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FUNCTIONAL SERVICING REPORT

5259 Dorchester Road, Niagara Falls
March 2025

INTRODUCTION

Upper Canada Consultants has been retained to undertake and provide a Functional Servicing Report to address the servicing needs and requirements as part of a Site Plan Application for the proposed development. The project site situated at the above noted address, is located north of Highway 420, east of the Queen Elizabeth Way, with the Dorchester QEW on-ramp located at the south/east limits of the site. The development site has recently been vacant land however was once a facility owned and operated by Loblaws.

The proposed development site is approximately 7.54 hectares and shall consist a number of different buildings and uses. The current preliminary development plan will result in the construction of 10 separate buildings with an associated underground parking garage. Three (3) of the buildings (Buildings #1 - 3) will include one tower with commercial space on the main floor and residential units above. Buildings #4 - #8 will consist of strictly residential uses and include two towers each attached by an amenity common space. Lastly, two storage/maintenance buildings will be constructed at the north-west corner of the site. In total, the development will result in approximately 1,782 residential units and 1,830m^2 of commercial space. The development will include associated asphalt road, concrete curb, catch basins, storm sewers, sanitary sewers, and watermain.

The objectives of this study are as follows:

1. Identify domestic and fire protection water service needs for the site;
2. Identify sanitary servicing needs for the site; and,
3. Identify stormwater management needs for the site.

WATER SERVICING

There is an existing 300mm diameter PVC municipal watermain (2006) located on the east side of Dorchester Road fronting the proposed development site. Per engineering drawings provided by the City of Niagara Falls, there are two services constructed to the property line for the proposed development site as follows:

- A 200mm diameter PVC water service located approximately 120m north of the QEW on-ramp.
- A 250mm diameter PVC water service located approximately 55m south of the intersection of Dawson Street.

Due to the size of the proposed development site, it is expected that a 300mm diameter water service will be required to provide adequate domestic and fire water supply for the proposed buildings. In this case, the existing water services would be disconnected and abandoned as part of future servicing designs.

All existing fire hydrants in proximity to the development site are located on the east side of Dorchester Road and will be insufficient for the requirements of this development. Additionally, due to the proposed building specifications, it is expected each tower will require an internal sprinkler system. Therefore as part of future detailed design, an internal watermain system will be constructed with private hydrants in close proximity to all future buildings on site, within 45m of all fire department connections.

As required by the City of Niagara Falls, a calculation has been conducted (Appendix A) to determine the domestic water supply requirements for the proposed development. Utilizing a population density of 1.6 persons per unit, a population of 2851 persons with a commercial floor area of approximately 1,830m^2 can be attributed to this development. This has been calculated to require an average domestic water demand of **9.02 L/s** for this site. This value utilizes a residential demand of 270 L/cap/day and commercial flow demand of 5 L/m^2/day in line with the minimum MOE drinking Water Design Guidelines, and is greater than the 240 L/cap/day used as part of the 2021 Regional Water Master Servicing Plan Update. Therefore, this will result in a maximum daily demand of 16.23 L/s and peak demand of 24.34 L/s utilizing maximum and peak rate factors of 1.8 and 2.7 respectively per the Drinking Water Guidelines for overall populations of 25,000-50,000 persons.

As required by the City of Niagara Falls, a minimum fire flow calculation has been conducted for each building utilizing the 'Water Supply for Public Fire Protection' per the Fire Underwriters Survey (FUS, 2020). Table 1 below outlines the minimum fire flow requirements for each building.

Table 1. Fire Flow Requirements

Building 1	50 L/s
Building 2	67 L/s
Building 3	67 L/s
Building 4	67 L/s
Building 5	83 L/s
Building 6	67 L/s
Building 7	100 L/s
Building 8	117 L/s

Therefore, the proposed development site will require a minimum fire flow of 117L/s. All FUS Calculations can be found in Appendix A.

