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39 Years

SORTATION FACILITY

99 Bill Leathem Drive, 2 & 20 Leikin Drive

OTTAWA, ONTARIO

Servicing and Stormwater Management Report

SORTATION FACILITY

99 Bill Leathem Drive, 2 & 20 Leikin Drive
OTTAWA, ONTARIO

SERVICING AND STORMWATER MANAGEMENT REPORT

Prepared By:

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Issued: May 28, 2021

Revised: August 6, 2021

Novatech File: 121137
Report Ref: R-2021-076

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August 6, 2021

City of Ottawa
Planning Infrastructure and Economic Development Department
110 Laurier Avenue West, 4th Floor
Ottawa, ON
K1P 1J1

Attention: **Cameron Hodgins**

Reference: **99 Bill Leathem Drive, 2 & 20 Leikin Drive, Ottawa**
Servicing and Stormwater Management Report
Novatech File No.: 121137

Please find enclosed the 'Servicing and Stormwater Management Report' for the above noted project. This report has been revised per City of Ottawa comments and is submitted for approval.

Should you have any questions or comments, please do not hesitate to contact us.

Sincerely,

NOVATECH

Matt Hrehoriak, P.Eng.

Project Engineer| Land Development Engineering

cc:

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- Drawings (pdf)
- PCSWMM Packaged Model Files

1.0 INTRODUCTION

Novatech has been retained to prepare a Servicing and Stormwater Management Report for the proposed development located at 99 Bill Leathem Drive, 2 & 20 Leikin Drive within the South Merivale Business Park Development (SMBP) in the City of Ottawa. This report will support a Site Plan Application for the proposed development. **Figure 1** is a Key Plan showing the site location.

This report outlines the site sanitary, water servicing, along with the proposed storm drainage and stormwater management strategy for the proposed development.

1.1 Existing Conditions

The property is approximately 30.6 hectares in size, and currently consists of undeveloped vacant land, and cultivated farm field. The property can be accessed from Bill Leathem Drive, Paragon Avenue, and Leikin Drive. There are existing easements containing a sanitary trunk sewer and overhead hydro lines that cross through the property in an east west orientation.

The property is bound by agricultural lands that are part of the City of Ottawa Greenbelt to the north and west and by the remainder of the South Merivale Business Park to the south and east including Leikin Drive, Paragon Avenue, Bill Leathem Drive, a 3-storey office building and vacant parcels. ***Figure 2*** shows the existing site conditions.

In 1992 the City of Nepean prepared a Development Plan (R-Plan by Farley, Smith & Murray Surveying Ltd.) for the South Merivale Business Park. However, this plan did not include a connection to Woodroffe Avenue via Longfields Drive. In 2009/2010 a connection between Woodroffe Avenue to Bill Leatham Drive was designed and constructed to provide westerly connectivity from the South Merivale Business Park. A contemplated draft plan was developed which revised the alignment of the future section of Bill Leatham Drive from Longfields Drive to Leikin Drive but was never deposited. In early 2021, the City of Ottawa removed the requirement for a connection from Bill Leatham Drive to Leikin Drive by returning unopened road allowances to the owners.

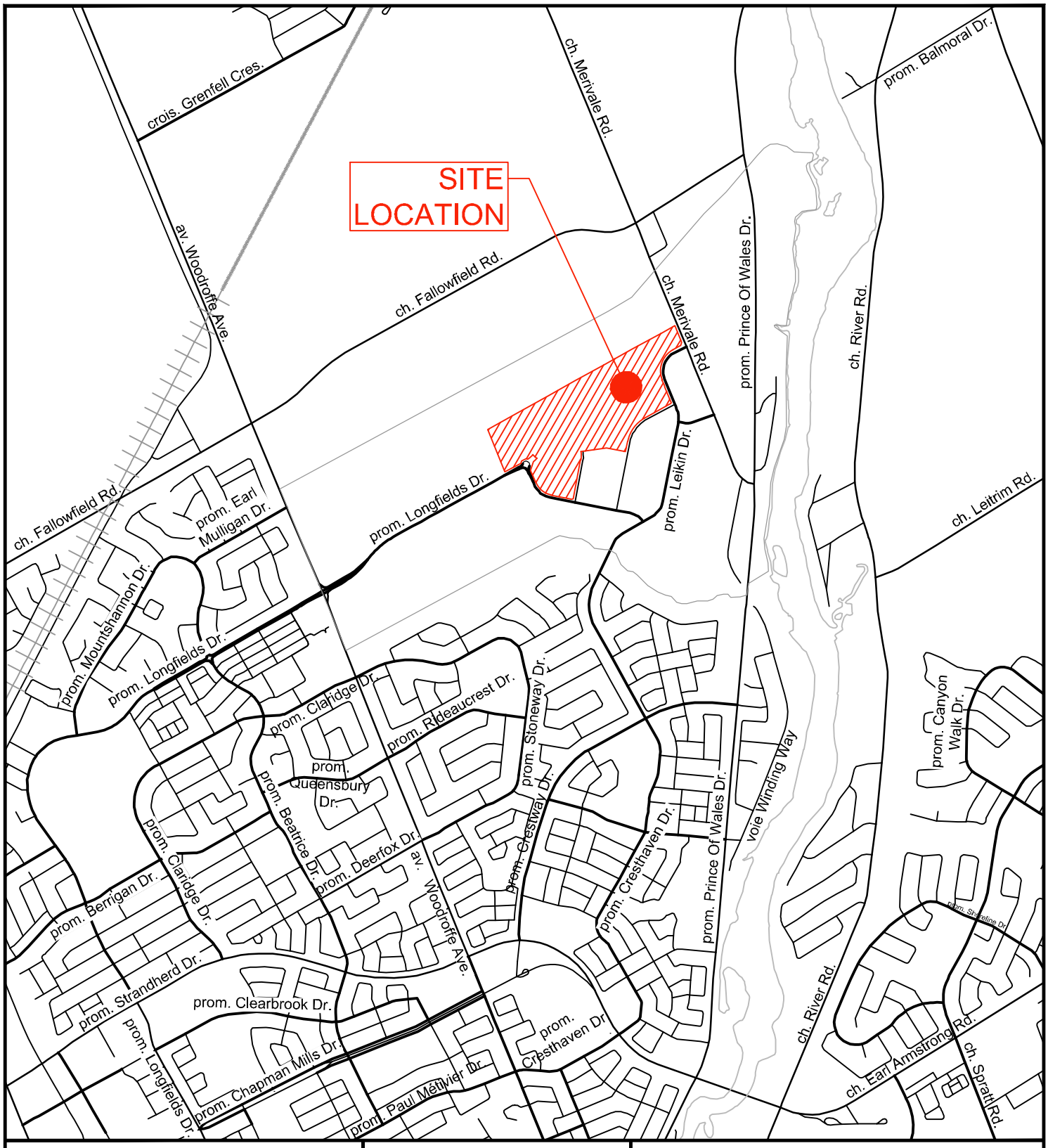
A servicing concept for the South Merivale Business Park has been completed and initial phases have been constructed (i.e. Leikin Drive, Bill Leathem Drive, Paragon Avenue). The servicing design information is provided in a report entitled 'City of Nepean, South Merivale Business Park, Phase II and III, Services Design Report' prepared by Novatech, dated June 23, 1992, hereafter referred to as SMBP Servicing Report. This report outlines the servicing for the roadways with consideration of future lot development.

1.2 Proposed Development

The proposed development consists of a single storey light industrial sortation facility, truck and trailer parking and staff parking lots which will cover approximately 16.2 hectares of the 30.6-hectare site. The remaining 14.4 hectares will remain vacant for the time being with the potential for future developments on the site. Access to the site would be provided by 3 separate entrances, two from the round-a-bout at the Bill Leathem Drive and Longfield Drive intersection, one from Paragon Avenue. A private road will be constructed with a connection to Leikin Drive and Paragon Avenue. **Figure 3** shows the proposed development.

It should be noted that this report should be read in conjunction with the engineering drawing set:

121137-ND	Notes and Details
121137-GP	General Plan of Services
121137-GR	Grading Plan



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SORTATION FACILITY

99 BILL LEATHEM DRIVE, 2 LEIKIN DRIVE AND 20 LEIKIN DRIVE, CITY OF OTTAWA

PROPERTY LOCATION MAP

SCALE		
N.T.S		
DATE	JOB	FIGURE
AUGUST 2021	121137	1

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LEGEND

PROPERTY LINE

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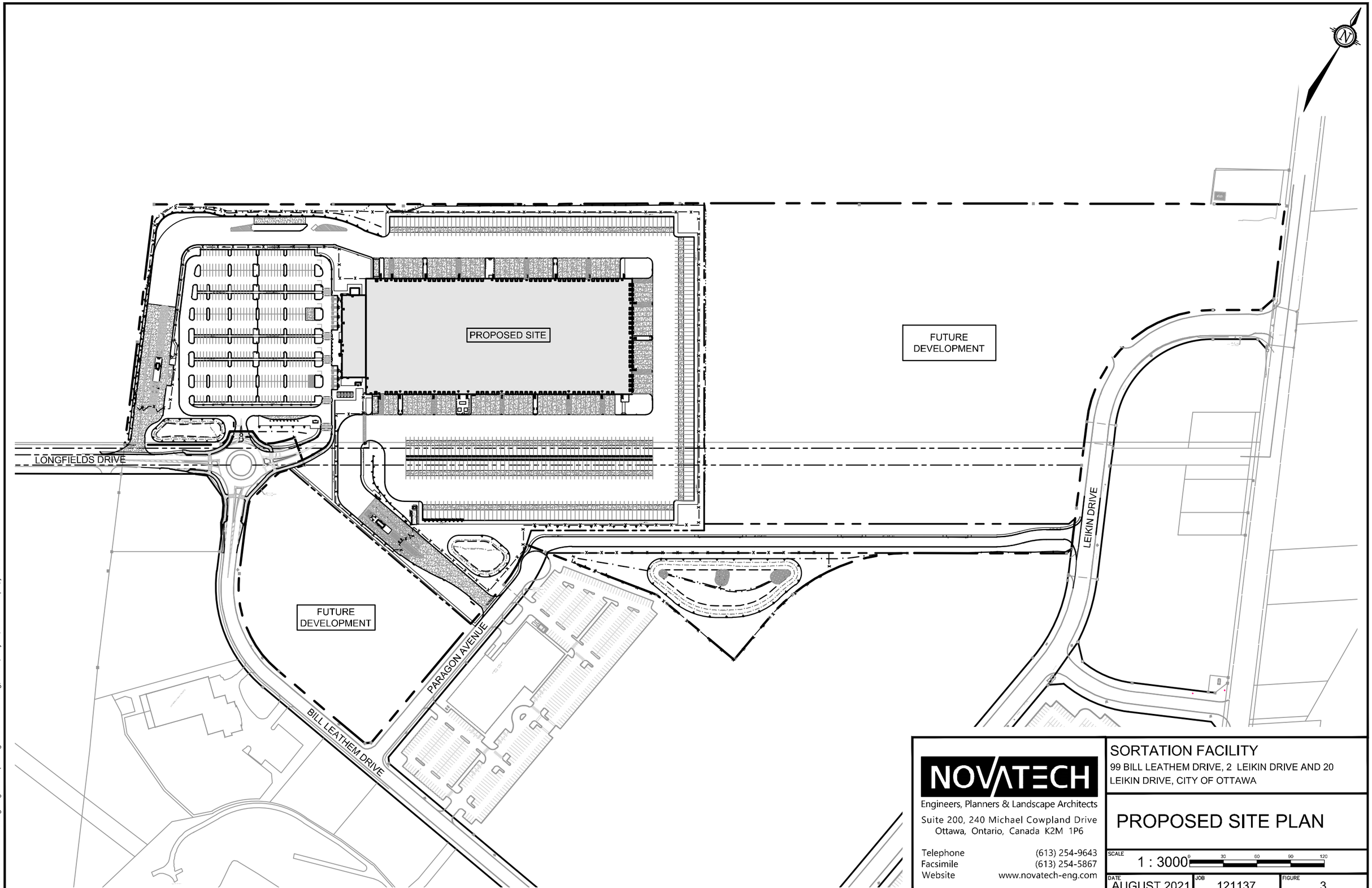
SORTATION FACILITY

99 BILL LEATHEM DRIVE, 2 LEIKIN DRIVE AND 20 LEIKIN DRIVE, CITY OF OTTAWA

EXISTING CONDITIONS PLAN

SCALE 1 : 3000 (0, 30, 60, 90, 120)

DATE AUGUST 2021 | JOB 121137 | FIGURE 2



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SORTATION FACILITY

99 BILL LEATHEM DRIVE, 2 LEIKIN DRIVE AND 20 LEIKIN DRIVE, CITY OF OTTAWA

PROPOSED SITE PLAN

SCALE 1 : 3000 (0, 30, 60, 90, 120)

DATE AUGUST 2021 | JOB 121137 | FIGURE 3

121137-ESC Erosion Sediment Control Plan

1.3 Site Design and Constraints

As indicated previously the subject site is part of the SMBP Development in the City of Ottawa. Servicing design criteria and information for the SMBP Development is provided in a report entitled '*City Of Nepean, South Merivale Business Park Phase II and III, Services Deign Report,*' prepared by Novatech, dated June 23,1992. Stormwater Management design criteria and information is provided in a report entitled *'City of Nepean, South Merivale Business Park, Stormwater Management Report'* prepared by Novatech, revised dated December 3, 1991. The SMBP Reports provide design criteria for the interior sites and designed the overall servicing systems including sanitary sewers, watermain and stormwater management systems. Each system is discussed in more detail in the appropriate sections of this report.

1.4 Background Reports

This report provides information on the considerations and approach by which Novatech has designed and evaluated the proposed servicing and stormwater management strategies. This report should be read in conjunction with the following:

- *South Merivale Business Park, 99 Bill Leathem Drive, 2 Leikin Drive and 20 Leikin Drive, Serviceability Report, prepared by Novatech dated March 25, 2021.*
- *City of Nepean, South Merivale Business Park Phase II and III, Services Design Report,'* prepared by Novatech, dated June 23,1992.
- *'City of Nepean, South Merivale Business Park, Stormwater Management Report'* prepared by Novatech, revised dated December 3, 1991.

2.0 WATER SERVICING

2.1 Existing Water Services

There are existing 300mm diameter watermains within the Bill Leathem Drive and Paragon Avenue rights-of-way, and an existing 400mm diameter watermain within the Leikin Drive right-of-way. There are also, existing 200mm and 300mm diameter stubs at the end of Bill Leathem Drive, and Paragon Avenue for use as future service connections to service the subject property. Refer to **Figure 4** for details on the existing watermain network.

2.2 Proposed Water Servicing

It is proposed to service the development by constructing approximately 508 meters of 300mm dia. and 450m of 250mm dia. private domestic watermain on site. The private watermain will provide service for both the domestic and the fire suppression systems. The proposed 250mm dia. watermain will connect to the existing 200mm dia. watermain stub in Bill Leathem Drive (north leg of the round-a-bout), to the 300mm dia. watermain stub at the end of Paragon Avenue. The 300mm dia watermain will connect the stub at the end of Paragon Avenue to the 400mm dia. Watermain in Leikin Drive.

As per the City of Ottawa Technical Bulletin ISDTB-2014-02, the proposed development will require two service connections as the average day demand is greater than 50 cubic meters of water. The two services will be separated by an isolation valve on the existing watermain system

EXISTING SANITARY AND OVERHEAD HYDRO EASEMENTS

LEIKIN DRIVE

BILL LEATHEM DRIVE

PARAGON AVENUE

BECKSTEAD ROAD

1050mmØ SAN

675mmØ STM

250mmØ SAN

300mmØ WATER

750mmØ STM

1050mmØ STM

825mmØ STM

1200mmØ STM

1650mmØ STM

375mmØ SAN

1500mmØ STM

1350mmØ STM

750mmØ SAN

1525mmØ STM

400mmØ WATER

525mmØ STM

600mmØ STM

650mmØ STM

900mmØ STM

EX. STORMWATER MANAGEMENT FACILITY

LEGEND

- PROPERTY LINE
- EXISTING SANITARY TRUNK SEWER
- EXISTING SANITARY SEWER c/w FLOW DIRECTION
- EXISTING STORM SEWER c/w FLOW DIRECTION
- EXISTING WATERMAIN
- EXISTING OVERHEAD HYDRO LINES

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SOUTH MERIVALE BUSINESS PARK

99 BILL LEATHEM DRIVE, 2 LEIKIN DRIVE
AND 20 LEIKIN DRIVE, CITY OF OTTAWA

EXISTING SERVICES PLAN

SCALE 1 : 3000 (0, 30, 60, 90, 120)

DATE AUGUST 2021 | JOB 121137 | FIGURE 4

in the event maintenance on the system is required. As per the original design intent from the SMBP Phase II and III Services design Report the existing municipal watermains in Leikin Drive, Paragon Avenue and Bill Leatham Drive are to be looped through the development and private roadway to improve system flows and pressures. Refer to the General Plan of Services (121137-GP) for water servicing details.

2.2.1 Proposed Development Domestic Water Demands

Design Criteria from the City of Ottawa Water Distribution Guidelines and Section 8 of the Ontario Building Code were used to calculate the theoretical water demands for proposed development. The demand calculations are based on flow requirements for the proposed different uses on site, and are calculated based on the following criteria:

- Industrial Water Demand
  - per each water closet = 950L/day
  - per each loading bay = 150L/day (each)
- Commercial Office Water Demand
  - per each 9.3m² floor space = 75L/day
- Peaking Factor
  - Max Day = 1.5
  - Peak Hour = 1.8

The domestic water demands for the proposed development are summarized in **Table 2.1** below.

Table 2.1: Domestic Water Demand Summary

Use	Ave. Daily Demand (L/s)	Max. Daily Demand (L/s)	Peak Hour Demand (L/s)
Industrial Flows	0.262	0.392	0.706
Commercial Flows	0.148	0.223	0.399
Total Domestic Demands	**0.41**	**0.62**	**1.11**

2.2.2 Proposed Development Fire Protection System

Fire protection systems for this type of development are intricate systems, that require a specialized fire consulting engineer to determine the requirements. Therefore, Civelec Consulting Inc. a specialized fire consulting engineering firm was retained to design the fire protection systems for the proposed development. The results of the Civelec design are summarized below:

- The required fire flow for the development is 2150 USGPM.
- An internal pump room in the southwest corner of the building shall contain a fire pump which draws water from the City watermain to pressurize the fire protection system
- 900 meters of 250mm dia. high pressure fire protection watermain which loops around the building.
- Six fire hydrants evenly spaced around the building that are directly connected to the high-pressure fire protection watermain loop.
- Three 200mm connections to the building from the high-pressure fire protection watermain loop to supply the internal sprinkler system.
- Two fire hydrants connected to the incoming City watermain, which are located within 45 meters of the Siamese connection.

2.3 Boundary Conditions and Hydraulic Analysis

Watermain boundary conditions were requested as part of the serviceability study that was prepared in support of the Re-Zoning application for the proposed development. The boundary conditions were based on connections to existing 300mm dia. watermains in Bill Leathem Drive and Paragon Avenue, and the 400mm dia. watermain in Leikin Drive. The domestic water demands were calculated assuming a 50% commercial and 50% industrial land use, and the fire flow demands were calculated using the Fire Underwriters Survey method. The following criteria provided in Section 4 of City of Ottawa Design Guidelines – Water Distribution, were used in the demand calculations:

- Light Industrial Water Demand = 35,000L/ha/day
- Commercial Water Demand = 28,000L/ha/day
- Peaking Factor
    - Max Day = 1.5; Peak Hour = 1.8
- Fire Flows = Fire Underwriters Survey

The boundary condition water demands for the development are summarized below in **Table 2.2.**

Table 2.2: Boundary Condition Water Demand Summary

Use	Area (ha)	Ave. Daily Demand (L/s)	Max. Daily Demand (L/s)	Peak Hour Demand (L/s)	Fire Flow (L/s)
Industrial Flows	15.29	6.19	11.14	20.05	267.00
Commercial Flows	15.29	4.95	7.43	13.37	
Total Water Demands	**30.57**	**11.1**	**18.6**	**33.4**	**267.0**

The above demands were sent to the City of Ottawa to determine the boundary conditions for the site. A summary of the boundary condition results provided by the City of Ottawa are shown below in **Table 2.3**.

Table 2.3: Boundary Condition Summary (Existing Conditions)

Condition	Min/Max Allowable Operating Pressures (psi)	Operating Pressures (psi)		
		Connection 1 Bill Leathem Dr	Connection 2 Paragon Ave	Connection 3 Leikin Dr
High Pressure	80psi (Max)	60.0	60.4	59.2
Max Day + Fire Flow	20psi (Min)	21.4	28.0	46.9
Peak Hour	40psi (Min)	49.1	49.5	48.3

Note: Pressures based on Ground Elevation of 90.5m, 90.2m and 91.0m respectively.

Through correspondence with the City, it is understood that planned watermain improvements (SUC Zone reconfiguration), will result in altered boundary conditions for the site. The future boundary conditions are provided in **Table 2.4**.

Table 2.4: Boundary Condition Summary (Post SUC Zone Reconfiguration)

Condition	Min/Max Allowable Operating Pressures (psi)	Operating Pressures (psi)		
		Connection 1 Bill Leathem Dr	Connection 2 Paragon Ave	Connection 3 Leikin Dr
High Pressure	80psi (Max)	78.4	78.8	58.7
Max Day + Fire Flow	20psi (Min)	39.2	45.9	33.1
Peak Hour	40psi (Min)	74.8	75.2	52.1

Note: Pressures based on Ground Elevation of 90.5m, 90.2m and 91.0m respectively.

The above boundary conditions were used to create a hydraulic model using EPANET for analyzing the performance of the proposed private watermain system for three theoretical conditions: 1) High Pressure check under Average Day conditions, 2) Peak Hour demand, 3) Maximum Day + Fire Flow Demand. The following **Table 2.5, and Table 2.6** summarise the results from the hydraulic water model for the existing conditions and the future SUC zone reconfiguration, respectively.

Table 2.5: Water Analysis Results Summary – Existing Conditions

Condition	Demand (L/s)	Min/Max Allowable Operating Pressures (psi)	Limits of Design Operating Pressures (psi)
High Pressure	0.41 L/s	80psi (Max)	61.6 psi (Max)
Max Day + Fire Flow	136.26 L/s	20psi (Min)	20.0 psi (Min)
Peak Hour	1.11 L/s	40psi (min)	48.4 psi (min)

Table 2.6: Water Analysis Results Summary - Post SUC Zone Reconfiguration

Condition	Demand (L/s)	Min/Max Allowable Operating Pressures (psi)	Limits of Design Operating Pressures (psi)
High Pressure	0.41 L/s	80psi (Max)	80.0 psi (Max)
Max Day + Fire Flow	136.26 L/s	20psi (Min)	37.8 psi (Min)
Peak Hour	1.11 L/s	40psi (min)	74.0 psi (min)

The SUC zone reconfiguration will result in a notable increase in available pressures under all conditions. The future pressure in the high-pressure scenario will be +/- 80 psi, which is at the allowable 80 psi threshold. Thus, it is recommended that a pressure reduction valve be installed to prevent high pressures within the private water system.

Based on the preceding analysis it can be concluded that the watermain, as designed, will provide adequate system pressures for domestic use and fire protection. The boundary conditions were based on water demands that are significantly greater than the requirements of the current proposed development. The flows accounted for are conservative and provide an allowance for future development on the site. Refer to **Appendix A** for detailed model results, model schematics and City of Ottawa boundary conditions. Refer to the General plan of Services (drawing 121137-GP) for details on the water servicing network.

3.0 SANITARY SERVICING

3.1 Existing Sanitary Services

There is an existing easement crossing through the proposed site which contains the existing 1050mm dia. Barrhaven Sanitary Trunk sewer. There are existing 250mm dia. municipal sanitary sewers in Paragon Avenue, Bill Leathem Drive and Leikin Drive (north of the sanitary trunk sewer easement). There is also an existing 750mm dia. sanitary trunk sewer in Leikin Drive (south of the trunk sewer easement).

The sanitary sewer outlet for the South Merivale Business Park is the Barrhaven Trunk Sanitary Sewer which flows to the West Rideau Collector Sewer.

Refer to **Figure 4** for details on the existing sanitary servicing network.

3.2 Proposed Sanitary Services

It is proposed to service the majority of the development by constructing approximately 450m of 250mm dia. private sanitary sewer on site. The proposed 250mm dia. sewer will outlet to the existing sanitary stub located at the end of Paragon Avenue. It is proposed to service the western Guardhouse by constructing approximately 95m of 200mm dia. and 22m of 250mm dia. private sanitary sewer on site with a connection to the 250mm dia. sanitary sewer in Bill Leathem Drive (capped stub north leg of round-a-bout). Refer to the General Plan of Services (121137-GP) for details.

3.2.1 Proposed Peak Sanitary Flows

The total theoretical peak sanitary flow for the proposed development was calculated based on the following criteria from Section 4 of the City of Ottawa Sewer Design Guidelines and Section 8 of the Ontario Building Code:

- Total Development Area = 28.3ha
- Industrial Sanitary Flow
    - per each water closet = 950L/day
    - per each loading bay = 150L/day (each)
    - Future Development Area = 35,000 L/ha/day
- Commercia Office Sanitary Flow
    - per each 9.3m² floor space = 75L/day
    - Future Development Area = 28,000 L/ha/day
- Commercial Peaking Factor = 1.5
- Light Industrial Peaking Factor = 3.5 (Appendix 4-B)
- Infiltration Rate = 0.33L/s/ha

The proposed sanitary flows are summarized below in **Table 3.1**.

Table 3.1: Peak Sanitary Flow Summary

Proposed Use	Peak Flow (L/s)
Industrial Flows	0.94
Commercial Flows	0.27
Sewer Infiltration Flow	4.62
Total Peak Flows	**5.83**

3.3 SMBP Sanitary Flow Allotment

The SMBP Phase II and III Services Design Report provides design criteria which was used to calculate the sanitary flow allotments for the development area. Based on the existing sanitary design sheet and drainage area plan there are multiple local municipal sanitary sewer outlets available for the proposed development. The sanitary flow allotment to each sanitary sewer outlet was calculated based on the following design criteria provided SMBP Services Report:

- Population Equivalent = 100 persons/ha
- Design Sanitary Flow = 450 L/person/day (Commercial/Institutional Flow Rate)
- Light Industrial Peaking Factor =2.8
- Infiltration Rate = 0.11L/s/ha

The sanitary flow allotments to each sanitary sewer outlet are summarized below in **Table 3.2**.

Table 3.2: Sanitary Flow Allotment Summary

SEWER OUTLET LOCATION	Area (ha)	Peak Flow (L/s)	Infiltration Flow (L/s)	Total Peak Design Flow (L/s)
Bill Leathem Dr	4.9	7.15	0.53	7.53
Paragon Ave	2.0	2.92	0.21	2.98
Trunk Sewer EX SANMH 62	17.4	25.38	1.91	27.29
Leikin Dr	3.4	4.96	0.37	5.33
Bill Leatham Dr (via Street C)	2.8	4.08	0.31	4.39
Total Allocation	**30.5**	**44.48**	**3.36**	**47.83**

The total flow allotment for the development area to the Barrhaven Sanitary Trunk Sewer was calculated to be 47.8 L/s. A copy of the existing sanitary drainage area plans and sanitary sewer design sheet from the SMBP Phase I and II Report are provided in **Appendix B** for reference.

The proposed 250mm dia. private sanitary sewer on site has a theoretical capacity of 32.5 L/s at the minimum slope of 0.3%. Therefore, there is adequate capacity in the proposed infrastructure to convey the required peak flow of 5.83 L/s from the site. Also, based on the total flow allotment of 47.8 L/s, and correspondence with the City of Ottawa there is capacity in the existing infrastructure for the proposed development and future developments on the site. Refer to **Appendix B**, for the proposed detailed sanitary flow calculations, sanitary drainage area pans, sanitary sewer design sheets and City correspondence.

4.0 STORM SERVICING AND STORMWATER MANAGEMENT

The storm servicing and stormwater management strategy for the site is based on the established criteria in the 1991 SMBP SWM Report.

4.1 Existing Storm Services

The storm infrastructure servicing the South Merivale Business Park includes a downstream stormwater management facility and storm sewers with sizes ranging from 525mm to 2400mm in diameter. There is an existing 675mm dia. storm sewer in Bill Leathem Drive and a 1050mm dia.

storm sewer in Paragon Avenue which are the proposed storm sewer outlets for the development. The stormwater management facility is located to the south of Bill Leatham Dr and provides quality control of stormwater prior to out letting to Barrhaven Creek. Refer to **Figure 4** for details on the existing storm servicing network.

4.2 Stormwater Management Criteria

4.2.1 Stormwater Quality Control

The existing downstream stormwater management facility was sized to provide quality control for the development. No further lot level quality control measures are required. Refer to the 1991 SMBP SWM Report contained in **Appendix D**, for details.

4.2.2 Stormwater Quantity Control – Allowable Release Rate

The 1991 SMBP SWM Report included the following stormwater management criteria for the future development blocks that drain to the downstream SWM Facility:

- Stormwater is to be controlled to a 5-year release rate using a runoff coefficient of 0.24 and a time of concentration of 15 minutes. Stormwater is to be controlled up to and including the 100-year storm event.
- Ensure no overland flow for all storms up-to and including the 100-year event.

The proposed development will outlet to storm maintenance holes 139 in Bill Leathem Drive and 159 & 160 in Paragon Avenue. The 5-year allowable release rate to these manholes were calculated using the rational method with the criteria provided above to be:

Structure	100-year Allowable Release Rate
EX STM 139	165.0 L/s
EX STM 159/160	1,034.2 L/s

Note that the off-site storm sewer was designed to convey the 5-year peak flow and surcharge during larger storm events. The storm sewer can surcharge as there are no basement connections.

4.3 Proposed On-Site Storm Infrastructure

The on-site storm sewer and stormwater management system will include storm sewers ranging in size from 300mm to 1500mm in diameter. On-site storage will be provided underground in the storm sewer system and on the surface in dry ponds. Peak flows will be attenuated to the allowable release rates specified using orifices. The inlet controls at each flow control structures are as follows:

CBMH 100: 220mm orifice
CBMH 200: 240mm orifice
HW3001: 570mm orifice

No surface storage in the parking areas or on the building roofs are accounted for in the storm servicing design. The 100-year peak flow will be attenuated to the allowable release rate via the underground storm sewer system and dry ponds (at the request of the client).

Refer to the General Plan of Services (121137-GP) for details.

4.3.1 Storm Sewer Sizing Criteria

The storm drainage design is based on the principals of dual drainage (i.e. minor and major system). The on-site storm sewers (i.e. minor system) have been designed based on the criteria outlined in the City of Ottawa Sewer Design Guidelines (October 2012) and associated technical bulletins. The design criteria used in sizing the storm sewers are summarized in **Table 4.1**.

Table 4.1: Storm Sewer Design Parameters

Parameter	Design Criteria
Private Roads	5 Year Return Period
Storm Sewer Design	Rational Method
IDF Rainfall Data	Ottawa Sewer Design Guidelines
Initial Time of Concentration (Tc)	10 min
Minimum Velocity	0.8 m/s
Maximum Velocity	3.0 m/s
Minimum Diameter	250 mm

Refer to the storm sewer design sheets provided in **Appendix C** and Storm Drainage Area Plan (Drawing 121137-STM).

4.3.2 Overland Flow Sizing Criteria

As previously indicated all flows will be contained underground and in the dry ponds for all storm events up-to and including the 100-year storm event. Storm events that exceed the 100-year storm will pond on the surface and be conveyed through major system flow pathways. The grading design includes maximum 0.35m of surface ponding before 'spilling' over a high-point. Ponding will only occur during very rare events that exceed the 100-year storm.

Refer to the Grading Plan (Drawing 121137-GR).

4.4 Stormwater Management Modeling

The *City of Ottawa Sewer Design Guidelines* (October 2012) requires hydrologic / hydraulic modeling for all dual drainage systems. The performance of the proposed storm drainage system for the site was evaluated using the PCSWMM hydrologic / hydraulic model.

The PCSWMM model schematics and 100-year model output data are provided in **Appendix D**. Digital copies of the modeling files and model output for all storm events are provided on the enclosed CD.

4.4.1 Design Storms

The hydrologic analysis was completed using the following synthetic design storms:

- 3-hour Chicago storm distribution
- 24-hour SCS Type II storm distribution

The return periods analyzed include the 2,5 & 100-year storm events. The IDF parameters used to generate the design storms were taken from the *City of Ottawa Sewer Design Guidelines* (October 2012).

The 3-hour Chicago distribution generated the highest peak flows for both the minor and major systems and was determined to be the critical storm distribution for the design of the storm drainage system.

The proposed drainage system was also 'stress tested' using a 100-year (+20%) 3-hour Chicago design storm. This design storm has a 20% higher intensity and total volume compared to the 100-year event.

4.4.2 Model Development

The PCSWMM model includes the subcatchment areas for the proposed development and the future development drainage area (FUT-1) to the east which is tributary to Pond 3 and ultimately the 1050mm dia. storm sewer outlet in Paragon Ave. Individual drainage areas to each inlet have been lumped together to determine the total area to each pipe run. The purpose of the model is to ensure that the proposed storm drainage and stormwater management system adheres to the allowable release rates specified and that there is no surface ponding during the 100-year storm event.

Infiltration

Infiltration losses for all catchment areas were modeled using Horton's infiltration equation, which defines the infiltration capacity of soil over the duration of a precipitation event using a decay function that ranges from an initial maximum infiltration rate to a minimum rate as the storm progresses. The default values as specified in the City of Ottawa Sewer Design Guidelines were used for all catchments.

Horton's Equation: $f(t) = f_c + (f_o - f_c)e^{-k(t)}$

Initial infiltration rate: f_o = 76.2 mm/hr

Final infiltration rate: f_c = 13.2 mm/hr

Decay Coefficient: k = 4.14/hr

Depression Storage

The default values for depression storage in the City of Ottawa were used for all subcatchments.

- Depression Storage (pervious areas): 4.67 mm
- Depression Storage (impervious areas): 1.57 mm

The rooftops assumed to provide no depression storage (zero-impervious parameter).

Equivalent Width

'Equivalent Width' refers to the width of the sub-catchment flow path. This parameter (Table 5.1) is calculated as described in Section 5.4.5.6 of the City of Ottawa Sewer Design Guidelines. The flow path lengths are shown on the Flow Length and Ponding Plan provided in **Appendix D**.

Impervious Values

Runoff coefficients for each subcatchment area were determined based on the proposed site plan. Refer to the Storm Drainage Area Plan (121137-SWM) for details. Percent impervious values were calculated using:

$$\%imp = (C - 0.20) / 0.70$$

Storm Drainage Areas

For modeling purposes, the site has been divided into subcatchments based on the drainage areas tributary to each inlet of the proposed storm sewer system. The subcatchment areas are shown on the Storm Drainage Area Plan (121137-STM).

The hydrologic modeling parameters for each subcatchment were developed based on the Site Plan (**Figure 3**) and Storm Drainage Area Plan specified above. Subcatchment parameters are provided in **Table 4.2**.

Table 4.2: Subcatchment Parameters

Area ID	Catchment Area (ha)	Runoff Coefficient (C)	Percent Impervious (%)	Zero-Imperv. (%)	Equiv. Width / Flow Length (m)		Average Slope (%)
Controlled Areas							
A-01	0.24	0.90	100	0	54.9	44.1	1.5
A-02	0.52	0.83	90	0	200.0	26.2	1.5
A-03	0.26	0.86	94	0	106.6	24.3	1.5
A-04	0.16	0.84	91	0	138.8	11.6	1.5
A-05	0.42	0.80	86	0	173.3	24.3	1.5
A-06	0.31	0.76	80	0	35.9	87.5	1.5
B-01	0.29	0.83	90	0	109.3	26.9	1.5
B-02	0.28	0.84	91	0	113.2	24.3	1.5
B-03	0.05	0.90	100	100	23.5	21.3	1.5
B-04	0.17	0.86	94	0	153.1	11.3	1.5
B-05	0.05	0.90	100	100	23.5	21.3	1.5
B-06	0.06	0.90	100	100	27.0	21.5	1.5
B-07	0.61	0.70	71	0	249.8	24.3	1.5
B-08	0.30	0.65	64	0	82.0	36.2	1.5
B-09	0.22	0.75	79	0	34.8	61.8	1.5
B-10	0.23	0.64	63	0	39.0	58.7	1.5
C-01	0.65	0.56	51	0	101.6	64.2	1.5
C-02	0.78	0.86	94	0	239.5	32.7	1.5
C-03	0.72	0.90	100	100	139.5	51.7	1.5
C-04	0.83	0.77	81	0	254.4	32.7	1.5
C-05	0.50	0.90	100	100	96.3	51.7	1.5
C-06	0.54	0.78	83	0	164.5	32.7	1.5
C-07	0.38	0.82	89	0	115.3	32.7	1.5
C-08	0.91	0.85	93	0	276.8	32.7	1.5
C-09	0.76	0.90	100	100	147.3	51.4	1.5
C-10	0.46	0.90	100	100	88.9	51.2	1.5
C-11	0.51	0.87	96	0	154.4	32.7	1.5
C-12	0.32	0.79	84	0	97.8	32.2	1.5
C-13	0.78	0.84	91	0	214.6	36.2	1.5
C-14	0.53	0.90	100	0	146.7	36.2	1.5
C-15	0.39	0.76	80	0	112.8	34.4	1.5
C-16	0.24	0.51	44	0	46.1	51.6	1
C-17	0.21	0.51	44	0	42.9	49.0	1
C-18	0.24	0.49	41	0	45.7	53.0	1
C-19	0.13	0.90	100	0	26.1	51.0	1
C-20	0.41	0.50	43	0	82.4	50.0	1
PND1	0.20	0.24	5	0	42.7	46.1	1.5
PND2	0.36	0.24	5	0	137.2	26.1	1.5
PND3	1.09	0.24	5	0	226.1	48.3	1.5

Area ID	Catchment Area (ha)	Runoff Coefficient (C)	Percent Impervious (%)	Zero-Imperv. (%)	Equiv. Width / Flow Length (m)		Average Slope (%)
FUT-1	8.45	0.85	93	25	296.2	285.2	1.5
TOTAL (Controlled)	**24.53**	**0.77**	**82**	**-**	**-**		**-**
Uncontrolled / Direct Runoff Areas							
D-01a	0.01	0.34	20	0	17.0	4.7	2
D-01b	0.02	0.24	5	0	40.0	6	2
D-02a	0.09	0.24	5	0	254.3	3.5	1.5
D-02b	0.04	0.24	5	0	286.7	1.5	1.5
TOTAL (Uncontrolled)	**0.16**	**0.24**	**6**	**-**	**-**		**-**

4.4.3 Model Results

The on-site storage and conveyance system requirements were refined using the PCSWMM model. The model was used to ensure that peak flows are controlled to the allowable release rates and ensure that the 100-year hydraulic grade line is contained on-site within the storm sewer system.

Storage Requirements

Per the client request, the 100-year storm event is to be confined underground in the proposed storm sewer and dry pond stormwater management system. The PCSWMM model provided the storage volume requirements for the system. The storage required and storage provided in the storm sewers and stormwater management system is shown in **Table 4.3** below.

Table 4.3: Required (100-year) and Provided Storage Volumes

Storage Node	Drainage Area (ha)	Inlet Control Device	Required 100-yr Storage Volume* (m^3)	Provided Storage Volume (m^3)
Storage-PND-1	2.12	220mm dia. Plate ICD	503	986
Storage-PND-2	2.61	240mm dia. Plate ICD	480	873
Storage-PND-3	19.81	570mm dia. Plate ICD	6,745	8,993
TOTAL	**24.54**	**-**	**7,728**	**10,852**

**Based on PCSWMM Model Results for a 100-year, 3-hour Chicago Storm.*
***Required and Provided Storage Volumes are for the Dry Pond Only*

Peak Flows

As shown in **Table 4.4**, the overall release rates from the site will adhere to the allowable release rates specified in **Section 4.2.2**. Peak flows from the site are release at a controlled rate to storm MH's 139, 159 & 160. The uncontrolled drainage areas are not tributary to the SMBP storm sewer and generate negligible flows and have therefore, been excluded from the results.

Table 4.4: Summary of Peak Flows

Outfall	Allowable Release Rate (L/s)	Peak Flow (L/s)		
		5 Year	100 Year	100 Year +20%
EX STMMH 139	165.0	145.8	160.3	166.4
EX STMMH 159 /160	1034.2	787.5	1021.8	1112.4

**Based on PCSWMM Model Results for a 3-hour Chicago Storm; outfall results account for hydrograph timing.*

Hydraulic Grade Line (HGL)

The PCSWMM model was used to estimate the hydraulic grade line (HGL) elevation of the of the storm sewer system during the 100-year storm event. **Table 4.5** provides a summary of the 100-year HGL elevation at each storm manhole within the proposed development. The model results indicate that the 100-year HGL elevations will be confined within the storm sewer system.

Table 4.5: Estimated Hydraulic Grade Line (HGL) Elevations

MH ID	Obvert Elevation (m)	T/G Elevation (m)	100-yr HGL Elevation (m)	Surcharge (m)	Clearance from T/G (m)	HGL in Stress Test (m)
CBMH100	91.75	90.80	90.34	0.00	0.46	90.53
CBMH-101	88.74	90.95	90.41	1.67	0.54	90.67
CBMH-102	88.86	91.00	90.49	1.63	0.51	90.79
CBMH-103	88.95	91.05	90.57	1.63	0.48	90.90
CBMH-104	89.07	91.10	90.64	1.58	0.46	91.00
CBMH200	90.80	89.80	89.45	0.00	0.35	89.64
CBMH-202	88.08	90.15	89.71	1.63	0.44	89.99
CBMH-203	88.41	90.40	89.96	1.55	0.44	90.32
CBMH-204	88.66	91.05	90.41	1.76	0.64	90.89
CBMH-205	88.76	91.10	90.57	1.81	0.53	91.05
CBMH-206	88.89	91.15	90.68	1.80	0.47	91.14
CBMH-207	89.10	91.15	90.79	1.69	0.36	91.15
CBMH-303	88.59	89.71	89.24	0.65	0.47	89.47
CBMH-314	89.24	90.40	89.96	0.72	0.44	90.40
MH-105	89.42	91.74	90.77	1.35	0.97	91.19
MH-201	87.80	89.85	89.46	1.66	0.39	89.65
MH-301	88.45	89.91	89.14	0.69	0.77	89.50
MH-302	88.52	89.76	89.15	0.63	0.61	89.51
MH-304	88.58	89.83	89.32	0.74	0.51	89.76
MH-305	88.71	90.08	89.47	0.77	0.61	89.98
MH-306	88.83	90.30	89.77	0.94	0.53	90.30
MH-307	88.65	90.16	89.39	0.74	0.77	89.85
MH-308	88.78	90.34	89.64	0.86	0.70	90.19
MH-309	88.92	90.38	89.82	0.90	0.56	90.38
MH-310	88.73	90.35	89.51	0.78	0.84	89.98
MH-311	88.81	90.29	89.61	0.80	0.68	90.09
MH-312	88.94	90.37	89.82	0.88	0.55	90.33
MH-313	89.07	90.38	89.92	0.85	0.46	90.38
MH-401	88.60	89.78	89.15	0.55	0.63	89.50
MH-402	88.78	90.14	89.15	0.37	0.99	89.51
MH-403	88.95	90.31	89.15	0.20	1.16	89.51
POND3	88.05	89.60	89.14	1.09	0.46	89.50

**Based on PCSWMM Model Results for a 3-hour Chicago Storm.*

Stress Test

Table 4.5 also provides the estimated HGL elevations for the 'stress test' event. The stress test event represents a 20% increase (rainfall intensity and total precipitation) in the 100-year design event. The 'stress test' event will not be confined within the storm sewer system. Ponding will occur within the parking lot sags and may cascade off-site. The major system overland flow will be diverted through overland pathways and spill off-site to Bill Leathem Drive and Paragon Avenue; ultimately discharging to Barrhaven Creek.

Foundation Drains

The proposed building will be slab-on-grade, as such, there are no concerns with the surcharged HGL elevations. The general grade of the site will allow water to pond in the parking lot and overflow downstream before impacting the building. Refer to the Grading Plan (drawing 121137-GR).

4.4.4 Future Development Area

The PCSWMM model includes the 8.45 ha future development area to the east. This area is tributary to Pond 3 and the required storage volume will be accounted for in the design. A 1500mm dia. storm sewer stub will be constructed for future connection. This area is represented in the model based on the following:

Drainage Area:	8.45 ha
Imperviousness:	93% (C=0.85)

5.0 EROSION AND SEDIMENT CONTROL

Temporary erosion and sediment control measures will be implemented on-site during construction in accordance with the Best Management Practices for Erosion and Sediment Control. This includes the following temporary measures:

- Filter socks (catchbasin inserts) will be placed in existing and proposed catchbasins and catchbasin manholes, and will remain in place until vegetation has been established and construction is completed;
- Silt fencing will be placed along the surrounding construction limits;
- Mud mats will be installed at the site entrances;
- Strawbale or rock check dams will be installed in swales and ditches;
- The contractor will be required to perform regular street sweeping and cleaning as required, to suppress dust and to provide safe and clean roadways adjacent to the construction site;

Erosion and sediment control measures should be inspected daily and after every rain event to determine maintenance, repair or replacement requirements. Sediments or granulars that enter site sewers shall be removed immediately by the contractor. These measures will be implemented prior to the commencement of construction and maintained in good order until vegetation has been established. Refer to the Erosion and Sediment Control Plan (121137-ESC) for additional information.

6.0 CONCLUSIONS AND RECOMMENDATIONS

Watermain

The analysis of the proposed watermain network confirms the following:

- The proposed private watermain that connects to the existing 300mm dia. watermain in Bill Leathem Drive and Paragon Avenue and the 400mm dia. watermain in Leikin Drive can service the proposed development.
- There are adequate pressures in the existing watermain infrastructure to meet the required domestic demands for the development.
- There is adequate flow to service the proposed fire protections system.

Sanitary Servicing

The analysis of the proposed sanitary servicing confirms the following:

- There is adequate capacity within the existing sanitary infrastructure to service the proposed development.
- The existing sanitary allotment would allow for future expansion or development on site.

Stormwater Management

The following provides a summary of the storm sewer and stormwater management system:

- Proposed storm sewer system is to connect with the existing storm sewer system on Bill Leathem Drive and Paragon Avenue.
    - Storm sewers (minor system) have been designed to convey the uncontrolled 5-year peak flow using the Rational Method.
    - Underground storage is to be provided within the storm sewer system and surface storage is provided in dry ponds.
    - There will be no surface ponding in the parking lot or truck court area during the 100-year storm event as the 100-year hydraulic grade line (HGL) is contained within the storm sewer system.
- Parking lot graded to ensure that static ponding depths do not exceed 0.35m.
    - Surface ponding would only office for storm events greater than the 100-year event.
    - A major overland flow route is provided to Bill Leathem Drive/ Paragon Avenue and ultimately to the down stream stormwater management facility.

Erosion and Sediment control

- Erosion and sediment control measures (i.e. filter fabric, catchbasin inserts, silt fences, etc.) will be implemented prior to construction and are to remain in place until vegetation is established.

7.0 CLOSURE

The preceding report is respectfully submitted for review and approval. Please contact the undersigned should you have questions or require additional information.

NOVATECH

Prepared by:

Matt Hrehoriak, P.Eng.
Project Coordinator
Land Development Engineering

Reviewed by:

J. Lee Sheets, C.E.T.
Director
Land Development Engineering

Appendix A

Water Servicing Information

Project No. 121137
Project Name: Sortation Facility
Project Location: South Merivale Business Park, Ottawa

Date: August 2021

Detailed Building Use Domestic Water Demands

Daily Demands from OBC Table 8.2.1.3

Establishment	Daily Demand Volume	
Industrial Building:	150	L/day/loading bay
	950	L/day/bathroom
Commercial Office:	75	L/day/9.3m² Floor area

Commercial / Industrial Peaking Factors City of Ottawa Water Distrubution Guidelines

Conditions	Peaking Factor	
Maximum Day	1.5	x avg day
Peak Hour	1.8	x max day

Proposed Development Conditions

	Commercial Office	Industrial Building	Primary Guard House	Secondary Guard House	Totals
Floor Area	1557	N/A	25.77	13.75	
No. Bathrooms	N/A	8	N/A	N/A	
No. Loading Bays	N/A	100	N/A	N/A	
Total Daily Volume (Liters)	12556.5	22600.0	207.8	110.9	35156.5
Avg Day Demand (L/s)	0.145	0.262	0.002	0.001	0.41
Max Day Demand (L/s)	0.218	0.392	0.004	0.002	0.62
Peak Hour Demand (L/s)	0.392	0.706	0.006	0.003	1.11

FUS - Fire Flow Calculations

As per 1999 Fire Underwriter's Survey Guidelines

NOVATECH
Engineers, Planners & Landscape Architects

Novatech Project #: 120187
Project Name: Sortation Facility

Date: 8/4/2021
Input By: Anthony Mestwarp
Reviewed By: Lee Sheets

Legend: Input by User; No Information or Input Required

Building Description: Industrial
Fire Resistive Construction

Step			Choose		Value Used	Total Fire Flow (L/min)
Base Fire Flow						
1	**Construction Material**			**Multiplier**		
	Coefficient related to type of construction C	Wood frame		1.5	0.6	
		Ordinary construction		1		
		Non-combustible construction		0.8		
		Modified Fire resistive construction (2 hrs)	Yes	0.6		
		Fire resistive construction (> 3 hrs)		0.6		
2	**Floor Area**					
	A	Building Footprint (m^2)	25896			
		Number of Floors/Storeys	1			
		Protected Openings (1 hr)	Yes			
		Area of structure considered (m^2)			**25,896**	
	F	**Base fire flow without reductions**				**21,000**
		F = 220 C $(A)^{0.5}$				
Reductions or Surcharges						
3	**Occupancy hazard reduction or surcharge**			**Reduction/Surcharge**		
	(1)	Non-combustible		-25%	0%	**21,000**
		Limited combustible	No	-15%		
		Combustible	Yes	0%		
		Free burning		15%		
		Rapid burning		25%		
4	**Sprinkler Reduction**			**Reduction**		
	(2)	Adequately Designed System (NFPA 13)	Yes	-30%	-30%	**-10,500**
		Standard Water Supply	Yes	-10%	-10%	
		Fully Supervised System	Yes	-10%	-10%	
				Cumulative Total	**-50%**	
5	**Exposure Surcharge (cumulative %)**				**Surcharge**	
	(3)	North Side	> 45.1m		0%	**0**
		East Side	> 45.1m		0%	
		South Side	> 45.1m		0%	
		West Side	> 45.1m		0%	
				Cumulative Total	**0%**	
Results						
6	(1) + (2) + (3)	**Total Required Fire Flow, rounded to nearest 1000L/min**			**L/min**	**11,000**
		(2,000 L/min < Fire Flow < 45,000 L/min)		or	L/s	**183**
				or	USGPM	2,906
7	**Storage Volume**	Required Duration of Fire Flow (hours)			Hours	2
		Required Volume of Fire Flow (m^3)			m^3	1320

Table 1

Water Demand

	Area (ha)	Demand (L/s)		
		Avg Day	Max. Daily	Peak Hour
Light Industrial use	**15.29**	6.19	11.14	20.05
Commercial Use	**15.29**	4.95	7.43	13.37
Total	30.57	11.14	18.6	33.42

Avg. Daily Demand (City of Ottawa Sewer Design Guidelines):

- Light Industrial	35000	L/ha/day
- Commercial	28000	L/ha/day

Commercial / Industrial Peaking Factors (City of Ottawa Water Distrubution Guidelines)

Max. Daily Demand:	1.5	x Avg. Day
Peak Hourly Demand:	1.8	x Max. Day

From: Sharif, Golam <sharif.sharif@ottawa.ca>
Sent: Tuesday, February 23, 2021 4:45 PM
To: Cara Ruddle <c.ruddle@novatech-eng.com>
Subject: RE: South Merivale Business Park - boundary conditions request

Hi Cara,

Please see the attached boundary condition. Please see the note, watermain looping is require to meet the pressure requirement. If you have any question, please let me know. Thanks.

Sharif

From: Cara Ruddle <c.ruddle@novatech-eng.com>
Sent: February 08, 2021 2:02 PM
To: Sharif, Golam <sharif.sharif@ottawa.ca>
Subject: RE: South Merivale Business Park - boundary conditions request

Please find attached a form which includes the FUS calculation as requested.

Thanks.

Cara Ruddle, P.Eng., Senior Project Manager | Land Development Engineering
NOVATECH Engineers, Planners & Landscape Architects
240 Michael Cowpland Drive, Suite 200, Ottawa, ON, K2M 1P6 | Tel: 613.254.9643 Ext: 220 | Cell: 613.261.7719 | Fax: 613.254.5867

From: Sharif, Golam <sharif.sharif@ottawa.ca>
Sent: Monday, February 8, 2021 12:53 PM
To: Cara Ruddle <c.ruddle@novatech-eng.com>
Subject: RE: South Merivale Business Park - boundary conditions request

Hi Cara,

Please provide the fire flow (FUS) calculation. Thanks.

Sharif

From: Cara Ruddle <c.ruddle@novatech-eng.com>
Sent: February 06, 2021 8:57 AM
To: Sharif, Golam <sharif.sharif@ottawa.ca>
Subject: FW: South Merivale Business Park - boundary conditions request

I tried to send the email below previously but I think I had your email address input incorrectly so I am resending my request for boundary conditions. Please let me know an approximate timeframe for receiving boundary conditions.

Thanks.

Cara Ruddle, P.Eng., Senior Project Manager | Land Development Engineering
NOVATECH Engineers, Planners & Landscape Architects
240 Michael Cowpland Drive, Suite 200, Ottawa, ON, K2M 1P6 | Tel: 613.254.9643 Ext: 220 | Cell: 613.261.7719 | Fax: 613.254.5867

From: Cara Ruddle
Sent: Tuesday, February 2, 2021 3:48 PM
To: 'sharif.golam@ottawa.ca' <sharif.golam@ottawa.ca>
Cc: Lee Sheets <l.sheets@novatech-eng.com>
Subject: South Merivale Business Park - boundary conditions request

Sharif:
I am looking to obtain boundary conditions for existing watermain for a potential development within the South Merivale Business Park to support an application to the City. Please find below water demand information for the proposed development (which includes addresses 99 Bill Leathem Drive, 2 Leikin Drive And 20 Leikin Drive). Also, attached is a key plan, showing the site location, and a geomap image showing the existing water infrastructure. Can you please provide boundary conditions for the existing watermain infrastructure at the round-about of Bill Leathem Drive and Longfield Drive, the end of Paragon Avenue, and the existing stub off of Leikin Drive, as highlighted on the attached plan as potential connection points, so we can review the servicing requirements for the site.

Water Demands proposed development:

AVG DAY = 11.14 L/s
MAX DAY = 18.6 L/s
PEAK HOUR = 33.42 L/s
MAX DAY + FIRE =285.6 L/s

Please let us know if you require any further information.

Thanks,

Cara Ruddle, P.Eng., Senior Project Manager | Land Development Engineering
NOVATECH Engineers, Planners & Landscape Architects
240 Michael Cowpland Drive, Suite 200, Ottawa, ON, K2M 1P6 | Tel: 613.254.9643 Ext: 220 | Cell: 613.261.7719 | Fax: 613.254.5867
The information contained in this email message is confidential and is for exclusive use of the addressee.

Boundary Conditions
South Merivale Business Park

Provided Information

Scenario	Demand	
	L/min	L/s
Average Daily Demand	668	11.14
Maximum Daily Demand	1,116	18.60
Peak Hour	2,005	33.42
Fire Flow Demand #1	16,000	266.67

Location

Results – Existing Conditions

Connection 1 – Bill Leathem Dr.

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	132.7	60.0
Peak Hour	125.0	49.1
Max Day plus Fire 1	105.5	21.4

Ground Elevation = 90.5 m

Connection 2 – Paragon Ave.

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	132.7	60.4
Peak Hour	125.0	49.5
Max Day plus Fire 1	109.9	28.0

Ground Elevation = 90.2 m

Connection 3 – Leikin Dr.

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	132.7	59.2
Peak Hour	125.0	48.3
Max Day plus Fire 1	124.1	46.9

Ground Elevation = 91.0 m

Results – SUC Zone Reconfiguration

Connection 1 – Bill Leathem Dr.

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	145.7	78.4
Peak Hour	143.1	74.8
Max Day plus Fire 1	118.1	39.2

Ground Elevation = 90.5 m

Connection 2 – Paragon Ave.

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	145.6	78.8
Peak Hour	143.1	75.2
Max Day plus Fire 1	122.5	45.9

Ground Elevation = 90.2 m

Connection 3 – Leikin Dr.

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	132.3	58.7
Peak Hour	127.7	52.1
Max Day plus Fire 1	114.4	33.1

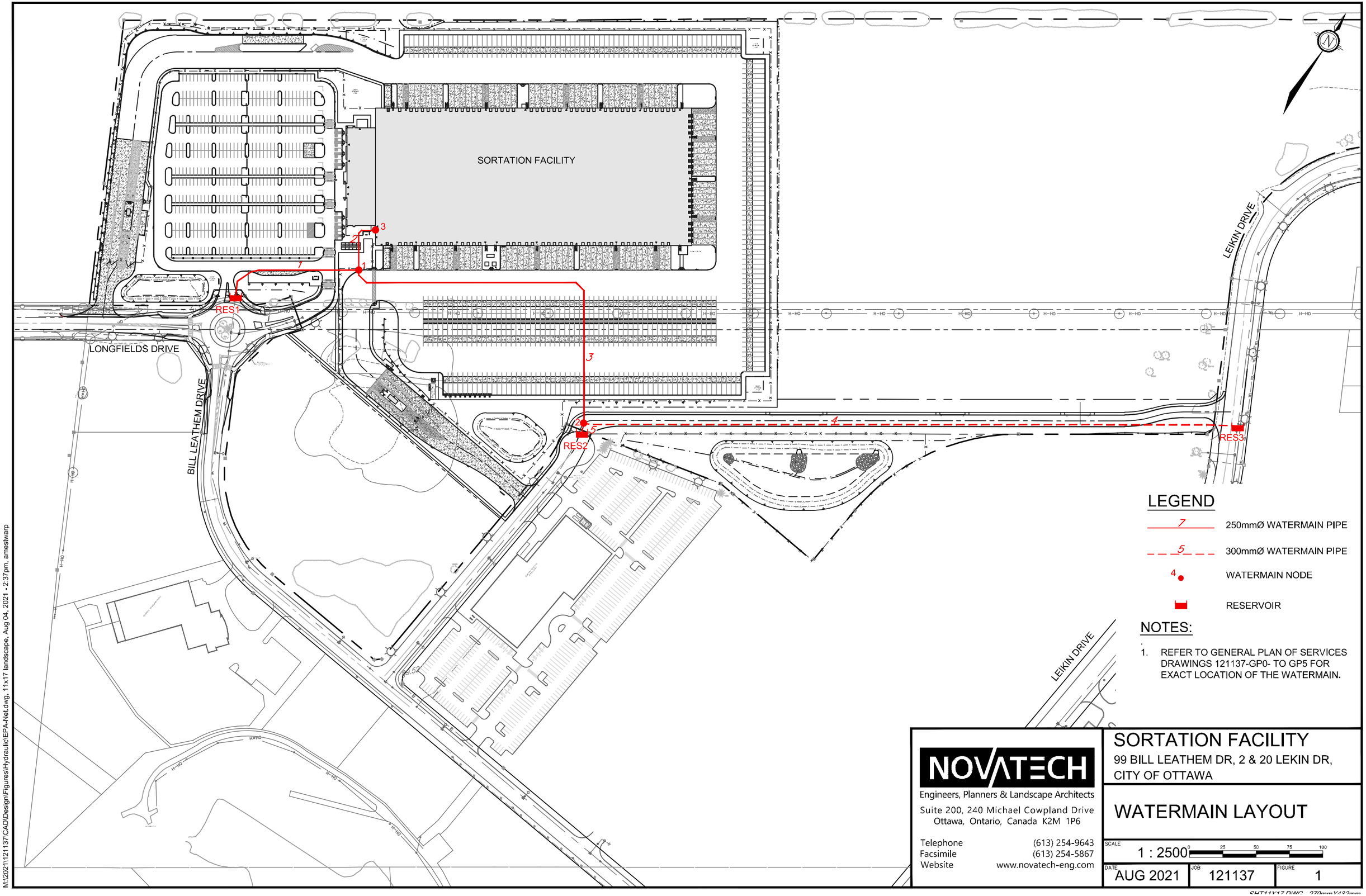
Ground Elevation = 91.0 m

Notes

1. **Watermain looping on Bill Leathem Dr. and Paragon Ave. was added to meet minimum fire flow requirements of 20 psi.**

Disclaimer

The boundary condition information is based on current operation of the city water distribution system. The computer model simulation is based on the best information available at the time. The operation of the water distribution system can change on a regular basis, resulting in a variation in boundary conditions. The physical properties of watermains deteriorate over time, as such must be assumed in the absence of actual field test data. The variation in physical watermain properties can therefore alter the results of the computer model simulation. Fire Flow analysis is a reflection of available flow in the watermain; there may be additional restrictions that occur between the watermain and the hydrant that the model cannot take into account.



NOVATECH
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Telephone (613) 254-9643
Facsimile (613) 254-5867
Website www.novatech-eng.com

SORTATION FACILITY

99 BILL LEATHEM DR, 2 & 20 LEKIN DR, CITY OF OTTAWA

WATERMAIN LAYOUT

SCALE 1 : 2500 (0, 25, 50, 75, 100)

DATE AUG 2021 | JOB 121137 | FIGURE 1

SHT11X17 DWG - 279mmX432mm

M:\2021\121137\CAD\Design\Figures\Hydraulic\EPA-Net.dwg, 11x17 landscape, Aug 04, 2021 - 2:37pm, amestwarp

```
******************************************************************
*                           E P A N E T                          *
*                    Hydraulic and Water Quality                 *
*                    Analysis for Pipe Networks                  *
*                         Version 2.0                            *
******************************************************************
```

Link - Node Table:

Link ID	Start Node	End Node	Length m	Diameter mm
3	2	1	276.8	250
1	RES1	1	104	250
2	1	3	41.2	250
5	RES2	2	6.5	300
4	2	RES3	490	300

Node Results (Average Day):

Node ID	Demand LPS	Head m	Pressure m	Quality	
1	0.00	132.70	41.72	0.00	
2	0.00	132.70	42.90	0.00	
3	0.41	132.70	43.30	0.00	
RES1	-0.26	132.70	0.00	0.00	Reservoir
RES2	-0.14	132.70	0.00	0.00	Reservoir
RES3	-0.01	132.70	0.00	0.00	Reservoir

Link Results (Average Day):

Link ID	Flow LPS	Velocity m/s	Unit Headloss m/km	Status
1	0.26	0.01	0.00	Open
2	0.41	0.01	0.00	Open
3	0.15	0.00	0.00	Open
4	-0.01	0.00	0.00	Open
5	0.14	0.00	0.00	Open

```
******************************************************************
*                            E P A N E T                         *
*                     Hydraulic and Water Quality                *
*                     Analysis for Pipe Networks                 *
*                          Version 2.0                           *
******************************************************************
```

Node Results (Max Day + Fire Flow):

Node ID	Demand LPS	Head m	Pressure m	Quality	
1	0.00	104.99	14.01	0.00	
2	0.00	109.96	20.16	0.00	
3	136.26	103.44	14.04	0.00	
RES1	-45.04	105.50	0.00	0.00	Reservoir
RES2	116.45	109.90	0.00	0.00	Reservoir
RES3	-207.67	124.10	0.00	0.00	Reservoir

Link Results (Max Day + Fire Flow):

Link ID	Flow LPS	VelocityUnit m/s	Headloss m/km	Status
1	45.04	0.92	4.86	Open
2	136.26	2.78	37.74	Open
3	91.22	1.86	17.95	Open
4	-207.67	2.94	28.85	Open
5	-116.45	1.65	9.88	Open

```
******************************************************************
*                            E P A N E T                         *
*                     Hydraulic and Water Quality                *
*                     Analysis for Pipe Networks                 *
*                          Version 2.0                           *
******************************************************************
```

Node Results (Peak Hour):

Node ID	Demand LPS	Head m	Pressure m	Quality	
1	0.00	125.00	34.02	0.00	
2	0.00	125.00	35.20	0.00	
3	1.11	125.00	35.60	0.00	
RES1	-0.70	125.00	0.00	0.00	Reservoir
RES2	-0.37	125.00	0.00	0.00	Reservoir
RES3	-0.04	125.00	0.00	0.00	Reservoir

Link Results (Peak Hour):

Link ID	Flow LPS	Velocity m/s	Unit Headloss m/km	Status
1	0.70	0.01	0.00	Open
2	1.11	0.02	0.01	Open
3	0.41	0.01	0.00	Open
4	-0.04	0.00	0.00	Open
5	0.37	0.01	0.00	Open

```
******************************************************************
*                            E P A N E T                         *
*                     Hydraulic and Water Quality                *
*                     Analysis for Pipe Networks                 *
*                          Version 2.0                           *
******************************************************************
```

Node Results (Average Day Future):

Node ID	Demand LPS	Head m	Pressure m	Quality	
1	0.00	145.63	54.65	0.00	
2	0.00	145.45	55.65	0.00	
3	0.41	145.63	56.23	0.00	
RES1	-15.60	145.70	0.00	0.00	Reservoir
RES2	-184.53	145.60	0.00	0.00	Reservoir
RES3	199.72	132.30	0.00	0.00	Reservoir

Link Results (Average Day Future):

Link ID	Flow LPS	Velocity m/s	Unit Headloss m/km	Status
1	15.60	0.32	0.68	Open
2	0.41	0.01	0.00	Open
3	-15.19	0.31	0.65	Open
4	199.72	2.83	26.84	Open
5	184.53	2.61	23.18	Open

```
******************************************************************
*                            E P A N E T                         *
*                     Hydraulic and Water Quality                *
*                     Analysis for Pipe Networks                 *
*                          Version 2.0                           *
******************************************************************
```

Node Results (Max Day + Fire Flow Future):

Node ID	Demand LPS	Head m	Pressure m	Quality	
1	0.00	117.54	26.56	0.00	
2	0.00	122.26	32.46	0.00	
3	136.26	115.99	26.59	0.00	
RES1	-47.59	118.10	0.00	0.00	Reservoir
RES2	-239.89	122.50	0.00	0.00	Reservoir
RES3	151.22	114.40	0.00	0.00	Reservoir

Link Results (Max Day + Fire Flow Future):

Link ID	Flow LPS	Velocity m/s	Unit Headloss m/km	Status
1	47.59	0.97	5.38	Open
2	136.26	2.78	37.74	Open
3	88.67	1.81	17.03	Open
4	151.22	2.14	16.03	Open
5	239.89	3.39	37.68	Open

```
******************************************************************
*                            E P A N E T                         *
*                     Hydraulic and Water Quality                *
*                     Analysis for Pipe Networks                 *
*                          Version 2.0                           *
******************************************************************
```

Node Results (Peak Hour Future):

Node ID	Demand LPS	Head m	Pressure m	Quality	
1	0.00	143.04	52.06	0.00	
2	0.00	142.92	53.12	0.00	
3	1.11	143.04	53.64	0.00	
RES1	-13.63	143.10	0.00	0.00	Reservoir
RES2	-203.60	143.10	0.00	0.00	Reservoir
RES3	216.12	127.70	0.00	0.00	Reservoir

Link Results (Peak Hour Future):

Link ID	Flow LPS	VelocityUnit m/s	Headloss m/km	Status
1	13.63	0.28	0.53	Open
2	1.11	0.02	0.00	Open
3	-12.52	0.26	0.45	Open
4	216.12	3.06	31.06	Open
5	203.60	2.88	27.81	Open

Appendix B

Sanitary Servicing Information

Project No. 121137
Project Name: Sortation Facility
Project Location: South Merivale Business Park, Ottawa

NOVATECH
Engineers, Planners & Landscape Architects

Date: May 2021

Detailed Building Use Sanitary Flows

Daily Demands from OBC Table 8.2.1.3

Establishment	Daily Demand Volume	
Industrial Building:	150	L/day/loading bay
	950	L/day/bathroom
Commercial Office:	75	L/day/9.3m² Floor area

Daily Demands from City of Ottawa Sewer Design Guidelines

Establishment	Daily Demand Volume	
Avg Commercial Flow	28000	L/ha/day
Avg Industrial Flow	35000	L/ha/day

Commercial / Industrial Peaking Factors City of Ottawa Sewer Design Guidelines

Building Use	Peaking Factor	
Commercial	1.5	Sewer Design Guidelines Appendix 4A
Industrial	3.6	Sewer Design Guidelines Appendix 4B

Proposed Building Sanitary Flows

	Commercial Office	Industrial Building	West Guard House	East Guard House	Totals
Floor Area	1557	N/A	13.75	25.77	
No. Bathrooms	N/A	8	N/A	N/A	
No. Loading Bays	N/A	100	N/A	N/A	
Total Daily Volume (Liters)	12556.5	22600.0	1031.3	1932.8	38120.5
Peak Building Sanitary Flow (L/s)	0.218	0.942	0.018	0.034	**1.21**

Future Development Area

	FUT 1 (Commercial)	FUT 2 (Light Industrial)	Totals
Area (ha)	2.8	11.5	14.3
Total Daily Volume (Liters)	78400.0	403550.0	481950.0
Peak Building Sanitary Flow (L/s)	1.36	16.81	18.18

Extraneous Flows

Total Site Area (ha)	Extraneous Flow Alottment (L/s/ha)	Total Extraneous Flows (L/s)
28.34	0.33	**9.35**

Total Site Peak Sanitary Flows

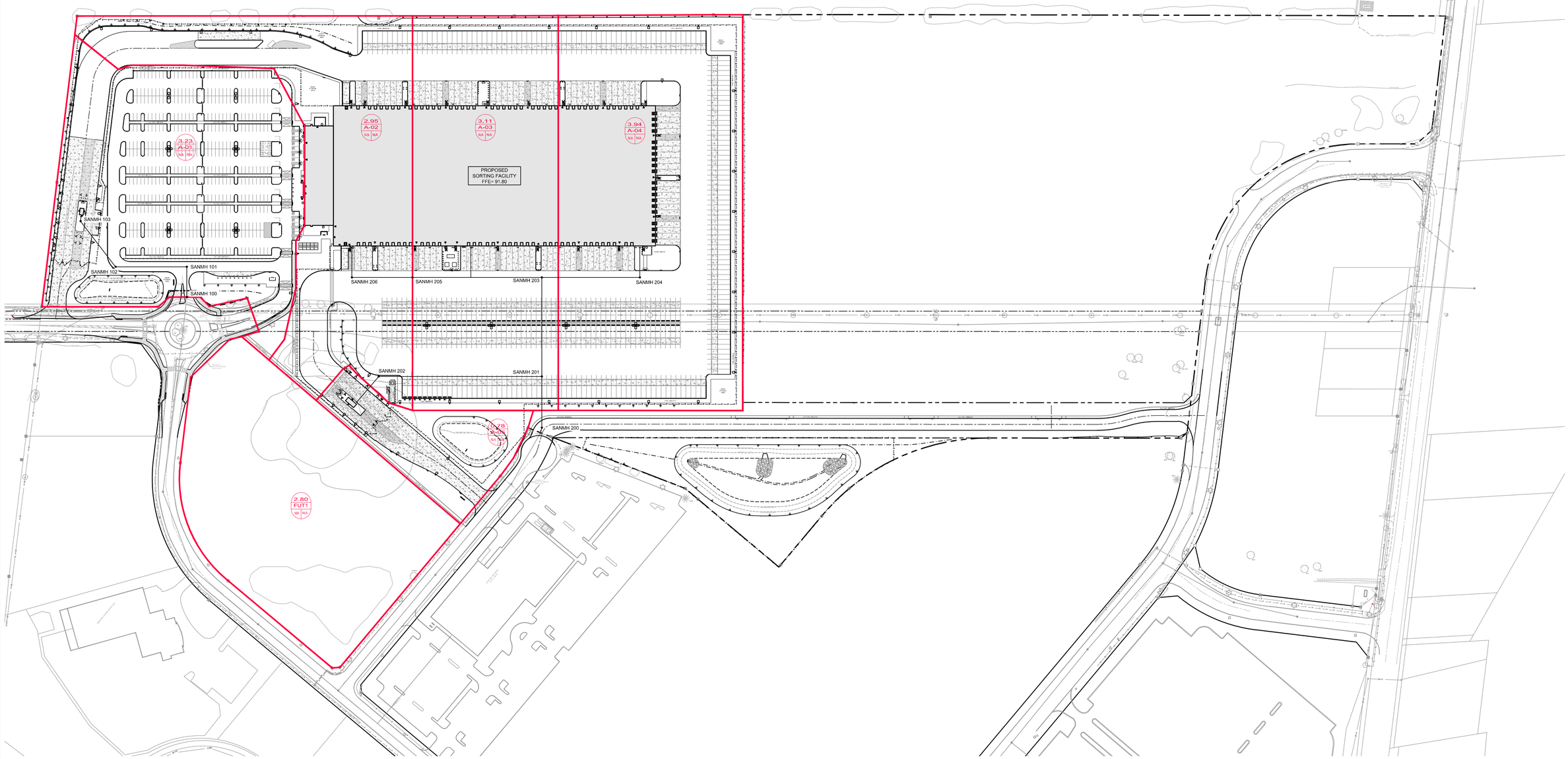
Total Peak Building Sanitary Flows (L/s)	Future Development Area Sanitary Flows (L/s)	Total Extraneous Flows (L/s)	Total Site Peak Flows (L/s)
1.21	18.18	9.35	**28.74**

LEGEND

- PROPERTY LINE
- PROPOSED SANITARY SEWER AND MANHOLE
- DIRECTION OF FLOW
- SAN MH — *EXISTING SANITARY MANHOLE & SEWER*
- SANITARY SEWER DRAINAGE AREA BOUNDARY
- 6.388 / A-01 / N/A | N/A — DRAINAGE AREA (ha) / SAN SEWER PIPE RUN / POPULATION / NO. UNITS

NORTH

KEY PLAN
N.T.S.



