2458 Cleroux Crescent, Ottawa
Assessment of Adequacy of Public Services & Stormwater Management Report

Project # CW-02-21

City Application # D07-12-22-0144

Prepared for:

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By:

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May 2023 (updated February 2026)

Table of Contents

1. Introduction

The subject property is located at 2458 Cleroux Crescent Ottawa. The proposed work comprises of a 3-storey+underground garage stacked dwelling building with total of 17 stacked dwellings and a garage for 24 vehicles at the parking level (basement). For the purpose of this report the site is considered to run north-south. Cleroux Crescent is extending east-west along the property's north edge.

Currently the property is used as a residential with a single house with backyard and two utility sheds.

Existing services locations are known and they will be disconnected before the demolition and will be recorded in the construction diary. The area is serviced by:

- Sanitary: 250mm Concrete
- Storm: A 375 mm PVC Storm sewer (2000)
- Water: A 203 mm Ductile Iron.

The sidewalk in front of the property is at elevation between 82.41 and 82.43 m a.s.l.

2458 Cleroux Cres, Ottawa: Location

2. Public Services Capacity

This section of the report will analyze existing municipal services and the potential impact of the proposed building at 2458 Cleroux Cres. on the existing service capacity.

2.1 Water Supply

Existing building is supplied from DI 203 mm pipe and calculated current consumption is **0.20 l/sec** for the peak period.

Design Parameter	Value
Residential Average Per Unit	1.8 P/unit
Residential Average Daily Demand	280 L/d/P
Residential Maximum Daily Demand	9.5 x Average Daily *
Residential Maximum Hourly	1.5 x Maximum Daily *
Commercial Demand	2.5 L / m2 /d
Commercial Maximum Daily Demand	1.5 x Average Daily
Commercial Maximum Hourly	1.8 x Maximum Daily
Minimum Watermain Size	150mm diameter
Minimum Depth of Cover	2.4m from top of watermain to finished grade
During Peak Hourly Demand operating pressure must remain within	275kPa and 552kPa
During fire flow operating pressure must not drop below	140kPa
* Residential Max. Daily and Max. Hourly peaking factors per MOE Guidelines for Drinking-Water Systems Table 3-3 for 0 to 500 persons.	

Table 1: Water Supply Design Criteria

[1]The following are boundary conditions, HGL, for hydraulic analysis at Cleroux Cres. (zone R4) assumed to be connected to the 203 mm watermain on Cleroux Crescent (see attached PDF for location).

Scenario	Demand	
	L/min	L/s
Average Daily Demand	6.81	0.11
Max Day Demand	64.56	1.08
Peak Hour	96.98	1.62
Fire Flow Demand #1	6,300	105

Required fire flow is available at residual pressure of 31.3 psi (215.8 Kpa) and with ground elevation of 83.3 m.

[1] City of Ottawa boundary condition information is based on current operation of the city water distribution system (also see Appendix A for complete correspondence information)

Design Parameter	Anticipated Demand1 (L/sec)	Boundary Condition2 (kPa)
Average Daily Demand	**0.11**	**467.9**
Max Day + Fire Flow	**106.08**	**212.9**
Peak Hour	**1.62**	**428.7**

Ground Elevation = 83.3 m

Proposed building height is 12.1 m so the residual pressure at the top of the building will be 10.0 Kpa.

The consumption is expected to be **1.62 l/sec** for peak period.

Using Darsy-Weisbach calculation, as shown below, it was determined that 50 mm lateral would provide a flow of 1.75 l/sec at 0.89 m/s velocity and the pressure loss at the building of 0.14 bar. For calculation estimated length of the lateral is 80 m.

Calculation output

Flow medium:	Water 20 °C / liquid
Volume flow::	1.75 l/s
Weight density:	998.206 kg/m³
Dynamic Viscosity:	1001.61 10-6 kg/ms
Element of pipe:	circular
Dimensions of element:	Diameter of pipe D: 50 mm Length of pipe L: 80 m
Velocity of flow:	0.89 m/s
Reynolds number:	44412
Velocity of flow 2:	-
Reynolds number 2:	-
Flow:	turbulent
Absolute roughness:	0.0015 mm
Pipe friction number:	0.02
Resistance coefficient:	34.49
Resist.coeff.branching pipe:	-
Press.drop branch.pipe:	-
Pressure drop:	136.74 mbar 0.14 bar

Note: The pressure drop was calculated by the online calculator of www.pressure-drop.com. We can not w

Important notice: The new version of the Online-Calculator is available: www.pressure-drop.online

Do you know our software SF Pressure Drop 10.x for Excel?
Information: www.pressure-drop.com

2.2.1 Fire Flow

The FUS fire flow calculation will be used as the flow demand is higher than 9,000 l/min.

As the building is a 3-storey height, the sprinkler system is not required.

Fire protection will be provided from the nearest hydrant (Class AA) at 41.3 m distance. The second nearest hydrant (Class AA) is located south from the property at 114.1 m distance and a third hydrant (Class AA) is at distance of 195.8 m.

In accordance with Table 18.5.4.3 of ISTB-2018-02 they have combined capacity of 12,302 l/min which is sufficient for the fire protection of the proposed building.

Table 18.5.4.3 Maximum fire flow hydrant capacity

Distance to buildings[a]		Maximum capacity[b]	
(ft)	(m)	(gpm)	(L/min)
≤ 250	≤ 76	1500	5678
> 250 and ≤ 500	> 76 and ≤ 152	1000	3785
> 500 and ≤ 1000	> 152 and ≤ 305	750	2839

2458 Cleroux Cres, Ottawa: Hydrants location and distance

2.2 Sanitary Sewer

Sanitary sewer outflow for the current buildings is 0.096 l/sec (wet weather peak flow).

Design Parameter	Value
Residential Average Stacked dwelling	1.8 P/unit
Average Daily Demand	280 L/cap/day
Peaking Factor	Harmon's Peaking Factor. Max 4.0, Min 2.0
Correction Factor (City of Ottawa Tech.Bulletin ISTB-2018-01)	0.8
Commercial Space	28,000 L/ha/day
Infiltration and Inflow Allowance	0.33L/s/ha
Sanitary sewers are to be sized employing the Manning's Equation	Q =(1/n)AR2/3S1/2
Minimum Sewer Size	200mm diameter
Minimum Manning's 'n'	0.013
Minimum Depth of Cover	2.5m from crown of sewer to grade
Minimum Full Flowing Velocity	0.6m/s
Maximum Full Flowing Velocity	3.0m/s
Extracted from Sections 4 and 6 of the City of Ottawa Sewer Design Guidelines, November 2012 & Infrastructure Technical Bulletins 2018	

Table 2: Wastewater Design Criteria

The estimated outflow for the new building is **0.46 l/sec** (peak flow + wet weather). Existing municipal sewer 250 mm has a capacity of 41.77 l/sec for 0.44% slope and 80% full.

Inputs:

Pipe Diameter, d_o	250.0000	mm
Manning Roughness, n	0.0130	
Pressure slope (possibly equal to pipe slope), S_o	0.4400	% slope
Percent of (or ratio to) full depth (100% or 1 if flowing full)	80.0000	%

Results:

Flow, Q	38.5574	l/s
Velocity, v	0.9159	m/s
Velocity head, hv	0.0428	m
Flow Area, A	0.0421	m^2
Wetted Perimeter, P	0.5536	m

Hydraulic Radius	0.0760	m
Top Width, T	0.2000	m
Froude Number, F	0.64	
Shear Stress (tractive force), τ	8.6293	N/m^2

Current residual capacity of 250 mm municipal sanitary pipe is not known however, as significant area upstream is conveyed to this pipe it was assumed that at least 45% of the pipe is full (below spring line) in front of the property.

