CIRRUS DEVELOPMENTS

Stormwater Management Report

Timberview Trail Development

February 2021 - 18-8995

Table of Contents

Figures

Tables

Appendices

1.0 Introduction

1.1 Background

This Stormwater Management (SWM) Report has been prepared in support of the detailed design of the 'Timberview Trail Development' residential subdivision located in the community of Mount Brydges, in the Municipality of Strathroy Caradoc (Municipality). The site of the proposed project is currently vacant land located immediately west of the Queen Street and Glendon Drive intersection. The site is bounded to the west by the Lipsit Drain, and to the north, east and south by existing residential development.

Dillon Consulting Limited (Dillon) was retained by Cirrus Developments to complete the detailed design of the residential development, including the design of municipal services, the local road network and lot grading. Stormwater from this site will be collected and conveyed by the proposed subdivision surface grading and a proposed local storm sewer system to a wet SWM pond that provides quality and quantity treatment in accordance with standard provincial stormwater management guidelines. The controlled stormwater flows (quality and quantity) from the proposed SWM pond will outlet to Lipsit Drain.

1.2 Purpose and Objectives

The purpose of this report is to document the existing hydrologic conditions within the Timberview Trail property, quantify the anticipated post-development flow rates and runoff volumes, and present a comprehensive stormwater management strategy that mitigates the impacts of the proposed development on the quality and quantity of runoff discharging to the receiving water system.

The primary objectives of the proposed stormwater management plan are to provide a design that results in:

- Controlled post-development rates and volumes of stormwater run-off to acceptable targets;
- Appropriate stormwater servicing of the proposed residential development area both in terms of major and minor flows;
- Protection of property from flooding or flood damage potential; and
- Protection of water quality relevant to current provincial and municipal design criteria.

1.3 Background Information

The following background information was used to assist with the development of the site SWM strategy:

- Lipsit Municipal Drain Drawings (1988 & 2009) by Spriet and Associates Consulting Engineers
- Pamela Drive Drain Drawings (1988) by Spriet and Associates Consulting Engineers
- Applewood Acres Drain (2004) by Spriet and Associates Consulting Engineers

- Rougham Road Drain (2004) by Spriet and Associates Consulting Engineers
- Geotechnical Engineering Report, dated February 2020, by Englobe (Ref. File160-B-0020770-0-GE-R-0001)
- Hydrogeology Study Report, dated February 2020, by Englobe (Ref. 160-B-0020770-0-02-HD-R-0001-0A)
- Topographic Plan of Survey by MTE Consultants, dated January 24, 2019 (Ref. File 44420-102)

1.4 Site SWM Criteria

The site SWM control criteria for the proposed development were developed based on consultation with the Municipality's reviewer (Spriet) and St. Clair Region Conservation Authority (SRCA), and are described below.

Water Quality Treatment
Provide MECP Normal Protection Level Water Quality Treatment (70% of TSS Removal)

Water Quantity Control
Reduce the post-development peak runoff to pre-development magnitudes for 5-year, 10-year, 25-year and 100-year storm. Additionally, assess the potential of pond overtopping and flooding of the proposed subdivision and surrounding properties for the 250-year storm.

1.5 General Modelling Approach and Hydrologic Input Parameters

Both existing and proposed hydrologic conditions were evaluated using Computational Hydraulics International's (CHI) Personal Computer Stormwater Management Model (PCSWMM). The SCS curve number (CN) method was used to calculate infiltration losses.

Hydrologic calculations were performed for the 5-year, 10-year, 25-year, 100-year and 250-year design events using a three hour Chicago storm distribution. A four hour 25 mm water quality design storm was also analyzed. The rainfall IDF curve parameters presented in Table 1 below were provided by Spriet and are consistent with the curves presented in the Municipality of Strathroy-Caradoc Servicing Standards.

Table 1: Design IDF Parameters

IDF Curve Parameter	25mm Storm	5-Year Storm	10-Year Storm	25-Year Storm	100-Year Storm	250-Year Storm
A	538.85	1137.257	1425.011	1835.352	2561.151	3048.220
B	6.331	7.184	7.382	7.844	9.093	10.030
C	0.809	0.83	0.843	0.858	0.880	0.888

2.0 Existing Conditions

A brief description of the existing drainage conditions is provided below.

2.1 Subject Site Existing Drainage

Presently, the majority of the 4.18 ha site is used for agricultural purposes while a small portion is open grassed area. The current drainage for the subject lands generally slopes to the west, outletting as surface flow to the Lipsit Drain. The existing topography of the subject site is gently sloping with an average slope of approximately 1.3%.

Based on the existing topography, there are five external drainage areas that contribute runoff to subject site, as shown on Figure 1. The corresponding existing conditions drainage parameters are presented in Table 2.

Table 2: Existing Drainage Parameters

Catchment ID	Description	Area (ha)	Impervious Area (%)	Slope (%)
01	Subject Site	3.74	0	1.3
EXT1	Residential Area to the south (backyards and portion of roofs)	0.20	31	0.85
EXT2	Residential Area to the south (backyards and portion of roofs)	1.47	13	1.1
EXT3&4	Major and Minor Flows from Queen Street	2.026	24	0.9
EXT6	Residential Area to the east (backyards and portion of roofs)	0.15	21	2.1
EXT5	Residential Area to the south (backyards and portion of roofs)	0.21	8	2.1
EXT7	Major Flows from Queen Street	1.783	24	0.9
TOTALS/AVERAGE:		9.579		

Catchment 02 (0.44 ha) shown on Figure 1 will remain undeveloped in the post-development condition. Consequently, this catchment was not included in the site SWM design hydrologic analysis.

Major flows from Queen Street generally flow through the site towards Lipsit Drain. Additionally, the existing Clarke Drain flows through a portion of the site, conveying external flows to Lipsit Drain.
The Geotechnical Engineering report completed by EXP in May of 2017, identifies a ground surface layer of organic topsoil ranging in thickness from roughly 30 mm to 200 mm overlying layers of very loose to compact fine sand within the explored depths of ranging from 4.3 m to 5 m. Based on this, the subject site and external areas can likely be classified as Hydrologic Soil Group 'A'. The water table level was

measured in the boreholes and monitoring wells at depths ranging from 0.7 m to 1.7 m below ground surface.

2.2 Municipal Drains

The site is bounded to the west by the Lipsit Drain, which is the outlet for the subject site. The Lipsit Drain drainage area, including its tributaries, is shown on the drainage plan presented in Appendix A. Based on visual observations during Dillon's site visits and survey, the Lipsit Drain banks near the subject site are currently well vegetated and no erosion issues were identified.

The Preliminary Servicing Report (December 2019), indicates that the calculated 250-year flood depth in the Lipsit Drain is approximately 0.91 m next to the subject site. In comparison, the total drain depth is approximately 1.51 m at the assessed locations. However, discussions are ongoing with Spriet and the Municipality to regarding the need for a more detailed hydraulic analysis of the Lipsit Drain.

The Clarke Drain is a closed municipal drain that conveys runoff from EXT1 across the subject site to the Lipsit Drain. The corresponding drainage plan is presented in Appendix A.

2.3 Existing Hydrology

Existing hydrologic conditions were evaluated using PCSWMM, a dynamic hydrology-hydraulic simulation software. The existing catchments areas provided in Table 2 are modelled to estimate the peak flows directed to Lipsit Drain.

The existing conditions PCSWMM input parameters are and corresponding model output are presented in Appendix B. The model results are summarized in Table 3.

Table 3: Existing Conditions Flow

Design Event	Peak Discharges (m^3/s)
5-year	0.276
10-year	0.335
25-year	0.411
100-year	0.529

The calculated discharges presented in Table 3, will be used as the proposed condition design peak flow targets. Note that these calculated target discharges include only major flows from EXT7 in anticipation of future drainage changes on Queen Street.

3.0 Proposed Conditions

3.1 Proposed Development and External Areas

The proposed development is comprised of 20 single-family residential units, 16 semi-detached residential units and 25 townhouse residential units with associated road and driveways. The proposed development increases the imperviousness of the site with the addition of building and driveway coverage.

The anticipated Catchment Area 1 imperviousness is approximately 58%. The existing external drainage areas will continue to contribute runoff to the subject site under the proposed conditions. The proposed conditions drainage parameters are presented in Table 4.

Table 4: Post-Development Drainage Parameters Considered in Proposed SWM

Catchment ID	Description	Area (ha)	Impervious Area (%)	Slope (%)
1	Subject Site	3.74	58	1.1
EXT1	Residential Area to the south (backyards and portion of roofs)	0.20	31	0.85
EXT2	Residential Area to the south (backyards and portion of roofs)	1.47	13	1.1
EXT3&4	Major and Minor Flows from Queen Street	2.026	24	0.9
EXT6	Residential Area to the east (backyards and portion of roofs)	0.15	21	2.1
EXT5	Residential Area to the south (backyards and portion of roofs)	0.21	8	2.1
EXT7	Major Flows from Queen Street	1.783	24	0.9
TOTALS/AVERAGE:		9.579		

As part of the separate proposed Queen Street improvements, a proposed storm sewer will be constructed to convey the minor flows from EXT7 northward directly to the Lipsit Drain. Consequently, only major flows from EXT7 enter the subject site under the proposed conditions. These major flows are accommodated by the proposed site major system.

All runoff from the proposed development as well as external areas will be collected and conveyed to a proposed SWM pond that discharges to the Lipsit Drain. The proposed conditions drainage areas and proposed SWM strategy are shown on Figure 2. The proposed conditions PCSWMM input parameters and corresponding model output are presented in Appendix C.

3.2 Lipsit Municipal Drain Consideration

Spriet expressed concerns that the Lipsit Municipal Drain tailwater could affect a proposed SWM strategy and cause flooding at the subject site. Therefore, the portion of the Lipsit Drain, ending downstream of Rougham Road culvert, is considered in the hydrology / hydraulic PCSWMM modeling. The Lipsit Drain catchment area was determined as per Lion's Gate Subdivision Stormwater Management Report by Dillon Consulting (dated March, 2019) accepted by Municipality and SCRCA.

As indicated on the Lipsit Drain Watershed Plan (Dwg. 1, Spriet 2009) provided in Appendix A, catchment areas used in modeling consist of Lipsit Drain (33 ha), Bice Drain (19.8 ha), Arena and Lions Park (7.1 ha) and the downstream areas (63 ha). These areas are further sub-delineated for modelling purposes. In addition to proposed development and external areas (considered in the subject site SWM strategy) presented above in Table 4, catchment areas are summarized in Table 5 below and drain directly to Lipsit Drain. As per Table 4 and Table 5, the total area is 123.1 Ha.

Table 5: Catchment Areas Draining Directly to Lipsit Drain

Catchment ID	Description	Area (ha)	Impervious Area (%)	Slope (%)
S1	Portion of Downstream Area	5.26	0*	0.85
S2	Portion of Downstream Area	28.37	20*	0.85
S3	Portion of Downstream Area	5.12	21**	0.55
S4	Portion of Downstream Area	2.16	6.5**	0.85
S5	Portion of Downstream Area	9.45	4.1**	0.9
S6	Arena and Lions Park	7.43	13.3**	0.9
S7	Lipsit Drain	33.00	20*	0.9
S9	Bice Drain	19.80	20*	1
S10	Portion of Downstream Area	2.93	15**	0.9
TOTALS:		113.52		

*Visually determined from aerial photo

**Measured from aerial photo

The imperviousness was determined based on the aerial photo which is more conservative approach than determining imperviousness based on the runoff coefficient used in the Lion's Gate Subdivision Report or runoff coefficient used in Spriet's storm sewer design sheets. Consequently, design flows to Lipsit Drain calculated by PCSWMM modeling is slightly higher than design flow calculated in the Lion's Gate Subdivision Report using the rational formula.

An upstream SWM block (refer to Lipsit Drain Watershed Plan, Spriet 2009) also contributes to the overall flows with a given discharge of 250 L/s for 100 year storms provided by Spriet. Controlled flows

for other return period of storms are calculated as a ratio. The upstream SWM block flows are summarized in the Table 6, below.

Table 6: Upstream SWM Block Controlled Flows

Design Event	SWM Block Controlled Flows (m^3/s)
25mm Storm	0.060*
5-year	0.114*
10-year	0.134*
25-year	0.160*
100-year	0.250**
250-year	0.284*

*Calculated as a Ratio

**Provided by Spriet

The cross-sectional data of Lipsit Drain was used from the surveyed cross-sections presented in the above referenced Lion's Gate Subdivision Stormwater Management Report and 2617 Queen Street Lipsit Drain Flow Calculations Brief by Ricor Engineering Ltd., dated June 2018. These cross-sections were modified as per Lipsit Drain 2009 Drawings by Spriet (Main Drain Upper Portion – Dwg. 2 and Main Drain Lower Portion –Dwg. 3). The cross-section modifications include deepening the drain but exclude drain widening (available space for widening and work plan to be discussed with Spriet) as presented on the Detail 'C', shown on Main Drain Lower Portion – Dwg. 3. The additional modifications as per Lipsit Drain 2009 Drawings used in the PCSWM modeling include the following: lowering the existing Rougham Road culvert (2210 x1600 mm arch CSP) and replacing 2 existing upstream culverts (1,200 mm CSP) with 1,500 mm CSP culverts.

Based on conversations with Spriet, the Lipsit Drain 100 year and 250 year storm events were modeled using a tailwater elevation of 245.50 m as a boundary condition at the outlet, downstream of the Rougham Road culvert. Other storm events (25mm storm, 5-year, 10-year and 25-year) were modelled using a calculated normal depth at the outlet.

The catchment areas presented in Table 4 and Table 5, along with upstream SWM block flows outlined Table 6 were modeled using PCSWMM. The proposed conditions PCSWMM input parameters and corresponding model output are presented in Appendix C.

3.3 Proposed SWM Strategy

The SWM strategy explained below was proposed to address negative impacts to the receiving Lipsit Drain due to proposed site development/urbanisation and to meet meets Municipal and provincial requirements.

As shown on Figure 2, attached to this report, the development site plans includes a traditional storm sewer collection system. The minor design storm is the 1:5-year rainfall event. All runoff during the minor storm event will be intercepted by catch basins connected to a storm sewer collection network. Flow will then be outlet to a stormwater management facility to control flows (both quality and quantity) before releasing to Lipsit Drain. Similarly, major flows are conveyed as shallow surface flow by the proposed right-of-ways to the proposed SWM pond.

Stormwater design for the site as constrained by two factors: minimal gradient from the Clark Drain tie-in on Queen Street and the Lipsit Drain outlet, and the requirement to maintain existing drainage from adjacent properties (limiting the ability to raise site grades). Due to these constraints, the storm sewers have minimal cover and grades.

The portions of the Clarke Drain located within the subject site will be removed within the site and capped at the west property limit and the rear of Lot 21 - B. External flows from Clarke Drain will be maintained and directed to Lipsit Drain through the proposed storm sewers. The existing diameter of Clarke Drain at the site is 375 mm and it is proposed to maintain this size at the Queen Street tie-in consistent with current conditions. For Clarke Drain within the subject site, refer to servicing drawing. Flows from external area EXT 7 will be picked up at Queen Street by the proposed Queen Street storm sewer system.

Therefore, drainage from external areas EXT 2, 3, and 5 will be incorporated into the site storm sewer sizing for the 5-year storm.

It is proposed that minor flows from EXT7 are redirected to Lipsit Drain (upstream of the subject site) via proposed 450mm and 600 mm Queen Street storm sewer. Therefore, EXT 7 minor flows are not part of proposed SWM strategy.

The major flows (storms exceeding 1:5-year rainfall event) from the proposed development will be collected and conveyed as a surface to the proposed SWM Pond via proposed roadways. These flows will eventually outlet to Lipsit Drain after being controlled in the SWM Pond.

For the proposed SWM strategy including catchment areas refer to Figure 2, attached to this report.

3.4 Proposed SWM Pond

The wet pond SWM Pond was proposed to address quality and quantity control requirements outlined in the Section 1.5. The SWM wet pond was designed in accordance to MECP Stormwater Management Planning and Design Manual, 2003 (SMPDM).

As per standard design, wet ponds consist of permanent pool and active storage. The permanent pool has forebay which is separated from rest of the pond by an earthen berm. Permanent pool is used to

achieve quality control while active storage is used to achieve both, quality and quantity requirements. Pond components are explained in more detail in below subsections.

3.4.1 Inlet Structure and Energy Dissipation

The proposed inlet structure for the pond is located near the north-east corner of the pond block. The pond inlet has been positioned in conjunction with the layout of the sediment forebay and aims to maximize the travel distance of flows entering and exiting the stormwater management pond. The inlet structure is proposed to consist of an OPSD 804.040 energy dissipating headwall (with grate) configured to accept the outlet storm sewer from the proposed. The pond inlet structure has been positioned above the permanent pool elevation of the pond. For this reason, as well to allow ease access for forebay cleaning, cable concrete is proposed, extending down the side slope to the bottom of the pond. The combination of the OPSD 804.040 headwall and cable concrete will dissipate the velocity of stormwater run-off discharging from the outlet storm sewer into the pond sediment forebay. In addition, the SC250--VMax Permanent Turf Reinforcement Mats are proposed to protect pond side slope at the major storm inlet location. For pond details refer to SWM Facility & Details Drawing, provided in Appendix D.

3.4.2 Quality and Quantity Control Outlet Structure

The proposed stormwater management facility utilizes an outlet structure comprised of a 1,500 mm CSP riser, ditch inlet catch basin (DICB) and weir, proposed to provide required quality and quantity control requirements.

A perforated 1,500 mm CSP riser with an 110mm diameter orifice is proposed to provide quality control attenuation. The CSP riser will be located at the west end of the wet pond, with the orifice inlet at the permanent pool elevation of 244.44 m.

The SWM wet pond facility quantity control utilizes a combination of two outlets (in addition to above mentioned 110 mm orifice used for quality control), a 2.4 m long weir with 10:1 side slope and a 525 mm pipe located in DICB, to control the release rates to required level. The bottom of weir is set at elevation of 245.90 m (100-year Lipsit Drain WS elevation at pond outlet), DICB lower grate is set at 244.96 m and DICB's 525 mm pipe invert is at 244.44 m. The controlled storm flows is to be conveyed to Lipsit Drain at the elevation of 244.40 m via 600 mm pipe. The head wall as per OPSD 705.030 with grate and cable concrete is to be placed at the outlet to Lipsit Drain to provide additional structural stability, erosion control and safety. The proposed weir will be protected with cable concrete. For more details refer to SWM Facility & Detail Drawing, provided in Appendix D.

3.4.3 Stage-Storage-Discharge Assessment of Pond

The SWM Facility design has been developed taking into consideration the natural topography of the pond block, proposed adjacent rear-yard elevations, and the adjacent buffer and design requirements outlined in MECP SMPDM. The proposed SWM Facility drawing is provided in Appendix D.

Table 7 summarizes the final stage-storage relationship for the proposed SWM pond and notes critical elevations within the pond. As noted in the table, the pond provides the required quality and quantity control volumes for storm events up to the 1:250-year design storm. As shown in the table below, the proposed wet pond has sufficient capacity to accommodate 250-year storm within the pond. The proposed pond provides approximately 338 m^3 of permanent pool volume and approximately 2166 m^3 of active storage at the top of the pond. The pond quality and quantity control performance is provided in following section.

Table 7: Stage Storage Relationship

Stage	Permanent Pool Volume (m^3)	Active Storage Volume (m^3)	Design Discharge (m^3/s)	Reference Elevation
243.14	0	0		Bottom of Pond
243.44	18.5	0		
244.64	Not Calculated	0		
244.84	Not Calculated	0		
244.04	Not Calculated	0		
244.24	Not Calculated	0		
244.44	338.5	0		Top of Permanent Pool
245.02	338.5	529	0.031*	Top of Quality Control Storm – 25 mm Storm / Storage Volume
245.1	338.5	620		
245.3	338.5	875		
245.36	338.5	958	0.179**	1:5-Year WS El./Storage Volume
245.49	338.5	1141	0.239**	1:10-Year WS El./Storage Volume
245.60	338.5	1317		
245.63	338.5	1366	0.324**	1:25-Year WS El.***/Storage Volume
245.70	338.5	1476		
245.78	338.5	1610	0.314**	1:100-Year WS El.***/Storage Volume
245.86	338.5	1736	0.361**	1:250-Year WS El./Storage Volume
245.90	338.5	1808		Bottom of the 2.4 m Weir
246.10	338.5	2166		Top Of the Pond

*Design discharge generated only by 110 mm orifice

**Design discharge generated by 110 mm orifice and DICB with 525 mm Pipe

***100-Year Storm Event was attenuated below 25-Year due to hydraulic conditions in Lipsit Drain. 100-Year was calculated using tailwater of 245.50 m at the outlet while 25-Year Storm was calculated using normal depth at the outlet.

3.4.4 Water Quality Treatment

Water quality control of run-off from the proposed development will be provided through a wet pond with a permanent pool and an extended detention storage volume, in accordance with guidelines in the MECP SMPDM. It was determined in consultation with the St. Clair Region Conservation Authority (SCRCA) and Municipality that the proposed wet pond should achieve 'Normal' (70% TSS removal) protection level. Table 3.2 in MECP SMPDM provides volumetric water quality criteria to achieve a 'Normal' protection level for various impervious levels, based on a 24-hour drawdown (minimum of 12 hours may be acceptable for smaller catchment) and a wet pond design which conforms to other guidance provided in the manual.

The required permanent pool and extended detention storage volumes for the proposed development were estimated from the MOE (2003) volumetric criteria, as summarized in Table 8. Additional calculations can be found in Appendix E.

Table 8: Water Quality Storage Requirements (MOE 2003)

Parameter	Value
Subcatchment Area	3.74 ha
Lot Impervious Level (assumed)	58%
Protection Level	Normal (70% long-term suspended solids removal)
Facility Type	Wet Pond
Required Total Water Quality Control Volume*	114 m^3/ha
Required Extended Detention Volume**	40 m^3/ha
Required Extended Detention Volume	150 m^3
Required Permanent Pool Volume	277 m^3
Provided Permanent Pool Volume	338 m^3

*Interpolated from MECP SMPDM Table 3.2 for imperviousness of 58%

**Value specified in the MECP SMPDM.

A forebay is a component of wet pond quality control that requires proper design. The sediment forebay facilitates maintenance and improves pollutant removal by trapping larger particles near the inlet of the pond. The sediment forebay has been positioned within the pond to optimize the potential length-to-width ratio and maximize potential flow distance through the pond under normal operating conditions. The sediment forebay has been separated from the rest of the pond's permanent pool with the use of a berm. The settling length and dispersion length were performed to confirm that the propped forebay meets MECP requirements. These calculations are provided in Appendix E. The settling length of the forebay has been calculated at approximately 10 m (Equation 4.5: Forebay Settling Length). The required length of dispersion was calculated to be 16 m (Equation 4.6: Dispersion Length). As stated in the MECP design guidelines, the forebay length should be greater than or equal to the larger of the dispersion and settlement lengths. The length of proposed forebay is 26 m, therefore requirements outlined in the MECP design guidelines are satisfied.

The model was used to simulate the run-off response of the developed site with a rainfall time series using the 25 mm, four hour Water Quality Storm. Based on the simulation results, an active storage volume of 529 m^3 is required to meet water quality targets above the provided permanent pool volume of 338 m^3 provided. This allows a drawdown time of approximately 15 hours with the orifice plate of 110 mm. Refer to Appendix F for Pond Graph (time vs volume). As presented on the graph there is more than 10% of pond volume, after 15 hours Therefore, the proposed pond can achieve 'Normal' level (or higher) of quality control.

3.4.5 Peak Flow Control

The proposed pond was designed to attenuate the post–development discharges to pre-development magnitude. The comparison of the pre-development and the post development flow rates is provided in Table 9.

Table 9: Existing and Proposed Conditions Flow

Design Event	Post-Development Peak Discharges (m^3/s)	Post-Development Peak Discharges (m^3/s)
5-year	0.276	0.179
10-year	0.335	0.239
25-year	0.411	0.324*
100-year	0.529	0.314*

*100-Year Storm Event was attenuated below 25-Year due to hydraulic conditions in Lipsit Drain. 100-Year was calculated using tailwater of 245.50 m at the outlet while 25-Year Storm was calculated using normal depth at the outlet.

As shown in the table above, the post-development flow rates are attenuated to pre-development levels (or below).

The comparison of the water surface elevations in Lipsit Drain and SWM Pond is presented in Table 10.

Table 10: Water Surface Comparisons

Design Event	WS Elevation in Lipsit Drain (m)	WS Elevation in SWM Pond (m)
25mm Storm	*245.01	245.02
5-year	*245.42	245.36
10-year	*245.54	245.49
25-year	*245.68	245.63
100-year	**245.89	245.78
250-year	**245.94	245.86

*Calculated using normal depth as a boundary condition

**Calculated using tailwater of 245.50m as a boundary condition

4.0 Erosion and Sediment Control

A comprehensive erosion and sediment control (ESC) plan will be prepared for the subdivision and will be in place during construction. Applicable measures may include straw bale check dams, filter cloth or silt sacks covered catch basin grates, silt fencing, and granular mats at entrances to existing roads.

4.1 Construction Scheduling

All temporary and permanent ESC facilities should be constructed prior to installation of any services or commencement of earth moving operations and construction of the wet pond facilities such that sediment control is properly addressed. Although it is expected that the subdivision will be constructed in a number of phases, the wet pond facilities will be constructed prior to any upstream development. The SWM pond will not be phased according to the service area, it will be constructed to its ultimate configuration to avoid future disturbance of established vegetation.

Work is to be scheduled such that exposed areas can be seeded and mulched in appropriate growing seasons and not left exposed during the winter and spring periods.

4.2 Temporary Sediment Control Measures

4.2.1 Silt Fence

A temporary silt fence will be constructed around the perimeter of the site and any areas, which could permit extensive rilling or sheet flow erosion. Silt fences are to be constructed of filter fabric and post to Ontario Provincial Standards. They should be checked throughout the site development to ensure sediments do not break through the filter fabric.

4.2.2 Catch Basin Sediment Traps

Throughout construction, all catch basin grates will be lined with filter fabric or silt sacks to prevent excessive volumes of sediment from entering into the catch basins and stormwater pipes. The catch basins will be constructed with a sump area below the outlet pipe to collect sediments from the road surfaces within the structures. All catch basins will be vacuumed or flushed throughout the construction phase and at the completion of the construction to remove any sediment. Upon post-construction, all catch basins will be cleaned regularly by municipal workers in sequence with other streets.

4.3 Permanent Erosion and Sediment Control Measures

Upon completion of construction, various long term erosion and sediment control measures will be implemented. The end of pipe permanent erosion control measure for the site is the wet pond SWM facility. The wet pond utilizes a permanent pool to increase pollutant removal and quantity control storage to reduce post-development peak flows and maintain the hydraulic flow regime within the

receiving water system. The extended detention storage provides additional water quality treatment through particulate settling and regulates the peak flows as the water is released in a control manner to the receiving stream of frequent low intensity storm events.

4.4 Pond Maintenance and Ownership

Upon completion of construction of the SWM pond, the Developer will be responsible for the maintenance of the pond until the end of warranty period. The warranty period will end one year from the date of substantial completion which generally coincides with the placement of base asphalt on the roadway. At the end of warranty, the Municipality will assume ownership of the pond and maintenance requirements. Maintenance will be as per MECP, Municipality and
St. Clair Region Conservation Authority requirements.

5.0 Conclusions and Recommendations

This study documents the result of implementing various local and provincial SWM policies such that the development of this site will not result in adverse effects on the downstream receiving water systems. The implementation of SWM strategy measures outlined in this report will ensure that the natural habitat of the area is not disturbed in the long-term and that the sediment transported on site does not negatively impact aquatic resources in the downstream conveyance systems. The proposed SWM strategy will meet Municipal and provincial requirements.

The proposed SWM wet pond will provide post-development peak flow attenuation to the pre-development levels (or below) and will provide quality control to the required 'Normal' Level (or higher).

Construction of the SWM wet pond, and related infrastructure will be required prior to development of any house construction, such that the minor and major flows are properly maintained throughout and after the development process.

It is recommended that upon acceptance of this report, Cirrus Developments implement the process to obtain other outstanding approvals including, but not limited to:

- Certificate of Approval from the MECP
- Approvals from the St. Clair Region Conservation Authority
- Municipal approvals from Municipality of Strathroy Caradoc.

DILLON CONSULTING LIMITED
LONDON, ONTARIO

Dragan Sredojevic, M.E.Sc., P.Eng.
Water Resource Engineer

Figures

LEGEND

EXISTING OVERLAND FLOW ROUTE

02 — AREA NUMBER
20% — IMPERVIOUS AREA (%)
0.55 — AREA IN ha

LONDON

FILENAME: C:\PW WORKING DIRECTORY\PROJECTS 2018\DLLS\... PLOTTED BY: SIMMS, LEAH

Conditions of Use

Verify elevations and/or dimensions on drawing prior to use. Report any discrepancies to Dillon Consulting Limited.

Do not scale dimensions from drawing.

Do not modify drawing, re-use it, or use it for purposes other than those intended at the time of its preparation without prior written permission from Dillon Consulting Limited.

DILLON CONSULTING

No.	ISSUED FOR	DATE	BY

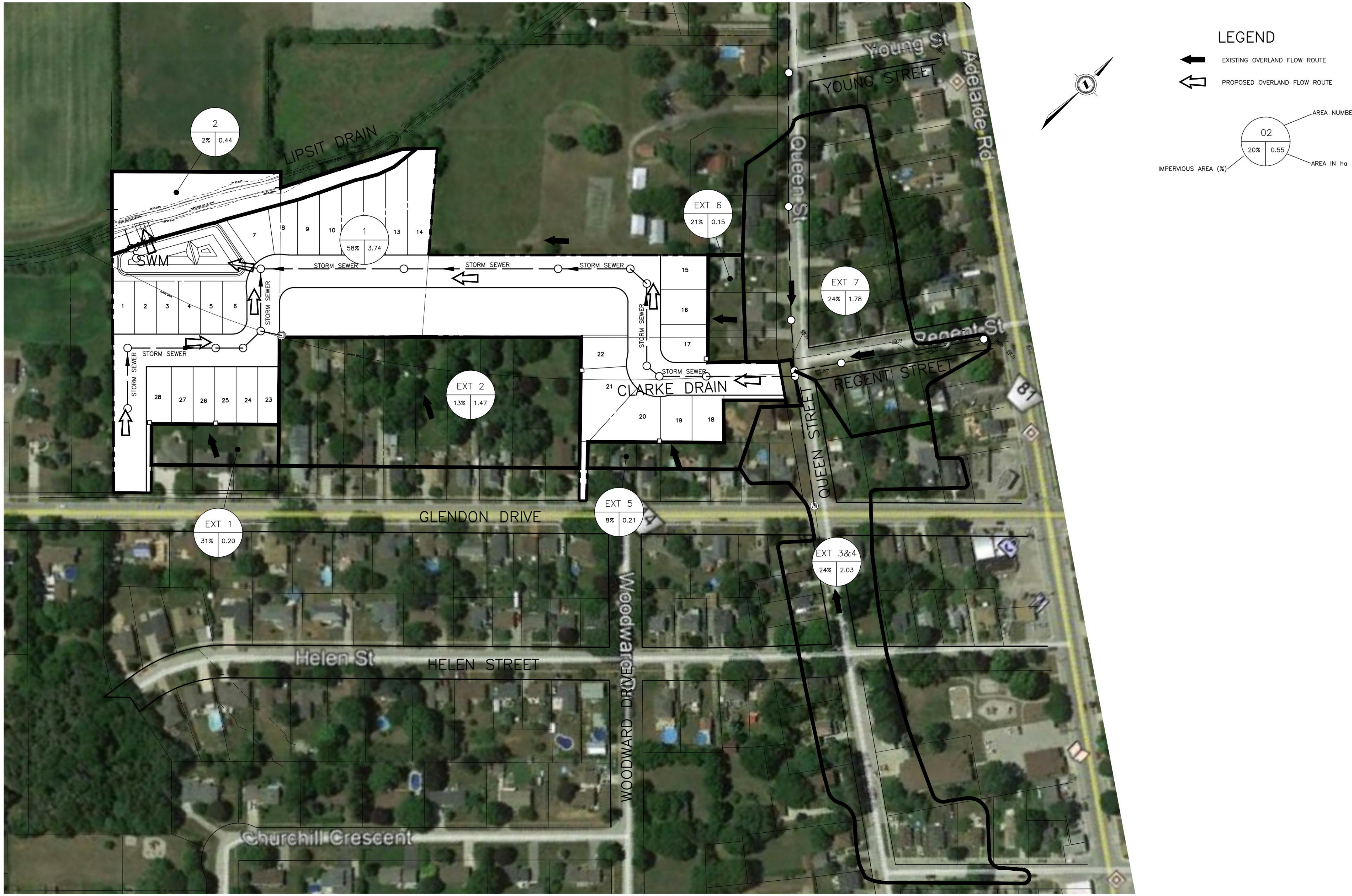
DESIGN	REVIEWED BY
DS	NE
DRAWN: LS	CHECKED BY: NE
DATE: DECEMBER 2020	
SCALE: 1250	

TIMBERVIEW SUBDIVISION

PRE-DEVELOPMENT
STORM AREA PLAN

PROJECT NO. 18-8995

SHEET NO. 01



Conditions of Use

Verify elevations and/or dimensions on drawing prior to use. Report any discrepancies to Dillon Consulting Limited.

Do not scale dimensions from drawing.

Do not modify drawing, re-use it, or use it for purposes other than those intended at the time of its preparation without prior written permission from Dillon Consulting Limited.

