083	0.73	5.167	33.63	8.250	2.92	11.33	0.73
2.167	0.73	5.250	33.63	8.333	1.46	11.42	0.73
2.250	0.73	5.333	9.50	8.417	1.46	11.50	0.73
2.333	4.39	5.417	9.50	8.500	1.46	11.58	0.73
2.417	4.39	5.500	9.50	8.583	1.46	11.67	0.73
2.500	4.39	5.583	9.50	8.667	1.46	11.75	0.73
2.583	4.39	5.667	9.50	8.750	1.46	11.83	0.73

Post-Dev Schematics

2.667	4.39	5.750	9.50	8.833	1.46	11.92	0.73
2.750	4.39	5.833	9.50	8.917	1.46	12.00	0.73
2.833	4.39	5.917	9.50	9.000	1.46	12.08	0.73
2.917	4.39	6.000	9.50	9.083	1.46	12.17	0.73
3.000	4.39	6.083	9.50	9.167	1.46	12.25	0.73
3.083	4.39	6.167	9.50	9.250	1.46		

Max.Eff.Inten.(mm/hr)= 33.63 17.82
over (min) 5.00 10.00
Storage Coeff. (min)= 3.03 (ii) 6.91 (ii)
Unit Hyd. Tpeak (min)= 5.00 10.00
Unit Hyd. peak (cms)= 0.27 0.14

TOTALS

PEAK FLOW (cms)= 0.05 0.00 0.056 (iii)
TIME TO PEAK (hrs)= 5.08 5.25 5.25
RUNOFF VOLUME (mm)= 72.10 29.24 69.09
TOTAL RAINFALL (mm)= 73.10 73.10 73.10
RUNOFF COEFFICIENT = 0.99 0.40 0.95

RESERVOIR(0036)
IN= 2---> OUT= 1
DT= 5.0 min

OVERFLOW IS OFF

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
0.0000	0.0000	0.0700	0.0020

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0035)	0.622	0.056	5.25	69.09
OUTFLOW: ID= 1 (0036)	0.622	0.056	5.25	69.09

PEAK FLOW REDUCTION [Qout/Qin](%)= 99.86
TIME SHIFT OF PEAK FLOW (min)= 0.00
MAXIMUM STORAGE USED (ha.m.)= 0.0016

V V I SSSSS U U A L (v 6.2.2019)
V V I SS U U A A L
V V I SS U U AAAAA L
V V I SS U U A A L
VV I SSSSS UUUUU A A LLLLL

000 TTTTT TTTTT H H Y Y M M 000 TM
O O T T H H Y Y MM MM O O
O O T T H H Y M M O O
000 T T H H Y M M 000

Post-Dev Schematics

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***** D E T A I L E D O U T P U T *****

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\V02\voin.dat

Output filename:

C:\Users\21LR\AppData\Local\Civica\XH5\946992b3-465d-43ba-a8b8-ff4639fd3c\3e3452
a-86c1-4858-8556-68edaca3ad54\scenari

Summary filename:

C:\Users\21LR\AppData\Local\Civica\XH5\946992b3-465d-43ba-a8b8-ff4639fd3c\3e3452
a-86c1-4858-8556-68edaca3ad54\scenari

DATE: 02-26-2025

TIME: 01:03:44

USER:

COMMENTS: _____

** SIMULATION : 5 Year 12 Hour AES (Bloor, TR **

READ STORM	Filename: C:\Users\21LR\AppData\Local\Temp\28207173-d642-49c7-a0c9-cddca95e4676\6ae99da1
Ptotal= 54.38 mm	Comments: 5 Year 12 Hour AES (Bloor, TRCA)

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	0.00	3.25	9.25	6.50	3.81	9.75	0.54
0.25	0.54	3.50	9.25	6.75	3.81	10.00	0.54
0.50	0.54	3.75	9.25	7.00	3.81	10.25	0.54
0.75	0.54	4.00	9.25	7.25	2.18	10.50	0.54
1.00	0.54	4.25	25.02	7.50	2.18	10.75	0.54
1.25	0.54	4.50	25.02	7.75	2.18	11.00	0.54
1.50	0.54	4.75	25.02	8.00	2.18	11.25	0.54

Post-Dev Schematics

1.75	0.54	5.00	25.02	8.25	1.09	11.50	0.54
2.00	0.54	5.25	7.07	8.50	1.09	11.75	0.54
2.25	3.26	5.50	7.07	8.75	1.09	12.00	0.54
2.50	3.26	5.75	7.07	9.00	1.09		
2.75	3.26	6.00	7.07	9.25	0.54		
3.00	3.26	6.25	3.81	9.50	0.54		

CALIB			
NASHYD (0034)	Area (ha)=	0.56	Curve Number (CN)= 71.0
ID= 1 DT= 5.0 min	Ia (mm)=	5.00	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)=	0.20	

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	0.00	3.167	3.26	6.250	7.07	9.33	0.54
0.167	0.00	3.250	3.26	6.333	3.81	9.42	0.54
0.250	0.00	3.333	9.25	6.417	3.81	9.50	0.54
0.333	0.54	3.417	9.25	6.500	3.81	9.58	0.54
0.417	0.54	3.500	9.25	6.583	3.81	9.67	0.54
0.500	0.54	3.583	9.25	6.667	3.81	9.75	0.54
0.583	0.54	3.667	9.25	6.750	3.81	9.83	0.54
0.667	0.54	3.750	9.25	6.833	3.81	9.92	0.54
0.750	0.54	3.833	9.25	6.917	3.81	10.00	0.54
0.833	0.54	3.917	9.25	7.000	3.81	10.08	0.54
0.917	0.54	4.000	9.25	7.083	3.81	10.17	0.54
1.000	0.54	4.083	9.25	7.167	3.81	10.25	0.54
1.083	0.54	4.167	9.25	7.250	3.81	10.33	0.54
1.167	0.54	4.250	9.25	7.333	2.18	10.42	0.54
1.250	0.54	4.333	25.02	7.417	2.18	10.50	0.54
1.333	0.54	4.417	25.02	7.500	2.18	10.58	0.54
1.417	0.54	4.500	25.02	7.583	2.18	10.67	0.54
1.500	0.54	4.583	25.02	7.667	2.18	10.75	0.54
1.583	0.54	4.667	25.02	7.750	2.18	10.83	0.54
1.667	0.54	4.750	25.02	7.833	2.18	10.92	0.54
1.750	0.54	4.833	25.02	7.917	2.18	11.00	0.54
1.833	0.54	4.917	25.02	8.000	2.18	11.08	0.54
1.917	0.54	5.000	25.02	8.083	2.18	11.17	0.54
2.000	0.54	5.083	25.02	8.167	2.18	11.25	0.54
2.083	0.54	5.167	25.02	8.250	2.18	11.33	0.54
2.167	0.54	5.250	25.02	8.333	1.09	11.42	0.54
2.250	0.54	5.333	7.07	8.417	1.09	11.50	0.54
2.333	3.26	5.417	7.07	8.500	1.09	11.58	0.54

Post-Dev Schematics

2.417	3.26	5.500	7.07	8.583	1.09	11.67	0.54
2.500	3.26	5.583	7.07	8.667	1.09	11.75	0.54
2.583	3.26	5.667	7.07	8.750	1.09	11.83	0.54
2.667	3.26	5.750	7.07	8.833	1.09	11.92	0.54
2.750	3.26	5.833	7.07	8.917	1.09	12.00	0.54
2.833	3.26	5.917	7.07	9.000	1.09	12.08	0.54
2.917	3.26	6.000	7.07	9.083	1.09	12.17	0.54
3.000	3.26	6.083	7.07	9.167	1.09	12.25	0.54
3.083	3.26	6.167	7.07	9.250	1.09		

Unit Hyd Qpeak (cms)= 0.107

PEAK FLOW (cms)= 0.014 (i)

TIME TO PEAK (hrs)= 5.250

RUNOFF VOLUME (mm)= 15.893

TOTAL RAINFALL (mm)= 54.380

RUNOFF COEFFICIENT = 0.292

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB	
STANDHYD (0030)	Area (ha)= 0.90
ID= 1 DT= 5.0 min	Total Imp(%)= 94.00 Dir. Conn.(%)= 94.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.85	0.05
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	77.55	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	0.00	3.167	3.26	6.250	7.07	9.33	0.54
0.167	0.00	3.250	3.26	6.333	3.81	9.42	0.54
0.250	0.00	3.333	9.25	6.417	3.81	9.50	0.54
0.333	0.54	3.417	9.25	6.500	3.81	9.58	0.54
0.417	0.54	3.500	9.25	6.583	3.81	9.67	0.54
0.500	0.54	3.583	9.25	6.667	3.81	9.75	0.54
0.583	0.54	3.667	9.25	6.750	3.81	9.83	0.54
0.667	0.54	3.750	9.25	6.833	3.81	9.92	0.54
0.750	0.54	3.833	9.25	6.917	3.81	10.00	0.54
0.833	0.54	3.917	9.25	7.000	3.81	10.08	0.54

Post-Dev Schematics

0.917	0.54	4.000	9.25	7.083	3.81	10.17	0.54
1.000	0.54	4.083	9.25	7.167	3.81	10.25	0.54
1.083	0.54	4.167	9.25	7.250	3.81	10.33	0.54
1.167	0.54	4.250	9.25	7.333	2.18	10.42	0.54
1.250	0.54	4.333	25.02	7.417	2.18	10.50	0.54
1.333	0.54	4.417	25.02	7.500	2.18	10.58	0.54
1.417	0.54	4.500	25.02	7.583	2.18	10.67	0.54
1.500	0.54	4.583	25.02	7.667	2.18	10.75	0.54
1.583	0.54	4.667	25.02	7.750	2.18	10.83	0.54
1.667	0.54	4.750	25.02	7.833	2.18	10.92	0.54
1.750	0.54	4.833	25.02	7.917	2.18	11.00	0.54
1.833	0.54	4.917	25.02	8.000	2.18	11.08	0.54
1.917	0.54	5.000	25.02	8.083	2.18	11.17	0.54
2.000	0.54	5.083	25.02	8.167	2.18	11.25	0.54
2.083	0.54	5.167	25.02	8.250	2.18	11.33	0.54
2.167	0.54	5.250	25.02	8.333	1.09	11.42	0.54
2.250	0.54	5.333	7.07	8.417	1.09	11.50	0.54
2.333	3.26	5.417	7.07	8.500	1.09	11.58	0.54
2.417	3.26	5.500	7.07	8.583	1.09	11.67	0.54
2.500	3.26	5.583	7.07	8.667	1.09	11.75	0.54
2.583	3.26	5.667	7.07	8.750	1.09	11.83	0.54
2.667	3.26	5.750	7.07	8.833	1.09	11.92	0.54
2.750	3.26	5.833	7.07	8.917	1.09	12.00	0.54
2.833	3.26	5.917	7.07	9.000	1.09	12.08	0.54
2.917	3.26	6.000	7.07	9.083	1.09	12.17	0.54
3.000	3.26	6.083	7.07	9.167	1.09	12.25	0.54
3.083	3.26	6.167	7.07	9.250	1.09		

Max.Eff.Inten.(mm/hr)= 25.02 11.03
over (min) 5.00 10.00
Storage Coeff. (min)= 3.82 (ii) 7.90 (ii)
Unit Hyd. Tpeak (min)= 5.00 10.00
Unit Hyd. peak (cms)= 0.25 0.13

TOTALS

PEAK FLOW (cms)= 0.06 0.00 0.061 (iii)
TIME TO PEAK (hrs)= 5.08 5.25 5.25
RUNOFF VOLUME (mm)= 53.38 17.85 51.25
TOTAL RAINFALL (mm)= 54.38 54.38 54.38
RUNOFF COEFFICIENT = 0.98 0.33 0.94

RESERVOIR(0033)
IN= 2---> OUT= 1
DT= 5.0 min

OVERFLOW IS OFF

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
0.0000	0.0000	0.0270	0.0450

AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
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Post-Dev Schematics

INFLOW : ID= 2 (0030) 0.902 0.061 5.25 51.25
OUTFLOW: ID= 1 (0033) 0.902 0.016 6.25 50.79

PEAK FLOW REDUCTION [Qout/Qin](%)= 26.96
TIME SHIFT OF PEAK FLOW (min)= 60.00
MAXIMUM STORAGE USED (ha.m.)= 0.0272

| ADD HYD (0032) |
1 + 2 = 3
ID1= 1 (0033): 0.90 0.016 6.25 50.79
+ ID2= 2 (0034): 0.56 0.014 5.25 15.89
=====

ID = 3 (0032): 1.46 0.030 5.25 37.44

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| CALIB |
| STANDHYD (0035) | Area (ha)= 0.62
| ID= 1 DT= 5.0 min | Total Imp(%)= 93.00 Dir. Conn.(%)= 93.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.58	0.04
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	64.39	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

