1010 Somerset Street - Adequacy of Services

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Stantec

Prepared for:
City of Ottawa Housing Solutions and Investment Services

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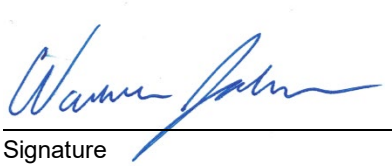

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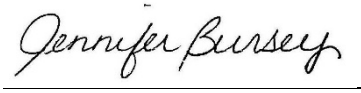

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1 Introduction

1.1 Project Information

This report is prepared to demonstrate the Adequacy of Public Services in support of a Zoning By-law Amendment (ZBLA) application for the proposed development by the City of Ottawa located at 1010 Somerset Street. The site is approximately 3.2 ha in size and current zoning is Mixed-Use Centre Zone F (1.5).

The site contains an existing abandoned building and associated parking areas. The site is bound by Somerset Street to the north, Plouffe Park and the Plant Recreation Centre to the east, Oak Street to the south, and the Trillium Pathway to the west. The site location is illustrated in **Figure 1.1** below.

Figure 1.1: Key Plan of Site

A copy of the Concept Plan (dated November 2024) prepared by Hobin Architecture Inc. is provided in **Appendix A.1**. The proposed development consists of a Recreation and Cultural Facility, school, district energy plant, mid-rise building (6 floors and 60 units), high density towers (max. 25 floors and total 480

units), a sports field/passive park, and an expansion to the existing Plant Recreation Centre. The existing abandoned building is to be removed to accommodate the proposed works.

The assumed preliminary unit type breakdown is listed in **Table 1.1** below.

Table 1.1: Unit Type Breakdown

Unit Type	Quantity
Residential Apartment Units (ea.) - Total	540
60 % One-bedroom	324
35% Two-bedroom	189
5% Three-bedroom	27

1.2 Regulatory Framework

The development of the 1010 Somerset Street site is governed by the City of Ottawa's current Official Plan and applicable development application requirements.

The pre-application consultation process with the City of Ottawa establishes the initial design criteria associated with demonstrating the adequacy of servicing for the site.

1.2.1 Supporting Information

Supporting documents referenced in support of this report include:

- *City of Ottawa Sewer Design Guidelines* (SDG), City of Ottawa, October 2012, including all subsequent technical bulletins
- *City of Ottawa Design Guidelines – Water Distribution*, City of Ottawa, July 2010, including all subsequent technical bulletins
- *Design Guidelines for Drinking Water Systems*, Ministry of the Environment, Conservation, and Parks (MECP), 2008
- *Fire Protection Water Supply Guideline* for Part 3 in the Ontario Building Code, Office of the Fire Marshal (OFM), October 2020
- *Water Supply for Public Fire Protection*, Fire Underwriters Survey (FUS), 2020
- *Fire Code*, National Fire Protection Agency, 2012
- Pre-Application Consultation meeting notes and related correspondence with City of Ottawa staff, June 7, 2024 (see **Appendix B.1**).
- Details of the existing infrastructure located within the adjacent public roads are obtained from available City of Ottawa as-built records and GeoOttawa.

1.3 Objective

This Adequacy of Public Services report assesses and identifies preliminary servicing and stormwater management (SWM) conditions which are generally consistent with City of Ottawa Design Guidelines and considers related pre-consultation advice provided by City of Ottawa staff.

Preliminary general and applicable site-specific objectives considered are summarized below. Specific technical design criteria details are described in the associated servicing sections of this report.

Potable Water Servicing

- Develop a preliminary assessment of the potable water and fire flow demand for the site.
- Identify that the City of Ottawa water distribution system can supply adequate water pressure to the site for typical operational and emergency conditions.

Wastewater (Sanitary Sewer) Servicing

- Develop a preliminary assessment of the wastewater flow projected for the site.
- Identify that the City of Ottawa sanitary sewer system can support the project wastewater flow from the site.

Storm Sewer Servicing and Stormwater Management

- Identify allowable flow contributions from the site to the City of Ottawa storm sewer (minor) and adjacent surface (major) drainage systems.
- Identify applicable water quality control and water balance control targets.
- Develop a preliminary assessment of the SWM system for the site to achieve applicable water quantity (minor and major system) control, water quality control, and water balance control targets.

Site Grading Plan

- Prepare a preliminary grading plan to support the servicing assessments and identify compatibility with surrounding existing ground conditions.

The accompanying figures and drawings illustrate the key components of the preliminary servicing assessments.

2 Potable Water Servicing

2.1 Background

The site is within Pressure Zone ‘1W’ of the City of Ottawa water distribution system.

The existing watermains along the boundaries of the site consist of a 300 mm diameter PVC watermain within Somerset Street, a 200 mm diameter PVC watermain within Oak Street, and a 400 mm diameter cast iron watermain within Champagne Avenue.

Several existing fire hydrants are located throughout Somerset Street, Oak Street, and Champagne Avenue.

The following design criteria are applied to the assessment of the potable water and fire protection servicing for the site.

2.1.1 Water Demand and Allowable Pressure

Preliminary potable water demand and allowable water pressure are assessed using the City of Ottawa Water Distribution Guidelines (2010) as amended, and the ISTB 2021-03 Technical Bulletin.

Residential Apartment Population Rate	
1 Bedroom	1.4 persons / unit
2 Bedroom	2.1 persons / unit
3 Bedroom	3.1 persons / unit

Residential Apartment Demand	
Average Daily (AVDY)	280 L/cap/day
Maximum Daily (MXDY)	2.5 x AVDY
Peak Hour (PKHR)	2.2 x MXDY

Industrial, Commercial, and Institutional Demand	
Commercial and Institutional	28,000 L/ha/day
Light Industrial	35,000 L/ha/day
Maximum Daily (MXDY)	1.5 x AVDY
Peak Hour (PKHR)	1.8 x MXDY

Maximum Allowable for Occupied Area	552 kPa (80 psi)

2.1.2 Fire Flow and Hydrant Capacity

Preliminary fire flow requirements are assessed using the Fire Underwriters Survey (FUS) methodology (2020). Site specific criteria considered are noted in **Section 2.2.2.**

Fire hydrant capacity is assessed based on Table 18.5.4.3 of the National Fire Protection Agency (NFPA) Fire Code document. A hydrant situated less than 76 m away from a building can supply a maximum capacity of 5,678 L/min, and a hydrant 76 to less than 152 m away can supply a maximum capacity of 3,785 L/min.

2.2 Water Demand

2.2.1 Domestic Water Demand

The domestic water demand is assessed based on the proposed development conditions described in **Table 1.1** and the design criteria described in **Section 2.1**.

The assessed domestic water demand for the site is summarized in **Table 2.1**. Supporting calculations are provided in **Appendix C.1**.

Table 2.1: Estimated Domestic Water Demands

Demand Type	Population	Area (ha)	AVDY (L/s)	MXDY (L/s)	PKHR (L/s)
Future High-Density Block	830	-	2.7	6.7	14.8
Conceptual Mid-Rise	104	-	0.3	0.8	1.9
Future School	-	0.56	0.2	0.3	0.5
Recreation and Cultural Facility	-	1.02	0.3	0.5	0.9
District Energy Plant	-	0.28	0.1	0.2	0.3
Tower A+B Commercial Podium	-	0.23	0.1	0.1	0.2
Sports field and/or passive park	-	1.00	0.3	0.5	0.9
Total	934	3.09	4.1	9.1	19.4

2.2.2 Fire Flow Demand

The fire flow demand is assessed based on:

- Type II – Non-combustible Construction / Type IV-A - Mass Timber Construction (i.e., building construction materials with a 1-hour fire resistance rating).

- Total effective building area is the gross floor area of the largest floor plus 25% of the floor area for each of the two immediately adjoining floors.
- Vertical openings are protected.
- Occupancy and contents factor considering limited combustible materials.
- A not fully supervised automatic sprinkler system that conforms to the NFPA 13 standard.
- Exposure distances to existing adjacent structures assumed to have Type V (no fire resistance rating) construction with no firewall or sprinkler systems where no information was available.
- Confirmation of the assumed building criteria to be coordinated with the architect during subsequent submissions.

The maximum fire flow is assessed to be approximately 11,000 L/min (183.3 L/s) for the worst-case location (Recreation and Cultural Facility). Supporting calculations per the FUS methodology are provided in **Appendix C.2**.

2.3 Available Level of Service

2.3.1 Boundary Conditions

The assessed domestic water and fire flow demands are used to confirm the level of servicing available to the proposed development from the adjacent municipal watermain and hydrants. The associated hydraulic grade line (HGL) elevation boundary conditions provided by the City of Ottawa (see **Appendix C.3** for correspondence) are summarized in **Table 2.2**.

Table 2.2: Boundary Conditions

HGL Condition	Elevation (m)
Minimum HGL	107.7
Maximum HGL	115.3
Max. Day + Fire Flow (183.3 L/s) HGL Connection 1	109.0
Max. Day + Fire Flow (183.3 L/s) HGL Connection 2	108.2

2.3.2 Allowable Domestic Pressure

The anticipated lowest finished floor elevation on the first floor of the Recreation and Cultural Facility at 58.00 m, serves as the reference elevation for the calculation of residual pressures at ground level. From the boundary condition HGL elevations, the pressures at the first-floor level are expected to range from 487.5 kPa to 561.9 kPa (70.7 psi to 81.5 psi) under normal operating conditions. The maximum pressure

is expected to be above the serviceable limit of 80 psi (552 kPa) and therefore buildings will require pressure reducing valves.

To ensure adequate water pressure above the first-floor elevation, booster pump requirements are to be confirmed by the mechanical engineering consultant during subsequent stages of the development application process.

2.3.3 Allowable Fire Flow Pressure

From the boundary condition HGL elevations, the existing watermains can provide the required fire flow while maintaining the minimum residual pressure of 138 kPa (20 psi).

2.3.4 Fire Hydrant Coverage

The buildings are to be sprinklered and Siamese (fire department) connections provided. The Siamese connections are anticipated to within 45 m of a proposed or existing fire hydrant.

The existing hydrants near the site are anticipated to be within 76 m of the proposed buildings. Additional detail illustrating the hydrant coverage and requirement for proposed fire hydrants will be provided with subsequent stages of the development application process.

2.4 Proposed Water Servicing

The development is to be serviced with connections to the existing watermains on Somerset Street and Champagne Avenue. The proposed water servicing is shown on **Drawing SSP-1**. Connections and service requirements are to be consistent with City of Ottawa guidelines and specifications.

A portion of the existing 300 mm diameter watermain between Champagne Avenue and Somerset Street conflicts with the conceptual mid-rise building. During subsequent design stages the building envelope will be modified to eliminate the conflict (to be determined by the architect) or the watermain will be relocated as required.

Prior to installation of potable water servicing infrastructure, applicable existing water service laterals are to be blanked at the main by the City of Ottawa.

The mechanical engineering consultant is responsible to confirm the service sizes required and that the water pressure within each building is adequate to meet building code requirements. This confirmation is to occur during subsequent stages of the development application process.

No change to the existing Plant Recreation Centre building service is considered.

3 Wastewater Servicing

3.1 Background

The existing sanitary sewers adjacent to the site consist of a 1500 mm diameter concrete combined sewer intersecting the site within Champagne Avenue, a 375 mm diameter PVC combined sewer within Somerset Street, and a 2100 mm diameter concrete combined sewer within Preston Street.

3.2 Design Criteria

Preliminary wastewater servicing is assessed using the City of Ottawa Sewer Design Guidelines (2012) as amended, and the MECP Design Guidelines for Sewage Works. The following design criteria are applied to the assessment of wastewater servicing for the site.

Residential Wastewater Flow	
Average Flow Generation	280 L/cap/day
Peaking Factor	Harmon Equation (max. residential = 4.0)
Harmon Correction Factor	0.80
Infiltration Allowance	0.33 L/s/ha

3.3 Wastewater Generation and Servicing Design

The peak wastewater flow is assessed based on the proposed development conditions described in **Table 1.1** and the design criteria described in **Section 3.2**.

The assessed peak wastewater flow for the site is summarized in **Table 3.1**. Supporting calculations are provided in **Appendix D.1**.

Table 3.1: Estimated Peak Wastewater Flow

Peak Residential Wastewater Flow			**Peak ICI Wastewater Flow (L/s)**	**Infiltration Flow (L/s)**	**Total Peak Flow (L/s)**
Population	**Peak Factor**	**Peak Flow (L/s)**			
934	3.26	9.9	0.8	1.1	11.8

The anticipated peak wastewater flows for the proposed development were provided to the City of Ottawa staff to evaluate the adequacy of the receiving municipal sanitary sewer system in the vicinity of the site and downstream network. Refer to **Appendix D.2** for City correspondence confirming available capacity in the downstream sewer in Champagne Avenue.

Since the proposed sanitary sewers will be connecting to a combined trunk sewer, City of Ottawa Asset Management's permission is required for the connection. At the time of writing this report coordination with the City is ongoing, although, given similar recent developments in the area have connected to this trunk sewer no issues are anticipated. Confirmation will be provided in subsequent submissions.

The current anticipated population at 934 persons and 3.47 ha gross area (0.88 ha residential, 0.23 ha commercial, 0.22 ha industrial, 1.07 ha institutional, 1.07 ha green/unused) is anticipated to have a negligible impact on the municipal sanitary sewer capacity condition and final design details can be confirmed during subsequent stages of the development application process.

3.4 Proposed Sanitary Servicing

The development is to be serviced with a connection to the existing 1500 mm diameter combined sewer in Champagne Ave. The proposed sanitary servicing is shown on **drawing SA-1**. Connections and service requirements are to be consistent with City of Ottawa guidelines and specifications.

The mechanical engineering consultant is responsible to confirm the service sizes required and that the appropriate backwater valve requirements are satisfied. This confirmation is to occur during subsequent stages of the development application process.

No change to the existing Plant Recreation Centre service is considered.

4 Stormwater Management and Servicing

4.1 Background

The existing storm drainage system along the boundaries of the site consists of curb and catch basins as part of a typical urban roadway section. Catch basins are connected to an associated storm sewer system. The existing storm sewers along the boundaries of the site consist of a 1650 mm diameter concrete sewer within the existing sewer easement along the western boundary of the site, a 600 mm diameter concrete sewer within Somerset Street, and a 1050 mm diameter concrete sewer within Preston Street.

4.2 Design Criteria

Preliminary stormwater management (SWM) and storm sewer servicing is assessed using the City of Ottawa Sewer Design Guidelines (2012) as amended. The following design criteria are applied to the assessment of SWM and storm sewer servicing for the site.

- Water Quality Control: provide enhanced levels of protection of 80% for total suspended solids removal.
- Water Quantity Control: control post-development runoff from the subject site, up to and including the 100-year storm event, to a 2-year pre-development level.
- The pre-development runoff coefficient to be determined as per existing conditions but in no case more than 0.5.
- The time of concentration (Tc) used to determine the pre-development condition should be calculated. Tc should not be less than 10 min.
- Tc of 10 minutes shall be used for all post-development calculations.
- Any storm events greater than the established 2-year allowable release rate, up to and including the 100-year storm event, shall be detained on-site. For events greater than 100 years, spillage must be directed to a public ROW and not to neighboring private property.
- 100-year spill elevation must be 300 mm lower than any building opening or ramp.
- The stress test spill elevation (100-year +20% event) shall not spill onto any permanent structures.
- The maximum permissible ponding depth for the 100-year storm event is 0.35 m. No spilling to adjacent sites.
- There shall be no surface ponding on private parking areas during the 2-year storm rainfall event.

4.3 Existing Conditions

The site area currently consists of an existing abandoned building, open space, and parking areas. All runoff from the site currently drains uncontrolled to the adjacent public roadways (Somerset Street and City Centre Avenue) and ultimately to the Plouffe Park stormwater relief area. There is no external drainage area draining into this property. The current pre-development drainage pattern is illustrated on **Drawing EXSD-1**.

The overall existing condition rational method runoff coefficient is assessed at C = 0.76.

4.4 Stormwater Management Design

Based on the concept plan, drainage area boundaries are defined as illustrated on **Drawing SD-1**. Conceptual runoff coefficient values for modified rational method calculations are assigned to each drainage area based on the expected land use. A summary of drainage areas and assumed runoff coefficients are provided in **Table 4.1**.

Table 4.1: Summary of Post-Development Drainage Areas

Land Use	Drainage Areas	Area (ha)	Runoff Coefficient, C	Outlet
High-density Res.	L102A	0.29	0.85	Storm Sewer
District Energy Plant	L102B	0.14	0.85	Storm Sewer
District Energy Plant	L102C	0.08	0.85	Storm Sewer
High-density Res. Roof	R102D	0.23	0.90	Roof Drain
High-density Res. Roof	R102E	0.10	0.90	Roof Drain
Mid-rise Res.	L103A	0.17	0.85	Storm Sewer
Mid-rise Res. Roof	R103B	0.07	0.90	Roof Drain
Sports field/Park	L104A	0.82	0.40	Storm Sewer
Rec. and Cultural Facility	L105A	0.23	0.85	Storm Sewer
School	L105B	0.21	0.70	Storm Sewer
Rec. and Cultural Facility Roof	R105C	0.49	0.90	Roof Drain
School Roof	R105D	0.14	0.90	Roof Drain
Parking and Access	L106A	0.24	0.85	Storm Sewer

4.4.1 Allowable Release Rate

The rational method equation (Q = 2.78 CiA) is used to assess the allowable pre-development release rate from the site. The following parameters are used to assess the allowable release rate.

- Based on the overall calculated C value of 0.76 for the applicable existing site condition a runoff coefficient of 0.50 is used to establish the allowable release rate.
- Rainfall intensity is for the City of Ottawa 2-year design storm. A calculated Time of Concentration of 10 minutes has been applied to the site. The resultant intensity is 76.81 mm/hr. Supporting calculations are provided in **Appendix E**.