As the exact building conditions and design cannot be confirmed at this time, the calculation utilizes conservative assumptions that may differ from future Site Plan Applications and Building Permit submissions. The 'minimum required flow rates calculated as part of this report are merely an estimate, and the buildings' future internal Sprinkler System Engineer will provide the minimum flow calculations and requirements necessary to provide adequate fire protection as required as part of future building permit submissions.

Hydrant Flow Testing has been conducted by Niagara Regional Fire Protection at the two existing hydrants fronting the site on Dorchester Road with the results and further fire flow calculations included in Appendix A. Using the Hydrant Flow Test Data, Fire Flow Calculations have determined the following:

- Hydrant located approximately 75m south of Dawson St. will provide 299.3L/s fire flow
- Hydrant located approximately 170m south of Dawson St. will provide 295.5L/s fire flow

The static pressures (80psi) at the hydrants aligned within the range (60-80psi) of calculated static pressures for this area noted within the 2021 Niagara Regional Master Water Servicing Plan Update (MSPU). Therefore, as the available fire flows in proximity to this development will be significantly greater than those required by the FUS, it is expected that the municipal infrastructure will have sufficient supply for the proposed development.

SANITARY SERVICING

There is an existing 1200/1350mm diameter municipal sanitary sewer on the east site of Dorchester Road conveying flows southerly. Additionally, a 1500mm diameter sanitary sewer conveys flows easterly, located south of the site - just south of the QEW onramp. An existing sanitary lateral currently provides a sanitary outlet to the existing 1500mm diameter sanitary sewer south of the site. All flows from the noted sanitary sewers ultimately discharge to the Regional Dorchester Road Sanitary Pumping Station.

It is expected that the existing sanitary service will not provide a suitable sanitary outlet for the proposed development site. As such, the proposed development will discharge to the existing 1200/1350mm diameter sanitary sewer on Dorchester Road. The existing sanitary service will be abandoned as part of future detailed design.

An analysis of future peak sanitary flows from the proposed development discharging to the existing sanitary system has been conducted and included in Appendix B. The analysis utilizes a residential population of 1.6 persons/unit due to the apartment usage as well as a commercial flow rate of 28 m^3/ha/day. Additionally, a peak flow rate of 255 L/person/day and infiltration rate of 0.28 L/s/ha has been used in accordance with the 2021 Niagara Regional MSPU and MECP Design Criteria for Sewers.

The sanitary flow analysis concludes that the proposed development will discharge a peak flow rate of 31.40 L/s to the municipal sanitary sewer system from a residential population of 2851 persons and 0.183 ha of commercial space. This will occupy 1.5% of the full flow capacity of the existing 1200mm diameter sanitary sewer fronting the site on Dorchester Road. It is expected that the existing downstream Municipal/Regional sanitary systems will have adequate capacity for the proposed development.

STORMWATER MANAGEMENT PLAN

As part of the site development for the proposed residential development, the following is a summary of the stormwater management plan.

The criteria provided by the City of Niagara Falls and Region of Niagara for this development includes the requirement to control future development stormwater flows to allowable levels from this site for up to and including the 5-year design storm event. It is also required to improve stormwater quality levels to MECP Normal Protection (70% TSS removal) levels prior to discharge to the existing storm sewer on Dorchester Road.

Existing Conditions

There is an existing 1200mm diameter municipal storm sewer on Dorchester Road fronting the proposed development site, conveying stormwater flows southerly prior to turning east just north of the QEW onramp. The flows are directed easterly through the residential condominium at #5200 Dawson Street and ultimately discharge directly to the OPG Hydro Canal east of 5232 Woodside Avenue.

The proposed development site was included as part of the design of the Dorchester Road storm sewer system with associated drainage areas (EXT, 205E &206E) outlined on the Preliminary Existing Overall Storm Drainage Area Plan (Figure 1) in Appendix C. Drainage Area EX1 represents the lands that will be included within the modelling of this Stormwater Management Plan. The drainage area consists of mainly the proposed development site as well as a portion of the northerly adjacent property (#4887 Dorchester Road) that directs stormwater flows towards the development property. Under existing conditions, the majority of the property is fairly flat although ultimately sloping southerly conveying stormwater flows towards the adjacent MTO road allowance.