----- TRANSFORMED HYETOGRAPH -----

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	0.00	3.167	3.26	6.250	7.07	9.33	0.54
0.167	0.00	3.250	3.26	6.333	3.81	9.42	0.54
0.250	0.00	3.333	9.25	6.417	3.81	9.50	0.54
0.333	0.54	3.417	9.25	6.500	3.81	9.58	0.54
0.417	0.54	3.500	9.25	6.583	3.81	9.67	0.54
0.500	0.54	3.583	9.25	6.667	3.81	9.75	0.54
0.583	0.54	3.667	9.25	6.750	3.81	9.83	0.54
0.667	0.54	3.750	9.25	6.833	3.81	9.92	0.54
0.750	0.54	3.833	9.25	6.917	3.81	10.00	0.54
0.833	0.54	3.917	9.25	7.000	3.81	10.08	0.54
0.917	0.54	4.000	9.25	7.083	3.81	10.17	0.54

Post-Dev Schematics

1.000	0.54	4.083	9.25	7.167	3.81	10.25	0.54
1.083	0.54	4.167	9.25	7.250	3.81	10.33	0.54
1.167	0.54	4.250	9.25	7.333	2.18	10.42	0.54
1.250	0.54	4.333	25.02	7.417	2.18	10.50	0.54
1.333	0.54	4.417	25.02	7.500	2.18	10.58	0.54
1.417	0.54	4.500	25.02	7.583	2.18	10.67	0.54
1.500	0.54	4.583	25.02	7.667	2.18	10.75	0.54
1.583	0.54	4.667	25.02	7.750	2.18	10.83	0.54
1.667	0.54	4.750	25.02	7.833	2.18	10.92	0.54
1.750	0.54	4.833	25.02	7.917	2.18	11.00	0.54
1.833	0.54	4.917	25.02	8.000	2.18	11.08	0.54
1.917	0.54	5.000	25.02	8.083	2.18	11.17	0.54
2.000	0.54	5.083	25.02	8.167	2.18	11.25	0.54
2.083	0.54	5.167	25.02	8.250	2.18	11.33	0.54
2.167	0.54	5.250	25.02	8.333	1.09	11.42	0.54
2.250	0.54	5.333	7.07	8.417	1.09	11.50	0.54
2.333	3.26	5.417	7.07	8.500	1.09	11.58	0.54
2.417	3.26	5.500	7.07	8.583	1.09	11.67	0.54
2.500	3.26	5.583	7.07	8.667	1.09	11.75	0.54
2.583	3.26	5.667	7.07	8.750	1.09	11.83	0.54
2.667	3.26	5.750	7.07	8.833	1.09	11.92	0.54
2.750	3.26	5.833	7.07	8.917	1.09	12.00	0.54
2.833	3.26	5.917	7.07	9.000	1.09	12.08	0.54
2.917	3.26	6.000	7.07	9.083	1.09	12.17	0.54
3.000	3.26	6.083	7.07	9.167	1.09	12.25	0.54
3.083	3.26	6.167	7.07	9.250	1.09		

Max.Eff.Inten.(mm/hr)= 25.02 11.03
over (min) 5.00 10.00
Storage Coeff. (min)= 3.41 (ii) 7.78 (ii)
Unit Hyd. Tpeak (min)= 5.00 10.00
Unit Hyd. peak (cms)= 0.26 0.13

TOTALS

PEAK FLOW (cms)= 0.04 0.00 0.041 (iii)
TIME TO PEAK (hrs)= 5.08 5.25 5.25
RUNOFF VOLUME (mm)= 53.38 17.85 50.89
TOTAL RAINFALL (mm)= 54.38 54.38 54.38
RUNOFF COEFFICIENT = 0.98 0.33 0.94

RESERVOIR(0036)
IN= 2---> OUT= 1
DT= 5.0 min

OVERFLOW IS OFF

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
0.0000	0.0000	0.0700	0.0020

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0035)	0.622	0.041	5.25	50.89

OUTFLOW: ID= 1 (0036) Post-Dev Schematics 0.622 0.041 5.25 50.89

PEAK FLOW REDUCTION [Qout/Qin](%)= 99.87
TIME SHIFT OF PEAK FLOW (min)= 0.00
MAXIMUM STORAGE USED (ha.m.)= 0.0012

```

V  V  I  SSSSS  U  U  A  L  (v 6.2.2019)
V  V  I  SS    U  U  A  A  L
V  V  I  SS    U  U  AAAAA L
V  V  I  SS    U  U  A  A  L
VV   I  SSSSS  UUUUU  A  A  LLLLL

```

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000  TTTTT  TTTTT  H  H  Y  Y  M  M  000  TM
O  O  T  T  H  H  Y  Y  MM MM  O  O
O  O  T  T  H  H  Y  M  M  O  O
000  T  T  H  H  Y  M  M  000

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***** D E T A I L E D O U T P U T *****

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\V02\voin.dat

Output filename:

C:\Users\21LR\AppData\Local\Civica\XH5\946992b3-465d-43ba-a8b8-ff4639fd3c\75d838
7-5686-4dfa-9733-084a7a79d3c7\scenari

Summary filename:

C:\Users\21LR\AppData\Local\Civica\XH5\946992b3-465d-43ba-a8b8-ff4639fd3c\75d838
7-5686-4dfa-9733-084a7a79d3c7\scenari

DATE: 02-26-2025

TIME: 01:03:44

USER:

COMMENTS: _____

Post-Dev Schematics

** SIMULATION : 50 Year 12 Hour AES (Bloor, T **

READ STORM Ptotal= 80.82 mm	Filename: C:\Users\21LR\AppData\Local\Temp\ 28207173-d642-49c7-a0c9-cddca95e4676\587398f2 Comments: 50 Year 12 Hour AES (Bloor, TRCA)
------------------------------------	---

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.00	0.00	3.25	13.74	6.50	5.66	9.75	0.81
0.25	0.81	3.50	13.74	6.75	5.66	10.00	0.81
0.50	0.81	3.75	13.74	7.00	5.66	10.25	0.81
0.75	0.81	4.00	13.74	7.25	3.23	10.50	0.81
1.00	0.81	4.25	37.17	7.50	3.23	10.75	0.81
1.25	0.81	4.50	37.17	7.75	3.23	11.00	0.81
1.50	0.81	4.75	37.17	8.00	3.23	11.25	0.81
1.75	0.81	5.00	37.17	8.25	1.62	11.50	0.81
2.00	0.81	5.25	10.50	8.50	1.62	11.75	0.81
2.25	4.85	5.50	10.50	8.75	1.62	12.00	0.81
2.50	4.85	5.75	10.50	9.00	1.62		
2.75	4.85	6.00	10.50	9.25	0.81		
3.00	4.85	6.25	5.66	9.50	0.81		

CALIB NASHYD (0034) ID= 1 DT= 5.0 min	Area (ha)= 0.56 Curve Number (CN)= 71.0 Ia (mm)= 5.00 # of Linear Res.(N)= 3.00 U.H. Tp(hrs)= 0.20
--	--

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	0.00	3.167	4.85	6.250	10.50	9.33	0.81
0.167	0.00	3.250	4.85	6.333	5.66	9.42	0.81
0.250	0.00	3.333	13.74	6.417	5.66	9.50	0.81
0.333	0.81	3.417	13.74	6.500	5.66	9.58	0.81
0.417	0.81	3.500	13.74	6.583	5.66	9.67	0.81
0.500	0.81	3.583	13.74	6.667	5.66	9.75	0.81
0.583	0.81	3.667	13.74	6.750	5.66	9.83	0.81
0.667	0.81	3.750	13.74	6.833	5.66	9.92	0.81

Post-Dev Schematics

0.750	0.81	3.833	13.74	6.917	5.66	10.00	0.81
0.833	0.81	3.917	13.74	7.000	5.66	10.08	0.81
0.917	0.81	4.000	13.74	7.083	5.66	10.17	0.81
1.000	0.81	4.083	13.74	7.167	5.66	10.25	0.81
1.083	0.81	4.167	13.74	7.250	5.66	10.33	0.81
1.167	0.81	4.250	13.74	7.333	3.23	10.42	0.81
1.250	0.81	4.333	37.17	7.417	3.23	10.50	0.81
1.333	0.81	4.417	37.17	7.500	3.23	10.58	0.81
1.417	0.81	4.500	37.17	7.583	3.23	10.67	0.81
1.500	0.81	4.583	37.17	7.667	3.23	10.75	0.81
1.583	0.81	4.667	37.17	7.750	3.23	10.83	0.81
1.667	0.81	4.750	37.17	7.833	3.23	10.92	0.81
1.750	0.81	4.833	37.17	7.917	3.23	11.00	0.81
1.833	0.81	4.917	37.17	8.000	3.23	11.08	0.81
1.917	0.81	5.000	37.17	8.083	3.23	11.17	0.81
2.000	0.81	5.083	37.17	8.167	3.23	11.25	0.81
2.083	0.81	5.167	37.17	8.250	3.23	11.33	0.81
2.167	0.81	5.250	37.17	8.333	1.62	11.42	0.81
2.250	0.81	5.333	10.50	8.417	1.62	11.50	0.81
2.333	4.85	5.417	10.50	8.500	1.62	11.58	0.81
2.417	4.85	5.500	10.50	8.583	1.62	11.67	0.81
2.500	4.85	5.583	10.50	8.667	1.62	11.75	0.81
2.583	4.85	5.667	10.50	8.750	1.62	11.83	0.81
2.667	4.85	5.750	10.50	8.833	1.62	11.92	0.81
2.750	4.85	5.833	10.50	8.917	1.62	12.00	0.81
2.833	4.85	5.917	10.50	9.000	1.62	12.08	0.81
2.917	4.85	6.000	10.50	9.083	1.62	12.17	0.81
3.000	4.85	6.083	10.50	9.167	1.62	12.25	0.81
3.083	4.85	6.167	10.50	9.250	1.62		

Unit Hyd Qpeak (cms)= 0.107

PEAK FLOW (cms)= 0.029 (i)

TIME TO PEAK (hrs)= 5.250

RUNOFF VOLUME (mm)= 31.952

TOTAL RAINFALL (mm)= 80.820

RUNOFF COEFFICIENT = 0.395

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB
STANDHYD (0030)
ID= 1 DT= 5.0 min

Area (ha)= 0.90

Total Imp(%)= 94.00 Dir. Conn.(%)= 94.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.85	0.05
Dep. Storage	(mm)=	1.00	1.50

Post-Dev Schematics			
Average Slope	(%)=	1.00	2.00
Length	(m)=	77.55	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

----- TRANSFORMED HYETOGRAPH -----							
TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	0.00	3.167	4.85	6.250	10.50	9.33	0.81
0.167	0.00	3.250	4.85	6.333	5.66	9.42	0.81
0.250	0.00	3.333	13.74	6.417	5.66	9.50	0.81
0.333	0.81	3.417	13.74	6.500	5.66	9.58	0.81
0.417	0.81	3.500	13.74	6.583	5.66	9.67	0.81
0.500	0.81	3.583	13.74	6.667	5.66	9.75	0.81
0.583	0.81	3.667	13.74	6.750	5.66	9.83	0.81
0.667	0.81	3.750	13.74	6.833	5.66	9.92	0.81
0.750	0.81	3.833	13.74	6.917	5.66	10.00	0.81
0.833	0.81	3.917	13.74	7.000	5.66	10.08	0.81
0.917	0.81	4.000	13.74	7.083	5.66	10.17	0.81
1.000	0.81	4.083	13.74	7.167	5.66	10.25	0.81
1.083	0.81	4.167	13.74	7.250	5.66	10.33	0.81
1.167	0.81	4.250	13.74	7.333	3.23	10.42	0.81
1.250	0.81	4.333	37.17	7.417	3.23	10.50	0.81
1.333	0.81	4.417	37.17	7.500	3.23	10.58	0.81
1.417	0.81	4.500	37.17	7.583	3.23	10.67	0.81
1.500	0.81	4.583	37.17	7.667	3.23	10.75	0.81
1.583	0.81	4.667	37.17	7.750	3.23	10.83	0.81
1.667	0.81	4.750	37.17	7.833	3.23	10.92	0.81
1.750	0.81	4.833	37.17	7.917	3.23	11.00	0.81
1.833	0.81	4.917	37.17	8.000	3.23	11.08	0.81
1.917	0.81	5.000	37.17	8.083	3.23	11.17	0.81
2.000	0.81	5.083	37.17	8.167	3.23	11.25	0.81
2.083	0.81	5.167	37.17	8.250	3.23	11.33	0.81
2.167	0.81	5.250	37.17	8.333	1.62	11.42	0.81
2.250	0.81	5.333	10.50	8.417	1.62	11.50	0.81
2.333	4.85	5.417	10.50	8.500	1.62	11.58	0.81
2.417	4.85	5.500	10.50	8.583	1.62	11.67	0.81
2.500	4.85	5.583	10.50	8.667	1.62	11.75	0.81
2.583	4.85	5.667	10.50	8.750	1.62	11.83	0.81
2.667	4.85	5.750	10.50	8.833	1.62	11.92	0.81
2.750	4.85	5.833	10.50	8.917	1.62	12.00	0.81
2.833	4.85	5.917	10.50	9.000	1.62	12.08	0.81
2.917	4.85	6.000	10.50	9.083	1.62	12.17	0.81
3.000	4.85	6.083	10.50	9.167	1.62	12.25	0.81
3.083	4.85	6.167	10.50	9.250	1.62		