An overall target release rate of **345.9 L/s** from the entire site was obtained based on the rational method equation shown below.

$$\boldsymbol{Q} = \mathbf{2.78}\,(\boldsymbol{C})(\boldsymbol{I})(\boldsymbol{A})$$

Where:

$\boldsymbol{Q} = peak\ flow\ rate, L/s$

$\boldsymbol{C} = site\ runoff\ coefficient$

$\boldsymbol{I}$ = *rainfall intensity corresponding to the 10 min storm duration mm/hr (per City of Ottawa 2-year IDF curves*

$\boldsymbol{A} = drainage\ area, ha$

$$Intensity\ (mm/hr) = \frac{732.951}{(10 + 6.199)^{0.81}} = \mathbf{76.81\ mm/hr}$$

$$Q = 2.78(0.5)(76.81 mm/hr)(3.24\ ha) = \mathbf{345.9\ L/s}$$

The overall site target release rate was divided by the total site area to determine the target release rate per hectare (**106.76 L/s/ha**). Target release rates for the site are summarized in **Table 4.2** below:

Table 4.2: Site Target Release Rates

Land Use	Area ID	Subcatchment Area (ha)	Target Flow Rate to Storm Sewer (L/s)'	Pre-Development Target (L/s/ha)
Future High-Density Residential	L102A (R102D and R102E roof areas)	0.6315	67.42	**106.76**
District Energy Plant Option 1	L102B	0.1415	15.11	
District Energy Plant Option 2	L102C	0.0794	8.48	
Conceptual Mid-Rise	L103A (R103B roof area)	0.2483	26.51	
Sports field / Passive Park	L104A	0.8223	87.79	

Land Use	Area ID	Subcatchment Area (ha)	Target Flow Rate to Storm Sewer (L/s)[1]	Pre-Development Target (L/s/ha)
Recreation and Cultural Facility	L105A (R105C roof area)	0.7222	77.10	
Future School	L105B (R105D roof area)	0.3514	37.52	
Parking and Access Lane	L106A	0.2435	26.00	
Total		**3.24**	**345.9**	

1. Target flow rate (L/s) from each block/street is the product of the allowable pre-development target rate (L/s/ha) and the subcatchment area (ha)

For the proposed development, the target allowable release rate is used to assess water quantity control measures to be applied.

4.4.2 Quantity Control

Based on the proposed change to the site condition, quantity control measures are needed to manage stormwater runoff to the allowable 2-year pre-development runoff flow rate. Post-development peak flows up to the 100-year storm from the proposed blocks will be restricted to the allowable release rates using a combination of surface storage, inlet control devices (ICD's), rooftop storage, underground cisterns, and pipe storage. Major system overflows will be directed overland to Somerset Street and ultimately to the Plouffe Park storm relief area.

Rooftop storage is expected to be provided on the school, recreation and cultural facility, conceptual mid-rise, and future high-density residential site blocks. The storage shall not exceed 150 mm depth with conservative assumptions adopted for the usable roof area and number of drains. Stormwater will first be detained on the roofs via roof drains, then it is assumed to be controlled by underground storage tanks/cisterns before discharging to the downstream sewer. **Appendix E** contains the functional storm sewer design sheet and the preliminary modified rational method calculations.

Roof storage calculations assume the roofs will be equipped with standard Watts Model R1100 Accuflow Single Notch Roof Drains (50%-75% open) and that 80% of the roof areas are usable. **Table 4.3** summarizes the conceptual 100-year roof release rates and storage requirements.

Table 4.3: 100-Year Summary of Roof Controls

Land Use	Area ID	Usable Roof Area (m^2)	Discharge (L/s)	Maximum Depth (m)	Required Storage Volume (m^3)	Available Storage Volume (m^3)
Future High-Density Residential[1]	R102D	1860.8	11.26	0.15	90.3	93.0
Future High-Density Residential[1]	R102E	838.4	5.01	0.15	40.9	41.9
Conceptual Mid-Rise	R103B	600.0	3.74	0.15	28.8	30.0
Recreation and Cultural Facility	R105C	3928.8	26.2	0.15	183.4	196.4
Future School	R105D	1122.4	6.3	0.15	55.9	56.1
				Total Roof Storage (m^3):	**399.3**	**417.4**

1. High-density residential building roof areas assume podium roof area is available for storage.

Additional storage is required within most blocks to restrict post-development peak flows up to the 100-year storm to the target release rates. It is assumed that uncontrolled surface areas within the proposed private blocks will be equipped with catch basins/drains that will either direct runoff to underground parking cisterns or to oversized pipes for storage. **Table 4.4** demonstrates that the target release rates can be achieved for the proposed site and shows the resultant minimum stormwater storage requirements for each block.

Table 4.4: 100-Year Storage Requirements and Release Rates

Land Use	Area ID	Area (ha)	100-Year Volume Requirements (m^3)		100-Year Release Rate (L/s)
			Cistern	Surface and/or Underground Storage	
Future High-Density Residential	L102A (R102D and R102E roof areas)	0.6315	56.9	-	67.42
District Energy Plant Option 1	L102B	0.1415	38.5	-	15.11

Land Use	Area ID	Area (ha)	100-Year Volume Requirements (m^3)		100-Year Release Rate (L/s)
			Cistern	Surface and/or Underground Storage	
District Energy Plant Option 2	L102C	0.0794	21.6	-	8.48
Conceptual Mid-Rise	L103A (R103B roof area)	0.2483	42.0	-	26.51
Sports field / Passive Park	L104A	0.8223	-	69.8	87.79
Recreation and Cultural Facility	L105A (R105C roof area)	0.7222	38.3	-	77.10
Future School	L105B (R105D roof area)	0.3514	36.5	-	37.52
Parking and Access Lane	L106A	0.2435	-	66.2	26.00
Totals:		**3.24**	**233.8**	**136.0**	**345.9**
Total Target Release Rate:					**345.9**

A detailed hydraulic analysis will be completed at the detailed design stage.

4.4.3 Quality Control

Enhanced level of quality control equivalent to 80% total suspended solids (TSS) removal will be provided within each block to treat runoff from all above-ground parking areas and access roads through oil/grit separators or approved equivalent that will be sized at the detailed design stage.

4.5 Proposed Stormwater Servicing

The development is to be serviced with a connection to the existing 1650 mm diameter storm sewer within the existing sewer easement along the western boundary of the site. The proposed storm servicing is shown on **drawing SD-1**. Connections and service requirements are to be consistent with City of Ottawa guidelines and specifications.

A portion of the existing 1650 mm diameter storm sewer within the Future High Density Residential Site conflicts with the conceptual buildings. During subsequent design stages the building envelopes will be

modified to eliminate the conflict (to be determined by the architect), or the storm sewer will be relocated as required.

The mechanical engineering consultant is responsible to confirm the service size required, that the appropriate backwater valve requirements are satisfied, the nature of the foundation drainage system, and that any roof drainage systems (including internal storage systems, roof drains, scuppers, and applicable green roof conditions) are adequate for accommodating the design storm conditions

No change to the existing Plant Recreation Centre service or drainage pattern is considered.

5 Site Grading

Conceptual grading for the proposed site has been provided as shown on **Drawing GP-1.** Grading design has been based on the existing topography and the requirement to route overland flows from the proposed development to the adjacent ROW's. Given the current topography, site grading will be designed to match the existing boundaries of the site as well as the existing Plant Recreation Centre building. Major system flows from the development will be directed to Somerset Street and City Centre Avenue and ultimately the Plouffe Park storm relief area as per existing conditions.

Preliminary building finished floor elevations are indicated based on ensuring suitable elevation ties to the surrounding existing conditions, the relative maximum allowable elevation change between the access roads and building entrances to ensure appropriate accessibility conditions are achieved, and that positive drainage away from the building face is achieved. The finished floor elevations may be adjusted during subsequent stages of the development application process.

Building footing elevations will be assessed at time of detailed design to ensure proper interaction with anticipated groundwater levels.

6 Other Considerations

6.1 Geotechnical

A geotechnical investigation was not available at the time of writing this report. Geotechnical conditions for the site shall be investigated during subsequent stages of the development application process. Recommendations from the geotechnical report are intended to be followed as they relate to the proposed servicing and grading strategy for the site.

6.2 Utilities

Utility infrastructure exists within the Somerset Street ROW at the north property boundary of the proposed site. It is anticipated that existing infrastructure will be sufficient to provide a means of distribution for the proposed site. The exact size, location, and routing of utilities is to be finalized during subsequent stages of the development application process.

Coordination with the appropriate governing bodies will be required to relocate or remove the existing utility poles and infrastructure within the proposed site and will be explored in the detailed design phase.

6.3 Erosion and Sediment Control During Construction

To protect downstream water quality and prevent sediment build-up in catch basins and storm sewers, erosion and sediment control measures must be implemented during construction. Erosion and sediment control (ESC) measures are the responsibility of the contractor. Refer to **drawing EC-1** for conceptual erosion control measures. Recommendations for ESC implementation will be included with subsequent submissions through the development application process.

6.4 Regulatory Approvals

Information on anticipated regulatory approvals associated with the site will be provided with subsequent submissions through the development application process.

7 Closing

The water, wastewater, and storm water servicing conditions assessed in this report indicate that the existing public services immediately adjacent to the project site are adequate to support the proposed development.

The mechanical engineering consultant is responsible to confirm:

- The water service sizes required and that the water pressure within each building is adequate to meet building code requirements.
- The sanitary sewer services size required and that the appropriate backwater valve requirements are satisfied.
- The storm sewer service sizes required, that the appropriate backwater valve requirements are satisfied, the nature of the foundation drainage system, and that any roof drainage systems (including internal storage systems, roof drains, scuppers, and applicable green roof conditions) are adequate for accommodating the design storm conditions.

The confirmations from the mechanical engineering consultant are to occur during subsequent stages of the development application process.

No change to the existing Plant Recreation Centre services or drainage pattern is considered.

Appendices

Appendix A

A.1 Concept Plan

SOMERSET STREET W

PRESTON STREET

TRILLIUM LINE

MUP

FUTURE RESIDENTIAL DEVELOPMENT SITE
(CONCEPTUAL HIGH-RISE BUILDING FOOTPRINT)

DISTRICT ENERGY PLANT OPTION 2

(CONCEPTUAL MID-RISE BUILDING FOOTPRINT)

RECREATION AND CULTURAL FACILITY
(3 FLOORS)

DISTRICT ENERGY PLANT OPTION 1

EMERGENCY AND SERVICE VEHICLES ONLY

CITY OF OTTAWA PLANT RECREATION CENTRE

1 HECTARE PUBLIC SPORTS FIELD AND / OR PASSIVE PARK

FUTURE SCHOOL SITE

PLOUFFE PARK

OTTAWA COMMUNITY HOUSING CORPORATION (0.02 HA)

GLADSTONE VILLAGE

OAK STREET

NORTH

LEGEND

- VISITOR TRAFFIC FLOW
- VEHICLE ACCESS TO UNDERGROUND PARKING
- SERVICE TRAFFIC FLOW
- SCHOOL BUS TRAFFIC FLOW (ONE-WAY)
- BUS LAY-BY
- SHORT-TERM PARKING / DROP-OFF
- POTENTIAL SIGNALIZED INTERSECTION
- UNDERPASS
- PEDESTRIAN TRAVEL ROUTE

1010 SOMERSET

MASTER CONCEPT PLAN

SCALE 1:800

NOVEMBER 12, 2024

Appendix B

B.1 Pre-application Consultation

File No.: PC2024-0206

June 7, 2024

Aditi Mane
Stantec
Via email: Aditi.Mane@stantec.com

Subject: **Pre-Consultation: Meeting Feedback**
Proposed Zoning By-law Amendment Application – 930 and 1010 Somerset Street

Please find below information regarding next steps as well as consolidated comments from the above-noted pre-consultation meeting held on May 28, 2024.

Pre-Consultation Preliminary Assessment

1 ☐	**2** ☐	**3** ☒	**4** ☐	**5** ☐

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

Next Steps

1. A review of the proposal and materials submitted for the above-noted pre-consultation has been undertaken. Please proceed to complete a Phase 3 Pre-consultation Application Form and submit it together with the necessary studies and/or plans to planningcirculations@ottawa.ca.

2. In your subsequent pre-consultation submission, please ensure that all comments or issues detailed herein are addressed. A detailed cover letter stating how each issue has been addressed must be included with the submission materials. Please coordinate the numbering of your responses within the cover letter with the comment number(s) herein.

3. Please note, if your development proposal changes significantly in scope, design, or density before the Phase 3 pre-consultation, you may be required to complete or repeat the Phase 2 pre-consultation process.

Supporting Information and Material Requirements

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

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

Consultation with Technical Agencies

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

Planning

2. This pre-application consultation is regarding a potential Official Plan Amendment and Zoning By-law Amendment. Further pre-application consultation will be required for the Site Plan Control applications associated with the individual development blocks.

3. Official Plan designation: Downtown Core, Corso Italia Protected Major Transit Station Area.

   Secondary Plan: West Downtown Core Corso Italia Station District, Main Street Corridor and Park designation. west_downtown_core_op_sec_plan_en.pdf (ottawa.ca)

   Secondary Plan components including focus on active transportation, quality public spaces, density along O-Train corridor, nurture the arts, alternative renewable energy solution have been incorporated.

4. The submitted Official Plan Amendment should include a planning rationale that includes items referenced in 12.3 of the Official Plan. Official Plan: Section 12. Local Plans (ottawa.ca)

5. Staff review has identified a number of Official Plan Amendments required to the West Downtown Core Secondary Plan:
   - Chapter 3, Section 4, 22) requires building heights along Somerset be mid-rise. The new community centre will require an amendment for a 3 storey massing there.
   - Schedule M – amendment to locate a school in area currently designated as park, and shift to include additional park block north of current
   - Chapter 3, Section 4, 20) maximum FSI of 1.5 - not clear whether current plan would exceed this

6. Staff are pleased that concept plan now includes buildings and no new surface parking along Somerset Street.

7. It appears that City Centre Underpass Pathway is to act as a pedestrian and cycling corridor as envisioned by the Secondary Plan – great.

8. Is the 1010 Somerset site been shifted into the lands associated with the MUP next to the Trillium Line? If so – additional OPAs required.

9. Need to control traffic somehow from Somerset to Oak so it's just private – not a public street with cut through traffic.

10. As the landowner in this case is the City of Ottawa, there is no requirement to apply for part-lot control to subdivide and convey land because of s. 50 (3) (c) Planning Act, R.S.O. 1990, c. P.13 (ontario.ca). We would not require a Plan of Subdivision as no new roads are being created or new engineering infrastructure. The next steps for land conveyance anticipated are the drafting of an R plan to delineate parcels so they can be described and working with City real estate and legal staff to convey.

Urban Design

Comments:

Submission Requirements

11. An Urban Design Brief is required. Please see attached customized Terms of Reference to guide the preparation of the submission.
    a. The Urban Design Brief should be structured by generally following the headings highlighted under **Section 3 – Contents of these Terms of Reference**.
12. Additional drawings and studies are required as shown on the SPIL. Please follow the terms of reference (Planning application submission information and materials | City of Ottawa) to prepare these drawings and studies.

Urban Design Review Panel Review and Report

13. The site is located within a Design Priority Area and is subject to review by the Urban Design Review Panel. UDRP review occurs within the Preconsultation stage. To proceed with a UDRP review, please contact udrp@ottawa.ca.
14. The submission of a UDRP report is a requirement for deeming an application complete. Please follow the instructions provided in the Terms of Reference available here: Urban Design Review Panel Report (ottawa.ca).
15. In spite of the above, the visit to the UDRP can occur after an application for an OPA is deemed complete if multiple applications run concurrently.

Comments on Preliminary Design

1. The following elements of the preliminary design are appreciated:
    a. Providing built form fronting Somerset Street.
    b. Separation of the blocks into reasonable development parcels.
    c. Limiting vehicular access points off Somerset.
2. The following elements of the preliminary design are of concern:
    a. Indication of the district energy plant in a stand-alone structure/location.
    b. Conflict between the mixed-use/residential block and the western MUP.

Recommendations

1. Provide design development and illustration of how the design has changed in the design brief.
2. Provide a response to the previous UDRP recommendations in the design brief, especially regarding connectivity and possibility for sustainable approach including the consideration of how to treat the Recreation Facility roof.

Other Comments:

This is an exciting project in an area full of potential. We look forward to helping you achieve its goals with the highest level of design resolution. We are happy to assist and answer any questions regarding the above. Good luck.

Feel free to contact Christropher Moise, Urban Designer, for follow-up questions.

Engineering

Comments:

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

    a. Water Quality Control: provide enhanced levels of protection of 80% for total suspended solids removal.

    b. Water Quantity Control: In the absence of area specific SWM criteria please control post-development runoff from the subject site, up to and including the 100-year storm event, to a 2-year pre-development level.

        i. The pre-development runoff coefficient will need to be determined as per existing conditions but in no case more than 0.5. (If discharging to a combined sewer, max runoff coefficient is to be 0.4). If 0.5 (or 0.4 for combined sewer discharge) applies it needs to be clearly demonstrated in the report that the pre-development runoff coefficient is of greater magnitude.

        ii. The time of concentration (Tc) used to determine the pre-development condition should be calculated. Tc should not be less than 10 min. since IDF curves become unrealistic at less than 10

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

iii. Any storm events greater than the established 2-year allowable release rate, up to and including the 100-year storm event, shall be detained on-site. For events greater than 100 years, spillage must be directed to a public ROW and not to neighboring private

c. Ponding Notes:

i. 100-year spill elevation must be 300mm lower than any building opening or ramp.

ii. Demonstrate that the stress test spill elevation (100-year +20% event) does not spill onto any permanent structures.

iii. The maximum permissible ponding depth for the 100-year storm event is 350mm. No spilling to adjacent sites.

iv. Please note that as per Technical Bulletin PIEDTB-2016-01 section 8.3.11.1 (p.12 of 14) there shall be no surface ponding on private parking areas during the 2-year storm rainfall event.

d. If rooftop control and storage is proposed as part of the SWM solutions, sufficient details (Cl. 8.3.8.4) shall be discussed and documented in the report.

2. General Servicing

a. Connections to trunk sewers, easement sewers and backbone watermains are only allowed on a case-by-case basis.

b. If severance is planned, this needs to be addressed in servicing to satisfy severance requirements. Where a large parcel with multiple buildings is planned, City will require an ultimate servicing plan so as to appropriately understand how severance requirements are being met. This includes any parcel to be conveyed to the city.

3. Storm Sewer

a. A 1500 mm dia. concrete combined sewer (1939) is available within the 1010 Somerset parcel.

b. A 1650mm dia. concrete storm sewer (1962/2024) is available within western and southern portion of the site.

c. There is a conflict with the proposed future residential development conceptual building footprint and the existing 1650mm storm trunk sewer (Nepean Bay Storm). This is one of the city's critical piece of

infrastructure which can't be easily relocated. I encourage you to explore how this conflict will be resolved immediately as this issue may affect impact the entire site redevelopment.

4. Sanitary Sewer

    a. A 1500 mm dia. concrete combined sewer (1939) is available within the 1010 Somerset parcel.

    b. A 375 mm dia. PVC combined sewer (1999) is available within Somerset Avenue for eastern portion of the site.

    c. A 250 mm dia. PVC sanitary/combined sewer (2022) is available within Oak Street.

    d. Please provide the new Sanitary sewer discharge and we will confirm if sanitary sewer main has the capacity.

    e. Include correspondence from the Architect within the Appendix of the report confirming the number of residential units per building and a unit type breakdown for each of the buildings to support the calculated building populations.

    f. Please apply the wastewater design flow parameters in Technical Bulletin PIEDTB-2018-01.