As part of the storm sewer system, two storm sewer stubs were designed and constructed for the proposed development site. Per the Storm Drainage Area Plan (10061-100B) for the Dorchester Road Reconstruction provided by the City of Niagara Falls, Drainage Areas 205E & 206E include the proposed development site for a total Drainage Area of 7.81 hectares at a Runoff Coefficient of 0.75 (imperviousness of 78.5%). Drainage Area 205E (6.773 ha at a Runoff Coefficient of 0.75) was designed to discharge to a northerly 1150x750mm diameter stub located 65m south of Dawson Street. Drainage Area 206E (1.08 hectares at a Runoff Coefficient of 0.75) was designed to a 525mm diameter stub located 165m south of Dawson Street.

In summary, the full drainage area of the proposed development site (EX1) was included in the Dorchester Road storm sewer system at a Runoff Coefficient of 0.75. Under existing conditions, Drainage Area EX1 conveys stormwater flows to the southerly MTO road allowance at a calculated Runoff Coefficient of 0.28. All Weighted Impervious calculations can be found in Appendix D.

Proposed Conditions

The proposed development site will convey the majority of stormwater flows from the development area to the existing Dorchester Road storm sewer system. Although two existing connections are currently available as part of the Dorchester Road storm sewer, new connections may be made due to restrictions imposed by the future underground parking garage structure to be constructed on site.

As shown on the Preliminary Future Overall Storm Drainage Area Plan (Figure 2) in Appendix C, overall drainage areas have been delineated to determine the expected general stormwater conditions of the proposed development site. Drainage Area A10 outlines the area that will collect stormwater within the internal future on-site storm sewer system prior to discharge to the existing Dorchester Road storm sewer system. Drainage Area A20 outlines the on-site lands that will discharge stormwater flows uncontrolled overland directly to the Dorchester Road storm sewer system. Drainage Area A30 delineates the lands to discharge flows uncontrolled via sheet flow directly to the MTO road allowance. Associated Runoff Coefficients have been outlined on Figure 2 with all Weighted Impervious Calculations included in Appendix D.

Quantity Assessment

Using the Modified Rational Method, the existing, allowable and future peak stormwater flows have been calculated for the proposed development site for the 2, 5, 10, 25 and 100 year design storm events using the City of Niagara Falls IDF Curves. The calculations have been conducted to determine peak stormwater flows rate to the Dorchester Road storm sewer system as well as the MTO road allowance. All Modified Ration Method Calculations can be found in Appendix D.

The delineated future drainage areas have been created to determine the general expected stormwater conditions of the proposed development site under the current Site Plan. The drainage areas and flow calculations will be confirmed as part of future Site Plan Application submissions with a more detailed design.

Table 1 below outlines the allowable and future peak stormwater flows to the Dorchester Road storm sewer system during the modelled design storm events. As stated previously, Drainage Area EX1 on Figure 1 represent the delineated overall drainage area originally designed to discharge stormwater flows to the Dorchester Road storm sewer system. Drainage Areas A10 and A20 on Figure 2 outline the lands expected to discharge to the Dorchester Road storm sewer system under future conditions.

Table 1. Peak Flows to Dorchester Road Stormwater System				
Design Storm Event	**Allowable Conditions (L/s)**	**Future Conditions (L/s)**		
	Drainage Area 'EX1'	**Drainage Area 'A10'**	**Drainage Area 'A20'**	**Total**
2 Year	1,127.2	886.4	14.9	901.3
5 Year	1,436.0	1,129.2	18.9	1,148.2
10 Year	1,697.3	1,334.7	22.4	1,357.1
25 Year	1,906.5	1,499.2	25.1	1,524.4
100 Year	2,290.9	1,801.5	30.2	1,831.7

As outlined in Table 1 above, peak stormwater flows to the Dorchester Road stormwater system will be reduced from allowable design conditions under the proposed development plan. Therefore, it is not expected that quantity controls will be required for this development prior to discharge to the municipal stormwater system.

