February 10, 2025
19-1108

The Corporation of the City of Sault Ste. Marie
Department of Engineering and Planning
Level V – Civic Centre
99 Foster Drive
Sault Ste. Marie, ON
P6A 5X6

Attention: Maggie McAuley, P. Eng.
Manager, Design and Transportation Engineering

Re: Preliminary Stormwater Management Memo
22 MacDonald Ave. Apartment Buildings
MacDonald Avenue, Sault Ste. Marie, ON

Ms. McAuley

Bellex Corporation has retained TULLOCH to prepare this preliminary stormwater management memo in support of a rezoning application for the proposed development located at 22 MacDonald Avenue, Sault Ste. Marie, ON. This memo summarizes the pre-development and preliminary proposed post-development conditions. The intent of this report is to satisfy to the City of Sault Ste. Marie that storm water generated on the site can be managed in accordance with City of Sault Ste. Marie stormwater management policies.

Existing Conditions

At present, the site is undeveloped and has an area of approximately 2.0 ha. The site is currently zoned as High Density Residential (R5) and adjacent properties are zoned Single Detached Residential Zone (R2) and Low-Density Residential Zone (R3). The site is a ravine lot with overland flows draining towards both the north (ravine) and a limited amount towards MacDonald Avenue.

According to the geotechnical investigation, surficial native soils for the study area generally consist of silty clays with slow infiltration rates. The hydrologic soil group, according to the Soil Classification Service Classification System, is estimated as ‘C’.

Pre-Development Conditions

The total drainage area is approximately 2.0 hectares, divided into three distinct catchment areas. Sub catchment 100 consists of 1.333 hectares and drains north towards the ravine. Sub catchment 101 consists of a slightly smaller area (0.442 hectares) than sub catchment 100 and drains south towards MacDonald Avenue. Sub catchment 102 (approximately 0.226 hectares) drains east towards Gladstone Avenue. The pre-development drainage areas are shown in attached drawing **SK1**.

Post-Development Conditions

The proposed development will consist of two apartment buildings joined together on the ground floor and a two story underground parking lot. The site will host associated parking lots, paved access roadways, amenity areas and landscape areas. For preliminary analysis purposes, the post-development drainage area has been modeled as three (3) distinct sub-catchment areas. The attached drawing (**SK2**) illustrates the post-development sub-catchment areas.

Pre- and Post-Development Flows

Sub catchment 202 (area approximately 0.40 ha) will remain largely in its original undisturbed vegetated condition, maintaining its natural state similar to the pre-development conditions. The imperviousness levels and runoff coefficient for this area will not change from pre to post-development conditions. Therefore, both qualitative and quantitative management of stormwater will likely not be required.

Sub catchment area 201 (approximately 0.80 hectares) will consist of driveways, parking lots and vegetated surfaces, necessitating stormwater management for both quality and quantity. Peak runoff flows from sub catchment area 201 is proposed to be attenuated by use of traditional underground stormwater chambers (located in the vicinity of the cal-de-sac) with outflows regulated using a control manhole and orifice plate. The stormwater system in this area will consist of storm sewer pipes, catch basins and manholes, StormTech chambers or equivalent storage product, and a control manhole with orifice plate. The peak flows generated from a 2 year up to and including the 100 year return period AES Type II storm will be managed. The Timmins storm will be conveyed to the Gladstone Pond via pipe and to parking lot storage. If overland flow route is required, attenuation and slope protection will be provided.

An Oil and Grit Separator (OGS) will be provided for quality control, adhering to the City of Sault Ste. Marie and MECP's design guidelines. The Sault Ste. Marie Region Conservation Authority will be consulted to determine the required level of TSS removal and the OGS will be sized accordingly. Surface runoff from vegetated areas within sub catchment areas 201 and 202 may be directed toward ravine end near MacDonald Avenue. An outfall to the ravine from the storm water management system will be constructed and designed to ensure erosion along the ravine bank and channel is mitigated.

Sub catchment area 200, at approximately 0.8 hectares in area, contains the bulk of the developed area, consisting of two apartment buildings, driveways and parking lots. Runoff generated in this area will be collected via a storm sewer system. The City of Sault Ste. Marie owns and operates a large stormwater detention and retention pond on the east side of Glastone Avenue across from the development. We propose to convey the runoff generated in sub catchment area 200 eastward through a pipe network into the existing ravine. Hydraulic modeling of sub catchment area 200 was conducted using PCSWMM 2023 Professional 2D to analyze the peak flow at the outlet of the existing ravine. **Table 1** compares discharge flows from the City SWM pond east of gladstone from current conditions to proposed conditions (including area 200). Appended to this report are preliminary discharge hydrographs from the stormwater management pond for both pre and proposed post development conditions.

Table 1: Summary of Pre- and Post-Development Flows

Return Period	Total Peak Runoff (m3/s)	
	Pre-Development	Post-Development
2-year	4.869	4.865
5-year	5.477	5.478
10-year	5.818	5.820
25-year	6.180	6.180
50-year	6.381	6.386
100-year	6.548	6.547
Timmins Storm	4.869	4.865

While analyzing the summary results, there is a slight variation in peak runoff flows. This variation is due to routing errors or instability in the PCSWMM model. The pre- and post- development SWMM results are attached in **Appendix A** and **Appendix B** respectively.

The results indicate that there will be no increase in peak discharge rates from the pond. Due to the large size of the catchment area of the pond, the runoff from the proposed relatively small development peaks well in advance of the peak inflows from the ponds upstream catchment area and is thus attenuated and discharged prior to the time that the peak discharge from the pond occurs. Additionally, because the discharge occurring at the time of peak discharge from the site remains below the peak discharge rates from the pond, the inlet capacity and downstream receiving capacity of the storm sewer system will therefore be adequate.

An Oil and Grit Separator (OGS) will be provided inside the property line, before the proposed storm sewer pipe crossing Gladstone Avenue to the City's storm water management facility. The OGS will be sized to achieve a 70% TSS removal rate.

Conclusion

Overall, the runoff from sub catchment areas 201 and 202 will be managed and directed towards the MacDonald Avenue drainage system. The runoff from sub catchment area 200 will be directed towards the Pim/Gladstone stormwater management pond, where discharge is controlled through an existing stormwater management pond. We are of the opinion that the industry standard stormwater management techniques can be readily employed to achieve City of Sault Ste. Marie stormwater management requirements for quantity control and quality control for the site can be achieved with the implementation of Oil Grit Separators.

A detailed functional stormwater management design and report will be provided as a part of the future Site Plan Control Application.

