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3200 Reid's Lane Subdivision

Conceptual Servicing and Stormwater Management Report

Prepared for: Crestview Innovation Inc.

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CONCEPTUAL SERVICING AND STORMWATER MANAGEMENT REPORT

3200 REID'S LANE SUBDIVISION

CITY OF OTTAWA

Prepared by:

NOVATECH
240 Michael Cowpland Dr. Suite 200
Ottawa, Ontario
K2M 1P6

Revised July 2025
Revised November 2024
Revised June 2023
September 2021

Novatech File No.: 119089
Report Reference No.: R-2021-060

NOVATECH
Engineers, Planners & Landscape Architects

July 11, 2025

BY EMAIL

City of Ottawa
Development Review, Planning, Real Estate and
Economic Development Department
110 Laurier Ave. West, 4th Floor
Ottawa ON, K1P 1J1

Attention: Kevin Hall, C.E.T., Senior Project Manager

Re: Conceptual Servicing and Stormwater Management Report
Reid's Lane Subdivision
Response to Comments
Our File No.: 119089

Please find enclosed the revised "*Conceptual Servicing and Stormwater Management Report – Reid's Lane Subdivision*" dated July 2025, prepared in support of an application for Draft Plan Approval.

This report has been updated based on comments received from the City of Ottawa (February 28, 2025). The comments are included in **Appendix A**.

Yours truly,

NOVATECH

Lisa Bowley, P. Eng.
Senior Project Manager
Land Development Engineering

Encl.

cc: Crestview Innovation Inc.

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Digital Files: Stormwater Management Modelling Files (PCSWMM)

1.0 INTRODUCTION

Novatech has been retained to provide a conceptual servicing and stormwater management report in support of an application for Draft Plan Approval for the proposed Reid's Lane subdivision.

1.1 Purpose

This report outlines the approach to servicing the development with regards to water supply, sanitary disposal, storm drainage and stormwater management. A pre-consultation meeting was held with the City of Ottawa in May 2019. Pre-consultation notes (May 16, 2019, and May 28, 2019) are included in **Appendix A** for reference.

This report has been updated based on comments received from the City of Ottawa (February 28, 2025). The comments are included in **Appendix A**

1.2 Site Location and Description

The Subject Property is located in the City of Ottawa. The subdivision lands are legally described as Part of Lots 27 & 28, Concession 1, Osgoode, and Part of Lots 50 & 51, Registered Plan 393, Ottawa. The property includes a portion of an adjacent eastern parcel that has been used historically as an informal walking trail connecting Osgoode Main Street and Lombardy Drive. The adjacent eastern parcel is legally described as Part of Lot 28, Concession 1, being parts 3 and 4 on Plan 5R1527, Osgoode. Refer to **Figure 1** for the site location.

The subdivision has approximately 22-metres of frontage along Lombardy Drive, and an approximate area of 3.54hectares (8.75acres). The property is vacant and located north of existing residential properties fronting onto Osgoode Main Street. Refer to **Figure 2** for existing site conditions.

1.3 Additional Reports

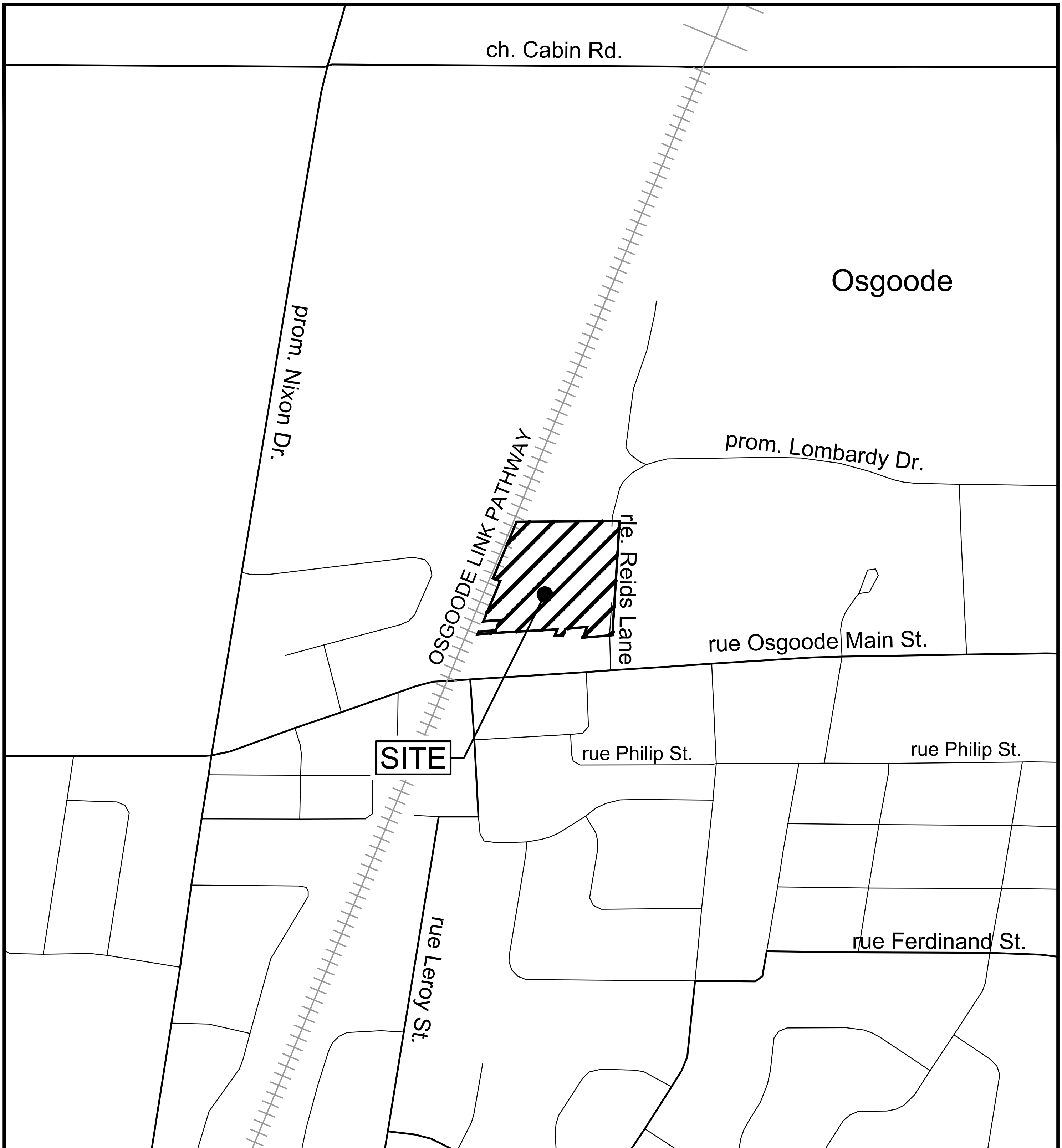
This report should be read in conjunction with the following reports:

- Tree Conservation Report and Environmental Impact Statement - Updated prepared by Muncaster Environmental Planning Inc., dated July 19, 2024;
- Hydrogeological Investigation and Terrain Evaluation prepared by Kollaard Associates, revision 2, dated June 12, 2024.

2.0 SITE SERVICING

The proposed development would extend Lombardy Drive approximately 240m from the existing cul-de-sac and would create seven residential lots with a minimum lot size of 0.4ha (1 acre). The proposed lots would front onto a proposed internal roadway (Lombardy Drive extension). Refer to the Preliminary Grading & Site Servicing Plan **(119089-PGR)** for the Typical Road Cross-Section of the proposed internal roadway.

The proposed lot layout is shown on the Draft Plan of Subdivision included with this report.



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REID'S LANE SUBDIVISION

KEY PLAN

SCALE 1 : 5000 (0, 50, 100, 150, 200)

DATE	JOB	FIGURE
JUL 2025	119089	1

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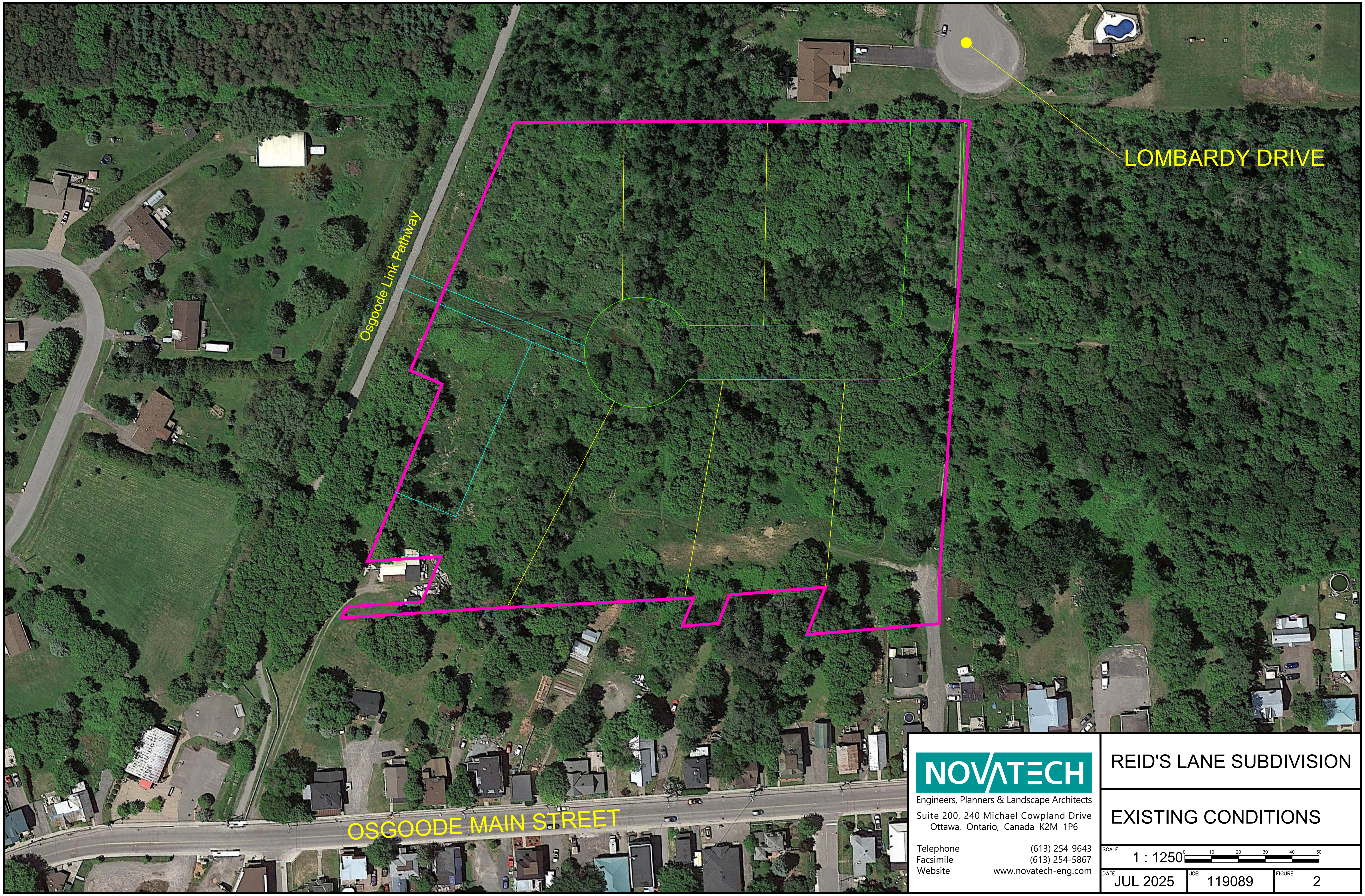

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REID'S LANE SUBDIVISION

EXISTING CONDITIONS

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

DATE JUL 2025 | JOB 119089 | FIGURE 2

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2.1 Grading and Drainage

The proposed grading would have minimum slopes, where possible. The tree retention areas suggested in the Tree Conservation Report and Environmental Impact Statement would remain in a natural state.

Preliminary road grades are shown on the Preliminary Grading & Site Servicing Plan (**119089-PGR**).

2.2 Water Supply and Sewage Disposal

The proposed residential lots would be serviced by individual drilled wells. Discussion of the water supply is provided in the Hydrogeological Investigation and Terrain Evaluation prepared by Kollaard.

Sanitary servicing for the proposed residential dwellings would be provided by individual on-site septic systems. Preliminary septic system locations and recommendations regarding construction of the septic systems have been provided in the Hydrogeological Investigation and Terrain Evaluation. Applications for approvals of the septic systems would be made by individual homeowners at the building permit stage.

Conceptual locations of the well and septic systems are shown on the Lot Development Plan provided in the Kollaard report, for all proposed lots within the subdivision.

3.0 STORMWATER MANAGEMENT CRITERIA

The following criteria will be applied to the stormwater management analysis and conceptual design.

<u>Water Quantity</u>

- Control post-development peak flows to pre-development levels.

<u>Conveyance</u>

- Road and driveway culverts are to be designed to convey the anticipated post-development peak flows:
  - Road crossing culverts are to have a minimum size of 600mm and are to be sized for the 10-year event.
  - Driveway culverts are to have a minimum size of 400mm and are to be sized for the 5-year event.
- Storm drainage is to be provided using roadside ditches and side/rearyard drainage swales:
  - Storm runoff for all storms up to and including the 100-year event is to be confined within the right-of-ways or within defined drainage easements.

<u>Water Quality</u>

- Implement lot-level and conveyance Best Management Practices.
- Provide an *Enhanced* level of water quality protection, corresponding to a long-term average total suspended solid (TSS) removal rate of 80%.

Flood Protection

- Ensure the proposed residential lots are adequately protected from surface flooding during the 100-year storm event.
- Ensure there are no adverse surface flooding effects on existing downstream residential lots during the 100-year storm event.

Erosion and Sediment Control

- Provide temporary and permanent erosion and sediment control measures prior to, during and after construction.

4.0 STORMWATER MANAGEMENT DESIGN

Pre-development and post-development drainage areas were developed to assess the stormwater management design requirements for the subject site. The Storm Drainage Area Plan (**119089-STM**) shows the catchment areas for both pre- and post-development conditions.

As described by Kollaard, the soils on the site consist of topsoil underlain by fine to medium grained sand overlying silty clays or glacial tills.

In a previous submission of the Conceptual Servicing and Stormwater Management report (September 2021), the majority of the runoff in the post-development condition was directed to the Lombardy Drive roadside ditches. This design results in post-development flows from the overall site being lower than pre-development flows, however, there was an increase in flows directed to the Lombardy Drive roadside ditches. This raised concerns for the capacity of the roadside ditches along Lombardy Drive and the potential for impacts further downstream.

This design approach has been revised to result in no increase in flows to either site outlet (Lombard Drive roadside ditches or Osgoode Link Pathway ditch), as discussed below.

Pre-development conditions

Under pre-development conditions, all storm runoff from the site is tributary to the Doyle Creek Municipal Drain and ultimately the Rideau River.

- The west portion of the site (area EX-1) drains to an existing ditch along the Osgoode Link Pathway
- The east portion of the site (area EX-2) drains to the Lombardy Drive roadside ditches

Storm runoff from both catchment areas (EX-1 and EX-2) is conveyed north by existing drainage ditches to the main branch of the Doyle Creek Municipal Drain.

Post-development conditions

Under post-development conditions, the drainage of the proposed development has been designed to closely match pre-development conditions. The west portion (4.41 ha) of the developed area of the subdivision will drain to the Osgoode Link Pathway and runoff will be controlled to pre-development levels through a dry pond and outlet structure. The outlet of the dry pond will be conveyed under the Osgoode Link Pathway via a proposed culvert to the west ditch across the pathway. This ditch will convey flows to Nixon Drive roadside ditch and connect into the Doyle Creek Municipal Drain.

The east portion (0.34 ha) of the subdivision will drain uncontrolled to the Lombardy Drive roadside ditches. The uncontrolled flows to the Lombardy Drive roadside ditches will be lower than pre-development flows. The two drainage outlets are shown on **Figure 3**.

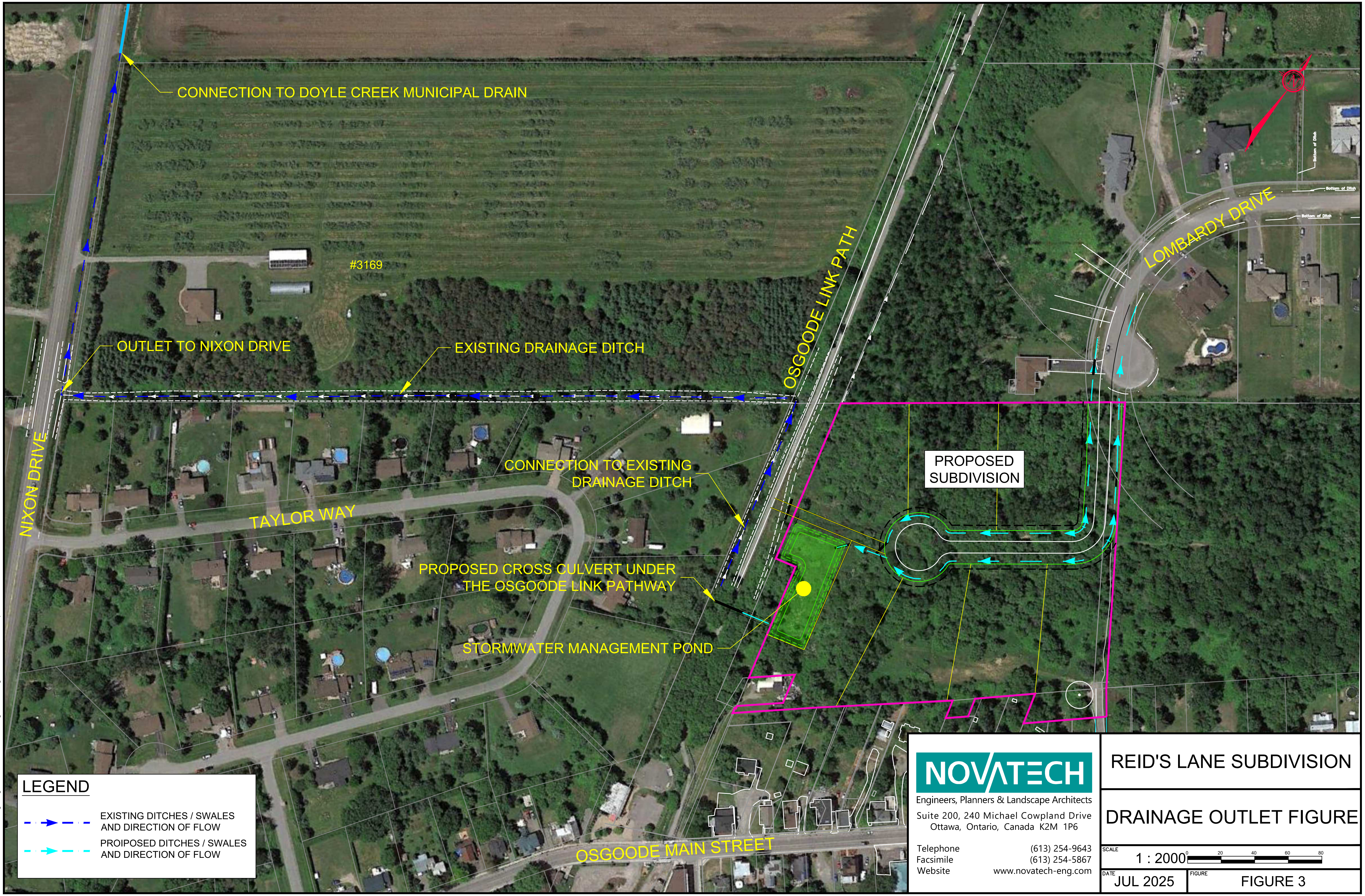
4.1 Model Parameters

The proposed rural subdivision was modelled using NASH instantaneous unit hydrograph (IUH) Alternate Runoff Method (ARM) subcatchments in PCSWMM. The ARM subcatchments generate a more conservative runoff volume from more pervious drainage areas. Due to the pre-development area being forested and the post-development conditions having large lots and tree protection areas, it was concluded that NASH IUH ARM subcatchments would be appropriate for the pre- and post-development PCSWMM models.

The time of concentration for each drainage area was calculated using the Uplands Overland Flow Method. Weighted curve numbers were calculated for each drainage area. The times of concentration, curve numbers and initial abstraction values are summarized in **Table 1**. The curve numbers are shown on the Storm Drainage Area Plan.

Table 1 – Weighted Curve Numbers

Area ID	Area (ha)	Time of Concentration (min)	CN	I_a
Pre-Development				
EX-1	3.31	16	59	13.9
EX-2	1.44	15	62	12.5
Post-Development				
A	1.12	15	65	11.8
B	0.48	15	58	13.8
C	0.20	15	57	14.9
D	0.48	15	62	13.0
E	0.52	15	67	11.0
F	0.22	15	68	10.8
G	0.11	15	69	10.4
H	0.43	15	62	12.8
EX-1	0.23	15	72	7.4
EX-2	0.48	15	75	6.4
EX-3	0.48	15	72	7.4



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Downstream Boundary

The Osgoode Link Pathway west ditch receives flows from an upstream storm sewer from Osgoode Main Street that outlets at a headwall approximately 50m upstream of the culvert under the pathway. GeoOttawa mapping shows this outlet pipe is a 750mm diameter sewer. Full flow of this pipe was estimated using Manning's Equation and following information:

- Diameter (nominal size) = 750mm
- Diameter (actual size) = 762mm
- Estimated Slope = 0.5%
- Manning's n = 0.013
- Full Flow = 821 L/s

The flows from this pipe were used to assign a baseflow in the ditch to account for backwater effects from ditch that would impact the proposed dry pond. Based on the age of the upstream drainage area (residential development developed before 2012), it is assumed that the sewer was sized for 80% capacity in the 5-year event. Based average model results in the pre- and post-development PCSWMM models, the 25mm storm event subcatchment peak flows are less than 5% of the 100-year peak flows. **Table 2** lists the baseflows used in the PCSWMM models.

Table 2 – Osgoode Link pathway West Ditch Baseflows

Storm Event	Condition	Flow (L/s)
25mm	5% full flow	**41**
2-year	80% full flow	657
5-year	80% full flow	657
100-year	100% full flow	821
100-year + 20%	100% full flow	821

4.2 Water Quantity Control

Peak flows for both pre- and post-development conditions were evaluated using the PCSWMM model. Storm runoff from the subdivision will increase under post-development conditions due to an increase in imperviousness (i.e. roads, houses and driveways).

Under post-development conditions, the peak flow from the west portion of the site would be controlled by using a stormwater management dry pond with a flow control structure outletting to the Osgoode Link Pathway. A 500mm diameter culvert with a 0.5% slope will have the capacity to convey the peak runoff from the dry pond under the Osgoode Link Pathway. The ditch that will convey the runoff to the Nixon Drive roadside ditch and connect into the Doyle Creek Municipal Drain has adequate capacity for the peak flows from the controlled pond. A profile of the proposed culvert and cross-sections of the Osgoode Link Pathway ditch can be found on the Stormwater Management Pond Facility plan (**119089-SWMF**) and the Preliminary Grading & Site Servicing Plan (**119089-PGR**).

Additional quantity control, upstream of the dry pond, will be provided by 400mm diameter driveway culverts, which are smaller than the City of Ottawa minimum size of 500mm diameter. The driveways will not overtop in the 100-year storm event even with the smaller culverts and the flows will be contained within the 0.60m deep ditches.

The drainage areas that outlet to the Lombardy Drive roadside ditches has been reduced so that the post-development runoff is less than pre-development levels and therefore, no stormwater quantity control is required for this outlet.

Refer to **Appendix B** for supporting stormwater management calculations and model output. Digital PCSWMM modelling files are available upon request with this submission.

Peak Flows

Pre- and post-development peak flows are summarized in **Table 3**.

- The 12-hour SCS storm event generated larger peak flows for both pre- and post-development conditions, and results in the highest HGLs in the roadside ditches.
- The sizing of the flow control structure was governed by the 24-hour SCS storm event due to a larger volume of runoff maximum required storage in the dry pond.

Table 3 demonstrates that the post-development flows to both Osgoode Link Pathway ditch and Lombardy Drive roadside ditches would be lower than pre-development levels for all storm events.

Table 3 – Peak Flows (L/s)

Storm Distribution->		**4hr Chicago**	**3hr Chicago**			**12hr SCS**			**24hr SCS**		
Return Period->		**25mm**	**2yr**	**5yr**	**100yr**	**2yr**	**5yr**	**100yr**	**2yr**	**5yr**	**100yr**
Osgoode Link Pathway[1]	*Pre*	45	670	693	974	682	715	1,011	683	709	972
	Post [2]	56	696	746	1,127	718	778	1,165	711	757	1,080
	Post [3]	46	662	677	928	675	701	979	679	705	972
Lombardy Drive	*Pre*	2	8	21	81	14	31	96	14	27	74
	Post [2]	1	3	7	33	5	10	42	4	8	25
Total	*Pre*	47	678	714	1,055	696	746	1,107	697	736	1,046
	Post	47	665	684	961	680	711	1,021	683	713	997

[1] Includes upstream baseflows from the 750mm sewer from Osgoode Main Street
[2] Uncontrolled flow
[3] Controlled flow

Osgoode Link Pathway Ditch Water Levels

There were concerns that the additional flows from the proposed development to the Osgoode Link Pathway west ditch and Taylor Way ditch would cause flooding issues for the Taylor Way rear yards. The highest post-development water levels result during the 24-hours SCS storm event due to maximum pond outflows during this event (largest required pond volumes). The additional flows from the pond to the Taylor Way ditch only result in an increase of 2 to 3cm within the Osgoode Link Pathway west ditch and Taylor Way ditch. A comparison of the Osgoode Link Pathway west ditch water levels between pre- and post-development is provided in **Table 4**. Any ditch sections where these HGLs are of concern to the Taylor Way rear yards are also an issue in the pre-development scenario.

Table 4 – Osgoode Link Pathway West Ditch HGLs (100-year 24-hour SCS Storm Event)

Pre-Development		Post-Development		Difference (m)
PCSWMM ID	**HGL (m)**	**PCSWMM ID**	**HGL (m)**	
J01	90.61	J34	90.64	0.03
J02	90.46	J35	90.49	0.03
J03	90.37	J36	90.40	0.03
J04	90.27	J37	90.29	0.02
J05	90.11	J38	90.14	0.03
J06	90.06	J39	90.09	0.03
J07	89.89	J40	89.92	0.03
J08	89.74	J41	89.76	0.02
OF-TaylorWay	88.82	OF-TaylorWay	88.84	0.02

Outlet to Osgoode Link Pathway Ditch

The conceptual PCSWMM model indicates that the stormwater management dry pond in addition to the proposed roadside ditches would provide storage to contain the runoff from all storms up to and including the 100-year event. The post-development peak flows would be controlled by a flow control structure at the outlet of the dry pond.

Runoff will inlet into the pond from the cul-de-sac roadside ditches via a 500mm diameter culvert with a 1.6% slope.

A brief description of the dry pond layout is as follows:

- Bottom of Low Flow Swale = 90.35m
- Pond Bottom (side slopes) = 90.40m
- Top of Pond = 91.20m
- Total Depth = 0.85m
- Total Available Volume = 953 m^3

The 100-year 24-Hour SCS storm event produces the maximum pond storage volume:

- 100-year Elevation = 90.96m
- 100-year Depth = 0.61m
- 100-year Volume = 618 m^3
- 100-year Outflow = 118 L/s
- 100-year Freeboard = 0.24m

The control structure would be located on the west side of the dry pond at the outlet, with access from Block 8 and the Osgoode Link Pathway. The outlet structure will consist of a low flow orifice in a ditch inlet catchbasin with larger flows controlled by a weir. The emergency overflow spillway will be incorporated into the weir and would provide relief for storm events exceeding the 100-year event. The outlet structure consists of the following stages:

- Low Flow Orifice (25mm event)
  - Invert = 90.35m
  - Diameter = 100mm

- High Flow Weir (2-year to 100-year)
  - Invert = 90.60m
  - Width = 0.30m
- Emergency Spillway
  - Invert = 90.96m
  - Width = 5.2m
  - Side slopes = 5H:1V

The location of the dry pond is shown on the Preliminary Grading & Site Servicing Plan (**119089-PGR**). The details on the design of the dry pond and flow control structure are provided on the Stormwater Management Pond Facility plans (**119089-SWMF** and **119089-SWMF1**).

In addition to the proposed dry pond and control structure, Best Management Practices (BMPs) and Low Impact Development (LIDs) practices (refer to **Section 4.6**) would further reduce the post-development runoff. These practices are not typically modelled during the conceptual design stage but could be added to the modelling during detailed design.

Outlet to Lombardy Drive Roadside Ditches

The conceptual PCSWMM model shows that the uncontrolled post-development runoff to the Lombardy Drive roadside ditches is below the pre-development peak flows for all storm events. No controls are required or proposed for the outlet to the Lombardy Drive roadside ditches. The proposed roadside ditches would convey the 100-year flows from the site between the east and west ditches.

4.3 Water Quality Control

The Rideau Valley Conservation Authority has indicated that an *Enhanced* level water quality control (corresponding to a long-term average TSS removal rate of 80%) is required for this subdivision. Quality control for the right-of-way and the front yard areas of the residential units would be provided by a combination of lot-level "Best Management Practices" (BMPs) and conveyance controls.

Lot-level BMPs would include minimizing grade changes on the lots, minimizing the disturbed area on each lot and encouraging builders to direct roof leaders to grassed areas. These practices would promote infiltration and reduce surface runoff. A treatment train approach of these BMP measures in addition to the dry pond and the grassed ditches would provide adequate treatment of the runoff. The proposed subdivision would be located on a cul-de-sac and would receive local traffic, reducing pollutant loading from the roadways. The large lots and minimal disturbance to the lots would also reduce the sediment loading from the development.

4.3.1 Dry Pond Design Criteria

As per Table 3.2 of the "*Stormwater Management Planning and Design Manual*" (MOE, March 2003), dry pond can provide 60% TSS removal. A drainage area that is 35% impervious (the proposed development is less than 35% impervious) would require 90 m^3/ha of storage. This would be a required storage volume of 399 m^3, which is less than the required 100-year volume. Table 4.8 of the "*Stormwater Management Planning and Design Manual*" (MOE, March 2003) requires a drawdown time between 24 to 48 hours for sediment settling. The 25mm event would drawdown over the course of 6 hours. This drawdown time is caused by the small drainage area to the dry pond and the low flow orifice size of 100mm. Due to clogging concerns, the low flow orifice is the smallest recommended by the City of Ottawa in SWM ponds.

4.3.2 Grassed Swale Design Criteria

The roadside ditches would be designed as water quality swales, using criteria outlined in section 4.5.9 of the "*Stormwater Management Planning and Design Manual*" (MOE, March 2003). The design criteria used is summarized in **Table 5**.

Table 5 – Water Quality Design Criteria for Grassed Swales

Criteria	**Recommended**	**Provided**
Drainage Area	< 2.0 ha	0.11 – 1.2 ha
Channel Slope	< 4.0%	0.5% - 1.0%
Bottom Width	> 0.75 m	1.0m
Side Slopes (H:V)	> 2.5:1	3:1
25mm Event (Water Quality)		
Velocity	< 0.5 m/s	Maximum of 0.23 m /s in ditches (up to 0.72 m/s through culverts)

Although grassed ditches and swales are generally used for the conveyance of storm water, under the appropriate conditions they permit significant amounts of total suspended solid (TSS) removal. Grassed ditches are effective for treatment when the bottom width is maximized while the depth of flow and channel slope is minimized.

<u>Grassed Swale Design (Roadside Ditches)</u>

All ditches projected to drain the roadway and upstream external areas meet the criteria listed in **Table 5**. The PCSWMM model results indicate that the peak flows generated by the 25mm storm event (water quality event) would have a maximum velocity less than 0.5m/s in the ditches.

The MOE Manual states that "*Grassed swales are most effective for stormwater treatment when depth of flow is minimized, bottom width is maximized (≥ 0.75 m) and channel slope is minimized (e.g., ≤ 1%)*". The depth of flow in the ditches during the 25mm event would range from 0 to 0.15m. Most of the ditch length would have a flow depth of less than 0.1m. The larger flow depths would occur at the upstream side of driveway culvert crossings and at the inlet to the proposed dry pond. The ditch bottom width would be 1.0m and the channel slope would be 0.5%.
Water quality calculations for each ditch would be provided as part of the detailed design submission. The conceptual model results demonstrate that it would be feasible to design the proposed ditches and swales to provide an *Enhanced* level of water quality treatment for the site.

<u>Maintenance and Effectiveness</u>

Case studies on the effectiveness of grassed ditches and swales for water quality control have provided variable results, which precludes the ability to precisely calculate pollutant removal efficiencies. However, the above referenced publications indicate that properly designed grassed channels can provide in excess of 80% long-term TSS removal, which will meet the requirements for an *Enhanced* level of quality control as per the MOE guidelines.

Both dry and wet swales demonstrate good pollutant removal, with dry swales providing significantly better performance for metals and nitrate. Dry swales typically remove 65 percent of total phosphorus

(TP), 50 percent of total nitrogen (TN), and between 80 and 90 percent of metals. Wet swale removal rates are closer to 20 percent of TP, 40 percent of TN, and between 40 and 70 percent of metals. The total suspended solids (TSS) removal for both swale types is typically between 80 and 90 percent.[1]

The majority of contaminants would come from the right-of-way. Storm runoff from grassed areas does not typically require any quality treatment. The site grading and drainage system would be designed to minimize the drainage area to the roadside ditches and individual outlets to provide the requisite level of treatment. Treatment is based on the flow characteristics of the water quality storm event (25mm storm), namely the flow depth and velocity. The other recommended criteria in **Table 4** form recommended physical characteristics for a given swale based on a 35% catchment area imperviousness to achieve those flow characteristics. It is equally worth noting that the proposed site is substantially less impervious than the 35% which was used to populate the recommended physical design criteria for the grassed swale, therefore, TSS loading is anticipated to be quite low.

4.4 Flood Protection

The following items would be evaluated at the detailed design stage:

- The proposed roadside ditches/easements would be designed to convey runoff for storm events up to and including the 1:100 year event.
- Road and driveway culverts would be sized to minimize potential flooding of private property for all storms up to the 1:100 year event.
- All required quantity control storage would be provided in the roadside ditches and would be confined in the right-of-way and/or adjacent easements.
- Terrace elevations would be set a minimum of 0.3m above the 1:100year ponding elevation.

4.5 Erosion Control (Watershed)

CLI-ECA for stormwater appendix A requires Erosion Control for watersheds to be evaluated. Based on the information available for the proposed development area, it is understood that at a minimum the runoff volume generated from the 25mm storm event should be detained over 24 to 48 hours.

Based on the proposed development, the 25mm event will be detained within the SWM pond and outlet over the course of 6 hours. This drawdown time is less than recommended in the CLI-ECA and is due to the small drainage area to the dry pond and the low flow orifice size of 100mm. Due to clogging concerns, the low flow orifice is the smallest recommended by the City of Ottawa in SWM ponds.

CLI-ECA requirements will be further evaluated at the Detailed Design and Construction approvals stage.

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[1] *Stormwater Best Management Practices in an Ultra-Urban Setting: Selection and Monitoring (FHWA, 1996) http://www.fhwa.dot.gov/environment/ultraurb/3fs10.htm*

4.6 Erosion and Sediment Control (Construction)

The following erosion and sediment control measures would be implemented during construction in accordance with the "Guidelines on Erosion and Sediment Control for Urban Construction Sites" (Government of Ontario, May 1987). These measures are generally in conformance with the recommendations from the Environmental Impact Statement. An Erosion and Sediment Control drawing would be prepared at the detailed design stage.

4.5.1 Temporary Measures

- Installing silt fences;
- Installing a series of rock flow check dams at the outlet(s) from the site; and
- Conducting regular street sweeping once the roads are completed.

The proposed temporary erosion and sediment control measures would be implemented prior to construction, would remain in place throughout each phase of construction and would be inspected regularly. Design drawings would indicate that no control measure be permanently removed without prior authorization from the Engineer.

4.5.2 Permanent Measures

- Swales and roadside ditches constructed at minimum grade, where possible;
- Seeding disturbed areas and establishing grass growth; and
- Roadside ditches acting as water quality swales.

4.7 Best Management Practices and Low Impact Development

In addition to stormwater management measures designed to meet the quantity and quality control criteria for the subdivision, additional best management practices (BMPs) and low impact development practices (LIDs) should be considered where feasible. Lot-level and conveyance stormwater BMPs and LIDs can potentially increase infiltration throughout the site, and help to preserve the natural hydrologic cycle, recharge groundwater reserves, reduce runoff volumes and peak flows, and further promote the removal of pollutants from the site.

Most LIDs require periodic inspection and maintenance. As such, the selection of appropriate LIDs requires careful consideration of site conditions (soil type, groundwater table, existing and proposed land use, maintenance requirements) to ensure they will provide a long-term benefit to the proposed development.

The preliminary geotechnical investigation shows that there is a shallow depth to groundwater, making BMPs and LIDs unlikely to infiltrate effectively. BMPs and LIDs could still provide some infiltration and runoff improvements to the proposed development. The evaluation and selection of LIDs would be further refined during the detailed design process.

Maintenance of LID infrastructure in right-of-way would be the responsibility of the City, while LIDs and BMPs on private property would be the responsibility of the homeowner.

5.0 WATER BALANCE

The proposed subdivision will consist of residential lots. Proposed BMPs and LIDs are discussed in **Section 4.6**.

By implementing infiltration BMPs and LIDs as part of the storm drainage design, the impacts of development on the hydrologic cycle can be considerably reduced. In addition, infiltration of clean runoff will also benefit the stormwater management. There are currently no infiltration targets set for the site.

A water budget was performed which is included in **Appendix C**. The water budget estimates the post-development annual infiltration will be 183mm, which is a 27mm decrease from the existing conditions estimate of 210mm. The water budget calculations are based on land use and the implementation of BMPs within the proposed development will provide additional infiltration and an improved water balance. The evaluation and selection of BMPs and LIDs would be completed during the detailed design process.

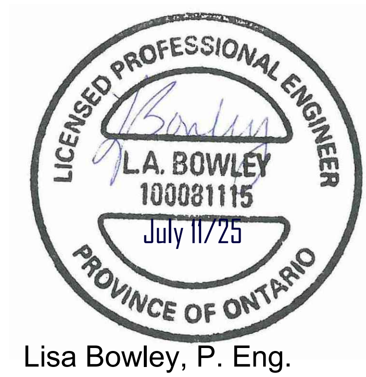
6.0 CONCLUSIONS

The conclusions are as follows:

- Servicing for residential dwellings would be provided by individual wells and septic systems.
- Stormwater quantity control measures would result in post-development peak flows below pre-development flows for the site.
  - Quantity control for flows directed to the Osgoode Link Pathway ditch would be provided by a dry pond and an outlet control structure.
  - By reducing the drainage area to Lombardy Drive roadside ditches under post-development conditions, the post-development runoff would be less than pre-development levels and no controls would be required.
- Stormwater quality control measures would provide an Enhanced level of water quality protection, corresponding to a long-term average TSS removal rate of 80%, by means of flat-bottomed roadside ditches which would act as water quality swales.
- Flood protection would be provided with 100-year storm runoff being contained within the roadside ditches. Terrace elevations would be set a minimum of 0.3m above the 1:100year ponding elevation.
- Erosion and sediment control would be provided both during construction and on a permanent basis.
- Best management practices and low impact development practices would be considered as part of the detailed design.
- The water balance shows that the proposed development would result in a 24mm decrease in infiltration.

NOVATECH

Prepared by:

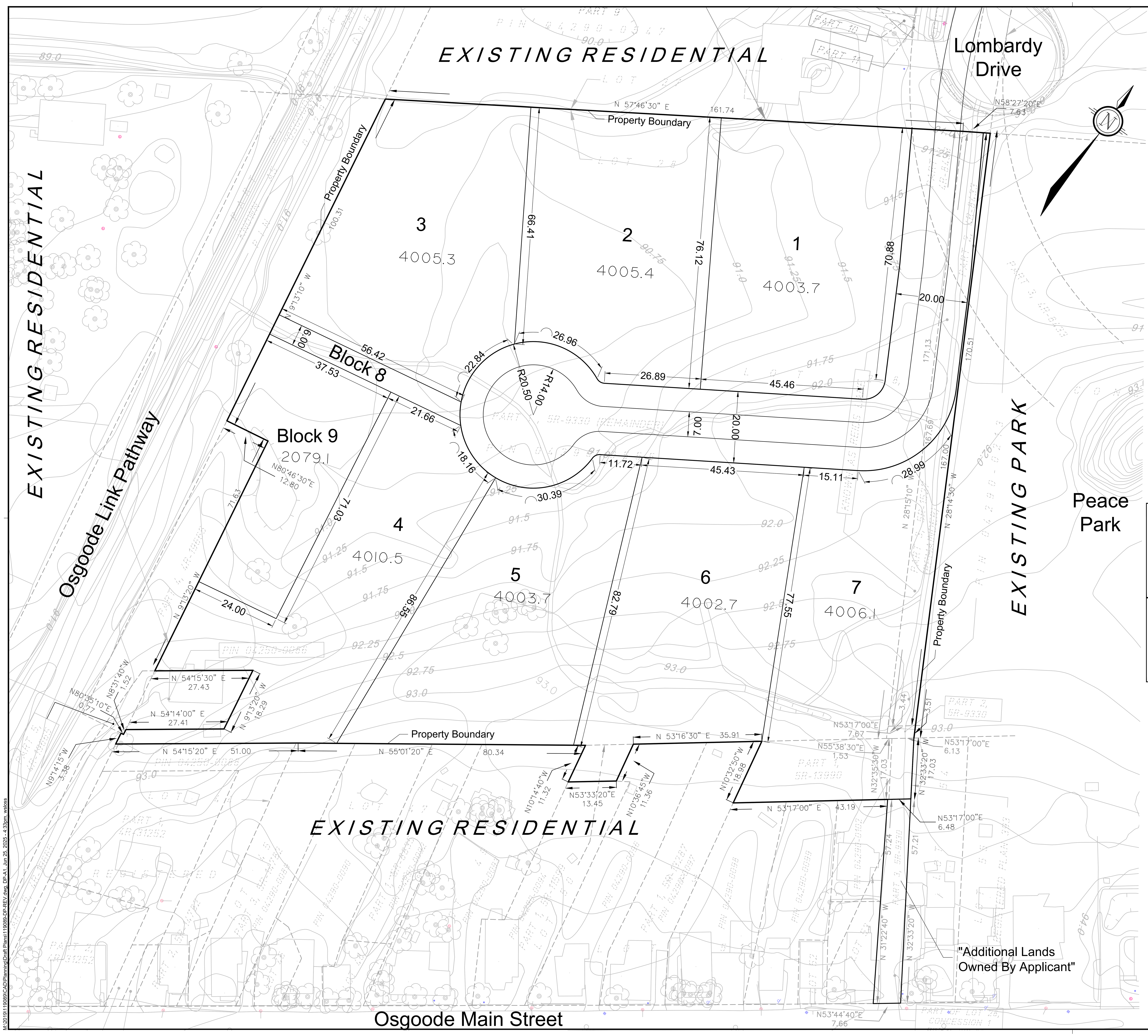


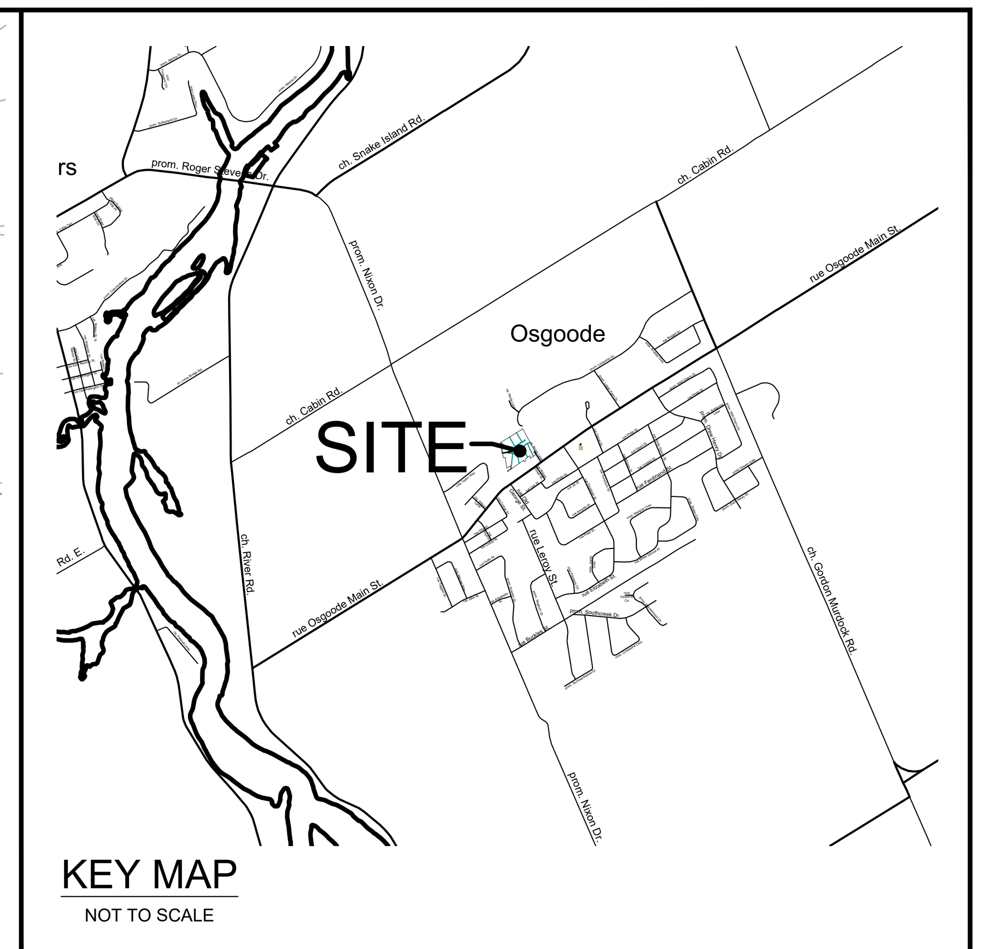
Melanie Schroeder, P.Eng.
Project Engineer
Water Resources

Lisa Bowley, P. Eng.
Project Manager
Land Development Engineering

Reviewed by:

Michael J. Petepiece, P.Eng.
Senior Project Manager
Water Resources





METRIC : MEASUREMENTS SHOWN ON THIS PLAN ARE IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048.

DRAFT PLAN OF SUBDIVISION OF
PART OF LOTS 27 & 28 CONCESSION 1
TOWNSHIP of OSGOODE
CITY OF OTTAWA

SCALE
1 : 500

DATE: JUNE, 2025

SURVEYOR'S CERTIFICATE

I HEREBY CERTIFY THAT THE BOUNDARIES OF THE LANDS TO BE SUBDIVIDED AND THEIR RELATIONSHIP TO ADJOINING LANDS ARE CORRECTLY SHOWN.

DATED ______________________

____
?surveyor name?
ONTARIO LAND SURVEYOR

FAIRHILL, MOFFATT & WOODLAND
ONTARIO LAND SURVEYORS

AA29500

OWNER'S CERTIFICATE

I/WE, ______________ ,BEING THE REGISTERED OWNER(S), HEREBY AUTHORIZE NOVATECH TO PREPARE AND SUBMIT THIS DRAFT PLAN OF SUBDIVISION TO THE CITY OF OTTAWA FOR REVIEW AND APPROVAL.

DATED ______________________

____
owner name

ADDITIONAL INFORMATION REQUIRED UNDER SECTION 51 (17) OF THE PLANNING ACT.

A) The boundaries of the land proposed to be subdivided, certified by an Ontario land Surveyor;
As shown on Draft Plan

B) The locations, widths & names of the proposed highways within the proposed subdivision & of existing highways on which the proposed subdivision abuts;
As shown on Draft Plan

C) On a small keyplan, on a scale of not less than 1cm to 100m, all of the land adjacent to the proposed subdivision that is owned by the applicant or in which the applicant has an interest, every subdivision adjacent to the proposed subdivision & the relationship of the boundaries of the land to be subdivided to the boundaries of the township lot of other original grant of which the land forms the whole part;
As Shown on Draft Plan

D) The purpose for which the proposed lots are to be used;
Residential shown on Draft Plan

E) The existing uses of all adjoining lands;
Residential and Open Space shown on Draft Plan

F) The approximate dimensions & layout of the proposed lots;
As shown on Draft Plan

F.1) if any affordable housing units are being proposed, the shape and dimensions of each proposed affordable housing unit and the approximate location of each proposed affordable housing unit in relation to other proposed residential units;
No affordable housing units are proposed

G) Natural & artificial features such as buildings or other structures or installations, railways, highways, watercources, drainage ditches, wetlands & wooded areas within or adjacent to the land proposed to be subdivided;
As shown on Draft Plan

H) The availability and nature of domestic water supplies;
Development will be supplied with individual drilled wells

I) The nature & porosity of the soil;
Please refer to Hydrogeological Investigation and Terrain Evaluation

J) Existing contours or elevations as may be required to determine the grade of the highways and the drainage of the land proposed to be subdivided;
Contours shown at 0.25 metre intervals on Draft Plan

K) The municipal services available or to be available to the land proposed to be subdivided;
Development will not be supplied with municipal services

L) The nature & extent of any restrictions affecting the land proposed to be subdivided, including restrictive covenants or easements. 1994, c. 23, s. 30; 1996, c. 4, s. 28 (3); 2016, c. 25, Sched. 4, s. 8 (1).;
As shown on Draft Plan.