DILLON CONSULTING

No.	ISSUED FOR	DATE	BY

DESIGN	REVIEWED BY
DS	NE
DRAWN: LS	CHECKED BY: NE
DATE: DECEMBER 2020	
SCALE: 1250	

TIMBERVIEW SUBDIVISION

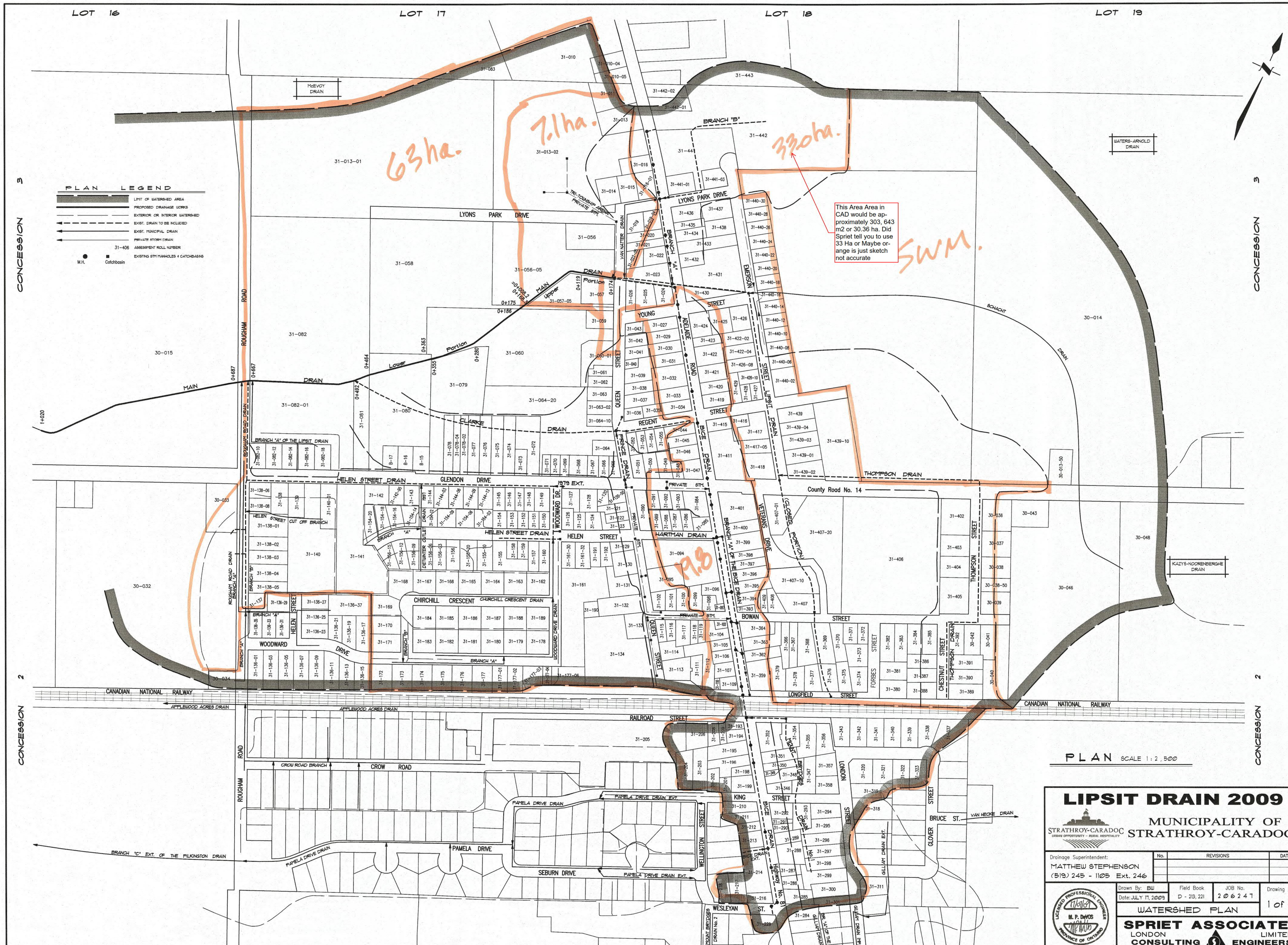
POST DEVELOPMENT STORM AREA PLAN

PROJECT NO. 18-8995

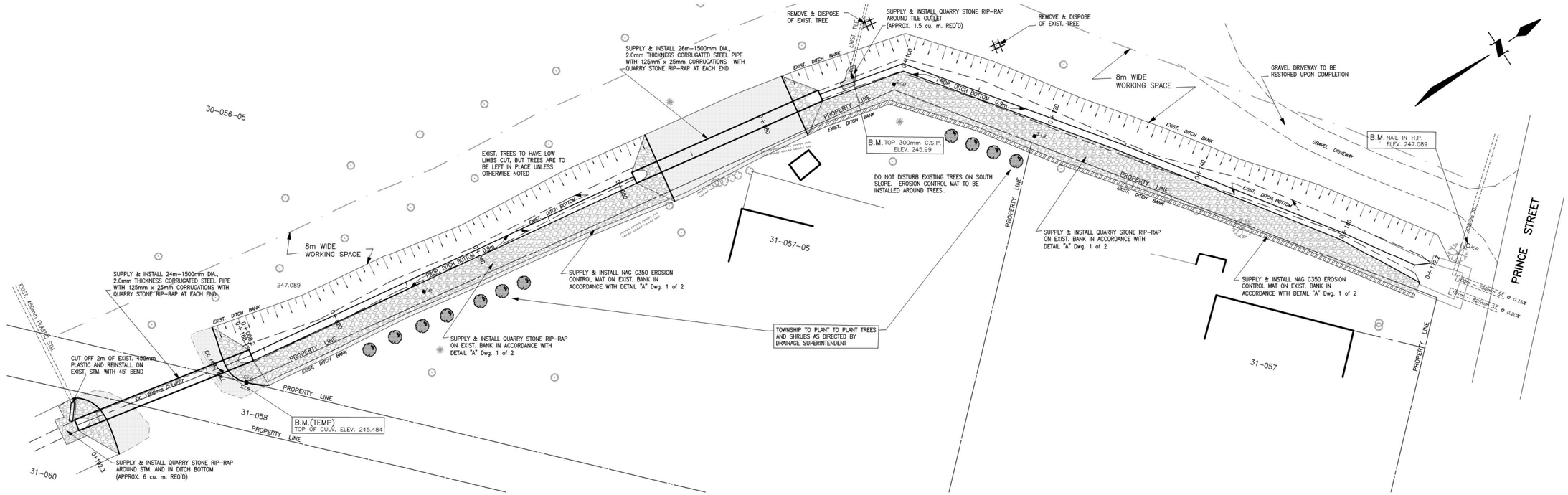
SHEET NO. 02

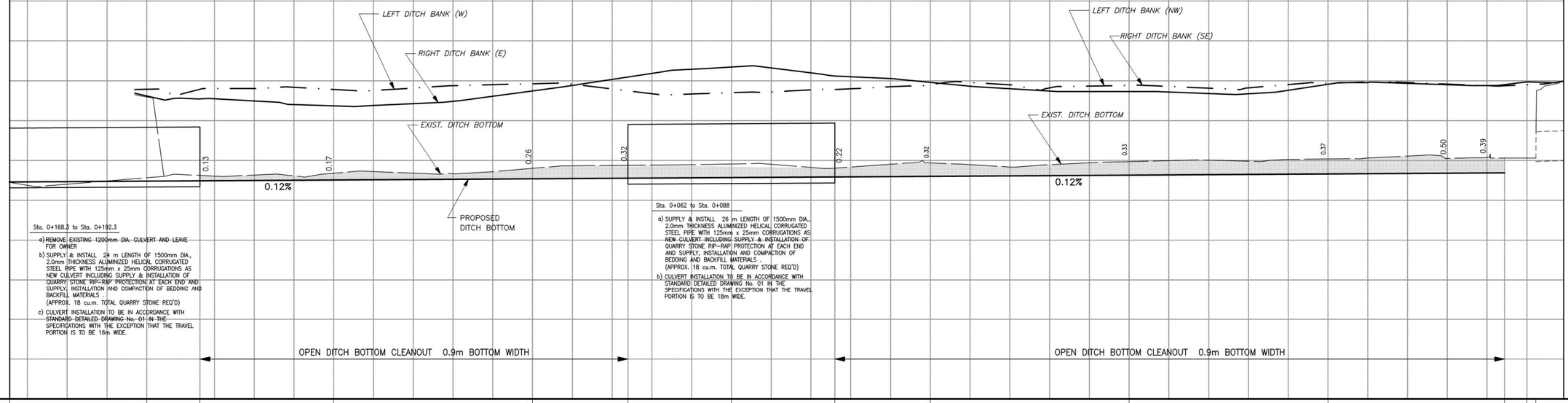
Appendix A

Lipsit Drain Catchment Area Plan and Lipsit Drain Relevant Drawings



LOT 16
LOT 17
LOT 18
LOT 19
CONCESSION 3
CONCESSION 2
PLAN LEGEND
LIMIT OF WATERSHED AREA
PROPOSED DRAINAGE WORKS
EXTERIOR OR INTERIOR WATERSHED
EXIST. DRAIN TO BE INCLUDED
EXIST. MUNICIPAL DRAIN
PRIVATE STORM DRAIN
ASSESSMENT ROLL NUMBER
EXISTING STM MANHOLES & CATCHBASINS
M.H.
Catchbasin
McEVOY DRAIN
WATERS-ARNOLD DRAIN
KAZYS-NOORENBERGHE DRAIN
63ha.
7.1ha.
33.0ha.
SWM.
19.8
This Area Area in CAD would be approximately 303, 643 m2 or 30.36 ha. Did Spriet tell you to use 33 Ha or Maybe orange is just sketch not accurate
BRANCH "B"
LYONS PARK DRIVE
MAIN DRAIN
Upper Portion
Lower Portion
CLARKE DRAIN
HELEN STREET DRAIN
GLENDON DRIVE
THOMPSON DRAIN
County Road No. 14
HARTMAN DRAIN
CHIRCHILL CRESCENT
WOODWARD DRIVE
CANADIAN NATIONAL RAILWAY
APPLEWOOD ACRES DRAIN
RAILROAD STREET
CROW ROAD
CROW ROAD BRANCH
PAMELA DRIVE
PAMELA DRIVE DRAIN
SEBURN DRIVE
KING STREET
WESLEYAN ST.
BRUCE ST.
VAN HECKE DRAIN
BRANCH "C" EXT. OF THE PILKINGTON DRAIN
ROUGHAM ROAD
PLAN SCALE 1 : 2,500
LIPSIT DRAIN 2009
STRATHROY-CARADOC
MUNICIPALITY OF STRATHROY-CARADOC
Drainage Superintendent:
MATTHEW STEPHENSON
(519) 245 - 1105 Ext. 246
No.
REVISIONS
DATE
Drawn By: BW
Date: JULY 17, 2009
Field Book D - 213, 221
JOB No. 206247
Drawing No. 1 of 3
WATERSHED PLAN
M. P. DeVOS
LICENSED PROFESSIONAL ENGINEER
PROVINCE OF ONTARIO
SPRIET ASSOCIATES
LONDON LIMITED
CONSULTING ENGINEERS
155 YORK STREET — LONDON
(519) 672-4100





STATION	0+192.3	0+175	0+168.3 =0+008.2	0+025	0+050	0+062	0+075	0+088	0+100	0+125	0+150	0+172.2	0+176.1
PROP. INV. OF DITCH	244.46		244.49									244.69	
EXIST. DITCH ELEV.		246.65		246.68	246.80		246.91	246.94		246.97	246.04	245.96	

AS CONSTRUCTED NOTES	COMPLETION	No.	REVISIONS	DATE	BY
	DESIGN: M.P.D.				
	DRAWN: AM/ak				
	CHECKED: ak				
	APPROVED: M.P.D.				
	DATE: JULY 17, 2009				

CONSULTANT
SPRIET ASSOCIATES
LONDON LIMITED
CONSULTING ENGINEERS
155 YORK STREET -- LONDON (519) 672-4100 -- N6A 1A8

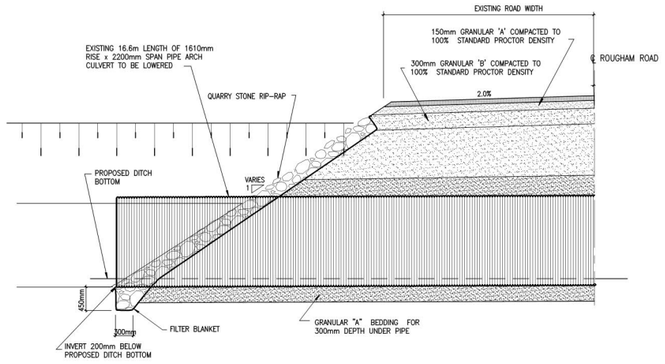
ENGR'S STAMP
LICENSED PROFESSIONAL ENGINEER
M. P. DeVOS
PROVINCE OF ONTARIO

CL
STRATHROY-CARADOC
URBAN OPPORTUNITY - RURAL HOSPITALITY

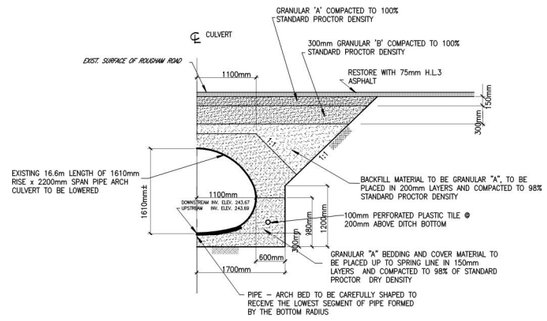
SCALE 1 : 250
2.5 m Ø 5.0 m Horizontal
0.5 m Ø 1.0 m Vertical

TITLE
LIPSIT DRAIN 2009
MAIN DRAIN-UPPER PORTION
Sta. 0+192.3 to Sta. 0+1683.=0+008.2 to Sta. 0+172.2

Project No. 206247
Sheet No. 2 of 3
Plan File No.



HALF SECTION THROUGH PIPE



ONE-HALF SECTION

BEDDING, BACKFILL AND COVER DETAIL FOR PIPE ARCH CULVERT - TYPE 1 & 2 SOIL

DETAIL "B"

N. T. S.

GENERAL NOTES

1/ OUR SPECIFICATIONS DATED JANUARY 2009 APPLY TO THIS PROJECT.

2/ THE WORKING WIDTH AVAILABLE TO THE CONTRACTOR TO CONSTRUCT THE NEW DRAINS SHALL CONSIST OF THOSE LANDS IMMEDIATELY ADJACENT TO THE DRAIN AND CONNECTIONS AND SHALL NOT EXCEED THE FOLLOWING AVERAGE WIDTHS .
OPEN PORTIONS - STA. Ø + 174 to Ø + 008 , 2+Ø + 168 , 3 to Ø + 186 - 8 meters ON NORTH WEST SIDE
(INCLUDING BUFFER) SEE DWG. 2 of 3 .
- STA Ø + 186 to Ø + 667 - 15 meters ON EACH SIDE OF DITCH (PLUS BUFFER)
- STA Ø + 667 to 1 + Ø1Ø - 15 meters ON NORTH SIDE OF DITCH (PLUS BUFFER)
THE WORKING WIDTH FOR PURPOSES OF FUTURE MAINTENANCE SHALL BE THE SAME AS ABOVE

3/ ALL OWNERS ALONG THE COURSE OF THE DRAIN SHALL MAKE AN ACCESS ROUTE FROM THE NEAREST ROAD TO THE DRAIN LOCATION AVAILABLE TO THE CONTRACTOR THE AVERAGE WIDTH OF THIS ROUTE SHALL NOT EXCEED 8 METERS . THE ACCESS ROUTE SHALL ALSO APPLY FOR FUTURE MAINTENANCE PURPOSES .

4/ a) ALL UTILITIES TO BE LOCATED AND EXPOSED PRIOR TO CONSTRUCTION SO THAT THE NEW TILE GRADES CAN BE CONFIRMED. IF THERE IS A CONFLICT IN ELEVATION BETWEEN THE PROPOSED DRAIN AND THE UTILITY, THE ENGINEER IS TO BE NOTIFIED IMMEDIATELY.
b) CONTRACTOR TO NOTIFY ALL UTILITIES 72 HOURS PRIOR TO HIS SCHEDULED TIME FOR STARTING THE ABOVE WORK.

5/ ALL TREES , SCRUB , BRUSH , ETC. TO BE CLEARED AND GRUBBED IN ACCORDANCE WITH "SECTION B. 3 AND C. 4" SPECIFICATIONS .

6/ RIP-RAP TO BE SUPPLIED AND INSTALLED IN ACCORDANCE WITH "SECTION A. 29" IN THE SPECIFICATIONS.

7/ EROSION CONTROL MAT SHALL BE " NORTH AMERICAN GREEN C 350 " OR APPROVED EQUAL. BLANKET SHALL BE INSTALLED ON SEEDED BANK IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS WITH THE FOLLOWING EXCEPTIONS :
a) STAPLES TO BE 200mm LONG AND SHALL BE INSTALLED TO MANUFACTURER'S " D " PATTERN .
b) BLANKET TO BE KEYED 300mm BELOW DITCH BOTTOM, 300mm INTO BANK SLOPE AT UPSTREAM LIMIT AND SHALL BE STAPLED 200mm BELOW TOE OF BANK .

8/ RESTORATION OF WORKING AREA IN THE MAIN DRAIN - UPPER PORTION
TOPSOIL TO BE STRIPPED, STOCKPILED AND RELEVELLED UPON COMPLETION OF CONSTRUCTION IN ACCORDANCE WITH "SECTIONS A. 31 IN THE SPECIFICATION.
a) TOPSOILED AREAS TO BE SEEDED IN ACCORDANCE WITH "SECTION A. 31 " IN THE SPECIFICATIONS.
b) LANEWAY TO BE RESTORED TO ORIGINAL CONDITION IN ACCORDANCE WITH SPECIFICATIONS .

9/ CONTRACTOR TO ARRANGE A PRE-CONSTRUCTION MEETING WITH THE ENGINEER , DRAINAGE SUPERINTENDENT , AND THE AFFECTED OWNERS . ALL PARTIES SHALL RECEIVE 48 HOURS NOTICE TO THE MEETING .

10/ WHERE EXISTING SURVEY BARS ARE DISTURBED AND/OR DESTROYED BY CONSTRUCTION , THEY ARE TO BE REINSTALLED BY AN ONTARIO LAND SURVEYOR (SEE "SECTION A . 21 " IN THE SPECIFICATIONS .

11/ EXISTING DITCH BOTTOM ONLY TO BE CLEANED OUT IN ACCORDANCE WITH SPECIFICATIONS WHERE NOTED ON PROFILES AND IN SECTIONS.

12/ EXISTING FENCE ALONG WEST BANK FROM STA. Ø + 355 TO STA. Ø + 362 TO BE REMOVED AND REINSTALLED UPON COMPLETION OF CONSTRUCTION .

13/ MAIN DRAIN - UPPER PORTION - EXCAVATED MATERIAL TO BE HAULED AWAY AND DISPOSED OF
MAIN DRAIN - LOWER PORTION - EXCAVATED MATERIAL TO BE DEPOSITED AND LEVELLED ON THE WORKING SIDES OF THE DITCH (SEE GENERAL NOTE No. 2) IN ACCORDANCE WITH "SECTION B. 5 " IN THE SPECIFICATIONS .

14/ A 3 METER WIDE GRASSED BUFFER STRIP (EXISTING AND/OR NEWLY SEEDED GRASS) ADJACENT TO THE TOP OF BOTH BANKS OF THE DITCH AS NOTED BELOW SHALL BE INCORPORATED AND MAINTAINED AS PART OF THE OPEN PORTION OF THE DRAIN .
a) STA. Ø + 008 to STA. Ø + 172 - UPPER PORTION
3 meter GRASSED AREA TO BE MAINTAINED ON BOTH SIDES (FOR NORTH SIDE SEE GENERAL NOTE 8)
b) STA Ø + 192 to STA. Ø + 667 - LOWER PORTION
3 meter GRASSED AREA TO BE CREATED AND OR MAINTAINED ON BOTH SIDES INCLUDING THE FOLLOWING SEEDING WIDTHS:
STA. Ø + 195 to STA. Ø + 355 - 3 meters ON BOTH SIDES
STA. Ø + 464 to STA. Ø + 667 - 3 meters ON NORTH SIDE

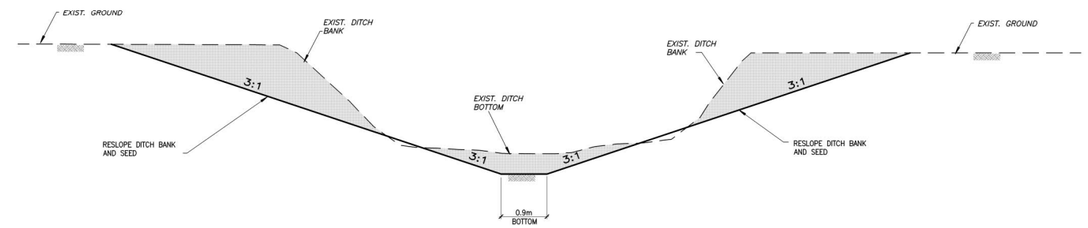
15/ NEWLY RECONSTRUCTED AND NEWLY EXPOSED DITCH BANKS ARE TO BE HAND SEEDED UPON COMPLETION OF CONSTRUCTION IN ACCORDANCE WITH "SECTION B. 11 " IN THE SPECIFICATIONS

16/ SILT FENCE TO BE PLACED ACROSS DITCH BOTTOM AT STA. 1 + Ø1Ø DURING CONSTRUCTION TO PREVENT SILT FROM FLUSHING DOWNSTREAM . SILT FENCE AND SILT TO BE REMOVED AND DISPOSED OF AFTER CONSTRUCTION .

BANK PROTECTION - QUARRY STONE AND E.C.M.

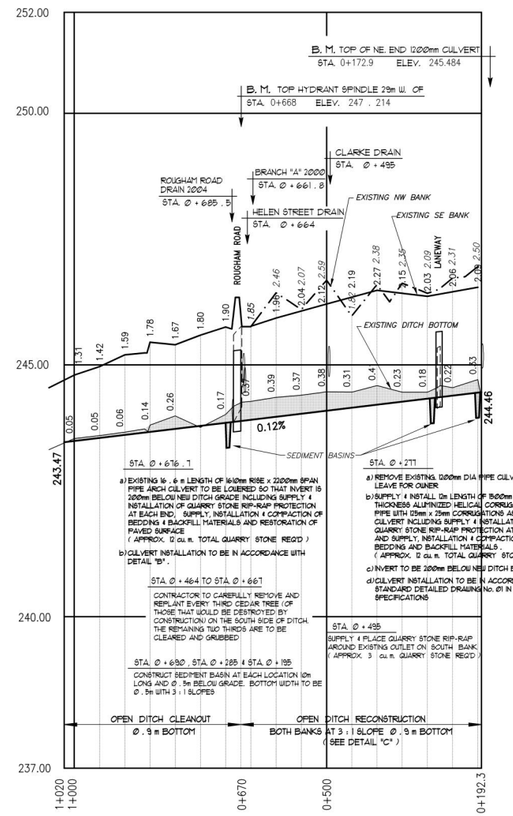
DETAIL "A"

N. T. S.



DETAIL "C"

N. T. S.



MAIN DRAIN - LOWER PORTION PROFILE

SCALE : HOR. 1 : 5,000
VERT. 1 : 50

LIPSIT DRAIN 2009

MUNICIPALITY OF STRATHROY-CARADOC

Drainage Superintendent:	No.	REVISIONS	DATE
MATTHEW STEPHENSON			
(519) 245 - 1105 Ext. 246			

Drawn By: AM / ak	Field Book	JOB No.	Drawing No.
Date: JULY 17, 2008	D - 213, 221	206247	3 of 3

MAIN DRAIN LOWER PORTION

M. P. DeWOS — LICENSED PROFESSIONAL ENGINEER — PROVINCE OF ONTARIO

SPRIET ASSOCIATES LONDON LIMITED
CONSULTING ENGINEERS
155 YORK STREET - LONDON (519) 672-4100 - N6A 1A8

Appendix B

PCSWM Documentation – Existing Conditions

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

WARNING 02: maximum depth increased for Node ST1

****
Element Count
****
Number of rain gages 1
Number of subcatchments ... 7
Number of nodes 5
Number of links 4
Number of pollutants 0
Number of land uses 0

****
Raingage Summary
****

Name	Data Source	Data Type	Recording Interval
Chicago_3h_100Yr	Chicago_3h_100Yr	INTENSITY	5 min.

****
Subcatchment Summary
****

Name	Area	Width	%Imperv	%Slope	Rain Gage	Outlet
01	3.74	124.25	0.00	1.1000	Chicago_3h_100Yr	OF1
EXT1	0.20	78.13	31.00	0.8500	Chicago_3h_100Yr	OF1
EXT2	1.47	169.94	13.00	1.1000	Chicago_3h_100Yr	OF1
EXT25	0.15	57.69	21.00	2.1000	Chicago_3h_100Yr	OF1
EXT3&4	2.03	52.62	24.00	0.9000	Chicago_3h_100Yr	OF1
EXT5	0.21	107.69	8.00	2.1000	Chicago_3h_100Yr	OF1
EXT7	1.78	46.31	24.00	0.9000	Chicago_3h_100Yr	ST1

****
Node Summary
****

Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
J3	JUNCTION	245.74	1.85	0.0	
MH5	JUNCTION	245.53	1.90	0.0	
ST1	JUNCTION	246.37	1.40	100.0	
OF1	OUTFALL	244.76	0.20	0.0	
OF2	OUTFALL	245.45	0.45	0.0	

****
Link Summary
****

Name	From Node	To Node	Type	Length	%Slope	Roughness
C2	J3	MH5	CONDUIT	65.0	0.3385	0.0130
C3	MH5	OF2	CONDUIT	10.0	0.7500	0.0130
GrassPath	ST1	OF1	CONDUIT	344.3	0.8174	0.0300
MH4	ST1	J3	CONDUIT	180.0	0.3494	0.0130

****
Cross Section Summary
****

Conduit	Shape	Full Depth	Full Area	Hyd. Rad.	Max. Width	No. of Barrels	Full Flow
C2	CIRCULAR	0.45	0.16	0.11	0.45	1	0.17
C3	CIRCULAR	0.45	0.16	0.11	0.45	1	0.25
GrassPath	RECT_OPEN	0.20	0.80	0.18	4.00	1	0.77
MH4	CIRCULAR	0.45	0.16	0.11	0.45	1	0.17

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

****
Analysis Options
****
Flow Units ..... CMS
Process Models:
  Rainfall/Runoff ..... YES
  RDII ..... NO
  Snowmelt ..... NO
  Groundwater ..... NO
  Flow Routing ..... YES
  Ponding Allowed ..... NO
  Water Quality ..... NO
Infiltration Method ..... CURVE_NUMBER
Flow Routing Method ..... DYNWAVE
Surcharge Method ..... EXTRAN
Starting Date 10/30/2020 00:00:00
Ending Date 10/31/2020 03:00:00
Antecedent Dry Days 0.0
Report Time Step 00:01:00
Wet Time Step 00:05:00
Dry Time Step 00:05:00
Routing Time Step ..... 5.00 sec
Variable Time Step ..... YES
Maximum Trials 8
Number of Threads 1
Head Tolerance ..... 0.001500 m

Runoff Quantity Continuity	Volume hectare-m	Depth mm
Total Precipitation	0.730	76.223
Evaporation Loss	0.000	0.000
Infiltration Loss	0.542	56.609
Surface Runoff	0.177	18.476
Final Storage	0.012	1.254
Continuity Error (%)	-0.153	

Flow Routing Continuity	Volume hectare-m	Volume 10^6 ltr
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	0.177	1.770
Groundwater Inflow	0.000	0.000

RDII Inflow	0.000	0.000
External Inflow	0.000	0.000
External Outflow	0.177	1.769
Flooding Loss	0.000	0.000
Evaporation Loss	0.000	0.000
Exfiltration Loss	0.000	0.000
Initial Stored Volume	0.000	0.000
Final Stored Volume	0.000	0.000
Continuity Error (%)	0.062	

****
Time-Step Critical Elements
****
Link C3 (7.81%)

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

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

Minimum Time Step	:	2.17 sec
Average Time Step	:	4.89 sec
Maximum Time Step	:	5.00 sec
Percent in Steady State	:	-0.00
Average Iterations per Step	:	2.00
Percent Not Converging	:	0.00

****
Subcatchment Runoff Summary
****

Subcatchment	Total Precip mm	Total Runon mm	Total Evap mm	Total Infil mm	Imperv Runoff mm	Perv Runoff mm	Tot Runo
01	76.22	0.00	0.00	55.85	0.00	19.23	19.
EXT1	76.22	0.00	0.00	47.72	23.20	4.08	27.
EXT2	76.22	0.00	0.00	61.68	9.73	3.62	13.
EXT25	76.22	0.00	0.00	54.44	15.72	4.88	20.
EXT3&4	76.22	0.00	0.00	55.58	18.11	1.43	19.
EXT5	76.22	0.00	0.00	63.40	6.00	5.78	11.
EXT7	76.22	0.00	0.00	55.58	18.11	1.43	19.

****
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
J3	JUNCTION	0.02	0.48	246.23	0 01:08	0.48
MH5	JUNCTION	0.02	0.32	245.84	0 01:08	0.32
ST1	JUNCTION	0.02	0.84	247.21	0 01:07	0.84

OF1	OUTFALL	0.00	0.00	244.76	0	00:00	0.00
OF2	OUTFALL	0.02	0.32	245.77	0	01:08	0.32

****
Node Inflow Summary
****

Node	Type	Maximum Lateral Inflow CMS	Maximum Total Inflow CMS	Time of Max Occurrence days hr:min	Lateral Inflow Volume 10^6 ltr	Total Inflow Volume 10^6 ltr	Fl Balan Err Perce
J3	JUNCTION	0.000	0.220	0 01:06	0	0.347	-0.1
MH5	JUNCTION	0.000	0.211	0 01:08	0	0.347	0.0
ST1	JUNCTION	0.264	0.264	0 01:05	0.348	0.348	0.4
OF1	OUTFALL	0.532	0.532	0 01:05	1.42	1.42	0.0
OF2	OUTFALL	0.000	0.211	0 01:08	0	0.347	0.0

****
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
J3	JUNCTION	0.06	0.034	1.366

****
Node Flooding Summary
****

No nodes were flooded.

****
Outfall Loading Summary
****

Outfall Node	Flow Freq Pcnt	Avg Flow CMS	Max Flow CMS	Total Volume 10^6 ltr
OF1	25.14	0.083	0.532	1.422
OF2	25.18	0.023	0.211	0.347
System	25.16	0.106	0.211	1.769

****
Link Flow Summary
****

Link	Type	Maximum |Flow| CMS	Time of Max Occurrence days hr:min	Maximum |Veloc| m/sec	Max/ Full Flow	Max/ Full Depth

C2	CONDUIT	0.211	0	01:08	1.46	1.27	0.86
C3	CONDUIT	0.211	0	01:08	1.74	0.85	0.71
GrassPath	CONDUIT	0.000	0	00:00	0.00	0.00	0.00
MH4	CONDUIT	0.220	0	01:06	1.40	1.31	1.00

****
Flow Classification Summary
****

	Adjusted	Fraction of Time in Flow Class								
Conduit	/Actual Length	Dry	Up Dry	Down Dry	Sub Crit	Sup Crit	Up Crit	Down Crit	Norm Ltd	Inlet Ctrl
C2	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.71	0.00
C3	1.00	0.00	0.00	0.00	0.71	0.29	0.00	0.00	0.05	0.00
GrassPath	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MH4	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.73	0.00

****
Conduit Surcharge Summary
****

	Hours Full			Hours Above Full	Hours Capacity
Conduit	Both Ends	Upstream	Dnstream	Normal Flow	Limited
C2	0.01	0.06	0.01	0.15	0.01
MH4	0.06	0.13	0.06	0.15	0.06

Analysis begun on: Fri Feb 5 11:42:48 2021
Analysis ended on: Fri Feb 5 11:42:49 2021
Total elapsed time: 00:00:01

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

WARNING 02: maximum depth increased for Node ST1

****
Element Count
****
Number of rain gages 1
Number of subcatchments ... 7
Number of nodes 5
Number of links 4
Number of pollutants 0
Number of land uses 0

****
Raingage Summary
****

Name	Data Source	Data Type	Recording Interval
Chicago_3h_25Yr	Chicago_3h_25Yr	INTENSITY	5 min.

****
Subcatchment Summary
****

Name	Area	Width	%Imperv	%Slope	Rain Gage	Outlet
01	3.74	124.25	0.00	1.1000	Chicago_3h_25Yr	OF1
EXT1	0.20	78.13	31.00	0.8500	Chicago_3h_25Yr	OF1
EXT2	1.47	169.94	13.00	1.1000	Chicago_3h_25Yr	OF1
EXT25	0.15	57.69	21.00	2.1000	Chicago_3h_25Yr	OF1
EXT3&4	2.03	52.62	24.00	0.9000	Chicago_3h_25Yr	OF1
EXT5	0.21	107.69	8.00	2.1000	Chicago_3h_25Yr	OF1
EXT7	1.78	46.31	24.00	0.9000	Chicago_3h_25Yr	ST1

****
Node Summary
****

Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
J3	JUNCTION	245.74	1.85	0.0	
MH5	JUNCTION	245.53	1.90	0.0	
ST1	JUNCTION	246.37	1.40	100.0	
OF1	OUTFALL	244.76	0.20	0.0	
OF2	OUTFALL	245.45	0.45	0.0	

****
Link Summary
****

Name	From Node	To Node	Type	Length	%Slope	Roughness
C2	J3	MH5	CONDUIT	65.0	0.3385	0.0130
C3	MH5	OF2	CONDUIT	10.0	0.7500	0.0130
GrassPath	ST1	OF1	CONDUIT	344.3	0.8174	0.0300
MH4	ST1	J3	CONDUIT	180.0	0.3494	0.0130

****
Cross Section Summary
****

Conduit	Shape	Full Depth	Full Area	Hyd. Rad.	Max. Width	No. of Barrels	Full Flow
C2	CIRCULAR	0.45	0.16	0.11	0.45	1	0.17
C3	CIRCULAR	0.45	0.16	0.11	0.45	1	0.25
GrassPath	RECT_OPEN	0.20	0.80	0.18	4.00	1	0.77
MH4	CIRCULAR	0.45	0.16	0.11	0.45	1	0.17

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

****
Analysis Options
****
Flow Units ..... CMS
Process Models:
  Rainfall/Runoff ..... YES
  RDII ..... NO
  Snowmelt ..... NO
  Groundwater ..... NO
  Flow Routing ..... YES
  Ponding Allowed ..... NO
  Water Quality ..... NO
Infiltration Method ..... CURVE_NUMBER
Flow Routing Method ..... DYNWAVE
Surcharge Method ..... EXTRAN
Starting Date 10/30/2020 00:00:00
Ending Date 10/31/2020 03:00:00
Antecedent Dry Days 0.0
Report Time Step 00:01:00
Wet Time Step 00:05:00
Dry Time Step 00:05:00
Routing Time Step ..... 5.00 sec
Variable Time Step ..... YES
Maximum Trials 8
Number of Threads 1
Head Tolerance ..... 0.001500 m

Runoff Quantity Continuity	Volume hectare-m	Depth mm
Total Precipitation	0.591	61.649
Evaporation Loss	0.000	0.000
Infiltration Loss	0.460	48.000
Surface Runoff	0.120	12.537
Final Storage	0.011	1.190
Continuity Error (%)	-0.127	

Flow Routing Continuity	Volume hectare-m	Volume 10^6 ltr
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	0.120	1.201
Groundwater Inflow	0.000	0.000

RDII Inflow	0.000	0.000
External Inflow	0.000	0.000
External Outflow	0.120	1.201
Flooding Loss	0.000	0.000
Evaporation Loss	0.000	0.000
Exfiltration Loss	0.000	0.000
Initial Stored Volume	0.000	0.000
Final Stored Volume	0.000	0.000
Continuity Error (%)	0.007	

****
Time-Step Critical Elements
****
Link C3 (5.83%)

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

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

Minimum Time Step	:	2.29 sec
Average Time Step	:	4.92 sec
Maximum Time Step	:	5.00 sec
Percent in Steady State	:	0.00
Average Iterations per Step	:	2.00
Percent Not Converging	:	0.00

****
Subcatchment Runoff Summary
****

Subcatchment	Total Precip mm	Total Runon mm	Total Evap mm	Total Infil mm	Imperv Runoff mm	Perv Runoff mm	Tot Runo
01	61.65	0.00	0.00	49.15	0.00	11.40	11.
EXT1	61.65	0.00	0.00	40.21	18.68	1.49	20.
EXT2	61.65	0.00	0.00	51.51	7.84	1.03	8.
EXT25	61.65	0.00	0.00	46.03	12.65	1.85	14.
EXT3&4	61.65	0.00	0.00	45.70	14.59	0.30	14.
EXT5	61.65	0.00	0.00	53.39	4.82	2.23	7.
EXT7	61.65	0.00	0.00	45.70	14.59	0.30	14.

****
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
J3	JUNCTION	0.02	0.39	246.14	0 01:07	0.39
MH5	JUNCTION	0.01	0.29	245.82	0 01:08	0.29
ST1	JUNCTION	0.02	0.47	246.84	0 01:06	0.46

OF1	OUTFALL	0.00	0.00	244.76	0	00:00	0.00	
OF2	OUTFALL	0.01	0.29	245.74	0	01:08	0.29	

****
Node Inflow Summary
****

Node	Type	Maximum Lateral Inflow CMS	Maximum Total Inflow CMS	Time of Max Occurrence days hr:min		Lateral Inflow Volume 10^6 ltr	Total Inflow Volume 10^6 ltr	Fl Balan Err Perce
J3	JUNCTION	0.000	0.192	0	01:06	0	0.265	-0.1
MH5	JUNCTION	0.000	0.185	0	01:07	0	0.265	0.0
ST1	JUNCTION	0.211	0.211	0	01:05	0.265	0.265	0.1
OF1	OUTFALL	0.412	0.412	0	01:05	0.935	0.935	0.0
OF2	OUTFALL	0.000	0.184	0	01:08	0	0.265	0.0

****
Node Surcharge Summary
****

No nodes were surcharged.

****
Node Flooding Summary
****

No nodes were flooded.

