Servicing and Stormwater Management Report – 1125 - 1149 Cyrville Road

Stantec Project No. 160401672

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Prepared for:

Westrich Pacific Corp.

Prepared by:

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1.0 INTRODUCTION

Stantec Consulting Ltd. has been commissioned by Westrich Pacific Corp. to prepare the following site servicing and stormwater management (SWM) report in support of a site plan control and zoning amendment application for a proposed multi-family residential development located at 1125 - 1149 Cyrville Road. The site is situated on Cyrville Road, between Ogilvie and Cummings Avenue intersections in the City of Ottawa. (See key plan in **Figure 1**). This report addresses the 3rd submission comments made by City of Ottawa reviewers and addresses subsequent changes to the Site plan.

The proposed development area (0.74 ha) consists of two residential high-rise buildings A and B to be developed in two phases i.e. Phase I and Phase II, respectively. Building A is a 6-storey building to contain 209 units in total consisting of 77 one-bedroom units, 127 two-bedroom units, 5 three-bedroom units, and 2532 m^2 of common area. Building B is a 20-storey building to contain 157 total units, including 77 one-bedroom units, 78 two-bedroom units, 2 townhouse units, and 1910 m^2 of common area. Parking is to be provided via underground parking, totaling 365 parking stalls, including 36 visitor parking stalls. The site plan has been provided in **Appendix B**.

Figure 1: Key Plan (1125 - 1149 Cyrville Road Site highlighted in Blue)

1.1 OBJECTIVE

This Site Servicing and Stormwater Management Report has been prepared to present a servicing scheme that is free of conflicts and presents the most suitable servicing approach that complies with the relevant City design guidelines. Details of the existing infrastructure were obtained from available as-built drawings and consultation with J+S Architect Inc., Westrich Pacific Corp, City of Ottawa staff, and the adjoining property owners. Infrastructure requirements for water supply, sanitary sewer, and storm sewer services are presented in this report.

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

- **Potable Water Servicing**
    - Estimate water demands to characterize the feed for the proposed development which will be serviced by an existing 250mm diameter cast iron watermain fronting the site along Cyrville Road.
    - Watermain servicing for the development is to be able to provide average day and maximum day and peak hour demands (i.e., non-emergency conditions) at pressures within the normal operating range of 50 to 80 psi (345 to 552 kPa) under maximum day condition and not less than 40psi under peak hour demand conditions.
    - Under fire flow (emergency) conditions with maximum day demands, the water distribution system is to maintain a minimum pressure greater than 20 psi (140 kPa).
- Prepare a grading plan in accordance with the proposed site plan and existing grades.
- **Stormwater Management and Servicing**
    - Define major and minor conveyance systems in conjunction with the proposed grading plan.
    - Post development peak 100-year flows controlled to the predevelopment peak 5-year release rate with a runoff coefficient of C=0.5 and a time of concentration of 20 minutes as estimated based on the existing storm sewer infrastructure servicing the existing site.
    - Excess stormwater to be detained on-site to meet the 5-year pre-development target release rate.
    - Connect to the proposed 600mm diameter concrete storm sewer within the Cyrville Road right-of-way.
    - Meet RVCA stormwater quality control requirements for the site.
    - Define and size the proposed storm sewer system.
- **Wastewater Servicing**
    - Estimate wastewater flows generated by the development and size sanitary sewers which will outlet to the existing 375mm diameter PVC sanitary sewer located on Cyrville Road.

- Define and size the proposed sanitary sewer system / building services.

The accompanying **Drawing SSP-1** illustrates the proposed internal servicing scheme for the site.

2.0 REFERENCES

Documents referenced in preparation of this Servicing and Stormwater Management Report include:

- *1125 - 1149 Cyrville Road pre-consultation comments,* City of Ottawa, March 2021.
- *City of Ottawa Design Guidelines - Water Distribution*, City of Ottawa, July 2010 (including all subsequent technical bulletins).
- *City of Ottawa Sewer Design Guidelines (SDG)*, City of Ottawa, October 2012 (including all subsequent technical bulletins).
- *Geotechnical Investigation, Proposed Commercial Development 1125 to 1149 Cyrville Road Ottawa Ontario*, Paterson Group Inc., November 2021.
- *Phase I Environmental Site Assessment Update, Proposed Residential Development 1125 to 1149 Cyrville Road Ottawa Ontario,* Paterson Group Inc., November 2021.
- *Phase II Environmental Site Assessment, Proposed Residential Development 1125 to 1149 Cyrville Road Ottawa Ontario,* Paterson Group Inc., November 2021.
- *Phase I-II Environmental Site Assessment, Proposed Commercial Development 1125 to 1149 Cyrville Road Ottawa Ontario,* Paterson Group Inc., March 2020.
- *Environmental Remedial Action Plan, Proposed Site Redevelopment 1125 to 1149 Cyrville Road Ottawa Ontario,* Paterson Group Inc., February 2020.

3.0 POTABLE WATER SERVICING

The proposed site is located within Pressure Zone 1E of the City of Ottawa's water distribution system. The proposed development will be serviced by the existing 250mm diameter watermain on Cyrville Road. To create a suitable water service connection for the property, two new service connections to the existing 250mm dia. watermain on Cyrville road separated by a new valve within the Cyrville Road watermain, and a fire hydrant within the private access right-of-way have been proposed as shown on **Drawing SSP-1**. Servicing for Building B is proposed to be provided through internal plumbing of Building A within accessible and maintainable space via underground parking areas, and is proposed to cross over the existing storm sewer easement roughly bisecting the site to the underground parking areas of Building B.

The proposed development area consists of two residential high-rise buildings (Building A & B) Building A is to contain 209 units in total consisting of 77 one-bedroom units, 127 two-bedroom units, 5 three-bedroom units, and 2,532m^2 of common areas. Building B is to contain 157 total units, including 77 one-bedroom units, 78 two-bedroom units, 2 townhouse units, and 1910m^2 of common areas.

Water demands were calculated using the City of Ottawa Water Distribution Guidelines (2010) and revised with technical bulletin ISTB-2021-03 to determine the typical operating pressures to be expected at the building (see detailed calculations in **Appendix A.1**). A demand rate of 280 L/cap/day was applied for the residential population of the proposed site. The average daily (AVDY) residential demand was estimated with population densities as per City of Ottawa Guidelines; 1.4 persons per one-bedroom apartments, 2.1 persons per two-bedroom apartments, and 3.1 persons per two-bedroom apartments with den and three-bedroom apartments.

An estimated demand of 28,000 L/ha/day was applied to the 2,532m^2 and 1,910m^2 of common areas respectively for Buildings A and B. Maximum Day (MXDY) demands were determined by multiplying the AVDY demands by a factor of 2.5 for residential areas and by a factor of 1.5 for common areas. Peak hourly (PKHR) demands were determined by multiplying the MXDY demands by a factor of 2.2 for residential areas and by a factor of 1.8 for common areas. Residential water demands are detailed in **Table 3-1**.

Table 3-1: Residential Population and Water Demands

Building	Total Units	Population	AVDY (L/s)	MXDY (L/s)	PKHR (L/s)
A	209	390	1.35	3.28	7.17
B	157	277	0.96	2.34	5.11
TOTAL SITE	**365**	**667**	**2.31**	**5.62**	**12.28**

The proposed development has an average day demand of 2.31L/s (199.6 m^3/day). Since this value exceeds 50 m^3/day, two service laterals will need to be provided for the development per the City's Water Distribution Guidelines. Two new 150mm diameter water services will be connected to the existing 250 mm diameter watermain on Cyrville Road separated by a new isolation valve on the main.

The fire flow requirement was calculated in accordance with Fire Underwriters Survey (FUS) and determined to be approximately 11,000 L/min (183.3 L/s) for Building A, and approximately 4,000 L/min (66.7 L/s) for Building B based on an updated site plan. Fire flow demand for both buildings were estimated using a non-combustible construction type with two-hour fire separations provided between each floor. Additionally, it is anticipated that both buildings will be sprinklered, with final sprinkler design to conform to the NFPA 13 standard.

As a result, the gross floor area of the ground floor (floor with the largest footprint) + 25% of the gross floor area of the two immediately adjoining floors (the second floor and third floor) were used in the FUS calculation for both buildings, as per the *Fire Underwriters Survey's Water Supply for Public Fire Protection* (2020). Detailed fire flow calculations per the FUS methodology are provided in **Appendix A.2**.

Table 3-2 shows the hydraulic boundary conditions provided by the City of Ottawa on July 20, 2021 based on domestic and fire flow demands estimated with a 350L/cap/day residential demand rate prior to the release of Technical Bulletin ISTB-2021-03. These boundary conditions are used as conservative values when analyzing the level of service for water demands presented in the table above **Table 3-2**. The boundary conditions are also included in **Appendix A.2**.

Table 3-2: Boundary Conditions

	Connection @ 1125 Cyrville Road
Min. HGL (m)	109.5
Max. HGL (m)	118.4
Max. Day + Fire Flow (200 L/s) (m)	105.0
Max. Day + Fire Flow (133.3 L/s) (m)	109.5

The desired normal operating objective pressure range as per the City of Ottawa 2010 Water Distribution Design Guidelines is 345 kPa (50 psi) to 552 kPa (80 psi) and no less than 276 kPa (40 psi) at ground elevation. Furthermore, the maximum pressure at any point in the water distribution should not exceed 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.

Both Building A and B's proposed finished floor elevation of 70.32m will serve as the ground elevation for the calculation of residual pressures at ground level. At the peak hour flow conditions (i.e., minimum HGL), the resulting boundary condition HGL of 109.5 m corresponds to a peak hour pressure of 384.3 kPa (55.7 psi). As both buildings have an average storey height of 3.16 m, an additional 31 kPa (4.5 psi) of head loss is incurred for every additional storey over ground level. This results in a peak hour pressure of 229.3 kPa (33.2 psi) at the top floor of the 6-storey Building A, and 43.3 kPa (6.3 psi) at the 12th floor of - Building B, both of which are insufficient pressures to entirely service both buildings. Therefore, a booster pump inside both buildings will be required to maintain an acceptable level of service on the higher floors. This booster pump is to be sized and designed by the buildings' mechanical engineer.

A maximum pressure check can be conducted using the building's finished floor elevation (70.32 m) and the maximum boundary condition HGL of 118.4 m. This results in a pressure of 471.6 kPa (68.4 psi). Since this value is below 80 psi, pressure reducing valves will not be required.

Boundary conditions provided by the City confirm that a fire flow rate of 12,000 L/min (200 L/s) by Building A would have a residual pressure of 340.2 kPa (49.3 psi) on Cyrville Road. Meanwhile, a fire flow rate by Building B of 8,000 L/min (133.3 L/s) fire flow would result in a residual pressure of 384.3 kPa (55.7 psi) at the watermain.

Building A is within 75 – 150m of the existing fire hydrants on St. Michael Street and Cyrville street as well as the proposed fire hydrant while building is B is within 75 -150m of the existing fire hydrant on St. Michael Street and the proposed hydrant on the northwest corner of Building A. The aggregate flow capacity of all available fire hydrants are 15,200 L/min and 9,500L/min for building A and B respectively according to ISTB-2018-02, thereby meeting the required fire flow for the site.

The proposed hydrant has been located to ensure a maximum 45m distance to proposed building fire department connections per Ontario Building Code requirements.

In conclusion, based on the boundary conditions available, the 250 mm diameter watermain on Cyrville Road provides adequate fire flow capacity as per the requirements of the Fire Underwriters Survey while respecting City of Ottawa design guidelines. Two 150 mm diameter service laterals connected to the 250 mm diameter watermain on Cyrville Road will be capable of providing the anticipated water demands to the lower storeys. A booster pump to be designed by the buildings' mechanical engineer, will be required to maintain acceptable pressures for the upper storeys of both buildings.

4.0 WASTEWATER SERVICING

As illustrated on **Drawing SSP-1 and SA-1**, sanitary servicing for the proposed development will be provided through a proposed 200 mm diameter connection along the private access road, connecting to the existing 375 mm diameter PVC sanitary sewer flowing westward on Cyrville Road. Servicing for Building B will be interconnected through internal building plumbing of Building A.

Using the City of Ottawa's recommended population densities, the proposed 6-storey residential Building A is to contain 209 units in total consisting of 77 one-bedroom units, 127 two-bedroom units, 5 three-bedroom units, and 2532 m^2 of common areas with a total estimated population of 390 people. The proposed 20-storey residential high-rise Building B is to contain 157 units in total consisting of 77 one-bedroom units, 78 two-bedroom units, 2 townhouse units, and 1910 m^2 of common areas with a total estimated population of 277 people. The anticipated wastewater peak flow generated from the proposed development is summarized in **Table 4-1** while the sanitary sewer design sheet is included in **Appendix C.1**.

Table 4-1: Estimated Wastewater Peak Flow

Residential/Commercial Peak Flows						Infiltration Flow (L/s)	Total Peak Flow (L/s)	
Building		# of Units	Population	Peak Factor	Peak Flow (L/s)			
A	Residential	209 units	390	3.79	4.91	0.22	5.13	**8.65**
B	Residential	157 units	277		3.50	0.03	3.52	

1. Average residential sanitary flow = 280 L/p/day per City of Ottawa Sewer Design Guidelines.
2. Peak factor for residential units calculated using Harmon's formula. Used a Harmon correction factor of 0.8.
3. Apartment population estimated based on 1.4 persons/unit for one-bedroom apartments, 2.1 persons/unit for one-bedroom with den & two-bedroom apartments, 3.1 persons/unit for two-bedroom with den & three-bedroom apartments
4. Estimated commercial/amenity area/lobby peak flows = 28,000 L/ha/day.
5. Infiltration flow = 0.33 L/s/ha.
6. Values in table above are subject to rounding

The City has expressed no concerns over the 375 mm diameter sanitary sewer on Cyrville Road providing sufficient capacity to service the proposed development.

The drains within covered portions of both buildings' underground parking garages will need to be pumped and ultimately outlet to the proposed sanitary sewer system. The design of these drains, internal plumbing, and associated pumping system is to be completed by the buildings' mechanical engineer.

A backflow preventer will be required for the proposed building in accordance with the City of Ottawa Sewer Design Guidelines. This requirement will be coordinated with the building's mechanical engineer.

5.0 STORMWATER MANAGEMENT

5.1 OBJECTIVES

The goal of this 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), and to provide sufficient details required for approval and construction.

5.2 EXISTING CONDITIONS AND SWM CRITERIA

The proposed re-development area (0.74 ha) is currently a vacant lot mixed with pavement and vegetation areas. The existing pavement structures on the site will be removed to allow for the proposed development. An additional area of 0.04ha (L100A) representing a 5-meter conveyance to the City along the access road area and setback requirements will be accommodated as part of this stormwater management plan.

The Stormwater Management (SWM) criteria for the subject site is based on pre-application consultation comments in **Appendix D.1** as provided by the City of Ottawa in March 2021 as follows:

i. Post-development peak flows up to 100-year event are to be controlled to the pre-development peak 5-year release rate. Excess stormwater is to be detained on-site.
ii. The 5-yr storm event runoff to be developed using the IDF information derived from the Meteorological Services of Canada rainfall data, taken from the MacDonald Cartier Airport, collected 1966 to 1997.
iii. Maximum Pre-development runoff coefficient of C=0.50.
iv. Pre-development time of concentration of tc=20, and post development tc=10.
v. Permissible surface ponding (including dynamic flow depth) of 350mm for paved areas during the 100-year storm event. No major system spillage to adjacent properties is to occur for events up to and including the 100-year storm event.
vi. Emergency major overland flows are to be directed to the adjacent municipal ROW.
vii. 100-year major system spill elevations must be 300mm lower than adjacent building openings.
viii. Permanent storm sewer infrastructure (apart from a single building service connection location for Building B) will not be permitted within the existing storm sewer easement on-site.

Other criteria considered in the SWM design are described in Section 5 of the Ottawa Sewer Design Guidelines (October 2012) including all subsequent technical bulletins.

Pre-development (i.e., current) site conditions have been classified into impervious (hard) and pervious (soft) areas, with impervious areas accounting for 81% (0.60 ha) while pervious areas cover up to 19%

(0.14 ha) of the site. Based on these figures, the overall pre-development runoff coefficient (C) for the site was calculated as C=0.77. As a result, a C value of 0.50 will be used to estimate the allowable release rate from the site as outlined in the pre-consultation meeting with City of Ottawa staff.