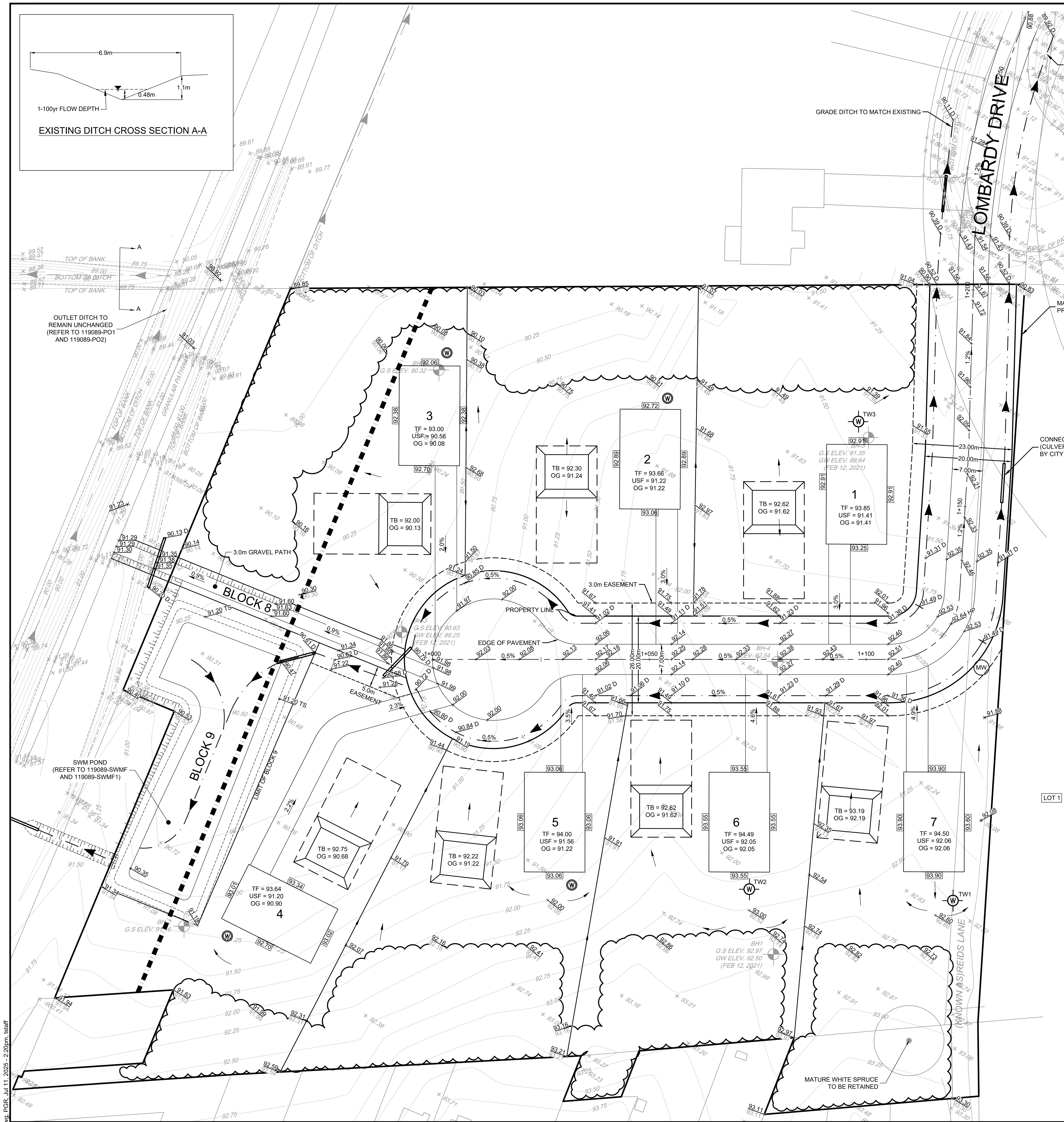
REID'S LANE SUBDIVISION

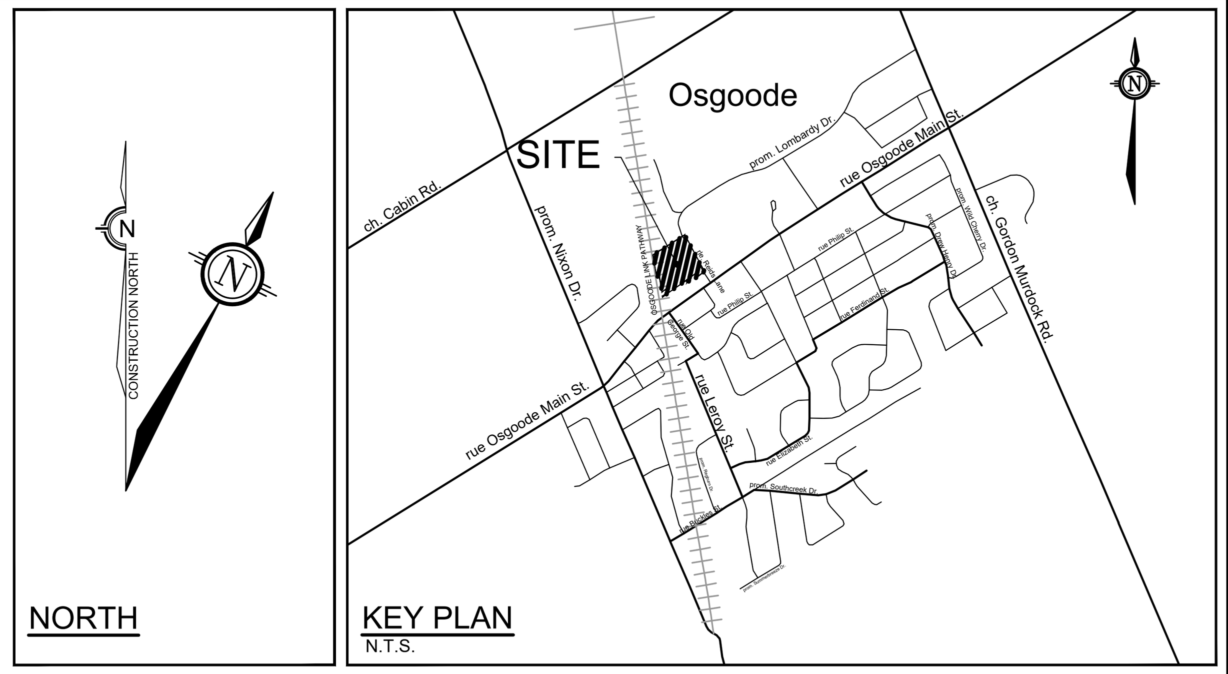
NOVATECH
Engineers, Planners & Landscape Architects
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada K2M 1P6
Telephone (613) 254-9643
Facsimile (613) 254-5867
Website www.novatech-eng.com

PROJECT No. 119089

Dxx-xx-xx-xxxx

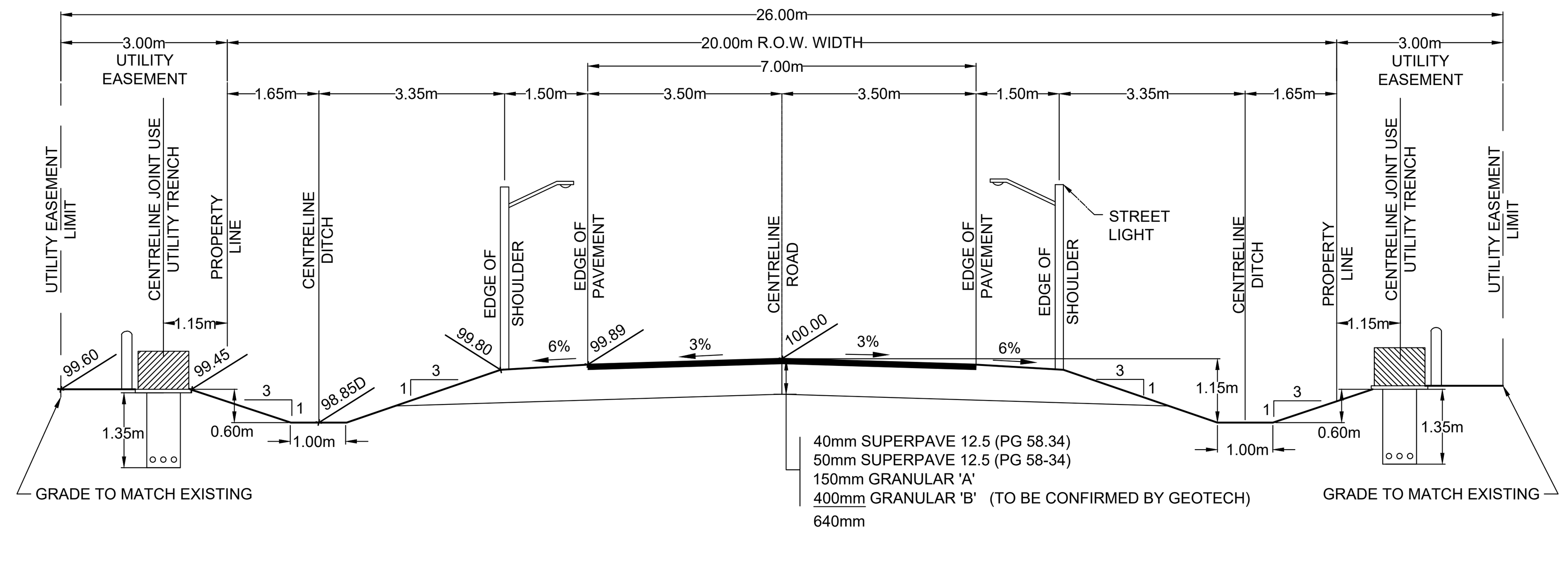
#xxxxx





LEGEND

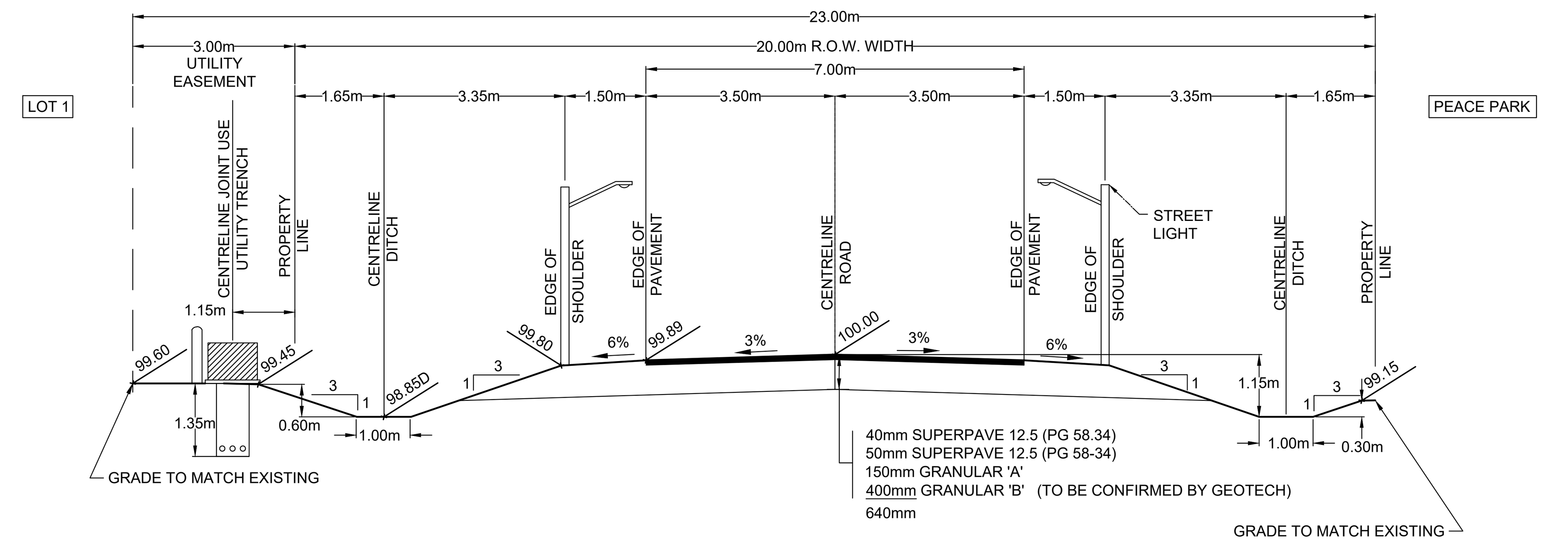
	PROPERTY LINE
	30m SETBACK FROM THE OSGOODE LINK PATHWAY
	℄ DITCH AND DIRECTION OF FLOW
92.10 / 92.02	PROPOSED ELEVATION / EXISTING ELEVATION
92.53	PROPOSED ELEVATION
90.97D	PROPOSED DITCH ELEVATION
0.50%	GRADE AND DIRECTION
	PROPOSED DIRECTION OF OVERLAND FLOW
BH-1 G.S. ELEV. 91.35 GW ELEV. 89.64	BOREHOLE NUMBER, INFORMATION AND APPROXIMATE LOCATION (PROVIDED BY KOLLAARD ASSOCIATES, MARCH 9, 2021)
	PROPOSED CULVERT
TW1	TEST WELL LOCATION AND NUMBER
MW	PROPOSED MONITORING WELL
W	PROPOSED WELL
	PROPOSED HOUSE FOOTPRINT ($320m^2$ / 3400 ft^2)
	PROPOSED SEPTIC ENVELOPE - 3000L/day (REFER TO HYDROGEOLOGICAL INVESTIGATION AND TERRAIN ANALYSIS REPORT PREPARED BY KOLLAARD - MARCH 17, 2025
	PROPOSED TREE RETENTION LIMITS (REFER TO MUNCASTER STATEMENT)



TYPICAL CROSS SECTION - 20.0m ROW
STA. 1+035 TO 1+122

SCALE 1:100

NOTES: 1. ELEVATIONS SHOWN ARE ASSUMED
2. CROSS-SECTION TO BE VIEWED LOOKING UP CHAINAGE



TYPICAL CROSS SECTION - 20.0m ROW
STA 1+122 TO 1+250

SCALE 1:100

NOTES: 1. ELEVATIONS SHOWN ARE ASSUMED
2. CROSS-SECTION TO BE VIEWED LOOKING UP CHAINAGE

SOURCE REFERENCE:

LEGAL INFORMATION:

CITY OF OTTAWA LEGAL PLANS 5R-9330, 5R-13990, 4R-17009, 4R-20040 AND 4R-19665

TOPOGRAPHIC INFORMATION:

- FAIRHALL MOFFATT & WOOLAND LIMITED (208-1 OSGOODE) PART OF LOTS 27 & 28 CONCESSION 1 (OSGOODE) AND PART OF LOTS 50 & 51 REGISTERED PLAN 393 / NOVEMBER 5, 2020 / MTM ZONE 9 (NAD83 ORIGINAL)
- FAIRHALL MOFFATT & WOOLAND LIMITED / OUTLET DITCH SURVEY / OCTOBER 29, 2024 / MTM ZONE 9 (NAD83 ORIGINAL)

NOTE:
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No.	REVISION	DATE	BY
10.	REVISED PER CITY COMMENTS	JUL 11/25	TGS
9.	ISSUED FOR COORDINATION	JUL 9/25	TGS
8.	REVISED PER CITY COMMENTS	NOV 13/24	RJK
7.	ISSUED FOR COORDINATION	JUNE 27/24	RJK
6.	ISSUED WITH REVISED CONCEPTUAL SWM REPORT	JUN 01/23	LAB
5.	ISSUED FOR COORDINATION	JUNE 13/22	LAB
4.	ISSUED FOR COORDINATION	MAY 5/22	LAB
3.	REVISED PER CITY COMMENTS	OCT 20/21	LAB
2.	ISSUED TO CITY OF OTTAWA	OCT 05/21	LAB
1.	ISSUED WITH CONCEPTUAL SWM REPORT	SEPT 03/21	LAB

SCALE 1:500

DESIGN	TGS
CHECKED	LAB
DRAWN	TGS
CHECKED	LAB
APPROVED	JLS

FOR REVIEW ONLY

LICENSED PROFESSIONAL ENGINEER
L.A. BOWLEY
100081115
July 11/25
PROVINCE OF ONTARIO

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

LOCATION
CITY OF OTTAWA
REID'S LANE SUBDIVISION

DRAWING NAME
PRELIMINARY GRADING & SITE SERVICING PLAN

PROJECT No. 119089
REV # 10
DRAWING No. 119089-PGR

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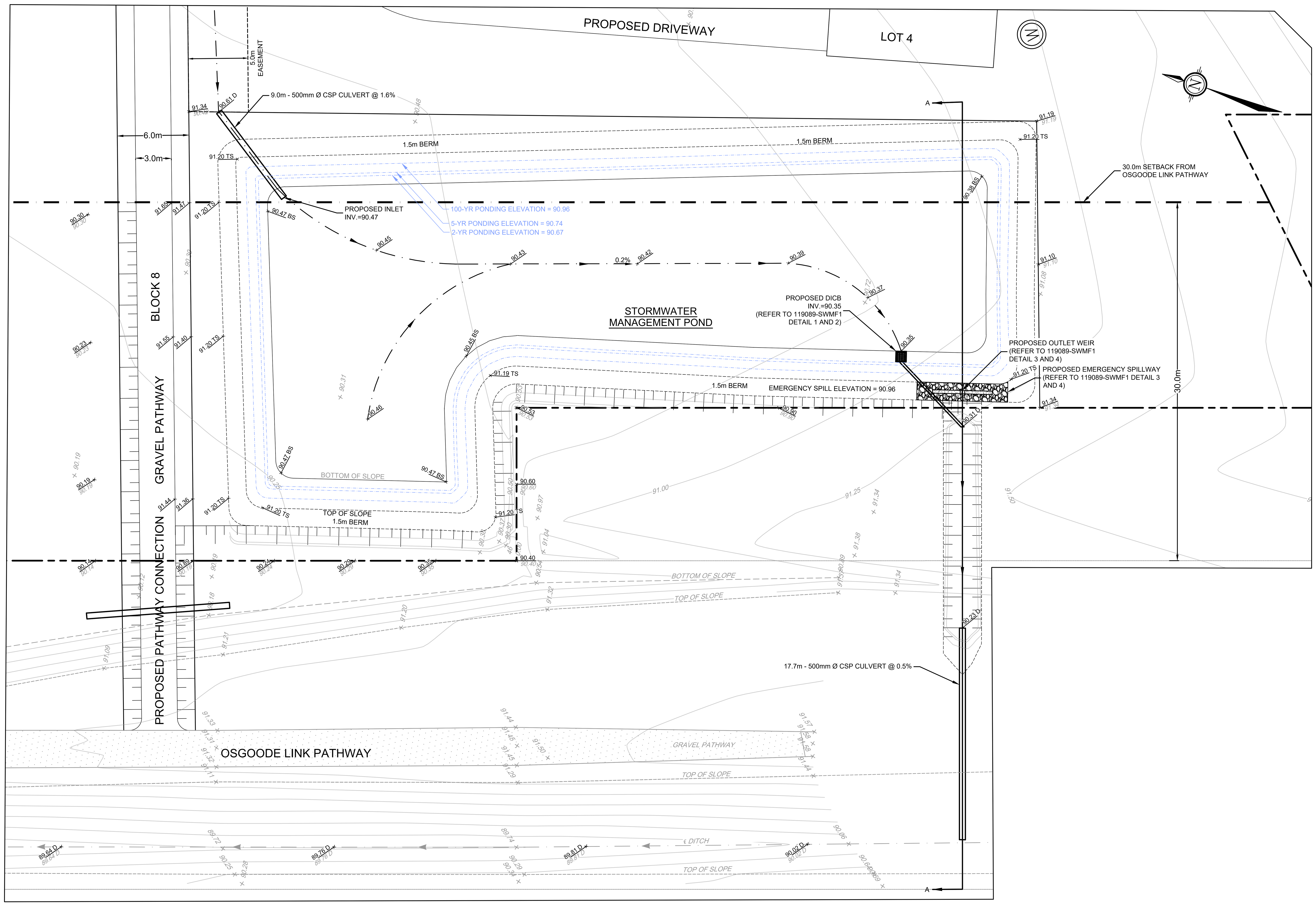
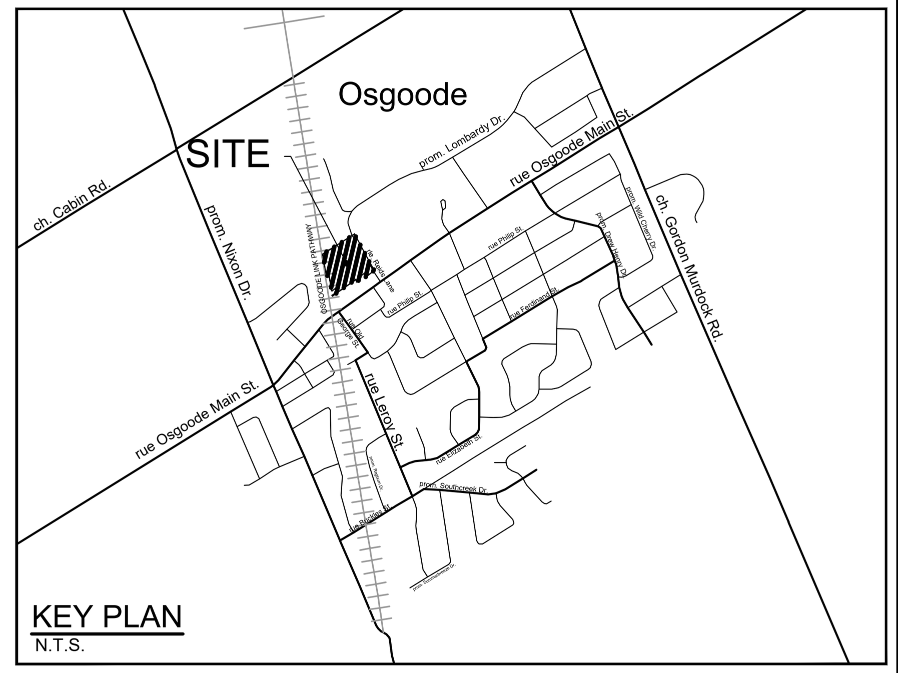
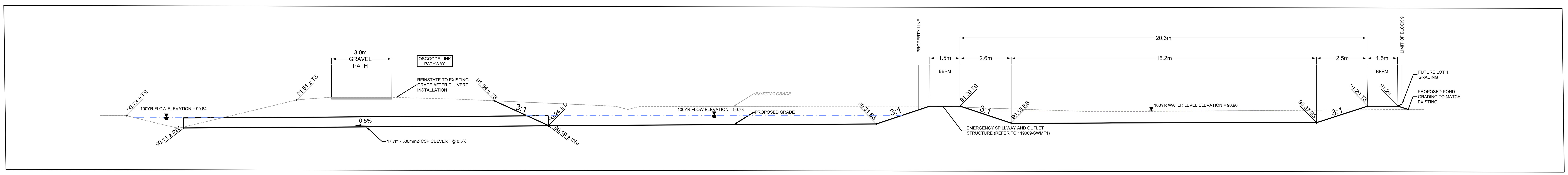


SWM POND PLAN
SCALE 1:200



LEGEND

(line)	PROPERTY LINE
(line)	30m SETBACK FROM THE OSGOODE LINK PATHWAY
(line)	℄ DITCH AND DIRECTION OF FLOW
92.10 / 92.02 EXISTING ELEVATION	PROPOSED ELEVATION
90.97 D	PROPOSED DITCH ELEVATION
91.00 TS	PROPOSED TOP OF SLOPE ELEVATION
90.40 BS	PROPOSED BOTTOM OF SLOPE ELEVATION
(symbol)	PROPOSED TERRACING (3:1 MAX)



SWM POND CROSS SECTION SECTION A-A
SCALE 1:100

NOTE:
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SOURCE REFERENCE:
LEGAL INFORMATION:
CITY OF OTTAWA LEGAL PLANS 5R-9330, 5R-13990, 4R-17009, 4R-20040 AND 4R-19665
TOPOGRAPHIC INFORMATION:
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- FAIRHALL MOFFATT & WOOLAND LIMITED / OUTLET DITCH SURVEY / OCTOBER 29, 2024 / MTM ZONE 9 (NAD83 ORIGINAL)

No.	REVISION	DATE	BY
3.	REVISED PER CITY COMMENTS	JUL 11/25	TGS
2.	REVISED PER CITY COMMENTS	NOV 13/24	RJK
1.	ISSUED FOR DISCUSSION	MAR 29/22	LAB

SCALE: AS SHOWN

DESIGN: MLS
CHECKED: LAB
DRAWN: TGS
CHECKED: LAB
APPROVED: MJP

FOR REVIEW ONLY

LICENSED PROFESSIONAL ENGINEER M. L. SCHROEDER 100213677 July 11, 2025 PROVINCE OF ONTARIO

LICENSED PROFESSIONAL ENGINEER M.J. PETEPIECE 100079354 PROVINCE OF ONTARIO

NOVATECH
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LOCATION
CITY OF OTTAWA
REID'S LANE SUBDIVISION

DRAWING NAME
STORMWATER MANAGEMENT POND FACILITY

PROJECT No. 119089
REV: REV # 3
DRAWING No. 119089-SWMF

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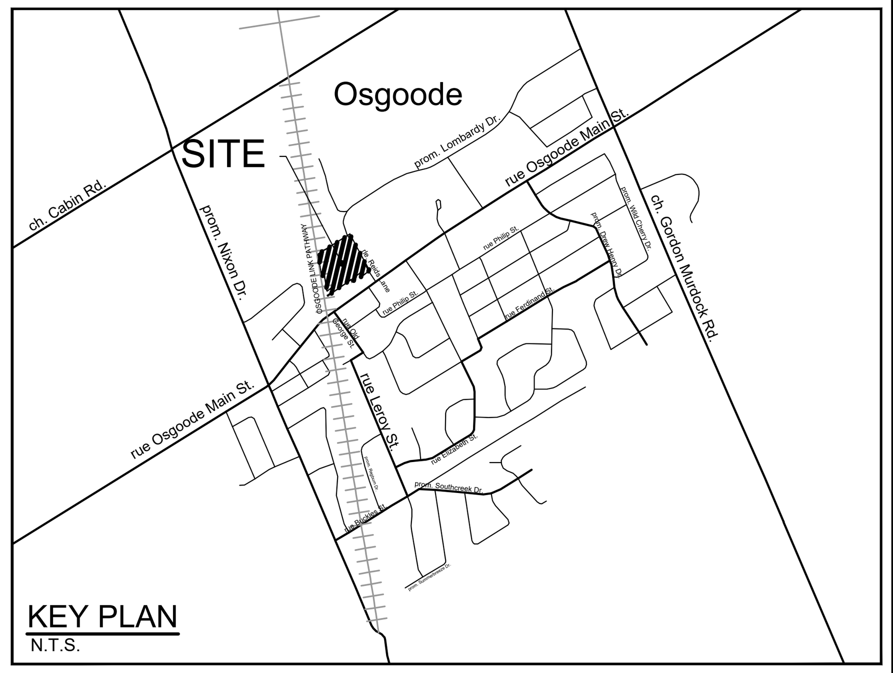
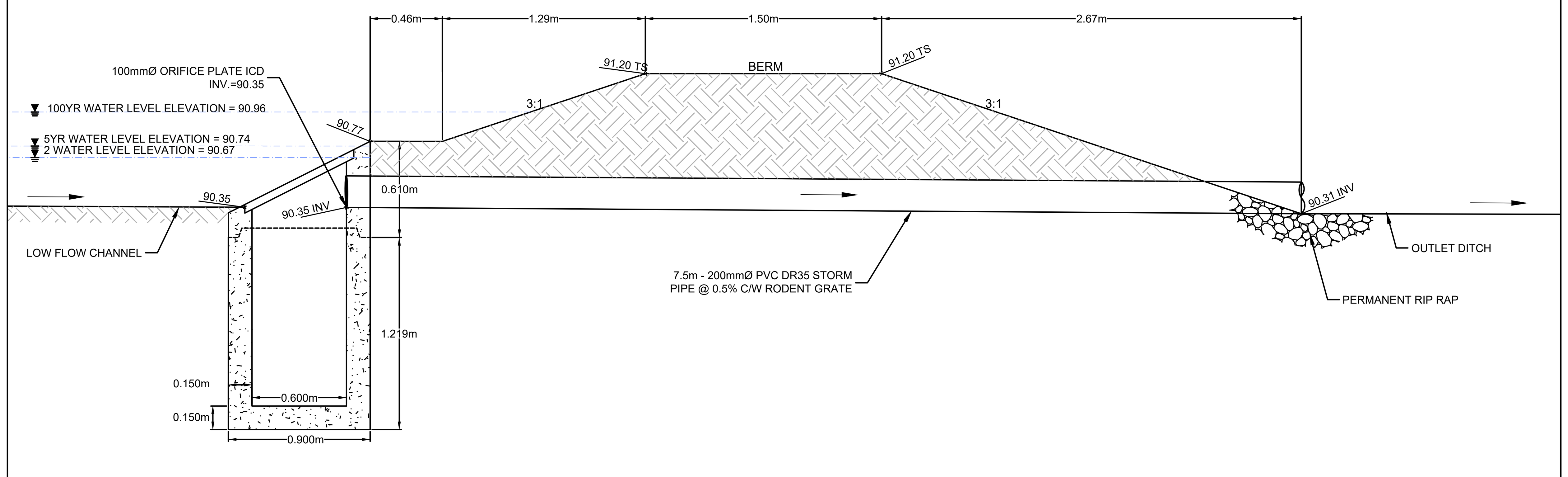
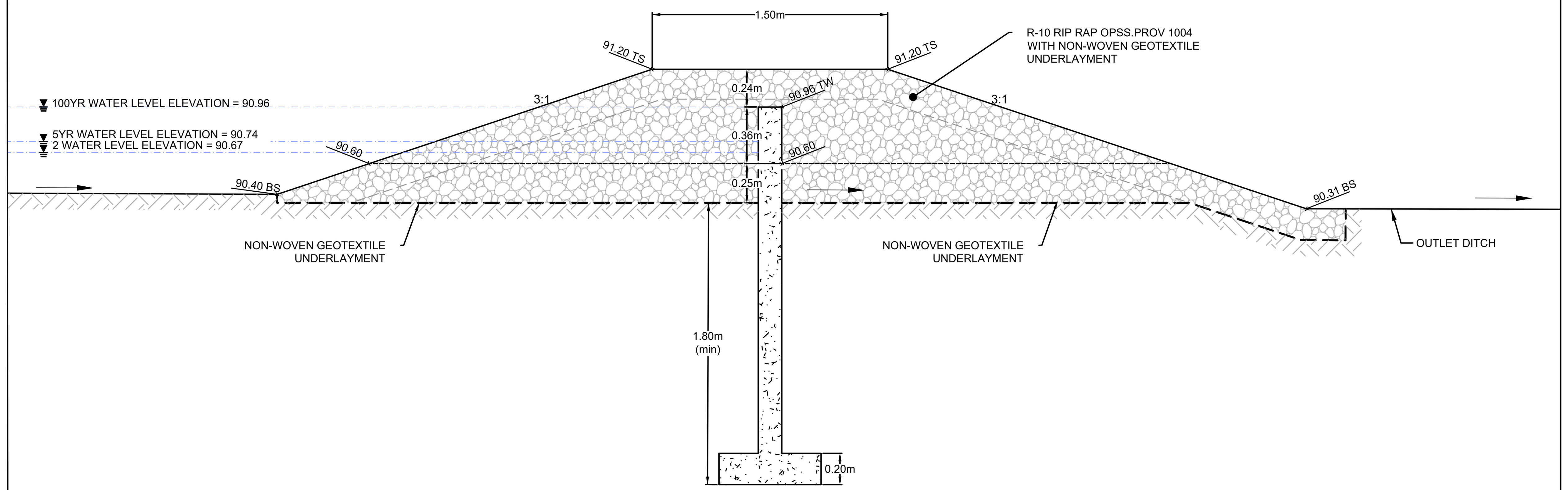




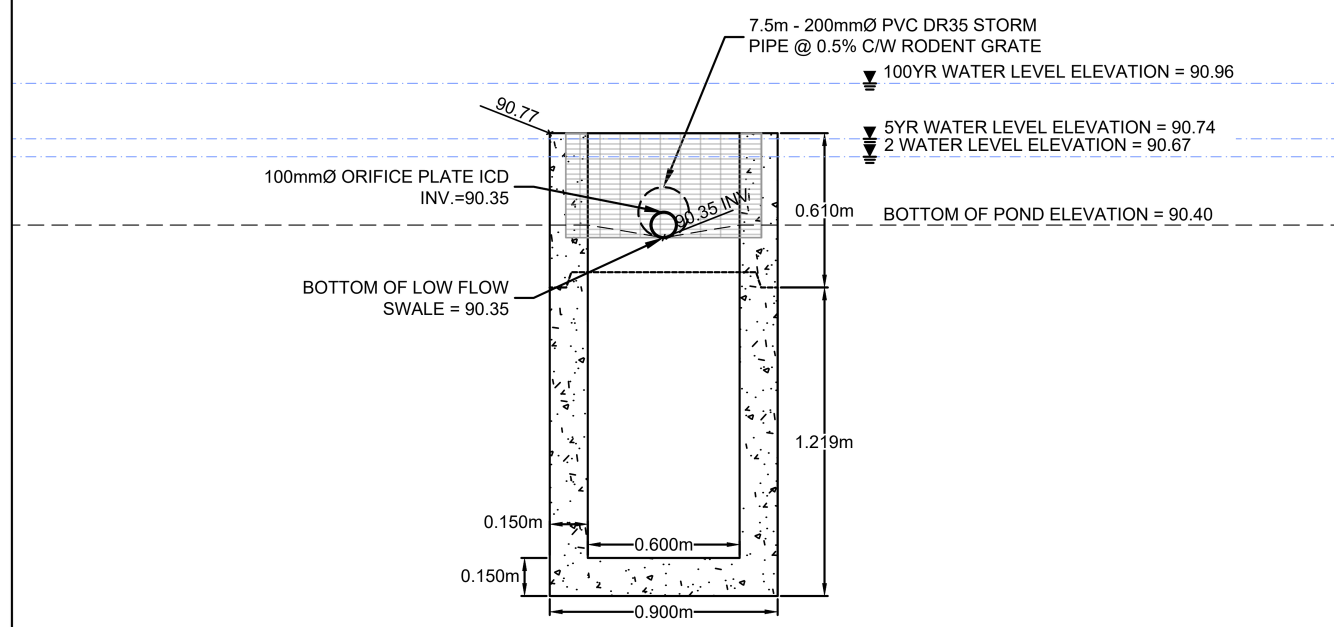
DETAIL 1 - POND OUTLET STUCTURE (DICB) SIDE VIEW

SCALE 1:25



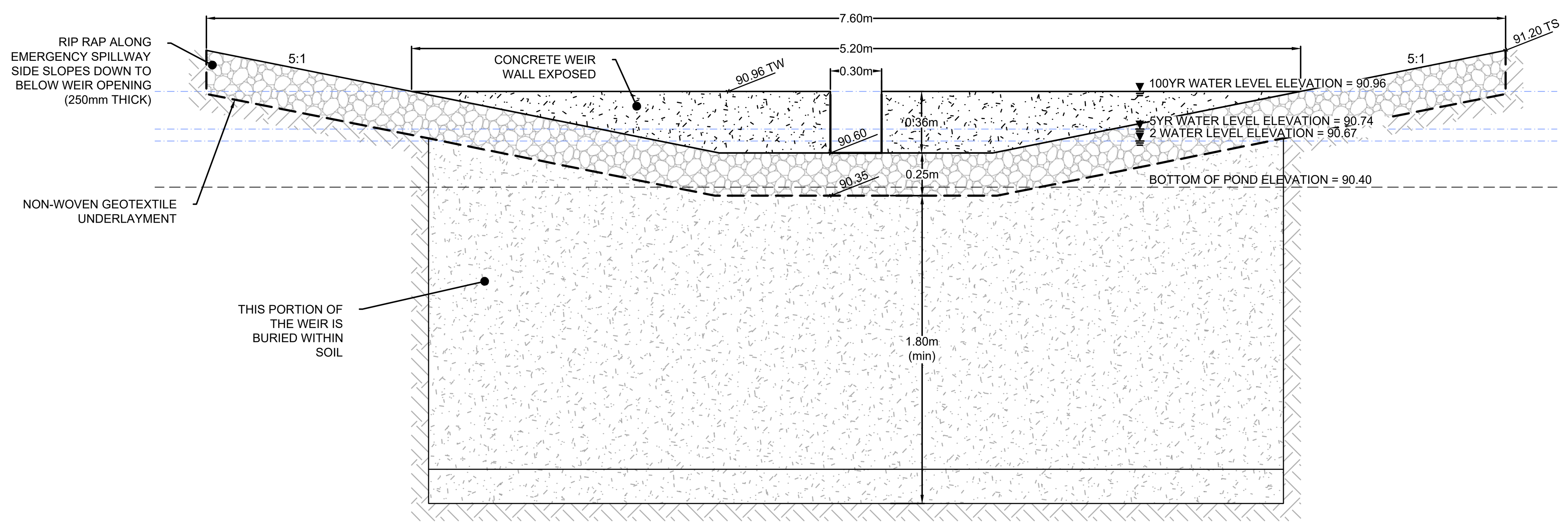
DETAIL 3 - OUTLET WEIR SIDE VIEW

SCALE 1:25



DETAIL 2 - POND OUTLET STRUCTURE (DICB) FRONT VIEW

SCALE 1:25



DETAIL 4 - OUTLET WEIR FRONT VIEW

SCALE 1:25

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No.	REVISION	DATE	BY
1.	REVISED PER CITY COMMENTS	JUL 11/25	TGS

SCALE: AS SHOWN

DESIGN: MLS
CHECKED: LAB
DRAWN: TGS
CHECKED: LAB
APPROVED: MJP

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LICENSED PROFESSIONAL ENGINEER
M. L. SCHROEDER
100213677
July 11, 2025
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LOCATION
CITY OF OTTAWA
REID'S LANE SUBDIVISION

DRAWING NAME
STORMWATER MANAGEMENT POND FACILITY - DETAILS

PROJECT No. 119089
REV: REV # 1
DRAWING No. 119089-SWMF1

LEGEND

- A / 1.12 / 65 — AREA ID / DRAINAGE AREA (hectares) / CURVE NUMBER
- STORM DRAINAGE AREA
- EXISTING DITCH
- PROPOSED DITCH AND DIRECTION OF FLOW
- PROPOSED OVERLAND FLOW
- EXISTING OVERLAND FLOW

TOTAL DRAINAGE AREA = 4.75 ha

SOURCE REFERENCE:

LEGAL INFORMATION:

CITY OF OTTAWA LEGAL PLANS 5R-9330, 5R-13990, 4R-17009, 4R-20040 AND 4R-19665

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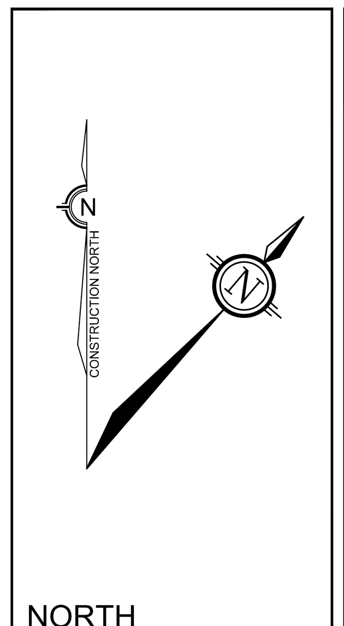
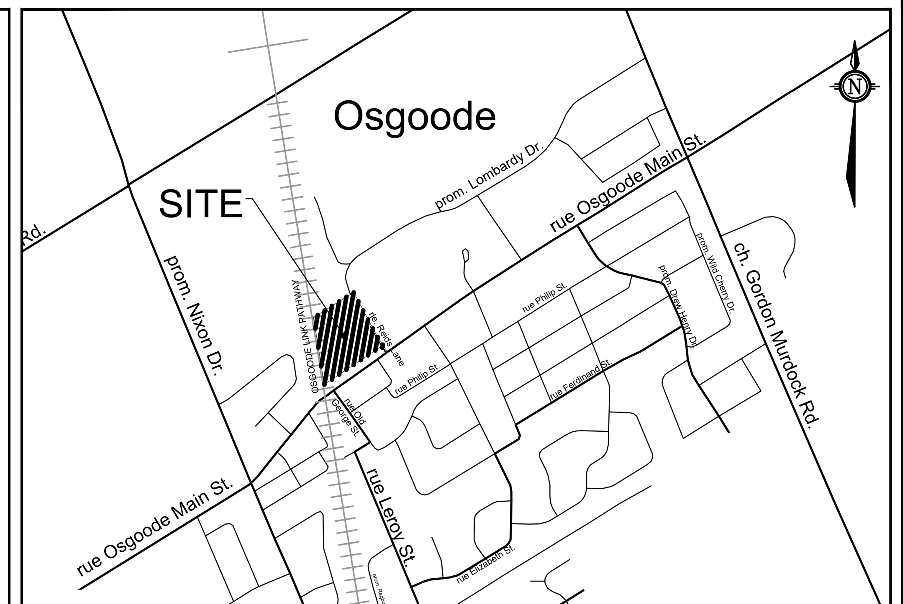


NORTH



KEY PLAN
N.T.S.

PRE-DEVELOPMENT
DRAINAGE AREAS

POST-DEVELOPMENT
DRAINAGE AREAS

NOTE:
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No.	REVISION	DATE	BY
7.	REVISED PER CITY COMMENTS	JUL 11/25	TGS
6.	REVISED PER CITY COMMENTS	NOV 13/24	RJK
5.	ISSUED WITH REVISED CONCEPTUAL SWM REPORT	JUN 01/23	LAB
4.	RE-ISSUED FOR DISCUSSION	FEB 17/22	LAB
3.	RE-ISSUED FOR DISCUSSION	FEB 08/22	LAB
2.	ISSUED FOR DISCUSSION	JAN 25/22	LAB
1.	ISSUED WITH CONCEPTUAL SWM REPORT	SEPT 03/21	LAB

SCALE 1:1000

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DESIGN	TGS
CHECKED	LAB
DRAWN	TGS
CHECKED	LAB
APPROVED	JLS

FOR REVIEW ONLY

LICENSED PROFESSIONAL ENGINEER
M. L. SCHROEDER
100213677
July 11, 2025
PROVINCE OF ONTARIO

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LOCATION
CITY OF OTTAWA
REID'S LANE SUBDIVISION

DRAWING NAME
STORM DRAINAGE AREA PLAN

PROJECT No. 119089
REV REV # 7
DRAWING No. 119089-STM

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APPENDIX A

CORRESPONDENCE

Plan of Subdivision Pre-consultation

Meeting Date: May 16, 2019 & May 28, 2019

3200 Reid's Lane

Applicant: Novatech **Councillor** Eli El-Chantiry, Ward 5

Proposal Summary: To create a 7-lot residential subdivision and new road.

Attendees:
Murray Chown, Novatech
Susan Gordon, Novatech
Ryan Poulton, Novatech
Miles Yang, Owner
Cheryl McWilliams, Senior Planner, PIEDD, City of Ottawa
Harry Alvey, Project Manager, PIEDD, City of Ottawa
Amira Shehata, Transportation Engineer, PIEDD, City of Ottawa
Kersten Nitsche, Planner II, Parks and Facilities Planning, Recreation, Culture, and Facilities Department, City of Ottawa
Kevin Wherry, Manager, Parks and Facilities Planning, Recreation, Culture, and Facilities Department, City of Ottawa
Matthew Hayley, Environmental Planner, PIEDD, City of Ottawa
Seana Turkington, Planner, PIEDD, City of Ottawa

Meeting Minutes

May 16 Minutes

Proposal details

- Proposal to create 7 new residential lots via a Plan of Subdivision.
- There are 2 Concept Plans—Concept Plan 1 proposes encroaching onto City Parkland for the creation of a Right-of Way which starts at 26 metres and decreases to 20 metres as the road continues; Concept Plan 2 proposes an 18 metre Right-of-Way, with the road entirely contained on the subject site.
- The laneway which abuts the subject site is privately owned.

Planning (Provided by Cheryl McWilliams and Seana Turkington)

- Property designated Village on Schedule A of the Official Plan and is designated as Village Residential on the Land Use Schedule for the consolidated Villages Secondary Plan-Osgoode.
- Due to the lot configuration of abutting lots, it would be beneficial to consider lot line adjustments to the abutting lots. This would result in a more regular lot for the subject site; however, it would result in the loss of some land area for lots 4 through 7.
- Concerning a potential land swap for parkland in exchange for an extended pedestrian pathway.
- Concept Plan 1 has better connectivity with the Douglas Thompson Pathway, due to the proposed pathway between lots 3 and 4.
- The laneway to Osgoode Main currently has three properties with driveway access from the pathway. The pathway is also privately owned. If a pedestrian pathway were to be extended along this laneway, the existing driveways need to be taken into consideration.

Parks Planning Comments (Provided by Seana Turkington on behalf of Kersten Nitsche)

- Through the development application Parks will collect cash-in-lieu of parkland for this development.
- The cash-in-lieu of parkland amount will be calculated as the lesser of:

- One (1) hectare for every five hundred (500) dwelling units (pursuant to Section 42 of the *Planning Act*); or
- 10% of the value of the land as required by the Parkland Dedication By-law.

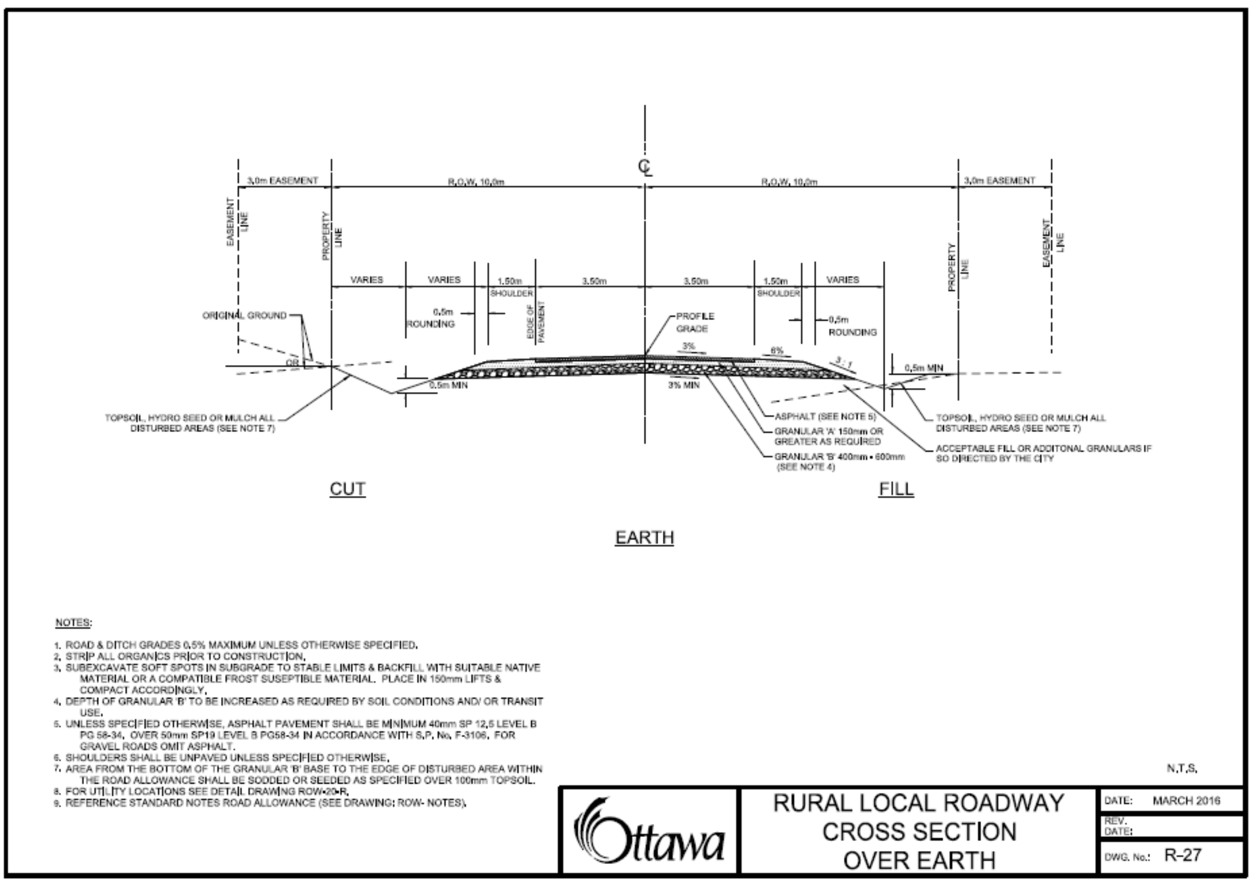
- Parks will also provide draft conditions depending on how this application proceeds.
- Parks is not supportive of Concept 1 as it proposes to use parkland for road access to the development. At this time, Parks will not support any applications to purchase parkland.

Engineering Comments (Provided by Harry Alvey)

- Review the size of the cul-de-sac to ensure that there is sufficient turning radii for garbage trucks and emergency services.
- There is an active rail line abutting the subject site. A 30-metre setback and safety berm will be required. Lots 3 and 4 will be impacted by the 30-metre setback and berm.
- At this point in time, no slope stability issues are anticipated.
- Note that there are high groundwater levels in Osgoode.

Transportation Comments (Provided by Amira Shehata)

- There is an existing pathway on Lombardi Street. If a pathway is extended further towards Osgoode Main, this would ensure pedestrian connectivity. If extension of the pathway is not possible, please explore alternative pedestrian connections.
- In the past, the intent was to extend Reid`s Lane to Osgoode Main.
- A Transportation Impact Assessment will not be required. This is based on the proposed development size and location.
- Please see the below road cross-section for a 20-metre ROW.



Environmental Comments (Provided by Matthew Hayley)

- A Tree Conservation Report will be required for any trees over 10cm in diameter.
- There is potential for Species at Risk on the subject site, specifically butternut.
- An Environmental Impact Statement will be required but, will be limited to potential Species at Risk present on site.

- There is a pathway shown in Concept Plan 1 that connects to the Douglas Thompson Pathway (DT Pathway) There is a tree on the DT Pathway that blocks the proposed pathway on Concept Plan 1. Consider moving pathway to ensure tree is preserved.

Rideau Valley Conservation Authority Comments (Provided by Jamie Batchelor)

- Regarding Stormwater Management, the recommendation is for post-development runoff to be equivalent to pre-development runoff and 80% TSS removal will be required.
- Please contact the RVCA to arrange a technical pre-consultation meeting to discuss the requirement for the hydrogeological report.

May 28 Minutes

- Considering a land exchange or outright purchase of lane to allow for the proposed Right-of-Way as shown in Concept Plan 1.

Parks Comments (Provided by Kevin Wherry and Kersten Nitsche)

- Consider connecting the proposed pathway (shown in a sketch provided May 24, 2019) to the Douglas Thompson Pathway and Peace Park.
- To infringe upon less parkland, altering the road design is highly recommended along with a width reduction to a 20-metre Right-of-Way for the entirety of the proposed road.
- There is a portion of Reid's Lane that is accessed by three properties. Consider closing Reid's Lane at the end of the access for these driveways.
- It would be worth considering a lot line adjustment to give some additional land to abutting lots. This would result in a better lot configuration for the subject site.
- Cash-in-Lieu of Parkland will be required, as will the fee in lieu of the Park Development Charge, which is currently $1818.
- There is currently some extra road allowance (the bulb-out) on Lombardy Drive. Initially, it was planned to extend Lombardy Drive to Osgoode Main. The subdivision agreement will need to be referenced to determine if this bulb-out is to return to the ownership of the property known as 5538 Lombardy Drive.

ADDITIONAL COMMENTS

Planning Comments

Official Plan: Village

Secondary Plan and/or Community Design Plan: Consolidated Villages Secondary Plan (Osgoode)

Zoning By-law: Development Reserve Zone, Subzone 1 (DR1)

Other: Based on GeoOttawa, the site has archaeological potential. As such, please fill out a screening form from the Ministry of Tourism, Culture and Sport's website and include with the application submission.

Environmental Comments

There are no further comments from Environmental Planning. For further comments from the RVCA, please contact the Conservation Authority directly.

Engineering Comments:

Water/Sanitary/Storm Servicing

- Water pipes:
    - No municipal water pipes are adjacent the proposed development. A hydrogeological and terrain analysis is required to determine that a satisfactory quality of groundwater is available and a quantity of flow that exceeds design requirements. The parameters tested shall be the "subdivision suite" known to local well testing companies.

- Sanitary Sewers:
    - No municipal sanitary pipes are adjacent the proposed development. A groundwater impact study is required to discuss the amount of septage treatment that is available if the design septage is more than 10,000 l/day.

- Storm Sewers:
    - No municipal storm pipes are adjacent the proposed development. The developer will need to define legal and sufficient outlet and achieve such outlet, entirely at the developer's cost. There appears to be a wet area on the site and an ephemeral stream that will both need to be discussed.

- Storm Water Management:
    - The consultant should determine a stormwater management regime for the application and, maintain post-development flows to pre-development levels by way of their choise, to the satisfaction of the municipality.
    - Any existing stormwater runoff from adjacent site(s) that crosses the property must be accommodated by the proposed stormwater management design.
    - Stormwater quality control is required for the site. The Rideau Valley Conservation Authority (RVCA) can be contacted to determine the level of stormwater quality control required for the site.
    - All stormwater management determinations shall have supporting rationale.
    - Stormwater management solutions should reference, and show concurrence with, the content of the Jock River Reach 2 and Mud Creek Sub-watershed Study.

Rights-of-Way

- Please refer to the City of Ottawa Private Approach By-Law 2003-447 for the entrance design.
- It is suggested that Lombardy Drive continues at the current width and that Reids Lane be converted to a MUP or other non-vehicular corridor.
- It is suggested to widen the adjacent rail corridor to the wider width of the two. The site is entirely within a 300 m rail corridor buffer and a 30 m setback and a safety berm, to appropriate standards, will be required (it is understood that the MECP will need the appropriate rail acceptance prior to their approval).
- A noise and vibration study because of the proximity of the rail corridor will be required.

Wellhead protection

- The application is within the Mississippi-Rideau highly vulnerable aquifer area- this will need to be researched for any ECA.

LID

- As per 8.3.13 of the Sewer Design Guidelines, Second Edition, document no. SDG002, prepared by the City of Ottawa, October 2012, including technical bulletins ISDTB-2014-1, PIEDTB-2016-01, ISDTB-2018-01, and ISTB-2018-04, the development shall include techniques for control of pollutants and sediments.

Permits and Approvals

- Please contact the Ministry of the Environment, Conservation and Parks (MECP) and the Rideau Valley Conservation Authority (RVCA), amongst other federal and provincial departments/agencies, to identify all the necessary permits and approvals required to facilitate the development: responsibility rests with the developer and their consultant for determining which approvals are needed and for obtaining all external agency approvals. The address shall be in good standing with all approval agencies, for example the RVCA, prior to approval.
- Copies of confirmation of correspondence will be required by the City of Ottawa from all approval agencies that a form of assent is given. Please note that a stormwater program for multiple lots is understood to be a to the direct type of Environmental Compliance Approval (ECA) application with the MOECC; please speak with your engineering consultant to understand the impact this has on the application. An MECP ECA application is not submitted until after planning approval. No construction shall commence until after a commence work notification is given in writing from an engineering Project Manager or Senior Engineer staff member of Development Review – Rural Services.

Ministry of the Environment, Conservation and Parks	Rideau Valley Conservation Authority
Contact Information:	Contact Information:
Christina Des Rochers	Roxanne Coghlan
Water Inspector	roxanne.coghlan@rvca.ca

613-521-3450 ext. 231

Christina.Desrochers@ontario.ca

Submission Requirements for engineering:

- Site Servicing Plan*
- Grading and Drainage Area Plan*
- Erosion and Sediment Control Plan* (for SPA only)

*All identified required plans are to be submitted on standard A1 size sheets as per City of Ottawa Servicing and Grading Plan Requirements (https://ottawa.ca/en/city-hall/planning-and-development/information-developers/development-application-review-process/development-application-submission/guide-preparing-studies-and-plans#servicing-and-grading-plan-requirements), and, on at least one of the plans, note the survey monument used to establish datum on the plans with sufficient information to enable a layperson to locate the monument.

Report Submission Requirements[1]:

- Site Servicing Report
- Storm Water Management Report
  - Please note that engineering issues will need to be significantly acceptable to forward any SWM reports for modelling review.
  - Upstream catchments will need to be drawn and verified.
  - A range of historical storms will need to be modelled (if modelling is required/provided).
- Hydro-geological and terrain analysis
- Groundwater impact study (only if septage is more than 10,000 l/day)
- Erosion and Sediment Control Measures
- Geotechnical Investigation Study
  - Please note that the area may contain sensitive marine clays. If yes, please note that Atterberg limits, consolidation testing, sensitivity values, density tests, shrinkage tests, and grade raise restrictions, and vane shear test results, and rationalised discussion thereof will be required in the report. The geotechnical consultant will need to provide full copies of any published and peer reviewed papers relied on to determine results and conclusions.
  - Chemical analysis will be required.
  - Please note that a long-term groundwater elevation will be required as per section 8.2 of Technical Bulletin ISTB-2018-04, City of Ottawa, dated June 27, 2018.
  - Earthquake analysis is now required to be provided in the report.
  - Deviation from the "Geotechnical Investigation and Reporting Guidelines for Development Applications in the City of Ottawa", 1st Edition, September 2007, Golder Associates (Geotechnical Guidelines), or "Slope Stability Guidelines for Development Applications in the City of Ottawa", 1st Edition, December 2004, Golder Associates (Slope Stability Guidelines), revised 2012, is permitted with supply of full copies (either digital or printed) of per reviewed and published papers with specific reference to actual pages that plainly agree with the consultants' design approach.

Footnote [1] - All required plans & reports are to be provided on a CD in *.pdf format (at application submission and for any, and all, re-submissions. Drawings shall be provided as individual files)

Application Submission Information

Application Type: **Plan of Subdivision**

For information on Applications, including fees, please visit: https://ottawa.ca/en/city-hall/planning-and-development/information-developers/development-application-review-process/development-application-submission/fees-and-funding-programs/development-application-fees

The application processing timeline generally depends on the quality of the submission. For more information on standard processing timelines, please visit: https://ottawa.ca/en/city-hall/planning-and-development/information-developers/development-application-review-process/development-application-submission/development-application-forms#site-plan-control

Prior to submitting a formal application, it is recommended that you pre-consult with the Ward Councillor.

Application Submission Requirements

For information on the preparation of Studies and Plans and the City's Planning and Engineering requirements, please visit: https://ottawa.ca/en/city-hall/planning-and-development/information-developers/development-application-review-process/development-application-submission/guide-preparing-studies-and-plans

To request City of Ottawa plan(s) or report information, please contact the ISD Information Centre at (613)-580-2424 ext. 44455.

Please provide electronic copy (PDF) of all plans and studies required.

All plans and drawings must be produced on A1-sized paper and folded to 21.6 cm x 27.9 cm (8½"x 11").

Note that many of the plans and studies collected with this application must be signed, sealed and dated by a qualified engineer, architect, surveyor, planner or designated specialist.

File No.: D07-16-21-0028

February 28, 2025

Ryan Poulton
Novatech Engineering
Via email: r.poulton@novatech-eng.com

Dear Mr. Poulton,

Re: Draft Plan of Subdivision Application – 3200 Reid's Lane (3rd review)

A review of the third submission concerning the above-noted draft plan of subdivision has been undertaken by internal and external contacts. Please find below the comments on your application. *Please ensure that changes required below on one plan are reflected on all other plans, when applicable.*

Planning Comments:

1. Previous planning comments have been addressed.
2. Please be reminded that planning comment 3. a. in the City's second submission comment dated July 31, 2023, will need to be addressed as a part of a future Zoning By-law Amendment.

Hydrogeological Comments:

3. Please see enclosed comment review letter provided by BluMetric dated 2025-02-18 for hydrogeological review comments.

Engineering Comments:

Stormwater Management Comments

4. Although the proposed dry pond design is small, it claims achieve 60% TSS removal. The current design does not comply with the basic parameters for dry pond design guidelines as per 2003 MOE Stormwater Management Design Manual (4.6.5 Dry Ponds). The drainage area is smaller than 5ha, and the pond is only 0.6m deep. The flow is short circuiting from the inlet to the outlet without a proper dispersion distance for particles to settle. Pond shape does not comply with the MOE design requirements for a dry pond.
5. The pond berm is only 0.6m wide and a minimum 1.5m berm is required. This requirement is essential to maintain stability and grass maintenance at the top of the berm.
6. The maximum side slope must be 3:1.
7. The top of the pond is approximately 0.1m above the 100-year water level which is not acceptable.
8. There is not access road to get from the west to the east side of the pond.
9. The access road is required for the maintenance up the ditch to Doyle Creek Municipal Drain.

10. The detail of the inlet to the pond is required.
11. The location of the pond against the property line would not allow an industrial lawn mower to cut grass between the property line and the slope of the pond.
12. The outlet weir with the 0.09m wide is susceptible to plugging by debris.
13. Please assure that the pond will function as a dry SW facility and have positive outlet and will not be soggy. In addition, please provide us with calculations that the pond will not back up to the adjacent lots at the Lombardy Way cul-de-sac.
14. Further comments provided by the City's Stormwater Management Modelling Review Unit are enclosed.

Phase II Environmental Site Assessment, Report 210064, prepared by Kollaard, dated January 24, 2023

15. Report documents the removal of asphalt and verification sampling which confirmed soil concentration met the provincial standards. Comment #30 (July 31, 2023, comment letter) can be considered resolved, and a remedial action plan is no longer required. As per the recommendations of the Phase II ESA, the construction debris identified on site should be removed from the site and disposed appropriately as waste.

Environmental Comments:

16. No new comments. The EIS was reviewed and found to address concerns related to natural heritage features and species at risk. The areas of tree retention are indicated in the EIS/TCR and within the preliminary grading, the City will look for this to be continue to be retained through detailed design.
17. Prepared to issue standard environmental draft conditions of approval when other disciplines are satisfied.

Parks Comments:

18. Previous Parks and Facilities Comments regarding Peace Park have been resolved with the redesign of the extension of Lombardy Drive so land is no longer being requested from Peace Park.
19. Cash-in-lieu of conveyance of parkland (CILP) will be requested 5% of the gross land area based on a residential density equal to or less than 18 dwelling units/net hectare.

Rideau Valley Conservation Authority:

20. Please see enclosed comment review letter provided by Rideau Valley Conservation Authority 2025-01-22 for review comments.

The next submission should address each and all of the comments or issues, to ensure the effectiveness and consistency of the next review. Your resubmission cover letter must indicate how each comment has been addressed. You must coordinate the responses from the different consultants and submit only **one cover letter** with numbered responses. If revisions are made other than the ones addressing the comments above, these need to be identified in your cover letter.

If you have any questions on any of the above, please do not hesitate to contact the undersigned at 613-580-2424 extension 12860 or via email at stephan.kukkonen@ottawa.ca

Sincerely,

Stephan Kukkonen

Planner I
Development Review Rural

c.c. Kevin Hall, Senior Engineer, Infrastructure City of Ottawa
Matthew Hayley, Environmental Planner, City of Ottawa
Warren Bedford, Parks Planner, City of Ottawa
Mike Giampa, Transportation Engineer, City of Ottawa
Richard Barker, Environmental Remediation, City of Ottawa
BluMetric Environmental Inc.
Stephen Bohan, Rideau Valley Conservation Authority

Date:	1/31/2025	File:	D07-16-21-0028
To:	Kevin Hall		
From:	Charles Warnock		
Project:	3200 Reids Lane, Osgoode		
Subject:	Stormwater Review		

TECHNICAL MEMO

The following is a summary of the review that was undertaken by Asset Management SWM modeling review unit of the Conceptual Servicing and Stormwater Management Report (Novatech, Revised November 2024) and supporting PCSWMM files, and engineering drawings revision November 13, 2024.