5. Water:

    a. A 300 mm dia. PVC watermain (1997) is available within Somerset Avenue for eastern portion of the site.

    b. A 200mm and 400 mm dia. UCI watermain (1916) is available within the 1010 Somerset parcel.

    c. A 200 mm dia. PVC watermain (2004/2023) is available within Oak Street.

    d. **There is a conflict with the proposed future mid-rise building footprint and the existing 300mm watemain on Somerset Avenue which cut through the site. This watermain is located next the Somerset bridge abutment and relocation of this infrastructure may be difficult. I encourage you to explore how this conflict will be resolved immediately as this issue may affect impact the entire site redevelopment**.

    e. Existing watermain within the site that will not be reused are to be decommissioned.

    f. Water Supply Redundancy: As per ISTB-2021-03, Industrial, commercial, institutional service areas with a basic day demand greater than 50 m^3/day and residential areas serving 50 or more dwellings shall be connected with

a minimum of two watermains, separated by an isolation valve, to avoid the creation of a vulnerable service area. Individual residential facilities with a basic day demand greater than 50 m3/day shall be connected with a minimum of two water services, each their own meter and separated by an isolation valve, to avoid the creation of a vulnerable service area.

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

    i. Plan showing the proposed location of service(s).

    ii. Type of development and the amount of fire flow required (L/min). Note: The OBC method can be used if the fire demand for the private property is less than 9,000 L/min. If the OBC fire demand reaches 9000 L/min, then the FUS method is to be used. Fire flow demand requirements are to be based on ISTB-2021-03. Exposure separation distances shall be defined on a figure to support the FUS calculation and required fire flow (RFF).

    iii. Average daily demand: __L/s.

    iv. Maximum daily demand: __L/s.

    v. Maximum hourly daily demand: __L/s.

    vi. Note: Use Table 3-3 of the MOE Design Guidelines for Drinking-Water System to determine Maximum Day and Maximum Hour peaking factors for 0 to 500 persons and use Table 4.2 of the Ottawa Design Guidelines, Water Distribution for 501 to 3,000 persons.

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

i. Hydraulic modelling will have to be provided to the city for review if any watermains are proposed on site.

6. Environmental

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

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

c. Official Plan: Section 10. Protection of Health and Safety (ottawa.ca)

7. Record of Site Condition (RSC)

   a. An RSC is required to be filled with the MECP for any property where there is a proposed changes in land use to a more sensitive land use. An RSC will be required for the 1010 Somerset Avenue parcel of this application.

   b. A memorandum prepared by an environmental consultant confirming that no potential contaminating activities have taken place within the RSC area since the filling of the RSC, may also be required.

   c. Submitting a record of site condition | Ontario.ca

8. Geotechnical

   a. A Geotechnical Study/Investigation shall be prepared in support of this development proposal.

   b. The geotechnical report shall address concerns with excavations in close proximity the Somerset Bridge abutments.

   c. Geotechnical Study shall be consistent with the Geotechnical Investigation and Reporting Guidelines for Development Applications. Geotechnical Investigation and Reporting (ottawa.ca)

   d. If Sensitive marine clay soils are present in this area that are susceptible to soil shrinkage that can lead to foundation and building damages. All six (6) conditions listed in the Tree Planting in Sensitive Marine Clay Soils-2017 Guidelines are required to be satisfied. Note that if the plasticity index of the soil is determined to be less than 40% a minimum separation between a street tree and the proposed building foundations of 4.5m will need to be achieved. A memorandum addressing the Tree in Clay Soil Guidelines prepared by a geotechnical engineer is required to be provided to the City. Tree Planting in Sensitive Marine Clay Soils - 2017 Guidelines (ottawa.ca)

Please refer to the City of Ottawa Guide to Preparing Studies and Plans [Engineering]: Planning application submission information and materials. The guide outlines the

requirement for a statement to be provided on the plan about where the property boundaries have been derived from.

Feel free to contact Vincent Duquette, Infrastructure Project Manager, for follow-up questions.

Noise

Comments:

9. Noise Study Requirements

    a. A Transportation Noise Assessment is required as the subject development is located within 100m proximity of the following arterial roads: Somerset St. West and Preston St. and within 500 m of Hwy #417.

    b. A Transportation Noise and Vibration Assessment is required as the subject development is located within 75m proximity of the Trillium LRT line.

    c. 2013_05_29_Guidelines_NewDevelopment_E CPCS Report Appendix_F.pdf

    d. A Stationary Noise Assessment is required in order to assess the noise impact of the lands zoned industrial located within 100m of the subject site. (Lands east of Breezehill Ave. as well as City Centre).

    e. https://documents.ottawa.ca/sites/default/files/documents/enviro_noise_guide_en.pdf

Feel free to contact Vincent Duquette, Infrastructure Project Manager, for follow-up questions.

Transportation

Comments:

    a. See Schedule C16 of the Official Plan.

    b. Any requests for exceptions to ROW protection requirements must be discussed with Transportation Planning and concurrence provided by Transportation Planning management.

10. The Screening Form has indicated that the TIA Triggers have been met. Please proceed with the TIA Step 2 – Scoping report.

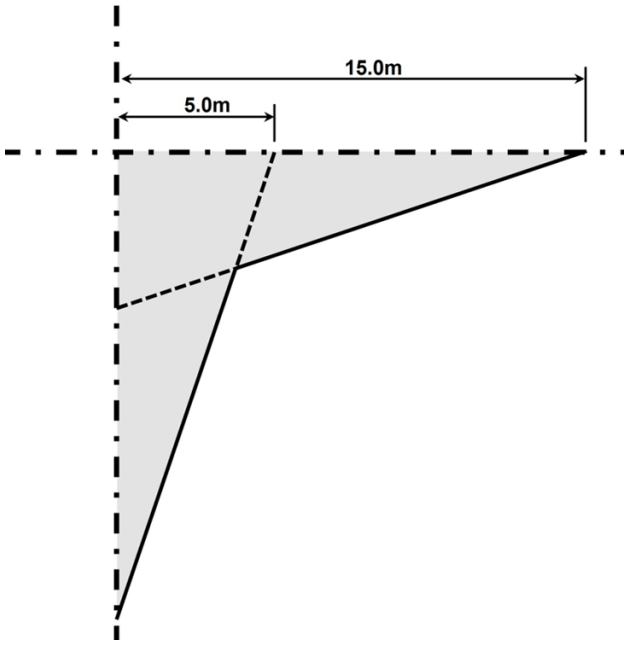
11. Somerset Street is designated as an Arterial Road within the City's Official Plan with a ROW protection limit of 20.0 metres between Breezehill Avenue N and Preston Street. The ROW protection limit and the offset distance (10.0 metres) are to be dimensioned from the existing centerline of pavement and shown on the drawings. The Certified Ontario Land Surveyor is to confirm the ROW protected limits and any portion that may fall within the private property to be conveyed to the City. Ensure that the development proposal complies with the Right-of-Way protection requirements of the Official Plan's Schedule C16.

12. Preston Street is designated as an Arterial Road within the City's Official Plan with a ROW protection limit of 23.0 metres between Albert Street and Carling Avenue. The ROW protection limit and the offset distance (11.5 metres) are to be dimensioned from the existing centerline of pavement and shown on the drawings. The Certified Ontario Land Surveyor is to confirm the ROW protected limits and any portion that may fall within the private property to be conveyed to the City. Ensure that the development proposal complies with the Right-of-Way protection requirements of the Official Plan's Schedule C16.

13. ROW interpretation – Land for a road widening will be taken equally from both sides of a road, measured from the centreline in existence at the time of the widening if required by the city. The centreline is a line running down the middle of a road surface, equidistant from both edges of the pavement. In determining the centreline, paved shoulders, bus lay-bys, auxiliary lanes, turning lanes and other special circumstances are not included in the road surface.

14. Two 5.0 metres x 15.0 metres corner triangles are required at the intersection of Somerset Street W and Preston Avenue based on Schedule C16 of the Official Plan. The 5.0 metres x 15.0 metres corner triangles area should be conveyed to the city ROW. The corner triangle dimensions are to be measured from the ROW protected limits. The development proponent should protect the corner triangle to accommodate protected intersections per Schedule C16 policies 2.1.1 (e) & (f). The shape of the triangle should consist of two overlapping 5 metres x 15 metres. This is illustrated in the image below.

Corner Triangle



15. Please keep in mind that on street parking is not a viable option for tenants. Ensure that potential tenants are aware that there is no provision for parking.

16. The consultant should review the sight distance to the access and any obstructions that may hinder the view of the driver.

17. The closure of an existing private approach shall reinstate the sidewalk, shoulder, curb, and boulevard to City standards.

18. Private accesses to Roads should comply with the City's Private Approach By-Law being By-Law No. 2003-447 as amended https://ottawa.ca/en/living-ottawa/laws-licences-and-permits/laws/law-z/private-approach-law-no-2003-447 or as approved through the Site Plan control process.

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

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

21. From Emmett – The alignment of the active transportation paths may not be adhered to. There is an desire line from Gladstone Village through the potential sports fields and north through the underpass to City Centre – should be given some thought.

22. From Emmett – Tranportation department only takes on the cost of maintaining warranted intersections. The one proposed may not be warranted, so who is paying for this needs to be determined.

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

Environment

23. Bird-safe Design Please review and incorporate bird safe design elements. Some of the risk factors include glass and related design traps such as corner glass and fly-through conditions, ventilation grates and open pipes, landscaping, light pollution. More guidance and solutions are available in the guidelines which can be found here: https://documents.ottawa.ca/sites/documents/files/birdsafedesign_guidelines_en.pdf
24. Urban Heat Island - Please add features that reduce the urban heat island effect (see OP 10.3.3) produced by the parking lot and a building footprint. For example, this impact can be reduced by adding large canopy trees, green roofs or vegetation walls, or constructing the parking lot or building differently.

25. Intake Zone - GeoOttawa indicates that a portion of the site is in the Intake Protection Zone, area of land that provides overland flow and this should be considered with stormwater management – however staff have reviewed and concluded proposed development does not include any significant drinking water threat activities, so this comment is for information only.

26. There is no trigger for an environmental impact study.

Feel free to contact Matthew Hayley, Environmental Planner, for follow-up questions.

Forestry

Comments:

27. Existing Trees

    a. Please provide an inventory plan documenting species, diameter and health condition

    b. If information on potential retention or removal status is known at this time, please provide it

28. Future Tree Planting

a. Please provide a conceptual landscape plan that shows potential planting locations

b. Efforts shall be made to provide as much future canopy cover as possible at a site level, through tree planting and tree retention. Please show/document that the proposed tree planting and retention will contribute to the City's overall canopy cover over time. Please provide a projection of the future canopy cover for the site to 40 years.

29. Tree information in the Planning Rational

a. Please provide a planned approach to tree retention and planting citing OP policies wherever possible

b. Ensure that minimum soil volume requirements are mentioned

Feel free to contact Mark Richardson, Forester, (mark.ricahrdson@Ottawa.ca) for follow-up questions.

Parkland

Parks staff were not in attendance or provided comments but have been involved in the process to date.

Heritage

Comments:

30. A Heritage Impact Assessment will be required as part of the zoning by-law amendment as per section 4.5.2.2 of the OP. We would mostly be looking to evaluate the impact of the proposed development, if any, on Plant Bath (designated under Part IV of the OHA). It would be helpful if the Impact Assessment contain a reference to 951 Gladstone (the former Standard Bread building) as a nearby heritage resource. The guidelines for preparing an HIA can be found here.

31. For a project of this scale, we sometimes also ask for a conservation plan to allow us to secure needed conservation works on a heritage resource as part of the development process. Given that Plant Bath is generally in good condition though and that the City is the steward, we will not be asking for one for this project.

32. A Heritage Permit will be required following the planning processes.

Feel free to contact Ashley Kotarba, Heritage Planner, for follow-up questions.

Community issues

Comments:

Dalhousie Community Association

North-South Road Through Site -Problems

1. Safety of people and kids moving along central east-west connection from Plouffe Park play structure area to New Park.
2. Car drop off proposed in north half of road but no turn-around space shown. Would be unsafe to do so in area of east-west path.
3. Location of south half of road is shown crossing the western end of the existing Plouffe Park. This is over the flood basin, one soccer field, the only mature treed portion of the entire site. The 1010 team assured us the road would actually be west of the west end of Plouffe Park. So, the location of the road is incorrectly shown. (The road will therefore have to jog at the east-west central path)
4. Only 3 buses (plus 1 para-bus) serve LA (which is what is shown on dwg.) There is room for them on Oak. Parent drop of at LA only 5 cars at any one time. Room for that also.
    a. students must cross bus lane to get to Plouffe Park. Risky
    b. entire length of bus lane flanking school not required as fire lane. If fire lane needed it could be dead end.
5. Accessible parking for new Rec. Facility can be accommodated within surface lot in front of Plant Red Centre. Why is there a line of parking (some new) along west side of Plant Rec.? Any talk of lifting 'no-surface-parking' prohibition premature.

Park Configuration

6. New park is sort of hidden away behind buildings.
7. The existing long ramp/green corridor (shown as MUP on CISP) connecting from Somerset has disappeared. This is the critical public access from the west to the Trillium path and to the new park.
8. Between the new park and Somerset is wall of buildings with only 2 narrow sidewalks beside busy driveways. This needs to be opened up.
    a. "*Parks should be of a shape and configuration that provides appropriate access and visibility*" (OP 4.4)
    b. "*min. 50% of park perimeter shall be continuous frontage on abutting streets*" OP. 4.4.6.E
9. Provide a swath of parkland into new park from Somerset. This could be done by relocating "mid-rise" building

Height Change at Mid-Rise

10. - CISP shows 3 towers along Somerset of 30, 25 and 18 storeys. Proposed Mid-rise building is roughly where the 18-storey tower is shown. Didn't know an OP change to put a 9-storeys instead of 18 was needed.

Future Residential Development Site

11. -an additional tower is being squeezed in at the expense of providing sufficient new park and at the expense of the existing MUP ramp.

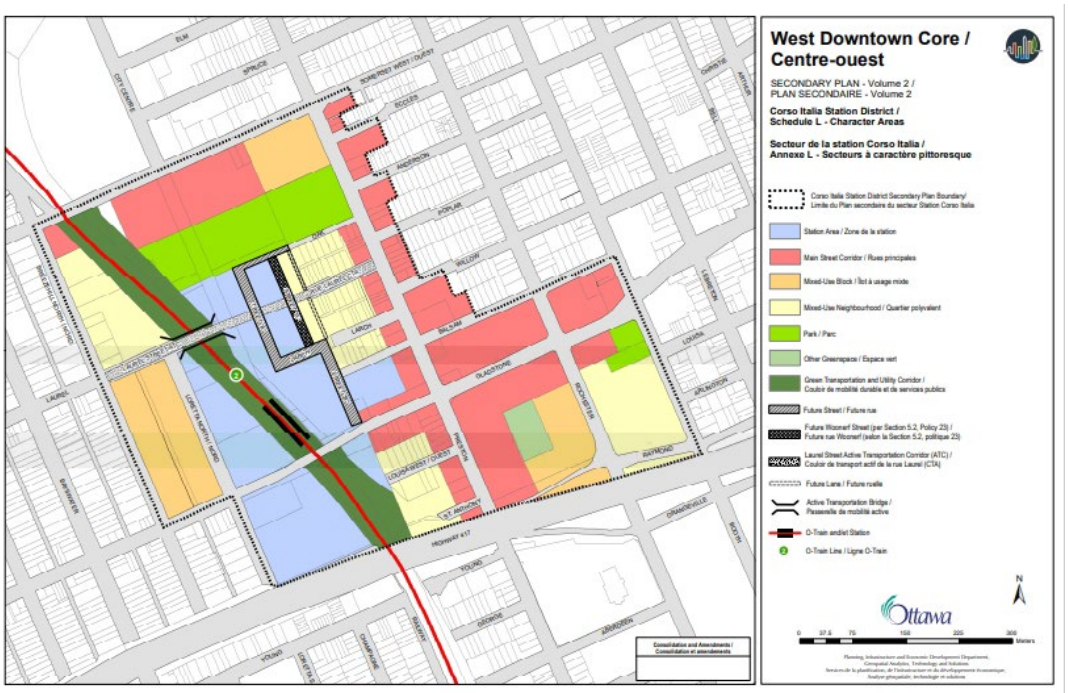
Park Size

1. -the new park shown is actually smaller than the 1 Ha noted.
    a. Cannot claim that the Heating Plant is parkland
    b. the bus road being incorrectly located on the drawing on top of Plouffe Park, will, when corrected, push the school westward and reduce new park area.
    c. front lawn along Oak in front of school cannot be claimed to be park. that leaves only 0.84 Ha of new parkland.

