Site Servicing Report

2625 Sheffield Road, Ottawa, Ontario

Amazon Logistics

60634622

October 2022

Delivering a better world

AECOM Canada Ltd.
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Kelby Lodoen Unseth, MCIP, RPP
Planner II/Development Review
City of Ottawa
100 Laurier Avenue West, 4th Floor
Ottawa, Ontario K1P 1J1

October 6, 2022

Project #
60634622

Subject: Site Servicing Report – 2625 Sheffield Road, Ottawa, Ontario

Dear Mr. Unseth:

Please find our Site Servicing Report, which is provided in support of the proposed Site Plan Application for the proposed works located at 2625 Sheffield Road, Ottawa, Ontario, Canada (to be referred to in this report as "Site").

This report presents the stormwater management plan and how the layout of the proposed site servicing (sanitary, water, stormwater) satisfy requirements set by the City of Ottawa and the Ministry of Environment, Conservation, and Parks (MECP). Please also be advised that no portion of the Site is located within a regulated area designated by the Rideau Valley Conservation Authority (RVCA) as per Ontario Regulation 174/06.

We request an approval of the subject application. If you have any questions or require additional information or clarification, please do not hesitate to contact the undersigned at 519-650-8669 or via e-mail: kosta.paliouras@aecom.com.

Sincerely,
AECOM Canada Ltd.

Konstantinos (Kosta) Paliouras, P.Eng
Senior Water Resources Engineer/Project Manager
kosta.paliouras@aecom.com

Encl.

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- may be based on information provided to AECOM which has not been independently verified;
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AECOM: 2015-04-13

Quality Information

Prepared by

Kosta Paliouras, P.Eng
Senior Water Resources Engineer

Reviewed by

Asif Bhatti, P.Eng
Senior Water Resources Engineer

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Prepared by:

Kosta Paliouras, P.Eng.
Senior Project Manager

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Executive Summary

This report addresses the proposed site servicing at 2625 Sheffield Road in Ottawa, Ontario, Canada.

The proposed works consists of demolishing the existing building structure and construction of a proposed building structure with a regrade and repave an existing parking lot area. Due to the construction of the proposed building, additional water quality and quantity controls are required to prevent detrimental impacts to the downstream outlets (municipal infrastructure on Sheffield Road and Humber Place). The objective for these stormwater management facilities is to provide water quality treatment, water quantity control, and groundwater recharge in accordance with the City's requirements for development.

The proposed stormwater management facilities will consist of multiple infiltration basins and two (2) underground chamber storage systems (StormTech MC-3500 systems or approved equivalent) with the capacity to accept surface runoff up to and including the 100-year storm event for the proposed building and parking lot area and provide water quality and quantity treatment prior to discharging downstream. The proposed infiltration basins will consist of clear stone bedding and capture runoff form the roof areas to encourage groundwater recharge. The chamber storage systems will consist of storage chambers with clear stone granular material bedding, surrounded by an impermeable liner to discourage infiltration of runoff from the parking lot area. The proposed underground chamber storage systems will then discharge to the municipal infrastructure on Humber Place and Sheffield Road and ultimately to Green's Creek.

The proposed stormwater management measures have met the design objectives of the City of Ottawa.

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Figures

Tables

Appendices

1. Introduction

AECOM Canada Limited (AECOM) has prepared the following Site Servicing Report for the industrial facility located at 2625 Sheffield Road in Ottawa, Ontario, Canada (to be referred to in this report as “Site”).

The proposed works consists of demolishing the existing building structure and construction of a proposed building structure with a regrade and repave an existing parking lot area. Due to the construction of the proposed building, additional water quality and quantity controls are required to prevent detrimental impacts to the downstream outlets (municipal infrastructure on Sheffield Road and Humber Place). The key objective of this report is to provide a summary of existing Site conditions and illustrate how the proposed stormwater management measures would address adverse water quality/quantity, erosion control, and water balance objectives detailed by City of Ottawa staff and regulatory agencies.

2. Background Information

2.1 General Site Information

The Site is located at 2625 Sheffield Road in Ottawa, Ontario (Site location is provided in **Figure 1**). The Site is bordered by Humber Place to the south, industrial property to the north, Sheffield Road to the west, and a CN Rail railway to the east. The Site is approximately 7.05 hectares (ha) in total size, with an existing building structure footprint of approx. 3.346 ha.

The existing building structure was constructed in multiple stages. The Site was first developed in the 1960s, with building expansions in the 1970s and 1990s.

A Draft Geotechnical Study was completed by AECOM for the Site in January 2021 and borehole logs are provided in **Appendix A**. According to borehole investigations within the vicinity of the Site, the underlying soils consist of clayey silt material. No groundwater was observed during the investigation and in the monitoring wells.

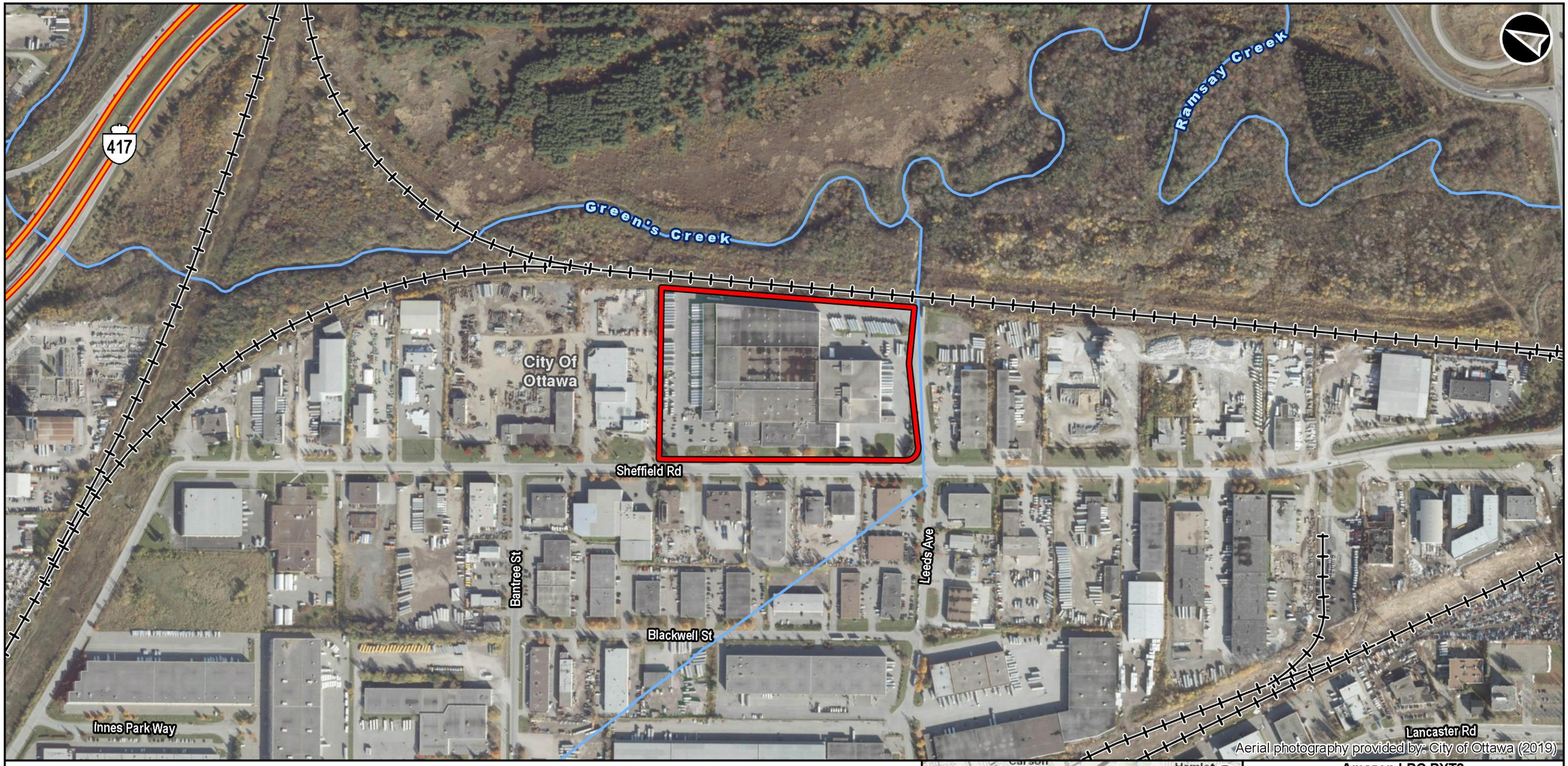
The Site is located within the Ottawa Drain, a tributary of Green's Creek. AECOM has reviewed updated regulated area mapping available from the Rideau Valley Conservation Authority (RVCA) via the online regulated area mapping tool and mapping is provided in **Appendix B**. No portions of the Site is located within a regulated area as per Ontario Regulation 174/06 (Regulation of Development, Interference, with Wetlands and Alterations to Shorelines and Watercourses) and a permit from the RVCA would not be required.

There is also no Certificate of Approval or Environmental Compliance Approval permit associated with the Site, according to Ministry of Environment, Conservation, and Parks (MECP) records. Pre-consultation with the MECP (included in **Appendix C**) indicates that no ECA is required for the Site, as under Ontario Regulation 525/98 states that Subsection 53 (1) and (3) of the Act do not apply to lands designed as:

- one parcel, for which the Site and all proposed works will be contained;
- that discharge into a storm sewer that is not combined, for which is not the case at the Site, as sanitary and storm services currently are and will continue to be separate;
- does not service industrial or a structure located on industrial land; and
- is not located on industrial land.

Ontario Water Resources Act defines industrial land as "land used for the production, processing, repair, maintenance or storage of goods of materials, or the processing, storage, transfer or disposal of waste, but does not include land used primarily for the purpose of buying or selling, (a) goods or materials other than fuel, or (b) services other than vehicle repair services."

Though the Site is located within a "Heavy Industrial Zone" according to the zoning by-law, the primary purpose of the proposed development will be for the distribution of goods and material, with only van and truck traffic through the proposed parking lot area. There will be no machinery or on-site processes that would require industrial water use to discharge to the municipal system and no outdoor storage of processed material or any contaminate material. Contaminates would include total suspended solids (TSS), vehicular oil and chlorides from the parking lot area. The proposed infiltration basins will only accept discharge from the proposed roof areas and an impermeable liner is proposed for the proposed underground chamber storage systems and therefore none of the runoff from the parking lot area will infiltrated into the underlying soil. The level of concern would be minimal.



Legend

- Property Limit

Base Layers

- Railway
- Freeway
- Watercourse

Amazon LDC DYT3
2625 Sheffield Road
Site Servicing Report

Site Location Plan

0 50 100 200 300 M

Datum: North American 1983

Feb, 2021	1:5,000	**Data Sources** MECP, MMAH, City of Ottawa
P:60634622	Rev:00	
AECOM		**Figure: 1**

2.2 Existing Water and Wastewater Services

The site is currently serviced from the existing 300 mm diameter watermain on Sheffield Road by two existing 200 mm diameter water service connections. The water service enters the west of the site through the office entrance driveway along Sheffield Road as well as the second most southern truck entrance. The service along the office entrance driveway supplies domestic water to the building in a 75 mm shoot-off, as well to an on-site hydrant system located around the building in a 200 mm diameter firemain. This firemain loop re-connects to the existing 300 mm diameter municipal main on Humber Place at the southeast corner of the site. The post-development design is not proposing any changes to the water servicing on the site.

The building currently discharges to two (2) sanitary services, one connection at the existing MH 1A on Sheffield and another connection to the existing MH 5A on Sheffield. The southerly sanitary service flow into a 200 mm sanitary flows in a 200 mm diameter service by gravity to the existing 375 mm diameter sanitary sewer on Sheffield Drive, in the southwest corner of the site.

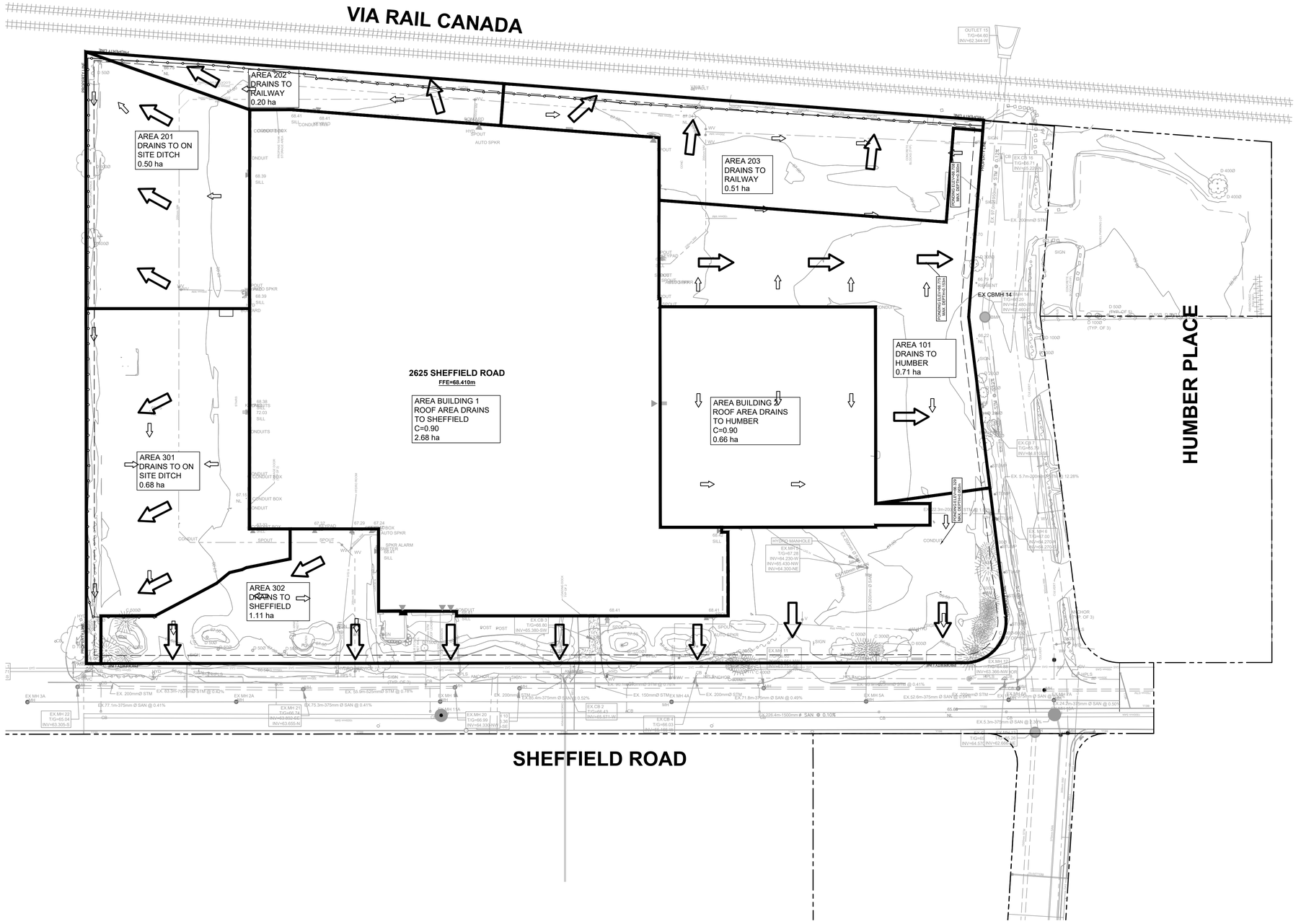
2.3 Existing Stormwater Management and Drainage Patterns

Existing drainage patterns at 2625 Sheffield Road (as indicated in **Figure 2** and **Figure 3**) consist of overland flow into an existing municipal storm sewer system and ultimately discharging into the City municipal system on Humber Place and Sheffield Road. Plan and profile servicing drawings for the Humber Place and Sheffield Road were obtained from the City and are provided in **Appendix D**.

The existing drainage patterns consist of the following flow paths:

- Runoff from the main parking lot area, located south of the existing building structure (Area 101) discharges overland directly into the existing City municipal storm sewer system on Humber Place. The existing storm sewer system ultimately discharges to the Ottawa Drain then to Green Creek.
- Runoff from the roof of the existing building structure is collected and discharges into the municipal storm sewer system on Sheffield Road and Humber place. A portion of the building roof structure (Building #1) discharges to the municipal storm sewer system on Sheffield Road, with another portion of the building roof structure (Building #2) discharges to the municipal storm sewer system on Humber Place.
- A portion of the existing parking lot area located north of the building structure, the access road east of the existing building structure, and portion of the main parking lot area (Area 200 series) discharges directly to a vegetated swale adjacent to the CN Rail railway and ultimately discharges to Green's Creek.
- A portion of the parking lot area located north of the existing building structure and the landscaped area adjacent to Sheffield Road (Areas 300 series) discharges directly to the City municipal storm sewer system on Sheffield Road. The existing storm sewer system ultimately discharges to Green's Creek.

According to site assessments, there are currently no on-Site surface water quality and quantity control infrastructure.



SURVEY NOTES

METRIC NOTE

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DISTANCE NOTE

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UNIVERSAL TRANSVERSE MERCATOR (UTM) PROJECTION, ZONE 18 NORTH, NAD-83 CSRS.

VERTICAL DATUM

NAD-83 VERTICAL DATUM - 1978 RE-ADJUSTMENT (GEODETIC)

COMPLETION NOTE

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SITE BENCHMARKS

TBM #1 - TOP NUT OF HYDRANT LOCATED AT NORTH WEST CORNER OF 2625 SHEFFIELD ROAD ELEVATION = 67.198m

TBM #2 - STANDARD IRON BAR (SIB) LOCATED AT SOUTH WEST CORNER OF 2625 SHEFFIELD ROAD ELEVATION = 66.015m

LEGEND

- PROPERTY LINE
- SIB — PROPERTY BAR
- 247.00 — EX. CONTOUR
- 247.50 — EX. SPOT ELEVATION
- EX. VEGETATION
- EX. CB, DCB, CBMH AND MH
- EX. SWALE/ DITCH
- EX. CHAIN LINK FENCE
- EX. POST & WIRE FENCE
- EXISTING DRAINAGE AREA BOUNDARY
- MAJOR OVERLAND FLOW

AECOM

PROJECT

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OTTAWA, ONTARIO
2625 SHEFFIELD ROAD

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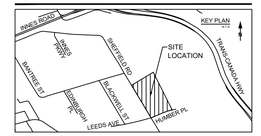
I/R	DATE	DESCRIPTION

KEY PLAN



PROJECT NUMBER

60634622

SHEET TITLE

EXISTING STORM WATER DRAINAGE AREAS

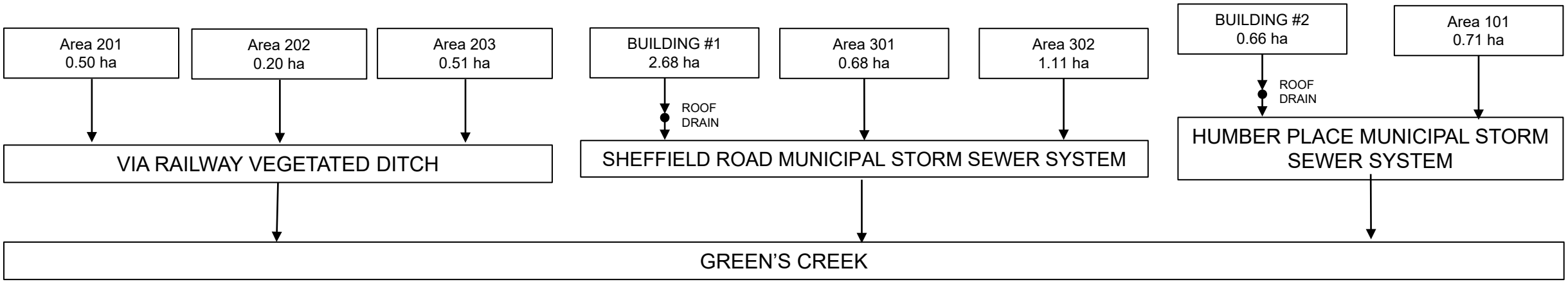
SHEET NUMBER

FIGURE 2

#18547

D07-12-21-0119

FIGURE 3: EXISTING CONDITIONS FLOW SCHEMATIC (DYT3)



3. Design Criteria

Stormwater management within City of Ottawa conforms to the following regulatory documents:

- City of Ottawa Sewer Design Guidelines (October 2012) and subsequent Technical Bulletins.
- Ministry of Environment, Conservation, and Parks (MECP) Stormwater Management Planning and Design Manual (MECP, March 2003)
- TRCA/Credit Valley Conservation (CVC)/Lake Simcoe Region Conservation Authority (LSRC) Low Impact Development Stormwater Management Planning and Design Guide (2019)

Pre-consultation was completed in December 2020 with the City of Ottawa and RVCA, and comments are included in **Appendix C**. Based on the prevailing policy framework, general design criteria, objectives and practices have been identified to complete the assessment of the proposed drainage infrastructure within the study area limits using current policies and guidelines. Below are the design criteria, based on those regulations noted above:

- **Water Quantity**
  It is the policy of the City to require that 100-year post-development peak flows are controlled to pre-development 2-year peak flow to Humber Place. In their pre-consultation response, the City has requested that the allowable runoff coefficient for the pre-development drainage area is the lesser of the existing pre-development conditions to a maximum of 0.5.
- **Water Quality**
  According to the correspondence from the RVCA, the proposed water quality control measures are to be designed to provide Enhanced (Level 1) water quality control (80% total suspended solids [TSS] removal) and shall use the treatment train approach to stormwater management with source, conveyance and end-of-pipe measures.
- **Water Balance**
  The general hydrological cycle of the Site to be maintained, by replenishing the underlying aquifer through infiltration (where possible). The vast majority of the current Site conditions is impervious and the proposed works would have similar impervious levels. Where possible, roof drainage will be directed to proposed infiltration basins.

According to the 2012 TRCA/CVC Low Impact Development (LID) Guidelines though, it is not advised that runoff from high traffic areas to infiltrate into the underlying soils. Due to the purpose of the Site, there will be consistent van and truck traffic through the proposed parking lot area. The extent of untreated surface runoff discharging into any proposed infiltrative infrastructure during proposed conditions would originate from parking lot area and would include high levels of TSS and untreated contaminates such as oil and chlorides. Utilizing infiltrative infrastructure as part of the “treatment train” approach, before discharging through an oil/grit separator, would result in the infiltrative infrastructure becoming clogged with sediment quickly (becoming more ineffective when used in low permeable underlying soils) and allow for contaminates such as chlorides and oil to infiltrate into the groundwater when operational.

Additional measures that were consider include the following:

- Maintaining existing drainage patterns, where possible;
- Adjoining and/or downstream properties not to be adversely impacted by the proposed development;
- Water quality and quantity of runoff discharged from the Site to be controlled at the source;
- Discharge water may not also exceed over 45 degrees Celsius; and
- Erosion is limited to preserve the stability of small streams and rivers.

4. Proposed Conditions Site Servicing

Proposed Conditions Site Servicing Drawings are provided at the end of the report.

4.1 Proposed Water and Wastewater Services

4.1.1 Water Supply Servicing Design

The development is proposed to be serviced via two 200 mm diameter service laterals, one located on the northwest side through the office entrance driveway along Sheffield Road and the other one located northeast side of the proposed building connected by the about mentioned loop.

The following table summarizes the preliminary water supply demand estimate for the proposed development based on Ottawa's Water Distribution Design Guidelines and fire flow requirements using Fire Underwriters Survey (FUS) method. Refer to **Appendix E** for detailed calculations.

Table 1: Water Demand Proposed Conditions

Parameter	Demand (L/s)	Demand (gpm)
Average Daily Demand	2.86	45.33
Max. Day Demand	4.29	68.00
Peak Hour Demand	7.72	122.36
Fire Flow Demand	267.00	4232.05
Total Demand = Max. Day + Fire Flow	271.29	4300.05

Boundary conditions have been requested to the City of Ottawa, once the information is available the above calculations may be evaluated/revised as to conform all relevant City Guidelines and Policies.

4.1.2 Sanitary Servicing Design

It is anticipated that the proposed development will discharge to the two (2) existing sanitary connections mentioned above via 200 mm diameter service laterals.

The post-development sanitary flow was calculated according to Ontario Building Code section 7. Refer to **Appendix E** for detailed calculations.

Table 2: Sanitary Proposed Conditions

Parameter	Flows (L/s)	Flows (gpm)
Sanitary Flow (Building)	4.35	69

Boundary conditions have been requested to the City of Ottawa, once the information is available the above calculations may be evaluated/revised as to conform all relevant City Guidelines and Policies.

4.2 Proposed Stormwater Management and Drainage Patterns

Due to the demolition of the existing building structure and the expansion of the parking lot area, additional surface runoff will discharge off-Site and would require additional water quality and quantity control to not cause detrimental impacts to the downstream outlet.

Subcatchments under the proposed conditions were revised as shown in **Figure 4** and the respective flow schematic is shown in **Figure 5**. Proposed drainage patterns consist of the following flow paths:

- Runoff from a portion of the proposed roof of the building structure (Area 101) will be collected and discharges into a proposed infiltration basin to store up to 10 mm depth of runoff (Calculations are provided in **Appendix F**). The proposed infiltration basins will consist of 50 mm diameter clear stone, with an overflow outlet to the proposed storm sewer system and ultimately to the municipal storm sewer system on Sheffield Road. The municipal storm sewer system ultimately discharges to Green's Creek. Infiltration calculations are provided in .

- The parking lot area located north of the proposed building structure and existing vegetated area (Areas 1 to 10) will be regraded to allow conveyance of all storm events up to and including the 100-year storm event through a proposed storm sewer infrastructure (sizing calculations provided in **Appendix G**). Surface ponding will be limited to 0.30 m depth over the proposed catch basin and catch basin structures during storm events greater than the 100-year storm event.

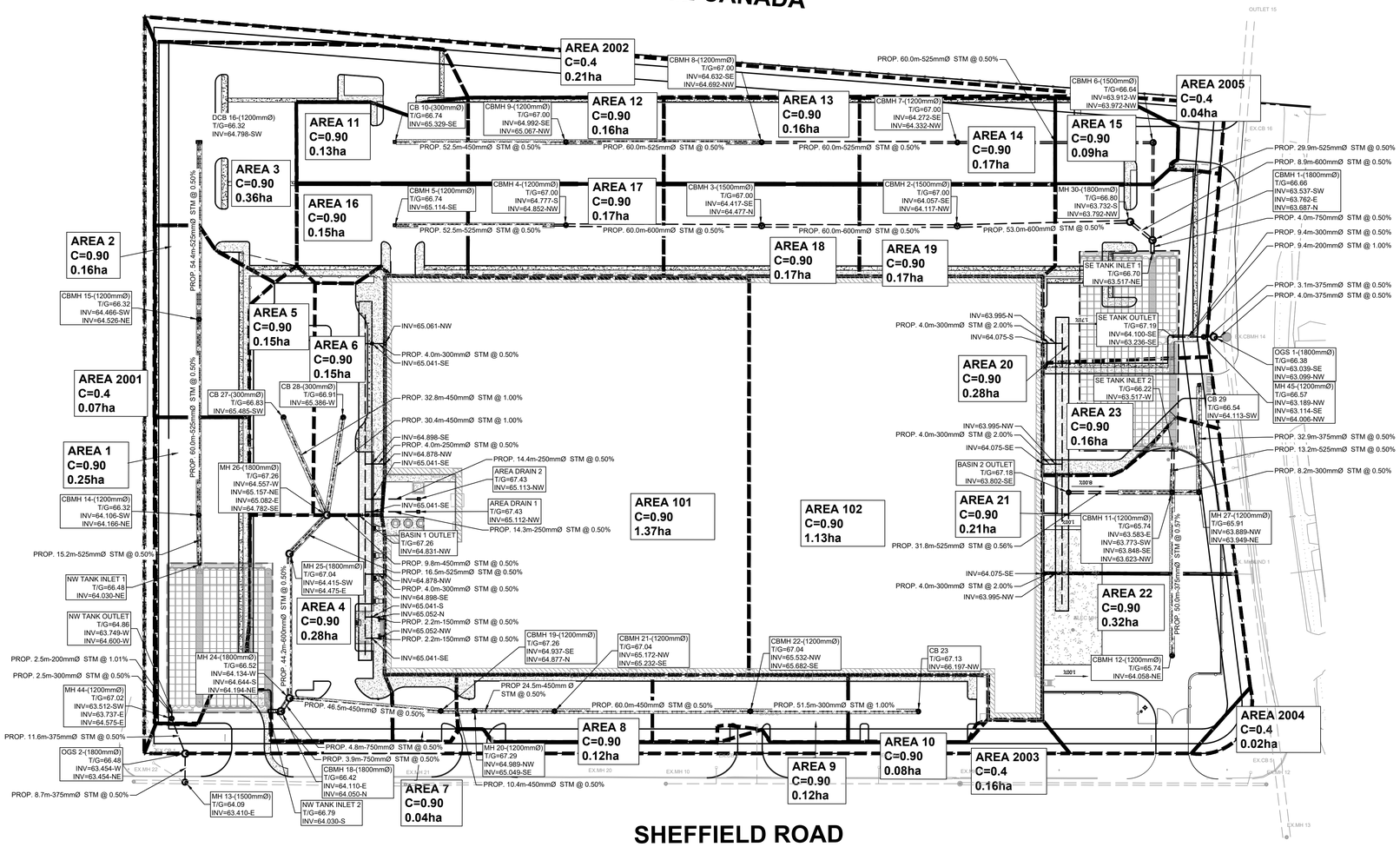
  The proposed storm sewer system will discharge into a proposed underground storage system (StormTech MC-3500 or approved equivalent with total storage volume capacity of approximately 1,530 m^3) to provide water quality and quantity control. Stage-storage table and product information for the proposed underground storage system is provided in **Appendix H**. The proposed system consists of an open bottom chamber, with surface runoff intercepted by the open-bottom chambers, which will then enter into the underground stone reservoirs and discharged controlled off-Site. The underground storage system will be wrapped with impermeable liner to discourage infiltration of surface runoff from the parking lot area. The system will also provide pre-treatment, which will consist of a row of chambers (known as an 'isolator row') wrapped in woven geotextile fabric (with two layers at the bottom). This acts as a filter strip that provides additional enhanced suspended solids and pollutant removal while providing surface area for runoff reduction.

  The proposed underground storage system will then discharge into the proposed MH44 via two (2) outlet pipes w/ orifice plates to control flow during various storm events. A 75 mm orifice opening on a proposed 300 mm pipe will control flow for storms less than the 4-hour 25 mm storm event, allowing for discharge over a minimum 24-hr detention period. For storm event larger than the 4-hour 25 mm storm event, a proposed 150 mm pipe will provide additional flow control for discharging downstream.

  The propose MH44 ultimately discharges to a proposed oil/grit separator (OGS, ADS FD-5HC or approved equivalent) to provide water quality control during first-flush conditions. The proposed OGS unit is Canadian ETV certified and is sized as part of a proposed treatment train approach to ultimately provide Enhanced-level treatment from the proposed parking lot areas. Sizing calculations and Canadian ETV certification for the proposed OGS unit is provided in **Appendix G.** Ultimately the proposed OGS discharges into the existing municipal storm sewer system on Sheffield Road and to Green's Creek.

- A portion of the landscaped area and entrance way along Sheffield Road (Area 2003) discharges to the existing municipal storm sewer system on Sheffield Road and ultimately to Green's Creek.

- Runoff from a portion of the proposed roof of the building structure (Area 102 and 103) will be collected and discharges into a proposed infiltration basin to store up to 10 mm depth of runoff. The proposed infiltration basins will consist of 50 mm diameter clear stone, with an overflow outlet to the proposed storm sewer system and ultimately to the municipal storm sewer system on Sheffield Road. The municipal storm sewer system ultimately discharges to Green's Creek. Infiltration calculations are provided in **Appendix F**.



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EX. VEGETATION
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EX. SWALE/ DITCH
EX. CHAIN LINK FENCE
EX. POST & WIRE FENCE
EXISTING DRAINAGE AREA BOUNDARY
MAJOR OVERLAND FLOW

AECOM

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OTTAWA, ONTARIO
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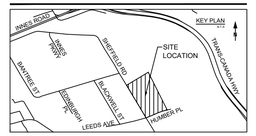

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PROPOSED STORMWATER DRAINAGE AREAS

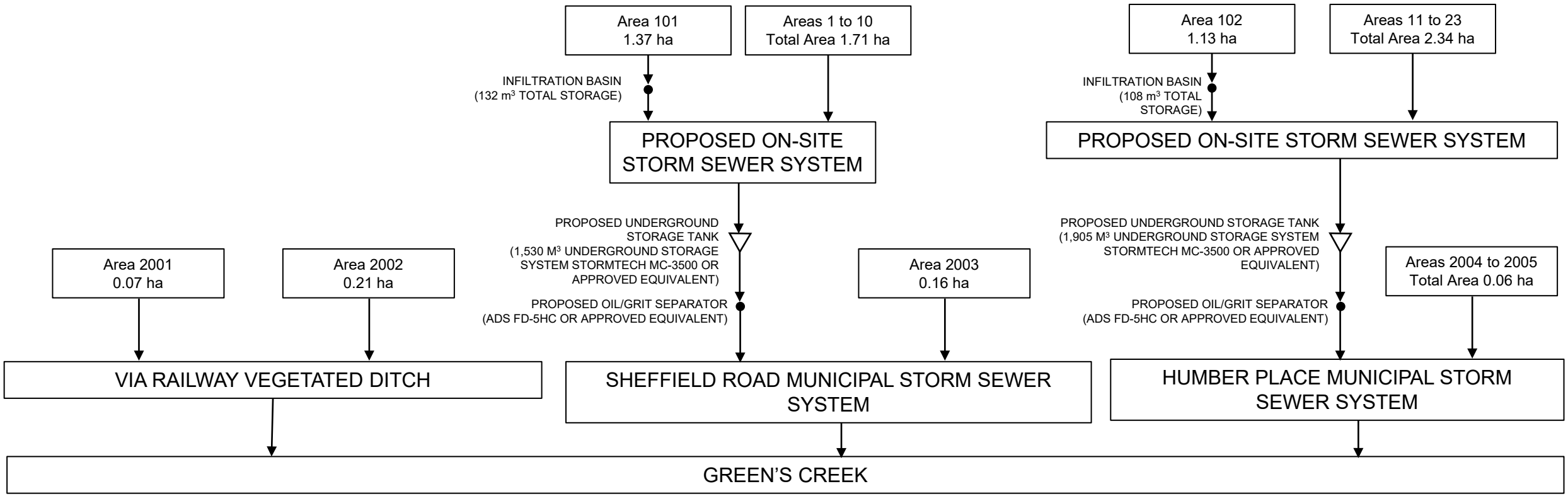
SHEET NUMBER

FIGURE 4

D07-12-21-0119

#18547

FIGURE 5: PROPOSED CONDITIONS FLOW SCHEMATIC (DYT3)



- The parking lot area located south and west of the proposed building structure and existing vegetated area (Areas 11 to 24) will be regraded to allow conveyance of all storm events up to and including the 100-year storm event through a proposed storm sewer infrastructure (sizing calculations provided in **Appendix G**). Surface ponding will be limited to 0.30 m depth over the proposed catch basin and catch basin structures during storm events greater than the 100-year storm event.

  The proposed storm sewer system will discharge into a proposed underground storage system (StormTech MC-3500 or approved equivalent with total storage volume capacity of approximately 1,905 m^3) to provide water quality and quantity control. Stage-storage table and product information for the proposed underground storage system is provided in **Appendix H**. The proposed system consists of an open bottom chamber, with surface runoff intercepted by the open-bottom chambers, which will then enter into the underground stone reservoirs and discharged controlled off-Site. The underground storage system will be wrapped with impermeable liner to discourage infiltration of surface runoff from the parking lot area. The system will also provide pre-treatment via an isolator row.

  The proposed underground storage system will then discharge into the proposed MH45 via two (2) outlet pipes w/ orifice plates to control flow during various storm events. A 75 mm orifice opening on a proposed 300 mm pipe will control flow for storms less than the 4-hour 25 mm storm event, allowing for discharge over a minimum 24-hr detention period. For storm event larger than the 4-hour 25 mm storm event, a proposed 300 mm pipe will provide additional flow control for discharging downstream.

  The propose MH45 ultimately discharges to a proposed oil/grit separator (OGS, ADS FD-5HC or approved equivalent) to provide water quality control during first-flush conditions. The proposed OGS unit is Canadian ETV certified and is sized as part of a proposed treatment train approach to ultimately provide Enhanced-level treatment from the proposed parking lot areas. Sizing calculations and Canadian ETV certification for the proposed OGS unit is provided in **Appendix G.** The proposed OGS discharges into the existing municipal storm sewer system on Humber Place and ultimately to Green's Creek.

- A portion of the landscaped area along Humber Place (Areas 2004 and 2005) discharges to the existing municipal storm sewer system on Humber Place and ultimately to Green's Creek.

- A portion of the landscaped area along the CN Rail (Area 2002) discharges to the CN Railway land and ultimately to Green's Creek

4.3 Water Quantity

4.3.1 Hydrological Model Development

AECOM developed PCSWMM (Personal Computer Stormwater Management Model, 2021 version 7.4.3240) model for both existing and proposed conditions to confirm and compare the proposed peak flow and runoff volumes from the Site to those under existing conditions.

Site conditions were determined using aerial photography, discussions with design staff, and Site inspections. General modelling Site parameters are listed in **Table 3**. Existing and proposed conditions catchment parameters are provided in **Appendix I** and **Appendix J** respectively. Stage-storage and stage-discharge curves presented in **Appendix H** were provided by the manufacturer for the underground retention chamber system and were included in the hydrological model for analysis.

Table 3: Main Hydrological Parameters Used

Hydrological Parameters	Values
Manning Roughness Coefficient (Impervious Surface)	0.013
Manning Roughness Coefficient (pervious Surface)	0.2
Depression Storage (Impervious Surface)	1.57
Depression Storage (Pervious Surface)	4.67
Drying Time	7
Maximum Infiltration Rate	75
Minimum Infiltration Rate	0.5

The model was simulated for 4-hour 25 mm storm event, Chicago 3-hour and 6-hour 2-year, 5-year and 100-year design storm events which were derived from Section 5.4.2 and 5.4.3.2 respectively of the City of Ottawa Stormwater Management Design Guidelines (October 2012). Rainfall amounts are provided in **Table 4**. The proposed conditions peak discharge rates leaving the Site would be compared to that under existing condition to design the stormwater management requirements for water quantity and erosion control.

Table 4: Rainfall Amounts

Storm Event		Rainfall Amount (mm)
4-hour 25 mm		25.00
2-year	3-hour	31.88
	6-hour	36.86
5-year	3-hour	42.54
	6-hour	49.04
100-year	3-hour	71.68
	6-hour	82.33

4.3.2 Hydrological Model Results

The PCSWMM hydrological modelling simulations were completed for existing and proposed Site conditions, with output files provided in **Appendix I** and **Appendix J** respectively. Peak flows to the City's municipal storm sewer system on Humber Place and Sheffield Road for the 25 mm storm and Chicago 3-hr and 6-hr, 2-year, 5-year and 100-year storm events during existing and proposed conditions are provided in **Table 5** and **Table 6,** respectively. A stage-discharge table of the proposed north and south underground storage system is presented in **Table 7** and **Table 8**, respectively.

The hydrological model produced the following results:

- For proposed conditions, as per City guidelines and reiterated during pre-consultation, the 100-year proposed development discharge to Humber Place and Sheffield Road was compared to the 5-year existing development flow rate (with a runoff coefficient of 0.5). Utilizing the proposed stormwater management measures indicated in Section 4.2, proposed conditions discharge rates to Humber Place and Sheffield Road will be maintained to less than the allocated existing conditions discharge rate. For **Table 5** and **Table 6** below, flows were taken at the outfall node.
- Maximum runoff volumes and water depths within the proposed underground storage system were modelled during the 6-hour 100-year storm event.

Table 5: Simulated Discharge Rate to Humber Place (m^3/s)

Scenario	Drainage Area (ha)	25 mm	2-year Chicago		5-year Chicago		100-year Chicago	
			3-hr	6-hr	3-hr	6-hr	3-hr	6-hr
Existing	1.370	0.090	0.150	0.150	0.210	0.220	0.380	0.390
Proposed	3.53	0.01	0.012	0.018	0.055	0.061	0.127	0.135

Table 6: Simulated Discharge Rate to Sheffield Road (m^3/s)

Scenario	Drainage Area (ha)	25 mm	2-year Chicago		5-year Chicago		100-year Chicago	
			3-hr	6-hr	3-hr	6-hr	3-hr	6-hr
Existing	4.47	0.300	0.480	0.490	0.690	0.730	1.220	1.280
Proposed	3.24	0.030	0.039	0.042	0.067	0.079	0.219	0.236

Table 7: Proposed Storage – Stage-Discharge (DYT3-N – 6-hour Storm Duration)

Storm Event	Water Depth m	Water Elevation m	Storage Volume m^3	Peak Flow (m^3/s)		Max. Outflow (m^3/s)
				75 mm Orifice	200 mm	
25 mm*	0.74	64.49	587.0	0.010	0	**0.010**
2-year	0.93	64.68	783.0	0.012	0.015	**0.027**
5-year	1.06	64.81	924.6	0.013	0.061	**0.074**
100-yr	1.51	65.26	1371	0.014	0.208	**0.223**

*Note: * – 4-hour storm duration*

Table 8: Proposed Storage - Stage-Discharge (DTY3-S – 6-hour Storm Duration)

Storm Event	Water Depth m	Water Elevation m	Storage Volume m^3	Peak Flow (m^3/s)		Max. Outflow (m^3/s)
				75 mm Orifice	200 mm	
25 mm*	0.70	63.93	679.7	0.010	0	**0.010**
2-year	0.91	64.15	956.8	0.012	0.007	**0.018**
5-year	1.04	64.27	1115.0	0.012	0.048	**0.060**
100-yr	1.54	64.78	1728	0.015	0.117	**0.132**

*Note: * – 4-hour storm duration*

4.4 Water Quality

Annual TSS loading removal calculations were completed to determine if the proposed stormwater management measures would meet regulatory requirements for TSS. Treatment effectiveness information for the OGS and isolator row are provided in **Appendix H.**

Currently, there are no on-Site water quality controls. According to the calculations (summarized in **Appendix G)**, the proposed stormwater management measures would provide over 80% annual pollutant loadings removal for TSS (and associated contaminates associated with particulates). The proposed OGS and isolator row, working as part of a 'treatment train' approach, will improve water quality discharging from the Site.

5. Erosion and Sediment Control

All activities should be controlled to prevent the entry of petroleum products, debris, rubble, concrete, or other deleterious substances into the natural features during construction. To prevent the discharge of these substances, several on-Site erosion and sediment controls (E&SC) measures are recommended. These would include the following E&SC measures (at a minimum):

- Light duty silt fencing; and
- Vegetate exposed graded soils with native, non-invasive grass seed species until final landscaping transpires.

These E&SC controls are illustrated in drawings provided in **Appendix E**. The E&SC Plan is in concordance with City and MECP guidelines and are recommended to be inspected daily, maintained, and continuously evaluated and upgraded when necessary or when directed by AECOM or City staff. The E&SC controls would be required to be installed prior to construction, especially prior to Site clearing. During construction, the selected contractor should monitor the local weather forecast to anticipate weather conditions and inspection of the E&SC controls should occur within 24 hrs of a 15 mm or greater rainfall event. Additional E&SC materials should be kept on-Site for emergencies and repairs. The selected contractor would seek final permission for the stockpile of material and storage of petroleum products and ensure that the proper E&SC controls are in place prior to placement or storage of material on-Site. At the end of construction, E&SC controls should be removed only when the Site conditions have been stabilized and vegetation has been established on disturbed areas, as approved by the on-Site inspector and City staff.

Groundwater levels is expected to fluctuate seasonally and dependent on precipitation events. The dewatering may not be required as no groundwater was observed during the current investigation. However, the dewatering assessment will be done during the construction, if necessary.

Please note that the E&SC Plan is a dynamic document that may be subject to change or modifications as a result of site developments or changes on-Site.

6. Operations and Maintenance

To meet regulatory requirements, the proposed stormwater management measures would need to be operated and maintained regularly effectively and efficiently. The following operation and maintenance measures would be required once the proposed stormwater management measures have been installed and in operation:

- The underground retention chamber system, isolator row, and OGS should be operated and maintained as per manufacturer's recommendations. The Operations and Maintenance (O&M) reports for the recommended products are provided in **Appendix G** and **H** respectively.
- The catch basins and storm sewer systems should be inspected and clean of sediment accumulation, with catch basin sumps to be clear of sediment accumulated as needed.

7. Conclusions

The proposed stormwater management facility meets the design objectives of the City.

Drawings

Appendix A

Geotechnical Report

LEGEND

Geotechnical Borehole - 1.5m Depth - Asphalt Pavement

Geotechnical Borehole/Corehole - 1.5m Depth - Asphalt Pavement

NOTES:

REFERENCE DRAWINGS

NO.	DATE	DESCRIPTION

REVISIONS

REV.	DATE	DESCRIPTION	BY	CHK
0	2021.02.08	BH Plan	JH	TA

CLIENT NAME:
AMAZON LOGISTICS

PROJECT LOCATION:
2625 Sheffield Rd, Ottawa ON

PROJECT NUMBER: 60634622

AS-BUILT BOREHOLE LOCATION PLAN

DRAWN BY: JH	SCALE: 1:1500	DRAWING No. 1
CHECKED: TA	DATE: FEB 2021	REVISION 0

Z:\Projects\60634622 - AMZL DYT3\400 - Technical\410 - Investigation\411 - Borehole Data\411.1 - Borehole Locations\DYT3 As-Built BH Plan_20210204.dwg

PROJECT: DYT3 - Ottawa
LOCATION: 2625 Sheffield Road
COORDINATES: N 5031369.8; E 451948.7
DATUM: Geodetic
AECOM PROJECT #: 60634622
CLIENT: Amazon Logistics

RECORD OF BOREHOLE: BH-1

SHEET 1 OF 1

START DATE: Jan 12, 2021
END DATE: Jan 12, 2021
BORING METHOD: 203 mm O.D. Solid Stem Auger
CONTRACTOR: Aardvark Drilling Inc.

PENETRATION TEST HAMMER, 64kg; DROP, 760mm
SAMPLER HAMMER, 64kg; DROP, 760mm

DEPTH SCALE (METRES)	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	N VALUE	Standard Penetration Testing (SPT) Number (blows/0.3m)	SHEAR STRENGTH Cu, kPa (nat V. + Q ●, rem V. ⊕ U △) / WATER CONTENT PERCENT (Wp, w, Wl)	ADDITIONAL LAB. TESTING & GRAIN SIZE DISTRIBUTION (%)	WELL INSTALLATION AND WATER LEVELS
		PAVEMENT		64.30						GR SA SI CL	
0	Power Auger Drilling 203 mm O.D. Solid Stem Auger	**ASPHALT:** 60 mm thick		0.06							
		FILL: sand and gravel, 700 mm thick, some clay with buried asphalt, grey, moist, very dense			1	SS	53			33 62 (5)	
				63.54							
1		**SILTY CLAY:** some sand, grey/brown, moist, very stiff		0.76	2	SS	25				
					3	SS	17			0 10 46 44	
2				62.17							
		END OF BOREHOLE		2.13							

Notes:
1. This log is to be read with the subject report and project number as presented above.
2. Interpretation assistance by AECOM is required for projects excluding the above mentioned project.
3. No abnormal odour or staining was observed unless otherwise indicated.
4. No groundwater was observed in the open hole upon the completion.

(LOG TO BE READ IN CONJUNCTION WITH REPORT)

DEPTH SCALE
1 : 50

AECOM

LOGGED: WH
CHECKED: TA

AECOM_BH_001 60634622_DYT3.GPJ GAL-MISS.GDT 21-2-16

PROJECT: DYT3 - Ottawa
LOCATION: 2625 Sheffield Road
COORDINATES: N 5031340.7; E 451960.8
DATUM: Geodetic
AECOM PROJECT #: 60634622
CLIENT: Amazon Logistics

RECORD OF BOREHOLE: BH-2

SHEET 1 OF 1

START DATE: Jan 12, 2021
END DATE: Jan 12, 2021
BORING METHOD: 203 mm O.D. Solid Stem Auger
CONTRACTOR: Aardvark Drilling Inc.

PENETRATION TEST HAMMER, 64kg; DROP, 760mm
SAMPLER HAMMER, 64kg; DROP, 760mm

DEPTH SCALE (METRES)	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	NUMBER	TYPE	N VALUE	Standard Penetration Testing (SPT) Number (blows/0.3m)	SHEAR STRENGTH Cu, kPa (nat V. + Q ●, rem V. ⊕ U △) / WATER CONTENT PERCENT (Wp, w, Wl)	ADDITIONAL LAB. TESTING & GRAIN SIZE DISTRIBUTION (%)	WELL INSTALLATION AND WATER LEVELS
		PAVEMENT		64.60						GR SA SI CL	
0	Power Auger Drilling 203 mm O.D. Solid Stem Auger	**ASPHALT**: 150 mm thick		0.00 / 64.45							
		FILL: sand and gravel, 600 mm thick, some silt, grey, moist, very dense		0.15 / 63.85	1	SS	42			23 67 (10)	
1		**FILL:** sand, some gravel, trace silt, brown, moist, dense		0.75 / 63.08	2	SS	46				
2		**SILTY CLAY:** trace gravel, some sand, brown, moist, stiff		1.52 / 62.47	3	SS	12				
		END OF BOREHOLE		2.13							
3		Notes: 1. This log is to be read with the subject report and project number as presented above. 2. Interpretation assistance by AECOM is required for projects excluding the above mentioned project. 3. No abnormal odour or staining was observed unless otherwise indicated. 4. No groundwater was observed in the open hole upon the completion.									
4											
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10											

(LOG TO BE READ IN CONJUNCTION WITH REPORT)

DEPTH SCALE
1 : 50

AECOM

LOGGED: WH
CHECKED: TA

AECOM_BH_001 60634622_DYT3.GPJ GAL-MISS.GDT 21-2-16

PROJECT: DYT3 - Ottawa
LOCATION: 2625 Sheffield Road
COORDINATES: N 5031373.6; E 451984.0
DATUM: Geodetic
AECOM PROJECT #: 60634622
CLIENT: Amazon Logistics

RECORD OF BOREHOLE: BH-3

SHEET 1 OF 1

START DATE: Jan 12, 2021
END DATE: Jan 12, 2021
BORING METHOD: 203 mm O.D. Solid Stem Auger
CONTRACTOR: Aardvark Drilling Inc.

PENETRATION TEST HAMMER, 64kg; DROP, 760mm
SAMPLER HAMMER, 64kg; DROP, 760mm

DEPTH SCALE (METRES)	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	N VALUE	Standard Penetration Testing (SPT) Number (blows/0.3m)	SHEAR STRENGTH Cu, kPa (nat V. - + Q - ●, rem V. - ⊕ U - △) / WATER CONTENT PERCENT (Wp, w, Wl)	ADDITIONAL LAB. TESTING & GRAIN SIZE DISTRIBUTION (%)	WELL INSTALLATION AND WATER LEVELS
		PAVEMENT		64.00						GR SA SI CL	
0	Power Auger Drilling 203 mm O.D. Solid Stem Auger	**ASPHALT:** 90 mm thick		0.00							
		FILL: sand and gravel, some silt, 670 mm thick, grey, moist, very dense with crushed granulars		0.09	1	SS	57			27 72 (1)	
				63.24							
1		**SILTY CLAY:** trace gravel, some sand, brown, moist, stiff to very stiff		0.76	2	SS	12				
2					3	SS	15				
				61.87							
		END OF BOREHOLE		2.13							
3		Notes: 1. This log is to be read with the subject report and project number as presented above. 2. Interpretation assistance by AECOM is required for projects excluding the above mentioned project. 3. No abnormal odour or staining was observed unless otherwise indicated. 4. No groundwater was obeserved in the open hole.									
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(LOG TO BE READ IN CONJUNCTION WITH REPORT)

DEPTH SCALE
1 : 50

AECOM

LOGGED: WH
CHECKED: TA

AECOM_BH_001 60634622_DYT3.GPJ GAL-MISS.GDT 21-2-16

RECORD OF BOREHOLE: BH-7

SHEET 1 OF 1

PROJECT: DYT3 - Ottawa
LOCATION: 2625 Sheffield Road
COORDINATES: N 50314365.9; E 452069.5
DATUM: Geodetic
AECOM PROJECT #: 60634622
CLIENT: Amazon Logistics

START DATE: Jan 12, 2021
END DATE: Jan 12, 2021
BORING METHOD: 203 mm O.D. Solid Stem Auger
CONTRACTOR: Aardvark Drilling Inc.

PENETRATION TEST HAMMER, 64kg; DROP, 760mm
SAMPLER HAMMER, 64kg; DROP, 760mm

DEPTH SCALE (METRES)	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	NUMBER	TYPE	N VALUE	Standard Penetration Testing (SPT) Number (blows/0.3m)	SHEAR STRENGTH Cu, kPa (nat V. + Q ●, rem V. ⊕ U △) / WATER CONTENT PERCENT (Wp, w, Wl)	ADDITIONAL LAB. TESTING & GRAIN SIZE DISTRIBUTION (%)	WELL INSTALLATION AND WATER LEVELS
		PAVEMENT		64.00						GR SA SI CL	
0	Power Auger Drilling, 203 mm O.D. Solid Stem Auger	**ASPHALT:** 80 mm thick		0.00							
		FILL: sand and gravel, some silt and clay, 680 mm thick, grey, moist, dense with crushed granulars		0.08	1	SS	40			13 75 (12)	
				63.24							
1		**CLAYEY SILT:** some to trace gravel, trace sand, grey, moist, stiff to very stiff		0.76	2	SS	8				
2					3	SS	16			1 13 40 46	
3				60.95							
		SILTY CLAY: grey, moist, firm		3.05	4	SS	4				
4											
5				58.82	5	SS	6			0 1 92 7	
		END OF BOREHOLE		5.18							
6		Notes: 1. This log is to be read with the subject report and project number as presented above. 2. Interpretation assistance by AECOM is required for projects excluding the above mentioned project. 3. No abnormal odour or staining was observed unless otherwise indicated. 4. Water level encountered at approximately 4.0 mbgs during drilling operations.									
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9											
10											

(LOG TO BE READ IN CONJUNCTION WITH REPORT)

DEPTH SCALE
1 : 50

AECOM

LOGGED: WH
CHECKED: TA

AECOM_BH_001 60634622_DYT3.GPJ GAL-MISS.GDT 21-2-16

PROJECT: DYT3 - Ottawa
LOCATION: 2625 Sheffield Road
COORDINATES: N 5031373.2; E 452134.3
DATUM: Geodetic
AECOM PROJECT #: 60634622
CLIENT: Amazon Logistics

RECORD OF BOREHOLE: BH-10

SHEET 1 OF 1

START DATE: Jan 12, 2021
END DATE: Jan 12, 2021
BORING METHOD: 203 mm O.D. Solid Stem Auger
CONTRACTOR: Aardvark Drilling Inc.

PENETRATION TEST HAMMER, 64kg; DROP, 760mm
SAMPLER HAMMER, 64kg; DROP, 760mm

DEPTH SCALE (METRES)	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	NUMBER	TYPE	N VALUE
		PAVEMENT		64.60			
0	Power Auger Drilling, 203 mm O.D. Solid Stem Auger	**ASPHALT:** 180 mm thick		0.00 / 64.42			
		FILL: sand and gravel, 660 mm thick, some silt, brown, moist, very dense		0.18 / 63.84	1	SS	74
1		**FILL:** gravelly sand, some silt, moist, compact with possible cobbles		0.76	2	SS	23
					3A	SS	8
2		**CLAYEY SILT:** some sand, grey, moist, stiff		1.83 / 62.47	3B		
		END OF BOREHOLE		2.13			

Notes:
1. This log is to be read with the subject report and project number as presented above.
2. Interpretation assistance by AECOM is required for projects excluding the above mentioned project.
3. No abnormal odour or staining was observed unless otherwise indicated.
4. No groundwater was observed in the open hole upon the completion.

Standard Penetration Testing (SPT) Number (blows/0.3m) ○ — 20 40 60 80 — □ 100 200 300 400

SHEAR STRENGTH Cu, kPa — nat V. - + Q - ● — rem V. - ⊕ U - △ — 20 40 60 80

WATER CONTENT PERCENT — Wp ○ w WI — 10 20 30 40

ADDITIONAL LAB. TESTING & GRAIN SIZE DISTRIBUTION (%)

GR SA SI CL

WELL INSTALLATION AND WATER LEVELS

(LOG TO BE READ IN CONJUNCTION WITH REPORT)

DEPTH SCALE
1 : 50

AECOM

LOGGED: WH
CHECKED: TA

AECOM_BH_001 60634622_DYT3.GPJ GAL-MISS.GDT 21-2-16

PROJECT: DYT3 - Ottawa
LOCATION: 2625 Sheffield Road
COORDINATES: N 5031311.5; E 452152.4
DATUM: Geodetic
AECOM PROJECT #: 60634622
CLIENT: Amazon Logistics

RECORD OF BOREHOLE: BH-11

SHEET 1 OF 1

START DATE: Jan 12, 2021
END DATE: Jan 12, 2021
BORING METHOD: 203 mm O.D. Solid Stem Auger
CONTRACTOR: Aardvark Drilling Inc.

PENETRATION TEST HAMMER, 64kg; DROP, 760mm
SAMPLER HAMMER, 64kg; DROP, 760mm

DEPTH SCALE (METRES)	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	N VALUE	Standard Penetration Testing (SPT) Number (blows/0.3m)	SHEAR STRENGTH Cu, kPa (nat V. + Q ●, rem V. ⊕ U △) / WATER CONTENT PERCENT (Wp, w, Wl)	ADDITIONAL LAB. TESTING & GRAIN SIZE DISTRIBUTION (%)	WELL INSTALLATION AND WATER LEVELS
		PAVEMENT		64.90						GR SA SI CL	
0	Power Auger Drilling, 203 mm O.D. Solid Stem Auger	**ASPHALT:** 180 mm thick		0.00 / 64.72							
		FILL: sand and gravel, 1040 mm thick, trace silt and clay, brown, moist, very dense to compact		0.18	1	SS	56			21 78 (1)	
1					2A	SS	15				
				63.68							
		CLAYEY SILT: trace gravel, trace sand, grey, moist, stiff		1.22	2B	SS					
2					3	SS	11				
				62.77							
		END OF BOREHOLE		2.13							
3		Notes: 1. This log is to be read with the subject report and project number as presented above. 2. Interpretation assistance by AECOM is required for projects excluding the above mentioned project. 3. No abnormal odour or staining was observed unless otherwise indicated. 4. No groundwater was observed in the open hole upon the completion.									
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(LOG TO BE READ IN CONJUNCTION WITH REPORT)

DEPTH SCALE
1 : 50

AECOM

LOGGED: WH
CHECKED: TA

AECOM_BH_001 60634622_DYT3.GPJ GAL-MISS.GDT 21-2-16

PROJECT: DYT3 - Ottawa
LOCATION: 2625 Sheffield Road
COORDINATES: N 5031275.1; E 452165342.0
DATUM: Geodetic
AECOM PROJECT #: 60634622
CLIENT: Amazon Logistics

RECORD OF BOREHOLE: BH-12

SHEET 1 OF 1

START DATE: Jan 12, 2021
END DATE: Jan 12, 2021
BORING METHOD: 203 mm O.D. Solid Stem Auger
CONTRACTOR: Aardvark Drilling Inc.
PENETRATION TEST HAMMER, 64kg; DROP, 760mm
SAMPLER HAMMER, 64kg; DROP, 760mm

DEPTH SCALE (METRES)	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: N VALUE	Standard Penetration Testing (SPT) Number (blows/0.3m)	SHEAR STRENGTH Cu, kPa (nat V. + Q ●, rem V. ⊕ U △) / WATER CONTENT PERCENT (Wp, w, Wl)	ADDITIONAL LAB. TESTING & GRAIN SIZE DISTRIBUTION (%)	WELL INSTALLATION AND WATER LEVELS
		PAVEMENT		64.60						GR SA SI CL	
0	Power Auger Drilling 203 mm O.D. Solid Stem Auger	**ASPHALT:** 90 mm thick		0.00							
		FILL: sand and gravel, some silt, brown, moist, compact with crushed granulars		0.09	1	SS	22				
1					2A	SS	18				
		CLAYEY SILT: some gravel, trace sand, brown, moist, very stiff		63.38 1.22	2B	SS					
2					3	SS	16			0 21 51 28	
		END OF BOREHOLE		62.47 2.13							
3		Notes: 1. This log is to be read with the subject report and project number as presented above. 2. Interpretation assistance by AECOM is required for projects excluding the above mentioned project. 3. No abnormal odour or staining was observed unless otherwise indicated. 4. No groundwater was observed in the open hole upon the completion.									
4											
5											
6											
7											
8											
9											
10											

(LOG TO BE READ IN CONJUNCTION WITH REPORT)

DEPTH SCALE
1 : 50

AECOM

LOGGED: WH
CHECKED: TA

AECOM_BH_001 60634622_DYT3.GPJ GAL-MISS.GDT 21-2-16

PROJECT: DYT3 - Ottawa
LOCATION: 2625 Sheffield Road
COORDINATES: N 5031239.3; E 452118.1
DATUM: Geodetic
AECOM PROJECT #: 60634622
CLIENT: Amazon Logistics

RECORD OF BOREHOLE: BH-14

SHEET 1 OF 1

START DATE: Jan 11, 2021
END DATE: Jan 11, 2021
BORING METHOD: 203 mm O.D. Solid Stem Auger
CONTRACTOR: Aardvark Drilling Inc.

PENETRATION TEST HAMMER, 64kg; DROP, 760mm
SAMPLER HAMMER, 64kg; DROP, 760mm

DEPTH SCALE (METRES)	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	N VALUE	Standard Penetration Testing (SPT) Number (blows/0.3m)	SHEAR STRENGTH Cu, kPa (nat V. - + Q - ●, rem V. - ⊕ U - △) / WATER CONTENT PERCENT (Wp, w, Wl)	ADDITIONAL LAB. TESTING & GRAIN SIZE DISTRIBUTION (%)	WELL INSTALLATION AND WATER LEVELS
		PAVEMENT		64.60						GR SA SI CL	
0	Power Auger Drilling 203 mm O.D. Solid Stem Auger	**ASPHALT:** 40 mm thick		0.04							
		FILL: sand and gravel, 1330 mm thick, trace silt and clay, brown/grey, moist, compact to dense with buried asphalt			1	SS	23			30 67 (3)	
1					2	SS	42				
				63.23							
		END OF BOREHOLE		1.37							

Notes:
1. This log is to be read with the subject report and project number as presented above.
2. Interpretation assistance by AECOM is required for projects excluding the above mentioned project.
3. No abnormal odour or staining was observed unless otherwise indicated.
4. No groundwater was observed in the open hole upon the completion.

(LOG TO BE READ IN CONJUNCTION WITH REPORT)

DEPTH SCALE
1 : 50

AECOM

LOGGED: WH
CHECKED: TA

AECOM_BH_001 60634622_DYT3.GPJ GAL-MISS.GDT 21-2-16

PROJECT: DYT3 - Ottawa
LOCATION: 2625 Sheffield Road
COORDINATES: N 5031205.4; E 452137.5
DATUM: Geodetic
AECOM PROJECT #: 60634622
CLIENT: Amazon Logistics

RECORD OF BOREHOLE: BH-15

SHEET 1 OF 1

START DATE: Jan 11, 2021
END DATE: Jan 11, 2021
BORING METHOD: 203 mm O.D. Solid Stem Auger
CONTRACTOR: Aardvark Drilling Inc.

PENETRATION TEST HAMMER, 64kg; DROP, 760mm
SAMPLER HAMMER, 64kg; DROP, 760mm

DEPTH SCALE (METRES)	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: N VALUE	Standard Penetration Testing (SPT) Number (blows/0.3m)	SHEAR STRENGTH Cu, kPa (nat V. - + Q - ●, rem V. - ⊕ U - △) / WATER CONTENT PERCENT (Wp, w, Wl)	ADDITIONAL LAB. TESTING & GRAIN SIZE DISTRIBUTION (%)	WELL INSTALLATION AND WATER LEVELS
		PAVEMENT		64.30						GR SA SI CL	
0	Power Auger Drilling 203 mm O.D. Solid Stem Auger	**ASPHALT:** 90 mm thick		0.00							
		FILL: sand and gravel, some silt, brown, moist, compact with buried asphalt and construction debris		0.09	1	SS	>50				
				63.39	2A	SS	6				
1		**CLAYEY SILT:** some to trace sand, grey, moist, stiff		0.91	2B	SS					
2				62.17	3	SS	12				
		END OF BOREHOLE		2.13							

Notes:
1. This log is to be read with the subject report and project number as presented above.
2. Interpretation assistance by AECOM is required for projects excluding the above mentioned project.
3. No abnormal odour or staining was observed unless otherwise indicated.
4. No groundwater was observed in the open hole upon the completion.

(LOG TO BE READ IN CONJUNCTION WITH REPORT)

DEPTH SCALE
1 : 50

AECOM

LOGGED: WH
CHECKED: TA

AECOM_BH_001 60634622_DYT3.GPJ GAL-MISS.GDT 21-2-16

PROJECT: DYT3 - Ottawa
LOCATION: 2625 Sheffield Road
COORDINATES: N 5031180.9; E 452172.4
DATUM: Geodetic
AECOM PROJECT #: 60634622
CLIENT: Amazon Logistics

RECORD OF BOREHOLE: BH-16

SHEET 1 OF 1

START DATE: Jan 11, 2021
END DATE: Jan 11, 2021
BORING METHOD: 203 mm O.D. Solid Stem Auger
CONTRACTOR: Aardvark Drilling Inc.

PENETRATION TEST HAMMER, 64kg; DROP, 760mm
SAMPLER HAMMER, 64kg; DROP, 760mm

DEPTH SCALE (METRES)	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	N VALUE	Standard Penetration Testing (SPT) Number (blows/0.3m)	SHEAR STRENGTH Cu, kPa (nat V. + Q ●, rem V. ⊕ U △) / WATER CONTENT PERCENT (Wp, w, Wl)	ADDITIONAL LAB. TESTING & GRAIN SIZE DISTRIBUTION (%)	WELL INSTALLATION AND WATER LEVELS
		PAVEMENT		64.30						GR SA SI CL	
0	Power Auger Drilling 203 mm O.D. Solid Stem Auger	**ASPHALT:** 90 mm thick		0.00							
		FILL: sand and gravel, some silt, brown, moist, compact with buried asphalt and construction debris		0.09	1	SS	77			37 62 (1)	
				63.54							
1		**CLAYEY SILT:** some to trace sand, grey, moist, stiff		0.76	2	SS	19				
					3	SS	14				
2				62.17							
		END OF BOREHOLE		2.13							

Notes:
1. This log is to be read with the subject report and project number as presented above.
2. Interpretation assistance by AECOM is required for projects excluding the above mentioned project.
3. No abnormal odour or staining was observed unless otherwise indicated.
4. No groundwater was observed in the open hole upon the completion.

(LOG TO BE READ IN CONJUNCTION WITH REPORT)

DEPTH SCALE
1 : 50

AECOM

LOGGED: WH
CHECKED: TA

AECOM_BH_001 60634622_DYT3.GPJ GAL-MISS.GDT 21-2-16

PROJECT: DYT3 - Ottawa
LOCATION: 2625 Sheffield Road
COORDINATES: N 5031175.2; E 452190.1
DATUM: Geodetic
AECOM PROJECT #: 60634622
CLIENT: Amazon Logistics

RECORD OF BOREHOLE: BH-17

SHEET 1 OF 1

START DATE: Jan 11, 2021
END DATE: Jan 11, 2021
BORING METHOD: 203 mm O.D. Solid Stem Auger
CONTRACTOR: Aardvark Drilling Inc.

PENETRATION TEST HAMMER, 64kg; DROP, 760mm
SAMPLER HAMMER, 64kg; DROP, 760mm

DEPTH SCALE (METRES)	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	N VALUE	Standard Penetration Testing (SPT) Number (blows/0.3m)	SHEAR STRENGTH Cu, kPa (nat V. + Q ●, rem V. ⊕ U △) / WATER CONTENT PERCENT (Wp, w, Wl)	ADDITIONAL LAB. TESTING & GRAIN SIZE DISTRIBUTION (%)	WELL INSTALLATION AND WATER LEVELS
		PAVEMENT		64.00						GR SA SI CL	
0	Power Auger Drilling 203 mm O.D. Solid Stem Auger	**ASPHALT:** 110 mm thick		63.89							
		FILL: sand and gravel, some silt, brown, moist, very dense with crushed granulars		0.11	1	SS	79			46 53 (1)	
				63.24							
1		**CLAYEY SILT:** some to trace sand, grey, moist, stiff		0.76	2	SS	8				
2					3	SS	13				
				61.87							
		END OF BOREHOLE		2.13							
3		Notes: 1. This log is to be read with the subject report and project number as presented above. 2. Interpretation assistance by AECOM is required for projects excluding the above mentioned project. 3. No abnormal odour or staining was observed unless otherwise indicated. 4. No groundwater was observed in the open hole upon the completion.									
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8											
9											
10											

(LOG TO BE READ IN CONJUNCTION WITH REPORT)

DEPTH SCALE
1 : 50

AECOM

LOGGED: WH
CHECKED: TA

AECOM_BH_001 60634622_DYT3.GPJ GAL-MISS.GDT 21-2-16

PROJECT: DYT3 - Ottawa
LOCATION: 2625 Sheffield Road
COORDINATES: N 5031139.8; E 452131.3
DATUM: Geodetic
AECOM PROJECT #: 60634622
CLIENT: Amazon Logistics

RECORD OF BOREHOLE: BH-18

SHEET 1 OF 1

START DATE: Jan 11, 2021
END DATE: Jan 11, 2021
BORING METHOD: 203 mm O.D. Solid Stem Auger
CONTRACTOR: Aardvark Drilling Inc.

PENETRATION TEST HAMMER, 64kg; DROP, 760mm
SAMPLER HAMMER, 64kg; DROP, 760mm

DEPTH SCALE (METRES)	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	NUMBER	TYPE	N VALUE	Standard Penetration Testing (SPT) Number (blows/0.3m)	SHEAR STRENGTH Cu, kPa (nat V. + Q ●, rem V. ⊕ U △) / WATER CONTENT PERCENT (Wp, w, Wl)	ADDITIONAL LAB. TESTING & GRAIN SIZE DISTRIBUTION (%)	WELL INSTALLATION AND WATER LEVELS
		PAVEMENT		63.40						GR SA SI CL	
0	Power Auger Drilling 203 mm O.D. Solid Stem Auger	**ASPHALT:** 60 mm thick		0.06							
		FILL: sand and gravel, 700 mm thick, trace silt and clay, brown/grey, moist, very dense		62.64	1	SS	>50				
1		**SILTY CLAY:** some sand, grey, moist, firm to stiff		0.76	2	SS	6				
2				61.27	3	SS	10			1 33 37 29	
		END OF BOREHOLE		2.13							

Notes:
1. This log is to be read with the subject report and project number as presented above.
2. Interpretation assistance by AECOM is required for projects excluding the above mentioned project.
3. No abnormal odour or staining was observed unless otherwise indicated.
4. No groundwater was observed in the open hole upon the completion.

(LOG TO BE READ IN CONJUNCTION WITH REPORT)

DEPTH SCALE
1 : 50

AECOM

LOGGED: WH
CHECKED: TA

AECOM_BH_001 60634622_DYT3.GPJ GAL-MISS.GDT 21-2-16

PROJECT: DYT3 - Ottawa
LOCATION: 2625 Sheffield Road
COORDINATES: N 5031134.8; E 452084.5
DATUM: Geodetic
AECOM PROJECT #: 60634622
CLIENT: Amazon Logistics

RECORD OF BOREHOLE: BH-19

SHEET 1 OF 1

START DATE: Jan 11, 2021
END DATE: Jan 11, 2021
BORING METHOD: 203 mm O.D. Solid Stem Auger
CONTRACTOR: Aardvark Drilling Inc.

PENETRATION TEST HAMMER, 64kg; DROP, 760mm
SAMPLER HAMMER, 64kg; DROP, 760mm

DEPTH SCALE (METRES)	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	N VALUE	Standard Penetration Testing (SPT) Number (blows/0.3m)	SHEAR STRENGTH Cu, kPa (nat V. + Q ●, rem V. ⊕ U △) / WATER CONTENT PERCENT (Wp, w, Wl)	ADDITIONAL LAB. TESTING & GRAIN SIZE DISTRIBUTION (%)	WELL INSTALLATION AND WATER LEVELS
		PAVEMENT		64.00						GR SA SI CL	
0	Power Auger Drilling 203 mm O.D. Solid Stem Auger	**ASPHALT:** 130 mm thick		63.87							
		FILL: crusher run limestone, grey, moist, very dense		0.13 / 63.54	1A	SS	72			44 56 (0)	
		FILL: sand and gravel, some silt and clay, grey, moist, very dense		0.46 / 63.24	1B	SS					
1		**CLAYEY SILT:** some to trace sand, grey/brown, moist, very stiff to stiff		0.76	2	SS	13				
2					3	SS	8			0 10 49 41	
		END OF BOREHOLE		61.87 / 2.13							
3		Notes: 1. This log is to be read with the subject report and project number as presented above. 2. Interpretation assistance by AECOM is required for projects excluding the above mentioned project. 3. No abnormal odour or staining was observed unless otherwise indicated. 4. No groundwater was observed in the open hole upon the completion.									
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(LOG TO BE READ IN CONJUNCTION WITH REPORT)

DEPTH SCALE
1 : 50

AECOM

LOGGED: WH
CHECKED: TA

AECOM_BH_001 60634622_DYT3.GPJ GAL-MISS.GDT 21-2-16

PROJECT: DYT3 - Ottawa
LOCATION: 2625 Sheffield Road
COORDINATES: N 5031101.7; E 452049.5
DATUM: Geodetic
AECOM PROJECT #: 60634622
CLIENT: Amazon Logistics

RECORD OF BOREHOLE: BH-20

SHEET 1 OF 1

START DATE: Jan 11, 2021
END DATE: Jan 11, 2021
BORING METHOD: 203 mm O.D. Solid Stem Auger
CONTRACTOR: Aardvark Drilling Inc.

PENETRATION TEST HAMMER, 64kg; DROP, 760mm
SAMPLER HAMMER, 64kg; DROP, 760mm

DEPTH SCALE (METRES)	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	NUMBER	TYPE	N VALUE	Standard Penetration Testing (SPT) Number (blows/0.3m)	SHEAR STRENGTH Cu, kPa (nat V. + Q ●, rem V. ⊕ U △) / WATER CONTENT PERCENT (Wp, w, Wl)	ADDITIONAL LAB. TESTING & GRAIN SIZE DISTRIBUTION (%)	WELL INSTALLATION AND WATER LEVELS
		PAVEMENT		64.00						GR SA SI CL	
0	Power Auger Drilling, 203 mm O.D. Solid Stem Auger	**ASPHALT:** 100 mm thick		0.00							
		FILL: sand and gravel, 660 mm thick, trace silt, grey, moist, very dense		0.10	1	SS	>50				
				63.24							
1		**CLAYEY SILT:** trace sand, grey/brown, moist, very stiff		0.76	2	SS	21				
2				61.87	3	SS	18				
		END OF BOREHOLE		2.13							

Notes:
1. This log is to be read with the subject report and project number as presented above.
2. Interpretation assistance by AECOM is required for projects excluding the above mentioned project.
3. No abnormal odour or staining was observed unless otherwise indicated.
4. No groundwater was observed in the open hole upon the completion.

(LOG TO BE READ IN CONJUNCTION WITH REPORT)

DEPTH SCALE
1 : 50

AECOM

LOGGED: WH
CHECKED: TA

AECOM_BH_001 60634622_DYT3.GPJ GAL-MISS.GDT 21-2-16

PROJECT: DYT3 - Ottawa
LOCATION: 2625 Sheffield Road
COORDINATES: N 5031155.8; E 452042.6
DATUM: Geodetic
AECOM PROJECT #: 60634622
CLIENT: Amazon Logistics

RECORD OF BOREHOLE: BH-21

SHEET 1 OF 1

START DATE: Jan 11, 2021
END DATE: Jan 11, 2021
BORING METHOD: 203 mm O.D. Solid Stem Auger
CONTRACTOR: Aardvark Drilling Inc.

PENETRATION TEST HAMMER, 64kg; DROP, 760mm
SAMPLER HAMMER, 64kg; DROP, 760mm

DEPTH SCALE (METRES)	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	N VALUE	Standard Penetration Testing (SPT) Number (blows/0.3m)	SHEAR STRENGTH Cu, kPa (nat V. + Q ●, rem V. ⊕ U △) / WATER CONTENT PERCENT (Wp, w, Wl)	ADDITIONAL LAB. TESTING & GRAIN SIZE DISTRIBUTION (%)	WELL INSTALLATION AND WATER LEVELS
		PAVEMENT		64.00						GR SA SI CL	
0	Power Auger Drilling, 203 mm O.D. Solid Stem Auger	**ASPHALT:** 100 mm thick		0.00							
		FILL: sand and gravel, some to trace silt, brown/grey, moist, very dense to compact		0.10	1	SS	61			47 49 (4)	
1					2	SS	19				
				62.48							
2		**CLAYEY SILT:** trace gravel, grey, moist, stiff		1.52	3	SS	11				
				61.87							
		END OF BOREHOLE		2.13							
3		Notes: 1. This log is to be read with the subject report and project number as presented above. 2. Interpretation assistance by AECOM is required for projects excluding the above mentioned project. 3. No abnormal odour or staining was observed unless otherwise indicated. 4. No groundwater was observed in the open hole upon the completion.									
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(LOG TO BE READ IN CONJUNCTION WITH REPORT)

DEPTH SCALE
1 : 50

AECOM

LOGGED: WH
CHECKED: TA

AECOM_BH_001 60634622_DYT3.GPJ GAL-MISS.GDT 21-2-16

PROJECT: DYT3 - Ottawa
LOCATION: 2625 Sheffield Road
COORDINATES: N 5031125.4; E 452039.9
DATUM: Geodetic
AECOM PROJECT #: 60634622
CLIENT: Amazon Logistics

RECORD OF BOREHOLE: BH-22

SHEET 1 OF 1

START DATE: Jan 11, 2021
END DATE: Jan 11, 2021
BORING METHOD: 203 mm O.D. Solid Stem Auger
CONTRACTOR: Aardvark Drilling Inc.