Inputs:

Pipe Diameter, d_o	250.0000	mm
Manning Roughness, n	0.0130	
Pressure slope (possibly equal to pipe slope), S_o	0.4400	% slope
Percent of (or ratio to) full depth (100% or 1 if flowing full)	45.0000	%

Results:

Flow, Q	16.4305	l/s
Velocity, v	0.7669	m/s
Velocity head, hv	0.0300	m
Flow Area, A	0.0214	m^2
Wetted Perimeter, P	0.3677	m
Hydraulic Radius	0.0583	m
Top Width, T	0.2487	m
Froude Number, F	0.83	
Shear Stress (tractive force), τ	4.8540	N/m^2

Increase for 0.46 l/sec would add 0.8% of depth in the receiving pipe so it is considered as minor increase with no potential adverse effect (back flow) and it assumed to be below the spring line.

Inputs:

Pipe Diameter, d_o	250.0000	mm
Manning Roughness, n	0.0130	
Pressure slope (possibly equal to pipe slope), S_o	0.4400	% slope
Percent of (or ratio to) full depth (100% or 1 if flowing full)	45.8000	%

Results:

Flow, Q	16.9486	l/s
Velocity, v	0.7731	m/s
Velocity head, hv	0.0305	m

Flow Area, A	0.0219	m^2
Wetted Perimeter, P	0.3717	m
Hydraulic Radius	0.0590	m
Top Width, T	0.2491	m
Froude Number, F	0.83	
Shear Stress (tractive force), τ	4.9403	N/m^2

The Manning formula was also used to assess the sewer lateral's size.. For given outflow and maximum achievable slope of 3.5% slope, the velocity in 150 mm lateral is 0.6m/sec.

Inputs: Sanitary lateral

Pipe Diameter, d_o	150.0000	mm
Manning Roughness, n	0.0130	
Pressure slope (possibly equal to pipe slope), S_o	3.5000	% slope
Percent of (or ratio to) full depth (100% or 1 if flowing full)	8.9000	%

Results:

Flow, Q	0.4654	l/s
Velocity, v	0.6006	m/s
Velocity head, hv	0.0184	m
Flow Area, A	0.0008	m^2
Wetted Perimeter, P	0.0909	m
Hydraulic Radius	0.0085	m
Top Width, T	0.0854	m
Froude Number, F	2.01	
Shear Stress (tractive force), τ	4.5819	N/m^2

Detailed calculation of water and sanitary flow is presented in Appendix A.

2.3 Site Stormwater Services

Current building and the rest of surface of the lot at 2458 Cleroux Crescent represent a typical urban site. All stormwater runoff is under uncontrolled condition for the entire site. For the purpose of protecting the municipal sewer system the City of Ottawa requires that the newly developed site must store certain amount of water on site and release it to the system under the 2-year predevelopment conditions.

Proposed stormwater retention will prevent increase of stormwater inflow into the system. The stormwater storage is proposed on the new building's flat roof. Total storage required for the 100 year event is 14.21 m^3.

In comparison to the predevelopment runoff to the front (stormwater system on Cleroux Cres.), the post-development runoff will be reduced as shown below:

Predevelopment Runoff Distribution			**Post-development Runoff Distribution**		
Uncontrolled Runoff to Front			**Uncontrolled Runoff to Front**		
2-year	3.36	l/sec	2-year	2.42	l/sec
100-year	9.77	l/sec	**100-year	7.04	l/sec

**Comment: runoff coefficient increase 25% (climate change allowance)

The post-development runoff to the rear is also reduced for 2-year storm in comparison to the predevelopment. The 100-year runoff is increased as a result of additional 25% (climate change impact correction) however, the south side (rear yard) is facing forested area where no development is planned.

Predevelopment Runoff Distribution			**Post-development Runoff Distribution**		
Uncontrolled Runoff to Rear			**Uncontrolled Runoff to Rear**		
2-year	7.61	l/sec	2-year	7.38	l/sec
100-year	17.70	l/sec	**100-year	21.45	l/sec
			****Comment:** runoff coefficient increase 25% (climate change allowance)		

The City of Ottawa allows the 2-year total runoff less the uncontrolled 100-year post development runoff to the front (into the stormwater minor system) which will be 6.66 l/sec over two roof drains, each of 3.33 l/sec maximum capacity. The storm lateral 200 mm provides this flow at 27.5% full.

The proposed side yards and grading will direct water toward the ravine on south.

Inputs: storm lateral

Pipe Diameter, d_o	200.0000	mm
Manning Roughness, n	0.0130	
Pressure slope (possibly equal to pipe slope), S_o	1.5000	% slope
Percent of (or ratio to) full depth (100% or 1 if flowing full)	27.5000	%

Results:

Flow, Q	6.6399	l/s
Velocity, v	0.9456	m/s
Velocity head, hv	0.0456	m
Flow Area, A	0.0070	m^2
Wetted Perimeter, P	0.2208	m
Hydraulic Radius	0.0318	m
Top Width, T	0.1786	m
Froude Number, F	1.52	
Shear Stress (tractive force), τ	8.0900	N/m^2

Detailed calculation is provided in Appendix A.

3. Conclusion and Recommendation

3.1 Water Supply

The consumption is expected to be **1.62 l/sec** for peak period.

Fire protection will be provided from the nearest hydrant (Class AA) at 41.3 m distance. The second nearest hydrant (Class AA) is located south from the property at 114.1 m distance and a third hydrant (Class AA) is at distance of 195.8 m.

In accordance with Table 18.5.4.3 of ISTB-2018-02 they have combined capacity of 12,302 l/min which is sufficient for the fire protection of the proposed building.

3.2 Sanitary Sewer

The estimated outflow for the new building is **0.46 l/sec** (peak flow + wet weather). Increase for 0.46 l/sec would add 0.8% of depth in the receiving pipe so it is considered as minor increase with no potential adverse effect (back flow) and it is still below the spring line.

For given outflow and minimum achievable slope of 3.5%, the velocity in 150 mm lateral is 0.6 m/sec.

3.3 Stormwater

For the purpose of protecting the municipal sewer system the City of Ottawa requires that the newly developed site must store water and release it to the system under the 2-year predevelopment conditions.

Proposed stormwater retention will prevent increase of stormwater inflow into the system. The stormwater storage is proposed on the new building's flat roof. Total storage required for the 100 year event is 14.21 m^3.

The City of Ottawa allows the 2-year total runoff less the uncontrolled 100-year post development runoff to the front (into the stormwater minor system) which will be 6.66 l/sec over two roof drains, each of 3.33 l/sec maximum capacity. The storm lateral 200 mm provides this flow at 27.5% full.

The proposed side yards and grading will direct water toward the ravine on south.

Prepared by:
Zoran Mrdja, P.Eng.

February 16, 2026

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Authorized by Professional Engineers of Ontario to provide professional services to public

Appendix A: Calculations

Water Supply Design Criteria

Design Parameter	Value
Residential Average Apartment	1.8 P/unit
Residential Average Daily Demand	350 L/d/P
Residential Maximum Daily Demand	9.5 x Average Daily *
Residential Maximum Hourly	1.5 x Maximum Daily *
Commercial Demand	2.5 L / m2 /d
Commercial Maximum Daily Demand	1.5 x Average Daily
Commercial Maximum Hourly	1.8 x Maximum Daily
Minimum Watermain Size	150mm diameter
Minimum Depth of Cover	2.4m from top of watermain to finished grade
must remain within	275kPa and 552kPa (40-80 psi; 28-56m)
During fire flow operating pressure must not drop below	140kPa (20 psi; 14 m)
* Residential Max. Daily and Max. Hourly peaking factors per MOE Guidelines for Drinking-Water Systems Table 3-3 for 0 to 500 persons.	

