1184-1196 CUMMINGS AVENUE SERVICING AND STORMWATER MANAGEMENT REPORT

August 30, 2023

Prepared for:
TCU Development Corporation

Prepared by:
Stantec Consulting Ltd.

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Prepared by: _____
Signature

Michael Wu, EIT
Printed Name

Reviewed by: _____
Signature

Tyler Moir, P.Eng.
Printed Name

Approved by: _____
Signature

Peter Moroz, P.Eng.

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1 Introduction

Stantec Consulting Ltd. has been commissioned by TCU Development Corporation to prepare the following Servicing and Stormwater Management Report in support of a Site Plan Control and a Zoning By-Law Amendment application for the proposed development located at 1184-1196 Cummings Avenue in the City of Ottawa.

The 0.35 ha site is situated along the west side of Cummings Avenue, at the southwest corner of the intersection between Cummings Avenue and Weldon Drive. The site is currently zoned R3Y [708] and contains an existing two-storey residential building and two single-storey residential buildings with sheds, trees, and surface parking. The site is bound by Weldon Drive to the north, Cummings Avenue to the east, an existing commercial development to the south and an existing residential development to the west as shown in **Figure 1-1** below.

Figure 1-1: Key Plan of Site

The proposed 0.35 ha site comprises of a six-storey medium-rise residential building and consists of 57 studio units, 102 one-bedroom units, 6 one-bedroom units with dens, and 23 two-bedroom units. Project 1 Studios Ltd. has prepared a site plan dated August 22, 2023, which defines the proposed development (see **Appendix B**).

1.1 Objective

This site servicing and stormwater management (SWM) report presents a servicing scheme that is free of conflicts, provides on-site servicing in accordance with City of Ottawa Design Guidelines, and uses the existing municipal infrastructure in accordance with any limitations communicated during consultation with the City of Ottawa staff. Details of the existing infrastructure located within the Cummings Avenue right of way (ROW) were obtained from available as-built drawings and site topographic survey.

Criteria and constraints provided by the City of Ottawa have been used as a basis for the detailed servicing design of the proposed development. Specific and potential development constraints to be addressed are as follows:

- Potable Water Servicing
    - Estimated water demands to characterize the proposed feed(s) for the proposed development which will be serviced from the existing 305 mm diameter watermain within the Cummings Avenue ROW.
    - Watermain servicing for the development is to be able to provide average day and maximum day (including peak hour) demands (i.e., non-emergency conditions) at pressures within the acceptable range of 345 to 552 kPa (50 to 80 psi)
    - Under fire flow (emergency) conditions, the water distribution system is to maintain a minimum pressure greater than 140 kPa (20 psi)
- Wastewater (Sanitary) Servicing
    - Define and size the sanitary service lateral which will be connected to the existing 250 mm diameter sanitary sewer within the Cummings Avenue ROW.
- Storm Sewer Servicing
    - Define major and minor conveyance systems in conjunction with the proposed grading plan.
    - Determine the stormwater management storage requirements to meet the allowable release rate for the site.
    - Define and size the proposed storm service lateral that will be connected to the existing 600 mm diameter municipal storm sewer within the Cummings Avenue ROW.
- Prepare a grading plan in accordance with the proposed site plan and existing grades.

The drawings included in **Appendix G** of this report illustrate the proposed internal servicing scheme for the site.

2 Background

Documents referenced in preparing of this stormwater and servicing report for the 1184 Cummings Avenue development include:

- *City of Ottawa Sewer Design Guidelines* (SDG), City of Ottawa, October 2012, including all subsequent technical bulletins
- *City of Ottawa Design Guidelines – Water Distribution*, City of Ottawa, July 2010, including all subsequent technical bulletins
- *Design Guidelines for Drinking Water Systems*, Ministry of the Environment, Conservation, and Parks (MECP), 2008
- *Fire Protection Water Supply Guideline* for Part 3 in the Ontario Building Code, Office of the Fire Marshal (OFM), October 2020
- *Water Supply for Public Fire Protection*, Fire Underwriters Survey (FUS), 2020
- *Geotechnical Investigation – Proposed Multi-Storey, 1184, 1188, and 1196 Cummings Avenue, Ottawa, Ontario,* Paterson Group, March 27, 2023
- *Phase I Environmental Site Assessment, 1184, 1188 and 1196 Cummings Avenue, Ottawa, Ontario,* Paterson Group, March 6, 2023

3 Water Servicing

3.1 Background

The proposed building is in Pressure Zone 1E of the City of Ottawa's Water Distribution System. The existing dwellings have water service lateral connections to the existing 305 mm diameter watermain on Cummings Avenue. The existing services will be blanked at the main by City forces, as shown in the Existing Conditions and Removals Plan (**Drawing EX-1** in **Appendix G**).

3.1 Water Demands

3.1.1 POTABLE (DOMESTIC) WATER DEMANDS

The proposed six-storey residential building consists of 57 studio units, 102 one-bedroom units, 6 one-bedroom units with dens, and 23 two-bedroom units. The City of Ottawa Water Distribution Guidelines (July 2010) and ISTB 2021-03 Technical Bulletin were used to determine water demands based on projected population densities for residential areas and associated peaking factors. The population was estimated using an occupancy of 1.4 persons per unit for studio and one-bedroom apartments and 2.1 persons per unit for one-bedroom with den and two-bedroom apartments. The proposed building was estimated to have a total projected population of 284 persons.

A daily rate of 280 L/cap/day has been used to estimate average daily (AVDY) potable water demand for the residential units. Maximum day (MXDY) demands were determined by multiplying the AVDY demands by a factor of 2.5 for residential areas, while peak hourly (PKHR) demands were determined by multiplying the MXDY by a factor of 2.2 for residential areas. The estimated demand for the proposed residential building is summarized in **Table 3-1** below.

Table 3-1: Estimated Water Demands

Demand Type	Population	AVDY (L/s)	MXDY (L/s)	PKHR (L/s)
Studio	80	0.26	0.65	1.42
1 Bedroom	143	0.46	1.16	2.55
1 Bedroom + Den	13	0.04	0.10	0.22
2 Bedroom	48	0.16	0.39	0.86
Total Site:	**284**	**0.92**	**2.30**	**5.07**

not

3.1.2 FIRE FLOW DEMANDS

Fire flow requirements were estimated using Fire Underwriters Survey (FUS) methodology, as the estimated fire flow for the site exceeds 9,000 L/min (150.0 L/s) when determined through the Office of the Fire Marshal (OFM) fire protection water supply guidelines under the Ontario Building Code. The FUS

estimate is based on a building of ordinary construction type, as a result, the 'gross construction area' of all floor areas was used for the purpose of the FUS calculation, as per page 22 of the *Fire Underwriters Survey's Water Supply for Public Fire Protection*, 2020. Additionally, it is anticipated that the building will be equipped with an automatic sprinkler system that is fully supervised and conforms to the NFPA 13 standard. Required fire flows were determined to be 333.3 L/s (20,000 L/min). Detailed fire flow calculations per the FUS methodology are provided in **Appendix A.2**, while correspondence with the architect on the construction type are provided in **Appendix A.3**.

3.2 Level of Servicing

3.2.1 BOUNDARY CONDITIONS

The estimated domestic water and fire flow demands were used to define the level of servicing required for the proposed development from the municipal watermain and hydrants within the Cummings Avenue ROW. **Table 3-2** outlines the boundary conditions provided by the City of Ottawa on June 29, 2023.

Table 3-2: Boundary Conditions

	Connection at Cummings Avenue
Min. HGL (m)	110.1
Max. HGL (m)	118.3
Max. Day + Fire Flow (333.3 L/s) HGL (m)	108.7

3.2.2 ALLOWABLE DOMESTIC PRESSURES

The desired normal operating pressure range in occupied areas as per the City of Ottawa 2010 Water Distribution Design Guidelines is 345 kPa to 552 kPa (50 psi to 80 psi) under a condition of maximum daily flow and no less than 276 kPa (40 psi) under a condition of maximum hourly demand. Furthermore, the maximum pressure at any point in the water distribution should not exceed 689 kPa (100 psi) as per the Ontario Building/Plumbing Code; pressure reducing measures are required to service areas where pressures greater than 552 kPa (80 psi) are anticipated in occupied areas.

The proposed finished floor elevation of the first floor, 71.8 m, will serve as the ground floor elevation for the calculation of the residual pressures at ground level. As per the boundary conditions, the on-site pressures are expected to range from 375.5 kPa to 455.9 kPa (54.4 psi to 66.1 psi) under normal operating conditions, which are within the normal operating pressure range defined by the City of Ottawa design guidelines as within 276 kPa to 552 kPa (40 psi to 80 psi). It is anticipated that booster pumps will be required to service the upper floors of the building.

3.2.3 ALLOWABLE FIRE FLOW PRESSURES

The boundary conditions provided by the City of Ottawa indicate that watermain within Cummings Avenue is expected to maintain a residual pressure of 37 m equivalent to 362.8 kPa (52.6 psi) under the worst-

case fire flow conditions. This demonstrates that the watermains and nearby hydrants can provide the required fire flows while maintaining a residual pressure of 20 psi.

3.2.4 FIRE HYDRANT COVERAGE

The building will be sprinklered and a Siamese (fire department) connection is to be provided to the right of the main entrance. There are six existing hydrants in the proximity of the proposed development site, as shown in **Figure 3-1**. The distance of each hydrant from the proposed building is more than 76 m.

According to the NFPA 1 Table 18.5.4.3 in Appendix I of the City of Ottawa Technical Bulletin ISTB-2018-02, a hydrant situated less than 76 m away from a building can supply a maximum capacity of 5,678 L/min, while a hydrant situated between 76 m and 152 m away from a building can supply a maximum capacity of 3,785 L/min. Given the large fire flow demands from the site, it is proposed that a new fire hydrant be placed within 45 metres from the Siamese connection to reduce the number of fire hydrants needed to service the site's fire flow demand. It is suggested that the new hydrant be located in the north end of the site, west of Cummings Avenue as shown on **Drawing SSP-1** in **Appendix G**. See **Appendix A.6** for fire hydrant coverage table calculations and NFPA Table 18.5.4.3.

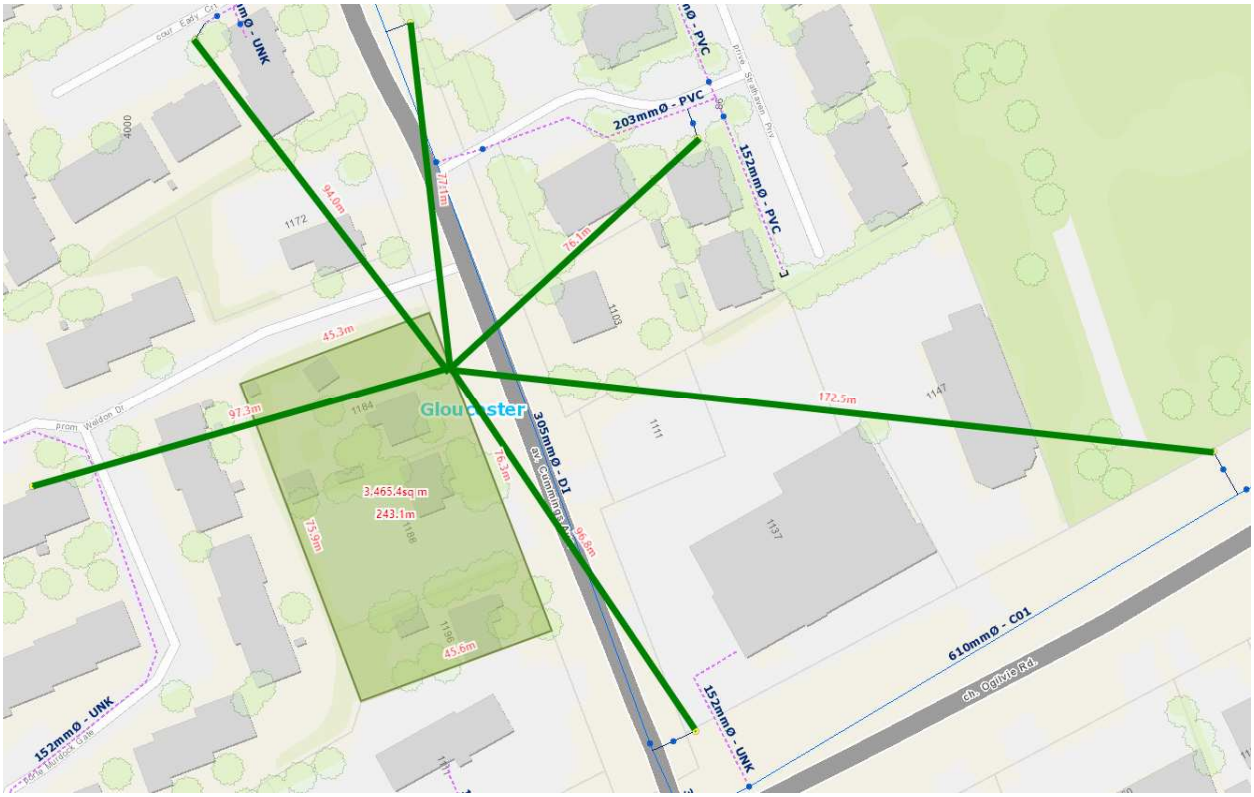


Figure 3-1: Existing Fire Hydrant Coverage Map

3.3 Proposed Water Servicing

The development will be serviced via dual 150 mm building services connecting to the existing 305 mm diameter watermain on Cummings Avenue with a 300 mm main isolation valve and individual 150 mm valves on each building service. The sizing of the service connection is to be confirmed by the mechanical consultant.

The proposed water servicing is shown on **Drawing SSP-1** in **Appendix G**. Based on the City of Ottawa Water Design Guidelines and the provided boundary conditions, the existing 305 mm diameter watermain on Cummings Avenue can provide adequate fire and domestic flows for the subject site.

Booster pumps are required for the building. The mechanical consultant or plumbing contractor will ultimately be responsible to confirm building pressures are adequate to meet building code requirements.

4 Wastewater Servicing

The site will be serviced from the existing 250 mm diameter asbestos cement sanitary sewer within the Cummings Avenue ROW. The existing dwellings have sanitary service lateral connections to the municipal sewer, which will be decommissioned and abandoned as shown in **Drawing EX-1** in **Appendix G**.

4.1 Design Criteria

As outlined in the City of Ottawa Sewer Design Guidelines and the MECP Design Guidelines for Sewage Works, the following criteria were used to calculate the estimated wastewater flow rates and to determine the size and location of the sanitary service lateral:

- Minimum velocity = 0.6 m/s (0.8 m/s for upstream sections)
- Maximum velocity = 3.0 m/s
- Manning roughness coefficient for all smooth wall pipes = 0.013
- Minimum size of sanitary sewer service = 135 mm
- Minimum grade of sanitary sewer service = 1.0 % (2.0 % preferred)
- Average wastewater generation = 280 L/person/day (per City Design Guidelines)
- Peak Factor = based on Harmon Equation; maximum of 4.0 (residential)
- Harmon correction factor = 0.8
- Infiltration allowance = 0.33 L/s/ha (per City Design Guidelines)
- Minimum cover for sewer service connections – 2.0 m
- Population density for one-bedroom and bachelor apartments – 1.4 persons/apartment
- Population density for one-bedroom with den and two-bedroom apartments – 2.1 persons/apartment

4.2 Wastewater Generation and Servicing Design

The proposed 0.35 ha development will consist of a 6-storey residential building comprising of 57 studio apartments, 102 one-bedroom units, 6 one-bedroom units with dens, and 23 two-bedroom units with a total projected population of 284. The anticipated peak wastewater flow generated from the proposed development is summarized in **Table 4-1** below.

Table 4-1: Estimated Peak Wastewater Flow

Peak Residential Wastewater Flow			Infiltration Flow (L/s)	Total Peak Flow (L/s)
Population	Peak Factor	Peak Flow (L/s)		
284	3.47	3.2	0.1	3.3

Detailed sanitary sewage calculations are included in **Appendix C.1**. A full port backwater valve will be required for the proposed building in accordance with the Sewer Design Guidelines and will be coordinated with the building mechanical engineers.

The anticipated peak wastewater flows for the proposed development were provided to the City of Ottawa staff on August 16th, 2023 (see **Appendix C.2**) to evaluate the adequacy of the receiving municipal sanitary sewer system in the vicinity of the site and downstream network. The City has confirmed that the 250 mm diameter sanitary sewers in Cummings Avenue has sufficient capacity for the proposed sanitary peak flows; however, the sewers will not have any further capacity should any additional development occur in the 250 mm sanitary sewer area along Cummings Avenue.

4.3 Proposed Sanitary Servicing

A 150 mm diameter sanitary building service, complete with full port backwater valve as per City standard S14.1, is recommended to service the proposed development. Final sizing of the lateral is to be confirmed by the mechanical consultant. The sanitary lateral is be equipped with a sanitary monitor manhole prior to connecting to the existing sewer manhole in Cummings Avenue. The proposed sanitary servicing is shown on **Drawing SSP-1** in **Appendix G**.

5 Stormwater Management and Servicing

5.1 Objectives

The goal of this stormwater servicing and stormwater management (SWM) plan is to determine the measures necessary to control the quantity and quality of stormwater released from the proposed development to meet the criteria established during the consultation process with City of Ottawa and Rideau Valley Conservation Authority (RVCA) staff, and to provide sufficient details required for approval.

5.2 Stormwater Management (SWM) Criteria

The Stormwater Management (SWM) criteria were established by combining current design practices outlined by the City of Ottawa Sewer Design Guidelines (SDG) (October 2012), review of project pre-consultation notes with the City of Ottawa, and through consultation with City of Ottawa staff. The following summarizes the criteria, with the source of each criterion indicated in brackets:

General

- Use of the dual drainage principle (City of Ottawa SDG)
- Wherever feasible and practical, site-level measures should be used to reduce and control the volume and rate of runoff (City of Ottawa SDG)
- Assess impact of 100-year event outlined in the City of Ottawa Sewer Design Guidelines on the major and minor drainage systems (City of Ottawa SDG)

Storm Sewer & Inlet Controls

- Size storm sewers to convey 5-year storm event.
- Discharge for each storm event to be restricted to a 5-year storm event pre-development rate with a maximum pre-development C coefficient of 0.5 (City of Ottawa pre-consultation, **Appendix F**)
- Peak flows generated from events greater than the 5-year and including the 100-year storm must be detained on site (City of Ottawa pre-consultation, **Appendix F**)
- The preferred stormwater system outlet for this site is the 600 mm diameter storm sewer within Cummings Avenue
- The foundation drainage system is to be pumped to the building site storm service lateral tying to Cummings Avenue.
- Internal roof drainage system shall not be routed through the cistern.
- T_c should be not less than 10 minutes (City of Ottawa SDG).
- T_c of 20 minutes for pre-development calculation as per pre-consultation requirements.

Surface Storage & Overland Flow

- Building openings to be a minimum of 0.30 m above the 100-year water level (City of Ottawa SDG)
- Maximum depth of flow under either static or dynamic conditions shall be less than 0.35 m (City of Ottawa SDG)

- Provide adequate emergency overflow conveyance off-site with a minimum vertical clearance of 15 cm between the spill elevation and the ground elevation at the building envelope in the proximity of the flow route or ponding area (City of Ottawa SDG)

5.3 Existing Conditions

The existing site (0.35 ha) consists of two one-story buildings, a two-storey building, vegetated/sodded areas, trees, chain link fencing, and gravel parking and driveway. The existing structures, chain link fence, and some trees will be removed to allow for the proposed development, as shown in the Existing Conditions and Removals Plan (see **Drawing EX-1** in **Appendix G**).

Four sub-catchments were delineated in the Existing Conditions Storm Drainage Plan (see **Drawing EXSD-1** in **Appendix G**), numbered 1 to 4. The catchments are characterized by a mix of gravel, roof, and vegetated areas, with Catchment Areas 1, 3 and 4 constituting most of the site which drains towards the western property line and into the adjacent lot to the west. The EXSD-1 plan was used to establish the overall site pre-development runoff coefficient of C=0.49.