Comments

It is our recommendation that the following comments be provided to the applicant:

Conceptual Servicing and Stormwater Management Report (Novatech, Revised November 2024):

No.			Outstanding
1	Initial Comment	In order for the ditches to meet the water quality requirements referenced in Table 3, the 25mm event must be run with a 4-hour design storm. The text (Table 2) refers to a 3 hour storm while the model label refers to a 4 hour storm.	
	Developer Response	Table 2 has been updated so that the 25mm storm is correctly described as a 4-hour storm as modelled.	
	Follow-up	*No further comment.*	
2	Initial Comment	It is not reasonable to only utilize swales for quality control. The Stormwater Management Planning and Design Manual does not specify that swales provide enhanced TSS removal. Further, a continuous flow dry pond only provides 60% TSS removal. Please consider the use for infiltration galleries or bioswales to help meet the 80% TSS removal target.	*
	Developer Response	The report has been updated to expand on the Conceptual Quality Control design, refer to Section 4.3.	
	Follow-up	*The city has now received the MECP CLI-ECA. The current proposal will not meet the criteria of the CLI_ECA. Please update the design so that it will meet the criteria of the CLI-ECA.*	
3	Initial Comment	As part of the detailed design, please show the 1:00 year design storm ponding extent within the ditches on grading plans.	
	Developer Response	Acknowledged.	
	Follow-up	*No further comment.*	
4	Initial Comment	How is runoff from the external areas routed to the proposed ditches? Section 3 says rear yard and side yard drainage will be provided. Preliminary grading plan should show what the plan is for the external drainage areas.	*

No.			Outstanding
	Developer Response	The Preliminary Grading Plan & Site Servicing Plan has been updated to show rear and sideyard swales to direct drainage from the existing Osgood Main Street lots, along side and rear lots lines to the SWM Block, while maintaining existing vegetation.	
	Follow-up	*We can only find proposed spot grade elevations. We can't find any proposed swale drainage. Please new comments at the end from our drainage group.*	
5	Initial Comment	Please provide an overview of the NASHYD unit hydrograph method in the report.	
	Developer Response	Additional descriptions for the NASHYD method have been added to the report refer to Section 4.1.	
	Follow-up	*No further comment.*	
6	Initial Comment	Please confirm that the house sizes utilized in the development of the runoff coefficients for the catchments will be the maximum house sizes proposed for the lots.	
	Developer Response	The maximum house sizes are shown (3400ft2). They are consistent with the analysis and results of the revised Hydrogeological Investigation and Terrain Evaluation prepared by Kollaard Associates.	
	Follow-up	*No further comment.*	
7	Initial Comment	The soil type (fine to medium sand) is probably more B than C. Tables in water balance calculations show fine sand as B. Plus assuming existing lands at CN numbers 81 and 83 is probably too high. The predevelopment CN need to be re-evaluated and more information provided.	
	Developer Response	The PCSWMM modelling (included in Appendix B of the revised report) and water balance calculations (included in Appendix C of the revised report) were updated to reflect soil type B.	
	Follow-up	*No further comment.*	
8	Initial Comment	Section 4.2. The increase in runoff is not just due to increase imperviousness. Change in land use, grading, and drainage channels all add to increase flows and runoff volumes. The SWM pond proposes to hold post development flows to predevelopment but the runoff volume leaving the site will most likely increase unless infiltration methods are introduced. The landowner may lose rights of drainage by introducing the proposed land use changes. This could be a problem and needs to be looked at in further detail. The site needs a sufficient legal outlet	
	Developer Response	The onsite groundwater is high making LID and infiltration measures to reduce the runoff volume from the development impractical. The minimum 1m clearance from the bottom of the infiltration measures to the seasonal high groundwater table would not be possible in the roadside ditches. The revised report includes Figure 3 which depicts the Drainage Outlets. These outlets are further described in report Section 4.2.	
	Follow-up	*Comments from our drainage group are attached at the end of this memo. No further comment.*	

No.			Outstanding
9	Initial Comment	Will the subdivision ditches have under drains? If so where will the outlet?	
		No subdrains are proposed in the roadside ditches.	
		No further comment.	
10		Please give us an estimate of what the flow structure will be. The concern is the control structure will end up being too small and will then end up being a maintenance issue.	
		Details of the pond flow structure has been added to the revised report and is depicted on the Stormwater Management Pond Facility (119089-SWMF). The flow structure will be a compound weir with three stages, Low Flow (2-year), High Flow (100-year) and Emergency Spillway.	
		No further comment.	
11		Need to decide now for draft approval if LID's will be included. There are places that have good soils with low water table values. LID's could be accommodated. Not only will they provide quality treatment, but they will reduce the runoff volume.	
		Low Impact Development measures will be utilized as described in Section 4.6 of the revised report.	
		No further comment.	
		6160 THUNDER ROAD & 5368 BOUNDARY ROAD: STORMWATER MANAGEMENT REPORT In the City of Ottawa, Ontario November 2024	JFSA
12		We need more information in the report on the SWM pond for draft approval. We need confidence that it will work the way it is proposed. 1. How much storage is required? This is required to verify the Block is of sufficient area. 2. What are the depths? Influences the size of the pond but also there is a concern that it could reverse flow towards Lombardy Drive. Will it back up into the ditches and flow to Lombardy? 3. What are the effects of the backwater in the receiving stream. 4. It is proposed to be a dry pond however there currently is a wet area right where the pond is proposed. Will it be dry?	
		Additional information for the dry pond has been added to the report and drawings. 1. The pond block provides adequate storage volume as shown Stormwater Management Pond Facility Plan. Required Storage = 360m3 Total available Volume = 435m3 2. In large storm event, the Osgoode Link Pathway outlet could back up into the on-site roadside ditches toward Lombardy. This volume has been accounted for in the PCSWMM model and the flows to Lombardy would continue to be below pre-development levels. Total pond depth = 0.60m, 100-year depth = 0.51m 3. The pond outlets to an existing ditch and it is assumed to have no backwater effects on the dry pond.	*

No.			Outstanding
		4. The ground water table is assumed to be at the surface, the majority of the dry pond is proposed to be constructed above existing grade, therefore it would be above the groundwater table.	
		1. No further comment. *2. No further comment.* *3. It cannot be an assumption that the ditch has no effect. It needs to be demonstrated. Furthermore there is a proposed culvert immediately downstream. How will this effect the water level? How do the external areas effect the flow? Where does the 100-year elevation of 90.0 m (shown on pond drawing) on the west side of the pathway come from?* *4. No further comment.*	
13		Need more information on how the water gets from the pond outlet to the MD. There is a concern that there is no defined downstream channel. EIS mentions standing water against the pathway and a meadow marsh evident. This in the approximate location of the proposed SWM block. Downstream works may be required. Current proposal may not have drainage rights if the runoff volumes will increase. Drainage easements or other drainage rights may be required.	*
		Novatech has prepared Figure 3 (included in the revised report) which depicts the drainage route to the Doyle Creek Municipal Drain.	
		The proposal now shows a culvert under the pathway. However there does not seem to be consideration that the water may still flow in the direction first proposed north along the east side of the pthway. The grades to the northeast on the east side of the pathway are lower than the proposed culvert invert. Please see comments from drainage group at the end of this memo.	
14		Is there other external land that drains to the pathway at proposed outlet?	*
		The pathway is significantly raised and no other external lands (not previously accounted for) drain to the proposed outlet. Refer to the Storm Drainage Area Plan (119089-STM).	
		Storm Drainage Plan seems to indicate that everything north of Osgoode Main will flow towards to the proposed new pathway crossing.	
15		Historical storms and stress test will be required at detailed design	
		Acknowledged.	
		No further comment.	
16		The model results show that the 100-year flows are not contained within the ditches as culverts controlling the flows (i.e. overtopping at Lot 4 driveway). We do not typically allow the 400 mm culverts with the exception in a few cases for SWM reasons. However, this is not discussed in the report. If 400 mm culverts are part of the SWM design this needs to be discussed. Doesn't the SWM pond provide the quantity control.	
		The 400mm culverts are used for quantity control and to minimize the	

No.			Outstanding
		required storage volume of the dry pond. The purpose of the reduced sized driveway culverts has been added to Section 4.2 of the revised report.	
		No further comment.	
17		Please provide the 25mm 4-hour design storm model for review in order to confirm the ditch flow velocity conditions meet the water quality criteria.	
		Refer to Response #7	
		Please provide the modeling files in the next submission. *No further comment.*	
18		Based on the Compendium Edition of the 2021 Building Code (O.Reg 332/12) Table 8.2.1.6B Minimum Clearances for distribution piping and leaching chambers, 15m of clearance is required from the ditches and culverts. Please clarify that this clearance is achieved from the ditches and culverts as well as the dry pond.	
		The layout of Lot 4 has been reviewed and adjusted to provide minimum clearance between the distribution piping and leaching chambers and the dry pond. It is noted that individual lot grading plans (with individual septic system design) would be submitted at the building permit stage.	
		No further comment.	

Additional comments:

1. Please provide SWM modeling files for the next submission.
2. The design should meet the requirements found in the CLI-ECA for stormwater appendix A. The report should include a section on, Erosion Control (Watershed). Please make sure that your ESC plan is in line with the CLI-ECA Construction Erosion and Sediment Control. Please note for quality treatment control to the 90th percentile storm event and if conventional methods are necessary, then enhanced, normal, or basic levels of protection (80%, 70%, or 60% respectively) for suspended solids removal (based on the receiver).

Brad Smith who is in the Municipal Drainage Branch provided the following:

My group cleaned the drainage easement between the Osgood Link Pathway (OLP) and Nixon Drive in 2021 after a request from a resident who lives at 5441 Taylor Way. We learned a lot about this area during the scoping/completion of this maintenance. You will note this is the only location with a detailed existing cross section showing any protection for the rear yards on Taylor Way.

1. The rear yards for the properties on Taylor Way are at increased risk of flooding for any event larger than 1:100 (this is my primary concern).
    a. Propose to increase berm height to protect rear yards on Taylor Way from flooding. (Taylor Way protection)
    b. This section of ditch is not well defined, and I would like to see more detail between the OLP and the rear property line for these homes on Taylor Way. (Typo Ditch Elevation)
    c. Developer may need to undertake works within this area to ensure additional flows do not impact existing properties.

2. Increased Drainage consideration may be required on the East side of the OLP (more details required for ditch work within the City parcel where the new pathway connecting to the OLP is located).
    a. If a new pathway from the new subdivision is connected to the OLP, will there be a North-South culvert to allow some flow to continue North as the existing grades indicate, or is the new pathway going to capture all runoff coming from the South and send it to the West through the proposed cross culvert? (Drainage East of OLP)
    b. The ditch in the rear yards of existing properties on Lombardy is likely not a defined 'ditch', more likely to be the bottom of the slope from the existing railway and added flows may lead to increased ponding areas. Would like to see more detailed elevations in this area.(East of OLP towards the North)
    c. Lets say the spillway is needed in an event greater than 1:100, where does this water go? Existing elevations indicate that they will flow into side yard of one of the new property parcels in the subdivision. (Spillway)
    d. If the new pathway is going to block all South-North flows and send them West, rear yards on Taylor Way are at an even greater risk of flooding.
3. Is there any consideration to have a drainage ditch around the perimeter of the new subdivision? (Perimeter Drainage Ditch)
    a. This perimeter ditch would intercept flows coming from existing properties to the South, and intercept flows from the new subdivision flowing North.
    b. Currently there is a proposed buffer consisting of 'tree retention' but I do not believe there are any protections that would prevent new property owners in the subdivision from removing these trees and grading their property to match existing elevations at the property line.
4. Nobody has taken responsibility for drainage maintenance of the pathway corridor.
    a. Public Works wants nothing to do with ditch maintenance on these rail corridors.
    b. The 'ditches' along the old railway are not engineered drainage systems, it is my understanding the old rail bed was raised up high enough that standing water at the bottom of the slope was not a concern and if there was ponding at the bottom of the slope nobody cared because this area was thick brush in the middle of nowhere when the railway was constructed and now the pathway is bordered by residential properties.
5. Residents on Lombardy Drive already complain about standing water in the roadside ditches.
    a. Adding more flows to the ROW ditches on Lombardy may exacerbate an ongoing concern with these ditches.

January 22, 2025

SENT BY EMAIL (stephan.kukkonen@ottawa.ca)

Stephan Kukkonen
Planner I
Development Review, Rural Services
City of Ottawa
110 Laurier St. W
Ottawa, ON K1P 1J1

Re: **Draft Plan of Subdivision Application D07-16-21-0028**
Part of Lot 27 & 28, Concession 1
3200 Reids Lane
City of Ottawa
Crestview Innovation Inc.

Further to our previous comments dated August 2, 2023, this letter acknowledges receipt of the above-noted application circulated by the City of Ottawa. The materials were received by the Rideau Valley Conservation Authority (RVCA) on December 12, 2024.

Application Specific Comments

Based on a review of the current submission materials, the majority of RVCA's previous comments related to the proposed functional stormwater management strategy have been addressed. The proponent has noted that RVCA's comments related to assessing the feasibility of Low Impact Development (LID) measures the site and site ponding details (comments 2 & 4) will be addressed as a part of the details design stage. While it is RVCA's preference that these details are addressed prior to approval of the draft plan of subdivision, staff are satisfied that these items can be addressed through detailed design without resulting in significant revisions to the layout of the proposed subdivision.

Recommendation

RVCA staff have no objection to the approval of Draft Plan of Subdivision D07-16-21-0028, subject to the conditions listed in Appendix 'B'.

Please provide the Notice of Decision for the Draft Plan of Subdivision once it is approved.

Fees/Timing

Please note that this project will be subject to a clearance fee at the time of clearance, which will be based on the fee schedule in effect at that time.

At the time of requesting clearance of RVCA conditions of draft plan approval, we ask that the applicant submit their request in writing to RVCA offices a minimum of 90 days in advance of expected registration. Additional time may be required in cases where Section 28.1 permits or technical review are required from RVCA. We ask that the applicant consider these requirements and take into consideration the required timelines prior to the submission of draft plan clearance requests.

We trust these comments are of assistance. Should you have any questions, please contact me at stephen.bohan@rvca.ca

Sincerely,

Stephen Bohan
Planner
Rideau Valley Conservation Authority
stephen.bohan@rvca.ca
613-692-3571 ext. 1191

Appendix 'A': Materials Review by RVCA

The following materials were received by RVCA on December 12, 2024

- Draft Plan of Subdivision, Part of Lots 27 & 28, Concession 1, Township of Osgoode, City of Ottawa, prepared by Novatech, revised dated July 2024.

- Draft Plan of Subdivision Application – Response to (RVCA) Comments, prepared by Novatech, dated November 21, 2024.

- Conceptual Servicing and Stormwater Management Report, prepared by Novatech, revised dated November 2024.

- Preliminary Grading & Site Servicing Plan, prepared by Novatech, revised dated November 2024.

- Stormwater Management Pond Facility, prepared by Novatech, revised dated November 2024.

Appendix 'B': RVCA Conditions of Draft Plan Approval

RVCA recommends approval of Draft Plan of Subdivision, Part of Lots 27 & 28, Concession 1, Township of Osgoode, City of Ottawa, prepared by Novatech, revised dated July 2024, subject to the following conditions:

1. That this draft plan of subdivision be subject to red-line revision(s) to meet the requirements of RVCA's conditions of draft plan approval, if necessary, to the satisfaction of RVCA.

2. Prior to the registration of the Plan of Subdivision, the Owner shall provide an M-Plan showing the lot/block lines and any required revisions to the satisfaction of RVCA.

3. Prior to the registration of the Plan of Subdivision the Owner shall provide a copy of the subdivision agreement and pay the required draft plan of subdivision planning review fees, clearances fees and permit fees to RVCA.

4. The Owner shall provide any and all stormwater reports and associated plans that may be required by RVCA and the City for approval prior to the commencement of any works in any phase of the Plan of Subdivision. Such reports and plans shall be in accordance with any watershed or subwatershed studies, conceptual stormwater reports, City or Provincial standards, specifications and guidelines.

5. The Owner acknowledges and agrees in the subdivision agreement in wording acceptable to RVCA which is standard, normal and consistent with applications and approvals for development of this kind:

    a. To carry out, or cause to be carried out, to the satisfaction of RVCA, the recommendations of the stormwater reports/strategies and details of the plans referenced in RVCA's conditions of draft plan approval.

    b. To install and maintain all stormwater management and erosion and sedimentation control measures in good repair during the construction period, in a manner satisfactory to RVCA.

    c. To obtain all necessary permits from RVCA pursuant to Section 28.1 of *Conservation Authorities Act*, to the satisfaction of the RVCA. This includes site alteration and construction works associated with the installation of the proposed stormwater outlet/culvert that connects to the watercourse feature on the west side of the Osgoode Link Pathway.

    d. To comply with permits approved under Section 28.1 of the *Conservation Authorities Act,* as may be amended, including the approved plans, reports and conditions to the satisfaction of RVCA.

NOVATECH
Engineers, Planners & Landscape Architects

July 11, 2025

By Email
Kevin.Hall@ottawa.ca

City of Ottawa
Development Review,
Planning, Development and Building Services Department
110 Laurier Ave. West, 4th Floor
Ottawa, ON K1P 1J1

Attention: Kevin Hall, C.E.T., Senior Project Manager

Reference: Draft Plan of Subdivision Application – Response to Technical Memo
3200 Reid's Lane, Ottawa, ON
City File No..: D07-16-21-0028
Novatech File No.: 119089

The following is in response to the review that was undertaken by Asset Management SWM modeling for the Conceptual Servicing and Stormwater Management Report, letter dated January 31, 2025.

We are providing the following updated information:

1. Conceptual Servicing and Stormwater Management Report – Reid's Lane Subdivision, Revised July 2024 prepared by Novatech, including plans:

- Preliminary Grading & Site Servicing Plan (119089-PGR, revision 9)
- Stormwater Management Pond Facility (119089-SWMF, revision 3)
- Stormwater Management Pond Facility Details (119089-SWMF1, revision 1)
- Storm Drainage Area Plan (119089-STM, revision 7)
- PCSWMM Modeling Files

2.

- Outlet Ditch Profile Sta. 0+000 to Sta. 0+350 (119089-PO1, revision 1)
- Outlet Ditch Profile Sta. 0+350 to Sta. 0+625 (119089-PO2, revision 1)

Comments

Items listed with "No further comment" have not been repeated here.

2. The city has now received the MECP CLI-ECA. The current proposal will not meet the criteria of the CLI_ECA. Please update the design so that it will meet the criteria of the CLI-ECA.

   Novatech Response: Acknowledged. An additional section (4.5) has been added to the report. The SWM pond detains the 25mm event over the course of 6-hours and the 100-year drains over 13 hours with the downstream backwater condition (23-hours if no backwater is present). This is the longest achievable detention time due to the small contributing drainage area and a low flow orifice size of 100mm (the smallest size preferred by the City of Ottawa

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for SWMF due to clogging concerns). CLI-ECA requirements will be further evaluated at the Detailed Design and construction approval stage.

4. We can only find proposed spot grade elevations. We can't find any proposed swale drainage.

   Novatech Response: Drainage from the upstream properties (i.e. on Osgoode Main Street) would be directed to property line (i.e. the low grade between adjacent properties).

12. (3) It cannot be an assumption that the ditch has no effect. It needs to be demonstrated. Furthermore there is a proposed culvert immediately downstream. How will this effect the water level? How do the external areas effect the flow? Where does the 100-year elevation of 90.0m (shown on pond drawing) on the west side of the pathway come from?

   Novatech Response: The east Osgoode Link Pathway ditch receives local flows from the pathway and the proposed development and modelled upstream drainage. The west Osgoode Link Pathway ditch has an upstream headwall with a 750mm diameter pipe outletting to the ditch. The full flow from this culvert was estimated and added as a baseflow in the model to account for backwater conditions on the proposed dry pond. A more detailed analysis of the flows from this culvert will be evaluated at the Detailed Design stage.

   The proposed culvert crossing the Osgoode Pathway was accounted for in the PCSWMM model and is able to convey the pond outflows with the backwater from the 750mm pipe flows. Any backwater from this crossing has been accounted for in the model results.

   The water level shown in the ditch profile is the 100-year water level in the ditch based the PCSWMM model results for pond outflows and flows from the upstream 750mm diameter pipe.

14. Storm Drainage Plan seems to indicate that everything north of Osgoode Main will flow towards the proposed new pathway crossing.

   Novatech Response: The drainage areas and model have been reviewed and the existing lots along Osgoode Main have rear yards draining to the SWM facility and thus the new pathway crossing. These flows have been accounted for in the model.

Additional Comments:

1. Please provide SWM modeling files for the next submission.

   Novatech Response: PCSWMM Model Files are included in the resubmission package

2. The design should meet the requirements found in the CLI-ECA for stormwater appendix A. The report should include a section on, Erosion Control (Watershed). Please make sure that your ESC plan is in line with the CLI-ECA Construction Erosion and Sediment Control. Please note for quality treatment control to the 90th percentile storm event and if conventional methods are necessary, then enhanced, normal, or basic levels of protection (80%, 70%, or 60% respectively) for suspended solids removal (based on the receiver).

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Novatech Response: Refer to comment #2, above.

Comments from Brad Smith who is in the Municipal Drainage Branch:
(Note -- a clarification call was held with City staff on April 25, 2025 where the following comments were discussed)

1. The rear yards for the properties on Taylor Way are at an increased risk of flooding for any event larger than 1:100 (this is my primary concern)
   a. Propose to increase berm height to protect rear yards on Taylor Way from flooding. (Taylor Way Protection)
   b. This section of ditch is not well defined, and I would like to see more detail between the OLP and the rear property line for these homes on Taylor Way. (Typo Ditch Elevation)
   c. Developer may need to undertake works within this area to ensure additional flows do not impact existing properties.

   Novatech Response: It is understood that the City recently maintained the existing ditch adjacent to the Taylor Way Lots. Novatech has prepared outlet plans for the City to demonstrate the existing ditch grading as well as the top of slope elevations. The minimum back slope is 0.47m. The post-development PCSWMM model results indicate that in the 1:100-year event the water level in the ditch is 0.47 to 0.59m. The pre-development model shows that the current water levels based on the 750mm diameter upstream pipe has a depth of 0.44 to 0.56m. The addition of the proposed development flows results in a 2 to 3cm increase in water levels along the ditch. Refer to the Outlet Ditch Profile plans for existing ditch and top of slope grades (119089-PO1, 119089-PO2).

2. Increased Drainage consideration may be required on the East side of the OLP (more details required for ditch work within the City parcel where the new pathway connecting to the OLP is located).
   a. If a new pathway from the new subdivision is connected to the OLP, will there be a North-South culvert to allow some flow to continue North as the existing grades indicate, or is the new pathway going to capture all runoff coming from the South and send it to the West through the proposed cross culvert? (Drainage East of OLP)
   b. The ditch in the rear yards of existing properties on Lombardy is likely not a defined 'ditch', more likely to be the bottom of the slope from the existing railway and added flows may lead to increased ponding areas. Would like to see more detailed elevations in this area. (East of OLP towards the North)
   c. Lets say the spillway is needed in an event greater than 1:100, where does this water go? Existing elevations indicate that they will flow into side yard of one of the new property parcels in the subdivision. (Spillway)
   d. If the new pathway is going to block all South-North flows and send them West, rear yards on Taylor Way are at an even greater risk of flooding.

   Novatech Response:

   A new culvert is proposed to allow the lowlands between the subdivision lands and the Osgoode Link Pathway to maintain its existing drainage path.

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The existing ditch and top of slope grades are provided on 119089-PO1 and 119089-PO2 for the City's review.

In an emergency spillway situation water would collect on the west side of the Osgoode Link Pathway and drain through the tow proposed culverts.

The proposed pathway has a proposed culvert that will maintain flows to the north.

3. Is there any consideration to have a drainage ditch around the perimeter of the new subdivision? (Perimeter Drainage Ditch)
    a. This perimeter ditch would intercept flows coming from existing properties to the South, and intercept flows from the new subdivision flowing North.
    b. Currently there is a proposed buffer consisting of 'tree retention' but I do not believe there are any protections that would prevent new property owners in the subdivision from removing these trees and grading their property to match existing elevations at the property line.

Novatech Response:

A perimeter ditch on the south property line would remove all existing trees. Drainage has been directed away from proposed houses and between lots, along low points on the property lines.

Novatech suggests that the Tree protection measures be included as Notice on Title for future homeowners.

4. Nobody has taken responsibility for **drainage maintenance** on these rail corridors.
    a. Public Works want nothing to do with ditch maintenance on these rail corridors.
    b. The 'ditches' along the old railway are not engineered drainage systems, it is my understanding the old rail bed was raised up high enough that standing water at the bottom of the slope was not a concern and if there was ponding at the bottom of the slope nobody cared because this area was thick brush in the middle of nowhere when the railway was constructed and now the pathway is bordered by residential properties.

Novatech Response: Acknowledged. The Osgood Link Pathway lands are owned by the City of Ottawa.

5. Residents on Lombardy Drive already complain about standing water in the roadside ditches.
    a. Adding more flows to the ROW ditches on Lombardy may exacerbate an ongoing concern with these ditches.

Novatech Response: Post-development flows towards Lombardy Drive are below pre-development levels for all storm events up to and including the 100-year storm event. No additional flows have been added.

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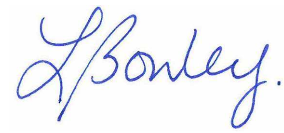
Yours truly,

NOVATECH



Melanie Schroeder, P.Eng
Project Engineer
Water Resources

Lisa Bowley, P.Eng.
Senior Project Manager
Land Development Engineering

Suite 200, 240 Michael Cowpland Drive, Ottawa ON K2M 1P6 Tel: 613.254.9643 www.novatech-eng.com

July 11, 2025

By Email
stephan.kukkonen@ottawa.ca

City of Ottawa
Development Review,
Planning, Development and Building Services Department
110 Laurier Ave. West, 4th Floor
Ottawa, ON K1P 1J1

Attention: Stephan Kukkonen, Planner I

Reference: Draft Plan of Subdivision Application – Response to Comments (3rd Review)
3200 Reid's Lane, Ottawa, ON
City File No..: D07-16-21-0028
Novatech File No.: 119089

The following is in response to Third Review Engineering Comments provided by the City of Ottawa, dated February 28, 2025, regarding the Draft Plan of Subdivision application for 3200 Reid's Lane.

We are providing the following updated information:

1. Conceptual Servicing and Stormwater Management Report – Reid's Lane Subdivision, Revised July 2024 prepared by Novatech, including plans:

- Preliminary Grading & Site Servicing Plan (119089-PGR, revision 9)
- Stormwater Management Pond Facility (119089-SWMF, revision 3)
- Stormwater Management Pond Facility Details (119089-SWMF1, revision 1)
- Storm Drainage Area Plan (119089-STM, revision 7)
- PCSWMM Modeling Files

Engineering Comments:

Stormwater Management Comments

4. Although the proposed dry pond design is small, it claims achieve 60% TSS removal. The current design does not comply with the basic parameters for dry pond design guidelines as per 2003 MOE Stormwater Management Design Manual (4.6.5 Dry Ponds). The drainage area is smaller than 5ha, and the pond is only 0.6m deep. The flow is short circuiting from the inlet to the outlet without a proper dispersion distance for particles to settle. Pond shape does not comply with the MOE design requirements for a dry pond.

   Novatech Response: Table 3.2 of the "*Stormwater Management Planning and Design Manual*" (MOE, March 2003), dry pond can provide 60% TSS removal. Based on a 35% imperviousness, an extended quality volume of 90 m^3/ha (399 m^3) is required to be drawn down over 24 hours, which is less than the 100-year volume (489m^3). It is recommended that the 25mm storm event is drawn down over 24-48 hours. Due to the small drainage area and a low flow orifice of 100mm, the 25mm even is limited to a draw down time of 6 hours. This

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draw down time could not be extended due to clogging concerns with a smaller orifice. The 100-year volume will draw down over 13-hours due to the backwater condition in the Osgoode Link Pathway ditch. With no backwater condition, the 100-year would draw down in 23 hours. It should also be noted that the dry pond design has also been revised with a low flow swale and a longer flow path to improve the removal of sediments.

5. The pond berm is only 0.6m wide and a minimum 1.5m berm is required. This requirement is essential to maintain stability and grass maintenance at the top of the berm

   Novatech Response: The proposed pond berm has been adjusted and is now 1.5m wide, shown on the Stormwater Management Pond Facility Plan (119089-SWMF).

6. The maximum side slope must be 3:1

   Novatech Response: The proposed side slopes around the pond are terraced at 3:1 max, shown on the Stormwater Management Pond Facility Plan (119089-SWMF).

7. The top of the pond is approximately 0.1m above the 100-year water level which is not acceptable.

   Novatech Response: The proposed pond has been updated to provide a minimum of 0.24m freeboard above the 1:100year water elevation. During the stress-test, there is 0.19m of freeboard, with 5cm of water flowing over the emergency spillway. Refer to the Stormwater Management Pond Facility Plan (119089-SWMF).

8. There is not access road to get from the west to the east side of the pond.

   Novatech Response: The pond can be access from City owned lands, that is the Osgood Link Pathway and Block 8 (future pathway to be owned by the City)

9. The access road is required for the maintenance up the ditch to Doyle Creek Municipal Drain.

   Novatech Response: The City has an existing easement along the existing drainage ditch between the Osgood Link Pathway and Nixon Drive. No additional maintenance road is proposed.

10. The detail of the inlet to the pond is required.

    Novatech Response: The inlet of the pond is a 500mm diameter culvert, shown on the Stormwater Management Pond Facility drawing (119089-SWMF)

11. The location of the pond against the property line would not allow an industrial lawn mower to cut grass between the property line and the slope of the pond.

    Novatech Response: The pond block has been expanded to allow for additional lands, including a 1.5m berm and more gradual side slopes to allow for maintenance.

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12. The outlet weir with 0.09m wide is susceptible to plugging by debris.

    Novatech Response: The outlet structure has been redesigned at this preliminary stage to provide detail of the proposed ditch inlet catchbasin, orifice plate ICD, weir (increased to 0.3m) and emergency overflow. These details are shown on Stormwater Management Pond Facility - Details drawings (119089-SWMF1)

13. Please assure that the pond will function as a dry SW facility and have positive outlet and will not be soggy.

    In addition, please provide us with calculations that the pond will not back up to the adjacent lots at the Lombardy Way cul-de-sac.

    Novatech Response: The pond has been redesigned with a low flow channel to direct the low flows to the outlet structure.

    The PCSWMM model has accounted for pond flows backing up and spilling over the roadside ditch high point and towards Lombardy. This only occurs in the larger storm events (i.e., 100-year storm) and has been taken into account in the model The modelled runoff is still below the pre-development flows, in this case.

14. Further comments provided by the City's Stormwater Management Modelling Review Unit are enclosed.

    Novatech Response: Acknowledged. Refer to Response to Technical Memo prepared by Novatech dated July 11, 2025.

Yours truly,

NOVATECH

Melanie Schroeder, P.Eng
Project Engineer
Water Resources

Lisa Bowley, P.Eng.
Senior Project Manager
Land Development Engineering

Suite 200, 240 Michael Cowpland Drive, Ottawa ON K2M 1P6 Tel: 613.254.9643 www.novatech-eng.com

APPENDIX B

STORMWATER MANAGEMENT CALCULATIONS

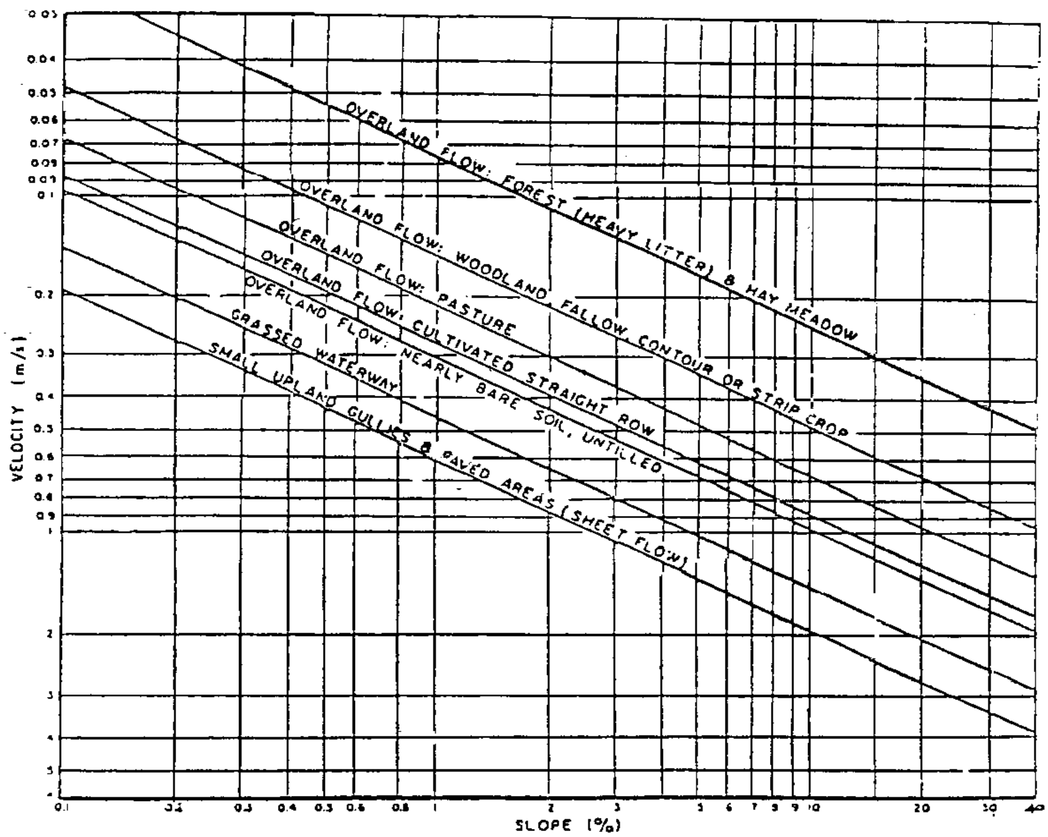


Figure A.5.2: Upland Method for Estimating Time of Concentration (SCS National Engineering Handbook, 1971)

Project Name
Pre-Development Model Parameters

NOVATECH
Engineers, Planners & Landscape Architects

Time to Peak Calculations
(Uplands Overland Flow Method)
Existing Conditions

Area ID	Area (ha)	Overland Flow						Concentrated Overland Flow						Overall		
		Length (m)	Elevation U/S (m)	Elevation D/S (m)	Slope (%)	Velocity (m/s)	Travel Time (min)	Length (m)	Elevation U/S (m)	Elevation D/S (m)	Slope (%)	Velocity (m/s)	Travel Time (min)	Time of Concentratio (min)	Time to Peak (min)	Time to Peak (min)
EX-1	3.31	100	94.00	91.15	2.8%	0.25	6.67	195	91.15	90.00	0.6%	0.35	9.29	16	11	11
EX-2	1.44	100	93.75	92.50	1.3%	0.16	10.42	140	92.50	90.50	1.4%	0.50	4.67	15	10	10

Weighted Curve Number Calculations
Soil type 'B' (Soil Mapping and Boreholes: silty sand and sandy clay)

Area ID	Land Use 1	Area	CN	Land Use 2	Area	CN	Weighted CN	
EX-1	Forest	79%	55	Residential	21%	72	59	** Soil Type (HSG) = B; Forest Cover = Good; Residential Unit = 1/3 acre
EX-2	Forest	67%	55	Residential	33%	75	62	** Soil Type (HSG) = B; Forest Cover = Good; Residential Unit = 1/4 acre

Weighted IA Calculations

Area ID	Land Use 1	Area	IA	Land Use 2	Area	IA	Weighted IA
EX-1	Forest	79%	15.6	Residential	21%	7.4	13.9
EX-2	Forest	67%	15.6	Residential	33%	6.4	12.5

Project Name
Pre-Development Model Parameters

NOVATECH
Engineers, Planners & Landscape Architects

Time to Peak Calculations
(Uplands Overland Flow Method)
Proposed Conditions

Area ID	Area (ha)	Overland Flow						Concentrated Overland Flow						Overall	
		Length (m)	Elevation U/S (m)	Elevation D/S (m)	Slope (%)	Velocity (m/s)	Travel Time (min)	Length (m)	Elevation U/S (m)	Elevation D/S (m)	Slope (%)	Velocity (m/s)	Travel Time (min)	Time of Concentration (min)	Time of Concentration (min)
A	1.12	85	93.25	91.06	2.6%	0.34	4.17	0	-	-	-	-	0.00	4.2	15
B	0.48	35	92.50	91.20	3.7%	0.41	1.42	0	-	-	-	-	0.00	1.4	15
C	0.20	50	92.73	89.85	5.8%	0.50	1.67	0	-	-	-	-	0.00	1.7	15
D	0.48	50	92.91	91.07	3.7%	0.41	2.03	0	-	-	-	-	0.00	2.0	15
E	0.52	25	92.91	91.13	7.1%	0.57	0.73	0	-	-	-	-	0.00	0.7	15
F	0.22	25	91.65	90.90	3.0%	0.37	1.13	0	-	-	-	-	0.00	1.1	15
G	0.11	10	92.46	91.31	11.5%	0.70	0.24	0	-	-	-	-	0.00	0.2	15
H	0.43	95	93.40	91.36	2.1%	0.30	5.28	0	-	-	-	-	0.00	5.3	15
EX-1	0.23	60	94.15	93.45	1.2%	0.22	4.55	0	-	-	-	-	0.00	4.5	15
EX-2	0.48	60	93.90	93.15	1.3%	0.24	4.17	0	-	-	-	-	0.00	4.2	15
EX-3	0.48	60	94.00	92.60	2.3%	0.32	3.13	0	-	-	-	-	0.00	3.1	15

Weighted Curve Number Calculations
Soil type 'B' (Soil Mapping and Boreholes: silty sand and sandy clay)

Area ID	Land Use 1	Area	CN	Land Use 2	Area	CN	Land Use 3	Area	CN	Weighted CN	
A	Pavement/Roof	19%	98	Lawn	58%	58	Forest / Trees	23%	55	65	
B	Pavement/Roof	1%	98	Lawn	88%	58	Forest / Trees	11%	55	58	
C	Pavement/Roof	2%	98	Lawn	21%	58	Forest / Trees	77%	55	57	
D	Pavement/Roof	13%	98	Lawn	38%	58	Forest / Trees	49%	55	62	
E	Pavement/Roof	22%	98	Lawn	78%	58	Forest / Trees	0.2%	55	67	
F	Pavement/Roof	27%	98	Lawn	51%	58	Forest / Trees	22%	55	68	
G	Pavement/Roof	27%	98	Lawn	73%	58	Forest / Trees	0%	55	69	
H	Pavement/Roof	12%	98	Lawn	53%	58	Forest / Trees	34%	55	62	
EX-1	Residential	100%	72	Lawn	0%	58	Forest / Trees	0%	55	72	** Residential Unit = 1/3 acre
EX-2	Residential	100%	75	Lawn	0%	58	Forest / Trees	0%	55	75	** Residential Unit = 1/4 acre
EX-3	Residential	100%	72	Lawn	0%	58	Forest / Trees	0%	55	72	** Residential Unit = 1/3 acre

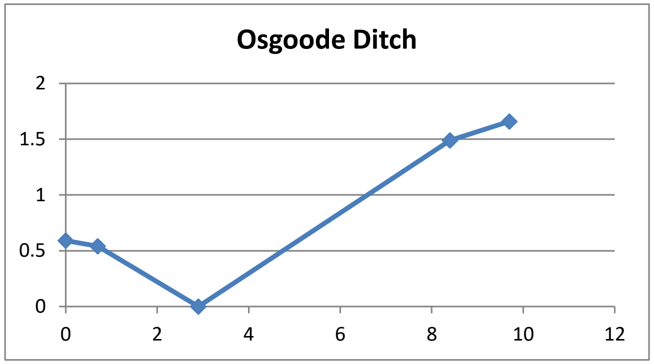
Weighted IA Calculations

Area ID	Land Use 1	Area	IA	Land Use 2	Area	IA	Land Use 3	Area	IA	Weighted IA
A	Pavement/Roof	19%	1.0	Lawn	58%	13.8	Forest / Trees	23%	15.6	11.8
B	Pavement/Roof	1%	1.0	Lawn	88%	13.8	Forest / Trees	11%	15.6	13.8
C	Pavement/Roof	2%	1.0	Lawn	21%	13.8	Forest / Trees	77%	15.6	14.9
D	Pavement/Roof	13%	1.0	Lawn	38%	13.8	Forest / Trees	49%	15.6	13.0
E	Pavement/Roof	22%	1.0	Lawn	78%	13.8	Forest / Trees	0.2%	15.6	11.0
F	Pavement/Roof	27%	1.0	Lawn	51%	13.8	Forest / Trees	22%	15.6	10.8
G	Pavement/Roof	27%	1.0	Lawn	73%	13.8	Forest / Trees	0%	15.6	10.4
H	Pavement/Roof	12%	1.0	Lawn	53%	13.8	Forest / Trees	34%	15.6	12.8
EX-1	Residential	100%	7.4	Lawn	0%	13.8	Forest / Trees	0%	15.6	7.4
EX-2	Residential	100%	6.4	Lawn	0%	13.8	Forest / Trees	0%	15.6	6.4
EX-3	Residential	100%	7.4	Lawn	0%	13.8	Forest / Trees	0%	15.6	7.4

3200 Reid's Lane (119089)
Roadway Cross-Sections

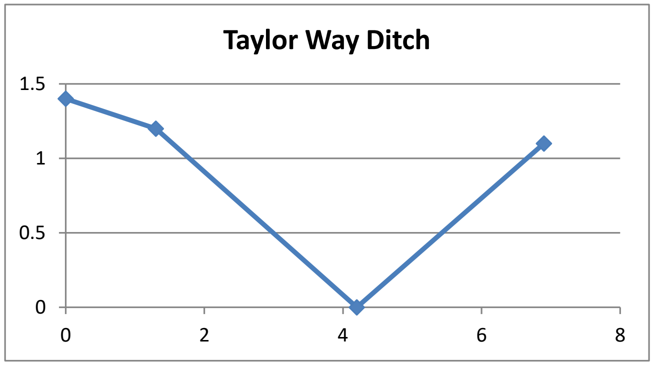
Osgoode Ditch

Station (m)	Depth (m)
0	0.59
0.7	0.54
2.9	0
8.4	1.49
9.7	1.66



Taylor Way Ditch

Station (m)	Depth (m)
0	1.4
1.3	1.2
4.2	0
6.9	1.1



3200 Reid's Lane (119089)
Design Storm Time Series Data
Chicago Design Storms

C25mm-4.stm		C2-3.stm		C5-3.stm	
Duration min	Intensity mm/hr	Duration min	Intensity mm/hr	Duration min	Intensity mm/hr
0:00	0	0:00	0	0:00	0
0:10	1.51	0:10	2.81	0:10	3.68
0:20	1.75	0:20	3.5	0:20	4.58
0:30	2.07	0:30	4.69	0:30	6.15
0:40	2.58	0:40	7.3	0:40	9.61
0:50	3.46	0:50	18.21	0:50	24.17
1:00	5.39	1:00	76.81	1:00	104.19
1:10	13.44	1:10	24.08	1:10	32.04
1:20	56.67	1:20	12.36	1:20	16.34
1:30	17.77	1:30	8.32	1:30	10.96
1:40	9.12	1:40	6.3	1:40	8.29
1:50	6.14	1:50	5.09	1:50	6.69
2:00	4.65	2:00	4.29	2:00	5.63
2:10	3.76	2:10	3.72	2:10	4.87
2:20	3.17	2:20	3.29	2:20	4.3
2:30	2.74	2:30	2.95	2:30	3.86
2:40	2.43	2:40	2.68	2:40	3.51
2:50	2.18	2:50	2.46	2:50	3.22
3:00	1.98	3:00	2.28	3:00	2.98
3:10	1.81				
3:20	1.68				
3:30	1.56				
3:40	1.47				
3:50	1.38				
4:00	1.31				

3200 Reid's Lane (119089)
Design Storm Time Series Data
Chicago Design Storms

C100-3.stm		C100-3+20%.stm	
Duration min	Intensity mm/hr	Duration min	Intensity mm/hr
0:00	0	0:00	0
0:10	6.05	0:10	6:14
0:20	7.54	0:20	9.05
0:30	10.16	0:30	12.19
0:40	15.97	0:40	19.16
0:50	40.65	0:50	48.78
1:00	178.56	1:00	214.27
1:10	54.05	1:10	64.86
1:20	27.32	1:20	32.78
1:30	18.24	1:30	21.89
1:40	13.74	1:40	16.49
1:50	11.06	1:50	13.27
2:00	9.29	2:00	11.15
2:10	8.02	2:10	9.62
2:20	7.08	2:20	8.5
2:30	6.35	2:30	7.62
2:40	5.76	2:40	6.91
2:50	5.28	2:50	6.34
3:00	4.88	3:00	5.86

3200 Reid's Lane (119089)
Design Storm Time Series Data
SCS Design Storms

S2-12.stm			S5-12.stm			S100-12.stm	
Duration	Intensity		Duration	Intensity		Duration	Intensity
min	mm/hr		min	mm/hr		min	mm/hr
0:00	0.00		0:00	0		0:00	0
0:30	1.27		0:30	1.69		0:30	2.82
1:00	0.59		1:00	0.79		1:00	1.31
1:30	1.10		1:30	1.46		1:30	2.44
2:00	1.10		2:00	1.46		2:00	2.44
2:30	1.44		2:30	1.91		2:30	3.19
3:00	1.27		3:00	1.69		3:00	2.82
3:30	1.69		3:30	2.25		3:30	3.76
4:00	1.69		4:00	2.25		4:00	3.76
4:30	2.29		4:30	3.03		4:30	5.07
5:00	2.88		5:00	3.82		5:00	6.39
5:30	4.57		5:30	6.07		5:30	10.14
6:00	36.24		6:00	48.08		6:00	80.38
6:30	9.23		6:30	12.25		6:30	20.47
7:00	4.06		7:00	5.39		7:00	9.01
7:30	2.71		7:30	3.59		7:30	6.01
8:00	2.37		8:00	3.15		8:00	5.26
8:30	1.86		8:30	2.47		8:30	4.13
9:00	1.95		9:00	2.58		9:00	4.32
9:30	1.27		9:30	1.69		9:30	2.82
10:00	1.02		10:00	1.35		10:00	2.25
10:30	1.44		10:30	1.91		10:30	3.19
11:00	0.93		11:00	1.24		11:00	2.07
11:30	0.85		11:30	1.12		11:30	1.88
12:00	0.85		12:00	1.12		12:00	1.88

3200 Reid's Lane (119089)
Design Storm Time Series Data
SCS Design Storms

S2-24.stm		S5-24.stm		S100-24.stm	
Duration	Intensity	Duration	Intensity	Duration	Intensity
min	mm/hr	min	mm/hr	min	mm/hr
0:00	0.00	0:00	0	0:00	0
1:00	0.72	1:00	0.44	1:00	0.6
2:00	0.34	2:00	0.44	2:00	0.75
3:00	0.63	3:00	0.81	3:00	1.39
4:00	0.63	4:00	0.81	4:00	1.39
5:00	0.81	5:00	1.06	5:00	1.81
6:00	0.72	6:00	0.94	6:00	1.6
7:00	0.96	7:00	1.25	7:00	2.13
8:00	0.96	8:00	1.25	8:00	2.13
9:00	1.30	9:00	1.68	9:00	2.88
10:00	1.63	10:00	2.12	10:00	3.63
11:00	2.59	11:00	3.37	11:00	5.76
12:00	20.55	12:00	26.71	12:00	45.69
13:00	5.23	13:00	6.8	13:00	11.64
14:00	2.30	14:00	2.99	14:00	5.12
15:00	1.54	15:00	2	15:00	3.42
16:00	1.34	16:00	1.75	16:00	2.99
17:00	1.06	17:00	1.37	17:00	2.35
18:00	1.11	18:00	1.44	18:00	2.46
19:00	0.72	19:00	0.94	19:00	1.6
20:00	0.58	20:00	0.75	20:00	1.28
21:00	0.81	21:00	1.06	21:00	1.81
22:00	0.53	22:00	0.68	22:00	1.17
23:00	0.48	23:00	0.63	23:00	1.07
0:00	0.48	0:00	0.63	0:00	1.07

3200 Reid's Lane (119089)
PCSWMM Pre-Development Model Schematics

Overall Model Schematic

Date: 2025-07-09
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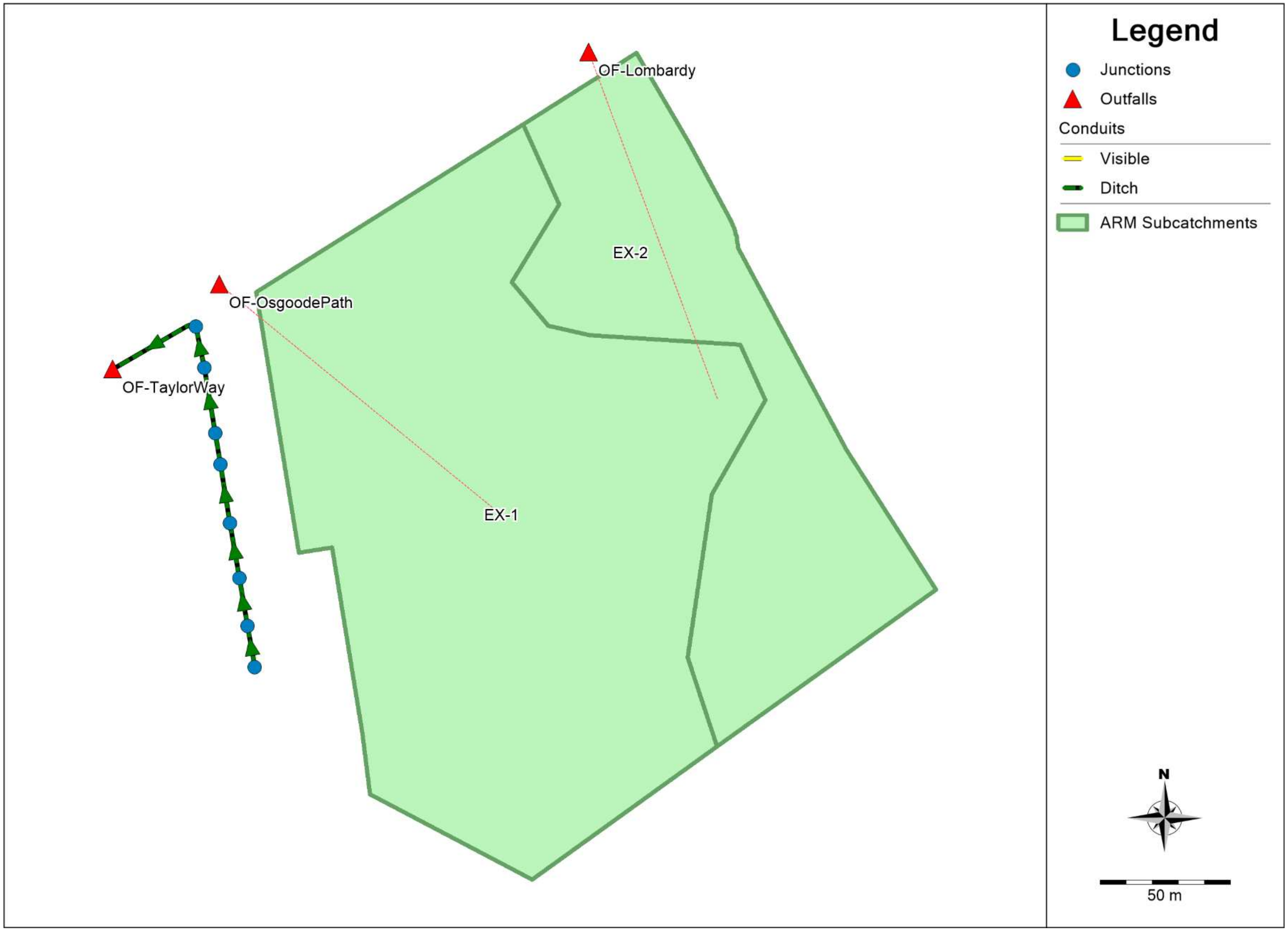
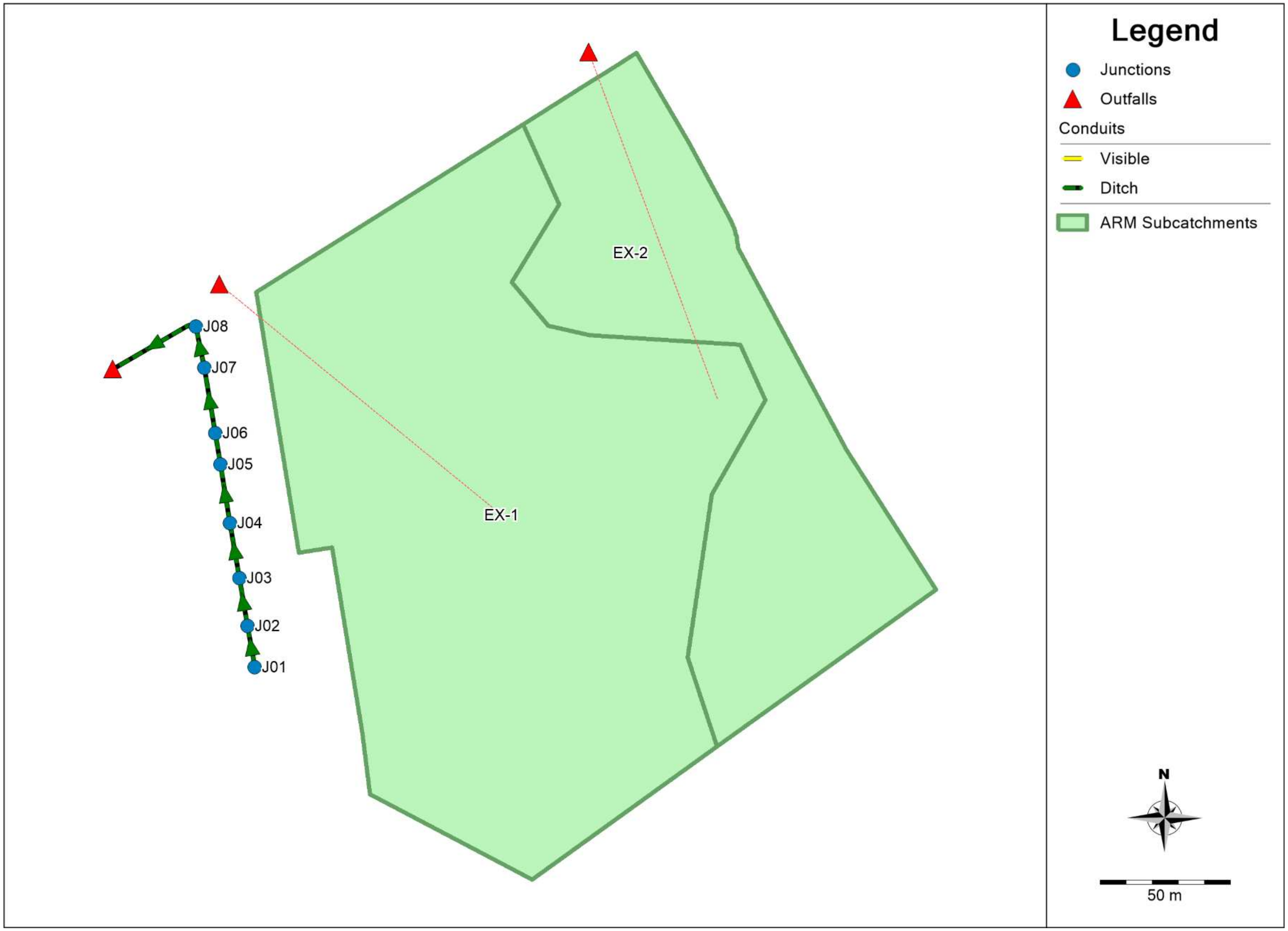
Subcatchments and Outfalls



3200 Reid's Lane (119089)
PCSWMM Pre-Development Model Schematics

Junctions



Date: 2025-07-09
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ALTERNATIVE RUNOFF METHOD (ARM) - PCSWMM VERSION 7.6.3620

This is a new version of ARM - your feedback and suggestions are solicited.
Create a ticket, post on the PCSWMM feature request forum, or email us directly!

