2705460 Ontario Inc.

Residential Developments
50 Bayswater Avenue
1088 Somerset Street W

Stormwater Management Report

August 08, 2024 1st Submission

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1088 Somerset Street W

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2705460 Ontario Inc.
1st Submission

Project No.: CA0003875.9802
Date: August 08, 2024

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Revision History

FIRST ISSUE

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Signatures

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Calvin Paul, P.Eng.,
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Date

Approved[1] by (must be reviewed for technical accuracy prior to approval)

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Date

[1] Approval of this document is an administrative function indicating readiness for release and does not impart legal liability on to the Approver for any technical content contained herein. Technical accuracy and fit-for-purpose of this content is obtained through the review process. The Approver shall ensure the applicable review process has occurred prior to signing the document.

Contributors

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2705460 Ontario Inc.

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1 INTRODUCTION

1.1 Scope

WSP Canada Inc. was retained by 27054460 Ontario Inc. to conduct a stormwater management study in support of site plan application to develop two towers. The proposed development at 50 Bayswater Avenue is a 16-storey residential tower, the existing structure is a 1-storey commercial building. The proposed development at 1088 Somerset Street W is a 6-storey residential building, the existing structure is 2.5 storey commercial dwelling.

1.2 Site Location

The 50 Bayswater lot is located at the south-west corner of Bayswater and Somerset intersection and 1088 Somerset lot is located just west of the same intersection.

Figure 1: Site Location

1.3 Stormwater Management Plan Objectives

The objectives of the stormwater management (SWM) study are as follows:

— Collect and review background information.

— Confirm applicable SWM design criteria with City of Ottawa staff.

— Evaluate various SWM practices that meet the stormwater management requirements and recommend a preferred strategy—specifically related to the applicable quantity and quality control criteria.

1.4 Design Criteria

Design criteria were confirmed through pre-consultation with the city of Ottawa held on May 25, 2022 (Meeting minutes included in **Appendix A**). In addition, the following guidelines have been reviewed:

— Ottawa Sewer Design Guidelines, City of Ottawa, SDG002, October 2012. (OSDG 2012)

- Technical Bulletin ISDTB-2014-01 City of Ottawa, February 5, 2014. (ISDTB-2014-01)
- Technical Bulletin PIEDTB-2016-01City of Ottawa, September 6, 2016. (PIEDTB-2016-01)
- Technical Bulletin ISTB-2018-01 City of Ottawa, March 21, 2018. (ISTB-2018-01)
- Technical Bulletin ISTB-2018-04 City of Ottawa, June 27, 2018. (ISTB-2018-04)
- Technical Bulletin ISTB-2019-02 City of Ottawa, July 8, 2019. (ISTB-2019-02)

— Stormwater Planning and Design Manual, Ministry of the Environment (MOE), 2008.

Therefore, criteria for 50 Bayswater Ave and 1088 Somerset Street W are as follows:

Water Quality

— If there will be no surface drainage capture/control infrastructure such as a catch basin, catch basin with ICD, then quality control is not required. (pre-consultation meeting August 24th, 2023). Refer to **Appendix A**.

Water Quantity Control and Discharge to Municipal Infrastructure

— Stormwater must be controlled to the 2-year pre-development peak flow. Runoff must be detained onsite to control all storm events up to and including the 100-year event. However, 1088 Somerset Street W development, the side yard and front yard can be left uncontrolled to the right-of-way (ROW) and for the 50 Bayswater development, only the roof need be controlled, all other areas can be left uncontrolled (email dated July 12th, 2024). Refer to **Appendix A**.

— Allowable Runoff coefficient (C): C = the lesser of the existing pre-development conditions to a maximum of 0.5 (pre-consultation meeting August 24th, 2023).

— Tc of 10 minutes shall be used for all post-development calculations.

— In the case where a submersible pump is not being used, average release rate should be halved to 50% of Peak Allowable Release Rate, to estimate storage volume.

— For very low flowrates, approved vortex type inlet control devices are recommended instead (City of Ottawa, 2012).

2 PREDEVELOPMENT CONDITIONS

2.1 General

As discussed in **Section 1.1**, the 50 Bayswater lot is located at the south-west corner of the Bayswater and Somerset intersection. The site consists of one 17-storey residential tower (Building C) and one 1-storey commercial building. The laneway along the western property line provides access to Building C's rear parking deck and the asphalt surface parking for the 1-storey building. The 1-storey building and existing parking lot are to be demolished with the proposed tower (Building B) constructed in their place. Building C and its rear parking deck is to remain, with minor modifications made to the parking deck to ensure access and egress. The 50 Bayswater lot in total is 0.30ha, with a proposed redevelopment area of 0.060ha. Refer to **Exhibit 1** for existing site layout.

The 1088 Somerset lot is located just west of the previously described intersection and is currently developed with a 2 ½ storey commercial dwelling, garage, and asphalt surface parking. The existing features on the lot are proposed to be demolished and the total 0.060 ha lot redeveloped with Building A, a rear amenity area, and 2 short term parking spaces. Similar to Building B, of this 0.060 ha, only 0.047 ha is to be controlled in post-development conditions. Refer to **Exhibit 1** for existing site layout. The existing condition land use breakdown is provided in **Table 2-1**. Stormwater Management calculations can be found in **Appendix B.**

Table 2-1: Pre-Development Area Breakdown

Land Use	Area (ha)	% Coverage	2-year Runoff C	100-year Runoff C
1088 Somerset Street W (Building EX-A)				
Roof	0.022	46.6	0.90	0.99
Hard Surface	0.024	50.0	0.90	0.99
Soft Landscaping	0.002	3.4	0.20	0.24
Area (to be controlled)	**0.047**	**100.0**	**0.88**	**0.97**
Area (to be uncontrolled)	**0.013**	**-**	**0.99**	**0.99**
50 Bayswater Avenue (Building EX-B)				
Roof	0.029	60.9	0.90	0.99
Hard Surface	0.019	39.1	0.90	0.99
Soft Landscaping	0.000	0.0	0.20	0.24
Area (to be controlled)	**0.047**	**-**	**0.90**	**0.99**
Area (to be uncontrolled)	**0.014**	**-**	**0.99**	**0.99**

2.2 Rainfall Information

The rainfall intensity was calculated in accordance with Section 5.4.2 of the Ottawa Sewer Design Guidelines, October 2012:

$$i = \left[\frac{A}{(T_d + C)^B}\right]$$

Where.

- A, B, C = regression constants for each return period (defined in section 5.4.2)
- i = rainfall intensity (mm/hour)
- T_d = storm duration (minutes)

The IDF parameters based on Section 5.4.2 for various return periods are summarized in **Table 2-2** below.

Table 2-2 Rainfall Parameters

Return Period (years)	2	5	10	25	50	100
A	732.951	998.071	1,174.184	1,402.884	1,569.580	1,735.688
B	0.810	0.814	0.816	0.819	0.820	0.820
C	6.199	6.053	6.014	6.018	6.014	6.014

The minimum time of concentration is 10 minutes.

2.3 Climate Change

As per Section 8.3.12 of the OSDG, the drainage system shall be stress tested using storms calculated on the basis of a 20% increase of the City's IDF rainfall curves. The updated rainfall parameters are presented below.

Table 2-3 Climate Change - Rainfall Parameters

Return Period (years)	2	5	10	25	50	100
A	879.541	1197.685	1409.021	1683.461	1883.496	2082.826
B	0.810	0.814	0.816	0.819	0.820	0.820
C	6.199	6.053	6.014	6.018	6.014	6.014

2.4 Allowable Flow Rates

As noted in **Section 1.4**, post-development stormwater runoff from the 2-year to 100-year design storms must not exceed the pre-development peak 2-year flow rate, calculated using a runoff coefficient being the lesser of 0.50 or existing conditions. In this instance, existing conditions have a runoff coefficient of 0.90 and 0.88, for 50 Bayswater and 1088 Somerset sites, respectively. So, a value of 0.50 has been used to calculate the allowable release rate.

The 1088 Somerset development will discharge to a 300 mm storm sewer on Somerset Street West and 50 Bayswater development will discharge to a 375 mm storm sewer on Bayswater Avenue. The calculated peak flow rates for the site in the pre-development condition are summarized below in **Table 2-4 and Table 2-5**. The analysis was performed in HydroCAD v10.00-21. The HydroCAD outputs for the existing conditions can be found in **Appendix C1**.

Table 2-4: Allowable Release Rate – 1088 Somerset Street

Return Period (Years)	Peak Flowrate C = 0.50 (L/s)	Allowable Release Rate (L/s)
2	4.9	4.9
5	6.7	
10	7.8	
25	9.3	
50	10.4	
100	11.5	

Table 2-5: Allowable Release Rate – 50 Bayswater Avenue

Return Period (Years)	Peak Flowrate C = 0.50 (L/s)	Allowable Release Rate (L/s)
2	4.9	4.9
5	6.7	
10	7.8	
25	9.3	
50	10.4	
100	11.5	

3 POST DEVELOPMENT CONDITIONS

3.1 General

Both, 50 Bayswater and 1088 Somerset, will be developed with two new 16-storey and 6-storey residential buildings, respectively. As mentioned in **Section 1.4**, for 1088 Somerset, only the roof and rear yard area will be controlled with the rest left uncontrolled. And for 50 Bayswater, only the roof area is to be controlled with the remaining area left uncontrolled.

The developed sites will have a runoff coefficient of 0.95 and 0.98, respectively. Two cisterns will be used to control the peak discharge of the newly developed sites to 2.45 L/s, each (i.e. half of the allowable release rate in accordance with City direction on applying the Modified Rational Method). This discharge rate will be met through the John Meunier Hydrovex 40SVHV-1 inlet control devices (ICD). **Exhibit 1** shows the proposed controlled and uncontrolled drainage areas for the developed site. The post-development area breakdown in shown in **Table 3-1**.

Note that this report should be read in conjunction with the proposed site servicing drawing package.

Table 3-1: Post Development Area Breakdown

Land Use	Hydraulics	Area (ha)	% Coverage	2-year Runoff C	100-year Runoff C
1088 Somerset Street W (Building PR-A)					
Roof	Controlled	0.039	65.0	0.90	0.99
Side and Front Yard	Uncontrolled	0.013	21.6	0.71	0.80
Rear Yard	Controlled	0.009	13.4	0.69	0.78
Total Area		**0.060**	**100**	**0.83**	**0.92**
50 Bayswater Avenue (Building PR-B)					
Roof	Controlled	0.047	77.6	0.90	0.99
Peripheral Area	Uncontrolled	0.014	22.4	0.88	0.98
Total Area		**0.061**	**-**	**0.90**	**0.99**

3.2 Water Quality Control

All building, landscape, pathways and amenity areas will generally be free of typical oil and sediment generating activities. As such, runoff generated from the site can be considered clean. Therefore, quality control is not required.

3.3 Water Quantity Control

As discussed in **Section 3.1**, the discharge rate will be met through vortex ICD's. These ICD's will be able to maintain release rates below 2.45 L/s. To attenuate the inflow before it is discharged, a cistern is proposed at each of the two sites.

This analysis was performed in HydroCAD using the Modified Rational Method subroutine. The cisterns were modelled as reservoirs. Stage-storage relationships were developed based on available footprint and height. Cistern A, for 1088 Somerset, has an available footprint and height of 16 m^2 and 1.85 m, respectively. Cistern B, for 50 Bayswater, has an available footprint and height of 21 m^2 and 1.65 m, respectively. Therefore, Cisterns A and B provide about 29.6 m^3 and 34.65 m^3 of storage volumes, each. Rating curves for the outlet 40SVHV-1 ICD's were obtained from Appendix 7C of the Ottawa Sewer Design Guidelines, 2012. The peak flow rates from the development areas are provided in **Table 3-2**. The output files for the proposed condition can be found in **Appendix C2**.

Table 3-2: Post-development Peak Flow Performance

Return Period (Years)	Uncontrolled Inflows (L/s)		Controlled Outflows (L/s)		Cistern Volume Utilised (m^3)[1]	
	1088 Somerset (0.047ha)	50 Bayswater (0.047ha)	1088 Somerset (0.047ha)	50 Bayswater (0.047ha)	1088 Somerset (0.047ha)	50 Bayswater (0.047ha)
2-yr	9.6	9.8	0.9	0.9	8	8
5-yr	13.0	13.2	1.0	0.9	12	12
100-yr	22.2	22.7	1.3	1.2	21	23

[1]*Cistern volume utilised presented are the volumes utilised when the critical duration for each storm is applied.*

As discussed in **Section 2.3**, all proposed SWM infrastructure must be stress tested to account for climate change by increasing the IDF parameters, by 20%. Climate change parameters estimated in **Table 2-3** were applied. The critical duration was estimated as

96 – 111 min, through HydroCAD. **Table 3-3** below, provides the max used volume utilised under the climate change scenario.

Table 3-3: Proposed Cistern Performance - Climate Change Impact

Return Period (Years)	Uncontrolled Inflows (L/s)		Controlled Outflows (L/s)		Max Volume Utilised (m^3)		Water Level within Cistern (m)	
	A[1]	B[2]	A[1]	B[2]	A[1]	B[2]	A[1]	B[2]
100-yr	5.4	5.4	1.9	1.7	26	28	1.614	1.311

[1]*Refers to Cistern A – utilised for 1088 Somerset Street W Site*

[2]*Refers to Cistern B – utilised for 50 Bayswater Avenue Site*

The results demonstrate that the target allowable release rate is satisfied at all durations, and that the provided storage volumes and cistern heights are sufficient.

4 CONCLUSIONS

A stormwater management plan has been proposed to support the site plan application for 1088 Somerset Street W and 50 Bayswater Avenue developments in the City of Ottawa, each. The key points are summarized below.

Water Quality

As runoff generated from the site is considered clean, no quantity control measures are required.

Water Quantity

Runoff collected from the roof and rear yard of 1088 Somerset Street W, will be collected in a cistern. The cistern will have a minimum volume of 29.6 m^3. The outflow through the cistern will be controlled though a vortex ICD – John Meunier 40SVHV-1. The peak volume and stage, reached in the cistern during the 100-yr event, are 26 m^3 and 1.614 m, respectively. The peak discharge is 1.9 L/s; therefore, the vortex ICD meets the average allowable outflow rate of 2.45 L/s.

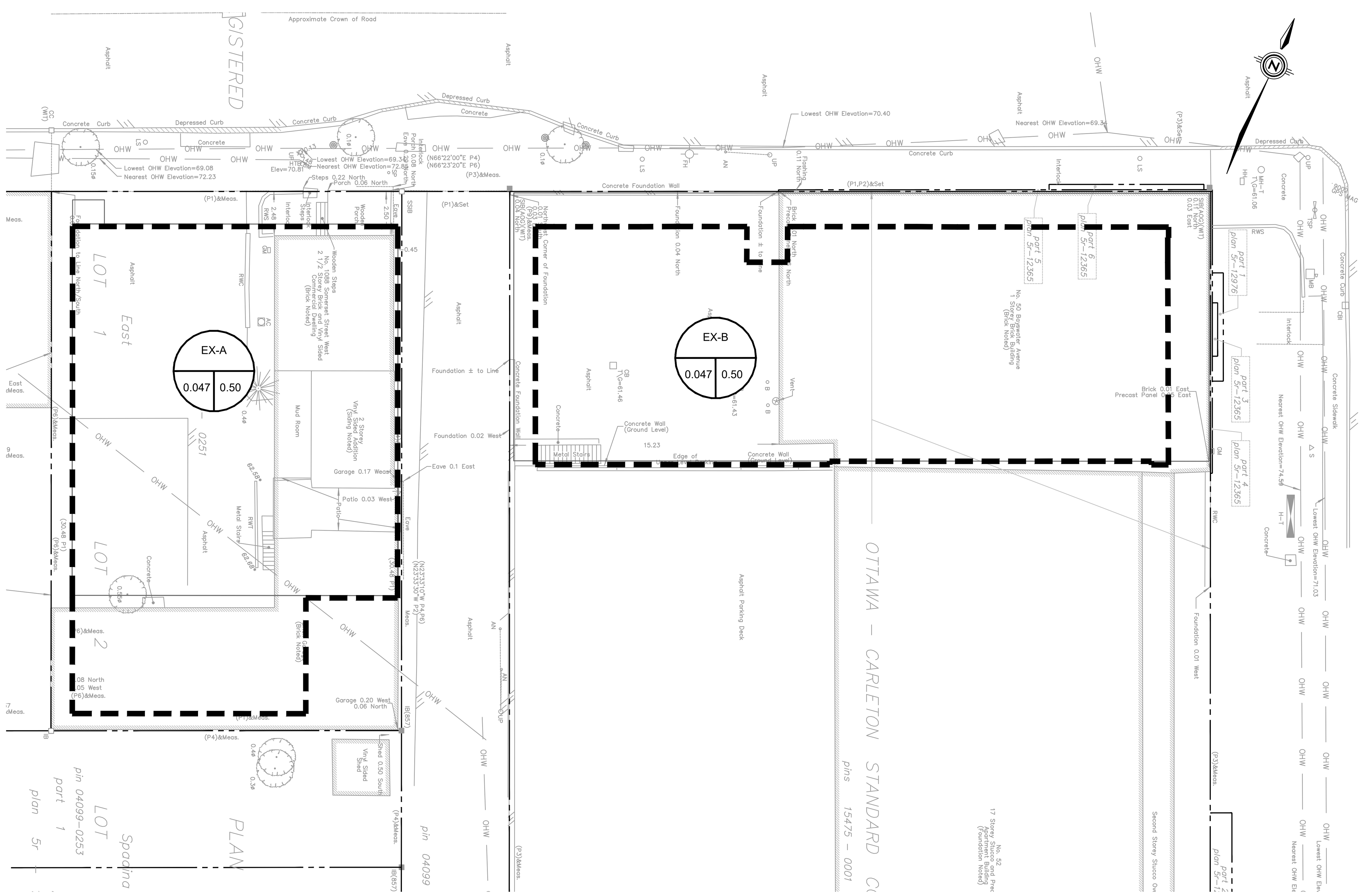
Runoff collected from the roof of 50 Bayswater Avenue, will be collected in a cistern. The cistern will have a minimum volume of 34.65 m^3. The outflow through the cistern will be controlled though a vortex ICD – John Meunier 40SVHV-1. The peak volume and stage, reached in the cistern during the 100-yr event, are 28 m^3 and 1.311 m, respectively. The peak discharge is 1.7 L/s; therefore, the vortex ICD meets the average allowable outflow rate of 2.45 L/s.

This report demonstrates that the proposed SWM strategy will address stormwater management related impacts from this project and meet the requirements of the City of Ottawa.

BIBLIOGRAPHY

— Ottawa Sewer Design Guidelines, City of Ottawa, SDG002, October 2012. (OSDG 2012).

Exhibits



1 C005 EXISTING STORM DRAINAGE AREA PLAN
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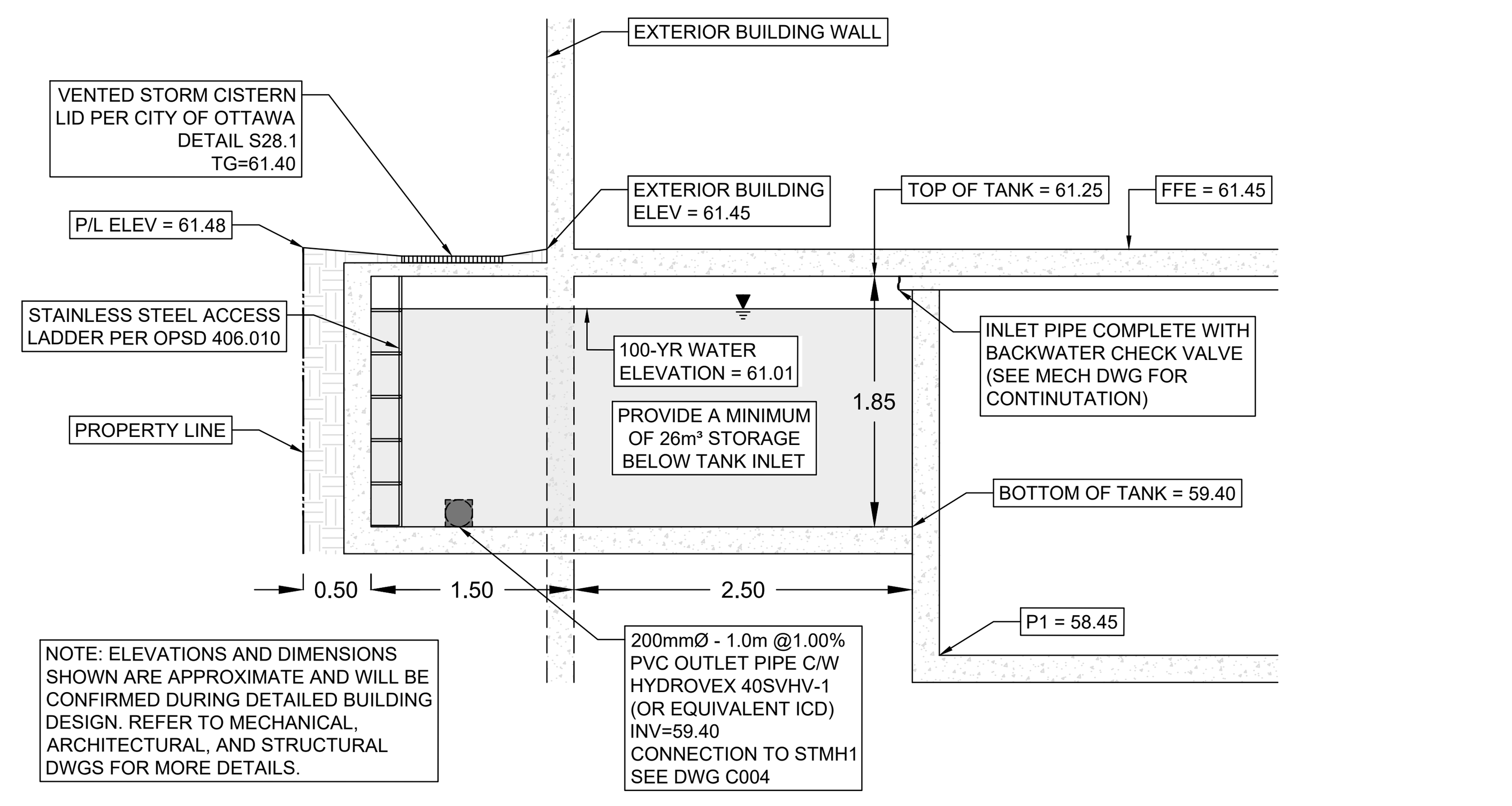
SCALE: 1:200



3 C005 BUILDING A - SWM TANK DETAIL
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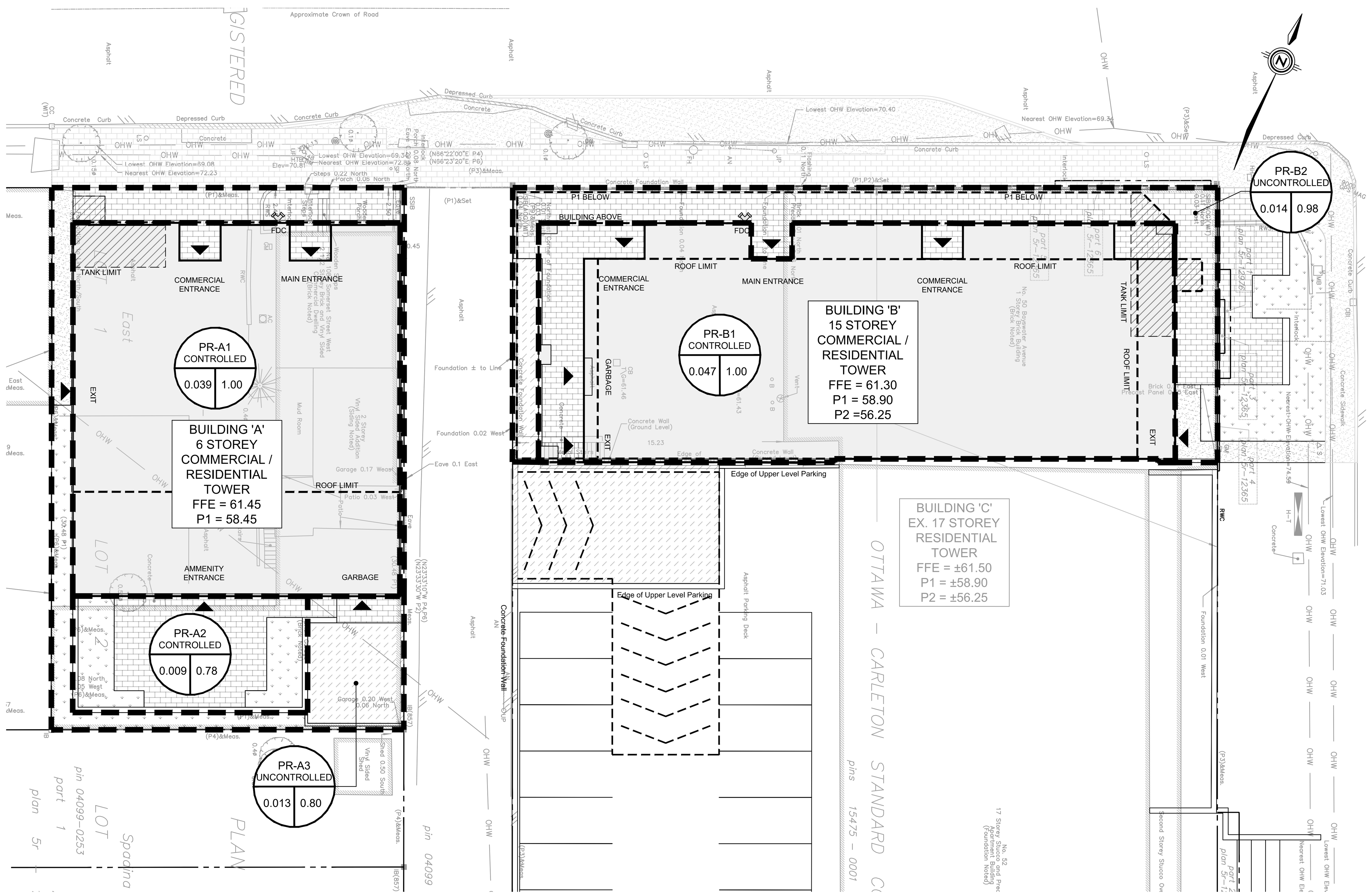
SCALE: 1:50