Max. Eff. Inten. (mm/hr)= 37.17 20.83

Post-Dev Schematics

	over (min)	5.00	10.00	
Storage Coeff.	(min)=	3.26 (ii)	6.75 (ii)	
Unit Hyd. Tpeak	(min)=	5.00	10.00	
Unit Hyd. peak	(cms)=	0.27	0.14	
				TOTALS
PEAK FLOW	(cms)=	0.09	0.00	0.091 (iii)
TIME TO PEAK	(hrs)=	5.08	5.25	5.25
RUNOFF VOLUME	(mm)=	79.82	34.37	77.09
TOTAL RAINFALL	(mm)=	80.82	80.82	80.82
RUNOFF COEFFICIENT	=	0.99	0.43	0.95

RESERVOIR(0033)	OVERFLOW IS OFF				
IN= 2---> OUT= 1					
DT= 5.0 min					
	OUTFLOW	STORAGE	OUTFLOW	STORAGE	
	(cms)	(ha.m.)	(cms)	(ha.m.)	
	0.0000	0.0000	0.0270	0.0450	

	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
INFLOW : ID= 2 (0030)	0.902	0.091	5.25	77.09
OUTFLOW: ID= 1 (0033)	0.902	0.024	6.25	76.63

PEAK FLOW REDUCTION [Qout/Qin](%)= 27.03
TIME SHIFT OF PEAK FLOW (min)= 60.00
MAXIMUM STORAGE USED (ha.m.)= 0.0408

ADD HYD (0032)					
1 + 2 = 3					
	AREA	QPEAK	TPEAK	R.V.	
	(ha)	(cms)	(hrs)	(mm)	
ID1= 1 (0033):	0.90	0.024	6.25	76.63	
+ ID2= 2 (0034):	0.56	0.029	5.25	31.95	
=====					
ID = 3 (0032):	1.46	0.052	5.25	59.53	

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB					
STANDHYD (0035)	Area	(ha)=	0.62		
ID= 1 DT= 5.0 min	Total Imp(%)=	93.00	Dir. Conn.(%)=	93.00	
	IMPERVIOUS		PERVIOUS (i)		
Surface Area	(ha)=	0.58	0.04		
Dep. Storage	(mm)=	1.00	1.50		

Post-Dev Schematics			
Average Slope	(%)=	1.00	2.00
Length	(m)=	64.39	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

----- TRANSFORMED HYETOGRAPH -----							
TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	0.00	3.167	4.85	6.250	10.50	9.33	0.81
0.167	0.00	3.250	4.85	6.333	5.66	9.42	0.81
0.250	0.00	3.333	13.74	6.417	5.66	9.50	0.81
0.333	0.81	3.417	13.74	6.500	5.66	9.58	0.81
0.417	0.81	3.500	13.74	6.583	5.66	9.67	0.81
0.500	0.81	3.583	13.74	6.667	5.66	9.75	0.81
0.583	0.81	3.667	13.74	6.750	5.66	9.83	0.81
0.667	0.81	3.750	13.74	6.833	5.66	9.92	0.81
0.750	0.81	3.833	13.74	6.917	5.66	10.00	0.81
0.833	0.81	3.917	13.74	7.000	5.66	10.08	0.81
0.917	0.81	4.000	13.74	7.083	5.66	10.17	0.81
1.000	0.81	4.083	13.74	7.167	5.66	10.25	0.81
1.083	0.81	4.167	13.74	7.250	5.66	10.33	0.81
1.167	0.81	4.250	13.74	7.333	3.23	10.42	0.81
1.250	0.81	4.333	37.17	7.417	3.23	10.50	0.81
1.333	0.81	4.417	37.17	7.500	3.23	10.58	0.81
1.417	0.81	4.500	37.17	7.583	3.23	10.67	0.81
1.500	0.81	4.583	37.17	7.667	3.23	10.75	0.81
1.583	0.81	4.667	37.17	7.750	3.23	10.83	0.81
1.667	0.81	4.750	37.17	7.833	3.23	10.92	0.81
1.750	0.81	4.833	37.17	7.917	3.23	11.00	0.81
1.833	0.81	4.917	37.17	8.000	3.23	11.08	0.81
1.917	0.81	5.000	37.17	8.083	3.23	11.17	0.81
2.000	0.81	5.083	37.17	8.167	3.23	11.25	0.81
2.083	0.81	5.167	37.17	8.250	3.23	11.33	0.81
2.167	0.81	5.250	37.17	8.333	1.62	11.42	0.81
2.250	0.81	5.333	10.50	8.417	1.62	11.50	0.81
2.333	4.85	5.417	10.50	8.500	1.62	11.58	0.81
2.417	4.85	5.500	10.50	8.583	1.62	11.67	0.81
2.500	4.85	5.583	10.50	8.667	1.62	11.75	0.81
2.583	4.85	5.667	10.50	8.750	1.62	11.83	0.81
2.667	4.85	5.750	10.50	8.833	1.62	11.92	0.81
2.750	4.85	5.833	10.50	8.917	1.62	12.00	0.81
2.833	4.85	5.917	10.50	9.000	1.62	12.08	0.81
2.917	4.85	6.000	10.50	9.083	1.62	12.17	0.81
3.000	4.85	6.083	10.50	9.167	1.62	12.25	0.81
3.083	4.85	6.167	10.50	9.250	1.62		

Max. Eff. Inten. (mm/hr)= 37.17 20.83

Post-Dev Schematics

over (min)	5.00	10.00	
Storage Coeff. (min)=	2.91 (ii)	6.64 (ii)	
Unit Hyd. Tpeak (min)=	5.00	10.00	
Unit Hyd. peak (cms)=	0.28	0.14	
			TOTALS
PEAK FLOW (cms)=	0.06	0.00	0.062 (iii)
TIME TO PEAK (hrs)=	5.08	5.25	5.25
RUNOFF VOLUME (mm)=	79.82	34.37	76.63
TOTAL RAINFALL (mm)=	80.82	80.82	80.82
RUNOFF COEFFICIENT =	0.99	0.43	0.95

RESERVOIR(0036)	OVERFLOW IS OFF				
IN= 2---> OUT= 1					
DT= 5.0 min					
	OUTFLOW	STORAGE		OUTFLOW	STORAGE
	(cms)	(ha.m.)		(cms)	(ha.m.)
	0.0000	0.0000		0.0700	0.0020

	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
INFLOW : ID= 2 (0035)	0.622	0.062	5.25	76.63
OUTFLOW: ID= 1 (0036)	0.622	0.062	5.25	76.63

PEAK FLOW REDUCTION [Qout/Qin](%)= 99.86
 TIME SHIFT OF PEAK FLOW (min)= 0.00
 MAXIMUM STORAGE USED (ha.m.)= 0.0018

FINISH

POST-DEVELOPMENT VO MODEL SCHEMATIC (REGIONAL STORM EVENT)



Post-Dev Schematics - Regional

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```

V   V   I   SSSSS U   U   A   L           (v 6.2.2019)
V   V   I   SS    U   U   A A   L
V   V   I   SS    U   U   AAAAA L
V   V   I   SS    U   U   A   A   L
VV      I   SSSSS UUUUU A   A   LLLLL

```

```

000   TTTTT TTTTT H   H   Y   Y   M   M   000   TM
O   O   T       T   H   H   Y Y   MM MM   O   O
O   O   T       T   H   H   Y   M   M   O   O
000       T       T   H   H   Y   M   M   000

```

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***** D E T A I L E D O U T P U T *****

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\V02\voin.dat

Output filename:

C:\Users\21yk\AppData\Local\Civica\XH5\946992b3-465d-43ba-a8b8-ff4639fd3c\22c82008-5ddf-494a-8b7e-bcf29875d28e\scenari

Summary filename:

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DATE: 02-26-2025

TIME: 03:50:37

USER:LETICIA M. N. RODRIGUES

COMMENTS: REGIONAL STORM EVENT