The pre-development release rates for the site have been determined using the rational method and the drainage characteristics identified above. A time of concentration for the pre-development area (20 minutes) was assigned based on the small site size and its proximity to the existing drainage outlet. The peak pre-development flow rates shown in **Table 5-1** have been calculated using the rational method as follows:

$$Q = 2.78\,(C)(I)(A)$$

Where:
$Q = peak\ flow\ rate, L/s$
$C = site\ runoff\ coefficient$
$I = rainfall\ intensity, mm/hr\ (per\ City\ of\ Ottawa\ IDF\ curves)$
$A = drainage\ area, ha$

Table 5-1: Peak Pre-Development Flow Rates

Design Storm	Pre-Development Flow Rate (L/s) for C=0.49, A=0.35 ha, t_c = 20 min
5-year	**33.3**
100-year	**56.9**

5.4 Stormwater Management Design

The Modified Rational Method was employed to assess the rate and volume of runoff anticipated during post-development rainfall runoff events. The site was subdivided into sub-catchments (subareas) as

defined by the proposed grades and the location, nature, or presence/absence of inlet control devices (ICDs). Each sub-catchment was assigned a runoff coefficient based on the proposed finished surface. A summary of subareas and runoff coefficients is provided in **Table 5-2** below. Further details can be found in **Appendix D.1**, while **Drawing SD-1** in **Appendix G** illustrates the proposed sub-catchments.

Table 5-2: Summary of Subcatchment Areas

Catchment Areas	C	A (ha)	Flow Type	Outlet
BLDG-1	0.90	0.17	Controlled	Cummings Storm Sewer
BLDG-2	0.26	0.01	Uncontrolled	Cistern
CB-1	0.82	0.05	Uncontrolled	
CB-2	0.74	0.02	Uncontrolled	
CB-3	0.76	0.03	Uncontrolled	
RAMP	0.90	0.01	Uncontrolled	
UNC-1	0.20	0.01	Uncontrolled	Adjacent property
UNC-2	0.20	0.01	Uncontrolled	Adjacent property
UNC-3	0.20	0.02	Uncontrolled	Weldon ROW
UNC-4	0.46	0.04	Uncontrolled	Cummings ROW
Total Site	**0.74**	**0.35**	-	-

5.4.1 ALLOWABLE RELEASE RATE

The pre-development 5-year release rate for the site was determined using the rational method to be 33.3 L/s. Consequently, the target release rate for 1184-1196 Cummings Avenue under all events up to and including the 100-year event will be 33.3 L/s. Runoff coefficient values have been increased by 25 % for the post-development 100-year storm event based on the City of Ottawa SDG.

5.4.2 QUANTITY CONTROL: STORAGE REQUIREMENTS

The site requires quantity control measures to meet the restrictive stormwater release criteria. It is proposed that rooftop storage via restricted roof release directly to the Cummings Ave. storm sewer while the remaining site drainage be collected through catch basins and routed to an internal cistern to reduce the site peak outflow. A spreadsheet using the Modified Rational Method (MRM) was used to size the roof and cistern storage, as shown in **Appendix D.1.**

5.4.2.1 Rooftop Storage

It is proposed to retain stormwater on the building rooftop by installing restricted flow roof drains. The MRM calculations assume the roof will be equipped with six standard Watts model roof drains complete with Adjustable Accutrol Weirs. Discharge from the six controlled roof drains will be routed by the mechanical consultant through the building's internal plumbing to the storm service lateral.

Watts Drainage Adjustable Accutrol roof drain weir data (see **Appendix D.2**) and the roof plan (see **Appendix B**) has been used to calculate a practical roof release rate and detention storage volume for the rooftop areas, with 80 % of the roof area assumed to be available for storage. It should be noted that the Accutrol weir has been used as an example only, and that other products may be specified for use, provided that:

- the peak roof drain release rate is restricted to match the maximum rate of release indicated in **Table 5-2**,
- sufficient roof storage is provided to meet (or exceed) the required volume of detained stormwater indicated in **Table 5-2**, and
- the maximum ponding depth of 150 mm is not exceeded during a design storm event.

The proposed drain release rates and storage volumes have been calculated based on the six roof drain weirs at 50 % opened setting. Rooftop storage volumes and controlled release rates are summarized in **Table 5-3**.

Table 5-3: Roof Subcatchment (BLDG) Stormwater Management

Design Storm	Storage Depth (mm)	Peak Discharge (L/s)	Volume Stored (m^3)
5-Year (Roof)	112.7	6.16	29.0
100-Year (Roof)	149.4	7.55	65.4

5.4.2.2 Uncontrolled Areas

There are four uncontrolled subcatchment areas, consisting of UNC-1, UNC-2, UNC-3, and UNC-4, which drain to the south and west sides of the site and to the Weldon Drive and Cummings Avenue ROWs, respectively. While UNC-1 and UNC-2 will continue to drain as per existing conditions to the neighbouring properties, UNC-3 and UNC-4 will drain to the Weldon Drive and Cummings Avenue ROWs via surface flows and are directed toward the existing roadway catch basins (CBs). The peak post-development release rates from the uncontrolled areas are summarized in **Table 5-4**.

Table 5-4: Peak Post-Development Uncontrolled Surface Release Rates

Design Storm	Release Rate (L/s)				
	UNC-1	UNC-2	UNC-3	UNC-4	Total
5-Year	0.29	0.58	1.10	4.66	**6.63**
100-Year	0.62	1.24	2.36	9.99	**14.21**

The reverse sloped ramp to the parking garage is considered a depressed driveway. A trench drain has been provided at the bottom of the ramp to provide an outlet for the driveway area (RAMP subcatchment). As per Section 5.7.6 of the City SDG (as amended), a separate stormwater service piping is proposed to connect the trench drain to the cistern, separate from the foundation draining and will be designed by the mechanical engineer.

5.4.2.3 Stormwater Cistern

As part of the stormwater management design of the site development, a stormwater cistern located in the underground parking area and equipped with a mechanical pump is proposed to attenuate peak flows from the catch basin and ramp drain areas. The final location of the cistern within the proposed building is to be coordinated by the architect with mechanical and structural engineers.

The stormwater cistern is to be designed to provide a minimum active storage volume of 30 m^3 with a maximum controlled release rate of 11.5 L/s. The stormwater cistern is to discharge at the specified controlled release rate using a pump. **Table 5-5** summarizes the respective flow rates and volume of retained stormwater in the 5-year and 100-year storm events.

Table 5-5: Proposed Cistern 5 and 100-Year Storage Requirement

Storm Return Period	Area IDs	Drainage Area (ha)	$Q_{release}$ (L/s)	$V_{required}$ (m^3)	$V_{available}$ (m^3)
5-year	CB-1 – CB-3, RAMP, BLDG-2	0.11	11.5	8.2	30.0
100-year				29.7	

5.4.2.4 Results

The proposed stormwater management plan meets the requirements identified during pre-consultation that all stormwater release under all storm events, including the 100-year storm event, are to be controlled to the 5-year pre-development target release rate. **Table 5-6** provides a summary of the peak design discharge rates calculated from the MRM analysis, shown in **Appendix D.1**.

Table 5-6: Summary of Total 5-Year and 100-Year Event Release Rates

Drainage areas	5-year Peak Discharge (L/s)	100-Year Peak Discharge (L/s)
Uncontrolled Areas	6.63	14.21
Roof to Sewer	6.16	7.55
Cistern to Sewer	11.54	
Target (L/s)	**33.30**	
Total (L/s)	**24.33**	**33.30**

5.4.3 QUALITY CONTROL

Through correspondence with the City of Ottawa, it was confirmed that on-site quality control with a minimum of 80 % TSS removal is required be established. As such, Contech's Stormceptor has been specified for this purpose to capture runoff from the surface drainage. Using a fine particle size distribution and the Stormceptor Sizing Tool, a Stormceptor model EFO4 has been selected for the proposed monitoring manhole at the east property limit near Cummings Avenue and will achieve 92 % TSS removal, exceeding the minimum required TSS removal level of 80 %. The detailed Stormceptor sizing report is included in **Appendix D.5**.

While a Contech Stormceptor EFO4 has been specified for this site, the objective is to demonstrate the ability to meet the water quality requirement. Other treatment systems with equivalent TSS removal capabilities might also be used.

5.5 Proposed Stormwater Servicing

One 300 mm diameter stormwater building service, complete with full port backwater valve as per City standard S14.1, is proposed for the storm service lateral, as per **Drawing SSP-1** in **Appendix G**. A stormwater sump and pump are required for the proposed foundation drain, ramp drain and surface drainage. The roof drains are to be connected to the service lateral downstream of the sump pump and full port backwater valve.

The combined foundation drain flow and proposed private storm sewers will outlet to the cistern, which then pumps the discharge at a controlled rate and to the existing 600 mm diameter storm sewer within the Cummings Avenue ROW. The lateral is to connect to the main as per City standard S11. The proposed stormwater servicing is shown on **Drawing SSP-1** and **SD-1** in **Appendix G**.

6 Site Grading

The proposed re-development site measures approximately 0.35 ha in area and consists of grassed areas with trees and three existing residential dwellings. The topography across the site generally slopes from the middle towards the northern boundary and the Cummings Avenue ROW at the south. A detailed grading plan (see **Drawing GP-1** in **Appendix G**) has been provided to satisfy the stormwater management requirements, as detailed in **Section 5**, adhere to any grade raise restrictions for the site, and provide for minimum cover requirements for storm and sanitary sewers where possible.

Site grading has been established to provide emergency overland flow routes required for stormwater management. The overland escape route will follow the south curb line of the site access drive aisle, with overland flow to Cummings Avenue right of way. The elevation of onsite surface ponding will be a minimum of 0.30 m below the elevations at the building openings as shown on the drawings. The proposed development will require a section of retaining wall along the west and south boundary to maintain existing property line ground conditions and to ensure the overland spill route is directed to Cummings Avenue rather than to neighboring parcels. The wall is expected to be less than 0.6 m high and therefore, will not require railing.

7 Utilities

Overhead (OH) hydro-wires run parallel to the south property line with branches servicing the existing buildings from the south. All utilities within the work area will require relocation during construction. The existing utility poles within the public right of way are to be protected during construction.

As the site is surrounded by existing residential and commercial development, Hydro Ottawa, Bell, Rogers, and Enbridge servicing is readily available through existing infrastructure to service this site. The exact size, location, and routing of utilities will be finalized after design circulation. Existing overhead wires and utility plants may need to be temporarily moved/reconfigured to allow sufficient clearance for the movement of heavy machinery required for construction. The relocation of existing utilities will be coordinated with the individual utility providers upon design circulation.

8 Approvals

The proposed development lies on a private site under singular ownership; drains to an approved separated sewer outlet; and is not intended to service industrial land or land uses. Therefore, the site is exempt from the Ministry of the Environment, Conservation and Parks (MECP) Environmental Compliance Application (ECA) process under O.Reg. 525/98.

For ground or surface water volumes being pumped during the construction phase, typically between 50,000 to 400,000 L/day, it is required to register on the Environmental Activity and Sector Registry (EASR). It is possible that groundwater may be encountered during the foundation excavation on this site. A minimum of two to four weeks should be allotted for completion of the EASR registration and the preparation of the Water Taking and Discharge Plan by a Qualified Person as stipulated under O.Reg. 63/16. An MECP Permit to Take Water (PTTW), which is required for dewatering volumes exceeding 400,000L/day, is not anticipated for the site.

9 Erosion and Sediment Control During Construction

To protect downstream water quality and prevent sediment build-up in catch basins and storm sewers, erosion and sediment control measures must be implemented during construction. The following recommendations will be included in the contract documents and communicated to the Contractor.

1. Implement best management practices to provide appropriate protection of the existing and proposed drainage system and the receiving water course(s).
2. Limit the extent of the exposed soils at any given time.
3. Re-vegetate exposed areas as soon as possible.
4. Minimize the area to be cleared and grubbed.
5. Protect exposed slopes with geotextiles, geogrid, or synthetic mulches.
6. Install silt barriers/fencing around the perimeter of the site as indicated in **Drawing ECDS-1** in **Appendix G** to prevent the migration of sediment offsite.
7. Install trackout control mats (mud mats) at the entrance/egress to prevent migration of sediment into the public ROW.
8. Provide sediment traps and basins during dewatering works.
9. Install sediment traps (such as SiltSack® by Terrafix) between catch basins and frames.
10. Schedule the construction works at times which avoid flooding due to seasonal rains.

The Contractor will also be required to complete inspections and guarantee the proper performance of their erosion and sediment control measures at least after every rainfall. The inspections are to include:

- Verification that water is not flowing under silt barriers.
- Cleaning and changing the sediment traps placed on catch basins.

Refer to **Drawing ECDS-1** in **Appendix G** for the proposed location of silt fences, sediment traps, and other erosion control measures.

10 Geotechnical Investigation

A geotechnical investigation for 1184-1196 Cummings Avenue was completed by Pinchin on March 27, 2023. Field testing consisting of the advancement of four boreholes to a maximum depth of 7.6 m below existing grade was carried out throughout the subject site on March 10, 2023, with previous investigations carried out by Paterson on February 14, 2023 and by others on January 28, 2021. The borehole locations are presented in the geotechnical investigation report included in **Appendix E.1**.

The subsurface profile encountered at the test hole locations consists of topsoil and fill, underlain by a layer of silty sand to sandy silty with gravel and cobbles, overlying bedrock. The fill was noted to consist of a mixture of brown silty sand with gravel and crushed stone, trace clay, some shale, and cobbles. Bedrock was observed to consist of black shale of the Billings formation and is classified as very poor to fair in quality at the top, generally increasing in quality with depth.

Groundwater levels were measured to be at depths ranging from 2.07 m to 2.87 m below ground surface (BGS) at the four boreholes on site. Long term groundwater level is estimated to be at 2 to 3 m BGS, though seasonal variations in the water table should be expected. Clean imported granular fill should be used for grading beneath the building areas, while site-excavated soil and non-specified existing fill can be used for general landscaping fill where settlement of the ground surface is of minor concern.

The subject site is considered suitable for the proposed building, and it is recommended that it be founded using conventional shallow footings placed on clean, surface sounded bedrock. Bedrock removal could be carried out by hoe-ramming, while for sounded bedrock removal, line drilling and controlled blasting may be used, though a pre-blast or pre-construction survey must be carried out, with subsequent blasting operations planned and carried out under the supervision of an experienced blasting consultant who is a licensed professional engineer.

The pavement structure for the parking and access driveway is provided as follows in **Table 10-1**: Pavement Structure:

Table 10-1: Pavement Structure

Material	Thickness (mm)		
	Parking Areas	Driveways	Underground Parking
Rigid Concrete Pavement – 32 MPa concrete with air entrainment	-	-	125
Wear Course – HL-3 or Superpave 12.5 Asphaltic Concrete	50	40	-
Binder – HL-8 or Superpave 19.0 Asphaltic Concrete	-	50	-
Base – OPSS Granular A Crushed Stone	150	150	300
Sub-Base – OPSS Granular B Type II	300	400	-

11 Conclusions

11.1 Water Servicing

Based on the supplied boundary conditions for existing watermains and calculated domestic and fire flow demands for the subject site, the adjacent watermain on Cummings Avenue has sufficient capacity to sustain both the required domestic and emergency fire flow demands for the development. Booster pumps are required to provide adequate pressures to the building's upper stories. The proposed development requires a 150 mm diameter water service lateral, which will be connected to the existing 305 mm diameter watermain in the Cummings Avenue ROW, and a new fire hydrant to be located within the public road right of way. Sizing of the water service and requirements for booster pump(s) are to be confirmed by the mechanical consultant.

11.2 Sanitary Servicing

The proposed sanitary sewer service will consist of a 150 mm diameter sanitary service lateral, a sanitary sump pit, a monitor manhole, and sump pump directing wastewater to the existing 250 mm diameter sanitary sewer on Cummings Avenue. Existing connections are to be abandoned and full port backwater valves installed on the proposed sanitary service within the site to prevent any surcharge from the downstream sewer main from impacting the proposed property. A sump pump will be required for sewage discharge from the mechanical room. Sizing of the service lateral, sump pit, and sump pump are to be confirmed by the mechanical consultant.

11.3 Stormwater Servicing and Management

Rooftop storage and a cistern have been proposed to limit the stormwater discharge rate for all rainfall events up to and including the 100-year event to a peak 5-year predevelopment release rate. The remaining site area drains uncontrolled, with the east and north sides drain uncontrolled to the Cummings Avenue and Weldon Drive ROWs, while the south and west landscaped sides of the site drain uncontrolled to the neighbouring properties as per existing conditions. While the proposed land use and site surfacing is not expected to be a significant source of particulates or pollutants, it is recommended that the site provides Enhanced level of stormwater quality control (80 % TSS removal).

A single 300 mm diameter storm service lateral is proposed for the building's foundation drain, ramp drain and storm sewer system, which is to be mechanically pumped at a controlled rate through the service lateral and the backwater valve to the 600 mm diameter municipal storm sewer in the Cummings Avenue ROW.. The roof drains are to be connected independently to the storm service lateral. Sizing of the service lateral, cistern, and foundation drain pump are to be confirmed by the mechanical consultant.

11.4 Grading

Site grading has been designed to provide an adequate emergency overland flow route. The east and north sides drain uncontrolled to the Cummings Avenue and Weldon Drive ROWs, while the south and west sides drain uncontrolled to the neighbouring properties as per existing conditions.

11.5 Erosion and Sediment Control During Construction

Erosion and sediment control measures and best management practices outlined in this report and included in the drawing set will be implemented during construction to reduce the impact on adjacent properties, the public ROW, and existing facilities.

11.6 Geotechnical Investigation

Based on the geotechnical investigation, the site is considered suitable for the proposed building, and it is recommended that it be founded using conventional shallow footings placed on clean, surface sounded bedrock. Long term groundwater level is estimated to be at 2 to 3 m BGS, though seasonal variations in the water table should be expected.

11.7 Utilities

The site is situated within an established neighbourhood, hence existing utility infrastructure is readily available to service the proposed development.

11.8 Approvals

This site is exempt from the Ministry of the Environment, Conservation and Parks (MECP) Environmental Compliance Application (ECA) process under O.Reg. 525/98. For the expected dewatering needs of 50,000 to 400,000 L/day, the proponent will need to register on the MECP's Environmental Activity and Sector Registry (EASR). A Permit to Take Water, for dewatering needs in excess of 400,000 L/day, is not anticipated for this site.