2 C005 PROPOSED STORM DRAINAGE AREA PLAN
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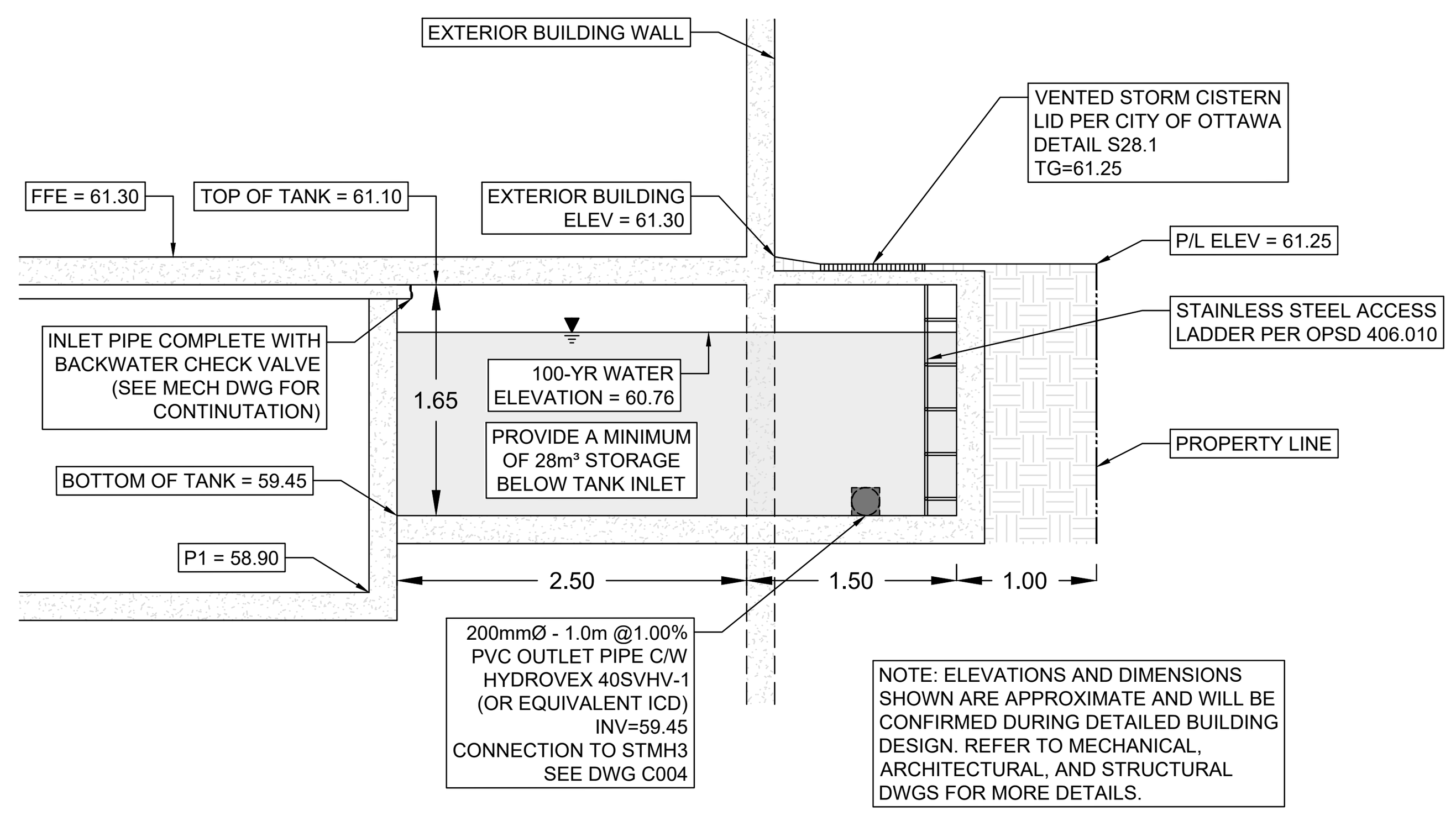
SCALE: 1:200



4 C005 BUILDING B - SWM TANK DETAIL
SCALE / ÉCHELLE = 1:50

0 1m 5m
SCALE: 1:50

rla/architecture

RENFROE LAND MANAGEMENT

REV	DATE	DESCRIPTION	BY
1	2024-08-07	ISSUED FOR SITE PLAN APPLICATION	SM

SEAL:
LICENSED PROFESSIONAL ENGINEER
D. B. YANG
100230568
2024-08-07
PROVINCE OF ONTARIO

ORIGINAL SCALE: VARIES
DATE: 2024-08-07
DESIGNED BY: SM
DRAWN BY: SM
APPROVED BY: WY
IF THIS BAR IS NOT 25mm LONG, ADJUST YOUR PLOTTING SCALE.
25mm
DISCIPLINE: CIVIL

wsp
WSP CANADA INC.
2611 QUEENSVIEW DRIVE, SUITE 300
OTTAWA ONTARIO K2B 8K2 CANADA
WSP.COM

PROJECT NUMBER: CA0003875.9802

CLIENT:
RENFROE LAND MANAGEMENT

CLIENT REF. #:

PROJECT:
50 BAYSWATER AVENUE & 1088 SOMERSET STREET W

TITLE:
STORMWATER MANAGEMENT PLAN AND DETAILS

DRAWING NUMBER: C005
REV.: 1

FILE: x:\10-13 mr 2023 projects\ca0003875.9802-ca-50 bayswater street and 1088 somerset avenue\14.0 tech_prof services\14.60_civil\3. drawings\working drawings\ca0003875.9802_c.dwg
CTB: wsp_ottawa.ctb
PLOTTED: 2024-08-07 - 1:11 PM

APPENDIX

A Correspondence

File No.: PC2023-0208

David Renfroe
2-371 Richmond Road
Ottawa, ON
K2L 1Y3

Via email: davidrenfroe@outlook.com

Subject: **Pre-Consultation: Meeting Feedback**
Proposed Official Plan Amendment, Zoning By-law Amendment and Site Plan Control Applications – 50 Bayswater Avenue and 1088 Somerset Street W.

Please find below information regarding next steps as well as consolidated comments from the above-noted pre-consultation meeting held on August 24, 2023.

Pre-Consultation Preliminary Assessment

1 ☐	**2** ☐	**3** ☒	**4** ☐	**5** ☐

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

Next Steps

1. A review of the proposal and materials submitted for the above-noted pre-consultation has been undertaken. Please proceed to complete a Phase 2 Pre-consultation Application Form and submit it together with the necessary studies and/or plans to planningcirculations@ottawa.ca.
2. In your subsequent pre-consultation submission, please ensure that all comments or issues detailed herein are addressed. A detailed cover letter stating how each issue has been addressed must be included with the submission materials. Please coordinate the numbering of your responses within the cover letter with the comment number(s) herein.
3. Please note, if your development proposal changes significantly in scope, design, or density before the Phase 3 pre-consultation, you may be required to complete or repeat the Phase 2 pre-consultation process.

Supporting Information and Material Requirements

4. The attached **Study and Plan Identification List** outlines the information and material that has been identified, during this phase of pre-consultation, as either required (R) or advised (A) as part of a future complete application submission.

   a. The required plans and studies must meet the City's Terms of Reference (ToR) and/or Guidelines, as available on Ottawa.ca. These ToR and Guidelines outline the specific requirements that must be met for each plan or study to be deemed adequate.

Consultation with Technical Agencies

5. You are encouraged to consult with technical agencies early in the development process and throughout the development of your project concept. A list of technical agencies and their contact information is enclosed.

Planning (Jean-Charles Renaud / John Bernier / Adrian van Wyk)

Application requirements:

6. It is anticipated that the current proposal will require Official Plan Amendment, Zoning By-law Amendment and Site Plan Control applications.
7. These are two properties with two different types of development. The buildings should be looked at as separate entities but can be combined for a **single ZBA application** (assuming both are under the same ownership). Separate Planning Rationales should be provided for each of the properties, or the Planning Rationale divided into two sections.
8. A boundary adjustment to the Wellington Street West Secondary Plan to capture 1088 Somerset Street West within its area will not be required.
9. Staff's preliminary assessment of the proposal indicates that the Official Plan Amendment application should only seek to amend the Secondary Plan (not the parent Official Plan). Staff still encourage the Planning consultant to confirm this assessment.

General:

10. The properties are currently zoned TM11 and R4UB (part of 1088 Somerset Street W.).

11. Per Schedule A of the Official Plan, the subject properties are located in the Inner Urban Transect. They are designated Minor Corridor per Schedule B. Building heights within this area are intended to be low-rise and mid-rise, with a minimum height of two storeys and a maximum height of six storeys per Table 7.

12. The properties are located in the Wellington Street West Secondary Plan area and are designated Mainstreet under that plan. They are located in the Somerset Square Park Policy Area. The Secondary Plan contemplates a maximum building height of six storeys or 20m, except where identified in a site-specific policy developed in accordance with Subsection 11.6, Policy 15 of the OP, for buildings within the Mainstreet designation.

13. 6-storey mixed-use building - policies within the Secondary Plan that support mid-rise buildings that have appropriate transition in height and includes retail/commercial at grade.

14. 15-storey rental building - which is not supported by the Secondary Plan.

    a. Instead, it will need to hinge on being an appendage of the existing 16-storey building and a background building in relation to the lands meant as the gateway.

    b. At-grade commercial is not required but is encouraged.

15. Attention should be paid to Subsection 2.1, Policy 5 of the Secondary Plan with respect to sidewalks and plazas. Upgrades to the public realm along Wellington Street West should be provided as part of this proposal. ROW streetscape needs to be further developed. Presently there is a lot of hardscape being proposed/existing.

16. **Angular Plane**: Please elaborate on how this is being addressed or, if not, why not. The angular plane will be a more significant topic of conversation considering that the transition to the R4 zone would be occurring within a zone currently zoned R4 (to be rezoned to TM11).

17. **Public Lane Access**: Please describe how this will function, as the Streetview imagery seems to indicate that turning and vertical clearance within the area may be difficult.

18. **More bike parking**: As is typical for urban developments, it will be expected that bike parking be provided at a rate of *at least* 1:1, and this increased rate will make part of the site-specific zoning exception provisions. Current project stats show an abundance of vehicular parking, which could be reduced to accommodate additional bicycle parking.

19. **Existing height at 50 Bayswater**: The existing tower benefits from legal non-complying rights, and that this may have an impact on the zoning relief being sought.

20. **Underground parking garage**: Portions of the drive-aisle appear to be less than 3.6m. With pillars throughout and a tight area, this space appears to be less than functional.

21. **Heritage assets:** Please take note that there are several listed heritage properties abutting/opposite the properties, and these should be considered in your analysis.

Building A:

22. Consider a controlled pedestrian access from the laneway to protect the at-grade amenity area.

Building B:

23. This is generally viewed as an improvement, as it will cap the existing building and remove a large blank wall from view of Somerset Street.
24. Traditional main street elements in terms of scale and detail/village character are not being communicated in the present design, specifically architectural articulation, treatment and details to form a two- to three-storey base. Some refinement is encouraged to help relate the new buildings better to their context.
25. Scope of plans needs to be expanded to include the Bayswater ROW and existing building and for further examination as to how this will affect the adjacent high-rise.
26. Please clarify the proposed parking arrangement, as it is not clear from existing floor plans.

Urban Design (Randolph Wang)

Submission requirements:

27. Urban design supports including the designs of the two separate sites in one package. Therefore, the required urban design materials and studies, such as the site plan, landscape plan, the shadow and wind studies can be combined. For readability purpose, floor plans and elevation drawings for each building may be presented separately.
28. Urban Design Brief. Please see attached customized Terms of Reference to guide the preparation. Here are a few highlights:
    a. The Urban Design Brief should be structured by generally following the headings highlighted under Section 3 – Contents of these Terms of Reference.
    b. It is extremely important to study and demonstrate built form transition between the proposed development, particularly the high-rise element, and the adjacent low-rise neighbourhood.

c. Given the complex situation with parking design, it is important to include sufficient materials, including detailed section drawings, to illustrate how the structure functions.

d. Please note that Urban Design Brief will also serve as the submission to the Urban Design Review Panel (see notes below).

29. Please refer to relevant Terms of Reference available on the City's website (Planning application submission information and materials | City of Ottawa) to prepare additional drawings and studies required.

UDRP review and report:

30. The sites are in a Design Priority Area. The proposed developments will be subject to UDRP review. The UDRP review will occur in the preconsultation stage. Please contact udrp@ottawa.ca for scheduling details.

31. The submission of a UDRP report is a requirement for deeming an application complete. The Terms of Reference of the UDRP report can be find in this link.

Comments on the Preliminary Design:

32. Attention to the need for a more generous pedestrian realm along Somerset and the provision of building setback is appreciated.

33. The approach to dealing with the site constraints, including the topography, the lot configurations, and the existence on site infrastructure such as parking ramps, etc., are appreciated.

34. With respect to building height, massing, and transition,

a. It is extremely important to ensure appropriate transition between the high-rise building, and the adjacent low-rise areas. Please review Urban Design Guidelines for High-Rise Buildings and use angular planes and appropriate separations to guide decision-making.

b. Equally important is to study shadow and wind impacts on public realm and private amenity spaces and to use these studies to guide built form design.

c. In the absence of the above-mentioned evidence and analysis, it is hard to tell if the proposed building massing and height are appropriate.

d. It is appreciated, however, the proposed development can improve the existing conditions on the sites.

35. With respect to built form design,

a. Expression of a one-storey base is appropriate in this context. It is also in keeping with policies of the Community Design Plan and the Secondary Plan.

b. However, the one-storey base should be achieved through building setback instead of change of material on the same plane.

c. Please study the three-dimensional effects of the datum line and building setback on the tower in both the existing and planned context. The current concept, which locates the datum line and sets the building back on the 14th floor, might make sense by looking at the elevation drawing without context. However, it might be appropriate to locate the datum line and have the setback on approximately the 10th floor (ceiling of 9th floor) within the context of the Community Design Plan and the Secondary Plan and the recent approved project at 961-969 Wellington Street (see Image 1).

36. With respect to public realm and ground floor,

a. More generous building setback at the Somerset-Bayswater corner behind the column may be required. Please explore landscaping design options. The small space behind the column shown on the preliminary concept does not feel comfortable (see Image2, item a).

b. Consider recessing the commercial entrance to ensure the positive effects of the building setbacks will not be canceled by the out-swing doors (see Image 2, item b).

c. Similarly, consider recessing the residential entrance of the 6-storey building (see Image 2, item c).

d. Please study the impacts of the two columns at the entrance of the public lane on vehicular movements (see Image 2, item d).

37. With respect to building design, please be mindful of the context. The architecture of the buildings should be reflective of the characteristics and scale of a traditional neighbourhood Mainstreet rather than conditions of downtown or a TOD node in a new developing community.

38. With respect to the design of the high-rise building,

a. Please be mindful of the relationship between the existing tower and the proposed tower. Because building floors of the two towers do not line up. Efforts should be made to avoid awkward conditions between balconies (see Image 3, item a).

b. Considerations should be given to extending the 1-storey base so that can wrap the corner instead of stopping at the corner (see Image 3, item b).

39. With respect to the design of the mid-rise building,

a. Please carefully study the relationship with and impacts on the new low-rise apartment building at 9 Spadina. Please be mindful that part of the proposed building overlaps with the rear yard of the low-rise apartment (see Image 4, item a).

b. Please carefully study the relationship with the commercial building at 1092 Somerset to ensure the new development won't overwhelm the existing building (see Image 4, item b).

c. Considerations should be given to introducing a datum line and building setback on the 5th floor (see Image 1).

40. Consider different façade treatment for the mid-rise building. The tower and the middle rise building does not have to be treated the same resulting in the perception of an overwhelming sale of the same architecture. Different treatments will contribute to maintaining the eclectic character of the Mainstreet.

Engineering (Mohammed Fawzi / Amy Whelan)

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

Water Quantity Control: In the absence of area specific SWM criteria please control post-development runoff from the subject site, up to and including the **100-year storm event**, to **a pre-development level of 2-year.** The pre-development runoff coefficient will need to be determined **as per existing conditions** but in no case more than 0.5. [**If 0.5 applies it needs to be clearly demonstrated in the report that the pre-development runoff coefficient is greater than 0.5**]. The time of concentration (T_c) used to determine the pre-development condition should be calculated.

Tc should not be less than 10 min. since IDF curves become unrealistic at less than 10 min; T_c of 10 minutes shall be used for all post-development calculations].

Any storm events greater than the established 2**-year allowable** release rate, up to and including the **100-year storm event**, shall be detained on-site. The SWM measures required to avoid impact on downstream sewer system will be subject to review.

Water Quality Control: Not required if there will be no surface drainage capture/control infrastructure such as a catch basin, catch basin with ICD.

Please see below for additional sewer and stormwater requirements:

a. Document how any foundation drainage system will be integrated into the servicing design and show the positive outlet on the plan. Foundation drainage is to be independently connected to sewer main unless being pumped with appropriate back up power, sufficient sized pump and back flow prevention. It is recommended that the foundation drainage system be drained by a sump pump connection to the storm sewer to minimize

risk of basement flooding as it will provide the best protection from the uncontrolled sewer system compared to relying on the backwater valve.

b. Please note that the minimum orifice dia. for a plug style ICD is 83mm and the minimum flow rate from a vortex ICD is 6 L/s in order to reduce the likelihood of plugging.

c. Please provide a Pre-Development Drainage Area Plan to define the pre-development drainage areas/patterns. Existing drainage patterns shall be maintained and discussed as part of the proposed SWM solution.

d. Post-development site grading shall match existing property line grades in order to minimize disruption to the adjacent residential properties. A **topographical plan of survey** shall be provided as part of the submission and a note provided on the plans.

e. There must be at least **15cm of vertical clearance** between the spill elevation and the ground elevation at the building envelope that is in proximity of the flow route or ponding area. The exception in this case would be at reverse sloped loading dock locations. At these locations, a minimum of 15cm of vertical clearance must be provided below loading dock openings. Ensure to provide discussion in report and ensure grading plan matches if applicable.

f. **Underground Storage:** Please note that the Modified Rational Method for storage computation in the Sewer Design Guidelines was originally intended to be used for above ground storage (i.e., parking lot) where the change in head over the orifice varied from 1.5 m to 1.2 m (assuming a 1.2 m deep CB and a max ponding depth of 0.3 m). This change in head was small and hence the release rate fluctuated little, therefore there was no need to use an average release rate.

g. When underground storage is used, the release rate fluctuates from a maximum peak flow based on maximum head down to a release rate of zero. This difference is large and has a significant impact on storage requirements. **We therefore require that an average release rate equal to 50% of the peak allowable rate shall be applied to estimate the required volume. Alternatively, the consultant may choose to use a submersible pump in the design to ensure a constant release rate.**

h. If there is a disagreement from the designer regarding the required storage, the City will require that the designer demonstrate their rationale utilizing dynamic modelling, that will then be reviewed by City modellers in the Water Resources Group.

i. Provide information on type of underground storage system including product name and model, number of chambers, chamber configuration, confirm invert of chamber system, top of chamber system, required cover over system and details, interior bottom slope (for self-cleansing), chart of storage values, length, width and height, capacity, entry ports

(maintenance) etc. UG storage to provide actual 2- and 100-year event storage requirements.

j. In regard to all proposed UG storage, ground water levels (and in particular HGW levels) will need to be reviewed to ensure that the proposed system does not become surcharged and thereby ineffective.

k. Modeling can be provided to ensure capacity for both storm and sanitary sewers for the proposed development by City's Water Distribution Dept. – Modeling Group, through PM and upon request.

l. If rooftop control and storage is proposed as part of the SWM solutions sufficient details (Cl. 8.3.8.4) shall be discussed and document in the report and on the plans. Roof drains are to be connected downstream of any incorporated ICDs within the SWM system and not to the foundation drain system. Provide a Roof Drain Plan as part of the submission.

m. Street catch basins are not to be located at any proposed entrances.

42. Water Boundary condition requests must include the location of the service (map or plan with connection location(s) indicated) and the expected loads required by the proposed development, including calculations. Please provide the following information:

a. Location of service

b. Type of development and the amount of fire flow required (as per FUS).

c. Average daily demand: ___ l/s.

d. Maximum daily demand: ___l/s.

e. Maximum hourly daily demand: ___ l/s.

43. **Water**

A 203 mm dia. PVC watermain (2011) is available within Sommerset Street**.**

A 203 mm dia. DI watermain (1990) is available within Bayswater Avenue**.**

a. Water Supply Redundancy: Residential buildings with a basic day demand greater than 50m3/day (0.57 L/s) are required to be connected to a minimum of two water services separated by an isolation valve to avoid a vulnerable service area as per the Ottawa Design Guidelines - Water Distribution, WDG001, July 2010 Clause 4.3.1 Configuration. The basic day demand for this site not expected to exceed 50m3/day.

b. Please review Technical Bulletin ISTB-2018-02, maximum fire flow hydrant capacity is provided in Section 3 Table 1 of Appendix I. A hydrant coverage figure shall be provided and demonstrate there is adequate fire protection for the proposal. Two or more public hydrants are anticipated to be required to handle fire flow.

c. Existing residential service to be blanked at the main.

44. **Sewer (sanitary and storm)**

A 300 mm dia. CONC Storm sewer (1991) is available within Sommerset Street**.**

A 300 mm dia. CONC Sanitary sewer (1991) is available within Sommerset Street**.**

A 375 mm dia. CONC Storm sewer (1990) is available within Bayswater Avenue**.**

A 300 mm dia. CONC Sanitary sewer (1990) is available within Bayswater Avenue**.**

a. **Capacity – Please provide proposed sanitary demands to verify for any capacity constraints.**

b. A storm sewer monitoring maintenance hole is required to be installed at the property line (on the private side of the property) as per City of Ottawa Sewer-Use By-Law 2003-514 (14) Monitoring Devices.

c. Sanitary sewer monitoring maintenance hole is required to be installed at the property line (on the private side of the property) as per City of Ottawa Sewer-Use By-Law 2003-514 (14) Monitoring Devices.

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

   i. Std Dwg S11.1 for flexible main sewers – connections made using approved tee or wye fittings.

   ii. Std Dwg S11 (For rigid main sewers) – lateral must be less that 50% the diameter of the sewermain,

   iii. Std Dwg S11.2 (for rigid main sewers using bell end insert method) – for larger diameter laterals where manufactured inserts are not available; lateral must be less that 50% the diameter of the sewermain,

   iv. Connections to manholes permitted when the connection is to rigid main sewers where the lateral exceeds 50% the diameter of the sewermain. – Connect obvert to obvert with the outlet pipe unless pipes are a similar size.

   v. No submerged outlet connections.

45. **Grading**

Post-development site grading shall match existing property line grades to minimize disruption to the adjacent residential properties. A **topographical plan of survey** shall be provided as part of the submission and a note provided on the plans.

46. **Corner Site Triangle**

A corner site triangle is required at the intersection of Somerset Street West and Bayswater Avenue. Please note that no infrastructure is permissible within the

limits of the site triangle, this includes the foundation of the underground parking garage.

47. **Geotechnical (including sensitive marine clay, where appropriate)**

Geotechnical Study shall be consistent with the Geotechnical Investigation and Reporting Guidelines for Development Applications.
https://documents.ottawa.ca/sites/default/files/documents/cap137602.pdf

48. **Snow Storage**

Any portion of the subject property which is intended to be used for permanent or temporary snow storage shall be as shown on the approved site plan and grading plan. Snow storage shall not interfere with approved grading and drainage patters or servicing. Snow storage areas shall be setback from the property lines, foundations, fencing or landscaping a minimum of 1.5m. Snow storage areas shall not occupy driveways, aisles, required parking spaces or any portion of a road allowance. If snow is to be removed from the site please indicate this on the plan(s).

49. **Road Reinstatement**

Where servicing involves three or more service trenches, either a full road width or full lane width 40 mm asphalt overlay will be required, as per amended Road Activity By- Law 2003-445 and City Standard Detail Drawing R10. The amount of overlay will depend on condition of roadway and width of roadway(s).

50. **Gas pressure regulating station**

A gas pressure regulating station may be required depending on HVAC needs (typically for 12+ units). Be sure to include this on the Grading, Site Servicing, SWM and Landscape plans. This is to ensure that there are no barriers for overland flow routes (SWM) or conflicts with any proposed grading or landscape features with installed structures and has nothing to do with supply and demand of any product.

51. **Phase One Environmental Site Assessment**

a. A Phase I ESA is required to be completed in accordance with Ontario Regulation 153/04 in support of this development proposal to determine the potential for site contamination. Depending on the Phase I recommendations a Phase II ESA may be required.

b. The Phase I ESA shall provide all the required Environmental Source Information as required by O. Reg. 153/04. ERIS records are available to public at a reasonable cost and need to be included in the ESA report to comply with O.Reg. 153/04 and the Official Plan. The City will not be in a position to approve the Phase I ESA without the inclusion of the ERIS reports.

c. Official Plan Section 10.1.6

d. Record of Site Condition (RSC) will be required based on the information provided in the Phase I ESA.

52. **Exterior Site Lighting**

Any proposed light fixtures (both pole-mounted and wall mounted) must be part of the approved Site Plan. All external light fixtures must meet the criteria for Full Cut-off Classification as recognized by the Illuminating Engineering Society of North America (IESNA or IES), and must result in minimal light spillage onto adjacent properties (as a guideline, 0.5 fc is normally the maximum allowable spillage). In order to satisfy these criteria, the please provide the City with a **Certification (Statement) Letter** from an acceptable professional engineer stating that the design is compliant.

53. **General**

a. It is the sole responsibility of the consultant to investigate the location of existing underground utilities in the proposed servicing area and submit a request for locates to avoid conflict(s). The location of existing utilities and services shall be documented on an **Existing Conditions Plan**.

b. Any easements on the subject site shall be identified and respected by any development proposal and shall adhere to the conditions identified in the easement agreement. A **legal survey plan** shall be provided, and all easements shall be shown on the engineering plans.

c. All underground and above ground building footprints and permanent walls need to be shown on the plans to confirm that any permanent structure does not extend either above or below into the existing property lines and sight triangles.

d. **Construction approach** – Please contact the Right-of-Ways Permit Office TMconstruction@ottawa.ca early in the Site Plan process to determine the ability to construct site and copy File Lead on this request.

54. **Noise**

a. A **Transportation Noise Assessment** is required as the subject development fronts an arterial road and a collector road.

b. A **Stationary Noise Assessment** is required to assess the noise impact of the proposed sources of stationary noise (mechanical HVAC system/equipment) of the development onto the surrounding residential area to ensure the noise levels do not exceed allowable limits specified in the City Environmental Noise Control Guidelines.

c. **Detailed Noise Study** in Support of Class 1 Designation that verifies applicable sound level limits will be met at the new noise sensitive land use with the appropriate mitigation measures for all noise sources to achieve a Class 1 designation to include in Appendix A of Part 1 of the ENCG, pursuant to the ENCG and NPC-300.

Feel free to contact Mohammed Fawzi, Infrastructure Project Manager, for follow-up questions.

Transportation (Wally Dubyk)

55. Please review the revised TIA Guidelines, and revised Screening, and resubmit the Screening Form.

56. *The following documents the process conducted for the Traffic Impact Assessment (TIA) Guidelines review and the recommended changes to the guidelines to maximize the likelihood of meeting the review timelines associated with Bill 109.*

    Revisions to Traffic Impact Assessment Guidelines (ottawa.ca).

    City of Ottawa TIA Guidelines Certification and Screening Form.

57. The consultant is to address how they plan to enable and encourage travel by sustainable modes (i.e. to make walking, cycling, transit, carpooling and telework more convenient, accessible, safe and comfortable). Please complete the City of Ottawa's *TDM Measures Checklist*.

58. Bayswater Avenue is designated as a Collector Road. There are no additional protected ROW limits within this area identified in the OP.

59. Somerset Street W is designated as an Arterial Road. There are no additional protected ROW limits within this area identified in the OP.

60. The City of Ottawa Zoning By-Law Corner Sight Triangles (Sec. 57) states that no obstruction to the vision of motor vehicle operators higher than 0.75 metres above grade. Please ensure that the existing flowering bush at the corner of Somerset Street W and Bayswater Avenue is not higher than 0.75 metres. The consultant should review the sight distance at the corner and any obstructions that may hinder the view of the driver.

61. Permanent structures such as curbing, stairs, retaining walls, and underground parking foundation also bicycle parking racks are not to extend into the City's right-of-way limits.

62. The Owner shall be required to enter into maintenance and liability agreement for all pavers, plant and landscaping material placed in the City right-of-way and the Owner shall assume all maintenance and replacement responsibilities in perpetuity.

63. Bicycle parking spaces are required as per Section 111 of the Ottawa Comprehensive Zoning By-law. Bicycle parking spaces should be in safe, secure places near main entrances and preferably protected from the weather.

64. The Owner is responsible for identifying the type and location of existing signage that will be removed from within the Right-of-Way to accommodate the development site. The Owner is responsible for providing the General Manager with a detailed drawing identifying the type and position of the existing signs and roadway pavement markings along the site frontage.

65. Should the property Owner wish to use a portion of the City's Road allowance for construction staging, prior to obtaining a building permit, the property Owner must obtain an approved Traffic Management Plan from the Manager, Traffic Management, Transportation Services Department. The city has the right for any reason to deny use of the Road Allowance and to amend the approved Traffic Management Plan as required.

Proposed Revisions to TIA Guidelines

These changes are minor and administrative in nature and the update is recommended to be completed by staff under By-law No. 2016-369.