PENETRATION TEST HAMMER, 64kg; DROP, 760mm
SAMPLER HAMMER, 64kg; DROP, 760mm

DEPTH SCALE (METRES)	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	N VALUE	Standard Penetration Testing (SPT) Number (blows/0.3m)	SHEAR STRENGTH Cu, kPa (nat V. + Q ●, rem V. ⊕ U △) / WATER CONTENT PERCENT (Wp, w, Wl)	ADDITIONAL LAB. TESTING & GRAIN SIZE DISTRIBUTION (%)	WELL INSTALLATION AND WATER LEVELS
		PAVEMENT		64.30						GR SA SI CL	
0	Power Auger Drilling 203 mm O.D. Solid Stem Auger	**TOPSOIL:** 50 mm thick		0.05							
		FILL: silty clay, trace gravel, some sand, brown, moist, very stiff with buried organics			1	SS	19				
				63.64							
		CLAYEY SILT: trace gravel, grey/brown, moist, very stiff		0.66							
1					2	SS	28				
2					3	SS	21			0 19 49 32	
				62.17							
		END OF BOREHOLE		2.13							
3		Notes: 1. This log is to be read with the subject report and project number as presented above. 2. Interpretation assistance by AECOM is required for projects excluding the above mentioned project. 3. No abnormal odour or staining was observed unless otherwise indicated. 4. No groundwater was observed in the open hole upon the completion.									▽ Jan 14, 2021
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(LOG TO BE READ IN CONJUNCTION WITH REPORT)

DEPTH SCALE
1 : 50

AECOM

LOGGED: WH
CHECKED: TA

AECOM_BH_001 60634622_DYT3.GPJ GAL-MISS.GDT 21-2-16

Appendix B

Regulatory Information

RVCA Regulations Mapping

2/16/2021, 8:49:30 AM

1:7,335

0 0.04 0.09 0.17 mi

0 0.05 0.1 0.2 km

Township Municipal

Waterbody

Conservation Areas

Conservation Areas

Structures

Geographic Township

Township Municipal

OHN Watercourse

1

2

3 to 4

>=5

Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri

RVCA Regulations Mapping - Online Mapping
Rideau Valley Conservation Authority (RVCA)

Appendix C

Pre-consultation Comments

APPLICANT'S STUDY AND PLAN IDENTIFICATION LIST

Legend: **S** indicates that the study or plan is required with application submission.
A indicates that the study or plan may be required to satisfy a condition of approval/draft approval.

For information and guidance on preparing required studies and plans refer to:

http://ottawa.ca/en/development-application-review-process-0/guide-preparing-studies-and-plans

S/A	Number of copies	ENGINEERING		S/A	Number of copies
S		1. Site Servicing Plan	2. Site Servicing Study	S	
S		3. Grade Control and Drainage Plan	4. Geotechnical Study	S	
		5. Composite Utility Plan	6. Groundwater Impact Study		
		7. Servicing Options Report	8. Wellhead Protection Study		
S		9. Community Transportation Study and / or Transportation Impact Study	10. Erosion and Sediment Control Plan	S	
S		11. Storm water Management Report	12. Hydro geological and Terrain Analysis		
		13. Hydraulic Water main Analysis	14. Noise / Vibration Study		
		15. Roadway Modification Design Plan	16. Confederation Line Proximity Study		

S/A	Number of copies	PLANNING / DESIGN / SURVEY		S/A	Number of copies
		17. Draft Plan of Subdivision	18. Plan Showing Layout of Parking Garage		
		19. Draft Plan of Condominium	20. Planning Rationale	S	
S		21. Site Plan	22. Minimum Distance Separation (MDS)		
		23. Concept Plan Showing Proposed Land Uses and Landscaping	24. Agrology and Soil Capability Study		
		25. Concept Plan Showing Ultimate Use of Land	26. Cultural Heritage Impact Statement		
S		27. Landscape Plan	28. Archaeological Resource Assessment Requirements: **S** (site plan) **A** (subdivision, condo)		
S		29. Survey Plan	30. Shadow Analysis		
S		31. Architectural Building Elevation Drawings (dimensioned)	32. Design Brief	S	
		33. Wind Analysis			

S/A	Number of copies	ENVIRONMENTAL		S/A	Number of copies
S		34. Phase 1 Environmental Site Assessment	35. Impact Assessment of Adjacent Waste Disposal/Former Landfill Site		
A		36. Phase 2 Environmental Site Assessment (depends on the outcome of Phase 1)	37. Assessment of Landform Features		
		38. Record of Site Condition	39. Mineral Resource Impact Assessment		
S		40. Tree Conservation Report	41. Environmental Impact Statement / Impact Assessment of Endangered Species	A	
		42. Mine Hazard Study / Abandoned Pit or Quarry Study	43. Integrated Environmental Review (Draft, as part of Planning Rationale)		

Number of copies
Digital versions of all submissions

Meeting Date: August 18, 2022

Application Type: SPC – complex

File Lead (Assigned Planner): Kelby Lodoen Unseth

Infrastructure Approvals Project Manager: Sharif Sharif

Site Address (Municipal Address): 2625 Sheffield Rd

*Preliminary Assessment: 1☐ 2☐ 3☐ 4☐ 5☐

*One (1) indicates that considerable major revisions are required before a planning application is submitted, while five (5) suggests that proposal appears to meet the City's key land use policies and guidelines. **This assessment is purely advisory and does not consider technical aspects of the proposal or in any way guarantee application approval.**

It is important to note that the need for additional studies and plans may result during application review. If following the submission of your application, it is determined that material that is not identified in this checklist is required to achieve complete application status, in accordance with the Planning Act and Official Plan requirements, the Planning, Infrastructure and Economic Development Department *will notify you of outstanding material required within the required 30 day period. Mandatory pre-application consultation will not shorten the City's standard processing timelines, or guarantee that an application will be approved. It is intended to help educate and inform the applicant about submission requirements as well as municipal processes, policies, and key issues in advance of submitting a formal development application. This list is valid for one year following the meeting date. If the application is not submitted within this timeframe the applicant must again pre-consult with the* Planning, Infrastructure and Economic Development Department.

Pre-consultation Notes

Meeting: Thursday August 18, 2022 @ 11am

City Attendees:

Kelby Lodoen Unseth – Planner
Sharif Sharif – Infrastructure Project Manager
Matthew Hayley – Environmental Planner
Ann O'Connor – Urban Design
Mark Richardson – Forestry

Location:

2625 Sheffield Road

Property Overview and Discussion:

The property is zone Heavy Industrial (IH). The purpose of the IH Zone is to:

1) permit a wide range of industrial uses, including those which, by their nature, generate noise, fumes, odours, and are hazardous or obnoxious, in accordance with the Employment Area designation of the Official Plan or, the General Urban Area designation where applicable;

2) allow in certain Employment Areas or General Urban Areas, a variety of complementary uses such as recreational, health and fitness uses and service commercial (e.g. convenience store, personal service business, restaurant, automobile service station and gas bar), occupying small sites as individual occupancies or in groupings as part of a small plaza, to serve the employees of the Employment or General Urban Area, the general public in the immediate vicinity, and passing traffic;

3) prohibit retail uses in areas designated as Employment Area but allow limited sample and showroom space that is secondary and subordinate to the primary use of buildings for the manufacturing or warehousing of the product; and

4) provide development standards that would ensure that the industrial uses would not impact on the adjacent non-industrial areas.

The current City of Ottawa Official Plan designates the property as Urban Employment, which identifies lands for a range of employment uses.

The new City of Ottawa Official Plan designates the property as Industrial and Logistics (Section 6.4) under Transect B3 (Outer Urban Transect). The Industrial and Logistics designation is characterized by traditional land uses such as warehousing, distribution, among other uses, requiring a range of parcel sizes.

Pre-consultation Notes

Meeting: Thursday August 18, 2022 @ 11am

Discussion:

The site appears to have strong pedestrian connections through the parking areas which is a positive. It is understood that the pedestrian walkway will be extended to the street near the north end of the property with a bus pad to be constructed. It may also be helpful to extend the walkway from the southern portion of the building to the street for pick-up and drop offs.

The City will be looking for a strong landscape plan as the site has substantial street frontage on both Sheffield Road and Humber Place. Although it is noted that above ground hydro lines run along Sheffield Road.

The vehicle and bicycle parking requirements will be confirmed through the Site Plan Control application, and the RVCA and VIA rail will be circulated on the development application.

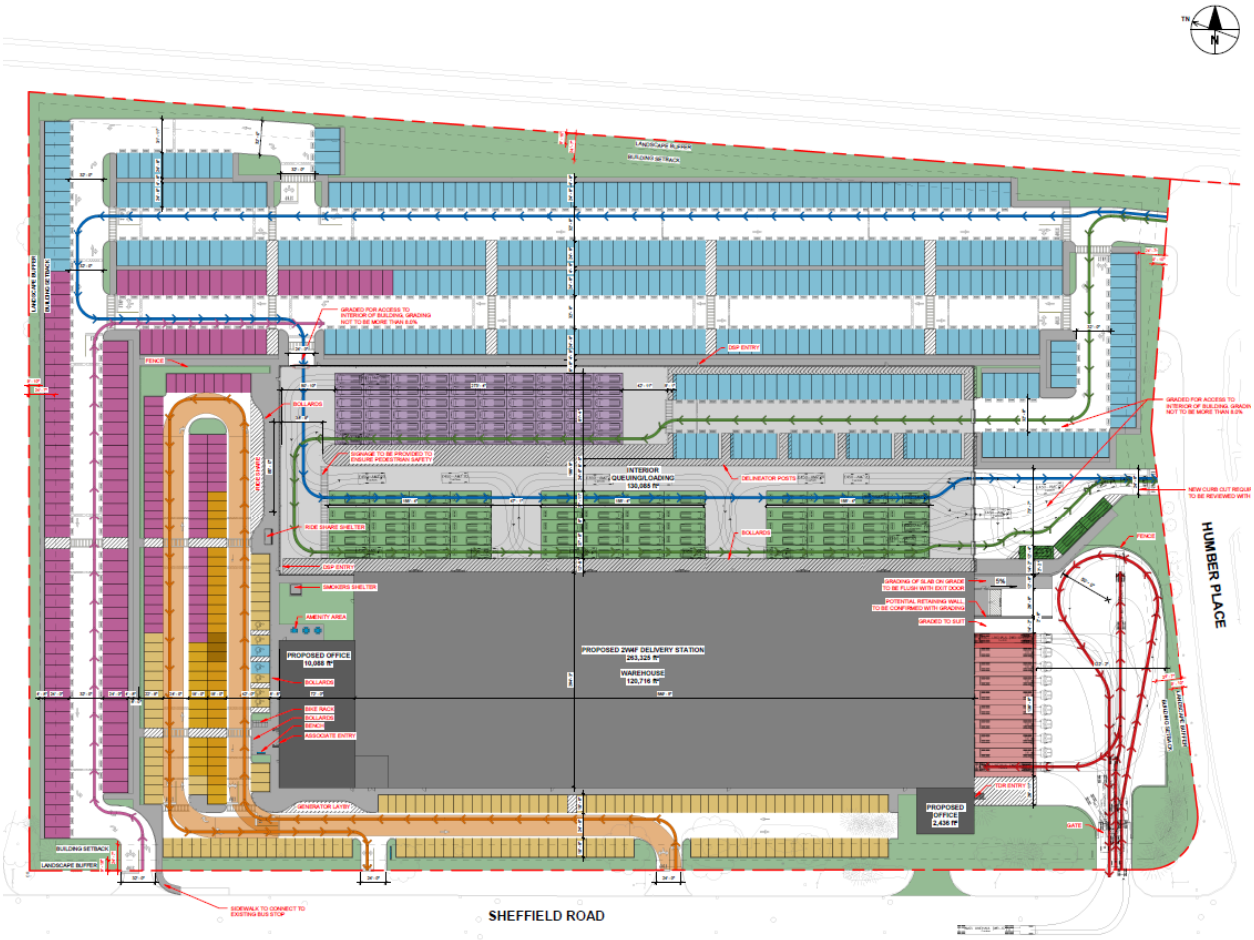
The outdoor amenity area will be an asset, but consideration should be made to how much the location is shaded, due to the building height on three sides, and if a secondary space with more sun could be accommodated.

Property:

Pre-consultation Notes

Meeting: Thursday August 18, 2022 @ 11am

Site Plan Concept:



Transportation:

1. A TIA is warranted proceed to scoping.

2. The application will not be deemed complete until the submission of the draft step 2-4, including the functional draft RMA package (if applicable) and/or monitoring report (if applicable).

3. Although a full review of the TIA Strategy report (Step 4) is not required prior to an application, it is strongly recommended.

4. Synchro files are required at Step 4.

5. ROW protection is N/A.

6. Corner sight triangle: 5m x 5m

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7. The throat length requirements should follow the TAC guidelines for a collector road.

8. Noise study is not required.

Environment:

9. Natural Heritage - The property to the east is part of the National Capital Commission (NCC) Greenbelt and is identified New OP as Greenbelt Linkage in Schedule C12 and is indicated as a natural heritage feature on Schedule C11-C. As described above, adjacent lands to the development are to be identified as "greenbelt linkage", this means that the site will need to ensure there is no negative impact on the linkage. However, an EIS is not triggered if the proposed development site is more than 30 m from the NCC lands. Given the adjacent natural area, lighting of the site will be a concern since it may attract wildlife from the greenbelt lands, some advice and guidance available in the EIS Guidelines and the Bird-safe guidelines.

10. Bird-safe Design - Given the size and type of the proposal the proposal will need to review and incorporate bird safe design elements. Some of the risk factors include glass and related design traps such as corner glass and fly-through conditions, ventilation grates and open pipes, landscaping, light pollution. More guidance and solutions are available in the guidelines which can be found here: https://documents.ottawa.ca/sites/documents/files/birdsafedesign_guidelines_en.pdf

11. Extreme heat - Please consider features that reduce the urban heat island effect (see OP 10.3.3) produced by the parking lot and a building footprint. For example, this impact can be reduced by adding large canopy trees, green roofs or vegetation walls, or constructing the parking lot or building differently.

Forestry:

TCR requirements:

12. a Tree Conservation Report (TCR) must be supplied for review along with the suite of other plans/reports required by the City
    a) an approved TCR is a requirement of Site Plan approval.
    b) The TCR may be combined with the LP provided all information is supplied

13. Any removal of privately-owned trees 10cm or larger in diameter, or city-owned trees of any diameter requires a tree permit issued under the Tree Protection Bylaw (Bylaw 2020 – 340); the permit will be based on an approved TCR and made available at or near plan approval.

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14. The Planning Forester from Planning and Growth Management as well as foresters from Forestry Services will review the submitted TCR
    a) If tree removal is required, both municipal and privately-owned trees will be addressed in a single permit issued through the Planning Forester
    b) Compensation may be required for city owned trees – if so, it will need to be paid prior to the release of the tree permit

15. The TCR just contain 2 separate plans:
    a) Plan/Map 1 - show existing conditions with tree cover information
    b) Plan/Map 2 - show proposed development with tree cover information
    c) Please ensure retained trees are shown on the landscape plan

16. the TCR must list all trees on site, as well as off-site trees if the CRZ extends into the developed area, by species, diameter and health condition

17. please identify trees by ownership – private onsite, private on adjoining site, city owned, co-owned (trees on a property line)

18. If trees are to be removed, the TCR must clearly show where they are, and document the reason they cannot be retained

19. All retained trees must be shown, and all retained trees within the area impacted by the development process must be protected as per City guidelines available at Tree Protection Specification or by searching Ottawa.ca
    a) the location of tree protection fencing must be shown on the plan

20. the City encourages the retention of healthy trees; if possible, please seek opportunities for retention of trees that will contribute to the design/function of the site.

21. For more information on the process or help with tree retention options, contact Mark Richardson mark.richardson@ottawa.ca or on City of Ottawa

LP tree planting requirements:

For additional information on the following please contact adam.palmer@Ottawa.ca

22. Minimum Setbacks
    a) Maintain 1.5m from sidewalk or MUP/cycle track or water service laterals.
    b) Maintain 2.5m from curb
    c) Coniferous species require a minimum 4.5m setback from curb, sidewalk or MUP/cycle track/pathway.
    d) Maintain 7.5m between large growing trees, and 4m between small growing trees. Park or open space planting should consider 10m spacing, except where otherwise approved in naturalization / afforestation areas. Adhere to

Ottawa Hydro's planting guidelines (species and setbacks) when planting around overhead primary conductors.

23. Tree specifications
    a) Minimum stock size: 50mm tree caliper for deciduous, 200cm height for coniferous.
    b) Maximize the use of large deciduous species wherever possible to maximize future canopy coverage
    c) Tree planting on city property shall be in accordance with the City of Ottawa's Tree Planting Specification; and include watering and warranty as described in the specification (can be provided by Forestry Services).
    d) Plant native trees whenever possible
    e) No root barriers, dead-man anchor systems, or planters are permitted.
    f) No tree stakes unless necessary (and only 1 on the prevailing winds side of the tree)
24. Hard surface planting
    a) Curb style planter is highly recommended
    b) No grates are to be used and if guards are required, City of Ottawa standard (which can be provided) shall be used.
    c) are to be planted at grade

25. Soil Volume
    a) Please document on the LP that adequate soil volumes can be met:

Tree Type/Size	Single Tree Soil Volume (m3)	Multiple Tree Soil Volume (m3/tree)
Ornamental	15	9
Columnar	15	9
Small	20	12
Medium	25	15
Large	30	18
Conifer	25	15

    b) Please note that these soil volumes are not applicable in cases with Sensitive Marine Clay.

26. Sensitive Marine Clay
    a) Please follow the City's 2017 Tree Planting in Sensitive Marine Clay guidelines

27. **Tree Canopy Cover**
    a) The landscape plan shall show how the proposed tree planting will replace and increase canopy cover on the site over time, to support the City's 40%

b) At a site level, efforts shall be made to provide as much canopy cover as possible, through tree planting and tree retention, with an aim of 40% canopy cover at 40 years, as appropriate.
c) Indicate on the plan the projected future canopy cover at 40 years for the site.

Urban Design:

28. A Design Brief that follows the provided Terms of Reference is required upon submission of the application.

29. Consider ways to simplify wayfinding and vehicular circulation on site.
    a) Consider reducing the amount of egresses. It appears there are six egresses proposed: two onto Humber Place and four onto Sheffield Road. Are all of these necessary to meet the needs of the site?
    b) Clarify on the Site Plan if there are fences/barriers proposed between the different programmed areas (areas of different colour-coding on the concept plan).
    c) If different egresses are needed for different purposes, consider clearly labelling these egresses for the benefit of drivers, so they are able to clearly understand which entrance is appropriate for them. Please illustrate the signs on the Site Plan.

30. Consider providing a simplified Site Plan that removes the various flow directions and colour-coded parking breakdowns. This other Site Plan should focus on providing clarity on:
    a) setbacks (to building, parking lot, and internal roads);
    b) providing all dimensions in metres (including for the proposed building, proposed amenity area, parking spaces, width of drive aisles and egresses, all setbacks etc.);
    c) clearly identifying building entrances, all pedestrian pathways, surface materials, vehicular access/navigation on-site, etc.
    d) clearly identifying the building footprint (including the loading area in the back that will be within the footprint).

31. Consider how the building facade facing Sheffield Rd can be designed to announce the building to the street. For example, consider:
    a) Incorporating glazing into the office portion
    b) Making prominent entrances
    c) Incorporating design elements to identify that this is the front of the building, and
    d) Removing/reducing blank walls facing Sheffield

32. Consider pedestrian flow on site.
    a) Support for the design of the pathways connecting to the bus stop and the provision of a new bus stop.

b) Consider providing a pedestrian pathway from Sheffield Rd to the entrance of the building, facing Sheffield Rd.
c) Continue to consider the desire-lines and safety of the drivers/staff walking around the site.

33. Consider how to facilitate a great amenity space.
    a) Consider moving the smoking area away from the picnic tables where non-smokers may choose to eat;
    b) Consider adding a tree to provide shade;
    c) Consider a location that will get sunlight;
    d) Consider the most convenient location for staff;
    e) Consider the views from people using the amenity area.

34. Consider ways to incorporate meaningful landscaping and tree plantings on-site.

Planning:

35. Stie Plan Control: https://ottawa.ca/en/planning-development-and-construction/development-information-residents/development-application-review-process/development-application-submission/development-applications/site-plan-control

36. City of Ottawa Accessibility Design Standards: https://documents.ottawa.ca/sites/documents/files/documents/accessibility_design_standards_en.pdf

37. Please ensure that the Parking, Queuing and Loading Provisions are following and appropriate vehicle and bicycle parking is provided on-site (https://ottawa.ca/en/part-4-parking-queuing-and-loading-provisions-sections-100-114#bicycle-parking-space-rates-and-provisions-sec-111).

38. Please ensure that the Landscaping Provisions for Parking Lots is followed (https://ottawa.ca/en/part-4-parking-queuing-and-loading-provisions-sections-100-114#section-110-landscaping-provisions-parking-lots).

39. The Planning Rationale Terms of Reference may be found here.

40. For information on Applications, including fees, please visit: https://ottawa.ca/en/planning-development-and-construction/developing-property/development-application-review-process/development-application-submission/development-application-forms#site-plan-control

41. The application processing timeline generally depends on the quality of the submission. For more information on standard processing timelines, please visit: https://ottawa.ca/en/city-hall/planning-and-development/information-

developers/development-application-review-process/development-application-submission/development-application-forms#site-plan-control

42. Bird-safe design guidelines: https://documents.ottawa.ca/sites/documents/files/birdsafe_designguidelines_en.pdf

Engineering:

List of Reports and Plans (Site Plan Control):

- Site Servicing Plan
- Grading Plan
- Drainage/ Ponding Plan
- Erosion and Sediment Control Plan
- Stormwater Management and Site Servicing Report
- Geotechnical Investigation Report

Please note the following information regarding the engineering design submissions for the above noted site:

46. The Servicing Study Guidelines for Development Applications are available at the following address:

    https://ottawa.ca/en/city-hall/planning-and-development/how-develop-property/development-application-review-process-2/guide-preparing-studies-and-plans

47. Servicing and site works shall be in accordance with the following documents:

    - Ottawa Sewer Design Guidelines, Second Edition, (October 2012), including Technical Bulletins, ISDTB-2014-01, PIEDTB-2016-01, ISTB 2018-01, ISTB-2018-04, and ISTB-2019-02
    - Ottawa Design Guidelines – Water Distribution, First Edition, (July 2010), including Technical Bulletins ISD-2010-2, ISDTB-2014-02, ISTB-2018-02, and ISTB-2021-03
    - Geotechnical Investigation and Reporting Guidelines for Development Applications in the City of Ottawa (Revised 2008)
    - City of Ottawa Slope Stability Guidelines for Development Applications (Revised 2012)

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- City of Ottawa Environmental Noise Control Guidelines (January, 2016)
- City of Ottawa Hydrogeological and Terrain Analysis Guidelines (March 2021)
- City of Ottawa Park and Pathway Development Manual (2012)
- City of Ottawa Accessibility Design Standards (2012)
- Ottawa Standard Tender Documents (latest version)
- Ontario Provincial Standards for Roads & Public Works (2013)

48. Record drawings and utility plans are also available for purchase from the City (Contact the City's Information Centre by email at InformationCentre@ottawa.ca or by phone at (613) 580-2424 x 44455

49. The Stormwater Management Criteria for the subject site is to be based on the following:

    - The pre-development runoff coefficient or a maximum equivalent 'C' of 0.5, whichever is less (§ 8.3.7.3).
    - For separated sewer system built pre-1970 the design of the storm sewers are based on a 2 year storm.
    - Flows to the storm sewer in excess of the 2-year pre-development storm release rate, up to and including the 100-year storm event, must be detained on site
    - Ensure no overland flow for all storms up to and including the 100-year event.
    - The 2-yr storm event using the IDF information derived from the Meteorological Services of Canada rainfall data, taken from the MacDonald Cartier Airport, collected 1966 to 1997.
    - A calculated time of concentration (Cannot be less than 10 minutes).
    - Quality control and sub watershed requirements to be provided by Rideau Valley Conservation Authority (RVCA)

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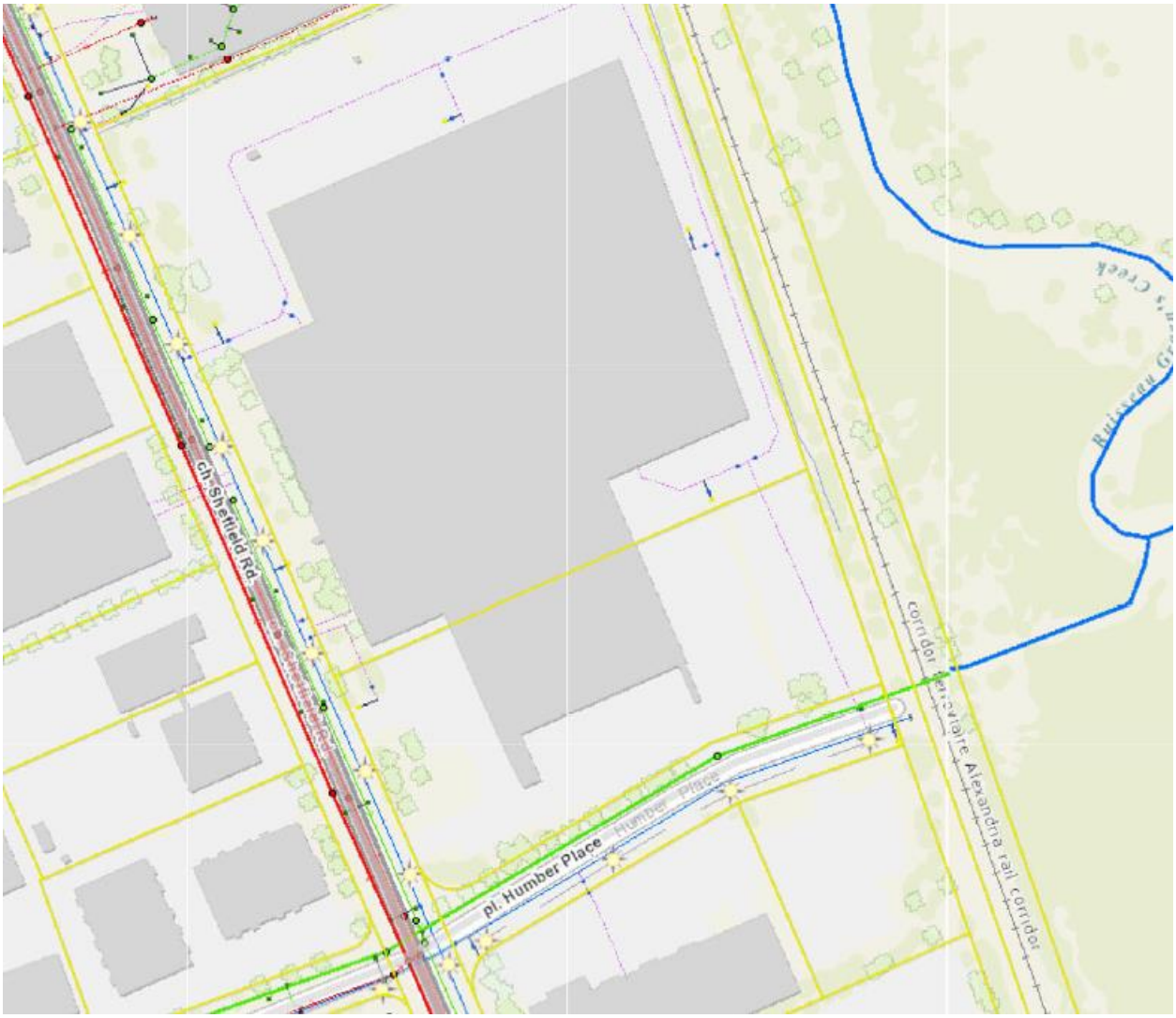

50. Deep Services:

Hydrants

Hydrant Laterals

Trunk Sewers
- Sanitary Pipe
- Combined Pipe
- Storm Pipe

Water Pipes
- Public
- Private

Storm Manholes

Storm Inlets

Valves
- Valve
- TVS,A,D

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i. *A plan view of the approximate services may be seen above. Services should ideally be grouped in a common trench to minimize the number of road cuts. The sizing of available future services is:*
   a. Humber Pl:
      i. Storm – 1950 mm (Trunk Sewer).
   b. Sheffield Road:
      i. Sanitary – 370 mm.
      ii. Storm – 375/525 mm.
      iii. Water – 300 mm.

ii. *Provide existing servicing information and the recommended location for the proposed connections. Services should ideally be grouped in a common trench to minimize the number of road cuts.*

iii. *Connections to trunk sewers and easement sewers are not permitted.*

iv. *Provide information on the monitoring manhole requirements – should be located in an accessible location on private property near the property line (ie. Not in a parking area).*

v. *Review provision of a high-level sewer.*

vi. *Provide information on the type of connection permitted*

Sewer connections to be made above the springline of the sewermain as per:

a. Std Dwg S11.1 for flexible main sewers – *connections made using approved tee or wye fittings.*
b. Std Dwg S11 (For rigid main sewers) – *lateral must be less that 50% the diameter of the sewermain,*
c. Std Dwg S11.2 (for rigid main sewers using bell end insert method) – *for larger diameter laterals where manufactured inserts are not available; lateral must be less than 50% the diameter of the sewermain,*
d. Connections to manholes permitted when the connection is to rigid main sewers where the lateral exceeds 50% the diameter of the sewermain. – Connect obvert to obvert with the outlet pipe unless pipes are a similar size.
e. *No submerged outlet connections.*

vii. *Please provide estimated storm and sanitary flows before the first submission, to allow the City to confirm whether there are any downstream capacity constraints.*

51. Civil consultant must request boundary conditions from the City's assigned Project Manager prior to first submission. Water Boundary condition requests must include the location of the service and the expected loads required by the proposed development. Please provide the following information:
    i. Location of service(s)

ii. Type of development and the amount of fire flow required (as per FUS, 1999).
iii. Average daily demand: ___ l/s.
iv. Maximum daily demand: ___l/s.
v. Maximum hourly daily demand: ___ l/s.
vi. Hydrant location and spacing to meet City's Water Design guidelines.
vii. Water supply redundancy will be required for more than 50 m3/day water demand.

52. Phase 1 ESAs and Phase 2 ESAs must conform to clause 4.8.4 of the Official Plan that requires that development applications conform to Ontario Regulation 153/04.

53. All development applications should be considered for an Environmental Compliance Approval (ECA) by the Ministry of the Environment, Conservation, and Parks (MECP);

    a. The consultants determine if an approval for sewage works under Section 53 of OWRA is required and determines what type of application. The City's project manager may help confirm and coordinate with the MECP as required.

    b. The project will be either transfer of review (standard), transfer of review (additional), direct submission, or exempt as per O. Reg. 525/98.

    c. Pre-consultation is not required if applying for standard or additional works (Schedule A of the Agreement) under Transfer Review.

    d. Pre-consultation with local District office of MECP is recommended for direct submission.

    e. Consultant completes an MECP request form for a pre-consultation. Send request to moeccottawasewage@ontario.ca

    f. ECA applications are required to be submitted online through the MECP portal. A business account required to submit ECA application. For more information visit https://www.ontario.ca/page/environmental-compliance-approval

NOTE: Site Plan Approval, or Draft Approval, is required before an application is sent to the MECP.

54. General Engineering Submission requirements:

    a. All industrial zone site must be verified eligibility/exemption for ECA process.

    b. Water supply redundancy will be required for more than 50 m3/day water demand.

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c. Discharge to Humber Pl storm trunk require back water valve for storm sewer within the site as per previous discussion. Provide the correspondence with the report.

d. As per section 53 of the Professional Engineers Act, O. Reg 941/40, R.S.O. 1990, all documents prepared by engineers must be signed and dated on the seal.

e. All required plans are to be submitted on standard A1 size sheets (594mm x 841mm) sheets, utilizing a reasonable and appropriate metric scale as per City of Ottawa Servicing and Grading Plan Requirements: title blocks are to be placed on the right of the sheets and not along the bottom. Engineering plans may be combined, but the Site Plans must be provided separately. Plans shall include the survey monument used to confirm datum. Information shall be provided to enable a non-surveyor to locate the survey monument presented by the consultant.

f. All required plans & reports are to be provided in *.pdf format (at application submission and for any, and all, re-submissions).

Parks

55. Comments outstanding.

Attachments:

- Plan and study list
- Urban Design Terms of Reference

For any questions, please feel free to contact me at the information below. Please provide all submission documents electronically as paper copies of plans and reports are not being requested at this time.

Best regards,

Kelby Lodoen Unseth

Kelby Lodoen Unseth MCIP, RPP
Planner II | Urbaniste II
Development Review (South Services) | Examen des projets d'aménagement (services sud)

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Planning, Infrastructure and Economic Development **|** Services de planification, d'infrastructure et de développement économique

City of Ottawa | Ville d'Ottawa
☎ 613.580.2424 ext./poste 12852
ottawa.ca/planning / ottawa.ca/urbanisme

Enc.

Description:

A Design Brief is the core submission document that illustrates how the development is designed to work with its existing and planned context, to improve its surroundings and also demonstrate how the proposal supports the overall goals of the Official Plan, relevant secondary plans, Council approved plans and design guidelines. The purpose of the Terms of Reference is to assist the applicant to organize and substantiate the design justification in support of the proposed development and to assist staff and the public in the review of the proposal.

Authority to Request a Design Brief:

The *Planning Act* gives municipalities the authority to require that a Design Brief be prepared. Under Sections 22(4), (5) and Section 41(4) of the *Planning Act*, a Council has the authority to request such other information or material that the authority needs in order to evaluate and make a decision on an application. Section 5.2.6 of the Official Plan sets out the general requirement for a Design Brief.

Preparation:

The Design Brief should be signed by an urban designer, licenced architect, landscape architect, or a full member of the Canadian Institute of Planners.

When Required:

A Design Brief is required for a Site Plan Control planning application.

A Scoped Design Brief* is required when the following planning applications are applied for and not accompanied by a Site Plan Control application:

- Official Plan Amendment
- Zoning By-law Amendment (exception: a change in use which does not result in an increase in height or massing)

The requirement and scope of a Design Brief will be determined at the formal pre-application consultation meeting. Should an application be required to go to the Urban Design Review Panel (UDRP), the Design Brief may be submitted as part of the submission materials to the panel.

Contents for Design Brief Submissions:

A Design Brief will contain and/or address the points identified during the pre-consultation meeting. Failure to address the critical elements identified in the pre-consultation meeting may result in the application being considered incomplete.

** A Scoped Design Brief is composed of:*

- *Section 1 should be combined into the Planning Rationale submission, and*
- *Section 2 items will be confirmed in the pre-application consultation meeting.*

SECTION 1 Note: This section may be combined with the Planning Rationale report

Application Submission:

Not Required	Required	
☐	X	State the: type of application, legal description, municipal address, purpose of the application and provide an overall vision statement and goals for the proposal.

Response to City Documents:

Not Required	Required	
☐	X	State the Official Plan land use designation for the subject property and demonstrate how the proposal conforms to the Official Plan as it relates to the design of the subject site. Reference specific policy numbers from the Official Plan to show consistency. Justify areas of non-compliance and explain why there is non-compliance.
☐	X	State the applicable plans which apply to the subject proposal: community design plan, secondary plan, concept plan and design guideline. Reference the relevant design related polices within the applicable plans/guidelines and provide a comprehensive analysis as to how the proposed development incorporates the objectives or why it does not incorporate the objectives.

Context Plan:

Not Required	Required	
☐	X	Provide a contextual analysis that discusses/illustrates abutting properties, key destinations and linkages within a 100 meter radius (a larger radius may be requested for larger/more complex projects), such as transit stations, transportation networks for cars, cyclists, and pedestrians, focal points/nodes, gateways; parks/open spaces, topography, views towards the site, the urban pattern (streets, blocks), future and current proposals (if applicable), public art and heritage resources.
☐	X	Photographs to illustrate existing site conditions and surrounding contexts. Include a map pinpointing (with numbers) where each photo is taken and correspond these numbers with the site photos. Arrows illustrating the direction the photo is taken is also useful.

SECTION 2

Design Proposal:
The purpose of the Design Proposal is to show the building elevations, exterior details, transitions in form, treatment of the public realm and compatibility with adjacent buildings, using 3-D models, illustrations, diagrams, plans, and cross sections. Referencing Official Plan, Section 5.2.1, as determined at time of pre-application consultation meeting, submissions will need to address the following in the form of labelled graphics and written explanation:

Massing and Scale

Not Required	Required	
		Images which show: Building massing – from:
☐	☐	• at least two sides set within it current context (showing the entire height and width of the building) **OR**
☐	☒	• all four sides set within it current context (showing the entire height and width of the building).
		Views – of the entire block, from:
☐	☒	• at least two perspectives to show how the proposed building is set within its current context **OR**
☐	☐	• all four perspectives to show how the proposed building is set within its current context.
☒	☐	Building transition – to adjacent uses, with labelled explanation of the transition measures used.
☐	☒	Grading – if grades are an issue.
☒	☐	Alternative building massing – additional imagery and site layouts considered and provide justification for the ultimate proposal sought.

Public Realm

Not Required	Required	
		Labelled graphics and a written explanation which show:
☐	☒	Streetscape – cross sections which illustrate the street design and right of way (referencing the City's design manuals).
☐	☒	Relationship to the public realm – illustrating how the first few storeys of the proposed development responds to and relates to the existing context (e.g. through a podium plan and first floor plan). This is to include detailed explanation on: • Architectural responses • Landscaping details • Public art features (in accordance with Official Plan, Section 4.11) • For developments in Design Priority Areas, detail the building and site features, (in accordance with Official Plan, Section 4.11) which will enhance the public realm. Provide explanation for features which are not provided.

Building Design

Not Required	Required	
☐	☒	Labelled graphics (e.g. building elevations and floor plans) and a written explanation which document the proposed exterior architectural details and design (in accordance with Official Plan, Section 5.2.1).
☒	☐	For high-rise development applications, detail the building design and massing and scale elements and how they relate to the proposed high-rise development (in accordance with Official Plan, Section 5.2.1).

Sustainability

Not Required	Required	
☐	☒	Any sustainable design features to be incorporated, such as green roofs or walls, sun traps, reflective or permeable surfaces.

Heritage

Not Required	Required	
☒	☐	How the building relates to the historic details, materials, site and setting of any existing historic resources on or adjacent to the subject property (if applicable).

Additional Contents:

Some proponents may be requested to provide submission material which complements the Design Brief. These additional requirements could be incorporated into the Design Brief submission for ease of review. These will be identified at the time of application consultation meeting:

- Site Plan
- Landscape Plan
- Elevations
- Plan showing existing and proposed servicing
- Shadow Analysis
- Wind Analysis

Submission Requirements

- Digital copies only

Paliouras, Kosta

From: Ahmed, Aziz (MECP) <Aziz.Ahmed@ontario.ca>
Sent: Monday, August 29, 2022 9:22 AM
To: Paliouras, Kosta
Cc: Kuljanin, Milan; Warnock, Charles; Primeau, Charlie (MECP)
Subject: [EXTERNAL] RE: 2625 Sheffield Road Ottawa ON

Kosta,

All is well, hope the same with you.

Based on the analysis you have provided that the works meets the criteria in s.3 of R525/98, I agree that the change in configuration of the development alone does not alter the exemption from the requirement to obtain an ECA.

Stay safe,

Aziz

Aziz S. Ahmed, P.Eng. | Manager
Municipal Water and Wastewater Permissions Section, Environmental Permissions Branch | Environmental Assessment and Permissions Division
Ministry of the Environment, Conservation and Parks | 40 St. Clair Ave. West, 2nd Floor, Toronto, ON M4V 1M2
Tel: 416.314.4625 | Cell: 416.712.7427 | Toll Free: 1-888-999-1305 | Fax: 416.314.1037 ✉: Aziz.Ahmed@ontario.ca

If you have any accommodation needs or require communication supports or alternate formats, please let me know.
Si vous avez des besoins en matière d'adaptation, ou si vous nécessitez des aides à la communication ou des médias substituts, veuillez me le faire savoir.

From: Paliouras, Kosta <kosta.paliouras@aecom.com>
Sent: August-29-22 9:16 AM
To: Ahmed, Aziz (MECP) <Aziz.Ahmed@ontario.ca>
Cc: Kuljanin, Milan <Milan.Kuljanin@aecom.com>
Subject: FW: 2625 Sheffield Road Ottawa ON

Good morning Aziz

I hope all is fine and you've had a good summer.

In October 2021, you indicated to the City of Ottawa staff that the proposed works at 2625 Sheffield Road in Ottawa, ON would not require a Sewage Works ECA permit (email chain is below). Since October 2021, there was a change to the layout of the Site but the nature of the Site has not changed.

Attached is a letter requesting an exemption from requiring an Sewage Works ECA for the Site works.

Please review and let me know if you have any questions

Thank you,
Kosta

Kosta Paliouras, P.Eng
Senior Water Resources Engineer/Project Manager/Group Leader, Water
D +1-519-650-8669
M +1-226-749-0964
kosta.paliouras@aecom.com

In light of the COVID-19 situation, I am currently working remotely away from the office. In any instance, please contact me at any of the numbers above

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From: Sharif, Golam <sharif.sharif@ottawa.ca>
Sent: Tuesday, October 26, 2021 11:30 AM
To: Kuljanin, Milan <Milan.Kuljanin@aecom.com>
Subject: [EXTERNAL] FW: 2625 Sheffield Road Ottawa ON

Good Morning Milan,

I have received a confirmation from the Toronto Office regarding the MECP ECA exemption. Please see the response below. I believe, according to the information you provided for the proposed development the land use do not fall under industrial use, thus Toronto Office confirmed no ECA will be required.

Please include this correspondence in your updated SWM and servicing report.

Thank you.

Sharif

From: Warnock, Charles <Charles.Warnock@ottawa.ca>
Sent: October 26, 2021 10:53 AM
To: Sharif, Golam <sharif.sharif@ottawa.ca>
Subject: 2625 Sheffield Road Ottawa ON

Hi Sharif, please see the response below from the MECP.
They have concluded that the land use is not Industrial.
If the proposal meets all conditions of O.Reg. 525/98 then I see no requirement to obtain an ECA.
Thanks.
Charles

From: Ahmed, Aziz (MECP) <Aziz.Ahmed@ontario.ca>
Sent: October 26, 2021 9:54 AM
To: Warnock, Charles <Charles.Warnock@ottawa.ca>
Subject: RE: 2625 Sheffield Road Ottawa ON

ATTENTION : Ce courriel provient d'un expéditeur externe. Ne cliquez sur aucun lien et n'ouvrez pas de pièce jointe, excepté si vous connaissez l'expéditeur.

Charles,

Hope you are well. Based on the landuse described, I agree that this does not fall under the classification of industrial use.

I would also like to draw your attention to the following:

We are happy to inform you that we have posted a notice on the Environmental Registry of Ontario (ERO) about our proposal to amend O. Reg. 525/98 under the *Ontario Water Resources Act*. The proposed changes would remove the requirement to obtain an Environmental Compliance Approval for low risk sewage works.

The proposal notice will be available for public comment for 45 days, closing on December 9, 2021. The posting can be accessed on the Environmental Registry of Ontario. The feedback that we receive during this 45-day consultation period will help finalize the amendments to the regulations.

Please provide comments on this if you are interested, including the definition of industrial land, and services on private property which you have raised previously.

Stay safe,

Aziz

Aziz S. Ahmed, P.Eng. | Manager
Municipal Water and Wastewater Permissions Section, Environmental Permissions Branch | Environmental Assessment and Permissions Division
Ministry of the Environment, Conservation and Parks | 40 St. Clair Ave. West, 2nd Floor, Toronto, ON M4V 1M2
Tel: 416.314.4625 | Cell: 416.712.7427 | Toll Free: 1-888-999-1305 | Fax: 416.314.1037 ✉: Aziz.Ahmed@ontario.ca

If you have any accommodation needs or require communication supports or alternate formats, please let me know.
Si vous avez des besoins en matière d'adaptation, ou si vous nécessitez des aides à la communication ou des médias substituts, veuillez me le faire savoir.

From: Warnock, Charles <Charles.Warnock@ottawa.ca>
Sent: October-26-21 9:50 AM
To: Ahmed, Aziz (MECP) <Aziz.Ahmed@ontario.ca>
Subject: 2625 Sheffield Road Ottawa ON

CAUTION -- EXTERNAL E-MAIL - Do not click links or open attachments unless you recognize the sender.

Hi Ahmed, I hope you are well and having a good day.
I am just following up on this email.
Thanks and have a good day.
Charles

From: Warnock, Charles
Sent: October 21, 2021 11:38 AM

To: Aziz Ahmed (aziz.ahmed@ontario.ca) <aziz.ahmed@ontario.ca>
Subject: 2625 Sheffield Road Ottawa ON

Hi Ahmed, I hope you are well and having a good day.
I am just following up on this email.
Thanks and have a good day.
Charles

From: Warnock, Charles
Sent: October 13, 2021 1:40 PM
To: Aziz Ahmed (aziz.ahmed@ontario.ca) <aziz.ahmed@ontario.ca>
Subject: 2625 Sheffield Road Ottawa ON

Hi Aziz, I hope all is well with you and that you had a nice long weekend.

Would the MECP consider that an Industrial ECA is not required for this site?
Furthermore, if no Industrial ECA is required it meets the other requirements for an exemption and therefore no ECA would be required.

We have a site plan application at 2625 Sheffield Road Ottawa ON.
The owner is Choice Properties Reit.
AECOM the civil consultant for the owner has made a request to ask the MECP if an Industrial ECA is required

The proposed works consists of developing an existing vegetated area to expand a large parking area only. There is no expansion of the existing building and will not require an expansion of the existing sanitary and water servicing. Due to the expansion of the parking lot area into existing vegetated area, additional surface runoff will discharge off-Site and would require additional water quality and quantity controls to minimize detrimental impacts to the downstream outlet. The objective for these stormwater management facilities is to provide water quality treatment, water quantity control, and groundwater recharge in accordance with the City's requirements for development.

The proposed stormwater management facilities will consist of an underground chamber storage systems (StormTech MC-3500 systems or approved equivalent) with the capacity to accept surface runoff up to and including the 100-year storm event for the proposed parking lot area and provide water quality treatment prior to discharging downstream. The chamber storage systems will consist of storage chambers with clear stone granular material bedding, surrounded by a permeable liner to encourage infiltration of runoff from the parking lot area. The proposed underground chamber storage systems will then ultimately discharge to the municipal infrastructure on Leeds Road. Existing drainage patterns from the existing building structure and parking lot area located north and west of the building structure will be maintained. The existing discharge control and location will be maintained to regulate discharge as per City's requirements.

The Site is zoned 'IH' (Heavy Industrial Use). AECOM has indicated that "*there will be no machinery or on-site processes that would require industrial water use to discharge to the municipal system and no outdoor storage of processed material or any contaminate material. Due to the purpose of the Site, there will be consistent van and truck traffic through the proposed parking lot area. The extent of untreated surface runoff would originate from parking lot area and would include total suspended solids (TSS), vehicular oil and chlorides. The level of concern is minimal.*"

Ontario Water Resources act defines industrial land as “
land used for the production, processing, repair, maintenance or storage of goods or materials, or the processing, storage, transfer or disposal of waste, but does not include land used primarily for the purpose of buying or selling, (a) goods or materials other than fuel, or (b) services other than vehicle repair services.”

The proposed use meets the MECP’s definition of Industrial lands however the consultant has indicated that “*The level of concern is minimal.”*

The SWMF services only the subject parcel and the site outlets to an existing storm sewer.

Ontario Regulation 525/98 states that Subsection 53 (1) and (3) of the Act do not apply to lands designed as:

- one parcel,
- that discharge into a storm sewer that is not combined,
- does not service industrial and or located on industrial land.”

The development is a single parcel of land, out letting to a storm sewer that is not combined.

Please let of us know if an Industrial ECA is required.

Thank you in advance.
Charles

'

'
'

This e-mail originates from the City of Ottawa e-mail system. Any distribution, use or copying of this e-mail or the information it contains by other than the intended recipient(s) is unauthorized. Thank you.

Le présent courriel a été expédié par le système de courriels de la Ville d'Ottawa. Toute distribution, utilisation ou reproduction du courriel ou des renseignements qui s'y trouvent par une personne autre que son destinataire prévu est interdite. Je vous remercie de votre collaboration.

'

AECOM Canada Ltd.
50 Sportsworld Crossing Road, Suite 290
Kitchener, ON N2P 0A4 Canada

T: 519.650.5313
F: 519.650.3424
www.aecom.com

Aziz S. Ahmed, P.Eng.
Manager, Municipal Water and Wastewater Permissions Section
Environmental Branch - Environmental Assessment and Permissions Division
Ministry of the Environment, Conservation, and Parks
40 St. Clair Avenue West, 2nd Floor
Toronto, Ontario M4V 1M2

August 29, 2022

Project #
60684725

DRAFT

Subject: Environmental Compliance Approval (ECA) Exemption
DYT3 Distribution Facility
2625 Sheffield Road, Ottawa, Ontario

Dear Mr. Ahmed:

The following letter is to indicate that the proposed distribution facility at 2625 Sheffield Road in Ottawa, Ontario (Site) is exempted from requiring an Environmental Compliance Approval (ECA) permit from the Ministry of Environment, Conservation, and Parks (MECP), as per Ontario Regulation 525/98.

Existing Site conditions consist of a building structure, parking lot area, and vegetated area. The Site is approximately 7.06 hectares (ha) in total size, with an existing building structure footprint of approx. 3,796 square metres (m^2). The proposed works consists of demolishing the existing building structure and parking lot area and redeveloping for a proposed 2,490 m^2 building structure and regraded parking lot area. Additional stormwater management infrastructure (such as infiltration basins, storm sewers, underground chamber storage, etc.) will be required to meet City of Ottawa discharge requirements.

Exemption Reasoning

Ontario Regulation 525/98 states that Subsection 53 (1) and (3) of the Act do not apply to lands designed as:

- one parcel, for which the Site and all proposed works will be contained;
- that discharge into a storm sewer that is not combined, for which is not the case at the Site, as sanitary and storm services currently are and will continue to be separate;
- does not service industrial or a structure located on industrial land; and
- is not located on industrial land.

Ontario Water Resources Act defines industrial land as “land used for the production, processing, repair, maintenance or storage of goods of materials, or the processing, storage, transfer or disposal of waste, but does not include land used primarily for the purpose of buying or selling, (a) goods or materials other than fuel, or (b) services other than vehicle repair services.”

Though the Site is located within a “Heavy Industrial Zone” according to the zoning by-law, the primary purpose of the proposed development will be for the distribution of goods and material, with only van and truck traffic through the proposed parking lot area. There will be no machinery or on-site processes that would require industrial water use to discharge to the municipal system and no outdoor storage of processed material or any contaminate material. Contaminates would include total suspended solids (TSS), vehicular oil and chlorides from the parking lot area. The proposed infiltration basins will only accept discharge from the proposed roof areas and an impermeable liner is proposed for the proposed underground chamber storage systems and

therefore none of the runoff from the parking lot area will infiltrated into the underlying soil. The level of concern would be minimal.

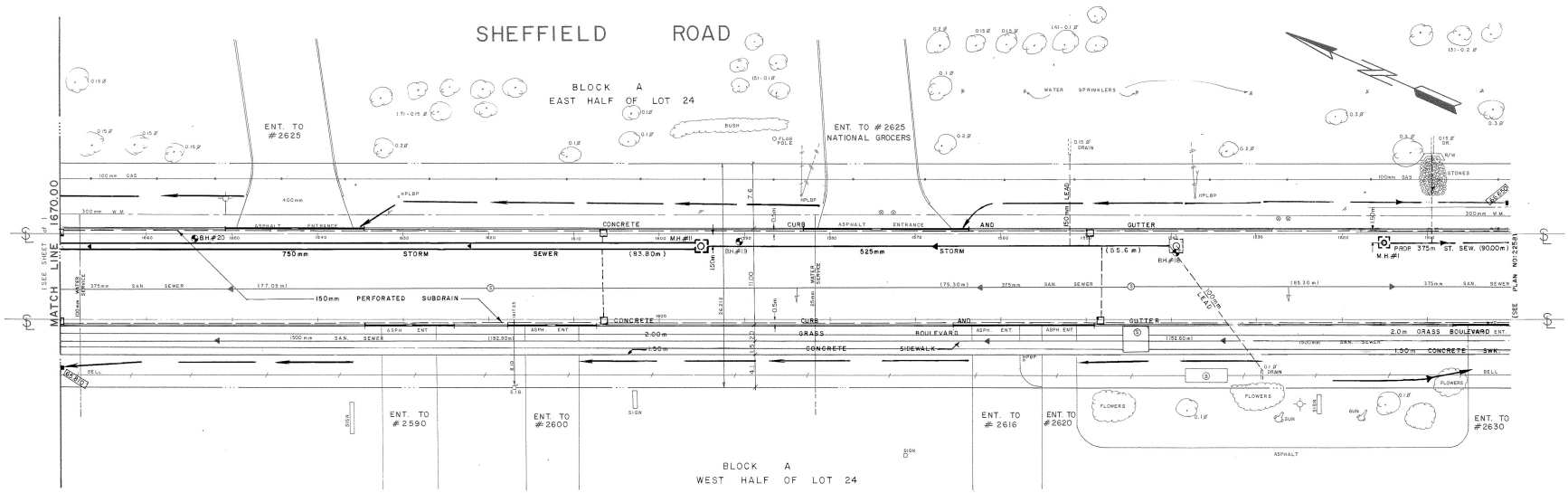
I hope this letter is to your satisfaction. If there are any questions, feel free to contact me at *kosta.paliouras@aecom.com* or 519-650-8669.

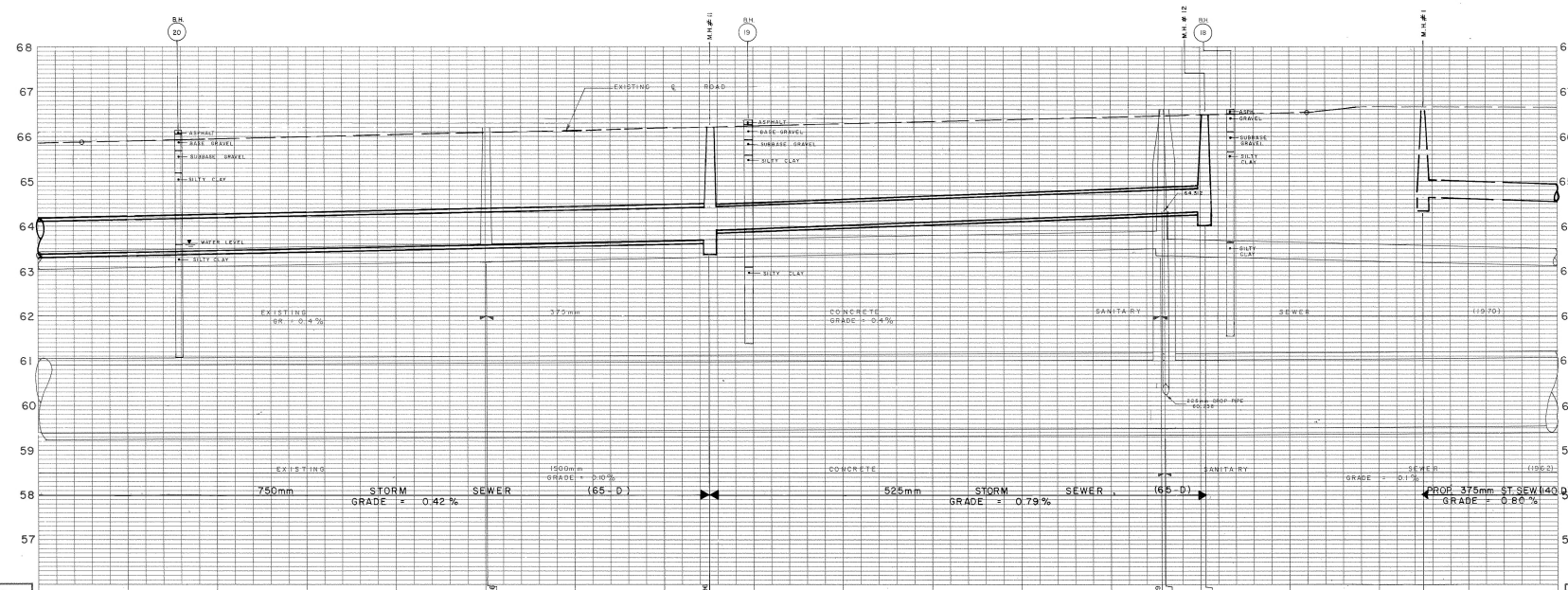
Sincerely,
AECOM Canada Ltd.

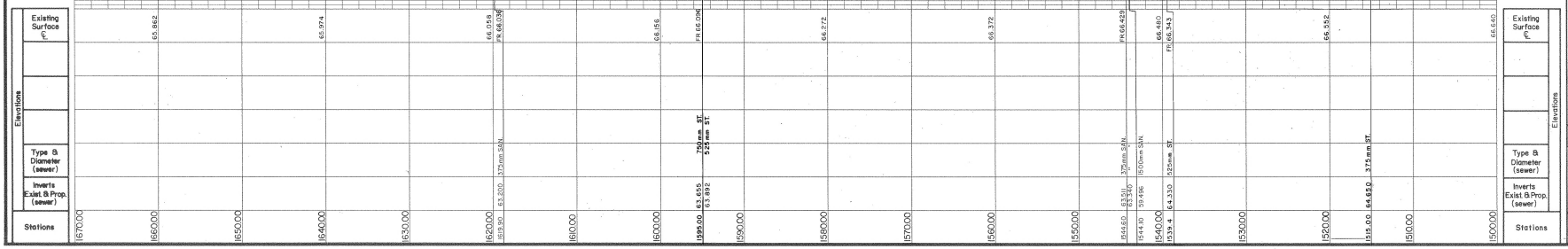
Kosta Paliouras, P.Eng.
Senior Water Resources Engineer/Project Manager/Group Leader, Water
kosta.paliouras@aecom.com

Appendix D

City of Ottawa Existing Drawings







Revisions:

No.	Date	Description	Drawn By	Appr'd By

Final Measurements:

Construction Type	SEWER AND ROAD	Inspector	S. SAUVE
Work Commenced	JUNE 25, 1990	Instrumentman	J. PINHEY
Work Completed	NOV. 16, 1990	Field Book #	5225, 5226, 5227
Contractor	DIBBLEE	Date	MARCH / 1991
Drafting Revisions	J. PINHEY	Checked By	

Designed By	Date 25-06-90	Structural Check By	Da
Survey Detail By	Date	Checked By	Da
Drafting By	Date 20-07-90	Checked By	Da
Chief Design & Contr.		Senior Const. Coord.	

LICENSED PROFESSIONAL ENGINEER PAUL E. SAUVE 23/4/90 PROVINCE OF ONTARIO

Notes:

- Utilities shown are taken from best available records. Contractor is requested to check with all utility companies before digging.
- Soil information shown is not guaranteed and contractors are advised to collect additional soils information as deemed necessary.
- Reference bench mark:
- Proposed storm and sanitary sewers may be constructed in a common trench provided that a minimum horizontal distance of 460mm is maintained between outside barrels of pipe.
- All pipes shall conform to the Canadian Standards Association (C.S.A.), A257.2 reinforced concrete sewer pipe with approved rubber gaskets
- A minimum of 460 mm vertical clearance to be maintained between sewers and watermains where practical.
- Borehole soil descriptions are not based on sieve analysis but on visual inspection only, except where otherwise noted.
- Soil information taken from:
- Date of television inspection:
- This plan supercedes (in whole or in part) plan no:
- Actual rock line recorded during construction of existing sewer.
- Registered plan no.:
- Caution, while illustrations and utilities shown are taken from best available information, they cannot be guaranteed.
- See additional notes on sheet # 1

City of Ottawa / Ville d'Ottawa

Department Of Engineering And Works
Engineering Branch
Design And Construction Division
1600 SCOTT STREET · OTTAWA ONTARIO · K1Y 4N 7

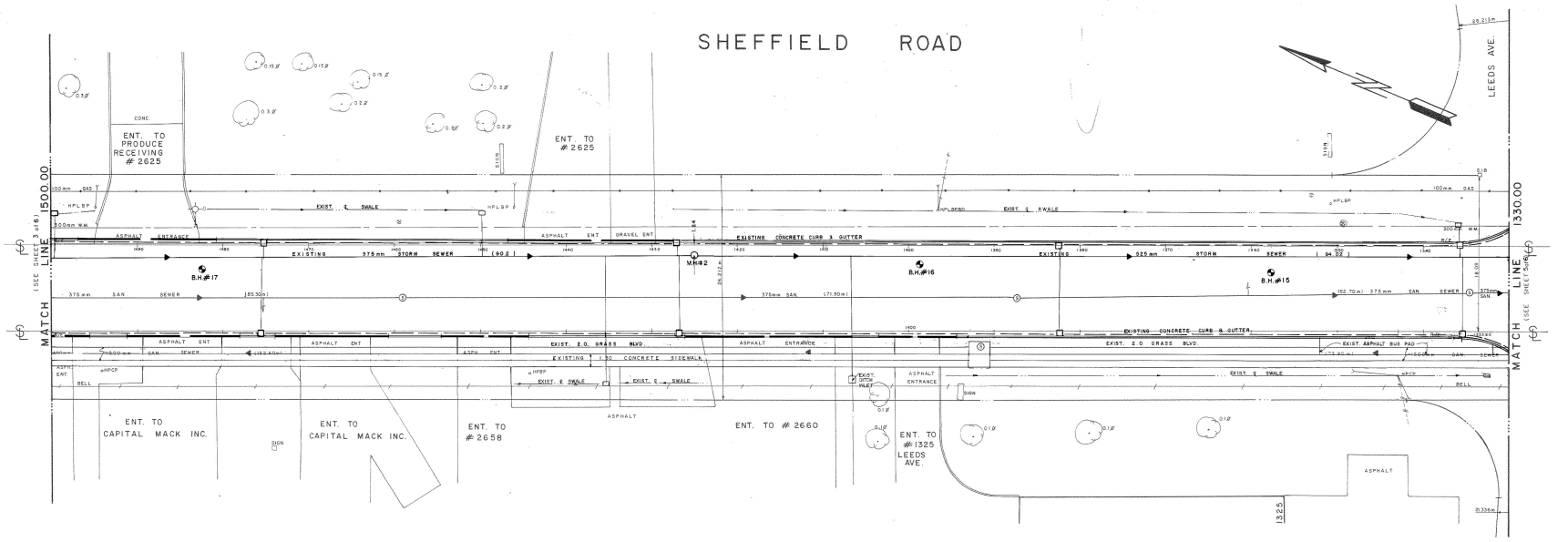
Commissioner	D. Curry P. Eng.	Branch Director	W. R. Cole P. Eng.

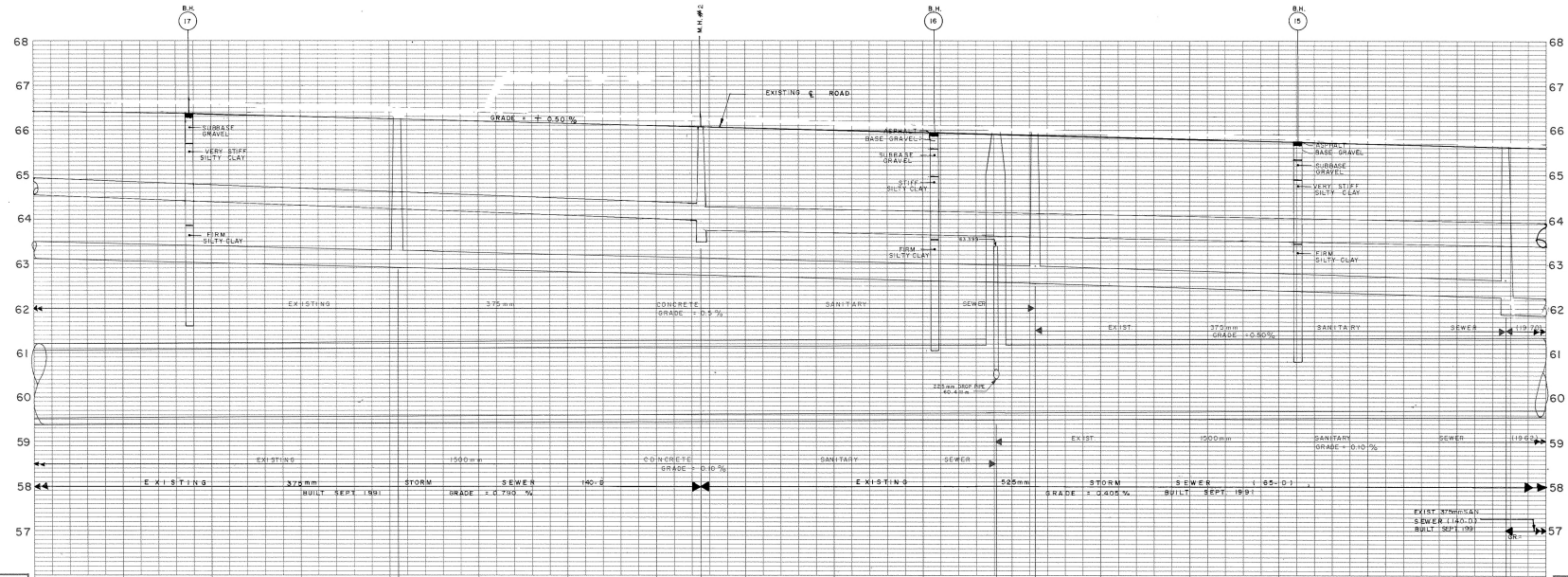
STORM SEWER AND ROAD RECONSTRUCTION

SHEFFIELD ROAD

FROM CH: 1500.00 TO CH: 1670.00

Contract No.	Survey Books	Scales	Plan No.
90-25	4706, 4761, 4869, 4879, 4886	HOR. 1:250 VERT. 1:50	225 Sheet 10 of 10





Elevations	1500.00	1490.00	1480.00	1470.00	1460.00	1450.00	1440.00	1430.00	1425.00	1420.00	1410.00	1400.00	1391.50	1390.00	1387.20	1380.00	1370.00	1360.00	1350.00	1340.00	1334.50	1330.00
Existing Surface ℄	66.415	66.364	66.324	66.274	66.235	66.191	66.134	66.071	P. 65.971	66.044	65.972	65.930	65.887	65.852	65.800	65.749	65.674	65.631	P. 65.601	65.575		
Type & Diameter (sewer)					375mm S.N.				375mm ST. 525mm ST.				1500mm S.N.		375mm S.N.					375mm S.N.		
Inverts Exist & Prop. (sewer)					62.858				62.761				59.649		62.544					61.756		
Stations	1500.00	1490.00	1480.00	1470.00	1460.00	1450.00	1440.00	1430.00	1425.10	1420.00	1410.00	1400.00	1391.50	1390.00	1387.20	1380.00	1370.00	1360.00	1350.00	1340.00	1334.50	1330.00

Revisions:

No.	Date	Description	Drawn By	Appr'd By

Final Measurements:

Construction Type	Storm & San. Sewer Road Reconstr.	Inspector	Rick Lester Bill Cordo
Work Commenced	May 1991	Instrumentman	John France
Work Completed	Sept. 1991	Field Book #	5327 5328
Contractor	Brenning Constr. C.A.C.E. Constr.	Date	Sept 30 1991
Drafting Revisions	Doug Mc Ewan Sept. 1991	Checked By	Oct 1/91

Designed By	Date	Structural Check By	Date
Survey Detail By	Date	Checked By	Date
Drafting By	Date	Checked By	Date
Chief Design & Const. Eng.		Senior Const. Coord.	

PAUL E. SAUVE — LICENSED PROFESSIONAL ENGINEER — PROVINCE OF ONTARIO

Notes:

Utilities shown are taken from best available records. Contractor is requested to check with all utility companies before digging.

Soil information shown is not guaranteed and contractors are advised to collect additional soils information as deemed necessary.

Reference bench mark:

Proposed storm and sanitary sewers may be constructed in a common trench provided that a minimum horizontal distance of 460mm is maintained between outside barrels of pipe.

All pipes shall conform to the Canadian Standards Association(C.S.A.), A2572 reinforced concrete sewer pipe with approved rubber gaskets.

A minimum of 460 mm vertical clearance to be maintained between sewers and watermains where practical.

Borehole soil descriptions are not based on sieve analysis but on visual inspection only, except where otherwise noted.

Soil information taken from:

Date of television inspection:

This plan supercedes (in whole or in part) plan no:

Actual rock line recorded during construction of existing sewer.

Registered plan no.

Caution, while illustrations and utilities shown are taken from best available information, they cannot be guaranteed.

See additional notes on sheet # 1

When reduced, the scale of this drawing is approximately 1:400 horizontaly and 1:81 verticaly. Do not scale this plan.

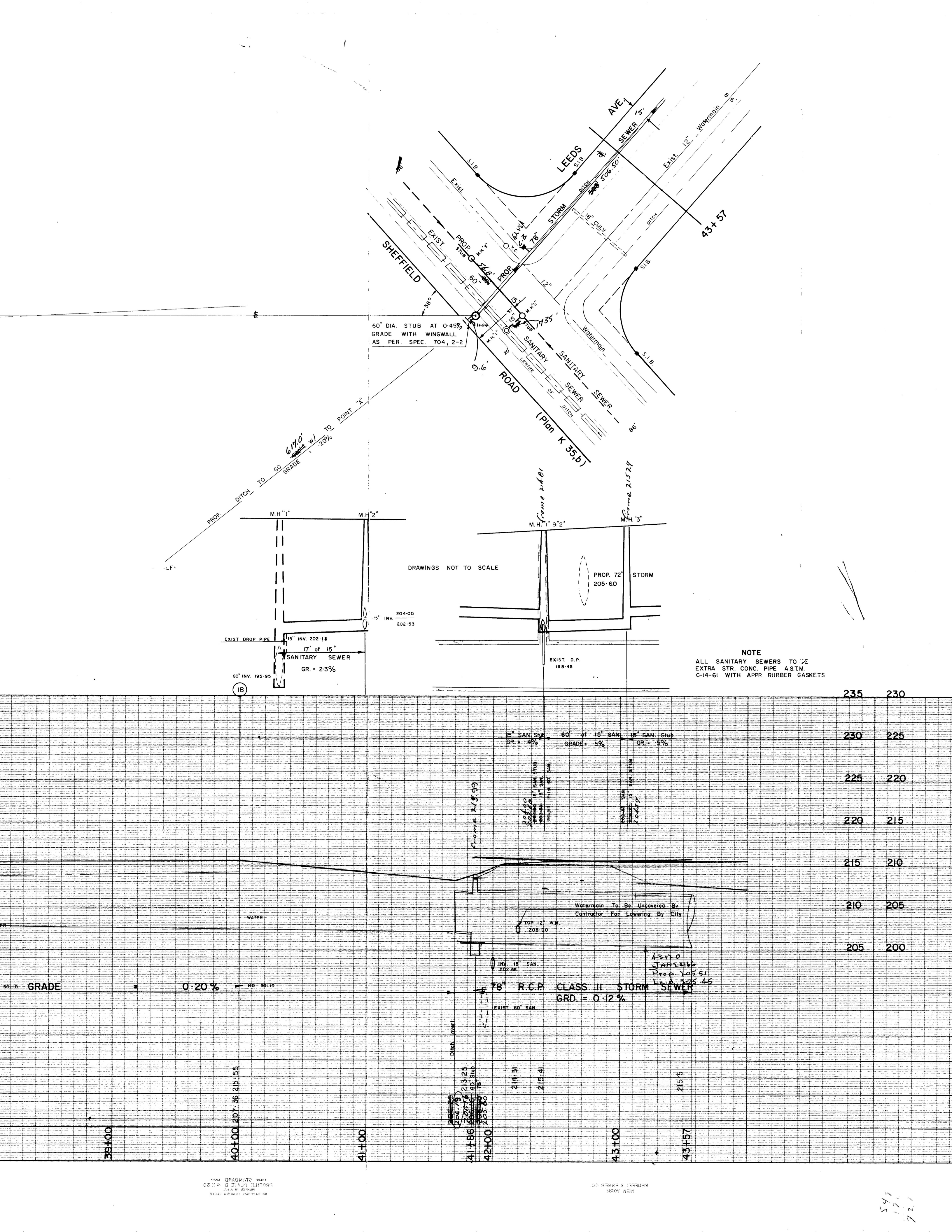
City of Ville d' Ottawa

Department Of Engineering And Works
Engineering Branch
Design And Construction Division
1600 SCOTT STREET · OTTAWA ONTARIO · K1Y 4N7

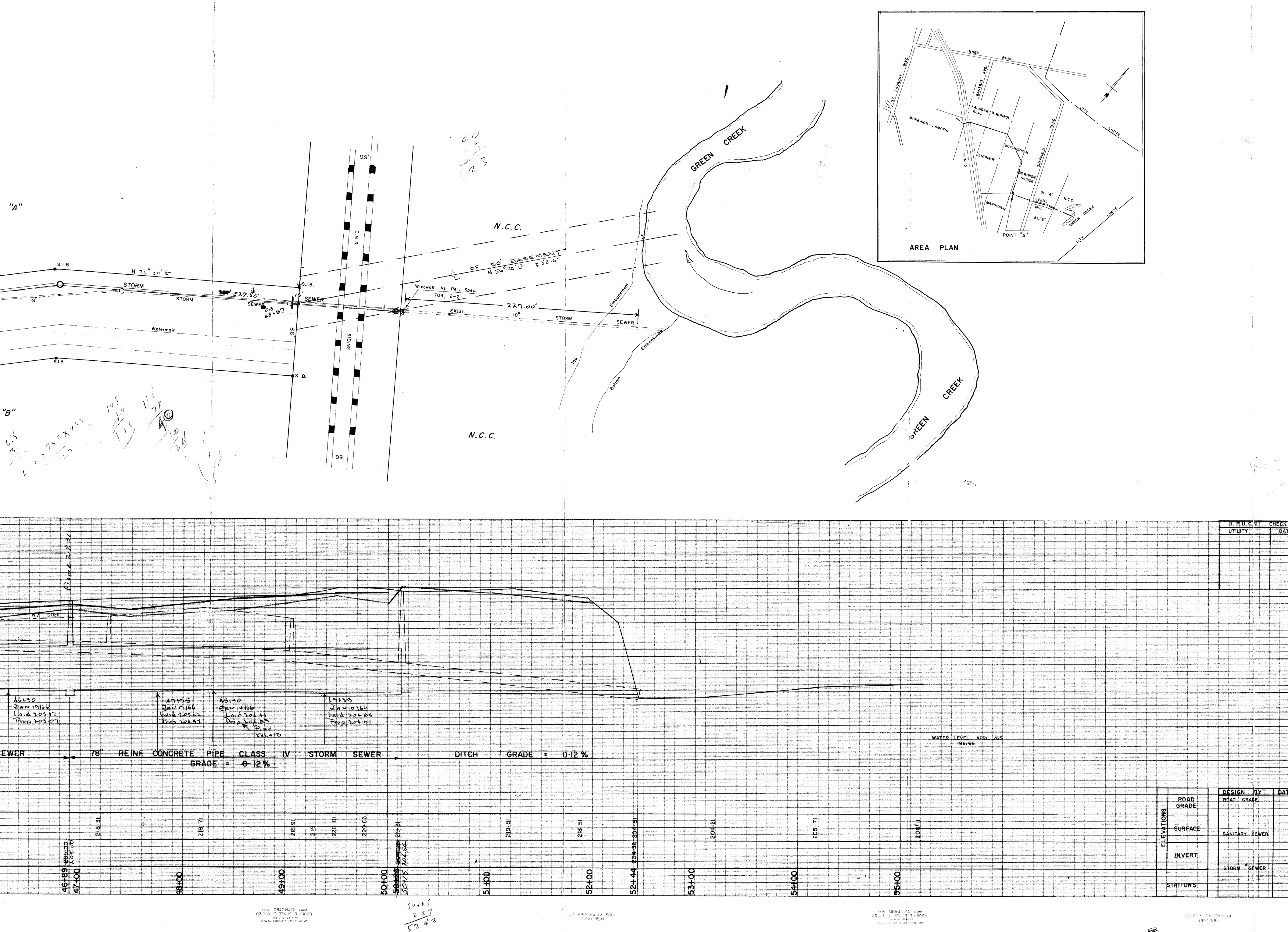
Commissioner	Branch Director
D. Curry P. Eng.	W.R. Cole P. Eng.

