

Forum/SLP 112 Nelson Limited Partnership

# 112-134 Nelson Street Stormwater Management Report

July 25, 2023







# 112-134 Nelson Street Stormwater Management Report

Forum/SLP 112 Nelson Limited Partnership

Confidential  
Issue for City Review  
Project No.: 211-04788-00  
Date: July 25, 2023

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# Revision History

## FIRST ISSUE

July 16, 2021	First Submission			
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<b>REVISION 1</b>				
August 27, 2021	Second submission			
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<b>REVISION 2</b>				
February 10, 2023	Third Submission			
Prepared by	Reviewed by	Approved By		
Kathryn Kerker Water Resources E.I.T.	Alex Sereda, P.Eng. Project Engineer	Alex Sereda, P.Eng. Project Engineer		
<b>REVISION 3</b>				
July 25, 2023	Third Submission			
Prepared by	Reviewed by	Approved By		
Kathryn Kerker Water Resources E.I.T.	Alex Sereda, P.Eng. Project Engineer	Alex Sereda, P.Eng. Project Engineer		

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# Signatures

Prepared by



July 25, 2023

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Kathryn Kerker  
Water Resources E.I.T.

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Date

APPROVED BY



July 25, 2023

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Alex Sereda, P.Eng.  
Project Engineer

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Date

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# 1 INTRODUCTION

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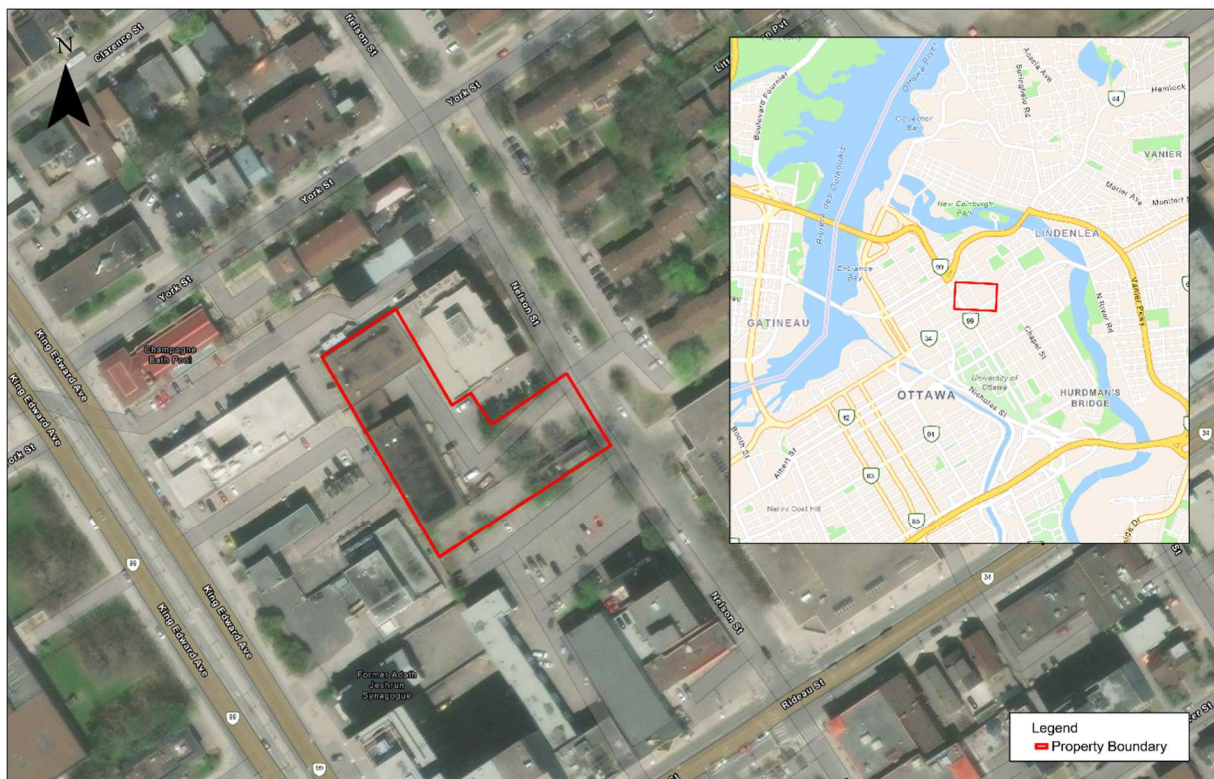
## 1.1 Scope

WSP Canada Inc. was retained by FORUM/SLP 112 Nelson Limited Partnership to conduct a stormwater management study in support of proposals to develop a 9-storey residential building on land which previously contained a two-storey multi-tenant warehouse with surface parking.

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## 1.2 Site Location

The site is located at 112 Nelson Street, Ottawa, Ontario, between Rideau Street and York Street. The location of the proposed development is illustrated in **Figure 1**.



**Figure 1: Site Location**

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## 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 October 22, 2020 (Meeting minutes included in **Appendix A**), with follow-up email on April 14, 2021. Criteria for 112 Nelson Street are as follows:

### Water Quantity Control and Discharge to Municipal Infrastructure

- Stormwater must be controlled to the peak flow for the 2-year pre-development storm event. Runoff must be detained onsite to control all storm events up to and including the 100-year event.
- Allowable Runoff coefficient (C): C = the lesser of the existing pre-development conditions to a maximum of 0.5 (OSDG 8.3.7.3)
- Time of concentration (Tc): Tc = pre-development (Calculated); maximum Tc = 10 min

### Water Quality

- RVCA requires enhanced water quality protection (80% TSS removal) be provided on-site

# 2 PRE-DEVELOPMENT CONDITIONS

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## 2.1 General

Currently the land proposed for the new development contains a two-storey multi-tenant warehouse with surface parking. The overall existing site has an estimated runoff coefficient of 0.90. The total study area (i.e. portion of the site affected by the proposed works) is 0.36 ha.