Table 2 below outlines the existing and future peak flows to the MTO road allowance during the modelled design storm events as a result of the proposed development plan. Under existing conditions, Drainage Area EX1 conveys all stormwater flows to the MTO road allowance. Drainage Area A30 will discharge flows uncontrolled overland towards the south/westerly road allowance.

Table 2. Peak Flows to MTO Road Allowance		
Design Storm Event	**Existing Conditions – 'EX1' (L/s)**	**Future Conditions – 'A30' (L/s)**
2 Year	420.8	50.8
5 year	536.1	64.7
10 Year	633.6	76.5
25 Year	711.7	85.9
100 year	855.3	103.2

Therefore, peak stormwater flows discharging from the site to the MTO road allowance will be significantly reduced under future development conditions during all storm events. Therefore, it is not expected that quantity controls will be required prior to discharge to this stormwater outlet.

During extreme storm events, stormwater flows from the internal development area will discharge directly to Dorchester Road as per existing design conditions.

Quality Assessment

As discussed previously, it will be required to provide stormwater quality controls to Normal (70% TSS removal) Protection levels prior to discharge from the site. Under the proposed stormwater management plan, Drainage Areas A20 and A30 will discharge stormwater flows uncontrolled directly to the Dorchester Road stormwater system and MTO Road Allowance respectively. These drainage areas will be comprised completely of landscape areas and will not consist of any significant sources of Total Suspended Solids (TSS). Therefore, these drainage areas will not require additional stormwater quality controls.

Due to the extensive parking lot areas as part of Drainage Area A10, stormwater from this area will required quality enhancements prior to discharge to the Dorchester Road stormwater system. It is expected that Oil/Grit Separators will provide the necessary water quality enhancements for this drainage area. The location and size of the necessary quality enhancement structures will be outlined as part of future detailed design.

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CONCLUSIONS AND RECOMMENDATIONS

Therefore, based on the above comments and design calculations provided for this site, the following summarizes the servicing for this site.

1. The existing 300mm diameter watermain will have sufficient capacity to provide both domestic and fire protection water supply.

2. The existing 1200/1350mm diameter municipal sanitary sewer on Dorchester Road will have adequate capacity for the proposed development.

3. The existing 1200mm diameter municipal storm sewer on Dorchester Road will have adequate capacity for the proposed development.

4. Stormwater quality controls will be provided to Normal Protection levels prior to discharge from the site.

5. The site extreme stormwater overland flow route is to Dorchester Road.

Based on the above and the accompanying calculations, there exists adequate municipal servicing for this development. We trust the above comments and enclosed calculations are satisfactory for approval. If you have any questions or require additional information, please do not hesitate to contact our office.

Yours very truly,

Kurt Tiessen, P.Eng.
March 18, 2025
Encl.

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APPENDICES

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APPENDIX A

Domestic Water Requirement Calculations
Fire Underwriters Survey Calculations
Hydrant Flow Test Results
Hydrant Fire Flow Calculations

Domestic Flow Requirement Calculation

Project: **Dorchester Panoramic**
Date: **March 18, 2025**

Residential	270.0	L/cap/day (2008 MOE Drinking Water Guidelines
Commercial	5.0	L/m^2/day (2023 MECP Design Guidelines)

Residential

	2851	Persons (1782 units @ 1.6ppu)
	270.00	L/cap/day
Average Day (Res)	8.91	L/s

Commercial

	1830.0	m^2 of 'commercial space'
	5.0	L/m^2/day
Average Day (Comm)	0.11	L/s

TOTAL

Total Average Day	9.02	L/s	
Total Maximum Day	16.23	L/s	*Peaking Factor of 1.8*
Total Peak Hourly	24.34	L/s	*Peaking Factor of 2.7*