2458 Cleroux Cres, Ottawa
New

Domestic Demand

Type of Housing	Per / Unit	Units	Pop
Single Family	3.4	0	0
Semi-detached	2.7		0
Townhouse	2.7		0
Apartment			0
Bachelor	1.4	3	4
1 Bedroom	1.4	16	22
2 Bedroom	2.1	4	8
3 Bedroom	3.1		0
4 Bedroom	4.2	0	0

	Pop	Avg. Daily		Max Day		Peak Hour	
		m^3/d	L/sec	m^3/d	L/sec	m^3/d	L/sec
Total Domestic Demand	35	9.80	0.11	93.10	1.08	139.65	1.62

Institutional / Commercial / Industrial Demand

				Avg. Daily		Max Day		Peak Hour	
Property Type	**Unit Rate**		**Units**	m^3/d	L/sec	m^3/d	L/sec	m^3/d	L/sec
Garage	2.5	$L/m^2/d$	0	0.00	0.00	0.00	0.00	0.00	0.00
Office	75.0	$L/9.3m^2/d$	0.0	0.00	0.000	0.00	0.0000	0.00	0.0000
Restaurant*	125.0	L/seat/d							
Industrial -Light	35,000.0	L/gross ha/d							
Industrial -Heavy	55,000.0	L/gross ha/d							
Total I/C/I Demand				0.00	0.00	0.00	0.00	0.00	0.00

Total Demand	9.80	0.11	93.10	1.08	139.65	1.616

* Estimated number of seats at 1seat per $9.3m^2$

Water Demand and Boundary Conditions

Proposed Conditions

Design Parameter	Anticipated Demand[1] (L/sec)	Boundary Condition[2] (kPa)
Average Daily Demand	0.11	467.9
Max Day + Fire Flow	6,301.08	212.9
Peak Hour	1.62	428.7

[1)] Water demand calculation per Water Supply Guidelines. See Appendix B for detailed calculations.

[2)] Boundary conditions supplied by the City of Ottawa. See Appendix B for correspondence with the City.

[3)] estimated ground elevation **83.3 m**

Wastewater Design Criteria

Design Parameter	Value
Residential Average Apartment	1.8 P/unit
Average Daily Demand	280 L/cap/day
Peaking Factor	Harmon's Peaking Factor. Max 4.0, Min 2.0
Correction Factor (City of Ottawa Tech.Bulletin ISTB-2018-0	0.8
Commercial Space	28,000 L/ha/day
Infiltration and Inflow Allowance	0.28L/s/ha
Sanitary sewers are to be sized employing the Manning's Equation	$Q = (1/n)AR^{2/3}S^{1/2}$
Minimum Sewer Size	200mm diameter
Minimum Manning's 'n'	0.013
Minimum Depth of Cover	2.5m from crown of sewer to grade
Minimum Full Flowing Velocity	0.6m/s
Maximum Full Flowing Velocity	3.0m/s
Extracted from Sections 4 and 6 of the City of Ottawa Sewer Design Guidelines, November 2012.	

2458 Cleroux Cres, Ottawa
New

Sanitary Sewer Post Development Outflow

Site Area	**0.138 ha**
Extraneous Flow Allowances	
Infiltration / Inflow	**0.04558 L/s**

Domestic Contributions

Unit Type	Unit Rate	Units	**Pop**
Single Family	3.4	0	0
Semi-detached and duplex	2.7		0
Duplex	2.3		0
Townhouse	2.7		0
Apartment			
Bachelor	1.4	3	4.2
1 Bedroom	1.4	16	22.4
2 Bedroom	2.1	4	8.4
3 Bedroom	3.1	0	0
4 Bedroom	4.2	0	0
Total Population			**35**
Average Domestic Flow			**0.11 L/s**
Peaking Factor			**3.7**
Peak Domestic Flow			**0.42 L/s**

Institutional / Commercial / Industrial Contributions

Property Type	**Unit Rate**	**No. of Units**	**Avg Wastewater (L/s)**
Commercial	28,000 L/gross ha/d	0	0.0000
Office	75 L/9.3m2/d	0	0.0000
Parking (Covered)*	6 l/park.space/d	0	0.0000
Institutional	28,000 L/gross ha/d	0	0.00
Industrial - Light	35,000 L/gross ha/d	0	0.00
Industrial - Heavy	55,000 L/gross ha/d	0	0.00
Average I/C/I Flow			**0.0000**
Peak Institutional / Commercial Flow*			**0.0000**
Peak Industrial Flow**			**0.0000**
Peak I/C/I Flow			**0.0000**

Total Estimated Average Dry Weather Flow Rate	**0.1134**
Total Estimated Peak Dry Weather Flow Rate	**0.4168**
Total Estimated Peak Wet Weather Flow Rate	**0.4624**

* Ottawa Sewer Design Guidelines 2012, Appendix 4-A.5
Ottawa TechBulletin ISTB-2018-01 Section 4.4.1 Page 4.5
**Use Apendix 4B diagram

2458 Cleroux Cres, Ottawa
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FUS Fire Flow Calculations

Project: 2458 Cleroux Cres., Ottawa

Calculations Based on 1999 Publication "Water Supply for Public

Fire Protection " by Fire Underwriters' Survey (FUS)

Fire Flow Calculation #: 1

Date: **2026-02-16**

Building Type/Description/Name: Apartment building

Data input by: Zoran Mrdja, P.Eng.

Table A: Fire Underwriters Survey Determination of Required Fire Flow - Long Method

Step	Task	Term	Options	Multiplier Associated with Option	Choose:	Value Used	Unit	Total Fire Flow (L/min)
1	Choose Frame Used for Construction of Unit	Framing Material						
		Coefficient related to type of construction (C)	Wood Frame	1.50	Ordinary Construction	1.00		
			Ordinary construction	1.00				
			Non-combustible construction	0.80				
			Fire resistive construction (< 2 hrs)	0.70				
			Fire resistive construction (> 2 hrs)	0.60				
2	Choose Type of Housing (if TH, Enter Number of Units Per TH Block)	Floor Space Area						
		Type of Housing	Single Family	1	Other (Comm, ind)	1	Units	
			Townhouse - indicate # of units	1				
			Other (Comm, Ind, etc.)	1				
2.2	# of Storeys	Number of Floors/ Storeys in the Unit (do not include basement):			3	3	Storeys	
3	Enter Ground Floor Area of One Unit	Enter Ground Floor Area (A) of One Unit Only :			0	1650	Area in Square Meters (m^2)	
		Measurement Units	Square Feet (ft^2)	0.093	Square Metres (m2)			
			Square Metres (m^2)	550				
			Hectares (ha)	10000				
4	Obtain Required Fire Flow without Reductions	Required Fire Flow(without reductions or increases per FUS) (F = 220 * C * √A) Round to nearest 1000L/min						8,936
5	Apply Factors Affecting Burning	Reductions/Increases Due to Factors Affecting Burning						
5.1	Choose Combustibility of Building Contents	Occupancy content hazard reduction or surcharge	Non-combustible	-0.25	Non-combustible	-0.25	N/A	-2,234
			Limited combustible	-0.15				
			Combustible	0.00				
			Free burning	0.15				
			Rapid burning	0.25				
5.2	Choose Reduction Due to Presence of Sprinklers	Sprinkler reduction	Complete Automatic Sprinkler Protection	-0.3	None	0.00	N/A	0
			None	0				
5.3	Choose Separation Distance Between Units	Exposure Distance Between Units	North Side	10.1-20 m	0.15	0.65	m	5,809
			East Side	0-3 m	0.25			
			South Side	30.1-45 m	0.05			
			West Side	3.1-10 m	0.20			
6	Obtain Required Fire Flow, Duration & Volume	Total Required Fire Flow, rounded to nearest 1000 L/min, with max/min limits applied:						12,000
		Total Required Fire Flow (above) in L/s:						200
		Required Duration of Fire Flow (hrs)						2.00
		Required Volume of Fire Flow (m^3)						1440

Note: The most current FUS document should be referenced before design to ensure that the above figures are consistent with the intent of the Guideline

Legend	
	Drop down menu - choose option, or enter value.
	No Information, No input required.