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## 2.2 Rainfall Information

The rainfall intensity is 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/regression constants are included in **Appendix B**.
- 

## 2.3 Allowable Flow Rates

As noted in **Section 1.4**, post-development stormwater runoff from the 2-year to 100-year design storms must not exceed the pre-development peak 2-year flow rate, calculated using a runoff coefficient being the lesser of 0.50 or existing conditions. In this instance existing conditions have a runoff coefficient of 0.90, therefore a value of 0.5 has been used to calculate the allowable release rate.

The area will discharge east to a 450 mm concrete storm pipe on Nelson Street through a new storm connection. The calculated peak flow rates for the site in the pre-development condition are summarized below in Table 2-1.

**Table 2-1: Pre-Development Peak Flow Rate Calculations (Runoff Coefficient, C = 0.50 and T<sub>c</sub>=10 min)**

Return Period (Years)	Rainfall Intensity (mm/hour)	Peak Flow Rate (l/s)	Target Release Rate (l/s)
2	76.8	39	39
5	104.2	53	
10	122.1	62	
25	144.7	81	
50	161.5	98	
100	178.6	113	

# 3 POST-DEVELOPMENT CONDITIONS

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## 3.1 General

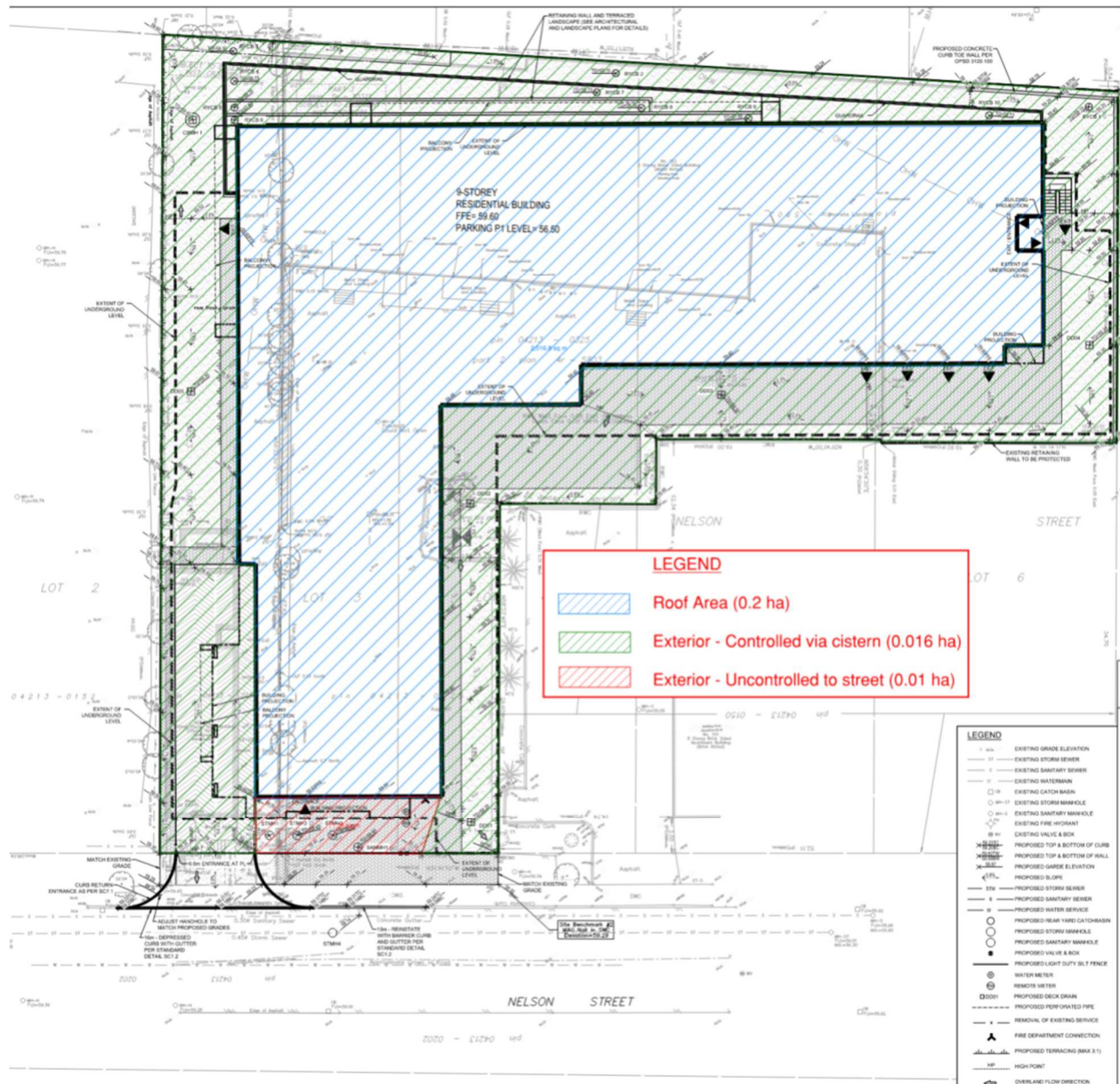
The site will be developed with a new 9-storey residential building. The developed site will have a runoff coefficient of 0.72 and study area of 0.365 ha. A cistern will be used to control the peak discharge of the newly developed site to 39 L/s. Figure 2 shows the proposed controlled and uncontrolled drainage areas for the developed site. The post-development area breakdown is shown in Table 3-1.

Uncontrolled areas of the site are small and along the property boundary. These uncontrolled areas cannot be captured due to grading constraints. The cistern outflow to Nelson Street is overcontrolled to account for these areas.