The allowable peak stormwater flow rate for the site was calculated as follows using the Modified Rational Method:

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

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

$$5 - year\ Intensity\ \left(\frac{mm}{hr}\right) = \frac{998.071}{(20 + 6.053)^{0.814}} = 70.25\ mm/hr$$

$$Q = 2.78(0.50)(70.25mm/hr)(0.74ha) = \mathbf{72.6\ L/s}$$

Therefore, the post-development peak flows up to the 100-year storm event must be controlled to **72.6 L/s**. The pre-development time of concentration was assumed to be 20 minutes, as directed by the City during pre-consultation.

5.3 STORMWATER MANAGEMENT DESIGN

The proposed site will be serviced by a proposed 600mm diameter storm sewer running east to west on Cyrville Road, as shown on **Drawing SD-1**. An area of 0.74 ha is considered in the stormwater management design and does not include the 5-meter wide City block.

Stormwater cisterns located in the underground parking area will attenuate peak flows from the roofs of both buildings, outdoor amenity areas and landscaped areas within the site to ensure that the overall site release rate meets the allowable release rate. The proposed stormwater cisterns will be fed by the internal plumbing of the buildings. As shown on **Drawing SD-1**, peak flows from the proposed Cistern B will outlet to a 300 mm diameter storm service lateral crossing the easement and drained to a storm service stub within the proposed site private access via Building A. The internal plumbing in Building A should accommodate an independent connection of Building B to the storm service stub at Building A.

Catch basins and landscape drains for the areas tributary to the stormwater cistern will connect to the cistern via internal plumbing (designed by the building's mechanical engineer). The stormwater cisterns will be pumped at a controlled rate and ultimately outlet to the proposed 600 mm diameter concrete storm sewer on Cyrville Road (see **Drawing SD-1)**. The stormwater cisterns' controlled release rate will be set via pump to be designed by a mechanical engineer based on calculations provided in **Appendix D**.

The stormwater cistern location(s) will be coordinated with the building's architect and structural engineer. Peak flows have been identified to the building's mechanical engineer to size the internal plumbing system appropriately.

Surface storage is also proposed on the private access way to retain storm run-off exceeding a 2-year storm event. The proposed site plan, drainage areas and proposed storm sewer infrastructure are shown on **Drawing SD-1 and SSP-1.**

5.3.1 Water Quantity Control

The Modified Rational Method (MRM) was used to assess the flow rate and volume of runoff generated under post-development conditions. The site was subdivided into sub-catchments tributary to separate quantity control measures and subject to different inlet controls. **Drawing SD-1** delineates the appropriate sub-catchment areas. The MRM spreadsheet is included in **Appendix D.2.**

The following assumptions were made in the creation of the storm drainage plan and accompanying MRM spreadsheet:

1) Rooftop storage is available on four of five roof catchment areas.
2) On-site stormwater runoff (including green areas) will be collected using a combination of area drains, catch-basins, and internal building plumbing for detention in two stormwater cisterns (Cistern A and Cistern B) located in Building A and B, respectively.
3) Some pedestrian access and landscaping areas on the south and west perimeters of the site will sheet drain uncontrolled to Cyrville Road (UNC-1).
4) The storm runoff within the access road area of the site will be captured into the site storm sewer system and directed to a proposed oil/grit separator unit.

Post-development peak flows up to the 100-year storm event within the development area will be controlled to a total permitted release rate of 72.6 L/s, therefore, on-site storage will be required.

5.3.1.1 Rooftop Storage

Rooftop storage is proposed on the site on all rooftop areas excluding areas intended for amenity use such as ROOF 1B. This rooftop area will drain uncontrolled to the cistern via the internal plumbing of the building (see **Drawing SD-1**).

Rooftop storage will be achieved by installing restricted flow roof drains. The following calculations assume the roof will be equipped with standard Watts Model R1100 Accuflow Roof Drains or approved equivalent, see **Appendix D.2** for Modified Rational Method design sheet.

Watts Drainage “Accutrol” roof drain weir data has been used to calculate a practical roof release rate and detention storage volume for the rooftops. 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 total roof drain release rate is restricted to match the maximum rate of release indicated in **Table 5-1**, and that sufficient roof storage is provided to meet (or exceed) the resulting volume of detained stormwater.

Table 5-1: Roof Control Area

Roof ID	Accutrol Weir Setting	No. of Drains	5-yr release rate (L/s)	100-yr release rate (L/s)	100-yr ponding depth (m)	100-yr storage required (cu.m)	Storage provided (cu.m)
Roof 1A	75% open	3	3.6	4.6	0.15	32.5	34.8
Roof 1C	75% open	5	6.2	7.9	0.15	68.9	69.3
Roof 2A	Closed	7	4.4	4.4	0.15	27.4	30.3
Roof 2B	Closed	1	0.63	0.63	0.15	1.4	2.5

5.3.1.2 Access Road Areas

The private access road consists of a flexible pavement providing access and exit to the underground parking. SWM in the proposed access road areas will be achieved using a proposed catchbasin manhole and catchbasin inlet equipped with an inlet control device (ICD) to restrict minor system peak flows (2-year) to the 100-year storm. **Table 5-2** below shows the characteristics of the proposed ICD (see **Appendix D.2** for detailed calculations).

Table 5-2: Schedule of Inlet Control Device

Catch basin ID	Tributary Area ID	ICD Type	5 - Year Head (m)	100 - Year Head (m)	5 -Year Flow (L/s)	100 - Year Flow (L/s)
CB L100A	L100	75 mm Orifice	1.77	1.92	10.2	16.5

The 5-year and 100-year storage/ flow values are conservative and represent the maximum permissible release rates/storage volumes.

5.3.1.3 Uncontrolled Areas

Uncontrolled areas UNC-1 and UNC-2 cannot be graded to enter the site storm sewer system and as such, they will sheet drain to Cyrville Road to the south and grassed area to the north. All uncontrolled flows have been included within the target release rate for the site.

Table 5-3 Peak Uncontrolled 5- and 100- Year run-off

Area IDs	Area (ha)	Runoff 'C' (5- Year)	5 Year uncontrolled peak flow (L/s)	Runoff 'C' (100 -Year)	100 Year uncontrolled peak flow (L/s)
UNC-1	0.04	0.44	4.6	0.55	9.9
UNC-2	0.01	0.50	1.8	0.63	3.9

5.3.1.4 Stormwater Cistern(s)

The allowable release rates from the proposed building's underground cisterns were determined by subtracting all uncontrolled 100-year peak flows as well as that from the access road tributary contribution from the overall site allowable release rate, which results in available peak flow rate of approximately 42.3 L/s.

The stormwater cisterns will be designed to provide a total storage volume of 85 m^3 with a maximum controlled release rate of 42 L/s (32 L/s for Cistern 'A' and 10 L/s for Cistern 'B'). The stormwater cisterns are each to discharge at their controlled release rates using a pump. **Table 5-5** and **Table 5-5** summarizes the respective flow rates and volumes of stormwater Cisterns A and B during the 5-year and 100-year storm events.

Table 5-4: Proposed Cistern-A 5 and 100-Year Release Rate

Storm Return Period	Area IDs	Area (ha)	$Q_{release}$ (L/s)	$V_{required}$ (m^3)	$V_{available}$ (m^3)
5-year	ROOF 1A, ROOF 1B, ROOF 1C, L100, TANK1B	0.45	32	11.9	45.0
100-year				43.4	

Table 5-5: Proposed Cistern-B 5 and 100-Year Release Rate

Storm Return Period	Area IDs	Area (ha)	$Q_{release}$ (L/s)	$V_{required}$ (m^3)	$V_{available}$ (m^3)
5-year	ROOF 2A, ROOF 2B, TANK 2A, TANK 2B, TANK 2C	0.20	10	12.9	40.0
100-year				35.5	

5.3.2 Results

Table 5-6 and **Table 5-7** demonstrate that the proposed stormwater management plan provides adequate attenuation storage to meet the post-development allowable release rate for the site.

Table 5-6: Estimated Post-Development Discharge (5-Year)

Area Type	$Q_{release}$ (L/s)	Allowable Release Rate (L/s)
Controlled areas	52.2	**72.6**
Uncontrolled areas	6.4	
Total	**58.6**	

Table 5-7: Estimated Post-Development Discharge (100-Year)

Area Type	$Q_{release}$ (L/s)	Allowable Release Rate (L/s)
Controlled areas	58.5	**72.6**
Uncontrolled areas	13.8	
Total	**72.3**	

5.3.3 Water Quality Control

The RVCA confirmed that enhanced water quality protection (80% TSS removal) is required for the site as distance from the downstream outlet to a watercourse is less than 500m. The water quality objective noted is for 'enhanced' (80% TSS removal, refer to correspondence with RVCA in **Appendix D.3**.)

To achieve this end, on-site runoff will be captured into the site storm sewer system and directed to a proposed oil/grit separator unit. The Stormceptor sizing software has been used to size the required unit to provide 80% long-term TSS removal based on proposed drainage areas (i.e., 0.74 ha) as shown in the Stormceptor sizing design sheet included in **Appendix D.5.**

An Imbrium Stormceptor EF04 designed to provide 81% TSS removal has been proposed to collect and treat storm runoff from the site before outleting to the proposed 600mm diameter storm sewer on Cyrville Road as shown in **Drawing SSP-1.** The EF04 unit has been used as an example only and other approved equivalent products may be specified for use so long as an equivalent treatment rate and unit oil/sediment storage capacity may be achieved.

6.0 GRADING AND DRAINAGE

The proposed re-development site measures approximately 0.74 ha in area. A detailed grading plan (see **Drawing GP-1**) has been prepared to satisfy the stormwater management requirements described in **Section 5.0** and to allow for positive drainage away from the face of the building.

The site grading along the access road is designed to effectively drain stormwater runoff in the area into proposed catch basins. Grading for the access ramp to the underground parking levels have been coordinated with the architect. The subject site where feasible maintains overland flow routes towards Cyrville Road to the south. Major overland flow routes to northern properties are for emergency purposes only where grading to Cyrville Road may not be maintained (areas L100, TANK 2A, TANK 1B, and TANK 2B); these routes are not expected to receive discharge for storm events up to and including the 100-year storm event as identified in the stormwater management section above.

7.0 UTILITIES

Hydro Ottawa, Bell, Rogers, and Enbridge all have existing utility plant in the area, which will be used to service Building A of the site. As directed by the City of Ottawa, no private utilities are to cross the central storm sewer easement between Building A and B. As such, electrical, gas, and other utilities will be supplied to Building B from the adjacent property to the north, through Ogilvie Road. The detailed design of the required utility services will be further investigated as part of the composite utility planning process, which will follow design circulation for the servicing plans.

Municipal water and sewer services are supplied to both buildings by underground service trenches along the private access road, connecting to Cyrville Road. Electricity and the phone line are to service Building A from underground service trenches south of the buildings

8.0 EROSION CONTROL DURING CONSTRUCTION

In order 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. Provide sediment traps and basins during dewatering works.

7. Install sediment traps (such as SiltSack® by Terrafix) between catch basins and frames.

8. 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 EC/DS-1** for the proposed location of silt fences, straw bales, and other erosion control measures.

9.0 GEOTECHNICAL INVESTIGATION AND PHASE I ESA

9.1 GEOTECHNICAL INVESTIGATION

A geotechnical report for the site was prepared by Paterson Group Inc. on November 16, 2021. This report was commissioned for a proposed residential development by Westrich Pacific Corp, based on field investigations completed in August 16 and 17, 2011.

The investigation consisted of twelve boreholes advanced to a maximum depth of 5.7m below existing grade. As stated in the geotechnical report, the subsurface profile encountered at the boreholes consists of pavement structure, topsoil, or crushed stone fill at ground surface underlain by brown silty clay with gravel and/or silty sand with gravel. A weathered shale bedrock was encountered below the above-noted layers at all borehole locations. Shale bedrock was cored at BH 1, BH 2 and BH 12 to a maximum depth of 5.7 m below existing ground surface. The bedrock in the immediate area of the subject site consists of potentially expansive shale from the Billings Formation at a 2 to 5 m depth.

Three groundwater monitoring wells were installed at BH1, BH2, and BH12 as part of the geotechnical investigation. Groundwater levels at the borehole locations were measured on August 22, 2011 and were found to be dry upon completion of the field program. It should be noted that groundwater levels are subject to seasonal fluctuations and can thus vary at the time of construction.

Bedrock removal will be required for the proposed building excavations and can be accomplished by hoe ramming where only small quantity of the bedrock needs to be removed, while line drilling and controlled blasting would be ideal for larger quantities. Sound bedrock may be removed by line drilling and controlled blasting and/or hoe ramming. Prior to considering blasting operations, the blasting effects on the existing services, buildings and other structures should be addressed. A pre-blast or pre-construction survey of the existing structures located in proximity of the blasting operations should be completed prior to commencing site activities. The extent of the survey should be determined by the blasting consultant and should be sufficient to respond to any inquiries/claims related to the blasting operations. As a general guideline, peak particle velocities (measured at the structures) should not exceed 25 mm/s during the blasting program to reduce the risks of damage to the existing structures. The blasting operations should be planned and conducted under the supervision of a licensed professional engineer who is also an experienced blasting consultant. Excavation side slopes in sound bedrock can be carried out using almost vertical side walls. A minimum 1m horizontal ledge, should be left between the bottom of the overburden excavation and the top of the bedrock surface to provide an area to allow for potential sloughing.

The report recommends a rigid pavement structure for the parking garage and a flexible pavement structure for the design of the access lanes.

Table 9-1: Recommended Rigid Pavement Structure - Parking Garage

Material	Thickness
Reinforced Concrete Slab	125 mm
Bedding, OPSS Granular A Crushed Stone	200 mm
Subgrade: In situ soil, or OPSS Granular B Type I or II material placed over in situ soil	

Table 9-2: Recommended Flexible Pavement Structure – Access Lane

Material	Thickness
Wear Course, HL-3 or Superpave 12.5 Asphaltic Concrete	40 mm
Binder Course, HL-8 or SP 19 Asphaltic Concrete	50 mm
Granular Base Course, OPSS Granular A Crushed Stone	150 mm
Granular Subbase Course, OPSS Granular B Type II	450 mm
Subgrade: Either in situ soils, engineered fill or OPSS Granular B Type I or II material placed over in situ soil	

Minimum Performance Graded (PG) 58-34 asphalt cement should be used for this project. If soft spots develop in the subgrade during compaction or due to construction traffic, the affected areas should be excavated and replaced with OPSS Granular B Type I or II material. The pavement granular base and subbase should be placed in maximum 300 mm thick lifts and compacted to a minimum of 100% of the material's SPMDD using suitable vibratory equipment.

The subject site is considered satisfactory for a proposed residential development in this geotechnical investigation, where it was expected that the proposed residential buildings would be founded by conventional shallow footings placed on the shale bedrock surface.

9.2 2021 PHASE I ENVIRONMENTAL SITE ASSESSMENT (ESA)

An update to the Phase I ESA (originally done in 2013) was completed by Paterson Group on November 10, 2021 to meet the requirements of MECP O.Reg. 153/04, as amended. References are provided to findings from the 2013 Phase I ESA, as well as the latest 2020 Phase I-II ESA.

A site visit conducted on October 29, 2021, confirming that the site exists as vacant land with a temporary MOD space/trailer on the central west portion of the site as well as a small sea container situated on the northern end of the lot. Three (3) hydro poles are also present on the central portion of the site. Most of the land is covered in gravel with some low brush and three (3) asphaltic concrete paved laneways situated where the former buildings were once present, fronting Cyrville Road. Site drainage consists primarily of infiltration. The site topography is relatively flat and slightly below the grade of Cyrville Road, while the regional topography slopes down in a southwesterly direction.

No signs of staining or discolouration were observed at the time of the site visit. No obvious signs of fill material were noted on the subject land at the time of the site assessment. No evidence of any above

ground or underground storage tanks was noted at the time of the site visit. No areas of ponded water exist. No evidence of current or former railway or spur lines was observed on the Phase I ESA Property at the time of the site visit. No areas of unidentified substances were observed on-site at this time. No PCAs were identified during the site visit.

Paterson Group's recommendation was that a Phase II ESA is required for the property.

