Stormwater Management Report

239 Dundas Street West, Belleville, ON

March 2026

WSE CONSULTING INC.

1.0 INTRODUCTION

WSE was retained to complete a stormwater report to be included with the detailed site plan drawing in support of the requested site plan approval for 239 Dundas St. W in the City of Belleville, Ontario.

The purpose of the report is to summarize the stormwater drainage requirements for the proposed development.

2.0 SITE DESCRIPTION

2.1 Existing Conditions

The parcel of land is approximately 0.37 hectares (ha), and is bounded to the east by existing residential and west by parkland, the north by Dundas St. and to the south by CP rail. A storm drainage outlet and ditch exists along the west property line currently receiving all site drainage.

The property currently has a single family dwelling on it. A site location plan is attached to this report as **Figure 1.**

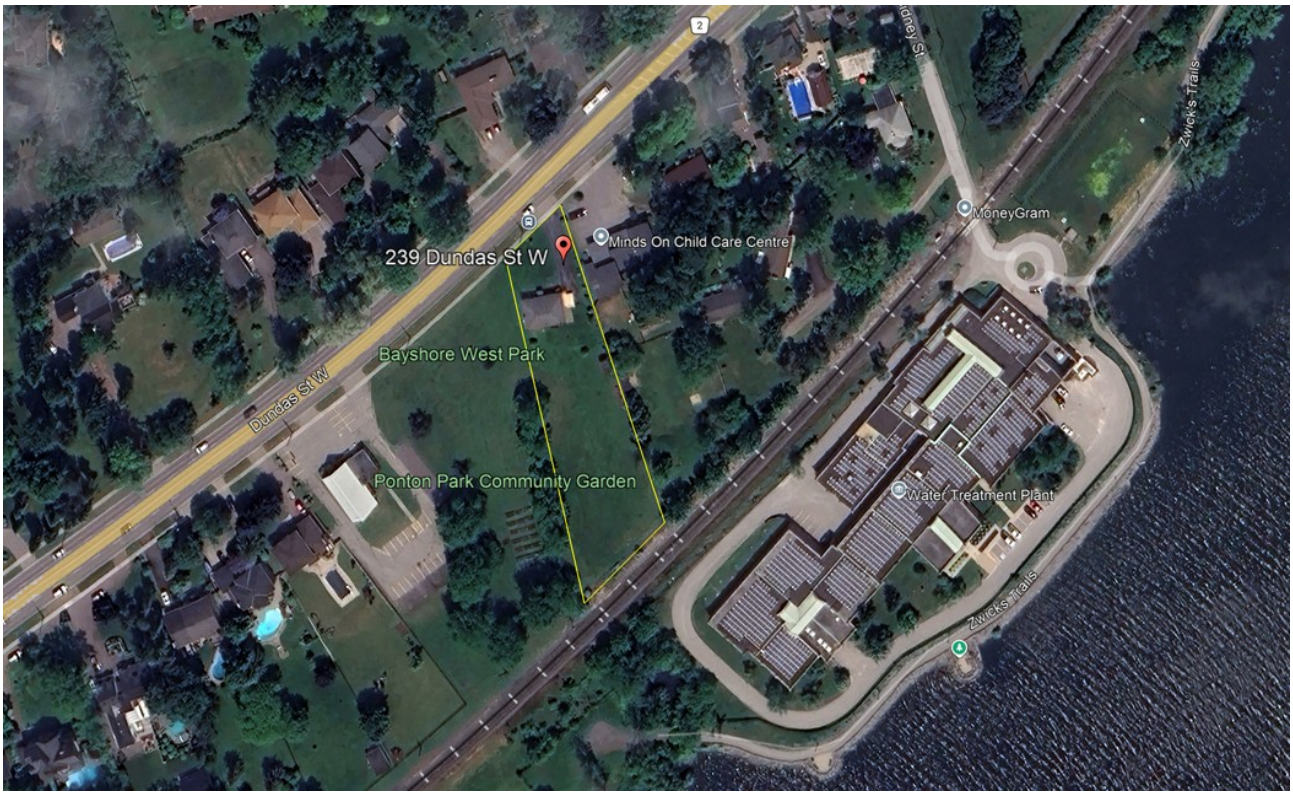

Figure 1 – Site Location & Existing Condition

2.2 Proposed Conditions

The property is proposed to be developed with a single multi-unit apartment building consistent of the following thirty seven (37) units as shown in the concept plan below as **Figure 2.**