APPENDICES

Appendix A Water Demands

A.1 Domestic Water Demands

1184-1196 Cummings Avenue - Domestic Water Demand Estimates

Site Plan provided by Project 1 Studios (2023-03-31)

Project Number: 160401787

Population densities as per MECP Guidelines:		
Bachelor	1.4	ppu
1 Bedroom	1.4	ppu
2 Bedroom	2.1	ppu

Demand conversion factors as per MECP Guidelines and Ottawa Design Guidelines - Water Distribution[5]:		
Residential	280	L/cap/day

Building ID	Number of Apt Units[2]	Estimated Population	Daily Rate of Demand[4]	Avg. Day Demand		Max. Day Demand [1]		Peak Hour Demand [1]	
				(L/min)	(L/s)	(L/min)	(L/s)	(L/min)	(L/s)
Studio	57	80	280	15.5	0.26	38.8	0.65	85.3	1.42
1-Bedroom	102	143	280	27.8	0.46	69.4	1.16	152.7	2.55
1-Bedroom+Den[3]	6	13	280	2.5	0.04	6.1	0.10	13.5	0.22
2-Bedroom	23	48	280	9.4	0.16	23.5	0.39	51.7	0.86
Total Site :	**188**	**284**		**55.13**	**0.92**	**137.81**	**2.30**	**303.19**	**5.05**

Notes:

1 Water demand criteria used to estimate peak demand rates for residential areas are as follows:
maximum day demand rate = 2.5 x average day demand rate
peak hour demand rate = 2.2 x maximum day demand rate (as per Technical Bulletin ISD-2010-02)

2 Number of apartment units counted as per **Project1 Studios Suite Plan** (March 31, 2023).

3 Assumption that "1 bedroom with den" has density of 2.1 ppu

4 As per Table 4-2 from the City of Ottawa Water Design Guidelines and Technical Bulletin ISTB-2021-03, the average daily rate of water demand for residential areas: 280 L/cap/day

A.2 Fire Flow Demands (FUS 2020)

FUS Fire Flow Calculation Sheet - 2020 FUS Guidelines

Stantec Project #: 160401787
Project Name: 1184-1196 Cummings Avenue
Date: 2023-03-16
Fire Flow Calculation #: 1
Description: 6-storey residential apartment building

Notes: Site Plan provided by Project 1 Studio on March 16, 2023

Step	Task	Notes										Value Used	Req'd Fire Flow (L/min)
1	Determine Type of Construction	Type III - Ordinary Construction / Type IV-C - Mass Timber Construction										1	-
2	Determine Effective Floor Area	Sum of All Floor Areas										-	-
		2094.06	1653.7	1633.74	1621.28	1609.42	1438.99	1433.41				11484.6	-
3	Determine Required Fire Flow	($F = 220 \times C \times A^{1/2}$). Round to nearest 1000 L/min										-	24000
4	Determine Occupancy Charge	Limited Combustible										-15%	20400
5	Determine Sprinkler Reduction	Conforms to NFPA 13										-30%	-10200
		Standard Water Supply										-10%	
		Fully Supervised										-10%	
		% Coverage of Sprinkler System										100%	
6	Determine Increase for Exposures (Max. 75%)	Direction	Exposure Distance (m)	Exposed Length (m)	Exposed Height (Stories)	Length-Height Factor (m x stories)	Construction of Adjacent Wall	Firewall / Sprinklered ?				-	-
		North	10.1 to 20	36.77	1	21-49	Type V	NO				11%	9588
		East	20.1 to 30	63	2	> 100	Type V	NO				10%	
		South	10.1 to 20	36.77	1	21-49	Type V	NO				11%	
		West	10.1 to 20	63	2	> 100	Type V	NO				15%	
7	Determine Final Required Fire Flow	Total Required Fire Flow in L/min, Rounded to Nearest 1000L/min											20000
		Total Required Fire Flow in L/s											333.3
		Required Duration of Fire Flow (hrs)											4.50
		Required Volume of Fire Flow (m^3)											5400

A.3 Correspondence with Architect on Construction Type

Wu, Michael

From: Ryan Koolwine <koolwine@project1studio.ca>
Sent: Monday, 27 March, 2023 15:44
To: Moir, Tyler
Cc: Kilborn, Kris; Wu, Michael
Subject: RE: 2231 - 1184 Cummings

Hi Tyler,

The building will be sprinklered.

The building is to be wood framed. That said, every exterior wall will have a fire resistance rating of 1hr, the floors will have a 1hr FRR and so will demising walls. We would propose that the building be considered 'ordinary construction' for the purpose of the FUS calculation.

Ryan Koolwine

project1studio | 613 884-3939 x1

From: Moir, Tyler <Tyler.Moir@stantec.com>
Sent: March 27, 2023 3:03 PM
To: Ryan Koolwine <koolwine@project1studio.ca>
Cc: Kilborn, Kris <kris.kilborn@stantec.com>; Wu, Michael <Michael.Wu@stantec.com>
Subject: RE: 2231 - 1184 Cummings

Hi Ryan,

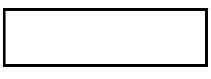
To complete the boundary conditions request for the 1184 Cummings Ave project, we will need to confirm the proposed construction classification and confirm that the building is sprinklered. Can you provide this information at your earliest convenience?

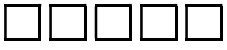
Thanks,
Tyler

Tyler Moir P.Eng.
Project Manager, Community Development

Direct: 902 620-0250
Mobile: 902 388-0100
Tyler.Moir@stantec.com

Stantec
165 Maple Hills Avenue
Charlottetown PE C1C 1N9





From: Ryan Koolwine <koolwine@project1studio.ca>
Sent: Thursday, March 16, 2023 8:19 AM
To: Kilborn, Kris <kris.kilborn@stantec.com>
Cc: Moir, Tyler <Tyler.Moir@stantec.com>
Subject: RE: 2231 - 1184 Cummings

Hi Kris,

Odd… just tried it an it worked. Either way, I've attached the two files.

Ryan Koolwine

project1studio | 613 884-3939 x1

From: Kilborn, Kris <kris.kilborn@stantec.com>
Sent: March 16, 2023 7:02 AM
To: Ryan Koolwine <koolwine@project1studio.ca>
Cc: Moir, Tyler <Tyler.Moir@stantec.com>
Subject: RE: 2231 - 1184 Cummings

Good morning Ryan

I clicked the attached link and it indicates that the files do not exist. Could you try resending or resetting the link

Sincerely

Kris Kilborn
Principal, Community Development
Business Center Practice Leader

Mobile: 613 297-0571
Fax: 613 722-2799
kris.kilborn@stantec.com
Stantec
300 - 1331 Clyde Avenue
Ottawa ON K2C 3G4

The Ottawa office is open however many staff are working remotely. To contact me please use email, or my mobile and leave a message.
Please note our reception is on the 3rd floor.

From: Ryan Koolwine <koolwine@project1studio.ca>
Sent: Wednesday, March 15, 2023 5:52 PM
To: Kilborn, Kris <kris.kilborn@stantec.com>; Mike Lennox <ml@jbla.ca>; James Lennox <jl@jbla.ca>; Timothy Beed <beed@fotenn.com>
Cc: Dylan Desjardins <D.Desjardins@tcudevcorp.com>; Bailey Haskins <haskins@project1studio.ca>
Subject: 2231 - 1184 Cummings

Hi All,

Please see the link below for the current version of the site plan in PDF and CAD.
https://www.dropbox.com/home/NASRevit/2231%20-%201184%20Cummings/Sent/230315%20Site%20Plan

Cheers,

Ryan Koolwine
Principal

project1studio
260 St. Patrick Street - Suite 300 | project1studio.ca | 613 884-3939 x1
Please consider the environment before printing this email

Caution: This email originated from outside of Stantec. Please take extra precaution.

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Atención: Este correo electrónico proviene de fuera de Stantec. Por favor, tome precauciones adicionales.

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A.4 Boundary Conditions

Wu, Michael

From: Moir, Tyler
Sent: June 29, 2023 11:58
To: Wu, Michael
Subject: FW: Application D02-02-23-0031/D07-12-23-0044 Address 1184,1188, 1196 Cummings - 1st Review Comments
Attachments: Memo to File Lead - Preliminary Comments 1184-1196 Cummings SPC.docx; D02-02-23-0031 and D07-12-23-0044 2023-06-16 09-20-24.pdf; D02-02-23-0031 and D07-12-23-0044 2023-06-16 09-20-01.pdf; Cummings, 1184_D07-12-23-0044_UD Comments 1.docx; Cummings, 1184_D07-12-23-0044 _UD Comments 1.docx; D07-12-23-0044 - 1184-1196 Cummings Avenue.pdf; 2023-05-16 - Application Summary - D02-02-23-0031.pdf

Importance: High

Kris just sent me this. I will review and give you a call to discuss.

Tyler Moir P.Eng.
Project Manager, Community Development

Direct: 902 620-0250
Mobile: 902 388-0100
Tyler.Moir@stantec.com

Stantec
165 Maple Hills Avenue
Charlottetown PE C1C 1N9

From: Kilborn, Kris <kris.kilborn@stantec.com>
Sent: Thursday, June 29, 2023 12:50 PM
To: Moir, Tyler <Tyler.Moir@stantec.com>
Subject: FW: Application D02-02-23-0031/D07-12-23-0044 Address 1184,1188, 1196 Cummings - 1st Review Comments
Importance: High

Fyi attached and below

From: Thomas Freeman <freeman@fotenn.com>
Sent: Thursday, June 29, 2023 10:54 AM
To: Kilborn, Kris <kris.kilborn@stantec.com>
Cc: Ryan Koolwine <koolwine@project1studio.ca>; Timothy Beed <beed@fotenn.com>; Dylan Desjardins <D.Desjardins@tcudevcorp.com>
Subject: FW: Application D02-02-23-0031/D07-12-23-0044 Address 1184,1188, 1196 Cummings - 1st Review

Comments
Importance: High

Hi Kris,

Are you able to provide the water modeling data for 1184 Cummings. The City planner says if they do not receive it today, we will be bumped to the August 16 PHC meeting.

Can you please confirm ASAP.

Thanks,

Thomas Freeman, B.URPL
Planner

From: Belan, Steve <Steve.Belan@ottawa.ca>
Sent: Wednesday, June 28, 2023 5:00 PM
To: Timothy Beed <beed@fotenn.com>; Thomas Freeman <freeman@fotenn.com>
Cc: Wildman, Geraldine <Geraldine.Wildman@ottawa.ca>; Elsby, Cam <Cam.Elsby@ottawa.ca>; Giampa, Mike <Mike.Giampa@ottawa.ca>
Subject: Application D02-02-23-0031/D07-12-23-0044 Address 1184,1188, 1196 Cummings - 1st Review Comments

Hello Tim,

We agreed to place the zoning report on the agenda, provided that servicing for the site was confirmed. At this time, it still has not be confirmed that there is sufficient water to service this site. Given that, we are looking to defer the zoning to the next available Planning and Housing Committee. Please have your engineer provide the modeling using the Project Managers Boundary Conditions below. We will need confirmation of the water in the next couple of days to make this committee date.

Here are the remainder of the comments from the circulation which ended on June 14.

Please find attached here consolidated comments from the 1st review of the above noted application.

Engineering

Water service still needs to be modeled. Please fine that following information to assist you

The following are boundary conditions, HGL, for hydraulic analysis at 1184-1196 Cumming Avenue (zone 1E) assumed to be connected to the 305 mm watermain on Cummings Avenue (see attached PDF for location).

Min HGL: 110.1 m

Max HGL: 118.3 m

Max Day + Fire Flow (333.3 L/s): 108.7 m

These are for current conditions and are based on computer model simulation.

Disclaimer: The boundary condition information is based on current operation of the city water distribution system. The computer model simulation is based on the best information available at the time. The operation of the water distribution system can change on a regular basis, resulting in a variation in boundary conditions. The physical properties of watermains deteriorate over time, as such must be assumed in the absence of actual field test data. The variation in physical watermain properties can therefore alter the results of the computer model simulation.

Other engineering comments are attached in the memo. Feel free to contact the Infrastructure Project Manager, Cam Elsby at Cam.Elsby@ottawa.ca, for follow-up questions

Transportation Engineering Services

Section 2.3.1 Planned Conditions

Section 2.3.1 states that, *"In the Active Transportation project List (April 2022), cycling facilities are identified along Cummings Avenue between Donald Street and Cyrville Road. Based on the Cyrville TOD Plan area, it is assumed that this cycling facility would be a shared-use lane"*. Please note that the Cyrville TOD Plan is outdated in this regard. The active transportation project is more likely to involve unidirectional cycling facilities on each side of the road, such as painted bike lanes or cycle tracks (consistent with Section 4.1.2 of the Official Plan).

Section 8.1 Design for Sustainable Modes

Within the Element 4.1.1 of the TIA (Design for Sustainable Modes), please reference and discuss the TDM-Supportive Development Design and Infrastructure Checklist.

Section 8.2 Circulation and Access

Provide swept path turning analysis for garbage collection vehicles and describe where/how garbage collection will occur.

Section 11.1 Location and Design of Access:

While the text of the TIA notes that the access will comply with the City of Ottawa standard drawing SC7.1, the site plan and grading plan currently show the curb return continuing across the sidewalk (noted on the site plan as #9, depressed curb). SC7.1 no longer includes a depressed curb return across the sidewalk. Weldon Drive to the north of the site is a good example of an access that does not include a depressed curb return across the sidewalk. Please correct the access design in the site plan and grading plan.

Traffic analysis presented in Section 7 of the TIA indicates that the southbound left-turn movement at Ogilvie Road and Cummings Avenue experiences extended queues (>75m) during the PM peak hour. In addition, the 95th percentile southbound through queue at this intersection is estimated to extend 64m and 57m during the AM and PM peak hours, respectively. The proposed access is only approximately 35m north of the intersection. Therefore, site generated traffic may have difficulty safely turning northbound left into the site or eastbound left out of the site during the PM peak hour. It is highly recommended that the site layout is "flipped" so that the access is located near the north edge of the site. This would place the access approximately 105m away from the Ogilvie Road and Cummings Avenue intersection and outside of the typical extent of the southbound left-turn queue.

The Private Approach By-Law states that no person shall construct a private approach within 3 metres of any property line measured at the highway line and at the curb or the edge of the roadway. The curb return of the proposed access extends into the adjacent property to the south, essentially providing 0 metres of off-set). The off-set is below the

absolute minimum of 0.3 metres, does not meet the conditions of the Private Approach By-Law, and therefore should not be permitted in its current location.

Section 14.2.2 Network Intersection MMLOS:

Transportation Engineering Services respectfully requests CGH to stop writing the following statement within their TIAs: *"Pedestrian delay LOS is not considered in the PLOS calculation as it is not a suitable metric for the assessment of pedestrian LOS as formulated. This exclusion is consistent with City direction since 2015, and no alternative methodology has been provided for its assessment."* This is not true, and CGH has not provided any evidence of the supposed City direction provided in 2015.

Traffic Signal Design

No comments for this current circulation. Traffic Signal Design Unit reserves the right to make future comments based on subsequent submissions.

If there are any future proposed changes in the existing roadway geometry that would require the installation of a pedestrian crossover (Type B or Type C), the signalization of an intersection or modifications to an existing signalized intersection, the City of Ottawa Traffic Signal Design Unit would be required to complete a traffic signal plant design and would need to be engaged in reviews during the functional design stage.

Traffic Engineering

The location of the full movement access in relation to the intersection of Ogilvie Road & Cummings Avenue is not supported. Alternatives (move, right-in/right-out) should be considered.

Streetlighting

No comments with the TIA for this circulation. Street lighting reserves the right to make future comments based on subsequent submissions.

Future considerations are as follows:

If there are any proposed changes to the existing roadway geometry, the City of Ottawa Street Light Asset Management Group is required to provide a full street light design. Upon completion of proposed roadway geometry design changes, please submit digital Micro Station drawings with proposed roadway geometry changes to the Street Lighting Department, so that we may proceed with the detailed street light design and coordination with the Street Light maintenance provider and all necessary parties. Be advised that the applicant will be 100% responsible for all costs associated with any Street Light design as a result of the roadway geometry change.

Alterations and /or repairs are required where the existing street light plant is directly, indirectly or adversely affected by the scope of work under this circulation, due to the proposed road reconstruction process. All street light plant alterations

Solid Waste

After reviewing this site plan the city will collect the garbage and recycling at this building ,I do not see any issues at this location but I would need the sqF of the garbage room. This is what they will need for containers:

Garbage: 5x4 yard bins

Fiber: 2x3 yard bin

Glass metal plastic: 1x3 yard bins

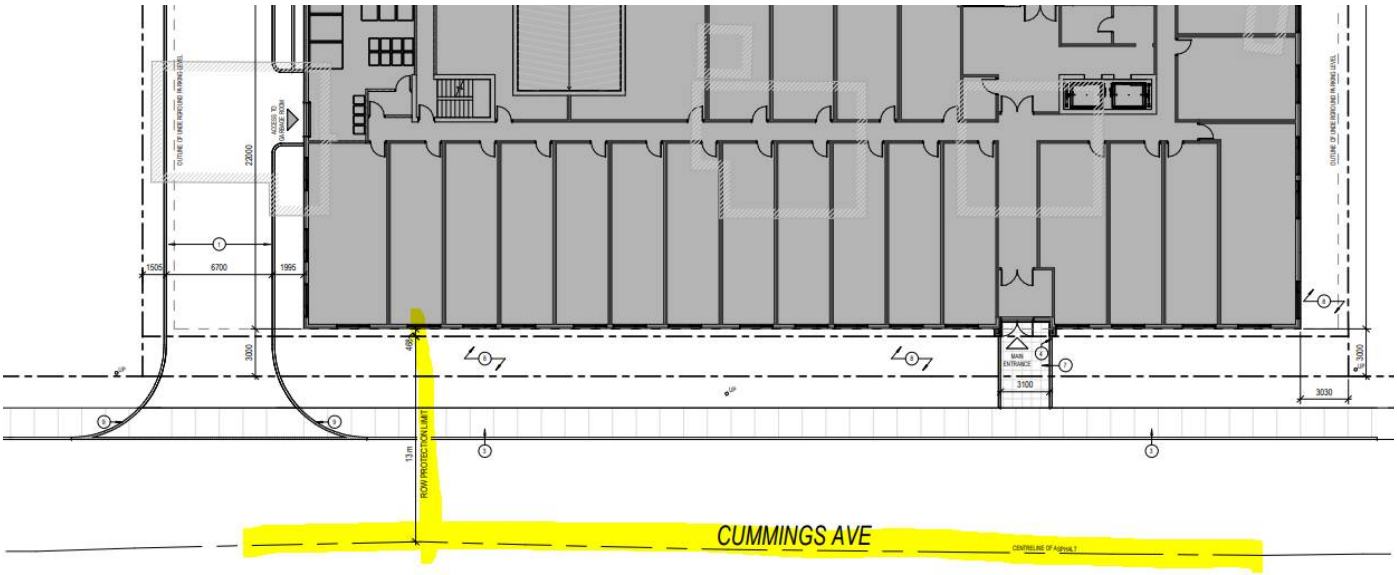
Organics: 3 x240L carts

City Surveyor

Just wondering how the CL of Cummings Ave has been captured or calculated on the site plan. The legal survey in the submission package does not show the CL !

If the CL location has not been calculated correctly according to the OP then the distance shown to the development limit could be changed.

Is there any other topographic survey ?



Community Benefit Contribution

The Site is subject to CBC and will be conditioned in the Site Plan Agreement

City Parks

Cash in lieu of parkland will be required in accordance with the City's By-laws

Noise

The building will need to be serviced with air conditioning to allow for window to remain closed to protect from road noise. Location of air handling units will need to be located away from neighbouring properties.

Environmental

No reference to the Bird-Safe Design Guidelines in the design brief or the elevation drawings; while they have avoided monolithic expanses of glass, there are still concerns here from a bird-safe perspective. The glass balcony railings are a design trap and should be treated; this would also help reduce the risk posed by the glass doors/windows behind the railings. I note that they are proposing to have fritted railings for some units as a design feature, this is a great start – all railings should be fritted or etched to render them bird-safe.

Trees and Forestry

TCR

- The tree removal permit will be issued upon site plan approval. Please reach out to the Planning Forester for more information on obtaining the permit (hayley.murray@ottawa.ca)

- Please ensure all adjacently owned trees with CRZs extending into the development site were accounted for.
- Section 4.8.2 (3,d) of the Official Plan states, when considering impacts on individual trees, planning and development decisions, including Committee of Adjustment decisions, shall give priority to the retention and protection of large, healthy trees over replacement plantings and compensation; 32 trees are planned for removed and only 12 are shown as replacements.
    - Why can a design that limits the large extent of the drive aisle not be proposed? The rear drive aisle in combination with the underground parking and the mid-rise apartment forces extensive tree removal and significantly limits opportunities for tree planting. Can the site not be oriented to decrease the size of the drive aisle, providing more space for replacement tree planting?
    - Has a retention solution been explored for the row of maples (in good health) bordering Weldon Drive?
    - Please investigate alternative designs that allow for more tree retention or increase space available for tree planting.
- Explain why the city owned eastern white cedar tree requires removal. If justified, monetary and replacement planting compensation would be required.

Landscape Plan

- Can an additional tree or two be planted in the northeast corner of the property where open sod is shown?
- Columnar varieties do not contribute to the urban canopy. Please replace the GP with medium or large canopy tree species.
- HA, JL and SB are small canopy trees that should only be planted when there are restrictions. Unless justified, please replace these species in the ROW with larger canopy species.
- Have adequate soil volumes been provided? Please label the volumes provided on the plan.
- Incorporating a landscape buffer with trees would contribute to the urban canopy cover that's being lost on this site and would also benefit the existing homes backing onto this property.
- Deciduous tree stock should be 50 mm in caliper. Larger or smaller stock has shown to have less success.

CPTED

No issues

Urban Design

This application should proceed to the UDRP prior to being rezoned. The remainder of the comments are attached in the UD_Comments above.

RVCA

The RVCA has reviewed the above noted Zoning By-law Amendment and Site Plan Control applications to permit a six-storey apartment building consisting of 188 dwelling units, 184 bicycle parking spaces and 56 vehicle parking spaces and have no objections.

School Board

Attached

Utilities

Attached

Telus

TELUS has no underground infrastructure in the area of your proposed work. Permit expires six (6) months from approval date.