Revisions to Step 1 – Screening

The screening step acts as the initial assessment to determine whether a TIA is required for the proposed development. In order to reduce the number of developments that would require a TIA, we recommend the following simplified process:

- If the development meets any one of the criteria below, a TIA is initiated:
  - If the development generates 60 person-trips or more;
  - If the development is located in a Location Trigger; or
  - If the development has a Safety Trigger.
- Update to Table 2: Trip Generation Trigger

Land Use Type	Minimum Development Size (60 trips)
Single-Detached[1]	60 units
Multi-Use Family (Low-Rise)	90 units
Multi-Use Family (High-Rise)	150 units
Office[2]	1,400 m²
Industrial[2]	7,000 m2
Fast-food restaurant or coffee shop[2]	110 m2
Destination retail[2]	1800 m2
Gas station or convenience market[2]	90 m2

[1]Table 2, Table 3 & Table 4 TRANS Trip Generation Manual

[2]ITE Trip Generation Manual 11.1 Ed.

- Update to Module 1.3 Location Triggers
  - Adding Hubs to the list of locations is recommended to be considered for Module 1.3 Location Trigger given their function to accommodate a diversity of functions, higher density development, and greater degree of mixed-uses and public transportation service. Hubs are identified as Protected Major Transit Station Areas (PMTSAs) and identified in Schedule C1-Protected Major Transit Station Areas (PMTSA). Refer to Schedules C7-A, C7-B, and C1.

- Replacing Spine Bicycle Networks with Cross Town Bikeways is recommended to be consistent with the 2024 Transportation Master Plan.

Revisions to Step 2 - Scoping

- Reorganized to include 3.1 Development-generated Travel Demand as scope of the TIA will be determined by mode share.
- Remove all exemptions.

Recommended reorganization:

Step 2 – Scoping - Modules and Triggers		
Site Design and TDM Modules		
4.1	Development Design	
4.1.1	Design for Sustainable Modes	All
4.1.2	Circulation and Access	All
4.1.3	New Street Networks	All subdivisions
4.2	Parking	
4.2.1	Parking Supply Include language that asks for justification of change to Zoning By-law parking requirements	All
4.3	Boundary Street Design	All
4.5	TDM	
4.5.1	Context for TDM	All
4.5.2	Need and Opportunity	All
4.5.3	TDM Program	All
Network Impact Modules		
Note - only require Network Demand Forecasting Modules (3.2 + 3.3) if one or more of these modules are triggered		

Step 2 – Scoping - Modules and Triggers		
4.6	~~Neighbourhood Traffic Management~~ Rename: Neighbourhood Traffic Calming* *Note: the NTC module will be reviewed in detail in the next comprehensive update of the TIA Guidelines*	If the development meets all of the following criteria: 1. Access to Collector or Local; 2. "Significant sensitive land use presence" exists, where there is at least two of the following adjacent to the subject street segment: ○ School (within 250m walking distance); ○ Park; ○ Retirement / Older Adult Facility (i.e. long-term care and retirement homes); ○ Licenced Child Care Centre; ○ Community Centre; or ○ 50%, or greater, of adjacent property is occupied by residential lands and a minimum of 10 occupied residential units are present on subject street segment. 3. Application is not Site Plan; 4. 75 site auto trips; 5. Site Trip Infiltration is expected.
4.7		Transit
4.7.1	Transit Route Capacity	> 75 site transit trips
4.7.2	Transit Priority Requirements	> 75 site auto trips
4.8	Network Concept	Site trips > by 200 persons
4.9		Intersection Design
4.9.1	Intersection Controls (including site accesses)	> 75 site auto trips
4.9.2	Intersection Design	> 75 site auto trips
Deleted and Combined Modules		
4.2.2	Spillover Parking	Deleted due to low impact on the development and surrounding network.
4.4.1	Access Location and Design	Location reviewed in Scoping Design reviewed in 4.9
4.4.2	Access Control	Reviewed in 4.9.1
4.4.3	Access Design	Reviewed in 4.9.2

Note that the City of Ottawa reserves the right to determine the scope of any TIA study based on its professional judgement despite these guidelines, meaning that staff can change the scope based on their understanding of the development context.

Feel free to contact Wally Dubyk, Transportation Project Manager, for follow-up questions.

Environment and Forestry (Mark Elliott / Mark Richardson)

66. **The following Tree Conservation Report (TCR) requirements have been adapted from the Schedule E of the Urban Tree Protection Guidelines**

a. A Tree Conservation Report (TCR) must be supplied for Site Plan Control review along with the suite of other plans/reports required by the City

i. an approved TCR is a requirement of Site Plan approval.

ii. The Planning Forester suggests that one is provided with any rezoning application

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

c. The TCR must contain 2 separate plans:

i. Plan/Map 1 - show existing conditions with tree cover information

ii. Plan/Map 2 - show proposed development with tree cover information

iii. Please ensure retained trees are shown on the landscape plan

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

i. for ease of review, the Planning Forester suggests that all trees be numbered and referenced in an inventory table

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

i. Compensation may be required for the removal of city owned trees.

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

g. All retained trees must be shown, and all retained trees within the area impacted by the development process must be protected as per City guidelines available at Tree Protection Specification or by searching Ottawa.ca

h. The location of tree protection fencing must be shown on the plan

i. Show the critical root zone of the retained trees

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

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

67. **Planning Forester Landscape Plan tree planting requirements:**

a. Please ensure any retained trees are shown on the LP

b. Minimum Setbacks

i. Maintain 1.5m from sidewalk or MUP/cycle track or water service laterals.

ii. Maintain 2.5m from curb

iii. Coniferous species require a minimum 4.5m setback from curb, sidewalk or MUP/cycle track/pathway.

c. Maintain 7.5m between large growing trees, and 4m between small growing trees. Park or open space planting should consider 10m spacing, except where otherwise approved in naturalization / afforestation areas. Adhere to Ottawa Hydro's planting guidelines (species and setbacks) when planting around overhead primary conductors.

d. Tree specifications

i. Minimum stock size: 50mm tree caliper for deciduous, 200cm height for coniferous.

ii. Maximize the use of large deciduous species wherever possible to maximize future canopy coverage

e. Tree planting on city property shall be in accordance with the City of Ottawa's Tree Planting Specification; and if possible include watering and warranty as described in the specification.

f. No root barriers, dead-man anchor systems, or planters are permitted.

g. No tree stakes unless necessary (and only 1 on the prevailing winds side of the tree)

h. Hard surface planting

i. If there are hard surface plantings, a planting detail must be provided

ii. Curb style planter is highly recommended

iii. No grates are to be used and if guards are required, City of Ottawa standard (which can be provided) shall be used.

iv. Trees are to be planted at grade

i. Soil Volume - Please demonstrate as per the **Landscape Plan Terms of Reference** that the available soil volumes for new plantings will meet or exceed the following:

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

j. It is suggested that the proposed species list include a column listing the available soil volume.

k. Sensitive Marine Clay

   i. Please follow the City's 2017 Tree Planting in Sensitive Marine Clay guidelines

l. The City requests that consideration be given to planting native species wherever there is a high probability of survival to maturity.

m. Efforts shall be made to provide as much future canopy cover as possible at a site level, through tree planting and tree retention. The Landscape Plan shall show/document that the

68. **Significant environmental features**

None present

69. **Species at risk**

None present

70. **Environmental impact statements**

No triggers on or nearby site, no EIS required.

71. **Bird-Safe Design Guidelines**

As the proposed design is above the 4-storey trigger, the buildings will have to incorporate mitigation measures from the Bird Safe Design Guidelines. In particular, large expanses of glazing should be avoided and 90% all glass panels and glazing 16m or below will have to incorporate bird safe standards for reflectivity and/or transparency. The glass panels on the patios are also a major design trap that should be avoided. The all-glass corners are also an issue and should be altered to reduce the risk of flythrough.

72. In order to help meet the city's urban canopy, urban heat island, and climate resilience goals (per sections 4.8.2 and 10.3 of the OP), additional plantings are encouraged wherever possible.

Feel free to contact Mark Elliott, Environmental Planner, or Mark Richardson, Forester, for follow-up questions.

Parkland (Kim Baldwin)

Parkland Dedication:

73. Upon review of the site context and surroundings, PFP will be requesting cash-in-lieu of parkland for parkland dedication.

74. The conveyance requirement is to be calculated as per the Parkland Dedication By-law No.2022-280, as amended. Per the By-law (as amended), this proposal would be subject to the following conveyance requirement per use:

    a. For residential uses (res density > 18 units per net hectare): 1 hectare per 1000 dwelling units, not exceeding 10% of the gross land area for sites under 5 hectares.

    b. For commercial uses: 2% of gross land area

    c. Where land is developed for a mix of uses within a building, the required conveyance shall be the cumulative sum for each use, as calculated using the applicable rate prorated proportionally to the gross floor area allocated to each use.

75. PFP will request the following information to confirm and calculate the parkland conveyance requirement:

    a. Gross land area, in square meters

    b. Number of residential units existing/proposed

    c. The proportion of existing commercial/residential development on site.

    d. Gross floor area of proposed residential development

    e. Gross floor area of proposed commercial development

    f. The proportion of proposed commercial/residential development on site.

Somerset Square Park and Community Benefits Charges:

76. We understand that this development will be subject to Community Benefits Charges.

77. The Wellington Street West road segment adjacent to Somerset Square, will be converted into a public realm/ plaza space. This initiative will be partially funded using Section 37 benefits from a nearby development.

78. Similarly, if supported by the City Councillor, City staff could explore potentially converting the Spadina Avenue road segment adjacent to Somerset Square into a public realm/ plaza space. If such closure is were possible, CBC funds collected from this project could go toward funding this initiative.

79. Such public realm/urban plaza enhancements north of and potentially east of Somerset Square could expand cultural and recreation programming opportunities in/around the Park.

Feel free to contact Kimberley Baldwin, Parks Planner, for follow-up questions.

Waste Collection Services (André Laplante)

80. Both garbage room should have a roll up door or service door opening of a minimum 2.2M. The commercial units will need their own garbage room and service. Any pathway leading to the collection point must be 2.2 M wide.

Community Association

81. Has concerns about the transition to the R4 zone – Q: how much of the R4 zone is 6 storey?
    a. A: the front portion is TM zone and rear end is R4 zone.
82. Stepping down and creating terraces – this may help with the transition.
83. This building is on the heritage register – will pass along on the notes.
84. Want loads of bicycle parking spaces – very transit-oriented neighborhood.
85. Biggest issue: transition of the 1088 property.
86. Much better proposal than the previous – have you considered building with strong wood.
    a. 6 storey buildings are allowed to be built in wood.

Other

87. The High Performance Development Standard (HPDS) is a collection of voluntary and required standards that raise the performance of new building

projects to achieve sustainable and resilient design. The HPDS was passed by Council on April 13, 2022.

a. At this time, the HPDS is not in effect and Council has referred the 2023 HPDS Update Report back to staff with direction to bring forward an updated report to Committee with recommendations for revised phasing timelines, resource requirements and associated amendments to the Site Plan Control By-law by no later than Q1 2024.

b. Please refer to the HPDS information attached and ottawa.ca/HPDS for more information.

Submission Requirements and Fees

88. Additional information regarding fees related to planning applications can be found here.

89. The attached **Study and Plan Identification List** outlines the information and material that has been identified as either required (R) or advised (A) as part of a future complete application submission.

    a. The required plans and studies must meet the City's Terms of Reference (ToR) and/or Guidelines, as available on Ottawa.ca. These ToR and Guidelines outline the specific requirements that must be met for each plan or study to be deemed adequate.

90. All of the above comments or issues should be addressed to ensure the effectiveness of the application submission review.

Should there be any questions, please do not hesitate to contact myself or the contact identified for the above areas / disciplines.

Yours Truly,

Jean-Charles Renaud

cc. John Bernier, Adrian van Wyk, Randolph Wang, Mohammed Fawzi, Amy Whelan, Abdul Mottalib, Wally Dubyk, Mark Elliott, Mark Richardson, Kim Baldwin, André Laplante, Sami Rehman (City of Ottawa)

Linda Hoad (Hintonburg Community Association)

Paul, Calvin

From: Manoryk, Spencer
Sent: July 12, 2024 12:43 PM
To: Paul, Calvin
Subject: FW: 50 Bayswater Avenue and 1088 Somerset Street W - SWM Requirements

FYI

From: Fawzi, Mohammed <mohammed.fawzi@ottawa.ca>
Sent: Friday, July 12, 2024 11:59 AM
To: Manoryk, Spencer <Spencer.Manoryk@wsp.com>
Cc: Yang, Winston <Winston.Yang@wsp.com>; Whelan, Amy <amy.whelan@ottawa.ca>
Subject: RE: 50 Bayswater Avenue and 1088 Somerset Street W - SWM Requirements

Hi Spencer,

I can confirm that for Building A, we will request that the site be controlled to the 2-year rate. The rear yard can have a drain connected to the cistern. The side yard and front yard can be left uncontrolled to the ROW. While for Building B, we request that the roof area be controlled to the 2-year rate and the remainder of the site can be left uncontrolled, permitted it discharges to the ROW.

Let me know if you wish to discuss further. Thanks Spencer.

Best Regards,

Mohammed Fawzi, P.Eng.
Project Manager, Infrastructure - Gestionnaire de projet, Projets d'infrastructure
Development Review All Wards (DRAW) | Direction de l'examen des projets d'aménagement - Tous les quartiers (EPATQ)
Planning, Development and Building Services Department (PDBS)| Direction générale des services de la planification, de l'aménagement et du bâtiment (DGSPAB)
City of Ottawa | Ville d'Ottawa
110 Laurier Avenue West | 110 Avenue Laurier Ouest
Ottawa, ON K1P 1J1
613.580.2424 ext./poste 20120, Mohammed.Fawzi@ottawa.ca

From: Manoryk, Spencer <Spencer.Manoryk@wsp.com>
Sent: Friday, July 12, 2024 8:08 AM
To: Fawzi, Mohammed <mohammed.fawzi@ottawa.ca>
Cc: Yang, Winston <winston.yang@wsp.com>; Whelan, Amy <amy.whelan@ottawa.ca>
Subject: RE: 50 Bayswater Avenue and 1088 Somerset Street W - SWM Requirements

Hi Mohammed,

Sure, feel free to call me at the number below.

Thanks,

Spencer Manoryk
Designer EIT
Land Development & Municipal Engineering, Ontario

T+ 1 613-690-7463

WSP Canada Inc.
2611 Queensview Drive, Suite 300
Ottawa, Ontario
K2B 8K2 Canada

wsp.com

From: Fawzi, Mohammed <mohammed.fawzi@ottawa.ca>
Sent: Thursday, July 11, 2024 3:22 PM
To: Manoryk, Spencer <Spencer.Manoryk@wsp.com>
Cc: Yang, Winston <Winston.Yang@wsp.com>; Whelan, Amy <amy.whelan@ottawa.ca>
Subject: RE: 50 Bayswater Avenue and 1088 Somerset Street W - SWM Requirements

Hi Spencer,

I am still looking into the matter. I did have a couple questions though. Do you have a min to chat? I'm free until 4:30 today, or alternatively we can chat tomorrow.

Let me know. Thanks.

Best Regards,

Mohammed Fawzi, P.Eng.
Project Manager, Infrastructure - Gestionnaire de projet, Projets d'infrastructure
Development Review All Wards (DRAW) | Direction de l'examen des projets d'aménagement - Tous les quartiers (EPATQ)
Planning, Development and Building Services Department (PDBS)| Direction générale des services de la planification, de l'aménagement et du bâtiment (DGSPAB)
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110 Laurier Avenue West | 110 Avenue Laurier Ouest
Ottawa, ON K1P 1J1
613.580.2424 ext./poste 20120, Mohammed.Fawzi@ottawa.ca

From: Manoryk, Spencer <Spencer.Manoryk@wsp.com>
Sent: Wednesday, July 10, 2024 9:39 AM
To: Fawzi, Mohammed <mohammed.fawzi@ottawa.ca>
Cc: Yang, Winston <winston.yang@wsp.com>; Whelan, Amy <amy.whelan@ottawa.ca>
Subject: RE: 50 Bayswater Avenue and 1088 Somerset Street W - SWM Requirements

Hi Mohammed,

Any update on the below?

Thanks,

Spencer Manoryk
Designer EIT
Land Development & Municipal Engineering, Ontario

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From: Manoryk, Spencer
Sent: Friday, July 5, 2024 11:57 AM
To: Fawzi, Mohammed <mohammed.fawzi@ottawa.ca>
Cc: Yang, Winston <Winston.Yang@wsp.com>; Whelan, Amy <amy.whelan@ottawa.ca>
Subject: RE: 50 Bayswater Avenue and 1088 Somerset Street W - SWM Requirements

Haha no problem! Let me know if I can clarify anything further.

Regards,

Spencer Manoryk
Designer EIT
Land Development & Municipal Engineering, Ontario

T+ 1 613-690-7463

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From: Fawzi, Mohammed <mohammed.fawzi@ottawa.ca>
Sent: Friday, July 5, 2024 11:54 AM
To: Manoryk, Spencer <Spencer.Manoryk@wsp.com>
Cc: Yang, Winston <Winston.Yang@wsp.com>; Whelan, Amy <amy.whelan@ottawa.ca>
Subject: RE: 50 Bayswater Avenue and 1088 Somerset Street W - SWM Requirements

HI Spencer,

My apologies, just noticed you sent that in your initial email. For some reason the file was not loading the full document.

I'll get back to you soon. Thanks.

Best Regards,

Mohammed Fawzi, P.Eng.
Project Manager, Infrastructure - Gestionnaire de projet, Projets d'infrastructure
Development Review All Wards (DRAW) | Direction de l'examen des projets d'aménagement - Tous les quartiers (EPATQ)
Planning, Development and Building Services Department (PDBS)| Direction générale des services de la planification, de l'aménagement et du bâtiment (DGSPAB)
City of Ottawa | Ville d'Ottawa
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Ottawa, ON K1P 1J1
613.580.2424 ext./poste 20120, Mohammed.Fawzi@ottawa.ca

From: Manoryk, Spencer <Spencer.Manoryk@wsp.com>
Sent: Friday, July 5, 2024 11:50 AM
To: Fawzi, Mohammed <mohammed.fawzi@ottawa.ca>
Cc: Yang, Winston <winston.yang@wsp.com>; Whelan, Amy <amy.whelan@ottawa.ca>
Subject: RE: 50 Bayswater Avenue and 1088 Somerset Street W - SWM Requirements

Hi Mohammed,

No problem, perhaps the catchment area plan attached better identifies the post-dev controlled (blue) vs uncontrolled (red) areas.

Please let me know if anything is unclear.

Regards,

Spencer Manoryk

Designer EIT
Land Development & Municipal Engineering, Ontario

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From: Fawzi, Mohammed <mohammed.fawzi@ottawa.ca>
Sent: Friday, July 5, 2024 11:35 AM
To: Manoryk, Spencer <Spencer.Manoryk@wsp.com>
Cc: Yang, Winston <Winston.Yang@wsp.com>; Whelan, Amy <amy.whelan@ottawa.ca>
Subject: RE: 50 Bayswater Avenue and 1088 Somerset Street W - SWM Requirements

Thanks Spencer.

Apologies, I should have mentioned, could you please quickly just hash the areas that will be uncontrolled?

Thanks Spencer.

Best Regards,

Mohammed Fawzi, P.Eng.
Project Manager, Infrastructure - Gestionnaire de projet, Projets d'infrastructure
Development Review All Wards (DRAW) | Direction de l'examen des projets d'aménagement - Tous les quartiers (EPATQ)
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613.580.2424 ext./poste 20120, Mohammed.Fawzi@ottawa.ca

From: Manoryk, Spencer <Spencer.Manoryk@wsp.com>
Sent: Friday, July 5, 2024 11:25 AM
To: Fawzi, Mohammed <mohammed.fawzi@ottawa.ca>
Cc: Yang, Winston <winston.yang@wsp.com>; Whelan, Amy <amy.whelan@ottawa.ca>
Subject: RE: 50 Bayswater Avenue and 1088 Somerset Street W - SWM Requirements

Hi Mohammed,

That's a good solution. Please see attached Site Plan showing the building areas.

Thanks,

Spencer Manoryk
Designer EIT
Land Development & Municipal Engineering, Ontario

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From: Fawzi, Mohammed <mohammed.fawzi@ottawa.ca>
Sent: Friday, July 5, 2024 11:06 AM
To: Manoryk, Spencer <Spencer.Manoryk@wsp.com>
Cc: Yang, Winston <Winston.Yang@wsp.com>; Whelan, Amy <amy.whelan@ottawa.ca>
Subject: RE: 50 Bayswater Avenue and 1088 Somerset Street W - SWM Requirements

Hi Spencer,

Can you please provide me with a plan that shows the building areas on the lots? We may be able to control the roofs only and allow the remainder of the sites to drain uncontrolled if the building footprints take up the majority of the area.

Thanks.

Best Regards,

Mohammed Fawzi, P.Eng.
Project Manager, Infrastructure - Gestionnaire de projet, Projets d'infrastructure
Development Review All Wards (DRAW) | Direction de l'examen des projets d'aménagement - Tous les quartiers (EPATQ)
Planning, Development and Building Services Department (PDBS)| Direction générale des services de la planification, de l'aménagement et du bâtiment (DGSPAB)
City of Ottawa | Ville d'Ottawa
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Ottawa, ON K1P 1J1
613.580.2424 ext./poste 20120, Mohammed.Fawzi@ottawa.ca

From: Manoryk, Spencer <Spencer.Manoryk@wsp.com>
Sent: Thursday, July 4, 2024 1:26 PM

To: Fawzi, Mohammed <mohammed.fawzi@ottawa.ca>
Cc: Yang, Winston <winston.yang@wsp.com>
Subject: 50 Bayswater Avenue and 1088 Somerset Street W - SWM Requirements

Hi Mohammed,

Hope you're well!

I have a couple comments regarding the SWM design for the 50 Bayswater & 1088 Somerset site.

You had indicated in the pre-consultation notes that the post-development runoff from the site, up to and including the 100-year storm event, must be controlled to a pre-development level of 2-year.

We are currently in a position where the 100-yr post-development uncontrolled areas for both buildings (as shown on the attached plan) are already exceeding the pre-development 2-year.

For reference we are currently getting:
1088 Somerset: 2-yr pre flow = 6.3 L/s, 100-yr post uncontrolled = 10 L/s
50 Bayswater: 2-yr pre flow = 6.4 L/s, 100-yr post uncontrolled 8.1 L/s

Is there any opportunity to change the controlled restriction from the 2-year up to the 5-year?

For the Somerset building, are we able to collect the rear amenity area with a landscape drain and direct it to the building's internal cistern?

Thanks,

Spencer Manoryk
Designer EIT
Land Development & Municipal Engineering, Ontario

T+ 1 613-690-7463

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2611 Queensview Drive, Suite 300
Ottawa, Ontario
K2B 8K2 Canada

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APPENDIX

B

Stormwater Management Calculations

Renfroe Land Management
50 Bayswater Avenue and 1088 Somerset Street
Project: CA0003875.9802
Date: July 2024
Prepared by: Calvin Paul

TABLE 1A - Pre-Development EX-A (1088 Somerset)

Runoff Coefficients taken from Table 5.7, City of Ottawa Sewer Design Guidelines (2012).

Pre Dev run-off Coefficient "C"

			2 & 5 Year Event		100 Year Event	
Area	**Surface**	**Ha**	**"C"**	**C_{avg}**	**"C"+25%**	***C_{avg}**
Total	Roof	0.022	0.90	0.88	0.99	0.97
0.047	Hard	0.024	0.90		0.99	
	Soft	0.002	0.20		0.24	
				0.50		**0.50**

Per City of Ottawa criteria pre development runoff coefficient shall be no greater than 0.5

Composite Runoff Coefficient Equation

$C = (A_{hard} \times 0.9 + A_{soft} \times 0.2)/A_{tot}$

$*C = (A_{hard} \times 1.0 + A_{soft} \times 0.25)/A_{tot}$

*Runoff coefficients increased by 25% up to a maximum value of 0.99 for the 100-Year event

Renfroe Land Management
50 Bayswater Avenue and 1088 Somerset Street
Project: CA0003875.9802
Date: July 2024
Prepared by: Calvin Paul

TABLE 1B - Pre-Development EX-B (50 Bayswater)

Runoff Coefficients taken from Table 5.7, City of Ottawa Sewer Design Guidelines (2012).

Pre Dev run-off Coefficient "C"

			2 & 5 Year Event		100 Year Event	
Area	**Surface**	**Ha**	**"C"**	**C_{avg}**	**"C"+25%**	***C_{avg}**
Total	Roof	0.029	0.90	0.90	0.99	0.99
0.047	Hard	0.019	0.90		0.99	
	Soft	0.000	0.20		0.24	
				0.50		**0.50**

Per City of Ottawa criteria pre development runoff coefficient shall be no greater than 0.5

Runoff Coefficient Equation

$C = (A_{hard} \times 0.9 + A_{soft} \times 0.2)/A_{tot}$

$*C = (A_{hard} \times 1.0 + A_{soft} \times 0.25)/A_{tot}$

*Runoff coefficients increased by 25% up to a maximum value of 0.99 for the 100-Year event

Renfroe Land Management
50 Bayswater Avenue and 1088 Somerset Street
Project: CA0003875.9802
Date: July 2024
Prepared by: Calvin Paul

TABLE 2-A1 Post-Development PR-A1 Controlled (1088 Somerset)

Runoff Coefficients taken from Table 5.7, City of Ottawa Sewer Design Guidelines (2012).

Post Dev run-off Coefficient "C"

			2 & 5 Year Event		100 Year Event	
Area	**Surface**	**Ha**	**"C"**	**C_{avg}**	**"C"+25%**	***C_{avg}**
Total	Roof	0.039	0.90	**0.90**	0.99	**0.99**
0.039	Hard	0.000	0.90		0.99	
	Soft	0.000	0.20		0.24	

Runoff Coefficient Equation

$C = (A_{hard} \times 0.9 + A_{soft} \times 0.2)/A_{tot}$

$*C = (A_{hard} \times 1.0 + A_{soft} \times 0.25)/A_{tot}$

*Runoff coefficients increased by 25% up to a maximum value of 0.99 for the 100-Year event

Renfroe Land Management
50 Bayswater Avenue and 1088 Somerset Street
Project: CA0003875.9802
Date: July 2024
Prepared by: Calvin Paul

TABLE 2-A2 - Post-Development PR-A2 Controlled (1088 Somerset)

Runoff Coefficients taken from Table 5.7, City of Ottawa Sewer Design Guidelines (2012).

Post Dev run-off Coefficient "C"

			2 & 5 Year Event		100 Year Event	
Area	**Surface**	**Ha**	**"C"**	**C_{avg}**	**"C"+25%**	***C_{avg}**
Total	Roof	0.000	0.90	**0.69**	0.99	**0.78**
0.009	Hard	0.006	0.90		0.99	
	Soft	0.003	0.20		0.24	

Runoff Coefficient Equation

$C = (A_{hard} \times 0.9 + A_{soft} \times 0.2)/A_{tot}$

$*C = (A_{hard} \times 1.0 + A_{soft} \times 0.25)/A_{tot}$

*Runoff coefficients increased by 25% up to a maximum value of 0.99 for the 100-Year event

Renfroe Land Management
50 Bayswater Avenue and 1088 Somerset Street
Project: CA0003875.9802
Date: July 2024
Prepared by: Calvin Paul

TABLE 2-A3 Post-Development PR-A3 Uncontrolled (1088 Somerset)

Runoff Coefficients taken from Table 5.7, City of Ottawa Sewer Design Guidelines (2012).