Simulation start time:	05/04/2021 00:00:00
Simulation end time:	05/06/2021 00:00:00
Runoff wet weather time steps:	240 seconds
Report time steps:	60 seconds
Number of data points:	2881

****
Unit Hydrographs Runoff Method
****

Subcatchment	Runoff Method	Raingage	Area (ha)	Time of Concentration (min)	Time to Peak (min)	Time after Peak (min)	Peak UH Flow ($m^3/s/mm$)	UH Depth (mm)
EX-2	Nash IUH	Raingage	1.44	15	10	62	0.01299	0.998
EX-1	Nash IUH	Raingage	3.31	16	10.67	69.33	0.028	0.999

****
ARM Runoff Summary
****

Subcatchment	Total Precip (mm)	Total Losses (mm)	Total Runoff (mm)	Total Runoff 10^6 ltr	Peak Runoff LPS	Runoff Coeff (fraction)
EX-2	93.91	65.956	27.903	0.402	95.531	0.297
EX-1	93.91	68.954	24.921	0.825	191.26	0.265

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

****
Element Count
****

Number of rain gages 1
Number of subcatchments ... 0
Number of nodes 11
Number of links 8
Number of pollutants 0
Number of land uses 0

****
Raingage Summary

****

Name	Data Source	Data Type	Recording Interval
Raingage	07-SCS100yr-12hr	INTENSITY	30 min.

****
Node Summary
****

Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
J01	JUNCTION	90.11	2.00	0.0	Yes
J02	JUNCTION	90.02	2.00	0.0	
J03	JUNCTION	89.81	2.00	0.0	
J04	JUNCTION	89.76	2.00	0.0	
J05	JUNCTION	89.64	2.00	0.0	
J06	JUNCTION	89.52	2.00	0.0	
J07	JUNCTION	89.44	2.00	0.0	
J08	JUNCTION	89.28	2.00	0.0	
OF-Lombardy	OUTFALL	90.80	0.00	0.0	
OF-OsgoodePath	OUTFALL	90.75	0.00	0.0	
OF-TaylorWay	OUTFALL	88.36	1.40	0.0	

****
Link Summary
****

Name	From Node	To Node	Type	Length	%Slope	Roughness
C01	J01	J02	CONDUIT	18.0	0.5000	0.0350
C02	J02	J03	CONDUIT	19.0	1.1053	0.0350
C03	J03	J04	CONDUIT	21.0	0.2381	0.0350
C04	J04	J05	CONDUIT	23.0	0.5217	0.0350
C05	J05	J06	CONDUIT	12.0	1.0001	0.0350
C06	J06	J07	CONDUIT	25.0	0.3200	0.0350
C07	J07	J08	CONDUIT	16.0	1.0001	0.0350
C08	J08	OF-TaylorWay	CONDUIT	36.0	2.5564	0.0350

****
Cross Section Summary
****

Conduit	Shape	Full Depth	Full Area	Hyd. Rad.	Max. Width	No. of Barrels	Full Flow
C01	OsgoodeDitch	1.66	8.97	0.81	9.70	1	15724.73
C02	OsgoodeDitch	1.66	8.97	0.81	9.70	1	23379.85
C03	OsgoodeDitch	1.66	8.97	0.81	9.70	1	10851.04
C04	OsgoodeDitch	1.66	8.97	0.81	9.70	1	16062.95
C05	OsgoodeDitch	1.66	8.97	0.81	9.70	1	22238.55
C06	OsgoodeDitch	1.66	8.97	0.81	9.70	1	12579.74
C07	OsgoodeDitch	1.66	8.97	0.81	9.70	1	22238.55
C08	TaylorWayDitch	1.40	4.75	0.64	6.90	1	16120.66

```
****************
Transect Summary
****************

Transect OsgoodeDitch
Area:
            0.0005     0.0019     0.0043     0.0076     0.0119
            0.0172     0.0234     0.0305     0.0387     0.0477
            0.0577     0.0687     0.0807     0.0935     0.1074
            0.1222     0.1383     0.1564     0.1755     0.1951
            0.2152     0.2357     0.2566     0.2780     0.2999
            0.3222     0.3449     0.3681     0.3918     0.4159
            0.4405     0.4655     0.4910     0.5169     0.5433
            0.5702     0.5975     0.6252     0.6534     0.6821
            0.7112     0.7408     0.7708     0.8013     0.8322
            0.8639     0.8965     0.9301     0.9646     1.0000
Hrad:
            0.0198     0.0396     0.0594     0.0792     0.0990
            0.1188     0.1386     0.1584     0.1782     0.1980
            0.2178     0.2376     0.2574     0.2772     0.2970
            0.3168     0.3204     0.3285     0.3578     0.3863
            0.4140     0.4412     0.4677     0.4936     0.5191
            0.5440     0.5685     0.5926     0.6164     0.6397
            0.6627     0.6854     0.7078     0.7300     0.7518
            0.7735     0.7949     0.8160     0.8370     0.8578
            0.8784     0.8988     0.9191     0.9392     0.9576
            0.9649     0.9729     0.9815     0.9905     1.0000
Width:
            0.0266     0.0532     0.0797     0.1063     0.1329
            0.1595     0.1860     0.2126     0.2392     0.2658
            0.2924     0.3189     0.3455     0.3721     0.3987
            0.4253     0.4768     0.5264     0.5390     0.5517
            0.5643     0.5769     0.5896     0.6022     0.6148
            0.6275     0.6401     0.6527     0.6654     0.6780
            0.6906     0.7033     0.7159     0.7285     0.7412
            0.7538     0.7664     0.7791     0.7917     0.8043
            0.8170     0.8296     0.8422     0.8549     0.8691
            0.8953     0.9215     0.9477     0.9738     1.0000

Transect TaylorWayDitch
Area:
            0.0004     0.0016     0.0036     0.0064     0.0101
            0.0145     0.0197     0.0258     0.0326     0.0402
            0.0487     0.0579     0.0680     0.0789     0.0905
            0.1030     0.1163     0.1304     0.1453     0.1610
            0.1775     0.1948     0.2129     0.2318     0.2515
            0.2720     0.2934     0.3155     0.3384     0.3622
            0.3867     0.4121     0.4382     0.4652     0.4930
            0.5215     0.5509     0.5811     0.6121     0.6438
            0.6759     0.7084     0.7413     0.7750     0.8098
            0.8457     0.8827     0.9207     0.9598     1.0000
Hrad:
            0.0201     0.0402     0.0603     0.0805     0.1006
            0.1207     0.1408     0.1609     0.1810     0.2011
            0.2212     0.2414     0.2615     0.2816     0.3017
            0.3218     0.3419     0.3620     0.3822     0.4023
            0.4224     0.4425     0.4626     0.4827     0.5028
            0.5229     0.5431     0.5632     0.5833     0.6034
```

```
            0.6235     0.6436     0.6637     0.6839     0.7040
            0.7241     0.7442     0.7643     0.7844     0.8117
            0.8416     0.8713     0.8984     0.9117     0.9255
            0.9396     0.9542     0.9691     0.9844     1.0000
Width:
            0.0198     0.0395     0.0593     0.0791     0.0988
            0.1186     0.1384     0.1581     0.1779     0.1977
            0.2174     0.2372     0.2570     0.2767     0.2965
            0.3163     0.3360     0.3558     0.3756     0.3953
            0.4151     0.4349     0.4546     0.4744     0.4942
            0.5139     0.5337     0.5535     0.5732     0.5930
            0.6128     0.6326     0.6523     0.6721     0.6919
            0.7116     0.7314     0.7512     0.7709     0.7836
            0.7934     0.8032     0.8154     0.8417     0.8681
            0.8945     0.9209     0.9472     0.9736     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 ............... LPS
Process Models:
  Rainfall/Runoff ........ YES
  RDII ................... NO
  Snowmelt ............... NO
  Groundwater ............ NO
  Flow Routing ........... YES
  Ponding Allowed ........ NO
  Water Quality .......... NO
Flow Routing Method ...... DYNWAVE
Surcharge Method ......... EXTRAN
Starting Date ............ 05/04/2021 00:00:00
Ending Date .............. 05/06/2021 00:00:00
Antecedent Dry Days ...... 0.0
Report Time Step ......... 00:01:00
Routing Time Step ........ 2.00 sec
Variable Time Step ....... YES
Maximum Trials ........... 8
Number of Threads ........ 1
Head Tolerance ........... 0.001500 m


**************************        Volume         Volume
Flow Routing Continuity         hectare-m       10^6 ltr
**************************       ---------      ---------
Dry Weather Inflow .......           0.000          0.000
Wet Weather Inflow .......           0.000          0.000
Groundwater Inflow .......           0.000          0.000
RDII Inflow ..............           0.000          0.000
External Inflow ..........          14.309        143.096
External Outflow .........          14.296        142.957
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 ......         0.015         0.146
Continuity Error (%) .....        -0.005


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


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


*************************
Routing Time Step Summary
*************************
Minimum Time Step           :     1.50 sec
Average Time Step           :     2.00 sec
Maximum Time Step           :     2.00 sec
Percent in Steady State     :     0.00
Average Iterations per Step :     2.00
Percent Not Converging      :     0.00
Time Step Frequencies       :
    2.000 -  1.516 sec      :   100.00 %
    1.516 -  1.149 sec      :     0.00 %
    1.149 -  0.871 sec      :     0.00 %
    0.871 -  0.660 sec      :     0.00 %
    0.660 -  0.500 sec      :     0.00 %


******************
Node Depth Summary
******************
```

Node	Type	Average Depth Meters	Maximum Depth Meters	Maximum HGL Meters	Time of Max Occurrence days	Time of Max Occurrence hr:min	Reported Max Depth Meters
J01	JUNCTION	0.50	0.50	90.61	0	00:07	0.50
J02	JUNCTION	0.44	0.44	90.46	0	00:08	0.44
J03	JUNCTION	0.56	0.56	90.37	1	12:49	0.56
J04	JUNCTION	0.51	0.51	90.27	1	19:54	0.51
J05	JUNCTION	0.47	0.47	90.11	1	03:32	0.47
J06	JUNCTION	0.54	0.54	90.06	1	07:17	0.54
J07	JUNCTION	0.45	0.45	89.89	0	00:28	0.45
J08	JUNCTION	0.46	0.46	89.74	0	00:39	0.46
OF-Lombardy	OUTFALL	0.00	0.00	90.80	0	00:00	0.00
OF-OsgoodePath	OUTFALL	0.00	0.00	90.75	0	00:00	0.00
OF-TaylorWay	OUTFALL	0.46	0.46	88.82	0	00:28	0.46

```
*******************
Node Inflow Summary
*******************
```

Node	Type	Maximum Lateral Inflow LPS	Maximum Total Inflow LPS	Time of Max Occurrence days hr:min	Lateral Inflow Volume 10^6 ltr	Total Inflow Volume 10^6 ltr	Flow Balance Error Percent
J01	JUNCTION	821.00	821.00	0 00:00	142	142	0.006
J02	JUNCTION	0.00	834.75	0 00:00	0	142	0.011
J03	JUNCTION	0.00	821.00	0 00:07	0	142	0.017
J04	JUNCTION	0.00	821.00	0 05:34	0	142	0.016
J05	JUNCTION	0.00	821.00	1 13:19	0	142	0.011
J06	JUNCTION	0.00	821.00	0 19:26	0	142	0.014
J07	JUNCTION	0.00	821.00	0 07:52	0	142	0.013
J08	JUNCTION	0.00	821.00	0 00:20	0	142	0.011
OF-Lombardy	OUTFALL	95.53	95.53	0 06:36	0.402	0.402	0.000
OF-OsgoodePath	OUTFALL	191.23	191.23	0 06:36	0.825	0.825	0.000
OF-TaylorWay	OUTFALL	0.00	821.00	0 01:54	0	142	0.000

```
**********************
Node Surcharge Summary
**********************
```

No nodes were surcharged.

```
*********************
Node Flooding Summary
*********************
```

No nodes were flooded.

```
***********************
Outfall Loading Summary
***********************
```

Outfall Node	Flow Freq Pcnt	Avg Flow LPS	Max Flow LPS	Total Volume 10^6 ltr
OF-Lombardy	16.78	13.86	95.53	0.402
OF-OsgoodePath	16.60	28.75	191.23	0.825
OF-TaylorWay	99.94	820.70	821.00	141.729
System	44.44	863.31	1107.75	142.956

```
********************
Link Flow Summary
********************
```

Link	Type	Maximum |Flow| LPS	Time of Max Occurrence days	hr:min	Maximum |Veloc| m/sec	Max/ Full Flow	Max/ Full Depth
C01	CHANNEL	834.75	0	00:00	1.67	0.05	0.29
C02	CHANNEL	821.00	0	00:07	1.51	0.04	0.30
C03	CHANNEL	821.00	0	05:34	1.30	0.08	0.32
C04	CHANNEL	821.00	1	13:19	1.23	0.05	0.29
C05	CHANNEL	821.00	0	19:26	1.22	0.04	0.30
C06	CHANNEL	821.00	0	07:52	1.22	0.07	0.30
C07	CHANNEL	821.00	0	00:20	1.22	0.04	0.27
C08	CHANNEL	821.00	0	01:54	1.62	0.05	0.33

****
Flow Classification Summary
****

Conduit	Adjusted /Actual Length	Dry	Up Dry	Down Dry	Sub Crit	Sup Crit	Up Crit	Down Crit	Norm Ltd	Inlet Ctrl
		---------- Fraction of Time in Flow Class ----------								
C01	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
C02	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	1.00	0.00
C03	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
C04	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
C05	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
C06	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
C07	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	1.00	0.00
C08	1.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00

****
Conduit Surcharge Summary
****

No conduits were surcharged.

Analysis begun on: Wed Jul 9 10:21:58 2025
Analysis ended on: Wed Jul 9 10:21:59 2025
Total elapsed time: 00:00:01

```
ALTERNATIVE RUNOFF METHOD (ARM) - PCSWMM VERSION 7.6.3620
---------------------------------------------------------

This is a new version of ARM - your feedback and suggestions are solicited.
Create a ticket, post on the PCSWMM feature request forum, or email us directly!

Simulation start time:            05/04/2021 00:00:00
Simulation end time:              05/06/2021 00:00:00
Runoff wet weather time steps:    240 seconds
Report time steps:                60 seconds
Number of data points:            2881


******************************
Unit Hydrographs Runoff Method
******************************
```

Subcatchment	Runoff Method	Raingage	Area (ha)	Time of Concentration (min)	Time to Peak (min)	Time after Peak (min)	Peak UH Flow (m³/s/mm)	UH Depth (mm)
EX-2	Nash IUH	Raingage	1.44	15	10	62	0.01299	0.998
EX-1	Nash IUH	Raingage	3.31	16	10.67	69.33	0.028	0.999

```
******************
ARM Runoff Summary
******************
```

Subcatchment	Total Precip (mm)	Total Losses (mm)	Total Runoff (mm)	Total Runoff 10^6 ltr	Peak Runoff LPS	Runoff Coeff (fraction)
EX-2	106.73	71.2	35.465	0.511	74.22	0.332
EX-1	106.73	74.735	31.964	1.058	151.848	0.299

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


*************
Element Count
*************
Number of rain gages ...... 1
Number of subcatchments ... 0
Number of nodes ........... 11
Number of links ........... 8
Number of pollutants ...... 0
Number of land uses ....... 0


****************
Raingage Summary
```

****

Name	Data Source	Data Type	Recording Interval
Raingage	11-SCS100yr-24hr	INTENSITY	60 min.

****
Node Summary
****

Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
J01	JUNCTION	90.11	2.00	0.0	Yes
J02	JUNCTION	90.02	2.00	0.0	
J03	JUNCTION	89.81	2.00	0.0	
J04	JUNCTION	89.76	2.00	0.0	
J05	JUNCTION	89.64	2.00	0.0	
J06	JUNCTION	89.52	2.00	0.0	
J07	JUNCTION	89.44	2.00	0.0	
J08	JUNCTION	89.28	2.00	0.0	
OF-Lombardy	OUTFALL	90.80	0.00	0.0	
OF-OsgoodePath	OUTFALL	90.75	0.00	0.0	
OF-TaylorWay	OUTFALL	88.36	1.40	0.0	

****
Link Summary
****

Name	From Node	To Node	Type	Length	%Slope	Roughness
C01	J01	J02	CONDUIT	18.0	0.5000	0.0350
C02	J02	J03	CONDUIT	19.0	1.1053	0.0350
C03	J03	J04	CONDUIT	21.0	0.2381	0.0350
C04	J04	J05	CONDUIT	23.0	0.5217	0.0350
C05	J05	J06	CONDUIT	12.0	1.0001	0.0350
C06	J06	J07	CONDUIT	25.0	0.3200	0.0350
C07	J07	J08	CONDUIT	16.0	1.0001	0.0350
C08	J08	OF-TaylorWay	CONDUIT	36.0	2.5564	0.0350

****
Cross Section Summary
****

Conduit	Shape	Full Depth	Full Area	Hyd. Rad.	Max. Width	No. of Barrels	Full Flow
C01	OsgoodeDitch	1.66	8.97	0.81	9.70	1	15724.73
C02	OsgoodeDitch	1.66	8.97	0.81	9.70	1	23379.85
C03	OsgoodeDitch	1.66	8.97	0.81	9.70	1	10851.04
C04	OsgoodeDitch	1.66	8.97	0.81	9.70	1	16062.95
C05	OsgoodeDitch	1.66	8.97	0.81	9.70	1	22238.55
C06	OsgoodeDitch	1.66	8.97	0.81	9.70	1	12579.74
C07	OsgoodeDitch	1.66	8.97	0.81	9.70	1	22238.55
C08	TaylorWayDitch	1.40	4.75	0.64	6.90	1	16120.66

```
****************
Transect Summary
****************

Transect OsgoodeDitch
Area:
            0.0005     0.0019     0.0043     0.0076     0.0119
            0.0172     0.0234     0.0305     0.0387     0.0477
            0.0577     0.0687     0.0807     0.0935     0.1074
            0.1222     0.1383     0.1564     0.1755     0.1951
            0.2152     0.2357     0.2566     0.2780     0.2999
            0.3222     0.3449     0.3681     0.3918     0.4159
            0.4405     0.4655     0.4910     0.5169     0.5433
            0.5702     0.5975     0.6252     0.6534     0.6821
            0.7112     0.7408     0.7708     0.8013     0.8322
            0.8639     0.8965     0.9301     0.9646     1.0000
Hrad:
            0.0198     0.0396     0.0594     0.0792     0.0990
            0.1188     0.1386     0.1584     0.1782     0.1980
            0.2178     0.2376     0.2574     0.2772     0.2970
            0.3168     0.3204     0.3285     0.3578     0.3863
            0.4140     0.4412     0.4677     0.4936     0.5191
            0.5440     0.5685     0.5926     0.6164     0.6397
            0.6627     0.6854     0.7078     0.7300     0.7518
            0.7735     0.7949     0.8160     0.8370     0.8578
            0.8784     0.8988     0.9191     0.9392     0.9576
            0.9649     0.9729     0.9815     0.9905     1.0000
Width:
            0.0266     0.0532     0.0797     0.1063     0.1329
            0.1595     0.1860     0.2126     0.2392     0.2658
            0.2924     0.3189     0.3455     0.3721     0.3987
            0.4253     0.4768     0.5264     0.5390     0.5517
            0.5643     0.5769     0.5896     0.6022     0.6148
            0.6275     0.6401     0.6527     0.6654     0.6780
            0.6906     0.7033     0.7159     0.7285     0.7412
            0.7538     0.7664     0.7791     0.7917     0.8043
            0.8170     0.8296     0.8422     0.8549     0.8691
            0.8953     0.9215     0.9477     0.9738     1.0000

Transect TaylorWayDitch
Area:
            0.0004     0.0016     0.0036     0.0064     0.0101
            0.0145     0.0197     0.0258     0.0326     0.0402
            0.0487     0.0579     0.0680     0.0789     0.0905
            0.1030     0.1163     0.1304     0.1453     0.1610
            0.1775     0.1948     0.2129     0.2318     0.2515
            0.2720     0.2934     0.3155     0.3384     0.3622
            0.3867     0.4121     0.4382     0.4652     0.4930
            0.5215     0.5509     0.5811     0.6121     0.6438
            0.6759     0.7084     0.7413     0.7750     0.8098
            0.8457     0.8827     0.9207     0.9598     1.0000
Hrad:
            0.0201     0.0402     0.0603     0.0805     0.1006
            0.1207     0.1408     0.1609     0.1810     0.2011
            0.2212     0.2414     0.2615     0.2816     0.3017
            0.3218     0.3419     0.3620     0.3822     0.4023
            0.4224     0.4425     0.4626     0.4827     0.5028
            0.5229     0.5431     0.5632     0.5833     0.6034
```

```
            0.6235     0.6436     0.6637     0.6839     0.7040
            0.7241     0.7442     0.7643     0.7844     0.8117
            0.8416     0.8713     0.8984     0.9117     0.9255
            0.9396     0.9542     0.9691     0.9844     1.0000
  Width:
            0.0198     0.0395     0.0593     0.0791     0.0988
            0.1186     0.1384     0.1581     0.1779     0.1977
            0.2174     0.2372     0.2570     0.2767     0.2965
            0.3163     0.3360     0.3558     0.3756     0.3953
            0.4151     0.4349     0.4546     0.4744     0.4942
            0.5139     0.5337     0.5535     0.5732     0.5930
            0.6128     0.6326     0.6523     0.6721     0.6919
            0.7116     0.7314     0.7512     0.7709     0.7836
            0.7934     0.8032     0.8154     0.8417     0.8681
            0.8945     0.9209     0.9472     0.9736     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 ............... LPS
  Process Models:
    Rainfall/Runoff ........ YES
    RDII ................... NO
    Snowmelt ............... NO
    Groundwater ............ NO
    Flow Routing ........... YES
    Ponding Allowed ........ NO
    Water Quality .......... NO
  Flow Routing Method ...... DYNWAVE
  Surcharge Method ......... EXTRAN
  Starting Date ............ 05/04/2021 00:00:00
  Ending Date .............. 05/06/2021 00:00:00
  Antecedent Dry Days ...... 0.0
  Report Time Step ......... 00:01:00
  Routing Time Step ........ 2.00 sec
  Variable Time Step ....... YES
  Maximum Trials ........... 8
  Number of Threads ........ 1
  Head Tolerance ........... 0.001500 m


  **************************        Volume         Volume
  Flow Routing Continuity        hectare-m       10^6 ltr
  **************************     ---------      ---------
  Dry Weather Inflow .......         0.000          0.000
  Wet Weather Inflow .......         0.000          0.000
  Groundwater Inflow .......         0.000          0.000
  RDII Inflow ..............         0.000          0.000
  External Inflow ..........        14.344        143.438
  External Outflow .........        14.330        143.298
  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 ......         0.015         0.146
  Continuity Error (%) .....        -0.005


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


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


  *************************
  Routing Time Step Summary
  *************************
  Minimum Time Step           :     1.50 sec
  Average Time Step           :     2.00 sec
  Maximum Time Step           :     2.00 sec
  Percent in Steady State     :     0.00
  Average Iterations per Step :     2.00
  Percent Not Converging      :     0.00
  Time Step Frequencies       :
     2.000 -  1.516 sec       :   100.00 %
     1.516 -  1.149 sec       :     0.00 %
     1.149 -  0.871 sec       :     0.00 %
     0.871 -  0.660 sec       :     0.00 %
     0.660 -  0.500 sec       :     0.00 %


  ******************
  Node Depth Summary
  ******************
```

Node	Type	Average Depth Meters	Maximum Depth Meters	Maximum HGL Meters	Time of Max Occurrence days	Time of Max Occurrence hr:min	Reported Max Depth Meters
J01	JUNCTION	0.50	0.50	90.61	0	00:07	0.50
J02	JUNCTION	0.44	0.44	90.46	0	00:08	0.44
J03	JUNCTION	0.56	0.56	90.37	1	12:49	0.56
J04	JUNCTION	0.51	0.51	90.27	1	19:54	0.51
J05	JUNCTION	0.47	0.47	90.11	1	03:32	0.47
J06	JUNCTION	0.54	0.54	90.06	1	07:17	0.54
J07	JUNCTION	0.45	0.45	89.89	0	00:28	0.45
J08	JUNCTION	0.46	0.46	89.74	0	00:39	0.46
OF-Lombardy	OUTFALL	0.00	0.00	90.80	0	00:00	0.00
OF-OsgoodePath	OUTFALL	0.00	0.00	90.75	0	00:00	0.00
OF-TaylorWay	OUTFALL	0.46	0.46	88.82	0	00:28	0.46

****
Node Inflow Summary
****

Node	Type	Maximum Lateral Inflow LPS	Maximum Total Inflow LPS	Time of Max Occurrence days hr:min	Lateral Inflow Volume 10^6 ltr	Total Inflow Volume 10^6 ltr	Flow Balance Error Percent
J01	JUNCTION	821.00	821.00	0 00:00	142	142	0.006
J02	JUNCTION	0.00	834.75	0 00:00	0	142	0.011
J03	JUNCTION	0.00	821.00	0 00:07	0	142	0.017
J04	JUNCTION	0.00	821.00	0 05:34	0	142	0.016
J05	JUNCTION	0.00	821.00	1 13:19	0	142	0.011
J06	JUNCTION	0.00	821.00	0 19:26	0	142	0.014
J07	JUNCTION	0.00	821.00	0 07:52	0	142	0.013
J08	JUNCTION	0.00	821.00	0 00:20	0	142	0.011
OF-Lombardy	OUTFALL	74.22	74.22	0 13:00	0.511	0.511	0.000
OF-OsgoodePath	OUTFALL	151.84	151.84	0 13:04	1.06	1.06	0.000
OF-TaylorWay	OUTFALL	0.00	821.00	0 01:54	0	142	0.000

****
Node Surcharge Summary
****

No nodes were surcharged.

****
Node Flooding Summary
****

No nodes were flooded.

****
Outfall Loading Summary
****

Outfall Node	Flow Freq Pcnt	Avg Flow LPS	Max Flow LPS	Total Volume 10^6 ltr
OF-Lombardy	32.95	8.97	74.22	0.511
OF-OsgoodePath	32.34	18.92	151.84	1.058
OF-TaylorWay	99.94	820.70	821.00	141.729
System	55.08	848.60	1046.62	143.298

****
Link Flow Summary
****

Link	Type	Maximum |Flow| LPS	Time of Max Occurrence days	hr:min	Maximum |Veloc| m/sec	Max/ Full Flow	Max/ Full Depth
C01	CHANNEL	834.75	0	00:00	1.67	0.05	0.29
C02	CHANNEL	821.00	0	00:07	1.51	0.04	0.30
C03	CHANNEL	821.00	0	05:34	1.30	0.08	0.32
C04	CHANNEL	821.00	1	13:19	1.23	0.05	0.29
C05	CHANNEL	821.00	0	19:26	1.22	0.04	0.30
C06	CHANNEL	821.00	0	07:52	1.22	0.07	0.30
C07	CHANNEL	821.00	0	00:20	1.22	0.04	0.27
C08	CHANNEL	821.00	0	01:54	1.62	0.05	0.33

****
Flow Classification Summary
****

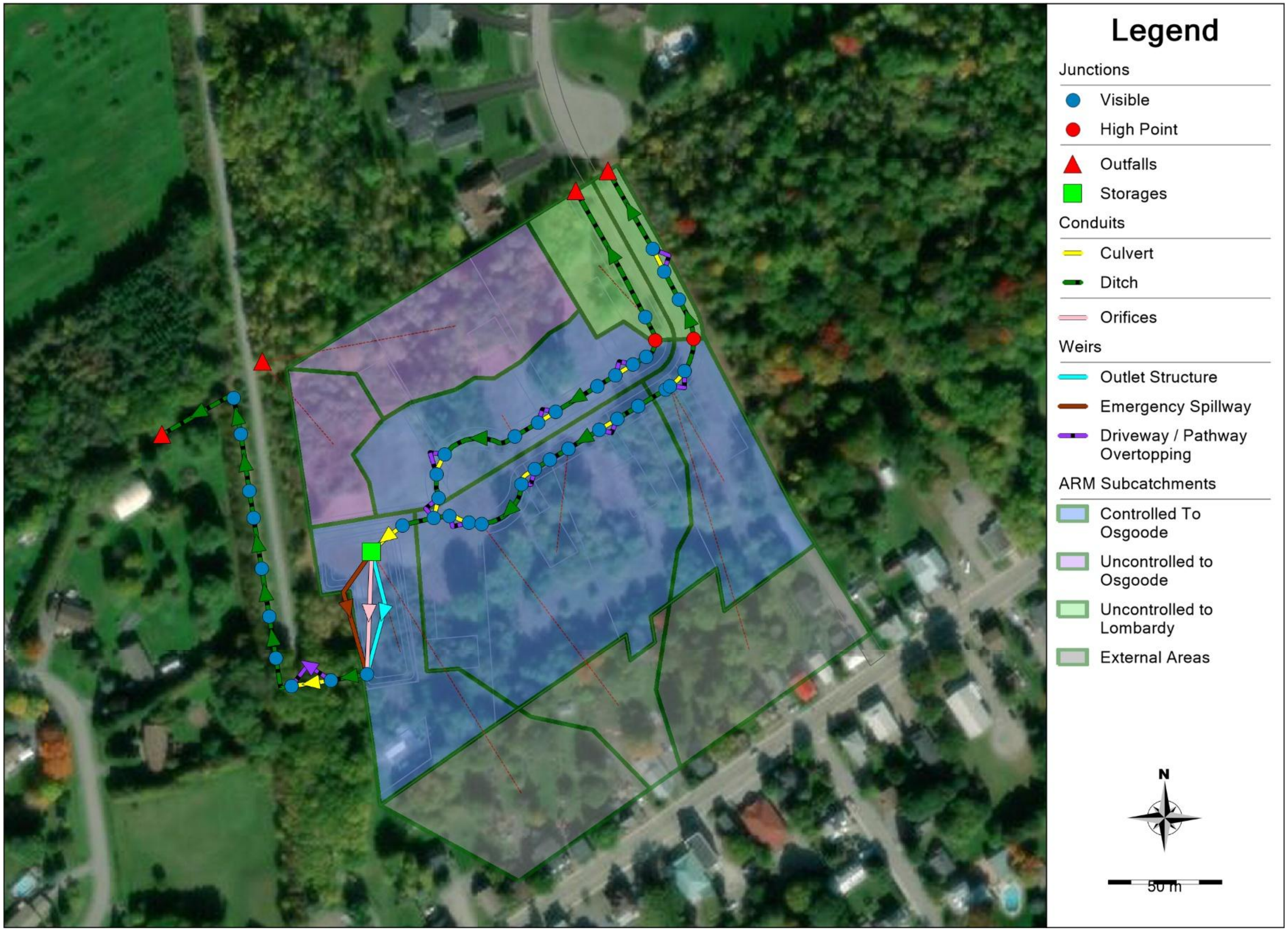
Conduit	Adjusted /Actual Length	Dry	Up Dry	Down Dry	Sub Crit	Sup Crit	Up Crit	Down Crit	Norm Ltd	Inlet Ctrl
		Fraction of Time in Flow Class								
C01	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
C02	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	1.00	0.00
C03	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
C04	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
C05	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
C06	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
C07	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	1.00	0.00
C08	1.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00

****
Conduit Surcharge Summary
****

No conduits were surcharged.

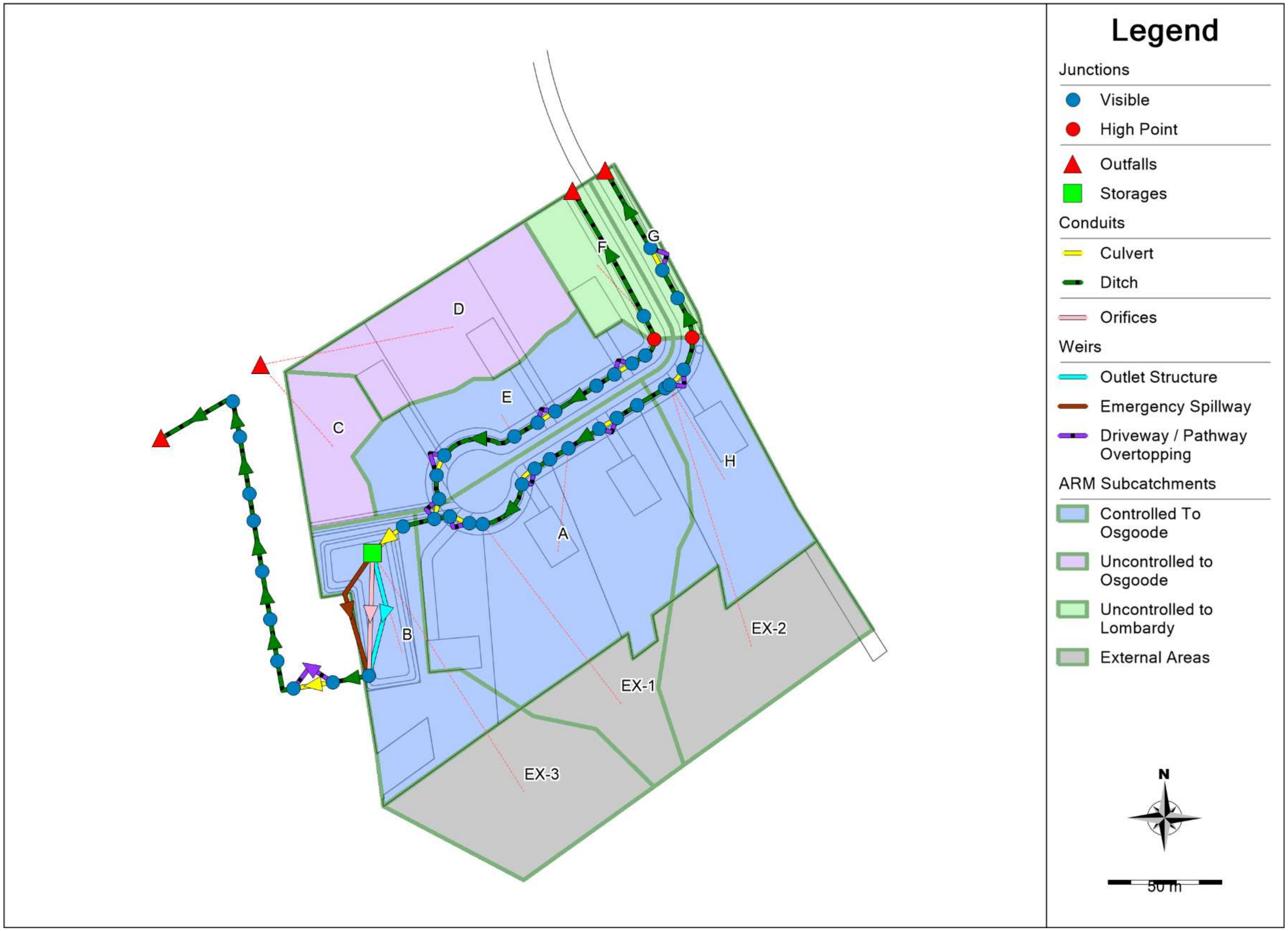
Analysis begun on: Wed Jul 9 10:25:41 2025
Analysis ended on: Wed Jul 9 10:25:42 2025
Total elapsed time: 00:00:01

Overall Model Schematic



3200 Reid's Lane (119089)
PCSWMM Post-Development Model Schematics

Subcatchments



Date: 2025-06-26
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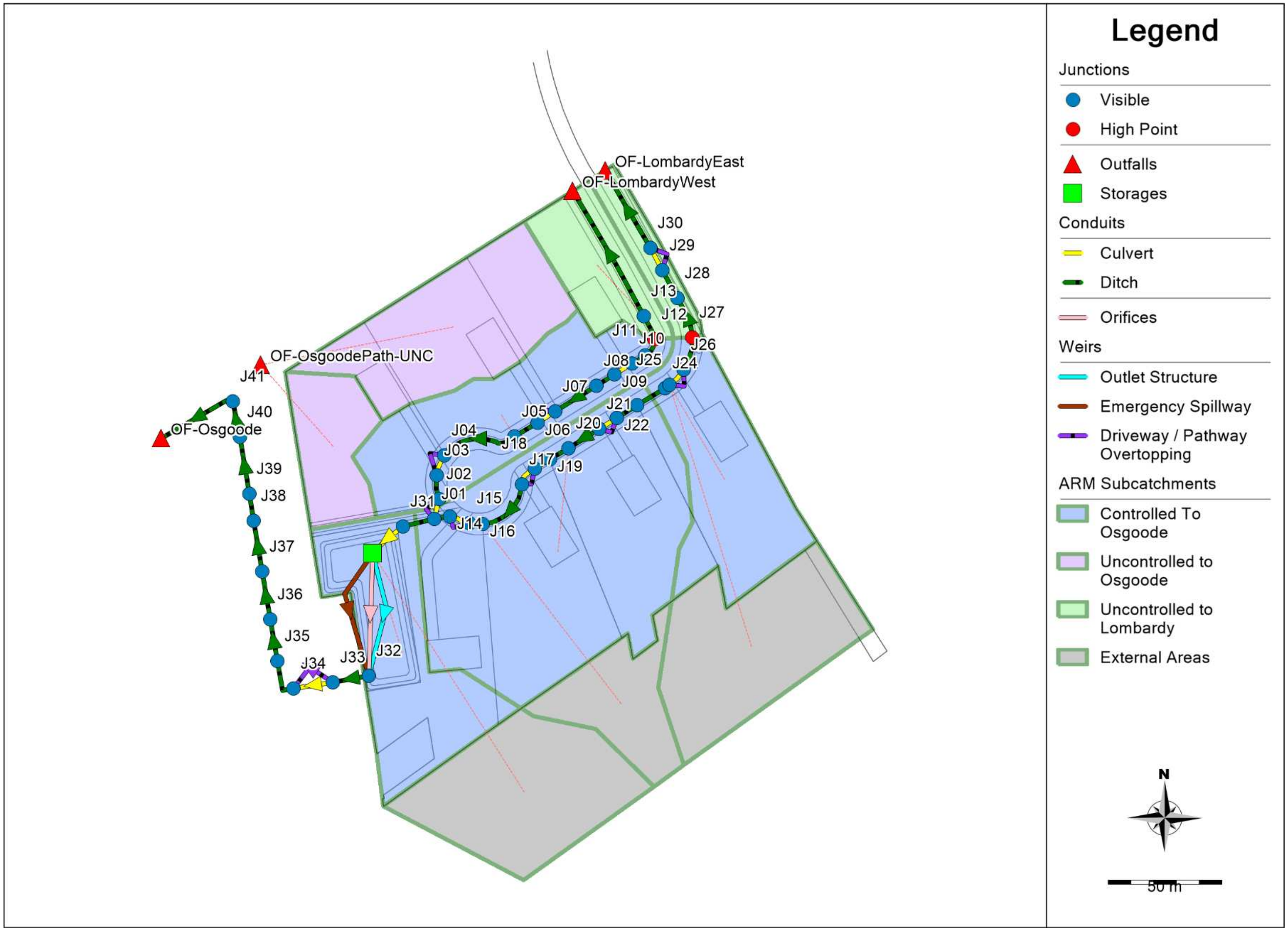
3200 Reid's Lane (119089)
PCSWMM Post-Development Model Schematics

Junctions and Outfalls



Date: 2025-06-26
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```
ALTERNATIVE RUNOFF METHOD (ARM) - PCSWMM VERSION 7.6.3620
---------------------------------------------------------

This is a new version of ARM - your feedback and suggestions are solicited.
Create a ticket, post on the PCSWMM feature request forum, or email us directly!

Simulation start time:              05/04/2021 00:00:00
Simulation end time:                05/06/2021 00:00:00
Runoff wet weather time steps:      240 seconds
Report time steps:                  60 seconds
Number of data points:              2881


******************************
Unit Hydrographs Runoff Method
******************************
```

Subcatchment	Runoff Method	Raingage	Area (ha)	Time of Concentration (min)	Time to Peak (min)	Time after Peak (min)	Peak UH Flow (m³/s/mm)	UH Depth (mm)
EX-2	Nash IUH	Raingage	0.48	15	10	54	0.00433	0.998
EX-1	Nash IUH	Raingage	0.23	15	10	50	0.00208	0.997
EX-3	Nash IUH	Raingage	0.48	15	10	54	0.00433	0.998
D	Nash IUH	Raingage	0.48	15	10	54	0.00433	0.998
A	Nash IUH	Raingage	1.12	15	10	58	0.01011	0.998
B	Nash IUH	Raingage	0.48	15	10	54	0.00433	0.998
C	Nash IUH	Raingage	0.2	15	10	50	0.0018	0.997
E	Nash IUH	Raingage	0.52	15	10	54	0.00469	0.998
G	Nash IUH	Raingage	0.11	15	10	46	0.00099	0.996
F	Nash IUH	Raingage	0.22	15	10	50	0.00198	0.997
H	Nash IUH	Raingage	0.43	15	10	54	0.00388	0.998

```
******************
ARM Runoff Summary
******************
```

Subcatchment	Total Precip (mm)	Total Losses (mm)	Total Runoff (mm)	Total Runoff 10^6 ltr	Peak Runoff LPS	Runoff Coeff (fraction)
EX-2	93.91	49.432	44.375	0.213	52.671	0.473
EX-1	93.91	53.519	40.283	0.093	22.744	0.429
EX-3	93.91	53.519	40.312	0.194	47.468	0.429
D	93.91	66.24	27.604	0.132	31.519	0.294
A	93.91	63.107	30.741	0.344	82.464	0.327
B	93.91	69.605	24.25	0.116	27.403	0.258
C	93.91	70.843	23.005	0.046	10.795	0.245
E	93.91	60.864	32.981	0.172	41.385	0.351
G	93.91	58.622	35.155	0.039	9.418	0.374
F	93.91	59.823	33.995	0.075	18.126	0.362
H	93.91	66.126	27.721	0.119	28.352	0.295

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


*************
Element Count
*************
Number of rain gages ...... 1
Number of subcatchments ... 0
Number of nodes ........... 46
Number of links ........... 56
Number of pollutants ...... 0
Number of land uses ....... 0


****************
Raingage Summary
****************
                                                       Data       Recording
Name                 Data Source                       Type       Interval
------------------------------------------------------------------------
Raingage             07-SCS100yr-12hr                  INTENSITY   30 min.


************
Node Summary
************
                                            Invert      Max.    Ponded    External
Name                 Type                    Elev.     Depth      Area    Inflow
-------------------------------------------------------------------------------
J01                  JUNCTION                90.68      1.00       0.0
J02                  JUNCTION                90.75      1.00       0.0
J03                  JUNCTION                90.81      1.00       0.0
J04                  JUNCTION                90.86      1.00       0.0
J05                  JUNCTION                91.02      1.00       0.0
J06                  JUNCTION                91.08      1.00       0.0
J07                  JUNCTION                91.13      1.00       0.0
J08                  JUNCTION                91.23      1.00       0.0
J09                  JUNCTION                91.28      1.00       0.0
J10                  JUNCTION                91.33      1.00       0.0
J11                  JUNCTION                91.36      1.00       0.0
J12                  JUNCTION                91.49      1.00       0.0
J13                  JUNCTION                91.31      1.00       0.0
J14                  JUNCTION                90.73      1.00       0.0
J15                  JUNCTION                90.80      1.00       0.0
J16                  JUNCTION                90.84      1.00       0.0
J17                  JUNCTION                90.98      1.00       0.0
J18                  JUNCTION                91.02      1.00       0.0
J19                  JUNCTION                91.06      1.00       0.0
J20                  JUNCTION                91.10      1.00       0.0
J21                  JUNCTION                91.18      1.00       0.0
J22                  JUNCTION                91.23      1.00       0.0
J23                  JUNCTION                91.29      1.00       0.0
J24                  JUNCTION                91.36      1.00       0.0
J25                  JUNCTION                91.37      1.00       0.0
J26                  JUNCTION                91.42      1.00       0.0
J27                  JUNCTION                91.49      1.00       0.0
```

```
J28                 JUNCTION            91.31      1.00       0.0
J29                 JUNCTION            91.14      1.00       0.0
J30                 JUNCTION            91.00      1.00       0.0
J31                 JUNCTION            90.61      1.00       0.0
J32                 JUNCTION            90.31      1.00       0.0
J33                 JUNCTION            90.19      2.00       0.0
J34                 JUNCTION            90.11      2.00       0.0    Yes
J35                 JUNCTION            90.02      2.00       0.0
J36                 JUNCTION            89.81      2.00       0.0
J37                 JUNCTION            89.76      2.00       0.0
J38                 JUNCTION            89.64      2.00       0.0
J39                 JUNCTION            89.52      2.00       0.0
J40                 JUNCTION            89.44      2.00       0.0
J41                 JUNCTION            89.28      2.00       0.0
OF-LombardyEast     OUTFALL             90.52      0.30       0.0
OF-LombardyWest     OUTFALL             90.52      0.60       0.0
OF-OsgoodePath-UNC  OUTFALL             91.00      0.00       0.0
OF-TaylorWay        OUTFALL             88.36      1.40       0.0
DryPond             STORAGE             90.35      1.00       0.0


************
Link Summary
************
Name             From Node        To Node          Type            Length    %Slope Roughness
---------------------------------------------------------------------------------------------
C01              J02              J01              CONDUIT            9.0    0.7778    0.0240
C02              J03              J02              CONDUIT           11.0    0.5455    0.0350
C03              J04              J03              CONDUIT            9.0    0.5556    0.0240
C04              J05              J04              CONDUIT           34.0    0.4706    0.0350
C05              J06              J05              CONDUIT           12.0    0.5000    0.0350
C06              J07              J06              CONDUIT            9.0    0.5556    0.0240
C07              J08              J07              CONDUIT           21.0    0.4762    0.0350
C08              J09              J08              CONDUIT            9.0    0.5556    0.0350
C09              J10              J09              CONDUIT            9.0    0.5556    0.0240
C10              J11              J10              CONDUIT            7.0    0.4286    0.0350
C11              J12              J11              CONDUIT            9.0    1.4446    0.0350
C12              J12              J13              CONDUIT           11.0    1.6366    0.0350
C13              J13              OF-LombardyWest  CONDUIT           63.0    1.2541    0.0350
C14              J14              J01              CONDUIT            7.0    0.7143    0.0350
C15              J15              J14              CONDUIT            9.0    0.7778    0.0240
C16              J16              J15              CONDUIT            6.0    0.6667    0.0350
C17              J17              J16              CONDUIT           27.0    0.5185    0.0350
C18              J18              J17              CONDUIT            9.0    0.4444    0.0240
C19              J19              J18              CONDUIT            8.0    0.5000    0.0350
C20              J20              J19              CONDUIT            9.0    0.4444    0.0350
C21              J21              J20              CONDUIT           16.0    0.5000    0.0350
C22              J22              J21              CONDUIT            9.0    0.5556    0.0240
C23              J23              J22              CONDUIT           11.0    0.5455    0.0350
C24              J24              J23              CONDUIT           14.0    0.5000    0.0350
C25              J25              J24              CONDUIT            2.0    0.5000    0.0350
C26              J26              J25              CONDUIT            9.0    0.5556    0.0240
C27              J27              J26              CONDUIT           15.0    0.4667    0.0350
C28              J27              J28              CONDUIT           19.0    0.9474    0.0350
C29              J28              J29              CONDUIT           14.0    1.2144    0.0350
C30              J29              J30              CONDUIT           11.0    1.2728    0.0240
C31              J30              OF-LombardyEast  CONDUIT           39.0    1.2309    0.0350
C32              J01              J31              CONDUIT           14.0    0.5000    0.0350
```

C33	J31	DryPond	CONDUIT	9.0	1.5557	0.0240
C34	J32	J33	CONDUIT	16.0	0.4375	0.0350
C35	J34	J35	CONDUIT	18.0	0.5000	0.0350
C36	J35	J36	CONDUIT	19.0	1.1053	0.0350
C37	J36	J37	CONDUIT	21.0	0.2381	0.0350
C38	J37	J38	CONDUIT	23.0	0.5217	0.0350
C39	J38	J39	CONDUIT	12.0	1.0001	0.0350
C40	J39	J40	CONDUIT	25.0	0.3200	0.0350
C41	J40	J41	CONDUIT	16.0	1.0001	0.0350
C42	J41	OF-TaylorWay	CONDUIT	36.0	2.5564	0.0350
Culv-OsgoodePath	J33	J34	CONDUIT	17.7	0.4520	0.0240
W-Pond	DryPond	J32	ORIFICE			
W01	J02	J01	WEIR			
W02	J04	J03	WEIR			
W03	J07	J06	WEIR			
W04	J10	J09	WEIR			
W05	J15	J14	WEIR			
W06	J18	J17	WEIR			
W07	J22	J21	WEIR			
W08	J26	J25	WEIR			
W09	J29	J30	WEIR			
W-Emergency	DryPond	J32	WEIR			
W-Path	J33	J34	WEIR			
W-PondUpper	DryPond	J32	WEIR			

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*********************
Cross Section Summary
*********************
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Conduit	Shape	Full Depth	Full Area	Hyd. Rad.	Max. Width	No. of Barrels	Full Flow
C01	CIRCULAR	0.40	0.13	0.10	0.40	1	99.49
C02	TRAPEZOIDAL	0.60	1.68	0.35	4.60	1	1762.03
C03	CIRCULAR	0.40	0.13	0.10	0.40	1	84.09
C04	TRAPEZOIDAL	0.60	1.68	0.35	4.60	1	1636.64
C05	TRAPEZOIDAL	0.60	1.68	0.35	4.60	1	1687.01
C06	CIRCULAR	0.40	0.13	0.10	0.40	1	84.09
C07	TRAPEZOIDAL	0.60	1.68	0.35	4.60	1	1646.35
C08	TRAPEZOIDAL	0.60	1.68	0.35	4.60	1	1778.27
C09	CIRCULAR	0.40	0.13	0.10	0.40	1	84.09
C10	TRAPEZOIDAL	0.60	1.68	0.35	4.60	1	1561.87
C11	TRAPEZOIDAL	0.60	1.68	0.35	4.60	1	2867.50
C12	TRAPEZOIDAL	0.60	1.68	0.35	4.60	1	3052.11
C13	TRAPEZOIDAL	0.60	1.68	0.35	4.60	1	2671.72
C14	TRAPEZOIDAL	0.60	1.68	0.35	4.60	1	2016.38
C15	CIRCULAR	0.40	0.13	0.10	0.40	1	99.49
C16	TRAPEZOIDAL	0.60	1.68	0.35	4.60	1	1948.00
C17	TRAPEZOIDAL	0.60	1.68	0.35	4.60	1	1717.97
C18	CIRCULAR	0.40	0.13	0.10	0.40	1	75.21
C19	TRAPEZOIDAL	0.60	1.68	0.35	4.60	1	1687.01
C20	TRAPEZOIDAL	0.60	1.68	0.35	4.60	1	1590.53
C21	TRAPEZOIDAL	0.60	1.68	0.35	4.60	1	1687.01
C22	CIRCULAR	0.40	0.13	0.10	0.40	1	84.09
C23	TRAPEZOIDAL	0.60	1.68	0.35	4.60	1	1762.03
C24	TRAPEZOIDAL	0.60	1.68	0.35	4.60	1	1687.01
C25	TRAPEZOIDAL	0.60	1.68	0.35	4.60	1	1687.01
C26	CIRCULAR	0.40	0.13	0.10	0.40	1	84.09

```
C27            TRAPEZOIDAL          0.60     1.68     0.35     4.60         1  1629.81
C28            TRAPEZOIDAL          0.30     0.57     0.20     2.80         1   536.23
C29            TRAPEZOIDAL          0.30     0.57     0.20     2.80         1   607.10
C30            CIRCULAR             0.50     0.20     0.12     0.50         1   230.77
C31            TRAPEZOIDAL          0.30     0.57     0.20     2.80         1   611.20
C32            TRAPEZOIDAL          0.60     1.68     0.35     4.60         1  1687.01
C33            CIRCULAR             0.50     0.20     0.12     0.50         1   255.13
C34            TRAPEZOIDAL          0.60     1.68     0.35     4.60         1  1578.05
C35            OsgoodeDitch         1.66     8.97     0.81     9.70         1 15724.73
C36            OsgoodeDitch         1.66     8.97     0.81     9.70         1 23379.85
C37            OsgoodeDitch         1.66     8.97     0.81     9.70         1 10851.04
C38            OsgoodeDitch         1.66     8.97     0.81     9.70         1 16062.95
C39            OsgoodeDitch         1.66     8.97     0.81     9.70         1 22238.55
C40            OsgoodeDitch         1.66     8.97     0.81     9.70         1 12579.74
C41            OsgoodeDitch         1.66     8.97     0.81     9.70         1 22238.55
C42            TaylorWayDitch       1.40     4.75     0.64     6.90         1 16120.66
Culv-OsgoodePath CIRCULAR           0.50     0.20     0.12     0.50         1   137.51


****************
Transect Summary
****************

Transect OsgoodeDitch
Area:
            0.0005     0.0019     0.0043     0.0076     0.0119
            0.0172     0.0234     0.0305     0.0387     0.0477
            0.0577     0.0687     0.0807     0.0935     0.1074
            0.1222     0.1383     0.1564     0.1755     0.1951
            0.2152     0.2357     0.2566     0.2780     0.2999
            0.3222     0.3449     0.3681     0.3918     0.4159
            0.4405     0.4655     0.4910     0.5169     0.5433
            0.5702     0.5975     0.6252     0.6534     0.6821
            0.7112     0.7408     0.7708     0.8013     0.8322
            0.8639     0.8965     0.9301     0.9646     1.0000
Hrad:
            0.0198     0.0396     0.0594     0.0792     0.0990
            0.1188     0.1386     0.1584     0.1782     0.1980
            0.2178     0.2376     0.2574     0.2772     0.2970
            0.3168     0.3204     0.3285     0.3578     0.3863
            0.4140     0.4412     0.4677     0.4936     0.5191
            0.5440     0.5685     0.5926     0.6164     0.6397
            0.6627     0.6854     0.7078     0.7300     0.7518
            0.7735     0.7949     0.8160     0.8370     0.8578
            0.8784     0.8988     0.9191     0.9392     0.9576
            0.9649     0.9729     0.9815     0.9905     1.0000
Width:
            0.0266     0.0532     0.0797     0.1063     0.1329
            0.1595     0.1860     0.2126     0.2392     0.2658
            0.2924     0.3189     0.3455     0.3721     0.3987
            0.4253     0.4768     0.5264     0.5390     0.5517
            0.5643     0.5769     0.5896     0.6022     0.6148
            0.6275     0.6401     0.6527     0.6654     0.6780
            0.6906     0.7033     0.7159     0.7285     0.7412
            0.7538     0.7664     0.7791     0.7917     0.8043
            0.8170     0.8296     0.8422     0.8549     0.8691
            0.8953     0.9215     0.9477     0.9738     1.0000
```

```
Transect TaylorWayDitch
Area:
            0.0004     0.0016     0.0036     0.0064     0.0101
            0.0145     0.0197     0.0258     0.0326     0.0402
            0.0487     0.0579     0.0680     0.0789     0.0905
            0.1030     0.1163     0.1304     0.1453     0.1610
            0.1775     0.1948     0.2129     0.2318     0.2515
            0.2720     0.2934     0.3155     0.3384     0.3622
            0.3867     0.4121     0.4382     0.4652     0.4930
            0.5215     0.5509     0.5811     0.6121     0.6438
            0.6759     0.7084     0.7413     0.7750     0.8098
            0.8457     0.8827     0.9207     0.9598     1.0000
Hrad:
            0.0201     0.0402     0.0603     0.0805     0.1006
            0.1207     0.1408     0.1609     0.1810     0.2011
            0.2212     0.2414     0.2615     0.2816     0.3017
            0.3218     0.3419     0.3620     0.3822     0.4023
            0.4224     0.4425     0.4626     0.4827     0.5028
            0.5229     0.5431     0.5632     0.5833     0.6034
            0.6235     0.6436     0.6637     0.6839     0.7040
            0.7241     0.7442     0.7643     0.7844     0.8117
            0.8416     0.8713     0.8984     0.9117     0.9255
            0.9396     0.9542     0.9691     0.9844     1.0000
Width:
            0.0198     0.0395     0.0593     0.0791     0.0988
            0.1186     0.1384     0.1581     0.1779     0.1977
            0.2174     0.2372     0.2570     0.2767     0.2965
            0.3163     0.3360     0.3558     0.3756     0.3953
            0.4151     0.4349     0.4546     0.4744     0.4942
            0.5139     0.5337     0.5535     0.5732     0.5930
            0.6128     0.6326     0.6523     0.6721     0.6919
            0.7116     0.7314     0.7512     0.7709     0.7836
            0.7934     0.8032     0.8154     0.8417     0.8681
            0.8945     0.9209     0.9472     0.9736     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 ............... LPS
Process Models:
  Rainfall/Runoff ........ YES
  RDII ................... NO
  Snowmelt ............... NO
  Groundwater ............ NO
  Flow Routing ........... YES
  Ponding Allowed ........ NO
  Water Quality .......... NO
Flow Routing Method ...... DYNWAVE
Surcharge Method ......... EXTRAN
Starting Date ............ 05/04/2021 00:00:00
```