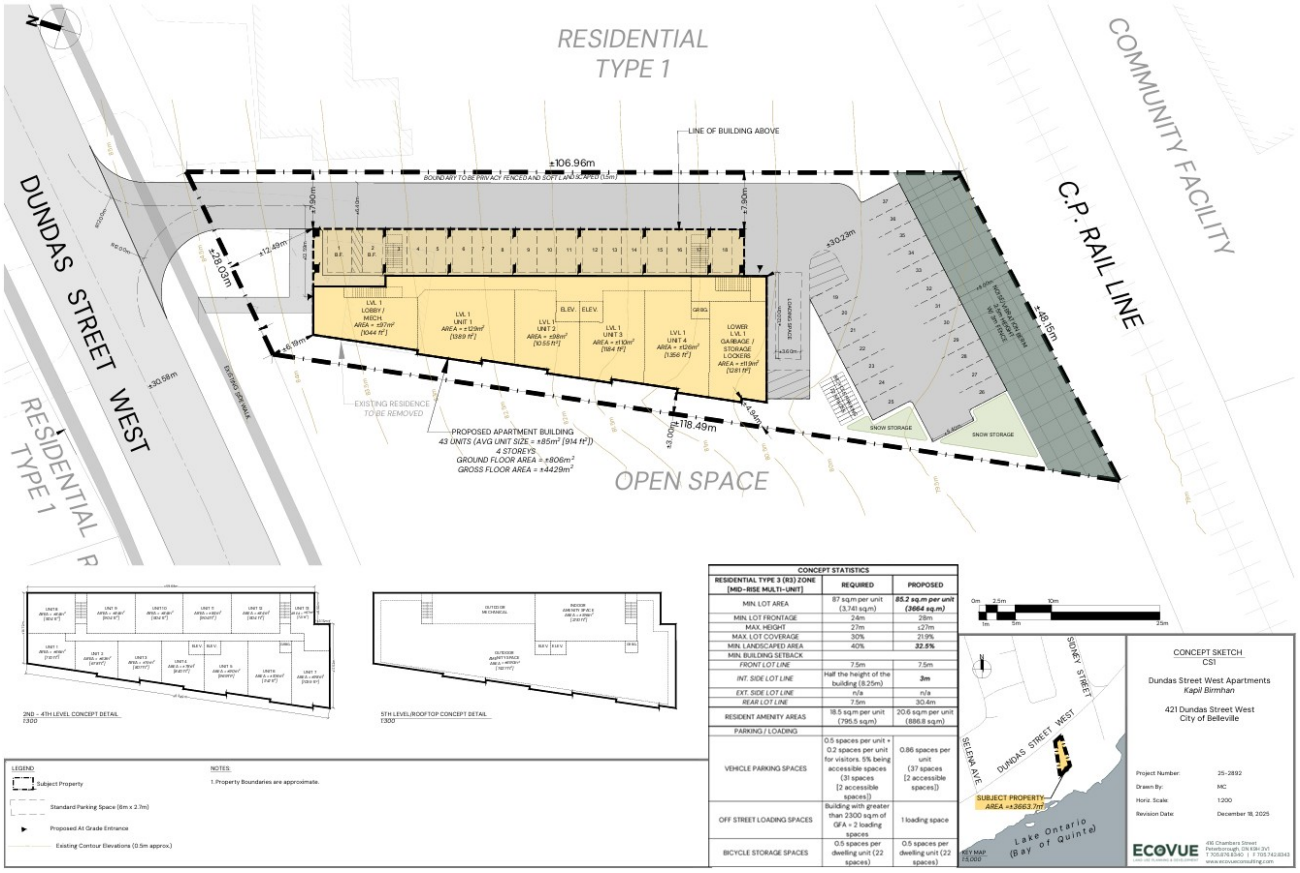

Figure 2 – Proposed Development

3.0 HYDROLOGY

3.1 Drainage Area

The site lies within a small drainage basin for an unnamed, urbanized, channel generating flow from an area of approximately 17.36ha discharging to the Bay of Quinte. A catchment area was developed using the city of Belleville Sewer Shed mapping, **Figure 3** The site is located at the south limits of the basin.