2. The OP targets 4 Ha/1000 and recommends the existing average of 2.0 Ha.
3. But downtown transect is only 0.5 Ha/1000
4. CISP anticipates 14,000 new folks. Over 3,000 new DU already in various planning stages. Just to keep status quo we need 7 Ha.
5. CISP shows 1.5Ha
6. Prov. Policy. Statement calls for the provision of "*equitable*" distribution of parks (1.5.1.b). Obviously the quantity of park in this area is not equitable.
7. the OP states that "*the acquisition of large parks in the Downtown Core and inner Urban area will be prioritised where opportunities arise". (4.4.3)*
8. This is an opportunity; but we are throwing it away if we put buildings as the higher priority; so
    - why has the area of the "Future Residential Development Zone" increased? and,
    - why is the footprint of the proposed Rec. Facility so large? and
    - why is the "Mid-Rise Building not on top of the new Rec. Facility?
9. The total building footprint on site needs to be reduced

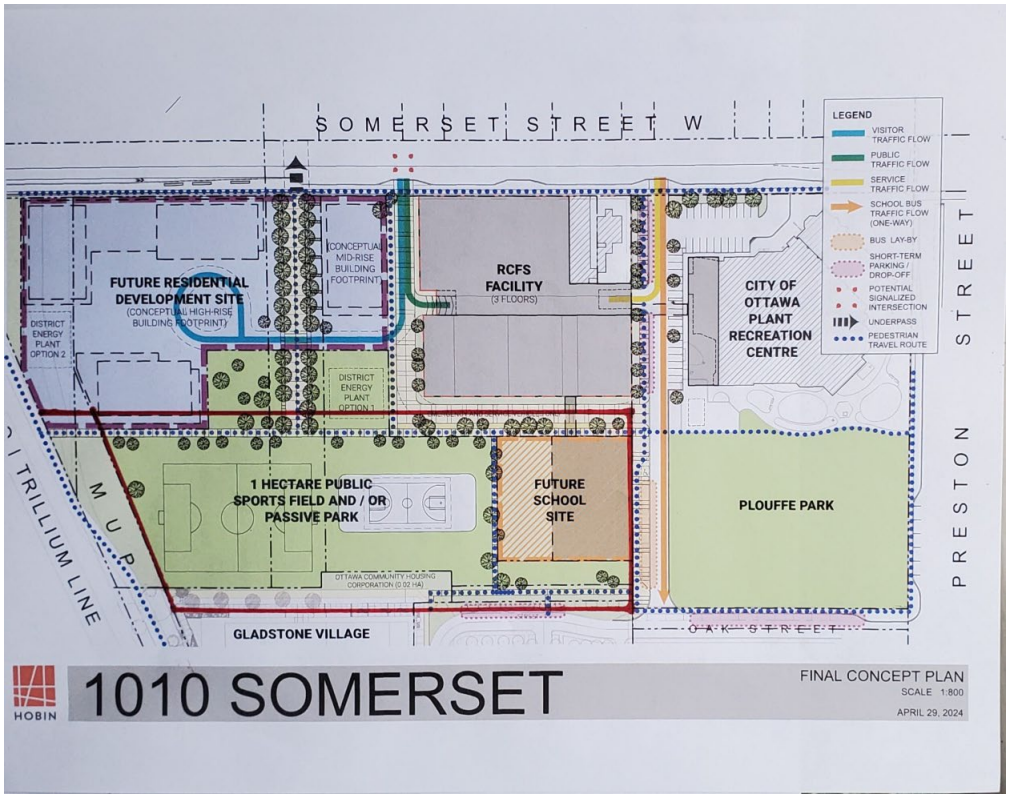
10. Schedule "L" shows 1.5 Ha of new parkland. That's what the public saw;
11. a green swath, half the width of the Oak-to-Somerset block running, unbroken from Plouffe Park to the MUP.

    OP Schedule L and Concept Plans below:

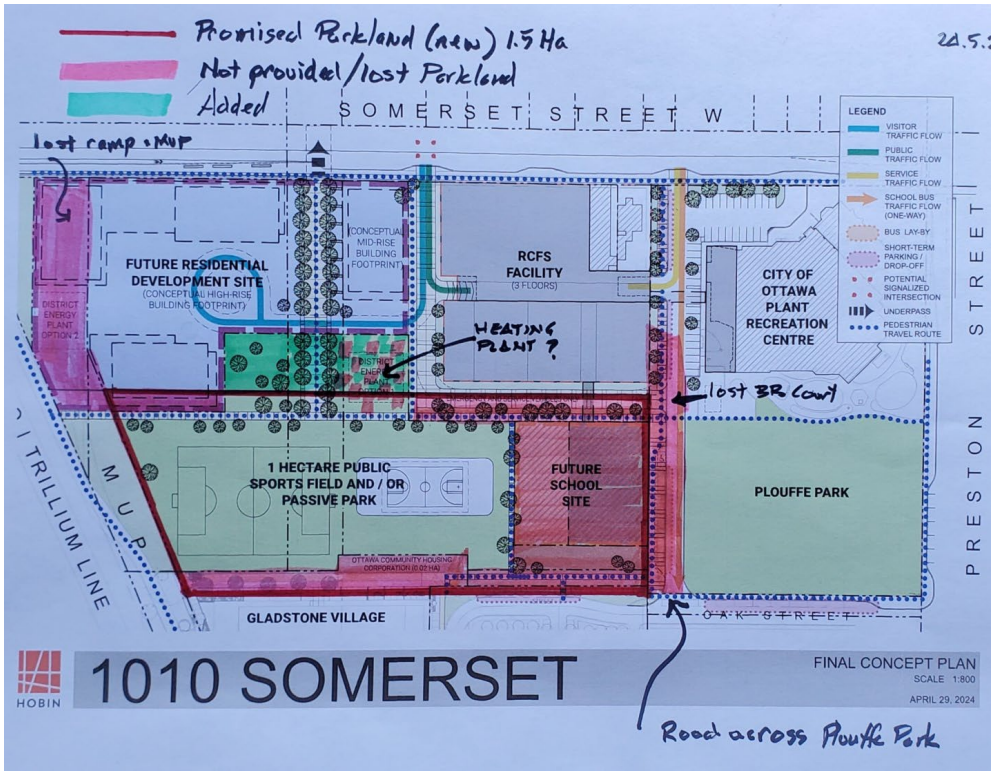


CIDSP Schedule "L"

Schedule L Blow-up



Outline of New Parkland from Schedule L overlaid onto May 2024 Concept Plan



Areas of Lost Parkland

Other Comments or Concerns:

12. If the new parkland must be separated from Plouffe Park, at least
    - open it up to Somerset instead and
    - provide the full 1.5 Ha shown, and
    - relocate the heating plant out of the park, and
    - keep the Future Residential Development Zone close by Somerset

13. **Mud:** Ever since Plouffe Park was reconstructed as a storm drainage basin, the playing surface has been terrible. Aeration, seeding, top dressing, use abstinence have all failed to rectify how the peculiarities of the soil, sub-grade and special drainage infrastructure conspire against a proper playing surface.
    a. The daily addition of 450 kids will create a mud bath!

14. Reconstruction will need to be complete prior to the new school opening.

15. PPS: There is no pedestrian crossing on Somerset between Preston and Bayswater. So the proposed signalization shown is beneficial to pedestrians and cyclists wishing to access site.

We should be able to accept the discontinuity of the new park once the other issues we have raised have been resolved.

16. In its present iteration, this "Final" Concept Plan has too many unresolved issues, is too vague, and is too inaccurate to be the basis of any OPA or Zoning determination.

Submission Requirements

1. The attached **Study and Plan Identification List** outlines the information and material that has been identified as either required (R) or advised (A) as part of a future complete application submission.
    a. The required plans and studies must meet the City's Terms of Reference (ToR) and/or Guidelines, as available on Ottawa.ca. These ToR and Guidelines outline the specific requirements that must be met for each plan or study to be deemed adequate.
2. All of the above comments or issues should be addressed to ensure the effectiveness of the application submission review.

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

Yours Truly,

Erin O’Connell

Encl. Study and Plan Identification List

Terms of Reference for Urban Design Brief

c.c.
Vincent Duquette
Natassia Pratt
Wally Dubyk
Emmett Proulx
Mark Richardson
Mike Russett
Kevin Wherry
Jennifer Shepherd
Christopher Moise
Taavi Siitam
Matthew Hayley
Amy MacPherson
Edith Tam
Ashley Kotarba
David Seaborn
Catherine Boucher

Appendix C Potable Water Analysis

C.1 Domestic Water Demand

1010 Somerset Street Adequacy of Services - Domestic Water Demand Estimates

Based on Site Plan provided by Hobin (2024-11-12)

Project No. 160402067 Designed by: WAJ

Date: 1/7/2025 Checked by:

Revision: 01

Population densities per Table 4.1 City of Ottawa Water Design Guidelines:		
1 Bedroom Apt.	1.4	ppu
2 Bedroom Apt.	2.1	ppu
3 Bedroom Apt.	3.1	ppu

Demand conversion factors per Table 4.2 of the City of Ottawa Water Design Guidelines and Technical Bulletin ISTB-2021-03:		
Residential	280	L/cap/day
Commercial and Institutional	28000	L/ha/day
Light Industrial	35000	L/ha/day

Building ID	Area (ha)	No. of Units	Population	Avg Day Demand		Max Day Demand [1,2]		Peak Hour Demand [1,2]	
				(L/min)	(L/s)	(L/min)	(L/s)	(L/min)	(L/s)
Future High Density Block (total 480 units)									
1 Bedroom (60% assumed)		288	403	78.4	1.3	196.0	3.3	431.2	7.2
2 Bedroom (35% assumed)		168	353	68.6	1.1	171.5	2.9	377.3	6.3
3 Bedroom (5% assumed)		24	74	14.5	0.2	36.2	0.6	79.6	1.3
Subtotal		**480**	**830**	**161.5**	**2.7**	**403.7**	**6.7**	**888.1**	**14.8**
Conceptual Mid-Rise (total 60 units)									
1 Bedroom (60% assumed)		36	50	9.8	0.2	24.5	0.4	53.9	0.9
2 Bedroom (35% assumed)		21	44	8.6	0.1	21.4	0.4	47.2	0.8
3 Bedroom (5% assumed)		3	9	1.8	0.0	4.5	0.1	9.9	0.2
Subtotal		**60**	**104**	**20.2**	**0.3**	**50.5**	**0.8**	**111.0**	**1.9**
Residential Subtotal		**540**	**934**	**181.7**	**3.0**	**454.1**	**7.6**	**999.1**	**16.7**
Institutional, Commercial, and Industrial									
Future School	0.56			10.8	0.2	16.3	0.3	29.3	0.5
Recreation and Cultural Facility	1.02			19.9	0.3	29.8	0.5	53.7	0.9
District Energy Plant[4]	0.28			6.8	0.1	10.3	0.2	18.5	0.3
Tower A+B Commercial Podium	0.23			4.5	0.1	6.8	0.1	12.2	0.2
Subtotal	**2.09**			**42.1**	**0.7**	**63.1**	**1.1**	**113.6**	**1.9**
Parkland[3]									
Sportsfield and/or passive park	1.00			19.4	0.3	29.2	0.5	52.5	0.9
Non-Residential Subtotal	**3.09**			**61.5**	**1.0**	**92.3**	**1.5**	**166.1**	**2.8**
Total Site :	**3.09**	**540**	**934**	**243.2**	**4.1**	**546.4**	**9.1**	**1165.2**	**19.4**

1 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
peak hour demand rate = 2.2 x maximum day demand rate (as per Technical Bulletin ISD-2010-02)

2 Water demand criteria used to estimate peak demand rates for commercial and institutional 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 (as per Technical Bulletin ISD-2010-02)

3 Parkland assumed to be institutional demands

4 District Energy Plant assumed to be light industrial demands

C.2 Fire Flow Demand (2020 FUS)

Stantec

FUS Fire Flow Calculation Sheet - 2020 FUS Guidelines

Stantec Project #: 160402067
Project Name: 1010 Somerset Street
Date: 1/7/2025
Fire Flow Calculation #: 1
Description: Recreation and Cultural Facility (3 floors)

Notes: Assumed worst-case with new firewall at 1000 Somerset

Step	Task	Notes										Value Used	Req'd Fire Flow (L/min)
1	Determine Type of Construction	Type II - Noncombustible Construction / Type IV-A - Mass Timber Construction										0.8	-
2	Determine Effective Floor Area	Sum of Largest Floor + 25% of Two Additional Floors					Vertical Openings Protected?					YES	-
		4910	4910	4910								7365	-
3	Determine Required Fire Flow	($F = 220 \times C \times A^{1/2}$). Round to nearest 1000 L/min										-	15000
4	Determine Occupancy Charge	Limited Combustible										-15%	12750
5	Determine Sprinkler Reduction	Conforms to NFPA 13										-30%	-3825
		Non-Standard Water Supply or N/A										0%	
		Not Fully Supervised or N/A										0%	
		% Coverage of Sprinkler System										100%	
6	Determine Increase for Exposures (Max. 75%)	Direction	Exposure Distance (m)	Exposed Length (m)	Exposed Height (Stories)	Length-Height Factor (m x stories)	Construction of Adjacent Wall	Firewall / Sprinklered ?				-	-
		North	0 to 3	23	2	41-60	Type V	YES				0%	765
		East	0 to 3	32	2	61-80	Type V	YES				0%	
		South	10.1 to 20	77	3	> 100	Type I-II - Protected Openings	NO				3%	
		West	10.1 to 20	74	3	> 100	Type I-II - Protected Openings	NO				3%	
7	Determine Final Required Fire Flow	Total Required Fire Flow in L/min, Rounded to Nearest 1000L/min											10000
		Total Required Fire Flow in L/s											166.7
		Required Duration of Fire Flow (hrs)											2.00
		Required Volume of Fire Flow (m^3)											1200

Stantec

FUS Fire Flow Calculation Sheet - 2020 FUS Guidelines

Stantec Project #: 160402067
Project Name: 1010 Somerset Street
Date: 1/7/2025
Fire Flow Calculation #: 2
Description: Recreation and Cultural Facility (3 floors)

Notes: Assumed worst-case separation to 973 Somerset and Plant Bath Recreation Center.

Step	Task	Notes										Value Used	Req'd Fire Flow (L/min)
1	Determine Type of Construction	Type II - Noncombustible Construction / Type IV-A - Mass Timber Construction										0.8	-
2	Determine Effective Floor Area	Sum of Largest Floor + 25% of Two Additional Floors					Vertical Openings Protected?					YES	-
		4910	4910	4910								7365	-
3	Determine Required Fire Flow	($F = 220 \times C \times A^{1/2}$). Round to nearest 1000 L/min										-	15000
4	Determine Occupancy Charge	Limited Combustible										-15%	12750
5	Determine Sprinkler Reduction	Conforms to NFPA 13										-30%	-3825
		Non-Standard Water Supply or N/A										0%	
		Not Fully Supervised or N/A										0%	
		% Coverage of Sprinkler System										100%	
6	Determine Increase for Exposures (Max. 75%)	Direction	Exposure Distance (m)	Exposed Length (m)	Exposed Height (Stories)	Length-Height Factor (m x stories)	Construction of Adjacent Wall	Firewall / Sprinklered ?				-	-
		North	20.1 to 30	56	2	> 100	Type V	NO				10%	2550
		East	20.1 to 30	42	1	41-60	Type V	NO				4%	
		South	10.1 to 20	77	2	> 100	Type I-II - Protected Openings	NO				3%	
		West	10.1 to 20	74	3	> 100	Type I-II - Protected Openings	NO				3%	
7	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 - 2020 FUS Guidelines

Stantec Project #: 160402067
Project Name: 1010 Somerset Street
Date: 1/7/2025
Fire Flow Calculation #: 3
Description: Conceptual Mid-Rise (6 floors)

Notes:

Step	Task	Notes										Value Used	Req'd Fire Flow (L/min)
1	Determine Type of Construction	Type II - Noncombustible Construction / Type IV-A - Mass Timber Construction										0.8	-
2	Determine Effective Floor Area	Sum of Largest Floor + 25% of Two Additional Floors					Vertical Openings Protected?					YES	-
		750	750	750	750							1125	-
3	Determine Required Fire Flow	($F = 220 \times C \times A^{1/2}$). Round to nearest 1000 L/min										-	6000
4	Determine Occupancy Charge	Limited Combustible										-15%	5100
5	Determine Sprinkler Reduction	Conforms to NFPA 13										-30%	-1530
		Non-Standard Water Supply or N/A										0%	
		Not Fully Supervised or N/A										0%	
		% Coverage of Sprinkler System										100%	
6	Determine Increase for Exposures (Max. 75%)	Direction	Exposure Distance (m)	Exposed Length (m)	Exposed Height (Stories)	Length-Height Factor (m x stories)	Construction of Adjacent Wall	Firewall / Sprinklered ?				-	-
		North	20.1 to 30	20	2	21-49	Type V	NO				2%	255
		East	10.1 to 20	38	3	> 100	Type I-II - Protected Openings	NO				3%	
		South	20.1 to 30	20	2	21-49	Type I-II - Protected Openings	NO				0%	
		West	20.1 to 30	38	6	> 100	Type I-II - Protected Openings	NO				0%	
7	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)											1.50
		Required Volume of Fire Flow (m^3)											360

Stantec

FUS Fire Flow Calculation Sheet - 2020 FUS Guidelines

Stantec Project #: 160402067
Project Name: 1010 Somerset Street
Date: 1/7/2025
Fire Flow Calculation #: 4
Description: District Energy Plant Option 1 (assumed 2 floors)

Notes: Assumed 2 floors. Project feasibility and design are required.

Step	Task	Notes										Value Used	Req'd Fire Flow (L/min)
1	Determine Type of Construction	Type II - Noncombustible Construction / Type IV-A - Mass Timber Construction										0.8	-
2	Determine Effective Floor Area	Sum of Largest Floor + 25% of Two Additional Floors					Vertical Openings Protected?					YES	-
		370	370									462.5	-
3	Determine Required Fire Flow	($F = 220 \times C \times A^{1/2}$). Round to nearest 1000 L/min										-	4000
4	Determine Occupancy Charge	Limited Combustible										-15%	3400
5	Determine Sprinkler Reduction	Conforms to NFPA 13										-30%	-1020
		Non-Standard Water Supply or N/A										0%	
		Not Fully Supervised or N/A										0%	
		% Coverage of Sprinkler System										100%	
6	Determine Increase for Exposures (Max. 75%)	Direction	Exposure Distance (m)	Exposed Length (m)	Exposed Height (Stories)	Length-Height Factor (m x stories)	Construction of Adjacent Wall	Firewall / Sprinklered ?				-	-
		North	20.1 to 30	20	2	21-49	Type I-II - Protected Openings	NO				0%	0
		East	10.1 to 20	19	2	21-49	Type I-II - Protected Openings	NO				0%	
		South	> 30	20	2	21-49	Type V	NO				0%	
		West	> 30	19	2	21-49	Type I-II - Protected Openings	NO				0%	
7	Determine Final Required Fire Flow	Total Required Fire Flow in L/min, Rounded to Nearest 1000L/min											2000
		Total Required Fire Flow in L/s											33.3
		Required Duration of Fire Flow (hrs)											1.00
		Required Volume of Fire Flow (m^3)											120

Stantec

FUS Fire Flow Calculation Sheet - 2020 FUS Guidelines

Stantec Project #: 160402067
Project Name: 1010 Somerset Street
Date: 1/7/2025
Fire Flow Calculation #: 5
Description: District Energy Plant Option 2 (assumed 2 floors)

Notes: Assumed 2 floors. Project feasibility and design are required.

