2705460 Ontario Inc.

## Residential Developments 50 Bayswater Avenue 1088 Somerset Street W

## Stormwater Management Report

August 08, 2024

1st Submission



## wsp



## Residential Developments 50 Bayswater Avenue 1088 Somerset Street W

## Stormwater Management Report

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., Project Engineer, Water Resources Date

Approved<sup>1</sup> by (must be reviewed for technical accuracy prior to approval)

Bryan Orendorff, P.Eng., Manager, Water Resources Date

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2705460 Ontario Inc.

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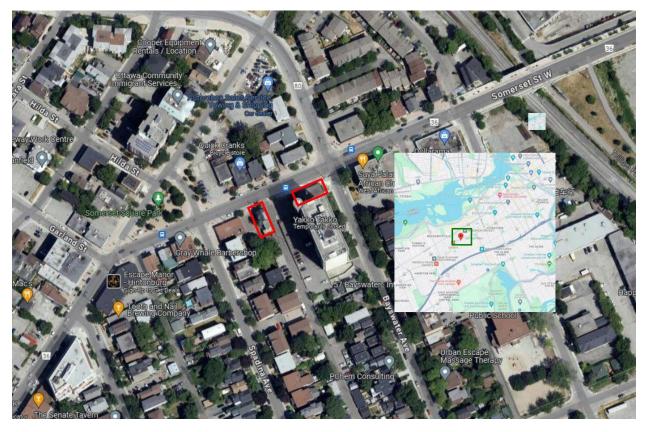
## 1 INTRODUCTION

## 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 24<sup>th</sup>, 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 12<sup>th</sup>, 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 24<sup>th</sup>, 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**.

Land Use	Area (ha)	% Coverage	2-year Runoff C	100-year Runoff C
1088 Son	nerset Street V	N (Building E)	K-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 Bays	water 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

#### Table 2-1: Pre-Development Area Breakdown

### 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<sub>d</sub> = 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
В	0.810	0.814	0.816	0.819	0.820	0.820
С	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
В	0.810	0.814	0.816	0.819	0.820	0.820
С	6.199	6.053	6.014	6.018	6.014	6.014

Residential Developments Project No. CA0003875.9802 2705460 Ontario Inc. 50 Bayswater Avenue

### 2.4 Allowable Flow Rates

As noted in **Section 1.4**, post-development stormwater runoff from the 2-year to 100year 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**.

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

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

#### 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	
5	6.7	
10	7.8	4.9
25	9.3	4.9
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.

Land Use	Hydraulics	Area (ha)	% Coverage	2-year Runoff C	100-year Runoff C		
	1088 Somerse	t Street W (B	uilding 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		

#### Table 3-1: Post Development Area Breakdown

## 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<sup>2</sup> and 1.85 m, respectively. Cistern B, for 50 Bayswater, has an available footprint and height of 21 m<sup>2</sup> and 1.65 m, respectively. Therefore, Cisterns A and B provide about 29.6 m<sup>3</sup> and 34.65 m<sup>3</sup> 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**.

Return Period	Uncontrolled Inflows (L/s)		Out	rolled flows ./s)	Volume	tern 9 Utilised 1 <sup>3</sup> ) <sup>1</sup>
(Years)	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

<sup>1</sup>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.

Return Period (Years)		trolled ows /s)	Outf	rolled Iows /s)	Volume	ax Utilised າ <sup>3</sup> )	within	r Level Cistern m)
(10010)	<b>A</b> <sup>1</sup>	B <sup>2</sup>	<b>A</b> <sup>1</sup>	B <sup>2</sup>	<b>A</b> <sup>1</sup>	B <sup>2</sup>	<b>A</b> <sup>1</sup>	B <sup>2</sup>
100-yr	5.4	5.4	1.9	1.7	26	28	1.614	1.311

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

<sup>1</sup>Refers to Cistern A – utilised for 1088 Somerset Street W Site <sup>2</sup>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<sup>3</sup>. 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<sup>3</sup> 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  $34.65 \text{ m}^3$ . 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<sup>3</sup> 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.

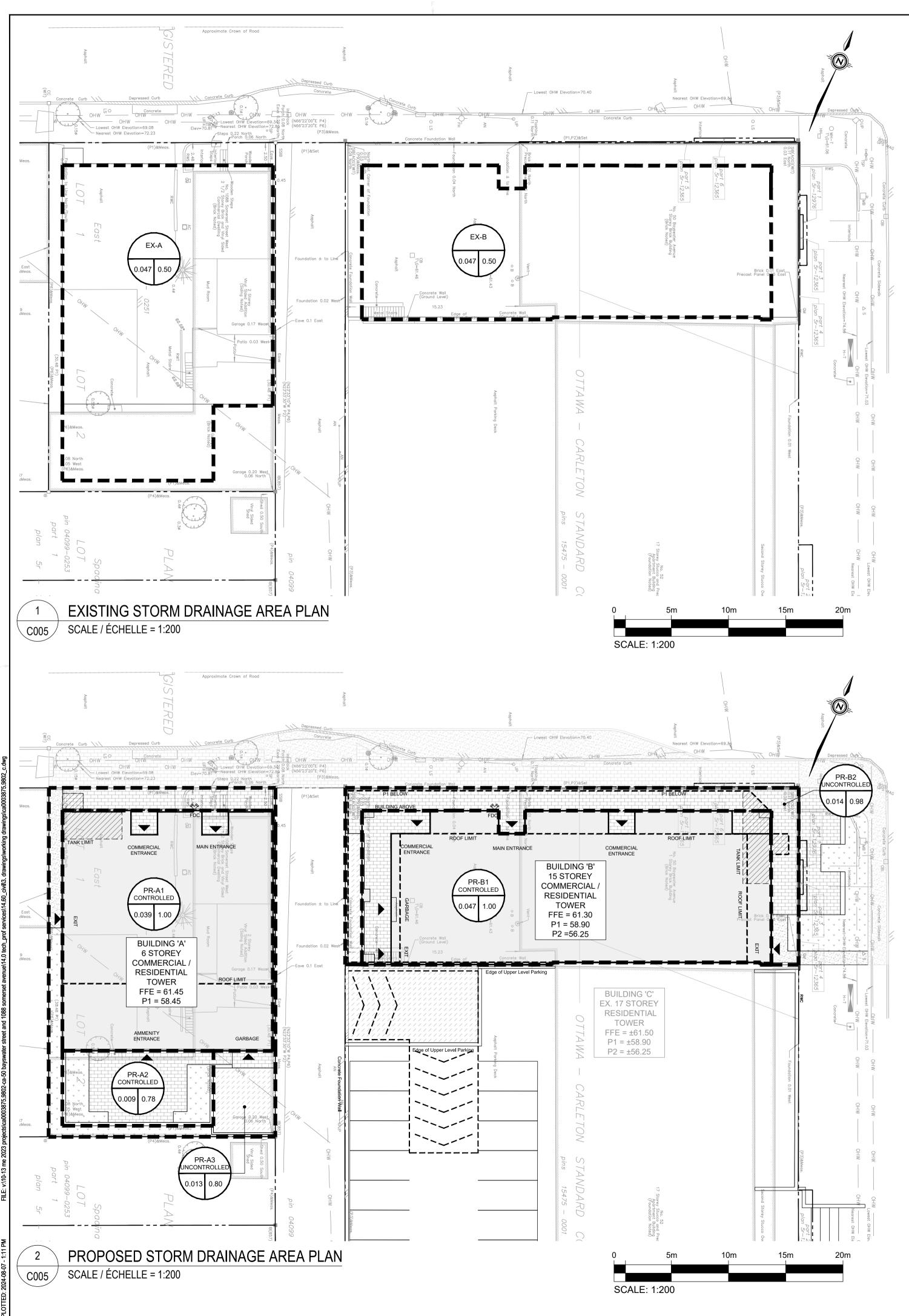
This report demonstrates that the proposed SWM strategy will address stormwater management related impacts from this project and meet the requirements of the City of Ottawa.

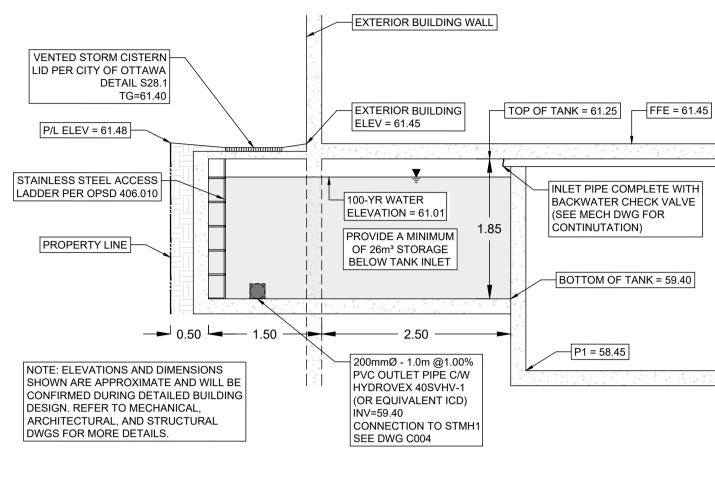
## **BIBLIOGRAPHY**

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

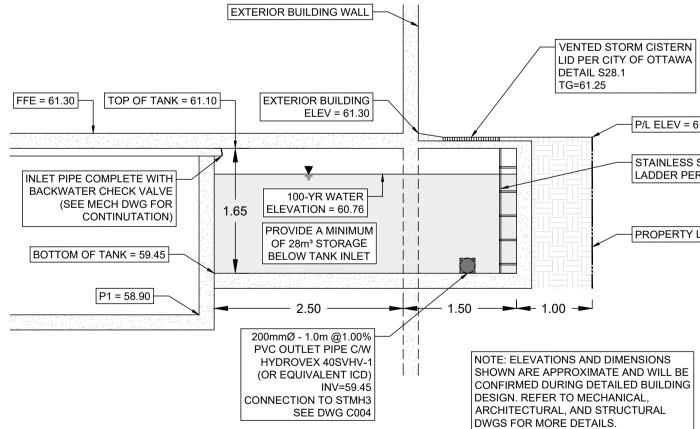
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## **Exhibits**



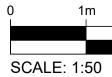








**BUILDING B - SWM TANK DETAIL** C005 SCALE / ÉCHELLE = 1:50



		Manager Handler Handle	Lopert A. Antenut S.A.
		RENFROE LAND MANAGEMENT	
	REVISION:		
	1 2024-08-07 REV DATE	ISSUED FOR SITE PLAN APPLICATION DESCRIPTION	SM BY
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	REPRODUCED OR SHALL CHECK AN	I ND DESIGN IS COPYRIGHT PROTECTED WHICH REVISED WITHOUT WRITTEN PERMISSION BY W D VERIFY ALL DIMENSIONS AND UTILITY LOCAT	SP. THE CONTRACTOR
	CREAR AND OMI ORIGINAL SCALE: VARIES DESIGNED BY: SM DRAWN BY: SM APPROVED BY: WY DISCIPLINE:	IF 25:	-08-07 THIS BAR IS NOT mm LONG, ADJUST IR PLOTTING SCALE. 25mm
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06.010	CLIENT: <b>RENF</b> CLIENT REF. #:	ROE LAND MANAG	EMENT
		BAYSWATER AVEN SOMERSET STRE	
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	DRAWING NUMB	ER:	REV.

P/L ELEV = 61.25

STAINLESS STEEL AC LADDER PER OPSD 4

PROPERTY LINE

## **APPENDIX**





File No.: PC2023-0208

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

Via email: <u>davidrenfroe@outlook.com</u>

#### 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**

|--|

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 preconsultation has been undertaken. Please proceed to complete a Phase 2 Preconsultation 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.
  - The required plans and studies must meet the City's Terms of Reference (ToR) and/or Guidelines, as available on <u>Ottawa.ca</u>. 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 16storey 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 noncomplying 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 <u>udrp@ottawa.ca</u> 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 <u>this link</u>.

#### **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 highrise 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 14<sup>th</sup> 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 10<sup>th</sup> floor (ceiling of 9<sup>th</sup> 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 lowrise 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 5<sup>th</sup> 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 predevelopment 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.
- 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.
- I. If rooftop control and storage is proposed as part of the SWM solutions sufficient details (CI. 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 <u>TMconstruction@ottawa.ca</u> 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.

<u>Revisions to Traffic Impact Assessment Guidelines (ottawa.ca)</u>. 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:
  - o If the development generates 60 person-trips or more;
  - o If the development is located in a Location Trigger; or
  - o If the development has a Safety Trigger.
- Update to Table 2: Trip Generation Trigger

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

<sup>1</sup>Table 2, Table 3 & Table 4 TRANS Trip Generation Manual <sup>2</sup>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.



	consistent with the 2	024 Transportation Master Plan.		
Revis	ions to Step 2 - Scoping	3		
	<ul> <li>Reorganized to include 3.1 D be determined by mode share</li> </ul>	evelopment-generated Travel Demand as scope of the TIA will re.		
	<ul> <li>Remove all exemptions.</li> </ul>			
Recomr	nended reorganization:			
Sten 2	- Scoping - Modules and Triggers			
Site De	esign 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	All		
4.2.1	Include language that asks for	All		
4.2.1	Include language that asks for justification of change to	All		
4.2.1	Include language that asks for justification of change to Zoning By-law parking	All		
	Include language that asks for justification of change to Zoning By-law parking requirements			
4.3	Include language that asks for justification of change to Zoning By-law parking	All		
4.3 4.5	Include language that asks for justification of change to Zoning By-law parking requirements Boundary Street Design	All		
4.3	Include language that asks for justification of change to Zoning By-law parking requirements Boundary Street Design Context for TDM	All		
4.3 4.5	Include language that asks for justification of change to Zoning By-law parking requirements Boundary Street Design	All		

Note - only require Network Demand Forecasting Modules (3.2 + 3.3) if one or more of these modules are triggered



4.6	Neighbourhood Traffic	If the development meets all of the following criteria:
	Management	1. Access to Collector or Local;
	Rename: Neighbourhood Traffic Calming* Note: the NTC module will be reviewed in detail in the next comprehensive update of the TIA Guidelines	<ol> <li>"Significant sensitive land use presence" exists, where there is at least two of the following adjacent to the subject street segment:         <ul> <li>School (within 250m walking distance);</li> <li>Park;</li> <li>Retirement / Older Adult Facility (i.e. long-term care and retirement homes);</li> <li>Licenced Child Care Centre;</li> <li>Community Centre; or</li> <li>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.</li> </ul> </li> <li>Application is not Site Plan;</li> <li>Site Trip Infiltration is ownected</li> </ol>
4.7		5. Site Trip Infiltration is expected. Transit
	Transis Davids Consists	
4.7.1 4.7.2	Transit Route Capacity Transit Priority Requirements	> 75 site transit trips > 75 site auto trips
4.7.2	Network Concept	Site trips > by 200 persons
4.9	Network concept	Intersection Design
4.9.1	Intersection Controls (including site accesses)	> 75 site auto trips
4.9.2	Intersection Design	> 75 site auto trips
Delete	ed 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
		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
- Any removal of privately-owned trees 10cm or larger in diameter, or cityowned 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 <u>Tree Protection Specification</u> 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 <u>mark.richardson@ottawa.ca</u> or at <u>City of Ottawa</u>

## 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.
- 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
- I. 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 cashin-lieu of parkland for parkland dedication.
- 74. The conveyance requirement is to be calculated as per the <u>Parkland Dedication</u> <u>By-law No.2022-280</u>, as amended. Per the By-law (as amended), this proposal would be subject to the following conveyance requirement per use:
  - 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.

## <u>Other</u>

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 <u>here</u>.
- 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 <u>Ottawa.ca</u>. These ToR and Guidelines outline the specific requirements that must be met for each plan or study to be deemed adequate.
- 90. <u>All</u> 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, SpencerSent:July 12, 2024 12:43 PMTo:Paul, CalvinSubject: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 <<u>Spencer.Manoryk@wsp.com</u>>
Sent: Friday, July 12, 2024 8:08 AM
To: Fawzi, Mohammed <<u>mohammed.fawzi@ottawa.ca</u>>
Cc: Yang, Winston <<u>winston.yang@wsp.com</u>>; Whelan, Amy <<u>amy.whelan@ottawa.ca</u>>
Subject: RE: 50 Bayswater Avenue and 1088 Somerset Street W - SWM Requirements

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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 <<u>mohammed.fawzi@ottawa.ca</u>>
Sent: Thursday, July 11, 2024 3:22 PM
To: Manoryk, Spencer <<u>Spencer.Manoryk@wsp.com</u>>
Cc: Yang, Winston <<u>Winston.Yang@wsp.com</u>>; Whelan, Amy <<u>amy.whelan@ottawa.ca</u>>
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) 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 <<u>Spencer.Manoryk@wsp.com</u>>
Sent: Wednesday, July 10, 2024 9:39 AM
To: Fawzi, Mohammed <<u>mohammed.fawzi@ottawa.ca</u>>
Cc: Yang, Winston <<u>winston.yang@wsp.com</u>>; Whelan, Amy <<u>amy.whelan@ottawa.ca</u>>
Subject: RE: 50 Bayswater Avenue and 1088 Somerset Street W - SWM Requirements

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Hi Mohammed,

Any update on the below?