Rogers Communications

> Rogers has no comment or concerns regarding this circulation. Please contact Aubrey Macmillan at Aubrey.Macmillan@rci.rogers.com or JoAnn.Zorzi@rci.rogers.com for Rogers Site Servicing if approved, or if you required additional information

In order to achieve the target review and approval timeline, **please provide the next submission in 5/3 weeks, by July 26 date.** Otherwise, the application will be placed on-hold.

The development review team will be happy to meet you to discuss comments and resolve issues. We highly recommend holding the comments review meeting within one week from the date of this letter. Please contact me at your earliest convenience to confirm the meeting date, time, format and location.

Please do not hesitate to contact me if you have any questions.

Regards,

Steve Belan, MCIP, RPP

Planner Planning Services, Development Review Services
Planning, Corporate Real Estate and Economic Development department (PRED)
City of Ottawa / Ville d'Ottawa
110 Laurier Avenue West, 4th Floor / 110, avenue Laurier Ouest, 4e étage
Ottawa, ON K1P 1J1
Telephone / tél.: 613-580-2424 ext./poste 27591
E-mail / courriel: Steve.Belan@ottawa.ca

'

'

A.5 Hydraulic Analysis

Stantec	Project:	**1184-1196 Cummings**	No. **160401787**
	SITE PLAN HYDRAULIC ANALYSIS		
	Revision:	01	Prepared By: MW
	Revision Date:	30-Aug-2023	Checked By:

BOUNDARY CONDITIONS (BC)	
Connection at Cummings Avenue	
Site Plan Revision Date	31-Mar-2023
Min. HGL (m)	110.1
Max. HGL (m)	118.3
Max. Day + Fire Flow (333 L/s)	108.7

Ground Floor Elevation (GFE) (Level 01) (m)	71.8

GROUND FLOOR (GF) PRESSURE RANGE				
	GF HGL (m)	**GF Pressure (kPa)**	**GF Pressure (psi)**	**Outcome**
	= BC HGL (m) - FFE (m)	= GF HGL (m) x 9.804 (kPa/m)	= GF Pressure (kPA) x 0.145 (psi/kPa)	If min <50 psi: booster pump If max >100 psi: pressure reducer
Minimum Normal	38.3	375.5	54.4	No Booster Pump Required
Maximum Normal	46.5	455.9	66.1	No Pressure Reducer Required

Number of Floors Above Ground	6
Approximate Height of One Storey (m)	3
Pressure Drop Per Floor (kPa)	29.4
Pressure Drop Per Floor (psi)	4.3

RESIDUAL PRESSURE RANGE IN MULTI-LEVEL BUILDINGS			
	Residual Pressure (kPa)	**Residual Pressure (psi)**	**Outcome**
Top Floor Min	228.4	33.1	Booster Pump Required
Top Floor Max	308.8	44.8	
Maximum Number of Floors Above Ground at Minimum Pressure	3		

RESIDUAL PRESSURE UNDER FIRE FLOW CONDITIONS			
	Residual HGL (m)	**Residual Pressure (kPa)**	**Residual Pressure (psi)**
Ground Floor	36.9	361.8	52.5
Top Floor	21.9	214.7	31.1

PRESSURE CHECK		
	Pressure (kPa)	**Pressure (psi)**
UNDER NORMAL OPERATING CONDITIONS		
Pressure Below Minimum	<276	<40
Pressure Below Normal	276-345	40-50
Pressure Within Normal Range	345-552	50-80
Pressure Above Normal Range	552-690	80-100
Pressure Above Maximum	>690	>100
UNDER FIRE FLOW CONDITIONS		
Pressure Below Minimum	<140	<20
Acceptable Pressure	≥140	≥20

A.6 Fire Hydrant Coverage Calculations

Stantec	Project:	**1184-1196 Cummings Avenue**		160401787
	TABLE 1: FIRE HYDRANT COVERAGE TABLE			
	Revision:	1	Prepared By:	MW
	Revision Date:	2023-04-18	Checked By:	

Description	Hydrants[1]						Total Available Fire Flow (L/min)	Total Required Fire Flow[2] (L/min)
	HYD-01	**HYD-02**	**HYD-03**	**HYD-04**	**HYD-05**	**HYD-06**		
1184-1196 Cummings Avenue								
Distance from building (m)	97.3	94.0	77.1	76.1	172.5	96.8	-	-
Maximum fire flow capacity[3] (L/min)	3,785	3,785	3,785	3,785	2,839	3,785	**21,764**	20,000

NFPA 1 Table 18.5.4.3	
Distance to Building (m)	Maximum Capacity (L/min)
≤ 76	**5,678**
> 76 and ≤ 152	**3,785**
> 152 and ≤ 305	**2,839**

Notes:

1. Hydrant locations as per GeoOttawa accessed April 18, 2023. Refer to fire hydrant coverage sketch (Figure 3-1).
2. See OBC Calculations, Appendix A.2 for fire flow requirements.
3. See NFPA 1 Table 18.5.4.3 (and Appendix I of ISTB-2018-02 Technical Bulletin) for maxiumim fire flow capacity of hydrants by distance to building.

Appendix B Site Plan by Project 1 Studios Inc.

SURVEYOR'S REAL PROPERTY REPORT
PART 1 - PLAN OF SURVEY
PART OF LOT 1
REGISTERED PLAN 217
(GEOGRAPHIC TOWNSHIP OF GLOUCESTER)
CITY OF OTTAWA
STANTEC GEOMATICS LTD.

SURVEY INFO
SCALE: 1 : 100

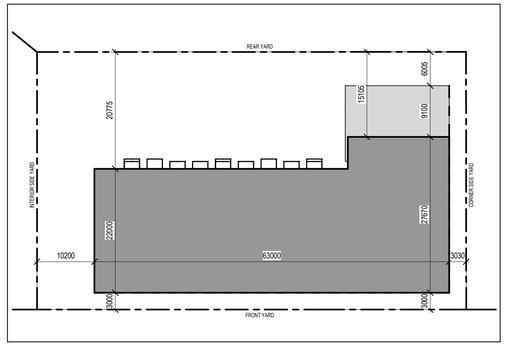
SITE PLAN SYMBOLS LEGEND

- BUILDING ENTRANCE
- BUILDING EXIT
- BICYCLE PARKING
- PROPERTY LINE
- SETBACK LINE
- INTERLOCKING STONE PAVERS
- UP — EXISTING UTILITY POLE TO REMAIN
- FDC — FIRE DEPARTMENT CONNECTION

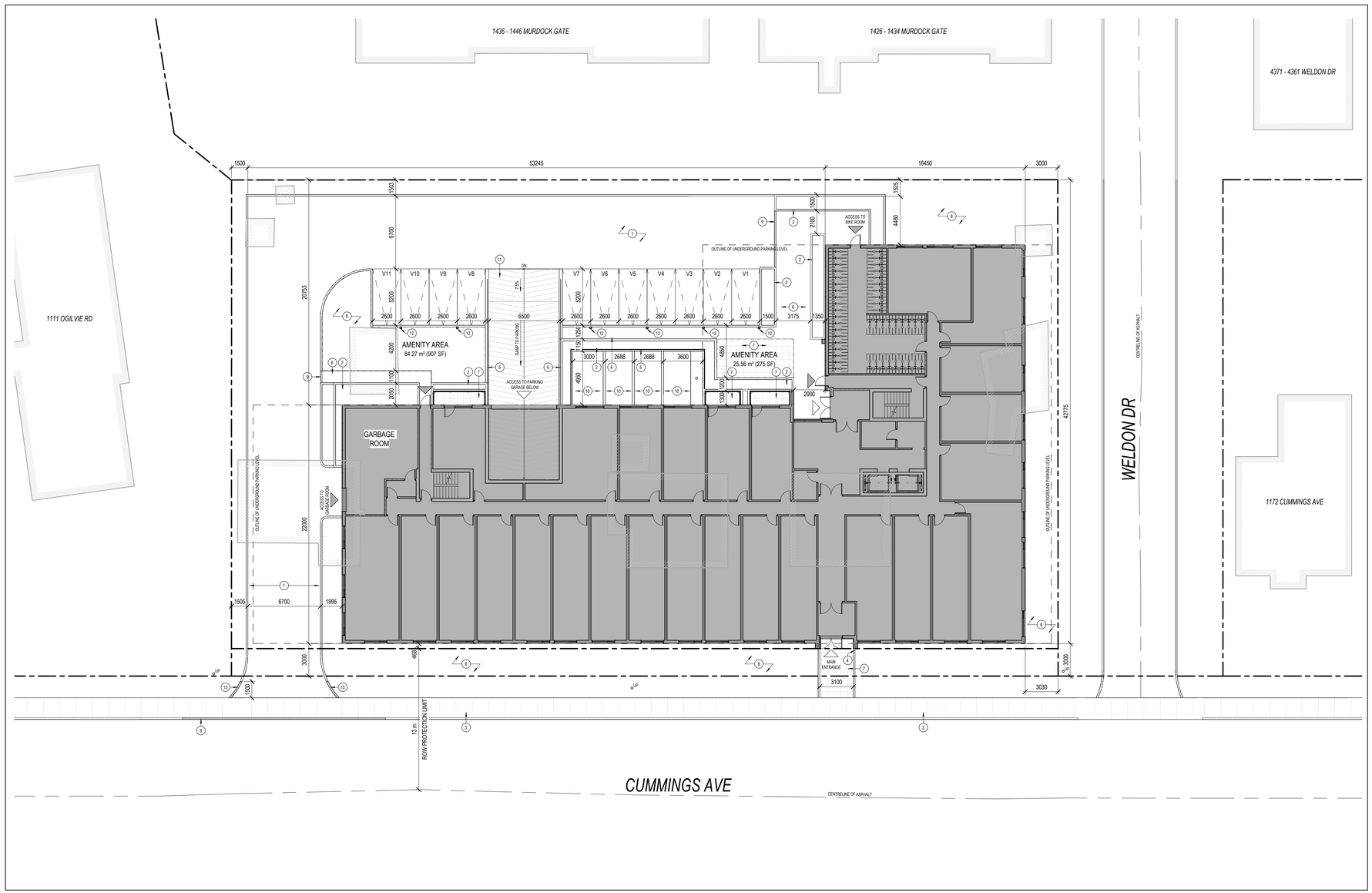
4 / SP-01 LOCATION PLAN
SCALE: N.T.S.

1. ASPHALT
2. RAISED PLANTER
3. EXISTING CONCRETE SIDEWALK
4. FIRE DEPARTMENT CONNECTION
5. RETAINING WALL WITH PAINTED STEEL GUARDS
6. CONCRETE WALKWAY
7. INTERLOCKING STONE PAVERS
8. SOFT LANDSCAPING
9. DEPRESSED CURB
10. TERRACED PLANTER
11. CONCRETE RAMP WITH HERRINGBONE & SNOW MELTING
12. EV CAR CHARGING STATION
13. CURB TRANSITION

3 / SP-01 KEYNOTE LEGEND
SCALE: N.T.S.



2 / SP-01 ZONING SETBACK SCHEDULE
SCALE: 1 : 500



1 / SP-01 SITE PLAN
SCALE: 1 : 200

Site Statistics

Current Zoning Designation:	TD1 (Transit Oriented Development Zone)
Lot Width:	76.2m
Total Lot Area:	3487.7m²
Average Existing Grade:	71.27m²
Gross Floor Area:	11484.6m²
Floor Space Index:	3.29
Proposed Unit Count:	188 Residential Units

Proposed Development - 6 Storey Mid-Rise Apartment Building

Zoning Mechanism	Required	Provided
Minimum Lot Width *Table 195(b)*	No Minimum	76.2m
Minimum Lot Area *Table 195(a)*	No Minimum	3487.7m²
Min. Front Yard Setback *Table 195(c)(i)*	2m	3m
Corner Side Yard Setback *Table 195(c)(i)*	3m	3m
Min. Interior Side Yard Setback *Table 195(c)(iii)*	No Minimum	1.5m
Min. Rear Yard Setback *Table 195(e)(i)*	6m	6m
Maximum Building Height *Table 195(g)(ii)*	20m	18.3m
Min. Residential Units per Hectare *Section 196(14)(a)(i)*	52 Units *150 units / hectare*	188 Units
Parking Space Rates *101(3)(Area X)* *101(6)(c)(i)*	81 Spaces *No Parking for 12 units, then 0.5 / unit* *10% reduction for Below Grade Parking*	38 Resident Spaces *(56 Total Spaces, 18 visitor)*
Minimum Visitor Parking Rates *102(2)(Area X)* *Table 102*	18 Spaces *No Parking for 12 units, then 0.1 / unit*	18 Spaces *(11 at grade + 7 underground)*
Bicycle Parking Rates *Table 111A* *111(11)*	94 Spaces *0.5 spaces / unit for 188 units* *Min. 50% at Grade*	184 Spaces *(94 at grade + 90 underground)*
Outdoor Communal Space at Grade *Section 195(8)*	69.75m² *(2% of total lot area)*	82.41m²
Total Amenity Area *Table 137(4)(II)*	1128m² *6m² / unit for 188 units*	1325.34m²
Communal Amenity Area *Table 137(4)(III)*	564m² *Min. 50% of Total Amenity Area*	1097.74m²

4 / SP-01 SITE & PROJECT STATISTICS
SCALE: 1 : 1

UNIT COUNT

NAME	LVL 01	LVL 02	LVL 03	LVL 04	LVL 05	LVL 06	TOTAL COUNT	PERCENTAGE
1-BEDROOM	17	17	17	17	17	17	102	54%
1-BEDROOM + DEN	1	1	1	1	1	1	6	3%
2-BEDROOM	2	5	5	5	3	3	23	12%
STUDIO	7	10	10	10	10	10	57	30%
TOTAL	27	33	33	33	31	31	188	100%

AMENITY AREAS (COMMUNAL)

LEVEL	NAME	AREA	AREA (SF)
LEVEL P1	INDOOR AMENITY	333.91 m²	3594 SF
AVG. GRADE	AMENITY AREA	109.83 m²	1182 SF
LEVEL 05	AMENITY - LEVEL 05 TERRACE	78.68 m²	847 SF
T.O. ROOF	AMENITY - ROOFTOP TERRACE	575.32 m²	6193 SF
TOTAL		1097.74 m²	11816 SF

LEASABLE FLOOR AREA

LEVEL	AREA	AREA (SF)
LEVEL 01	1185.96 m²	12766 SF
LEVEL 02	1486.98 m²	16006 SF
LEVEL 03	1474.52 m²	15872 SF
LEVEL 04	1462.67 m²	15744 SF
LEVEL 05	1293.62 m²	13924 SF
LEVEL 06	1293.21 m²	13920 SF
TOTAL	8196.96 m²	88231 SF

AMENITY AREAS (PRIVATE)

LEVEL	AREA	AREA (SF)
LEVEL 01	15.34 m²	165 SF
LEVEL 02	37.12 m²	400 SF
LEVEL 03	41.71 m²	449 SF
LEVEL 04	40.54 m²	436 SF
LEVEL 05	57.28 m²	617 SF
LEVEL 06	35.61 m²	383 SF
TOTAL	227.60 m²	2450 SF

GROSS FLOOR AREA

LEVEL	AREA	AREA (SF)
LEVEL P1	2094.06 m²	22540 SF
LEVEL 01	1646.89 m²	17727 SF
LEVEL 02	1633.74 m²	17585 SF
LEVEL 03	1621.28 m²	17451 SF
LEVEL 04	1609.42 m²	17324 SF
LEVEL 05	1438.99 m²	15489 SF
LEVEL 06	1433.41 m²	15429 SF
TOTAL	11477.77 m²	123546 SF

PARKING SCH. (BICYCLE)

LEVEL	COUNT
LEVEL P1	90
LEVEL 01	94
TOTAL	184

PARKING SCH. (VEHICLE)

LEVEL	COUNT
LEVEL P1	45
AVG. GRADE	11
TOTAL	56

GENERAL ARCHITECTURAL NOTES:

1. This drawing is the property of the Architect and may not be reproduced or used without the expressed consent of the Architect.
2. Drawings are not to be scaled. The Contractor is responsible for checking and verifying all levels and dimensions and shall report all discrepancies to the Architect and obtain clarification prior to commencing work.
3. Upon notice in writing, the Architect will provide written/graphic clarification or supplementary information regarding the intent of the Contract Documents.
4. The Architectural drawings are to be read in conjuction with all other Contract Documents including Project Manuals and the Structural, Mechanical and Electrical Drawings.
5. Positions of exposed or finished Mechanical or Electrical devices, fittings and fixtures are indicated on the Architectural Drawings. Locations shown on the Architectural Drawings shall govern over Mechanical and Electrical Drawings. Mechanical and Electrical items not clearly located will be located as directed by the Architect.
6. These documents are not to be used for construction unless specifically noted for such purpose.

KEY PLAN

5	REISSUED FOR SITE PLAN CONTROL	2023-08-22
4	ISSUED FOR SITE PLAN CONTROL	2023-04-12
3	ISSUED FOR COORDINATION	2023-03-31
2	ISSUED FOR COORDINATION	2023-03-15
1	ISSUED FOR COORDINATION	2023-03-02

ISSUE RECORD

ONTARIO ASSOCIATION OF ARCHITECTS
EVAN M. KOOLWINE
LICENCE
7370

project1 studio
Project1 Studio Incorporated
| 613.884.3939 | mail@project1studio.ca

1184 CUMMINGS

1184 Cummings Avenue
Gloucester, ON

PROJ	SCALE	DRAWN	REVIEWED
2231	NOTED	BH	RK

SITE PLAN

SP-01

Appendix C Sanitary

C.1 Sanitary Calculation Sheet

SITE:
1184-1196 Cummings Avenue, Ottawa, ON

DATE: 3/30/2023
REVISION: 1
DESIGNED BY: MW
CHECKED BY: TM

SANITARY SEWER DESIGN SHEET
(City of Ottawa)

FILE NUMBER: 160401787

DESIGN PARAMETERS

MAX PEAK FACTOR (RES.)=	4.0	AVG. DAILY FLOW / PERSON	280	l/p/day	MINIMUM VELOCITY	0.60	m/s
MIN PEAK FACTOR (RES.)=	2.0	COMMERCIAL	28,000	l/ha/day	MAXIMUM VELOCITY	3.00	m/s
PEAKING FACTOR (INDUSTRIAL):	2.4	INDUSTRIAL (HEAVY)	55,000	l/ha/day	MANNINGS n	0.013	
PEAKING FACTOR (ICI >20%):	1.5	INDUSTRIAL (LIGHT)	35,000	l/ha/day	BEDDING CLASS	B	
PERSONS / 1 BEDROOM	1.4	INSTITUTIONAL	28,000	l/ha/day	MINIMUM COVER	2.50	m
PERSONS / 2 BEDROOM	2.1	INFILTRATION	0.33	l/s/Ha	HARMON CORRECTION FACTOR	0.8	
PERSONS / 3 BEDROOM	3.1						

LOCATION			RESIDENTIAL AREA AND POPULATION								COMM/AMENITY		INDUSTRIAL (L)		INDUSTRIAL (H)		INSTITUTIONAL		GREEN / UNUSED		C+I+I	INFILTRATION			TOTAL	PIPE									
AREA ID NUMBER	FROM M.H.	TO M.H.	AREA	1 BEDROOM	2 BEDROOM	3 BEDROOM	POP.	CUMULATIVE AREA	CUMULATIVE POP.	PEAK FACT.	PEAK FLOW	AREA	ACCU. AREA	AREA	ACCU. AREA	AREA	ACCU. AREA	AREA	ACCU. AREA	AREA	ACCU. AREA	PEAK FLOW	TOTAL AREA	ACCU. AREA	INFILT. FLOW	FLOW	LENGTH	DIA	MATERIAL	CLASS	SLOPE	CAP. (FULL)	CAP. V PEAK FLOW	VEL. (FULL)	VEL. (ACT.)
			(ha)					(ha)			(l/s)	(ha)	(ha)	(ha)	(ha)	(ha)	(ha)	(ha)	(ha)	(ha)	(ha)	(l/s)	(ha)	(ha)	(ha)	(l/s)	(m)	(mm)			(%)	(l/s)	(%)	(m/s)	(m/s)
PROPOSED BLDG	BLDG	EX SAN	0.165	159	29		284	0.165	284	3.47	3.19	0.000	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.183	0.18	0.00	0.349	0.35	0.12	3.30	8.9	150	PVC	SDR 35	5.00	34.3	**9.64%**	1.93	1.01

Notes
1. Unit breakdown for proposed 6-storey residential building provided by Project 1 Studios Inc. in March 2023
2. Site to outlet to existing 250 mm dia. sanitary sewer on Cummings Avenue.
3. Entire site area considered as potential source of infiltration.