Note that this report should be read in conjunction with the proposed site servicing drawing package—specifically drawings C001 (Servicing Plan) and C002 (Grading Plan).

**Table 3-1: Post-development area breakdown**

	Area (ha)	Runoff Coefficient
Controlled area		
Impervious	0.266	0.90
Pervious	0.092	0.20
Total controlled	0.358	0.72
Uncontrolled area		
Impervious	0.007	0.90
Pervious	0.001	0.20
Total Uncontrolled	0.008	0.82
<b>Total</b>	<b>0.365</b>	<b>0.72</b>



**Figure 2: Proposed Drainage Areas**

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## 3.2 Water Quantity

As noted in **Section 2.3**, the target allowable discharge rate to the Nelson Street sewer is 39 L/s. This is equivalent to the peak runoff rate under pre-development conditions during a 2-year design storm event with a runoff coefficient of 0.50. Compliance with the 100-yr target offsite discharge rate will be achieved through use of a cistern with outlet control prior to discharge into the Nelson Street storm sewer.

It is noted that a small portion of the study area will not drain to the proposed cistern. Post-development runoff calculations have accounted for uncontrolled runoff from these areas, and the following analysis results report on the cumulative release rates from the study area (controlled plus uncontrolled). There are no external areas draining to the site.

A HydroCAD model of the project was created and includes:

- Cistern (minimum volume 90 m<sup>3</sup>), with outlet controlled using flow control ICD (130mm orifice) to detain 0.3575 ha of the new development with a runoff coefficient of 0.72 (+25% for 100-year event as per OSDG 5.4.5.2.1; C = 0.90).
- Uncontrolled runoff from 0.0075 ha area with C = 0.82 (+25% for 100-year event as per OSDG 5.4.5.2.1; C = 1.0).

The Modified Rational Method (an inherent subroutine of the HydroCAD software) has been used for the modelling exercise, and the model has informed the maximum storage volume used in the cistern based on the proposed flow. The peak flow rate generated from the uncontrolled drainage area within the project site and controlled flow from the cistern is 39 L/s, which meets the total allowable 100-year release rate of 39 L/s. Modelling results are summarized below in **Table 3-1** and shown in **Appendix C**.

Note that results provided below describe performance of the proposed system at multiple storm durations, which have been solved iteratively within HydroCAD to represent critical conditions (i.e. maximum storage utilized within storage features, and peak release rate at the system discharge point). The results demonstrate that the target allowable 100-year release rate is satisfied at all durations. In this case the duration for peak discharge and peak storage are the same.

**Table 3-2: Summary of Modelling Results**

Return Period (Years)	Time of Conc. (min)	Utilized Storage (m <sup>3</sup> )	Peak Water Elevation in storage (m)	Peak Flow Rate at control (L/s)	Total Flow Leaving Site* (L/s)	Allowable 100-yr Flow Rate (L/s)
100-year (Peak Discharge and Peak Storage)	30	89.3	58.163	38	<b>39</b>	<b>39</b>

\*Total Flow Leaving Site' includes uncontrolled area and cistern discharge.

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### 3.3 Water Quality

As noted in section 1.4, quality control is required to provide enhanced water quality treatment of the site (80% TSS removal). An OGS unit (Stormceptor EFO4 or equivalent) will be installed just upstream of the city storm sewer connection to provide the required quality treatment. OGS sizing is provided in **Appendix D**.



# 4 CONCLUSIONS

A stormwater management plan has been prepared to support the site plan application for the 112 Nelson Street development in the City of Ottawa. The key points are summarized below.

## WATER QUANTITY

Runoff collected from the project site will be directed to a cistern with a minimum storage volume of 90 m<sup>3</sup> to control the 100-year event. The peak 100-year discharge from the site is 39 L/s, which meets the allowable release rate of 39 L/s.

## WATER QUALITY

Water treatment is provided by an OGS unit placed just upstream of the city storm sewer connection.

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.

# APPENDIX

**A**

Pre-consultation meeting minutes  
(October 22, 2020)

## **Pre-Application Consultation Meeting Minutes**

**112 Nelson**

PC2020-0262

October 22, 2020, Videoconference Call

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### **Applicant Team (invitees)**

- Paul Black, Fotenn
- Aly Damji, Forum Equity
- Hoa Nguyen, Forum Equity
- Jeremy Silburt, Smart Living Properties
- Dany Elsalibi, Smart Living Properties
- Bob Woodman, Woodman Architects
- Juan Gomez, Woodman Architects
- Christopher Gordon, CHG Transportation
- Andrew Harte, CHG Transportation

### **Lowertown Community Association**

- Warren Waters

### **City of Ottawa**

- Andrew McCreight, Planner, File Lead
  - John Wu, Engineering
  - Christopher Moise, Urban Design
  - Wally Dubyk, Transportation
- 

**Subject: 112 Nelson Street**

### **Opening & attendee introduction**

- Introduction of meeting attendees
- Andrew explained NDA process with Lowertown CA.

### **Project Overview (applicant team)**

Intro to team and partnership

- Presentation and Intro made to forum equity and smart living properties partnership and business approach.
  - **Note:** Staff request a copy of the presentation made during the meeting.
- Development focuses on millennial form housing.