Thanks,



#### Spencer Manoryk

Designer EIT Land Development & Municipal Engineering, Ontario

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

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From: Manoryk, Spencer
Sent: Friday, July 5, 2024 11:57 AM
To: Fawzi, Mohammed <<u>mohammed.fawzi@ottawa.ca</u>>
Cc: Yang, Winston <<u>Winston.Yang@wsp.com</u>>; Whelan, Amy <<u>amy.whelan@ottawa.ca</u>>
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

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

wsp.com

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

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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

wsp |

Designer EIT Land Development & Municipal Engineering, Ontario

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

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From: Fawzi, Mohammed <<u>mohammed.fawzi@ottawa.ca</u>>
Sent: Friday, July 5, 2024 11:35 AM
To: Manoryk, Spencer <<u>Spencer.Manoryk@wsp.com</u>>
Cc: Yang, Winston <<u>Winston.Yang@wsp.com</u>>; Whelan, Amy <<u>amy.whelan@ottawa.ca</u>>
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) 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, <u>Mohammed.Fawzi@ottawa.ca</u>

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

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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

T+ 1 613-690-7463

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

wsp.com

From: Fawzi, Mohammed <<u>mohammed.fawzi@ottawa.ca</u>>
Sent: Friday, July 5, 2024 11:06 AM
To: Manoryk, Spencer <<u>Spencer.Manoryk@wsp.com</u>>
Cc: Yang, Winston <<u>Winston.Yang@wsp.com</u>>; Whelan, Amy <<u>amy.whelan@ottawa.ca</u>>
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 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 <<u>Spencer.Manoryk@wsp.com</u>> Sent: Thursday, July 4, 2024 1:26 PM To: Fawzi, Mohammed <<u>mohammed.fawzi@ottawa.ca</u>>
 Cc: Yang, Winston <<u>winston.yang@wsp.com</u>>
 Subject: 50 Bayswater Avenue and 1088 Somerset Street W - SWM Requirements

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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,

VSD-

## 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

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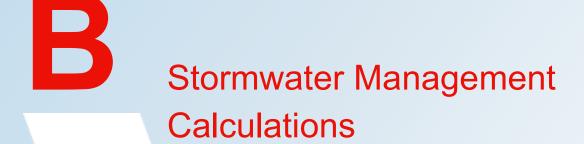
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# **APPENDIX**



## 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 E	Ivent
Area	Surface	На	"C"	C <sub>avg</sub>	"C"+25%	*C <sub>avg</sub>
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}

# 

## 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 E	vent
Area	Surface	На	"C"	C <sub>avg</sub>	"C"+25%	*C <sub>avg</sub>
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}



## 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 E	vent
Area	Surface	На	"C"	C <sub>avg</sub>	"C"+25%	*C <sub>avg</sub>
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}



## 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 E	vent
Area	Surface	На	"C"	C <sub>avg</sub>	"C"+25%	*C <sub>avg</sub>
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}



## 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 E	vent
Area	Surface	На	"C"	C <sub>avg</sub>	"C"+25%	*C <sub>avg</sub>
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}



## 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 E	vent
Area	Surface	На	"C"	C <sub>avg</sub>	"C"+25%	*C <sub>avg</sub>
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}



## 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 E	vent
Area	Surface	На	"C"	C <sub>avg</sub>	"C"+25%	*C <sub>avg</sub>
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}

# **APPENDIX**





# C-1 Existing Conditions

Ottawa City ID	F	
	<b>4</b> S	<b>5</b> S
	1088 Somerset	50 Bayswater
	Existing ( C=	Conditions =0.5)
	<u> </u>	
Subcat Reach Pond	Prepare	am for 50Bays1088Somerset_20240730 ed by WSP, Printed 2024-07-30 /n 10697 © 2018 HydroCAD Software Solutions LLC

50Bays1088Somerset\_20240730 Prepared by WSP HydroCAD® 10.00-21 s/n 10697 © 2018 HydroCAD Software Solutions LLC

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		Soil Li	sting (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	

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		Area Listing (selected nodes)
 Area (hectares)	С	Description (subcatchment-numbers)
0.0940 <b>0.0940</b>	0.50 <b>0.50</b>	Composite (4S, 5S) TOTAL AREA

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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 <b>0.0000</b>	0.0000 <b>0.0000</b>	0.0000 <b>0.0000</b>	0.0000 <b>0.0000</b>	0.0940 <b>0.0940</b>	0.0940 <b>0.0940</b>	Composite TOTAL AREA	4S, 5S

Prepared by WSP HydroCAD® 10.00-21 s/n 10697 © 2018 Hydro	droCAD Software Solutions LLC Page 5	Prepared by WSP Printed 2024-07-30 HydroCAD® 10.00-21 s/n 10697 © 2018 HydroCAD Software Solutions LLC Page 6				
Time span= Runoff by F	+0.00-3.00 hrs, dt=0.01 hrs, 301 points tational method, Rise/Fall=1.0/1.0 xTc I+Trans method - Pond routing by Stor-Ind method	Summary for Subcatchment 4S: 1088 Somerset Runoff = 0.0049 m³/s @ 0.17 hrs, Volume= 0.003 MI, Depth= 6 mm				
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 MI	Runoff by Rational method, Rise/Fali=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				
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 MI	Area (ha) C Description 0.0470 0.50 Composite				
Total Runoff Area = 0.0	040 ha Runoff Volume = 0.006 MI Average Runoff Depth = 6 mm 100.00% Pervious = 0.0940 ha 0.00% Impervious = 0.0000 ha	0.0470     100.00% Pervious Area       Tc     Length     Slope     Velocity     Capacity     Description       (min)     (meters)     (m/m)     (m/sec)     (m <sup>2</sup> /s)       10.0     Direct Entry, Minimum				
		Subcatchment 4S: 1088 Somerset				
		Hydrograph				
		0.005				

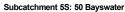
0.0049 m³/s	
0.005 Ottawa City IDF 2-Ye	ar
0.004 Duration=10 m	
0.004 Inten=76.8 mm	/hr
Runoff Area=0.0470	ha
Runoff Volume=0.003	MI
0.002 Runoff Depth=6 m	۱m
0.002 TC=10.0 m	
0.001 C=0.	50
0.001	
0.000	
	777
0 1 2 Time (hours)	3

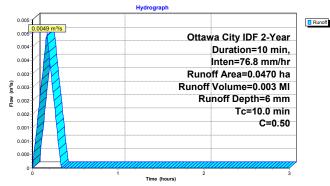
50Bavs1088Somerset 20240730 Ottawa City IDF 2-Year Duration=10 min. Inten=76.8 mm/hr

50Bays1088Somerset_20240730         Ottawa City IDF 2-Year Duration=10 min, Inten=76.8 mm/hr           Prepared by WSP         Printed 2024-07-30           HydroCAD® 10.00-21 s/n 10697 © 2018 HydroCAD Software Solutions LLC         Page 7	50Bays1088Somerset_20240730         Ottawa City IDF 5-Year Duration=10 min, Inten=104.2 mm/hr           Prepared by WSP         Printed 2024-07-30           HydroCAD® 10.00-21 s/n 10697 © 2018 HydroCAD Software Solutions LLC         Page 8		
Summary for Subcatchment 5S: 50 Bayswater Runoff = 0.0049 m³/s @ 0.17 hrs, Volume= 0.003 MI, Depth= 6 mm	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		
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	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 MI		
Area (ha) C. Description	Subcatchment 5S: 50 Bayswater Runoff Area=0.0470 ha 0.00% Impervious Runoff Depth=9 mm		

Area	(ha)	С	Desc	cription		
0.	0470	0.50	Com	posite		
0.0470 100.00% Pervious Area						
Tc (min)				Velocity (m/sec)	Capacity (m³/s)	Description
10.0						Direct Entry, Minimum
	0. 0. Tc (min)	Tc Len (min) (mete	0.0470 0.50 0.0470 Tc Length ( (min) (meters) (	0.0470 0.50 Com 0.0470 100. Tc Length Slope (min) (meters) (m/m)	0.0470         0.50         Composite           0.0470         100.00%         Pervi           Tc         Length         Slope         Velocity           (min)         (meters)         (m/m)         (m/sec)	0.0470         0.50         Composite           0.0470         100.00% Pervious Area           Tc         Length         Slope         Velocity         Capacity (min)           (meters)         (m/m)         (m/sec)         (m <sup>3</sup> /s)

50Bavs1088Somerset 20240730 Ottawa City IDF 2-Year Duration=10 min. Inten=76.8 mm/hr





nd method rvious Runoff Depth=9 mm unoff=0.0067 m<sup>3</sup>/s 0.004 MI a=0.0470 ha 0.00% Impervious Runoff Depth=9 mm Tc=10.0 min C=0.50 Runoff=0.0067 m³/s 0.004 MI

 Total Runoff Area = 0.0940 ha
 Runoff Volume = 0.008 Mi
 Average Runoff Depth = 9 mm

 100.00% Pervious = 0.0940 ha
 0.00% Impervious = 0.0000 ha

50Bays1088Somerset_20240730	Ottawa City IDF 5-Year Duration=10 min,	Inten=104.2 mm/hr
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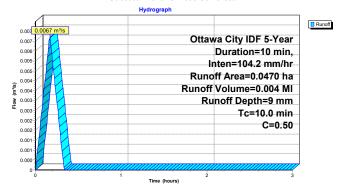
#### Summary for Subcatchment 4S: 1088 Somerset

0.004 MI, Depth= Runoff = 0.0067 m<sup>3</sup>/s @ 0.17 hrs. Volume= 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	a (ha)	С	Dese	cription		
0.0470 0.50 Composite							
	0.0470 100.00% Pervious Area						
	_						
	Tc	Len					Description
	(min)	(mete	ers) (	m/m)	(m/sec)	(m³/s)	
	10.0						Direct Entry, Minimum

#### Subcatchment 4S: 1088 Somerset



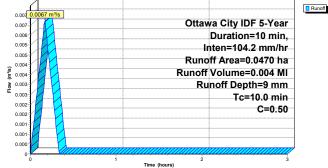
50Bays1088Somerset\_20240730 Ottawa City IDF 5-Year Duration=10 min, Inten=104.2 mm/hr Prepared by WSP HydroCAD® 10.00-21 s/n 10697 © 2018 HydroCAD Software Solutions LLC Printed 2024-07-30 Page 10

#### Summary for Subcatchment 5S: 50 Bayswater

Runoff = 0.0067 m<sup>3</sup>/s @ 0.17 hrs. Volume= 0.004 MI. 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

		a (ha) .0470	C 0.50		posite				
	0.	0470		100.	00% Pervi	ous Area			
	Tc (min)	Leng (meter		Slope m/m)	Velocity (m/sec)	Capacity (m³/s)	Description		
	10.0 Direct Entry, Minimum								
Subcatchment 5S: 50 Bayswater									
Hydrograph									



50Bays1088Somerset\_20240730 Ottawa City IDF 10-Year Duration=10 min, Inten=122.1 mm/hr Prepared by WSP HydroCAD® 10.00-21 s/n 10697 © 2018 HydroCAD Software Solutions LLC Printed 2024-07-30 Page 12

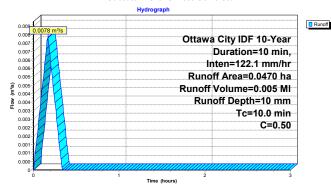
#### Summary for Subcatchment 4S: 1088 Somerset

= 0.0078 m<sup>3</sup>/s @ 0.17 hrs, Volume= 0.005 MI. Depth= 10 mm Runoff

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)	С	Des	cription		
0.	0470	0.50	Corr	nposite		
0.0470			100.00% Pervious Area			
Tc (min)	Leno (mete		Slope m/m)	Velocity (m/sec)	Capacity (m³/s)	Description
10.0						Direct Entry, Minimum

Subcatchment 4S: 1088 Somerset



50Bays1088Somerset\_20240730 Ottawa City IDF 10-Year Duration=10 min, Inten=122.1 mm/hr Prepared by WSP HydroCAD® 10.00-21 s/n 10697 © 2018 HydroCAD Software Solutions LLC Printed 2024-07-30 Page 11

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 MI

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 MI

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

50Bays1088Somerset_20240730	Ottawa City IDF 10-Year Duration=10 min,	Inten=122.1 mm/hr
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#### Summary for Subcatchment 5S: 50 Bayswater

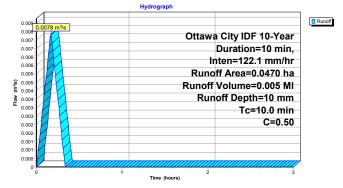
= 0.0078 m³/s @ 0.17 hrs, Volume= 0.005 MI, Depth= 10 mm Runoff

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	a (ha)	С	Dese	cription		
0.0470 0.50 Composite						
0.0470 100.00% Pervious Area						
Tc	Len					Description
(min)	(mete	ers) (	(m/m)	(m/sec)	(m³/s)	
10.0						Direct Entry, Minimum

#### Direct Entry, Minimum

Subcatchment 5S: 50 Bayswater

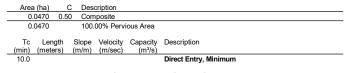


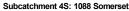
50Bays1088Somerset_20240730	Ottawa City IDF 25-Year D	Duration=10 min,	Inten=144.7 mm/hr
Prepared by WSP			Printed 2024-07-30
HudroCAD® 10.00.21 c/p 10607 @ 2018 H	vdroCAD Software Solutions LLC	<b>`</b>	Deee 15

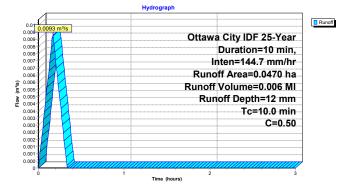
Summary for Subcatchment 4S: 1088 Somerset

= 0.0093 m<sup>3</sup>/s @ 0.17 hrs, Volume= 0.006 MI. Depth= 12 mm Runoff

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







50Bays1088Somerset\_20240730 Ottawa City IDF 25-Year Duration=10 min, Inten=144.7 mm/hr Prepared by WSP HydroCAD® 10.00-21 s/n 10697 © 2018 HydroCAD Software Solutions LLC Printed 2024-07-30 Page 14

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 MI

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 MI

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

50Bays1088Somerset_20240730	Ottawa City IDF 25-Year Duration=10 min,	Inten=144.7 mm/hr
Prepared by WSP		Printed 2024-07-30
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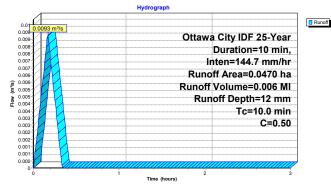
#### Summary for Subcatchment 5S: 50 Bayswater

= 0.0093 m<sup>3</sup>/s @ 0.17 hrs. Volume= Runoff 0.006 MI. 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 De	scription		
0.0470	0.50 Co	nposite		
0.0470	100	.00% Perv	ious Area	
Tc Leng (min) (meter 10.0		Velocity (m/sec)	Capacity (m³/s)	Description Direct Entry, Minimum

#### Subcatchment 5S: 50 Bayswater



50Bays1088Somerset_20240730 Prepared by WSP HydroCAD® 10.00-21 s/n 10697 © 2018 Hy	Ottawa City IDF 50-Year Duration=10 min, Inten=161.5 mm/hr Printed 2024-07-30 droCAD Software Solutions LLC Page 17	50Bays1088Somerset_20240730 C Prepared by WSP HydroCAD® 10.00-21 s/n 10697 © 2018 Hydr
Runoff by F	=0.00-3.00 hrs, dt=0.01 hrs, 301 points Rational method, Rise/Fall=1.0/1.0 xTc	Summary for
Reach routing by Stor-Inc	d+Trans method - Pond routing by Stor-Ind method	Runoff = 0.0104 m <sup>3</sup> /s @ 0.17 hr
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 MI	Runoff by Rational method, Rise/Fall=1.0/ Ottawa City IDF 50-Year Duration=10 mir
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 MI	Area (ha) C Description
	TC=T0.0 min C=0.50 RUNOTT=0.0104 m/s 0.006 MI	0.0470 0.50 Composite
Total Runoff Area = 0.09	40 ba Runoff Volume = 0.013 ML Average Runoff Depth = 13 mm	0.0470 100.00% Pervious

Total Runoff Area = 0.0940 ha Runoff Volume = 0.013 MI Average Runoff Depth = 13 mm 100.00% Pervious = 0.0940 ha 0.00% Impervious = 0.0000 ha 
 50Bays1088Somerset\_20240730
 Ottawa City IDF 50-Year Duration=10 min, Inten=161.5 mm/hr

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 Printed 2024-07-30

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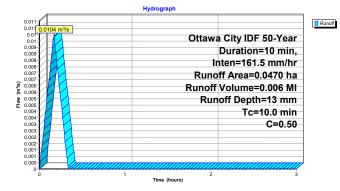
#### Summary for Subcatchment 4S: 1088 Somerset

Runoff = 0.0104 m<sup>3</sup>/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	Des	cription		
0.04	470 0.50	Corr	posite		
0.04	470	100.	00% Pervi	ous Area	
Tc (min) (	Length meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Description
10.0					Direct Entry, Minimum

#### Subcatchment 4S: 1088 Somerset



 50Bays1088Somerset\_20240730
 Ottawa City IDF 50-Year Duration=10 min, Inten=161.5 mm/hr

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 Printed 2024-07-30

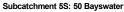
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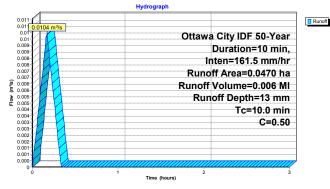
Summary for Subcatchment 5S: 50 Bayswater

Runoff = 0.0104 m<sup>3</sup>/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	i (ha)	С	Desc	cription		
0.	0470	0.50	Com	posite		
0.	0470		100.	00% Pervi	ous Area	
Tc (min)	Len (mete		Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Description
10.0						Direct Entry, Minimum





 50Bays1088Somerset\_20240730
 Ottawa City IDF 100-Year Duration=10 min, Inten=178.6 mm/hr

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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 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 MI

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 MI

 Total Runoff Area = 0.0940 ha
 Runoff Volume = 0.014 Mi
 Average Runoff Depth = 15 mm

 100.00% Pervious = 0.0940 ha
 0.00% Impervious = 0.0000 ha

50Bays1088Somerset_20240730 Ottawa City IDF 100-Year Duration=10 min,	Inten=178.6 mm/hr
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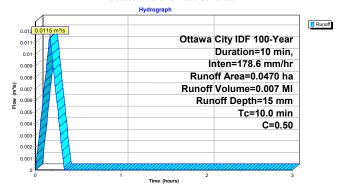
Summary for Subcatchment 4S: 1088 Somerset

Runoff = 0.0115 m<sup>3</sup>/s @ 0.17 hrs, Volume= 0.007 MI, 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	a (ha)	С	Des	cription		
	0.	0470	0.50	Com	nposite		
	0.	0470		100.	00% Pervi	ous Area	
	_						
	Tc	Len					Description
_	(min)	(mete	ers) (	(m/m)	(m/sec)	(m³/s)	
	10.0						Direct Entry, Minimum

#### Subcatchment 4S: 1088 Somerset



 50Bays1088Somerset\_20240730 Ottawa City IDF 100-Year Duration=10 min, Inten=178.6 mm/hr

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 Page 22

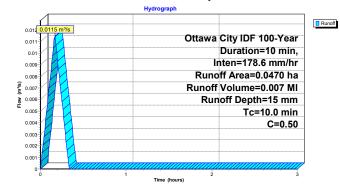
#### Summary for Subcatchment 5S: 50 Bayswater

Runoff = 0.0115 m<sup>3</sup>/s @ 0.17 hrs, Volume= 0.007 MI, 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