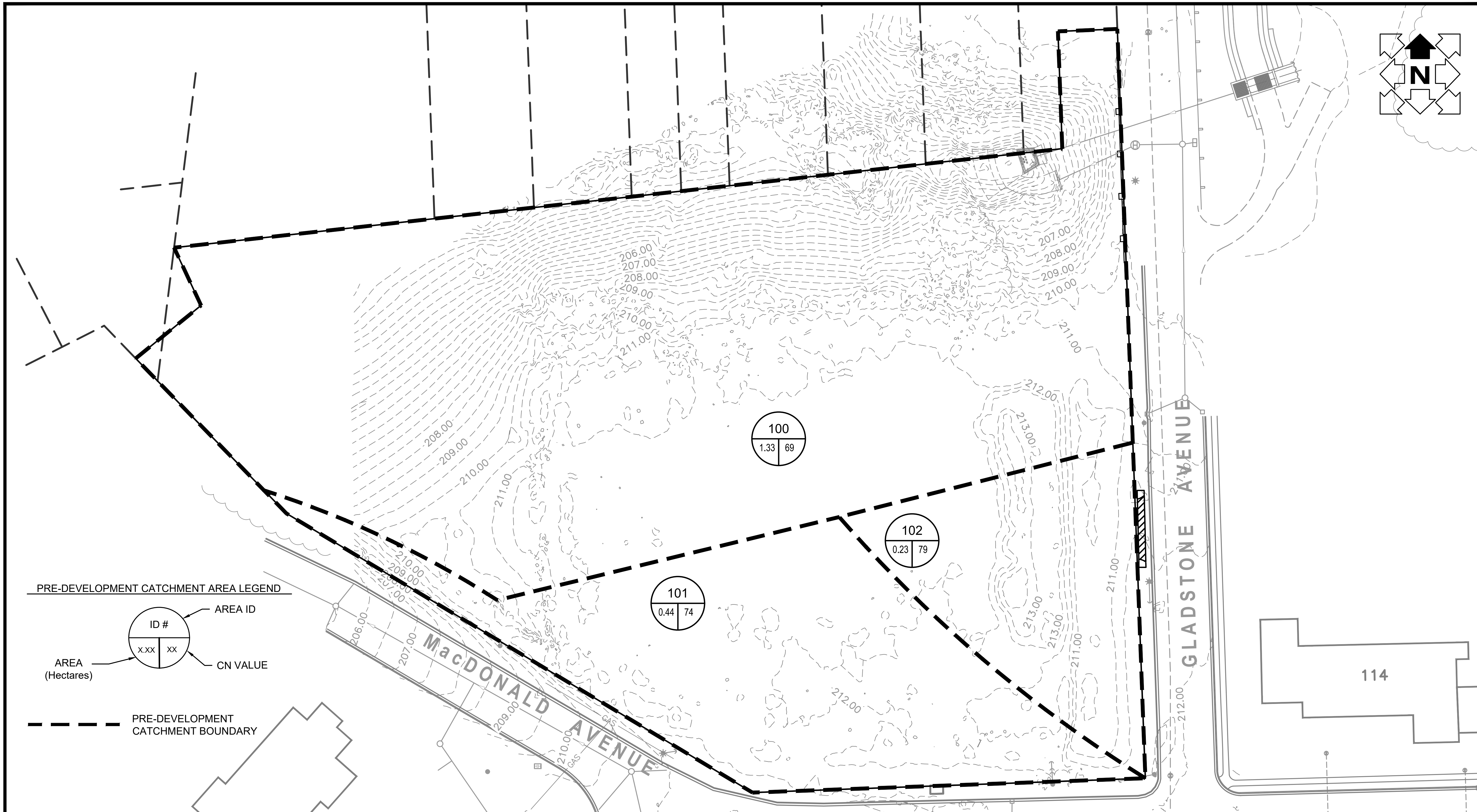
Closure

We trust that the information in this report will be found to be complete and adequate for your consideration. Should further elaboration be required for any portion of this project, TULLOCH would be pleased to provide assistance.

Sincerely,

Niraj Neupane
Engineering Intern

cc. John McDonald, P.Eng.
Project Manager, Principal
Encl. (5)



0	01.22.25	KG	ISSUED FOR REPORT
No.	DATE	BY	ISSUES / REVISIONS

TULLOCH

DRAWING:

PRE-DEVELOPMENT DRAINAGE AREAS

PROJECT:

22 MACDONALD AVE.
APARTMENT DEVELOPMENT
SAULT STE MARIE ON.

DRAWN BY: TP	CHECKED BY: JM	PROJECT No. : 19-1108	
DESIGNED BY: -	APPROVED BY: JM	DRAWING No. SK1	REVISION No. 0
SCALE: 1:750	DATE: OCT.22, 2021		

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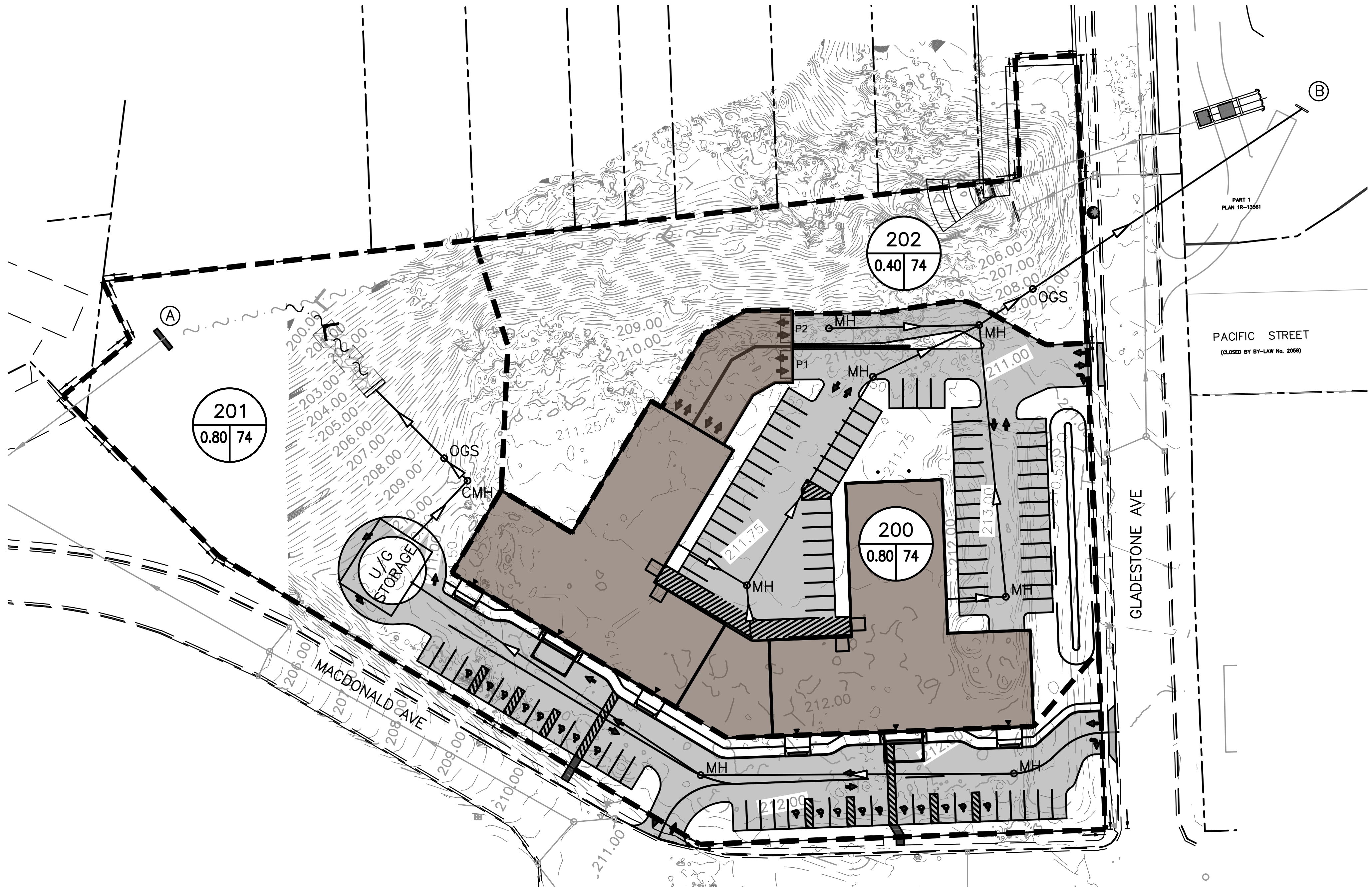

POST–DEVELOPMENT CATCHMENT AREA LEGEND

- AREA ID: ID #
- AREA (Hectares): X.XX
- CN VALUE: XX
- POST–DEVELOPMENT CATCHMENT BOUNDARY
- DRAINAGE DIRECTION
- PROPOSED STM MAIN
- CB: PROPOSED CATCHBASIN
- MH: PROPOSED STM MANHOLE
- PROPOSED DITCH
- GENERAL GRADING/SLOPE ARROW

AREA 200 DISCHARGES TO THE PIM/GLADSTONE STORM WATER MANAGEMENT POND WHERE DISCHARGE IS CONTROLLED.