REFER TO 121137-ND FOR ADDITIONAL NOTES

NOTE:
THE POSITION OF ALL POLE LINES, CONDUITS, WATERMAINS, SEWERS AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, DETERMINE THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND ASSUME ALL LIABILITY FOR DAMAGE TO THEM.

Owner:
Medusa LP
c/o Russell Beach
16766 rte Trans-Canada, Suite 500
Kirkland, Quebec
H9H 4M7

NOT FOR CONSTRUCTION

No.	REVISION	DATE	BY
4.	REVISED PER CITY COMMENTS	AUG 06/2021	MJH
3.	ISSUED FOR SUPERSTRUCTURE AND ENVELOPE PERMIT	JULY 9/2021	MJH
2.	ISSUED FOR FOUNDATION PERMIT	JUNE 8/2021	MJH
1.	ISSUED FOR SITE PLAN APPROVAL	MAY 31/2021	MJH

SCALE
1:1250
1:1250
0 10 20 30 40 50

DESIGN MJH/ARM
CHECKED JLS
DRAWN MJH/ARM
CHECKED JLS
APPROVED JLS

FOR REVIEW ONLY

ISSUED FOR REVIEW

ISSUED FOR REVIEW

NOVATECH
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Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada K2M 1P6
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Facsimile (613) 254-5867
Website www.novatech-eng.com

LOCATION
SORTATION FACILITY
99 BILL LEATHEM DR, 2 & 20 LEIKIN DR, CITY OF OTTAWA

DRAWING NAME
SANITARY SEWER DRAINAGE AREA PLAN

PROJECT No. 121137
REV REV #4
DRAWING No. 121137-SAN

D07-12-21-0079

PLAN # 18474

M:\2021\121137\CAD\Design\121137 - SAN.dwg SANITARY SEWER DRAINAGE AREA PLAN Aug 05, 2021 - 3:11pm ameshcorp

Project No. 121137
Project Name: Sortation Facility
Project Location: South Merivale Business Park, Ottawa

Engineers, Planners & Landscape Architects

Date: May 2021
Revised:July 2021

Sanitary Sewer Design Sheet

LOCATION			COMMERCIAL / INDUTRIAL FLOW							PIPE					
AREA ID	FROM	TO	AREA (ha)	ACCUM AREA (ha)	PEAK FACTOR	PEAK FLOW (l/s)	ACCUM PEAK FLOW (l/s)	INFIL. FLOW (l/s)	TOTAL PEAK FLOW (l/s)	PIPE SIZE (mm)	PIPE SLOPE (%)	LENGTH (m)	CAPACITY (l/s)	VELOCITY (m/s)	Q/Qfull
West System															
A-01	103	102	3.23	3.23	1.5	0.018	0.02	1.07	1.08	200	2.00	42.2	46.3	1.5	2.3%
	102	101		3.23	0.0	0.000	0.02	1.07	1.08	200	0.50	52.4	23.2	0.7	4.7%
	101	ex		3.23	0.0	0.000	0.02	1.07	1.08	200	0.30	22.4	17.9	0.6	6.0%
East System (Trunk Sewer Connection)															
A-02	206	205	2.95	2.95	Varies	0.532	0.53	0.97	1.51	250	0.50	44.6	42.0	0.9	3.6%
A-03	205	203	3.11	6.06	3.6	0.314	0.85	2.00	2.85	250	0.30	95.2	32.5	0.7	8.7%
A-04	204	203	3.94	3.94	3.6	0.314	0.31	1.30	1.61	250	0.50	72.0	42.0	0.9	3.8%
	203	201		10.00	0.0	0.000	1.16	3.30	4.46	250	0.50	72.9	42.0	0.9	10.6%
A-05	202	201	0.78	0.78	1.5	0.034	0.03	0.26	0.29	250	1.00	120.0	59.4	1.2	0.5%
	201	200		10.78	0.0	0.000	1.19	3.56	4.75	250	2.00	37.6	84.0	1.7	5.7%
	200	EX 74		10.78	0.0	0.000	1.19	3.56	4.75	250	0.30	4.6	32.5	0.7	14.6%
							1.21	**4.62**	**5.84**						

* Area A-02 contains commercial and industrial land uses with peaking factors of 1.5 and 3.5 respectively. Refer to the detailed building use sanitary flows for a comprehensive breakdown.

** The Industrial portion of the building was divided evenly between the 3 proposed building services (areas A-02, A-03, and A-04).

Design Parameters:

City of Ottawa Sewer Design Guidelines (Appendix 4-A)		
- Extraneous Flows	0.33	l/s/ha
- Commercial Peaking Factor	1.5	
City of Ottawa Sewer Design Guidelines (Appendix 4-B)		
Industrial Peaking factor	3.6	

AREA TRIBUTARY TO EX SANMH 62 BARRHAVEN TRUNK SEWER

AREA TRIBUTARY TO 250mm DIA. SAN SEWER IN BILL LEATHEM DR

AREA TRIBUTARY TO 250mm DIA. SAN SEWER IN PARAGON AVE.

AREA TRIBUTARY TO 250mm dia. SEWER IN LEIKIN DR

AREA TRIBUTARY TO 250mm/ 750mm dia. SEWER IN LEIKIN DR

AREA TRIBUTARY TO 375mm dia. SAN SEWER IN BILL LEATHEM (VIA UNCONSTRUCTED STREET C SEWER

FUTURE WEST RIDEAU SANITARY COLLECTOR 1994-1995

EX. MERIVALE PUMPING STATION CAPACITY 152 L/S

BARRHAVEN TRUNK SANITARY SEWER (BTSS)

PHASE 1

PHASE 2

PHASE 3

PHASE 4

STREET 'A'

STREET 'B'

STREET 'C'

STREET 'D'

STREET 'E'

STREET 'F'

STREET 'G'

4.86 ha

1.91 ha

17.47 ha

3.31 ha

2.79 ha

24.4 ha

2.41 ha

STORM WATER MANAGEMENT FACILITY

EXISTING PUMPING STATION

MERIVALE ROAD

HIGHWAY No. 16

QUEEN ANNE CRESCENT

FUTURE DEVELOPMENT

KEY PLAN — SCALE : NTS

SITE

MEADOWLANDS ROAD, KNOXDALE ROAD, GREENBANK RD, WOODROFFE AVE, MERIVALE ROAD, CN, CP, SLACK ROAD, MACFARLANE ROAD, FALLOWFIELD ROAD, STRANDHERD, HWY 16, REGIEL BRIDGE

LEGEND

- EXISTING SANITARY SEWER
- PROPOSED SANITARY SEWER
- FUTURE RMOC TRUNK SANITARY SEWER
- SANITARY SUB DRAINAGE AREA
- EXTERNAL SANITARY DRAINAGE AREA BOUNDARY
- AREA (HECTARES) / POPULATION EQUIVALENT 100 PERSONS/ha
- MH MANHOLE

NOTE:
THE POSITION OF ALL POLE LINES, CONDUITS, WATERMAINS, SEWERS AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, DETERMINE THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND ASSUME ALL LIABILITY FOR DAMAGE TO THEM.

No.	REVISION	DATE	BY
1	REVISED PER R.M.O.C. COMMENTS	01.06.92	JFB

LICENCED PROFESSIONAL ENGINEER — UDO BOEHME — PROVINCE OF ONTARIO

LICENCED PROFESSIONAL ENGINEER — R.S. CEBRYK — PROVINCE OF ONTARIO

NOVATECH
ENGINEERING CONSULTANTS LTD
OTTAWA, ONTARIO

DESIGN	UB/JFB
CHECKED	UB
DRAWN	JFB
CHECKED	UB
APPROVED	RSC
SCALE	1 : 2500
	HORIZONTAL
	VERTICAL

CITY OF NEPEAN

NEPEAN

SOUTH MERIVALE BUSINESS PARK - PHASE 2 & 3

SANITARY DRAINAGE AREA PLAN

CONTRACT No.	92019
DATE	JULY 1992
DRAWING No.	92019-SAN

Project No. 121137
Project Name: Project Medusa
Project Location: South Merivale Business Park, Ottawa

NOVATECH
Engineers, Planners & Landscape Architects

Date: May 2021

Sanitary Flow Allotment Calculations

Sewer Outlet Location	Area (ha)	Equivalent Population	Peak Flow (L/s)	Extraneous Flow (L/s)	Total Peak Sanitary Flow Allotment (L/s)
250mm dia. Bill Leathem Dr.	4.9	490	7.15	0.54	7.68
250mm dia. Paragon Ave.	2.0	200	2.92	0.22	3.14
1050mm dia. Trunk Sewer EX SANMH 62	17.4	1740	25.38	1.91	27.29
250mm/750mm dia. Leikin Dr.	3.4	340	4.96	0.37	5.33
375mm dia. Bill Leathem Dr Via Street C	2.8	280	4.08	0.31	4.39
Total	30.5	3050	44.48	3.36	47.83

Design Criteria From SMB Ph II & III Services Design Report :

Equivalent Population =	100	People/ha
Design Flow =	450	L/day/person
Peaking Factor =	2.8	
Extraneous Flows=	0.11	L/s/ha

SANITARY SEWER DESIGN SHEET

PROJECT: SOUTH MERIVALE BUSINESS PARK Phases II and III
PAGE: 1 of 5

DESIGNED BY : LJ
DEVELOPER: CITY OF NEPEAN
DATE: June 22, 1992

CHECKED BY :
ENGINEERS: NOVATECH ENGINEERING CONSULTANTS LTD.
Revision:

LOCATION			INDIVIDUAL		CUMMULATIVE		PEAKING	POP FLOW	PEAK EXTRAN.	PEAK DESIGN	PROPOSED SEWER					
STREET	FROM M.H.	TO M.H.	POP	AREA (ha)	POP	AREA (ha)	FACTOR M	Q (p) (L/s)	FLOW Q (i) (L/s)	FLOW Q (d) (L/s)	LENGTH (m)	PIPE SIZE (mm)	TYPE OF PIPE	GRADE %	CAPACITY (L/s)	FULL FLOW VELOCITY (m/s)
'F'	19	10	190	1.9	190	1.9	2.80	2.77	0.21	2.98	154.0	250	PVC	0.30	33.98	0.67
'F'	20	21	120	1.2	120	1.2	2.80	1.75	0.13	1.88	58.0	250	PVC	0.30	33.98	0.67
'F'	21	22	210	2.1	330	3.3	2.80	4.81	0.36	5.18	80.0	250	PVC	0.30	33.98	0.67
'F'	22	23	250	2.5	580	5.8	2.80	8.46	0.64	9.10	111.0	250	PVC	0.30	33.98	0.67
'F'	23	24	150	1.5	730	7.3	2.80	10.65	0.80	11.45	80.0	250	PVC	0.30	33.98	0.67
Flow From Future Development Into Manhole																
			170	1.7												
'F'	24	26	210	2.1	1110	11.1	2.80	16.19	1.22	17.41	64.0	250	PVC	0.30	33.98	0.67

q = average daily per cap. flow (450 L/cap. d)
I = unit of peak extraneous flow (0.11 L/ha/s)
M = peaking factor =2.8

Q (p) = peak population flow (L/s)
Q (i) = peak extraneous flow (L/s)
Q (d) = peak design flow (L/s)

Q (p) = (P*q*M)/(86,400) (L/s)
Q (i) = I*A (L/s), A in hectares
Q (d) = Q (p) + Q (i) (L/s)

n = 0.013

SANITARY SEWER DESIGN SHEET

PROJECT: SOUTH MERIVALE BUSINESS PARK Phases II and III
DEVELOPER: CITY OF NEPEAN
ENGINEERS: NOVATECH ENGINEERING CONSULTANTS LTD.

DESIGNED BY : LJ
CHECKED BY :

DATE: SEPTEMBER 6, 1990
Revision:

LOCATION			INDIVIDUAL		CUMMULATIVE		PEAKING	POP FLOW	PEAK EXTRAN.	PEAK DESIGN	PROPOSED SEWER					
STREET	FROM M.H.	TO M.H.	POP	AREA (ha)	POP	AREA (ha)	FACTOR M	Q (p) (L/s)	FLOW Q (i) (L/s)	FLOW Q (d) (L/s)	LENGTH (m)	PIPE SIZE (mm)	TYPE OF PIPE	GRADE %	CAPACITY (L/s)	FULL FLOW VELOCITY (m/s)
'F'	26	27	130	1.3	1240.0	12.4	2.80	18.08	1.36	19.45	64.0	250	PVC	0.30	33.98	0.67
'F'	27	28	120	1.2	1360	13.6	2.80	19.83	1.50	21.33	66.0	250	PVC	0.30	33.98	0.67
'F'	28	29	60	0.6	1420	14.2	2.80	20.71	1.56	22.27	24.0	250	PVC	0.30	33.98	0.67
'F'	29	14	70	0.7	1490	14.9	2.80	21.73	1.64	23.37	150.0	250	PVC	0.30	33.98	0.67
'D'	62	59	130	1.3	130	1.3	2.80	1.90	0.14	2.04	44.0	250	PVC	0.30	33.98	0.67
'D'	59	58	190	1.9	320	3.2	2.80	4.67	0.35	5.02	87.0	250	PVC	0.30	33.98	0.67
'D'	58	35	120	1.2	440	4.4	2.80	6.42	0.48	6.90	110.0	250	PVC	0.31	33.98	0.67

q = average daily per cap. flow (450 L/cap. d)
I = unit of peak extraneous flow (0.11 l/ha/s)
M = peaking factor = 2.8

Q (p) = peak population flow (L/s)
Q (i) = peak extraneous flow (L/s)
Q (d) = peak design flow (L/s)

Q (p) = (P*q*M)/(86,400) (L/s)
Q (i) = I*A (L/s), A in hectares
Q (d) = Q (p) + Q (i) (L/s)

n = 0.013

PROJECT: SOUTH MERIVALE BUSINESS PARK Phases II and III

DESIGNED BY : SG

DEVELOPER: CITY OF NEPEAN

CHECKED BY : LJ

ENGINEERS: NOVATECH ENGINEERING CONSULTANTS LTD.

DATE: June 22, 1992

Revision:

LOCATION			INDIVIDUAL		CUMMULATIVE		PEAKING	POP FLOW	PEAK EXTRAN.	PEAK DESIGN	PROPOSED SEWER					
STREET	FROM M.H.	TO M.H.	POP	AREA (ha)	POP	AREA (ha)	FACTOR M	Q (p) (L/s)	FLOW Q (i) (L/s)	FLOW Q (d) (L/s)	LENGTH (m)	PIPE SIZE (mm)	TYPE OF PIPE	GRADE %	CAPACITY (L/s)	FULL FLOW VELOCITY (m/s)
'B'	40	39	360	3.6	360	3.6	2.80	5.25	0.40	5.65	113.0	250	PVC	0.30	33.98	0.67
'B'	39	38	240	2.4	600	6.0	2.80	8.75	0.66	9.41	95.0	250	PVC	0.30	33.98	0.67
'B'	38	37	160	1.6	760	7.6	2.80	11.08	0.84	11.92	61.0	250	PVC	0.30	33.98	0.67
'B'	37	36	160	1.6	920	9.2	2.80	13.42	1.01	14.43	60.8	250	PVC	0.30	33.98	0.67
'B'	36	35	90	0.9	1010	10.1	2.80	14.73	1.11	15.84	75.0	250	PVC	0.30	33.98	0.67
'B'	35	34	130	1.3	1580	15.8	2.80	23.04	1.74	24.78	106.0	250	PVC	0.30	33.98	0.67
'B'	41	42	290	2.9	290	2.9	2.80	4.23	0.32	4.55	110.0	250	PVC	0.30	33.98	0.67
'B'	42	43	190	1.9	480	4.8	2.80	7.00	0.53	7.53	113.0	250	PVC	0.30	33.98	0.67

q = average daily per cap. flow (450 L/cap. d)

I = unit of peak extraneous flow (0.11 l/ha/s)

Q (p) = peak population flow (L/s)

Q (i) = peak extraneous flow (L/s)

Q (p) = (P*q*M)/(86,400) (L/s)

Q (i) = I*A (L/s), A in hectares

n = 0.013

SANITARY SEWER DESIGN SHEET

PROJECT: SOUTH MERIVALE BUSINESS PARK Phases II and III
DEVELOPER: CITY OF NEPEAN
ENGINEERS: NOVATECH ENGINEERING CONSULTANTS LTD.

DESIGNED BY : LJ
CHECKED BY :

DATE: SEPTEMBER 6, 1990
Revision:

LOCATION			INDIVIDUAL		CUMMULATIVE		PEAKING	POP FLOW	PEAK EXTRAN.	PEAK DESIGN	PROPOSED SEWER					
STREET	FROM M.H.	TO M.H.	POP	AREA (ha)	POP	AREA (ha)	FACTOR M	Q (p) (L/s)	FLOW Q (i) (L/s)	FLOW Q (d) (L/s)	LENGTH (m)	PIPE SIZE (mm)	TYPE OF PIPE	GRADE %	CAPACITY (L/s)	FULL FLOW VELOCITY (m/s)
'B'	49	47	170	1.7	170	1.7	2.80	2.48	0.19	2.67	105.0	250	PVC	0.30	33.98	0.67
'B'	47	46	200	2.0	370	3.7	2.80	5.40	0.41	5.80	86.0	250	PVC	0.30	33.98	0.67
'B'	46	45	220	2.2	590	5.9	2.80	8.60	0.65	9.25	99.0	250	PVC	0.30	33.98	0.67
'B'	45	44	230	2.3	820	8.2	2.80	11.96	0.90	12.86	101.0	250	PVC	0.30	33.98	0.67
'B'	44	43	160	1.6	980	9.8	2.80	14.29	1.08	15.37	97.0	250	PVC	0.30	33.98	0.67
'D'	43	62	120	1.2	1580	15.8	2.80	23.04	1.74	24.78	118.0	250	PVC	0.30	33.98	0.67
'D'	61	62	160	1.6	160	1.6	2.80	2.33	0.18	2.51	38.0	250	PVC	0.30	33.98	0.67

q = average daily per cap. flow (450 L/cap. d)
I = unit of peak extraneous flow (0.11 l/ha/s)
M = peaking factor = 2.8

Q (p) = peak population flow (L/s)
Q (i) = peak extraneous flow (L/s)
Q (d) = peak design flow (L/s)

Q (p) = (P*q*M)/(86,400) (L/s)
Q (i) = I*A (L/s), A in hectares
Q (d) = Q (p) + Q (i) (L/s)

n = 0.013

total flow to EX SAN MH 62

SANITARY SEWER DESIGN SHEET

PROJECT: SOUTH MERIVALE BUSINESS PARK Phases II and III

PAGE: 5 of 5

DESIGNED BY : LJ

DEVELOPER: CITY OF NEPEAN

DATE: June 22, 1992

CHECKED BY :

ENGINEERS: NOVATECH ENGINEERING CONSULTANTS LTD.

Revision:

LOCATION			INDIVIDUAL		CUMMULATIVE		PEAKING	POP FLOW	PEAK EXTRAN.	PEAK DESIGN	PROPOSED SEWER					
STREET	FROM M.H.	TO M.H.	POP	AREA (ha)	POP	AREA (ha)	FACTOR M	Q (p) (L/s)	FLOW Q (i) (L/s)	FLOW Q (d) (L/s)	LENGTH (m)	PIPE SIZE (mm)	TYPE OF PIPE	GRADE %	CAPACITY (L/s)	FULL FLOW VELOCITY (m/s)
'E'	17	8	120	1.2	120	1.2	2.80	1.75	0.13	1.88	111.3	250	PVC	0.30	33.98	0.67

q = average daily per cap. flow (450 L/cap. d)

I = unit of peak extraneous flow (0.11 l/ha/s)

M = peaking factor = 2.8

Q (p) = peak population flow (L/s)

Q (i) = peak extraneous flow (L/s)

Q (d) = peak design flow (L/s)

Q (p) = (P*q*M)/(86,400) (L/s)

Q (i) = I*A (L/s), A in hectares

Q (d) = Q (p) + Q (i) (L/s)

n = 0.013

SANITARY SEWER DESIGN SHEET

DESIGNED BY : SG
CHECKED BY : LJ

PROJECT: SOUTH MERIVALE BUSINESS PARK - PHASE 1
DEVELOPER: CITY OF NEPEAN
ENGINEERS: NOVATECH ENGINEERING CONSULTANTS LTD.

DATE: NOV. 5, 1991
Revision: Dec. 31/91

LOCATION			INDIVIDUAL		CUMULATIVE		PEAKING	POP FLOW	PEAK EXTRAN.	PEAK DESIGN	PROPOSED SEWER					
STREET	FROM M.H.	TO M.H.	POP	AREA (ha)	POP	AREA (ha)	FACTOR M	Q (p) (L/s)	FLOW Q (I) (L/s)	FLOW Q (d) (L/s)	LENGTH (m)	PIPE SIZE (mm)	TYPE OF PIPE	GRADE %	CAPACITY (L/s)	FULL FLOW VELOCITY (m/s)
'A'	EXT.	15A	Constant Flow from Longfield-Davidson Heights = 249.45 L/s*							249.45		750	CONC	0.15	449.81	0.99
	15A	15								249.45	18.0	750	CONC	0.15	449.81	0.99
	15	14	200	2.0	200	2.0	2.80	2.92	0.22	252.59	105.0	750	CONC	0.15	449.81	0.99
Flow from Street 'B' into MH 34:			1580	15.8												
'B'	34	33	170	1.7	1750	17.5	2.80	25.52	1.93	27.45	94.0	375	CONC	0.18	77.60	0.68
Flow from Street 'C' into MH 33:			830	8.3												
'B'	33	32	110	1.1	2690	26.9	2.80	39.23	2.96	42.19	79.0	375	CONC	0.18	77.60	0.68
	32	31			2690	26.9	2.80	39.23	2.96	42.19	27.5	375	CONC	0.18	77.60	0.68
	31	14			2690	26.9	2.80	39.23	2.96	42.19	34.0	375	CONC	0.18	77.60	0.68

* Constant flow from external area = 249.45 L/s per Delcan Design Sheet dated 91.10.21

q = average daily per cap. flow (450 L/cap. d)

I = unit of peak extraneous flow (0.11 l/ha/s)

M = peaking factor = 2.8 for Light Industrial land use

Q (p) = peak population flow (L/s)

Q (I) = peak extraneous flow (L/s)

Q (d) = peak design flow (L/s)

Q (p) = (P*q*M)/(86,400) (L/s)

Q (I) = I*A (L/s), A in hectares

Q (d) = Q (p) + Q (I) (L/s)

n = 0.013

SANITARY SEWER DESIGN SHEET

DESIGNED BY : SG
CHECKED BY : LJ

PROJECT: SOUTH MERIVALE BUSINESS PARK - PHASE 1
DEVELOPER: CITY OF NEPEAN
ENGINEERS: NOVATECH ENGINEERING CONSULTANTS LTD.

DATE: NOV. 4, 1991
Revision: Dec. 31/91

LOCATION			INDIVIDUAL		CUMULATIVE		PEAKING	POP FLOW	PEAK EXTRAN.	PEAK DESIGN	PROPOSED SEWER					
STREET	FROM M.H.	TO M.H.	POP	AREA (ha)	POP	AREA (ha)	FACTOR M	Q (p) (L/s)	FLOW Q (i) (L/s)	FLOW Q (d) (L/s)	LENGTH (m)	PIPE SIZE (mm)	TYPE OF PIPE	GRADE %	CAPACITY (L/s)	FULL FLOW VELOCITY (m/s)
Flow from Street 'F' into MH 14:			1540	15.4												
'A'	14	13	120	1.2	4550	45.5	2.80	66.35	5.01	320.81	72.0	750	CONC	0.14	434.56	0.95
	13	12	120	1.2	4670	46.7	2.80	68.10	5.14	322.69	40.5	750	CONC	0.14	434.56	0.95
	12	11	220	2.2	4890	48.9	2.80	71.31	5.38	326.14	119.0	750	CONC	0.15	449.81	0.99
	11	10	260	2.6	5150	51.5	2.80	75.10	5.67	330.22	115.0	750	CONC	0.15	449.81	0.99
Flow from Street 'F' into MH 10:			190	1.9												
'A'	10	9	180	1.8	5520	55.2	2.80	80.50	6.07	336.02	86.5	750	CONC	0.15	449.81	0.99
	9	8	140	1.4	5660	56.6	2.80	82.54	6.23	338.22	86.0	750	CONC.	0.15	449.81	0.99

q = average daily per cap. flow (450 L/cap. d)
I = unit of peak extraneous flow (0.11 l/ha/s)
M = peaking factor = 2.8 for Light Industrial land use

Q (p) = peak population flow (L/s)
Q (i) = peak extraneous flow (L/s)
Q (d) = peak design flow (L/s)

Q (p) = (P*q*M)/(86,400) (L/s)
Q (i) = I*A (L/s), A in hectares
Q (d) = Q (p) + Q (i) (L/s)

n = 0.013

SANITARY SEWER DESIGN SHEET

DESIGNED BY : SG

CHECKED BY : LJ

PROJECT: SOUTH MERIVALE BUSINESS PARK - PHASE 1

DEVELOPER: CITY OF NEPEAN

ENGINEERS: NOVATECH ENGINEERING CONSULTANTS LTD.

DATE: NOV.4, 1991

Revision: Dec. 31/91

LOCATION			INDIVIDUAL		CUMULATIVE		PEAKING	POP FLOW	PEAK EXTRAN.	PEAK DESIGN	PROPOSED SEWER					
STREET	FROM M.H.	TO M.H.	POP	AREA (ha)	POP	AREA (ha)	FACTOR M	Q (p) (L/s)	FLOW Q (i) (L/s)	FLOW Q (d) (L/s)	LENGTH (m)	PIPE SIZE (mm)	TYPE OF PIPE	GRADE %	CAPACITY (L/s)	FULL FLOW VELOCITY (m/s)
Flow from Street 'E' into MH 8:			-120	1.2												
'A'	8	7	250	2.5	6030	60.3	2.80	87.94	6.63	344.02	44.0	750	CONC	0.16	464.57	1.02
	7	6			6030	60.3	2.80	87.94	6.63	344.02	44.0	750	CONC	0.16	464.57	1.02
	6	5	250	2.5	6280	62.8	2.80	91.58	6.91	347.94	96.0	750	CONC	0.16	464.57	1.02
'A'	1	2	230	2.3	230	2.3	2.80	3.35	0.25	3.61	23.5	250	PVC	0.30	33.98	0.67
	2	3			230	2.3	2.80	3.35	0.25	3.61	49.0	250	PVC	0.30	33.98	0.67
	3	4	190	1.9	420	4.2	2.80	6.13	0.46	6.59	43.0	250	PVC	0.30	33.98	0.67
	4	5			420	4.2	2.80	6.13	0.46	6.59	56.0	250	PVC	0.30	33.98	0.67
'A'	* Service Connections:															
		S9			290	2.9	2.80	4.23	0.32	4.55		250	PVC	1.00	62.04	1.22

q = average daily per cap. flow (450 L/cap. d)

I = unit of peak extraneous flow (0.11 l/ha/s)

M = peaking factor = 2.8 for Light Industrial land use

Q (p) = peak population flow (L/s)

Q (i) = peak extraneous flow (L/s)

Q (d) = peak design flow (L/s)

Q (p) = (P*q*M)/(86,400) (L/s)

Q (i) = I*A (L/s), A in hectares

Q (d) = Q (p) + Q (i) (L/s)

n = 0.013

* Note: 10 service connections - worst case @ manhole S9

Matthew Hrehoriak

From: Sharif, Golam <sharif.sharif@ottawa.ca>
Sent: Friday, July 30, 2021 2:34 PM
To: Matthew Hrehoriak
Subject: RE: 99 Bill Leathem Dr, 2 & 20 Leikin Dr Sanitary Capacity Confirmation

Hi Matthew,

We have sufficient capacity for the proposed sanitary flows. Thanks.

Sharif

From: Matthew Hrehoriak <m.hrehoriak@novatech-eng.com>
Sent: July 28, 2021 11:15 AM
To: Sharif, Golam <sharif.sharif@ottawa.ca>
Subject: 99 Bill Leathem Dr, 2 & 20 Leikin Dr Sanitary Capacity Confirmation

Hi Sharif,

In response to comments 2.38 can you please confirm the downstream capacity of the sanitary sewer for the proposed South Merivale Business Park development.

The proposed flows are as follows:

Connection #1 (Bill Leatham Round-a-bout connection): Peak flow 0.018 L/s, Infiltration 1.07 1.07 L/s, **Total Flow = 1.08 L/s**

Connection #2 (Paragon Avenue Connection_: Peak flow 1.03 L/s, Infiltration 3.56 L/s, **Total Flow = 4.59 L/s**

Connection #3 (Leikin Drive Connection): Peak flow 1.5 L/s, Infiltration = 0.51 L/s, **Total Flow = 2.01 L/s**

A figure is attached depicted the proposed connection locations.

Please let me know if you require any further information.

Regards,

Matthew Hrehoriak, P.Eng., Project Engineer | Land Development Engineering
NOVATECH Engineers, Planners & Landscape Architects
240 Michael Cowpland Drive, Suite 200, Ottawa, ON, K2M 1P6 | Tel: 613.254.9643 x 273 | Fax: 613.254.5867

'

'

Appendix C

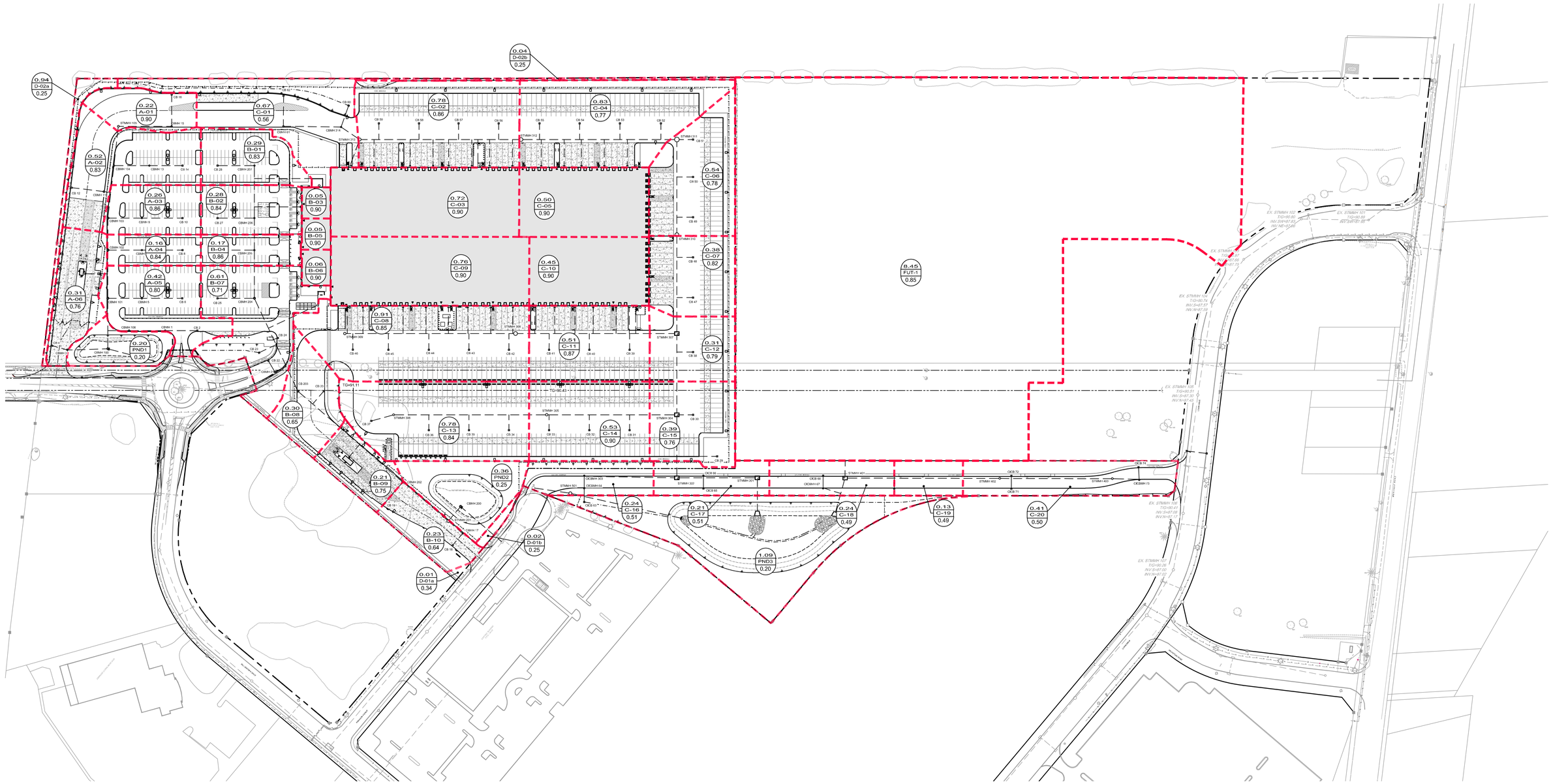
Storm Servicing Information

LEGEND

- PROPERTY LINE
- PROPOSED STORM SEWER AND MANHOLE
- DIRECTION OF FLOW
- PROPOSED CATCHBASIN MANHOLE
- PROPOSED CATCHBASIN
- STM MH — EXISTING STORM MANHOLE & SEWER
- CB 1 — EXISTING CATCHBASIN
- STORM SEWER DRAINAGE AREA BOUNDARY
- 0.085 / A-16 / 0.78 — DRAINAGE AREA (ha) / DRAINAGE AREA ID / RUNOFF COEFFICIENT

NORTH

KEY PLAN
N.T.S.



REFER TO 121137-ND FOR ADDITIONAL NOTES

NOTE:
THE POSITION OF ALL POLE LINES, CONDUITS, WATERMAINS, SEWERS AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, DETERMINE THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND ASSUME ALL LIABILITY FOR DAMAGE TO THEM.

Owner:
Medusa LP
c/o Russell Beach
16766 rte Trans-Canada, Suite 500
Kirkland, Quebec
H9H 4M7

NOT FOR CONSTRUCTION

No.	REVISION	DATE	BY
4.	REVISED PER CITY COMMENTS	AUG 06/2021	MJH
3.	ISSUED FOR SUPERSTRUCTURE AND ENVELOPE PERMIT	JULY 9/2021	MJH
2.	ISSUED FOR FOUNDATION PERMIT	JUNE 8/2021	MJH
1.	ISSUED FOR SITE PLAN APPROVAL	MAY 31/2021	MJH

SCALE
1:1250
1:1250
0 10 20 30 40 50

DESIGN MJH/ARM
CHECKED JLS
DRAWN MJH/ARM
CHECKED JLS
APPROVED JLS

FOR REVIEW ONLY
ISSUED FOR REVIEW
ISSUED FOR REVIEW

NOVATECH
Engineers, Planners & Landscape Architects
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada K2M 1P6
Telephone (613) 254-9643
Facsimile (613) 254-5867
Website www.novatech-eng.com

LOCATION
SORTATION FACILITY
99 BILL LEATHEM DR, 2 & 20 LEIKIN DR, CITY OF OTTAWA

DRAWING NAME
STORM SEWER DRAINAGE AREA PLAN

PROJECT No. 121137
REV REV #4
DRAWING No. 121137-STM

PLAN # 18474

D07-12-21-0079

M:\2021\121137\CAD\Design\121137-STM.dwg, STM, Aug 05, 2021 - 3:09pm, smaxwarp

Sortation Facility

Project No.: 121137

STORM SEWER DESIGN SHEET

FLOW RATES BASED ON RATIONAL METHOD

NOVATECH
Engineers, Planners & Landscape Architects

LOCATION			AREA (ha)					FLOW							TOTAL FLOW	SEWER DATA								
AREA ID	From Manhole	To Manhole	Total Area (ha)	C = 0.20	C = 0.90	C	AC (ha)	Indiv 2.78 AC	Accum 2.78 AC	Time of Concentration	Rainfall Intensity 2 Year (mm/hr)	Rainfall Intensity 5 Year (mm/hr)	Rainfall Intensity 10 Year (mm/hr)	Peak Flow (L/s)	Total Peak Flow, Q (L/s)	Dia. (m) Actual	Equivalent Dia. (mm)	Pipe Dimension (mm)	Type	Slope (%)	Length (m)	Capacity (L/s)	Velocity (m/s)	Flow Time (min)	Ratio Q/Q full
WEST PARKING SYSTEM - POND 1 (1:5 YEAR STORM EVENT)																								
A-01	STMMH 105	CBMH 104	0.220	0.000	0.220	0.00 0.90 0.00	0.00 0.20 0.00	0.000 0.550 0.000	0.000 0.550 0.000	10.00 10.00 10.00		104.19		57.4	57.4	0.381	375	375	PVC	1.00	29.4	182.8	1.60	0.31	31%
A-02	CBMH 104	CBMH 103	0.520	0.053	0.467	0.00 0.83 0.00	0.00 0.43 0.00	0.000 1.199 0.000	0.000 1.749 0.000	10.31 10.31 10.31		102.61		179.5	179.5	0.686	675	675	Conc	0.30	39.3	480.0	1.30	0.50	37%
A-03	CBMH 103	CBMH 102	0.258	0.016	0.242	0.00 0.86 0.00	0.00 0.22 0.00	0.000 0.615 0.000	0.000 2.364 0.000	10.81 10.81 10.81		100.10		236.7	236.7	0.686	675	675	Conc	0.30	23.9	480.0	1.30	0.31	49%
A-04	CBMH 102	CBMH 101	0.162	0.013	0.148	0.00 0.84 0.00	0.00 0.14 0.00	0.000 0.378 0.000	0.000 2.743 0.000	11.12 11.12 11.12		98.64		270.5	270.5	0.762	750	750	Conc	0.30	35.9	635.8	1.39	0.43	43%
A-05	CBMH 101	CBMH 100	0.421	0.058	0.363	0.00 0.80 0.00	0.00 0.34 0.00	0.000 0.941 0.000	0.000 3.684 0.000	11.55 11.55 11.55		96.68		356.2	356.2	0.762	750	750	Conc	0.30	37.5	635.8	1.39	0.45	56%
PND 1, A-06	CBMH 100	EX. STMMH 139	0.510	0.260	0.251	0.00 0.54 0.00	0.00 0.28 0.00	0.000 0.772 0.000	0.000 4.455 0.000	11.99 11.99 11.99		94.72		422.0	422.0	0.686	675	675	Conc	1.00	56.6	876.4	2.37	0.40	48%
EAST PARKING SYSTEM - POND 2 (1:5 YEAR STORM EVENT)																								
B-01, B-03	CBMH 207	CBMH 206	0.344	0.031	0.313	0.00 0.84 0.00	0.00 0.29 0.00	0.000 0.801 0.000	0.000 0.801 0.000	10.00 10.00 10.00		104.19		83.4	83.4	0.457	450	450	Conc	0.50	39.0	210.2	1.28	0.51	40%
B-02, B-05	CBMH 206	CBMH 205	0.325	0.023	0.302	0.00 0.85 0.00	0.00 0.28 0.00	0.000 0.769 0.000	0.000 1.570 0.000	10.51 10.51 10.51		101.59		159.5	159.5	0.533	525	525	Conc	0.50	23.9	317.0	1.42	0.28	50%
B-04,B-06	CBMH 205	CBMH 204	0.231	0.011	0.220	0.00 0.87 0.00	0.00 0.20 0.00	0.000 0.556 0.000	0.000 2.126 0.000	10.79 10.79 10.79		100.20		213.0	213.0	0.610	600	600	Conc	0.30	35.9	350.6	1.20	0.50	61%
B-07	CBMH 204	CBMH 203	0.611	0.168	0.443	0.00 0.71 0.00	0.00 0.43 0.00	0.000 1.202 0.000	0.000 3.328 0.000	11.29 11.29 11.29		97.86		325.6	325.6	0.686	675	675	Conc	0.30	76.3	480.0	1.30	0.98	68%
B-08	CBMH 203	CBMH 202	0.297	0.104	0.193	0.00 0.65 0.00	0.00 0.19 0.00	0.000 0.541 0.000	0.000 3.868 0.000	12.27 12.27 12.27		93.58		362.0	362.0	0.838	825	825	Conc	0.30	103.2	819.8	1.49	1.16	44%
B-09	CBMH 202	STMMH 201	0.215	0.046	0.168	0.00 0.75 0.00	0.00 0.16 0.00	0.000 0.447 0.000	0.000 4.315 0.000	13.42 13.42 13.42		89.02		384.2	384.2	0.838	825	825	Conc	0.50	44.5	1,058.3	1.92	0.39	36%
B-10	STMMH 201	CBMH 200	0.229	0.086	0.143	0.00 0.64 0.00	0.00 0.15 0.00	0.000 0.406 0.000	0.000 4.721 0.000	13.81 13.81 13.81		87.61		413.6	413.6	0.838	825	825	Conc	1.00	14.1	1,496.7	2.71	0.09	28%
PND2	CBMH 200	EX. STMMH 159	0.382	0.382	0.000	0.00 0.20 0.00	0.00 0.08 0.00	0.000 0.212 0.000	0.000 4.933 0.000	13.90 13.90 13.90		87.30		430.7	430.7	0.838	825	825	Conc	1.00	40.5	1,496.7	2.71	0.25	29%

Sortation Facility

Project No.: 121137

STORM SEWER DESIGN SHEET

FLOW RATES BASED ON RATIONAL METHOD

NOVATECH
Engineers, Planners & Landscape Architects

LOCATION			AREA (ha)					FLOW							TOTAL FLOW	SEWER DATA								
AREA ID	From Manhole	To Manhole	Total Area (ha)	C = 0.20	C = 0.90	C	AC (ha)	Indiv 2.78 AC	Accum 2.78 AC	Time of Concentration	Rainfall Intensity 2 Year (mm/hr)	Rainfall Intensity 5 Year (mm/hr)	Rainfall Intensity 10 Year (mm/hr)	Peak Flow (L/s)	Total Peak Flow, Q (L/s)	Dia. (m) Actual	Equivalent Dia. (mm)	Pipe Dimension (mm)	Type	Slope (%)	Length (m)	Capacity (L/s)	Velocity (m/s)	Flow Time (min)	Ratio Q/Q full
TRUCK COURT SYSTEM - POND 3 (1:5 YEAR STORM EVENT)																								
						0.00	0.00	0.000	0.000	10.00														
C-01	CBMH 314	STMMH 313	0.668	0.329	0.339	0.56	0.37	1.031	1.031	10.00		104.19		107.4	107.4	0.457	450	450	Conc	0.50	16.6	210.2	1.28	0.22	51%
						0.00	0.00	0.000	0.000	10.00														
						0.00	0.00	0.000	0.000	10.22														
C-02,C-03	STMMH 313	STMMH 312	1.504	0.075	1.429	0.87	1.30	3.618	4.648	10.22		103.06		479.1	479.1	1.067	1050	1050	Conc	0.10	120.0	900.5	1.01	1.99	53%
						0.00	0.00	0.000	0.000	10.22														
						0.00	0.00	0.000	0.000	12.20														
C-04,C-05	STMMH 312	STMMH 311	1.331	0.152	1.178	0.82	1.09	3.033	7.681	12.20		93.84		720.8	720.8	1.219	1200	1200	Conc	0.10	116.0	1,285.7	1.10	1.76	56%
						0.00	0.00	0.000	0.000	12.20														
						0.00	0.00	0.000	0.000	13.96														
C-06	STMMH 311	STMMH 310	0.538	0.095	0.443	0.78	0.42	1.161	8.842	13.96		87.09		770.0	770.0	1.219	1200	1200	Conc	0.10	70.9	1,285.7	1.10	1.07	60%
						0.00	0.00	0.000	0.000	13.96														
						0.00	0.00	0.000	0.000	15.03														
C-07	STMMH 310	STMMH 307	0.377	0.041	0.336	0.82	0.31	0.863	9.705	15.03		83.46		810.0	810.0	1.219	1200	1200	Conc	0.10	73.5	1,285.7	1.10	1.11	63%
						0.00	0.00	0.000	0.000	15.03														
						0.00	0.00	0.000	0.000	10.00														
C-08,C-09	CBMH 309	STMMH 308	1.662	0.064	1.598	0.87	1.45	4.035	4.035	10.00		104.19		420.4	420.4	0.914	900	900	Conc	0.10	127.0	596.9	0.91	2.33	70%
						0.00	0.00	0.000	0.000	10.00														
						0.00	0.00	0.000	0.000	12.33														
C-10, C-11	STMMH 308	STMMH 307	0.960	0.021	0.939	0.88	0.85	2.361	6.396	12.33		93.32		596.8	596.8	1.067	1050	1050	Conc	0.10	120.0	900.5	1.01	1.99	66%
						0.00	0.00	0.000	0.000	12.33														
						0.00	0.00	0.000	0.000	16.14														
C-12	STMMH 307	STMMH 304	0.315	0.051	0.263	0.79	0.25	0.687	16.787	16.14		80.04		1,343.6	1,343.6	1.524	1500	1219x1930	Conc	0.10	60.4	2,331.3	1.28	0.79	58%
						0.00	0.00	0.000	0.000	16.14														
						0.00	0.00	0.000	0.000	10.00														
C-13	CBMH 306	STMMH 305	0.777	0.066	0.711	0.84	0.65	1.816	1.816	10.00		104.19		189.2	189.2	0.610	600	600	Conc	0.15	113.9	247.9	0.85	2.23	76%
						0.00	0.00	0.000	0.000	10.00														
						0.00	0.00	0.000	0.000	12.23														
C-14	STMMH 305	STMMH 304	0.531		0.531	0.90	0.48	1.329	3.145	12.23		93.71		294.7	294.7	0.838	825	825	Conc	0.10	96.8	473.3	0.86	1.88	62%
						0.00	0.00	0.000	0.000	12.23														
						0.00	0.00	0.000	0.000	16.93														
C-15	STMMH 304	STMMH 302	0.388	0.076	0.312	0.76	0.30	0.822	20.755	16.93		77.80		1,614.7	1,614.7	1.524	1500	1219x1930	Conc	0.10	46.9	2,331.3	1.28	0.61	69%
						0.00	0.00	0.000	0.000	16.93														
						0.00	0.00	0.000	0.000	10.00														
C-16	CBMH 303	STMMH 302	0.238	0.133	0.105	0.51	0.12	0.337	0.337	10.00		104.19		35.1	35.1	0.305	300	300	PVC	0.35	68.9	59.6	0.82	1.41	59%
						0.00	0.00	0.000	0.000	10.00														
						0.00	0.00	0.000	0.000	17.54														
C-17	STMMH 302	STMMH 301	0.210	0.118	0.092	0.51	0.11	0.296	21.387	17.54		76.15		1,628.7	1,628.7	1.524	1500	1219x1930	Conc	0.10	59.9	2,331.3	1.28	0.78	70%
						0.00	0.00	0.000	0.000	17.54														
						0.00	0.00	0.000	0.000	18.32														
	STMMH 301	POND			0.000	0.00	0.00	0.000	21.387	18.32		74.16		1,586.1	1,586.1	1.524	1500	1219x1930	Conc	0.10	24.8	2,331.3	1.28	0.32	68%
						0.00	0.00	0.000	0.000	18.32														

Sortation Facility

Project No.: 121137

STORM SEWER DESIGN SHEET

FLOW RATES BASED ON RATIONAL METHOD

NOVATECH
Engineers, Planners & Landscape Architects

LOCATION			AREA (ha)					FLOW							TOTAL FLOW	SEWER DATA								
AREA ID	From Manhole	To Manhole	Total Area (ha)	C = 0.20	C = 0.90	C	AC (ha)	Indiv 2.78 AC	Accum 2.78 AC	Time of Concentration	Rainfall Intensity 2 Year (mm/hr)	Rainfall Intensity 5 Year (mm/hr)	Rainfall Intensity 10 Year (mm/hr)	Peak Flow (L/s)	Total Peak Flow, Q (L/s)	Dia. (m) Actual	Equivalent Dia. (mm)	Pipe Dimension (mm)	Type	Slope (%)	Length (m)	Capacity (L/s)	Velocity (m/s)	Flow Time (min)	Ratio Q/Q full
EAST ROAD SYSTEM - POND 3 (1:5 YEAR STORM EVENT)																								
						0.00	0.00	0.000	0.000	10.00														
C-20	STMMH 403	STMMH 402	0.412	0.238	0.174	0.50	0.20	0.568	0.568	10.00		104.19		59.1	59.1	0.457	450	450	Conc	0.20	83.7	132.9	0.81	1.72	44%
						0.00	0.00	0.000	0.000	10.00														
						0.00	0.00	0.000	0.000	11.72														
C-19	STMMH 402	STMMH 401	0.133	0.078	0.055	0.49	0.07	0.181	0.749	11.72		95.90		71.8	71.8	0.610	600	600	Conc	0.15	115.0	247.9	0.85	2.26	29%
						0.00	0.00	0.000	0.000	11.72														
						0.00	0.00	0.000	0.000	20.00														
FUT-1	STUB	STMMH 401	8.450	0.600	7.850	0.85	7.19	19.974	19.974	20.00		70.25		1,403.2	1,403.2	1.524	1500	1219x1930	Conc	0.10	12.9	2,331.3	1.28	0.17	60%
						0.00	0.00	0.000	0.000	20.00														
						0.00	0.00	0.000	0.000	20.17														
C-18	STMMH 401	HW 3003	0.242	0.142	0.100	0.49	0.12	0.329	21.052	20.17		69.88		1,471.2	1,471.2	1.524	1500	1219x1930	Conc	0.10	26.4	2,331.3	1.28	0.34	63%
						0.00	0.00	0.000	0.000	20.17														

Q = 2.78 AIC, where
Q = Peak Flow in Litres per Second (L/s)
A = Area in hectares (ha)
I = Rainfall Intensity (mm/hr), 5 year storm
C = Runoff Coefficient

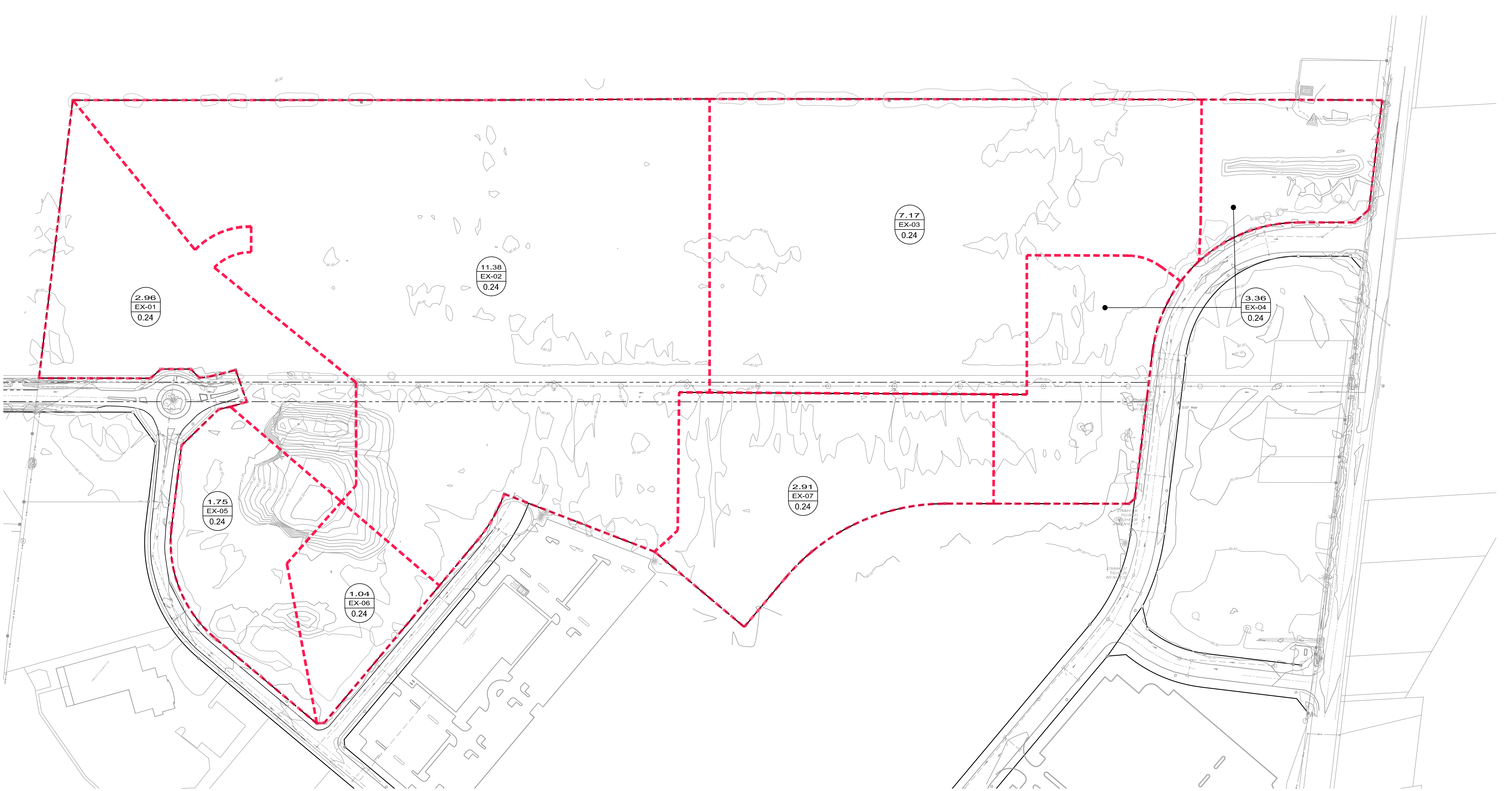
Consultant:	**Novatech**
Date:	August 4, 2020
Design By:	Anthony Mestwarp
Client:	
Dwg. Reference:	**Checked By:**
121137-STM	LS

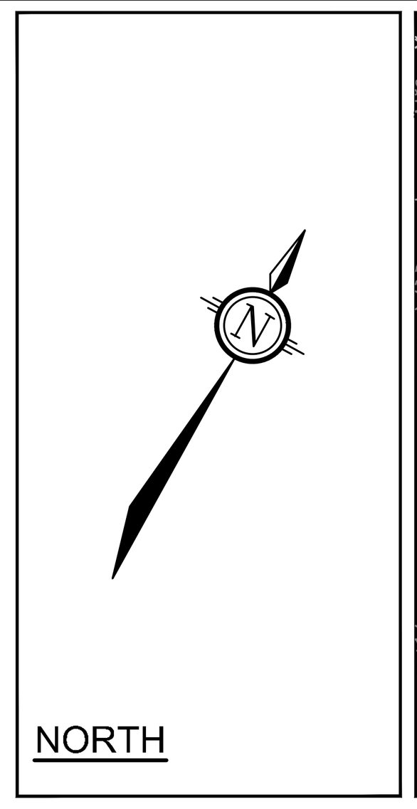
Legend:

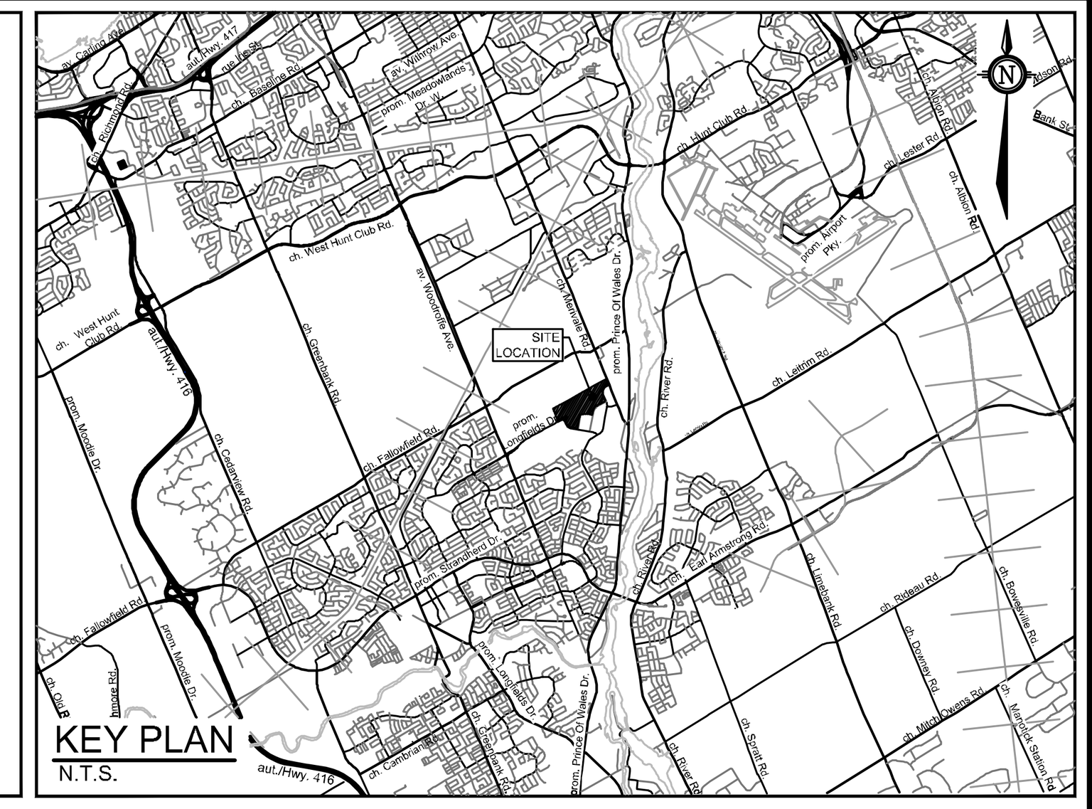
*	Indicates 100 Year intensity for storm sewers
10.00	Storm sewers designed to the 2 year event (without ponding) for local roads
10.00	Storm sewers designed to the 5 year event (without ponding) for collector roads
10.00	Storm sewers designed to the 10 year event (without ponding) for arterial roads

Appendix D

Stormwater Management Modeling







REFER TO 121137-ND FOR ADDITIONAL NOTES

NOTE:
THE POSITION OF ALL POLE LINES, CONDUITS, WATERMAINS, SEWERS AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, DETERMINE THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND ASSUME ALL LIABILITY FOR DAMAGE TO THEM.