****
Outfall Loading Summary
****

Outfall Node	Flow Freq Pcnt	Avg Flow CMS	Max Flow CMS	Total Volume 10^6 ltr
OF1	24.68	0.053	0.412	0.935
OF2	24.67	0.017	0.184	0.265
System	24.68	0.070	0.184	1.201

****
Link Flow Summary
****

Link	Type	Maximum |Flow| CMS	Time of Max Occurrence days hr:min		Maximum |Veloc| m/sec	Max/ Full Flow	Max/ Full Depth
C2	CONDUIT	0.185	0	01:07	1.43	1.11	0.76
C3	CONDUIT	0.184	0	01:08	1.70	0.75	0.64
GrassPath	CONDUIT	0.000	0	00:00	0.00	0.00	0.00
MH4	CONDUIT	0.192	0	01:06	1.27	1.14	0.93

****
Flow Classification Summary
****

Conduit	Adjusted /Actual Length	Fraction of Time in Flow Class: Dry	Up Dry	Down Dry	Sub Crit	Sup Crit	Up Crit	Down Crit	Norm Ltd	Inlet Ctrl
C2	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.71	0.00
C3	1.00	0.00	0.00	0.00	0.71	0.28	0.00	0.00	0.05	0.00
GrassPath	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MH4	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.74	0.00

****
Conduit Surcharge Summary
****

Conduit	Hours Full: Both Ends	Upstream	Dnstream	Hours Above Full Normal Flow	Hours Capacity Limited
C2	0.01	0.01	0.01	0.07	0.01
MH4	0.01	0.03	0.01	0.07	0.01

Analysis begun on: Fri Feb 5 11:42:48 2021
Analysis ended on: Fri Feb 5 11:42:48 2021
Total elapsed time: < 1 sec

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

WARNING 02: maximum depth increased for Node ST1

****
Element Count
****
Number of rain gages 1
Number of subcatchments ... 7
Number of nodes 5
Number of links 4
Number of pollutants 0
Number of land uses 0

****
Raingage Summary
****

Name	Data Source	Data Type	Recording Interval
Chicago_3hr_10YR	Chicago_3hr_10YR	INTENSITY	5 min.

****
Subcatchment Summary
****

Name	Area	Width	%Imperv	%Slope	Rain Gage	Outlet
01	3.74	124.25	0.00	1.1000	Chicago_3hr_10YR	OF1
EXT1	0.20	78.13	31.00	0.8500	Chicago_3hr_10YR	OF1
EXT2	1.47	169.94	13.00	1.1000	Chicago_3hr_10YR	OF1
EXT25	0.15	57.69	21.00	2.1000	Chicago_3hr_10YR	OF1
EXT3&4	2.03	52.62	24.00	0.9000	Chicago_3hr_10YR	OF1
EXT5	0.21	107.69	8.00	2.1000	Chicago_3hr_10YR	OF1
EXT7	1.78	46.31	24.00	0.9000	Chicago_3hr_10YR	ST1

****
Node Summary
****

Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
J3	JUNCTION	245.74	1.85	0.0	
MH5	JUNCTION	245.53	1.90	0.0	
ST1	JUNCTION	246.37	1.40	100.0	
OF1	OUTFALL	244.76	0.20	0.0	
OF2	OUTFALL	245.45	0.45	0.0	

****
Link Summary
****

Name	From Node	To Node	Type	Length	%Slope	Roughness
C2	J3	MH5	CONDUIT	65.0	0.3385	0.0130
C3	MH5	OF2	CONDUIT	10.0	0.7500	0.0130
GrassPath	ST1	OF1	CONDUIT	344.3	0.8174	0.0300
MH4	ST1	J3	CONDUIT	180.0	0.3494	0.0130

****
Cross Section Summary
****

Conduit	Shape	Full Depth	Full Area	Hyd. Rad.	Max. Width	No. of Barrels	Full Flow
C2	CIRCULAR	0.45	0.16	0.11	0.45	1	0.17
C3	CIRCULAR	0.45	0.16	0.11	0.45	1	0.25
GrassPath	RECT_OPEN	0.20	0.80	0.18	4.00	1	0.77
MH4	CIRCULAR	0.45	0.16	0.11	0.45	1	0.17

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

****
Analysis Options
****
Flow Units ..... CMS
Process Models:
  Rainfall/Runoff ..... YES
  RDII ..... NO
  Snowmelt ..... NO
  Groundwater ..... NO
  Flow Routing ..... YES
  Ponding Allowed ..... NO
  Water Quality ..... NO
Infiltration Method ..... CURVE_NUMBER
Flow Routing Method ..... DYNWAVE
Surcharge Method ..... EXTRAN
Starting Date 10/30/2020 00:00:00
Ending Date 10/31/2020 03:00:00
Antecedent Dry Days 0.0
Report Time Step 00:01:00
Wet Time Step 00:05:00
Dry Time Step 00:05:00
Routing Time Step ..... 5.00 sec
Variable Time Step ..... YES
Maximum Trials 8
Number of Threads 1
Head Tolerance ..... 0.001500 m

Runoff Quantity Continuity	Volume hectare-m	Depth mm
Total Precipitation	0.497	51.884
Evaporation Loss	0.000	0.000
Infiltration Loss	0.399	41.618
Surface Runoff	0.088	9.149
Final Storage	0.011	1.179
Continuity Error (%)	-0.121	

Flow Routing Continuity	Volume hectare-m	Volume 10^6 ltr
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	0.088	0.876
Groundwater Inflow	0.000	0.000

RDII Inflow	0.000	0.000
External Inflow	0.000	0.000
External Outflow	0.088	0.876
Flooding Loss	0.000	0.000
Evaporation Loss	0.000	0.000
Exfiltration Loss	0.000	0.000
Initial Stored Volume	0.000	0.000
Final Stored Volume	0.000	0.000
Continuity Error (%)	0.005	

****
Time-Step Critical Elements
****
Link C3 (4.98%)

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

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

Minimum Time Step	:	2.44 sec
Average Time Step	:	4.93 sec
Maximum Time Step	:	5.00 sec
Percent in Steady State	:	0.00
Average Iterations per Step	:	2.00
Percent Not Converging	:	0.00

****
Subcatchment Runoff Summary
****

Subcatchment	Total Precip mm	Total Runon mm	Total Evap mm	Total Infil mm	Imperv Runoff mm	Perv Runoff mm	Tot Runo
01	51.88	0.00	0.00	43.95	0.00	6.82	6.
EXT1	51.88	0.00	0.00	34.84	15.65	0.21	15.
EXT2	51.88	0.00	0.00	44.12	6.57	0.09	6.
EXT25	51.88	0.00	0.00	39.72	10.61	0.29	10.
EXT3&4	51.88	0.00	0.00	38.54	12.22	0.02	12.
EXT5	51.88	0.00	0.00	46.25	4.05	0.36	4.
EXT7	51.88	0.00	0.00	38.54	12.22	0.02	12.

****
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
J3	JUNCTION	0.01	0.33	246.08	0 01:07	0.33
MH5	JUNCTION	0.01	0.26	245.78	0 01:08	0.26
ST1	JUNCTION	0.01	0.36	246.74	0 01:06	0.36

OF1	OUTFALL	0.00	0.00	244.76	0	00:00	0.00
OF2	OUTFALL	0.01	0.26	245.71	0	01:08	0.26

****
Node Inflow Summary
****

Node	Type	Maximum Lateral Inflow CMS	Maximum Total Inflow CMS	Time of Max Occurrence days hr:min		Lateral Inflow Volume 10^6 ltr	Total Inflow Volume 10^6 ltr	Fl Balan Err Perce
J3	JUNCTION	0.000	0.161	0	01:06	0	0.218	-0.0
MH5	JUNCTION	0.000	0.153	0	01:07	0	0.218	0.0
ST1	JUNCTION	0.171	0.171	0	01:05	0.218	0.218	-0.0
OF1	OUTFALL	0.337	0.337	0	01:05	0.658	0.658	0.0
OF2	OUTFALL	0.000	0.153	0	01:08	0	0.218	0.0

****
Node Surcharge Summary
****

No nodes were surcharged.

****
Node Flooding Summary
****

No nodes were flooded.

****
Outfall Loading Summary
****

Outfall Node	Flow Freq Pcnt	Avg Flow CMS	Max Flow CMS	Total Volume 10^6 ltr
OF1	24.40	0.036	0.337	0.658
OF2	24.34	0.014	0.153	0.218
System	24.37	0.050	0.153	0.876

****
Link Flow Summary
****

Link	Type	Maximum |Flow| CMS	Time of Max Occurrence days hr:min		Maximum |Veloc| m/sec	Max/ Full Flow	Max/ Full Depth
C2	CONDUIT	0.153	0	01:07	1.39	0.92	0.65
C3	CONDUIT	0.153	0	01:08	1.63	0.62	0.57
GrassPath	CONDUIT	0.000	0	00:00	0.00	0.00	0.00
MH4	CONDUIT	0.161	0	01:06	1.26	0.95	0.75

****
Flow Classification Summary
****

Conduit	Adjusted /Actual Length	Fraction of Time in Flow Class: Dry	Up Dry	Down Dry	Sub Crit	Sup Crit	Up Crit	Down Crit	Norm Ltd	Inlet Ctrl
C2	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.71	0.00
C3	1.00	0.00	0.00	0.00	0.72	0.28	0.00	0.00	0.04	0.00
GrassPath	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MH4	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.74	0.00

****
Conduit Surcharge Summary
****

No conduits were surcharged.

Analysis begun on: Fri Feb 5 11:42:48 2021
Analysis ended on: Fri Feb 5 11:42:48 2021
Total elapsed time: < 1 sec

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

WARNING 02: maximum depth increased for Node ST1

****
Element Count
****
Number of rain gages 1
Number of subcatchments ... 7
Number of nodes 5
Number of links 4
Number of pollutants 0
Number of land uses 0

****
Raingage Summary
****

Name	Data Source	Data Type	Recording Interval
Chicago_3h_5YR	Chicago_3h_5YR	INTENSITY	5 min.

****
Subcatchment Summary
****

Name	Area	Width	%Imperv	%Slope	Rain Gage	Outlet
01	3.74	124.25	0.00	1.1000	Chicago_3h_5YR	OF1
EXT1	0.20	78.13	31.00	0.8500	Chicago_3h_5YR	OF1
EXT2	1.47	169.94	13.00	1.1000	Chicago_3h_5YR	OF1
EXT25	0.15	57.69	21.00	2.1000	Chicago_3h_5YR	OF1
EXT3&4	2.03	52.62	24.00	0.9000	Chicago_3h_5YR	OF1
EXT5	0.21	107.69	8.00	2.1000	Chicago_3h_5YR	OF1
EXT7	1.78	46.31	24.00	0.9000	Chicago_3h_5YR	ST1

****
Node Summary
****

Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
J3	JUNCTION	245.74	1.85	0.0	
MH5	JUNCTION	245.53	1.90	0.0	
ST1	JUNCTION	246.37	1.40	100.0	
OF1	OUTFALL	244.76	0.20	0.0	
OF2	OUTFALL	245.45	0.45	0.0	

****
Link Summary
****

Name	From Node	To Node	Type	Length	%Slope	Roughness
C2	J3	MH5	CONDUIT	65.0	0.3385	0.0130
C3	MH5	OF2	CONDUIT	10.0	0.7500	0.0130
GrassPath	ST1	OF1	CONDUIT	344.3	0.8174	0.0300
MH4	ST1	J3	CONDUIT	180.0	0.3494	0.0130

****
Cross Section Summary
****

Conduit	Shape	Full Depth	Full Area	Hyd. Rad.	Max. Width	No. of Barrels	Full Flow
C2	CIRCULAR	0.45	0.16	0.11	0.45	1	0.17
C3	CIRCULAR	0.45	0.16	0.11	0.45	1	0.25
GrassPath	RECT_OPEN	0.20	0.80	0.18	4.00	1	0.77
MH4	CIRCULAR	0.45	0.16	0.11	0.45	1	0.17

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

****
Analysis Options
****
Flow Units ..... CMS
Process Models:
  Rainfall/Runoff ..... YES
  RDII ..... NO
  Snowmelt ..... NO
  Groundwater ..... NO
  Flow Routing ..... YES
  Ponding Allowed ..... NO
  Water Quality ..... NO
Infiltration Method ..... CURVE_NUMBER
Flow Routing Method ..... DYNWAVE
Surcharge Method ..... EXTRAN
Starting Date 10/30/2020 00:00:00
Ending Date 10/31/2020 03:00:00
Antecedent Dry Days 0.0
Report Time Step 00:01:00
Wet Time Step 00:05:00
Dry Time Step 00:05:00
Routing Time Step ..... 5.00 sec
Variable Time Step ..... YES
Maximum Trials 8
Number of Threads 1
Head Tolerance ..... 0.001500 m

Runoff Quantity Continuity	Volume hectare-m	Depth mm
Total Precipitation	0.425	44.361
Evaporation Loss	0.000	0.000
Infiltration Loss	0.347	36.261
Surface Runoff	0.066	6.936
Final Storage	0.012	1.210
Continuity Error (%)	-0.106	

Flow Routing Continuity	Volume hectare-m	Volume 10^6 ltr
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	0.066	0.664
Groundwater Inflow	0.000	0.000

RDII Inflow	0.000	0.000
External Inflow	0.000	0.000
External Outflow	0.066	0.664
Flooding Loss	0.000	0.000
Evaporation Loss	0.000	0.000
Exfiltration Loss	0.000	0.000
Initial Stored Volume	0.000	0.000
Final Stored Volume	0.000	0.000
Continuity Error (%)	0.005	

****
Time-Step Critical Elements
****
Link C3 (4.39%)

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

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

Minimum Time Step	:	2.60 sec
Average Time Step	:	4.94 sec
Maximum Time Step	:	5.00 sec
Percent in Steady State	:	0.00
Average Iterations per Step	:	2.00
Percent Not Converging	:	0.00

****
Subcatchment Runoff Summary
****

Subcatchment	Total Precip mm	Total Runon mm	Total Evap mm	Total Infil mm	Imperv Runoff mm	Perv Runoff mm	Tot Runo
01	44.36	0.00	0.00	39.48	0.00	3.72	3.
EXT1	44.36	0.00	0.00	29.80	13.31	0.00	13.
EXT2	44.36	0.00	0.00	37.58	5.59	0.00	5.
EXT25	44.36	0.00	0.00	34.12	9.01	0.00	9.
EXT3&4	44.36	0.00	0.00	32.83	10.39	0.00	10.
EXT5	44.36	0.00	0.00	39.74	3.43	0.00	3.
EXT7	44.36	0.00	0.00	32.83	10.39	0.00	10.

****
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
J3	JUNCTION	0.01	0.29	246.03	0 01:07	0.29
MH5	JUNCTION	0.01	0.23	245.75	0 01:08	0.23
ST1	JUNCTION	0.01	0.31	246.68	0 01:06	0.31

OF1	OUTFALL	0.00	0.00	244.76	0	00:00	0.00
OF2	OUTFALL	0.01	0.23	245.68	0	01:08	0.23

****
Node Inflow Summary
****

Node	Type	Maximum Lateral Inflow CMS	Maximum Total Inflow CMS	Time of Max Occurrence days hr:min	Lateral Inflow Volume 10^6 ltr	Total Inflow Volume 10^6 ltr	Fl Balan Err Perce
J3	JUNCTION	0.000	0.132	0 01:06	0	0.185	0.0
MH5	JUNCTION	0.000	0.126	0 01:08	0	0.185	0.0
ST1	JUNCTION	0.139	0.139	0 01:05	0.185	0.185	-0.0
OF1	OUTFALL	0.277	0.277	0 01:05	0.479	0.479	0.0
OF2	OUTFALL	0.000	0.126	0 01:08	0	0.185	0.0

****
Node Surcharge Summary
****

No nodes were surcharged.

****
Node Flooding Summary
****

No nodes were flooded.

****
Outfall Loading Summary
****

Outfall Node	Flow Freq Pcnt	Avg Flow CMS	Max Flow CMS	Total Volume 10^6 ltr
OF1	24.17	0.026	0.277	0.479
OF2	24.06	0.011	0.126	0.185
System	24.12	0.037	0.126	0.664

****
Link Flow Summary
****

Link	Type	Maximum |Flow| CMS	Time of Max Occurrence days hr:min	Maximum |Veloc| m/sec	Max/ Full Flow	Max/ Full Depth
C2	CONDUIT	0.126	0 01:08	1.34	0.76	0.57
C3	CONDUIT	0.126	0 01:08	1.56	0.51	0.51
GrassPath	CONDUIT	0.000	0 00:00	0.00	0.00	0.00
MH4	CONDUIT	0.132	0 01:06	1.22	0.78	0.65

****
Flow Classification Summary
****

Conduit	Adjusted /Actual Length	Fraction of Time in Flow Class: Dry	Up Dry	Down Dry	Sub Crit	Sup Crit	Up Crit	Down Crit	Norm Ltd	Inlet Ctrl
C2	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.71	0.00
C3	1.00	0.00	0.00	0.00	0.72	0.28	0.00	0.00	0.04	0.00
GrassPath	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MH4	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.73	0.00

****
Conduit Surcharge Summary
****

No conduits were surcharged.

Analysis begun on: Fri Feb 5 11:42:48 2021
Analysis ended on: Fri Feb 5 11:42:48 2021
Total elapsed time: < 1 sec

Appendix C

PCSWMM – Proposed Conditions

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

WARNING 02: maximum depth increased for Node J10
WARNING 02: maximum depth increased for Node J3
WARNING 02: maximum depth increased for Node J4
WARNING 02: maximum depth increased for Node J5
WARNING 02: maximum depth increased for Node J6
WARNING 02: maximum depth increased for Node J7
WARNING 02: maximum depth increased for Node J8
WARNING 02: maximum depth increased for Node J9
WARNING 02: maximum depth increased for Node OF2
WARNING 02: maximum depth increased for Node OF3
WARNING 02: maximum depth increased for Node ST1

****
Element Count
****
Number of rain gages 1
Number of subcatchments ... 16
Number of nodes 16
Number of links 18
Number of pollutants 0
Number of land uses 0

****
Raingage Summary
****

Name	Data Source	Data Type	Recording Interval
Chicago_3h_250YR	Chicago_3h_250YR	INTENSITY	5 min.

****
Subcatchment Summary
****

Name	Area	Width	%Imperv	%Slope	Rain Gage	Outlet
1	3.74	124.25	58.00	1.1000	Chicago_3h_250YR	SU1
EXT1	0.20	78.13	31.00	0.8500	Chicago_3h_250YR	SU1
EXT22	1.47	169.94	13.00	1.1000	Chicago_3h_250YR	SU1
EXT3&4	2.03	52.62	24.00	0.9000	Chicago_3h_250YR	SU1
EXT5	0.21	107.69	8.00	2.1000	Chicago_3h_250YR	SU1
EXT6	0.15	57.69	21.00	2.1000	Chicago_3h_250YR	SU1
EXT7	1.78	46.31	24.00	0.9000	Chicago_3h_250YR	ST1
S1	5.26	196.97	0.00	0.8500	Chicago_3h_250YR	J9
S10	2.93	154.36	15.00	0.9000	Chicago_3h_250YR	J6
S2	28.37	236.38	18.00	0.8500	Chicago_3h_250YR	J8
S3	5.12	157.65	21.00	0.5500	Chicago_3h_250YR	J6
S4	2.16	156.57	6.50	0.8500	Chicago_3h_250YR	J7
S5	9.45	239.24	4.10	0.9000	Chicago_3h_250YR	OF3
S6	7.43	174.81	13.30	0.9000	Chicago_3h_250YR	OF2
S7	33.00	253.07	20.00	0.9000	Chicago_3h_250YR	OF2
S9	19.80	167.66	20.00	1.0000	Chicago_3h_250YR	OF2

****
Node Summary
****

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

J1	JUNCTION	244.43	1.67	0.0	
J10	JUNCTION	244.02	2.51	0.0	
J3	JUNCTION	244.01	2.80	0.0	
J4	JUNCTION	244.05	2.49	0.0	
J5	JUNCTION	244.20	3.00	0.0	
J6	JUNCTION	244.18	2.47	0.0	
J7	JUNCTION	244.56	2.72	0.0	
J8	JUNCTION	243.63	2.71	0.0	
J9	JUNCTION	243.61	2.53	0.0	
OF2	JUNCTION	244.69	2.21	0.0	Yes
OF3	JUNCTION	244.09	2.50	0.0	
ST1	JUNCTION	246.07	1.73	100.0	
ST6	JUNCTION	245.39	2.35	0.0	
ST7	JUNCTION	245.23	1.90	0.0	
OF1	OUTFALL	243.76	2.33	0.0	
SU1	STORAGE	244.44	1.66	0.0	

****
Link Summary
****

Name	From Node	To Node	Type	Length	%Slope	Roughness
C1	J1	OF3	CONDUIT	15.6	0.1927	0.0130
C10	J3	OF3	CONDUIT	177.5	0.1240	0.0600
C11	J4	J3	CONDUIT	24.0	0.1667	0.0240
C12	J6	J4	CONDUIT	84.1	0.1308	0.0600
C13	J5	J6	CONDUIT	26.0	0.0769	0.0240
C14	OF2	J7	CONDUIT	106.6	0.1219	0.0600
C15	J7	J5	CONDUIT	63.6	0.1259	0.0600
C3	ST1	ST6	CONDUIT	182.9	0.3554	0.0130
C4	ST6	ST7	CONDUIT	65.0	0.2108	0.0130
C5	ST7	OF2	CONDUIT	10.0	0.1500	0.0130
C6	J8	J9	CONDUIT	16.6	0.1205	0.0240
C7	J9	OF1	CONDUIT	42.6	0.1174	0.0600
C8	OF3	J10	CONDUIT	61.2	0.1144	0.0600
C9	J10	J8	CONDUIT	153.8	0.1235	0.0600
W3	ST1	SU1	CONDUIT	384.0	0.4854	0.0130
OR1	SU1	J1	ORIFICE			
OR2	SU1	J1	WEIR			
W1	SU1	OF3	WEIR			

****
Cross Section Summary
****

Conduit	Shape	Full Depth	Full Area	Hyd. Rad.	Max. Width	No. of Barrels	Full Flow	
C1	CIRCULAR	0.60	0.28	0.15	0.60	1	0.27	
C10	DownstreamCul.1	2.50	16.25	1.48	9.70	1	12.36	
C11	FILLED_CIRCULAR	1.30	1.63	0.33	1.50	1	1.33	
C12	DownstreamCul.2	2.19	12.52	1.15	9.71	1	8.27	
C13	FILLED_CIRCULAR	1.30	1.63	0.33	1.50	1	0.91	
C14	ClosetoQueenSt	2.21	12.38	0.98	11.35	1	7.13	
C15	UpstreamCulvert2	2.72	14.48	1.38	9.00	1	10.64	
C3	CIRCULAR	0.45	0.16	0.11	0.45	1	0.17	
C4	CIRCULAR	0.60	0.28	0.15	0.60	1	0.28	
C5	CIRCULAR	0.60	0.28	0.15	0.60	1	0.24	
C6	ARCH	1.60	2.98	0.48	2.21	1	2.64	
C7	Lipsit_SouthofRoughamRd	2.33	12.64	1.16	9.59	1	7.95	
C8	Pond0utlet	2.15	18.67	1.33	13.08	1	12.70	
C9	atLion'sGate	2.51	16.02	1.18	12.34	1	10.48	

W3	Road	0.38	3.99	0.20	20.01	1	7.36

****
Transect Summary
****

Transect atLion'sGate
Area:

0.0004	0.0016	0.0035	0.0062	0.0097
0.0140	0.0191	0.0249	0.0315	0.0389
0.0470	0.0560	0.0657	0.0762	0.0875
0.0996	0.1125	0.1262	0.1408	0.1563
0.1725	0.1896	0.2075	0.2263	0.2459
0.2663	0.2876	0.3097	0.3326	0.3563
0.3809	0.4064	0.4326	0.4597	0.4876
0.5164	0.5460	0.5764	0.6077	0.6398
0.6727	0.7065	0.7410	0.7765	0.8126
0.8491	0.8861	0.9236	0.9616	1.0000

Hrad:

0.0196	0.0391	0.0587	0.0783	0.0978
0.1174	0.1370	0.1565	0.1761	0.1957
0.2152	0.2348	0.2544	0.2739	0.2934
0.3119	0.3306	0.3494	0.3684	0.3874
0.4065	0.4257	0.4450	0.4642	0.4836
0.5030	0.5224	0.5418	0.5613	0.5808
0.6003	0.6198	0.6394	0.6589	0.6785
0.6981	0.7177	0.7373	0.7570	0.7766
0.7963	0.8159	0.8356	0.8553	0.8800
0.9046	0.9289	0.9528	0.9766	1.0000

Width:

0.0201	0.0402	0.0603	0.0805	0.1006
0.1207	0.1408	0.1609	0.1810	0.2012
0.2213	0.2414	0.2615	0.2816	0.3019
0.3235	0.3451	0.3666	0.3882	0.4098
0.4313	0.4529	0.4745	0.4960	0.5176
0.5391	0.5607	0.5823	0.6038	0.6254
0.6469	0.6685	0.6901	0.7116	0.7332
0.7548	0.7763	0.7979	0.8194	0.8410
0.8626	0.8841	0.9057	0.9272	0.9396
0.9516	0.9637	0.9758	0.9879	1.0000

Transect ClosetoQueenSt
Area:

0.0036	0.0081	0.0133	0.0194	0.0263
0.0340	0.0426	0.0520	0.0621	0.0731
0.0850	0.0976	0.1111	0.1254	0.1404
0.1561	0.1722	0.1888	0.2060	0.2236
0.2417	0.2603	0.2794	0.2990	0.3190
0.3396	0.3606	0.3822	0.4042	0.4267
0.4497	0.4732	0.4972	0.5216	0.5466
0.5721	0.5980	0.6244	0.6513	0.6787
0.7066	0.7350	0.7639	0.7933	0.8231
0.8542	0.8875	0.9229	0.9605	1.0000

Hrad:

0.0396	0.0726	0.1019	0.1290	0.1547
0.1794	0.2034	0.2268	0.2498	0.2726
0.2950	0.3173	0.3394	0.3613	0.3867
0.4131	0.4406	0.4675	0.4939	0.5199
0.5454	0.5705	0.5953	0.6197	0.6439
0.6677	0.6913	0.7147	0.7378	0.7607
0.7835	0.8060	0.8284	0.8506	0.8727
0.8947	0.9165	0.9382	0.9597	0.9812

1.0026 1.0239 1.0450 1.0661 1.0871
1.0604 1.0382 1.0207 1.0081 1.0000
Width:
0.0996 0.1198 0.1401 0.1603 0.1806
0.2008 0.2211 0.2413 0.2616 0.2819
0.3021 0.3224 0.3426 0.3629 0.3787
0.3927 0.4048 0.4169 0.4289 0.4410
0.4531 0.4652 0.4773 0.4893 0.5014
0.5135 0.5256 0.5377 0.5497 0.5618
0.5739 0.5860 0.5981 0.6101 0.6222
0.6343 0.6464 0.6585 0.6705 0.6826
0.6947 0.7068 0.7189 0.7309 0.7430
0.7950 0.8478 0.9007 0.9519 1.0000

Transect DownstreamCul.1
Area:
0.0033 0.0078 0.0133 0.0200 0.0278
0.0367 0.0467 0.0578 0.0701 0.0835
0.0977 0.1126 0.1282 0.1444 0.1610
0.1781 0.1955 0.2134 0.2317 0.2504
0.2695 0.2891 0.3091 0.3295 0.3503
0.3715 0.3932 0.4153 0.4378 0.4607
0.4840 0.5078 0.5320 0.5566 0.5816
0.6071 0.6329 0.6592 0.6859 0.7131
0.7406 0.7685 0.7967 0.8250 0.8536
0.8825 0.9115 0.9408 0.9703 1.0000
Hrad:
0.0286 0.0516 0.0721 0.0912 0.1096
0.1275 0.1450 0.1623 0.1794 0.1963
0.2185 0.2400 0.2609 0.2841 0.3075
0.3302 0.3525 0.3743 0.3957 0.4166
0.4372 0.4575 0.4774 0.4971 0.5164
0.5356 0.5544 0.5731 0.5915 0.6098
0.6278 0.6457 0.6634 0.6810 0.6984
0.7157 0.7328 0.7498 0.7667 0.7835
0.8002 0.8219 0.8446 0.8673 0.8897
0.9120 0.9342 0.9563 0.9782 1.0000
Width:
0.1302 0.1675 0.2049 0.2423 0.2797
0.3170 0.3544 0.3918 0.4292 0.4665
0.4890 0.5114 0.5339 0.5496 0.5637
0.5778 0.5919 0.6060 0.6201 0.6342
0.6483 0.6624 0.6765 0.6906 0.7048
0.7189 0.7330 0.7471 0.7612 0.7753
0.7894 0.8035 0.8176 0.8317 0.8458
0.8599 0.8740 0.8881 0.9022 0.9163
0.9304 0.9393 0.9469 0.9544 0.9620
0.9696 0.9772 0.9848 0.9924 1.0000

Transect DownstreamCul.2
Area:
0.0035 0.0079 0.0130 0.0189 0.0257
0.0332 0.0415 0.0506 0.0605 0.0711
0.0826 0.0947 0.1074 0.1207 0.1347
0.1493 0.1644 0.1802 0.1966 0.2135
0.2311 0.2493 0.2681 0.2874 0.3074
0.3280 0.3492 0.3710 0.3934 0.4164
0.4401 0.4643 0.4891 0.5145 0.5405
0.5672 0.5944 0.6222 0.6507 0.6797
0.7094 0.7396 0.7705 0.8019 0.8340
0.8666 0.8995 0.9327 0.9662 1.0000
Hrad:
0.0337 0.0618 0.0868 0.1099 0.1318
0.1529 0.1733 0.1932 0.2128 0.2321

0.2533 0.2741 0.2953 0.3166 0.3374
0.3579 0.3781 0.3981 0.4178 0.4373
0.4567 0.4759 0.4949 0.5138 0.5326
0.5512 0.5698 0.5883 0.6067 0.6250
0.6433 0.6615 0.6796 0.6976 0.7157
0.7336 0.7515 0.7694 0.7873 0.8051
0.8228 0.8406 0.8583 0.8759 0.8936
0.9147 0.9364 0.9578 0.9790 1.0000
Width:
0.1160 0.1394 0.1627 0.1860 0.2094
0.2327 0.2561 0.2794 0.3027 0.3261
0.3459 0.3656 0.3840 0.4018 0.4195
0.4373 0.4551 0.4728 0.4906 0.5084
0.5261 0.5439 0.5616 0.5794 0.5972
0.6149 0.6327 0.6505 0.6682 0.6860
0.7038 0.7215 0.7393 0.7571 0.7748
0.7926 0.8104 0.8281 0.8459 0.8637
0.8814 0.8992 0.9169 0.9347 0.9525
0.9634 0.9725 0.9817 0.9908 1.0000

Transect Lipsit_SouthofRoughamRd
Area:
0.0007 0.0030 0.0067 0.0118 0.0181
0.0249 0.0322 0.0401 0.0486 0.0576
0.0672 0.0775 0.0885 0.1002 0.1127
0.1258 0.1398 0.1544 0.1698 0.1859
0.2027 0.2203 0.2386 0.2576 0.2773
0.2978 0.3190 0.3409 0.3636 0.3870
0.4111 0.4359 0.4615 0.4878 0.5148
0.5426 0.5710 0.6003 0.6302 0.6609
0.6923 0.7244 0.7572 0.7908 0.8251
0.8598 0.8946 0.9296 0.9647 1.0000
Hrad:
0.0194 0.0389 0.0583 0.0777 0.1062
0.1333 0.1587 0.1828 0.2059 0.2281
0.2479 0.2656 0.2832 0.3009 0.3185
0.3362 0.3539 0.3715 0.3892 0.4068
0.4245 0.4421 0.4597 0.4774 0.4950
0.5127 0.5303 0.5479 0.5656 0.5832
0.6008 0.6185 0.6361 0.6537 0.6714
0.6890 0.7066 0.7243 0.7419 0.7595
0.7772 0.7948 0.8124 0.8301 0.8497
0.8801 0.9104 0.9404 0.9703 1.0000
Width:
0.0418 0.0836 0.1254 0.1672 0.1847
0.2002 0.2158 0.2313 0.2468 0.2623
0.2803 0.3009 0.3214 0.3420 0.3626
0.3832 0.4038 0.4244 0.4450 0.4656
0.4862 0.5068 0.5274 0.5480 0.5686
0.5892 0.6097 0.6303 0.6509 0.6715
0.6921 0.7127 0.7333 0.7539 0.7745
0.7951 0.8157 0.8363 0.8569 0.8774
0.8980 0.9186 0.9392 0.9598 0.9780
0.9824 0.9868 0.9912 0.9956 1.0000

Transect Pond0utlet
Area:
0.0009 0.0037 0.0083 0.0148 0.0232
0.0334 0.0454 0.0591 0.0735 0.0883
0.1036 0.1192 0.1352 0.1515 0.1683
0.1855 0.2031 0.2210 0.2393 0.2581
0.2772 0.2967 0.3166 0.3369 0.3575
0.3786 0.4000 0.4219 0.4441 0.4667
0.4897 0.5131 0.5369 0.5611 0.5857

```
            0.6106     0.6360     0.6617     0.6879     0.7144
            0.7413     0.7686     0.7963     0.8243     0.8528
            0.8816     0.9108     0.9403     0.9700     1.0000
Hrad:
            0.0161     0.0321     0.0482     0.0643     0.0803
            0.0964     0.1125     0.1338     0.1606     0.1874
            0.2134     0.2389     0.2637     0.2880     0.3118
            0.3351     0.3579     0.3804     0.4025     0.4242
            0.4456     0.4667     0.4875     0.5080     0.5282
            0.5483     0.5681     0.5877     0.6071     0.6263
            0.6453     0.6641     0.6828     0.7013     0.7197
            0.7380     0.7561     0.7741     0.7920     0.8098
            0.8274     0.8450     0.8624     0.8798     0.8970
            0.9142     0.9357     0.9572     0.9787     1.0000
Width:
            0.0615     0.1231     0.1846     0.2462     0.3077
            0.3693     0.4308     0.4700     0.4858     0.4987
            0.5117     0.5246     0.5375     0.5505     0.5634
            0.5763     0.5892     0.6022     0.6151     0.6280
            0.6410     0.6539     0.6668     0.6797     0.6927
            0.7056     0.7185     0.7314     0.7444     0.7573
            0.7702     0.7832     0.7961     0.8090     0.8219
            0.8349     0.8478     0.8607     0.8737     0.8866
            0.8995     0.9124     0.9254     0.9383     0.9512
            0.9642     0.9733     0.9822     0.9911     1.0000

Transect Road
Area:
            0.0005     0.0020     0.0045     0.0079     0.0124
            0.0179     0.0243     0.0317     0.0402     0.0496
            0.0600     0.0714     0.0838     0.0972     0.1116
            0.1270     0.1426     0.1583     0.1740     0.1897
            0.2059     0.2229     0.2406     0.2591     0.2783
            0.2983     0.3190     0.3404     0.3626     0.3855
            0.4092     0.4336     0.4587     0.4846     0.5113
            0.5387     0.5668     0.5956     0.6253     0.6556
            0.6867     0.7185     0.7511     0.7845     0.8185
            0.8533     0.8889     0.9252     0.9622     1.0000
Hrad:
            0.0182     0.0364     0.0547     0.0729     0.0911
            0.1093     0.1275     0.1458     0.1640     0.1822
            0.2004     0.2187     0.2369     0.2551     0.2733
            0.2953     0.3311     0.3668     0.4024     0.4380
            0.4724     0.5046     0.5349     0.5635     0.5904
            0.6159     0.6401     0.6630     0.6849     0.7057
            0.7256     0.7447     0.7630     0.7806     0.7976
            0.8139     0.8297     0.8450     0.8598     0.8742
            0.8881     0.9017     0.9150     0.9279     0.9406
            0.9529     0.9651     0.9769     0.9886     1.0000
Width:
            0.0260     0.0520     0.0780     0.1040     0.1300
            0.1560     0.1820     0.2080     0.2340     0.2600
            0.2860     0.3121     0.3381     0.3641     0.3901
            0.4106     0.4107     0.4107     0.4108     0.4159
            0.4354     0.4549     0.4743     0.4938     0.5133
            0.5327     0.5522     0.5717     0.5911     0.6106
            0.6301     0.6496     0.6690     0.6885     0.7080
            0.7274     0.7469     0.7664     0.7858     0.8053
            0.8248     0.8442     0.8637     0.8832     0.9027
            0.9221     0.9416     0.9611     0.9805     1.0000

Transect UpstreamCulvert2
Area:
            0.0037     0.0081     0.0132     0.0190     0.0255
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            0.0327     0.0405     0.0491     0.0583     0.0682
            0.0787     0.0898     0.1016     0.1140     0.1271
            0.1409     0.1554     0.1706     0.1864     0.2030
            0.2202     0.2381     0.2566     0.2759     0.2958
            0.3164     0.3377     0.3597     0.3824     0.4057
            0.4297     0.4544     0.4798     0.5058     0.5326
            0.5600     0.5881     0.6169     0.6463     0.6765
            0.7073     0.7387     0.7703     0.8023     0.8345
            0.8671     0.8999     0.9330     0.9663     1.0000
Hrad:
            0.0349     0.0639     0.0896     0.1131     0.1351
            0.1562     0.1764     0.1961     0.2154     0.2350
            0.2551     0.2743     0.2921     0.3098     0.3274
            0.3449     0.3623     0.3796     0.3969     0.4142
            0.4314     0.4486     0.4657     0.4828     0.4999
            0.5170     0.5340     0.5510     0.5681     0.5850
            0.6020     0.6190     0.6359     0.6529     0.6698
            0.6867     0.7036     0.7205     0.7374     0.7543
            0.7712     0.7959     0.8220     0.8480     0.8738
            0.8994     0.9248     0.9500     0.9751     1.0000
Width:
            0.1203     0.1407     0.1610     0.1814     0.2017
            0.2221     0.2424     0.2627     0.2831     0.3022
            0.3197     0.3378     0.3580     0.3781     0.3983
            0.4184     0.4385     0.4587     0.4788     0.4989
            0.5191     0.5392     0.5593     0.5795     0.5996
            0.6197     0.6399     0.6600     0.6802     0.7003
            0.7204     0.7406     0.7607     0.7808     0.8010
            0.8211     0.8412     0.8614     0.8815     0.9016
            0.9218     0.9323     0.9408     0.9492     0.9577
            0.9662     0.9746     0.9831     0.9915     1.0000


************************************************************
NOTE: The summary statistics displayed in this report are
based on results found at every computational time step,
not just on results from each reporting time step.
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Analysis Options
****************
Flow Units ............... CMS
Process Models:
  Rainfall/Runoff ........ YES
  RDII ................... NO
  Snowmelt ............... NO
  Groundwater ............ NO
  Flow Routing ........... YES
  Ponding Allowed ........ NO
  Water Quality .......... NO
Infiltration Method ...... CURVE_NUMBER
Flow Routing Method ...... DYNWAVE
Surcharge Method ......... EXTRAN
Starting Date ............ 10/30/2020 00:00:00
Ending Date .............. 11/01/2020 03:00:00
Antecedent Dry Days ...... 0.0
Report Time Step ......... 00:01:00
Wet Time Step ............ 00:05:00
Dry Time Step ............ 00:05:00
Routing Time Step ........ 5.00 sec
Variable Time Step ....... YES
Maximum Trials ........... 8
Number of Threads ........ 4
```

Head Tolerance ..... 0.001500 m

Runoff Quantity Continuity	Volume hectare-m	Depth mm
Total Precipitation	10.662	86.611
Evaporation Loss	0.000	0.000
Infiltration Loss	8.253	67.046
Surface Runoff	2.275	18.479
Final Storage	0.150	1.219
Continuity Error (%)	-0.153	

Flow Routing Continuity	Volume hectare-m	Volume 10^6 ltr
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	2.275	22.753
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	4.589	45.895
External Outflow	6.711	67.114
Flooding Loss	0.046	0.463
Evaporation Loss	0.000	0.000
Exfiltration Loss	0.000	0.000
Initial Stored Volume	0.387	3.870
Final Stored Volume	0.507	5.065
Continuity Error (%)	-0.173	

Highest Continuity Errors

Node J1 (-13.45%)
Node SU1 (9.89%)

Time-Step Critical Elements

Link C11 (96.69%)
Link C5 (1.52%)

Highest Flow Instability Indexes

Link OR2 (137)
Link OR1 (137)
Link C1 (37)

Routing Time Step Summary

Minimum Time Step	:	0.50 sec
Average Time Step	:	2.61 sec
Maximum Time Step	:	5.00 sec
Percent in Steady State	:	-0.00
Average Iterations per Step	:	7.58
Percent Not Converging	:	70.18
Time Step Frequencies	:	
5.000 - 3.155 sec	:	2.37 %

```
    3.155 -  1.991 sec      :    95.31 %
    1.991 -  1.256 sec      :     1.30 %
    1.256 -  0.792 sec      :     0.61 %
    0.792 -  0.500 sec      :     0.41 %
```

Subcatchment Runoff Summary

Subcatchment	Total Precip mm	Total Runon mm	Total Evap mm	Total Infil mm	Imperv Runoff mm	Perv Runoff mm	Tot Runo
1	86.61	0.00	0.00	33.53	49.81	2.41	52.
EXT1	86.61	0.00	0.00	52.71	26.45	6.24	32.
EXT22	86.61	0.00	0.00	68.30	11.08	6.00	17.
EXT3&4	86.61	0.00	0.00	62.28	20.61	2.70	23.
EXT5	86.61	0.00	0.00	70.04	6.82	8.70	15.
EXT6	86.61	0.00	0.00	60.14	17.90	7.38	25.
EXT7	86.61	0.00	0.00	62.28	20.61	2.70	23.
S1	86.61	0.00	0.00	60.77	0.00	24.74	24.
S10	86.61	0.00	0.00	65.38	12.82	7.26	20.
S2	86.61	0.00	0.00	68.93	15.45	1.18	16.
S3	86.61	0.00	0.00	61.81	18.03	5.80	23.
S4	86.61	0.00	0.00	71.67	5.54	8.23	13.
S5	86.61	0.00	0.00	81.06	3.50	0.81	4.
S6	86.61	0.00	0.00	68.07	11.41	6.16	17.
S7	86.61	0.00	0.00	67.24	17.16	1.12	18.
S9	86.61	0.00	0.00	67.03	17.16	1.27	18.