AREA 201 DISCHARGES TO THE RAVINE END PT A

AREA 202 DISCHARGES TO THE RAVINE END PT B

No.	DATE	BY	ISSUES / REVISIONS
0	01.22.25	KG	ISSUED FOR REPORT

TULLOCH

DRAWING: **POST DEVELOPMENT DRAINAGE AREAS**

PROJECT: **22 MADONALD AVE APARTMENT DEVELOPEMNT SAULT STE MARIE ,ON**

DRAWN BY:	CHECKED BY:	PROJECT No. :	
KG	JM	191108	
DESIGNED BY: NN	APPROVED BY: JM	DRAWING No. SK2	REVISION No. 0
SCALE: 1:1000	DATE: JAN 22, 2025		

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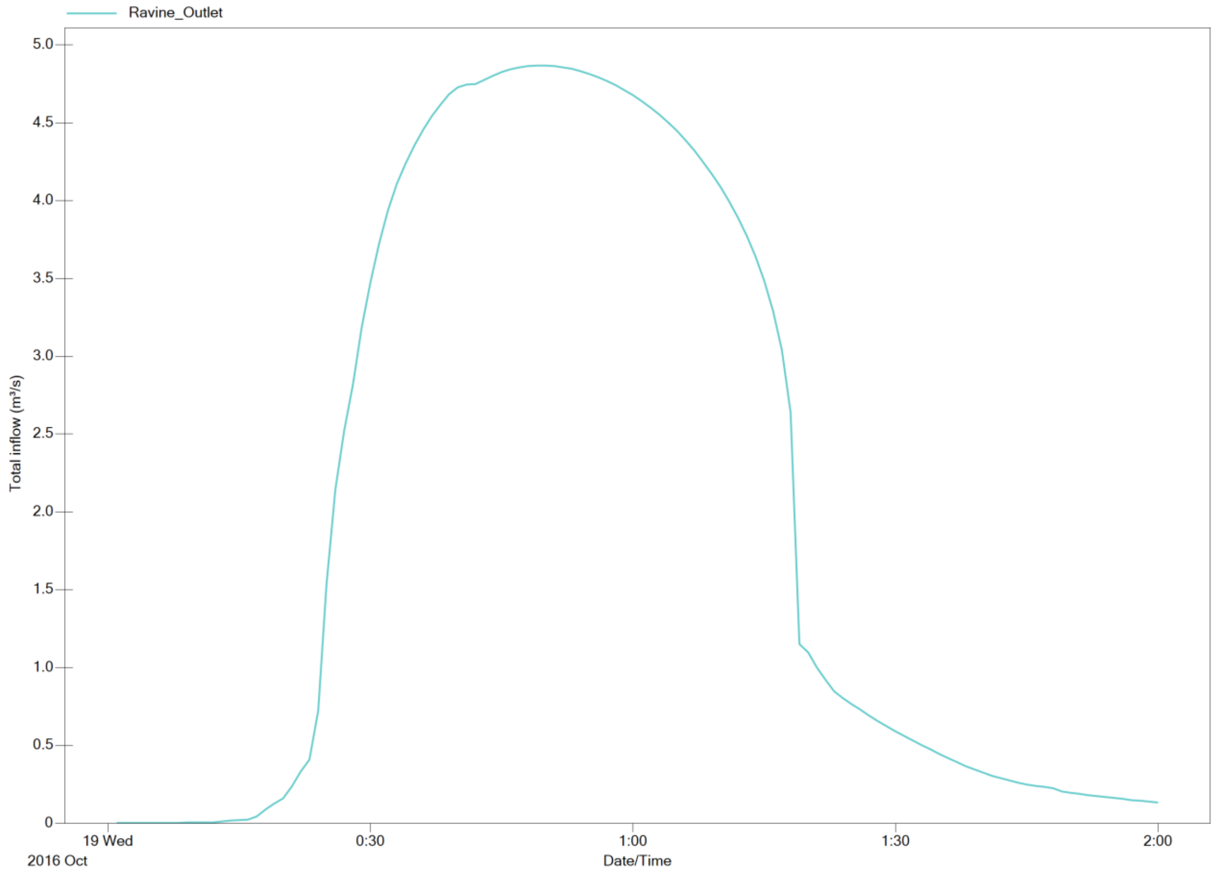
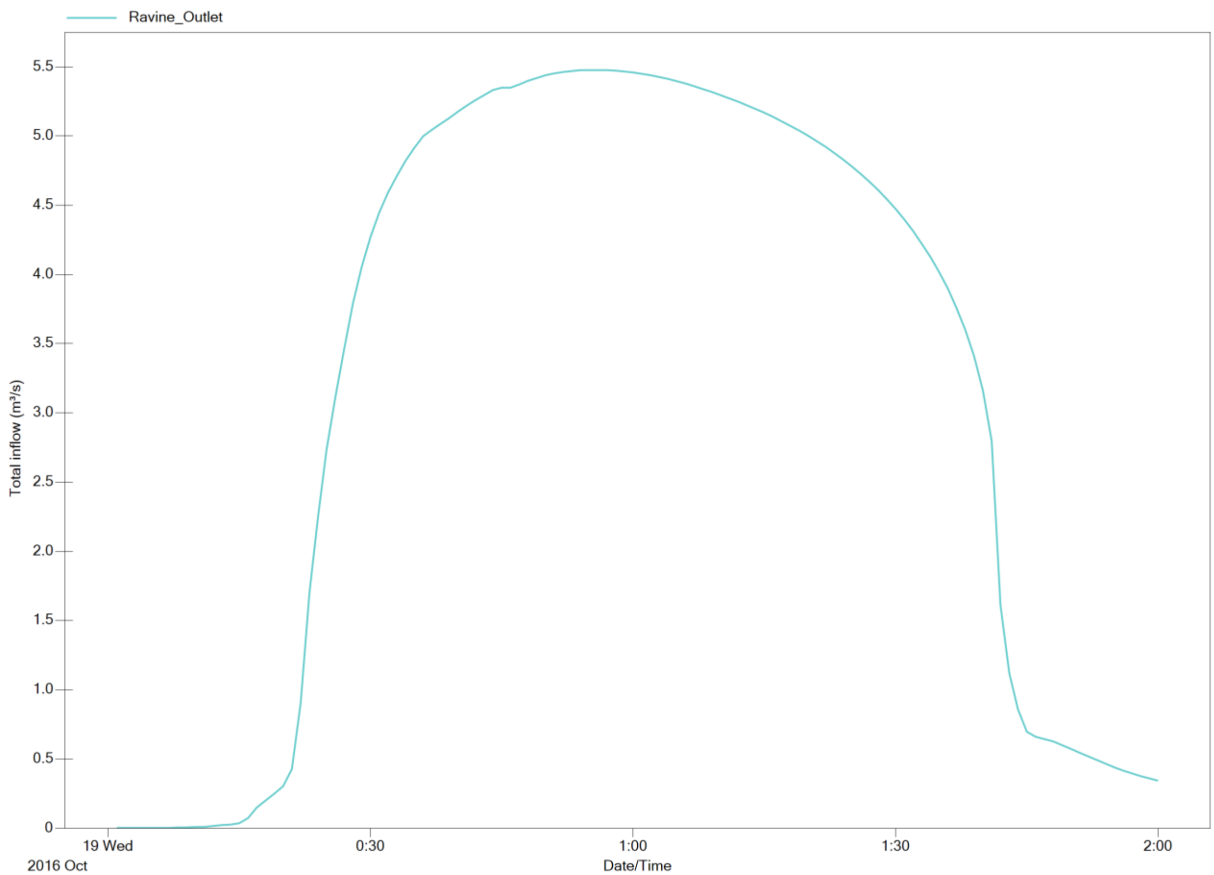
APPENDIX A