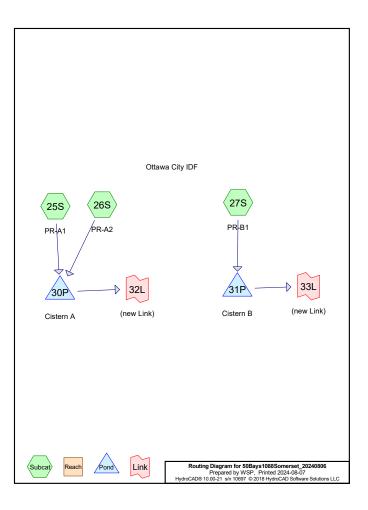
Area	ı (ha)	С	Dese	cription		
0.	0470	0.50	Com	posite		
0.	0470		100.	00% Pervi	ous Area	
Tc (min)	Len (mete		Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Description
10.0						Direct Entry, Minimum

#### Subcatchment 5S: 50 Bayswater



## **APPENDIX**

# C-2 Proposed Conditions



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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

\_

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		Area Listing (selected nodes)
Area (hectares)	С	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

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Ground Covers (selected nodes)							
HSG-A (hectares)	HSG-B (hectares)	HSG-C (hectares)	HSG-D (hectares)	Other (hectares)	Total (hectares)	Ground Cover	
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	

Sub Nun

Prepared by WSP		Printed 2024-08-07
HydroCAD® 10.00-21 s/n 10697 © 2018 Hydr	oCAD Software Solutions LLC	Page 5
Runoff by Ra	0.00-6.00 hrs, dt=0.01 hrs, 601 points tional method, Rise/Fall=1.0/1.0 xTc Trans method - Pond routing by Stor	-Ind method
Subcatchment 25S: PR-A1	Runoff Area=0.0390 ha 100.00% Imp Tc=10.0 min C=0.99	ervious Runoff Depth=13 mm Runoff=0.0081 m³/s 0.005 MI
Subcatchment 26S: PR-A2	Runoff Area=0.0090 ha 0.00% Imp Tc=10.0 min C=0.78	ervious Runoff Depth=10 mm Runoff=0.0015 m³/s 0.001 MI
Subcatchment 27S: PR-B1	Runoff Area=0.0470 ha 100.00% Imp Tc=10.0 min C=0.99	ervious Runoff Depth=13 mm Runoff=0.0098 m³/s 0.006 MI
Pond 30P: Cistern A	Peak Elev=0.324 m Storage=0.005 MI	Inflow=0.0096 m³/s 0.006 MI Outflow=0.0009 m³/s 0.006 MI
Pond 31P: Cistern B	Peak Elev=0.257 m Storage=0.005 MI	Inflow=0.0098 m³/s 0.006 MI Outflow=0.0008 m³/s 0.006 MI
Link 32L: (new Link)		Inflow=0.0009 m³/s 0.006 MI Primary=0.0009 m³/s 0.006 MI
Link 33L: (new Link)		Inflow=0.0008 m³/s 0.006 MI Primary=0.0008 m³/s 0.006 MI
Total Runoff Area = 0.0950	0 ha Runoff Volume = 0.012 MI Ave 9.47% Pervious = 0.0090 ha 90.5	age Runoff Depth = 12 mm 3% Impervious = 0.0860 ha

Ottawa City IDF 2-Year Duration=10 min. Inten=76.8 mm/hr

50Bavs1088Somerset 20240806

50Bays1088Somerset_20240806	Ottawa City IDF 2-Year	Duration=10 min, Inten=76.8 mr	n/hr
Prepared by WSP		Printed 2024-08	3-07
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#### Summary for Subcatchment 25S: PR-A1

Runoff = 0.0081 m3/s @ 0.17 hrs, Volume= 0.005 MI, 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

			cription	nin, inten-	/0.01111/11			
	.0390 0.9							
0	.0390	100.	.00% Impe	ervious Area	a			
Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Description			
10.0					Direct Entry, M	<i>l</i> inimum		
				Subcatch	ment 25S: PF	<b>2-</b> Δ1		
				Hydro				
0.00								Runo
	.0081 m <sup>3</sup> /s							
0.00					Otta	awa City ID	F 2-Year	
0.00						Duration	=10 min.	
0.00						Inten=76		
0.00								
0.00	5					noff Area=0		
<sup>%</sup> € 0.00					Runo	ff Volume=	0.005 MI	
(se 0.00 0.00 0.00					R	unoff Depth	n=13 mm	
은 0.00 0.00							10.0 min	
0.00								
0.00	2						C=0.99	
0.00	2							
0.00								
0.00								
0.00				·/////////////////////////////////////		111111111111111111111111111111111111111		
	0	1	2		3 .	4 5	6	

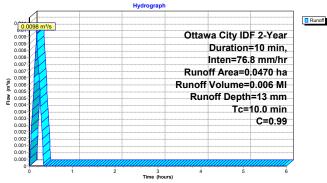
3 Time (hours)

50Bays1088Somerset_20240806 Prepared by WSP	Ottawa City IDF 2-Year		Inten=76.8 mm/hr Printed 2024-08-07
HydroCAD® 10.00-21 s/n 10697 © 2018 Hydr	OCAD Software Solutions LLC	:	Page 8
Summary	for Subcatchment 27S	PR-B1	

= 0.0098 m<sup>3</sup>/s @ 0.17 hrs, Volume= 0.006 MI, Depth= 13 mm Runoff

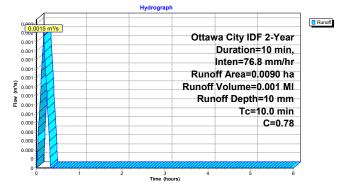
Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs Ottawa City IDF 2-Year Duration=10 min, Inten=76.8 mm/hr

Area	i (ha)	С	Des	cription		
0.	0470	0.99	Roo	f		
0.	0470		100.	00% Impe	rvious Area	1
Tc (min)				Velocity (m/sec)	Capacity (m³/s)	Description
10.0						Direct Entry, Minimum
						ment 27S: PR-B1
	0. 0. Tc (min)	(min) (mete	0.0470 0.99 0.0470 Tc Length (min) (meters)	0.0470 0.99 Roo 0.0470 100. Tc Length Slope (min) (meters) (m/m)	0.0470         0.99         Roof           0.0470         100.00%         Impe           Tc         Length         Slope         Velocity           (min)         (meters)         (m/m)         (m/sec)           10.0         0         0         0	0.0470         0.99         Roof           0.0470         100.00%         Impervious Area           Tc         Length         Slope         Velocity         Capacity (min) (meters)         (m/m) (m/sec) (m <sup>3</sup> /s)           10.0



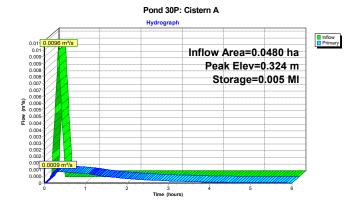
Prepared by		+0000 Ollan	a City IDI 2-Teal	Duration=n	Printed 2024-08-07
		2018 HydroCAD S	Software Solutions LL	С	Page 7
	s	ummary for Su	bcatchment 26	6: PR-A2	
Runoff =	0.0015 m³/s @	0.17 hrs, Volu	me= 0.001	MI, Depth=	10 mm
	onal method, Rise F 2-Year Duration C Descript	n=10 min, Inten=	, Time Span= 0.00- 76.8 mm/hr	6.00 hrs, dt= (	0.01 hrs
0.0090	0.78 Soft Lan	dscaping and At-	Grade Surfaces		
0.0090	100.00%	6 Pervious Area			
Tc Ler (min) (met		elocity Capacity n/sec) (m³/s)	Description		
10.0			Direct Entry, Min	imum	
		Subcatch	ment 26S: PR-A	2	

50Bays1088Somerset\_20240806 Ottawa City IDF 2-Year Duration=10 min, Inten=76.8 mm/hr



			Su	mmary for Pond	30P: Cistern A	
Inflow Are	a =	0.0480 h	na, 81.25	% Impervious, Inflo	w Depth = 12 mm for 2-Year event	
Inflow	= 0.0	096 m <sup>3</sup> /s	s@ 0.1	17 hrs, Volume=	0.006 MI	
Outflow				32 hrs, Volume=	0.006 MI, Atten= 91%, Lag= 9.1 m	in
Primary	= 0.0	/009 m³/s	s@ 0.3	32 hrs, Volume=	0.006 MI	
Routing by	y Stor-Ind	method,	Time Spa	an= 0.00-6.00 hrs, o	It= 0.01 hrs	
Peak Elev	= 0.324 n	n @ 0.32	hrs Sur	f.Area= 0.0000 ha	Storage= 0.005 MI	
		0.0			5	
Plug-Flow	detentior	time= 78	8.5 min c	alculated for 0.006	5	
Plug-Flow	detentior	time= 78	8.5 min c		5	
Plug-Flow Center-of-	detentior	time= 78 time= 78	8.5 min c 8.8 min (	alculated for 0.006 88.8 - 10.0)	VII (99% of inflow)	
Plug-Flow	detentior Mass det	time= 78 time= 78 t Avail	8.5 min c 8.8 min (	alculated for 0.006 88.8 - 10.0 ) Storage Descripti	on	
Plug-Flow Center-of- <u>Volume</u> #1	detentior Mass det Inver 0.000 m	time= 78 time= 78 t Avail	8.5 min ca 8.8 min ( .Storage	alculated for 0.006 88.8 - 10.0 ) Storage Descripti	on	
Plug-Flow Center-of- <u>Volume</u> #1 Elevation	detentior Mass det Inver 0.000 m Cun	time= 78 time= 78 t <u>Avail</u>	8.5 min ca 8.8 min ( .Storage	alculated for 0.006 88.8 - 10.0 ) Storage Descripti	on	
Plug-Flow Center-of- <u>Volume</u> #1 Elevation (meters)	detention Mass det Inver 0.000 m Cun (Mega	time= 78 time= 78 t Avail.	8.5 min ca 8.8 min ( .Storage	alculated for 0.006 88.8 - 10.0 ) Storage Descripti	on	
Plug-Flow Center-of- <u>Volume</u> #1 Elevation <u>(meters)</u> 0.000	detention Mass det Inver 0.000 m Cun (Mega	time= 78 time= 78 t Avail. h.Store h-liters) 0.000	8.5 min ca 8.8 min ( .Storage	alculated for 0.006 88.8 - 10.0 ) Storage Descripti	on	
Plug-Flow Center-of- <u>/olume</u> #1 Elevation (meters)	detention Mass det Inver 0.000 m Cun (Mega	time= 78 time= 78 t Avail.	8.5 min ca 8.8 min ( .Storage	alculated for 0.006 88.8 - 10.0 ) Storage Descripti	on	
Plug-Flow Center-of- #1 Elevation (meters) 0.000 1.850	detention Mass det Inver 0.000 m Cun (Mega	time= 78 time= 78 t Avail. h.Store h-liters) 0.000 0.030	8.5 min c: 8.8 min ( <u>.Storage</u> 0.030 MI	alculated for 0.006 i 88.8 - 10.0 ) <u>Storage Descripti</u> Custom Stage Da	on	
Plug-Flow Center-of- #1 Elevation (meters) 0.000 1.850 Device F	detention Mass det Inver 0.000 m Cun (Mega Routing	time= 78 time= 78 t Avail. h.Store <u>i-liters)</u> 0.000 0.030	8.5 min c 8.8 min ( <u>.Storage</u> 0.030 Mi	alculated for 0.006 l 88.8 - 10.0 ) <u>Storage Descripti</u> Custom Stage Da	on	
Plug-Flow Center-of- #1 Elevation (meters) 0.000 1.850 Device F	detention Mass det Inver 0.000 m Cun (Mega	time= 78 time= 78 t Avail. h.Store <u>i-liters)</u> 0.000 0.030	8.5 min ci 8.8 min ( <u>.Storage</u> 0.030 MI 0.030 MI 0.030 MI	alculated for 0.006 l 88.8 - 10.0 ) Storage Descripti Custom Stage Da utlet Devices /drovex 40SVHV-1	on	

50Bays1088Somerset\_20240806 Ottawa City IDF 2-Year I Prepared by WSP HydroCAD® 10.00-21 s/n 10697 © 2018 HydroCAD Software Solutions LLC Ottawa City IDF 2-Year Duration=10 min, Inten=76.8 mm/hr Printed 2024-08-07 Page 10



	ed by WS D® 10.00-		2018 HydroCAD Software Solutions LLC	Printed 2024-08-0 Page 1
			Summary for Pond 31P: Cistern B	
Peak ĔĬ Plug-Flo	= ( = ( = ( by Stor-Ir ev= 0.257	0.0098 m³/s @ 0.0008 m³/s @ 0.0008 m³/s @ 0.0008 m³/s @ m @ 0.32 hrs on time= 91.6 m	0.00% Impervious, Inflow Depth =         13 mm           0.17 hrs, Volume=         0.006 MI           0.32 hrs, Volume=         0.006 MI, Atten = 9           0.32 hrs, Volume=         0.006 MI           Span= 0.00-6.00 hrs, dt= 0.01 hrs         Surf.Area = 0.0000 ha           Surf.Area =         0.0000 ha           Storage=         0.005 MI           in calculated for 0.006 MI (97% of inflow)           in (101.8 - 10.0)	
Volume	Inv	ert Avail.Stora	age Storage Description	
#1	0.000	m 0.035	MI Custom Stage Data Listed below	
Elevatio (meter 0.00 1.65	s) (Me	um.Store ga-liters) 0.000 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 1.5 Disch. (m <sup>3</sup> /s) 0.00000 0.00070 0.00110 0.00	

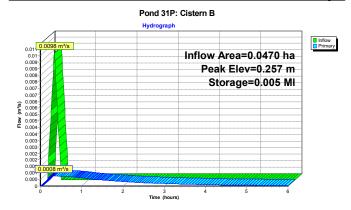
Ottawa City IDF 2-Year Duration=10 min, Inten=76.8 mm/hr

Primary OutFlow Max=0.0008 m<sup>3</sup>/s @ 0.32 hrs HW=0.257 m (Free Discharge) 1=Hydrovex 40SVHV-1 (Custom Controls 0.0008 m<sup>3</sup>/s)

50Bays1088Somerset\_20240806

50Bays1088Somerset\_20240806 Ottawa City IDF 2-Year I Prepared by WSP HydroCAD® 10.00-21 s/n 10697 © 2018 HydroCAD Software Solutions LLC

Ottawa City IDF 2-Year Duration=10 min, Inten=76.8 mm/hr Printed 2024-08-07 Page 12



50Bays1088Somerset_20240806	Ottawa City IDF 2-Year	Duration=10 min,	Inten=76.8 mm/hr
Prepared by WSP			Printed 2024-08-07
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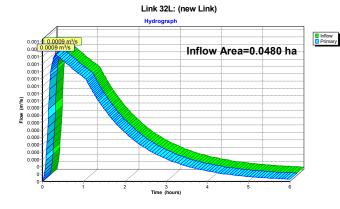
## Summary for Link 32L: (new Link)

 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 MI

 Primary =
 0.0009 m³/s @
 0.32 hrs, Volume=
 0.006 MI, Atten= 0%, Lag= 0.0 min

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



 50Bays1088Somerset\_20240806
 Ottawa City IDF 2-Year Duration=10 min, Inten=76.8 mm/hr

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## 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 MI

 Primary =
 0.0008 m³/s @
 0.32 hrs, Volume=
 0.006 MI, Atten= 0%, Lag= 0.0 min

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



50Bays1088Somerset_20240806 C Prepared by WSP	Ottawa City IDF 5-Year Duration=10 min, Inten=104.2 mm/hr Printed 2024-08-07
HydroCAD® 10.00-21 s/n 10697 © 2018 Hydro	
Runoff by Rat	
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 MI
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 MI
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 MI
Pond 30P: Cistern A	Peak Elev=0.445 m Storage=0.007 MI Inflow=0.0130 m <sup>3</sup> /s 0.008 MI Outflow=0.0010 m <sup>3</sup> /s 0.008 MI
Pond 31P: Cistern B	Peak Elev=0.352 m Storage=0.007 MI Inflow=0.0132 m <sup>3</sup> /s 0.008 MI Outflow=0.0009 m <sup>3</sup> /s 0.008 MI
Link 32L: (new Link)	Inflow=0.0010 m³/s 0.008 MI Primary=0.0010 m³/s 0.008 MI
Link 33L: (new Link)	Inflow=0.0009 m³/s 0.008 MI Primary=0.0009 m³/s 0.008 MI

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 
 50Bays1088Somerset\_20240806
 Ottawa City IDF 5-Year Duration=10 min, Inten=104.2 mm/hr

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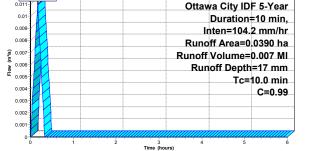
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## Summary for Subcatchment 25S: PR-A1

Runoff = 0.0110 m<sup>3</sup>/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         Length         Slope           (min)         (meters)         (m/m)           10.0         Direct Entry, Minimum           Subcatchment 25S: PR-A1									
0.0390     100.00% Impervious Area       Tc     Length       Slope     Velocity       (min)     (meters)       (m/m)     (m <sup>3</sup> /s)       10.0     Direct Entry, Minimum									
Tc Length Slope Velocity Capacity Description (min) (meters) (m/m) (m/sec) (m³/s) 10.0 Direct Entry, Minimum									
(min) (meters) (m/m) (m/sec) (m³/s) 10.0 Direct Entry, Minimum									
Subcatchment 25S: PR-A1									
Hydrograph									
0.012									
0.011 Ottawa City IDF 5-Year									



HydroCAD® 10.00-21	s/n 10697 © 2018 H	ydroCAD Soft	ware Solutions LL	.C		Page 1
	Summar	ry for Subc	atchment 26	5: PR-A2		
Runoff = 0.00	20 m³/s @ 0.17	hrs, Volume	= 0.001	MI, Depth=	14 mm	
Runoff by Rational m				-6.00 hrs, dt=	0.01 hrs	
Ottawa City IDF 5-Ye	ar Duration=10 mi	n, Inten=104	4.2 mm/hr			
Area (ha) C	Description					
0.0090 0.78	Soft Landscapin		ade Surfaces			
0.0090	100.00% Pervio	us Area				
Tc Lenath	Slope Velocity	Capacity D	escription			
	(m/m) (m/sec)	(m <sup>3</sup> /s)	escription			
10.0		D	irect Entry, Min	imum		
	_			-		
	S	ubcatchm	ent 26S: PR-A	2		
		Hydrogra	ph			
0.002						Runoff
0.0020 m <sup>3</sup> /s			0.11-1	04-10		
0.002			Ottav	/a City ID		
				Duration	=10 min,	
0.002						
0.002 0.002 0.002				nten=104.	2 mm/hr	
0.002 0.002 0.002 0.002						
0.002			Runo	ff Area=0	.0090 ha	
0.002			Runo	ff Area=0 Volume=	.0090 ha 0.001 MI	
0.002 0.002 0.002 0.002 0.001 0.001 0.001 0.001 0.001 0.001			Runo	ff Area=0 Volume= off Depth	.0090 ha 0.001 MI =14 mm	
0.002 0.002 0.002 0.001 0.001 0.001 0.001 0.001 0.001 0.001			Runo	ff Area=0 Volume= off Depth	.0090 ha 0.001 MI	
E 2000 E 200 E 2000 E 2000			Runo	ff Area=0 Volume= off Depth	.0090 ha 0.001 MI =14 mm 10.0 min	
≤2000 ≤2000 5000 5000 5000 100000 10000 10000 10000 10000 10000 100			Runo	ff Area=0 Volume= off Depth	.0090 ha 0.001 MI =14 mm	
E2000 Hereina (1990) Hereina (1990)			Runo	ff Area=0 Volume= off Depth	.0090 ha 0.001 MI =14 mm 10.0 min	