Note:

The most current FUS document should be referenced before design to ensure that the above figures are consistent with the intent of the Guideline.
Fire protection will be provided from the nearest hydrant (Class AA) at 41.3 m distance. The second nearest hydrant (Class AA) is located south from the property at 114.1 m distance and a third hydrant (Class AA) is at distance of 195.8 m.
In accordance with Table 18.5.4.3 of ISTB-2018-02 they have combined capacity of **12,302 l/min**

Project Number: CW-02-21 2458 Cleroux Cres. Ottawa

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Architecture
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Consulting

PRE-DEVELOPMENT (all unclontrolled)

The pre-development time of concentration is 10 minutes

where:

$I_2 = 732.951 / (Tc + 6.199)^{0.810}$ $I_{100} = 1735.688 / (Tc + 6.014)^{0.820}$

$I_2 =$ **76.8 mm/hr** $I_{100} =$ **178.6 mm/hr**

Surface Type	ID	Area (ha)	Percent of total Area	C	A X C (ha)
Vegetation area	A1	0.0360	25.8%	0.30	0.011
Green space	A2	0.0640	45.9%	0.40	0.026
Shed	A3	0.0035	2.5%	0.90	0.003
Shed2	A4	0.0008	0.6%	0.90	0.001
House	A5	0.0142	10.2%	0.90	0.013
Porch	A6	0.0030	2.2%	0.90	0.003
Green space	A7	0.0010	0.7%	0.40	0.000
Green space	A8	0.0110	7.9%	0.40	0.004
Driveway	A9	0.0040	2.9%	0.80	0.003
Wood ramp	A10	0.0020	1.4%	0.50	0.001
TOTAL		0.1395	100.0%		0.065
Weighted C =					0.46

0.46 Actual C factor

$Q_{2pre} = (2.78)*(C)*(I_5)*(A)$
$Q_{2pre} =$ 2.78 x 0.46 x 76.8 x 0.1395
$Q_{2pre} =$ 13.70 L/s

$Q_{100pre} = (2.78)*(C)*(I_{100})*(A)$
$Q_{100pre} =$ 2.78 x 0.58 x 178.6 x 0.1395
$Q_{100pre} =$ 39.83 L/s

C=0.5 for predevlopment (City of Ottawa)

POST-DEVELOPMENT (UNCONTROLLED RUNOFF)

The post-development time of concentration is 10 minutes

where:

$I_2 = 732.951 / (Tc + 6.199)^{0.810}$ $I_{100} = 1735.688 / (Tc + 6.014)^{0.820}$

$I_2 =$ **76.8 mm/hr** $I_{100} =$ **178.6 mm/hr**

Surface Type	ID	Area (ha)	Percent of total Area	C	A X C (ha)
Landscape A2		0.072000	85.7%	0.45	0.032
Landscape A3		0.012000	14.3%	0.70	0.008
TOTAL		0.0840	100.0%		0.041
Weighted C =					0.49

0.49 Actual C factor

$Q_{2post} = (2.78)*(C)*(I_5)*(A)$
$Q_{2post} =$ 2.78 x 0.49 x 76.8 x 0.0840
$Q_{2post} =$ 8.79 L/s

$Q_{100post} = (2.78)*(C)*(I_{100})*(A)$
$Q_{100post} =$ 2.78 x 0.61 x 178.6 x 0.0840
$Q_{100post} =$ 25.55 L/s

Post-development 100-year C factor increased for 25%

Project Number: CW-02-21 2458 Cleroux Cres. Ottawa

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PRE-DEVELOPMENT CONTROLLED RUNOFF

The pre-development time of concentration is 10 minutes

where:

$I_2 = 732.951 / (Tc + 6.199)^{0.810}$ $I_{100} = 1735.688 / (Tc + 6.014)^{0.820}$

$I_2 =$ **76.8 mm/hr** $I_{100} =$ **178.6 mm/hr**

Surface Type	ID	Area (ha)	Percent of total Area	C	A X C (ha)
Bus Stop	A1	0.00000	0.0%	0.95	0.000
Parking	A2	0.00000	0.0%	0.95	0.000
Green area	A3	0.00000	0.0%	0.70	0.000
TOTAL		0.0000	0.0%		0.000
Weighted C =					0.00

C=0.6 used for predevelopment calculation (City of Ottawa requirement)

$Q_{2pre} = (2.78)*(C)*(I_5)*(A)$
$Q_{2pre} =$ 2.78 x 0.00 x 76.8 x 0.0000
$Q_{2pre} =$ 0.00 L/s

$Q_{100pre} = (2.78)*(C)*(I_{100})*(A)$
$Q_{100pre} =$ 2.78 x 0.00 x 178.6 x 0.0000
$Q_{100pre} =$ 0.00 L/s

POST-DEVELOPMENT (CONTROLLED RUNOFF)

The post-development time of concentration is 10 minutes

where:

$I_2 = 732.951 / (Tc + 6.199)^{0.810}$ $I_{100} = 1735.688 / (Tc + 6.014)^{0.820}$

$I_2 =$ **76.8 mm/hr** $I_{100} =$ **178.6 mm/hr**

Surface Type	ID	Area (ha)	Percent of total Area	C	A X C (ha)
Building	A1	0.05550	0.0%	0.95	0.053
TOTAL		0.05550	0.0%		0.053
Weighted C =					0.95

Post-development 100-year C factor increased for 25%

$Q_{2post} = (2.78)*(C)*(I_5)*(A)$
$Q_{2post} =$ 2.78 x 0.95 x 76.8 x 0.0555
$Q_{2post} =$ 11.26 L/s

$Q_{100post} = (2.78)*(C)*(I_{100})*(A)$
$Q_{100post} =$ 2.78 x 1.00 x 178.6 x 0.0555
$Q_{100post} =$ 27.56 L/s

Project Number: CW-02-21 2458 Cleroux Cres. Ottawa

PREDEVELOPMENT RUNOFF DISTRIBUTION

UNCONTROLLED TO REAR

The pre-development time of concentration is 10 minutes

where:

$I_2 = 732.951 / (Tc + 6.199)^{0.810}$ $I_{100} = 1735.688 / (Tc + 6.014)^{0.820}$

$I_2 =$ **76.8 mm/hr** $I_{100} =$ **178.6 mm/hr**

Surface Type	ID	Area (ha)	Percent of total Area	C	A X C (ha)
Vegetation area	A1	0.0360	32.3%	0.25	0.009
Green space	A2	0.0640	57.5%	0.25	0.016
Shed	A3	0.0035	3.1%	0.90	0.003
Shed2	A4	0.0008	0.7%	0.90	0.001
House	A5	0.0071	6.4%	0.90	0.006
TOTAL		0.11140	100.0%		0.035
Weighted C =					0.32

0.32 Actual C factor

$Q_{2pre} = (2.78)*(C)*(I_5)*(A)$

$Q_{2pre} = 2.78 \times 0.32 \times 76.8 \times 0.1114$

$Q_{2pre} = 7.61$ L/s

$Q_{100pre} = (2.78)*(C)*(I_{100})*(A)$

$Q_{100pre} = 2.78 \times 0.32 \times 178.6 \times 0.1114$

$Q_{100pre} = 17.70$ L/s

Note: Maximum C=0.5 for predevlopment (City of Ottawa) * house's 1/2 of the roof drains to the rear yard

UNCONTROLLED TO FRONT

The pre-development time of concentration is 10 minutes

where:

$I_2 = 732.951 / (Tc + 6.199)^{0.810}$ $I_{100} = 1735.688 / (Tc + 6.014)^{0.820}$