9.2.1 2020 Remedial Action Plan

Paterson Group Inc. proposed a remedial action plan for the subject site on February 12, 2020, addressing previously identified locations, namely the south-central portion of the site with metal impacted fill material, and the northwestern portion of the site with PHC impacted soil, surrounding the former underground storage tank nest. The proposed remedial program involves a full depth approach, which will excavate all hydrocarbon and/or heavy metal impacted soil and bedrock from within the boundaries of the subject site. Any free product that may be encountered in the groundwater within the excavation would be pumped by an MECP licensed pumping contractor for off-site transfer and disposal.

In the northwest portion of the site, where PHC impacted soils were identified in a previous study, a portable treatment system would be installed to treat on-site accumulated groundwater by means of granular activated carbon. The groundwater treatment system will consist of one unit and will remain in place until the on-site groundwater concentrations are in compliance with both the MECP Table 7 standards and City of Ottawa sewer discharge standards.

Upon completion, there would be a confirmatory sampling program to ensure that the site meets MECP Table 7 standards. Finally, backfills would occur at the excavations, using clean excavated material if deemed geotechnically suitable, or with OPSS Granular B Type II crushed stone as engineered fill up to the underside of the pavement structure.

9.3 2021 PHASE II ENVIRONMENTAL SITE ASSESSMENT (ESA)

A Phase II ESA was prepared by Paterson Group on November 12, 2021 to address potentially contaminating activities (PCAs) that were identified during the previous Phase I ESAs and Phase I ESA Update and considered to result in areas of potential environmental concern (APECs) on the subject Property.

Concentrations of BTEX, PHCs and 1-4 dichlorobenzene exceeding the MECP Table 7 Standards were identified in the immediate area of the former UST nest. All other groundwater samples complied with the selected MECP Standards. Benzene tested from the BH3-20 sample was marginally in excess of the standard, while the duplicate sample concentration indicated compliance with the standard due to sediment. Paterson recommends the groundwater at BH3-20 should be retested for confirmatory purposes.

Based on the findings of the Phase II ESA, Paterson recommended that a soil and groundwater remediation program be carried out at the Phase II Property. The remediation should be completed in conjunction with

the construction excavation. It is anticipated that the impacted groundwater will be removed in conjunction with the excavation and removal of the impacted soil and upper levels of the underlying bedrock.

Prior to remedial activities, it is recommended that a representative sample of impacted soil be submitted for a leachate analysis in accordance with O.Reg. 347/558, as required for disposal at an approved landfill site. It is recommended that Paterson personnel be on-site at the time of the remedial activities to direct excavation and segregation of impacted soil, and to collect additional delineation and confirmatory soil samples as required in accordance with O.Reg. 153/04 to support the filing of a Record of Site Condition. Excess soil requiring off-site disposal during construction must be managed in accordance with Ontario Regulation 406/19: On-site and Excess Soil Management.

Paterson also recommends that the groundwater monitoring wells be maintained for future sampling purposes. The monitoring wells are registered with the MECP under Ontario Regulation 903 (Ontario Water Resources Act). However, the wells would require decommission according to this regulation, if they are determined to not be of use in the future, or will be destroyed during future construction activities.

10.0 APPROVALS/PERMITS

A Ministry of the Environment, Conservation and Parks (MECP) Environmental Compliance Approval (ECA) will be required for the installation of a new 600 mm diameter storm sewer run within the Cyrville Road ROW. Additionally, municipal consent will be required for upsizing of the Cyrville Road storm sewer to provide an adequate outlet for the proposed site and ensure that no infrastructure and utility conflicts exist.

If the ground or surface water volumes being pumped during the construction phase are between 50,000 and 400,000 L/day, it is required to register on the Environmental Activity and Sector Registry (EASR). 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. A Permit to Take Water (PTTW) through the MECP would be required for dewatering in excess of 400,000 L/day, which is unlikely for this site. However, if a PTTW is required, at least 4 to 5 months should be allowed for completion of the application and issuance of the permit by the MECP. If blasting is used to remove the bedrock as part of the excavation for the building foundation, prior approval is required from the owners/operators of any water storage reservoir, pumping station, and water works transformer station within 200 m of the site.

11.0 CONCLUSIONS

11.1 POTABLE WATER SERVICING

The proposed 6 and 20-storey residential high-rise buildings will be serviced by the existing 250mm diameter watermain on Cyrville Road. Water demand calculation was based on a demand rate of 280 L/cap/day for residential units and 28,000 L/ha/day for common areas. The fire flow requirement for both buildings were calculated in accordance with Fire Underwriters Survey guidelines (FUS). It is anticipated that the building will be sprinklered, with final sprinkler design to conform to the NFPA 13 standard. A booster pump, to be designed by the buildings' mechanical engineer, will be required to maintain minimum required pressures for the upper storeys.

11.2 WASTEWATER SERVICING

The site will be serviced by an existing 375 mm diameter PVC sanitary sewer flowing westward on Cyrville Road. A 200 mm diameter service pipe will firstly direct sanitary flows from Building B to the 6-storey Building A. The development's combined sanitary flows will be routed through a single 200 mm service lateral southward along the private access road and connect to the existing Cyrville Road sanitary sewer.

The proposed sanitary service lateral is sufficiently sized to provide gravity drainage for the site. The floor drains in the underground parking will be connected to the building plumbing system and discharged to the sanitary service lateral through a sump pump. A backflow preventer will be required for the proposed building in accordance with the Ottawa Sewer Design Guide and will be coordinated with the buildings' mechanical engineer.

11.3 STORMWATER MANAGEMENT AND SERVICING

The subject site will be serviced by a proposed 600mm diameter concrete storm sewer running east to west on Cyrville Road. Stormwater cisterns will be required to attenuate peak flows from the site, to meet the site target release rate. The proposed stormwater cisterns will be serviced by the building internal plumbing system. The stormwater cistern's controlled release rate will be achieved by a pump to be designed by a mechanical engineer.

A proposed oil/grit separator unit will treat storm runoff from the site to achieve 80% TSS removal. An Imbrium stormceptor EF06 or approved equivalent is recommended for this purpose.

11.4 SITE GRADING AND DRAINAGE

Grading for the site is designed as per City of Ottawa requirements and provides for outlet of emergency overland flow under extreme flood conditions. Erosion and sediment control measures will be implemented during construction to reduce the impact on existing facilities.

11.5 UTILITIES

Hydro Ottawa, Bell, Rogers, and Enbridge all have existing utility plants in the area, which will be used to service the 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 moved/reconfigured to allow sufficient clearance to the proposed building. The relocation of existing utilities will be coordinated with the individual utility providers upon design circulation.

11.6 APPROVALS/PERMITS

A Ministry of the Environment, Conservation and Parks (MECP) Environmental Compliance Approval (ECA) will be required for the installation of a new storm sewer run within the Cyrville Road ROW. Municipal consent will be required for upsizing of the Cyrville Road storm sewer to provide an adequate outlet for the proposed site and ensure that no infrastructure and utility conflicts exist.

A Permit to Take Water (PTTW) may be required if the dewatering during the construction of the underground parking level is expected to exceed 400,000 L/day. No other approval requirements from other regulatory agencies are anticipated. For dewatering activities between 50,000 and 400,000 L/day, registration on the Environmental Activity and Sector Registry (EASR) will be required. If blasting is used to remove the bedrock as part of the excavation for the building foundation, prior approval is required from the owners/operators of any water storage reservoir, pumping station, and water works transformer station within 200 m of the site.

APPENDICES

Appendix A POTABLE WATER SERVICING

A.1 WATER DEMAND CALCULATIONS

1125-1149 Cyrville Road, Ottawa, ON - Domestic Water Demand Estimates

Site Plan provided by J + S Architect Inc. (2023-01-18)

Project No. 160401672

Densities as per City Guidelines:		
Apartment Units		
1 Bedroom	1.4	ppu
2 Bedroom	2.1	ppu
3 Bedroom	3.1	ppu

Building ID	Amenity & Common Area (m²)	No. of Units	Population	Daily Rate of Demand [1] [2] (L/cap/day or L/ha/day)	Avg Day Demand		Max Day Demand [3] [4]		Peak Hour Demand [3] [4]	
					(L/min)	(L/s)	(L/min)	(L/s)	(L/min)	(L/s)
Building A										
Apartment Units										
1 Bedroom		77	108	280	21.0	0.35	52.4	0.87	115.3	1.92
2 Bedroom		127	267	280	51.9	0.86	129.6	2.16	285.2	4.75
3 Bedroom		5	16	280	3.0	0.05	7.5	0.13	16.6	0.28
Total common areas	2532			28000	4.9	0.082	7.4	0.123	13.3	0.222
Total Site :		**209**	**390**		**80.8**	**1.35**	**197.0**	**3.28**	**430.4**	**7.17**

1 Average day water demand for residential areas: 280 L/cap/d per ISTB-2021-03

2 Average day water demand for Amenity/common areas: 28,000 L/ha/d (Based on commercial water demand rates)

3 The City of Ottawa 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 for residential

peak hour demand rate = 2.2 x maximum day demand rate for residential

4 Water demand criteria used to estimate peak demand rates for amenity/common areas are as follows:

maximum daily demand rate = 1.5 x average day demand rate

peak hour demand rate = 1.8 x maximum day demand rate

1125-1149 Cyrville Road, Ottawa, ON - Domestic Water Demand Estimates

Site Plan provided by J + S Architect Inc. (2023-01-18)

Project No. 160401672

Densities as per City Guidelines:		
Apartment Units		
1 Bedroom	1.4	ppu
2 Bedroom	2.1	ppu
Townhouse	2.7	ppu

Building ID	Amenity & common areas (m²)	No. of Units	Population	Daily Rate of Demand [1] [2] (L/cap/day or L/ha/day)	Avg Day Demand		Max Day Demand [3] [4]		Peak Hour Demand [3] [4]	
					(L/min)	(L/s)	(L/min)	(L/s)	(L/min)	(L/s)
Building B										
Apartment Units										
1 Bedroom		77	108	280	21.0	0.35	52.4	0.87	115.3	1.92
2 Bedroom		78	164	280	31.9	0.53	79.7	1.33	175.4	2.92
Townhouse Unit		2	5	280	1.1	0.02	2.6	0.04	5.8	0.10
Total common areas	1910			28000	3.71	0.062	5.6	0.093	10.0	0.17
Total Site :		**157**	**277**		**57.6**	**0.96**	**140.3**	**2.34**	**306.5**	**5.11**

1 Average day water demand for residential areas: 280 L/cap/d per ISTB-2021-03

2 Average day water demand for Amenity/common areas: 28,000 L/ha/d (Based on commercial water demand rates)

3 The City of Ottawa 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 for residential

peak hour demand rate = 2.2 x maximum day demand rate for residential

4 Water demand criteria used to estimate peak demand rates for amenity/common areas are as follows:

maximum daily demand rate = 1.5 x average day demand rate

peak hour demand rate = 1.8 x maximum day demand rate

A.2 FIRE FLOW REQUIREMENTS PER FUS GUIDELINES

FUS Fire Flow Calculation Sheet

Stantec Project #: 160401672
Project Name: 1125-1149 Cyrville Road, Ottawa, ON
Date: 2022-05-09
Fire Flow Calculation #: 1
Description: Multi family residential
Notes: Building A:6-storey residential high-rise with indoor amenity in its 6th floor. Information taken from Conceptual Design by J + S Architect Inc. dated April 18, 2022. 2-hour fire separation provided between each floor and 1-hour fire separation provided for exterior vertical communications.

Step	Task	Notes	Value Used	Req'd Fire Flow (L/min)
1	Determine Type of Construction	Non-Combustible Construction	0.8	-
2	Determine Ground Floor Area of One Unit (m2)	Used the 'gross floor area' of Building A ground floor (i.e. floor with the largest footprint, 2638.1 m2) + 25% of the gross construction area of the two immediately adjoining floors (the third floor and fourth floor). Methodology as per Page 17 of the Fire Underwriters Survey's Water Supply for Public Fire Protection, 1999.	3957.2	-
	Determine Number of Adjoining Units	-	1	-
3	Determine Height in Storeys	Does not include floors >50% below grade or open attic space	1	-
4	Determine Required Fire Flow	(F = 220 x C x $A^{1/2}$). Round to nearest 1000 L/min	-	11000
5	Determine Occupancy Charge	Limited Combustible	-15%	9350
6	Determine Sprinkler Reduction	Conforms to NFPA 13	-30%	-3740
		Standard Water Supply	-10%	
		Not Fully Supervised or N/A	0%	
		% Coverage of Sprinkler System	100%	

7	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	-	-
		North	10.1 to 20	30	20	> 120	Wood Frame or Non-Combustible	15%	5610
		East	10.1 to 20	40	1	31-60	Wood Frame or Non-Combustible	13%	
		South	3.1 to 10	87	2	> 120	Wood Frame or Non-Combustible	20%	
		West	10.1 to 20	27	1	0-30	Wood Frame or Non-Combustible	12%	

8	Determine Final Required Fire Flow	Total Required Fire Flow in L/min, Rounded to Nearest 1000L/min	11000
		Total Required Fire Flow in L/s	183.3
		Required Duration of Fire Flow (hrs)	2.00
		Required Volume of Fire Flow (m^3)	1320

FUS Fire Flow Calculation Sheet

Stantec Project #: 160401672
Project Name: 1125-1149 Cyrville Road, Ottawa, ON
Date: 2022-05-09
Fire Flow Calculation #: 1
Description: Residential High-rise
Notes: Building B: 20-storey residential high-rise. Information taken from Conceptual Deisgn Residential Development by J + S Architect Inc. dated April 18, 2022. 2-hour fire separation provided between each floor and 1-hour fire separation provided for exterior vertical communications.

Step	Task	Notes	Value Used	Req'd Fire Flow (L/min)
1	Determine Type of Construction	Non-Combustible Construction	0.8	-
2	Determine Ground Floor Area of One Unit (m2)	Used the 'gross floor area' of Building B's largest floor (floor with the largest footprint, 631.8 m2) + 25% of the gross construction area of the two immediately adjoining floors (the first floor and third floor). Methodology as per Page 17 of the Fire Underwriters Survey's Water Supply for Public Fire Protection, 1999.	950.7	-
	Determine Number of Adjoining Units	-	1	-
3	Determine Height in Storeys	Does not include floors >50% below grade or open attic space	1	-
4	Determine Required Fire Flow	(F = 220 x C x $A^{1/2}$). Round to nearest 1000 L/min	-	5000
5	Determine Occupancy Charge	Limited Combustible	-15%	4250
6	Determine Sprinkler Reduction	Conforms to NFPA 13	-30%	-1700
		Standard Water Supply	-10%	
		Not Fully Supervised or N/A	0%	
		% Coverage of Sprinkler System	100%	

7 — 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	Value Used	Req'd Fire Flow (L/min)
						-	-
North	30.1 to 45	45	25	> 120	Wood Frame or Non-Combustible	5%	1870
East	20.1 to 30	40	36	> 120	Wood Frame or Non-Combustible	10%	
South	10.1 to 20	87	6	> 120	Wood Frame or Non-Combustible	15%	
West	10.1 to 20	27	3	61-90	Wood Frame or Non-Combustible	14%	

Step	Task		
8	Determine Final Required Fire Flow	**Total Required Fire Flow in L/min, Rounded to Nearest 1000L/min**	**4000**
		Total Required Fire Flow in L/s	**66.7**
		Required Duration of Fire Flow (hrs)	**1.75**
		Required Volume of Fire Flow (m^3)	**420**

A.3 BOUNDARY CONDITIONS

Nwanise, Nwanise

From: Moroz, Peter
Sent: Tuesday, July 20, 2021 2:42 PM
To: Curry, William; Nwanise, Nwanise; Thiffault, Dustin
Subject: RE: BC Request

Will, Thank you very much!

Peter

Peter Moroz P.Eng., MBA
Managing Principal, Community Development

Stantec
400 - 1331 Clyde Avenue Ottawa ON K2C 3G4
Cell: (613) 294-2851

peter.moroz@stantec.com

From: Curry, William <William.Curry@ottawa.ca>
Sent: Tuesday, July 20, 2021 2:27 PM
To: Nwanise, Nwanise <Nwanise.Nwanise@stantec.com>; Thiffault, Dustin <Dustin.Thiffault@stantec.com>
Cc: Moroz, Peter <peter.moroz@stantec.com>
Subject: BC Request

The following are boundary conditions, HGL, for hydraulic analysis at 1125 Cyrville Rd (zone 1E) assumed to be a dual connection to the 254 mm on Cyrville Road (see attached PDF for location).