```
Ending Date .............. 05/06/2021 00:00:00
Antecedent Dry Days ...... 0.0
Report Time Step ......... 00:01:00
Routing Time Step ........ 2.00 sec
Variable Time Step ....... YES
Maximum Trials ........... 8
Number of Threads ........ 4
Head Tolerance ........... 0.001500 m


**************************        Volume         Volume
Flow Routing Continuity        hectare-m       10^6 ltr
**************************     ---------      ---------
Dry Weather Inflow .......         0.000          0.000
Wet Weather Inflow .......         0.000          0.000
Groundwater Inflow .......         0.000          0.000
RDII Inflow ..............         0.000          0.000
External Inflow ..........        14.341        143.412
External Outflow .........        14.306        143.057
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 ......         0.036          0.362
Continuity Error (%) .....        -0.005


***************************
Time-Step Critical Elements
***************************
Link C25 (7.08%)


********************************
Highest Flow Instability Indexes
********************************
Link W-PondUpper (51)
Link C33 (2)
Link C22 (1)


*************************
Routing Time Step Summary
*************************
Minimum Time Step           :     0.50 sec
Average Time Step           :     1.96 sec
Maximum Time Step           :     2.00 sec
Percent in Steady State     :     0.00
Average Iterations per Step :     2.00
Percent Not Converging      :     0.00
Time Step Frequencies       :
    2.000 -  1.516 sec      :    95.98 %
    1.516 -  1.149 sec      :     2.27 %
    1.149 -  0.871 sec      :     1.61 %
    0.871 -  0.660 sec      :     0.05 %
    0.660 -  0.500 sec      :     0.09 %
```

****
Node Depth Summary
****

Node	Type	Average Depth Meters	Maximum Depth Meters	Maximum HGL Meters	Time of Max Occurrence days	Time of Max Occurrence hr:min	Reported Max Depth Meters
J01	JUNCTION	0.02	0.40	91.08	0	06:44	0.40
J02	JUNCTION	0.02	0.34	91.09	0	06:44	0.34
J03	JUNCTION	0.01	0.28	91.09	0	06:44	0.28
J04	JUNCTION	0.02	0.25	91.11	0	06:42	0.25
J05	JUNCTION	0.01	0.10	91.12	0	06:41	0.10
J06	JUNCTION	0.00	0.04	91.12	0	06:40	0.04
J07	JUNCTION	0.00	0.00	91.13	0	00:00	0.00
J08	JUNCTION	0.00	0.00	91.23	0	00:00	0.00
J09	JUNCTION	0.00	0.00	91.28	0	00:00	0.00
J10	JUNCTION	0.00	0.00	91.33	0	00:00	0.00
J11	JUNCTION	0.00	0.00	91.36	0	00:00	0.00
J12	JUNCTION	0.00	0.00	91.49	0	00:00	0.00
J13	JUNCTION	0.00	0.04	91.35	0	06:35	0.04
J14	JUNCTION	0.02	0.35	91.08	0	06:44	0.35
J15	JUNCTION	0.03	0.53	91.33	0	06:43	0.53
J16	JUNCTION	0.02	0.49	91.33	0	06:43	0.49
J17	JUNCTION	0.02	0.35	91.33	0	06:43	0.35
J18	JUNCTION	0.03	0.51	91.53	0	06:39	0.51
J19	JUNCTION	0.02	0.47	91.53	0	06:39	0.47
J20	JUNCTION	0.02	0.43	91.53	0	06:39	0.43
J21	JUNCTION	0.01	0.35	91.53	0	06:39	0.35
J22	JUNCTION	0.02	0.34	91.57	0	06:38	0.34
J23	JUNCTION	0.01	0.28	91.57	0	06:38	0.28
J24	JUNCTION	0.01	0.22	91.58	0	06:38	0.22
J25	JUNCTION	0.01	0.21	91.58	0	06:38	0.21
J26	JUNCTION	0.00	0.13	91.55	0	06:38	0.13
J27	JUNCTION	0.00	0.05	91.54	0	06:39	0.05
J28	JUNCTION	0.00	0.04	91.35	0	06:40	0.04
J29	JUNCTION	0.00	0.10	91.24	0	06:37	0.10
J30	JUNCTION	0.00	0.05	91.05	0	06:39	0.05
J31	JUNCTION	0.04	0.46	91.07	0	06:44	0.46
J32	JUNCTION	0.31	0.41	90.72	0	07:13	0.41
J33	JUNCTION	0.43	0.53	90.72	0	07:13	0.53
J34	JUNCTION	0.51	0.53	90.64	0	07:13	0.53
J35	JUNCTION	0.44	0.47	90.49	0	07:13	0.47
J36	JUNCTION	0.56	0.59	90.40	0	07:14	0.59
J37	JUNCTION	0.51	0.53	90.29	0	07:14	0.53
J38	JUNCTION	0.47	0.49	90.13	0	07:15	0.49
J39	JUNCTION	0.54	0.57	90.09	0	07:15	0.57
J40	JUNCTION	0.45	0.47	89.91	0	07:15	0.47
J41	JUNCTION	0.46	0.48	89.76	0	07:15	0.48
OF-LombardyEast	OUTFALL	0.00	0.05	90.57	0	06:39	0.05
OF-LombardyWest	OUTFALL	0.00	0.04	90.56	0	06:35	0.04
OF-OsgoodePath-UNC	OUTFALL	0.00	0.00	91.00	0	00:00	0.00
OF-TaylorWay	OUTFALL	0.46	0.48	88.84	0	07:15	0.48
DryPond	STORAGE	0.28	0.60	90.95	0	07:12	0.60

****

Node Inflow Summary
****

Node	Type	Maximum Lateral Inflow LPS	Maximum Total Inflow LPS	Time of Max Occurrence days	Time of Max Occurrence hr:min	Lateral Inflow Volume 10^6 ltr	Total Inflow Volume 10^6 ltr	Flow Balance Error Percent
J01	JUNCTION	0.00	177.30	0	06:42	0	0.924	-0.002
J02	JUNCTION	0.00	36.54	0	06:35	0	0.171	0.007
J03	JUNCTION	0.00	38.37	0	06:35	0	0.171	-0.003
J04	JUNCTION	0.00	41.27	0	06:35	0	0.172	0.054
J05	JUNCTION	41.38	41.38	0	06:32	0.171	0.172	-0.055
J06	JUNCTION	0.00	0.46	0	06:17	0	0.000296	0.196
J07	JUNCTION	0.00	0.00	0	00:00	0	0	0.000 ltr
J08	JUNCTION	0.00	0.00	0	00:00	0	0	0.000 ltr
J09	JUNCTION	0.00	0.00	0	00:00	0	0	0.000 ltr
J10	JUNCTION	0.00	0.00	0	00:00	0	0	0.000 ltr
J11	JUNCTION	0.00	0.00	0	00:00	0	0	0.000 ltr
J12	JUNCTION	0.00	0.00	0	00:00	0	0	0.000 ltr
J13	JUNCTION	18.13	18.13	0	06:32	0.0748	0.0748	0.000
J14	JUNCTION	0.00	144.70	0	06:43	0	0.752	-0.010
J15	JUNCTION	0.00	144.92	0	06:42	0	0.752	0.007
J16	JUNCTION	22.74	149.00	0	06:38	0.0926	0.752	0.006
J17	JUNCTION	0.00	132.71	0	06:38	0	0.66	-0.007
J18	JUNCTION	0.00	133.45	0	06:37	0	0.66	0.004
J19	JUNCTION	0.00	136.03	0	06:36	0	0.66	0.002
J20	JUNCTION	82.46	140.13	0	06:35	0.344	0.66	-0.000
J21	JUNCTION	0.00	61.34	0	06:32	0	0.315	-0.026
J22	JUNCTION	0.00	63.40	0	06:32	0	0.315	0.025
J23	JUNCTION	0.00	67.23	0	06:32	0	0.315	0.006
J24	JUNCTION	0.00	69.22	0	06:32	0	0.315	-0.006
J25	JUNCTION	80.85	80.85	0	06:32	0.332	0.333	-0.003
J26	JUNCTION	0.00	16.02	0	06:38	0	0.018	0.003
J27	JUNCTION	0.00	15.97	0	06:38	0	0.0171	-0.016
J28	JUNCTION	0.00	15.99	0	06:39	0	0.017	-0.041
J29	JUNCTION	0.00	15.95	0	06:40	0	0.017	0.499
J30	JUNCTION	9.42	25.96	0	06:37	0.0387	0.0556	-0.128
J31	JUNCTION	0.00	176.69	0	06:43	0	0.924	0.073
J32	JUNCTION	0.00	115.39	0	07:11	0	1.36	0.388
J33	JUNCTION	0.00	115.32	0	07:12	0	1.37	0.561
J34	JUNCTION	821.00	936.29	0	07:13	142	143	0.007
J35	JUNCTION	0.00	936.29	0	07:13	0	143	0.011
J36	JUNCTION	0.00	936.29	0	07:13	0	143	0.016
J37	JUNCTION	0.00	936.28	0	07:14	0	143	0.016
J38	JUNCTION	0.00	936.28	0	07:14	0	143	0.011
J39	JUNCTION	0.00	936.27	0	07:15	0	143	0.014
J40	JUNCTION	0.00	936.27	0	07:15	0	143	0.012
J41	JUNCTION	0.00	936.27	0	07:15	0	143	0.011
OF-LombardyEast	OUTFALL	0.00	24.39	0	06:39	0	0.0557	0.000
OF-LombardyWest	OUTFALL	0.00	18.06	0	06:35	0	0.0748	0.000
OF-OsgoodePath-UNC	OUTFALL	42.31	42.31	0	06:36	0.179	0.179	0.000
OF-TaylorWay	OUTFALL	0.00	936.27	0	07:15	0	143	0.000
DryPond	STORAGE	74.54	240.50	0	06:38	0.31	1.39	-0.022

****

Node Surcharge Summary
****

No nodes were surcharged.

****
Node Flooding Summary
****

No nodes were flooded.

****
Storage Volume Summary
****

Storage Unit	Average Volume 1000 m3	Avg Pcnt Full	Evap Pcnt Loss	Exfil Pcnt Loss	Maximum Volume 1000 m3	Max Pcnt Full	Time of Max Occurrence days hr:min	Maximum Outflow LPS
DryPond	0.218	23	0	0	0.608	64	0 07:12	115.39

****
Outfall Loading Summary
****

Outfall Node	Flow Freq Pcnt	Avg Flow LPS	Max Flow LPS	Total Volume 10^6 ltr
OF-LombardyEast	18.13	2.71	24.39	0.056
OF-LombardyWest	18.48	3.32	18.06	0.075
OF-OsgoodePath-UNC	17.86	8.16	42.31	0.179
OF-TaylorWay	99.94	827.76	936.27	142.747
System	38.60	841.95	959.77	143.056

****
Link Flow Summary
****

Link	Type	Maximum |Flow| LPS	Time of Max Occurrence days hr:min	Maximum |Veloc| m/sec	Max/ Full Flow	Max/ Full Depth
C01	CONDUIT	35.06	0 06:36	0.44	0.35	0.92
C02	CONDUIT	36.54	0 06:35	0.15	0.02	0.51
C03	CONDUIT	38.37	0 06:35	0.77	0.46	0.66
C04	CONDUIT	41.27	0 06:35	0.18	0.03	0.29
C05	CONDUIT	0.49	0 06:53	0.01	0.00	0.11
C06	CONDUIT	0.00	0 00:00	0.00	0.00	0.05
C07	CONDUIT	0.00	0 00:00	0.00	0.00	0.00

C08	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
C09	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
C10	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
C11	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
C12	CONDUIT	0.00	0	00:00	0.00	0.00	0.04
C13	CONDUIT	18.06	0	06:35	0.37	0.01	0.07
C14	CONDUIT	144.55	0	06:43	0.35	0.07	0.62
C15	CONDUIT	144.70	0	06:43	1.19	1.45	0.93
C16	CONDUIT	144.92	0	06:42	0.17	0.07	0.84
C17	CONDUIT	128.86	0	06:40	0.24	0.08	0.70
C18	CONDUIT	132.71	0	06:38	1.11	1.76	0.94
C19	CONDUIT	133.45	0	06:37	0.15	0.08	0.82
C20	CONDUIT	136.03	0	06:36	0.22	0.09	0.76
C21	CONDUIT	57.85	0	06:37	0.18	0.03	0.66
C22	CONDUIT	61.34	0	06:32	0.89	0.73	0.87
C23	CONDUIT	63.40	0	06:32	0.16	0.04	0.52
C24	CONDUIT	67.23	0	06:32	0.27	0.04	0.42
C25	CONDUIT	69.22	0	06:32	0.35	0.04	0.35
C26	CONDUIT	16.02	0	06:38	0.32	0.19	0.42
C27	CONDUIT	15.97	0	06:38	0.14	0.01	0.15
C28	CONDUIT	15.99	0	06:39	0.32	0.03	0.15
C29	CONDUIT	15.95	0	06:40	0.19	0.03	0.24
C30	CONDUIT	17.36	0	06:40	0.90	0.08	0.16
C31	CONDUIT	24.39	0	06:39	0.40	0.04	0.17
C32	CONDUIT	176.69	0	06:43	0.26	0.10	0.72
C33	CONDUIT	176.54	0	06:44	1.11	0.69	0.88
C34	CONDUIT	115.32	0	07:12	0.35	0.07	0.74
C35	CHANNEL	936.29	0	07:13	1.60	0.06	0.30
C36	CHANNEL	936.29	0	07:13	1.45	0.04	0.32
C37	CHANNEL	936.28	0	07:14	1.30	0.09	0.34
C38	CHANNEL	936.28	0	07:14	1.21	0.06	0.31
C39	CHANNEL	936.27	0	07:15	1.19	0.04	0.32
C40	CHANNEL	936.27	0	07:15	1.17	0.07	0.31
C41	CHANNEL	936.27	0	07:15	1.19	0.04	0.29
C42	CHANNEL	936.27	0	07:15	1.67	0.06	0.34
Culv-OsgoodePath	CONDUIT	115.29	0	07:13	0.79	0.84	1.00
W-Pond	ORIFICE	10.21	0	07:09			1.00
W01	WEIR	0.00	0	00:00			0.00
W02	WEIR	0.00	0	00:00			0.00
W03	WEIR	0.00	0	00:00			0.00
W04	WEIR	0.00	0	00:00			0.00
W05	WEIR	0.00	0	00:00			0.00
W06	WEIR	0.00	0	00:00			0.00
W07	WEIR	0.00	0	00:00			0.00
W08	WEIR	0.00	0	00:00			0.00
W09	WEIR	0.00	0	00:00			0.00
W-Emergency	WEIR	0.00	0	00:00			0.00
W-Path	WEIR	0.00	0	00:00			0.00
W-PondUpper	WEIR	105.18	0	07:11			0.97

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**************************
Flow Classification Summary
**************************

-------------------------------------------------------------------------------------
                   Adjusted    ---------- Fraction of Time in Flow Class ----------
                    /Actual         Up    Down  Sub   Sup   Up    Down  Norm  Inlet
```

Conduit	Length	Dry	Dry	Dry	Crit	Crit	Crit	Crit	Ltd	Ctrl
C01	1.00	0.08	0.02	0.00	0.90	0.00	0.00	0.00	0.00	0.11
C02	1.00	0.10	0.40	0.00	0.50	0.00	0.00	0.00	0.84	0.00
C03	1.00	0.10	0.00	0.00	0.90	0.00	0.00	0.00	0.00	0.10
C04	1.00	0.09	0.62	0.00	0.29	0.00	0.00	0.00	0.89	0.00
C05	1.00	0.71	0.23	0.00	0.06	0.00	0.00	0.00	0.86	0.00
C06	1.00	0.94	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C07	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C08	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C09	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C10	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C11	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C12	1.00	0.72	0.28	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C13	1.00	0.72	0.00	0.00	0.28	0.00	0.00	0.00	0.81	0.00
C14	1.00	0.46	0.13	0.00	0.41	0.00	0.00	0.00	0.84	0.00
C15	1.00	0.08	0.00	0.00	0.82	0.11	0.00	0.00	0.00	0.04
C16	1.00	0.07	0.51	0.00	0.42	0.00	0.00	0.00	0.77	0.00
C17	1.00	0.58	0.03	0.00	0.39	0.00	0.00	0.00	0.89	0.00
C18	1.00	0.08	0.00	0.00	0.91	0.00	0.00	0.00	0.00	0.01
C19	1.00	0.08	0.56	0.00	0.36	0.00	0.00	0.00	0.76	0.00
C20	1.00	0.64	0.01	0.00	0.35	0.00	0.00	0.00	0.80	0.00
C21	1.00	0.65	0.02	0.00	0.33	0.00	0.00	0.00	0.89	0.00
C22	1.00	0.07	0.00	0.00	0.88	0.05	0.00	0.00	0.00	0.06
C23	1.00	0.07	0.66	0.00	0.27	0.00	0.00	0.00	0.87	0.00
C24	1.00	0.72	0.02	0.00	0.25	0.00	0.00	0.00	0.77	0.00
C25	1.00	0.75	0.03	0.00	0.23	0.00	0.00	0.00	0.79	0.00
C26	1.00	0.77	0.13	0.00	0.10	0.00	0.00	0.00	0.00	0.85
C27	1.00	0.90	0.04	0.00	0.06	0.00	0.00	0.00	0.86	0.00
C28	1.00	0.92	0.02	0.00	0.06	0.00	0.00	0.00	0.86	0.00
C29	1.00	0.92	0.00	0.00	0.08	0.00	0.00	0.00	0.04	0.00
C30	1.00	0.76	0.17	0.00	0.07	0.01	0.00	0.00	0.00	0.86
C31	1.00	0.76	0.00	0.00	0.24	0.00	0.00	0.00	0.79	0.00
C32	1.00	0.08	0.38	0.00	0.54	0.00	0.00	0.00	0.81	0.00
C33	1.00	0.03	0.05	0.00	0.91	0.00	0.00	0.01	0.00	0.08
C34	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
C35	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
C36	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	1.00	0.00
C37	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
C38	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
C39	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
C40	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
C41	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.81	0.00
C42	1.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00
Culv-OsgoodePath	1.00	0.00	0.00	0.00	1.00	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
C15	0.01	0.55	0.01	0.64	0.01
C18	0.01	0.49	0.01	0.73	0.01

```
  Culv-OsgoodePath            0.86      0.86     47.95      0.01         0.23


  Analysis begun on:  Wed Jul  9 10:58:16 2025
  Analysis ended on:  Wed Jul  9 10:58:19 2025
  Total elapsed time: 00:00:03
```

ALTERNATIVE RUNOFF METHOD (ARM) - PCSWMM VERSION 7.6.3620

This is a new version of ARM - your feedback and suggestions are solicited.
Create a ticket, post on the PCSWMM feature request forum, or email us directly!

Simulation start time:	05/04/2021 00:00:00
Simulation end time:	05/06/2021 00:00:00
Runoff wet weather time steps:	240 seconds
Report time steps:	60 seconds
Number of data points:	2881

****
Unit Hydrographs Runoff Method
****

Subcatchment	Runoff Method	Raingage	Area (ha)	Time of Concentration (min)	Time to Peak (min)	Time after Peak (min)	Peak UH Flow ($m^3/s/mm$)	UH Depth (mm)
EX-2	Nash IUH	Raingage	0.48	15	10	54	0.00433	0.998
EX-1	Nash IUH	Raingage	0.23	15	10	50	0.00208	0.997
EX-3	Nash IUH	Raingage	0.48	15	10	54	0.00433	0.998
D	Nash IUH	Raingage	0.48	15	10	54	0.00433	0.998
A	Nash IUH	Raingage	1.12	15	10	58	0.01011	0.998
B	Nash IUH	Raingage	0.48	15	10	54	0.00433	0.998
C	Nash IUH	Raingage	0.2	15	10	50	0.0018	0.997
E	Nash IUH	Raingage	0.52	15	10	54	0.00469	0.998
G	Nash IUH	Raingage	0.11	15	10	46	0.00099	0.996
F	Nash IUH	Raingage	0.22	15	10	50	0.00198	0.997
H	Nash IUH	Raingage	0.43	15	10	54	0.00388	0.998

****
ARM Runoff Summary
****

Subcatchment	Total Precip (mm)	Total Losses (mm)	Total Runoff (mm)	Total Runoff 10^6 ltr	Peak Runoff LPS	Runoff Coeff (fraction)
EX-2	106.73	52.318	54.292	0.261	37.594	0.509
EX-1	106.73	56.927	49.652	0.114	16.53	0.465
EX-3	106.73	56.927	49.688	0.238	34.507	0.466
D	106.73	71.505	35.146	0.169	24.56	0.329
A	106.73	67.836	38.821	0.435	63.398	0.364
B	106.73	75.538	31.125	0.149	21.626	0.292
C	106.73	76.979	29.67	0.059	8.594	0.278
E	106.73	65.232	41.404	0.215	31.425	0.388
G	106.73	62.636	43.927	0.048	7.064	0.412
F	106.73	64.019	42.595	0.094	13.692	0.399
H	106.73	71.383	35.279	0.152	22.066	0.331

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


*************
Element Count
*************
Number of rain gages ...... 1
Number of subcatchments ... 0
Number of nodes ........... 46
Number of links ........... 56
Number of pollutants ...... 0
Number of land uses ....... 0


****************
Raingage Summary
****************
                                                     Data       Recording
Name                 Data Source                     Type       Interval
------------------------------------------------------------------------
Raingage             11-SCS100yr-24hr                INTENSITY   60 min.


************
Node Summary
************
                                          Invert      Max.    Ponded    External
Name                 Type                  Elev.     Depth      Area    Inflow
-------------------------------------------------------------------------------
J01                  JUNCTION              90.68      1.00       0.0
J02                  JUNCTION              90.75      1.00       0.0
J03                  JUNCTION              90.81      1.00       0.0
J04                  JUNCTION              90.86      1.00       0.0
J05                  JUNCTION              91.02      1.00       0.0
J06                  JUNCTION              91.08      1.00       0.0
J07                  JUNCTION              91.13      1.00       0.0
J08                  JUNCTION              91.23      1.00       0.0
J09                  JUNCTION              91.28      1.00       0.0
J10                  JUNCTION              91.33      1.00       0.0
J11                  JUNCTION              91.36      1.00       0.0
J12                  JUNCTION              91.49      1.00       0.0
J13                  JUNCTION              91.31      1.00       0.0
J14                  JUNCTION              90.73      1.00       0.0
J15                  JUNCTION              90.80      1.00       0.0
J16                  JUNCTION              90.84      1.00       0.0
J17                  JUNCTION              90.98      1.00       0.0
J18                  JUNCTION              91.02      1.00       0.0
J19                  JUNCTION              91.06      1.00       0.0
J20                  JUNCTION              91.10      1.00       0.0
J21                  JUNCTION              91.18      1.00       0.0
J22                  JUNCTION              91.23      1.00       0.0
J23                  JUNCTION              91.29      1.00       0.0
J24                  JUNCTION              91.36      1.00       0.0
J25                  JUNCTION              91.37      1.00       0.0
J26                  JUNCTION              91.42      1.00       0.0
J27                  JUNCTION              91.49      1.00       0.0
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J28	JUNCTION	91.31	1.00	0.0	
J29	JUNCTION	91.14	1.00	0.0	
J30	JUNCTION	91.00	1.00	0.0	
J31	JUNCTION	90.61	1.00	0.0	
J32	JUNCTION	90.31	1.00	0.0	
J33	JUNCTION	90.19	2.00	0.0	
J34	JUNCTION	90.11	2.00	0.0	Yes
J35	JUNCTION	90.02	2.00	0.0	
J36	JUNCTION	89.81	2.00	0.0	
J37	JUNCTION	89.76	2.00	0.0	
J38	JUNCTION	89.64	2.00	0.0	
J39	JUNCTION	89.52	2.00	0.0	
J40	JUNCTION	89.44	2.00	0.0	
J41	JUNCTION	89.28	2.00	0.0	
OF-LombardyEast	OUTFALL	90.52	0.30	0.0	
OF-LombardyWest	OUTFALL	90.52	0.60	0.0	
OF-OsgoodePath-UNC	OUTFALL	91.00	0.00	0.0	
OF-TaylorWay	OUTFALL	88.36	1.40	0.0	
DryPond	STORAGE	90.35	1.00	0.0	

****
Link Summary
****

Name	From Node	To Node	Type	Length	%Slope	Roughness
C01	J02	J01	CONDUIT	9.0	0.7778	0.0240
C02	J03	J02	CONDUIT	11.0	0.5455	0.0350
C03	J04	J03	CONDUIT	9.0	0.5556	0.0240
C04	J05	J04	CONDUIT	34.0	0.4706	0.0350
C05	J06	J05	CONDUIT	12.0	0.5000	0.0350
C06	J07	J06	CONDUIT	9.0	0.5556	0.0240
C07	J08	J07	CONDUIT	21.0	0.4762	0.0350
C08	J09	J08	CONDUIT	9.0	0.5556	0.0350
C09	J10	J09	CONDUIT	9.0	0.5556	0.0240
C10	J11	J10	CONDUIT	7.0	0.4286	0.0350
C11	J12	J11	CONDUIT	9.0	1.4446	0.0350
C12	J12	J13	CONDUIT	11.0	1.6366	0.0350
C13	J13	OF-LombardyWest	CONDUIT	63.0	1.2541	0.0350
C14	J14	J01	CONDUIT	7.0	0.7143	0.0350
C15	J15	J14	CONDUIT	9.0	0.7778	0.0240
C16	J16	J15	CONDUIT	6.0	0.6667	0.0350
C17	J17	J16	CONDUIT	27.0	0.5185	0.0350
C18	J18	J17	CONDUIT	9.0	0.4444	0.0240
C19	J19	J18	CONDUIT	8.0	0.5000	0.0350
C20	J20	J19	CONDUIT	9.0	0.4444	0.0350
C21	J21	J20	CONDUIT	16.0	0.5000	0.0350
C22	J22	J21	CONDUIT	9.0	0.5556	0.0240
C23	J23	J22	CONDUIT	11.0	0.5455	0.0350
C24	J24	J23	CONDUIT	14.0	0.5000	0.0350
C25	J25	J24	CONDUIT	2.0	0.5000	0.0350
C26	J26	J25	CONDUIT	9.0	0.5556	0.0240
C27	J27	J26	CONDUIT	15.0	0.4667	0.0350
C28	J27	J28	CONDUIT	19.0	0.9474	0.0350
C29	J28	J29	CONDUIT	14.0	1.2144	0.0350
C30	J29	J30	CONDUIT	11.0	1.2728	0.0240
C31	J30	OF-LombardyEast	CONDUIT	39.0	1.2309	0.0350
C32	J01	J31	CONDUIT	14.0	0.5000	0.0350

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C33             J31             DryPond         CONDUIT           9.0    1.5557    0.0240
C34             J32             J33             CONDUIT          16.0    0.4375    0.0350
C35             J34             J35             CONDUIT          18.0    0.5000    0.0350
C36             J35             J36             CONDUIT          19.0    1.1053    0.0350
C37             J36             J37             CONDUIT          21.0    0.2381    0.0350
C38             J37             J38             CONDUIT          23.0    0.5217    0.0350
C39             J38             J39             CONDUIT          12.0    1.0001    0.0350
C40             J39             J40             CONDUIT          25.0    0.3200    0.0350
C41             J40             J41             CONDUIT          16.0    1.0001    0.0350
C42             J41             OF-TaylorWay    CONDUIT          36.0    2.5564    0.0350
Culv-OsgoodePath J33            J34             CONDUIT          17.7    0.4520    0.0240
W-Pond          DryPond         J32             ORIFICE
W01             J02             J01             WEIR
W02             J04             J03             WEIR
W03             J07             J06             WEIR
W04             J10             J09             WEIR
W05             J15             J14             WEIR
W06             J18             J17             WEIR
W07             J22             J21             WEIR
W08             J26             J25             WEIR
W09             J29             J30             WEIR
W-Emergency     DryPond         J32             WEIR
W-Path          J33             J34             WEIR
W-PondUpper     DryPond         J32             WEIR


*********************
Cross Section Summary
*********************
                                     Full     Full     Hyd.     Max.   No. of     Full
Conduit         Shape               Depth     Area     Rad.    Width  Barrels     Flow
---------------------------------------------------------------------------------------
C01             CIRCULAR             0.40     0.13     0.10     0.40        1    99.49
C02             TRAPEZOIDAL          0.60     1.68     0.35     4.60        1  1762.03
C03             CIRCULAR             0.40     0.13     0.10     0.40        1    84.09
C04             TRAPEZOIDAL          0.60     1.68     0.35     4.60        1  1636.64
C05             TRAPEZOIDAL          0.60     1.68     0.35     4.60        1  1687.01
C06             CIRCULAR             0.40     0.13     0.10     0.40        1    84.09
C07             TRAPEZOIDAL          0.60     1.68     0.35     4.60        1  1646.35
C08             TRAPEZOIDAL          0.60     1.68     0.35     4.60        1  1778.27
C09             CIRCULAR             0.40     0.13     0.10     0.40        1    84.09
C10             TRAPEZOIDAL          0.60     1.68     0.35     4.60        1  1561.87
C11             TRAPEZOIDAL          0.60     1.68     0.35     4.60        1  2867.50
C12             TRAPEZOIDAL          0.60     1.68     0.35     4.60        1  3052.11
C13             TRAPEZOIDAL          0.60     1.68     0.35     4.60        1  2671.72
C14             TRAPEZOIDAL          0.60     1.68     0.35     4.60        1  2016.38
C15             CIRCULAR             0.40     0.13     0.10     0.40        1    99.49
C16             TRAPEZOIDAL          0.60     1.68     0.35     4.60        1  1948.00
C17             TRAPEZOIDAL          0.60     1.68     0.35     4.60        1  1717.97
C18             CIRCULAR             0.40     0.13     0.10     0.40        1    75.21
C19             TRAPEZOIDAL          0.60     1.68     0.35     4.60        1  1687.01
C20             TRAPEZOIDAL          0.60     1.68     0.35     4.60        1  1590.53
C21             TRAPEZOIDAL          0.60     1.68     0.35     4.60        1  1687.01
C22             CIRCULAR             0.40     0.13     0.10     0.40        1    84.09
C23             TRAPEZOIDAL          0.60     1.68     0.35     4.60        1  1762.03
C24             TRAPEZOIDAL          0.60     1.68     0.35     4.60        1  1687.01
C25             TRAPEZOIDAL          0.60     1.68     0.35     4.60        1  1687.01
C26             CIRCULAR             0.40     0.13     0.10     0.40        1    84.09
```

C27	TRAPEZOIDAL	0.60	1.68	0.35	4.60	1	1629.81
C28	TRAPEZOIDAL	0.30	0.57	0.20	2.80	1	536.23
C29	TRAPEZOIDAL	0.30	0.57	0.20	2.80	1	607.10
C30	CIRCULAR	0.50	0.20	0.12	0.50	1	230.77
C31	TRAPEZOIDAL	0.30	0.57	0.20	2.80	1	611.20
C32	TRAPEZOIDAL	0.60	1.68	0.35	4.60	1	1687.01
C33	CIRCULAR	0.50	0.20	0.12	0.50	1	255.13
C34	TRAPEZOIDAL	0.60	1.68	0.35	4.60	1	1578.05
C35	OsgoodeDitch	1.66	8.97	0.81	9.70	1	15724.73
C36	OsgoodeDitch	1.66	8.97	0.81	9.70	1	23379.85
C37	OsgoodeDitch	1.66	8.97	0.81	9.70	1	10851.04
C38	OsgoodeDitch	1.66	8.97	0.81	9.70	1	16062.95
C39	OsgoodeDitch	1.66	8.97	0.81	9.70	1	22238.55
C40	OsgoodeDitch	1.66	8.97	0.81	9.70	1	12579.74
C41	OsgoodeDitch	1.66	8.97	0.81	9.70	1	22238.55
C42	TaylorWayDitch	1.40	4.75	0.64	6.90	1	16120.66
Culv-OsgoodePath	CIRCULAR	0.50	0.20	0.12	0.50	1	137.51

```
****************
Transect Summary
****************

Transect OsgoodeDitch
Area:
            0.0005     0.0019     0.0043     0.0076     0.0119
            0.0172     0.0234     0.0305     0.0387     0.0477
            0.0577     0.0687     0.0807     0.0935     0.1074
            0.1222     0.1383     0.1564     0.1755     0.1951
            0.2152     0.2357     0.2566     0.2780     0.2999
            0.3222     0.3449     0.3681     0.3918     0.4159
            0.4405     0.4655     0.4910     0.5169     0.5433
            0.5702     0.5975     0.6252     0.6534     0.6821
            0.7112     0.7408     0.7708     0.8013     0.8322
            0.8639     0.8965     0.9301     0.9646     1.0000
Hrad:
            0.0198     0.0396     0.0594     0.0792     0.0990
            0.1188     0.1386     0.1584     0.1782     0.1980
            0.2178     0.2376     0.2574     0.2772     0.2970
            0.3168     0.3204     0.3285     0.3578     0.3863
            0.4140     0.4412     0.4677     0.4936     0.5191
            0.5440     0.5685     0.5926     0.6164     0.6397
            0.6627     0.6854     0.7078     0.7300     0.7518
            0.7735     0.7949     0.8160     0.8370     0.8578
            0.8784     0.8988     0.9191     0.9392     0.9576
            0.9649     0.9729     0.9815     0.9905     1.0000
Width:
            0.0266     0.0532     0.0797     0.1063     0.1329
            0.1595     0.1860     0.2126     0.2392     0.2658
            0.2924     0.3189     0.3455     0.3721     0.3987
            0.4253     0.4768     0.5264     0.5390     0.5517
            0.5643     0.5769     0.5896     0.6022     0.6148
            0.6275     0.6401     0.6527     0.6654     0.6780
            0.6906     0.7033     0.7159     0.7285     0.7412
            0.7538     0.7664     0.7791     0.7917     0.8043
            0.8170     0.8296     0.8422     0.8549     0.8691
            0.8953     0.9215     0.9477     0.9738     1.0000
```

```
Transect TaylorWayDitch
Area:
            0.0004     0.0016     0.0036     0.0064     0.0101
            0.0145     0.0197     0.0258     0.0326     0.0402
            0.0487     0.0579     0.0680     0.0789     0.0905
            0.1030     0.1163     0.1304     0.1453     0.1610
            0.1775     0.1948     0.2129     0.2318     0.2515
            0.2720     0.2934     0.3155     0.3384     0.3622
            0.3867     0.4121     0.4382     0.4652     0.4930
            0.5215     0.5509     0.5811     0.6121     0.6438
            0.6759     0.7084     0.7413     0.7750     0.8098
            0.8457     0.8827     0.9207     0.9598     1.0000
Hrad:
            0.0201     0.0402     0.0603     0.0805     0.1006
            0.1207     0.1408     0.1609     0.1810     0.2011
            0.2212     0.2414     0.2615     0.2816     0.3017
            0.3218     0.3419     0.3620     0.3822     0.4023
            0.4224     0.4425     0.4626     0.4827     0.5028
            0.5229     0.5431     0.5632     0.5833     0.6034
            0.6235     0.6436     0.6637     0.6839     0.7040
            0.7241     0.7442     0.7643     0.7844     0.8117
            0.8416     0.8713     0.8984     0.9117     0.9255
            0.9396     0.9542     0.9691     0.9844     1.0000
Width:
            0.0198     0.0395     0.0593     0.0791     0.0988
            0.1186     0.1384     0.1581     0.1779     0.1977
            0.2174     0.2372     0.2570     0.2767     0.2965
            0.3163     0.3360     0.3558     0.3756     0.3953
            0.4151     0.4349     0.4546     0.4744     0.4942
            0.5139     0.5337     0.5535     0.5732     0.5930
            0.6128     0.6326     0.6523     0.6721     0.6919
            0.7116     0.7314     0.7512     0.7709     0.7836
            0.7934     0.8032     0.8154     0.8417     0.8681
            0.8945     0.9209     0.9472     0.9736     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 ............... LPS
Process Models:
  Rainfall/Runoff ........ YES
  RDII ................... NO
  Snowmelt ............... NO
  Groundwater ............ NO
  Flow Routing ........... YES
  Ponding Allowed ........ NO
  Water Quality .......... NO
Flow Routing Method ...... DYNWAVE
Surcharge Method ......... EXTRAN
Starting Date ............ 05/04/2021 00:00:00
```

```
  Ending Date .............. 05/06/2021 00:00:00
  Antecedent Dry Days ...... 0.0
  Report Time Step ......... 00:01:00
  Routing Time Step ........ 2.00 sec
  Variable Time Step ....... YES
  Maximum Trials ........... 8
  Number of Threads ........ 4
  Head Tolerance ........... 0.001500 m


  **************************        Volume         Volume
  Flow Routing Continuity        hectare-m      10^6 ltr
  **************************     ---------     ---------
  Dry Weather Inflow .......         0.000         0.000
  Wet Weather Inflow .......         0.000         0.000
  Groundwater Inflow .......         0.000         0.000
  RDII Inflow ..............         0.000         0.000
  External Inflow ..........        14.380       143.804
  External Outflow .........        14.345       143.449
  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 ......         0.036         0.362
  Continuity Error (%) .....        -0.005


  ***************************
  Time-Step Critical Elements
  ***************************
  Link C25 (8.11%)


  ********************************
  Highest Flow Instability Indexes
  ********************************
  Link W-PondUpper (35)
  Link C33 (6)
  Link C15 (4)
  Link C14 (2)


  *************************
  Routing Time Step Summary
  *************************
  Minimum Time Step           :     0.19 sec
  Average Time Step           :     1.95 sec
  Maximum Time Step           :     2.00 sec
  Percent in Steady State     :    -0.00
  Average Iterations per Step :     2.00
  Percent Not Converging      :     0.00
  Time Step Frequencies       :
      2.000 -  1.516 sec      :    95.43 %
      1.516 -  1.149 sec      :     3.70 %
      1.149 -  0.871 sec      :     0.69 %
      0.871 -  0.660 sec      :     0.07 %
      0.660 -  0.500 sec      :     0.11 %
```

```
******************
Node Depth Summary
******************
```

Node	Type	Average Depth Meters	Maximum Depth Meters	Maximum HGL Meters	Time of Max Occurrence days	Time of Max Occurrence hr:min	Reported Max Depth Meters
J01	JUNCTION	0.03	0.35	91.03	0	13:08	0.35
J02	JUNCTION	0.03	0.29	91.04	0	13:07	0.29
J03	JUNCTION	0.01	0.23	91.04	0	13:07	0.23
J04	JUNCTION	0.02	0.21	91.07	0	13:05	0.21
J05	JUNCTION	0.01	0.08	91.10	0	13:01	0.08
J06	JUNCTION	0.00	0.02	91.10	0	13:01	0.02
J07	JUNCTION	0.00	0.00	91.13	0	00:00	0.00
J08	JUNCTION	0.00	0.00	91.23	0	00:00	0.00
J09	JUNCTION	0.00	0.00	91.28	0	00:00	0.00
J10	JUNCTION	0.00	0.00	91.33	0	00:00	0.00
J11	JUNCTION	0.00	0.00	91.36	0	00:00	0.00
J12	JUNCTION	0.00	0.00	91.49	0	00:00	0.00
J13	JUNCTION	0.00	0.04	91.35	0	13:01	0.04
J14	JUNCTION	0.02	0.31	91.04	0	13:08	0.31
J15	JUNCTION	0.04	0.46	91.26	0	13:08	0.46
J16	JUNCTION	0.03	0.42	91.26	0	13:08	0.42
J17	JUNCTION	0.02	0.28	91.26	0	13:08	0.28
J18	JUNCTION	0.04	0.44	91.46	0	13:05	0.44
J19	JUNCTION	0.03	0.40	91.46	0	13:05	0.40
J20	JUNCTION	0.02	0.36	91.46	0	13:05	0.36
J21	JUNCTION	0.02	0.28	91.46	0	13:05	0.28
J22	JUNCTION	0.03	0.28	91.51	0	13:04	0.28
J23	JUNCTION	0.01	0.23	91.52	0	13:04	0.22
J24	JUNCTION	0.01	0.16	91.52	0	13:04	0.16
J25	JUNCTION	0.01	0.15	91.52	0	13:04	0.15
J26	JUNCTION	0.00	0.10	91.52	0	13:04	0.10
J27	JUNCTION	0.00	0.02	91.51	0	13:05	0.02
J28	JUNCTION	0.00	0.02	91.33	0	13:06	0.02
J29	JUNCTION	0.00	0.07	91.21	0	13:07	0.07
J30	JUNCTION	0.00	0.03	91.03	0	13:06	0.03
J31	JUNCTION	0.05	0.42	91.03	0	13:08	0.42
J32	JUNCTION	0.31	0.42	90.73	0	13:28	0.42
J33	JUNCTION	0.43	0.54	90.73	0	13:28	0.54
J34	JUNCTION	0.51	0.53	90.64	0	13:28	0.53
J35	JUNCTION	0.45	0.47	90.49	0	13:28	0.47
J36	JUNCTION	0.56	0.59	90.40	0	13:29	0.59
J37	JUNCTION	0.51	0.53	90.29	0	13:29	0.53
J38	JUNCTION	0.47	0.50	90.14	0	13:29	0.50
J39	JUNCTION	0.54	0.57	90.09	0	13:29	0.57
J40	JUNCTION	0.45	0.48	89.92	0	13:30	0.48
J41	JUNCTION	0.46	0.48	89.76	0	13:30	0.48
OF-LombardyEast	OUTFALL	0.00	0.03	90.55	0	13:06	0.03
OF-LombardyWest	OUTFALL	0.00	0.04	90.56	0	13:01	0.04
OF-OsgoodePath-UNC	OUTFALL	0.00	0.00	91.00	0	00:00	0.00
OF-TaylorWay	OUTFALL	0.46	0.48	88.84	0	13:30	0.48
DryPond	STORAGE	0.28	0.61	90.96	0	13:26	0.61

```
*******************
Node Inflow Summary
*******************
```

Node	Type	Maximum Lateral Inflow LPS	Maximum Total Inflow LPS	Time of Max Occurrence days	hr:min	Lateral Inflow Volume 10^6 ltr	Total Inflow Volume 10^6 ltr	Flow Balance Error Percent
J01	JUNCTION	0.00	156.00	0	13:07	0	1.17	-0.001
J02	JUNCTION	0.00	30.15	0	13:05	0	0.215	0.006
J03	JUNCTION	0.00	30.30	0	13:05	0	0.215	-0.001
J04	JUNCTION	0.00	31.28	0	13:01	0	0.215	0.026
J05	JUNCTION	31.42	31.42	0	13:00	0.215	0.215	-0.027
J06	JUNCTION	0.00	0.17	0	12:30	0	0.000142	0.310
J07	JUNCTION	0.00	0.00	0	00:00	0	0	0.000 ltr
J08	JUNCTION	0.00	0.00	0	00:00	0	0	0.000 ltr
J09	JUNCTION	0.00	0.00	0	00:00	0	0	0.000 ltr
J10	JUNCTION	0.00	0.00	0	00:00	0	0	0.000 ltr
J11	JUNCTION	0.00	0.00	0	00:00	0	0	0.000 ltr
J12	JUNCTION	0.00	0.00	0	00:00	0	0	0.000 ltr
J13	JUNCTION	13.69	13.69	0	13:00	0.0937	0.0937	0.000
J14	JUNCTION	0.00	126.60	0	13:08	0	0.956	-0.048
J15	JUNCTION	0.00	126.66	0	13:07	0	0.957	0.044
J16	JUNCTION	16.53	128.10	0	13:04	0.114	0.957	0.004
J17	JUNCTION	0.00	113.78	0	13:05	0	0.843	-0.006
J18	JUNCTION	0.00	114.00	0	13:04	0	0.843	0.003
J19	JUNCTION	0.00	114.68	0	13:04	0	0.843	0.001
J20	JUNCTION	63.40	115.76	0	13:01	0.435	0.843	-0.000
J21	JUNCTION	0.00	53.57	0	13:01	0	0.408	-0.006
J22	JUNCTION	0.00	54.03	0	13:00	0	0.408	0.006
J23	JUNCTION	0.00	54.99	0	13:00	0	0.408	0.003
J24	JUNCTION	0.00	55.46	0	13:00	0	0.408	-0.003
J25	JUNCTION	59.66	59.66	0	13:00	0.412	0.413	-0.001
J26	JUNCTION	0.00	4.61	0	13:04	0	0.00538	0.003
J27	JUNCTION	0.00	4.56	0	13:04	0	0.00451	-0.001
J28	JUNCTION	0.00	4.55	0	13:05	0	0.00444	-0.050
J29	JUNCTION	0.00	4.51	0	13:06	0	0.00444	0.158
J30	JUNCTION	7.06	10.93	0	13:05	0.0483	0.0528	-0.004
J31	JUNCTION	0.00	155.74	0	13:07	0	1.17	0.000
J32	JUNCTION	0.00	118.44	0	13:26	0	1.76	0.300
J33	JUNCTION	0.00	118.34	0	13:27	0	1.77	0.433
J34	JUNCTION	821.00	939.31	0	13:28	142	143	0.007
J35	JUNCTION	0.00	939.31	0	13:28	0	143	0.011
J36	JUNCTION	0.00	939.31	0	13:28	0	143	0.016
J37	JUNCTION	0.00	939.30	0	13:29	0	143	0.016
J38	JUNCTION	0.00	939.29	0	13:29	0	143	0.011
J39	JUNCTION	0.00	939.29	0	13:29	0	143	0.014
J40	JUNCTION	0.00	939.29	0	13:29	0	143	0.012
J41	JUNCTION	0.00	939.28	0	13:30	0	143	0.011
OF-LombardyEast	OUTFALL	0.00	10.91	0	13:06	0	0.0528	0.000
OF-LombardyWest	OUTFALL	0.00	13.62	0	13:01	0	0.0937	0.000
OF-OsgoodePath-UNC	OUTFALL	33.15	33.15	0	13:00	0.228	0.228	0.000
OF-TaylorWay	OUTFALL	0.00	939.28	0	13:30	0	143	0.000
DryPond	STORAGE	56.13	208.89	0	13:04	0.388	1.76	0.018

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**********************
Node Surcharge Summary
**********************

No nodes were surcharged.


*********************
Node Flooding Summary
*********************

No nodes were flooded.


**********************
Storage Volume Summary
**********************
```

Storage Unit	Average Volume 1000 m3	Avg Pcnt Full	Evap Pcnt Loss	Exfil Pcnt Loss	Maximum Volume 1000 m3	Max Pcnt Full	Time of Max Occurrence days hr:min	Maximum Outflow LPS
DryPond	0.226	24	0	0	0.618	65	0 13:26	118.44

```
***********************
Outfall Loading Summary
***********************
```

Outfall Node	Flow Freq Pcnt	Avg Flow LPS	Max Flow LPS	Total Volume 10^6 ltr
OF-LombardyEast	33.96	1.21	10.91	0.053
OF-LombardyWest	34.59	2.06	13.62	0.094
OF-OsgoodePath-UNC	33.60	5.14	33.15	0.228
OF-TaylorWay	99.94	829.98	939.28	143.074
System	50.52	838.39	965.67	143.448

```
********************
Link Flow Summary
********************
```

Link	Type	Maximum |Flow| LPS	Time of Max Occurrence days hr:min	Maximum |Veloc| m/sec	Max/ Full Flow	Max/ Full Depth
C01	CONDUIT	29.96	0 13:05	0.43	0.30	0.81
C02	CONDUIT	30.15	0 13:05	0.14	0.02	0.44
C03	CONDUIT	30.30	0 13:05	0.74	0.36	0.56
C04	CONDUIT	31.28	0 13:01	0.16	0.02	0.24
C05	CONDUIT	0.23	0 13:11	0.01	0.00	0.08
C06	CONDUIT	0.00	0 00:00	0.00	0.00	0.02

```
  C07                 CONDUIT       0.00      0  00:00       0.00     0.00     0.00
  C08                 CONDUIT       0.00      0  00:00       0.00     0.00     0.00
  C09                 CONDUIT       0.00      0  00:00       0.00     0.00     0.00
  C10                 CONDUIT       0.00      0  00:00       0.00     0.00     0.00
  C11                 CONDUIT       0.00      0  00:00       0.00     0.00     0.00
  C12                 CONDUIT       0.00      0  00:00       0.00     0.00     0.03
  C13                 CONDUIT      13.62      0  13:01       0.33     0.01     0.06
  C14                 CONDUIT     126.59      0  13:08       0.35     0.06     0.55
  C15                 CONDUIT     126.60      0  13:08       1.15     1.27     0.88
  C16                 CONDUIT     126.66      0  13:07       0.17     0.07     0.73
  C17                 CONDUIT     112.63      0  13:06       0.23     0.07     0.58
  C18                 CONDUIT     113.78      0  13:05       1.04     1.51     0.85
  C19                 CONDUIT     114.00      0  13:04       0.15     0.07     0.70
  C20                 CONDUIT     114.68      0  13:04       0.21     0.07     0.63
  C21                 CONDUIT      53.12      0  13:05       0.17     0.03     0.53
  C22                 CONDUIT      53.57      0  13:01       0.86     0.64     0.71
  C23                 CONDUIT      54.03      0  13:00       0.15     0.03     0.42
  C24                 CONDUIT      54.99      0  13:00       0.26     0.03     0.32
  C25                 CONDUIT      55.46      0  13:00       0.33     0.03     0.26
  C26                 CONDUIT       4.61      0  13:04       0.14     0.05     0.31
  C27                 CONDUIT       4.56      0  13:04       0.06     0.00     0.10
  C28                 CONDUIT       4.55      0  13:05       0.20     0.01     0.07
  C29                 CONDUIT       4.51      0  13:06       0.12     0.01     0.14
  C30                 CONDUIT       4.42      0  13:07       0.43     0.02     0.10
  C31                 CONDUIT      10.91      0  13:06       0.30     0.02     0.11
  C32                 CONDUIT     155.74      0  13:07       0.26     0.09     0.64
  C33                 CONDUIT     155.65      0  13:08       0.96     0.61     0.89
  C34                 CONDUIT     118.34      0  13:27       0.35     0.07     0.75
  C35                 CHANNEL     939.31      0  13:28       1.60     0.06     0.30
  C36                 CHANNEL     939.31      0  13:28       1.45     0.04     0.32
  C37                 CHANNEL     939.30      0  13:29       1.30     0.09     0.34
  C38                 CHANNEL     939.29      0  13:29       1.21     0.06     0.31
  C39                 CHANNEL     939.29      0  13:29       1.19     0.04     0.32
  C40                 CHANNEL     939.29      0  13:29       1.17     0.07     0.31
  C41                 CHANNEL     939.28      0  13:30       1.19     0.04     0.29
  C42                 CHANNEL     939.28      0  13:30       1.67     0.06     0.34
  Culv-OsgoodePath    CONDUIT     118.31      0  13:28       0.79     0.86     1.00
  W-Pond              ORIFICE      10.27      0  13:23                         1.00
  W01                 WEIR          0.00      0  00:00                         0.00
  W02                 WEIR          0.00      0  00:00                         0.00
  W03                 WEIR          0.00      0  00:00                         0.00
  W04                 WEIR          0.00      0  00:00                         0.00
  W05                 WEIR          0.00      0  00:00                         0.00
  W06                 WEIR          0.00      0  00:00                         0.00
  W07                 WEIR          0.00      0  00:00                         0.00
  W08                 WEIR          0.00      0  00:00                         0.00
  W09                 WEIR          0.00      0  00:00                         0.00
  W-Emergency         WEIR          0.00      0  00:00                         0.00
  W-Path              WEIR          0.00      0  00:00                         0.00
  W-PondUpper         WEIR        108.18      0  13:26                         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
C01	1.00	0.14	0.04	0.00	0.82	0.00	0.00	0.00	0.00	0.26
C02	1.00	0.18	0.16	0.00	0.66	0.00	0.00	0.00	0.75	0.00
C03	1.00	0.17	0.00	0.00	0.82	0.00	0.00	0.00	0.00	0.12
C04	1.00	0.17	0.37	0.00	0.46	0.00	0.00	0.00	0.81	0.00
C05	1.00	0.54	0.40	0.00	0.06	0.00	0.00	0.00	0.72	0.00
C06	1.00	0.94	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C07	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C08	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C09	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C10	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C11	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C12	1.00	0.54	0.46	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C13	1.00	0.54	0.00	0.00	0.46	0.00	0.00	0.00	0.56	0.00
C14	1.00	0.27	0.13	0.00	0.60	0.00	0.00	0.00	0.77	0.00
C15	1.00	0.13	0.00	0.00	0.67	0.20	0.00	0.00	0.00	0.15
C16	1.00	0.13	0.26	0.00	0.60	0.00	0.00	0.00	0.57	0.00
C17	1.00	0.40	0.03	0.00	0.57	0.00	0.00	0.00	0.83	0.00
C18	1.00	0.14	0.00	0.00	0.85	0.00	0.00	0.00	0.00	0.07
C19	1.00	0.14	0.32	0.00	0.54	0.00	0.00	0.00	0.56	0.00
C20	1.00	0.45	0.01	0.00	0.54	0.00	0.00	0.00	0.68	0.00
C21	1.00	0.45	0.02	0.00	0.52	0.00	0.00	0.00	0.82	0.00
C22	1.00	0.12	0.00	0.00	0.84	0.03	0.00	0.00	0.00	0.21
C23	1.00	0.12	0.41	0.00	0.47	0.00	0.00	0.00	0.80	0.00
C24	1.00	0.53	0.02	0.00	0.45	0.00	0.00	0.00	0.53	0.00
C25	1.00	0.55	0.03	0.00	0.42	0.00	0.00	0.00	0.66	0.00
C26	1.00	0.58	0.31	0.00	0.11	0.00	0.00	0.00	0.00	0.71
C27	1.00	0.89	0.06	0.00	0.06	0.00	0.00	0.00	0.72	0.00
C28	1.00	0.92	0.02	0.00	0.06	0.00	0.00	0.00	0.73	0.00
C29	1.00	0.92	0.00	0.00	0.08	0.00	0.00	0.00	0.71	0.00
C30	1.00	0.59	0.34	0.00	0.07	0.00	0.00	0.00	0.00	0.73
C31	1.00	0.59	0.00	0.00	0.41	0.00	0.00	0.00	0.54	0.00
C32	1.00	0.14	0.13	0.00	0.72	0.00	0.00	0.00	0.74	0.00
C33	1.00	0.03	0.11	0.00	0.86	0.00	0.00	0.00	0.00	0.25
C34	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
C35	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
C36	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	1.00	0.00
C37	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
C38	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
C39	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
C40	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
C41	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.65	0.00
C42	1.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00
Culv-OsgoodePath	1.00	0.00	0.00	0.00	1.00	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
C15	0.01	0.46	0.01	0.62	0.01

```
C18                        0.01      0.37      0.01      0.79        0.01
Culv-OsgoodePath           1.06      1.06     47.95      0.01        0.36