$I_2 =$ **76.8 mm/hr** $I_{100} =$ **178.6 mm/hr**

Surface Type	ID	Area (ha)	Percent of total Area	C	A X C (ha)
House*	A5	0.0071	6.4%	0.90	0.006
Porch	A6	0.0030	2.7%	0.75	0.002
Green space	A7	0.0010	0.9%	0.25	0.000
Green space	A8	0.0110	9.9%	0.25	0.003
Driveway	A9	0.0040	3.6%	0.80	0.003
Wood ramp	A10	0.0020	1.8%	0.40	0.001
TOTAL		0.0281	25.2%		0.016
Weighted C =					0.56

0.56 Actual C factor

$Q_{2pre} = (2.78)*(C)*(I_5)*(A)$

$Q_{2pre} = 2.78 \times 0.56 \times 76.8 \times 0.0281$

$Q_{2pre} = 3.36$ L/s

$Q_{100pre} = (2.78)*(C)*(I_{100})*(A)$

$Q_{100pre} = 2.78 \times 0.70 \times 178.6 \times 0.0281$

$Q_{100pre} = 9.77$ L/s

Note: * house's 1/2 of the roof drains toward the street

Project Number: CW-02-21 2458 Cleroux Cres. Ottawa

POST-DEVELOPMENT RUNOFF DISTRIBUTION

ARCH-NOVA DESIGN INC.
Architecture
Engineering
Consulting

UNCONTROLLED TO REAR

The post-development time of concentration is 10 minutes

where:

$I_2 = 732.951 / (Tc + 6.199)^{0.810}$ $I_{100} = 1735.688 / (Tc + 6.014)^{0.820}$

$I_2 =$ **76.8 mm/hr** $I_{100} =$ **178.6 mm/hr**

Surface Type	ID	Area (ha)	Percent of total Area	C	A X C (ha)
Landscape 1	A2	0.036000	50.0%	0.25	0.009
Landscape 1	A2	0.036000	50.0%	0.70	0.025
TOTAL		0.0720	100.0%		0.034
Weighted C =					0.48

0.48 Actual C factor

$Q_{2post} = (2.78)*(C)*(I_5)*(A)$

$Q_{2post} =$ 2.78 x 0.48 x 76.8 x 0.0720

$Q_{2post} =$ 7.38 L/s

$Q_{100post} = (2.78)*(C)*(I_{100})*(A)$

$Q_{100post} =$ 2.78 x 0.60 x 178.6 x 0.0720

$Q_{100post} =$ 21.45 L/s

Post-development 100-year C factor increased for 25%

UNCONTROLLED TO FRONT

The post-development time of concentration is 10 minutes

where:

$I_2 = 732.951 / (Tc + 6.199)^{0.810}$ $I_{100} = 1735.688 / (Tc + 6.014)^{0.820}$

$I_2 =$ **76.8 mm/hr** $I_{100} =$ **178.6 mm/hr**

Surface Type	ID	Area (ha)	Percent of total Area	C	A X C (ha)
Landscape 2		0.016200	22.5%	0.70	0.011
TOTAL		0.0162	22.5%		0.011
Weighted C =					0.70

0.70 Actual C factor

$Q_{2post} = (2.78)*(C)*(I_5)*(A)$

$Q_{2post} =$ 2.78 x 0.70 x 76.8 x 0.0162

$Q_{2post} =$ 2.42 L/s

$Q_{100post} = (2.78)*(C)*(I_{100})*(A)$

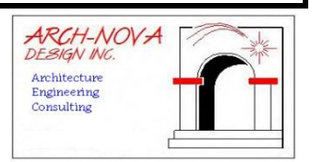
$Q_{100post} =$ 2.78 x 0.88 x 178.6 x 0.0162

$Q_{100post} =$ 7.04 L/s

Post-development 100-year C factor increased for 25%

ALLOWABLE RUNOFF SUMMARY

Predevelopment Runoff:			Predevelopment Runoff Distribution			Post-development Runoff Distribution			Comments
Uncontrolled Runoff			**Uncontrolled Runoff to Rear**			**Uncontrolled Runoff to Rear**			
2-year	13.70	l/sec	2-year	7.61	l/sec	2-year	7.38	l/sec	Runoff reduced
100-year	39.83	l/sec	100-year	17.70	l/sec	**100-year	21.45	l/sec	Runoff increased (see Comment**)
Controlled Runoff:			**Uncontrolled Runoff to Front**			**Unontrolled Runoff to Front**			
2-year	0.00	l/sec	2-year	3.36	l/sec	2-year	2.42	l/sec	Runoff reduced
100-year	0.00	l/sec	100-year	9.77	l/sec	**100-year	7.04	l/sec	Runoff increased (see Comment**)
Postdevelopment Runoff:						**Comment:** runoff coefficient increase 25% (climate change allowance)			
Uncontrolled Runoff									
2-year	8.79	l/sec							
100-year	25.55	l/sec							
Controlled Runoff:									
2-year	11.26	l/sec							
100-year	27.56	l/sec							
Controlled allowable runoff									
Allowable Runoff:									
100-year*	6.66	l/sec							
*__Comment: C__ity allows 2 year pre-development total runoff less uncontrolled 100 year postdevelopment runoff to the front.									



Storage Volumes (2-Year Storm)

2458 Cleroux Cres. Ottawa

Tc = 10 (mins)
C_{AVG} = 1.00 (dimmensionless)
Area = 0.056 (hectares)
Storm = 2 (year)
Release Rate = 6.66 (L/sec)
Time Interval = 5 (mins)

Duration (min)	Rainfall Intensity (mm/hr)	Peak Flow (L/sec)	Release Rate (L/sec)	Storage Rate (L/sec)	Storage (m^3)
1	148	2.3	6.66		
6	97	8.9	6.66	2.28	0.82
11	73	11.3	6.66	4.63	3.05
16	60	9.2	6.66	2.52	2.42
21	50	7.8	6.66	1.13	1.42
26	44	6.8	6.66	0.13	0.20
31	39	6.0	6.66	-0.62	-1.15
36	35	5.5	6.66	-1.21	-2.60
41	32	5.0	6.66	-1.68	-4.13
46	30	4.6	6.66	-2.07	-5.71
51	28	4.3	6.66	-2.40	-7.34
56	26	4.0	6.66	-2.68	-9.00
61	24	3.7	6.66	-2.92	-10.68
66	23	3.5	6.66	-3.13	-12.40
71	22	3.3	6.66	-3.32	-14.13
76	21	3.2	6.66	-3.48	-15.88
81	20	3.0	6.66	-3.63	-17.65
86	19	2.9	6.66	-3.77	-19.43
91	18	2.8	6.66	-3.89	-21.22
96	17	2.7	6.66	-4.00	-23.02
101	17	2.6	6.66	-4.10	-24.84
106	16	2.5	6.66	-4.19	-26.66
111	15	2.4	6.66	-4.28	-28.48
116	15	2.3	6.66	-4.36	-30.32
121	14	2.2	6.66	-4.43	-32.16
126	14	2.2	6.66	-4.50	-34.01
131	14	2.1	6.66	-4.56	-35.86
136	13.2	2.0	6.66	-4.62	-37.72

Notes

1) For a storm duration that is less than the time of concentration the peak flow is equal to the product of 2.78CIA and the ratio of the storm duration to the time of concentration.