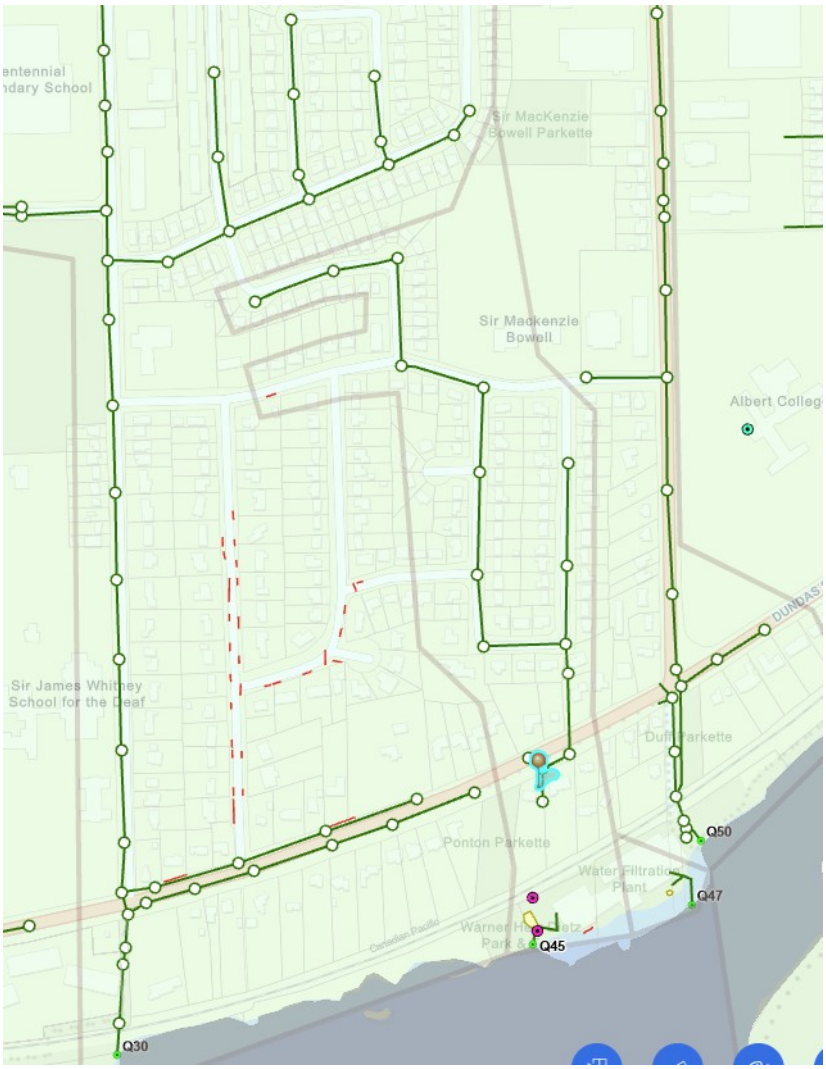

Figure 3 – Catchment Area

The subject site represents a small portion of the catchment; 2.1% (0.37ha of 17.36ha).

3.2 Runoff Methodology

Flow calculations for the pre-development and post-development conditions were evaluated using the MRM Method. This method is applicable for small catchments (less than 125ha) and urbanized areas.

For this review both the site and the overall catchment were assessed.

Under the existing condition the following runoff coefficients were applied from the MTO Design chart 1.07.

- 0.35 – undeveloped site – residential grassed lot
- 0.45 – typical residential urban areas

For the proposed condition the following runoff coefficients were applied from the MTO Design chart 1.07.

- 0.72 – Apartments (see enclosed calculations)
- 0.45 – typical residential urban areas

3.3 Pre-development Flow

The following summaries the findings of the pre-development conditions;

- 5 year site = 0.024 m^3/s
- 5 year Entire Basin = 0.731m^3/s
- 100 year site = 0.040 m^3/s
- 100 year Entire Basin = 1.191m^3/s

Calculations are enclosed in Appendix A.

3.4 Post Development Flow

The following summaries the finding of the post development conditions;

- 5 year site = 0.050 m^3/s
- 5 year Entire Basin = 0.744m^3/s
- 100 year site = 0.081 m^3/s
- 100 yea Entire Basin = 1.212m^3/s

Calculations are enclosed in Appendix A.

4.0 STORMWATER MANAGEMENT

4.1 Quantity Control

It can be seen in **Sections 3.3** and **3.4** that the increase in stormwater runoff from the proposed development on the overall catchment area is of low magnitude 0.021m^3/s in the 100 year event, or an increase of 1.8%.