Step	Task	Notes										Value Used	Req'd Fire Flow (L/min)
1	Determine Type of Construction	Type II - Noncombustible Construction / Type IV-A - Mass Timber Construction										0.8	-
2	Determine Effective Floor Area	Sum of Largest Floor + 25% of Two Additional Floors					Vertical Openings Protected?					YES	-
		370	370									462.5	-
3	Determine Required Fire Flow	($F = 220 \times C \times A^{1/2}$). Round to nearest 1000 L/min										-	4000
4	Determine Occupancy Charge	Limited Combustible										-15%	3400
5	Determine Sprinkler Reduction	Conforms to NFPA 13										-30%	-1020
		Non-Standard Water Supply or N/A										0%	
		Not Fully Supervised or N/A										0%	
		% Coverage of Sprinkler System										100%	
6	Determine Increase for Exposures (Max. 75%)	Direction	Exposure Distance (m)	Exposed Length (m)	Exposed Height (Stories)	Length-Height Factor (m x stories)	Construction of Adjacent Wall	Firewall / Sprinklered ?				-	-
		North	0 to 3	20	2	21-49	Type I-II - Protected Openings	NO				1%	68
		East	0 to 3	19	2	21-49	Type I-II - Protected Openings	NO				1%	
		South	> 30	20	2	21-49	Type V	NO				0%	
		West	> 30	19	2	21-49	Type V	NO				0%	
7	Determine Final Required Fire Flow	Total Required Fire Flow in L/min, Rounded to Nearest 1000L/min											2000
		Total Required Fire Flow in L/s											33.3
		Required Duration of Fire Flow (hrs)											1.00
		Required Volume of Fire Flow (m^3)											120

Stantec

FUS Fire Flow Calculation Sheet - 2020 FUS Guidelines

Stantec Project #: 160402067
Project Name: 1010 Somerset Street
Date: 1/7/2025
Fire Flow Calculation #: 6
Description: Future School (5 floors)

Notes:

Step	Task	Notes										Value Used	Req'd Fire Flow (L/min)
1	Determine Type of Construction	Type II - Noncombustible Construction / Type IV-A - Mass Timber Construction										0.8	-
2	Determine Effective Floor Area	Sum of Largest Floor + 25% of Two Additional Floors					Vertical Openings Protected?					YES	-
		1405	1405	1405	1405							2107.5	-
3	Determine Required Fire Flow	($F = 220 \times C \times A^{1/2}$). Round to nearest 1000 L/min										-	8000
4	Determine Occupancy Charge	Limited Combustible										-15%	6800
5	Determine Sprinkler Reduction	Conforms to NFPA 13										-30%	-2040
		Non-Standard Water Supply or N/A										0%	
		Not Fully Supervised or N/A										0%	
		% Coverage of Sprinkler System										100%	
6	Determine Increase for Exposures (Max. 75%)	Direction	Exposure Distance (m)	Exposed Length (m)	Exposed Height (Stories)	Length-Height Factor (m x stories)	Construction of Adjacent Wall	Firewall / Sprinklered ?				-	-
		North	10.1 to 20	30	3	81-100	Type I-II - Protected Openings	YES				0%	0
		East	> 30	47	5	> 100	Type V	YES				0%	
		South	> 30	30	5	> 100	Type V	NO				0%	
		West	> 30	47	5	> 100	Type V	NO				0%	
7	Determine Final Required Fire Flow	Total Required Fire Flow in L/min, Rounded to Nearest 1000L/min											5000
		Total Required Fire Flow in L/s											83.3
		Required Duration of Fire Flow (hrs)											1.75
		Required Volume of Fire Flow (m^3)											525

Stantec

FUS Fire Flow Calculation Sheet - 2020 FUS Guidelines

Stantec Project #: 160402067
Project Name: 1010 Somerset Street
Date: 1/7/2025
Fire Flow Calculation #: 7
Description: Future High Density Tower A (25 floors) + B (20 floors)

Notes: Connected through 4 floor podium

Step	Task	Notes										Value Used	Req'd Fire Flow (L/min)
1	Determine Type of Construction	Type II - Noncombustible Construction / Type IV-A - Mass Timber Construction										0.8	-
2	Determine Effective Floor Area	Sum of Largest Floor + 25% of Two Additional Floors					Vertical Openings Protected?					YES	-
		2325	2325	2325	2325							3487.5	-
3	Determine Required Fire Flow	($F = 220 \times C \times A^{1/2}$). Round to nearest 1000 L/min										-	10000
4	Determine Occupancy Charge	Limited Combustible										-15%	8500
5	Determine Sprinkler Reduction	Conforms to NFPA 13										-30%	-2550
		Non-Standard Water Supply or N/A										0%	
		Not Fully Supervised or N/A										0%	
		% Coverage of Sprinkler System										100%	
6	Determine Increase for Exposures (Max. 75%)	Direction	Exposure Distance (m)	Exposed Length (m)	Exposed Height (Stories)	Length-Height Factor (m x stories)	Construction of Adjacent Wall	Firewall / Sprinklered ?				-	-
		North	> 30	91	1	81-100	Type V	NO				0%	170
		East	20.1 to 30	22	6	> 100	Type I-II - Protected Openings	NO				0%	
		South	0 to 3	26	2	41-60	Type I-II - Protected Openings	NO				2%	
		West	> 30	39	10	> 100	Type V	NO				0%	
7	Determine Final Required Fire Flow	Total Required Fire Flow in L/min, Rounded to Nearest 1000L/min											6000
		Total Required Fire Flow in L/s											100.0
		Required Duration of Fire Flow (hrs)											2.00
		Required Volume of Fire Flow (m^3)											720

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FUS Fire Flow Calculation Sheet - 2020 FUS Guidelines

Stantec Project #: 160402067
Project Name: 1010 Somerset Street
Date: 1/7/2025
Fire Flow Calculation #: 8
Description: Future High Density Tower C (15 floors)

Notes:

Step	Task	Notes										Value Used	Req'd Fire Flow (L/min)
1	Determine Type of Construction	Type II - Noncombustible Construction / Type IV-A - Mass Timber Construction										0.8	-
2	Determine Effective Floor Area	Sum of Largest Floor + 25% of Two Additional Floors					Vertical Openings Protected?					YES	-
		1050	1050	1050	1050							1575	-
3	Determine Required Fire Flow	($F = 220 \times C \times A^{1/2}$). Round to nearest 1000 L/min										-	7000
4	Determine Occupancy Charge	Limited Combustible										-15%	5950
5	Determine Sprinkler Reduction	Conforms to NFPA 13										-30%	-1785
		Non-Standard Water Supply or N/A										0%	
		Not Fully Supervised or N/A										0%	
		% Coverage of Sprinkler System										100%	
6	Determine Increase for Exposures (Max. 75%)	Direction	Exposure Distance (m)	Exposed Length (m)	Exposed Height (Stories)	Length-Height Factor (m x stories)	Construction of Adjacent Wall	Firewall / Sprinklered ?				-	-
		North	10.1 to 20	46	15	> 100	Type I-II - Protected Openings	NO				3%	893
		East	> 30	26	2	41-60	Type I-II - Protected Openings	NO				0%	
		South	> 30	38	15	> 100	Type V	NO				0%	
		West	0 to 3	28	2	41-60	Type I-II - Unprotected Openings	NO				12%	
7	Determine Final Required Fire Flow	Total Required Fire Flow in L/min, Rounded to Nearest 1000L/min											5000
		Total Required Fire Flow in L/s											83.3
		Required Duration of Fire Flow (hrs)											1.75
		Required Volume of Fire Flow (m^3)											525

C.3 Boundary Conditions (City of Ottawa)

Johnson, Warren

From: Duquette, Vincent <Vincent.Duquette@ottawa.ca>
Sent: Tuesday, January 14, 2025 12:22 PM
To: Johnson, Warren
Cc: Tam, Edith
Subject: RE: 1010 Somerset Street Boundary Conditions
Attachments: 1010 Somerset Street January 2025.pdf

Follow Up Flag: Follow up
Flag Status: Flagged

Hi Warren,

The following are boundary conditions, HGL, for hydraulic analysis at 1010 Somerset Street (zone 1W) assumed to be connected via two connections to the 300mm watermain on Somerset Street AND 400mm watermain (see attached PDF for location).

Both Connections:
Minimum HGL = 107.7 m
Maximum HGL = 115.3 m
Max Day + Fire Flow (183.3 L/s) = 109.0 m (Connection 1), and 108.2 m (Connection 2)

The maximum pressure is estimated to be more than 80 psi. A pressure check at completion of construction is recommended to determine if pressure control is required.

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. Fire Flow analysis is a reflection of available flow in the watermain; there may be additional restrictions that occur between the watermain and the hydrant that the model cannot take into account.

Best Regards,

Vincent Duquette, E.I.T
Project Manager, Infrastructure Approvals | Gestionnaire de projet, Projets d'infrastructure
Development Review – All Ward | Direction de l'examen des projets d'aménagement - Tous les quartiers
Planning, Development and Building Services Department (PDBS)| Direction générale des services de la planification, de l'aménagement et du bâtiment (DGSPAB)
City of Ottawa | Ville d'Ottawa
110 Laurier Avenue West | 110 avenue Laurier Ouest
Ottawa, ON K1P 1J1
613.580.2424 ext./poste 14048, vincent.duquette@ottawa.ca

From: Duquette, Vincent
Sent: January 06, 2025 11:22 AM
To: Johnson, Warren <Warren.Johnson@stantec.com>
Subject: RE: 1010 Somerset Street Boundary Conditions

Hi Warren,

Boundary condition request has been submitted to our water resource group using the latest revised demands.
I will keep you posted when I get the results. Result typically take 3-4 week to obtain.

Best Regards,

Vincent Duquette, E.I.T
Project Manager, Infrastructure Approvals | Gestionnaire de projet, Projets d'infrastructure
Development Review – All Ward | Direction de l'examen des projets d'aménagement - Tous les quartiers
Planning, Development and Building Services Department (PDBS)| Direction générale des services de la planification, de l'aménagement et du bâtiment (DGSPAB)
City of Ottawa | Ville d'Ottawa
110 Laurier Avenue West | 110 avenue Laurier Ouest
Ottawa, ON K1P 1J1
613.580.2424 ext./poste 14048, vincent.duquette@ottawa.ca

From: Johnson, Warren <Warren.Johnson@stantec.com>
Sent: December 20, 2024 1:49 PM
To: Duquette, Vincent <Vincent.Duquette@ottawa.ca>
Subject: RE: 1010 Somerset Street Boundary Conditions

Hi Vincent,

Apologies, I noticed a minor typo in the water demand calculations. See attached corrected calculation sheet with the revised demands summarized here:

- Average Day Demand: 4.1 L/s (243.2 L/min)
- Maximum Day Demand: 9.1 L/s (546.4 L/min)
- Peak Hour Demand: 19.4 L/s (1165.2 L/min)

Thanks, and have a great holiday!

Warren Johnson C.E.T.
Civil Engineering Technologist

Direct: 613 784-2272
Warren.Johnson@stantec.com

Stantec

From: Johnson, Warren
Sent: Friday, December 20, 2024 11:31 AM
To: vincent.duquette@ottawa.ca
Cc: Moroz, Peter <peter.moroz@stantec.com>; Thiffault, Dustin <Dustin.Thiffault@stantec.com>; Bays, Eric <Eric.Bays@stantec.com>
Subject: 1010 Somerset Street Boundary Conditions

Hi Vincent,

We would like to request boundary conditions for the City of Ottawa development on 1010 Somerset Street. The proposed development consists of a Recreation and Cultural Facility, school, district energy plant, mid-rise (6 floors and 60 units), high density towers (max 25 floors and total 480 units), and a sports field/passive park.

The proposed site is expected to be serviced via connections to the existing 400 mm diameter watermain in Champagne Avenue and the 300 mm diameter watermain in Somerset Street which are highlighted on the attached conceptual site servicing plan.

Estimated domestic demands based on the City of Ottawa guidelines and fire flow requirements for the site are as follows:

- Total domestic demands:
  - Average Day Demand: 5.0 L/s (301.4 L/min)
  - Maximum Day Demand: 11.5 L/s (692.0 L/min)
  - Peak Hour Demand: 24.8 L/s (1485.4 L/min)
- Maximum Fire Flow Demand per FUS methodology: 183.3 L/s (11,000 L/min)

Attached is a conceptual site servicing plan, site plan, water demand, and fire flow calculations.
Please let me know if you have any questions or need additional information.

Thanks,

Warren Johnson C.E.T.
Civil Engineering Technologist

Direct: 613 784-2272
Warren.Johnson@stantec.com

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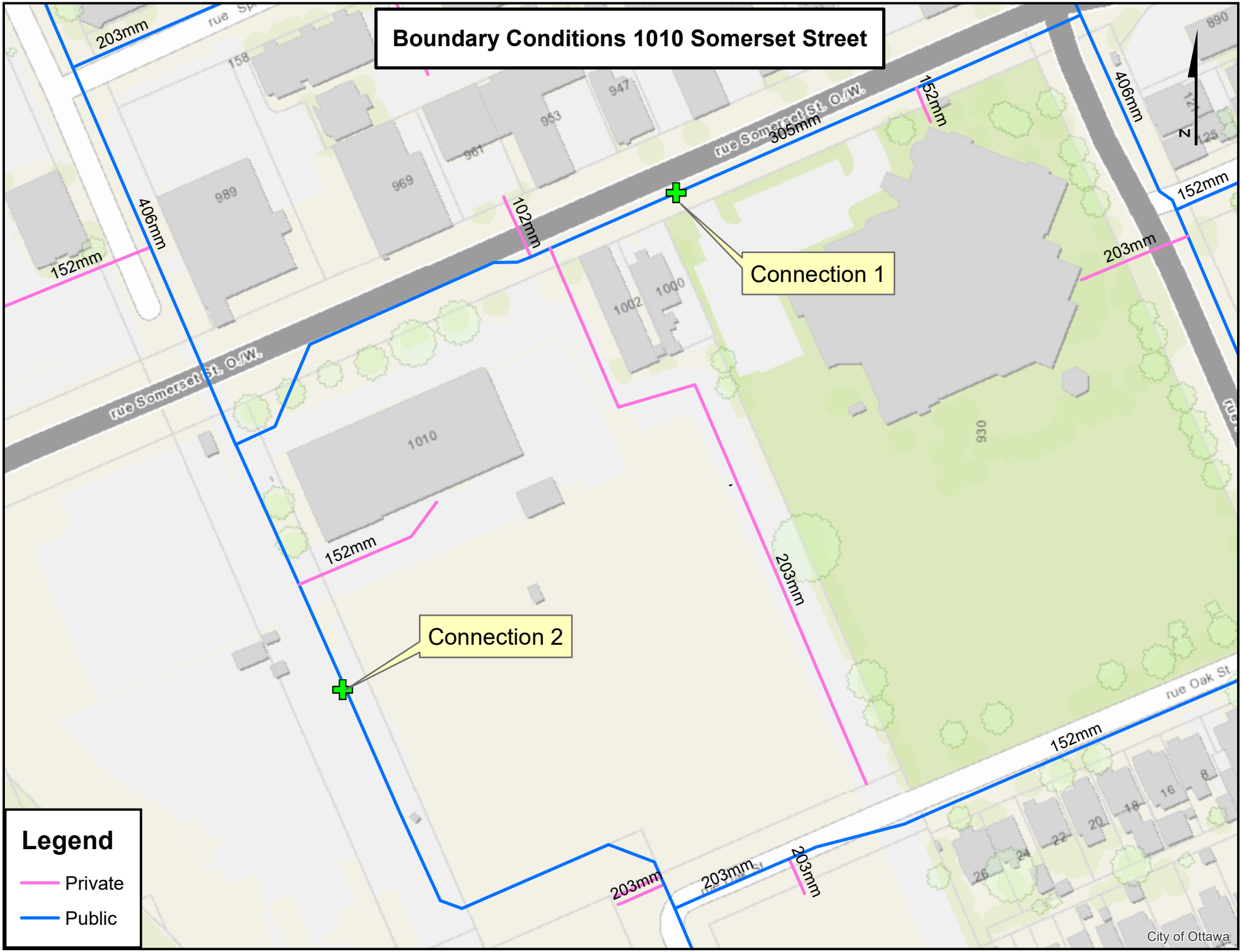
Boundary Conditions 1010 Somerset Street
Connection 1
Connection 2
rue Somerset St. O./W.
rue Somerset St. O./W.
rue Oak St
203mm
406mm
152mm
102mm
305mm
152mm
406mm
152mm
203mm
152mm
203mm
203mm
203mm
203mm
152mm
158
989
969
961
953
947
1002
1000
1010
930
890
N
Legend
Private
Public
City of Ottawa

Appendix D Sanitary Analysis

D.1 Sanitary Sewer Design Sheet

Stantec

SUBDIVISION:
1010 Somerset Street

DATE: 2/3/2025
REVISION: 1
DESIGNED BY: WAJ
CHECKED BY: -

SANITARY SEWER DESIGN SHEET
(City of Ottawa)

FILE NUMBER: 160402067

DESIGN PARAMETERS

MAX PEAK FACTOR (RES.)=	4.0	AVG. DAILY FLOW / PERSON	280 l/p/day	MINIMUM VELOCITY	0.60 m/s
MIN PEAK FACTOR (RES.)=	2.0	COMMERCIAL	28,000 l/ha/day	MAXIMUM VELOCITY	3.00 m/s
PEAKING FACTOR (INDUSTRIAL):	2.4	INDUSTRIAL (HEAVY)	55,000 l/ha/day	MANNINGS n	0.013
PEAKING FACTOR (ICI >20%):	1.5	INDUSTRIAL (LIGHT)	35,000 l/ha/day	BEDDING CLASS	B
PERSONS / SINGLE	3.4	INSTITUTIONAL	28,000 l/ha/day	MINIMUM COVER	2.50 m
PERSONS / TOWNHOME	2.7	INFILTRATION	0.33 l/s/Ha	HARMON CORRECTION FACTOR	0.8
PERSONS / APARTMENT	1.8				

LOCATION			RESIDENTIAL AREA AND POPULATION									COMMERCIAL		INDUSTRIAL (L)		INDUSTRIAL (H)		INSTITUTIONAL		GREEN / UNUSED		C+I+I	INFILTRATION			TOTAL	PIPE							
AREA ID NUMBER	FROM M.H.	TO M.H.	AREA	SINGLE	UNITS TOWN	APT	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)
I5A, G5C, I5B	5	4	0.00	0	0	0	0	0.00	0	3.80	0.0	0.00	0.00	0.00	0.00	0.00	0.00	1.07	1.07	0.24	0.24	0.5	1.32	1.32	0.4	1.0	71.9	250	PVC	SDR 35	0.50	42.9	**2.23%**	0.86	0.30
G4A	4	3	0.00	0	0	0	0	0.00	0	3.80	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.07	0.82	1.07	0.5	0.82	2.14	0.7	1.2	26.6	250	PVC	SDR 35	0.50	42.9	**2.86%**	0.86	0.31
L3B, R3A	3	3A	0.25	0	0	0	104	0.25	104	3.59	1.2	0.00	0.00	0.14	0.14	0.00	0.00	0.00	1.07	0.00	1.07	0.7	0.39	2.53	0.8	2.7	35.4	250	PVC	SDR 35	0.50	42.9	**6.31%**	0.86	0.40
	3A	1	0.00	0	0	0	0	0.25	104	3.59	1.2	0.00	0.00	0.00	0.14	0.00	0.00	0.00	1.07	0.00	1.07	0.7	0.00	2.53	0.8	2.7	8.7	250	PVC	SDR 35	0.50	42.9	**6.31%**	0.86	0.40
R2A, L2B	2	1	0.63	0	0	0	830	0.63	830	3.28	8.8	0.23	0.23	0.08	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.2	0.94	0.94	0.3	9.3	10.1	250	PVC	SDR 35	0.50	42.9	**21.75%**	0.86	0.58
Ex. Combined Sewer	1	1A	0.00	0	0	0	0	0.88	934	3.26	9.9	0.00	0.23	0.00	0.22	0.00	0.00	0.00	1.07	0.00	1.07	0.8	0.00	3.47	1.1	11.8	85.1	1500	CONCRETE	SDR 35	0.35	4409.2	**0.27%**	2.42	0.46
																												1500							

D.2 Downstream Sewer Capacity Confirmation (City of Ottawa)

From: Duquette, Vincent
To: Johnson, Warren
Cc: Moroz, Peter
Subject: RE: 1010 Somerset Street Boundary Conditions
Date: Wednesday, January 22, 2025 11:49:12 AM

Hi Warren,

There is no capacity concerns with sending 11.8 L/s of sanitary flows to the existing 1500 mm diameter combined sewer in Champagne Avenue.
However, seeing as this is a trunk sewer, we require asset management's permission to connect to it. I am still waiting for them to confirm the proposed connection is permitted.