2) Rainfall Intensity, I = 732.951 / (Tc + 6.199)^0.810 (2 year, City of Ottawa)
3) Peak Flow = Duration/Tc x 2.78 x C x I x A (Duration < Tc)
4) Peak Flow = 2.78 x C x I x A (Duration > Tc)
5) Storage = Duration x Storage Rate

Storage Volumes (100-Year Storm)

Tc = 10 (mins)
C_{AVG} = 1.00 (dimmensionless)
Area = 0.056 (hectares)
Storm = 100 (year)
Release Rate = 6.66 (L/sec)
Time Interval = 5 (mins)

Duration (min)	Rainfall Intensity (mm/hr)	Peak Flow (L/sec)	Release Rate (L/sec)	Storage Rate (L/sec)	Storage (m^3)
1	351	5.4	6.66		
6	226	20.9	6.66	14.26	5.13
11	170	26.2	6.66	19.55	12.90
16	138	21.2	6.66	14.56	13.98
21	116	17.9	6.66	11.28	14.21
26	101	15.6	6.66	8.95	13.96
31	90	13.9	6.66	7.20	13.39
36	81	12.5	6.66	5.83	12.59
41	74	11.4	6.66	4.73	11.63
46	68	10.5	6.66	3.82	10.55
51	63	9.7	6.66	3.06	9.37
56	59	9.1	6.66	2.41	8.11
61	55	8.5	6.66	1.86	6.79
66	52	8.0	6.66	1.37	5.42
71	49	7.6	6.66	0.94	3.99
76	47	7.2	6.66	0.56	2.53
81	45	6.9	6.66	0.21	1.04
86	43	6.6	6.66	-0.09	-0.49
91	41	6.3	6.66	-0.37	-2.04
96	39	6.0	6.66	-0.63	-3.61
101	38	5.8	6.66	-0.86	-5.21
106	36	5.6	6.66	-1.07	-6.82
111	35	5.4	6.66	-1.27	-8.45
116	34	5.2	6.66	-1.45	-10.10
121	33	5.0	6.66	-1.62	-11.76
126	32	4.9	6.66	-1.78	-13.44
131	31	4.7	6.66	-1.92	-15.12
136	30	4.6	6.66	-2.06	-16.82

Notes

1) For a storm duration that is less than the time of concentration the peak flow is equal to the product of 2.78CIA and the ratio of the storm duration to the time of concentration.

2) Rainfall Intensity, I = 1735.688 / (Tc + 6.014)^0.820 (100 year, City of Ottawa)
3) Peak Flow = Duration/Tc x 2.78 x C x I x A (Duration < Tc)
4) Peak Flow = 2.78 x C x I x A (Duration > Tc)
5) Storage = Duration x Storage Rate

Storage Requirements

2-year **3.05 m^3**

100-year **14.21 m^3**

Surface Type	ID	Area (ha)	Percent of total Area	Required Storage 2 year	Required Storage 100 year	Max Allowed Drain Outflow l/s	Max Allowed Drain Outflow GPM
Roof	**A1**	0.0278	50.0%	1.53	7.11	3.33	52.80
Roof	**A2**	0.0278	50.0%	1.53	7.11	3.33	52.80
TOTAL		0.0555	100.0%	3.05	14.21	6.66	105.60

Stage-Storage

Roof A1 (Drain 1)			Roof A2 (Drain 2)		
Depth m	**Area** m^2	**Volume** m^3	**Depth** m	**Area** m^2	**Volume** m^3
0.030	55.00	0.55	0.030	55.00	0.55
0.040	70.00	0.93	0.040	70.00	0.93
0.05	**90.00**	**1.50**	**0.05**	**90.00**	**1.50**
0.077	**277.00**	**7.11**	**0.077**	**277.00**	**7.11**

Legend:

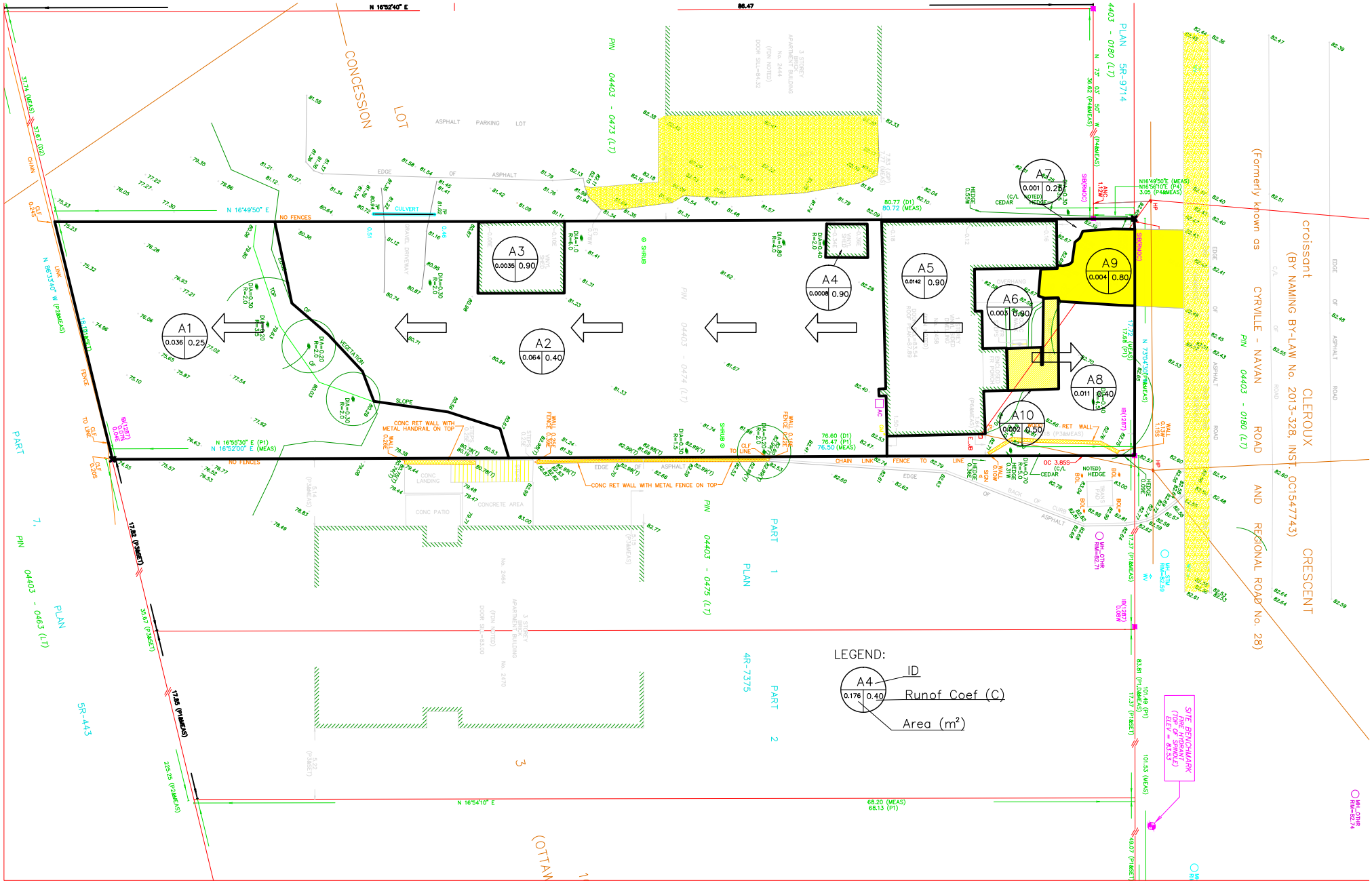
data for 2-year event
data for 100-year event

.