Analysis begun on:  Wed Jul  9 10:56:09 2025
Analysis ended on:  Wed Jul  9 10:56:12 2025
Total elapsed time: 00:00:03
```

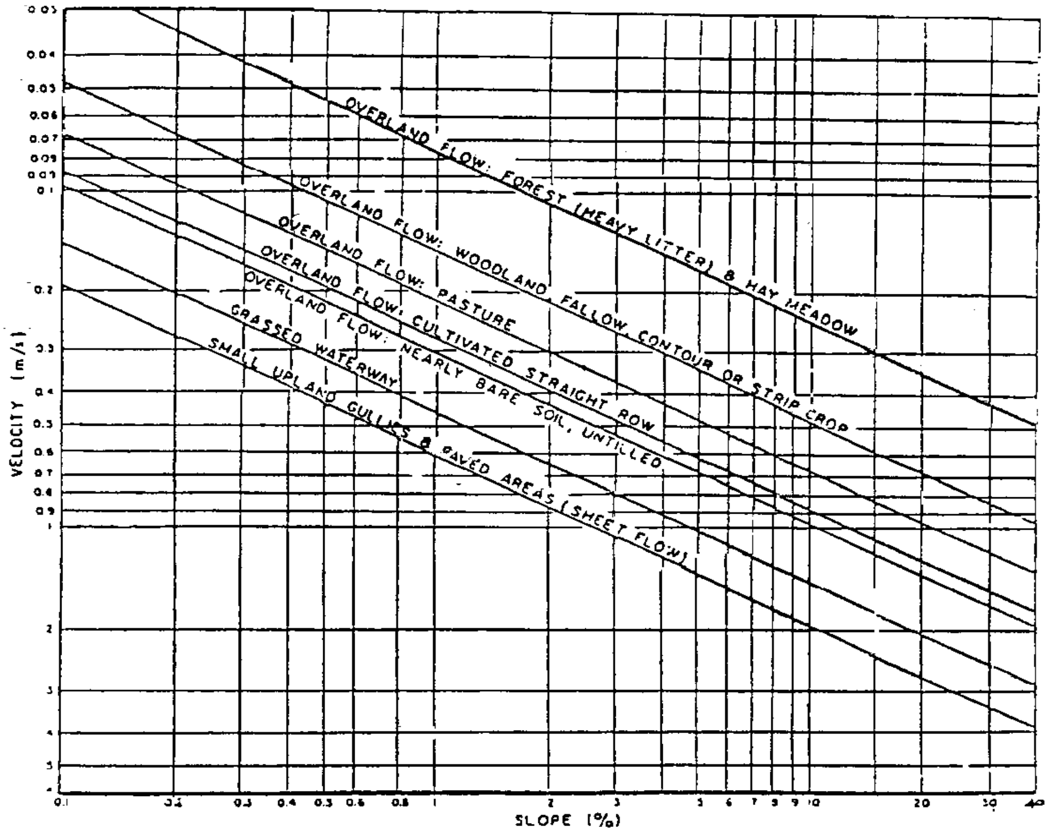


Figure A.5.2: Upland Method for Estimating Time of Concentration (SCS National Engineering Handbook, 1971)

Project Name
Pre-Development Model Parameters

NOVATECH
Engineers, Planners & Landscape Architects

Time to Peak Calculations
(Uplands Overland Flow Method)
Existing Conditions

Area ID	Area (ha)	Overland Flow						Concentrated Overland Flow						Overall		
		Length (m)	Elevation U/S (m)	Elevation D/S (m)	Slope (%)	Velocity (m/s)	Travel Time (min)	Length (m)	Elevation U/S (m)	Elevation D/S (m)	Slope (%)	Velocity (m/s)	Travel Time (min)	Time of Concentratio (min)	Time to Peak (min)	Time to Peak (min)
EX-1	3.31	100	94.00	91.15	2.8%	0.25	6.67	195	91.15	90.00	0.6%	0.35	9.29	16	11	11
EX-2	1.44	100	93.75	92.50	1.3%	0.16	10.42	140	92.50	90.50	1.4%	0.50	4.67	15	10	10

Weighted Curve Number Calculations
Soil type 'B' (Soil Mapping and Boreholes: silty sand and sandy clay)

Area ID	Land Use 1	Area	CN	Land Use 2	Area	CN	Weighted CN	
EX-1	Forest	79%	55	Residential	21%	72	59	** Soil Type (HSG) = B; Forest Cover = Good; Residential Unit = 1/3 acre
EX-2	Forest	67%	55	Residential	33%	75	62	** Soil Type (HSG) = B; Forest Cover = Good; Residential Unit = 1/4 acre

Weighted IA Calculations

Area ID	Land Use 1	Area	IA	Land Use 2	Area	IA	Weighted IA
EX-1	Forest	79%	15.6	Residential	21%	7.4	13.9
EX-2	Forest	67%	15.6	Residential	33%	6.4	12.5

Project Name
Pre-Development Model Parameters

NOVATECH
Engineers, Planners & Landscape Architects

Time to Peak Calculations
(Uplands Overland Flow Method)
Proposed Conditions

Area ID	Area (ha)	Overland Flow Length (m)	Overland Flow Elevation U/S (m)	Overland Flow Elevation D/S (m)	Overland Flow Slope (%)	Overland Flow Velocity (m/s)	Overland Flow Travel Time (min)	Concentrated Overland Flow Length (m)	Concentrated Overland Flow Elevation U/S (m)	Concentrated Overland Flow Elevation D/S (m)	Concentrated Overland Flow Slope (%)	Concentrated Overland Flow Velocity (m/s)	Concentrated Overland Flow Travel Time (min)	Overall Time of Concentration (min)	Overall Time of Concentration (min)
A	1.12	85	93.25	91.06	2.6%	0.34	4.17	0	-	-	-	-	0.00	4.2	15
B	0.48	35	92.50	91.20	3.7%	0.41	1.42	0	-	-	-	-	0.00	1.4	15
C	0.20	50	92.73	89.85	5.8%	0.50	1.67	0	-	-	-	-	0.00	1.7	15
D	0.48	50	92.91	91.07	3.7%	0.41	2.03	0	-	-	-	-	0.00	2.0	15
E	0.52	25	92.91	91.13	7.1%	0.57	0.73	0	-	-	-	-	0.00	0.7	15
F	0.22	25	91.65	90.90	3.0%	0.37	1.13	0	-	-	-	-	0.00	1.1	15
G	0.11	10	92.46	91.31	11.5%	0.70	0.24	0	-	-	-	-	0.00	0.2	15
H	0.43	95	93.40	91.36	2.1%	0.30	5.28	0	-	-	-	-	0.00	5.3	15
EX-1	0.23	60	94.15	93.45	1.2%	0.22	4.55	0	-	-	-	-	0.00	4.5	15
EX-2	0.48	60	93.90	93.15	1.3%	0.24	4.17	0	-	-	-	-	0.00	4.2	15
EX-3	0.48	60	94.00	92.60	2.3%	0.32	3.13	0	-	-	-	-	0.00	3.1	15

Weighted Curve Number Calculations
Soil type 'B' (Soil Mapping and Boreholes: silty sand and sandy clay)

Area ID	Land Use 1	Area	CN	Land Use 2	Area	CN	Land Use 3	Area	CN	Weighted CN	
A	Pavement/Roof	19%	98	Lawn	58%	58	Forest / Trees	23%	55	65	
B	Pavement/Roof	1%	98	Lawn	88%	58	Forest / Trees	11%	55	58	
C	Pavement/Roof	2%	98	Lawn	21%	58	Forest / Trees	77%	55	57	
D	Pavement/Roof	13%	98	Lawn	38%	58	Forest / Trees	49%	55	62	
E	Pavement/Roof	22%	98	Lawn	78%	58	Forest / Trees	0.2%	55	67	
F	Pavement/Roof	27%	98	Lawn	51%	58	Forest / Trees	22%	55	68	
G	Pavement/Roof	27%	98	Lawn	73%	58	Forest / Trees	0%	55	69	
H	Pavement/Roof	12%	98	Lawn	53%	58	Forest / Trees	34%	55	62	
EX-1	Residential	100%	72	Lawn	0%	58	Forest / Trees	0%	55	72	** Residential Unit = 1/3 acre
EX-2	Residential	100%	75	Lawn	0%	58	Forest / Trees	0%	55	75	** Residential Unit = 1/4 acre
EX-3	Residential	100%	72	Lawn	0%	58	Forest / Trees	0%	55	72	** Residential Unit = 1/3 acre

Weighted IA Calculations

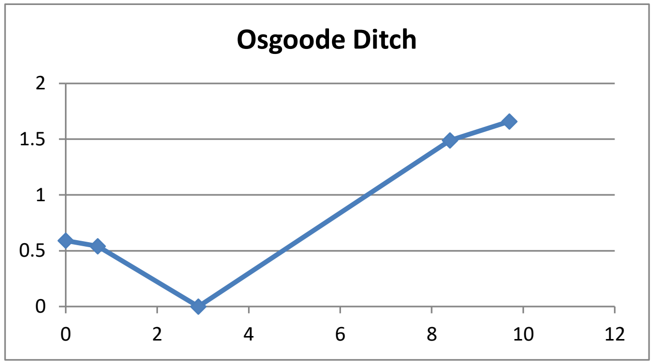
Area ID	Land Use 1	Area	IA	Land Use 2	Area	IA	Land Use 3	Area	IA	Weighted IA
A	Pavement/Roof	19%	1.0	Lawn	58%	13.8	Forest / Trees	23%	15.6	11.8
B	Pavement/Roof	1%	1.0	Lawn	88%	13.8	Forest / Trees	11%	15.6	13.8
C	Pavement/Roof	2%	1.0	Lawn	21%	13.8	Forest / Trees	77%	15.6	14.9
D	Pavement/Roof	13%	1.0	Lawn	38%	13.8	Forest / Trees	49%	15.6	13.0
E	Pavement/Roof	22%	1.0	Lawn	78%	13.8	Forest / Trees	0.2%	15.6	11.0
F	Pavement/Roof	27%	1.0	Lawn	51%	13.8	Forest / Trees	22%	15.6	10.8
G	Pavement/Roof	27%	1.0	Lawn	73%	13.8	Forest / Trees	0%	15.6	10.4
H	Pavement/Roof	12%	1.0	Lawn	53%	13.8	Forest / Trees	34%	15.6	12.8
EX-1	Residential	100%	7.4	Lawn	0%	13.8	Forest / Trees	0%	15.6	7.4
EX-2	Residential	100%	6.4	Lawn	0%	13.8	Forest / Trees	0%	15.6	6.4
EX-3	Residential	100%	7.4	Lawn	0%	13.8	Forest / Trees	0%	15.6	7.4

3200 Reid's Lane (119089)
Roadway Cross-Sections

Engineers, Planners & Landscape Architects

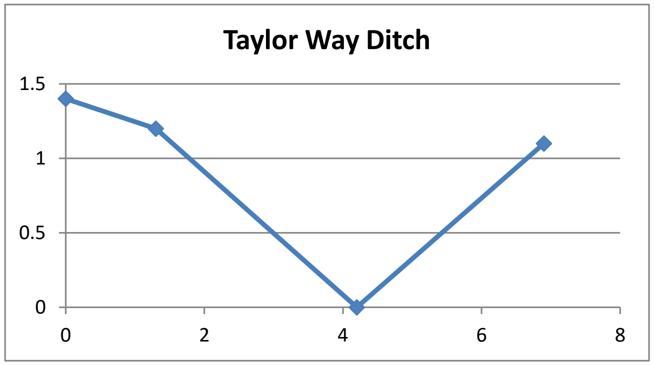
Osgoode Ditch

Station (m)	Depth (m)
0	0.59
0.7	0.54
2.9	0
8.4	1.49
9.7	1.66



Taylor Way Ditch

Station (m)	Depth (m)
0	1.4
1.3	1.2
4.2	0
6.9	1.1



3200 Reid's Lane (119089)
Design Storm Time Series Data
Chicago Design Storms

C25mm-4.stm		C2-3.stm		C5-3.stm	
Duration	Intensity	Duration	Intensity	Duration	Intensity
min	mm/hr	min	mm/hr	min	mm/hr
0:00	0	0:00	0	0:00	0
0:10	1.51	0:10	2.81	0:10	3.68
0:20	1.75	0:20	3.5	0:20	4.58
0:30	2.07	0:30	4.69	0:30	6.15
0:40	2.58	0:40	7.3	0:40	9.61
0:50	3.46	0:50	18.21	0:50	24.17
1:00	5.39	1:00	76.81	1:00	104.19
1:10	13.44	1:10	24.08	1:10	32.04
1:20	56.67	1:20	12.36	1:20	16.34
1:30	17.77	1:30	8.32	1:30	10.96
1:40	9.12	1:40	6.3	1:40	8.29
1:50	6.14	1:50	5.09	1:50	6.69
2:00	4.65	2:00	4.29	2:00	5.63
2:10	3.76	2:10	3.72	2:10	4.87
2:20	3.17	2:20	3.29	2:20	4.3
2:30	2.74	2:30	2.95	2:30	3.86
2:40	2.43	2:40	2.68	2:40	3.51
2:50	2.18	2:50	2.46	2:50	3.22
3:00	1.98	3:00	2.28	3:00	2.98
3:10	1.81				
3:20	1.68				
3:30	1.56				
3:40	1.47				
3:50	1.38				
4:00	1.31				

3200 Reid's Lane (119089)
Design Storm Time Series Data
Chicago Design Storms

C100-3.stm		C100-3+20%.stm	
Duration min	Intensity mm/hr	Duration min	Intensity mm/hr
0:00	0	0:00	0
0:10	6.05	0:10	6:14
0:20	7.54	0:20	9.05
0:30	10.16	0:30	12.19
0:40	15.97	0:40	19.16
0:50	40.65	0:50	48.78
1:00	178.56	1:00	214.27
1:10	54.05	1:10	64.86
1:20	27.32	1:20	32.78
1:30	18.24	1:30	21.89
1:40	13.74	1:40	16.49
1:50	11.06	1:50	13.27
2:00	9.29	2:00	11.15
2:10	8.02	2:10	9.62
2:20	7.08	2:20	8.5
2:30	6.35	2:30	7.62
2:40	5.76	2:40	6.91
2:50	5.28	2:50	6.34
3:00	4.88	3:00	5.86

3200 Reid's Lane (119089)
Design Storm Time Series Data
SCS Design Storms

NOVATECH
Engineers, Planners & Landscape Architects

S2-12.stm		S5-12.stm		S100-12.stm	
Duration	Intensity	Duration	Intensity	Duration	Intensity
min	mm/hr	min	mm/hr	min	mm/hr
0:00	0.00	0:00	0	0:00	0
0:30	1.27	0:30	1.69	0:30	2.82
1:00	0.59	1:00	0.79	1:00	1.31
1:30	1.10	1:30	1.46	1:30	2.44
2:00	1.10	2:00	1.46	2:00	2.44
2:30	1.44	2:30	1.91	2:30	3.19
3:00	1.27	3:00	1.69	3:00	2.82
3:30	1.69	3:30	2.25	3:30	3.76
4:00	1.69	4:00	2.25	4:00	3.76
4:30	2.29	4:30	3.03	4:30	5.07
5:00	2.88	5:00	3.82	5:00	6.39
5:30	4.57	5:30	6.07	5:30	10.14
6:00	36.24	6:00	48.08	6:00	80.38
6:30	9.23	6:30	12.25	6:30	20.47
7:00	4.06	7:00	5.39	7:00	9.01
7:30	2.71	7:30	3.59	7:30	6.01
8:00	2.37	8:00	3.15	8:00	5.26
8:30	1.86	8:30	2.47	8:30	4.13
9:00	1.95	9:00	2.58	9:00	4.32
9:30	1.27	9:30	1.69	9:30	2.82
10:00	1.02	10:00	1.35	10:00	2.25
10:30	1.44	10:30	1.91	10:30	3.19
11:00	0.93	11:00	1.24	11:00	2.07
11:30	0.85	11:30	1.12	11:30	1.88
12:00	0.85	12:00	1.12	12:00	1.88

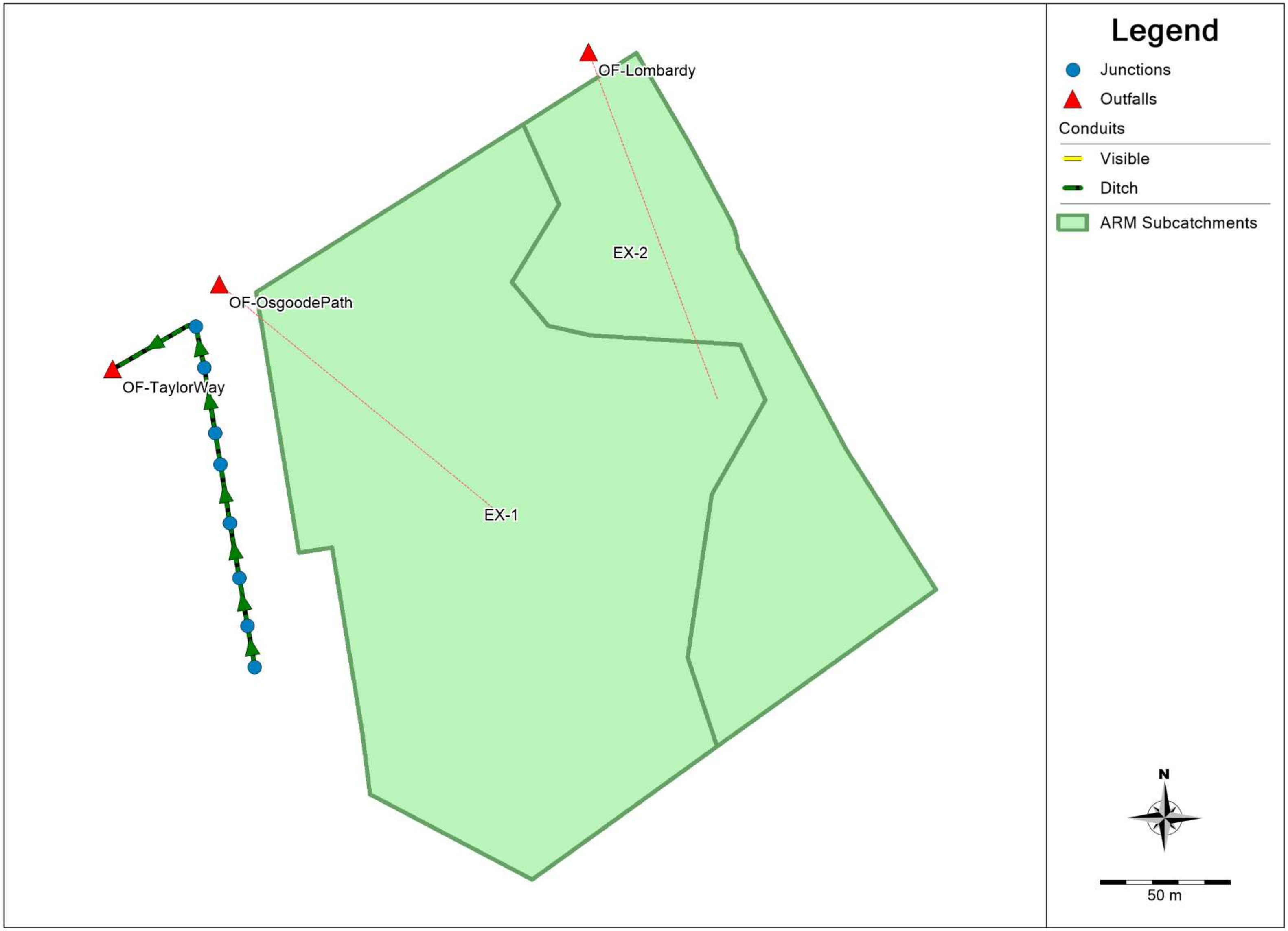
3200 Reid's Lane (119089)
Design Storm Time Series Data
SCS Design Storms

S2-24.stm		S5-24.stm		S100-24.stm	
Duration	Intensity	Duration	Intensity	Duration	Intensity
min	mm/hr	min	mm/hr	min	mm/hr
0:00	0.00	0:00	0	0:00	0
1:00	0.72	1:00	0.44	1:00	0.6
2:00	0.34	2:00	0.44	2:00	0.75
3:00	0.63	3:00	0.81	3:00	1.39
4:00	0.63	4:00	0.81	4:00	1.39
5:00	0.81	5:00	1.06	5:00	1.81
6:00	0.72	6:00	0.94	6:00	1.6
7:00	0.96	7:00	1.25	7:00	2.13
8:00	0.96	8:00	1.25	8:00	2.13
9:00	1.30	9:00	1.68	9:00	2.88
10:00	1.63	10:00	2.12	10:00	3.63
11:00	2.59	11:00	3.37	11:00	5.76
12:00	20.55	12:00	26.71	12:00	45.69
13:00	5.23	13:00	6.8	13:00	11.64
14:00	2.30	14:00	2.99	14:00	5.12
15:00	1.54	15:00	2	15:00	3.42
16:00	1.34	16:00	1.75	16:00	2.99
17:00	1.06	17:00	1.37	17:00	2.35
18:00	1.11	18:00	1.44	18:00	2.46
19:00	0.72	19:00	0.94	19:00	1.6
20:00	0.58	20:00	0.75	20:00	1.28
21:00	0.81	21:00	1.06	21:00	1.81
22:00	0.53	22:00	0.68	22:00	1.17
23:00	0.48	23:00	0.63	23:00	1.07
0:00	0.48	0:00	0.63	0:00	1.07

Overall Model Schematic

3200 Reid's Lane (119089)
PCSWMM Pre-Development Model Schematics

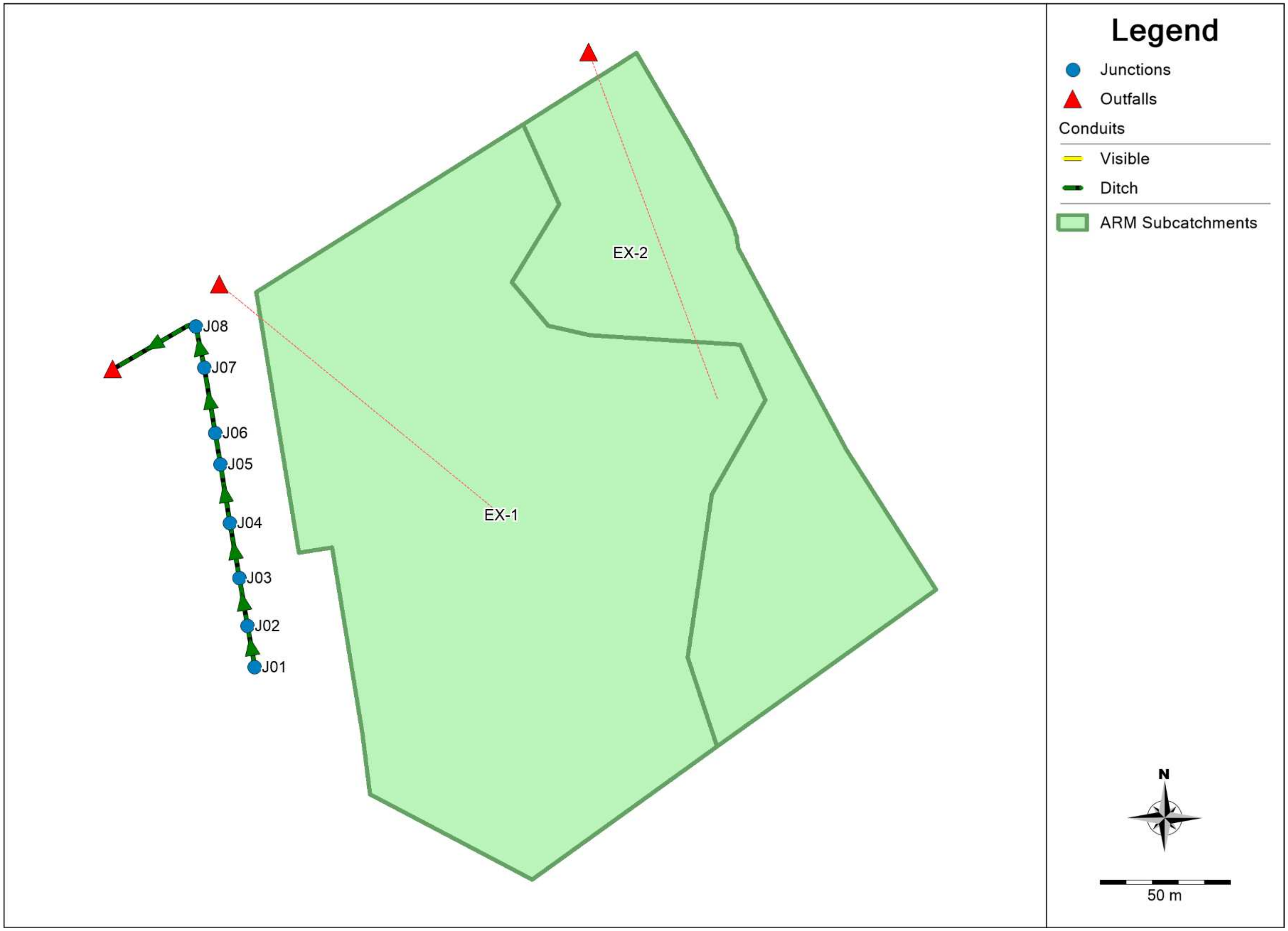
Subcatchments and Outfalls



Date: 2025-07-09
M:\2019\119089\DATA\Calculations\Sewer Calcs\SWM\PCSWMM\Sub 4\119089-Pre PCSWMM Model Schematics-Rev2.docx

3200 Reid's Lane (119089)
PCSWMM Pre-Development Model Schematics

Junctions



Date: 2025-07-09
M:\2019\119089\DATA\Calculations\Sewer Calcs\SWM\PCSWMM\Sub 4\119089-Pre PCSWMM Model Schematics-Rev2.docx

```
ALTERNATIVE RUNOFF METHOD (ARM) - PCSWMM VERSION 7.6.3620
---------------------------------------------------------

This is a new version of ARM - your feedback and suggestions are solicited.
Create a ticket, post on the PCSWMM feature request forum, or email us directly!

Simulation start time:              05/04/2021 00:00:00
Simulation end time:                05/06/2021 00:00:00
Runoff wet weather time steps:      240 seconds
Report time steps:                  60 seconds
Number of data points:              2881


******************************
Unit Hydrographs Runoff Method
******************************
```

Subcatchment	Runoff Method	Raingage	Area (ha)	Time of Concentration (min)	Time to Peak (min)	Time after Peak (min)	Peak UH Flow (m³/s/mm)	UH Depth (mm)
EX-2	Nash IUH	Raingage	1.44	15	10	62	0.01299	0.998
EX-1	Nash IUH	Raingage	3.31	16	10.67	69.33	0.028	0.999

```
******************
ARM Runoff Summary
******************
```

Subcatchment	Total Precip (mm)	Total Losses (mm)	Total Runoff (mm)	Total Runoff 10^6 ltr	Peak Runoff LPS	Runoff Coeff (fraction)
EX-2	93.91	65.956	27.903	0.402	95.531	0.297
EX-1	93.91	68.954	24.921	0.825	191.26	0.265

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


*************
Element Count
*************
Number of rain gages ...... 1
Number of subcatchments ... 0
Number of nodes ........... 11
Number of links ........... 8
Number of pollutants ...... 0
Number of land uses ....... 0


****************
Raingage Summary
```

```
****************
                                                      Data       Recording
Name                 Data Source                      Type       Interval 
-------------------------------------------------------------------------
Raingage             07-SCS100yr-12hr                 INTENSITY   30 min.


************
Node Summary
************
                                           Invert      Max.    Ponded    External
Name                 Type                   Elev.     Depth      Area    Inflow  
-------------------------------------------------------------------------------
J01                  JUNCTION               90.11      2.00       0.0    Yes
J02                  JUNCTION               90.02      2.00       0.0
J03                  JUNCTION               89.81      2.00       0.0
J04                  JUNCTION               89.76      2.00       0.0
J05                  JUNCTION               89.64      2.00       0.0
J06                  JUNCTION               89.52      2.00       0.0
J07                  JUNCTION               89.44      2.00       0.0
J08                  JUNCTION               89.28      2.00       0.0
OF-Lombardy          OUTFALL                90.80      0.00       0.0
OF-OsgoodePath       OUTFALL                90.75      0.00       0.0
OF-TaylorWay         OUTFALL                88.36      1.40       0.0


************
Link Summary
************
Name             From Node        To Node          Type            Length    %Slope Roughness
---------------------------------------------------------------------------------------------
C01              J01              J02              CONDUIT           18.0    0.5000    0.0350
C02              J02              J03              CONDUIT           19.0    1.1053    0.0350
C03              J03              J04              CONDUIT           21.0    0.2381    0.0350
C04              J04              J05              CONDUIT           23.0    0.5217    0.0350
C05              J05              J06              CONDUIT           12.0    1.0001    0.0350
C06              J06              J07              CONDUIT           25.0    0.3200    0.0350
C07              J07              J08              CONDUIT           16.0    1.0001    0.0350
C08              J08              OF-TaylorWay     CONDUIT           36.0    2.5564    0.0350


*********************
Cross Section Summary
*********************
                                        Full     Full     Hyd.     Max.   No. of     Full
Conduit          Shape                 Depth     Area     Rad.    Width  Barrels     Flow
---------------------------------------------------------------------------------------
C01              OsgoodeDitch           1.66     8.97     0.81     9.70        1 15724.73
C02              OsgoodeDitch           1.66     8.97     0.81     9.70        1 23379.85
C03              OsgoodeDitch           1.66     8.97     0.81     9.70        1 10851.04
C04              OsgoodeDitch           1.66     8.97     0.81     9.70        1 16062.95
C05              OsgoodeDitch           1.66     8.97     0.81     9.70        1 22238.55
C06              OsgoodeDitch           1.66     8.97     0.81     9.70        1 12579.74
C07              OsgoodeDitch           1.66     8.97     0.81     9.70        1 22238.55
C08              TaylorWayDitch         1.40     4.75     0.64     6.90        1 16120.66
```

```
****************
Transect Summary
****************

Transect OsgoodeDitch
Area:
            0.0005     0.0019     0.0043     0.0076     0.0119
            0.0172     0.0234     0.0305     0.0387     0.0477
            0.0577     0.0687     0.0807     0.0935     0.1074
            0.1222     0.1383     0.1564     0.1755     0.1951
            0.2152     0.2357     0.2566     0.2780     0.2999
            0.3222     0.3449     0.3681     0.3918     0.4159
            0.4405     0.4655     0.4910     0.5169     0.5433
            0.5702     0.5975     0.6252     0.6534     0.6821
            0.7112     0.7408     0.7708     0.8013     0.8322
            0.8639     0.8965     0.9301     0.9646     1.0000
Hrad:
            0.0198     0.0396     0.0594     0.0792     0.0990
            0.1188     0.1386     0.1584     0.1782     0.1980
            0.2178     0.2376     0.2574     0.2772     0.2970
            0.3168     0.3204     0.3285     0.3578     0.3863
            0.4140     0.4412     0.4677     0.4936     0.5191
            0.5440     0.5685     0.5926     0.6164     0.6397
            0.6627     0.6854     0.7078     0.7300     0.7518
            0.7735     0.7949     0.8160     0.8370     0.8578
            0.8784     0.8988     0.9191     0.9392     0.9576
            0.9649     0.9729     0.9815     0.9905     1.0000
Width:
            0.0266     0.0532     0.0797     0.1063     0.1329
            0.1595     0.1860     0.2126     0.2392     0.2658
            0.2924     0.3189     0.3455     0.3721     0.3987
            0.4253     0.4768     0.5264     0.5390     0.5517
            0.5643     0.5769     0.5896     0.6022     0.6148
            0.6275     0.6401     0.6527     0.6654     0.6780
            0.6906     0.7033     0.7159     0.7285     0.7412
            0.7538     0.7664     0.7791     0.7917     0.8043
            0.8170     0.8296     0.8422     0.8549     0.8691
            0.8953     0.9215     0.9477     0.9738     1.0000

Transect TaylorWayDitch
Area:
            0.0004     0.0016     0.0036     0.0064     0.0101
            0.0145     0.0197     0.0258     0.0326     0.0402
            0.0487     0.0579     0.0680     0.0789     0.0905
            0.1030     0.1163     0.1304     0.1453     0.1610
            0.1775     0.1948     0.2129     0.2318     0.2515
            0.2720     0.2934     0.3155     0.3384     0.3622
            0.3867     0.4121     0.4382     0.4652     0.4930
            0.5215     0.5509     0.5811     0.6121     0.6438
            0.6759     0.7084     0.7413     0.7750     0.8098
            0.8457     0.8827     0.9207     0.9598     1.0000
Hrad:
            0.0201     0.0402     0.0603     0.0805     0.1006
            0.1207     0.1408     0.1609     0.1810     0.2011
            0.2212     0.2414     0.2615     0.2816     0.3017
            0.3218     0.3419     0.3620     0.3822     0.4023
            0.4224     0.4425     0.4626     0.4827     0.5028
            0.5229     0.5431     0.5632     0.5833     0.6034
```

```
            0.6235     0.6436     0.6637     0.6839     0.7040
            0.7241     0.7442     0.7643     0.7844     0.8117
            0.8416     0.8713     0.8984     0.9117     0.9255
            0.9396     0.9542     0.9691     0.9844     1.0000
Width:
            0.0198     0.0395     0.0593     0.0791     0.0988
            0.1186     0.1384     0.1581     0.1779     0.1977
            0.2174     0.2372     0.2570     0.2767     0.2965
            0.3163     0.3360     0.3558     0.3756     0.3953
            0.4151     0.4349     0.4546     0.4744     0.4942
            0.5139     0.5337     0.5535     0.5732     0.5930
            0.6128     0.6326     0.6523     0.6721     0.6919
            0.7116     0.7314     0.7512     0.7709     0.7836
            0.7934     0.8032     0.8154     0.8417     0.8681
            0.8945     0.9209     0.9472     0.9736     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 ............... LPS
Process Models:
  Rainfall/Runoff ........ YES
  RDII ................... NO
  Snowmelt ............... NO
  Groundwater ............ NO
  Flow Routing ........... YES
  Ponding Allowed ........ NO
  Water Quality .......... NO
Flow Routing Method ...... DYNWAVE
Surcharge Method ......... EXTRAN
Starting Date ............ 05/04/2021 00:00:00
Ending Date .............. 05/06/2021 00:00:00
Antecedent Dry Days ...... 0.0
Report Time Step ......... 00:01:00
Routing Time Step ........ 2.00 sec
Variable Time Step ....... YES
Maximum Trials ........... 8
Number of Threads ........ 1
Head Tolerance ........... 0.001500 m


**************************        Volume         Volume
Flow Routing Continuity        hectare-m      10^6 ltr
**************************     ---------      ---------
Dry Weather Inflow .......         0.000          0.000
Wet Weather Inflow .......         0.000          0.000
Groundwater Inflow .......         0.000          0.000
RDII Inflow ..............         0.000          0.000
External Inflow ..........        14.309        143.096
External Outflow .........        14.296        142.957
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 ......         0.015         0.146
  Continuity Error (%) .....        -0.005


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


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


  *************************
  Routing Time Step Summary
  *************************
  Minimum Time Step           :     1.50 sec
  Average Time Step           :     2.00 sec
  Maximum Time Step           :     2.00 sec
  Percent in Steady State     :     0.00
  Average Iterations per Step :     2.00
  Percent Not Converging      :     0.00
  Time Step Frequencies       :
     2.000 -  1.516 sec       :   100.00 %
     1.516 -  1.149 sec       :     0.00 %
     1.149 -  0.871 sec       :     0.00 %
     0.871 -  0.660 sec       :     0.00 %
     0.660 -  0.500 sec       :     0.00 %


  ******************
  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
J01	JUNCTION	0.50	0.50	90.61	0	00:07	0.50
J02	JUNCTION	0.44	0.44	90.46	0	00:08	0.44
J03	JUNCTION	0.56	0.56	90.37	1	12:49	0.56
J04	JUNCTION	0.51	0.51	90.27	1	19:54	0.51
J05	JUNCTION	0.47	0.47	90.11	1	03:32	0.47
J06	JUNCTION	0.54	0.54	90.06	1	07:17	0.54
J07	JUNCTION	0.45	0.45	89.89	0	00:28	0.45
J08	JUNCTION	0.46	0.46	89.74	0	00:39	0.46
OF-Lombardy	OUTFALL	0.00	0.00	90.80	0	00:00	0.00
OF-OsgoodePath	OUTFALL	0.00	0.00	90.75	0	00:00	0.00
OF-TaylorWay	OUTFALL	0.46	0.46	88.82	0	00:28	0.46

Node Inflow Summary

Node	Type	Maximum Lateral Inflow LPS	Maximum Total Inflow LPS	Time of Max Occurrence days	Time of Max Occurrence hr:min	Lateral Inflow Volume 10^6 ltr	Total Inflow Volume 10^6 ltr	Flow Balance Error Percent
J01	JUNCTION	821.00	821.00	0	00:00	142	142	0.006
J02	JUNCTION	0.00	834.75	0	00:00	0	142	0.011
J03	JUNCTION	0.00	821.00	0	00:07	0	142	0.017
J04	JUNCTION	0.00	821.00	0	05:34	0	142	0.016
J05	JUNCTION	0.00	821.00	1	13:19	0	142	0.011
J06	JUNCTION	0.00	821.00	0	19:26	0	142	0.014
J07	JUNCTION	0.00	821.00	0	07:52	0	142	0.013
J08	JUNCTION	0.00	821.00	0	00:20	0	142	0.011
OF-Lombardy	OUTFALL	95.53	95.53	0	06:36	0.402	0.402	0.000
OF-OsgoodePath	OUTFALL	191.23	191.23	0	06:36	0.825	0.825	0.000
OF-TaylorWay	OUTFALL	0.00	821.00	0	01:54	0	142	0.000

Node Surcharge Summary

No nodes were surcharged.

Node Flooding Summary

No nodes were flooded.

Outfall Loading Summary

Outfall Node	Flow Freq Pcnt	Avg Flow LPS	Max Flow LPS	Total Volume 10^6 ltr
OF-Lombardy	16.78	13.86	95.53	0.402
OF-OsgoodePath	16.60	28.75	191.23	0.825
OF-TaylorWay	99.94	820.70	821.00	141.729
System	44.44	863.31	1107.75	142.956

Link Flow Summary

Link	Type	Maximum |Flow| LPS	Time of Max Occurrence days	hr:min	Maximum |Veloc| m/sec	Max/ Full Flow	Max/ Full Depth
C01	CHANNEL	834.75	0	00:00	1.67	0.05	0.29
C02	CHANNEL	821.00	0	00:07	1.51	0.04	0.30
C03	CHANNEL	821.00	0	05:34	1.30	0.08	0.32
C04	CHANNEL	821.00	1	13:19	1.23	0.05	0.29
C05	CHANNEL	821.00	0	19:26	1.22	0.04	0.30
C06	CHANNEL	821.00	0	07:52	1.22	0.07	0.30
C07	CHANNEL	821.00	0	00:20	1.22	0.04	0.27
C08	CHANNEL	821.00	0	01:54	1.62	0.05	0.33

****
Flow Classification Summary
****

Conduit	Adjusted /Actual Length	Dry	Up Dry	Down Dry	Sub Crit	Sup Crit	Up Crit	Down Crit	Norm Ltd	Inlet Ctrl
		---------- Fraction of Time in Flow Class ----------								
C01	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
C02	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	1.00	0.00
C03	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
C04	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
C05	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
C06	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
C07	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	1.00	0.00
C08	1.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00

****
Conduit Surcharge Summary
****

No conduits were surcharged.

Analysis begun on: Wed Jul 9 10:21:58 2025
Analysis ended on: Wed Jul 9 10:21:59 2025
Total elapsed time: 00:00:01

```
ALTERNATIVE RUNOFF METHOD (ARM) - PCSWMM VERSION 7.6.3620
---------------------------------------------------------

This is a new version of ARM - your feedback and suggestions are solicited.
Create a ticket, post on the PCSWMM feature request forum, or email us directly!

Simulation start time:              05/04/2021 00:00:00
Simulation end time:                05/06/2021 00:00:00
Runoff wet weather time steps:      240 seconds
Report time steps:                  60 seconds
Number of data points:              2881


******************************
Unit Hydrographs Runoff Method
******************************
```

Subcatchment	Runoff Method	Raingage	Area (ha)	Time of Concentration (min)	Time to Peak (min)	Time after Peak (min)	Peak UH Flow (m³/s/mm)	UH Depth (mm)
EX-2	Nash IUH	Raingage	1.44	15	10	62	0.01299	0.998
EX-1	Nash IUH	Raingage	3.31	16	10.67	69.33	0.028	0.999

```
******************
ARM Runoff Summary
******************
```

Subcatchment	Total Precip (mm)	Total Losses (mm)	Total Runoff (mm)	Total Runoff 10^6 ltr	Peak Runoff LPS	Runoff Coeff (fraction)
EX-2	106.73	71.2	35.465	0.511	74.22	0.332
EX-1	106.73	74.735	31.964	1.058	151.848	0.299

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


*************
Element Count
*************
Number of rain gages ...... 1
Number of subcatchments ... 0
Number of nodes ........... 11
Number of links ........... 8
Number of pollutants ...... 0
Number of land uses ....... 0


****************
Raingage Summary
```

****

Name	Data Source	Data Type	Recording Interval
Raingage	11-SCS100yr-24hr	INTENSITY	60 min.

****
Node Summary
****

Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
J01	JUNCTION	90.11	2.00	0.0	Yes
J02	JUNCTION	90.02	2.00	0.0	
J03	JUNCTION	89.81	2.00	0.0	
J04	JUNCTION	89.76	2.00	0.0	
J05	JUNCTION	89.64	2.00	0.0	
J06	JUNCTION	89.52	2.00	0.0	
J07	JUNCTION	89.44	2.00	0.0	
J08	JUNCTION	89.28	2.00	0.0	
OF-Lombardy	OUTFALL	90.80	0.00	0.0	
OF-OsgoodePath	OUTFALL	90.75	0.00	0.0	
OF-TaylorWay	OUTFALL	88.36	1.40	0.0	

****
Link Summary
****

Name	From Node	To Node	Type	Length	%Slope	Roughness
C01	J01	J02	CONDUIT	18.0	0.5000	0.0350
C02	J02	J03	CONDUIT	19.0	1.1053	0.0350
C03	J03	J04	CONDUIT	21.0	0.2381	0.0350
C04	J04	J05	CONDUIT	23.0	0.5217	0.0350
C05	J05	J06	CONDUIT	12.0	1.0001	0.0350
C06	J06	J07	CONDUIT	25.0	0.3200	0.0350
C07	J07	J08	CONDUIT	16.0	1.0001	0.0350
C08	J08	OF-TaylorWay	CONDUIT	36.0	2.5564	0.0350

****
Cross Section Summary
****

Conduit	Shape	Full Depth	Full Area	Hyd. Rad.	Max. Width	No. of Barrels	Full Flow
C01	OsgoodeDitch	1.66	8.97	0.81	9.70	1	15724.73
C02	OsgoodeDitch	1.66	8.97	0.81	9.70	1	23379.85
C03	OsgoodeDitch	1.66	8.97	0.81	9.70	1	10851.04
C04	OsgoodeDitch	1.66	8.97	0.81	9.70	1	16062.95
C05	OsgoodeDitch	1.66	8.97	0.81	9.70	1	22238.55
C06	OsgoodeDitch	1.66	8.97	0.81	9.70	1	12579.74
C07	OsgoodeDitch	1.66	8.97	0.81	9.70	1	22238.55
C08	TaylorWayDitch	1.40	4.75	0.64	6.90	1	16120.66

```
****************
Transect Summary
****************

Transect OsgoodeDitch
Area:
            0.0005     0.0019     0.0043     0.0076     0.0119
            0.0172     0.0234     0.0305     0.0387     0.0477
            0.0577     0.0687     0.0807     0.0935     0.1074
            0.1222     0.1383     0.1564     0.1755     0.1951
            0.2152     0.2357     0.2566     0.2780     0.2999
            0.3222     0.3449     0.3681     0.3918     0.4159
            0.4405     0.4655     0.4910     0.5169     0.5433
            0.5702     0.5975     0.6252     0.6534     0.6821
            0.7112     0.7408     0.7708     0.8013     0.8322
            0.8639     0.8965     0.9301     0.9646     1.0000
Hrad:
            0.0198     0.0396     0.0594     0.0792     0.0990
            0.1188     0.1386     0.1584     0.1782     0.1980
            0.2178     0.2376     0.2574     0.2772     0.2970
            0.3168     0.3204     0.3285     0.3578     0.3863
            0.4140     0.4412     0.4677     0.4936     0.5191
            0.5440     0.5685     0.5926     0.6164     0.6397
            0.6627     0.6854     0.7078     0.7300     0.7518
            0.7735     0.7949     0.8160     0.8370     0.8578
            0.8784     0.8988     0.9191     0.9392     0.9576
            0.9649     0.9729     0.9815     0.9905     1.0000
Width:
            0.0266     0.0532     0.0797     0.1063     0.1329
            0.1595     0.1860     0.2126     0.2392     0.2658
            0.2924     0.3189     0.3455     0.3721     0.3987
            0.4253     0.4768     0.5264     0.5390     0.5517
            0.5643     0.5769     0.5896     0.6022     0.6148
            0.6275     0.6401     0.6527     0.6654     0.6780
            0.6906     0.7033     0.7159     0.7285     0.7412
            0.7538     0.7664     0.7791     0.7917     0.8043
            0.8170     0.8296     0.8422     0.8549     0.8691
            0.8953     0.9215     0.9477     0.9738     1.0000

Transect TaylorWayDitch
Area:
            0.0004     0.0016     0.0036     0.0064     0.0101
            0.0145     0.0197     0.0258     0.0326     0.0402
            0.0487     0.0579     0.0680     0.0789     0.0905
            0.1030     0.1163     0.1304     0.1453     0.1610
            0.1775     0.1948     0.2129     0.2318     0.2515
            0.2720     0.2934     0.3155     0.3384     0.3622
            0.3867     0.4121     0.4382     0.4652     0.4930
            0.5215     0.5509     0.5811     0.6121     0.6438
            0.6759     0.7084     0.7413     0.7750     0.8098
            0.8457     0.8827     0.9207     0.9598     1.0000
Hrad:
            0.0201     0.0402     0.0603     0.0805     0.1006
            0.1207     0.1408     0.1609     0.1810     0.2011
            0.2212     0.2414     0.2615     0.2816     0.3017
            0.3218     0.3419     0.3620     0.3822     0.4023
            0.4224     0.4425     0.4626     0.4827     0.5028
            0.5229     0.5431     0.5632     0.5833     0.6034
```

```
            0.6235     0.6436     0.6637     0.6839     0.7040
            0.7241     0.7442     0.7643     0.7844     0.8117
            0.8416     0.8713     0.8984     0.9117     0.9255
            0.9396     0.9542     0.9691     0.9844     1.0000
  Width:
            0.0198     0.0395     0.0593     0.0791     0.0988
            0.1186     0.1384     0.1581     0.1779     0.1977
            0.2174     0.2372     0.2570     0.2767     0.2965
            0.3163     0.3360     0.3558     0.3756     0.3953
            0.4151     0.4349     0.4546     0.4744     0.4942
            0.5139     0.5337     0.5535     0.5732     0.5930
            0.6128     0.6326     0.6523     0.6721     0.6919
            0.7116     0.7314     0.7512     0.7709     0.7836
            0.7934     0.8032     0.8154     0.8417     0.8681
            0.8945     0.9209     0.9472     0.9736     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 ............... LPS
  Process Models:
    Rainfall/Runoff ........ YES
    RDII ................... NO
    Snowmelt ............... NO
    Groundwater ............ NO
    Flow Routing ........... YES
    Ponding Allowed ........ NO
    Water Quality .......... NO
  Flow Routing Method ...... DYNWAVE
  Surcharge Method ......... EXTRAN
  Starting Date ............ 05/04/2021 00:00:00
  Ending Date .............. 05/06/2021 00:00:00
  Antecedent Dry Days ...... 0.0
  Report Time Step ......... 00:01:00
  Routing Time Step ........ 2.00 sec
  Variable Time Step ....... YES
  Maximum Trials ........... 8
  Number of Threads ........ 1
  Head Tolerance ........... 0.001500 m


  **************************        Volume         Volume
  Flow Routing Continuity        hectare-m       10^6 ltr
  **************************     ---------      ---------
  Dry Weather Inflow .......         0.000          0.000
  Wet Weather Inflow .......         0.000          0.000
  Groundwater Inflow .......         0.000          0.000
  RDII Inflow ..............         0.000          0.000
  External Inflow ..........        14.344        143.438
  External Outflow .........        14.330        143.298
  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 ......         0.015         0.146
Continuity Error (%) .....        -0.005


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


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


*************************
Routing Time Step Summary
*************************
Minimum Time Step           :     1.50 sec
Average Time Step           :     2.00 sec
Maximum Time Step           :     2.00 sec
Percent in Steady State     :     0.00
Average Iterations per Step :     2.00
Percent Not Converging      :     0.00
Time Step Frequencies       :
    2.000 -  1.516 sec      :   100.00 %
    1.516 -  1.149 sec      :     0.00 %
    1.149 -  0.871 sec      :     0.00 %
    0.871 -  0.660 sec      :     0.00 %
    0.660 -  0.500 sec      :     0.00 %


******************
Node Depth Summary
******************
```

Node	Type	Average Depth Meters	Maximum Depth Meters	Maximum HGL Meters	Time of Max Occurrence days	Time of Max Occurrence hr:min	Reported Max Depth Meters
J01	JUNCTION	0.50	0.50	90.61	0	00:07	0.50
J02	JUNCTION	0.44	0.44	90.46	0	00:08	0.44
J03	JUNCTION	0.56	0.56	90.37	1	12:49	0.56
J04	JUNCTION	0.51	0.51	90.27	1	19:54	0.51
J05	JUNCTION	0.47	0.47	90.11	1	03:32	0.47
J06	JUNCTION	0.54	0.54	90.06	1	07:17	0.54
J07	JUNCTION	0.45	0.45	89.89	0	00:28	0.45
J08	JUNCTION	0.46	0.46	89.74	0	00:39	0.46
OF-Lombardy	OUTFALL	0.00	0.00	90.80	0	00:00	0.00
OF-OsgoodePath	OUTFALL	0.00	0.00	90.75	0	00:00	0.00
OF-TaylorWay	OUTFALL	0.46	0.46	88.82	0	00:28	0.46

NOVATECH
Engineers, Planners & Landscape Architects

****
Node Inflow Summary
****

Node	Type	Maximum Lateral Inflow LPS	Maximum Total Inflow LPS	Time of Max Occurrence days	Time of Max Occurrence hr:min	Lateral Inflow Volume 10^6 ltr	Total Inflow Volume 10^6 ltr	Flow Balance Error Percent
J01	JUNCTION	821.00	821.00	0	00:00	142	142	0.006
J02	JUNCTION	0.00	834.75	0	00:00	0	142	0.011
J03	JUNCTION	0.00	821.00	0	00:07	0	142	0.017
J04	JUNCTION	0.00	821.00	0	05:34	0	142	0.016
J05	JUNCTION	0.00	821.00	1	13:19	0	142	0.011
J06	JUNCTION	0.00	821.00	0	19:26	0	142	0.014
J07	JUNCTION	0.00	821.00	0	07:52	0	142	0.013
J08	JUNCTION	0.00	821.00	0	00:20	0	142	0.011
OF-Lombardy	OUTFALL	74.22	74.22	0	13:00	0.511	0.511	0.000
OF-OsgoodePath	OUTFALL	151.84	151.84	0	13:04	1.06	1.06	0.000
OF-TaylorWay	OUTFALL	0.00	821.00	0	01:54	0	142	0.000

****
Node Surcharge Summary
****

No nodes were surcharged.

****
Node Flooding Summary
****

No nodes were flooded.

****
Outfall Loading Summary
****

Outfall Node	Flow Freq Pcnt	Avg Flow LPS	Max Flow LPS	Total Volume 10^6 ltr
OF-Lombardy	32.95	8.97	74.22	0.511
OF-OsgoodePath	32.34	18.92	151.84	1.058
OF-TaylorWay	99.94	820.70	821.00	141.729
System	55.08	848.60	1046.62	143.298

****
Link Flow Summary
****

Link	Type	Maximum |Flow| LPS	Time of Max Occurrence days	Time of Max Occurrence hr:min	Maximum |Veloc| m/sec	Max/ Full Flow	Max/ Full Depth
C01	CHANNEL	834.75	0	00:00	1.67	0.05	0.29
C02	CHANNEL	821.00	0	00:07	1.51	0.04	0.30
C03	CHANNEL	821.00	0	05:34	1.30	0.08	0.32
C04	CHANNEL	821.00	1	13:19	1.23	0.05	0.29
C05	CHANNEL	821.00	0	19:26	1.22	0.04	0.30
C06	CHANNEL	821.00	0	07:52	1.22	0.07	0.30
C07	CHANNEL	821.00	0	00:20	1.22	0.04	0.27
C08	CHANNEL	821.00	0	01:54	1.62	0.05	0.33

****
Flow Classification Summary
****

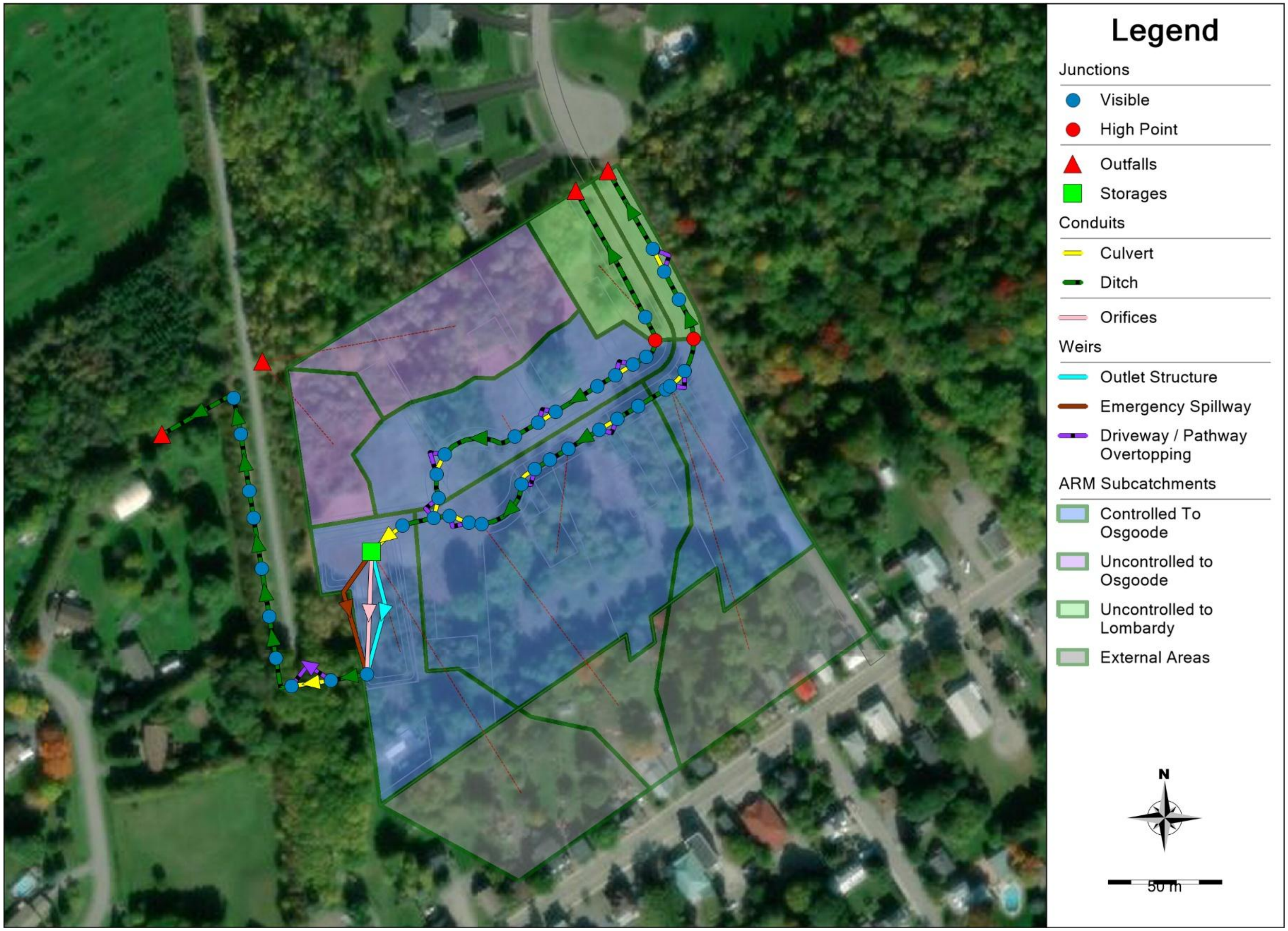
Conduit	Adjusted /Actual Length	Dry	Up Dry	Down Dry	Sub Crit	Sup Crit	Up Crit	Down Crit	Norm Ltd	Inlet Ctrl
		Fraction of Time in Flow Class								
C01	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
C02	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	1.00	0.00
C03	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
C04	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
C05	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
C06	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
C07	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	1.00	0.00
C08	1.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00

****
Conduit Surcharge Summary
****

No conduits were surcharged.