Pre-Development SWMM Results

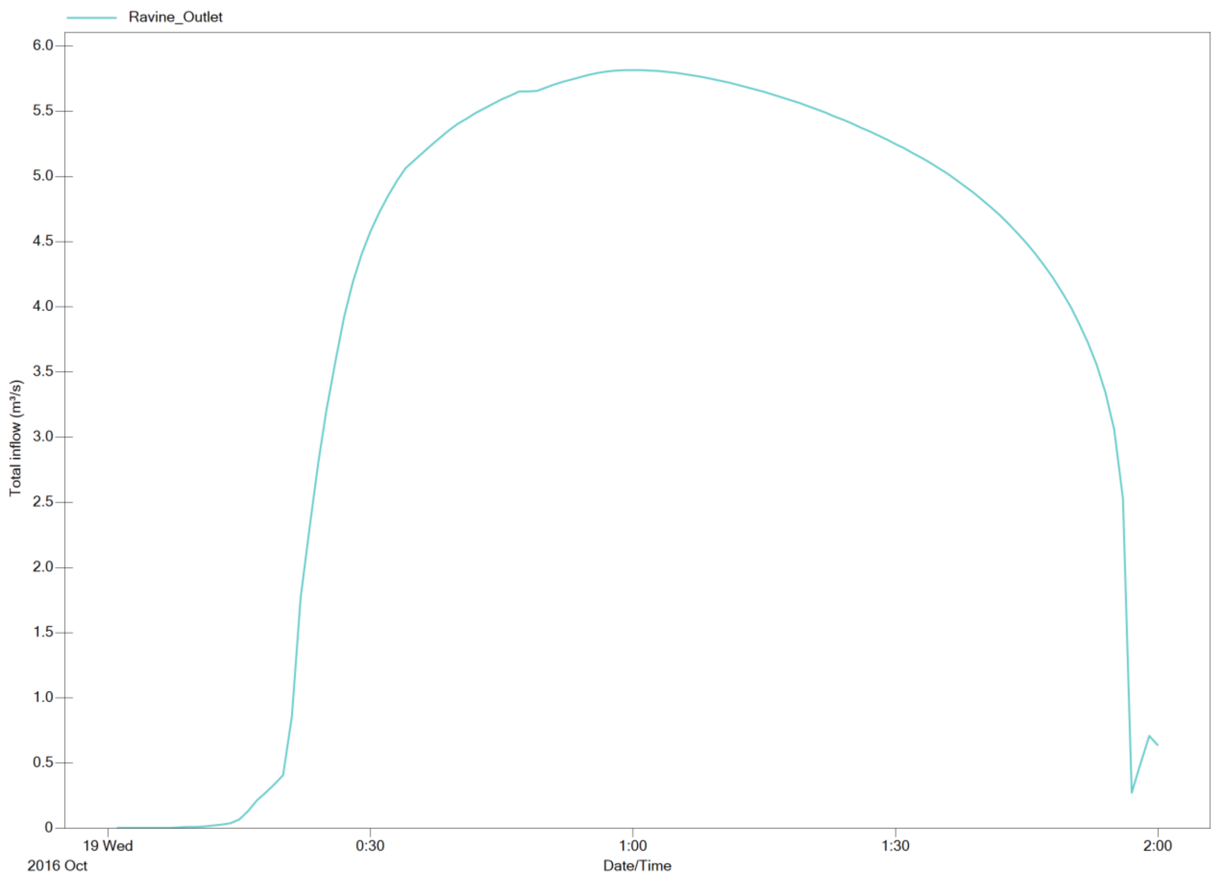
2-Year Return Period Storm Event



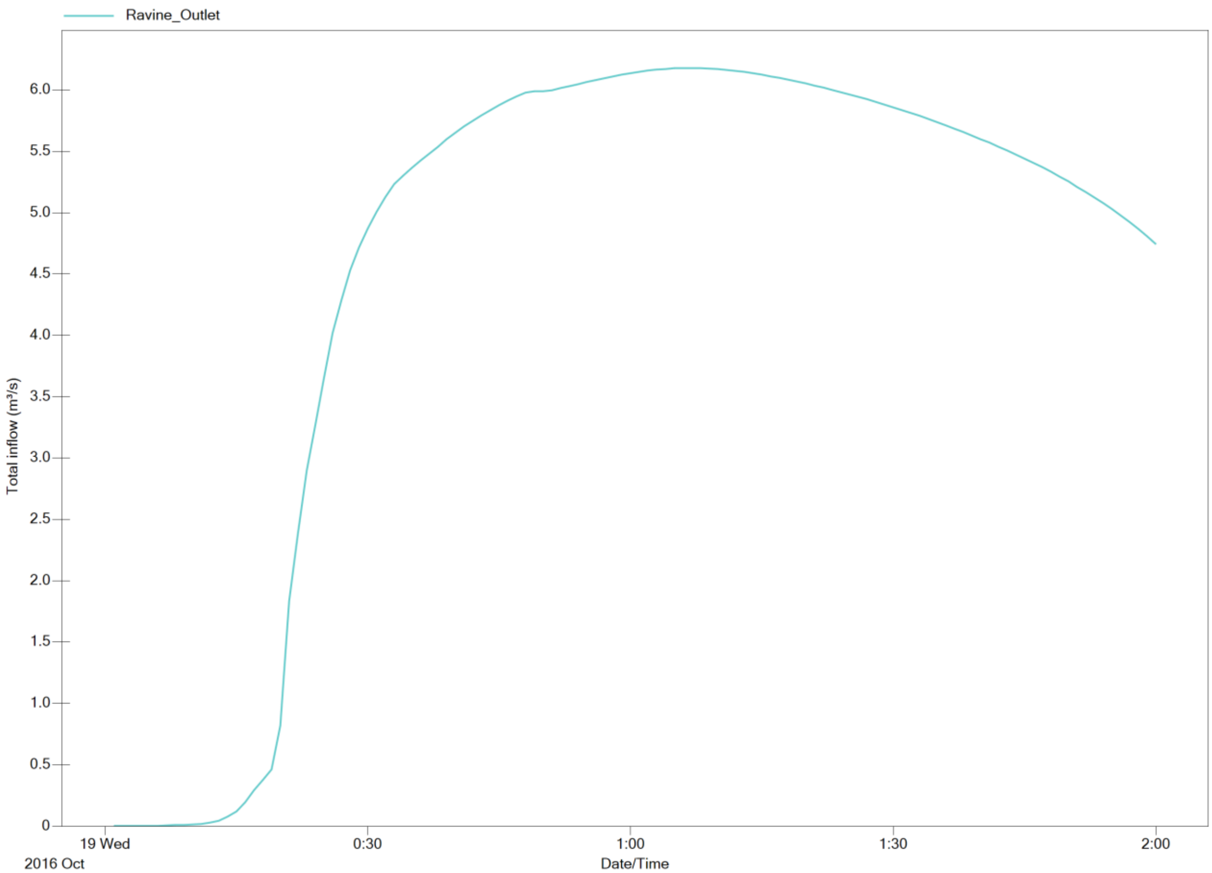
5-Year Return Period Storm Event



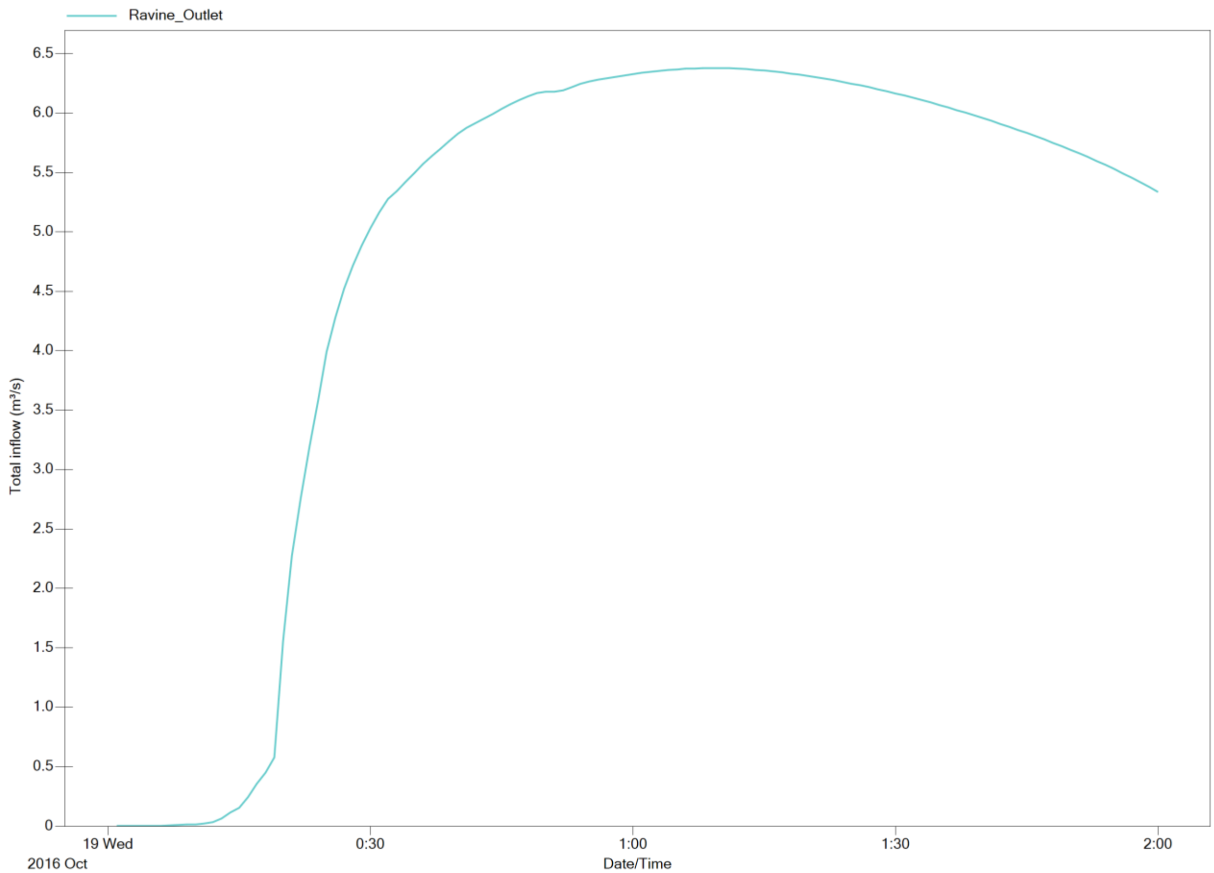
10-Year Return Period Storm Event



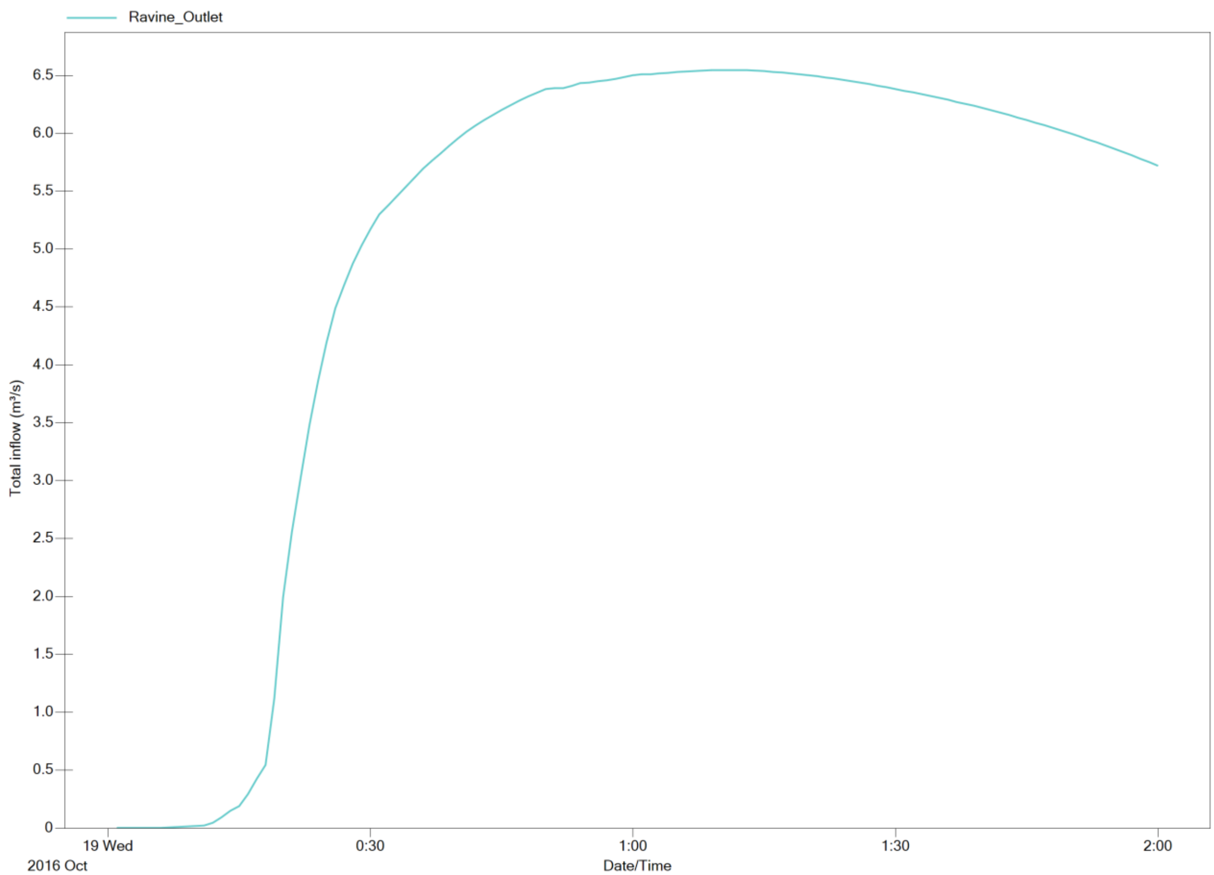