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
J1	JUNCTION	1.04	1.42	245.85	0 01:34	1.42
J10	JUNCTION	1.49	1.90	245.92	0 01:18	1.90
J3	JUNCTION	1.50	2.02	246.03	0 01:18	2.02
J4	JUNCTION	1.47	2.58	246.63	0 01:13	2.58
J5	JUNCTION	1.33	3.00	247.20	0 01:12	3.00
J6	JUNCTION	1.34	2.47	246.65	0 01:13	2.47
J7	JUNCTION	0.97	2.66	247.22	0 01:12	2.65
J8	JUNCTION	1.87	2.20	245.83	0 01:16	2.20
J9	JUNCTION	1.89	1.99	245.60	0 01:17	1.99
OF2	JUNCTION	0.85	2.56	247.25	0 01:12	2.56
OF3	JUNCTION	1.42	1.85	245.94	0 01:18	1.85
ST1	JUNCTION	0.01	1.40	247.47	0 01:12	1.40
ST6	JUNCTION	0.15	1.77	247.16	0 01:10	1.76
ST7	JUNCTION	0.31	1.90	247.13	0 01:09	1.90
OF1	OUTFALL	1.74	1.74	245.50	0 00:00	1.74
SU1	STORAGE	1.04	1.42	245.86	0 01:42	1.42

Node Inflow Summary

Node	Type	Maximum Lateral Inflow CMS	Maximum Total Inflow CMS	Time of Max Occurrence days hr:min	Lateral Inflow Volume 10^6 ltr	Total Inflow Volume 10^6 ltr	Fl Balan Err Perce
J1	JUNCTION	0.000	0.360	0 02:08	0	6.68	-11.8
J10	JUNCTION	0.000	3.825	0 01:20	0	61.1	0.0
J3	JUNCTION	0.000	3.888	0 01:13	0	58.9	0.0
J4	JUNCTION	0.000	4.062	0 01:11	0	58.9	-0.0
J5	JUNCTION	0.000	4.283	0 01:09	0	57.2	0.0
J6	JUNCTION	1.082	4.424	0 01:09	1.81	59	0.0
J7	JUNCTION	0.107	6.285	0 01:08	0.298	57.2	0.0
J8	JUNCTION	2.819	5.134	0 01:14	4.72	65.8	-0.0
J9	JUNCTION	0.297	5.387	0 01:17	1.3	67.1	0.0
OF2	JUNCTION	6.588	6.763	0 01:05	56.9	57.2	-0.0
OF3	JUNCTION	0.295	3.861	0 01:14	0.408	61.1	-0.0
ST1	JUNCTION	0.295	0.295	0 01:05	0.416	0.416	-3.1
ST6	JUNCTION	0.000	0.179	0 01:05	0	0.416	0.7
ST7	JUNCTION	0.000	0.806	0 01:12	0	0.743	0.2
OF1	OUTFALL	0.000	5.387	0 01:17	0	67.1	0.0
SU1	STORAGE	1.898	1.898	0 01:05	2.81	8.69	10.9

****
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
J1	JUNCTION	1.76	0.305	0.245
J4	JUNCTION	0.21	0.089	0.000
J5	JUNCTION	0.03	0.000	0.000
J6	JUNCTION	0.07	0.000	0.000
OF2	JUNCTION	0.32	0.354	0.000
ST6	JUNCTION	0.89	1.167	0.584
ST7	JUNCTION	1.06	1.270	0.000

****
Node Flooding Summary
****

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

Node	Hours Flooded	Maximum Rate CMS	Time of Max Occurrence days hr:min	Total Flood Volume 10^6 ltr	Maximum Ponded Depth Meters
J5	0.03	0.616	0 01:13	0.043	0.000
J6	0.07	0.203	0 01:13	0.032	0.000
ST7	0.19	0.806	0 01:12	0.388	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	Maxi Outf
SU1	1.137	52	0	0	1.734	80	0 01:42	0.

****
Outfall Loading Summary
****

Outfall Node	Flow Freq Pcnt	Avg Flow CMS	Max Flow CMS	Total Volume 10^6 ltr
OF1	99.98	0.333	5.387	67.114
System	99.98	0.333	5.387	67.114

****
Link Flow Summary
****

Link	Type	Maximum |Flow| CMS	Time of Max Occurrence days hr:min	Maximum |Veloc| m/sec	Max/ Full Flow	Max/ Full Depth
C1	CONDUIT	0.360	0 02:08	1.27	1.34	1.00
C10	CHANNEL	3.781	0 01:18	0.39	0.31	0.71
C11	CONDUIT	3.888	0 01:13	2.39	2.91	1.00
C12	CHANNEL	4.062	0 01:11	0.42	0.49	1.00
C13	CONDUIT	3.773	0 01:10	2.32	4.16	1.00
C14	CHANNEL	6.202	0 01:08	0.58	0.87	1.00
C15	CHANNEL	4.283	0 01:09	0.46	0.40	0.99
C3	CONDUIT	0.179	0 01:05	1.13	1.05	1.00
C4	CONDUIT	0.179	0 01:05	0.63	0.63	1.00
C5	CONDUIT	0.687	0 01:12	2.43	2.89	1.00
C6	CONDUIT	5.109	0 01:16	1.71	1.94	1.00
C7	CHANNEL	5.387	0 01:17	0.71	0.68	0.76
C8	CHANNEL	3.825	0 01:20	0.25	0.30	0.87
C9	CHANNEL	3.894	0 01:21	0.42	0.37	0.78
W3	CHANNEL	0.033	0 01:12	0.44	0.00	0.39
OR1	ORIFICE	0.010	0 02:08			1.00
OR2	WEIR	0.350	0 02:08			1.00
W1	WEIR	0.043	0 01:18			0.22

****
Flow Classification Summary
****

Conduit	Adjusted /Actual Length	Fraction of Time in Flow Class: Dry	Up Dry	Down Dry	Sub Crit	Sup Crit	Up Crit	Down Crit	Norm Ltd	Inlet Ctrl
C1	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
C10	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
C11	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
C12	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
C13	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00

C14	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
C15	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
C3	1.00	0.00	0.05	0.00	0.95	0.00	0.00	0.00	0.98	0.00
C4	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
C5	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
C6	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
C7	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
C8	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
C9	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
W3	1.00	0.97	0.02	0.00	0.00	0.00	0.00	0.00	0.98	0.00

****
Conduit Surcharge Summary
****

Conduit	Hours Full: Both Ends	Hours Full: Upstream	Hours Full: Dnstream	Hours Above Full Normal Flow	Hours Capacity Limited
C1	49.93	49.93	51.00	0.91	0.92
C11	2.26	2.26	3.02	1.04	1.34
C12	0.01	0.01	0.21	0.01	0.01
C13	1.21	1.27	1.21	1.26	1.21
C14	0.32	0.32	0.40	0.01	0.01
C15	0.01	0.01	0.03	0.01	0.01
C3	0.60	0.60	1.04	0.03	0.03
C4	0.89	0.89	1.06	0.01	0.01
C5	1.12	1.12	1.15	0.15	0.02
C6	51.00	51.00	51.00	0.88	1.39

Analysis begun on: Fri Feb 5 14:41:11 2021
Analysis ended on: Fri Feb 5 14:42:03 2021
Total elapsed time: 00:00:52

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

WARNING 02: maximum depth increased for Node J10
WARNING 02: maximum depth increased for Node J3
WARNING 02: maximum depth increased for Node J4
WARNING 02: maximum depth increased for Node J5
WARNING 02: maximum depth increased for Node J6
WARNING 02: maximum depth increased for Node J7
WARNING 02: maximum depth increased for Node J8
WARNING 02: maximum depth increased for Node J9
WARNING 02: maximum depth increased for Node OF2
WARNING 02: maximum depth increased for Node OF3
WARNING 02: maximum depth increased for Node ST1

****
Element Count
****
Number of rain gages 1
Number of subcatchments ... 16
Number of nodes 16
Number of links 18
Number of pollutants 0
Number of land uses 0

****
Raingage Summary
****

Name	Data Source	Data Type	Recording Interval
Chicago_3h_100Yr	Chicago_3h_100Yr	INTENSITY	5 min.

****
Subcatchment Summary
****

Name	Area	Width	%Imperv	%Slope	Rain Gage	Outlet
1	3.74	124.25	58.00	1.1000	Chicago_3h_100Yr	SU1
EXT1	0.20	78.13	31.00	0.8500	Chicago_3h_100Yr	SU1
EXT22	1.47	169.94	13.00	1.1000	Chicago_3h_100Yr	SU1
EXT3&4	2.03	52.62	24.00	0.9000	Chicago_3h_100Yr	SU1
EXT5	0.21	107.69	8.00	2.1000	Chicago_3h_100Yr	SU1
EXT6	0.15	57.69	21.00	2.1000	Chicago_3h_100Yr	SU1
EXT7	1.78	46.31	24.00	0.9000	Chicago_3h_100Yr	ST1
S1	5.26	196.97	0.00	0.8500	Chicago_3h_100Yr	J9
S10	2.93	154.36	15.00	0.9000	Chicago_3h_100Yr	J6
S2	28.37	236.38	18.00	0.8500	Chicago_3h_100Yr	J8
S3	5.12	157.65	21.00	0.5500	Chicago_3h_100Yr	J6
S4	2.16	156.57	6.50	0.8500	Chicago_3h_100Yr	J7
S5	9.45	239.24	4.10	0.9000	Chicago_3h_100Yr	OF3
S6	7.43	174.81	13.30	0.9000	Chicago_3h_100Yr	OF2
S7	33.00	253.07	20.00	0.9000	Chicago_3h_100Yr	OF2
S9	19.80	167.66	20.00	1.0000	Chicago_3h_100Yr	OF2

****
Node Summary
****

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

J1	JUNCTION	244.43	1.67	0.0	
J10	JUNCTION	244.02	2.51	0.0	
J3	JUNCTION	244.01	2.80	0.0	
J4	JUNCTION	244.05	2.49	0.0	
J5	JUNCTION	244.20	3.00	0.0	
J6	JUNCTION	244.18	2.47	0.0	
J7	JUNCTION	244.56	2.72	0.0	
J8	JUNCTION	243.63	2.71	0.0	
J9	JUNCTION	243.61	2.53	0.0	
OF2	JUNCTION	244.69	2.21	0.0	Yes
OF3	JUNCTION	244.09	2.50	0.0	
ST1	JUNCTION	246.07	1.73	100.0	
ST6	JUNCTION	245.39	2.35	0.0	
ST7	JUNCTION	245.23	1.90	0.0	
OF1	OUTFALL	243.76	2.33	0.0	
SU1	STORAGE	244.44	1.66	0.0	

****
Link Summary
****

Name	From Node	To Node	Type	Length	%Slope	Roughness
C1	J1	OF3	CONDUIT	15.6	0.1927	0.0130
C10	J3	OF3	CONDUIT	177.5	0.1240	0.0600
C11	J4	J3	CONDUIT	24.0	0.1667	0.0240
C12	J6	J4	CONDUIT	84.1	0.1308	0.0600
C13	J5	J6	CONDUIT	26.0	0.0769	0.0240
C14	OF2	J7	CONDUIT	106.6	0.1219	0.0600
C15	J7	J5	CONDUIT	63.6	0.1259	0.0600
C3	ST1	ST6	CONDUIT	182.9	0.3554	0.0130
C4	ST6	ST7	CONDUIT	65.0	0.2108	0.0130
C5	ST7	OF2	CONDUIT	10.0	0.1500	0.0130
C6	J8	J9	CONDUIT	16.6	0.1205	0.0240
C7	J9	OF1	CONDUIT	42.6	0.1174	0.0600
C8	OF3	J10	CONDUIT	61.2	0.1144	0.0600
C9	J10	J8	CONDUIT	153.8	0.1235	0.0600
W3	ST1	SU1	CONDUIT	384.0	0.4854	0.0130
OR1	SU1	J1	ORIFICE			
OR2	SU1	J1	WEIR			
W1	SU1	OF3	WEIR			

****
Cross Section Summary
****

Conduit	Shape	Full Depth	Full Area	Hyd. Rad.	Max. Width	No. of Barrels	Full Flow	
C1	CIRCULAR	0.60	0.28	0.15	0.60	1	0.27	
C10	DownstreamCul.1	2.50	16.25	1.48	9.70	1	12.36	
C11	FILLED_CIRCULAR	1.30	1.63	0.33	1.50	1	1.33	
C12	DownstreamCul.2	2.19	12.52	1.15	9.71	1	8.27	
C13	FILLED_CIRCULAR	1.30	1.63	0.33	1.50	1	0.91	
C14	ClosetoQueenSt	2.21	12.38	0.98	11.35	1	7.13	
C15	UpstreamCulvert2	2.72	14.48	1.38	9.00	1	10.64	
C3	CIRCULAR	0.45	0.16	0.11	0.45	1	0.17	
C4	CIRCULAR	0.60	0.28	0.15	0.60	1	0.28	
C5	CIRCULAR	0.60	0.28	0.15	0.60	1	0.24	
C6	ARCH	1.60	2.98	0.48	2.21	1	2.64	
C7	Lipsit_SouthofRoughamRd	2.33	12.64	1.16	9.59	1	7.95	
C8	Pond0utlet	2.15	18.67	1.33	13.08	1	12.70	
C9	atLion'sGate	2.51	16.02	1.18	12.34	1	10.48	

W3	Road	0.38	3.99	0.20	20.01	1	7.36

****
Transect Summary
****

Transect atLion'sGate
Area:

0.0004	0.0016	0.0035	0.0062	0.0097
0.0140	0.0191	0.0249	0.0315	0.0389
0.0470	0.0560	0.0657	0.0762	0.0875
0.0996	0.1125	0.1262	0.1408	0.1563
0.1725	0.1896	0.2075	0.2263	0.2459
0.2663	0.2876	0.3097	0.3326	0.3563
0.3809	0.4064	0.4326	0.4597	0.4876
0.5164	0.5460	0.5764	0.6077	0.6398
0.6727	0.7065	0.7410	0.7765	0.8126
0.8491	0.8861	0.9236	0.9616	1.0000

Hrad:

0.0196	0.0391	0.0587	0.0783	0.0978
0.1174	0.1370	0.1565	0.1761	0.1957
0.2152	0.2348	0.2544	0.2739	0.2934
0.3119	0.3306	0.3494	0.3684	0.3874
0.4065	0.4257	0.4450	0.4642	0.4836
0.5030	0.5224	0.5418	0.5613	0.5808
0.6003	0.6198	0.6394	0.6589	0.6785
0.6981	0.7177	0.7373	0.7570	0.7766
0.7963	0.8159	0.8356	0.8553	0.8800
0.9046	0.9289	0.9528	0.9766	1.0000

Width:

0.0201	0.0402	0.0603	0.0805	0.1006
0.1207	0.1408	0.1609	0.1810	0.2012
0.2213	0.2414	0.2615	0.2816	0.3019
0.3235	0.3451	0.3666	0.3882	0.4098
0.4313	0.4529	0.4745	0.4960	0.5176
0.5391	0.5607	0.5823	0.6038	0.6254
0.6469	0.6685	0.6901	0.7116	0.7332
0.7548	0.7763	0.7979	0.8194	0.8410
0.8626	0.8841	0.9057	0.9272	0.9396
0.9516	0.9637	0.9758	0.9879	1.0000

Transect ClosetoQueenSt
Area:

0.0036	0.0081	0.0133	0.0194	0.0263
0.0340	0.0426	0.0520	0.0621	0.0731
0.0850	0.0976	0.1111	0.1254	0.1404
0.1561	0.1722	0.1888	0.2060	0.2236
0.2417	0.2603	0.2794	0.2990	0.3190
0.3396	0.3606	0.3822	0.4042	0.4267
0.4497	0.4732	0.4972	0.5216	0.5466
0.5721	0.5980	0.6244	0.6513	0.6787
0.7066	0.7350	0.7639	0.7933	0.8231
0.8542	0.8875	0.9229	0.9605	1.0000

Hrad:

0.0396	0.0726	0.1019	0.1290	0.1547
0.1794	0.2034	0.2268	0.2498	0.2726
0.2950	0.3173	0.3394	0.3613	0.3867
0.4131	0.4406	0.4675	0.4939	0.5199
0.5454	0.5705	0.5953	0.6197	0.6439
0.6677	0.6913	0.7147	0.7378	0.7607
0.7835	0.8060	0.8284	0.8506	0.8727
0.8947	0.9165	0.9382	0.9597	0.9812

1.0026 1.0239 1.0450 1.0661 1.0871
1.0604 1.0382 1.0207 1.0081 1.0000
Width:
0.0996 0.1198 0.1401 0.1603 0.1806
0.2008 0.2211 0.2413 0.2616 0.2819
0.3021 0.3224 0.3426 0.3629 0.3787
0.3927 0.4048 0.4169 0.4289 0.4410
0.4531 0.4652 0.4773 0.4893 0.5014
0.5135 0.5256 0.5377 0.5497 0.5618
0.5739 0.5860 0.5981 0.6101 0.6222
0.6343 0.6464 0.6585 0.6705 0.6826
0.6947 0.7068 0.7189 0.7309 0.7430
0.7950 0.8478 0.9007 0.9519 1.0000

Transect DownstreamCul.1
Area:
0.0033 0.0078 0.0133 0.0200 0.0278
0.0367 0.0467 0.0578 0.0701 0.0835
0.0977 0.1126 0.1282 0.1444 0.1610
0.1781 0.1955 0.2134 0.2317 0.2504
0.2695 0.2891 0.3091 0.3295 0.3503
0.3715 0.3932 0.4153 0.4378 0.4607
0.4840 0.5078 0.5320 0.5566 0.5816
0.6071 0.6329 0.6592 0.6859 0.7131
0.7406 0.7685 0.7967 0.8250 0.8536
0.8825 0.9115 0.9408 0.9703 1.0000
Hrad:
0.0286 0.0516 0.0721 0.0912 0.1096
0.1275 0.1450 0.1623 0.1794 0.1963
0.2185 0.2400 0.2609 0.2841 0.3075
0.3302 0.3525 0.3743 0.3957 0.4166
0.4372 0.4575 0.4774 0.4971 0.5164
0.5356 0.5544 0.5731 0.5915 0.6098
0.6278 0.6457 0.6634 0.6810 0.6984
0.7157 0.7328 0.7498 0.7667 0.7835
0.8002 0.8219 0.8446 0.8673 0.8897
0.9120 0.9342 0.9563 0.9782 1.0000
Width:
0.1302 0.1675 0.2049 0.2423 0.2797
0.3170 0.3544 0.3918 0.4292 0.4665
0.4890 0.5114 0.5339 0.5496 0.5637
0.5778 0.5919 0.6060 0.6201 0.6342
0.6483 0.6624 0.6765 0.6906 0.7048
0.7189 0.7330 0.7471 0.7612 0.7753
0.7894 0.8035 0.8176 0.8317 0.8458
0.8599 0.8740 0.8881 0.9022 0.9163
0.9304 0.9393 0.9469 0.9544 0.9620
0.9696 0.9772 0.9848 0.9924 1.0000

Transect DownstreamCul.2
Area:
0.0035 0.0079 0.0130 0.0189 0.0257
0.0332 0.0415 0.0506 0.0605 0.0711
0.0826 0.0947 0.1074 0.1207 0.1347
0.1493 0.1644 0.1802 0.1966 0.2135
0.2311 0.2493 0.2681 0.2874 0.3074
0.3280 0.3492 0.3710 0.3934 0.4164
0.4401 0.4643 0.4891 0.5145 0.5405
0.5672 0.5944 0.6222 0.6507 0.6797
0.7094 0.7396 0.7705 0.8019 0.8340
0.8666 0.8995 0.9327 0.9662 1.0000
Hrad:
0.0337 0.0618 0.0868 0.1099 0.1318
0.1529 0.1733 0.1932 0.2128 0.2321

0.2533 0.2741 0.2953 0.3166 0.3374
0.3579 0.3781 0.3981 0.4178 0.4373
0.4567 0.4759 0.4949 0.5138 0.5326
0.5512 0.5698 0.5883 0.6067 0.6250
0.6433 0.6615 0.6796 0.6976 0.7157
0.7336 0.7515 0.7694 0.7873 0.8051
0.8228 0.8406 0.8583 0.8759 0.8936
0.9147 0.9364 0.9578 0.9790 1.0000
Width:
0.1160 0.1394 0.1627 0.1860 0.2094
0.2327 0.2561 0.2794 0.3027 0.3261
0.3459 0.3656 0.3840 0.4018 0.4195
0.4373 0.4551 0.4728 0.4906 0.5084
0.5261 0.5439 0.5616 0.5794 0.5972
0.6149 0.6327 0.6505 0.6682 0.6860
0.7038 0.7215 0.7393 0.7571 0.7748
0.7926 0.8104 0.8281 0.8459 0.8637
0.8814 0.8992 0.9169 0.9347 0.9525
0.9634 0.9725 0.9817 0.9908 1.0000

Transect Lipsit_SouthofRoughamRd
Area:
0.0007 0.0030 0.0067 0.0118 0.0181
0.0249 0.0322 0.0401 0.0486 0.0576
0.0672 0.0775 0.0885 0.1002 0.1127
0.1258 0.1398 0.1544 0.1698 0.1859
0.2027 0.2203 0.2386 0.2576 0.2773
0.2978 0.3190 0.3409 0.3636 0.3870
0.4111 0.4359 0.4615 0.4878 0.5148
0.5426 0.5710 0.6003 0.6302 0.6609
0.6923 0.7244 0.7572 0.7908 0.8251
0.8598 0.8946 0.9296 0.9647 1.0000
Hrad:
0.0194 0.0389 0.0583 0.0777 0.1062
0.1333 0.1587 0.1828 0.2059 0.2281
0.2479 0.2656 0.2832 0.3009 0.3185
0.3362 0.3539 0.3715 0.3892 0.4068
0.4245 0.4421 0.4597 0.4774 0.4950
0.5127 0.5303 0.5479 0.5656 0.5832
0.6008 0.6185 0.6361 0.6537 0.6714
0.6890 0.7066 0.7243 0.7419 0.7595
0.7772 0.7948 0.8124 0.8301 0.8497
0.8801 0.9104 0.9404 0.9703 1.0000
Width:
0.0418 0.0836 0.1254 0.1672 0.1847
0.2002 0.2158 0.2313 0.2468 0.2623
0.2803 0.3009 0.3214 0.3420 0.3626
0.3832 0.4038 0.4244 0.4450 0.4656
0.4862 0.5068 0.5274 0.5480 0.5686
0.5892 0.6097 0.6303 0.6509 0.6715
0.6921 0.7127 0.7333 0.7539 0.7745
0.7951 0.8157 0.8363 0.8569 0.8774
0.8980 0.9186 0.9392 0.9598 0.9780
0.9824 0.9868 0.9912 0.9956 1.0000

Transect Pond0utlet
Area:
0.0009 0.0037 0.0083 0.0148 0.0232
0.0334 0.0454 0.0591 0.0735 0.0883
0.1036 0.1192 0.1352 0.1515 0.1683
0.1855 0.2031 0.2210 0.2393 0.2581
0.2772 0.2967 0.3166 0.3369 0.3575
0.3786 0.4000 0.4219 0.4441 0.4667
0.4897 0.5131 0.5369 0.5611 0.5857

```
            0.6106     0.6360     0.6617     0.6879     0.7144
            0.7413     0.7686     0.7963     0.8243     0.8528
            0.8816     0.9108     0.9403     0.9700     1.0000
Hrad:
            0.0161     0.0321     0.0482     0.0643     0.0803
            0.0964     0.1125     0.1338     0.1606     0.1874
            0.2134     0.2389     0.2637     0.2880     0.3118
            0.3351     0.3579     0.3804     0.4025     0.4242
            0.4456     0.4667     0.4875     0.5080     0.5282
            0.5483     0.5681     0.5877     0.6071     0.6263
            0.6453     0.6641     0.6828     0.7013     0.7197
            0.7380     0.7561     0.7741     0.7920     0.8098
            0.8274     0.8450     0.8624     0.8798     0.8970
            0.9142     0.9357     0.9572     0.9787     1.0000
Width:
            0.0615     0.1231     0.1846     0.2462     0.3077
            0.3693     0.4308     0.4700     0.4858     0.4987
            0.5117     0.5246     0.5375     0.5505     0.5634
            0.5763     0.5892     0.6022     0.6151     0.6280
            0.6410     0.6539     0.6668     0.6797     0.6927
            0.7056     0.7185     0.7314     0.7444     0.7573
            0.7702     0.7832     0.7961     0.8090     0.8219
            0.8349     0.8478     0.8607     0.8737     0.8866
            0.8995     0.9124     0.9254     0.9383     0.9512
            0.9642     0.9733     0.9822     0.9911     1.0000

Transect Road
Area:
            0.0005     0.0020     0.0045     0.0079     0.0124
            0.0179     0.0243     0.0317     0.0402     0.0496
            0.0600     0.0714     0.0838     0.0972     0.1116
            0.1270     0.1426     0.1583     0.1740     0.1897
            0.2059     0.2229     0.2406     0.2591     0.2783
            0.2983     0.3190     0.3404     0.3626     0.3855
            0.4092     0.4336     0.4587     0.4846     0.5113
            0.5387     0.5668     0.5956     0.6253     0.6556
            0.6867     0.7185     0.7511     0.7845     0.8185
            0.8533     0.8889     0.9252     0.9622     1.0000
Hrad:
            0.0182     0.0364     0.0547     0.0729     0.0911
            0.1093     0.1275     0.1458     0.1640     0.1822
            0.2004     0.2187     0.2369     0.2551     0.2733
            0.2953     0.3311     0.3668     0.4024     0.4380
            0.4724     0.5046     0.5349     0.5635     0.5904
            0.6159     0.6401     0.6630     0.6849     0.7057
            0.7256     0.7447     0.7630     0.7806     0.7976
            0.8139     0.8297     0.8450     0.8598     0.8742
            0.8881     0.9017     0.9150     0.9279     0.9406
            0.9529     0.9651     0.9769     0.9886     1.0000
Width:
            0.0260     0.0520     0.0780     0.1040     0.1300
            0.1560     0.1820     0.2080     0.2340     0.2600
            0.2860     0.3121     0.3381     0.3641     0.3901
            0.4106     0.4107     0.4107     0.4108     0.4159
            0.4354     0.4549     0.4743     0.4938     0.5133
            0.5327     0.5522     0.5717     0.5911     0.6106
            0.6301     0.6496     0.6690     0.6885     0.7080
            0.7274     0.7469     0.7664     0.7858     0.8053
            0.8248     0.8442     0.8637     0.8832     0.9027
            0.9221     0.9416     0.9611     0.9805     1.0000

Transect UpstreamCulvert2
Area:
            0.0037     0.0081     0.0132     0.0190     0.0255
```

```
            0.0327     0.0405     0.0491     0.0583     0.0682
            0.0787     0.0898     0.1016     0.1140     0.1271
            0.1409     0.1554     0.1706     0.1864     0.2030
            0.2202     0.2381     0.2566     0.2759     0.2958
            0.3164     0.3377     0.3597     0.3824     0.4057
            0.4297     0.4544     0.4798     0.5058     0.5326
            0.5600     0.5881     0.6169     0.6463     0.6765
            0.7073     0.7387     0.7703     0.8023     0.8345
            0.8671     0.8999     0.9330     0.9663     1.0000
Hrad:
            0.0349     0.0639     0.0896     0.1131     0.1351
            0.1562     0.1764     0.1961     0.2154     0.2350
            0.2551     0.2743     0.2921     0.3098     0.3274
            0.3449     0.3623     0.3796     0.3969     0.4142
            0.4314     0.4486     0.4657     0.4828     0.4999
            0.5170     0.5340     0.5510     0.5681     0.5850
            0.6020     0.6190     0.6359     0.6529     0.6698
            0.6867     0.7036     0.7205     0.7374     0.7543
            0.7712     0.7959     0.8220     0.8480     0.8738
            0.8994     0.9248     0.9500     0.9751     1.0000
Width:
            0.1203     0.1407     0.1610     0.1814     0.2017
            0.2221     0.2424     0.2627     0.2831     0.3022
            0.3197     0.3378     0.3580     0.3781     0.3983
            0.4184     0.4385     0.4587     0.4788     0.4989
            0.5191     0.5392     0.5593     0.5795     0.5996
            0.6197     0.6399     0.6600     0.6802     0.7003
            0.7204     0.7406     0.7607     0.7808     0.8010
            0.8211     0.8412     0.8614     0.8815     0.9016
            0.9218     0.9323     0.9408     0.9492     0.9577
            0.9662     0.9746     0.9831     0.9915     1.0000


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

****************
Analysis Options
****************
Flow Units ............... CMS
Process Models:
  Rainfall/Runoff ........ YES
  RDII ................... NO
  Snowmelt ............... NO
  Groundwater ............ NO
  Flow Routing ........... YES
  Ponding Allowed ........ NO
  Water Quality .......... NO
Infiltration Method ...... CURVE_NUMBER
Flow Routing Method ...... DYNWAVE
Surcharge Method ......... EXTRAN
Starting Date ............ 10/30/2020 00:00:00
Ending Date .............. 11/01/2020 03:00:00
Antecedent Dry Days ...... 0.0
Report Time Step ......... 00:01:00
Wet Time Step ............ 00:05:00
Dry Time Step ............ 00:05:00
Routing Time Step ........ 5.00 sec
Variable Time Step ....... YES
Maximum Trials ........... 8
Number of Threads ........ 4
```

Head Tolerance ..... 0.001500 m

Runoff Quantity Continuity	Volume hectare-m	Depth mm
Total Precipitation	9.383	76.223
Evaporation Loss	0.000	0.000
Infiltration Loss	7.348	59.689
Surface Runoff	1.899	15.430
Final Storage	0.151	1.223
Continuity Error (%)	-0.156	

Flow Routing Continuity	Volume hectare-m	Volume 10^6 ltr
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	1.900	19.001
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	4.589	45.895
External Outflow	6.382	63.817
Flooding Loss	0.000	0.000
Evaporation Loss	0.000	0.000
Exfiltration Loss	0.000	0.000
Initial Stored Volume	0.387	3.870
Final Stored Volume	0.507	5.065
Continuity Error (%)	-0.169	

Highest Continuity Errors

Node J1 (-14.43%)
Node SU1 (10.23%)

Time-Step Critical Elements

Link C11 (97.25%)
Link C5 (1.27%)

Highest Flow Instability Indexes

Link OR2 (137)
Link OR1 (137)
Link C1 (37)
Link C5 (1)

Routing Time Step Summary

Minimum Time Step	:	0.50 sec
Average Time Step	:	2.59 sec
Maximum Time Step	:	5.00 sec
Percent in Steady State	:	-0.00
Average Iterations per Step	:	7.56
Percent Not Converging	:	69.78
Time Step Frequencies	:	

```
    5.000 -  3.155 sec      :     2.01 %
    3.155 -  1.991 sec      :    94.90 %
    1.991 -  1.256 sec      :     1.31 %
    1.256 -  0.792 sec      :     1.11 %
    0.792 -  0.500 sec      :     0.67 %
```

Subcatchment Runoff Summary

Subcatchment	Total Precip mm	Total Runon mm	Total Evap mm	Total Infil mm	Imperv Runoff mm	Perv Runoff mm	Tot Runo
1	76.22	0.00	0.00	30.19	43.75	1.39	45.
EXT1	76.22	0.00	0.00	47.72	23.20	4.08	27.
EXT22	76.22	0.00	0.00	61.68	9.73	3.62	13.
EXT3&4	76.22	0.00	0.00	55.58	18.11	1.43	19.
EXT5	76.22	0.00	0.00	63.40	6.00	5.78	11.
EXT6	76.22	0.00	0.00	54.44	15.72	4.88	20.
EXT7	76.22	0.00	0.00	55.58	18.11	1.43	19.
S1	76.22	0.00	0.00	56.45	0.00	18.67	18.
S10	76.22	0.00	0.00	59.21	11.26	4.67	15.
S2	76.22	0.00	0.00	60.98	13.57	0.57	14.
S3	76.22	0.00	0.00	55.81	15.84	3.56	19.
S4	76.22	0.00	0.00	64.90	4.87	5.34	10.
S5	76.22	0.00	0.00	71.83	3.07	0.09	3.
S6	76.22	0.00	0.00	61.25	10.02	3.75	13.
S7	76.22	0.00	0.00	59.49	15.07	0.54	15.
S9	76.22	0.00	0.00	59.49	15.07	0.62	15.