Minimum HGL: 109.5 m
Maximum HGL: 118.4 m
Max Day + Fire Flow (200 L/s): 105.0 m
Max Day + Fire Flow (133.3 L/s): 109.5 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.

Will Curry, C.E.T.

Project Manager

Planning, Infrastructure and Economic Development /

Planification, d'infrastructure et de développement économique

City of Ottawa | Ville d'Ottawa

613.580.2424 ext./poste 16214

110 Laurier Ave., 4th Fl East;

Ottawa ON K1P 1J1

William.Curry@Ottawa.ca

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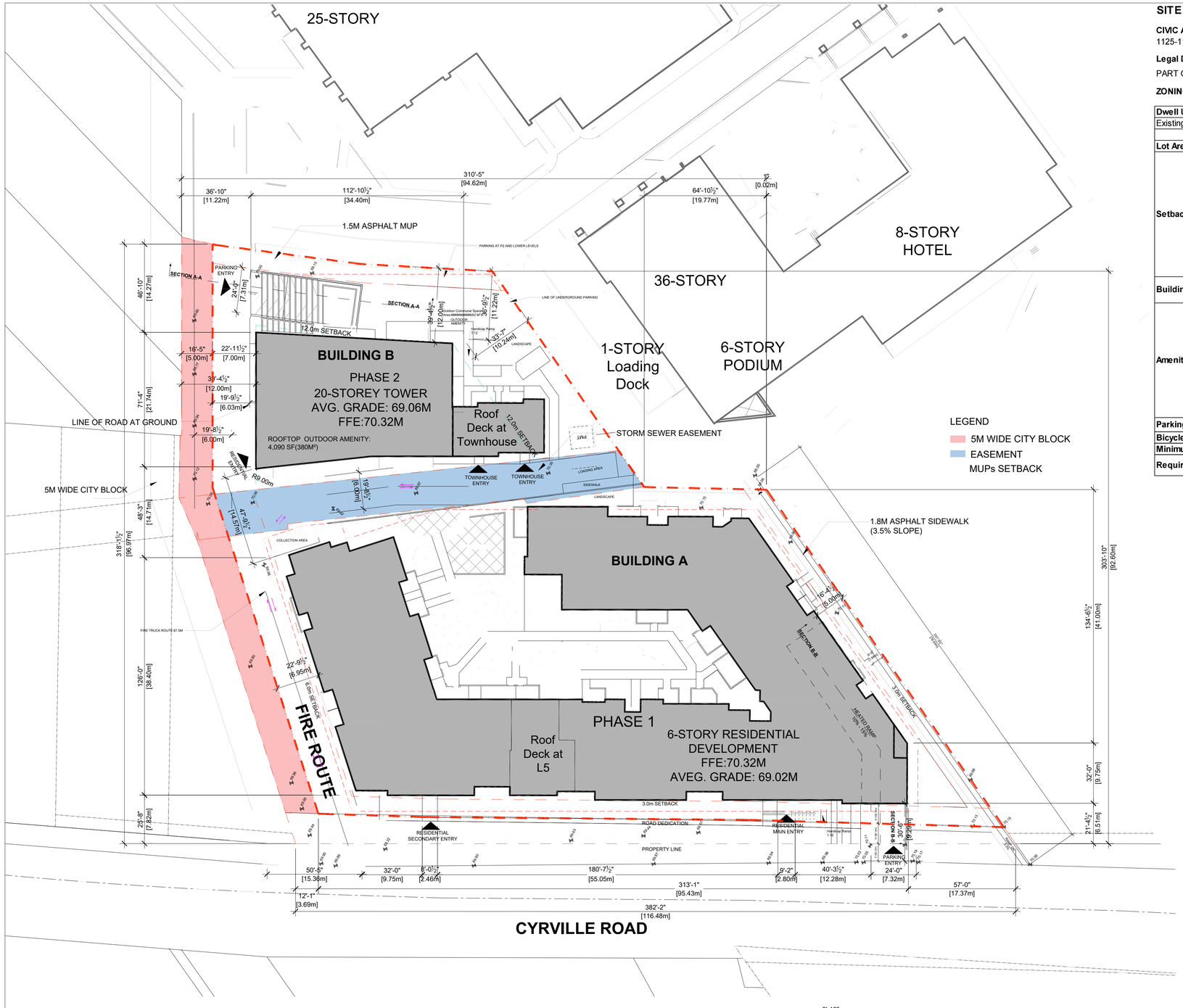
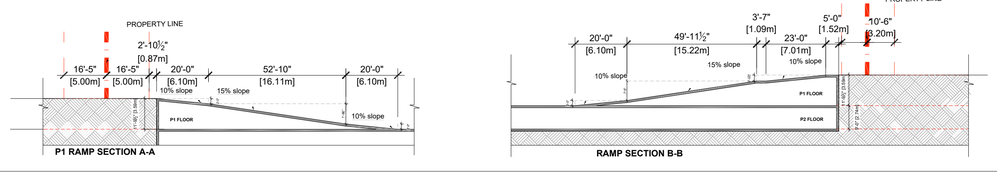
Appendix B PROPOSED SITE PLAN





SITE DATA

CIVIC ADDRESS:
1125-1149 Cyrville Road

Legal Description:

PART OF LOT 27, CONCESSION 2 (Ottawa Front), Geographic Township of Gloucester, City of Ottawa

ZONING DATA

Dwell Unit	356 dwelling units	
Existing Zoning: MC	Proposed Zoning: TD2	
	Required	**Provided**
Lot Area	No minimum	Total lot area:7445 m²
Setbacks	Front(active frontage street): 3m Side(East+West): Under 6 storeys: 0m Over 6 storeys: 12m Rear: Under 6 storeys: 0m Over 6 storeys: 12m	Front(active frontage street): 3m Side under 6 storeys: East: 3.6m West: 5.0m Side over 6 storeys: East: 12m West: 7.0m(12m to city's property) Rear: 4.45m(phase1) 11.2m(phase 2 under 6 storeys) 12m(phase 2 over 6 storeys)
Building Height	Minumum:6.7m(2 storeys) Maximum: 60m	Phase1: 19m(6 storeys) Phase 2: 60.25m(20 storeys)
Amenity Area	Total: 2,136 m²(6m²/dwelling unit) Communal: 1,068 m²	**Private amenity space** -Private balconies: 1774m²(phase 2) 1390 m²(phase1) **Common amenity space** -Indoor amenity:190 m² -Outdoor rooftop amenity: 76m²(phase 1) 380m²(phase 2) -Outdoor ground amenity:450m² total common amenity space: 1,096m²
Parking	201	365(including 36 visitor parking)
Bicycle	183 (0.5/dwelling unit)	183 (15 at ground, 168 at parking level 1)
Minimum Density	186 (250 units/net ha)	365
Required Communal Outdoor Space	149 m²(2% of lot area at grade)	284 m² (202 m² in phase 1/ 82 m² in phase 2)

Residential Statistics - GFA per City Definition

BUILDING A

Level	Number of Roors	GFA	
L1	1	20,650 sq ft	1,918 sq ft
L2 - L5	4	96,440 sq ft	8,959 sq ft
L6	1	22,077 sq ft	2,051 sq ft
TOTAL	**6**	**139,167 sq ft**	**12929 sq m**

BUILDING B.

Level	Number of Floors	GFA	
L1	1	3,608 sq ft	335 sq m
L2	1	6,151 sq ft	571 sq m
L3-L20	18	103,284 sq ft	9595 sq m
TOTAL	**20**	**113,043 sq ft**	**10502 sq m**

TOTAL.	252,210 sq ft	23430 sq m

Residential Statistics - Unit Counts

BUILDING A

Level	Studio	1 Bed	2Bed	3 Bed	Total	Number of Floors
L1	1	15	16	0	32	1
L2 - L5	1	13	22	1	37	4
L6	1	10	23	1	35	1
Total	**6**	**77**	**127**	**5**	**215**	

BUILDING B

Level	1 Bed	2 Bed	3 Bed	Total	Number of Floors
L1	1	2	2	5	1
L2	4	3	0	7	1
L3 -L20	4	4	0	8	18
Total	**77**	**77**	**2**	**156**	

TOTAL				*371*	

J+S ARCHITECT

T 604 210 9698 INFO@JSARCHITECT.CA
206-4603 KINGSWAY, BURNABY, BC V5H 4M4
WWW.JSARCHITECT.CA

NO. REVISION	DATE(D/M/Y)
REVISION AS PER CITY COMMETNS	18/01/2023
REVISION AS PER CITY COMMETNS	18/10/2022
REVISION AS PER CITY COMMETNS	08/06/2022
REVISION AS PER CITY COMMETNS	30/05/2022

REVISIONS:

ISSUED FOR:	DATE(D/M/Y)
ISSUED FOR REZONING APPLICATION	18/04/2022

PROJECT:

MULTI-FAMILY RESIDENTIAL DEVELOPMENT

1125-1149 Cyrville Road,
Ottawa, ON

CLIENT:

WESTRICH PACIFIC CORP.

CONSULTANT:

SCALE: 1:350
DATE: 08/06/2022
DRAWN BY:
CHECKED BY:
JOB NO.: 2021-01O
SEAL:

SHEET TITLE:

SITE PLAN

DRAWING N0.: A1.0
REVISION No:

D07-12-21-0214

Appendix C SANITARY SERVICING

C.1 SANITARY SEWER DESIGN SHEET

Stantec

SITE: **1125-1149 Cyrville Road**

DATE: 2023-03-01
REVISION: 4
DESIGNED BY: PM
CHECKED BY: DT

SANITARY SEWER DESIGN SHEET
(City of Ottawa)

FILE NUMBER: 160401672

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	MANNING'S 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						
PERSONS / 3 BEDROOM	3.1	INFILTRATION	0.33	L/s/ha	HARMON CORRECTION FACTOR	0.8	
PERSONS / TOWNHOME	2.7						

LOCATION			RESIDENTIAL AREA AND POPULATION										COMMERCIAL/ AMENITY/LOBBY		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	TOWNHOME	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)	(L/s)	(L/s)	(m)	(mm)			(%)	(l/s)	(%)	(m/s)	(m/s)
R100B	BLDG B	BLDG A	0.080	77	78	0	2	277	0.080	277	3.79	3.41	0.191	0.191	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.09	0.080	0.080	0.03	3.52	8.4	200	PVC	SDR 35	1.00	125.8	**2.80%**	1.79	0.62
G100A			0.390					0	0.390	0	3.79	0.00	0.000	0.000	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.00	0.390	0.390	0.13	3.65									
R100A	BLDG A	MONITOR	0.270	77	127	5	0	390	0.270	390	3.79	4.79	0.253	0.253	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.12	0.270	0.270	0.09	8.65	4.3	200	PVC	SDR 35	1.00	125.8	**6.88%**	1.79	0.62
	MONITOR	SAN 1	0.000					0	0.000	0	3.80	0.00	0.000	0.000	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.00	0.000	0.000	0.00	**8.65**	12.9	200	PVC	SDR 35	1.00	125.8	**6.88%**	1.79	0.62
								667	0.740																											

Appendix D STORMWATER SERVICING AND MANAGEMENT

D.1 PRECONSULTATION NOTES WITH CITY OF OTTAWA

From:	Curry, William
To:	Moroz, Peter
Cc:	Boughton, Michael; Peter Hume; Murshid, Shoma; dsanche@westrichpacific.com; Jack Stirling
Subject:	Re: 1125 Cyrville Road - parting thoughts from meeting
Date:	Monday, March 15, 2021 1:44:27 PM
Attachments:	1125 Cyrville Map.pdf

Peter,

We don't permit connections to any Trunks within an easement at all. This 1900 mm Ø storm sewer has HGL issues. In a 100-year event the water is 30cm above the Storm MH cover (MHST21507) on Cummings Ave at elevation 68.24. Cover elevation is 68.21. City Water Resources staff have confirmed this. The entire pipe has maximum of about 800mm cover.

With the application of 1178 Cyrville Road I asked that they remove the 1 CB within their parcel. It spans the property line of both developments. With the development of 1125 Cyrville the CB closer to the 1113 Cyrville parcel should also be removed as it has a cover of 68.13. The City has a known history of this area and excessive ponding issues.

The constraints are:

1. No direct connections to any Trunks within an easement at all.
2. When Trunk sewers in easements are deep we typically permit 1 set of services across an Easement as there is little to no impact to the Deep trunk sewer. We could permit it here, but they would have to be pumped and maybe below the storm trunk.
3. We **do not** permit anything private to cross the easement such as Hydro, gas or utilities unless in a City Block.
4. it is Unkown exactly what 1178 Cummings, and 1098 Ogilvie are re-designing. They have not resubmitted. They could service this parcel of 1125 Cyrville if required by gravity, also with a JUMA. Note it was recommended that their entire site be raised as much as possible, near a metre in height. This may benefit 1125 Cyrville also.
5. Retaining walls if crossing an easement must be of the block type that can be easily removed by the City if need be. No fixed structures.
6. Discussion was there may be a shared Private Road between the 2 developments, Ogilvie to Cyrville and again a JUMA. Ideal for servicing.
7. Practicality may suggest providing additional cover over the pipe for protection from vehicles...etc.

CCTV was ordered and is on the List to be done. None currently available.

I hope that helps if you need to discuss further, please contact me.

Will

From: Moroz, Peter <peter.moroz@stantec.com>
Sent: Monday, March 15, 2021 12:44 PM
To: Curry, William <William.Curry@ottawa.ca>
Cc: Boughton, Michael <Michael.Boughton@ottawa.ca>; Peter Hume <peter.hume@hpurban.ca>; Murshid, Shoma <Shoma.Murshid@ottawa.ca>; dsanche@westrichpacific.com <dsanche@westrichpacific.com>; Jack Stirling <jack@thestirlinggroup.ca>
Subject: FW: 1125 Cyrville Road - parting thoughts from meeting

William, I am in process of reviewing the servicing requirements for 1125 Cyrville Road, and would like to clarify the servicing constraints pertaining to the northern part of the site, north of the City trunk storm trunk sewer (see highlighted comment below). Can you confirm which services has the City determined to be coming through 1098 Ogilvie/1178 Cummings? Alternatively, can you also confirm if water and sanitary forcemain can cross the easement with storm connection directly into the storm trunk, in the event that the easement through the 1098 Ogilvie/1178 Cummings is not available.

thx

Peter

Peter Moroz P.Eng., MBA
Managing Principal, Community Development

Stantec
400 - 1331 Clyde Avenue Ottawa ON K2C 3G4

Phone: (613) 724-4082
Cell: (613) 294-2851

peter.moroz@stantec.com

From: Murshid, Shoma <Shoma.Murshid@ottawa.ca>
Sent: Tuesday, February 16, 2021 11:42 AM
To: Peter Hume <peter.hume@hpurban.ca>
Cc: David Sanche <dsanche@westrichpacific.com>; Curry, William <William.Curry@ottawa.ca>; Boughton, Michael <Michael.Boughton@ottawa.ca>; Wang, Randolph <Randolph.Wang@ottawa.ca>; Giles, Peter <peter.giles1@ottawa.ca>; Wood, Mary Ellen <MaryEllen.Wood@ottawa.ca>; Giampa, Mike <Mike.Giampa@ottawa.ca>
Subject: 1125 Cyrville Road - parting thoughts from meeting

Hi Peter,

Even though I am not in a position to provide a formal or typical 'pre-consultation follow-up' to the February 4, 2021 meeting, I wanted to share a few items that will help in a re-design process.

You may proceed and re-convene with us on a formal pre-consultation for what is required at the time of a site plan control submission with what is permitted exactly in the zoning for the lands today without the need for a zoning amendment and/or an official plan amendment. If you wish to depart from the zoning provisions today by increasing or decreasing the density and/or heights, it will automatically trigger the need for a Zoning Amendment and we can only consider a rezoning that at the very least complies with the TD2 zone. If you wish provisions more in keeping with a TD3 zone, then this will also have to be accompanied by an Official Plan Amendment (OPA). Any site-specific OPAs must be in and deemed complete by PIED in advance of the new OP becoming Minister-approved, otherwise a 2-year moratorium on site-specific OPAs will take effect. However, if you wish to proceed with the current zone and there are minor changes required to the current zone provisions that do not change the density or height provisions and it meets the 4 tests for required for minor variance (as can be determined by a Committee of Adjustment planner), this could also be considered. Again, we are ready to review any re-design and have another pre-consult meeting with you.