3 Time (hours) 5

50Bays1088Somerset_20240806	Ottawa City IDF 5-Year Duratio	n=10 min, Inten=104.2 mm/hr
Prepared by WSP		Printed 2024-08-07
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## Summary for Subcatchment 27S: PR-B1

Runoff = 0.0132 m<sup>3</sup>/s @ 0.17 hrs, Volume= 0.008 MI, 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			cription					
0.0	470 0.9	9 Roo	f					
0.0	470	100.	00% Impe	rvious Area	a			
Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Description			
10.0					Direct Entry, Mir	nimum		
				Subcatch	ment 27S: PR-I	B1		
				Hydro	graph			
	()							Run
	)132 m <sup>3</sup> /s							-
0.013	Г <mark>И</mark>				Ottav	va City ID	F 5-Year	
0.012	1					Duration	=10 min,	
0.011	1					nten=104.	2 mm/hr	
0.01	( <b>K</b>					ff Area=0		
÷ 0.009								
<sup>8</sup> € 0.008-	<b>1</b>				Runoff	Volume=	0.008 MI	
(Se 0.008-	1				Run	off Depth	=17 mm	
œ 0.006-						Tc=	10.0 min	
0.005							C=0.99	
0.004							0.99	
0.003								
0.002								

3 Time (hours)

2

0.001

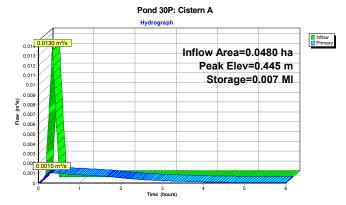
Prepared by WSP		Printed 2024-08-07
HydroCAD® 10.00-21 s/n 10697 @	2018 HydroCAD Software Solutions LLC	Page 19
	Summary for Pond 30P: Cistern A	
Inflow = 0.0130 m <sup>3</sup> /s @ Outflow = 0.0010 m <sup>3</sup> /s @	81.25% Impervious, Inflow Depth = 17 mm for 5- 0.17 hrs, Volume= 0.008 MI 0.32 hrs, Volume= 0.008 MI, Atten= 92%, 0.32 hrs, Volume= 0.008 MI	
	ne Span= 0.00-6.00 hrs, dt= 0.01 hrs Surf.Area= 0.0000 ha Storage= 0.007 MI	
Center-of-Mass det. time= 86.1		
	rage Storage Description	
#1 0.000 m 0.03	30 MI Custom Stage Data Listed below	
Elevation (meters)         Cum.Store (Mega-liters)           0.000         0.000           1.850         0.030		
Device Routing Inver	t Outlet Devices	
#1 Primary 0.000 n	Hydrovex 40SVHV-1           Elev. (meters) 0.000 0.200 0.500 1.000 1.500 2           Disch. (m³/s) 0.00000 0.00070 0.00110 0.00150	

50Bays1088Somerset\_20240806 Ottawa City IDF 5-Year Duration=10 min, Inten=104.2 mm/hr

 50Bays1088Somerset\_20240806
 Ottawa City IDF 5-Year Duration=10 min, Inten=104.2 mm/hr

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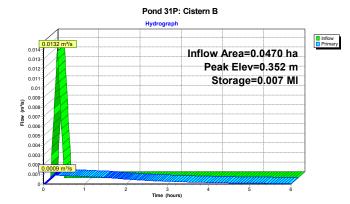
Primary OutFlow Max=0.0010 m³/s @ 0.32 hrs HW=0.445 m (Free Discharge) 1=Hydrovex 40SVHV-1 (Custom Controls 0.0010 m³/s)

50Bays1088 Prepared by	Somerset_20240806	Ottawa City IDF	5-Year Duration=10 min	, Inten=104.2 mm/hr Printed 2024-08-07
HydroCAD® 10	.00-21 s/n 10697 © 2018 l	HydroCAD Software S	olutions LLC	Page 21
	Sun	mary for Pond 3	1P: Cistern B	
Inflow Area = Inflow = Outflow =	0.0132 m³/s @ 0.17		0.008 MI	
Outflow = Primary =	0.0009 m <sup>3</sup> /s @ 0.32 0.0009 m <sup>3</sup> /s @ 0.32		0.008 MI, Atten= 93%, 0.008 MI	Lag= 9.3 min
	or-Ind method, Time Spa 352 m @ 0.32 hrs Surf.			
Center-of-Mas	ention time= 98.4 min ca s det. time= 98.1 min ( 1	08.1 - 10.0 )	. ,	
		Storage Description		
#1 0.0	000 m 0.035 MI	Custom Stage Data	Listed below	
Elevation	Cum.Store			
(meters) (	Mega-liters)			
0.000	0.000			
1.650	0.035			
Device Rout	ina Invert Out	let Devices		
#1 Prim	ary 0.000 m Hyc Elev		0.200 0.500 1.000 1.500 2 0.00070 0.00110 0.00150	
	low Max=0.0009 m³/s @ x 40SVHV-1 (Custom Co			

 50Bays1088Somerset\_20240806
 Ottawa City IDF 5-Year Duration=10 min, Inten=104.2 mm/hr

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50Bays1088Somerset_20240806	Ottawa City IDF 5-Year Duration=10 min,	Inten=104.2 mm/hr
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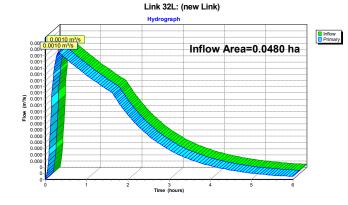
Summary for Link 32L: (new Link)

 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 MI

 Primary =
 0.0010 m³/s @
 0.32 hrs, Volume=
 0.008 MI, Atten= 0%, Lag= 0.0 min

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



 50Bays1088Somerset\_20240806
 Ottawa City IDF 5-Year Duration=10 min, Inten=104.2 mm/hr

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## 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 MI

 Primary =
 0.0009 m³/s @
 0.32 hrs, Volume=
 0.008 MI, Atten= 0%, Lag= 0.0 min

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



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HydroCAD® 10.00-21 S/II 10097 @ 2018 Hydro	CAD Software Solutions EEC	Page 25
Runoff by Rat	00-6.00 hrs, dt=0.01 hrs, 601 points ional method, Rise/Fall=1.0/1.0 xTc Frans method - Pond routing by Stor	-Ind method
Subcatchment 25S: PR-A1	Runoff Area=0.0390 ha 100.00% Imp Tc=10.0 min C=0.99	ervious Runoff Depth=20 mm Runoff=0.0129 m³/s 0.008 MI
Subcatchment 26S: PR-A2	Runoff Area=0.0090 ha 0.00% Imp Tc=10.0 min C=0.78	vervious Runoff Depth=16 mm Runoff=0.0023 m³/s 0.001 MI
Subcatchment 27S: PR-B1	Runoff Area=0.0470 ha 100.00% Imp Tc=10.0 min C=0.99	vervious Runoff Depth=20 mm Runoff=0.0155 m³/s 0.009 MI
Pond 30P: Cistern A	Peak Elev=0.524 m Storage=0.009 M	Inflow=0.0152 m³/s 0.009 MI Outflow=0.0011 m³/s 0.009 MI
Pond 31P: Cistern B	Peak Elev=0.414 m Storage=0.009 M	Inflow=0.0155 m³/s 0.009 MI Outflow=0.0010 m³/s 0.009 MI
Link 32L: (new Link)		Inflow=0.0011 m³/s 0.009 MI Primary=0.0011 m³/s 0.009 MI
Link 33L: (new Link)		Inflow=0.0010 m³/s 0.009 MI Primary=0.0010 m³/s 0.009 MI
Total Runoff Area = 0.0950		rage Runoff Depth = 20 mm 53% Impervious = 0.0860 ha

50Bays1088Somerset\_20240806 Ottawa City IDF 10-Year Duration=10 min, Inten=122.1 mm/hr

 50Bays1088Somerset\_20240806
 Ottawa City IDF 10-Year Duration=10 min, Inten=122.1 mm/hr

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## Summary for Subcatchment 25S: PR-A1

Runoff = 0.0129 m<sup>3</sup>/s @ 0.17 hrs, Volume= 0.008 MI, 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 0.0		<u>C Des</u> ).99 Roo	cription f					
	0.0	0390	100	00% Impe	rvious Area	a			
(m	Tc in)	Lengt (meters		Velocity (m/sec)	Capacity (m³/s)	Description			
10	0.0					Direct Entry, Min	imum		
					Subcatch	ment 25S: PR-4	1		
					Hydro				
					nyuro				
	0.014	0129 m³/s							Run
	0.013	= / /···				Ottawa	a City IDF	10-Year	
	0.012						Duration=	=10 min,	
	0.011					lr	nten=122.	1 mm/hr	
	0.009					Runo	ff Area=0	0390 ha	
(s/c	0.008					Runoff	Volume=	0 008 MI	
Flow (m³/s)	0.007						off Depth		
Ē	0.006					Ruh	•		
	0.005						1 C=	10.0 min	
	0.004							C=0.99	
	0.003								
	0.002								
	0.001								
	0			///////////////////////////////////////	///////////////////////////////////////				

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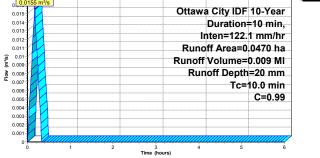
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## Summary for Subcatchment 27S: PR-B1

Runoff = 0.0155 m<sup>3</sup>/s @ 0.17 hrs, Volume= 0.009 MI, 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)	С	Des	cription					
0.0	470	0.99	Root						
0.0	0470		100.	00% Impe	rvious Area	a			
Tc (min)	Leng (mete		Slope m/m)	Velocity (m/sec)	Capacity (m³/s)	Description			
10.0						Direct Entry, Min	imum		
					Subcatch	iment 27S: PR-E graph	31		
0.017- 0.000	0155 m <sup>3</sup>	Ys							Runoff
0.015	Y 🖊					Ottawa	City IDF	10-Year	
0.014							D	40	



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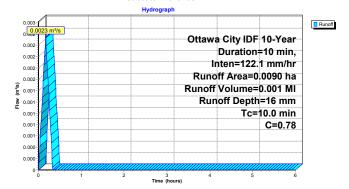
Summary for Subcatchment 26S: PR-A2

Runoff = 0.0023 m<sup>3</sup>/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

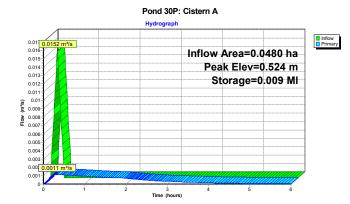
	Area	(ha)	С	Desc	cription		
	0.	0090	0.78	Soft	Landscapi	ing and At-	Grade Surfaces
	0.	0090		100.	00% Pervi	ous Area	
	Тс	Len	ath S	Slope	Velocitv	Capacity	Description
_(	min)	(mete		m/m)	(m/sec)	(m <sup>3</sup> /s)	
	10.0						Direct Entry, Minimum

#### Subcatchment 26S: PR-A2

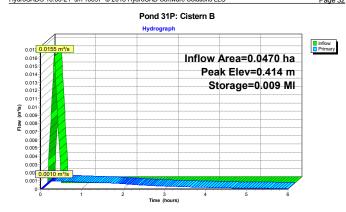


			Su	mmary for Pond	30P: Cistern A
Inflow Are	a =	0.0480 ha	a. 81.25	% Impervious. Inflo	w Depth = 19 mm for 10-Year event
Inflow	= 0.	)152 m <sup>3</sup> /s	@ 0.1	17 hrs, Volume=	0.009 MI
Outflow	= 0.	)011 m³/s		32 hrs, Volume=	0.009 MI, Atten= 93%, Lag= 9.2 min
Primary	= 0.	)011 m³/s		32 hrs, Volume=	0.009 MI
				an= 0.00-6.00 hrs, o	
Peak Elev	= 0.524 r	n @ 0.32 I	nrs Sur	f.Area= 0.0000 ha	Storage= 0.009 MI
		0.0			5
Plug-Flow	detentio	n time= 90	.3 min c	alculated for 0.009 I	5
Plug-Flow	detentio	n time= 90	.3 min c		5
Plug-Flow	detentio	n time= 90 time= 90	.3 min c .6 min (	alculated for 0.009 I	/I (98% of inflow)
Plug-Flow Center-of-	detentio Mass de	n time= 90 time= 90 .t Avail.	.3 min c .6 min (	alculated for 0.009 l 100.6 - 10.0 ) Storage Descripti	vII (98% of inflow)
Plug-Flow Center-of- <u>Volume</u> #1	detentio Mass de Inve 0.000 r	n time= 90 time= 90 .t Avail.: n 0	.3 min c .6 min ( Storage	alculated for 0.009 l 100.6 - 10.0 ) Storage Descripti	vII (98% of inflow)
Plug-Flow Center-of- <u>Volume</u> #1 Elevation	detentio Mass de Inve 0.000 r Cur	n time= 90 time= 90 <u>t Avail.</u> n 0 n.Store	.3 min c .6 min ( Storage	alculated for 0.009 l 100.6 - 10.0 ) Storage Descripti	vII (98% of inflow)
Plug-Flow Center-of- <u>Volume</u> #1 Elevation <u>(meters)</u>	detentio Mass de Inve 0.000 r Cur (Meg	n time= 90 time= 90 t <u>Avail.</u> n 0 n.Store a-liters)	.3 min c .6 min ( Storage	alculated for 0.009 l 100.6 - 10.0 ) Storage Descripti	vII (98% of inflow)
Plug-Flow Center-of- <u>Volume</u> #1 Elevation <u>(meters)</u> 0.000	detentio Mass de Inve 0.000 r Cur (Meg	n time= 90 time= 90 n dvail. n 0 nStore a-liters) 0.000	.3 min c .6 min ( Storage	alculated for 0.009 l 100.6 - 10.0 ) Storage Descripti	vII (98% of inflow)
Plug-Flow Center-of- <u>Volume</u> #1 Elevation <u>(meters)</u>	detentio Mass de Inve 0.000 r Cur (Meg	n time= 90 time= 90 t <u>Avail.</u> n 0 n.Store a-liters)	.3 min c .6 min ( Storage	alculated for 0.009 l 100.6 - 10.0 ) Storage Descripti	vII (98% of inflow)
Plug-Flow Center-of- #1 Elevation (meters) 0.000 1.850	detentio Mass de Inve 0.000 r Cur (Meg	n time= 90 time= 90 n <u>t Avail.</u> n 0 n.Store <u>a-liters)</u> 0.000 0.030	.3 min c .6 min ( <u>Storage</u> .030 MI	alculated for 0.009 l 100.6 - 10.0 ) Storage Descripti	vII (98% of inflow)
Plug-Flow Center-of- #1 Elevation (meters) 0.000 1.850 Device f	detentio Mass de Inve 0.000 r Cu (Meg	n time= 90 time= 90 n <u>t Avail.</u> n 0 n.Store <u>a-liters)</u> 0.000 0.030	.3 min c .6 min ( <u>Storage</u> .030 MI	alculated for 0.009 I 100.6 - 10.0 ) Storage Descripti Custom Stage Da	vII (98% of inflow)
Plug-Flow Center-of- #1 Elevation (meters) 0.000 1.850 Device f	detentio Mass de <u>Inve</u> 0.000 r Cur (Meg Routing	n time= 90 time= 90 n <u>t Avail.</u> n 0 n.Store <u>a-liters)</u> 0.000 0.030	.3 min c .6 min ( <u>Storage</u> .030 MI <u>vert Ot</u> 0 m <b>Hy</b>	alculated for 0.009 I 100.6 - 10.0 ) Storage Descripti Custom Stage De utlet Devices drovex 40SVHV-1	vII (98% of inflow)

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Prepared by WSP HydroCAD® 10.00-21 s/n 10697 © 2018 HydroCAD Software Solutions LLC Printed 2024-08-07 Page 31 Summary for Pond 31P: Cistern B 0.0470 ha,100.00% Impervious, Inflow Depth = 20 mm for 10-Year event 0155 m<sup>3</sup>/s @ 0.17 hrs, Volume= 0.009 MI 0010 m<sup>3</sup>/s @ 0.32 hrs, Volume= 0.009 MI, Atten= 94%, Lag= 9.3 min 0010 m<sup>3</sup>/s @ 0.32 hrs, Volume= 0.009 MI Inflow Area = Inflow Outflow Primary 0.0155 m<sup>3</sup>/s @ 0.17 hrs, Volume= 0.0010 m<sup>3</sup>/s @ 0.32 hrs, Volume= 0.0010 m<sup>3</sup>/s @ 0.32 hrs, Volume= = = = 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 MI Plug-Flow detention time= 102.5 min calculated for 0.009 MI (96% of inflow) Center-of-Mass det. time= 102.6 min ( 112.6 - 10.0 ) Invert Avail.Storage Storage Description .000 m 0.035 MI Custom Stage Data Listed below Volume 0.000 m #1 Elevation Cum.Store (Mega-liters) 0.000 (meters) 0.000 1.650 0.035 
 Invert
 Outlet Devices

 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
 Device Routing Primary Primary OutFlow Max=0.0010 m<sup>3</sup>/s @ 0.32 hrs HW=0.414 m (Free Discharge) 1=Hydrovex 40SVHV-1 (Custom Controls 0.0010 m<sup>3</sup>/s)

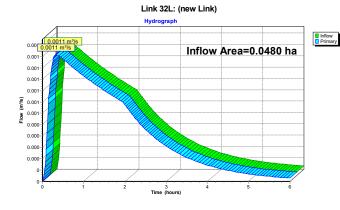
50Bays1088Somerset\_20240806 Ottawa City IDF 10-Year Duration=10 min, Inten=122.1 mm/hr

50Bays1088Somerset_20240806	Ottawa City IDF 10-Year	Duration=10 min,	Inten=122.1 mm/hr	
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## Summary for Link 32L: (new Link)