It is not expected that this increase will generate any adverse impacts to the receiving drainage channel or downstream infrastructure (i.e. CP crossing). Accordingly, no mitigation measures are warranted.

All drainage will continue to discharge to the adjacent drainage channel and will continue to discharge in the same manner as it is currently.

4.2 Quality Control

The City of Belleville's Design Manual section F1.4.2 2)a) notes that quality control is required for development sites with areas greater than 1.0ha. However, the site lies within the Intake Protection Zone for the water treatment plant. As such it is recommended that parking lot runoff be treated onsite through an oil grit unit.

Preliminary sizing has identified that a Downstream Defender, DD1200, will provide 90% TSS removal. During detailed site plan development the unit sizing will be confirmed.

5.0 EROSION AND SEDIMENTATION CONTROL

An erosion and sediment control strategy will be implemented as per the plan included in the detailed engineering drawing package in order to minimize the transfer of silt off-site during construction. The following measures will be incorporated into the strategy as required:

- Environmental fencing and straw bales
- Regular inspection of the erosion and sediment control devices
- Removal and disposal of the erosion and sediment control devices after the site has been stabilized
- All exposed earth to be re-vegetated within thirty days after constructed has completed.

6.0 CONCLUSIONS

- The proposed development will generate a minimal increase in runoff for the overall catchment and no quantity mitigation measures are warranted
- Quality control is recommended with an oil grit unit as the site lies within the IPZ.
- Silt fencing and straw bale barriers will be in place during construction.

We trust the above information meets your needs at this time and should you have any further questions or concerns, please do not hesitate to contact our office.

Sincerely,
WSE Consulting

Adam Wilson, P. Eng.
Principal/Senior Engineer

APPENDIX A

Calculations

Design Chart 1.07: Runoff Coefficients

- Urban for 5 to 10-Year Storms

Land Use		Runoff Coefficient	
		Min.	Max.
Pavement	- asphalt or concrete	0.80	0.95
- brick		0.70	0.85
Gravel roads and shoulders		0.40	0.60
Roofs		0.70	0.95
Business	- downtown	0.70	0.95
- neighbourhood		0.50	0.70
- light		0.50	0.80
- heavy		0.60	0.90
Residential	- single family urban	0.30	0.50
- multiple, detached		0.40	0.60
- multiple, attached		0.60	0.75
- suburban		0.25	0.40
Industrial	- light	0.50	0.80
- heavy		0.60	0.90
Apartments		0.50	0.70
Parks, cemeteries		0.10	0.25
Playgrounds (unpaved)		0.20	0.35
Railroad yards		0.20	0.35
Unimproved areas		0.10	0.30
Lawns	- Sandy soil		
- flat, to 2%		0.05	0.10
- average, 2 to 7%		0.10	0.15
- steep, over 7%		0.15	0.20
- Clayey soil			
- flat, to 2%		0.13	0.17
- average, 2 to 7%		0.18	0.22
- steep, over 7%		0.25	0.35

0.45

For flat or permeable surfaces, use the lower values. For steeper or more impervious surfaces, use the higher values. For return period of more than 10 years, increase above values as 25-year - add 10%, 50-year - add 20%, 100-year - add 25%.

The coefficients listed above are for unfrozen ground.

site. Area = 0.37 ha.
Bldg + Asphalt = 2470 x 0.95 = 2346.5.
Landscaping = 1230 x 0.25 = 307.5
Σ 2654 / 3700 = 71.7

STORM SEWER DESIGN SHEET

WSE

239 Dundas St.

CITY OF BELLEVILLE

Project: **095**

Revised: **Mar 8 2026**

Checked: **AJW**

RATIONAL METHOD Q = 2.78 AIR

Where: Q = peak flow in litres per second (L/s)
A = area in hectares (ha)
R = runoff coefficient
I = rainfall intensity in millimetres per hour (mm/hr)
26.4 * (Tc /60)^-0.677

Return Period = 5 year

N-value = 0.013 PVC
0.011 Concrete

LOCATION										RATIONAL METHOD FLOWS					SEWER DATA							
				DRAINAGE AREAS																		
AREA	STREET	FROM MH	TO MH	AREA ha	IMP %	R= 0.2	R= 0.45	R= 0.6	Rt=	INDIVID AR	ACCUM AR	TIME OF CONC. Tc	RAINFALL INTENSITY I	PEAK FLOW Q (L/s)	INSIDE DIAMETER (mm)	SLOPE (%)	LENGTH (m)	CAPACITY (l/s)	VELOCITY (m/s)	TIME OF FLOW (min)	Q/Qcap	Material
EX	Site			0.37			0.35		0.35	0.130	0.130	15.00	67.48	24								
EX	Catchment			16.99			0.45		0.45	7.646	7.775	41.58	33.84	731								
PRO	Site			0.37			0.72		0.72	0.266	0.266	15.00	67.48	50								
PRO	Catchment			16.99			0.45		0.45	7.646	7.912	41.58	33.84	744								