NOT FOR CONSTRUCTION

No.	REVISION	DATE	BY
1.	ISSUED FOR SITE PLAN APPROVAL	MAY 31/2021	MJH

SCALE 1:1250

DESIGN MJH/ARM
CHECKED JLS
DRAWN MJH/ARM
CHECKED JLS
APPROVED JLS

FOR REVIEW ONLY
ISSUED FOR REVIEW
ISSUED FOR REVIEW

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Ottawa, Ontario, Canada K2M 1P6
Telephone (613) 254-9643
Facsimile (613) 254-5867
Website www.novatech-eng.com

LOCATION
SORTATION FACILITY
99 BILL LEATHEM DR, 2 & 20 LEIKIN DR, CITY OF OTTAWA

DRAWING NAME
EXISTING STORM DRAINAGE PLAN

PROJECT No. 121137
REV REV #1
DRAWING No. 121137-XSTM

Table 1: Allowable Release Rates - Bill Leathem Drive

Area ID	Area (ha)	C_{Allow}	I_{5Year}	Q_{Allow}
EX-01	2.96	0.24	83.56	**165.0**
Total (Current Development)	**2.96**			**165.0**
EX-05 (Future)	1.75	0.24	83.56	**97.6**
Total	**4.71**			**427.6**

Table 2: Allowable Release Rates - Paragon Avenue

Area ID	Area (ha)	C_{Allow}	I_{5Year}	Q_{Allow}
EX-02	11.38	0.24	83.56	**634.4**
EX-03 (Future)	7.17	0.24	83.56	**399.7**
Total (Current Development)	**18.55**			**1034.2**
EX-06 (Future)	1.04	0.24	83.56	**58.0**
Total	**19.59**			**1092.1**

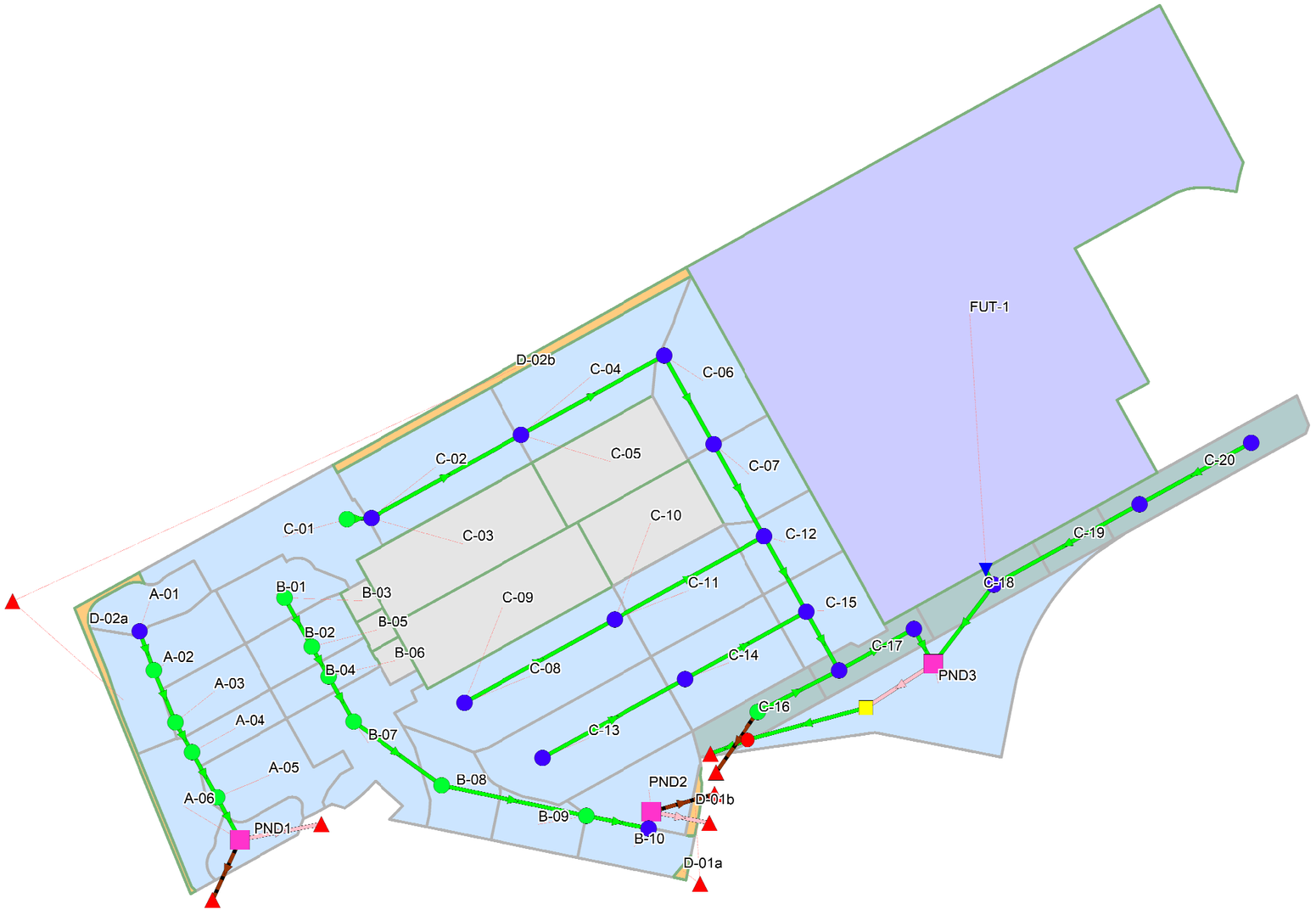
Table 3: Allowable Release Rates - Leikin Drive

Area ID	Area (ha)	C_{Allow}	I_{5Year}	Q_{Allow}
EX-04 (Future)	3.36	0.24	83.56	**187.3**
Total	**3.36**			**187.3**

Time of Concentration Tc= 15.0 min
Intensity (5 Year Event) I_5= 83.56 mm/hr
5 year Intensity = 998.071 / (Time in min + 6.053) $^{0.814}$

Equations:
Flow Equation
Q = 2.78 x C x I x A
Where:
C is the runoff coefficient
I is the rainfall intensity, City of Ottawa IDF
A is the total drainage area

PCSWMM Model Schematic - Drainage Area ID's



Legend

Junctions
- Visible
- Headwall
- Manhole
- Cap

Outfalls

Storages
- CBMH
- STMMH
- Pond

Conduits
- Visible
- Storm Sewer
- Major System

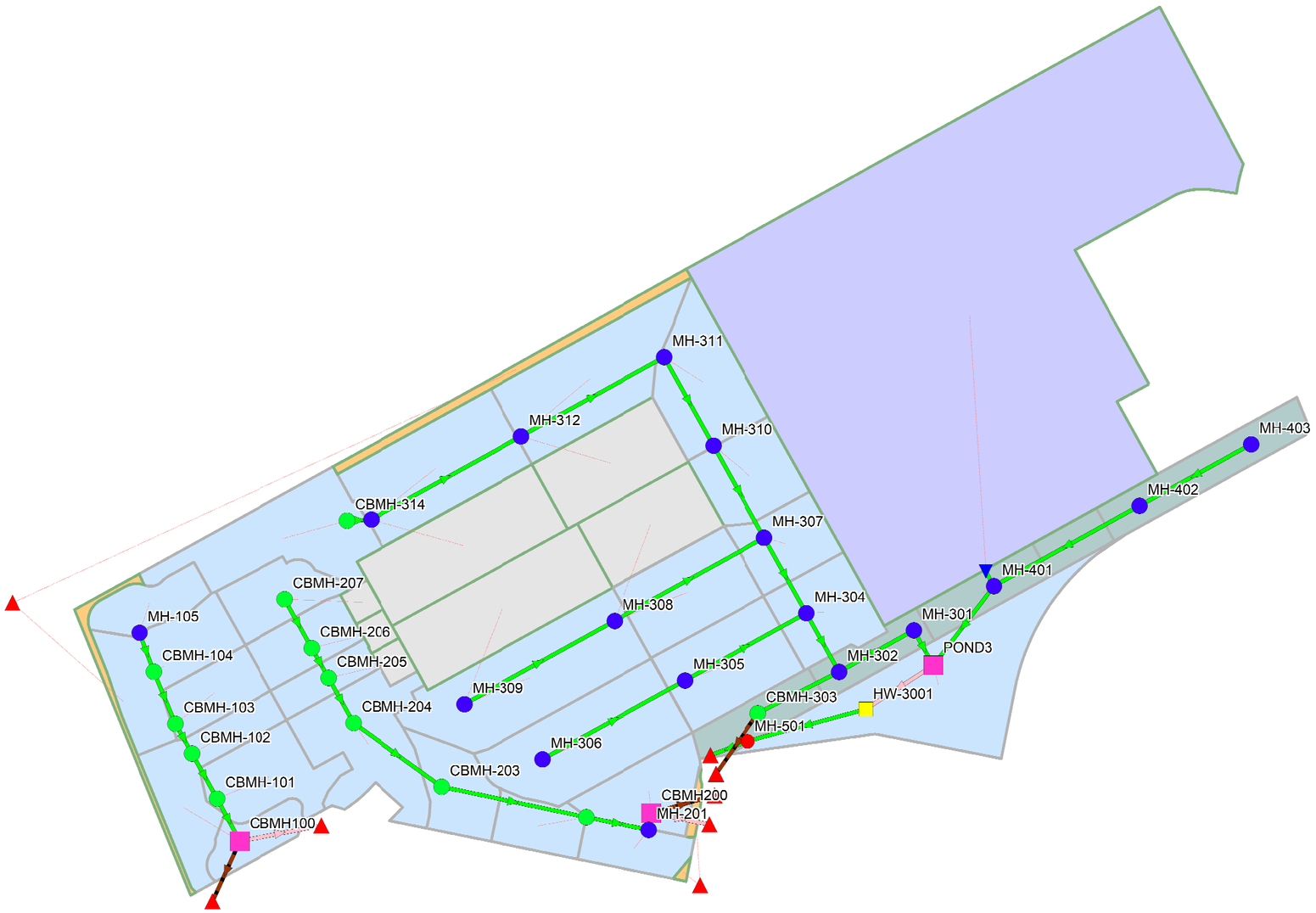
Orifices

Subcatchments
- Visible
- Controlled Area
- Building Roof
- Future Development Area
- Uncontrolled Area
- Controlled Road Areas

N

200

PCSWMM Model Schematic - Structure ID's



Legend

Junctions
- Visible
- Headwall
- Manhole
- Cap

Outfalls

Storages
- CBMH
- STMMH
- Pond

Conduits
- Visible
- Storm Sewer
- Major System

Orifices

Subcatchments
- Visible
- Controlled Area
- Building Roof
- Future Development Area
- Uncontrolled Area
- Controlled Road Areas

N

200

Chicago 3hr - 2-year Storm PCSWMM Model Results

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

****
Element Count
****
Number of rain gages 1
Number of subcatchments ... 44
Number of nodes 43
Number of links 38
Number of pollutants 0
Number of land uses 0

****
Raingage Summary
****

Name	Data Source	Data Type	Recording Interval
Raingage1	C3hr-2yr	INTENSITY	10 min.

****
Subcatchment Summary
****

Name	Area	Width	%Imperv	%Slope	Rain Gage	Outlet
A-01	0.24	54.88	100.00	1.5000	Raingage1	MH-105
A-02	0.52	200.00	90.00	1.5000	Raingage1	CBMH-104
A-03	0.26	106.58	94.00	1.5000	Raingage1	CBMH-103
A-04	0.16	138.79	91.00	1.5000	Raingage1	CBMH-102
A-05	0.42	173.25	86.00	1.5000	Raingage1	CBMH-101
A-06	0.31	35.89	80.00	1.5000	Raingage1	CBMH100
B-01	0.29	109.29	90.00	1.5000	Raingage1	CBMH-207
B-02	0.28	113.17	91.00	1.5000	Raingage1	CBMH-206
B-03	0.05	23.47	100.00	1.5000	Raingage1	CBMH-207
B-04	0.17	153.10	94.00	1.5000	Raingage1	CBMH-205
B-05	0.05	23.47	100.00	1.5000	Raingage1	CBMH-206
B-06	0.06	26.98	100.00	1.5000	Raingage1	CBMH-205
B-07	0.61	249.79	71.00	1.5000	Raingage1	CBMH-204
B-08	0.30	82.04	64.00	1.5000	Raingage1	CBMH-203
B-09	0.22	34.79	79.00	1.5000	Raingage1	CBMH-202
B-10	0.23	39.01	63.00	1.5000	Raingage1	MH-201
C-01	0.65	101.56	51.00	1.5000	Raingage1	CBMH-314
C-02	0.78	239.45	94.00	1.5000	Raingage1	MH-313
C-03	0.72	139.46	100.00	1.5000	Raingage1	MH-313
C-04	0.83	254.43	81.00	1.5000	Raingage1	MH-312
C-05	0.50	96.33	100.00	1.5000	Raingage1	MH-312
C-06	0.54	164.53	83.00	1.5000	Raingage1	MH-311
C-07	0.38	115.29	89.00	1.5000	Raingage1	MH-310
C-08	0.90	276.76	93.00	1.5000	Raingage1	MH-309
C-09	0.76	147.28	100.00	1.5000	Raingage1	MH-309
C-10	0.46	88.87	100.00	1.5000	Raingage1	MH-308
C-11	0.51	154.43	96.00	1.5000	Raingage1	MH-308
C-12	0.32	97.83	84.00	1.5000	Raingage1	MH-307
C-13	0.78	214.64	91.00	1.5000	Raingage1	MH-306
C-14	0.53	146.69	100.00	1.5000	Raingage1	MH-305
C-15	0.39	112.79	80.00	1.5000	Raingage1	MH-304
C-16	0.24	46.12	44.00	1.0000	Raingage1	CBMH-303
C-17	0.21	42.86	44.00	1.0000	Raingage1	MH-302
C-18	0.24	45.66	41.00	1.0000	Raingage1	MH-401
C-19	0.13	26.08	100.00	1.0000	Raingage1	MH-402
C-20	0.41	82.40	43.00	1.0000	Raingage1	MH-403
D-01a	0.01	17.02	20.00	2.0000	Raingage1	OF5
D-01b	0.02	40.00	5.00	2.0000	Raingage1	OF5
D-02a	0.09	254.29	5.00	1.5000	Raingage1	OF1
D-02b	0.04	286.67	5.00	1.5000	Raingage1	OF1
FUT-1	8.45	296.25	93.00	1.5000	Raingage1	CAP
PND1	0.20	42.73	5.00	1.5000	Raingage1	CBMH100
PND2	0.36	137.16	5.00	1.5000	Raingage1	CBMH200
PND3	1.09	226.09	5.00	1.5000	Raingage1	POND3

****
Node Summary
****

Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow

CAP	JUNCTION	87.02	2.80	0.0
HW-3001	JUNCTION	87.00	2.60	0.0
MH-501	JUNCTION	86.82	2.97	0.0
EX-MH139	OUTFALL	87.17	0.00	0.0
EX-MH159	OUTFALL	86.01	0.00	0.0
EX-MH160	OUTFALL	86.12	1.69	0.0
OF1	OUTFALL	90.65	0.00	0.0
OF2	OUTFALL	89.60	2.00	0.0
OF3	OUTFALL	89.50	1.25	0.0
OF4	OUTFALL	0.00	90.40	0.0
OF5	OUTFALL	89.70	0.00	0.0
CBMH100	STORAGE	87.80	3.00	0.0
CBMH-101	STORAGE	87.99	2.96	0.0
CBMH-102	STORAGE	88.11	2.89	0.0
CBMH-103	STORAGE	88.27	2.78	0.0
CBMH-104	STORAGE	88.39	2.71	0.0
CBMH200	STORAGE	86.76	3.04	0.0
CBMH-202	STORAGE	87.25	2.90	0.0
CBMH-203	STORAGE	87.58	2.82	0.0
CBMH-204	STORAGE	87.98	3.07	0.0
CBMH-205	STORAGE	88.16	2.94	0.0
CBMH-206	STORAGE	88.36	2.79	0.0
CBMH-207	STORAGE	88.65	2.50	0.0
CBMH-303	STORAGE	88.29	1.42	0.0
CBMH-314	STORAGE	88.71	1.69	0.0
MH-105	STORAGE	89.04	2.70	0.0
MH-201	STORAGE	86.97	2.88	0.0
MH-301	STORAGE	87.23	2.68	0.0
MH-302	STORAGE	86.85	2.91	0.0
MH-304	STORAGE	87.36	2.47	0.0
MH-305	STORAGE	87.88	2.20	0.0
MH-306	STORAGE	88.18	2.12	0.0
MH-307	STORAGE	87.43	2.73	0.0
MH-308	STORAGE	87.73	2.61	0.0
MH-309	STORAGE	88.02	2.36	0.0
MH-310	STORAGE	87.53	2.82	0.0
MH-311	STORAGE	87.61	2.68	0.0
MH-312	STORAGE	87.74	2.63	0.0
MH-313	STORAGE	88.02	2.36	0.0
MH-401	STORAGE	87.38	2.40	0.0
MH-402	STORAGE	88.18	1.96	0.0
MH-403	STORAGE	88.50	1.81	0.0
POND3	STORAGE	87.00	2.60	0.0

****
Link Summary
****

Name	From Node	To Node	Type	Length	%Slope	Roughness
101-PND1	CBMH-101	CBMH100	CONDUIT	37.5	0.3200	0.0130
102-101	CBMH-102	CBMH-101	CONDUIT	35.9	0.3065	0.0130
103-102	CBMH-103	CBMH-102	CONDUIT	23.9	0.2935	0.0130
104-103	CBMH-104	CBMH-103	CONDUIT	39.3	0.2800	0.0130
105-104	MH-105	CBMH-104	CONDUIT	29.4	0.9864	0.0130
201-PND2	MH-201	CBMH200	CONDUIT	14.1	1.0639	0.0130
202-201	CBMH-202	MH-201	CONDUIT	44.5	0.5169	0.0130
204-203	CBMH-203	CBMH-202	CONDUIT	103.2	0.2908	0.0130
205-204	CBMH-204	CBMH-203	CONDUIT	76.3	0.3015	0.0130
206-205	CBMH-205	CBMH-204	CONDUIT	35.9	0.3010	0.0130
207-206	CBMH-206	CBMH-205	CONDUIT	23.9	0.5030	0.0130
208-207	CBMH-207	CBMH-206	CONDUIT	39.0	0.5126	0.0130
3001-501	HW-3001	MH-501	CONDUIT	85.5	0.1988	0.0130
301-PND3	MH-301	POND3	CONDUIT	28.2	0.1066	0.0130
302-301	MH-302	MH-301	CONDUIT	59.9	0.1002	0.0130
303-302	CBMH-303	MH-302	CONDUIT	68.9	0.3483	0.0130
304-302	MH-304	MH-302	CONDUIT	46.9	0.1066	0.0130
305-304	MH-305	MH-304	CONDUIT	96.8	0.1033	0.0130
306-305	MH-306	MH-305	CONDUIT	113.9	0.0966	0.0130
307-304	MH-307	MH-304	CONDUIT	60.4	0.0994	0.0130
308-307	MH-308	MH-307	CONDUIT	120.0	0.1000	0.0130
309-308	MH-309	MH-308	CONDUIT	127.0	0.1024	0.0130
310-307	MH-310	MH-307	CONDUIT	73.5	0.0952	0.0130
311-310	MH-311	MH-310	CONDUIT	70.9	0.0988	0.0130
312-311	MH-312	MH-311	CONDUIT	116.0	0.1034	0.0130
313-312	MH-313	MH-312	CONDUIT	120.0	0.1000	0.0130
314-313	CBMH-314	MH-313	CONDUIT	16.6	0.4819	0.0130
401-PND3	MH-401	POND3	CONDUIT	31.1	0.0965	0.0130
402-401	MH-402	MH-401	CONDUIT	115.0	0.1478	0.0130
403-402	MH-403	MH-402	CONDUIT	83.7	0.2031	0.0130
501-160	MH-501	EX-MH160	CONDUIT	27.8	0.2156	0.0130
CAP-401	CAP	MH-401	CONDUIT	12.9	0.0775	0.0130

PND1_OVR	CBMH100	OF2	CONDUIT	42.4	0.3539	0.0150
PND2_OVR	CBMH200	OF3	CONDUIT	7.0	0.7143	0.0150
PND3_OVR	CBMH-303	OF4	CONDUIT	7.0	0.7143	0.0130
OR1	CBMH100	EX-MH139	ORIFICE			
OR2	CBMH200	EX-MH159	ORIFICE			
OR3	POND3	HW-3001	ORIFICE			

****
Cross Section Summary
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Conduit	Shape	Full Depth	Full Area	Hyd. Rad.	Max. Width	No. of Barrels	Full Flow
101-PND1	CIRCULAR	0.75	0.44	0.19	0.75	1	629.80
102-101	CIRCULAR	0.75	0.44	0.19	0.75	1	616.38
103-102	CIRCULAR	0.68	0.36	0.17	0.68	1	455.39
104-103	CIRCULAR	0.68	0.36	0.17	0.68	1	444.85
105-104	CIRCULAR	0.38	0.11	0.09	0.38	1	174.15
201-PND2	CIRCULAR	0.82	0.53	0.21	0.82	1	1480.67
202-201	CIRCULAR	0.82	0.53	0.21	0.82	1	1032.04
204-203	CIRCULAR	0.82	0.53	0.21	0.82	1	774.10
205-204	CIRCULAR	0.68	0.36	0.17	0.68	1	461.60
206-205	CIRCULAR	0.60	0.28	0.15	0.60	1	336.86
207-206	CIRCULAR	0.53	0.22	0.13	0.53	1	305.04
208-207	CIRCULAR	0.45	0.16	0.11	0.45	1	204.14
3001-501	CIRCULAR	1.05	0.87	0.26	1.05	1	1217.65
301-PND3	HORIZ_ELLIPSE	1.22	1.89	0.37	1.93	1	2454.60
302-301	HORIZ_ELLIPSE	1.22	1.89	0.37	1.93	1	2380.17
303-302	CIRCULAR	0.30	0.07	0.07	0.30	1	57.08
304-302	HORIZ_ELLIPSE	1.22	1.89	0.37	1.93	1	2454.89
305-304	CIRCULAR	0.82	0.53	0.21	0.82	1	461.38
306-305	CIRCULAR	0.60	0.28	0.15	0.60	1	190.84
307-304	HORIZ_ELLIPSE	1.22	1.89	0.37	1.93	1	2370.77
308-307	CIRCULAR	1.05	0.87	0.26	1.05	1	863.58
309-308	CIRCULAR	0.90	0.64	0.23	0.90	1	579.23
310-307	CIRCULAR	1.20	1.13	0.30	1.20	1	1202.94
311-310	CIRCULAR	1.20	1.13	0.30	1.20	1	1225.48
312-311	CIRCULAR	1.20	1.13	0.30	1.20	1	1254.04
313-312	CIRCULAR	1.05	0.87	0.26	1.05	1	863.73
314-313	CIRCULAR	0.53	0.22	0.13	0.53	1	298.57
401-PND3	HORIZ_ELLIPSE	1.22	1.89	0.37	1.93	1	2335.49
402-401	CIRCULAR	0.60	0.28	0.15	0.60	1	236.09
403-402	CIRCULAR	0.45	0.16	0.11	0.45	1	128.50
501-160	CIRCULAR	1.05	0.87	0.26	1.05	1	1268.08
CAP-401	HORIZ_ELLIPSE	1.22	1.89	0.37	1.93	1	2093.65
PND1_OVR	RECT_OPEN	1.00	3.00	0.75	3.00	1	9822.22
PND2_OVR	RECT_OPEN	1.00	3.00	0.75	3.00	1	13954.21
PND3_OVR	RECT_OPEN	1.00	5.50	0.85	5.50	1	31990.42

****
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 ..... LPS
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 03/18/2020 00:00:00
Ending Date 03/19/2020 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
Routing Time Step ..... 2.00 sec
Variable Time Step ..... YES
Maximum Trials 8

Number of Threads 4
Head Tolerance ..... 0.001500 m

****
Control Actions Taken
****

Runoff Quantity Continuity	Volume hectare-m	Depth mm
Total Precipitation	0.787	31.857
Evaporation Loss	0.000	0.000
Infiltration Loss	0.145	5.874
Surface Runoff	0.622	25.179
Final Storage	0.025	0.995
Continuity Error (%)	-0.600	

Flow Routing Continuity	Volume hectare-m	Volume 10^6 ltr
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	0.622	6.219
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	0.000	0.000
External Outflow	0.625	6.253
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	0.003
Continuity Error (%)	-0.600	

****
Highest Continuity Errors
****
Node MH-305 (2.92%)

Node MH-313 (1.23%)
Node CBMH-204 (1.16%)
Node MH-311 (-1.02%)

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

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

****
Routing Time Step Summary
****
Minimum Time Step : 0.50 sec
Average Time Step : 2.00 sec
Maximum Time Step : 2.00 sec
Percent in Steady State : -0.00
Average Iterations per Step : 2.00
Percent Not Converging : 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 LPS	Runoff Coeff

A-01	31.86	0.00	0.00	0.00	30.56	0.00	30.56	0.07	51.34	0.959
A-02	31.86	0.00	0.00	3.17	27.46	0.03	27.49	0.14	101.08	0.863
A-03	31.86	0.00	0.00	1.90	28.68	0.03	28.71	0.07	52.22	0.901
A-04	31.86	0.00	0.00	2.84	27.69	0.07	27.76	0.04	31.63	0.871
A-05	31.86	0.00	0.00	4.44	26.23	0.04	26.27	0.11	77.75	0.824
A-06	31.86	0.00	0.00	6.37	24.46	0.01	24.47	0.08	52.55	0.768
B-01	31.86	0.00	0.00	3.17	27.46	0.03	27.50	0.08	56.75	0.863
B-02	31.86	0.00	0.00	2.85	27.76	0.04	27.80	0.08	53.70	0.873
B-03	31.86	0.00	0.00	0.00	32.04	0.00	32.04	0.02	10.66	1.006
B-04	31.86	0.00	0.00	1.89	28.60	0.07	28.67	0.05	35.07	0.900
B-05	31.86	0.00	0.00	0.00	32.04	0.00	32.04	0.02	10.66	1.006
B-06	31.86	0.00	0.00	0.00	32.04	0.00	32.04	0.02	12.37	1.006
B-07	31.86	0.00	0.00	9.22	21.64	0.04	21.68	0.13	92.71	0.680
B-08	31.86	0.00	0.00	11.45	19.53	0.03	19.55	0.06	40.79	0.614
B-09	31.86	0.00	0.00	6.68	24.15	0.02	24.16	0.05	36.06	0.759
B-10	31.86	0.00	0.00	11.78	19.25	0.02	19.27	0.04	30.81	0.605
C-01	31.86	0.00	0.00	15.60	15.58	0.02	15.59	0.10	71.13	0.489
C-02	31.86	0.00	0.00	1.90	28.71	0.03	28.73	0.22	157.49	0.902
C-03	31.86	0.00	0.00	0.00	32.12	0.00	32.12	0.23	152.39	1.008
C-04	31.86	0.00	0.00	6.04	24.73	0.03	24.75	0.21	144.45	0.777
C-05	31.86	0.00	0.00	0.00	32.12	0.00	32.12	0.16	105.26	1.008
C-06	31.86	0.00	0.00	5.40	25.34	0.03	25.37	0.14	95.69	0.796

C-07	31.86	0.00	0.00	3.49	27.18	0.03	27.20	0.10	71.85	0.854
C-08	31.86	0.00	0.00	2.22	28.40	0.03	28.43	0.26	180.12	0.892
C-09	31.86	0.00	0.00	0.00	32.12	0.00	32.12	0.24	160.02	1.008
C-10	31.86	0.00	0.00	0.00	32.12	0.00	32.12	0.15	96.19	1.008
C-11	31.86	0.00	0.00	1.26	29.32	0.03	29.34	0.15	103.69	0.921
C-12	31.86	0.00	0.00	5.08	25.64	0.03	25.67	0.08	56.70	0.806
C-13	31.86	0.00	0.00	2.86	27.80	0.02	27.82	0.22	151.20	0.873
C-14	31.86	0.00	0.00	0.00	30.55	0.00	30.55	0.16	112.97	0.959
C-15	31.86	0.00	0.00	6.36	24.42	0.03	24.45	0.09	66.51	0.768
C-16	31.86	0.00	0.00	17.83	13.43	0.02	13.45	0.03	22.44	0.422
C-17	31.86	0.00	0.00	17.83	13.43	0.02	13.45	0.03	19.81	0.422
C-18	31.86	0.00	0.00	18.79	12.52	0.02	12.53	0.03	21.27	0.393
C-19	31.86	0.00	0.00	0.00	30.57	0.00	30.57	0.04	27.92	0.960
C-20	31.86	0.00	0.00	18.15	13.13	0.02	13.14	0.05	37.98	0.413
D-01a	31.86	0.00	0.00	25.39	6.09	0.22	6.31	0.00	0.40	0.198
D-01b	31.86	0.00	0.00	30.18	1.52	0.18	1.70	0.00	0.40	0.053
D-02a	31.86	0.00	0.00	30.15	1.52	0.26	1.78	0.00	1.71	0.056
D-02b	31.86	0.00	0.00	30.05	1.52	0.56	2.08	0.00	1.26	0.065
FUT-1	31.86	0.00	0.00	2.23	28.70	0.00	28.70	2.42	1298.65	0.901
PND1	31.86	0.00	0.00	30.25	1.52	0.02	1.54	0.00	2.24	0.048
PND2	31.86	0.00	0.00	30.24	1.52	0.04	1.56	0.01	4.25	0.049
PND3	31.86	0.00	0.00	30.25	1.52	0.02	1.54	0.02	12.36	0.048

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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
CAP	JUNCTION	0.44	1.09	88.11	0	01:10	1.09
HW-3001	JUNCTION	0.08	0.49	87.49	0	01:38	0.49
MH-501	JUNCTION	0.09	0.57	87.39	0	01:39	0.57
EX-MH139	OUTFALL	0.00	0.00	87.17	0	00:00	0.00
EX-MH159	OUTFALL	0.00	0.00	86.01	0	00:00	0.00
EX-MH160	OUTFALL	0.00	0.00	86.12	0	00:00	0.00
OF1	OUTFALL	0.00	0.00	90.65	0	00:00	0.00
OF2	OUTFALL	0.00	0.00	89.60	0	00:00	0.00
OF3	OUTFALL	0.00	0.00	89.50	0	00:00	0.00
OF4	OUTFALL	0.00	0.00	0.00	0	00:00	0.00
OF5	OUTFALL	0.00	0.00	89.70	0	00:00	0.00
CBMH100	STORAGE	0.07	1.95	89.75	0	01:15	1.95
CBMH-101	STORAGE	0.06	1.77	89.76	0	01:16	1.77
CBMH-102	STORAGE	0.05	1.65	89.76	0	01:16	1.65
CBMH-103	STORAGE	0.05	1.50	89.77	0	01:16	1.49
CBMH-104	STORAGE	0.04	1.38	89.77	0	01:16	1.37
CBMH200	STORAGE	0.06	1.86	88.62	0	01:14	1.86
CBMH-202	STORAGE	0.04	1.39	88.64	0	01:14	1.39
CBMH-203	STORAGE	0.03	1.07	88.65	0	01:14	1.06
CBMH-204	STORAGE	0.02	0.68	88.66	0	01:14	0.67
CBMH-205	STORAGE	0.02	0.50	88.66	0	01:14	0.50
CBMH-206	STORAGE	0.01	0.29	88.65	0	01:14	0.28
CBMH-207	STORAGE	0.01	0.18	88.83	0	01:10	0.18
CBMH-303	STORAGE	0.01	0.13	88.42	0	01:10	0.13
CBMH-314	STORAGE	0.01	0.18	88.89	0	01:10	0.18
MH-105	STORAGE	0.02	0.74	89.78	0	01:10	0.74
MH-201	STORAGE	0.05	1.66	88.63	0	01:14	1.66
MH-301	STORAGE	0.09	0.83	88.06	0	01:38	0.83
MH-302	STORAGE	0.52	1.28	88.13	0	01:12	1.28
MH-304	STORAGE	0.07	0.87	88.23	0	01:12	0.87
MH-305	STORAGE	0.02	0.48	88.36	0	01:10	0.48
MH-306	STORAGE	0.07	0.43	88.61	0	01:10	0.43
MH-307	STORAGE	0.06	0.82	88.25	0	01:12	0.82
MH-308	STORAGE	0.04	0.65	88.38	0	01:10	0.65
MH-309	STORAGE	0.02	0.49	88.51	0	01:10	0.49
MH-310	STORAGE	0.05	0.76	88.29	0	01:11	0.76
MH-311	STORAGE	0.04	0.71	88.32	0	01:11	0.71
MH-312	STORAGE	0.03	0.68	88.42	0	01:11	0.68
MH-313	STORAGE	0.02	0.49	88.51	0	01:10	0.49
MH-401	STORAGE	0.07	0.71	88.09	0	01:10	0.71
MH-402	STORAGE	0.01	0.23	88.41	0	01:10	0.23
MH-403	STORAGE	0.01	0.17	88.67	0	01:10	0.17
POND3	STORAGE	0.14	1.05	88.05	0	01:38	1.05

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Node Inflow Summary
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Node	Type	Maximum Lateral Inflow LPS	Maximum Total Inflow LPS	Time of Max Occurrence days	hr:min	Lateral Inflow Volume 10^6 ltr	Total Inflow Volume 10^6 ltr	Flow Balance Error Percent	
CAP	JUNCTION	1298.65	1298.65	0	01:10	2.42	2.42	0.005	
HW-3001	JUNCTION	0.00	516.16	0	01:38	0	5.17	-0.003	
MH-501	JUNCTION	0.00	516.14	0	01:38	0	5.17	-0.023	
EX-MH139	OUTFALL	0.00	139.38	0	01:15	0	0.528	0.000	
EX-MH159	OUTFALL	0.00	161.45	0	01:14	0	0.548	0.000	
EX-MH160	OUTFALL	0.00	516.11	0	01:39	0	5.17	0.000	
OF1	OUTFALL	2.97	2.97	0	01:10	0.00248	0.00248	0.000	
OF2	OUTFALL	0.00	0.00	0	00:00	0	0	0.000	ltr
OF3	OUTFALL	0.00	0.00	0	00:00	0	0	0.000	ltr
OF4	OUTFALL	0.00	0.00	0	00:00	0	0	0.000	ltr
OF5	OUTFALL	0.80	0.80	0	01:10	0.000913	0.000913	0.000	
CBMH100	STORAGE	54.78	339.99	0	01:09	0.0799	0.528	0.002	
CBMH-101	STORAGE	77.75	295.84	0	01:09	0.111	0.448	-0.002	
CBMH-102	STORAGE	31.63	231.29	0	01:08	0.0447	0.337	-0.183	
CBMH-103	STORAGE	52.22	204.01	0	01:08	0.0744	0.292	0.221	
CBMH-104	STORAGE	101.08	154.92	0	01:08	0.144	0.218	-0.222	

CBMH200	STORAGE	4.25	165.57	0	01:10	0.00558	0.548	0.002
CBMH-202	STORAGE	36.06	329.40	0	01:06	0.052	0.494	-0.819
CBMH-203	STORAGE	40.79	315.31	0	01:08	0.0581	0.441	-0.184
CBMH-204	STORAGE	92.71	271.26	0	01:09	0.132	0.388	1.173
CBMH-205	STORAGE	47.44	178.92	0	01:10	0.0682	0.257	0.272
CBMH-206	STORAGE	64.37	131.61	0	01:10	0.0925	0.189	0.171
CBMH-207	STORAGE	67.41	67.41	0	01:10	0.0969	0.0969	0.460
CBMH-303	STORAGE	22.44	22.44	0	01:10	0.032	0.032	-0.013
CBMH-314	STORAGE	71.13	71.13	0	01:10	0.102	0.102	-0.003
MH-105	STORAGE	51.34	54.40	0	01:07	0.074	0.074	0.505
MH-201	STORAGE	30.81	213.37	0	01:09	0.0441	0.542	-0.117
MH-301	STORAGE	0.00	1520.69	0	01:12	0	2.59	0.015
MH-302	STORAGE	19.81	1525.75	0	01:11	0.0282	2.6	-0.060
MH-304	STORAGE	66.51	1509.37	0	01:11	0.0949	2.52	-0.417
MH-305	STORAGE	112.97	260.80	0	01:10	0.162	0.378	3.004
MH-306	STORAGE	151.20	151.20	0	01:10	0.216	0.216	-0.012
MH-307	STORAGE	56.70	1234.60	0	01:10	0.0809	2.04	-0.964
MH-308	STORAGE	199.88	533.58	0	01:09	0.294	0.785	0.802
MH-309	STORAGE	340.14	340.14	0	01:10	0.5	0.5	2.029
MH-310	STORAGE	71.85	701.53	0	01:11	0.103	1.17	-0.819
MH-311	STORAGE	95.69	682.96	0	01:10	0.136	1.06	-1.005
MH-312	STORAGE	249.71	622.57	0	01:10	0.366	0.917	-0.698
MH-313	STORAGE	309.88	380.84	0	01:10	0.457	0.558	1.241
MH-401	STORAGE	21.27	1377.98	0	01:10	0.0303	2.55	0.389
MH-402	STORAGE	27.92	65.35	0	01:10	0.0407	0.0948	-0.019
MH-403	STORAGE	37.98	37.98	0	01:10	0.0541	0.0541	-0.020
POND3	STORAGE	12.36	2802.74	0	01:10	0.0168	5.15	-0.421

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Node Surcharge Summary
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No nodes were surcharged.

****
Node Flooding Summary
****

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 LPS
CBMH100	0.001	0	0	0	0.058	6	0 01:15	139.38
CBMH-101	0.000	2	0	0	0.003	60	0 01:16	286.62
CBMH-102	0.000	2	0	0	0.003	57	0 01:16	218.34
CBMH-103	0.000	2	0	0	0.003	54	0 01:16	199.77
CBMH-104	0.000	1	0	0	0.002	51	0 01:16	152.10
CBMH200	0.000	0	0	0	0.003	0	0 01:14	161.45
CBMH-202	0.000	1	0	0	0.003	48	0 01:14	182.61
CBMH-203	0.000	1	0	0	0.002	38	0 01:14	295.34
CBMH-204	0.000	1	0	0	0.001	22	0 01:14	274.90
CBMH-205	0.000	1	0	0	0.001	17	0 01:14	178.63
CBMH-206	0.000	0	0	0	0.000	11	0 01:14	131.50
CBMH-207	0.000	0	0	0	0.000	7	0 01:10	67.26
CBMH-303	0.000	0	0	0	0.000	9	0 01:10	22.22
CBMH-314	0.000	0	0	0	0.000	11	0 01:10	71.00
MH-105	0.000	1	0	0	0.001	27	0 01:10	54.54
MH-201	0.000	2	0	0	0.004	58	0 01:14	162.44
MH-301	0.001	3	0	0	0.006	31	0 01:38	1522.46
MH-302	0.004	18	0	0	0.009	44	0 01:12	1520.69
MH-304	0.001	3	0	0	0.006	35	0 01:12	1491.12
MH-305	0.000	1	0	0	0.001	22	0 01:10	256.47
MH-306	0.000	3	0	0	0.000	20	0 01:10	148.23
MH-307	0.000	2	0	0	0.006	30	0 01:12	1210.76
MH-308	0.000	1	0	0	0.003	25	0 01:10	515.33
MH-309	0.000	1	0	0	0.001	21	0 01:10	334.49
MH-310	0.000	2	0	0	0.004	27	0 01:11	691.56
MH-311	0.000	2	0	0	0.005	26	0 01:11	640.31
MH-312	0.000	1	0	0	0.003	26	0 01:11	587.35
MH-313	0.000	1	0	0	0.001	21	0 01:10	373.13
MH-401	0.001	3	0	0	0.005	30	0 01:10	1364.57
MH-402	0.000	1	0	0	0.000	12	0 01:10	61.76

MH-403	0.000	0	0	0	0.000	10	0	01:10	37.49
POND3	0.212	2	0	0	2.349	26	0	01:38	516.16

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Outfall Loading Summary
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Outfall Node	Flow Freq Pcnt	Avg Flow LPS	Max Flow LPS	Total Volume 10^6 ltr
EX-MH139	23.79	25.82	139.38	0.528
EX-MH159	24.49	26.07	161.45	0.548
EX-MH160	91.19	65.81	516.11	5.173
OF1	10.79	0.27	2.97	0.002
OF2	0.00	0.00	0.00	0.000
OF3	0.00	0.00	0.00	0.000
OF4	0.00	0.00	0.00	0.000
OF5	7.12	0.14	0.80	0.001
System	19.67	118.10	0.80	6.253

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Link Flow Summary
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Link	Type	Maximum |Flow| LPS	Time of Max Occurrence days	hr:min	Maximum |Veloc| m/sec	Max/ Full Flow	Max/ Full Depth
101-PND1	CONDUIT	286.62	0	01:09	0.65	0.46	1.00
102-101	CONDUIT	218.34	0	01:09	0.76	0.35	1.00
103-102	CONDUIT	199.77	0	01:08	0.96	0.44	1.00
104-103	CONDUIT	152.10	0	01:08	0.90	0.34	1.00
105-104	CONDUIT	54.54	0	01:08	1.33	0.31	1.00
201-PND2	CONDUIT	162.44	0	01:13	0.83	0.11	1.00
202-201	CONDUIT	182.61	0	01:09	1.03	0.18	1.00
204-203	CONDUIT	295.34	0	01:06	1.16	0.38	1.00
205-204	CONDUIT	274.90	0	01:08	1.43	0.60	1.00
206-205	CONDUIT	178.63	0	01:09	1.24	0.53	0.91
207-206	CONDUIT	131.50	0	01:10	1.35	0.43	0.67
208-207	CONDUIT	67.26	0	01:10	1.15	0.33	0.40
3001-501	CONDUIT	516.14	0	01:38	1.18	0.42	0.50
301-PND3	CONDUIT	1522.46	0	01:12	1.54	0.62	0.69
302-301	CONDUIT	1520.69	0	01:12	1.15	0.64	0.65
303-302	CONDUIT	22.22	0	01:10	0.81	0.39	0.41
304-302	CONDUIT	1491.12	0	01:12	1.03	0.61	0.69
305-304	CONDUIT	256.47	0	01:10	0.96	0.56	0.56
306-305	CONDUIT	148.23	0	01:10	0.99	0.78	0.52
307-304	CONDUIT	1210.76	0	01:12	0.90	0.51	0.69
308-307	CONDUIT	515.33	0	01:10	1.08	0.60	0.61
309-308	CONDUIT	334.49	0	01:09	1.06	0.58	0.54
310-307	CONDUIT	691.56	0	01:11	1.00	0.57	0.64
311-310	CONDUIT	640.31	0	01:11	1.06	0.52	0.61
312-311	CONDUIT	587.35	0	01:10	0.99	0.47	0.57
313-312	CONDUIT	373.13	0	01:10	1.03	0.43	0.48
314-313	CONDUIT	71.00	0	01:10	1.11	0.24	0.34
401-PND3	CONDUIT	1364.57	0	01:10	1.45	0.58	0.57
402-401	CONDUIT	61.76	0	01:11	0.79	0.26	0.32
403-402	CONDUIT	37.49	0	01:10	0.79	0.29	0.34
501-160	CONDUIT	516.11	0	01:39	1.32	0.41	0.46
CAP-401	CONDUIT	1296.69	0	01:10	1.12	0.62	0.58
PND1_OVR	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
PND2_OVR	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
PND3_OVR	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
OR1	ORIFICE	139.38	0	01:15			1.00
OR2	ORIFICE	161.45	0	01:14			1.00
OR3	ORIFICE	516.16	0	01:38			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

101-PND1	1.00	0.02	0.00	0.00	0.07	0.00	0.00	0.91	0.00	0.00
102-101	1.00	0.02	0.00	0.00	0.16	0.00	0.00	0.82	0.06	0.00
103-102	1.00	0.02	0.00	0.00	0.04	0.00	0.00	0.94	0.00	0.00
104-103	1.00	0.02	0.00	0.00	0.14	0.00	0.00	0.83	0.01	0.00
105-104	1.00	0.02	0.00	0.00	0.03	0.00	0.00	0.95	0.00	0.00
201-PND2	1.00	0.01	0.00	0.00	0.06	0.02	0.00	0.90	0.00	0.00
202-201	1.00	0.01	0.00	0.00	0.04	0.00	0.00	0.95	0.00	0.00
204-203	1.00	0.01	0.00	0.00	0.03	0.00	0.00	0.96	0.01	0.00
205-204	1.00	0.01	0.00	0.00	0.02	0.00	0.00	0.97	0.00	0.00
206-205	1.00	0.01	0.00	0.00	0.02	0.00	0.00	0.97	0.00	0.00
207-206	1.00	0.01	0.00	0.00	0.01	0.00	0.00	0.98	0.00	0.00
208-207	1.00	0.01	0.00	0.00	0.01	0.00	0.00	0.99	0.01	0.00
3001-501	1.00	0.01	0.00	0.00	0.62	0.00	0.00	0.37	0.09	0.00
301-PND3	1.00	0.03	0.00	0.00	0.17	0.00	0.00	0.80	0.01	0.00
302-301	1.00	0.03	0.00	0.00	0.28	0.00	0.00	0.69	0.02	0.00
303-302	1.00	0.02	0.00	0.00	0.00	0.00	0.00	0.98	0.00	0.00
304-302	1.00	0.01	0.00	0.00	0.26	0.00	0.00	0.73	0.01	0.00
305-304	1.00	0.02	0.00	0.00	0.07	0.00	0.00	0.90	0.01	0.00
306-305	1.00	0.03	0.00	0.00	0.00	0.00	0.00	0.97	0.00	0.00
307-304	1.00	0.01	0.00	0.00	0.28	0.00	0.00	0.71	0.01	0.00
308-307	1.00	0.01	0.00	0.00	0.10	0.00	0.00	0.89	0.02	0.00
309-308	1.00	0.01	0.00	0.00	0.05	0.00	0.00	0.94	0.02	0.00
310-307	1.00	0.01	0.00	0.00	0.15	0.00	0.00	0.84	0.01	0.00
311-310	1.00	0.01	0.00	0.00	0.30	0.00	0.00	0.69	0.11	0.00
312-311	1.00	0.01	0.00	0.00	0.22	0.00	0.00	0.78	0.03	0.00
313-312	1.00	0.01	0.00	0.00	0.05	0.00	0.00	0.94	0.02	0.00
314-313	1.00	0.02	0.00	0.00	0.00	0.00	0.00	0.98	0.00	0.00
401-PND3	1.00	0.01	0.00	0.00	0.14	0.00	0.00	0.85	0.00	0.00
402-401	1.00	0.02	0.00	0.00	0.00	0.00	0.00	0.98	0.00	0.00
403-402	1.00	0.02	0.00	0.00	0.00	0.00	0.00	0.98	0.00	0.00
501-160	1.00	0.01	0.00	0.00	0.00	0.00	0.00	0.99	0.00	0.00
CAP-401	1.00	0.01	0.00	0.00	0.44	0.00	0.00	0.54	0.00	0.00
PND1_OVR	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PND2_OVR	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PND3_OVR	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

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Conduit Surcharge Summary
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Conduit	Hours Full: Both Ends	Hours Full: Upstream	Hours Full: Dnstream	Hours Above Full Normal Flow	Hours Capacity Limited
101-PND1	0.69	0.69	0.75	0.01	0.01
102-101	0.64	0.64	0.69	0.01	0.01
103-102	0.62	0.62	0.64	0.01	0.01
104-103	0.58	0.58	0.62	0.01	0.01
105-104	0.50	0.50	0.57	0.01	0.01
201-PND2	0.60	0.60	0.67	0.01	0.01
202-201	0.45	0.45	0.57	0.01	0.01
204-203	0.25	0.25	0.43	0.01	0.01
205-204	0.01	0.01	0.24	0.01	0.01
206-205	0.01	0.01	0.01	0.01	0.01

Analysis begun on: Thu Aug 5 09:52:48 2021
Analysis ended on: Thu Aug 5 09:52:51 2021
Total elapsed time: 00:00:03

Chicago 3hr - 5-year Storm PCSWMM Model Results

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

****
Element Count
****
Number of rain gages 1
Number of subcatchments ... 44
Number of nodes 43
Number of links 38
Number of pollutants 0
Number of land uses 0

****
Raingage Summary
****

Name	Data Source	Data Type	Recording Interval
Raingage1	C3hr-5yr	INTENSITY	10 min.

****
Subcatchment Summary
****

Name	Area	Width	%Imperv	%Slope	Rain Gage	Outlet
A-01	0.24	54.88	100.00	1.5000	Raingage1	MH-105
A-02	0.52	200.00	90.00	1.5000	Raingage1	CBMH-104
A-03	0.26	106.58	94.00	1.5000	Raingage1	CBMH-103
A-04	0.16	138.79	91.00	1.5000	Raingage1	CBMH-102
A-05	0.42	173.25	86.00	1.5000	Raingage1	CBMH-101
A-06	0.31	35.89	80.00	1.5000	Raingage1	CBMH100
B-01	0.29	109.29	90.00	1.5000	Raingage1	CBMH-207
B-02	0.28	113.17	91.00	1.5000	Raingage1	CBMH-206
B-03	0.05	23.47	100.00	1.5000	Raingage1	CBMH-207
B-04	0.17	153.10	94.00	1.5000	Raingage1	CBMH-205
B-05	0.05	23.47	100.00	1.5000	Raingage1	CBMH-206
B-06	0.06	26.98	100.00	1.5000	Raingage1	CBMH-205
B-07	0.61	249.79	71.00	1.5000	Raingage1	CBMH-204
B-08	0.30	82.04	64.00	1.5000	Raingage1	CBMH-203
B-09	0.22	34.79	79.00	1.5000	Raingage1	CBMH-202
B-10	0.23	39.01	63.00	1.5000	Raingage1	MH-201
C-01	0.65	101.56	51.00	1.5000	Raingage1	CBMH-314
C-02	0.78	239.45	94.00	1.5000	Raingage1	MH-313
C-03	0.72	139.46	100.00	1.5000	Raingage1	MH-313
C-04	0.83	254.43	81.00	1.5000	Raingage1	MH-312
C-05	0.50	96.33	100.00	1.5000	Raingage1	MH-312
C-06	0.54	164.53	83.00	1.5000	Raingage1	MH-311
C-07	0.38	115.29	89.00	1.5000	Raingage1	MH-310
C-08	0.90	276.76	93.00	1.5000	Raingage1	MH-309
C-09	0.76	147.28	100.00	1.5000	Raingage1	MH-309
C-10	0.46	88.87	100.00	1.5000	Raingage1	MH-308
C-11	0.51	154.43	96.00	1.5000	Raingage1	MH-308
C-12	0.32	97.83	84.00	1.5000	Raingage1	MH-307
C-13	0.78	214.64	91.00	1.5000	Raingage1	MH-306
C-14	0.53	146.69	100.00	1.5000	Raingage1	MH-305
C-15	0.39	112.79	80.00	1.5000	Raingage1	MH-304
C-16	0.24	46.12	44.00	1.0000	Raingage1	CBMH-303
C-17	0.21	42.86	44.00	1.0000	Raingage1	MH-302
C-18	0.24	45.66	41.00	1.0000	Raingage1	MH-401
C-19	0.13	26.08	100.00	1.0000	Raingage1	MH-402
C-20	0.41	82.40	43.00	1.0000	Raingage1	MH-403
D-01a	0.01	17.02	20.00	2.0000	Raingage1	OF5
D-01b	0.02	40.00	5.00	2.0000	Raingage1	OF5
D-02a	0.09	254.29	5.00	1.5000	Raingage1	OF1
D-02b	0.04	286.67	5.00	1.5000	Raingage1	OF1
FUT-1	8.45	296.25	93.00	1.5000	Raingage1	CAP
PND1	0.20	42.73	5.00	1.5000	Raingage1	CBMH100
PND2	0.36	137.16	5.00	1.5000	Raingage1	CBMH200
PND3	1.09	226.09	5.00	1.5000	Raingage1	POND3

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Node Summary
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Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow

CAP	JUNCTION	87.02	2.80	0.0
HW-3001	JUNCTION	87.00	2.60	0.0
MH-501	JUNCTION	86.82	2.97	0.0
EX-MH139	OUTFALL	87.17	0.00	0.0
EX-MH159	OUTFALL	86.01	0.00	0.0
EX-MH160	OUTFALL	86.12	1.69	0.0
OF1	OUTFALL	90.65	0.00	0.0
OF2	OUTFALL	89.60	2.00	0.0
OF3	OUTFALL	89.50	1.25	0.0
OF4	OUTFALL	0.00	90.40	0.0
OF5	OUTFALL	89.70	0.00	0.0
CBMH100	STORAGE	87.80	3.00	0.0
CBMH-101	STORAGE	87.99	2.96	0.0
CBMH-102	STORAGE	88.11	2.89	0.0
CBMH-103	STORAGE	88.27	2.78	0.0
CBMH-104	STORAGE	88.39	2.71	0.0
CBMH200	STORAGE	86.76	3.04	0.0
CBMH-202	STORAGE	87.25	2.90	0.0
CBMH-203	STORAGE	87.58	2.82	0.0
CBMH-204	STORAGE	87.98	3.07	0.0
CBMH-205	STORAGE	88.16	2.94	0.0
CBMH-206	STORAGE	88.36	2.79	0.0
CBMH-207	STORAGE	88.65	2.50	0.0
CBMH-303	STORAGE	88.29	1.42	0.0
CBMH-314	STORAGE	88.71	1.69	0.0
MH-105	STORAGE	89.04	2.70	0.0
MH-201	STORAGE	86.97	2.88	0.0
MH-301	STORAGE	87.23	2.68	0.0
MH-302	STORAGE	86.85	2.91	0.0
MH-304	STORAGE	87.36	2.47	0.0
MH-305	STORAGE	87.88	2.20	0.0
MH-306	STORAGE	88.18	2.12	0.0
MH-307	STORAGE	87.43	2.73	0.0
MH-308	STORAGE	87.73	2.61	0.0
MH-309	STORAGE	88.02	2.36	0.0
MH-310	STORAGE	87.53	2.82	0.0
MH-311	STORAGE	87.61	2.68	0.0
MH-312	STORAGE	87.74	2.63	0.0
MH-313	STORAGE	88.02	2.36	0.0
MH-401	STORAGE	87.38	2.40	0.0
MH-402	STORAGE	88.18	1.96	0.0
MH-403	STORAGE	88.50	1.81	0.0
POND3	STORAGE	87.00	2.60	0.0

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Link Summary
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Name	From Node	To Node	Type	Length	%Slope	Roughness
101-PND1	CBMH-101	CBMH100	CONDUIT	37.5	0.3200	0.0130
102-101	CBMH-102	CBMH-101	CONDUIT	35.9	0.3065	0.0130
103-102	CBMH-103	CBMH-102	CONDUIT	23.9	0.2935	0.0130
104-103	CBMH-104	CBMH-103	CONDUIT	39.3	0.2800	0.0130
105-104	MH-105	CBMH-104	CONDUIT	29.4	0.9864	0.0130
201-PND2	MH-201	CBMH200	CONDUIT	14.1	1.0639	0.0130
202-201	CBMH-202	MH-201	CONDUIT	44.5	0.5169	0.0130
204-203	CBMH-203	CBMH-202	CONDUIT	103.2	0.2908	0.0130
205-204	CBMH-204	CBMH-203	CONDUIT	76.3	0.3015	0.0130
206-205	CBMH-205	CBMH-204	CONDUIT	35.9	0.3010	0.0130
207-206	CBMH-206	CBMH-205	CONDUIT	23.9	0.5030	0.0130
208-207	CBMH-207	CBMH-206	CONDUIT	39.0	0.5126	0.0130
3001-501	HW-3001	MH-501	CONDUIT	85.5	0.1988	0.0130
301-PND3	MH-301	POND3	CONDUIT	28.2	0.1066	0.0130
302-301	MH-302	MH-301	CONDUIT	59.9	0.1002	0.0130
303-302	CBMH-303	MH-302	CONDUIT	68.9	0.3483	0.0130
304-302	MH-304	MH-302	CONDUIT	46.9	0.1066	0.0130
305-304	MH-305	MH-304	CONDUIT	96.8	0.1033	0.0130
306-305	MH-306	MH-305	CONDUIT	113.9	0.0966	0.0130
307-304	MH-307	MH-304	CONDUIT	60.4	0.0994	0.0130
308-307	MH-308	MH-307	CONDUIT	120.0	0.1000	0.0130
309-308	MH-309	MH-308	CONDUIT	127.0	0.1024	0.0130
310-307	MH-310	MH-307	CONDUIT	73.5	0.0952	0.0130
311-310	MH-311	MH-310	CONDUIT	70.9	0.0988	0.0130
312-311	MH-312	MH-311	CONDUIT	116.0	0.1034	0.0130
313-312	MH-313	MH-312	CONDUIT	120.0	0.1000	0.0130
314-313	CBMH-314	MH-313	CONDUIT	16.6	0.4819	0.0130
401-PND3	MH-401	POND3	CONDUIT	31.1	0.0965	0.0130
402-401	MH-402	MH-401	CONDUIT	115.0	0.1478	0.0130
403-402	MH-403	MH-402	CONDUIT	83.7	0.2031	0.0130
501-160	MH-501	EX-MH160	CONDUIT	27.8	0.2156	0.0130
CAP-401	CAP	MH-401	CONDUIT	12.9	0.0775	0.0130

PND1_OVR	CBMH100	OF2	CONDUIT	42.4	0.3539	0.0150
PND2_OVR	CBMH200	OF3	CONDUIT	7.0	0.7143	0.0150
PND3_OVR	CBMH-303	OF4	CONDUIT	7.0	0.7143	0.0130
OR1	CBMH100	EX-MH139	ORIFICE			
OR2	CBMH200	EX-MH159	ORIFICE			
OR3	POND3	HW-3001	ORIFICE			

****
Cross Section Summary
****

Conduit	Shape	Full Depth	Full Area	Hyd. Rad.	Max. Width	No. of Barrels	Full Flow
101-PND1	CIRCULAR	0.75	0.44	0.19	0.75	1	629.80
102-101	CIRCULAR	0.75	0.44	0.19	0.75	1	616.38
103-102	CIRCULAR	0.68	0.36	0.17	0.68	1	455.39
104-103	CIRCULAR	0.68	0.36	0.17	0.68	1	444.85
105-104	CIRCULAR	0.38	0.11	0.09	0.38	1	174.15
201-PND2	CIRCULAR	0.82	0.53	0.21	0.82	1	1480.67
202-201	CIRCULAR	0.82	0.53	0.21	0.82	1	1032.04
204-203	CIRCULAR	0.82	0.53	0.21	0.82	1	774.10
205-204	CIRCULAR	0.68	0.36	0.17	0.68	1	461.60
206-205	CIRCULAR	0.60	0.28	0.15	0.60	1	336.86
207-206	CIRCULAR	0.53	0.22	0.13	0.53	1	305.04
208-207	CIRCULAR	0.45	0.16	0.11	0.45	1	204.14
3001-501	CIRCULAR	1.05	0.87	0.26	1.05	1	1217.65
301-PND3	HORIZ_ELLIPSE	1.22	1.89	0.37	1.93	1	2454.60
302-301	HORIZ_ELLIPSE	1.22	1.89	0.37	1.93	1	2380.17
303-302	CIRCULAR	0.30	0.07	0.07	0.30	1	57.08
304-302	HORIZ_ELLIPSE	1.22	1.89	0.37	1.93	1	2454.89
305-304	CIRCULAR	0.82	0.53	0.21	0.82	1	461.38
306-305	CIRCULAR	0.60	0.28	0.15	0.60	1	190.84
307-304	HORIZ_ELLIPSE	1.22	1.89	0.37	1.93	1	2370.77
308-307	CIRCULAR	1.05	0.87	0.26	1.05	1	863.58
309-308	CIRCULAR	0.90	0.64	0.23	0.90	1	579.23
310-307	CIRCULAR	1.20	1.13	0.30	1.20	1	1202.94
311-310	CIRCULAR	1.20	1.13	0.30	1.20	1	1225.48
312-311	CIRCULAR	1.20	1.13	0.30	1.20	1	1254.04
313-312	CIRCULAR	1.05	0.87	0.26	1.05	1	863.73
314-313	CIRCULAR	0.53	0.22	0.13	0.53	1	298.57
401-PND3	HORIZ_ELLIPSE	1.22	1.89	0.37	1.93	1	2335.49
402-401	CIRCULAR	0.60	0.28	0.15	0.60	1	236.09
403-402	CIRCULAR	0.45	0.16	0.11	0.45	1	128.50
501-160	CIRCULAR	1.05	0.87	0.26	1.05	1	1268.08
CAP-401	HORIZ_ELLIPSE	1.22	1.89	0.37	1.93	1	2093.65
PND1_OVR	RECT_OPEN	1.00	3.00	0.75	3.00	1	9822.22
PND2_OVR	RECT_OPEN	1.00	3.00	0.75	3.00	1	13954.21
PND3_OVR	RECT_OPEN	1.00	5.50	0.85	5.50	1	31990.42

****
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 ..... LPS
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 03/18/2020 00:00:00
Ending Date 03/19/2020 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
Routing Time Step ..... 2.00 sec
Variable Time Step ..... YES
Maximum Trials 8

Number of Threads 4
Head Tolerance ..... 0.001500 m

****
Control Actions Taken
****

Runoff Quantity Continuity	Volume hectare-m	Depth mm
Total Precipitation	1.050	42.512
Evaporation Loss	0.000	0.000
Infiltration Loss	0.175	7.079
Surface Runoff	0.857	34.717
Final Storage	0.025	0.995
Continuity Error (%)	-0.657	

Flow Routing Continuity	Volume hectare-m	Volume 10^6 ltr
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	0.857	8.575
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	0.000	0.000
External Outflow	0.862	8.621
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	0.003
Continuity Error (%)	-0.581	

****
Highest Continuity Errors
****
Node MH-402 (2.62%)

Node MH-305 (2.15%)
Node CBMH-204 (1.17%)
Node MH-313 (1.04%)

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

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

****
Routing Time Step Summary
****
Minimum Time Step : 0.65 sec
Average Time Step : 2.00 sec
Maximum Time Step : 2.00 sec
Percent in Steady State : 0.00
Average Iterations per Step : 2.00
Percent Not Converging : 0.00

****
Subcatchment Runoff Summary
****

Subcatchment	Total Precip mm	Total Runon mm	Total Evap mm	Total Infil mm	Imperv Runoff mm	Perv Runoff mm	Total Runoff mm	Total Runoff 10^6 ltr	Peak Runoff LPS	Runoff Coeff

A-01	42.51	0.00	0.00	0.00	41.30	0.00	41.30	0.10	69.84	0.971
A-02	42.51	0.00	0.00	3.64	37.09	0.67	37.76	0.20	144.44	0.888
A-03	42.51	0.00	0.00	2.16	38.73	0.42	39.15	0.10	73.21	0.921
A-04	42.51	0.00	0.00	3.24	37.41	0.64	38.05	0.06	45.08	0.895
A-05	42.51	0.00	0.00	5.10	35.42	0.93	36.35	0.15	112.98	0.855
A-06	42.51	0.00	0.00	7.62	33.06	0.92	33.98	0.11	74.76	0.799
B-01	42.51	0.00	0.00	3.63	37.09	0.68	37.77	0.11	81.05	0.889
B-02	42.51	0.00	0.00	3.26	37.49	0.62	38.11	0.10	76.44	0.897
B-03	42.51	0.00	0.00	0.00	42.73	0.00	42.73	0.02	14.47	1.005
B-04	42.51	0.00	0.00	2.15	38.64	0.43	39.07	0.07	49.03	0.919
B-05	42.51	0.00	0.00	0.00	42.73	0.00	42.73	0.02	14.47	1.005
B-06	42.51	0.00	0.00	0.00	42.73	0.00	42.73	0.02	16.78	1.005
B-07	42.51	0.00	0.00	10.74	29.22	1.71	30.93	0.19	141.27	0.728
B-08	42.51	0.00	0.00	13.57	26.37	1.82	28.19	0.08	61.45	0.663
B-09	42.51	0.00	0.00	7.91	32.63	1.06	33.69	0.07	51.69	0.793
B-10	42.51	0.00	0.00	14.20	26.00	1.58	27.59	0.06	45.04	0.649
C-01	42.51	0.00	0.00	19.08	21.04	1.81	22.85	0.15	105.25	0.537
C-02	42.51	0.00	0.00	2.17	38.78	0.42	39.19	0.31	220.74	0.922
C-03	42.51	0.00	0.00	0.00	42.86	0.00	42.86	0.31	207.63	1.008
C-04	42.51	0.00	0.00	7.01	33.39	1.15	34.54	0.29	211.06	0.812
C-05	42.51	0.00	0.00	0.00	42.86	0.00	42.86	0.21	143.41	1.008
C-06	42.51	0.00	0.00	6.25	34.22	1.05	35.27	0.19	139.13	0.830

C-07	42.51	0.00	0.00	4.01	36.71	0.73	37.43	0.14	102.70	0.880
C-08	42.51	0.00	0.00	2.54	38.36	0.48	38.84	0.35	253.60	0.914
C-09	42.51	0.00	0.00	0.00	42.86	0.00	42.86	0.32	218.01	1.008
C-10	42.51	0.00	0.00	0.00	42.86	0.00	42.86	0.19	131.05	1.008
C-11	42.51	0.00	0.00	1.44	39.60	0.28	39.89	0.20	143.85	0.938
C-12	42.51	0.00	0.00	5.88	34.63	1.00	35.63	0.11	82.27	0.838
C-13	42.51	0.00	0.00	3.28	37.55	0.60	38.15	0.30	214.37	0.897
C-14	42.51	0.00	0.00	0.00	41.27	0.00	41.27	0.22	153.48	0.971
C-15	42.51	0.00	0.00	7.40	32.99	1.18	34.17	0.13	97.20	0.804
C-16	42.51	0.00	0.00	21.91	18.14	1.96	20.10	0.05	33.71	0.473
C-17	42.51	0.00	0.00	21.86	18.14	2.00	20.14	0.04	29.89	0.474
C-18	42.51	0.00	0.00	23.15	16.90	1.99	18.89	0.05	32.10	0.444
C-19	42.51	0.00	0.00	0.00	41.32	0.00	41.32	0.05	38.14	0.972
C-20	42.51	0.00	0.00	22.28	17.73	2.01	19.73	0.08	57.34	0.464
D-01a	42.51	0.00	0.00	29.14	8.23	5.34	13.57	0.00	1.37	0.319
D-01b	42.51	0.00	0.00	34.86	2.06	5.97	8.03	0.00	3.00	0.189
D-02a	42.51	0.00	0.00	34.61	2.06	6.32	8.38	0.01	13.17	0.197
D-02b	42.51	0.00	0.00	34.26	2.06	6.70	8.76	0.00	7.90	0.206
FUT-1	42.51	0.00	0.00	2.68	38.69	0.31	39.00	3.29	1900.64	0.917
PND1	42.51	0.00	0.00	37.47	2.06	2.99	5.05	0.01	6.79	0.119
PND2	42.51	0.00	0.00	36.65	2.06	3.87	5.92	0.02	17.16	0.139
PND3	42.51	0.00	0.00	37.54	2.06	2.92	4.98	0.05	36.69	0.117

****
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
CAP	JUNCTION	0.48	1.32	88.34	0	01:38	1.32
HW-3001	JUNCTION	0.10	0.55	87.55	0	01:39	0.55
MH-501	JUNCTION	0.11	0.63	87.45	0	01:40	0.63
EX-MH139	OUTFALL	0.00	0.00	87.17	0	00:00	0.00
EX-MH159	OUTFALL	0.00	0.00	86.01	0	00:00	0.00
EX-MH160	OUTFALL	0.00	0.00	86.12	0	00:00	0.00
OF1	OUTFALL	0.00	0.00	90.65	0	00:00	0.00
OF2	OUTFALL	0.00	0.00	89.60	0	00:00	0.00
OF3	OUTFALL	0.00	0.00	89.50	0	00:00	0.00
OF4	OUTFALL	0.00	0.00	0.00	0	00:00	0.00
OF5	OUTFALL	0.00	0.00	89.70	0	00:00	0.00
CBMH100	STORAGE	0.10	2.12	89.92	0	01:21	2.12
CBMH-101	STORAGE	0.09	1.94	89.93	0	01:19	1.94
CBMH-102	STORAGE	0.08	1.83	89.94	0	01:10	1.83
CBMH-103	STORAGE	0.07	1.70	89.97	0	01:10	1.69
CBMH-104	STORAGE	0.07	1.60	89.99	0	01:10	1.59
CBMH200	STORAGE	0.09	2.23	88.99	0	01:21	2.23
CBMH-202	STORAGE	0.06	1.78	89.03	0	01:13	1.78
CBMH-203	STORAGE	0.05	1.49	89.07	0	01:12	1.49
CBMH-204	STORAGE	0.04	1.20	89.18	0	01:10	1.19
CBMH-205	STORAGE	0.03	1.07	89.23	0	01:11	1.07
CBMH-206	STORAGE	0.02	0.90	89.26	0	01:11	0.88
CBMH-207	STORAGE	0.01	0.64	89.29	0	01:11	0.61
CBMH-303	STORAGE	0.01	0.16	88.45	0	01:10	0.16
CBMH-314	STORAGE	0.01	0.22	88.93	0	01:10	0.22
MH-105	STORAGE	0.03	0.99	90.03	0	01:10	0.98
MH-201	STORAGE	0.08	2.03	89.00	0	01:20	2.03
MH-301	STORAGE	0.13	1.10	88.33	0	01:40	1.10
MH-302	STORAGE	0.56	1.49	88.34	0	01:41	1.49
MH-304	STORAGE	0.11	1.08	88.44	0	01:12	1.08
MH-305	STORAGE	0.04	0.63	88.51	0	01:11	0.63
MH-306	STORAGE	0.07	0.52	88.70	0	01:10	0.52
MH-307	STORAGE	0.10	1.03	88.46	0	01:11	1.03
MH-308	STORAGE	0.06	0.84	88.57	0	01:11	0.84
MH-309	STORAGE	0.03	0.63	88.65	0	01:10	0.63
MH-310	STORAGE	0.08	0.97	88.50	0	01:11	0.97
MH-311	STORAGE	0.07	0.92	88.53	0	01:11	0.92
MH-312	STORAGE	0.06	0.89	88.63	0	01:11	0.89
MH-313	STORAGE	0.03	0.65	88.67	0	01:10	0.65
MH-401	STORAGE	0.11	0.96	88.34	0	01:38	0.96
MH-402	STORAGE	0.01	0.28	88.46	0	01:10	0.28
MH-403	STORAGE	0.01	0.21	88.71	0	01:10	0.21
POND3	STORAGE	0.19	1.33	88.33	0	01:39	1.33

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Node Inflow Summary
****

Node	Type	Maximum Lateral Inflow LPS	Maximum Total Inflow LPS	Time of Max Occurrence days	hr:min	Lateral Inflow Volume 10^6 ltr	Total Inflow Volume 10^6 ltr	Flow Balance Error Percent	
CAP	JUNCTION	1900.64	1900.64	0	01:10	3.29	3.29	-0.005	
HW-3001	JUNCTION	0.00	609.93	0	01:39	0	7.1	-0.001	
MH-501	JUNCTION	0.00	609.91	0	01:39	0	7.1	-0.016	
EX-MH139	OUTFALL	0.00	145.79	0	01:21	0	0.73	0.000	
EX-MH159	OUTFALL	0.00	177.56	0	01:21	0	0.779	0.000	
EX-MH160	OUTFALL	0.00	609.89	0	01:40	0	7.1	0.000	
OF1	OUTFALL	21.08	21.08	0	01:10	0.0112	0.0112	0.000	
OF2	OUTFALL	0.00	0.00	0	00:00	0	0	0.000	ltr
OF3	OUTFALL	0.00	0.00	0	00:00	0	0	0.000	ltr
OF4	OUTFALL	0.00	0.00	0	00:00	0	0	0.000	ltr
OF5	OUTFALL	4.37	4.37	0	01:10	0.00301	0.00301	0.000	
CBMH100	STORAGE	81.54	495.55	0	01:10	0.117	0.73	0.005	
CBMH-101	STORAGE	112.98	424.05	0	01:06	0.153	0.614	-0.001	
CBMH-102	STORAGE	45.08	324.19	0	01:06	0.0613	0.46	-0.108	
CBMH-103	STORAGE	73.21	282.07	0	01:06	0.101	0.399	0.132	
CBMH-104	STORAGE	144.44	211.78	0	01:10	0.198	0.297	-0.161	