C.2 Correspondence with City on Sanitary Sewer Capacity

Wu, Michael

From: Elsby, Cam <Cam.Elsby@ottawa.ca>
Sent: August 16, 2023 09:12
To: Wu, Michael
Cc: Moir, Tyler
Subject: RE: D07-12-23-0044 - 1184-1196 Cummings Avenue Updated Sanitary Peak Flows

Hi Michael,

Thanks for sending this over. I've confirmed with our Asset Management team that the revised proposed sanitary flow is still acceptable as the increase is not significant enough to affect the sewer's capacity.

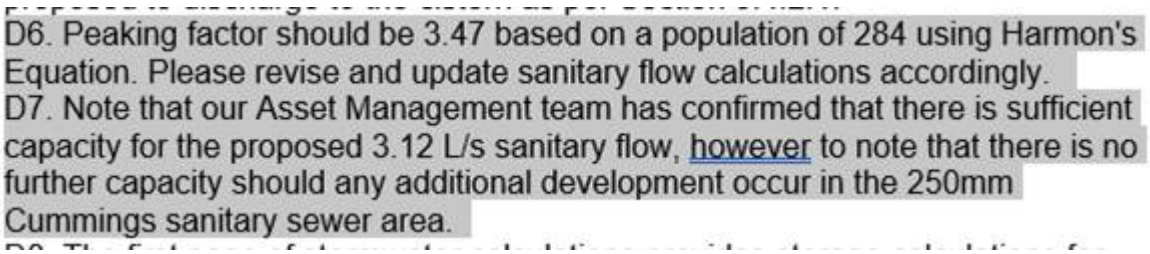
Kind regards,

Cam Elsby
Project Manager, Infrastructure Approvals
Planning, Real Estate and Economic Development Department | Services de la planification, des biens immobiliers et du développement économique
Development Review – East Branch
City of Ottawa | Ville d'Ottawa
110 Laurier Avenue West Ottawa, ON | 110, avenue Laurier Ouest. Ottawa (Ontario) K1P 1J1
613.580.2424 ext./poste 21443
cam.elsby@ottawa.ca

From: Wu, Michael <Michael.Wu@stantec.com>
Sent: August 15, 2023 10:58 AM
To: Elsby, Cam <Cam.Elsby@ottawa.ca>
Cc: Moir, Tyler <Tyler.Moir@stantec.com>
Subject: D07-12-23-0044 - 1184-1196 Cummings Avenue Updated Sanitary Peak Flows

Good morning, Cam:

As a follow-up to the preliminary engineering comments for 1184-1196 Cummings Avenue (D07-12-23-0044), we have updated the sanitary flows based on the corrected peaking factor, as per comment D.6.


D6. Peaking factor should be 3.47 based on a population of 284 using Harmon's Equation. Please revise and update sanitary flow calculations accordingly.
D7. Note that our Asset Management team has confirmed that there is sufficient capacity for the proposed 3.12 L/s sanitary flow, however to note that there is no further capacity should any additional development occur in the 250mm Cummings sanitary sewer area.

As the sanitary peak flow has been revised to 3.3 L/s, up from 3.12 L/s that was initially submitted, we would like to confirm if the 250 mm diameter sanitary sewer in Cummings Avenue has the capacity for the 3.3 L/s of peak flow from the proposed site.

Attached is the updated sanitary design sheet for your information.

Please let me know if you have any questions or comments.

Thanks,

Michael Wu EIT
Civil Engineering Intern, Community Development

Direct: 1 (613) 738-6033
Michael.Wu@stantec.com

Stantec
300-1331 Clyde Avenue
Ottawa ON K2C 3G4

Appendix D Stormwater Servicing

D.1 Modified Rational Method Sheet

Project #160401787, 1184-1196 Cummings Avenue
Roof Drain Design Sheet, Area BLDG
Standard Watts Roof Drain with Adjustable Accutrol Weir

Rating Curve				Volume Estimation				
Elevation (m)	Discharge Rate (cu.m/s)	Outlet Discharge (cu.m/s)	Storage (cu. m)	Elevation (m)	Area (sq. m)	Volume (cu. m) Increment	Volume (cu. m) Accumulated	Water Depth (m)
0.000	0.000000	0.0000	0.00	0.000	0	0.00	0.00	0.000
0.025	0.000315	0.0019	0.31	0.025	36.67	0.31	0.31	0.025
0.050	0.000631	0.0038	2.44	0.050	146.67	2.14	2.44	0.050
0.075	0.000789	0.0047	8.25	0.075	330.00	5.81	8.25	0.075
0.100	0.000946	0.0057	19.56	0.100	586.67	11.31	19.56	0.100
0.125	0.001104	0.0066	38.19	0.125	916.67	18.64	38.19	0.125
0.150	0.001262	0.0076	66.00	0.150	1320.00	27.81	66.00	0.150

Drawdown Estimate			
Total Volume (cu.m)	Total Time (sec)	Vol (cu.m)	Detention Time (hr)
0.0	0.0	0.0	0
2.1	565.1	2.1	0.15697
7.9	1227.1	5.8	0.49782
19.3	1991.3	11.3	1.05096
37.9	2813.9	18.6	1.83261
65.7	3673.1	27.8	2.85292

Rooftop Storage Summary		
Total Building Area (sq.m)		1650
Assume Available Roof Area (sq.	80%	1320
Roof Imperviousness		0.99
Roof Drain Requirement (sq.m/Notch)		232
Number of Roof Notches*		6
Max. Allowable Depth of Roof Ponding (m)		0.15
Max. Allowable Storage (cu.m)		66
Estimated 100 Year Drawdown Time (h)		2.8

* As per Ontario Building Code section OBC 7.4.10.4.(2)(c).

* Note: Number of drains can be reduced if multiple-notch drain used.

Adjustable Accutrol Weir Flow Rate Settings From Watts Drain Catalogue					
Head (m)	L/s Open	75%	**50%**	25%	Closed
0.025	0.3154	0.31542	**0.31542**	0.31542	0.31542
0.05	0.6308	0.63083	**0.63083**	0.63083	0.31542
0.075	0.9462	0.8674	**0.78854**	0.70969	0.31542
0.1	1.2617	1.10396	**0.94625**	0.78854	0.31542
0.125	1.5771	1.34052	**1.10396**	0.8674	0.31542
0.15	1.8925	1.57708	**1.26167**	0.94625	0.31542

Calculation Results

	5yr	100yr	Available
Qresult (cu.m/s)	0.006	0.008	-
Depth (m)	0.113	0.149	0.150
Volume (cu.m)	29.0	65.4	66.0
Draintime (hrs)	1.5	2.8	

Stormwater Management Calculations

File No: **160401787**
Project: **1184-1196 Cummings Avenue**
Date: **28-Aug-23**

SWM Approach:
Post-development to Pre-development flows

Post-Development Site Conditions:

Overall Runoff Coefficient for Site and Sub-Catchment Areas

Runoff Coefficient Table

Catchment Type	Sub-catchment Area ID / Description		Area (ha) "A"		Runoff Coefficient "C"	"A x C"		Overall Runoff Coefficient
Cistern	CISTERN	Hard	0.092		0.9	0.083		
		Soft	0.022		0.2	0.004		
		Subtotal		0.11			0.08716	0.765
Uncontrolled - Tributary to Cistern	BLDG-2	Hard	0.001		0.9	0.000		
		Soft	0.005		0.2	0.001		
		Subtotal		0.01			0.00156	0.260
Roof	BLDG-1	Hard	0.165		0.9	0.149		
		Soft	0.000		0.2	0.000		
		Subtotal		0.17			0.1485	0.900
Uncontrolled - Tributary to Cistern	CB-3	Hard	0.026		0.9	0.023		
		Soft	0.006		0.2	0.001		
		Subtotal		0.03			0.02432	0.760
Uncontrolled - Tributary to Cistern	CB-2	Hard	0.016		0.9	0.015		
		Soft	0.005		0.2	0.001		
		Subtotal		0.02			0.01554	0.740
Uncontrolled - Tributary to Cistern	CB-1	Hard	0.042		0.9	0.037		
		Soft	0.005		0.2	0.001		
		Subtotal		0.05			0.03854	0.820
Uncontrolled - Ramp to Cistern	RAMP	Hard	0.008		0.9	0.007		
		Soft	0.000		0.2	0.000		
		Subtotal		0.01			0.0072	0.900
Uncontrolled - Non-Tributary	UNC-4	Hard	0.013		0.9	0.012		
		Soft	0.022		0.2	0.004		
		Subtotal		0.04			0.0161	0.460
Uncontrolled - Non-Tributary	UNC-3	Hard	0.000		0.9	0.000		
		Soft	0.019		0.2	0.004		
		Subtotal		0.02			0.0038	0.200
Uncontrolled - Non-Tributary	UNC-2	Hard	0.000		0.9	0.000		
		Soft	0.010		0.2	0.002		
		Subtotal		0.01			0.002	0.200
Uncontrolled - Non-Tributary	UNC-1	Hard	0.000		0.9	0.000		
		Soft	0.005		0.2	0.001		
		Subtotal		0.01			0.001	0.200
Total				**0.35**			**0.346**	
Overall Runoff Coefficient= C:								**0.99**

Total Roof Areas	**0.17 ha**
Total Tributary Surface Areas (Controlled and Uncontrolled)	**0.11 ha**
Total Tributary Area to Outlet	**0.27 ha**
Total Uncontrolled Areas (Non-Tributary)	**0.08 ha**
Total Site	**0.35 ha**

Stormwater Management Calculations

Project #160401787, 1184-1196 Cummings Avenue
Modified Rational Method Calculations for Storage

5 yr Intensity
City of Ottawa

$I = a/(t + b)^c$

a =	998.071
b =	6.053
c =	0.814

t (min)	I (mm/hr)
10	104.19
20	70.25
30	53.93
40	44.18
50	37.65
60	32.94
70	29.37
80	26.56
90	24.29
100	22.41
110	20.82
120	19.47

5 YEAR Predevelopment Target Release from Portion of Site

Subdrainage Area: Predevelopment Tributary Area to Outlet
Area (ha): 0.35
C: 0.49

Typical Time of Concentration

tc (min)	I (5 yr) (mm/hr)	Qtarget (L/s)
20	70.25	**33.30**

5 YEAR Modified Rational Method for Entire Site

Subdrainage Area: CISTERN — Cistern
Area (ha): 0.11
C: 0.76

tc (min)	I (5 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)
10	104.19	25.25	11.54	13.70	**8.22**
20	70.25	17.02	11.54	5.48	6.57
30	53.93	13.07	11.54	1.52	2.74
40	44.18	10.71	10.71	0.00	0.00
50	37.65	9.12	9.12	0.00	0.00
60	32.94	7.98	7.98	0.00	0.00
70	29.37	7.12	7.12	0.00	0.00
80	26.56	6.44	6.44	0.00	0.00
90	24.29	5.89	5.89	0.00	0.00
100	22.41	5.43	5.43	0.00	0.00
110	20.82	5.05	5.05	0.00	0.00
120	19.47	4.72	4.72	0.00	0.00

	Stage	Head (m)	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Volume Check
5-year Water Level	-	-	11.54	8.22	30.00	OK

Subdrainage Area: BLDG-2 — Uncontrolled - Tributary to Cistern
Area (ha): 0.01
C: 0.26

tc (min)	I (5 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)
10	104.19	0.45	0.45		
20	70.25	0.30	0.30		
30	53.93	0.23	0.23		
40	44.18	0.19	0.19		
50	37.65	0.16	0.16		
60	32.94	0.14	0.14		
70	29.37	0.13	0.13		
80	26.56	0.12	0.12		
90	24.29	0.11	0.11		
100	22.41	0.10	0.10		
110	20.82	0.09	0.09		
120	19.47	0.08	0.08		

Subdrainage Area: BLDG-1 — Roof
Area (ha): 0.17 — Maximum Storage Depth: 150 mm
C: 0.90

tc (min)	I (5 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)	Depth (mm)	
10	104.19	43.01	5.82	37.20	22.32	103.7	0.00
20	70.25	29.00	6.08	22.92	27.50	110.7	0.00
30	53.93	22.26	6.16	16.11	28.99	112.7	0.00
40	44.18	18.24	6.16	12.08	**29.00**	112.7	0.00
50	37.65	15.54	6.12	9.42	28.27	111.7	0.00
60	32.94	13.60	6.06	7.54	27.14	110.2	0.00
70	29.37	12.13	5.99	6.13	25.76	108.3	0.00
80	26.56	10.97	5.92	5.05	24.24	106.3	0.00
90	24.29	10.03	5.83	4.19	22.64	104.1	0.00
100	22.41	9.25	5.75	3.50	21.00	101.9	0.00
110	20.82	8.60	5.66	2.93	19.37	99.6	0.00
120	19.47	8.04	5.54	2.49	17.95	96.5	0.00

Storage: Roof Storage

	Depth (mm)	Head (m)	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Discharge Check
5-year Water Level	112.67	0.11	6.16	29.00	66.00	0.00

Project #160401787, 1184-1196 Cummings Avenue
Modified Rational Method Calculations for Storage

100 yr Intensity
City of Ottawa

$I = a/(t + b)^c$

a =	1735.688
b =	6.014
c =	0.820

t (min)	I (mm/hr)
10	178.56
20	119.95
30	91.87
40	75.15
50	63.95
60	55.89
70	49.79
80	44.99
90	41.11
100	37.90
110	35.20
120	32.89

100 YEAR Predevelopment Target Release from Portion of Site

Subdrainage Area: Predevelopment Tributary Area to Outlet
Area (ha): 0.35
C: 0.49

Estimated Time of Concentration after Development

tc (min)	I (100 yr) (mm/hr)	Q100yr (L/s)
20	119.95	**56.86**

100 YEAR Modified Rational Method for Entire Site

Subdrainage Area: CISTERN — Cistern
Area (ha): 0.11
C: 0.96

tc (min)	I (100 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)
10	178.56	54.08	11.54	42.54	25.52
20	119.95	36.33	11.54	24.79	**29.74**
30	91.87	27.83	11.54	16.28	29.30
40	75.15	22.76	11.54	11.22	26.92
50	63.95	19.37	11.54	7.83	23.48
60	55.89	16.93	11.54	5.38	19.39
70	49.79	15.08	11.54	3.54	14.85
80	44.99	13.63	11.54	2.08	9.99
90	41.11	12.45	11.54	0.91	4.90
100	37.90	11.48	11.48	0.00	0.00
110	35.20	10.66	10.66	0.00	0.00
120	32.89	9.96	9.96	0.00	0.00

	Stage	Head (m)	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Volume Check
100-year Water Level	-	-	11.54	29.74	30.00	OK

Subdrainage Area: BLDG-2 — Uncontrolled - Tributary to Cistern
Area (ha): 0.01
C: 0.33

tc (min)	I (100 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)
10	178.56	0.97	0.97		
20	119.95	0.65	0.65		
30	91.87	0.50	0.50		
40	75.15	0.41	0.41		
50	63.95	0.35	0.35		
60	55.89	0.30	0.30		
70	49.79	0.27	0.27		
80	44.99	0.24	0.24		
90	41.11	0.22	0.22		
100	37.90	0.21	0.21		
110	35.20	0.19	0.19		
120	32.89	0.18	0.18		

Subdrainage Area: BLDG-1 — Roof
Area (ha): 0.17 — Maximum Storage Depth: 150 mm
C: 1.00

tc (min)	I (100 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)	Depth (mm)	
10	178.56	81.91	6.86	75.05	45.03	131.1	0.00
20	119.95	55.02	7.27	47.75	57.30	142.2	0.00
30	91.87	42.14	7.45	34.69	62.44	146.8	0.00
40	75.15	34.47	7.52	26.94	64.67	148.8	0.00
50	63.95	29.34	7.55	21.79	**65.36**	149.4	0.00
60	55.89	25.64	7.54	18.10	65.15	149.2	0.00
70	49.79	22.84	7.51	15.32	64.36	148.5	0.00
80	44.99	20.64	7.47	13.16	63.18	147.5	0.00
90	41.11	18.86	7.42	11.43	61.74	146.2	0.00
100	37.90	17.39	7.37	10.02	60.10	144.7	0.00
110	35.20	16.15	7.31	8.84	58.33	143.1	0.00
120	32.89	15.09	7.25	7.84	56.47	141.4	0.00

Storage: Roof Storage

	Depth (mm)	Head (m)	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Discharge Check
100-year Water Level	149.43	0.15	7.55	65.36	66.00	0.00

Stormwater Management Calculations

Project #160401787, 1184-1196 Cummings Avenue
Modified Rational Method Calculations for Storage

Subdrainage Area: CB-3 — Uncontrolled - Tributary to Cistern
Area (ha): 0.03
C: 0.76

tc (min)	I (5 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)
10	104.19	7.04	7.04	0.00	**0.00**
20	70.25	4.75	4.75	0.00	**0.00**
30	53.93	3.65	3.65	0.00	**0.00**
40	44.18	2.99	2.99	0.00	**0.00**
50	37.65	2.55	2.55	0.00	**0.00**
60	32.94	2.23	2.23	0.00	**0.00**
70	29.37	1.99	1.99	0.00	**0.00**
80	26.56	1.80	1.80	0.00	**0.00**
90	24.29	1.64	1.64	0.00	**0.00**
100	22.41	1.51	1.51	0.00	**0.00**
110	20.82	1.41	1.41	0.00	**0.00**
120	19.47	1.32	1.32	0.00	**0.00**

Storage: Surface Storage Above CB

Orifice Equation: LMF 80
Orifice Diameter: 80.00 mm
Invert Elevation 68.96 m
T/G Elevation 71.28 m
Max Ponding Depth 0.00 m
Downstream W/L 68.90 m

	Stage	Head (m)	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Volume Check
5-year Water Level	71.28	1.88	7.84	0.00	3.70	OK

Subdrainage Area: CB-2 — Uncontrolled - Tributary to Cistern
Area (ha): 0.02
C: 0.74

tc (min)	I (5 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)
10	104.19	4.50	4.50	0.00	**0.00**
20	70.25	3.03	3.03	0.00	**0.00**
30	53.93	2.33	2.33	0.00	**0.00**
40	44.18	1.91	1.91	0.00	**0.00**
50	37.65	1.63	1.63	0.00	**0.00**
60	32.94	1.42	1.42	0.00	**0.00**
70	29.37	1.27	1.27	0.00	**0.00**
80	26.56	1.15	1.15	0.00	**0.00**
90	24.29	1.05	1.05	0.00	**0.00**
100	22.41	0.97	0.97	0.00	**0.00**
110	20.82	0.90	0.90	0.00	**0.00**
120	19.47	0.84	0.84	0.00	**0.00**

Storage: Surface Storage Above CB

Orifice Equation: LMF 65
Orifice Diameter: 65.00 mm
Invert Elevation 69.06 m
T/G Elevation 71.30 m
Max Ponding Depth 0.00 m
Downstream W/L 69.00 m

	Stage	Head (m)	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Volume Check
5-year Water Level	71.30	2.24	5.42	0.00	2.60	OK

Subdrainage Area: CB-1 — Uncontrolled - Tributary to Cistern
Area (ha): 0.05
C: 0.82

tc (min)	I (5 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)
10	104.19	11.16	11.16	0.00	**0.00**
20	70.25	7.53	7.53	0.00	**0.00**
30	53.93	5.78	5.78	0.00	**0.00**
40	44.18	4.73	4.73	0.00	**0.00**
50	37.65	4.03	4.03	0.00	**0.00**
60	32.94	3.53	3.53	0.00	**0.00**
70	29.37	3.15	3.15	0.00	**0.00**
80	26.56	2.85	2.85	0.00	**0.00**
90	24.29	2.60	2.60	0.00	**0.00**
100	22.41	2.40	2.40	0.00	**0.00**
110	20.82	2.23	2.23	0.00	**0.00**
120	19.47	2.09	2.09	0.00	**0.00**