Best Regards,

Vincent Duquette, E.I.T
Project Manager, Infrastructure Approvals | Gestionnaire de projet, Projets d'infrastructure
Development Review – All Ward | Direction de l'examen des projets d'aménagement - Tous les quartiers
Planning, Development and Building Services Department (PDBS)| Direction générale des services de la planification, de l'aménagement et du bâtiment (DGSPAB)
City of Ottawa | Ville d'Ottawa
110 Laurier Avenue West | 110 avenue Laurier Ouest
Ottawa, ON K1P 1J1
613.580.2424 ext./poste 14048, vincent.duquette@ottawa.ca

From: Johnson, Warren <Warren.Johnson@stantec.com>
Sent: January 22, 2025 10:55 AM
To: Duquette, Vincent <Vincent.Duquette@ottawa.ca>
Cc: Moroz, Peter <peter.moroz@stantec.com>
Subject: RE: 1010 Somerset Street Boundary Conditions

Hi Vincent,

I am following up to see if you have heard back regarding the sanitary capacity confirmation. If you need any more information, please let me know.

Thanks,

Warren Johnson C.E.T.
Civil Engineering Technologist
Direct: 613 784-2272

Warren.Johnson@stantec.com

Stantec

From: Duquette, Vincent <Vincent.Duquette@ottawa.ca>
Sent: Monday, January 6, 2025 6:53 PM
To: Johnson, Warren <Warren.Johnson@stantec.com>
Subject: RE: 1010 Somerset Street Boundary Conditions

Hi Warren,

The sanitary demands have been circulated to confirm capacity. I should have an answer for within two weeks.

Best Regards,

Vincent Duquette, E.I.T
Project Manager, Infrastructure Approvals | Gestionnaire de projet, Projets d'infrastructure
Development Review – All Ward | Direction de l'examen des projets d'aménagement - Tous les quartiers
Planning, Development and Building Services Department (PDBS)| Direction générale des services de la planification, de l'aménagement et du bâtiment (DGSPAB)
City of Ottawa | Ville d'Ottawa
110 Laurier Avenue West | 110 avenue Laurier Ouest
Ottawa, ON K1P 1J1
613.580.2424 ext./poste 14048, vincent.duquette@ottawa.ca

From: Johnson, Warren <Warren.Johnson@stantec.com>
Sent: January 06, 2025 11:40 AM
To: Duquette, Vincent <Vincent.Duquette@ottawa.ca>
Subject: RE: 1010 Somerset Street Boundary Conditions

Thanks Vincent, hopefully you had a great holiday.
Per the pre-consultation with the City, I would also like to confirm the capacity of the downstream sanitary sewer network. The proposed site is expected to be serviced via a connection to the existing 1500 mm diameter combined sewer in Champagne Avenue as indicated on the attached conceptual sanitary

drainage area plan. The total estimated peak flow for the site is 11.8 L/s (detailed breakdown in the attached sewer design sheet).

Please let me know if you have any questions or need additional information.
Thanks,

Warren Johnson C.E.T.
Civil Engineering Technologist

Direct: 613 784-2272
Warren.Johnson@stantec.com

Stantec

From: Duquette, Vincent <Vincent.Duquette@ottawa.ca>
Sent: Monday, January 6, 2025 11:22 AM
To: Johnson, Warren <Warren.Johnson@stantec.com>
Subject: RE: 1010 Somerset Street Boundary Conditions

Hi Warren,

Boundary condition request has been submitted to our water resource group using the latest revised demands.
I will keep you posted when I get the results. Result typically take 3-4 week to obtain.

Best Regards,

Vincent Duquette, E.I.T
Project Manager, Infrastructure Approvals | Gestionnaire de projet, Projets d'infrastructure
Development Review – All Ward | Direction de l'examen des projets d'aménagement - Tous les quartiers
Planning, Development and Building Services Department (PDBS)| Direction générale des services de la planification, de l'aménagement et du bâtiment (DGSPAB)
City of Ottawa | Ville d'Ottawa
110 Laurier Avenue West | 110 avenue Laurier Ouest
Ottawa, ON K1P 1J1
613.580.2424 ext./poste 14048, vincent.duquette@ottawa.ca

From: Johnson, Warren <Warren.Johnson@stantec.com>
Sent: December 20, 2024 1:49 PM
To: Duquette, Vincent <Vincent.Duquette@ottawa.ca>
Subject: RE: 1010 Somerset Street Boundary Conditions

Hi Vincent,

Apologies, I noticed a minor typo in the water demand calculations. See attached corrected calculation sheet with the revised demands summarized here:

- Average Day Demand: 4.1 L/s (243.2 L/min)
- Maximum Day Demand: 9.1 L/s (546.4 L/min)
- Peak Hour Demand: 19.4 L/s (1165.2 L/min)

Thanks, and have a great holiday!

Warren Johnson C.E.T.
Civil Engineering Technologist

Direct: 613 784-2272
Warren.Johnson@stantec.com

Stantec

From: Johnson, Warren
Sent: Friday, December 20, 2024 11:31 AM
To: vincent.duquette@ottawa.ca
Cc: Moroz, Peter <peter.moroz@stantec.com>; Thiffault, Dustin <Dustin.Thiffault@stantec.com>; Bays, Eric <Eric.Bays@stantec.com>
Subject: 1010 Somerset Street Boundary Conditions

Hi Vincent,

We would like to request boundary conditions for the City of Ottawa development on 1010 Somerset Street. The proposed development consists of a Recreation and Cultural Facility, school, district energy plant, mid-rise (6 floors and 60 units), high density towers (max 25 floors and total 480 units), and a sports field/passive park.

The proposed site is expected to be serviced via connections to the existing 400 mm diameter watermain in Champagne Avenue and the 300 mm diameter watermain in Somerset Street which are highlighted on the attached conceptual site servicing plan.

Estimated domestic demands based on the City of Ottawa guidelines and fire flow requirements for the site are as follows:

- Total domestic demands:
  - Average Day Demand: 5.0 L/s (301.4 L/min)
  - Maximum Day Demand: 11.5 L/s (692.0 L/min)

    Peak Hour Demand: 24.8 L/s (1485.4 L/min)

- Maximum Fire Flow Demand per FUS methodology: 183.3 L/s (11,000 L/min)

Attached is a conceptual site servicing plan, site plan, water demand, and fire flow calculations. Please let me know if you have any questions or need additional information.

Thanks,

Warren Johnson C.E.T.
Civil Engineering Technologist

Direct: 613 784-2272
Warren.Johnson@stantec.com

Stantec

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

Appendix E Storm Analysis

E.1 Storm Sewer Design Sheet

Stantec

1010 Somerset Street

DATE: 2025-02-03
REVISION: 1
DESIGNED BY: WAJ
CHECKED BY: -

FILE NUMBER: 160402067

STORM SEWER DESIGN SHEET
(City of Ottawa)

DESIGN PARAMETERS

$I = a / (t+b)^c$ (As per City of Ottawa Guidelines, 2012)

	1:2 yr	1:5 yr	1:10 yr	1:100 yr
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 10 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)
L106A	106	105	0.24	0.00	0.00	0.00	0.00	0.85	0.00	0.00	0.00	0.207	0.207	0.000	0.000	0.000	0.000	0.000	0.000	10.00	76.81	104.19	122.14	178.56	0.0	0.0	44.2	74.5	375	375	CIRCULAR	PVC	SDR 35	0.26	84.0	**52.53%**	0.80	0.69	1.79
L105A, L105B, R105C, R105D	105	104	0.44	0.00	0.00	0.00	0.63	0.78	0.00	0.00	0.00	0.344	0.551	0.000	0.000	0.000	0.000	0.000	0.000	11.79	70.56	95.61	112.03	163.71	32.5	32.5	140.5	62.5	600	600	CIRCULAR	CONCRETE	100-D	0.14	239.7	**58.62%**	0.82	0.73	1.42
L104A	104	101	0.82	0.00	0.00	0.00	0.00	0.40	0.00	0.00	0.00	0.329	0.880	0.000	0.000	0.000	0.000	0.000	0.000	13.21	66.35	89.83	105.23	153.73	0.0	32.5	194.7	78.6	675	675	CIRCULAR	CONCRETE	100-D	0.12	303.8	**64.08%**	0.82	0.76	1.73
																				14.94																			
L103A, R103B	103	102	0.17	0.00	0.00	0.00	0.08	0.85	0.00	0.00	0.00	0.147	0.147	0.000	0.000	0.000	0.000	0.000	0.000	10.00	76.81	104.19	122.14	178.56	3.7	3.7	35.2	44.8	300	300	CIRCULAR	PVC	SDR 35	0.34	56.1	**62.74%**	0.80	0.73	1.02
L102A, L102B, L102C, R102D, R102E	102	101	0.52	0.00	0.00	0.00	0.34	0.85	0.00	0.00	0.00	0.438	0.585	0.000	0.000	0.000	0.000	0.000	0.000	11.02	73.09	99.08	116.12	169.71	16.3	20.0	138.8	36.2	525	525	CIRCULAR	CONCRETE	100-D	0.16	179.5	**77.34%**	0.80	0.78	0.77
																				11.80																			
	101	100	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000	1.465	0.000	0.000	0.000	0.000	0.000	0.000	14.94	61.92	83.77	98.10	143.26	0.0	52.5	304.5	51.3	825	825	CIRCULAR	CONCRETE	100-D	0.10	473.6	**64.30%**	0.86	0.79	1.08
Ex. Storm Sewer	100	100A	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000	1.465	0.000	0.000	0.000	0.000	0.000	0.000	16.02	59.47	80.41	94.16	137.47	0.0	52.5	294.5	6.7	1650	1650	CIRCULAR	CONCRETE	100-D	0.37	5783.8	**5.09%**	2.62	1.16	0.10
			2.20				1.04													**16.11**								1650	1650									
							3.24																																	

E.2 Modified Rational Method

Stormwater Management Calculations

File No: **160402067**
Project: **1010 Somerset Street**
Date: **07-Jan-25**

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
Controlled - Tributary	L106A		Hard	0.226		0.9	0.203		
			Soft	0.017		0.2	0.003		
		Subtotal			0.2435			0.206975	0.850
Roof	R105D		Hard	0.140		0.9	0.126		
			Soft	0.000		0.2	0.000		
		Subtotal			0.1403			0.12627	0.900
Controlled - Tributary	L105B		Hard	0.151		0.9	0.136		
			Soft	0.060		0.2	0.012		
		Subtotal			0.2111			0.14777	0.700
Roof	R105C		Hard	0.491		0.9	0.442		
			Soft	0.000		0.2	0.000		
		Subtotal			0.4911			0.44199	0.900
Controlled - Tributary	L105A		Hard	0.215		0.9	0.193		
			Soft	0.017		0.2	0.003		
		Subtotal			0.2311			0.196435	0.850
Controlled - Tributary	L104A		Hard	0.235		0.9	0.211		
			Soft	0.587		0.2	0.117		
		Subtotal			0.8223			0.32892	0.400
Controlled - Tributary	L102C		Hard	0.074		0.9	0.066		
			Soft	0.006		0.2	0.001		
		Subtotal			0.0794			0.06749	0.850
Controlled - Tributary	L102B		Hard	0.131		0.9	0.118		
			Soft	0.010		0.2	0.002		
		Subtotal			0.1415			0.120275	0.850
Roof	R103B		Hard	0.075		0.9	0.068		
			Soft	0.000		0.2	0.000		
		Subtotal			0.075			0.0675	0.900
Controlled - Tributary	L103A		Hard	0.161		0.9	0.145		
			Soft	0.012		0.2	0.002		
		Subtotal			0.1733			0.147305	0.850
Roof	R102E		Hard	0.105		0.9	0.094		
			Soft	0.000		0.2	0.000		
		Subtotal			0.1048			0.09432	0.900
Roof	R102D		Hard	0.233		0.9	0.209		
			Soft	0.000		0.2	0.000		
		Subtotal			0.2326			0.20934	0.900
Controlled - Tributary	L102A		Hard	0.273		0.9	0.246		
			Soft	0.021		0.2	0.004		
		Subtotal			0.2941			0.249985	0.850
Total					**3.240**			**2.405**	
Overall Runoff Coefficient= C:									**0.74**

Total Roof Areas	**1.044**	**ha**
Total Tributary Surface Areas (Controlled and Uncontrolled)	**2.196**	**ha**
Total Tributary Area to Outlet	**3.240**	**ha**
Total Uncontrolled Areas (Non-Tributary)	**0.000**	**ha**
Total Site	**3.240**	**ha**

Project #160402067, 1010 Somerset Street
Roof Drain Design Sheet, Area R102D
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	0.0028	0	0.025	52	0	0	0.025
0.050	0.0006	0.0057	3	0.050	207	3	3	0.050
0.075	0.0008	0.0071	12	0.075	465	8	12	0.075
0.100	0.0009	0.0085	28	0.100	827	16	28	0.100
0.125	0.0011	0.0099	54	0.125	1292	26	54	0.125
0.150	0.0013	0.0114	93	0.150	1861	39	93	0.150

Drawdown Estimate			
Total Volume (cu.m)	Total Time (sec)	Vol (cu.m)	Detention Time (hr)
0.0	0.0	0.0	0
3.0	531.0	3.0	0.14751
11.2	1153.1	8.2	0.4678
27.1	1871.2	15.9	0.98758
53.4	2644.3	26.3	1.7221
92.6	3451.6	39.2	2.68088

Rooftop Storage Summary

Total Building Area (sq.m)		2326
Assume Available Roof Area (sq.r	80%	1860.8
Roof Imperviousness		0.99
Roof Drain Requirement (sq.m/Notch)		232
Number of Roof Notches*		9
Max. Allowable Depth of Roof Ponding (m)		0.150
Max. Allowable Storage (cu.m)		93
Estimated 100 Year Drawdown Time (h)		2.6

* 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	0.31545	0.31545	**0.31545**	0.31545	0.31545
0.050	0.6309	0.6309	**0.6309**	0.6309	0.6309
0.075	0.94635	0.86749	**0.78863**	0.70976	0.6309
0.100	1.2618	1.10408	**0.94635**	0.78863	0.6309
0.125	1.57726	1.34067	**1.10408**	0.86749	0.6309
0.150	1.89271	1.57726	**1.2618**	0.94635	0.6309

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

Calculation Results	5yr	100yr	Available
Qresult (cu.m/s)	0.008	0.011	-
Depth (m)	0.099	0.148	0.150
Volume (cu.m)	26.7	90.3	93.0
Draintime (hrs)	1.0	2.6	

Project #160402067, 1010 Somerset Street
Roof Drain Design Sheet, Area R102E
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	0.0013	0	0.025	23	0	0	0.025
0.050	0.0006	0.0025	2	0.050	93	1	2	0.050
0.075	0.0008	0.0032	5	0.075	210	4	5	0.075
0.100	0.0009	0.0038	12	0.100	373	7	12	0.100
0.125	0.0011	0.0044	24	0.125	582	12	24	0.125
0.150	0.0013	0.0050	42	0.150	838	18	42	0.150

Drawdown Estimate			
Total Volume (cu.m)	Total Time (sec)	Vol (cu.m)	Detention Time (hr)
0.0	0.0	0.0	0
1.4	538.3	1.4	0.14953
5.0	1168.9	3.7	0.47424
12.2	1897.0	7.2	1.00117
24.1	2680.6	11.8	1.74579
41.7	3499.1	17.7	2.71776

Rooftop Storage Summary

Total Building Area (sq.m)		1048
Assume Available Roof Area (sq.r	80%	838.4
Roof Imperviousness		0.99
Roof Drain Requirement (sq.m/Notch)		232
Number of Roof Notches*		4
Max. Allowable Depth of Roof Ponding (m)		0.15
Max. Allowable Storage (cu.m)		42
Estimated 100 Year Drawdown Time (h)		2.7

* 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	0.31545	0.31545	**0.31545**	0.31545	0.31545
0.050	0.6309	0.6309	**0.6309**	0.6309	0.6309
0.075	0.94635	0.86749	**0.78863**	0.70976	0.6309
0.100	1.2618	1.10408	**0.94635**	0.78863	0.6309
0.125	1.57726	1.34067	**1.10408**	0.86749	0.6309
0.150	1.89271	1.57726	**1.2618**	0.94635	0.6309

Calculation Results	5yr	100yr	Available
Qresult (cu.m/s)	0.004	0.005	-
Depth (m)	0.099	0.149	0.150
Volume (cu.m)	12.1	40.9	41.9
Draintime (hrs)	1.0	2.7	

Project #160402067, 1010 Somerset Street
Roof Drain Design Sheet, Area R103B
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	17	0	0	0.025
0.050	0.0006	0.0019	1	0.050	67	1	1	0.050
0.075	0.0008	0.0024	4	0.075	150	3	4	0.075
0.100	0.0009	0.0028	9	0.100	267	5	9	0.100
0.125	0.0011	0.0033	17	0.125	417	8	17	0.125
0.150	0.0013	0.0038	30	0.150	600	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	513.7	1.0	0.14269
3.6	1115.4	2.6	0.45252
8.8	1810.1	5.1	0.95531
17.2	2557.9	8.5	1.66583
29.9	3338.8	12.6	2.59329

Rooftop Storage Summary

Total Building Area (sq.m)		750
Assume Available Roof Area (sq.r	80%	600
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)		30
Estimated 100 Year Drawdown Time (h)		2.5