- Forum has worked on various Ottawa projects, as well as student residents in Manitoba, and many rental projects.
- Proposed development is intended for Rental.
- Location is priority for our projects, and target active transit tenants
- All inclusive rental package, and tenant mix
- Fully furnished suites etc.
- Rental affordability with efficient units and location with amenity proximity etc. Tenants will be enjoying the outside of the unit with quality amenities in the building and surrounding neighbourhood

### Proposal Overview

- Goal of project is to try to design the building to meet zoning as close as possible.
- The built form and envelope is intended to meet previous Schedule as much as possible.
- Parking complies with plans submitted, but there will likely be a request to further reduce parking requirement.
- Biggest difference from previous rezoning concept (and approval) is the building is now 10-storeys, but fits within previous zoning height.
- Architect description
  - Previous proposal was 150+ condo type units. We are looking at very different market (rental) and creating flexible use spaces.
  - Looking to maintain 10% as 3-bedroom units.
  - Fit within the envelope but not necessarily maximizing.
  - Meeting envelope and setbacks
  - Change of use to high-rise but within permitted form.
  - Residential building
  - Amenity – interior and roof-top. Meet calc. requirements
  - 342 keys (units)
  - This is not specifically designed for student. May include student but looking for young professionals etc.

### **Preliminary Comments from Related Discipline**

#### Andrew McCreight – File Lead

- The Pre-con Form notes Site Plan but based on the discussion it is clear that a Zoning By-law amendment will be required as well.
- Provided a brief overview of the ownership, site history and previous rezoning application (recently approved via Omnibus Report)
- Question was raised about the design if the intent was for the design to result in every “suite” satisfying the definition of a dwelling unit?
  - Answer: Jeremy – all units will be designed to comply as dwelling units.

- Section 37 requirements will require re-negotiation based on the changes to the proposed development.
  - Applicant acknowledged.
- Any submission needs to provide a clear breakdown of the how the proposed GFA compares to the previous rezoning concept.
  - Planning Rationale to include a section of S. 37. See guidelines.
- The assessment and rationale that the built form and envelopment is consistent with the previous approval, except going to 10-storeys, is not accurate. Comparing this proposal to the approved Zoning Schedule highlights some concerning inconsistencies, such as the height (storeys), but also some of the stepbacks have not been incorporated.
- Staff fully expect that building heights (including storeys), setbacks and stepbacks previously established and approved through the Omnibus Report will be maintained.
- The design seems to intentionally maximize the number of units in this development and in a manner that is not desirable.
  - Floor heights seem to be squeezed to the minimum code requirement and paired with exceptionally small units
  - The concept incorporates dwelling units within the P1 garage level. This seems unnecessary and may contribute to a discussion around overdevelopment.
- Visitor parking – the zoning provision specific to minimum of 6 spaces was based on the previous concept. More visitor parking should be provided and relate the number of units.
- Waste Room access does not appear sufficient, at least for City collection. Consider the number of units proposed and design the waste/recycling room accordingly.
- Part of the business plan presentation spoke to tenants having excellent access to amenity outside of their unit. With the proposal development concept, which raises concern about the number and type of units proposed, it will be very important to see proper indoor Amenity Areas for ease of access by all tenants.
- Bicycle parking – the desire to achieve a 1:1 ratio is supported but further the design and location of bike parking for ease of use. Bicycle rooms within parking garage may work, but they need to be easy to access with a bike. Prefer to see a ground floor facility. Also look at option for visitor bicycle parking.
- More information will be required on affordable housing relative to the previous S. 37 items.
- Discuss this proposal with the Ward Councillor as he may have other ideas in mind for S. 37, and for the proposed development in general.
- Further pre-consultation is strongly recommended in response to comments received. The current proposal raises many concerns, and with the high-level issues addressed, staff can provide more detailed feedback.

## Christopher – Urban Design

- Convincing business plan
  - Location
  - Quality design with efficient spaces, shared amenities, quality finishes etc.
  - Convenience
  - Shortage of rental housing, proforma, small units, amenities.
- However, while the strong business plan discussion is appreciated, but the missing piece is how the building itself contributes to the immediate community and the design of the City.

### Specific Areas of Concern:

- The project is ten storeys and triggers the tall building guidelines and this proposal doesn't come close to meeting the max 750m<sup>2</sup> floorplate. Bringing this proposal down to nine storeys would avoid that.
- Would like further analysis of building relationship with surrounding context, especially planned function. Provide visualization.
- It might be helpful to see how this proposal relates to its surrounding properties within their planned context. Perhaps some modelling with ghosted blocks that illustrate what could be built around it to investigate side yard conditions.
- How the building presents a street scale and how the design relates to the context of Nelson.
- The massing and materiality of the design seems akin to a campus building on a green field site, so additional investigation would be valuable to recognize the diverse local context.
- No balconies which are a common way to visually break up a long facade and provide an architectural element that signifies a residential use.
- Concern about livability of below grade units. More elaboration of this approach needs to be provided (perhaps with a section).
- Quality of life of the building needs further description from a built form and design perspective. Not sure the business plan idea has translated into this form. This is not a convincing proposal.
- The P1 level units are very concerning.
- There is no landscaping plan provided yet and this will be a critical component of the success of the design and how it stitches itself into the context of the block as a whole.

### Other

- This building will be highly visible in the middle of a downtown block, and although it does not sit within one of the City's Design Priority Areas we

recommend the proposal consider attending an Informal visit (prior to a full submission and is not a public meeting), with the City's UDRP to further discuss and evaluate various scenarios of development for the whole site;

- A Design Brief is a required submittal for all site plan applications. Please see the Design Brief Terms of Reference provided for details and consult the City's website for details regarding the UDRP schedule (if applicable).

#### John Wu - Engineering

- Major concern is to check sanitary capacity.
- Storm and water should not cause any concerns.
- Noise study will be required due to proximity of Rideau and King Edward.
- Jeremy – similar number of occupants from previous proposal, so capacity should not be an issue.

#### Wally - Transportation

- The remaining steps (Forecasting & Analysis) of the TIA report to be submitted during the Site Plan application. All other Transportation comments have been noted by the consultant and should be addressed on the site plan.
- Applicant
  - We will be further discussing additional transit demand strategies with staff such as car share, e-bike spaces etc.

#### **Preliminary Comments from Community Association Representatives:**

Warren is currently the only member from Lowertown Community Association who has signed the non-disclosure agreement.