Notes:

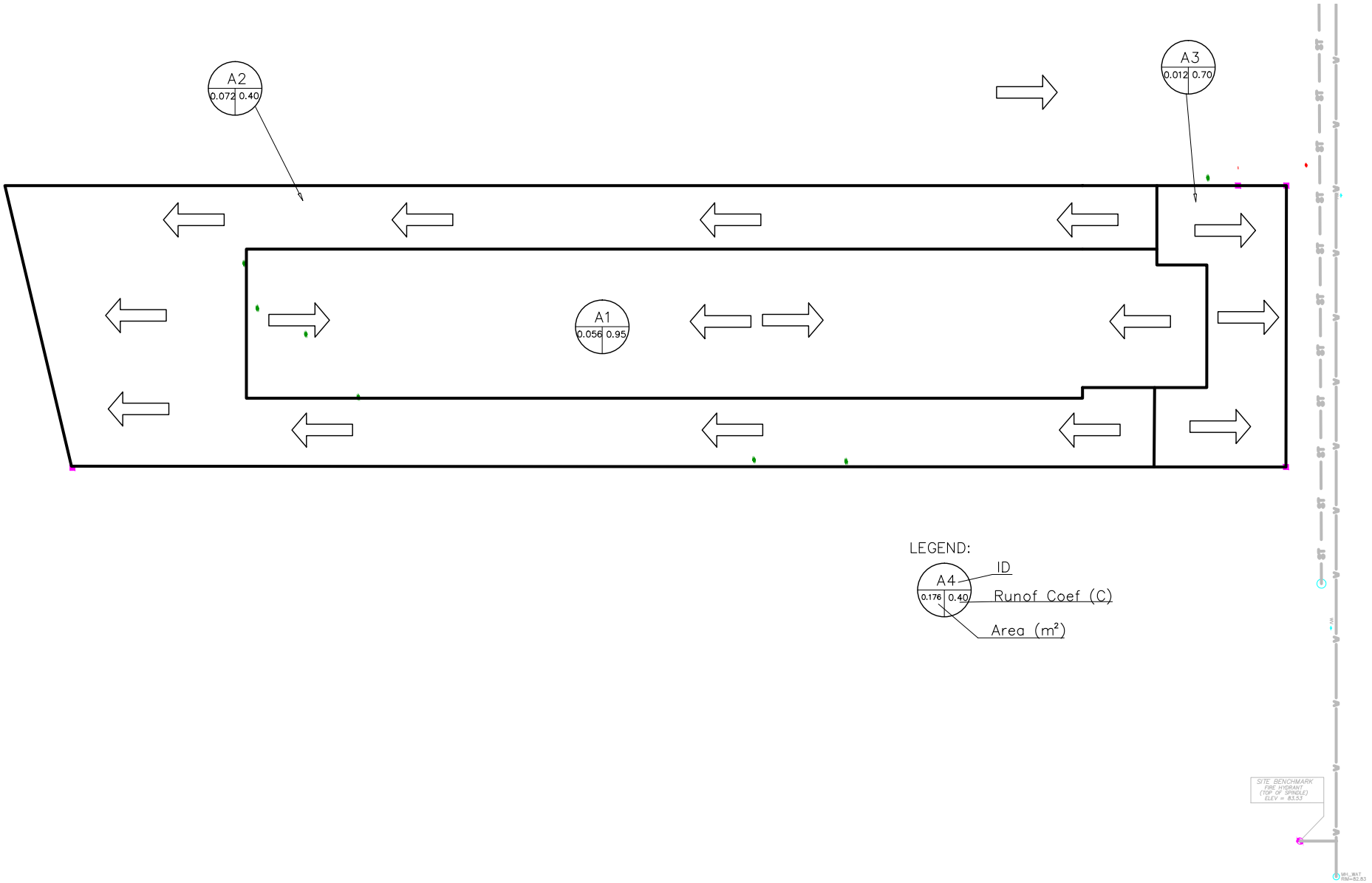
Roof drains with controlled flow to be specified by manufacturer using the allowable flow rates presented in this chart

ARCH-NOVA DESIGN INC.
Architecture
Engineering
Consulting



2458 CLEROUX CRES
SWM PREDEVELOPMENT

ARCH-NOVA Design Inc.
45 Banner Road NEPEAN ON K2H 8X5
613-702-3403 contact@archnova.ca



2458 CLEROUX CRES
SWM POSTDEVELOPMENT

ARCH-NOVA Design Inc.
45 Banner Road NEPEAN ON K2H 8X5
613-702-3403 contact@archnova.ca

Manning Formula Uniform Pipe Flow at Given Slope and Depth

2458 Cleroux Cres, Ottawa

Inputs: sanitary lateral

Pipe Diameter, d_o	150.0000	mm
Manning Roughness, n	0.0130	
Pressure slope (possibly equal to pipe slope), S_o	3.5000	% slope
Percent of (or ratio to) full depth (100% or 1 if flowing full)	8.9000	%

Results:

Flow, Q	0.4654	l/s
Velocity, v	0.6006	m/s
Velocity head, hv	0.0184	m
Flow Area, A	0.0008	m^2
Wetted Perimeter, P	0.0909	m
Hydraulic Radius	0.0085	m
Top Width, T	0.0854	m
Froude Number, F	2.01	
Shear Stress (tractive force), τ	4.5819	N/m^2

Manning Formula Uniform Pipe Flow at Given Slope and Depth

2458 Cleroux Cres, Ottawa

Inputs: storm lateral

Pipe Diameter, d_o	200.0000	mm
Manning Roughness, n	0.0130	
Pressure slope (possibly equal to pipe slope), S_o	1.5000	% slope
Percent of (or ratio to) full depth (100% or 1 if flowing full)	27.5000	%

Results:

Flow, Q	6.6399	l/s
Velocity, v	0.9456	m/s
Velocity head, hv	0.0456	m
Flow Area, A	0.0070	m^2
Wetted Perimeter, P	0.2208	m
Hydraulic Radius	0.0318	m
Top Width, T	0.1786	m
Froude Number, F	1.52	
Shear Stress (tractive force), τ	8.0900	N/m^2

Site Plan Pre- Application Consultation Notes

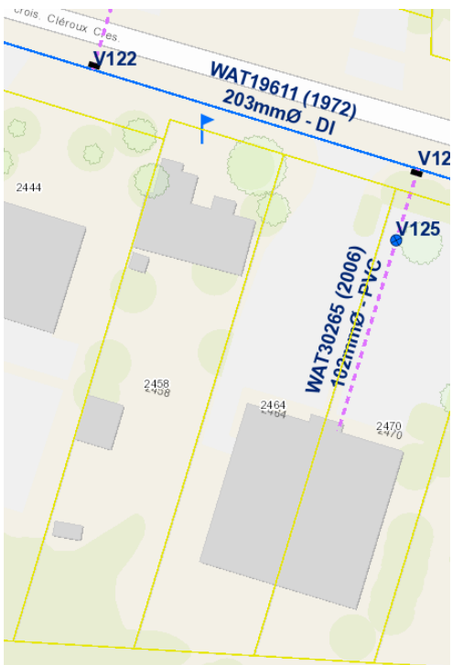
Date: Monday, March 18, 2021
Site Location: 2458 Cleroux Croissant
Type of Development: ☒ **Residential (**☐ **townhomes,** ☐ **stacked,** ☐ **singles,** ☒ **apartments),** ☐ **Office Space,** ☐ **Commercial,** ☐ **Retail,** ☐ **Institutional,** ☐ **Industrial, Other:** N/A

Infrastructure

Water

Existing public services:

- Cleroux Crossiant – 203 mm Ductile Iron



Watermain Frontage Fees to be paid ($190.00 per metre) on Woodroffe Avenue ☒ **Yes** ☐ **No**

Boundary conditions:
Civil consultant must request boundary conditions from the City's assigned Project Manager prior to first submission.