Further items to consider within your re-design:

- Please be aware of affordable housing programs, such as CMHC's Rental Construction Financing program, and see if your re-design can be considered for eligibility

- Bird-safe safety design guidelines are now in effect.
  https://ottawa.ca/en/city-hall/public-engagement/projects/bird-friendly-design-guidelines
  https://ottawa.ca/en/city-hall/public-engagement/projects/bird-friendly-design-guidelines#bird-friendly-design-guidelines

- Due to the City's TOD Plan in effect for the area (Cyrville TOD) and an exception present in the current zone for MC[1957]F(1.1)H(15), there is a requirement to take an additional 5 metres of road dedication along the west side of your property from your site. This, will have to be designed, developed and constructed at the applicant's cost, via a site plan control process's review, as a MUP.

- Due to the City trunk sewer and easement running approximately halfway through your property, it makes the northern half unserviceable straight from a City source. There may be a chance to seek a service right through a private property at the moment, due to an active site plan application at 1098 Ogilvie/1178 Cummings, where the applicant appears to be proposing a private service line adjacent to the back of your site. You may wish to pursue this option with the landowner of aforementioned lands. For further information,

please click on https://devapps.ottawa.ca/en/applications/__8569VJ/details or contact Michael Boughton, Planner for this site at Michael.Boughton@ottawa.ca and/or Will Curry, Project Manager at William.Curry@ottawa.ca .

- This is an active priority streetscape along Cyrville (as per the Cyrville TOD Plan). This includes the requirement for achieving large canopy trees at the frontage of Cyrville Road, and large canopy trees along the MUP is encouraged.
- A pre-consultation with UDRP is encouraged.
- Please have a meeting to discuss your development options with Councillor Tierney.
- Ensure there are principal entrances and widnows along not only Cyrville Road, but also towards the MUP that is to be developed to the west.
- Transit-supportive uses and jobs, plus densities are encouraged at this location.
- ROW protection on Cyrville is 26m. Please ensure that this ROW protection currently exists via your surveyor. If not, the appropriate amount will have to be dedicated along Cyrville Road via the site plan control process.
- Parks will be requesting conveyance of parkland (see attached for further comments). With respect to density calculation, typically it is calculated using the entire parcel. The land conveyed as parkland is not subtracted from the parcel.

Urban Design Reflections to consider:
Here are urban design comments on behalf of PRUD:

1. The applicants face some servicing and land allocation challenges. It is anticipated that they will change their design and a second pre-consultation may be required when the new design is developed.
2. A Design Brief is required for a site plan and a scoped Design Brief is required for rezoning. The Terms of Reference of the Design Brief is attached for convenience. A wind study is not required for a mid-rise proposal. However, a wind study may be required if a high-rise is proposed in the new design.
3. The site is within a Design Priority Area and a visit to the review by the City's Urban Design Review Panel (UDRP) for formal review is required. The applicant may also benefit from an informal review by the UDRP. However, at this time, informal UDRP review is not recommended. The decision on the merits of UDRP informal review can be made at the second staff pre-consultation.
4. It is crucially important to understand the planned context of the area and develop design responses accordingly. I am sharing the slides I presented to the applicants at the meeting for information. See attached.
5. The proposed mid-rise concept is quite interesting and has the potential to achieve many planning and urban design objectives for the area, however,
    a. It appears the design does not take into consideration the approximately 5m wide trip of lands taken by the City along the west side of the property, neither does it take into consideration the street and pathway systems

envisioned in the TOP plan for the street block the site is situated.

b. The close proximity (3m) of the residential units to the interior lot lines and rear lot lines with primary windows and balconies facing the very narrow side yards and rear yard is quite concerning. Please keep in mind the planned context for the area and the neighbouring properties. Both the current zoning of MC and the future zoning of TD, as directed by the TOD study, are very permissive with respect to building setbacks. Neighbouring properties can potentially see mixed use buildings rising up right at the interior lot lines.

6. A few suggestions for the development of revised options.
    a. Provide sufficient building setbacks from the west property line (in addition to the 5m that has already been taken by the City) to allow for the construction of a potential street connection and/or a multi-use pathway.
    b. Provide sufficient building setbacks from the south and east property lines to allow for the construction of multi-use pathways.
    c. Please note the proposed development at 1178 Cumming has already provided space along interior and rear property lines to allow the above-mentioned street connections and pathways.
    d. Orient and design buildings in response to these future street connection and pathways by following the principle of “eyes on the street”. Depending on the programing there may be merits to include some ground-oriented units.
    e. Provide adequate landscaping along all public streets and pathways in accordance with the TOP plan and other relevant City policies and guidelines.
    f. Provide commercial and other active uses along Cyrville Road.
    g. Locate main pedestrian entrances on Cyrville Road as the applicants have already done in the concept shown at pre-consultation.

Further transportation and noise review notes to consider are:

- Submit a screening form.
- If a TIA is warranted proceed to scoping.
- The application will not be deemed complete until the submission of the draft step 2-4, including the functional draft RMA package (if applicable) and/or monitoring report (if applicable).
- Although a full review of the TIA Strategy report (Step 4) is not required prior to an application, it is strongly recommended. Synchro files are required at Step 4.
- A Road Noise Impact Study is required.
- Clear throat requirements as per TAC guidelines for a collector road.

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

<u>Design Criteria - Civil Engineer to contact Will Curry directly</u>

Storm Pre to post, C of .5, Pre tc 20; post tc 10

Onsite, 5-year pipe minimum and store up to 100-year on site.

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

Nothing is permitted with the storm easement other than asphalt, curbs, pavers, grass and low shrubs.

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.

Closing thoughts:

We look forward to a concept re-design. Should you be ready to pre-consult with us on a revised concept, please do not hesitate to reach out to me first and discuss. If you have any questions or concerns in the interim, please do not hesitate to contact me.

Best wishes,

Shoma Murshid, MCIP, RPP
File Lead, Planner II
Responsable de dossier, urbaniste II
City of Ottawa/ Ville d'Ottawa
Development Review (Suburban Services, East)/ Examen des projets d'aménagement (Services suburbains Est)
Planning, Infrastructure, and Economic Development Department/ Service de la planification, de l'infrastructure et du développement économique
110 Laurier Avenue West, 4th Floor, Ottawa ON K1P 1J1/ 110, avenue Laurier Ouest, 4e étage, Ottawa (Ontario) K1P 1J1
Mail Code/ Code de courrier : 01-14
Tel/ Tél: (613) 580-2424 ext. 15430
Fax/ Téléc. : (613) 580-4751
e-mail/ courriel : shoma.murshid@ottawa.ca
www.ottawa.ca

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collaboration.
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D.2 MODIFIED RATIONAL METHOD CALCULATIONS

Stormwater Management Calculations

File No: **160401672**
Project: **1125-1149 Cyrville Road, Ottawa, ON**
Date: **01-Mar-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
Roof	Roof 2B	Hard	0.005		0.9	0.005		
		Soft	0.000		0.2	0.000		
	Subtotal			0.01			0.005	0.900
Uncontrolled - Tributary	L100A	Hard	0.039		0.9	0.035		
		Soft	0.000		0.2	0.000		
	Subtotal			0.04			0.035	0.900
Roof	Roof 1A	Hard	0.087		0.9	0.078		
		Soft	0.000		0.2	0.000		
	Subtotal			0.09			0.078	0.900
Roof	Roof 1B	Hard	0.014		0.9	0.013		
		Soft	0.000		0.2	0.000		
	Subtotal			0.01			0.013	0.900
Roof	Roof 1C	Hard	0.173		0.9	0.156		
		Soft	0.000		0.2	0.000		
	Subtotal			0.17			0.156	0.900
Uncontrolled - Tributary	L100	Hard	0.111		0.9	0.100		
		Soft	0.000		0.2	0.000		
	Subtotal			0.11			0.100	0.900
Controlled - Tributary	Tank 1B	Hard	0.030		0.9	0.027		
		Soft	0.040		0.2	0.008		
	Subtotal			0.07			0.035	0.500
Roof	Roof 2A	Hard	0.076		0.9	0.068		
		Soft	0.000		0.2	0.000		
	Subtotal			0.08			0.068	0.900
Uncontrolled - Tributary	Tank 2A	Hard	0.040		0.9	0.036		
		Soft	0.000		0.2	0.000		
	Subtotal			0.04			0.036	0.900
Uncontrolled - Tributary	Tank 2B	Hard	0.008		0.9	0.008		
		Soft	0.000		0.2	0.000		
	Subtotal			0.01			0.008	0.900
Controlled - Tributary	Tank 2C	Hard	0.032		0.9	0.029		
		Soft	0.038		0.2	0.008		
	Subtotal			0.07			0.037	0.520
Uncontrolled - Non-Tributary	UNC-1	Hard	0.012		0.9	0.011		
		Soft	0.024		0.2	0.005		
	Subtotal			0.04			0.016	0.440
Uncontrolled - Non-Tributary	UNC-2	Hard	0.005		0.9	0.005		
		Soft	0.007		0.2	0.001		
	Subtotal			0.01			0.006	0.500
Total				**0.74**			**0.592**	
Overall Runoff Coefficient= C:								**0.80**

Total Roof Areas	**0.36**	**ha**
Total Tributary Surface Areas (Controlled and Uncontrolled)	**0.34**	**ha**
Total Tributary Area to Outlet	**0.69**	**ha**
Total Uncontrolled Areas (Non-Tributary)	**0.05**	**ha**
Total Site	**0.74**	**ha**

Stormwater Management Calculations

Project #160401672, 1125-1149 Cyrville Road, Ottawa, ON
Modified Rational Method Calculatons 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)
5	141.18
10	104.19
15	83.56
20	70.25
25	60.90
30	53.93
35	48.52
40	44.18
45	40.63
50	37.65
55	35.12
60	32.94

5 YEAR Predevelopment Target Release from Portion of Site

Subdrainage Area: Predevelopment Tributary Area to Outlet
Area (ha): 0.74
C: 0.50 (as directed by the City of Ottawa)

Typical Time of Concentration

tc (min)	I (5 yr) (mm/hr)	Qtarget (L/s)
20	70.25	**72.6**

5 YEAR Modified Rational Method for Entire Site

Subdrainage Area: Roof 2B (Flows to stormwater cistern B) Roof
Area (ha): 0.01 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	1.38	0.63	0.75	0.45	**82.8**	0.00
20	70.25	0.93	0.63	0.30	0.36	77.5	0.00
30	53.93	0.71	0.63	0.08	0.15	56.1	0.00
40	44.18	0.58	0.55	0.03	0.07	43.9	0.00
50	37.65	0.50	0.48	0.02	0.05	38.0	0.00
60	32.94	0.44	0.42	0.01	0.04	33.6	0.00
70	29.37	0.39	0.38	0.01	0.03	30.2	0.00
80	26.56	0.35	0.35	0.00	0.02	27.5	0.00
90	24.29	0.32	0.32	0.00	0.01	25.3	0.00
100	22.41	0.30	0.29	0.00	0.01	23.3	0.00
110	20.82	0.28	0.27	0.00	0.01	21.7	0.00
120	19.47	0.26	0.26	0.00	0.01	20.3	0.00

Storage: Storage on Westend Roof of Phase 1 Building.

	Depth (mm)	Head (m)	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Discharge Check
5-year Water Level	82.8	0.08	0.6	0.4	2.5	0.0

Subdrainage Area: L100A Uncontrolled - Tributary
Area (ha): 0.04
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	10.2	10.2	0.0	**0.0**
20	70.25	6.9	6.9	0.0	**0.0**
30	53.93	5.3	5.3	0.0	**0.0**
40	44.18	4.3	4.3	0.0	**0.0**
50	37.65	3.7	3.7	0.0	**0.0**
60	32.94	3.2	3.2	0.0	**0.0**
70	29.37	2.9	2.9	0.0	**0.0**
80	26.56	2.6	2.6	0.0	**0.0**
90	24.29	2.4	2.4	0.0	**0.0**
100	22.41	2.2	2.2	0.0	**0.0**
110	20.82	2.0	2.0	0.0	**0.0**
120	19.47	1.9	1.9	0.0	**0.0**

Storage: Surface Storage in 5-year Event Note: No ponding in 2year event

Orifice Equation $Q = CdA(2gh)^{0.5}$ Where C = 0.61
Orifice Diameter 75.00 mm Max available volume in CB 0.50 m3
Invert Elevation 68.15 m
T/G Elevation 69.77 m
Max Ponding Depth 0.15 m
Downstream W/L 67.95 m

	Stage	Head (m)	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Volume Check
5-year Water Level	69.92	1.77	15.9	0.0	1.9	OK

Subdrainage Area: Roof 1A (Flows to stormwater cistern A) Roof
Area (ha): 0.09 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	22.7	3.4	19.3	11.6	103.2	0.00
20	70.25	15.3	3.6	11.7	14.1	109.5	0.00
30	53.93	11.7	3.6	8.1	14.6	**110.9**	0.00
40	44.18	9.6	3.6	6.0	14.4	110.5	0.00
50	37.65	8.2	3.6	4.6	13.9	109.1	0.00
60	32.94	7.2	3.5	3.7	13.2	107.2	0.00
70	29.37	6.4	3.5	2.9	12.3	105.1	0.00
80	26.56	5.8	3.4	2.4	11.5	102.9	0.00
90	24.29	5.3	3.3	2.0	10.6	100.6	0.00
100	22.41	4.9	3.2	1.6	9.8	97.7	0.00
110	20.82	4.5	3.2	1.4	9.0	94.7	0.00
120	19.47	4.2	3.1	1.2	8.3	91.8	0.00

Storage: Storage on Westend Roof of Phase 1 Building.

	Depth (mm)	Head (m)	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Discharge Check
5-year Water Level	110.9	0.11	3.6	14.6	34.8	0.0

Subdrainage Area: Roof 1B (Flows to stormwater cistern A) Roof
Area (ha): 0.01 Maximum Storage Depth: No Storage
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	3.7	3.7			
20	70.25	2.5	2.5			
30	53.93	1.9	1.9			
40	44.18	1.6	1.6			
50	37.65	1.4	1.4			

Project #160401672, 1125-1149 Cyrville Road, Ottawa, ON
Modified Rational Method Calculatons 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)
5	242.70
10	178.56
15	142.89
20	119.95
25	103.85
30	91.87
35	82.58
40	75.15
45	69.05
50	63.95
55	59.62
60	55.89

100 YEAR Predevelopment Target Release from Portion of Site

Subdrainage Area: Predevelopment Tributary Area to Outlet

Post development
Target release rate = 72.6 L/s

100 YEAR Modified Rational Method for Entire Site

Subdrainage Area: Roof 2B (Flows to stormwater cistern B) Roof
Area (ha): 0.01 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	2.62	0.63	1.99	1.19	115.9	0.00
20	119.95	1.76	0.63	1.13	1.36	**121.6**	0.00
30	91.87	1.35	0.63	0.72	1.29	119.4	0.00
40	75.15	1.10	0.63	0.47	1.13	113.8	0.00
50	63.95	0.94	0.63	0.31	0.92	106.4	0.00
60	55.89	0.82	0.63	0.19	0.68	96.5	0.00
70	49.79	0.73	0.63	0.10	0.42	81.2	0.00
80	44.99	0.66	0.63	0.03	0.14	55.2	0.00
90	41.11	0.60	0.59	0.02	0.08	46.6	0.00
100	37.90	0.56	0.54	0.01	0.07	43.2	0.00
110	35.20	0.52	0.51	0.01	0.06	40.2	0.00
120	32.89	0.48	0.48	0.01	0.05	37.7	0.00

Storage: Storage on Westend Roof of Phase 1 Building.