Storage: Surface Storage Above CB

Orifice Equation: = CdA(2gh)^0.5 Where C = 0.57
Orifice Diameter: 79.00 mm
Invert Elevation 69.00 m
T/G Elevation 71.30 m
Max Ponding Depth 0.00 m
Downstream W/L 68.77 m

	Stage	Head (m)	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Volume Check
5-year Water Level	71.30	2.30	18.77	0.00	3.00	OK

Subdrainage Area: RAMP — Uncontrolled - Ramp to Cistern
Area (ha): 0.01
C: 0.90

tc (min)	I (5 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)
10	104.19	2.09	2.09		
20	70.25	1.41	1.41		
30	53.93	1.08	1.08		
40	44.18	0.88	0.88		
50	37.65	0.75	0.75		
60	32.94	0.66	0.66		
70	29.37	0.59	0.59		
80	26.56	0.53	0.53		
90	24.29	0.49	0.49		
100	22.41	0.45	0.45		
110	20.82	0.42	0.42		
120	19.47	0.39	0.39		

Project #160401787, 1184-1196 Cummings Avenue
Modified Rational Method Calculations for Storage

Subdrainage Area: CB-3 — Uncontrolled - Tributary to Cistern
Area (ha): 0.03
C: 0.95

tc (min)	I (100 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)
10	178.56	15.09	8.93	6.16	**3.70**
20	119.95	10.14	8.93	1.21	1.45
30	91.87	7.76	7.76	0.00	0.00
40	75.15	6.35	6.35	0.00	0.00
50	63.95	5.40	5.40	0.00	0.00
60	55.89	4.72	4.72	0.00	0.00
70	49.79	4.21	4.21	0.00	0.00
80	44.99	3.80	3.80	0.00	0.00
90	41.11	3.47	3.47	0.00	0.00
100	37.90	3.20	3.20	0.00	0.00
110	35.20	2.98	2.98	0.00	0.00
120	32.89	2.78	2.78	0.00	0.00

Storage: Surface Storage Above CB

Orifice Equation: LMF 80
Orifice Diameter: 80.00 mm
Invert Elevation 68.96 m
T/G Elevation 71.28 m
Max Ponding Depth 0.12 m
Downstream W/L 68.90 m

	Stage	Head (m)	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Volume Check
100-year Water Level	71.40	2.44	8.93	3.70	3.70	OK

Subdrainage Area: CB-2 — Uncontrolled - Tributary to Cistern
Area (ha): 0.02
C: 0.93

tc (min)	I (100 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)
10	178.56	9.64	5.54	4.10	**2.46**
20	119.95	6.48	5.54	0.93	1.12
30	91.87	4.96	4.96	0.00	0.00
40	75.15	4.06	4.06	0.00	0.00
50	63.95	3.45	3.45	0.00	0.00
60	55.89	3.02	3.02	0.00	0.00
70	49.79	2.69	2.69	0.00	0.00
80	44.99	2.43	2.43	0.00	0.00
90	41.11	2.22	2.22	0.00	0.00
100	37.90	2.05	2.05	0.00	0.00
110	35.20	1.90	1.90	0.00	0.00
120	32.89	1.78	1.78	0.00	0.00

Storage: Surface Storage Above CB

Orifice Equation: LMF 65
Orifice Diameter: 65.00 mm
Invert Elevation 69.06 m
T/G Elevation 71.30 m
Max Ponding Depth 0.10 m
Downstream W/L 69.00 m

	Stage	Head (m)	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Volume Check
100-year Water Level	71.40	2.34	5.54	2.46	2.60	OK

Subdrainage Area: CB-1 — Uncontrolled - Tributary to Cistern
Area (ha): 0.05
C: 1.00

tc (min)	I (100 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)
10	178.56	23.33	19.17	4.16	**2.49**
20	119.95	15.67	15.67	0.00	0.00
30	91.87	12.00	12.00	0.00	0.00
40	75.15	9.82	9.82	0.00	0.00
50	63.95	8.36	8.36	0.00	0.00
60	55.89	7.30	7.30	0.00	0.00
70	49.79	6.51	6.51	0.00	0.00
80	44.99	5.88	5.88	0.00	0.00
90	41.11	5.37	5.37	0.00	0.00
100	37.90	4.95	4.95	0.00	0.00
110	35.20	4.60	4.60	0.00	0.00
120	32.89	4.30	4.30	0.00	0.00

Storage: Surface Storage Above CB

Orifice Equation: Q = CdA(2gh)^0.5 Where C = 0.57
Orifice Diameter: 79.00 mm
Invert Elevation 69.00 m
T/G Elevation 71.30 m
Max Ponding Depth 0.10 m
Downstream W/L 68.77 m

	Stage	Head (m)	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Volume Check
100-year Water Level	71.40	2.40	19.17	2.49	3.00	OK

Subdrainage Area: RAMP — Uncontrolled - Ramp to Cistern
Area (ha): 0.01
C: 1.00

tc (min)	I (100 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)
10	178.56	3.97	3.97		
20	119.95	2.67	2.67		
30	91.87	2.04	2.04		
40	75.15	1.67	1.67		
50	63.95	1.42	1.42		
60	55.89	1.24	1.24		
70	49.79	1.11	1.11		
80	44.99	1.00	1.00		
90	41.11	0.91	0.91		
100	37.90	0.84	0.84		
110	35.20	0.78	0.78		
120	32.89	0.73	0.73		

Stormwater Management Calculations

Project #160401787, 1184-1196 Cummings Avenue
Modified Rational Method Calculations for Storage

Subdrainage Area: UNC-4 — Uncontrolled - Non-Tributary
Area (ha): 0.04
C: 0.46

tc (min)	I (5 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)
10	104.19	4.66	4.66		
20	70.25	3.14	3.14		
30	53.93	2.41	2.41		
40	44.18	1.98	1.98		
50	37.65	1.69	1.69		
60	32.94	1.47	1.47		
70	29.37	1.31	1.31		
80	26.56	1.19	1.19		
90	24.29	1.09	1.09		
100	22.41	1.00	1.00		
110	20.82	0.93	0.93		
120	19.47	0.87	0.87		

Subdrainage Area: UNC-3 — Uncontrolled - Non-Tributary
Area (ha): 0.02
C: 0.20

tc (min)	I (5 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)
10	104.19	1.10	1.10		
20	70.25	0.74	0.74		
30	53.93	0.57	0.57		
40	44.18	0.47	0.47		
50	37.65	0.40	0.40		
60	32.94	0.35	0.35		
70	29.37	0.31	0.31		
80	26.56	0.28	0.28		
90	24.29	0.26	0.26		
100	22.41	0.24	0.24		
110	20.82	0.22	0.22		
120	19.47	0.21	0.21		

Subdrainage Area: UNC-2 — Uncontrolled - Non-Tributary
Area (ha): 0.01
C: 0.20

tc (min)	I (5 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)
10	104.19	0.58	0.58		
20	70.25	0.39	0.39		
30	53.93	0.30	0.30		
40	44.18	0.25	0.25		
50	37.65	0.21	0.21		
60	32.94	0.18	0.18		
70	29.37	0.16	0.16		
80	26.56	0.15	0.15		
90	24.29	0.14	0.14		
100	22.41	0.12	0.12		
110	20.82	0.12	0.12		
120	19.47	0.11	0.11		

Subdrainage Area: UNC-1 — Uncontrolled - Non-Tributary
Area (ha): 0.01
C: 0.20

tc (min)	I (5 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)
10	104.19	0.29	0.29		
20	70.25	0.20	0.20		
30	53.93	0.15	0.15		
40	44.18	0.12	0.12		
50	37.65	0.10	0.10		
60	32.94	0.09	0.09		
70	29.37	0.08	0.08		
80	26.56	0.07	0.07		
90	24.29	0.07	0.07		
100	22.41	0.06	0.06		
110	20.82	0.06	0.06		
120	19.47	0.05	0.05		

SUMMARY TO OUTLET

			Vrequired	Vavailable*	
Roof, Cistern and Ramp Drain Areas	0.28	ha			
Total 5yr Flow to Cistern	23.16	L/s	37.22	105.30 m^3	Ok
Total 5yr Flow from Roof to Sewer	6.16	L/s			
5yr Flow from Cistern to Sewer	11.54	L/s			
Non-Tributary Area	0.07	ha			
Total 5yr Flow Uncontrolled	6.63	L/s			
Total Area	0.35	ha			
Total 5yr Flow	18.18	L/s			
Target	33.30	L/s			

Project #160401787, 1184-1196 Cummings Avenue
Modified Rational Method Calculations for Storage

Subdrainage Area: UNC-4 — Uncontrolled - Non-Tributary
Area (ha): 0.04
C: 0.58

tc (min)	I (100 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)
10	178.56	9.99	9.99		
20	119.95	6.71	6.71		
30	91.87	5.14	5.14		
40	75.15	4.20	4.20		
50	63.95	3.58	3.58		
60	55.89	3.13	3.13		
70	49.79	2.79	2.79		
80	44.99	2.52	2.52		
90	41.11	2.30	2.30		
100	37.90	2.12	2.12		
110	35.20	1.97	1.97		
120	32.89	1.84	1.84		

Subdrainage Area: UNC-3 — Uncontrolled - Non-Tributary
Area (ha): 0.02
C: 0.25

tc (min)	I (100 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)
10	178.56	2.36	2.36		
20	119.95	1.58	1.58		
30	91.87	1.21	1.21		
40	75.15	0.99	0.99		
50	63.95	0.84	0.84		
60	55.89	0.74	0.74		
70	49.79	0.66	0.66		
80	44.99	0.59	0.59		
90	41.11	0.54	0.54		
100	37.90	0.50	0.50		
110	35.20	0.46	0.46		
120	32.89	0.43	0.43		

Subdrainage Area: UNC-2 — Uncontrolled - Non-Tributary
Area (ha): 0.01
C: 0.25

tc (min)	I (100 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)
10	178.56	1.24	1.24		
20	119.95	0.83	0.83		
30	91.87	0.64	0.64		
40	75.15	0.52	0.52		
50	63.95	0.44	0.44		
60	55.89	0.39	0.39		
70	49.79	0.35	0.35		
80	44.99	0.31	0.31		
90	41.11	0.29	0.29		
100	37.90	0.26	0.26		
110	35.20	0.24	0.24		
120	32.89	0.23	0.23		

Subdrainage Area: UNC-1 — Uncontrolled - Non-Tributary
Area (ha): 0.01
C: 0.25

tc (min)	I (100 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)
10	178.56	0.62	0.62		
20	119.95	0.42	0.42		
30	91.87	0.32	0.32		
40	75.15	0.26	0.26		
50	63.95	0.22	0.22		
60	55.89	0.19	0.19		
70	49.79	0.17	0.17		
80	44.99	0.16	0.16		
90	41.11	0.14	0.14		
100	37.90	0.13	0.13		
110	35.20	0.12	0.12		
120	32.89	0.11	0.11		

SUMMARY TO OUTLET

			Vrequired	Vavailable*	
Roof, Catch Basin and Ramp Drain Areas	0.28	ha			
Total 100yr Flow to Cistern	34.61	L/s	103.76	105.30 m^3	Ok
Total 100yr Flow from Roof to Sewer	7.55	L/s			
100yr Flow from Cistern to Sewer	11.54	L/s			
Non-Tributary Area	0.07	ha			
Total 100yr Flow Uncontrolled	14.21	L/s			
Total Area	0.35	ha			
Total 100yr Flow	33.30	L/s			
Target	33.30	L/s			

D.2 Watts Drainage Adjustable Accutrol Weir Detail (2016)

Adjustable Accutrol Weir

Tag: _____

Adjustable Flow Control for Roof Drains

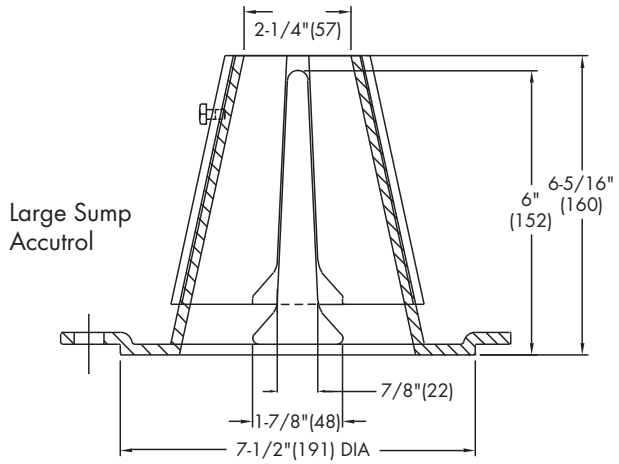
ADJUSTABLE ACCUTROL (for Large Sump Roof Drains only)

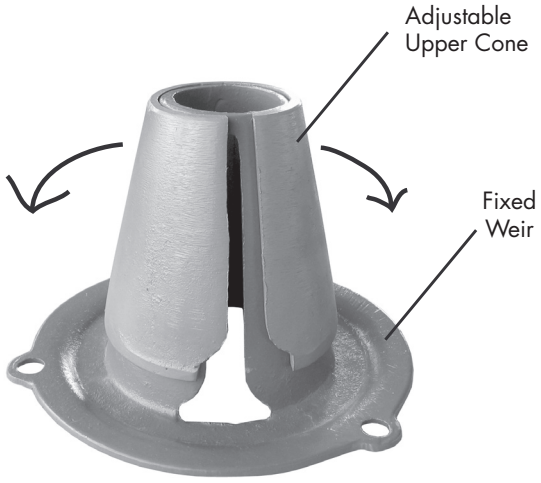
For more flexibility in controlling flow with heads deeper than 2", Watts Drainage offers the Adjustable Accutrol. The Adjustable Accutrol Weir is designed with a single parabolic opening that can be covered to restrict flow above 2" of head to less than 5 gpm per inch, up to 6" of head. To adjust the flow rate for depths over 2" of head, set the slot in the adjustable upper cone according to the flow rate required. Refer to Table 1 below.
Note: Flow rates are directly proportional to the amount of weir opening that is exposed.

EXAMPLE:

For example, if the adjustable upper cone is set to cover 1/2 of the weir opening, flow rates above 2"of head will be restricted to 2-1/2 gpm per inch of head.

Therefore, at 3"of head, the flow rate through the Accutrol Weir that has 1/2 the slot exposed will be:
[5 gpm (per inch of head) x 2 inches of head] + 2-1/2 gpm (for the third inch of head) = 12-1/2 gpm.





1/2 Weir Opening Exposed Shown Above

TABLE 1. Adjustable Accutrol Flow Rate Settings

Weir Opening Exposed	1"	2"	3"	4"	5"	6"
	Flow Rate (gallons per minute)					
Fully Exposed	5	10	15	20	25	30
3/4	5	10	13.75	17.5	21.25	25
1/2	5	10	12.5	15	17.5	20
1/4	5	10	11.25	12.5	13.75	15
Closed	5	5	5	5	5	5

Job Name _____ Contractor _____

Job Location _____ Contractor's P.O. No. _____

Engineer _____ Representative _____

USA: Tel: (800) 338-2581 • Fax: (828) 248-3929 • Watts.com
Canada: Tel: (905) 332-4090 • Fax: (905) 332-7068 • Watts.ca
Latin America: Tel: (52) 81-1001-8600 • Fax: (52) 81-8000-7091 • Watts.com

A Watts Water Technologies Company

D.3 Storm Sewer Design Sheet

Stantec

JOB NAME		STORM SEWER DESIGN SHEET (City of Ottawa)	DESIGN PARAMETERS $I = a / (t+b)^c$ (As per City of Ottawa Guidelines, 2012)	1:2 yr	1:5 yr	1:10 yr	1:100 yr				
DATE:	2023-08-30		a =	732.951	998.071	1174.184	1735.688	MANNING'S n =	0.013	BEDDING CLASS =	B
REVISION:	1		b =	6.199	6.053	6.014	6.014	MINIMUM COVER:	2.00	m	
DESIGNED BY:	-	FILE NUMBER: 160401787	c =	0.810	0.814	0.816	0.820	TIME OF ENTRY	10	min	
CHECKED BY:	-										

LOCATION			DRAINAGE AREA																						PIPE SELECTION											
AREA ID NUMBER	FROM M.H.	TO M.H.	AREA (2-YEAR) (ha)	AREA (5-YEAR) (ha)	AREA (10-YEAR) (ha)	AREA (100-YEAR) (ha)	AREA (ROOF) (ha)	C (2-YEAR) (-)	C (5-YEAR) (-)	C (10-YEAR) (-)	C (100-YEAR) (-)	A x C (2-YEAR) (ha)	ACCUM. AxC (2YR) (ha)	A x C (5-YEAR) (ha)	ACCUM. AxC (5YR) (ha)	A x C (10-YEAR) (ha)	ACCUM. AxC (10YR) (ha)	A x C (100-YEAR) (ha)	ACCUM. AxC (100YR) (ha)	T of C (min)	$I_{2\text{-YEAR}}$ (mm/h)	$I_{5\text{-YEAR}}$ (mm/h)	$I_{10\text{-YEAR}}$ (mm/h)	$I_{100\text{-YEAR}}$ (mm/h)	$Q_{CONTROL}$ (L/s)	ACCUM. $Q_{CONTROL}$ (L/s)	Q_{ACT} (CIA/360) (L/s)	LENGTH (m)	PIPE WIDTH OR DIAMETER (mm)	PIPE HEIGHT (mm)	PIPE SHAPE (-)	MATERIAL (-)	CLASS (-)	SLOPE %	Q_{CAP} (FULL) (L/s)	% FULL (-)	VEL. (FULL) (m/s)	VEL. (ACT) (m/s)	TIME OF FLOW (min)
	STM1	STM2	0.00	0.05	0.00	0.00	0.00	0.00	0.82	0.00	0.00	0.000	0.000	0.039	0.039	0.000	0.000	0.000	0.000	10.00	76.81	104.19	122.14	178.56	0.0	0.0	11.2	22.6	200	200	CIRCULAR	PVC	-	1.00	33.3	**33.49%**	1.05	0.80	0.47
	STM2	STM3	0.00	0.02	0.00	0.00	0.00	0.00	0.74	0.00	0.00	0.000	0.000	0.016	0.054	0.000	0.000	0.000	0.000	10.47	75.03	101.76	119.27	174.34	0.0	0.0	15.3	16.7	250	250	CIRCULAR	PVC	-	0.50	42.7	**35.79%**	0.86	0.66	0.42
	STM3	BLDG	0.00	0.03	0.00	0.00	0.00	0.00	0.76	0.00	0.00	0.000	0.000	0.024	0.078	0.000	0.000	0.000	0.000	10.89	73.53	99.69	116.84	170.77	0.0	0.0	21.7	8.3	250	250	CIRCULAR	PVC	-	0.50	42.7	**50.84%**	0.86	0.74	0.19
	ROOF/RAMP	OGS	0.00	0.18	0.00	0.00	0.00	0.00	0.90	0.00	0.00	0.000	0.000	0.161	0.161	0.000	0.000	0.000	0.000	10.00	76.81	104.19	122.14	178.56	0.0	0.0	46.6	2.0	300	300	CIRCULAR	PVC	-	1.00	96.2	**48.49%**	1.37	1.16	0.03
	CISTERN/ROOF	STREET																									68.3	9.4	300	300	CIRCULAR	PVC	-	1.00	96.2	**71.07%**	1.37	1.30	0.12

D.4 Correspondence with City on SWM Quality Control Criteria

Wu, Michael

From: Polyak, Alex <alex.polyak@ottawa.ca>
Sent: Monday, 17 April, 2023 13:57
To: Wu, Michael
Cc: Moir, Tyler
Subject: RE: 1184-1196 Cummings Avenue Boundary Condition Request

Hello Michael,

That is correct, SWM quality control requirements will be responsibility of the City going forward. The following criteria must be met for development scenarios:

General:

i) Characterize the water quality to be protected and Stormwater Contaminants (e.g., suspended solids, nutrients, bacteria, water temperature) for potential impact on the Natural Environment, and control as necessary, **OR**
ii) As per the watershed/subwatershed plan, similar area-wide Stormwater study, or Stormwater management plan to minimize, or where possible, prevent increases in Contaminant loads and impacts to receiving waters.

Suspended Solids:

iii) Provide Enhanced level of protection (80%) for suspended solids removal.