```

*****
** SIMULATION : Hazel                      **
*****

```

| READ STORM |

Filename: C:\Users\21yk\AppData

Post-Dev Schematics - Regional

ata\Local\Temp\

6b25242d-ccae-4010-94e0-2d8065be6090\05ba0a93

Ptotal=212.00 mm

Comments: Hazel

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.00	6.00	3.00	13.00	6.00	23.00	9.00	53.00
1.00	4.00	4.00	17.00	7.00	13.00	10.00	38.00
2.00	6.00	5.00	13.00	8.00	13.00	11.00	13.00

CALIB

STANDHYD (0035)

ID= 1 DT= 5.0 min

Area (ha)= 0.62

Total Imp(%)= 93.00 Dir. Conn.(%)= 93.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.58	0.04
Dep. Storage (mm)=	1.00	1.50
Average Slope (%)=	1.00	2.00
Length (m)=	64.39	40.00
Mannings n =	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00

Post-Dev Schematics - Regional

1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Max.Eff.Inten.(mm/hr)= 53.00 44.48
over (min) 5.00 10.00
Storage Coeff. (min)= 2.53 (ii) 5.76 (ii)
Unit Hyd. Tpeak (min)= 5.00 10.00
Unit Hyd. peak (cms)= 0.29 0.15

TOTALS

PEAK FLOW (cms)= 0.09 0.01 0.091 (iii)
TIME TO PEAK (hrs)= 9.67 10.00 10.00
RUNOFF VOLUME (mm)= 211.00 141.00 206.09
TOTAL RAINFALL (mm)= 212.00 212.00 212.00
RUNOFF COEFFICIENT = 1.00 0.67 0.97

| CALIB |
| NASHYD (0034) | Area (ha)= 0.56 Curve Number (CN)= 71.0
| ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
|-----| U.H. Tp(hrs)= 0.20

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

----- TRANSFORMED HYETOGRAPH -----

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00

Post-Dev Schematics - Regional

0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Unit Hyd Qpeak (cms)= 0.107

PEAK FLOW (cms)= 0.067 (i)

TIME TO PEAK (hrs)= 10.000

RUNOFF VOLUME (mm)= 137.627

TOTAL RAINFALL (mm)= 212.000

RUNOFF COEFFICIENT = 0.649

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB			
STANDHYD (0030)		Area (ha)=	0.90
ID= 1 DT= 5.0 min		Total Imp(%)=	94.00 Dir. Conn.(%)= 94.00

Surface Area (ha)= IMPERVIOUS 0.85 PERVIOUS (i) 0.05

Post-Dev Schematics - Regional

Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	77.55	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
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1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Max. Eff. Inten. (mm/hr)= 53.00 44.48

Post-Dev Schematics - Regional

over (min)	5.00	10.00	
Storage Coeff. (min)=	2.83 (ii)	5.85 (ii)	
Unit Hyd. Tpeak (min)=	5.00	10.00	
Unit Hyd. peak (cms)=	0.28	0.15	
			TOTALS
PEAK FLOW (cms)=	0.12	0.01	0.131 (iii)
TIME TO PEAK (hrs)=	9.75	10.00	10.00
RUNOFF VOLUME (mm)=	211.00	141.00	206.80
TOTAL RAINFALL (mm)=	212.00	212.00	212.00
RUNOFF COEFFICIENT =	1.00	0.67	0.98

RESERVOIR(0033)	OVERFLOW IS OFF		
IN= 2---> OUT= 1			
DT= 5.0 min			
	OUTFLOW	STORAGE	OUTFLOW
	(cms)	(ha.m.)	(cms)
	0.0000	0.0000	0.0270
			STORAGE
			(ha.m.)
			0.0450

	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
INFLOW : ID= 2 (0030)	0.902	0.131	10.00	206.80
OUTFLOW: ID= 1 (0033)	0.902	0.057	11.08	206.33

PEAK FLOW REDUCTION [Qout/Qin](%)= 43.47
TIME SHIFT OF PEAK FLOW (min)= 65.00
MAXIMUM STORAGE USED (ha.m.)= 0.0954

ADD HYD (0038)				
1 + 2 = 3				
	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0033):	0.90	0.057	11.08	206.33
+ ID2= 2 (0034):	0.56	0.067	10.00	137.63
ID = 3 (0038):	1.46	0.115	10.00	180.04

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

FINISH

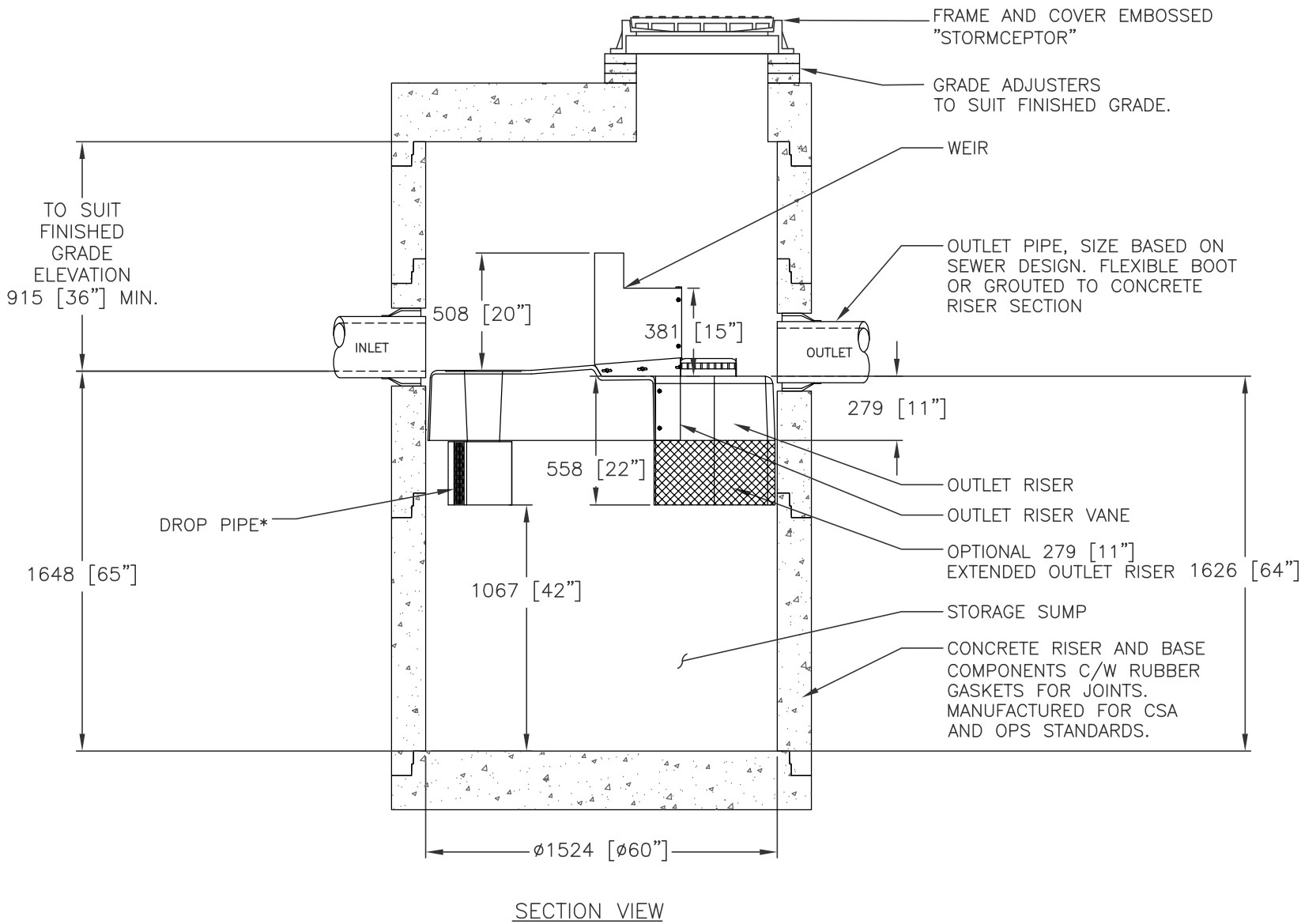
Block ID	Area (ha)	RC	TIMP (%)	Water Balance Volume (m3)
				Block Target (5mm over imp-ha)
200	0.622	0.85	93%	28.9
201	0.902	0.86	94%	42.5
202	0.559	0.44	34%	9.6
Total Site	2.083			81.0

$$c = (0.7)(TIMP) + 0.2$$

where,

c = the runoff coefficient
 $TIMP$ = total impervious fraction (dimensionless)

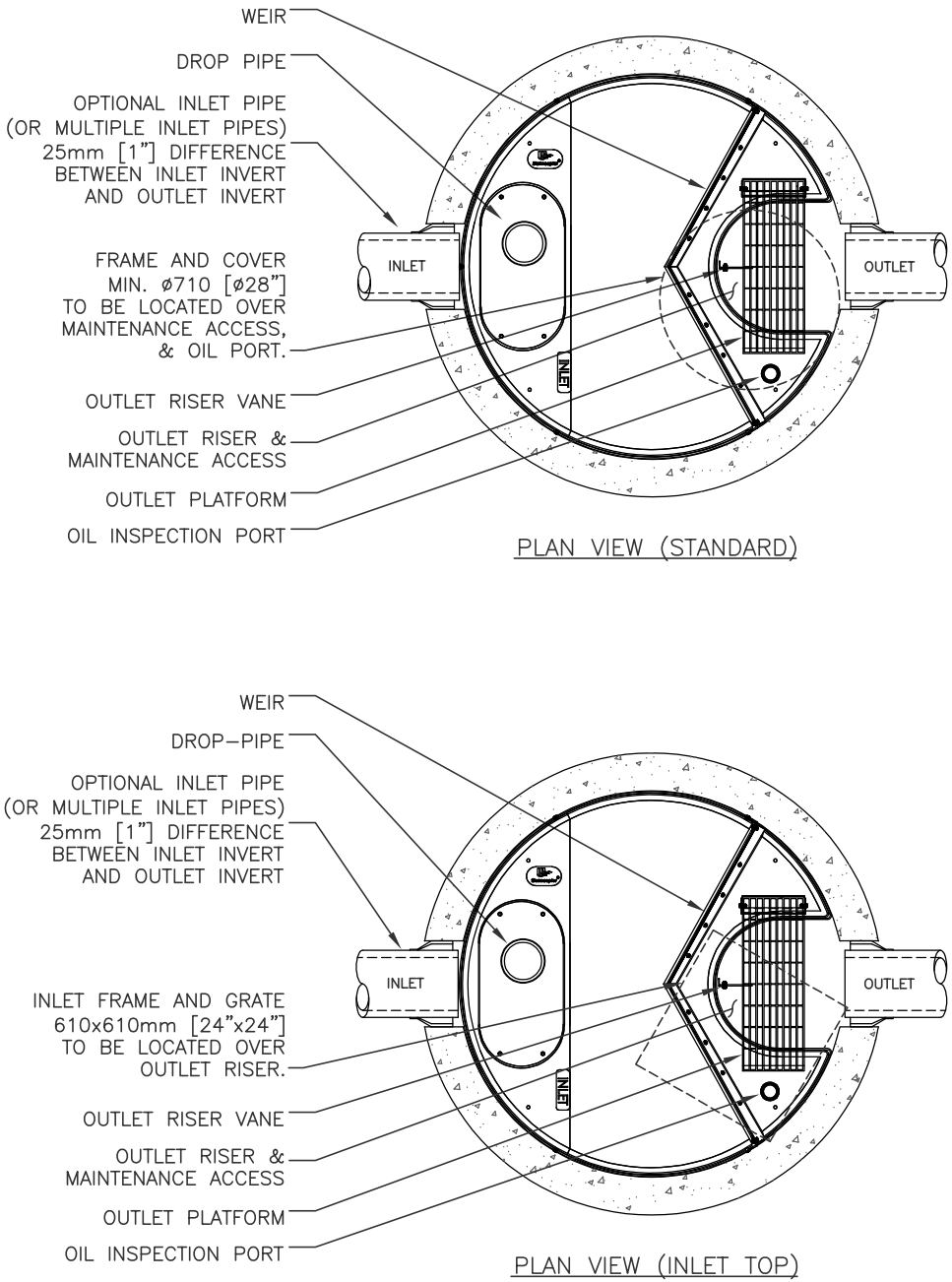
DRAWING NOT TO BE USED FOR CONSTRUCTION



- GENERAL NOTES:**
- * MAXIMUM SURFACE LOADING RATE (SLR) INTO LOWER CHAMBER THROUGH DROP PIPE IS 1135 L/min/m² (27.9 gpm/ft²) FOR STORMCEPTOR EF5 AND 535 L/min/m² (13.1 gpm/ft²) FOR STORMCEPTOR EFO5 (OIL CAPTURE CONFIGURATION).
 - 1. ALL DIMENSIONS INDICATED ARE IN MILLIMETERS (INCHES) UNLESS OTHERWISE SPECIFIED.
 - 2. STORMCEPTOR STRUCTURE INLET AND OUTLET PIPE SIZE AND ORIENTATION SHOWN FOR INFORMATIONAL PURPOSES ONLY.
 - 3. UNLESS OTHERWISE NOTED, BYPASS INFRASTRUCTURE, SUCH AS ALL UPSTREAM DIVERSION STRUCTURES, CONNECTING STRUCTURES, OR PIPE CONDUITS CONNECTING TO COMPLETE THE STORMCEPTOR SYSTEM SHALL BE PROVIDED AND ADDRESSED SEPARATELY.
 - 4. DRAWING FOR INFORMATION PURPOSES ONLY. REFER TO ENGINEER'S SITE/UTILITY PLAN FOR STRUCTURE ORIENTATION.
 - 5. NO PRODUCT SUBSTITUTIONS SHALL BE ACCEPTED UNLESS SUBMITTED 10 DAYS PRIOR TO PROJECT BID DATE, OR AS DIRECTED BY THE ENGINEER OF RECORD.

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

STANDARD DETAIL
NOT FOR CONSTRUCTION



SITE SPECIFIC DATA REQUIREMENTS					
STORMCEPTOR MODEL		EFO5			
STRUCTURE ID		*			
HYDROCARBON STORAGE REQ'D (L)		*			
WATER QUALITY FLOW RATE (L/s)		*			
PEAK FLOW RATE (L/s)		*			
RETURN PERIOD OF PEAK FLOW (yrs)		*			
DRAINAGE AREA (HA)		*			
DRAINAGE AREA IMPERVIOUSNESS (%)		*			
PIPE DATA:	I.E.	MAT'L	DIA	SLOPE %	HGL
INLET #1	*	*	*	*	*
INLET #2	*	*	*	*	*
OUTLET	*	*	*	*	*
* PER ENGINEER OF RECORD					

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

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

Stormceptor® EF

SCALE = NTS

imbrium

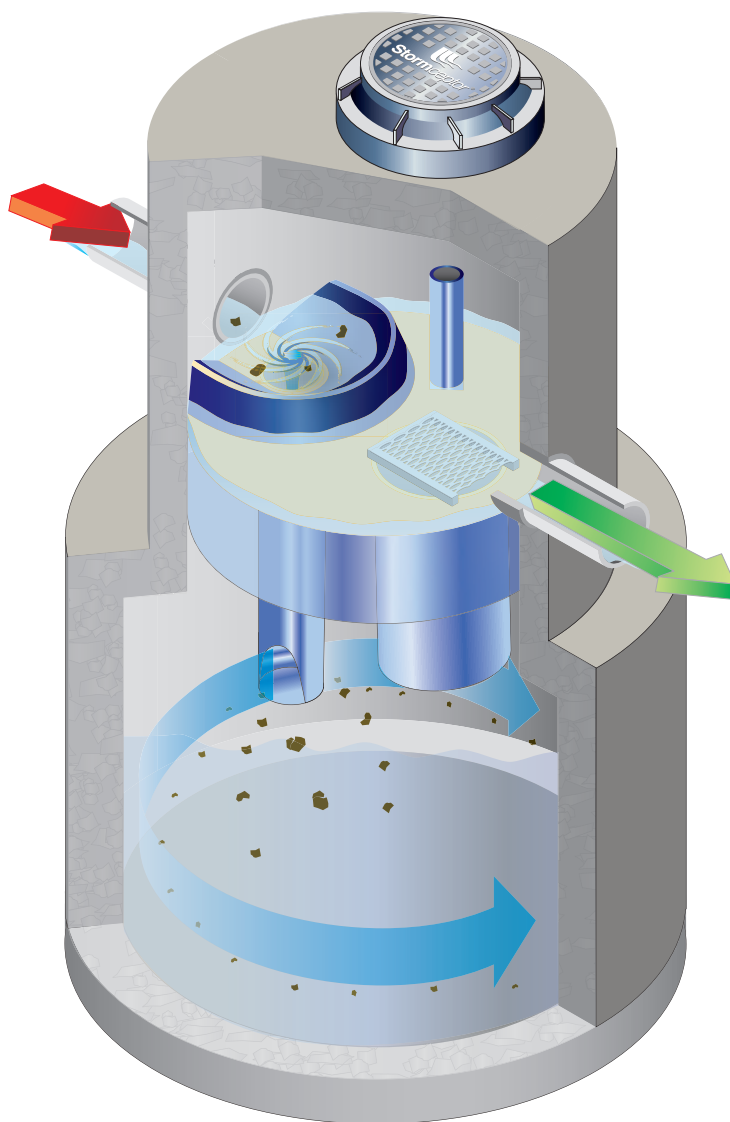
407 FAIRVIEW DRIVE, WHITBY, ON L1N 5A9
TF 800-585-4831 CA 416-860-5800 INTL +1 416-860-5800

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DATE: 8/22/2024	
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PROJECT No.: EFO5	SEQUENCE No.: *
SHEET: 1 OF 1	

Stormceptor[®]

Owner's Manual



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

Canadian Patent No. 2,137,942
Canadian Patent No. 2,175,277
Canadian Patent No. 2,180,305
Canadian Patent No. 2,180,338
Canadian Patent No. 2,206,338
Canadian Patent No. 2,327,768
U.S. Patent No. 5,753,115
U.S. Patent No. 5,849,181
U.S. Patent No. 6,068,765
U.S. Patent No. 6,371,690
U.S. Patent No. 7,582,216
U.S. Patent No. 7,666,303
Australia Patent No. 693.164
Australia Patent No. 707,133
Australia Patent No. 729,096
Australia Patent No. 779,401
Australia Patent No. 2008,279,378
Australia Patent No. 2008,288,900
Indonesia Patent No. 0007058
Japan Patent No. 3581233
Japan Patent No. 9-11476
Korean Patent No. 0519212
Malaysia Patent No. 118987
New Zealand Patent No. 314,646
New Zealand Patent No. 583,008
New Zealand Patent No. 583,583
South African Patent No. 2010/00682
South African Patent No. 2010/01796
Other Patents Pending

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Congratulations!

Your selection of a Stormceptor® means that you have chosen the most recognized and efficient stormwater oil/sediment separator available for protecting the environment. Stormceptor is a pollution control device often referred to as a “Hydrodynamic Separator (HDS)” or an “Oil Grit Separator (OGS)”, engineered to remove and retain pollutants from stormwater runoff to protect our lakes, rivers and streams from the harmful effects of non-point source pollution.

1 – Stormceptor Overview

Stormceptor is a patented stormwater quality structure most often utilized as a treatment component of the underground storm drain network for stormwater pollution prevention. Stormceptor is designed to remove sediment, total suspended solids (TSS), other pollutants attached to sediment, hydrocarbons and free oil from stormwater runoff. Collectively the Stormceptor provides spill protection and prevents non-point source pollution from entering downstream waterways.

Key benefits of Stormceptor include:

- Removes sediment, suspended solids, debris, nutrients, heavy metals, and hydrocarbons (oil and grease) from runoff and snowmelt.
- Will not scour or re-suspend trapped pollutants.
- Provides sediment and oil storage.
- Provides spill control for accidents, commercial and industrial developments.
- Easy to inspect and maintain (vacuum truck).
- “STORMCEPTOR” is *clearly* marked on the access cover (excluding inlet designs).
- Relatively small footprint.
- 3rd Party tested and independently verified.
- Dedicated team of experts available to provide support.

Model Types:

- STC (Standard)
- STF (Fiberglass)
- EOS (Extended Oil Storage)
- OSR (Oil and Sand Removal)
- MAX (Custom designed unit, specific to site)

Configuration Types:

- Inlet unit (accommodates inlet flow entry, and multi-pipe entry)
- In-Line (accommodates multi-pipe entry)