	Depth (mm)	Head (m)	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Discharge Check
100-year Water Level	121.6	0.12	0.6	1.4	2.5	0.0

Subdrainage Area: L100A Uncontrolled - Tributary
Area (ha): 0.04
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	19.4	16.5	2.9	**1.7**
20	119.95	13.1	13.1	0.0	0.0
30	91.87	10.0	10.0	0.0	0.0
40	75.15	8.2	8.2	0.0	0.0
50	63.95	7.0	7.0	0.0	0.0
60	55.89	6.1	6.1	0.0	0.0
70	49.79	5.4	5.4	0.0	0.0
80	44.99	4.9	4.9	0.0	0.0
90	41.11	4.5	4.5	0.0	0.0
100	37.90	4.1	4.1	0.0	0.0
110	35.20	3.8	3.8	0.0	0.0
120	32.89	3.6	3.6	0.0	0.0

Storage: Surface Storage in 100 year Event

Orifice Equation $Q = CdA(2gh)^{0.5}$ Where C = 0.61
Orifice Diameter 75.00 mm Max available volume in CB 0.50 m3
Invert Elevation 68.15 m
T/G Elevation 69.77 m
Max Ponding Depth 0.30 m
Downstream W/L 67.95 m

	Stage	Head (m)	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Volume Check
100-year Water Level	70.07	1.92	16.5	1.7	1.9	OK

Subdrainage Area: Roof 1A (Flows to stormwater cistern A) Roof
Area (ha): 0.09 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	43.2	4.2	39.0	23.4	130.6	0.00
20	119.95	29.0	4.5	24.5	29.4	140.9	0.00
30	91.87	22.2	4.6	17.6	31.7	144.8	0.00
40	75.15	18.2	4.6	13.6	32.5	146.1	0.00
50	63.95	15.5	4.6	10.8	32.5	**146.1**	0.00
60	55.89	13.5	4.6	8.9	32.1	145.4	0.00
70	49.79	12.0	4.6	7.5	31.4	144.2	0.00
80	44.99	10.9	4.5	6.4	30.5	142.7	0.00
90	41.11	9.9	4.5	5.5	29.5	141.0	0.00
100	37.90	9.2	4.4	4.7	28.5	139.2	0.00
110	35.20	8.5	4.4	4.1	27.3	137.3	0.00
120	32.89	8.0	4.3	3.6	26.2	135.3	0.00

Storage: Storage on Westend Roof of Phase 1 Building.

	Depth (mm)	Head (m)	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Discharge Check
100-year Water Level	146.1	0.15	4.6	32.5	34.8	0.0

Subdrainage Area: Roof 1B (Flows to stormwater cistern A) Roof
Area (ha): 0.01 Maximum Storage Depth: No Storage
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	7.1	7.1			
20	119.95	4.8	4.8			
30	91.87	3.7	3.7			
40	75.15	3.0	3.0			
50	63.95	2.6	2.6			

Stormwater Management Calculations

Project #160401672, 1125-1149 Cyrville Road, Ottawa, ON
Modified Rational Method Calculatons for Storage

60	32.94	1.2	1.2
70	29.37	1.1	1.1
80	26.56	1.0	1.0
90	24.29	0.9	0.9
100	22.41	0.8	0.8
110	20.82	0.7	0.7
120	19.47	0.7	0.7

Subdrainage Area: Roof 1C (Flows to stormwater cistern A) 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	45.2	5.7	39.5	23.7	104.0	0.00
20	70.25	30.5	6.0	24.4	29.3	111.2	0.00
30	53.93	23.4	6.2	17.2	31.0	113.4	0.00
40	44.18	19.2	6.2	13.0	31.2	**113.6**	0.00
50	37.65	16.3	6.1	10.2	30.6	112.8	0.00
60	32.94	14.3	6.1	8.2	29.6	111.6	0.00
70	29.37	12.7	6.0	6.7	28.3	110.0	0.00
80	26.56	11.5	5.9	5.6	26.9	108.2	0.00
90	24.29	10.5	5.8	4.7	25.5	106.3	0.00
100	22.41	9.7	5.7	4.0	24.0	104.3	0.00
110	20.82	9.0	5.6	3.4	22.4	102.4	0.00
120	19.47	8.4	5.5	2.9	20.9	100.4	0.00

Storage: Storage on Eastend Roof of Phase 1 Building.

	Depth (mm)	Head (m)	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Discharge Check
5-year Water Level	113.60	0.11	6.2	31.2	69.3	0.0

Subdrainage Area: L100 (Flows to stormwater cistern A) Uncontrolled - Tributary
Area (ha): 0.111
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	28.8	28.8	0.0	0.0
20	70.25	19.4	19.4	0.0	0.0
30	53.93	14.9	14.9	0.0	0.0
40	44.18	12.2	12.2	0.0	0.0
50	37.65	10.4	10.4	0.0	0.0
60	32.94	9.1	9.1	0.0	0.0
70	29.37	8.1	8.1	0.0	0.0
80	26.56	7.4	7.4	0.0	0.0
90	24.29	6.7	6.7	0.0	0.0
100	22.41	6.2	6.2	0.0	0.0
110	20.82	5.8	5.8	0.0	0.0
120	19.47	5.4	5.4	0.0	0.0

Subdrainage Area: Tank 1B (Flows to stormwater cistern A) Controlled - Tributary
Area (ha): 0.07
C: 0.50

tc (min)	I (5 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)
10	104.19	51.8	32.0	19.8	11.9
20	70.25	38.4	32.0	6.4	7.7
30	53.93	31.9	32.0	0.0	0.0
40	44.18	27.9	32.0	0.0	0.0
50	37.65	25.1	32.0	0.0	0.0
60	32.94	23.1	32.0	0.0	0.0
70	29.37	21.5	32.0	0.0	0.0
80	26.56	20.2	32.0	0.0	0.0
90	24.29	19.1	32.0	0.0	0.0
100	22.41	18.1	32.0	0.0	0.0
110	20.82	17.3	32.0	0.0	0.0
120	19.47	16.6	32.0	0.0	0.0

1) All flows from ROOF 1A, ROOF 1B, ROOF 1C, L100, TANK 1B to be directed to a stormwater cistern.
2) Outflow from the 45 cu.m cistern to be set by pump (maximum outflow rate of 32 L/s).

	Stage	Head (m)	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Volume Check
5-year Storage Req.	N/A	N/A	32.0	11.9	45.0	OK
			Excess storage (m3):		33.14	

Subdrainage Area: Roof 2A (Flows to stormwater cistern B) Roof
Area (ha): 0.08 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	19.8	4.4	15.3	9.2	100.6	0.00
20	70.25	13.3	4.4	8.9	10.7	**105.0**	0.00
30	53.93	10.2	4.4	5.8	10.5	104.3	0.00
40	44.18	8.4	4.4	4.0	9.5	101.5	0.00
50	37.65	7.1	4.4	2.7	8.2	96.1	0.00
60	32.94	6.2	4.4	1.8	6.6	88.5	0.00
70	29.37	5.6	4.4	1.2	4.8	80.1	0.00
80	26.56	5.0	4.4	0.6	3.0	67.3	0.00
90	24.29	4.6	4.4	0.2	1.1	49.8	0.00
100	22.41	4.2	4.1	0.2	1.0	46.3	0.00
110	20.82	3.9	3.8	0.1	0.9	43.2	0.00
120	19.47	3.7	3.6	0.1	0.8	40.6	0.00

Storage: Storage on Westend Roof of Phase 1 Building.

	Depth (mm)	Head (m)	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Discharge Check
5-year Water Level	104.97	0.10	4.4	10.7	30.3	-19.6

Subdrainage Area: Tank 2A (Flows to stormwater cistern B) Uncontrolled - Tributary
Area (ha): 0.04
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	10.4	10.4		
20	70.25	7.0	7.0		
30	53.93	5.4	5.4		
40	44.18	4.4	4.4		
50	37.65	3.8	3.8		
60	32.94	3.3	3.3		
70	29.37	2.9	2.9		
80	26.56	2.7	2.7		
90	24.29	2.4	2.4		
100	22.41	2.2	2.2		
110	20.82	2.1	2.1		
120	19.47	1.9	1.9		

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60	55.89	2.2	2.2
70	49.79	2.0	2.0
80	44.99	1.8	1.8
90	41.11	1.6	1.6
100	37.90	1.5	1.5
110	35.20	1.4	1.4
120	32.89	1.3	1.3

Subdrainage Area: Roof 1C (Flows to stormwater cistern A) 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	86.0	7.0	79.0	47.4	131.2	0.00
20	119.95	57.8	7.5	50.3	60.3	142.3	0.00
30	91.87	44.3	7.7	36.5	65.8	146.9	0.00
40	75.15	36.2	7.8	28.4	68.1	148.9	0.00
50	63.95	30.8	7.9	23.0	68.9	**149.6**	0.00
60	55.89	26.9	7.9	19.1	68.7	149.4	0.00
70	49.79	24.0	7.8	16.2	67.9	148.8	0.00
80	44.99	21.7	7.8	13.9	66.7	147.8	0.00
90	41.11	19.8	7.7	12.1	65.3	146.5	0.00
100	37.90	18.3	7.7	10.6	63.7	145.1	0.00
110	35.20	17.0	7.6	9.4	61.9	143.6	0.00
120	32.89	15.9	7.5	8.3	60.1	142.1	0.00

Storage: Storage on Eastend Roof of Phase 1 Building.

	Depth (mm)	Head (m)	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Discharge Check
100-year Water Level	149.59	0.15	7.9	68.9	69.3	0.0

Subdrainage Area: L100 (Flows to stormwater cistern A) Uncontrolled - Tributary
Area (ha): 0.11
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	54.9	54.9	0.0	0.0
20	119.95	36.9	36.9	0.0	0.0
30	91.87	28.3	28.3	0.0	0.0
40	75.15	23.1	23.1	0.0	0.0
50	63.95	19.7	19.7	0.0	0.0
60	55.89	17.2	17.2	0.0	0.0
70	49.79	15.3	15.3	0.0	0.0
80	44.99	13.8	13.8	0.0	0.0
90	41.11	12.6	12.6	0.0	0.0
100	37.90	11.7	11.7	0.0	0.0
110	35.20	10.8	10.8	0.0	0.0
120	32.89	10.1	10.1	0.0	0.0

Subdrainage Area: Tank 1B (Flows to stormwater cistern A) Controlled - Tributary
Area (ha): 0.07
C: 0.63

tc (min)	I (100 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)
10	178.56	94.8	32.0	62.8	37.7
20	119.95	68.2	32.0	36.2	43.4
30	91.87	55.3	32.0	23.3	42.0
40	75.15	47.6	32.0	15.6	37.6
50	63.95	42.4	32.0	10.4	31.3
60	55.89	38.6	32.0	6.6	23.9
70	49.79	35.7	32.0	3.7	15.6
80	44.99	33.4	32.0	1.4	6.6
90	41.11	31.5	32.0	0.0	0.0
100	37.90	29.8	32.0	0.0	0.0
110	35.20	28.4	32.0	0.0	0.0
120	32.89	27.2	32.0	0.0	0.0

1) All flows from ROOF 1A, ROOF 1B, ROOF 1C, L100, TANK 1B to be directed to a stormwater cistern.
2) Outflow from the 45 cu.m cistern to be set by pump (maximum outflow rate of 32 L/s).

	Stage	Head (m)	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Volume Check
100-year Storage Req.	N/A	N/A	32.0	43.4	45.0	OK
			Excess storage (m3):		1.60	

Subdrainage Area: Roof 2A (Flows to stormwater cistern B) Roof
Area (ha): 0.08 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	37.6	4.4	33.2	19.9	129.7	0.00
20	119.95	25.3	4.4	20.8	25.0	139.6	0.00
30	91.87	19.4	4.4	14.9	26.9	143.3	0.00
40	75.15	15.8	4.4	11.4	27.4	**144.3**	0.00
50	63.95	13.5	4.4	9.1	27.2	143.8	0.00
60	55.89	11.8	4.4	7.4	26.5	142.5	0.00
70	49.79	10.5	4.4	6.1	25.5	140.6	0.00
80	44.99	9.5	4.4	5.1	24.3	138.2	0.00
90	41.11	8.7	4.4	4.2	22.9	135.5	0.00
100	37.90	8.0	4.4	3.6	21.4	132.6	0.00
110	35.20	7.4	4.4	3.0	19.8	129.4	0.00
120	32.89	6.9	4.4	2.5	18.1	126.1	0.00

Storage: Storage on Westend Roof of Phase 1 Building.

	Depth (mm)	Head (m)	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Discharge Check
100-year Water Level	144.29	0.14	4.4	27.4	30.3	-2.9

Subdrainage Area: Tank 2A (Flows to stormwater cistern B) Uncontrolled - Tributary
Area (ha): 0.04
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	19.8	19.8		
20	119.95	13.3	13.3		
30	91.87	10.2	10.2		
40	75.15	8.3	8.3		
50	63.95	7.1	7.1		
60	55.89	6.2	6.2		
70	49.79	5.5	5.5		
80	44.99	5.0	5.0		
90	41.11	4.6	4.6		
100	37.90	4.2	4.2		
110	35.20	3.9	3.9		
120	32.89	3.6	3.6		

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Subdrainage Area: Tank 2B (Flows to stormwater cistern B) Uncontrolled - Tributary
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	2.2	2.2		
20	70.25	1.5	1.5		
30	53.93	1.1	1.1		
40	44.18	0.9	0.9		
50	37.65	0.8	0.8		
60	32.94	0.7	0.7		
70	29.37	0.6	0.6		
80	26.56	0.6	0.6		
90	24.29	0.5	0.5		
100	22.41	0.5	0.5		
110	20.82	0.4	0.4		
120	19.47	0.4	0.4		

Subdrainage Area: Tank 2C (Flows to stormwater cistern B) Controlled - Tributary
Area (ha): 0.07
C: 0.52

tc (min)	I (5 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)
10	104.19	28.3	10.0	18.3	**11.0**
20	70.25	20.7	10.0	10.7	12.9
30	53.93	17.1	10.0	7.1	12.8
40	44.18	14.8	10.0	4.8	11.6
50	37.65	13.3	10.0	3.3	9.9
60	32.94	12.2	10.0	2.2	7.9
70	29.37	11.4	10.0	1.4	5.7
80	26.56	10.7	10.0	0.7	3.3
90	24.29	10.1	10.0	0.1	0.8
100	22.41	9.4	10.0	0.0	0.0
110	20.82	8.7	10.0	0.0	0.0
120	19.47	8.2	10.0	0.0	0.0

1) All flows from ROOF 2A, TANK 2A, TANK 2B, and Tank 2C to be directed to stormwater cistern
2) Outflow from the 40 m3 cistern to be set by pump (maximum outflow rate of 20 L/s).

	Stage	Head (m)	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Volume Check
5-year Storage Req.	N/A	N/A	10.0	12.9	40.0	OK

Excess storage (m^3): 27.11

Subdrainage Area: UNC-1 Uncontrolled - Non-Tributary
Area (ha): 0.04
C: 0.44

tc (min)	I (5 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)
10	104.19	4.6	4.6		
20	70.25	3.1	3.1		
30	53.93	2.4	2.4		
40	44.18	2.0	2.0		
50	37.65	1.7	1.7		
60	32.94	1.5	1.5		
70	29.37	1.3	1.3		
80	26.56	1.2	1.2		
90	24.29	1.1	1.1		
100	22.41	1.0	1.0		
110	20.82	0.9	0.9		
120	19.47	0.9	0.9		

Subdrainage Area: UNC-2 Uncontrolled - Non-Tributary
Area (ha): 0.01
C: 0.50

tc (min)	I (5 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)
10	104.19	1.8	1.8		
20	70.25	1.2	1.2		
30	53.93	0.9	0.9		
40	44.18	0.8	0.8		
50	37.65	0.7	0.7		
60	32.94	0.6	0.6		
70	29.37	0.5	0.5		
80	26.56	0.5	0.5		
90	24.29	0.4	0.4		
100	22.41	0.4	0.4		
110	20.82	0.4	0.4		
120	19.47	0.3	0.3		

SUMMARY TO OUTLET

		Cistern + Roof Storage: Vrequired	Vavailable*	
Tributary Area (Controlled)	0.69 ha			
Maximum 5yr Flow to Sewer	52.2 L/s	81.2	219.4 m^3	Ok
Tributary Area (Uncontrolled)	0.05 ha			
Maximum 5yr Flow Uncontrolled	6.4 L/s			
Total Area	0.74 ha			
Total 5yr Flow	58.6 L/s			
Target	72.6 L/s			

Project #160401672, 1125-1149 Cyrville Road, Ottawa, ON
Modified Rational Method Calculatons for Storage

Subdrainage Area: Tank 2B (Flows to stormwater cistern B) Uncontrolled - Tributary
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	4.2	4.2		
20	119.95	2.8	2.8		
30	91.87	2.2	2.2		
40	75.15	1.8	1.8		
50	63.95	1.5	1.5		
60	55.89	1.3	1.3		
70	49.79	1.2	1.2		
80	44.99	1.1	1.1		
90	41.11	1.0	1.0		
100	37.90	0.9	0.9		
110	35.20	0.8	0.8		
120	32.89	0.8	0.8		

Subdrainage Area: Tank 2C (Flows to stormwater cistern B) Controlled - Tributary
Area (ha): 0.07
C: 0.65

tc (min)	I (100 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)
10	178.56	51.9	10.0	41.9	25.1
20	119.95	36.5	10.0	26.5	**31.8**
30	91.87	29.2	10.0	19.2	34.5
40	75.15	24.8	10.0	14.8	35.4
50	63.95	21.8	10.0	11.8	35.5
60	55.89	19.7	10.0	9.7	35.0
70	49.79	18.1	10.0	8.1	34.1
80	44.99	16.9	10.0	6.9	32.9
90	41.11	15.8	10.0	5.8	31.3
100	37.90	14.9	10.0	4.9	29.4
110	35.20	14.2	10.0	4.2	27.5
120	32.89	13.5	10.0	3.5	25.4

1) All flows from ROOF 2A, TANK 2A, TANK 2B, and Tank 2C to be directed to stormwater cistern B.
2) Outflow from the 40 m3 cistern to be set by pump (maximum outflow rate of 20 L/s).