0.0480 ha, 81.25% Impervious, Inflow Depth > 19 mm for 10-Year event 0011 m³/s @ 0.32 hrs, Volume= 0.009 MI 0011 m³/s @ 0.32 hrs, Volume= 0.009 MI, Atten= 0%, Lag= 0.0 min Inflow Area =  $\begin{array}{rcl} \text{Inflow} & = & 0.0400 \text{ m}_{3} & (51.25.76 \text{ m}) \text{ m}^{2}\text{ m}$ 

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



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## Summary for Link 33L: (new Link)

0.0470 ha,100.00% Impervious, Inflow Depth > 19 mm for 10-Year event 0010 m³/s @ 0.32 hrs, Volume= 0.009 MI 0010 m³/s @ 0.32 hrs, Volume= 0.009 MI, Atten= 0%, Lag= 0.0 min Inflow Area = Inflow = Primary = 0.0010 m³/s @ 0.32 hrs, Volume= 0.0010 m³/s @ 0.32 hrs, Volume=

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



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Runoff by	
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 MI
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 MI
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 MI
Pond 30P: Cistern A	Peak Elev=0.625 m Storage=0.010 MI Inflow=0.0180 m³/s 0.011 MI Outflow=0.0012 m³/s 0.011 MI
Pond 31P: Cistern B	Peak Elev=0.493 m Storage=0.010 MI Inflow=0.0184 m³/s 0.011 MI Outflow=0.0011 m³/s 0.011 MI
Link 32L: (new Link)	Inflow=0.0012 m³/s 0.011 MI Primary=0.0012 m³/s 0.011 MI
Link 33L: (new Link)	Inflow=0.0011 m³/s 0.011 MI Primary=0.0011 m³/s 0.011 MI

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

50Bays1088Somerset\_20240806 Ottawa City IDF 25-Year Duration=10 min, Inten=144.7 mm/hr Prepared by WSP HydroCAD® 10.00-21 s/n 10697 © 2018 HydroCAD Software Solutions LLC Printed 2024-08-07 Page 36

## Summary for Subcatchment 25S: PR-A1

Runoff = 0.0152 m<sup>3</sup>/s @ 0.17 hrs, Volume= 0.009 MI. 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

0.0	<u>390 0.9</u> 390			rvious Area				
0.0	390	100.	00% impe	I VIOUS AI ea	1			
Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Description			
10.0					Direct Entry, Min	imum		
				Subcatch	ment 25S: PR-A	1		
				Hydrog				
	/			Tiyaroş	Jiapii			
0.017	152 m <sup>3</sup> /s							Run
0.015					Ottawa	a City IDF	25-Year	
0.014						Duration:		
0.013						ten=144.	, ,	
0.012						ff Area=0		
( 0.009 0.009 0.008						Volume=		
0.008 0.007					Run	off Depth		
0.006						Tc=	10.0 min	
0.005							C=0.99	
0.004								
0.003								
0.002								

Summary for Subcatchment 26S: PR-A2           Runoff         =         0.0028 m³/s @         0.17 hrs, Volume=         0.002 MI, 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         0.017 hrs, Volume=         0.002 MI, Depth=         19 mm           Area (ha)         C         Description         0.0090         0.78         Soft Landscaping and At-Grade Surfaces         0.0090         100.00% Pervious Area           Tc         Length         Slope         Velocity         Capacity         Description           (min)         (m/sc)         (m³/s)         Direct Entry, Minimum           Subcatchment 26S: PR-A2           Hydrograph           Image: Subcatchment 26S: PR-A2           Index City IDF 25-Year           Uration=10 min, inten=144.7 mm/hr           Ottawa City IDF 25-Year           Ottawa City IDF 25-Year           Ottawa City IDF 25-Year           Grad of the method in the	
Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs           Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs           Area (ha)         C           0.0090         0.78           0.0090         100.00% Pervious Area           Tc         Length           No         Direct Entry, Minimum           Subcatchment 26S: PR-A2           Hydrograph           0.0000         0.002 m/s           Ottawa City IDF 25-Year           Ouration=10 min,           Inten=144.7 mm/hr	
Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs           Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs           Area (ha)         C           0.0090         0.78           Soft Landscaping and Al-Grade Surfaces           0.0090         100.00% Pervious Area           Tc         Length           Slope         Velocity           C         Description           (min) (meters)         (m/sc)           10.0         Direct Entry, Minimum            Ottawa City IDF 25-Year           0.0000         0.0028 m/s           0.0000         Ottawa City IDF 25-Year           0.0000         Duration=110 min,           0.0000         Inten=144.7 mm/hr	
Ottawa Čity 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         Length         Slope           10.0         Direct Entry, Minimum           Subcatchment 26S: PR-A2           Hydrograph           Ottawa City IDF 25-Year           Ottawa City IDF 25-Year           Ottawa City IDF 25-Year           Ouration=10 min,           Inten=144.7 mm/hr           Numotification and the second and	
Area (ha)         C         Description           0.0090         0.78         Soft Landscaping and At-Grade Surfaces           0.0090         100.00% Pervious Area           Tc         Length         Slope           (min)         (m/ms)         Discription           (min)         (m/ms)         Direct Entry, Minimum           Subcatchment 26S: PR-A2           Hydrograph           Outation=10         min, Inten=144.7         mm/hr           0.0020         Inten=144.7         mm/hr	
0.0090         0.78         Soft Landscaping and Al-Grade Surfaces           0.0090         100.00% Pervious Area           Tc         Length         Slope         Velocity         Capacity         Description           (min)         (m/sec)         (m's)         Direct Entry, Minimum           10.0         Direct Entry, Minimum           Subcatchment 26S: PR-A2           Hydrograph           0.0020 m/s         Ottawa City IDF 25-Year           0.0020 m/s         Duration=10 min,           0.0021 m/s         Inten=144.7 mm/hr	
0.0090 100.00% Pervious Area Tc Length Slope Velocity Capacity Description (min) (meters) (m/m) (m/sec) (m <sup>3</sup> /s) 10.0 Direct Entry, Minimum Subcatchment 26S: PR-A2 Hydrograph 00028 m <sup>3</sup> /s 00028 m <sup>3</sup> /s 00020 m <sup>3</sup> /s	
Tc Length Slope Velocity Capacity Description (min) (m/m) (m/sec) (m <sup>3</sup> /s) 10.0 Direct Entry, Minimum Subcatchment 26S: PR-A2 Hydrograph 00002 m <sup>3</sup> /s 00002 m <sup>3</sup> /s 00000 m <sup>3</sup> /s	
(min) (meters) (m/m) (m/sec) (m <sup>3</sup> /s) Direct Entry, Minimum 10.0 Direct Entry, Minimum Subcatchment 26S: PR-A2 Hydrograph O0022 m <sup>3</sup> /s Ottawa City IDF 25-Year Duration=10 min, Inten=144.7 mm/hr 0.002 Runoff Area=0,0090 ha	
10.0 Direct Entry, Minimum Subcatchment 26S: PR-A2 Hydrograph Outawa City IDF 25-Year Duration=10 min, Inten=144.7 mm/hr 0.002 Inten=144.7 mm/hr	
Hydrograph 0.0022 m/ys 0.0000 0.0000 0.00000 0.0000 0.0000 0.0000 0.00000 0.00000 0.0000 0.0000 0.000000 0.00000 0.00000000	
Hydrograph 0.00028 mVs 0.0002 mVs 0.000	
Ottawa City IDF 25-Year Duration=10 min, Inten=144.7 mm/hr 0.002 0.0	
Outcome         Ottawa City IDF         25-Year           0.000         Duration=10 min,           0.000         Inten=144.7 mm/hr           0.000         Runoff Area=0,0090 ha	
Ottawa City IDF         25-Year           0.000         Duration=10 min,           0.000         Inten=144.7 mm/hr           0.000         Runoff Area=0,0090 ha	off
Duration=10 min,           0.002         Inten=144.7 mm/hr           0.002         Runoff Area=0,0090 ha	
0.002 0.002 0.002 0.002 Inten=144.7 mm/hr Runoff Area=0,0090 ha	
Nulloii Alea-0.0030 Ha	
Bunoff Depth=19 mm	
0.001 C=0.78	
0.001	

3 Time (hours) 
 50Bays1088Somerset\_20240806
 Ottawa City IDF 25-Year Duration=10 min, Inten=144.7 mm/hr

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## Summary for Subcatchment 27S: PR-B1

Runoff = 0.0184 m<sup>3</sup>/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

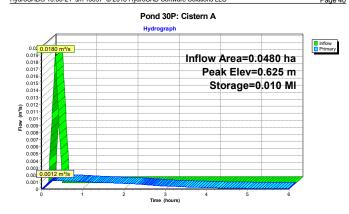
Area	a (ha) (	C Des	cription					
0	.0470 0.9	9 Roo	f					
0	.0470	100.	00% Impe	rvious Area	a			
Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Description			
10.0					Direct Entry, Min	limum		
				Subcatch	iment 27S: PR-E	31		
				Hydrog	graph			
60								Runot
01	).0184 m³/s				<b>0</b> 44-000		05 V	
0.01						a City IDF		
0.01						Duration=	=10 min,	
0.01					Ir	nten=144.	7 mm/hr	
0.01	3				Runo	ff Area=0	.0470 ha	
(se 0.01					Runoff	Volume=	0.011 MI	
≥ 0.0	1				Run	off Depth	=24 mm	
은 0.00 0.00						•••••	10.0 min	
0.00						10-		
0.00							C=0.99	
0.00								
0.00	<sup>14</sup>							

3 Time (hours)

 50Bays1088Somerset\_20240806
 Ottawa City IDF 25-Year Duration=10 min, Inten=144.7 mm/hr

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					1 age 33
			Summary for Pone	I 30P: Cistern A	
Inflow A Inflow Outflow Primarv	=	0.0180 m <sup>3</sup> /s @ 0.0012 m <sup>3</sup> /s @	1.25% Impervious, Inf 0.17 hrs, Volume= 0.32 hrs, Volume= 0.32 hrs, Volume=	0.011 MI, Atten=	for 25-Year event 93%, Lag= 9.3 min
Routing Peak Ele Plug-Flo	by Stor- ev= 0.62 ow deten	Ind method, Tin 5 m @ 0.32 hrs tion time= 96.6	Span= 0.00-6.00 hrs, Surf.Area= 0.0000 ha in calculated for 0.011	dt= 0.01 hrs Storage= 0.010 MI	
Center-c Volume			in(106.4 - 10.0) age Storage Descrip	ion	
#1	0.00		M Custom Stage E		
Elevatio (meters 0.00 1.85	s) (M 00	Cum.Store ega-liters) 0.000 0.030			
Device	Routin	g Inve	Outlet Devices		
#1	Primar	y 0.000 r	Elev. (meters) 0.00	0 0.200 0.500 1.000 1. 0 0.00070 0.00110 0.0	

50Bays1088Somerset\_20240806 Ottawa City IDF 25-Year Duration=10 min, Inten=144.7 mm/hr

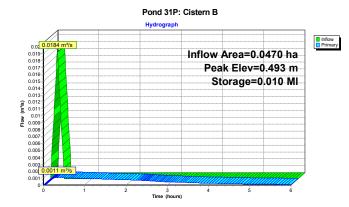
Primary OutFlow Max=0.0012 m<sup>3</sup>/s @ 0.32 hrs HW=0.625 m (Free Discharge) 1=Hydrovex 40SVHV-1 (Custom Controls 0.0012 m<sup>3</sup>/s)

				Sumr	mary for Pon	d 31P:	Cisterr	۱B			
Inflow Are	a =				Impervious, Ir				for 2	5-Year e	event
nflow	=				hrs, Volume=		0.011 MI				
Outflow Primary	=				hrs, Volume= hrs, Volume=		0.011 MI 0.011 MI		94%,	Lag= 9.	.4 min
Peak Elev					= 0.00-6.00 hrs			0.84			
Center-of-	Mass	det. time	e= 107.9 e= 107.9	min cal min ( 1	lculated for 0.0 17.9 - 10.0)	11 MI (9					
	Mass- Ir	det. time	e= 107.9 e= 107.9	min cal min ( 1 age S	lculated for 0.0	11 MI (9	6% of in	low)			
Center-of- Volume	Mass Ir 0.00	det. time ivert A	e= 107.9 e= 107.9 <u>Avail.Stor</u> 0.035 rre <u>(s)</u> 00	min cal min ( 1 age S	lculated for 0.0 17.9 - 10.0) Storage Descrij	11 MI (9	6% of in	low)			
Center-of- <u>Volume</u> #1 Elevation <u>(meters)</u> 0.000 1.650	Mass Ir 0.00	det. time nvert <u>A</u> 00 m Cum.Sto lega-liter 0.00 0.03	e= 107.9 = 107.9 (vail.Stor 0.035 (vail.stor 0.035 (vail.stor) 0.035	min cal min (1 a <u>ge S</u> MI <b>C</b>	lculated for 0.0 17.9 - 10.0) Storage Descrij	11 MI (9	6% of in	low)			

 50Bays1088Somerset\_20240806
 Ottawa City IDF 25-Year Duration=10 min, Inten=144.7 mm/hr

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50Bays1088Somerset_20240806	Ottawa City IDF 25-Year Duration=10 mir	, Inten=144.7 mm/hr
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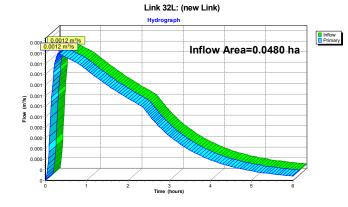
Summary for Link 32L: (new Link)

 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 MI

 Primary =
 0.0012 m³/s @
 0.32 hrs, Volume=
 0.011 MI, Atten= 0%, Lag= 0.0 min

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



 50Bays1088Somerset\_20240806
 Ottawa City IDF 25-Year Duration=10 min, Inten=144.7 mm/hr

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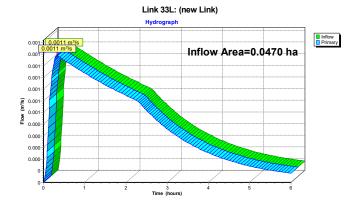
## Summary for Link 33L: (new Link)

 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 MI

 Primary =
 0.0011 m³/s @
 0.32 hrs, Volume=
 0.011 MI, Atten= 0%, Lag= 0.0 min

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



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Runoff by F	-0.00-6.00 hrs, dt=0.01 hrs, 601 points tational method, Rise/Fall=1.0/1.0 xTc J+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 MI
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 MI
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 MI
Pond 30P: Cistern A	Peak Elev=0.701 m Storage=0.011 MI Inflow=0.0201 m³/s 0.012 MI Outflow=0.0013 m³/s 0.012 MI
Pond 31P: Cistern B	Peak Elev=0.552 m Storage=0.012 MI Inflow=0.0205 m³/s 0.013 MI Outflow=0.0011 m³/s 0.012 MI
Link 32L: (new Link)	Inflow=0.0013 m³/s 0.012 MI Primary=0.0013 m³/s 0.012 MI
Link 33L: (new Link)	Inflow=0.0011 m³/s 0.012 MI Primary=0.0011 m³/s 0.012 MI
Total Runoff Area = 0.09	50 ha Runoff Volume = 0.025 MI Average Runoff Depth = 26 mm

50Bays1088Somerset\_20240806 Ottawa City IDF 50-Year Duration=10 min, Inten=161.5 mm/hr

9.47% Pervious = 0.0090 ha 90.53% Impervious = 0.0860 ha

50Bays1088Somerset\_20240806 Ottawa City IDF 50-Year Duration=10 min, Inten=161.5 mm/hr Prepared by WSP HydroCAD® 10.00-21 s/n 10697 © 2018 HydroCAD Software Solutions LLC Printed 2024-08-07 Page 46

## Summary for Subcatchment 25S: PR-A1

Runoff = 0.0170 m<sup>3</sup>/s @ 0.17 hrs, Volume= 0.010 MI, 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

	(ha)		cription	,				
	0390 0.9							
0.	0390	100.	00% Impe	rvious Area	a			
Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Description			
10.0					Direct Entry, Mi	nimum		
				Subcatch	ment 25S: PR	-A1		
				Hydro	graph			
0.019								Runoff
0.01	.0170 m³/s				044-011		EO Vaar	
0.016					Ottaw	a City IDF		
0.015						Duration	=10 min,	
0.014						nten=161.	5 mm/hr	
0.012					Run	off Area=0	.0390 ha	
(ສຸ 0.011 ຍຸ 0.01					Runof	f Volume=	0.010 MI	
8 0.008					Ru	noff Depth	=27 mm	
■ 0.008 0.007						Tc=	10.0 min	
0.006							C=0.99	
0.005	5						0-0.33	
0.004								
0.003								
0.002								
		///////////////////////////////////////	///////////////////////////////////////	///////////////////////////////////////	///////////////////////////////////////	///////////////////////////////////////	///////////////////////////////////////	

3 Time (hours)

50Bays1088Somerset\_20240806 Ottawa City IDF 50-Year Duration=10 min, Inten=161.5 mm/hr Prepared by WSP HydroCAD® 10.00-21 s/n 10697 © 2018 HydroCAD Software Solutions LLC Printed 2024-08-07 Page 48

## Summary for Subcatchment 27S: PR-B1

Runoff = 0.0205 m<sup>3</sup>/s @ 0.17 hrs, Volume= 0.013 MI, 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

	0470 0.9				_
0.	0470	100.	00% Impe	ervious Area	a
Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Description
10.0					Direct Entry, Minimum
				Subcatch	hment 27S: PR-B1
				Hydro	
0	.0205 m <sup>3</sup> /s				
0.02	A A Contractor				Ottawa City IDF 50-Year
0.01					Duration=10 min,
0.01					
0.01					Inten=161.5 mm/hr
0.01					Runoff Area=0.0470 ha
0.01 و 0.01 في 0.01					Runoff Volume=0.013 MI
8 0.01 0.0					Runoff Depth=27 mm
0.00					Tc=10.0 min
0.00					C=0.99
0.00					C-0.99
0.00					
0.00					
0.00					
0.00					

50Bays1088Somerset_20240806	Ottawa City IDF 50-Year Duration=10 min,	Inten=161.5 mm/hr
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Summary for Subcatchment 26S: PR-A2

= 0.0031 m<sup>3</sup>/s @ 0.17 hrs, Volume= 0.002 MI, Depth= 21 mm Runoff

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)	С	Desc	cription		
	0.	0090	0.78	Soft	Landscapi	ing and At-	Grade Surfaces
	0.	0090		100.	00% Pervi	ous Area	
	_						
	Tc	Len			Velocity		Description
_	(min)	(mete	rs) (r	m/m)	(m/sec)	(m³/s)	
	10.0						Direct Entry, Minimum