- Submerged Unit (accommodates the site's tailwater conditions)
- Series Unit (combines treatment in two systems)

Please Maintain Your Stormceptor

To ensure long-term environmental protection through continued performance as originally designed for your site, **Stormceptor must be maintained**, as any stormwater treatment practice does. The need for maintenance is determined through inspection of the Stormceptor. Procedures for inspection are provided within this document. Maintenance of the Stormceptor is performed from the surface via vacuum truck.

If you require information about Stormceptor, or assistance in finding resources to facilitate inspections or maintenance of your Stormceptor please call your local Stormceptor Licensee or Imbrium® Systems.

2 – Stormceptor Operation & Components

Stormceptor is a flexibly designed underground stormwater quality treatment device that is unparalleled in its effectiveness for pollutant capture and retention using patented flow separation technology.

Stormceptor creates a non-turbulent treatment environment below the insert platform within the system. The insert diverts water into the lower chamber, allowing free oils and debris to rise, and sediment to settle under relatively low velocity conditions. These pollutants are trapped and stored below the insert and protected from large runoff events for later removal during the maintenance procedure.

With thousands of units operating worldwide, Stormceptor delivers reliable protection every day, in every storm. The patented Stormceptor design prohibits the scour and release of captured pollutants, ensuring superior water quality treatment and protection during even the most extreme storm events. Stormceptor's proven performance is backed by the longest record of lab and field verification in the industry.

Stormceptor Schematic and Component Functions

Below are schematics of two common Stormceptor configurations with key components identified and their functions briefly described.

Figure 1.

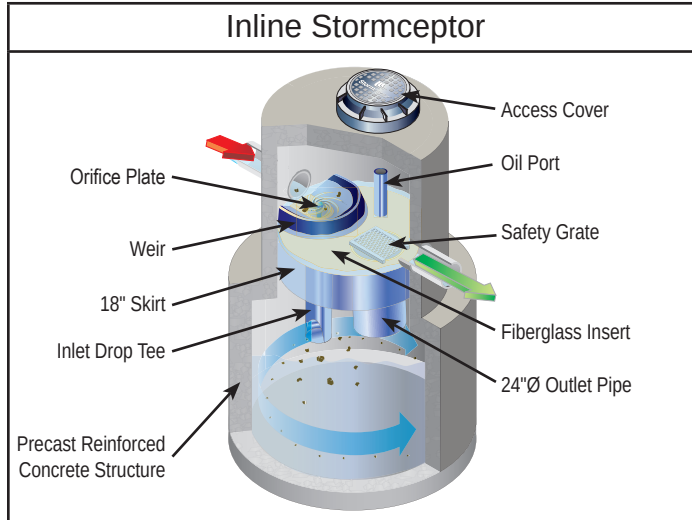
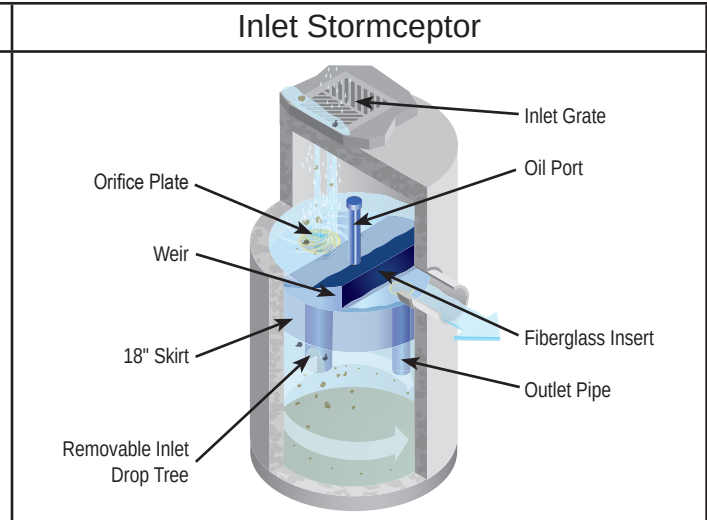


Figure 2.



- **Manhole access cover** – provides access to the subsurface components
- **Precast reinforced concrete structure** – provides the vessel's watertight structural support
- **Fiberglass insert** – separates vessel into upper and lower chambers
- **Weir** – directs incoming stormwater and oil spills into the lower chamber
- **Orifice plate** – prevents scour of accumulated pollutants
- **Inlet drop tee** – conveys stormwater into the lower chamber
- **Fiberglass skirt** – provides double-wall containment of hydrocarbons
- **Outlet riser pipe** – conveys treated water to the upper chamber; primary vacuum line access port for sediment removal
- **Oil inspection port** – primary access for measuring oil depth and oil removal
- **Safety grate** – safety measure to cover riser pipe in the event of manned entry into vessel

3 – Stormceptor Identification

Stormceptor is available in both precast concrete and fiberglass vessels, with precast concrete often being the dominant material of construction.

In the Stormceptor, a patented, engineered fiberglass insert separates the structure into an upper chamber and lower chamber. The lower chamber will remain full of water, as this is where the pollutants are sequestered for later removal. Multiple Stormceptor model (STC, OSR, EOS, MAX and STF) configurations exist, each to be inspected and maintained in a similar fashion.

Each unit is easily identifiable as a Stormceptor by the trade name “Stormceptor” embossed on each access cover at the surface. To determine the location of “inlet” Stormceptor units with horizontal catch basin inlet, look down into the grate as the Stormceptor insert will be visible. The name “Stormceptor” is not embossed on inlet models due to the variability of inlet grates used/ approved across North America.

Once the location of the Stormceptor is determined, the model number may be identified by comparing the measured depth from the fiberglass insert level at the outlet pipe's invert (water level) to the bottom of the tank using **Table 1**.

In addition, starting in 1996 a metal serial number tag containing the model number has been affixed to the inside of the unit, on the fiberglass insert. If the unit does not have a serial number, or if there is any uncertainty regarding the size of the unit using depth measurements, please contact your local Stormceptor Representative for assistance.

Sizes/Models

Typical general dimensions and capacities of the standard precast STC, EOS & OSR Stormceptor models in both USA and Canada/International (excluding South East Asia and Australia) are provided in **Tables 1 and 2**. Typical rim to invert measurements are provided later in this document. The total depth for cleaning will be the sum of the depth from outlet pipe invert (generally the water level) to rim (grade) and the depth from outlet pipe invert to the precast bottom of the unit. Note that depths and capacities may vary slightly between regions.

Table 1A. (US) Stormceptor Dimensions – Insert to Base of Structure

STC Model	Insert to Base (in.)	EOS Model	Insert to Base (in.)	OSR Model	Insert to Base (in.)	Typical STF m (in.)
450	60	4-175	60	65	60	1.5 (60)
900	55	9-365	55	140	55	1.5 (61)
1200	71	12-590	71			1.8 (73)
1800	105	18-1000	105			2.9 (115)
2400	94	24-1400	94	250	94	2.3 (89)
3600	134	36-1700	134			3.2 (127)
4800	128	48-2000	128	390	128	2.9 (113)
6000	150	60-2500	150			3.5 (138)
7200	134	72-3400	134	560	134	3.3 (128)
11000*	128	110-5000*	128	780*	128	
13000*	150	130-6000*	150			
16000*	134	160-7800*	134	1125*	134	

Notes:

1. Depth Below Pipe Inlet Invert to the Bottom of Base Slab can vary slightly by manufacturing facility, and can be modified to accommodate specific site designs, pollutant loads or site conditions. Contact your local representative for assistance.

*Consist of two chamber structures in series.

Table 1B. (CA & Int'l) Stormceptor Dimensions – Insert to Base of Structure

STC Model	Insert to Base (m)	EOS Model	Insert to Base (m)	OSR Model	Insert to Base (m)	Typical STF m (in.)
300	1.5	300	1.5	300	1.7	1.5 (60)
750	1.5	750	1.5	750	1.6	1.5 (61)
1000	1.8	1000	1.8			1.8 (73)
1500	2.8					2.9 (115)
2000	2.8	2000	2.8	2000	2.6	2.3 (89)
3000	3.7	3000	3.7			3.2 (127)
4000	3.4	4000	3.4	4000	3.6	2.9 (113)
5000	4.0	5000	4.0			3.5 (138)
6000	3.7	6000	3.7	6000	3.7	3.3 (128)
9000*	3.4	9000*	3.4	9000*	3.6	
11000*	4.0	10000*	4.0			
14000*	3.7	14000*	3.7	14000*	3.7	

Notes:

1. Depth Below Pipe Inlet Invert to the Bottom of Base Slab can vary slightly by manufacturing facility, and can be modified to accommodate specific site designs, pollutant loads or site conditions. Contact your local representative for assistance.

*Consist of two chamber structures in series.

Table 2A. (US) Storage Capacities

STC Model	Hydrocarbon Storage Capacity gal	Sediment Capacity ft ³	EOS Model	Hydrocarbon Storage Capacity gal	OSR Model	Hydrocarbon Storage Capacity gal	Sediment Capacity ft ³
450	86	46	4-175	175	065	115	46
900	251	89	9-365	365	140	233	58
1200	251	127	12-590	591			
1800	251	207	18-1000	1198			
2400	840	205	24-1400	1457	250	792	156
3600	840	373	36-1700	1773			
4800	909	543	48-2000	2005	390	1233	465
6000	909	687	60-2500	2514			
7200	1059	839	72-3400	3418	560	1384	690
11000*	2797	1089	110-5000*	5023	780*	2430	930
13000*	2797	1374	130-6000*	6041			
16000*	3055	1677	160-7800*	7850	1125*	2689	1378

Notes:

1. Hydrocarbon & Sediment capacities can be modified to accommodate specific site design requirements, contact your local representative for assistance.

*Consist of two chamber structures in series.

Table 2B. (CA & Int'l) Storage Capacities

STC Model	Hydrocarbon Storage Capacity L	Sediment Capacity L	EOS Model	Hydrocarbon Storage Capacity L	OSR Model	Hydrocarbon Storage Capacity L	Sediment Capacity L
300	300	1450	300	662	300	300	1500
750	915	3000	750	1380	750	900	3000
1000	915	3800	1000	2235			
1500	915	6205					
2000	2890	7700	2000	5515	2000	2790	7700
3000	2890	11965	3000	6710			
4000	3360	16490	4000	7585	4000	4700	22200
5000	3360	20940	5000	9515			
6000	3930	26945	6000	12940	6000	5200	26900
9000*	10555	32980	9000*	19010	9000*	9300	33000
11000*	10555	37415	10000*	22865			
14000*	11700	53890	14000*	29715	14000*	10500	53900

Notes:

1. Hydrocarbon & Sediment capacities can be modified to accommodate specific site design requirements, contact your local representative for assistance.