SHEFFIELD ROAD

Contract No.:	Survey Books:	Scales:	Plan No:
91-38	4706, 4761, 4869, 4879, 4886	HOR. 1:250 VERT. 1:50	2459 Sheet 4 of 6



LEEDS AVE.
SHEFFIELD ROAD
(Plan K 35,b)
STORM SEWER
PROP. 78"
PROP. 60"
EXIST.
SANITARY SEWER
SANITARY
CENTRE OF DITCH
Watermain
Exist. 12" Watermain
18" CULV.
DITCH
S.I.B.
43+57
60" DIA. STUB AT 0.45% GRADE WITH WINGWALL AS PER. SPEC. 704, 2-2
PROP. DITCH TO GO 617.0' W/ GRADE = .20% TO POINT "A"
DRAWINGS NOT TO SCALE
MH"1"
MH"2"
M.H."1" & "2"
M.H."3"
15" INV. 204.00 / 202.53
EXIST DROP PIPE
15" INV. 202.18
17' of 15" SANITARY SEWER
GR. = 2.3%
60" INV. 195.95
PROP. 72" 205.60
STORM
EXIST. D.P. 198.45
NOTE
ALL SANITARY SEWERS TO BE EXTRA STR. CONC. PIPE A.S.T.M. C-14-61 WITH APPR. RUBBER GASKETS
15" SAN. Stub GR. = .4%
60' of 15" SAN. GRADE = .5%
15" SAN. Stub GR. = .5%
Watermain To Be Uncovered By Contractor For Lowering By City
TOP 12" W.M. 208.00
WATER
INV. 15" SAN. 202.68
78" R.C.P. CLASS II STORM SEWER
GRD. = 0.12%
EXIST. 60" SAN.
GRADE 0.20%
Ditch Invert
235 230 225 220 215 210 205
230 225 220 215 210 205 200
39+00
40+00 207.36 215.55
41+00
41+86
42+00
43+00
43+57
KEUFFEL & ESSER CO. NEW YORK



"A"
"B"
S.I.B.
N 71° 20' E
STORM
STORM
18
SEWER
327.30'
Watermain
S.I.B.
15" SEWER
98
99'
C.N.R.
SIDING
N.C.C.
N.C.C.
℄ OF 50' EASEMENT
N 56° 30' E 352.6'
Wingwall As Per. Spec. 704, 2-2
EXIST.
227.00'
18"
STORM
SEWER
Top Embankment
Bottom Embankment
GREEN CREEK
GREEN CREEK
INNES ROAD
ST. LAURENT BLVD.
BANTREE AVE.
KALADAR
D. MONROE
MORRISON LAMOTHE
BETCHERMAN
C.N.R.
DOMINION BRIDGE
SHEFFIELD ROAD
BL. "A"
BL. "B"
LEEDS AVE.
N.C.C.
MARSHALL
POINT "A"
CITY LIMITS
AREA PLAN
N/ Ditch
46+30 JAN 19/66 Laid 205.12 Prop 205.07
47+75 JAN 17/66 Laid 205.02 Prop 204.97
48+30 JAN 14/66 Laid 204.61 Prop 204.83 Pipe Relaid
49+39 JAN 10/66 Laid 204.85 Prop 204.71
WATER LEVEL APRIL /65 198.68
SEWER
78" REINF. CONCRETE PIPE CLASS IV STORM SEWER
GRADE = 0.12%
DITCH GRADE = 0.12%
218.31
218.71
218.91
219.11
220.01
220.03
219.31
219.81
218.51
204.81
204.21
205.71
206.11
205.00
204.54
204.32
46+89
47+00
48+00
49+00
50+00
50+15
51+00
52+00
52+44
53+00
54+00
55+00
ROAD GRADE
ELEVATIONS
SURFACE
INVERT
STATIONS
U. P. U. C. N.
UTILITY
CHECK
DESIGN BY
DATE
ROAD GRADE
SANITARY SEWER
STORM SEWER
50+15
227
5242

Appendix E

Design Drawings

Domestic Water and Sanitary Load Calculation Chart

Project Name:	**DYT3**
Project Number:	**60634622**
Date:	**14-Sep-2022**

Number of floors	**1**
Basement (Yes/No)	**No**
Building type	**Office Building**

References
FUs: OBC 2012 Tables 7.4.9.3., 7.6.3.2.A, B, C and D
FUs to gpm for drains: OBC 2012 Tables 7.4.10.5 and A.7.4.10.5
Horizontal sanitary sizing: OBC 2012 7.4.10.8

DOMESTIC WATER & SANITARY LOAD CALCULATION CHART

FIXTURE	SUPPLY / OUTLET	No of FIXTURES PRIVATE	No of FIXTURES PUBLIC	TOTAL	SANITARY		PUBLIC USE					
							COLD		HOT		TOTAL	
					F.U.	TOTAL	F.U.	TOTAL	F.U.	TOTAL	F.U.	TOTAL
Bathroom group with 6 LPF flush tank (max 3 fixtures)	N/A			0	6	0	-	-	-	-	-	-
Bathtub, regular	1/2" H&CW / 1.5"			0	1.5	0	3	0	3	0	4	0
Bathtub with 3/4" spout	3/4" H&CW / 1.5"			0	1.5	0	7.5	0	7.5	0	10	0
Clothes washer, 3.5 kg	1/2" H&CW / 2"			0	1.5	0	2.25	0	2.25	0	3	0
Clothes washer, 6.8 kg	1/2" H&CW / 2"			0	2	0	3	0	3	0	4	0
Clothes washer, commercial	manufact.			0	3	0	0	0	0	0	0	0
Dishwasher, commercial	manufact./ 2"			0	3	0	0	0	0	0	0	0
Dishwasher, domestic	1/2" HW / 1.5"			0	1	0	-	-	-	-	-	-
Drinking fountain	**1/2" CW / 1.25"**		**14**	**14**	**2**	**28**	**0.25**	**3.5**	**-**	**-**	**0.25**	**3.5**
Floor drain	**- / 3"**		**16**	**16**	**3**	**48**	**-**	**-**	**-**	**-**	**-**	**-**
Hose bib	**1/2" CW / -**		**4**	**4**	**-**	**-**	**2.5**	**10**	**-**	**-**	**2.5**	**10**
Hose bib	3/4" CW / -			0	-	-	6	0	-	-	6	0
Hose bib, combination	1/2" H&CW / -			0	-	-	1.9	0	1.9	0	2.5	0
Lavatory, 8.3 L/min or less	**1/2" H&CW / 1.25"**		**13**	**13**	**1**	**13**	**1.5**	**19.5**	**1.5**	**19.5**	**2**	**26**
Shower head, 9.5 L/min or less	1/2" H&CW / 1.5"			0	1.5	0	3	0	3	0	4	0
Shower, multi-head, FU per head	manufact. / 2"			0	3	0	3	0	3	0	4	0
Sink, bar	1/2" H&CW / 1.5"			0	1.5	0	1.5	0	1.5	0	2	0
Sink, kitchen, commercial, per faucet	**1/2" H&CW / 2"**		**1**	**1**	**2**	**2**	**3**	**3**	**3**	**3**	**4**	**4**
Sink, kitchen, domestic, 8.3 L/min or less	**1/2" H&CW / 1.5"**		**2**	**2**	**1.5**	**3**	**1**	**2**	**1**	**2**	**1.4**	**2.8**
Sink, laundry	1/2" H&CW / 1.5"			0	1.5	0	1	0	1	0	1.4	0
Sink, mop (janitor's)	**1/2" H&CW / 3"**		**2**	**2**	**3**	**6**	**2.25**	**4.5**	**2.25**	**4.5**	**3**	**6**
Urinal, flush valve	**3/4" CW / 2"**		**3**	**3**	**4**	**12**	**N/A**	**45**	**-**	**-**	**N/A**	**45**
Urinal, flush tank	1/2" CW / 1.5"			0	1.5	0	3	0	-	-	3	0
WC, 6 LPF or less, tank	1/2" CW / 3"			0	4	0	2.2	0	-	-	2.2	0
WC, flush valve	**1" CW / 3"**		**12**	**12**	**6**	**72**	**N/A**	**185**	**-**	**-**	**N/A**	**185**
Penal Fixture	1" CW / 3"			0	6	0	N/A	0	-	-	N/A	0
Reserve for MHE-Sanitary only			1	1	5	5		0		0		0
Reserve for Landscape and MHE-Plumbing only			1	1		0	75	75	10	10	85	85
			69	69	**Total =**	**189**	Total =	**347.5**	**Total =**	**39**	**Total =**	**367.3**

SANITARY								
Plumbing System Sanitary Load	=	189 FUs	=	69 gpm	**Main Drain Size**	=	**6"**	per OBC
Other Sanitary Load (pool drain, cooling tower, sump pit)			=	gpm				
Building Sanitary Load	=	**189 FUs**	=	**69 gpm**	**Building Sewer Size**	=	**6"**	per OBC

DOMESTIC COLD AND HOT WATER								
Total Cold Water	=	348 FUs	=	119.08 gpm	**Dom. Cold Water Pipe**	=	**3"**	per OBC
Total Hot Water	=	39 FUs	=	40.8 gpm	**Dom. Hot Water Pipe**	=	**2"**	per OBC
System Domestic Water	=	**367 FUs**	=	**121.94 gpm**	**Main Cold Water Pipe**	=	**3"**	per OBC

City of Ottawa Water Demands

AECOM

Project:	2625 Sheffield Road-DYT3-Ottawa
Project No.:	60648725
Designed By:	German Verbel
Checked By:	
Date:	9/27/2022
Site Area (ha):	7.06

Average Daily Demand

Demand Type	Amount	Units
Residential	350	L/c/d
Industrial - Light	35,000	L/gross ha/d
Industrial - Heavy	55,000	L/gross ha/d
Commercial and Institutional		
Shopping Centres	2500	L/(1000m2/d)
Hospitals	900	L/(bed/day)
Schools	70	L/(Student/d)
Trailer Parks no Hook-Ups	340	L/(space/d)
Trailer Parks with Hook-Ups	800	L/(space/d)
Campgrounds	225	L/(campsite/d)
Mobile Home Parks	1000	L/(Space/d)
Motels	150	L/(bed-space/d)
Hotels	225	L/(bed-space/d)
Tourist Commercial	28,000	L/gross ha/d
Other Commercial	28,000	L/gross ha/d
Average Daily Demand	2.86	L/s

Maximum Daily Demand

Residential	2.5 x avg. day	L/c/d
Industrial	1.5 x avg. day	L/gross ha/d
Commercial	1.5 x avg. day	L/gross ha/d
Institutional	1.5 x avg. day	L/gross ha/d
Maximum Daily Demand	4.29	L/s

Maximum Hour Demand

Residential	2.2 x max. day	L/c/d
Industrial	1.8 x max. day	L/gross ha/d
Commercial	1.8 x max. day	L/gross ha/d
Institutional	1.8 x max. day	L/gross ha/d
Maximum Daily Demand	7.72	L/s

Ottawa Design Guidelines - Water Distribution First Edition, July 2010 - WDG001
Technical Bulletin ISD-2010-2

Fire Flow Calculations

1999 Fire Underwriters Survey (FUS) Method

AECOM

Project: DYT3 2625 Sheffield Road Ottawa, Ontario | Calculated by: GV | Checked by: KS
Project #: 60648725 | Date: 23-Sep-22 | Date: 23-Sep-22

Building A

Fire Flow Formula $F = 220 \cdot C \cdot \sqrt{A}$

A) C = Structure Coefficient — **C =** 0.8

1.5	Wood Frame Construction - Essentially all combustible (Max Value of C)
1.0	Ordinary Construction - Brick/Masonry Walls, Combustible Floor & Interior
0.8	Non-Combustible - Unprotected metal structural, masonry, or metal walls
0.6	Fire Resistive Construction - Fully protected frame, floors, roof (Min Value of C)

B) A = Floor Area — **A =** 24460.00 **m²**

C) # Floors (excl. basement) — 1

Includes all storeys, but exclude basements >50% below grade.

For fire-resistive buildings with unprotected vertical openings: add two largest adjoining floors plus 50% of any floors immediately above/below them up to to 8

For fire-resistive buildings with protected vertical openings (1hr rating): add largest floors plus 25% of each adjoining floor area

D)

F = 27526 **(L/min)**
Rounded = **28000** **(L/min)**

Occupancy Reduction/Surcharge

E) Type of occupancy/contents

- ○ Non-Combustible
- ○ Limited Combustible
- ○ Combustible
- ◉ Free Burning
- ○ Rapid Burning

Fire hazard adjustment = 15%
Adjustment = **4200** **(L/min)**
F_{adj} = **32200** **(L/min)**

Generally Low-Hazard Occupancy is Non-/Limited Combustible (National Building Group A, B, C, D)
Generally High-Hazard Occupancy is Free/Rapid Burning (National Building Group F, Division 1 & 2)

F) Sprinkler System Reduction

Revised F may be reduced up to:

- 50% for a complete automatic sprinkler system (incl. water flow/control valve alarm system)
- 30% for a sprinkler system conforming to NFPA Code 13
- Add'l credit up to 10% can be applied if water supply is standard for both the sprinkler system and fire dept hose lines

Reduction = 50.00%
Reduction = **-16100** **(L/min)**

G) Exposure Surcharge

Sum of all exposures must be less than 75%

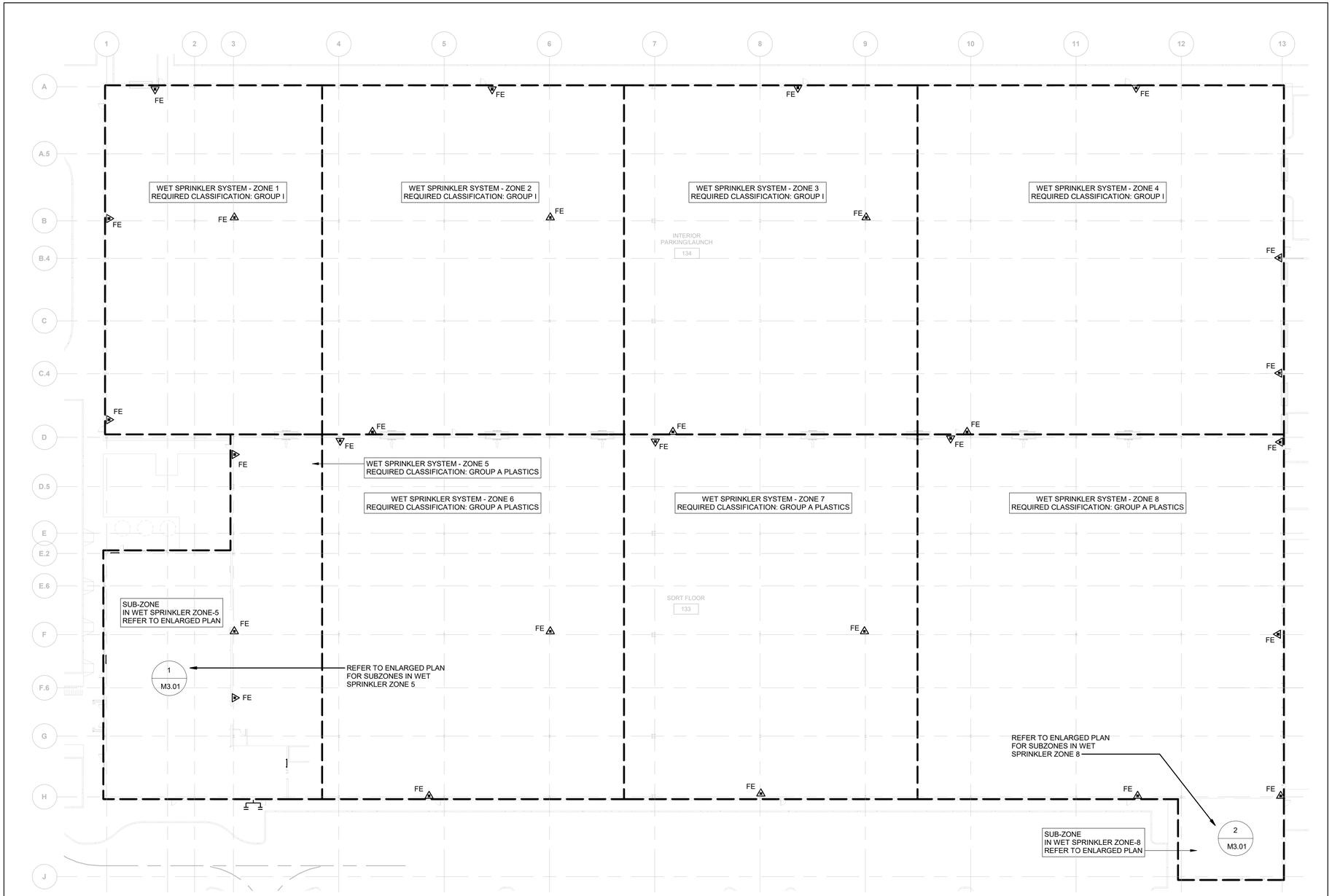
If building face is unpierced party wall (min. 2hr rating), choose "Fire Wall"

	Distance to nearest building (m)	% addition
North	>45m	0%
East	>45m	0%
South	>45m	0%
West	>45m	0%
Surcharge %		0%
Surcharge Add'n		**0** **(L/min)**

H) Total Fire Flow

Minimum 2000L/min; Max 40 000L/min (rounded to nearest 1000L/min)

= 16000 L/min
= **267** **L/sec**



1 / M3.00 GROUND FLOOR - FIRE PROTECTION

1 : 350

SPRINKLER HAZARD CLASSIFICATIONS				
OCCUPANCY		**MAX PROTECTION AREA**	**DESIGN DENSITY**	**MINIMUM PRESSURE REQUIREMENT**
LIGHT HAZARD		20 m²	4.1 mm/min	15 PSI
ORDINARY HAZARD GROUP 1		12 m²	6.1 mm/min	20 PSI
ORDINARY HAZARD GROUP 2		12 m²	8.1 mm/min	20 PSI
OCCUPANCY	**K FACTOR**	**MAX PROTECTION AREA**	**NO. OF SPRINKLERS IN DESIGN AREA**	**MINIMUM PRESSURE REQUIREMENT**
GROUP A PLASTICS	25.2	9 m²	12	25 PSI

WEIGHT OF FULL SPRINKLER MAINS		
SIZE OF SPRINKLER MAIN	**WEIGHT**	
	kg/m	lbs/ft.
150 mm (6 in.)	35	23
200 mm (8 in.)	60	40
250 mm (10 in.)	83	56

GENERAL FIRE PROTECTION SYSTEM NOTES:

1. FIRE PROTECTION CONTRACTOR SHALL PROVIDE DRAWINGS AND HYDRAULIC CALCULATIONS SIGNED AND SEALED BY A PROFESSIONAL ENGINEER.
2. THE SPRINKLER LAYOUTS SHALL INCLUDE ALL PIPING AND SPRINKERS NECESSARY TO SUIT THE ARCHITECTURAL CEILING PLANS. PROPOSED LAYOUTS SHALL BE PROVIDED AS SHOP DRAWINGS FOR REVIEW PRIOR TO INSTALLATION.
3. INSTALL AUTOMATIC SPRINKLERS BELOW OBSTRUCTIONS 600 mm WIDE AND LARGER SUCH AS DUCTS, DECKS, OPEN GRATE FLOORING, CUTTING TABLES, AND OVERHEAD DOORS IN ACCORDANCE WITH NFPA 13. REFER TO STANDARD DETAILS FOR MORE OBSTRUCTION REQUIREMENTS AND CLEARANCES OF ESFR SPRINKLERS. COORDINATE WITH ALL OTHER TRADES PRIOR TO SYSTEM INSTALLATION.
4. OFFSET SPRINKLER PIPING AWAY FROM VERTICAL OBSTRUCTIONS SUCH AS VERTICAL DUCTWORK AND COLUMNS IN ACCORDANCE WITH NFPA 13. SPRINKLERS SHOULD BE KEPT 30mm AWAY FROM VERTICA OBSTRUCTIONS UP TO 300 mm WIDE, 600 mm AWAY FROM VERTICAL OBSTRUCTIONS 300 mm TO 600 mm WIDE, AND ON EITHER SIDE OF THE OBSTRUCTION OR VERTICAL OBSTRUCTIONS LARGER THAN 600 mm WIDE.
5. INSTALL AUTOMATIC SPRINKLERS TO ACCOMODATE HVLS FANS IN ACCORDANCE WITH NFPA 13.
6. FIRE PROTECTION CONTRACTOR TO PROVIDE VENTS AND DRAINAGE CONNECTION FOR COMMISSIONING AND SERVICING OF THE SYSTEM.
7. PROVIDE HIGH TEMPERATURE HEADS WITH GUARDS IN ALL ELECTRICAL, COMMUNICATIONS AND SPRINKLER ROOMS.
8. FLOW INDICATION AND PRESSURE SWITCHES ARE SHOWN ON SCHEMATICS FOR CLARITY AND ARE CONSIDERED PART OF A COMPLETE LISTED ALARM CHECK VALVE ASSEMBLY.
9. ELEVATED PLATFORMS AND CONVEYERS WIDER THAN 1.2 m (48 in.) SHALL BE PROVIDED WITH SPRINKLER PROTECTION UNDERNEATH. SPRINKLER SHALL BE UPRIGHT OR PENDENT K11.2 QUICK- RESPONSE SPRINKLERS LISTED FOR STORAGE APPLICATIONS. SYSTEMS SHALL BE DESIGNED TO PROTECT EXTRA HAZARD GROUP 2 AND ALL CRITERIA SHALL BE VALIDATED BY THE AUTHORITY HAVING JURISDICTION.
10. SPRINKLERS SHALL NOT BE REQUIRED BELOW CONVERYORS THAT ARE 1.2 m (4 ft.) WIDE OR LESS, ARE OVER PERSONNEL WALKWAYS, WOULD NOT ALLOW FOR COMBUSTIBLE STORAGE UNDERNEATH, AND/OR ARE FLOOR MOUNTED UP TO A HEIGHT OF 900 mm (3 ft.), UNLESS REQUESTED BY THE AUTHORITY HAVING JURISDICTION.
11. WHERE SPRINKLERS ARE REQUIRED UNDERNEATH CONVEYORS AND/OR CONVEYOR EQUIPMENT PLATFORMS, PROVIDE HEAD GUARDS FOR THOSE SPRINKLERS.
12. AT THE COMPLETION OF THE PROJECT, FIRE PROTECTION CONTRACTOR SHALL ISSUE A LETTER SIGNED AND SEALED BY A PROFESSIONAL ENGINEER CONFIRMING THE INSTALLATION COMPLIES WITH NFPA 13.
13. REFER TO ARCHITECTURAL DRAWINGS FOR REFLECTED CEILING PLANS.

AECOM

PROJECT

DYT3 GEN 3.1 BTS, OTTAWA, ONTARIO
2625 SHEFFIELD ROAD

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CONSULTANT

AECOM Canada Architects Ltd.
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www.aecom.com

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REGISTRATION

ISSUE/REVISION

I/R	DATE	DESCRIPTION

NOT FOR CONSTRUCTION

PROJECT NUMBER

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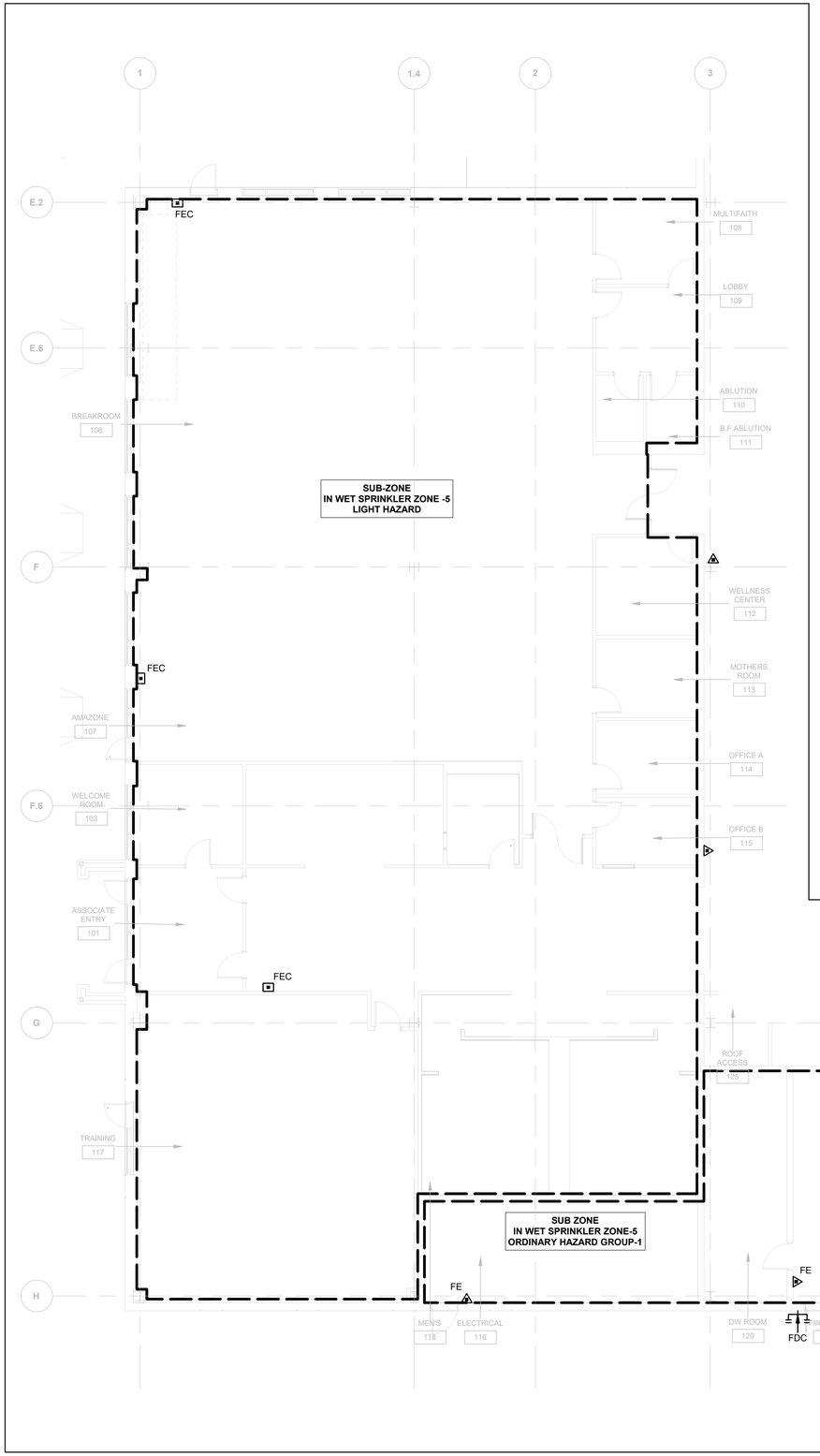
SHEET TITLE

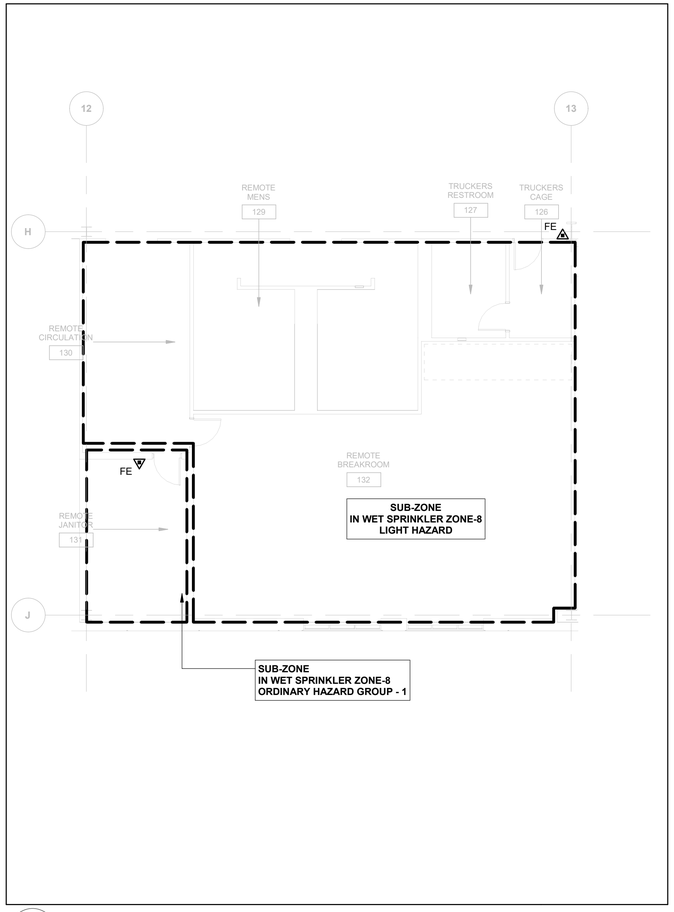
OVERALL FLOOR PLAN - FIRE PROTECTION

SHEET NUMBER

M3.00



1 M3.01 ENLARGED PLAN - OFFICE BLOCK - FIRE PROTECTION
1 : 100



2 M3.01 ENLARGED PLAN -REMOTE AREA -FIRE PROTECTION
1 : 100

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2. THE SPRINKLER LAYOUTS SHALL INCLUDE ALL PIPING AND SPRINKERS NECESSARY TO SUIT THE ARCHITECTURAL CEILING PLANS. PROPOSED LAYOUTS SHALL BE PROVIDED AS SHOP DRAWINGS FOR REVIEW PRIOR TO INSTALLATION.
3. INSTALL AUTOMATIC SPRINKLERS BELOW OBSTRUCTIONS 600 mm WIDE AND LARGER SUCH AS DUCTS, DECKS, OPEN GRATE FLOORING, CUTTING TABLES, AND OVERHEAD DOORS IN ACCORDANCE WITH NFPA 13. REFER TO STANDARD DETAILS FOR MORE OBSTRUCTION REQUIREMENTS AND CLEARANCES OF ESFR SPRINKLERS. COORDINATE WITH ALL OTHER TRADES PRIOR TO SYSTEM INSTALLATION.
4. OFFSET SPRINKLER PIPING AWAY FROM VERTICAL OBSTRUCTIONS SUCH AS VERTICAL DUCTWORK AND COLUMNS IN ACCORDANCE WITH NFPA 13. SPRINKLERS SHOULD BE KEPT 30mm AWAY FROM VERTICA OBSTRUCTIONS UP TO 300 mm WIDE, 600mm AWAY FROM VERTICAL OBSTRUCTIONS 300 mm TO 600 mm WIDE, AND ON EITHER SIDE OF THE OBSTRUCTION OR VERTICAL OBSTRUCTIONS LARGER THAN 600 mm WIDE.
5. INSTALL AUTOMATIC SPRINKLERS TO ACCOMODATE HVLS FANS IN ACCORDANCE WITH NFPA 13.
6. FIRE PROTECTION CONTRACTOR TO PROVIDE VENTS AND DRAINAGE CONNECTION FOR COMMISSIONING AND SERVICING OF THE SYSTEM.
7. PROVIDE HIGH TEMPERATURE HEADS WITH GUARDS IN ALL ELECTRICAL, COMMUNICATIONS AND SPRINKLER ROOMS.
8. FLOW INDICATION AND PRESSURE SWITCHES ARE SHOWN ON SCHEMATICS FOR CLARITY AND ARE CONSIDERED PART OF A COMPLETE LISTED ALARM CHECK VALVE ASSEMBLY.
9. ELEVATED PLATFORMS AND CONVEYERS WIDER THAN 1.2 m (48 in.) SHALL BE PROVIDED WITH SPRINKLER PROTECTION UNDERNEATH. SPRINKLER SHALL BE UPRIGHT OR PENDENT K11.2 QUICK-RESPONSE SPRINKLERS LISTED FOR STORAGE APPLICATIONS. SYSTEMS SHALL BE DESIGNED TO PROTECT EXTRA HAZARD GROUP 2 AND ALL CRITERIA SHALL BE VALIDATED BY THE AUTHORITY HAVING JURISDICTION.
10. SPRINKLERS SHALL NOT BE REQUIRED BELOW CONVEYORS THAT ARE 1.2 m (4 ft.) WIDE OR LESS, ARE OVER PERSONNEL WALKWAYS, WOULD NOT ALLOW FOR COMBUSTIBLE STORAGE UNDERNEATH, AND/OR ARE FLOOR MOUNTED UP TO A HEIGHT OF 900 mm (3 ft.), UNLESS REQUESTED BY THE AUTHORITY HAVING JURISDICTION.
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12. AT THE COMPLETION OF THE PROJECT, FIRE PROTECTION CONTRACTOR SHALL ISSUE A LETTER SIGNED AND SEALED BY A PROFESSIONAL ENGINEER CONFIRMING THE INSTALLATION COMPLIES WITH NFPA 13.
13. REFER TO ARCHITECTURAL DRAWINGS FOR REFLECTED CEILING PLANS.

SPRINKLER HAZARD CLASSIFICATIONS				
OCCUPANCY		**MAX PROTECTION AREA**	**DESIGN DENSITY**	**MINIMUM PRESSURE REQUIREMENT**
LIGHT HAZARD		20 m²	4.1 mm/min	15 PSI
ORDINARY HAZARD GROUP 1		12 m²	6.1 mm/min	20 PSI
ORDINARY HAZARD GROUP 2		12 m²	8.1 mm/min	20 PSI
OCCUPANCY	**K FACTOR**	**MAX PROTECTION AREA**	**NO. OF SPRINKLERS IN DESIGN AREA**	**MINIMUM PRESSURE REQUIREMENT**
GROUP A PLASTICS	25.2	9 m²	12	25 PSI

WEIGHT OF FULL SPRINKLER MAINS		
SIZE OF SPRINKLER MAIN	**WEIGHT**	
	kg/m	lbs/ft.
150 mm (6 in.)	35	23
200 mm (8 in.)	60	40
250 mm (10 in.)	83	56

NOT FOR CONSTRUCTION

AECOM

PROJECT

DYT3 GEN 3.1 BTS, OTTAWA, ONTARIO 2625 SHEFFIELD ROAD

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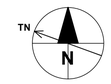


REGISTRATION

ISSUE/REVISION

I/R	DATE	DESCRIPTION

PROJECT NUMBER

00000000

SHEET TITLE

ENLARGED FLOOR PLAN - FIRE PROTECTION

SHEET NUMBER

M3.01

Appendix F

Supporting Engineering Documentation and Calculations – Infiltration Basin Calculations

Infiltraiton Basin Sizing - DYT3

Site Conditions		
Rainfall Amount	10	mm
	0.01	m
Site Areas		
Total Building Area	2	ha
	24800	m^2
Area 101 Footprint Area	1.36	ha
	13600	m^2
Area 102 Footprint Area	1.12	ha
	11200	m^2
Runoff Coefficient		
Impervious Area	0.9	

Area 101		
Required Clear Stone Bedding Infiltration Basin Sizing Calculation		
Volume (Total - Building Area)	**122.40**	**m^3**
Stone Void Ratio	0.4	
Depth	0.75	m
Length	66.72	m
Width	6.12	m
Proposed Clear Stone Bedding Infiltration Basin Sizing Calculation		
Volume (Total - Building Area)	**132.00**	**m^3**
Stone Void Ratio	0.4	
Depth	0.75	m
Length	110.00	m
Width	4.00	m
Infiltration Basin Bottom Area (Equation 4.3, MECP 2003)		
Runoff Volume	132.00	m^3
Percolation Rate	42	mm/hr
Factor of Safety	2.5	
Porosity	0.4	
Retention Time	48	hr
Bottom Area	**409.23**	**m^2**
Proposed Bottom Area	**440.00**	**m^2**
Maximum Allowable Basin Depth (Equation 4.2, MECP, 2003)		
Percolation Rate	42	mm/hr
Factor of Safety	2.5	
Retention Time	48	hr
Maximum Allowable Depth	**0.81**	**m**
Proposed Depth	**0.75**	**m**

Area 102		
Required Clear Stone Bedding Infiltration Basin Sizing Calculation		
Volume (Total - Building Area)	**100.80**	**m^3**
Stone Void Ratio	0.4	
Depth	0.75	m
Length	165.00	m
Width	2.04	m
Proposed Clear Stone Bedding Infiltration Basin Sizing Calculation		
Volume (Total - Building Area)	**108.00**	**m^3**
Stone Void Ratio	0.4	
Depth	0.75	m
Length	90.00	m
Width	4.00	m
Infiltration Basin Bottom Area (Equation 4.3, MECP 2003)		
Runoff Volume	108.00	m^3
Percolation Rate	42	mm/hr
Factor of Safety	2.5	
Porosity	0.4	
Retention Time	48	hr
Bottom Area	**334.82**	**m^2**
Proposed Bottom Area	**360.00**	**m^2**
Maximum Allowable Basin Depth (Equation 4.2, MECP, 2003)		
Percolation Rate	42	mm/hr
Factor of Safety	2.5	
Retention Time	48	hr
Maximum Allowable Depth	**0.81**	**m**
Proposed Depth	**0.75**	**m**

AECOM

Appendix G

Supporting Engineering Documentation and Calculations – Oil/Grit Separator and Storm Sewer

ADS Treatment Train Sizing

Project Name:	DYT3 - North
Consulting Engineer:	AECOM
Location:	Ottawa, ON
Sizing Completed By:	C. Neath
Email:	cody.neath@adspipe.com

Summary of Results	
Isolator Row PLUS TSS Removal:	80.6%
FD-4HC TSS Removal:	34.0%
Combined TSS Removal:	**87.0%**
Total Volume Treated:	**99.4%**

Site Details	
Site Area (ha):	2.33
Rational C:	0.9
Particle Size Distribution:	ETV
Rainfall Station:	Ottawa, ONT

Notes: OGS results based on ETV PSD and results from ETV testing protocols.

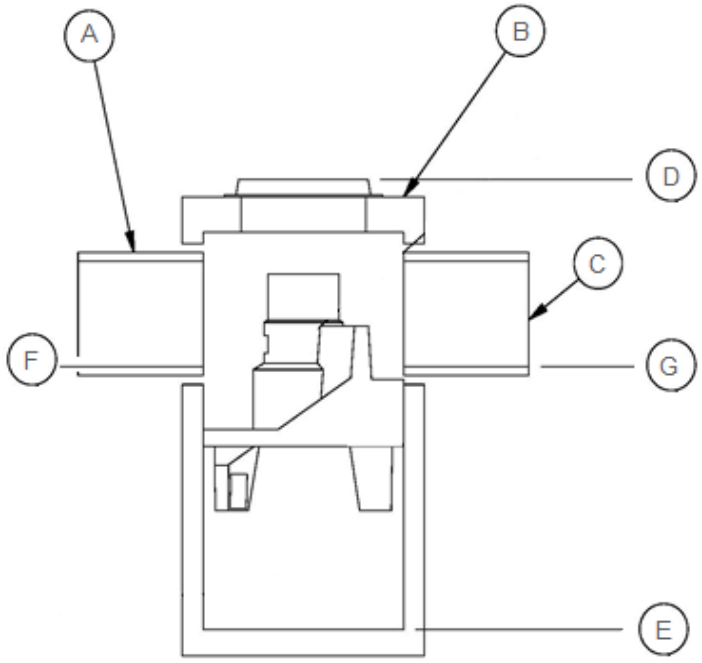
Individual OGS Results		
Model	**TSS Removal**	**Volume Treated**
FD-4HC	34.0%	>90%
FD-5HC	37.0%	>90%
FD-6HC	39.0%	>90%
FD-8HC	42.0%	>90%
FD-10HC	44.0%	>90%

Stormtech Details	
Chamber Model:	MC-3500
No. Chambers in Isolator Row PLUS:	19
Volume Treated by Isolator Row PLUS:	99.2%

Notes: Refer to Stormtech drawings for full IR+ configuration.

Isolator Row PLUS must include Flared End Ramp (FLAMP) for proper performance.

Overall System Capacities	
Total Sediment Storage Capacity:	6.88 m³
Oil Storage Capacity:	723 L
Max. OGS Pipe Diameter:	600 mm
Peak OGS Flow Capacity:	510 L/s
Peak Stormtech Inlet Flow Capacity:	311 L/s
Peak IR PLUS Water Quality Flow:	211.1 L/s



OGS Specifications	
Inlet Pipe Diameter (A):	375 mm
Unit Diameter (B):	1,200 mm
Outlet Pipe Diameter (C):	375 mm
Rim Elevation (D):	66.74 m
Bottom of Sump Elevation (E):	61.97 m
Inlet Pipe Elevation (F):	63.53 m
Outlet Pipe Elevation (G):	63.47 m

Notes:

Isolator Row PLUS removal efficiency based on verified ETV test report. For dimensions and configuration of Isolator Row PLUS, please see Stormtech drawing package.

Project Name: DYT3 - North
Consulting Engineer: AECOM
Location: Ottawa, ON

Net Annual Removal Efficiency Summary

Rainfall Intensity	Fraction of Rainfall	Removal Efficiency		Combined Removal Efficiency	Combined Weighted Removal Efficiency
		FD-4HC	IR PLUS[(2)]		
mm/hr	%	%	%	%	%
0.50	0.1%	55.1%	81.2%	91.6%	0.1%
1.00	14.1%	50.1%	81.2%	90.6%	12.8%
1.50	14.2%	47.2%	81.2%	90.1%	12.8%
2.00	14.1%	45.2%	81.2%	89.7%	12.7%
2.50	4.2%	43.5%	81.2%	89.4%	3.7%
3.00	1.5%	42.2%	81.2%	89.1%	1.3%
3.50	8.5%	41.1%	81.2%	88.9%	7.6%
4.00	5.4%	40.2%	81.2%	88.8%	4.8%
4.50	1.2%	39.3%	81.2%	88.6%	1.0%
5.00	5.5%	38.6%	81.2%	88.4%	4.9%
6.00	4.3%	37.2%	81.2%	88.2%	3.8%
7.00	4.5%	36.1%	81.2%	88.0%	4.0%
8.00	3.1%	0.0%	81.2%	81.2%	2.5%
9.00	2.3%	0.0%	81.2%	81.2%	1.9%
10.00	2.6%	0.0%	81.2%	81.2%	2.1%
20.00	9.2%	0.0%	81.2%	81.2%	7.5%
30.00	2.6%	0.0%	81.2%	81.2%	2.1%
40.00	1.2%	0.0%	73.6%	73.6%	0.9%
50.00	0.5%	0.0%	58.9%	58.9%	0.3%
100.00	0.7%	0.0%	29.4%	29.4%	0.2%
150.00	0.1%	0.0%	19.6%	19.6%	0.0%
200.00	0.0%	0.0%	14.7%	14.7%	0.0%
		Total Net Annual Removal Efficiency			**87.0%**
		Total Runoff Volume Treated			**99.4%**

Notes:

(1) Rainfall Data: 1960:2007, HLY03, Ottawa, ONT, 6105976 & 6105978.

(2) IR PLUS removal based on ETV PSD and ETV protocols.

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

(4) Combined removal efficiencies calculated based on NCDENR Stormwater BMP Manual, Section 3.9.4, where Total Removal Efficiency = 1st BMP Efficiency + 2nd BMP Efficiency - (1st BMP Efficiency x 2nd BMP Efficiency)

ADS Treatment Train Sizing

Project Name: DYT3 - South

Consulting Engineer: AECOM

Location: Ottawa, ON

Sizing Completed By: C. Neath **Email:** cody.neath@adspipe.com

Summary of Results	
Isolator Row PLUS TSS Removal:	76.7%
FD-4HC TSS Removal:	26.0%
Combined TSS Removal:	**81.5%**
Total Volume Treated:	**95.6%**

Site Details	
Site Area (ha):	4.21
Rational C:	0.9
Particle Size Distribution:	ETV
Rainfall Station:	Ottawa, ONT

Notes: OGS results based on ETV PSD and results from ETV testing protocols.

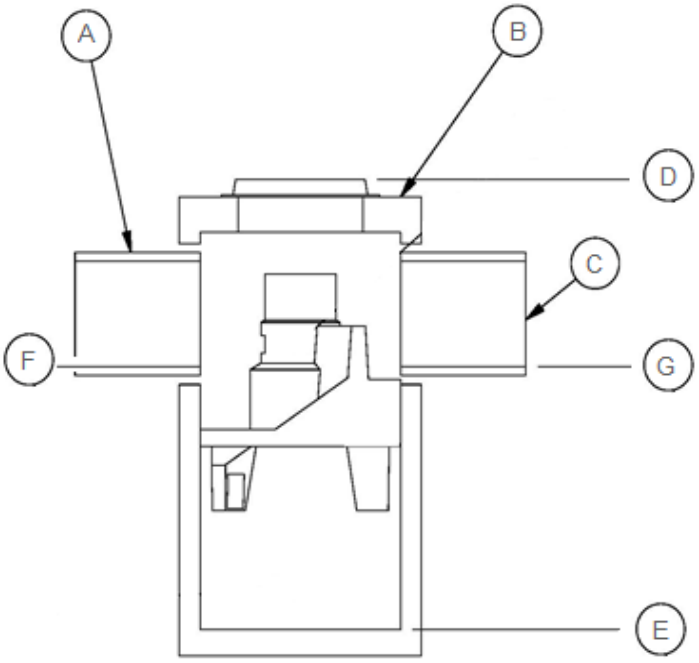
Individual OGS Results		
Model	**TSS Removal**	**Volume Treated**
FD-4HC	26.0%	>90%
FD-5HC	28.0%	>90%
FD-6HC	29.0%	>90%
FD-8HC	32.0%	>90%
FD-10HC	34.0%	>90%

Stormtech Details	
Chamber Model:	MC-3500
No. Chambers in Isolator Row PLUS:	14
Volume Treated by Isolator Row PLUS:	94.5%

Notes: Refer to Stormtech drawings for full IR+ configuration.

Isolator Row PLUS must include Flared End Ramp (FLAMP) for proper performance.

Overall System Capacities	
Total Sediment Storage Capacity:	5.28 m³
Oil Storage Capacity:	723 L
Max. OGS Pipe Diameter:	600 mm
Peak OGS Flow Capacity:	510 L/s
Peak Stormtech Inlet Flow Capacity:	311 L/s
Peak IR PLUS Water Quality Flow:	155.5 L/s



OGS Specifications	
Inlet Pipe Diameter (A):	375 mm
Unit Diameter (B):	1,200 mm
Outlet Pipe Diameter (C):	375 mm
Rim Elevation (D):	66.64 m
Bottom of Sump Elevation (E):	61.56 m
Inlet Pipe Elevation (F):	63.12 m
Outlet Pipe Elevation (G):	63.06 m

Notes:

Isolator Row PLUS removal efficiency based on verified ETV test report. For dimensions and configuration of Isolator Row PLUS, please see Stormtech drawing package.

Project Name: DYT3 - South
Consulting Engineer: AECOM
Location: Ottawa, ON

Net Annual Removal Efficiency Summary

Rainfall Intensity	Fraction of Rainfall	Removal Efficiency		Combined Removal Efficiency	Combined Weighted Removal Efficiency
		FD-4HC	IR PLUS(2)		
mm/hr	%	%	%	%	%
0.50	0.1%	50.9%	81.2%	90.8%	0.1%
1.00	14.1%	45.9%	81.2%	89.8%	12.7%
1.50	14.2%	43.0%	81.2%	89.3%	12.7%
2.00	14.1%	40.9%	81.2%	88.9%	12.6%
2.50	4.2%	39.3%	81.2%	88.6%	3.7%
3.00	1.5%	38.0%	81.2%	88.3%	1.3%
3.50	8.5%	36.9%	81.2%	88.1%	7.5%
4.00	5.4%	35.9%	81.2%	88.0%	4.8%
4.50	1.2%	0.0%	81.2%	81.2%	0.9%
5.00	5.5%	0.0%	81.2%	81.2%	4.5%
6.00	4.3%	0.0%	81.2%	81.2%	3.5%
7.00	4.5%	0.0%	81.2%	81.2%	3.7%
8.00	3.1%	0.0%	81.2%	81.2%	2.5%
9.00	2.3%	0.0%	81.2%	81.2%	1.9%
10.00	2.6%	0.0%	81.2%	81.2%	2.1%
20.00	9.2%	0.0%	60.0%	60.0%	5.5%
30.00	2.6%	0.0%	40.0%	40.0%	1.0%
40.00	1.2%	0.0%	30.0%	30.0%	0.3%
50.00	0.5%	0.0%	24.0%	24.0%	0.1%
100.00	0.7%	0.0%	12.0%	12.0%	0.1%
150.00	0.1%	0.0%	8.0%	8.0%	0.0%
200.00	0.0%	0.0%	6.0%	6.0%	0.0%
		Total Net Annual Removal Efficiency			**81.5%**
		Total Runoff Volume Treated			**95.6%**

Notes:

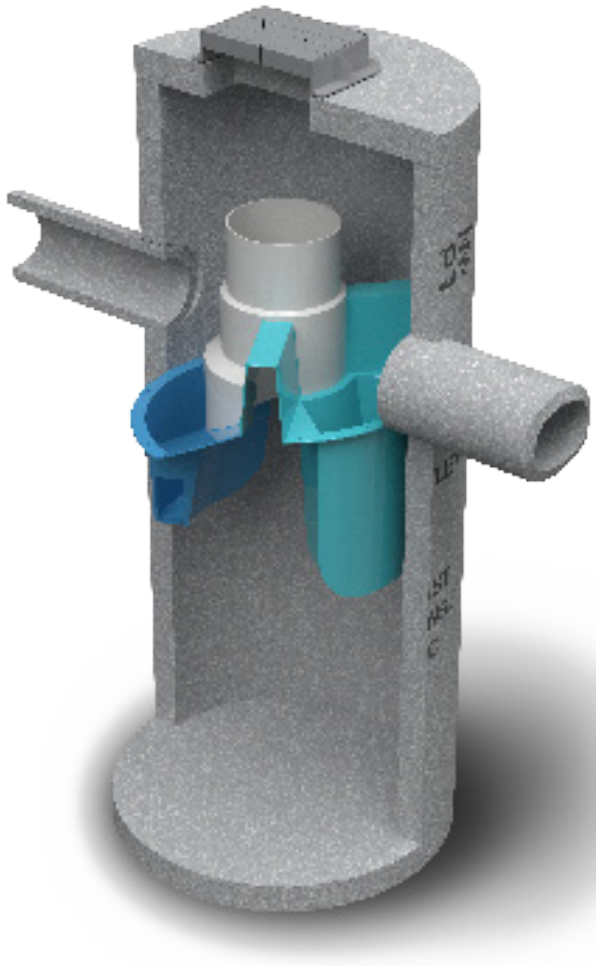
(1) Rainfall Data: 1960:2007, HLY03, Ottawa, ONT, 6105976 & 6105978.

(2) IR PLUS removal based on ETV PSD and ETV protocols.

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

(4) Combined removal efficiencies calculated based on NCDENR Stormwater BMP Manual, Section 3.9.4, where Total Removal Efficiency = 1st BMP Efficiency + 2nd BMP Efficiency - (1st BMP Efficiency x 2nd BMP Efficiency)

Hydro International



Operation and Maintenance Manual

First Defense® High Capacity and First Defense®Optimum

Vortex Separator for Stormwater Treatment

Table of Contents

Hydro International (Stormwater), 94 Hutchins Drive, Portland ME 04102
Tel: (207) 756-6200 Fax: (207) 756-6212 Web: www.hydro-int.com

I. First Defense® by Hydro International

Introduction

The First Defense® is an enhanced vortex separator that combines an effective and economical stormwater treatment chamber with an integral peak flow bypass. It efficiently removes total suspended solids (TSS), trash and hydrocarbons from stormwater runoff without washing out previously captured pollutants. The First Defense® is available in several model configurations to accommodate a wide range of pipe sizes, peak flows and depth constraints.

The two product models described in this guide are the First Defense® High Capacity and the First Defense® Optimum; they are inspected and maintained identically.

Operation

The First Defense® operates on simple fluid hydraulics. It is self-activating, has no moving parts, no external power requirement and is fabricated with durable non-corrosive components. No manual procedures are required to operate the unit and maintenance is limited to monitoring accumulations of stored pollutants and periodic clean-outs. The First Defense® has been designed to allow for easy and safe access for inspection, monitoring and clean-out procedures. Neither entry into the unit nor removal of the internal components is necessary for maintenance, thus safety concerns related to confined-space-entry are avoided.

Pollutant Capture and Retention

The internal components of the First Defense® have been designed to optimize pollutant capture. Sediment is captured and retained in the base of the unit, while oil and floatables are stored on the water surface in the inner volume (Fig.1).

The pollutant storage volumes are isolated from the built-in bypass chamber to prevent washout during high-flow storm events. The sump of the First Defense® retains a standing water level between storm events. This ensures a quiescent flow regime at the onset of a storm, preventing resuspension and washout of pollutants captured during previous events.

Accessories such as oil absorbent pads are available for enhanced oil removal and storage. Due to the separation of the oil and floatable storage volume from the outlet, the potential for washout of stored pollutants between clean-outs is minimized.

Applications

- Stormwater treatment at the point of entry into the drainage line
- Sites constrained by space, topography or drainage profiles with limited slope and depth of cover
- Retrofit installations where stormwater treatment is placed on or tied into an existing storm drain line
- Pretreatment for filters, infiltration and storage

Advantages

- Inlet options include surface grate or multiple inlet pipes
- Integral high capacity bypass conveys large peak flows without the need for “offline” arrangements using separate junction manholes
- Long flow path through the device ensures a long residence time within the treatment chamber, enhancing pollutant settling
- Delivered to site pre-assembled and ready for installation

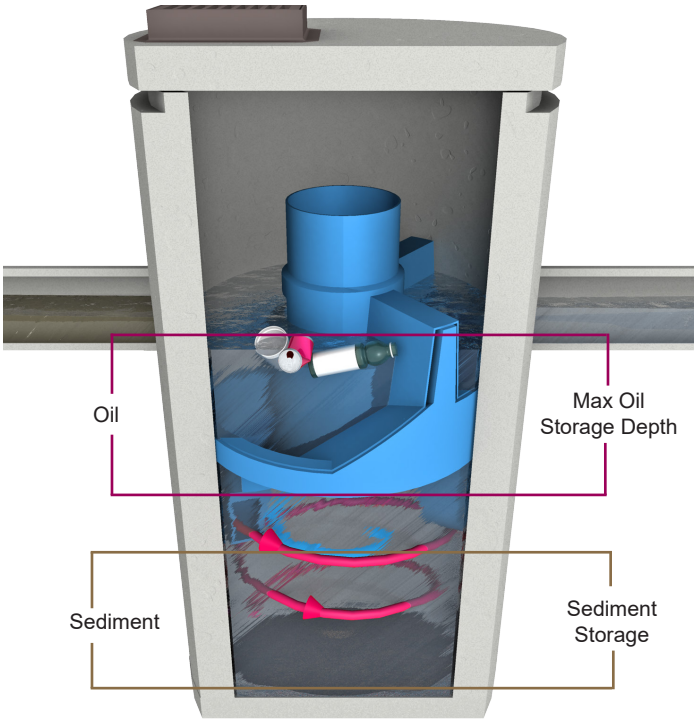


Fig.1 Pollutant storage volumes in the First Defense®.

II. Model Sizes & Configurations

The First Defense® inlet and internal bypass arrangements are available in several model sizes and configurations. The components have modified geometries allowing greater design flexibility to accommodate various site constraints.

All First Defense® models include the internal components that are designed to remove and retain total suspended solids (TSS), gross solids, floatable trash and hydrocarbons (Fig.2). First Defense® model sizes (diameter) are shown in Table 1.

III. Maintenance

First Defense® Components

1. **Built-In Bypass**
2. **Inlet Pipe**
3. **Inlet Chute**
4. **Floatables Draw-off Port**
5. **Outlet Pipe**
6. **Floatables Storage**
7. **Sediment Storage**
8. **Inlet Grate or Cover**

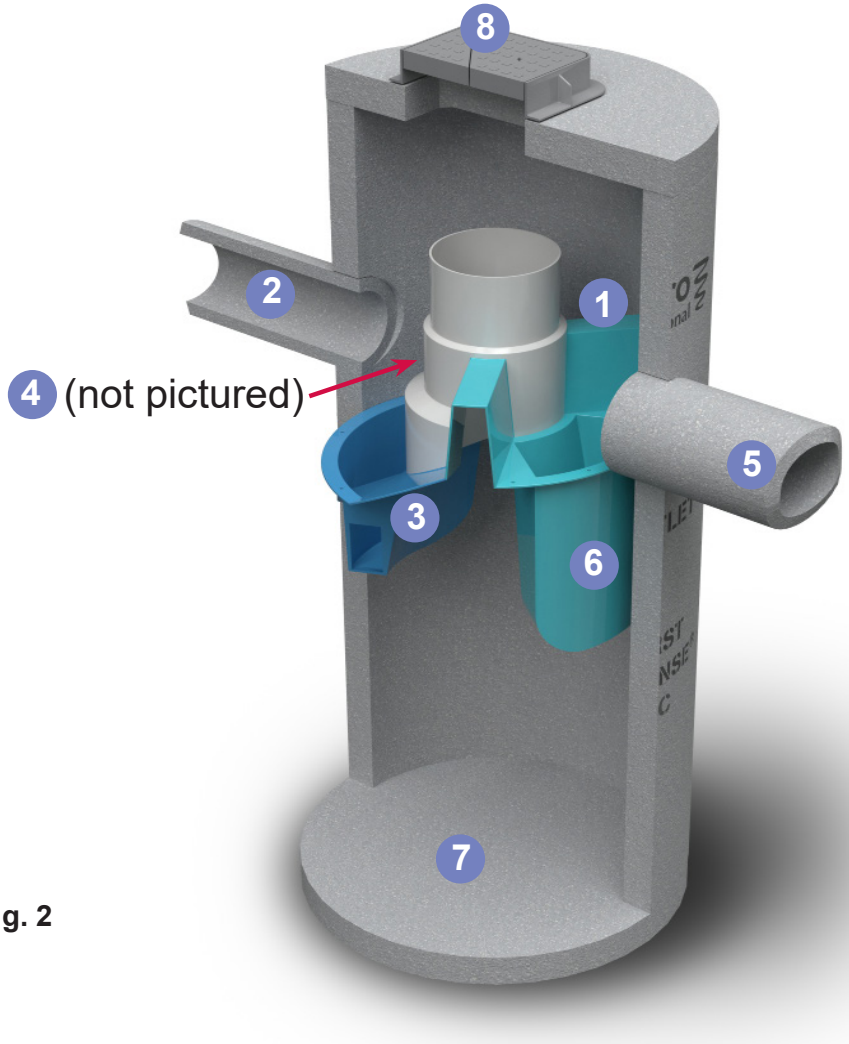


Fig. 2

First Defense® Model Sizes
(ft / m) diameter
3 / 0.9
4 / 1.2
5 / 1.5
6 / 1.8
8 / 2.4
10 / 3.0

Table 1

Overview

The First Defense® protects the environment by removing a wide range of pollutants from stormwater runoff. Periodic removal of these captured pollutants is essential to the continuous, long-term functioning of the First Defense®. The First Defense® will capture and retain sediment and oil until the sediment and oil storage volumes are full to capacity. When sediment and oil storage capacities are reached, the First Defense® will no longer be able to store removed sediment and oil.

The First Defense® allows for easy and safe inspection, monitoring and clean-out procedures. A commercially or municipally owned sump-vac is used to remove captured sediment and floatables. Access ports are located in the top of the manhole.

Maintenance events may include Inspection, Oil & Floatables Removal, and Sediment Removal. Maintenance events do not require entry into the First Defense®, nor do they require the internal components of the First Defense® to be removed. In the case of inspection and floatables removal, a vactor truck is not required. However, a vactor truck is required if the maintenance event is to include oil removal and/or sediment removal.

Maintenance Equipment Considerations

The internal components of the First Defense® have a centrally located circular shaft through which the sediment storage sump can be accessed with a sump vac hose. The open diameter of this access shaft is 15 inches in diameter (Fig.3). Therefore, the nozzle fitting of any vactor hose used for maintenance should be less than 15 inches in diameter.

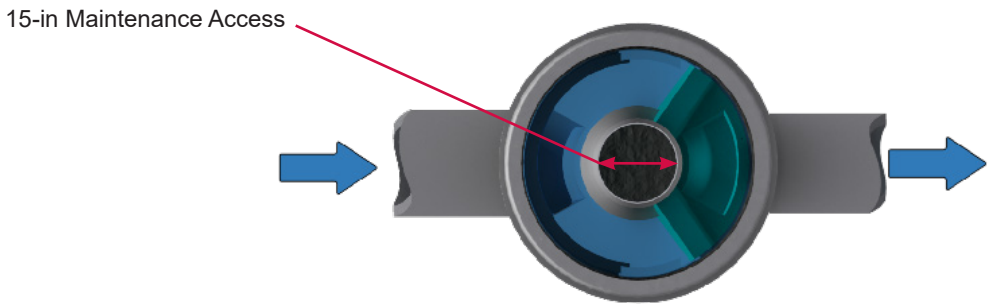


Fig.3 The central opening to the sump of the First Defense®is 15 inches in diameter.

Determining Your Maintenance Schedule

The frequency of clean out is determined in the field after installation. During the first year of operation, the unit should be inspected every six months to determine the rate of sediment and floatables accumulation. A simple probe such as a Sludge-Judge® can be used to determine the level of accumulated solids stored in the sump. This information can be recorded in the maintenance log (see page 9) to establish a routine maintenance schedule.

The vactor procedure, including both sediment and oil / flotables removal, for First Defense® typically takes less than 30 minutes and removes a combined water/oil volume of about 765 gallons.

Inspection Procedures

1. Set up any necessary safety equipment around the access port or grate of the First Defense® as stipulated by local ordinances. Safety equipment should notify passing pedestrian and road traffic that work is being done.

2. Remove the grate or lid to the manhole.

3. Without entering the vessel, look down into the chamber to inspect the inside. Make note of any irregularities. Fig.4 shows the standing water level that should be observed.

4. Without entering the vessel, use the pole with the skimmer net to remove floatables and loose debris from the components and water surface.

5. Using a sediment probe such as a Sludge Judge®, measure the depth of sediment that has collected in the sump of the vessel.

6. On the Maintenance Log (see page 9), record the date, unit location, estimated volume of floatables and gross debris removed, and the depth of sediment measured. Also note any apparent irregularities such as damaged components or blockages.

7. Securely replace the grate or lid.

8. Take down safety equipment.

9. Notify Hydro International of any irregularities noted during inspection.

Floatables and Sediment Clean Out

Floatables clean out is typically done in conjunction with sediment removal. A commercially or municipally owned sump-vac is used to remove captured sediment and floatables (Fig.4).

Floatables and loose debris can also be netted with a skimmer and pole. The access port located at the top of the manhole provides unobstructed access for a vactor hose to be lowered to the base of the sump.

Scheduling

- Floatables and sump clean out are typically conducted once a year during any season.

- Floatables and sump clean out should occur as soon as possible following a spill in the contributing drainage area.

Fig.4 Floatables are removed with a vactor hose

Recommended Equipment

- Safety Equipment (traffic cones, etc)
- Crow bar or other tool to remove grate or lid
- Pole with skimmer or net (if only floatables are being removed)
- Sediment probe (such as a Sludge Judge®)
- Vactor truck (flexible hose recommended)
- First Defense® Maintenance Log

Floatables and Sediment Clean Out Procedures

1. Set up any necessary safety equipment around the access port or grate of the First Defense® as stipulated by local ordinances. Safety equipment should notify passing pedestrian and road traffic that work is being done.

2. Remove the grate or lid to the manhole.

3. Without entering the vessel, look down into the chamber to inspect the inside. Make note of any irregularities.

4. Remove oil and floatables stored on the surface of the water with the vactor hose or with the skimmer or net

5. Using a sediment probe such as a Sludge Judge®, measure the depth of sediment that has collected in the sump of the vessel and record it in the Maintenance Log (page 9).

6. Once all floatables have been removed, drop the vactor hose to the base of the sump. Vactor out the sediment and gross debris off the sump floor

7. Retract the vactor hose from the vessel.

8. On the Maintenance Log provided by Hydro International, record the date, unit location, estimated volume of floatables and gross debris removed, and the depth of sediment measured. Also note any apparent irregularities such as damaged components, blockages, or irregularly high or low water levels.

9. Securely replace the grate or lid.

Maintenance at a Glance

Inspection	- Regularly during first year of installation - Every 6 months after the first year of installation
Oil and Floatables Removal	- Once per year, with sediment removal - Following a spill in the drainage area
Sediment Removal	- Once per year or as needed - Following a spill in the drainage area
NOTE: For most clean outs the entire volume of liquid does not need to be removed from the manhole. Only remove the first few inches of oils and floatables from the water surface to reduce the total volume of liquid removed during a clean out.	

First Defense® Installation Log

HYDRO INTERNATIONAL REFERENCE NUMBER:	
SITE NAME:	
SITE LOCATION:	
OWNER:	CONTRACTOR:
CONTACT NAME:	CONTACT NAME:
COMPANY NAME:	COMPANY NAME:
ADDRESS:	ADDRESS:
TELEPHONE:	TELEPHONE:
FAX:	FAX:

INSTALLATION DATE: / /

MODEL SIZE (CIRCLE ONE): [3-FT] [4-FT] [5-FT] [6-FT] [8-FT] [10-FT]

INLET (CIRCLE ALL THAT APPLY): GRATED INLET (CATCH BASIN) INLET PIPE (FLOW THROUGH)

Hydro International (Stormwater), 94 Hutchins Drive, Portland ME 04102
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First Defense® Inspection and Maintenance Log

Date	Initials	Depth of Floatables and Oils	Sediment Depth Measured	Volume of Sediment Removed	Site Activity and Comments

Hydro International (Stormwater), 94 Hutchins Drive, Portland ME 04102
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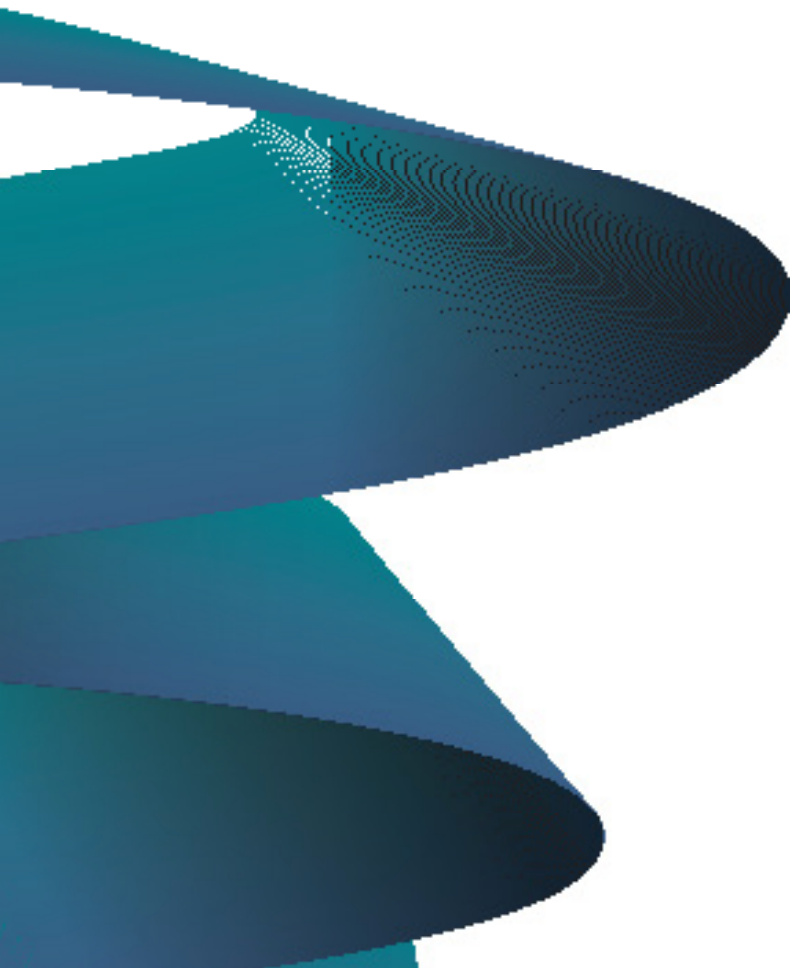
Hydro International®



Stormwater Solutions

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stormwaterinquiry@hydro-int.com

www.hydro-int.com

Turning Water Around...®

FD_O+M_J_2009(2)

Verification Statement

Hydro International First Defense® HC Oil Grit Separator
Registration number: (V-2018-10-01)
Date of issue: 2018-October-15 (rev 2019-02-01)

Technology type	Oil Grit Separator
Application	Technology to remove oil, sediment, trash and debris from stormwater and snowmelt runoff as well as other pollutants that attach to sediment particles, such as nutrients and metals
Company	Hydro International
Address	94 Hutchins Drive, Portland, Maine USA 04102 **Phone** +1-207-756 6200
Website	https://www.hydro-int.com
E-mail	dscott@hydro-int.com

Verified Performance Claims

The Hydro International First Defense® High Capacity (HC) Oil Grit Separator (OGS) was tested by Good Harbour Laboratories Inc. (GHL), Mississauga, Ontario, Canada in 2018. The performance test results were verified by Toronto and Region Conservation Authority (TRCA), Vaughan, Ontario, Canada following the requirements of ISO 14034:2016 and the VerifiGlobal Performance Verification Protocol. The following performance claims were verified:

Capture test[1]:
With a false floor set to 50% of the manufacturer's recommended maximum sediment storage depth and an influent test sediment concentration of 200 mg/L, the First Defense® HC OGS device removes 67, 60, 55, 50, 45, 45, and 41 percent of influent sediment by mass at surface loading rates of 40, 80, 200, 400, 600, 1000, and 1400 L/min/m^2, respectively.

Scour test[1]:
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, the First Defense® HC OGS device generates adjusted effluent[2] concentrations of 0, 0, 11, 2, and 0 mg/L at 5-minute duration surface loading rates of 200, 800, 1400, 2000, and 2600 L/min/m^2, respectively.

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

[2] The effluent suspended sediment concentration is adjusted based on the background concentration and the smallest 5% of particles captured during the 40 L/min/m^2 sediment capture test (see Table 2)

Technology Application

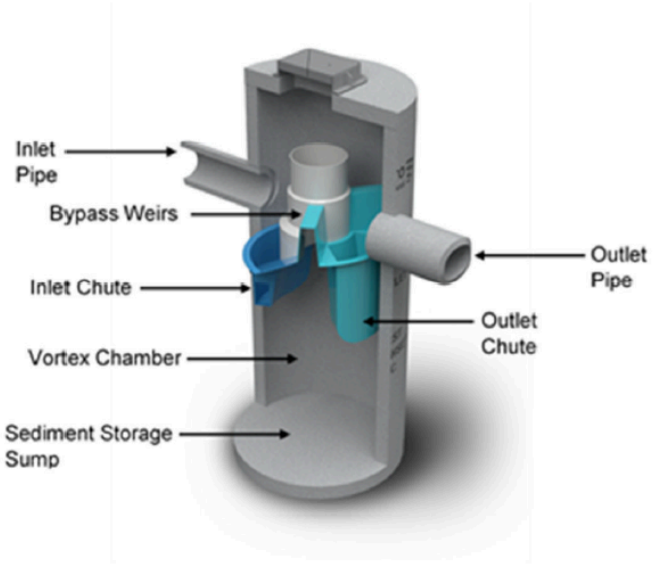
The First Defense® HC (FDHC) Oil Grit Separator can be used as a stand-alone stormwater treatment technology, depending on water quality objectives, or as a pretreatment component in a treatment train when higher TSS removals are required and polishing or volume reduction best management practices (BMPs), such as infiltration or bio-infiltration, are installed downstream. FDHC applications include: stormwater treatment at the point of entry into the drainage line; sites constrained by space, topography or drainage profiles with limited slope and depth of cover; retrofit installations where stormwater treatment is placed on or tied into an existing storm drain line; pretreatment for filters, infiltration, other sedimentation BMPs and storage.

Technology Description

The Hydro International First Defense® HC (FDHC) is an Oil Grit Separator designed to remove oil, sediment, trash and debris from stormwater and snowmelt runoff as well as other pollutants that attach to sediment particles, such as nutrients and metals. The patented flow modifying internal components are designed to be inserted into standard precast concrete manholes where they collect and treat runoff as part of the drainage system (Figure 1).

Flow entering the manhole via an inlet pipe or inlet grate is diverted into a vortex chamber beneath a separation module that includes both inlet/outlet chutes and bypass weirs. The internal bypass weirs divert flows greater than the maximum design treatment flow rate over the separation module and away from the vortex chamber where oil, sediment, debris and attached pollutants are accumulating. This function prevents high velocities from re-suspending previously captured pollutants during large storm events. The FDHC can be designed and sized to function effectively in either online or offline configurations.

Figure 1: Hydro International First Defense® HC Oil Grit Separator



The test unit was 1.2 m (4 foot) in diameter with a 1.51 m (59 5/8 inches) sump depth measured from the outlet invert to the floor of the unit. The effective treatment area (also known as the effective sedimentation area) is 1.2 m^2 (12.6 ft^2). The maximum sediment storage depth is 0.457 m (18 inches).

Description of Test Procedure

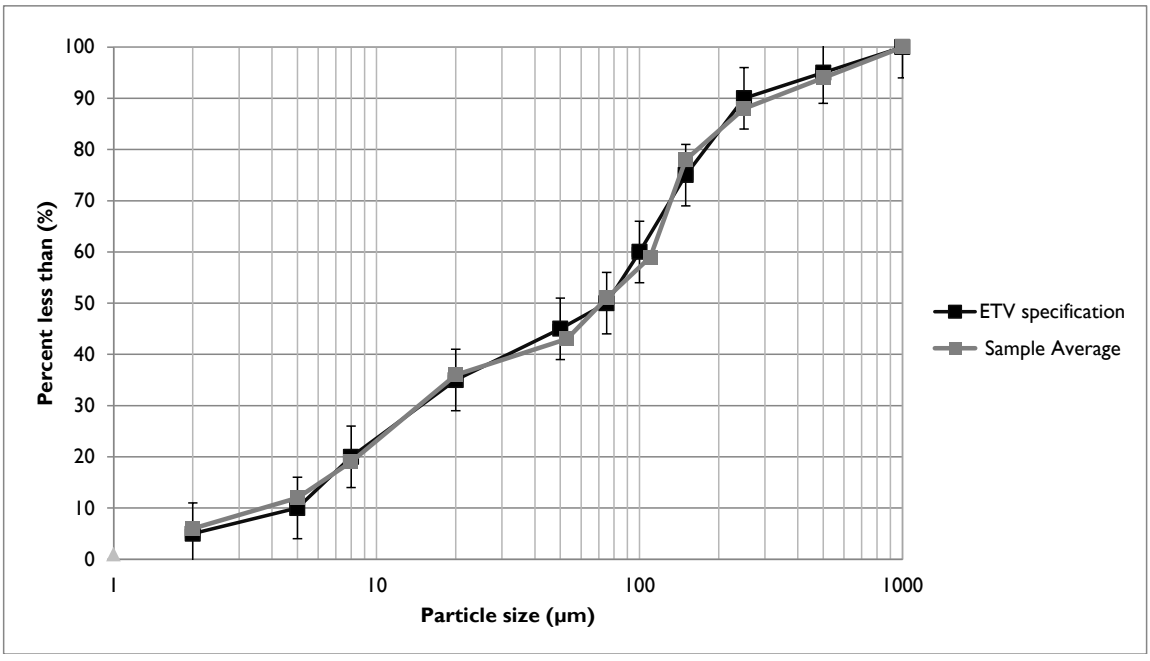
The test data and results for this verification were obtained from independent testing conducted on a 1.2 m (48 inch) diameter Hydro International First Defense® HC OGS device, in accordance with the *Procedure for Laboratory Testing of Oil-Grit Separators (Version 3.0, June 2014)*. The laboratory test procedure was originally prepared by the Toronto and Region Conservation Authority (TRCA) in association with a 31 member advisory committee from various stakeholder groups.

Verification Results

Toronto and Region Conservation Authority verified the performance test data and other information pertaining to the First Defense® HC Oil Grit Separator. A Verification Plan was prepared to guide the verification process based on the requirements of ISO 14034:2016 and the VerifiGlobal Performance Verification Protocol.

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%, and a median particle size no greater than 75 µm. Comparison of the individual sample and average test sediment PSD to the specified PSD shown in Figure 2 indicates that the test sediment used for the capture and scour tests met this condition. The median particle size was 73 µm. Samples from test sediment batches used for each run met the specified PSD within the required tolerance thresholds.

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).

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 are 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) 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 First Defence HC at specified surface loading rates

Particle size fraction (µm)	Surface loading rate (L/min/m²)						
	40	80	200	400	600	1000	1400
>500	100*	100*	100*	81	72	86	80
250 - 500	100*	97	99	100*	100*	59	88
150 - 250	100*	91	95	93	47	100*	84
105 - 150	96	89	94	89	90	70	75
75 - 105	100*	90	95	77	-20**	100	51
53 - 75	74	100*	97	62	100*	46	37
20 - 53	60	33	10	5	4	0	0
8 - 20	29	16	8	3	3	1	1
5 – 8	8	5	8	4	4	4	3
<5	5	3	0	0	0	3	3
All particle sizes By mass balance	**66.5**	**59.9**	**55.4**	**50.2**	**44.9**	**45.2**	**40.5**

* Removal efficiencies were calculated to be above 100%. Calculated values ranged between 101 and 184% (average 115%). See text and Bulletin # CETV 2016-11-0001 for more information.
** An outlier in the retained sediment sample sieve data resulted in negative removal for this size fraction. The outlier at the 75 um particle size is shown in Figure 3.

Figure 3 - Particle size distribution of sediment retained in the First Defense HC in relation to the injected test sediment average

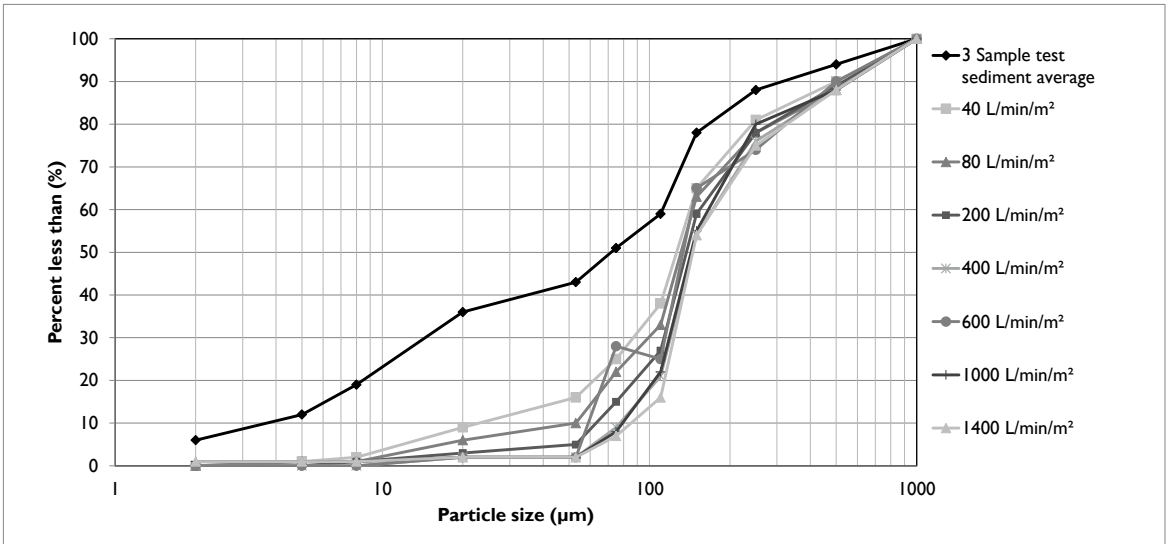


Figure 3 compares the particle size distribution (PSD) of the three sample average of the test sediment to the PSD of the sediment retained by the FDHC device at each of the tested surface loading rates. As expected, the capture efficiency for fine particles was generally found to decrease as surface loading rates increased, particularly in the 40 to 400 L/min/m² range.

Table 2 shows the results of the sediment scour and re-suspension test for the First Defense® HC unit. The scour test involved preloading 10.2 cm (4 inches) 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. The smallest 5% of particles captured during the 40 L/min/m^2 sediment capture test (13.5 μm in this case) was used to further adjust the effluent sediment concentrations, as per the method described in Bulletin # CETV 2016-09-0001. Results showed average adjusted effluent sediment concentrations below 11 mg/L at all surface loading rates. Effluent concentrations would be expected to decrease at higher flow rates since bypass over the insert bypass weirs was observed to begin at 1,032 L/min/m^2.

Table 2 - Scour test adjusted effluent sediment concentration at each surface loading rate

Run	Surface loading rate (L/min/m^2)	Run time (min)	Background sample concentration (mg/L)	Average adjusted effluent suspended sediment concentration (mg/L)*
1	200	1:00 – 6:00	0.8	0
2	800	7:00 – 12:00	1.0	0
3	1400	13:00 – 18:00	1.1	10.6
4	2000	19:00 – 24:00	2.8	2.4
5	2600	25:00 – 30:00	6.6	0

*The effluent suspended sediment concentration is adjusted based on the background concentration and the smallest 5% of particles captured during the 40 L/min/m^2 sediment capture test, as per the method described in Bulletin # CETV 2016-09-0001.

Variances from the Procedure

Minor variances from the *Procedure for Laboratory Testing of Oil-Grit Separators* used as the basis of testing for this verification were as follows:

1. The *Procedure* states that the tested device "must be a full scale commercially available device with the same configuration and components as would be typical for an actual installation." The unit tested for this verification had the same internal components as would be typical for a commercial installation, but the internal components were placed inside a structure constructed of composite materials, rather than a manhole made of concrete, the latter of which is typical for most installations. The dimensions of the structure were the same as would have been the case had the manhole been concrete. The use of alternate materials for the structure was not believed to significantly affect system performance.