- Welcome to the neighbourhood. There is an affordability emergency.
- We need more family housing.
- We do welcome student and young professions.
- You will receive concerns about this being a student bunkhouse.
- Beautiful neighbourhood and I recommend you get to know your neighbours and get to know the people who are affected by this development.
- City – don't hold up good housing projects.
- Investment with rental real estate with high turnover results in higher rents and increasement. Don't make this your business approach.
- Increase stress on infrastructure and more property taxes etc.

Note: there was a response discussion about Development Charges, and application process

**Next Steps:**

- Warren has signed non-disclosure agreement. If the applicant decides to go to the public, please email Warren to break this agreement. Andrew must be copied on such an e-mail if this occurs.
- Recommend consulting the Ward Councillor, as well as Lowertown Community Association.
- The plans and studies list will be provided for submission requirements.



## McCaughey, Stephen

---

**From:** Wu, John <John.Wu@ottawa.ca>  
**Sent:** Wednesday, April 14, 2021 11:10 AM  
**To:** McCaughey, Stephen  
**Subject:** RE: 112 Nelson St. - Design Criteria from Pre-consultation

**Follow Up Flag:** Follow up  
**Flag Status:** Flagged

Please use C 0.5 , 2 year's storm to restrict up to 100 year's storm on site.

---

**From:** McCaughey, Stephen <Stephen.Mccaughey@wsp.com>  
**Sent:** April 14, 2021 11:06 AM  
**To:** Wu, John <John.Wu@ottawa.ca>  
**Cc:** Blanchette, Erin <Erin.Blanchette@wsp.com>  
**Subject:** 112 Nelson St. - Design Criteria from Pre-consultation

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I understand you're the engineering contact for this 112 Nelson St. proposed development and possible re-zoning.

We'll be generating the proposed water and sanitary demands shortly but what isn't clear from the pre-consultation minutes is what are the stormwater management requirements for this site development?

Thanks very much,

**Stephen McCaughey, P.Eng.**

Project Engineer  
Municipal Infrastructure



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# APPENDIX

## B

### Pre-Development Stormwater Management Calculations



Project:	112 Nelson Street	No.:	211-04788-00
By:	KK	Date:	2021-07-14
Checked:	MH	Checked:	2021-07-14
			<b>Page:</b> 1

Subject: **SWM CALCULATIONS- Pre-Development Peak Flow**

Calculation of existing runoff rate is undertaken using the Rational Method:

$$Q = 2.78CiA$$

- Where: Q = peak flow rate (litres/second)  
 C = runoff coefficient  
 i = rainfall intensity (mm/hour)  
 A = catchment area (hectares)

Site Area, A	2,948	m <sup>2</sup>
Site Area, A	0.29	hectares
Runoff Coefficient, C	0.50	

Rainfall intensity calculated in accordance with City of Ottawa Sewer Design Guidelines (section 5.4.2):

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

- Where: A, B, C = regression constants for each return period (defined in section 5.4.2)  
 i = rainfall intensity (mm/hour)  
 Td = storm duration (minutes) 10 minutes

Return Period (Years)	2	5	10	25	50	100*
<b>A</b>	733.0	998.1	1,174.2	1,402.9	1,569.6	1,735.7
<b>B</b>	0.810	0.814	0.816	0.819	0.820	0.820
<b>C</b>	6.199	6.053	6.014	6.018	6.014	6.014
<b>T (mins)</b>	10	10	10	10	10	10
<b>I (mm/hr)</b>	76.8	104.2	122.1	144.7	161.5	178.6
<b>Runoff Coefficient C</b>	0.50	0.50	0.50	0.50	0.50	0.50
<b>C Multiplier (OSDG Table 5.7)</b>	1.00	1.00	1.00	1.10	1.20	1.25
<b>Revised Runoff Coefficient C</b>	0.50	0.50	0.50	0.55	0.60	0.63
<b>Q (litres/sec)</b>	31	43	50	65	79	91
<b>Q (m3/sec)</b>	0.03	0.04	0.05	0.07	0.08	0.09



# APPENDIX

**C**

HydroCAD Model Output

**20230717\_112\_Nelson**

Prepared by WSP Canada inc.