**Consist of two chamber structures in series.*

4 – Stormceptor Inspection & Maintenance

Regular inspection and maintenance is a proven, cost-effective way to maximize water resource protection for all stormwater pollution control practices, and is required to insure proper functioning of the Stormceptor. Both inspection and maintenance of the Stormceptor is easily performed from the surface. Stormceptor's patented technology has no moving parts, simplifying the inspection and maintenance process.

Please refer to the following information and guidelines before conducting inspection and maintenance activities.

When is inspection needed?

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

When is maintenance cleaning needed?

- For optimum performance, the unit should be cleaned out once the sediment depth reaches the recommended maintenance sediment depth, which is approximately 15% of the unit's total storage capacity (see **Table 2**). The frequency should be adjusted based on historical inspection results due to variable site pollutant loading.

- Sediment removal is easier when removed on a regular basis at or prior to the recommended maintenance sediment depths, as sediment build-up can compact making removal more difficult.
- The unit should be cleaned out immediately after an oil, fuel or chemical spill.

What conditions can compromise Stormceptor performance?

- If construction sediment and debris is not removed prior to activating the Stormceptor unit, maintenance frequency may be reduced.
- If the system is not maintained regularly and fills with sediment and debris beyond the capacity as indicated in **Table 2**, pollutant removal efficiency may be reduced.
- If an oil spill(s) exceeds the oil capacity of the system, subsequent spills may not be captured.
- If debris clogs the inlet of the system, removal efficiency of sediment and hydrocarbons may be reduced.
- If a downstream blockage occurs, a backwater condition may occur for the Stormceptor and removal efficiency of sediment and hydrocarbons may be reduced.

What training is required?

The Stormceptor is to be inspected and maintained by professional vacuum cleaning service providers with experience in the maintenance of underground tanks, sewers and catch basins. For typical inspection and maintenance activities, no specific supplemental training is required for the Stormceptor. Information provided within this Manual (provided to the site owner) contains sufficient guidance to maintain the system properly.

In unusual circumstances, such as if a damaged component needs replacement or some other condition requires manned entry into the vessel, confined space entry procedures must be followed. Only professional maintenance service providers trained in these procedures should enter the vessel. Service provider companies typically have personnel who are trained and certified in confined space entry procedures according to local, state, and federal standards.

What equipment is typically required for inspection?

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

Recommended Stormceptor Inspection Procedure:

- Stormceptor is to be inspected from grade through a standard surface manhole access cover.
- Sediment and oil depth inspections are performed with a sediment probe and oil dipstick.
- Oil depth is measured through the oil inspection port, either a 4-inch (100 mm) or 6-inch (150 mm) diameter port.
- Sediment depth can be measured through the oil inspection port or the 24-inch (610 mm) diameter outlet riser pipe.
- Inspections also involve a visual inspection of the internal components of the system.

Figure 3.

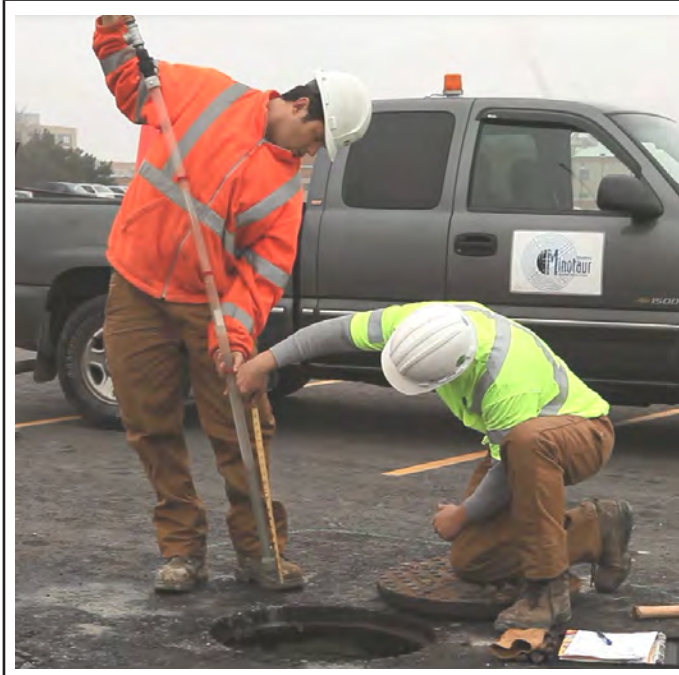
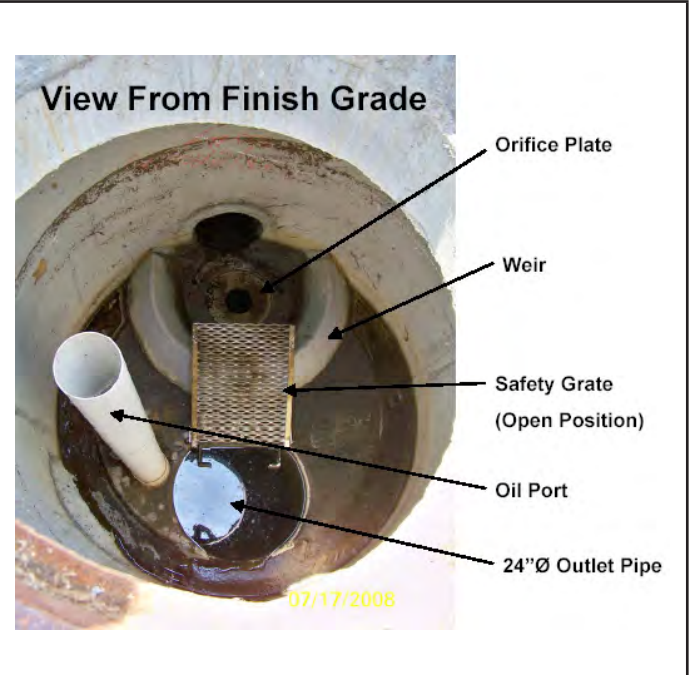


Figure 4.



What equipment is typically required for maintenance?

- Vacuum truck equipped with water hose and jet nozzle
- Small pump and tubing for oil removal
- Manhole access cover lifting tool
- Oil dipstick / Sediment probe with ball valve (typically $\frac{3}{4}$ -inch to 1-inch diameter)
- Flashlight
- Camera
- Data log / Inspection Report
- Safety cones
- Hard hats, safety shoes, safety glasses, chemical-resistant gloves, and hearing protection for service providers
- Gas analyzer, respiratory gear, and safety harness for specially trained personnel if confined space entry is required

Recommended Stormceptor Maintenance Procedure

Maintenance of Stormceptor is performed using a vacuum truck.

No entry into the unit is required for maintenance. **DO NOT ENTER THE STORMCEPTOR CHAMBER** unless you have the proper personal safety equipment, have been trained and are qualified to enter a confined space, as identified by local Occupational Safety and Health Regulations (e.g. 29 CFR 1910.146 or Canada Occupational Safety and Health Regulations – SOR/86-304). Without the proper equipment, training and permit, entry into confined spaces can result in serious bodily harm and potentially death. Consult local, provincial, and/or state regulations to determine the requirements for confined space entry. Be aware, and take precaution that the Stormceptor fiberglass insert may be slippery. In addition, be aware that some units do not have a safety grate to cover the outlet riser pipe that leads to the submerged, lower chamber.

- Ideally maintenance should be conducted during dry weather conditions when no flow is entering the unit.
- Stormceptor is to be maintained through a standard surface manhole access cover.
- Insert the oil dipstick into the oil inspection port. If oil is present, pump off the oil layer into separate containment using a small pump and tubing.
- Maintenance cleaning of accumulated sediment is performed with a vacuum truck.
 - For 6-ft (1800 mm) diameter models and larger, the vacuum hose is inserted into the lower chamber via the 24-inch (610 mm) outlet riser pipe.
 - For 4-ft (1200 mm) diameter model, the removable drop tee is lifted out, and the vacuum hose is inserted into the lower chamber via the 12-inch (305 mm) drop tee hole.

Figure 5.

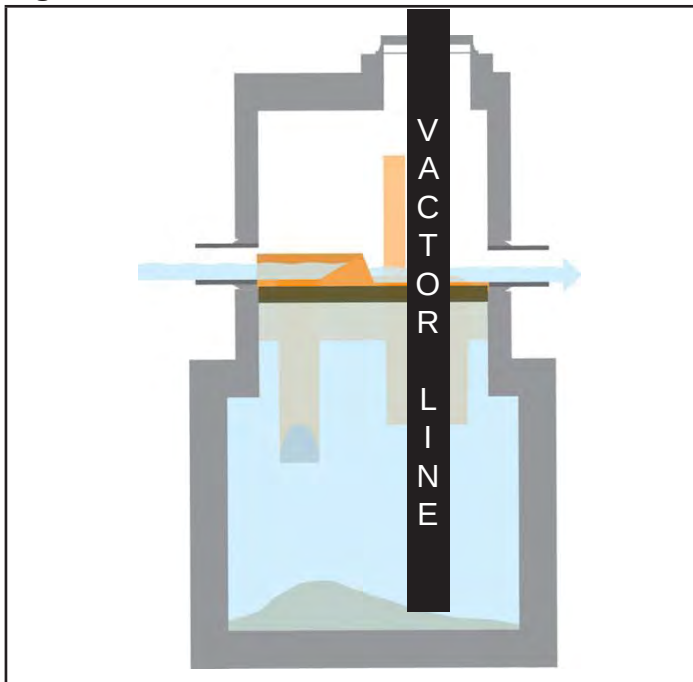
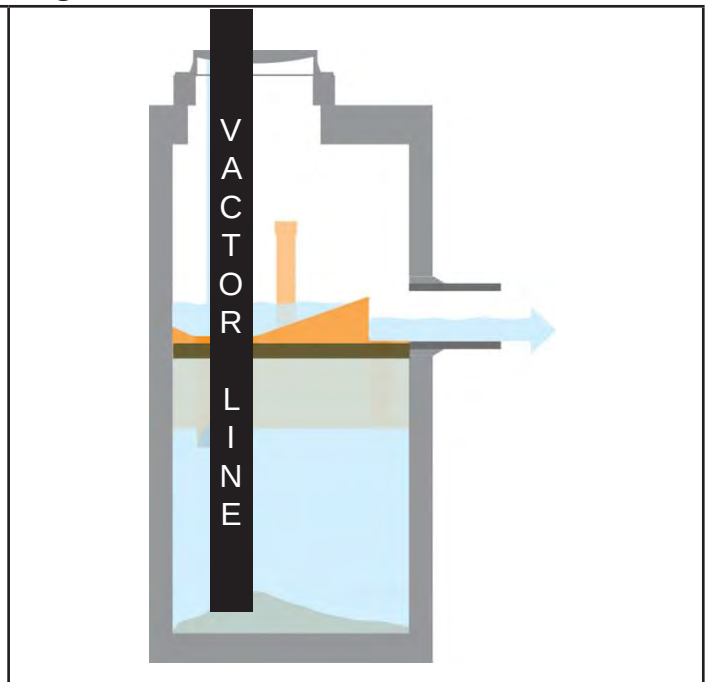


Figure 6.



- Using the vacuum hose, decant the water from the lower chamber into a separate containment tank or to the sanitary sewer, if permitted by the local regulating authority.
- Remove the sediment sludge from the bottom of the unit using the vacuum hose. For large Stormceptor units, a flexible hose is often connected to the primary vacuum line for ease of movement in the lower chamber.
- Units that have not been maintained regularly, have surpassed the maximum recommended sediment capacity, or contain damaged components may require manned entry by trained personnel using safe and proper confined space entry procedures.

Figure 7.



Figure 8.



A maintenance worker stationed at the above ground surface uses a vacuum hose to evacuate water, sediment, and debris from the system.

What is required for proper disposal?

The requirements for the disposal of material removed from Stormceptor units are similar to that of any other stormwater treatment Best Management Practices (BMP). Local guidelines should be consulted prior to disposal of the separator contents. In most areas the sediment, once dewatered, can be disposed of in a sanitary landfill. It is not anticipated that the sediment would be classified as hazardous waste. This could be site and pollutant dependent. In some cases, approval from the disposal facility operator/agency may be required.

What about oil spills?

Stormceptor is often implemented in areas where there is high potential for oil, fuel or other hydrocarbon or chemical spills. Stormceptor units should be cleaned immediately after a spill occurs by a licensed liquid waste hauler. You should also notify the appropriate regulatory agencies as required in the event of a spill.

What if I see an oil rainbow or sheen at the Stormceptor outlet?

With a steady influx of water with high concentrations of oil, a sheen may be noticeable at the Stormceptor outlet. This may occur because a hydrocarbon rainbow or sheen can be seen at

very small oil concentrations (< 10 ppm). Stormceptor is effective at removing 95% of free oil, and the appearance of a sheen at the outlet with high influent oil concentrations does not mean that the unit is not working to this level of removal. In addition, if the influent oil is emulsified, the Stormceptor will not be able to remove it. The Stormceptor is designed for free oil removal and not emulsified or dissolved oil conditions.