Post Dev run-off Coefficient "C"

			2 & 5 Year Event		100 Year Event	
Area	**Surface**	**Ha**	**"C"**	**C_{avg}**	**"C"+25%**	***C_{avg}**
Total	Roof	0.000	0.90	**0.71**	0.99	**0.80**
0.013	Hard	0.010	0.90		0.99	
	Soft	0.004	0.20		0.24	

Runoff Coefficient Equation

$C = (A_{hard} \times 0.9 + A_{soft} \times 0.2)/A_{tot}$

$*C = (A_{hard} \times 1.0 + A_{soft} \times 0.25)/A_{tot}$

*Runoff coefficients increased by 25% up to a maximum value of 0.99 for the 100-Year event

Renfroe Land Management
50 Bayswater Avenue and 1088 Somerset Street
Project: CA0003875.9802
Date: July 2024
Prepared by: Calvin Paul

TABLE 2-B1 Post-Development PR-B1 Controlled (50 Bayswater)

Runoff Coefficients taken from Table 5.7, City of Ottawa Sewer Design Guidelines (2012).

Post Dev run-off Coefficient "C"

			2 & 5 Year Event		100 Year Event	
Area	**Surface**	**Ha**	**"C"**	**C_{avg}**	**"C"+25%**	***C_{avg}**
Total	Roof	0.047	0.90	**0.90**	0.99	**0.99**
0.047	Hard	0.000	0.90		0.99	
	Soft	0.000	0.20		0.24	

Runoff Coefficient Equation

$C = (A_{hard} \times 0.9 + A_{soft} \times 0.2)/A_{tot}$

$*C = (A_{hard} \times 1.0 + A_{soft} \times 0.25)/A_{tot}$

*Runoff coefficients increased by 25% up to a maximum value of 0.99 for the 100-Year event

Renfroe Land Management
50 Bayswater Avenue and 1088 Somerset Street
Project: CA0003875.9802
Date: July 2024
Prepared by: Calvin Paul

TABLE 2-B2 Post-Development PR-B2 Uncontrolled (50 Bayswater)

Runoff Coefficients taken from Table 5.7, City of Ottawa Sewer Design Guidelines (2012).

Post Dev run-off Coefficient "C"

			2 & 5 Year Event		100 Year Event	
Area	**Surface**	**Ha**	**"C"**	**C_{avg}**	**"C"+25%**	***C_{avg}**
Total	Roof	0.000	0.90	**0.88**	0.99	**0.98**
0.014	Hard	0.013	0.90		0.99	
	Soft	0.000	0.20		0.24	

Runoff Coefficient Equation

$C = (A_{hard} \times 0.9 + A_{soft} \times 0.2)/A_{tot}$

$*C = (A_{hard} \times 1.0 + A_{soft} \times 0.25)/A_{tot}$

*Runoff coefficients increased by 25% up to a maximum value of 0.99 for the 100-Year event

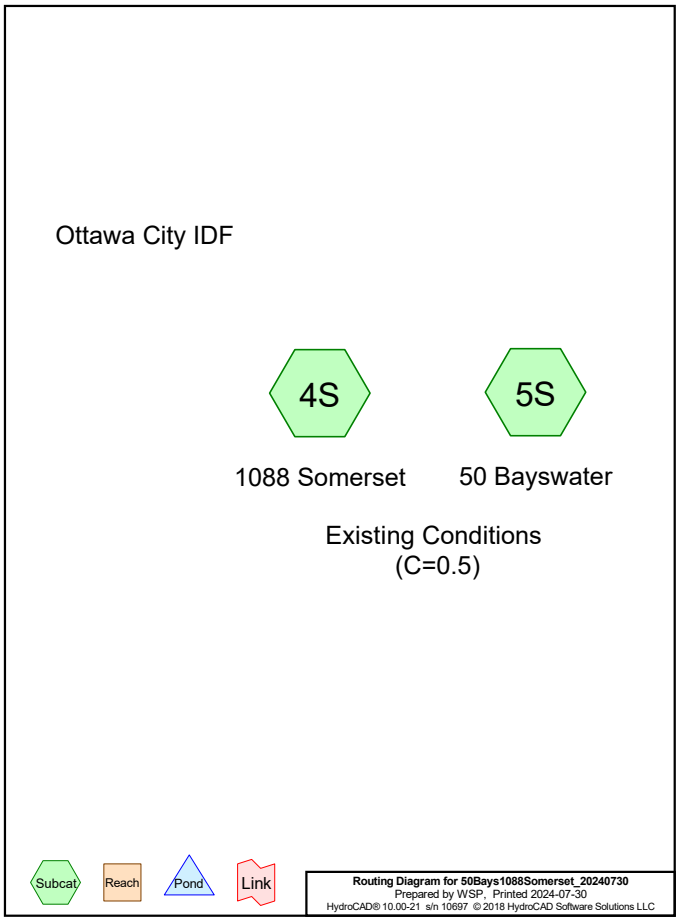
APPENDIX

C

HydroCAD outputs

APPENDIX

C-1 Existing Conditions



Area Listing (selected nodes)

Area (hectares)	C	Description (subcatchment-numbers)
0.0940	0.50	Composite (4S, 5S)
0.0940	**0.50**	**TOTAL AREA**

Soil Listing (selected nodes)

Area (hectares)	Soil Group	Subcatchment Numbers
0.0000	HSG A	
0.0000	HSG B	
0.0000	HSG C	
0.0000	HSG D	
0.0940	Other	4S, 5S
0.0940		**TOTAL AREA**

Ground Covers (selected nodes)

HSG-A (hectares)	HSG-B (hectares)	HSG-C (hectares)	HSG-D (hectares)	Other (hectares)	Total (hectares)	Ground Cover	Subcatchment Numbers
0.0000	0.0000	0.0000	0.0000	0.0940	0.0940	Composite	4S, 5S
0.0000	**0.0000**	**0.0000**	**0.0000**	**0.0940**	**0.0940**	**TOTAL AREA**	

Time span=0.00-3.00 hrs, dt=0.01 hrs, 301 points
Runoff by Rational method, Rise/Fall=1.0/1.0 xTc
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 4S: 1088 Somerset Runoff Area=0.0470 ha 0.00% Impervious Runoff Depth=6 mm
Tc=10.0 min C=0.50 Runoff=0.0049 m³/s 0.003 Ml

Subcatchment 5S: 50 Bayswater Runoff Area=0.0470 ha 0.00% Impervious Runoff Depth=6 mm
Tc=10.0 min C=0.50 Runoff=0.0049 m³/s 0.003 Ml

Total Runoff Area = 0.0940 ha Runoff Volume = 0.006 Ml Average Runoff Depth = 6 mm
100.00% Pervious = 0.0940 ha 0.00% Impervious = 0.0000 ha

Summary for Subcatchment 4S: 1088 Somerset

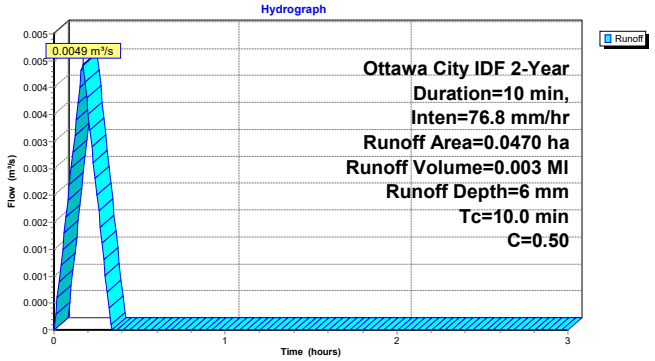
Runoff = 0.0049 m³/s @ 0.17 hrs, Volume= 0.003 Ml, Depth= 6 mm

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs
Ottawa City IDF 2-Year Duration=10 min, Inten=76.8 mm/hr

Area (ha)	C	Description
0.0470	0.50	Composite
0.0470		100.00% Pervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Description
10.0					**Direct Entry, Minimum**

Subcatchment 4S: 1088 Somerset



Summary for Subcatchment 5S: 50 Bayswater

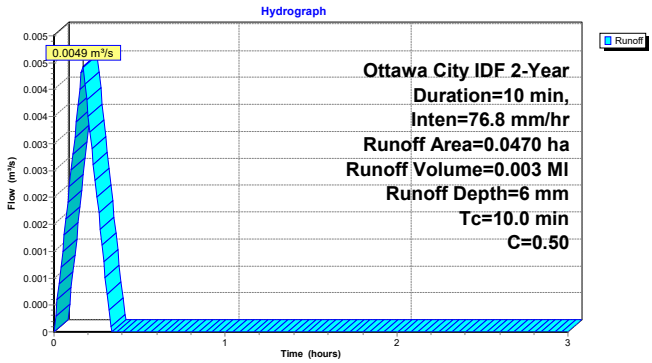
Runoff = 0.0049 m³/s @ 0.17 hrs, Volume= 0.003 Ml, Depth= 6 mm

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs
Ottawa City IDF 2-Year Duration=10 min, Inten=76.8 mm/hr

Area (ha)	C	Description
0.0470	0.50	Composite
0.0470		100.00% Pervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Description
10.0					**Direct Entry, Minimum**

Subcatchment 5S: 50 Bayswater



Time span=0.00-3.00 hrs, dt=0.01 hrs, 301 points
Runoff by Rational method, Rise/Fall=1.0/1.0 xTc
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 4S: 1088 Somerset Runoff Area=0.0470 ha 0.00% Impervious Runoff Depth=9 mm
Tc=10.0 min C=0.50 Runoff=0.0067 m³/s 0.004 Ml

Subcatchment 5S: 50 Bayswater Runoff Area=0.0470 ha 0.00% Impervious Runoff Depth=9 mm
Tc=10.0 min C=0.50 Runoff=0.0067 m³/s 0.004 Ml

Total Runoff Area = 0.0940 ha Runoff Volume = 0.008 Ml Average Runoff Depth = 9 mm
100.00% Pervious = 0.0940 ha 0.00% Impervious = 0.0000 ha

Summary for Subcatchment 4S: 1088 Somerset

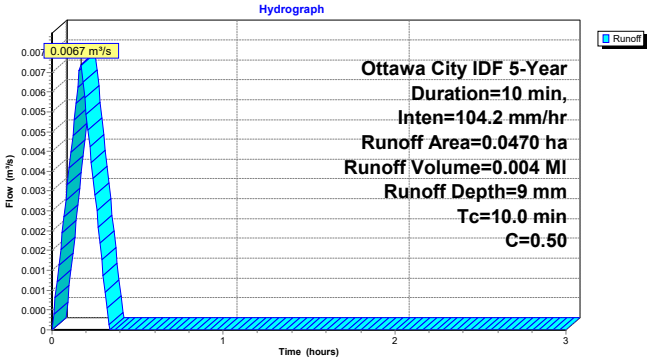
Runoff = 0.0067 m³/s @ 0.17 hrs, Volume= 0.004 Ml, Depth= 9 mm

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs
Ottawa City IDF 5-Year Duration=10 min, Inten=104.2 mm/hr

Area (ha)	C	Description
0.0470	0.50	Composite
0.0470		100.00% Pervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Description
10.0					**Direct Entry, Minimum**

Subcatchment 4S: 1088 Somerset



Summary for Subcatchment 5S: 50 Bayswater

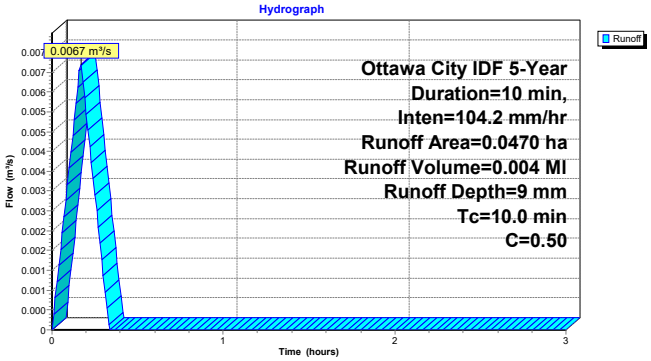
Runoff = 0.0067 m³/s @ 0.17 hrs, Volume= 0.004 Ml, Depth= 9 mm

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs
Ottawa City IDF 5-Year Duration=10 min, Inten=104.2 mm/hr

Area (ha)	C	Description
0.0470	0.50	Composite
0.0470		100.00% Pervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Description
10.0					**Direct Entry, Minimum**

Subcatchment 5S: 50 Bayswater



Time span=0.00-3.00 hrs, dt=0.01 hrs, 301 points
Runoff by Rational method, Rise/Fall=1.0/1.0 xTc
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 4S: 1088 Somerset Runoff Area=0.0470 ha 0.00% Impervious Runoff Depth=10 mm
Tc=10.0 min C=0.50 Runoff=0.0078 m³/s 0.005 Ml

Subcatchment 5S: 50 Bayswater Runoff Area=0.0470 ha 0.00% Impervious Runoff Depth=10 mm
Tc=10.0 min C=0.50 Runoff=0.0078 m³/s 0.005 Ml

Total Runoff Area = 0.0940 ha Runoff Volume = 0.010 Ml Average Runoff Depth = 10 mm
100.00% Pervious = 0.0940 ha 0.00% Impervious = 0.0000 ha

Summary for Subcatchment 4S: 1088 Somerset

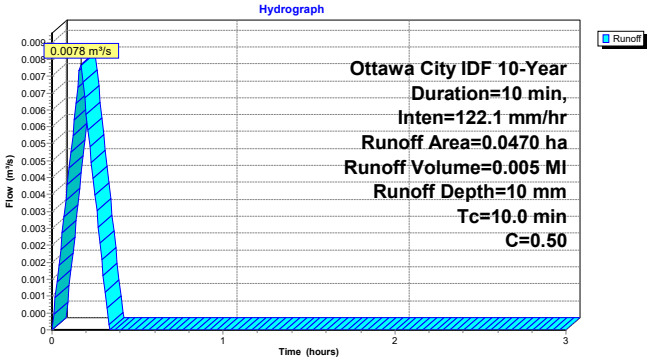
Runoff = 0.0078 m³/s @ 0.17 hrs, Volume= 0.005 Ml, Depth= 10 mm

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs
Ottawa City IDF 10-Year Duration=10 min, Inten=122.1 mm/hr

Area (ha)	C	Description
0.0470	0.50	Composite
0.0470		100.00% Pervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Description
10.0					**Direct Entry, Minimum**

Subcatchment 4S: 1088 Somerset



Summary for Subcatchment 5S: 50 Bayswater

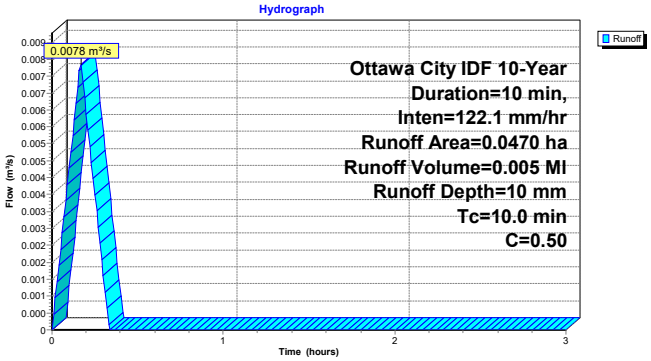
Runoff = 0.0078 m³/s @ 0.17 hrs, Volume= 0.005 Ml, Depth= 10 mm

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs
Ottawa City IDF 10-Year Duration=10 min, Inten=122.1 mm/hr

Area (ha)	C	Description
0.0470	0.50	Composite
0.0470		100.00% Pervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Description
10.0					**Direct Entry, Minimum**

Subcatchment 5S: 50 Bayswater



Time span=0.00-3.00 hrs, dt=0.01 hrs, 301 points
Runoff by Rational method, Rise/Fall=1.0/1.0 xTc
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 4S: 1088 Somerset Runoff Area=0.0470 ha 0.00% Impervious Runoff Depth=12 mm
Tc=10.0 min C=0.50 Runoff=0.0093 m³/s 0.006 Ml

Subcatchment 5S: 50 Bayswater Runoff Area=0.0470 ha 0.00% Impervious Runoff Depth=12 mm
Tc=10.0 min C=0.50 Runoff=0.0093 m³/s 0.006 Ml

Total Runoff Area = 0.0940 ha Runoff Volume = 0.011 Ml Average Runoff Depth = 12 mm
100.00% Pervious = 0.0940 ha 0.00% Impervious = 0.0000 ha

Summary for Subcatchment 4S: 1088 Somerset

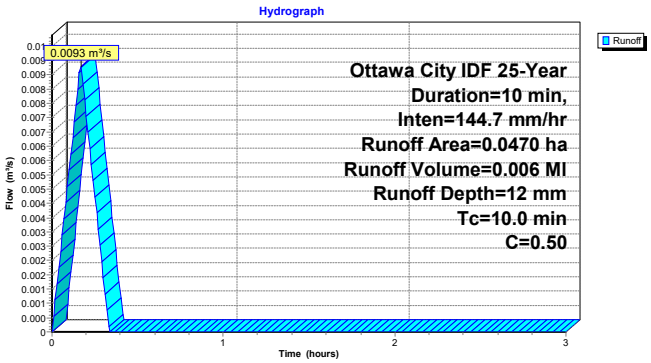
Runoff = 0.0093 m³/s @ 0.17 hrs, Volume= 0.006 Ml, Depth= 12 mm

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs
Ottawa City IDF 25-Year Duration=10 min, Inten=144.7 mm/hr

Area (ha)	C	Description
0.0470	0.50	Composite
0.0470		100.00% Pervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Description
10.0					**Direct Entry, Minimum**

Subcatchment 4S: 1088 Somerset



Summary for Subcatchment 5S: 50 Bayswater

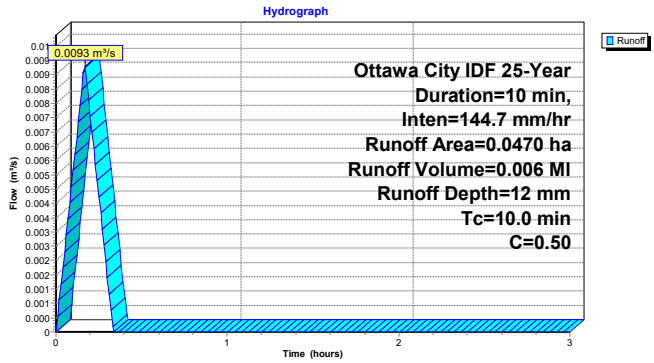
Runoff = 0.0093 m³/s @ 0.17 hrs, Volume= 0.006 Ml, Depth= 12 mm

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs
Ottawa City IDF 25-Year Duration=10 min, Inten=144.7 mm/hr

Area (ha)	C	Description
0.0470	0.50	Composite
0.0470		100.00% Pervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Description
10.0					**Direct Entry, Minimum**

Subcatchment 5S: 50 Bayswater



Time span=0.00-3.00 hrs, dt=0.01 hrs, 301 points
Runoff by Rational method, Rise/Fall=1.0/1.0 xTc
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 4S: 1088 Somerset Runoff Area=0.0470 ha 0.00% Impervious Runoff Depth=13 mm
Tc=10.0 min C=0.50 Runoff=0.0104 m³/s 0.006 Ml

Subcatchment 5S: 50 Bayswater Runoff Area=0.0470 ha 0.00% Impervious Runoff Depth=13 mm
Tc=10.0 min C=0.50 Runoff=0.0104 m³/s 0.006 Ml

Total Runoff Area = 0.0940 ha Runoff Volume = 0.013 Ml Average Runoff Depth = 13 mm
100.00% Pervious = 0.0940 ha 0.00% Impervious = 0.0000 ha

Summary for Subcatchment 4S: 1088 Somerset

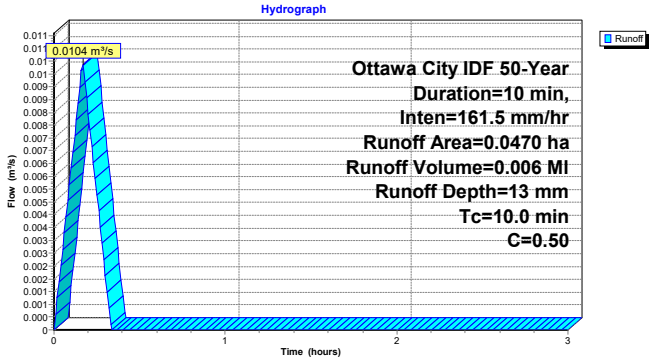
Runoff = 0.0104 m³/s @ 0.17 hrs, Volume= 0.006 Ml, Depth= 13 mm

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs
Ottawa City IDF 50-Year Duration=10 min, Inten=161.5 mm/hr

Area (ha)	C	Description
0.0470	0.50	Composite
0.0470		100.00% Pervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Description
10.0					**Direct Entry, Minimum**

Subcatchment 4S: 1088 Somerset



Summary for Subcatchment 5S: 50 Bayswater

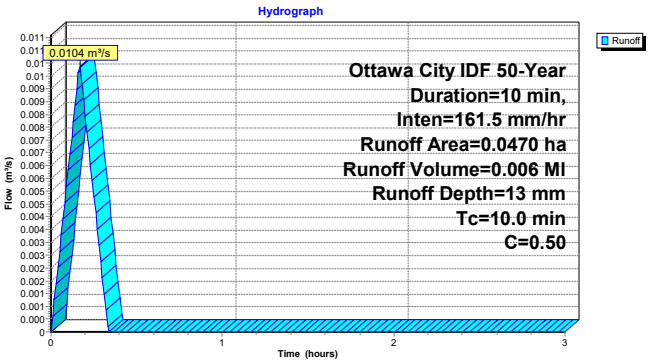
Runoff = 0.0104 m³/s @ 0.17 hrs, Volume= 0.006 Ml, Depth= 13 mm

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs
Ottawa City IDF 50-Year Duration=10 min, Inten=161.5 mm/hr

Area (ha)	C	Description
0.0470	0.50	Composite
0.0470		100.00% Pervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Description
10.0					**Direct Entry, Minimum**

Subcatchment 5S: 50 Bayswater



Time span=0.00-3.00 hrs, dt=0.01 hrs, 301 points
Runoff by Rational method, Rise/Fall=1.0/1.0 xTc
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 4S: 1088 Somerset Runoff Area=0.0470 ha 0.00% Impervious Runoff Depth=15 mm
Tc=10.0 min C=0.50 Runoff=0.0115 m³/s 0.007 Ml

Subcatchment 5S: 50 Bayswater Runoff Area=0.0470 ha 0.00% Impervious Runoff Depth=15 mm
Tc=10.0 min C=0.50 Runoff=0.0115 m³/s 0.007 Ml

Total Runoff Area = 0.0940 ha Runoff Volume = 0.014 Ml Average Runoff Depth = 15 mm
100.00% Pervious = 0.0940 ha 0.00% Impervious = 0.0000 ha

Summary for Subcatchment 4S: 1088 Somerset

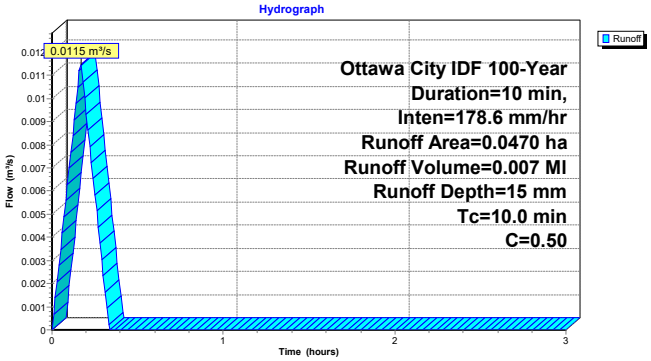
Runoff = 0.0115 m³/s @ 0.17 hrs, Volume= 0.007 Ml, Depth= 15 mm

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs
Ottawa City IDF 100-Year Duration=10 min, Inten=178.6 mm/hr

Area (ha)	C	Description
0.0470	0.50	Composite
0.0470		100.00% Pervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Description
10.0					**Direct Entry, Minimum**

Subcatchment 4S: 1088 Somerset



Summary for Subcatchment 5S: 50 Bayswater

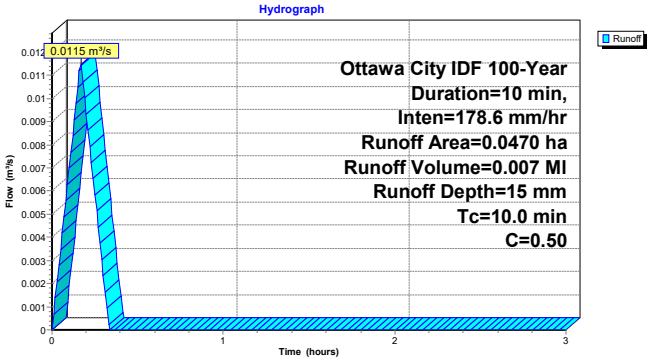
Runoff = 0.0115 m³/s @ 0.17 hrs, Volume= 0.007 Ml, Depth= 15 mm

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs
Ottawa City IDF 100-Year Duration=10 min, Inten=178.6 mm/hr

Area (ha)	C	Description
0.0470	0.50	Composite
0.0470		100.00% Pervious Area

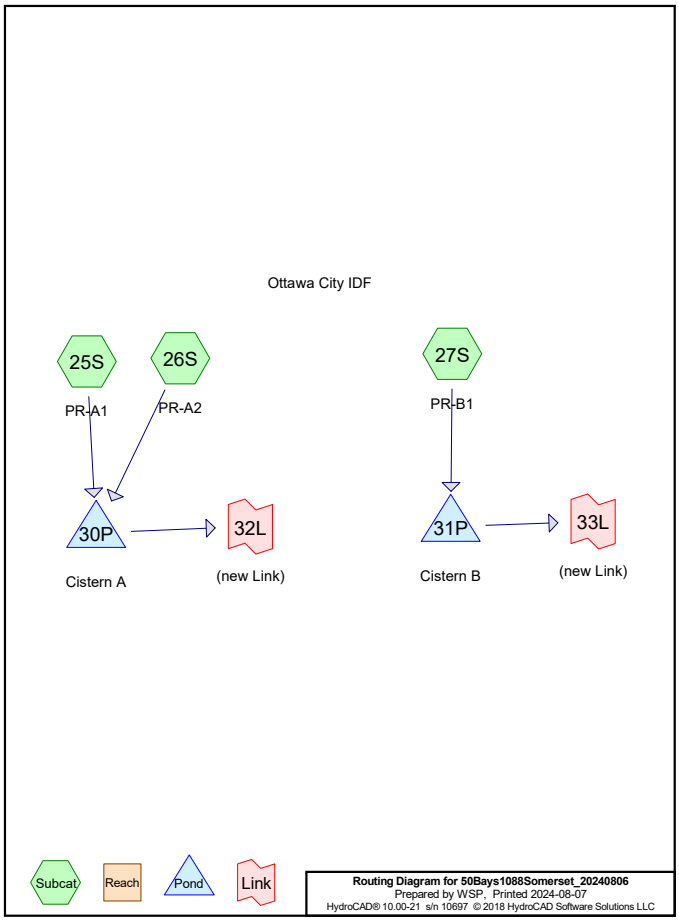
Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Description
10.0					**Direct Entry, Minimum**

Subcatchment 5S: 50 Bayswater



APPENDIX

C-2 Proposed Conditions



Area Listing (selected nodes)

Area (hectares)	C	Description (subcatchment-numbers)
0.0860	0.99	Roof (25S, 27S)
0.0090	0.78	Soft Landscaping and At-Grade Surfaces (26S)
0.0950	**0.97**	**TOTAL AREA**

Soil Listing (selected nodes)

Area (hectares)	Soil Group	Subcatchment Numbers
0.0000	HSG A	
0.0000	HSG B	
0.0000	HSG C	
0.0000	HSG D	
0.0950	Other	25S, 26S, 27S
0.0950		**TOTAL AREA**

Ground Covers (selected nodes)

HSG-A (hectares)	HSG-B (hectares)	HSG-C (hectares)	HSG-D (hectares)	Other (hectares)	Total (hectares)	Ground Cover	Sub Num
0.0000	0.0000	0.0000	0.0000	0.0860	0.0860	Roof	
0.0000	0.0000	0.0000	0.0000	0.0090	0.0090	Soft Landscaping and At-Grade Surfaces	
0.0000	**0.0000**	**0.0000**	**0.0000**	**0.0950**	**0.0950**	**TOTAL AREA**	