#### Subcatchment 26S: PR-A2

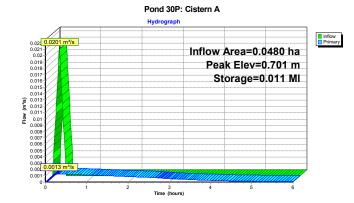
Hydrograph 0.003 Runoff Ottawa City IDF 50-Year 0.003 Duration=10 min, 0.003 Inten=161.5 mm/hr Runoff Area=0.0090 ha (m) 0.002 Runoff Volume=0.002 MI 0.002 Runoff Depth=21 mm 0.001 Tc=10.0 min 0.001 C=0.78 0.001 0.001 0.000 0.000 3 Time (hours)

/				8 HydroCAD Software	Solutions LLC Page 4
			Su	mmary for Pond	30P: Cistern A
Inflow Are Inflow Outflow	= 0.	0201 m <sup>3</sup> / 0013 m <sup>3</sup> /	s@ 0. s@ 0.	17 hrs, Volume= 32 hrs, Volume=	
Primary	= 0.	0013 m³/	s@ 0.	32 hrs, Volume=	0.012 MI
Peak Elev	= 0.701	n @ 0.32		oan= 0.00-6.00 hrs, o rf.Area= 0.0000 ha	
Plug-Flow Center-of-	detentio Mass de	n time= 1 t. time= 1	2 hrs Sui 100.6 min 100.8 min	f.Area= 0.0000 ha calculated for 0.012 ( 110.8 - 10.0 )	Storage= 0.011 MI MI (98% of inflow)
Plug-Flow Center-of- Volume	detentio Mass de Inve	n time= 1 t. time= 1 rt Avai	2 hrs Sui 100.6 min 100.8 min 1.Storage	f.Area= 0.0000 ha calculated for 0.012 ( 110.8 - 10.0 ) Storage Descripti	Storage= 0.011 MI MI (98% of inflow) on
Plug-Flow Center-of-	detentio Mass de	n time= 1 t. time= 1 rt Avai	2 hrs Sui 100.6 min 100.8 min	f.Area= 0.0000 ha calculated for 0.012 ( 110.8 - 10.0 ) Storage Descripti	Storage= 0.011 MI MI (98% of inflow) on
Plug-Flow Center-of- <u>Volume</u> #1	detentio Mass de Inve 0.000 r	n time= 1 t. time= 1 rt Avai	2 hrs Sui 100.6 min 100.8 min 1.Storage	f.Area= 0.0000 ha calculated for 0.012 ( 110.8 - 10.0 ) Storage Descripti	Storage= 0.011 MI MI (98% of inflow) on
Plug-Flow Center-of- <u>Volume</u> #1 Elevation <u>(meters)</u>	detentio Mass de Inve 0.000 r Cu (Meg	n time= 1 t. time= 1 r <u>t Avai</u> n	2 hrs Sui 100.6 min 100.8 min 1.Storage	f.Area= 0.0000 ha calculated for 0.012 ( 110.8 - 10.0 ) Storage Descripti	Storage= 0.011 MI MI (98% of inflow) on
Plug-Flow Center-of- <u>Volume</u> #1 Elevation <u>(meters)</u> 0.000	detentio Mass de Inve 0.000 r Cu (Meg	n time= 1 t. time= 1 n m.Store <u>a-liters)</u> 0.000	2 hrs Sui 100.6 min 100.8 min 1.Storage	f.Area= 0.0000 ha calculated for 0.012 ( 110.8 - 10.0 ) Storage Descripti	Storage= 0.011 MI MI (98% of inflow) on
Plug-Flow Center-of- <u>Volume</u> #1 Elevation (meters)	detentio Mass de Inve 0.000 r Cu (Meg	n time= 1 t. time= 1 n m.Store <u>a-liters)</u>	2 hrs Sui 100.6 min 100.8 min 1.Storage	f.Area= 0.0000 ha calculated for 0.012 ( 110.8 - 10.0 ) Storage Descripti	Storage= 0.011 MI MI (98% of inflow) on
Plug-Flow Center-of- #1 Elevation (meters) 0.000 1.850	detentio Mass de Inve 0.000 r Cu (Meg	n time= 1 t. time= 1 n m.Store <u>a-liters)</u> 0.000 0.030	2 hrs Su 100.6 min 100.8 min <u>1.Storage</u> 0.030 MI	ff.Area= 0.0000 ha calculated for 0.012 (110.8 - 10.0) <u>Storage Descripti</u> Custom Stage Da	Storage= 0.011 MI MI (98% of inflow) on
Plug-Flow Center-of- #1 Elevation (meters) 0.000 1.850 Device I	detentio Mass de <u>Inve</u> 0.000 r Cu (Meg Routing	n time= 1 t. time= 1 n m.Store <u>a-liters)</u> 0.000 0.030	2 hrs Sui 100.6 min 100.8 min <u>1.Storage</u> 0.030 MI nvert O	rf.Area= 0.0000 ha calculated for 0.012 (110.8 - 10.0) <u>Storage Descripti</u> Custom Stage Da	Storage= 0.011 MI MI (98% of inflow) on
Plug-Flow Center-of- #1 Elevation (meters) 0.000 1.850 Device I	detentio Mass de Inve 0.000 r Cu (Meg	n time= 1 t. time= 1 n m.Store <u>a-liters)</u> 0.000 0.030	2 hrs Sui 100.6 min 100.8 min 1. <u>Storage</u> 0.030 MI <u>1.Storage</u> 0.030 MI	ff.Area= 0.0000 ha calculated for 0.012 ( 110.8 - 10.0 ) <u>Storage Descripti</u> Custom Stage Da utlet Devices ydrovex 405VHV-1	Storage= 0.011 MI MI (98% of inflow) on

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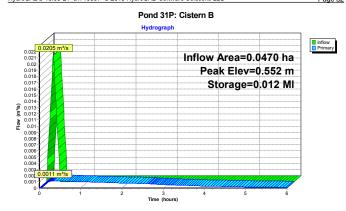
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Summary for Pond 31P: Cistern B	
Inflow Area =         0.0470 ha,100.00% Impervious, Inflow Depth =         27 mm         for 50           Inflow =         0.0205 m³/s @         0.17 hrs, Volume=         0.013 MI           Outflow =         0.0011 m³/s @         0.32 hrs, Volume=         0.012 MI, Atten= 94%, I           Primary =         0.0011 m³/s @         0.32 hrs, Volume=         0.012 MI, Atten= 94%, I           Routing by Stor-Ind method, Time Span=         0.00-6.00 hrs, dt= 0.01 hrs           Peak Elev=         0.552 m @         0.32 hrs           Plug-Flow detention time=         111.8 min calculated for 0.012 MI (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 MI Custom Stage Data Listed below	
Elevation         Cum.Store           (meters)         (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 Disch. (m³/s) 0.0000 0.00070 0.00110 0.00150 0	

50Bays1088Somerset\_20240806 Ottawa City IDF 50-Year Duration=10 min, Inten=161.5 mm/hr

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) 
 50Bays1088Somerset\_20240806
 Ottawa City IDF 50-Year Duration=10 min, Inten=161.5 mm/hr

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50Bays1088Somerset_20240806	Ottawa City IDF 50-Year	Duration=10 min,	Inten=161.5 mm/hr
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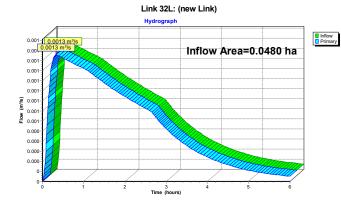
## Summary for Link 32L: (new Link)

 
 0.0480 ha, 81.25% Impervious, Inflow Depth >
 25 mm
 for 50-Year event

 0013 m³/s @
 0.32 hrs, Volume=
 0.012 MI

 0013 m³/s @
 0.32 hrs, Volume=
 0.012 MI, Atten= 0%, Lag= 0.0 min
 Inflow Area = 0.0013 m³/s @ 0.32 hrs, Volume= 0.0013 m³/s @ 0.32 hrs, Volume= Inflow = Primary =

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

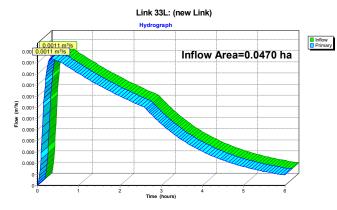


50Bays1088Somerset\_20240806 Ottawa City IDF 50-Year Duration=10 min, Inten=161.5 mm/hr Prepared by WSP HydroCAD® 10.00-21 s/n 10697 © 2018 HydroCAD Software Solutions LLC Printed 2024-08-07 Page 54

## Summary for Link 33L: (new Link)

0.0470 ha,100.00% Impervious, Inflow Depth > 25 mm for 50-Year event 0011 m³/s @ 0.32 hrs, Volume= 0.012 MI 0011 m³/s @ 0.32 hrs, Volume= 0.012 MI, Atten= 0%, Lag= 0.0 min Inflow Area = Inflow = Primary = 0.0011 m³/s @ 0.32 hrs, Volume= 0.0011 m³/s @ 0.32 hrs, Volume=

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



50Bays1088Somerset_20240806 Otta Prepared by WSP HydroCAD® 10.00-21 s/n 10697 © 2018 Hydro	wa City IDF 100-Year Duration=10 min, Inten=178.6 mm/hr Printed 2024-08-07 CAD Software Solutions LLC Page 55
Runoff by Rat	00-6.00 hrs, dt=0.01 hrs, 601 points ional method, Rise/Fall=1.0/1.0 xTc Frans 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 MI
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 MI
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 MI
Pond 30P: Cistern A	Peak Elev=0.778 m Storage=0.013 MI Inflow=0.0222 m³/s 0.014 MI Outflow=0.0013 m³/s 0.013 MI
Pond 31P: Cistern B	Peak Elev=0.612 m Storage=0.013 MI Inflow=0.0227 m³/s 0.014 MI Outflow=0.0012 m³/s 0.013 MI
Link 32L: (new Link)	Inflow=0.0013 m³/s 0.013 MI Primary=0.0013 m³/s 0.013 MI
Link 33L: (new Link)	Inflow=0.0012 m³/s 0.013 MI Primary=0.0012 m³/s 0.013 MI

 Total Runoff Area = 0.0950 ha
 Runoff Volume = 0.027 MI
 Average Runoff Depth = 29 mm

 9.47% Pervious = 0.0090 ha
 90.53% Impervious = 0.0860 ha

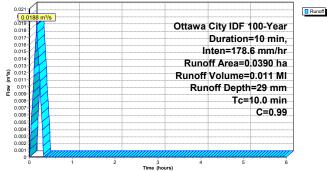
50Bays1088Somerset\_20240806 Ottawa City IDF 100-Year Duration=10 min, Inten=178.6 mm/hr Prepared by WSP HydroCAD® 10.00-21 s/n 10697 © 2018 HydroCAD Software Solutions LLC Printed 2024-08-07 Page 56

## Summary for Subcatchment 25S: PR-A1

= 0.0188 m<sup>3</sup>/s @ 0.17 hrs, Volume= Runoff 0.011 MI. 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) 0.0390 0.9	C Description 9 Roof	
0.0390	100.00% Impervious Are	a
Tc Length (min) (meters)	Slope Velocity Capacity (m/m) (m/sec) (m <sup>3</sup> /s)	Description
10.0		Direct Entry, Minimum
		nment 25S: PR-A1



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		Summa	ry for Sub	ocatchment 26	S: PR-A2		
Runoff =	0.0034 n	n³/s @ 0.17	hrs, Volun	ne= 0.002	2 MI, Depth=	23 mm	
				Time Span= 0.00 =178.6 mm/hr	-6.00 hrs, dt=	0.01 hrs	
Area (ha		escription					
0.009			ng and At-G	Grade Surfaces			
0.009		0.00% Pervic		ado candooo			
0.000	- "						
		e Velocity		Description			
	eters) (m/n	n) (m/sec)	(m <sup>3</sup> /s)				
10.0				Direct Entry, Mir	nimum		
			Pubaatabu	ment 260, DD	**		
		5	Subcatchr	ment 26S: PR-	42		
	4	\$	Subcatchr Hydrogr		A2	-	-
0.004		<b>,</b>	our out on		A2		Runoff
0.003	4 m³/s	5	our out on	raph	_		Runoff
0.003	4 m³/s	5	our out on	raph	A2 City IDF	100-Year	Runoff
0.003	4 m³/s	5	our out on	raph	_		Runoff
0.003 0.003 0.003	4 m³/s	5	our out on	Ottawa	City IDF	=10 min,	Runoff
0.003 0.003 0.003 0.003 0.003 0.003	4 m³/s	5	our out on	Ottawa	City IDF Duration 1ten=178.	=10 min, 6 mm/hr	Runoff
0.003 0.003 0.003 0.003 0.003 0.003 0.003 0.003	4 m <sup>y</sup> s	S	our out on	Ottawa	City IDF Duration ten=178. ff Area=0	=10 min, 6 mm/hr .0090 ha	Runoff
0.003 0.003 0.003 0.003 0.003 0.003 0.003 0.003	4 m²/s	۶ 	our out on	Ottawa	City IDF Duration 1ten=178.	=10 min, 6 mm/hr .0090 ha	Runoff
0 0.003 0.003 0.003 0.003 0.003 0.003 0.002 (% 0.002 0.002	4 m²/s	۶ 	our out on	Ottawa In Runof	City IDF Duration ten=178. ff Area=0	=10 min, 6 mm/hr .0090 ha 0.002 MI	Runoff
0 0.003 0.003 0.003 0.003 0.003 0.002 0.002 0.002 0.002 0.002 0.002 0.002	4 m²/s	\$	our out on	Ottawa In Runof	City IDF Duration Iten=178. Iff Area=0 Volume= off Depth	=10 min, 6 mm/hr .0090 ha 0.002 MI =23 mm	Runoff
0 0.003 0.003 0.003 0.003 0.003 0.003 0.003 0.003 0.003 0.002 0.002 0.002 0.002 0.002 0.002 0.002 0.002	4 m²/s	S	our out on	Ottawa In Runof	City IDF Duration Iten=178. Iff Area=0 Volume= off Depth	=10 min, 6 mm/hr .0090 ha 0.002 Mi =23 mm 10.0 min	Runoff
0 0.003 0.003 0.003 0.003 0.003 0.002 0.002 0.002 0.002 0.002 0.002 0.002	4 m <sup>2</sup> /s	S	our out on	Ottawa In Runof	City IDF Duration Iten=178. Iff Area=0 Volume= off Depth	=10 min, 6 mm/hr .0090 ha 0.002 MI =23 mm	Runoff
0 0.003 0.003 0.003 0.003 0.003 0.003 0.003 0.003 0.002 0.002 0.002 0.002 0.002 0.002 0.002 0.002	4 m <sup>3</sup> /8 ].	5	our out on	Ottawa In Runof	City IDF Duration Iten=178. Iff Area=0 Volume= off Depth	=10 min, 6 mm/hr .0090 ha 0.002 Mi =23 mm 10.0 min	- ERunoff
0 0.003 0.003 0.003 0.003 0.003 0.003 0.003 0.002 0.002 0.002 0.002 0.002 0.002 0.002 0.002 0.002 0.002 0.002 0.002	4 m7s	S	our out on	Ottawa In Runof	City IDF Duration Iten=178. Iff Area=0 Volume= off Depth	=10 min, 6 mm/hr .0090 ha 0.002 Mi =23 mm 10.0 min	Runoff

3 Time (hours)

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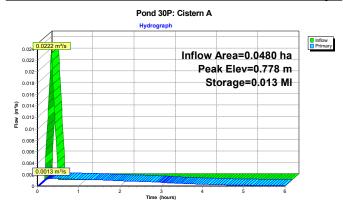
## Summary for Subcatchment 27S: PR-B1

Runoff = 0.0227 m<sup>3</sup>/s @ 0.17 hrs, Volume= 0.014 MI, 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 0.0	470 0.9		cription f					
0.0	470	100.	00% Impe	rvious Area	3			
Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Description			
10.0					Direct Entry, Min	limum		
				Subcatch	ment 27S: PR-	21		
				Hydrog				
				,	Juch			ا
0. 0.(	)227 m <sup>3</sup> /s							Run
0.022					Ottawa	City IDF 1	00-Year	1
0.02						Duration	=10 min,	1
0.018					II	nten=178.	6 mm/hr	1
0.016					Runo	ff Area=0	.0470 ha	1
(Se 0.014					Runoff	Volume=	0.014 MI	
(Se 0.014 MO 0.012					Run	off Depth	=29 mm	1
ت 0.01							10.0 min	
0.008	AL.						C=0.99	1
0.006	<b>PH</b>							1
0.004								1
0.002								1
0		///////////////////////////////////////	///////////////////////////////////////	///////////////////////////////////////			///////////////////////////////////////	•

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			Summary for Pond 30P: Cistern A	
Inflow A Inflow Outflow Primary	= 0.	0222 m³/s @ 0013 m³/s @	.25% Impervious, Inflow Depth = 28 mm for 1 0.17 hrs, Volume= 0.014 MI 0.32 hrs, Volume= 0.013 MI, Atten= 94%, 0.32 hrs, Volume= 0.013 MI	
			Span= 0.00-6.00 hrs, dt= 0.01 hrs Surf.Area= 0.0000 ha Storage= 0.013 MI	
Center-	of-Mass de	t. time= 105.1 r	nin calculated for 0.013 Ml (98% of inflow) nin(115.1 - 10.0)	
Volume			ge Storage Description	
#1	1 000.0	m 0.030	MI Custom Stage Data Listed below	
Elevatio (meter 0.00 1.85	rs) (Meg 00	m.Store <u>(a-liters)</u> 0.000 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 Disch. (m <sup>3</sup> /s) 0.00000 0.00070 0.00110 0.00150	

50Bays1088Somerset\_20240806 Ottawa City IDF 100-Year Duration=10 min, Inten=178.6 mm/hr

Primary OutFlow Max=0.0013 m<sup>3</sup>/s @ 0.32 hrs HW=0.777 m (Free Discharge) 1=Hydrovex 40SVHV-1 (Custom Controls 0.0013 m<sup>3</sup>/s)