Analysis begun on: Wed Jul 9 10:25:41 2025
Analysis ended on: Wed Jul 9 10:25:42 2025
Total elapsed time: 00:00:01

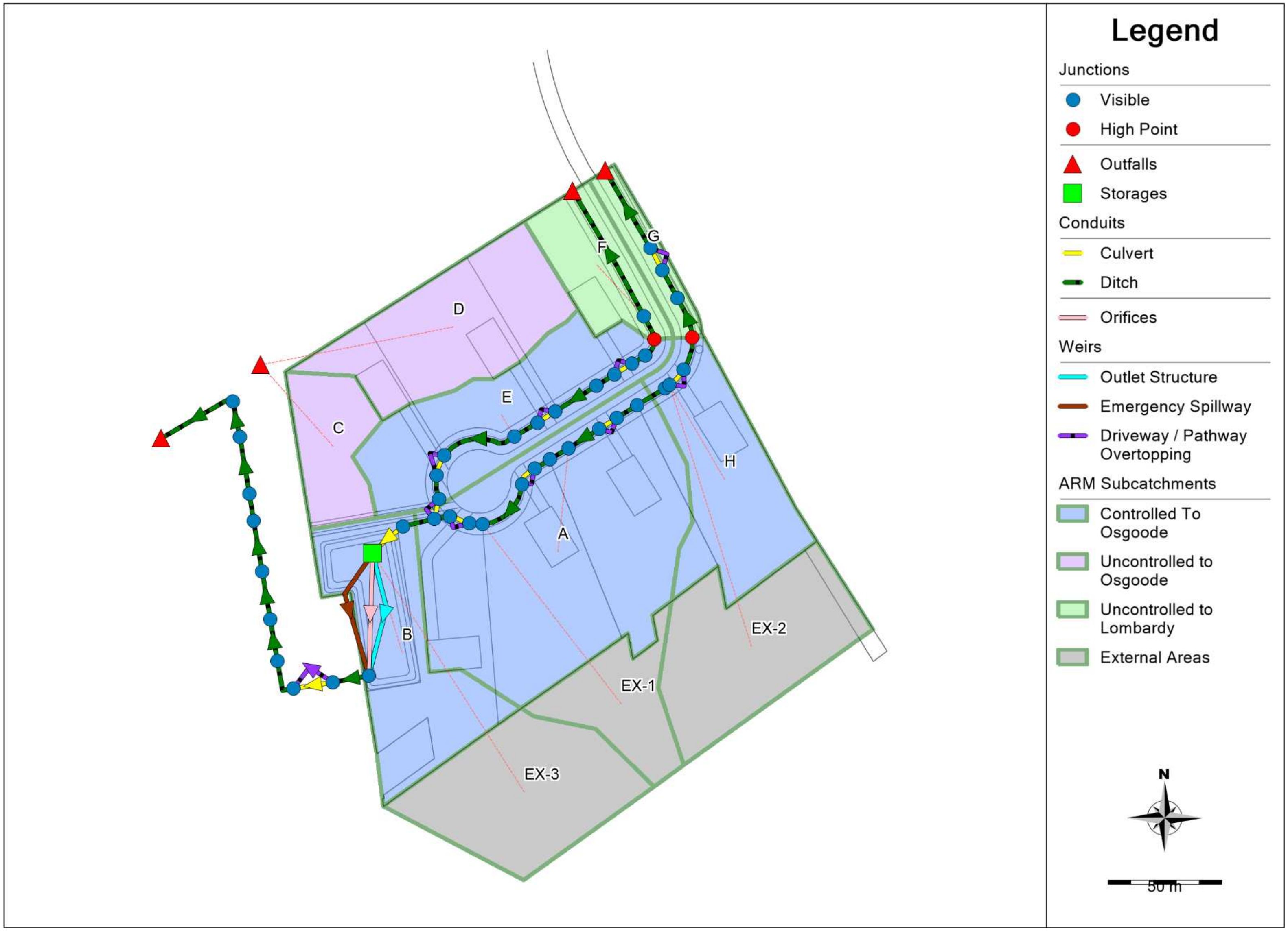
Overall Model Schematic



Date: 2025-06-26
M:\2019\119089\DATA\Calculations\Sewer Calcs\SWM\PCSWMM\Sub 4\119089-Post PCSWMM Model Schematics_Rev3.docx

3200 Reid's Lane (119089)
PCSWMM Post-Development Model Schematics

Subcatchments



Date: 2025-06-26
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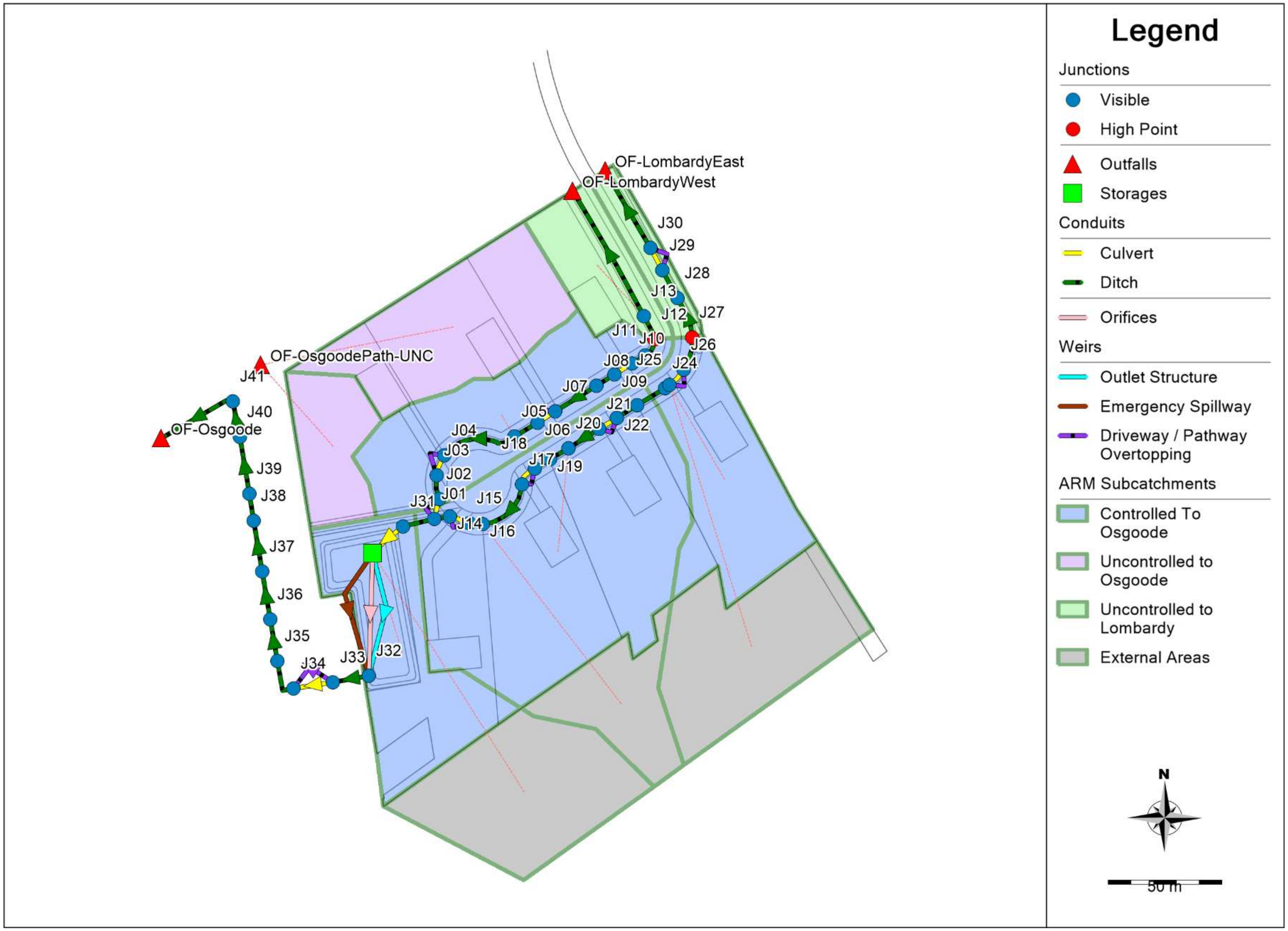
Junctions and Outfalls



```
ALTERNATIVE RUNOFF METHOD (ARM) - PCSWMM VERSION 7.6.3620
---------------------------------------------------------

This is a new version of ARM - your feedback and suggestions are solicited.
Create a ticket, post on the PCSWMM feature request forum, or email us directly!

Simulation start time:              05/04/2021 00:00:00
Simulation end time:                05/06/2021 00:00:00
Runoff wet weather time steps:      240 seconds
Report time steps:                  60 seconds
Number of data points:              2881


******************************
Unit Hydrographs Runoff Method
******************************
```

Subcatchment	Runoff Method	Raingage	Area (ha)	Time of Concentration (min)	Time to Peak (min)	Time after Peak (min)	Peak UH Flow ($m^3/s/mm$)	UH Depth (mm)
EX-2	Nash IUH	Raingage	0.48	15	10	54	0.00433	0.998
EX-1	Nash IUH	Raingage	0.23	15	10	50	0.00208	0.997
EX-3	Nash IUH	Raingage	0.48	15	10	54	0.00433	0.998
D	Nash IUH	Raingage	0.48	15	10	54	0.00433	0.998
A	Nash IUH	Raingage	1.12	15	10	58	0.01011	0.998
B	Nash IUH	Raingage	0.48	15	10	54	0.00433	0.998
C	Nash IUH	Raingage	0.2	15	10	50	0.0018	0.997
E	Nash IUH	Raingage	0.52	15	10	54	0.00469	0.998
G	Nash IUH	Raingage	0.11	15	10	46	0.00099	0.996
F	Nash IUH	Raingage	0.22	15	10	50	0.00198	0.997
H	Nash IUH	Raingage	0.43	15	10	54	0.00388	0.998

```
******************
ARM Runoff Summary
******************
```

Subcatchment	Total Precip (mm)	Total Losses (mm)	Total Runoff (mm)	Total Runoff 10^6 ltr	Peak Runoff LPS	Runoff Coeff (fraction)
EX-2	93.91	49.432	44.375	0.213	52.671	0.473
EX-1	93.91	53.519	40.283	0.093	22.744	0.429
EX-3	93.91	53.519	40.312	0.194	47.468	0.429
D	93.91	66.24	27.604	0.132	31.519	0.294
A	93.91	63.107	30.741	0.344	82.464	0.327
B	93.91	69.605	24.25	0.116	27.403	0.258
C	93.91	70.843	23.005	0.046	10.795	0.245
E	93.91	60.864	32.981	0.172	41.385	0.351
G	93.91	58.622	35.155	0.039	9.418	0.374
F	93.91	59.823	33.995	0.075	18.126	0.362
H	93.91	66.126	27.721	0.119	28.352	0.295

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


*************
Element Count
*************
Number of rain gages ...... 1
Number of subcatchments ... 0
Number of nodes ........... 46
Number of links ........... 56
Number of pollutants ...... 0
Number of land uses ....... 0


****************
Raingage Summary
****************
                                                 Data       Recording
Name                 Data Source                 Type       Interval
------------------------------------------------------------------------
Raingage             07-SCS100yr-12hr            INTENSITY   30 min.


************
Node Summary
************
                                      Invert      Max.    Ponded    External
Name                 Type              Elev.     Depth      Area    Inflow
-------------------------------------------------------------------------------
J01                  JUNCTION          90.68      1.00       0.0
J02                  JUNCTION          90.75      1.00       0.0
J03                  JUNCTION          90.81      1.00       0.0
J04                  JUNCTION          90.86      1.00       0.0
J05                  JUNCTION          91.02      1.00       0.0
J06                  JUNCTION          91.08      1.00       0.0
J07                  JUNCTION          91.13      1.00       0.0
J08                  JUNCTION          91.23      1.00       0.0
J09                  JUNCTION          91.28      1.00       0.0
J10                  JUNCTION          91.33      1.00       0.0
J11                  JUNCTION          91.36      1.00       0.0
J12                  JUNCTION          91.49      1.00       0.0
J13                  JUNCTION          91.31      1.00       0.0
J14                  JUNCTION          90.73      1.00       0.0
J15                  JUNCTION          90.80      1.00       0.0
J16                  JUNCTION          90.84      1.00       0.0
J17                  JUNCTION          90.98      1.00       0.0
J18                  JUNCTION          91.02      1.00       0.0
J19                  JUNCTION          91.06      1.00       0.0
J20                  JUNCTION          91.10      1.00       0.0
J21                  JUNCTION          91.18      1.00       0.0
J22                  JUNCTION          91.23      1.00       0.0
J23                  JUNCTION          91.29      1.00       0.0
J24                  JUNCTION          91.36      1.00       0.0
J25                  JUNCTION          91.37      1.00       0.0
J26                  JUNCTION          91.42      1.00       0.0
J27                  JUNCTION          91.49      1.00       0.0
```

J28	JUNCTION	91.31	1.00	0.0	
J29	JUNCTION	91.14	1.00	0.0	
J30	JUNCTION	91.00	1.00	0.0	
J31	JUNCTION	90.61	1.00	0.0	
J32	JUNCTION	90.31	1.00	0.0	
J33	JUNCTION	90.19	2.00	0.0	
J34	JUNCTION	90.11	2.00	0.0	Yes
J35	JUNCTION	90.02	2.00	0.0	
J36	JUNCTION	89.81	2.00	0.0	
J37	JUNCTION	89.76	2.00	0.0	
J38	JUNCTION	89.64	2.00	0.0	
J39	JUNCTION	89.52	2.00	0.0	
J40	JUNCTION	89.44	2.00	0.0	
J41	JUNCTION	89.28	2.00	0.0	
OF-LombardyEast	OUTFALL	90.52	0.30	0.0	
OF-LombardyWest	OUTFALL	90.52	0.60	0.0	
OF-OsgoodePath-UNC	OUTFALL	91.00	0.00	0.0	
OF-TaylorWay	OUTFALL	88.36	1.40	0.0	
DryPond	STORAGE	90.35	1.00	0.0	

****
Link Summary
****

Name	From Node	To Node	Type	Length	%Slope	Roughness
C01	J02	J01	CONDUIT	9.0	0.7778	0.0240
C02	J03	J02	CONDUIT	11.0	0.5455	0.0350
C03	J04	J03	CONDUIT	9.0	0.5556	0.0240
C04	J05	J04	CONDUIT	34.0	0.4706	0.0350
C05	J06	J05	CONDUIT	12.0	0.5000	0.0350
C06	J07	J06	CONDUIT	9.0	0.5556	0.0240
C07	J08	J07	CONDUIT	21.0	0.4762	0.0350
C08	J09	J08	CONDUIT	9.0	0.5556	0.0350
C09	J10	J09	CONDUIT	9.0	0.5556	0.0240
C10	J11	J10	CONDUIT	7.0	0.4286	0.0350
C11	J12	J11	CONDUIT	9.0	1.4446	0.0350
C12	J12	J13	CONDUIT	11.0	1.6366	0.0350
C13	J13	OF-LombardyWest	CONDUIT	63.0	1.2541	0.0350
C14	J14	J01	CONDUIT	7.0	0.7143	0.0350
C15	J15	J14	CONDUIT	9.0	0.7778	0.0240
C16	J16	J15	CONDUIT	6.0	0.6667	0.0350
C17	J17	J16	CONDUIT	27.0	0.5185	0.0350
C18	J18	J17	CONDUIT	9.0	0.4444	0.0240
C19	J19	J18	CONDUIT	8.0	0.5000	0.0350
C20	J20	J19	CONDUIT	9.0	0.4444	0.0350
C21	J21	J20	CONDUIT	16.0	0.5000	0.0350
C22	J22	J21	CONDUIT	9.0	0.5556	0.0240
C23	J23	J22	CONDUIT	11.0	0.5455	0.0350
C24	J24	J23	CONDUIT	14.0	0.5000	0.0350
C25	J25	J24	CONDUIT	2.0	0.5000	0.0350
C26	J26	J25	CONDUIT	9.0	0.5556	0.0240
C27	J27	J26	CONDUIT	15.0	0.4667	0.0350
C28	J27	J28	CONDUIT	19.0	0.9474	0.0350
C29	J28	J29	CONDUIT	14.0	1.2144	0.0350
C30	J29	J30	CONDUIT	11.0	1.2728	0.0240
C31	J30	OF-LombardyEast	CONDUIT	39.0	1.2309	0.0350
C32	J01	J31	CONDUIT	14.0	0.5000	0.0350

C33	J31	DryPond	CONDUIT	9.0	1.5557	0.0240
C34	J32	J33	CONDUIT	16.0	0.4375	0.0350
C35	J34	J35	CONDUIT	18.0	0.5000	0.0350
C36	J35	J36	CONDUIT	19.0	1.1053	0.0350
C37	J36	J37	CONDUIT	21.0	0.2381	0.0350
C38	J37	J38	CONDUIT	23.0	0.5217	0.0350
C39	J38	J39	CONDUIT	12.0	1.0001	0.0350
C40	J39	J40	CONDUIT	25.0	0.3200	0.0350
C41	J40	J41	CONDUIT	16.0	1.0001	0.0350
C42	J41	OF-TaylorWay	CONDUIT	36.0	2.5564	0.0350
Culv-OsgoodePath	J33	J34	CONDUIT	17.7	0.4520	0.0240
W-Pond	DryPond	J32	ORIFICE			
W01	J02	J01	WEIR			
W02	J04	J03	WEIR			
W03	J07	J06	WEIR			
W04	J10	J09	WEIR			
W05	J15	J14	WEIR			
W06	J18	J17	WEIR			
W07	J22	J21	WEIR			
W08	J26	J25	WEIR			
W09	J29	J30	WEIR			
W-Emergency	DryPond	J32	WEIR			
W-Path	J33	J34	WEIR			
W-PondUpper	DryPond	J32	WEIR			

****
Cross Section Summary
****

Conduit	Shape	Full Depth	Full Area	Hyd. Rad.	Max. Width	No. of Barrels	Full Flow
C01	CIRCULAR	0.40	0.13	0.10	0.40	1	99.49
C02	TRAPEZOIDAL	0.60	1.68	0.35	4.60	1	1762.03
C03	CIRCULAR	0.40	0.13	0.10	0.40	1	84.09
C04	TRAPEZOIDAL	0.60	1.68	0.35	4.60	1	1636.64
C05	TRAPEZOIDAL	0.60	1.68	0.35	4.60	1	1687.01
C06	CIRCULAR	0.40	0.13	0.10	0.40	1	84.09
C07	TRAPEZOIDAL	0.60	1.68	0.35	4.60	1	1646.35
C08	TRAPEZOIDAL	0.60	1.68	0.35	4.60	1	1778.27
C09	CIRCULAR	0.40	0.13	0.10	0.40	1	84.09
C10	TRAPEZOIDAL	0.60	1.68	0.35	4.60	1	1561.87
C11	TRAPEZOIDAL	0.60	1.68	0.35	4.60	1	2867.50
C12	TRAPEZOIDAL	0.60	1.68	0.35	4.60	1	3052.11
C13	TRAPEZOIDAL	0.60	1.68	0.35	4.60	1	2671.72
C14	TRAPEZOIDAL	0.60	1.68	0.35	4.60	1	2016.38
C15	CIRCULAR	0.40	0.13	0.10	0.40	1	99.49
C16	TRAPEZOIDAL	0.60	1.68	0.35	4.60	1	1948.00
C17	TRAPEZOIDAL	0.60	1.68	0.35	4.60	1	1717.97
C18	CIRCULAR	0.40	0.13	0.10	0.40	1	75.21
C19	TRAPEZOIDAL	0.60	1.68	0.35	4.60	1	1687.01
C20	TRAPEZOIDAL	0.60	1.68	0.35	4.60	1	1590.53
C21	TRAPEZOIDAL	0.60	1.68	0.35	4.60	1	1687.01
C22	CIRCULAR	0.40	0.13	0.10	0.40	1	84.09
C23	TRAPEZOIDAL	0.60	1.68	0.35	4.60	1	1762.03
C24	TRAPEZOIDAL	0.60	1.68	0.35	4.60	1	1687.01
C25	TRAPEZOIDAL	0.60	1.68	0.35	4.60	1	1687.01
C26	CIRCULAR	0.40	0.13	0.10	0.40	1	84.09

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C27              TRAPEZOIDAL          0.60      1.68      0.35      4.60         1  1629.81
C28              TRAPEZOIDAL          0.30      0.57      0.20      2.80         1   536.23
C29              TRAPEZOIDAL          0.30      0.57      0.20      2.80         1   607.10
C30              CIRCULAR             0.50      0.20      0.12      0.50         1   230.77
C31              TRAPEZOIDAL          0.30      0.57      0.20      2.80         1   611.20
C32              TRAPEZOIDAL          0.60      1.68      0.35      4.60         1  1687.01
C33              CIRCULAR             0.50      0.20      0.12      0.50         1   255.13
C34              TRAPEZOIDAL          0.60      1.68      0.35      4.60         1  1578.05
C35              OsgoodeDitch         1.66      8.97      0.81      9.70         1 15724.73
C36              OsgoodeDitch         1.66      8.97      0.81      9.70         1 23379.85
C37              OsgoodeDitch         1.66      8.97      0.81      9.70         1 10851.04
C38              OsgoodeDitch         1.66      8.97      0.81      9.70         1 16062.95
C39              OsgoodeDitch         1.66      8.97      0.81      9.70         1 22238.55
C40              OsgoodeDitch         1.66      8.97      0.81      9.70         1 12579.74
C41              OsgoodeDitch         1.66      8.97      0.81      9.70         1 22238.55
C42              TaylorWayDitch       1.40      4.75      0.64      6.90         1 16120.66
Culv-OsgoodePath CIRCULAR             0.50      0.20      0.12      0.50         1   137.51


****************
Transect Summary
****************

Transect OsgoodeDitch
Area:
            0.0005     0.0019     0.0043     0.0076     0.0119
            0.0172     0.0234     0.0305     0.0387     0.0477
            0.0577     0.0687     0.0807     0.0935     0.1074
            0.1222     0.1383     0.1564     0.1755     0.1951
            0.2152     0.2357     0.2566     0.2780     0.2999
            0.3222     0.3449     0.3681     0.3918     0.4159
            0.4405     0.4655     0.4910     0.5169     0.5433
            0.5702     0.5975     0.6252     0.6534     0.6821
            0.7112     0.7408     0.7708     0.8013     0.8322
            0.8639     0.8965     0.9301     0.9646     1.0000
Hrad:
            0.0198     0.0396     0.0594     0.0792     0.0990
            0.1188     0.1386     0.1584     0.1782     0.1980
            0.2178     0.2376     0.2574     0.2772     0.2970
            0.3168     0.3204     0.3285     0.3578     0.3863
            0.4140     0.4412     0.4677     0.4936     0.5191
            0.5440     0.5685     0.5926     0.6164     0.6397
            0.6627     0.6854     0.7078     0.7300     0.7518
            0.7735     0.7949     0.8160     0.8370     0.8578
            0.8784     0.8988     0.9191     0.9392     0.9576
            0.9649     0.9729     0.9815     0.9905     1.0000
Width:
            0.0266     0.0532     0.0797     0.1063     0.1329
            0.1595     0.1860     0.2126     0.2392     0.2658
            0.2924     0.3189     0.3455     0.3721     0.3987
            0.4253     0.4768     0.5264     0.5390     0.5517
            0.5643     0.5769     0.5896     0.6022     0.6148
            0.6275     0.6401     0.6527     0.6654     0.6780
            0.6906     0.7033     0.7159     0.7285     0.7412
            0.7538     0.7664     0.7791     0.7917     0.8043
            0.8170     0.8296     0.8422     0.8549     0.8691
            0.8953     0.9215     0.9477     0.9738     1.0000
```

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Transect TaylorWayDitch
Area:
            0.0004     0.0016     0.0036     0.0064     0.0101
            0.0145     0.0197     0.0258     0.0326     0.0402
            0.0487     0.0579     0.0680     0.0789     0.0905
            0.1030     0.1163     0.1304     0.1453     0.1610
            0.1775     0.1948     0.2129     0.2318     0.2515
            0.2720     0.2934     0.3155     0.3384     0.3622
            0.3867     0.4121     0.4382     0.4652     0.4930
            0.5215     0.5509     0.5811     0.6121     0.6438
            0.6759     0.7084     0.7413     0.7750     0.8098
            0.8457     0.8827     0.9207     0.9598     1.0000
Hrad:
            0.0201     0.0402     0.0603     0.0805     0.1006
            0.1207     0.1408     0.1609     0.1810     0.2011
            0.2212     0.2414     0.2615     0.2816     0.3017
            0.3218     0.3419     0.3620     0.3822     0.4023
            0.4224     0.4425     0.4626     0.4827     0.5028
            0.5229     0.5431     0.5632     0.5833     0.6034
            0.6235     0.6436     0.6637     0.6839     0.7040
            0.7241     0.7442     0.7643     0.7844     0.8117
            0.8416     0.8713     0.8984     0.9117     0.9255
            0.9396     0.9542     0.9691     0.9844     1.0000
Width:
            0.0198     0.0395     0.0593     0.0791     0.0988
            0.1186     0.1384     0.1581     0.1779     0.1977
            0.2174     0.2372     0.2570     0.2767     0.2965
            0.3163     0.3360     0.3558     0.3756     0.3953
            0.4151     0.4349     0.4546     0.4744     0.4942
            0.5139     0.5337     0.5535     0.5732     0.5930
            0.6128     0.6326     0.6523     0.6721     0.6919
            0.7116     0.7314     0.7512     0.7709     0.7836
            0.7934     0.8032     0.8154     0.8417     0.8681
            0.8945     0.9209     0.9472     0.9736     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 ............... LPS
Process Models:
  Rainfall/Runoff ........ YES
  RDII ................... NO
  Snowmelt ............... NO
  Groundwater ............ NO
  Flow Routing ........... YES
  Ponding Allowed ........ NO
  Water Quality .......... NO
Flow Routing Method ...... DYNWAVE
Surcharge Method ......... EXTRAN
Starting Date ............ 05/04/2021 00:00:00
```

```
Ending Date .............. 05/06/2021 00:00:00
Antecedent Dry Days ...... 0.0
Report Time Step ......... 00:01:00
Routing Time Step ........ 2.00 sec
Variable Time Step ....... YES
Maximum Trials ........... 8
Number of Threads ........ 4
Head Tolerance ........... 0.001500 m


**************************        Volume         Volume
Flow Routing Continuity        hectare-m       10^6 ltr
**************************     ---------      ---------
Dry Weather Inflow .......         0.000          0.000
Wet Weather Inflow .......         0.000          0.000
Groundwater Inflow .......         0.000          0.000
RDII Inflow ..............         0.000          0.000
External Inflow ..........        14.341        143.412
External Outflow .........        14.306        143.057
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 ......         0.036          0.362
Continuity Error (%) .....        -0.005


***************************
Time-Step Critical Elements
***************************
Link C25 (7.08%)


********************************
Highest Flow Instability Indexes
********************************
Link W-PondUpper (51)
Link C33 (2)
Link C22 (1)


*************************
Routing Time Step Summary
*************************
Minimum Time Step           :     0.50 sec
Average Time Step           :     1.96 sec
Maximum Time Step           :     2.00 sec
Percent in Steady State     :     0.00
Average Iterations per Step :     2.00
Percent Not Converging      :     0.00
Time Step Frequencies       :
    2.000 -  1.516 sec      :    95.98 %
    1.516 -  1.149 sec      :     2.27 %
    1.149 -  0.871 sec      :     1.61 %
    0.871 -  0.660 sec      :     0.05 %
    0.660 -  0.500 sec      :     0.09 %
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****
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
J01	JUNCTION	0.02	0.40	91.08	0	06:44	0.40
J02	JUNCTION	0.02	0.34	91.09	0	06:44	0.34
J03	JUNCTION	0.01	0.28	91.09	0	06:44	0.28
J04	JUNCTION	0.02	0.25	91.11	0	06:42	0.25
J05	JUNCTION	0.01	0.10	91.12	0	06:41	0.10
J06	JUNCTION	0.00	0.04	91.12	0	06:40	0.04
J07	JUNCTION	0.00	0.00	91.13	0	00:00	0.00
J08	JUNCTION	0.00	0.00	91.23	0	00:00	0.00
J09	JUNCTION	0.00	0.00	91.28	0	00:00	0.00
J10	JUNCTION	0.00	0.00	91.33	0	00:00	0.00
J11	JUNCTION	0.00	0.00	91.36	0	00:00	0.00
J12	JUNCTION	0.00	0.00	91.49	0	00:00	0.00
J13	JUNCTION	0.00	0.04	91.35	0	06:35	0.04
J14	JUNCTION	0.02	0.35	91.08	0	06:44	0.35
J15	JUNCTION	0.03	0.53	91.33	0	06:43	0.53
J16	JUNCTION	0.02	0.49	91.33	0	06:43	0.49
J17	JUNCTION	0.02	0.35	91.33	0	06:43	0.35
J18	JUNCTION	0.03	0.51	91.53	0	06:39	0.51
J19	JUNCTION	0.02	0.47	91.53	0	06:39	0.47
J20	JUNCTION	0.02	0.43	91.53	0	06:39	0.43
J21	JUNCTION	0.01	0.35	91.53	0	06:39	0.35
J22	JUNCTION	0.02	0.34	91.57	0	06:38	0.34
J23	JUNCTION	0.01	0.28	91.57	0	06:38	0.28
J24	JUNCTION	0.01	0.22	91.58	0	06:38	0.22
J25	JUNCTION	0.01	0.21	91.58	0	06:38	0.21
J26	JUNCTION	0.00	0.13	91.55	0	06:38	0.13
J27	JUNCTION	0.00	0.05	91.54	0	06:39	0.05
J28	JUNCTION	0.00	0.04	91.35	0	06:40	0.04
J29	JUNCTION	0.00	0.10	91.24	0	06:37	0.10
J30	JUNCTION	0.00	0.05	91.05	0	06:39	0.05
J31	JUNCTION	0.04	0.46	91.07	0	06:44	0.46
J32	JUNCTION	0.31	0.41	90.72	0	07:13	0.41
J33	JUNCTION	0.43	0.53	90.72	0	07:13	0.53
J34	JUNCTION	0.51	0.53	90.64	0	07:13	0.53
J35	JUNCTION	0.44	0.47	90.49	0	07:13	0.47
J36	JUNCTION	0.56	0.59	90.40	0	07:14	0.59
J37	JUNCTION	0.51	0.53	90.29	0	07:14	0.53
J38	JUNCTION	0.47	0.49	90.13	0	07:15	0.49
J39	JUNCTION	0.54	0.57	90.09	0	07:15	0.57
J40	JUNCTION	0.45	0.47	89.91	0	07:15	0.47
J41	JUNCTION	0.46	0.48	89.76	0	07:15	0.48
OF-LombardyEast	OUTFALL	0.00	0.05	90.57	0	06:39	0.05
OF-LombardyWest	OUTFALL	0.00	0.04	90.56	0	06:35	0.04
OF-OsgoodePath-UNC	OUTFALL	0.00	0.00	91.00	0	00:00	0.00
OF-TaylorWay	OUTFALL	0.46	0.48	88.84	0	07:15	0.48
DryPond	STORAGE	0.28	0.60	90.95	0	07:12	0.60

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Node Inflow Summary
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Node	Type	Maximum Lateral Inflow LPS	Maximum Total Inflow LPS	Time of Max Occurrence days	Time of Max Occurrence hr:min	Lateral Inflow Volume 10^6 ltr	Total Inflow Volume 10^6 ltr	Flow Balance Error Percent
J01	JUNCTION	0.00	177.30	0	06:42	0	0.924	-0.002
J02	JUNCTION	0.00	36.54	0	06:35	0	0.171	0.007
J03	JUNCTION	0.00	38.37	0	06:35	0	0.171	-0.003
J04	JUNCTION	0.00	41.27	0	06:35	0	0.172	0.054
J05	JUNCTION	41.38	41.38	0	06:32	0.171	0.172	-0.055
J06	JUNCTION	0.00	0.46	0	06:17	0	0.000296	0.196
J07	JUNCTION	0.00	0.00	0	00:00	0	0	0.000 ltr
J08	JUNCTION	0.00	0.00	0	00:00	0	0	0.000 ltr
J09	JUNCTION	0.00	0.00	0	00:00	0	0	0.000 ltr
J10	JUNCTION	0.00	0.00	0	00:00	0	0	0.000 ltr
J11	JUNCTION	0.00	0.00	0	00:00	0	0	0.000 ltr
J12	JUNCTION	0.00	0.00	0	00:00	0	0	0.000 ltr
J13	JUNCTION	18.13	18.13	0	06:32	0.0748	0.0748	0.000
J14	JUNCTION	0.00	144.70	0	06:43	0	0.752	-0.010
J15	JUNCTION	0.00	144.92	0	06:42	0	0.752	0.007
J16	JUNCTION	22.74	149.00	0	06:38	0.0926	0.752	0.006
J17	JUNCTION	0.00	132.71	0	06:38	0	0.66	-0.007
J18	JUNCTION	0.00	133.45	0	06:37	0	0.66	0.004
J19	JUNCTION	0.00	136.03	0	06:36	0	0.66	0.002
J20	JUNCTION	82.46	140.13	0	06:35	0.344	0.66	-0.000
J21	JUNCTION	0.00	61.34	0	06:32	0	0.315	-0.026
J22	JUNCTION	0.00	63.40	0	06:32	0	0.315	0.025
J23	JUNCTION	0.00	67.23	0	06:32	0	0.315	0.006
J24	JUNCTION	0.00	69.22	0	06:32	0	0.315	-0.006
J25	JUNCTION	80.85	80.85	0	06:32	0.332	0.333	-0.003
J26	JUNCTION	0.00	16.02	0	06:38	0	0.018	0.003
J27	JUNCTION	0.00	15.97	0	06:38	0	0.0171	-0.016
J28	JUNCTION	0.00	15.99	0	06:39	0	0.017	-0.041
J29	JUNCTION	0.00	15.95	0	06:40	0	0.017	0.499
J30	JUNCTION	9.42	25.96	0	06:37	0.0387	0.0556	-0.128
J31	JUNCTION	0.00	176.69	0	06:43	0	0.924	0.073
J32	JUNCTION	0.00	115.39	0	07:11	0	1.36	0.388
J33	JUNCTION	0.00	115.32	0	07:12	0	1.37	0.561
J34	JUNCTION	821.00	936.29	0	07:13	142	143	0.007
J35	JUNCTION	0.00	936.29	0	07:13	0	143	0.011
J36	JUNCTION	0.00	936.29	0	07:13	0	143	0.016
J37	JUNCTION	0.00	936.28	0	07:14	0	143	0.016
J38	JUNCTION	0.00	936.28	0	07:14	0	143	0.011
J39	JUNCTION	0.00	936.27	0	07:15	0	143	0.014
J40	JUNCTION	0.00	936.27	0	07:15	0	143	0.012
J41	JUNCTION	0.00	936.27	0	07:15	0	143	0.011
OF-LombardyEast	OUTFALL	0.00	24.39	0	06:39	0	0.0557	0.000
OF-LombardyWest	OUTFALL	0.00	18.06	0	06:35	0	0.0748	0.000
OF-OsgoodePath-UNC	OUTFALL	42.31	42.31	0	06:36	0.179	0.179	0.000
OF-TaylorWay	OUTFALL	0.00	936.27	0	07:15	0	143	0.000
DryPond	STORAGE	74.54	240.50	0	06:38	0.31	1.39	-0.022

****

Node Surcharge Summary

No nodes were surcharged.

Node Flooding Summary

No nodes were flooded.

Storage Volume Summary

Storage Unit	Average Volume 1000 m3	Avg Pcnt Full	Evap Pcnt Loss	Exfil Pcnt Loss	Maximum Volume 1000 m3	Max Pcnt Full	Time of Max Occurrence days hr:min	Maximum Outflow LPS
DryPond	0.218	23	0	0	0.608	64	0 07:12	115.39

Outfall Loading Summary

Outfall Node	Flow Freq Pcnt	Avg Flow LPS	Max Flow LPS	Total Volume 10^6 ltr
OF-LombardyEast	18.13	2.71	24.39	0.056
OF-LombardyWest	18.48	3.32	18.06	0.075
OF-OsgoodePath-UNC	17.86	8.16	42.31	0.179
OF-TaylorWay	99.94	827.76	936.27	142.747
System	38.60	841.95	959.77	143.056

Link Flow Summary

Link	Type	Maximum |Flow| LPS	Time of Max Occurrence days hr:min	Maximum |Veloc| m/sec	Max/ Full Flow	Max/ Full Depth
C01	CONDUIT	35.06	0 06:36	0.44	0.35	0.92
C02	CONDUIT	36.54	0 06:35	0.15	0.02	0.51
C03	CONDUIT	38.37	0 06:35	0.77	0.46	0.66
C04	CONDUIT	41.27	0 06:35	0.18	0.03	0.29
C05	CONDUIT	0.49	0 06:53	0.01	0.00	0.11
C06	CONDUIT	0.00	0 00:00	0.00	0.00	0.05
C07	CONDUIT	0.00	0 00:00	0.00	0.00	0.00

C08	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
C09	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
C10	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
C11	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
C12	CONDUIT	0.00	0	00:00	0.00	0.00	0.04
C13	CONDUIT	18.06	0	06:35	0.37	0.01	0.07
C14	CONDUIT	144.55	0	06:43	0.35	0.07	0.62
C15	CONDUIT	144.70	0	06:43	1.19	1.45	0.93
C16	CONDUIT	144.92	0	06:42	0.17	0.07	0.84
C17	CONDUIT	128.86	0	06:40	0.24	0.08	0.70
C18	CONDUIT	132.71	0	06:38	1.11	1.76	0.94
C19	CONDUIT	133.45	0	06:37	0.15	0.08	0.82
C20	CONDUIT	136.03	0	06:36	0.22	0.09	0.76
C21	CONDUIT	57.85	0	06:37	0.18	0.03	0.66
C22	CONDUIT	61.34	0	06:32	0.89	0.73	0.87
C23	CONDUIT	63.40	0	06:32	0.16	0.04	0.52
C24	CONDUIT	67.23	0	06:32	0.27	0.04	0.42
C25	CONDUIT	69.22	0	06:32	0.35	0.04	0.35
C26	CONDUIT	16.02	0	06:38	0.32	0.19	0.42
C27	CONDUIT	15.97	0	06:38	0.14	0.01	0.15
C28	CONDUIT	15.99	0	06:39	0.32	0.03	0.15
C29	CONDUIT	15.95	0	06:40	0.19	0.03	0.24
C30	CONDUIT	17.36	0	06:40	0.90	0.08	0.16
C31	CONDUIT	24.39	0	06:39	0.40	0.04	0.17
C32	CONDUIT	176.69	0	06:43	0.26	0.10	0.72
C33	CONDUIT	176.54	0	06:44	1.11	0.69	0.88
C34	CONDUIT	115.32	0	07:12	0.35	0.07	0.74
C35	CHANNEL	936.29	0	07:13	1.60	0.06	0.30
C36	CHANNEL	936.29	0	07:13	1.45	0.04	0.32
C37	CHANNEL	936.28	0	07:14	1.30	0.09	0.34
C38	CHANNEL	936.28	0	07:14	1.21	0.06	0.31
C39	CHANNEL	936.27	0	07:15	1.19	0.04	0.32
C40	CHANNEL	936.27	0	07:15	1.17	0.07	0.31
C41	CHANNEL	936.27	0	07:15	1.19	0.04	0.29
C42	CHANNEL	936.27	0	07:15	1.67	0.06	0.34
Culv-OsgoodePath	CONDUIT	115.29	0	07:13	0.79	0.84	1.00
W-Pond	ORIFICE	10.21	0	07:09			1.00
W01	WEIR	0.00	0	00:00			0.00
W02	WEIR	0.00	0	00:00			0.00
W03	WEIR	0.00	0	00:00			0.00
W04	WEIR	0.00	0	00:00			0.00
W05	WEIR	0.00	0	00:00			0.00
W06	WEIR	0.00	0	00:00			0.00
W07	WEIR	0.00	0	00:00			0.00
W08	WEIR	0.00	0	00:00			0.00
W09	WEIR	0.00	0	00:00			0.00
W-Emergency	WEIR	0.00	0	00:00			0.00
W-Path	WEIR	0.00	0	00:00			0.00
W-PondUpper	WEIR	105.18	0	07:11			0.97

```
**************************
Flow Classification Summary
**************************

-------------------------------------------------------------------------------------
                   Adjusted    ---------- Fraction of Time in Flow Class ----------
                    /Actual         Up    Down  Sub   Sup   Up    Down  Norm  Inlet
```

Conduit	Length	Dry	Dry	Dry	Crit	Crit	Crit	Crit	Ltd	Ctrl
C01	1.00	0.08	0.02	0.00	0.90	0.00	0.00	0.00	0.00	0.11
C02	1.00	0.10	0.40	0.00	0.50	0.00	0.00	0.00	0.84	0.00
C03	1.00	0.10	0.00	0.00	0.90	0.00	0.00	0.00	0.00	0.10
C04	1.00	0.09	0.62	0.00	0.29	0.00	0.00	0.00	0.89	0.00
C05	1.00	0.71	0.23	0.00	0.06	0.00	0.00	0.00	0.86	0.00
C06	1.00	0.94	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C07	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C08	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C09	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C10	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C11	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C12	1.00	0.72	0.28	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C13	1.00	0.72	0.00	0.00	0.28	0.00	0.00	0.00	0.81	0.00
C14	1.00	0.46	0.13	0.00	0.41	0.00	0.00	0.00	0.84	0.00
C15	1.00	0.08	0.00	0.00	0.82	0.11	0.00	0.00	0.00	0.04
C16	1.00	0.07	0.51	0.00	0.42	0.00	0.00	0.00	0.77	0.00
C17	1.00	0.58	0.03	0.00	0.39	0.00	0.00	0.00	0.89	0.00
C18	1.00	0.08	0.00	0.00	0.91	0.00	0.00	0.00	0.00	0.01
C19	1.00	0.08	0.56	0.00	0.36	0.00	0.00	0.00	0.76	0.00
C20	1.00	0.64	0.01	0.00	0.35	0.00	0.00	0.00	0.80	0.00
C21	1.00	0.65	0.02	0.00	0.33	0.00	0.00	0.00	0.89	0.00
C22	1.00	0.07	0.00	0.00	0.88	0.05	0.00	0.00	0.00	0.06
C23	1.00	0.07	0.66	0.00	0.27	0.00	0.00	0.00	0.87	0.00
C24	1.00	0.72	0.02	0.00	0.25	0.00	0.00	0.00	0.77	0.00
C25	1.00	0.75	0.03	0.00	0.23	0.00	0.00	0.00	0.79	0.00
C26	1.00	0.77	0.13	0.00	0.10	0.00	0.00	0.00	0.00	0.85
C27	1.00	0.90	0.04	0.00	0.06	0.00	0.00	0.00	0.86	0.00
C28	1.00	0.92	0.02	0.00	0.06	0.00	0.00	0.00	0.86	0.00
C29	1.00	0.92	0.00	0.00	0.08	0.00	0.00	0.00	0.04	0.00
C30	1.00	0.76	0.17	0.00	0.07	0.01	0.00	0.00	0.00	0.86
C31	1.00	0.76	0.00	0.00	0.24	0.00	0.00	0.00	0.79	0.00
C32	1.00	0.08	0.38	0.00	0.54	0.00	0.00	0.00	0.81	0.00
C33	1.00	0.03	0.05	0.00	0.91	0.00	0.00	0.01	0.00	0.08
C34	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
C35	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
C36	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	1.00	0.00
C37	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
C38	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
C39	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
C40	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
C41	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.81	0.00
C42	1.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00
Culv-OsgoodePath	1.00	0.00	0.00	0.00	1.00	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
C15	0.01	0.55	0.01	0.64	0.01
C18	0.01	0.49	0.01	0.73	0.01

```
Culv-OsgoodePath           0.86      0.86     47.95      0.01         0.23


Analysis begun on:  Wed Jul  9 10:58:16 2025
Analysis ended on:  Wed Jul  9 10:58:19 2025
Total elapsed time: 00:00:03
```

```
ALTERNATIVE RUNOFF METHOD (ARM) - PCSWMM VERSION 7.6.3620
---------------------------------------------------------

This is a new version of ARM - your feedback and suggestions are solicited.
Create a ticket, post on the PCSWMM feature request forum, or email us directly!

Simulation start time:              05/04/2021 00:00:00
Simulation end time:                05/06/2021 00:00:00
Runoff wet weather time steps:      240 seconds
Report time steps:                  60 seconds
Number of data points:              2881


******************************
Unit Hydrographs Runoff Method
******************************
```

Subcatchment	Runoff Method	Raingage	Area (ha)	Time of Concentration (min)	Time to Peak (min)	Time after Peak (min)	Peak UH Flow ($m^3/s/mm$)	UH Depth (mm)
EX-2	Nash IUH	Raingage	0.48	15	10	54	0.00433	0.998
EX-1	Nash IUH	Raingage	0.23	15	10	50	0.00208	0.997
EX-3	Nash IUH	Raingage	0.48	15	10	54	0.00433	0.998
D	Nash IUH	Raingage	0.48	15	10	54	0.00433	0.998
A	Nash IUH	Raingage	1.12	15	10	58	0.01011	0.998
B	Nash IUH	Raingage	0.48	15	10	54	0.00433	0.998
C	Nash IUH	Raingage	0.2	15	10	50	0.0018	0.997
E	Nash IUH	Raingage	0.52	15	10	54	0.00469	0.998
G	Nash IUH	Raingage	0.11	15	10	46	0.00099	0.996
F	Nash IUH	Raingage	0.22	15	10	50	0.00198	0.997
H	Nash IUH	Raingage	0.43	15	10	54	0.00388	0.998

```
******************
ARM Runoff Summary
******************
```

Subcatchment	Total Precip (mm)	Total Losses (mm)	Total Runoff (mm)	Total Runoff 10^6 ltr	Peak Runoff LPS	Runoff Coeff (fraction)
EX-2	106.73	52.318	54.292	0.261	37.594	0.509
EX-1	106.73	56.927	49.652	0.114	16.53	0.465
EX-3	106.73	56.927	49.688	0.238	34.507	0.466
D	106.73	71.505	35.146	0.169	24.56	0.329
A	106.73	67.836	38.821	0.435	63.398	0.364
B	106.73	75.538	31.125	0.149	21.626	0.292
C	106.73	76.979	29.67	0.059	8.594	0.278
E	106.73	65.232	41.404	0.215	31.425	0.388
G	106.73	62.636	43.927	0.048	7.064	0.412
F	106.73	64.019	42.595	0.094	13.692	0.399
H	106.73	71.383	35.279	0.152	22.066	0.331

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


*************
Element Count
*************
Number of rain gages ...... 1
Number of subcatchments ... 0
Number of nodes ........... 46
Number of links ........... 56
Number of pollutants ...... 0
Number of land uses ....... 0


****************
Raingage Summary
****************
                                                             Data       Recording
Name                 Data Source                             Type       Interval
------------------------------------------------------------------------
Raingage             11-SCS100yr-24hr                        INTENSITY   60 min.


************
Node Summary
************
                                         Invert      Max.    Ponded    External
Name                 Type                 Elev.     Depth      Area    Inflow
-------------------------------------------------------------------------------
J01                  JUNCTION             90.68      1.00       0.0
J02                  JUNCTION             90.75      1.00       0.0
J03                  JUNCTION             90.81      1.00       0.0
J04                  JUNCTION             90.86      1.00       0.0
J05                  JUNCTION             91.02      1.00       0.0
J06                  JUNCTION             91.08      1.00       0.0
J07                  JUNCTION             91.13      1.00       0.0
J08                  JUNCTION             91.23      1.00       0.0
J09                  JUNCTION             91.28      1.00       0.0
J10                  JUNCTION             91.33      1.00       0.0
J11                  JUNCTION             91.36      1.00       0.0
J12                  JUNCTION             91.49      1.00       0.0
J13                  JUNCTION             91.31      1.00       0.0
J14                  JUNCTION             90.73      1.00       0.0
J15                  JUNCTION             90.80      1.00       0.0
J16                  JUNCTION             90.84      1.00       0.0
J17                  JUNCTION             90.98      1.00       0.0
J18                  JUNCTION             91.02      1.00       0.0
J19                  JUNCTION             91.06      1.00       0.0
J20                  JUNCTION             91.10      1.00       0.0
J21                  JUNCTION             91.18      1.00       0.0
J22                  JUNCTION             91.23      1.00       0.0
J23                  JUNCTION             91.29      1.00       0.0
J24                  JUNCTION             91.36      1.00       0.0
J25                  JUNCTION             91.37      1.00       0.0
J26                  JUNCTION             91.42      1.00       0.0
J27                  JUNCTION             91.49      1.00       0.0
```

J28	JUNCTION	91.31	1.00	0.0	
J29	JUNCTION	91.14	1.00	0.0	
J30	JUNCTION	91.00	1.00	0.0	
J31	JUNCTION	90.61	1.00	0.0	
J32	JUNCTION	90.31	1.00	0.0	
J33	JUNCTION	90.19	2.00	0.0	
J34	JUNCTION	90.11	2.00	0.0	Yes
J35	JUNCTION	90.02	2.00	0.0	
J36	JUNCTION	89.81	2.00	0.0	
J37	JUNCTION	89.76	2.00	0.0	
J38	JUNCTION	89.64	2.00	0.0	
J39	JUNCTION	89.52	2.00	0.0	
J40	JUNCTION	89.44	2.00	0.0	
J41	JUNCTION	89.28	2.00	0.0	
OF-LombardyEast	OUTFALL	90.52	0.30	0.0	
OF-LombardyWest	OUTFALL	90.52	0.60	0.0	
OF-OsgoodePath-UNC	OUTFALL	91.00	0.00	0.0	
OF-TaylorWay	OUTFALL	88.36	1.40	0.0	
DryPond	STORAGE	90.35	1.00	0.0	

****
Link Summary
****

Name	From Node	To Node	Type	Length	%Slope	Roughness
C01	J02	J01	CONDUIT	9.0	0.7778	0.0240
C02	J03	J02	CONDUIT	11.0	0.5455	0.0350
C03	J04	J03	CONDUIT	9.0	0.5556	0.0240
C04	J05	J04	CONDUIT	34.0	0.4706	0.0350
C05	J06	J05	CONDUIT	12.0	0.5000	0.0350
C06	J07	J06	CONDUIT	9.0	0.5556	0.0240
C07	J08	J07	CONDUIT	21.0	0.4762	0.0350
C08	J09	J08	CONDUIT	9.0	0.5556	0.0350
C09	J10	J09	CONDUIT	9.0	0.5556	0.0240
C10	J11	J10	CONDUIT	7.0	0.4286	0.0350
C11	J12	J11	CONDUIT	9.0	1.4446	0.0350
C12	J12	J13	CONDUIT	11.0	1.6366	0.0350
C13	J13	OF-LombardyWest	CONDUIT	63.0	1.2541	0.0350
C14	J14	J01	CONDUIT	7.0	0.7143	0.0350
C15	J15	J14	CONDUIT	9.0	0.7778	0.0240
C16	J16	J15	CONDUIT	6.0	0.6667	0.0350
C17	J17	J16	CONDUIT	27.0	0.5185	0.0350
C18	J18	J17	CONDUIT	9.0	0.4444	0.0240
C19	J19	J18	CONDUIT	8.0	0.5000	0.0350
C20	J20	J19	CONDUIT	9.0	0.4444	0.0350
C21	J21	J20	CONDUIT	16.0	0.5000	0.0350
C22	J22	J21	CONDUIT	9.0	0.5556	0.0240
C23	J23	J22	CONDUIT	11.0	0.5455	0.0350
C24	J24	J23	CONDUIT	14.0	0.5000	0.0350
C25	J25	J24	CONDUIT	2.0	0.5000	0.0350
C26	J26	J25	CONDUIT	9.0	0.5556	0.0240
C27	J27	J26	CONDUIT	15.0	0.4667	0.0350
C28	J27	J28	CONDUIT	19.0	0.9474	0.0350
C29	J28	J29	CONDUIT	14.0	1.2144	0.0350
C30	J29	J30	CONDUIT	11.0	1.2728	0.0240
C31	J30	OF-LombardyEast	CONDUIT	39.0	1.2309	0.0350
C32	J01	J31	CONDUIT	14.0	0.5000	0.0350

```
C33             J31             DryPond         CONDUIT          9.0    1.5557     0.0240
C34             J32             J33             CONDUIT         16.0    0.4375     0.0350
C35             J34             J35             CONDUIT         18.0    0.5000     0.0350
C36             J35             J36             CONDUIT         19.0    1.1053     0.0350
C37             J36             J37             CONDUIT         21.0    0.2381     0.0350
C38             J37             J38             CONDUIT         23.0    0.5217     0.0350
C39             J38             J39             CONDUIT         12.0    1.0001     0.0350
C40             J39             J40             CONDUIT         25.0    0.3200     0.0350
C41             J40             J41             CONDUIT         16.0    1.0001     0.0350
C42             J41             OF-TaylorWay    CONDUIT         36.0    2.5564     0.0350
Culv-OsgoodePath J33            J34             CONDUIT         17.7    0.4520     0.0240
W-Pond          DryPond         J32             ORIFICE
W01             J02             J01             WEIR
W02             J04             J03             WEIR
W03             J07             J06             WEIR
W04             J10             J09             WEIR
W05             J15             J14             WEIR
W06             J18             J17             WEIR
W07             J22             J21             WEIR
W08             J26             J25             WEIR
W09             J29             J30             WEIR
W-Emergency     DryPond         J32             WEIR
W-Path          J33             J34             WEIR
W-PondUpper     DryPond         J32             WEIR