Time span=0.00-6.00 hrs, dt=0.01 hrs, 601 points
Runoff by Rational method, Rise/Fall=1.0/1.0 xTc
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 25S: PR-A1 Runoff Area=0.0390 ha 100.00% Impervious Runoff Depth=13 mm
Tc=10.0 min C=0.99 Runoff=0.0081 m³/s 0.005 Ml

Subcatchment 26S: PR-A2 Runoff Area=0.0090 ha 0.00% Impervious Runoff Depth=10 mm
Tc=10.0 min C=0.78 Runoff=0.0015 m³/s 0.001 Ml

Subcatchment 27S: PR-B1 Runoff Area=0.0470 ha 100.00% Impervious Runoff Depth=13 mm
Tc=10.0 min C=0.99 Runoff=0.0098 m³/s 0.006 Ml

Pond 30P: Cistern A Peak Elev=0.324 m Storage=0.005 Ml Inflow=0.0096 m³/s 0.006 Ml
Outflow=0.0009 m³/s 0.006 Ml

Pond 31P: Cistern B Peak Elev=0.257 m Storage=0.005 Ml Inflow=0.0098 m³/s 0.006 Ml
Outflow=0.0008 m³/s 0.006 Ml

Link 32L: (new Link) Inflow=0.0009 m³/s 0.006 Ml
Primary=0.0009 m³/s 0.006 Ml

Link 33L: (new Link) Inflow=0.0008 m³/s 0.006 Ml
Primary=0.0008 m³/s 0.006 Ml

Total Runoff Area = 0.0950 ha Runoff Volume = 0.012 Ml Average Runoff Depth = 12 mm
9.47% Pervious = 0.0090 ha 90.53% Impervious = 0.0860 ha

Summary for Subcatchment 25S: PR-A1

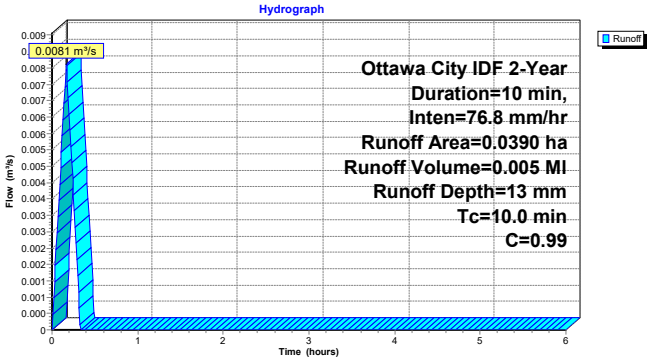
Runoff = 0.0081 m³/s @ 0.17 hrs, Volume= 0.005 Ml, Depth= 13 mm

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
Ottawa City IDF 2-Year Duration=10 min, Inten=76.8 mm/hr

Area (ha)	C	Description
0.0390	0.99	Roof
0.0390		100.00% Impervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Description
10.0					**Direct Entry, Minimum**

Subcatchment 25S: PR-A1



Summary for Subcatchment 26S: PR-A2

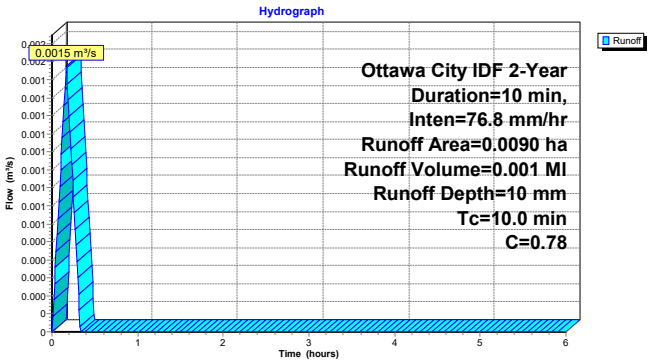
Runoff = 0.0015 m³/s @ 0.17 hrs, Volume= 0.001 Ml, Depth= 10 mm

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
Ottawa City IDF 2-Year Duration=10 min, Inten=76.8 mm/hr

Area (ha)	C	Description
0.0090	0.78	Soft Landscaping and At-Grade Surfaces
0.0090		100.00% Pervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Description
10.0					**Direct Entry, Minimum**

Subcatchment 26S: PR-A2



Summary for Subcatchment 27S: PR-B1

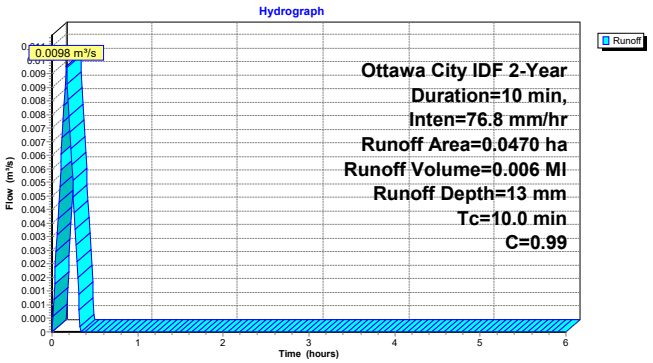
Runoff = 0.0098 m³/s @ 0.17 hrs, Volume= 0.006 Ml, Depth= 13 mm

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
Ottawa City IDF 2-Year Duration=10 min, Inten=76.8 mm/hr

Area (ha)	C	Description
0.0470	0.99	Roof
0.0470		100.00% Impervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Description
10.0					**Direct Entry, Minimum**

Subcatchment 27S: PR-B1



Summary for Pond 30P: Cistern A

Inflow Area = 0.0480 ha, 81.25% Impervious, Inflow Depth = 12 mm for 2-Year event
Inflow = 0.0096 m³/s @ 0.17 hrs, Volume= 0.006 Ml
Outflow = 0.0009 m³/s @ 0.32 hrs, Volume= 0.006 Ml, Atten= 91%, Lag= 9.1 min
Primary = 0.0009 m³/s @ 0.32 hrs, Volume= 0.006 Ml

Routing by Stor-Ind method, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
Peak Elev= 0.324 m @ 0.32 hrs Surf.Area= 0.0000 ha Storage= 0.005 Ml

Plug-Flow detention time= 78.5 min calculated for 0.006 Ml (99% of inflow)
Center-of-Mass det. time= 78.8 min (88.8 - 10.0)

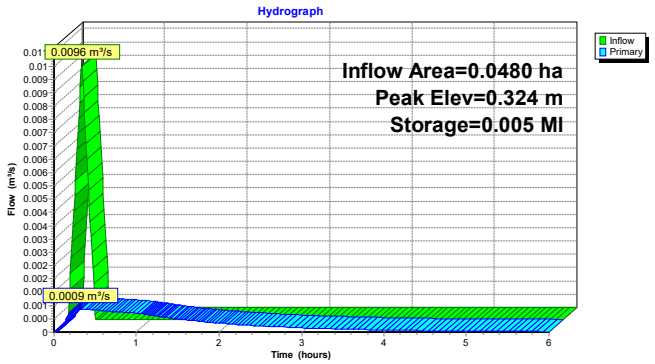
Volume	Invert	Avail.Storage	Storage Description
#1	0.000 m	0.030 Ml	**Custom Stage Data** Listed below

Elevation (meters)	Cum.Store (Mega-liters)
0.000	0.000
1.850	0.030

Device	Routing	Invert	Outlet Devices
#1	Primary	0.000 m	**Hydrovex 40SVHV-1**
			Elev. (meters) 0.000 0.200 0.500 1.000 1.500 2.000
			Disch. (m³/s) 0.00000 0.00070 0.00110 0.00150 0.00190 0.00210

Primary OutFlow Max=0.0009 m³/s @ 0.32 hrs HW=0.324 m (Free Discharge)
└**1=Hydrovex 40SVHV-1** (Custom Controls 0.0009 m³/s)

Pond 30P: Cistern A



Summary for Pond 31P: Cistern B

Inflow Area = 0.0470 ha,100.00% Impervious, Inflow Depth = 13 mm for 2-Year event
Inflow = 0.0098 m³/s @ 0.17 hrs, Volume= 0.006 Ml
Outflow = 0.0008 m³/s @ 0.32 hrs, Volume= 0.006 Ml, Atten= 92%, Lag= 9.2 min
Primary = 0.0008 m³/s @ 0.32 hrs, Volume= 0.006 Ml

Routing by Stor-Ind method, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
Peak Elev= 0.257 m @ 0.32 hrs Surf.Area= 0.0000 ha Storage= 0.005 Ml

Plug-Flow detention time= 91.6 min calculated for 0.006 Ml (97% of inflow)
Center-of-Mass det. time= 91.8 min (101.8 - 10.0)

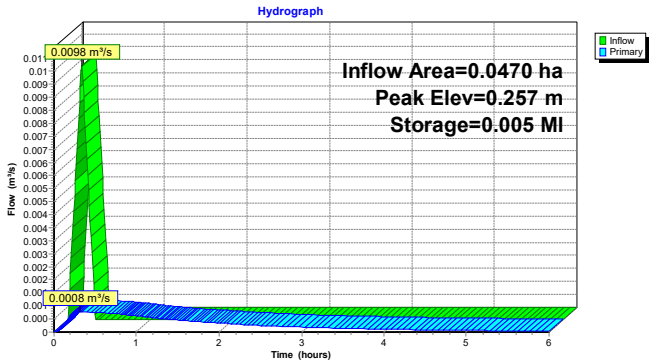
Volume	Invert	Avail.Storage	Storage Description
#1	0.000 m	0.035 Ml	**Custom Stage Data** Listed below

Elevation (meters)	Cum.Store (Mega-liters)
0.000	0.000
1.650	0.035

Device	Routing	Invert	Outlet Devices
#1	Primary	0.000 m	**Hydrovex 40SVHV-1**
			Elev. (meters) 0.000 0.200 0.500 1.000 1.500 2.000
			Disch. (m³/s) 0.00000 0.00070 0.00110 0.00150 0.00190 0.00210

Primary OutFlow Max=0.0008 m³/s @ 0.32 hrs HW=0.257 m (Free Discharge)
└**1=Hydrovex 40SVHV-1** (Custom Controls 0.0008 m³/s)

Pond 31P: Cistern B

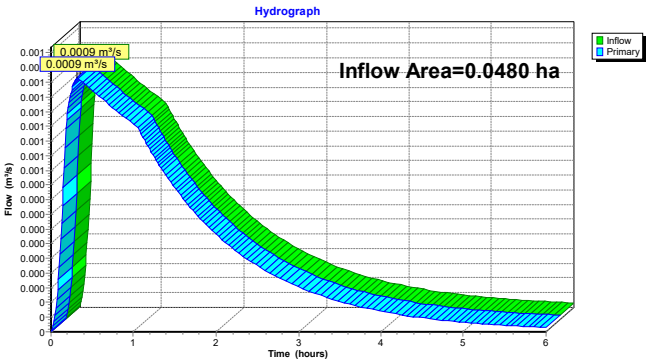


Summary for Link 32L: (new Link)

Inflow Area = 0.0480 ha, 81.25% Impervious, Inflow Depth > 12 mm for 2-Year event
Inflow = 0.0009 m³/s @ 0.32 hrs, Volume= 0.006 Ml
Primary = 0.0009 m³/s @ 0.32 hrs, Volume= 0.006 Ml, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs

Link 32L: (new Link)

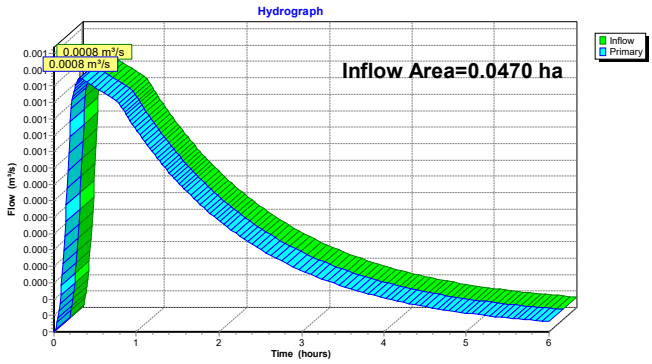


Summary for Link 33L: (new Link)

Inflow Area = 0.0470 ha,100.00% Impervious, Inflow Depth > 12 mm for 2-Year event
Inflow = 0.0008 m³/s @ 0.32 hrs, Volume= 0.006 Ml
Primary = 0.0008 m³/s @ 0.32 hrs, Volume= 0.006 Ml, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs

Link 33L: (new Link)



Time span=0.00-6.00 hrs, dt=0.01 hrs, 601 points
Runoff by Rational method, Rise/Fall=1.0/1.0 xTc
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 25S: PR-A1 Runoff Area=0.0390 ha 100.00% Impervious Runoff Depth=17 mm
Tc=10.0 min C=0.99 Runoff=0.0110 m³/s 0.007 Ml

Subcatchment 26S: PR-A2 Runoff Area=0.0090 ha 0.00% Impervious Runoff Depth=14 mm
Tc=10.0 min C=0.78 Runoff=0.0020 m³/s 0.001 Ml

Subcatchment 27S: PR-B1 Runoff Area=0.0470 ha 100.00% Impervious Runoff Depth=17 mm
Tc=10.0 min C=0.99 Runoff=0.0132 m³/s 0.008 Ml

Pond 30P: Cistern A Peak Elev=0.445 m Storage=0.007 Ml Inflow=0.0130 m³/s 0.008 Ml
Outflow=0.0010 m³/s 0.008 Ml

Pond 31P: Cistern B Peak Elev=0.352 m Storage=0.007 Ml Inflow=0.0132 m³/s 0.008 Ml
Outflow=0.0009 m³/s 0.008 Ml

Link 32L: (new Link) Inflow=0.0010 m³/s 0.008 Ml
Primary=0.0010 m³/s 0.008 Ml

Link 33L: (new Link) Inflow=0.0009 m³/s 0.008 Ml
Primary=0.0009 m³/s 0.008 Ml

Total Runoff Area = 0.0950 ha Runoff Volume = 0.016 Ml Average Runoff Depth = 17 mm
9.47% Pervious = 0.0090 ha 90.53% Impervious = 0.0860 ha

Summary for Subcatchment 25S: PR-A1

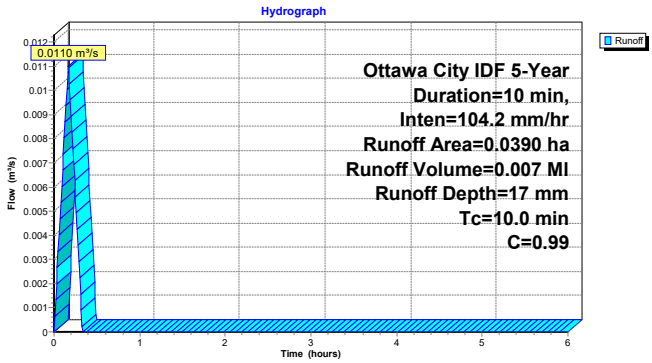
Runoff = 0.0110 m³/s @ 0.17 hrs, Volume= 0.007 Ml, Depth= 17 mm

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
Ottawa City IDF 5-Year Duration=10 min, Inten=104.2 mm/hr

Area (ha)	C	Description
0.0390	0.99	Roof
0.0390		100.00% Impervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Description
10.0					**Direct Entry, Minimum**

Subcatchment 25S: PR-A1



Summary for Subcatchment 26S: PR-A2

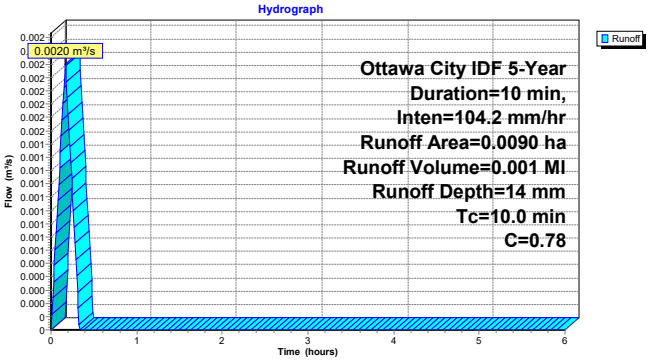
Runoff = 0.0020 m³/s @ 0.17 hrs, Volume= 0.001 Ml, Depth= 14 mm

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
Ottawa City IDF 5-Year Duration=10 min, Inten=104.2 mm/hr

Area (ha)	C	Description
0.0090	0.78	Soft Landscaping and At-Grade Surfaces
0.0090		100.00% Pervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Description
10.0					**Direct Entry, Minimum**

Subcatchment 26S: PR-A2



Summary for Subcatchment 27S: PR-B1

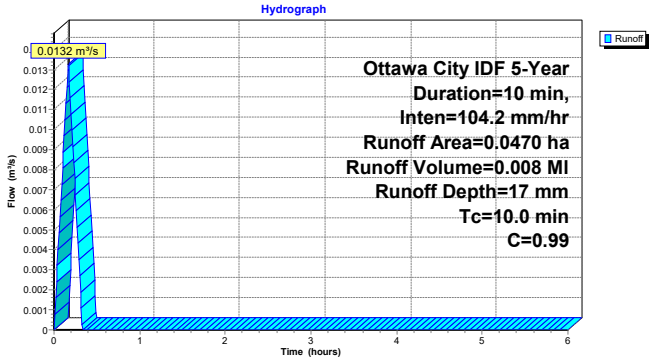
Runoff = 0.0132 m³/s @ 0.17 hrs, Volume= 0.008 Ml, Depth= 17 mm

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
Ottawa City IDF 5-Year Duration=10 min, Inten=104.2 mm/hr

Area (ha)	C	Description
0.0470	0.99	Roof
0.0470		100.00% Impervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Description
10.0					**Direct Entry, Minimum**

Subcatchment 27S: PR-B1



Summary for Pond 30P: Cistern A

Inflow Area = 0.0480 ha, 81.25% Impervious, Inflow Depth = 17 mm for 5-Year event
Inflow = 0.0130 m³/s @ 0.17 hrs, Volume= 0.008 Ml
Outflow = 0.0010 m³/s @ 0.32 hrs, Volume= 0.008 Ml, Atten= 92%, Lag= 9.2 min
Primary = 0.0010 m³/s @ 0.32 hrs, Volume= 0.008 Ml

Routing by Stor-Ind method, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
Peak Elev= 0.445 m @ 0.32 hrs Surf.Area= 0.0000 ha Storage= 0.007 Ml

Plug-Flow detention time= 86.2 min calculated for 0.008 Ml (99% of inflow)
Center-of-Mass det. time= 86.1 min (96.1 - 10.0)

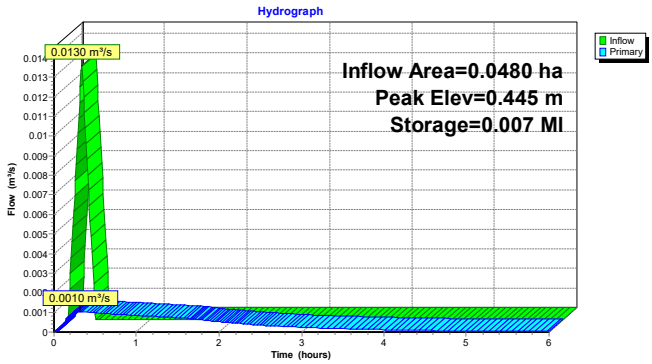
Volume	Invert	Avail.Storage	Storage Description
#1	0.000 m	0.030 Ml	**Custom Stage Data** Listed below

Elevation (meters)	Cum.Store (Mega-liters)
0.000	0.000
1.850	0.030

Device	Routing	Invert	Outlet Devices
#1	Primary	0.000 m	**Hydrovex 40SVHV-1** Elev. (meters) 0.000 0.200 0.500 1.000 1.500 2.000 Disch. (m³/s) 0.00000 0.00070 0.00110 0.00150 0.00190 0.00210

Primary OutFlow Max=0.0010 m³/s @ 0.32 hrs HW=0.445 m (Free Discharge)
↑1=Hydrovex 40SVHV-1 (Custom Controls 0.0010 m³/s)

Pond 30P: Cistern A



Summary for Pond 31P: Cistern B

Inflow Area = 0.0470 ha,100.00% Impervious, Inflow Depth = 17 mm for 5-Year event
Inflow = 0.0132 m³/s @ 0.17 hrs, Volume= 0.008 Ml
Outflow = 0.0009 m³/s @ 0.32 hrs, Volume= 0.008 Ml, Atten= 93%, Lag= 9.3 min
Primary = 0.0009 m³/s @ 0.32 hrs, Volume= 0.008 Ml

Routing by Stor-Ind method, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
Peak Elev= 0.352 m @ 0.32 hrs Surf.Area= 0.0000 ha Storage= 0.007 Ml

Plug-Flow detention time= 98.4 min calculated for 0.008 Ml (96% of inflow)
Center-of-Mass det. time= 98.1 min (108.1 - 10.0)

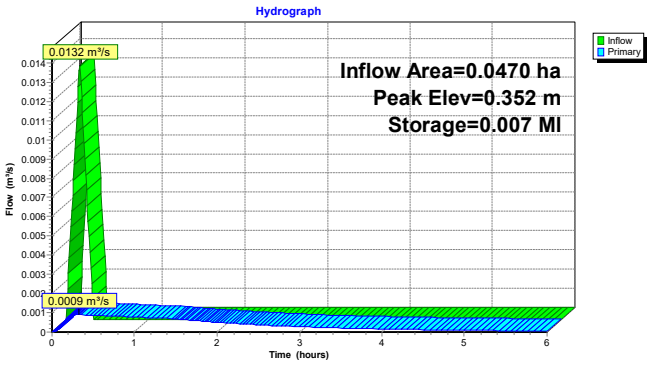
Volume	Invert	Avail.Storage	Storage Description
#1	0.000 m	0.035 Ml	**Custom Stage Data** Listed below

Elevation (meters)	Cum.Store (Mega-liters)
0.000	0.000
1.650	0.035

Device	Routing	Invert	Outlet Devices
#1	Primary	0.000 m	**Hydrovex 40SVHV-1**
			Elev. (meters) 0.000 0.200 0.500 1.000 1.500 2.000
			Disch. (m³/s) 0.00000 0.00070 0.00110 0.00150 0.00190 0.00210

Primary OutFlow Max=0.0009 m³/s @ 0.32 hrs HW=0.352 m (Free Discharge)
↑**1=Hydrovex 40SVHV-1** (Custom Controls 0.0009 m³/s)

Pond 31P: Cistern B

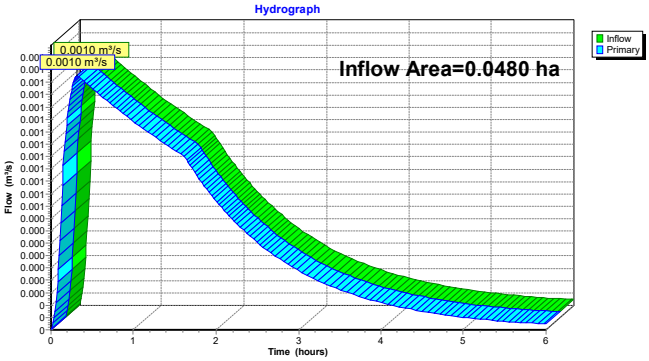


Summary for Link 32L: (new Link)

Inflow Area = 0.0480 ha, 81.25% Impervious, Inflow Depth > 16 mm for 5-Year event
Inflow = 0.0010 m³/s @ 0.32 hrs, Volume= 0.008 Ml
Primary = 0.0010 m³/s @ 0.32 hrs, Volume= 0.008 Ml, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs

Link 32L: (new Link)

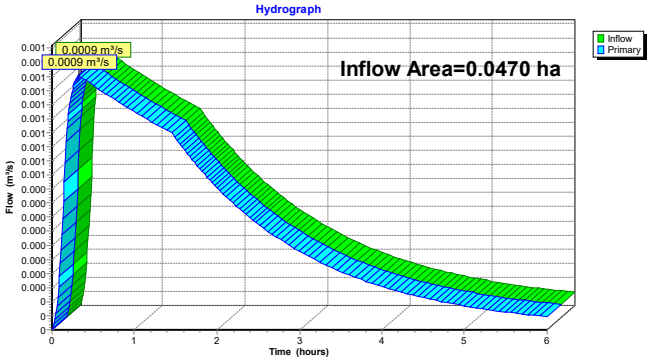


Summary for Link 33L: (new Link)

Inflow Area = 0.0470 ha,100.00% Impervious, Inflow Depth > 17 mm for 5-Year event
Inflow = 0.0009 m³/s @ 0.32 hrs, Volume= 0.008 Ml
Primary = 0.0009 m³/s @ 0.32 hrs, Volume= 0.008 Ml, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs

Link 33L: (new Link)



Time span=0.00-6.00 hrs, dt=0.01 hrs, 601 points
Runoff by Rational method, Rise/Fall=1.0/1.0 xTc
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 25S: PR-A1 Runoff Area=0.0390 ha 100.00% Impervious Runoff Depth=20 mm
Tc=10.0 min C=0.99 Runoff=0.0129 m³/s 0.008 Ml

Subcatchment 26S: PR-A2 Runoff Area=0.0090 ha 0.00% Impervious Runoff Depth=16 mm
Tc=10.0 min C=0.78 Runoff=0.0023 m³/s 0.001 Ml

Subcatchment 27S: PR-B1 Runoff Area=0.0470 ha 100.00% Impervious Runoff Depth=20 mm
Tc=10.0 min C=0.99 Runoff=0.0155 m³/s 0.009 Ml

Pond 30P: Cistern A Peak Elev=0.524 m Storage=0.009 Ml Inflow=0.0152 m³/s 0.009 Ml
Outflow=0.0011 m³/s 0.009 Ml

Pond 31P: Cistern B Peak Elev=0.414 m Storage=0.009 Ml Inflow=0.0155 m³/s 0.009 Ml
Outflow=0.0010 m³/s 0.009 Ml

Link 32L: (new Link) Inflow=0.0011 m³/s 0.009 Ml
Primary=0.0011 m³/s 0.009 Ml

Link 33L: (new Link) Inflow=0.0010 m³/s 0.009 Ml
Primary=0.0010 m³/s 0.009 Ml

Total Runoff Area = 0.0950 ha Runoff Volume = 0.019 Ml Average Runoff Depth = 20 mm
9.47% Pervious = 0.0090 ha 90.53% Impervious = 0.0860 ha

Summary for Subcatchment 25S: PR-A1

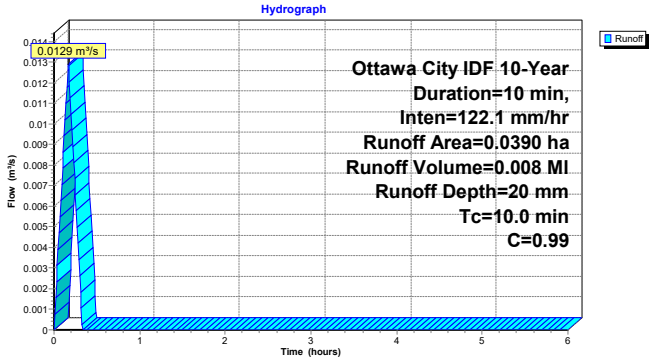
Runoff = 0.0129 m³/s @ 0.17 hrs, Volume= 0.008 Ml, Depth= 20 mm

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
Ottawa City IDF 10-Year Duration=10 min, Inten=122.1 mm/hr

Area (ha)	C	Description
0.0390	0.99	Roof
0.0390		100.00% Impervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Description
10.0					**Direct Entry, Minimum**

Subcatchment 25S: PR-A1



Summary for Subcatchment 26S: PR-A2

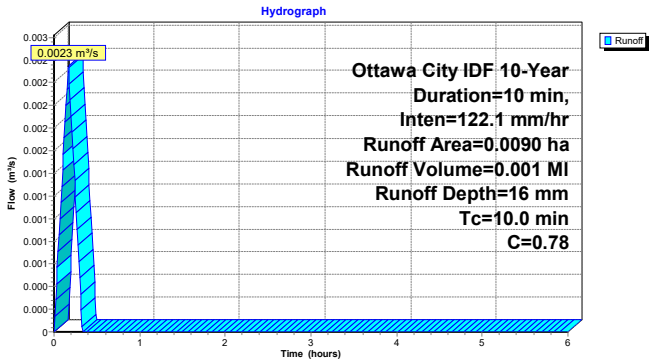
Runoff = 0.0023 m³/s @ 0.17 hrs, Volume= 0.001 Ml, Depth= 16 mm