What factors affect the costs involved with inspection/maintenance?

The Vacuum Service Industry for stormwater drainage and sewer systems is a well-established sector of the service industry that cleans underground tanks, sewers and catch basins. Costs to clean Stormceptor units will vary. Inspection and maintenance costs are most often based on unit size, the number of units on a site, sediment/oil/hazardous material loads, transportation distances, tipping fees, disposal requirements and other local regulations.

What factors predict maintenance frequency?

Maintenance frequency will vary with the amount of pollution on your site (number of hydrocarbon spills, amount of sediment, site activity and use, etc.). It is recommended that the frequency of maintenance be increased or reduced based on local conditions. If the sediment load is high from an unstable site or sediment loads transported from upstream catchments, maintenance may be required semi-annually. Conversely once a site has stabilized, maintenance may be required less frequently (for example: two to seven year, site and situation dependent). Maintenance should be performed immediately after an oil spill or once the sediment depth in Stormceptor reaches the value specified in **Table 3** based on the unit size.

Table 3A. (US) Recommended Sediment Depths Indicating Maintenance

STC Model	Maintenance Sediment depth (in)	EOS Model	Maintenance Sediment depth (in)	Oil Storage Depth (in)	OSR Model	Maintenance Sediment depth (in)
450	8	4-175	9	24	065	8
900	8	9-365	9	24	140	8
1200	10	12-590	11	39		
1800	15					
2400	12	24-1400	14	68	250	12
3600	17	36-1700	19	79		
4800	15	48-2000	16	68	390	17
6000	18	60-2500	20	79		
7200	15	72-3400	17	79	560	17
11000*	17	110-5000*	16	68	780*	17
13000*	20	130-6000*	20	79		
16000*	17	160-7800*	17	79	1125*	17

Note:

1. The values above are for typical standard units.

*Per structure.

Table 3B. (CA & Int'l) Recommended Sediment Depths Indicating Maintenance

STC Model	Maintenance Sediment depth (mm)	EOS Model	Maintenance Sediment depth (mm)	Oil Storage Depth (mm)	OSR Model	Maintenance Sediment depth (mm)
300	225	300	225	610	300	200
750	230	750	230	610	750	200
1000	275	1000	275	990		
1500	400					
2000	350	2000	350	1727	2000	300
3000	475	3000	475	2006		
4000	400	4000	400	1727	4000	375
5000	500	5000	500	2006		
6000	425	6000	425	2006	6000	375
9000*	400	9000*	400	1727	9000*	425
11000*	500	10000*	500	2006		
14000*	425	14000*	425	2006	14000*	425

Note:

1. The values above are for typical standard units.

*Per structure.

Replacement parts

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

The benefits of regular inspection and maintenance are many – from ensuring maximum operation efficiency, to keeping maintenance costs low, to the continued protection of natural waterways – and provide the key to Stormceptor’s long and effective service life.

Stormceptor Inspection and Maintenance Log

Stormceptor Model No: _____

Allowable Sediment Depth: _____

Serial Number: _____

Installation Date: _____

Location Description of Unit: _____

Other Comments: _____

Contact Information

Questions regarding the Stormceptor can be addressed by contacting your area Stormceptor Licensee, Imbrium Systems, or visit our website at www.stormceptor.com.

Stormceptor Licensees:

CANADA

Lafarge Canada Inc. www.lafargepipe.com 403-292-9502 / 1-888-422-4022 780-468-5910 204-958-6348	Calgary, AB Edmonton, AB Winnipeg, MB, NW. ON, SK
--	---

Langley Concrete Group www.langleyconcretigroup.com 604-502-5236	BC
--	----

Hanson Pipe & Precast Inc. www.hansonpipeandprecast.com 519-622-7574 / 1-888-888-3222	ON
---	----

Lécuyer et Fils Ltée. www.lecuyerbeton.com 450-454-3928 / 1-800-561-0970	QC
--	----

Strescon Limited www.strescon.com 902-494-7400 506-633-8877	NS, NF NB, PE
--	------------------

UNITED STATES

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www.rinkerstormceptor.com
1-800-909-7763

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www.imbriumsystems.com
www.stormceptor.com

VERIFICATION STATEMENT

GLOBE Performance Solutions

Verifies the performance of

Stormceptor® EF and EFO Oil-Grit Separators

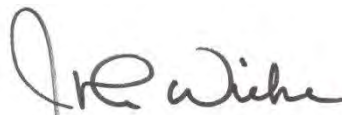
Developed by Imbrium Systems, Inc.,
Whitby, Ontario, Canada

Registration: GPS-ETV_VR2023-11-15_Imbrium-SC

In accordance with

ISO 14034:2016

**Environmental management —
Environmental technology verification (ETV)**



John D. Wiebe, PhD
Executive Chairman
GLOBE Performance Solutions

November 15, 2023
Vancouver, BC, Canada



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

Technology description and application

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

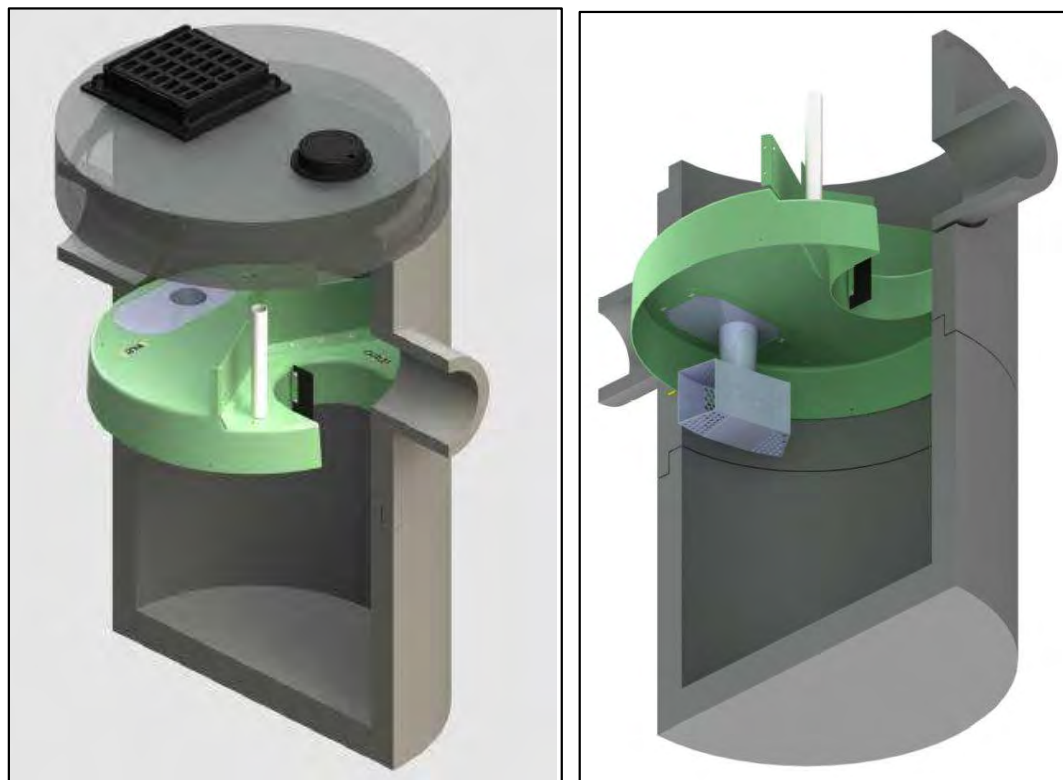


Figure 1. Graphic of typical inline Stormceptor® unit and core components.

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

Maximum flow rate into the lower chamber is a function of weir height and drop pipe orifice diameter. The Stormceptor® EF and EFO are designed to allow a surface loading rate of 1135 L/min/m² (27.9 gal/min/ft²) and 535 L/min/m² (13.1 gal/min/ft²) into the lower chamber, respectively. When prescribed surface loading rates are exceeded, ponding water can overtop the weir height and bypass the lower treatment chamber, exiting directly through the outlet pipe. Hydraulic testing and scour testing demonstrate that the internal bypass effectively prevents scour at all bypass flow rates. Increasing the bypass flow rate does not increase the orifice-controlled flow rate into the lower treatment chamber where sediment is stored. This internal bypass feature allows for in-line installation, avoiding the cost of

additional bypass structures. During bypass, treatment continues in the lower chamber at the maximum flow rate. The Stormceptor® EFO's lower design surface loading rate is favorable for minimizing re-entrainment and washout of captured light liquids. Inspection of Stormceptor® EF and EFO devices is performed from grade by inserting a sediment probe through the outlet riser and an oil dipstick through the oil inspection pipe. The unit can be maintained by using a vacuum hose through the outlet riser.

Performance conditions

The data and results published in this Technology Fact Sheet were obtained from the testing program conducted on the Imbrium Systems Inc.'s Stormceptor® EF4 and EFO4 Oil-Grit Separators, in accordance with the Procedure for Laboratory Testing of Oil-Grit Separators (Version 3.0, June 2014). The Procedure was prepared by the Toronto and Region Conservation Authority (TRCA) for Environment Canada's Environmental Technology Verification (ETV) Program. A copy of the Procedure may be accessed on the Canadian ETV website at www.etvcanada.ca.

Performance claim(s)

Capture test^a:

During the capture test, the Stormceptor® EF4 OGS device, with a false floor set to 50% of the manufacturer's recommended maximum sediment storage depth and a constant influent test sediment concentration of 200 mg/L, removes 70, 64, 54, 48, 46, 44, and 49 percent of influent sediment by mass at surface loading rates of 40, 80, 200, 400, 600, 1000, and 1400 L/min/m², respectively.

Stormceptor® EFO4, with a false floor set to 50% of the manufacturer's recommended maximum sediment storage depth and a constant influent test sediment concentration of 200 mg/L, removes 70, 64, 54, 48, 42, 40, and 34 percent of influent sediment by mass at surface loading rates of 40, 80, 200, 400, 600, 1000, and 1400 L/min/m², respectively.

Scour test^a:

During the scour test, the Stormceptor® EF4 and Stormceptor® EFO4 OGS devices, with 10.2 cm (4 inches) of test sediment pre-loaded onto a false floor reaching 50% of the manufacturer's recommended maximum sediment storage depth, generate corrected effluent concentrations of 4.6, 0.7, 0, 0.2, and 0.4 mg/L at 5-minute duration surface loading rates of 200, 800, 1400, 2000, and 2600 L/min/m², respectively.

Light liquid re-entrainment test^a:

During the light liquid re-entrainment test, the Stormceptor® EFO4 OGS device with surrogate low-density polyethylene beads preloaded within the lower chamber oil collection zone, representing a floating light liquid volume equal to a depth of 50.8 mm over the sedimentation area, retained 100, 99.5, 99.8, 99.8, and 99.9 percent of loaded beads by mass during the 5-minute duration surface loading rates of 200, 800, 1400, 2000, and 2600 L/min/m².