CBMH200	STORAGE	17.16	426.45	0	01:11	0.0212	0.779	0.001
CBMH-202	STORAGE	51.69	404.58	0	01:11	0.0724	0.692	-0.272
CBMH-203	STORAGE	61.45	427.83	0	01:06	0.0837	0.614	-0.781
CBMH-204	STORAGE	141.27	377.93	0	01:07	0.188	0.537	1.185
CBMH-205	STORAGE	65.82	246.92	0	01:08	0.0924	0.35	0.237
CBMH-206	STORAGE	90.91	183.99	0	01:09	0.126	0.257	-0.078
CBMH-207	STORAGE	95.51	95.51	0	01:10	0.132	0.132	0.865
CBMH-303	STORAGE	33.71	33.71	0	01:10	0.0478	0.0478	2.436
CBMH-314	STORAGE	105.25	105.25	0	01:10	0.149	0.149	-0.003
MH-105	STORAGE	69.84	69.84	0	01:10	0.0999	0.0999	0.406
MH-201	STORAGE	45.04	419.80	0	01:11	0.0632	0.757	-0.096
MH-301	STORAGE	0.00	2063.75	0	01:12	0	3.55	0.021
MH-302	STORAGE	29.89	2081.99	0	01:11	0.0423	3.55	-0.066
MH-304	STORAGE	97.20	2055.63	0	01:10	0.133	3.45	-0.353
MH-305	STORAGE	153.48	363.98	0	01:10	0.219	0.506	2.198
MH-306	STORAGE	214.37	214.37	0	01:10	0.296	0.296	3.375
MH-307	STORAGE	82.27	1684.43	0	01:11	0.112	2.8	-0.750
MH-308	STORAGE	274.90	726.17	0	01:10	0.396	1.06	-0.260
MH-309	STORAGE	471.62	471.62	0	01:10	0.676	0.676	1.228
MH-310	STORAGE	102.70	975.70	0	01:10	0.141	1.61	-0.614
MH-311	STORAGE	139.13	923.46	0	01:10	0.19	1.46	-0.918
MH-312	STORAGE	354.47	854.78	0	01:10	0.501	1.26	-0.987
MH-313	STORAGE	428.36	533.09	0	01:10	0.616	0.765	1.048
MH-401	STORAGE	32.10	2022.69	0	01:10	0.0457	3.47	0.332
MH-402	STORAGE	38.14	93.50	0	01:10	0.055	0.136	2.689
MH-403	STORAGE	57.34	57.34	0	01:10	0.0813	0.0813	-0.015
POND3	STORAGE	36.69	3983.37	0	01:10	0.0544	7.07	-0.393

****
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 LPS
CBMH100	0.004	0	0	0	0.158	16	0 01:21	145.79
CBMH-101	0.000	3	0	0	0.004	66	0 01:19	414.78
CBMH-102	0.000	3	0	0	0.003	63	0 01:10	316.99
CBMH-103	0.000	3	0	0	0.003	61	0 01:10	280.75
CBMH-104	0.000	2	0	0	0.002	59	0 01:10	211.13
CBMH200	0.001	0	0	0	0.071	8	0 01:21	177.56
CBMH-202	0.000	2	0	0	0.003	61	0 01:13	385.18
CBMH-203	0.000	2	0	0	0.003	53	0 01:12	362.55
CBMH-204	0.000	1	0	0	0.002	39	0 01:10	371.33
CBMH-205	0.000	1	0	0	0.001	36	0 01:11	245.30
CBMH-206	0.000	1	0	0	0.001	32	0 01:11	181.85
CBMH-207	0.000	1	0	0	0.001	25	0 01:11	94.11
CBMH-303	0.000	0	0	0	0.000	12	0 01:10	33.35
CBMH-314	0.000	1	0	0	0.000	13	0 01:10	104.95
MH-105	0.000	1	0	0	0.001	37	0 01:10	70.51
MH-201	0.000	3	0	0	0.005	70	0 01:20	411.59
MH-301	0.001	5	0	0	0.008	41	0 01:40	2039.44
MH-302	0.004	19	0	0	0.011	51	0 01:41	2063.75
MH-304	0.001	4	0	0	0.008	44	0 01:12	2026.09
MH-305	0.000	2	0	0	0.001	29	0 01:11	337.30
MH-306	0.000	3	0	0	0.001	25	0 01:10	210.73
MH-307	0.001	4	0	0	0.007	38	0 01:11	1654.30
MH-308	0.000	2	0	0	0.004	32	0 01:11	676.19
MH-309	0.000	1	0	0	0.001	27	0 01:10	452.71
MH-310	0.000	3	0	0	0.005	34	0 01:11	956.16
MH-311	0.001	3	0	0	0.007	34	0 01:11	886.27
MH-312	0.000	2	0	0	0.004	34	0 01:11	793.10
MH-313	0.000	1	0	0	0.002	28	0 01:10	502.51
MH-401	0.001	5	0	0	0.007	40	0 01:38	1993.49
MH-402	0.000	1	0	0	0.000	14	0 01:10	92.04

MH-403	0.000	1	0	0	0.000	12	0	01:10	55.74
POND3	0.347	4	0	0	3.350	37	0	01:39	609.93

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Outfall Loading Summary
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Outfall Node	Flow Freq Pcnt	Avg Flow LPS	Max Flow LPS	Total Volume 10^6 ltr
EX-MH139	24.26	34.95	145.79	0.730
EX-MH159	24.71	36.58	177.56	0.779
EX-MH160	91.65	89.77	609.89	7.098
OF1	11.22	1.16	21.08	0.011
OF2	0.00	0.00	0.00	0.000
OF3	0.00	0.00	0.00	0.000
OF4	0.00	0.00	0.00	0.000
OF5	9.07	0.38	4.37	0.003
System	20.11	162.84	4.37	8.621

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Link Flow Summary
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Link	Type	Maximum |Flow| LPS	Time of Max Occurrence days	hr:min	Maximum |Veloc| m/sec	Max/ Full Flow	Max/ Full Depth
101-PND1	CONDUIT	414.78	0	01:10	0.94	0.66	1.00
102-101	CONDUIT	316.99	0	01:06	0.75	0.51	1.00
103-102	CONDUIT	280.75	0	01:06	0.96	0.62	1.00
104-103	CONDUIT	211.13	0	01:06	0.79	0.47	1.00
105-104	CONDUIT	70.51	0	01:07	1.34	0.40	1.00
201-PND2	CONDUIT	411.59	0	01:12	0.83	0.28	1.00
202-201	CONDUIT	385.18	0	01:11	1.03	0.37	1.00
204-203	CONDUIT	362.55	0	01:11	1.12	0.47	1.00
205-204	CONDUIT	371.33	0	01:06	1.54	0.80	1.00
206-205	CONDUIT	245.30	0	01:07	1.27	0.73	1.00
207-206	CONDUIT	181.85	0	01:08	1.38	0.60	1.00
208-207	CONDUIT	94.11	0	01:09	1.26	0.46	1.00
3001-501	CONDUIT	609.91	0	01:39	1.23	0.50	0.56
301-PND3	CONDUIT	2039.44	0	01:12	1.65	0.83	0.92
302-301	CONDUIT	2063.75	0	01:12	1.30	0.87	0.87
303-302	CONDUIT	33.35	0	01:10	0.89	0.58	0.67
304-302	CONDUIT	2026.09	0	01:11	1.19	0.83	0.85
305-304	CONDUIT	337.30	0	01:10	1.00	0.73	0.78
306-305	CONDUIT	210.73	0	01:10	1.07	1.10	0.71
307-304	CONDUIT	1654.30	0	01:11	0.97	0.70	0.86
308-307	CONDUIT	676.19	0	01:10	1.15	0.78	0.80
309-308	CONDUIT	452.71	0	01:08	1.06	0.78	0.73
310-307	CONDUIT	956.16	0	01:11	1.07	0.79	0.82
311-310	CONDUIT	886.27	0	01:11	1.10	0.72	0.78
312-311	CONDUIT	793.10	0	01:10	1.03	0.63	0.75
313-312	CONDUIT	502.51	0	01:09	1.05	0.58	0.66
314-313	CONDUIT	104.95	0	01:10	1.23	0.35	0.42
401-PND3	CONDUIT	1993.49	0	01:10	1.66	0.85	0.80
402-401	CONDUIT	92.04	0	01:10	0.87	0.39	0.42
403-402	CONDUIT	55.74	0	01:10	0.89	0.43	0.42
501-160	CONDUIT	609.89	0	01:40	1.38	0.48	0.51
CAP-401	CONDUIT	1899.05	0	01:10	1.30	0.91	0.77
PND1_OVR	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
PND2_OVR	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
PND3_OVR	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
OR1	ORIFICE	145.79	0	01:21			1.00
OR2	ORIFICE	177.56	0	01:21			1.00
OR3	ORIFICE	609.93	0	01:39			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

101-PND1	1.00	0.02	0.00	0.00	0.09	0.00	0.00	0.89	0.01	0.00
102-101	1.00	0.02	0.00	0.00	0.16	0.00	0.00	0.82	0.05	0.00
103-102	1.00	0.02	0.00	0.00	0.06	0.00	0.00	0.92	0.00	0.00
104-103	1.00	0.02	0.00	0.00	0.15	0.00	0.00	0.83	0.01	0.00
105-104	1.00	0.02	0.00	0.00	0.04	0.00	0.00	0.94	0.00	0.00
201-PND2	1.00	0.01	0.00	0.00	0.08	0.03	0.00	0.88	0.01	0.00
202-201	1.00	0.01	0.00	0.00	0.05	0.00	0.00	0.93	0.00	0.00
204-203	1.00	0.01	0.00	0.00	0.05	0.00	0.00	0.94	0.01	0.00
205-204	1.00	0.01	0.00	0.00	0.04	0.00	0.00	0.95	0.00	0.00
206-205	1.00	0.01	0.00	0.00	0.03	0.00	0.00	0.96	0.00	0.00
207-206	1.00	0.01	0.00	0.00	0.03	0.00	0.00	0.96	0.00	0.00
208-207	1.00	0.01	0.00	0.00	0.03	0.00	0.00	0.97	0.00	0.00
3001-501	1.00	0.01	0.00	0.00	0.62	0.00	0.00	0.36	0.09	0.00
301-PND3	1.00	0.03	0.00	0.00	0.20	0.00	0.00	0.77	0.01	0.00
302-301	1.00	0.03	0.00	0.00	0.28	0.00	0.00	0.69	0.01	0.00
303-302	1.00	0.02	0.00	0.00	0.08	0.00	0.00	0.90	0.07	0.00
304-302	1.00	0.01	0.00	0.00	0.25	0.00	0.00	0.74	0.01	0.00
305-304	1.00	0.02	0.00	0.00	0.11	0.00	0.00	0.87	0.01	0.00
306-305	1.00	0.02	0.00	0.00	0.06	0.00	0.00	0.92	0.03	0.00
307-304	1.00	0.01	0.00	0.00	0.28	0.00	0.00	0.71	0.01	0.00
308-307	1.00	0.01	0.00	0.00	0.14	0.00	0.00	0.85	0.02	0.00
309-308	1.00	0.01	0.00	0.00	0.10	0.00	0.00	0.89	0.02	0.00
310-307	1.00	0.01	0.00	0.00	0.18	0.00	0.00	0.81	0.02	0.00
311-310	1.00	0.01	0.00	0.00	0.30	0.00	0.00	0.69	0.06	0.00
312-311	1.00	0.01	0.00	0.00	0.21	0.00	0.00	0.78	0.02	0.00
313-312	1.00	0.01	0.00	0.00	0.10	0.00	0.00	0.89	0.02	0.00
314-313	1.00	0.02	0.00	0.00	0.00	0.00	0.00	0.98	0.00	0.00
401-PND3	1.00	0.01	0.00	0.00	0.17	0.00	0.00	0.82	0.00	0.00
402-401	1.00	0.02	0.00	0.00	0.08	0.00	0.00	0.90	0.03	0.00
403-402	1.00	0.02	0.00	0.00	0.00	0.00	0.00	0.98	0.00	0.00
501-160	1.00	0.01	0.00	0.00	0.00	0.00	0.00	0.99	0.00	0.00
CAP-401	1.00	0.01	0.00	0.00	0.45	0.00	0.00	0.54	0.00	0.00
PND1_OVR	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PND2_OVR	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PND3_OVR	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

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Conduit Surcharge Summary
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Conduit	Hours Full: Both Ends	Hours Full: Upstream	Hours Full: Dnstream	Hours Above Full Normal Flow	Hours Capacity Limited
101-PND1	1.08	1.08	1.13	0.01	0.01
102-101	1.03	1.03	1.07	0.01	0.01
103-102	1.01	1.01	1.03	0.01	0.01
104-103	0.98	0.98	1.01	0.01	0.01
105-104	0.90	0.90	0.97	0.01	0.01
201-PND2	0.94	0.94	1.01	0.01	0.01
202-201	0.81	0.81	0.91	0.01	0.01
204-203	0.66	0.66	0.79	0.01	0.01
205-204	0.56	0.56	0.65	0.01	0.01
206-205	0.52	0.52	0.56	0.01	0.01
207-206	0.43	0.43	0.52	0.01	0.01
208-207	0.07	0.07	0.41	0.01	0.01
306-305	0.01	0.01	0.01	0.08	0.01

Analysis begun on: Thu Aug 5 09:51:29 2021
Analysis ended on: Thu Aug 5 09:51:33 2021
Total elapsed time: 00:00:04

Chicago 3hr - 100-year Storm PCSWMM Model Results

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

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Element Count
****
Number of rain gages 1
Number of subcatchments ... 44
Number of nodes 43
Number of links 38
Number of pollutants 0
Number of land uses 0

****
Raingage Summary
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Name	Data Source	Data Type	Recording Interval
Raingage1	C3hr-100yr	INTENSITY	10 min.

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Subcatchment Summary
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Name	Area	Width	%Imperv	%Slope	Rain Gage	Outlet
A-01	0.24	54.88	100.00	1.5000	Raingage1	MH-105
A-02	0.52	200.00	90.00	1.5000	Raingage1	CBMH-104
A-03	0.26	106.58	94.00	1.5000	Raingage1	CBMH-103
A-04	0.16	138.79	91.00	1.5000	Raingage1	CBMH-102
A-05	0.42	173.25	86.00	1.5000	Raingage1	CBMH-101
A-06	0.31	35.89	80.00	1.5000	Raingage1	CBMH100
B-01	0.29	109.29	90.00	1.5000	Raingage1	CBMH-207
B-02	0.28	113.17	91.00	1.5000	Raingage1	CBMH-206
B-03	0.05	23.47	100.00	1.5000	Raingage1	CBMH-207
B-04	0.17	153.10	94.00	1.5000	Raingage1	CBMH-205
B-05	0.05	23.47	100.00	1.5000	Raingage1	CBMH-206
B-06	0.06	26.98	100.00	1.5000	Raingage1	CBMH-205
B-07	0.61	249.79	71.00	1.5000	Raingage1	CBMH-204
B-08	0.30	82.04	64.00	1.5000	Raingage1	CBMH-203
B-09	0.22	34.79	79.00	1.5000	Raingage1	CBMH-202
B-10	0.23	39.01	63.00	1.5000	Raingage1	MH-201
C-01	0.65	101.56	51.00	1.5000	Raingage1	CBMH-314
C-02	0.78	239.45	94.00	1.5000	Raingage1	MH-313
C-03	0.72	139.46	100.00	1.5000	Raingage1	MH-313
C-04	0.83	254.43	81.00	1.5000	Raingage1	MH-312
C-05	0.50	96.33	100.00	1.5000	Raingage1	MH-312
C-06	0.54	164.53	83.00	1.5000	Raingage1	MH-311
C-07	0.38	115.29	89.00	1.5000	Raingage1	MH-310
C-08	0.90	276.76	93.00	1.5000	Raingage1	MH-309
C-09	0.76	147.28	100.00	1.5000	Raingage1	MH-309
C-10	0.46	88.87	100.00	1.5000	Raingage1	MH-308
C-11	0.51	154.43	96.00	1.5000	Raingage1	MH-308
C-12	0.32	97.83	84.00	1.5000	Raingage1	MH-307
C-13	0.78	214.64	91.00	1.5000	Raingage1	MH-306
C-14	0.53	146.69	100.00	1.5000	Raingage1	MH-305
C-15	0.39	112.79	80.00	1.5000	Raingage1	MH-304
C-16	0.24	46.12	44.00	1.0000	Raingage1	CBMH-303
C-17	0.21	42.86	44.00	1.0000	Raingage1	MH-302
C-18	0.24	45.66	41.00	1.0000	Raingage1	MH-401
C-19	0.13	26.08	100.00	1.0000	Raingage1	MH-402
C-20	0.41	82.40	43.00	1.0000	Raingage1	MH-403
D-01a	0.01	17.02	20.00	2.0000	Raingage1	OF5
D-01b	0.02	40.00	5.00	2.0000	Raingage1	OF5
D-02a	0.09	254.29	5.00	1.5000	Raingage1	OF1
D-02b	0.04	286.67	5.00	1.5000	Raingage1	OF1
FUT-1	8.45	296.25	93.00	1.5000	Raingage1	CAP
PND1	0.20	42.73	5.00	1.5000	Raingage1	CBMH100
PND2	0.36	137.16	5.00	1.5000	Raingage1	CBMH200
PND3	1.09	226.09	5.00	1.5000	Raingage1	POND3

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Node Summary
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Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow

CAP	JUNCTION	87.02	2.80	0.0
HW-3001	JUNCTION	87.00	2.60	0.0
MH-501	JUNCTION	86.82	2.97	0.0
EX-MH139	OUTFALL	87.17	0.00	0.0
EX-MH159	OUTFALL	86.01	0.00	0.0
EX-MH160	OUTFALL	86.12	1.69	0.0
OF1	OUTFALL	90.65	0.00	0.0
OF2	OUTFALL	89.60	2.00	0.0
OF3	OUTFALL	89.50	1.25	0.0
OF4	OUTFALL	0.00	90.40	0.0
OF5	OUTFALL	89.70	0.00	0.0
CBMH100	STORAGE	87.80	3.00	0.0
CBMH-101	STORAGE	87.99	2.96	0.0
CBMH-102	STORAGE	88.11	2.89	0.0
CBMH-103	STORAGE	88.27	2.78	0.0
CBMH-104	STORAGE	88.39	2.71	0.0
CBMH200	STORAGE	86.76	3.04	0.0
CBMH-202	STORAGE	87.25	2.90	0.0
CBMH-203	STORAGE	87.58	2.82	0.0
CBMH-204	STORAGE	87.98	3.07	0.0
CBMH-205	STORAGE	88.16	2.94	0.0
CBMH-206	STORAGE	88.36	2.79	0.0
CBMH-207	STORAGE	88.65	2.50	0.0
CBMH-303	STORAGE	88.29	1.42	0.0
CBMH-314	STORAGE	88.71	1.69	0.0
MH-105	STORAGE	89.04	2.70	0.0
MH-201	STORAGE	86.97	2.88	0.0
MH-301	STORAGE	87.23	2.68	0.0
MH-302	STORAGE	86.85	2.91	0.0
MH-304	STORAGE	87.36	2.47	0.0
MH-305	STORAGE	87.88	2.20	0.0
MH-306	STORAGE	88.18	2.12	0.0
MH-307	STORAGE	87.43	2.73	0.0
MH-308	STORAGE	87.73	2.61	0.0
MH-309	STORAGE	88.02	2.36	0.0
MH-310	STORAGE	87.53	2.82	0.0
MH-311	STORAGE	87.61	2.68	0.0
MH-312	STORAGE	87.74	2.63	0.0
MH-313	STORAGE	88.02	2.36	0.0
MH-401	STORAGE	87.38	2.40	0.0
MH-402	STORAGE	88.18	1.96	0.0
MH-403	STORAGE	88.50	1.81	0.0
POND3	STORAGE	87.00	2.60	0.0

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Link Summary
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Name	From Node	To Node	Type	Length	%Slope	Roughness
101-PND1	CBMH-101	CBMH100	CONDUIT	37.5	0.3200	0.0130
102-101	CBMH-102	CBMH-101	CONDUIT	35.9	0.3065	0.0130
103-102	CBMH-103	CBMH-102	CONDUIT	23.9	0.2935	0.0130
104-103	CBMH-104	CBMH-103	CONDUIT	39.3	0.2800	0.0130
105-104	MH-105	CBMH-104	CONDUIT	29.4	0.9864	0.0130
201-PND2	MH-201	CBMH200	CONDUIT	14.1	1.0639	0.0130
202-201	CBMH-202	MH-201	CONDUIT	44.5	0.5169	0.0130
204-203	CBMH-203	CBMH-202	CONDUIT	103.2	0.2908	0.0130
205-204	CBMH-204	CBMH-203	CONDUIT	76.3	0.3015	0.0130
206-205	CBMH-205	CBMH-204	CONDUIT	35.9	0.3010	0.0130
207-206	CBMH-206	CBMH-205	CONDUIT	23.9	0.5030	0.0130
208-207	CBMH-207	CBMH-206	CONDUIT	39.0	0.5126	0.0130
3001-501	HW-3001	MH-501	CONDUIT	85.5	0.1988	0.0130
301-PND3	MH-301	POND3	CONDUIT	28.2	0.1066	0.0130
302-301	MH-302	MH-301	CONDUIT	59.9	0.1002	0.0130
303-302	CBMH-303	MH-302	CONDUIT	68.9	0.3483	0.0130
304-302	MH-304	MH-302	CONDUIT	46.9	0.1066	0.0130
305-304	MH-305	MH-304	CONDUIT	96.8	0.1033	0.0130
306-305	MH-306	MH-305	CONDUIT	113.9	0.0966	0.0130
307-304	MH-307	MH-304	CONDUIT	60.4	0.0994	0.0130
308-307	MH-308	MH-307	CONDUIT	120.0	0.1000	0.0130
309-308	MH-309	MH-308	CONDUIT	127.0	0.1024	0.0130
310-307	MH-310	MH-307	CONDUIT	73.5	0.0952	0.0130
311-310	MH-311	MH-310	CONDUIT	70.9	0.0988	0.0130
312-311	MH-312	MH-311	CONDUIT	116.0	0.1034	0.0130
313-312	MH-313	MH-312	CONDUIT	120.0	0.1000	0.0130
314-313	CBMH-314	MH-313	CONDUIT	16.6	0.4819	0.0130
401-PND3	MH-401	POND3	CONDUIT	31.1	0.0965	0.0130
402-401	MH-402	MH-401	CONDUIT	115.0	0.1478	0.0130
403-402	MH-403	MH-402	CONDUIT	83.7	0.2031	0.0130
501-160	MH-501	EX-MH160	CONDUIT	27.8	0.2156	0.0130
CAP-401	CAP	MH-401	CONDUIT	12.9	0.0775	0.0130

PND1_OVR	CBMH100	OF2	CONDUIT	42.4	0.3539	0.0150
PND2_OVR	CBMH200	OF3	CONDUIT	7.0	0.7143	0.0150
PND3_OVR	CBMH-303	OF4	CONDUIT	7.0	0.7143	0.0130
OR1	CBMH100	EX-MH139	ORIFICE			
OR2	CBMH200	EX-MH159	ORIFICE			
OR3	POND3	HW-3001	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
101-PND1	CIRCULAR	0.75	0.44	0.19	0.75	1	629.80
102-101	CIRCULAR	0.75	0.44	0.19	0.75	1	616.38
103-102	CIRCULAR	0.68	0.36	0.17	0.68	1	455.39
104-103	CIRCULAR	0.68	0.36	0.17	0.68	1	444.85
105-104	CIRCULAR	0.38	0.11	0.09	0.38	1	174.15
201-PND2	CIRCULAR	0.82	0.53	0.21	0.82	1	1480.67
202-201	CIRCULAR	0.82	0.53	0.21	0.82	1	1032.04
204-203	CIRCULAR	0.82	0.53	0.21	0.82	1	774.10
205-204	CIRCULAR	0.68	0.36	0.17	0.68	1	461.60
206-205	CIRCULAR	0.60	0.28	0.15	0.60	1	336.86
207-206	CIRCULAR	0.53	0.22	0.13	0.53	1	305.04
208-207	CIRCULAR	0.45	0.16	0.11	0.45	1	204.14
3001-501	CIRCULAR	1.05	0.87	0.26	1.05	1	1217.65
301-PND3	HORIZ_ELLIPSE	1.22	1.89	0.37	1.93	1	2454.60
302-301	HORIZ_ELLIPSE	1.22	1.89	0.37	1.93	1	2380.17
303-302	CIRCULAR	0.30	0.07	0.07	0.30	1	57.08
304-302	HORIZ_ELLIPSE	1.22	1.89	0.37	1.93	1	2454.89
305-304	CIRCULAR	0.82	0.53	0.21	0.82	1	461.38
306-305	CIRCULAR	0.60	0.28	0.15	0.60	1	190.84
307-304	HORIZ_ELLIPSE	1.22	1.89	0.37	1.93	1	2370.77
308-307	CIRCULAR	1.05	0.87	0.26	1.05	1	863.58
309-308	CIRCULAR	0.90	0.64	0.23	0.90	1	579.23
310-307	CIRCULAR	1.20	1.13	0.30	1.20	1	1202.94
311-310	CIRCULAR	1.20	1.13	0.30	1.20	1	1225.48
312-311	CIRCULAR	1.20	1.13	0.30	1.20	1	1254.04
313-312	CIRCULAR	1.05	0.87	0.26	1.05	1	863.73
314-313	CIRCULAR	0.53	0.22	0.13	0.53	1	298.57
401-PND3	HORIZ_ELLIPSE	1.22	1.89	0.37	1.93	1	2335.49
402-401	CIRCULAR	0.60	0.28	0.15	0.60	1	236.09
403-402	CIRCULAR	0.45	0.16	0.11	0.45	1	128.50
501-160	CIRCULAR	1.05	0.87	0.26	1.05	1	1268.08
CAP-401	HORIZ_ELLIPSE	1.22	1.89	0.37	1.93	1	2093.65
PND1_OVR	RECT_OPEN	1.00	3.00	0.75	3.00	1	9822.22
PND2_OVR	RECT_OPEN	1.00	3.00	0.75	3.00	1	13954.21
PND3_OVR	RECT_OPEN	1.00	5.50	0.85	5.50	1	31990.42

****
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 ..... LPS
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 03/18/2020 00:00:00
Ending Date 03/19/2020 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
Routing Time Step ..... 2.00 sec
Variable Time Step ..... YES
Maximum Trials 8

Number of Threads 4
Head Tolerance ..... 0.001500 m

****
Control Actions Taken
****

**********	Volume	Depth
Runoff Quantity Continuity	hectare-m	mm
Total Precipitation	1.770	71.667
Evaporation Loss	0.000	0.000
Infiltration Loss	0.211	8.548
Surface Runoff	1.549	62.699
Final Storage	0.025	0.995
Continuity Error (%)	-0.802	

**********	Volume	Volume
Flow Routing Continuity	hectare-m	10^6 ltr
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	1.549	15.486
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	0.009	0.086
External Outflow	1.559	15.590
Flooding Loss	0.000	0.000
Evaporation Loss	0.000	0.000
Exfiltration Loss	0.000	0.000
Initial Stored Volume	0.000	0.003
Final Stored Volume	0.006	0.065
Continuity Error (%)	-0.510	

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

****
Highest Flow Instability Indexes
****
Link OR2 (121)
Link OR1 (92)
Link OR3 (34)

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

Minimum Time Step	:	0.50 sec
Average Time Step	:	2.00 sec
Maximum Time Step	:	2.00 sec
Percent in Steady State	:	0.00
Average Iterations per Step	:	2.00
Percent Not Converging	:	0.00

****
Subcatchment Runoff Summary
****

Subcatchment	Total Precip mm	Total Runon mm	Total Evap mm	Total Infil mm	Imperv Runoff mm	Perv Runoff mm	Total Runoff mm	Total Runoff 10^6 ltr	Peak Runoff LPS	Runoff Coeff
A-01	71.67	0.00	0.00	0.00	70.59	0.00	70.59	0.17	119.95	0.985
A-02	71.67	0.00	0.00	4.40	63.35	3.16	66.52	0.35	256.87	0.928
A-03	71.67	0.00	0.00	2.63	66.16	1.92	68.08	0.18	127.31	0.950
A-04	71.67	0.00	0.00	3.94	63.90	2.91	66.81	0.11		

A-05	71.67	0.00	0.00	6.17	60.51	4.26	64.77	0.27	
203.74	0.904								
A-06	71.67	0.00	0.00	9.12	56.56	5.40	61.96	0.19	
139.85	0.865								
B-01	71.67	0.00	0.00	4.40	63.36	3.09	66.45	0.20	
143.47	0.927								
B-02	71.67	0.00	0.00	3.96	64.04	2.82	66.86	0.18	
134.50	0.933								
B-03	71.67	0.00	0.00	0.00	71.93	0.00	71.93	0.04	
24.80	1.004								
B-04	71.67	0.00	0.00	2.63	66.01	1.96	67.96	0.12	
85.05	0.948								
B-05	71.67	0.00	0.00	0.00	71.93	0.00	71.93	0.04	
24.80	1.004								
B-06	71.67	0.00	0.00	0.00	71.93	0.00	71.93	0.04	
28.77	1.004								
B-07	71.67	0.00	0.00	12.91	49.92	8.40	58.32	0.35	
277.88	0.814								
B-08	71.67	0.00	0.00	16.26	45.05	9.96	55.01	0.16	
125.48	0.768								
B-09	71.67	0.00	0.00	9.48	55.79	5.81	61.61	0.13	
97.36	0.860								
B-10	71.67	0.00	0.00	17.03	44.44	9.78	54.22	0.12	
90.28	0.757								
C-01	71.67	0.00	0.00	22.98	35.95	12.42	48.37	0.32	
220.07	0.675								
C-02	71.67	0.00	0.00	2.64	66.25	1.89	68.14	0.53	
384.78	0.951								
C-03	71.67	0.00	0.00	0.00	72.20	0.00	72.20	0.52	
357.14	1.007								
C-04	71.67	0.00	0.00	8.44	57.05	5.55	62.60	0.52	
393.61	0.873								
C-05	71.67	0.00	0.00	0.00	72.20	0.00	72.20	0.36	
246.68	1.007								
C-06	71.67	0.00	0.00	7.54	58.46	5.00	63.47	0.34	
256.61	0.886								
C-07	71.67	0.00	0.00	4.85	62.71	3.33	66.04	0.25	
183.33	0.922								
C-08	71.67	0.00	0.00	3.08	65.54	2.18	67.73	0.61	
443.95	0.945								
C-09	71.67	0.00	0.00	0.00	72.19	0.00	72.19	0.55	
374.99	1.007								
C-10	71.67	0.00	0.00	0.00	72.19	0.00	72.19	0.33	
225.39	1.007								

C-11	71.67	0.00	0.00	1.75	67.67	1.28	68.95	0.35
248.96	0.962							
C-12	71.67	0.00	0.00	7.09	59.17	4.73	63.90	0.20
150.87	0.892							
C-13	71.67	0.00	0.00	3.97	64.16	2.75	66.90	0.52
379.42	0.934							
C-14	71.67	0.00	0.00	0.00	70.53	0.00	70.53	0.37
263.31	0.984							
C-15	71.67	0.00	0.00	8.90	56.35	5.80	62.15	0.24
182.39	0.867							
C-16	71.67	0.00	0.00	26.45	31.00	13.97	44.97	0.11
73.06	0.627							
C-17	71.67	0.00	0.00	26.37	30.99	14.07	45.06	0.09
65.19	0.629							
C-18	71.67	0.00	0.00	28.01	28.88	14.56	43.44	0.11
70.54	0.606							
C-19	71.67	0.00	0.00	0.00	70.68	0.00	70.68	0.09
65.78	0.986							
C-20	71.67	0.00	0.00	26.90	30.28	14.25	44.53	0.18
125.47	0.621							
D-01a	71.67	0.00	0.00	35.26	14.06	24.40	38.46	0.00
3.43	0.537							
D-01b	71.67	0.00	0.00	42.06	3.53	28.18	31.71	0.01
9.54	0.442							
D-02a	71.67	0.00	0.00	41.88	3.53	28.94	32.47	0.03
36.93	0.453							
D-02b	71.67	0.00	0.00	41.67	3.53	30.40	33.94	0.01
18.31	0.474							
FUT-1	71.67	0.00	0.00	3.21	66.05	1.87	67.91	5.74
3630.04	0.948							
PND1	71.67	0.00	0.00	45.51	3.51	22.98	26.49	0.05
30.10	0.370							
PND2	71.67	0.00	0.00	43.99	3.51	24.76	28.27	0.10
78.01	0.394							
PND3	71.67	0.00	0.00	45.66	3.51	22.82	26.33	0.29
161.82	0.367							

****
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
CAP	JUNCTION	0.62	2.13	89.15	0 01:45	2.13
HW-3001	JUNCTION	0.26	0.68	87.68	0 01:46	0.68
MH-501	JUNCTION	0.41	0.76	87.58	0 01:46	0.76
EX-MH139	OUTFALL	0.67	0.67	87.84	0 00:00	0.67
EX-MH159	OUTFALL	1.05	1.05	87.06	0 00:00	1.05
EX-MH160	OUTFALL	1.06	1.15	87.27	0 01:47	1.15
OF1	OUTFALL	0.00	0.00	90.65	0 00:00	0.00
OF2	OUTFALL	0.00	0.00	89.60	0 00:00	0.00
OF3	OUTFALL	0.00	0.00	89.50	0 00:00	0.00
OF4	OUTFALL	0.00	0.00	0.00	0 00:00	0.00
OF5	OUTFALL	0.00	0.00	89.70	0 00:00	0.00
CBMH100	STORAGE	0.25	2.54	90.34	0 01:28	2.54
CBMH-101	STORAGE	0.20	2.42	90.41	0 01:10	2.42
CBMH-102	STORAGE	0.19	2.38	90.49	0 01:10	2.38
CBMH-103	STORAGE	0.17	2.30	90.57	0 01:10	2.28
CBMH-104	STORAGE	0.16	2.25	90.64	0 01:10	2.24
CBMH200	STORAGE	0.49	2.69	89.45	0 01:30	2.69
CBMH-202	STORAGE	0.17	2.46	89.71	0 01:12	2.46
CBMH-203	STORAGE	0.15	2.38	89.96	0 01:11	2.37
CBMH-204	STORAGE	0.11	2.43	90.41	0 01:11	2.43
CBMH-205	STORAGE	0.10	2.41	90.57	0 01:10	2.41
CBMH-206	STORAGE	0.08	2.32	90.68	0 01:10	2.31
CBMH-207	STORAGE	0.06	2.14	90.79	0 01:10	2.13
CBMH-303	STORAGE	0.08	0.95	89.24	0 01:12	0.95
CBMH-314	STORAGE	0.04	1.25	89.96	0 01:10	1.25
MH-105	STORAGE	0.10	1.73	90.77	0 01:10	1.72
MH-201	STORAGE	0.28	2.49	89.46	0 01:23	2.49
MH-301	STORAGE	0.28	1.91	89.14	0 01:47	1.91
MH-302	STORAGE	0.71	2.30	89.15	0 01:48	2.30
MH-304	STORAGE	0.26	1.96	89.32	0 01:12	1.95
MH-305	STORAGE	0.15	1.59	89.47	0 01:11	1.59
MH-306	STORAGE	0.14	1.59	89.77	0 01:10	1.59
MH-307	STORAGE	0.24	1.96	89.39	0 01:12	1.96
MH-308	STORAGE	0.18	1.91	89.64	0 01:11	1.91
MH-309	STORAGE	0.13	1.80	89.82	0 01:10	1.79
MH-310	STORAGE	0.22	1.98	89.51	0 01:11	1.98
MH-311	STORAGE	0.20	2.00	89.61	0 01:11	1.99
MH-312	STORAGE	0.18	2.08	89.82	0 01:11	2.08
MH-313	STORAGE	0.13	1.90	89.92	0 01:10	1.90
MH-401	STORAGE	0.25	1.77	89.15	0 01:45	1.76
MH-402	STORAGE	0.09	0.97	89.15	0 01:46	0.97
MH-403	STORAGE	0.05	0.65	89.15	0 01:46	0.65
POND3	STORAGE	0.46	2.14	89.14	0 01:46	2.14

****
Node Inflow Summary
****

Node	Type	Maximum Lateral Inflow LPS	Maximum Total Inflow LPS	Time of Max Occurrence days hr:min	Lateral Inflow Volume 10^6 ltr	Total Inflow Volume 10^6 ltr	Flow Balance Error Percent	
CAP	JUNCTION	3630.04	3630.04	0 01:10	5.74	5.74	-0.010	
HW-3001	JUNCTION	0.00	832.59	0 01:45	0	12.8	0.040	
MH-501	JUNCTION	0.00	832.58	0 01:46	0	12.8	0.103	
EX-MH139	OUTFALL	0.00	160.26	0 01:28	0	1.32	0.000	
EX-MH159	OUTFALL	0.00	189.20	0 01:30	0	1.52	0.000	
EX-MH160	OUTFALL	0.00	832.57	0 01:47	0	12.8	0.000	
OF1	OUTFALL	55.25	55.25	0 01:10	0.0435	0.0435	0.000	
OF2	OUTFALL	0.00	0.00	0 00:00	0	0	0.000	ltr
OF3	OUTFALL	0.00	0.00	0 00:00	0	0	0.000	ltr
OF4	OUTFALL	0.00	0.00	0 00:00	0	0	0.000	ltr
OF5	OUTFALL	12.97	12.97	0 01:10	0.0107	0.0107	0.000	
CBMH100	STORAGE	169.95	909.29	0 01:10	0.247	1.32	0.065	
CBMH-101	STORAGE	203.74	752.29	0 01:10	0.273	1.08	0.021	
CBMH-102	STORAGE	78.79	559.25	0 01:10	0.108	0.803	-0.092	
CBMH-103	STORAGE	127.31	491.28	0 01:10	0.176	0.696	0.087	
CBMH-104	STORAGE	256.87	373.16	0 01:10	0.349	0.519	-0.048	
CBMH200	STORAGE	78.01	928.51	0 01:11	0.101	1.5	0.043	
CBMH-202	STORAGE	97.36	810.08	0 01:10	0.132	1.26	-0.240	
CBMH-203	STORAGE	125.48	758.94	0 01:10	0.163	1.12	-0.341	
CBMH-204	STORAGE	277.88	670.89	0 01:10	0.354	0.962	0.472	
CBMH-205	STORAGE	113.82	412.08	0 01:10	0.159	0.609	0.185	
CBMH-206	STORAGE	159.30	315.88	0 01:10	0.22	0.45	-0.001	
CBMH-207	STORAGE	168.27	168.27	0 01:10	0.231	0.231	0.531	

CBMH-303	STORAGE	73.06	73.06	0	01:10	0.107	0.107	1.645
CBMH-314	STORAGE	220.07	220.07	0	01:10	0.315	0.315	0.319
MH-105	STORAGE	119.95	119.95	0	01:10	0.171	0.171	0.126
MH-201	STORAGE	90.28	865.58	0	01:11	0.124	1.39	0.008
MH-301	STORAGE	0.00	3462.77	0	01:11	0	6.28	-0.023
MH-302	STORAGE	65.19	3535.29	0	01:11	0.0946	6.28	-0.032
MH-304	STORAGE	182.39	3509.94	0	01:10	0.241	6.06	-0.277
MH-305	STORAGE	263.31	606.98	0	01:10	0.375	0.882	0.343
MH-306	STORAGE	379.42	379.42	0	01:10	0.52	0.52	2.495
MH-307	STORAGE	150.87	2913.62	0	01:10	0.201	4.91	-0.707
MH-308	STORAGE	474.36	1233.74	0	01:10	0.677	1.83	-0.625
MH-309	STORAGE	818.93	818.93	0	01:10	1.16	1.16	0.937
MH-310	STORAGE	183.33	1719.52	0	01:10	0.249	2.86	-0.203
MH-311	STORAGE	256.61	1652.88	0	01:10	0.341	2.6	-0.448
MH-312	STORAGE	640.29	1530.64	0	01:10	0.88	2.24	-0.831
MH-313	STORAGE	741.92	955.54	0	01:10	1.05	1.37	0.580
MH-401	STORAGE	70.54	3842.16	0	01:10	0.105	6.12	0.311
MH-402	STORAGE	65.78	185.78	0	01:10	0.094	0.273	-0.037
MH-403	STORAGE	125.47	125.47	0	01:10	0.183	0.183	2.287
POND3	STORAGE	161.82	7320.33	0	01:10	0.288	12.7	-0.279

****
Node Surcharge Summary
****

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
CAP	JUNCTION	2.37	0.527	0.674

****
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 LPS
CBMH100	0.025	3	0	0	0.503	51	0 01:28	160.26
CBMH-101	0.000	7	0	0	0.004	82	0 01:10	739.90
CBMH-102	0.000	7	0	0	0.004	83	0 01:10	551.13
CBMH-103	0.000	6	0	0	0.004	83	0 01:10	480.84
CBMH-104	0.000	6	0	0	0.003	83	0 01:10	364.14
CBMH200	0.021	2	0	0	0.480	55	0 01:30	189.20
CBMH-202	0.000	6	0	0	0.004	85	0 01:12	787.61
CBMH-203	0.000	5	0	0	0.004	84	0 01:11	723.84
CBMH-204	0.000	4	0	0	0.004	79	0 01:11	638.45
CBMH-205	0.000	3	0	0	0.003	82	0 01:10	396.51
CBMH-206	0.000	3	0	0	0.003	83	0 01:10	298.95
CBMH-207	0.000	2	0	0	0.002	85	0 01:10	156.79
CBMH-303	0.000	5	0	0	0.001	67	0 01:12	62.45
CBMH-314	0.000	2	0	0	0.001	74	0 01:10	214.10
MH-105	0.000	4	0	0	0.002	64	0 01:10	116.37
MH-201	0.001	10	0	0	0.007	87	0 01:23	855.58
MH-301	0.002	11	0	0	0.014	71	0 01:47	3405.27
MH-302	0.005	24	0	0	0.017	79	0 01:48	3462.77
MH-304	0.002	10	0	0	0.014	79	0 01:12	3416.65
MH-305	0.000	7	0	0	0.003	72	0 01:11	545.40
MH-306	0.000	7	0	0	0.002	75	0 01:10	344.18
MH-307	0.002	9	0	0	0.014	72	0 01:12	2812.28
MH-308	0.001	7	0	0	0.009	73	0 01:11	1123.95
MH-309	0.000	5	0	0	0.003	76	0 01:10	761.11
MH-310	0.001	8	0	0	0.009	70	0 01:11	1667.04
MH-311	0.001	8	0	0	0.015	75	0 01:11	1554.38
MH-312	0.001	7	0	0	0.010	79	0 01:11	1405.56
MH-313	0.000	6	0	0	0.005	80	0 01:10	890.82
MH-401	0.002	10	0	0	0.013	74	0 01:45	3809.12
MH-402	0.000	5	0	0	0.001	49	0 01:46	175.54
MH-403	0.000	3	0	0	0.001	36	0 01:46	120.01

POND3	0.904	10	0	0	6.745	75	0	01:46	832.59

****
Outfall Loading Summary
****

Outfall Node	Flow Freq Pcnt	Avg Flow LPS	Max Flow LPS	Total Volume 10^6 ltr
EX-MH139	98.85	15.79	160.26	1.324
EX-MH159	95.12	18.78	189.20	1.516
EX-MH160	97.61	152.41	832.57	12.782
OF1	12.16	4.83	55.25	0.043
OF2	0.00	0.00	0.00	0.000
OF3	0.00	0.00	0.00	0.000
OF4	0.00	0.00	0.00	0.000
OF5	11.81	1.21	12.97	0.011
System	39.44	193.01	12.97	15.677

****
Link Flow Summary
****

Link	Type	Maximum |Flow| LPS	Time of Max Occurrence days	hr:min	Maximum |Veloc| m/sec	Max/ Full Flow	Max/ Full Depth
101-PND1	CONDUIT	739.90	0	01:10	1.67	1.17	1.00
102-101	CONDUIT	551.13	0	01:10	1.25	0.89	1.00
103-102	CONDUIT	480.84	0	01:10	1.34	1.06	1.00
104-103	CONDUIT	364.14	0	01:10	1.02	0.82	1.00
105-104	CONDUIT	116.37	0	01:10	1.14	0.67	1.00
201-PND2	CONDUIT	855.58	0	01:11	1.60	0.58	1.00
202-201	CONDUIT	787.61	0	01:11	1.47	0.76	1.00
204-203	CONDUIT	723.84	0	01:11	1.35	0.94	1.00
205-204	CONDUIT	638.45	0	01:10	1.78	1.38	1.00
206-205	CONDUIT	396.51	0	01:10	1.40	1.18	1.00
207-206	CONDUIT	298.95	0	01:10	1.41	0.98	1.00
208-207	CONDUIT	156.79	0	01:10	1.27	0.77	1.00
3001-501	CONDUIT	832.58	0	01:46	1.32	0.68	0.68
301-PND3	CONDUIT	3405.27	0	01:11	1.83	1.39	1.00
302-301	CONDUIT	3462.77	0	01:11	1.84	1.45	1.00
303-302	CONDUIT	62.45	0	01:10	0.96	1.09	1.00
304-302	CONDUIT	3416.65	0	01:11	1.81	1.39	1.00
305-304	CONDUIT	545.40	0	01:10	1.02	1.18	1.00
306-305	CONDUIT	344.18	0	01:10	1.22	1.80	1.00
307-304	CONDUIT	2812.28	0	01:11	1.49	1.19	1.00
308-307	CONDUIT	1123.95	0	01:10	1.30	1.30	1.00
309-308	CONDUIT	761.11	0	01:10	1.20	1.31	1.00
310-307	CONDUIT	1667.04	0	01:11	1.47	1.39	1.00
311-310	CONDUIT	1554.38	0	01:10	1.37	1.27	1.00
312-311	CONDUIT	1405.56	0	01:10	1.24	1.12	1.00
313-312	CONDUIT	890.82	0	01:10	1.08	1.03	1.00
314-313	CONDUIT	214.10	0	01:10	1.44	0.72	1.00
401-PND3	CONDUIT	3809.12	0	01:10	2.17	1.63	1.00
402-401	CONDUIT	175.54	0	01:11	0.72	0.74	1.00
403-402	CONDUIT	120.01	0	01:10	1.02	0.93	1.00
501-160	CONDUIT	832.57	0	01:47	1.52	0.66	0.61
CAP-401	CONDUIT	3626.49	0	01:10	1.92	1.73	1.00
PND1_OVR	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
PND2_OVR	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
PND3_OVR	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
OR1	ORIFICE	160.26	0	01:28			1.00
OR2	ORIFICE	189.20	0	01:30			1.00
OR3	ORIFICE	832.59	0	01:45			1.00

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

101-PND1	1.00	0.01	0.00	0.00	0.12	0.00	0.00	0.86	0.01	0.00
102-101	1.00	0.01	0.00	0.00	0.17	0.00	0.00	0.82	0.01	0.00
103-102	1.00	0.01	0.00	0.00	0.11	0.00	0.00	0.88	0.00	0.00
104-103	1.00	0.01	0.00	0.00	0.15	0.00	0.00	0.83	0.01	0.00
105-104	1.00	0.01	0.00	0.00	0.09	0.00	0.00	0.89	0.00	0.00
201-PND2	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
202-201	1.00	0.00	0.08	0.00	0.92	0.00	0.00	0.00	0.88	0.00
204-203	1.00	0.01	0.00	0.00	0.10	0.00	0.00	0.89	0.01	0.00
205-204	1.00	0.01	0.00	0.00	0.09	0.00	0.00	0.90	0.00	0.00
206-205	1.00	0.01	0.00	0.00	0.08	0.00	0.00	0.91	0.00	0.00
207-206	1.00	0.01	0.00	0.00	0.08	0.00	0.00	0.91	0.00	0.00
208-207	1.00	0.01	0.00	0.00	0.08	0.00	0.00	0.91	0.00	0.00
3001-501	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.04	0.00
301-PND3	1.00	0.02	0.00	0.00	0.28	0.00	0.00	0.70	0.01	0.00
302-301	1.00	0.02	0.00	0.00	0.29	0.00	0.00	0.69	0.02	0.00
303-302	1.00	0.01	0.00	0.00	0.16	0.00	0.00	0.83	0.03	0.00
304-302	1.00	0.01	0.00	0.00	0.28	0.00	0.00	0.71	0.01	0.00
305-304	1.00	0.01	0.00	0.00	0.19	0.00	0.00	0.80	0.01	0.00
306-305	1.00	0.02	0.00	0.00	0.15	0.00	0.00	0.83	0.01	0.00
307-304	1.00	0.01	0.00	0.00	0.28	0.00	0.00	0.72	0.01	0.00
308-307	1.00	0.01	0.00	0.00	0.21	0.00	0.00	0.78	0.02	0.00
309-308	1.00	0.01	0.00	0.00	0.18	0.00	0.00	0.81	0.02	0.00
310-307	1.00	0.01	0.00	0.00	0.26	0.00	0.00	0.73	0.02	0.00
311-310	1.00	0.01	0.00	0.00	0.26	0.00	0.00	0.73	0.02	0.00
312-311	1.00	0.01	0.00	0.00	0.25	0.00	0.00	0.74	0.03	0.00
313-312	1.00	0.01	0.00	0.00	0.18	0.00	0.00	0.81	0.02	0.00
314-313	1.00	0.01	0.00	0.00	0.10	0.00	0.00	0.89	0.01	0.00
401-PND3	1.00	0.01	0.00	0.00	0.24	0.00	0.00	0.75	0.00	0.00
402-401	1.00	0.01	0.00	0.00	0.16	0.00	0.00	0.82	0.02	0.00
403-402	1.00	0.01	0.00	0.00	0.13	0.00	0.00	0.86	0.02	0.00
501-160	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
CAP-401	1.00	0.01	0.00	0.00	0.46	0.00	0.00	0.53	0.00	0.00
PND1_OVR	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PND2_OVR	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PND3_OVR	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

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Conduit Surcharge Summary
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Conduit	Hours Full (Both Ends)	Hours Full (Upstream)	Hours Full (Dnstream)	Hours Above Full Normal Flow	Hours Capacity Limited
101-PND1	2.21	2.21	2.28	0.11	0.17
102-101	2.16	2.16	2.21	0.01	0.01
103-102	2.13	2.13	2.15	0.09	0.09
104-103	2.10	2.10	2.12	0.01	0.01
105-104	2.02	2.02	2.08	0.01	0.01
201-PND2	2.16	2.16	2.26	0.01	0.11
202-201	1.99	1.99	2.12	0.01	0.08
204-203	1.86	1.86	1.98	0.01	0.01
205-204	1.78	1.78	1.85	0.13	0.14
206-205	1.74	1.74	1.78	0.11	0.12
207-206	1.66	1.66	1.74	0.01	0.01
208-207	1.38	1.38	1.65	0.01	0.01
301-PND3	2.69	2.73	2.76	0.16	0.12
302-301	2.57	2.61	2.70	0.17	0.14
303-302	2.47	2.47	3.02	0.06	0.06
304-302	2.48	2.50	2.59	0.16	0.19
305-304	2.23	2.23	2.44	0.13	0.13
306-305	1.91	1.93	2.20	0.19	0.14
307-304	2.35	2.35	2.48	0.11	0.11
308-307	2.05	2.06	2.32	0.15	0.14
309-308	1.66	1.66	2.03	0.14	0.11
310-307	2.16	2.16	2.32	0.14	0.14
311-310	1.96	1.96	2.14	0.11	0.12
312-311	1.59	1.59	1.93	0.07	0.12
313-312	1.05	1.05	1.56	0.03	0.04
314-313	0.15	0.15	0.27	0.01	0.01
401-PND3	2.33	2.40	2.40	0.17	0.17
402-401	1.88	1.88	2.38	0.01	0.01
403-402	1.36	1.36	1.88	0.01	0.01
CAP-401	2.36	2.37	2.38	0.19	0.20

Analysis begun on: Thu Aug 5 09:43:24 2021
Analysis ended on: Thu Aug 5 09:43:27 2021
Total elapsed time: 00:00:03

Chicago 3hr - 100-year + 20% Storm PCSWMM Model Results

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

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Element Count
****
Number of rain gages 1
Number of subcatchments ... 44
Number of nodes 43
Number of links 38
Number of pollutants 0
Number of land uses 0

****
Raingage Summary
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Name	Data Source	Data Type	Recording Interval
Raingage1	C3hr-100yr+20%	INTENSITY	10 min.

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Subcatchment Summary
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Name	Area	Width	%Imperv	%Slope	Rain Gage	Outlet
A-01	0.24	54.88	100.00	1.5000	Raingage1	MH-105
A-02	0.52	200.00	90.00	1.5000	Raingage1	CBMH-104
A-03	0.26	106.58	94.00	1.5000	Raingage1	CBMH-103
A-04	0.16	138.79	91.00	1.5000	Raingage1	CBMH-102
A-05	0.42	173.25	86.00	1.5000	Raingage1	CBMH-101
A-06	0.31	35.89	80.00	1.5000	Raingage1	CBMH100
B-01	0.29	109.29	90.00	1.5000	Raingage1	CBMH-207
B-02	0.28	113.17	91.00	1.5000	Raingage1	CBMH-206
B-03	0.05	23.47	100.00	1.5000	Raingage1	CBMH-207
B-04	0.17	153.10	94.00	1.5000	Raingage1	CBMH-205
B-05	0.05	23.47	100.00	1.5000	Raingage1	CBMH-206
B-06	0.06	26.98	100.00	1.5000	Raingage1	CBMH-205
B-07	0.61	249.79	71.00	1.5000	Raingage1	CBMH-204
B-08	0.30	82.04	64.00	1.5000	Raingage1	CBMH-203
B-09	0.22	34.79	79.00	1.5000	Raingage1	CBMH-202
B-10	0.23	39.01	63.00	1.5000	Raingage1	MH-201
C-01	0.65	101.56	51.00	1.5000	Raingage1	CBMH-314
C-02	0.78	239.45	94.00	1.5000	Raingage1	MH-313
C-03	0.72	139.46	100.00	1.5000	Raingage1	MH-313
C-04	0.83	254.43	81.00	1.5000	Raingage1	MH-312
C-05	0.50	96.33	100.00	1.5000	Raingage1	MH-312
C-06	0.54	164.53	83.00	1.5000	Raingage1	MH-311
C-07	0.38	115.29	89.00	1.5000	Raingage1	MH-310
C-08	0.90	276.76	93.00	1.5000	Raingage1	MH-309
C-09	0.76	147.28	100.00	1.5000	Raingage1	MH-309
C-10	0.46	88.87	100.00	1.5000	Raingage1	MH-308
C-11	0.51	154.43	96.00	1.5000	Raingage1	MH-308
C-12	0.32	97.83	84.00	1.5000	Raingage1	MH-307
C-13	0.78	214.64	91.00	1.5000	Raingage1	MH-306
C-14	0.53	146.69	100.00	1.5000	Raingage1	MH-305
C-15	0.39	112.79	80.00	1.5000	Raingage1	MH-304
C-16	0.24	46.12	44.00	1.0000	Raingage1	CBMH-303
C-17	0.21	42.86	44.00	1.0000	Raingage1	MH-302
C-18	0.24	45.66	41.00	1.0000	Raingage1	MH-401
C-19	0.13	26.08	100.00	1.0000	Raingage1	MH-402
C-20	0.41	82.40	43.00	1.0000	Raingage1	MH-403
D-01a	0.01	17.02	20.00	2.0000	Raingage1	OF5
D-01b	0.02	40.00	5.00	2.0000	Raingage1	OF5
D-02a	0.09	254.29	5.00	1.5000	Raingage1	OF1
D-02b	0.04	286.67	5.00	1.5000	Raingage1	OF1
FUT-1	8.45	296.25	93.00	1.5000	Raingage1	CAP
PND1	0.20	42.73	5.00	1.5000	Raingage1	CBMH100
PND2	0.36	137.16	5.00	1.5000	Raingage1	CBMH200
PND3	1.09	226.09	5.00	1.5000	Raingage1	POND3

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Node Summary
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Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow

CAP	JUNCTION	87.02	2.80	0.0
HW-3001	JUNCTION	87.00	2.60	0.0
MH-501	JUNCTION	86.82	2.97	0.0
EX-MH139	OUTFALL	87.17	0.00	0.0
EX-MH159	OUTFALL	86.01	0.00	0.0
EX-MH160	OUTFALL	86.12	1.69	0.0
OF1	OUTFALL	90.65	0.00	0.0
OF2	OUTFALL	89.60	2.00	0.0
OF3	OUTFALL	89.50	1.25	0.0
OF4	OUTFALL	0.00	90.40	0.0
OF5	OUTFALL	89.70	0.00	0.0
CBMH100	STORAGE	87.80	3.00	0.0
CBMH-101	STORAGE	87.99	2.96	0.0
CBMH-102	STORAGE	88.11	2.89	0.0
CBMH-103	STORAGE	88.27	2.78	0.0
CBMH-104	STORAGE	88.39	2.71	0.0
CBMH200	STORAGE	86.76	3.04	0.0
CBMH-202	STORAGE	87.25	2.90	0.0
CBMH-203	STORAGE	87.58	2.82	0.0
CBMH-204	STORAGE	87.98	3.07	0.0
CBMH-205	STORAGE	88.16	2.94	0.0
CBMH-206	STORAGE	88.36	2.79	0.0
CBMH-207	STORAGE	88.65	2.50	0.0
CBMH-303	STORAGE	88.29	1.42	0.0
CBMH-314	STORAGE	88.71	1.69	0.0
MH-105	STORAGE	89.04	2.70	0.0
MH-201	STORAGE	86.97	2.88	0.0
MH-301	STORAGE	87.23	2.68	0.0
MH-302	STORAGE	86.85	2.91	0.0
MH-304	STORAGE	87.36	2.47	0.0
MH-305	STORAGE	87.88	2.20	0.0
MH-306	STORAGE	88.18	2.12	0.0
MH-307	STORAGE	87.43	2.73	0.0
MH-308	STORAGE	87.73	2.61	0.0
MH-309	STORAGE	88.02	2.36	0.0
MH-310	STORAGE	87.53	2.82	0.0
MH-311	STORAGE	87.61	2.68	0.0
MH-312	STORAGE	87.74	2.63	0.0
MH-313	STORAGE	88.02	2.36	0.0
MH-401	STORAGE	87.38	2.40	0.0
MH-402	STORAGE	88.18	1.96	0.0
MH-403	STORAGE	88.50	1.81	0.0
POND3	STORAGE	87.00	2.60	0.0

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Link Summary
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Name	From Node	To Node	Type	Length	%Slope	Roughness
101-PND1	CBMH-101	CBMH100	CONDUIT	37.5	0.3200	0.0130
102-101	CBMH-102	CBMH-101	CONDUIT	35.9	0.3065	0.0130
103-102	CBMH-103	CBMH-102	CONDUIT	23.9	0.2935	0.0130
104-103	CBMH-104	CBMH-103	CONDUIT	39.3	0.2800	0.0130
105-104	MH-105	CBMH-104	CONDUIT	29.4	0.9864	0.0130
201-PND2	MH-201	CBMH200	CONDUIT	14.1	1.0639	0.0130
202-201	CBMH-202	MH-201	CONDUIT	44.5	0.5169	0.0130
204-203	CBMH-203	CBMH-202	CONDUIT	103.2	0.2908	0.0130
205-204	CBMH-204	CBMH-203	CONDUIT	76.3	0.3015	0.0130
206-205	CBMH-205	CBMH-204	CONDUIT	35.9	0.3010	0.0130
207-206	CBMH-206	CBMH-205	CONDUIT	23.9	0.5030	0.0130
208-207	CBMH-207	CBMH-206	CONDUIT	39.0	0.5126	0.0130
3001-501	HW-3001	MH-501	CONDUIT	85.5	0.1988	0.0130
301-PND3	MH-301	POND3	CONDUIT	28.2	0.1066	0.0130
302-301	MH-302	MH-301	CONDUIT	59.9	0.1002	0.0130
303-302	CBMH-303	MH-302	CONDUIT	68.9	0.3483	0.0130
304-302	MH-304	MH-302	CONDUIT	46.9	0.1066	0.0130
305-304	MH-305	MH-304	CONDUIT	96.8	0.1033	0.0130
306-305	MH-306	MH-305	CONDUIT	113.9	0.0966	0.0130
307-304	MH-307	MH-304	CONDUIT	60.4	0.0994	0.0130
308-307	MH-308	MH-307	CONDUIT	120.0	0.1000	0.0130
309-308	MH-309	MH-308	CONDUIT	127.0	0.1024	0.0130
310-307	MH-310	MH-307	CONDUIT	73.5	0.0952	0.0130
311-310	MH-311	MH-310	CONDUIT	70.9	0.0988	0.0130
312-311	MH-312	MH-311	CONDUIT	116.0	0.1034	0.0130
313-312	MH-313	MH-312	CONDUIT	120.0	0.1000	0.0130
314-313	CBMH-314	MH-313	CONDUIT	16.6	0.4819	0.0130
401-PND3	MH-401	POND3	CONDUIT	31.1	0.0965	0.0130
402-401	MH-402	MH-401	CONDUIT	115.0	0.1478	0.0130
403-402	MH-403	MH-402	CONDUIT	83.7	0.2031	0.0130
501-160	MH-501	EX-MH160	CONDUIT	27.8	0.2156	0.0130
CAP-401	CAP	MH-401	CONDUIT	12.9	0.0775	0.0130

PND1_OVR	CBMH100	OF2	CONDUIT	42.4	0.3539	0.0150
PND2_OVR	CBMH200	OF3	CONDUIT	7.0	0.7143	0.0150
PND3_OVR	CBMH-303	OF4	CONDUIT	7.0	0.7143	0.0130
OR1	CBMH100	EX-MH139	ORIFICE			
OR2	CBMH200	EX-MH159	ORIFICE			
OR3	POND3	HW-3001	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
101-PND1	CIRCULAR	0.75	0.44	0.19	0.75	1	629.80
102-101	CIRCULAR	0.75	0.44	0.19	0.75	1	616.38
103-102	CIRCULAR	0.68	0.36	0.17	0.68	1	455.39
104-103	CIRCULAR	0.68	0.36	0.17	0.68	1	444.85
105-104	CIRCULAR	0.38	0.11	0.09	0.38	1	174.15
201-PND2	CIRCULAR	0.82	0.53	0.21	0.82	1	1480.67
202-201	CIRCULAR	0.82	0.53	0.21	0.82	1	1032.04
204-203	CIRCULAR	0.82	0.53	0.21	0.82	1	774.10
205-204	CIRCULAR	0.68	0.36	0.17	0.68	1	461.60
206-205	CIRCULAR	0.60	0.28	0.15	0.60	1	336.86
207-206	CIRCULAR	0.53	0.22	0.13	0.53	1	305.04
208-207	CIRCULAR	0.45	0.16	0.11	0.45	1	204.14
3001-501	CIRCULAR	1.05	0.87	0.26	1.05	1	1217.65
301-PND3	HORIZ_ELLIPSE	1.22	1.89	0.37	1.93	1	2454.60
302-301	HORIZ_ELLIPSE	1.22	1.89	0.37	1.93	1	2380.17
303-302	CIRCULAR	0.30	0.07	0.07	0.30	1	57.08
304-302	HORIZ_ELLIPSE	1.22	1.89	0.37	1.93	1	2454.89
305-304	CIRCULAR	0.82	0.53	0.21	0.82	1	461.38
306-305	CIRCULAR	0.60	0.28	0.15	0.60	1	190.84
307-304	HORIZ_ELLIPSE	1.22	1.89	0.37	1.93	1	2370.77
308-307	CIRCULAR	1.05	0.87	0.26	1.05	1	863.58
309-308	CIRCULAR	0.90	0.64	0.23	0.90	1	579.23
310-307	CIRCULAR	1.20	1.13	0.30	1.20	1	1202.94
311-310	CIRCULAR	1.20	1.13	0.30	1.20	1	1225.48
312-311	CIRCULAR	1.20	1.13	0.30	1.20	1	1254.04
313-312	CIRCULAR	1.05	0.87	0.26	1.05	1	863.73
314-313	CIRCULAR	0.53	0.22	0.13	0.53	1	298.57
401-PND3	HORIZ_ELLIPSE	1.22	1.89	0.37	1.93	1	2335.49
402-401	CIRCULAR	0.60	0.28	0.15	0.60	1	236.09
403-402	CIRCULAR	0.45	0.16	0.11	0.45	1	128.50
501-160	CIRCULAR	1.05	0.87	0.26	1.05	1	1268.08
CAP-401	HORIZ_ELLIPSE	1.22	1.89	0.37	1.93	1	2093.65
PND1_OVR	RECT_OPEN	1.00	3.00	0.75	3.00	1	9822.22
PND2_OVR	RECT_OPEN	1.00	3.00	0.75	3.00	1	13954.21
PND3_OVR	RECT_OPEN	1.00	5.50	0.85	5.50	1	31990.42

****
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 ..... LPS
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 03/18/2020 00:00:00
Ending Date 03/19/2020 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
Routing Time Step ..... 2.00 sec
Variable Time Step ..... YES
Maximum Trials 8

Number of Threads 4
Head Tolerance ..... 0.001500 m

****
Control Actions Taken
****

**********	Volume	Depth
Runoff Quantity Continuity	hectare-m	mm
**********	---------	-------
Total Precipitation	2.124	86.000
Evaporation Loss	0.000	0.000
Infiltration Loss	0.222	8.982
Surface Runoff	1.895	76.727
Final Storage	0.025	0.995
Continuity Error (%)	-0.818	

**********	Volume	Volume
Flow Routing Continuity	hectare-m	10^6 ltr
**********	---------	---------
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	1.895	18.951
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	0.009	0.086
External Outflow	1.896	18.956
Flooding Loss	0.010	0.101
Evaporation Loss	0.000	0.000
Exfiltration Loss	0.000	0.000
Initial Stored Volume	0.000	0.003
Final Stored Volume	0.006	0.065
Continuity Error (%)	-0.425	

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

****
Highest Flow Instability Indexes
****
Link OR2 (121)
Link OR1 (91)
Link OR3 (32)

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

Minimum Time Step	:	0.50 sec
Average Time Step	:	2.00 sec
Maximum Time Step	:	2.00 sec
Percent in Steady State	:	0.00
Average Iterations per Step	:	2.00
Percent Not Converging	:	0.00

****
Subcatchment Runoff Summary
****

Subcatchment	Total Precip mm	Total Runon mm	Total Evap mm	Total Infil mm	Imperv Runoff mm	Perv Runoff mm	Total Runoff mm	Total Runoff 10^6 ltr	Peak Runoff LPS	Runoff Coeff
A-01	86.00	0.00	0.00	0.00	85.00	0.00	85.00	0.21	143.98	0.988
A-02	86.00	0.00	0.00	4.65	76.30	4.31	80.61	0.42	308.15	0.937
A-03	86.00	0.00	0.00	2.78	79.68	2.61	82.29	0.21	153.10	0.957
A-04	86.00	0.00	0.00	4.17	77.03	3.91	80.94	0.13		

A-05		86.00	0.00	0.00	6.52	72.88	5.98	78.86	0.33
246.20	0.917								
A-06		86.00	0.00	0.00	9.59	68.11	7.87	75.98	0.24
172.18	0.883								
B-01		86.00	0.00	0.00	4.65	76.31	4.30	80.61	0.24
172.91	0.937								
B-02		86.00	0.00	0.00	4.18	77.13	3.89	81.02	0.22
161.97	0.942								
B-03		86.00	0.00	0.00	0.00	86.27	0.00	86.27	0.04
29.76	1.003								
B-04		86.00	0.00	0.00	2.78	79.57	2.60	82.17	0.14
102.27	0.955								
B-05		86.00	0.00	0.00	0.00	86.27	0.00	86.27	0.04
29.76	1.003								
B-06		86.00	0.00	0.00	0.00	86.27	0.00	86.27	0.05
34.52	1.003								
B-07		86.00	0.00	0.00	13.62	60.14	12.00	72.14	0.44
342.07	0.839								
B-08		86.00	0.00	0.00	17.11	54.25	14.42	68.68	0.20
157.41	0.799								
B-09		86.00	0.00	0.00	9.98	67.17	8.42	75.59	0.16
119.76	0.879								
B-10		86.00	0.00	0.00	17.89	53.51	14.34	67.85	0.16
113.85	0.789								
C-01		86.00	0.00	0.00	24.10	43.29	18.44	61.74	0.40
282.99	0.718								
C-02		86.00	0.00	0.00	2.79	79.77	2.60	82.37	0.64
462.79	0.958								
C-03		86.00	0.00	0.00	0.00	86.60	0.00	86.60	0.62
428.80	1.007								
C-04		86.00	0.00	0.00	8.91	68.70	7.91	76.61	0.64
479.45	0.891								
C-05		86.00	0.00	0.00	0.00	86.60	0.00	86.60	0.43
296.17	1.007								
C-06		86.00	0.00	0.00	7.96	70.55	7.12	77.66	0.42
311.75	0.903								
C-07		86.00	0.00	0.00	5.13	75.51	4.69	80.20	0.30
221.25	0.933								
C-08		86.00	0.00	0.00	3.25	78.92	3.02	81.94	0.74
534.24	0.953								
C-09		86.00	0.00	0.00	0.00	86.59	0.00	86.59	0.66
450.22	1.007								
C-10		86.00	0.00	0.00	0.00	86.59	0.00	86.59	0.39
270.61	1.007								

C-11		86.00	0.00	0.00	1.85	81.48	1.74	83.21	0.42
299.19	0.968								
C-12		86.00	0.00	0.00	7.48	71.40	6.72	78.12	0.25
183.03	0.908								
C-13		86.00	0.00	0.00	4.19	77.25	3.85	81.10	0.63
457.30	0.943								
C-14		86.00	0.00	0.00	0.00	84.92	0.00	84.92	0.45
316.01	0.987								
C-15		86.00	0.00	0.00	9.39	67.86	8.29	76.15	0.30
222.61	0.885								
C-16		86.00	0.00	0.00	27.73	37.32	20.85	58.18	0.14
95.21	0.676								
C-17		86.00	0.00	0.00	27.65	37.32	20.95	58.27	0.12
85.01	0.678								
C-18		86.00	0.00	0.00	29.36	34.77	21.80	56.58	0.14
92.44	0.658								
C-19		86.00	0.00	0.00	0.00	85.11	0.00	85.11	0.11
79.02	0.990								
C-20		86.00	0.00	0.00	28.20	36.47	21.25	57.72	0.24
163.91	0.671								
D-01a		86.00	0.00	0.00	37.26	16.96	34.22	51.18	0.00
4.29	0.595								
D-01b		86.00	0.00	0.00	44.41	4.24	39.98	44.22	0.01
12.32	0.514								
D-02a		86.00	0.00	0.00	44.26	4.24	40.60	44.84	0.04
46.74	0.521								
D-02b		86.00	0.00	0.00	44.07	4.24	41.27	45.51	0.02
22.82	0.529								
FUT-1		86.00	0.00	0.00	3.37	79.50	2.73	82.23	6.95
4484.38	0.956								
PND1		86.00	0.00	0.00	47.68	4.24	34.62	38.86	0.08
45.69	0.452								
PND2		86.00	0.00	0.00	46.18	4.24	36.47	40.71	0.15
115.17	0.473								
PND3		86.00	0.00	0.00	47.84	4.24	34.44	38.68	0.42
245.97	0.450								

****
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
CAP	JUNCTION	0.70	2.48	89.50	0	01:47	2.48
HW-3001	JUNCTION	0.28	0.73	87.73	0	01:50	0.73
MH-501	JUNCTION	0.43	0.81	87.63	0	01:51	0.81
EX-MH139	OUTFALL	0.67	0.67	87.84	0	00:00	0.67
EX-MH159	OUTFALL	1.05	1.05	87.06	0	00:00	1.05
EX-MH160	OUTFALL	1.06	1.18	87.30	0	01:51	1.18
OF1	OUTFALL	0.00	0.00	90.65	0	00:00	0.00
OF2	OUTFALL	0.00	0.00	89.60	0	00:00	0.00
OF3	OUTFALL	0.00	0.00	89.50	0	00:00	0.00
OF4	OUTFALL	0.00	0.00	0.00	0	00:00	0.00
OF5	OUTFALL	0.00	0.00	89.70	0	00:00	0.00
CBMH100	STORAGE	0.31	2.73	90.53	0	01:32	2.73
CBMH-101	STORAGE	0.26	2.68	90.67	0	01:10	2.68
CBMH-102	STORAGE	0.24	2.68	90.79	0	01:10	2.67
CBMH-103	STORAGE	0.22	2.63	90.90	0	01:10	2.62
CBMH-104	STORAGE	0.21	2.61	91.00	0	01:10	2.60
CBMH200	STORAGE	0.54	2.88	89.64	0	01:32	2.88
CBMH-202	STORAGE	0.23	2.74	89.99	0	01:11	2.74
CBMH-203	STORAGE	0.19	2.74	90.32	0	01:10	2.74
CBMH-204	STORAGE	0.15	2.91	90.89	0	01:10	2.90
CBMH-205	STORAGE	0.14	2.89	91.05	0	01:10	2.89
CBMH-206	STORAGE	0.12	2.78	91.14	0	01:10	2.77
CBMH-207	STORAGE	0.09	2.50	91.15	0	01:08	2.50
CBMH-303	STORAGE	0.13	1.18	89.47	0	01:11	1.18
CBMH-314	STORAGE	0.08	1.69	90.40	0	01:08	1.69
MH-105	STORAGE	0.13	2.15	91.19	0	01:10	2.14
MH-201	STORAGE	0.34	2.68	89.65	0	01:31	2.68
MH-301	STORAGE	0.36	2.27	89.50	0	01:49	2.27
MH-302	STORAGE	0.79	2.66	89.51	0	01:49	2.66
MH-304	STORAGE	0.34	2.40	89.76	0	01:12	2.40
MH-305	STORAGE	0.21	2.10	89.98	0	01:11	2.10
MH-306	STORAGE	0.20	2.12	90.30	0	01:09	2.12
MH-307	STORAGE	0.32	2.42	89.85	0	01:11	2.41
MH-308	STORAGE	0.25	2.46	90.19	0	01:10	2.46
MH-309	STORAGE	0.19	2.36	90.38	0	01:09	2.36
MH-310	STORAGE	0.29	2.45	89.98	0	01:11	2.45
MH-311	STORAGE	0.28	2.48	90.09	0	01:11	2.48
MH-312	STORAGE	0.25	2.59	90.33	0	01:10	2.59
MH-313	STORAGE	0.19	2.36	90.38	0	01:09	2.36
MH-401	STORAGE	0.33	2.12	89.50	0	01:47	2.12
MH-402	STORAGE	0.14	1.33	89.51	0	01:47	1.33
MH-403	STORAGE	0.10	1.01	89.51	0	01:47	1.01
POND3	STORAGE	0.54	2.50	89.50	0	01:50	2.50

****
Node Inflow Summary
****

Node	Type	Maximum Lateral Inflow LPS	Maximum Total Inflow LPS	Time of Max Occurrence days	hr:min	Lateral Inflow Volume 10^6 ltr	Total Inflow Volume 10^6 ltr	Flow Balance Error Percent	
CAP	JUNCTION	4484.38	4484.38	0	01:10	6.95	6.95	-0.019	
HW-3001	JUNCTION	0.00	915.88	0	01:50	0	15.4	0.035	
MH-501	JUNCTION	0.00	915.88	0	01:50	0	15.4	0.085	
EX-MH139	OUTFALL	0.00	166.43	0	01:32	0	1.62	0.000	
EX-MH159	OUTFALL	0.00	196.55	0	01:32	0	1.85	0.000	
EX-MH160	OUTFALL	0.00	915.87	0	01:51	0	15.4	0.000	
OF1	OUTFALL	69.56	69.56	0	01:10	0.0595	0.0595	0.000	
OF2	OUTFALL	0.00	0.00	0	00:00	0	0	0.000	ltr
OF3	OUTFALL	0.00	0.00	0	00:00	0	0	0.000	ltr
OF4	OUTFALL	0.00	39.27	0	01:11	0	0.0777	0.000	
OF5	OUTFALL	16.61	16.61	0	01:10	0.0147	0.0147	0.000	
CBMH100	STORAGE	217.87	1109.80	0	01:10	0.315	1.62	0.046	
CBMH-101	STORAGE	246.20	906.87	0	01:10	0.332	1.3	0.015	
CBMH-102	STORAGE	94.84	672.98	0	01:10	0.13	0.971	-0.063	
CBMH-103	STORAGE	153.10	590.54	0	01:10	0.213	0.841	0.058	
CBMH-104	STORAGE	308.15	447.95	0	01:10	0.422	0.628	-0.071	
CBMH200	STORAGE	115.17	1135.16	0	01:10	0.146	1.84	0.039	
CBMH-202	STORAGE	119.76	957.40	0	01:10	0.163	1.52	-0.178	
CBMH-203	STORAGE	157.41	888.92	0	01:09	0.204	1.36	-0.137	
CBMH-204	STORAGE	342.07	783.84	0	01:08	0.438	1.15	0.256	
CBMH-205	STORAGE	136.79	481.62	0	01:08	0.192	0.717	0.097	
CBMH-206	STORAGE	191.73	372.79	0	01:08	0.266	0.525	-0.012	
CBMH-207	STORAGE	202.67	202.67	0	01:10	0.28	0.28	0.451	

CBMH-303	STORAGE	95.21	95.21	0	01:10	0.138	0.178	1.062
CBMH-314	STORAGE	282.99	282.99	0	01:10	0.403	0.403	0.277
MH-105	STORAGE	143.98	143.98	0	01:10	0.206	0.206	0.145
MH-201	STORAGE	113.85	1034.56	0	01:10	0.155	1.68	0.009
MH-301	STORAGE	0.00	3939.12	0	01:10	0	7.46	-0.052
MH-302	STORAGE	85.01	4045.64	0	01:10	0.122	7.5	-0.032
MH-304	STORAGE	222.61	4062.73	0	01:10	0.295	7.27	-0.210
MH-305	STORAGE	316.01	723.45	0	01:09	0.451	1.06	0.093
MH-306	STORAGE	457.30	457.30	0	01:10	0.63	0.63	1.944
MH-307	STORAGE	183.03	3397.27	0	01:10	0.246	5.88	-0.608
MH-308	STORAGE	569.80	1470.85	0	01:09	0.814	2.19	-0.534
MH-309	STORAGE	984.45	984.45	0	01:10	1.4	1.4	0.720
MH-310	STORAGE	221.25	1999.96	0	01:09	0.302	3.43	-0.105
MH-311	STORAGE	311.75	1923.36	0	01:09	0.418	3.11	-0.364
MH-312	STORAGE	775.63	1807.87	0	01:08	1.07	2.67	-0.831
MH-313	STORAGE	891.59	1143.28	0	01:08	1.27	1.65	0.479
MH-401	STORAGE	92.44	4763.17	0	01:10	0.137	7.43	0.312
MH-402	STORAGE	79.02	225.32	0	01:10	0.113	0.347	-0.190
MH-403	STORAGE	163.91	163.91	0	01:10	0.238	0.238	1.871
POND3	STORAGE	245.97	8779.00	0	01:10	0.422	15.3	-0.219

****
Node Surcharge Summary
****

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
CAP	JUNCTION	3.12	0.885	0.316

****
Node Flooding Summary
****

Flooding refers to all water that overflows a node, whether it ponds or not.