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
J1	JUNCTION	1.04	1.36	245.79	0 01:37	1.36
J10	JUNCTION	1.49	1.86	245.88	0 01:20	1.86
J3	JUNCTION	1.50	1.97	245.98	0 01:19	1.97
J4	JUNCTION	1.47	2.49	246.54	0 01:17	2.49
J5	JUNCTION	1.32	2.88	247.08	0 01:15	2.87
J6	JUNCTION	1.34	2.38	246.56	0 01:18	2.38
J7	JUNCTION	0.97	2.53	247.09	0 01:15	2.53
J8	JUNCTION	1.87	2.15	245.78	0 01:18	2.15
J9	JUNCTION	1.89	1.98	245.59	0 01:18	1.98
OF2	JUNCTION	0.85	2.43	247.12	0 01:15	2.42
OF3	JUNCTION	1.42	1.80	245.89	0 01:20	1.80
ST1	JUNCTION	0.01	1.38	247.45	0 01:12	1.38
ST6	JUNCTION	0.14	1.75	247.15	0 01:15	1.75
ST7	JUNCTION	0.31	1.89	247.12	0 01:15	1.89
OF1	OUTFALL	1.74	1.74	245.50	0 00:00	1.74
SU1	STORAGE	1.03	1.34	245.78	0 01:42	1.34

Node Inflow Summary

Node	Type	Maximum Lateral Inflow CMS	Maximum Total Inflow CMS	Time of Max Occurrence days hr:min	Lateral Inflow Volume 10^6 ltr	Total Inflow Volume 10^6 ltr	Fl Balan Err Perce
J1	JUNCTION	0.000	0.313	0 02:03	0	6.25	-12.6
J10	JUNCTION	0.000	3.690	0 01:21	0	58.8	0.0
J3	JUNCTION	0.000	3.668	0 01:17	0	57.2	0.0
J4	JUNCTION	0.000	3.784	0 01:13	0	57.2	0.0
J5	JUNCTION	0.000	3.874	0 01:10	0	55.7	0.0
J6	JUNCTION	0.974	4.016	0 01:11	1.46	57.2	0.0
J7	JUNCTION	0.097	5.242	0 01:05	0.221	55.8	0.0
J8	JUNCTION	2.476	4.729	0 01:16	4.01	62.8	-0.0
J9	JUNCTION	0.207	4.901	0 01:18	0.982	63.8	0.0
OF2	JUNCTION	5.821	5.975	0 01:05	55.2	55.5	-0.0
OF3	JUNCTION	0.268	3.691	0 01:18	0.299	58.8	-0.0
ST1	JUNCTION	0.264	0.264	0 01:05	0.349	0.349	0.0
ST6	JUNCTION	0.000	0.182	0 01:06	0	0.352	0.8
ST7	JUNCTION	0.000	0.182	0 01:06	0	0.369	0.6
OF1	OUTFALL	0.000	4.902	0 01:18	0	63.8	0.0
SU1	STORAGE	1.690	1.690	0 01:05	2.39	8.25	11.4

****
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
J1	JUNCTION	1.39	0.242	0.308
J4	JUNCTION	0.02	0.001	0.000
OF2	JUNCTION	0.24	0.215	0.000
ST6	JUNCTION	0.79	1.152	0.599
ST7	JUNCTION	0.93	1.263	0.007

****
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	Maxi Outf
SU1	1.134	52	0	0	1.610	74	0 01:42	0.

****
Outfall Loading Summary
****

Outfall Node	Flow Freq Pcnt	Avg Flow CMS	Max Flow CMS	Total Volume 10^6 ltr
OF1	99.98	0.325	4.902	63.816
System	99.98	0.325	4.902	63.816

****
Link Flow Summary
****

Link	Type	Maximum |Flow| CMS	Time of Max Occurrence days hr:min	Maximum |Veloc| m/sec	Max/ Full Flow	Max/ Full Depth
C1	CONDUIT	0.313	0 02:03	1.11	1.16	1.00
C10	CHANNEL	3.634	0 01:19	0.39	0.29	0.70
C11	CONDUIT	3.668	0 01:17	2.25	2.75	1.00
C12	CHANNEL	3.784	0 01:13	0.42	0.46	0.98
C13	CONDUIT	3.534	0 01:13	2.17	3.90	1.00
C14	CHANNEL	5.150	0 01:05	0.57	0.72	1.00
C15	CHANNEL	3.874	0 01:10	0.46	0.36	0.94
C3	CONDUIT	0.182	0 01:06	1.15	1.07	1.00
C4	CONDUIT	0.182	0 01:06	0.64	0.65	1.00
C5	CONDUIT	0.182	0 00:00	1.68	0.76	1.00
C6	CONDUIT	4.713	0 01:18	1.58	1.79	1.00
C7	CHANNEL	4.902	0 01:18	0.65	0.62	0.75
C8	CHANNEL	3.690	0 01:21	0.25	0.29	0.85
C9	CHANNEL	3.730	0 01:23	0.41	0.36	0.76
W3	CHANNEL	0.008	0 01:13	0.31	0.00	0.29
OR1	ORIFICE	0.009	0 02:03			1.00
OR2	WEIR	0.304	0 02:03			1.00
W1	WEIR	0.001	0 01:20			0.01

****
Flow Classification Summary
****

Conduit	Adjusted /Actual Length	Fraction of Time in Flow Class: Dry	Up Dry	Down Dry	Sub Crit	Sup Crit	Up Crit	Down Crit	Norm Ltd	Inlet Ctrl
C1	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
C10	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
C11	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
C12	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
C13	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
C14	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
C15	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
C3	1.00	0.00	0.05	0.00	0.95	0.00	0.00	0.00	0.99	0.00
C4	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
C5	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
C6	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
C7	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
C8	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
C9	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
W3	1.00	0.98	0.02	0.00	0.00	0.00	0.00	0.00	0.98	0.00

****
Conduit Surcharge Summary
****

Conduit	Hours Full: Both Ends	Hours Full: Upstream	Hours Full: Dnstream	Hours Above Full Normal Flow	Hours Capacity Limited
C1	49.92	49.92	51.00	0.53	0.55
C11	1.89	1.89	2.82	0.91	1.15
C12	0.01	0.01	0.02	0.01	0.01
C13	1.04	1.09	1.04	1.09	1.04
C14	0.24	0.24	0.32	0.01	0.01
C3	0.52	0.52	0.90	0.04	0.04
C4	0.79	0.79	0.93	0.01	0.01
C5	0.97	0.97	1.00	0.01	0.01
C6	51.00	51.00	51.00	0.76	1.16

Analysis begun on: Fri Feb 5 14:41:11 2021
Analysis ended on: Fri Feb 5 14:41:59 2021
Total elapsed time: 00:00:48

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

WARNING 02: maximum depth increased for Node J10
WARNING 02: maximum depth increased for Node J3
WARNING 02: maximum depth increased for Node J4
WARNING 02: maximum depth increased for Node J5
WARNING 02: maximum depth increased for Node J6
WARNING 02: maximum depth increased for Node J7
WARNING 02: maximum depth increased for Node J8
WARNING 02: maximum depth increased for Node J9
WARNING 02: maximum depth increased for Node OF2
WARNING 02: maximum depth increased for Node OF3
WARNING 02: maximum depth increased for Node ST1

****
Element Count
****
Number of rain gages 1
Number of subcatchments ... 16
Number of nodes 16
Number of links 18
Number of pollutants 0
Number of land uses 0

****
Raingage Summary
****

Name	Data Source	Data Type	Recording Interval
Chicago_3h_25Yr	Chicago_3h_25Yr	INTENSITY	5 min.

****
Subcatchment Summary
****

Name	Area	Width	%Imperv	%Slope	Rain Gage	Outlet
1	3.74	124.25	58.00	1.1000	Chicago_3h_25Yr	SU1
EXT1	0.20	78.13	31.00	0.8500	Chicago_3h_25Yr	SU1
EXT2	1.47	169.94	13.00	1.1000	Chicago_3h_25Yr	SU1
EXT3&4	2.03	52.62	24.00	0.9000	Chicago_3h_25Yr	SU1
EXT5	0.21	107.69	8.00	2.1000	Chicago_3h_25Yr	SU1
EXT6	0.15	57.69	21.00	2.1000	Chicago_3h_25Yr	SU1
EXT7	1.78	46.31	24.00	0.9000	Chicago_3h_25Yr	ST1
S1	5.26	196.97	0.00	0.8500	Chicago_3h_25Yr	J9
S10	2.93	154.36	15.00	0.9000	Chicago_3h_25Yr	J6
S2	28.37	236.38	20.00	0.8500	Chicago_3h_25Yr	J8
S3	5.12	157.65	21.00	0.5500	Chicago_3h_25Yr	J6
S4	2.16	156.57	6.50	0.8500	Chicago_3h_25Yr	J7
S5	9.45	239.24	4.10	0.9000	Chicago_3h_25Yr	OF3
S6	7.43	174.81	13.30	0.9000	Chicago_3h_25Yr	OF2
S7	33.00	253.07	20.00	0.9000	Chicago_3h_25Yr	OF2
S9	19.80	167.66	20.00	1.0000	Chicago_3h_25Yr	OF2

****
Node Summary
****

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

J1	JUNCTION	244.43	1.67	0.0	
J10	JUNCTION	244.02	2.51	0.0	
J3	JUNCTION	244.01	2.80	0.0	
J4	JUNCTION	244.05	2.49	0.0	
J5	JUNCTION	244.20	3.00	0.0	
J6	JUNCTION	244.18	2.47	0.0	
J7	JUNCTION	244.56	2.72	0.0	
J8	JUNCTION	243.63	2.71	0.0	
J9	JUNCTION	243.61	2.53	0.0	
OF2	JUNCTION	244.69	2.21	0.0	Yes
OF3	JUNCTION	244.09	2.50	0.0	
ST1	JUNCTION	246.07	1.68	100.0	
ST6	JUNCTION	245.39	2.35	0.0	
ST7	JUNCTION	245.23	1.90	0.0	
OF1	OUTFALL	243.76	2.33	0.0	
SU1	STORAGE	244.44	1.66	0.0	

****
Link Summary
****

Name	From Node	To Node	Type	Length	%Slope	Roughness
C1	J1	OF3	CONDUIT	15.6	0.1927	0.0130
C10	J3	OF3	CONDUIT	177.5	0.1240	0.0600
C11	J4	J3	CONDUIT	24.0	0.1667	0.0240
C12	J6	J4	CONDUIT	84.1	0.1308	0.0600
C13	J5	J6	CONDUIT	26.0	0.0769	0.0240
C14	OF2	J7	CONDUIT	106.6	0.1219	0.0600
C15	J7	J5	CONDUIT	63.6	0.1259	0.0600
C3	ST1	ST6	CONDUIT	182.9	0.3554	0.0130
C4	ST6	ST7	CONDUIT	65.0	0.2108	0.0130
C5	ST7	OF2	CONDUIT	10.0	0.1500	0.0130
C6	J8	J9	CONDUIT	16.6	0.1205	0.0240
C7	J9	OF1	CONDUIT	42.6	0.1174	0.0600
C8	OF3	J10	CONDUIT	61.2	0.1144	0.0600
C9	J10	J8	CONDUIT	153.8	0.1235	0.0600
W3	ST1	SU1	CONDUIT	384.0	0.4724	0.0130
OR1	SU1	J1	ORIFICE			
OR2	SU1	J1	WEIR			
W1	SU1	OF3	WEIR			

****
Cross Section Summary
****

Conduit	Shape	Full Depth	Full Area	Hyd. Rad.	Max. Width	No. of Barrels	Full Flow	
C1	CIRCULAR	0.60	0.28	0.15	0.60	1	0.27	
C10	DownstreamCul.1	2.50	16.25	1.48	9.70	1	12.36	
C11	FILLED_CIRCULAR	1.30	1.63	0.33	1.50	1	1.33	
C12	DownstreamCul.2	2.19	12.52	1.15	9.71	1	8.27	
C13	FILLED_CIRCULAR	1.30	1.63	0.33	1.50	1	0.91	
C14	ClosetoQueenSt	2.21	12.38	0.98	11.35	1	7.13	
C15	UpstreamCulvert2	2.72	14.48	1.38	9.00	1	10.64	
C3	CIRCULAR	0.45	0.16	0.11	0.45	1	0.17	
C4	CIRCULAR	0.60	0.28	0.15	0.60	1	0.28	
C5	CIRCULAR	0.60	0.28	0.15	0.60	1	0.24	
C6	ARCH	1.60	2.98	0.48	2.21	1	2.64	
C7	Lipsit_SouthofRoughamRd	2.33	12.64	1.16	9.59	1	7.95	
C8	Pond0utlet	2.15	18.67	1.33	13.08	1	12.70	
C9	atLion'sGate	2.51	16.02	1.18	12.34	1	10.48	

W3	Road	0.38	3.99	0.20	20.01	1	7.26

****
Transect Summary
****

Transect atLion'sGate
Area:

0.0004	0.0016	0.0035	0.0062	0.0097
0.0140	0.0191	0.0249	0.0315	0.0389
0.0470	0.0560	0.0657	0.0762	0.0875
0.0996	0.1125	0.1262	0.1408	0.1563
0.1725	0.1896	0.2075	0.2263	0.2459
0.2663	0.2876	0.3097	0.3326	0.3563
0.3809	0.4064	0.4326	0.4597	0.4876
0.5164	0.5460	0.5764	0.6077	0.6398
0.6727	0.7065	0.7410	0.7765	0.8126
0.8491	0.8861	0.9236	0.9616	1.0000

Hrad:

0.0196	0.0391	0.0587	0.0783	0.0978
0.1174	0.1370	0.1565	0.1761	0.1957
0.2152	0.2348	0.2544	0.2739	0.2934
0.3119	0.3306	0.3494	0.3684	0.3874
0.4065	0.4257	0.4450	0.4642	0.4836
0.5030	0.5224	0.5418	0.5613	0.5808
0.6003	0.6198	0.6394	0.6589	0.6785
0.6981	0.7177	0.7373	0.7570	0.7766
0.7963	0.8159	0.8356	0.8553	0.8800
0.9046	0.9289	0.9528	0.9766	1.0000

Width:

0.0201	0.0402	0.0603	0.0805	0.1006
0.1207	0.1408	0.1609	0.1810	0.2012
0.2213	0.2414	0.2615	0.2816	0.3019
0.3235	0.3451	0.3666	0.3882	0.4098
0.4313	0.4529	0.4745	0.4960	0.5176
0.5391	0.5607	0.5823	0.6038	0.6254
0.6469	0.6685	0.6901	0.7116	0.7332
0.7548	0.7763	0.7979	0.8194	0.8410
0.8626	0.8841	0.9057	0.9272	0.9396
0.9516	0.9637	0.9758	0.9879	1.0000

Transect ClosetoQueenSt
Area:

0.0036	0.0081	0.0133	0.0194	0.0263
0.0340	0.0426	0.0520	0.0621	0.0731
0.0850	0.0976	0.1111	0.1254	0.1404
0.1561	0.1722	0.1888	0.2060	0.2236
0.2417	0.2603	0.2794	0.2990	0.3190
0.3396	0.3606	0.3822	0.4042	0.4267
0.4497	0.4732	0.4972	0.5216	0.5466
0.5721	0.5980	0.6244	0.6513	0.6787
0.7066	0.7350	0.7639	0.7933	0.8231
0.8542	0.8875	0.9229	0.9605	1.0000

Hrad:

0.0396	0.0726	0.1019	0.1290	0.1547
0.1794	0.2034	0.2268	0.2498	0.2726
0.2950	0.3173	0.3394	0.3613	0.3867
0.4131	0.4406	0.4675	0.4939	0.5199
0.5454	0.5705	0.5953	0.6197	0.6439
0.6677	0.6913	0.7147	0.7378	0.7607
0.7835	0.8060	0.8284	0.8506	0.8727
0.8947	0.9165	0.9382	0.9597	0.9812

1.0026 1.0239 1.0450 1.0661 1.0871
1.0604 1.0382 1.0207 1.0081 1.0000
Width:
0.0996 0.1198 0.1401 0.1603 0.1806
0.2008 0.2211 0.2413 0.2616 0.2819
0.3021 0.3224 0.3426 0.3629 0.3787
0.3927 0.4048 0.4169 0.4289 0.4410
0.4531 0.4652 0.4773 0.4893 0.5014
0.5135 0.5256 0.5377 0.5497 0.5618
0.5739 0.5860 0.5981 0.6101 0.6222
0.6343 0.6464 0.6585 0.6705 0.6826
0.6947 0.7068 0.7189 0.7309 0.7430
0.7950 0.8478 0.9007 0.9519 1.0000

Transect DownstreamCul.1
Area:
0.0033 0.0078 0.0133 0.0200 0.0278
0.0367 0.0467 0.0578 0.0701 0.0835
0.0977 0.1126 0.1282 0.1444 0.1610
0.1781 0.1955 0.2134 0.2317 0.2504
0.2695 0.2891 0.3091 0.3295 0.3503
0.3715 0.3932 0.4153 0.4378 0.4607
0.4840 0.5078 0.5320 0.5566 0.5816
0.6071 0.6329 0.6592 0.6859 0.7131
0.7406 0.7685 0.7967 0.8250 0.8536
0.8825 0.9115 0.9408 0.9703 1.0000
Hrad:
0.0286 0.0516 0.0721 0.0912 0.1096
0.1275 0.1450 0.1623 0.1794 0.1963
0.2185 0.2400 0.2609 0.2841 0.3075
0.3302 0.3525 0.3743 0.3957 0.4166
0.4372 0.4575 0.4774 0.4971 0.5164
0.5356 0.5544 0.5731 0.5915 0.6098
0.6278 0.6457 0.6634 0.6810 0.6984
0.7157 0.7328 0.7498 0.7667 0.7835
0.8002 0.8219 0.8446 0.8673 0.8897
0.9120 0.9342 0.9563 0.9782 1.0000
Width:
0.1302 0.1675 0.2049 0.2423 0.2797
0.3170 0.3544 0.3918 0.4292 0.4665
0.4890 0.5114 0.5339 0.5496 0.5637
0.5778 0.5919 0.6060 0.6201 0.6342
0.6483 0.6624 0.6765 0.6906 0.7048
0.7189 0.7330 0.7471 0.7612 0.7753
0.7894 0.8035 0.8176 0.8317 0.8458
0.8599 0.8740 0.8881 0.9022 0.9163
0.9304 0.9393 0.9469 0.9544 0.9620
0.9696 0.9772 0.9848 0.9924 1.0000

Transect DownstreamCul.2
Area:
0.0035 0.0079 0.0130 0.0189 0.0257
0.0332 0.0415 0.0506 0.0605 0.0711
0.0826 0.0947 0.1074 0.1207 0.1347
0.1493 0.1644 0.1802 0.1966 0.2135
0.2311 0.2493 0.2681 0.2874 0.3074
0.3280 0.3492 0.3710 0.3934 0.4164
0.4401 0.4643 0.4891 0.5145 0.5405
0.5672 0.5944 0.6222 0.6507 0.6797
0.7094 0.7396 0.7705 0.8019 0.8340
0.8666 0.8995 0.9327 0.9662 1.0000
Hrad:
0.0337 0.0618 0.0868 0.1099 0.1318
0.1529 0.1733 0.1932 0.2128 0.2321

0.2533 0.2741 0.2953 0.3166 0.3374
0.3579 0.3781 0.3981 0.4178 0.4373
0.4567 0.4759 0.4949 0.5138 0.5326
0.5512 0.5698 0.5883 0.6067 0.6250
0.6433 0.6615 0.6796 0.6976 0.7157
0.7336 0.7515 0.7694 0.7873 0.8051
0.8228 0.8406 0.8583 0.8759 0.8936
0.9147 0.9364 0.9578 0.9790 1.0000
Width:
0.1160 0.1394 0.1627 0.1860 0.2094
0.2327 0.2561 0.2794 0.3027 0.3261
0.3459 0.3656 0.3840 0.4018 0.4195
0.4373 0.4551 0.4728 0.4906 0.5084
0.5261 0.5439 0.5616 0.5794 0.5972
0.6149 0.6327 0.6505 0.6682 0.6860
0.7038 0.7215 0.7393 0.7571 0.7748
0.7926 0.8104 0.8281 0.8459 0.8637
0.8814 0.8992 0.9169 0.9347 0.9525
0.9634 0.9725 0.9817 0.9908 1.0000

Transect Lipsit_SouthofRoughamRd
Area:
0.0007 0.0030 0.0067 0.0118 0.0181
0.0249 0.0322 0.0401 0.0486 0.0576
0.0672 0.0775 0.0885 0.1002 0.1127
0.1258 0.1398 0.1544 0.1698 0.1859
0.2027 0.2203 0.2386 0.2576 0.2773
0.2978 0.3190 0.3409 0.3636 0.3870
0.4111 0.4359 0.4615 0.4878 0.5148
0.5426 0.5710 0.6003 0.6302 0.6609
0.6923 0.7244 0.7572 0.7908 0.8251
0.8598 0.8946 0.9296 0.9647 1.0000
Hrad:
0.0194 0.0389 0.0583 0.0777 0.1062
0.1333 0.1587 0.1828 0.2059 0.2281
0.2479 0.2656 0.2832 0.3009 0.3185
0.3362 0.3539 0.3715 0.3892 0.4068
0.4245 0.4421 0.4597 0.4774 0.4950
0.5127 0.5303 0.5479 0.5656 0.5832
0.6008 0.6185 0.6361 0.6537 0.6714
0.6890 0.7066 0.7243 0.7419 0.7595
0.7772 0.7948 0.8124 0.8301 0.8497
0.8801 0.9104 0.9404 0.9703 1.0000
Width:
0.0418 0.0836 0.1254 0.1672 0.1847
0.2002 0.2158 0.2313 0.2468 0.2623
0.2803 0.3009 0.3214 0.3420 0.3626
0.3832 0.4038 0.4244 0.4450 0.4656
0.4862 0.5068 0.5274 0.5480 0.5686
0.5892 0.6097 0.6303 0.6509 0.6715
0.6921 0.7127 0.7333 0.7539 0.7745
0.7951 0.8157 0.8363 0.8569 0.8774
0.8980 0.9186 0.9392 0.9598 0.9780
0.9824 0.9868 0.9912 0.9956 1.0000

Transect Pond0utlet
Area:
0.0009 0.0037 0.0083 0.0148 0.0232
0.0334 0.0454 0.0591 0.0735 0.0883
0.1036 0.1192 0.1352 0.1515 0.1683
0.1855 0.2031 0.2210 0.2393 0.2581
0.2772 0.2967 0.3166 0.3369 0.3575
0.3786 0.4000 0.4219 0.4441 0.4667
0.4897 0.5131 0.5369 0.5611 0.5857

```
            0.6106     0.6360     0.6617     0.6879     0.7144
            0.7413     0.7686     0.7963     0.8243     0.8528
            0.8816     0.9108     0.9403     0.9700     1.0000
Hrad:
            0.0161     0.0321     0.0482     0.0643     0.0803
            0.0964     0.1125     0.1338     0.1606     0.1874
            0.2134     0.2389     0.2637     0.2880     0.3118
            0.3351     0.3579     0.3804     0.4025     0.4242
            0.4456     0.4667     0.4875     0.5080     0.5282
            0.5483     0.5681     0.5877     0.6071     0.6263
            0.6453     0.6641     0.6828     0.7013     0.7197
            0.7380     0.7561     0.7741     0.7920     0.8098
            0.8274     0.8450     0.8624     0.8798     0.8970
            0.9142     0.9357     0.9572     0.9787     1.0000
Width:
            0.0615     0.1231     0.1846     0.2462     0.3077
            0.3693     0.4308     0.4700     0.4858     0.4987
            0.5117     0.5246     0.5375     0.5505     0.5634
            0.5763     0.5892     0.6022     0.6151     0.6280
            0.6410     0.6539     0.6668     0.6797     0.6927
            0.7056     0.7185     0.7314     0.7444     0.7573
            0.7702     0.7832     0.7961     0.8090     0.8219
            0.8349     0.8478     0.8607     0.8737     0.8866
            0.8995     0.9124     0.9254     0.9383     0.9512
            0.9642     0.9733     0.9822     0.9911     1.0000

Transect Road
Area:
            0.0005     0.0020     0.0045     0.0079     0.0124
            0.0179     0.0243     0.0317     0.0402     0.0496
            0.0600     0.0714     0.0838     0.0972     0.1116
            0.1270     0.1426     0.1583     0.1740     0.1897
            0.2059     0.2229     0.2406     0.2591     0.2783
            0.2983     0.3190     0.3404     0.3626     0.3855
            0.4092     0.4336     0.4587     0.4846     0.5113
            0.5387     0.5668     0.5956     0.6253     0.6556
            0.6867     0.7185     0.7511     0.7845     0.8185
            0.8533     0.8889     0.9252     0.9622     1.0000
Hrad:
            0.0182     0.0364     0.0547     0.0729     0.0911
            0.1093     0.1275     0.1458     0.1640     0.1822
            0.2004     0.2187     0.2369     0.2551     0.2733
            0.2953     0.3311     0.3668     0.4024     0.4380
            0.4724     0.5046     0.5349     0.5635     0.5904
            0.6159     0.6401     0.6630     0.6849     0.7057
            0.7256     0.7447     0.7630     0.7806     0.7976
            0.8139     0.8297     0.8450     0.8598     0.8742
            0.8881     0.9017     0.9150     0.9279     0.9406
            0.9529     0.9651     0.9769     0.9886     1.0000
Width:
            0.0260     0.0520     0.0780     0.1040     0.1300
            0.1560     0.1820     0.2080     0.2340     0.2600
            0.2860     0.3121     0.3381     0.3641     0.3901
            0.4106     0.4107     0.4107     0.4108     0.4159
            0.4354     0.4549     0.4743     0.4938     0.5133
            0.5327     0.5522     0.5717     0.5911     0.6106
            0.6301     0.6496     0.6690     0.6885     0.7080
            0.7274     0.7469     0.7664     0.7858     0.8053
            0.8248     0.8442     0.8637     0.8832     0.9027
            0.9221     0.9416     0.9611     0.9805     1.0000

Transect UpstreamCulvert2
Area:
            0.0037     0.0081     0.0132     0.0190     0.0255
```

```
            0.0327     0.0405     0.0491     0.0583     0.0682
            0.0787     0.0898     0.1016     0.1140     0.1271
            0.1409     0.1554     0.1706     0.1864     0.2030
            0.2202     0.2381     0.2566     0.2759     0.2958
            0.3164     0.3377     0.3597     0.3824     0.4057
            0.4297     0.4544     0.4798     0.5058     0.5326
            0.5600     0.5881     0.6169     0.6463     0.6765
            0.7073     0.7387     0.7703     0.8023     0.8345
            0.8671     0.8999     0.9330     0.9663     1.0000
Hrad:
            0.0349     0.0639     0.0896     0.1131     0.1351
            0.1562     0.1764     0.1961     0.2154     0.2350
            0.2551     0.2743     0.2921     0.3098     0.3274
            0.3449     0.3623     0.3796     0.3969     0.4142
            0.4314     0.4486     0.4657     0.4828     0.4999
            0.5170     0.5340     0.5510     0.5681     0.5850
            0.6020     0.6190     0.6359     0.6529     0.6698
            0.6867     0.7036     0.7205     0.7374     0.7543
            0.7712     0.7959     0.8220     0.8480     0.8738
            0.8994     0.9248     0.9500     0.9751     1.0000
Width:
            0.1203     0.1407     0.1610     0.1814     0.2017
            0.2221     0.2424     0.2627     0.2831     0.3022
            0.3197     0.3378     0.3580     0.3781     0.3983
            0.4184     0.4385     0.4587     0.4788     0.4989
            0.5191     0.5392     0.5593     0.5795     0.5996
            0.6197     0.6399     0.6600     0.6802     0.7003
            0.7204     0.7406     0.7607     0.7808     0.8010
            0.8211     0.8412     0.8614     0.8815     0.9016
            0.9218     0.9323     0.9408     0.9492     0.9577
            0.9662     0.9746     0.9831     0.9915     1.0000


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

****************
Analysis Options
****************
Flow Units ............... CMS
Process Models:
  Rainfall/Runoff ........ YES
  RDII ................... NO
  Snowmelt ............... NO
  Groundwater ............ NO
  Flow Routing ........... YES
  Ponding Allowed ........ NO
  Water Quality .......... NO
Infiltration Method ...... CURVE_NUMBER
Flow Routing Method ...... DYNWAVE
Surcharge Method ......... EXTRAN
Starting Date ............ 10/30/2020 00:00:00
Ending Date .............. 11/01/2020 03:00:00
Antecedent Dry Days ...... 0.0
Report Time Step ......... 00:01:00
Wet Time Step ............ 00:05:00
Dry Time Step ............ 00:05:00
Routing Time Step ........ 5.00 sec
Variable Time Step ....... YES
Maximum Trials ........... 8
Number of Threads ........ 4
```

Head Tolerance ..... 0.001500 m

Runoff Quantity Continuity	Volume hectare-m	Depth mm
Total Precipitation	7.589	61.649
Evaporation Loss	0.000	0.000
Infiltration Loss	5.985	48.622
Surface Runoff	1.467	11.919
Final Storage	0.148	1.204
Continuity Error (%)	-0.156	

Flow Routing Continuity	Volume hectare-m	Volume 10^6 ltr
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	1.468	14.679
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	2.937	29.373
External Outflow	4.354	43.542
Flooding Loss	0.000	0.000
Evaporation Loss	0.000	0.000
Exfiltration Loss	0.000	0.000
Initial Stored Volume	0.000	0.000
Final Stored Volume	0.075	0.755
Continuity Error (%)	-0.555	

Highest Continuity Errors

Node ST6 (-1.41%)

Time-Step Critical Elements

Link C6 (95.82%)

Highest Flow Instability Indexes

Link OR1 (7)
Link C5 (1)

Routing Time Step Summary

Minimum Time Step	:	0.50 sec
Average Time Step	:	4.59 sec
Maximum Time Step	:	5.00 sec
Percent in Steady State	:	0.00
Average Iterations per Step	:	2.05
Percent Not Converging	:	0.31
Time Step Frequencies	:	
5.000 - 3.155 sec	:	93.46 %
3.155 - 1.991 sec	:	3.98 %
1.991 - 1.256 sec	:	1.15 %
1.256 - 0.792 sec	:	0.62 %

0.792 - 0.500 sec : 0.78 %

****
Subcatchment Runoff Summary
****

Subcatchment	Total Precip mm	Total Runon mm	Total Evap mm	Total Infil mm	Imperv Runoff mm	Perv Runoff mm	Tot Runo
1	61.65	0.00	0.00	25.06	35.23	0.35	35.
EXT1	61.65	0.00	0.00	40.21	18.68	1.49	20.
EXT2	61.65	0.00	0.00	51.51	7.84	1.03	8.
EXT3&4	61.65	0.00	0.00	45.70	14.59	0.30	14.
EXT5	61.65	0.00	0.00	53.39	4.82	2.23	7.
EXT6	61.65	0.00	0.00	46.03	12.65	1.85	14.
EXT7	61.65	0.00	0.00	45.70	14.59	0.30	14.
S1	61.65	0.00	0.00	49.61	0.00	10.92	10.
S10	61.65	0.00	0.00	49.93	9.08	1.60	10.
S2	61.65	0.00	0.00	48.30	12.13	0.11	12.
S3	61.65	0.00	0.00	46.77	12.76	1.06	13.
S4	61.65	0.00	0.00	54.70	3.92	1.89	5.
S5	61.65	0.00	0.00	58.11	2.47	0.00	2.
S6	61.65	0.00	0.00	51.33	8.08	1.09	9.
S7	61.65	0.00	0.00	48.30	12.13	0.10	12.
S9	61.65	0.00	0.00	48.30	12.13	0.12	12.