25-Year Return Period Storm Event



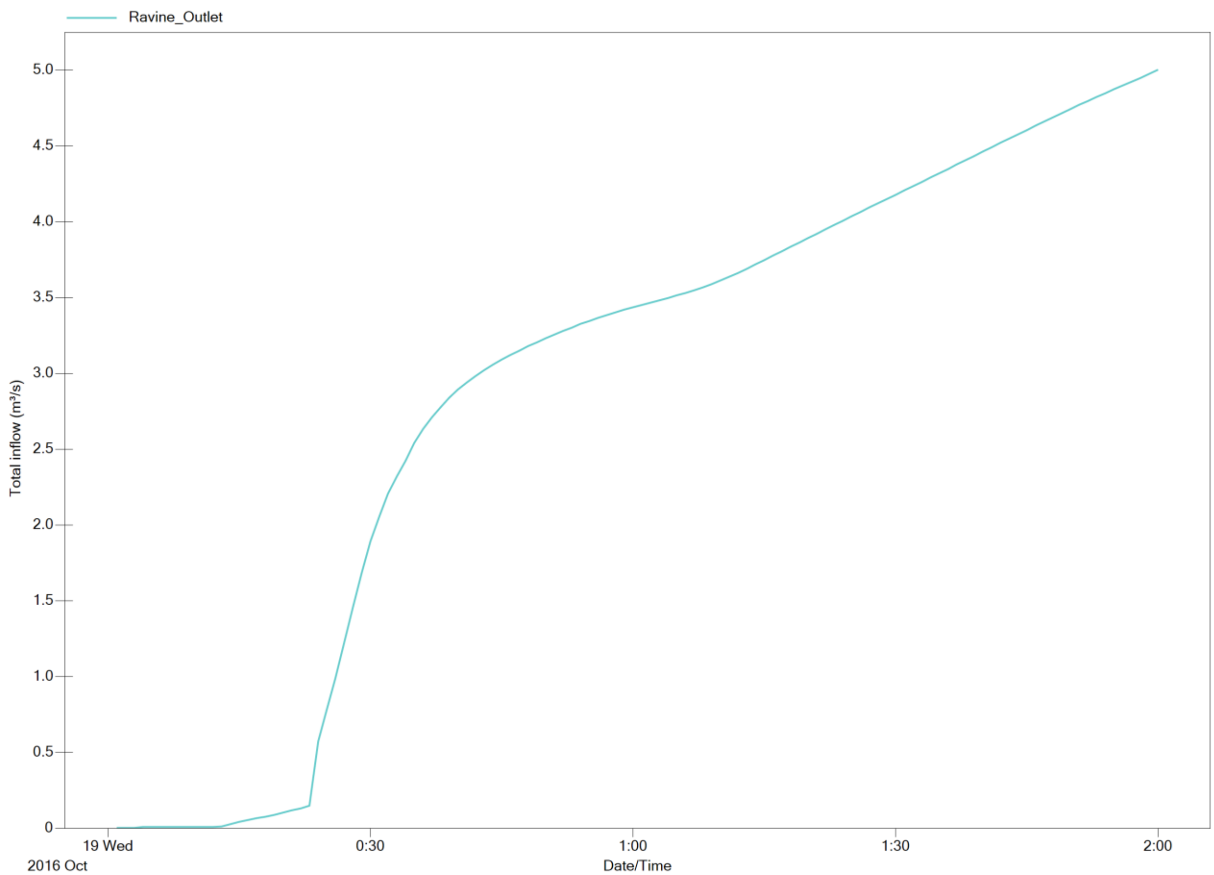
50-Year Return Period Storm Event



100-Year Return Period Storm Event



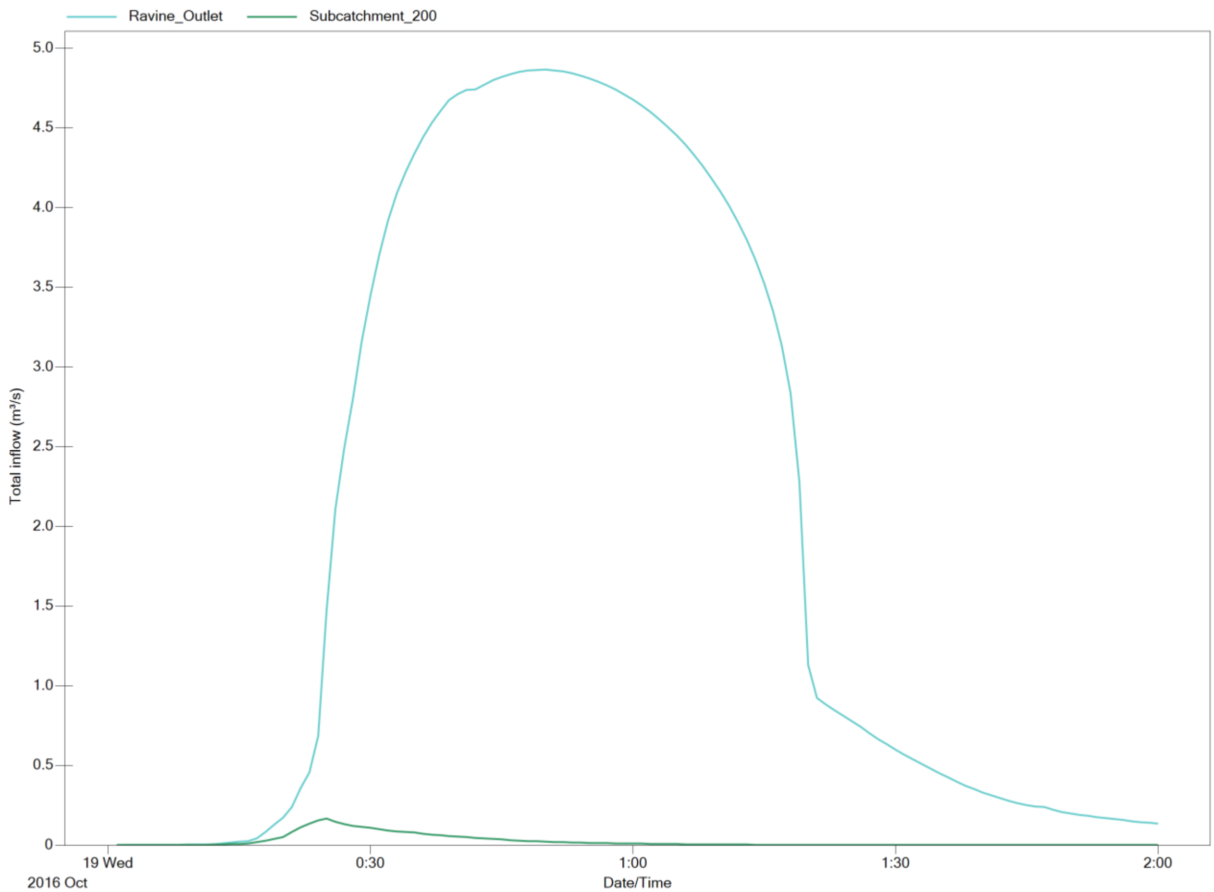
Timmins Storm

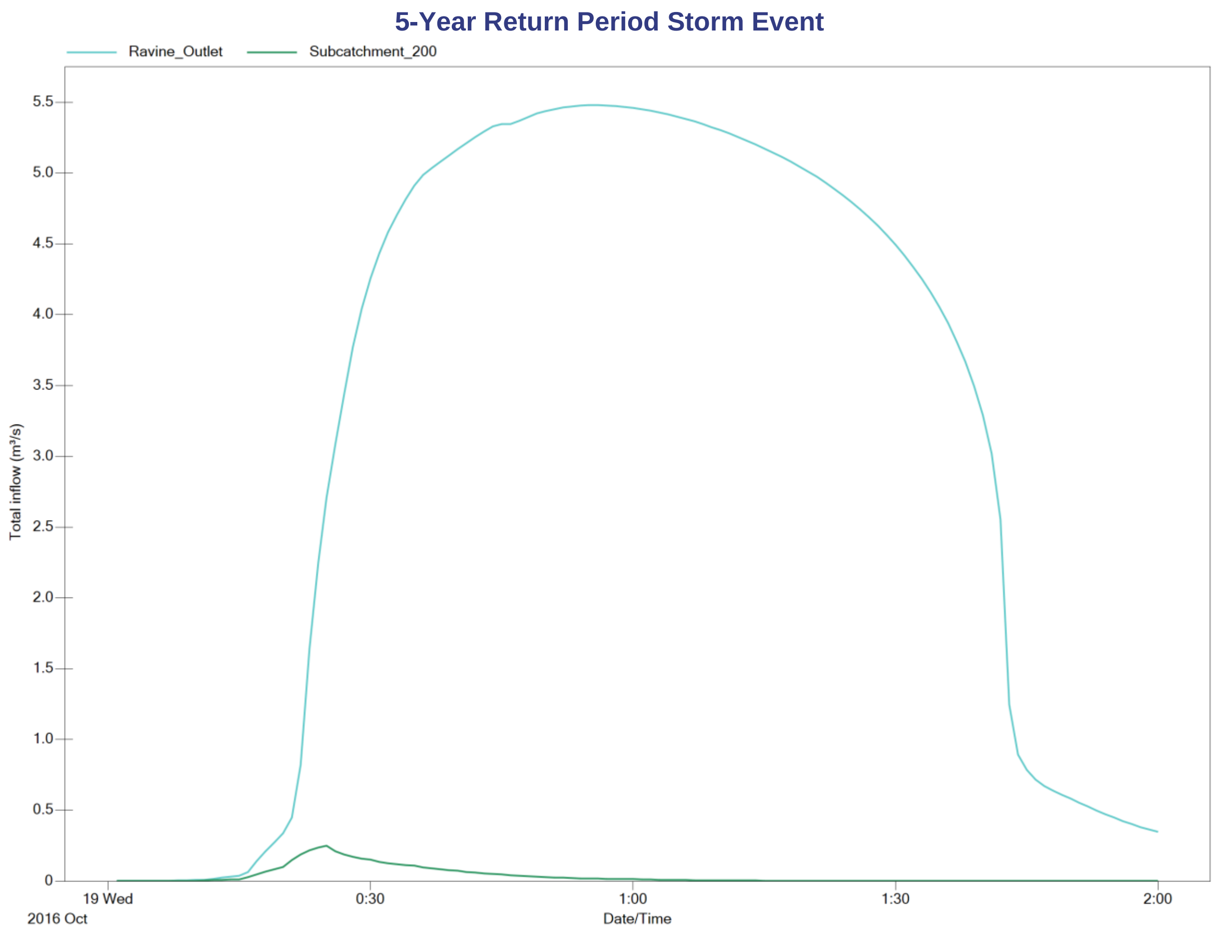


APPENDIX B

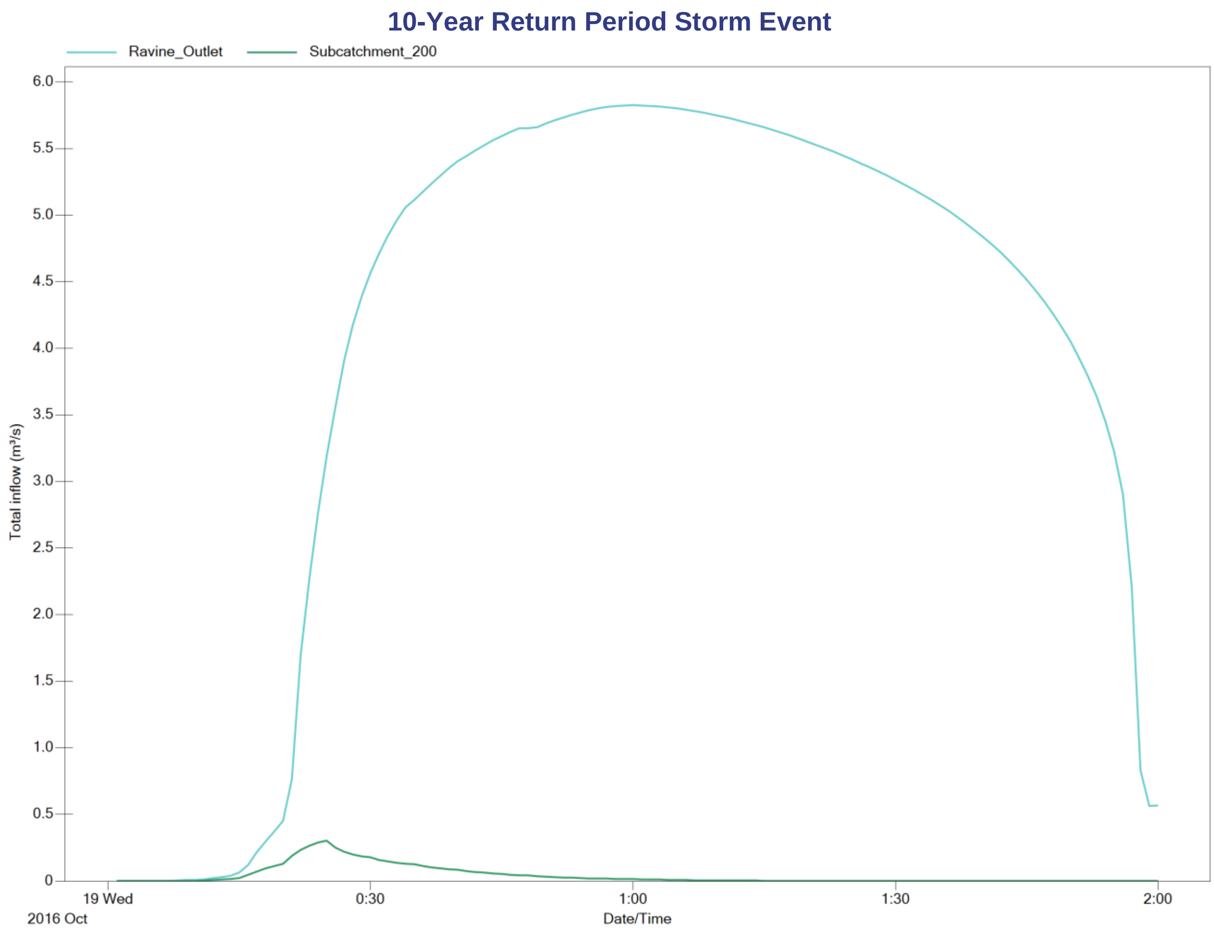
Post-Development SWMM Results