Node	Hours Flooded	Maximum Rate LPS	Time of Max Occurrence days hr:min	Total Flood Volume 10^6 ltr	Maximum Ponded Depth Meters
CBMH-207	0.07	124.86	0 01:10	0.020	0.000
CBMH-314	0.07	143.05	0 01:10	0.026	0.000
MH-306	0.05	72.69	0 01:10	0.008	0.000
MH-309	0.04	144.69	0 01:10	0.016	0.000
MH-313	0.06	250.14	0 01:10	0.032	0.000

****
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 LPS
CBMH100	0.043	4	0	0	0.693	70	0 01:32	166.43
CBMH-101	0.000	9	0	0	0.005	91	0 01:10	892.37
CBMH-102	0.000	8	0	0	0.005	93	0 01:10	663.21
CBMH-103	0.000	8	0	0	0.005	95	0 01:10	578.40
CBMH-104	0.000	8	0	0	0.003	96	0 01:10	437.56
CBMH200	0.038	4	0	0	0.689	79	0 01:32	196.55
CBMH-202	0.000	8	0	0	0.005	94	0 01:11	927.30
CBMH-203	0.000	7	0	0	0.005	97	0 01:10	838.75
CBMH-204	0.000	5	0	0	0.005	95	0 01:10	736.74
CBMH-205	0.000	5	0	0	0.003	98	0 01:10	453.57
CBMH-206	0.000	4	0	0	0.003	99	0 01:10	344.93
CBMH-207	0.000	3	0	0	0.003	100	0 01:08	181.94
CBMH-303	0.000	9	0	0	0.001	83	0 01:11	91.20
CBMH-314	0.000	5	0	0	0.002	100	0 01:08	256.71
MH-105	0.000	5	0	0	0.002	80	0 01:10	139.87
MH-201	0.001	12	0	0	0.007	93	0 01:31	1022.46
MH-301	0.003	14	0	0	0.016	85	0 01:49	3862.37
MH-302	0.006	27	0	0	0.019	91	0 01:49	3939.12
MH-304	0.002	14	0	0	0.017	97	0 01:12	3909.54
MH-305	0.000	10	0	0	0.004	96	0 01:11	636.19

MH-306	0.000	9	0	0	0.002	100	0	01:09	407.93
MH-307	0.002	12	0	0	0.017	88	0	01:11	3217.60
MH-308	0.001	10	0	0	0.011	94	0	01:10	1315.51
MH-309	0.000	8	0	0	0.004	100	0	01:09	902.33
MH-310	0.001	10	0	0	0.011	87	0	01:11	1901.87
MH-311	0.002	10	0	0	0.018	93	0	01:11	1778.98
MH-312	0.001	9	0	0	0.012	99	0	01:10	1613.78
MH-313	0.001	8	0	0	0.006	100	0	01:09	1041.11
MH-401	0.002	14	0	0	0.015	88	0	01:47	4713.25
MH-402	0.000	7	0	0	0.001	68	0	01:47	214.57
MH-403	0.000	5	0	0	0.001	56	0	01:47	147.62
POND3	1.215	13	0	0	8.489	94	0	01:50	915.88

****
Outfall Loading Summary
****

Outfall Node	Flow Freq Pcnt	Avg Flow LPS	Max Flow LPS	Total Volume 10^6 ltr
EX-MH139	98.89	19.15	166.43	1.621
EX-MH159	95.11	22.78	196.55	1.854
EX-MH160	97.79	182.94	915.87	15.416
OF1	12.12	6.28	69.56	0.059
OF2	0.00	0.00	0.00	0.000
OF3	0.00	0.00	0.00	0.000
OF4	3.92	23.05	39.27	0.078
OF5	11.92	1.56	16.61	0.015
System	39.97	255.77	16.61	19.042

****
Link Flow Summary
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Link	Type	|Flow| Maximum LPS	Occurrence Time of Max days	hr:min	|Veloc| Maximum m/sec	Full Flow Max/	Full Depth Max/
101-PND1	CONDUIT	892.37	0	01:10	2.02	1.42	1.00
102-101	CONDUIT	663.21	0	01:10	1.50	1.08	1.00
103-102	CONDUIT	578.40	0	01:10	1.62	1.27	1.00
104-103	CONDUIT	437.56	0	01:10	1.22	0.98	1.00
105-104	CONDUIT	139.87	0	01:10	1.27	0.80	1.00
201-PND2	CONDUIT	1022.46	0	01:10	1.91	0.69	1.00
202-201	CONDUIT	927.30	0	01:10	1.73	0.90	1.00
204-203	CONDUIT	838.75	0	01:10	1.57	1.08	1.00
205-204	CONDUIT	736.74	0	01:08	2.06	1.60	1.00
206-205	CONDUIT	453.57	0	01:08	1.60	1.35	1.00
207-206	CONDUIT	344.93	0	01:08	1.59	1.13	1.00
208-207	CONDUIT	181.94	0	01:08	1.27	0.89	1.00
3001-501	CONDUIT	915.88	0	01:50	1.35	0.75	0.73
301-PND3	CONDUIT	3862.37	0	01:10	2.05	1.57	1.00
302-301	CONDUIT	3939.12	0	01:10	2.09	1.65	1.00
303-302	CONDUIT	73.73	0	01:09	1.04	1.29	1.00
304-302	CONDUIT	3909.54	0	01:10	2.07	1.59	1.00
305-304	CONDUIT	636.19	0	01:09	1.19	1.38	1.00
306-305	CONDUIT	407.93	0	01:09	1.44	2.14	1.00
307-304	CONDUIT	3217.60	0	01:10	1.71	1.36	1.00
308-307	CONDUIT	1315.51	0	01:09	1.52	1.52	1.00
309-308	CONDUIT	902.33	0	01:09	1.42	1.56	1.00
310-307	CONDUIT	1901.87	0	01:10	1.68	1.58	1.00
311-310	CONDUIT	1778.98	0	01:09	1.57	1.45	1.00
312-311	CONDUIT	1613.78	0	01:09	1.43	1.29	1.00
313-312	CONDUIT	1041.11	0	01:08	1.20	1.21	1.00
314-313	CONDUIT	256.71	0	01:08	1.49	0.86	1.00
401-PND3	CONDUIT	4713.25	0	01:10	2.54	2.02	1.00
402-401	CONDUIT	214.57	0	01:11	0.76	0.91	1.00
403-402	CONDUIT	147.62	0	01:10	1.02	1.15	1.00
501-160	CONDUIT	915.87	0	01:51	1.56	0.72	0.64
CAP-401	CONDUIT	4484.80	0	01:10	2.38	2.14	1.00
PND1_OVR	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
PND2_OVR	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
PND3_OVR	CONDUIT	39.27	0	01:11	0.43	0.00	0.02
OR1	ORIFICE	166.43	0	01:32			1.00
OR2	ORIFICE	196.55	0	01:32			1.00
OR3	ORIFICE	915.88	0	01:50			1.00

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Flow Classification Summary
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Conduit	Adjusted /Actual Length	Dry	Up Dry	Down Dry	Sub Crit	Sup Crit	Up Crit	Down Crit	Norm Ltd	Inlet Ctrl
		---------- Fraction of Time in Flow Class ----------								
101-PND1	1.00	0.01	0.00	0.00	0.14	0.00	0.00	0.84	0.00	0.00
102-101	1.00	0.01	0.00	0.00	0.17	0.00	0.00	0.82	0.01	0.00
103-102	1.00	0.01	0.00	0.00	0.13	0.00	0.00	0.86	0.00	0.00
104-103	1.00	0.01	0.00	0.00	0.16	0.00	0.00	0.83	0.01	0.00
105-104	1.00	0.01	0.00	0.00	0.11	0.00	0.00	0.87	0.00	0.00
201-PND2	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
202-201	1.00	0.00	0.08	0.00	0.92	0.00	0.00	0.00	0.86	0.00
204-203	1.00	0.01	0.00	0.00	0.12	0.00	0.00	0.87	0.01	0.00
205-204	1.00	0.01	0.00	0.00	0.11	0.00	0.00	0.88	0.00	0.00
206-205	1.00	0.01	0.00	0.00	0.11	0.00	0.00	0.89	0.00	0.00
207-206	1.00	0.01	0.00	0.00	0.10	0.00	0.00	0.89	0.00	0.00
208-207	1.00	0.01	0.00	0.00	0.10	0.00	0.00	0.89	0.00	0.00
3001-501	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.04	0.00
301-PND3	1.00	0.02	0.00	0.00	0.31	0.00	0.00	0.67	0.01	0.00
302-301	1.00	0.02	0.00	0.00	0.32	0.00	0.00	0.66	0.02	0.00
303-302	1.00	0.01	0.00	0.00	0.19	0.00	0.00	0.80	0.03	0.00
304-302	1.00	0.01	0.00	0.00	0.31	0.00	0.00	0.68	0.01	0.00
305-304	1.00	0.01	0.00	0.00	0.22	0.00	0.00	0.77	0.01	0.00
306-305	1.00	0.02	0.00	0.00	0.18	0.00	0.00	0.80	0.01	0.00
307-304	1.00	0.01	0.00	0.00	0.30	0.00	0.00	0.69	0.01	0.00
308-307	1.00	0.01	0.00	0.00	0.24	0.00	0.00	0.75	0.02	0.00
309-308	1.00	0.01	0.00	0.00	0.21	0.00	0.00	0.78	0.02	0.00
310-307	1.00	0.01	0.00	0.00	0.29	0.00	0.00	0.70	0.01	0.00
311-310	1.00	0.01	0.00	0.00	0.29	0.00	0.00	0.71	0.02	0.00
312-311	1.00	0.01	0.00	0.00	0.28	0.00	0.00	0.72	0.03	0.00
313-312	1.00	0.01	0.00	0.00	0.21	0.00	0.00	0.78	0.02	0.00
314-313	1.00	0.01	0.00	0.00	0.13	0.00	0.00	0.86	0.01	0.00
401-PND3	1.00	0.01	0.00	0.00	0.27	0.00	0.00	0.72	0.01	0.00
402-401	1.00	0.01	0.00	0.00	0.19	0.00	0.00	0.79	0.02	0.00
403-402	1.00	0.01	0.00	0.00	0.16	0.00	0.00	0.83	0.02	0.00
501-160	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
CAP-401	1.00	0.01	0.00	0.00	0.46	0.00	0.00	0.53	0.00	0.00
PND1_OVR	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PND2_OVR	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PND3_OVR	1.00	0.96	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.00

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Conduit Surcharge Summary
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Conduit	Hours Full: Both Ends	Hours Full: Upstream	Hours Full: Dnstream	Hours Above Full Normal Flow	Hours Capacity Limited
101-PND1	2.69	2.69	2.74	0.15	0.19
102-101	2.65	2.65	2.68	0.10	0.10
103-102	2.62	2.62	2.64	0.13	0.13
104-103	2.59	2.59	2.62	0.01	0.01
105-104	2.51	2.51	2.57	0.01	0.01
201-PND2	2.62	2.62	2.70	0.01	0.16
202-201	2.47	2.47	2.59	0.01	0.14
204-203	2.34	2.34	2.46	0.08	0.08
205-204	2.27	2.27	2.34	0.17	0.17
206-205	2.24	2.24	2.27	0.15	0.16
207-206	2.17	2.17	2.24	0.06	0.06
208-207	1.89	1.89	2.16	0.01	0.01
301-PND3	3.41	3.45	3.47	0.19	0.22
302-301	3.29	3.33	3.42	0.20	0.23
303-302	3.19	3.19	3.72	0.08	0.08
304-302	3.20	3.21	3.30	0.20	0.26
305-304	2.96	2.96	3.16	0.17	0.16
306-305	2.72	2.74	2.93	0.21	0.17
307-304	3.07	3.07	3.19	0.16	0.16
308-307	2.81	2.82	3.05	0.18	0.17
309-308	2.55	2.55	2.80	0.17	0.14
310-307	2.91	2.91	3.05	0.19	0.18
311-310	2.75	2.75	2.89	0.16	0.16
312-311	2.50	2.51	2.73	0.13	0.16
313-312	2.25	2.25	2.49	0.07	0.06

314-313	1.83	1.83	2.05	0.01	0.01
401-PND3	3.07	3.16	3.13	0.22	0.24
402-401	2.78	2.78	3.13	0.01	0.01
403-402	2.45	2.45	2.78	0.08	0.08
CAP-401	3.11	3.12	3.13	0.26	0.29

Analysis begun on: Thu Aug 5 09:24:40 2021
Analysis ended on: Thu Aug 5 09:24:43 2021
Total elapsed time: 00:00:03

SCS 24hr - 2-year Storm PCSWMM Model Results

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

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Element Count
****
Number of rain gages 1
Number of subcatchments ... 44
Number of nodes 43
Number of links 38
Number of pollutants 0
Number of land uses 0

****
Raingage Summary
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Name	Data Source	Data Type	Recording Interval
Raingage1	SCS24hr-2yr	INTENSITY	60 min.

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Subcatchment Summary
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Name	Area	Width	%Imperv	%Slope	Rain Gage	Outlet
A-01	0.24	54.88	100.00	1.5000	Raingage1	MH-105
A-02	0.52	200.00	90.00	1.5000	Raingage1	CBMH-104
A-03	0.26	106.58	94.00	1.5000	Raingage1	CBMH-103
A-04	0.16	138.79	91.00	1.5000	Raingage1	CBMH-102
A-05	0.42	173.25	86.00	1.5000	Raingage1	CBMH-101
A-06	0.31	35.89	80.00	1.5000	Raingage1	CBMH100
B-01	0.29	109.29	90.00	1.5000	Raingage1	CBMH-207
B-02	0.28	113.17	91.00	1.5000	Raingage1	CBMH-206
B-03	0.05	23.47	100.00	1.5000	Raingage1	CBMH-207
B-04	0.17	153.10	94.00	1.5000	Raingage1	CBMH-205
B-05	0.05	23.47	100.00	1.5000	Raingage1	CBMH-206
B-06	0.06	26.98	100.00	1.5000	Raingage1	CBMH-205
B-07	0.61	249.79	71.00	1.5000	Raingage1	CBMH-204
B-08	0.30	82.04	64.00	1.5000	Raingage1	CBMH-203
B-09	0.22	34.79	79.00	1.5000	Raingage1	CBMH-202
B-10	0.23	39.01	63.00	1.5000	Raingage1	MH-201
C-01	0.65	101.56	51.00	1.5000	Raingage1	CBMH-314
C-02	0.78	239.45	94.00	1.5000	Raingage1	MH-313
C-03	0.72	139.46	100.00	1.5000	Raingage1	MH-313
C-04	0.83	254.43	81.00	1.5000	Raingage1	MH-312
C-05	0.50	96.33	100.00	1.5000	Raingage1	MH-312
C-06	0.54	164.53	83.00	1.5000	Raingage1	MH-311
C-07	0.38	115.29	89.00	1.5000	Raingage1	MH-310
C-08	0.90	276.76	93.00	1.5000	Raingage1	MH-309
C-09	0.76	147.28	100.00	1.5000	Raingage1	MH-309
C-10	0.46	88.87	100.00	1.5000	Raingage1	MH-308
C-11	0.51	154.43	96.00	1.5000	Raingage1	MH-308
C-12	0.32	97.83	84.00	1.5000	Raingage1	MH-307
C-13	0.78	214.64	91.00	1.5000	Raingage1	MH-306
C-14	0.53	146.69	100.00	1.5000	Raingage1	MH-305
C-15	0.39	112.79	80.00	1.5000	Raingage1	MH-304
C-16	0.24	46.12	44.00	1.0000	Raingage1	CBMH-303
C-17	0.21	42.86	44.00	1.0000	Raingage1	MH-302
C-18	0.24	45.66	41.00	1.0000	Raingage1	MH-401
C-19	0.13	26.08	100.00	1.0000	Raingage1	MH-402
C-20	0.41	82.40	43.00	1.0000	Raingage1	MH-403
D-01a	0.01	17.02	20.00	2.0000	Raingage1	OF5
D-01b	0.02	40.00	5.00	2.0000	Raingage1	OF5
D-02a	0.09	254.29	5.00	1.5000	Raingage1	OF1
D-02b	0.04	286.67	5.00	1.5000	Raingage1	OF1
FUT-1	8.45	296.25	93.00	1.5000	Raingage1	CAP
PND1	0.20	42.73	5.00	1.5000	Raingage1	CBMH100
PND2	0.36	137.16	5.00	1.5000	Raingage1	CBMH200
PND3	1.09	226.09	5.00	1.5000	Raingage1	POND3

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Node Summary
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Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow

CAP	JUNCTION	87.02	2.80	0.0
HW-3001	JUNCTION	87.00	2.60	0.0
MH-501	JUNCTION	86.82	2.97	0.0
EX-MH139	OUTFALL	87.17	0.00	0.0
EX-MH159	OUTFALL	86.01	0.00	0.0
EX-MH160	OUTFALL	86.12	1.69	0.0
OF1	OUTFALL	90.65	0.00	0.0
OF2	OUTFALL	89.60	2.00	0.0
OF3	OUTFALL	89.50	1.25	0.0
OF4	OUTFALL	0.00	90.40	0.0
OF5	OUTFALL	89.70	0.00	0.0
CBMH100	STORAGE	87.80	3.00	0.0
CBMH-101	STORAGE	87.99	2.96	0.0
CBMH-102	STORAGE	88.11	2.89	0.0
CBMH-103	STORAGE	88.27	2.78	0.0
CBMH-104	STORAGE	88.39	2.71	0.0
CBMH200	STORAGE	86.76	3.04	0.0
CBMH-202	STORAGE	87.25	2.90	0.0
CBMH-203	STORAGE	87.58	2.82	0.0
CBMH-204	STORAGE	87.98	3.07	0.0
CBMH-205	STORAGE	88.16	2.94	0.0
CBMH-206	STORAGE	88.36	2.79	0.0
CBMH-207	STORAGE	88.65	2.50	0.0
CBMH-303	STORAGE	88.29	1.42	0.0
CBMH-314	STORAGE	88.71	1.69	0.0
MH-105	STORAGE	89.04	2.70	0.0
MH-201	STORAGE	86.97	2.88	0.0
MH-301	STORAGE	87.23	2.68	0.0
MH-302	STORAGE	86.85	2.91	0.0
MH-304	STORAGE	87.36	2.47	0.0
MH-305	STORAGE	87.88	2.20	0.0
MH-306	STORAGE	88.18	2.12	0.0
MH-307	STORAGE	87.43	2.73	0.0
MH-308	STORAGE	87.73	2.61	0.0
MH-309	STORAGE	88.02	2.36	0.0
MH-310	STORAGE	87.53	2.82	0.0
MH-311	STORAGE	87.61	2.68	0.0
MH-312	STORAGE	87.74	2.63	0.0
MH-313	STORAGE	88.02	2.36	0.0
MH-401	STORAGE	87.38	2.40	0.0
MH-402	STORAGE	88.18	1.96	0.0
MH-403	STORAGE	88.50	1.81	0.0
POND3	STORAGE	87.00	2.60	0.0

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Link Summary
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Name	From Node	To Node	Type	Length	%Slope	Roughness
101-PND1	CBMH-101	CBMH100	CONDUIT	37.5	0.3200	0.0130
102-101	CBMH-102	CBMH-101	CONDUIT	35.9	0.3065	0.0130
103-102	CBMH-103	CBMH-102	CONDUIT	23.9	0.2935	0.0130
104-103	CBMH-104	CBMH-103	CONDUIT	39.3	0.2800	0.0130
105-104	MH-105	CBMH-104	CONDUIT	29.4	0.9864	0.0130
201-PND2	MH-201	CBMH200	CONDUIT	14.1	1.0639	0.0130
202-201	CBMH-202	MH-201	CONDUIT	44.5	0.5169	0.0130
204-203	CBMH-203	CBMH-202	CONDUIT	103.2	0.2908	0.0130
205-204	CBMH-204	CBMH-203	CONDUIT	76.3	0.3015	0.0130
206-205	CBMH-205	CBMH-204	CONDUIT	35.9	0.3010	0.0130
207-206	CBMH-206	CBMH-205	CONDUIT	23.9	0.5030	0.0130
208-207	CBMH-207	CBMH-206	CONDUIT	39.0	0.5126	0.0130
3001-501	HW-3001	MH-501	CONDUIT	85.5	0.1988	0.0130
301-PND3	MH-301	POND3	CONDUIT	28.2	0.1066	0.0130
302-301	MH-302	MH-301	CONDUIT	59.9	0.1002	0.0130
303-302	CBMH-303	MH-302	CONDUIT	68.9	0.3483	0.0130
304-302	MH-304	MH-302	CONDUIT	46.9	0.1066	0.0130
305-304	MH-305	MH-304	CONDUIT	96.8	0.1033	0.0130
306-305	MH-306	MH-305	CONDUIT	113.9	0.0966	0.0130
307-304	MH-307	MH-304	CONDUIT	60.4	0.0994	0.0130
308-307	MH-308	MH-307	CONDUIT	120.0	0.1000	0.0130
309-308	MH-309	MH-308	CONDUIT	127.0	0.1024	0.0130
310-307	MH-310	MH-307	CONDUIT	73.5	0.0952	0.0130
311-310	MH-311	MH-310	CONDUIT	70.9	0.0988	0.0130
312-311	MH-312	MH-311	CONDUIT	116.0	0.1034	0.0130
313-312	MH-313	MH-312	CONDUIT	120.0	0.1000	0.0130
314-313	CBMH-314	MH-313	CONDUIT	16.6	0.4819	0.0130
401-PND3	MH-401	POND3	CONDUIT	31.1	0.0965	0.0130
402-401	MH-402	MH-401	CONDUIT	115.0	0.1478	0.0130
403-402	MH-403	MH-402	CONDUIT	83.7	0.2031	0.0130
501-160	MH-501	EX-MH160	CONDUIT	27.8	0.2156	0.0130
CAP-401	CAP	MH-401	CONDUIT	12.9	0.0775	0.0130

PND1_OVR	CBMH100	OF2	CONDUIT	42.4	0.3539	0.0150
PND2_OVR	CBMH200	OF3	CONDUIT	7.0	0.7143	0.0150
PND3_OVR	CBMH-303	OF4	CONDUIT	7.0	0.7143	0.0130
OR1	CBMH100	EX-MH139	ORIFICE			
OR2	CBMH200	EX-MH159	ORIFICE			
OR3	POND3	HW-3001	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
101-PND1	CIRCULAR	0.75	0.44	0.19	0.75	1	629.80
102-101	CIRCULAR	0.75	0.44	0.19	0.75	1	616.38
103-102	CIRCULAR	0.68	0.36	0.17	0.68	1	455.39
104-103	CIRCULAR	0.68	0.36	0.17	0.68	1	444.85
105-104	CIRCULAR	0.38	0.11	0.09	0.38	1	174.15
201-PND2	CIRCULAR	0.82	0.53	0.21	0.82	1	1480.67
202-201	CIRCULAR	0.82	0.53	0.21	0.82	1	1032.04
204-203	CIRCULAR	0.82	0.53	0.21	0.82	1	774.10
205-204	CIRCULAR	0.68	0.36	0.17	0.68	1	461.60
206-205	CIRCULAR	0.60	0.28	0.15	0.60	1	336.86
207-206	CIRCULAR	0.53	0.22	0.13	0.53	1	305.04
208-207	CIRCULAR	0.45	0.16	0.11	0.45	1	204.14
3001-501	CIRCULAR	1.05	0.87	0.26	1.05	1	1217.65
301-PND3	HORIZ_ELLIPSE	1.22	1.89	0.37	1.93	1	2454.60
302-301	HORIZ_ELLIPSE	1.22	1.89	0.37	1.93	1	2380.17
303-302	CIRCULAR	0.30	0.07	0.07	0.30	1	57.08
304-302	HORIZ_ELLIPSE	1.22	1.89	0.37	1.93	1	2454.89
305-304	CIRCULAR	0.82	0.53	0.21	0.82	1	461.38
306-305	CIRCULAR	0.60	0.28	0.15	0.60	1	190.84
307-304	HORIZ_ELLIPSE	1.22	1.89	0.37	1.93	1	2370.77
308-307	CIRCULAR	1.05	0.87	0.26	1.05	1	863.58
309-308	CIRCULAR	0.90	0.64	0.23	0.90	1	579.23
310-307	CIRCULAR	1.20	1.13	0.30	1.20	1	1202.94
311-310	CIRCULAR	1.20	1.13	0.30	1.20	1	1225.48
312-311	CIRCULAR	1.20	1.13	0.30	1.20	1	1254.04
313-312	CIRCULAR	1.05	0.87	0.26	1.05	1	863.73
314-313	CIRCULAR	0.53	0.22	0.13	0.53	1	298.57
401-PND3	HORIZ_ELLIPSE	1.22	1.89	0.37	1.93	1	2335.49
402-401	CIRCULAR	0.60	0.28	0.15	0.60	1	236.09
403-402	CIRCULAR	0.45	0.16	0.11	0.45	1	128.50
501-160	CIRCULAR	1.05	0.87	0.26	1.05	1	1268.08
CAP-401	HORIZ_ELLIPSE	1.22	1.89	0.37	1.93	1	2093.65
PND1_OVR	RECT_OPEN	1.00	3.00	0.75	3.00	1	9822.22
PND2_OVR	RECT_OPEN	1.00	3.00	0.75	3.00	1	13954.21
PND3_OVR	RECT_OPEN	1.00	5.50	0.85	5.50	1	31990.42

****
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 ..... LPS
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 03/18/2020 00:00:00
Ending Date 03/19/2020 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
Routing Time Step ..... 2.00 sec
Variable Time Step ..... YES
Maximum Trials 8

Number of Threads 4
Head Tolerance ..... 0.001500 m

****
Control Actions Taken
****

Runoff Quantity Continuity	Volume hectare-m	Depth mm
Total Precipitation	1.185	47.990
Evaporation Loss	0.000	0.000
Infiltration Loss	0.219	8.860
Surface Runoff	0.937	37.949
Final Storage	0.031	1.251
Continuity Error (%)	-0.144	

Flow Routing Continuity	Volume hectare-m	Volume 10^6 ltr
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	0.937	9.368
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	0.000	0.000
External Outflow	0.934	9.339
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	0.005	0.051
Continuity Error (%)	-0.233	

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

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

****
Routing Time Step Summary
****
Minimum Time Step : 1.56 sec
Average Time Step : 2.00 sec
Maximum Time Step : 2.00 sec
Percent in Steady State : 0.00
Average Iterations per Step : 2.00
Percent Not Converging : 0.00

****
Subcatchment Runoff Summary
****

Subcatchment	Total Precip mm	Total Runon mm	Total Evap mm	Total Infil mm	Imperv Runoff mm	Perv Runoff mm	Total Runoff mm	Total Runoff 10^6 ltr	Peak Runoff LPS	Runoff Coeff
A-01	47.99	0.00	0.00	0.00	46.33	0.00	46.33	0.11	13.95	0.965
A-02	47.99	0.00	0.00	4.80	41.76	0.00	41.76	0.22	27.18	0.870
A-03	47.99	0.00	0.00	2.88	43.62	0.00	43.62	0.11	14.03	0.909
A-04	47.99	0.00	0.00	4.32	42.25	0.00	42.25	0.07	8.44	0.880
A-05	47.99	0.00	0.00	6.72	39.91	0.00	39.91	0.17		

A-06	47.99	0.00	0.00	9.60	37.01	0.00	37.01	0.12
14.48 0.771								
B-01	47.99	0.00	0.00	4.80	41.76	0.00	41.76	0.12
15.25 0.870								
B-02	47.99	0.00	0.00	4.32	42.23	0.00	42.23	0.12
14.42 0.880								
B-03	47.99	0.00	0.00	0.00	47.98	0.00	47.98	0.02
2.88 1.000								
B-04	47.99	0.00	0.00	2.88	43.64	0.00	43.64	0.08
9.37 0.909								
B-05	47.99	0.00	0.00	0.00	47.98	0.00	47.98	0.02
2.88 1.000								
B-06	47.99	0.00	0.00	0.00	47.98	0.00	47.98	0.03
3.34 1.000								
B-07	47.99	0.00	0.00	13.92	32.96	0.00	32.96	0.20
24.84 0.687								
B-08	47.99	0.00	0.00	17.28	29.70	0.00	29.70	0.09
10.96 0.619								
B-09	47.99	0.00	0.00	10.08	36.59	0.00	36.59	0.08
9.79 0.762								
B-10	47.99	0.00	0.00	17.76	29.20	0.00	29.20	0.07
8.32 0.609								
C-01	47.99	0.00	0.00	23.52	23.65	0.00	23.65	0.15
19.17 0.493								
C-02	47.99	0.00	0.00	2.88	43.59	0.00	43.59	0.34
42.42 0.908								
C-03	47.99	0.00	0.00	0.00	47.88	0.00	47.88	0.35
41.56 0.998								
C-04	47.99	0.00	0.00	9.12	37.58	0.00	37.58	0.31
38.84 0.783								
C-05	47.99	0.00	0.00	0.00	47.88	0.00	47.88	0.24
28.70 0.998								
C-06	47.99	0.00	0.00	8.16	38.50	0.00	38.50	0.21
25.74 0.802								
C-07	47.99	0.00	0.00	5.28	41.28	0.00	41.28	0.16
19.34 0.860								
C-08	47.99	0.00	0.00	3.36	43.13	0.00	43.13	0.39
48.51 0.899								
C-09	47.99	0.00	0.00	0.00	47.88	0.00	47.88	0.36
43.63 0.998								
C-10	47.99	0.00	0.00	0.00	47.88	0.00	47.88	0.22
26.23 0.998								
C-11	47.99	0.00	0.00	1.92	44.52	0.00	44.52	0.22
27.94 0.928								

C-12	47.99	0.00	0.00	7.68	38.97	0.00	38.97	0.12
15.25 0.812								
C-13	47.99	0.00	0.00	4.32	42.19	0.00	42.19	0.33
40.75 0.879								
C-14	47.99	0.00	0.00	0.00	46.36	0.00	46.36	0.25
30.61 0.966								
C-15	47.99	0.00	0.00	9.60	37.11	0.00	37.11	0.14
17.89 0.773								
C-16	47.99	0.00	0.00	26.87	20.41	0.00	20.41	0.05
6.04 0.425								
C-17	47.99	0.00	0.00	26.87	20.41	0.00	20.41	0.04
5.33 0.425								
C-18	47.99	0.00	0.00	28.31	19.02	0.00	19.02	0.05
5.72 0.396								
C-19	47.99	0.00	0.00	0.00	46.28	0.00	46.28	0.06
7.67 0.964								
C-20	47.99	0.00	0.00	27.35	19.95	0.00	19.95	0.08
10.21 0.416								
D-01a	47.99	0.00	0.00	38.39	9.29	0.00	9.29	0.00
0.09 0.194								
D-01b	47.99	0.00	0.00	45.59	2.33	0.00	2.33	0.00
0.07 0.048								
D-02a	47.99	0.00	0.00	45.59	2.32	0.00	2.32	0.00
0.26 0.048								
D-02b	47.99	0.00	0.00	45.59	2.33	0.00	2.33	0.00
0.12 0.049								
FUT-1	47.99	0.00	0.00	3.36	43.06	0.00	43.06	3.64
451.83 0.897								
PND1	47.99	0.00	0.00	45.59	2.32	0.00	2.32	0.00
0.57 0.048								
PND2	47.99	0.00	0.00	45.59	2.32	0.00	2.32	0.01
1.03 0.048								
PND3	47.99	0.00	0.00	45.59	2.32	0.00	2.32	0.03
3.15 0.048								

****
Node Depth Summary
****

	Average Depth	Maximum Depth	Maximum HGL	Time of Max Occurrence	Reported Max Depth

Node	Type	Meters	Meters	Meters	days	hr:min	Meters
CAP	JUNCTION	0.48	0.92	87.94	0	13:07	0.92
HW-3001	JUNCTION	0.16	0.47	87.47	0	13:09	0.47
MH-501	JUNCTION	0.18	0.54	87.36	0	13:10	0.54
EX-MH139	OUTFALL	0.00	0.00	87.17	0	00:00	0.00
EX-MH159	OUTFALL	0.00	0.00	86.01	0	00:00	0.00
EX-MH160	OUTFALL	0.00	0.00	86.12	0	00:00	0.00
OF1	OUTFALL	0.00	0.00	90.65	0	00:00	0.00
OF2	OUTFALL	0.00	0.00	89.60	0	00:00	0.00
OF3	OUTFALL	0.00	0.00	89.50	0	00:00	0.00
OF4	OUTFALL	0.00	0.00	0.00	0	00:00	0.00
OF5	OUTFALL	0.00	0.00	89.70	0	00:00	0.00
CBMH100	STORAGE	0.09	0.98	88.78	0	13:00	0.98
CBMH-101	STORAGE	0.07	0.80	88.79	0	13:00	0.80
CBMH-102	STORAGE	0.06	0.68	88.79	0	13:00	0.68
CBMH-103	STORAGE	0.05	0.52	88.79	0	13:00	0.52
CBMH-104	STORAGE	0.04	0.40	88.79	0	13:00	0.40
CBMH200	STORAGE	0.09	0.81	87.57	0	13:00	0.81
CBMH-202	STORAGE	0.05	0.33	87.58	0	13:00	0.33
CBMH-203	STORAGE	0.05	0.19	87.77	0	12:18	0.19
CBMH-204	STORAGE	0.05	0.19	88.17	0	12:41	0.19
CBMH-205	STORAGE	0.04	0.16	88.32	0	12:40	0.16
CBMH-206	STORAGE	0.03	0.12	88.48	0	13:00	0.12
CBMH-207	STORAGE	0.02	0.09	88.74	0	13:00	0.09
CBMH-303	STORAGE	0.02	0.07	88.36	0	13:00	0.07
CBMH-314	STORAGE	0.02	0.09	88.80	0	13:00	0.09
MH-105	STORAGE	0.02	0.07	89.11	0	13:00	0.07
MH-201	STORAGE	0.06	0.61	87.58	0	13:00	0.61
MH-301	STORAGE	0.14	0.71	87.94	0	13:08	0.71
MH-302	STORAGE	0.54	1.09	87.94	0	13:04	1.09
MH-304	STORAGE	0.12	0.59	87.95	0	13:03	0.59
MH-305	STORAGE	0.07	0.25	88.13	0	12:59	0.25
MH-306	STORAGE	0.10	0.25	88.43	0	13:00	0.25
MH-307	STORAGE	0.11	0.52	87.95	0	13:02	0.52
MH-308	STORAGE	0.09	0.33	88.06	0	12:18	0.33
MH-309	STORAGE	0.08	0.25	88.27	0	13:00	0.25
MH-310	STORAGE	0.11	0.43	87.96	0	13:02	0.43
MH-311	STORAGE	0.09	0.37	87.98	0	13:01	0.37
MH-312	STORAGE	0.08	0.33	88.07	0	13:00	0.33
MH-313	STORAGE	0.08	0.25	88.27	0	13:00	0.25
MH-401	STORAGE	0.13	0.56	87.94	0	13:07	0.56
MH-402	STORAGE	0.04	0.13	88.31	0	13:00	0.13
MH-403	STORAGE	0.03	0.09	88.59	0	13:00	0.09
POND3	STORAGE	0.24	0.94	87.94	0	13:09	0.94

****
Node Inflow Summary
****

Node	Type	Maximum Lateral Inflow LPS	Maximum Total Inflow LPS	Time of Max Occurrence days	hr:min	Lateral Inflow Volume 10^6 ltr	Total Inflow Volume 10^6 ltr	Flow Balance Error Percent	
CAP	JUNCTION	451.83	451.83	0	13:00	3.64	3.64	0.014	
HW-3001	JUNCTION	0.00	471.71	0	13:09	0	7.71	0.035	
MH-501	JUNCTION	0.00	471.67	0	13:09	0	7.71	0.025	
EX-MH139	OUTFALL	0.00	96.05	0	13:00	0	0.8	0.000	
EX-MH159	OUTFALL	0.00	101.79	0	13:00	0	0.83	0.000	
EX-MH160	OUTFALL	0.00	471.60	0	13:10	0	7.71	0.000	
OF1	OUTFALL	0.38	0.38	0	12:50	0.00307	0.00307	0.000	
OF2	OUTFALL	0.00	0.00	0	00:00	0	0	0.000	ltr
OF3	OUTFALL	0.00	0.00	0	00:00	0	0	0.000	ltr
OF4	OUTFALL	0.00	0.00	0	00:00	0	0	0.000	ltr
OF5	OUTFALL	0.16	0.16	0	12:05	0.0013	0.0013	0.000	
CBMH100	STORAGE	15.05	96.39	0	13:00	0.121	0.8	0.001	
CBMH-101	STORAGE	20.87	82.00	0	13:00	0.168	0.679	0.040	
CBMH-102	STORAGE	8.44	62.22	0	12:12	0.068	0.511	-0.069	
CBMH-103	STORAGE	14.03	55.10	0	12:20	0.113	0.444	0.088	
CBMH-104	STORAGE	27.18	41.13	0	13:00	0.219	0.331	0.009	
CBMH200	STORAGE	1.03	101.85	0	13:00	0.0083	0.83	0.002	
CBMH-202	STORAGE	9.79	94.75	0	12:19	0.0786	0.753	-0.157	
CBMH-203	STORAGE	10.96	83.95	0	12:41	0.0882	0.677	0.435	
CBMH-204	STORAGE	24.84	72.99	0	12:40	0.2	0.59	0.066	
CBMH-205	STORAGE	12.71	48.15	0	12:40	0.103	0.39	0.035	
CBMH-206	STORAGE	17.31	35.44	0	13:00	0.14	0.287	0.019	
CBMH-207	STORAGE	18.13	18.13	0	13:00	0.147	0.147	0.038	
CBMH-303	STORAGE	6.04	6.04	0	13:00	0.0486	0.0486	0.118	
CBMH-314	STORAGE	19.17	19.17	0	13:00	0.154	0.154	0.016	

MH-105	STORAGE	13.95	13.95	0	13:00	0.112	0.112	0.023
MH-201	STORAGE	8.32	101.29	0	12:19	0.0668	0.821	-0.082
MH-301	STORAGE	0.00	471.87	0	12:29	0	3.87	-0.041
MH-302	STORAGE	5.33	474.62	0	12:30	0.0428	3.87	-0.027
MH-304	STORAGE	17.89	464.55	0	12:31	0.144	3.78	-0.010
MH-305	STORAGE	30.61	71.36	0	13:00	0.246	0.573	0.842
MH-306	STORAGE	40.75	40.75	0	13:00	0.328	0.328	0.260
MH-307	STORAGE	15.25	376.70	0	12:32	0.123	3.06	-0.309
MH-308	STORAGE	54.17	146.31	0	13:00	0.442	1.19	0.953
MH-309	STORAGE	92.14	92.14	0	13:00	0.752	0.752	0.234
MH-310	STORAGE	19.34	215.49	0	12:33	0.156	1.75	-0.142
MH-311	STORAGE	25.74	196.43	0	12:40	0.207	1.6	-0.283
MH-312	STORAGE	67.55	170.70	0	13:00	0.551	1.39	0.046
MH-313	STORAGE	83.98	103.15	0	13:00	0.686	0.84	0.228
MH-401	STORAGE	5.72	474.23	0	13:00	0.046	3.82	0.149
MH-402	STORAGE	7.67	17.88	0	13:00	0.0615	0.143	0.341
MH-403	STORAGE	10.21	10.21	0	13:00	0.0821	0.0821	0.211
POND3	STORAGE	3.15	920.02	0	12:33	0.0253	7.72	-0.135

****
Node Surcharge Summary
****

No nodes were surcharged.

****
Node Flooding Summary
****

No nodes were flooded.

****
Storage Volume Summary
****

Storage Unit	Average Volume	Avg Pcnt	Evap Pcnt	Exfil Pcnt	Maximum Volume	Max Pcnt	Time of Max Occurrence	Maximum Outflow
CBMH100	0.000	0	0	0	0.002	0	0 13:00	96.05
CBMH-101	0.000	2	0	0	0.001	27	0 13:00	81.70
CBMH-102	0.000	2	0	0	0.001	23	0 13:00	62.27
CBMH-103	0.000	2	0	0	0.001	19	0 13:00	53.78
CBMH-104	0.000	2	0	0	0.000	15	0 13:00	41.07
CBMH200	0.000	0	0	0	0.001	0	0 13:00	101.79
CBMH-202	0.000	2	0	0	0.001	11	0 13:00	92.99
CBMH-203	0.000	2	0	0	0.000	7	0 12:18	85.03
CBMH-204	0.000	2	0	0	0.000	6	0 12:41	72.99
CBMH-205	0.000	1	0	0	0.000	5	0 12:40	48.15
CBMH-206	0.000	1	0	0	0.000	4	0 13:00	35.44
CBMH-207	0.000	1	0	0	0.000	4	0 13:00	18.13
CBMH-303	0.000	1	0	0	0.000	5	0 13:00	6.04
CBMH-314	0.000	1	0	0	0.000	5	0 13:00	19.17
MH-105	0.000	1	0	0	0.000	3	0 13:00	13.95
MH-201	0.000	2	0	0	0.002	21	0 13:00	100.83
MH-301	0.001	5	0	0	0.005	26	0 13:08	464.93
MH-302	0.004	19	0	0	0.008	37	0 13:04	471.87
MH-304	0.001	5	0	0	0.004	24	0 13:03	463.26
MH-305	0.000	3	0	0	0.000	11	0 12:59	71.96
MH-306	0.000	5	0	0	0.000	12	0 13:00	40.75
MH-307	0.001	4	0	0	0.004	19	0 13:02	375.31
MH-308	0.000	4	0	0	0.002	13	0 12:18	147.21
MH-309	0.000	3	0	0	0.000	11	0 13:00	92.14
MH-310	0.000	4	0	0	0.002	15	0 13:02	215.04
MH-311	0.001	3	0	0	0.003	14	0 13:01	196.15
MH-312	0.000	3	0	0	0.002	12	0 13:00	170.69
MH-313	0.000	3	0	0	0.001	11	0 13:00	103.15
MH-401	0.001	5	0	0	0.004	23	0 13:07	469.14
MH-402	0.000	2	0	0	0.000	6	0 13:00	17.88
MH-403	0.000	1	0	0	0.000	5	0 13:00	10.21
POND3	0.228	3	0	0	1.945	22	0 13:09	471.71

****
Outfall Loading Summary
****

Outfall Node	Flow Freq Pcnt	Avg Flow LPS	Max Flow LPS	Total Volume 10^6 ltr
EX-MH139	83.90	11.04	96.05	0.800
EX-MH159	93.45	10.28	101.79	0.830
EX-MH160	93.57	95.32	471.60	7.705
OF1	24.78	0.11	0.38	0.003
OF2	0.00	0.00	0.00	0.000
OF3	0.00	0.00	0.00	0.000
OF4	0.00	0.00	0.00	0.000
OF5	8.51	0.10	0.16	0.001
System	38.02	116.84	0.16	9.339

****
Link Flow Summary
****

Link	Type	Maximum |Flow| LPS	Time of Max Occurrence days	hr:min	Maximum |Veloc| m/sec	Max/ Full Flow	Max/ Full Depth
101-PND1	CONDUIT	81.70	0	13:00	0.67	0.13	1.00
102-101	CONDUIT	62.27	0	13:02	0.79	0.10	0.95
103-102	CONDUIT	53.78	0	12:12	0.93	0.12	0.82
104-103	CONDUIT	41.07	0	12:20	0.74	0.09	0.67
105-104	CONDUIT	13.95	0	13:00	0.95	0.08	0.19
201-PND2	CONDUIT	100.83	0	13:00	0.83	0.07	0.82
202-201	CONDUIT	92.99	0	12:19	1.04	0.09	0.54
204-203	CONDUIT	85.03	0	12:19	1.00	0.11	0.29
205-204	CONDUIT	72.99	0	12:41	0.99	0.16	0.26
206-205	CONDUIT	48.15	0	12:40	0.90	0.14	0.24
207-206	CONDUIT	35.44	0	13:00	0.94	0.12	0.23
208-207	CONDUIT	18.13	0	13:00	0.79	0.09	0.20
3001-501	CONDUIT	471.67	0	13:09	1.16	0.39	0.48
301-PND3	CONDUIT	464.93	0	12:28	1.11	0.19	0.59
302-301	CONDUIT	471.87	0	12:29	0.86	0.20	0.55
303-302	CONDUIT	6.04	0	13:00	0.56	0.11	0.21
304-302	CONDUIT	463.26	0	12:30	0.77	0.19	0.50
305-304	CONDUIT	71.96	0	13:00	0.70	0.16	0.25
306-305	CONDUIT	40.75	0	13:00	0.65	0.21	0.27
307-304	CONDUIT	375.31	0	12:31	0.70	0.16	0.45
308-307	CONDUIT	147.21	0	12:52	0.82	0.17	0.31
309-308	CONDUIT	92.14	0	13:00	0.80	0.16	0.24
310-307	CONDUIT	215.04	0	12:32	0.76	0.18	0.39
311-310	CONDUIT	196.15	0	12:33	0.76	0.16	0.33
312-311	CONDUIT	170.69	0	12:40	0.70	0.14	0.29
313-312	CONDUIT	103.15	0	13:00	0.82	0.12	0.20
314-313	CONDUIT	19.17	0	13:00	0.77	0.06	0.17
401-PND3	CONDUIT	469.14	0	12:59	1.11	0.20	0.47
402-401	CONDUIT	17.88	0	13:00	0.54	0.08	0.17
403-402	CONDUIT	10.21	0	13:00	0.53	0.08	0.18
501-160	CONDUIT	471.60	0	13:10	1.29	0.37	0.44
CAP-401	CONDUIT	450.64	0	13:00	0.87	0.22	0.45
PND1_OVR	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
PND2_OVR	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
PND3_OVR	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
OR1	ORIFICE	96.05	0	13:00			1.00
OR2	ORIFICE	101.79	0	13:00			1.00
OR3	ORIFICE	471.71	0	13:09			1.00

****
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
101-PND1	1.00	0.16	0.00	0.00	0.09	0.00	0.00	0.76	0.00	0.00
102-101	1.00	0.16	0.00	0.00	0.84	0.00	0.00	0.01	0.16	0.00
103-102	1.00	0.16	0.00	0.00	0.05	0.00	0.00	0.80	0.00	0.00
104-103	1.00	0.16	0.00	0.00	0.83	0.00	0.00	0.01	0.05	0.00
105-104	1.00	0.16	0.00	0.00	0.00	0.00	0.00	0.84	0.00	0.00
201-PND2	1.00	0.05	0.00	0.00	0.09	0.01	0.00	0.85	0.00	0.00
202-201	1.00	0.05	0.00	0.00	0.04	0.00	0.00	0.91	0.01	0.00
204-203	1.00	0.05	0.00	0.00	0.04	0.00	0.00	0.92	0.03	0.00

205-204	1.00	0.05	0.00	0.00	0.00	0.00	0.00	0.95	0.00	0.00
206-205	1.00	0.05	0.00	0.00	0.00	0.00	0.00	0.95	0.00	0.00
207-206	1.00	0.04	0.00	0.00	0.00	0.00	0.00	0.96	0.00	0.00
208-207	1.00	0.04	0.00	0.00	0.00	0.00	0.00	0.96	0.00	0.00
3001-501	1.00	0.06	0.00	0.00	0.93	0.00	0.00	0.01	0.67	0.00
301-PND3	1.00	0.09	0.00	0.00	0.22	0.00	0.00	0.69	0.00	0.00
302-301	1.00	0.09	0.00	0.00	0.91	0.00	0.00	0.00	0.08	0.00
303-302	1.00	0.16	0.00	0.00	0.00	0.00	0.00	0.84	0.00	0.00
304-302	1.00	0.05	0.00	0.00	0.91	0.00	0.00	0.05	0.00	0.00
305-304	1.00	0.16	0.00	0.00	0.03	0.00	0.00	0.81	0.01	0.00
306-305	1.00	0.16	0.00	0.00	0.00	0.00	0.00	0.84	0.00	0.00
307-304	1.00	0.04	0.00	0.00	0.93	0.00	0.00	0.02	0.63	0.00
308-307	1.00	0.04	0.00	0.00	0.10	0.00	0.00	0.86	0.02	0.00
309-308	1.00	0.04	0.00	0.00	0.00	0.00	0.00	0.96	0.00	0.00
310-307	1.00	0.05	0.00	0.00	0.31	0.00	0.00	0.64	0.01	0.00
311-310	1.00	0.04	0.00	0.00	0.93	0.00	0.00	0.03	0.79	0.00
312-311	1.00	0.04	0.00	0.00	0.94	0.00	0.00	0.02	0.03	0.00
313-312	1.00	0.04	0.00	0.00	0.00	0.00	0.00	0.96	0.00	0.00
314-313	1.00	0.16	0.00	0.00	0.00	0.00	0.00	0.84	0.00	0.00
401-PND3	1.00	0.06	0.00	0.00	0.14	0.00	0.00	0.80	0.00	0.00
402-401	1.00	0.16	0.00	0.00	0.00	0.00	0.00	0.84	0.00	0.00
403-402	1.00	0.16	0.00	0.00	0.00	0.00	0.00	0.84	0.00	0.00
501-160	1.00	0.06	0.00	0.00	0.00	0.00	0.00	0.94	0.00	0.00
CAP-401	1.00	0.06	0.00	0.00	0.94	0.00	0.00	0.00	0.00	0.00
PND1_OVR	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PND2_OVR	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PND3_OVR	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

****
Conduit Surcharge Summary
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Conduit	Hours Full: Both Ends	Hours Full: Upstream	Hours Full: Dnstream	Hours Above Full Normal Flow	Hours Capacity Limited
101-PND1	0.26	0.26	0.60	0.01	0.01
102-101	0.01	0.01	0.22	0.01	0.01

Analysis begun on: Thu Aug 5 09:50:14 2021
Analysis ended on: Thu Aug 5 09:50:17 2021
Total elapsed time: 00:00:03

SCS 24hr - 5-year Storm PCSWMM Model Results

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

****
Element Count
****
Number of rain gages 1
Number of subcatchments ... 44
Number of nodes 43
Number of links 38
Number of pollutants 0
Number of land uses 0

****
Raingage Summary
****

Name	Data Source	Data Type	Recording Interval
Raingage1	SCS24hr-5yr	INTENSITY	60 min.

****
Subcatchment Summary
****

Name	Area	Width	%Imperv	%Slope	Rain Gage	Outlet
A-01	0.24	54.88	100.00	1.5000	Raingage1	MH-105
A-02	0.52	200.00	90.00	1.5000	Raingage1	CBMH-104
A-03	0.26	106.58	94.00	1.5000	Raingage1	CBMH-103
A-04	0.16	138.79	91.00	1.5000	Raingage1	CBMH-102
A-05	0.42	173.25	86.00	1.5000	Raingage1	CBMH-101
A-06	0.31	35.89	80.00	1.5000	Raingage1	CBMH100
B-01	0.29	109.29	90.00	1.5000	Raingage1	CBMH-207
B-02	0.28	113.17	91.00	1.5000	Raingage1	CBMH-206
B-03	0.05	23.47	100.00	1.5000	Raingage1	CBMH-207
B-04	0.17	153.10	94.00	1.5000	Raingage1	CBMH-205
B-05	0.05	23.47	100.00	1.5000	Raingage1	CBMH-206
B-06	0.06	26.98	100.00	1.5000	Raingage1	CBMH-205
B-07	0.61	249.79	71.00	1.5000	Raingage1	CBMH-204
B-08	0.30	82.04	64.00	1.5000	Raingage1	CBMH-203
B-09	0.22	34.79	79.00	1.5000	Raingage1	CBMH-202
B-10	0.23	39.01	63.00	1.5000	Raingage1	MH-201
C-01	0.65	101.56	51.00	1.5000	Raingage1	CBMH-314
C-02	0.78	239.45	94.00	1.5000	Raingage1	MH-313
C-03	0.72	139.46	100.00	1.5000	Raingage1	MH-313
C-04	0.83	254.43	81.00	1.5000	Raingage1	MH-312
C-05	0.50	96.33	100.00	1.5000	Raingage1	MH-312
C-06	0.54	164.53	83.00	1.5000	Raingage1	MH-311
C-07	0.38	115.29	89.00	1.5000	Raingage1	MH-310
C-08	0.90	276.76	93.00	1.5000	Raingage1	MH-309
C-09	0.76	147.28	100.00	1.5000	Raingage1	MH-309
C-10	0.46	88.87	100.00	1.5000	Raingage1	MH-308
C-11	0.51	154.43	96.00	1.5000	Raingage1	MH-308
C-12	0.32	97.83	84.00	1.5000	Raingage1	MH-307
C-13	0.78	214.64	91.00	1.5000	Raingage1	MH-306
C-14	0.53	146.69	100.00	1.5000	Raingage1	MH-305
C-15	0.39	112.79	80.00	1.5000	Raingage1	MH-304
C-16	0.24	46.12	44.00	1.0000	Raingage1	CBMH-303
C-17	0.21	42.86	44.00	1.0000	Raingage1	MH-302
C-18	0.24	45.66	41.00	1.0000	Raingage1	MH-401
C-19	0.13	26.08	100.00	1.0000	Raingage1	MH-402
C-20	0.41	82.40	43.00	1.0000	Raingage1	MH-403
D-01a	0.01	17.02	20.00	2.0000	Raingage1	OF5
D-01b	0.02	40.00	5.00	2.0000	Raingage1	OF5
D-02a	0.09	254.29	5.00	1.5000	Raingage1	OF1
D-02b	0.04	286.67	5.00	1.5000	Raingage1	OF1
FUT-1	8.45	296.25	93.00	1.5000	Raingage1	CAP
PND1	0.20	42.73	5.00	1.5000	Raingage1	CBMH100
PND2	0.36	137.16	5.00	1.5000	Raingage1	CBMH200
PND3	1.09	226.09	5.00	1.5000	Raingage1	POND3

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Node Summary
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Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow

CAP	JUNCTION	87.02	2.80	0.0
HW-3001	JUNCTION	87.00	2.60	0.0
MH-501	JUNCTION	86.82	2.97	0.0
EX-MH139	OUTFALL	87.17	0.00	0.0
EX-MH159	OUTFALL	86.01	0.00	0.0
EX-MH160	OUTFALL	86.12	1.69	0.0
OF1	OUTFALL	90.65	0.00	0.0
OF2	OUTFALL	89.60	2.00	0.0
OF3	OUTFALL	89.50	1.25	0.0
OF4	OUTFALL	0.00	90.40	0.0
OF5	OUTFALL	89.70	0.00	0.0
CBMH100	STORAGE	87.80	3.00	0.0
CBMH-101	STORAGE	87.99	2.96	0.0
CBMH-102	STORAGE	88.11	2.89	0.0
CBMH-103	STORAGE	88.27	2.78	0.0
CBMH-104	STORAGE	88.39	2.71	0.0
CBMH200	STORAGE	86.76	3.04	0.0
CBMH-202	STORAGE	87.25	2.90	0.0
CBMH-203	STORAGE	87.58	2.82	0.0
CBMH-204	STORAGE	87.98	3.07	0.0
CBMH-205	STORAGE	88.16	2.94	0.0
CBMH-206	STORAGE	88.36	2.79	0.0
CBMH-207	STORAGE	88.65	2.50	0.0
CBMH-303	STORAGE	88.29	1.42	0.0
CBMH-314	STORAGE	88.71	1.69	0.0
MH-105	STORAGE	89.04	2.70	0.0
MH-201	STORAGE	86.97	2.88	0.0
MH-301	STORAGE	87.23	2.68	0.0
MH-302	STORAGE	86.85	2.91	0.0
MH-304	STORAGE	87.36	2.47	0.0
MH-305	STORAGE	87.88	2.20	0.0
MH-306	STORAGE	88.18	2.12	0.0
MH-307	STORAGE	87.43	2.73	0.0
MH-308	STORAGE	87.73	2.61	0.0
MH-309	STORAGE	88.02	2.36	0.0
MH-310	STORAGE	87.53	2.82	0.0
MH-311	STORAGE	87.61	2.68	0.0
MH-312	STORAGE	87.74	2.63	0.0
MH-313	STORAGE	88.02	2.36	0.0
MH-401	STORAGE	87.38	2.40	0.0
MH-402	STORAGE	88.18	1.96	0.0
MH-403	STORAGE	88.50	1.81	0.0
POND3	STORAGE	87.00	2.60	0.0

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Link Summary
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Name	From Node	To Node	Type	Length	%Slope	Roughness
101-PND1	CBMH-101	CBMH100	CONDUIT	37.5	0.3200	0.0130
102-101	CBMH-102	CBMH-101	CONDUIT	35.9	0.3065	0.0130
103-102	CBMH-103	CBMH-102	CONDUIT	23.9	0.2935	0.0130
104-103	CBMH-104	CBMH-103	CONDUIT	39.3	0.2800	0.0130
105-104	MH-105	CBMH-104	CONDUIT	29.4	0.9864	0.0130
201-PND2	MH-201	CBMH200	CONDUIT	14.1	1.0639	0.0130
202-201	CBMH-202	MH-201	CONDUIT	44.5	0.5169	0.0130
204-203	CBMH-203	CBMH-202	CONDUIT	103.2	0.2908	0.0130
205-204	CBMH-204	CBMH-203	CONDUIT	76.3	0.3015	0.0130
206-205	CBMH-205	CBMH-204	CONDUIT	35.9	0.3010	0.0130
207-206	CBMH-206	CBMH-205	CONDUIT	23.9	0.5030	0.0130
208-207	CBMH-207	CBMH-206	CONDUIT	39.0	0.5126	0.0130
3001-501	HW-3001	MH-501	CONDUIT	85.5	0.1988	0.0130
301-PND3	MH-301	POND3	CONDUIT	28.2	0.1066	0.0130
302-301	MH-302	MH-301	CONDUIT	59.9	0.1002	0.0130
303-302	CBMH-303	MH-302	CONDUIT	68.9	0.3483	0.0130
304-302	MH-304	MH-302	CONDUIT	46.9	0.1066	0.0130
305-304	MH-305	MH-304	CONDUIT	96.8	0.1033	0.0130
306-305	MH-306	MH-305	CONDUIT	113.9	0.0966	0.0130
307-304	MH-307	MH-304	CONDUIT	60.4	0.0994	0.0130
308-307	MH-308	MH-307	CONDUIT	120.0	0.1000	0.0130
309-308	MH-309	MH-308	CONDUIT	127.0	0.1024	0.0130
310-307	MH-310	MH-307	CONDUIT	73.5	0.0952	0.0130
311-310	MH-311	MH-310	CONDUIT	70.9	0.0988	0.0130
312-311	MH-312	MH-311	CONDUIT	116.0	0.1034	0.0130
313-312	MH-313	MH-312	CONDUIT	120.0	0.1000	0.0130
314-313	CBMH-314	MH-313	CONDUIT	16.6	0.4819	0.0130
401-PND3	MH-401	POND3	CONDUIT	31.1	0.0965	0.0130
402-401	MH-402	MH-401	CONDUIT	115.0	0.1478	0.0130
403-402	MH-403	MH-402	CONDUIT	83.7	0.2031	0.0130
501-160	MH-501	EX-MH160	CONDUIT	27.8	0.2156	0.0130
CAP-401	CAP	MH-401	CONDUIT	12.9	0.0775	0.0130

PND1_OVR	CBMH100	OF2	CONDUIT	42.4	0.3539	0.0150
PND2_OVR	CBMH200	OF3	CONDUIT	7.0	0.7143	0.0150
PND3_OVR	CBMH-303	OF4	CONDUIT	7.0	0.7143	0.0130
OR1	CBMH100	EX-MH139	ORIFICE			
OR2	CBMH200	EX-MH159	ORIFICE			
OR3	POND3	HW-3001	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
101-PND1	CIRCULAR	0.75	0.44	0.19	0.75	1	629.80
102-101	CIRCULAR	0.75	0.44	0.19	0.75	1	616.38
103-102	CIRCULAR	0.68	0.36	0.17	0.68	1	455.39
104-103	CIRCULAR	0.68	0.36	0.17	0.68	1	444.85
105-104	CIRCULAR	0.38	0.11	0.09	0.38	1	174.15
201-PND2	CIRCULAR	0.82	0.53	0.21	0.82	1	1480.67
202-201	CIRCULAR	0.82	0.53	0.21	0.82	1	1032.04
204-203	CIRCULAR	0.82	0.53	0.21	0.82	1	774.10
205-204	CIRCULAR	0.68	0.36	0.17	0.68	1	461.60
206-205	CIRCULAR	0.60	0.28	0.15	0.60	1	336.86
207-206	CIRCULAR	0.53	0.22	0.13	0.53	1	305.04
208-207	CIRCULAR	0.45	0.16	0.11	0.45	1	204.14
3001-501	CIRCULAR	1.05	0.87	0.26	1.05	1	1217.65
301-PND3	HORIZ_ELLIPSE	1.22	1.89	0.37	1.93	1	2454.60
302-301	HORIZ_ELLIPSE	1.22	1.89	0.37	1.93	1	2380.17
303-302	CIRCULAR	0.30	0.07	0.07	0.30	1	57.08
304-302	HORIZ_ELLIPSE	1.22	1.89	0.37	1.93	1	2454.89
305-304	CIRCULAR	0.82	0.53	0.21	0.82	1	461.38
306-305	CIRCULAR	0.60	0.28	0.15	0.60	1	190.84
307-304	HORIZ_ELLIPSE	1.22	1.89	0.37	1.93	1	2370.77
308-307	CIRCULAR	1.05	0.87	0.26	1.05	1	863.58
309-308	CIRCULAR	0.90	0.64	0.23	0.90	1	579.23
310-307	CIRCULAR	1.20	1.13	0.30	1.20	1	1202.94
311-310	CIRCULAR	1.20	1.13	0.30	1.20	1	1225.48
312-311	CIRCULAR	1.20	1.13	0.30	1.20	1	1254.04
313-312	CIRCULAR	1.05	0.87	0.26	1.05	1	863.73
314-313	CIRCULAR	0.53	0.22	0.13	0.53	1	298.57
401-PND3	HORIZ_ELLIPSE	1.22	1.89	0.37	1.93	1	2335.49
402-401	CIRCULAR	0.60	0.28	0.15	0.60	1	236.09
403-402	CIRCULAR	0.45	0.16	0.11	0.45	1	128.50
501-160	CIRCULAR	1.05	0.87	0.26	1.05	1	1268.08
CAP-401	HORIZ_ELLIPSE	1.22	1.89	0.37	1.93	1	2093.65
PND1_OVR	RECT_OPEN	1.00	3.00	0.75	3.00	1	9822.22
PND2_OVR	RECT_OPEN	1.00	3.00	0.75	3.00	1	13954.21
PND3_OVR	RECT_OPEN	1.00	5.50	0.85	5.50	1	31990.42

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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 ..... LPS
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 03/18/2020 00:00:00
Ending Date 03/19/2020 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
Routing Time Step ..... 2.00 sec
Variable Time Step ..... YES
Maximum Trials 8

Number of Threads 4
Head Tolerance ..... 0.001500 m

****
Control Actions Taken
****

Runoff Quantity Continuity	Volume hectare-m	Depth mm
Total Precipitation	1.568	63.470
Evaporation Loss	0.000	0.000
Infiltration Loss	0.277	11.225
Surface Runoff	1.261	51.051
Final Storage	0.032	1.299
Continuity Error (%)	-0.166	

Flow Routing Continuity	Volume hectare-m	Volume 10^6 ltr
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	1.260	12.603
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	0.000	0.000
External Outflow	1.256	12.564
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	0.007	0.066
Continuity Error (%)	-0.213	

****
Highest Continuity Errors
****
Node MH-402 (1.20%)

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

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Highest Flow Instability Indexes
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All links are stable.