2. As part of the capture test, evaluation of the 40 and 80 L/min/m^2 surface loading rate was split into 3 and 2 parts, respectively. The test was conducted in parts because of the long duration (i.e. over 10 hours) needed to feed the required minimum 11.3 kg of test sediment into the unit. At the end of the first and second parts of the test, the flow rates were gradually decreased to prevent capture of particles that would have been washed out under normal circumstances. The requirement to split the test into parts was not anticipated in the *Procedure for Laboratory Testing of Oil-Grit Separators*, but has been a common feature of testing at the 40 L/min/m^2 surface loading rate. Conducting the test in two parts for the 80 L/ min/m^2 surface loading rate is less common. The testing did not assess the significance of the breaks, however, the test laboratory and verifier do not believe that the breaks significantly affected the test results.

3. During the sediment scour test, the flow rate coefficient of variation (COV) at the 200 L/min/m^2 surface loading rate of 0.045 slightly exceeded the target COV of 0.04. The average flow rate during the test remained within ±10% of the target flow rate.

Quality assurance

Performance testing and verification of the First Defense® HC Oil Grit Separator were performed in accordance with the requirements of ISO 14034:2016 and the VerifiGlobal Performance Verification Protocol. The verifier, Toronto and Region Conservation Authority, has confirmed that quality assurance requirements were addressed throughout the performance testing process and in the generation of performance test results. This includes reviewing all data sheets and data downloads, as well as overall management of the test system, quality control and data integrity.

Verification Summary

In summary, the First Defense® HC Oil Grit Separator is designed to remove oil, sediment, trash and debris from stormwater and snowmelt runoff as well as other pollutants that attach to sediment particles, such as nutrients and metals. Verification of performance claims for the Hydro International First Defense® HC Oil Grit Separator was conducted by Toronto and Region Conservation Authority based on independent third-party performance test results provided by Good Harbour Laboratories, as well as additional information provided by Hydro International. Table 3 summarizes the verification results in relation to the technology performance parameters that were identified to determine the efficacy of the First Defense® HC Oil Grit Separator.

Table 3 - Summary of Verification Results Against Performance Parameters

Performance Parameter	Verified Performance
Sediment Removal Rate	The sediment removal rate of the FDHC is dependent upon flow rate, particle density and particle size. Removal efficiency decreased with increasing surface loading rate from 67% at 40 L/min/m^2 to 41% at 1400 L/min/m^2. The weighted average removal efficiency achieved by the unit will vary depending on the rainfall distribution of the jurisdiction in which it is installed, and site characteristics.
Sediment Scour	When pre-loaded with sediment with a particle size distribution matching that of the feed sediment used in the sediment capture test, the FDHC generated effluent suspended solids concentrations of less than 11 mg/L at surface loading rates ranging from 200 to 2600 L/min/m^2.
Bypass flow rate	The flow rate at which bypass occurs will vary based on model size. For the 1.2 m (4 foot) diameter test unit, the flow rate at which bypass occurred over the insert bypass weirs was 1238 L/min (327 gpm).
Head loss	The loss of hydraulic head across the FDHC was determined by measuring the water elevation difference between the inlet and outlet sides of the insert. Head loss may vary based on model size. For the tested unit the head loss ranged from 2 mm (0.08 inches) at 93.5 L/min (12.3 gpm) to 100 mm (3.94 inches) at 1238 L/min (327 gpm) when bypass was observed to occur. At 327 gpm, when bypass occurred, the depth of the water was 177 mm upstream and 77 mm downstream for a difference of 100 mm (3.94 inches). The highest water elevation difference was 111mm (4.37 inches) at a flow rate of 1635 L/min (431.8 gpm), after which head loss declined up to the maximum measured flow rate of 3036 L/min (801.9 gpm).

What is ISO 14034?

The purpose of environmental technology verification is to provide a credible and impartial account of the performance of environmental technologies. Environmental technology verification is based on a number of principles to ensure that verifications are performed and reported accurately, clearly, unambiguously and objectively. The International Organization for Standardization (ISO) standard for environmental technology verification (ETV) is ISO 14034, which was published in November 2016.

Benefits of ETV

ETV contributes to protection and conservation of the environment by promoting and facilitating market uptake of innovative environmental technologies, especially those that perform better than relevant alternatives. ETV is particularly applicable to those environmental technologies whose innovative features or performance cannot be fully assessed using existing standards. Through the provision of objective evidence, ETV provides an independent and impartial confirmation of the performance of an environmental technology based on reliable test data. ETV aims to strengthen the credibility of new, innovative technologies by supporting informed decision-making among interested parties.

For more information on the First Defense® HC Oil Grit Separator, contact:	For more information on VerifiGlobal, contact:
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Signed for Hydro International: *Original signed by:* *David Scott* David Scott Technical Product Manager, Americas Stormwater	Signed for VerifiGlobal: *Original signed by:* *Thomas Bruun* Thomas Bruun, Managing Director *Original signed by:* *John Neate* John Neate, Managing Director

NOTICE: Verifications are based on an evaluation of technology performance under specific, predetermined operational conditions and parameters and the appropriate quality assurance procedures. VerifiGlobal and the Verification Expert, Toronto and Region Conservation Authority, make no expressed or implied warranties as to the performance of the technology and do not certify that a technology will always operate as verified. The end user is solely responsible for complying with any and all applicable regulatory requirements. Mention of commercial product names does not imply endorsement.

VerifiGlobal and the Verification Expert, Toronto and Region Conservation Authority, provide the verification services solely on the basis of the information supplied by the applicant or vendor and assume no liability thereafter. The responsibility for the information supplied remains solely with the applicant or vendor and the liability for the purchase, installation, and operation (whether consequential or otherwise) is not transferred to any other party as a result of the verification.

AECOM

Appendix H

Supporting Engineering Documentation and Calculations – Underground Storage System

Project: DYT3 - North - Rev 2

Chamber Model -	MC-3500	
Units -	**Metric**	
Number of Chambers -	285	
Number of End Caps -	30	
Voids in the stone (porosity) -	40	%
Base of Stone Elevation -	63.55	m
Amount of Stone Above Chambers -	305	mm
Amount of Stone Below Chambers -	229	mm

1477.325 sq.meters Min. Area - 1357.38 sq.meters

☑ Include Perimeter Stone in Calculations

☐ Click for Stage Area Data

☐ Click to Invert Stage Area Data

Click Here for Imperial

StormTech MC-3500 Cumulative Storage Volumes

Height of System (mm)	Incremental Single Chamber (cubic meters)	Incremental Single End Cap (cubic meters)	Incremental Chambers (cubic meters)	Incremental End Cap (cubic meters)	Incremental Stone (cubic meters)	Incremental Ch, EC and Stone (cubic meters)	Cumulative System (cubic meters)	Elevation (meters)
1676	0.00	0.00	0.00	0.00	15.002	15.00	1530.15	65.22
1651	0.00	0.00	0.00	0.00	15.002	15.00	1515.15	65.20
1626	0.00	0.00	0.00	0.00	15.002	15.00	1500.14	65.17
1600	0.00	0.00	0.00	0.00	15.002	15.00	1485.14	65.15
1575	0.00	0.00	0.00	0.00	15.002	15.00	1470.14	65.12
1549	0.00	0.00	0.00	0.00	15.002	15.00	1455.14	65.10
1524	0.00	0.00	0.00	0.00	15.002	15.00	1440.14	65.07
1499	0.00	0.00	0.00	0.00	15.002	15.00	1425.13	65.05
1473	0.00	0.00	0.00	0.00	15.002	15.00	1410.13	65.02
1448	0.00	0.00	0.00	0.00	15.002	15.00	1395.13	64.99
1422	0.00	0.00	0.00	0.00	15.002	15.00	1380.13	64.97
1397	0.00	0.00	0.00	0.00	15.002	15.00	1365.13	64.94
1372	0.00	0.00	0.47	0.00	14.815	15.28	1350.12	64.92
1346	0.01	0.00	1.57	0.02	14.367	15.95	1334.84	64.89
1321	0.01	0.00	2.37	0.03	14.040	16.44	1318.89	64.87
1295	0.01	0.00	3.26	0.04	13.682	16.98	1302.44	64.84
1270	0.02	0.00	5.55	0.06	12.761	18.36	1285.46	64.82
1245	0.03	0.00	8.30	0.07	11.653	20.03	1267.10	64.79
1219	0.04	0.00	10.08	0.09	10.932	21.11	1247.07	64.77
1194	0.04	0.00	11.48	0.11	10.368	21.95	1225.96	64.74
1168	0.04	0.00	12.70	0.12	9.875	22.69	1204.01	64.72
1143	0.05	0.00	13.78	0.14	9.436	23.35	1181.32	64.69
1118	0.05	0.01	14.76	0.15	9.038	23.95	1157.96	64.66
1092	0.05	0.01	15.64	0.17	8.679	24.49	1134.02	64.64
1067	0.06	0.01	16.47	0.19	8.340	25.00	1109.53	64.61
1041	0.06	0.01	17.23	0.20	8.031	25.46	1084.53	64.59
1016	0.06	0.01	17.95	0.21	7.737	25.90	1059.07	64.56
991	0.07	0.01	18.62	0.23	7.465	26.31	1033.17	64.54
965	0.07	0.01	19.25	0.24	7.209	26.69	1006.87	64.51
940	0.07	0.01	19.85	0.25	6.964	27.06	980.17	64.49
914	0.07	0.01	20.40	0.26	6.736	27.40	953.11	64.46
889	0.07	0.01	20.93	0.27	6.520	27.73	925.71	64.44
864	0.08	0.01	21.44	0.28	6.314	28.03	897.99	64.41
838	0.08	0.01	21.91	0.29	6.119	28.33	869.95	64.39
813	0.08	0.01	22.37	0.31	5.934	28.60	841.63	64.36
787	0.08	0.01	22.80	0.32	5.757	28.87	813.02	64.33
762	0.08	0.01	23.21	0.33	5.589	29.12	784.15	64.31
737	0.08	0.01	23.60	0.34	5.428	29.36	755.03	64.28
711	0.08	0.01	23.97	0.35	5.276	29.59	725.67	64.26
686	0.09	0.01	24.31	0.36	5.135	29.80	696.08	64.23
660	0.09	0.01	24.64	0.36	5.000	30.01	666.28	64.21
635	0.09	0.01	24.97	0.37	4.864	30.21	636.27	64.18
610	0.09	0.01	25.26	0.38	4.743	30.39	606.06	64.16
584	0.09	0.01	25.55	0.39	4.626	30.57	575.67	64.13
559	0.09	0.01	25.82	0.40	4.514	30.73	545.10	64.11
533	0.09	0.01	26.08	0.41	4.408	30.89	514.37	64.08
508	0.09	0.01	26.32	0.42	4.308	31.04	483.48	64.06
483	0.09	0.01	26.55	0.42	4.211	31.19	452.43	64.03
457	0.09	0.01	26.78	0.43	4.119	31.33	421.25	64.00
432	0.09	0.01	26.99	0.44	4.032	31.46	389.92	63.98
406	0.10	0.01	27.19	0.44	3.950	31.58	358.46	63.95
381	0.10	0.01	27.38	0.45	3.871	31.70	326.88	63.93
356	0.10	0.02	27.56	0.46	3.797	31.81	295.18	63.90
330	0.10	0.02	27.74	0.46	3.722	31.92	263.37	63.88
305	0.10	0.02	27.91	0.47	3.653	32.03	231.45	63.85
279	0.10	0.02	28.07	0.47	3.584	32.13	199.43	63.83
254	0.10	0.02	28.29	0.51	3.485	32.28	167.30	63.80
229	0.00	0.00	0.00	0.00	15.002	15.00	135.02	63.78
203	0.00	0.00	0.00	0.00	15.002	15.00	120.02	63.75
178	0.00	0.00	0.00	0.00	15.002	15.00	105.01	63.72
152	0.00	0.00	0.00	0.00	15.002	15.00	90.01	63.70
127	0.00	0.00	0.00	0.00	15.002	15.00	75.01	63.67
102	0.00	0.00	0.00	0.00	15.002	15.00	60.01	63.65
76	0.00	0.00	0.00	0.00	15.002	15.00	45.01	63.62
51	0.00	0.00	0.00	0.00	15.002	15.00	30.00	63.60
25	0.00	0.00	0.00	0.00	15.002	15.00	15.00	63.57

Project: DYT3 - S

Chamber Model -	MC-3500		
Units -	Metric	Click Here for Imperial	
Number of Chambers -	354		
Number of End Caps -	38		
Voids in the stone (porosity) -	40	%	
Base of Stone Elevation -	63.15	m	☑ Include Perimeter Stone in Calculations
Amount of Stone Above Chambers -	305	mm	
Amount of Stone Below Chambers -	229	mm	
Area of system -	1841.8	sq.meters	Min. Area - 1748.581 sq.meters

StormTech MC-3500 Cumulative Storage Volumes

Height of System *(mm)*	Incremental Single Chamber *(cubic meters)*	Incremental Single End Cap *(cubic meters)*	Incremental Chambers *(cubic meters)*	Incremental End Cap *(cubic meters)*	Incremental Stone *(cubic meters)*	Incremental Chamber, End Cap and Stone *(cubic meters)*	Cumulative System *(cubic meters)*	Elevation *(meters)*
1676	0.00	0.00	0.00	0.00	18.703	18.70	1905.36	64.83
1651	0.00	0.00	0.00	0.00	18.703	18.70	1886.65	64.80
1626	0.00	0.00	0.00	0.00	18.703	18.70	1867.95	64.78
1600	0.00	0.00	0.00	0.00	18.703	18.70	1849.25	64.75
1575	0.00	0.00	0.00	0.00	18.703	18.70	1830.54	64.73
1549	0.00	0.00	0.00	0.00	18.703	18.70	1811.84	64.70
1524	0.00	0.00	0.00	0.00	18.703	18.70	1793.14	64.68
1499	0.00	0.00	0.00	0.00	18.703	18.70	1774.43	64.65
1473	0.00	0.00	0.00	0.00	18.703	18.70	1755.73	64.63
1448	0.00	0.00	0.00	0.00	18.703	18.70	1737.03	64.60
1422	0.00	0.00	0.00	0.00	18.703	18.70	1718.32	64.57
1397	0.00	0.00	0.00	0.00	18.703	18.70	1699.62	64.55
1372	0.00	0.00	0.58	0.00	18.470	19.05	1680.92	64.52
1346	0.01	0.00	1.95	0.03	17.915	19.89	1661.86	64.50
1321	0.01	0.00	2.95	0.04	17.508	20.50	1641.98	64.47
1295	0.01	0.00	4.05	0.06	17.063	21.16	1621.48	64.45
1270	0.02	0.00	6.89	0.07	15.919	22.88	1600.32	64.42
1245	0.03	0.00	10.31	0.09	14.542	24.94	1577.44	64.40
1219	0.04	0.00	12.53	0.12	13.647	26.29	1552.49	64.37
1194	0.04	0.00	14.26	0.14	12.946	27.34	1526.20	64.35
1168	0.04	0.00	15.77	0.16	12.333	28.26	1498.87	64.32
1143	0.05	0.00	17.11	0.18	11.788	29.08	1470.61	64.30
1118	0.05	0.01	18.33	0.20	11.293	29.82	1441.53	64.27
1092	0.05	0.01	19.42	0.22	10.847	30.49	1411.71	64.24
1067	0.06	0.01	20.46	0.23	10.426	31.12	1381.23	64.22
1041	0.06	0.01	21.40	0.25	10.043	31.69	1350.11	64.19
1016	0.06	0.01	22.30	0.27	9.677	32.24	1318.41	64.17
991	0.07	0.01	23.12	0.29	9.339	32.75	1286.17	64.14
965	0.07	0.01	23.91	0.30	9.021	33.23	1253.42	64.12
940	0.07	0.01	24.65	0.32	8.717	33.68	1220.19	64.09
914	0.07	0.01	25.34	0.33	8.434	34.11	1186.51	64.07
889	0.07	0.01	26.00	0.35	8.165	34.51	1152.40	64.04
864	0.08	0.01	26.62	0.36	7.909	34.89	1117.89	64.02
838	0.08	0.01	27.22	0.37	7.667	35.26	1083.00	63.99
813	0.08	0.01	27.78	0.39	7.436	35.60	1047.74	63.96
787	0.08	0.01	28.32	0.40	7.217	35.93	1012.14	63.94
762	0.08	0.01	28.82	0.41	7.008	36.25	976.20	63.91
737	0.08	0.01	29.31	0.43	6.808	36.55	939.96	63.89
711	0.08	0.01	29.77	0.44	6.619	36.83	903.41	63.86
686	0.09	0.01	30.20	0.45	6.444	37.09	866.58	63.84
660	0.09	0.01	30.61	0.46	6.276	37.34	829.49	63.81
635	0.09	0.01	31.02	0.47	6.107	37.60	792.15	63.79
610	0.09	0.01	31.38	0.49	5.957	37.82	754.55	63.76
584	0.09	0.01	31.73	0.50	5.812	38.04	716.72	63.74
559	0.09	0.01	32.07	0.51	5.672	38.25	678.68	63.71
533	0.09	0.01	32.39	0.52	5.541	38.45	640.43	63.69
508	0.09	0.01	32.69	0.53	5.415	38.64	601.99	63.66
483	0.09	0.01	32.98	0.54	5.296	38.81	563.35	63.63
457	0.09	0.01	33.26	0.54	5.181	38.99	524.54	63.61
432	0.09	0.01	33.52	0.55	5.073	39.15	485.55	63.58
406	0.10	0.01	33.77	0.56	4.971	39.30	446.40	63.56
381	0.10	0.01	34.01	0.57	4.872	39.45	407.10	63.53
356	0.10	0.02	34.23	0.58	4.781	39.59	367.65	63.51
330	0.10	0.02	34.45	0.58	4.688	39.73	328.06	63.48
305	0.10	0.02	34.66	0.59	4.602	39.85	288.34	63.46
279	0.10	0.02	34.87	0.60	4.516	39.98	248.48	63.43
254	0.10	0.02	35.14	0.64	4.393	40.17	208.50	63.41
229	0.00	0.00	0.00	0.00	18.703	18.70	168.33	63.38
203	0.00	0.00	0.00	0.00	18.703	18.70	149.63	63.36
178	0.00	0.00	0.00	0.00	18.703	18.70	130.92	63.33
152	0.00	0.00	0.00	0.00	18.703	18.70	112.22	63.30
127	0.00	0.00	0.00	0.00	18.703	18.70	93.52	63.28
102	0.00	0.00	0.00	0.00	18.703	18.70	74.81	63.25
76	0.00	0.00	0.00	0.00	18.703	18.70	56.11	63.23
51	0.00	0.00	0.00	0.00	18.703	18.70	37.41	63.20
25	0.00	0.00	0.00	0.00	18.703	18.70	18.70	63.18

STORMTECH MC-3500 CHAMBER

Designed to meet the most stringent industry performance standards for superior structural integrity while providing designers with a cost-effective method to save valuable land and protect water resources. The StormTech system is designed primarily to be used under parking lots, thus maximizing land usage for private (commercial) and public applications. StormTech chambers can also be used in conjunction with Green Infrastructure, thus enhancing the performance and extending the service life of these practices.

STORMTECH MC-3500 CHAMBER
(not to scale)

Nominal Chamber Specifications

Size (L x W x H)
90" x 77" x 45"
2,286 mm x 1,956 mm x 1,143 mm

Chamber Storage
109.9 ft³ (3.11 m³)

Min. Installed Storage*
175.0 ft³ (4.96 m³)

Weight
134 lbs (60.8 kg)

Shipping
15 chambers/pallet
7 end caps/pallet
7 pallets/truck

*Assumes a minimum of 12" (300 mm) of stone above, 9" (230 mm) of stone below chambers, 6" (150 mm) of stone between chambers/end caps and 40% stone porosity.

STORMTECH MC-3500 END CAP
(not to scale)

Nominal End Cap Specifications

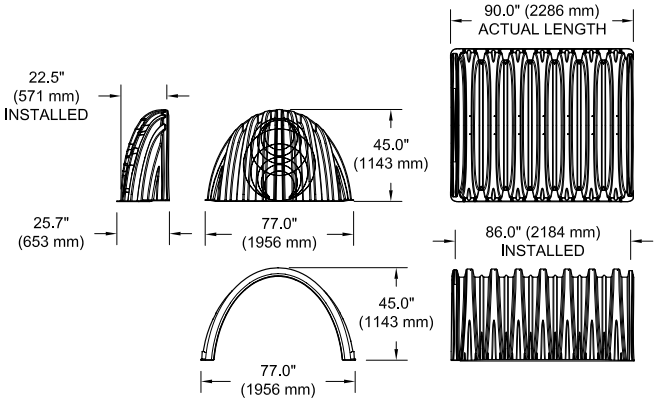
Size (L x W x H)
26.5" x 71" x 45.1"
673 mm x 1,803 mm x 1,145 mm

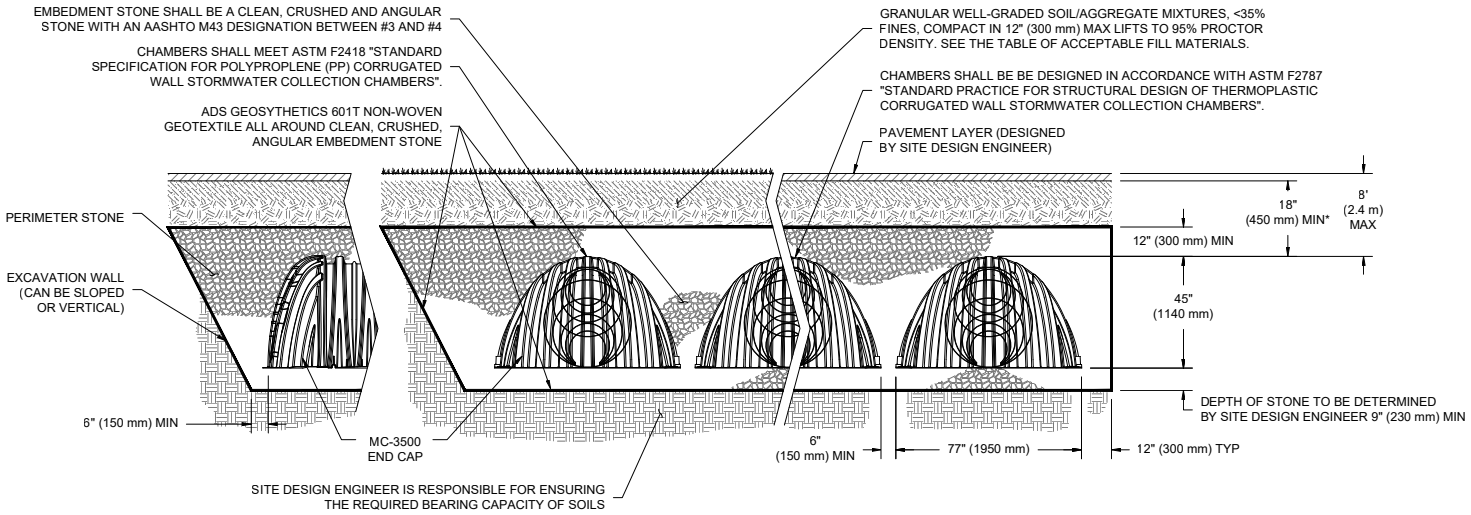
End Cap Storage
14.9 ft³ (0.42 m³)

Min. Installed Storage*
45.1ft ³ (1.28 m³)

Weight
49 lbs (22.2 kg)

*Assumes a minimum of 12" (300 mm) of stone above, 9" (230 mm) of stone below, 6" (150 mm) of stone perimeter, 6" (150 mm) of stone between chambers/ end caps and 40% stone porosity.





*MINIMUM COVER TO BOTTOM OF FLEXIBLE PAVEMENT. FOR UNPAVED INSTALLATIONS WHERE RUTTING FROM VEHICLES MAY OCCUR, INCREASE COVER TO 24" (600 mm).

MC-3500 CHAMBER SPECIFICATION

STORAGE VOLUME PER CHAMBER FT³ (M³)

	Bare Chamber Storage ft³ (m³)	Chamber and Stone Foundation Depth in. (mm)			
		9" (230 mm)	12" (300 mm)	15" (375 mm)	18" (450 mm)
MC-3500 Chamber	109.9 (3.11)	175.0 (4.96)	179.9 (5.09)	184.9 (5.24)	189.9 (5.38)
MC-3500 End Cap	14.9 (.42)	45.1 (1.28)	46.6 (1.32)	48.3 (1.37)	49.9 (1.41)

Note: Assumes 6" (150 mm) row spacing, 40% stone porosity, 12" (300 mm) stone above and includes the bare chamber/end cap volume.

AMOUNT OF STONE PER CHAMBER

ENGLISH TONS (yds³)	Stone Foundation Depth			
	9"	12"	15"	18"
MC-3500 Chamber	8.5 (6.0)	9.1 (6.5)	9.7 (6.9)	10.4 (7.4)
MC-3500 End Cap	3.9 (2.8)	4.1 (2.9)	4.3 (3.1)	4.5 (3.2)
METRIC KILOGRAMS (m³)	**230 mm**	**300 mm**	**375 mm**	**450 mm**
MC-3500 Chamber	7711 (4.6)	8255 (5.0)	8800 (5.3)	9435 (5.7)
MC-3500 End Cap	3538 (2.1)	3719 (2.2)	3901 (2.4)	4082 (2.5)

Note: Assumes 12" (300 mm) of stone above and 6" (150 mm) row spacing and 6" (150 mm) of perimeter stone in front of end caps.

VOLUME EXCAVATION PER CHAMBER YD³ (M³)

	Stone Foundation Depth			
	9" (230 mm)	12" (300 mm)	15" (375mm)	18" (450 mm)
MC-3500 Chamber	11.9 (9.1)	12.4 (9.5)	12.8(9.8)	13.3 (10.2)
MC-3500 End Cap	4.0 (3.1)	4.1 (3.2)	4.3 (3.3)	4.4 (3.4)

Note: Assumes 6" (150 mm) of separation between chamber rows and 24" (600 mm) of cover. The volume of excavation will vary as depth of cover increases.

Working on a project?
Visit us at www.stormtech.com
and utilize the StormTech Design Tool

For more information on the StormTech MC-3500 Chamber and other ADS products, please contact our Customer Service Representatives at 1-800-821-6710

*THE MOST **ADVANCED** NAME IN WATER MANAGEMENT SOLUTIONS®*

Advanced Drainage Systems, Inc.
4640 Trueman Blvd., Hilliard, OH 43026
1-800-821-6710 www.ads-pipe.com

Verification Statement

StormTech Isolator® Row PLUS
Registration number: (V-2020-10-01)
Date of issue: (2020-October-27)

Technology type	Stormwater Filtration Device
Application	Stormwater filtration technology to remove sediments, nutrients, heavy metals, and organic contaminants from stormwater runoff
Company	StormTech, LLC.
Address	520 Cromwell Avenue, Rocky Hill, CT 06067 USA **Phone** +1-888-892-2694
Website	www.stormtech.com
E-mail	info@stormtech.com

Verified Performance Claims

The StormTech Isolator® Row PLUS technology was tested at the Mid-Atlantic Storm Water Research Center (MASWRC), under the supervision of Boggs Environmental Consultants, Inc. The performance test results for two overlapping StormTech Isolator® Row PLUS chambers (commercial unit model SC-740) were verified by Good Harbour Laboratories Inc. (GHL), following the requirements of ISO 14034:2016 and the VerifiGlobal Performance Verification Protocol. Based on the laboratory testing conducted, the verified performance claims are as follows:

Total Suspended Solids (TSS) Removal Efficiency - The StormTech Isolator® Row PLUS achieved 82% ± 1% removal efficiency of suspended sediment concentration (SCC) at a 95% confidence level.

Average Loading Rate - Based on the reported flow rate data and the effective sedimentation and filtration treatment area of the test unit, the average loading rate of the test unit was 4.15 ± 0.03 GPM/ft^2 at a 95% confidence level.

Maximum Treatment Flow Rate (MTFR) - Although the MTFR varies among the StormTech Isolator® Row PLUS model sizes and the number of chambers, the design surface loading rate remains the same (4.13 gpm/ ft^2 of treatment surface area). The test unit consisted of two overlapping StormTech SC-740 chambers with a nominal MTFR of 225 GPM (0.501 CFS) and an effective filtration treatment area (EFTA) of approximately 54.5 ft^2.

Detention Time and Volume - The StormTech Isolator Row PLUS detention time and wet volume varies with model size. The unit tested had a wet volume of approximately 65.1 ft^3 and a detention time of 2.2 minutes.

Maximum Sediment Storage Depth and Volume - The sediment storage volume and depth vary according to the StormTech Isolator® Row PLUS model sizes and system configuration. For the two overlapping StormTech SC-740 chambers tested, the maximum sediment storage volume is 2.3 ft^3 at a sediment depth of 0.5 inches.

Effective Sedimentation/Filtration Treatment Areas - The Effective Sedimentation Area (ESA) and the Effective Filtration Treatment Area (EFTA) increase as the size of the system increases. For the two overlapping StormTech SC-740 chambers tested, the ESA and the ratio of ESA/EFTA were 54.5 ft^2 and 1.0, respectively.

Sediment Mass Load Capacity - The sediment mass load capacity varies according to the StormTech Isolator® Row PLUS model sizes and system configuration. For the two overlapping StormTech SC-740 chambers tested, the mass loading capture was 158.4 lbs ± 0.8 lbs (2.91 ±0.01 lbs/ ft^2) following a total sediment loading of 195.2 lbs.

Technology Application

The StormTech "Isolator® Row PLUS" is a stormwater treatment technology designed for use under parking lots, roadways and heavy earth loads while providing a superior and durable structural system. The technology comprises a row of chambers covered in a non-woven geotextile fabric with a single layer of proprietary woven fabric at the bottom that serves as a filter strip, providing surface area for infiltration and runoff reduction with enhanced suspended solids and pollutant removal. The following features make the Isolator® Row PLUS effective as a water quality solution:

- Enhanced infiltration Surface Area
- Runoff Volume Reduction
- Peak Flow Reduction
- Sediment/Pollutant Removal
- Internal Water Storage (IWS)
- Water Temperature Cooling (Thermal Buffer).

Technology Description

The Isolator® Row PLUS (shown in Figures 1 and 2) is the first row of StormTech chambers that is surrounded with filter fabric and connected to a closely located manhole for easy access. The Isolator® Row PLUS provides for settling and filtration of sediment as stormwater rises in the chamber and ultimately passes through the filter fabric. The open-bottom chambers allow stormwater to flow out of the chambers, while sediment is captured in the Isolator® Row PLUS.

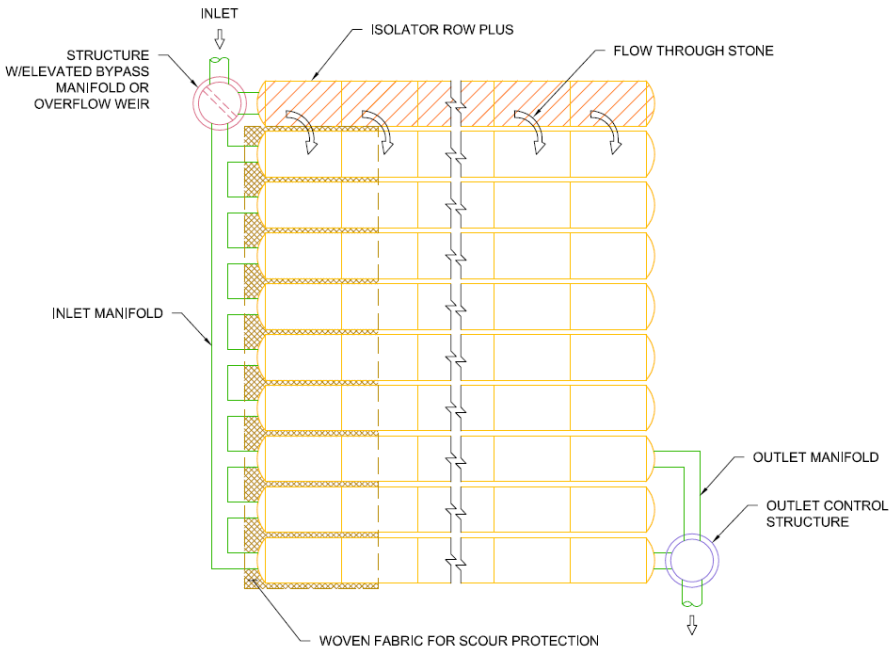


Figure 1: Schematic of the StormTech Isolator® Row PLUS System

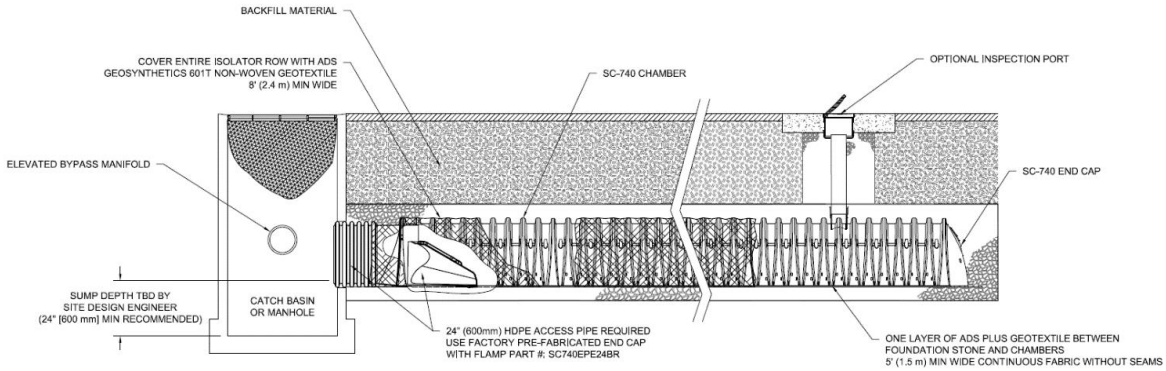


Figure 2: Isolator® Row PLUS Detail

A single layer of proprietary Advanced Drainage Systems (ADS) PLUS fabric is placed between the angular base stone and the Isolator Row PLUS chamber. The geotextile provides the means for stormwater filtration and provides a durable surface for maintenance operations. A 6 oz. non-woven fabric is placed over the chambers.

The Isolator® Row PLUS is designed to capture the “first flush” and offers the versatility to be sized on a volume basis or a flow-rate basis. An upstream manhole not only provides access to the Isolator® Row PLUS but includes a high low/concept such that stormwater flow rates or volumes that exceed the capacity of the Isolator® Row PLUS bypass through a manifold to the other chambers. This is achieved with either a high-flow weir or an elevated manifold. This creates a differential between the Isolator® Row PLUS and the manifold, thus allowing for settlement time in the Isolator® Row PLUS. After Stormwater flows through the Isolator® Row PLUS and into the rest of the StormTech chamber system it is either infiltrated into the soils below or passed at a controlled rate through an outlet manifold and outlet control structure.

StormTech developed and owns the Isolator® Row PLUS technology and has filed a number of patent applications relating to the Isolator® Row PLUS system.[1]

Description of Test Procedure for the StormTech Isolator® Row PLUS

In January 2020, two overlapping StormTech SC-740 Isolator® Row PLUS commercial size chambers were installed at the Mid-Atlantic Storm Water Research Center (MASWRC, a subsidiary of BaySaver), in Mount Airy, Maryland, to evaluate the performance of the Isolator® Row PLUS system for Total Suspended Solid (TSS) removal (Figure 3) All testing and data collection procedures were supervised by Boggs Environmental Consultants, Inc. (BEC), who was hired by ADS for third party oversight, and were in accordance with the *New Jersey Department of Environmental Protection Laboratory Protocol to Assess Total Suspended Solids Removal by a Filtration Manufactured Treatment Device (January 2013)*.

Prior to the start of testing, a Quality Assurance Project Plan (QAPP), revision dated January 09, 2020, was submitted and approved by the New Jersey Corporation for Advanced Technology (NJCAT), c/o Center for Environmental Systems, Stevens Institute of Technology, Castle Point on Hudson, Hoboken, NJ 07030.

[1] (U.S. Provisional Application No. 62/753,050, filed October 30, 2018; U.S. Non-Provisional Application No. 16/670,628, filed October 31, 2019; International Application No. PCT/US2019/059283, filed October 31, 2019; U.S. Application No. 16/938,482, filed July 24, 2020; U.S. Application No. 16/938,657, filed July 24, 2020; PCT International Application No. PCT/US2020/043543, filed July 24, 2020; PCT International Application No. PCT/US2020/043557, filed July 24, 2020.

Figure 3: StormTech "Isolator® Row PLUS" Test Set-up at MASWRC

Verification Results

The verification process for the StormTech Isolator® Row PLUS technology was conducted by GHL in accordance with the VerifiGlobal Verification Plan for the StormTech "Isolator® Row PLUS" Technology – 2020-09-09. The technology performance claims verified by GHL are summarized at the front of this Verification Statement and in Table 6 on Page 8 under the heading "Verification Summary".

Particle size distribution analysis was performed by ECS Mid-Atlantic, LLC of Frederick, MD in accordance with ASTM D422-63(2007). ECS is accredited by the American Association of State Highways and Transportation Officials (AASHTO).

ASTM D422-63(2007) is a sieve and hydrometer method where the larger particles, > 75 microns, are measured using a standard sieve stack while the smaller particles are measured based on their settling time using a hydrometer.

The PSD meets the requirements of NJDEP, which is generally accepted as representative of the type of particle sizes an OGS would be designed to treat. Actual PSD is site and rainfall event specific, so it was necessary to choose a standard PSD to make testing and comparison manageable.

Table 1 shows the NJDEP PSD specification. Table 2 and Figure 4 show the incoming material PSD as determined by ECS Mid-Atlantic and confirmed by the verifier.

Table 1: NJDEP PSD Specification

Particle Size (µm)	NJDEP Minimum Specification
1000	98
500	93
250	88
150	73
100	58
75	48
50	43
20	33
8	18
5	8
2	3
d_{50}	< 75 µm

Table 2 – Particle Size Distribution (PSD) of Test Sediment

Mesh (mm)	US Sieve Size	Sample ID		
		PSD A	PSD B	PSD C
		Percent Finer		
9.525	0.375	100.0	100.0	100.0
4.750	#4	100.0	100.0	100.0
4.000	#5	100.0	100.0	100.0
2.360	#8	100.0	100.0	100.0
2.000	#10	100.0	100.0	100.0
1.180	#16	100.0	100.0	100.0
1.000	#18	100.0	100.0	100.0
0.500	#35	100.0	100.0	100.0
0.425	#40	93.3	93.0	93.6
0.250	#60	90.3	89.8	90.2
0.150	#100	79.3	78.1	78.1
0.125	#120	73.6	71.7	71.7
0.106	#140	68.4	65.2	64.8
0.090	#170	60.2	58.3	57.5
0.075	#200	52.0	50.9	50.3
0.053	#270	48.0	48.3	47.8
0.045	Hydrometer	46.6	46.7	46.7
0.032		42.8	42.9	41.0
0.021		37.1	37.2	35.3
0.0125		25.7	25.7	25.8
0.0090		20.1	20.1	19.2
0.0064		16.3	16.4	14.5
0.0032		8.8	8.7	7.8
0.0014		3.8	3.7	3.8

The suspended sediment concentration analysis was completed by Fredericktowne Labs Inc., Meyersville, MD. Fredericktown Labs is accredited by the Maryland Department of Environment as Maryland Certified Water Quality Laboratory. The analysis procedure was ASTM D3977-97, Suspended Sediment Concentration. The sampling procedure and submission of samples to the test lab were overseen by the independent observer, Boggs Environmental Consultants, Inc.

All test data and calculations were detailed in the report “NJCAT TECHNOLOGY VERIFICATION Isolator® Row PLUS StormTech, LLC”, July 2020, which was submitted to and verified by the New Jersey Corporation for Advanced Technology (NJCAT).

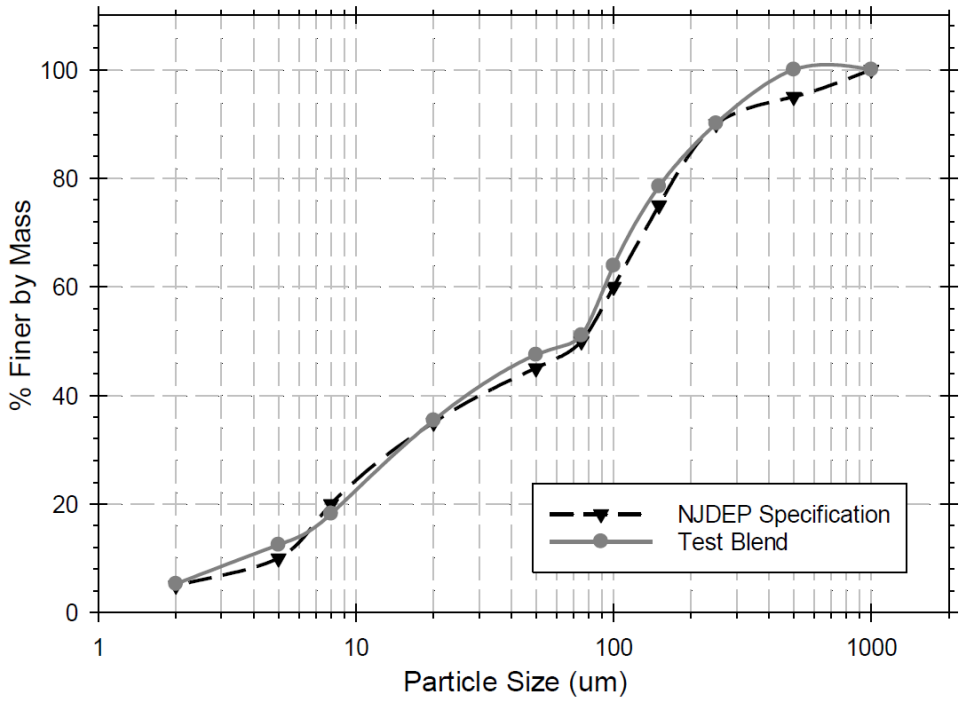


Figure 4– Particle Size Distribution (PSD)

The data in Table 3 (Flow Rate and Temperature) and Table 4 (Removal Efficiency) form the basis for the verified technology performance claim, specifically, flow rate, sediment captured and removal efficiency.

Table 3: Flow Rate and Temperature Summary

Run	Max Flow (gpm)	Min Flow (gpm)	Average Flow (gpm)	Flow COV	Flow Compliance (COV< 0.1)	Maximum Temperature (Fahrenheit)	NJDEP Temperature Compliance (< 80 F)
1	232.8	223.9	226.3	0.0078	Y	48.2	Y
2	228.9	218.6	220.8	0.0104	Y	51.5	Y
3	229.4	220.0	227.2	0.0094	Y	44.7	Y
4	230.2	218.7	223.2	0.0138	Y	40.5	Y
5	228.7	216.9	222.2	0.0103	Y	44.7	Y
6	227.6	217.0	224.2	0.0115	Y	46.7	Y
7	229.7	221.9	226.4	0.0092	Y	44.6	Y
8	230.3	222.2	226.8	0.0089	Y	43.5	Y
9	233.2	218.4	225.6	0.0136	Y	45.5	Y
10	232.2	219.7	228.4	0.0126	Y	44.7	Y
11	226.9	219.2	224.1	0.0088	Y	52.4	Y
12	232.2	222.1	226.9	0.0107	Y	48.5	Y
13	234.7	221.2	226.1	0.0109	Y	48.5	Y
14	231.9	223.4	228.7	0.0103	Y	45.6	Y
15	236.8	224.1	231.4	0.0131	Y	52.2	Y
16	232.5	221.3	229.0	0.0137	Y	47.8	Y

Table 4: Removal Efficiency Results

Run	Average Influent TSS (mg/L)	Influent Water Volume (gal)	Adjusted Average Effluent TSS (mg/L)	Effluent Water Volume (gal)	Adjusted Average Drain Down TSS (mg/L)	Drain Down Water Volume (gal)	Single Run Removal Efficiency (%)	Mass of Captured Sediment (g)	Cumulative Removal Efficiency (%)
1	203	7166	46	6881	34	285	77.8	4282	77.8
2	199	6993	32	6639	27	354	84.0	4415	80.8
3	207	7197	37	6793	27	403	82.6	4654	81.4
4	217	7068	33	6635	29	433	84.9	4923	82.3
5	215	7037	39	6593	29	444	82.2	4705	82.3
6	207	7097	40	6643	31	454	81.2	4504	82.1
7	198	7169	37	6693	30	476	81.6	4386	82.0
8	201	7184	37	6716	32	468	81.6	4473	82.0
9	205	7147	38	6675	30	472	81.8	4539	82.0
10	203	7235	38	6759	31	476	81.4	4523	81.9
11	208	7096	38	6624	30	472	81.8	4567	81.9
12	209	7185	41	6709	30	476	80.7	4584	81.8
13	198	7162	41	6680	32	482	79.7	4277	81.6
14	200	7242	43	6757	34	485	78.8	4318	81.4
15	196	7329	41	6842	32	487	79.5	4320	81.3
16	202	7254	44	6769	31	485	78.9	4384	81.2
Avg.	**204.2**	**7160**	**39**	**6713**	**31**	**447**	**81.2**	**4491**	**N/A**
Cumulative Mass Removed (g)							**71854**		
Cumulative Mass Removed (lb)							**158.4**		
Total Mass Loaded (lb)							**195.2**		
Cumulative Removal Efficiency (%)							**81.2**		

Quality Assurance

Performance verification of the StormTech Isolator® Row PLUS technology was performed in accordance with the requirements of ISO 14034:2016 and the VerifiGlobal Performance Verification Protocol. This included reviewing all data sheets and calculated values, as well as overall management of the test system, quality control and data integrity.

Additional information on quality control measures taken can be found in section 5 of the QAPP for StormTech Isolator Row New Jersey Department of Environmental Protection Testing, Rev. 1/9/2020.

Specific QA/QC measures reviewed by the verifier are summarized in Table 5 below.

Table 5. Validation of QA/QC Procedures

QC Parameter	Acceptance Criteria
Independence of observer	Confirmed in letter from Boggs Environmental Consultants, Inc. to NJCAT
Consistency of procedure	Daily logs confirm proper procedure
Existence of QAPP	Confirmed. “QAPP For StormTech Isolator Row New Jersey Department of Environmental Protection Testing”, Rev. 1/9/2020*)*
Use of appropriate sample analysis method – ASTM D3799	Confirmed by method reference on lab reports from Fredericktowne Labs Inc.
Test method appropriate for the technology	Used industry stakeholder approved protocol: *New Jersey Department of Environmental Protection Laboratory Protocol to Assess Total Suspended Solids*

	Removal by a Filtration Manufactured Treatment Device (January 2013)
Test parameters stayed within required limits	Confirmed in report "NJCAT TECHNOLOGY VERIFICATION Isolator® Row PLUS StormTech, LLC", July 2020
Third party verified data	All testing was observed and reviewed by Boggs Environmental Consultants, Inc.

Variance

Performance claims regarding structural load limitations were not verified as they are outside the scope of the performance testing that was conducted in accordance with the 'Quality Assurance Project Plan (QAPP) for StormTech Isolator Row, New Jersey Department of Environmental Protection Testing', revision dated January 09, 2020.

Verification Summary

The StormTech "Isolator® Row PLUS" is a stormwater treatment technology designed for use under parking lots, roadways and heavy earth loads while providing a superior and durable structural system. The technology comprises a row of chambers wrapped in woven geotextile fabric with two layers at the bottom that serve as a filter strip, providing surface area for infiltration and runoff reduction with enhanced suspended solids and pollutant removal.

The StormTech Isolator® Row PLUS technology was tested at the Mid-Atlantic Storm Water Research Center (MASWRC), under the supervision of Boggs Environmental Consultants, Inc. The performance test results for two overlapping StormTech Isolator® Row PLUS chambers (commercial unit model SC-740) were verified by Good Harbour Laboratories Inc. (GHL), following the requirements of ISO 14034:2016 and the VerifiGlobal Performance Verification Protocol. Table 6 summarizes the verification results in relation to the technology performance parameters that were identified in the Verification Plan to determine the efficacy of the StormTech Isolator® Row PLUS technology.

Table 6 - Summary of Verification Results Against Performance Parameters

Parameters	Verified Claims	Accuracy
Total Suspended Solids (TSS) Removal Efficiency	Based on the laboratory testing conducted, the StormTech Isolator® Row PLUS achieved an average 82% removal efficiency of SSC	± 1% (95% confidence level)
Average Loading Rate	Based on the laboratory testing parameters, the StormTech Isolator® Row PLUS maintained a loading rate of 4.15 GPM/sf	±0.03 GPM/sf (95% confidence level)
Maximum Treatment Flow Rate (MTFR)	Although the MTFR varies among the StormTech Isolator® Row PLUS model sizes and the number of chambers, the design surface loading rate remains the same (4.13 GPM/ft^2 of treatment surface area). The test unit consisted of two overlapping StormTech SC-740 chambers with a nominal MTFR of 225 GPM (0.501 CFS) and an effective filtration treatment area (EFTA) of approximately 54.5 ft^2.	± 1.4 GPM (95% confidence level)
Detention Time and Volume	Detention time and wet volume varies with model size. The unit tested had a wet volume of approximately 65.1 ft^3 (based on	N/A

	physical measurement) and a detention time of 2.2 minutes.	
Maximum Sediment Storage Depth and Volume	The sediment storage volume and depth vary according to the StormTech Isolator® Row PLUS model sizes and system configuration. For the two overlapping StormTech SC-740 chambers tested, the maximum sediment storage volume is 2.3 ft^3 at a sediment depth of 0.5 inches.	N/A
Effective Sedimentation/ Filtration Treatment Area	The effective sedimentation and filtration treatment area increases as the size of the chamber increases. Under the tested conditions using 2 overlapping chambers, the treatment area was 54.5 ft^2	The sedimentation /filtration area was determined from the actual physical dimensions of the test unit*
Sediment Mass Load Capacity	The sediment mass load capacity varies according to the StormTech Isolator® Row PLUS model sizes and system configuration. For the two overlapping StormTech SC-740 chambers tested, the mass loading capture was 158.4 lbs (2.91 lbs/ ft^2) following a total sediment loading of 195.2 lbs	± 0.8 lbs (±0.01 lbs/ft^2) (95% confidence level)

*Note: These numbers are determined based on physical measurement or a dimensional drawing, which is standard practice. Highly accurate measurements are not practical.

In conclusion, the StormTech Isolator® Row PLUS is a viable technology that can be used to remove contaminants from stormwater runoff via filtration. This technology has proven effective at removing suspended sediment from stormwater through in-lab testing using an industry recognized laboratory protocol.

By extension of sediment removal, this technology should also remove particle bound nutrients, heavy metals, and a wide variety of organic contaminants. Performance is a function of pollutant properties, hydraulic retention time, filter media, pre-treatment, and flow rate, such that proper design of the system is critical to achieving the desired results.

What is ISO 14034?

The purpose of environmental technology verification is to provide a credible and impartial account of the performance of environmental technologies. Environmental technology verification is based on a number of principles to ensure that verifications are performed and reported accurately, clearly, unambiguously and objectively. The International Organization for Standardization (ISO) standard for environmental technology verification (ETV) is ISO 14034, which was published in November 2016.

Benefits of ETV

ETV contributes to protection and conservation of the environment by promoting and facilitating market uptake of innovative environmental technologies, especially those that perform better than relevant alternatives. ETV is particularly applicable to those environmental technologies whose innovative features or performance cannot be fully assessed using existing standards. Through the provision of objective evidence, ETV provides an independent and impartial confirmation of the performance of an environmental technology based on reliable test data. ETV aims to strengthen the credibility of new, innovative technologies by supporting informed decision-making among interested parties.

For more information on the StormTech "Isolator® Row PLUS" technology, contact:	For more information on VerifiGlobal, contact:
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Signed for StormTech: *Original signed by:* *Greg Spires* Greg Spires, P.E. General Manager	Signed for VerifiGlobal: *Original signed by:* *Thomas Bruun* Thomas Bruun, Managing Director *Original signed by:* *John Neate* John Neate, Managing Director

StormTech
Detention • Retention • Water Quality
An ADS company

Isolator® Row O&M Manual

THE MOST ADVANCED NAME IN WATER MANAGEMENT SOLUTIONS™

ADS®

THE ISOLATOR® ROW

INTRODUCTION

An important component of any Stormwater Pollution Prevention Plan is inspection and maintenance. The StormTech Isolator Row is a technique to inexpensively enhance Total Suspended Solids (TSS) removal and provide easy access for inspection and maintenance.

THE ISOLATOR ROW

The Isolator Row is a row of StormTech chambers, either SC-160LP, SC-310, SC-310-3, SC-740, DC-780, MC-3500 or MC-4500 models, that is surrounded with filter fabric and connected to a closely located manhole for easy access. The fabric-wrapped chambers provide for settling and filtration of sediment as storm water rises in the Isolator Row and ultimately passes through the filter fabric. The open bottom chambers and perforated sidewalls (SC-310, SC- 310-3 and SC-740 models) allow storm water to flow both vertically and horizontally out of the chambers. Sediments are captured in the Isolator Row protecting the storage areas of the adjacent stone and chambers from sediment accumulation.

Two different fabrics are used for the Isolator Row. A woven geotextile fabric is placed between the stone and the Isolator Row chambers. The tough geotextile provides a media for storm water filtration and provides a durable surface for maintenance operations. It is also designed to prevent scour of the underlying stone and remain intact during high pressure jetting. A non-woven fabric is placed over the chambers to provide a filter media for flows passing through the perforations in the sidewall of the chamber. The non-woven fabric is not required over the SC-160LP, DC-780, MC-3500 or MC-4500 models as these chambers do not have perforated side walls.

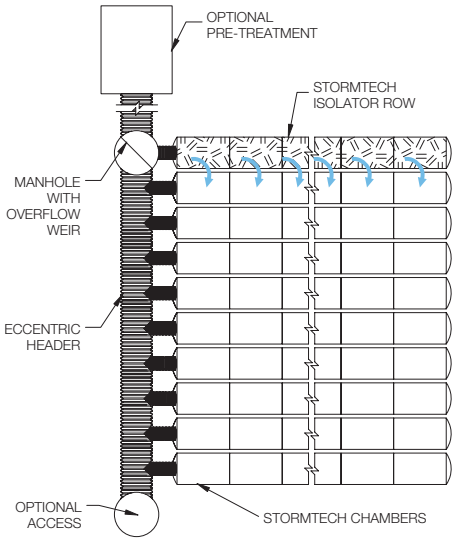
The Isolator Row is typically designed to capture the “first flush” and offers the versatility to be sized on a volume basis or flow rate basis. An upstream manhole not only provides access to the Isolator Row but typically includes a high flow weir such that storm water flowrates or volumes that exceed the capacity of the Isolator Row overtop the over flow weir and discharge through a manifold to the other chambers.

The Isolator Row may also be part of a treatment train. By treating storm water prior to entry into the chamber system, the service life can be extended and pollutants such as hydrocarbons can be captured. Pre-treatment best management practices can be as simple as deep sump catch basins, oil-water separators or can be innovative storm water treatment devices. The design of the treatment train and selection of pretreatment devices by the design engineer is often driven by regulatory requirements. Whether pretreatment is used or not, the Isolator Row is recommended by StormTech as an effective means to minimize maintenance requirements and maintenance costs.

Note: See the StormTech Design Manual for detailed information on designing inlets for a StormTech system, including the Isolator Row.

Looking down the Isolator Row from the manhole opening, woven geotextile is shown between the chamber and stone base.

StormTech Isolator Row with Overflow Spillway (not to scale)



ISOLATOR ROW INSPECTION/MAINTENANCE

INSPECTION

The frequency of inspection and maintenance varies by location. A routine inspection schedule needs to be established for each individual location based upon site specific variables. The type of land use (i.e. industrial, commercial, residential), anticipated pollutant load, percent imperviousness, climate, etc. all play a critical role in determining the actual frequency of inspection and maintenance practices.

At a minimum, StormTech recommends annual inspections. Initially, the Isolator Row should be inspected every 6 months for the first year of operation. For subsequent years, the inspection should be adjusted based upon previous observation of sediment deposition.

The Isolator Row incorporates a combination of standard manhole(s) and strategically located inspection ports (as needed). The inspection ports allow for easy access to the system from the surface, eliminating the need to perform a confined space entry for inspection purposes.

If upon visual inspection it is found that sediment has accumulated, a stadia rod should be inserted to determine the depth of sediment. When the average depth of sediment exceeds 3 inches throughout the length of the Isolator Row, clean-out should be performed.

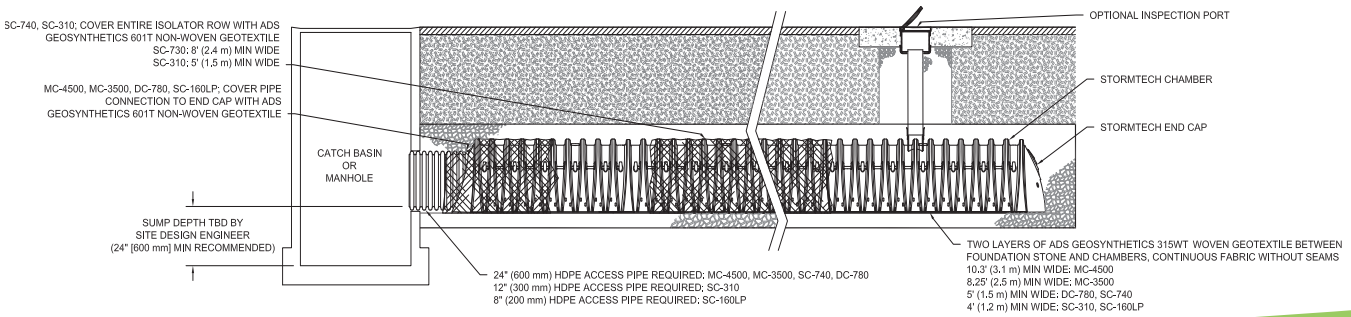
MAINTENANCE

The Isolator Row was designed to reduce the cost of periodic maintenance. By "isolating" sediments to just one row, costs are dramatically reduced by eliminating the need to clean out each row of the entire storage bed. If inspection indicates the potential need for maintenance, access is provided via a manhole(s) located on the end(s) of the row for cleanout. If entry into the manhole is required, please follow local and OSHA rules for a confined space entries.

Maintenance is accomplished with the JetVac process. The JetVac process utilizes a high pressure water nozzle to propel itself down the Isolator Row while scouring and suspending sediments. As the nozzle is retrieved, the captured pollutants are flushed back into the manhole for vacuuming. Most sewer and pipe maintenance companies have vacuum/JetVac combination vehicles. Selection of an appropriate JetVac nozzle will improve maintenance efficiency. Fixed nozzles designed for culverts or large diameter pipe cleaning are preferable. Rear facing jets with an effective spread of at least 45" are best. Most JetVac reels have 400 feet of hose allowing maintenance of an Isolator Row up to 50 chambers long. **The JetVac process shall only be performed on StormTech Isolator Rows that have AASHTO class 1 woven geotextile (as specified by StormTech) over their angular base stone.**

StormTech Isolator Row (not to scale)

Note: Non-woven fabric is only required over the inlet pipe connection into the end cap for SC-160LP, DC-780, MC-3500 and MC-4500 chamber models and is not required over the entire Isolator Row.



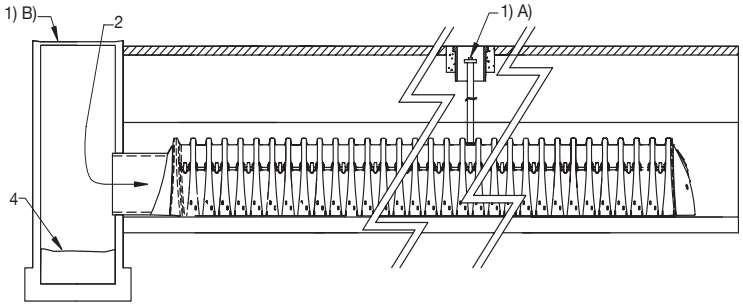
ISOLATOR ROW STEP BY STEP MAINTENANCE PROCEDURES

STEP 1
Inspect Isolator Row for sediment.
- A) Inspection ports (if present)
  - i. Remove lid from floor box frame
  - ii. Remove cap from inspection riser
  - iii. Using a flashlight and stadia rod,measure depth of sediment and record results on maintenance log.
  - iv. If sediment is at or above 3 inch depth, proceed to Step 2. If not, proceed to Step 3.
- B) All Isolator Rows
  - i. Remove cover from manhole at upstream end of Isolator Row
  - ii. Using a flashlight, inspect down Isolator Row through outlet pipe
    1. Mirrors on poles or cameras may be used to avoid a confined space entry
    2. Follow OSHA regulations for confined space entry if entering manhole
  - iii. If sediment is at or above the lower row of sidewall holes (approximately 3 inches), proceed to Step 2. If not, proceed to Step 3.

STEP 2
Clean out Isolator Row using the JetVac process.
- A) A fixed floor cleaning nozzle with rear facing nozzle spread of 45 inches or more is preferable
- B) Apply multiple passes of JetVac until backflush water is clean
- C) Vacuum manhole sump as required

STEP 3
Replace all caps, lids and covers, record observations and actions.

STEP 4
Inspect & clean catch basins and manholes upstream of the StormTech system.



SAMPLE MAINTENANCE LOG

Date	Stadia Rod Readings		Sediment Depth (1)–(2)	Observations/Actions	Inspector
	Fixed point to chamber bottom (1)	Fixed point to top of sediment (2)			
3/15/11	6.3 ft	none		New installation. Fixed point is CI frame at grade	DJM
9/24/11		6.2	0.1 ft	Some grit felt	SM
6/20/13		5.8	0.5 ft	Mucky feel, debris visible in manhole and in Isolator Row, maintenance due	NV
7/7/13	6.3 ft		0	System jetted and vacuumed	DJM

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A division of ADS

Advanced Drainage Systems, Inc.
4640 Trueman Blvd., Hilliard, OH 43026
1-800-821-6710 www.ads-pipe.com

AECOM

Appendix I

PCSWMM Input/Output Documentation – Existing Conditions

Input

```
[TITLE]
;;Project Title/Notes

[OPTIONS]
;;Option             Value
FLOW_UNITS           CMS
INFILTRATION         HORTON
FLOW_ROUTING         DYNWAVE
LINK_OFFSETS         ELEVATION
MIN_SLOPE            0
ALLOW_PONDING        NO
SKIP_STEADY_STATE    NO

START_DATE           12/11/2020
START_TIME           00:00:00
REPORT_START_DATE    12/11/2020
REPORT_START_TIME    00:00:00
END_DATE             12/21/2020
END_TIME             00:00:00
SWEEP_START          01/01
SWEEP_END            12/31
DRY_DAYS             0
REPORT_STEP          00:01:00
WET_STEP             00:05:00
DRY_STEP             00:05:00
ROUTING_STEP         5
RULE_STEP            00:00:00

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

[EVAPORATION]
;;Data Source    Parameters
;;--------------- ----------------
CONSTANT         0.0
DRY_ONLY         NO

[RAINGAGES]
;;Name           Format    Interval SCF      Source
;;-------------- --------- -------- -------- ----------
25mm             INTENSITY 0:05     1.0      TIMESERIES 25mm
3hr-100yr        INTENSITY 0:10     1.0      TIMESERIES 3hr-100yr
3hr-2yr          INTENSITY 0:05     1.0      TIMESERIES 3hr-2yr
3hr-5yr          INTENSITY 0:05     1.0      TIMESERIES 3hr-5yr
6hr-100yr        INTENSITY 0:10     1.0      TIMESERIES 6hr-100yr
6hr-2yr          INTENSITY 0:05     1.0      TIMESERIES 6hr-2yr
6hr-5yr          INTENSITY 0:05     1.0      TIMESERIES 6hr-5yr

[SUBCATCHMENTS]
;;Name           Rain Gage        Outlet           Area     %Imperv  Width    %Slope   CurbLen  SnowPack
;;-------------- ---------------- ---------------- -------- -------- -------- -------- -------- ----------------
EX_N             6hr-100yr        SHEFFIELD_RD     4.47     40       447      1        0
EX_S             6hr-100yr        HUMBER_PL        1.37     40       137      1        0

[SUBAREAS]
;;Subcatchment   N-Imperv   N-Perv     S-Imperv   S-Perv     PctZero    RouteTo    PctRouted
;;-------------- ---------- ---------- ---------- ---------- ---------- ---------- ----------
EX_N             0.013      0.2        1.57       4.67       0          OUTLET
EX_S             0.013      0.2        1.57       4.67       0          OUTLET

[INFILTRATION]
;;Subcatchment   Param1     Param2     Param3     Param4     Param5
;;-------------- ---------- ---------- ---------- ---------- ----------
EX_N             75         0.5        4          7          0
EX_S             75         0.5        4          7          0

[OUTFALLS]
;;Name           Elevation  Type       Stage Data       Gated    Route To
;;-------------- ---------- ---------- ---------------- -------- ----------------
HUMBER_PL        62.477     FREE                        NO
SHEFFIELD_RD     64         FREE                        NO

[CURVES]
;;Name           Type       X-Value    Y-Value
;;-------------- ---------- ---------- ----------
ADS              Storage    0.025      530
ADS                         0.051      530
ADS                         0.076      530
ADS                         0.102      530
ADS                         0.127      530
ADS                         0.152      530
ADS                         0.178      530
ADS                         0.203      530
```

```
ADS                         0.229      530
ADS                         0.254      590
ADS                         0.279      638
ADS                         0.305      678
ADS                         0.33       711
ADS                         0.356      739
ADS                         0.381      764
ADS                         0.406      785
ADS                         0.432      803
ADS                         0.457      819
ADS                         0.483      833
ADS                         0.508      846
ADS                         0.533      857
ADS                         0.559      866
ADS                         0.584      875
ADS                         0.61       883
ADS                         0.635      889
ADS                         0.66       895
ADS                         0.686      901
ADS                         0.711      905
ADS                         0.737      910
ADS                         0.762      913
ADS                         0.787      916
ADS                         0.813      919
ADS                         0.838      921
ADS                         0.864      922
ADS                         0.889      924
ADS                         0.914      925
ADS                         0.94       925
ADS                         0.965      925
ADS                         0.991      925
ADS                         1.016      925
ADS                         1.041      924
ADS                         1.067      923
ADS                         1.092      921
ADS                         1.118      919
ADS                         1.143      917
ADS                         1.168      914
ADS                         1.194      911
ADS                         1.219      908
ADS                         1.245      903
ADS                         1.27       898
ADS                         1.295      892
ADS                         1.321      886
ADS                         1.346      880
ADS                         1.372      874
ADS                         1.397      868
ADS                         1.422      862
ADS                         1.448      856
ADS                         1.473      850
ADS                         1.499      845
ADS                         1.524      840
ADS                         1.549      834
ADS                         1.575      830
ADS                         1.6        825
ADS                         1.626      820
ADS                         1.651      816
ADS                         1.676      811

STORAGE_N        Storage    0          1500
STORAGE_N                   1          1500

STORAGE_S        Storage    0          1800
STORAGE_S                   1          1800

[TIMESERIES]
;;Name           Date       Time       Value
;;-------------- ---------- ---------- ----------
25mm                        0:00       1.423
25mm                        0:05       1.423
25mm                        0:10       1.574
25mm                        0:15       1.574
25mm                        0:20       1.769
25mm                        0:25       1.769
25mm                        0:30       2.028
25mm                        0:35       2.028
25mm                        0:40       2.389
25mm                        0:45       2.389
25mm                        0:50       2.933
25mm                        0:55       2.933
25mm                        1:00       3.859
25mm                        1:05       3.859
25mm                        1:10       5.821
25mm                        1:15       5.821
25mm                        1:20       13.337
25mm                        1:25       13.337
25mm                        1:30       61.503
25mm                        1:35       61.503
25mm                        1:40       15.65
25mm                        1:45       15.65
25mm                        1:50       7.793
25mm                        1:55       7.793
25mm                        2:00       5.294
25mm                        2:05       5.294
25mm                        2:10       4.057
```

25mm	2:15	4.057
25mm	2:20	3.314
25mm	2:25	3.314
25mm	2:30	2.817
25mm	2:35	2.817
25mm	2:40	2.459
25mm	2:45	2.459
25mm	2:50	2.189
25mm	2:55	2.189
25mm	3:00	1.977
25mm	3:05	1.977
25mm	3:10	1.805
25mm	3:15	1.805
25mm	3:20	1.664
25mm	3:25	1.664
25mm	3:30	1.545
25mm	3:35	1.545
25mm	3:40	1.444
25mm	3:45	1.444
25mm	3:50	1.356
25mm	3:55	1.356
25mm	4:00	0
3hr-100yr	0:00	0
3hr-100yr	0:10	6.05
3hr-100yr	0:20	7.54
3hr-100yr	0:30	10.17
3hr-100yr	0:40	15.98
3hr-100yr	0:50	40.76
3hr-100yr	1:00	178.56
3hr-100yr	1:10	54.04
3hr-100yr	1:20	27.31
3hr-100yr	1:30	18.23
3hr-100yr	1:40	13.73
3hr-100yr	1:50	11.05
3hr-100yr	2:00	9.28
3hr-100yr	2:10	8.02
3hr-100yr	2:20	7.08
3hr-100yr	2:30	6.34
3hr-100yr	2:40	5.76
3hr-100yr	2:50	5.28
3hr-100yr	3:00	4.88
;Chicago design storm, a = 732.951, b = 6.199, c = 0.81, Duration = 180 minutes, r = 0.35, rain units = mm/hr.		
3hr-2yr	0:00	2.393
3hr-2yr	0:05	2.588
3hr-2yr	0:10	2.823
3hr-2yr	0:15	3.109
3hr-2yr	0:20	3.466
3hr-2yr	0:25	3.927
3hr-2yr	0:30	4.543
3hr-2yr	0:35	5.41
3hr-2yr	0:40	6.721
3hr-2yr	0:45	8.935
3hr-2yr	0:50	13.427
3hr-2yr	0:55	26.893
3hr-2yr	1:00	103.571
3hr-2yr	1:05	49.651
3hr-2yr	1:10	27.587
3hr-2yr	1:15	17.967
3hr-2yr	1:20	13.238
3hr-2yr	1:25	10.466
3hr-2yr	1:30	8.658
3hr-2yr	1:35	7.391
3hr-2yr	1:40	6.455
3hr-2yr	1:45	5.737
3hr-2yr	1:50	5.169
3hr-2yr	1:55	4.707
3hr-2yr	2:00	4.326
3hr-2yr	2:05	4.005
3hr-2yr	2:10	3.731
3hr-2yr	2:15	3.494
3hr-2yr	2:20	3.288
3hr-2yr	2:25	3.107
3hr-2yr	2:30	2.945
3hr-2yr	2:35	2.801
3hr-2yr	2:40	2.672
3hr-2yr	2:45	2.555
3hr-2yr	2:50	2.449
3hr-2yr	2:55	2.351
3hr-2yr	3:00	0
;Chicago design storm, a = 998.071, b = 6.053, c = 0.814, Duration = 180 minutes, r = 0.35, rain units = mm/hr.		
3hr-5yr	0:00	3.128
3hr-5yr	0:05	3.385
3hr-5yr	0:10	3.693
3hr-5yr	0:15	4.069
3hr-5yr	0:20	4.54
3hr-5yr	0:25	5.147
3hr-5yr	0:30	5.959
3hr-5yr	0:35	7.105
3hr-5yr	0:40	8.84
3hr-5yr	0:45	11.775
3hr-5yr	0:50	17.755
3hr-5yr	0:55	35.83

```
3hr-5yr                     1:00       141.179
3hr-5yr                     1:05       66.682
3hr-5yr                     1:10       36.749
3hr-5yr                     1:15       23.822
3hr-5yr                     1:20       17.501
3hr-5yr                     1:25       13.81
3hr-5yr                     1:30       11.408
3hr-5yr                     1:35       9.727
3hr-5yr                     1:40       8.488
3hr-5yr                     1:45       7.538
3hr-5yr                     1:50       6.786
3hr-5yr                     1:55       6.177
3hr-5yr                     2:00       5.673
3hr-5yr                     2:05       5.25
3hr-5yr                     2:10       4.889
3hr-5yr                     2:15       4.577
3hr-5yr                     2:20       4.306
3hr-5yr                     2:25       4.066
3hr-5yr                     2:30       3.854
3hr-5yr                     2:35       3.665
3hr-5yr                     2:40       3.495
3hr-5yr                     2:45       3.341
3hr-5yr                     2:50       3.201
3hr-5yr                     2:55       3.073
3hr-5yr                     3:00       0

6hr-100yr                   0:00       0
6hr-100yr                   0:10       2.91
6hr-100yr                   0:20       3.17
6hr-100yr                   0:30       3.48
6hr-100yr                   0:40       3.88
6hr-100yr                   0:50       4.39
6hr-100yr                   1:00       5.08
6hr-100yr                   1:10       6.05
6hr-100yr                   1:20       7.55
6hr-100yr                   1:30       10.17
6hr-100yr                   1:40       15.98
6hr-100yr                   1:50       40.67
6hr-100yr                   2:00       178.56
6hr-100yr                   2:10       54.04
6hr-100yr                   2:20       27.31
6hr-100yr                   2:30       18.23
6hr-100yr                   2:40       13.73
6hr-100yr                   2:50       11.05
6hr-100yr                   3:00       9.28
6hr-100yr                   3:10       8.02
6hr-100yr                   3:20       7.08
6hr-100yr                   3:30       6.34
6hr-100yr                   3:40       5.76
6hr-100yr                   3:50       5.28
6hr-100yr                   4:00       4.88
6hr-100yr                   4:10       4.54
6hr-100yr                   4:20       4.25
6hr-100yr                   4:30       3.99
6hr-100yr                   4:40       3.77
6hr-100yr                   4:50       3.57
6hr-100yr                   5:00       3.4
6hr-100yr                   5:10       3.24
6hr-100yr                   5:20       3.1
6hr-100yr                   5:30       2.97
6hr-100yr                   5:40       2.85
6hr-100yr                   5:50       2.74
6hr-100yr                   6:00       2.64

;Chicago design storm, a = 732.951, b = 6.199, c = 0.81, Duration = 360 minutes, r = 0.35, rain units = mm/hr.
6hr-2yr                     0:00       1.274
6hr-2yr                     0:05       1.32
6hr-2yr                     0:10       1.37
6hr-2yr                     0:15       1.425
6hr-2yr                     0:20       1.485
6hr-2yr                     0:25       1.55
6hr-2yr                     0:30       1.623
6hr-2yr                     0:35       1.703
6hr-2yr                     0:40       1.793
6hr-2yr                     0:45       1.894
6hr-2yr                     0:50       2.008
6hr-2yr                     0:55       2.139
6hr-2yr                     1:00       2.29
6hr-2yr                     1:05       2.467
6hr-2yr                     1:10       2.677
6hr-2yr                     1:15       2.93
6hr-2yr                     1:20       3.242
6hr-2yr                     1:25       3.636
6hr-2yr                     1:30       4.15
6hr-2yr                     1:35       4.851
6hr-2yr                     1:40       5.864
6hr-2yr                     1:45       7.456
6hr-2yr                     1:50       10.31
6hr-2yr                     1:55       16.817
6hr-2yr                     2:00       41.518
6hr-2yr                     2:05       103.571
6hr-2yr                     2:10       39.807
6hr-2yr                     2:15       22.769
6hr-2yr                     2:20       15.728
6hr-2yr                     2:25       11.97
```

6hr-2yr	2:30	9.658
6hr-2yr	2:35	8.101
6hr-2yr	2:40	6.985
6hr-2yr	2:45	6.147
6hr-2yr	2:50	5.495
6hr-2yr	2:55	4.973
6hr-2yr	3:00	4.546
6hr-2yr	3:05	4.191
6hr-2yr	3:10	3.89
6hr-2yr	3:15	3.632
6hr-2yr	3:20	3.409
6hr-2yr	3:25	3.213
6hr-2yr	3:30	3.04
6hr-2yr	3:35	2.886
6hr-2yr	3:40	2.748
6hr-2yr	3:45	2.624
6hr-2yr	3:50	2.511
6hr-2yr	3:55	2.409
6hr-2yr	4:00	2.315
6hr-2yr	4:05	2.229
6hr-2yr	4:10	2.149
6hr-2yr	4:15	2.076
6hr-2yr	4:20	2.008
6hr-2yr	4:25	1.944
6hr-2yr	4:30	1.885
6hr-2yr	4:35	1.83
6hr-2yr	4:40	1.778
6hr-2yr	4:45	1.729
6hr-2yr	4:50	1.684
6hr-2yr	4:55	1.64
6hr-2yr	5:00	1.599
6hr-2yr	5:05	1.561
6hr-2yr	5:10	1.524
6hr-2yr	5:15	1.489
6hr-2yr	5:20	1.456
6hr-2yr	5:25	1.425
6hr-2yr	5:30	1.395
6hr-2yr	5:35	1.366
6hr-2yr	5:40	1.339
6hr-2yr	5:45	1.312
6hr-2yr	5:50	1.287
6hr-2yr	5:55	1.263
6hr-2yr	6:00	0

;Chicago design storm, a = 998.071, b = 6.053, c = 0.814, Duration = 360 minutes, r = 0.35, rain units = mm/hr.