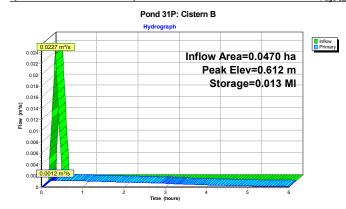
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		manage for Dand 24	D. Ciatara B	
	3	ummary for Pond 31	P: Cistern D	
Inflow Area =			Depth = 29 mm for 100-Ye	ar event
Inflow =	0.0227 m <sup>3</sup> /s @ 0		0.014 MI	
Outflow = Primarv =		.32 hrs, Volume= .32 hrs, Volume=	0.013 MI, Atten= 95%, Lag= 0.013 MI	9.4 min
	0.0012111/5@0	.52 ms, volume-	0.013 101	
		pan= 0.00-6.00 hrs, dt=		
Peak Elev= 0.	312 m @ 0.32 hre Si	irf.Area= 0.0000 ha Ste	areas 0.012 MI	
	512111 @ 0.521113 50	III.Alea= 0.0000 Ha Ol	brage- 0.013 Mi	
	-		-	
Plug-Flow det	ention time= 116.2 mir	n calculated for 0.013 M	-	
Plug-Flow det	-	n calculated for 0.013 M	-	
Plug-Flow det Center-of-Ma	ention time= 116.2 mir s det. time= 115.8 mir	n calculated for 0.013 M n ( 125.8 - 10.0 )	-	
Plug-Flow det Center-of-Mas Volume	ention time= 116.2 mir s det. time= 115.8 mir	n calculated for 0.013 M n(125.8 - 10.0) e Storage Description	l (95% of inflow)	
Plug-Flow det Center-of-Mas <u>Volume</u> #1 0.	ention time= 116.2 mi s det. time= 115.8 min Invert Avail.Storage 000 m 0.035 M	n calculated for 0.013 M n(125.8 - 10.0) e Storage Description	l (95% of inflow)	
Plug-Flow det Center-of-Mas <u>Volume</u> #1 0. Elevation	ention time= 116.2 mir s det. time= 115.8 mir Invert Avail.Storage 000 m 0.035 M Cum.Store	n calculated for 0.013 M n(125.8 - 10.0) e Storage Description	l (95% of inflow)	
Plug-Flow det Center-of-Mas <u>/olume</u> #1 0. Elevation (meters)	ention time= 116.2 mir s det. time= 115.8 mir Invert Avail.Storage 000 m 0.035 M Cum.Store Mega-liters)	n calculated for 0.013 M n(125.8 - 10.0) e Storage Description	l (95% of inflow)	
Plug-Flow det Center-of-Mas <u>/olume</u> #1 0. Elevation (meters) 0.000	ention time= 116.2 mir s det. time= 115.8 mir Invert <u>Avail.Storag</u> 000 m 0.035 M Cum.Store <u>Mega-liters)</u> 0.000	n calculated for 0.013 M n(125.8 - 10.0) e Storage Description	l (95% of inflow)	
Plug-Flow det Center-of-Mas <u>/olume</u> #1 0. Elevation (meters)	ention time= 116.2 mir s det. time= 115.8 mir Invert Avail.Storage 000 m 0.035 M Cum.Store Mega-liters)	n calculated for 0.013 M n(125.8 - 10.0) e Storage Description	l (95% of inflow)	
Plug-Flow det Center-of-Mas <u>volume</u> #1 0. Elevation (meters) 0.000 1.650	ention time= 116.2 mil s det. time= 115.8 mil Invert Avail.Storage 000 m 0.035 M Cum.Store Mega-liters) 0.000 0.035	n calculated for 0.013 M n(125.8 - 10.0) e Storage Description	l (95% of inflow)	
Plug-Flow det Center-of-Mas <u>/olume</u> #1 0. Elevation (meters) 0.000 1.650	ention time= 116.2 min s det. time= 115.8 min Invert Avail.Storage 000 m 0.035 M Cum.Store <u>Mega-liters</u> ) 0.000 0.035 ing Invert C	n calculated for 0.013 M n ( 125.8 - 10.0 ) <u>storage Description</u> <b>Custom Stage Data</b>	l (95% of inflow)	
Plug-Flow det Center-of-Mas // 0. #1 0. Elevation (meters) 0.000 1.650 Device Rou	ention time= 116.2 mil s det. time= 115.8 mil Invert Avail.Storage 000 m 0.035 M Cum.Store <u>Mega-liters)</u> 0.000 0.035 ing Invert C ary 0.000 m I	n calculated for 0.013 M 1 (125.8 - 10.0) Storage Description Custom Stage Data Dutlet Devices Sydrovex 40SVHV-1	l (95% of inflow)	

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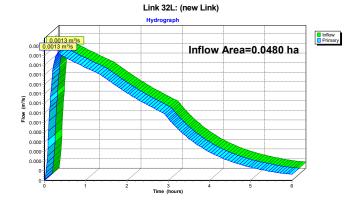
Summary for Link 32L: (new Link)

 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 MI

 Primary =
 0.0013 m³/s @
 0.32 hrs, Volume=
 0.013 MI, Atten= 0%, Lag= 0.0 min

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



 50Bays1088Somerset\_20240806 Ottawa City IDF 100-Year Duration=10 min, Inten=178.6 mm/hr

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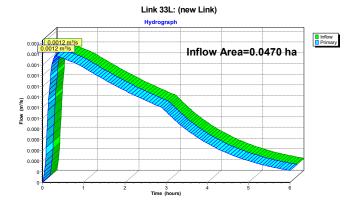
## Summary for Link 33L: (new Link)

 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 MI

 Primary =
 0.0012 m³/s @
 0.32 hrs, Volume=
 0.013 MI, Atten= 0%, Lag= 0.0 min

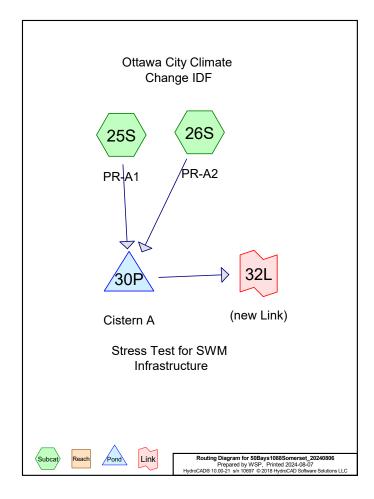
Primary outflow = Inflow, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs





## **APPENDIX**

# C-3 Stress Test for Climate Change



0.0480

0.0480

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25S. 26S

TOTAL AREA

		Soil Listing (selected nodes	)
Area	Soil	Subcatchment	
(hectares)	Group	Numbers	
0.0000	HSG A		
0.0000	HSG B		
0.0000	HSG C		
0.0000	HSG D		

Other

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		Area Listing (selected nodes)
Area	С	Description
(hectares)		(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

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		Gre	ound Cover	s (selected	nodes)	
HSG-A (hectares)	HSG-B (hectares)	HSG-C (hectares)	HSG-D (hectares)	Other (hectares)	Total (hectares)	Ground Cover
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

Sub Nun

Prepared by WSP	a City Climate Change IDF 2-Year Duration=96 min, Inten=20.7 mm/hr Printed 2024-08-07 2018 HydroCAD Software Solutions LLC Page 5	50Bays1088Somers         Ottawa City Climate Change IDF 2-Year Duration=96 min, Inten=20.7 mm/hr           Prepared by WSP         Printed 2024-08-07           HydroCAD® 10.00-21 s/n 10697         © 2018 HydroCAD Software Solutions LLC         Page 6
	ne span=0.00-6.00 hrs, dt=0.01 hrs, 601 points noff by Rational method. Rise/Fall=1.0/1.0 xTc	Summary for Pond 30P: Cistern A
Reach routing by	/ Stor-Ind+Trans method - Pond routing by Stor-Ind method	Inflow Area = 0.0480 ha, 81.25% Impervious, Inflow Depth = 32 mm for 2-Year event
Pond 30P: Cistern A	Peak Elev=0.624 m Storage=0.010 MI Inflow=0.0026 m³/s 0.015 MI Outflow=0.0012 m³/s 0.015 MI	Inflow = 0.0026 m³/s @ 0.17 hrs, Volume= 0.015 MI Outflow = 0.0012 m³/s @ 1.69 hrs, Volume= 0.015 MI, Atten= 54%, Lag= 91.2 min Primary = 0.0012 m³/s @ 1.69 hrs, Volume= 0.015 MI
		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 MI
		Plug-Flow detention time= 96.0 min calculated for 0.015 MI (96% of inflow) Center-of-Mass det. time= 94.2 min ( 147.2 - 53.0 )
		Volume Invert Avail.Storage Storage Description

Volume #1 
 Avail.Storage
 Storage Description

 0.030 MI
 Custom Stage Data Listed below
 0.000 m Cum.Store Elevation (meters) (Mega-liters) 0.000 0.000 1.850 0.030 
 Invert
 Outlet Devices

 0.000 m
 Hydrovex 405VHV-1 Elev. (meters) 0.000 0.500 1.000 1.500 2.000 Disch. (m<sup>3</sup>/s) 0.00000 0.00070 0.00110 0.00150 0.00190 0.00210
 Device Routing #1 Primary

Primary OutFlow Max=0.0012 m<sup>3</sup>/s @ 1.69 hrs HW=0.624 m (Free Discharge) 1=Hydrovex 40SVHV-1 (Custom Controls 0.0012 m<sup>3</sup>/s)

 50Bays1088Somers
 Ottawa City Climate Change IDF 2-Year Duration=96 min, Inten=20.7 mm/hr

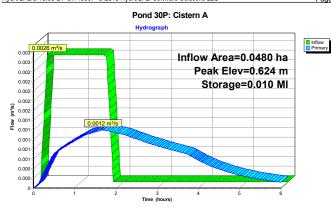
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50Bays1088Somers Ottawa City Climate Change IDF 5-Year Duration=96 min, Inten=27.7 mm/hr Prepared by WSP HydroCAD® 10.00-21 s/n 10697 © 2018 HydroCAD Software Solutions LLC Printed 2024-08-07 Page 8

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 MI Inflow=0.0035 m<sup>3</sup>/s 0.020 MI Outflow=0.0014 m<sup>3</sup>/s 0.019 MI

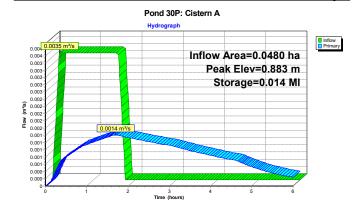


.,				HydroCAD Software		-		Page
			Su	mmary for Pond	30P: Ciste	ern A		
Inflow Area Inflow Outflow Primary	= 0.0 = 0.0 = 0.0	035 m³/s ( 014 m³/s ( 014 m³/s (	2) 0.1 2) 1.7 2) 1.7	% Impervious, Infl 17 hrs, Volume= 70 hrs, Volume= 70 hrs, Volume=	0.020 0.019 0.019	MI MI, Atten	for 5-Year = 60%, Lag=	
				an= 0.00-6.00 hrs, (		044.84		
Peak Elev	= 0.883 m	i@_1.70 h	's Sur	f.Area= 0.0000 ha	Storage= 0.	014 MI		
Plua-Flow	detention	time= 108	.9 min	calculated for 0.019	9 MI (94% of	inflow)		
				calculated for 0.019 (159.4 - 53.0)	9 MI (94% of	inflow)		
Center-of-	Mass det.	time= 106	.4 min	( 159.4 - 53.0 )		inflow)		
Center-of-I Volume	Mass det. Inver	time= 106	.4 min torage	( 159.4 - 53.0 ) Storage Descripti	on	,		
Center-of-	Mass det.	time= 106	.4 min	( 159.4 - 53.0 ) Storage Descripti	on	,		
Center-of-I Volume	Mass det. Inver 0.000 m	time= 106	.4 min torage	( 159.4 - 53.0 ) Storage Descripti	on	,		
Center-of-l <u>Volume</u> #1	Mass det. Invert 0.000 m Cum	time= 106 Avail.S	.4 min torage	( 159.4 - 53.0 ) Storage Descripti	on	,		
Center-of-l <u>Volume</u> #1 Elevation	Mass det. Inver 0.000 m Cum (Mega	time= 106 Avail.S 0.	.4 min torage	( 159.4 - 53.0 ) Storage Descripti	on	,		
Center-of-l <u>Volume</u> #1 Elevation (meters)	Mass det. Inver 0.000 m Cun (Mega	time= 106 Avail.S 0. .Store liters)	.4 min torage	( 159.4 - 53.0 ) Storage Descripti	on	,		
Center-of-I Volume #1 Elevation (meters) 0.000 1.850	Mass det. Inver 0.000 m Cum (Mega	time= 106 Avail.S 0.	.4 min torage 030 MI	( 159.4 - 53.0 ) Storage Descripti Custom Stage Da	on	,		
Center-of-I Volume #1 Elevation (meters) 0.000 1.850 Device F	Mass det. Inver 0.000 m Cun (Mega	time= 106 Avail.S 0.	.4 min torage 030 Mi	( 159.4 - 53.0 ) Storage Descripti	on	,		

 50Bays1088Somers
 Ottawa City Climate Change IDF 5-Year Duration=96 min, Inten=27.7 mm/hr

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50Bays1088Somer	Ottawa City Climate Change IDF 10-Year Duration=96 n	nin, Inten=32.3 mm/hr
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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

ţ

Peak Elev=1.056 m Storage=0.017 MI Inflow=0.0041 m³/s 0.024 MI Outflow=0.0015 m³/s 0.022 MI

 
 50Bays1088Somer
 Ottawa City Climate Change IDF 10-Year Duration=96 min, Inten=32.3 mm/hr

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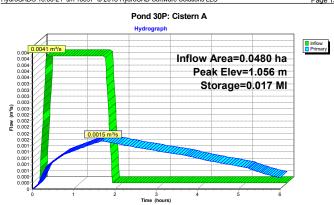
## Summary for Pond 30P: Cistern A

Inflow Area = Inflow = Outflow = Primary =	0.0041 m³/s @ 0.0015 m³/s @	25% Impervious, Inflow 0.17 hrs, Volume= 1.70 hrs, Volume= 1.70 hrs, Volume=	Depth = 49 mm for 10-Year event 0.024 MI 0.022 MI, Atten= 62%, Lag= 92.0 min 0.022 MI
		Span= 0.00-6.00 hrs, dt= Surf.Area= 0.0000 ha St	
	ntion time= 116.0 m s det. time= 112.5 m	iin calculated for 0.022 M iin ( 165.5 - 53.0 )	11 (93% of inflow)

Invert	Avail.Storag	e Storage Description
0.000 m	0.030 N	/I Custom Stage Data Listed below
(Mega-l	iters) ).000	
Routing	Invert	Outlet Devices
Primary		Hydrovex 40SVHV-1
		Elev. (meters) 0.000 0.200 0.500 1.000 1.500 2.000 Disch. (m <sup>3</sup> /s) 0.00000 0.00070 0.00110 0.00150 0.00190 0.00210
	0.000 m Cum.9 (Mega-I	0.000 m         0.030 M           Cum.Store         (Mega-liters)           0.000         0.030           0.030         0.030           Routing         Invert           Primary         0.000 m

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)

50Bays1088Somer	Ottawa City Climate Change IDF 10-Year Duration=96 I	min, Inten=32.3 mm/hr
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50Bays1088Somer	Ottawa City Climate Change IDF 25-Year Duration=96 m	nin, Inten=38.1 mm/hr
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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 MI Inflow=0.0048 m³/s 0.028 MI Outflow=0.0017 m³/s 0.025 MI

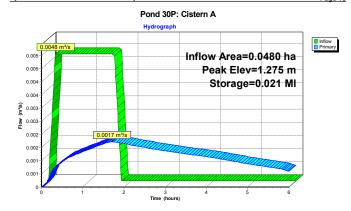
HyaroCA	D® 10.0	00-21 s/n	10697 © 2	018 HydroCAD S	Software Solution	ons LLC	Page 1
				Summary for	Pond 30P:	Cistern A	
Inflow A Inflow Outflow Primary Pouting	= = =	0.0048 0.0017 0.0017	m³/s @ m³/s @ m³/s @	0.17 hrs, Volu	me= me= me=	0.028 MI 0.025 MI, Att 0.025 MI	nm for 25-Year event en= 64%, Lag= 92.2 min
				Surf.Area= 0.00			
	of-Mass	det. tim	e= 117.5 r	nin calculated fo nin ( 170.5 - 53. age Storage D	0) escription	,	
Center-	of-Mass	det. tim	e= 117.5 r	nin ( 170.5 - 53. ige Storage D	0)	,	
Center-	of-Mass <u>I</u> 0.0 on s) (M 00	det. tim	e= 117.5 r <u>Avail.Stora</u> 0.030 pre <u>rs)</u> 00	nin ( 170.5 - 53. ige Storage D	0) escription	,	
Center- Volume #1 Elevatio (meter 0.0	of-Mass <u>I</u> 0.0 on s) (M 00	s det. tim nvert / 00 m Cum.Sto <u>Aega-lite</u> 0.0 0.0	e= 117.5 r <u>Avail.Stora</u> 0.030 pre <u>rs)</u> 00	nin ( 170.5 - 53. I <u>ge Storage D</u> MI <b>Custom S</b>	0) <u>escription</u> tage Data Lis	,	

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)

 50Bays1088Somer
 Ottawa City Climate Change IDF 25-Year Duration=96 min, Inten=38.1 mm/hr

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Prepared by WSP	City Climate Change IDF 50-Year Duration=96 min, Inten=42.4 mm/hr Printed 2024-08-07 2018 HydroCAD Software Solutions LLC Page 17	50Bays1088Somer         Ottawa City Climate Change IDF 50-Year Duration=96 min, Inten=42.4 mm/hr           Prepared by WSP         Printed         2024-08-07           HydroCAD® 10.00-21 s/n 10697         © 2018 HydroCAD Software Solutions LLC         Page 18		
	ne span=0.00-6.00 hrs, dt=0.01 hrs, 601 points noff by Rational method. Rise/Fall=1.0/1.0 xTc	Summary for Pond 30P: Cistern A		
	Stor-Ind+Trans method - Pond routing by Stor-Ind method	Inflow Area = 0.0480 ha, 81.25% Impervious, Inflow Depth = 65 mm for 50-Year event		
Pond 30P: Cistern A	Peak Elev=1.441 m Storage=0.023 MI Inflow=0.0054 m³/s 0.031 MI Outflow=0.0019 m³/s 0.027 MI	Inflow = 0.0054 m³/s @ 0.17 hrs, Volume= 0.031 MI Outflow = 0.0019 m³/s @ 1.71 hrs, Volume= 0.027 MI, Atten= 66%, Lag= 92.4 min Primary = 0.0019 m³/s @ 1.71 hrs, Volume= 0.027 MI		
		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 MI		
		Plug-Flow detention time= 125.1 min calculated for 0.027 MI (88% of inflow) Center-of-Mass det. time= 119.3 min ( 172.3 - 53.0 )		

Inflow
Primary

Volume #1

Elevation (meters)

0.000 1.850

Device Routing #1 Primary

0.000 m Cum.Store

(Mega-liters) 0.000

0.030

 50Bays1088Somer
 Ottawa City Climate Change IDF 50-Year Duration=96 min, Inten=42.4 mm/hr