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Routing Time Step Summary
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Minimum Time Step : 0.50 sec
Average Time Step : 2.00 sec
Maximum Time Step : 2.00 sec
Percent in Steady State : 0.00
Average Iterations per Step : 2.00
Percent Not Converging : 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 LPS	Runoff Coeff
A-01	63.47	0.00	0.00	0.00	61.81	0.00	61.81	0.15	18.45	0.974
A-02	63.47	0.00	0.00	5.89	55.70	0.48	56.18	0.29		

A-03	63.47	0.00	0.00	3.52	58.18	0.30	58.48	0.15
19.16	0.921							
A-04	63.47	0.00	0.00	5.27	56.34	0.46	56.80	0.09
11.73	0.895							
A-05	63.47	0.00	0.00	8.28	53.23	0.62	53.86	0.23
29.84	0.849							
A-06	63.47	0.00	0.00	12.13	49.38	0.57	49.95	0.16
20.74	0.787							
B-01	63.47	0.00	0.00	5.91	55.70	0.46	56.16	0.17
21.30	0.885							
B-02	63.47	0.00	0.00	5.30	56.32	0.43	56.75	0.16
20.03	0.894							
B-03	63.47	0.00	0.00	0.00	63.47	0.00	63.47	0.03
3.81	1.000							
B-04	63.47	0.00	0.00	3.51	58.19	0.32	58.51	0.10
12.80	0.922							
B-05	63.47	0.00	0.00	0.00	63.47	0.00	63.47	0.03
3.81	1.000							
B-06	63.47	0.00	0.00	0.00	63.47	0.00	63.47	0.04
4.42	1.000							
B-07	63.47	0.00	0.00	17.32	43.95	1.11	45.07	0.27
38.96	0.710							
B-08	63.47	0.00	0.00	21.72	39.61	1.15	40.76	0.12
17.58	0.642							
B-09	63.47	0.00	0.00	12.67	48.82	0.67	49.49	0.11
14.26	0.780							
B-10	63.47	0.00	0.00	22.54	38.96	0.96	39.92	0.09
12.91	0.629							
C-01	63.47	0.00	0.00	30.05	31.55	1.07	32.61	0.21
31.10	0.514							
C-02	63.47	0.00	0.00	3.53	58.15	0.29	58.44	0.46
57.93	0.921							
C-03	63.47	0.00	0.00	0.00	63.36	0.00	63.36	0.46
54.98	0.998							
C-04	63.47	0.00	0.00	11.33	50.12	0.75	50.87	0.42
56.99	0.802							
C-05	63.47	0.00	0.00	0.00	63.36	0.00	63.36	0.32
37.97	0.998							
C-06	63.47	0.00	0.00	10.12	51.36	0.69	52.05	0.28
37.35	0.820							
C-07	63.47	0.00	0.00	6.51	55.06	0.48	55.55	0.21
27.15	0.875							
C-08	63.47	0.00	0.00	4.13	57.53	0.33	57.87	0.52
66.60	0.912							

C-09	63.47	0.00	0.00	0.00	63.36	0.00	63.36	0.48
57.72	0.998							
C-10	63.47	0.00	0.00	0.00	63.36	0.00	63.36	0.29
34.69	0.998							
C-11	63.47	0.00	0.00	2.35	59.39	0.20	59.59	0.30
37.75	0.939							
C-12	63.47	0.00	0.00	9.52	51.98	0.66	52.64	0.17
22.01	0.829							
C-13	63.47	0.00	0.00	5.32	56.29	0.40	56.69	0.44
56.56	0.893							
C-14	63.47	0.00	0.00	0.00	61.84	0.00	61.84	0.33
40.49	0.974							
C-15	63.47	0.00	0.00	11.94	49.50	0.77	50.27	0.20
26.37	0.792							
C-16	63.47	0.00	0.00	34.41	27.22	1.14	28.37	0.07
10.20	0.447							
C-17	63.47	0.00	0.00	34.38	27.23	1.18	28.40	0.06
9.07	0.448							
C-18	63.47	0.00	0.00	36.31	25.37	1.15	26.52	0.06
9.81	0.418							
C-19	63.47	0.00	0.00	0.00	61.75	0.00	61.75	0.08
10.14	0.973							
C-20	63.47	0.00	0.00	35.02	26.61	1.17	27.78	0.11
17.44	0.438							
D-01a	63.47	0.00	0.00	47.31	12.38	3.58	15.96	0.00
0.36	0.251							
D-01b	63.47	0.00	0.00	56.47	3.11	3.95	7.06	0.00
0.93	0.111							
D-02a	63.47	0.00	0.00	56.19	3.10	4.24	7.34	0.01
3.54	0.116							
D-02b	63.47	0.00	0.00	55.78	3.11	4.74	7.84	0.00
1.74	0.124							
FUT-1	63.47	0.00	0.00	4.26	57.38	0.19	57.57	4.86
612.46	0.907							
PND1	63.47	0.00	0.00	58.60	3.10	1.72	4.81	0.01
3.41	0.076							
PND2	63.47	0.00	0.00	58.01	3.10	2.33	5.42	0.02
8.47	0.085							
PND3	63.47	0.00	0.00	58.64	3.10	1.67	4.77	0.05
18.41	0.075							

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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
CAP	JUNCTION	0.52	1.15	88.17	0	13:07	1.15
HW-3001	JUNCTION	0.19	0.52	87.52	0	13:09	0.52
MH-501	JUNCTION	0.22	0.60	87.42	0	13:09	0.60
EX-MH139	OUTFALL	0.00	0.00	87.17	0	00:00	0.00
EX-MH159	OUTFALL	0.00	0.00	86.01	0	00:00	0.00
EX-MH160	OUTFALL	0.00	0.00	86.12	0	00:00	0.00
OF1	OUTFALL	0.00	0.00	90.65	0	00:00	0.00
OF2	OUTFALL	0.00	0.00	89.60	0	00:00	0.00
OF3	OUTFALL	0.00	0.00	89.50	0	00:00	0.00
OF4	OUTFALL	0.00	0.00	0.00	0	00:00	0.00
OF5	OUTFALL	0.00	0.00	89.70	0	00:00	0.00
CBMH100	STORAGE	0.13	1.71	89.51	0	13:00	1.71
CBMH-101	STORAGE	0.10	1.53	89.52	0	13:00	1.53
CBMH-102	STORAGE	0.09	1.41	89.52	0	13:00	1.41
CBMH-103	STORAGE	0.08	1.25	89.52	0	13:00	1.25
CBMH-104	STORAGE	0.07	1.13	89.52	0	13:00	1.13
CBMH200	STORAGE	0.12	1.35	88.11	0	13:02	1.35
CBMH-202	STORAGE	0.07	0.87	88.12	0	13:02	0.87
CBMH-203	STORAGE	0.06	0.54	88.12	0	13:01	0.54
CBMH-204	STORAGE	0.06	0.22	88.20	0	13:00	0.22
CBMH-205	STORAGE	0.05	0.19	88.35	0	13:00	0.19
CBMH-206	STORAGE	0.04	0.14	88.50	0	13:00	0.14
CBMH-207	STORAGE	0.03	0.11	88.76	0	13:00	0.11
CBMH-303	STORAGE	0.02	0.09	88.38	0	12:59	0.09
CBMH-314	STORAGE	0.03	0.12	88.83	0	13:00	0.12
MH-105	STORAGE	0.03	0.49	89.53	0	13:00	0.49
MH-201	STORAGE	0.08	1.15	88.12	0	13:02	1.15
MH-301	STORAGE	0.19	0.94	88.17	0	13:09	0.94
MH-302	STORAGE	0.59	1.32	88.17	0	13:10	1.32
MH-304	STORAGE	0.17	0.81	88.17	0	13:12	0.81
MH-305	STORAGE	0.08	0.31	88.19	0	13:01	0.31
MH-306	STORAGE	0.11	0.29	88.47	0	13:00	0.29
MH-307	STORAGE	0.15	0.74	88.17	0	13:13	0.74
MH-308	STORAGE	0.12	0.46	88.19	0	13:01	0.45
MH-309	STORAGE	0.09	0.29	88.31	0	12:45	0.29
MH-310	STORAGE	0.14	0.64	88.17	0	13:13	0.64
MH-311	STORAGE	0.12	0.57	88.18	0	13:13	0.57
MH-312	STORAGE	0.11	0.46	88.20	0	13:01	0.46
MH-313	STORAGE	0.09	0.29	88.31	0	13:00	0.29
MH-401	STORAGE	0.17	0.79	88.17	0	13:07	0.79
MH-402	STORAGE	0.04	0.15	88.33	0	12:58	0.15
MH-403	STORAGE	0.03	0.12	88.62	0	13:00	0.12
POND3	STORAGE	0.31	1.17	88.17	0	13:08	1.17

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Node Inflow Summary
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Node	Type	Maximum Lateral Inflow LPS	Maximum Total Inflow LPS	Time of Max Occurrence days	hr:min	Lateral Inflow Volume 10^6 ltr	Total Inflow Volume 10^6 ltr	Flow Balance Error Percent	
CAP	JUNCTION	612.46	612.46	0	13:00	4.86	4.86	0.008	
HW-3001	JUNCTION	0.00	555.62	0	13:08	0	10.3	0.032	
MH-501	JUNCTION	0.00	555.56	0	13:08	0	10.3	0.026	
EX-MH139	OUTFALL	0.00	130.12	0	13:00	0	1.08	0.000	
EX-MH159	OUTFALL	0.00	135.67	0	13:02	0	1.13	0.000	
EX-MH160	OUTFALL	0.00	555.47	0	13:09	0	10.3	0.000	
OF1	OUTFALL	5.28	5.28	0	13:00	0.0099	0.0099	0.000	
OF2	OUTFALL	0.00	0.00	0	00:00	0	0	0.000	ltr
OF3	OUTFALL	0.00	0.00	0	00:00	0	0	0.000	ltr
OF4	OUTFALL	0.00	0.00	0	00:00	0	0	0.000	ltr
OF5	OUTFALL	1.29	1.29	0	13:00	0.00297	0.00297	0.000	
CBMH100	STORAGE	24.16	135.68	0	13:00	0.166	1.08	0.001	
CBMH-101	STORAGE	29.84	113.12	0	13:00	0.227	0.913	0.037	
CBMH-102	STORAGE	11.73	84.58	0	13:00	0.0914	0.686	-0.057	
CBMH-103	STORAGE	19.16	74.14	0	13:00	0.151	0.595	0.069	
CBMH-104	STORAGE	38.02	56.06	0	13:00	0.294	0.444	-0.028	
CBMH200	STORAGE	8.47	135.95	0	13:01	0.0194	1.13	0.001	
CBMH-202	STORAGE	14.26	124.33	0	12:58	0.106	1.02	-0.166	
CBMH-203	STORAGE	17.58	122.63	0	13:00	0.121	0.914	0.180	

CBMH-204	STORAGE	38.96	105.12	0	13:00	0.273	0.796	0.334
CBMH-205	STORAGE	17.22	66.17	0	13:00	0.138	0.522	0.031
CBMH-206	STORAGE	23.84	48.95	0	13:00	0.188	0.384	0.017
CBMH-207	STORAGE	25.11	25.11	0	13:00	0.197	0.197	0.034
CBMH-303	STORAGE	10.20	10.20	0	13:00	0.0675	0.0675	0.641
CBMH-314	STORAGE	31.10	31.10	0	13:00	0.213	0.213	0.014
MH-105	STORAGE	18.45	18.45	0	13:00	0.15	0.15	0.109
MH-201	STORAGE	12.91	129.76	0	13:01	0.0914	1.11	-0.060
MH-301	STORAGE	0.00	621.37	0	12:26	0	5.19	-0.054
MH-302	STORAGE	9.07	625.76	0	12:27	0.0596	5.2	-0.013
MH-304	STORAGE	26.37	613.11	0	12:27	0.195	5.07	-0.053
MH-305	STORAGE	40.49	97.00	0	13:00	0.328	0.767	0.875
MH-306	STORAGE	56.56	56.56	0	13:00	0.44	0.44	0.220
MH-307	STORAGE	22.01	497.41	0	12:28	0.166	4.1	-0.288
MH-308	STORAGE	72.44	197.54	0	12:56	0.589	1.58	0.427
MH-309	STORAGE	124.33	124.33	0	13:00	1	1	0.897
MH-310	STORAGE	27.15	284.53	0	12:29	0.209	2.36	-0.135
MH-311	STORAGE	37.35	267.07	0	12:57	0.28	2.14	-0.263
MH-312	STORAGE	94.97	238.49	0	13:00	0.738	1.86	-0.318
MH-313	STORAGE	112.90	143.91	0	13:00	0.914	1.13	0.804
MH-401	STORAGE	9.81	648.18	0	13:00	0.0642	5.12	0.114
MH-402	STORAGE	10.14	27.21	0	13:00	0.0821	0.196	1.217
MH-403	STORAGE	17.44	17.44	0	13:00	0.114	0.114	0.175
POND3	STORAGE	18.41	1205.53	0	12:27	0.052	10.4	-0.115

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Node Surcharge Summary
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No nodes were surcharged.

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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 LPS
CBMH100	0.000	0	0	0	0.005	0	0 13:00	130.12
CBMH-101	0.000	3	0	0	0.003	52	0 13:00	111.54
CBMH-102	0.000	3	0	0	0.003	49	0 13:00	83.48
CBMH-103	0.000	3	0	0	0.002	45	0 13:00	72.86
CBMH-104	0.000	3	0	0	0.001	42	0 13:00	54.98
CBMH200	0.000	0	0	0	0.002	0	0 13:02	135.67
CBMH-202	0.000	2	0	0	0.002	30	0 13:02	119.17
CBMH-203	0.000	2	0	0	0.001	19	0 13:01	111.05
CBMH-204	0.000	2	0	0	0.000	7	0 13:00	105.05
CBMH-205	0.000	2	0	0	0.000	6	0 13:00	66.16
CBMH-206	0.000	1	0	0	0.000	5	0 13:00	48.95
CBMH-207	0.000	1	0	0	0.000	4	0 13:00	25.11
CBMH-303	0.000	1	0	0	0.000	6	0 12:59	10.44
CBMH-314	0.000	2	0	0	0.000	7	0 13:00	31.03
MH-105	0.000	1	0	0	0.001	18	0 13:00	18.45
MH-201	0.000	3	0	0	0.003	40	0 13:02	128.76
MH-301	0.001	7	0	0	0.007	35	0 13:09	611.82
MH-302	0.004	20	0	0	0.010	45	0 13:10	621.37
MH-304	0.001	7	0	0	0.006	33	0 13:12	610.73
MH-305	0.000	4	0	0	0.001	14	0 13:01	97.11
MH-306	0.000	5	0	0	0.000	13	0 13:00	56.52
MH-307	0.001	5	0	0	0.005	27	0 13:13	495.07
MH-308	0.001	4	0	0	0.002	17	0 13:01	194.91
MH-309	0.000	4	0	0	0.001	12	0 12:45	125.11
MH-310	0.001	5	0	0	0.003	23	0 13:13	283.49
MH-311	0.001	4	0	0	0.004	21	0 13:13	258.94
MH-312	0.000	4	0	0	0.002	18	0 13:01	229.84
MH-313	0.000	4	0	0	0.001	12	0 13:00	143.55
MH-401	0.001	7	0	0	0.006	33	0 13:07	637.44
MH-402	0.000	2	0	0	0.000	8	0 12:58	28.11
MH-403	0.000	2	0	0	0.000	7	0 13:00	17.11
POND3	0.366	4	0	0	2.745	30	0 13:08	555.62

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Outfall Loading Summary
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Outfall Node	Flow Freq Pcnt	Avg Flow LPS	Max Flow LPS	Total Volume 10^6 ltr
EX-MH139	86.51	14.58	130.12	1.079
EX-MH159	93.72	14.13	135.67	1.131
EX-MH160	93.88	127.90	555.47	10.341
OF1	33.47	0.31	5.28	0.010
OF2	0.00	0.00	0.00	0.000
OF3	0.00	0.00	0.00	0.000
OF4	0.00	0.00	0.00	0.000
OF5	8.76	0.29	1.29	0.003
System	39.54	157.21	1.29	12.564

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Link Flow Summary
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Link	Type	Maximum |Flow| LPS	Time of Max Occurrence days	hr:min	Maximum |Veloc| m/sec	Max/ Full Flow	Max/ Full Depth
101-PND1	CONDUIT	111.54	0	13:00	0.67	0.18	1.00
102-101	CONDUIT	83.48	0	13:00	0.81	0.14	1.00
103-102	CONDUIT	72.86	0	13:00	0.98	0.16	1.00
104-103	CONDUIT	54.98	0	13:00	0.79	0.12	1.00
105-104	CONDUIT	18.45	0	12:32	1.03	0.11	1.00
201-PND2	CONDUIT	128.76	0	13:01	0.82	0.09	1.00
202-201	CONDUIT	119.17	0	13:01	1.06	0.12	1.00
204-203	CONDUIT	111.05	0	12:26	1.07	0.14	0.83
205-204	CONDUIT	105.05	0	13:00	1.08	0.23	0.44
206-205	CONDUIT	66.16	0	13:00	0.98	0.20	0.29
207-206	CONDUIT	48.95	0	13:00	1.03	0.16	0.27
208-207	CONDUIT	25.11	0	13:00	0.87	0.12	0.24
3001-501	CONDUIT	555.56	0	13:08	1.20	0.46	0.53
301-PND3	CONDUIT	611.82	0	12:25	1.17	0.25	0.78
302-301	CONDUIT	621.37	0	12:26	0.91	0.26	0.74
303-302	CONDUIT	10.44	0	13:00	0.64	0.18	0.30
304-302	CONDUIT	610.73	0	12:27	0.81	0.25	0.68
305-304	CONDUIT	97.11	0	12:48	0.77	0.21	0.42
306-305	CONDUIT	56.52	0	13:00	0.72	0.30	0.32
307-304	CONDUIT	495.07	0	12:27	0.74	0.21	0.63
308-307	CONDUIT	194.91	0	12:37	0.86	0.23	0.48
309-308	CONDUIT	125.11	0	12:56	0.86	0.22	0.32
310-307	CONDUIT	283.49	0	12:28	0.80	0.24	0.56
311-310	CONDUIT	258.94	0	12:29	0.81	0.21	0.50
312-311	CONDUIT	229.84	0	12:57	0.75	0.18	0.42
313-312	CONDUIT	143.55	0	13:00	0.88	0.17	0.28
314-313	CONDUIT	31.03	0	13:00	0.88	0.10	0.22
401-PND3	CONDUIT	637.44	0	12:59	1.17	0.27	0.66
402-401	CONDUIT	28.11	0	13:00	0.61	0.12	0.23
403-402	CONDUIT	17.11	0	13:00	0.62	0.13	0.23
501-160	CONDUIT	555.47	0	13:09	1.35	0.44	0.48
CAP-401	CONDUIT	610.36	0	12:59	0.91	0.29	0.64
PND1_OVR	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
PND2_OVR	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
PND3_OVR	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
OR1	ORIFICE	130.12	0	13:00			1.00
OR2	ORIFICE	135.67	0	13:02			1.00
OR3	ORIFICE	555.62	0	13:08			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
101-PND1	1.00	0.13	0.00	0.00	0.09	0.00	0.00	0.77	0.02	0.00
102-101	1.00	0.13	0.00	0.00	0.86	0.00	0.00	0.01	0.27	0.00

103-102	1.00	0.13	0.00	0.00	0.06	0.00	0.00	0.81	0.00	0.00
104-103	1.00	0.13	0.00	0.00	0.86	0.00	0.00	0.01	0.04	0.00
105-104	1.00	0.13	0.00	0.00	0.04	0.00	0.00	0.83	0.01	0.00
201-PND2	1.00	0.05	0.00	0.00	0.09	0.07	0.00	0.78	0.03	0.00
202-201	1.00	0.05	0.00	0.00	0.06	0.00	0.00	0.89	0.00	0.00
204-203	1.00	0.05	0.00	0.00	0.05	0.00	0.00	0.90	0.02	0.00
205-204	1.00	0.04	0.00	0.00	0.02	0.00	0.00	0.94	0.02	0.00
206-205	1.00	0.04	0.00	0.00	0.00	0.00	0.00	0.96	0.00	0.00
207-206	1.00	0.04	0.00	0.00	0.00	0.00	0.00	0.96	0.00	0.00
208-207	1.00	0.04	0.00	0.00	0.00	0.00	0.00	0.96	0.00	0.00
3001-501	1.00	0.06	0.00	0.00	0.94	0.00	0.00	0.01	0.67	0.00
301-PND3	1.00	0.09	0.00	0.00	0.28	0.00	0.00	0.63	0.00	0.00
302-301	1.00	0.08	0.00	0.00	0.91	0.00	0.00	0.00	0.05	0.00
303-302	1.00	0.13	0.00	0.00	0.04	0.00	0.00	0.83	0.03	0.00
304-302	1.00	0.05	0.00	0.00	0.91	0.00	0.00	0.04	0.00	0.00
305-304	1.00	0.13	0.00	0.00	0.09	0.00	0.00	0.77	0.01	0.00
306-305	1.00	0.14	0.00	0.00	0.00	0.00	0.00	0.86	0.00	0.00
307-304	1.00	0.04	0.00	0.00	0.93	0.00	0.00	0.02	0.58	0.00
308-307	1.00	0.04	0.00	0.00	0.14	0.00	0.00	0.82	0.02	0.00
309-308	1.00	0.04	0.00	0.00	0.10	0.00	0.00	0.86	0.04	0.00
310-307	1.00	0.05	0.00	0.00	0.46	0.00	0.00	0.50	0.01	0.00
311-310	1.00	0.04	0.00	0.00	0.93	0.00	0.00	0.02	0.76	0.00
312-311	1.00	0.04	0.00	0.00	0.94	0.00	0.00	0.02	0.02	0.00
313-312	1.00	0.04	0.00	0.00	0.10	0.00	0.00	0.86	0.04	0.00
314-313	1.00	0.13	0.00	0.00	0.00	0.00	0.00	0.87	0.00	0.00
401-PND3	1.00	0.06	0.00	0.00	0.18	0.00	0.00	0.76	0.00	0.00
402-401	1.00	0.13	0.00	0.00	0.04	0.00	0.00	0.82	0.03	0.00
403-402	1.00	0.13	0.00	0.00	0.00	0.00	0.00	0.87	0.00	0.00
501-160	1.00	0.06	0.00	0.00	0.00	0.00	0.00	0.94	0.00	0.00
CAP-401	1.00	0.06	0.00	0.00	0.94	0.00	0.00	0.00	0.00	0.00
PND1_OVR	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PND2_OVR	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PND3_OVR	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

****
Conduit Surcharge Summary
****

	Hours	Hours

	--------- Hours Full --------			Above Full	Capacity
Conduit	Both Ends	Upstream	Dnstream	Normal Flow	Limited
101-PND1	0.92	0.92	1.04	0.01	0.01
102-101	0.82	0.82	0.91	0.01	0.01
103-102	0.75	0.75	0.81	0.01	0.01
104-103	0.65	0.65	0.74	0.01	0.01
105-104	0.24	0.24	0.59	0.01	0.01
201-PND2	0.75	0.75	0.96	0.01	0.01
202-201	0.13	0.13	0.63	0.01	0.01
204-203	0.01	0.01	0.07	0.01	0.01

Analysis begun on: Thu Aug 5 09:48:21 2021
Analysis ended on: Thu Aug 5 09:48:25 2021
Total elapsed time: 00:00:04

SCS 24hr - 100-year Storm PCSWMM Model Results

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

****
Element Count
****
Number of rain gages 1
Number of subcatchments ... 44
Number of nodes 43
Number of links 38
Number of pollutants 0
Number of land uses 0

****
Raingage Summary
****

Name	Data Source	Data Type	Recording Interval
Raingage1	SCS24hr-100yr	INTENSITY	60 min.

****
Subcatchment Summary
****

Name	Area	Width	%Imperv	%Slope	Rain Gage	Outlet
A-01	0.24	54.88	100.00	1.5000	Raingage1	MH-105
A-02	0.52	200.00	90.00	1.5000	Raingage1	CBMH-104
A-03	0.26	106.58	94.00	1.5000	Raingage1	CBMH-103
A-04	0.16	138.79	91.00	1.5000	Raingage1	CBMH-102
A-05	0.42	173.25	86.00	1.5000	Raingage1	CBMH-101
A-06	0.31	35.89	80.00	1.5000	Raingage1	CBMH100
B-01	0.29	109.29	90.00	1.5000	Raingage1	CBMH-207
B-02	0.28	113.17	91.00	1.5000	Raingage1	CBMH-206
B-03	0.05	23.47	100.00	1.5000	Raingage1	CBMH-207
B-04	0.17	153.10	94.00	1.5000	Raingage1	CBMH-205
B-05	0.05	23.47	100.00	1.5000	Raingage1	CBMH-206
B-06	0.06	26.98	100.00	1.5000	Raingage1	CBMH-205
B-07	0.61	249.79	71.00	1.5000	Raingage1	CBMH-204
B-08	0.30	82.04	64.00	1.5000	Raingage1	CBMH-203
B-09	0.22	34.79	79.00	1.5000	Raingage1	CBMH-202
B-10	0.23	39.01	63.00	1.5000	Raingage1	MH-201
C-01	0.65	101.56	51.00	1.5000	Raingage1	CBMH-314
C-02	0.78	239.45	94.00	1.5000	Raingage1	MH-313
C-03	0.72	139.46	100.00	1.5000	Raingage1	MH-313
C-04	0.83	254.43	81.00	1.5000	Raingage1	MH-312
C-05	0.50	96.33	100.00	1.5000	Raingage1	MH-312
C-06	0.54	164.53	83.00	1.5000	Raingage1	MH-311
C-07	0.38	115.29	89.00	1.5000	Raingage1	MH-310
C-08	0.90	276.76	93.00	1.5000	Raingage1	MH-309
C-09	0.76	147.28	100.00	1.5000	Raingage1	MH-309
C-10	0.46	88.87	100.00	1.5000	Raingage1	MH-308
C-11	0.51	154.43	96.00	1.5000	Raingage1	MH-308
C-12	0.32	97.83	84.00	1.5000	Raingage1	MH-307
C-13	0.78	214.64	91.00	1.5000	Raingage1	MH-306
C-14	0.53	146.69	100.00	1.5000	Raingage1	MH-305
C-15	0.39	112.79	80.00	1.5000	Raingage1	MH-304
C-16	0.24	46.12	44.00	1.0000	Raingage1	CBMH-303
C-17	0.21	42.86	44.00	1.0000	Raingage1	MH-302
C-18	0.24	45.66	41.00	1.0000	Raingage1	MH-401
C-19	0.13	26.08	100.00	1.0000	Raingage1	MH-402
C-20	0.41	82.40	43.00	1.0000	Raingage1	MH-403
D-01a	0.01	17.02	20.00	2.0000	Raingage1	OF5
D-01b	0.02	40.00	5.00	2.0000	Raingage1	OF5
D-02a	0.09	254.29	5.00	1.5000	Raingage1	OF1
D-02b	0.04	286.67	5.00	1.5000	Raingage1	OF1
FUT-1	8.45	296.25	93.00	1.5000	Raingage1	CAP
PND1	0.20	42.73	5.00	1.5000	Raingage1	CBMH100
PND2	0.36	137.16	5.00	1.5000	Raingage1	CBMH200
PND3	1.09	226.09	5.00	1.5000	Raingage1	POND3

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Node Summary
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Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow

CAP	JUNCTION	87.02	2.80	0.0
HW-3001	JUNCTION	87.00	2.60	0.0
MH-501	JUNCTION	86.82	2.97	0.0
EX-MH139	OUTFALL	87.17	0.00	0.0
EX-MH159	OUTFALL	86.01	0.00	0.0
EX-MH160	OUTFALL	86.12	1.69	0.0
OF1	OUTFALL	90.65	0.00	0.0
OF2	OUTFALL	89.60	2.00	0.0
OF3	OUTFALL	89.50	1.25	0.0
OF4	OUTFALL	0.00	90.40	0.0
OF5	OUTFALL	89.70	0.00	0.0
CBMH100	STORAGE	87.80	3.00	0.0
CBMH-101	STORAGE	87.99	2.96	0.0
CBMH-102	STORAGE	88.11	2.89	0.0
CBMH-103	STORAGE	88.27	2.78	0.0
CBMH-104	STORAGE	88.39	2.71	0.0
CBMH200	STORAGE	86.76	3.04	0.0
CBMH-202	STORAGE	87.25	2.90	0.0
CBMH-203	STORAGE	87.58	2.82	0.0
CBMH-204	STORAGE	87.98	3.07	0.0
CBMH-205	STORAGE	88.16	2.94	0.0
CBMH-206	STORAGE	88.36	2.79	0.0
CBMH-207	STORAGE	88.65	2.50	0.0
CBMH-303	STORAGE	88.29	1.42	0.0
CBMH-314	STORAGE	88.71	1.69	0.0
MH-105	STORAGE	89.04	2.70	0.0
MH-201	STORAGE	86.97	2.88	0.0
MH-301	STORAGE	87.23	2.68	0.0
MH-302	STORAGE	86.85	2.91	0.0
MH-304	STORAGE	87.36	2.47	0.0
MH-305	STORAGE	87.88	2.20	0.0
MH-306	STORAGE	88.18	2.12	0.0
MH-307	STORAGE	87.43	2.73	0.0
MH-308	STORAGE	87.73	2.61	0.0
MH-309	STORAGE	88.02	2.36	0.0
MH-310	STORAGE	87.53	2.82	0.0
MH-311	STORAGE	87.61	2.68	0.0
MH-312	STORAGE	87.74	2.63	0.0
MH-313	STORAGE	88.02	2.36	0.0
MH-401	STORAGE	87.38	2.40	0.0
MH-402	STORAGE	88.18	1.96	0.0
MH-403	STORAGE	88.50	1.81	0.0
POND3	STORAGE	87.00	2.60	0.0

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Link Summary
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Name	From Node	To Node	Type	Length	%Slope	Roughness
101-PND1	CBMH-101	CBMH100	CONDUIT	37.5	0.3200	0.0130
102-101	CBMH-102	CBMH-101	CONDUIT	35.9	0.3065	0.0130
103-102	CBMH-103	CBMH-102	CONDUIT	23.9	0.2935	0.0130
104-103	CBMH-104	CBMH-103	CONDUIT	39.3	0.2800	0.0130
105-104	MH-105	CBMH-104	CONDUIT	29.4	0.9864	0.0130
201-PND2	MH-201	CBMH200	CONDUIT	14.1	1.0639	0.0130
202-201	CBMH-202	MH-201	CONDUIT	44.5	0.5169	0.0130
204-203	CBMH-203	CBMH-202	CONDUIT	103.2	0.2908	0.0130
205-204	CBMH-204	CBMH-203	CONDUIT	76.3	0.3015	0.0130
206-205	CBMH-205	CBMH-204	CONDUIT	35.9	0.3010	0.0130
207-206	CBMH-206	CBMH-205	CONDUIT	23.9	0.5030	0.0130
208-207	CBMH-207	CBMH-206	CONDUIT	39.0	0.5126	0.0130
3001-501	HW-3001	MH-501	CONDUIT	85.5	0.1988	0.0130
301-PND3	MH-301	POND3	CONDUIT	28.2	0.1066	0.0130
302-301	MH-302	MH-301	CONDUIT	59.9	0.1002	0.0130
303-302	CBMH-303	MH-302	CONDUIT	68.9	0.3483	0.0130
304-302	MH-304	MH-302	CONDUIT	46.9	0.1066	0.0130
305-304	MH-305	MH-304	CONDUIT	96.8	0.1033	0.0130
306-305	MH-306	MH-305	CONDUIT	113.9	0.0966	0.0130
307-304	MH-307	MH-304	CONDUIT	60.4	0.0994	0.0130
308-307	MH-308	MH-307	CONDUIT	120.0	0.1000	0.0130
309-308	MH-309	MH-308	CONDUIT	127.0	0.1024	0.0130
310-307	MH-310	MH-307	CONDUIT	73.5	0.0952	0.0130
311-310	MH-311	MH-310	CONDUIT	70.9	0.0988	0.0130
312-311	MH-312	MH-311	CONDUIT	116.0	0.1034	0.0130
313-312	MH-313	MH-312	CONDUIT	120.0	0.1000	0.0130
314-313	CBMH-314	MH-313	CONDUIT	16.6	0.4819	0.0130
401-PND3	MH-401	POND3	CONDUIT	31.1	0.0965	0.0130
402-401	MH-402	MH-401	CONDUIT	115.0	0.1478	0.0130
403-402	MH-403	MH-402	CONDUIT	83.7	0.2031	0.0130
501-160	MH-501	EX-MH160	CONDUIT	27.8	0.2156	0.0130
CAP-401	CAP	MH-401	CONDUIT	12.9	0.0775	0.0130

PND1_OVR	CBMH100	OF2	CONDUIT	42.4	0.3539	0.0150
PND2_OVR	CBMH200	OF3	CONDUIT	7.0	0.7143	0.0150
PND3_OVR	CBMH-303	OF4	CONDUIT	7.0	0.7143	0.0130
OR1	CBMH100	EX-MH139	ORIFICE			
OR2	CBMH200	EX-MH159	ORIFICE			
OR3	POND3	HW-3001	ORIFICE			

****
Cross Section Summary
****

Conduit	Shape	Full Depth	Full Area	Hyd. Rad.	Max. Width	No. of Barrels	Full Flow
101-PND1	CIRCULAR	0.75	0.44	0.19	0.75	1	629.80
102-101	CIRCULAR	0.75	0.44	0.19	0.75	1	616.38
103-102	CIRCULAR	0.68	0.36	0.17	0.68	1	455.39
104-103	CIRCULAR	0.68	0.36	0.17	0.68	1	444.85
105-104	CIRCULAR	0.38	0.11	0.09	0.38	1	174.15
201-PND2	CIRCULAR	0.82	0.53	0.21	0.82	1	1480.67
202-201	CIRCULAR	0.82	0.53	0.21	0.82	1	1032.04
204-203	CIRCULAR	0.82	0.53	0.21	0.82	1	774.10
205-204	CIRCULAR	0.68	0.36	0.17	0.68	1	461.60
206-205	CIRCULAR	0.60	0.28	0.15	0.60	1	336.86
207-206	CIRCULAR	0.53	0.22	0.13	0.53	1	305.04
208-207	CIRCULAR	0.45	0.16	0.11	0.45	1	204.14
3001-501	CIRCULAR	1.05	0.87	0.26	1.05	1	1217.65
301-PND3	HORIZ_ELLIPSE	1.22	1.89	0.37	1.93	1	2454.60
302-301	HORIZ_ELLIPSE	1.22	1.89	0.37	1.93	1	2380.17
303-302	CIRCULAR	0.30	0.07	0.07	0.30	1	57.08
304-302	HORIZ_ELLIPSE	1.22	1.89	0.37	1.93	1	2454.89
305-304	CIRCULAR	0.82	0.53	0.21	0.82	1	461.38
306-305	CIRCULAR	0.60	0.28	0.15	0.60	1	190.84
307-304	HORIZ_ELLIPSE	1.22	1.89	0.37	1.93	1	2370.77
308-307	CIRCULAR	1.05	0.87	0.26	1.05	1	863.58
309-308	CIRCULAR	0.90	0.64	0.23	0.90	1	579.23
310-307	CIRCULAR	1.20	1.13	0.30	1.20	1	1202.94
311-310	CIRCULAR	1.20	1.13	0.30	1.20	1	1225.48
312-311	CIRCULAR	1.20	1.13	0.30	1.20	1	1254.04
313-312	CIRCULAR	1.05	0.87	0.26	1.05	1	863.73
314-313	CIRCULAR	0.53	0.22	0.13	0.53	1	298.57
401-PND3	HORIZ_ELLIPSE	1.22	1.89	0.37	1.93	1	2335.49
402-401	CIRCULAR	0.60	0.28	0.15	0.60	1	236.09
403-402	CIRCULAR	0.45	0.16	0.11	0.45	1	128.50
501-160	CIRCULAR	1.05	0.87	0.26	1.05	1	1268.08
CAP-401	HORIZ_ELLIPSE	1.22	1.89	0.37	1.93	1	2093.65
PND1_OVR	RECT_OPEN	1.00	3.00	0.75	3.00	1	9822.22
PND2_OVR	RECT_OPEN	1.00	3.00	0.75	3.00	1	13954.21
PND3_OVR	RECT_OPEN	1.00	5.50	0.85	5.50	1	31990.42

****
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 ..... LPS
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 03/18/2020 00:00:00
Ending Date 03/19/2020 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
Routing Time Step ..... 2.00 sec
Variable Time Step ..... YES
Maximum Trials 8

Number of Threads 4
Head Tolerance ..... 0.001500 m

****
Control Actions Taken
****

**********	Volume	Depth
Runoff Quantity Continuity	hectare-m	mm
Total Precipitation	2.610	105.660
Evaporation Loss	0.000	0.000
Infiltration Loss	0.369	14.956
Surface Runoff	2.210	89.481
Final Storage	0.035	1.407
Continuity Error (%)	-0.174	

**********	Volume	Volume
Flow Routing Continuity	hectare-m	10^6 ltr
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	2.209	22.091
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	0.006	0.065
External Outflow	2.204	22.040
Flooding Loss	0.000	0.000
Evaporation Loss	0.000	0.000
Exfiltration Loss	0.000	0.000
Initial Stored Volume	0.000	0.003
Final Stored Volume	0.015	0.147
Continuity Error (%)	-0.120	

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

****
Highest Flow Instability Indexes
****
Link OR1 (13)
Link OR2 (11)
Link OR3 (1)

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

Minimum Time Step	:	0.50 sec
Average Time Step	:	1.99 sec
Maximum Time Step	:	2.00 sec
Percent in Steady State	:	-0.00
Average Iterations per Step	:	2.00
Percent Not Converging	:	0.00

****
Subcatchment Runoff Summary
****

Subcatchment	Total Precip mm	Total Runon mm	Total Evap mm	Total Infil mm	Imperv Runoff mm	Perv Runoff mm	Total Runoff mm	Total Runoff 10^6 ltr	Peak Runoff LPS	Runoff Coeff
A-01	105.66	0.00	0.00	0.00	104.02	0.00	104.02	0.25	30.71	0.985
A-02	105.66	0.00	0.00	7.86	93.69	2.74	96.43	0.51	64.65	0.913
A-03	105.66	0.00	0.00	4.73	97.86	1.63	99.49	0.26	32.30	0.942
A-04	105.66	0.00	0.00	7.09	94.72	2.45	97.17	0.16		

A-05	105.66	0.00	0.00	11.08	89.53	3.75	93.28	0.39
51.26	0.883							
A-06	105.66	0.00	0.00	16.09	83.13	5.07	88.20	0.28
37.48	0.835							
B-01	105.66	0.00	0.00	7.91	93.69	2.69	96.38	0.28
36.23	0.912							
B-02	105.66	0.00	0.00	7.11	94.74	2.43	97.16	0.27
33.99	0.920							
B-03	105.66	0.00	0.00	0.00	105.68	0.00	105.68	0.05
6.35	1.000							
B-04	105.66	0.00	0.00	4.72	97.85	1.64	99.49	0.17
21.57	0.942							
B-05	105.66	0.00	0.00	0.00	105.68	0.00	105.68	0.05
6.35	1.000							
B-06	105.66	0.00	0.00	0.00	105.68	0.00	105.68	0.06
7.36	1.000							
B-07	105.66	0.00	0.00	23.08	73.91	7.62	81.53	0.49
70.53	0.772							
B-08	105.66	0.00	0.00	28.84	66.63	9.25	75.88	0.23
33.72	0.718							
B-09	105.66	0.00	0.00	16.82	82.16	5.40	87.56	0.19
25.61	0.829							
B-10	105.66	0.00	0.00	29.88	65.55	9.25	74.81	0.17
25.80	0.708							
C-01	105.66	0.00	0.00	39.93	53.08	11.89	64.96	0.42
69.58	0.615							
C-02	105.66	0.00	0.00	4.74	97.84	1.62	99.46	0.78
97.65	0.941							
C-03	105.66	0.00	0.00	0.00	105.56	0.00	105.56	0.76
91.51	0.999							
C-04	105.66	0.00	0.00	15.10	84.32	5.01	89.33	0.74
99.77	0.845							
C-05	105.66	0.00	0.00	0.00	105.56	0.00	105.56	0.53
63.20	0.999							
C-06	105.66	0.00	0.00	13.50	86.40	4.50	90.89	0.49
64.91	0.860							
C-07	105.66	0.00	0.00	8.71	92.64	2.94	95.58	0.36
46.32	0.905							
C-08	105.66	0.00	0.00	5.53	96.80	1.89	98.68	0.89
112.53	0.934							
C-09	105.66	0.00	0.00	0.00	105.56	0.00	105.56	0.80
96.08	0.999							
C-10	105.66	0.00	0.00	0.00	105.56	0.00	105.56	0.48
57.75	0.999							

C-11	105.66	0.00	0.00	3.15	99.91	1.09	101.00	0.51
63.35	0.956							
C-12	105.66	0.00	0.00	12.70	87.44	4.24	91.68	0.29
38.12	0.868							
C-13	105.66	0.00	0.00	7.12	94.70	2.41	97.12	0.75
96.04	0.919							
C-14	105.66	0.00	0.00	0.00	104.06	0.00	104.06	0.55
67.39	0.985							
C-15	105.66	0.00	0.00	15.91	83.27	5.26	88.53	0.34
46.38	0.838							
C-16	105.66	0.00	0.00	45.79	45.80	13.42	59.22	0.14
24.54	0.561							
C-17	105.66	0.00	0.00	45.72	45.80	13.50	59.30	0.12
21.72	0.561							
C-18	105.66	0.00	0.00	48.37	42.68	14.02	56.70	0.14
24.49	0.537							
C-19	105.66	0.00	0.00	0.00	103.94	0.00	103.94	0.14
16.88	0.984							
C-20	105.66	0.00	0.00	46.59	44.76	13.68	58.44	0.24
42.34	0.553							
D-01a	105.66	0.00	0.00	63.32	20.82	21.43	42.25	0.00
0.78	0.400							
D-01b	105.66	0.00	0.00	75.39	5.24	25.20	30.44	0.01
2.21	0.288							
D-02a	105.66	0.00	0.00	75.20	5.21	25.43	30.64	0.03
8.18	0.290							
D-02b	105.66	0.00	0.00	74.92	5.21	25.79	31.00	0.01
3.95	0.293							
FUT-1	105.66	0.00	0.00	5.65	96.46	1.76	98.22	8.30
1049.55	0.930							
PND1	105.66	0.00	0.00	78.24	5.20	22.20	27.41	0.05
16.48	0.259							
PND2	105.66	0.00	0.00	76.95	5.21	23.53	28.73	0.10
32.08	0.272							
PND3	105.66	0.00	0.00	78.38	5.20	22.07	27.27	0.30
90.52	0.258							

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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
CAP	JUNCTION	0.67	1.83	88.85	0 13:15	1.83
HW-3001	JUNCTION	0.29	0.64	87.64	0 13:15	0.64
MH-501	JUNCTION	0.42	0.72	87.54	0 13:15	0.72
EX-MH139	OUTFALL	0.67	0.67	87.84	0 00:00	0.67
EX-MH159	OUTFALL	1.05	1.05	87.06	0 00:00	1.05
EX-MH160	OUTFALL	1.06	1.13	87.25	0 13:15	1.13
OF1	OUTFALL	0.00	0.00	90.65	0 00:00	0.00
OF2	OUTFALL	0.00	0.00	89.60	0 00:00	0.00
OF3	OUTFALL	0.00	0.00	89.50	0 00:00	0.00
OF4	OUTFALL	0.00	0.00	0.00	0 00:00	0.00
OF5	OUTFALL	0.00	0.00	89.70	0 00:00	0.00
CBMH100	STORAGE	0.27	2.26	90.06	0 13:03	2.26
CBMH-101	STORAGE	0.22	2.08	90.07	0 13:00	2.08
CBMH-102	STORAGE	0.20	1.97	90.08	0 13:00	1.96
CBMH-103	STORAGE	0.18	1.81	90.08	0 13:00	1.81
CBMH-104	STORAGE	0.16	1.69	90.08	0 13:00	1.69
CBMH200	STORAGE	0.47	2.43	89.19	0 13:03	2.43
CBMH-202	STORAGE	0.19	1.97	89.22	0 13:01	1.97
CBMH-203	STORAGE	0.16	1.66	89.24	0 13:00	1.66
CBMH-204	STORAGE	0.13	1.30	89.28	0 13:00	1.30
CBMH-205	STORAGE	0.11	1.13	89.29	0 13:00	1.13
CBMH-206	STORAGE	0.08	0.94	89.30	0 13:00	0.94
CBMH-207	STORAGE	0.06	0.66	89.31	0 13:00	0.66
CBMH-303	STORAGE	0.06	0.57	88.86	0 13:11	0.57
CBMH-314	STORAGE	0.04	0.19	88.90	0 13:00	0.19
MH-105	STORAGE	0.09	1.05	90.09	0 13:00	1.05
MH-201	STORAGE	0.26	2.23	89.20	0 13:01	2.23
MH-301	STORAGE	0.36	1.62	88.85	0 13:13	1.62
MH-302	STORAGE	0.76	2.00	88.85	0 13:11	2.00
MH-304	STORAGE	0.32	1.50	88.86	0 13:11	1.50
MH-305	STORAGE	0.18	0.98	88.86	0 13:12	0.98
MH-306	STORAGE	0.16	0.69	88.87	0 13:00	0.68
MH-307	STORAGE	0.29	1.43	88.86	0 13:11	1.43
MH-308	STORAGE	0.23	1.13	88.86	0 13:11	1.13
MH-309	STORAGE	0.16	0.85	88.87	0 13:00	0.85
MH-310	STORAGE	0.27	1.34	88.87	0 13:10	1.34
MH-311	STORAGE	0.25	1.26	88.87	0 13:10	1.26
MH-312	STORAGE	0.22	1.14	88.88	0 13:10	1.14
MH-313	STORAGE	0.16	0.86	88.88	0 13:10	0.86
MH-401	STORAGE	0.32	1.47	88.85	0 13:15	1.47
MH-402	STORAGE	0.10	0.67	88.85	0 13:13	0.67
MH-403	STORAGE	0.05	0.35	88.85	0 13:12	0.35
POND3	STORAGE	0.53	1.85	88.85	0 13:14	1.85

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Node Inflow Summary
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Node	Type	Maximum Lateral Inflow LPS	Maximum Total Inflow LPS	Time of Max Occurrence days hr:min	Lateral Inflow Volume 10^6 ltr	Total Inflow Volume 10^6 ltr	Flow Balance Error Percent	
CAP	JUNCTION	1049.55	1049.55	0 13:00	8.3	8.3	0.003	
HW-3001	JUNCTION	0.00	757.96	0 13:14	0	18.1	0.041	
MH-501	JUNCTION	0.00	757.93	0 13:15	0	18.1	0.073	
EX-MH139	OUTFALL	0.00	150.66	0 13:03	0	1.89	0.000	
EX-MH159	OUTFALL	0.00	178.51	0 13:03	0	2.07	0.000	
EX-MH160	OUTFALL	0.00	757.90	0 13:15	0	18.1	0.000	
OF1	OUTFALL	12.14	12.14	0 13:00	0.0406	0.0406	0.000	
OF2	OUTFALL	0.00	0.00	0 00:00	0	0	0.000	ltr
OF3	OUTFALL	0.00	0.00	0 00:00	0	0	0.000	ltr
OF4	OUTFALL	0.00	0.00	0 00:00	0	0	0.000	ltr
OF5	OUTFALL	2.99	2.99	0 13:00	0.0107	0.0107	0.000	
CBMH100	STORAGE	53.96	247.23	0 13:00	0.331	1.89	0.002	
CBMH-101	STORAGE	51.26	194.83	0 13:00	0.393	1.56	0.032	
CBMH-102	STORAGE	19.90	144.84	0 13:00	0.156	1.17	-0.063	
CBMH-103	STORAGE	32.30	126.20	0 13:00	0.258	1.01	0.073	
CBMH-104	STORAGE	64.65	94.95	0 13:00	0.505	0.756	-0.035	
CBMH200	STORAGE	32.08	286.87	0 13:00	0.103	2.07	0.042	
CBMH-202	STORAGE	25.61	233.68	0 13:00	0.188	1.79	-0.246	
CBMH-203	STORAGE	33.72	211.64	0 13:00	0.225	1.6	0.130	
CBMH-204	STORAGE	70.53	179.94	0 13:00	0.495	1.38	0.254	
CBMH-205	STORAGE	28.93	112.10	0 12:20	0.233	0.889	0.114	
CBMH-206	STORAGE	40.34	82.80	0 12:25	0.32	0.655	0.015	
CBMH-207	STORAGE	42.58	42.58	0 13:00	0.336	0.336	0.169	

CBMH-303	STORAGE	24.54	24.54	0	13:00	0.141	0.141	0.601
CBMH-314	STORAGE	69.58	69.58	0	13:00	0.423	0.423	0.114
MH-105	STORAGE	30.71	30.71	0	13:00	0.252	0.252	0.118
MH-201	STORAGE	25.80	256.29	0	13:00	0.171	1.97	0.031
MH-301	STORAGE	0.00	1036.32	0	12:21	0	8.95	0.002
MH-302	STORAGE	21.72	1056.51	0	12:21	0.124	8.96	0.010
MH-304	STORAGE	46.38	1040.40	0	12:22	0.343	8.69	-0.043
MH-305	STORAGE	67.39	164.36	0	12:37	0.552	1.3	0.376
MH-306	STORAGE	96.04	96.04	0	13:00	0.754	0.754	1.001
MH-307	STORAGE	38.12	852.41	0	12:22	0.289	7.04	-0.245
MH-308	STORAGE	121.10	329.70	0	12:28	0.99	2.67	0.258
MH-309	STORAGE	208.61	208.61	0	13:00	1.69	1.69	0.703
MH-310	STORAGE	46.32	496.75	0	12:22	0.36	4.08	-0.105
MH-311	STORAGE	64.91	461.81	0	12:25	0.489	3.72	-0.168
MH-312	STORAGE	162.98	408.81	0	12:31	1.27	3.22	-0.225
MH-313	STORAGE	189.15	258.40	0	12:59	1.54	1.96	0.475
MH-401	STORAGE	24.49	1117.90	0	13:00	0.137	8.81	0.095
MH-402	STORAGE	16.88	58.39	0	12:46	0.138	0.377	0.681
MH-403	STORAGE	42.34	42.34	0	13:00	0.241	0.241	0.892
POND3	STORAGE	90.52	2150.45	0	13:00	0.298	18.1	-0.066

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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
CAP	JUNCTION	1.65	0.232	0.969

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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 LPS
CBMH100	0.010	1	0	0	0.260	26	0 13:03	150.66
CBMH-101	0.000	7	0	0	0.004	70	0 13:00	193.27
CBMH-102	0.000	7	0	0	0.004	68	0 13:00	143.78
CBMH-103	0.000	6	0	0	0.003	65	0 13:00	124.94
CBMH-104	0.000	6	0	0	0.002	63	0 13:00	93.90
CBMH200	0.007	1	0	0	0.222	25	0 13:03	178.51
CBMH-202	0.000	6	0	0	0.004	68	0 13:01	230.58
CBMH-203	0.000	6	0	0	0.003	59	0 13:00	208.09
CBMH-204	0.000	4	0	0	0.002	42	0 13:00	177.92
CBMH-205	0.000	4	0	0	0.001	38	0 13:00	111.02
CBMH-206	0.000	3	0	0	0.001	34	0 13:00	83.18
CBMH-207	0.000	2	0	0	0.001	26	0 13:00	42.50
CBMH-303	0.000	5	0	0	0.001	40	0 13:11	22.74
CBMH-314	0.000	2	0	0	0.000	11	0 13:00	69.24
MH-105	0.000	3	0	0	0.001	39	0 13:00	31.03
MH-201	0.001	9	0	0	0.006	77	0 13:01	254.79
MH-301	0.003	13	0	0	0.012	60	0 13:13	1008.49
MH-302	0.006	26	0	0	0.015	69	0 13:11	1036.32
MH-304	0.002	13	0	0	0.011	61	0 13:11	1025.13
MH-305	0.000	8	0	0	0.002	45	0 13:12	163.10
MH-306	0.000	8	0	0	0.001	32	0 13:00	96.97
MH-307	0.002	11	0	0	0.010	52	0 13:11	832.72
MH-308	0.001	9	0	0	0.005	43	0 13:11	326.69
MH-309	0.000	7	0	0	0.002	36	0 13:00	208.63
MH-310	0.001	10	0	0	0.006	47	0 13:10	488.49
MH-311	0.002	9	0	0	0.009	47	0 13:10	450.78
MH-312	0.001	8	0	0	0.005	43	0 13:10	397.57
MH-313	0.000	7	0	0	0.002	37	0 13:10	246.37
MH-401	0.002	13	0	0	0.011	61	0 13:15	1105.60
MH-402	0.000	5	0	0	0.001	34	0 13:13	54.05
MH-403	0.000	3	0	0	0.000	20	0 13:12	41.51

POND3	0.935	10	0	0	5.423	60	0	13:14	757.96	

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Outfall Loading Summary
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Outfall Node	Flow Freq Pcnt	Avg Flow LPS	Max Flow LPS	Total Volume 10^6 ltr
EX-MH139	99.95	22.25	150.66	1.893
EX-MH159	99.29	24.54	178.51	2.072
EX-MH160	99.98	210.82	757.90	18.087
OF1	66.66	0.74	12.14	0.041
OF2	0.00	0.00	0.00	0.000
OF3	0.00	0.00	0.00	0.000
OF4	0.00	0.00	0.00	0.000
OF5	17.23	0.69	2.99	0.011
System	47.89	259.04	2.99	22.104

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Link Flow Summary
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Link	Type	Maximum |Flow| LPS	Time of Max Occurrence days	hr:min	Maximum |Veloc| m/sec	Max/ Full Flow	Max/ Full Depth
101-PND1	CONDUIT	193.27	0	13:00	0.64	0.31	1.00
102-101	CONDUIT	143.78	0	13:00	0.84	0.23	1.00
103-102	CONDUIT	124.94	0	13:00	1.10	0.27	1.00
104-103	CONDUIT	93.90	0	13:00	0.90	0.21	1.00
105-104	CONDUIT	31.03	0	12:16	1.18	0.18	1.00
201-PND2	CONDUIT	254.79	0	13:00	0.48	0.17	1.00
202-201	CONDUIT	230.58	0	13:00	0.85	0.22	1.00
204-203	CONDUIT	208.09	0	13:00	1.16	0.27	1.00
205-204	CONDUIT	177.92	0	13:00	1.24	0.39	1.00
206-205	CONDUIT	111.02	0	12:18	1.14	0.33	1.00
207-206	CONDUIT	83.18	0	12:20	1.20	0.27	1.00
208-207	CONDUIT	42.50	0	12:25	1.01	0.21	1.00
3001-501	CONDUIT	757.93	0	13:15	1.29	0.62	0.64
301-PND3	CONDUIT	1008.49	0	12:20	1.25	0.41	1.00
302-301	CONDUIT	1036.32	0	12:21	1.00	0.44	1.00
303-302	CONDUIT	22.74	0	13:00	0.78	0.40	1.00
304-302	CONDUIT	1025.13	0	12:21	0.92	0.42	1.00
305-304	CONDUIT	163.10	0	12:23	0.88	0.35	1.00
306-305	CONDUIT	96.97	0	12:37	0.86	0.51	1.00
307-304	CONDUIT	832.72	0	12:22	0.79	0.35	1.00
308-307	CONDUIT	326.69	0	12:21	0.95	0.38	1.00
309-308	CONDUIT	208.63	0	12:28	0.95	0.36	0.97
310-307	CONDUIT	488.49	0	12:22	0.89	0.41	1.00
311-310	CONDUIT	450.78	0	12:22	0.93	0.37	1.00
312-311	CONDUIT	397.57	0	12:25	0.86	0.32	0.98
313-312	CONDUIT	246.37	0	12:31	0.97	0.29	0.88
314-313	CONDUIT	69.24	0	12:59	1.10	0.23	0.41
401-PND3	CONDUIT	1105.60	0	13:00	1.30	0.47	1.00
402-401	CONDUIT	54.05	0	12:33	0.73	0.23	1.00
403-402	CONDUIT	41.51	0	12:46	0.80	0.32	0.89
501-160	CONDUIT	757.90	0	13:15	1.48	0.60	0.57
CAP-401	CONDUIT	1047.79	0	12:58	0.99	0.50	1.00
PND1_OVR	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
PND2_OVR	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
PND3_OVR	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
OR1	ORIFICE	150.66	0	13:03			1.00
OR2	ORIFICE	178.51	0	13:03			1.00
OR3	ORIFICE	757.96	0	13:14			1.00

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

101-PND1	1.00	0.08	0.00	0.00	0.25	0.00	0.00	0.67	0.06	0.00
102-101	1.00	0.08	0.00	0.00	0.91	0.00	0.00	0.01	0.56	0.00
103-102	1.00	0.08	0.00	0.00	0.10	0.00	0.00	0.82	0.00	0.00
104-103	1.00	0.08	0.00	0.00	0.91	0.00	0.00	0.01	0.07	0.00
105-104	1.00	0.08	0.00	0.00	0.09	0.00	0.00	0.83	0.00	0.00
201-PND2	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
202-201	1.00	0.00	0.05	0.00	0.41	0.00	0.00	0.54	0.09	0.00
204-203	1.00	0.05	0.00	0.00	0.10	0.00	0.00	0.86	0.01	0.00
205-204	1.00	0.04	0.00	0.00	0.08	0.00	0.00	0.87	0.01	0.00
206-205	1.00	0.04	0.00	0.00	0.08	0.00	0.00	0.88	0.00	0.00
207-206	1.00	0.04	0.00	0.00	0.07	0.00	0.00	0.89	0.00	0.00
208-207	1.00	0.04	0.00	0.00	0.07	0.00	0.00	0.89	0.01	0.00
3001-501	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.18	0.00
301-PND3	1.00	0.07	0.00	0.00	0.54	0.00	0.00	0.39	0.00	0.00
302-301	1.00	0.07	0.00	0.00	0.92	0.00	0.00	0.00	0.00	0.00
303-302	1.00	0.08	0.00	0.00	0.16	0.00	0.00	0.76	0.04	0.00
304-302	1.00	0.04	0.00	0.00	0.92	0.00	0.00	0.03	0.00	0.00
305-304	1.00	0.08	0.00	0.00	0.21	0.00	0.00	0.71	0.01	0.00
306-305	1.00	0.09	0.00	0.00	0.14	0.00	0.00	0.77	0.01	0.00
307-304	1.00	0.04	0.00	0.00	0.94	0.00	0.00	0.02	0.40	0.00
308-307	1.00	0.04	0.00	0.00	0.24	0.00	0.00	0.72	0.02	0.00
309-308	1.00	0.04	0.00	0.00	0.20	0.00	0.00	0.76	0.02	0.00
310-307	1.00	0.05	0.00	0.00	0.78	0.00	0.00	0.17	0.01	0.00
311-310	1.00	0.04	0.00	0.00	0.94	0.00	0.00	0.02	0.65	0.00
312-311	1.00	0.04	0.00	0.00	0.94	0.00	0.00	0.01	0.02	0.00
313-312	1.00	0.04	0.00	0.00	0.20	0.00	0.00	0.76	0.02	0.00
314-313	1.00	0.08	0.00	0.00	0.06	0.00	0.00	0.86	0.02	0.00
401-PND3	1.00	0.05	0.00	0.00	0.29	0.00	0.00	0.66	0.00	0.00
402-401	1.00	0.08	0.00	0.00	0.17	0.00	0.00	0.75	0.03	0.00
403-402	1.00	0.08	0.00	0.00	0.11	0.00	0.00	0.81	0.03	0.00
501-160	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
CAP-401	1.00	0.05	0.00	0.00	0.95	0.00	0.00	0.00	0.00	0.00
PND1_OVR	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PND2_OVR	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PND3_OVR	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

****
Conduit Surcharge Summary
****

Conduit	Hours Full: Both Ends	Hours Full: Upstream	Hours Full: Dnstream	Hours Above Full Normal Flow	Hours Capacity Limited
101-PND1	2.05	2.05	2.11	0.01	0.01
102-101	2.00	2.00	2.04	0.01	0.01
103-102	1.96	1.96	1.99	0.01	0.01
104-103	1.93	1.93	1.96	0.01	0.01
105-104	1.81	1.81	1.91	0.01	0.01
201-PND2	2.04	2.04	2.14	0.01	0.01
202-201	1.86	1.86	2.01	0.01	0.01
204-203	1.61	1.61	1.84	0.01	0.01
205-204	1.45	1.45	1.60	0.01	0.01
206-205	1.39	1.39	1.45	0.01	0.01
207-206	1.25	1.25	1.38	0.01	0.01
208-207	0.72	0.72	1.23	0.01	0.01
301-PND3	2.33	2.33	2.43	0.01	0.01
302-301	2.06	2.06	2.29	0.01	0.01
303-302	1.80	1.80	2.73	0.01	0.01
304-302	1.83	1.83	2.02	0.01	0.01
305-304	1.35	1.35	1.73	0.01	0.01
306-305	0.56	0.56	1.29	0.01	0.01
307-304	1.56	1.56	1.79	0.01	0.01
308-307	1.02	1.02	1.52	0.01	0.01
309-308	0.01	0.01	0.94	0.01	0.01
310-307	1.26	1.26	1.52	0.01	0.01
311-310	0.74	0.74	1.21	0.01	0.01
312-311	0.01	0.01	0.63	0.01	0.01
401-PND3	1.72	1.72	1.82	0.01	0.01
402-401	0.91	0.91	1.68	0.01	0.01
403-402	0.01	0.01	0.91	0.01	0.01
CAP-401	1.65	1.65	1.68	0.01	0.01

Analysis begun on: Thu Aug 5 09:46:48 2021
Analysis ended on: Thu Aug 5 09:46:51 2021
Total elapsed time: 00:00:03

SCS 24hr - 100-year + 20% Storm PCSWMM Model Results

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

****
Element Count
****
Number of rain gages 1
Number of subcatchments ... 44
Number of nodes 43
Number of links 38
Number of pollutants 0
Number of land uses 0

****
Raingage Summary
****

Name	Data Source	Data Type	Recording Interval
Raingage1	SCS24hr-100yr+20%	INTENSITY	60 min.