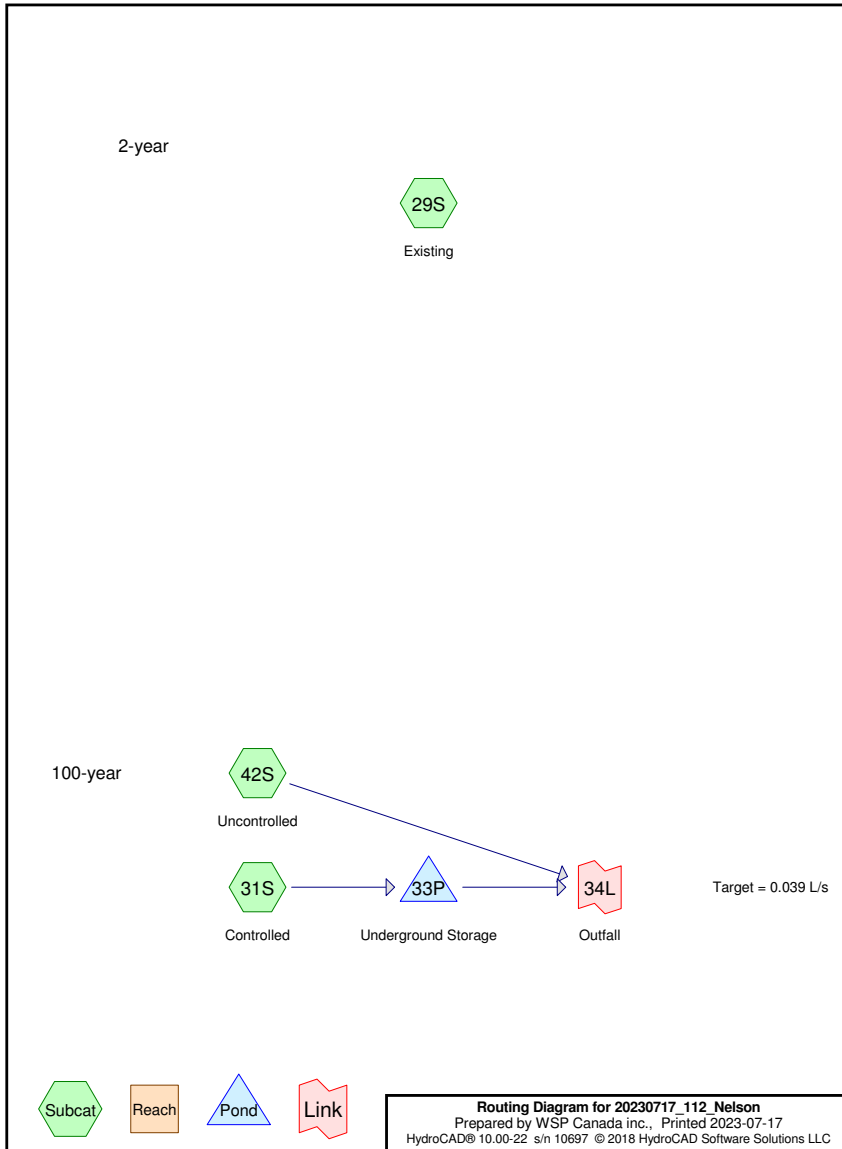
HydroCAD® 10.00-22 s/n 10697 © 2018 HydroCAD Software Solutions LLC

Printed 2023-07-17

Page 2

**Area Listing (all nodes)**

Area (sq-meters)	C	Description (subcatchment-numbers)
2,947.7	0.50	(29S)
3,575.0	0.90	Controlled Area (0.718) (31S)
75.0	1.00	Uncontrolled Area (0.819) (42S)
<b>6,597.7</b>	<b>0.72</b>	<b>TOTAL AREA</b>



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**Soil Listing (all nodes)**

Area (sq-meters)	Soil Group	Subcatchment Numbers
0.0	HSG A	
0.0	HSG B	
0.0	HSG C	
0.0	HSG D	
6,597.7	Other	29S, 31S, 42S
<b>6,597.7</b>		<b>TOTAL AREA</b>

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**Ground Covers (all nodes)**

HSG-A (sq-meters)	HSG-B (sq-meters)	HSG-C (sq-meters)	HSG-D (sq-meters)	Other (sq-meters)	Total (sq-meters)	Ground Cover
0.0	0.0	0.0	0.0	2,947.7	2,947.7	
0.0	0.0	0.0	0.0	3,575.0	3,575.0	Controlled Area (0.718)
0.0	0.0	0.0	0.0	75.0	75.0	Uncontrolled Area (0.819)
<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>6,597.7</b>	<b>6,597.7</b>	<b>TOTAL AREA</b>



Time span=0.00-4.00 hrs, dt=0.01 hrs, 401 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 29S: Existing** Runoff Area=2,947.7 m<sup>2</sup> 0.00% Impervious Runoff Depth=23 mm  
 Tc=10.0 min C=0.50 Runoff=0.03761 m<sup>3</sup>/s 67.7 m<sup>3</sup>

**Subcatchment 31S: Controlled** Runoff Area=0.3575 ha 0.00% Impervious Runoff Depth=41 mm  
 Tc=10.0 min C=0.90 Runoff=0.08211 m<sup>3</sup>/s 147.8 m<sup>3</sup>

**Subcatchment 42S: Uncontrolled** Runoff Area=0.0075 ha 100.00% Impervious Runoff Depth=46 mm  
 Tc=10.0 min C=1.00 Runoff=0.00191 m<sup>3</sup>/s 3.4 m<sup>3</sup>

**Pond 33P: Underground Storage** Peak Elev=58.163 m Storage=89.3 m<sup>3</sup> Inflow=0.08211 m<sup>3</sup>/s 147.8 m<sup>3</sup>  
 Outflow=0.03791 m<sup>3</sup>/s 147.8 m<sup>3</sup>

**Link 34L: Outfall** Inflow=0.03898 m<sup>3</sup>/s 151.2 m<sup>3</sup>  
 Primary=0.03898 m<sup>3</sup>/s 151.2 m<sup>3</sup>

**Total Runoff Area = 6,597.7 m<sup>2</sup> Runoff Volume = 218.9 m<sup>3</sup> Average Runoff Depth = 33 mm**  
**98.86% Pervious = 6,522.7 m<sup>2</sup> 1.14% Impervious = 75.0 m<sup>2</sup>**

**Summary for Subcatchment 29S: Existing**

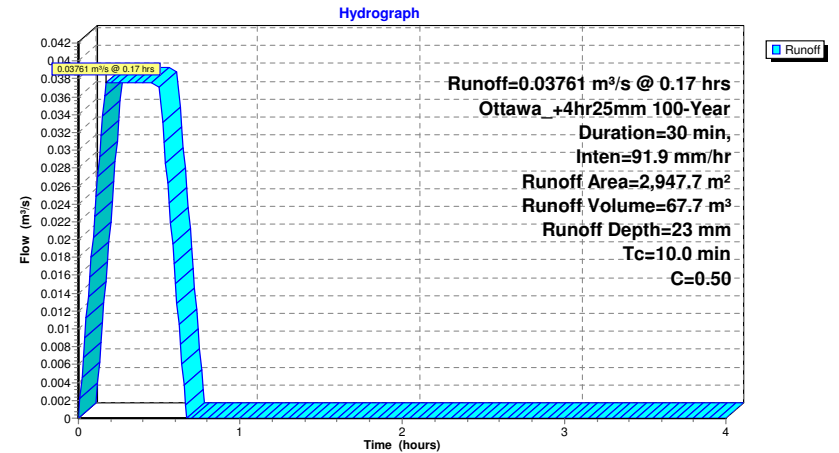
Runoff = 0.03761 m<sup>3</sup>/s @ 0.17 hrs, Volume= 67.7 m<sup>3</sup>, Depth= 23 mm