****
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
J1	JUNCTION	0.20	1.24	245.67	0 01:29	1.20
J10	JUNCTION	0.60	1.65	245.67	0 01:25	1.65
J3	JUNCTION	0.71	1.75	245.76	0 01:23	1.75
J4	JUNCTION	0.69	2.04	246.09	0 01:18	2.04
J5	JUNCTION	0.69	2.30	246.50	0 01:14	2.30
J6	JUNCTION	0.70	1.96	246.14	0 01:17	1.96
J7	JUNCTION	0.45	1.97	246.53	0 01:14	1.97
J8	JUNCTION	0.70	1.94	245.57	0 01:24	1.94
J9	JUNCTION	0.72	1.87	245.48	0 01:25	1.87
OF2	JUNCTION	0.43	1.87	246.56	0 01:14	1.87
OF3	JUNCTION	0.53	1.59	245.68	0 01:25	1.59
ST1	JUNCTION	0.02	0.96	247.03	0 01:08	0.96
ST6	JUNCTION	0.03	2.63	248.02	0 01:03	1.19
ST7	JUNCTION	0.04	1.34	246.57	0 01:14	1.34
OF1	OUTFALL	0.52	1.67	245.43	0 01:25	1.67
SU1	STORAGE	0.24	1.19	245.63	0 01:37	1.19

****
Node Inflow Summary
****

	Maximum Lateral	Maximum Total	Time of Max	Lateral Inflow	Total Inflow	Fl Balan

Node	Type	Inflow CMS	Inflow CMS	Occurrence days	Occurrence hr:min	Volume 10^6 ltr	Volume 10^6 ltr	Err Perce
J1	JUNCTION	0.000	0.324	0	01:53	0	1.77	-0.1
J10	JUNCTION	0.000	2.629	0	01:21	0	39.8	0.3
J3	JUNCTION	0.000	3.110	0	01:12	0	38	0.1
J4	JUNCTION	0.000	3.305	0	01:11	0	37.9	-0.3
J5	JUNCTION	0.000	3.213	0	01:10	0	36.8	-0.2
J6	JUNCTION	0.785	3.490	0	01:10	1.02	37.9	0.1
J7	JUNCTION	0.080	4.058	0	01:05	0.125	36.9	0.2
J8	JUNCTION	2.032	3.310	0	01:21	3.47	43.1	0.2
J9	JUNCTION	0.102	3.344	0	01:24	0.574	43.6	0.0
OF2	JUNCTION	4.474	4.608	0	01:05	36.5	36.8	0.0
OF3	JUNCTION	0.221	2.908	0	01:15	0.234	40	0.4
ST1	JUNCTION	0.211	0.211	0	01:05	0.266	0.266	1.0
ST6	JUNCTION	0.000	0.221	0	01:02	0	0.271	-1.3
ST7	JUNCTION	0.000	0.161	0	01:07	0	0.288	-0.4
OF1	OUTFALL	0.000	3.343	0	01:25	0	43.5	0.0
SU1	STORAGE	1.336	1.336	0	01:05	1.84	1.86	0.0

****
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
J1	JUNCTION	0.35	0.116	0.434
ST6	JUNCTION	0.54	2.030	0.000
ST7	JUNCTION	0.63	0.712	0.558

****
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	Maxi Outf
SU1	0.208	10	0	0	1.366	63	0 01:37	0.

****
Outfall Loading Summary
****

Outfall Node	Flow Freq Pcnt	Avg Flow CMS	Max Flow CMS	Total Volume 10^6 ltr

OF1	99.23	0.295	3.343	43.542
System	99.23	0.295	3.343	43.542

****
Link Flow Summary
****

Link	Type	Maximum |Flow| CMS	Time of Max Occurrence days hr:min	Maximum |Veloc| m/sec	Max/ Full Flow	Max/ Full Depth
C1	CONDUIT	0.324	0 01:53	1.15	1.20	1.00
C10	CHANNEL	2.848	0 01:15	0.52	0.23	0.61
C11	CONDUIT	3.110	0 01:12	1.91	2.33	1.00
C12	CHANNEL	3.305	0 01:11	0.58	0.40	0.78
C13	CONDUIT	3.057	0 01:11	1.88	3.37	1.00
C14	CHANNEL	3.983	0 01:05	0.63	0.56	0.87
C15	CHANNEL	3.213	0 01:10	0.53	0.30	0.73
C3	CONDUIT	0.161	0 01:07	1.01	0.95	1.00
C4	CONDUIT	0.161	0 01:07	0.57	0.57	1.00
C5	CONDUIT	0.161	0 01:08	0.57	0.68	1.00
C6	CONDUIT	3.250	0 01:24	1.09	1.23	1.00
C7	CHANNEL	3.343	0 01:25	0.49	0.42	0.72
C8	CHANNEL	2.629	0 01:21	0.23	0.21	0.75
C9	CHANNEL	2.594	0 01:26	0.36	0.25	0.68
W3	CHANNEL	0.000	0 00:00	0.00	0.00	0.09
OR1	ORIFICE	0.016	0 04:41			1.00
OR2	WEIR	0.315	0 01:53			1.00
W1	WEIR	0.000	0 00:00			0.00

****
Flow Classification Summary
****

Conduit	Adjusted /Actual Length	Fraction of Time in Flow Class: Dry	Up Dry	Down Dry	Sub Crit	Sup Crit	Up Crit	Down Crit	Norm Ltd	Inlet Ctrl
C1	1.00	0.00	0.00	0.00	0.99	0.00	0.00	0.01	0.00	0.00
C10	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
C11	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
C12	1.00	0.00	0.00	0.00	0.99	0.00	0.00	0.00	0.00	0.00
C13	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
C14	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
C15	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
C3	1.00	0.00	0.00	0.00	0.04	0.00	0.00	0.96	0.01	0.00
C4	1.00	0.00	0.00	0.00	0.07	0.00	0.00	0.93	0.01	0.00
C5	1.00	0.00	0.00	0.00	0.08	0.00	0.00	0.92	0.00	0.00
C6	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
C7	1.00	0.01	0.00	0.00	0.99	0.00	0.00	0.00	0.01	0.00
C8	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
C9	1.00	0.01	0.00	0.00	0.99	0.00	0.00	0.00	0.00	0.00
W3	1.00	0.99	0.01	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
C1	1.57	1.57	1.65	0.42	0.42
C11	0.64	0.73	0.64	0.69	0.64
C13	0.63	0.68	0.63	0.82	0.63
C3	0.27	0.27	0.62	0.01	0.01
C4	0.54	0.54	0.63	0.01	0.01
C5	0.66	0.66	0.67	0.01	0.01
C6	0.75	0.78	0.75	0.48	0.75

Analysis begun on: Fri Feb 5 14:20:02 2021
Analysis ended on: Fri Feb 5 14:20:04 2021
Total elapsed time: 00:00:02

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

WARNING 02: maximum depth increased for Node J10
WARNING 02: maximum depth increased for Node J3
WARNING 02: maximum depth increased for Node J4
WARNING 02: maximum depth increased for Node J5
WARNING 02: maximum depth increased for Node J6
WARNING 02: maximum depth increased for Node J7
WARNING 02: maximum depth increased for Node J8
WARNING 02: maximum depth increased for Node J9
WARNING 02: maximum depth increased for Node OF2
WARNING 02: maximum depth increased for Node OF3
WARNING 02: maximum depth increased for Node ST1

****
Element Count
****
Number of rain gages 1
Number of subcatchments ... 16
Number of nodes 16
Number of links 18
Number of pollutants 0
Number of land uses 0

****
Raingage Summary
****

Name	Data Source	Data Type	Recording Interval
Chicago_3hr_10YR	Chicago_3hr_10YR	INTENSITY	5 min.

****
Subcatchment Summary
****

Name	Area	Width	%Imperv	%Slope	Rain Gage	Outlet
1	3.74	124.25	58.00	1.1000	Chicago_3hr_10YR	SU1
EXT1	0.20	78.13	31.00	0.8500	Chicago_3hr_10YR	SU1
EXT2	1.47	169.94	13.00	1.1000	Chicago_3hr_10YR	SU1
EXT3&4	2.03	52.62	24.00	0.9000	Chicago_3hr_10YR	SU1
EXT5	0.21	107.69	8.00	2.1000	Chicago_3hr_10YR	SU1
EXT6	0.15	57.69	21.00	2.1000	Chicago_3hr_10YR	SU1
EXT7	1.78	46.31	24.00	0.9000	Chicago_3hr_10YR	ST1
S1	5.26	196.97	0.00	0.8500	Chicago_3hr_10YR	J9
S10	2.93	154.36	15.00	0.9000	Chicago_3hr_10YR	J6
S2	28.37	236.38	20.00	0.8500	Chicago_3hr_10YR	J8
S3	5.12	157.65	21.00	0.5500	Chicago_3hr_10YR	J6
S4	2.16	156.57	6.50	0.8500	Chicago_3hr_10YR	J7
S5	9.45	239.24	4.10	0.9000	Chicago_3hr_10YR	OF3
S6	7.43	174.81	13.30	0.9000	Chicago_3hr_10YR	OF2
S7	33.00	253.07	20.00	0.9000	Chicago_3hr_10YR	OF2
S9	19.80	167.66	20.00	1.0000	Chicago_3hr_10YR	OF2

****
Node Summary
****

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

J1	JUNCTION	244.43	1.67	0.0	
J10	JUNCTION	244.02	2.51	0.0	
J3	JUNCTION	244.01	2.80	0.0	
J4	JUNCTION	244.05	2.49	0.0	
J5	JUNCTION	244.20	3.00	0.0	
J6	JUNCTION	244.18	2.47	0.0	
J7	JUNCTION	244.56	2.72	0.0	
J8	JUNCTION	243.63	2.71	0.0	
J9	JUNCTION	243.61	2.53	0.0	
OF2	JUNCTION	244.69	2.21	0.0	Yes
OF3	JUNCTION	244.09	2.50	0.0	
ST1	JUNCTION	246.07	1.68	100.0	
ST6	JUNCTION	245.39	2.35	0.0	
ST7	JUNCTION	245.23	1.90	0.0	
OF1	OUTFALL	243.76	2.33	0.0	
SU1	STORAGE	244.44	1.66	0.0	

****
Link Summary
****

Name	From Node	To Node	Type	Length	%Slope	Roughness
C1	J1	OF3	CONDUIT	15.6	0.1927	0.0130
C10	J3	OF3	CONDUIT	177.5	0.1240	0.0600
C11	J4	J3	CONDUIT	24.0	0.1667	0.0240
C12	J6	J4	CONDUIT	84.1	0.1308	0.0600
C13	J5	J6	CONDUIT	26.0	0.0769	0.0240
C14	OF2	J7	CONDUIT	106.6	0.1219	0.0600
C15	J7	J5	CONDUIT	63.6	0.1259	0.0600
C3	ST1	ST6	CONDUIT	182.9	0.3554	0.0130
C4	ST6	ST7	CONDUIT	65.0	0.2108	0.0130
C5	ST7	OF2	CONDUIT	10.0	0.1500	0.0130
C6	J8	J9	CONDUIT	16.6	0.1205	0.0240
C7	J9	OF1	CONDUIT	42.6	0.1174	0.0600
C8	OF3	J10	CONDUIT	61.2	0.1144	0.0600
C9	J10	J8	CONDUIT	153.8	0.1235	0.0600
W3	ST1	SU1	CONDUIT	384.0	0.4724	0.0130
OR1	SU1	J1	ORIFICE			
OR2	SU1	J1	WEIR			
W1	SU1	OF3	WEIR			

****
Cross Section Summary
****

Conduit	Shape	Full Depth	Full Area	Hyd. Rad.	Max. Width	No. of Barrels	Full Flow	
C1	CIRCULAR	0.60	0.28	0.15	0.60	1	0.27	
C10	DownstreamCul.1	2.50	16.25	1.48	9.70	1	12.36	
C11	FILLED_CIRCULAR	1.30	1.63	0.33	1.50	1	1.33	
C12	DownstreamCul.2	2.19	12.52	1.15	9.71	1	8.27	
C13	FILLED_CIRCULAR	1.30	1.63	0.33	1.50	1	0.91	
C14	ClosetoQueenSt	2.21	12.38	0.98	11.35	1	7.13	
C15	UpstreamCulvert2	2.72	14.48	1.38	9.00	1	10.64	
C3	CIRCULAR	0.45	0.16	0.11	0.45	1	0.17	
C4	CIRCULAR	0.60	0.28	0.15	0.60	1	0.28	
C5	CIRCULAR	0.60	0.28	0.15	0.60	1	0.24	
C6	ARCH	1.60	2.98	0.48	2.21	1	2.64	
C7	Lipsit_SouthofRoughamRd	2.33	12.64	1.16	9.59	1	7.95	
C8	Pond0utlet	2.15	18.67	1.33	13.08	1	12.70	
C9	atLion'sGate	2.51	16.02	1.18	12.34	1	10.48	

W3	Road	0.38	3.99	0.20	20.01	1	7.26

****
Transect Summary
****

Transect atLion'sGate
Area:

0.0004	0.0016	0.0035	0.0062	0.0097
0.0140	0.0191	0.0249	0.0315	0.0389
0.0470	0.0560	0.0657	0.0762	0.0875
0.0996	0.1125	0.1262	0.1408	0.1563
0.1725	0.1896	0.2075	0.2263	0.2459
0.2663	0.2876	0.3097	0.3326	0.3563
0.3809	0.4064	0.4326	0.4597	0.4876
0.5164	0.5460	0.5764	0.6077	0.6398
0.6727	0.7065	0.7410	0.7765	0.8126
0.8491	0.8861	0.9236	0.9616	1.0000

Hrad:

0.0196	0.0391	0.0587	0.0783	0.0978
0.1174	0.1370	0.1565	0.1761	0.1957
0.2152	0.2348	0.2544	0.2739	0.2934
0.3119	0.3306	0.3494	0.3684	0.3874
0.4065	0.4257	0.4450	0.4642	0.4836
0.5030	0.5224	0.5418	0.5613	0.5808
0.6003	0.6198	0.6394	0.6589	0.6785
0.6981	0.7177	0.7373	0.7570	0.7766
0.7963	0.8159	0.8356	0.8553	0.8800
0.9046	0.9289	0.9528	0.9766	1.0000

Width:

0.0201	0.0402	0.0603	0.0805	0.1006
0.1207	0.1408	0.1609	0.1810	0.2012
0.2213	0.2414	0.2615	0.2816	0.3019
0.3235	0.3451	0.3666	0.3882	0.4098
0.4313	0.4529	0.4745	0.4960	0.5176
0.5391	0.5607	0.5823	0.6038	0.6254
0.6469	0.6685	0.6901	0.7116	0.7332
0.7548	0.7763	0.7979	0.8194	0.8410
0.8626	0.8841	0.9057	0.9272	0.9396
0.9516	0.9637	0.9758	0.9879	1.0000

Transect ClosetoQueenSt
Area:

0.0036	0.0081	0.0133	0.0194	0.0263
0.0340	0.0426	0.0520	0.0621	0.0731
0.0850	0.0976	0.1111	0.1254	0.1404
0.1561	0.1722	0.1888	0.2060	0.2236
0.2417	0.2603	0.2794	0.2990	0.3190
0.3396	0.3606	0.3822	0.4042	0.4267
0.4497	0.4732	0.4972	0.5216	0.5466
0.5721	0.5980	0.6244	0.6513	0.6787
0.7066	0.7350	0.7639	0.7933	0.8231
0.8542	0.8875	0.9229	0.9605	1.0000

Hrad:

0.0396	0.0726	0.1019	0.1290	0.1547
0.1794	0.2034	0.2268	0.2498	0.2726
0.2950	0.3173	0.3394	0.3613	0.3867
0.4131	0.4406	0.4675	0.4939	0.5199
0.5454	0.5705	0.5953	0.6197	0.6439
0.6677	0.6913	0.7147	0.7378	0.7607
0.7835	0.8060	0.8284	0.8506	0.8727
0.8947	0.9165	0.9382	0.9597	0.9812

1.0026 1.0239 1.0450 1.0661 1.0871
1.0604 1.0382 1.0207 1.0081 1.0000
Width:
0.0996 0.1198 0.1401 0.1603 0.1806
0.2008 0.2211 0.2413 0.2616 0.2819
0.3021 0.3224 0.3426 0.3629 0.3787
0.3927 0.4048 0.4169 0.4289 0.4410
0.4531 0.4652 0.4773 0.4893 0.5014
0.5135 0.5256 0.5377 0.5497 0.5618
0.5739 0.5860 0.5981 0.6101 0.6222
0.6343 0.6464 0.6585 0.6705 0.6826
0.6947 0.7068 0.7189 0.7309 0.7430
0.7950 0.8478 0.9007 0.9519 1.0000

Transect DownstreamCul.1
Area:
0.0033 0.0078 0.0133 0.0200 0.0278
0.0367 0.0467 0.0578 0.0701 0.0835
0.0977 0.1126 0.1282 0.1444 0.1610
0.1781 0.1955 0.2134 0.2317 0.2504
0.2695 0.2891 0.3091 0.3295 0.3503
0.3715 0.3932 0.4153 0.4378 0.4607
0.4840 0.5078 0.5320 0.5566 0.5816
0.6071 0.6329 0.6592 0.6859 0.7131
0.7406 0.7685 0.7967 0.8250 0.8536
0.8825 0.9115 0.9408 0.9703 1.0000
Hrad:
0.0286 0.0516 0.0721 0.0912 0.1096
0.1275 0.1450 0.1623 0.1794 0.1963
0.2185 0.2400 0.2609 0.2841 0.3075
0.3302 0.3525 0.3743 0.3957 0.4166
0.4372 0.4575 0.4774 0.4971 0.5164
0.5356 0.5544 0.5731 0.5915 0.6098
0.6278 0.6457 0.6634 0.6810 0.6984
0.7157 0.7328 0.7498 0.7667 0.7835
0.8002 0.8219 0.8446 0.8673 0.8897
0.9120 0.9342 0.9563 0.9782 1.0000
Width:
0.1302 0.1675 0.2049 0.2423 0.2797
0.3170 0.3544 0.3918 0.4292 0.4665
0.4890 0.5114 0.5339 0.5496 0.5637
0.5778 0.5919 0.6060 0.6201 0.6342
0.6483 0.6624 0.6765 0.6906 0.7048
0.7189 0.7330 0.7471 0.7612 0.7753
0.7894 0.8035 0.8176 0.8317 0.8458
0.8599 0.8740 0.8881 0.9022 0.9163
0.9304 0.9393 0.9469 0.9544 0.9620
0.9696 0.9772 0.9848 0.9924 1.0000

Transect DownstreamCul.2
Area:
0.0035 0.0079 0.0130 0.0189 0.0257
0.0332 0.0415 0.0506 0.0605 0.0711
0.0826 0.0947 0.1074 0.1207 0.1347
0.1493 0.1644 0.1802 0.1966 0.2135
0.2311 0.2493 0.2681 0.2874 0.3074
0.3280 0.3492 0.3710 0.3934 0.4164
0.4401 0.4643 0.4891 0.5145 0.5405
0.5672 0.5944 0.6222 0.6507 0.6797
0.7094 0.7396 0.7705 0.8019 0.8340
0.8666 0.8995 0.9327 0.9662 1.0000
Hrad:
0.0337 0.0618 0.0868 0.1099 0.1318
0.1529 0.1733 0.1932 0.2128 0.2321

0.2533 0.2741 0.2953 0.3166 0.3374
0.3579 0.3781 0.3981 0.4178 0.4373
0.4567 0.4759 0.4949 0.5138 0.5326
0.5512 0.5698 0.5883 0.6067 0.6250
0.6433 0.6615 0.6796 0.6976 0.7157
0.7336 0.7515 0.7694 0.7873 0.8051
0.8228 0.8406 0.8583 0.8759 0.8936
0.9147 0.9364 0.9578 0.9790 1.0000
Width:
0.1160 0.1394 0.1627 0.1860 0.2094
0.2327 0.2561 0.2794 0.3027 0.3261
0.3459 0.3656 0.3840 0.4018 0.4195
0.4373 0.4551 0.4728 0.4906 0.5084
0.5261 0.5439 0.5616 0.5794 0.5972
0.6149 0.6327 0.6505 0.6682 0.6860
0.7038 0.7215 0.7393 0.7571 0.7748
0.7926 0.8104 0.8281 0.8459 0.8637
0.8814 0.8992 0.9169 0.9347 0.9525
0.9634 0.9725 0.9817 0.9908 1.0000

Transect Lipsit_SouthofRoughamRd
Area:
0.0007 0.0030 0.0067 0.0118 0.0181
0.0249 0.0322 0.0401 0.0486 0.0576
0.0672 0.0775 0.0885 0.1002 0.1127
0.1258 0.1398 0.1544 0.1698 0.1859
0.2027 0.2203 0.2386 0.2576 0.2773
0.2978 0.3190 0.3409 0.3636 0.3870
0.4111 0.4359 0.4615 0.4878 0.5148
0.5426 0.5710 0.6003 0.6302 0.6609
0.6923 0.7244 0.7572 0.7908 0.8251
0.8598 0.8946 0.9296 0.9647 1.0000
Hrad:
0.0194 0.0389 0.0583 0.0777 0.1062
0.1333 0.1587 0.1828 0.2059 0.2281
0.2479 0.2656 0.2832 0.3009 0.3185
0.3362 0.3539 0.3715 0.3892 0.4068
0.4245 0.4421 0.4597 0.4774 0.4950
0.5127 0.5303 0.5479 0.5656 0.5832
0.6008 0.6185 0.6361 0.6537 0.6714
0.6890 0.7066 0.7243 0.7419 0.7595
0.7772 0.7948 0.8124 0.8301 0.8497
0.8801 0.9104 0.9404 0.9703 1.0000
Width:
0.0418 0.0836 0.1254 0.1672 0.1847
0.2002 0.2158 0.2313 0.2468 0.2623
0.2803 0.3009 0.3214 0.3420 0.3626
0.3832 0.4038 0.4244 0.4450 0.4656
0.4862 0.5068 0.5274 0.5480 0.5686
0.5892 0.6097 0.6303 0.6509 0.6715
0.6921 0.7127 0.7333 0.7539 0.7745
0.7951 0.8157 0.8363 0.8569 0.8774
0.8980 0.9186 0.9392 0.9598 0.9780
0.9824 0.9868 0.9912 0.9956 1.0000

Transect Pond0utlet
Area:
0.0009 0.0037 0.0083 0.0148 0.0232
0.0334 0.0454 0.0591 0.0735 0.0883
0.1036 0.1192 0.1352 0.1515 0.1683
0.1855 0.2031 0.2210 0.2393 0.2581
0.2772 0.2967 0.3166 0.3369 0.3575
0.3786 0.4000 0.4219 0.4441 0.4667
0.4897 0.5131 0.5369 0.5611 0.5857

```
            0.6106     0.6360     0.6617     0.6879     0.7144
            0.7413     0.7686     0.7963     0.8243     0.8528
            0.8816     0.9108     0.9403     0.9700     1.0000
Hrad:
            0.0161     0.0321     0.0482     0.0643     0.0803
            0.0964     0.1125     0.1338     0.1606     0.1874
            0.2134     0.2389     0.2637     0.2880     0.3118
            0.3351     0.3579     0.3804     0.4025     0.4242
            0.4456     0.4667     0.4875     0.5080     0.5282
            0.5483     0.5681     0.5877     0.6071     0.6263
            0.6453     0.6641     0.6828     0.7013     0.7197
            0.7380     0.7561     0.7741     0.7920     0.8098
            0.8274     0.8450     0.8624     0.8798     0.8970
            0.9142     0.9357     0.9572     0.9787     1.0000
Width:
            0.0615     0.1231     0.1846     0.2462     0.3077
            0.3693     0.4308     0.4700     0.4858     0.4987
            0.5117     0.5246     0.5375     0.5505     0.5634
            0.5763     0.5892     0.6022     0.6151     0.6280
            0.6410     0.6539     0.6668     0.6797     0.6927
            0.7056     0.7185     0.7314     0.7444     0.7573
            0.7702     0.7832     0.7961     0.8090     0.8219
            0.8349     0.8478     0.8607     0.8737     0.8866
            0.8995     0.9124     0.9254     0.9383     0.9512
            0.9642     0.9733     0.9822     0.9911     1.0000

Transect Road
Area:
            0.0005     0.0020     0.0045     0.0079     0.0124
            0.0179     0.0243     0.0317     0.0402     0.0496
            0.0600     0.0714     0.0838     0.0972     0.1116
            0.1270     0.1426     0.1583     0.1740     0.1897
            0.2059     0.2229     0.2406     0.2591     0.2783
            0.2983     0.3190     0.3404     0.3626     0.3855
            0.4092     0.4336     0.4587     0.4846     0.5113
            0.5387     0.5668     0.5956     0.6253     0.6556
            0.6867     0.7185     0.7511     0.7845     0.8185
            0.8533     0.8889     0.9252     0.9622     1.0000
Hrad:
            0.0182     0.0364     0.0547     0.0729     0.0911
            0.1093     0.1275     0.1458     0.1640     0.1822
            0.2004     0.2187     0.2369     0.2551     0.2733
            0.2953     0.3311     0.3668     0.4024     0.4380
            0.4724     0.5046     0.5349     0.5635     0.5904
            0.6159     0.6401     0.6630     0.6849     0.7057
            0.7256     0.7447     0.7630     0.7806     0.7976
            0.8139     0.8297     0.8450     0.8598     0.8742
            0.8881     0.9017     0.9150     0.9279     0.9406
            0.9529     0.9651     0.9769     0.9886     1.0000
Width:
            0.0260     0.0520     0.0780     0.1040     0.1300
            0.1560     0.1820     0.2080     0.2340     0.2600
            0.2860     0.3121     0.3381     0.3641     0.3901
            0.4106     0.4107     0.4107     0.4108     0.4159
            0.4354     0.4549     0.4743     0.4938     0.5133
            0.5327     0.5522     0.5717     0.5911     0.6106
            0.6301     0.6496     0.6690     0.6885     0.7080
            0.7274     0.7469     0.7664     0.7858     0.8053
            0.8248     0.8442     0.8637     0.8832     0.9027
            0.9221     0.9416     0.9611     0.9805     1.0000

Transect UpstreamCulvert2
Area:
            0.0037     0.0081     0.0132     0.0190     0.0255
```

```
            0.0327     0.0405     0.0491     0.0583     0.0682
            0.0787     0.0898     0.1016     0.1140     0.1271
            0.1409     0.1554     0.1706     0.1864     0.2030
            0.2202     0.2381     0.2566     0.2759     0.2958
            0.3164     0.3377     0.3597     0.3824     0.4057
            0.4297     0.4544     0.4798     0.5058     0.5326
            0.5600     0.5881     0.6169     0.6463     0.6765
            0.7073     0.7387     0.7703     0.8023     0.8345
            0.8671     0.8999     0.9330     0.9663     1.0000
Hrad:
            0.0349     0.0639     0.0896     0.1131     0.1351
            0.1562     0.1764     0.1961     0.2154     0.2350
            0.2551     0.2743     0.2921     0.3098     0.3274
            0.3449     0.3623     0.3796     0.3969     0.4142
            0.4314     0.4486     0.4657     0.4828     0.4999
            0.5170     0.5340     0.5510     0.5681     0.5850
            0.6020     0.6190     0.6359     0.6529     0.6698
            0.6867     0.7036     0.7205     0.7374     0.7543
            0.7712     0.7959     0.8220     0.8480     0.8738
            0.8994     0.9248     0.9500     0.9751     1.0000
Width:
            0.1203     0.1407     0.1610     0.1814     0.2017
            0.2221     0.2424     0.2627     0.2831     0.3022
            0.3197     0.3378     0.3580     0.3781     0.3983
            0.4184     0.4385     0.4587     0.4788     0.4989
            0.5191     0.5392     0.5593     0.5795     0.5996
            0.6197     0.6399     0.6600     0.6802     0.7003
            0.7204     0.7406     0.7607     0.7808     0.8010
            0.8211     0.8412     0.8614     0.8815     0.9016
            0.9218     0.9323     0.9408     0.9492     0.9577
            0.9662     0.9746     0.9831     0.9915     1.0000


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

****************
Analysis Options
****************
Flow Units ............... CMS
Process Models:
  Rainfall/Runoff ........ YES
  RDII ................... NO
  Snowmelt ............... NO
  Groundwater ............ NO
  Flow Routing ........... YES
  Ponding Allowed ........ NO
  Water Quality .......... NO
Infiltration Method ...... CURVE_NUMBER
Flow Routing Method ...... DYNWAVE
Surcharge Method ......... EXTRAN
Starting Date ............ 10/30/2020 00:00:00
Ending Date .............. 11/01/2020 03:00:00
Antecedent Dry Days ...... 0.0
Report Time Step ......... 00:01:00
Wet Time Step ............ 00:05:00
Dry Time Step ............ 00:05:00
Routing Time Step ........ 5.00 sec
Variable Time Step ....... YES
Maximum Trials ........... 8
Number of Threads ........ 4
```

Head Tolerance ..... 0.001500 m

Runoff Quantity Continuity	Volume hectare-m	Depth mm
Total Precipitation	6.387	51.884
Evaporation Loss	0.000	0.000
Infiltration Loss	5.059	41.098
Surface Runoff	1.188	9.647
Final Storage	0.150	1.216
Continuity Error (%)	-0.148	

Flow Routing Continuity	Volume hectare-m	Volume 10^6 ltr
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	1.187	11.874
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	2.460	24.600
External Outflow	3.604	36.040
Flooding Loss	0.000	0.000
Evaporation Loss	0.000	0.000
Exfiltration Loss	0.000	0.000
Initial Stored Volume	0.000	0.000
Final Stored Volume	0.066	0.657
Continuity Error (%)	-0.609	

****
Highest Continuity Errors
****
Node ST6 (-1.64%)

****
Time-Step Critical Elements
****
Link C6 (32.35%)

****
Highest Flow Instability Indexes
****
Link OR1 (8)
Link OR2 (1)
Link C5 (1)

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

Minimum Time Step	:	0.50 sec
Average Time Step	:	4.74 sec
Maximum Time Step	:	5.00 sec
Percent in Steady State	:	-0.00
Average Iterations per Step	:	2.06
Percent Not Converging	:	0.72
Time Step Frequencies	:	
5.000 - 3.155 sec	:	93.54 %
3.155 - 1.991 sec	:	3.73 %
1.991 - 1.256 sec	:	1.18 %