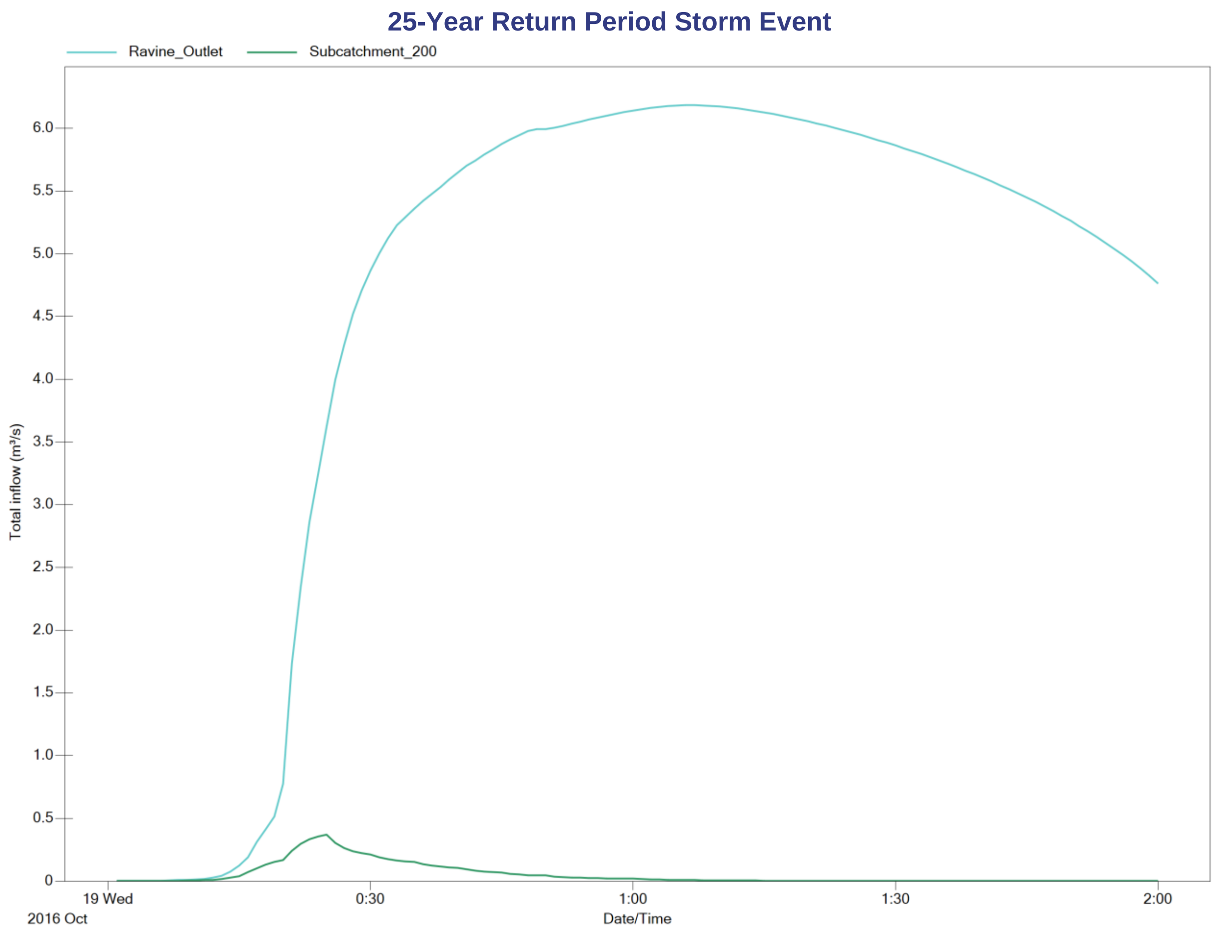
2-Year Return Period Storm Event





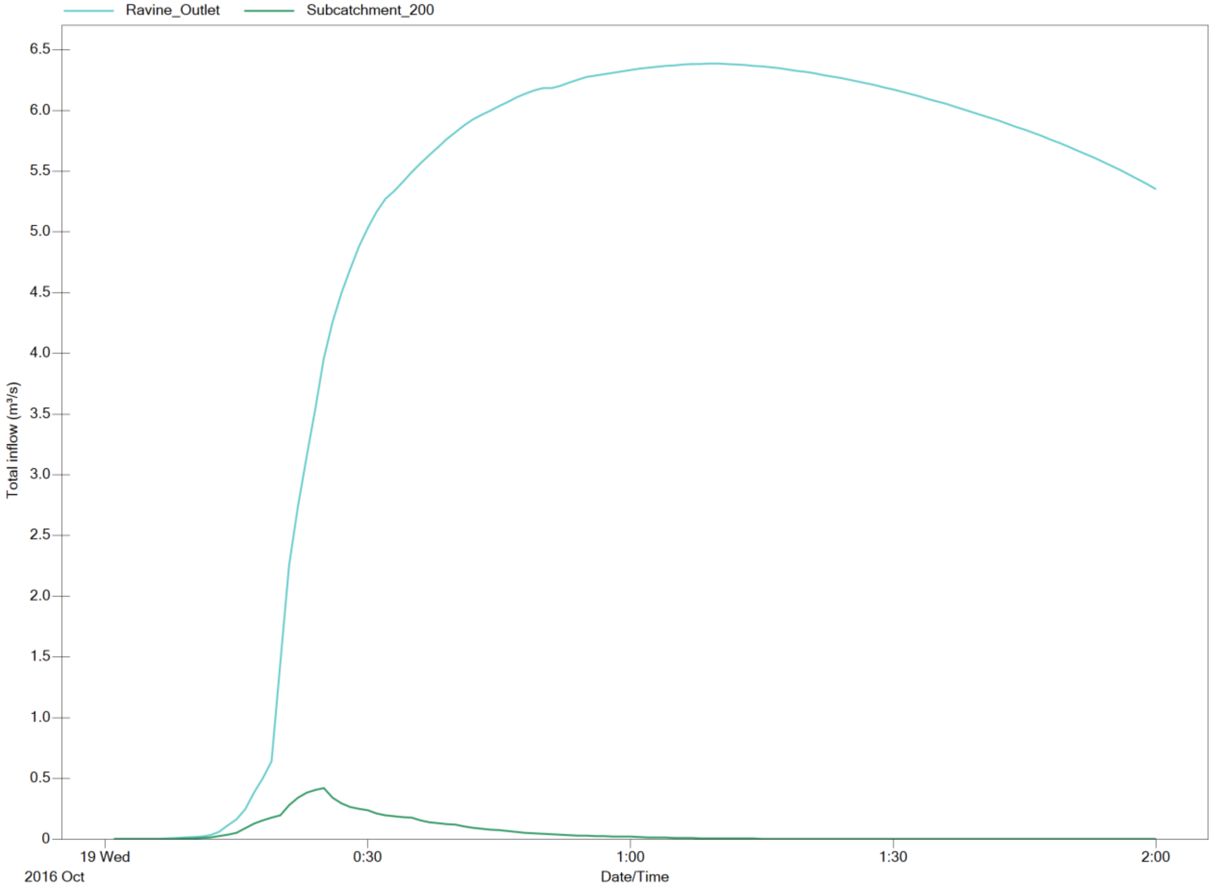
5-Year Return Period Storm Event
Ravine_Outlet
Subcatchment_200
Total inflow (m³/s)
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0
19 Wed
2016 Oct
0:30
1:00
1:30
2:00
Date/Time