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
Ottawa City IDF 10-Year Duration=10 min, Inten=122.1 mm/hr

Area (ha)	C	Description
0.0090	0.78	Soft Landscaping and At-Grade Surfaces
0.0090		100.00% Pervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Description
10.0					**Direct Entry, Minimum**

Subcatchment 26S: PR-A2



Summary for Subcatchment 27S: PR-B1

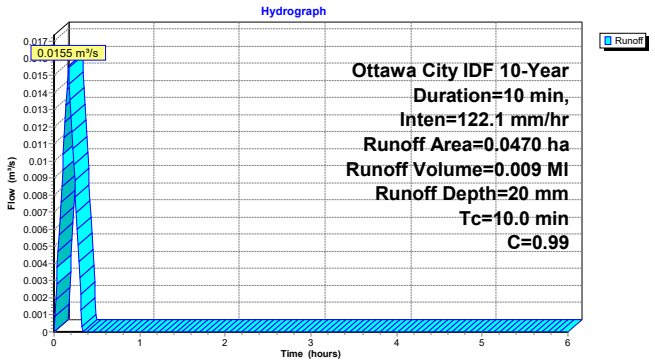
Runoff = 0.0155 m³/s @ 0.17 hrs, Volume= 0.009 Ml, Depth= 20 mm

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
Ottawa City IDF 10-Year Duration=10 min, Inten=122.1 mm/hr

Area (ha)	C	Description
0.0470	0.99	Roof
0.0470		100.00% Impervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Description
10.0					**Direct Entry, Minimum**

Subcatchment 27S: PR-B1



Summary for Pond 30P: Cistern A

Inflow Area = 0.0480 ha, 81.25% Impervious, Inflow Depth = 19 mm for 10-Year event
Inflow = 0.0152 m³/s @ 0.17 hrs, Volume= 0.009 Ml
Outflow = 0.0011 m³/s @ 0.32 hrs, Volume= 0.009 Ml, Atten= 93%, Lag= 9.2 min
Primary = 0.0011 m³/s @ 0.32 hrs, Volume= 0.009 Ml

Routing by Stor-Ind method, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
Peak Elev= 0.524 m @ 0.32 hrs Surf.Area= 0.0000 ha Storage= 0.009 Ml

Plug-Flow detention time= 90.3 min calculated for 0.009 Ml (98% of inflow)
Center-of-Mass det. time= 90.6 min (100.6 - 10.0)

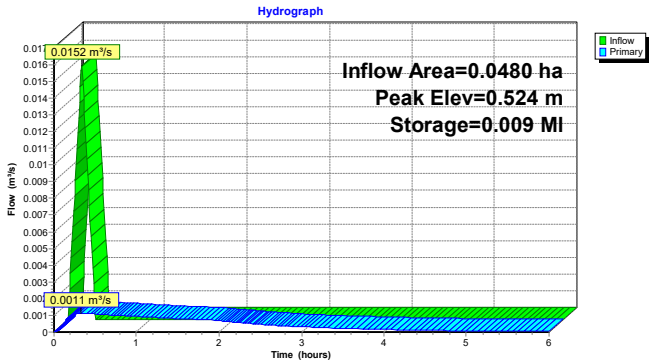
Volume	Invert	Avail.Storage	Storage Description
#1	0.000 m	0.030 Ml	**Custom Stage Data** Listed below

Elevation (meters)	Cum.Store (Mega-liters)
0.000	0.000
1.850	0.030

Device	Routing	Invert	Outlet Devices
#1	Primary	0.000 m	**Hydrovex 40SVHV-1**
			Elev. (meters) 0.000 0.200 0.500 1.000 1.500 2.000
			Disch. (m³/s) 0.00000 0.00070 0.00110 0.00150 0.00190 0.00210

Primary OutFlow Max=0.0011 m³/s @ 0.32 hrs HW=0.524 m (Free Discharge)
1=Hydrovex 40SVHV-1 (Custom Controls 0.0011 m³/s)

Pond 30P: Cistern A



Summary for Pond 31P: Cistern B

Inflow Area = 0.0470 ha,100.00% Impervious, Inflow Depth = 20 mm for 10-Year event
Inflow = 0.0155 m³/s @ 0.17 hrs, Volume= 0.009 Ml
Outflow = 0.0010 m³/s @ 0.32 hrs, Volume= 0.009 Ml, Atten= 94%, Lag= 9.3 min
Primary = 0.0010 m³/s @ 0.32 hrs, Volume= 0.009 Ml

Routing by Stor-Ind method, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
Peak Elev= 0.414 m @ 0.32 hrs Surf.Area= 0.0000 ha Storage= 0.009 Ml

Plug-Flow detention time= 102.5 min calculated for 0.009 Ml (96% of inflow)
Center-of-Mass det. time= 102.6 min (112.6 - 10.0)

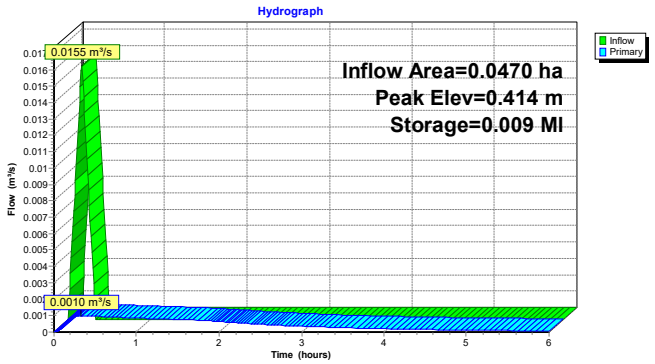
Volume	Invert	Avail.Storage	Storage Description
#1	0.000 m	0.035 Ml	**Custom Stage Data** Listed below

Elevation (meters)	Cum.Store (Mega-liters)
0.000	0.000
1.650	0.035

Device	Routing	Invert	Outlet Devices
#1	Primary	0.000 m	**Hydrovex 40SVHV-1**
			Elev. (meters) 0.000 0.200 0.500 1.000 1.500 2.000
			Disch. (m³/s) 0.00000 0.00070 0.00110 0.00150 0.00190 0.00210

Primary OutFlow Max=0.0010 m³/s @ 0.32 hrs HW=0.414 m (Free Discharge)
1=Hydrovex 40SVHV-1 (Custom Controls 0.0010 m³/s)

Pond 31P: Cistern B

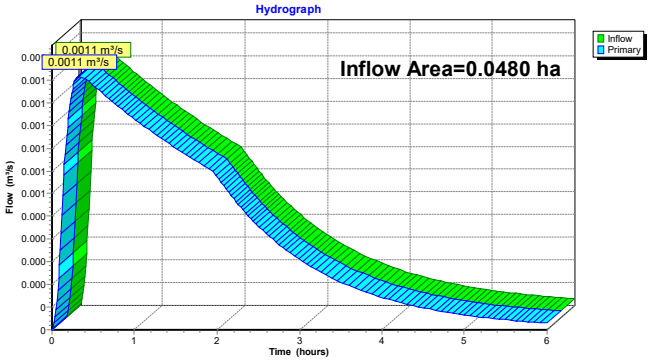


Summary for Link 32L: (new Link)

Inflow Area = 0.0480 ha, 81.25% Impervious, Inflow Depth > 19 mm for 10-Year event
Inflow = 0.0011 m³/s @ 0.32 hrs, Volume= 0.009 Ml
Primary = 0.0011 m³/s @ 0.32 hrs, Volume= 0.009 Ml, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs

Link 32L: (new Link)

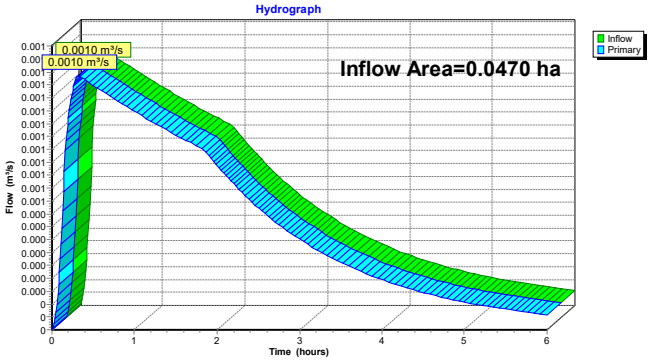


Summary for Link 33L: (new Link)

Inflow Area = 0.0470 ha,100.00% Impervious, Inflow Depth > 19 mm for 10-Year event
Inflow = 0.0010 m³/s @ 0.32 hrs, Volume= 0.009 Ml
Primary = 0.0010 m³/s @ 0.32 hrs, Volume= 0.009 Ml, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs

Link 33L: (new Link)



Time span=0.00-6.00 hrs, dt=0.01 hrs, 601 points
Runoff by Rational method, Rise/Fall=1.0/1.0 xTc
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 25S: PR-A1 Runoff Area=0.0390 ha 100.00% Impervious Runoff Depth=24 mm
Tc=10.0 min C=0.99 Runoff=0.0152 m³/s 0.009 Ml

Subcatchment 26S: PR-A2 Runoff Area=0.0090 ha 0.00% Impervious Runoff Depth=19 mm
Tc=10.0 min C=0.78 Runoff=0.0028 m³/s 0.002 Ml

Subcatchment 27S: PR-B1 Runoff Area=0.0470 ha 100.00% Impervious Runoff Depth=24 mm
Tc=10.0 min C=0.99 Runoff=0.0184 m³/s 0.011 Ml

Pond 30P: Cistern A Peak Elev=0.625 m Storage=0.010 Ml Inflow=0.0180 m³/s 0.011 Ml
Outflow=0.0012 m³/s 0.011 Ml

Pond 31P: Cistern B Peak Elev=0.493 m Storage=0.010 Ml Inflow=0.0184 m³/s 0.011 Ml
Outflow=0.0011 m³/s 0.011 Ml

Link 32L: (new Link) Inflow=0.0012 m³/s 0.011 Ml
Primary=0.0012 m³/s 0.011 Ml

Link 33L: (new Link) Inflow=0.0011 m³/s 0.011 Ml
Primary=0.0011 m³/s 0.011 Ml

Total Runoff Area = 0.0950 ha Runoff Volume = 0.022 Ml Average Runoff Depth = 23 mm
9.47% Pervious = 0.0090 ha 90.53% Impervious = 0.0860 ha

Summary for Subcatchment 25S: PR-A1

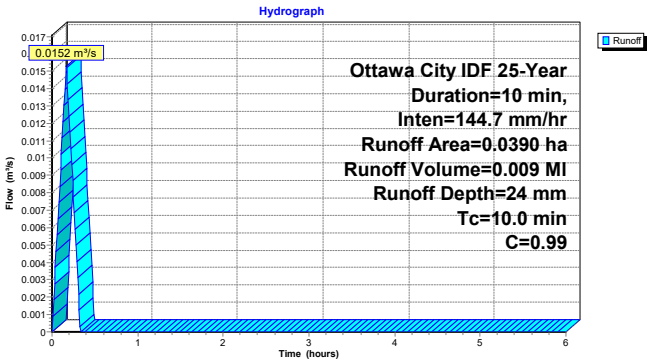
Runoff = 0.0152 m³/s @ 0.17 hrs, Volume= 0.009 Ml, Depth= 24 mm

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
Ottawa City IDF 25-Year Duration=10 min, Inten=144.7 mm/hr

Area (ha)	C	Description
0.0390	0.99	Roof
0.0390		100.00% Impervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Description
10.0					**Direct Entry, Minimum**

Subcatchment 25S: PR-A1



Summary for Subcatchment 26S: PR-A2

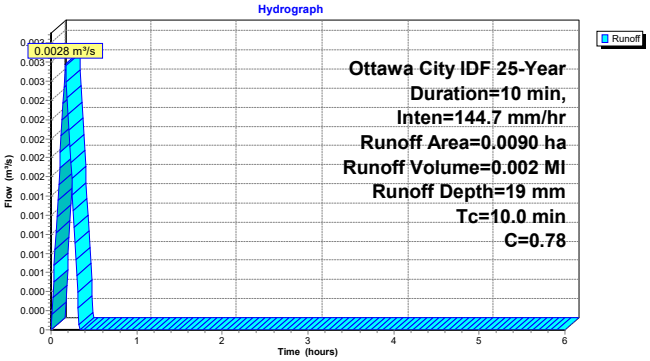
Runoff = 0.0028 m³/s @ 0.17 hrs, Volume= 0.002 Ml, Depth= 19 mm

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
Ottawa City IDF 25-Year Duration=10 min, Inten=144.7 mm/hr

Area (ha)	C	Description
0.0090	0.78	Soft Landscaping and At-Grade Surfaces
0.0090		100.00% Pervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Description
10.0					**Direct Entry, Minimum**

Subcatchment 26S: PR-A2



Summary for Subcatchment 27S: PR-B1

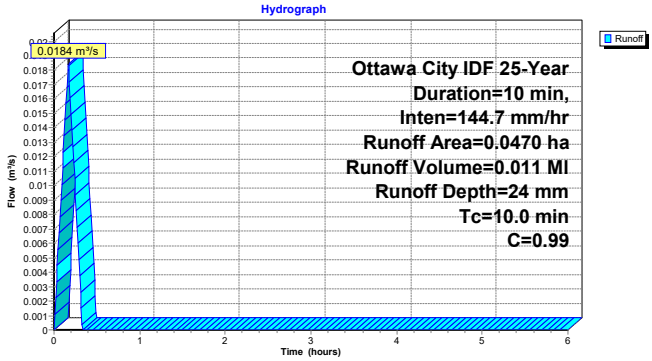
Runoff = 0.0184 m³/s @ 0.17 hrs, Volume= 0.011 Ml, Depth= 24 mm

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
Ottawa City IDF 25-Year Duration=10 min, Inten=144.7 mm/hr

Area (ha)	C	Description
0.0470	0.99	Roof
0.0470		100.00% Impervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Description
10.0					**Direct Entry, Minimum**

Subcatchment 27S: PR-B1



Summary for Pond 30P: Cistern A

Inflow Area = 0.0480 ha, 81.25% Impervious, Inflow Depth = 23 mm for 25-Year event
Inflow = 0.0180 m³/s @ 0.17 hrs, Volume= 0.011 Ml
Outflow = 0.0012 m³/s @ 0.32 hrs, Volume= 0.011 Ml, Atten= 93%, Lag= 9.3 min
Primary = 0.0012 m³/s @ 0.32 hrs, Volume= 0.011 Ml

Routing by Stor-Ind method, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
Peak Elev= 0.625 m @ 0.32 hrs Surf.Area= 0.0000 ha Storage= 0.010 Ml

Plug-Flow detention time= 96.6 min calculated for 0.011 Ml (98% of inflow)
Center-of-Mass det. time= 96.4 min (106.4 - 10.0)

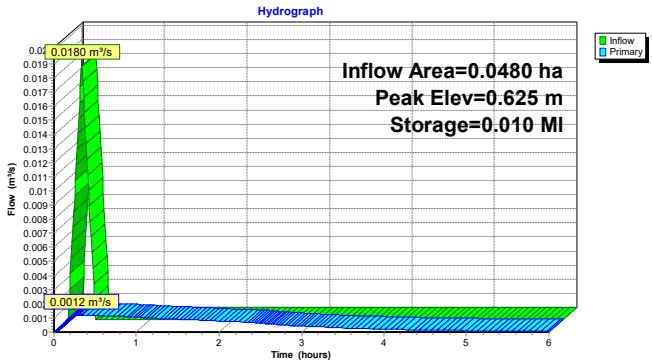
Volume	Invert	Avail.Storage	Storage Description
#1	0.000 m	0.030 Ml	**Custom Stage Data** Listed below

Elevation (meters)	Cum.Store (Mega-liters)
0.000	0.000
1.850	0.030

Device	Routing	Invert	Outlet Devices
#1	Primary	0.000 m	**Hydrovex 40SVHV-1** Elev. (meters) 0.000 0.200 0.500 1.000 1.500 2.000 Disch. (m³/s) 0.00000 0.00070 0.00110 0.00150 0.00190 0.00210

Primary OutFlow Max=0.0012 m³/s @ 0.32 hrs HW=0.625 m (Free Discharge)
1=Hydrovex 40SVHV-1 (Custom Controls 0.0012 m³/s)

Pond 30P: Cistern A



Summary for Pond 31P: Cistern B

Inflow Area = 0.0470 ha,100.00% Impervious, Inflow Depth = 24 mm for 25-Year event
Inflow = 0.0184 m³/s @ 0.17 hrs, Volume= 0.011 Ml
Outflow = 0.0011 m³/s @ 0.32 hrs, Volume= 0.011 Ml, Atten= 94%, Lag= 9.4 min
Primary = 0.0011 m³/s @ 0.32 hrs, Volume= 0.011 Ml

Routing by Stor-Ind method, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
Peak Elev= 0.493 m @ 0.32 hrs Surf.Area= 0.0000 ha Storage= 0.010 Ml

Plug-Flow detention time= 107.9 min calculated for 0.011 Ml (96% of inflow)
Center-of-Mass det. time= 107.9 min (117.9 - 10.0)

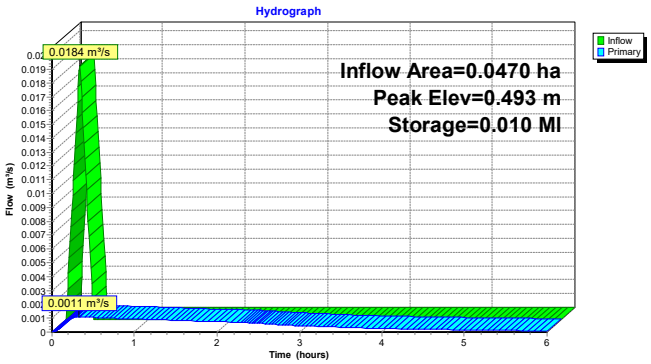
Volume	Invert	Avail.Storage	Storage Description
#1	0.000 m	0.035 Ml	**Custom Stage Data** Listed below

Elevation (meters)	Cum.Store (Mega-liters)
0.000	0.000
1.650	0.035

Device	Routing	Invert	Outlet Devices
#1	Primary	0.000 m	**Hydrovex 40SVHV-1**
			Elev. (meters) 0.000 0.200 0.500 1.000 1.500 2.000
			Disch. (m³/s) 0.00000 0.00070 0.00110 0.00150 0.00190 0.00210

Primary OutFlow Max=0.0011 m³/s @ 0.32 hrs HW=0.493 m (Free Discharge)
↑**1=Hydrovex 40SVHV-1** (Custom Controls 0.0011 m³/s)

Pond 31P: Cistern B

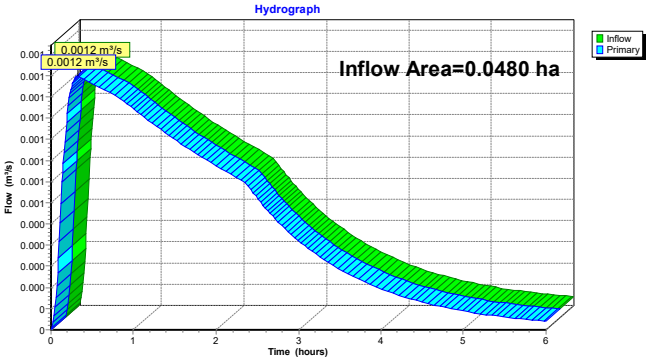


Summary for Link 32L: (new Link)

Inflow Area = 0.0480 ha, 81.25% Impervious, Inflow Depth > 23 mm for 25-Year event
Inflow = 0.0012 m³/s @ 0.32 hrs, Volume= 0.011 Ml
Primary = 0.0012 m³/s @ 0.32 hrs, Volume= 0.011 Ml, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs

Link 32L: (new Link)

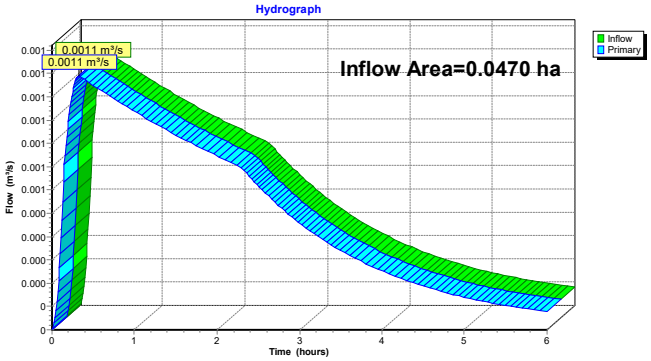


Summary for Link 33L: (new Link)

Inflow Area = 0.0470 ha,100.00% Impervious, Inflow Depth > 23 mm for 25-Year event
Inflow = 0.0011 m³/s @ 0.32 hrs, Volume= 0.011 Ml
Primary = 0.0011 m³/s @ 0.32 hrs, Volume= 0.011 Ml, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs

Link 33L: (new Link)



Time span=0.00-6.00 hrs, dt=0.01 hrs, 601 points
Runoff by Rational method, Rise/Fall=1.0/1.0 xTc
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 25S: PR-A1 Runoff Area=0.0390 ha 100.00% Impervious Runoff Depth=27 mm
Tc=10.0 min C=0.99 Runoff=0.0170 m³/s 0.010 Ml

Subcatchment 26S: PR-A2 Runoff Area=0.0090 ha 0.00% Impervious Runoff Depth=21 mm
Tc=10.0 min C=0.78 Runoff=0.0031 m³/s 0.002 Ml

Subcatchment 27S: PR-B1 Runoff Area=0.0470 ha 100.00% Impervious Runoff Depth=27 mm
Tc=10.0 min C=0.99 Runoff=0.0205 m³/s 0.013 Ml

Pond 30P: Cistern A Peak Elev=0.701 m Storage=0.011 Ml Inflow=0.0201 m³/s 0.012 Ml
Outflow=0.0013 m³/s 0.012 Ml

Pond 31P: Cistern B Peak Elev=0.552 m Storage=0.012 Ml Inflow=0.0205 m³/s 0.013 Ml
Outflow=0.0011 m³/s 0.012 Ml

Link 32L: (new Link) Inflow=0.0013 m³/s 0.012 Ml
Primary=0.0013 m³/s 0.012 Ml

Link 33L: (new Link) Inflow=0.0011 m³/s 0.012 Ml
Primary=0.0011 m³/s 0.012 Ml

Total Runoff Area = 0.0950 ha Runoff Volume = 0.025 Ml Average Runoff Depth = 26 mm
9.47% Pervious = 0.0090 ha 90.53% Impervious = 0.0860 ha

Summary for Subcatchment 25S: PR-A1

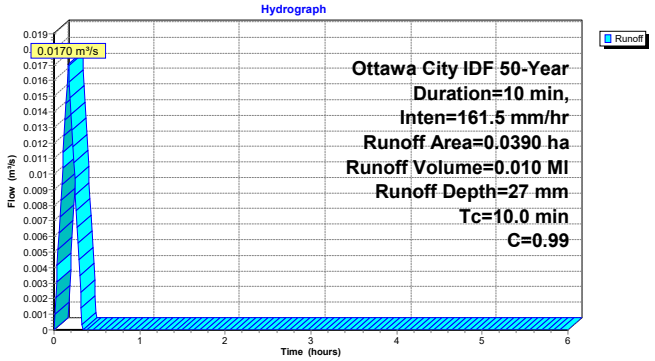
Runoff = 0.0170 m³/s @ 0.17 hrs, Volume= 0.010 Ml, Depth= 27 mm

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
Ottawa City IDF 50-Year Duration=10 min, Inten=161.5 mm/hr

Area (ha)	C	Description
0.0390	0.99	Roof
0.0390		100.00% Impervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Description
10.0					**Direct Entry, Minimum**

Subcatchment 25S: PR-A1



Summary for Subcatchment 26S: PR-A2

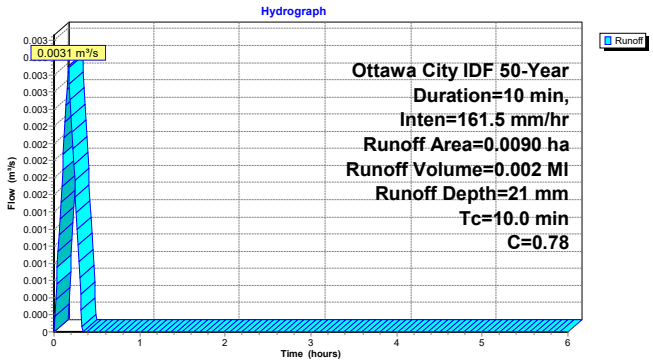
Runoff = 0.0031 m³/s @ 0.17 hrs, Volume= 0.002 Ml, Depth= 21 mm

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
Ottawa City IDF 50-Year Duration=10 min, Inten=161.5 mm/hr

Area (ha)	C	Description
0.0090	0.78	Soft Landscaping and At-Grade Surfaces
0.0090		100.00% Pervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Description
10.0					**Direct Entry, Minimum**

Subcatchment 26S: PR-A2



Summary for Subcatchment 27S: PR-B1

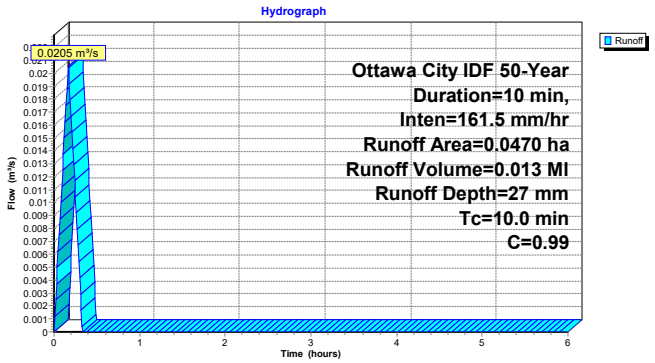
Runoff = 0.0205 m³/s @ 0.17 hrs, Volume= 0.013 Ml, Depth= 27 mm

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
Ottawa City IDF 50-Year Duration=10 min, Inten=161.5 mm/hr

Area (ha)	C	Description
0.0470	0.99	Roof
0.0470		100.00% Impervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Description
10.0					**Direct Entry, Minimum**

Subcatchment 27S: PR-B1



Summary for Pond 30P: Cistern A

Inflow Area = 0.0480 ha, 81.25% Impervious, Inflow Depth = 26 mm for 50-Year event
Inflow = 0.0201 m³/s @ 0.17 hrs, Volume= 0.012 Ml
Outflow = 0.0013 m³/s @ 0.32 hrs, Volume= 0.012 Ml, Atten= 94%, Lag= 9.3 min
Primary = 0.0013 m³/s @ 0.32 hrs, Volume= 0.012 Ml

Routing by Stor-Ind method, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
Peak Elev= 0.701 m @ 0.32 hrs Surf.Area= 0.0000 ha Storage= 0.011 Ml

Plug-Flow detention time= 100.6 min calculated for 0.012 Ml (98% of inflow)
Center-of-Mass det. time= 100.8 min (110.8 - 10.0)

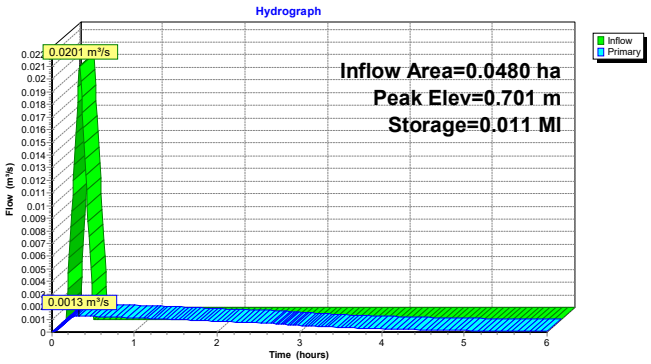
Volume	Invert	Avail.Storage	Storage Description
#1	0.000 m	0.030 Ml	**Custom Stage Data** Listed below