*********************
Cross Section Summary
*********************
                                       Full     Full     Hyd.     Max.   No. of     Full
Conduit         Shape                 Depth     Area     Rad.    Width  Barrels     Flow
---------------------------------------------------------------------------------------
C01             CIRCULAR               0.40     0.13     0.10     0.40        1    99.49
C02             TRAPEZOIDAL            0.60     1.68     0.35     4.60        1  1762.03
C03             CIRCULAR               0.40     0.13     0.10     0.40        1    84.09
C04             TRAPEZOIDAL            0.60     1.68     0.35     4.60        1  1636.64
C05             TRAPEZOIDAL            0.60     1.68     0.35     4.60        1  1687.01
C06             CIRCULAR               0.40     0.13     0.10     0.40        1    84.09
C07             TRAPEZOIDAL            0.60     1.68     0.35     4.60        1  1646.35
C08             TRAPEZOIDAL            0.60     1.68     0.35     4.60        1  1778.27
C09             CIRCULAR               0.40     0.13     0.10     0.40        1    84.09
C10             TRAPEZOIDAL            0.60     1.68     0.35     4.60        1  1561.87
C11             TRAPEZOIDAL            0.60     1.68     0.35     4.60        1  2867.50
C12             TRAPEZOIDAL            0.60     1.68     0.35     4.60        1  3052.11
C13             TRAPEZOIDAL            0.60     1.68     0.35     4.60        1  2671.72
C14             TRAPEZOIDAL            0.60     1.68     0.35     4.60        1  2016.38
C15             CIRCULAR               0.40     0.13     0.10     0.40        1    99.49
C16             TRAPEZOIDAL            0.60     1.68     0.35     4.60        1  1948.00
C17             TRAPEZOIDAL            0.60     1.68     0.35     4.60        1  1717.97
C18             CIRCULAR               0.40     0.13     0.10     0.40        1    75.21
C19             TRAPEZOIDAL            0.60     1.68     0.35     4.60        1  1687.01
C20             TRAPEZOIDAL            0.60     1.68     0.35     4.60        1  1590.53
C21             TRAPEZOIDAL            0.60     1.68     0.35     4.60        1  1687.01
C22             CIRCULAR               0.40     0.13     0.10     0.40        1    84.09
C23             TRAPEZOIDAL            0.60     1.68     0.35     4.60        1  1762.03
C24             TRAPEZOIDAL            0.60     1.68     0.35     4.60        1  1687.01
C25             TRAPEZOIDAL            0.60     1.68     0.35     4.60        1  1687.01
C26             CIRCULAR               0.40     0.13     0.10     0.40        1    84.09
```

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C27              TRAPEZOIDAL          0.60      1.68      0.35      4.60         1  1629.81
C28              TRAPEZOIDAL          0.30      0.57      0.20      2.80         1   536.23
C29              TRAPEZOIDAL          0.30      0.57      0.20      2.80         1   607.10
C30              CIRCULAR             0.50      0.20      0.12      0.50         1   230.77
C31              TRAPEZOIDAL          0.30      0.57      0.20      2.80         1   611.20
C32              TRAPEZOIDAL          0.60      1.68      0.35      4.60         1  1687.01
C33              CIRCULAR             0.50      0.20      0.12      0.50         1   255.13
C34              TRAPEZOIDAL          0.60      1.68      0.35      4.60         1  1578.05
C35              OsgoodeDitch         1.66      8.97      0.81      9.70         1 15724.73
C36              OsgoodeDitch         1.66      8.97      0.81      9.70         1 23379.85
C37              OsgoodeDitch         1.66      8.97      0.81      9.70         1 10851.04
C38              OsgoodeDitch         1.66      8.97      0.81      9.70         1 16062.95
C39              OsgoodeDitch         1.66      8.97      0.81      9.70         1 22238.55
C40              OsgoodeDitch         1.66      8.97      0.81      9.70         1 12579.74
C41              OsgoodeDitch         1.66      8.97      0.81      9.70         1 22238.55
C42              TaylorWayDitch       1.40      4.75      0.64      6.90         1 16120.66
Culv-OsgoodePath CIRCULAR             0.50      0.20      0.12      0.50         1   137.51


****************
Transect Summary
****************

Transect OsgoodeDitch
Area:
            0.0005     0.0019     0.0043     0.0076     0.0119
            0.0172     0.0234     0.0305     0.0387     0.0477
            0.0577     0.0687     0.0807     0.0935     0.1074
            0.1222     0.1383     0.1564     0.1755     0.1951
            0.2152     0.2357     0.2566     0.2780     0.2999
            0.3222     0.3449     0.3681     0.3918     0.4159
            0.4405     0.4655     0.4910     0.5169     0.5433
            0.5702     0.5975     0.6252     0.6534     0.6821
            0.7112     0.7408     0.7708     0.8013     0.8322
            0.8639     0.8965     0.9301     0.9646     1.0000
Hrad:
            0.0198     0.0396     0.0594     0.0792     0.0990
            0.1188     0.1386     0.1584     0.1782     0.1980
            0.2178     0.2376     0.2574     0.2772     0.2970
            0.3168     0.3204     0.3285     0.3578     0.3863
            0.4140     0.4412     0.4677     0.4936     0.5191
            0.5440     0.5685     0.5926     0.6164     0.6397
            0.6627     0.6854     0.7078     0.7300     0.7518
            0.7735     0.7949     0.8160     0.8370     0.8578
            0.8784     0.8988     0.9191     0.9392     0.9576
            0.9649     0.9729     0.9815     0.9905     1.0000
Width:
            0.0266     0.0532     0.0797     0.1063     0.1329
            0.1595     0.1860     0.2126     0.2392     0.2658
            0.2924     0.3189     0.3455     0.3721     0.3987
            0.4253     0.4768     0.5264     0.5390     0.5517
            0.5643     0.5769     0.5896     0.6022     0.6148
            0.6275     0.6401     0.6527     0.6654     0.6780
            0.6906     0.7033     0.7159     0.7285     0.7412
            0.7538     0.7664     0.7791     0.7917     0.8043
            0.8170     0.8296     0.8422     0.8549     0.8691
            0.8953     0.9215     0.9477     0.9738     1.0000
```

```
Transect TaylorWayDitch
Area:
            0.0004     0.0016     0.0036     0.0064     0.0101
            0.0145     0.0197     0.0258     0.0326     0.0402
            0.0487     0.0579     0.0680     0.0789     0.0905
            0.1030     0.1163     0.1304     0.1453     0.1610
            0.1775     0.1948     0.2129     0.2318     0.2515
            0.2720     0.2934     0.3155     0.3384     0.3622
            0.3867     0.4121     0.4382     0.4652     0.4930
            0.5215     0.5509     0.5811     0.6121     0.6438
            0.6759     0.7084     0.7413     0.7750     0.8098
            0.8457     0.8827     0.9207     0.9598     1.0000
Hrad:
            0.0201     0.0402     0.0603     0.0805     0.1006
            0.1207     0.1408     0.1609     0.1810     0.2011
            0.2212     0.2414     0.2615     0.2816     0.3017
            0.3218     0.3419     0.3620     0.3822     0.4023
            0.4224     0.4425     0.4626     0.4827     0.5028
            0.5229     0.5431     0.5632     0.5833     0.6034
            0.6235     0.6436     0.6637     0.6839     0.7040
            0.7241     0.7442     0.7643     0.7844     0.8117
            0.8416     0.8713     0.8984     0.9117     0.9255
            0.9396     0.9542     0.9691     0.9844     1.0000
Width:
            0.0198     0.0395     0.0593     0.0791     0.0988
            0.1186     0.1384     0.1581     0.1779     0.1977
            0.2174     0.2372     0.2570     0.2767     0.2965
            0.3163     0.3360     0.3558     0.3756     0.3953
            0.4151     0.4349     0.4546     0.4744     0.4942
            0.5139     0.5337     0.5535     0.5732     0.5930
            0.6128     0.6326     0.6523     0.6721     0.6919
            0.7116     0.7314     0.7512     0.7709     0.7836
            0.7934     0.8032     0.8154     0.8417     0.8681
            0.8945     0.9209     0.9472     0.9736     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 ............... LPS
Process Models:
  Rainfall/Runoff ........ YES
  RDII ................... NO
  Snowmelt ............... NO
  Groundwater ............ NO
  Flow Routing ........... YES
  Ponding Allowed ........ NO
  Water Quality .......... NO
Flow Routing Method ...... DYNWAVE
Surcharge Method ......... EXTRAN
Starting Date ............ 05/04/2021 00:00:00
```

```
  Ending Date .............. 05/06/2021 00:00:00
  Antecedent Dry Days ...... 0.0
  Report Time Step ......... 00:01:00
  Routing Time Step ........ 2.00 sec
  Variable Time Step ....... YES
  Maximum Trials ........... 8
  Number of Threads ........ 4
  Head Tolerance ........... 0.001500 m


  **************************        Volume         Volume
  Flow Routing Continuity        hectare-m      10^6 ltr
  **************************     ---------     ---------
  Dry Weather Inflow .......         0.000         0.000
  Wet Weather Inflow .......         0.000         0.000
  Groundwater Inflow .......         0.000         0.000
  RDII Inflow ..............         0.000         0.000
  External Inflow ..........        14.380       143.804
  External Outflow .........        14.345       143.449
  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 ......         0.036         0.362
  Continuity Error (%) .....        -0.005


  ***************************
  Time-Step Critical Elements
  ***************************
  Link C25 (8.11%)


  ********************************
  Highest Flow Instability Indexes
  ********************************
  Link W-PondUpper (35)
  Link C33 (6)
  Link C15 (4)
  Link C14 (2)


  *************************
  Routing Time Step Summary
  *************************
  Minimum Time Step           :     0.19 sec
  Average Time Step           :     1.95 sec
  Maximum Time Step           :     2.00 sec
  Percent in Steady State     :    -0.00
  Average Iterations per Step :     2.00
  Percent Not Converging      :     0.00
  Time Step Frequencies       :
      2.000 -  1.516 sec      :    95.43 %
      1.516 -  1.149 sec      :     3.70 %
      1.149 -  0.871 sec      :     0.69 %
      0.871 -  0.660 sec      :     0.07 %
      0.660 -  0.500 sec      :     0.11 %
```

****
Node Depth Summary
****

Node	Type	Average Depth Meters	Maximum Depth Meters	Maximum HGL Meters	Time of Max Occurrence days	Time of Max Occurrence hr:min	Reported Max Depth Meters
J01	JUNCTION	0.03	0.35	91.03	0	13:08	0.35
J02	JUNCTION	0.03	0.29	91.04	0	13:07	0.29
J03	JUNCTION	0.01	0.23	91.04	0	13:07	0.23
J04	JUNCTION	0.02	0.21	91.07	0	13:05	0.21
J05	JUNCTION	0.01	0.08	91.10	0	13:01	0.08
J06	JUNCTION	0.00	0.02	91.10	0	13:01	0.02
J07	JUNCTION	0.00	0.00	91.13	0	00:00	0.00
J08	JUNCTION	0.00	0.00	91.23	0	00:00	0.00
J09	JUNCTION	0.00	0.00	91.28	0	00:00	0.00
J10	JUNCTION	0.00	0.00	91.33	0	00:00	0.00
J11	JUNCTION	0.00	0.00	91.36	0	00:00	0.00
J12	JUNCTION	0.00	0.00	91.49	0	00:00	0.00
J13	JUNCTION	0.00	0.04	91.35	0	13:01	0.04
J14	JUNCTION	0.02	0.31	91.04	0	13:08	0.31
J15	JUNCTION	0.04	0.46	91.26	0	13:08	0.46
J16	JUNCTION	0.03	0.42	91.26	0	13:08	0.42
J17	JUNCTION	0.02	0.28	91.26	0	13:08	0.28
J18	JUNCTION	0.04	0.44	91.46	0	13:05	0.44
J19	JUNCTION	0.03	0.40	91.46	0	13:05	0.40
J20	JUNCTION	0.02	0.36	91.46	0	13:05	0.36
J21	JUNCTION	0.02	0.28	91.46	0	13:05	0.28
J22	JUNCTION	0.03	0.28	91.51	0	13:04	0.28
J23	JUNCTION	0.01	0.23	91.52	0	13:04	0.22
J24	JUNCTION	0.01	0.16	91.52	0	13:04	0.16
J25	JUNCTION	0.01	0.15	91.52	0	13:04	0.15
J26	JUNCTION	0.00	0.10	91.52	0	13:04	0.10
J27	JUNCTION	0.00	0.02	91.51	0	13:05	0.02
J28	JUNCTION	0.00	0.02	91.33	0	13:06	0.02
J29	JUNCTION	0.00	0.07	91.21	0	13:07	0.07
J30	JUNCTION	0.00	0.03	91.03	0	13:06	0.03
J31	JUNCTION	0.05	0.42	91.03	0	13:08	0.42
J32	JUNCTION	0.31	0.42	90.73	0	13:28	0.42
J33	JUNCTION	0.43	0.54	90.73	0	13:28	0.54
J34	JUNCTION	0.51	0.53	90.64	0	13:28	0.53
J35	JUNCTION	0.45	0.47	90.49	0	13:28	0.47
J36	JUNCTION	0.56	0.59	90.40	0	13:29	0.59
J37	JUNCTION	0.51	0.53	90.29	0	13:29	0.53
J38	JUNCTION	0.47	0.50	90.14	0	13:29	0.50
J39	JUNCTION	0.54	0.57	90.09	0	13:29	0.57
J40	JUNCTION	0.45	0.48	89.92	0	13:30	0.48
J41	JUNCTION	0.46	0.48	89.76	0	13:30	0.48
OF-LombardyEast	OUTFALL	0.00	0.03	90.55	0	13:06	0.03
OF-LombardyWest	OUTFALL	0.00	0.04	90.56	0	13:01	0.04
OF-OsgoodePath-UNC	OUTFALL	0.00	0.00	91.00	0	00:00	0.00
OF-TaylorWay	OUTFALL	0.46	0.48	88.84	0	13:30	0.48
DryPond	STORAGE	0.28	0.61	90.96	0	13:26	0.61

****
Node Inflow Summary
****

Node	Type	Maximum Lateral Inflow LPS	Maximum Total Inflow LPS	Time of Max Occurrence days	hr:min	Lateral Inflow Volume 10^6 ltr	Total Inflow Volume 10^6 ltr	Flow Balance Error Percent
J01	JUNCTION	0.00	156.00	0	13:07	0	1.17	-0.001
J02	JUNCTION	0.00	30.15	0	13:05	0	0.215	0.006
J03	JUNCTION	0.00	30.30	0	13:05	0	0.215	-0.001
J04	JUNCTION	0.00	31.28	0	13:01	0	0.215	0.026
J05	JUNCTION	31.42	31.42	0	13:00	0.215	0.215	-0.027
J06	JUNCTION	0.00	0.17	0	12:30	0	0.000142	0.310
J07	JUNCTION	0.00	0.00	0	00:00	0	0	0.000 ltr
J08	JUNCTION	0.00	0.00	0	00:00	0	0	0.000 ltr
J09	JUNCTION	0.00	0.00	0	00:00	0	0	0.000 ltr
J10	JUNCTION	0.00	0.00	0	00:00	0	0	0.000 ltr
J11	JUNCTION	0.00	0.00	0	00:00	0	0	0.000 ltr
J12	JUNCTION	0.00	0.00	0	00:00	0	0	0.000 ltr
J13	JUNCTION	13.69	13.69	0	13:00	0.0937	0.0937	0.000
J14	JUNCTION	0.00	126.60	0	13:08	0	0.956	-0.048
J15	JUNCTION	0.00	126.66	0	13:07	0	0.957	0.044
J16	JUNCTION	16.53	128.10	0	13:04	0.114	0.957	0.004
J17	JUNCTION	0.00	113.78	0	13:05	0	0.843	-0.006
J18	JUNCTION	0.00	114.00	0	13:04	0	0.843	0.003
J19	JUNCTION	0.00	114.68	0	13:04	0	0.843	0.001
J20	JUNCTION	63.40	115.76	0	13:01	0.435	0.843	-0.000
J21	JUNCTION	0.00	53.57	0	13:01	0	0.408	-0.006
J22	JUNCTION	0.00	54.03	0	13:00	0	0.408	0.006
J23	JUNCTION	0.00	54.99	0	13:00	0	0.408	0.003
J24	JUNCTION	0.00	55.46	0	13:00	0	0.408	-0.003
J25	JUNCTION	59.66	59.66	0	13:00	0.412	0.413	-0.001
J26	JUNCTION	0.00	4.61	0	13:04	0	0.00538	0.003
J27	JUNCTION	0.00	4.56	0	13:04	0	0.00451	-0.001
J28	JUNCTION	0.00	4.55	0	13:05	0	0.00444	-0.050
J29	JUNCTION	0.00	4.51	0	13:06	0	0.00444	0.158
J30	JUNCTION	7.06	10.93	0	13:05	0.0483	0.0528	-0.004
J31	JUNCTION	0.00	155.74	0	13:07	0	1.17	0.000
J32	JUNCTION	0.00	118.44	0	13:26	0	1.76	0.300
J33	JUNCTION	0.00	118.34	0	13:27	0	1.77	0.433
J34	JUNCTION	821.00	939.31	0	13:28	142	143	0.007
J35	JUNCTION	0.00	939.31	0	13:28	0	143	0.011
J36	JUNCTION	0.00	939.31	0	13:28	0	143	0.016
J37	JUNCTION	0.00	939.30	0	13:29	0	143	0.016
J38	JUNCTION	0.00	939.29	0	13:29	0	143	0.011
J39	JUNCTION	0.00	939.29	0	13:29	0	143	0.014
J40	JUNCTION	0.00	939.29	0	13:29	0	143	0.012
J41	JUNCTION	0.00	939.28	0	13:30	0	143	0.011
OF-LombardyEast	OUTFALL	0.00	10.91	0	13:06	0	0.0528	0.000
OF-LombardyWest	OUTFALL	0.00	13.62	0	13:01	0	0.0937	0.000
OF-OsgoodePath-UNC	OUTFALL	33.15	33.15	0	13:00	0.228	0.228	0.000
OF-TaylorWay	OUTFALL	0.00	939.28	0	13:30	0	143	0.000
DryPond	STORAGE	56.13	208.89	0	13:04	0.388	1.76	0.018

```
**********************
Node Surcharge Summary
**********************

No nodes were surcharged.


*********************
Node Flooding Summary
*********************

No nodes were flooded.


**********************
Storage Volume Summary
**********************

--------------------------------------------------------------------------------------------------
                       Average     Avg  Evap Exfil       Maximum     Max    Time of Max    Maximum
                        Volume    Pcnt  Pcnt  Pcnt        Volume    Pcnt     Occurrence    Outflow
Storage Unit           1000 m3    Full  Loss  Loss       1000 m3    Full    days hr:min        LPS
--------------------------------------------------------------------------------------------------
DryPond                  0.226      24     0     0         0.618      65       0  13:26     118.44


***********************
Outfall Loading Summary
***********************

-----------------------------------------------------------
                       Flow       Avg       Max       Total
                       Freq      Flow      Flow      Volume
Outfall Node           Pcnt       LPS       LPS    10^6 ltr
-----------------------------------------------------------
OF-LombardyEast       33.96      1.21     10.91       0.053
OF-LombardyWest       34.59      2.06     13.62       0.094
OF-OsgoodePath-UNC    33.60      5.14     33.15       0.228
OF-TaylorWay          99.94    829.98    939.28     143.074
-----------------------------------------------------------
System                50.52    838.39    965.67     143.448


********************
Link Flow Summary
********************

-----------------------------------------------------------------------------
                               Maximum  Time of Max   Maximum    Max/    Max/
                                |Flow|   Occurrence   |Veloc|    Full    Full
Link                 Type          LPS  days hr:min     m/sec    Flow   Depth
-----------------------------------------------------------------------------
C01                  CONDUIT     29.96     0  13:05      0.43    0.30    0.81
C02                  CONDUIT     30.15     0  13:05      0.14    0.02    0.44
C03                  CONDUIT     30.30     0  13:05      0.74    0.36    0.56
C04                  CONDUIT     31.28     0  13:01      0.16    0.02    0.24
C05                  CONDUIT      0.23     0  13:11      0.01    0.00    0.08
C06                  CONDUIT      0.00     0  00:00      0.00    0.00    0.02
```

```
  C07                  CONDUIT      0.00     0  00:00      0.00    0.00    0.00
  C08                  CONDUIT      0.00     0  00:00      0.00    0.00    0.00
  C09                  CONDUIT      0.00     0  00:00      0.00    0.00    0.00
  C10                  CONDUIT      0.00     0  00:00      0.00    0.00    0.00
  C11                  CONDUIT      0.00     0  00:00      0.00    0.00    0.00
  C12                  CONDUIT      0.00     0  00:00      0.00    0.00    0.03
  C13                  CONDUIT     13.62     0  13:01      0.33    0.01    0.06
  C14                  CONDUIT    126.59     0  13:08      0.35    0.06    0.55
  C15                  CONDUIT    126.60     0  13:08      1.15    1.27    0.88
  C16                  CONDUIT    126.66     0  13:07      0.17    0.07    0.73
  C17                  CONDUIT    112.63     0  13:06      0.23    0.07    0.58
  C18                  CONDUIT    113.78     0  13:05      1.04    1.51    0.85
  C19                  CONDUIT    114.00     0  13:04      0.15    0.07    0.70
  C20                  CONDUIT    114.68     0  13:04      0.21    0.07    0.63
  C21                  CONDUIT     53.12     0  13:05      0.17    0.03    0.53
  C22                  CONDUIT     53.57     0  13:01      0.86    0.64    0.71
  C23                  CONDUIT     54.03     0  13:00      0.15    0.03    0.42
  C24                  CONDUIT     54.99     0  13:00      0.26    0.03    0.32
  C25                  CONDUIT     55.46     0  13:00      0.33    0.03    0.26
  C26                  CONDUIT      4.61     0  13:04      0.14    0.05    0.31
  C27                  CONDUIT      4.56     0  13:04      0.06    0.00    0.10
  C28                  CONDUIT      4.55     0  13:05      0.20    0.01    0.07
  C29                  CONDUIT      4.51     0  13:06      0.12    0.01    0.14
  C30                  CONDUIT      4.42     0  13:07      0.43    0.02    0.10
  C31                  CONDUIT     10.91     0  13:06      0.30    0.02    0.11
  C32                  CONDUIT    155.74     0  13:07      0.26    0.09    0.64
  C33                  CONDUIT    155.65     0  13:08      0.96    0.61    0.89
  C34                  CONDUIT    118.34     0  13:27      0.35    0.07    0.75
  C35                  CHANNEL    939.31     0  13:28      1.60    0.06    0.30
  C36                  CHANNEL    939.31     0  13:28      1.45    0.04    0.32
  C37                  CHANNEL    939.30     0  13:29      1.30    0.09    0.34
  C38                  CHANNEL    939.29     0  13:29      1.21    0.06    0.31
  C39                  CHANNEL    939.29     0  13:29      1.19    0.04    0.32
  C40                  CHANNEL    939.29     0  13:29      1.17    0.07    0.31
  C41                  CHANNEL    939.28     0  13:30      1.19    0.04    0.29
  C42                  CHANNEL    939.28     0  13:30      1.67    0.06    0.34
  Culv-OsgoodePath     CONDUIT    118.31     0  13:28      0.79    0.86    1.00
  W-Pond               ORIFICE     10.27     0  13:23                      1.00
  W01                  WEIR         0.00     0  00:00                      0.00
  W02                  WEIR         0.00     0  00:00                      0.00
  W03                  WEIR         0.00     0  00:00                      0.00
  W04                  WEIR         0.00     0  00:00                      0.00
  W05                  WEIR         0.00     0  00:00                      0.00
  W06                  WEIR         0.00     0  00:00                      0.00
  W07                  WEIR         0.00     0  00:00                      0.00
  W08                  WEIR         0.00     0  00:00                      0.00
  W09                  WEIR         0.00     0  00:00                      0.00
  W-Emergency          WEIR         0.00     0  00:00                      0.00
  W-Path               WEIR         0.00     0  00:00                      0.00
  W-PondUpper          WEIR       108.18     0  13:26                      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
C01	1.00	0.14	0.04	0.00	0.82	0.00	0.00	0.00	0.00	0.26
C02	1.00	0.18	0.16	0.00	0.66	0.00	0.00	0.00	0.75	0.00
C03	1.00	0.17	0.00	0.00	0.82	0.00	0.00	0.00	0.00	0.12
C04	1.00	0.17	0.37	0.00	0.46	0.00	0.00	0.00	0.81	0.00
C05	1.00	0.54	0.40	0.00	0.06	0.00	0.00	0.00	0.72	0.00
C06	1.00	0.94	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C07	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C08	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C09	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C10	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C11	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C12	1.00	0.54	0.46	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C13	1.00	0.54	0.00	0.00	0.46	0.00	0.00	0.00	0.56	0.00
C14	1.00	0.27	0.13	0.00	0.60	0.00	0.00	0.00	0.77	0.00
C15	1.00	0.13	0.00	0.00	0.67	0.20	0.00	0.00	0.00	0.15
C16	1.00	0.13	0.26	0.00	0.60	0.00	0.00	0.00	0.57	0.00
C17	1.00	0.40	0.03	0.00	0.57	0.00	0.00	0.00	0.83	0.00
C18	1.00	0.14	0.00	0.00	0.85	0.00	0.00	0.00	0.00	0.07
C19	1.00	0.14	0.32	0.00	0.54	0.00	0.00	0.00	0.56	0.00
C20	1.00	0.45	0.01	0.00	0.54	0.00	0.00	0.00	0.68	0.00
C21	1.00	0.45	0.02	0.00	0.52	0.00	0.00	0.00	0.82	0.00
C22	1.00	0.12	0.00	0.00	0.84	0.03	0.00	0.00	0.00	0.21
C23	1.00	0.12	0.41	0.00	0.47	0.00	0.00	0.00	0.80	0.00
C24	1.00	0.53	0.02	0.00	0.45	0.00	0.00	0.00	0.53	0.00
C25	1.00	0.55	0.03	0.00	0.42	0.00	0.00	0.00	0.66	0.00
C26	1.00	0.58	0.31	0.00	0.11	0.00	0.00	0.00	0.00	0.71
C27	1.00	0.89	0.06	0.00	0.06	0.00	0.00	0.00	0.72	0.00
C28	1.00	0.92	0.02	0.00	0.06	0.00	0.00	0.00	0.73	0.00
C29	1.00	0.92	0.00	0.00	0.08	0.00	0.00	0.00	0.71	0.00
C30	1.00	0.59	0.34	0.00	0.07	0.00	0.00	0.00	0.00	0.73
C31	1.00	0.59	0.00	0.00	0.41	0.00	0.00	0.00	0.54	0.00
C32	1.00	0.14	0.13	0.00	0.72	0.00	0.00	0.00	0.74	0.00
C33	1.00	0.03	0.11	0.00	0.86	0.00	0.00	0.00	0.00	0.25
C34	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
C35	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
C36	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	1.00	0.00
C37	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
C38	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
C39	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
C40	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
C41	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.65	0.00
C42	1.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00
Culv-OsgoodePath	1.00	0.00	0.00	0.00	1.00	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
C15	0.01	0.46	0.01	0.62	0.01

```
  C18                         0.01      0.37      0.01      0.79         0.01
  Culv-OsgoodePath            1.06      1.06     47.95      0.01         0.36


  Analysis begun on:  Wed Jul  9 10:56:09 2025
  Analysis ended on:  Wed Jul  9 10:56:12 2025
  Total elapsed time: 00:00:03
```

APPENDIX C

WATER BALANCE CALCULATIONS

Water Balance Model Description

The Thornthwaite-Mather (1957) water balance models are conceptual models that are used to simulate steady-state climatic averages or continuous values of precipitation (rain + snow), snowpack, snowmelt, soil moisture, evapotranspiration, and water surplus (infiltration + runoff) (refer to **Figure 1**). Input parameters consist of daily precipitation *(PRECIP)*, temperature *(MAX / MIN TEMP)*, potential evaportranspiration *(PET)*, and the available water content *(AWC)* that can also be referred to as the water holding capacity of the soil. All water quantities in the model are based on monthly calculations and are represented as depths (volume per unit area) of liquid water over the area being simulated. *All model units are in millimetres (mm)*.

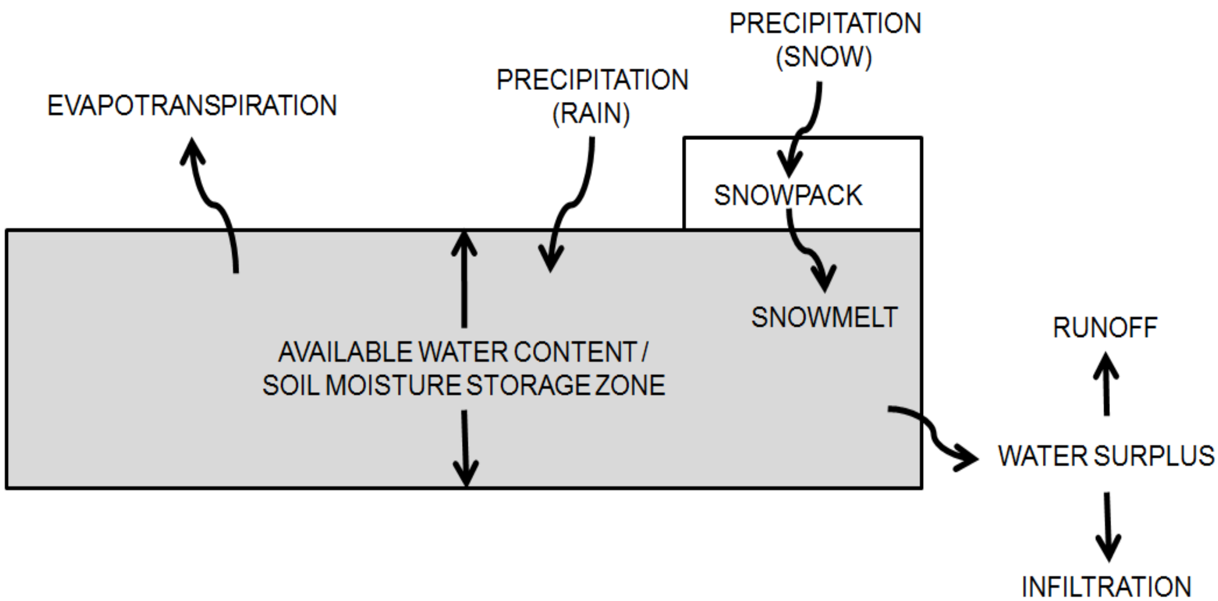


Figure 1: Conceptual Water Balance Model

Available Water Content (Water Holding Capacity)

The available water content (AWC) or water holding capacity of the soil was taken from Table 3.1 from the *Stormwater Management and Planning Manual (MOE, 2003)*, which has been reproduced in **Table 1** below. The available water content is the soil-moisture storage zone or the zone between the field capacity and vertical extent of the root zone.

Table 1: Water Holding Capacity Values (MOE, 2003)

Land Use / Soil Type	Hydrologic Soil Group	Water Holding Capacity (mm)
Urban Lawns / Shallow Rooted Crops (spinach, beans, beets, carrots)		
Fine Sand	A	50
Fine Sandy Loam	B	75
Silt Loam	C	125
Clay Loam	CD	100
Clay	D	75

Water Balance Model Description

Land Use / Soil Type	Hydrologic Soil Group	Water Holding Capacity (mm)
Moderately Rooted Crops (corn and cereal grains)		
Fine Sand	A	75
Fine Sandy Loam	B	150
Silt Loam	C	200
Clay Loam	CD	200
Clay	D	150
Pasture and Shrubs		
Fine Sand	A	100
Fine Sandy Loam	B	150
Silt Loam	C	250
Clay Loam	CD	250
Clay	D	200
Mature Forests		
Fine Sand	A	250
Fine Sandy Loam	B	300
Silt Loam	C	400
Clay Loam	CD	400
Clay	D	350

Precipitation

Daily precipitation *(PRECIP)* values consist of the total daily rainfall and water equivalent of snowmelt that fell on that day. Based on the mean daily temperature *(MEAN TEMP)* precipitation falls either as rainfall *(RAIN)* or the water equivalent of snowfall *(SNOW)*:

- *RAIN: If (MEAN TEMP >= 0, RAIN, SNOW)*
- *SNOW: If (MEAN TEMP < 0, SNOW, RAIN)*

Snowmelt / Snowpack / Water Input

Snowmelt *(MELT)* occurs if there is available snow (water equivalent) in the snowpack *(SNOWPACK)* and the maximum daily temperature *(MAX TEMP)* is greater than 0. The available snowmelt is limited to the available water in the snowpack.

Snowmelt is computed by a degree-day equation (Haith, 1985):

SNOWMELT (cm/d) = MELT COEFICIENT x [AIR TEMP (^{o}C) – MELT TEMP(^{o}C)]

The melt coefficient is typically 0.45 for northern climates (Haith, 1985). The melt temperature is assumed to be 0^{o}C. The air temperature is assumed to be the max temperature multiplied by a ratio of the max to min temperatures:

AIR TEMP = *MAX TEMP / (MAX TEMP – MIN TEMP)*

Water Balance Model Description

Therefore the snowmelt equation is:

- *MELT: If (MAX TEMP > 0, IF(SNOWPACK > 0, MIN((MAX TEMP*0.45*MAX TEMP/(MAX TEMP – MIN TEMP)*10mm/cm), SNOWPACK), 0), 0)*

Snow accumulates in the snowpack from the previous day if precipitation falls as snow and there is no snowmelt or the amount of snow that falls in a day exceeds the daily snowmelt:

$SNOWPACK_N = SNOWPACK_{N-1} + SNOW - MELT$

The initial snowmelt on day 1 (i.e. January 1) is assumed to be 0. The initial snowpack on day 1 is assumed to be the snowpack on the last day of simulation (i.e. December 31).

The total water input (W) is rain + snowmelt. This is the available water that fills the soil moisture storage zone each day.

Evaporation

Measured potential evaporation (PE) data (i.e. lake evaporation) is provided with the Environment Canada Climate Normals (see example below). The data represents daily averages for each month over a 20+ year period.

▼ Evaporation

Evaporation														
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year	Code
Lake Evaporation (mm)	0	0	0	0	3.6	4.3	4.5	3.7	2.4	1.4	0	0	0	C

The daily evaporation data was assumed to represent the middle or 15th of each month and 'smoothed' to represent the transition from month to month (see **Figure 2** below). As shown in **Figure 2** this produces a more realistic curve of potential evapotranspiration.

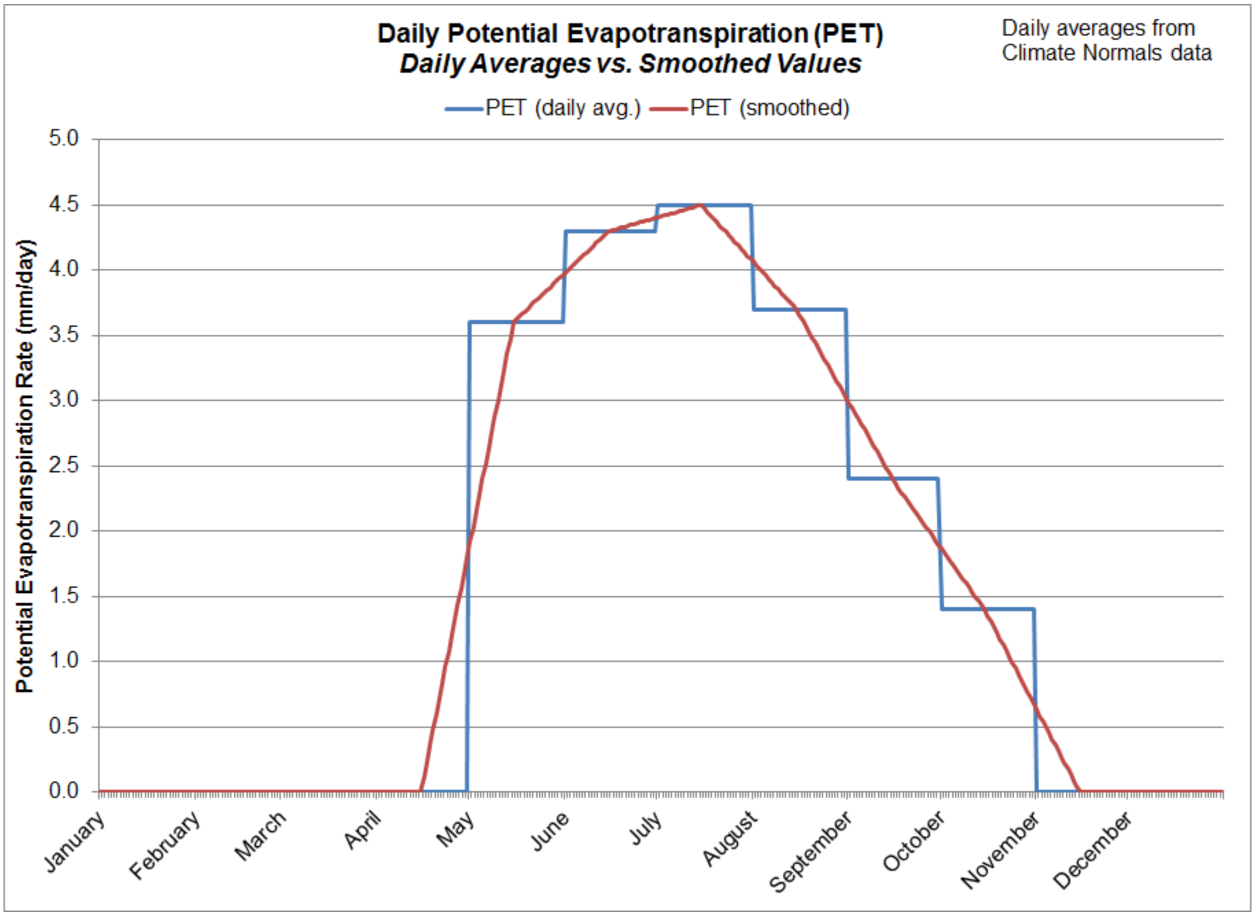


Figure 2: Daily Potential Evapotranspiration Rates (Daily Averages vs. Smoothed Values)

Potential Evapotranspiration

To convert potential evaporation data to potential crop evapotranspiration (PET) data a cover coefficient is applied based on land use and growing / dormant seasons:

PET = PE x Crop Cover Coefficient

Crop cover coefficients are based on the crop growth stages for different crop types (see **Figure 3**). A typical crop coefficient curve is shown in **Figure 4**, which depicts a crop that provides transpiration above the potential evaporation rates during the growing season.

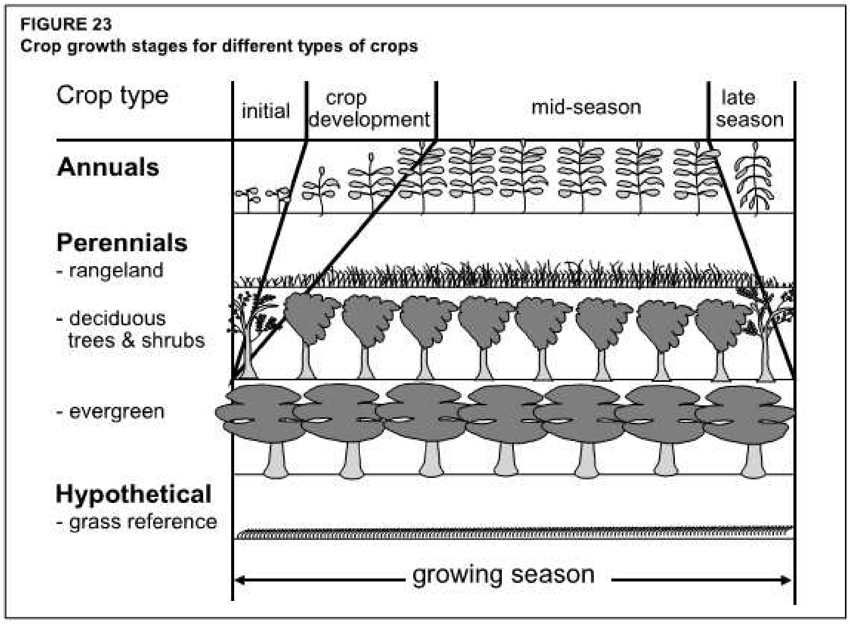


Figure 3: Crop Growth Stages for Different Types of Crops

Source: Food and Agriculture Organization of the United Nations (FAO), 1998, Crop Evapotranspiration - Guidelines for Computing Crop Water Requirements. FAO Irrigation and Drainage paper 56.

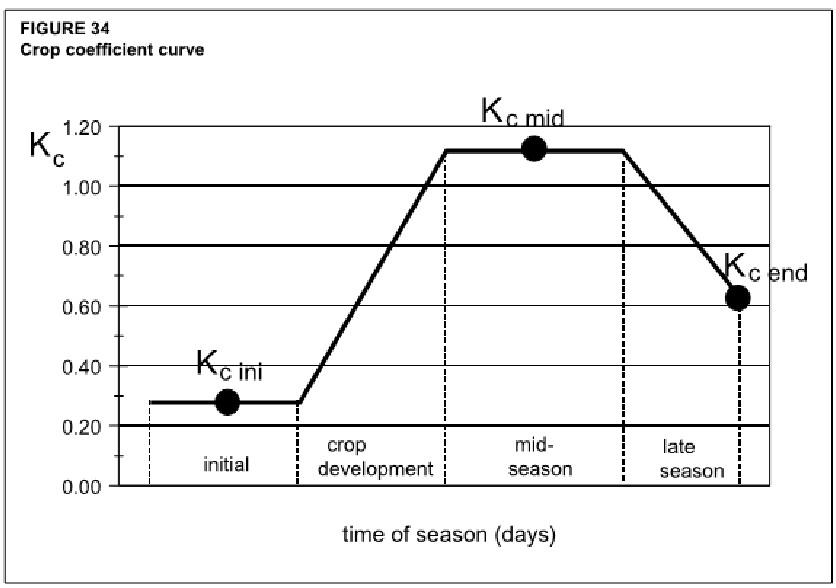


Figure 4: Crop Coefficient Curve

Source: Food and Agriculture Organization of the United Nations (FAO), 1998, Crop Evapotranspiration - Guidelines for Computing Crop Water Requirements. FAO Irrigation and Drainage paper 56.

Water Balance Model Description

The crop cover coefficients used in the water budget model for the various land use types is shown in **Table 2**. The growing / dormant seasons are shown in **Table 3**. The crop cover coefficients for the initial growing season are based on the average value of the dormant and middle of the growing season.

Table 2: Crop Cover Coefficients

Land Use	Dormant Season	Initial Growing Season	Middle of Growing Season	End of Growing Season
Urban Lawns / Shallow Rooted Crops	0.40	0.78	1.15	0.55
Moderately Rooted Crops	0.30	0.73	1.15	0.40
Pasture and Shrubs	0.40	0.68	0.95	0.90
Mature Forest	0.3	0.75	1.20	0.30
Impervious Areas	1.00	1.00	1.00	1.00

Reference: Data is based on Table 12 from the Food and Agriculture Organization of the United Nations (FAO), 1998, Crop Evapotranspiration - Guidelines for Computing Crop Water Requirements. FAO Irrigation and Drainage paper 56.

Table 3: Crop Growing Season

Month(s)	Crop Growing Season
January – April	Dormant Season
May	Initial Growing Season
June - August	Middle of Growing Season
September	End of Growing Season
October - December	Dormant Season (harvest in October)

Reference: Food and Agriculture Organization of the United Nations (FAO), 1977, Crop Water Requirements. FAO Irrigation and Drainage paper 24.

Actual Evapotranspiration

Following Alley (1984), if the monthly water input (i.e. rain + snowmelt) is greater than the potential evapotranspiration (PET) rate, the actual evapotranspiration (AET) rate takes place at the potential evapotranspiration rate:

IF W > PET, then AET = PET

If the monthly water input is less than the potential evapotranspiration rate (i.e. W < PET) then the actual evapotranspiration rate is the sum of the water input and an increment removed from the available water in the soil moisture storage zone (SOIL WATER):

IF W < PET, then AET = W + ΔSOIL WATER

WHERE: $\Delta SOIL\ WATER = SOIL\ WATER_{N-1} - SOIL\ WATER_N$

Figure 5 shows a comparison of the average monthly potential evapotranspiration and actual evapotranspiration rates.

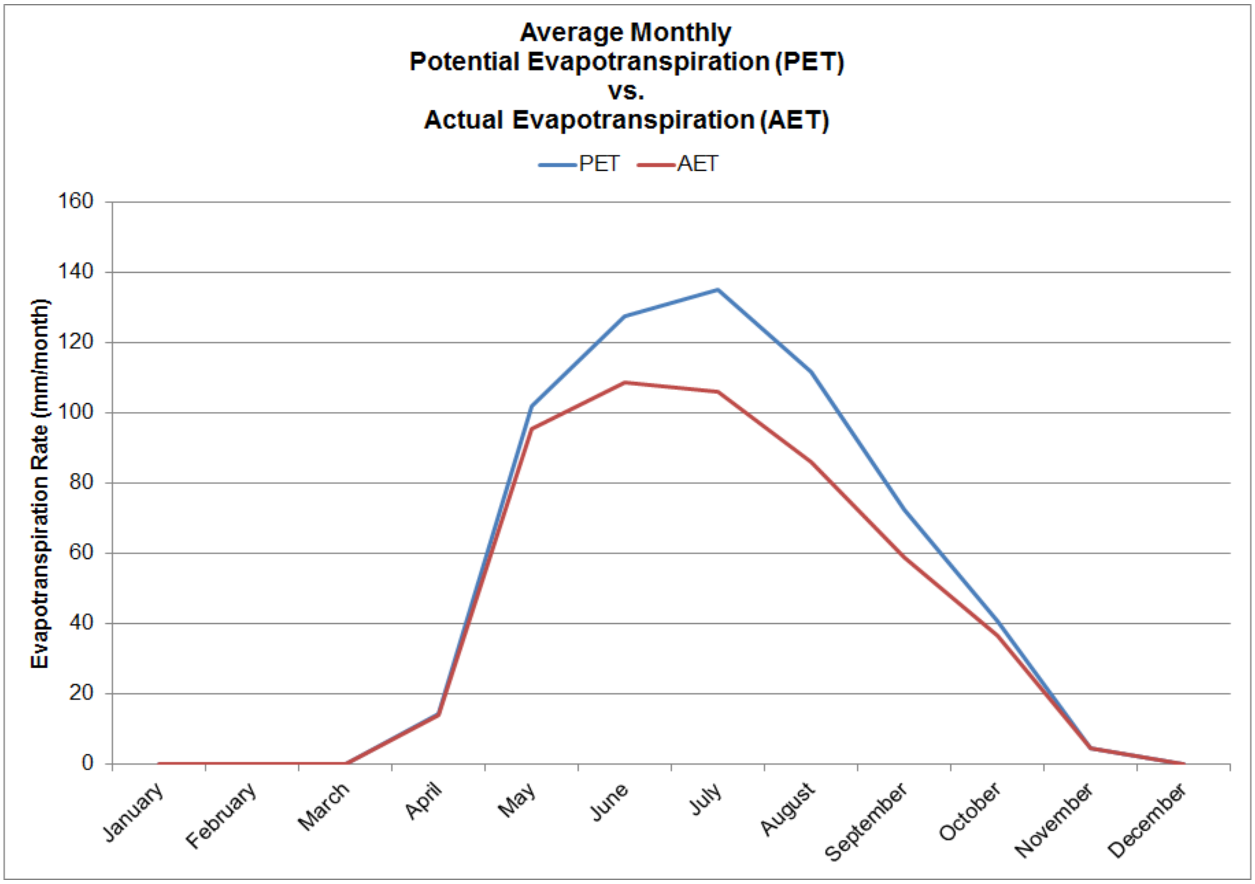


Figure 5: Average Monthly Potential Evapotranspiration vs. Actual Evapotranspiration

Soil Moisture

The soil moisture storage zone (SOIL WATER) is the amount of water available for actual evapotranspiration, but actual evapotranspiration is limited by the potential evapotranspiration rate.

The decrease / change in the soil moisture storage zone (ΔSOIL WATER) is based on the following relationship (Thornthwaite,1948), where AWC represents the available water content:

$$\Delta SOIL\ WATER = SOIL\ WATER_{N-1} \times [1\text{-}exp(-((PET - W) / AWC))]$$

The soil moisture storage zone is replenished with rainwater and snowmelt (i.e. the water input) to the maximum value of the available water content (AWC):

$$SOIL\ WATER_N = min[(W - PET) + SOIL\ WATER_{N-1}), AWC]$$

Water Balance Model Description

Water Surplus

The water surplus (SURPLUS) is defined as the excess water that is greater than the available water content (AWC).

SURPLUS = W – AET - ΔSOIL WATER

The water surplus represents the difference between precipitation and evapotranspiration. It is an estimate of the water that is available to contribute to infiltration and runoff (i.e. streamflow).

Infiltration / Runoff

The amount of water surplus that is infiltration was determined by summing the infiltration factors (IF) based on topography, soils and land cover. Since the water surplus represents infiltration and runoff; direct runoff is the amount of water surplus remaining after taking into account infiltration: (1.0 – infiltration factor = runoff factor). The infiltration and runoff factors were applied to the average monthly water surplus values:

INFILTRATION = IF x SURPLUS

RUNOFF = (1.0 – IF) x SURPLUS

The infiltration factors are shown in **Table 4**, which was reproduced from Table 3.1 in the *Stormwater Management and Planning Manual (MOE, 2003)*. These infiltration factors were initially presented in the document *"Hydrogeological Technical Information Requirements for Land Development Applications" (MOE, 1995)*.

Table 4: Infiltration Factors (MOE, 2003)

Description	Value of Infiltration Factor
Topography	
Flat Land, average slope < 0.6 m/km	0.3
Rolling Land, average slope 2.8 m/km to 3.8 m/km	0.2
Hilly Land, average slope 28 m/km to 47 m/km	0.1
Surficial Soils	
Tight impervious clay	0.1
Medium combination of clay and loam	0.2
Open sandy loam	0.4
Land Cover	
Cultivated Land	0.1
Woodland	0.2

Water Balance Model Description

Each soil type been assigned a corresponding infiltration factor as per Table 3.1 in the *Stormwater Management and Planning Manual (MOE, 2003),* as shown in **Table 5** below.

Table 5: Soils Infiltration Factors

Soil Type	Hydrologic Soil Group	Infiltration Factor
Coarse Sand	A	0.40
Fine Sand	AB	0.40
Fine Sandy Loam	B	0.30
Loam	BC	0.30
Silt Loam	C	0.20
Clay Loam	CD	0.15
Clay	D	0.10

The land use was combined into five (5) main categories (mature forest, row crops, pasture / meadow, urban lawns, and impervious areas) to be consistent with Table 3.1 in the *Stormwater Management and Planning Manual (MOE, 2003)*. The land use infiltration factors are shown in **Table 6** below.

Table 6: Land Use Infiltration Factor

Land Use	Infiltration Factor
Urban Lawns	0.10
Row Crops	0.10
Pasture / Meadow	0.10
Mature Forest	0.20
Impervious Areas	0.00

Land Use / Soils / Topography

The available water content (AWC) and infiltration factors (IF), and crop cover coefficients (CROP COEF) are determined based on the combination of land use, soils and topography, as shown in **Table 7**.

Water Balance Model Description

Table 7: Model Parameters based on Land Use / Soils (existing areas)

Land Use	Soils (HSG)	AWC (mm)	IF (Land Use)	IF (Soils)	Crop Cover Coefficient			
					Dormant Season	Initial Growing Season	Middle of Growing Season	End of Growing Season
Urban Lawns	A	50	0.10	0.40	0.40	0.78	1.15	0.55
	AB	62.5		0.40				
	B	75		0.30				
	BC	100		0.30				
	C	125		0.20				
	CD	100		0.15				
	D	75		0.10				
Row Crops	A	75	0.10	0.40	0.30	0.73	1.15	0.40
	AB	112.5		0.40				
	B	150		0.30				
	BC	175		0.30				
	C	200		0.20				
	CD	200		0.15				
	D	150		0.10				
Pasture / Meadow	A	100	0.10	0.40	0.40	0.68	0.95	0.90
	AB	125		0.40				
	B	150		0.30				
	BC	200		0.30				
	C	250		0.20				
	CD	250		0.15				
	D	200		0.10				
Mature Forest	A	250	0.20	0.40	0.30	0.75	1.20	0.30
	AB	275		0.40				
	B	300		0.30				
	BC	350		0.30				
	C	400		0.20				
	CD	400		0.15				
	D	350		0.10				
Impervious Areas *(see Table 9)*	A	1.57	0.00	0.00	1.00	1.00	1.00	1.00
	AB	1.57						
	B	1.57						
	BC	1.57						
	C	1.57						
	CD	1.57						
	D	1.57						

*For impervious areas, potential evapotranspiration is equal to potential evaporation (i.e. crop cover coefficient = 1.00).

3200 Reid's Lane (119089)
Water Balance Calculations

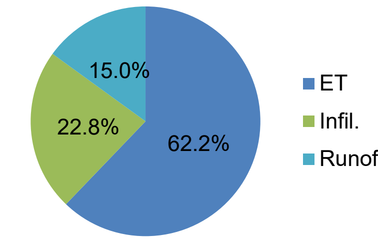
NOVATECH
Engineers, Planners & Landscape Architects

Pre-Development

Drainage Area 4.750 ha

Landuse	% of Watershed	Watershed Area	% of Pervious Area within Watershed	Water Holding Capacity	Infiltration Factor	Factor	Condition	Infiltration Factor
Mature Forest	75.2%	3.570	78.3%	300 mm	0.20	**Topography**	Rolling to Hilly Land	0.15
Pasture/Meadow	0.0%	0.000	0.0%	150 mm	0.10	**Soils**	Silty sand / Sandy Clay	0.30
Urban Lawns	20.9%	0.991	21.7%	75 mm	0.10		**Pervious Infiltration Factor**	**0.63**
Imp. Areas	4.0%	0.189	-	0 mm	0.00		**Weighted Infiltration Factor**	**0.60**
Average				**241 mm**	**0.18**		**Runoff Factor**	**0.40**

*table 3.1 MOE



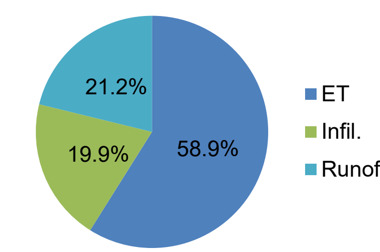
Ottawa (6105976) 1981-2010

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Total Precipitation (mm)	**P**	63	50	58	71	87	93	84	84	93	86	83	70	**920**
Potential Evapotranspiration (mm)	**PE**	0	0	0	0	112	129	136	115	72	43	0	0	**607**
Total Precip. - Potential ET (mm)	P-PE	63	50	58	71	-25	-36	-52	-31	21	43	83	70	
Soil Moisture Storage (mm)	ST	241	241	241	241	217	187	151	132	153	196	241	241	
Change in Soil Moisture Storage (mm)	ΔST	0	0	0	0	-24	-30	-36	-18	21	43	46	0	
Deficit (mm)	D	0	0	0	0	1	6	16	13	0	0	0	0	**35**
Actual Evapotranspiration (mm)	**AE**	0	0	0	0	110	123	121	102	72	43	0	0	**572**
Water Surplus (mm)	**S**	63	50	58	71	0	0	0	0	0	0	37	70	**348**
Annual Infiltration (mm)	**I**													**210**
Annual Runoff (mm)	**R**													**138**

Post-Development

Drainage Area 4.750 ha

Landuse	% of Watershed	Watershed Area	% of Pervious Area within Watershed	Water Holding Capacity	Infiltration Factor	Factor	Condition	Infiltration Factor
Mature Forest	18.9%	0.896	22.3%	300 mm	0.20	**Topography**	Rolling to Hilly Land	0.15
Pasture/Meadow	0.0%	0.000	0.0%	150 mm	0.10	**Soils**	Silty sand / Sandy Clay	0.30
Urban Lawns	65.6%	3.115	77.7%	75 mm	0.10		**Pervious Infiltration Factor**	**0.57**
Imp. Areas	15.3%	0.729	-	0 mm	0.00		**Weighted Infiltration Factor**	**0.48**
Average				**106 mm**	**0.12**		**Runoff Factor**	**0.52**



Ottawa (6105976) 1981-2010

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Total Precipitation (mm)	**P**	63	50	58	71	87	93	84	84	93	86	83	70	**920**
Potential Evapotranspiration (mm)	**PE**	0	0	0	0	112	129	136	115	72	43	0	0	**607**
Total Precip. - Potential Evap. (mm)	P-PE	63	50	58	71	-25	-36	-52	-31	21	43	83	70	
Soil Moisture Storage (mm)	ST	106	106	106	106	83	59	36	27	48	90	106	106	
Change in Soil Moisture Storage (mm)	ΔST	0	0	0	0	-22	-24	-23	-9	21	43	16	0	
Deficit (mm)	D	0	0	0	0	3	12	29	22	0	0	0	0	**65**
Actual Evapotranspiration (mm)	**AE**	0	0	0	0	109	117	107	93	72	43	0	0	**542**
Water Surplus (mm)	**S**	63	50	58	71	0	0	0	0	0	0	67	70	**378**
Annual Infiltration (mm)	**I**													**183**
Annual Runoff (mm)	**R**													**195**

Notes:
1) Uses measured average monthly total precipitation and potential evaporation data (converted to evapotranspiration based on a cover coefficient of 1.0).
2) Actual evapotranspiration and water surplus calculated using the Thornthwaite & Mather (1957) methodology.
3) Runoff and infiltration calculated as per the MOE SWM Planning and Design Manual (2003) methodology.
4) Impervious areas consist of rooftops, roads, and driveways.

Annual Summary

Sceneario	**Precipitation**	**ET**		**Surplus**		**Infil.**		**Runoff**	
Pre-Development	920 mm	572 mm	62.2%	348 mm	37.8%	210 mm	22.8%	138 mm	15.0%
Post-Development	920 mm	542 mm	58.9%	378 mm	41.1%	183 mm	19.9%	195 mm	21.2%
Difference (Post - Pre)	0 mm	-30 mm	-3.2%	30 mm	3.2%	-27 mm	-2.9%	57 mm	6.2%

Thornthwaite, C.W., and Mather, J.R. 1957. Instructions and tables for computing potential evapotranspiration and the water balance.
Centerton, N.J., Laboratory of Climatology, Publications in Climatology, v.10, no.3, p.185-311

Prepared by Novatech Engineering Consultants Ltd.
Date: 6/26/2025

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Table 3.1: Hydrologic Cycle Component Values

	Water Holding Capacity mm	Hydrologic Soil Group	Precipitation mm	Evapo-transpiration mm	Runoff mm	Infiltration* mm
Urban Lawns/Shallow Rooted Crops (spinach, beans, beets, carrots)						
Fine Sand	50	A	940	515	149	276
Fine Sandy Loam	75	B	940	525	187	228
Silt Loam	125	C	940	536	222	182
Clay Loam	100	CD	940	531	245	164
Clay	75	D	940	525	270	145
Moderately Rooted Crops (corn and cereal grains)						
Fine Sand	75	A	940	525	125	291
Fine Sandy Loam	150	B	940	539	160	241
Silt Loam	200	C	940	543	199	199
Clay Loam	200	CD	940	543	218	179
Clay	150	D	940	539	241	160
Pasture and Shrubs						
Fine Sand	100	A	940	531	102	307
Fine Sandy Loam	150	B	940	539	140	261
Silt Loam	250	C	940	546	177	217
Clay Loam	250	CD	940	546	197	197
Clay	200	D	940	543	218	179
Mature Forests						
Fine Sand	250	A	940	546	79	315
Fine Sandy Loam	300	B	940	548	118	274
Silt Loam	400	C	940	550	156	234
Clay Loam	400	CD	940	550	176	215
Clay	350	D	940	549	196	196

Notes: Hydrologic Soil Group A represents soils with low runoff potential and Soil Group D represents soils with high runoff potential. The evapotranspiration values are for mature vegetation. Streamflow is composed of baseflow and runoff.

* *This is the total infiltration of which some discharges back to the stream as base flow. The infiltration factor is determined by summing a factor for topography, soils and cover.*

Topography	Flat Land, average slope < 0.6 m/km	0.3
	Rolling Land, average slope 2.8 m to 3.8 m/km	0.2
	Hilly Land, average slope 28 m to 47 m/km	0.1
Soils	Tight impervious clay	0.1
	Medium combinations of clay and loam	0.2
	Open Sandy loam	0.4
Cover	Cultivated Land	0.1
	Woodland	0.2