6hr-5yr	0:00	1.659
6hr-5yr	0:05	1.72
6hr-5yr	0:10	1.786
6hr-5yr	0:15	1.857
6hr-5yr	0:20	1.936
6hr-5yr	0:25	2.022
6hr-5yr	0:30	2.117
6hr-5yr	0:35	2.222
6hr-5yr	0:40	2.34
6hr-5yr	0:45	2.472
6hr-5yr	0:50	2.623
6hr-5yr	0:55	2.794
6hr-5yr	1:00	2.993
6hr-5yr	1:05	3.225
6hr-5yr	1:10	3.501
6hr-5yr	1:15	3.834
6hr-5yr	1:20	4.244
6hr-5yr	1:25	4.763
6hr-5yr	1:30	5.442
6hr-5yr	1:35	6.367
6hr-5yr	1:40	7.706
6hr-5yr	1:45	9.813
6hr-5yr	1:50	13.603
6hr-5yr	1:55	22.285
6hr-5yr	2:00	55.656
6hr-5yr	2:05	141.179
6hr-5yr	2:10	53.291
6hr-5yr	2:15	30.263
6hr-5yr	2:20	20.826
6hr-5yr	2:25	15.811
6hr-5yr	2:30	12.736
6hr-5yr	2:35	10.669
6hr-5yr	2:40	9.189
6hr-5yr	2:45	8.079
6hr-5yr	2:50	7.217
6hr-5yr	2:55	6.528
6hr-5yr	3:00	5.965
6hr-5yr	3:05	5.496
6hr-5yr	3:10	5.099
6hr-5yr	3:15	4.759
6hr-5yr	3:20	4.464
6hr-5yr	3:25	4.206
6hr-5yr	3:30	3.979
6hr-5yr	3:35	3.776
6hr-5yr	3:40	3.595
6hr-5yr	3:45	3.431
6hr-5yr	3:50	3.283
6hr-5yr	3:55	3.148
6hr-5yr	4:00	3.025
6hr-5yr	4:05	2.912

```
6hr-5yr                 4:10       2.808
6hr-5yr                 4:15       2.711
6hr-5yr                 4:20       2.622
6hr-5yr                 4:25       2.539
6hr-5yr                 4:30       2.461
6hr-5yr                 4:35       2.389
6hr-5yr                 4:40       2.32
6hr-5yr                 4:45       2.257
6hr-5yr                 4:50       2.196
6hr-5yr                 4:55       2.14
6hr-5yr                 5:00       2.086
6hr-5yr                 5:05       2.035
6hr-5yr                 5:10       1.987
6hr-5yr                 5:15       1.942
6hr-5yr                 5:20       1.898
6hr-5yr                 5:25       1.857
6hr-5yr                 5:30       1.818
6hr-5yr                 5:35       1.78
6hr-5yr                 5:40       1.744
6hr-5yr                 5:45       1.71
6hr-5yr                 5:50       1.677
6hr-5yr                 5:55       1.646
6hr-5yr                 6:00       0

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

[TAGS]

[MAP]
DIMENSIONS       922195.2104      5041730.342      922454.7796      5042003.582
UNITS            Meters

[COORDINATES]
;;Node           X-Coord            Y-Coord
;;-------------- ------------------ ------------------
HUMBER_PL        922268.498         5041894.2
SHEFFIELD_RD     922422.12          5041745.436

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

[POLYGONS]
;;Subcatchment   X-Coord            Y-Coord
;;-------------- ------------------ ------------------
EX_N             922405.17          5041835.648
EX_N             922442.981         5041761.954
EX_N             922393.45          5041742.762
EX_N             922362.523         5041813.337
EX_N             922405.17          5041835.648
EX_S             922249.656         5041991.162
EX_S             922287.467         5041917.468
EX_S             922237.936         5041898.276
EX_S             922207.009         5041968.851
EX_S             922249.656         5041991.162

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

25 mm

```
EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.015)
--------------------------------------------------------------


*************
Element Count
*************
Number of rain gages ...... 7
Number of subcatchments ... 2
Number of nodes ........... 2
Number of links ........... 0
Number of pollutants ...... 0
Number of land uses ....... 0


****************
Raingage Summary
****************
                                                  Data       Recording
Name                 Data Source                  Type       Interval
------------------------------------------------------------------------
25mm                 25mm                         INTENSITY    5 min.
3hr-100yr            3hr-100yr                    INTENSITY   10 min.
3hr-2yr              3hr-2yr                      INTENSITY    5 min.
3hr-5yr              3hr-5yr                      INTENSITY    5 min.
6hr-100yr            6hr-100yr                    INTENSITY   10 min.
6hr-2yr              6hr-2yr                      INTENSITY    5 min.
6hr-5yr              6hr-5yr                      INTENSITY    5 min.


*******************
Subcatchment Summary
*******************
Name                       Area     Width   %Imperv    %Slope Rain Gage            Outlet
------------------------------------------------------------------------------------------------------
EX_N                       4.47    447.00     40.00    1.0000 25mm                 SHEFFIELD_RD
EX_S                       1.37    137.00     40.00    1.0000 25mm                 HUMBER_PL


************
Node Summary
************
                                       Invert      Max.    Ponded    External
Name                 Type                Elev.     Depth      Area    Inflow
--------------------------------------------------------------------------------
HUMBER_PL            OUTFALL             62.48      0.00       0.0
SHEFFIELD_RD         OUTFALL             64.00      0.00       0.0


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

***************
Analysis Options
***************
Flow Units ............... CMS
Process Models:
  Rainfall/Runoff ........ YES
  RDII ................... NO
  Snowmelt ............... NO
  Groundwater ............ NO
  Flow Routing ........... NO
  Water Quality .......... NO
Infiltration Method ...... HORTON
Surcharge Method ......... EXTRAN
Starting Date ............ 12/11/2020 00:00:00
Ending Date .............. 12/21/2020 00:00:00
Antecedent Dry Days ...... 0.0
Report Time Step ......... 00:01:00
Wet Time Step ............ 00:05:00
Dry Time Step ............ 00:05:00


*************************        Volume         Depth
Runoff Quantity Continuity     hectare-m            mm
*************************     ---------       -------
Total Precipitation ......         0.146        25.000
Evaporation Loss .........         0.000         0.000
Infiltration Loss ........         0.087        14.982
Surface Runoff ...........         0.055         9.483
Final Storage ............         0.004         0.628
Continuity Error (%) .....        -0.374


*************************        Volume        Volume
Flow Routing Continuity        hectare-m      10^6 ltr
*************************     ---------     ---------
Dry Weather Inflow .......         0.000         0.000
```

Wet Weather Inflow	0.055	0.554
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	0.000	0.000
External Outflow	0.055	0.554
Flooding Loss	0.000	0.000
Evaporation Loss	0.000	0.000
Exfiltration Loss	0.000	0.000
Initial Stored Volume	0.000	0.000
Final Stored Volume	0.000	0.000
Continuity Error (%)	0.000	

****
Subcatchment Runoff Summary
****

Subcatchment	Total Precip mm	Total Runon mm	Total Evap mm	Total Infil mm	Imperv Runoff mm	Perv Runoff mm	Total Runoff mm	Total Runoff 10^6 ltr	Peak Runoff CMS	Runoff Coeff
EX_N	25.00	0.00	0.00	14.98	9.47	0.02	9.48	0.42	0.30	0.379
EX_S	25.00	0.00	0.00	14.98	9.47	0.02	9.48	0.13	0.09	0.379

Analysis begun on: Wed Oct 5 21:27:16 2022
Analysis ended on: Wed Oct 5 21:27:16 2022

Total elapsed time: < 1 sec

2-yr, 3-hour

```
  EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.015)
  --------------------------------------------------------------


  *************
  Element Count
  *************
  Number of rain gages ...... 7
  Number of subcatchments ... 2
  Number of nodes ........... 2
  Number of links ........... 0
  Number of pollutants ...... 0
  Number of land uses ....... 0


  ****************
  Raingage Summary
  ****************
                                                    Data       Recording
  Name                 Data Source                  Type       Interval
  ------------------------------------------------------------------------
  25mm                 25mm                         INTENSITY    5 min.
  3hr-100yr            3hr-100yr                    INTENSITY   10 min.
  3hr-2yr              3hr-2yr                      INTENSITY    5 min.
  3hr-5yr              3hr-5yr                      INTENSITY    5 min.
  6hr-100yr            6hr-100yr                    INTENSITY   10 min.
  6hr-2yr              6hr-2yr                      INTENSITY    5 min.
  6hr-5yr              6hr-5yr                      INTENSITY    5 min.


  ********************
  Subcatchment Summary
  ********************
  Name                       Area     Width   %Imperv    %Slope Rain Gage            Outlet
  ------------------------------------------------------------------------------------------------
  EX_N                       4.47    447.00     40.00    1.0000 3hr-2yr              SHEFFIELD_RD
  EX_S                       1.37    137.00     40.00    1.0000 3hr-2yr              HUMBER_PL


  ************
  Node Summary
  ************
                                         Invert      Max.    Ponded    External
  Name                 Type                Elev.     Depth      Area    Inflow
  ------------------------------------------------------------------------------
  HUMBER_PL            OUTFALL            62.48      0.00       0.0
  SHEFFIELD_RD         OUTFALL            64.00      0.00       0.0


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

  ***************
  Analysis Options
  ***************
  Flow Units ............... CMS
  Process Models:
    Rainfall/Runoff ........ YES
    RDII ................... NO
    Snowmelt ............... NO
    Groundwater ............ NO
    Flow Routing ........... NO
    Water Quality .......... NO
  Infiltration Method ...... HORTON
  Surcharge Method ......... EXTRAN
  Starting Date ............ 12/11/2020 00:00:00
  Ending Date .............. 12/21/2020 00:00:00
  Antecedent Dry Days ...... 0.0
  Report Time Step ......... 00:01:00
  Wet Time Step ............ 00:05:00
  Dry Time Step ............ 00:05:00


  *************************        Volume         Depth
  Runoff Quantity Continuity     hectare-m            mm
  *************************     ---------       -------
  Total Precipitation ......         0.186        31.880
  Evaporation Loss .........         0.000         0.000
  Infiltration Loss ........         0.091        15.601
  Surface Runoff ...........         0.092        15.782
  Final Storage ............         0.004         0.628
  Continuity Error (%) .....        -0.410


  *************************        Volume        Volume
  Flow Routing Continuity        hectare-m      10^6 ltr
  *************************     ---------     ---------
  Dry Weather Inflow .......         0.000         0.000
```

Wet Weather Inflow	0.092	0.922
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	0.000	0.000
External Outflow	0.092	0.922
Flooding Loss	0.000	0.000
Evaporation Loss	0.000	0.000
Exfiltration Loss	0.000	0.000
Initial Stored Volume	0.000	0.000
Final Stored Volume	0.000	0.000
Continuity Error (%)	0.000	

****
Subcatchment Runoff Summary
****

Subcatchment	Total Precip mm	Total Runon mm	Total Evap mm	Total Infil mm	Imperv Runoff mm	Perv Runoff mm	Total Runoff mm	Total Runoff 10^6 ltr	Peak Runoff CMS	Runoff Coeff
EX_N	31.88	0.00	0.00	15.60	12.25	3.53	15.78	0.71	0.48	0.495
EX_S	31.88	0.00	0.00	15.60	12.25	3.53	15.78	0.22	0.15	0.495

Analysis begun on: Wed Oct 5 21:27:34 2022
Analysis ended on: Wed Oct 5 21:27:34 2022

Total elapsed time: < 1 sec

2-yr, 6-hour

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.015)

****
Element Count
****
Number of rain gages 7
Number of subcatchments ... 2
Number of nodes 2
Number of links 0
Number of pollutants 0
Number of land uses 0

****
Raingage Summary
****

Name	Data Source	Data Type	Recording Interval
25mm	25mm	INTENSITY	5 min.
3hr-100yr	3hr-100yr	INTENSITY	10 min.
3hr-2yr	3hr-2yr	INTENSITY	5 min.
3hr-5yr	3hr-5yr	INTENSITY	5 min.
6hr-100yr	6hr-100yr	INTENSITY	10 min.
6hr-2yr	6hr-2yr	INTENSITY	5 min.
6hr-5yr	6hr-5yr	INTENSITY	5 min.

****
Subcatchment Summary
****

Name	Area	Width	%Imperv	%Slope	Rain Gage	Outlet
EX_N	4.47	447.00	40.00	1.0000	6hr-2yr	SHEFFIELD_RD
EX_S	1.37	137.00	40.00	1.0000	6hr-2yr	HUMBER_PL

****
Node Summary
****

Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
HUMBER_PL	OUTFALL	62.48	0.00	0.0	
SHEFFIELD_RD	OUTFALL	64.00	0.00	0.0	

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

****
Analysis Options
****
Flow Units ..... CMS
Process Models:
  Rainfall/Runoff ..... YES
  RDII ..... NO
  Snowmelt ..... NO
  Groundwater ..... NO
  Flow Routing ..... NO
  Water Quality ..... NO
Infiltration Method ..... HORTON
Surcharge Method ..... EXTRAN
Starting Date 12/11/2020 00:00:00
Ending Date 12/21/2020 00:00:00
Antecedent Dry Days 0.0
Report Time Step 00:01:00
Wet Time Step 00:05:00
Dry Time Step 00:05:00

Runoff Quantity Continuity	Volume hectare-m	Depth mm
Total Precipitation	0.215	36.865
Evaporation Loss	0.000	0.000
Infiltration Loss	0.094	16.058
Surface Runoff	0.119	20.301
Final Storage	0.004	0.628
Continuity Error (%)	-0.330	

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

*************************	---------	---------
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	0.119	1.186
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	0.000	0.000
External Outflow	0.119	1.186
Flooding Loss	0.000	0.000
Evaporation Loss	0.000	0.000
Exfiltration Loss	0.000	0.000
Initial Stored Volume	0.000	0.000
Final Stored Volume	0.000	0.000
Continuity Error (%)	0.000	

****
Subcatchment Runoff Summary
****

Subcatchment	Total Precip mm	Total Runon mm	Total Evap mm	Total Infil mm	Imperv Runoff mm	Perv Runoff mm	Total Runoff mm	Total Runoff 10^6 ltr	Peak Runoff CMS	Runoff Coeff
EX_N	36.86	0.00	0.00	16.06	14.22	6.08	20.30	0.91	0.49	0.551
EX_S	36.86	0.00	0.00	16.06	14.22	6.08	20.30	0.28	0.15	0.551

Analysis begun on: Wed Oct 5 21:27:45 2022
Analysis ended on: Wed Oct 5 21:27:45 2022
Total elapsed time: < 1 sec

5-yr, 3-hour

```
  EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.015)
  --------------------------------------------------------------


  *************
  Element Count
  *************
  Number of rain gages ...... 7
  Number of subcatchments ... 2
  Number of nodes ........... 2
  Number of links ........... 0
  Number of pollutants ...... 0
  Number of land uses ....... 0


  ****************
  Raingage Summary
  ****************
                                                    Data       Recording
  Name                 Data Source                  Type       Interval
  ---------------------------------------------------------------------
  25mm                 25mm                         INTENSITY    5 min.
  3hr-100yr            3hr-100yr                    INTENSITY   10 min.
  3hr-2yr              3hr-2yr                      INTENSITY    5 min.
  3hr-5yr              3hr-5yr                      INTENSITY    5 min.
  6hr-100yr            6hr-100yr                    INTENSITY   10 min.
  6hr-2yr              6hr-2yr                      INTENSITY    5 min.
  6hr-5yr              6hr-5yr                      INTENSITY    5 min.


  ********************
  Subcatchment Summary
  ********************
  Name                       Area     Width   %Imperv    %Slope Rain Gage            Outlet
  ------------------------------------------------------------------------------------------------
  EX_N                       4.47    447.00     40.00    1.0000 3hr-5yr              SHEFFIELD_RD
  EX_S                       1.37    137.00     40.00    1.0000 3hr-5yr              HUMBER_PL


  ************
  Node Summary
  ************
                                        Invert      Max.    Ponded    External
  Name                 Type                Elev.     Depth      Area    Inflow
  ---------------------------------------------------------------------------
  HUMBER_PL            OUTFALL            62.48      0.00       0.0
  SHEFFIELD_RD         OUTFALL            64.00      0.00       0.0


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

  ***************
  Analysis Options
  ***************
  Flow Units ............... CMS
  Process Models:
    Rainfall/Runoff ........ YES
    RDII ................... NO
    Snowmelt ............... NO
    Groundwater ............ NO
    Flow Routing ........... NO
    Water Quality .......... NO
  Infiltration Method ...... HORTON
  Surcharge Method ......... EXTRAN
  Starting Date ............ 12/11/2020 00:00:00
  Ending Date .............. 12/21/2020 00:00:00
  Antecedent Dry Days ...... 0.0
  Report Time Step ......... 00:01:00
  Wet Time Step ............ 00:05:00
  Dry Time Step ............ 00:05:00


  *************************        Volume         Depth
  Runoff Quantity Continuity     hectare-m            mm
  *************************     ---------       -------
  Total Precipitation ......         0.248        42.540
  Evaporation Loss .........         0.000         0.000
  Infiltration Loss ........         0.092        15.728
  Surface Runoff ...........         0.154        26.404
  Final Storage ............         0.004         0.628
  Continuity Error (%) .....        -0.516


  *************************        Volume        Volume
  Flow Routing Continuity        hectare-m      10^6 ltr
  *************************     ---------     ---------
  Dry Weather Inflow .......         0.000         0.000
```

Wet Weather Inflow	0.154	1.542
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	0.000	0.000
External Outflow	0.154	1.542
Flooding Loss	0.000	0.000
Evaporation Loss	0.000	0.000
Exfiltration Loss	0.000	0.000
Initial Stored Volume	0.000	0.000
Final Stored Volume	0.000	0.000
Continuity Error (%)	0.000	

****
Subcatchment Runoff Summary
****

Subcatchment	Total Precip mm	Total Runon mm	Total Evap mm	Total Infil mm	Imperv Runoff mm	Perv Runoff mm	Total Runoff mm	Total Runoff 10^6 ltr	Peak Runoff CMS	Runoff Coeff
EX_N	42.54	0.00	0.00	15.73	16.54	9.86	26.40	1.18	0.69	0.621
EX_S	42.54	0.00	0.00	15.73	16.54	9.86	26.40	0.36	0.21	0.621

Analysis begun on: Wed Oct 5 21:28:01 2022
Analysis ended on: Wed Oct 5 21:28:01 2022

Total elapsed time: < 1 sec

5-yr, 6-hour

```
  EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.015)
  --------------------------------------------------------------


  *************
  Element Count
  *************
  Number of rain gages ...... 7
  Number of subcatchments ... 2
  Number of nodes ........... 2
  Number of links ........... 0
  Number of pollutants ...... 0
  Number of land uses ....... 0


  ****************
  Raingage Summary
  ****************
                                                    Data       Recording
  Name                 Data Source                  Type       Interval
  ---------------------------------------------------------------------
  25mm                 25mm                         INTENSITY    5 min.
  3hr-100yr            3hr-100yr                    INTENSITY   10 min.
  3hr-2yr              3hr-2yr                      INTENSITY    5 min.
  3hr-5yr              3hr-5yr                      INTENSITY    5 min.
  6hr-100yr            6hr-100yr                    INTENSITY   10 min.
  6hr-2yr              6hr-2yr                      INTENSITY    5 min.
  6hr-5yr              6hr-5yr                      INTENSITY    5 min.


  ********************
  Subcatchment Summary
  ********************
  Name                       Area     Width   %Imperv    %Slope Rain Gage            Outlet
  ------------------------------------------------------------------------------------------------
  EX_N                       4.47    447.00     40.00    1.0000 6hr-5yr              SHEFFIELD_RD
  EX_S                       1.37    137.00     40.00    1.0000 6hr-5yr              HUMBER_PL


  ************
  Node Summary
  ************
                                        Invert      Max.    Ponded    External
  Name                 Type                Elev.     Depth      Area    Inflow
  ---------------------------------------------------------------------------
  HUMBER_PL            OUTFALL            62.48      0.00       0.0
  SHEFFIELD_RD         OUTFALL            64.00      0.00       0.0


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

  ***************
  Analysis Options
  ***************
  Flow Units ............... CMS
  Process Models:
    Rainfall/Runoff ........ YES
    RDII ................... NO
    Snowmelt ............... NO
    Groundwater ............ NO
    Flow Routing ........... NO
    Water Quality .......... NO
  Infiltration Method ...... HORTON
  Surcharge Method ......... EXTRAN
  Starting Date ............ 12/11/2020 00:00:00
  Ending Date .............. 12/21/2020 00:00:00
  Antecedent Dry Days ...... 0.0
  Report Time Step ......... 00:01:00
  Wet Time Step ............ 00:05:00
  Dry Time Step ............ 00:05:00


  *************************        Volume         Depth
  Runoff Quantity Continuity     hectare-m            mm
  *************************     ---------       -------
  Total Precipitation ......         0.286        49.044
  Evaporation Loss .........         0.000         0.000
  Infiltration Loss ........         0.094        16.153
  Surface Runoff ...........         0.190        32.489
  Final Storage ............         0.004         0.628
  Continuity Error (%) .....        -0.461


  *************************        Volume        Volume
  Flow Routing Continuity        hectare-m      10^6 ltr
  *************************     ---------     ---------
  Dry Weather Inflow .......         0.000         0.000
```

Wet Weather Inflow	0.190	1.897
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	0.000	0.000
External Outflow	0.190	1.897
Flooding Loss	0.000	0.000
Evaporation Loss	0.000	0.000
Exfiltration Loss	0.000	0.000
Initial Stored Volume	0.000	0.000
Final Stored Volume	0.000	0.000
Continuity Error (%)	0.000	

****
Subcatchment Runoff Summary
****

Subcatchment	Total Precip mm	Total Runon mm	Total Evap mm	Total Infil mm	Imperv Runoff mm	Perv Runoff mm	Total Runoff mm	Total Runoff 10^6 ltr	Peak Runoff CMS	Runoff Coeff
EX_N	49.04	0.00	0.00	16.15	19.12	13.37	32.49	1.45	0.73	0.662
EX_S	49.04	0.00	0.00	16.15	19.12	13.37	32.49	0.45	0.22	0.662

Analysis begun on: Wed Oct 5 21:28:15 2022
Analysis ended on: Wed Oct 5 21:28:16 2022

Total elapsed time: 00:00:01

100-yr, 3-hour

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.015)

****
Element Count
****
Number of rain gages 7
Number of subcatchments ... 2
Number of nodes 2
Number of links 0
Number of pollutants 0
Number of land uses 0

****
Raingage Summary
****

Name	Data Source	Data Type	Recording Interval
25mm	25mm	INTENSITY	5 min.
3hr-100yr	3hr-100yr	INTENSITY	10 min.
3hr-2yr	3hr-2yr	INTENSITY	5 min.
3hr-5yr	3hr-5yr	INTENSITY	5 min.
6hr-100yr	6hr-100yr	INTENSITY	10 min.
6hr-2yr	6hr-2yr	INTENSITY	5 min.
6hr-5yr	6hr-5yr	INTENSITY	5 min.

****
Subcatchment Summary
****

Name	Area	Width	%Imperv	%Slope	Rain Gage	Outlet
EX_N	4.47	447.00	40.00	1.0000	3hr-100yr	SHEFFIELD_RD
EX_S	1.37	137.00	40.00	1.0000	3hr-100yr	HUMBER_PL

****
Node Summary
****

Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
HUMBER_PL	OUTFALL	62.48	0.00	0.0	
SHEFFIELD_RD	OUTFALL	64.00	0.00	0.0	

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

****
Analysis Options
****
Flow Units ..... CMS
Process Models:
  Rainfall/Runoff ..... YES
  RDII ..... NO
  Snowmelt ..... NO
  Groundwater ..... NO
  Flow Routing ..... NO
  Water Quality ..... NO
Infiltration Method ..... HORTON
Surcharge Method ..... EXTRAN
Starting Date 12/11/2020 00:00:00
Ending Date 12/21/2020 00:00:00
Antecedent Dry Days 0.0
Report Time Step 00:01:00
Wet Time Step 00:05:00
Dry Time Step 00:05:00

Runoff Quantity Continuity	Volume hectare-m	Depth mm
Total Precipitation	0.419	71.677
Evaporation Loss	0.000	0.000
Infiltration Loss	0.093	15.893
Surface Runoff	0.325	55.588
Final Storage	0.004	0.628
Continuity Error (%)	-0.603	

Flow Routing Continuity	Volume hectare-m	Volume 10^6 ltr
Dry Weather Inflow	0.000	0.000

Wet Weather Inflow	0.325	3.246
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	0.000	0.000
External Outflow	0.325	3.246
Flooding Loss	0.000	0.000
Evaporation Loss	0.000	0.000
Exfiltration Loss	0.000	0.000
Initial Stored Volume	0.000	0.000
Final Stored Volume	0.000	0.000
Continuity Error (%)	0.000	

****
Subcatchment Runoff Summary
****

Subcatchment	Total Precip mm	Total Runon mm	Total Evap mm	Total Infil mm	Imperv Runoff mm	Perv Runoff mm	Total Runoff mm	Total Runoff 10^6 ltr	Peak Runoff CMS	Runoff Coeff
EX_N	71.68	0.00	0.00	15.89	28.25	27.33	55.59	2.48	1.22	0.776
EX_S	71.68	0.00	0.00	15.89	28.25	27.33	55.59	0.76	0.38	0.776

Analysis begun on: Wed Oct 5 21:28:29 2022
Analysis ended on: Wed Oct 5 21:28:29 2022

Total elapsed time: < 1 sec

100-yr, 6-hour

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.015)

****
Element Count
****
Number of rain gages 7
Number of subcatchments ... 2
Number of nodes 2
Number of links 0
Number of pollutants 0
Number of land uses 0

****
Raingage Summary
****

Name	Data Source	Data Type	Recording Interval
25mm	25mm	INTENSITY	5 min.
3hr-100yr	3hr-100yr	INTENSITY	10 min.
3hr-2yr	3hr-2yr	INTENSITY	5 min.
3hr-5yr	3hr-5yr	INTENSITY	5 min.
6hr-100yr	6hr-100yr	INTENSITY	10 min.
6hr-2yr	6hr-2yr	INTENSITY	5 min.
6hr-5yr	6hr-5yr	INTENSITY	5 min.

****
Subcatchment Summary
****

Name	Area	Width	%Imperv	%Slope	Rain Gage	Outlet
EX_N	4.47	447.00	40.00	1.0000	6hr-100yr	SHEFFIELD_RD
EX_S	1.37	137.00	40.00	1.0000	6hr-100yr	HUMBER_PL

****
Node Summary
****

Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
HUMBER_PL	OUTFALL	62.48	0.00	0.0	
SHEFFIELD_RD	OUTFALL	64.00	0.00	0.0	

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

****
Analysis Options
****
Flow Units ..... CMS
Process Models:
  Rainfall/Runoff ..... YES
  RDII ..... NO
  Snowmelt ..... NO
  Groundwater ..... NO
  Flow Routing ..... NO
  Water Quality ..... NO
Infiltration Method ..... HORTON
Surcharge Method ..... EXTRAN
Starting Date 12/11/2020 00:00:00
Ending Date 12/21/2020 00:00:00
Antecedent Dry Days 0.0
Report Time Step 00:01:00
Wet Time Step 00:05:00
Dry Time Step 00:05:00

Runoff Quantity Continuity	Volume hectare-m	Depth mm
Total Precipitation	0.481	82.325
Evaporation Loss	0.000	0.000
Infiltration Loss	0.096	16.366
Surface Runoff	0.384	65.763
Final Storage	0.004	0.628
Continuity Error (%)	-0.524	

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

**************************	---------	---------
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	0.384	3.841
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	0.000	0.000
External Outflow	0.384	3.841
Flooding Loss	0.000	0.000
Evaporation Loss	0.000	0.000
Exfiltration Loss	0.000	0.000
Initial Stored Volume	0.000	0.000
Final Stored Volume	0.000	0.000
Continuity Error (%)	0.000	

****
Subcatchment Runoff Summary
****

Subcatchment	Total Precip mm	Total Runon mm	Total Evap mm	Total Infil mm	Imperv Runoff mm	Perv Runoff mm	Total Runoff mm	Total Runoff 10^6 ltr	Peak Runoff CMS	Runoff Coeff
EX_N	82.33	0.00	0.00	16.37	32.50	33.26	65.76	2.94	1.28	0.799
EX_S	82.32	0.00	0.00	16.37	32.50	33.26	65.76	0.90	0.39	0.799

Analysis begun on: Wed Oct 5 21:28:42 2022
Analysis ended on: Wed Oct 5 21:28:42 2022
Total elapsed time: < 1 sec

AECOM

Appendix J

PCSWMM Input/Output Documentation – Proposed Conditions

Input

[TITLE]
;;Project Title/Notes

[OPTIONS]

;;Option	Value
FLOW_UNITS	CMS
INFILTRATION	HORTON
FLOW_ROUTING	DYNWAVE
LINK_OFFSETS	ELEVATION
MIN_SLOPE	0
ALLOW_PONDING	NO
SKIP_STEADY_STATE	NO
START_DATE	12/11/2020
START_TIME	00:00:00
REPORT_START_DATE	12/11/2020
REPORT_START_TIME	00:00:00
END_DATE	12/21/2020
END_TIME	00:00:00
SWEEP_START	01/01
SWEEP_END	12/31
DRY_DAYS	0
REPORT_STEP	00:01:00
WET_STEP	00:01:00
DRY_STEP	00:01:00
ROUTING_STEP	1
RULE_STEP	00:00:00
INERTIAL_DAMPING	PARTIAL
NORMAL_FLOW_LIMITED	BOTH
FORCE_MAIN_EQUATION	H-W
VARIABLE_STEP	0.75
LENGTHENING_STEP	0
MIN_SURFAREA	0
MAX_TRIALS	8
HEAD_TOLERANCE	0.0015
SYS_FLOW_TOL	5
LAT_FLOW_TOL	5
MINIMUM_STEP	0.5
THREADS	6

[EVAPORATION]

;;Data Source	Parameters
CONSTANT	0.0
DRY_ONLY	NO

[RAINGAGES]

;;Name	Format	Interval	SCF	Source
25mm	INTENSITY	0:05	1.0	TIMESERIES 25mm
3hr-100yr	INTENSITY	0:10	1.0	TIMESERIES 3hr-100yr
3hr-2yr	INTENSITY	0:05	1.0	TIMESERIES 3hr-2yr
3hr-5yr	INTENSITY	0:05	1.0	TIMESERIES 3hr-5yr
6hr-100yr	INTENSITY	0:10	1.0	TIMESERIES 6hr-100yr
6hr-2yr	INTENSITY	0:05	1.0	TIMESERIES 6hr-2yr
6hr-5yr	INTENSITY	0:05	1.0	TIMESERIES 6hr-5yr

[SUBCATCHMENTS]

;;Name	Rain Gage	Outlet	Area	%Imperv	Width	%Slope	CurbLen	SnowPack
Area_1	25mm	CBMH_14	0.25	90	83.333	1	0	
Area_10	25mm	CB_23	0.08	90	26.667	1	0	
Area_101	25mm	MH_26	1.37	95	137	0.5	0	
Area_102	25mm	CBMH_11	1.13	95	113	0.5	0	
Area_11	25mm	CB_10	0.13	90	43.333	1	0	
Area_12	25mm	CBMH_9	0.16	90	53.333	1	0	
Area_13	25mm	CBMH_8	0.16	90	53.333	1	0	
Area_14	25mm	CBMH_7	0.17	90	56.667	1	0	
Area_15	25mm	CBMH_6	0.09	90	30	1	0	
Area_16	25mm	CB_5	0.15	90	50	1	0	
Area_17	25mm	CBMH_4	0.17	90	56.667	1	0	
Area_18	25mm	CBMH_3	0.17	90	56.667	1	0	
Area_19	25mm	CBMH_2	0.17	90	56.667	1	0	
Area_2	25mm	CBMH_15	0.16	90	53.333	1	0	
Area_20	25mm	J13	0.28	90	93.333	1	0	
Area_2001	25mm	OF2	0.07	25	7	0.5	0	
Area_2002	25mm	OF2	0.21	90	21	0.5	0	
Area_2003	25mm	OF1	0.16	90	16	1	0	
Area_2004	25mm	Humber_Pl	0.02	5	13.333	0.5	0	
Area_2005	25mm	Humber_Pl	0.04	5	26.667	0.5	0	
Area_21	25mm	CBMH_11	0.21	90	70	1	0	
Area_22	25mm	CBMH_12	0.32	90	106.667	1	0	
Area_23	25mm	CB_29	0.16	90	53.333	1	0	
Area_3	25mm	DCB_16	0.36	90	120	1	0	
Area_4	25mm	CBMH_18	0.28	90	93.333	1	0	
Area_5	25mm	CB_27	0.15	90	50	1	0	
Area_6	25mm	CB_28	0.15	90	50	1	0	
Area_7	25mm	CBMH_19	0.04	90	13.333	1	0	
Area_8	25mm	CBMH_21	0.12	90	40	1	0	
Area_9	25mm	CBMH_22	0.12	90	40	1	0	

[SUBAREAS]

;;Subcatchment	N-Imperv	N-Perv	S-Imperv	S-Perv	PctZero	RouteTo	PctRouted
Area_1	0.013	0.2	1.57	4.67	100	OUTLET	
Area_10	0.013	0.2	1.57	4.67	100	OUTLET	
Area_101	0.013	0.2	1.57	4.67	100	OUTLET	
Area_102	0.013	0.2	1.57	4.67	100	OUTLET	
Area_11	0.013	0.2	1.57	4.67	100	OUTLET	
Area_12	0.013	0.2	1.57	4.67	100	OUTLET	
Area_13	0.013	0.2	1.57	4.67	100	OUTLET	
Area_14	0.013	0.2	1.57	4.67	100	OUTLET	
Area_15	0.013	0.2	1.57	4.67	100	OUTLET	
Area_16	0.013	0.2	1.57	4.67	100	OUTLET	
Area_17	0.013	0.2	1.57	4.67	100	OUTLET	
Area_18	0.013	0.2	1.57	4.67	100	OUTLET	
Area_19	0.013	0.2	1.57	4.67	100	OUTLET	
Area_2	0.013	0.2	1.57	4.67	100	OUTLET	
Area_20	0.013	0.2	1.57	4.67	100	OUTLET	
Area_2001	0.013	0.2	1.57	4.67	100	OUTLET	
Area_2002	0.013	0.2	1.57	4.67	100	OUTLET	
Area_2003	0.013	0.2	2	5	100	OUTLET	
Area_2004	0.013	0.2	1.57	4.67	100	OUTLET	
Area_2005	0.013	0.2	1.57	4.67	100	OUTLET	
Area_21	0.013	0.2	1.57	4.67	100	OUTLET	
Area_22	0.013	0.2	1.57	4.67	100	OUTLET	
Area_23	0.013	0.2	1.57	4.67	100	OUTLET	
Area_3	0.013	0.2	1.57	4.67	100	OUTLET	
Area_4	0.013	0.2	1.57	4.67	100	OUTLET	
Area_5	0.013	0.2	1.57	4.67	100	OUTLET	
Area_6	0.013	0.2	1.57	4.67	100	OUTLET	
Area_7	0.013	0.2	1.57	4.67	100	OUTLET	
Area_8	0.013	0.2	1.57	4.67	100	OUTLET	
Area_9	0.013	0.2	1.57	4.67	100	OUTLET	

[INFILTRATION]

;;Subcatchment	Param1	Param2	Param3	Param4	Param5
Area_1	75	0.5	4	7	0
Area_10	75	0.5	4	7	0
Area_101	75	0.5	4	7	0
Area_102	75	0.5	4	7	0
Area_11	75	0.5	4	7	0
Area_12	75	0.5	4	7	0
Area_13	75	0.5	4	7	0
Area_14	75	0.5	4	7	0
Area_15	75	0.5	4	7	0
Area_16	75	0.5	4	7	0
Area_17	75	0.5	4	7	0
Area_18	75	0.5	4	7	0
Area_19	75	0.5	4	7	0
Area_2	75	0.5	4	7	0
Area_20	75	0.5	4	7	0
Area_2001	75	0.5	4	7	0
Area_2002	75	0.5	4	7	0
Area_2003	75	0.5	4	7	0
Area_2004	75	0.5	4	7	0
Area_2005	75	0.5	4	7	0
Area_21	75	0.5	4	7	0
Area_22	75	0.5	4	7	0
Area_23	75	0.5	4	7	0
Area_3	75	0.5	4	7	0
Area_4	75	0.5	4	7	0
Area_5	75	0.5	4	7	0
Area_6	75	0.5	4	7	0
Area_7	75	0.5	4	7	0
Area_8	75	0.5	4	7	0
Area_9	75	0.5	4	7	0

[JUNCTIONS]

;;Name	Elevation	MaxDepth	InitDepth	SurDepth	Aponded
CB_10	65.329	1.411	0	0	10
CB_23	66.197	0.933	0	0	10
CB_27	65.485	1.345	0	0	10
CB_28	65.386	1.524	0	0	10
CB_29	64.113	2.427	0	0	0
CB_5	65.114	1.626	0	0	10
CBMH_11	63.583	2.157	0	0	10
CBMH_12	64.058	1.682	0	0	10
CBMH_14	64.106	2.214	0	0	10
CBMH_15	64.466	1.854	0	0	10
CBMH_18	64.05	2.54	0	0	0
CBMH_19	64.877	2.383	0	0	10
CBMH_2	64.057	2.943	0	0	10
CBMH_21	65.172	1.868	0	0	10
CBMH_22	65.532	1.508	0	0	10
CBMH_3	64.417	2.583	0	0	10
CBMH_4	64.777	2.223	0	0	10
CBMH_6	63.912	2.728	0	0	10
CBMH_7	64.272	2.728	0	0	10
CBMH_8	64.632	2.368	0	0	10
CBMH_9	64.992	2.008	0	0	10
DCB_16	64.798	1.522	0	0	10
J1	63.749	3.271	0	0	0
J13	63.537	3.103	0	0	10
J2	63.236	3.334	0	0	0

MH_20	64.989	2.301	0	0	0
MH_24	64.134	2.496	0	0	10
MH_25	64.415	2.625	0	0	0
MH_26	64.557	2.703	0	0	0
MH_27	63.889	2.021	0	0	0
MH_30	63.732	3.078	0	0	0
MH_44	63.512	3.508	0	0	0
MH_45	63.114	3.456	0	0	0
OGS_1	63.039	3.341	0	0	0
OGS_2	63.469	3.011	0	0	0

[OUTFALLS]

;;Name	Elevation	Type	Stage Data	Gated	Route To
Humber_Pl	62.477	FREE		NO	
OF1	63.41	FREE		NO	
OF2	0	FREE		NO	

[STORAGE]

;;Name	Elev.	MaxDepth	InitDepth	Shape	Curve Name/Params	N/A	Fevap	Psi	Ksat	IMD
SU_N	63.749	3.041	0	TABULAR	STORAGE_N	0	0			
SU_S	63.236	3.334	0	TABULAR	STORAGE_S	0	0			

[CONDUITS]

;;Name	From Node	To Node	Length	Roughness	InOffset	OutOffset	InitFlow	MaxFlow
C1	SU_N	MH_44	2.5	0.009	64.6	64.575	0	0
C10	CB_28	MH_26	30.4	0.011	65.386	65.082	0	0
C11	CB_27	MH_26	32.8	0.011	65.485	65.157	0	0
C12	MH_26	MH_25	16.5	0.011	64.557	64.475	0	0
C13	MH_24	CBMH_18	4.8	0.011	64.134	64.11	0	0
C14	CB_23	CBMH_22	51.5	0.011	66.197	65.682	0	0
C15	CBMH_22	CBMH_21	60	0.011	65.532	65.232	0	0
C16	CBMH_21	MH_20	24.5	0.011	65.172	65.049	0	0
C17	MH_20	CBMH_19	10.4	0.011	64.989	64.937	0	0
C18	CBMH_19	MH_24	46.5	0.011	64.877	64.644	0	0
C19	CB_10	CBMH_9	52.5	0.011	65.329	65.067	0	0
C2	MH_44	OGS_2	11.6	0.011	63.512	63.454	0	0
C20	CBMH_9	CBMH_8	60	0.011	64.992	64.692	0	0
C21	CBMH_8	CBMH_7	60	0.011	64.632	64.332	0	0
C22	CBMH_7	CBMH_6	60	0.011	64.272	63.972	0	0
C23	CBMH_6	J13	29.9	0.011	63.912	63.762	0	0
C24	J13	SU_S	4	0.011	63.537	63.517	0	0
C25	CB_5	CBMH_4	52.5	0.011	65.114	64.852	0	0
C26	CBMH_4	CBMH_3	60	0.011	64.777	64.477	0	0
C27	CBMH_3	CBMH_2	60	0.011	64.417	64.117	0	0
C28	CBMH_2	MH_30	53.4	0.011	64.057	63.792	0	0
C29	CBMH_12	CBMH_11	50	0.011	64.058	63.773	0	0
C3	J1	MH_44	2.5	0.011	63.749	63.737	0	0
C30	MH_30	J13	9.3	0.011	63.732	63.687	0	0
C31	MH_27	CBMH_11	8.2	0.011	63.889	63.848	0	0
C32	CBMH_11	SU_S	13.2	0.011	63.568	63.517	0	0
C33	OGS_1	Humber_Pl	4	0.011	63.039	62.48	0	0
C34	OGS_2	OF1	8.7	0.011	63.454	63.41	0	0
C35	MH_25	MH_24	44.2	0.011	64.415	64.194	0	0
C36	CBMH_18	SU_N	3.9	0.011	64.05	64.03	0	0
C37	CB_29	MH_27	32.9	0.011	64.113	63.949	0	0
C4	SU_S	MH_45	9.4	0.009	64.1	64.006	0	0
C5	J2	MH_45	9.4	0.011	63.236	63.189	0	0
C6	MH_45	OGS_1	3.1	0.011	63.114	63.099	0	0
C7	DCB_16	CBMH_15	54.4	0.011	64.798	64.526	0	0
C8	CBMH_15	CBMH_14	60	0.011	64.466	64.166	0	0
C9	CBMH_14	SU_N	15.2	0.011	64.106	64.03	0	0

[ORIFICES]

;;Name	From Node	To Node	Type	Offset	Qcoeff	Gated	CloseTime
OR1	SU_S	J2	SIDE	63.236	0.65	NO	0
OR2	SU_N	J1	SIDE	63.749	0.65	NO	0

[XSECTIONS]

;;Link	Shape	Geom1	Geom2	Geom3	Geom4	Barrels	Culvert
C1	CIRCULAR	0.2	0	0	0	1	
C10	CIRCULAR	0.45	0	0	0	1	
C11	CIRCULAR	0.45	0	0	0	1	
C12	CIRCULAR	0.525	0	0	0	1	
C13	CIRCULAR	0.6	0	0	0	1	
C14	CIRCULAR	0.375	0	0	0	1	
C15	CIRCULAR	0.45	0	0	0	1	
C16	CIRCULAR	0.45	0	0	0	1	
C17	CIRCULAR	0.45	0	0	0	1	
C18	CIRCULAR	0.45	0	0	0	1	
C19	CIRCULAR	0.45	0	0	0	1	
C2	CIRCULAR	0.375	0	0	0	1	
C20	CIRCULAR	0.525	0	0	0	1	
C21	CIRCULAR	0.525	0	0	0	1	
C22	CIRCULAR	0.525	0	0	0	1	
C23	CIRCULAR	0.525	0	0	0	1	
C24	CIRCULAR	0.75	0	0	0	1	
C25	CIRCULAR	0.525	0	0	0	1	
C26	CIRCULAR	0.6	0	0	0	1	
C27	CIRCULAR	0.6	0	0	0	1	

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C28              CIRCULAR     0.6              0          0          0          1
C29              CIRCULAR     0.375            0          0          0          1
C3               CIRCULAR     0.3              0          0          0          1
C30              CIRCULAR     0.6              0          0          0          1
C31              CIRCULAR     0.375            0          0          0          1
C32              CIRCULAR     0.525            0          0          0          1
C33              CIRCULAR     0.375            0          0          0          1
C34              CIRCULAR     0.375            0          0          0          1
C35              CIRCULAR     0.6              0          0          0          1
C36              CIRCULAR     0.75             0          0          0          1
C37              CIRCULAR     0.375            0          0          0          1
C4               CIRCULAR     0.2              0          0          0          1
C5               CIRCULAR     0.3              0          0          0          1
C6               CIRCULAR     0.375            0          0          0          1
C7               CIRCULAR     0.525            0          0          0          1
C8               CIRCULAR     0.525            0          0          0          1
C9               CIRCULAR     0.6              0          0          0          1
OR1              CIRCULAR     0.075            0          0          0
OR2              CIRCULAR     0.075            0          0          0

[LOSSES]
;;Link           Kentry     Kexit      Kavg       Flap Gate  Seepage
;;-------------- ---------- ---------- ---------- ---------- ----------

[CURVES]
;;Name           Type       X-Value    Y-Value
;;-------------- ---------- ---------- ----------
ADS              Storage    0.025      530
ADS                         0.051      530
ADS                         0.076      530
ADS                         0.102      530
ADS                         0.127      530
ADS                         0.152      530
ADS                         0.178      530
ADS                         0.203      530
ADS                         0.229      530
ADS                         0.254      590
ADS                         0.279      638
ADS                         0.305      678
ADS                         0.33       711
ADS                         0.356      739
ADS                         0.381      764
ADS                         0.406      785
ADS                         0.432      803
ADS                         0.457      819
ADS                         0.483      833
ADS                         0.508      846
ADS                         0.533      857
ADS                         0.559      866
ADS                         0.584      875
ADS                         0.61       883
ADS                         0.635      889
ADS                         0.66       895
ADS                         0.686      901
ADS                         0.711      905
ADS                         0.737      910
ADS                         0.762      913
ADS                         0.787      916
ADS                         0.813      919
ADS                         0.838      921
ADS                         0.864      922
ADS                         0.889      924
ADS                         0.914      925
ADS                         0.94       925
ADS                         0.965      925
ADS                         0.991      925
ADS                         1.016      925
ADS                         1.041      924
ADS                         1.067      923
ADS                         1.092      921
ADS                         1.118      919
ADS                         1.143      917
ADS                         1.168      914
ADS                         1.194      911
ADS                         1.219      908
ADS                         1.245      903
ADS                         1.27       898
ADS                         1.295      892
ADS                         1.321      886
ADS                         1.346      880
ADS                         1.372      874
ADS                         1.397      868
ADS                         1.422      862
ADS                         1.448      856
ADS                         1.473      850
ADS                         1.499      845
ADS                         1.524      840
ADS                         1.549      834
ADS                         1.575      830
ADS                         1.6        825
ADS                         1.626      820
ADS                         1.651      816
ADS                         1.676      811

STORAGE_N        Storage    0          0
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```
STORAGE_N                   0.025      600
STORAGE_N                   0.051      588.2352941
STORAGE_N                   0.076      592.2368421
STORAGE_N                   0.102      588.3333333
STORAGE_N                   0.127      590.6299213
STORAGE_N                   0.152      592.1710526
STORAGE_N                   0.178      589.9438202
STORAGE_N                   0.203      591.2315271
STORAGE_N                   0.229      589.6069869
STORAGE_N                   0.254      658.6614173
STORAGE_N                   0.279      714.8028674
STORAGE_N                   0.305      758.852459
STORAGE_N                   0.33       798.0909091
STORAGE_N                   0.356      829.1573034
STORAGE_N                   0.381      857.9527559
STORAGE_N                   0.406      882.9064039
STORAGE_N                   0.432      902.5925926
STORAGE_N                   0.457      921.7724289
STORAGE_N                   0.483      936.7080745
STORAGE_N                   0.508      951.7322835
STORAGE_N                   0.533      965.0469043
STORAGE_N                   0.559      975.1341682
STORAGE_N                   0.584      985.7363014
STORAGE_N                   0.61       993.5409836
STORAGE_N                   0.635      1002
STORAGE_N                   0.66       1009.515152
STORAGE_N                   0.686      1014.693878
STORAGE_N                   0.711      1020.632911
STORAGE_N                   0.737      1024.464043
STORAGE_N                   0.762      1029.068241
STORAGE_N                   0.787      1033.062262
STORAGE_N                   0.813      1035.215252
STORAGE_N                   0.838      1038.126492
STORAGE_N                   0.864      1039.340278
STORAGE_N                   0.889      1041.293588
STORAGE_N                   0.914      1042.789934
STORAGE_N                   0.94       1042.734043
STORAGE_N                   0.965      1043.388601
STORAGE_N                   0.991      1042.552977
STORAGE_N                   1.016      1042.391732
STORAGE_N                   1.041      1041.815562
STORAGE_N                   1.067      1039.859419
STORAGE_N                   1.092      1038.479853
STORAGE_N                   1.118      1035.742397
STORAGE_N                   1.143      1033.525809
STORAGE_N                   1.168      1030.830479
STORAGE_N                   1.194      1026.767169
STORAGE_N                   1.219      1023.027071
STORAGE_N                   1.245      1017.751004
STORAGE_N                   1.27       1012.173228
STORAGE_N                   1.295      1005.745174
STORAGE_N                   1.321      998.4027252
STORAGE_N                   1.346      991.7087667
STORAGE_N                   1.372      984.0524781
STORAGE_N                   1.397      977.1868289
STORAGE_N                   1.422      970.5555556
STORAGE_N                   1.448      963.4875691
STORAGE_N                   1.473      957.3183978
STORAGE_N                   1.499      950.7204803
STORAGE_N                   1.524      944.9737533
STORAGE_N                   1.549      939.4060684
STORAGE_N                   1.575      933.4222222
STORAGE_N                   1.6        928.2125
STORAGE_N                   1.626      922.595326
STORAGE_N                   1.651      917.7165354
STORAGE_N                   1.676      912.977327

STORAGE_S        Storage    0          0
STORAGE_S                   0.025      736
STORAGE_S                   0.051      736
STORAGE_S                   0.076      736
STORAGE_S                   0.102      736
STORAGE_S                   0.127      736
STORAGE_S                   0.152      736
STORAGE_S                   0.178      736
STORAGE_S                   0.203      736
STORAGE_S                   0.229      736
STORAGE_S                   0.254      821
STORAGE_S                   0.279      889
STORAGE_S                   0.305      946
STORAGE_S                   0.33       994
STORAGE_S                   0.356      1034
STORAGE_S                   0.381      1069
STORAGE_S                   0.406      1098
STORAGE_S                   0.432      1124
STORAGE_S                   0.457      1147
STORAGE_S                   0.483      1167
STORAGE_S                   0.508      1185
STORAGE_S                   0.533      1201
STORAGE_S                   0.559      1215
STORAGE_S                   0.584      1227
STORAGE_S                   0.61       1238
STORAGE_S                   0.635      1247
STORAGE_S                   0.66       1256
STORAGE_S                   0.686      1264
```

```
STORAGE_S                   0.711      1270
STORAGE_S                   0.737      1276
STORAGE_S                   0.762      1281
STORAGE_S                   0.787      1285
STORAGE_S                   0.813      1289
STORAGE_S                   0.838      1292
STORAGE_S                   0.864      1294
STORAGE_S                   0.889      1296
STORAGE_S                   0.914      1298
STORAGE_S                   0.94       1298
STORAGE_S                   0.965      1299
STORAGE_S                   0.991      1298
STORAGE_S                   1.016      1298
STORAGE_S                   1.041      1296
STORAGE_S                   1.067      1295
STORAGE_S                   1.092      1293
STORAGE_S                   1.118      1290
STORAGE_S                   1.143      1287
STORAGE_S                   1.168      1283
STORAGE_S                   1.194      1278
STORAGE_S                   1.219      1273
STORAGE_S                   1.245      1267
STORAGE_S                   1.27       1260
STORAGE_S                   1.295      1252
STORAGE_S                   1.321      1243
STORAGE_S                   1.346      1234
STORAGE_S                   1.372      1226
STORAGE_S                   1.397      1217
STORAGE_S                   1.422      1208
STORAGE_S                   1.448      1200
STORAGE_S                   1.473      1192
STORAGE_S                   1.499      1184
STORAGE_S                   1.524      1177
STORAGE_S                   1.549      1169
STORAGE_S                   1.575      1162
STORAGE_S                   1.6        1156
STORAGE_S                   1.626      1149
STORAGE_S                   1.651      1143
STORAGE_S                   1.676      1137

TEST             Storage    0          1193.31
TEST                        1.676      1193.31

[TIMESERIES]
;;Name           Date       Time       Value
;;-------------- ---------- ---------- ----------
25mm                        0:00       1.423
25mm                        0:05       1.423
25mm                        0:10       1.574
25mm                        0:15       1.574
25mm                        0:20       1.769
25mm                        0:25       1.769
25mm                        0:30       2.028
25mm                        0:35       2.028
25mm                        0:40       2.389
25mm                        0:45       2.389
25mm                        0:50       2.933
25mm                        0:55       2.933
25mm                        1:00       3.859
25mm                        1:05       3.859
25mm                        1:10       5.821
25mm                        1:15       5.821
25mm                        1:20       13.337
25mm                        1:25       13.337
25mm                        1:30       61.503
25mm                        1:35       61.503
25mm                        1:40       15.65
25mm                        1:45       15.65
25mm                        1:50       7.793
25mm                        1:55       7.793
25mm                        2:00       5.294
25mm                        2:05       5.294
25mm                        2:10       4.057
25mm                        2:15       4.057
25mm                        2:20       3.314
25mm                        2:25       3.314
25mm                        2:30       2.817
25mm                        2:35       2.817
25mm                        2:40       2.459
25mm                        2:45       2.459
25mm                        2:50       2.189
25mm                        2:55       2.189
25mm                        3:00       1.977
25mm                        3:05       1.977
25mm                        3:10       1.805
25mm                        3:15       1.805
25mm                        3:20       1.664
25mm                        3:25       1.664
25mm                        3:30       1.545
25mm                        3:35       1.545
25mm                        3:40       1.444
25mm                        3:45       1.444
25mm                        3:50       1.356
25mm                        3:55       1.356
25mm                        4:00       0
```

```
3hr-100yr                   0:00       0
3hr-100yr                   0:10       6.05
3hr-100yr                   0:20       7.54
3hr-100yr                   0:30       10.17
3hr-100yr                   0:40       15.98
3hr-100yr                   0:50       40.76
3hr-100yr                   1:00       178.56
3hr-100yr                   1:10       54.04
3hr-100yr                   1:20       27.31
3hr-100yr                   1:30       18.23
3hr-100yr                   1:40       13.73
3hr-100yr                   1:50       11.05
3hr-100yr                   2:00       9.28
3hr-100yr                   2:10       8.02
3hr-100yr                   2:20       7.08
3hr-100yr                   2:30       6.34
3hr-100yr                   2:40       5.76
3hr-100yr                   2:50       5.28
3hr-100yr                   3:00       4.88

;Chicago design storm, a = 732.951, b = 6.199, c = 0.81, Duration = 180 minutes, r = 0.35, rain units = mm/hr.
3hr-2yr                     0:00       2.393
3hr-2yr                     0:05       2.588
3hr-2yr                     0:10       2.823
3hr-2yr                     0:15       3.109
3hr-2yr                     0:20       3.466
3hr-2yr                     0:25       3.927
3hr-2yr                     0:30       4.543
3hr-2yr                     0:35       5.41
3hr-2yr                     0:40       6.721
3hr-2yr                     0:45       8.935
3hr-2yr                     0:50       13.427
3hr-2yr                     0:55       26.893
3hr-2yr                     1:00       103.571
3hr-2yr                     1:05       49.651
3hr-2yr                     1:10       27.587
3hr-2yr                     1:15       17.967
3hr-2yr                     1:20       13.238
3hr-2yr                     1:25       10.466
3hr-2yr                     1:30       8.658
3hr-2yr                     1:35       7.391
3hr-2yr                     1:40       6.455
3hr-2yr                     1:45       5.737
3hr-2yr                     1:50       5.169
3hr-2yr                     1:55       4.707
3hr-2yr                     2:00       4.326
3hr-2yr                     2:05       4.005
3hr-2yr                     2:10       3.731
3hr-2yr                     2:15       3.494
3hr-2yr                     2:20       3.288
3hr-2yr                     2:25       3.107
3hr-2yr                     2:30       2.945
3hr-2yr                     2:35       2.801
3hr-2yr                     2:40       2.672
3hr-2yr                     2:45       2.555
3hr-2yr                     2:50       2.449
3hr-2yr                     2:55       2.351
3hr-2yr                     3:00       0

;Chicago design storm, a = 998.071, b = 6.053, c = 0.814, Duration = 180 minutes, r = 0.35, rain units = mm/hr.
3hr-5yr                     0:00       3.128
3hr-5yr                     0:05       3.385
3hr-5yr                     0:10       3.693
3hr-5yr                     0:15       4.069
3hr-5yr                     0:20       4.54
3hr-5yr                     0:25       5.147
3hr-5yr                     0:30       5.959
3hr-5yr                     0:35       7.105
3hr-5yr                     0:40       8.84
3hr-5yr                     0:45       11.775
3hr-5yr                     0:50       17.755
3hr-5yr                     0:55       35.83
3hr-5yr                     1:00       141.179
3hr-5yr                     1:05       66.682
3hr-5yr                     1:10       36.749
3hr-5yr                     1:15       23.822
3hr-5yr                     1:20       17.501
3hr-5yr                     1:25       13.81
3hr-5yr                     1:30       11.408
3hr-5yr                     1:35       9.727
3hr-5yr                     1:40       8.488
3hr-5yr                     1:45       7.538
3hr-5yr                     1:50       6.786
3hr-5yr                     1:55       6.177
3hr-5yr                     2:00       5.673
3hr-5yr                     2:05       5.25
3hr-5yr                     2:10       4.889
3hr-5yr                     2:15       4.577
3hr-5yr                     2:20       4.306
3hr-5yr                     2:25       4.066
3hr-5yr                     2:30       3.854
3hr-5yr                     2:35       3.665
3hr-5yr                     2:40       3.495
3hr-5yr                     2:45       3.341
```

3hr-5yr	2:50	3.201
3hr-5yr	2:55	3.073
3hr-5yr	3:00	0
6hr-100yr	0:00	0
6hr-100yr	0:10	2.91
6hr-100yr	0:20	3.17
6hr-100yr	0:30	3.48
6hr-100yr	0:40	3.88
6hr-100yr	0:50	4.39
6hr-100yr	1:00	5.08
6hr-100yr	1:10	6.05
6hr-100yr	1:20	7.55
6hr-100yr	1:30	10.17
6hr-100yr	1:40	15.98
6hr-100yr	1:50	40.67
6hr-100yr	2:00	178.56
6hr-100yr	2:10	54.04
6hr-100yr	2:20	27.31
6hr-100yr	2:30	18.23
6hr-100yr	2:40	13.73
6hr-100yr	2:50	11.05
6hr-100yr	3:00	9.28
6hr-100yr	3:10	8.02
6hr-100yr	3:20	7.08
6hr-100yr	3:30	6.34
6hr-100yr	3:40	5.76
6hr-100yr	3:50	5.28
6hr-100yr	4:00	4.88
6hr-100yr	4:10	4.54
6hr-100yr	4:20	4.25
6hr-100yr	4:30	3.99
6hr-100yr	4:40	3.77
6hr-100yr	4:50	3.57
6hr-100yr	5:00	3.4
6hr-100yr	5:10	3.24
6hr-100yr	5:20	3.1
6hr-100yr	5:30	2.97
6hr-100yr	5:40	2.85
6hr-100yr	5:50	2.74
6hr-100yr	6:00	2.64

;Chicago design storm, a = 732.951, b = 6.199, c = 0.81, Duration = 360 minutes, r = 0.35, rain units = mm/hr.

6hr-2yr	0:00	1.274
6hr-2yr	0:05	1.32
6hr-2yr	0:10	1.37
6hr-2yr	0:15	1.425
6hr-2yr	0:20	1.485
6hr-2yr	0:25	1.55
6hr-2yr	0:30	1.623
6hr-2yr	0:35	1.703
6hr-2yr	0:40	1.793
6hr-2yr	0:45	1.894
6hr-2yr	0:50	2.008
6hr-2yr	0:55	2.139
6hr-2yr	1:00	2.29
6hr-2yr	1:05	2.467
6hr-2yr	1:10	2.677
6hr-2yr	1:15	2.93
6hr-2yr	1:20	3.242
6hr-2yr	1:25	3.636
6hr-2yr	1:30	4.15
6hr-2yr	1:35	4.851
6hr-2yr	1:40	5.864
6hr-2yr	1:45	7.456
6hr-2yr	1:50	10.31
6hr-2yr	1:55	16.817
6hr-2yr	2:00	41.518
6hr-2yr	2:05	103.571
6hr-2yr	2:10	39.807
6hr-2yr	2:15	22.769
6hr-2yr	2:20	15.728
6hr-2yr	2:25	11.97
6hr-2yr	2:30	9.658
6hr-2yr	2:35	8.101
6hr-2yr	2:40	6.985
6hr-2yr	2:45	6.147
6hr-2yr	2:50	5.495
6hr-2yr	2:55	4.973
6hr-2yr	3:00	4.546
6hr-2yr	3:05	4.191
6hr-2yr	3:10	3.89
6hr-2yr	3:15	3.632
6hr-2yr	3:20	3.409
6hr-2yr	3:25	3.213
6hr-2yr	3:30	3.04
6hr-2yr	3:35	2.886
6hr-2yr	3:40	2.748
6hr-2yr	3:45	2.624
6hr-2yr	3:50	2.511
6hr-2yr	3:55	2.409
6hr-2yr	4:00	2.315
6hr-2yr	4:05	2.229
6hr-2yr	4:10	2.149
6hr-2yr	4:15	2.076

```
6hr-2yr                     4:20       2.008
6hr-2yr                     4:25       1.944
6hr-2yr                     4:30       1.885
6hr-2yr                     4:35       1.83
6hr-2yr                     4:40       1.778
6hr-2yr                     4:45       1.729
6hr-2yr                     4:50       1.684
6hr-2yr                     4:55       1.64
6hr-2yr                     5:00       1.599
6hr-2yr                     5:05       1.561
6hr-2yr                     5:10       1.524
6hr-2yr                     5:15       1.489
6hr-2yr                     5:20       1.456
6hr-2yr                     5:25       1.425
6hr-2yr                     5:30       1.395
6hr-2yr                     5:35       1.366
6hr-2yr                     5:40       1.339
6hr-2yr                     5:45       1.312
6hr-2yr                     5:50       1.287
6hr-2yr                     5:55       1.263
6hr-2yr                     6:00       0

;Chicago design storm, a = 998.071, b = 6.053, c = 0.814, Duration = 360 minutes, r = 0.35, rain units = mm/hr.
6hr-5yr                     0:00       1.659
6hr-5yr                     0:05       1.72
6hr-5yr                     0:10       1.786
6hr-5yr                     0:15       1.857
6hr-5yr                     0:20       1.936
6hr-5yr                     0:25       2.022
6hr-5yr                     0:30       2.117
6hr-5yr                     0:35       2.222
6hr-5yr                     0:40       2.34
6hr-5yr                     0:45       2.472
6hr-5yr                     0:50       2.623
6hr-5yr                     0:55       2.794
6hr-5yr                     1:00       2.993
6hr-5yr                     1:05       3.225
6hr-5yr                     1:10       3.501
6hr-5yr                     1:15       3.834
6hr-5yr                     1:20       4.244
6hr-5yr                     1:25       4.763
6hr-5yr                     1:30       5.442
6hr-5yr                     1:35       6.367
6hr-5yr                     1:40       7.706
6hr-5yr                     1:45       9.813
6hr-5yr                     1:50       13.603
6hr-5yr                     1:55       22.285
6hr-5yr                     2:00       55.656
6hr-5yr                     2:05       141.179
6hr-5yr                     2:10       53.291
6hr-5yr                     2:15       30.263
6hr-5yr                     2:20       20.826
6hr-5yr                     2:25       15.811
6hr-5yr                     2:30       12.736
6hr-5yr                     2:35       10.669
6hr-5yr                     2:40       9.189
6hr-5yr                     2:45       8.079
6hr-5yr                     2:50       7.217
6hr-5yr                     2:55       6.528
6hr-5yr                     3:00       5.965
6hr-5yr                     3:05       5.496
6hr-5yr                     3:10       5.099
6hr-5yr                     3:15       4.759
6hr-5yr                     3:20       4.464
6hr-5yr                     3:25       4.206
6hr-5yr                     3:30       3.979
6hr-5yr                     3:35       3.776
6hr-5yr                     3:40       3.595
6hr-5yr                     3:45       3.431
6hr-5yr                     3:50       3.283
6hr-5yr                     3:55       3.148
6hr-5yr                     4:00       3.025
6hr-5yr                     4:05       2.912
6hr-5yr                     4:10       2.808
6hr-5yr                     4:15       2.711
6hr-5yr                     4:20       2.622
6hr-5yr                     4:25       2.539
6hr-5yr                     4:30       2.461
6hr-5yr                     4:35       2.389
6hr-5yr                     4:40       2.32
6hr-5yr                     4:45       2.257
6hr-5yr                     4:50       2.196
6hr-5yr                     4:55       2.14
6hr-5yr                     5:00       2.086
6hr-5yr                     5:05       2.035
6hr-5yr                     5:10       1.987
6hr-5yr                     5:15       1.942
6hr-5yr                     5:20       1.898
6hr-5yr                     5:25       1.857
6hr-5yr                     5:30       1.818
6hr-5yr                     5:35       1.78
6hr-5yr                     5:40       1.744
6hr-5yr                     5:45       1.71
6hr-5yr                     5:50       1.677
6hr-5yr                     5:55       1.646
```

```
6hr-5yr                     6:00       0

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

[TAGS]

[MAP]
DIMENSIONS       922046.74785     5041834.0492     922407.88115     5042274.6388
UNITS            Meters

[COORDINATES]
;;Node            X-Coord            Y-Coord
;;--------------- ------------------ ------------------
CB_10            922267.44          5042167.037
CB_23            922183.138         5041946.243
CB_27            922174.44          5042163.651
CB_28            922183.823         5042138.927
CB_29            922311.039         5041911.888
CB_5             922241.227         5042156.669
CBMH_11          922268.343         5041907.04
CBMH_12          922226.064         5041886.711
CBMH_14          922119.051         5042161.391
CBMH_15          922187.216         5042194.27
CBMH_18          922101.491         5042122.208
CBMH_19          922112.299         5042084.028
CBMH_2           922320.148         5042000.64
CBMH_21          922131.832         5042046.581
CBMH_22          922160.736         5041992.512
CBMH_3           922294.476         5042054.025
CBMH_4           922264.811         5042107.553
CBMH_6           922368.578         5041956.48
CBMH_7           922344.579         5042017.069
CBMH_8           922319.775         5042064.766
CBMH_9           922291.331         5042119.713
DCB_16           922244.166         5042219.719
J1               922088.074         5042134.4
J13              922346.799         5041946.002
J2               922329.977         5041930.789
MH_20            922120.386         5042071.917
MH_24            922098.64          5042113.25
MH_25            922131.745         5042141.429
MH_26            922150.032         5042150.054
MH_27            922274.874         5041890.955
MH_30            922343.248         5041959.86
MH_44            922084.598         5042122.314
MH_45            922334.286         5041926.103
OGS_1            922335.039         5041923.577
OGS_2            922081.054         5042120.627
Humber_Pl        922336.187         5041918.196
OF1              922072.924         5042114.432
OF2              922274.791         5042250.679
SU_N             922101.096         5042130.118
SU_S             922332.618         5041935.618

[VERTICES]
;;Link            X-Coord            Y-Coord
;;--------------- ------------------ ------------------
C1               922096.948         5042121.48
C4               922337.658         5041932.991

[POLYGONS]
;;Subcatchment    X-Coord            Y-Coord
;;--------------- ------------------ ------------------
Area_1           922156.684         5042195.99
Area_1           922169.821         5042170.099
Area_1           922115.018         5042141.948
Area_1           922097.108         5042135.258
Area_1           922095.563         5042134.473
Area_1           922091.602         5042142.138
Area_1           922078.404         5042141.433
Area_1           922072.844         5042153.373
Area_1           922156.684         5042195.99
Area_10          922182.687         5041970.194
Area_10          922202.152         5041931.834
Area_10          922189.98          5041925.657
Area_10          922187.058         5041928.291
Area_10          922181.001         5041928.076
Area_10          922164.529         5041960.981
Area_10          922182.687         5041970.194
Area_101         922274.182         5042060.554
Area_101         922164.013         5042006.979
Area_101         922118.261         5042097.159
Area_101         922156.344         5042116.483
Area_101         922161.602         5042120.253
Area_101         922173.064         5042124.967
Area_101         922228.053         5042151.46
Area_101         922238.998         5042129.891
Area_101         922274.182         5042060.554
Area_102         922274.182         5042060.554
```

Area_102	922293.417	5042022.648
Area_102	922318.903	5041972.423
Area_102	922292.345	5041958.947
Area_102	922264.29	5041944.711
Area_102	922197.507	5041910.823
Area_102	922189.979	5041925.657
Area_102	922202.152	5041931.834
Area_102	922164.013	5042006.979
Area_102	922274.182	5042060.554
Area_11	922264.237	5042142.698
Area_11	922240.449	5042189.576
Area_11	922262.695	5042201.089
Area_11	922272.999	5042180.783
Area_11	922274.904	5042166.229
Area_11	922280.04	5042166.668
Area_11	922287.842	5042154.676
Area_11	922264.237	5042142.698
Area_12	922291.446	5042089.077
Area_12	922264.237	5042142.698
Area_12	922287.841	5042154.676
Area_12	922315.053	5042101.05
Area_12	922291.446	5042089.077
Area_13	922318.655	5042035.455
Area_13	922291.446	5042089.077
Area_13	922315.049	5042101.059
Area_13	922342.258	5042047.437
Area_13	922318.655	5042035.455
Area_14	922345.865	5041981.834
Area_14	922318.655	5042035.455
Area_14	922342.258	5042047.437
Area_14	922369.397	5041993.769
Area_14	922345.865	5041981.834
Area_15	922365.904	5041952.636
Area_15	922359.463	5041955.035
Area_15	922357.167	5041959.56
Area_15	922345.865	5041981.834
Area_15	922369.472	5041993.807
Area_15	922371.927	5041988.763
Area_15	922378.739	5041976.704
Area_15	922378.755	5041956.1
Area_15	922369.637	5041951.745
Area_15	922367.394	5041953.143
Area_15	922365.821	5041952.667
Area_15	922365.904	5041952.636
Area_16	922264.237	5042142.698
Area_16	922238.998	5042129.891
Area_16	922228.221	5042151.129
Area_16	922229.721	5042154.923
Area_16	922221.355	5042159.491
Area_16	922215.755	5042170.747
Area_16	922217.934	5042178.151
Area_16	922240.449	5042189.576
Area_16	922264.237	5042142.698
Area_17	922291.446	5042089.077
Area_17	922266.207	5042076.27
Area_17	922238.998	5042129.891
Area_17	922264.237	5042142.698
Area_17	922291.446	5042089.077
Area_18	922318.654	5042035.454
Area_18	922293.417	5042022.648
Area_18	922266.207	5042076.27
Area_18	922291.446	5042089.077
Area_18	922318.654	5042035.454
Area_19	922345.865	5041981.834
Area_19	922323.529	5041970.5
Area_19	922318.903	5041972.423
Area_19	922293.417	5042022.648
Area_19	922318.655	5042035.455
Area_19	922345.865	5041981.834
Area_2	922209.215	5042222.737
Area_2	922215.404	5042210.581
Area_2	922211.118	5042202.902
Area_2	922210.778	5042201.725
Area_2	922210.247	5042181.824
Area_2	922200.465	5042185.649
Area_2	922169.821	5042170.099
Area_2	922156.651	5042196.064
Area_2	922209.215	5042222.737
Area_20	922295.881	5041959.172
Area_20	922292.345	5041958.947
Area_20	922318.903	5041972.423
Area_20	922323.528	5041970.499
Area_20	922345.32	5041981.557
Area_20	922345.865	5041981.834
Area_20	922355.492	5041963.045
Area_20	922357.167	5041959.56
Area_20	922359.463	5041955.035
Area_20	922365.859	5041952.653
Area_20	922368.907	5041946.111
Area_20	922371.707	5041938.283
Area_20	922325.369	5041919.024
Area_20	922320.146	5041915.508
Area_20	922295.881	5041959.172
Area_2001	922259.515	5042248.266
Area_2001	922073.048	5042152.971

Area_2001	922063.194	5042152.009
Area_2001	922264.858	5042254.388
Area_2001	922259.515	5042248.266
Area_2002	922379.025	5041976.492
Area_2002	922287.841	5042154.678
Area_2002	922297.66	5042167.96
Area_2002	922297.19	5042169.092
Area_2002	922291.55	5042182.669
Area_2002	922289.978	5042186.538
Area_2002	922259.517	5042248.262
Area_2002	922264.919	5042254.612
Area_2002	922379.025	5041976.492
Area_2003	922063.163	5042152.017
Area_2003	922073.048	5042152.971
Area_2003	922078.89	5042141.459
Area_2003	922091.7	5042141.95
Area_2003	922095.563	5042134.474
Area_2003	922095.417	5042131.52
Area_2003	922097.809	5042127.104
Area_2003	922097.503	5042125.683
Area_2003	922084.342	5042119.006
Area_2003	922109.135	5042069.705
Area_2003	922113.823	5042069.046
Area_2003	922116.98	5042062.787
Area_2003	922114.888	5042058.367
Area_2003	922145.979	5041996.588
Area_2003	922150.409	5041998.871
Area_2003	922151.992	5041996.657
Area_2003	922155.734	5041986.203
Area_2003	922153.387	5041982.171
Area_2003	922181.001	5041928.076
Area_2003	922187.058	5041928.291
Area_2003	922189.786	5041925.832
Area_2003	922197.337	5041910.438
Area_2003	922192.103	5041898.561
Area_2003	922063.163	5042152.017
Area_2004	922209.02	5041865.313
Area_2004	922235.292	5041858.36
Area_2004	922233.17	5041856.72
Area_2004	922230.811	5041855.444
Area_2004	922228.277	5041854.564
Area_2004	922225.635	5041854.104
Area_2004	922222.953	5041854.076
Area_2004	922220.302	5041854.481
Area_2004	922217.757	5041855.423
Area_2004	922215.4	5041856.768
Area_2004	922213.295	5041858.48
Area_2004	922211.498	5041860.514
Area_2004	922210.057	5041862.813
Area_2004	922209.011	5041865.318
Area_2004	922209.02	5041865.313
Area_2005	922371.594	5041938.235
Area_2005	922368.998	5041945.932
Area_2005	922365.962	5041952.377
Area_2005	922369.637	5041951.745
Area_2005	922378.755	5041956.1
Area_2005	922378.739	5041976.704
Area_2005	922391.466	5041946.493
Area_2005	922371.707	5041938.282
Area_2005	922371.594	5041938.235
Area_21	922237.628	5041931.182
Area_21	922264.427	5041944.78
Area_21	922274.121	5041925.898
Area_21	922277.379	5041923.323
Area_21	922284.651	5041920.109
Area_21	922298.899	5041916.291
Area_21	922301.752	5041903.119
Area_21	922264.403	5041877.966
Area_21	922237.628	5041931.182
Area_22	922192.103	5041898.562
Area_22	922197.507	5041910.823
Area_22	922237.628	5041931.182
Area_22	922262.14	5041882.443
Area_22	922264.403	5041877.966
Area_22	922235.292	5041858.36
Area_22	922209.013	5041865.315
Area_22	922192.103	5041898.562
Area_23	922292.345	5041958.947
Area_23	922295.881	5041959.172
Area_23	922320.146	5041915.507
Area_23	922301.752	5041903.119
Area_23	922298.899	5041916.291
Area_23	922284.651	5041920.109
Area_23	922277.379	5041923.323
Area_23	922274.121	5041925.898
Area_23	922264.411	5041944.772
Area_23	922292.345	5041958.947
Area_3	922280.091	5042166.581
Area_3	922274.904	5042166.229
Area_3	922273.008	5042180.81
Area_3	922262.695	5042201.089
Area_3	922217.934	5042178.15
Area_3	922210.247	5042181.824
Area_3	922211.001	5042202.867
Area_3	922215.404	5042210.581

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Area_3           922209.221         5042222.74
Area_3           922232.117         5042234.358
Area_3           922259.517         5042248.262
Area_3           922291.901         5042181.949
Area_3           922297.215         5042169.271
Area_3           922297.618         5042167.941
Area_3           922287.842         5042154.676
Area_3           922280.091         5042166.581
Area_4           922143.181         5042156.27
Area_4           922161.483         5042120.204
Area_4           922156.344         5042116.484
Area_4           922118.26          5042097.159
Area_4           922114.257         5042092.55
Area_4           922109.378         5042089.904
Area_4           922101.037         5042085.662
Area_4           922084.076         5042119.088
Area_4           922089.477         5042121.836
Area_4           922097.449         5042125.976
Area_4           922097.726         5042126.825
Area_4           922095.579         5042131.056
Area_4           922095.563         5042134.473
Area_4           922115.018         5042141.948
Area_4           922143.181         5042156.27
Area_5           922152.032         5042138.87
Area_5           922143.185         5042156.239
Area_5           922200.513         5042185.631
Area_5           922210.247         5042181.824
Area_5           922217.934         5042178.15
Area_5           922215.802         5042170.903
Area_5           922152.032         5042138.87
Area_6           922215.755         5042170.747
Area_6           922221.427         5042159.476
Area_6           922229.627         5042155.107
Area_6           922228.053         5042151.46
Area_6           922227.484         5042152.582
Area_6           922173.058         5042124.965
Area_6           922161.483         5042120.204
Area_6           922151.987         5042138.959
Area_6           922215.755         5042170.747
Area_7           922128.26          5042077.453
Area_7           922122.858         5042074.827
Area_7           922118.32          5042072.395
Area_7           922113.587         5042069.511
Area_7           922108.959         5042069.833
Area_7           922101.037         5042085.662
Area_7           922114.159         5042092.581
Area_7           922118.26          5042097.159
Area_7           922128.26          5042077.453
Area_8           922118.345         5042072.41
Area_8           922128.26          5042077.453
Area_8           922155.476         5042023.817
Area_8           922137.141         5042014.511
Area_8           922114.851         5042058.188
Area_8           922115.066         5042058.458
Area_8           922117.071         5042062.608
Area_8           922113.617         5042069.414
Area_8           922118.345         5042072.41
Area_9           922137.14          5042014.511
Area_9           922155.476         5042023.817
Area_9           922182.686         5041970.194
Area_9           922164.343         5041960.893
Area_9           922153.575         5041982.125
Area_9           922155.734         5041986.203
Area_9           922151.992         5041996.657
Area_9           922150.409         5041998.871
Area_9           922146.183         5041996.693
Area_9           922137.32          5042014.602
Area_9           922137.14          5042014.511

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

25mm

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.015)

WARNING 03: negative offset ignored for Link C2
WARNING 03: negative offset ignored for Link C32
WARNING 03: negative offset ignored for Link C34

****
Element Count
****
Number of rain gages 7
Number of subcatchments ... 30
Number of nodes 40
Number of links 39
Number of pollutants 0
Number of land uses 0

****
Raingage Summary
****

Name	Data Source	Data Type	Recording Interval
25mm	25mm	INTENSITY	5 min.
3hr-100yr	3hr-100yr	INTENSITY	10 min.
3hr-2yr	3hr-2yr	INTENSITY	5 min.
3hr-5yr	3hr-5yr	INTENSITY	5 min.
6hr-100yr	6hr-100yr	INTENSITY	10 min.
6hr-2yr	6hr-2yr	INTENSITY	5 min.
6hr-5yr	6hr-5yr	INTENSITY	5 min.