* 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	0.31545	0.31545	**0.31545**	0.31545	0.31545
0.050	0.6309	0.6309	**0.6309**	0.6309	0.6309
0.075	0.94635	0.86749	**0.78863**	0.70976	0.6309
0.100	1.2618	1.10408	**0.94635**	0.78863	0.6309
0.125	1.57726	1.34067	**1.10408**	0.86749	0.6309
0.150	1.89271	1.57726	**1.2618**	0.94635	0.6309

Calculation Results	5yr	100yr	Available
Qresult (cu.m/s)	0.003	0.004	-
Depth (m)	0.098	0.148	0.150
Volume (cu.m)	8.5	28.8	30.0
Draintime (hrs)	0.9	2.5	

Project #160402067, 1010 Somerset Street
Roof Drain Design Sheet, Area R105C
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	0.0054	1	0.025	109	1	1	0.025
0.050	0.0006	0.0107	7	0.050	437	6	7	0.050
0.075	0.0009	0.0147	25	0.075	982	17	25	0.075
0.100	0.0011	0.0188	58	0.100	1746	34	58	0.100
0.125	0.0013	0.0228	114	0.125	2728	55	114	0.125
0.150	0.0016	0.0268	196	0.150	3929	83	196	0.150

Drawdown Estimate			
Total Volume (cu.m)	Total Time (sec)	Vol (cu.m)	Detention Time (hr)
0.0	0.0	0.0	0
6.4	593.6	6.4	0.16488
23.6	1171.7	17.3	0.49035
57.3	1792.8	33.6	0.98835
112.8	2434.1	55.5	1.66448
195.5	3086.5	82.8	2.52184

Rooftop Storage Summary

Total Building Area (sq.m)		4911
Assume Available Roof Area (sq.r	80%	3928.8
Roof Imperviousness		0.99
Roof Drain Requirement (sq.m/Notch)		232
Number of Roof Notches*		17
Max. Allowable Depth of Roof Ponding (m)		0.15
Max. Allowable Storage (cu.m)		196
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	0.31545	**0.31545**	0.31545	0.31545	0.31545
0.050	0.6309	**0.6309**	0.6309	0.6309	0.6309
0.075	0.94635	**0.86749**	0.78863	0.70976	0.6309
0.100	1.2618	**1.10408**	0.94635	0.78863	0.6309
0.125	1.57726	**1.34067**	1.10408	0.86749	0.6309
0.150	1.89271	**1.57726**	1.2618	0.94635	0.6309

Calculation Results	5yr	100yr	Available
Qresult (cu.m/s)	0.018	0.026	-
Depth (m)	0.098	0.146	0.150
Volume (cu.m)	55.4	183.4	196.4
Draintime (hrs)	1.0	2.4	

Project #160402067, 1010 Somerset Street
Roof Drain Design Sheet, Area R105D
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	31	0	0	0.025
0.050	0.0006	0.0032	2	0.050	125	2	2	0.050
0.075	0.0008	0.0039	7	0.075	281	5	7	0.075
0.100	0.0009	0.0047	17	0.100	499	10	17	0.100
0.125	0.0011	0.0055	32	0.125	779	16	32	0.125
0.150	0.0013	0.0063	56	0.150	1122	24	56	0.150

Drawdown Estimate			
Total Volume (cu.m)	Total Time (sec)	Vol (cu.m)	Detention Time (hr)
0.0	0.0	0.0	0
1.8	576.5	1.8	0.16015
6.8	1251.9	4.9	0.5079
16.4	2031.6	9.6	1.07224
32.2	2870.9	15.8	1.86973
55.9	3747.5	23.6	2.9107

Rooftop Storage Summary

Total Building Area (sq.m)		1403
Assume Available Roof Area (sq.r	80%	1122.4
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
Max. Allowable Storage (cu.m)		56
Estimated 100 Year Drawdown Time (h)		2.9

* 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	0.31545	0.31545	**0.31545**	0.31545	0.31545
0.050	0.6309	0.6309	**0.6309**	0.6309	0.6309
0.075	0.94635	0.86749	**0.78863**	0.70976	0.6309
0.100	1.2618	1.10408	**0.94635**	0.78863	0.6309
0.125	1.57726	1.34067	**1.10408**	0.86749	0.6309
0.150	1.89271	1.57726	**1.2618**	0.94635	0.6309

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

Calculation Results	5yr	100yr	Available
Qresult (cu.m/s)	0.005	0.006	-
Depth (m)	0.100	0.150	0.150
Volume (cu.m)	16.8	55.9	56.1
Draintime (hrs)	1.1	2.9	

Stormwater Management Calculations

Project #160402067, 1010 Somerset Street
Modified Rational Method Calculatons for Storage

2 yr Intensity
City of Ottawa

I = a/(t + b)^c		
a =	732.951	
b =	6.199	
c =	0.81	

t (min)	I (mm/hr)
10	76.81
20	52.03
30	40.04
40	32.86
50	28.04
60	24.56
70	21.91
80	19.83
90	18.14
100	16.75
110	15.57
120	14.56

2 YEAR Modified Rational Method for Entire Site

Subdrainage Area: L106A — Controlled - Tributary
Area (ha): 0.24
C: 0.85

tc (min)	I (2 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)
10	76.81	44.19	26.00	18.20	**10.92**
20	52.03	29.94	26.00	3.94	4.73
30	40.04	23.04	23.04	0.00	0.00
40	32.86	18.91	18.91	0.00	0.00
50	28.04	16.13	16.13	0.00	0.00
60	24.56	14.13	14.13	0.00	0.00
70	21.91	12.61	12.61	0.00	0.00
80	19.83	11.41	11.41	0.00	0.00
90	18.14	10.44	10.44	0.00	0.00
100	16.75	9.64	9.64	0.00	0.00
110	15.57	8.96	8.96	0.00	0.00
120	14.56	8.38	8.38	0.00	0.00

Storage: Surface Storage and/or underground storage

	% of Area	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Volume Check
2-year Water Level	7.52%	26.00	10.92	67.00	OK

Subdrainage Area: R105D — Roof
Area (ha): 0.14 — Maximum Storage Depth: 150 mm
C: 0.90

tc (min)	I (2 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)	Depth (mm)	
10	76.81	26.96	4.47	22.49	13.49	91.8	0.00
20	52.03	18.26	4.70	13.56	16.27	99.1	0.00
30	40.04	14.06	4.74	9.32	**16.77**	100.2	0.00
40	32.86	11.54	4.71	6.82	16.38	99.4	0.00
50	28.04	9.84	4.65	5.20	15.59	97.3	0.00
60	24.56	8.62	4.57	4.06	14.60	94.7	0.00
70	21.91	7.69	4.48	3.22	13.51	91.9	0.00
80	19.83	6.96	4.38	2.58	12.37	88.9	0.00
90	18.14	6.37	4.29	2.08	11.23	86.0	0.00
100	16.75	5.88	4.20	1.68	10.10	83.0	0.00
110	15.57	5.47	4.10	1.36	8.98	80.1	0.00
120	14.56	5.11	4.02	1.10	7.89	77.3	0.00

Storage: Roof Storage to outelt to cistern (see L105B)

	Depth (mm)	Head (m)	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Discharge Check
2-year Water Level	100.23	0.10	4.74	16.77	56.12	0.00

Subdrainage Area: L105B — Controlled - Tributary
Area (ha): 0.21
C: 0.70

tc (min)	I (2 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)
10	76.81	36.29	36.29	0.00	**0.00**
20	52.03	26.11	26.11	0.00	**0.00**
30	40.04	21.19	21.19	0.00	**0.00**
40	32.86	18.24	18.24	0.00	**0.00**
50	28.04	16.26	16.26	0.00	**0.00**
60	24.56	14.83	14.83	0.00	**0.00**
70	21.91	13.74	13.74	0.00	**0.00**
80	19.83	12.88	12.88	0.00	**0.00**
90	18.14	12.19	12.19	0.00	**0.00**
100	16.75	11.62	11.62	0.00	**0.00**
110	15.57	11.13	11.13	0.00	**0.00**
120	14.56	10.72	10.72	0.00	**0.00**

Storage: Underground cistern to be controlled by mechanical pump at set flow rate
Roof area R105D to outlet to cistern

	% of Area	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Volume Check
2-year Water Level	10.85%	36.29	0.00	37.00	OK

Subdrainage Area: R105C — Roof
Area (ha): 0.49 — Maximum Storage Depth: 150 mm

Project #160402067, 1010 Somerset Street
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)
10	178.56
20	119.95
30	91.87
40	75.15
50	63.95
60	55.89
70	49.79
80	44.99
90	41.11
100	37.90
110	35.20
120	32.89

100 Year Target Release Rate

Subdrainage Area: Predevelopment Tributary Area to Outlet
Area (ha): 3.2401
C: 0.50

Calculated Time of Concentration (refer to Appendix E)

tc (min)	I (2 yr) (mm/hr)	Q2yr (L/s)	Q2yr (L/s/ha)
10	76.81	**345.91**	**106.76**

100 YEAR Modified Rational Method for Entire Site

Subdrainage Area: L106A — Controlled - Tributary
Area (ha): 0.24
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	120.87	26.00	94.88	56.93
20	119.95	81.20	26.00	55.20	**66.24**
30	91.87	62.19	26.00	36.19	65.15
40	75.15	50.87	26.00	24.87	59.69
50	63.95	43.29	26.00	17.30	51.89
60	55.89	37.84	26.00	11.84	42.63
70	49.79	33.70	26.00	7.71	32.37
80	44.99	30.46	26.00	4.46	21.41
90	41.11	27.83	26.00	1.83	9.90
100	37.90	25.66	25.66	0.00	0.00
110	35.20	23.83	23.83	0.00	0.00
120	32.89	22.27	22.27	0.00	0.00

Storage: Surface Storage and/or underground storage

	% of Area	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Volume Check
100-year Water Level	7.52%	26.00	66.24	67.00	OK
				0.76	

Subdrainage Area: R105D — Roof
Area (ha): 0.14 — 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	69.64	5.72	63.93	38.36	131.2	0.00
20	119.95	46.78	6.07	40.72	48.86	142.3	0.00
30	91.87	35.83	6.22	29.62	53.31	147.0	0.00
40	75.15	29.31	6.28	23.03	55.27	149.1	0.00
50	63.95	24.94	6.30	18.64	**55.93**	149.8	0.00
60	55.89	21.80	6.30	15.50	55.81	149.7	0.00
70	49.79	19.42	6.28	13.14	55.19	149.0	0.00
80	44.99	17.55	6.25	11.30	54.25	148.0	0.00
90	41.11	16.03	6.21	9.83	53.07	146.8	0.00
100	37.90	14.78	6.16	8.62	51.73	145.4	0.00
110	35.20	13.73	6.11	7.62	50.27	143.8	0.00
120	32.89	12.83	6.06	6.77	48.73	142.2	0.00

Storage: Roof Storage to outelt to cistern (see L105B)

	Depth (mm)	Head (m)	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Discharge Check
100-year Water Level	149.79	0.15	6.30	55.93	56.12	0.00

Subdrainage Area: L105B — Controlled - Tributary
Area (ha): 0.21
C: 0.88

tc (min)	I (100 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)
10	178.56	97.99	37.52	60.48	36.29
20	119.95	67.90	37.52	30.38	**36.46**
30	91.87	53.48	37.52	15.96	28.73
40	75.15	44.89	37.52	7.37	17.70
50	63.95	39.14	37.52	1.63	4.88
60	55.89	35.00	35.00	0.00	0.00
70	49.79	31.87	31.87	0.00	0.00
80	44.99	29.41	29.41	0.00	0.00
90	41.11	27.41	27.41	0.00	0.00
100	37.90	25.77	25.77	0.00	0.00
110	35.20	24.38	24.38	0.00	0.00
120	32.89	23.19	23.19	0.00	0.00

Storage: Underground cistern to be controlled by mechanical pump at set flow rate
Roof area R105D to outlet to cistern

	% of Area	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Volume Check
100-year Water Level	10.85%	37.52	36.46	37.00	OK
				0.54	

Subdrainage Area: R105C — Roof
Area (ha): 0.49 — Maximum Storage Depth: 150 mm

Stormwater Management Calculations

Project #160402067, 1010 Somerset Street
Modified Rational Method Calculatons for Storage

C: 0.90

tc (min)	I (2 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)	Depth (mm)	
10	76.81	94.37	17.34	77.04	46.22	91.1	0.00
20	52.03	63.93	18.35	45.58	54.70	97.4	0.00
30	40.04	49.20	18.43	30.77	**55.39**	97.9	0.00
40	32.86	40.38	18.18	22.20	53.28	96.3	0.00
50	28.04	34.45	17.79	16.67	50.00	93.9	0.00
60	24.56	30.17	17.34	12.84	46.22	91.1	0.00
70	21.91	26.92	16.86	10.06	42.26	88.2	0.00
80	19.83	24.37	16.39	7.98	38.29	85.2	0.00
90	18.14	22.29	15.92	6.37	34.39	82.3	0.00
100	16.75	20.58	15.47	5.10	30.62	79.5	0.00
110	15.57	19.13	15.04	4.09	27.00	76.8	0.00
120	14.56	17.89	14.58	3.31	23.84	74.0	0.00

Storage: Roof Storage to outelt to cistern (see L105A)

	Depth (mm)	Head (m)	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Discharge Check
2-year Water Level	97.91	0.10	18.43	55.39	196.44	0.00

Subdrainage Area: L105A — Controlled - Tributary
Area (ha): 0.23
C: 0.85

tc (min)	I (2 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)
10	76.81	60.37	60.37	0.00	**0.00**
20	52.03	46.85	46.85	0.00	**0.00**
30	40.04	40.30	40.30	0.00	**0.00**
40	32.86	36.38	36.38	0.00	**0.00**
50	28.04	33.75	33.75	0.00	**0.00**
60	24.56	31.84	31.84	0.00	**0.00**
70	21.91	30.40	30.40	0.00	**0.00**
80	19.83	29.26	29.26	0.00	**0.00**
90	18.14	28.34	28.34	0.00	**0.00**
100	16.75	27.58	27.58	0.00	**0.00**
110	15.57	26.93	26.93	0.00	**0.00**
120	14.56	26.38	26.38	0.00	**0.00**

Storage: Underground cistern to be controlled by mechanical pump at set flow rate
Roof area R105C to outlet to cistern

	% of Area	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Volume Check
2-year Water Level	22.29%	60.37	0.00	39.00	OK

Subdrainage Area: L104A — Controlled - Tributary
Area (ha): 0.82
C: 0.40

tc (min)	I (2 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)
10	76.81	70.23	70.23	0.00	**0.00**
20	52.03	47.58	47.58	0.00	**0.00**
30	40.04	36.62	36.62	0.00	**0.00**
40	32.86	30.05	30.05	0.00	**0.00**
50	28.04	25.64	25.64	0.00	**0.00**
60	24.56	22.46	22.46	0.00	**0.00**
70	21.91	20.04	20.04	0.00	**0.00**
80	19.83	18.13	18.13	0.00	**0.00**
90	18.14	16.59	16.59	0.00	**0.00**
100	16.75	15.31	15.31	0.00	**0.00**
110	15.57	14.24	14.24	0.00	**0.00**
120	14.56	13.32	13.32	0.00	**0.00**

Storage: Surface Storage and/or underground storage

	% of Area	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Volume Check
2-year Water Level	25.38%	70.23	0.00	70.00	OK

Subdrainage Area: L102C — Controlled - Tributary
Area (ha): 0.08
C: 0.85

tc (min)	I (2 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)
10	76.81	14.41	8.48	5.93	**3.56**
20	52.03	9.76	8.48	1.29	1.54
30	40.04	7.51	7.51	0.00	0.00
40	32.86	6.17	6.17	0.00	0.00
50	28.04	5.26	5.26	0.00	0.00
60	24.56	4.61	4.61	0.00	0.00
70	21.91	4.11	4.11	0.00	0.00
80	19.83	3.72	3.72	0.00	0.00
90	18.14	3.40	3.40	0.00	0.00
100	16.75	3.14	3.14	0.00	0.00
110	15.57	2.92	2.92	0.00	0.00
120	14.56	2.73	2.73	0.00	0.00

Storage: Underground cistern to be controlled by mechanical pump at set flow rate

	% of Area	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Volume Check
2-year Water Level	2.45%	8.48	3.56	22.00	OK

Subdrainage Area: L102B — Controlled - Tributary
Area (ha): 0.14
C: 0.85

tc (min)	I (2 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)
10	76.81	25.68	15.11	10.57	**6.34**
20	52.03	17.40	15.11	2.29	2.75

Project #160402067, 1010 Somerset Street
Modified Rational Method Calculatons for 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	243.78	23.68	220.09	132.06	130.6	0.00
20	119.95	163.76	25.34	138.42	166.11	140.8	0.00
30	91.87	125.42	25.97	99.46	179.02	144.7	0.00
40	75.15	102.59	26.18	76.41	183.39	146.1	0.00
50	63.95	87.31	26.18	61.13	**183.40**	146.1	0.00
60	55.89	76.31	26.06	50.25	180.91	145.3	0.00
70	49.79	67.98	25.86	42.11	176.88	144.1	0.00
80	44.99	61.42	25.62	35.81	171.86	142.6	0.00
90	41.11	56.13	25.34	30.78	166.22	140.9	0.00
100	37.90	51.75	25.05	26.70	160.18	139.0	0.00
110	35.20	48.06	24.75	23.32	153.88	137.1	0.00
120	32.89	44.91	24.43	20.48	147.44	135.2	0.00

Storage: Roof Storage to outelt to cistern (see L105A)

	Depth (mm)	Head (m)	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Discharge Check
100-year Water Level	146.06	0.15	26.18	183.40	196.44	0.00

Subdrainage Area: L105A — Controlled - Tributary
Area (ha): 0.23
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	140.90	77.10	63.80	**38.28**
20	119.95	103.24	77.10	26.14	31.37
30	91.87	85.20	77.10	8.10	14.58
40	75.15	74.46	74.46	0.00	0.00
50	63.95	67.27	67.27	0.00	0.00
60	55.89	62.09	62.09	0.00	0.00
70	49.79	58.17	58.17	0.00	0.00
80	44.99	55.08	55.08	0.00	0.00
90	41.11	52.59	52.59	0.00	0.00
100	37.90	50.53	50.53	0.00	0.00
110	35.20	48.80	48.80	0.00	0.00
120	32.89	47.31	47.31	0.00	0.00

Storage: Underground cistern to be controlled by mechanical pump at set flow rate
Roof area R105C to outlet to cistern

	% of Area	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Volume Check	
100-year Water Level	22.29%	77.10	38.28	39.00	OK	
						0.72