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RATIONAL METHOD Q = 2.78 AIR

Where: Q = peak flow in litres per second (L/s)
A = area in hectares (ha)
R = runoff coefficient
I = rainfall intensity in millimetres per hour (mm/hr)
43 * (Tc /60)^-0.678

Return Period = 100 year

N-value = 0.013 PVC
0.011 Concrete

LOCATION										RATIONAL METHOD FLOWS					SEWER DATA							
				DRAINAGE AREAS																		
AREA	STREET	FROM MH	TO MH	AREA ha	IMP %	R= 0.2	R= 0.45	R= 0.6	Rt=	INDIVID AR	ACCUM AR	TIME OF CONC. Tc	RAINFALL INTENSITY I	PEAK FLOW Q (L/s)	INSIDE DIAMETER (mm)	SLOPE (%)	LENGTH (m)	CAPACITY (l/s)	VELOCITY (m/s)	TIME OF FLOW (min)	Q/Qcap	Material
EX	Site			0.37			0.35		0.35	0.130	0.130	15.00	109.92	40								
EX	Catchment			16.99			0.45		0.45	7.646	7.775	41.58	55.12	1191								
PRO	Site			0.37			0.72		0.72	0.266	0.266	15.00	109.92	81								
PRO	Catchment			16.99			0.45		0.45	7.646	7.912	41.58	55.12	1212								

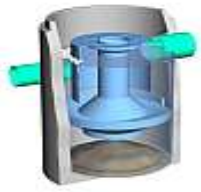
Downstream Defender® and First Defense®HC

Sizing Calculator Version R.2.0

Check for latest version of this tool.

Submitt design to Hydro for review.

Send feedback / Request help.



Hydro International

inspired by HX

PROJECT DETAILS:

Project Name:	239 Dundas	*Designer:*	
Street:		*Company:*	
City:		*Office:*	
State:		*email:*	
County:		*Phone:*	
Post Code:		*Sizing Method:*	Net Annual Treatment

TREATMENT PARAMETERS:

Sizing Approval Regulator: Local

TSS Treatment Goal: 80 % Removal

TSS Particle Size: NJDEP Pre-2015

WATER QUALITY FLOW METHOD:

Water Quality Flow Rate: 0.081 L/s (?)

FLOW RATE RESULTS

Unit	TSS
FDHC1200	-
FDHC1800	-
DD1200	100.0%
DD1800	100.0%
DD2400	100.0%
DD3000	100.0%
DD3700	100.0%

NET ANNUAL RAINFALL METHOD:

Area: 0.37 ha

Percent Impervious: 67%

Runoff Coefficient 0.70 (Adjust using % Impervious)

Rainfall Volume Goal: 90 % of Annual Rainfall (?)

Rainfall Station: Belleville

NET ANNUAL RESULTS

Unit	TSS	Volume
FDHC1200	-	-
FDHC1800	-	-
DD1200	90.9%	99.7%
DD1800	93.0%	99.7%
DD2400	93.2%	99.7%
DD3000	93.2%	99.7%
DD3700	93.2%	99.7%

LAYOUT DETAILS:

Peak Flow at Unit: 0.081 L/s (?) ***Select Unit:*** DD1200

Return Period: 5 yrs

Structure ID: OGS (?)

Installation: New Development

Placement: Offline

Outlet Pipe Size: 600 mm (?) Note 1.(?)

Inlet Pipe 1 Size: 600 mm (?)

Inlet Pipe 2 Size: 0 mm (?)

Inlet Pipe 3 Size: mm (?)

Grate Inlet: No

Rim Level: 238.040 m

Outlet Invert: 235.830 m (?)

Invert Inlet 1: 235.455 m (?)

Invert Inlet 2: 0.000 m (?)

Invert Inlet 3: 0.000 m (?)

Suggested
235.230
235.830
0.000

Notes: *1. Use 300 to 600 matched invert adaptor to connect DD outlet stub to pipe.*