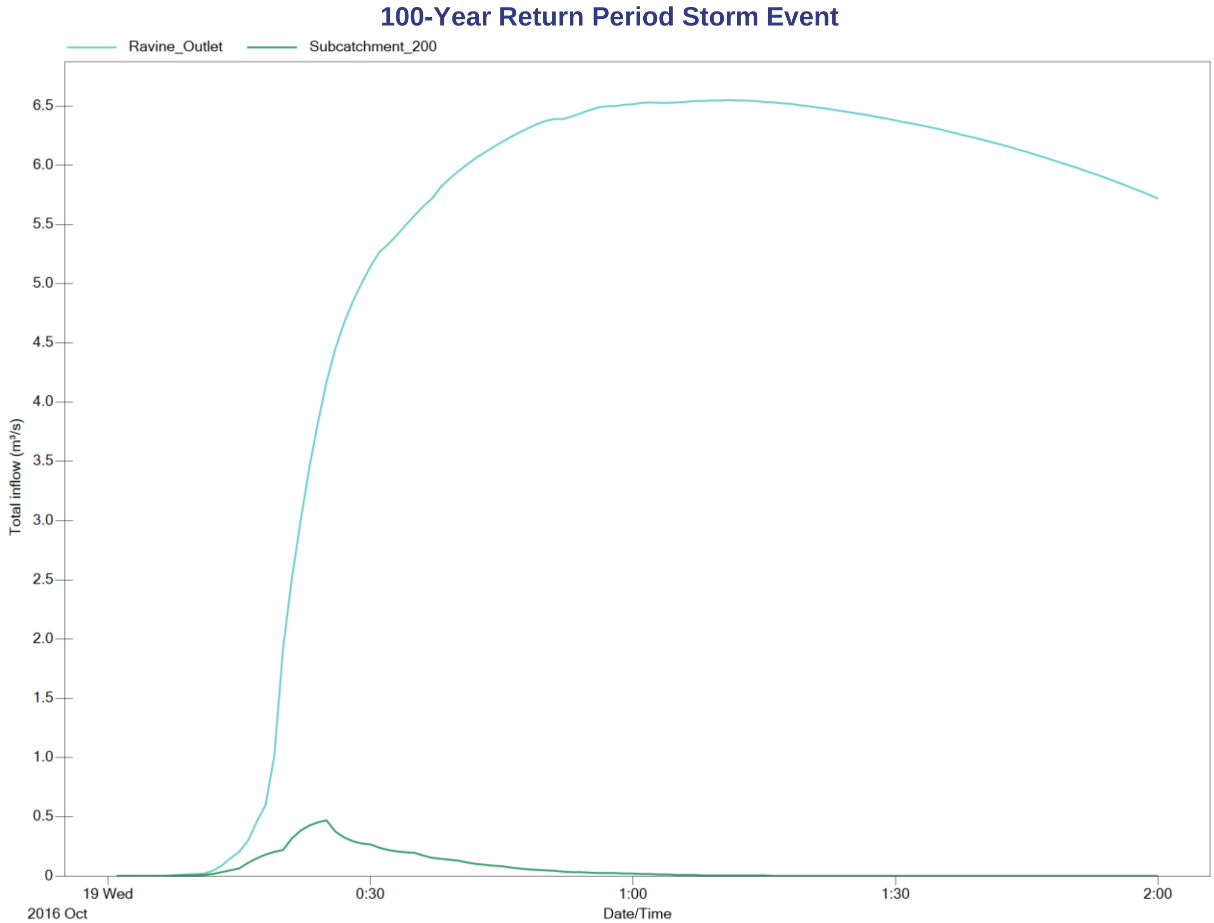

10-Year Return Period Storm Event
Ravine_Outlet
Subcatchment_200
Total inflow (m³/s)
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0
19 Wed
2016 Oct
0:30
1:00
1:30
2:00
Date/Time



25-Year Return Period Storm Event
Ravine_Outlet
Subcatchment_200
Total inflow (m³/s)
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0
19 Wed
2016 Oct
0:30
1:00
1:30
2:00
Date/Time

50-Year Return Period Storm Event




100-Year Return Period Storm Event
Ravine_Outlet
Subcatchment_200
Total inflow (m³/s)
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0
19 Wed
2016 Oct
0:30
1:00
1:30
2:00
Date/Time

Timmins Storm