Elevation (meters)	Cum.Store (Mega-liters)
0.000	0.000
1.850	0.030

Device	Routing	Invert	Outlet Devices
#1	Primary	0.000 m	**Hydrovex 40SVHV-1**
			Elev. (meters) 0.000 0.200 0.500 1.000 1.500 2.000
			Disch. (m³/s) 0.00000 0.00070 0.00110 0.00150 0.00190 0.00210

Primary OutFlow Max=0.0013 m³/s @ 0.32 hrs HW=0.700 m (Free Discharge)
1=Hydrovex 40SVHV-1 (Custom Controls 0.0013 m³/s)

Pond 30P: Cistern A



Summary for Pond 31P: Cistern B

Inflow Area = 0.0470 ha,100.00% Impervious, Inflow Depth = 27 mm for 50-Year event
Inflow = 0.0205 m³/s @ 0.17 hrs, Volume= 0.013 Ml
Outflow = 0.0011 m³/s @ 0.32 hrs, Volume= 0.012 Ml, Atten= 94%, Lag= 9.4 min
Primary = 0.0011 m³/s @ 0.32 hrs, Volume= 0.012 Ml

Routing by Stor-Ind method, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
Peak Elev= 0.552 m @ 0.32 hrs Surf.Area= 0.0000 ha Storage= 0.012 Ml

Plug-Flow detention time= 111.8 min calculated for 0.012 Ml (95% of inflow)
Center-of-Mass det. time= 111.8 min (121.8 - 10.0)

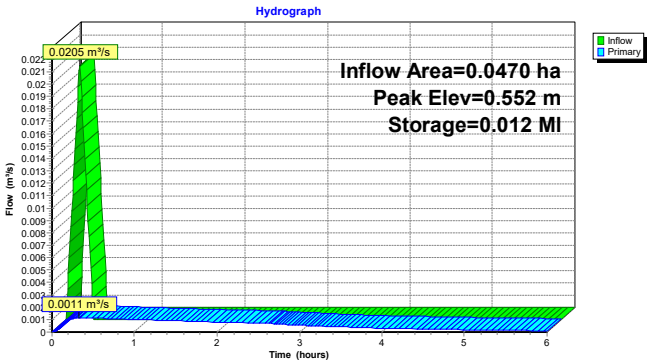
Volume	Invert	Avail.Storage	Storage Description
#1	0.000 m	0.035 Ml	**Custom Stage Data** Listed below

Elevation (meters)	Cum.Store (Mega-liters)
0.000	0.000
1.650	0.035

Device	Routing	Invert	Outlet Devices
#1	Primary	0.000 m	**Hydrovex 40SVHV-1**
			Elev. (meters) 0.000 0.200 0.500 1.000 1.500 2.000
			Disch. (m³/s) 0.00000 0.00070 0.00110 0.00150 0.00190 0.00210

Primary OutFlow Max=0.0011 m³/s @ 0.32 hrs HW=0.552 m (Free Discharge)
1=Hydrovex 40SVHV-1 (Custom Controls 0.0011 m³/s)

Pond 31P: Cistern B

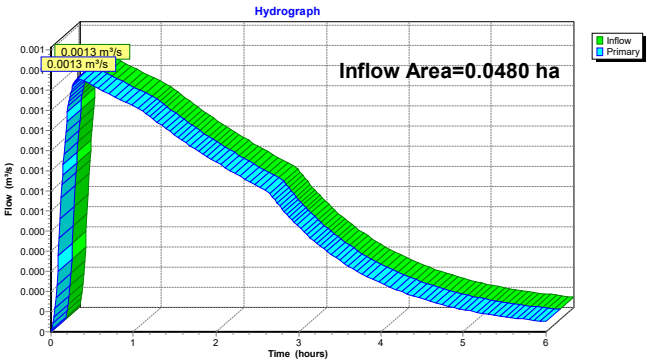


Summary for Link 32L: (new Link)

Inflow Area = 0.0480 ha, 81.25% Impervious, Inflow Depth > 25 mm for 50-Year event
Inflow = 0.0013 m³/s @ 0.32 hrs, Volume= 0.012 Ml
Primary = 0.0013 m³/s @ 0.32 hrs, Volume= 0.012 Ml, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs

Link 32L: (new Link)

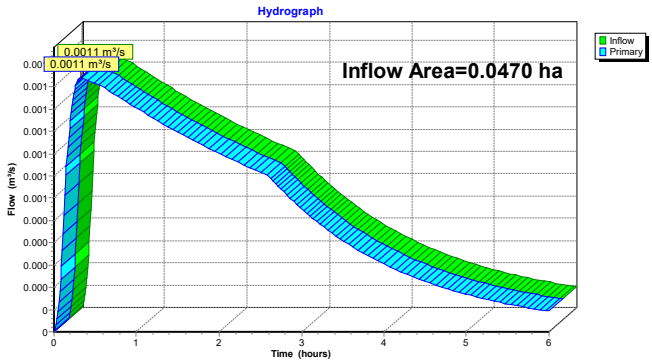


Summary for Link 33L: (new Link)

Inflow Area = 0.0470 ha,100.00% Impervious, Inflow Depth > 25 mm for 50-Year event
Inflow = 0.0011 m³/s @ 0.32 hrs, Volume= 0.012 Ml
Primary = 0.0011 m³/s @ 0.32 hrs, Volume= 0.012 Ml, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs

Link 33L: (new Link)



Time span=0.00-6.00 hrs, dt=0.01 hrs, 601 points
Runoff by Rational method, Rise/Fall=1.0/1.0 xTc
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 25S: PR-A1 Runoff Area=0.0390 ha 100.00% Impervious Runoff Depth=29 mm
Tc=10.0 min C=0.99 Runoff=0.0188 m³/s 0.011 Ml

Subcatchment 26S: PR-A2 Runoff Area=0.0090 ha 0.00% Impervious Runoff Depth=23 mm
Tc=10.0 min C=0.78 Runoff=0.0034 m³/s 0.002 Ml

Subcatchment 27S: PR-B1 Runoff Area=0.0470 ha 100.00% Impervious Runoff Depth=29 mm
Tc=10.0 min C=0.99 Runoff=0.0227 m³/s 0.014 Ml

Pond 30P: Cistern A Peak Elev=0.778 m Storage=0.013 Ml Inflow=0.0222 m³/s 0.014 Ml
Outflow=0.0013 m³/s 0.013 Ml

Pond 31P: Cistern B Peak Elev=0.612 m Storage=0.013 Ml Inflow=0.0227 m³/s 0.014 Ml
Outflow=0.0012 m³/s 0.013 Ml

Link 32L: (new Link) Inflow=0.0013 m³/s 0.013 Ml
Primary=0.0013 m³/s 0.013 Ml

Link 33L: (new Link) Inflow=0.0012 m³/s 0.013 Ml
Primary=0.0012 m³/s 0.013 Ml

Total Runoff Area = 0.0950 ha Runoff Volume = 0.027 Ml Average Runoff Depth = 29 mm
9.47% Pervious = 0.0090 ha 90.53% Impervious = 0.0860 ha

Summary for Subcatchment 25S: PR-A1

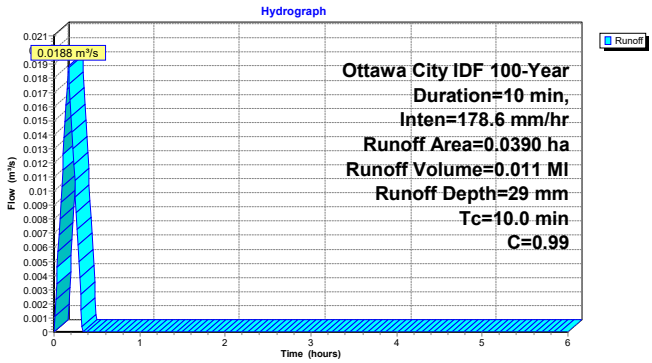
Runoff = 0.0188 m³/s @ 0.17 hrs, Volume= 0.011 Ml, Depth= 29 mm

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
Ottawa City IDF 100-Year Duration=10 min, Inten=178.6 mm/hr

Area (ha)	C	Description
0.0390	0.99	Roof
0.0390		100.00% Impervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Description
10.0					**Direct Entry, Minimum**

Subcatchment 25S: PR-A1



Summary for Subcatchment 26S: PR-A2

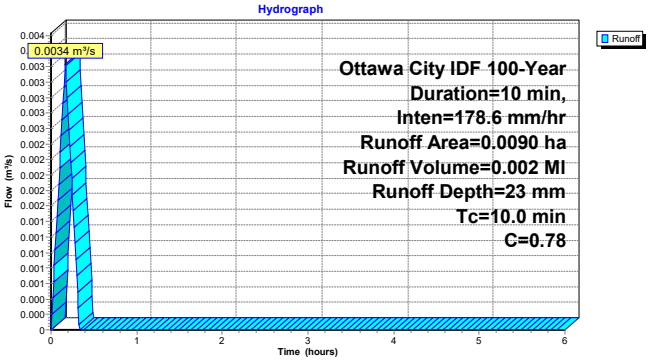
Runoff = 0.0034 m³/s @ 0.17 hrs, Volume= 0.002 Ml, Depth= 23 mm

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
Ottawa City IDF 100-Year Duration=10 min, Inten=178.6 mm/hr

Area (ha)	C	Description
0.0090	0.78	Soft Landscaping and At-Grade Surfaces
0.0090		100.00% Pervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Description
10.0					**Direct Entry, Minimum**

Subcatchment 26S: PR-A2



Summary for Subcatchment 27S: PR-B1

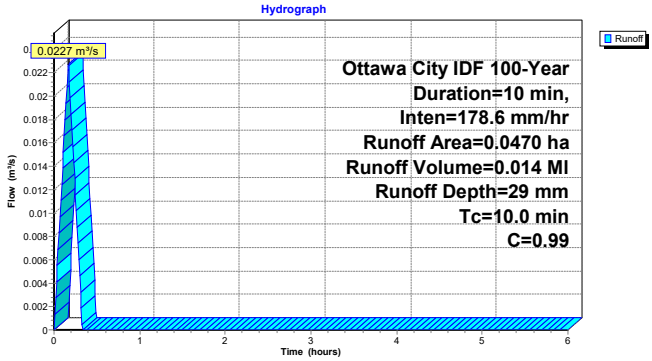
Runoff = 0.0227 m³/s @ 0.17 hrs, Volume= 0.014 Ml, Depth= 29 mm

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
Ottawa City IDF 100-Year Duration=10 min, Inten=178.6 mm/hr

Area (ha)	C	Description
0.0470	0.99	Roof
0.0470		100.00% Impervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Description
10.0					**Direct Entry, Minimum**

Subcatchment 27S: PR-B1



Summary for Pond 30P: Cistern A

Inflow Area = 0.0480 ha, 81.25% Impervious, Inflow Depth = 28 mm for 100-Year event
Inflow = 0.0222 m³/s @ 0.17 hrs, Volume= 0.014 Ml
Outflow = 0.0013 m³/s @ 0.32 hrs, Volume= 0.013 Ml, Atten= 94%, Lag= 9.4 min
Primary = 0.0013 m³/s @ 0.32 hrs, Volume= 0.013 Ml

Routing by Stor-Ind method, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
Peak Elev= 0.778 m @ 0.32 hrs Surf.Area= 0.0000 ha Storage= 0.013 Ml

Plug-Flow detention time= 104.9 min calculated for 0.013 Ml (98% of inflow)
Center-of-Mass det. time= 105.1 min (115.1 - 10.0)

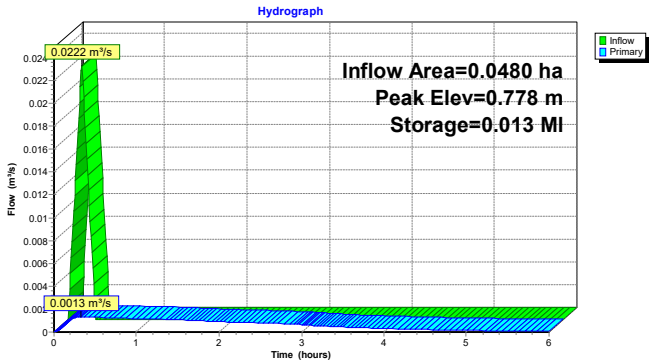
Volume	Invert	Avail.Storage	Storage Description
#1	0.000 m	0.030 Ml	**Custom Stage Data** Listed below

Elevation (meters)	Cum.Store (Mega-liters)
0.000	0.000
1.850	0.030

Device	Routing	Invert	Outlet Devices
#1	Primary	0.000 m	**Hydrovex 40SVHV-1**
			Elev. (meters) 0.000 0.200 0.500 1.000 1.500 2.000
			Disch. (m³/s) 0.00000 0.00070 0.00110 0.00150 0.00190 0.00210

Primary OutFlow Max=0.0013 m³/s @ 0.32 hrs HW=0.777 m (Free Discharge)
↑—1=Hydrovex 40SVHV-1 (Custom Controls 0.0013 m³/s)

Pond 30P: Cistern A



Summary for Pond 31P: Cistern B

Inflow Area = 0.0470 ha,100.00% Impervious, Inflow Depth = 29 mm for 100-Year event
Inflow = 0.0227 m³/s @ 0.17 hrs, Volume= 0.014 Ml
Outflow = 0.0012 m³/s @ 0.32 hrs, Volume= 0.013 Ml, Atten= 95%, Lag= 9.4 min
Primary = 0.0012 m³/s @ 0.32 hrs, Volume= 0.013 Ml

Routing by Stor-Ind method, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
Peak Elev= 0.612 m @ 0.32 hrs Surf.Area= 0.0000 ha Storage= 0.013 Ml

Plug-Flow detention time= 116.2 min calculated for 0.013 Ml (95% of inflow)
Center-of-Mass det. time= 115.8 min (125.8 - 10.0)

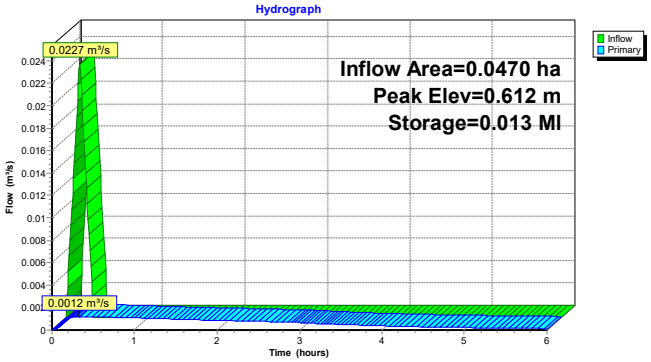
Volume	Invert	Avail.Storage	Storage Description
#1	0.000 m	0.035 Ml	**Custom Stage Data** Listed below

Elevation (meters)	Cum.Store (Mega-liters)
0.000	0.000
1.650	0.035

Device	Routing	Invert	Outlet Devices
#1	Primary	0.000 m	**Hydrovex 40SVHV-1**
			Elev. (meters) 0.000 0.200 0.500 1.000 1.500 2.000
			Disch. (m³/s) 0.00000 0.00070 0.00110 0.00150 0.00190 0.00210

Primary OutFlow Max=0.0012 m³/s @ 0.32 hrs HW=0.612 m (Free Discharge)
↑**1=Hydrovex 40SVHV-1** (Custom Controls 0.0012 m³/s)

Pond 31P: Cistern B

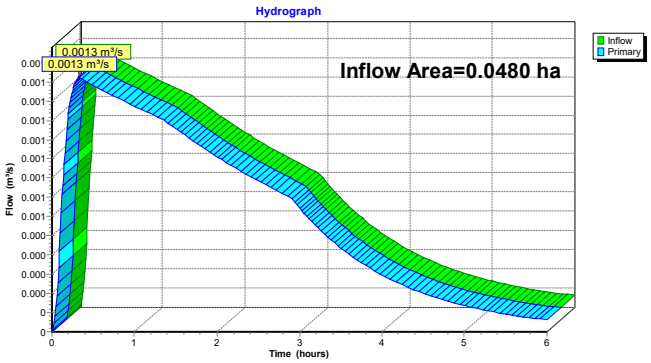


Summary for Link 32L: (new Link)

Inflow Area = 0.0480 ha, 81.25% Impervious, Inflow Depth > 28 mm for 100-Year event
Inflow = 0.0013 m³/s @ 0.32 hrs, Volume= 0.013 Ml
Primary = 0.0013 m³/s @ 0.32 hrs, Volume= 0.013 Ml, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs

Link 32L: (new Link)

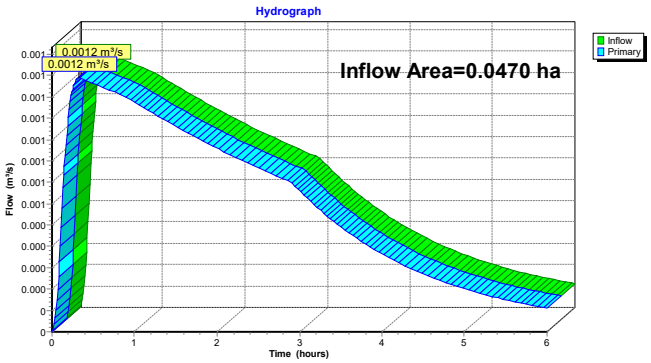


Summary for Link 33L: (new Link)

Inflow Area = 0.0470 ha,100.00% Impervious, Inflow Depth > 28 mm for 100-Year event
Inflow = 0.0012 m³/s @ 0.32 hrs, Volume= 0.013 Ml
Primary = 0.0012 m³/s @ 0.32 hrs, Volume= 0.013 Ml, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs

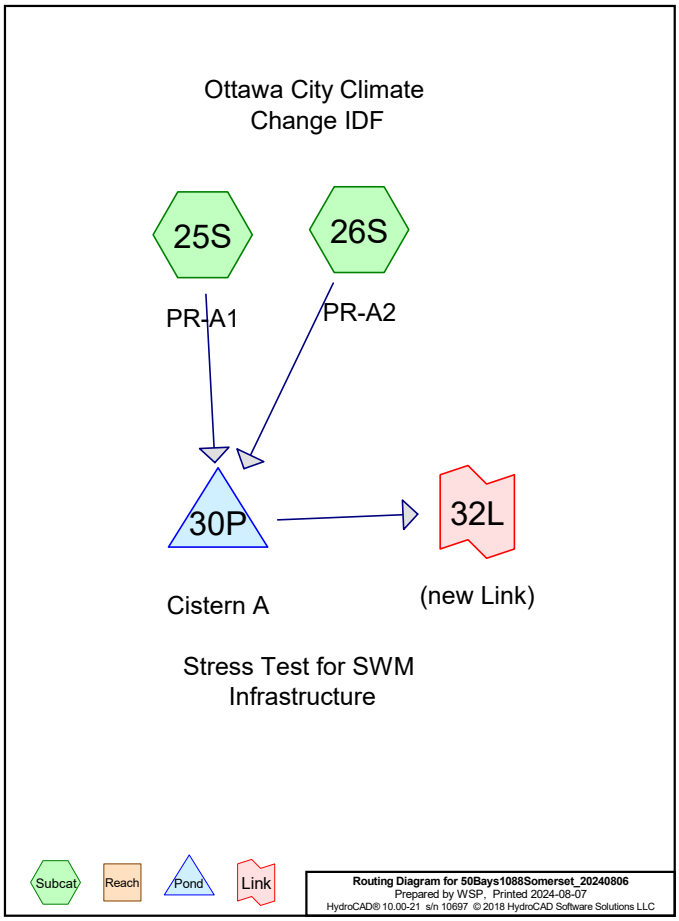
Link 33L: (new Link)



APPENDIX

APPENDIX

C-3 Stress Test for Climate Change



Area Listing (selected nodes)

Area (hectares)	C	Description (subcatchment-numbers)
0.0390	0.99	Roof (25S)
0.0090	0.78	Soft Landscaping and At-Grade Surfaces (26S)
0.0480	**0.95**	**TOTAL AREA**

Soil Listing (selected nodes)

Area (hectares)	Soil Group	Subcatchment Numbers
0.0000	HSG A	
0.0000	HSG B	
0.0000	HSG C	
0.0000	HSG D	
0.0480	Other	25S, 26S
0.0480		**TOTAL AREA**

Ground Covers (selected nodes)

HSG-A (hectares)	HSG-B (hectares)	HSG-C (hectares)	HSG-D (hectares)	Other (hectares)	Total (hectares)	Ground Cover	Sub Num
0.0000	0.0000	0.0000	0.0000	0.0390	0.0390	Roof	
0.0000	0.0000	0.0000	0.0000	0.0090	0.0090	Soft Landscaping and At-Grade Surfaces	
0.0000	**0.0000**	**0.0000**	**0.0000**	**0.0480**	**0.0480**	**TOTAL AREA**	

Time span=0.00-6.00 hrs, dt=0.01 hrs, 601 points
Runoff by Rational method, Rise/Fall=1.0/1.0 xTc
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Pond 30P: Cistern A Peak Elev=0.624 m Storage=0.010 Ml Inflow=0.0026 m³/s 0.015 Ml
Outflow=0.0012 m³/s 0.015 Ml

Summary for Pond 30P: Cistern A

Inflow Area = 0.0480 ha, 81.25% Impervious, Inflow Depth = 32 mm for 2-Year event
Inflow = 0.0026 m³/s @ 0.17 hrs, Volume= 0.015 Ml
Outflow = 0.0012 m³/s @ 1.69 hrs, Volume= 0.015 Ml, Atten= 54%, Lag= 91.2 min
Primary = 0.0012 m³/s @ 1.69 hrs, Volume= 0.015 Ml

Routing by Stor-Ind method, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
Peak Elev= 0.624 m @ 1.69 hrs Surf.Area= 0.0000 ha Storage= 0.010 Ml

Plug-Flow detention time= 96.0 min calculated for 0.015 Ml (96% of inflow)
Center-of-Mass det. time= 94.2 min (147.2 - 53.0)

Volume	Invert	Avail.Storage	Storage Description
#1	0.000 m	0.030 Ml	**Custom Stage Data** Listed below

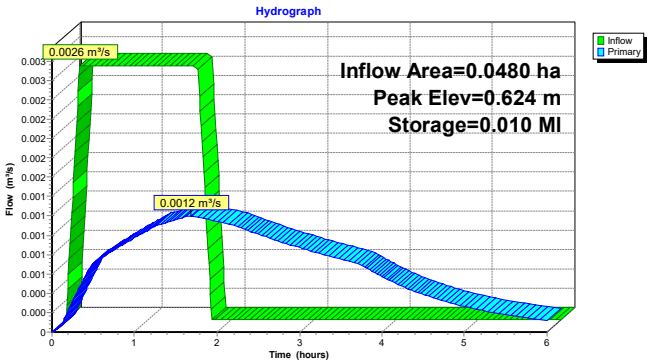
Elevation (meters)	Cum.Store (Mega-liters)
0.000	0.000
1.850	0.030

Device	Routing	Invert	Outlet Devices
#1	Primary	0.000 m	**Hydrovex 40SVHV-1**

Elev. (meters) 0.000 0.200 0.500 1.000 1.500 2.000
Disch. (m³/s) 0.00000 0.00070 0.00110 0.00150 0.00190 0.00210

Primary OutFlow Max=0.0012 m³/s @ 1.69 hrs HW=0.624 m (Free Discharge)
↑—**1=Hydrovex 40SVHV-1** (Custom Controls 0.0012 m³/s)

Pond 30P: Cistern A



Time span=0.00-6.00 hrs, dt=0.01 hrs, 601 points
Runoff by Rational method, Rise/Fall=1.0/1.0 xTc
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Pond 30P: Cistern A Peak Elev=0.883 m Storage=0.014 Ml Inflow=0.0035 m³/s 0.020 Ml
Outflow=0.0014 m³/s 0.019 Ml

Summary for Pond 30P: Cistern A

Inflow Area = 0.0480 ha, 81.25% Impervious, Inflow Depth = 42 mm for 5-Year event
Inflow = 0.0035 m³/s @ 0.17 hrs, Volume= 0.020 Ml
Outflow = 0.0014 m³/s @ 1.70 hrs, Volume= 0.019 Ml, Atten= 60%, Lag= 91.8 min
Primary = 0.0014 m³/s @ 1.70 hrs, Volume= 0.019 Ml

Routing by Stor-Ind method, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
Peak Elev= 0.883 m @ 1.70 hrs Surf.Area= 0.0000 ha Storage= 0.014 Ml

Plug-Flow detention time= 108.9 min calculated for 0.019 Ml (94% of inflow)
Center-of-Mass det. time= 106.4 min (159.4 - 53.0)

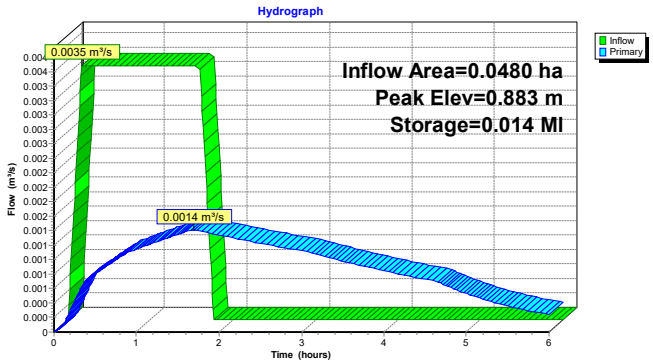
Volume	Invert	Avail.Storage	Storage Description
#1	0.000 m	0.030 Ml	**Custom Stage Data** Listed below

Elevation (meters)	Cum.Store (Mega-liters)
0.000	0.000
1.850	0.030

Device	Routing	Invert	Outlet Devices
#1	Primary	0.000 m	**Hydrovex 40SVHV-1** Elev. (meters) 0.000 0.200 0.500 1.000 1.500 2.000 Disch. (m³/s) 0.00000 0.00070 0.00110 0.00150 0.00190 0.00210

Primary OutFlow Max=0.0014 m³/s @ 1.70 hrs HW=0.883 m (Free Discharge)
↳**1=Hydrovex 40SVHV-1** (Custom Controls 0.0014 m³/s)

Pond 30P: Cistern A



Time span=0.00-6.00 hrs, dt=0.01 hrs, 601 points
Runoff by Rational method, Rise/Fall=1.0/1.0 xTc
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Pond 30P: Cistern A Peak Elev=1.056 m Storage=0.017 Ml Inflow=0.0041 m³/s 0.024 Ml
Outflow=0.0015 m³/s 0.022 Ml

Summary for Pond 30P: Cistern A

Inflow Area = 0.0480 ha, 81.25% Impervious, Inflow Depth = 49 mm for 10-Year event
Inflow = 0.0041 m³/s @ 0.17 hrs, Volume= 0.024 Ml
Outflow = 0.0015 m³/s @ 1.70 hrs, Volume= 0.022 Ml, Atten= 62%, Lag= 92.0 min
Primary = 0.0015 m³/s @ 1.70 hrs, Volume= 0.022 Ml

Routing by Stor-Ind method, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
Peak Elev= 1.056 m @ 1.70 hrs Surf.Area= 0.0000 ha Storage= 0.017 Ml

Plug-Flow detention time= 116.0 min calculated for 0.022 Ml (93% of inflow)
Center-of-Mass det. time= 112.5 min (165.5 - 53.0)

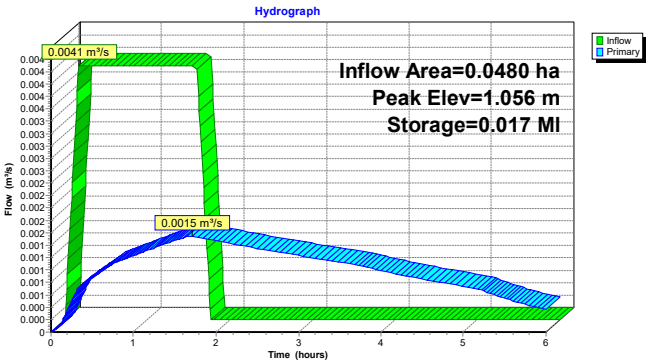
Volume	Invert	Avail.Storage	Storage Description
#1	0.000 m	0.030 Ml	**Custom Stage Data** Listed below