- Water boundary condition requests must include the location of the service(s) and the expected loads required by the proposed developments. Please provide all the following information:
  - Location of service(s)
  - Type of development and the amount of fire flow required (as per FUS, 1999)
  - Average daily demand: ___ L/s
  - Maximum daily demand: ___ L/s
  - Maximum hourly daily demand: ___ L/s
- Fire protection (Fire demand, Hydrant Locations)
- Please submit sanitary demands with the water boundary conditions to identify any capacity constraints at the local pumping station

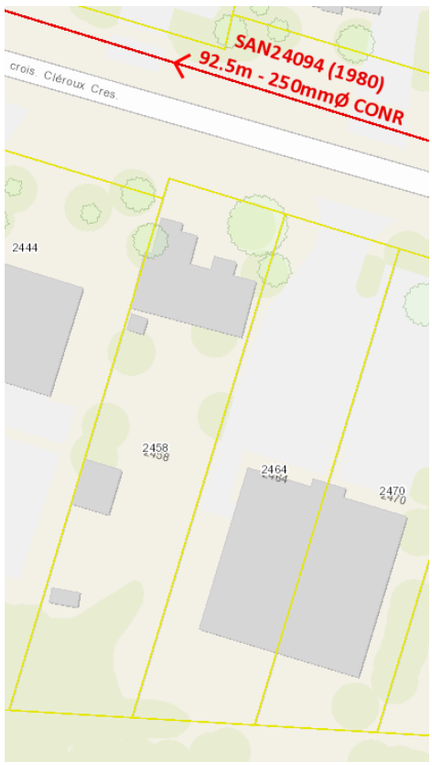
General comments

- Service areas with a basic demand greater than 50 m^3/day shall be connected with a minimum of two water services, separated by an isolation valve, to avoid creation of vulnerable service area.
- A District Metering Area Chamber (DMA) is required for services 150mm or greater in diameter.

Sanitary Sewer

Existing public services:

- Cleroux Crossiant – 250mm Concrete



Is a monitoring manhole required on private property? ☒ **Yes** ☐ **No**

General comments

- Please submit sanitary demands with the water boundary conditions to identify any capacity constraints at the local pumping station.
- For concrete sewer pipe, maintenance holes shall be installed when the service is greater than 50% of the diameter of the mainline concrete pipe.

Storm Sewer

Existing public services:

- Cleroux Crossiant – 375mm PVC

General comments

- Ensure that the proposed drive ramp entrance to the underground parking garage is protected from the major overland flow route.
    - A minimum freeboard elevation of 350mm from highpoint of the ramp to the street spill elevation.
    - A minimum freeboard elevation of 300mm from the invert of the ramp drain to the 100 year HGL of the storm sewer.
    - In general conformity of City of Ottawa Standard S17.
- A separate storm service connection is required for the ramp drain and the foundation drain

Stormwater Management

Quality Control:

- Rideau Valley Conservation Authority to confirm quality control requirements.

Quantity Control:

- Site is located within the Mud (Green's) Creek Area Subwatershed Study Area draining to the Ottawa River
- Time of concentration (Tc): Tc = pre-development; maximum Tc = 10 min
- Allowable run-off coefficient C = 0.5
- Allowable flowrate: Allowable flowrate: Control the 100-year storm events to the 2-year storm event.

General Service Design Comments

- During the pre-consultation meeting there was a discussion about the servicing the units through a common corridor. Building Code Services is responsible for plumbing within the building and should be consulted for plumbing and fire suppression inquires. BuildingPermits@ottawa.ca
- Existing sewer or watermains that are not reused must be decommissioned as per City Standards.
- The City of Ottawa Standard Detail Drawings should be referenced where possible for all work within the Public Right-of-Way.

Other

Capital Works Projects within proximity to application? ☐ **Yes** ☒ **No**

References and Resources

- As per section 53 of the Professional Engineers Act, O. Reg 941/40, R.S.O. 1990, all documents prepared by engineers must be signed and dated on the seal.
- All required plans & reports are to be provided in *.pdf format (at application submission and for any, and all, re-submissions)
- Please find relevant City of Ottawa Links to Preparing Studies and Plans below: https://ottawa.ca/en/city-hall/planning-and-development/information-developers/development-application-review-process/development-application-submission/guide-preparing-studies-and-plans#standards-policies-and-guidelines
- To request City of Ottawa plan(s) or report information please contact the City of Ottawa Information Centre:
  InformationCentre@ottawa.ca<mailto:InformationCentre@ottawa.ca>
  (613) 580-2424 ext. 44455
- geoOttawa
  http://maps.ottawa.ca/geoOttawa/

SITE PLAN APPLICATION – Municipal servicing

For information on preparing required studies and plans refer to:
http://ottawa.ca/en/development-application-review-process-0/guide-preparing-studies-and-plans

S/A	Number of copies	ENGINEERING		S/A	Number of copies
S		1. Site Servicing Plan	2. Site Servicing Brief	S	
S		3. Grade Control and Drainage Plan	4. Geotechnical Study	S	
		5. Composite Utility Plan	6. Groundwater Impact Study		
		7. Servicing Options Report	8. Wellhead Protection Study		
		9. Community Transportation Study and/or Transportation Impact Study / Brief	10. Erosion and Sediment Control Plan / Brief	S	
S		11. Storm water Management Brief	12. Hydro-geological and Terrain Analysis		
		13. Water main Analysis	14. Noise / Vibration Study	S	
		15. Roadway Modification Design Plan	16. Confederation Line Proximity Study		

It is important to note that the need for additional studies and plans may result during application review. If following the submission of your application, it is determined that material that is not identified in this checklist is required to achieve complete application status, in accordance with the Planning Act and Official Plan requirements, City Planning will notify you of outstanding material required within the required 30 day period. Mandatory pre-application consultation will not shorten the City's standard processing timelines, or guarantee that an application will be approved. It is intended to help educate and inform the applicant about submission requirements as well as municipal processes, policies, and key issues in advance of submitting a formal development application. This list is valid for one year following the meeting date. If the application is not submitted within this timeframe the applicant must again pre-consult with the City.

Notes:

4. Geotechnical Study / Slope Stability Study – required as per Official Plan section 4.8.3. All site plan applications need to demonstrate the soils are suitable for development. A Slope Stability Study may be required with unique circumstances (Schedule K or topography may define slope stability concerns).

10. Erosion and Sediment Control Plan – required with all site plan applications as per Official Plan section 4.7.3.

11. Stormwater Management Report/Brief - required with all site plan applications as per Official Plan section 4.7.6.

zoran@archnova.ca

From: Rasool, Rubina <Rubina.Rasool@ottawa.ca>
Sent: August 20, 2021 3:36 PM
To: zoran@archnova.ca
Subject: RE: 2458 Cleroux Cres: Boundary Codnitions
Attachments: 2458 Cleroux Cres_20August2021.docx

Good afternoon,

Please find attached the water boundary conditions for the proposed development.

Have a good weekend.

Rubina

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From: zoran@archnova.ca <zoran@archnova.ca>
Sent: August 03, 2021 7:41 PM
To: Rasool, Rubina <Rubina.Rasool@ottawa.ca>
Subject: 2458 Cleroux Cres: Boundary Codnitions

Could you please provide the boundary conditions for the location of 2458 Cleroux Cres., Ottawa?
Following are the initial information:

1. Type of development: 3storey+covered garage, 20 units building.
2. Fire flow required: 217 l/sec (FUS); 163.98 (OBC); nearest hydrant distance 38.4 m
3. Average Daily Demand: 0.12 l/sec
4. Maximum Hourly Demand: 1.75 l/Sec
5. Maximum Daily Demand: 1.16 l/sec

Attached are calculation sheets, image of nearest hydrant distance (from GeoOttawa) and the site plan of proposed development.
Regards,

Zoran Mrdja, P.Eng., FEC

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Boundary Conditions
2458 Cleroux Crescent

Provided Information

Scenario	Demand	
	L/min	L/s
Average Daily Demand	7	0.12
Maximum Daily Demand	70	1.16
Peak Hour	105	1.75
Fire Flow Demand #1	13,000	216.67

Location

Results

Connection 1 – Cleroux Cres.

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	131.0	67.7
Peak Hour	127.0	62.1
Max Day plus Fire 1	105.3	31.3

Ground Elevation = 83.3 m

Notes

1. A second connection to the watermain is recommended to decrease vulnerability of the water system in case of breaks.

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.