	Stage	Head (m)	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Volume Check
100-year Storage Req.	N/A	N/A	10.0	35.5	40.0	OK

Excess storage (m^3): 4.51

Subdrainage Area: UNC-1 Uncontrolled - Non-Tributary
Area (ha): 0.04
C: 0.55

tc (min)	I (100 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)
10	178.56	9.9	9.9		
20	119.95	6.6	6.6		
30	91.87	5.1	5.1		
40	75.15	4.2	4.2		
50	63.95	3.5	3.5		
60	55.89	3.1	3.1		
70	49.79	2.8	2.8		
80	44.99	2.5	2.5		
90	41.11	2.3	2.3		
100	37.90	2.1	2.1		
110	35.20	2.0	2.0		
120	32.89	1.8	1.8		

Subdrainage Area: UNC-2 Uncontrolled - Non-Tributary
Area (ha): 0.01
C: 0.63

tc (min)	I (100 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)
10	178.56	3.9	3.9		
20	119.95	2.6	2.6		
30	91.87	2.0	2.0		
40	75.15	1.6	1.6		
50	63.95	1.4	1.4		
60	55.89	1.2	1.2		
70	49.79	1.1	1.1		
80	44.99	1.0	1.0		
90	41.11	0.9	0.9		
100	37.90	0.8	0.8		
110	35.20	0.8	0.8		
120	32.89	0.7	0.7		

SUMMARY TO OUTLET

		Cistern + Roof Storage: Vrequired	Vavailable*	
Tributary Area (Controlled)	0.69 ha			
Maximum 100yr Flow to Sewer	58.5 L/s	207.7	221.9 m^3	Ok
Tributary Area (Uncontrolled)	0.05 ha			
Total 100yr Flow Uncontrolled	13.8 L/s			
Total Area	0.74 ha			
Total 100yr Flow	72.3 L/s			
Target	72.6 L/s			

Project #160401672, 1125-1149 Cyrville Road, Ottawa, ON
Roof Drain Design Sheet, Area Roof 1A
Standard Watts Model R1100 Accuflow Roof Drain

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	0.0000	0.0000	0	0.000	0	0	0	0.000
0.025	0.0003	0.0009	0	0.025	19	0	0	0.025
0.050	0.0006	0.0019	1	0.050	77	1	1	0.050
0.075	0.0009	0.0026	4	0.075	174	3	4	0.075
0.100	0.0011	0.0033	10	0.100	309	6	10	0.100
0.125	0.0013	0.0040	20	0.125	483	10	20	0.125
0.150	0.0016	0.0047	35	0.150	696	15	35	0.150

Drawdown Estimate			
Total Volume (cu.m)	Total Time (sec)	Vol (cu.m)	Detention Time (hr)
0.0	0.0	0.0	0
1.1	595.8	1.1	0.16551
4.2	1176.2	3.1	0.49222
10.1	1799.6	6.0	0.99211
20.0	2443.4	9.8	1.67083
34.6	3098.3	14.7	2.53145

Rooftop Storage Summary

Total Building Area (sq.m)		869.95
Assume Available Roof Area (sq.m)	80%	695.96
Roof Imperviousness		0.99
Roof Drain Requirement (sq.m/Notch)		232
Number of Roof Notches*		3
Max. Allowable Depth of Roof Ponding (m)		0.15
Max. Allowable Storage (cu.m)		35
Estimated 100 Year Drawdown Time (h)		2.4

* 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.

From Watts Drain Catalogue

Head (m)	L/s Open	**75%**	50%	25%	Closed
0.025	0.315	**0.315**	0.315	0.315	0.315
0.050	0.631	**0.631**	0.631	0.631	0.631
0.075	0.946	**0.867**	0.789	0.710	0.631
0.100	1.262	**1.104**	0.946	0.789	0.631
0.125	1.577	**1.341**	1.104	0.867	0.631
0.150	1.893	**1.577**	1.262	0.946	0.631

Calculation Results	5yr	100yr	Available
Qresult (cu.m/s)	0.004	0.005	-
Depth (m)	0.111	0.146	0.150
Volume (cu.m)	14.6	32.5	34.8
Draintime (hrs)	1.3	2.4	

Project #160401672, 1125-1149 Cyrville Road, Ottawa, ON
Roof Drain Design Sheet, Area Roof 1C
Standard Watts Model R1100 Accuflow Roof Drain

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	0.0000	0.0000	0	0.000	0	0	0	0.000
0.025	0.0003	0.0016	0	0.025	39	0	0	0.025
0.050	0.0006	0.0032	3	0.050	154	2	3	0.050
0.075	0.0009	0.0043	9	0.075	347	6	9	0.075
0.100	0.0011	0.0055	21	0.100	616	12	21	0.100
0.125	0.0013	0.0067	40	0.125	963	20	40	0.125
0.150	0.0016	0.0079	69	0.150	1387	29	69	0.150

Drawdown Estimate			
Total Volume (cu.m)	Total Time (sec)	Vol (cu.m)	Detention Time (hr)
0.0	0.0	0.0	0
2.2	712.3	2.2	0.19787
8.3	1406.1	6.1	0.58846
20.2	2151.5	11.9	1.18609
39.8	2921.1	19.6	1.99751
69.0	3704.1	29.2	3.02641

Rooftop Storage Summary

Total Building Area (sq.m)		1733.41	
Assume Available Roof Area (sq.m)	80%	1386.728	
Roof Imperviousness		0.99	
Roof Drain Requirement (sq.m/Notch)		232	
Number of Roof Notches*		5	
Max. Allowable Depth of Roof Ponding (m)		0.15	* As per Ontario Building Code section OBC 7.4.10.4.(2)(c).
Max. Allowable Storage (cu.m)		69	
Estimated 100 Year Drawdown Time (h)		3.0	

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

From Watts Drain Catalogue

Head (m)	L/s Open	75%	50%	25%	Closed
0.025	0.315	**0.315**	0.315	0.315	0.315
0.050	0.631	**0.631**	0.631	0.631	0.631
0.075	0.946	**0.867**	0.789	0.710	0.631
0.100	1.262	**1.104**	0.946	0.789	0.631
0.125	1.577	**1.341**	1.104	0.867	0.631
0.150	1.893	**1.577**	1.262	0.946	0.631

Calculation Results	5yr	100yr	Available
Qresult (cu.m/s)	0.006	0.008	-
Depth (m)	0.114	0.150	0.150
Volume (cu.m)	31.2	68.9	69.3
Draintime (hrs)	1.6	3.0	

Project #160401672, 1125-1149 Cyrville Road, Ottawa, ON
Roof Drain Design Sheet, Area Roof 2A
Standard Watts Model R1100 Accuflow Roof Drain

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	0.0000	0.0000	0	0.000	0	0	0	0.000
0.025	0.0003	0.0022	0	0.025	17	0	0	0.025
0.050	0.0006	0.0044	1	0.050	67	1	1	0.050
0.075	0.0006	0.0044	4	0.075	152	3	4	0.075
0.100	0.0006	0.0044	9	0.100	269	5	9	0.100
0.125	0.0006	0.0044	18	0.125	421	9	18	0.125
0.150	0.0006	0.0044	30	0.150	606	13	30	0.150

Drawdown Estimate			
Total Volume (cu.m)	Total Time (sec)	Vol (cu.m)	Detention Time (hr)
0.0	0.0	0.0	0
1.0	222.4	1.0	0.06178
3.6	603.6	2.7	0.22945
8.8	1175.5	5.2	0.55599
17.4	1938.0	8.6	1.09432
30.2	2891.1	12.8	1.89742

Rooftop Storage Summary

Total Building Area (sq.m)		757.67
Assume Available Roof Area (sq.m)	80%	606.136
Roof Imperviousness		0.99
Roof Drain Requirement (sq.m/Notch)		232
Number of Roof Notches*		7
Max. Allowable Depth of Roof Ponding (m)		0.15
Max. Allowable Storage (cu.m)		30
Estimated 100 Year Drawdown Time (h)		1.7

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

From Watts Drain Catalogue

Head (m)	L/s Open	75%	50%	25%	Closed
0.025	0.3155	0.3155	0.3155	0.3155	**0.3155**
0.050	0.6309	0.6309	0.6309	0.6309	**0.6309**
0.075	0.9464	0.8675	0.7886	0.7098	**0.6309**
0.100	1.2618	1.1041	0.9464	0.7886	**0.6309**
0.125	1.5773	1.3407	1.1041	0.8675	**0.6309**
0.150	1.8927	1.5773	1.2618	0.9464	**0.6309**

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

Calculation Results

	5yr	100yr	Available
Qresult (cu.m/s)	0.004	0.004	-
Depth (m)	0.105	0.144	0.150
Volume (cu.m)	10.7	27.4	30.3
Draintime (hrs)	0.7	1.7	

Project #160401672, 1125-1149 Cyrville Road, Ottawa, ON
Roof Drain Design Sheet, Area Roof 2A
Standard Watts Model R1100 Accuflow Roof Drain

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	0.0000	0.0000	0	0.000	0	0	0	0.000
0.025	0.0003	0.0003	0	0.025	1	0	0	0.025
0.050	0.0006	0.0006	0	0.050	6	0	0	0.050
0.075	0.0006	0.0006	0	0.075	13	0	0	0.075
0.100	0.0006	0.0006	1	0.100	22	0	1	0.100
0.125	0.0006	0.0006	1	0.125	35	1	1	0.125
0.150	0.0006	0.0006	3	0.150	50	1	3	0.150

Drawdown Estimate			
Total Volume (cu.m)	Total Time (sec)	Vol (cu.m)	Detention Time (hr)
0.0	0.0	0.0	0
0.1	128.9	0.1	0.03579
0.3	349.7	0.2	0.13294
0.7	681.1	0.4	0.32213
1.4	1122.9	0.7	0.63404
2.5	1675.1	1.1	1.09934

Rooftop Storage Summary

Total Building Area (sq.m)		52.81
Assume Available Roof Area (sq.m)	95%	50.17
Roof Imperviousness		0.99
Roof Drain Requirement (sq.m/Notch)		232
Number of Roof Notches*		1
Max. Allowable Depth of Roof Ponding (m)		0.15
Max. Allowable Storage (cu.m)		3
Estimated 100 Year Drawdown Time (h)		0.6

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

From Watts Drain Catalogue

Head (m)	L/s Open	75%	50%	25%	Closed
0.025	0.315	0.315	0.315	0.315	**0.315**
0.050	0.631	0.631	0.631	0.631	**0.631**
0.075	0.946	0.867	0.789	0.710	**0.631**
0.100	1.262	1.104	0.946	0.789	**0.631**
0.125	1.577	1.341	1.104	0.867	**0.631**
0.150	1.893	1.577	1.262	0.946	**0.631**

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

Calculation Results

	5yr	100yr	Available
Qresult (cu.m/s)	0.001	0.001	-
Depth (m)	0.083	0.122	0.150
Volume (cu.m)	0.4	1.4	2.5
Draintime (hrs)	0.2	0.6	

D.3 STORM SEWER DESIGN SHEET

Stantec

1125 - 1149 CYRVILLE ROAD, OTTAWA, ON

DATE: 2023-03-01
REVISION: 1
DESIGNED BY: PM, NN
CHECKED BY: DT

STORM SEWER DESIGN SHEET
(City of Ottawa)

FILE NUMBER: 160401672

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
a =	732.951	998.071	1174.184	1735.688
b =	6.199	6.053	6.014	6.014
c =	0.810	0.814	0.816	0.820

MANNING'S n = 0.013
MINIMUM COVER: 2.00 m
TIME OF ENTRY 20 min
BEDDING CLASS = B

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 DIAMETEI (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)
TANK 2A	CBMH 102	BLDG B	0.00	0.04	0.00	0.00	0.00	0.00	0.90	0.00	0.00	0.000	0.000	0.036	0.036	0.000	0.000	0.000	0.000	20.00	52.03	70.25	82.21	119.95	0.0	0.0	7.0	6.3	200	200	CIRCULAR	PVC	-	1.00	33.3	**21.09%**	1.05	0.69	0.15
																				20.15									200	200									
ROOF 2A, ROOF 2B, TANK 2B, TANK 2C	BLDG B	BLDG A	0.00	0.17	0.00	0.00	0.00	0.00	0.90	0.00	0.00	0.000	0.000	0.153	0.153	0.000	0.000	0.000	0.000	20.00	52.03	70.25	82.21	119.95	0.0	0.0	29.9	8.7	300	300	CIRCULAR	PVC	-	1.00	96.2	**31.13%**	1.37	1.01	0.14
																				20.14									300	300									
TANK 1B	CB101	BLDG A	0.00	0.07	0.00	0.00	0.00	0.00	0.50	0.00	0.00	0.000	0.000	0.035	0.035	0.000	0.000	0.000	0.000	20.00	52.03	70.25	82.21	119.95	0.0	0.0	6.8	2.3	200	200	CIRCULAR	PVC	-	1.00	33.3	**20.51%**	1.05	0.68	0.06
																				20.06									200	200									
ROOF 1A, ROOF 1B, ROOF 1C, L100	BLDG A	MONITOR MH	0.00	0.38	0.00	0.00	0.00	0.00	0.90	0.00	0.00	0.000	0.000	0.342	0.342	0.000	0.000	0.000	0.000	20.00	52.03	70.25	82.21	119.95	0.0	0.0	66.7	5.2	375	375	CIRCULAR	PVC	-	2.50	260.6	**25.61%**	2.47	1.73	0.05
																				20.05																			
L100A	L100A	MONITOR MH	0.00	0.04	0.00	0.00	0.00	0.00	0.90	0.00	0.00	0.000	0.000	0.036	0.036	0.000	0.000	0.000	0.000	20.00	52.03	70.25	82.21	119.95	0.0	0.0	7.0	10.2	200	200	CIRCULAR	PVC	-	2.00	47.1	**14.91%**	1.48	0.88	0.19
	MONITOR MH	STM 1000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000	0.000	0.378	0.000	0.000	0.000	0.000	20.19	51.72	69.83	81.72	119.22	0.0	0.0	73.3	18.4	450	450	CIRCULAR	PVC	-	0.70	248.9	**29.46%**	1.52	1.11	0.28
	STM 1000	STM 1000-A	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000	0.000	0.414	0.000	0.000	0.000	0.000	20.47	51.29	69.24	81.02	118.20	0.0	0.0	79.6	18.4	600	600	CIRCULAR	CONCRETE	-	0.32	362.4	**21.97%**	1.24	0.83	0.37

D.4 CORRESPONDENCE WITH RIDEAU VALLEY CONSERVATION AUTHORITY (RVCA)

Nwanise, Nwanise

From: Jamie Batchelor <jamie.batchelor@rvca.ca>
Sent: Thursday, October 21, 2021 9:57 AM
To: Wu, Dennis
Cc: Moroz, Peter; Thiffault, Dustin; Sharp, Mike; Nwanise, Nwanise
Subject: RE: 160401672 _ 1125-1149 Cyrville Rd_ Stormwater Quality Control Criteria

Good Morning Dennis,

The downstream outlet to a watercourse is less than 500m. Therefore, t=on-site water quality control would be required. The water quality objective is 'enhanced' (80% TSS removal). We would also strongly encourage you to incorporate Lid measures into the stormwater management plan and to consider the new criteria for the upcoming linear ECA process.