****
Subcatchment Summary
****

Name	Area	Width	%Imperv	%Slope	Rain Gage	Outlet
A-01	0.24	54.88	100.00	1.5000	Raingage1	MH-105
A-02	0.52	200.00	90.00	1.5000	Raingage1	CBMH-104
A-03	0.26	106.58	94.00	1.5000	Raingage1	CBMH-103
A-04	0.16	138.79	91.00	1.5000	Raingage1	CBMH-102
A-05	0.42	173.25	86.00	1.5000	Raingage1	CBMH-101
A-06	0.31	35.89	80.00	1.5000	Raingage1	CBMH100
B-01	0.29	109.29	90.00	1.5000	Raingage1	CBMH-207
B-02	0.28	113.17	91.00	1.5000	Raingage1	CBMH-206
B-03	0.05	23.47	100.00	1.5000	Raingage1	CBMH-207
B-04	0.17	153.10	94.00	1.5000	Raingage1	CBMH-205
B-05	0.05	23.47	100.00	1.5000	Raingage1	CBMH-206
B-06	0.06	26.98	100.00	1.5000	Raingage1	CBMH-205
B-07	0.61	249.79	71.00	1.5000	Raingage1	CBMH-204
B-08	0.30	82.04	64.00	1.5000	Raingage1	CBMH-203
B-09	0.22	34.79	79.00	1.5000	Raingage1	CBMH-202
B-10	0.23	39.01	63.00	1.5000	Raingage1	MH-201
C-01	0.65	101.56	51.00	1.5000	Raingage1	CBMH-314
C-02	0.78	239.45	94.00	1.5000	Raingage1	MH-313
C-03	0.72	139.46	100.00	1.5000	Raingage1	MH-313
C-04	0.83	254.43	81.00	1.5000	Raingage1	MH-312
C-05	0.50	96.33	100.00	1.5000	Raingage1	MH-312
C-06	0.54	164.53	83.00	1.5000	Raingage1	MH-311
C-07	0.38	115.29	89.00	1.5000	Raingage1	MH-310
C-08	0.90	276.76	93.00	1.5000	Raingage1	MH-309
C-09	0.76	147.28	100.00	1.5000	Raingage1	MH-309
C-10	0.46	88.87	100.00	1.5000	Raingage1	MH-308
C-11	0.51	154.43	96.00	1.5000	Raingage1	MH-308
C-12	0.32	97.83	84.00	1.5000	Raingage1	MH-307
C-13	0.78	214.64	91.00	1.5000	Raingage1	MH-306
C-14	0.53	146.69	100.00	1.5000	Raingage1	MH-305
C-15	0.39	112.79	80.00	1.5000	Raingage1	MH-304
C-16	0.24	46.12	44.00	1.0000	Raingage1	CBMH-303
C-17	0.21	42.86	44.00	1.0000	Raingage1	MH-302
C-18	0.24	45.66	41.00	1.0000	Raingage1	MH-401
C-19	0.13	26.08	100.00	1.0000	Raingage1	MH-402
C-20	0.41	82.40	43.00	1.0000	Raingage1	MH-403
D-01a	0.01	17.02	20.00	2.0000	Raingage1	OF5
D-01b	0.02	40.00	5.00	2.0000	Raingage1	OF5
D-02a	0.09	254.29	5.00	1.5000	Raingage1	OF1
D-02b	0.04	286.67	5.00	1.5000	Raingage1	OF1
FUT-1	8.45	296.25	93.00	1.5000	Raingage1	CAP
PND1	0.20	42.73	5.00	1.5000	Raingage1	CBMH100
PND2	0.36	137.16	5.00	1.5000	Raingage1	CBMH200
PND3	1.09	226.09	5.00	1.5000	Raingage1	POND3

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Node Summary
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Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow

CAP	JUNCTION	87.02	2.80	0.0
HW-3001	JUNCTION	87.00	2.60	0.0
MH-501	JUNCTION	86.82	2.97	0.0
EX-MH139	OUTFALL	87.17	0.00	0.0
EX-MH159	OUTFALL	86.01	0.00	0.0
EX-MH160	OUTFALL	86.12	1.69	0.0
OF1	OUTFALL	90.65	0.00	0.0
OF2	OUTFALL	89.60	2.00	0.0
OF3	OUTFALL	89.50	1.25	0.0
OF4	OUTFALL	0.00	90.40	0.0
OF5	OUTFALL	89.70	0.00	0.0
CBMH100	STORAGE	87.80	3.00	0.0
CBMH-101	STORAGE	87.99	2.96	0.0
CBMH-102	STORAGE	88.11	2.89	0.0
CBMH-103	STORAGE	88.27	2.78	0.0
CBMH-104	STORAGE	88.39	2.71	0.0
CBMH200	STORAGE	86.76	3.04	0.0
CBMH-202	STORAGE	87.25	2.90	0.0
CBMH-203	STORAGE	87.58	2.82	0.0
CBMH-204	STORAGE	87.98	3.07	0.0
CBMH-205	STORAGE	88.16	2.94	0.0
CBMH-206	STORAGE	88.36	2.79	0.0
CBMH-207	STORAGE	88.65	2.50	0.0
CBMH-303	STORAGE	88.29	1.42	0.0
CBMH-314	STORAGE	88.71	1.69	0.0
MH-105	STORAGE	89.04	2.70	0.0
MH-201	STORAGE	86.97	2.88	0.0
MH-301	STORAGE	87.23	2.68	0.0
MH-302	STORAGE	86.85	2.91	0.0
MH-304	STORAGE	87.36	2.47	0.0
MH-305	STORAGE	87.88	2.20	0.0
MH-306	STORAGE	88.18	2.12	0.0
MH-307	STORAGE	87.43	2.73	0.0
MH-308	STORAGE	87.73	2.61	0.0
MH-309	STORAGE	88.02	2.36	0.0
MH-310	STORAGE	87.53	2.82	0.0
MH-311	STORAGE	87.61	2.68	0.0
MH-312	STORAGE	87.74	2.63	0.0
MH-313	STORAGE	88.02	2.36	0.0
MH-401	STORAGE	87.38	2.40	0.0
MH-402	STORAGE	88.18	1.96	0.0
MH-403	STORAGE	88.50	1.81	0.0
POND3	STORAGE	87.00	2.60	0.0

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Link Summary
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Name	From Node	To Node	Type	Length	%Slope	Roughness
101-PND1	CBMH-101	CBMH100	CONDUIT	37.5	0.3200	0.0130
102-101	CBMH-102	CBMH-101	CONDUIT	35.9	0.3065	0.0130
103-102	CBMH-103	CBMH-102	CONDUIT	23.9	0.2935	0.0130
104-103	CBMH-104	CBMH-103	CONDUIT	39.3	0.2800	0.0130
105-104	MH-105	CBMH-104	CONDUIT	29.4	0.9864	0.0130
201-PND2	MH-201	CBMH200	CONDUIT	14.1	1.0639	0.0130
202-201	CBMH-202	MH-201	CONDUIT	44.5	0.5169	0.0130
204-203	CBMH-203	CBMH-202	CONDUIT	103.2	0.2908	0.0130
205-204	CBMH-204	CBMH-203	CONDUIT	76.3	0.3015	0.0130
206-205	CBMH-205	CBMH-204	CONDUIT	35.9	0.3010	0.0130
207-206	CBMH-206	CBMH-205	CONDUIT	23.9	0.5030	0.0130
208-207	CBMH-207	CBMH-206	CONDUIT	39.0	0.5126	0.0130
3001-501	HW-3001	MH-501	CONDUIT	85.5	0.1988	0.0130
301-PND3	MH-301	POND3	CONDUIT	28.2	0.1066	0.0130
302-301	MH-302	MH-301	CONDUIT	59.9	0.1002	0.0130
303-302	CBMH-303	MH-302	CONDUIT	68.9	0.3483	0.0130
304-302	MH-304	MH-302	CONDUIT	46.9	0.1066	0.0130
305-304	MH-305	MH-304	CONDUIT	96.8	0.1033	0.0130
306-305	MH-306	MH-305	CONDUIT	113.9	0.0966	0.0130
307-304	MH-307	MH-304	CONDUIT	60.4	0.0994	0.0130
308-307	MH-308	MH-307	CONDUIT	120.0	0.1000	0.0130
309-308	MH-309	MH-308	CONDUIT	127.0	0.1024	0.0130
310-307	MH-310	MH-307	CONDUIT	73.5	0.0952	0.0130
311-310	MH-311	MH-310	CONDUIT	70.9	0.0988	0.0130
312-311	MH-312	MH-311	CONDUIT	116.0	0.1034	0.0130
313-312	MH-313	MH-312	CONDUIT	120.0	0.1000	0.0130
314-313	CBMH-314	MH-313	CONDUIT	16.6	0.4819	0.0130
401-PND3	MH-401	POND3	CONDUIT	31.1	0.0965	0.0130
402-401	MH-402	MH-401	CONDUIT	115.0	0.1478	0.0130
403-402	MH-403	MH-402	CONDUIT	83.7	0.2031	0.0130
501-160	MH-501	EX-MH160	CONDUIT	27.8	0.2156	0.0130
CAP-401	CAP	MH-401	CONDUIT	12.9	0.0775	0.0130

PND1_OVR	CBMH100	OF2	CONDUIT	42.4	0.3539	0.0150
PND2_OVR	CBMH200	OF3	CONDUIT	7.0	0.7143	0.0150
PND3_OVR	CBMH-303	OF4	CONDUIT	7.0	0.7143	0.0130
OR1	CBMH100	EX-MH139	ORIFICE			
OR2	CBMH200	EX-MH159	ORIFICE			
OR3	POND3	HW-3001	ORIFICE			

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Cross Section Summary
****

Conduit	Shape	Full Depth	Full Area	Hyd. Rad.	Max. Width	No. of Barrels	Full Flow
101-PND1	CIRCULAR	0.75	0.44	0.19	0.75	1	629.80
102-101	CIRCULAR	0.75	0.44	0.19	0.75	1	616.38
103-102	CIRCULAR	0.68	0.36	0.17	0.68	1	455.39
104-103	CIRCULAR	0.68	0.36	0.17	0.68	1	444.85
105-104	CIRCULAR	0.38	0.11	0.09	0.38	1	174.15
201-PND2	CIRCULAR	0.82	0.53	0.21	0.82	1	1480.67
202-201	CIRCULAR	0.82	0.53	0.21	0.82	1	1032.04
204-203	CIRCULAR	0.82	0.53	0.21	0.82	1	774.10
205-204	CIRCULAR	0.68	0.36	0.17	0.68	1	461.60
206-205	CIRCULAR	0.60	0.28	0.15	0.60	1	336.86
207-206	CIRCULAR	0.53	0.22	0.13	0.53	1	305.04
208-207	CIRCULAR	0.45	0.16	0.11	0.45	1	204.14
3001-501	CIRCULAR	1.05	0.87	0.26	1.05	1	1217.65
301-PND3	HORIZ_ELLIPSE	1.22	1.89	0.37	1.93	1	2454.60
302-301	HORIZ_ELLIPSE	1.22	1.89	0.37	1.93	1	2380.17
303-302	CIRCULAR	0.30	0.07	0.07	0.30	1	57.08
304-302	HORIZ_ELLIPSE	1.22	1.89	0.37	1.93	1	2454.89
305-304	CIRCULAR	0.82	0.53	0.21	0.82	1	461.38
306-305	CIRCULAR	0.60	0.28	0.15	0.60	1	190.84
307-304	HORIZ_ELLIPSE	1.22	1.89	0.37	1.93	1	2370.77
308-307	CIRCULAR	1.05	0.87	0.26	1.05	1	863.58
309-308	CIRCULAR	0.90	0.64	0.23	0.90	1	579.23
310-307	CIRCULAR	1.20	1.13	0.30	1.20	1	1202.94
311-310	CIRCULAR	1.20	1.13	0.30	1.20	1	1225.48
312-311	CIRCULAR	1.20	1.13	0.30	1.20	1	1254.04
313-312	CIRCULAR	1.05	0.87	0.26	1.05	1	863.73
314-313	CIRCULAR	0.53	0.22	0.13	0.53	1	298.57
401-PND3	HORIZ_ELLIPSE	1.22	1.89	0.37	1.93	1	2335.49
402-401	CIRCULAR	0.60	0.28	0.15	0.60	1	236.09
403-402	CIRCULAR	0.45	0.16	0.11	0.45	1	128.50
501-160	CIRCULAR	1.05	0.87	0.26	1.05	1	1268.08
CAP-401	HORIZ_ELLIPSE	1.22	1.89	0.37	1.93	1	2093.65
PND1_OVR	RECT_OPEN	1.00	3.00	0.75	3.00	1	9822.22
PND2_OVR	RECT_OPEN	1.00	3.00	0.75	3.00	1	13954.21
PND3_OVR	RECT_OPEN	1.00	5.50	0.85	5.50	1	31990.42

****
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 ..... LPS
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 03/18/2020 00:00:00
Ending Date 03/19/2020 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
Routing Time Step ..... 2.00 sec
Variable Time Step ..... YES
Maximum Trials 8

Number of Threads 4
Head Tolerance ..... 0.001500 m

****
Control Actions Taken
****

Runoff Quantity Continuity	Volume hectare-m	Depth mm
Total Precipitation	3.133	126.840
Evaporation Loss	0.000	0.000
Infiltration Loss	0.416	16.842
Surface Runoff	2.687	108.782
Final Storage	0.036	1.454
Continuity Error (%)	-0.187	

Flow Routing Continuity	Volume hectare-m	Volume 10^6 ltr
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	2.686	26.856
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	0.006	0.065
External Outflow	2.678	26.785
Flooding Loss	0.000	0.000
Evaporation Loss	0.000	0.000
Exfiltration Loss	0.000	0.000
Initial Stored Volume	0.000	0.003
Final Stored Volume	0.017	0.170
Continuity Error (%)	-0.113	

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

****
Highest Flow Instability Indexes
****
Link OR1 (13)
Link OR2 (10)

****
Routing Time Step Summary
****
Minimum Time Step : 0.50 sec
Average Time Step : 2.00 sec
Maximum Time Step : 2.00 sec
Percent in Steady State : -0.00
Average Iterations per Step : 2.00
Percent Not Converging : 0.00

****
Subcatchment Runoff Summary
****

Subcatchment	Total Precip mm	Total Runon mm	Total Evap mm	Total Infil mm	Imperv Runoff mm	Perv Runoff mm	Total Runoff mm	Total Runoff 10^6 ltr	Peak Runoff LPS	Runoff Coeff
A-01	126.84	0.00	0.00	0.00	125.22	0.00	125.22	0.30	36.85	0.987
A-02	126.84	0.00	0.00	8.87	112.77	3.88	116.65	0.61	77.94	0.920
A-03	126.84	0.00	0.00	5.37	117.78	2.29	120.07	0.31	38.87	0.947
A-04	126.84	0.00	0.00	8.05	114.00	3.46	117.46	0.19	23.98	0.926

A-05	126.84	0.00	0.00	12.54	107.76	5.29	113.04	0.48	
61.94	0.891								
A-06	126.84	0.00	0.00	18.12	100.08	7.29	107.37	0.34	
45.48	0.846								
B-01	126.84	0.00	0.00	8.95	112.76	3.79	116.56	0.34	
43.69	0.919								
B-02	126.84	0.00	0.00	8.06	114.02	3.42	117.44	0.32	
40.97	0.926								
B-03	126.84	0.00	0.00	0.00	126.87	0.00	126.87	0.06	
7.61	1.000								
B-04	126.84	0.00	0.00	5.36	117.76	2.32	120.08	0.21	
25.96	0.947								
B-05	126.84	0.00	0.00	0.00	126.87	0.00	126.87	0.06	
7.61	1.000								
B-06	126.84	0.00	0.00	0.00	126.87	0.00	126.87	0.07	
8.83	1.000								
B-07	126.84	0.00	0.00	26.05	88.96	10.83	99.79	0.61	
85.96	0.787								
B-08	126.84	0.00	0.00	32.49	80.19	13.25	93.44	0.28	
41.29	0.737								
B-09	126.84	0.00	0.00	18.95	98.91	7.73	106.64	0.23	
31.08	0.841								
B-10	126.84	0.00	0.00	33.64	78.91	13.36	92.27	0.21	
31.68	0.727								
C-01	126.84	0.00	0.00	44.91	63.89	17.31	81.20	0.53	
86.62	0.640								
C-02	126.84	0.00	0.00	5.37	117.76	2.28	120.04	0.94	
117.51	0.946								
C-03	126.84	0.00	0.00	0.00	126.75	0.00	126.75	0.91	
109.79	0.999								
C-04	126.84	0.00	0.00	17.06	101.48	7.11	108.60	0.90	
120.89	0.856								
C-05	126.84	0.00	0.00	0.00	126.75	0.00	126.75	0.63	
75.83	0.999								
C-06	126.84	0.00	0.00	15.26	103.99	6.38	110.36	0.59	
78.57	0.870								
C-07	126.84	0.00	0.00	9.86	111.50	4.15	115.65	0.44	
55.89	0.912								
C-08	126.84	0.00	0.00	6.27	116.51	2.66	119.17	1.08	
135.49	0.940								
C-09	126.84	0.00	0.00	0.00	126.76	0.00	126.76	0.96	
115.27	0.999								
C-10	126.84	0.00	0.00	0.00	126.76	0.00	126.76	0.58	
69.29	0.999								

C-11	126.84	0.00	0.00	3.58	120.26	1.53	121.79	0.62	
76.16	0.960								
C-12	126.84	0.00	0.00	14.36	105.24	6.01	111.25	0.35	
46.12	0.877								
C-13	126.84	0.00	0.00	8.06	113.99	3.40	117.40	0.91	
115.75	0.926								
C-14	126.84	0.00	0.00	0.00	125.25	0.00	125.25	0.67	
80.86	0.988								
C-15	126.84	0.00	0.00	17.97	100.23	7.47	107.70	0.42	
56.24	0.849								
C-16	126.84	0.00	0.00	51.49	55.13	19.62	74.74	0.18	
30.82	0.589								
C-17	126.84	0.00	0.00	51.41	55.13	19.69	74.82	0.16	
27.25	0.590								
C-18	126.84	0.00	0.00	54.37	51.37	20.54	71.91	0.17	
30.92	0.567								
C-19	126.84	0.00	0.00	0.00	125.13	0.00	125.13	0.17	
20.25	0.987								
C-20	126.84	0.00	0.00	52.38	53.97	19.99	73.96	0.30	
53.21	0.583								
D-01a	126.84	0.00	0.00	71.67	25.06	30.24	55.30	0.00	
0.98	0.436								
D-01b	126.84	0.00	0.00	85.22	6.29	35.70	41.98	0.01	
2.82	0.331								
D-02a	126.84	0.00	0.00	85.11	6.27	35.91	42.17	0.04	
10.45	0.332								
D-02b	126.84	0.00	0.00	84.98	6.27	36.34	42.61	0.02	
5.05	0.336								
FUT-1	126.84	0.00	0.00	6.35	116.10	2.54	118.63	10.02	
1264.35	0.935								
PND1	126.84	0.00	0.00	87.92	6.26	32.69	38.95	0.08	
21.89	0.307								
PND2	126.84	0.00	0.00	86.59	6.26	34.06	40.32	0.14	
41.54	0.318								
PND3	126.84	0.00	0.00	88.06	6.26	32.54	38.81	0.42	
120.60	0.306								

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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
CAP	JUNCTION	0.76	2.17	89.19	0 13:15	2.17
HW-3001	JUNCTION	0.32	0.69	87.69	0 13:20	0.69
MH-501	JUNCTION	0.44	0.77	87.59	0 13:20	0.77
EX-MH139	OUTFALL	0.67	0.67	87.84	0 00:00	0.67
EX-MH159	OUTFALL	1.05	1.05	87.06	0 00:00	1.05
EX-MH160	OUTFALL	1.06	1.16	87.28	0 13:20	1.16
OF1	OUTFALL	0.00	0.00	90.65	0 00:00	0.00
OF2	OUTFALL	0.00	0.00	89.60	0 00:00	0.00
OF3	OUTFALL	0.00	0.00	89.50	0 00:00	0.00
OF4	OUTFALL	0.00	0.00	0.00	0 00:00	0.00
OF5	OUTFALL	0.00	0.00	89.70	0 00:00	0.00
CBMH100	STORAGE	0.34	2.45	90.25	0 13:04	2.45
CBMH-101	STORAGE	0.27	2.27	90.26	0 13:00	2.27
CBMH-102	STORAGE	0.25	2.16	90.27	0 13:00	2.16
CBMH-103	STORAGE	0.23	2.01	90.28	0 13:00	2.01
CBMH-104	STORAGE	0.21	1.90	90.29	0 13:00	1.89
CBMH200	STORAGE	0.52	2.62	89.38	0 13:04	2.62
CBMH-202	STORAGE	0.24	2.17	89.42	0 13:01	2.17
CBMH-203	STORAGE	0.21	1.87	89.45	0 13:00	1.87
CBMH-204	STORAGE	0.17	1.53	89.51	0 13:00	1.52
CBMH-205	STORAGE	0.15	1.36	89.52	0 13:00	1.36
CBMH-206	STORAGE	0.11	1.18	89.54	0 13:00	1.18
CBMH-207	STORAGE	0.08	0.90	89.55	0 13:00	0.90
CBMH-303	STORAGE	0.11	0.92	89.21	0 13:01	0.92
CBMH-314	STORAGE	0.07	0.56	89.27	0 13:00	0.56
MH-105	STORAGE	0.12	1.26	90.30	0 13:00	1.26
MH-201	STORAGE	0.31	2.43	89.40	0 13:02	2.43
MH-301	STORAGE	0.45	1.96	89.19	0 13:18	1.96
MH-302	STORAGE	0.85	2.35	89.20	0 13:17	2.35
MH-304	STORAGE	0.42	1.84	89.20	0 13:01	1.84
MH-305	STORAGE	0.25	1.33	89.21	0 13:01	1.33
MH-306	STORAGE	0.22	1.06	89.24	0 13:00	1.06
MH-307	STORAGE	0.38	1.78	89.21	0 13:01	1.78
MH-308	STORAGE	0.30	1.50	89.23	0 13:00	1.50
MH-309	STORAGE	0.23	1.23	89.25	0 13:00	1.22
MH-310	STORAGE	0.36	1.69	89.22	0 13:01	1.69
MH-311	STORAGE	0.33	1.62	89.23	0 13:01	1.62
MH-312	STORAGE	0.29	1.51	89.25	0 13:00	1.51
MH-313	STORAGE	0.23	1.24	89.26	0 13:00	1.24
MH-401	STORAGE	0.40	1.81	89.19	0 13:15	1.81
MH-402	STORAGE	0.15	1.02	89.20	0 13:15	1.02
MH-403	STORAGE	0.09	0.70	89.20	0 13:15	0.70
POND3	STORAGE	0.63	2.19	89.19	0 13:19	2.19

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Node Inflow Summary
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Node	Type	Maximum Lateral Inflow LPS	Maximum Total Inflow LPS	Time of Max Occurrence days hr:min	Lateral Inflow Volume 10^6 ltr	Total Inflow Volume 10^6 ltr	Flow Balance Error Percent	
CAP	JUNCTION	1264.35	1264.35	0 13:00	10	10	0.002	
HW-3001	JUNCTION	0.00	844.13	0 13:19	0	21.9	0.035	
MH-501	JUNCTION	0.00	844.13	0 13:20	0	21.9	0.061	
EX-MH139	OUTFALL	0.00	157.22	0 13:04	0	2.3	0.000	
EX-MH159	OUTFALL	0.00	186.35	0 13:04	0	2.54	0.000	
EX-MH160	OUTFALL	0.00	844.12	0 13:20	0	21.9	0.000	
OF1	OUTFALL	15.50	15.50	0 13:00	0.0559	0.0559	0.000	
OF2	OUTFALL	0.00	0.00	0 00:00	0	0	0.000	ltr
OF3	OUTFALL	0.00	0.00	0 00:00	0	0	0.000	ltr
OF4	OUTFALL	0.00	0.00	0 00:00	0	0	0.000	ltr
OF5	OUTFALL	3.80	3.80	0 13:00	0.0145	0.0145	0.000	
CBMH100	STORAGE	67.37	299.68	0 13:00	0.414	2.3	-0.002	
CBMH-101	STORAGE	61.94	234.36	0 13:00	0.476	1.89	0.033	
CBMH-102	STORAGE	23.98	174.08	0 13:00	0.189	1.41	-0.056	
CBMH-103	STORAGE	38.87	151.75	0 13:00	0.311	1.22	0.068	
CBMH-104	STORAGE	77.94	118.14	0 12:11	0.611	0.914	-0.033	
CBMH200	STORAGE	41.54	349.41	0 13:00	0.144	2.54	0.034	
CBMH-202	STORAGE	31.08	282.41	0 13:00	0.229	2.18	-0.211	
CBMH-203	STORAGE	41.29	256.05	0 13:00	0.277	1.95	0.091	
CBMH-204	STORAGE	85.96	217.43	0 13:00	0.605	1.68	0.242	
CBMH-205	STORAGE	34.79	135.10	0 12:16	0.281	1.07	0.098	
CBMH-206	STORAGE	48.58	99.66	0 12:19	0.386	0.791	0.013	
CBMH-207	STORAGE	51.30	51.30	0 13:00	0.406	0.406	0.191	

CBMH-303	STORAGE	30.82	30.82	0	13:00	0.178	0.178	0.552
CBMH-314	STORAGE	86.62	86.62	0	13:00	0.529	0.529	0.101
MH-105	STORAGE	36.85	36.85	0	13:00	0.303	0.303	0.112
MH-201	STORAGE	31.68	309.86	0	13:00	0.211	2.39	0.023
MH-301	STORAGE	0.00	1227.54	0	12:18	0	10.8	0.011
MH-302	STORAGE	27.25	1253.41	0	12:18	0.157	10.8	0.015
MH-304	STORAGE	56.24	1239.54	0	12:18	0.418	10.5	-0.040
MH-305	STORAGE	80.86	197.23	0	12:29	0.665	1.57	0.327
MH-306	STORAGE	115.75	115.75	0	13:00	0.912	0.912	0.961
MH-307	STORAGE	46.12	1017.57	0	12:19	0.35	8.51	-0.234
MH-308	STORAGE	145.45	395.92	0	12:22	1.19	3.22	0.200
MH-309	STORAGE	250.76	250.76	0	13:00	2.04	2.04	0.656
MH-310	STORAGE	55.89	594.74	0	12:20	0.436	4.95	-0.079
MH-311	STORAGE	78.57	554.61	0	12:22	0.594	4.51	-0.152
MH-312	STORAGE	196.73	497.81	0	13:00	1.53	3.91	-0.188
MH-313	STORAGE	227.30	312.79	0	12:59	1.85	2.38	0.407
MH-401	STORAGE	30.92	1355.90	0	12:58	0.174	10.7	0.088
MH-402	STORAGE	20.25	70.16	0	12:41	0.166	0.468	0.607
MH-403	STORAGE	53.21	53.21	0	13:00	0.305	0.305	0.811
POND3	STORAGE	120.60	2644.15	0	12:59	0.424	22	-0.064

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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
CAP	JUNCTION	2.86	0.575	0.626

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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 LPS
CBMH100	0.022	2	0	0	0.420	42	0 13:04	157.22
CBMH-101	0.000	9	0	0	0.004	77	0 13:00	232.31
CBMH-102	0.000	9	0	0	0.004	75	0 13:00	172.68
CBMH-103	0.000	8	0	0	0.004	72	0 13:00	150.10
CBMH-104	0.000	8	0	0	0.002	70	0 13:00	112.88
CBMH200	0.018	2	0	0	0.406	46	0 13:04	186.35
CBMH-202	0.000	8	0	0	0.004	75	0 13:01	278.27
CBMH-203	0.000	7	0	0	0.003	66	0 13:00	251.34
CBMH-204	0.000	6	0	0	0.003	50	0 13:00	214.76
CBMH-205	0.000	5	0	0	0.002	46	0 13:00	132.90
CBMH-206	0.000	4	0	0	0.001	42	0 13:00	100.32
CBMH-207	0.000	3	0	0	0.001	36	0 13:00	51.15
CBMH-303	0.000	8	0	0	0.001	65	0 13:01	28.72
CBMH-314	0.000	4	0	0	0.001	33	0 13:00	85.49
MH-105	0.000	4	0	0	0.001	47	0 13:00	42.91
MH-201	0.001	11	0	0	0.006	84	0 13:02	307.87
MH-301	0.003	17	0	0	0.014	73	0 13:18	1194.78
MH-302	0.006	29	0	0	0.017	81	0 13:17	1227.54
MH-304	0.003	17	0	0	0.013	75	0 13:01	1214.54
MH-305	0.000	11	0	0	0.002	61	0 13:01	194.59
MH-306	0.000	10	0	0	0.001	50	0 13:00	116.37
MH-307	0.003	14	0	0	0.013	65	0 13:01	990.63
MH-308	0.001	12	0	0	0.007	58	0 13:00	391.09
MH-309	0.000	10	0	0	0.002	52	0 13:00	250.50
MH-310	0.002	13	0	0	0.008	60	0 13:01	581.00
MH-311	0.002	12	0	0	0.012	61	0 13:01	539.04
MH-312	0.001	11	0	0	0.007	58	0 13:00	476.83
MH-313	0.001	10	0	0	0.003	53	0 13:00	301.09
MH-401	0.003	17	0	0	0.013	76	0 13:15	1340.74
MH-402	0.000	8	0	0	0.001	52	0 13:15	64.30
MH-403	0.000	5	0	0	0.001	39	0 13:15	49.91

POND3	1.290	14	0	0	6.969	77	0	13:19	844.13	

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Outfall Loading Summary
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Outfall Node	Flow Freq Pcnt	Avg Flow LPS	Max Flow LPS	Total Volume 10^6 ltr
EX-MH139	99.98	26.93	157.22	2.302
EX-MH159	99.33	29.94	186.35	2.542
EX-MH160	99.98	254.94	844.12	21.935
OF1	78.72	0.86	15.50	0.056
OF2	0.00	0.00	0.00	0.000
OF3	0.00	0.00	0.00	0.000
OF4	0.00	0.00	0.00	0.000
OF5	25.43	0.64	3.80	0.014
System	50.43	313.31	3.80	26.849

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Link Flow Summary
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Link	Type	Maximum |Flow| LPS	Time of Max Occurrence days	hr:min	Maximum |Veloc| m/sec	Max/ Full Flow	Max/ Full Depth
101-PND1	CONDUIT	232.31	0	13:00	0.61	0.37	1.00
102-101	CONDUIT	172.68	0	13:00	0.85	0.28	1.00
103-102	CONDUIT	150.10	0	13:00	1.13	0.33	1.00
104-103	CONDUIT	112.88	0	13:00	0.93	0.25	1.00
105-104	CONDUIT	42.91	0	12:11	1.22	0.25	1.00
201-PND2	CONDUIT	307.87	0	13:00	0.58	0.21	1.00
202-201	CONDUIT	278.27	0	13:00	0.81	0.27	1.00
204-203	CONDUIT	251.34	0	13:00	1.17	0.32	1.00
205-204	CONDUIT	214.76	0	13:00	1.31	0.47	1.00
206-205	CONDUIT	132.90	0	12:14	1.17	0.39	1.00
207-206	CONDUIT	100.32	0	12:16	1.26	0.33	1.00
208-207	CONDUIT	51.15	0	12:19	1.07	0.25	1.00
3001-501	CONDUIT	844.13	0	13:20	1.33	0.69	0.69
301-PND3	CONDUIT	1194.78	0	12:17	1.21	0.49	1.00
302-301	CONDUIT	1227.54	0	12:18	1.04	0.52	1.00
303-302	CONDUIT	28.72	0	13:00	0.81	0.50	1.00
304-302	CONDUIT	1214.54	0	12:18	0.95	0.49	1.00
305-304	CONDUIT	194.59	0	12:18	0.91	0.42	1.00
306-305	CONDUIT	116.37	0	12:29	0.92	0.61	1.00
307-304	CONDUIT	990.63	0	12:18	0.83	0.42	1.00
308-307	CONDUIT	391.09	0	12:19	0.98	0.45	1.00
309-308	CONDUIT	250.50	0	12:22	0.99	0.43	1.00
310-307	CONDUIT	581.00	0	12:19	0.93	0.48	1.00
311-310	CONDUIT	539.04	0	12:20	0.98	0.44	1.00
312-311	CONDUIT	476.83	0	12:21	0.91	0.38	1.00
313-312	CONDUIT	301.09	0	13:00	1.01	0.35	1.00
314-313	CONDUIT	85.49	0	12:59	1.16	0.29	1.00
401-PND3	CONDUIT	1340.74	0	12:58	1.35	0.57	1.00
402-401	CONDUIT	64.30	0	12:26	0.77	0.27	1.00
403-402	CONDUIT	49.91	0	12:41	0.84	0.39	1.00
501-160	CONDUIT	844.12	0	13:20	1.52	0.67	0.61
CAP-401	CONDUIT	1264.13	0	12:58	1.07	0.60	1.00
PND1_OVR	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
PND2_OVR	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
PND3_OVR	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
OR1	ORIFICE	157.22	0	13:04			1.00
OR2	ORIFICE	186.35	0	13:04			1.00
OR3	ORIFICE	844.13	0	13:19			1.00

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

101-PND1	1.00	0.07	0.00	0.00	0.33	0.00	0.00	0.60	0.05	0.00
102-101	1.00	0.07	0.00	0.00	0.92	0.00	0.00	0.01	0.63	0.00
103-102	1.00	0.07	0.00	0.00	0.12	0.00	0.00	0.81	0.00	0.00
104-103	1.00	0.07	0.00	0.00	0.92	0.00	0.00	0.01	0.05	0.00
105-104	1.00	0.07	0.00	0.00	0.11	0.00	0.00	0.82	0.00	0.00
201-PND2	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
202-201	1.00	0.00	0.05	0.00	0.29	0.00	0.00	0.66	0.08	0.00
204-203	1.00	0.05	0.00	0.00	0.12	0.00	0.00	0.84	0.01	0.00
205-204	1.00	0.04	0.00	0.00	0.11	0.00	0.00	0.85	0.01	0.00
206-205	1.00	0.04	0.00	0.00	0.10	0.00	0.00	0.85	0.00	0.00
207-206	1.00	0.04	0.00	0.00	0.09	0.00	0.00	0.86	0.00	0.00
208-207	1.00	0.04	0.00	0.00	0.09	0.00	0.00	0.87	0.00	0.00
3001-501	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.22	0.00
301-PND3	1.00	0.07	0.00	0.00	0.71	0.00	0.00	0.22	0.00	0.00
302-301	1.00	0.07	0.00	0.00	0.93	0.00	0.00	0.00	0.00	0.00
303-302	1.00	0.07	0.00	0.00	0.21	0.00	0.00	0.72	0.04	0.00
304-302	1.00	0.04	0.00	0.00	0.93	0.00	0.00	0.03	0.00	0.00
305-304	1.00	0.07	0.00	0.00	0.25	0.00	0.00	0.68	0.01	0.00
306-305	1.00	0.08	0.00	0.00	0.19	0.00	0.00	0.73	0.01	0.00
307-304	1.00	0.04	0.00	0.00	0.94	0.00	0.00	0.02	0.30	0.00
308-307	1.00	0.04	0.00	0.00	0.28	0.00	0.00	0.68	0.01	0.00
309-308	1.00	0.04	0.00	0.00	0.24	0.00	0.00	0.72	0.02	0.00
310-307	1.00	0.05	0.00	0.00	0.85	0.00	0.00	0.11	0.01	0.00
311-310	1.00	0.04	0.00	0.00	0.94	0.00	0.00	0.02	0.57	0.00
312-311	1.00	0.04	0.00	0.00	0.95	0.00	0.00	0.01	0.02	0.00
313-312	1.00	0.04	0.00	0.00	0.24	0.00	0.00	0.72	0.02	0.00
314-313	1.00	0.07	0.00	0.00	0.11	0.00	0.00	0.82	0.01	0.00
401-PND3	1.00	0.05	0.00	0.00	0.33	0.00	0.00	0.62	0.00	0.00
402-401	1.00	0.07	0.00	0.00	0.21	0.00	0.00	0.72	0.03	0.00
403-402	1.00	0.07	0.00	0.00	0.16	0.00	0.00	0.77	0.03	0.00
501-160	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
CAP-401	1.00	0.05	0.00	0.00	0.95	0.00	0.00	0.00	0.00	0.00
PND1_OVR	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PND2_OVR	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PND3_OVR	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

****
Conduit Surcharge Summary
****

Conduit	Hours Full (Both Ends)	Hours Full (Upstream)	Hours Full (Dnstream)	Hours Above Full Normal Flow	Hours Capacity Limited
101-PND1	2.56	2.56	2.62	0.01	0.01
102-101	2.51	2.51	2.55	0.01	0.01
103-102	2.48	2.48	2.50	0.01	0.01
104-103	2.45	2.45	2.48	0.01	0.01
105-104	2.36	2.36	2.43	0.01	0.01
201-PND2	2.53	2.53	2.62	0.01	0.01
202-201	2.36	2.36	2.50	0.01	0.01
204-203	2.18	2.18	2.35	0.01	0.01
205-204	2.06	2.06	2.17	0.01	0.01
206-205	2.01	2.01	2.06	0.01	0.01
207-206	1.91	1.91	2.01	0.01	0.01
208-207	1.53	1.53	1.90	0.01	0.01
301-PND3	3.45	3.45	3.54	0.01	0.01
302-301	3.21	3.21	3.41	0.01	0.01
303-302	2.99	2.99	3.83	0.01	0.01
304-302	3.02	3.02	3.18	0.01	0.01
305-304	2.61	2.61	2.93	0.01	0.01
306-305	2.22	2.22	2.56	0.01	0.01
307-304	2.79	2.79	2.99	0.01	0.01
308-307	2.38	2.38	2.75	0.01	0.01
309-308	1.90	1.90	2.34	0.01	0.01
310-307	2.53	2.53	2.75	0.01	0.01
311-310	2.28	2.28	2.50	0.01	0.01
312-311	1.84	1.84	2.24	0.01	0.01
313-312	1.39	1.39	1.80	0.01	0.01
314-313	0.06	0.06	0.94	0.01	0.01
401-PND3	2.92	2.92	3.00	0.01	0.33
402-401	2.32	2.32	2.88	0.01	0.01
403-402	1.73	1.73	2.32	0.01	0.01
CAP-401	2.86	2.86	2.89	0.01	0.01

Analysis begun on: Thu Aug 5 09:45:43 2021
Analysis ended on: Thu Aug 5 09:45:46 2021
Total elapsed time: 00:00:03

Sortation Facility
100-year HGL Elevations

NOVATECH
Engineers, Planners & Landscape Architects

MH ID	Pipe / MH / USF Information				HGL Information[1]		Surcharge Depth Above Pipe Obvert		Clearance from T/G	
	D/S Pipe Size (mm)	D/S Pipe Invert Elev. (m)	D/S Pipe Obvert Elev. (m)	MH T/G Elev. (m)	100-year (m)	100-year (+20%) (m)	100-year (m)	100-year (+20%) (m)	100-year (m)	100-year (+20%) (m)
CBMH100	1000	90.75	91.75	90.80	90.34	90.53	0.00	0.00	0.46	0.27
CBMH-101	750	87.99	88.74	90.95	90.41	90.67	1.67	1.93	0.54	0.28
CBMH-102	750	88.11	88.86	91.00	90.49	90.79	1.63	1.93	0.51	0.21
CBMH-103	675	88.27	88.95	91.05	90.57	90.90	1.63	1.96	0.48	0.15
CBMH-104	675	88.39	89.07	91.10	90.64	91.00	1.58	1.94	0.46	0.10
CBMH200	1000	89.80	90.80	89.80	89.45	89.64	0.00	0.00	0.35	0.16
CBMH-202	825	87.25	88.08	90.15	89.71	89.99	1.63	1.91	0.44	0.16
CBMH-203	825	87.58	88.41	90.40	89.96	90.32	1.55	1.91	0.44	0.08
CBMH-204	675	87.98	88.66	91.05	90.41	90.89	1.76	2.24	0.64	0.16
CBMH-205	600	88.16	88.76	91.10	90.57	91.05	1.81	2.29	0.53	0.05
CBMH-206	525	88.36	88.89	91.15	90.68	91.14	1.80	2.26	0.47	0.01
CBMH-207	450	88.65	89.10	91.15	90.79	91.15	1.69	2.05	0.36	0.00
CBMH-303	300	88.29	88.59	89.71	89.24	89.47	0.65	0.88	0.47	0.24
CBMH-314	525	88.71	89.24	90.40	89.96	90.40	0.72	1.17	0.44	0.00
MH-105	375	89.04	89.42	91.74	90.77	91.19	1.35	1.77	0.97	0.55
MH-201	825	86.97	87.80	89.85	89.46	89.65	1.66	1.86	0.39	0.20
MH-301	1219	87.23	88.45	89.91	89.14	89.50	0.69	1.05	0.77	0.41
MH-302	1219	87.30	88.52	89.76	89.15	89.51	0.63	0.99	0.61	0.25
MH-304	1219	87.36	88.58	89.83	89.32	89.76	0.74	1.18	0.51	0.07
MH-305	825	87.88	88.71	90.08	89.47	89.98	0.77	1.28	0.61	0.10
MH-306	600	88.23	88.83	90.30	89.77	90.30	0.94	1.47	0.53	0.00
MH-307	1219	87.43	88.65	90.16	89.39	89.85	0.74	1.20	0.77	0.31
MH-308	1050	87.73	88.78	90.34	89.64	90.19	0.86	1.41	0.70	0.15
MH-309	900	88.02	88.92	90.38	89.82	90.38	0.90	1.46	0.56	0.00
MH-310	1200	87.53	88.73	90.35	89.51	89.98	0.78	1.25	0.84	0.37
MH-311	1200	87.61	88.81	90.29	89.61	90.09	0.80	1.28	0.68	0.20
MH-312	1200	87.74	88.94	90.37	89.82	90.33	0.88	1.39	0.55	0.04
MH-313	1050	88.02	89.07	90.38	89.92	90.38	0.85	1.31	0.46	0.00
MH-401	1219	87.38	88.60	89.78	89.15	89.50	0.55	0.90	0.63	0.28
MH-402	600	88.18	88.78	90.14	89.15	89.51	0.37	0.73	0.99	0.63
MH-403	450	88.50	88.95	90.31	89.15	89.51	0.20	0.56	1.16	0.80
POND3	1050	87.00	88.05	89.60	89.14	89.50	1.09	1.45	0.46	0.10

(1) HGL information is for a 3-hour Chicago Storm Distribution; based on a fixed outfall elevation

LEGEND

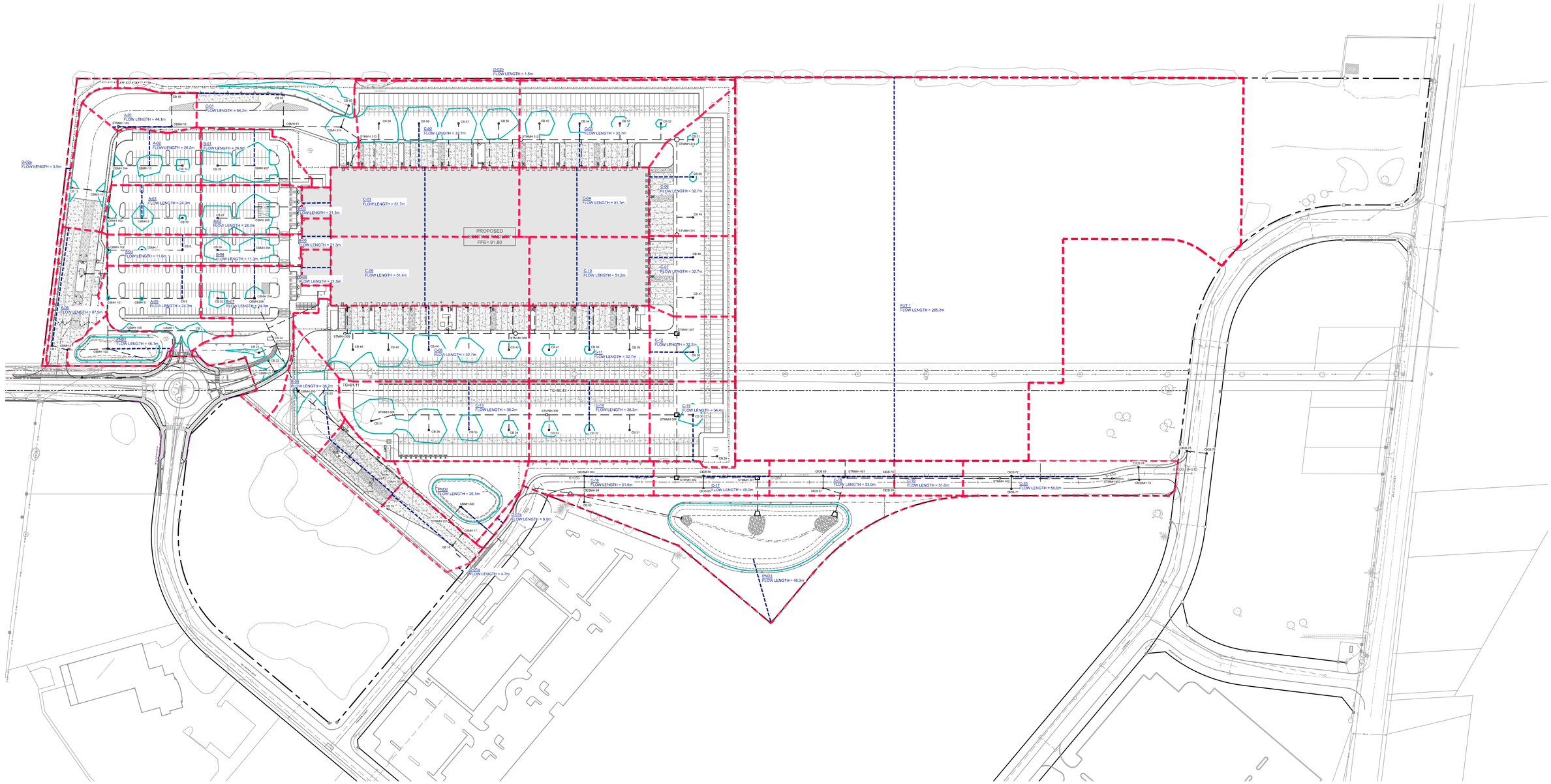
- PROPERTY LINE
- PROPOSED STORM SEWER AND MANHOLE
- PROPOSED CATCHBASIN MANHOLE
- PROPOSED CATCHBASIN
- STM MH — EXISTING STORM MANHOLE & SEWER
- CB 1 — EXISTING CATCHBASIN
- STORM SEWER DRAINAGE AREA BOUNDARY (REFER TO 121137-STM FOR TRIBUTARY DETAILS)
- DRAINAGE AREA FLOW LENGTH
- 100+20% STORM PONDING EXTENTS

NOTE:

1. THIS SITE HAS BEEN DESIGNED TO CONVEY ALL STORMS UP TO AND INCLUDING THE 100-YEAR STORM EVENT UNDERGROUND THROUGH THE MINOR SYSTEM.
2. ABOVE GROUND PONDING WILL ONLY OCCUR FOR EVENTS EXCEEDING THE 100-YEAR STORM EVENT

NORTH

KEY PLAN
N.T.S.



REFER TO 121137-ND FOR ADDITIONAL NOTES

NOTE:
THE POSITION OF ALL POLE LINES, CONDUITS, WATERMAINS, SEWERS AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, DETERMINE THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND ASSUME ALL LIABILITY FOR DAMAGE TO THEM.

Owner:
Medusa LP
c/o Russell Beach
16766 rte Trans-Canada, Suite 500
Kirkland, Quebec
H9H 4M7

NOT FOR CONSTRUCTION

No.	REVISION	DATE	BY
4.	REVISED PER CITY COMMENTS	AUG 06/2021	MJH
3.	ISSUED FOR SUPERSTRUCTURE AND ENVELOPE PERMIT	JULY 9/2021	MJH
2.	ISSUED FOR FOUNDATION PERMIT	JUNE 8/2021	MJH
1.	ISSUED FOR SITE PLAN APPROVAL	MAY 31/2021	MJH

SCALE
1:1250
1:1250
0 10 20 30 40 50

DESIGN MJH/ARM
CHECKED JLS
DRAWN MJH/ARM
CHECKED JLS
APPROVED JLS

FOR REVIEW ONLY
ISSUED FOR REVIEW
ISSUED FOR REVIEW

NOVATECH
Engineers, Planners & Landscape Architects
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada K2M 1P6
Telephone (613) 254-9643
Facsimile (613) 254-5867
Website www.novatech-eng.com

LOCATION
SORTATION FACILITY
99 BILL LEATHEM DR, 2 & 20 LEIKIN DR, CITY OF OTTAWA

DRAWING NAME
FLOW LENGTHS AND PONDING

PROJECT No. 121137
REV REV #4
DRAWING No. 121137-FLPND

D07-12-21-0079
PLAN # 18474

N.C.C. LANDS

EX. SANITARY AND STORM SEWERS FROM WOODROFFE AVE

EXISTING STORM SEWER

EX. STORM OUTLET

PROPOSED STORM OUTLET FOR S.M.B.P.

LIMIT OF STORM WATER TREATMENT FACILITY EXPANSION

BARRHAVEN CREEK

STORM WATER TREATMENT FACILITY

STREET 'A'

STREET 'B'

STREET 'C'

STREET 'D'

STREET 'E'

STREET 'F'

STREET 'G'

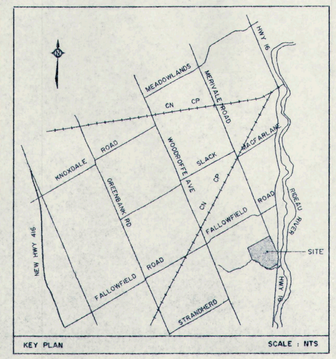
MERIVALE ROAD

HIGHWAY No. 16

QUEEN ANNE CRESCENT

MH 140 INV SE=87.13
111m-675mmø @0.25%
111.5m-825mmø @ 0.21%
MH 141 INV NE=87.23
MH 142 INV SW=86.96 NE=86.81
MH 143 INV SW=86.58 NE=86.35 SE=86.05
MH 144 INV NE=86.66 SW=86.59
99m-1050mmø @0.24%
101m-975mmø @0.26%
MH 145 INV NE=87.00 SW=86.93
98m-900mmø @0.24%
MH 146 INV NE=87.31 SW=87.24
78m-675mmø @0.18%
MH 147 INV NE=87.62 SW=87.47
88m-825mmø @0.18%
MH 148 INV E=87.91 SW=87.76
MH 149 INV W=87.96
27m-525mmø @ 0.17%
43.5m-750mmø @ 0.15%
48m-675mmø @ 0.15%
MH 102 INV NE=87.92 SW=87.89
MH 101 INV SW=87.99
54m-675mmø @ 0.15%
MH 103 INV NE=87.81 S=87.73
MH 104 INV N=87.67 S=87.64
56m-750mmø @ 0.15%
115m-675mmø @ 0.28%
MH 162 INV SE&NW=85.91
88m-1350mmø @0.16%
69m-1350mmø @0.20%
MH 105 INV N=87.55 S=87.48
94.5m-825mmø @ 0.21%
MH 139 INV NW=86.81 SE=86.66
115m-825mmø @ 0.30%
46.5m-1350mmø @0.22%
MH 161 INV NW=85.78 SE=85.75
MH 160 INV NW=85.64 S=85.49
41m-1500mmø @0.14%
80m-600mmø @ 0.20%
51m-675mmø @ 0.18%
56m-450mmø @0.20%
MH 156 INV NE=87.09 SW=86.94
MH 106 INV S=87.28 N=87.20
MH 154 INV NE=86.62 SW=86.47
5m-825mmø @ 0.17%
46m-900mmø @ 0.16%
MH 159 INV N=85.44 S=85.41
MH 153 INV NE=86.38 S=86.30
MH 155 INV NE=86.78 SW=86.71
MH 157 INV SW=87.21
MH 107 INV N=87.13 S=87.10
MH 138 INV NW=86.32 SE=86.24
36.5m-900mmø @ 0.33%
99m-1500mmø @ 0.17%
66.5m-900mmø @ 0.19%
45m-900mmø @ 0.18%
59m-675mmø @ 0.16%
MH 137 INV E=86.12 NW=86.04
MH 158 INV N=S=85.24
MH 152 INV N=86.18 S=86.10
MH 108 INV S=86.67 N=87.02 E=87.25
MH 17 INV W=87.59
75m-975mmø @ 0.32%
MH 136 INV E=85.73 W=85.80
99m-1500mmø @ 0.19%
95.5m-975mmø @ 0.22%
86m-1050mmø @0.20%
MH 116 INV E=87.41 W=87.34
88m-600mmø @ 0.20%
75m-1050mmø @ 0.30%
MH 135 INV N=85.05 E=84.60 W=85.50
105.5m-1950mmø @ 0.12%
MH 151 INV N=85.89 S=85.67
MH 109 INV S=86.55 N=86.70
95.5m-1200mmø @ 0.13%
81.5m-1200mmø @ 0.15%
MH 110 INV S=86.28 N=86.43 E=86.88
MH 150 INV N&S=85.54
119.5m-750mmø @ 0.18%
100m-2400mmø @ 0.20%
AS PER DELCAN INV =83.82
MH 134 INV S=84.02 W&E=84.47
95.5m-1200mmø @ 0.13%
117.5m-1350mmø @ 0.16%
94.5m-1950mmø @ 0.21%
MH 133 INV W=84.67 E=84.82 N=85.42
MH 111 INV N&S=86.09
40.0m-675mmø @ 0.15%
MH 118 INV SE=87.17 W=87.10
MH 132 INV W=84.97 SE=85.00
MH 119 INV NW=87.23
79.5m-1800mmø @ 0.19%
117.5m-1350mmø @ 0.21%
38m-1800mmø @ 0.18%
MH 131 INV NW=84.97 SE=85.10
32.5m-1800mmø @ 0.18%
70m-1500mmø @ 0.15%
MH 115 INV NE=86.61
MH 112 INV N=85.84 SW=85.81
MH 120 INV S=87.63
43.5m-1350mmø @ 0.22%
55m-600mmø @ 0.15%
MH 113 INV SW=85.57 NE=85.72
100.0m-525mmø @ 0.17%
MH 114 INV SW=86.44 NE=85.46 NW=85.16 SE=85.61
83.5m-825mmø @ 0.15%
MH 121 INV N=87.55 S=87.32
72.5m-1350mmø @ 0.16%
MH 130 INV NW&SE=85.72
78m-1350mmø @ 0.15%
MH 122 INV N=87.20 S=87.12
MH 129 INV NW=85.84 SE=85.87
106m-900mmø @ 0.22%
17m-1350mmø @ 0.15%
MH 128 INV NW=85.90 E=85.83
MH 123 INV S=86.74 N=86.89
MH 127 INV W=86.03 E=86.18
67.5m-1350mmø @ 0.15%
106m-1050mmø @ 0.16%
67.5m-1200mmø @ 0.18%
MH 124 INV N=86.58 SW=86.43
15m-1200mmø @ 0.15%
MH 126 INV SW=86.33 NE=86.30
MH 125 INV NE=86.41 SW=86.38 S=86.98
32m-1200mmø @ 0.15%
10m-600mmø @ 0.15%

FUTURE DAVIDSON HEIGHTS COMMUNITY



PRELIMINARY

DATE ISSUED
AUG 19 1991

NOTE : UNLESS OTHERWISE SPECIFIED ALL STORM SEWERS SHALL BE CONCRETE CLASS IV. ALL ELEVATIONS GEODETIC

LEGEND

- EXISTING SANITARY SEWER
- EXISTING STORM SEWER
- PROPOSED STORM SEWER & MANHOLE
- MH MANHOLE
- INV INVERT

No.	REVISION	DATE	BY
1.	ROAD PATTERN REVISED	AUG 16/91	SMG

UDO BOEHME — LICENSED PROFESSIONAL ENGINEER — PROVINCE OF ONTARIO

S.M. GORDON — LICENSED PROFESSIONAL ENGINEER — PROVINCE OF ONTARIO

NOVATECH
ENGINEERING CONSULTANTS LTD
OTTAWA, ONTARIO

DESIGN	JMD
CHECKED	UB
DRAWN	MGB
CHECKED	UB
APPROVED	MJH

SCALE
1 : 2500
HORIZONTAL
VERTICAL

CITY OF NEPEAN

NEPEAN

SOUTH MERIVALE BUSINESS PARK

STORM SEWER

CONTRACT No.	90041
DATE	SEPT. 1990
DRAWING No.	STM-001

N.C.C. LANDS

STORM FLOWS TO BILL LEATHEM

STORM FLOWS TO PARAGON AVE

STORM FLOWS TO STREET C, NO OUTLET COMPENSATED BY OVER CONTROLLING OTHER AREAS

STORM FLOWS TO LEIKIN DR

EX. SANITARY AND STORM SEWERS FROM WOODROFFE AVE

EXISTING STORM SEWER

AS PER DELCAN INV ±83.82

EX. STORM OUTLET

PROPOSED STORM OUTLET FOR S.W.E.P.

LIMIT OF STORM WATER TREATMENT FACILITY EXPANSION

STORM WATER TREATMENT FACILITY

BARRHAVEN CREEK

MERIVALE ROAD

HIGHWAY No. 16

QUEEN ANNE CRESCENT

FUTURE DAVIDSON HEIGHTS COMMUNITY

FUTURE DEVELOPMENT

KEY PLAN — SCALE : NTS

LEGEND

- EXISTING SANITARY SEWER
- EXISTING STORM SEWER
- PROPOSED STORM SEWER & MANHOLE
- STORM DRAINAGE AREA
- 2.5 ha — DRAINAGE AREA (HECTARES)
- MH — MANHOLE

DATE ISSUED
AUG 19 1991

PRELIMINARY

No.	REVISION	DATE	BY
1.	ROAD PATTERN REVISED	AUG 16/91	SMG

LICENSED PROFESSIONAL ENGINEER — UDO BOEHME — PROVINCE OF ONTARIO

LICENSED PROFESSIONAL ENGINEER — S. M. GORDON — PROVINCE OF ONTARIO

NOVATECH
ENGINEERING CONSULTANTS LTD
OTTAWA, ONTARIO

DESIGN	JMD
CHECKED	UB
DRAWN	MGB
CHECKED	UB
APPROVED	MJH

SCALE
1 : 2500
HORIZONTAL
VERTICAL

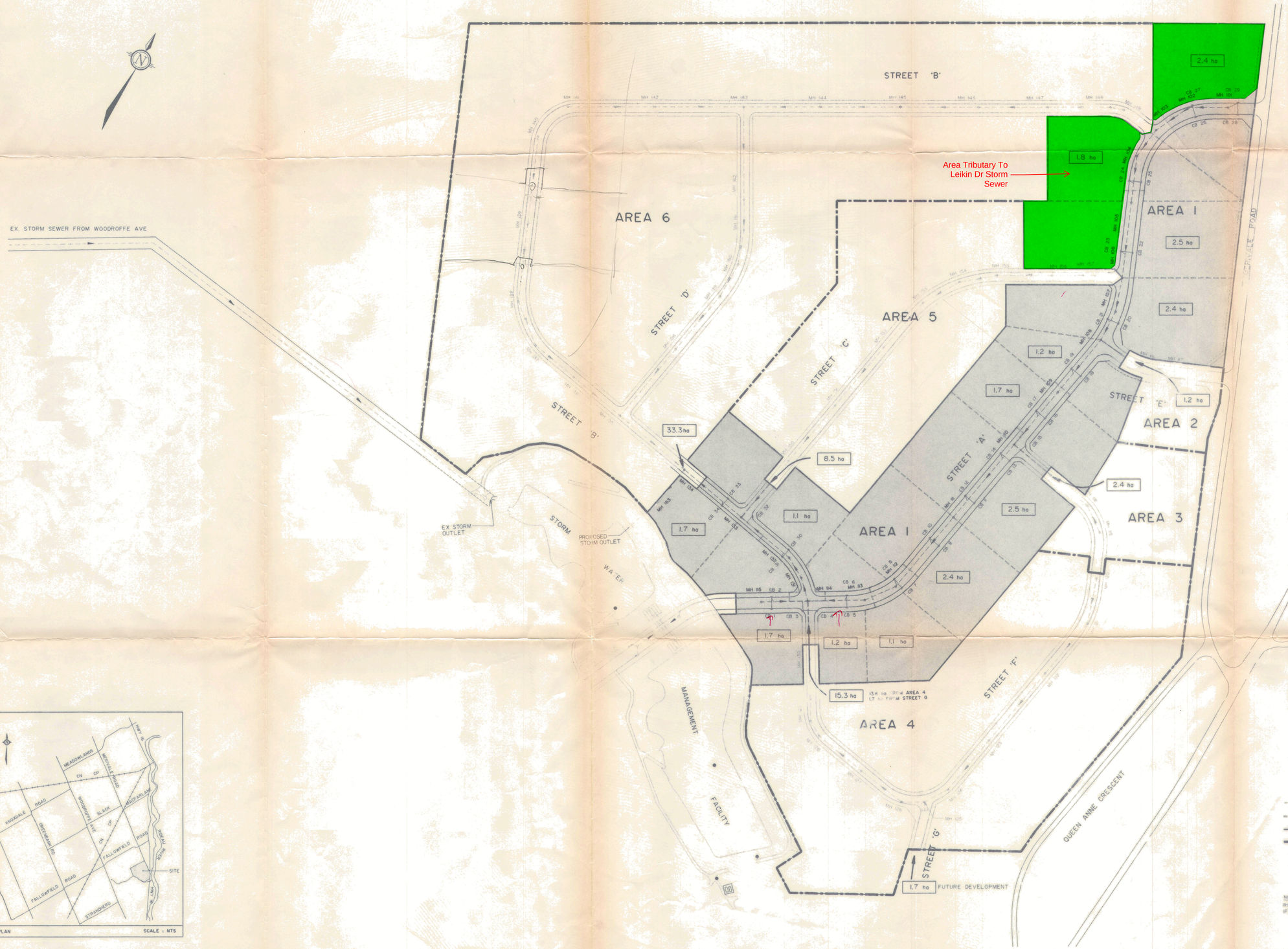
CITY OF NEPEAN

NEPEAN

SOUTH MERIVALE BUSINESS PARK

STORM DRAINAGE AREAS

CONTRACT No.	90041
DATE	SEPT. 1990
DRAWING No.	STM-002



DRAINAGE AREA SCHEDULE	
AREA No.	AREA (ha)
1	23.7
2	12
3	2.4
4	15.3
5	8.5
6	33.3
TOTAL	84.4

LEGEND

- PROPOSED STORM SEWER
- SUB CATCHMENT AREA
- STORM DRAINAGE AREA - PHASE I
- EXTERNAL STORM DRAINAGE AREA BOUNDARY
- 2.4 ha — STORM DRAINAGE AREA (HECTARES)
- MH — MANHOLE

NOTE
RUNOFF COEFFICIENTS FOR ALL DRAINAGE AREAS : C=0.25
(FLOWS TO BE RESRICTED TO PREDEVELOPMENT LEVEL)

NOTE:
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No.	REVISION	DATE	BY
3	ISSUED FOR TENDER	JAN 15/92	SG
2	REVISED AS PER RMOC COMMENTS	DEC 9/91	SG
1	REVISED AS PER NEPEAN COMMENTS	NOV 28/91	SG

LICENSED PROFESSIONAL ENGINEER — UDO BOEHME — PROVINCE OF ONTARIO

LICENSED PROFESSIONAL ENGINEER — S.M. GORDON — PROVINCE OF ONTARIO

NOVATECH
ENGINEERING CONSULTANTS LTD.
OTTAWA, ONTARIO

DESIGN	SG
CHECKED	UB
DRAWN	JFB
CHECKED	UB
APPROVED	MJH

SCALE
1 : 2500
HORIZONTAL
VERTICAL

CITY OF NEPEAN

NEPEAN

SOUTH MERIVALE BUSINESS PARK

STORM DRAINAGE AREA PLAN
PHASE I

CONTRACT No.	90041
DATE	OCT. 1991
DRAWING No.	90041-STM

T0501WR117

CITY OF NEPEAN
SOUTH MERIVALE BUSINESS PARK
STORMWATER MANAGEMENT REPORT

Prepared by:

NOVATECH ENGINEERING CONSULTANTS LTD.

November 1, 1991

Revised December 3, 1991

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1.0 INTRODUCTION

The South Merivale Business Park (SMBP) is located at the south end of Merivale Road and is bounded on the north and northwest by National Capital Commission (NCC) Greenbelt, on the south and southwest by Barrhaven Creek and the Longfield/Davidson Stormwater Management Facility (LDSWMF) and on the east by Merivale Road and Queen Anne Crescent. This area has been redesignated for industrial development. The total site area is 84.4 hectares.

The subdivision is to consist of full urban road cross sections including a storm sewer system. Stormwater drainage currently drains toward Barrhaven Creek with the exception of a portion east of Street A which enters a minor watercourse and then flows east into the Rideau. Proposed stormwater flows will outlet into the (LDSWMF), a stormwater treatment area on Barrhaven Creek.

The LDSWMF currently operates as a water quality detention area for storm runoff from Barrhaven and will also serve the future Longfield and Davidson Heights Communities. It is being upgraded and reconstructed to provide detention for a greater development area with the addition of ultra-violet disinfection. This facility is being designed to detain and treat frequent rainfalls with more severe rainfalls bypassing the treatment facility. The facility has been designed to include stormwater runoff from the business park.

2.0 DESIGN GUIDELINES

Stormwater runoff from the development area must conform to the criteria and parameters established in the LDSWMF Report by Delcan and the South Urban Community Drainage Study by UMA Engineering. Only the former report directly affects the design criteria.

The following summarizes the design criteria to be utilized for stormwater management.

1. A maximum stormwater flow of 4600 L/s will be permitted into the LDSWMF from the SMBP.

2. The following upper basin pond levels and storm events are to be used for design purposes.

POND EVENT	ELEVATION (m)
Normal Dry Weather	83.50
1:2 Year	85.60
1:5 Year	86.20
1:100 Year	86.80

Appendices A and B confirm these design criteria.

The City of Nepean has also established standards to be utilized in conjunction with the above criteria.

These standards are as follows:

1. Outlet control when utilized to be installed at catchbasin only.

2. Inlet flow control devices to be Scepter type A and B, plug version (see Appendix E).

3. Maximum depth of ponding in streets to be 0.25 m.

3.0 MINOR DRAINAGE SYSTEM

3.1 Flow Rates

All storm sewers within the development area have been sized to transmit flows of 54.5 L/s/ha. This average area release rate has been obtained as follows:

$$\text{Area Release Rate} = \frac{\text{Permissable Pond Inflow}}{\text{Total Area}}$$

$$= \frac{4600 \text{ L/s}}{84.4 \text{ ha}}$$

$$= 54.5 \text{ L/s/ha}$$

This release rate approximates to pre-development flows from the area. By using the rational method an overall runoff coefficient, "R", can be calculated applying the 4600 L/s discharge, 84.4 ha area and a rainfall intensity of 83 mm/hr based upon a time of concentration of 15 minutes for a 1:5 year storm event.

$$Q = 2.78 \text{ RIA}$$

$$R = \frac{Q}{2.78 \text{ IA}}$$

$$= \frac{4600}{(2.78)\ (83)\ (84.4)}$$

$$= 0.24$$

Typical runoff coefficient for the business park is estimated at R = 0.75. In this regard, on-site stormwater management will be required to achieve the design release rate. It is proposed that inlet control devices ICD's be installed in all catchbasins and property leads.

Because an average area release rate is used, allowable release rates can be calculated for each identified drainage basin. Table 1 summarizes flow rates from each drainage area. The location of each drainage area is presented on Plan 90041-STM in Appendix E. Column C presents the flow which may be transmitted from each area. It is calculated by proportioning the total flow to each drainage area. Area A1, to be developed in Phase I construction, a total stormwater flow

of 1293 L/s is permissable. This flow is generated from both road right-of-ways and from the industrial sites.

TABLE 1: Summary of SMBP Area R.O.W. and Site Stormwater Flows

Area (ha) (a)	% SMBP (%) a x 100/84.4 (b)	Allowable Flows (b) x 4600 (L/s) (c)	R.O.W. Area (Ha) (d)	Site Area (Ha) (e)	R.O.W.[1] Flows L/s (f)	Site Flows (c-f) (g)	Site Release Rate (L/s/ha) (g)/(e)
A_1 = 23.7	28.1	1293	2.7	21.0	500	793	38.8
A_2 = 1.2	1.4	64	To be designed in detail at a later stage	To be designed in detail at a later stage	To be designed in detail at a later stage	To be designed in detail at a later stage	To be designed in detail at a later stage
A_3 = 2.4	2.8	129					
A_4 = 15.3	18.1	833					
A_5 = 8.5	10.1	465					
A_6 = 33.3/84.4	39.5/00	1816/4600					

NOTES

1. R.O.W. flows calculated as follow

15 pairs catchbasins @ 30 L/s release rate	=	450	L/s
3 catchbasins @ 30 L/s combined release rate	=	30	L/s
single catchbasin @ 20 L/s release rate	=	20	L/s
		500	L/s

3.2 System Design

The storm sewers in the SMBP have been designed using the inlet method and an area release rate of 54.5 L/s/ha. Inlet control devices will be used to restrict the stormwater flow from all roadway catchbasins and properties to the above noted levels. Storm sewer design sheets have been prepared for Phase I using this method and are presented in Appendix C.

Peak flows have been calculated individually by multiplying the catchment area from manhole to manhole by 54.5 L/s. These flows are then added cumulatively to calculate total flows in the system. Proposed sewers have been sized based upon these flows.

To support the use of this design philosophy, design sheets are also included for Phase I construction by applying the rational method in conjunction with the City of Nepean's standard 1 in 5 year IDF curve. Comparing the two sets of design sheets the following differences are noted:

1) The rational method results in total peak flows of 3000 L/s from the entire site whereas the inlet method results in flows of 4600 L/s.

2) A consequence of the rational method would result in the undersizing of storm sewers at the lower end of the system.

The difference in peak design flows is explained by underlying assumptions of each method. Peak flows are a function of the travel time from the upper most end of the system to the outlet. As stormwater travels through the system, flow being added along the way is reduced because the storm's intensity has diminished. The inlet method assumes drainage areas upstream of each catchbasin and property inlet control device are surcharged during infrequent storm events and a constant flow is added to the entire system.