Subdrainage Area: L104A — Controlled - Tributary
Area (ha): 0.82
C: 0.50

tc (min)	I (100 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)
10	178.56	204.09	87.79	116.30	**69.78**
20	119.95	137.10	87.79	49.32	59.18
30	91.87	105.01	87.79	17.22	30.99
40	75.15	85.89	85.89	0.00	0.00
50	63.95	73.10	73.10	0.00	0.00
60	55.89	63.89	63.89	0.00	0.00
70	49.79	56.91	56.91	0.00	0.00
80	44.99	51.42	51.42	0.00	0.00
90	41.11	46.99	46.99	0.00	0.00
100	37.90	43.32	43.32	0.00	0.00
110	35.20	40.24	40.24	0.00	0.00
120	32.89	37.60	37.60	0.00	0.00

Storage: Surface Storage and/or underground storage

	% of Area	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Volume Check	
100-year Water Level	25.38%	87.79	69.78	70.00	OK	
						0.22

Subdrainage Area: L102C — Controlled - Tributary
Area (ha): 0.08
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	39.41	8.48	30.94	18.56
20	119.95	26.48	8.48	18.00	**21.60**
30	91.87	20.28	8.48	11.80	21.24
40	75.15	16.59	8.48	8.11	19.46
50	63.95	14.12	8.48	5.64	16.92
60	55.89	12.34	8.48	3.86	13.90
70	49.79	10.99	8.48	2.51	10.56
80	44.99	9.93	8.48	1.45	6.98
90	41.11	9.07	8.48	0.60	3.23
100	37.90	8.37	8.37	0.00	0.00
110	35.20	7.77	7.77	0.00	0.00
120	32.89	7.26	7.26	0.00	0.00

Storage: Underground cistern to be controlled by mechanical pump at set flow rate

	% of Area	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Volume Check	
100-year Water Level	2.45%	8.48	21.60	22.00	OK	
						0.40

Subdrainage Area: L102B — Controlled - Tributary
Area (ha): 0.14
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	70.24	15.11	55.13	33.08
20	119.95	47.18	15.11	32.08	**38.49**

Stormwater Management Calculations

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30	40.04	13.39	13.39	0.00	0.00
40	32.86	10.99	10.99	0.00	0.00
50	28.04	9.38	9.38	0.00	0.00
60	24.56	8.21	8.21	0.00	0.00
70	21.91	7.33	7.33	0.00	0.00
80	19.83	6.63	6.63	0.00	0.00
90	18.14	6.07	6.07	0.00	0.00
100	16.75	5.60	5.60	0.00	0.00
110	15.57	5.21	5.21	0.00	0.00
120	14.56	4.87	4.87	0.00	0.00

Storage: Underground cistern to be controlled by mechanical pump at set flow rate

	% of Area	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Volume Check
2-year Water Level	4.37%	15.11	6.34	39.00	OK

Subdrainage Area: R103B — Roof
Area (ha): 0.08 — Maximum Storage Depth: 150 mm
C: 0.90

tc (min)	I (2 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)	Depth (mm)	
10	76.81	14.41	2.67	11.74	7.05	91.0	0.00
20	52.03	9.76	2.79	6.97	8.37	97.5	0.00
30	40.04	7.51	2.80	4.71	**8.48**	98.0	0.00
40	32.86	6.17	2.77	3.40	8.15	96.4	0.00
50	28.04	5.26	2.72	2.54	7.62	93.8	0.00
60	24.56	4.61	2.66	1.94	7.00	90.8	0.00
70	21.91	4.11	2.60	1.51	6.33	87.6	0.00
80	19.83	3.72	2.54	1.18	5.66	84.3	0.00
90	18.14	3.40	2.48	0.92	4.99	81.0	0.00
100	16.75	3.14	2.42	0.72	4.34	77.8	0.00
110	15.57	2.92	2.36	0.56	3.71	74.6	0.00
120	14.56	2.73	2.28	0.45	3.27	70.4	0.00

Storage: Roof Storage to outelt to cistern (see L103A)

	Depth (mm)	Head (m)	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Discharge Check
2-year Water Level	98.02	0.10	2.80	8.48	30.00	0.00

Subdrainage Area: L103A — Controlled - Tributary
Area (ha): 0.17
C: 0.85

tc (min)	I (2 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)
10	76.81	34.25	26.51	7.75	**4.65**
20	52.03	24.11	24.11	0.00	0.00
30	40.04	19.20	19.20	0.00	0.00
40	32.86	16.26	16.26	0.00	0.00
50	28.04	14.28	14.28	0.00	0.00
60	24.56	12.86	12.86	0.00	0.00
70	21.91	11.78	11.78	0.00	0.00
80	19.83	10.92	10.92	0.00	0.00
90	18.14	10.23	10.23	0.00	0.00
100	16.75	9.66	9.66	0.00	0.00
110	15.57	9.18	9.18	0.00	0.00
120	14.56	8.76	8.76	0.00	0.00

Storage: Underground cistern to be controlled by mechanical pump at set flow rate
Roof area R103B to outlet to cistern

	% of Area	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Volume Check
2-year Water Level	7.66%	26.51	4.65	43.00	OK

Subdrainage Area: R102E — Roof
Area (ha): 0.10 — Maximum Storage Depth: 150 mm
C: 0.90

tc (min)	I (2 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)	Depth (mm)	
10	76.81	20.14	3.57	16.57	9.94	91.4	0.00
20	52.03	13.64	3.74	9.90	11.89	98.1	0.00
30	40.04	10.50	3.76	6.74	**12.13**	99.0	0.00
40	32.86	8.62	3.73	4.89	11.74	97.6	0.00
50	28.04	7.35	3.67	3.69	11.06	95.3	0.00
60	24.56	6.44	3.59	2.85	10.24	92.4	0.00
70	21.91	5.75	3.52	2.23	9.36	89.4	0.00
80	19.83	5.20	3.44	1.76	8.46	86.2	0.00
90	18.14	4.76	3.36	1.40	7.56	83.1	0.00
100	16.75	4.39	3.28	1.11	6.67	80.0	0.00
110	15.57	4.08	3.20	0.88	5.80	76.9	0.00
120	14.56	3.82	3.12	0.70	5.03	73.6	0.00

Storage: Roof Storage to outelt to cistern (see L102A)

	Depth (mm)	Head (m)	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Discharge Check
2-year Water Level	98.99	0.10	3.76	12.13	41.92	0.00

Subdrainage Area: R102D — Roof
Area (ha): 0.23 — Maximum Storage Depth: 150 mm
C: 0.90

tc (min)	I (2 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)	Depth (mm)	
10	76.81	44.70	8.02	36.68	22.01	91.3	0.00
20	52.03	30.28	8.40	21.88	26.26	97.9	0.00
30	40.04	23.30	8.44	14.86	**26.75**	98.7	0.00
40	32.86	19.13	8.36	10.76	25.83	97.3	0.00
50	28.04	16.32	8.22	8.09	24.28	94.8	0.00
60	24.56	14.29	8.06	6.23	22.43	91.9	0.00
70	21.91	12.75	7.88	4.87	20.45	88.8	0.00
80	19.83	11.54	7.70	3.84	18.42	85.7	0.00

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30	91.87	36.14	15.11	21.03	37.86
40	75.15	29.56	15.11	14.45	34.69
50	63.95	25.16	15.11	10.05	30.15
60	55.89	21.99	15.11	6.88	24.77
70	49.79	19.59	15.11	4.48	18.81
80	44.99	17.70	15.11	2.59	12.44
90	41.11	16.17	15.11	1.07	5.75
100	37.90	14.91	14.91	0.00	0.00
110	35.20	13.85	13.85	0.00	0.00
120	32.89	12.94	12.94	0.00	0.00

Storage: Underground cistern to be controlled by mechanical pump at set flow rate

	% of Area	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Volume Check	
100-year Water Level	4.37%	15.11	38.49	39.00	OK	
				0.51		

Subdrainage Area: R103B — 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	37.23	3.42	33.81	20.28	130.8	0.00
20	119.95	25.01	3.62	21.39	25.66	141.4	0.00
30	91.87	19.15	3.70	15.45	27.81	145.7	0.00
40	75.15	15.67	3.73	11.93	28.64	147.3	0.00
50	63.95	13.33	3.74	9.59	**28.78**	147.6	0.00
60	55.89	11.65	3.73	7.92	28.53	147.1	0.00
70	49.79	10.38	3.71	6.67	28.01	146.1	0.00
80	44.99	9.38	3.69	5.69	27.34	144.7	0.00
90	41.11	8.57	3.66	4.92	26.54	143.2	0.00
100	37.90	7.90	3.62	4.28	25.68	141.4	0.00
110	35.20	7.34	3.59	3.75	24.75	139.6	0.00
120	32.89	6.86	3.55	3.31	23.80	137.7	0.00

Storage: Roof Storage to outelt to cistern (see L103A)

	Depth (mm)	Head (m)	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Discharge Check
100-year Water Level	147.59	0.15	3.74	28.78	30.00	0.00

Subdrainage Area: L103A — Controlled - Tributary
Area (ha): 0.17
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	89.76	26.51	63.26	37.95
20	119.95	61.53	26.51	35.02	**42.02**
30	91.87	48.00	26.51	21.49	38.68
40	75.15	39.94	26.51	13.43	32.24
50	63.95	34.55	26.51	8.04	24.13
60	55.89	30.67	26.51	4.16	14.98
70	49.79	27.73	26.51	1.22	5.12
80	44.99	25.42	25.42	0.00	0.00
90	41.11	23.55	23.55	0.00	0.00
100	37.90	22.00	22.00	0.00	0.00
110	35.20	20.70	20.70	0.00	0.00
120	32.89	19.59	19.59	0.00	0.00

Storage: Underground cistern to be controlled by mechanical pump at set flow rate
Roof area R103B to outlet to cistern

	% of Area	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Volume Check	
100-year Water Level	7.66%	26.51	42.02	43.00	OK	
				0.98		

Subdrainage Area: R102E — Roof
Area (ha): 0.10 — 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	52.02	4.57	47.46	28.47	131.0	0.00
20	119.95	34.95	4.84	30.11	36.13	141.8	0.00
30	91.87	26.77	4.95	21.81	39.26	146.2	0.00
40	75.15	21.89	5.00	16.89	40.55	148.1	0.00
50	63.95	18.63	5.01	13.62	**40.87**	148.5	0.00
60	55.89	16.28	5.00	11.28	40.62	148.2	0.00
70	49.79	14.51	4.98	9.53	40.01	147.3	0.00
80	44.99	13.11	4.95	8.16	39.16	146.1	0.00
90	41.11	11.98	4.91	7.06	38.15	144.7	0.00
100	37.90	11.04	4.87	6.17	37.02	143.1	0.00
110	35.20	10.26	4.83	5.43	35.82	141.4	0.00
120	32.89	9.58	4.78	4.80	34.56	139.6	0.00

Storage: Roof Storage to outelt to cistern (see L102A)

	Depth (mm)	Head (m)	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Discharge Check
100-year Water Level	148.51	0.15	5.01	40.87	41.92	0.00

Subdrainage Area: R102D — Roof
Area (ha): 0.23 — 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	115.46	10.27	105.19	63.11	130.9	0.00
20	119.95	77.56	10.88	66.68	80.01	141.7	0.00
30	91.87	59.40	11.13	48.27	86.89	146.1	0.00
40	75.15	48.59	11.23	37.36	89.66	147.8	0.00
50	63.95	41.35	11.26	30.10	**90.29**	148.2	0.00
60	55.89	36.14	11.23	24.91	89.67	147.9	0.00
70	49.79	32.20	11.18	21.01	88.25	146.9	0.00
80	44.99	29.09	11.11	17.98	86.30	145.7	0.00

Stormwater Management Calculations

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90	18.14	10.56	7.52	3.04	16.40	82.5	0.00
100	16.75	9.75	7.34	2.40	14.41	79.4	0.00
110	15.57	9.06	7.17	1.89	12.46	76.3	0.00
120	14.56	8.47	6.97	1.51	10.87	72.7	0.00

Storage: Roof Storage to outelt to cistern (see L102A)

	Depth (mm)	Head (m)	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Discharge Check
2-year Water Level	98.71	0.10	8.44	26.75	93.04	0.00

Subdrainage Area: L102A — Controlled - Tributary
Area (ha): 0.29
C: 0.85

tc (min)	I (2 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)
10	76.81	65.58	65.58	0.00	**0.00**
20	52.03	48.36	48.36	0.00	**0.00**
30	40.04	40.03	40.03	0.00	**0.00**
40	32.86	35.04	35.04	0.00	**0.00**
50	28.04	31.69	31.69	0.00	**0.00**
60	24.56	29.27	29.27	0.00	**0.00**
70	21.91	27.43	27.43	0.00	**0.00**
80	19.83	25.99	25.99	0.00	**0.00**
90	18.14	24.81	24.81	0.00	**0.00**
100	16.75	23.84	23.84	0.00	**0.00**
110	15.57	23.02	23.02	0.00	**0.00**
120	14.56	22.32	22.32	0.00	**0.00**

Storage: Underground cistern to be controlled by mechanical pump at set flow rate
Roof areas R102D and R102E to outlet to cistern

	% of Area	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Volume Check
2-year Water Level	19.49%	65.58	0.00	57.00	OK

SUMMARY TO OUTLET

		Vrequired	Vavailable*	
Tributary Area	3.240 ha			
Total 2yr Flow to Sewer	308.6 L/s	145	792 m^3	Ok
Non-Tributary Area	0.000 ha			
Total 2yr Flow Uncontrolled	0 L/s			
Total Area	3.240 ha			
Total 2yr Flow	308.6 L/s			
Target	345.9 L/s			

Project #160402067, 1010 Somerset Street
Modified Rational Method Calculatons for Storage

90	41.11	26.58	11.03	15.55	84.00	144.2	0.00
100	37.90	24.51	10.94	13.57	81.44	142.6	0.00
110	35.20	22.76	10.84	11.93	78.71	140.9	0.00
120	32.89	21.27	10.73	10.54	75.86	139.0	0.00

Storage: Roof Storage to outelt to cistern (see L102A)

	Depth (mm)	Head (m)	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Discharge Check
100-year Water Level	148.25	0.15	11.26	90.29	93.04	0.00

Subdrainage Area: L102A — Controlled - Tributary
Area (ha): 0.29
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	162.26	67.42	94.84	**56.90**
20	119.95	114.34	67.42	46.92	56.30
30	91.87	91.38	67.42	23.96	43.13
40	75.15	77.71	67.42	10.29	24.69
50	63.95	68.56	67.42	1.14	3.41
60	55.89	61.97	61.97	0.00	0.00
70	49.79	56.97	56.97	0.00	0.00
80	44.99	53.05	53.05	0.00	0.00
90	41.11	49.88	49.88	0.00	0.00
100	37.90	47.26	47.26	0.00	0.00
110	35.20	45.05	45.05	0.00	0.00
120	32.89	43.16	43.16	0.00	0.00

Storage: Underground cistern to be controlled by mechanical pump at set flow rate
Roof areas R102D and R102E to outlet to cistern

	% of Area	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Volume Check	
100-year Water Level	19.49%	67.42	56.90	57.00	OK	100.00%
				0.10		

SUMMARY TO OUTLET

		Vrequired	Vavailable*	
Tributary Area	3.240 ha			
Total 100yr Flow to Sewer	345.9 L/s	769	792 m^3	Ok
Non-Tributary Area	0.000 ha			
Total 100yr Flow Uncontrolled	0 L/s			
Total Area	3.240 ha			
Total 100yr Flow	345.9 L/s			
Target	345.9 L/s			

E.3 Time of Concentration

Job # 160402067 - 1010 Somerset Street

Date: 7-Jan-25

PRE-DEVELOPMENT CONDITIONS
Calculation of Time of Concentration and Peak Flow

Runoff Coefficient Calculation

Area (ha)	C	Description	A x C
3.24	0.76		2.4624
3.2			2.4624

Composite C-Factor: 0.76

Diff. Elev. 3.00 m
Length 145 m (longest overland flow path)

C- factor from MTO Design Chart 1.07: Runoff Coefficients

Overland Flow Time of Concentration

Bransby Williams (C>0.40)
$tc = 0.057 \times L / (S_w^{0.2} \times A^{0.1})$

L	145	m (longest flow path)
S_w	2.1%	
A	3.2400	ha
t_c	6.4	min
	0.11	hrs

Airport (C<0.40)
$tc = [3.26 \times (1.1-C) \times L^{0.5}] / S_w^{0.33}$

L	145	m
S_w	2.1%	
C	0.76	
t_c	10	min

Worst-case T_c =	10	min
	0.17	hrs

Rational Method Calculation of Catchment Flow Rate

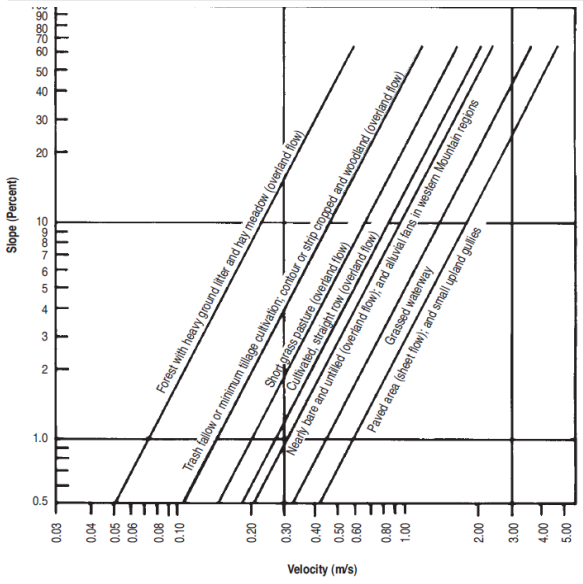
IDF Parameters, City of Ottawa 2012

Return Period	a	b	c	Intensity	Qpeak
100	1735.688	6.014	0.820	178.6	1221.3
50	1569.58	6.014	0.820	161.5	1104.5
25	1402.884	6.018	0.819	144.7	989.7
10	1174.184	6.014	0.816	122.1	835.4
5	998.071	6.053	0.814	104.2	712.7
2	732.951	6.199	0.810	76.8	525.3

Uplands Method Chart

Table 3.9 $V/S^{0.5}$ relationship for various land covers

Land Cover	$V/S^{0.5}$ (m/s)
Forest with heavy ground litter, hay meadow (overland flow)	0.6
Trash fallow or minimum tillage cultivation, contour, strip cropped woodland (overland flow)	1.5
Short grass pasture (overland flow)	2.3
Cultivated, straight row (overland flow)	2.7
Nearly bare and untilled (overland flow) or alluvial fans in Western mountain regions	3.0
Grassed waterway	4.6
Paved areas (sheet flow); small upland gullies	6.1



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