****
Subcatchment Summary
****

Name	Area	Width	%Imperv	%Slope	Rain Gage	Outlet
Area_1	0.25	83.33	90.00	1.0000	25mm	CBMH_14
Area_10	0.08	26.67	90.00	1.0000	25mm	CB_23
Area_101	1.37	137.00	95.00	0.5000	25mm	MH_26
Area_102	1.13	113.00	95.00	0.5000	25mm	CBMH_11
Area_11	0.13	43.33	90.00	1.0000	25mm	CB_10
Area_12	0.16	53.33	90.00	1.0000	25mm	CBMH_9
Area_13	0.16	53.33	90.00	1.0000	25mm	CBMH_8
Area_14	0.17	56.67	90.00	1.0000	25mm	CBMH_7
Area_15	0.09	30.00	90.00	1.0000	25mm	CBMH_6
Area_16	0.15	50.00	90.00	1.0000	25mm	CB_5
Area_17	0.17	56.67	90.00	1.0000	25mm	CBMH_4
Area_18	0.17	56.67	90.00	1.0000	25mm	CBMH_3
Area_19	0.17	56.67	90.00	1.0000	25mm	CBMH_2
Area_2	0.16	53.33	90.00	1.0000	25mm	CBMH_15
Area_20	0.28	93.33	90.00	1.0000	25mm	J13
Area_2001	0.07	7.00	25.00	0.5000	25mm	OF2
Area_2002	0.21	21.00	90.00	0.5000	25mm	OF2
Area_2003	0.16	16.00	90.00	1.0000	25mm	OF1
Area_2004	0.02	13.33	5.00	0.5000	25mm	Humber_Pl
Area_2005	0.04	26.67	5.00	0.5000	25mm	Humber_Pl
Area_21	0.21	70.00	90.00	1.0000	25mm	CBMH_11
Area_22	0.32	106.67	90.00	1.0000	25mm	CBMH_12
Area_23	0.16	53.33	90.00	1.0000	25mm	CB_29
Area_3	0.36	120.00	90.00	1.0000	25mm	DCB_16
Area_4	0.28	93.33	90.00	1.0000	25mm	CBMH_18
Area_5	0.15	50.00	90.00	1.0000	25mm	CB_27
Area_6	0.15	50.00	90.00	1.0000	25mm	CB_28
Area_7	0.04	13.33	90.00	1.0000	25mm	CBMH_19
Area_8	0.12	40.00	90.00	1.0000	25mm	CBMH_21
Area_9	0.12	40.00	90.00	1.0000	25mm	CBMH_22

****
Node Summary
****

Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
CB_10	JUNCTION	65.33	1.41	10.0	
CB_23	JUNCTION	66.20	0.93	10.0	
CB_27	JUNCTION	65.48	1.34	10.0	
CB_28	JUNCTION	65.39	1.52	10.0	
CB_29	JUNCTION	64.11	2.43	0.0	
CB_5	JUNCTION	65.11	1.63	10.0	
CBMH_11	JUNCTION	63.58	2.16	10.0	
CBMH_12	JUNCTION	64.06	1.68	10.0	
CBMH_14	JUNCTION	64.11	2.21	10.0	
CBMH_15	JUNCTION	64.47	1.85	10.0	
CBMH_18	JUNCTION	64.05	2.54	0.0	
CBMH_19	JUNCTION	64.88	2.38	10.0	
CBMH_2	JUNCTION	64.06	2.94	10.0	
CBMH_21	JUNCTION	65.17	1.87	10.0	
CBMH_22	JUNCTION	65.53	1.51	10.0	

CBMH_3	JUNCTION	64.42	2.58	10.0
CBMH_4	JUNCTION	64.78	2.22	10.0
CBMH_6	JUNCTION	63.91	2.73	10.0
CBMH_7	JUNCTION	64.27	2.73	10.0
CBMH_8	JUNCTION	64.63	2.37	10.0
CBMH_9	JUNCTION	64.99	2.01	10.0
DCB_16	JUNCTION	64.80	1.52	10.0
J1	JUNCTION	63.75	3.27	0.0
J13	JUNCTION	63.54	3.10	10.0
J2	JUNCTION	63.24	3.33	0.0
MH_20	JUNCTION	64.99	2.30	0.0
MH_24	JUNCTION	64.13	2.50	10.0
MH_25	JUNCTION	64.42	2.63	0.0
MH_26	JUNCTION	64.56	2.70	0.0
MH_27	JUNCTION	63.89	2.02	0.0
MH_30	JUNCTION	63.73	3.08	0.0
MH_44	JUNCTION	63.51	3.51	0.0
MH_45	JUNCTION	63.11	3.46	0.0
OGS_1	JUNCTION	63.04	3.34	0.0
OGS_2	JUNCTION	63.47	3.01	0.0
Humber_Pl	OUTFALL	62.48	0.38	0.0
OF1	OUTFALL	63.41	0.38	0.0
OF2	OUTFALL	0.00	0.00	0.0
SU_N	STORAGE	63.75	3.04	0.0
SU_S	STORAGE	63.24	3.33	0.0

****
Link Summary
****

Name	From Node	To Node	Type	Length	%Slope	Roughness
C1	SU_N	MH_44	CONDUIT	2.5	1.0001	0.0090
C10	CB_28	MH_26	CONDUIT	30.4	1.0001	0.0110
C11	CB_27	MH_26	CONDUIT	32.8	1.0001	0.0110
C12	MH_26	MH_25	CONDUIT	16.5	0.4970	0.0110
C13	MH_24	CBMH_18	CONDUIT	4.8	0.5000	0.0110
C14	CB_23	CBMH_22	CONDUIT	51.5	1.0001	0.0110
C15	CBMH_22	CBMH_21	CONDUIT	60.0	0.5000	0.0110
C16	CBMH_21	MH_20	CONDUIT	24.5	0.5020	0.0110
C17	MH_20	CBMH_19	CONDUIT	10.4	0.5000	0.0110
C18	CBMH_19	MH_24	CONDUIT	46.5	0.5011	0.0110
C19	CB_10	CBMH_9	CONDUIT	52.5	0.4991	0.0110
C2	MH_44	OGS_2	CONDUIT	11.6	0.3707	0.0110
C20	CBMH_9	CBMH_8	CONDUIT	60.0	0.5000	0.0110
C21	CBMH_8	CBMH_7	CONDUIT	60.0	0.5000	0.0110
C22	CBMH_7	CBMH_6	CONDUIT	60.0	0.5000	0.0110
C23	CBMH_6	J13	CONDUIT	29.9	0.5017	0.0110
C24	J13	SU_S	CONDUIT	4.0	0.5000	0.0110
C25	CB_5	CBMH_4	CONDUIT	52.5	0.4991	0.0110
C26	CBMH_4	CBMH_3	CONDUIT	60.0	0.5000	0.0110
C27	CBMH_3	CBMH_2	CONDUIT	60.0	0.5000	0.0110
C28	CBMH_2	MH_30	CONDUIT	53.4	0.4963	0.0110
C29	CBMH_12	CBMH_11	CONDUIT	50.0	0.5700	0.0110
C3	J1	MH_44	CONDUIT	2.5	0.4800	0.0110
C30	MH_30	J13	CONDUIT	9.3	0.4839	0.0110
C31	MH_27	CBMH_11	CONDUIT	8.2	0.5000	0.0110
C32	CBMH_11	SU_S	CONDUIT	13.2	0.5000	0.0110
C33	OGS_1	Humber_Pl	CONDUIT	4.0	14.1135	0.0110
C34	OGS_2	OF1	CONDUIT	8.7	0.6782	0.0110
C35	MH_25	MH_24	CONDUIT	44.2	0.5000	0.0110
C36	CBMH_18	SU_N	CONDUIT	3.9	0.5128	0.0110
C37	CB_29	MH_27	CONDUIT	32.9	0.4985	0.0110
C4	SU_S	MH_45	CONDUIT	9.4	1.0001	0.0090
C5	J2	MH_45	CONDUIT	9.4	0.5000	0.0110
C6	MH_45	OGS_1	CONDUIT	3.1	0.4839	0.0110
C7	DCB_16	CBMH_15	CONDUIT	54.4	0.5000	0.0110
C8	CBMH_15	CBMH_14	CONDUIT	60.0	0.5000	0.0110
C9	CBMH_14	SU_N	CONDUIT	15.2	0.5000	0.0110
OR1	SU_S	J2	ORIFICE			
OR2	SU_N	J1	ORIFICE			

****
Cross Section Summary
****

Conduit	Shape	Full Depth	Full Area	Hyd. Rad.	Max. Width	No. of Barrels	Full Flow
C1	CIRCULAR	0.20	0.03	0.05	0.20	1	0.05
C10	CIRCULAR	0.45	0.16	0.11	0.45	1	0.34
C11	CIRCULAR	0.45	0.16	0.11	0.45	1	0.34
C12	CIRCULAR	0.53	0.22	0.13	0.53	1	0.36
C13	CIRCULAR	0.60	0.28	0.15	0.60	1	0.51
C14	CIRCULAR	0.38	0.11	0.09	0.38	1	0.21
C15	CIRCULAR	0.45	0.16	0.11	0.45	1	0.24
C16	CIRCULAR	0.45	0.16	0.11	0.45	1	0.24
C17	CIRCULAR	0.45	0.16	0.11	0.45	1	0.24
C18	CIRCULAR	0.45	0.16	0.11	0.45	1	0.24
C19	CIRCULAR	0.45	0.16	0.11	0.45	1	0.24
C2	CIRCULAR	0.38	0.11	0.09	0.38	1	0.13
C20	CIRCULAR	0.53	0.22	0.13	0.53	1	0.36
C21	CIRCULAR	0.53	0.22	0.13	0.53	1	0.36
C22	CIRCULAR	0.53	0.22	0.13	0.53	1	0.36
C23	CIRCULAR	0.53	0.22	0.13	0.53	1	0.36

C24	CIRCULAR	0.75	0.44	0.19	0.75	1	0.93
C25	CIRCULAR	0.53	0.22	0.13	0.53	1	0.36
C26	CIRCULAR	0.60	0.28	0.15	0.60	1	0.51
C27	CIRCULAR	0.60	0.28	0.15	0.60	1	0.51
C28	CIRCULAR	0.60	0.28	0.15	0.60	1	0.51
C29	CIRCULAR	0.38	0.11	0.09	0.38	1	0.16
C3	CIRCULAR	0.30	0.07	0.07	0.30	1	0.08
C30	CIRCULAR	0.60	0.28	0.15	0.60	1	0.50
C31	CIRCULAR	0.38	0.11	0.09	0.38	1	0.15
C32	CIRCULAR	0.53	0.22	0.13	0.53	1	0.36
C33	CIRCULAR	0.38	0.11	0.09	0.38	1	0.78
C34	CIRCULAR	0.38	0.11	0.09	0.38	1	0.17
C35	CIRCULAR	0.60	0.28	0.15	0.60	1	0.51
C36	CIRCULAR	0.75	0.44	0.19	0.75	1	0.94
C37	CIRCULAR	0.38	0.11	0.09	0.38	1	0.15
C4	CIRCULAR	0.20	0.03	0.05	0.20	1	0.05
C5	CIRCULAR	0.30	0.07	0.07	0.30	1	0.08
C6	CIRCULAR	0.38	0.11	0.09	0.38	1	0.14
C7	CIRCULAR	0.53	0.22	0.13	0.53	1	0.36
C8	CIRCULAR	0.53	0.22	0.13	0.53	1	0.36
C9	CIRCULAR	0.60	0.28	0.15	0.60	1	0.51

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

****
Analysis Options
****
Flow Units ..... CMS
Process Models:
  Rainfall/Runoff ..... YES
  RDII ..... NO
  Snowmelt ..... NO
  Groundwater ..... NO
  Flow Routing ..... YES
  Ponding Allowed ..... NO
  Water Quality ..... NO
Infiltration Method ..... HORTON
Flow Routing Method ..... DYNWAVE
Surcharge Method ..... EXTRAN
Starting Date 12/11/2020 00:00:00
Ending Date 12/21/2020 00:00:00
Antecedent Dry Days 0.0
Report Time Step 00:01:00
Wet Time Step 00:01:00
Dry Time Step 00:01:00
Routing Time Step ..... 1.00 sec
Variable Time Step ..... YES
Maximum Trials 8
Number of Threads 6
Head Tolerance ..... 0.001500 m

Runoff Quantity Continuity	Volume hectare-m	Depth mm
Total Precipitation	0.176	25.000
Evaporation Loss	0.000	0.000
Infiltration Loss	0.017	2.383
Surface Runoff	0.160	22.630
Final Storage	0.000	0.000
Continuity Error (%)	-0.049	

Flow Routing Continuity	Volume hectare-m	Volume 10^6 ltr
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	0.160	1.595
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	0.000	0.000
External Outflow	0.160	1.596
Flooding Loss	0.000	0.000
Evaporation Loss	0.000	0.000
Exfiltration Loss	0.000	0.000
Initial Stored Volume	0.000	0.000
Final Stored Volume	0.000	0.000
Continuity Error (%)	-0.034	

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

****
Highest Flow Instability Indexes
****

Link C2 (2)
Link OR1 (1)
Link OR2 (1)

****
Routing Time Step Summary
****
Minimum Time Step : 0.74 sec
Average Time Step : 1.00 sec
Maximum Time Step : 1.00 sec
Percent in Steady State : 0.00
Average Iterations per Step : 2.00
Percent Not Converging : 0.00
Time Step Frequencies :
1.000 - 0.871 sec : 99.97 %
0.871 - 0.758 sec : 0.03 %
0.758 - 0.660 sec : 0.00 %
0.660 - 0.574 sec : 0.00 %
0.574 - 0.500 sec : 0.00 %

****
Subcatchment Runoff Summary
****

Subcatchment	Total Precip mm	Total Runon mm	Total Evap mm	Total Infil mm	Imperv Runoff mm	Perv Runoff mm	Total Runoff mm	Total Runoff 10^6 ltr	Peak Runoff CMS	Runoff Coeff
Area_1	25.00	0.00	0.00	2.48	22.52	0.02	22.54	0.06	0.04	0.902
Area_10	25.00	0.00	0.00	2.48	22.52	0.02	22.54	0.02	0.01	0.902
Area_101	25.00	0.00	0.00	1.24	23.76	0.01	23.76	0.33	0.19	0.951
Area_102	25.00	0.00	0.00	1.24	23.76	0.01	23.76	0.27	0.16	0.951
Area_11	25.00	0.00	0.00	2.48	22.52	0.02	22.54	0.03	0.02	0.902
Area_12	25.00	0.00	0.00	2.48	22.52	0.02	22.54	0.04	0.02	0.902
Area_13	25.00	0.00	0.00	2.48	22.52	0.02	22.54	0.04	0.02	0.902
Area_14	25.00	0.00	0.00	2.48	22.52	0.02	22.54	0.04	0.03	0.902
Area_15	25.00	0.00	0.00	2.48	22.52	0.02	22.54	0.02	0.01	0.902
Area_16	25.00	0.00	0.00	2.48	22.52	0.02	22.54	0.03	0.02	0.902
Area_17	25.00	0.00	0.00	2.48	22.52	0.02	22.54	0.04	0.03	0.902
Area_18	25.00	0.00	0.00	2.48	22.52	0.02	22.54	0.04	0.03	0.902
Area_19	25.00	0.00	0.00	2.48	22.52	0.02	22.54	0.04	0.03	0.902
Area_2	25.00	0.00	0.00	2.48	22.52	0.02	22.54	0.04	0.02	0.902
Area_20	25.00	0.00	0.00	2.48	22.52	0.02	22.54	0.06	0.04	0.902
Area_2001	25.00	0.00	0.00	18.74	6.25	0.01	6.27	0.00	0.00	0.251
Area_2002	25.00	0.00	0.00	2.49	22.51	0.01	22.52	0.05	0.03	0.901
Area_2003	25.00	0.00	0.00	2.50	22.51	0.00	22.51	0.04	0.02	0.900
Area_2004	25.00	0.00	0.00	23.68	1.25	0.07	1.32	0.00	0.00	0.053
Area_2005	25.00	0.00	0.00	23.68	1.25	0.07	1.32	0.00	0.00	0.053
Area_21	25.00	0.00	0.00	2.48	22.52	0.02	22.54	0.05	0.03	0.902
Area_22	25.00	0.00	0.00	2.48	22.52	0.02	22.54	0.07	0.05	0.902
Area_23	25.00	0.00	0.00	2.48	22.52	0.02	22.54	0.04	0.02	0.902
Area_3	25.00	0.00	0.00	2.48	22.52	0.02	22.54	0.08	0.06	0.902
Area_4	25.00	0.00	0.00	2.48	22.52	0.02	22.54	0.06	0.04	0.902
Area_5	25.00	0.00	0.00	2.48	22.52	0.02	22.54	0.03	0.02	0.902
Area_6	25.00	0.00	0.00	2.48	22.52	0.02	22.54	0.03	0.02	0.902
Area_7	25.00	0.00	0.00	2.48	22.52	0.02	22.54	0.01	0.01	0.902
Area_8	25.00	0.00	0.00	2.48	22.52	0.02	22.54	0.03	0.02	0.902
Area_9	25.00	0.00	0.00	2.48	22.52	0.02	22.54	0.03	0.02	0.902

****
Node Depth Summary
****

Node	Type	Average Depth Meters	Maximum Depth Meters	Maximum HGL Meters	Time of Max Occurrence days hr:min	Reported Max Depth Meters
CB_10	JUNCTION	0.00	0.09	65.42	0 01:40	0.09
CB_23	JUNCTION	0.00	0.06	66.26	0 01:40	0.06
CB_27	JUNCTION	0.00	0.08	65.56	0 01:40	0.08
CB_28	JUNCTION	0.00	0.08	65.47	0 01:40	0.08
CB_29	JUNCTION	0.00	0.10	64.22	0 01:40	0.10
CB_5	JUNCTION	0.00	0.09	65.20	0 01:40	0.09
CBMH_11	JUNCTION	0.01	0.35	63.93	0 04:04	0.35
CBMH_12	JUNCTION	0.00	0.14	64.20	0 01:40	0.14
CBMH_14	JUNCTION	0.01	0.38	64.49	0 04:02	0.38
CBMH_15	JUNCTION	0.00	0.17	64.63	0 01:40	0.17
CBMH_18	JUNCTION	0.02	0.44	64.49	0 04:03	0.44
CBMH_19	JUNCTION	0.00	0.15	65.02	0 01:40	0.15
CBMH_2	JUNCTION	0.00	0.18	64.24	0 01:40	0.18
CBMH_21	JUNCTION	0.00	0.14	65.31	0 01:40	0.14
CBMH_22	JUNCTION	0.00	0.11	65.64	0 01:40	0.11
CBMH_3	JUNCTION	0.00	0.15	64.57	0 01:40	0.15
CBMH_4	JUNCTION	0.00	0.13	64.90	0 01:40	0.13
CBMH_6	JUNCTION	0.00	0.20	64.11	0 01:40	0.20
CBMH_7	JUNCTION	0.00	0.18	64.46	0 01:40	0.18
CBMH_8	JUNCTION	0.00	0.16	64.79	0 01:40	0.16
CBMH_9	JUNCTION	0.00	0.12	65.12	0 01:40	0.12
DCB_16	JUNCTION	0.00	0.14	64.94	0 01:40	0.14
J1	JUNCTION	0.01	0.07	63.82	0 04:01	0.07

J13	JUNCTION	0.02	0.40	63.94	0	04:04	0.40
J2	JUNCTION	0.01	0.07	63.31	0	04:05	0.07
MH_20	JUNCTION	0.00	0.14	65.13	0	01:40	0.14
MH_24	JUNCTION	0.01	0.35	64.49	0	04:03	0.35
MH_25	JUNCTION	0.00	0.29	64.70	0	01:40	0.28
MH_26	JUNCTION	0.00	0.31	64.87	0	01:40	0.31
MH_27	JUNCTION	0.00	0.10	63.99	0	01:40	0.10
MH_30	JUNCTION	0.01	0.20	63.94	0	04:03	0.20
MH_44	JUNCTION	0.01	0.07	63.58	0	04:02	0.07
MH_45	JUNCTION	0.01	0.07	63.18	0	04:05	0.07
OGS_1	JUNCTION	0.00	0.03	63.07	0	04:05	0.03
OGS_2	JUNCTION	0.01	0.06	63.53	0	04:02	0.06
Humber_Pl	OUTFALL	0.00	0.00	62.48	0	00:00	0.00
OF1	OUTFALL	0.01	0.06	63.47	0	04:02	0.06
OF2	OUTFALL	0.00	0.00	0.00	0	00:00	0.00
SU_N	STORAGE	0.05	0.74	64.49	0	04:01	0.74
SU_S	STORAGE	0.05	0.70	63.93	0	04:05	0.70

****
Node Inflow Summary
****

Node	Type	Maximum Lateral Inflow CMS	Maximum Total Inflow CMS	Time of Max Occurrence days hr:min	Lateral Inflow Volume 10^6 ltr	Total Inflow Volume 10^6 ltr	Flow Balance Error Percent
CB_10	JUNCTION	0.020	0.020	0 01:40	0.0293	0.0293	-0.009
CB_23	JUNCTION	0.012	0.012	0 01:40	0.018	0.018	-0.006
CB_27	JUNCTION	0.023	0.023	0 01:40	0.0338	0.0338	-0.003
CB_28	JUNCTION	0.023	0.023	0 01:40	0.0338	0.0338	-0.003
CB_29	JUNCTION	0.025	0.025	0 01:40	0.0361	0.0361	-0.005
CB_5	JUNCTION	0.023	0.023	0 01:40	0.0338	0.0338	-0.010
CBMH_11	JUNCTION	0.189	0.262	0 01:40	0.316	0.424	0.077
CBMH_12	JUNCTION	0.049	0.049	0 01:40	0.0721	0.0721	0.212
CBMH_14	JUNCTION	0.038	0.118	0 01:40	0.0563	0.179	-0.120
CBMH_15	JUNCTION	0.025	0.080	0 01:40	0.0361	0.117	0.514
CBMH_18	JUNCTION	0.043	0.330	0 01:40	0.0631	0.543	0.004
CBMH_19	JUNCTION	0.006	0.055	0 01:40	0.00902	0.0811	-0.006
CBMH_2	JUNCTION	0.026	0.101	0 01:40	0.0383	0.149	0.169
CBMH_21	JUNCTION	0.018	0.049	0 01:40	0.027	0.0721	-0.003
CBMH_22	JUNCTION	0.018	0.031	0 01:40	0.027	0.0451	-0.007
CBMH_3	JUNCTION	0.026	0.075	0 01:40	0.0383	0.11	-0.011
CBMH_4	JUNCTION	0.026	0.049	0 01:40	0.0383	0.0721	-0.008
CBMH_6	JUNCTION	0.014	0.108	0 01:40	0.0203	0.16	0.120
CBMH_7	JUNCTION	0.026	0.095	0 01:40	0.0383	0.14	-0.007
CBMH_8	JUNCTION	0.025	0.069	0 01:40	0.0361	0.101	-0.010
CBMH_9	JUNCTION	0.025	0.044	0 01:40	0.0361	0.0654	-0.007
DCB_16	JUNCTION	0.055	0.055	0 01:40	0.0811	0.0811	-0.010
J1	JUNCTION	0.000	0.010	0 04:01	0	0.711	-0.006
J13	JUNCTION	0.043	0.251	0 01:40	0.0631	0.378	-0.053
J2	JUNCTION	0.000	0.010	0 04:05	0	0.796	-0.006
MH_20	JUNCTION	0.000	0.049	0 01:40	0	0.0721	-0.001
MH_24	JUNCTION	0.000	0.290	0 01:40	0	0.476	-0.198
MH_25	JUNCTION	0.000	0.235	0 01:40	0	0.393	0.257
MH_26	JUNCTION	0.190	0.236	0 01:40	0.326	0.393	-0.000
MH_27	JUNCTION	0.000	0.024	0 01:40	0	0.0361	0.014
MH_30	JUNCTION	0.000	0.101	0 01:40	0	0.151	-0.116
MH_44	JUNCTION	0.000	0.010	0 04:01	0	0.711	0.007
MH_45	JUNCTION	0.000	0.010	0 04:05	0	0.796	0.001
OGS_1	JUNCTION	0.000	0.010	0 04:05	0	0.796	-0.001
OGS_2	JUNCTION	0.000	0.010	0 04:02	0	0.711	-0.007
Humber_Pl	OUTFALL	0.001	0.010	0 04:00	0.000793	0.797	0.000
OF1	OUTFALL	0.023	0.030	0 01:40	0.036	0.747	0.000
OF2	OUTFALL	0.031	0.031	0 01:40	0.0517	0.0517	0.000
SU_N	STORAGE	0.000	0.448	0 01:40	0	0.719	-0.099
SU_S	STORAGE	0.000	0.513	0 01:40	0	0.799	-0.085

****
Node Surcharge Summary
****

No nodes were surcharged.

****
Node Flooding Summary
****

No nodes were flooded.

****
Storage Volume Summary
****

Storage Unit	Average Volume 1000 m3	Avg Pcnt Full	Evap Pcnt Loss	Exfil Pcnt Loss	Maximum Volume 1000 m3	Max Pcnt Full	Time of Max Occurrence days hr:min	Maximum Outflow CMS
SU_N	0.032	1	0	0	0.587	23	0 04:01	0.012

SU_S	0.043	1	0	0	0.680	20	0	04:05	0.013	

****
Outfall Loading Summary
****

Outfall Node	Flow Freq Pcnt	Avg Flow CMS	Max Flow CMS	Total Volume 10^6 ltr
Humber_Pl	24.35	0.004	0.010	0.797
OF1	20.58	0.004	0.030	0.747
OF2	2.58	0.002	0.031	0.052
System	15.84	0.010	0.069	1.596

****
Link Flow Summary
****

Link	Type	Maximum |Flow| CMS	Time of Max Occurrence days	hr:min	Maximum |Veloc| m/sec	Max/ Full Flow	Max/ Full Depth
C1	CONDUIT	0.000	0	00:00	0.00	0.00	0.00
C10	CONDUIT	0.023	0	01:40	1.21	0.07	0.18
C11	CONDUIT	0.023	0	01:40	1.21	0.07	0.18
C12	CONDUIT	0.235	0	01:40	1.77	0.66	0.59
C13	CONDUIT	0.290	0	01:40	1.87	0.56	0.61
C14	CONDUIT	0.012	0	01:40	1.03	0.06	0.16
C15	CONDUIT	0.031	0	01:40	1.03	0.13	0.24
C16	CONDUIT	0.049	0	01:40	1.18	0.20	0.31
C17	CONDUIT	0.049	0	01:40	1.18	0.21	0.31
C18	CONDUIT	0.055	0	01:40	1.22	0.23	0.33
C19	CONDUIT	0.020	0	01:40	0.91	0.08	0.20
C2	CONDUIT	0.010	0	04:02	0.78	0.08	0.18
C20	CONDUIT	0.044	0	01:40	1.13	0.12	0.24
C21	CONDUIT	0.069	0	01:40	1.28	0.19	0.30
C22	CONDUIT	0.094	0	01:40	1.40	0.26	0.35
C23	CONDUIT	0.108	0	01:40	1.46	0.30	0.38
C24	CONDUIT	0.251	0	01:40	1.79	0.27	0.54
C25	CONDUIT	0.023	0	01:40	0.93	0.06	0.17
C26	CONDUIT	0.049	0	01:40	1.15	0.10	0.21
C27	CONDUIT	0.075	0	01:40	1.30	0.15	0.26
C28	CONDUIT	0.101	0	01:40	1.41	0.20	0.30
C29	CONDUIT	0.049	0	01:40	1.26	0.31	0.38
C3	CONDUIT	0.010	0	04:01	0.78	0.13	0.24
C30	CONDUIT	0.101	0	01:40	1.39	0.20	0.38
C31	CONDUIT	0.024	0	01:40	0.99	0.17	0.28
C32	CONDUIT	0.262	0	01:40	1.82	0.73	0.73
C33	CONDUIT	0.010	0	04:05	2.44	0.01	0.08
C34	CONDUIT	0.010	0	04:02	0.85	0.06	0.17
C35	CONDUIT	0.235	0	01:40	1.78	0.46	0.48
C36	CONDUIT	0.330	0	01:40	1.94	0.35	0.60
C37	CONDUIT	0.024	0	01:40	0.99	0.17	0.28
C4	CONDUIT	0.000	0	00:00	0.00	0.00	0.00
C5	CONDUIT	0.010	0	04:05	0.78	0.12	0.24
C6	CONDUIT	0.010	0	04:05	0.75	0.07	0.18
C7	CONDUIT	0.055	0	01:40	1.21	0.15	0.26
C8	CONDUIT	0.079	0	01:40	1.34	0.22	0.33
C9	CONDUIT	0.118	0	01:40	1.48	0.23	0.70
OR1	ORIFICE	0.010	0	04:05			1.00
OR2	ORIFICE	0.010	0	04:01			1.00

****
Flow Classification Summary
****

Conduit	Adjusted /Actual Length	Fraction of Time in Flow Class: Dry	Up Dry	Down Dry	Sub Crit	Sup Crit	Up Crit	Down Crit	Norm Ltd	Inlet Ctrl
C1	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C10	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
C11	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
C12	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
C13	1.00	0.00	0.00	0.00	0.06	0.00	0.00	0.94	0.00	0.00
C14	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
C15	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
C16	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
C17	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
C18	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
C19	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
C2	1.00	0.00	0.10	0.00	0.79	0.12	0.00	0.00	0.79	0.00
C20	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
C21	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
C22	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
C23	1.00	0.00	0.00	0.00	0.04	0.00	0.00	0.96	0.03	0.00
C24	1.00	0.00	0.00	0.00	0.08	0.00	0.00	0.92	0.00	0.00

C25	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
C26	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
C27	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
C28	1.00	0.00	0.00	0.00	0.03	0.00	0.00	0.97	0.03	0.00
C29	1.00	0.00	0.00	0.00	0.04	0.00	0.00	0.96	0.04	0.00
C3	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
C30	1.00	0.00	0.00	0.00	0.05	0.00	0.00	0.95	0.01	0.00
C31	1.00	0.00	0.00	0.00	0.02	0.00	0.00	0.98	0.01	0.00
C32	1.00	0.00	0.00	0.00	0.08	0.00	0.00	0.92	0.01	0.00
C33	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
C34	1.00	0.00	0.00	0.00	0.77	0.23	0.00	0.00	0.04	0.00
C35	1.00	0.00	0.00	0.00	0.05	0.00	0.00	0.95	0.04	0.00
C36	1.00	0.00	0.00	0.00	0.07	0.00	0.00	0.93	0.00	0.00
C37	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
C4	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C5	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
C6	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
C7	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
C8	1.00	0.00	0.00	0.00	0.05	0.00	0.00	0.95	0.05	0.00
C9	1.00	0.00	0.00	0.00	0.07	0.00	0.00	0.93	0.01	0.00

****
Conduit Surcharge Summary
****

No conduits were surcharged.

Analysis begun on: Wed Oct 5 20:17:15 2022
Analysis ended on: Wed Oct 5 20:17:45 2022

Total elapsed time: 00:00:30

2-yr, 3-hour

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EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.015)
--------------------------------------------------------------

WARNING 03: negative offset ignored for Link C2
WARNING 03: negative offset ignored for Link C32
WARNING 03: negative offset ignored for Link C34

*************
Element Count
*************
Number of rain gages ...... 7
Number of subcatchments ... 30
Number of nodes ........... 40
Number of links ........... 39
Number of pollutants ...... 0
Number of land uses ....... 0


****************
Raingage Summary
****************
                                                 Data       Recording
Name                 Data Source                 Type       Interval
------------------------------------------------------------------------
25mm                 25mm                        INTENSITY    5 min.
3hr-100yr            3hr-100yr                   INTENSITY   10 min.
3hr-2yr              3hr-2yr                     INTENSITY    5 min.
3hr-5yr              3hr-5yr                     INTENSITY    5 min.
6hr-100yr            6hr-100yr                   INTENSITY   10 min.
6hr-2yr              6hr-2yr                     INTENSITY    5 min.
6hr-5yr              6hr-5yr                     INTENSITY    5 min.


*********************
Subcatchment Summary
*********************
Name                       Area     Width   %Imperv    %Slope Rain Gage            Outlet
------------------------------------------------------------------------------------------------------------
Area_1                     0.25     83.33     90.00    1.0000 3hr-2yr              CBMH_14
Area_10                    0.08     26.67     90.00    1.0000 3hr-2yr              CB_23
Area_101                   1.37    137.00     95.00    0.5000 3hr-2yr              MH_26
Area_102                   1.13    113.00     95.00    0.5000 3hr-2yr              CBMH_11
Area_11                    0.13     43.33     90.00    1.0000 3hr-2yr              CB_10
Area_12                    0.16     53.33     90.00    1.0000 3hr-2yr              CBMH_9
Area_13                    0.16     53.33     90.00    1.0000 3hr-2yr              CBMH_8
Area_14                    0.17     56.67     90.00    1.0000 3hr-2yr              CBMH_7
Area_15                    0.09     30.00     90.00    1.0000 3hr-2yr              CBMH_6
Area_16                    0.15     50.00     90.00    1.0000 3hr-2yr              CB_5
Area_17                    0.17     56.67     90.00    1.0000 3hr-2yr              CBMH_4
Area_18                    0.17     56.67     90.00    1.0000 3hr-2yr              CBMH_3
Area_19                    0.17     56.67     90.00    1.0000 3hr-2yr              CBMH_2
Area_2                     0.16     53.33     90.00    1.0000 3hr-2yr              CBMH_15
Area_20                    0.28     93.33     90.00    1.0000 3hr-2yr              J13
Area_2001                  0.07      7.00     25.00    0.5000 3hr-2yr              OF2
Area_2002                  0.21     21.00     90.00    0.5000 3hr-2yr              OF2
Area_2003                  0.16     16.00     90.00    1.0000 3hr-2yr              OF1
Area_2004                  0.02     13.33      5.00    0.5000 3hr-2yr              Humber_Pl
Area_2005                  0.04     26.67      5.00    0.5000 3hr-2yr              Humber_Pl
Area_21                    0.21     70.00     90.00    1.0000 3hr-2yr              CBMH_11
Area_22                    0.32    106.67     90.00    1.0000 3hr-2yr              CBMH_12
Area_23                    0.16     53.33     90.00    1.0000 3hr-2yr              CB_29
Area_3                     0.36    120.00     90.00    1.0000 3hr-2yr              DCB_16
Area_4                     0.28     93.33     90.00    1.0000 3hr-2yr              CBMH_18
Area_5                     0.15     50.00     90.00    1.0000 3hr-2yr              CB_27
Area_6                     0.15     50.00     90.00    1.0000 3hr-2yr              CB_28
Area_7                     0.04     13.33     90.00    1.0000 3hr-2yr              CBMH_19
Area_8                     0.12     40.00     90.00    1.0000 3hr-2yr              CBMH_21
Area_9                     0.12     40.00     90.00    1.0000 3hr-2yr              CBMH_22


************
Node Summary
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                                    Invert      Max.    Ponded    External
Name                 Type            Elev.     Depth      Area    Inflow
------------------------------------------------------------------------
CB_10                JUNCTION        65.33      1.41      10.0
CB_23                JUNCTION        66.20      0.93      10.0
CB_27                JUNCTION        65.48      1.34      10.0
CB_28                JUNCTION        65.39      1.52      10.0
CB_29                JUNCTION        64.11      2.43       0.0
CB_5                 JUNCTION        65.11      1.63      10.0
CBMH_11              JUNCTION        63.58      2.16      10.0
CBMH_12              JUNCTION        64.06      1.68      10.0
CBMH_14              JUNCTION        64.11      2.21      10.0
CBMH_15              JUNCTION        64.47      1.85      10.0
CBMH_18              JUNCTION        64.05      2.54       0.0
CBMH_19              JUNCTION        64.88      2.38      10.0
CBMH_2               JUNCTION        64.06      2.94      10.0
CBMH_21              JUNCTION        65.17      1.87      10.0
CBMH_22              JUNCTION        65.53      1.51      10.0
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CBMH_3	JUNCTION	64.42	2.58	10.0
CBMH_4	JUNCTION	64.78	2.22	10.0
CBMH_6	JUNCTION	63.91	2.73	10.0
CBMH_7	JUNCTION	64.27	2.73	10.0
CBMH_8	JUNCTION	64.63	2.37	10.0
CBMH_9	JUNCTION	64.99	2.01	10.0
DCB_16	JUNCTION	64.80	1.52	10.0
J1	JUNCTION	63.75	3.27	0.0
J13	JUNCTION	63.54	3.10	10.0
J2	JUNCTION	63.24	3.33	0.0
MH_20	JUNCTION	64.99	2.30	0.0
MH_24	JUNCTION	64.13	2.50	10.0
MH_25	JUNCTION	64.42	2.63	0.0
MH_26	JUNCTION	64.56	2.70	0.0
MH_27	JUNCTION	63.89	2.02	0.0
MH_30	JUNCTION	63.73	3.08	0.0
MH_44	JUNCTION	63.51	3.51	0.0
MH_45	JUNCTION	63.11	3.46	0.0
OGS_1	JUNCTION	63.04	3.34	0.0
OGS_2	JUNCTION	63.47	3.01	0.0
Humber_Pl	OUTFALL	62.48	0.38	0.0
OF1	OUTFALL	63.41	0.38	0.0
OF2	OUTFALL	0.00	0.00	0.0
SU_N	STORAGE	63.75	3.04	0.0
SU_S	STORAGE	63.24	3.33	0.0

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Link Summary
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Name	From Node	To Node	Type	Length	%Slope	Roughness
C1	SU_N	MH_44	CONDUIT	2.5	1.0001	0.0090
C10	CB_28	MH_26	CONDUIT	30.4	1.0001	0.0110
C11	CB_27	MH_26	CONDUIT	32.8	1.0001	0.0110
C12	MH_26	MH_25	CONDUIT	16.5	0.4970	0.0110
C13	MH_24	CBMH_18	CONDUIT	4.8	0.5000	0.0110
C14	CB_23	CBMH_22	CONDUIT	51.5	1.0001	0.0110
C15	CBMH_22	CBMH_21	CONDUIT	60.0	0.5000	0.0110
C16	CBMH_21	MH_20	CONDUIT	24.5	0.5020	0.0110
C17	MH_20	CBMH_19	CONDUIT	10.4	0.5000	0.0110
C18	CBMH_19	MH_24	CONDUIT	46.5	0.5011	0.0110
C19	CB_10	CBMH_9	CONDUIT	52.5	0.4991	0.0110
C2	MH_44	OGS_2	CONDUIT	11.6	0.3707	0.0110
C20	CBMH_9	CBMH_8	CONDUIT	60.0	0.5000	0.0110
C21	CBMH_8	CBMH_7	CONDUIT	60.0	0.5000	0.0110
C22	CBMH_7	CBMH_6	CONDUIT	60.0	0.5000	0.0110
C23	CBMH_6	J13	CONDUIT	29.9	0.5017	0.0110
C24	J13	SU_S	CONDUIT	4.0	0.5000	0.0110
C25	CB_5	CBMH_4	CONDUIT	52.5	0.4991	0.0110
C26	CBMH_4	CBMH_3	CONDUIT	60.0	0.5000	0.0110
C27	CBMH_3	CBMH_2	CONDUIT	60.0	0.5000	0.0110
C28	CBMH_2	MH_30	CONDUIT	53.4	0.4963	0.0110
C29	CBMH_12	CBMH_11	CONDUIT	50.0	0.5700	0.0110
C3	J1	MH_44	CONDUIT	2.5	0.4800	0.0110
C30	MH_30	J13	CONDUIT	9.3	0.4839	0.0110
C31	MH_27	CBMH_11	CONDUIT	8.2	0.5000	0.0110
C32	CBMH_11	SU_S	CONDUIT	13.2	0.5000	0.0110
C33	OGS_1	Humber_Pl	CONDUIT	4.0	14.1135	0.0110
C34	OGS_2	OF1	CONDUIT	8.7	0.6782	0.0110
C35	MH_25	MH_24	CONDUIT	44.2	0.5000	0.0110
C36	CBMH_18	SU_N	CONDUIT	3.9	0.5128	0.0110
C37	CB_29	MH_27	CONDUIT	32.9	0.4985	0.0110
C4	SU_S	MH_45	CONDUIT	9.4	1.0001	0.0090
C5	J2	MH_45	CONDUIT	9.4	0.5000	0.0110
C6	MH_45	OGS_1	CONDUIT	3.1	0.4839	0.0110
C7	DCB_16	CBMH_15	CONDUIT	54.4	0.5000	0.0110
C8	CBMH_15	CBMH_14	CONDUIT	60.0	0.5000	0.0110
C9	CBMH_14	SU_N	CONDUIT	15.2	0.5000	0.0110
OR1	SU_S	J2	ORIFICE			
OR2	SU_N	J1	ORIFICE			

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Cross Section Summary
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Conduit	Shape	Full Depth	Full Area	Hyd. Rad.	Max. Width	No. of Barrels	Full Flow
C1	CIRCULAR	0.20	0.03	0.05	0.20	1	0.05
C10	CIRCULAR	0.45	0.16	0.11	0.45	1	0.34
C11	CIRCULAR	0.45	0.16	0.11	0.45	1	0.34
C12	CIRCULAR	0.53	0.22	0.13	0.53	1	0.36
C13	CIRCULAR	0.60	0.28	0.15	0.60	1	0.51
C14	CIRCULAR	0.38	0.11	0.09	0.38	1	0.21
C15	CIRCULAR	0.45	0.16	0.11	0.45	1	0.24
C16	CIRCULAR	0.45	0.16	0.11	0.45	1	0.24
C17	CIRCULAR	0.45	0.16	0.11	0.45	1	0.24
C18	CIRCULAR	0.45	0.16	0.11	0.45	1	0.24
C19	CIRCULAR	0.45	0.16	0.11	0.45	1	0.24
C2	CIRCULAR	0.38	0.11	0.09	0.38	1	0.13
C20	CIRCULAR	0.53	0.22	0.13	0.53	1	0.36
C21	CIRCULAR	0.53	0.22	0.13	0.53	1	0.36
C22	CIRCULAR	0.53	0.22	0.13	0.53	1	0.36
C23	CIRCULAR	0.53	0.22	0.13	0.53	1	0.36

C24	CIRCULAR	0.75	0.44	0.19	0.75	1	0.93
C25	CIRCULAR	0.53	0.22	0.13	0.53	1	0.36
C26	CIRCULAR	0.60	0.28	0.15	0.60	1	0.51
C27	CIRCULAR	0.60	0.28	0.15	0.60	1	0.51
C28	CIRCULAR	0.60	0.28	0.15	0.60	1	0.51
C29	CIRCULAR	0.38	0.11	0.09	0.38	1	0.16
C3	CIRCULAR	0.30	0.07	0.07	0.30	1	0.08
C30	CIRCULAR	0.60	0.28	0.15	0.60	1	0.50
C31	CIRCULAR	0.38	0.11	0.09	0.38	1	0.15
C32	CIRCULAR	0.53	0.22	0.13	0.53	1	0.36
C33	CIRCULAR	0.38	0.11	0.09	0.38	1	0.78
C34	CIRCULAR	0.38	0.11	0.09	0.38	1	0.17
C35	CIRCULAR	0.60	0.28	0.15	0.60	1	0.51
C36	CIRCULAR	0.75	0.44	0.19	0.75	1	0.94
C37	CIRCULAR	0.38	0.11	0.09	0.38	1	0.15
C4	CIRCULAR	0.20	0.03	0.05	0.20	1	0.05
C5	CIRCULAR	0.30	0.07	0.07	0.30	1	0.08
C6	CIRCULAR	0.38	0.11	0.09	0.38	1	0.14
C7	CIRCULAR	0.53	0.22	0.13	0.53	1	0.36
C8	CIRCULAR	0.53	0.22	0.13	0.53	1	0.36
C9	CIRCULAR	0.60	0.28	0.15	0.60	1	0.51

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NOTE: The summary statistics displayed in this report are
based on results found at every computational time step,
not just on results from each reporting time step.
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Analysis Options
****
Flow Units ..... CMS
Process Models:
  Rainfall/Runoff ..... YES
  RDII ..... NO
  Snowmelt ..... NO
  Groundwater ..... NO
  Flow Routing ..... YES
  Ponding Allowed ..... NO
  Water Quality ..... NO
Infiltration Method ..... HORTON
Flow Routing Method ..... DYNWAVE
Surcharge Method ..... EXTRAN
Starting Date 12/11/2020 00:00:00
Ending Date 12/21/2020 00:00:00
Antecedent Dry Days 0.0
Report Time Step 00:01:00
Wet Time Step 00:01:00
Dry Time Step 00:01:00
Routing Time Step ..... 1.00 sec
Variable Time Step ..... YES
Maximum Trials 8
Number of Threads 6
Head Tolerance ..... 0.001500 m

Runoff Quantity Continuity	Volume hectare-m	Depth mm
Total Precipitation	0.225	31.880
Evaporation Loss	0.000	0.000
Infiltration Loss	0.017	2.387
Surface Runoff	0.208	29.513
Final Storage	0.000	0.000
Continuity Error (%)	-0.066	

Flow Routing Continuity	Volume hectare-m	Volume 10^6 ltr
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	0.208	2.081
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	0.000	0.000
External Outflow	0.208	2.081
Flooding Loss	0.000	0.000
Evaporation Loss	0.000	0.000
Exfiltration Loss	0.000	0.000
Initial Stored Volume	0.000	0.000
Final Stored Volume	0.000	0.000
Continuity Error (%)	-0.037	

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Time-Step Critical Elements
****
None

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Highest Flow Instability Indexes
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Link C2 (3)
Link OR1 (1)
Link OR2 (1)

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Routing Time Step Summary
****
Minimum Time Step : 0.30 sec
Average Time Step : 1.00 sec
Maximum Time Step : 1.00 sec
Percent in Steady State : 0.00
Average Iterations per Step : 2.00
Percent Not Converging : 0.00
Time Step Frequencies :
1.000 - 0.871 sec : 99.92 %
0.871 - 0.758 sec : 0.08 %
0.758 - 0.660 sec : 0.00 %
0.660 - 0.574 sec : 0.00 %
0.574 - 0.500 sec : 0.00 %

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Subcatchment Runoff Summary
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Subcatchment	Total Precip mm	Total Runon mm	Total Evap mm	Total Infil mm	Imperv Runoff mm	Perv Runoff mm	Total Runoff mm	Total Runoff 10^6 ltr	Peak Runoff CMS	Runoff Coeff
Area_1	31.88	0.00	0.00	2.46	28.72	0.73	29.45	0.07	0.06	0.924
Area_10	31.88	0.00	0.00	2.46	28.72	0.73	29.45	0.02	0.02	0.924
Area_101	31.88	0.00	0.00	1.24	30.30	0.35	30.65	0.42	0.26	0.961
Area_102	31.88	0.00	0.00	1.24	30.30	0.35	30.65	0.35	0.21	0.961
Area_11	31.88	0.00	0.00	2.46	28.72	0.73	29.45	0.04	0.03	0.924
Area_12	31.88	0.00	0.00	2.46	28.72	0.73	29.45	0.05	0.04	0.924
Area_13	31.88	0.00	0.00	2.46	28.72	0.73	29.45	0.05	0.04	0.924
Area_14	31.88	0.00	0.00	2.46	28.72	0.73	29.45	0.05	0.04	0.924
Area_15	31.88	0.00	0.00	2.46	28.72	0.73	29.45	0.03	0.02	0.924
Area_16	31.88	0.00	0.00	2.46	28.72	0.73	29.45	0.04	0.04	0.924
Area_17	31.88	0.00	0.00	2.46	28.72	0.73	29.45	0.05	0.04	0.924
Area_18	31.88	0.00	0.00	2.46	28.72	0.73	29.45	0.05	0.04	0.924
Area_19	31.88	0.00	0.00	2.46	28.72	0.73	29.45	0.05	0.04	0.924
Area_2	31.88	0.00	0.00	2.46	28.72	0.73	29.45	0.05	0.04	0.924
Area_20	31.88	0.00	0.00	2.46	28.72	0.73	29.45	0.08	0.07	0.924
Area_2001	31.88	0.00	0.00	19.96	7.98	3.95	11.93	0.01	0.00	0.374
Area_2002	31.88	0.00	0.00	2.50	28.70	0.68	29.39	0.06	0.04	0.922
Area_2003	31.88	0.00	0.00	2.52	28.71	0.66	29.37	0.05	0.03	0.921
Area_2004	31.88	0.00	0.00	23.95	1.60	6.34	7.94	0.00	0.00	0.249
Area_2005	31.88	0.00	0.00	23.95	1.60	6.34	7.94	0.00	0.00	0.249
Area_21	31.88	0.00	0.00	2.46	28.72	0.73	29.45	0.06	0.05	0.924
Area_22	31.88	0.00	0.00	2.46	28.72	0.73	29.45	0.09	0.08	0.924
Area_23	31.88	0.00	0.00	2.46	28.72	0.73	29.45	0.05	0.04	0.924
Area_3	31.88	0.00	0.00	2.46	28.72	0.73	29.45	0.11	0.09	0.924
Area_4	31.88	0.00	0.00	2.46	28.72	0.73	29.45	0.08	0.07	0.924
Area_5	31.88	0.00	0.00	2.46	28.72	0.73	29.45	0.04	0.04	0.924
Area_6	31.88	0.00	0.00	2.46	28.72	0.73	29.45	0.04	0.04	0.924
Area_7	31.88	0.00	0.00	2.46	28.72	0.73	29.45	0.01	0.01	0.924
Area_8	31.88	0.00	0.00	2.46	28.72	0.73	29.45	0.04	0.03	0.924
Area_9	31.88	0.00	0.00	2.46	28.72	0.73	29.45	0.04	0.03	0.924

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Node Depth Summary
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Node	Type	Average Depth Meters	Maximum Depth Meters	Maximum HGL Meters	Time of Max Occurrence days hr:min	Reported Max Depth Meters
CB_10	JUNCTION	0.00	0.11	65.44	0 01:05	0.11
CB_23	JUNCTION	0.00	0.08	66.28	0 01:05	0.08
CB_27	JUNCTION	0.00	0.10	65.59	0 01:05	0.10
CB_28	JUNCTION	0.00	0.10	65.49	0 01:05	0.10
CB_29	JUNCTION	0.00	0.13	64.25	0 01:05	0.13
CB_5	JUNCTION	0.00	0.11	65.23	0 01:05	0.11
CBMH_11	JUNCTION	0.03	0.53	64.12	0 03:08	0.53
CBMH_12	JUNCTION	0.00	0.19	64.25	0 01:05	0.19
CBMH_14	JUNCTION	0.02	0.56	64.67	0 02:58	0.56
CBMH_15	JUNCTION	0.00	0.22	64.68	0 01:05	0.22
CBMH_18	JUNCTION	0.03	0.61	64.66	0 02:59	0.61
CBMH_19	JUNCTION	0.00	0.19	65.07	0 01:05	0.19
CBMH_2	JUNCTION	0.00	0.23	64.29	0 01:05	0.23
CBMH_21	JUNCTION	0.00	0.18	65.35	0 01:05	0.18
CBMH_22	JUNCTION	0.00	0.14	65.67	0 01:05	0.14
CBMH_3	JUNCTION	0.00	0.20	64.61	0 01:05	0.20
CBMH_4	JUNCTION	0.00	0.16	64.94	0 01:05	0.16
CBMH_6	JUNCTION	0.01	0.25	64.17	0 01:05	0.25
CBMH_7	JUNCTION	0.00	0.24	64.51	0 01:05	0.24
CBMH_8	JUNCTION	0.00	0.20	64.83	0 01:05	0.20
CBMH_9	JUNCTION	0.00	0.16	65.15	0 01:05	0.16
DCB_16	JUNCTION	0.00	0.18	64.98	0 01:05	0.18
J1	JUNCTION	0.01	0.08	63.83	0 02:59	0.08

J13	JUNCTION	0.03	0.60	64.13	0	03:02	0.59
J2	JUNCTION	0.01	0.08	63.31	0	03:07	0.08
MH_20	JUNCTION	0.00	0.18	65.17	0	01:05	0.18
MH_24	JUNCTION	0.02	0.53	64.66	0	02:59	0.53
MH_25	JUNCTION	0.01	0.35	64.77	0	01:05	0.35
MH_26	JUNCTION	0.00	0.40	64.95	0	01:05	0.39
MH_27	JUNCTION	0.01	0.23	64.12	0	03:08	0.23
MH_30	JUNCTION	0.01	0.39	64.12	0	03:06	0.39
MH_44	JUNCTION	0.01	0.10	63.62	0	03:00	0.10
MH_45	JUNCTION	0.01	0.07	63.19	0	03:07	0.07
OGS_1	JUNCTION	0.00	0.03	63.07	0	03:08	0.03
OGS_2	JUNCTION	0.01	0.09	63.56	0	02:59	0.09
Humber_Pl	OUTFALL	0.00	0.00	62.48	0	00:00	0.00
OF1	OUTFALL	0.01	0.09	63.50	0	03:00	0.09
OF2	OUTFALL	0.00	0.00	0.00	0	00:00	0.00
SU_N	STORAGE	0.06	0.91	64.66	0	02:59	0.91
SU_S	STORAGE	0.07	0.88	64.12	0	03:07	0.88

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Node Inflow Summary
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Node	Type	Maximum Lateral Inflow CMS	Maximum Total Inflow CMS	Time of Max Occurrence days hr:min	Lateral Inflow Volume 10^6 ltr	Total Inflow Volume 10^6 ltr	Flow Balance Error Percent
CB_10	JUNCTION	0.033	0.033	0 01:05	0.0383	0.0383	-0.012
CB_23	JUNCTION	0.020	0.020	0 01:05	0.0236	0.0236	-0.007
CB_27	JUNCTION	0.038	0.038	0 01:05	0.0442	0.0442	-0.004
CB_28	JUNCTION	0.038	0.038	0 01:05	0.0442	0.0442	-0.004
CB_29	JUNCTION	0.040	0.040	0 01:05	0.0471	0.0471	0.120
CB_5	JUNCTION	0.038	0.038	0 01:05	0.0442	0.0442	-0.012
CBMH_11	JUNCTION	0.265	0.384	0 01:05	0.408	0.549	-0.020
CBMH_12	JUNCTION	0.080	0.080	0 01:05	0.0942	0.0942	0.854
CBMH_14	JUNCTION	0.063	0.190	0 01:05	0.0736	0.255	-0.264
CBMH_15	JUNCTION	0.040	0.129	0 01:05	0.0471	0.155	0.586
CBMH_18	JUNCTION	0.070	0.480	0 01:05	0.0824	0.697	-0.003
CBMH_19	JUNCTION	0.010	0.088	0 01:05	0.0118	0.106	-0.007
CBMH_2	JUNCTION	0.043	0.160	0 01:05	0.0501	0.194	0.319
CBMH_21	JUNCTION	0.030	0.079	0 01:05	0.0353	0.0942	-0.003
CBMH_22	JUNCTION	0.030	0.050	0 01:05	0.0353	0.0589	-0.010
CBMH_3	JUNCTION	0.043	0.120	0 01:05	0.0501	0.144	-0.012
CBMH_4	JUNCTION	0.043	0.080	0 01:05	0.0501	0.0942	-0.011
CBMH_6	JUNCTION	0.023	0.170	0 01:05	0.0265	0.21	0.058
CBMH_7	JUNCTION	0.043	0.150	0 01:05	0.0501	0.183	0.147
CBMH_8	JUNCTION	0.040	0.111	0 01:05	0.0471	0.133	-0.011
CBMH_9	JUNCTION	0.040	0.072	0 01:05	0.0471	0.0854	-0.010
DCB_16	JUNCTION	0.090	0.090	0 01:05	0.106	0.106	0.166
J1	JUNCTION	0.000	0.012	0 02:59	0	0.878	-0.005
J13	JUNCTION	0.070	0.394	0 01:05	0.0824	0.578	-0.037
J2	JUNCTION	0.000	0.011	0 03:07	0	1.03	-0.004
MH_20	JUNCTION	0.000	0.078	0 01:05	0	0.0942	-0.001
MH_24	JUNCTION	0.000	0.420	0 01:05	0	0.612	-0.310
MH_25	JUNCTION	0.000	0.332	0 01:05	0	0.508	0.360
MH_26	JUNCTION	0.257	0.331	0 01:05	0.42	0.508	0.047
MH_27	JUNCTION	0.000	0.040	0 01:05	0	0.0471	-0.032
MH_30	JUNCTION	0.000	0.160	0 01:05	0	0.21	-0.281
MH_44	JUNCTION	0.000	0.021	0 02:59	0	0.924	0.006
MH_45	JUNCTION	0.000	0.012	0 03:08	0	1.04	0.001
OGS_1	JUNCTION	0.000	0.012	0 03:08	0	1.04	-0.000
OGS_2	JUNCTION	0.000	0.021	0 02:59	0	0.924	-0.006
Humber_Pl	OUTFALL	0.001	0.012	0 03:05	0.00476	1.04	0.000
OF1	OUTFALL	0.033	0.039	0 01:05	0.047	0.971	0.000
OF2	OUTFALL	0.043	0.043	0 01:05	0.0701	0.0701	0.000
SU_N	STORAGE	0.000	0.667	0 01:05	0	0.951	-0.092
SU_S	STORAGE	0.000	0.776	0 01:05	0	1.11	-0.107

****
Node Surcharge Summary
****

No nodes were surcharged.

****
Node Flooding Summary
****

No nodes were flooded.

****
Storage Volume Summary
****

Storage Unit	Average Volume 1000 m3	Avg Pcnt Full	Evap Pcnt Loss	Exfil Pcnt Loss	Maximum Volume 1000 m3	Max Pcnt Full	Time of Max Occurrence days hr:min	Maximum Outflow CMS
SU_N	0.045	2	0	0	0.767	30	0 02:59	0.028

SU_S	0.065	2	0	0	0.914	26	0	03:07	0.061

****
Outfall Loading Summary
****

Outfall Node	Flow Freq Pcnt	Avg Flow CMS	Max Flow CMS	Total Volume 10^6 ltr
Humber_Pl	26.62	0.005	0.012	1.040
OF1	22.05	0.005	0.039	0.971
OF2	2.60	0.003	0.043	0.070
System	17.09	0.013	0.090	2.081

****
Link Flow Summary
****

Link	Type	Maximum |Flow| CMS	Time of Max Occurrence days hr:min	Maximum |Veloc| m/sec	Max/ Full Flow	Max/ Full Depth
C1	CONDUIT	0.010	0 02:59	1.18	0.20	0.31
C10	CONDUIT	0.037	0 01:05	1.40	0.11	0.23
C11	CONDUIT	0.037	0 01:05	1.40	0.11	0.23
C12	CONDUIT	0.332	0 01:05	1.92	0.93	0.75
C13	CONDUIT	0.419	0 01:05	2.02	0.82	0.90
C14	CONDUIT	0.020	0 01:05	1.19	0.10	0.21
C15	CONDUIT	0.049	0 01:05	1.18	0.21	0.31
C16	CONDUIT	0.078	0 01:05	1.35	0.33	0.39
C17	CONDUIT	0.079	0 01:05	1.35	0.33	0.40
C18	CONDUIT	0.088	0 01:05	1.39	0.37	0.42
C19	CONDUIT	0.032	0 01:05	1.05	0.13	0.25
C2	CONDUIT	0.021	0 02:59	0.94	0.17	0.26
C20	CONDUIT	0.071	0 01:05	1.30	0.20	0.30
C21	CONDUIT	0.109	0 01:05	1.46	0.30	0.38
C22	CONDUIT	0.150	0 01:05	1.59	0.42	0.45
C23	CONDUIT	0.171	0 01:05	1.64	0.47	0.55
C24	CONDUIT	0.394	0 01:05	2.02	0.42	0.80
C25	CONDUIT	0.037	0 01:05	1.07	0.10	0.22
C26	CONDUIT	0.078	0 01:05	1.32	0.15	0.26
C27	CONDUIT	0.119	0 01:05	1.48	0.23	0.33
C28	CONDUIT	0.160	0 01:05	1.60	0.31	0.38
C29	CONDUIT	0.080	0 01:05	1.33	0.51	0.57
C3	CONDUIT	0.012	0 02:59	0.80	0.15	0.26
C30	CONDUIT	0.160	0 01:05	1.58	0.32	0.69
C31	CONDUIT	0.040	0 01:05	1.09	0.27	0.66
C32	CONDUIT	0.382	0 01:05	2.05	1.06	1.00
C33	CONDUIT	0.012	0 03:08	2.58	0.02	0.09
C34	CONDUIT	0.021	0 03:00	1.05	0.12	0.24
C35	CONDUIT	0.332	0 01:05	1.93	0.65	0.59
C36	CONDUIT	0.480	0 01:05	2.14	0.51	0.83
C37	CONDUIT	0.040	0 01:05	1.13	0.27	0.36
C4	CONDUIT	0.001	0 03:08	0.54	0.01	0.08
C5	CONDUIT	0.011	0 03:07	0.81	0.14	0.25
C6	CONDUIT	0.012	0 03:08	0.79	0.08	0.20
C7	CONDUIT	0.089	0 01:05	1.38	0.25	0.34
C8	CONDUIT	0.128	0 01:05	1.53	0.36	0.66
C9	CONDUIT	0.189	0 01:05	1.68	0.37	0.97
OR1	ORIFICE	0.011	0 03:07			1.00
OR2	ORIFICE	0.012	0 02:59			1.00

****
Flow Classification Summary
****

Conduit	Adjusted /Actual Length	Fraction of Time in Flow Class: Dry	Up Dry	Down Dry	Sub Crit	Sup Crit	Up Crit	Down Crit	Norm Ltd	Inlet Ctrl
C1	1.00	0.99	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00
C10	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
C11	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
C12	1.00	0.00	0.00	0.00	0.03	0.00	0.00	0.97	0.01	0.00
C13	1.00	0.00	0.00	0.00	0.08	0.00	0.00	0.92	0.00	0.00
C14	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
C15	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
C16	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
C17	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
C18	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
C19	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
C2	1.00	0.00	0.11	0.00	0.76	0.13	0.00	0.00	0.79	0.00
C20	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
C21	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
C22	1.00	0.00	0.00	0.00	0.03	0.00	0.00	0.97	0.03	0.00
C23	1.00	0.00	0.00	0.00	0.06	0.00	0.00	0.94	0.03	0.00
C24	1.00	0.00	0.00	0.00	0.10	0.00	0.00	0.90	0.01	0.00

C25	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
C26	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
C27	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
C28	1.00	0.00	0.00	0.00	0.06	0.00	0.00	0.94	0.05	0.00
C29	1.00	0.00	0.00	0.00	0.06	0.00	0.00	0.94	0.06	0.00
C3	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
C30	1.00	0.00	0.00	0.00	0.07	0.00	0.00	0.92	0.01	0.00
C31	1.00	0.00	0.00	0.00	0.05	0.00	0.00	0.95	0.01	0.00
C32	1.00	0.00	0.00	0.00	0.10	0.00	0.00	0.90	0.01	0.00
C33	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
C34	1.00	0.00	0.00	0.00	0.76	0.24	0.00	0.00	0.04	0.00
C35	1.00	0.00	0.00	0.00	0.07	0.00	0.00	0.93	0.03	0.00
C36	1.00	0.00	0.00	0.00	0.09	0.00	0.00	0.91	0.00	0.00
C37	1.00	0.00	0.00	0.00	0.03	0.00	0.00	0.97	0.03	0.00
C4	1.00	0.99	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00
C5	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
C6	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
C7	1.00	0.00	0.00	0.00	0.02	0.00	0.00	0.98	0.02	0.00
C8	1.00	0.00	0.00	0.00	0.07	0.00	0.00	0.93	0.04	0.00
C9	1.00	0.00	0.00	0.00	0.09	0.00	0.00	0.91	0.01	0.00

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Conduit Surcharge Summary
****

	Hours Full			Hours Above Full	Hours Capacity
Conduit	Both Ends	Upstream	Dnstream	Normal Flow	Limited
C32	0.83	0.83	4.15	0.02	0.01
C9	0.01	0.01	1.77	0.01	0.01

Analysis begun on: Wed Oct 5 20:35:01 2022
Analysis ended on: Wed Oct 5 20:35:31 2022
Total elapsed time: 00:00:30

2-yr, 6-hour

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  EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.015)
  --------------------------------------------------------------

  WARNING 03: negative offset ignored for Link C2
  WARNING 03: negative offset ignored for Link C32
  WARNING 03: negative offset ignored for Link C34

  *************
  Element Count
  *************
  Number of rain gages ...... 7
  Number of subcatchments ... 30
  Number of nodes ........... 40
  Number of links ........... 39
  Number of pollutants ...... 0
  Number of land uses ....... 0


  ****************
  Raingage Summary
  ****************
                                                  Data       Recording
  Name                 Data Source                Type       Interval
  ------------------------------------------------------------------------
  25mm                 25mm                       INTENSITY    5 min.
  3hr-100yr            3hr-100yr                  INTENSITY   10 min.
  3hr-2yr              3hr-2yr                    INTENSITY    5 min.
  3hr-5yr              3hr-5yr                    INTENSITY    5 min.
  6hr-100yr            6hr-100yr                  INTENSITY   10 min.
  6hr-2yr              6hr-2yr                    INTENSITY    5 min.
  6hr-5yr              6hr-5yr                    INTENSITY    5 min.


  ********************
  Subcatchment Summary
  ********************
  Name                       Area     Width   %Imperv    %Slope Rain Gage            Outlet
  ------------------------------------------------------------------------------------------------------------
  Area_1                     0.25     83.33     90.00    1.0000 6hr-2yr              CBMH_14
  Area_10                    0.08     26.67     90.00    1.0000 6hr-2yr              CB_23
  Area_101                   1.37    137.00     95.00    0.5000 6hr-2yr              MH_26
  Area_102                   1.13    113.00     95.00    0.5000 6hr-2yr              CBMH_11
  Area_11                    0.13     43.33     90.00    1.0000 6hr-2yr              CB_10
  Area_12                    0.16     53.33     90.00    1.0000 6hr-2yr              CBMH_9
  Area_13                    0.16     53.33     90.00    1.0000 6hr-2yr              CBMH_8
  Area_14                    0.17     56.67     90.00    1.0000 6hr-2yr              CBMH_7
  Area_15                    0.09     30.00     90.00    1.0000 6hr-2yr              CBMH_6
  Area_16                    0.15     50.00     90.00    1.0000 6hr-2yr              CB_5
  Area_17                    0.17     56.67     90.00    1.0000 6hr-2yr              CBMH_4
  Area_18                    0.17     56.67     90.00    1.0000 6hr-2yr              CBMH_3
  Area_19                    0.17     56.67     90.00    1.0000 6hr-2yr              CBMH_2
  Area_2                     0.16     53.33     90.00    1.0000 6hr-2yr              CBMH_15
  Area_20                    0.28     93.33     90.00    1.0000 6hr-2yr              J13
  Area_2001                  0.07      7.00     25.00    0.5000 6hr-2yr              OF2
  Area_2002                  0.21     21.00     90.00    0.5000 6hr-2yr              OF2
  Area_2003                  0.16     16.00     90.00    1.0000 6hr-2yr              OF1
  Area_2004                  0.02     13.33      5.00    0.5000 6hr-2yr              Humber_Pl
  Area_2005                  0.04     26.67      5.00    0.5000 6hr-2yr              Humber_Pl
  Area_21                    0.21     70.00     90.00    1.0000 6hr-2yr              CBMH_11
  Area_22                    0.32    106.67     90.00    1.0000 6hr-2yr              CBMH_12
  Area_23                    0.16     53.33     90.00    1.0000 6hr-2yr              CB_29
  Area_3                     0.36    120.00     90.00    1.0000 6hr-2yr              DCB_16
  Area_4                     0.28     93.33     90.00    1.0000 6hr-2yr              CBMH_18
  Area_5                     0.15     50.00     90.00    1.0000 6hr-2yr              CB_27
  Area_6                     0.15     50.00     90.00    1.0000 6hr-2yr              CB_28
  Area_7                     0.04     13.33     90.00    1.0000 6hr-2yr              CBMH_19
  Area_8                     0.12     40.00     90.00    1.0000 6hr-2yr              CBMH_21
  Area_9                     0.12     40.00     90.00    1.0000 6hr-2yr              CBMH_22


  ************
  Node Summary
  ************
                                      Invert      Max.    Ponded    External
  Name                 Type            Elev.     Depth      Area    Inflow
  ------------------------------------------------------------------------
  CB_10                JUNCTION        65.33      1.41      10.0
  CB_23                JUNCTION        66.20      0.93      10.0
  CB_27                JUNCTION        65.48      1.34      10.0
  CB_28                JUNCTION        65.39      1.52      10.0
  CB_29                JUNCTION        64.11      2.43       0.0
  CB_5                 JUNCTION        65.11      1.63      10.0
  CBMH_11              JUNCTION        63.58      2.16      10.0
  CBMH_12              JUNCTION        64.06      1.68      10.0
  CBMH_14              JUNCTION        64.11      2.21      10.0
  CBMH_15              JUNCTION        64.47      1.85      10.0
  CBMH_18              JUNCTION        64.05      2.54       0.0
  CBMH_19              JUNCTION        64.88      2.38      10.0
  CBMH_2               JUNCTION        64.06      2.94      10.0
  CBMH_21              JUNCTION        65.17      1.87      10.0
  CBMH_22              JUNCTION        65.53      1.51      10.0
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CBMH_3	JUNCTION	64.42	2.58	10.0
CBMH_4	JUNCTION	64.78	2.22	10.0
CBMH_6	JUNCTION	63.91	2.73	10.0
CBMH_7	JUNCTION	64.27	2.73	10.0
CBMH_8	JUNCTION	64.63	2.37	10.0
CBMH_9	JUNCTION	64.99	2.01	10.0
DCB_16	JUNCTION	64.80	1.52	10.0
J1	JUNCTION	63.75	3.27	0.0
J13	JUNCTION	63.54	3.10	10.0
J2	JUNCTION	63.24	3.33	0.0
MH_20	JUNCTION	64.99	2.30	0.0
MH_24	JUNCTION	64.13	2.50	10.0
MH_25	JUNCTION	64.42	2.63	0.0
MH_26	JUNCTION	64.56	2.70	0.0
MH_27	JUNCTION	63.89	2.02	0.0
MH_30	JUNCTION	63.73	3.08	0.0
MH_44	JUNCTION	63.51	3.51	0.0
MH_45	JUNCTION	63.11	3.46	0.0
OGS_1	JUNCTION	63.04	3.34	0.0
OGS_2	JUNCTION	63.47	3.01	0.0
Humber_Pl	OUTFALL	62.48	0.38	0.0
OF1	OUTFALL	63.41	0.38	0.0
OF2	OUTFALL	0.00	0.00	0.0
SU_N	STORAGE	63.75	3.04	0.0
SU_S	STORAGE	63.24	3.33	0.0

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Link Summary
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Name	From Node	To Node	Type	Length	%Slope	Roughness
C1	SU_N	MH_44	CONDUIT	2.5	1.0001	0.0090
C10	CB_28	MH_26	CONDUIT	30.4	1.0001	0.0110
C11	CB_27	MH_26	CONDUIT	32.8	1.0001	0.0110
C12	MH_26	MH_25	CONDUIT	16.5	0.4970	0.0110
C13	MH_24	CBMH_18	CONDUIT	4.8	0.5000	0.0110
C14	CB_23	CBMH_22	CONDUIT	51.5	1.0001	0.0110
C15	CBMH_22	CBMH_21	CONDUIT	60.0	0.5000	0.0110
C16	CBMH_21	MH_20	CONDUIT	24.5	0.5020	0.0110
C17	MH_20	CBMH_19	CONDUIT	10.4	0.5000	0.0110
C18	CBMH_19	MH_24	CONDUIT	46.5	0.5011	0.0110
C19	CB_10	CBMH_9	CONDUIT	52.5	0.4991	0.0110
C2	MH_44	OGS_2	CONDUIT	11.6	0.3707	0.0110
C20	CBMH_9	CBMH_8	CONDUIT	60.0	0.5000	0.0110
C21	CBMH_8	CBMH_7	CONDUIT	60.0	0.5000	0.0110
C22	CBMH_7	CBMH_6	CONDUIT	60.0	0.5000	0.0110
C23	CBMH_6	J13	CONDUIT	29.9	0.5017	0.0110
C24	J13	SU_S	CONDUIT	4.0	0.5000	0.0110
C25	CB_5	CBMH_4	CONDUIT	52.5	0.4991	0.0110
C26	CBMH_4	CBMH_3	CONDUIT	60.0	0.5000	0.0110
C27	CBMH_3	CBMH_2	CONDUIT	60.0	0.5000	0.0110
C28	CBMH_2	MH_30	CONDUIT	53.4	0.4963	0.0110
C29	CBMH_12	CBMH_11	CONDUIT	50.0	0.5700	0.0110
C3	J1	MH_44	CONDUIT	2.5	0.4800	0.0110
C30	MH_30	J13	CONDUIT	9.3	0.4839	0.0110
C31	MH_27	CBMH_11	CONDUIT	8.2	0.5000	0.0110
C32	CBMH_11	SU_S	CONDUIT	13.2	0.5000	0.0110
C33	OGS_1	Humber_Pl	CONDUIT	4.0	14.1135	0.0110
C34	OGS_2	OF1	CONDUIT	8.7	0.6782	0.0110
C35	MH_25	MH_24	CONDUIT	44.2	0.5000	0.0110
C36	CBMH_18	SU_N	CONDUIT	3.9	0.5128	0.0110
C37	CB_29	MH_27	CONDUIT	32.9	0.4985	0.0110
C4	SU_S	MH_45	CONDUIT	9.4	1.0001	0.0090
C5	J2	MH_45	CONDUIT	9.4	0.5000	0.0110
C6	MH_45	OGS_1	CONDUIT	3.1	0.4839	0.0110
C7	DCB_16	CBMH_15	CONDUIT	54.4	0.5000	0.0110
C8	CBMH_15	CBMH_14	CONDUIT	60.0	0.5000	0.0110
C9	CBMH_14	SU_N	CONDUIT	15.2	0.5000	0.0110
OR1	SU_S	J2	ORIFICE			
OR2	SU_N	J1	ORIFICE			

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Cross Section Summary
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Conduit	Shape	Full Depth	Full Area	Hyd. Rad.	Max. Width	No. of Barrels	Full Flow
C1	CIRCULAR	0.20	0.03	0.05	0.20	1	0.05
C10	CIRCULAR	0.45	0.16	0.11	0.45	1	0.34
C11	CIRCULAR	0.45	0.16	0.11	0.45	1	0.34
C12	CIRCULAR	0.53	0.22	0.13	0.53	1	0.36
C13	CIRCULAR	0.60	0.28	0.15	0.60	1	0.51
C14	CIRCULAR	0.38	0.11	0.09	0.38	1	0.21
C15	CIRCULAR	0.45	0.16	0.11	0.45	1	0.24
C16	CIRCULAR	0.45	0.16	0.11	0.45	1	0.24
C17	CIRCULAR	0.45	0.16	0.11	0.45	1	0.24
C18	CIRCULAR	0.45	0.16	0.11	0.45	1	0.24
C19	CIRCULAR	0.45	0.16	0.11	0.45	1	0.24
C2	CIRCULAR	0.38	0.11	0.09	0.38	1	0.13
C20	CIRCULAR	0.53	0.22	0.13	0.53	1	0.36
C21	CIRCULAR	0.53	0.22	0.13	0.53	1	0.36
C22	CIRCULAR	0.53	0.22	0.13	0.53	1	0.36
C23	CIRCULAR	0.53	0.22	0.13	0.53	1	0.36

C24	CIRCULAR	0.75	0.44	0.19	0.75	1	0.93
C25	CIRCULAR	0.53	0.22	0.13	0.53	1	0.36
C26	CIRCULAR	0.60	0.28	0.15	0.60	1	0.51
C27	CIRCULAR	0.60	0.28	0.15	0.60	1	0.51
C28	CIRCULAR	0.60	0.28	0.15	0.60	1	0.51
C29	CIRCULAR	0.38	0.11	0.09	0.38	1	0.16
C3	CIRCULAR	0.30	0.07	0.07	0.30	1	0.08
C30	CIRCULAR	0.60	0.28	0.15	0.60	1	0.50
C31	CIRCULAR	0.38	0.11	0.09	0.38	1	0.15
C32	CIRCULAR	0.53	0.22	0.13	0.53	1	0.36
C33	CIRCULAR	0.38	0.11	0.09	0.38	1	0.78
C34	CIRCULAR	0.38	0.11	0.09	0.38	1	0.17
C35	CIRCULAR	0.60	0.28	0.15	0.60	1	0.51
C36	CIRCULAR	0.75	0.44	0.19	0.75	1	0.94
C37	CIRCULAR	0.38	0.11	0.09	0.38	1	0.15
C4	CIRCULAR	0.20	0.03	0.05	0.20	1	0.05
C5	CIRCULAR	0.30	0.07	0.07	0.30	1	0.08
C6	CIRCULAR	0.38	0.11	0.09	0.38	1	0.14
C7	CIRCULAR	0.53	0.22	0.13	0.53	1	0.36
C8	CIRCULAR	0.53	0.22	0.13	0.53	1	0.36
C9	CIRCULAR	0.60	0.28	0.15	0.60	1	0.51

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

****
Analysis Options
****
Flow Units ..... CMS
Process Models:
  Rainfall/Runoff ..... YES
  RDII ..... NO
  Snowmelt ..... NO
  Groundwater ..... NO
  Flow Routing ..... YES
  Ponding Allowed ..... NO
  Water Quality ..... NO
Infiltration Method ..... HORTON
Flow Routing Method ..... DYNWAVE
Surcharge Method ..... EXTRAN
Starting Date 12/11/2020 00:00:00
Ending Date 12/21/2020 00:00:00
Antecedent Dry Days 0.0
Report Time Step 00:01:00
Wet Time Step 00:01:00
Dry Time Step 00:01:00
Routing Time Step ..... 1.00 sec
Variable Time Step ..... YES
Maximum Trials 8
Number of Threads 6
Head Tolerance ..... 0.001500 m

Runoff Quantity Continuity	Volume hectare-m	Depth mm
Total Precipitation	0.260	36.865
Evaporation Loss	0.000	0.000
Infiltration Loss	0.017	2.475
Surface Runoff	0.243	34.409
Final Storage	0.000	0.000
Continuity Error (%)	-0.052	

Flow Routing Continuity	Volume hectare-m	Volume 10^6 ltr
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	0.243	2.426
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	0.000	0.000
External Outflow	0.243	2.427
Flooding Loss	0.000	0.000
Evaporation Loss	0.000	0.000
Exfiltration Loss	0.000	0.000
Initial Stored Volume	0.000	0.000
Final Stored Volume	0.000	0.000
Continuity Error (%)	-0.032	

****
Time-Step Critical Elements
****
Link C33 (1.54%)

****
Highest Flow Instability Indexes
****

Link C2 (4)
Link OR1 (1)
Link OR2 (1)

****
Routing Time Step Summary
****
Minimum Time Step : 0.15 sec
Average Time Step : 1.00 sec
Maximum Time Step : 1.00 sec
Percent in Steady State : 0.00
Average Iterations per Step : 2.00
Percent Not Converging : 0.00
Time Step Frequencies :
1.000 - 0.871 sec : 99.94 %
0.871 - 0.758 sec : 0.05 %
0.758 - 0.660 sec : 0.01 %
0.660 - 0.574 sec : 0.00 %
0.574 - 0.500 sec : 0.00 %

****
Subcatchment Runoff Summary
****

Subcatchment	Total Precip mm	Total Runon mm	Total Evap mm	Total Infil mm	Imperv Runoff mm	Perv Runoff mm	Total Runoff mm	Total Runoff 10^6 ltr	Peak Runoff CMS	Runoff Coeff
Area_1	36.86	0.00	0.00	2.56	33.20	1.13	34.33	0.09	0.06	0.931
Area_10	36.86	0.00	0.00	2.56	33.20	1.13	34.33	0.03	0.02	0.931
Area_101	36.86	0.00	0.00	1.29	35.03	0.56	35.59	0.49	0.28	0.965
Area_102	36.86	0.00	0.00	1.29	35.03	0.56	35.59	0.40	0.23	0.965
Area_11	36.86	0.00	0.00	2.56	33.20	1.13	34.33	0.04	0.03	0.931
Area_12	36.86	0.00	0.00	2.56	33.20	1.13	34.33	0.05	0.04	0.931
Area_13	36.86	0.00	0.00	2.56	33.20	1.13	34.33	0.05	0.04	0.931
Area_14	36.86	0.00	0.00	2.56	33.20	1.13	34.33	0.06	0.04	0.931
Area_15	36.86	0.00	0.00	2.56	33.20	1.13	34.33	0.03	0.02	0.931
Area_16	36.86	0.00	0.00	2.56	33.20	1.13	34.33	0.05	0.04	0.931
Area_17	36.86	0.00	0.00	2.56	33.20	1.13	34.33	0.06	0.04	0.931
Area_18	36.86	0.00	0.00	2.56	33.20	1.13	34.33	0.06	0.04	0.931
Area_19	36.86	0.00	0.00	2.56	33.20	1.13	34.33	0.06	0.04	0.931
Area_2	36.86	0.00	0.00	2.56	33.20	1.13	34.33	0.05	0.04	0.931
Area_20	36.86	0.00	0.00	2.56	33.20	1.13	34.33	0.10	0.07	0.931
Area_2001	36.86	0.00	0.00	20.55	9.22	7.10	16.32	0.01	0.00	0.443
Area_2002	36.86	0.00	0.00	2.59	33.19	1.10	34.29	0.07	0.04	0.930
Area_2003	36.86	0.00	0.00	2.61	33.19	1.08	34.27	0.05	0.03	0.930
Area_2004	36.86	0.00	0.00	24.74	1.84	10.29	12.13	0.00	0.00	0.329
Area_2005	36.86	0.00	0.00	24.74	1.84	10.29	12.13	0.00	0.00	0.329
Area_21	36.86	0.00	0.00	2.56	33.20	1.13	34.33	0.07	0.05	0.931
Area_22	36.86	0.00	0.00	2.56	33.20	1.13	34.33	0.11	0.08	0.931
Area_23	36.86	0.00	0.00	2.56	33.20	1.13	34.33	0.05	0.04	0.931
Area_3	36.86	0.00	0.00	2.56	33.20	1.13	34.33	0.12	0.09	0.931
Area_4	36.86	0.00	0.00	2.56	33.20	1.13	34.33	0.10	0.07	0.931
Area_5	36.86	0.00	0.00	2.56	33.20	1.13	34.33	0.05	0.04	0.931
Area_6	36.86	0.00	0.00	2.56	33.20	1.13	34.33	0.05	0.04	0.931
Area_7	36.86	0.00	0.00	2.56	33.20	1.13	34.33	0.01	0.01	0.931
Area_8	36.86	0.00	0.00	2.56	33.20	1.13	34.33	0.04	0.03	0.931
Area_9	36.86	0.00	0.00	2.56	33.20	1.13	34.33	0.04	0.03	0.931

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Node Depth Summary
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Node	Type	Average Depth Meters	Maximum Depth Meters	Maximum HGL Meters	Time of Max Occurrence days hr:min	Reported Max Depth Meters
CB_10	JUNCTION	0.00	0.11	65.44	0 02:10	0.11
CB_23	JUNCTION	0.00	0.08	66.28	0 02:10	0.08
CB_27	JUNCTION	0.00	0.10	65.59	0 02:10	0.10
CB_28	JUNCTION	0.00	0.10	65.49	0 02:10	0.10
CB_29	JUNCTION	0.00	0.14	64.25	0 02:10	0.14
CB_5	JUNCTION	0.00	0.12	65.23	0 02:10	0.12
CBMH_11	JUNCTION	0.03	0.57	64.15	0 04:41	0.57
CBMH_12	JUNCTION	0.00	0.19	64.25	0 02:10	0.19
CBMH_14	JUNCTION	0.03	0.58	64.68	0 03:37	0.57
CBMH_15	JUNCTION	0.01	0.22	64.69	0 02:10	0.22
CBMH_18	JUNCTION	0.03	0.63	64.68	0 03:42	0.63
CBMH_19	JUNCTION	0.00	0.19	65.07	0 02:10	0.19
CBMH_2	JUNCTION	0.00	0.23	64.29	0 02:10	0.23
CBMH_21	JUNCTION	0.00	0.18	65.35	0 02:10	0.18
CBMH_22	JUNCTION	0.00	0.14	65.67	0 02:10	0.14
CBMH_3	JUNCTION	0.00	0.20	64.62	0 02:10	0.20
CBMH_4	JUNCTION	0.00	0.16	64.94	0 02:10	0.16
CBMH_6	JUNCTION	0.01	0.26	64.17	0 02:10	0.26
CBMH_7	JUNCTION	0.00	0.24	64.51	0 02:10	0.24
CBMH_8	JUNCTION	0.00	0.20	64.83	0 02:10	0.20
CBMH_9	JUNCTION	0.00	0.16	65.15	0 02:10	0.16
DCB_16	JUNCTION	0.00	0.18	64.98	0 02:10	0.18
J1	JUNCTION	0.01	0.08	63.83	0 03:39	0.08

J13	JUNCTION	0.04	0.62	64.16	0	04:18	0.62
J2	JUNCTION	0.01	0.08	63.31	0	04:41	0.08
MH_20	JUNCTION	0.00	0.18	65.17	0	02:10	0.18
MH_24	JUNCTION	0.03	0.55	64.68	0	03:42	0.54
MH_25	JUNCTION	0.01	0.37	64.79	0	02:10	0.37
MH_26	JUNCTION	0.00	0.41	64.97	0	02:10	0.41
MH_27	JUNCTION	0.01	0.26	64.15	0	04:41	0.26
MH_30	JUNCTION	0.02	0.42	64.15	0	04:39	0.42
MH_44	JUNCTION	0.01	0.12	63.63	0	03:39	0.12
MH_45	JUNCTION	0.01	0.09	63.20	0	04:41	0.09
OGS_1	JUNCTION	0.01	0.04	63.08	0	04:41	0.04
OGS_2	JUNCTION	0.01	0.10	63.57	0	03:39	0.10
Humber_Pl	OUTFALL	0.00	0.00	62.48	0	00:00	0.00
OF1	OUTFALL	0.01	0.10	63.51	0	03:39	0.10
OF2	OUTFALL	0.00	0.00	0.00	0	00:00	0.00
SU_N	STORAGE	0.07	0.93	64.68	0	03:39	0.93
SU_S	STORAGE	0.08	0.91	64.15	0	04:41	0.91

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Node Inflow Summary
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Node	Type	Maximum Lateral Inflow CMS	Maximum Total Inflow CMS	Time of Max Occurrence days hr:min	Lateral Inflow Volume 10^6 ltr	Total Inflow Volume 10^6 ltr	Flow Balance Error Percent
CB_10	JUNCTION	0.033	0.033	0 02:10	0.0446	0.0446	-0.008
CB_23	JUNCTION	0.021	0.021	0 02:10	0.0275	0.0275	-0.005
CB_27	JUNCTION	0.038	0.038	0 02:10	0.0515	0.0515	-0.003
CB_28	JUNCTION	0.038	0.038	0 02:10	0.0515	0.0515	-0.003
CB_29	JUNCTION	0.041	0.041	0 02:10	0.0549	0.0549	0.137
CB_5	JUNCTION	0.038	0.038	0 02:10	0.0515	0.0515	-0.009
CBMH_11	JUNCTION	0.283	0.405	0 02:10	0.474	0.638	-0.024
CBMH_12	JUNCTION	0.082	0.082	0 02:10	0.11	0.11	0.895
CBMH_14	JUNCTION	0.064	0.194	0 02:10	0.0858	0.28	-0.250
CBMH_15	JUNCTION	0.041	0.132	0 02:10	0.0549	0.179	0.547
CBMH_18	JUNCTION	0.072	0.505	0 02:10	0.0961	0.915	-0.006
CBMH_19	JUNCTION	0.010	0.090	0 02:10	0.0137	0.124	0.005
CBMH_2	JUNCTION	0.044	0.164	0 02:10	0.0584	0.226	0.273
CBMH_21	JUNCTION	0.031	0.080	0 02:10	0.0412	0.11	-0.002
CBMH_22	JUNCTION	0.031	0.051	0 02:10	0.0412	0.0687	-0.007
CBMH_3	JUNCTION	0.044	0.123	0 02:10	0.0584	0.168	0.068
CBMH_4	JUNCTION	0.044	0.081	0 02:10	0.0584	0.11	-0.007
CBMH_6	JUNCTION	0.023	0.174	0 02:10	0.0309	0.243	0.055
CBMH_7	JUNCTION	0.044	0.154	0 02:10	0.0584	0.213	0.159
CBMH_8	JUNCTION	0.041	0.113	0 02:10	0.0549	0.155	-0.008
CBMH_9	JUNCTION	0.041	0.074	0 02:10	0.0549	0.0996	-0.007
DCB_16	JUNCTION	0.092	0.092	0 02:10	0.124	0.124	0.183
J1	JUNCTION	0.000	0.012	0 03:39	0	0.953	-0.005
J13	JUNCTION	0.072	0.404	0 02:10	0.0961	0.664	-0.052
J2	JUNCTION	0.000	0.012	0 04:41	0	1.15	-0.004
MH_20	JUNCTION	0.000	0.080	0 02:10	0	0.11	-0.001
MH_24	JUNCTION	0.000	0.445	0 02:10	0	0.764	-0.276
MH_25	JUNCTION	0.000	0.354	0 02:10	0	0.591	0.349
MH_26	JUNCTION	0.278	0.354	0 02:10	0.488	0.591	0.049
MH_27	JUNCTION	0.000	0.041	0 02:10	0	0.0549	-0.048
MH_30	JUNCTION	0.000	0.163	0 02:10	0	0.242	-0.287
MH_44	JUNCTION	0.000	0.027	0 03:39	0	1.08	0.005
MH_45	JUNCTION	0.000	0.018	0 04:41	0	1.21	0.001
OGS_1	JUNCTION	0.000	0.018	0 04:41	0	1.21	-0.000
OGS_2	JUNCTION	0.000	0.027	0 03:39	0	1.08	-0.005
Humber_Pl	OUTFALL	0.001	0.018	0 04:38	0.00728	1.21	0.000
OF1	OUTFALL	0.034	0.042	0 02:10	0.0548	1.13	0.000
OF2	OUTFALL	0.046	0.046	0 02:10	0.0834	0.0834	0.000
SU_N	STORAGE	0.000	0.697	0 02:10	0	1.14	-0.093
SU_S	STORAGE	0.000	0.807	0 02:10	0	1.29	-0.100

****
Node Surcharge Summary
****

No nodes were surcharged.