Jamie Batchelor, MCIP, RPP
Planner, ext. 1191
Jamie.batchelor@rvca.ca

Rideau Valley Conservation Authority
3889 Rideau Valley Drive
PO Box 599, Manotick ON K4M 1A5
T 613-692-3571 | 1-800-267-3504 F 613-692-0831 | www.rvca.ca

From: Wu, Dennis <Dennis.Wu@stantec.com>
Sent: Tuesday, October 19, 2021 3:44 PM
To: Jamie Batchelor <jamie.batchelor@rvca.ca>
Cc: Moroz, Peter <peter.moroz@stantec.com>; Thiffault, Dustin <Dustin.Thiffault@stantec.com>; Sharp, Mike <Mike.Sharp@stantec.com>; Nwanise, Nwanise <Nwanise.Nwanise@stantec.com>
Subject: 160401672 _ 1125-1149 Cyrville Rd_ Stormwater Quality Control Criteria

Good day Jamie,

I am writing to request stormwater quality control criteria for a proposed development at 1125-1149 Cyrville Road, the property area is bound by Cyrville Road to the south, between the intersections with Michael Street and Cummings Avenue. Stantec is preparing an Adequacy of Services report in support of an application for site control and zoning amendment.

The proposed development area (0.84 ha) contains two residential high-rise buildings, one at 6-storeys and the other at 12-storeys. The 6-storey building contains 208 units in total and an estimated population at 400. It consists of 60 one-bedroom units, 143 two-bedroom units, 5 three-bedroom units, and 2,392m^2 of communal amenity areas. The 12-storey building would house 146 total units with population of 275, including 55 one-bedroom units, 85 two-bedroom units, 6 three-bedroom units, and 2,028m^2 of communal amenity areas. There will be an access lane for internal circulation and access to parking, which is found in two underground parking levels (P1 and P2) in each building, totaling 354 parking stalls overall.

A location map, Site Servicing Plan, and Stormwater Drainage plan are attached for your use and reference.

Please do not hesitate to contact me if you require more information.

Thank you in advance.

Best regards,

Dennis Wu,EIT
Civil Designer, Community Development

Mobile: (613) 413-1218
dennis.wu@stantec.com

Stantec
400 - 1331 Clyde Avenue
Ottawa ON K2C 3G4

D.5 STORMCEPTOR SIZING SHEET AND STANDARD DETAIL

Stormceptor Net Annual Sediment Load Reduction Sizing Tool

Project Name: 1125 - 1149 Cyrville Road **Site Name:** 1125-1149 Cyrville road **Location:** Ottawa / ON

Site has been updated successfully.

Download Stormceptor Specifications & Drawings

Download Stormceptor EFO Sizing Report

Design Summary

Net Annual Sediment (TSS) Load Reduction Sizing Summary	
Stormceptor Model	**TSS Removal Provided (%)**
EFO4	81
EFO6	90
EFO8	95
EFO10	97
EFO12	99

Recommended Stormceptor EFO Model: EFO4

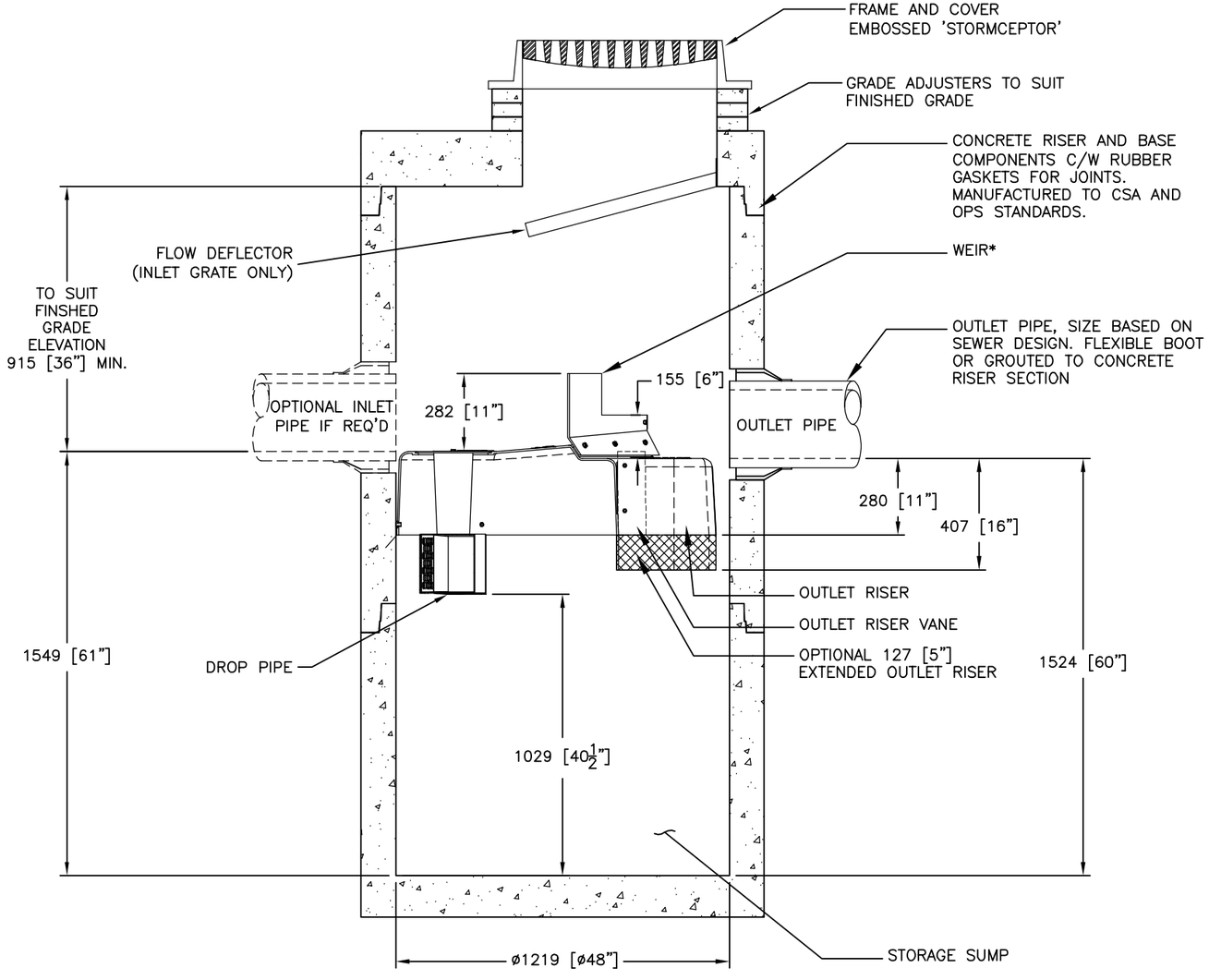
Estimated Net Annual Sediment (TSS) Load Reduction (%): 81

Water Quality Runoff Volume Capture (%): > 90

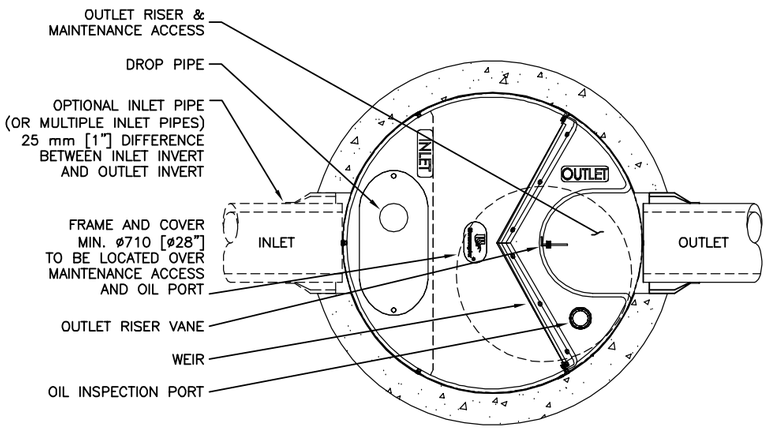
Rainfall Intensity (mm/hr)	Percent Rainfall Volume	Cumulative Rainfall Volume	Flow Rate (L/s)	Flow Rate (L/min)	Surface Loading	Removal Efficiency (%)	Incremental Removal (%)	Cumulative Removal (%)

					Rate ($L/min/m^2$)			
0.5	8.6%	8.6%	0.81	48.8	40.7	100	8.6	8.6
1	20.3%	29.0%	1.63	97.6	81.3	98	20.0	28.6
2	16.2%	45.2%	3.25	195.2	162.6	88	14.3	43.0
3	12.0%	57.2%	4.88	292.7	243.9	81	9.7	52.7
4	8.4%	65.6%	6.51	390.3	325.3	78	6.5	59.2
5	5.9%	71.6%	8.13	487.9	406.6	74	4.4	63.6
6	4.6%	76.2%	9.76	585.5	487.9	70	3.3	66.9
7	3.1%	79.3%	11.38	683.0	569.2	66	2.0	68.9
8	2.7%	82.0%	13.01	780.6	650.5	64	1.8	70.7
9	3.3%	85.3%	14.64	878.2	731.8	64	2.1	72.8
10	2.3%	87.6%	16.26	975.8	813.2	63	1.4	74.2
11	1.6%	89.2%	17.89	1073.4	894.5	62	1.0	75.2
12	1.3%	90.5%	19.52	1170.9	975.8	62	0.8	76.0
13	1.7%	92.2%	21.14	1268.5	1057.1	60	1.0	77.1
14	1.2%	93.5%	22.77	1366.1	1138.4	59	0.7	77.8
15	1.2%	94.6%	24.39	1463.7	1219.7	56	0.7	78.4
16	0.7%	95.3%	26.02	1561.2	1301.0	55	0.4	78.8
17	0.7%	96.1%	27.65	1658.8	1382.4	53	0.4	79.2
18	0.4%	96.5%	29.27	1756.4	1463.7	50	0.2	79.4
19	0.4%	96.9%	30.90	1854.0	1545.0	48	0.2	79.6
20	0.2%	97.1%	32.53	1951.6	1626.3	45	0.1	79.7
21	0.5%	97.5%	34.15	2049.1	1707.6	43	0.2	79.9
22	0.2%	97.8%	35.78	2146.7	1788.9	41	0.1	80.0
23	1.0%	98.8%	37.40	2244.3	1870.2	39	0.4	80.4
24	0.3%	99.1%	39.03	2341.9	1951.6	38	0.1	80.5
25	0.0%	99.1%	40.66	2439.5	2032.9	36	0.0	80.5
30	0.9%	100.0%	48.79	2927.3	2439.5	30	0.3	80.8
35	0.0%	100.0%	56.92	3415.2	2846.0	26	0.0	80.8
40	0.0%	100.0%	65.05	3903.1	3252.6	23	0.0	80.8
45	0.0%	100.0%	73.18	4391.0	3659.2	20	0.0	80.8

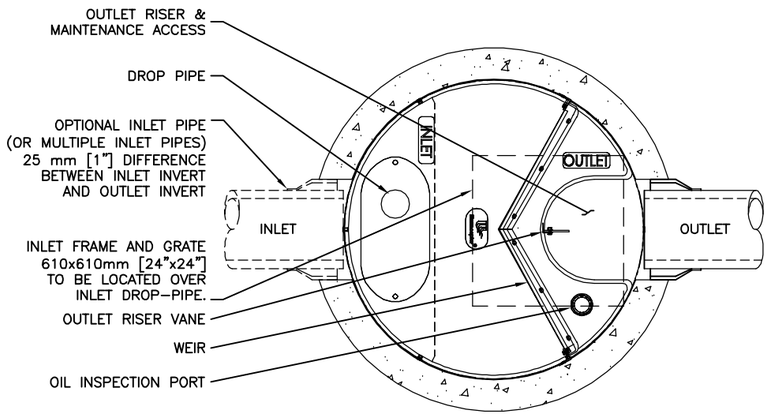
Download Stormceptor Specifications & Drawings



SECTION VIEW



PLAN VIEW (STANDARD)



PLAN VIEW (INLET TOP)

FOR SITE SPECIFIC DRAWINGS PLEASE CONTACT YOUR LOCAL STORMCEPTOR REPRESENTATIVE. SITE SPECIFIC DRAWINGS ARE BASED ON THE BEST AVAILABLE INFORMATION AT THE TIME. SOME FIELD REVISIONS TO THE SYSTEM LOCATION OR CONNECTION PIPING MAY BE NECESSARY BASED ON AVAILABLE SPACE OR SITE CONFIGURATION REVISIONS. ELEVATIONS SHOULD BE MAINTAINED EXCEPT WHERE NOTED ON BYPASS STRUCTURE (IF REQUIRED).

GENERAL NOTES:

* MAXIMUM SURFACE LOADING RATE (SLR) INTO LOWER CHAMBER THROUGH DROP PIPE IS 1135 L/min/m^2 (27.9 gpm/ft^2) FOR STORMCEPTOR EF4 AND 535 L/min/m^2 (13.1 gpm/ft^2) FOR STORMCEPTOR EFO4 (OIL CAPTURE CONFIGURATION). WEIR HEIGHT IS 150 mm (6 INCH) FOR EF04.

1. ALL DIMENSIONS INDICATED ARE IN MILLIMETERS (INCHES) UNLESS OTHERWISE SPECIFIED.
2. STORMCEPTOR STRUCTURE INLET AND OUTLET PIPE SIZE AND ORIENTATION SHOWN FOR INFORMATIONAL PURPOSES ONLY.
3. UNLESS OTHERWISE NOTED, BYPASS INFRASTRUCTURE, SUCH AS ALL UPSTREAM DIVERSION STRUCTURES, CONNECTING STRUCTURES, OR PIPE CONDUITS CONNECTING TO COMPLETE THE STORMCEPTOR SYSTEM SHALL BE PROVIDED AND ADDRESSED SEPARATELY.
4. DRAWING FOR INFORMATION PURPOSES ONLY. REFER TO ENGINEER'S SITE/UTILITY PLAN FOR STRUCTURE ORIENTATION.
5. NO PRODUCT SUBSTITUTIONS SHALL BE ACCEPTED UNLESS SUBMITTED 10 DAYS PRIOR TO PROJECT BID DATE, OR AS DIRECTED BY THE ENGINEER OF RECORD.

INSTALLATION NOTES

A. ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD.
B. CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE STRUCTURE (LIFTING CLUTCHES PROVIDED)
C. CONTRACTOR WILL INSTALL AND LEVEL THE STRUCTURE, SEALING THE JOINTS, LINE ENTRY AND EXIT POINTS (NON-SHRINK GROUT WITH APPROVED WATERSTOP OR FLEXIBLE BOOT)
D. CONTRACTOR TO TAKE APPROPRIATE MEASURES TO PROTECT THE DEVICE FROM CONSTRUCTION-RELATED EROSION RUNOFF.
E. DEVICE ACTIVATION, BY CONTRACTOR, SHALL OCCUR ONLY AFTER SITE HAS BEEN STABILIZED AND THE STORMCEPTOR UNIT IS CLEAN AND FREE OF DEBRIS.

STANDARD DETAIL
NOT FOR CONSTRUCTION

SITE SPECIFIC DATA REQUIREMENTS

STORMCEPTOR MODEL	EFO4				
STRUCTURE ID					*
HYDROCARBON STORAGE REQ'D (L)					*
WATER QUALITY FLOW RATE (L/s)					*
PEAK FLOW RATE (L/s)					*
RETURN PERIOD OF PEAK FLOW (yrs)					*
DRAINAGE AREA (HA)					*
DRAINAGE AREA IMPERVIOUSNESS (%)					*
PIPE DATA:	I.E.	MAT'L	DIA	SLOPE %	HGL
INLET #1	*	*	*	*	*
INLET #2	*	*	*	*	*
OUTLET	*	*	*	*	*

* PER ENGINEER OF RECORD

MARK	DATE	REVISION DESCRIPTION	BY
####	####	####	####
####	####	####	####
1	6/8/18	UPDATES	JSK
0	5/26/17	INITIAL RELEASE	JSK

Stormceptor® EF

SCALE = NTS

imbrium®
407 FAIRVIEW DRIVE, WHITBY, ON, L1N 9A9
TF 800-565-4501 CA 416-800-9000 INTL +1-416-800-9000

DATE: 10/13/2017

DESIGNED:	DRAWN:
JSK	JSK
CHECKED:	APPROVED:
BSF	SP
PROJECT No.:	SEQUENCE No.:
EFO4	*

SHEET: 1 OF 1