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 Prond 30P: Cistern A
 Page 19

Inflow Area=0.0480 ha

Peak Elev=1.441 m

5

Storage=0.023 MI

Hydrograph

3 Time (hours)

ż

4

0.00

0.005

0.005

0.004

0.004 (st. U 0.003 0.002 0.002 0.001 0.001 0.001 
 50Bays1088Some
 Ottawa City Climate Change IDF 100-Year
 Duration=96 min, Inten=46.9 mm/hr

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Invert Avail.Storage Storage Description .000 m 0.030 MI Custom Stage Data Listed below

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)

 
 Invert
 Outlet Devices

 0.000 m
 Hydrovex 405VHV-1 Elev. (meters) 0.000 0.500 1.000 1.500 2.000 Disch. (m<sup>3</sup>/s) 0.00000 0.00070 0.00110 0.00150 0.00190 0.00210

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 and 30P: Cistern A Peak Elev=1.614 m Storace=0.026 Mi Inflow=0.0059 m³/s 0.034 M

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

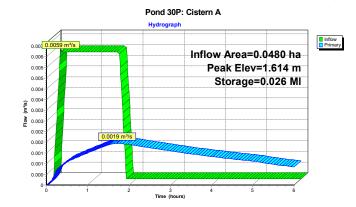
.,	00 10.	JU-21 S/N	10697 @2	20101190100	CAD Software S			Page 2
				Summary	y for Pond 3	30P: Cistern	Α	
Inflow A Inflow Outflow Primary	= =	0.0059 0.0019	m³/s @ m³/s @	0.17 hrs, 1.71 hrs,	ervious, Inflov Volume= Volume= Volume=	0.034 MI 0.029 MI,	71 mm for 10 Atten= 67%, 1	
					0-6.00 hrs, dt 0.0000 ha S	= 0.01 hrs Storage= 0.026	i MI	
				min calculat min ( 173.8		MI (86% of infl	ow)	
Center- Volume	of-Mass	det. time nvert A	e= 120.8 r Avail.Stora	min (173.8 age Stora	- 53.0) ige Descriptio	'n	,	
Center-	of-Mass <u> </u> 0.0 on s) (M 00	s det. time	e= 120.8 r Avail.Stora 0.030 ore r <u>s)</u> 00	min (173.8 age Stora	- 53.0) ige Descriptio		,	
Center- Volume #1 Elevati (meter 0.0	of-Mass <u> </u>	s det. time nvert <u>A</u> 00 m Cum.Sto <u>Aega-liter</u> 0.00 0.03	e= 120.8 r Avail.Stora 0.030 ore r <u>s)</u> 00 30	min (173.8 age Stora	- 53.0 ) <u>ige Descriptio</u> om Stage Dat	'n	,	

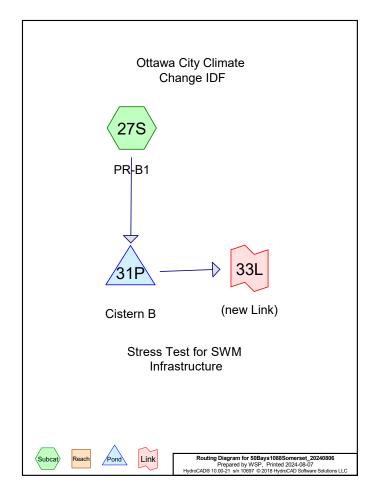
 $\label{eq:primary outFlow Max=0.0019 m^3/s @ 1.71 hrs HW=1.614 m} \mbox{ (Free Discharge) $$1$-1+Hydrovex 40SVHV-1 (Custom Controls 0.0019 m^3/s)$}$ 

 50Bays1088Some
 Ottawa City Climate Change IDF 100-Year Duration=96 min, Inten=46.9 mm/hr

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Soil Listing (selected nodes)

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Page 3

Area	Soil	Subcatchment
(hectares)	Group	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

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		Area Listing (selected nodes)
Area (hectares)	С	Description (subcatchment-numbers)
0.0470 <b>0.0470</b>	0.99 <b>0.99</b>	Roof (27S) TOTAL AREA

50Bays1088Somerset\_20240806 Prepared by WSP HydroCAD® 10.00-21 s/n 10697 © 2018 HydroCAD Software Solutions LLC Printed 2024-08-07 Page 4

	Ground Covers (selected nodes)							
HS (hect	SG-A ares)	HSG-B (hectares)	HSG-C (hectares)	HSG-D (hectares)	Other (hectares)	Total (hectares)	Ground Cover	Subcatchment Numbers
	0000 0000	0.0000 <b>0.0000</b>	0.0000 <b>0.0000</b>	0.0000 <b>0.0000</b>	0.0470 <b>0.0470</b>	0.0470 <b>0.0470</b>	Roof TOTAL AREA	278

Prepared by WSP	City Climate Change IDF 2-Year Duration=111 min, Inten=18.6 mm/hr Printed 2024-08-07 2018 HydroCAD Software Solutions LLC Page 5	50Bays1088Somer         Ottawa City Climate Change IDF 2-Year Duration=111 min, Inten=18.6 mm/hr           Prepared by WSP         Printed 2024-08-07           HydroCAD® 10.00-21 s/n 10697 © 2018 HydroCAD Software Solutions LLC         Page 6
	e span=0.00-6.00 hrs, dt=0.01 hrs, 601 points off bv Rational method. Rise/Fall=1.0/1.0 xTc	Summary for Pond 31P: Cistern B
Reach routing by	Stor-Ind+Trans method - Pond routing by Stor-Ind method	Inflow Area = 0.0470 ha,100.00% Impervious, Inflow Depth = 34 mm for 2-Year event
Pond 31P: Cistern B	Peak Elev=0.509 m Storage=0.011 MI Inflow=0.0024 m³/s 0.016 MI Outflow=0.0011 m³/s 0.015 MI	Inflow = 0.0024 m³/s @ 0.17 hrs, Volume= 0.016 MI Outflow = 0.0011 m³/s @ 1.94 hrs, Volume= 0.015 MI, Atten= 54%, Lag= 106.2 min Primary = 0.0011 m³/s @ 1.94 hrs, Volume= 0.015 MI
		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 MI
		Plug-Flow detention time= 106.6 min calculated for 0.015 MI (92% of inflow) Center-of-Mass det. time= 102.0 min(162.5 - 60.5)

Volume #1

Elevation (meters)

0.000 1.650

Device Routing #1 Primary

0.000 m Cum.Store

(Mega-liters) 0.000

0.035

50Bays1088Somer	Ottawa City Climate Change IDF 2-Year Duration=111 m	in, Inten=18.6 mm/hr
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Pond 31P: Cistern B Hydrograph

3 Time (hours)

4

5

0.0011

ż

0.00

0.002

0.002 0.002

0.002 

₿ 0.001 0.001 0.001 0.001 0.000 0.000

Prepared by WSP HydroCAD® 10.00-21 s/n 10697 © 2018 HydroCAD Software Solutions LLC Printed 2024-08-07 Page 7 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 Inflow
Primary Peak Elev=0.717 m Storage=0.015 MI Inflow=0.0032 m³/s 0.021 MI Outflow=0.0013 m³/s 0.019 MI Pond 31P: Cistern B Inflow Area=0.0470 ha Peak Elev=0.509 m Storage=0.011 MI

Invert Avail.Storage Storage Description .000 m 0.035 MI Custom Stage Data Listed below

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)

 Invert
 Outlet Devices

 0.000 m
 Hydrovex 405VHV-1 Elev. (meters) 0.000 0.500 1.000 1.500 2.000 Disch. (m<sup>3</sup>/s) 0.00000 0.00070 0.00110 0.00150 0.00190 0.00210

50Bays1088Somer Ottawa City Climate Change IDF 5-Year Duration=111 min, Inten=24.8 mm/hr

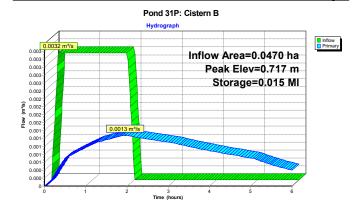
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TYUIOCAL	J® 10.0	10-21 s/	n 10697	© 201	8 Hydrou	CAD Software	Solutio	ns LLC		 		Page
				Su	Immar	y for Pond	31P:	Cister	пB			
Inflow Ar Inflow Outflow Primary Routing I	= = =	0.003 0.001 0.001	2 m³/s 3 m³/s 3 m³/s	@ 0 @ 1 @ 1	17 hrs, 95 hrs, 95 hrs,	ervious, Inflo Volume= Volume= Volume= 00-6.00 hrs, c		).021 M ).019 M ).019 M	, Atten=		event 106.8 m	nin
						= 0.0000 ha			5 MI			
	v dete	ntion tir	ne= 11	8.1 mir	calcula	ted for 0.019						
Plug-Flo	v dete f-Mass	ntion tir	ne= 11 ne= 11 <u>Avail.</u>	8.1 mir 2.0 mir	calcula (172.5 Stora	ted for 0.019	MI (89	9% of in	flow)			
Plug-Flov Center-o Volume	v dete f-Mass <u>I</u> 0.00	ntion tir det. tir	ne= 11 ne= 11 <u>Avail.</u> 0	8.1 mir 2.0 mir Storage	calcula (172.5 Stora	ited for 0.019 - 60.5) age Description	MI (89	9% of in	flow)	 		
Plug-Flov Center-o <u>Volume</u> #1 Elevation (meters	v deter f-Mass 0.00 n ) (N	ntion tir det. tir <u>nvert</u> 00 m Cum.S <u>1ega-lit</u>	ne= 11; ne= 11; <u>Avail.s</u> 0 tore <u>ers)</u>	8.1 mir 2.0 mir Storage	calcula (172.5 Stora	ited for 0.019 - 60.5) age Description	MI (89	9% of in	flow)	 		
Plug-Flov Center-o Volume #1 Elevation (meters 0.00	v deter f-Mass 0.00 n ) (N	ntion tir det. tir <u>nvert</u> 00 m Cum.S <u>1ega-lit</u> 0.	ne= 11 ne= 11 <u>Avail.s</u> 0 tore <u>ers)</u> 000	8.1 mir 2.0 mir Storage	calcula (172.5 Stora	ited for 0.019 - 60.5) age Description	MI (89	9% of in	flow)	 		
Plug-Flov Center-o <u>Volume</u> #1 Elevation (meters	v deter f-Mass 0.00 n ) (N	ntion tir det. tir <u>nvert</u> 00 m Cum.S <u>1ega-lit</u> 0.	ne= 11; ne= 11; <u>Avail.s</u> 0 tore <u>ers)</u>	8.1 mir 2.0 mir Storage	calcula (172.5 Stora	ited for 0.019 - 60.5) age Description	MI (89	9% of in	flow)	 		
Plug-Flov Center-o Volume #1 Elevation (meters 0.000 1.65	v deter f-Mass 0.00 n ) (N	ntion tir det. tir nvert 00 m Cum.S Aega-lit 0. 0.	ne= 11: ne= 11: <u>Avail.s</u> 0 tore <u>ers)</u> 000 035	8.1 mir 2.0 mir <u>Storage</u> .035 M	calcula (172.5 Stora	ated for 0.019 i - 60.5 ) age <u>Descripti</u> <b>om Stage Da</b>	MI (89	9% of in	flow)	 		

 50Bays1088Somer
 Ottawa City Climate Change IDF 5-Year Duration=111 min, Inten=24.8 mm/hr

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50Bays1088Some	Ottawa City Climate Change IDF 10-Year Duration=	=111 min, Inten=28.9 mm/hr
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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 MI Inflow=0.0037 m<sup>3</sup>/s 0.025 MI Outflow=0.0014 m<sup>3</sup>/s 0.021 MI 
 50Bays1088Some Ottawa City Climate Change IDF 10-Year Duration=111 min, Inten=28.9 mm/hr

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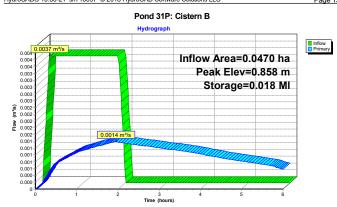
## Summary for Pond 31P: Cistern B

Inflow Area = Inflow = Outflow = Primary =	0.0037 m <sup>3</sup> /s @	0.17 hrs, Volume= 1.95 hrs, Volume=	Depth = 53 mm for 10-Year event 0.025 MI 0.021 MI, Atten= 63%, Lag= 107.1 min 0.021 MI
		e Span= 0.00-6.00 hrs, dt= ( Surf.Area= 0.0000 ha Sto	

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

Volume	Invert	Avail.Stora	ge Storage Description
#1	0.000 m	0.035	MI Custom Stage Data Listed below
Elevation (meters) 0.000 1.650	(Mega-	Store liters) 0.000 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)



50Bays1088Some	Ottawa	n City Climate	Change	IDF 25-Year	Duration=111 min,	Inten=34.1 mn	n/hr
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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 MI Inflow=0.0044 m³/s 0.029 MI Outflow=0.0015 m³/s 0.024 MI

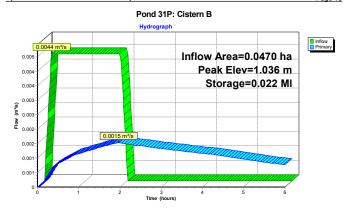
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HydroCAD® 10	.00-21 s/n 10697 ©	2018 HydroCAD Software Solutions LLC	Page
		Summary for Pond 31P: Cistern B	
Inflow Area =	0.0470 ha,10	0.00% Impervious, Inflow Depth = 62 mm	for 25-Year event
Inflow =	0.0044 m³/s @		
Outflow =			65%, Lag= 107.3 min
Primary =	0.0015 m³/s @	1.96 hrs, Volume= 0.024 MI	
Routing by St	or-Ind method Time	e Span= 0.00-6.00 hrs, dt= 0.01 hrs	
		Surf.Area= 0.0000 ha Storage= 0.022 MI	
	0	5	
		min calculated for 0.024 MI (82% of inflow)	
Center-of-Mas	s det. time= 119.2	min ( 179.7 - 60.5 )	
		· · ·	
Volume		age Storage Description	
#1 0.	000 m 0.03	5 MI Custom Stage Data Listed below	
Elevation	Cum Store		
	(Mega-liters)		
0.000	0.000		
1.650	0.035		
Device Rout	ting Invert	Outlet Devices	
#1 Prim	ary 0.000 m		
		Elev. (meters) 0.000 0.200 0.500 1.000 1.	
		Disch. (m <sup>3</sup> /s) 0.00000 0.00070 0.00110 0.0	0150 0.00190 0.00210
D-1	M 0 0045	3/- @ 1.00 has 110/-1.000 as (Ease Discharge	<b>`</b>
		n <sup>3</sup> /s @ 1.96 hrs HW=1.036 m (Free Discharge	•)
-i-nyurove	A 403 VIIV-1 (Cust	om Controls 0.0015 m³/s)	

50Bays1088Some Ottawa City Climate Change IDF 25-Year Duration=111 min, Inten=34.1 mm/hr

 50Bays1088Some
 Ottawa City Climate Change IDF 25-Year Duration=111 min, Inten=34.1 mm/hr

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Prepared by WSP	ity Climate Change IDF 50-Year Duration=111 min, Inten=37.9 mm/hr Printed 2024-08-07 2018 HydroCAD Software Solutions LLC Page 17	50Bays1088Some         Ottawa City Climate Change IDF 50-Year Duration=111 min, Inten=37.9 mm/hr           Prepared by WSP         Printed 2024-08-07           HydroCAD® 10.00-21 s/n 10697 © 2018 HydroCAD Software Solutions LLC         Page 18			
	ie span=0.00-6.00 hrs, dt=0.01 hrs, 601 points off by Rational method, Rise/Fall=1.0/1.0 xTc	Summary for Pond 31P: Cistern B			
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method		Inflow Area = 0.0470 ha,100.00% Impervious, Inflow Depth = 69 mm for 50-Year event			
Pond 31P: Cistern B	Peak Elev=1.171 m Storage=0.025 MI Inflow=0.0049 m³/s 0.033 MI Outflow=0.0016 m³/s 0.026 MI	Inflow = 0.0049 m <sup>3</sup> /s @ 0.17 hrs, Volume= 0.033 MI Outflow = 0.0016 m <sup>3</sup> /s @ 1.96 hrs, Volume= 0.026 MI, Atten= 67%, Lag= 107.5 min Primary = 0.0016 m <sup>3</sup> /s @ 1.96 hrs, Volume= 0.026 MI			
		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 MI			
		Plug-Flow detention time= 131.9 min calculated for 0.026 MI (79% of inflow) Center-of-Mass det. time= 120.6 min (181.1 - 60.5)			

Volume #1

Elevation (meters)

0.000 1.650

Device Routing #1 Primary

0.000 m Cum.Store

(Mega-liters) 0.000

0.035

 50Bays1088Some
 Ottawa City Climate Change IDF 50-Year Duration=111 min, Inten=37.9 mm/hr

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 50Bays1088Som
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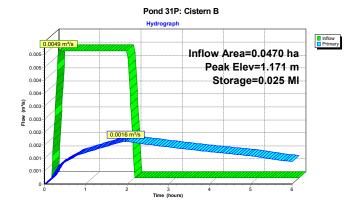
Invert Avail.Storage Storage Description .000 m 0.035 MI Custom Stage Data Listed below

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)

 
 Invert
 Outlet Devices

 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

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 MI Inflow=0.0054 m<sup>3</sup>/s 0.036 MI Outflow=0.0017 m<sup>3</sup>/s 0.028 MI



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Summary for Pond 31P: Cistern B					

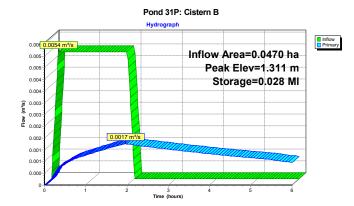
Inflow Area =         0.0470 ha,100.00% Impervious, Inflow Depth =         77 mm         for 100-Year event           Inflow         =         0.0054 m³/s @         0.17 hrs, Volume=         0.036 MI           Outflow         =         0.0017 m³/s @         1.96 hrs, Volume=         0.028 MI, Atten= 68%, Lag= 107.6 min           Primary         =         0.0017 m³/s @         1.96 hrs, Volume=         0.028 MI
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 MI
Plug-Flow detention time= 134.3 min calculated for 0.028 MI (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 MI Custom Stage Data Listed below
Elevation         Cum.Store           (meters)         (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) 0.0000 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) 
 50Bays1088Som
 Ottawa City Climate Change IDF 100-Year Duration=111 min, Inten=41.9 mm/hr

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## **APPENDIX**