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    1.256 -  0.792 sec      :     0.63 %
    0.792 -  0.500 sec      :     0.92 %
```

****
Subcatchment Runoff Summary
****

Subcatchment	Total Precip mm	Total Runon mm	Total Evap mm	Total Infil mm	Imperv Runoff mm	Perv Runoff mm	Tot Runo
1	51.88	0.00	0.00	21.30	29.50	0.03	29.
EXT1	51.88	0.00	0.00	34.84	15.65	0.21	15.
EXT2	51.88	0.00	0.00	44.12	6.57	0.09	6.
EXT3&4	51.88	0.00	0.00	38.54	12.22	0.02	12.
EXT5	51.88	0.00	0.00	46.25	4.05	0.36	4.
EXT6	51.88	0.00	0.00	39.72	10.61	0.29	10.
EXT7	51.88	0.00	0.00	38.54	12.22	0.02	12.
S1	51.88	0.00	0.00	44.25	0.00	6.40	6.
S10	51.88	0.00	0.00	42.92	7.61	0.19	7.
S2	51.88	0.00	0.00	40.57	10.16	0.01	10.
S3	51.88	0.00	0.00	39.89	10.69	0.10	10.
S4	51.88	0.00	0.00	47.21	3.28	0.25	3.
S5	51.88	0.00	0.00	48.75	2.07	0.00	2.
S6	51.88	0.00	0.00	43.97	6.77	0.10	6.
S7	51.88	0.00	0.00	40.57	10.15	0.01	10.
S9	51.88	0.00	0.00	40.57	10.16	0.01	10.

****
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
J1	JUNCTION	0.17	1.06	245.49	0 01:36	1.06
J10	JUNCTION	0.57	1.51	245.53	0 01:25	1.51
J3	JUNCTION	0.68	1.62	245.63	0 01:23	1.62
J4	JUNCTION	0.65	1.82	245.87	0 01:17	1.82
J5	JUNCTION	0.66	2.01	246.21	0 01:14	2.01
J6	JUNCTION	0.67	1.75	245.93	0 01:16	1.75
J7	JUNCTION	0.41	1.70	246.26	0 01:13	1.70
J8	JUNCTION	0.67	1.79	245.42	0 01:24	1.79
J9	JUNCTION	0.69	1.75	245.36	0 01:24	1.75
OF2	JUNCTION	0.40	1.62	246.31	0 01:12	1.62
OF3	JUNCTION	0.50	1.45	245.54	0 01:25	1.45
ST1	JUNCTION	0.01	0.54	246.61	0 01:09	0.54
ST6	JUNCTION	0.02	1.94	247.33	0 01:04	0.93
ST7	JUNCTION	0.03	1.08	246.31	0 01:13	1.08
OF1	OUTFALL	0.49	1.55	245.31	0 01:24	1.55
SU1	STORAGE	0.21	1.05	245.49	0 01:37	1.05

****
Node Inflow Summary
****

	Maximum	Maximum		Lateral	Total	Fl

Node	Type	Lateral Inflow CMS	Total Inflow CMS	Time of Max Occurrence days	hr:min	Inflow Volume 10^6 ltr	Inflow Volume 10^6 ltr	Balan Err Perce
J1	JUNCTION	0.000	0.234	0	01:52	0	1.47	-0.3
J10	JUNCTION	0.000	2.212	0	01:21	0	33.1	0.4
J3	JUNCTION	0.000	2.734	0	01:12	0	31.6	0.1
J4	JUNCTION	0.000	2.879	0	01:11	0	31.5	-0.4
J5	JUNCTION	0.000	2.727	0	01:11	0	30.7	-0.2
J6	JUNCTION	0.640	2.989	0	01:11	0.782	31.5	0.1
J7	JUNCTION	0.067	3.295	0	01:05	0.0762	30.7	0.2
J8	JUNCTION	1.596	2.779	0	01:21	2.88	35.8	0.2
J9	JUNCTION	0.053	2.764	0	01:24	0.337	36.1	0.0
OF2	JUNCTION	3.541	3.670	0	01:05	30.5	30.7	0.0
OF3	JUNCTION	0.183	2.585	0	01:11	0.196	33.2	0.5
ST1	JUNCTION	0.171	0.171	0	01:05	0.218	0.218	1.5
ST6	JUNCTION	0.000	0.201	0	01:03	0	0.223	-1.6
ST7	JUNCTION	0.000	0.140	0	01:05	0	0.24	-0.0
OF1	OUTFALL	0.000	2.762	0	01:24	0	36	0.0
SU1	STORAGE	1.074	1.074	0	01:05	1.51	1.55	0.3

****
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
ST6	JUNCTION	0.38	1.338	0.413
ST7	JUNCTION	0.49	0.450	0.820

****
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	Maxi Outf
SU1	0.181	8	0	0	1.141	53	0 01:37	0.

****
Outfall Loading Summary
****

Outfall Node	Flow Freq Pcnt	Avg Flow CMS	Max Flow CMS	Total Volume 10^6 ltr

OF1	99.15	0.259	2.762	36.040
System	99.15	0.259	2.762	36.040

****
Link Flow Summary
****

Link	Type	Maximum |Flow| CMS	Time of Max Occurrence days hr:min	Maximum |Veloc| m/sec	Max/ Full Flow	Max/ Full Depth
C1	CONDUIT	0.234	0 01:52	0.83	0.87	1.00
C10	CHANNEL	2.513	0 01:13	0.53	0.20	0.55
C11	CONDUIT	2.734	0 01:12	1.69	2.05	1.00
C12	CHANNEL	2.879	0 01:11	0.58	0.35	0.68
C13	CONDUIT	2.641	0 01:11	1.62	2.91	1.00
C14	CHANNEL	3.234	0 01:05	0.61	0.45	0.75
C15	CHANNEL	2.727	0 01:11	0.53	0.26	0.63
C3	CONDUIT	0.141	0 01:05	0.98	0.83	1.00
C4	CONDUIT	0.140	0 01:05	0.58	0.50	1.00
C5	CONDUIT	0.140	0 01:05	0.56	0.59	1.00
C6	CONDUIT	2.725	0 01:24	0.91	1.03	1.00
C7	CHANNEL	2.762	0 01:24	0.47	0.35	0.66
C8	CHANNEL	2.212	0 01:21	0.23	0.17	0.69
C9	CHANNEL	2.157	0 01:26	0.36	0.21	0.62
W3	CHANNEL	0.000	0 00:00	0.00	0.00	0.00
OR1	ORIFICE	0.017	0 04:35			1.00
OR2	WEIR	0.225	0 01:52			0.98
W1	WEIR	0.000	0 00:00			0.00

****
Flow Classification Summary
****

Conduit	Adjusted /Actual Length	Fraction of Time in Flow Class: Dry	Up Dry	Down Dry	Sub Crit	Sup Crit	Up Crit	Down Crit	Norm Ltd	Inlet Ctrl
C1	1.00	0.00	0.00	0.00	0.99	0.00	0.00	0.01	0.00	0.00
C10	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
C11	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
C12	1.00	0.00	0.00	0.00	0.99	0.00	0.00	0.00	0.00	0.00
C13	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
C14	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
C15	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
C3	1.00	0.00	0.00	0.00	0.04	0.00	0.00	0.96	0.01	0.00
C4	1.00	0.00	0.00	0.00	0.06	0.00	0.00	0.94	0.01	0.00
C5	1.00	0.00	0.00	0.00	0.07	0.00	0.00	0.93	0.00	0.00
C6	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
C7	1.00	0.01	0.00	0.00	0.99	0.00	0.00	0.00	0.01	0.00
C8	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
C9	1.00	0.01	0.00	0.00	0.99	0.00	0.00	0.00	0.01	0.00
W3	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
C1	1.28	1.28	1.35	0.01	0.01
C11	0.40	0.54	0.40	0.57	0.40
C13	0.46	0.52	0.46	0.69	0.46
C3	0.10	0.10	0.48	0.01	0.01
C4	0.38	0.38	0.49	0.01	0.01
C5	0.51	0.51	0.52	0.01	0.01
C6	0.50	0.54	0.50	0.16	0.50

Analysis begun on: Fri Feb 5 14:14:14 2021
Analysis ended on: Fri Feb 5 14:14:16 2021
Total elapsed time: 00:00:02

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

WARNING 02: maximum depth increased for Node J10
WARNING 02: maximum depth increased for Node J3
WARNING 02: maximum depth increased for Node J4
WARNING 02: maximum depth increased for Node J5
WARNING 02: maximum depth increased for Node J6
WARNING 02: maximum depth increased for Node J7
WARNING 02: maximum depth increased for Node J8
WARNING 02: maximum depth increased for Node J9
WARNING 02: maximum depth increased for Node OF2
WARNING 02: maximum depth increased for Node OF3
WARNING 02: maximum depth increased for Node ST1

****
Element Count
****
Number of rain gages 1
Number of subcatchments ... 16
Number of nodes 16
Number of links 18
Number of pollutants 0
Number of land uses 0

****
Raingage Summary
****

Name	Data Source	Data Type	Recording Interval
Chicago_3h_5YR	Chicago_3h_5YR	INTENSITY	5 min.

****
Subcatchment Summary
****

Name	Area	Width	%Imperv	%Slope	Rain Gage	Outlet
1	3.74	124.25	58.00	1.1000	Chicago_3h_5YR	SU1
EXT1	0.20	78.13	31.00	0.8500	Chicago_3h_5YR	SU1
EXT2	1.47	169.94	13.00	1.1000	Chicago_3h_5YR	SU1
EXT3&4	2.03	52.62	24.00	0.9000	Chicago_3h_5YR	SU1
EXT5	0.21	107.69	8.00	2.1000	Chicago_3h_5YR	SU1
EXT6	0.15	57.69	21.00	2.1000	Chicago_3h_5YR	SU1
EXT7	1.78	46.31	24.00	0.9000	Chicago_3h_5YR	ST1
S1	5.26	196.97	0.00	0.8500	Chicago_3h_5YR	J9
S10	2.93	154.36	15.00	0.9000	Chicago_3h_5YR	J6
S2	28.37	236.38	20.00	0.8500	Chicago_3h_5YR	J8
S3	5.12	157.65	21.00	0.5500	Chicago_3h_5YR	J6
S4	2.16	156.57	6.50	0.8500	Chicago_3h_5YR	J7
S5	9.45	239.24	4.10	0.9000	Chicago_3h_5YR	OF3
S6	7.43	174.81	13.30	0.9000	Chicago_3h_5YR	OF2
S7	33.00	253.07	20.00	0.9000	Chicago_3h_5YR	OF2
S9	19.80	167.66	20.00	1.0000	Chicago_3h_5YR	OF2

****
Node Summary
****

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

J1	JUNCTION	244.43	1.67	0.0	
J10	JUNCTION	244.02	2.51	0.0	
J3	JUNCTION	244.01	2.80	0.0	
J4	JUNCTION	244.05	2.49	0.0	
J5	JUNCTION	244.20	3.00	0.0	
J6	JUNCTION	244.18	2.47	0.0	
J7	JUNCTION	244.56	2.72	0.0	
J8	JUNCTION	243.63	2.71	0.0	
J9	JUNCTION	243.61	2.53	0.0	
OF2	JUNCTION	244.69	2.21	0.0	Yes
OF3	JUNCTION	244.09	2.50	0.0	
ST1	JUNCTION	246.07	1.68	100.0	
ST6	JUNCTION	245.39	2.35	0.0	
ST7	JUNCTION	245.23	1.90	0.0	
OF1	OUTFALL	243.76	2.33	0.0	
SU1	STORAGE	244.44	1.66	0.0	

****
Link Summary
****

Name	From Node	To Node	Type	Length	%Slope	Roughness
C1	J1	OF3	CONDUIT	15.6	0.1927	0.0130
C10	J3	OF3	CONDUIT	177.5	0.1240	0.0600
C11	J4	J3	CONDUIT	24.0	0.1667	0.0240
C12	J6	J4	CONDUIT	84.1	0.1308	0.0600
C13	J5	J6	CONDUIT	26.0	0.0769	0.0240
C14	OF2	J7	CONDUIT	106.6	0.1219	0.0600
C15	J7	J5	CONDUIT	63.6	0.1259	0.0600
C3	ST1	ST6	CONDUIT	182.9	0.3554	0.0130
C4	ST6	ST7	CONDUIT	65.0	0.2108	0.0130
C5	ST7	OF2	CONDUIT	10.0	0.1500	0.0130
C6	J8	J9	CONDUIT	16.6	0.1205	0.0240
C7	J9	OF1	CONDUIT	42.6	0.1174	0.0600
C8	OF3	J10	CONDUIT	61.2	0.1144	0.0600
C9	J10	J8	CONDUIT	153.8	0.1235	0.0600
W3	ST1	SU1	CONDUIT	384.0	0.4724	0.0130
OR1	SU1	J1	ORIFICE			
OR2	SU1	J1	WEIR			
W1	SU1	OF3	WEIR			

****
Cross Section Summary
****

Conduit	Shape	Full Depth	Full Area	Hyd. Rad.	Max. Width	No. of Barrels	Full Flow	
C1	CIRCULAR	0.60	0.28	0.15	0.60	1	0.27	
C10	DownstreamCul.1	2.50	16.25	1.48	9.70	1	12.36	
C11	FILLED_CIRCULAR	1.30	1.63	0.33	1.50	1	1.33	
C12	DownstreamCul.2	2.19	12.52	1.15	9.71	1	8.27	
C13	FILLED_CIRCULAR	1.30	1.63	0.33	1.50	1	0.91	
C14	ClosetoQueenSt	2.21	12.38	0.98	11.35	1	7.13	
C15	UpstreamCulvert2	2.72	14.48	1.38	9.00	1	10.64	
C3	CIRCULAR	0.45	0.16	0.11	0.45	1	0.17	
C4	CIRCULAR	0.60	0.28	0.15	0.60	1	0.28	
C5	CIRCULAR	0.60	0.28	0.15	0.60	1	0.24	
C6	ARCH	1.60	2.98	0.48	2.21	1	2.64	
C7	Lipsit_SouthofRoughamRd	2.33	12.64	1.16	9.59	1	7.95	
C8	Pond0utlet	2.15	18.67	1.33	13.08	1	12.70	
C9	atLion'sGate	2.51	16.02	1.18	12.34	1	10.48	

W3	Road	0.38	3.99	0.20	20.01	1	7.26

****
Transect Summary
****

Transect atLion'sGate
Area:

0.0004	0.0016	0.0035	0.0062	0.0097
0.0140	0.0191	0.0249	0.0315	0.0389
0.0470	0.0560	0.0657	0.0762	0.0875
0.0996	0.1125	0.1262	0.1408	0.1563
0.1725	0.1896	0.2075	0.2263	0.2459
0.2663	0.2876	0.3097	0.3326	0.3563
0.3809	0.4064	0.4326	0.4597	0.4876
0.5164	0.5460	0.5764	0.6077	0.6398
0.6727	0.7065	0.7410	0.7765	0.8126
0.8491	0.8861	0.9236	0.9616	1.0000

Hrad:

0.0196	0.0391	0.0587	0.0783	0.0978
0.1174	0.1370	0.1565	0.1761	0.1957
0.2152	0.2348	0.2544	0.2739	0.2934
0.3119	0.3306	0.3494	0.3684	0.3874
0.4065	0.4257	0.4450	0.4642	0.4836
0.5030	0.5224	0.5418	0.5613	0.5808
0.6003	0.6198	0.6394	0.6589	0.6785
0.6981	0.7177	0.7373	0.7570	0.7766
0.7963	0.8159	0.8356	0.8553	0.8800
0.9046	0.9289	0.9528	0.9766	1.0000

Width:

0.0201	0.0402	0.0603	0.0805	0.1006
0.1207	0.1408	0.1609	0.1810	0.2012
0.2213	0.2414	0.2615	0.2816	0.3019
0.3235	0.3451	0.3666	0.3882	0.4098
0.4313	0.4529	0.4745	0.4960	0.5176
0.5391	0.5607	0.5823	0.6038	0.6254
0.6469	0.6685	0.6901	0.7116	0.7332
0.7548	0.7763	0.7979	0.8194	0.8410
0.8626	0.8841	0.9057	0.9272	0.9396
0.9516	0.9637	0.9758	0.9879	1.0000

Transect ClosetoQueenSt
Area:

0.0036	0.0081	0.0133	0.0194	0.0263
0.0340	0.0426	0.0520	0.0621	0.0731
0.0850	0.0976	0.1111	0.1254	0.1404
0.1561	0.1722	0.1888	0.2060	0.2236
0.2417	0.2603	0.2794	0.2990	0.3190
0.3396	0.3606	0.3822	0.4042	0.4267
0.4497	0.4732	0.4972	0.5216	0.5466
0.5721	0.5980	0.6244	0.6513	0.6787
0.7066	0.7350	0.7639	0.7933	0.8231
0.8542	0.8875	0.9229	0.9605	1.0000

Hrad:

0.0396	0.0726	0.1019	0.1290	0.1547
0.1794	0.2034	0.2268	0.2498	0.2726
0.2950	0.3173	0.3394	0.3613	0.3867
0.4131	0.4406	0.4675	0.4939	0.5199
0.5454	0.5705	0.5953	0.6197	0.6439
0.6677	0.6913	0.7147	0.7378	0.7607
0.7835	0.8060	0.8284	0.8506	0.8727
0.8947	0.9165	0.9382	0.9597	0.9812

1.0026 1.0239 1.0450 1.0661 1.0871
1.0604 1.0382 1.0207 1.0081 1.0000
Width:
0.0996 0.1198 0.1401 0.1603 0.1806
0.2008 0.2211 0.2413 0.2616 0.2819
0.3021 0.3224 0.3426 0.3629 0.3787
0.3927 0.4048 0.4169 0.4289 0.4410
0.4531 0.4652 0.4773 0.4893 0.5014
0.5135 0.5256 0.5377 0.5497 0.5618
0.5739 0.5860 0.5981 0.6101 0.6222
0.6343 0.6464 0.6585 0.6705 0.6826
0.6947 0.7068 0.7189 0.7309 0.7430
0.7950 0.8478 0.9007 0.9519 1.0000

Transect DownstreamCul.1
Area:
0.0033 0.0078 0.0133 0.0200 0.0278
0.0367 0.0467 0.0578 0.0701 0.0835
0.0977 0.1126 0.1282 0.1444 0.1610
0.1781 0.1955 0.2134 0.2317 0.2504
0.2695 0.2891 0.3091 0.3295 0.3503
0.3715 0.3932 0.4153 0.4378 0.4607
0.4840 0.5078 0.5320 0.5566 0.5816
0.6071 0.6329 0.6592 0.6859 0.7131
0.7406 0.7685 0.7967 0.8250 0.8536
0.8825 0.9115 0.9408 0.9703 1.0000
Hrad:
0.0286 0.0516 0.0721 0.0912 0.1096
0.1275 0.1450 0.1623 0.1794 0.1963
0.2185 0.2400 0.2609 0.2841 0.3075
0.3302 0.3525 0.3743 0.3957 0.4166
0.4372 0.4575 0.4774 0.4971 0.5164
0.5356 0.5544 0.5731 0.5915 0.6098
0.6278 0.6457 0.6634 0.6810 0.6984
0.7157 0.7328 0.7498 0.7667 0.7835
0.8002 0.8219 0.8446 0.8673 0.8897
0.9120 0.9342 0.9563 0.9782 1.0000
Width:
0.1302 0.1675 0.2049 0.2423 0.2797
0.3170 0.3544 0.3918 0.4292 0.4665
0.4890 0.5114 0.5339 0.5496 0.5637
0.5778 0.5919 0.6060 0.6201 0.6342
0.6483 0.6624 0.6765 0.6906 0.7048
0.7189 0.7330 0.7471 0.7612 0.7753
0.7894 0.8035 0.8176 0.8317 0.8458
0.8599 0.8740 0.8881 0.9022 0.9163
0.9304 0.9393 0.9469 0.9544 0.9620
0.9696 0.9772 0.9848 0.9924 1.0000

Transect DownstreamCul.2
Area:
0.0035 0.0079 0.0130 0.0189 0.0257
0.0332 0.0415 0.0506 0.0605 0.0711
0.0826 0.0947 0.1074 0.1207 0.1347
0.1493 0.1644 0.1802 0.1966 0.2135
0.2311 0.2493 0.2681 0.2874 0.3074
0.3280 0.3492 0.3710 0.3934 0.4164
0.4401 0.4643 0.4891 0.5145 0.5405
0.5672 0.5944 0.6222 0.6507 0.6797
0.7094 0.7396 0.7705 0.8019 0.8340
0.8666 0.8995 0.9327 0.9662 1.0000
Hrad:
0.0337 0.0618 0.0868 0.1099 0.1318
0.1529 0.1733 0.1932 0.2128 0.2321

0.2533 0.2741 0.2953 0.3166 0.3374
0.3579 0.3781 0.3981 0.4178 0.4373
0.4567 0.4759 0.4949 0.5138 0.5326
0.5512 0.5698 0.5883 0.6067 0.6250
0.6433 0.6615 0.6796 0.6976 0.7157
0.7336 0.7515 0.7694 0.7873 0.8051
0.8228 0.8406 0.8583 0.8759 0.8936
0.9147 0.9364 0.9578 0.9790 1.0000
Width:
0.1160 0.1394 0.1627 0.1860 0.2094
0.2327 0.2561 0.2794 0.3027 0.3261
0.3459 0.3656 0.3840 0.4018 0.4195
0.4373 0.4551 0.4728 0.4906 0.5084
0.5261 0.5439 0.5616 0.5794 0.5972
0.6149 0.6327 0.6505 0.6682 0.6860
0.7038 0.7215 0.7393 0.7571 0.7748
0.7926 0.8104 0.8281 0.8459 0.8637
0.8814 0.8992 0.9169 0.9347 0.9525
0.9634 0.9725 0.9817 0.9908 1.0000

Transect Lipsit_SouthofRoughamRd
Area:
0.0007 0.0030 0.0067 0.0118 0.0181
0.0249 0.0322 0.0401 0.0486 0.0576
0.0672 0.0775 0.0885 0.1002 0.1127
0.1258 0.1398 0.1544 0.1698 0.1859
0.2027 0.2203 0.2386 0.2576 0.2773
0.2978 0.3190 0.3409 0.3636 0.3870
0.4111 0.4359 0.4615 0.4878 0.5148
0.5426 0.5710 0.6003 0.6302 0.6609
0.6923 0.7244 0.7572 0.7908 0.8251
0.8598 0.8946 0.9296 0.9647 1.0000
Hrad:
0.0194 0.0389 0.0583 0.0777 0.1062
0.1333 0.1587 0.1828 0.2059 0.2281
0.2479 0.2656 0.2832 0.3009 0.3185
0.3362 0.3539 0.3715 0.3892 0.4068
0.4245 0.4421 0.4597 0.4774 0.4950
0.5127 0.5303 0.5479 0.5656 0.5832
0.6008 0.6185 0.6361 0.6537 0.6714
0.6890 0.7066 0.7243 0.7419 0.7595
0.7772 0.7948 0.8124 0.8301 0.8497
0.8801 0.9104 0.9404 0.9703 1.0000
Width:
0.0418 0.0836 0.1254 0.1672 0.1847
0.2002 0.2158 0.2313 0.2468 0.2623
0.2803 0.3009 0.3214 0.3420 0.3626
0.3832 0.4038 0.4244 0.4450 0.4656
0.4862 0.5068 0.5274 0.5480 0.5686
0.5892 0.6097 0.6303 0.6509 0.6715
0.6921 0.7127 0.7333 0.7539 0.7745
0.7951 0.8157 0.8363 0.8569 0.8774
0.8980 0.9186 0.9392 0.9598 0.9780
0.9824 0.9868 0.9912 0.9956 1.0000

Transect Pond0utlet
Area:
0.0009 0.0037 0.0083 0.0148 0.0232
0.0334 0.0454 0.0591 0.0735 0.0883
0.1036 0.1192 0.1352 0.1515 0.1683
0.1855 0.2031 0.2210 0.2393 0.2581
0.2772 0.2967 0.3166 0.3369 0.3575
0.3786 0.4000 0.4219 0.4441 0.4667
0.4897 0.5131 0.5369 0.5611 0.5857

```
            0.6106     0.6360     0.6617     0.6879     0.7144
            0.7413     0.7686     0.7963     0.8243     0.8528
            0.8816     0.9108     0.9403     0.9700     1.0000
Hrad:
            0.0161     0.0321     0.0482     0.0643     0.0803
            0.0964     0.1125     0.1338     0.1606     0.1874
            0.2134     0.2389     0.2637     0.2880     0.3118
            0.3351     0.3579     0.3804     0.4025     0.4242
            0.4456     0.4667     0.4875     0.5080     0.5282
            0.5483     0.5681     0.5877     0.6071     0.6263
            0.6453     0.6641     0.6828     0.7013     0.7197
            0.7380     0.7561     0.7741     0.7920     0.8098
            0.8274     0.8450     0.8624     0.8798     0.8970
            0.9142     0.9357     0.9572     0.9787     1.0000
Width:
            0.0615     0.1231     0.1846     0.2462     0.3077
            0.3693     0.4308     0.4700     0.4858     0.4987
            0.5117     0.5246     0.5375     0.5505     0.5634
            0.5763     0.5892     0.6022     0.6151     0.6280
            0.6410     0.6539     0.6668     0.6797     0.6927
            0.7056     0.7185     0.7314     0.7444     0.7573
            0.7702     0.7832     0.7961     0.8090     0.8219
            0.8349     0.8478     0.8607     0.8737     0.8866
            0.8995     0.9124     0.9254     0.9383     0.9512
            0.9642     0.9733     0.9822     0.9911     1.0000

Transect Road
Area:
            0.0005     0.0020     0.0045     0.0079     0.0124
            0.0179     0.0243     0.0317     0.0402     0.0496
            0.0600     0.0714     0.0838     0.0972     0.1116
            0.1270     0.1426     0.1583     0.1740     0.1897
            0.2059     0.2229     0.2406     0.2591     0.2783
            0.2983     0.3190     0.3404     0.3626     0.3855
            0.4092     0.4336     0.4587     0.4846     0.5113
            0.5387     0.5668     0.5956     0.6253     0.6556
            0.6867     0.7185     0.7511     0.7845     0.8185
            0.8533     0.8889     0.9252     0.9622     1.0000
Hrad:
            0.0182     0.0364     0.0547     0.0729     0.0911
            0.1093     0.1275     0.1458     0.1640     0.1822
            0.2004     0.2187     0.2369     0.2551     0.2733
            0.2953     0.3311     0.3668     0.4024     0.4380
            0.4724     0.5046     0.5349     0.5635     0.5904
            0.6159     0.6401     0.6630     0.6849     0.7057
            0.7256     0.7447     0.7630     0.7806     0.7976
            0.8139     0.8297     0.8450     0.8598     0.8742
            0.8881     0.9017     0.9150     0.9279     0.9406
            0.9529     0.9651     0.9769     0.9886     1.0000
Width:
            0.0260     0.0520     0.0780     0.1040     0.1300
            0.1560     0.1820     0.2080     0.2340     0.2600
            0.2860     0.3121     0.3381     0.3641     0.3901
            0.4106     0.4107     0.4107     0.4108     0.4159
            0.4354     0.4549     0.4743     0.4938     0.5133
            0.5327     0.5522     0.5717     0.5911     0.6106
            0.6301     0.6496     0.6690     0.6885     0.7080
            0.7274     0.7469     0.7664     0.7858     0.8053
            0.8248     0.8442     0.8637     0.8832     0.9027
            0.9221     0.9416     0.9611     0.9805     1.0000

Transect UpstreamCulvert2
Area:
            0.0037     0.0081     0.0132     0.0190     0.0255
```

```
            0.0327     0.0405     0.0491     0.0583     0.0682
            0.0787     0.0898     0.1016     0.1140     0.1271
            0.1409     0.1554     0.1706     0.1864     0.2030
            0.2202     0.2381     0.2566     0.2759     0.2958
            0.3164     0.3377     0.3597     0.3824     0.4057
            0.4297     0.4544     0.4798     0.5058     0.5326
            0.5600     0.5881     0.6169     0.6463     0.6765
            0.7073     0.7387     0.7703     0.8023     0.8345
            0.8671     0.8999     0.9330     0.9663     1.0000
Hrad:
            0.0349     0.0639     0.0896     0.1131     0.1351
            0.1562     0.1764     0.1961     0.2154     0.2350
            0.2551     0.2743     0.2921     0.3098     0.3274
            0.3449     0.3623     0.3796     0.3969     0.4142
            0.4314     0.4486     0.4657     0.4828     0.4999
            0.5170     0.5340     0.5510     0.5681     0.5850
            0.6020     0.6190     0.6359     0.6529     0.6698
            0.6867     0.7036     0.7205     0.7374     0.7543
            0.7712     0.7959     0.8220     0.8480     0.8738
            0.8994     0.9248     0.9500     0.9751     1.0000
Width:
            0.1203     0.1407     0.1610     0.1814     0.2017
            0.2221     0.2424     0.2627     0.2831     0.3022
            0.3197     0.3378     0.3580     0.3781     0.3983
            0.4184     0.4385     0.4587     0.4788     0.4989
            0.5191     0.5392     0.5593     0.5795     0.5996
            0.6197     0.6399     0.6600     0.6802     0.7003
            0.7204     0.7406     0.7607     0.7808     0.8010
            0.8211     0.8412     0.8614     0.8815     0.9016
            0.9218     0.9323     0.9408     0.9492     0.9577
            0.9662     0.9746     0.9831     0.9915     1.0000


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

****************
Analysis Options
****************
Flow Units ............... CMS
Process Models:
  Rainfall/Runoff ........ YES
  RDII ................... NO
  Snowmelt ............... NO
  Groundwater ............ NO
  Flow Routing ........... YES
  Ponding Allowed ........ NO
  Water Quality .......... NO
Infiltration Method ...... CURVE_NUMBER
Flow Routing Method ...... DYNWAVE
Surcharge Method ......... EXTRAN
Starting Date ............ 10/30/2020 00:00:00
Ending Date .............. 11/01/2020 03:00:00
Antecedent Dry Days ...... 0.0
Report Time Step ......... 00:01:00
Wet Time Step ............ 00:05:00
Dry Time Step ............ 00:05:00
Routing Time Step ........ 5.00 sec
Variable Time Step ....... YES
Maximum Trials ........... 8
Number of Threads ........ 4
```

Head Tolerance ..... 0.001500 m

Runoff Quantity Continuity	Volume hectare-m	Depth mm
Total Precipitation	5.461	44.361
Evaporation Loss	0.000	0.000
Infiltration Loss	4.321	35.098
Surface Runoff	0.996	8.091
Final Storage	0.152	1.232
Continuity Error (%)	-0.137	

Flow Routing Continuity	Volume hectare-m	Volume 10^6 ltr
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	0.995	9.951
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	2.093	20.928
External Outflow	3.048	30.480
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	0.058	0.576
Continuity Error (%)	-0.576	

****
Highest Continuity Errors
****
Node ST6 (-1.93%)

****
Time-Step Critical Elements
****
Link C6 (13.45%)
Link C11 (1.58%)

****
Highest Flow Instability Indexes
****
Link OR1 (9)

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

Minimum Time Step	:	0.42 sec
Average Time Step	:	4.69 sec
Maximum Time Step	:	5.00 sec
Percent in Steady State	:	0.00
Average Iterations per Step	:	2.07
Percent Not Converging	:	0.08
Time Step Frequencies	:	
5.000 - 3.155 sec	:	92.05 %
3.155 - 1.991 sec	:	3.64 %
1.991 - 1.256 sec	:	1.44 %
1.256 - 0.792 sec	:	1.17 %

0.792 - 0.500 sec : 1.70 %

****
Subcatchment Runoff Summary
****

Subcatchment	Total Precip mm	Total Runon mm	Total Evap mm	Total Infil mm	Imperv Runoff mm	Perv Runoff mm	Tot Runo
1	44.36	0.00	0.00	18.14	25.08	0.00	25.
EXT1	44.36	0.00	0.00	29.80	13.31	0.00	13.
EXT2	44.36	0.00	0.00	37.58	5.59	0.00	5.
EXT3&4	44.36	0.00	0.00	32.83	10.39	0.00	10.
EXT5	44.36	0.00	0.00	39.74	3.43	0.00	3.
EXT6	44.36	0.00	0.00	34.12	9.01	0.00	9.
EXT7	44.36	0.00	0.00	32.83	10.39	0.00	10.
S1	44.36	0.00	0.00	39.77	0.00	3.40	3.
S10	44.36	0.00	0.00	36.72	6.48	0.00	6.
S2	44.36	0.00	0.00	34.56	8.63	0.00	8.
S3	44.36	0.00	0.00	34.12	9.09	0.00	9.
S4	44.36	0.00	0.00	40.39	2.79	0.00	2.
S5	44.36	0.00	0.00	41.39	1.76	0.00	1.
S6	44.36	0.00	0.00	37.45	5.76	0.00	5.
S7	44.36	0.00	0.00	34.56	8.63	0.00	8.
S9	44.36	0.00	0.00	34.56	8.64	0.00	8.

****
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
J1	JUNCTION	0.15	0.93	245.36	0 01:33	0.93
J10	JUNCTION	0.55	1.39	245.41	0 01:25	1.39
J3	JUNCTION	0.66	1.50	245.51	0 01:22	1.50
J4	JUNCTION	0.64	1.64	245.69	0 01:17	1.64
J5	JUNCTION	0.65	1.79	245.99	0 01:13	1.79
J6	JUNCTION	0.65	1.59	245.77	0 01:15	1.59
J7	JUNCTION	0.40	1.49	246.05	0 01:13	1.49
J8	JUNCTION	0.65	1.66	245.29	0 01:25	1.66
J9	JUNCTION	0.67	1.63	245.24	0 01:25	1.63
OF2	JUNCTION	0.38	1.42	246.11	0 01:12	1.42
OF3	JUNCTION	0.49	1.33	245.42	0 01:25	1.33
ST1	JUNCTION	0.01	0.29	246.37	0 01:06	0.29
ST6	JUNCTION	0.03	1.03	246.42	0 01:07	0.73
ST7	JUNCTION	0.04	0.89	246.12	0 01:12	0.89
OF1	OUTFALL	0.47	1.43	245.19	0 01:25	1.43
SU1	STORAGE	0.19	0.92	245.36	0 01:38	0.92

****
Node Inflow Summary
****

	Maximum Lateral	Maximum Total	Time of Max	Lateral Inflow	Total Inflow	Fl Balan

Node	Type	Inflow CMS	Inflow CMS	Occurrence days	Occurrence hr:min	Volume 10^6 ltr	Volume 10^6 ltr	Err Perce
J1	JUNCTION	0.000	0.179	0	01:53	0	1.23	0.0
J10	JUNCTION	0.000	1.858	0	01:20	0	28.1	0.4
J3	JUNCTION	0.000	2.434	0	01:12	0	26.9	0.1
J4	JUNCTION	0.000	2.474	0	01:12	0	26.8	-0.4
J5	JUNCTION	0.000	2.312	0	01:10	0	26.1	-0.2
J6	JUNCTION	0.524	2.535	0	01:09	0.655	26.8	0.1
J7	JUNCTION	0.056	2.668	0	01:06	0.0603	26.1	0.2
J8	JUNCTION	1.263	2.328	0	01:21	2.45	30.4	0.2
J9	JUNCTION	0.028	2.289	0	01:24	0.179	30.5	0.0
OF2	JUNCTION	2.822	2.941	0	01:05	25.9	26.1	0.0
OF3	JUNCTION	0.153	2.312	0	01:12	0.167	28.2	0.5
ST1	JUNCTION	0.139	0.139	0	01:05	0.185	0.185	1.8
ST6	JUNCTION	0.000	0.175	0	01:04	0	0.188	-1.8
ST7	JUNCTION	0.000	0.157	0	01:05	0	0.203	-0.0
OF1	OUTFALL	0.000	2.287	0	01:25	0	30.5	0.0
SU1	STORAGE	0.867	0.867	0	01:05	1.28	1.28	-0.0

****
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
ST6	JUNCTION	0.23	0.430	1.321
ST7	JUNCTION	0.35	0.259	1.011

****
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	Maxi Outf
SU1	0.165	8	0	0	0.958	44	0 01:38	0.

****
Outfall Loading Summary
****

Outfall Node	Flow Freq Pcnt	Avg Flow CMS	Max Flow CMS	Total Volume 10^6 ltr
OF1	99.11	0.254	2.287	30.480

System	99.11	0.254	2.287	30.480

****
Link Flow Summary
****

Link	Type	Maximum |Flow| CMS	Time of Max Occurrence days	hr:min	Maximum |Veloc| m/sec	Max/ Full Flow	Max/ Full Depth
C1	CONDUIT	0.179	0	01:53	0.63	0.66	1.00
C10	CHANNEL	2.253	0	01:12	0.52	0.18	0.50
C11	CONDUIT	2.434	0	01:12	1.52	1.82	1.00
C12	CHANNEL	2.474	0	01:12	0.57	0.30	0.60
C13	CONDUIT	2.238	0	01:13	1.38	2.47	1.00
C14	CHANNEL	2.620	0	01:06	0.56	0.37	0.66
C15	CHANNEL	2.312	0	01:10	0.53	0.22	0.55
C3	CONDUIT	0.130	0	01:06	0.99	0.76	0.83
C4	CONDUIT	0.157	0	01:05	0.59	0.56	1.00
C5	CONDUIT	0.156	0	01:05	0.57	0.66	1.00
C6	CONDUIT	2.278	0	01:24	0.76	0.86	1.00
C7	CHANNEL	2.287	0	01:25	0.45	0.29	0.62
C8	CHANNEL	1.858	0	01:20	0.23	0.15	0.63
C9	CHANNEL	1.791	0	01:26	0.35	0.17	0.57
W3	CHANNEL	0.000	0	00:00	0.00	0.00	0.00
OR1	ORIFICE	0.017	0	04:31			1.00
OR2	WEIR	0.169	0	01:53			0.67
W1	WEIR	0.000	0	00:00			0.00

****
Flow Classification Summary
****

Conduit	Adjusted /Actual Length	Fraction of Time in Flow Class: Dry	Up Dry	Down Dry	Sub Crit	Sup Crit	Up Crit	Down Crit	Norm Ltd	Inlet Ctrl
C1	1.00	0.00	0.00	0.00	0.98	0.00	0.00	0.01	0.00	0.00
C10	1.00	0.00	0.01	0.00	0.99	0.00	0.00	0.00	0.00	0.00
C11	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
C12	1.00	0.00	0.00	0.00	0.99	0.00	0.00	0.00	0.00	0.00
C13	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
C14	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
C15	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
C3	1.00	0.00	0.00	0.00	0.05	0.00	0.00	0.95	0.01	0.00
C4	1.00	0.00	0.00	0.00	0.07	0.00	0.00	0.93	0.01	0.00
C5	1.00	0.00	0.00	0.00	0.08	0.00	0.00	0.92	0.00	0.00
C6	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
C7	1.00	0.01	0.00	0.00	0.99	0.00	0.00	0.00	0.41	0.00
C8	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
C9	1.00	0.01	0.00	0.00	0.99	0.00	0.00	0.00	0.01	0.00
W3	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
C1	1.07	1.07	1.15	0.01	0.01
C11	0.01	0.36	0.01	0.46	0.01
C13	0.28	0.37	0.28	0.59	0.28
C3	0.01	0.01	0.35	0.01	0.01
C4	0.23	0.23	0.35	0.01	0.01
C5	0.38	0.38	0.39	0.01	0.01
C6	0.22	0.27	0.22	0.01	0.22

Analysis begun on: Fri Feb 5 14:07:32 2021
Analysis ended on: Fri Feb 5 14:07:34 2021
Total elapsed time: 00:00:02

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

WARNING 02: maximum depth increased for Node J10
WARNING 02: maximum depth increased for Node J3
WARNING 02: maximum depth increased for Node J4
WARNING 02: maximum depth increased for Node J5
WARNING 02: maximum depth increased for Node J6
WARNING 02: maximum depth increased for Node J7
WARNING 02: maximum depth increased for Node J8
WARNING 02: maximum depth increased for Node J9
WARNING 02: maximum depth increased for Node OF2
WARNING 02: maximum depth increased for Node OF3
WARNING 02: maximum depth increased for Node ST1

****
Element Count
****
Number of rain gages 1
Number of subcatchments ... 16
Number of nodes 16
Number of links 18
Number of pollutants 0
Number of land uses 0

****
Raingage Summary
****

Name	Data Source	Data Type	Recording Interval
Chicago_4h_25mmStorm	Chicago_4h_25mmStorm	INTENSITY	5 min.

****
Subcatchment Summary
****

Name	Area	Width	%Imperv	%Slope	Rain Gage	Outlet
1	3.74	124.25	58.00	1.1000	Chicago_4h_25mmStorm	SU1
EXT1	0.20	78.13	31.00	0.8500	Chicago_4h_25mmStorm	SU1
EXT2	1.47	169.94	13.00	1.1000	Chicago_4h_25mmStorm	SU1
EXT3&4	2.03	52.62	24.00	0.9000	Chicago_4h_25mmStorm	SU1
EXT5	0.21	107.69	8.00	2.1000	Chicago_4h_25mmStorm	SU1
EXT6	0.15	57.69	21.00	2.1000	Chicago_4h_25mmStorm	SU1
EXT7	1.78	46.31	24.00	0.9000	Chicago_4h_25mmStorm	ST1
S1	5.26	196.97	0.00	0.8500	Chicago_4h_25mmStorm	J9
S10	2.93	154.36	15.00	0.9000	Chicago_4h_25mmStorm	J6
S2	28.37	236.38	20.00	0.8500	Chicago_4h_25mmStorm	J8
S3	5.12	157.65	21.00	0.5500	Chicago_4h_25mmStorm	J6
S4	2.16	156.57	6.50	0.8500	Chicago_4h_25mmStorm	J7
S5	9.45	239.24	4.10	0.9000	Chicago_4h_25mmStorm	OF3
S6	7.43	174.81	13.30	0.9000	Chicago_4h_25mmStorm	OF2
S7	33.00	253.07	20.00	0.9000	Chicago_4h_25mmStorm	OF2
S9	19.80	167.66	20.00	1.0000	Chicago_4h_25mmStorm	OF2

****
Node Summary
****

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

J1	JUNCTION	244.43	1.67	0.0	
J10	JUNCTION	244.02	2.51	0.0	
J3	JUNCTION	244.01	2.80	0.0	
J4	JUNCTION	244.05	2.49	0.0	
J5	JUNCTION	244.20	3.00	0.0	
J6	JUNCTION	244.18	2.47	0.0	
J7	JUNCTION	244.56	2.72	0.0	
J8	JUNCTION	243.63	2.71	0.0	
J9	JUNCTION	243.61	2.53	0.0	
OF2	JUNCTION	244.69	2.21	0.0	Yes
OF3	JUNCTION	244.09	2.50	0.0	
ST1	JUNCTION	246.07	1.68	100.0	
ST6	JUNCTION	245.39	2.35	0.0	
ST7	JUNCTION	245.23	1.90	0.0	
OF1	OUTFALL	243.76	2.33	0.0	
SU1	STORAGE	244.44	1.66	0.0	

****
Link Summary
****

Name	From Node	To Node	Type	Length	%Slope	Roughness
C1	J1	OF3	CONDUIT	15.6	0.1927	0.0130
C10	J3	OF3	CONDUIT	177.5	0.1240	0.0600
C11	J4	J3	CONDUIT	24.0	0.1667	0.0240
C12	J6	J4	CONDUIT	84.1	0.1308	0.0600
C13	J5	J6	CONDUIT	26.0	0.0769	0.0240
C14	OF2	J7	CONDUIT	106.6	0.1219	0.0600
C15	J7	J5	CONDUIT	63.6	0.1259	0.0600
C3	ST1	ST6	CONDUIT	182.9	0.3554	0.0130
C4	ST6	ST7	CONDUIT	65.0	0.2108	0.0130
C5	ST7	OF2	CONDUIT	10.0	0.1500	0.0130
C6	J8	J9	CONDUIT	16.6	0.1205	0.0240
C7	J9	OF1	CONDUIT	42.6	0.1174	0.0600
C8	OF3	J10	CONDUIT	61.2	0.1144	0.0600
C9	J10	J8	CONDUIT	153.8	0.1235	0.0600
W3	ST1	SU1	CONDUIT	384.0	0.4724	0.0130
OR1	SU1	J1	ORIFICE			
OR2	SU1	J1	WEIR			
W1	SU1	OF3	WEIR			

****
Cross Section Summary
****

Conduit	Shape	Full Depth	Full Area	Hyd. Rad.	Max. Width	No. of Barrels	Full Flow	
C1	CIRCULAR	0.60	0.28	0.15	0.60	1	0.27	
C10	DownstreamCul.1	2.50	16.25	1.48	9.70	1	12.36	
C11	FILLED_CIRCULAR	1.30	1.63	0.33	1.50	1	1.33	
C12	DownstreamCul.2	2.19	12.52	1.15	9.71	1	8.27	
C13	FILLED_CIRCULAR	1.30	1.63	0.33	1.50	1	0.91	
C14	ClosetoQueenSt	2.21	12.38	0.98	11.35	1	7.13	
C15	UpstreamCulvert2	2.72	14.48	1.38	9.00	1	10.64	
C3	CIRCULAR	0.45	0.16	0.11	0.45	1	0.17	
C4	CIRCULAR	0.60	0.28	0.15	0.60	1	0.28	
C5	CIRCULAR	0.60	0.28	0.15	0.60	1	0.24	
C6	ARCH	1.60	2.98	0.48	2.21	1	2.64	
C7	Lipsit_SouthofRoughamRd	2.33	12.64	1.16	9.59	1	7.95	
C8	Pond0utlet	2.15	18.67	1.33	13.08	1	12.70	
C9	atLion'sGate	2.51	16.02	1.18	12.34	1	10.48	

W3	Road	0.38	3.99	0.20	20.01	1	7.26

****
Transect Summary
****

Transect atLion'sGate
Area:

0.0004	0.0016	0.0035	0.0062	0.0097
0.0140	0.0191	0.0249	0.0315	0.0389
0.0470	0.0560	0.0657	0.0762	0.0875
0.0996	0.1125	0.1262	0.1408	0.1563
0.1725	0.1896	0.2075	0.2263	0.2459
0.2663	0.2876	0.3097	0.3326	0.3563
0.3809	0.4064	0.4326	0.4597	0.4876
0.5164	0.5460	0.5764	0.6077	0.6398
0.6727	0.7065	0.7410	0.7765	0.8126
0.8491	0.8861	0.9236	0.9616	1.0000

Hrad:

0.0196	0.0391	0.0587	0.0783	0.0978
0.1174	0.1370	0.1565	0.1761	0.1957
0.2152	0.2348	0.2544	0.2739	0.2934
0.3119	0.3306	0.3494	0.3684	0.3874
0.4065	0.4257	0.4450	0.4642	0.4836
0.5030	0.5224	0.5418	0.5613	0.5808
0.6003	0.6198	0.6394	0.6589	0.6785
0.6981	0.7177	0.7373	0.7570	0.7766
0.7963	0.8159	0.8356	0.8553	0.8800
0.9046	0.9289	0.9528	0.9766	1.0000

Width:

0.0201	0.0402	0.0603	0.0805	0.1006
0.1207	0.1408	0.1609	0.1810	0.2012
0.2213	0.2414	0.2615	0.2816	0.3019
0.3235	0.3451	0.3666	0.3882	0.4098
0.4313	0.4529	0.4745	0.4960	0.5176
0.5391	0.5607	0.5823	0.6038	0.6254
0.6469	0.6685	0.6901	0.7116	0.7332
0.7548	0.7763	0.7979	0.8194	0.8410
0.8626	0.8841	0.9057	0.9272	0.9396
0.9516	0.9637	0.9758	0.9879	1.0000

Transect ClosetoQueenSt
Area:

0.0036	0.0081	0.0133	0.0194	0.0263
0.0340	0.0426	0.0520	0.0621	0.0731
0.0850	0.0976	0.1111	0.1254	0.1404
0.1561	0.1722	0.1888	0.2060	0.2236
0.2417	0.2603	0.2794	0.2990	0.3190
0.3396	0.3606	0.3822	0.4042	0.4267
0.4497	0.4732	0.4972	0.5216	0.5466
0.5721	0.5980	0.6244	0.6513	0.6787
0.7066	0.7350	0.7639	0.7933	0.8231
0.8542	0.8875	0.9229	0.9605	1.0000

Hrad:

0.0396	0.0726	0.1019	0.1290	0.1547
0.1794	0.2034	0.2268	0.2498	0.2726
0.2950	0.3173	0.3394	0.3613	0.3867
0.4131	0.4406	0.4675	0.4939	0.5199
0.5454	0.5705	0.5953	0.6197	0.6439
0.6677	0.6913	0.7147	0.7378	0.7607
0.7835	0.8060	0.8284	0.8506	0.8727
0.8947	0.9165	0.9382	0.9597	0.9812

1.0026 1.0239 1.0450 1.0661 1.0871
1.0604 1.0382 1.0207 1.0081 1.0000
Width:
0.0996 0.1198 0.1401 0.1603 0.1806
0.2008 0.2211 0.2413 0.2616 0.2819
0.3021 0.3224 0.3426 0.3629 0.3787
0.3927 0.4048 0.4169 0.4289 0.4410
0.4531 0.4652 0.4773 0.4893 0.5014
0.5135 0.5256 0.5377 0.5497 0.5618
0.5739 0.5860 0.5981 0.6101 0.6222
0.6343 0.6464 0.6585 0.6705 0.6826
0.6947 0.7068 0.7189 0.7309 0.7430
0.7950 0.8478 0.9007 0.9519 1.0000

Transect DownstreamCul.1
Area:
0.0033 0.0078 0.0133 0.0200 0.0278
0.0367 0.0467 0.0578 0.0701 0.0835
0.0977 0.1126 0.1282 0.1444 0.1610
0.1781 0.1955 0.2134 0.2317 0.2504
0.2695 0.2891 0.3091 0.3295 0.3503
0.3715 0.3932 0.4153 0.4378 0.4607
0.4840 0.5078 0.5320 0.5566 0.5816
0.6071 0.6329 0.6592 0.6859 0.7131
0.7406 0.7685 0.7967 0.8250 0.8536
0.8825 0.9115 0.9408 0.9703 1.0000
Hrad:
0.0286 0.0516 0.0721 0.0912 0.1096
0.1275 0.1450 0.1623 0.1794 0.1963
0.2185 0.2400 0.2609 0.2841 0.3075
0.3302 0.3525 0.3743 0.3957 0.4166
0.4372 0.4575 0.4774 0.4971 0.5164
0.5356 0.5544 0.5731 0.5915 0.6098
0.6278 0.6457 0.6634 0.6810 0.6984
0.7157 0.7328 0.7498 0.7667 0.7835
0.8002 0.8219 0.8446 0.8673 0.8897
0.9120 0.9342 0.9563 0.9782 1.0000
Width:
0.1302 0.1675 0.2049 0.2423 0.2797
0.3170 0.3544 0.3918 0.4292 0.4665
0.4890 0.5114 0.5339 0.5496 0.5637
0.5778 0.5919 0.6060 0.6201 0.6342
0.6483 0.6624 0.6765 0.6906 0.7048
0.7189 0.7330 0.7471 0.7612 0.7753
0.7894 0.8035 0.8176 0.8317 0.8458
0.8599 0.8740 0.8881 0.9022 0.9163
0.9304 0.9393 0.9469 0.9544 0.9620
0.9696 0.9772 0.9848 0.9924 1.0000

Transect DownstreamCul.2
Area:
0.0035 0.0079 0.0130 0.0189 0.0257
0.0332 0.0415 0.0506 0.0605 0.0711
0.0826 0.0947 0.1074 0.1207 0.1347
0.1493 0.1644 0.1802 0.1966 0.2135
0.2311 0.2493 0.2681 0.2874 0.3074
0.3280 0.3492 0.3710 0.3934 0.4164
0.4401 0.4643 0.4891 0.5145 0.5405
0.5672 0.5944 0.6222 0.6507 0.6797
0.7094 0.7396 0.7705 0.8019 0.8340
0.8666 0.8995 0.9327 0.9662 1.0000
Hrad:
0.0337 0.0618 0.0868 0.1099 0.1318
0.1529 0.1733 0.1932 0.2128 0.2321

0.2533 0.2741 0.2953 0.3166 0.3374
0.3579 0.3781 0.3981 0.4178 0.4373
0.4567 0.4759 0.4949 0.5138 0.5326
0.5512 0.5698 0.5883 0.6067 0.6250
0.6433 0.6615 0.6796 0.6976 0.7157
0.7336 0.7515 0.7694 0.7873 0.8051
0.8228 0.8406 0.8583 0.8759 0.8936
0.9147 0.9364 0.9578 0.9790 1.0000
Width:
0.1160 0.1394 0.1627 0.1860 0.2094
0.2327 0.2561 0.2794 0.3027 0.3261
0.3459 0.3656 0.3840 0.4018 0.4195
0.4373 0.4551 0.4728 0.4906 0.5084
0.5261 0.5439 0.5616 0.5794 0.5972
0.6149 0.6327 0.6505 0.6682 0.6860
0.7038 0.7215 0.7393 0.7571 0.7748
0.7926 0.8104 0.8281 0.8459 0.8637
0.8814 0.8992 0.9169 0.9347 0.9525
0.9634 0.9725 0.9817 0.9908 1.0000

Transect Lipsit_SouthofRoughamRd
Area:
0.0007 0.0030 0.0067 0.0118 0.0181
0.0249 0.0322 0.0401 0.0486 0.0576
0.0672 0.0775 0.0885 0.1002 0.1127
0.1258 0.1398 0.1544 0.1698 0.1859
0.2027 0.2203 0.2386 0.2576 0.2773
0.2978 0.3190 0.3409 0.3636 0.3870
0.4111 0.4359 0.4615 0.4878 0.5148
0.5426 0.5710 0.6003 0.6302 0.6609
0.6923 0.7244 0.7572 0.7908 0.8251
0.8598 0.8946 0.9296 0.9647 1.0000
Hrad:
0.0194 0.0389 0.0583 0.0777 0.1062
0.1333 0.1587 0.1828 0.2059 0.2281
0.2479 0.2656 0.2832 0.3009 0.3185
0.3362 0.3539 0.3715 0.3892 0.4068
0.4245 0.4421 0.4597 0.4774 0.4950
0.5127 0.5303 0.5479 0.5656 0.5832
0.6008 0.6185 0.6361 0.6537 0.6714
0.6890 0.7066 0.7243 0.7419 0.7595
0.7772 0.7948 0.8124 0.8301 0.8497
0.8801 0.9104 0.9404 0.9703 1.0000
Width:
0.0418 0.0836 0.1254 0.1672 0.1847
0.2002 0.2158 0.2313 0.2468 0.2623
0.2803 0.3009 0.3214 0.3420 0.3626
0.3832 0.4038 0.4244 0.4450 0.4656
0.4862 0.5068 0.5274 0.5480 0.5686
0.5892 0.6097 0.6303 0.6509 0.6715
0.6921 0.7127 0.7333 0.7539 0.7745
0.7951 0.8157 0.8363 0.8569 0.8774
0.8980 0.9186 0.9392 0.9598 0.9780
0.9824 0.9868 0.9912 0.9956 1.0000

Transect Pond0utlet
Area:
0.0009 0.0037 0.0083 0.0148 0.0232
0.0334 0.0454 0.0591 0.0735 0.0883
0.1036 0.1192 0.1352 0.1515 0.1683
0.1855 0.2031 0.2210 0.2393 0.2581
0.2772 0.2967 0.3166 0.3369 0.3575
0.3786 0.4000 0.4219 0.4441 0.4667
0.4897 0.5131 0.5369 0.5611 0.5857