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-4.00 hrs, dt= 0.01 hrs  
 Ottawa\_+4hr25mm 100-Year Duration=30 min, Inten=91.9 mm/hr

Area (m <sup>2</sup> )	C	Description
495.0	0.50	
140.5	0.50	
67.5	0.50	
59.2	0.50	
274.4	0.50	
1,827.0	0.50	
54.5	0.50	
5.2	0.50	
24.4	0.50	
2,947.7	0.50	Weighted Average
2,947.7		100.00% Pervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m <sup>3</sup> /s)	Description
10.0					Direct Entry,

**Subcatchment 29S: Existing**



**Summary for Subcatchment 31S: Controlled**

Runoff = 0.08211 m³/s @ 0.17 hrs, Volume= 147.8 m³, Depth= 41 mm

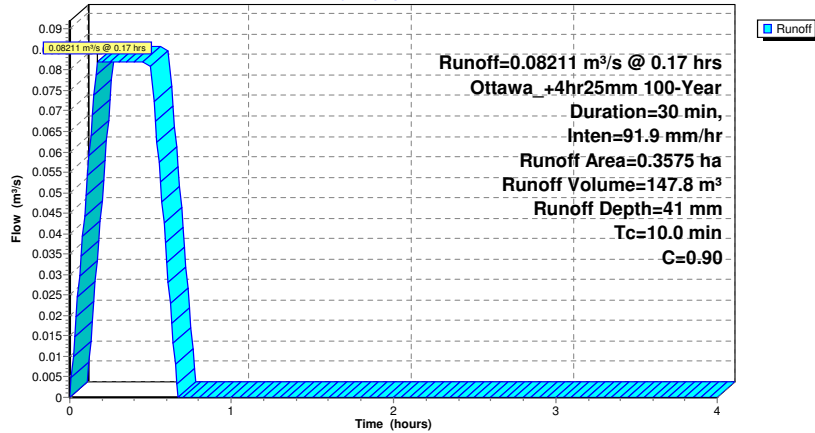
Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-4.00 hrs, dt= 0.01 hrs  
 Ottawa\_+4hr25mm 100-Year Duration=30 min, Inten=91.9 mm/hr

Area (ha)	C	Description
0.3575	0.90	Controlled Area (0.718)
0.3575		100.00% Pervious Area

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

**Subcatchment 31S: Controlled**

Hydrograph



**Summary for Subcatchment 42S: Uncontrolled**

Runoff = 0.00191 m³/s @ 0.17 hrs, Volume= 3.4 m³, Depth= 46 mm

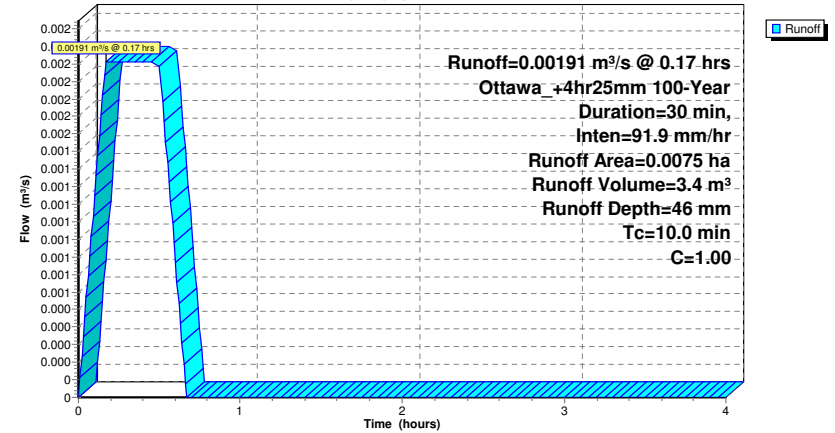
Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-4.00 hrs, dt= 0.01 hrs  
 Ottawa\_+4hr25mm 100-Year Duration=30 min, Inten=91.9 mm/hr

Area (ha)	C	Description
0.0075	1.00	Uncontrolled Area (0.819)
0.0075		100.00% Impervious Area

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

**Subcatchment 42S: Uncontrolled**

Hydrograph



**Summary for Pond 33P: Underground Storage**

[44] Hint: Outlet device #1 is below defined storage

Inflow Area = 3,575.0 m<sup>2</sup>, 0.00% Impervious, Inflow Depth = 41 mm for 100-Year event  
 Inflow = 0.08211 m<sup>3</sup>/s @ 0.17 hrs, Volume= 147.8 m<sup>3</sup>  
 Outflow = 0.03791 m<sup>3</sup>/s @ 0.59 hrs, Volume= 147.8 m<sup>3</sup>, Atten= 54%, Lag= 25.2 min  
 Primary = 0.03791 m<sup>3</sup>/s @ 0.59 hrs, Volume= 147.8 m<sup>3</sup>

Routing by Stor-Ind method, Time Span= 0.00-4.00 hrs, dt= 0.01 hrs  
 Peak Elev= 58.163 m @ 0.59 hrs Surf.Area= 90.0 m<sup>2</sup> Storage= 89.3 m<sup>3</sup>

Plug-Flow detention time= 27.2 min calculated for 147.4 m<sup>3</sup> (100% of inflow)  
 Center-of-Mass det. time= 27.3 min ( 47.3 - 20.0 )