Water Balance:

iv) Provide a water balance analysis as per the conservation authority guidelines for development applications.
    a) Control the recharge to meet Pre-development conditions on property.

Let me know if you have any questions regarding the above.

Regards,

Oleksandr (Alex) Polyak, B.Eng., P.Eng
Project Manager, Infrastructure Approvals, Development Review East Branch | Gestionnaire de projet, Direction de l'examen des projets d'aménagement – Est.
Planning, Real Estate and Economic Development Department | Direction générale de la planification, des biens immobiliers et du développement économique

City of Ottawa | Ville d'Ottawa
110 Laurier Ave., 4th Fl East, Ottawa ON K1P 1J1
Email: alex.polyak@ottawa.ca
www.Ottawa.ca

From: Wu, Michael <Michael.Wu@stantec.com>
Sent: April 17, 2023 11:40 AM
To: Polyak, Alex <alex.polyak@ottawa.ca>
Cc: Moir, Tyler <Tyler.Moir@stantec.com>
Subject: RE: 1184-1196 Cummings Avenue Boundary Condition Request

Morning Alex, thanks for the update.

On a side note, I have been informed by Eric Lalande at the RVCA that as a result of Bill 23, stormwater quality control criteria will be provided by the City.

As such, below is a list of some key site information for our request for the stormwater quality control criteria for the site:

1. Stormwater quantity control for the site is anticipated to be provided via a combination of rooftop storage and surface storage in the surface parking and access driveway, while the remaining site will drain via uncontrolled surface flow towards the Cummings Avenue and Weldon Drive ROWs.
2. The proposed storm service lateral will be connected to the existing 600 mm diameter separated concrete storm sewer fronting the site on Cummings Avenue. This local sewer discharges to the 600 mm diameter storm sewer on Ogilvie Road.
3. In the preconsultation, the City indicated that the allowable stormwater release rate is to be calculated using:
    a. Allowable Runoff Coefficient (C): 0.5 or the existing C coefficient, whichever is more restricted
    b. Allowable Flowrate: Control the 100-year storm event to the 5-year predevelopment storm event. The remainder of the site is to be left to drain uncontrolled towards the rights of way.

Attached is the latest Site Plan (provided by Project 1 Studios Inc.), preliminary storm drainage plan, and a site map for your review.

Please let me know if you have any questions or require any additional information from our end.

Thanks,

Michael Wu, EIT
Civil Engineering Intern, Community Development

Work: (613) 738-6033
Mobile: (613) 858-0548
michael.wu@stantec.com

Stantec
300 - 1331 Clyde Avenue
Ottawa ON K2C 3G4

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D.5 Detailed Stormceptor Sizing Reports

Stormceptor® Rinker Materials

Stormceptor® EF Sizing Report

Imbrium® Systems
ESTIMATED NET ANNUAL SEDIMENT (TSS) LOAD REDUCTION

08/30/2023

Province:	Ontario
City:	Ottawa
Nearest Rainfall Station:	OTTAWA CDA RCS
Climate Station Id:	6105978
Years of Rainfall Data:	20

Project Name:	1184 Cummings Avenue
Project Number:	160401787
Designer Name:	Michael Wu
Designer Company:	Stantec
Designer Email:	Michael.Wu@stantec.com
Designer Phone:	613-738-6033
EOR Name:	
EOR Company:	
EOR Email:	
EOR Phone:	

Site Name:	Total Controlled Site

Drainage Area (ha):	0.28
Runoff Coefficient 'c':	0.84

Particle Size Distribution:	Fine
Target TSS Removal (%):	80.0

Required Water Quality Runoff Volume Capture (%):	90.00
Estimated Water Quality Flow Rate (L/s):	7.59
Oil / Fuel Spill Risk Site?	Yes
Upstream Flow Control?	No
Peak Conveyance (maximum) Flow Rate (L/s):	
Influent TSS Concentration (mg/L):	200
Estimated Average Annual Sediment Load (kg/yr):	291
Estimated Average Annual Sediment Volume (L/yr):	237

Net Annual Sediment (TSS) Load Reduction Sizing Summary

Stormceptor Model	TSS Removal Provided (%)
EFO4	92
EFO6	97
EFO8	99
EFO10	100
EFO12	100

Recommended Stormceptor EFO Model: EFO4

Estimated Net Annual Sediment (TSS) Load Reduction (%): 92

Water Quality Runoff Volume Capture (%): > 90

imbrium

THIRD-PARTY TESTING AND VERIFICATION

►**Stormceptor® EF and Stormceptor® EFO** are the latest evolutions in the Stormceptor® oil-grit separator (OGS) technology series, and are designed to remove a wide variety of pollutants from stormwater and snowmelt runoff. These technologies have been third-party tested in accordance with the Canadian ETV **Procedure for Laboratory Testing of Oil-Grit Separators** and performance has been third-party verified in accordance with the **ISO 14034 Environmental Technology Verification (ETV)** protocol.

PERFORMANCE

►**Stormceptor® EF and EFO** remove stormwater pollutants through gravity separation and floatation, and feature a patent-pending design that generates positive removal of total suspended solids (TSS) throughout each storm event, including high-intensity storms. Captured pollutants include sediment, free oils, and sediment-bound pollutants such as nutrients, heavy metals, and petroleum hydrocarbons. Stormceptor is sized to remove a high level of TSS from the frequent rainfall events that contribute the vast majority of annual runoff volume and pollutant load. The technology incorporates an internal bypass to convey excessive stormwater flows from high-intensity storms through the device without resuspension and washout (scour) of previously captured pollutants. Proper routine maintenance ensures high pollutant removal performance and protection of downstream waterwavs.

PARTICLE SIZE DISTRIBUTION (PSD)

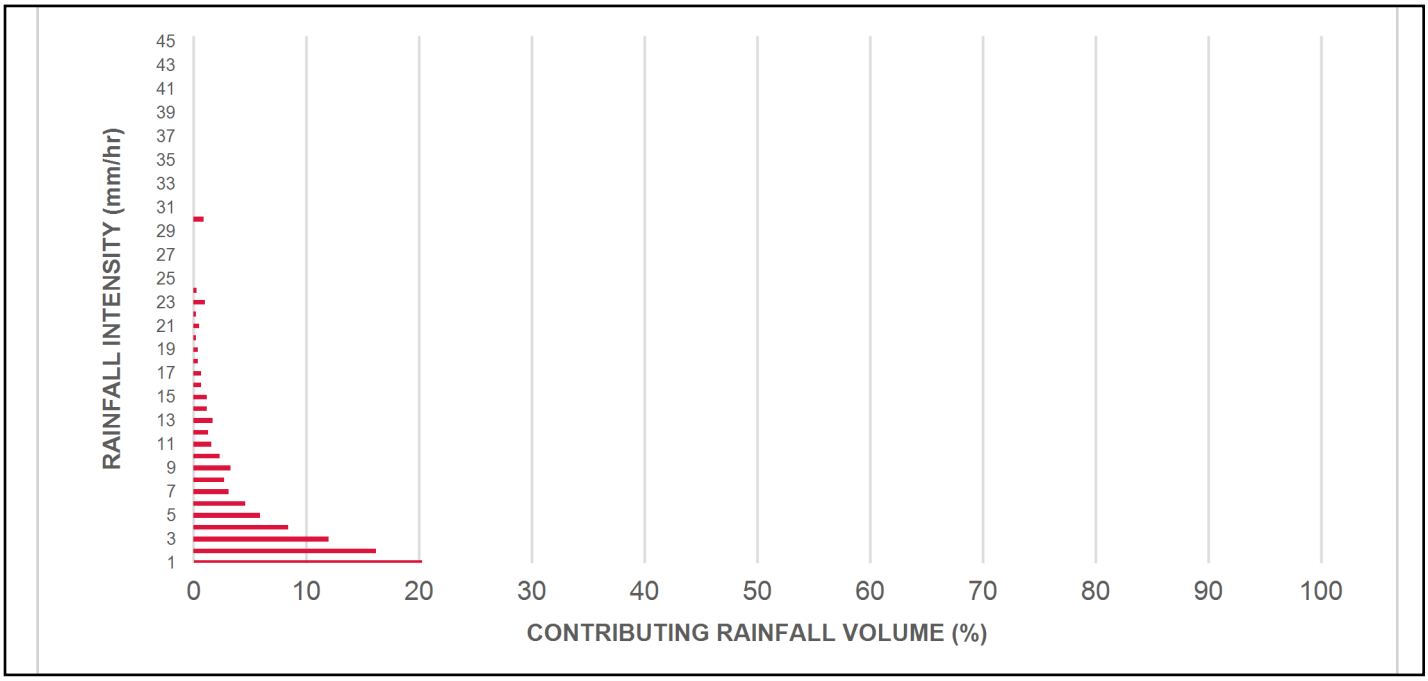
►The **Canadian ETV PSD** shown in the table below was used, or in part, for this sizing. This is the identical PSD that is referenced in the Canadian ETV ***Procedure for Laboratory Testing of Oil-Grit Separators*** for both sediment removal testing and scour testing. The Canadian ETV PSD contains a wide range of particle sizes in the sand and silt fractions, and is considered reasonably representative of the particle size fractions found in typical urban stormwater runoff.

Particle Size (µm)	Percent Less Than	Particle Size Fraction (µm)	Percent
1000	100	500-1000	5
500	95	250-500	5
250	90	150-250	15
150	75	100-150	15
100	60	75-100	10
75	50	50-75	5
50	45	20-50	10
20	35	8-20	15
8	20	5-8	10
5	10	2-5	5
2	5	<2	5

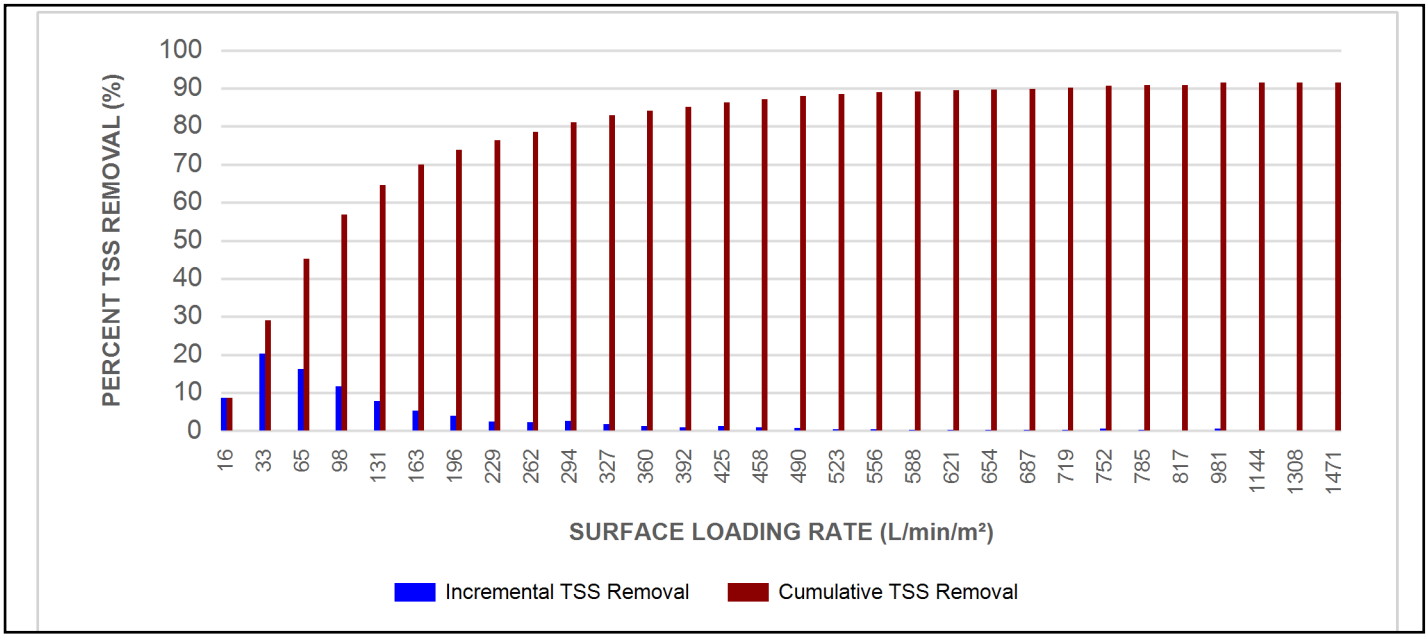
Rainfall Intensity (mm / hr)	Percent Rainfall Volume (%)	Cumulative Rainfall Volume (%)	Flow Rate (L/s)	Flow Rate (L/min)	Surface Loading Rate (L/min/m²)	Removal Efficiency (%)	Incremental Removal (%)	Cumulative Removal (%)
0.50	8.6	8.6	0.33	20.0	16.0	100	8.6	8.6
1.00	20.3	29.0	0.65	39.0	33.0	100	20.3	29.0
2.00	16.2	45.2	1.31	78.0	65.0	100	16.2	45.2
3.00	12.0	57.2	1.96	118.0	98.0	97	11.7	56.8
4.00	8.4	65.6	2.62	157.0	131.0	92	7.8	64.6
5.00	5.9	71.6	3.27	196.0	163.0	88	5.2	69.9
6.00	4.6	76.2	3.92	235.0	196.0	84	3.9	73.8
7.00	3.1	79.3	4.58	275.0	229.0	82	2.5	76.3
8.00	2.7	82.0	5.23	314.0	262.0	80	2.2	78.5
9.00	3.3	85.3	5.88	353.0	294.0	79	2.6	81.1
10.00	2.3	87.6	6.54	392.0	327.0	78	1.8	82.9
11.00	1.6	89.2	7.19	432.0	360.0	76	1.2	84.1
12.00	1.3	90.5	7.85	471.0	392.0	74	1.0	85.1
13.00	1.7	92.2	8.50	510.0	425.0	73	1.3	86.3
14.00	1.2	93.5	9.15	549.0	458.0	72	0.9	87.2
15.00	1.2	94.6	9.81	588.0	490.0	70	0.8	88.0
16.00	0.7	95.3	10.46	628.0	523.0	68	0.5	88.5
17.00	0.7	96.1	11.12	667.0	556.0	67	0.5	89.0
18.00	0.4	96.5	11.77	706.0	588.0	66	0.3	89.2
19.00	0.4	96.9	12.42	745.0	621.0	64	0.3	89.5
20.00	0.2	97.1	13.08	785.0	654.0	64	0.1	89.6
21.00	0.5	97.5	13.73	824.0	687.0	64	0.3	89.9
22.00	0.2	97.8	14.38	863.0	719.0	64	0.2	90.1
23.00	1.0	98.8	15.04	902.0	752.0	63	0.6	90.7
24.00	0.3	99.1	15.69	942.0	785.0	63	0.2	90.9
25.00	0.0	99.1	16.35	981.0	817.0	63	0.0	90.9
30.00	0.9	100.0	19.62	1177.0	981.0	62	0.6	91.5
35.00	0.0	100.0	22.88	1373.0	1144.0	58	0.0	91.5
40.00	0.0	100.0	26.15	1569.0	1308.0	55	0.0	91.5
45.00	0.0	100.0	29.42	1765.0	1471.0	50	0.0	91.5
Estimated Net Annual Sediment (TSS) Load Reduction =								**91 %**

Climate Station ID: 6105978 *Years of Rainfall Data*: 20

RAINFALL DATA FROM OTTAWA CDA RCS RAINFALL STATION



INCREMENTAL AND CUMULATIVE TSS REMOVAL FOR THE RECOMMENDED STORMCEPTOR® MODEL



Maximum Pipe Diameter / Peak Conveyance

Stormceptor EF / EFO	Model Diameter		Min Angle Inlet / Outlet Pipes	Max Inlet Pipe Diameter		Max Outlet Pipe Diameter		Peak Conveyance Flow Rate	
	(m)	(ft)		(mm)	(in)	(mm)	(in)	(L/s)	(cfs)
EF4 / EFO4	1.2	4	90	609	24	609	24	425	15
EF6 / EFO6	1.8	6	90	914	36	914	36	990	35
EF8 / EFO8	2.4	8	90	1219	48	1219	48	1700	60
EF10 / EFO10	3.0	10	90	1828	72	1828	72	2830	100
EF12 / EFO12	3.6	12	90	1828	72	1828	72	2830	100

SCOUR PREVENTION AND ONLINE CONFIGURATION

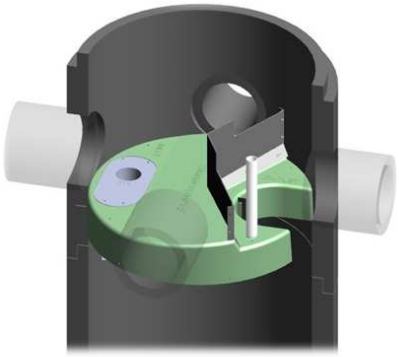
►**Stormceptor® EF and EFO** feature an internal bypass and superior scour prevention technology that have been demonstrated in third-party testing according to the scour testing provisions of the Canadian ETV **Procedure for Laboratory Testing of Oil-Grit Separators**, and the exceptional scour test performance has been third-party verified in accordance with the ISO 14034 ETV protocol. As a result, Stormceptor EF and EFO are approved for online installation, eliminating the need for costly additional bypass structures, piping, and installation expense.

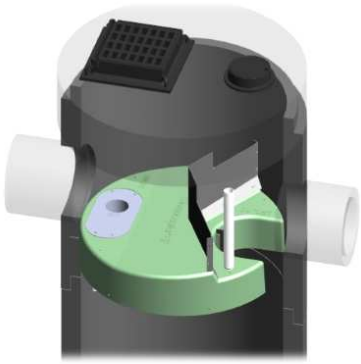
DESIGN FLEXIBILITY

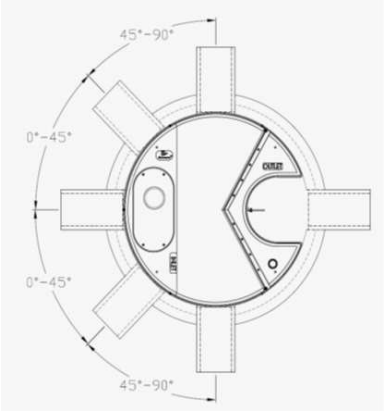
►**Stormceptor® EF** and **EFO** offers design flexibility in one simplified platform, accepting stormwater flow from a single inlet pipe or multiple inlet pipes, and/or surface runoff through an inlet grate. The device can also serve as a junction structure, accommodate a 90-degree inlet-to-outlet bend angle, and can be modified to ensure performance in submerged conditions.

OIL CAPTURE AND RETENTION

►While Stormceptor® EF will capture and retain oil from dry weather spills and low intensity runoff, **Stormceptor® EFO** has demonstrated superior oil capture and greater than 99% oil retention in third-party testing according to the light liquid re-entrainment testing provisions of the Canadian ETV **Procedure for Laboratory Testing of Oil-Grit Separators**. Stormceptor EFO is recommended for sites where oil capture and retention is a requirement.







INLET-TO-OUTLET DROP

Elevation differential between inlet and outlet pipe inverts is dictated by the angle at which the inlet pipe(s) enters the unit.
0° - 45° : The inlet pipe is 1-inch (25mm) higher than the outlet pipe.
45° - 90° : The inlet pipe is 2-inches (50mm) higher than the outlet pipe.

HEAD LOSS

The head loss through Stormceptor EF is similar to that of a 60-degree bend structure. The applicable K value for calculating minor losses through the unit is 1.1. For submerged conditions the applicable K value is 3.0.