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

Performance results

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

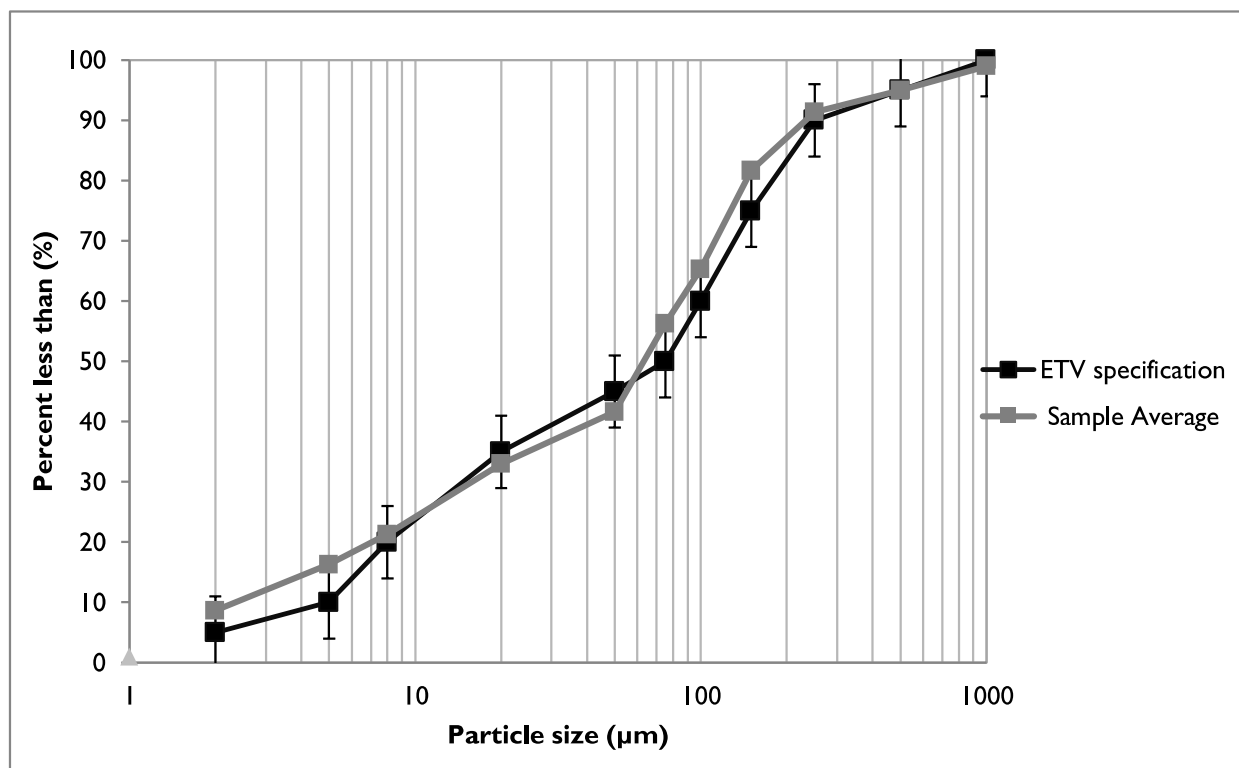


Figure 2. The three sample average particle size distribution (PSD) of the test sediment used for the capture and scour test compared to the specified PSD.

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

In some instances, the removal efficiencies were above 100% for certain particle size fractions. These discrepancies are not unique to any one test laboratory and may be attributed to errors relating to the blending of sediment, collection of representative samples for laboratory submission, and laboratory

analysis of PSD. Due to these errors, caution should be exercised in applying the removal efficiencies by particle size fraction for the purposes of sizing the tested device (see [Bulletin # CETV 2016-11-0001](#)). The results for “all particle sizes by mass balance” (see Table 1 and 2) are based on measurements of the total injected and retained sediment mass, and are therefore not subject to blending, sampling or PSD analysis errors.

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

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

^a An outlier in the feed sample sieve data resulted in a negative removal efficiency for this size fraction.

* Removal efficiencies were calculated to be above 100%. Calculated values ranged between 101 and 171% (average 128%). See text and [Bulletin # CETV 2016-11-0001](#) for more information.

Table 2. Removal efficiencies (%) of the EFO4 at surface loading rates above the bypass rate of 535 L/min/m²

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

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

Figure 3 compares the particle size distribution (PSD) of the three sample average of the test sediment to the PSD of the sediment retained by the EF4 at each of the tested surface loading rates. Figure 4 shows the same graph for the EFO4 unit at surface loading rates above the bypass rate of 535 L/min/m².

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

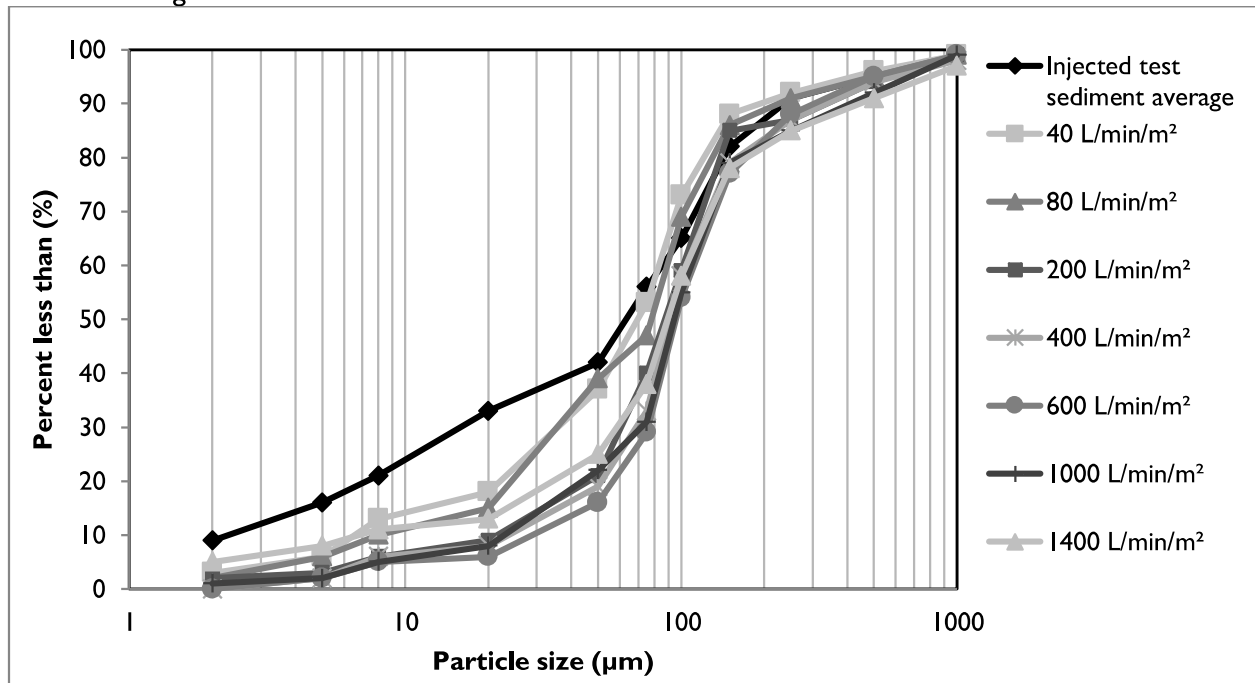


Figure 3. Particle size distribution of sediment retained in the EF4 in relation to the injected test sediment average.

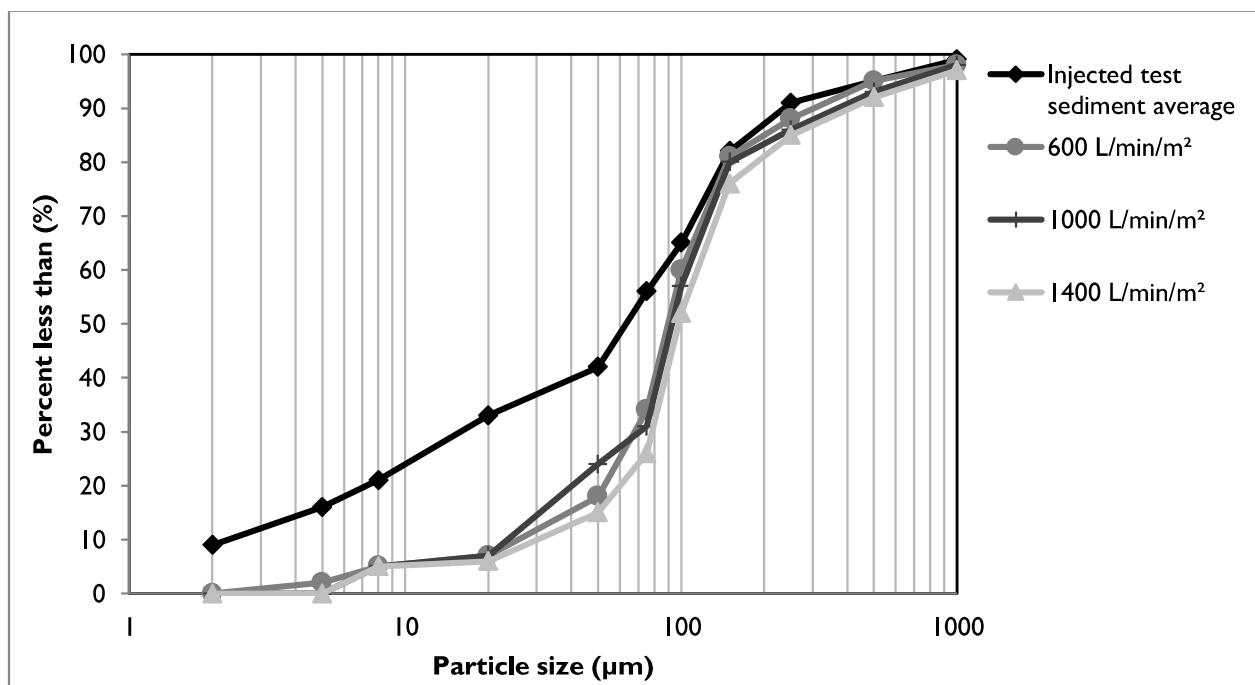


Figure 4. Particle size distribution of sediment retained in the EFO4 in relation to the injected test sediment average at surface loading rates above the bypass rate of 535 L/min/m²

Table 4 shows the results of the sediment scour and re-suspension test for the EF4 unit. The EFO4 was not tested as it was reasonably assumed that scour rates would be lower given that flow bypass occurs at a lower surface loading rate. The scour test involved preloading 10.2 cm of fresh test sediment into

the sedimentation sump of the device. The sediment was placed on a false floor to mimic a device filled to 50% of the maximum recommended sediment storage depth. Clean water was run through the device at five surface loading rates over a 30 minute period. Each flow rate was maintained for 5 minutes with a one minute transition time between flow rates. Effluent samples were collected at one minute sampling intervals and analyzed for Suspended Sediment Concentration (SSC) and PSD by recognized methods. The effluent samples were subsequently adjusted based on the background concentration of the influent water. Typically, the smallest 5% of particles captured during the 40 L/min/m² sediment capture test is also used to adjust the concentration, as per the method described in [Bulletin # CETV 2016-09-0001](#). However, since the composites of effluent concentrations were below the Reporting Detection Limit of the Laser Diffraction PSD methodology, this adjustment was not made. Results showed average adjusted effluent sediment concentrations below 5 mg/L at all tested surface loading rates.

It should be noted that the EF4 starts to internally bypass water at 1135 L/min/m², potentially resulting in the dilution of effluent concentrations, which would not normally occur under typical field conditions because the field influent concentration would contain a much higher sediment concentration than during the lab test. Recalculation of effluent concentrations to account for dilution at surface loading rates above the bypass rate showed sediment effluent concentrations to be below 1.6 mg/L.

Table 4. Scour test adjusted effluent sediment concentration.

Run	Surface loading rate (L/min/m ²)	Run time (min)	Background sample concentration (mg/L)	Adjusted effluent suspended sediment concentration (mg/L) ^a	Average (mg/L)
1	200	1:00	<RDL	11.9	4.6
		2:00		7.0	
		3:00		4.4	
		4:00		2.2	
		5:00		1.0	
		6:00		1.2	
2	800	7:00	<RDL	1.1	0.7
		8:00		0.9	
		9:00		0.6	
		10:00		1.4	
		11:00		0.1	
		12:00		0	
3	1400	13:00	<RDL	0	0
		14:00		0.1	
		15:00		0	
		16:00		0	
		17:00		0	
		18:00		0	
4	2000	19:00	1.2	0.2	0.2
		20:00		0	
		21:00		0	
		22:00		0.7	
		23:00		0	
		24:00		0.4	

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

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

The results of the light liquid re-entrainment test used to evaluate the unit's capacity to prevent re-entrainment of light liquids are reported in Table 5. The test involved preloading 58.3 L (corresponding to a 5 cm depth over the collection sump area of 1.17m²) of surrogate low-density polyethylene beads within the oil collection skirt and running clean water through the device continuously at five surface loading rates (200, 800, 1400, 2000, and 2600 L/min/m²). Each flow rate was maintained for 5 minutes with approximately 1 minute transition time between flow rates. The effluent flow was screened to capture all re-entrained pellets throughout the test.

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

Surface Loading Rate (L/min/m ²)	Time Stamp	Amount of Beads Re-entrained			
		Mass (g)	Volume (L) ^a	% of Pre-loaded Mass Re-entrained	% of Pre-loaded Mass Retained
200	62	0	0	0.00	100
800	247	168.45	0.3	0.52	99.48
1400	432	51.88	0.09	0.16	99.83
2000	617	55.54	0.1	0.17	99.84
2600	802	19.73	0.035	0.06	99.94
Total Re-entrained		295.60	0.525	0.91	--
Total Retained		32403	57.78	--	99.09
Total Loaded		32699	58.3	--	--

^a Determined from bead bulk density of 0.56074 g/cm³

Variances from testing Procedure

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

- During the capture test, the 40 L/min/m² and 80 L/min/m² surface loading rates were evaluated over 3 and 2 days respectively due to the long duration needed to feed the required minimum of 11.3 kg of test sediment into the unit at these lower flow rates. Pumps were shut down at the end of each intermediate day, and turned on again the following morning. The target flow rate was re-established within 30 seconds of switching on the pump. This procedure may have allowed sediments to be captured that otherwise may have exited the unit if the test was continuous. On the basis of practical considerations, this variance was approved by the verifier prior to testing.

2. During the scour test, the coefficient of variation (COV) for the lowest flow rate tested (200 L/min/m²) was 0.07, which exceeded the specified limit of 0.04 target specified in the OGS Procedure. A pump capable of attaining the highest flow rate of 3036 L/min had difficulty maintaining the lowest flow of 234 L/min but still remained within +/- 10% of the target flow and is viewed as having very little impact on the observed results. Similarly, for the light liquid re-entrainment test the COV for the flow rate of the 200 L/min/m² run was 0.049, exceeding the limit of 0.04, but is believed to introduce negligible bias.
3. Due to pressure build up in the filters, the runs at 1000 L/min/m² for the Stormceptor® EF4 and 1000 and 1400 L/min/m² for the Stormceptor® EFO4 were slightly shorter than the target. The run times were 54, 59 and 43 minutes respectively, versus targets of 60 and 50 minutes. The final feed samples were timed to coincide with the end of the run. Since >25 lbs of sediment was fed, the shortened time did not invalidate the runs.

Verification

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

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

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

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