Elevation (meters)	Cum.Store (Mega-liters)
0.000	0.000
1.850	0.030

Device	Routing	Invert	Outlet Devices
#1	Primary	0.000 m	**Hydrovex 40SVHV-1** Elev. (meters) 0.000 0.200 0.500 1.000 1.500 2.000 Disch. (m³/s) 0.00000 0.00070 0.00110 0.00150 0.00190 0.00210

Primary OutFlow Max=0.0015 m³/s @ 1.70 hrs HW=1.056 m (Free Discharge)
↳**1=Hydrovex 40SVHV-1** (Custom Controls 0.0015 m³/s)

Pond 30P: Cistern A



Time span=0.00-6.00 hrs, dt=0.01 hrs, 601 points
Runoff by Rational method, Rise/Fall=1.0/1.0 xTc
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Pond 30P: Cistern A Peak Elev=1.275 m Storage=0.021 Ml Inflow=0.0048 m³/s 0.028 Ml
Outflow=0.0017 m³/s 0.025 Ml

Summary for Pond 30P: Cistern A

Inflow Area = 0.0480 ha, 81.25% Impervious, Inflow Depth = 58 mm for 25-Year event
Inflow = 0.0048 m³/s @ 0.17 hrs, Volume= 0.028 Ml
Outflow = 0.0017 m³/s @ 1.71 hrs, Volume= 0.025 Ml, Atten= 64%, Lag= 92.2 min
Primary = 0.0017 m³/s @ 1.71 hrs, Volume= 0.025 Ml

Routing by Stor-Ind method, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
Peak Elev= 1.275 m @ 1.71 hrs Surf.Area= 0.0000 ha Storage= 0.021 Ml

Plug-Flow detention time= 122.2 min calculated for 0.025 Ml (90% of inflow)
Center-of-Mass det. time= 117.5 min (170.5 - 53.0)

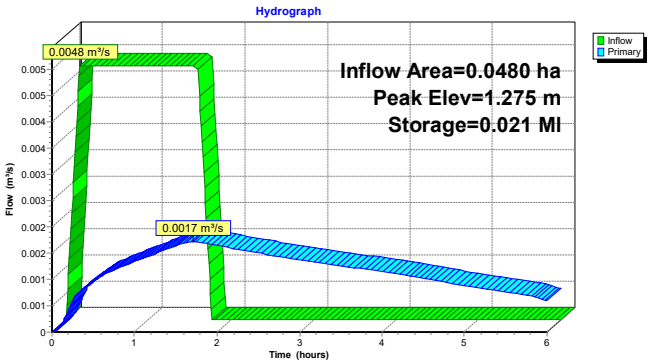
Volume	Invert	Avail.Storage	Storage Description
#1	0.000 m	0.030 Ml	**Custom Stage Data** Listed below

Elevation (meters)	Cum.Store (Mega-liters)
0.000	0.000
1.850	0.030

Device	Routing	Invert	Outlet Devices
#1	Primary	0.000 m	**Hydrovex 40SVHV-1**
			Elev. (meters) 0.000 0.200 0.500 1.000 1.500 2.000
			Disch. (m³/s) 0.00000 0.00070 0.00110 0.00150 0.00190 0.00210

Primary OutFlow Max=0.0017 m³/s @ 1.71 hrs HW=1.275 m (Free Discharge)
↑—**1=Hydrovex 40SVHV-1** (Custom Controls 0.0017 m³/s)

Pond 30P: Cistern A



Time span=0.00-6.00 hrs, dt=0.01 hrs, 601 points
Runoff by Rational method, Rise/Fall=1.0/1.0 xTc
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Pond 30P: Cistern A Peak Elev=1.441 m Storage=0.023 Ml Inflow=0.0054 m³/s 0.031 Ml
Outflow=0.0019 m³/s 0.027 Ml

Summary for Pond 30P: Cistern A

Inflow Area = 0.0480 ha, 81.25% Impervious, Inflow Depth = 65 mm for 50-Year event
Inflow = 0.0054 m³/s @ 0.17 hrs, Volume= 0.031 Ml
Outflow = 0.0019 m³/s @ 1.71 hrs, Volume= 0.027 Ml, Atten= 66%, Lag= 92.4 min
Primary = 0.0019 m³/s @ 1.71 hrs, Volume= 0.027 Ml

Routing by Stor-Ind method, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
Peak Elev= 1.441 m @ 1.71 hrs Surf.Area= 0.0000 ha Storage= 0.023 Ml

Plug-Flow detention time= 125.1 min calculated for 0.027 Ml (88% of inflow)
Center-of-Mass det. time= 119.3 min (172.3 - 53.0)

Volume	Invert	Avail.Storage	Storage Description
#1	0.000 m	0.030 Ml	**Custom Stage Data** Listed below

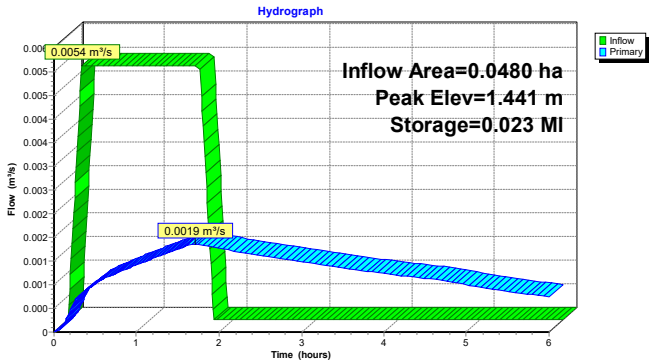
Elevation (meters)	Cum.Store (Mega-liters)
0.000	0.000
1.850	0.030

Device	Routing	Invert	Outlet Devices
#1	Primary	0.000 m	**Hydrovex 40SVHV-1**

Elev. (meters) 0.000 0.200 0.500 1.000 1.500 2.000
Disch. (m³/s) 0.00000 0.00070 0.00110 0.00150 0.00190 0.00210

Primary OutFlow Max=0.0019 m³/s @ 1.71 hrs HW=1.441 m (Free Discharge)
↑—**1=Hydrovex 40SVHV-1** (Custom Controls 0.0019 m³/s)

Pond 30P: Cistern A



Time span=0.00-6.00 hrs, dt=0.01 hrs, 601 points
Runoff by Rational method, Rise/Fall=1.0/1.0 xTc
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Pond 30P: Cistern A Peak Elev=1.614 m Storage=0.026 Ml Inflow=0.0059 m³/s 0.034 Ml
Outflow=0.0019 m³/s 0.029 Ml

Summary for Pond 30P: Cistern A

Inflow Area = 0.0480 ha, 81.25% Impervious, Inflow Depth = 71 mm for 100-Year event
Inflow = 0.0059 m³/s @ 0.17 hrs, Volume= 0.034 Ml
Outflow = 0.0019 m³/s @ 1.71 hrs, Volume= 0.029 Ml, Atten= 67%, Lag= 92.5 min
Primary = 0.0019 m³/s @ 1.71 hrs, Volume= 0.029 Ml

Routing by Stor-Ind method, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
Peak Elev= 1.614 m @ 1.71 hrs Surf.Area= 0.0000 ha Storage= 0.026 Ml

Plug-Flow detention time= 127.5 min calculated for 0.029 Ml (86% of inflow)
Center-of-Mass det. time= 120.8 min (173.8 - 53.0)

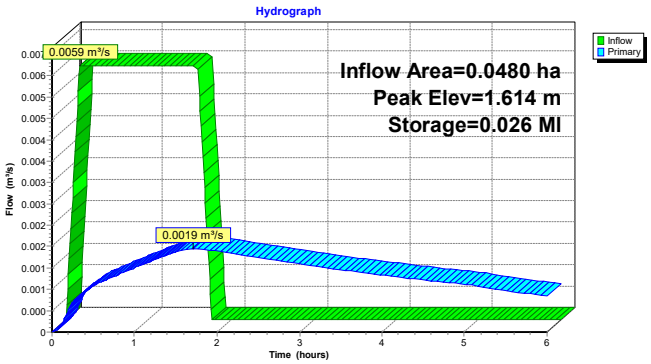
Volume	Invert	Avail.Storage	Storage Description
#1	0.000 m	0.030 Ml	**Custom Stage Data** Listed below

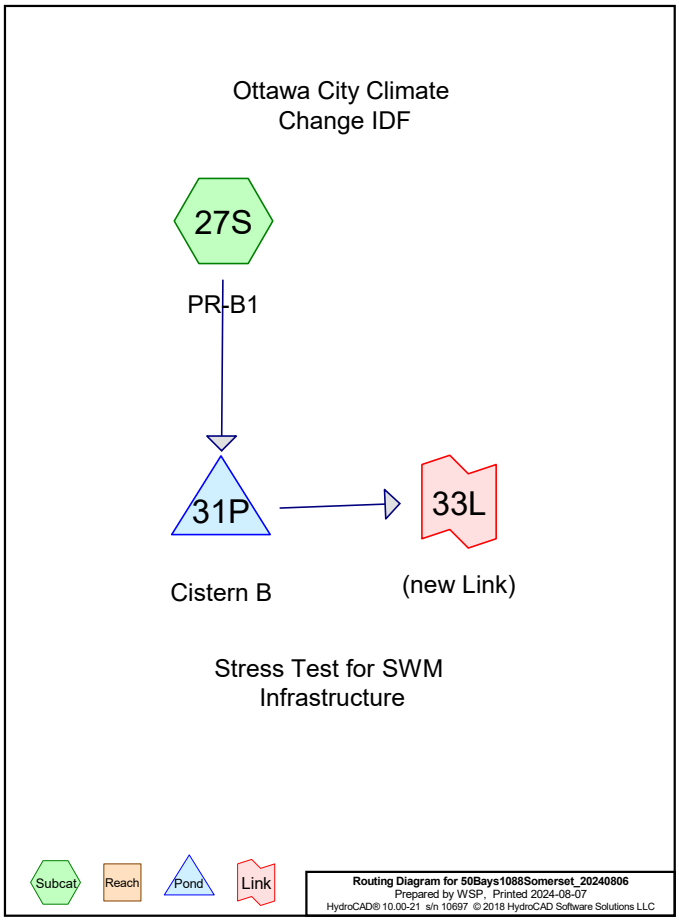
Elevation (meters)	Cum.Store (Mega-liters)
0.000	0.000
1.850	0.030

Device	Routing	Invert	Outlet Devices
#1	Primary	0.000 m	**Hydrovex 40SVHV-1**
			Elev. (meters) 0.000 0.200 0.500 1.000 1.500 2.000
			Disch. (m³/s) 0.00000 0.00070 0.00110 0.00150 0.00190 0.00210

Primary OutFlow Max=0.0019 m³/s @ 1.71 hrs HW=1.614 m (Free Discharge)
↑—**1=Hydrovex 40SVHV-1** (Custom Controls 0.0019 m³/s)

Pond 30P: Cistern A





Area Listing (selected nodes)

Area (hectares)	C	Description (subcatchment-numbers)
0.0470	0.99	Roof (27S)
0.0470	**0.99**	**TOTAL AREA**

Soil Listing (selected nodes)

Area (hectares)	Soil Group	Subcatchment Numbers
0.0000	HSG A	
0.0000	HSG B	
0.0000	HSG C	
0.0000	HSG D	
0.0470	Other	27S
0.0470		**TOTAL AREA**

Ground Covers (selected nodes)

HSG-A (hectares)	HSG-B (hectares)	HSG-C (hectares)	HSG-D (hectares)	Other (hectares)	Total (hectares)	Ground Cover	Subcatchment Numbers
0.0000	0.0000	0.0000	0.0000	0.0470	0.0470	Roof	27S
0.0000	**0.0000**	**0.0000**	**0.0000**	**0.0470**	**0.0470**	**TOTAL AREA**	

Time span=0.00-6.00 hrs, dt=0.01 hrs, 601 points
Runoff by Rational method, Rise/Fall=1.0/1.0 xTc
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Pond 31P: Cistern B Peak Elev=0.509 m Storage=0.011 Ml Inflow=0.0024 m³/s 0.016 Ml
Outflow=0.0011 m³/s 0.015 Ml

Summary for Pond 31P: Cistern B

Inflow Area = 0.0470 ha,100.00% Impervious, Inflow Depth = 34 mm for 2-Year event
Inflow = 0.0024 m³/s @ 0.17 hrs, Volume= 0.016 Ml
Outflow = 0.0011 m³/s @ 1.94 hrs, Volume= 0.015 Ml, Atten= 54%, Lag= 106.2 min
Primary = 0.0011 m³/s @ 1.94 hrs, Volume= 0.015 Ml

Routing by Stor-Ind method, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
Peak Elev= 0.509 m @ 1.94 hrs Surf.Area= 0.0000 ha Storage= 0.011 Ml

Plug-Flow detention time= 106.6 min calculated for 0.015 Ml (92% of inflow)
Center-of-Mass det. time= 102.0 min (162.5 - 60.5)

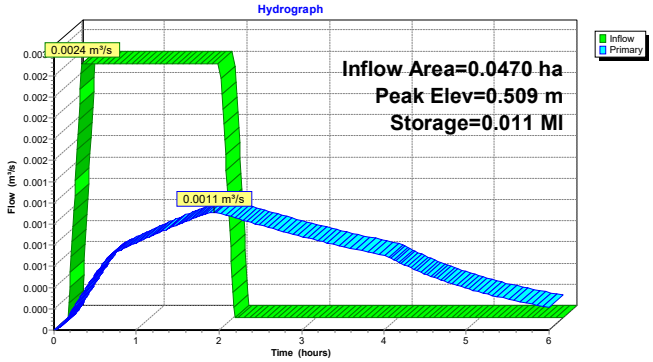
Volume	Invert	Avail.Storage	Storage Description
#1	0.000 m	0.035 Ml	**Custom Stage Data** Listed below

Elevation (meters)	Cum.Store (Mega-liters)
0.000	0.000
1.650	0.035

Device	Routing	Invert	Outlet Devices
#1	Primary	0.000 m	**Hydrovex 40SVHV-1**
			Elev. (meters) 0.000 0.200 0.500 1.000 1.500 2.000
			Disch. (m³/s) 0.00000 0.00070 0.00110 0.00150 0.00190 0.00210

Primary OutFlow Max=0.0011 m³/s @ 1.94 hrs HW=0.509 m (Free Discharge)
↑—**1=Hydrovex 40SVHV-1** (Custom Controls 0.0011 m³/s)

Pond 31P: Cistern B



Time span=0.00-6.00 hrs, dt=0.01 hrs, 601 points
Runoff by Rational method, Rise/Fall=1.0/1.0 xTc
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Pond 31P: Cistern B Peak Elev=0.717 m Storage=0.015 Ml Inflow=0.0032 m³/s 0.021 Ml
Outflow=0.0013 m³/s 0.019 Ml

Summary for Pond 31P: Cistern B

Inflow Area = 0.0470 ha,100.00% Impervious, Inflow Depth = 45 mm for 5-Year event
Inflow = 0.0032 m³/s @ 0.17 hrs, Volume= 0.021 Ml
Outflow = 0.0013 m³/s @ 1.95 hrs, Volume= 0.019 Ml, Atten= 60%, Lag= 106.8 min
Primary = 0.0013 m³/s @ 1.95 hrs, Volume= 0.019 Ml

Routing by Stor-Ind method, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
Peak Elev= 0.717 m @ 1.95 hrs Surf.Area= 0.0000 ha Storage= 0.015 Ml

Plug-Flow detention time= 118.1 min calculated for 0.019 Ml (89% of inflow)
Center-of-Mass det. time= 112.0 min (172.5 - 60.5)

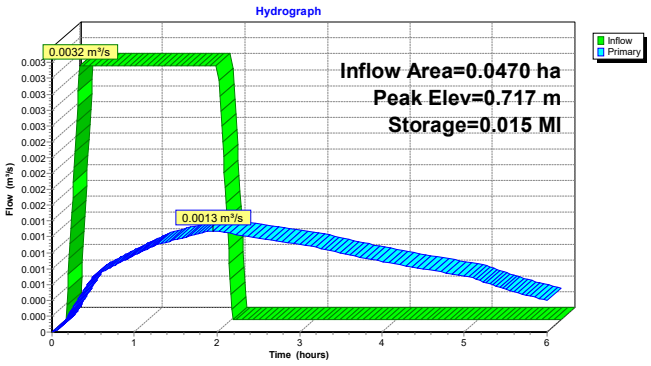
Volume	Invert	Avail.Storage	Storage Description
#1	0.000 m	0.035 Ml	**Custom Stage Data** Listed below

Elevation (meters)	Cum.Store (Mega-liters)
0.000	0.000
1.650	0.035

Device	Routing	Invert	Outlet Devices
#1	Primary	0.000 m	**Hydrovex 40SVHV-1**
			Elev. (meters) 0.000 0.200 0.500 1.000 1.500 2.000
			Disch. (m³/s) 0.00000 0.00070 0.00110 0.00150 0.00190 0.00210

Primary OutFlow Max=0.0013 m³/s @ 1.95 hrs HW=0.717 m (Free Discharge)
↳**1=Hydrovex 40SVHV-1** (Custom Controls 0.0013 m³/s)

Pond 31P: Cistern B



Time span=0.00-6.00 hrs, dt=0.01 hrs, 601 points
Runoff by Rational method, Rise/Fall=1.0/1.0 xTc
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Pond 31P: Cistern B Peak Elev=0.858 m Storage=0.018 Ml Inflow=0.0037 m³/s 0.025 Ml
Outflow=0.0014 m³/s 0.021 Ml

Summary for Pond 31P: Cistern B

Inflow Area = 0.0470 ha,100.00% Impervious, Inflow Depth = 53 mm for 10-Year event
Inflow = 0.0037 m³/s @ 0.17 hrs, Volume= 0.025 Ml
Outflow = 0.0014 m³/s @ 1.95 hrs, Volume= 0.021 Ml, Atten= 63%, Lag= 107.1 min
Primary = 0.0014 m³/s @ 1.95 hrs, Volume= 0.021 Ml

Routing by Stor-Ind method, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
Peak Elev= 0.858 m @ 1.95 hrs Surf.Area= 0.0000 ha Storage= 0.018 Ml

Plug-Flow detention time= 124.1 min calculated for 0.021 Ml (86% of inflow)
Center-of-Mass det. time= 116.5 min (177.0 - 60.5)

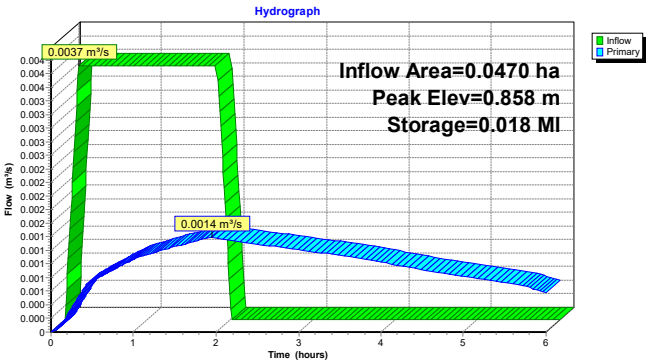
Volume	Invert	Avail.Storage	Storage Description
#1	0.000 m	0.035 Ml	**Custom Stage Data** Listed below

Elevation (meters)	Cum.Store (Mega-liters)
0.000	0.000
1.650	0.035

Device	Routing	Invert	Outlet Devices
#1	Primary	0.000 m	**Hydrovex 40SVHV-1**
			Elev. (meters) 0.000 0.200 0.500 1.000 1.500 2.000
			Disch. (m³/s) 0.00000 0.00070 0.00110 0.00150 0.00190 0.00210

Primary OutFlow Max=0.0014 m³/s @ 1.95 hrs HW=0.858 m (Free Discharge)
↳**1=Hydrovex 40SVHV-1** (Custom Controls 0.0014 m³/s)

Pond 31P: Cistern B



Time span=0.00-6.00 hrs, dt=0.01 hrs, 601 points
Runoff by Rational method, Rise/Fall=1.0/1.0 xTc
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Pond 31P: Cistern B Peak Elev=1.036 m Storage=0.022 Ml Inflow=0.0044 m³/s 0.029 Ml
Outflow=0.0015 m³/s 0.024 Ml

Summary for Pond 31P: Cistern B

Inflow Area = 0.0470 ha,100.00% Impervious, Inflow Depth = 62 mm for 25-Year event
Inflow = 0.0044 m³/s @ 0.17 hrs, Volume= 0.029 Ml
Outflow = 0.0015 m³/s @ 1.96 hrs, Volume= 0.024 Ml, Atten= 65%, Lag= 107.3 min
Primary = 0.0015 m³/s @ 1.96 hrs, Volume= 0.024 Ml

Routing by Stor-Ind method, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
Peak Elev= 1.036 m @ 1.96 hrs Surf.Area= 0.0000 ha Storage= 0.022 Ml

Plug-Flow detention time= 129.3 min calculated for 0.024 Ml (82% of inflow)
Center-of-Mass det. time= 119.2 min (179.7 - 60.5)

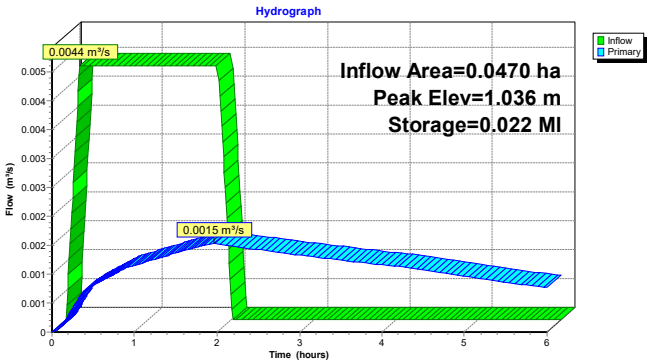
Volume	Invert	Avail.Storage	Storage Description
#1	0.000 m	0.035 Ml	**Custom Stage Data** Listed below

Elevation (meters)	Cum.Store (Mega-liters)
0.000	0.000
1.650	0.035

Device	Routing	Invert	Outlet Devices
#1	Primary	0.000 m	**Hydrovex 40SVHV-1**
			Elev. (meters) 0.000 0.200 0.500 1.000 1.500 2.000
			Disch. (m³/s) 0.00000 0.00070 0.00110 0.00150 0.00190 0.00210

Primary OutFlow Max=0.0015 m³/s @ 1.96 hrs HW=1.036 m (Free Discharge)
↑1=Hydrovex 40SVHV-1 (Custom Controls 0.0015 m³/s)

Pond 31P: Cistern B



Time span=0.00-6.00 hrs, dt=0.01 hrs, 601 points
Runoff by Rational method, Rise/Fall=1.0/1.0 xTc
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Pond 31P: Cistern B Peak Elev=1.171 m Storage=0.025 Ml Inflow=0.0049 m³/s 0.033 Ml
Outflow=0.0016 m³/s 0.026 Ml

Summary for Pond 31P: Cistern B

Inflow Area = 0.0470 ha,100.00% Impervious, Inflow Depth = 69 mm for 50-Year event
Inflow = 0.0049 m³/s @ 0.17 hrs, Volume= 0.033 Ml
Outflow = 0.0016 m³/s @ 1.96 hrs, Volume= 0.026 Ml, Atten= 67%, Lag= 107.5 min
Primary = 0.0016 m³/s @ 1.96 hrs, Volume= 0.026 Ml

Routing by Stor-Ind method, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
Peak Elev= 1.171 m @ 1.96 hrs Surf.Area= 0.0000 ha Storage= 0.025 Ml

Plug-Flow detention time= 131.9 min calculated for 0.026 Ml (79% of inflow)
Center-of-Mass det. time= 120.6 min (181.1 - 60.5)

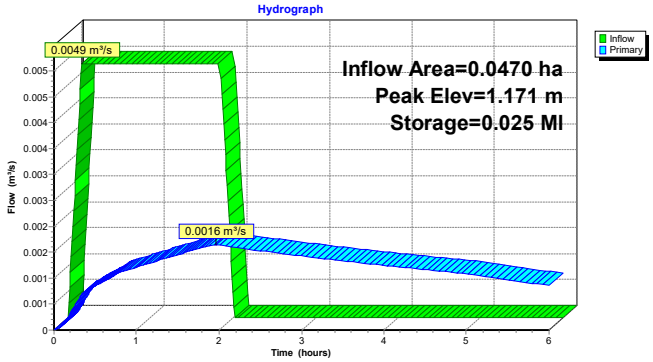
Volume	Invert	Avail.Storage	Storage Description
#1	0.000 m	0.035 Ml	**Custom Stage Data** Listed below

Elevation (meters)	Cum.Store (Mega-liters)
0.000	0.000
1.650	0.035

Device	Routing	Invert	Outlet Devices
#1	Primary	0.000 m	**Hydrovex 40SVHV-1**
			Elev. (meters) 0.000 0.200 0.500 1.000 1.500 2.000
			Disch. (m³/s) 0.00000 0.00070 0.00110 0.00150 0.00190 0.00210

Primary OutFlow Max=0.0016 m³/s @ 1.96 hrs HW=1.171 m (Free Discharge)
↑—**1=Hydrovex 40SVHV-1** (Custom Controls 0.0016 m³/s)

Pond 31P: Cistern B



Time span=0.00-6.00 hrs, dt=0.01 hrs, 601 points
Runoff by Rational method, Rise/Fall=1.0/1.0 xTc
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Pond 31P: Cistern B Peak Elev=1.311 m Storage=0.028 Ml Inflow=0.0054 m³/s 0.036 Ml
Outflow=0.0017 m³/s 0.028 Ml

Summary for Pond 31P: Cistern B

Inflow Area = 0.0470 ha,100.00% Impervious, Inflow Depth = 77 mm for 100-Year event
Inflow = 0.0054 m³/s @ 0.17 hrs, Volume= 0.036 Ml
Outflow = 0.0017 m³/s @ 1.96 hrs, Volume= 0.028 Ml, Atten= 68%, Lag= 107.6 min
Primary = 0.0017 m³/s @ 1.96 hrs, Volume= 0.028 Ml

Routing by Stor-Ind method, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
Peak Elev= 1.311 m @ 1.96 hrs Surf.Area= 0.0000 ha Storage= 0.028 Ml

Plug-Flow detention time= 134.3 min calculated for 0.028 Ml (77% of inflow)
Center-of-Mass det. time= 121.6 min (182.1 - 60.5)

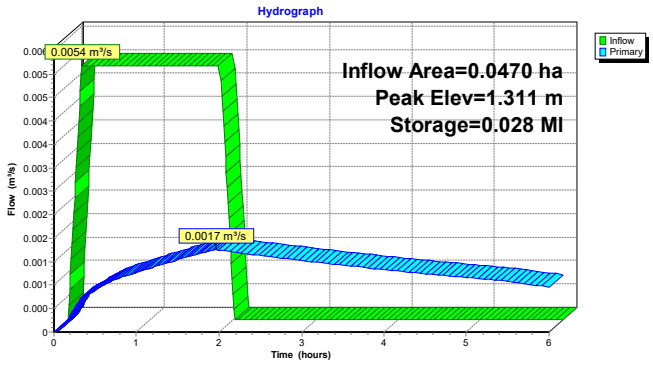
Volume	Invert	Avail.Storage	Storage Description
#1	0.000 m	0.035 Ml	**Custom Stage Data** Listed below

Elevation (meters)	Cum.Store (Mega-liters)
0.000	0.000
1.650	0.035

Device	Routing	Invert	Outlet Devices
#1	Primary	0.000 m	**Hydrovex 40SVHV-1**
			Elev. (meters) 0.000 0.200 0.500 1.000 1.500 2.000
			Disch. (m³/s) 0.00000 0.00070 0.00110 0.00150 0.00190 0.00210

Primary OutFlow Max=0.0017 m³/s @ 1.96 hrs HW=1.311 m (Free Discharge)
↑—**1=Hydrovex 40SVHV-1** (Custom Controls 0.0017 m³/s)

Pond 31P: Cistern B



APPENDIX

D Miscellaneous