```
            0.6106     0.6360     0.6617     0.6879     0.7144
            0.7413     0.7686     0.7963     0.8243     0.8528
            0.8816     0.9108     0.9403     0.9700     1.0000
Hrad:
            0.0161     0.0321     0.0482     0.0643     0.0803
            0.0964     0.1125     0.1338     0.1606     0.1874
            0.2134     0.2389     0.2637     0.2880     0.3118
            0.3351     0.3579     0.3804     0.4025     0.4242
            0.4456     0.4667     0.4875     0.5080     0.5282
            0.5483     0.5681     0.5877     0.6071     0.6263
            0.6453     0.6641     0.6828     0.7013     0.7197
            0.7380     0.7561     0.7741     0.7920     0.8098
            0.8274     0.8450     0.8624     0.8798     0.8970
            0.9142     0.9357     0.9572     0.9787     1.0000
Width:
            0.0615     0.1231     0.1846     0.2462     0.3077
            0.3693     0.4308     0.4700     0.4858     0.4987
            0.5117     0.5246     0.5375     0.5505     0.5634
            0.5763     0.5892     0.6022     0.6151     0.6280
            0.6410     0.6539     0.6668     0.6797     0.6927
            0.7056     0.7185     0.7314     0.7444     0.7573
            0.7702     0.7832     0.7961     0.8090     0.8219
            0.8349     0.8478     0.8607     0.8737     0.8866
            0.8995     0.9124     0.9254     0.9383     0.9512
            0.9642     0.9733     0.9822     0.9911     1.0000

Transect Road
Area:
            0.0005     0.0020     0.0045     0.0079     0.0124
            0.0179     0.0243     0.0317     0.0402     0.0496
            0.0600     0.0714     0.0838     0.0972     0.1116
            0.1270     0.1426     0.1583     0.1740     0.1897
            0.2059     0.2229     0.2406     0.2591     0.2783
            0.2983     0.3190     0.3404     0.3626     0.3855
            0.4092     0.4336     0.4587     0.4846     0.5113
            0.5387     0.5668     0.5956     0.6253     0.6556
            0.6867     0.7185     0.7511     0.7845     0.8185
            0.8533     0.8889     0.9252     0.9622     1.0000
Hrad:
            0.0182     0.0364     0.0547     0.0729     0.0911
            0.1093     0.1275     0.1458     0.1640     0.1822
            0.2004     0.2187     0.2369     0.2551     0.2733
            0.2953     0.3311     0.3668     0.4024     0.4380
            0.4724     0.5046     0.5349     0.5635     0.5904
            0.6159     0.6401     0.6630     0.6849     0.7057
            0.7256     0.7447     0.7630     0.7806     0.7976
            0.8139     0.8297     0.8450     0.8598     0.8742
            0.8881     0.9017     0.9150     0.9279     0.9406
            0.9529     0.9651     0.9769     0.9886     1.0000
Width:
            0.0260     0.0520     0.0780     0.1040     0.1300
            0.1560     0.1820     0.2080     0.2340     0.2600
            0.2860     0.3121     0.3381     0.3641     0.3901
            0.4106     0.4107     0.4107     0.4108     0.4159
            0.4354     0.4549     0.4743     0.4938     0.5133
            0.5327     0.5522     0.5717     0.5911     0.6106
            0.6301     0.6496     0.6690     0.6885     0.7080
            0.7274     0.7469     0.7664     0.7858     0.8053
            0.8248     0.8442     0.8637     0.8832     0.9027
            0.9221     0.9416     0.9611     0.9805     1.0000

Transect UpstreamCulvert2
Area:
            0.0037     0.0081     0.0132     0.0190     0.0255
```

```
            0.0327     0.0405     0.0491     0.0583     0.0682
            0.0787     0.0898     0.1016     0.1140     0.1271
            0.1409     0.1554     0.1706     0.1864     0.2030
            0.2202     0.2381     0.2566     0.2759     0.2958
            0.3164     0.3377     0.3597     0.3824     0.4057
            0.4297     0.4544     0.4798     0.5058     0.5326
            0.5600     0.5881     0.6169     0.6463     0.6765
            0.7073     0.7387     0.7703     0.8023     0.8345
            0.8671     0.8999     0.9330     0.9663     1.0000
Hrad:
            0.0349     0.0639     0.0896     0.1131     0.1351
            0.1562     0.1764     0.1961     0.2154     0.2350
            0.2551     0.2743     0.2921     0.3098     0.3274
            0.3449     0.3623     0.3796     0.3969     0.4142
            0.4314     0.4486     0.4657     0.4828     0.4999
            0.5170     0.5340     0.5510     0.5681     0.5850
            0.6020     0.6190     0.6359     0.6529     0.6698
            0.6867     0.7036     0.7205     0.7374     0.7543
            0.7712     0.7959     0.8220     0.8480     0.8738
            0.8994     0.9248     0.9500     0.9751     1.0000
Width:
            0.1203     0.1407     0.1610     0.1814     0.2017
            0.2221     0.2424     0.2627     0.2831     0.3022
            0.3197     0.3378     0.3580     0.3781     0.3983
            0.4184     0.4385     0.4587     0.4788     0.4989
            0.5191     0.5392     0.5593     0.5795     0.5996
            0.6197     0.6399     0.6600     0.6802     0.7003
            0.7204     0.7406     0.7607     0.7808     0.8010
            0.8211     0.8412     0.8614     0.8815     0.9016
            0.9218     0.9323     0.9408     0.9492     0.9577
            0.9662     0.9746     0.9831     0.9915     1.0000


************************************************************
NOTE: The summary statistics displayed in this report are
based on results found at every computational time step,
not just on results from each reporting time step.
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****************
Analysis Options
****************
Flow Units ............... CMS
Process Models:
  Rainfall/Runoff ........ YES
  RDII ................... NO
  Snowmelt ............... NO
  Groundwater ............ NO
  Flow Routing ........... YES
  Ponding Allowed ........ NO
  Water Quality .......... NO
Infiltration Method ...... CURVE_NUMBER
Flow Routing Method ...... DYNWAVE
Surcharge Method ......... EXTRAN
Starting Date ............ 10/30/2020 00:00:00
Ending Date .............. 11/01/2020 04:00:00
Antecedent Dry Days ...... 0.0
Report Time Step ......... 00:01:00
Wet Time Step ............ 00:05:00
Dry Time Step ............ 00:05:00
Routing Time Step ........ 5.00 sec
Variable Time Step ....... YES
Maximum Trials ........... 8
Number of Threads ........ 4
```

Head Tolerance ..... 0.001500 m

Runoff Quantity Continuity	Volume hectare-m	Depth mm
Total Precipitation	3.084	25.049
Evaporation Loss	0.000	0.000
Infiltration Loss	2.397	19.475
Surface Runoff	0.537	4.361
Final Storage	0.153	1.242
Continuity Error (%)	-0.115	

Flow Routing Continuity	Volume hectare-m	Volume 10^6 ltr
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	0.537	5.365
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	1.123	11.231
External Outflow	1.620	16.200
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	0.035	0.348
Continuity Error (%)	0.287	

Highest Continuity Errors

Node ST6 (-2.38%)

Time-Step Critical Elements

Link C6 (8.37%)

Highest Flow Instability Indexes

All links are stable.

Routing Time Step Summary

Minimum Time Step	:	2.44 sec
Average Time Step	:	4.90 sec
Maximum Time Step	:	5.00 sec
Percent in Steady State	:	0.00
Average Iterations per Step	:	2.00
Percent Not Converging	:	0.01
Time Step Frequencies	:	
5.000 - 3.155 sec	:	98.04 %
3.155 - 1.991 sec	:	1.96 %
1.991 - 1.256 sec	:	0.00 %
1.256 - 0.792 sec	:	0.00 %
0.792 - 0.500 sec	:	0.00 %

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Subcatchment Runoff Summary
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Subcatchment	Total Precip mm	Total Runon mm	Total Evap mm	Total Infil mm	Imperv Runoff mm	Perv Runoff mm	Tot Runo
1	25.05	0.00	0.00	10.02	13.76	0.00	13.
EXT1	25.05	0.00	0.00	16.46	7.33	0.00	7.
EXT2	25.05	0.00	0.00	20.76	3.08	0.00	3.
EXT3&4	25.05	0.00	0.00	18.13	5.71	0.00	5.
EXT5	25.05	0.00	0.00	21.95	1.89	0.00	1.
EXT6	25.05	0.00	0.00	18.85	4.96	0.00	4.
EXT7	25.05	0.00	0.00	18.13	5.71	0.00	5.
S1	25.05	0.00	0.00	23.83	0.00	0.00	0.
S10	25.05	0.00	0.00	20.28	3.57	0.00	3.
S2	25.05	0.00	0.00	19.09	4.74	0.00	4.
S3	25.05	0.00	0.00	18.85	4.99	0.00	4.
S4	25.05	0.00	0.00	22.31	1.54	0.00	1.
S5	25.05	0.00	0.00	22.96	0.97	0.00	0.
S6	25.05	0.00	0.00	20.69	3.17	0.00	3.
S7	25.05	0.00	0.00	19.09	4.74	0.00	4.
S9	25.05	0.00	0.00	19.09	4.74	0.00	4.

****
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
J1	JUNCTION	0.05	0.55	244.98	0 02:00	0.55
J10	JUNCTION	0.42	0.99	245.01	0 01:50	0.99
J3	JUNCTION	0.54	1.11	245.12	0 01:39	1.11
J4	JUNCTION	0.51	1.15	245.20	0 01:37	1.15
J5	JUNCTION	0.52	1.21	245.41	0 01:35	1.21
J6	JUNCTION	0.53	1.17	245.35	0 01:36	1.17
J7	JUNCTION	0.27	0.97	245.53	0 01:35	0.97
J8	JUNCTION	0.51	1.22	244.85	0 01:50	1.22
J9	JUNCTION	0.53	1.23	244.84	0 01:50	1.23
OF2	JUNCTION	0.26	0.94	245.63	0 01:33	0.93
OF3	JUNCTION	0.36	0.92	245.01	0 01:50	0.92
ST1	JUNCTION	0.01	0.18	246.25	0 01:28	0.18
ST6	JUNCTION	0.01	0.24	245.64	0 01:32	0.24
ST7	JUNCTION	0.01	0.40	245.63	0 01:33	0.40
OF1	OUTFALL	0.33	1.03	244.79	0 01:50	1.03
SU1	STORAGE	0.11	0.58	245.02	0 02:34	0.58

****
Node Inflow Summary
****

	Maximum Lateral Inflow	Maximum Total Inflow	Time of Max Occurrence	Lateral Inflow Volume	Total Inflow Volume	Fl Balan Err

Node	Type	CMS	CMS	days	hr:min	10^6 ltr	10^6 ltr	Perce
J1	JUNCTION	0.000	0.030	0	02:43	0	0.699	-0.0
J10	JUNCTION	0.000	0.846	0	01:43	0	15	0.5
J3	JUNCTION	0.000	1.159	0	01:35	0	14.4	0.0
J4	JUNCTION	0.000	1.167	0	01:34	0	14.4	-0.1
J5	JUNCTION	0.000	1.065	0	01:33	0	14	0.1
J6	JUNCTION	0.246	1.196	0	01:32	0.36	14.4	0.1
J7	JUNCTION	0.029	1.149	0	01:30	0.0332	14.1	0.3
J8	JUNCTION	0.531	1.042	0	01:46	1.34	16.3	0.5
J9	JUNCTION	0.000	1.018	0	01:49	0	16.2	0.0
OF2	JUNCTION	1.163	1.206	0	01:28	14	14.1	0.0
OF3	JUNCTION	0.080	1.140	0	01:37	0.0918	15.2	0.7
ST1	JUNCTION	0.062	0.062	0	01:25	0.102	0.102	2.7
ST6	JUNCTION	0.000	0.055	0	01:29	0	0.0989	-2.3
ST7	JUNCTION	0.000	0.047	0	01:27	0	0.102	-0.2
OF1	OUTFALL	0.000	1.017	0	01:50	0	16.2	0.0
SU1	STORAGE	0.380	0.380	0	01:25	0.701	0.701	0.0

****
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	Maxi Outf
SU1	0.088	4	0	0	0.529	24	0 02:34	0.

****
Outfall Loading Summary
****

Outfall Node	Flow Freq Pcnt	Avg Flow CMS	Max Flow CMS	Total Volume 10^6 ltr
OF1	98.48	0.099	1.017	16.200
System	98.48	0.099	1.017	16.200

****
Link Flow Summary
****

Link	Type	Maximum |Flow| CMS	Time of Max Occurrence days	hr:min	Maximum |Veloc| m/sec	Max/ Full Flow	Max/ Full Depth
C1	CONDUIT	0.031	0	02:43	0.64	0.11	0.95
C10	CHANNEL	1.119	0	01:37	0.42	0.09	0.34
C11	CONDUIT	1.159	0	01:35	0.93	0.87	0.72
C12	CHANNEL	1.167	0	01:34	0.51	0.14	0.40
C13	CONDUIT	1.061	0	01:34	0.79	1.17	0.76
C14	CHANNEL	1.135	0	01:30	0.45	0.16	0.43
C15	CHANNEL	1.065	0	01:33	0.47	0.10	0.35
C3	CONDUIT	0.055	0	01:29	0.98	0.32	0.41
C4	CONDUIT	0.047	0	01:27	0.59	0.17	0.51
C5	CONDUIT	0.050	0	01:33	0.53	0.21	0.68
C6	CONDUIT	1.018	0	01:49	0.40	0.39	0.76
C7	CHANNEL	1.017	0	01:50	0.37	0.13	0.44
C8	CHANNEL	0.846	0	01:43	0.18	0.07	0.44
C9	CHANNEL	0.794	0	01:51	0.32	0.08	0.40
W3	CHANNEL	0.000	0	00:00	0.00	0.00	0.00
OR1	ORIFICE	0.018	0	04:37			1.00
OR2	WEIR	0.017	0	02:34			0.10
W1	WEIR	0.000	0	00:00			0.00

****
Flow Classification Summary
****

Conduit	Adjusted /Actual Length	Fraction of Time in Flow Class: Dry	Up Dry	Down Dry	Sub Crit	Sup Crit	Up Crit	Down Crit	Norm Ltd	Inlet Ctrl
C1	1.00	0.00	0.00	0.00	0.74	0.00	0.00	0.25	0.57	0.00
C10	1.00	0.00	0.01	0.00	0.99	0.00	0.00	0.00	0.90	0.00
C11	1.00	0.01	0.00	0.00	0.99	0.00	0.00	0.00	0.00	0.00
C12	1.00	0.00	0.00	0.00	0.99	0.00	0.00	0.01	0.00	0.00
C13	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
C14	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.89	0.00
C15	1.00	0.00	0.00	0.00	0.99	0.00	0.00	0.01	0.00	0.00
C3	1.00	0.00	0.00	0.00	0.01	0.00	0.00	0.99	0.01	0.00
C4	1.00	0.00	0.00	0.00	0.02	0.00	0.00	0.98	0.01	0.00
C5	1.00	0.00	0.00	0.00	0.02	0.00	0.00	0.98	0.00	0.00
C6	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
C7	1.00	0.01	0.00	0.00	0.99	0.00	0.00	0.00	0.40	0.00
C8	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
C9	1.00	0.01	0.00	0.00	0.98	0.00	0.00	0.00	0.00	0.00
W3	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

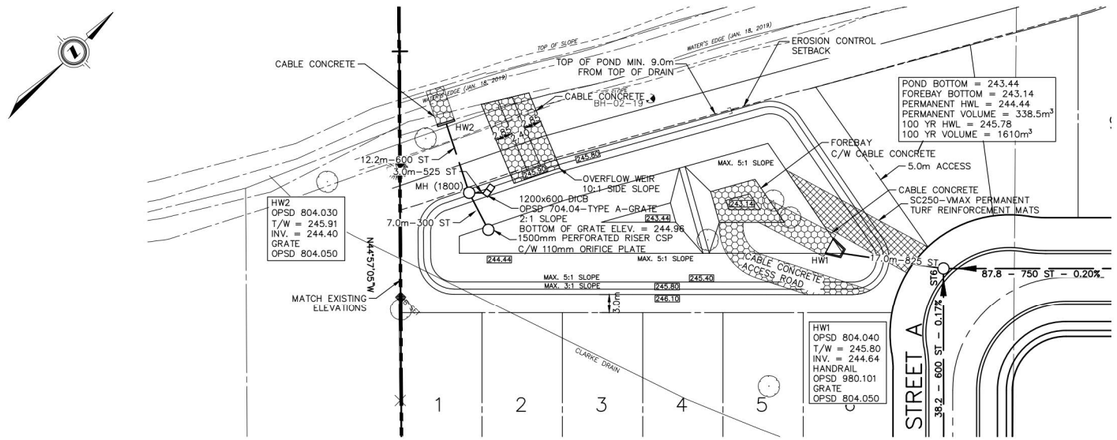
****
Conduit Surcharge Summary
****

Conduit	Hours Full: Both Ends	Upstream	Dnstream	Hours Above Full Normal Flow	Hours Capacity Limited
C1	0.01	0.01	0.18	0.01	0.01
C13	0.01	0.01	0.01	0.22	0.01

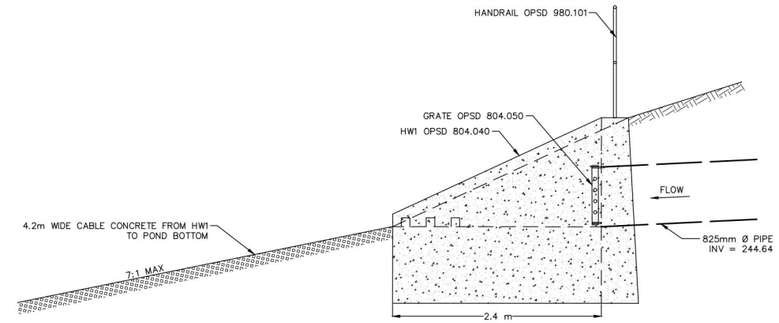
```
Analysis begun on:  Fri Feb  5 14:11:31 2021
Analysis ended on:  Fri Feb  5 14:11:33 2021
Total elapsed time: 00:00:02
```

Appendix D

Pond Section Drawing

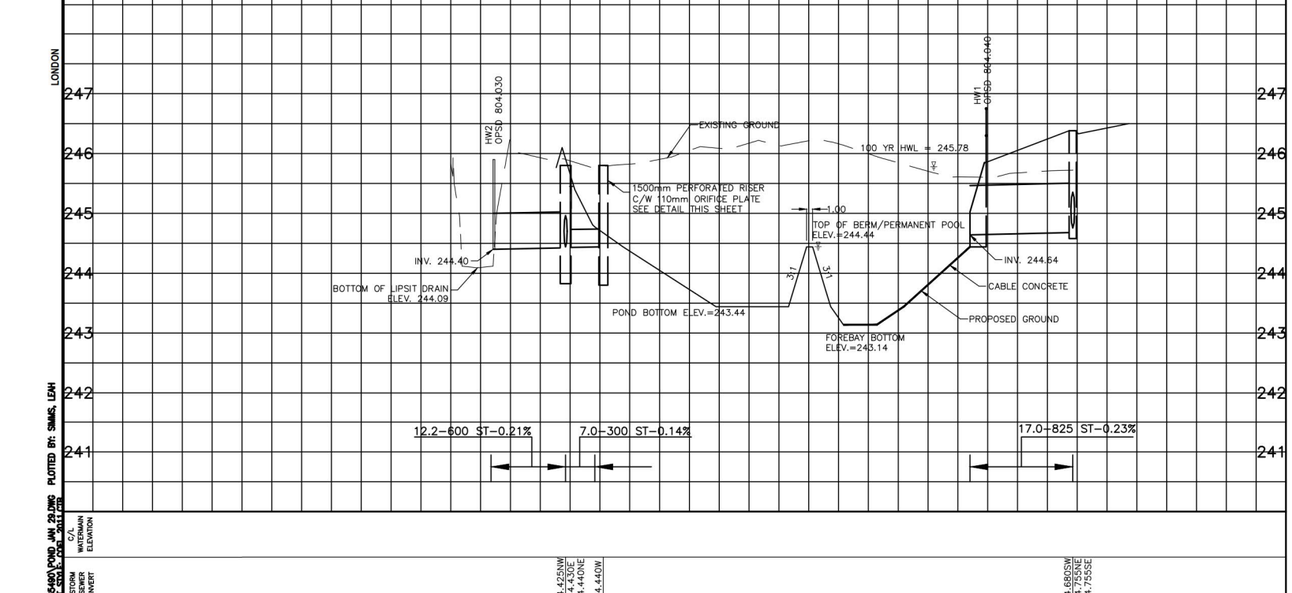


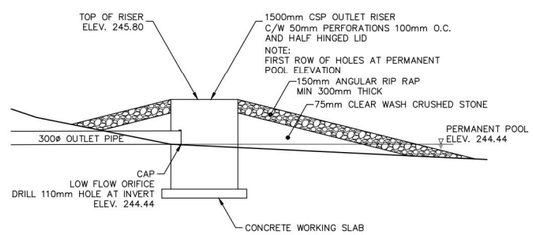
SWM FACILITY



HW1 DETAIL

SCALE N.T.S.





RISER DETAIL

SCALE N.T.S.

Conditions of Use

Verify elevations and/or dimensions on drawing prior to use. Report any discrepancies to Dillon Consulting Limited.

Do not scale dimensions from drawing.

Do not modify drawing, re-use it, or use it for purposes other than those intended at the time of its preparation without prior written permission from Dillon Consulting Limited.

DILLON CONSULTING

No.	ISSUED FOR	DATE	BY

DESIGN	REVIEWED BY
DS	NE
DRAWN	CHECKED BY
LS	NE
DATE	DECEMBER 2020
SCALE	H 500 V 50

TIMBERVIEW SUBDIVISION

PROJECT NO. 18-8995

SWM FACILITY & DETAILS

SHEET NO. 01

Appendix E

Forebay Calculations

SWMF - Water Quality Requirements

Drainage Area	3.74	ha
% Impervious:	58.00	
Level 2 protection (70%TSS):		
Treatment Volume	114	m^3/ha
Active Storage:	40	m^3/ha
	150	m^3
Perm Storage:	74	m^3/ha required
	277	m^3

Notes:

Input

Output

SWMF - Required Forebay Length

Length to width ratio of forebay, r = 2.0:1

Peak outflow (25 mm storm), Q_p = 0.031 m^3/s (24hr ext. det)

Target particle size = 150 mm

Settling velocity, V_s = 0.0003 m/s

Forebay Settling Length, Dist 1

$$Dist = \sqrt{\frac{rQ_p}{V_s}}$$

14 m

Forebay Dispersion Length, Dist 2

Desired velocity in forebay, V_f = 0.5 m/s

Peak inlet flowrate , *Q5* (Model, 5yr 3h Chicago storm) = 0.600 m^3/s

Depth in forebay, d = 0.7 m

$$Dist_2 = \frac{8Q}{dV_f}$$

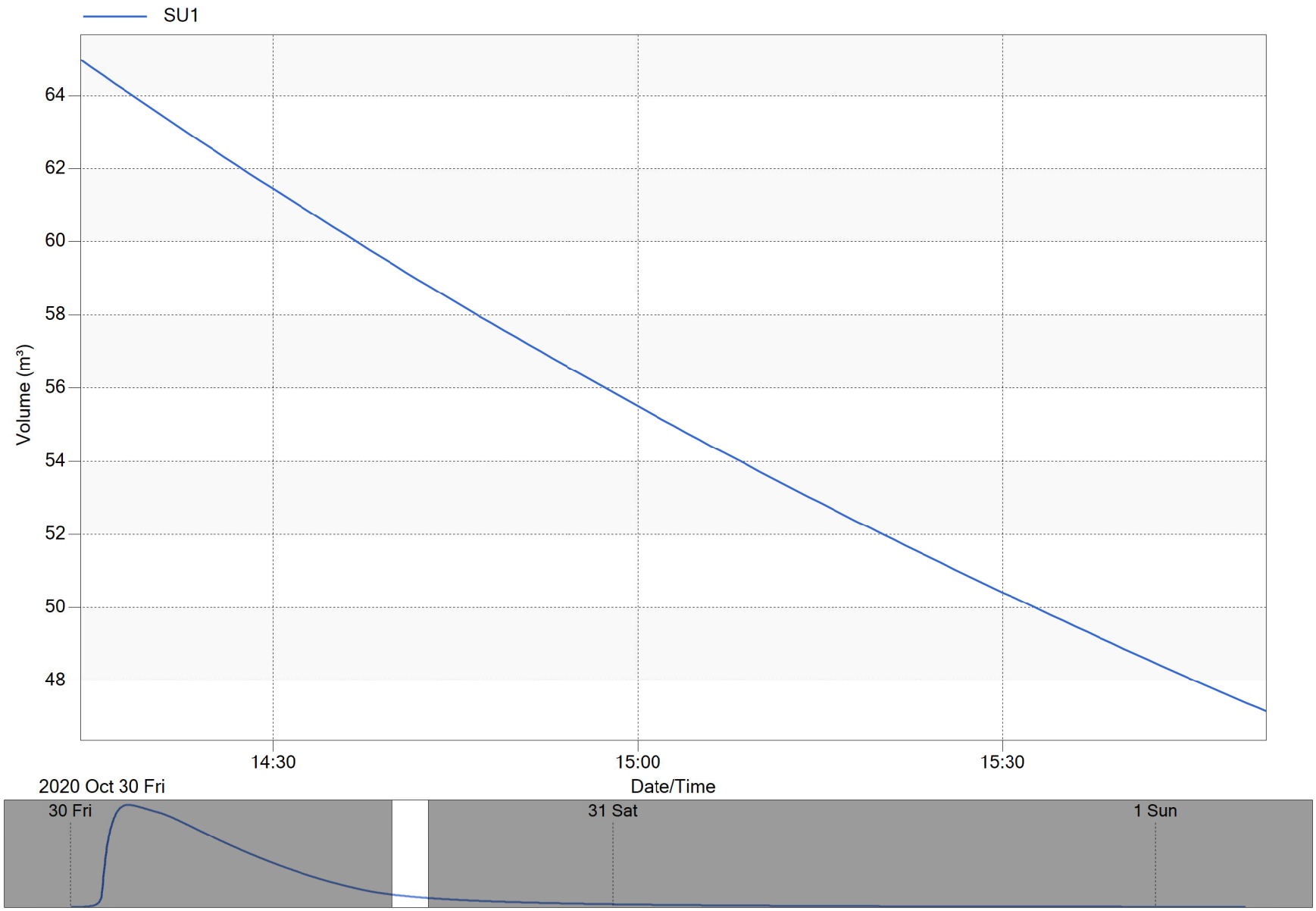
14 m

Therefore, the settling length of 14 m governs the design.

Provided Length: 26 **m**

Appendix F

Drawdown Graph


SU1
64
62
60
58
56
54
52
50
48
Volume (m³)
14:30
15:00
15:30
2020 Oct 30 Fri
Date/Time
30 Fri
31 Sat
1 Sun