Pollutant Capacity

Stormceptor EF / EFO	Model Diameter		Depth (Outlet Pipe Invert to Sump Floor)		Oil Volume		Recommended Sediment Maintenance Depth *		Maximum Sediment Volume *		Maximum Sediment Mass **	
	(m)	(ft)	(m)	(ft)	(L)	(Gal)	(mm)	(in)	(L)	(ft³)	(kg)	(lb)
EF4 / EFO4	1.2	4	1.52	5.0	265	70	203	8	1190	42	1904	5250
EF6 / EFO6	1.8	6	1.93	6.3	610	160	305	12	3470	123	5552	15375
EF8 / EFO8	2.4	8	2.59	8.5	1070	280	610	24	8780	310	14048	38750
EF10 / EFO10	3.0	10	3.25	10.7	1670	440	610	24	17790	628	28464	78500
EF12 / EFO12	3.6	12	3.89	12.8	2475	655	610	24	31220	1103	49952	137875

*Increased sump depth may be added to increase sediment storage capacity
** Average density of wet packed sediment in sump = 1.6 kg/L (100 lb/ft³)

Feature	Benefit	Feature Appeals To
Patent-pending enhanced flow treatment and scour prevention technology	Superior, verified third-party performance	Regulator, Specifying & Design Engineer
Third-party verified light liquid capture and retention for EFO version	Proven performance for fuel/oil hotspot locations	Regulator, Specifying & Design Engineer, Site Owner
Functions as bend, junction or inlet structure	Design flexibility	Specifying & Design Engineer
Minimal drop between inlet and outlet	Site installation ease	Contractor
Large diameter outlet riser for inspection and maintenance	Easy maintenance access from grade	Maintenance Contractor & Site Owner

STANDARD STORMCEPTOR EF/EFO DRAWINGS

For standard details, please visit http://www.imbriumsystems.com/stormwater-treatment-solutions/stormceptor-ef

STANDARD STORMCEPTOR EF/EFO SPECIFICATION

For specifications, please visit http://www.imbriumsystems.com/stormwater-treatment-solutions/stormceptor-ef

STANDARD PERFORMANCE SPECIFICATION FOR "OIL GRIT SEPARATOR" (OGS) STORMWATER QUALITY TREATMENT DEVICE

PART 1 – GENERAL

1.1 WORK INCLUDED

This section specifies requirements for selecting, sizing, and designing an underground Oil Grit Separator (OGS) device for stormwater quality treatment, with third-party testing results and a Statement of Verification in accordance with ISO 14034 Environmental Management – Environmental Technology Verification (ETV).

1.2 REFERENCE STANDARDS & PROCEDURES

ISO 14034:2016 Environmental management – Environmental technology verification (ETV)

Canadian Environmental Technology Verification (ETV) Program's **Procedure for Laboratory Testing of Oil-Grit** S**eparators**

1.3 SUBMITTALS

1.3.1 All submittals, including sizing reports & shop drawings, shall be submitted upon request with each order to the contractor then forwarded to the Engineer of Record for review and acceptance. Shop drawings shall detail all OGS components, elevations, and sequence of construction.

1.3.2 Alternative devices shall have features identical to or greater than the specified device, including: treatment chamber diameter, treatment chamber wet volume, sediment storage volume, and oil storage volume.

1.3.3 Unless directed otherwise by the Engineer of Record, OGS stormwater quality treatment product substitutions or alternatives submitted within ten days prior to project bid shall not be accepted. All alternatives or substitutions submitted shall be signed and sealed by a local registered Professional Engineer, based on the exact same criteria detailed in Section 3, in entirety, subject to review and approval by the Engineer of Record.

PART 2 – PRODUCTS

2.1 OGS POLLUTANT STORAGE

The OGS device shall include a sump for sediment storage, and a protected volume for the capture and storage of petroleum hydrocarbons and buoyant gross pollutants. The minimum sediment & petroleum hydrocarbon storage capacity shall be as follows:

2.1.1	4 ft (1219 mm) Diameter OGS Units:	1.19 m^3 sediment / 265 L oil
	6 ft (1829 mm) Diameter OGS Units:	3.48 m^3 sediment / 609 L oil
	8 ft (2438 mm) Diameter OGS Units:	8.78 m^3 sediment / 1,071 L oil
	10 ft (3048 mm) Diameter OGS Units:	17.78 m^3 sediment / 1,673 L oil
	12 ft (3657 mm) Diameter OGS Units:	31.23 m^3 sediment / 2,476 L oil

PART 3 – PERFORMANCE & DESIGN

3.1 GENERAL

The OGS stormwater quality treatment device shall be verified in accordance with ISO 14034:2016 Environmental management – Environmental technology verification (ETV). The OGS stormwater quality treatment device shall

remove oil, sediment and gross pollutants from stormwater runoff during frequent wet weather events, and retain these pollutants during less frequent high flow wet weather events below the insert within the OGS for later removal during maintenance. The Manufacturer shall have at least ten (10) years of local experience, history and success in engineering design, manufacturing and production and supply of OGS stormwater quality treatment device systems, acceptable to the Engineer of Record.

3.2 SIZING METHODOLOGY

The OGS device shall be engineered, designed and sized to provide stormwater quality treatment based on treating a minimum of 90 percent of the average annual runoff volume and a minimum removal of an annual average 60% of the sediment (TSS) load based on the Particle Size Distribution (PSD) specified in the sizing report for the specified device. Sizing of the OGS shall be determined by use of a minimum ten (10) years of local historical rainfall data provided by Environment Canada. Sizing shall also be determined by use of the sediment removal performance data derived from the ISO 14034 ETV third-party verified laboratory testing data from testing conducted in accordance with the Canadian ETV protocol Procedure for Laboratory Testing of Oil-Grit Separators, as follows:

3.2.1 Sediment removal efficiency for a given surface loading rate and its associated flow rate shall be based on sediment removal efficiency demonstrated at the seven (7) tested surface loading rates specified in the protocol, ranging 40 L/min/m^2 to 1400 L/min/m^2, and as stated in the ISO 14034 ETV Verification Statement for the OGS device.

3.2.2 Sediment removal efficiency for surface loading rates between 40 L/min/m^2 and 1400 L/min/m^2 shall be based on linear interpolation of data between consecutive tested surface loading rates.

3.2.3 Sediment removal efficiency for surface loading rates less than the lowest tested surface loading rate of 40 L/min/m^2 shall be assumed to be identical to the sediment removal efficiency at 40 L/min/m^2. No extrapolation shall be allowed that results in a sediment removal efficiency that is greater than that demonstrated at 40 L/min/m^2.

3.2.4 Sediment removal efficiency for surface loading rates greater than the highest tested surface loading rate of 1400 L/min/m^2 shall assume zero sediment removal for the portion of flow that exceeds 1400 L/min/m^2, and shall be calculated using a simple proportioning formula, with 1400 L/min/m^2 in the numerator and the higher surface loading rate in the denominator, and multiplying the resulting fraction times the sediment removal efficiency at 1400 L/min/m^2.

The OGS device shall also have sufficient annual sediment storage capacity as specified and calculated in Section 2.1.

3.3 CANADIAN ETV or ISO 14034 ETV VERIFICATION OF SCOUR TESTING

The OGS device shall have Canadian ETV or ISO 14034 ETV Verification of third-party scour testing conducted in accordance with the Canadian ETV Program's **Procedure for Laboratory Testing of Oil-Grit Separators.**

3.3.1 To be acceptable for on-line installation, the OGS device must demonstrate an average scour test effluent concentration less than 10 mg/L at each surface loading rate tested, up to and including 2600 L/min/m^2.

3.4 LIGHT LIQUID RE-ENTRAINMENT SIMULATION TESTING

The OGS device shall have Canadian ETV or ISO 14034 ETV Verification of completed third-party Light Liquid Re-entrainment Simulation Testing in accordance with the Canadian ETV **Program's Procedure for Laboratory Testing of Oil-Grit Separators,** with results reported within the Canadian ETV or ISO 14034 ETV verification. This re-entrainment testing is conducted with the device pre-loaded with low density polyethylene (LDPE) plastic beads as a surrogate for light liquids such as oil and fuel. Testing is conducted on the same OGS unit tested for sediment removal to

assess whether light liquids captured after a spill are effectively retained at high flow rates.

3.4.1 For an OGS device to be an acceptable stormwater treatment device on a site where vehicular traffic occurs and the potential for an oil or fuel spill exists, the OGS device must have reported verified performance results of greater than 99% cumulative retention of LDPE plastic beads for the five specified surface loading rates (ranging 200 L/min/m^2 to 2600 L/min/m^2) in accordance with the Light Liquid Re-entrainment Simulation Testing within the Canadian ETV Program's **Procedure for Laboratory Testing of Oil-Grit Separators.** However, an OGS device shall not be allowed if the Light Liquid Re-entrainment Simulation Testing was performed with screening components within the OGS device that are effective at retaining the LDPE plastic beads, but would not be expected to retain light liquids such as oil and fuel.

Appendix E Background Studies

E.1 Geotechnical Investigation Report by Paterson Group, March 2023

E.2 Phase I Environmental Site Assessment by Paterson Group, March 2023

Appendix F Pre-consultation

Pre-application Consultation PC2023-0001
1184, 1188 and 1196 Cummings Avenue

Zoning By-law Amendment and Site Plan Control

Follow up Meeting Notes (revised), sent on 8 February 2023

Meeting Date: 13 January 2023 Location: Virtual meeting via Teams software

Attendees:

TCU Dev. Corp.
-Dylan Desjardins, Vice President Operations
-Brendan Kuffner, Assoc., Acquisition & Private Equity

Project 1 Studio
-Ryan Koolwine

Fotenn Planning + Design
-Tamara Nahal, Planner
-Brian Casagrande, Partner
-Timothy Beed, Senior Planner

City of Ottawa

ROW, Heritage and UD
-Moise Christopher, Urban Designer

Parks and Facilities Planning
-Phil Castro, Parks Planner

Development Review
-Alex Polyak, Project Manager
-Michael Boughton, Senior Planner
-Patrick McMahon, Transportation Eng.
-Evode Rwagasore, Planner

Proposal summary

The proposal is in a form of a residential development that will consist of a six (6) storey apartment building. The three existing detached dwellings located on 1184, 1188 and 1196 Cummings Avenue will be demolished

The properties southern side lot line abuts local commercial - a gas station and car wash. The northern side lot line abuts a detached residential dwelling. The rear lot line abuts Ogilvie Court a Planned Unit Development made up of townhouses and apartment building. Across the street there is currently local commercial. The property has frontage on Cummings Avenue, a major collector road. Approximately 40 metres south of the property, Cummings Avenue intersects with Ogilvie Road, an arterial road.

As part of Planning review, we will evaluate the proposed development against the Ottawa Official Plan, Zoning By-law 2008-250, and other relevant guidelines.

PLANNING COMMENTS _ **Evode Rwagasore** - Evode.Rwagasore@ottawa.ca

Official Plan - The City's *Official Plan* (OP) designates the subject site "Mixed-Use Centre". The Mixed-Use Centre designation supports higher densities, and compact and mixed-use development oriented to rapid transit.

Secondary Plan - The property is in the planning area of the Tremblay, St. Laurent and Cyrville Secondary Plan, which provides direction on maximum building heights and minimum densities. According to Schedule C of the Secondary Plan- Cyrville Transit-Oriented Development – Maximum Building Heights – the maximum number of storeys is 6 storeys and the minimum density is 150 units per net hectare (residential) and/or 0.5 floor space index (non-residential).Based on the preliminary plan between 32 to 40 unites are proposed. At 32 units the density for the site is 229 dwelling units/hectare and at 40 units the density for the site is 287 dwelling unites/hectare.

Community Design Plan (CDP) - Transit-Oriented Development Plans are a form of CDP. The property is in the *Cyrville TOD plan*. All six TOD studies are included in one document entitled, Transit-Oriented Development (TOD) Plans – Lees, Hurdman, Tremblay, St. Laurent, Cyrville Blair. The study area boundaries for the Transit Oriented Development (TOD) Plans were established based on an approximate 10-minute (800 metre) walking distance from the transit stations. The CDPs build upon previous plans and complement other general design guidelines prepared by the City and which may be applied to the area. Where a CDP conflicts with previously adopted guidelines, the guidelines in the CDP shall prevail. All TOD Plans are within a Design Priority Area as defined in the *Official Plan*.

Guidelines - The City has adopted Transit-Oriented Development (TOD) Guidelines for use in the Mixed Use Centres to assist applicants in submitting well-designed, context-sensitive development applications.

Zoning - The site is currently zone Residential Third Density, Subzone Y, Urban Exception 708 (R3Y [708]). The Planning Rationale and proposed site plan will need to demonstrate compliance with the proposed Transit Oriented Development Subzone 1 (TD1) provisions. Buildings in the TD1 zone are to have a minimum density of 150 units per net hectare for residential or a minimum Floor Space Index (FSI) 0.5 for non-residential land use. Proponents are encouraged to provide higher than the minimum densities required in the applicable TOD zone to bolster transit supportability. Buildings in this Zone shall range in height from two storeys to six storeys, and will be comprised of one or more of stacked dwellings, townhouses, apartment dwellings, or mixed-use and commercial uses. New single and semi-detached dwellings are not permitted. The maximum building height in any area up to and including 15 metres from a property line abutting a R3 zone is 14.5 metres.

To move forward a Major Zoning Amendment Application is required, and this proposal will be treated through a Site Plan Control Application - New Complex requiring an agreement.

Application forms, timeline and fees can be found through Development applications | City of Ottawa

Planning Application Fees
Please note fees increase each year.
1. Zoning By-law Amendment: Major Zoning Amendment fee + Conservation Authority Fee
2. Site Plan Control Approval: New Complex + Initial Engineering Design Review and Inspection Fee, Ranges from $1000 to $10,000 dependent on value of hard and soft servicing + Conservation Authority Fee
Note 1: Additional Engineering Design Review and Inspection Fees of 4.5 % of the value of the hard servicing (road, sewers, watermains, sidewalks, curbs, stormwater, etc.) and 2.25 % of the soft servicing (landscaping, parking lot construction, etc.) are payable prior to the registration and should be forwarded to the Assigned Staff. The Engineering Design Review and Inspection Flat Rate Fee collected at submission will be credited to these fees. If the Site Plan process does not involve an agreement the Engineering Design Review and Inspection, Fee is required prior to Site Plan Approval.
Note 2: Each planning fee will be reduced by 10 % if two or more planning application are submitted at the same time and for the same lands. Conservation Authority, Engineering Design Review, Inspection fees and applications for Municipal Review and Concurrence of an Antenna System are not subject to this reduction.

Parkland Dedication
Any development application to which cash-in-lieu of parkland is applicable and for which an appraisal is required, will be subject to a fee for appraisal services as per the Parkland Dedication By-law.

ENGINEERING COMMENTS _ **Alex Polyak** - Alex.Polyak@ottawa.ca

Zoning By-Law Amendment

Confirm if existing services (storm, water, sanitary) are adequate to service the site.

Submission Documents:

- General Plan of Services
- Design Brief
- Geotechnical Report including a slope stability analysis

Services fronting the property:
- 250mm diameter AC Sanitary
- 600mm diameter concrete Storm
- 305mm diameter Ductile Iron Watermain

Some Engineering Design Criteria to consider under a site plan control process:

Design Criteria - Civil Engineer to contact Alex Polyak directly

Storm post to pre, C of .5 or existing (whichever is more restrictive), Pre tc 20; post tc 10

Onsite, 5-year pipe minimum and store up to 100-year on site.
No 2-year ponding onsite.
Permissible ponding of 350mm for 100-year.
No spilling to adjacent properties.
At 100-year ponding elevation you must spill to City ROW
100-year Spill elevation must be 300mm lower than any building opening

Water Boundary condition requests must include the location of the service and the expected loads required by the proposed development. Please provide the following information:

- Location of service connections (MAP)
- Type of development and the amount of fire flow required (as per FUS).
- Average daily demand: ___ l/s.
- Maximum daily demand: ___l/s.
- Maximum hourly daily demand: ___ l/s

Asset Management
There is an existing constraint in the downstream existing sanitary sewer on St. Laurent under the 417.

TRANSPORTATION _ **Patrick McMahon** - Patrick.McMahon@ottawa.ca

- Follow Traffic Impact Assessment Guidelines
  - Start this process as soon as possible.
  - Applicant advised that their application will not be deemed complete until the submission of the draft step 1-4.
- Cummings has a right of way protection of 26m as per the Official Plan. The existing ROW is approximately 20m, therefore a widening of approximately 3m will be required along the site frontage. Show this widening on future plans. Cummings is also being evaluated for cycling facilities within the draft Transportation Master Plan. If funding for the City project and timing align, opportunities should be sought to coordinate construction efforts.
- Ensure that sufficient accessible parking spaces are provided as per AODA requirements.

Future site plan considerations:

- Access location further away from Ogilvie is preferred, however any queueing impacts can be assessed within the TIA to determine whether a northbound left-turn would be warranted.
- Clear throat requirements for 100-200 apartment units accessing from a collector road are 15m which is met as proposed.
- Given TOD status and cycling infrastructure nearby, meeting one bicycle parking space per unit is recommended as well as other TDM measures given then the site is at the edge of the TOD zone.
- A noise study will be required due to proximity to Cummings and Ogilvie. Stationary noise may also need review if there is exposed mechanical equipment.
- Emsure that all previous accesses are removed and the sidewalk and curb are reinstated to full height.

FORESTRY _ **Mark Richardson** - Mark.Richardson@ottawa.ca

- A Tree Conservation Report is not mandatory but recommended at this stage; it will be required for Site Plan

ENVIRONMENTAL PLANNING _ **Sami Rehman** - Sami.Rehman@ottawa.ca

"I don't see any major environmental concerns with the proposed development on the subject property.

However, since this proposal is over 4-storeys, I would suggest they review and incorporate design elements from the City's Bird-safe Design Guidelines into their proposal. I would also encourage them to plan as many locally appropriate native trees and shrubs as they can to help reach our urban canopy target."

URBAN DESIGN _ **Christopher Moise** - Christopher.Moise@ottawa.ca

- The site is within a Design Priority Area and the proposal is subject to review by the City's Urban Design Review Panel prior to the application being deemed complete. Note this will be an Informal visit (prior to a full submission and is not a public meeting). Please contact udrp@ottawa.ca for details on submission requirements and scheduling.
- We recommend additional information to better understand the light well into the basement amenity space.
- We recommend a plan that illustrates the setback alignment with neighbouring properties to better understand the building placement in relation to the streetscape and surrounding existing and future development.
- We recommend investigating grade accessible units to the street if appropriate on one or both street frontages.
- We recommend tree planting in front of the buildings street facing facades.
- A scoped Design Brief is a required submittal (and separate from any UDRP submission) for all Site Plan/Re-zoning applications and can be combined with the Planning Rationale. Please see the Design Brief Terms of Reference provided for reference.
    - It is important to study the broader existing and future contexts.
    - It is important to explore and analyze alternative site planning and massing options. Alternative options explored and the analysis should be documented in the Design Brief.
    - A shadow study is required. Please refer to the Terms of Reference for the shadow analysis to conduct the study and evaluate the impacts.
    - ***Note. The Design Brief submittal should have a section which addresses these pre-consultation comments.***

SUBMISSION REQUIREMENTS

- Site Plan.
- Landscape Plan / Tree Conservation Report
- Planning Rationale (including Design Statement)
- Coloured Elevations
- Site Survey Plan
- Phase 1 ESA
- General Plan of Services
- Design Brief
- Geotechnical Report including a slope stability analysis
- USB stick (all submitted plans and reports in .pdf format).

Other points to note:

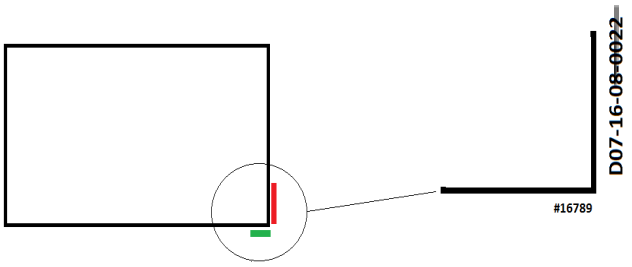
1. Contact the Conservation Authority (RVCA) Office for their requirements

2. As a suggestion, if you have not already done so, please contact and brief the Ward Councillor on your proposed application.

3. Minimum drawing and file requirements - All plans

Plans are to be submitted on standard **A1 size** (594mm x 841mm) sheets, utilizing an appropriate Metric scale (1:200, 1:250, 1:300, 1:400, or 1:500).

4. Please use the standard border (below)
A0.1 Place on all plans; DWG # and D07 # as per sample



Use **Bold Black text**:

Your Numbers are as per the colours listed here.
DWG **XXXXX** (place number on the bottom right)
D07 Number **D07-12-23-**

5. For information/question related to Development Charge, please contact AJ Mohmmand, Development Information Officer, Suburban East at DIOCentrum@ottawa.ca or 613-580-2424, ext. 29674

If you have any questions or require clarification with the above information, please contact me.

Sincerely,

Evode Rwagasore

Appendix G Drawings