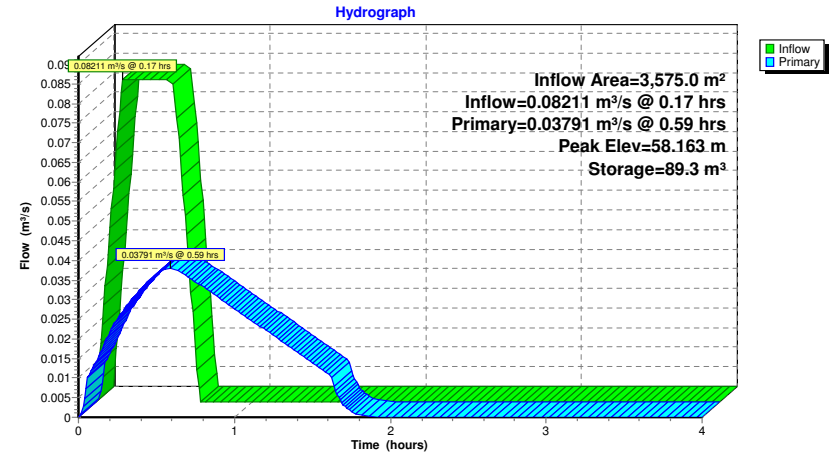
Volume	Invert	Avail.Storage	Storage Description
#1	57.170 m	254.7 m <sup>3</sup>	<b>Custom Stage Data (Prismatic)</b> Listed below

Elevation (meters)	Surf.Area (sq-meters)	Inc.Store (cubic-meters)	Cum.Store (cubic-meters)
57.170	90.0	0.0	0.0
58.170	90.0	90.0	90.0
60.000	90.0	164.7	254.7

Device	Routing	Invert	Outlet Devices
#1	Primary	57.050 m	<b>130 mm Vert. Orifice/Grate</b> C= 0.630

**Primary OutFlow** Max=0.03791 m<sup>3</sup>/s @ 0.59 hrs HW=58.163 m (Free Discharge)  
 ↳1=Orifice/Grate (Orifice Controls 0.03791 m<sup>3</sup>/s @ 2.86 m/s)

**Pond 33P: Underground Storage**



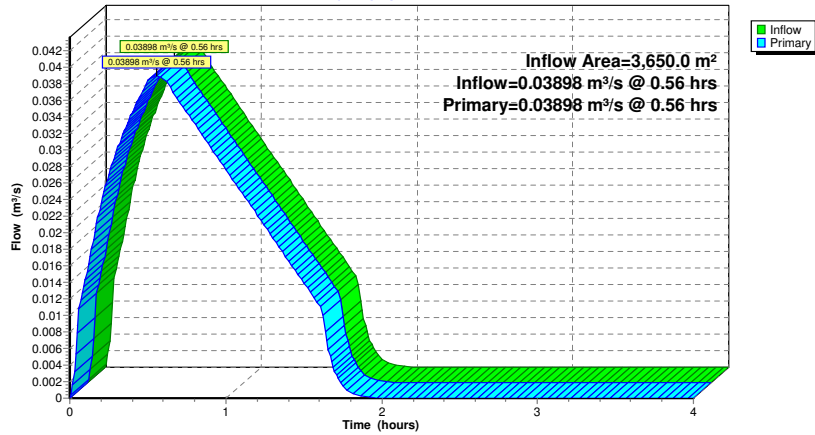
### Summary for Link 34L: Outfall

Inflow Area = 3,650.0 m<sup>2</sup>, 2.05% Impervious, Inflow Depth = 41 mm for 100-Year event  
Inflow = 0.03898 m<sup>3</sup>/s @ 0.56 hrs, Volume= 151.2 m<sup>3</sup>  
Primary = 0.03898 m<sup>3</sup>/s @ 0.56 hrs, Volume= 151.2 m<sup>3</sup>, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-4.00 hrs, dt= 0.01 hrs

### Link 34L: Outfall

Hydrograph





# APPENDIX

**D**

OGS Sizing



## Stormceptor® EF Sizing Report

### STORMCEPTOR®

#### ESTIMATED NET ANNUAL SEDIMENT (TSS) LOAD REDUCTION

08/25/2021

Province:	Ontario	Project Name:	112 Nelson Street
City:	Ottawa	Project Number:	211-04788-00
Nearest Rainfall Station:	OTTAWA MACDONALD-CARTIER INT'L AP	Designer Name:	Kathryn Kerker
NCDC Rainfall Station Id:	6000	Designer Company:	WSP
Years of Rainfall Data:	37	Designer Email:	kathryn.kerker@wsp.com
Site Name:		Designer Phone:	613-690-1206
Drainage Area (ha):	0.24	EOR Name:	
% Imperviousness:	100.00	EOR Company:	
Runoff Coefficient 'c': 0.90		EOR Email:	
Particle Size Distribution:	Fine	EOR Phone:	
Target TSS Removal (%):	80.0		

Required Water Quality Runoff Volume Capture (%):	90.00
Estimated Water Quality Flow Rate (L/s):	7.81
Oil / Fuel Spill Risk Site?	Yes
Upstream Flow Control?	Yes
Upstream Orifice Control Flow Rate to Stormceptor (L/s):	31.00
Peak Conveyance (maximum) Flow Rate (L/s):	
Site Sediment Transport Rate (kg/ha/yr):	

Net Annual Sediment (TSS) Load Reduction Sizing Summary	
Stormceptor Model	TSS Removal Provided (%)
EFO4	84
EFO6	89
EFO8	91
EFO10	92
EFO12	93

**Recommended Stormceptor EFO Model: EFO4**  
**Estimated Net Annual Sediment (TSS) Load Reduction (%): 84**  
**Water Quality Runoff Volume Capture (%): > 90**