Since the inlet method models the system as it is intended to operate, it is recommended that the storm sewers be designed using this method even though pipe sizes are somewhat conservatively designed.

3.3 Storage

Storage of rainfall from infrequent storm events is necessary in order to achieve the required release rate. Storage can be provided in two locations, as follows:

a) within the road right-of-way
b) on the subdivision sites

Storage volumes for runoff exceeding the allowable release rates is provided in the road right-of-way by virtue of a saw-tooth grading design of the roadway profile. In general, the elevations of successive downstream summits of the saw-tooth design are lower providing, as a minimum, a 0.1% overall major system grade.

Subdivision site storage will be provided in parking areas and is described in detail in section 5.0.

The road right-of-way catchment areas varies in size from 0.13 to 0.25 ha and the typical area is 0.18 ha. Each catchment area will be served by a pair of catchbasins and the flow from each pair will be restricted to 30 L/s. In order to establish this flow a head of 1.4 m is necessary. (See flow curves for the Scepter inlet control device, Type B presented in Appendix E). In area "A1", 34 catchbasins will have a combined flow of 500 L/s as detailed on Table 1. Fifteen catchbasins will be paired together and a single ICD will be installed for every two catchbasins. In one location three catchbasins will be interconnected utilizing one inlet control. A single catchbasin will require a Type "A" ICD in order to achieve the required release rate at this location (catchbasin 32 on drawing 90041-STM).

The total head of 1.4 m can be broken down into two components, the elevation from the centre of the ICD to the top of the catchbasin inlet and from the top of the inlet to the maximum ponding elevation. The maximum ponding elevation has been taken as the pavement grade at the curb located at the downstream summit elevation on the roadway. This typically corresponds to .15 m ponding depth. The centre line of the ICD will be 1.25 m below this point. A maximum ponding elevation of 0.2 m will occur at catchbasin's #24 and 25. Consequently the centre line of this ICD will be 0.05 m higher. Inverts for the 200 mm catchbasin lead will be 100 mm below this elevation. See Appendix G for typical catchbasin and grate details. Catchbasin connections have been shown on the storm drainage area plan.

Type B Scepter ICD was selected because of the larger opening than the Type A which typically results in less maintenance. Furthermore a single ICD will be located in two catchbasins which again will require less maintenance compared to an ICD in every catchbasin. The two catchbasins will be connected by a 200 mm lead at 1.0%. The connection to the storm sewer will be made from the catchbasin closest to the storm sewer for cost reduction.

4.0 MAJOR SYSTEM

The major system has been designed to store flows resulting from the 1:100 year event. Only storms less frequent than this will flood the downstream roadway into the next catchment area.

For the typical catchment area the amount of storage required has been calculated using the modified rational method. At catchbasin's 5 and 6, the following detention volume was calculated.

1:100 Year Storm Event

CB #	Time	Intensity	Area R=0.58 (ha)	Inflow Rate (L/s)	Allowable Release Rate (L/s)	Storage Rate (L/s)	Detention (m^3)
5 & 6	10 20 30 40	174 116 89 70	0.18 0.18 0.18 0.18	50.5 33.7 25.8 20.3	30 30 30 30	20.5 3.7	12.3 $<15m^3$ 4.4

The storage available in the right-of-way catchment area for catchbasins 5 and 6 is 15 m^3. Since a volume of 12.3 m^3 must be stored, sufficient volume is available to provide storage for the 100 year event. Although a ponding level of 150 mm is available in this particular catchment, this depth will not be reached during the 1:100 year design storm event.

5.0 SITE STORMWATER MANAGEMENT

5.1 Typical Phase I Site Release Rate

A summary of recommended release rates for Phase I construction is presented on Table 1. Release rates for Phase I subdivision sites are calculated by subtracting the total allowable stormwater flow from Area 1 right-of-way flows and dividing by the area for the sites. Allowable flows from subdivision sites for Phase I are 38.8 L/s/ha.

Subdivision site release rates for additional phase construction will approximate this flow but must be verified when detail designs are complete.

5.2 On-Site Storage

Site storage is required to control stormwater for rainfalls as infrequent as the 1:100 year storm event. Storage may be provided in two locations.

1. Parking Lot
2. Roof Tops

Figure 1 details a typical site grading plan with the local catchment areas. Parking area grades vary from 1.3% to 4% from the high points to the top of the grates. The highest point in the parking area is set at the road entrance to dam all stormwater from the 1:100 year event from entering the road right-of-way. All other high points have been set to match this elevation.

By using the modified rational method a total detention volume of 206.4 m^3 will be required in the parking area for the 1:100 year storm event. It is assumed roof top storage will be provided on all buildings and the release rate will be limited to approximately 8.0 L/s. The maximum depth of ponding will be approximately 0.3 m at each of the catchbasins for the 100 year storm event.

Figure 1 demonstrates the feasibility of on-site storage. It will be the responsibility of the owners at the site development stage to provide a design for grading and drainage suitable for their particular site with the following criteria:

- Phase I Site Release Rates 38.8 L/s/ha max.
- 100 Year Design Storm

6.0 CONCLUSION

The following summarizes conclusions for the stormwater management for the SMBP.

1. An overall area release rate of 54.8 L/s/ha is permitted to the Longfield/Davidson Stormwater Management Facility.

2. Phase I stormwater flows are to be limited to 1293 L/s.

3. Phase I site stormwater flows are to be limited to 38.8 L/s/ha.

4. The minor stormwater system has been designed to transmit inlet flows equivalent to 54.8 L/s/ha.

5. Release rates in the road right-of-way can be limited to 30 L/s by utilizing a Scepter Type B inlet control device installed to a pair of catchbasins with 1.4 m of head.

6. Saw-tooth road grades have been set to contain the 1:100 year storm event on the road.

7. Sites can be provided with roof top and parking area storage to contain the 1:100 year storm event.

Prepared by:

(Sign + Stamp)

Reviewed by:

(Sign + Stamp)

APPENDIX A

DELCAN LETTER

100-11

DELCAN ENGINEERS PLANNERS ARCHITECTS

35 YEARS

1991 08 15 **BY HAND**

Our Ref: 04-1917-A-00

Mr. Udo Boehme, P.Eng.
Novatech Engineering Consultants Ltd.
Suite 17
77 Auriga Drive
Nepean, Ontario
K2E 7Z7

REÇU/RECEIVED
AUG 21 1991

Dear Mr. Boehme:

RE: Longfields/Davidson Stormwater Facility
City of Nepean

With reference to your letter of August 1, 1991, we are enclosing the following tender issue drawings for your information at this time:

Drawing No.	Description
4	Plan of Facility
5	Horizontal and Vertical Control
7	Collector Road Plan and Profile
9	Existing and Business Park Storm Sewers, Monitoring Station, Site Plans, Access Roads and Details
DA-1	Area Drainage Plan Collector Road Sanitary Sewer

Please note that in some respects, these plans are not final, for example, the watermains will be 406 mm diameter and are under review by the Region. We are also providing copies of design sheets for the sanitary sewer in the collector road, and the storm sewer outlet from the Business Park.

DELCAN CORPORATION

2001 THURSTON DRIVE, P.O. BOX 8004, OTTAWA, ONTARIO, K1G 3H6 • (613) 738-4160 TELEX 06-9666-89
FAX: (613) 739-7105

ST JOHNS, TORONTO, MONTREAL, HAMILTON, NIAGARA FALLS, LONDON, THUNDER BAY, WINNIPEG, REGINA, SASKATOON, CALGARY, VICTORIA, VANCOUVER, NANAIMO

DELCAN

Drawings 4 and 7 show the location and elevation of the sanitary sewer you refer to in your letter. Drawing 5 provides the horizontal location control. Please note that the curved collector road alignment within the boundary of the Facility as shown on your plan does not agree with the straight alignment shown on our plan.

With regard to the Business Park storm sewer outlet, in addition to the design sheets, the plan and profile (drawing 9) and location plans enclosed, we are providing the following water levels in the upper basin per your request.

Pond Level	Elevation
Normal Dry Weather	83.50
1 in 2 Year	85.60
1 in 5 Year	86.20
1 in 100 Year	86.80

We trust this is satisfactory.

Regards.

John R. Allen, P.Eng.
Project Manager

JRA:lmb

Encl.

cc: Mr. Fel Petti, P.Eng.

STORM SEWER DESIGN SHEET

Q = 2.78 AIR
Where Q = peak flow in litres per second (L/s)
A = area in hectares (ha)
I = rainfall intensity in millimetres per hour (mm/h)
R = runoff coefficient

LOCATION			AREAS (ha)			Indiv. 2.78 AR.	Accum. 2.78 AR.	Time of Conc.	Rainfall Intensity I	Peak Flow Q (L/s)	SEWER DATA							COMMENTS
STREET	FROM	TO	R =	R =	R =						Type of Pipe	Diameter (mm)	Slope (%)	Length (m)	Capacity (L/s) n=	Velocity (m/s)	Time of Flow (min)	
* Outlet to Facility										11,867	Conc	2400	0.25%	46 m	12,914	2.765		

*See Novatech Design Sheets Dated Sept. 9, 1990

DeLCan DELCAN CATHER CANADA LTD
CONSULTING ENGINEERS AND PLANNERS

DESIGN J.R. Allen	PROJECT Longfields/Davidson Stormwater Management Facility - South Merivale Business Park Storm Sewer Outlet
CHECKED P.J. Hunt	
DATE 91.05.22	

SHEET No. 1 of 1

SANITARY SEWER DESIGN SHEET

q = average daily per capita flow (454L/cap.d)
I = unit of peak extraneous flow (0.11 L/ha.s)
M = peaking factor
Q(p) = peak population flow (L/s)
Q(i) = peak extraneous flow (L/s)
Q(d) = peak design flow

$M = 1 + \frac{14}{4 + P^{0.5}}$ where P = population in 1000's

$Q(p) = \frac{PqM}{86.4}$ (L/s)

Q(i) = IA (L/s) where A = area in hectares
Q(d) = Q(p) + Q(i) (L/s)

LOCATION			INDIVIDUAL		CUMULATIVE		Peaking factor M	Pop. flow Q(p) (L/s)	Peak extraneous flow Q(i) (L/s)	Peak design flow Q(d) (L/s)	PROPOSED SEWER						
STREET	FROM	TO	Pop.	Area A (hectares)	Pop.	Area A (hectares)					Length (m)	Pipe size (mm)	Type of pipe	Grade %	Capacity (L/s) n =	Full flow velocity(m/s)	Actual vel.at Q(d
*Collector Rd	South P.L.	NorthP.L.	-	-	8623	193.31	3.02	136.84	21.26	158.10							
						65.19	2.70	91.67	7.17	98.84							
										256.94*	171	675	Conc	0.15%	339.52	0.95	
											28	2-450	Conc	0.35%	352.4	1.073	

*See Oliver Mangione McCalla Design Sheets Dated June, 1991

DeLCan DE LEUW CATHER CANADA LTD
CONSULTING ENGINEERS AND PLANNERS

DESIGN	J.R. Allen
CHECKED	P.J. Hunt
DATE	91/06/16

PROJECT Longfields/Davidson
Stormwater Management Facility

SHEET No. 1 of 1

APPENDIX B

STORMWATER MANAGEMENT MEETING MINUTES

MINUTES OF MEETING NO. 1

PROJECT:	South Merivale Business Park		**PROJECT NO:** 90041
DATE:			
LOCATION:	City of Nepean		
PRESENT:	Mr. Gary Craig, P.Eng. Director of Engineering	-	City of Nepean
	Mr. John Allen, P.Eng.	-	Delcan
	Mr. M. Hawdur, P.Eng.	-	Novatech Engineering
	Mr. U. Boehme, P.Eng.	-	Novatech Engineering
DISTRIBUTION:	All present File No. 90041		

The following represent major points and issues discussed:

- The storm outlet for the business park is the Longfields/Davidson Stormwater Management Facility.
- An outlet structure has been provided for in Delcan's contract.
- The pond has been designed to accept controlled flows of 0.05 m^3/sec/ha or a total flow of 4.6 m^3/sec from the business park.
- Delcan is finalizing the twin 400 mm diameter watermain crossing. Present design calls for two watermains approximately 1.0 meter off of curb. Delcan to confirm upon receipt of approval from R.M.O.C.
- The priority of placement of fill resulting from pond excavation will be the berm along Merivale and lots/blocks along Phase I construction for the S.M.B.P. recognizing the suitability of the fill material.
- It was agreed that connecting invert to invert the proposed 625 diameter sanitary sewer to the existing 1050 diameter Barrhaven trunk would not pose a problem.
    - flows may not materialize to the extent causing surcharge.
    - timing for construction of the Merivale Road trunk is on schedule and quite possibly may be advanced.

. . . /2

- The discrepancy between the legal plan and Delcan's design drawing at the northerly limit of the crossing should pose no problems and Delcan will make any necessary adjustments.

- The reference plan should be adjusted to provide a 100 metre centreline radius and be tangential at either end of the curve with respect to the most northerly curve of the business park.

- Depending on the timing of construction for Phase I of the business park and Delcan's contract, proper coordination between the two contracts may be required.

Mr. John Allen left the meeting and the following items/issues were discussed:

- Streetlighting on internal streets would be consistent with City of Nepean criteria.

- Novatech to examine alternatives and make recommendations for Street No. 1 (4 lane facility) with respect to lighting design.

- Nepean to confirm luminaire and pole type.

- Novatech to contact Hydro regarding additional premium to provide underground hydro at all road crossings.

- Novatech to confirm with Park and Recreation location of bike and walkways.

- Novatech to confirm with O.C. Transpo regarding bus lay-by requirements.

PLEASE REPORT ANY ERRORS AND/OR OMISSIONS
TO THE UNDERSIGNED

Prepared by:

NOVATECH ENGINEERING CONSULTANTS LTD.

Udo Boehme, P.Eng.

APPENDIX C

STORMWATER DRAINAGE AREA DESIGN SHEETS Q = 54.5 L/s/ha

STORM SEWER DESIGN SHEET

PROJECT: SOUTH MERIVALE BUSINESS PARK - PHASE 1
DEVELOPER: CITY OF NEPEAN
ENGINEERS: NOVATECH ENGINEERING CONSULTANTS LTD.

DESIGNED BY : SG
CHECKED BY : LJ

DATE: NOV. 1, 1991
Revision:

LOCATION			AREA	INDIV	PEAK FLOW	PROPOSED SEWER					
STREET	FROM M.H.	TO M.H.	(ha)	54.5 A (L/s)	Q (L/s)	TYPE OF PIPE	NOMINAL PIPE SIZE (mm)	GRADE (%)	LENGTH (m)	CAPACITY (L/s)	FULL FLOW VELOCITY (m/s)
'A'	101	102	2.4	130.8	130.8	CONC.	525	0.17	49.0	184.99	0.83
	102	103			130.8	CONC.	525	0.17	51.0	184.99	0.83
	103	104	1.8	98.1	228.9	CONC.	600	0.17	41.0	264.11	0.90
	104	105			228.9	CONC.	600	0.17	59.5	264.11	0.90
	105	106	2.5	136.3	365.2	CONC.	750	0.15	96.0	449.81	0.99
	106	107	2.4	130.8	496.0	CONC.	825	0.15	43.5	579.98	1.05
	107	108			496.0	CONC.	825	0.15	41.0	579.98	1.05
Flow from Street 'E' into MH 108:			1.2	65.4							
'A'	108	109	1.2	65.4	626.8	CONC.	825	0.18	86.0	635.34	1.15
	109	110	1.7	92.7	719.4	CONC.	900	0.15	86.5	731.45	1.11

Q = 54.5 * A (L/s) where: Post Development Flow Restricted to 54.5 L/s/ha n = 0.013

A = Area in hectares

STORM SEWER DESIGN SHEET

PROJECT: SOUTH MERIVALE BUSINESS PARK - PHASE 1
PAGE: 2 of 3

DESIGNED BY : SG
DEVELOPER: CITY OF NEPEAN
DATE: NOV. 1, 1991

CHECKED BY : LJ
ENGINEERS: NOVATECH ENGINEERING CONSULTANTS LTD.
Revision:

LOCATION			AREA	INDIV	PEAK FLOW	PROPOSED SEWER					
STREET	FROM M.H.	TO M.H.	(ha)	54.5 A (L/s)	Q (L/s)	TYPE OF PIPE	PIPE SIZE (mm)	GRADE (%)	LENGTH (m)	CAPACITY (L/s)	FULL FLOW VELOCITY (m/s)
Flow from Street 'F' into MH 110:			2.4	130.8							
'A'	110	111	2.5	136.3	986.5	CONC.	1050	0.15	120.0	1,103.34	1.23
	111	112	2.4	130.8	1117.3	CONC.	1050	0.16	114.0	1,139.52	1.27
	112	113	1.1	60.0	1177.2	CONC.	1050	0.18	43.5	1,208.64	1.35
	113	114	1.2	65.4	1242.6	CONC.	1050	0.2	72.5	1,274.02	1.43
'A'	115	114	1.7	92.7	92.7	CONC.	525	0.17	55.5	184.99	0.83
Flow from Street 'F' into MH 114:			15.3	833.9							
'B'	114	131			2169.1	CONC.	1350	0.16	30.5	2,227.28	1.51
	131	132			2169.1	CONC.	1350	0.16	29.5	2,227.28	1.51
	132	133	1.1	60.0	2229.1	CONC.	1350	0.17	79.0	2,295.82	1.55

Q = 54.5 * A (L/s) where: Post Development Flow Restricted to 54.50 L/s/ha n = 0.013

A = Area in hectares

STORM SEWER DESIGN SHEET

PROJECT: SOUTH MERIVALE BUSINESS PARK - PHASE 1
DEVELOPER: CITY OF NEPEAN
ENGINEERS: NOVATECH ENGINEERING CONSULTANTS LTD.

DESIGNED BY : SG
CHECKED BY : LJ

DATE: NOV. 1, 1991
Revision:

LOCATION			AREA	INDIV	PEAK FLOW	PROPOSED SEWER					
STREET	FROM M.H.	TO M.H.	(ha)	54.5 A (L/s)	Q (L/s)	TYPE OF PIPE	NOMINAL PIPE SIZE (mm)	GRADE (%)	LENGTH (m)	CAPACITY (L/s)	FULL FLOW VELOCITY (m/s)
Flow from Street 'C' into MH 133:			8.5	463.3							
'B'	133	134	1.7	92.7	2785.0	CONC.	1500	0.15	94.0	2,856.14	1.57
Flow from Street 'B' into MH 134:			33.3	1814.9							
	134	163			4599.8	CONC.	1650	0.20	54.0	4,252.36	1.93
	163	outlet			4599.8	CONC.	2400	0.25	46.0	12,912.91	2.77

Q = 54.5 * A (L/s) where: Post Development Flow Restricted to 54.5 L/s/ha n = 0.013

A = Area in hectares

APPENDIX D

STORMWATER DRAINAGE AREA DESIGN SHEETS R = 0.24

STORM SEWER DESIGN SHEET

PROJECT: SOUTH MERIVALE BUSINESS PARK - PHASE 1
DEVELOPER: CITY OF NEPEAN
ENGINEERS: NOVATECH ENGINEERING CONSULTANTS LTD.

DATE: NOV. 1, 1991
Revision:

DESIGNED BY : SG
CHECKED BY : LJ

LOCATION			AREA	RUNOFF	INDIV	ACCUM	TIME OF	RAINFALL	PEAK FLOW	PROPOSED SEWER						
STREET	FROM M.H.	TO M.H.	(ha)	COEFF. R	2.78 AR (L/s)	2.78 AR (L/s)	CONC. (MIN)	INTENSITY (MM/HR)	Q (L/s)	TYPE OF PIPE	NOMINAL PIPE SIZE (mm)	GRADE (%)	LENGTH (m)	CAPACITY (L/s)	FULL FLOW VELOCITY (m/s)	TIME OF FLOW (MIN)
'A'	101	102	2.4	0.24	1.6	1.6	15.0	83	132.4	CONC.	525	0.17	49.0	184.99	0.83	1.0
	102	103							132.4	CONC.	525	0.17	51.0	184.99	0.83	1.0
	103	104	1.8	0.24	1.2	2.8	17.0	77	215.7	CONC.	600	0.17	41.0	264.11	0.90	0.8
	104	105							215.7	CONC.	600	0.17	59.5	264.11	0.90	1.1
	105	106	2.5	0.24	1.7	4.5	18.9	72	323.5	CONC.	750	0.15	96.0	449.81	0.99	1.8
	106	107	2.4	0.24	1.6	6.1	20.7	69	416.8	CONC.	825	0.15	43.0	579.98	1.05	0.7
	107	108							416.8	CONC.	825	0.15	40.0	579.98	1.05	1.4
Flow from Street 'E' into MH 108:			1.2	0.24	0.8	0.8										
'A'	108	109	1.2	0.24	0.8	7.7	22.1	66	507.1	CONC.	825	0.18	86.0	635.34	1.15	1.2
	109	110	1.7	0.24	1.1	8.8	23.3	64	563.1	CONC.	900	0.15	86.5	731.45	1.11	1.3

Q = 2.78 AIR (L/s) where: Post Development Flow Restricted to 54.5 L/s/ha

A = Area in hectares,ha

I = Rainfall Intensity in mm/hr.

n = 0.013

R = Runoff Coefficient

STORM SEWER DESIGN SHEET

PROJECT: SOUTH MERIVALE BUSINESS PARK - PHASE 1

DEVELOPER: CITY OF NEPEAN

ENGINEERS: NOVATECH ENGINEERING CONSULTANTS LTD.

DESIGNED BY : SG

CHECKED BY : LJ

DATE: NOV. 1, 1991

Revision:

LOCATION			AREA	RUNOFF	INDIV	ACCUM	TIME OF	RAINFALL	PEAK FLOW	PROPOSED SEWER						
STREET	FROM M.H.	TO M.H.	(ha)	COEFF. R	2.78 AR (L/s)	2.78 AR (L/s)	CONC. (MIN)	INTENSITY (MM/HR)	Q (L/s)	TYPE OF PIPE	NOMINAL PIPE SIZE (mm)	GRADE (%)	LENGTH (m)	CAPACITY (L/s)	FULL FLOW VELOCITY (m/s)	TIME OF FLOW (MIN)
Flow from Street 'F' into MH 110:			2.4	0.24	1.6	1.6										
'A'	110	111	2.5	0.24	1.7	12.1	24.6	62	747.2	CONC.	1050	0.15	120.0	1,103.34	1.23	1.6
	111	112	2.4	0.24	1.6	13.7	26.2	60	813.8	CONC.	1050	0.16	113.5	1,139.52	1.27	1.5
	112	113	1.1	0.24	0.7	14.4	27.7	58	828.8	CONC.	1050	0.18	42.5	1,208.64	1.35	0.5
	113	114	1.2	0.24	0.8	15.2	28.2	57	864.7	CONC.	1050	0.2	73.5	1,274.02	1.43	0.9
'A'	115	114	1.7	0.24	1.1	1.1	10.0	103	116.5	CONC.	525	0.17	54.0	184.99	0.83	1.1
Flow from Street 'F' into MH 114:			13.6	0.24	9.1	9.1										
'B'	114	131				25.4	29.1	56	1418.2	CONC.	1350	0.16	28.5	2,227.28	1.51	0.3
	131	132							1418.2	CONC.	1350	0.16	29.0	2,227.28	1.51	0.3
	132	133	1.1	0.24	0.7	26.2	29.7	55	1439.6	CONC.	1350	0.17	80.0	2,295.82	1.55	0.9

Q = 2.78 AIR (L/s) where: Post Development Flow Restricted to 50 L/s/ha

A = Area in hectares

I = Rainfall Intensity in mm/hr.

n = 0.013

R = Runoff Coefficient

STORM SEWER DESIGN SHEET

PROJECT: SOUTH MERIVALE BUSINESS PARK - PHASE 1

PAGE: 3 of 3

DESIGNED BY : SG

DEVELOPER: CITY OF NEPEAN

DATE: OCT. 11, 1991

CHECKED BY : LJ

ENGINEERS: NOVATECH ENGINEERING CONSULTANTS LTD.

Revision:

LOCATION			AREA	RUNOFF	INDIV	ACCUM	TIME OF	RAINFALL	PEAK FLOW	PROPOSED SEWER						
STREET	FROM M.H.	TO M.H.	(ha)	COEFF. R	2.78 AR (L/s)	2.78 AR (L/s)	CONC. (MIN)	INTENSITY (MM/HR)	Q (L/s)	TYPE OF PIPE	NOMINAL PIPE SIZE (mm)	GRADE (%)	LENGTH (m)	CAPACITY (L/s)	FULL FLOW VELOCITY (m/s)	TIME OF FLOW (MIN)
Flow from Street 'C' into MH 133:			8.5	0.24	5.7	5.7										
'B'	133	134	1.7	0.24	1.1	33.0	30.6	54	1782.0	CONC.	1500	0.15	93.0	2,656.14	1.57	1.0
Flow from Street 'B' into MH 134:			33.3	0.24	22.2											
	134	162				55.2	31.6	53	2923.9	CONC.	1650	0.20	52.5	4,252.36	1.93	0.5
	162	outlet							2923.9	CONC.	2400	0.25	46.0	12,912.91	2.77	0.3

Q = 2.78 AIR (L/s) where: Post Development Flow Restricted to 50 L/s/ha

A = Area in hectares

I = Rainfall Intensity in mm/hr.

R = Runoff Coefficient

n = 0.013

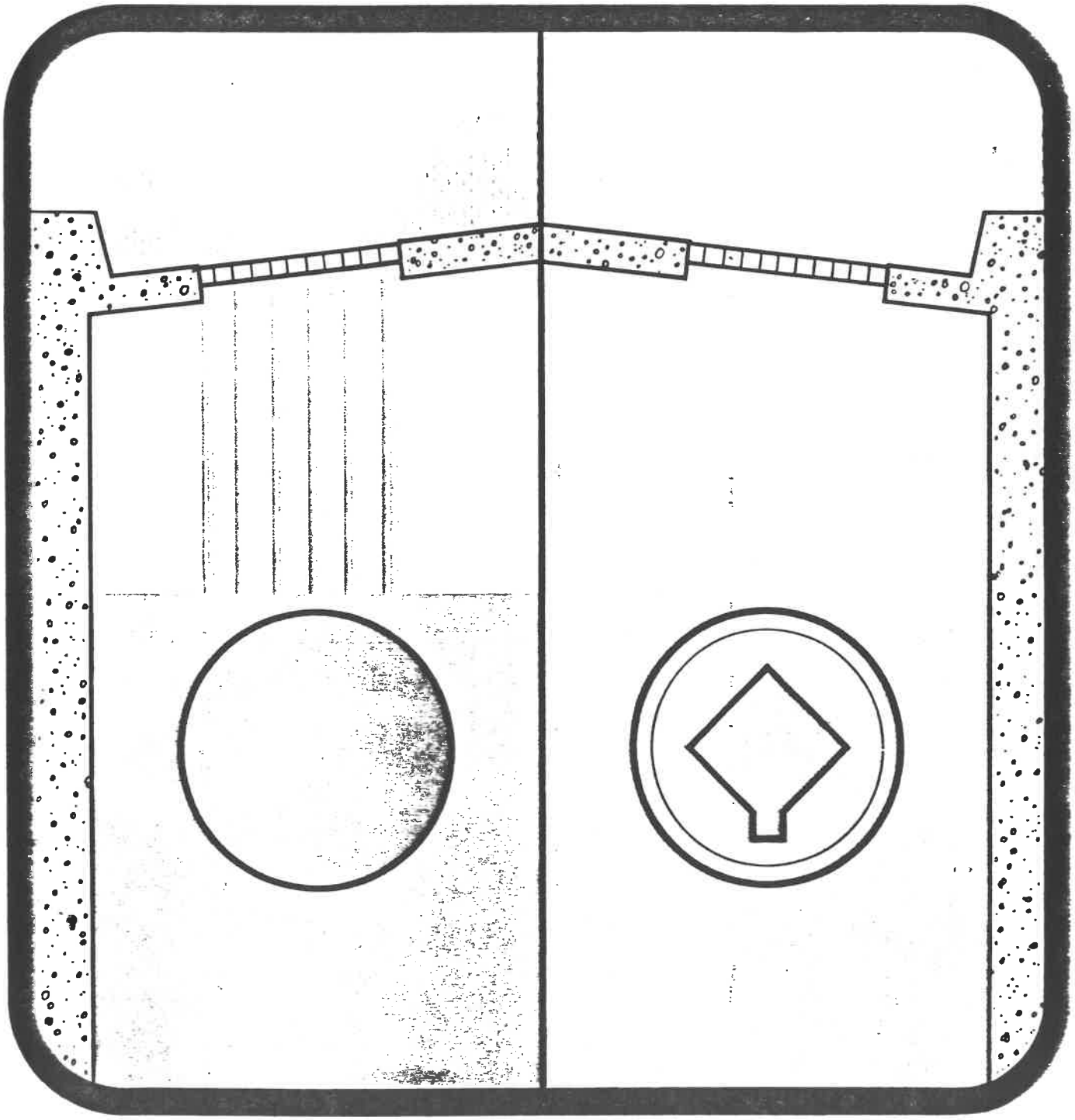
APPENDIX E

INLET CONTROL DEVICE INFORMATION

Sceptor

ICD - Inlet Control Device

A SIMPLE ADDITION TO NEW OR EXISTING STORM SEWER SYSTEMS TO ELIMINATE FLOODED BASEMENTS BY TEMPORARILY DIVERTING EXCESS RAINFALL TO THE SURFACE



SCEPTER ICD
Controls storm water

DESCRIPTION

The Scepter Inlet Control Device (ICD) is a fabricated or injection molded PVC flow orifice. Developed in the Department of Civil Engineering, University of Ottawa, the ICD is available in two standard versions to restrict the flow of storm water.

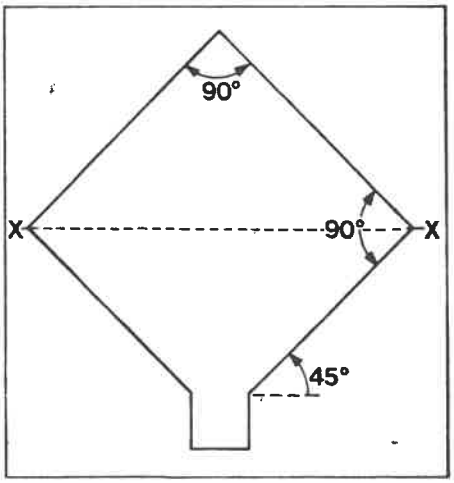
The ratings are:

ICD TYPE	FLOW cfs (l/s)	HEAD ft. (m)
A	0.7 (19.8)	4 (1.22)
B	1.0 (28.3)	4 (1.22)
C	1.3 (36.8)	4 (1.22)
D	3.0 (84.9)	10 (3.05)
F	4.0 (113.2)	10 (3.05)

DESIGN FACTORS

The unique compound orifice shape promotes self-cleaning action in debris-laden flows, especially important in the critical early stages of flow capture. When submerged, the sharp corners of the orifice contract the flow, which helps to "centre" the debris as it traverses the plane of the orifice.

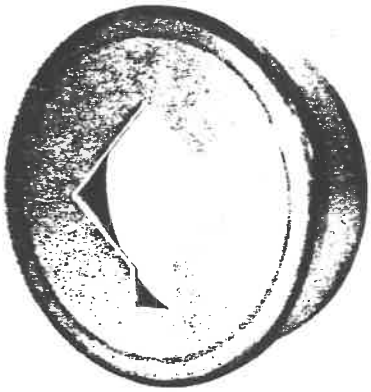
HYDRAULICS



The head is measured from the centreline of the triangle (X-X) to the catchbasin inlet (flood level). Calibration curves for the five standard orifice sizes under various heads are shown on the right.

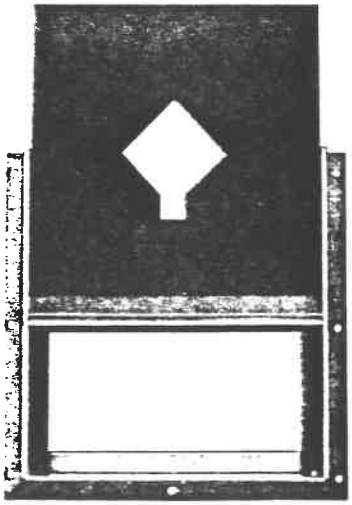
ADAPTABILITY

The Scepter ICD is available in two versions:



PLUG ICD

A short, slightly-tapered plug for insertion in the outlet pipe from the catchbasin (the catchbasin lead). It is held in place by friction and hydrostatic pressure. Made to fit 8", 10" or 12" pipe in any material (clay, A-C, concrete, PVC, etc.). The orifice plate is flush with the end of the plug.



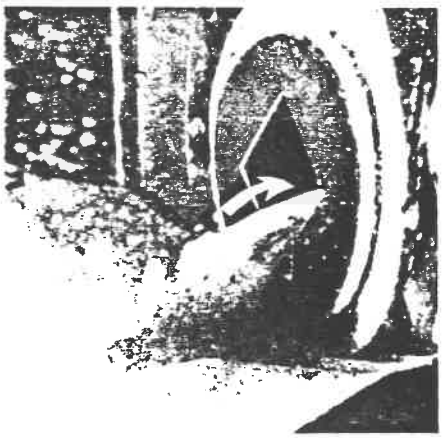
FRAMED ICD

A plate containing the orifice is held in channels in a metal frame. The framed ICD is installed over the outlet pipe from the catchbasin. Both versions of the ICD can be removed for inspection. As installed, they do not limit access to the catchbasin.

ELIMINATES BASEMENT FLOODING AND FOUNDATION SEEPAGE

The patented* function of the ICD is to control surcharging of storm sewers by restricting the flow into the sewer pipe. In the normal course of events drainage system surcharging is unavoidable. During major storms a surcharged sewer may back up into foundation drains (or basement drains in combined systems) and the result is a public outcry against "inadequate" sewer systems. Designing for "100-year storms" or even "five-year storms" can be a costly alternative to simply diverting excessive rainfall to temporary surface storage, and away from the community's basements.

SUMP SCOURING ACTION



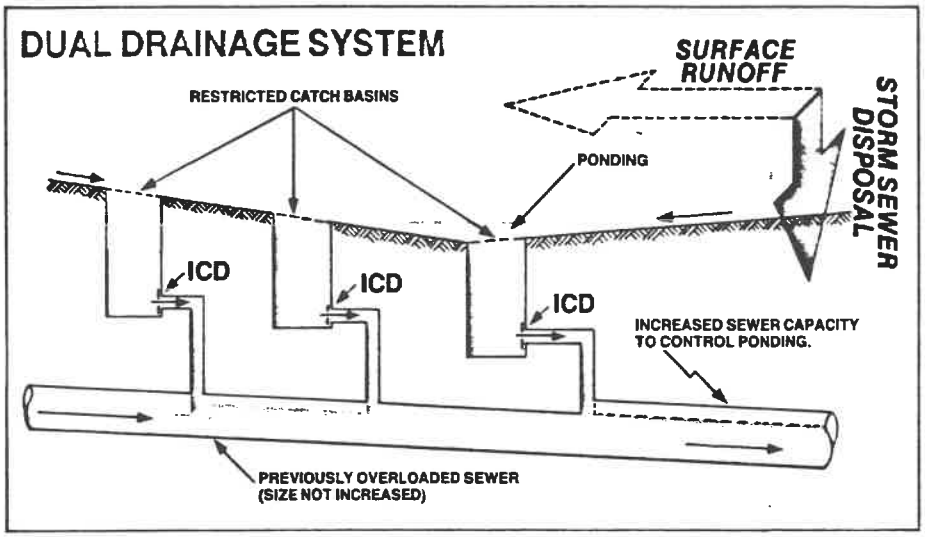
The rectangular slot at the bottom of the orifice works effectively in two ways. First, during dry periods it draws the water level below the main orifice area keeping it clear of floating debris. Second, it generates strong vortex action in the approach flow during heavy rainfalls, which vigorously scours sediment from the sump of the catchbasin and away from the orifice. Field trials and laboratory testing prove this action.

*CANADIAN PATENT 1165207 U.S. PATENT 4522533
MEXICO PATENT PENDING.

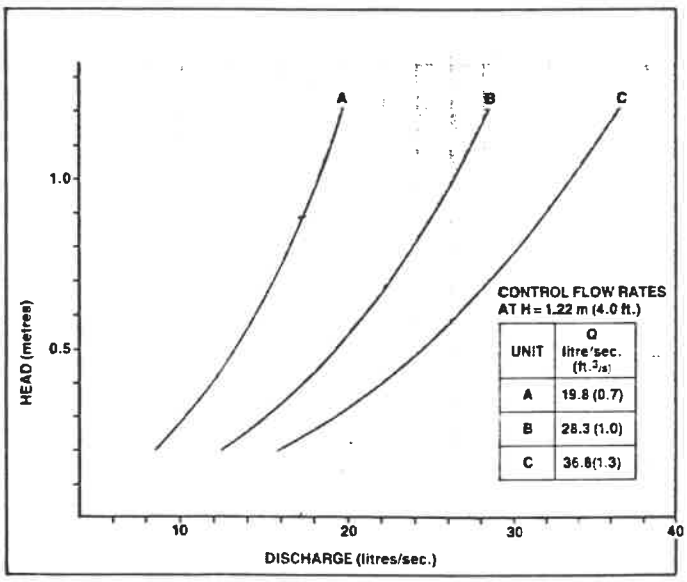
SCEPTER ICD
Preserves storm sewer capacity

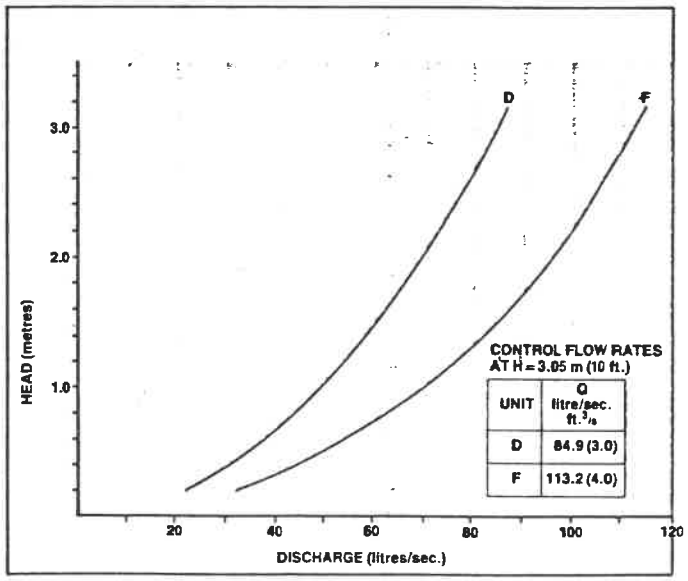
THE SCEPTER ICD ROLE IN THE "DUAL DRAINAGE SYSTEM"

Typically the disposal of storm water is via overland flow and an underground pipe system. A rational design of storm sewer systems will consider not just the capacity of the storm sewer itself, but also the hydraulic characteristics of the sewer inlets and the potential for overland flow via streets and other surface drainage features. A community's storm water disposal system can be modelled on computer. (Your Scepter Representative can suggest a contact for this service.) From such an analysis will emerge an optimum design of pipe size, location of Scepter ICD's, depth of ponding, and the duration and spread of ponding. Together with the strategic location of parkland and proper street grading, the use of Scepter ICD's plays a key role in the elimination of flooding by controlling sewer inlets. Studies in a number of communities show that systems designed with the "dual drainage" principle using Scepter ICD's can avoid surcharging during flows having return periods up to 100 years. Existing systems can make use of this principle if suitable temporary storage facilities are introduced. Relief sewer projects for existing systems can also use the ICD's. In the above figure only the lower conduit has an increased capacity. Without ICD's, the entire system would have required changes.



CALIBRATION CURVES FOR STANDARD ORIFICE SIZES

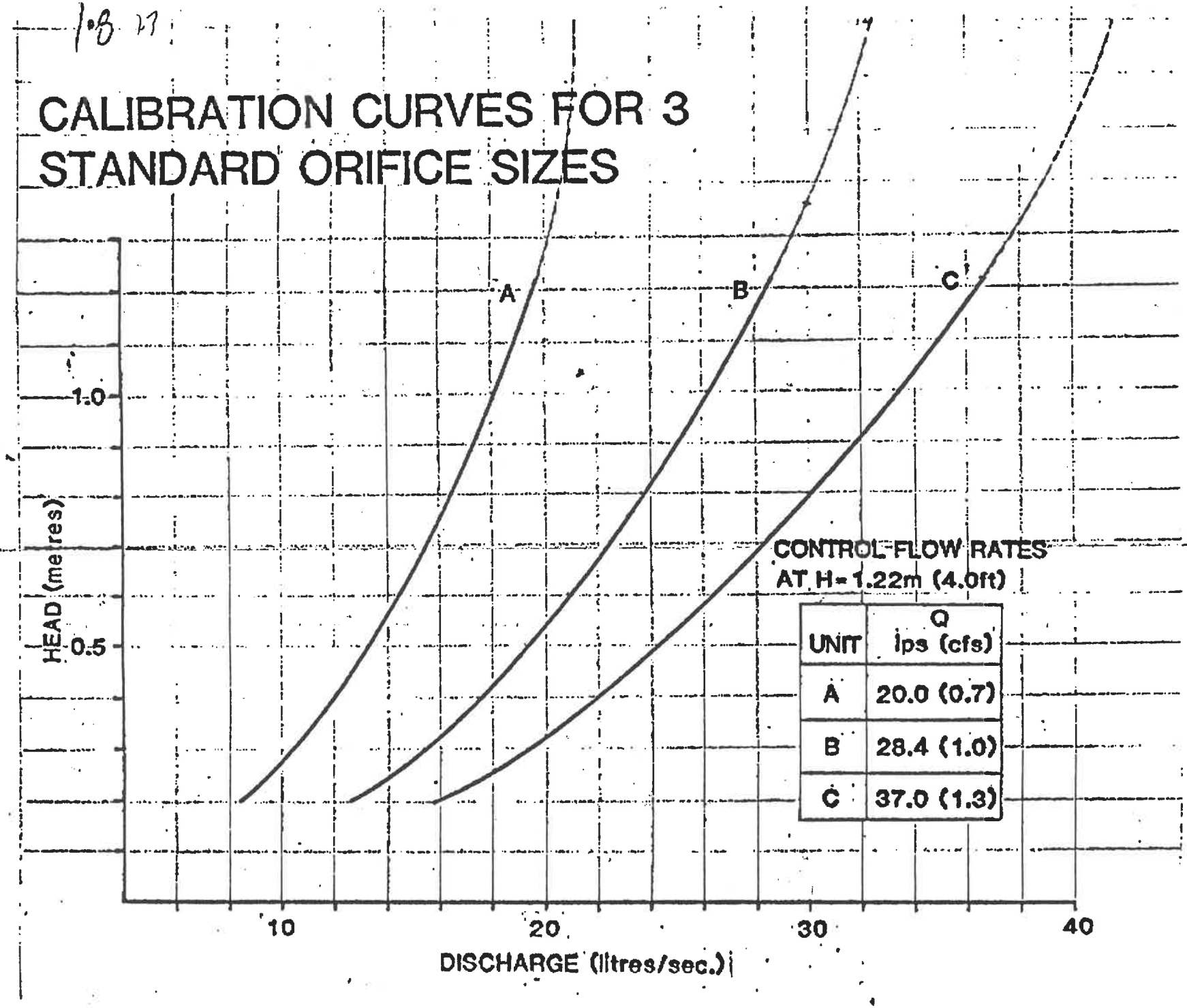




Note: Units D and F can be adapted to minimum 10-inch size pipes.

1.B 27

CALIBRATION CURVES FOR 3 STANDARD ORIFICE SIZES

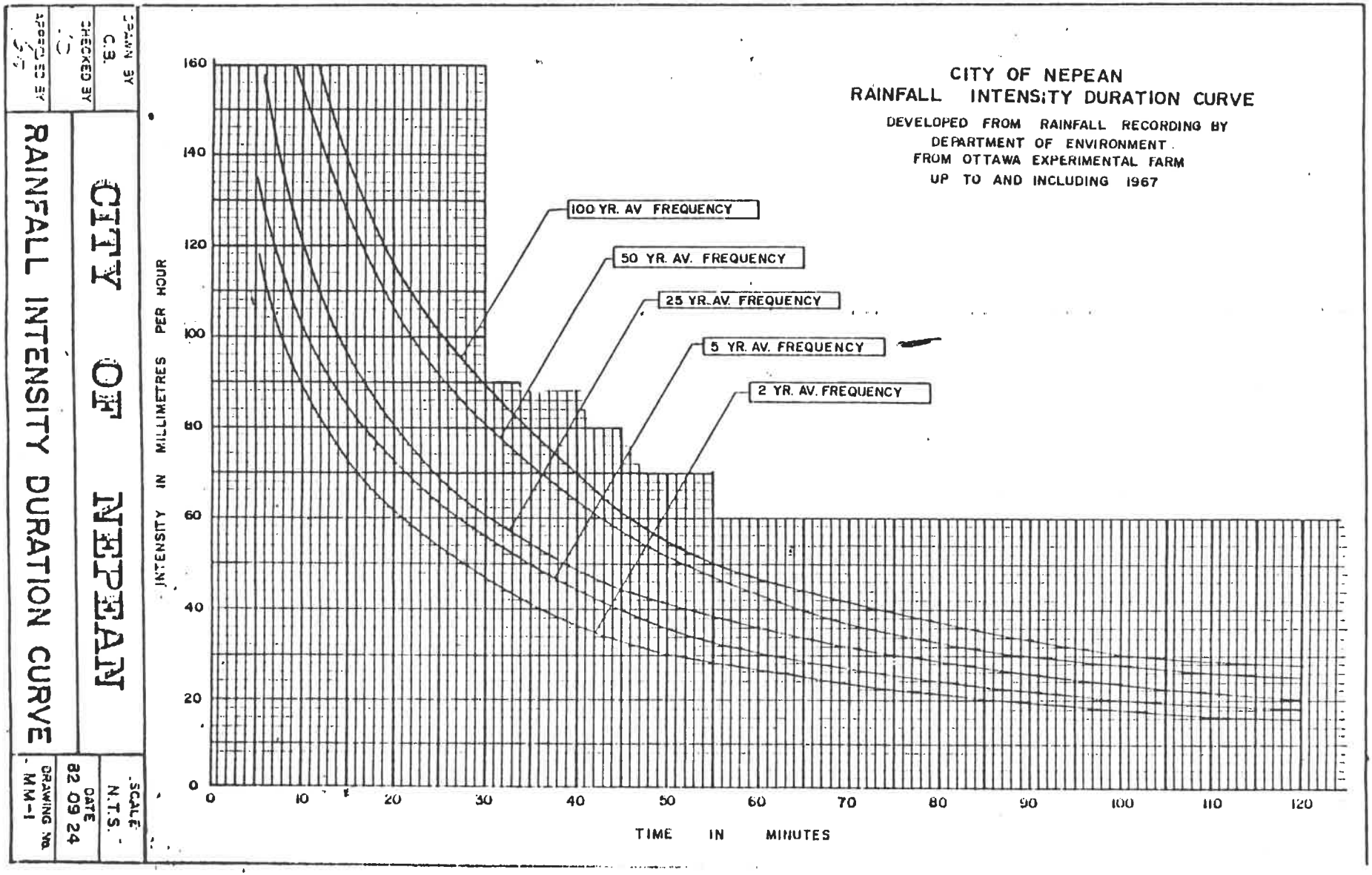


CONTROL FLOW RATES
AT H = 1.22m (4.0ft)

UNIT	Q lps (cfs)
A	20.0 (0.7)
B	28.4 (1.0)
C	37.0 (1.3)

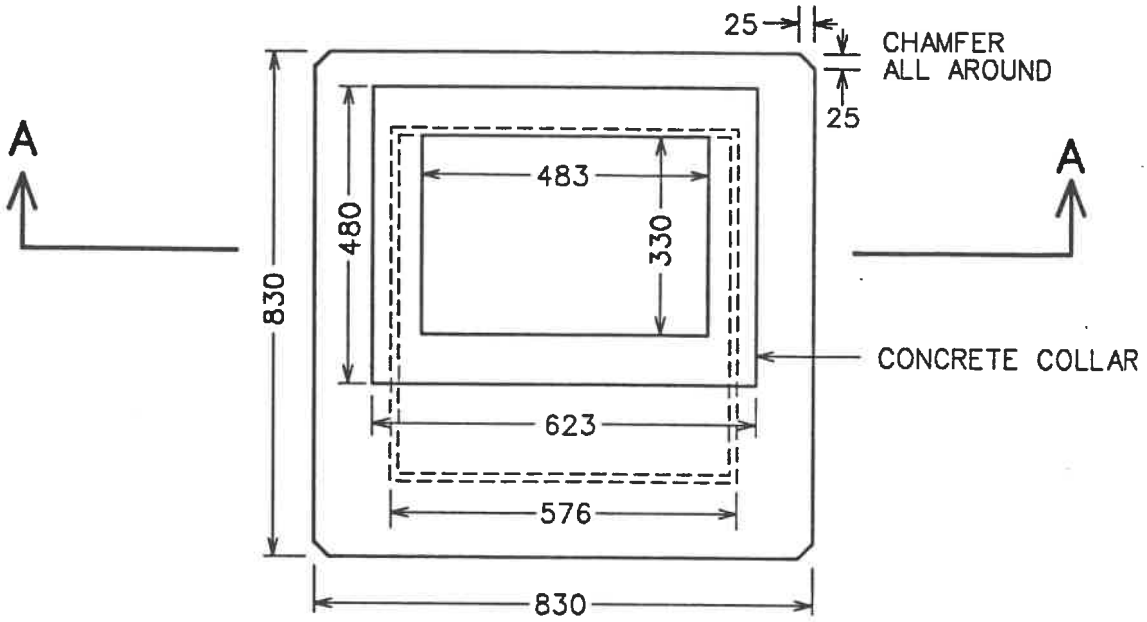
APPENDIX F

CITY OF NEPEAN IDF CURVES

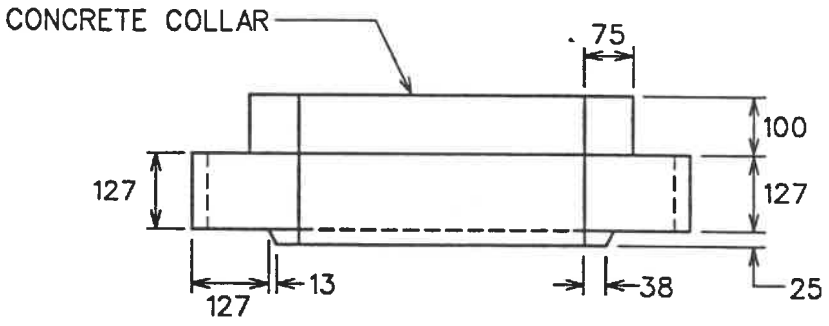

CITY OF NEPEAN
RAINFALL INTENSITY DURATION CURVE
DEVELOPED FROM RAINFALL RECORDING BY
DEPARTMENT OF ENVIRONMENT.
FROM OTTAWA EXPERIMENTAL FARM
UP TO AND INCLUDING 1967
100 YR. AV FREQUENCY
50 YR. AV. FREQUENCY
25 YR. AV. FREQUENCY
5 YR. AV. FREQUENCY
2 YR. AV. FREQUENCY
INTENSITY IN MILLIMETRES PER HOUR
0
20
40
60
80
100
120
140
160
0
10
20
30
40
50
60
70
80
90
100
110
120
TIME IN MINUTES
CITY OF NEPEAN
RAINFALL INTENSITY DURATION CURVE
DRAWN BY C.B.
CHECKED BY
APPROVED BY
SCALE N.T.S.
DATE 82 09 24
DRAWING No. MM-1

APPENDIX G

TYPICAL CATCHBASIN AND GRATE DETAIL



PLAN VIEW

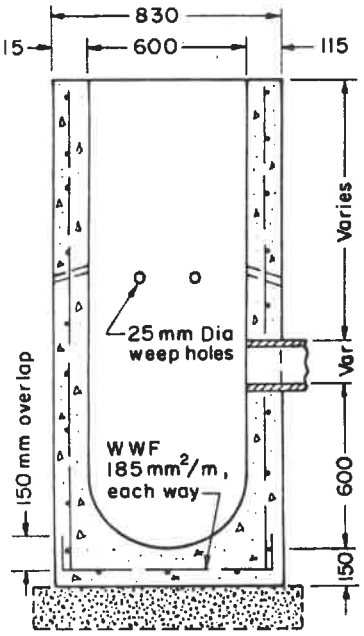


SECTION A-A

NOTES:

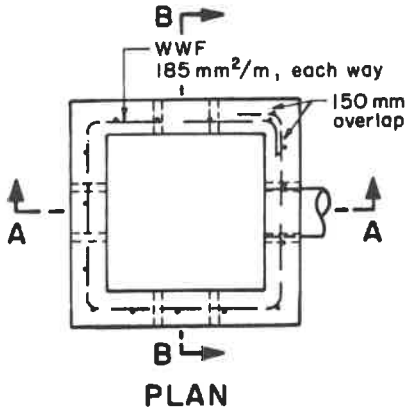
1. TOP TO BE USED ON ALL CATCH BASINS - O.P.S.D. 705.02
2. NS-400 FRAME AND COVER TO BE SET ON COLLAR AND SECURED - SEE NS-700
3. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE SHOWN

SCALE: N.T.S.	**CITY OF NEPEAN** PUBLIC WORKS DEPARTMENT	REV: 1
DRAWN: M.F.M.		DATE: SEPT. 1991
APPR.: W.R.N.	CONCRETE CATCH BASIN TOP	DRAWING NO.: NS-703

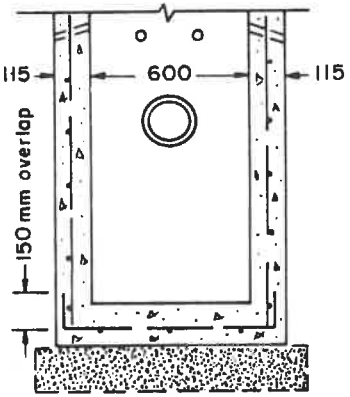


SECTION A-A

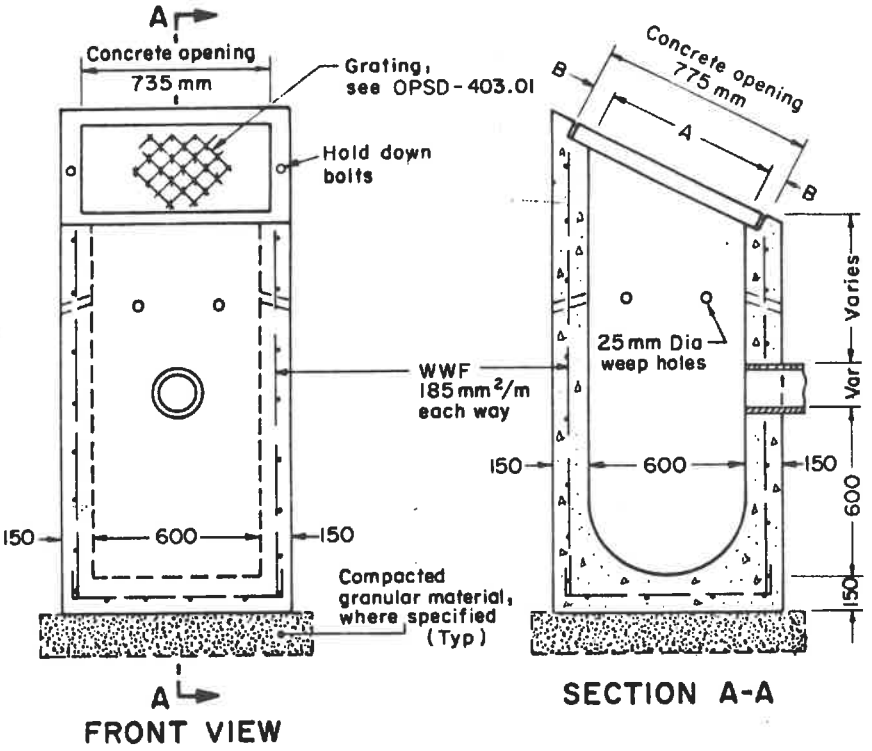
CATCH BASIN TYPE A



PLAN



SECTION B-B



FRONT VIEW

SECTION A-A

DITCH INLET TYPE B

SLOPE OF GRATING	DIMENSIONS	
	A	B
2:1	675	50
3:1	645	65
4:1	625	75
6:1	605	85
8:1	605	85
10:1	605	85

NOTES:

A Where inlet is placed across ditch and is accessible to vehicular traffic, grating slope is to be 6:1 or flatter.

B All reinforcing steel shall have 25 mm min cover.

C Weep holes, where required, shall be placed so that the bottom of the weeper on the inside and the top of the weeper on the outside are level.

D Granular backfill to be placed to a min thickness of 300 mm on all sides.

E All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING

600 x 600 mm PRECAST CONCRETE CATCH BASIN AND DITCH INLET

DEPTH 4.0 m MAX

Date	1983 12 01	Rev	

Date

OPSD-705.02

APPENDIX H

MAJOR SYSTEM PLANS

DRAINAGE AREA SCHEDULE	
AREA No.	AREA (ha)
1	23.7
2	1.2
3	2.4
4	15.3
5	8.5
6	33.3
TOTAL	84.4

LEGEND

- PROPOSED STORM SEWER
- SUB CATCHMENT AREA
- STORM DRAINAGE AREA - PHASE I
- EXTERNAL STORM DRAINAGE AREA BOUNDARY
- 2.4 ha — STORM DRAINAGE AREA (HECTARES)
- MH — MANHOLE

NOTE
RUNOFF COEFFICIENTS FOR ALL DRAINAGE AREAS : C=0.25
(FLOWS TO BE RESTRICTED TO PREDEVELOPMENT LEVEL)

NOTE.
THE POSITION OF ALL POLE LINES, CONDUITS, WATERMAINS, SEWERS AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, DETERMINE THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND ASSUME ALL LIABILITY FOR DAMAGE TO THEM.

No.	REVISION	DATE	BY
3	ISSUED FOR TENDER	JAN 15/92	SG
2	REVISED AS PER RMOC COMMENTS	DEC 9/91	SG
1	REVISED AS PER NEPEAN COMMENTS	NOV.28/91	SG

LICENCED PROFESSIONAL ENGINEER — UDO BOEHME — PROVINCE OF ONTARIO

LICENCED PROFESSIONAL ENGINEER — S.M. GORDON — PROVINCE OF ONTARIO

NOVATECH
ENGINEERING CONSULTANTS LTD
OTTAWA, ONTARIO

DESIGN	SG
CHECKED	UB
DRAWN	JFB
CHECKED	UB
APPROVED	MJH

SCALE
1 : 2500
HORIZONTAL
VERTICAL

CITY OF NEPEAN

NEPEAN

SOUTH MERIVALE BUSINESS PARK

STORM DRAINAGE AREA PLAN
PHASE I

CONTRACT No.	90041
DATE	OCT. 1991
DRAWING No.	90041-STM

Appendix E

Development Servicing Checklist

4. Development Servicing Study Checklist

The following section describes the checklist of the required content of servicing studies. It is expected that the proponent will address each one of the following items for the study to be deemed complete and ready for review by City of Ottawa Infrastructure Approvals staff.

The level of required detail in the Servicing Study will increase depending on the type of application. For example, for Official Plan amendments and re-zoning applications, the main issues will be to determine the capacity requirements for the proposed change in land use and confirm this against the existing capacity constraint, and to define the solutions, phasing of works and the financing of works to address the capacity constraint. For subdivisions and site plans, the above will be required with additional detailed information supporting the servicing within the development boundary.

4.1 General Content

N/A ☐ Executive Summary (for larger reports only).

☒ Date and revision number of the report.

☒ Location map and plan showing municipal address, boundary, and layout of proposed development.

☒ Plan showing the site and location of all existing services.

☒ Development statistics, land use, density, adherence to zoning and official plan, and reference to applicable subwatershed and watershed plans that provide context to which individual developments must adhere.

☐ Summary of Pre-consultation Meetings with City and other approval agencies.

☒ Reference and confirm conformance to higher level studies and reports (Master Servicing Studies, Environmental Assessments, Community Design Plans), or in the case where it is not in conformance, the proponent must provide justification and develop a defendable design criteria.

☒ Statement of objectives and servicing criteria.

☒ Identification of existing and proposed infrastructure available in the immediate area.

☒ Identification of Environmentally Significant Areas, watercourses and Municipal Drains potentially impacted by the proposed development (Reference can be made to the Natural Heritage Studies, if available).

☒ Concept level master grading plan to confirm existing and proposed grades in the development. This is required to confirm the feasibility of proposed stormwater management and drainage, soil removal and fill constraints, and potential impacts to neighbouring properties. This is also required to confirm that the proposed grading will not impede existing major system flow paths.

N/A ☐ Identification of potential impacts of proposed piped services on private services (such as wells and septic fields on adjacent lands) and mitigation required to address potential impacts.

N/A ☐ Proposed phasing of the development, if applicable.

☒ Reference to geotechnical studies and recommendations concerning servicing.

☒ All preliminary and formal site plan submissions should have the following information:

- Metric scale
- North arrow (including construction North)
- Key plan
- Name and contact information of applicant and property owner
- Property limits including bearings and dimensions
- Existing and proposed structures and parking areas
- Easements, road widening and rights-of-way
- Adjacent street names

4.2 Development Servicing Report: Water

☒ Confirm consistency with Master Servicing Study, if available

☒ Availability of public infrastructure to service proposed development

N/A ☐ Identification of system constraints

☒ Identify boundary conditions

☒ Confirmation of adequate domestic supply and pressure

☒ Confirmation of adequate fire flow protection and confirmation that fire flow is calculated as per the Fire Underwriter's Survey. Output should show available fire flow at locations throughout the development.

☒ Provide a check of high pressures. If pressure is found to be high, an assessment is required to confirm the application of pressure reducing valves.

N/A ☐ Definition of phasing constraints. Hydraulic modeling is required to confirm servicing for all defined phases of the project including the ultimate design

☒ Address reliability requirements such as appropriate location of shut-off valves

N/A ☐ Check on the necessity of a pressure zone boundary modification.

☒ Reference to water supply analysis to show that major infrastructure is capable of delivering sufficient water for the proposed land use. This includes data that shows that the expected demands under average day, peak hour and fire flow conditions provide water within the required pressure range

☒ Description of the proposed water distribution network, including locations of proposed connections to the existing system, provisions for necessary looping, and appurtenances (valves, pressure reducing valves, valve chambers, and fire hydrants) including special metering provisions.

N/A ☐ Description of off-site required feedermains, booster pumping stations, and other water infrastructure that will be ultimately required to service proposed development, including financing, interim facilities, and timing of implementation.

☒ Confirmation that water demands are calculated based on the City of Ottawa Design Guidelines.

☒ Provision of a model schematic showing the boundary conditions locations, streets, parcels, and building locations for reference.

4.3 Development Servicing Report: Wastewater

☒ Summary of proposed design criteria (Note: Wet-weather flow criteria should not deviate from the City of Ottawa Sewer Design Guidelines. Monitored flow data from relatively new infrastructure cannot be used to justify capacity requirements for proposed infrastructure).

☒ Confirm consistency with Master Servicing Study and/or justifications for deviations.

N/A ☐ Consideration of local conditions that may contribute to extraneous flows that are higher than the recommended flows in the guidelines. This includes groundwater and soil conditions, and age and condition of sewers.

☒ Description of existing sanitary sewer available for discharge of wastewater from proposed development.

☒ Verify available capacity in downstream sanitary sewer and/or identification of upgrades necessary to service the proposed development. (Reference can be made to previously completed Master Servicing Study if applicable)

☒ Calculations related to dry-weather and wet-weather flow rates from the development in standard MOE sanitary sewer design table (Appendix 'C') format.

☒ Description of proposed sewer network including sewers, pumping stations, and forcemains.

N/A ☐ Discussion of previously identified environmental constraints and impact on servicing (environmental constraints are related to limitations imposed on the development in order to preserve the physical condition of watercourses, vegetation, soil cover, as well as protecting against water quantity and quality).

N/A ☐ Pumping stations: impacts of proposed development on existing pumping stations or requirements for new pumping station to service development.

N/A ☐ Forcemain capacity in terms of operational redundancy, surge pressure and maximum flow velocity.

N/A ☐ Identification and implementation of the emergency overflow from sanitary pumping stations in relation to the hydraulic grade line to protect against basement flooding.

☐ Special considerations such as contamination, corrosive environment etc.

4.4 Development Servicing Report: Stormwater Checklist

☒ Description of drainage outlets and downstream constraints including legality of outlets (i.e. municipal drain, right-of-way, watercourse, or private property)

N/A ☐ Analysis of available capacity in existing public infrastructure.

☒ A drawing showing the subject lands, its surroundings, the receiving watercourse, existing drainage patterns, and proposed drainage pattern.

☒ Water quantity control objective (e.g. controlling post-development peak flows to pre-development level for storm events ranging from the 2 or 5 year event (dependent on the receiving sewer design) to 100 year return period); if other objectives are being applied, a rationale must be included with reference to hydrologic analyses of the potentially affected subwatersheds, taking into account long-term cumulative effects.

☒ Water Quality control objective (basic, normal or enhanced level of protection based on the sensitivities of the receiving watercourse) and storage requirements.

☒ Description of the stormwater management concept with facility locations and descriptions with references and supporting information.

N/A ☐ Set-back from private sewage disposal systems.

N/A ☐ Watercourse and hazard lands setbacks.

N/A ☐ Record of pre-consultation with the Ontario Ministry of Environment and the Conservation Authority that has jurisdiction on the affected watershed.

☒ Confirm consistency with sub-watershed and Master Servicing Study, if applicable study exists.

- [X] Storage requirements (complete with calculations) and conveyance capacity for minor events (1:5 year return period) and major events (1:100 year return period).
- [X] Identification of watercourses within the proposed development and how watercourses will be protected, or, if necessary, altered by the proposed development with applicable approvals.
- [X] Calculate pre and post development peak flow rates including a description of existing site conditions and proposed impervious areas and drainage catchments in comparison to existing conditions.
- N/A [ ] Any proposed diversion of drainage catchment areas from one outlet to another.
- [X] Proposed minor and major systems including locations and sizes of stormwater trunk sewers, and stormwater management facilities.
- N/A [ ] If quantity control is not proposed, demonstration that downstream system has adequate capacity for the post-development flows up to and including the 100-year return period storm event.
- [ ] Identification of potential impacts to receiving watercourses
- [ ] Identification of municipal drains and related approval requirements.
- [X] Descriptions of how the conveyance and storage capacity will be achieved for the development.
- [ ] 100 year flood levels and major flow routing to protect proposed development from flooding for establishing minimum building elevations (MBE) and overall grading.
- [X] Inclusion of hydraulic analysis including hydraulic grade line elevations.
- [X] Description of approach to erosion and sediment control during construction for the protection of receiving watercourse or drainage corridors.
- N/A [ ] Identification of floodplains – proponent to obtain relevant floodplain information from the appropriate Conservation Authority. The proponent may be required to delineate floodplain elevations to the satisfaction of the Conservation Authority if such information is not available or if information does not match current conditions.
- N/A [ ] Identification of fill constraints related to floodplain and geotechnical investigation.

4.5 Approval and Permit Requirements: Checklist

The Servicing Study shall provide a list of applicable permits and regulatory approvals necessary for the proposed development as well as the relevant issues affecting each approval. The approval and permitting shall include but not be limited to the following:

☒ Conservation Authority as the designated approval agency for modification of floodplain, potential impact on fish habitat, proposed works in or adjacent to a watercourse, cut/fill permits and Approval under Lakes and Rivers Improvement Act. The Conservation Authority is not the approval authority for the Lakes and Rivers Improvement Act. Where there are Conservation Authority regulations in place, approval under the Lakes and Rivers Improvement Act is not required, except in cases of dams as defined in the Act.

☐ Application for Certificate of Approval (CofA) under the Ontario Water Resources Act.

N/A ☐ Changes to Municipal Drains.

N/A ☐ Other permits (National Capital Commission, Parks Canada, Public Works and Government Services Canada, Ministry of Transportation etc.)

4.6 Conclusion Checklist

☒ Clearly stated conclusions and recommendations

N/A ☐ Comments received from review agencies including the City of Ottawa and information on how the comments were addressed. Final sign-off from the responsible reviewing agency.

☒ All draft and final reports shall be signed and stamped by a professional Engineer registered in Ontario

Appendix F

Drawings