****
Node Flooding Summary
****

No nodes were flooded.

****
Storage Volume Summary
****

Storage Unit	Average Volume 1000 m3	Avg Pcnt Full	Evap Pcnt Loss	Exfil Pcnt Loss	Maximum Volume 1000 m3	Max Pcnt Full	Time of Max Occurrence days hr:min	Maximum Outflow CMS
SU_N	0.052	2	0	0	0.783	30	0 03:39	0.034

SU_S	0.076	2	0	0	0.957	28	0	04:41	0.058

****
Outfall Loading Summary
****

Outfall Node	Flow Freq Pcnt	Avg Flow CMS	Max Flow CMS	Total Volume 10^6 ltr
Humber_Pl	28.18	0.005	0.018	1.213
OF1	23.24	0.006	0.042	1.130
OF2	3.86	0.003	0.046	0.083
System	18.42	0.014	0.097	2.427

****
Link Flow Summary
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Link	Type	Maximum |Flow| CMS	Time of Max Occurrence days hr:min	Maximum |Veloc| m/sec	Max/ Full Flow	Max/ Full Depth
C1	CONDUIT	0.015	0 03:39	1.34	0.31	0.39
C10	CONDUIT	0.038	0 02:10	1.41	0.11	0.23
C11	CONDUIT	0.038	0 02:10	1.41	0.11	0.23
C12	CONDUIT	0.354	0 02:10	1.97	0.99	0.78
C13	CONDUIT	0.443	0 02:10	2.04	0.86	0.93
C14	CONDUIT	0.020	0 02:10	1.19	0.10	0.21
C15	CONDUIT	0.050	0 02:10	1.19	0.21	0.31
C16	CONDUIT	0.080	0 02:10	1.36	0.34	0.40
C17	CONDUIT	0.080	0 02:10	1.35	0.34	0.40
C18	CONDUIT	0.090	0 02:10	1.40	0.38	0.42
C19	CONDUIT	0.033	0 02:10	1.05	0.14	0.25
C2	CONDUIT	0.027	0 03:39	1.00	0.21	0.29
C20	CONDUIT	0.073	0 02:10	1.30	0.20	0.31
C21	CONDUIT	0.112	0 02:10	1.47	0.31	0.38
C22	CONDUIT	0.153	0 02:10	1.60	0.43	0.46
C23	CONDUIT	0.175	0 02:10	1.65	0.48	0.61
C24	CONDUIT	0.405	0 02:10	2.03	0.43	0.84
C25	CONDUIT	0.038	0 02:10	1.08	0.11	0.22
C26	CONDUIT	0.080	0 02:10	1.32	0.16	0.27
C27	CONDUIT	0.122	0 02:10	1.49	0.24	0.33
C28	CONDUIT	0.163	0 02:10	1.61	0.32	0.39
C29	CONDUIT	0.082	0 02:10	1.32	0.52	0.62
C3	CONDUIT	0.012	0 03:39	0.80	0.15	0.26
C30	CONDUIT	0.164	0 02:10	1.59	0.32	0.74
C31	CONDUIT	0.041	0 02:10	1.08	0.28	0.75
C32	CONDUIT	0.403	0 02:10	2.10	1.12	1.00
C33	CONDUIT	0.018	0 04:41	2.92	0.02	0.11
C34	CONDUIT	0.027	0 03:39	1.12	0.16	0.27
C35	CONDUIT	0.356	0 02:10	1.95	0.69	0.62
C36	CONDUIT	0.505	0 02:10	2.17	0.54	0.85
C37	CONDUIT	0.041	0 02:10	1.14	0.28	0.36
C4	CONDUIT	0.007	0 04:41	1.06	0.14	0.25
C5	CONDUIT	0.012	0 04:41	0.81	0.14	0.26
C6	CONDUIT	0.018	0 04:41	0.89	0.13	0.24
C7	CONDUIT	0.091	0 02:10	1.39	0.25	0.34
C8	CONDUIT	0.131	0 02:10	1.53	0.36	0.69
C9	CONDUIT	0.193	0 02:10	1.69	0.38	0.98
OR1	ORIFICE	0.012	0 04:41			1.00
OR2	ORIFICE	0.012	0 03:39			1.00

****
Flow Classification Summary
****

Conduit	Adjusted /Actual Length	Fraction of Time in Flow Class: Dry	Up Dry	Down Dry	Sub Crit	Sup Crit	Up Crit	Down Crit	Norm Ltd	Inlet Ctrl
C1	1.00	0.98	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00
C10	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
C11	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
C12	1.00	0.00	0.00	0.00	0.04	0.00	0.00	0.96	0.01	0.00
C13	1.00	0.00	0.00	0.00	0.09	0.00	0.00	0.91	0.00	0.00
C14	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
C15	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
C16	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
C17	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
C18	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
C19	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
C2	1.00	0.00	0.10	0.00	0.76	0.14	0.00	0.00	0.78	0.00
C20	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
C21	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
C22	1.00	0.00	0.00	0.00	0.04	0.00	0.00	0.96	0.04	0.00
C23	1.00	0.00	0.00	0.00	0.07	0.00	0.00	0.93	0.03	0.00
C24	1.00	0.00	0.00	0.00	0.12	0.00	0.00	0.88	0.01	0.00

C25	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
C26	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
C27	1.00	0.00	0.00	0.00	0.01	0.00	0.00	0.99	0.01	0.00
C28	1.00	0.00	0.00	0.00	0.07	0.00	0.00	0.93	0.05	0.00
C29	1.00	0.00	0.00	0.00	0.07	0.00	0.00	0.93	0.05	0.00
C3	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
C30	1.00	0.00	0.00	0.00	0.09	0.00	0.00	0.91	0.01	0.00
C31	1.00	0.00	0.00	0.00	0.06	0.00	0.00	0.94	0.01	0.00
C32	1.00	0.00	0.00	0.00	0.12	0.00	0.00	0.88	0.01	0.00
C33	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
C34	1.00	0.00	0.00	0.00	0.74	0.26	0.00	0.00	0.04	0.00
C35	1.00	0.00	0.00	0.00	0.07	0.00	0.00	0.93	0.03	0.00
C36	1.00	0.00	0.00	0.00	0.10	0.00	0.00	0.90	0.00	0.00
C37	1.00	0.00	0.00	0.00	0.04	0.00	0.00	0.96	0.03	0.00
C4	1.00	0.98	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00
C5	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
C6	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
C7	1.00	0.00	0.00	0.00	0.03	0.00	0.00	0.97	0.03	0.00
C8	1.00	0.00	0.00	0.00	0.08	0.00	0.00	0.92	0.04	0.00
C9	1.00	0.00	0.00	0.00	0.09	0.00	0.00	0.90	0.01	0.00

****
Conduit Surcharge Summary
****

	Hours Full			Hours Above Full	Hours Capacity
Conduit	Both Ends	Upstream	Dnstream	Normal Flow	Limited
C29	0.01	0.01	1.00	0.01	0.01
C32	4.03	4.03	6.86	0.04	0.01
C9	0.01	0.01	3.57	0.01	0.01

Analysis begun on: Wed Oct 5 21:11:37 2022
Analysis ended on: Wed Oct 5 21:12:08 2022
Total elapsed time: 00:00:31

5-yr, 3-hour

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.015)

WARNING 03: negative offset ignored for Link C2
WARNING 03: negative offset ignored for Link C32
WARNING 03: negative offset ignored for Link C34

****
Element Count
****
Number of rain gages 7
Number of subcatchments ... 30
Number of nodes 40
Number of links 39
Number of pollutants 0
Number of land uses 0

****
Raingage Summary
****

Name	Data Source	Data Type	Recording Interval
25mm	25mm	INTENSITY	5 min.
3hr-100yr	3hr-100yr	INTENSITY	10 min.
3hr-2yr	3hr-2yr	INTENSITY	5 min.
3hr-5yr	3hr-5yr	INTENSITY	5 min.
6hr-100yr	6hr-100yr	INTENSITY	10 min.
6hr-2yr	6hr-2yr	INTENSITY	5 min.
6hr-5yr	6hr-5yr	INTENSITY	5 min.

****
Subcatchment Summary
****

Name	Area	Width	%Imperv	%Slope	Rain Gage	Outlet
Area_1	0.25	83.33	90.00	1.0000	3hr-5yr	CBMH_14
Area_10	0.08	26.67	90.00	1.0000	3hr-5yr	CB_23
Area_101	1.37	137.00	95.00	0.5000	3hr-5yr	MH_26
Area_102	1.13	113.00	95.00	0.5000	3hr-5yr	CBMH_11
Area_11	0.13	43.33	90.00	1.0000	3hr-5yr	CB_10
Area_12	0.16	53.33	90.00	1.0000	3hr-5yr	CBMH_9
Area_13	0.16	53.33	90.00	1.0000	3hr-5yr	CBMH_8
Area_14	0.17	56.67	90.00	1.0000	3hr-5yr	CBMH_7
Area_15	0.09	30.00	90.00	1.0000	3hr-5yr	CBMH_6
Area_16	0.15	50.00	90.00	1.0000	3hr-5yr	CB_5
Area_17	0.17	56.67	90.00	1.0000	3hr-5yr	CBMH_4
Area_18	0.17	56.67	90.00	1.0000	3hr-5yr	CBMH_3
Area_19	0.17	56.67	90.00	1.0000	3hr-5yr	CBMH_2
Area_2	0.16	53.33	90.00	1.0000	3hr-5yr	CBMH_15
Area_20	0.28	93.33	90.00	1.0000	3hr-5yr	J13
Area_2001	0.07	7.00	25.00	0.5000	3hr-5yr	OF2
Area_2002	0.21	21.00	90.00	0.5000	3hr-5yr	OF2
Area_2003	0.16	16.00	90.00	1.0000	3hr-5yr	OF1
Area_2004	0.02	13.33	5.00	0.5000	3hr-5yr	Humber_Pl
Area_2005	0.04	26.67	5.00	0.5000	3hr-5yr	Humber_Pl
Area_21	0.21	70.00	90.00	1.0000	3hr-5yr	CBMH_11
Area_22	0.32	106.67	90.00	1.0000	3hr-5yr	CBMH_12
Area_23	0.16	53.33	90.00	1.0000	3hr-5yr	CB_29
Area_3	0.36	120.00	90.00	1.0000	3hr-5yr	DCB_16
Area_4	0.28	93.33	90.00	1.0000	3hr-5yr	CBMH_18
Area_5	0.15	50.00	90.00	1.0000	3hr-5yr	CB_27
Area_6	0.15	50.00	90.00	1.0000	3hr-5yr	CB_28
Area_7	0.04	13.33	90.00	1.0000	3hr-5yr	CBMH_19
Area_8	0.12	40.00	90.00	1.0000	3hr-5yr	CBMH_21
Area_9	0.12	40.00	90.00	1.0000	3hr-5yr	CBMH_22

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Node Summary
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Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
CB_10	JUNCTION	65.33	1.41	10.0	
CB_23	JUNCTION	66.20	0.93	10.0	
CB_27	JUNCTION	65.48	1.34	10.0	
CB_28	JUNCTION	65.39	1.52	10.0	
CB_29	JUNCTION	64.11	2.43	0.0	
CB_5	JUNCTION	65.11	1.63	10.0	
CBMH_11	JUNCTION	63.58	2.16	10.0	
CBMH_12	JUNCTION	64.06	1.68	10.0	
CBMH_14	JUNCTION	64.11	2.21	10.0	
CBMH_15	JUNCTION	64.47	1.85	10.0	
CBMH_18	JUNCTION	64.05	2.54	0.0	
CBMH_19	JUNCTION	64.88	2.38	10.0	
CBMH_2	JUNCTION	64.06	2.94	10.0	
CBMH_21	JUNCTION	65.17	1.87	10.0	
CBMH_22	JUNCTION	65.53	1.51	10.0	

CBMH_3	JUNCTION	64.42	2.58	10.0
CBMH_4	JUNCTION	64.78	2.22	10.0
CBMH_6	JUNCTION	63.91	2.73	10.0
CBMH_7	JUNCTION	64.27	2.73	10.0
CBMH_8	JUNCTION	64.63	2.37	10.0
CBMH_9	JUNCTION	64.99	2.01	10.0
DCB_16	JUNCTION	64.80	1.52	10.0
J1	JUNCTION	63.75	3.27	0.0
J13	JUNCTION	63.54	3.10	10.0
J2	JUNCTION	63.24	3.33	0.0
MH_20	JUNCTION	64.99	2.30	0.0
MH_24	JUNCTION	64.13	2.50	10.0
MH_25	JUNCTION	64.42	2.63	0.0
MH_26	JUNCTION	64.56	2.70	0.0
MH_27	JUNCTION	63.89	2.02	0.0
MH_30	JUNCTION	63.73	3.08	0.0
MH_44	JUNCTION	63.51	3.51	0.0
MH_45	JUNCTION	63.11	3.46	0.0
OGS_1	JUNCTION	63.04	3.34	0.0
OGS_2	JUNCTION	63.47	3.01	0.0
Humber_Pl	OUTFALL	62.48	0.38	0.0
OF1	OUTFALL	63.41	0.38	0.0
OF2	OUTFALL	0.00	0.00	0.0
SU_N	STORAGE	63.75	3.04	0.0
SU_S	STORAGE	63.24	3.33	0.0

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Link Summary
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Name	From Node	To Node	Type	Length	%Slope	Roughness
C1	SU_N	MH_44	CONDUIT	2.5	1.0001	0.0090
C10	CB_28	MH_26	CONDUIT	30.4	1.0001	0.0110
C11	CB_27	MH_26	CONDUIT	32.8	1.0001	0.0110
C12	MH_26	MH_25	CONDUIT	16.5	0.4970	0.0110
C13	MH_24	CBMH_18	CONDUIT	4.8	0.5000	0.0110
C14	CB_23	CBMH_22	CONDUIT	51.5	1.0001	0.0110
C15	CBMH_22	CBMH_21	CONDUIT	60.0	0.5000	0.0110
C16	CBMH_21	MH_20	CONDUIT	24.5	0.5020	0.0110
C17	MH_20	CBMH_19	CONDUIT	10.4	0.5000	0.0110
C18	CBMH_19	MH_24	CONDUIT	46.5	0.5011	0.0110
C19	CB_10	CBMH_9	CONDUIT	52.5	0.4991	0.0110
C2	MH_44	OGS_2	CONDUIT	11.6	0.3707	0.0110
C20	CBMH_9	CBMH_8	CONDUIT	60.0	0.5000	0.0110
C21	CBMH_8	CBMH_7	CONDUIT	60.0	0.5000	0.0110
C22	CBMH_7	CBMH_6	CONDUIT	60.0	0.5000	0.0110
C23	CBMH_6	J13	CONDUIT	29.9	0.5017	0.0110
C24	J13	SU_S	CONDUIT	4.0	0.5000	0.0110
C25	CB_5	CBMH_4	CONDUIT	52.5	0.4991	0.0110
C26	CBMH_4	CBMH_3	CONDUIT	60.0	0.5000	0.0110
C27	CBMH_3	CBMH_2	CONDUIT	60.0	0.5000	0.0110
C28	CBMH_2	MH_30	CONDUIT	53.4	0.4963	0.0110
C29	CBMH_12	CBMH_11	CONDUIT	50.0	0.5700	0.0110
C3	J1	MH_44	CONDUIT	2.5	0.4800	0.0110
C30	MH_30	J13	CONDUIT	9.3	0.4839	0.0110
C31	MH_27	CBMH_11	CONDUIT	8.2	0.5000	0.0110
C32	CBMH_11	SU_S	CONDUIT	13.2	0.5000	0.0110
C33	OGS_1	Humber_Pl	CONDUIT	4.0	14.1135	0.0110
C34	OGS_2	OF1	CONDUIT	8.7	0.6782	0.0110
C35	MH_25	MH_24	CONDUIT	44.2	0.5000	0.0110
C36	CBMH_18	SU_N	CONDUIT	3.9	0.5128	0.0110
C37	CB_29	MH_27	CONDUIT	32.9	0.4985	0.0110
C4	SU_S	MH_45	CONDUIT	9.4	1.0001	0.0090
C5	J2	MH_45	CONDUIT	9.4	0.5000	0.0110
C6	MH_45	OGS_1	CONDUIT	3.1	0.4839	0.0110
C7	DCB_16	CBMH_15	CONDUIT	54.4	0.5000	0.0110
C8	CBMH_15	CBMH_14	CONDUIT	60.0	0.5000	0.0110
C9	CBMH_14	SU_N	CONDUIT	15.2	0.5000	0.0110
OR1	SU_S	J2	ORIFICE			
OR2	SU_N	J1	ORIFICE			

****
Cross Section Summary
****

Conduit	Shape	Full Depth	Full Area	Hyd. Rad.	Max. Width	No. of Barrels	Full Flow
C1	CIRCULAR	0.20	0.03	0.05	0.20	1	0.05
C10	CIRCULAR	0.45	0.16	0.11	0.45	1	0.34
C11	CIRCULAR	0.45	0.16	0.11	0.45	1	0.34
C12	CIRCULAR	0.53	0.22	0.13	0.53	1	0.36
C13	CIRCULAR	0.60	0.28	0.15	0.60	1	0.51
C14	CIRCULAR	0.38	0.11	0.09	0.38	1	0.21
C15	CIRCULAR	0.45	0.16	0.11	0.45	1	0.24
C16	CIRCULAR	0.45	0.16	0.11	0.45	1	0.24
C17	CIRCULAR	0.45	0.16	0.11	0.45	1	0.24
C18	CIRCULAR	0.45	0.16	0.11	0.45	1	0.24
C19	CIRCULAR	0.45	0.16	0.11	0.45	1	0.24
C2	CIRCULAR	0.38	0.11	0.09	0.38	1	0.13
C20	CIRCULAR	0.53	0.22	0.13	0.53	1	0.36
C21	CIRCULAR	0.53	0.22	0.13	0.53	1	0.36
C22	CIRCULAR	0.53	0.22	0.13	0.53	1	0.36
C23	CIRCULAR	0.53	0.22	0.13	0.53	1	0.36

C24	CIRCULAR	0.75	0.44	0.19	0.75	1	0.93
C25	CIRCULAR	0.53	0.22	0.13	0.53	1	0.36
C26	CIRCULAR	0.60	0.28	0.15	0.60	1	0.51
C27	CIRCULAR	0.60	0.28	0.15	0.60	1	0.51
C28	CIRCULAR	0.60	0.28	0.15	0.60	1	0.51
C29	CIRCULAR	0.38	0.11	0.09	0.38	1	0.16
C3	CIRCULAR	0.30	0.07	0.07	0.30	1	0.08
C30	CIRCULAR	0.60	0.28	0.15	0.60	1	0.50
C31	CIRCULAR	0.38	0.11	0.09	0.38	1	0.15
C32	CIRCULAR	0.53	0.22	0.13	0.53	1	0.36
C33	CIRCULAR	0.38	0.11	0.09	0.38	1	0.78
C34	CIRCULAR	0.38	0.11	0.09	0.38	1	0.17
C35	CIRCULAR	0.60	0.28	0.15	0.60	1	0.51
C36	CIRCULAR	0.75	0.44	0.19	0.75	1	0.94
C37	CIRCULAR	0.38	0.11	0.09	0.38	1	0.15
C4	CIRCULAR	0.20	0.03	0.05	0.20	1	0.05
C5	CIRCULAR	0.30	0.07	0.07	0.30	1	0.08
C6	CIRCULAR	0.38	0.11	0.09	0.38	1	0.14
C7	CIRCULAR	0.53	0.22	0.13	0.53	1	0.36
C8	CIRCULAR	0.53	0.22	0.13	0.53	1	0.36
C9	CIRCULAR	0.60	0.28	0.15	0.60	1	0.51

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

****
Analysis Options
****
Flow Units ..... CMS
Process Models:
  Rainfall/Runoff ..... YES
  RDII ..... NO
  Snowmelt ..... NO
  Groundwater ..... NO
  Flow Routing ..... YES
  Ponding Allowed ..... NO
  Water Quality ..... NO
Infiltration Method ..... HORTON
Flow Routing Method ..... DYNWAVE
Surcharge Method ..... EXTRAN
Starting Date 12/11/2020 00:00:00
Ending Date 12/21/2020 00:00:00
Antecedent Dry Days 0.0
Report Time Step 00:01:00
Wet Time Step 00:01:00
Dry Time Step 00:01:00
Routing Time Step ..... 1.00 sec
Variable Time Step ..... YES
Maximum Trials 8
Number of Threads 6
Head Tolerance ..... 0.001500 m

Runoff Quantity Continuity	Volume hectare-m	Depth mm
Total Precipitation	0.300	42.540
Evaporation Loss	0.000	0.000
Infiltration Loss	0.017	2.395
Surface Runoff	0.283	40.179
Final Storage	0.000	0.000
Continuity Error (%)	-0.080	

Flow Routing Continuity	Volume hectare-m	Volume 10^6 ltr
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	0.283	2.832
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	0.000	0.000
External Outflow	0.283	2.834
Flooding Loss	0.000	0.000
Evaporation Loss	0.000	0.000
Exfiltration Loss	0.000	0.000
Initial Stored Volume	0.000	0.000
Final Stored Volume	0.000	0.000
Continuity Error (%)	-0.061	

****
Time-Step Critical Elements
****
Link C33 (1.37%)

****
Highest Flow Instability Indexes
****

Link C2 (4)
Link OR1 (1)
Link OR2 (1)

****
Routing Time Step Summary
****
Minimum Time Step : 0.44 sec
Average Time Step : 0.99 sec
Maximum Time Step : 1.00 sec
Percent in Steady State : -0.00
Average Iterations per Step : 2.00
Percent Not Converging : 0.00
Time Step Frequencies :
1.000 - 0.871 sec : 98.11 %
0.871 - 0.758 sec : 0.37 %
0.758 - 0.660 sec : 0.50 %
0.660 - 0.574 sec : 0.57 %
0.574 - 0.500 sec : 0.46 %

****
Subcatchment Runoff Summary
****

Subcatchment	Total Precip mm	Total Runon mm	Total Evap mm	Total Infil mm	Imperv Runoff mm	Perv Runoff mm	Total Runoff mm	Total Runoff 10^6 ltr	Peak Runoff CMS	Runoff Coeff
Area_1	42.54	0.00	0.00	2.47	38.33	1.79	40.12	0.10	0.09	0.943
Area_10	42.54	0.00	0.00	2.47	38.33	1.79	40.12	0.03	0.03	0.943
Area_101	42.54	0.00	0.00	1.24	40.43	0.89	41.32	0.57	0.38	0.971
Area_102	42.54	0.00	0.00	1.24	40.43	0.89	41.32	0.47	0.31	0.971
Area_11	42.54	0.00	0.00	2.47	38.33	1.79	40.12	0.05	0.05	0.943
Area_12	42.54	0.00	0.00	2.47	38.33	1.79	40.12	0.06	0.06	0.943
Area_13	42.54	0.00	0.00	2.47	38.33	1.79	40.12	0.06	0.06	0.943
Area_14	42.54	0.00	0.00	2.47	38.33	1.79	40.12	0.07	0.06	0.943
Area_15	42.54	0.00	0.00	2.47	38.33	1.79	40.12	0.04	0.03	0.943
Area_16	42.54	0.00	0.00	2.47	38.33	1.79	40.12	0.06	0.05	0.943
Area_17	42.54	0.00	0.00	2.47	38.33	1.79	40.12	0.07	0.06	0.943
Area_18	42.54	0.00	0.00	2.47	38.33	1.79	40.12	0.07	0.06	0.943
Area_19	42.54	0.00	0.00	2.47	38.33	1.79	40.12	0.07	0.06	0.943
Area_2	42.54	0.00	0.00	2.47	38.33	1.79	40.12	0.06	0.06	0.943
Area_20	42.54	0.00	0.00	2.47	38.33	1.79	40.12	0.11	0.10	0.943
Area_2001	42.54	0.00	0.00	20.24	10.64	11.67	22.31	0.02	0.01	0.524
Area_2002	42.54	0.00	0.00	2.51	38.30	1.74	40.05	0.08	0.06	0.941
Area_2003	42.54	0.00	0.00	2.53	38.31	1.73	40.03	0.06	0.05	0.941
Area_2004	42.54	0.00	0.00	24.03	2.13	16.39	18.52	0.00	0.00	0.435
Area_2005	42.54	0.00	0.00	24.03	2.13	16.39	18.52	0.01	0.00	0.435
Area_21	42.54	0.00	0.00	2.47	38.33	1.79	40.12	0.08	0.08	0.943
Area_22	42.54	0.00	0.00	2.47	38.33	1.79	40.12	0.13	0.12	0.943
Area_23	42.54	0.00	0.00	2.47	38.33	1.79	40.12	0.06	0.06	0.943
Area_3	42.54	0.00	0.00	2.47	38.33	1.79	40.12	0.14	0.13	0.943
Area_4	42.54	0.00	0.00	2.47	38.33	1.79	40.12	0.11	0.10	0.943
Area_5	42.54	0.00	0.00	2.47	38.33	1.79	40.12	0.06	0.05	0.943
Area_6	42.54	0.00	0.00	2.47	38.33	1.79	40.12	0.06	0.05	0.943
Area_7	42.54	0.00	0.00	2.47	38.33	1.79	40.12	0.02	0.01	0.943
Area_8	42.54	0.00	0.00	2.47	38.33	1.79	40.12	0.05	0.04	0.943
Area_9	42.54	0.00	0.00	2.47	38.33	1.79	40.12	0.05	0.04	0.943

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Node Depth Summary
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Node	Type	Average Depth Meters	Maximum Depth Meters	Maximum HGL Meters	Time of Max Occurrence days hr:min	Reported Max Depth Meters
CB_10	JUNCTION	0.00	0.13	65.46	0 01:05	0.13
CB_23	JUNCTION	0.00	0.09	66.29	0 01:05	0.09
CB_27	JUNCTION	0.00	0.12	65.61	0 01:05	0.12
CB_28	JUNCTION	0.00	0.12	65.51	0 01:05	0.12
CB_29	JUNCTION	0.00	0.16	64.28	0 01:04	0.16
CB_5	JUNCTION	0.00	0.14	65.25	0 01:05	0.14
CBMH_11	JUNCTION	0.04	0.66	64.25	0 02:10	0.66
CBMH_12	JUNCTION	0.00	0.24	64.30	0 01:05	0.24
CBMH_14	JUNCTION	0.03	0.68	64.79	0 01:56	0.68
CBMH_15	JUNCTION	0.01	0.32	64.79	0 01:53	0.32
CBMH_18	JUNCTION	0.04	0.74	64.79	0 01:55	0.74
CBMH_19	JUNCTION	0.00	0.23	65.11	0 01:05	0.23
CBMH_2	JUNCTION	0.00	0.28	64.34	0 01:05	0.28
CBMH_21	JUNCTION	0.00	0.22	65.39	0 01:05	0.22
CBMH_22	JUNCTION	0.00	0.17	65.70	0 01:05	0.17
CBMH_3	JUNCTION	0.00	0.24	64.66	0 01:05	0.24
CBMH_4	JUNCTION	0.00	0.19	64.97	0 01:05	0.19
CBMH_6	JUNCTION	0.01	0.34	64.25	0 02:09	0.33
CBMH_7	JUNCTION	0.00	0.29	64.57	0 01:05	0.29
CBMH_8	JUNCTION	0.00	0.24	64.88	0 01:05	0.24
CBMH_9	JUNCTION	0.00	0.19	65.18	0 01:05	0.19
DCB_16	JUNCTION	0.00	0.22	65.02	0 01:05	0.22
J1	JUNCTION	0.01	0.08	63.83	0 01:55	0.08

J13	JUNCTION	0.04	0.77	64.31	0	02:14	0.75
J2	JUNCTION	0.01	0.08	63.32	0	02:10	0.08
MH_20	JUNCTION	0.00	0.22	65.21	0	01:05	0.22
MH_24	JUNCTION	0.03	0.65	64.79	0	01:55	0.65
MH_25	JUNCTION	0.01	0.47	64.88	0	01:05	0.46
MH_26	JUNCTION	0.01	0.55	65.10	0	01:05	0.55
MH_27	JUNCTION	0.01	0.36	64.25	0	02:10	0.36
MH_30	JUNCTION	0.02	0.52	64.25	0	02:11	0.52
MH_44	JUNCTION	0.01	0.19	63.70	0	01:55	0.19
MH_45	JUNCTION	0.01	0.16	63.27	0	02:10	0.16
OGS_1	JUNCTION	0.01	0.07	63.11	0	02:10	0.07
OGS_2	JUNCTION	0.01	0.16	63.63	0	01:55	0.16
Humber_Pl	OUTFALL	0.00	0.00	62.48	0	00:00	0.00
OF1	OUTFALL	0.01	0.16	63.57	0	01:55	0.16
OF2	OUTFALL	0.00	0.00	0.00	0	00:00	0.00
SU_N	STORAGE	0.07	1.04	64.79	0	01:55	1.04
SU_S	STORAGE	0.09	1.01	64.25	0	02:10	1.01

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Node Inflow Summary
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Node	Type	Maximum Lateral Inflow CMS	Maximum Total Inflow CMS	Time of Max Occurrence days	hr:min	Lateral Inflow Volume 10^6 ltr	Total Inflow Volume 10^6 ltr	Flow Balance Error Percent
CB_10	JUNCTION	0.047	0.047	0	01:05	0.0521	0.0521	-0.013
CB_23	JUNCTION	0.029	0.029	0	01:05	0.0321	0.0321	-0.008
CB_27	JUNCTION	0.054	0.054	0	01:05	0.0602	0.0602	-0.005
CB_28	JUNCTION	0.054	0.054	0	01:05	0.0602	0.0602	-0.005
CB_29	JUNCTION	0.058	0.058	0	01:05	0.0642	0.0642	0.550
CB_5	JUNCTION	0.054	0.054	0	01:05	0.0602	0.0602	-0.014
CBMH_11	JUNCTION	0.389	0.556	0	01:05	0.551	0.743	-0.003
CBMH_12	JUNCTION	0.115	0.115	0	01:05	0.128	0.128	0.786
CBMH_14	JUNCTION	0.090	0.271	0	01:05	0.1	0.307	-0.410
CBMH_15	JUNCTION	0.058	0.185	0	01:05	0.0642	0.208	0.631
CBMH_18	JUNCTION	0.101	0.700	0	01:05	0.112	0.943	-0.006
CBMH_19	JUNCTION	0.014	0.126	0	01:05	0.016	0.144	0.268
CBMH_2	JUNCTION	0.061	0.230	0	01:05	0.0682	0.266	0.330
CBMH_21	JUNCTION	0.043	0.113	0	01:05	0.0481	0.128	-0.003
CBMH_22	JUNCTION	0.043	0.071	0	01:05	0.0481	0.0802	-0.011
CBMH_3	JUNCTION	0.061	0.172	0	01:05	0.0682	0.197	0.230
CBMH_4	JUNCTION	0.061	0.114	0	01:05	0.0682	0.128	-0.012
CBMH_6	JUNCTION	0.032	0.244	0	01:05	0.0361	0.284	-0.010
CBMH_7	JUNCTION	0.061	0.216	0	01:05	0.0682	0.249	0.346
CBMH_8	JUNCTION	0.058	0.158	0	01:05	0.0642	0.181	-0.010
CBMH_9	JUNCTION	0.058	0.103	0	01:05	0.0642	0.116	-0.011
DCB_16	JUNCTION	0.129	0.129	0	01:05	0.144	0.144	0.380
J1	JUNCTION	0.000	0.012	0	01:55	0	0.911	-0.005
J13	JUNCTION	0.101	0.565	0	01:05	0.112	0.791	-0.108
J2	JUNCTION	0.000	0.012	0	02:10	0	1.11	-0.004
MH_20	JUNCTION	0.000	0.112	0	01:05	0	0.128	-0.001
MH_24	JUNCTION	0.000	0.610	0	01:05	0	0.828	-0.376
MH_25	JUNCTION	0.000	0.490	0	01:05	0	0.686	0.292
MH_26	JUNCTION	0.380	0.487	0	01:05	0.566	0.686	0.091
MH_27	JUNCTION	0.000	0.058	0	01:05	0	0.0639	-0.391
MH_30	JUNCTION	0.000	0.229	0	01:05	0	0.29	-0.451
MH_44	JUNCTION	0.000	0.064	0	01:55	0	1.25	0.010
MH_45	JUNCTION	0.000	0.054	0	02:10	0	1.41	0.000
OGS_1	JUNCTION	0.000	0.054	0	02:10	0	1.41	-0.000
OGS_2	JUNCTION	0.000	0.065	0	01:55	0	1.25	-0.007
Humber_Pl	OUTFALL	0.004	0.055	0	02:10	0.0111	1.42	0.000
OF1	OUTFALL	0.047	0.067	0	01:54	0.064	1.32	0.000
OF2	OUTFALL	0.063	0.063	0	01:05	0.0997	0.0997	0.000
SU_N	STORAGE	0.000	0.968	0	01:05	0	1.25	-0.110
SU_S	STORAGE	0.000	1.119	0	01:05	0	1.51	-0.111

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Node Surcharge Summary
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Surcharging occurs when water rises above the top of the highest conduit.

Node	Type	Hours Surcharged	Max. Height Above Crown Meters	Min. Depth Below Rim Meters
CBMH_11	JUNCTION	1.32	0.024	1.493
CBMH_14	JUNCTION	1.85	0.080	1.534
J13	JUNCTION	0.01	0.023	2.330

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Node Flooding Summary
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No nodes were flooded.

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Storage Volume Summary

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Storage Unit	Average Volume 1000 m3	Avg Pcnt Full	Evap Pcnt Loss	Exfil Pcnt Loss	Maximum Volume 1000 m3	Max Pcnt Full	Time of Max Occurrence days hr:min	Maximum Outflow CMS
SU_N	0.054	2	0	0	0.896	35	0 01:55	0.064
SU_S	0.080	2	0	0	1.082	31	0 02:10	0.136

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Outfall Loading Summary
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Outfall Node	Flow Freq Pcnt	Avg Flow CMS	Max Flow CMS	Total Volume 10^6 ltr
Humber_Pl	27.80	0.007	0.055	1.417
OF1	22.80	0.008	0.067	1.317
OF2	3.48	0.005	0.063	0.100
System	18.03	0.020	0.129	2.834

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Link Flow Summary
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Link	Type	Maximum |Flow| CMS	Time of Max Occurrence days hr:min	Maximum |Veloc| m/sec	Max/ Full Flow	Max/ Full Depth
C1	CONDUIT	0.052	0 01:55	1.72	1.09	0.93
C10	CONDUIT	0.054	0 01:05	1.55	0.16	0.27
C11	CONDUIT	0.054	0 01:05	1.55	0.16	0.27
C12	CONDUIT	0.490	0 01:05	2.32	1.37	0.94
C13	CONDUIT	0.611	0 01:05	2.38	1.19	1.00
C14	CONDUIT	0.028	0 01:05	1.32	0.14	0.25
C15	CONDUIT	0.070	0 01:05	1.31	0.29	0.37
C16	CONDUIT	0.112	0 01:05	1.48	0.47	0.48
C17	CONDUIT	0.112	0 01:05	1.48	0.47	0.48
C18	CONDUIT	0.125	0 01:05	1.52	0.53	0.52
C19	CONDUIT	0.046	0 01:05	1.16	0.19	0.30
C2	CONDUIT	0.065	0 01:55	1.31	0.52	0.46
C20	CONDUIT	0.102	0 01:05	1.43	0.28	0.36
C21	CONDUIT	0.157	0 01:05	1.61	0.44	0.46
C22	CONDUIT	0.214	0 01:05	1.74	0.60	0.56
C23	CONDUIT	0.244	0 01:05	1.79	0.68	0.82
C24	CONDUIT	0.565	0 01:05	2.21	0.61	0.99
C25	CONDUIT	0.053	0 01:05	1.19	0.15	0.26
C26	CONDUIT	0.112	0 01:05	1.46	0.22	0.32
C27	CONDUIT	0.171	0 01:05	1.64	0.33	0.40
C28	CONDUIT	0.229	0 01:05	1.76	0.45	0.54
C29	CONDUIT	0.114	0 01:05	1.30	0.73	0.82
C3	CONDUIT	0.012	0 01:55	0.82	0.16	0.27
C30	CONDUIT	0.229	0 01:05	1.74	0.45	0.93
C31	CONDUIT	0.064	0 01:05	1.08	0.43	0.98
C32	CONDUIT	0.555	0 01:05	2.60	1.54	1.00
C33	CONDUIT	0.054	0 02:10	4.04	0.07	0.18
C34	CONDUIT	0.064	0 01:55	1.43	0.38	0.42
C35	CONDUIT	0.485	0 01:05	2.10	0.95	0.80
C36	CONDUIT	0.700	0 01:05	2.34	0.74	0.99
C37	CONDUIT	0.058	0 01:05	1.21	0.39	0.58
C4	CONDUIT	0.042	0 02:10	1.70	0.88	0.73
C5	CONDUIT	0.012	0 02:10	0.82	0.15	0.27
C6	CONDUIT	0.054	0 02:10	1.21	0.38	0.42
C7	CONDUIT	0.128	0 01:05	1.53	0.36	0.41
C8	CONDUIT	0.183	0 01:05	1.68	0.51	0.81
C9	CONDUIT	0.271	0 01:05	1.84	0.53	1.00
OR1	ORIFICE	0.012	0 02:10			1.00
OR2	ORIFICE	0.012	0 01:55			1.00

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Flow Classification Summary
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Conduit	Adjusted /Actual Length	Fraction of Time in Flow Class: Dry	Up Dry	Down Dry	Sub Crit	Sup Crit	Up Crit	Down Crit	Norm Ltd	Inlet Ctrl
C1	1.00	0.98	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00
C10	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
C11	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
C12	1.00	0.00	0.00	0.00	0.04	0.00	0.00	0.96	0.01	0.00
C13	1.00	0.00	0.00	0.00	0.09	0.00	0.00	0.91	0.00	0.00
C14	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
C15	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
C16	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
C17	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00

C18	1.00	0.00	0.00	0.00	0.02	0.00	0.00	0.98	0.01	0.00
C19	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
C2	1.00	0.00	0.10	0.00	0.76	0.14	0.00	0.00	0.78	0.00
C20	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
C21	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
C22	1.00	0.00	0.00	0.00	0.04	0.00	0.00	0.96	0.04	0.00
C23	1.00	0.00	0.00	0.00	0.08	0.00	0.00	0.92	0.03	0.00
C24	1.00	0.00	0.00	0.00	0.12	0.00	0.00	0.88	0.01	0.00
C25	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
C26	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
C27	1.00	0.00	0.00	0.00	0.02	0.00	0.00	0.98	0.01	0.00
C28	1.00	0.00	0.00	0.00	0.07	0.00	0.00	0.93	0.04	0.00
C29	1.00	0.00	0.00	0.00	0.08	0.00	0.00	0.92	0.05	0.00
C3	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
C30	1.00	0.00	0.00	0.00	0.09	0.00	0.00	0.91	0.01	0.00
C31	1.00	0.00	0.00	0.00	0.06	0.00	0.00	0.94	0.02	0.00
C32	1.00	0.00	0.00	0.00	0.12	0.00	0.00	0.88	0.01	0.00
C33	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
C34	1.00	0.00	0.00	0.00	0.75	0.25	0.00	0.00	0.04	0.00
C35	1.00	0.00	0.00	0.00	0.07	0.00	0.00	0.93	0.03	0.00
C36	1.00	0.00	0.00	0.00	0.10	0.00	0.00	0.90	0.00	0.00
C37	1.00	0.00	0.00	0.00	0.05	0.00	0.00	0.95	0.03	0.00
C4	1.00	0.98	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00
C5	1.00	0.00	0.00	0.00	0.00	0.01	0.00	0.99	0.00	0.00
C6	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
C7	1.00	0.00	0.00	0.00	0.03	0.00	0.00	0.97	0.03	0.00
C8	1.00	0.00	0.00	0.00	0.08	0.00	0.00	0.92	0.04	0.00
C9	1.00	0.00	0.00	0.00	0.09	0.00	0.00	0.90	0.01	0.00

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Conduit Surcharge Summary
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	Hours Full			Hours Above Full	Hours Capacity
Conduit	Both Ends	Upstream	Dnstream	Normal Flow	Limited
C1	0.01	0.01	0.01	0.73	0.01
C12	0.01	0.01	0.01	0.10	0.01
C13	1.44	1.44	1.80	0.05	0.01
C23	0.01	0.01	0.01	0.01	0.01
C24	0.01	0.01	0.01	0.01	0.01
C29	0.01	0.01	2.84	0.01	0.01
C30	0.01	0.01	0.01	0.01	0.01
C31	0.01	0.01	1.32	0.01	0.01
C32	4.08	4.11	6.43	0.14	0.01
C36	0.01	0.01	0.44	0.01	0.01
C8	0.01	0.01	2.04	0.01	0.01
C9	1.85	1.85	3.14	0.01	0.01

Analysis begun on: Wed Oct 5 21:15:03 2022
Analysis ended on: Wed Oct 5 21:15:33 2022

Total elapsed time: 00:00:30

5-yr, 6-hour

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.015)

WARNING 03: negative offset ignored for Link C2
WARNING 03: negative offset ignored for Link C32
WARNING 03: negative offset ignored for Link C34

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Element Count
****
Number of rain gages 7
Number of subcatchments ... 30
Number of nodes 40
Number of links 39
Number of pollutants 0
Number of land uses 0

****
Raingage Summary
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Name	Data Source	Data Type	Recording Interval
25mm	25mm	INTENSITY	5 min.
3hr-100yr	3hr-100yr	INTENSITY	10 min.
3hr-2yr	3hr-2yr	INTENSITY	5 min.
3hr-5yr	3hr-5yr	INTENSITY	5 min.
6hr-100yr	6hr-100yr	INTENSITY	10 min.
6hr-2yr	6hr-2yr	INTENSITY	5 min.
6hr-5yr	6hr-5yr	INTENSITY	5 min.

****
Subcatchment Summary
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Name	Area	Width	%Imperv	%Slope	Rain Gage	Outlet
Area_1	0.25	83.33	90.00	1.0000	6hr-5yr	CBMH_14
Area_10	0.08	26.67	90.00	1.0000	6hr-5yr	CB_23
Area_101	1.37	137.00	95.00	0.5000	6hr-5yr	MH_26
Area_102	1.13	113.00	95.00	0.5000	6hr-5yr	CBMH_11
Area_11	0.13	43.33	90.00	1.0000	6hr-5yr	CB_10
Area_12	0.16	53.33	90.00	1.0000	6hr-5yr	CBMH_9
Area_13	0.16	53.33	90.00	1.0000	6hr-5yr	CBMH_8
Area_14	0.17	56.67	90.00	1.0000	6hr-5yr	CBMH_7
Area_15	0.09	30.00	90.00	1.0000	6hr-5yr	CBMH_6
Area_16	0.15	50.00	90.00	1.0000	6hr-5yr	CB_5
Area_17	0.17	56.67	90.00	1.0000	6hr-5yr	CBMH_4
Area_18	0.17	56.67	90.00	1.0000	6hr-5yr	CBMH_3
Area_19	0.17	56.67	90.00	1.0000	6hr-5yr	CBMH_2
Area_2	0.16	53.33	90.00	1.0000	6hr-5yr	CBMH_15
Area_20	0.28	93.33	90.00	1.0000	6hr-5yr	J13
Area_2001	0.07	7.00	25.00	0.5000	6hr-5yr	OF2
Area_2002	0.21	21.00	90.00	0.5000	6hr-5yr	OF2
Area_2003	0.16	16.00	90.00	1.0000	6hr-5yr	OF1
Area_2004	0.02	13.33	5.00	0.5000	6hr-5yr	Humber_Pl
Area_2005	0.04	26.67	5.00	0.5000	6hr-5yr	Humber_Pl
Area_21	0.21	70.00	90.00	1.0000	6hr-5yr	CBMH_11
Area_22	0.32	106.67	90.00	1.0000	6hr-5yr	CBMH_12
Area_23	0.16	53.33	90.00	1.0000	6hr-5yr	CB_29
Area_3	0.36	120.00	90.00	1.0000	6hr-5yr	DCB_16
Area_4	0.28	93.33	90.00	1.0000	6hr-5yr	CBMH_18
Area_5	0.15	50.00	90.00	1.0000	6hr-5yr	CB_27
Area_6	0.15	50.00	90.00	1.0000	6hr-5yr	CB_28
Area_7	0.04	13.33	90.00	1.0000	6hr-5yr	CBMH_19
Area_8	0.12	40.00	90.00	1.0000	6hr-5yr	CBMH_21
Area_9	0.12	40.00	90.00	1.0000	6hr-5yr	CBMH_22

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Node Summary
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Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
CB_10	JUNCTION	65.33	1.41	10.0	
CB_23	JUNCTION	66.20	0.93	10.0	
CB_27	JUNCTION	65.48	1.34	10.0	
CB_28	JUNCTION	65.39	1.52	10.0	
CB_29	JUNCTION	64.11	2.43	0.0	
CB_5	JUNCTION	65.11	1.63	10.0	
CBMH_11	JUNCTION	63.58	2.16	10.0	
CBMH_12	JUNCTION	64.06	1.68	10.0	
CBMH_14	JUNCTION	64.11	2.21	10.0	
CBMH_15	JUNCTION	64.47	1.85	10.0	
CBMH_18	JUNCTION	64.05	2.54	0.0	
CBMH_19	JUNCTION	64.88	2.38	10.0	
CBMH_2	JUNCTION	64.06	2.94	10.0	
CBMH_21	JUNCTION	65.17	1.87	10.0	
CBMH_22	JUNCTION	65.53	1.51	10.0	

CBMH_3	JUNCTION	64.42	2.58	10.0
CBMH_4	JUNCTION	64.78	2.22	10.0
CBMH_6	JUNCTION	63.91	2.73	10.0
CBMH_7	JUNCTION	64.27	2.73	10.0
CBMH_8	JUNCTION	64.63	2.37	10.0
CBMH_9	JUNCTION	64.99	2.01	10.0
DCB_16	JUNCTION	64.80	1.52	10.0
J1	JUNCTION	63.75	3.27	0.0
J13	JUNCTION	63.54	3.10	10.0
J2	JUNCTION	63.24	3.33	0.0
MH_20	JUNCTION	64.99	2.30	0.0
MH_24	JUNCTION	64.13	2.50	10.0
MH_25	JUNCTION	64.42	2.63	0.0
MH_26	JUNCTION	64.56	2.70	0.0
MH_27	JUNCTION	63.89	2.02	0.0
MH_30	JUNCTION	63.73	3.08	0.0
MH_44	JUNCTION	63.51	3.51	0.0
MH_45	JUNCTION	63.11	3.46	0.0
OGS_1	JUNCTION	63.04	3.34	0.0
OGS_2	JUNCTION	63.47	3.01	0.0
Humber_Pl	OUTFALL	62.48	0.38	0.0
OF1	OUTFALL	63.41	0.38	0.0
OF2	OUTFALL	0.00	0.00	0.0
SU_N	STORAGE	63.75	3.04	0.0
SU_S	STORAGE	63.24	3.33	0.0

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Link Summary
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Name	From Node	To Node	Type	Length	%Slope	Roughness
C1	SU_N	MH_44	CONDUIT	2.5	1.0001	0.0090
C10	CB_28	MH_26	CONDUIT	30.4	1.0001	0.0110
C11	CB_27	MH_26	CONDUIT	32.8	1.0001	0.0110
C12	MH_26	MH_25	CONDUIT	16.5	0.4970	0.0110
C13	MH_24	CBMH_18	CONDUIT	4.8	0.5000	0.0110
C14	CB_23	CBMH_22	CONDUIT	51.5	1.0001	0.0110
C15	CBMH_22	CBMH_21	CONDUIT	60.0	0.5000	0.0110
C16	CBMH_21	MH_20	CONDUIT	24.5	0.5020	0.0110
C17	MH_20	CBMH_19	CONDUIT	10.4	0.5000	0.0110
C18	CBMH_19	MH_24	CONDUIT	46.5	0.5011	0.0110
C19	CB_10	CBMH_9	CONDUIT	52.5	0.4991	0.0110
C2	MH_44	OGS_2	CONDUIT	11.6	0.3707	0.0110
C20	CBMH_9	CBMH_8	CONDUIT	60.0	0.5000	0.0110
C21	CBMH_8	CBMH_7	CONDUIT	60.0	0.5000	0.0110
C22	CBMH_7	CBMH_6	CONDUIT	60.0	0.5000	0.0110
C23	CBMH_6	J13	CONDUIT	29.9	0.5017	0.0110
C24	J13	SU_S	CONDUIT	4.0	0.5000	0.0110
C25	CB_5	CBMH_4	CONDUIT	52.5	0.4991	0.0110
C26	CBMH_4	CBMH_3	CONDUIT	60.0	0.5000	0.0110
C27	CBMH_3	CBMH_2	CONDUIT	60.0	0.5000	0.0110
C28	CBMH_2	MH_30	CONDUIT	53.4	0.4963	0.0110
C29	CBMH_12	CBMH_11	CONDUIT	50.0	0.5700	0.0110
C3	J1	MH_44	CONDUIT	2.5	0.4800	0.0110
C30	MH_30	J13	CONDUIT	9.3	0.4839	0.0110
C31	MH_27	CBMH_11	CONDUIT	8.2	0.5000	0.0110
C32	CBMH_11	SU_S	CONDUIT	13.2	0.5000	0.0110
C33	OGS_1	Humber_Pl	CONDUIT	4.0	14.1135	0.0110
C34	OGS_2	OF1	CONDUIT	8.7	0.6782	0.0110
C35	MH_25	MH_24	CONDUIT	44.2	0.5000	0.0110
C36	CBMH_18	SU_N	CONDUIT	3.9	0.5128	0.0110
C37	CB_29	MH_27	CONDUIT	32.9	0.4985	0.0110
C4	SU_S	MH_45	CONDUIT	9.4	1.0001	0.0090
C5	J2	MH_45	CONDUIT	9.4	0.5000	0.0110
C6	MH_45	OGS_1	CONDUIT	3.1	0.4839	0.0110
C7	DCB_16	CBMH_15	CONDUIT	54.4	0.5000	0.0110
C8	CBMH_15	CBMH_14	CONDUIT	60.0	0.5000	0.0110
C9	CBMH_14	SU_N	CONDUIT	15.2	0.5000	0.0110
OR1	SU_S	J2	ORIFICE			
OR2	SU_N	J1	ORIFICE			

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Cross Section Summary
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Conduit	Shape	Full Depth	Full Area	Hyd. Rad.	Max. Width	No. of Barrels	Full Flow
C1	CIRCULAR	0.20	0.03	0.05	0.20	1	0.05
C10	CIRCULAR	0.45	0.16	0.11	0.45	1	0.34
C11	CIRCULAR	0.45	0.16	0.11	0.45	1	0.34
C12	CIRCULAR	0.53	0.22	0.13	0.53	1	0.36
C13	CIRCULAR	0.60	0.28	0.15	0.60	1	0.51
C14	CIRCULAR	0.38	0.11	0.09	0.38	1	0.21
C15	CIRCULAR	0.45	0.16	0.11	0.45	1	0.24
C16	CIRCULAR	0.45	0.16	0.11	0.45	1	0.24
C17	CIRCULAR	0.45	0.16	0.11	0.45	1	0.24
C18	CIRCULAR	0.45	0.16	0.11	0.45	1	0.24
C19	CIRCULAR	0.45	0.16	0.11	0.45	1	0.24
C2	CIRCULAR	0.38	0.11	0.09	0.38	1	0.13
C20	CIRCULAR	0.53	0.22	0.13	0.53	1	0.36
C21	CIRCULAR	0.53	0.22	0.13	0.53	1	0.36
C22	CIRCULAR	0.53	0.22	0.13	0.53	1	0.36
C23	CIRCULAR	0.53	0.22	0.13	0.53	1	0.36

C24	CIRCULAR	0.75	0.44	0.19	0.75	1	0.93
C25	CIRCULAR	0.53	0.22	0.13	0.53	1	0.36
C26	CIRCULAR	0.60	0.28	0.15	0.60	1	0.51
C27	CIRCULAR	0.60	0.28	0.15	0.60	1	0.51
C28	CIRCULAR	0.60	0.28	0.15	0.60	1	0.51
C29	CIRCULAR	0.38	0.11	0.09	0.38	1	0.16
C3	CIRCULAR	0.30	0.07	0.07	0.30	1	0.08
C30	CIRCULAR	0.60	0.28	0.15	0.60	1	0.50
C31	CIRCULAR	0.38	0.11	0.09	0.38	1	0.15
C32	CIRCULAR	0.53	0.22	0.13	0.53	1	0.36
C33	CIRCULAR	0.38	0.11	0.09	0.38	1	0.78
C34	CIRCULAR	0.38	0.11	0.09	0.38	1	0.17
C35	CIRCULAR	0.60	0.28	0.15	0.60	1	0.51
C36	CIRCULAR	0.75	0.44	0.19	0.75	1	0.94
C37	CIRCULAR	0.38	0.11	0.09	0.38	1	0.15
C4	CIRCULAR	0.20	0.03	0.05	0.20	1	0.05
C5	CIRCULAR	0.30	0.07	0.07	0.30	1	0.08
C6	CIRCULAR	0.38	0.11	0.09	0.38	1	0.14
C7	CIRCULAR	0.53	0.22	0.13	0.53	1	0.36
C8	CIRCULAR	0.53	0.22	0.13	0.53	1	0.36
C9	CIRCULAR	0.60	0.28	0.15	0.60	1	0.51

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NOTE: The summary statistics displayed in this report are
based on results found at every computational time step,
not just on results from each reporting time step.
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Analysis Options
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Flow Units ..... CMS
Process Models:
  Rainfall/Runoff ..... YES
  RDII ..... NO
  Snowmelt ..... NO
  Groundwater ..... NO
  Flow Routing ..... YES
  Ponding Allowed ..... NO
  Water Quality ..... NO
Infiltration Method ..... HORTON
Flow Routing Method ..... DYNWAVE
Surcharge Method ..... EXTRAN
Starting Date 12/11/2020 00:00:00
Ending Date 12/21/2020 00:00:00
Antecedent Dry Days 0.0
Report Time Step 00:01:00
Wet Time Step 00:01:00
Dry Time Step 00:01:00
Routing Time Step ..... 1.00 sec
Variable Time Step ..... YES
Maximum Trials 8
Number of Threads 6
Head Tolerance ..... 0.001500 m

Runoff Quantity Continuity	Volume hectare-m	Depth mm
Total Precipitation	0.346	49.044
Evaporation Loss	0.000	0.000
Infiltration Loss	0.018	2.482
Surface Runoff	0.328	46.593
Final Storage	0.000	0.000
Continuity Error (%)	-0.065	

Flow Routing Continuity	Volume hectare-m	Volume 10^6 ltr
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	0.328	3.285
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	0.000	0.000
External Outflow	0.329	3.286
Flooding Loss	0.000	0.000
Evaporation Loss	0.000	0.000
Exfiltration Loss	0.000	0.000
Initial Stored Volume	0.000	0.000
Final Stored Volume	0.000	0.000
Continuity Error (%)	-0.045	

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Time-Step Critical Elements
****
Link C33 (2.13%)

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Highest Flow Instability Indexes
****

Link C2 (5)
Link OR1 (1)

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Routing Time Step Summary
****
Minimum Time Step : 0.43 sec
Average Time Step : 0.99 sec
Maximum Time Step : 1.00 sec
Percent in Steady State : 0.00
Average Iterations per Step : 2.00
Percent Not Converging : 0.00
Time Step Frequencies :
1.000 - 0.871 sec : 97.27 %
0.871 - 0.758 sec : 0.63 %
0.758 - 0.660 sec : 0.72 %
0.660 - 0.574 sec : 0.63 %
0.574 - 0.500 sec : 0.75 %

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Subcatchment Runoff Summary
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Subcatchment	Total Precip mm	Total Runon mm	Total Evap mm	Total Infil mm	Imperv Runoff mm	Perv Runoff mm	Total Runoff mm	Total Runoff 10^6 ltr	Peak Runoff CMS	Runoff Coeff
Area_1	49.04	0.00	0.00	2.56	44.17	2.35	46.52	0.12	0.09	0.949
Area_10	49.04	0.00	0.00	2.56	44.17	2.35	46.52	0.04	0.03	0.949
Area_101	49.04	0.00	0.00	1.29	46.61	1.17	47.77	0.65	0.41	0.974
Area_102	49.04	0.00	0.00	1.29	46.61	1.17	47.77	0.54	0.34	0.974
Area_11	49.04	0.00	0.00	2.56	44.17	2.35	46.52	0.06	0.05	0.949
Area_12	49.04	0.00	0.00	2.56	44.17	2.35	46.52	0.07	0.06	0.949
Area_13	49.04	0.00	0.00	2.56	44.17	2.35	46.52	0.07	0.06	0.949
Area_14	49.04	0.00	0.00	2.56	44.17	2.35	46.52	0.08	0.06	0.949
Area_15	49.04	0.00	0.00	2.56	44.17	2.35	46.52	0.04	0.03	0.949
Area_16	49.04	0.00	0.00	2.56	44.17	2.35	46.52	0.07	0.06	0.949
Area_17	49.04	0.00	0.00	2.56	44.17	2.35	46.52	0.08	0.06	0.949
Area_18	49.04	0.00	0.00	2.56	44.17	2.35	46.52	0.08	0.06	0.949
Area_19	49.04	0.00	0.00	2.56	44.17	2.35	46.52	0.08	0.06	0.949
Area_2	49.04	0.00	0.00	2.56	44.17	2.35	46.52	0.07	0.06	0.949
Area_20	49.04	0.00	0.00	2.56	44.17	2.35	46.52	0.13	0.10	0.949
Area_2001	49.04	0.00	0.00	20.73	12.27	16.06	28.33	0.02	0.01	0.578
Area_2002	49.04	0.00	0.00	2.60	44.16	2.31	46.46	0.10	0.06	0.947
Area_2003	49.04	0.00	0.00	2.62	44.16	2.29	46.45	0.07	0.05	0.947
Area_2004	49.04	0.00	0.00	24.83	2.45	21.78	24.23	0.00	0.00	0.494
Area_2005	49.04	0.00	0.00	24.83	2.45	21.78	24.23	0.01	0.00	0.494
Area_21	49.04	0.00	0.00	2.56	44.17	2.35	46.52	0.10	0.08	0.949
Area_22	49.04	0.00	0.00	2.56	44.17	2.35	46.52	0.15	0.12	0.949
Area_23	49.04	0.00	0.00	2.56	44.17	2.35	46.52	0.07	0.06	0.949
Area_3	49.04	0.00	0.00	2.56	44.17	2.35	46.52	0.17	0.13	0.949
Area_4	49.04	0.00	0.00	2.56	44.17	2.35	46.52	0.13	0.10	0.949
Area_5	49.04	0.00	0.00	2.56	44.17	2.35	46.52	0.07	0.06	0.949
Area_6	49.04	0.00	0.00	2.56	44.17	2.35	46.52	0.07	0.06	0.949
Area_7	49.04	0.00	0.00	2.56	44.17	2.35	46.52	0.02	0.01	0.949
Area_8	49.04	0.00	0.00	2.56	44.17	2.35	46.52	0.06	0.04	0.949
Area_9	49.04	0.00	0.00	2.56	44.17	2.35	46.52	0.06	0.04	0.949

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Node Depth Summary
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Node	Type	Average Depth Meters	Maximum Depth Meters	Maximum HGL Meters	Time of Max Occurrence days hr:min	Reported Max Depth Meters
CB_10	JUNCTION	0.00	0.14	65.47	0 02:10	0.14
CB_23	JUNCTION	0.00	0.10	66.29	0 02:10	0.10
CB_27	JUNCTION	0.00	0.12	65.61	0 02:10	0.12
CB_28	JUNCTION	0.00	0.12	65.51	0 02:10	0.12
CB_29	JUNCTION	0.00	0.17	64.28	0 02:10	0.17
CB_5	JUNCTION	0.00	0.14	65.25	0 02:10	0.14
CBMH_11	JUNCTION	0.04	0.70	64.28	0 02:57	0.69
CBMH_12	JUNCTION	0.01	0.25	64.31	0 02:10	0.25
CBMH_14	JUNCTION	0.04	0.71	64.81	0 02:53	0.71
CBMH_15	JUNCTION	0.01	0.35	64.81	0 02:50	0.35
CBMH_18	JUNCTION	0.04	0.76	64.81	0 02:52	0.76
CBMH_19	JUNCTION	0.00	0.24	65.11	0 02:10	0.24
CBMH_2	JUNCTION	0.01	0.29	64.35	0 02:10	0.29
CBMH_21	JUNCTION	0.00	0.22	65.39	0 02:10	0.22
CBMH_22	JUNCTION	0.00	0.17	65.70	0 02:10	0.17
CBMH_3	JUNCTION	0.00	0.24	64.66	0 02:10	0.24
CBMH_4	JUNCTION	0.00	0.19	64.97	0 02:10	0.19
CBMH_6	JUNCTION	0.01	0.36	64.27	0 03:08	0.36
CBMH_7	JUNCTION	0.00	0.30	64.57	0 02:10	0.30
CBMH_8	JUNCTION	0.00	0.25	64.88	0 02:10	0.25
CBMH_9	JUNCTION	0.00	0.20	65.19	0 02:10	0.20
DCB_16	JUNCTION	0.00	0.22	65.02	0 02:10	0.22
J1	JUNCTION	0.01	0.08	63.83	0 02:52	0.08
J13	JUNCTION	0.05	0.78	64.31	0 02:57	0.75

J2	JUNCTION	0.01	0.08	63.32	0	03:08	0.08
MH_20	JUNCTION	0.00	0.22	65.21	0	02:10	0.22
MH_24	JUNCTION	0.03	0.68	64.81	0	02:52	0.68
MH_25	JUNCTION	0.01	0.49	64.90	0	02:10	0.48
MH_26	JUNCTION	0.01	0.57	65.13	0	02:10	0.57
MH_27	JUNCTION	0.01	0.38	64.27	0	03:04	0.38
MH_30	JUNCTION	0.03	0.54	64.28	0	03:06	0.54
MH_44	JUNCTION	0.01	0.20	63.71	0	02:54	0.20
MH_45	JUNCTION	0.01	0.17	63.28	0	03:02	0.17
OGS_1	JUNCTION	0.01	0.07	63.11	0	03:08	0.07
OGS_2	JUNCTION	0.01	0.17	63.64	0	02:55	0.17
Humber_Pl	OUTFALL	0.00	0.00	62.48	0	00:00	0.00
OF1	OUTFALL	0.01	0.17	63.58	0	02:53	0.17
OF2	OUTFALL	0.00	0.00	0.00	0	00:00	0.00
SU_N	STORAGE	0.08	1.06	64.81	0	02:52	1.06
SU_S	STORAGE	0.10	1.04	64.27	0	03:08	1.04

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Node Inflow Summary
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Node	Type	Maximum Lateral Inflow CMS	Maximum Total Inflow CMS	Time of Max Occurrence days hr:min		Lateral Inflow Volume 10^6 ltr	Total Inflow Volume 10^6 ltr	Flow Balance Error Percent
CB_10	JUNCTION	0.048	0.048	0	02:10	0.0605	0.0605	-0.010
CB_23	JUNCTION	0.030	0.030	0	02:10	0.0372	0.0372	-0.006
CB_27	JUNCTION	0.056	0.056	0	02:10	0.0698	0.0698	-0.004
CB_28	JUNCTION	0.056	0.056	0	02:10	0.0698	0.0698	-0.004
CB_29	JUNCTION	0.059	0.059	0	02:10	0.0744	0.0744	0.570
CB_5	JUNCTION	0.056	0.056	0	02:10	0.0698	0.0698	-0.010
CBMH_11	JUNCTION	0.415	0.587	0	02:10	0.637	0.86	0.024
CBMH_12	JUNCTION	0.119	0.119	0	02:10	0.149	0.149	0.588
CBMH_14	JUNCTION	0.093	0.281	0	02:10	0.116	0.355	-0.502
CBMH_15	JUNCTION	0.059	0.191	0	02:10	0.0744	0.241	0.899
CBMH_18	JUNCTION	0.104	0.741	0	02:10	0.13	1.09	-0.003
CBMH_19	JUNCTION	0.015	0.130	0	02:10	0.0186	0.167	0.246
CBMH_2	JUNCTION	0.063	0.238	0	02:10	0.0791	0.307	0.310
CBMH_21	JUNCTION	0.044	0.117	0	02:10	0.0558	0.149	-0.002
CBMH_22	JUNCTION	0.044	0.074	0	02:10	0.0558	0.093	-0.008
CBMH_3	JUNCTION	0.063	0.179	0	02:10	0.0791	0.228	0.268
CBMH_4	JUNCTION	0.063	0.118	0	02:10	0.0791	0.149	-0.009
CBMH_6	JUNCTION	0.033	0.253	0	02:10	0.0419	0.329	-0.031
CBMH_7	JUNCTION	0.063	0.224	0	02:10	0.0791	0.288	0.369
CBMH_8	JUNCTION	0.059	0.164	0	02:10	0.0744	0.209	-0.007
CBMH_9	JUNCTION	0.059	0.107	0	02:10	0.0744	0.135	-0.008
DCB_16	JUNCTION	0.133	0.133	0	02:10	0.167	0.167	0.399
J1	JUNCTION	0.000	0.013	0	02:52	0	0.978	-0.004
J13	JUNCTION	0.104	0.588	0	02:10	0.13	0.854	-0.156
J2	JUNCTION	0.000	0.012	0	03:08	0	1.18	-0.004
MH_20	JUNCTION	0.000	0.116	0	02:10	0	0.149	-0.001
MH_24	JUNCTION	0.000	0.648	0	02:10	0	0.958	-0.364
MH_25	JUNCTION	0.000	0.520	0	02:10	0	0.793	0.309
MH_26	JUNCTION	0.409	0.520	0	02:10	0.654	0.794	0.091
MH_27	JUNCTION	0.000	0.059	0	02:10	0	0.074	-0.452
MH_30	JUNCTION	0.000	0.237	0	02:10	0	0.321	-0.447
MH_44	JUNCTION	0.000	0.074	0	02:51	0	1.45	0.009
MH_45	JUNCTION	0.000	0.060	0	03:01	0	1.63	0.001
OGS_1	JUNCTION	0.000	0.060	0	03:08	0	1.63	-0.000
OGS_2	JUNCTION	0.000	0.076	0	02:50	0	1.45	-0.010
Humber_Pl	OUTFALL	0.005	0.061	0	02:51	0.0145	1.64	0.000
OF1	OUTFALL	0.050	0.079	0	02:44	0.0743	1.52	0.000
OF2	OUTFALL	0.068	0.068	0	02:10	0.117	0.117	0.000
SU_N	STORAGE	0.000	1.017	0	02:10	0	1.45	-0.108
SU_S	STORAGE	0.000	1.173	0	02:10	0	1.7	-0.102

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Node Surcharge Summary
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Surcharging occurs when water rises above the top of the highest conduit.

Node	Type	Hours Surcharged	Max. Height Above Crown Meters	Min. Depth Below Rim Meters
CBMH_11	JUNCTION	1.78	0.061	1.456
CBMH_14	JUNCTION	2.17	0.107	1.507
CBMH_18	JUNCTION	0.56	0.013	1.777
J13	JUNCTION	0.04	0.026	2.327

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Node Flooding Summary
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No nodes were flooded.

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Storage Volume Summary

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Storage Unit	Average Volume 1000 m3	Avg Pcnt Full	Evap Pcnt Loss	Exfil Pcnt Loss	Maximum Volume 1000 m3	Max Pcnt Full	Time of Max Occurrence days hr:min	Maximum Outflow CMS
SU_N	0.061	2	0	0	0.925	36	0 02:52	0.074
SU_S	0.089	3	0	0	1.115	32	0 03:08	0.094

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Outfall Loading Summary
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Outfall Node	Flow Freq Pcnt	Avg Flow CMS	Max Flow CMS	Total Volume 10^6 ltr
Humber_Pl	28.97	0.008	0.061	1.644
OF1	23.99	0.009	0.079	1.525
OF2	4.75	0.004	0.068	0.117
System	19.24	0.022	0.147	3.286

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Link Flow Summary
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Link	Type	Maximum |Flow| CMS	Time of Max Occurrence days hr:min	Maximum |Veloc| m/sec	Max/ Full Flow	Max/ Full Depth
C1	CONDUIT	0.061	0 02:44	1.95	1.29	1.00
C10	CONDUIT	0.055	0 02:10	1.57	0.16	0.27
C11	CONDUIT	0.055	0 02:10	1.57	0.16	0.27
C12	CONDUIT	0.520	0 02:10	2.45	1.45	0.95
C13	CONDUIT	0.648	0 02:10	2.48	1.26	1.00
C14	CONDUIT	0.029	0 02:10	1.33	0.14	0.25
C15	CONDUIT	0.073	0 02:10	1.32	0.30	0.38
C16	CONDUIT	0.116	0 02:10	1.50	0.49	0.49
C17	CONDUIT	0.116	0 02:10	1.49	0.49	0.49
C18	CONDUIT	0.130	0 02:10	1.54	0.54	0.53
C19	CONDUIT	0.047	0 02:10	1.17	0.20	0.30
C2	CONDUIT	0.076	0 02:50	1.38	0.60	0.50
C20	CONDUIT	0.105	0 02:10	1.45	0.29	0.37
C21	CONDUIT	0.162	0 02:10	1.63	0.45	0.47
C22	CONDUIT	0.222	0 02:10	1.76	0.62	0.57
C23	CONDUIT	0.254	0 02:10	1.81	0.70	0.84
C24	CONDUIT	0.588	0 02:10	2.23	0.63	1.00
C25	CONDUIT	0.055	0 02:10	1.20	0.15	0.26
C26	CONDUIT	0.116	0 02:10	1.47	0.23	0.32
C27	CONDUIT	0.177	0 02:10	1.65	0.35	0.41
C28	CONDUIT	0.237	0 02:10	1.78	0.46	0.58
C29	CONDUIT	0.116	0 02:10	1.27	0.74	0.83
C3	CONDUIT	0.013	0 02:52	0.82	0.16	0.27
C30	CONDUIT	0.238	0 02:10	1.76	0.47	0.95
C31	CONDUIT	0.067	0 02:10	1.03	0.45	1.00
C32	CONDUIT	0.586	0 02:10	2.74	1.63	1.00
C33	CONDUIT	0.060	0 03:08	4.17	0.08	0.19
C34	CONDUIT	0.074	0 02:53	1.49	0.43	0.46
C35	CONDUIT	0.518	0 02:10	2.16	1.01	0.83
C36	CONDUIT	0.741	0 02:10	2.36	0.79	1.00
C37	CONDUIT	0.059	0 02:10	1.21	0.40	0.64
C4	CONDUIT	0.048	0 02:58	1.72	1.00	0.88
C5	CONDUIT	0.012	0 03:07	0.82	0.15	0.29
C6	CONDUIT	0.060	0 03:08	1.24	0.42	0.45
C7	CONDUIT	0.132	0 02:10	1.54	0.37	0.42
C8	CONDUIT	0.189	0 02:10	1.69	0.53	0.83
C9	CONDUIT	0.278	0 02:10	1.84	0.54	1.00
OR1	ORIFICE	0.012	0 03:08			1.00
OR2	ORIFICE	0.013	0 02:52			1.00

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Flow Classification Summary
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Conduit	Adjusted /Actual Length	Fraction of Time in Flow Class: Dry	Up Dry	Down Dry	Sub Crit	Sup Crit	Up Crit	Down Crit	Norm Ltd	Inlet Ctrl
C1	1.00	0.97	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00
C10	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
C11	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
C12	1.00	0.00	0.00	0.00	0.05	0.00	0.00	0.95	0.01	0.00
C13	1.00	0.00	0.00	0.00	0.09	0.00	0.00	0.91	0.00	0.00
C14	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
C15	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
C16	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
C17	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00

C18	1.00	0.00	0.00	0.00	0.02	0.00	0.00	0.98	0.01	0.00
C19	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
C2	1.00	0.00	0.10	0.00	0.75	0.15	0.00	0.00	0.78	0.00
C20	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
C21	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
C22	1.00	0.00	0.00	0.00	0.05	0.00	0.00	0.95	0.04	0.00
C23	1.00	0.00	0.00	0.00	0.08	0.00	0.00	0.92	0.03	0.00
C24	1.00	0.00	0.00	0.00	0.12	0.00	0.00	0.87	0.01	0.00
C25	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
C26	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
C27	1.00	0.00	0.00	0.00	0.03	0.00	0.00	0.97	0.02	0.00
C28	1.00	0.00	0.00	0.00	0.08	0.00	0.00	0.92	0.04	0.00
C29	1.00	0.00	0.00	0.00	0.08	0.00	0.00	0.92	0.05	0.00
C3	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
C30	1.00	0.00	0.00	0.00	0.10	0.00	0.00	0.90	0.01	0.00
C31	1.00	0.00	0.00	0.00	0.07	0.00	0.00	0.93	0.02	0.00
C32	1.00	0.00	0.00	0.00	0.13	0.00	0.00	0.87	0.01	0.00
C33	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
C34	1.00	0.00	0.00	0.00	0.74	0.26	0.00	0.00	0.05	0.00
C35	1.00	0.00	0.00	0.00	0.08	0.00	0.00	0.92	0.03	0.00
C36	1.00	0.00	0.00	0.00	0.11	0.00	0.00	0.89	0.00	0.00
C37	1.00	0.00	0.00	0.00	0.06	0.00	0.00	0.94	0.03	0.00
C4	1.00	0.97	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00
C5	1.00	0.00	0.00	0.00	0.01	0.00	0.00	0.99	0.00	0.00
C6	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
C7	1.00	0.00	0.00	0.00	0.04	0.00	0.00	0.96	0.03	0.00
C8	1.00	0.00	0.00	0.00	0.09	0.00	0.00	0.91	0.04	0.00
C9	1.00	0.00	0.00	0.00	0.10	0.00	0.00	0.89	0.01	0.00

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Conduit Surcharge Summary
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	Hours Full			Hours Above Full	Hours Capacity
Conduit	Both Ends	Upstream	Dnstream	Normal Flow	Limited
C1	0.13	0.56	0.13	1.12	0.13
C12	0.01	0.03	0.01	0.09	0.01
C13	1.67	1.67	2.09	0.06	0.01
C23	0.01	0.01	0.04	0.01	0.01
C24	0.04	0.04	0.49	0.01	0.01
C29	0.01	0.01	4.24	0.01	0.01
C30	0.01	0.01	0.04	0.01	0.01
C31	0.65	0.65	1.78	0.01	0.01
C32	5.48	5.53	7.81	0.11	0.01
C35	0.01	0.01	0.69	0.01	0.01
C36	0.56	0.56	0.95	0.01	0.01
C4	0.01	0.01	0.01	0.45	0.01
C8	0.01	0.01	2.53	0.01	0.01
C9	2.17	2.17	4.46	0.01	0.01

Analysis begun on: Wed Oct 5 21:16:09 2022
Analysis ended on: Wed Oct 5 21:16:39 2022

Total elapsed time: 00:00:30

100-yr, 3-hour

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.015)

WARNING 03: negative offset ignored for Link C2
WARNING 03: negative offset ignored for Link C32
WARNING 03: negative offset ignored for Link C34

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Element Count
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Number of rain gages 7
Number of subcatchments ... 30
Number of nodes 40
Number of links 39
Number of pollutants 0
Number of land uses 0

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Raingage Summary
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Name	Data Source	Data Type	Recording Interval
25mm	25mm	INTENSITY	5 min.
3hr-100yr	3hr-100yr	INTENSITY	10 min.
3hr-2yr	3hr-2yr	INTENSITY	5 min.
3hr-5yr	3hr-5yr	INTENSITY	5 min.
6hr-100yr	6hr-100yr	INTENSITY	10 min.
6hr-2yr	6hr-2yr	INTENSITY	5 min.
6hr-5yr	6hr-5yr	INTENSITY	5 min.

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Subcatchment Summary
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Name	Area	Width	%Imperv	%Slope	Rain Gage	Outlet
Area_1	0.25	83.33	90.00	1.0000	3hr-100yr	CBMH_14
Area_10	0.08	26.67	90.00	1.0000	3hr-100yr	CB_23
Area_101	1.37	137.00	95.00	0.5000	3hr-100yr	MH_26
Area_102	1.13	113.00	95.00	0.5000	3hr-100yr	CBMH_11
Area_11	0.13	43.33	90.00	1.0000	3hr-100yr	CB_10
Area_12	0.16	53.33	90.00	1.0000	3hr-100yr	CBMH_9
Area_13	0.16	53.33	90.00	1.0000	3hr-100yr	CBMH_8
Area_14	0.17	56.67	90.00	1.0000	3hr-100yr	CBMH_7
Area_15	0.09	30.00	90.00	1.0000	3hr-100yr	CBMH_6
Area_16	0.15	50.00	90.00	1.0000	3hr-100yr	CB_5
Area_17	0.17	56.67	90.00	1.0000	3hr-100yr	CBMH_4
Area_18	0.17	56.67	90.00	1.0000	3hr-100yr	CBMH_3
Area_19	0.17	56.67	90.00	1.0000	3hr-100yr	CBMH_2
Area_2	0.16	53.33	90.00	1.0000	3hr-100yr	CBMH_15
Area_20	0.28	93.33	90.00	1.0000	3hr-100yr	J13
Area_2001	0.07	7.00	25.00	0.5000	3hr-100yr	OF2
Area_2002	0.21	21.00	90.00	0.5000	3hr-100yr	OF2
Area_2003	0.16	16.00	90.00	1.0000	3hr-100yr	OF1
Area_2004	0.02	13.33	5.00	0.5000	3hr-100yr	Humber_Pl
Area_2005	0.04	26.67	5.00	0.5000	3hr-100yr	Humber_Pl
Area_21	0.21	70.00	90.00	1.0000	3hr-100yr	CBMH_11
Area_22	0.32	106.67	90.00	1.0000	3hr-100yr	CBMH_12
Area_23	0.16	53.33	90.00	1.0000	3hr-100yr	CB_29
Area_3	0.36	120.00	90.00	1.0000	3hr-100yr	DCB_16
Area_4	0.28	93.33	90.00	1.0000	3hr-100yr	CBMH_18
Area_5	0.15	50.00	90.00	1.0000	3hr-100yr	CB_27
Area_6	0.15	50.00	90.00	1.0000	3hr-100yr	CB_28
Area_7	0.04	13.33	90.00	1.0000	3hr-100yr	CBMH_19
Area_8	0.12	40.00	90.00	1.0000	3hr-100yr	CBMH_21
Area_9	0.12	40.00	90.00	1.0000	3hr-100yr	CBMH_22

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Node Summary
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Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
CB_10	JUNCTION	65.33	1.41	10.0	
CB_23	JUNCTION	66.20	0.93	10.0	
CB_27	JUNCTION	65.48	1.34	10.0	
CB_28	JUNCTION	65.39	1.52	10.0	
CB_29	JUNCTION	64.11	2.43	0.0	
CB_5	JUNCTION	65.11	1.63	10.0	
CBMH_11	JUNCTION	63.58	2.16	10.0	
CBMH_12	JUNCTION	64.06	1.68	10.0	
CBMH_14	JUNCTION	64.11	2.21	10.0	
CBMH_15	JUNCTION	64.47	1.85	10.0	
CBMH_18	JUNCTION	64.05	2.54	0.0	
CBMH_19	JUNCTION	64.88	2.38	10.0	
CBMH_2	JUNCTION	64.06	2.94	10.0	
CBMH_21	JUNCTION	65.17	1.87	10.0	
CBMH_22	JUNCTION	65.53	1.51	10.0	

CBMH_3	JUNCTION	64.42	2.58	10.0
CBMH_4	JUNCTION	64.78	2.22	10.0
CBMH_6	JUNCTION	63.91	2.73	10.0
CBMH_7	JUNCTION	64.27	2.73	10.0
CBMH_8	JUNCTION	64.63	2.37	10.0
CBMH_9	JUNCTION	64.99	2.01	10.0
DCB_16	JUNCTION	64.80	1.52	10.0
J1	JUNCTION	63.75	3.27	0.0
J13	JUNCTION	63.54	3.10	10.0
J2	JUNCTION	63.24	3.33	0.0
MH_20	JUNCTION	64.99	2.30	0.0
MH_24	JUNCTION	64.13	2.50	10.0
MH_25	JUNCTION	64.42	2.63	0.0
MH_26	JUNCTION	64.56	2.70	0.0
MH_27	JUNCTION	63.89	2.02	0.0
MH_30	JUNCTION	63.73	3.08	0.0
MH_44	JUNCTION	63.51	3.51	0.0
MH_45	JUNCTION	63.11	3.46	0.0
OGS_1	JUNCTION	63.04	3.34	0.0
OGS_2	JUNCTION	63.47	3.01	0.0
Humber_Pl	OUTFALL	62.48	0.38	0.0
OF1	OUTFALL	63.41	0.38	0.0
OF2	OUTFALL	0.00	0.00	0.0
SU_N	STORAGE	63.75	3.04	0.0
SU_S	STORAGE	63.24	3.33	0.0

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Link Summary
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Name	From Node	To Node	Type	Length	%Slope	Roughness
C1	SU_N	MH_44	CONDUIT	2.5	1.0001	0.0090
C10	CB_28	MH_26	CONDUIT	30.4	1.0001	0.0110
C11	CB_27	MH_26	CONDUIT	32.8	1.0001	0.0110
C12	MH_26	MH_25	CONDUIT	16.5	0.4970	0.0110
C13	MH_24	CBMH_18	CONDUIT	4.8	0.5000	0.0110
C14	CB_23	CBMH_22	CONDUIT	51.5	1.0001	0.0110
C15	CBMH_22	CBMH_21	CONDUIT	60.0	0.5000	0.0110
C16	CBMH_21	MH_20	CONDUIT	24.5	0.5020	0.0110
C17	MH_20	CBMH_19	CONDUIT	10.4	0.5000	0.0110
C18	CBMH_19	MH_24	CONDUIT	46.5	0.5011	0.0110
C19	CB_10	CBMH_9	CONDUIT	52.5	0.4991	0.0110
C2	MH_44	OGS_2	CONDUIT	11.6	0.3707	0.0110
C20	CBMH_9	CBMH_8	CONDUIT	60.0	0.5000	0.0110
C21	CBMH_8	CBMH_7	CONDUIT	60.0	0.5000	0.0110
C22	CBMH_7	CBMH_6	CONDUIT	60.0	0.5000	0.0110
C23	CBMH_6	J13	CONDUIT	29.9	0.5017	0.0110
C24	J13	SU_S	CONDUIT	4.0	0.5000	0.0110
C25	CB_5	CBMH_4	CONDUIT	52.5	0.4991	0.0110
C26	CBMH_4	CBMH_3	CONDUIT	60.0	0.5000	0.0110
C27	CBMH_3	CBMH_2	CONDUIT	60.0	0.5000	0.0110
C28	CBMH_2	MH_30	CONDUIT	53.4	0.4963	0.0110
C29	CBMH_12	CBMH_11	CONDUIT	50.0	0.5700	0.0110
C3	J1	MH_44	CONDUIT	2.5	0.4800	0.0110
C30	MH_30	J13	CONDUIT	9.3	0.4839	0.0110
C31	MH_27	CBMH_11	CONDUIT	8.2	0.5000	0.0110
C32	CBMH_11	SU_S	CONDUIT	13.2	0.5000	0.0110
C33	OGS_1	Humber_Pl	CONDUIT	4.0	14.1135	0.0110
C34	OGS_2	OF1	CONDUIT	8.7	0.6782	0.0110
C35	MH_25	MH_24	CONDUIT	44.2	0.5000	0.0110
C36	CBMH_18	SU_N	CONDUIT	3.9	0.5128	0.0110
C37	CB_29	MH_27	CONDUIT	32.9	0.4985	0.0110
C4	SU_S	MH_45	CONDUIT	9.4	1.0001	0.0090
C5	J2	MH_45	CONDUIT	9.4	0.5000	0.0110
C6	MH_45	OGS_1	CONDUIT	3.1	0.4839	0.0110
C7	DCB_16	CBMH_15	CONDUIT	54.4	0.5000	0.0110
C8	CBMH_15	CBMH_14	CONDUIT	60.0	0.5000	0.0110
C9	CBMH_14	SU_N	CONDUIT	15.2	0.5000	0.0110
OR1	SU_S	J2	ORIFICE			
OR2	SU_N	J1	ORIFICE			

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Cross Section Summary
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Conduit	Shape	Full Depth	Full Area	Hyd. Rad.	Max. Width	No. of Barrels	Full Flow
C1	CIRCULAR	0.20	0.03	0.05	0.20	1	0.05
C10	CIRCULAR	0.45	0.16	0.11	0.45	1	0.34
C11	CIRCULAR	0.45	0.16	0.11	0.45	1	0.34
C12	CIRCULAR	0.53	0.22	0.13	0.53	1	0.36
C13	CIRCULAR	0.60	0.28	0.15	0.60	1	0.51
C14	CIRCULAR	0.38	0.11	0.09	0.38	1	0.21
C15	CIRCULAR	0.45	0.16	0.11	0.45	1	0.24
C16	CIRCULAR	0.45	0.16	0.11	0.45	1	0.24
C17	CIRCULAR	0.45	0.16	0.11	0.45	1	0.24
C18	CIRCULAR	0.45	0.16	0.11	0.45	1	0.24
C19	CIRCULAR	0.45	0.16	0.11	0.45	1	0.24
C2	CIRCULAR	0.38	0.11	0.09	0.38	1	0.13
C20	CIRCULAR	0.53	0.22	0.13	0.53	1	0.36
C21	CIRCULAR	0.53	0.22	0.13	0.53	1	0.36
C22	CIRCULAR	0.53	0.22	0.13	0.53	1	0.36
C23	CIRCULAR	0.53	0.22	0.13	0.53	1	0.36

C24	CIRCULAR	0.75	0.44	0.19	0.75	1	0.93
C25	CIRCULAR	0.53	0.22	0.13	0.53	1	0.36
C26	CIRCULAR	0.60	0.28	0.15	0.60	1	0.51
C27	CIRCULAR	0.60	0.28	0.15	0.60	1	0.51
C28	CIRCULAR	0.60	0.28	0.15	0.60	1	0.51
C29	CIRCULAR	0.38	0.11	0.09	0.38	1	0.16
C3	CIRCULAR	0.30	0.07	0.07	0.30	1	0.08
C30	CIRCULAR	0.60	0.28	0.15	0.60	1	0.50
C31	CIRCULAR	0.38	0.11	0.09	0.38	1	0.15
C32	CIRCULAR	0.53	0.22	0.13	0.53	1	0.36
C33	CIRCULAR	0.38	0.11	0.09	0.38	1	0.78
C34	CIRCULAR	0.38	0.11	0.09	0.38	1	0.17
C35	CIRCULAR	0.60	0.28	0.15	0.60	1	0.51
C36	CIRCULAR	0.75	0.44	0.19	0.75	1	0.94
C37	CIRCULAR	0.38	0.11	0.09	0.38	1	0.15
C4	CIRCULAR	0.20	0.03	0.05	0.20	1	0.05
C5	CIRCULAR	0.30	0.07	0.07	0.30	1	0.08
C6	CIRCULAR	0.38	0.11	0.09	0.38	1	0.14
C7	CIRCULAR	0.53	0.22	0.13	0.53	1	0.36
C8	CIRCULAR	0.53	0.22	0.13	0.53	1	0.36
C9	CIRCULAR	0.60	0.28	0.15	0.60	1	0.51

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NOTE: The summary statistics displayed in this report are
based on results found at every computational time step,
not just on results from each reporting time step.
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Analysis Options
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Flow Units ..... CMS
Process Models:
  Rainfall/Runoff ..... YES
  RDII ..... NO
  Snowmelt ..... NO
  Groundwater ..... NO
  Flow Routing ..... YES
  Ponding Allowed ..... NO
  Water Quality ..... NO
Infiltration Method ..... HORTON
Flow Routing Method ..... DYNWAVE
Surcharge Method ..... EXTRAN
Starting Date 12/11/2020 00:00:00
Ending Date 12/21/2020 00:00:00
Antecedent Dry Days 0.0
Report Time Step 00:01:00
Wet Time Step 00:01:00
Dry Time Step 00:01:00
Routing Time Step ..... 1.00 sec
Variable Time Step ..... YES
Maximum Trials 8
Number of Threads 6
Head Tolerance ..... 0.001500 m

Runoff Quantity Continuity	Volume hectare-m	Depth mm
Total Precipitation	0.505	71.677
Evaporation Loss	0.000	0.000
Infiltration Loss	0.017	2.413
Surface Runoff	0.489	69.322
Final Storage	0.000	0.000
Continuity Error (%)	-0.082	

Flow Routing Continuity	Volume hectare-m	Volume 10^6 ltr
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	0.489	4.886
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	0.000	0.000
External Outflow	0.489	4.888
Flooding Loss	0.000	0.000
Evaporation Loss	0.000	0.000
Exfiltration Loss	0.000	0.000
Initial Stored Volume	0.000	0.000
Final Stored Volume	0.000	0.000
Continuity Error (%)	-0.037	

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Time-Step Critical Elements
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Link C33 (3.80%)

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Highest Flow Instability Indexes
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Link C2 (4)
Link OR1 (1)
Link OR2 (1)

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Routing Time Step Summary
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Minimum Time Step : 0.50 sec
Average Time Step : 0.98 sec
Maximum Time Step : 1.00 sec
Percent in Steady State : 0.00
Average Iterations per Step : 2.00
Percent Not Converging : 0.01
Time Step Frequencies :
1.000 - 0.871 sec : 96.49 %
0.871 - 0.758 sec : 0.30 %
0.758 - 0.660 sec : 0.28 %
0.660 - 0.574 sec : 0.66 %
0.574 - 0.500 sec : 2.28 %

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Subcatchment Runoff Summary
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Subcatchment	Total Precip mm	Total Runon mm	Total Evap mm	Total Infil mm	Imperv Runoff mm	Perv Runoff mm	Total Runoff mm	Total Runoff 10^6 ltr	Peak Runoff CMS	Runoff Coeff
Area_1	71.68	0.00	0.00	2.48	64.57	4.70	69.27	0.17	0.12	0.966
Area_10	71.68	0.00	0.00	2.48	64.57	4.70	69.27	0.06	0.04	0.966
Area_101	71.68	0.00	0.00	1.25	68.12	2.34	70.46	0.97	0.65	0.983
Area_102	71.68	0.00	0.00	1.25	68.12	2.34	70.46	0.80	0.53	0.983
Area_11	71.68	0.00	0.00	2.48	64.57	4.70	69.27	0.09	0.06	0.966
Area_12	71.68	0.00	0.00	2.48	64.57	4.70	69.27	0.11	0.08	0.966
Area_13	71.68	0.00	0.00	2.48	64.57	4.70	69.27	0.11	0.08	0.966
Area_14	71.68	0.00	0.00	2.48	64.57	4.70	69.27	0.12	0.08	0.966
Area_15	71.68	0.00	0.00	2.48	64.57	4.70	69.27	0.06	0.04	0.966
Area_16	71.68	0.00	0.00	2.48	64.57	4.70	69.27	0.10	0.07	0.966
Area_17	71.68	0.00	0.00	2.48	64.57	4.70	69.27	0.12	0.08	0.966
Area_18	71.68	0.00	0.00	2.48	64.57	4.70	69.27	0.12	0.08	0.966
Area_19	71.68	0.00	0.00	2.48	64.57	4.70	69.27	0.12	0.08	0.966
Area_2	71.68	0.00	0.00	2.48	64.57	4.70	69.27	0.11	0.08	0.966
Area_20	71.68	0.00	0.00	2.48	64.57	4.70	69.27	0.19	0.14	0.966
Area_2001	71.68	0.00	0.00	20.52	17.93	33.25	51.18	0.04	0.01	0.714
Area_2002	71.68	0.00	0.00	2.53	64.54	4.64	69.18	0.15	0.10	0.965
Area_2003	71.68	0.00	0.00	2.55	64.54	4.62	69.17	0.11	0.08	0.965
Area_2004	71.68	0.00	0.00	24.23	3.59	43.89	47.48	0.01	0.01	0.662
Area_2005	71.68	0.00	0.00	24.23	3.59	43.89	47.48	0.02	0.01	0.662
Area_21	71.68	0.00	0.00	2.48	64.57	4.70	69.27	0.15	0.10	0.966
Area_22	71.68	0.00	0.00	2.48	64.57	4.70	69.27	0.22	0.16	0.966
Area_23	71.68	0.00	0.00	2.48	64.57	4.70	69.27	0.11	0.08	0.966
Area_3	71.68	0.00	0.00	2.48	64.57	4.70	69.27	0.25	0.18	0.966
Area_4	71.68	0.00	0.00	2.48	64.57	4.70	69.27	0.19	0.14	0.966
Area_5	71.68	0.00	0.00	2.48	64.57	4.70	69.27	0.10	0.07	0.966
Area_6	71.68	0.00	0.00	2.48	64.57	4.70	69.27	0.10	0.07	0.966
Area_7	71.68	0.00	0.00	2.48	64.57	4.70	69.27	0.03	0.02	0.966
Area_8	71.68	0.00	0.00	2.48	64.57	4.70	69.27	0.08	0.06	0.966
Area_9	71.68	0.00	0.00	2.48	64.57	4.70	69.27	0.08	0.06	0.966

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Node Depth Summary
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Node	Type	Average Depth Meters	Maximum Depth Meters	Maximum HGL Meters	Time of Max Occurrence days hr:min	Reported Max Depth Meters
CB_10	JUNCTION	0.00	0.16	65.49	0 01:10	0.16
CB_23	JUNCTION	0.00	0.11	66.31	0 01:10	0.11
CB_27	JUNCTION	0.00	0.31	65.80	0 01:10	0.30
CB_28	JUNCTION	0.00	0.39	65.78	0 01:10	0.37
CB_29	JUNCTION	0.01	0.86	64.98	0 01:08	0.60
CB_5	JUNCTION	0.00	0.16	65.28	0 01:10	0.16
CBMH_11	JUNCTION	0.06	1.13	64.71	0 01:52	1.13
CBMH_12	JUNCTION	0.02	1.51	65.57	0 01:03	0.84
CBMH_14	JUNCTION	0.04	1.08	65.19	0 01:32	1.08
CBMH_15	JUNCTION	0.01	1.34	65.81	0 01:16	0.72
CBMH_18	JUNCTION	0.05	1.14	65.19	0 01:32	1.14
CBMH_19	JUNCTION	0.00	0.32	65.19	0 01:33	0.32
CBMH_2	JUNCTION	0.02	0.66	64.72	0 01:53	0.66
CBMH_21	JUNCTION	0.00	0.27	65.44	0 01:10	0.27
CBMH_22	JUNCTION	0.00	0.20	65.73	0 01:10	0.20
CBMH_3	JUNCTION	0.00	0.30	64.71	0 01:53	0.30
CBMH_4	JUNCTION	0.00	0.23	65.00	0 01:10	0.23
CBMH_6	JUNCTION	0.02	0.80	64.71	0 01:52	0.80
CBMH_7	JUNCTION	0.01	0.44	64.71	0 01:50	0.44
CBMH_8	JUNCTION	0.00	0.30	64.93	0 01:10	0.30
CBMH_9	JUNCTION	0.00	0.23	65.22	0 01:10	0.23
DCB_16	JUNCTION	0.00	0.39	65.19	0 01:32	0.39
J1	JUNCTION	0.01	0.18	63.93	0 01:32	0.18

J13	JUNCTION	0.06	1.17	64.71	0	01:52	1.17
J2	JUNCTION	0.01	0.14	63.37	0	01:53	0.14
MH_20	JUNCTION	0.00	0.27	65.26	0	01:10	0.27
MH_24	JUNCTION	0.04	1.06	65.19	0	01:31	1.06
MH_25	JUNCTION	0.02	0.99	65.40	0	01:10	0.98
MH_26	JUNCTION	0.01	1.23	65.78	0	01:10	1.22
MH_27	JUNCTION	0.03	0.82	64.71	0	01:52	0.82
MH_30	JUNCTION	0.04	0.98	64.71	0	01:52	0.98
MH_44	JUNCTION	0.02	0.42	63.93	0	01:32	0.42
MH_45	JUNCTION	0.02	0.26	63.37	0	01:53	0.26
OGS_1	JUNCTION	0.01	0.10	63.14	0	01:53	0.10
OGS_2	JUNCTION	0.01	0.35	63.82	0	01:32	0.35
Humber_Pl	OUTFALL	0.00	0.00	62.48	0	00:00	0.00
OF1	OUTFALL	0.01	0.33	63.74	0	01:32	0.33
OF2	OUTFALL	0.00	0.00	0.00	0	00:00	0.00
SU_N	STORAGE	0.09	1.44	65.19	0	01:32	1.44
SU_S	STORAGE	0.11	1.47	64.71	0	01:53	1.47

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Node Inflow Summary
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Node	Type	Maximum Lateral Inflow CMS	Maximum Total Inflow CMS	Time of Max Occurrence days	hr:min	Lateral Inflow Volume 10^6 ltr	Total Inflow Volume 10^6 ltr	Flow Balance Error Percent
CB_10	JUNCTION	0.064	0.064	0	01:10	0.09	0.09	-0.012
CB_23	JUNCTION	0.039	0.039	0	01:10	0.0554	0.0554	-0.007
CB_27	JUNCTION	0.074	0.074	0	01:10	0.104	0.104	0.357
CB_28	JUNCTION	0.074	0.074	0	01:10	0.104	0.104	0.478
CB_29	JUNCTION	0.079	0.079	0	01:10	0.111	0.111	0.583
CB_5	JUNCTION	0.074	0.074	0	01:10	0.104	0.104	-0.013
CBMH_11	JUNCTION	0.636	0.872	0	01:10	0.942	1.27	0.040
CBMH_12	JUNCTION	0.157	0.157	0	01:10	0.222	0.222	0.322
CBMH_14	JUNCTION	0.123	0.378	0	01:07	0.173	0.53	-0.516
CBMH_15	JUNCTION	0.079	0.258	0	01:09	0.111	0.358	0.361
CBMH_18	JUNCTION	0.138	1.071	0	01:10	0.194	1.62	0.006
CBMH_19	JUNCTION	0.020	0.177	0	01:10	0.0277	0.249	0.857
CBMH_2	JUNCTION	0.084	0.323	0	01:10	0.118	0.458	0.370
CBMH_21	JUNCTION	0.059	0.157	0	01:10	0.0831	0.222	0.067
CBMH_22	JUNCTION	0.059	0.098	0	01:10	0.0831	0.139	0.041
CBMH_3	JUNCTION	0.084	0.241	0	01:10	0.118	0.338	0.207
CBMH_4	JUNCTION	0.084	0.157	0	01:10	0.118	0.222	0.640
CBMH_6	JUNCTION	0.044	0.348	0	01:10	0.0623	0.487	-0.394
CBMH_7	JUNCTION	0.084	0.304	0	01:10	0.118	0.427	0.625
CBMH_8	JUNCTION	0.079	0.221	0	01:10	0.111	0.311	0.562
CBMH_9	JUNCTION	0.079	0.142	0	01:10	0.111	0.201	0.228
DCB_16	JUNCTION	0.177	0.177	0	01:10	0.249	0.249	0.955
J1	JUNCTION	0.000	0.014	0	01:32	0	0.951	-0.005
J13	JUNCTION	0.138	0.802	0	01:08	0.194	1.14	-0.232
J2	JUNCTION	0.000	0.015	0	01:53	0	1.21	-0.004
MH_20	JUNCTION	0.000	0.157	0	01:10	0	0.221	-0.019
MH_24	JUNCTION	0.000	0.940	0	01:10	0	1.42	-0.507
MH_25	JUNCTION	0.000	0.764	0	01:10	0	1.17	0.262
MH_26	JUNCTION	0.646	0.771	0	01:08	0.965	1.17	0.074
MH_27	JUNCTION	0.000	0.080	0	01:08	0	0.11	-0.540
MH_30	JUNCTION	0.000	0.323	0	01:10	0	0.459	-0.800
MH_44	JUNCTION	0.000	0.207	0	01:32	0	2.15	0.012
MH_45	JUNCTION	0.000	0.124	0	01:53	0	2.42	0.000
OGS_1	JUNCTION	0.000	0.124	0	01:53	0	2.42	-0.000
OGS_2	JUNCTION	0.000	0.207	0	01:32	0	2.15	-0.011
Humber_Pl	OUTFALL	0.017	0.127	0	01:50	0.0285	2.45	0.000
OF1	OUTFALL	0.076	0.219	0	01:30	0.111	2.26	0.000
OF2	OUTFALL	0.110	0.110	0	01:10	0.181	0.181	0.000
SU_N	STORAGE	0.000	1.442	0	01:08	0	2.15	-0.100
SU_S	STORAGE	0.000	1.654	0	01:08	0	2.42	-0.085

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Node Surcharge Summary
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Surcharging occurs when water rises above the top of the highest conduit.

Node	Type	Hours Surcharged	Max. Height Above Crown Meters	Min. Depth Below Rim Meters
CB_29	JUNCTION	2.31	0.490	1.562
CBMH_11	JUNCTION	3.90	0.488	1.029
CBMH_12	JUNCTION	2.66	1.140	0.167
CBMH_14	JUNCTION	2.80	0.483	1.131
CBMH_15	JUNCTION	0.87	0.755	0.514
CBMH_18	JUNCTION	2.17	0.389	1.401
CBMH_2	JUNCTION	0.01	0.002	2.281
CBMH_6	JUNCTION	2.15	0.213	1.930
J13	JUNCTION	3.32	0.422	1.931
MH_24	JUNCTION	0.70	0.097	1.439
MH_25	JUNCTION	1.20	0.389	1.636
MH_26	JUNCTION	0.04	0.176	1.477
MH_27	JUNCTION	3.20	0.387	1.199
MH_30	JUNCTION	2.69	0.319	2.099

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Node Flooding Summary
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No nodes were flooded.

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Storage Volume Summary
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Storage Unit	Average Volume 1000 m3	Avg Pcnt Full	Evap Pcnt Loss	Exfil Pcnt Loss	Maximum Volume 1000 m3	Max Pcnt Full	Time of Max Occurrence days hr:min	Maximum Outflow CMS
SU_N	0.067	3	0	0	1.304	50	0 01:32	0.207
SU_S	0.107	3	0	0	1.664	48	0 01:53	0.124

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Outfall Loading Summary
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Outfall Node	Flow Freq Pcnt	Avg Flow CMS	Max Flow CMS	Total Volume 10^6 ltr
Humber_Pl	29.10	0.014	0.127	2.446
OF1	23.64	0.018	0.219	2.261
OF2	4.45	0.008	0.110	0.181
System	19.06	0.040	0.370	4.888

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Link Flow Summary
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Link	Type	Maximum |Flow| CMS	Time of Max Occurrence days hr:min	Maximum |Veloc| m/sec	Max/ Full Flow	Max/ Full Depth
C1	CONDUIT	0.193	0 01:32	6.13	4.07	1.00
C10	CONDUIT	0.079	0 01:11	1.65	0.24	0.94
C11	CONDUIT	0.087	0 01:10	1.66	0.26	0.85
C12	CONDUIT	0.764	0 01:10	3.53	2.13	1.00
C13	CONDUIT	0.935	0 01:10	3.31	1.82	1.00
C14	CONDUIT	0.039	0 01:10	1.45	0.19	0.29
C15	CONDUIT	0.098	0 01:10	1.40	0.41	0.45
C16	CONDUIT	0.157	0 01:10	1.61	0.66	0.59
C17	CONDUIT	0.157	0 01:10	1.60	0.66	0.59
C18	CONDUIT	0.177	0 01:10	1.65	0.74	0.85
C19	CONDUIT	0.064	0 01:10	1.28	0.27	0.35
C2	CONDUIT	0.207	0 01:32	1.90	1.64	0.96
C20	CONDUIT	0.142	0 01:10	1.52	0.40	0.45
C21	CONDUIT	0.221	0 01:10	1.70	0.61	0.58
C22	CONDUIT	0.304	0 01:10	1.86	0.85	0.92
C23	CONDUIT	0.347	0 01:09	1.95	0.96	1.00
C24	CONDUIT	0.800	0 01:07	2.37	0.86	1.00
C25	CONDUIT	0.074	0 01:10	1.31	0.21	0.31
C26	CONDUIT	0.157	0 01:10	1.59	0.31	0.38
C27	CONDUIT	0.240	0 01:10	1.78	0.47	0.74
C28	CONDUIT	0.323	0 01:10	1.91	0.63	1.00
C29	CONDUIT	0.157	0 01:10	1.42	1.00	1.00
C3	CONDUIT	0.014	0 01:33	0.84	0.18	0.63
C30	CONDUIT	0.320	0 01:08	1.73	0.63	1.00
C31	CONDUIT	0.080	0 01:08	0.97	0.55	1.00
C32	CONDUIT	0.872	0 01:10	4.03	2.42	1.00
C33	CONDUIT	0.124	0 01:53	5.15	0.16	0.27
C34	CONDUIT	0.207	0 01:32	1.97	1.21	0.90
C35	CONDUIT	0.764	0 01:10	2.70	1.49	1.00
C36	CONDUIT	1.071	0 01:10	2.67	1.14	1.00
C37	CONDUIT	0.080	0 01:08	1.20	0.55	1.00
C4	CONDUIT	0.110	0 01:53	3.49	2.31	1.00
C5	CONDUIT	0.015	0 01:53	0.82	0.18	0.54
C6	CONDUIT	0.124	0 01:53	1.52	0.86	0.69
C7	CONDUIT	0.179	0 01:09	1.62	0.50	0.88
C8	CONDUIT	0.256	0 01:07	1.77	0.71	1.00
C9	CONDUIT	0.376	0 01:08	1.95	0.73	1.00
OR1	ORIFICE	0.015	0 01:53			1.00
OR2	ORIFICE	0.014	0 01:32			1.00

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Flow Classification Summary
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	Adjusted /Actual	Fraction of Time in Flow Class						
		Up	Down	Sub	Sup	Up	Down	Norm	Inlet

Conduit	Length	Dry	Dry	Dry	Crit	Crit	Crit	Crit	Ltd	Ctrl
C1	1.00	0.97	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00
C10	1.00	0.00	0.00	0.00	0.01	0.00	0.00	0.99	0.00	0.00
C11	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
C12	1.00	0.00	0.00	0.00	0.05	0.00	0.00	0.95	0.01	0.00
C13	1.00	0.00	0.00	0.00	0.10	0.00	0.00	0.90	0.00	0.00
C14	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
C15	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
C16	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.99	0.00	0.00
C17	1.00	0.00	0.00	0.00	0.01	0.00	0.00	0.99	0.00	0.00
C18	1.00	0.00	0.00	0.00	0.03	0.00	0.00	0.97	0.01	0.00
C19	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
C2	1.00	0.00	0.09	0.00	0.77	0.14	0.00	0.00	0.78	0.00
C20	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
C21	1.00	0.00	0.00	0.00	0.02	0.00	0.00	0.98	0.01	0.00
C22	1.00	0.00	0.00	0.00	0.06	0.00	0.00	0.94	0.03	0.00
C23	1.00	0.00	0.00	0.00	0.09	0.00	0.00	0.91	0.03	0.00
C24	1.00	0.00	0.00	0.00	0.13	0.00	0.00	0.87	0.01	0.00
C25	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
C26	1.00	0.00	0.00	0.00	0.02	0.00	0.00	0.98	0.01	0.00
C27	1.00	0.00	0.00	0.00	0.04	0.00	0.00	0.96	0.01	0.00
C28	1.00	0.00	0.00	0.00	0.09	0.00	0.00	0.91	0.04	0.00
C29	1.00	0.00	0.00	0.00	0.09	0.00	0.00	0.91	0.05	0.00
C3	1.00	0.00	0.00	0.00	0.01	0.00	0.00	0.99	0.00	0.00
C30	1.00	0.00	0.00	0.00	0.10	0.00	0.00	0.90	0.01	0.00
C31	1.00	0.00	0.00	0.00	0.08	0.00	0.00	0.92	0.02	0.00
C32	1.00	0.00	0.00	0.00	0.13	0.00	0.00	0.87	0.01	0.00
C33	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
C34	1.00	0.00	0.00	0.00	0.75	0.25	0.00	0.00	0.04	0.00
C35	1.00	0.00	0.00	0.00	0.09	0.00	0.00	0.91	0.03	0.00
C36	1.00	0.00	0.00	0.00	0.11	0.00	0.00	0.89	0.00	0.00
C37	1.00	0.00	0.00	0.00	0.06	0.00	0.00	0.94	0.03	0.00
C4	1.00	0.96	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.00
C5	1.00	0.00	0.00	0.00	0.03	0.00	0.00	0.97	0.00	0.00
C6	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
C7	1.00	0.00	0.00	0.00	0.04	0.00	0.00	0.96	0.02	0.00
C8	1.00	0.00	0.00	0.00	0.09	0.00	0.00	0.91	0.04	0.00
C9	1.00	0.00	0.00	0.00	0.10	0.00	0.00	0.89	0.01	0.00

****
Conduit Surcharge Summary
****

	Hours Full			Hours Above Full	Hours Capacity
Conduit	Both Ends	Upstream	Dnstream	Normal Flow	Limited
C1	2.08	2.16	2.08	2.35	2.08
C10	0.01	0.01	0.07	0.01	0.01
C11	0.01	0.01	0.04	0.01	0.01
C12	0.98	1.01	1.25	0.22	0.18
C13	2.58	2.64	2.76	0.18	0.07
C18	0.01	0.01	0.70	0.01	0.01
C2	0.01	0.69	0.01	1.46	0.01
C22	0.01	0.01	2.15	0.01	0.01
C23	2.46	2.46	3.32	0.01	0.01
C24	3.32	3.32	3.45	0.01	0.01
C27	0.01	0.01	0.01	0.01	0.01
C28	0.99	0.99	2.69	0.01	0.01
C29	2.66	2.66	4.96	0.03	0.03
C30	3.04	3.04	3.32	0.01	0.01
C31	3.58	3.58	3.90	0.01	0.01
C32	6.08	6.11	8.35	0.23	0.18
C34	0.01	0.01	0.01	0.88	0.01
C35	1.13	1.20	2.22	0.15	0.06
C36	2.17	2.17	2.28	0.09	0.01
C37	2.31	2.31	3.20	0.01	0.01
C4	2.89	3.23	2.89	3.45	2.89
C7	0.01	0.01	0.87	0.01	0.01
C8	1.13	1.13	2.95	0.01	0.01
C9	2.80	2.80	3.93	0.01	0.01

Analysis begun on: Wed Oct 5 21:19:30 2022
Analysis ended on: Wed Oct 5 21:20:01 2022

Total elapsed time: 00:00:31

100-yr, 6-hour

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.015)

WARNING 03: negative offset ignored for Link C2
WARNING 03: negative offset ignored for Link C32
WARNING 03: negative offset ignored for Link C34

****
Element Count
****
Number of rain gages 7
Number of subcatchments ... 30
Number of nodes 40
Number of links 39
Number of pollutants 0
Number of land uses 0

****
Raingage Summary
****

Name	Data Source	Data Type	Recording Interval
25mm	25mm	INTENSITY	5 min.
3hr-100yr	3hr-100yr	INTENSITY	10 min.
3hr-2yr	3hr-2yr	INTENSITY	5 min.
3hr-5yr	3hr-5yr	INTENSITY	5 min.
6hr-100yr	6hr-100yr	INTENSITY	10 min.
6hr-2yr	6hr-2yr	INTENSITY	5 min.
6hr-5yr	6hr-5yr	INTENSITY	5 min.

****
Subcatchment Summary
****

Name	Area	Width	%Imperv	%Slope	Rain Gage	Outlet
Area_1	0.25	83.33	90.00	1.0000	6hr-100yr	CBMH_14
Area_10	0.08	26.67	90.00	1.0000	6hr-100yr	CB_23
Area_101	1.37	137.00	95.00	0.5000	6hr-100yr	MH_26
Area_102	1.13	113.00	95.00	0.5000	6hr-100yr	CBMH_11
Area_11	0.13	43.33	90.00	1.0000	6hr-100yr	CB_10
Area_12	0.16	53.33	90.00	1.0000	6hr-100yr	CBMH_9
Area_13	0.16	53.33	90.00	1.0000	6hr-100yr	CBMH_8
Area_14	0.17	56.67	90.00	1.0000	6hr-100yr	CBMH_7
Area_15	0.09	30.00	90.00	1.0000	6hr-100yr	CBMH_6
Area_16	0.15	50.00	90.00	1.0000	6hr-100yr	CB_5
Area_17	0.17	56.67	90.00	1.0000	6hr-100yr	CBMH_4
Area_18	0.17	56.67	90.00	1.0000	6hr-100yr	CBMH_3
Area_19	0.17	56.67	90.00	1.0000	6hr-100yr	CBMH_2
Area_2	0.16	53.33	90.00	1.0000	6hr-100yr	CBMH_15
Area_20	0.28	93.33	90.00	1.0000	6hr-100yr	J13
Area_2001	0.07	7.00	25.00	0.5000	6hr-100yr	OF2
Area_2002	0.21	21.00	90.00	0.5000	6hr-100yr	OF2
Area_2003	0.16	16.00	90.00	1.0000	6hr-100yr	OF1
Area_2004	0.02	13.33	5.00	0.5000	6hr-100yr	Humber_Pl
Area_2005	0.04	26.67	5.00	0.5000	6hr-100yr	Humber_Pl
Area_21	0.21	70.00	90.00	1.0000	6hr-100yr	CBMH_11
Area_22	0.32	106.67	90.00	1.0000	6hr-100yr	CBMH_12
Area_23	0.16	53.33	90.00	1.0000	6hr-100yr	CB_29
Area_3	0.36	120.00	90.00	1.0000	6hr-100yr	DCB_16
Area_4	0.28	93.33	90.00	1.0000	6hr-100yr	CBMH_18
Area_5	0.15	50.00	90.00	1.0000	6hr-100yr	CB_27
Area_6	0.15	50.00	90.00	1.0000	6hr-100yr	CB_28
Area_7	0.04	13.33	90.00	1.0000	6hr-100yr	CBMH_19
Area_8	0.12	40.00	90.00	1.0000	6hr-100yr	CBMH_21
Area_9	0.12	40.00	90.00	1.0000	6hr-100yr	CBMH_22

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Node Summary
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Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
CB_10	JUNCTION	65.33	1.41	10.0	
CB_23	JUNCTION	66.20	0.93	10.0	
CB_27	JUNCTION	65.48	1.34	10.0	
CB_28	JUNCTION	65.39	1.52	10.0	
CB_29	JUNCTION	64.11	2.43	0.0	
CB_5	JUNCTION	65.11	1.63	10.0	
CBMH_11	JUNCTION	63.58	2.16	10.0	
CBMH_12	JUNCTION	64.06	1.68	10.0	
CBMH_14	JUNCTION	64.11	2.21	10.0	
CBMH_15	JUNCTION	64.47	1.85	10.0	
CBMH_18	JUNCTION	64.05	2.54	0.0	
CBMH_19	JUNCTION	64.88	2.38	10.0	
CBMH_2	JUNCTION	64.06	2.94	10.0	
CBMH_21	JUNCTION	65.17	1.87	10.0	
CBMH_22	JUNCTION	65.53	1.51	10.0	
CBMH_3	JUNCTION	64.42	2.58	10.0	

CBMH_4	JUNCTION	64.78	2.22	10.0
CBMH_6	JUNCTION	63.91	2.73	10.0
CBMH_7	JUNCTION	64.27	2.73	10.0
CBMH_8	JUNCTION	64.63	2.37	10.0
CBMH_9	JUNCTION	64.99	2.01	10.0
DCB_16	JUNCTION	64.80	1.52	10.0
J1	JUNCTION	63.75	3.27	0.0
J13	JUNCTION	63.54	3.10	10.0
J2	JUNCTION	63.24	3.33	0.0
MH_20	JUNCTION	64.99	2.30	0.0
MH_24	JUNCTION	64.13	2.50	10.0
MH_25	JUNCTION	64.42	2.63	0.0
MH_26	JUNCTION	64.56	2.70	0.0
MH_27	JUNCTION	63.89	2.02	0.0
MH_30	JUNCTION	63.73	3.08	0.0
MH_44	JUNCTION	63.51	3.51	0.0
MH_45	JUNCTION	63.11	3.46	0.0
OGS_1	JUNCTION	63.04	3.34	0.0
OGS_2	JUNCTION	63.47	3.01	0.0
Humber_Pl	OUTFALL	62.48	0.38	0.0
OF1	OUTFALL	63.41	0.38	0.0
OF2	OUTFALL	0.00	0.00	0.0
SU_N	STORAGE	63.75	3.04	0.0
SU_S	STORAGE	63.24	3.33	0.0

****
Link Summary
****

Name	From Node	To Node	Type	Length	%Slope	Roughness
C1	SU_N	MH_44	CONDUIT	2.5	1.0001	0.0090
C10	CB_28	MH_26	CONDUIT	30.4	1.0001	0.0110
C11	CB_27	MH_26	CONDUIT	32.8	1.0001	0.0110
C12	MH_26	MH_25	CONDUIT	16.5	0.4970	0.0110
C13	MH_24	CBMH_18	CONDUIT	4.8	0.5000	0.0110
C14	CB_23	CBMH_22	CONDUIT	51.5	1.0001	0.0110
C15	CBMH_22	CBMH_21	CONDUIT	60.0	0.5000	0.0110
C16	CBMH_21	MH_20	CONDUIT	24.5	0.5020	0.0110
C17	MH_20	CBMH_19	CONDUIT	10.4	0.5000	0.0110
C18	CBMH_19	MH_24	CONDUIT	46.5	0.5011	0.0110
C19	CB_10	CBMH_9	CONDUIT	52.5	0.4991	0.0110
C2	MH_44	OGS_2	CONDUIT	11.6	0.3707	0.0110
C20	CBMH_9	CBMH_8	CONDUIT	60.0	0.5000	0.0110
C21	CBMH_8	CBMH_7	CONDUIT	60.0	0.5000	0.0110
C22	CBMH_7	CBMH_6	CONDUIT	60.0	0.5000	0.0110
C23	CBMH_6	J13	CONDUIT	29.9	0.5017	0.0110
C24	J13	SU_S	CONDUIT	4.0	0.5000	0.0110
C25	CB_5	CBMH_4	CONDUIT	52.5	0.4991	0.0110
C26	CBMH_4	CBMH_3	CONDUIT	60.0	0.5000	0.0110
C27	CBMH_3	CBMH_2	CONDUIT	60.0	0.5000	0.0110
C28	CBMH_2	MH_30	CONDUIT	53.4	0.4963	0.0110
C29	CBMH_12	CBMH_11	CONDUIT	50.0	0.5700	0.0110
C3	J1	MH_44	CONDUIT	2.5	0.4800	0.0110
C30	MH_30	J13	CONDUIT	9.3	0.4839	0.0110
C31	MH_27	CBMH_11	CONDUIT	8.2	0.5000	0.0110
C32	CBMH_11	SU_S	CONDUIT	13.2	0.5000	0.0110
C33	OGS_1	Humber_Pl	CONDUIT	4.0	14.1135	0.0110
C34	OGS_2	OF1	CONDUIT	8.7	0.6782	0.0110
C35	MH_25	MH_24	CONDUIT	44.2	0.5000	0.0110
C36	CBMH_18	SU_N	CONDUIT	3.9	0.5128	0.0110
C37	CB_29	MH_27	CONDUIT	32.9	0.4985	0.0110
C4	SU_S	MH_45	CONDUIT	9.4	1.0001	0.0090
C5	J2	MH_45	CONDUIT	9.4	0.5000	0.0110
C6	MH_45	OGS_1	CONDUIT	3.1	0.4839	0.0110
C7	DCB_16	CBMH_15	CONDUIT	54.4	0.5000	0.0110
C8	CBMH_15	CBMH_14	CONDUIT	60.0	0.5000	0.0110
C9	CBMH_14	SU_N	CONDUIT	15.2	0.5000	0.0110
OR1	SU_S	J2	ORIFICE			
OR2	SU_N	J1	ORIFICE			

****
Cross Section Summary
****

Conduit	Shape	Full Depth	Full Area	Hyd. Rad.	Max. Width	No. of Barrels	Full Flow
C1	CIRCULAR	0.20	0.03	0.05	0.20	1	0.05
C10	CIRCULAR	0.45	0.16	0.11	0.45	1	0.34
C11	CIRCULAR	0.45	0.16	0.11	0.45	1	0.34
C12	CIRCULAR	0.53	0.22	0.13	0.53	1	0.36
C13	CIRCULAR	0.60	0.28	0.15	0.60	1	0.51
C14	CIRCULAR	0.38	0.11	0.09	0.38	1	0.21
C15	CIRCULAR	0.45	0.16	0.11	0.45	1	0.24
C16	CIRCULAR	0.45	0.16	0.11	0.45	1	0.24
C17	CIRCULAR	0.45	0.16	0.11	0.45	1	0.24
C18	CIRCULAR	0.45	0.16	0.11	0.45	1	0.24
C19	CIRCULAR	0.45	0.16	0.11	0.45	1	0.24
C2	CIRCULAR	0.38	0.11	0.09	0.38	1	0.13
C20	CIRCULAR	0.53	0.22	0.13	0.53	1	0.36
C21	CIRCULAR	0.53	0.22	0.13	0.53	1	0.36
C22	CIRCULAR	0.53	0.22	0.13	0.53	1	0.36
C23	CIRCULAR	0.53	0.22	0.13	0.53	1	0.36
C24	CIRCULAR	0.75	0.44	0.19	0.75	1	0.93

C25	CIRCULAR	0.53	0.22	0.13	0.53	1	0.36
C26	CIRCULAR	0.60	0.28	0.15	0.60	1	0.51
C27	CIRCULAR	0.60	0.28	0.15	0.60	1	0.51
C28	CIRCULAR	0.60	0.28	0.15	0.60	1	0.51
C29	CIRCULAR	0.38	0.11	0.09	0.38	1	0.16
C3	CIRCULAR	0.30	0.07	0.07	0.30	1	0.08
C30	CIRCULAR	0.60	0.28	0.15	0.60	1	0.50
C31	CIRCULAR	0.38	0.11	0.09	0.38	1	0.15
C32	CIRCULAR	0.53	0.22	0.13	0.53	1	0.36
C33	CIRCULAR	0.38	0.11	0.09	0.38	1	0.78
C34	CIRCULAR	0.38	0.11	0.09	0.38	1	0.17
C35	CIRCULAR	0.60	0.28	0.15	0.60	1	0.51
C36	CIRCULAR	0.75	0.44	0.19	0.75	1	0.94
C37	CIRCULAR	0.38	0.11	0.09	0.38	1	0.15
C4	CIRCULAR	0.20	0.03	0.05	0.20	1	0.05
C5	CIRCULAR	0.30	0.07	0.07	0.30	1	0.08
C6	CIRCULAR	0.38	0.11	0.09	0.38	1	0.14
C7	CIRCULAR	0.53	0.22	0.13	0.53	1	0.36
C8	CIRCULAR	0.53	0.22	0.13	0.53	1	0.36
C9	CIRCULAR	0.60	0.28	0.15	0.60	1	0.51

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

****
Analysis Options
****
Flow Units ..... CMS
Process Models:
  Rainfall/Runoff ..... YES
  RDII ..... NO
  Snowmelt ..... NO
  Groundwater ..... NO
  Flow Routing ..... YES
  Ponding Allowed ..... NO
  Water Quality ..... NO
Infiltration Method ..... HORTON
Flow Routing Method ..... DYNWAVE
Surcharge Method ..... EXTRAN
Starting Date 12/11/2020 00:00:00
Ending Date 12/21/2020 00:00:00
Antecedent Dry Days 0.0
Report Time Step 00:01:00
Wet Time Step 00:01:00
Dry Time Step 00:01:00
Routing Time Step ..... 1.00 sec
Variable Time Step ..... YES
Maximum Trials 8
Number of Threads 6
Head Tolerance ..... 0.001500 m

Runoff Quantity Continuity	Volume hectare-m	Depth mm
Total Precipitation	0.580	82.325
Evaporation Loss	0.000	0.000
Infiltration Loss	0.018	2.506
Surface Runoff	0.563	79.876
Final Storage	0.000	0.000
Continuity Error (%)	-0.069	

Flow Routing Continuity	Volume hectare-m	Volume 10^6 ltr
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	0.563	5.630
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	0.000	0.000
External Outflow	0.563	5.633
Flooding Loss	0.000	0.000
Evaporation Loss	0.000	0.000
Exfiltration Loss	0.000	0.000
Initial Stored Volume	0.000	0.000
Final Stored Volume	0.000	0.000
Continuity Error (%)	-0.048	

****
Time-Step Critical Elements
****
Link C33 (4.38%)

****
Highest Flow Instability Indexes
****
Link C2 (5)

Link OR2 (1)
Link OR1 (1)

****
Routing Time Step Summary
****
Minimum Time Step : 0.50 sec
Average Time Step : 0.98 sec
Maximum Time Step : 1.00 sec
Percent in Steady State : -0.00
Average Iterations per Step : 2.00
Percent Not Converging : 0.01
Time Step Frequencies :
1.000 - 0.871 sec : 95.79 %
0.871 - 0.758 sec : 0.30 %
0.758 - 0.660 sec : 0.29 %
0.660 - 0.574 sec : 0.83 %
0.574 - 0.500 sec : 2.79 %

****
Subcatchment Runoff Summary
****

Subcatchment	Total Precip mm	Total Runon mm	Total Evap mm	Total Infil mm	Imperv Runoff mm	Perv Runoff mm	Total Runoff mm	Total Runoff 10^6 ltr	Peak Runoff CMS	Runoff Coeff
Area_1	82.33	0.00	0.00	2.58	74.16	5.66	79.82	0.20	0.12	0.970
Area_10	82.32	0.00	0.00	2.58	74.16	5.66	79.82	0.06	0.04	0.970
Area_101	82.32	0.00	0.00	1.30	78.24	2.82	81.06	1.11	0.65	0.985
Area_102	82.32	0.00	0.00	1.30	78.24	2.82	81.06	0.92	0.53	0.985
Area_11	82.33	0.00	0.00	2.58	74.16	5.66	79.82	0.10	0.06	0.970
Area_12	82.32	0.00	0.00	2.58	74.16	5.66	79.82	0.13	0.08	0.970
Area_13	82.32	0.00	0.00	2.58	74.16	5.66	79.82	0.13	0.08	0.970
Area_14	82.32	0.00	0.00	2.58	74.16	5.66	79.82	0.14	0.08	0.970
Area_15	82.33	0.00	0.00	2.58	74.16	5.66	79.82	0.07	0.04	0.970
Area_16	82.33	0.00	0.00	2.58	74.16	5.66	79.82	0.12	0.07	0.970
Area_17	82.32	0.00	0.00	2.58	74.16	5.66	79.82	0.14	0.08	0.970
Area_18	82.32	0.00	0.00	2.58	74.16	5.66	79.82	0.14	0.08	0.970
Area_19	82.32	0.00	0.00	2.58	74.16	5.66	79.82	0.14	0.08	0.970
Area_2	82.32	0.00	0.00	2.58	74.16	5.66	79.82	0.13	0.08	0.970
Area_20	82.33	0.00	0.00	2.58	74.16	5.66	79.82	0.22	0.14	0.970
Area_2001	82.33	0.00	0.00	21.03	20.60	40.72	61.31	0.04	0.01	0.745
Area_2002	82.33	0.00	0.00	2.63	74.12	5.61	79.73	0.17	0.10	0.969
Area_2003	82.32	0.00	0.00	2.65	74.13	5.59	79.72	0.13	0.08	0.968
Area_2004	82.32	0.00	0.00	25.10	4.12	53.14	57.25	0.01	0.01	0.695
Area_2005	82.32	0.00	0.00	25.10	4.12	53.14	57.25	0.02	0.01	0.695
Area_21	82.33	0.00	0.00	2.58	74.16	5.66	79.82	0.17	0.10	0.970
Area_22	82.32	0.00	0.00	2.58	74.16	5.66	79.82	0.26	0.16	0.970
Area_23	82.32	0.00	0.00	2.58	74.16	5.66	79.82	0.13	0.08	0.970
Area_3	82.33	0.00	0.00	2.58	74.16	5.66	79.82	0.29	0.18	0.970
Area_4	82.33	0.00	0.00	2.58	74.16	5.66	79.82	0.22	0.14	0.970
Area_5	82.33	0.00	0.00	2.58	74.16	5.66	79.82	0.12	0.07	0.970
Area_6	82.33	0.00	0.00	2.58	74.16	5.66	79.82	0.12	0.07	0.970
Area_7	82.32	0.00	0.00	2.58	74.16	5.66	79.82	0.03	0.02	0.970
Area_8	82.33	0.00	0.00	2.58	74.16	5.66	79.82	0.10	0.06	0.970
Area_9	82.33	0.00	0.00	2.58	74.16	5.66	79.82	0.10	0.06	0.970

****
Node Depth Summary
****

Node	Type	Average Depth Meters	Maximum Depth Meters	Maximum HGL Meters	Time of Max Occurrence days hr:min	Reported Max Depth Meters
CB_10	JUNCTION	0.00	0.16	65.49	0 02:10	0.16
CB_23	JUNCTION	0.00	0.11	66.31	0 02:10	0.11
CB_27	JUNCTION	0.00	0.48	65.96	0 02:10	0.45
CB_28	JUNCTION	0.00	1.39	66.77	0 02:09	0.54
CB_29	JUNCTION	0.02	0.93	65.04	0 02:07	0.67
CB_5	JUNCTION	0.00	0.16	65.28	0 02:10	0.16
CBMH_11	JUNCTION	0.06	1.20	64.78	0 02:50	1.20
CBMH_12	JUNCTION	0.02	1.45	65.50	0 02:03	0.93
CBMH_14	JUNCTION	0.05	1.15	65.26	0 02:32	1.15
CBMH_15	JUNCTION	0.02	1.57	66.04	0 02:13	0.80
CBMH_18	JUNCTION	0.05	1.21	65.26	0 02:31	1.21
CBMH_19	JUNCTION	0.00	0.39	65.26	0 02:30	0.39
CBMH_2	JUNCTION	0.02	0.73	64.78	0 02:50	0.72
CBMH_21	JUNCTION	0.00	0.27	65.44	0 02:10	0.27
CBMH_22	JUNCTION	0.00	0.20	65.73	0 02:10	0.20
CBMH_3	JUNCTION	0.01	0.37	64.78	0 02:50	0.36
CBMH_4	JUNCTION	0.00	0.23	65.01	0 02:10	0.23
CBMH_6	JUNCTION	0.03	0.87	64.78	0 02:50	0.87
CBMH_7	JUNCTION	0.01	0.51	64.78	0 02:50	0.51
CBMH_8	JUNCTION	0.00	0.30	64.93	0 02:10	0.30
CBMH_9	JUNCTION	0.00	0.23	65.22	0 02:10	0.23
DCB_16	JUNCTION	0.01	0.47	65.27	0 02:29	0.47
J1	JUNCTION	0.01	0.24	63.99	0 02:31	0.24
J13	JUNCTION	0.07	1.24	64.78	0 02:51	1.24

J2	JUNCTION	0.02	0.15	63.38	0	02:51	0.15
MH_20	JUNCTION	0.00	0.27	65.26	0	02:30	0.27
MH_24	JUNCTION	0.04	1.13	65.26	0	02:31	1.13
MH_25	JUNCTION	0.02	1.26	65.67	0	02:09	1.10
MH_26	JUNCTION	0.01	1.59	66.15	0	02:09	1.35
MH_27	JUNCTION	0.03	0.89	64.78	0	02:50	0.89
MH_30	JUNCTION	0.04	1.05	64.78	0	02:50	1.05
MH_44	JUNCTION	0.02	0.47	63.99	0	02:31	0.47
MH_45	JUNCTION	0.02	0.27	63.38	0	02:51	0.27
OGS_1	JUNCTION	0.01	0.10	63.14	0	02:51	0.10
OGS_2	JUNCTION	0.02	0.38	63.85	0	02:31	0.38
Humber_Pl	OUTFALL	0.00	0.00	62.48	0	00:00	0.00
OF1	OUTFALL	0.01	0.34	63.75	0	02:31	0.34
OF2	OUTFALL	0.00	0.00	0.00	0	00:00	0.00
SU_N	STORAGE	0.10	1.51	65.26	0	02:31	1.51
SU_S	STORAGE	0.12	1.54	64.78	0	02:51	1.54

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Node Inflow Summary
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Node	Type	Maximum Lateral Inflow CMS	Maximum Total Inflow CMS	Time of Max Occurrence days hr:min	Lateral Inflow Volume 10^6 ltr	Total Inflow Volume 10^6 ltr	Flow Balance Error Percent
CB_10	JUNCTION	0.064	0.064	0 02:10	0.104	0.104	-0.010
CB_23	JUNCTION	0.039	0.039	0 02:10	0.0638	0.0638	-0.006
CB_27	JUNCTION	0.074	0.074	0 02:10	0.12	0.12	0.440
CB_28	JUNCTION	0.074	0.074	0 02:10	0.12	0.12	0.379
CB_29	JUNCTION	0.079	0.079	0 02:10	0.128	0.128	0.499
CB_5	JUNCTION	0.074	0.074	0 02:10	0.12	0.12	-0.011
CBMH_11	JUNCTION	0.637	0.874	0 02:10	1.08	1.47	0.034
CBMH_12	JUNCTION	0.158	0.158	0 02:10	0.255	0.255	0.284
CBMH_14	JUNCTION	0.123	0.377	0 02:06	0.2	0.612	-0.406
CBMH_15	JUNCTION	0.079	0.258	0 02:08	0.128	0.413	-0.081
CBMH_18	JUNCTION	0.138	1.080	0 02:10	0.223	1.86	0.005
CBMH_19	JUNCTION	0.020	0.177	0 02:10	0.0319	0.287	0.775
CBMH_2	JUNCTION	0.084	0.325	0 02:10	0.136	0.523	0.118
CBMH_21	JUNCTION	0.059	0.158	0 02:10	0.0958	0.255	0.120
CBMH_22	JUNCTION	0.059	0.099	0 02:10	0.0958	0.16	0.027
CBMH_3	JUNCTION	0.084	0.241	0 02:10	0.136	0.39	0.533
CBMH_4	JUNCTION	0.084	0.158	0 02:10	0.136	0.255	0.562
CBMH_6	JUNCTION	0.044	0.349	0 02:10	0.0718	0.562	-0.377
CBMH_7	JUNCTION	0.084	0.305	0 02:10	0.136	0.493	0.562
CBMH_8	JUNCTION	0.079	0.222	0 02:10	0.128	0.358	0.432
CBMH_9	JUNCTION	0.079	0.143	0 02:10	0.128	0.231	0.306
DCB_16	JUNCTION	0.177	0.177	0 02:10	0.287	0.287	0.838
J1	JUNCTION	0.000	0.014	0 02:23	0	1.02	-0.004
J13	JUNCTION	0.138	0.801	0 02:07	0.223	1.31	-0.203
J2	JUNCTION	0.000	0.015	0 02:51	0	1.28	-0.003
MH_20	JUNCTION	0.000	0.158	0 02:10	0	0.255	-0.069
MH_24	JUNCTION	0.000	0.963	0 02:10	0	1.63	-0.450
MH_25	JUNCTION	0.000	0.787	0 02:10	0	1.35	0.228
MH_26	JUNCTION	0.647	0.787	0 02:10	1.11	1.35	0.049
MH_27	JUNCTION	0.000	0.080	0 02:07	0	0.127	-0.483
MH_30	JUNCTION	0.000	0.327	0 02:09	0	0.523	-0.712
MH_44	JUNCTION	0.000	0.223	0 02:31	0	2.48	0.011
MH_45	JUNCTION	0.000	0.132	0 02:51	0	2.78	0.000
OGS_1	JUNCTION	0.000	0.132	0 02:51	0	2.78	-0.000
OGS_2	JUNCTION	0.000	0.223	0 02:31	0	2.48	-0.009
Humber_Pl	OUTFALL	0.019	0.135	0 02:44	0.0344	2.82	0.000
OF1	OUTFALL	0.077	0.236	0 02:30	0.128	2.6	0.000
OF2	OUTFALL	0.111	0.111	0 02:10	0.21	0.21	0.000
SU_N	STORAGE	0.000	1.428	0 02:10	0	2.48	-0.069
SU_S	STORAGE	0.000	1.642	0 02:09	0	2.78	-0.074

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Node Surcharge Summary
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Surcharging occurs when water rises above the top of the highest conduit.

Node	Type	Hours Surcharged	Max. Height Above Crown Meters	Min. Depth Below Rim Meters
CB_27	JUNCTION	0.01	0.027	0.868
CB_28	JUNCTION	0.02	0.938	0.136
CB_29	JUNCTION	2.73	0.554	1.498
CBMH_11	JUNCTION	4.80	0.560	0.957
CBMH_12	JUNCTION	3.15	1.070	0.237
CBMH_14	JUNCTION	3.66	0.553	1.061
CBMH_15	JUNCTION	1.04	0.987	0.282
CBMH_18	JUNCTION	2.32	0.459	1.331
CBMH_2	JUNCTION	1.01	0.065	2.218
CBMH_6	JUNCTION	2.56	0.285	1.858
J13	JUNCTION	4.22	0.493	1.860
MH_24	JUNCTION	0.90	0.167	1.369
MH_25	JUNCTION	1.31	0.660	1.365
MH_26	JUNCTION	0.05	0.545	1.108
MH_27	JUNCTION	4.00	0.459	1.127

MH_30	JUNCTION	3.32	0.389	2.029
OGS_2	JUNCTION	0.31	0.007	2.629

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Node Flooding Summary
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No nodes were flooded.

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Storage Volume Summary
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Storage Unit	Average Volume 1000 m3	Avg Pcnt Full	Evap Pcnt Loss	Exfil Pcnt Loss	Maximum Volume 1000 m3	Max Pcnt Full	Time of Max Occurrence days hr:min	Maximum Outflow CMS
SU_N	0.075	3	0	0	1.371	53	0 02:31	0.223
SU_S	0.118	3	0	0	1.748	51	0 02:51	0.132

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Outfall Loading Summary
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Outfall Node	Flow Freq Pcnt	Avg Flow CMS	Max Flow CMS	Total Volume 10^6 ltr
Humber_Pl	30.07	0.017	0.135	2.818
OF1	24.82	0.020	0.236	2.605
OF2	5.74	0.007	0.111	0.210
System	20.21	0.043	0.402	5.633

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Link Flow Summary
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Link	Type	Maximum |Flow| CMS	Time of Max Occurrence days hr:min	Maximum |Veloc| m/sec	Max/ Full Flow	Max/ Full Depth
C1	CONDUIT	0.208	0 02:31	6.63	4.40	1.00
C10	CONDUIT	0.078	0 02:09	1.66	0.23	1.00
C11	CONDUIT	0.091	0 02:10	1.67	0.27	1.00
C12	CONDUIT	0.787	0 02:10	3.63	2.20	1.00
C13	CONDUIT	0.947	0 02:10	3.35	1.85	1.00
C14	CONDUIT	0.039	0 02:10	1.45	0.19	0.30
C15	CONDUIT	0.099	0 02:10	1.40	0.41	0.45
C16	CONDUIT	0.158	0 02:10	1.61	0.66	0.59
C17	CONDUIT	0.158	0 02:10	1.60	0.66	0.67
C18	CONDUIT	0.177	0 02:09	1.64	0.74	0.93
C19	CONDUIT	0.064	0 02:10	1.28	0.27	0.35
C2	CONDUIT	0.223	0 02:31	2.02	1.76	1.00
C20	CONDUIT	0.143	0 02:10	1.52	0.40	0.45
C21	CONDUIT	0.221	0 02:10	1.70	0.62	0.59
C22	CONDUIT	0.305	0 02:10	1.86	0.85	0.99
C23	CONDUIT	0.347	0 02:07	1.95	0.96	1.00
C24	CONDUIT	0.797	0 02:07	2.36	0.86	1.00
C25	CONDUIT	0.074	0 02:10	1.31	0.21	0.31
C26	CONDUIT	0.158	0 02:10	1.59	0.31	0.38
C27	CONDUIT	0.241	0 02:10	1.78	0.47	0.80
C28	CONDUIT	0.327	0 02:09	1.91	0.64	1.00
C29	CONDUIT	0.158	0 02:10	1.43	1.01	1.00
C3	CONDUIT	0.015	0 02:43	0.84	0.19	0.81
C30	CONDUIT	0.319	0 02:07	1.73	0.63	1.00
C31	CONDUIT	0.080	0 02:07	0.97	0.55	1.00
C32	CONDUIT	0.874	0 02:10	4.04	2.43	1.00
C33	CONDUIT	0.132	0 02:51	5.24	0.17	0.28
C34	CONDUIT	0.223	0 02:31	2.06	1.30	0.95
C35	CONDUIT	0.787	0 02:10	2.78	1.53	1.00
C36	CONDUIT	1.079	0 02:10	2.63	1.15	1.00
C37	CONDUIT	0.080	0 02:07	1.20	0.55	1.00
C4	CONDUIT	0.117	0 02:51	3.73	2.47	1.00
C5	CONDUIT	0.015	0 02:52	0.82	0.19	0.57
C6	CONDUIT	0.132	0 02:51	1.56	0.92	0.72
C7	CONDUIT	0.180	0 02:08	1.62	0.50	0.95
C8	CONDUIT	0.255	0 02:06	1.73	0.71	1.00
C9	CONDUIT	0.366	0 02:07	1.89	0.71	1.00
OR1	ORIFICE	0.015	0 02:51			1.00
OR2	ORIFICE	0.014	0 02:23			1.00

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Flow Classification Summary
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Conduit	Adjusted /Actual Length	Fraction of Time in Flow Class: Dry	Up Dry	Down Dry	Sub Crit	Sup Crit	Up Crit	Down Crit	Norm Ltd	Inlet Ctrl
C1	1.00	0.96	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.00
C10	1.00	0.00	0.00	0.00	0.01	0.00	0.00	0.99	0.00	0.00
C11	1.00	0.00	0.00	0.00	0.01	0.00	0.00	0.99	0.00	0.00
C12	1.00	0.00	0.00	0.00	0.06	0.00	0.00	0.94	0.01	0.00
C13	1.00	0.00	0.00	0.00	0.10	0.00	0.00	0.89	0.00	0.00
C14	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
C15	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
C16	1.00	0.00	0.00	0.00	0.01	0.00	0.00	0.99	0.00	0.00
C17	1.00	0.00	0.00	0.00	0.01	0.00	0.00	0.99	0.00	0.00
C18	1.00	0.00	0.00	0.00	0.04	0.00	0.00	0.96	0.01	0.00
C19	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
C2	1.00	0.00	0.09	0.00	0.76	0.15	0.00	0.00	0.77	0.00
C20	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.99	0.00	0.00
C21	1.00	0.00	0.00	0.00	0.03	0.00	0.00	0.97	0.01	0.00
C22	1.00	0.00	0.00	0.00	0.07	0.00	0.00	0.93	0.03	0.00
C23	1.00	0.00	0.00	0.00	0.10	0.00	0.00	0.90	0.03	0.00
C24	1.00	0.00	0.00	0.00	0.14	0.00	0.00	0.86	0.01	0.00
C25	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
C26	1.00	0.00	0.00	0.00	0.02	0.00	0.00	0.98	0.01	0.00
C27	1.00	0.00	0.00	0.00	0.04	0.00	0.00	0.95	0.02	0.00
C28	1.00	0.00	0.00	0.00	0.09	0.00	0.00	0.91	0.04	0.00
C29	1.00	0.00	0.00	0.00	0.10	0.00	0.00	0.90	0.05	0.00
C3	1.00	0.00	0.00	0.00	0.01	0.00	0.00	0.99	0.00	0.00
C30	1.00	0.00	0.00	0.00	0.11	0.00	0.00	0.89	0.01	0.00
C31	1.00	0.00	0.00	0.00	0.08	0.00	0.00	0.91	0.02	0.00
C32	1.00	0.00	0.00	0.00	0.14	0.00	0.00	0.86	0.01	0.00
C33	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
C34	1.00	0.00	0.00	0.00	0.74	0.26	0.00	0.00	0.05	0.00
C35	1.00	0.00	0.00	0.00	0.09	0.00	0.00	0.91	0.03	0.00
C36	1.00	0.00	0.00	0.00	0.12	0.00	0.00	0.88	0.00	0.00
C37	1.00	0.00	0.00	0.00	0.07	0.00	0.00	0.93	0.03	0.00
C4	1.00	0.95	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.00
C5	1.00	0.00	0.00	0.00	0.03	0.00	0.00	0.96	0.00	0.00
C6	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
C7	1.00	0.00	0.00	0.00	0.05	0.00	0.00	0.95	0.03	0.00
C8	1.00	0.00	0.00	0.00	0.10	0.00	0.00	0.90	0.04	0.00
C9	1.00	0.00	0.00	0.00	0.11	0.00	0.00	0.88	0.01	0.00

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Conduit Surcharge Summary
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Conduit	Hours Full: Both Ends	Upstream	Dnstream	Hours Above Full Normal Flow	Hours Capacity Limited
C1	2.19	2.32	2.19	2.65	2.19
C10	0.02	0.02	0.08	0.01	0.01
C11	0.01	0.01	0.05	0.01	0.01
C12	1.11	1.14	1.36	0.23	0.18
C13	3.13	3.17	3.56	0.18	0.09
C18	0.01	0.01	0.90	0.01	0.01
C2	0.30	0.89	0.30	1.57	0.30
C22	0.01	0.01	2.56	0.01	0.01
C23	3.01	3.01	4.22	0.01	0.01
C24	4.22	4.22	4.36	0.01	0.01
C27	0.01	0.01	1.01	0.01	0.01
C28	1.48	1.48	3.32	0.01	0.01
C29	3.15	3.15	5.89	0.05	0.05
C30	3.84	3.84	4.22	0.01	0.01
C31	4.48	4.48	4.80	0.01	0.01
C32	7.02	7.05	9.30	0.23	0.19
C34	0.01	0.30	0.01	1.05	0.01
C35	1.25	1.31	2.40	0.15	0.07
C36	2.32	2.32	2.53	0.10	0.03
C37	2.73	2.73	4.00	0.01	0.01
C4	3.60	4.12	3.60	4.36	3.60
C7	0.01	0.01	1.04	0.01	0.01
C8	1.29	1.29	4.08	0.01	0.01
C9	3.65	3.65	5.22	0.01	0.01

Analysis begun on: Wed Oct 5 21:20:59 2022
Analysis ended on: Wed Oct 5 21:21:30 2022
Total elapsed time: 00:00:31

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