Note: - Peaking Factors based on overall system populations of 25000-50000
- Minimum commercial peaking factors are 1.5, conservatively utilized residential peaking factors for this calculation

Fire Underwriters Survey

Water Supply for Public Fire Protection (2020) Calculations

Dorchester Panoramic - Building 1 (Upper Floors)

Required Fire Flow in Litres per Minute	F=	3,000	(L/m)
		50.00	(L/s)
		793	(USgmp)
Type of Construction			
Non-Combustible Construction (unprotected metal structural components, masonry o	C=	0.80	
Total Floor Area in square metres	A=	1207.5	(m2)
= Upper Floors + 25% of adjacent floors (805*1.5)			
2. Combustibility of Contents *(may not reduce fire flow demand below 2,000 L/min)*			
Limited Combustible	=	-15%	
3. Sprinkler Systems			
Is there a complete automatic sprinkler protection system per NFPA (Yes/No).	Yes	-30%	
Water supply standard for both system and fire department hose lines (Yes/No).	Yes	-10%	
Is system fully monitored (Yes/No).	Yes	-10%	
Total Sprinker Reduction to Overall Fire Flow Demand		-50%	
4. Spacial Separation of Neighbouring Structures (within 45 metres)			
Location of Building:			
Building 1 - Upper Floors			
Distance to Nearest Building to the North	-	0%	
Distance to Nearest Building to the South	13.5 m	15%	
Distance to Nearest Building to the East	-	0%	
Distance to Nearest Building to the West	-	0%	
Total Spacial Separation to Adjacent Structures		15%	

Fire Underwriters Survey

Water Supply for Public Fire Protection (2020) Calculations

Dorchester Panoramic - Building 2

Required Fire Flow in Litres per Minute	F=	4,000	(L/m)
		66.67	(L/s)
		1,057	(USgmp)

Type of Construction

Non-Combustible Construction (unprotected metal structural components, masonry o	C=	0.80

Total Floor Area in square metres	A=	1413	(m2)
= Main Floor + 25% of Adjacent Floor Areas (942*1.5)			

2. Combustibility of Contents *(may not reduce fire flow demand below 2,000 L/min)*

Limited Combustible	=	-15%

3. Sprinkler Systems

Is there a complete automatic sprinkler protection system per NFPA (Yes/No).	Yes	-30%
Water supply standard for both system and fire department hose lines (Yes/No).	Yes	-10%
Is system fully monitored (Yes/No).	Yes	-10%
Total Sprinker Reduction to Overall Fire Flow Demand		-50%

4. Spacial Separation of Neighbouring Structures (within 45 metres)

Location of Building:

Building 2		
Distance to Nearest Building to the North	6.2 m	20%
Distance to Nearest Building to the South	13.4 m	15%
Distance to Nearest Building to the East	-	0%
Distance to Nearest Building to the West	30.5 m	0%
Total Spacial Separation to Adjacent Structures		35%

Fire Underwriters Survey

Water Supply for Public Fire Protection (2020) Calculations

Dorchester Panoramic - Building 3

Required Fire Flow in Litres per Minute	F=	4,000	(L/m)
		66.67	(L/s)
		1,057	(USgmp)

Type of Construction

Non-Combustible Construction (unprotected metal structural components, masonry o	C=	0.80

Total Floor Area in square metres	A=	1413 (m2)
= Main Floor + 25% of Adjacent Floor Areas (942*1.5)		

2. Combustibility of Contents *(may not reduce fire flow demand below 2,000 L/min)*

Limited Combustible	=	-15%

3. Sprinkler Systems

Is there a complete automatic sprinkler protection system per NFPA (Yes/No).	Yes	-30%
Water supply standard for both system and fire department hose lines (Yes/No).	Yes	-10%
Is system fully monitored (Yes/No).	Yes	-10%
Total Sprinker Reduction to Overall Fire Flow Demand		-50%

4. Spacial Separation of Neighbouring Structures (within 45 metres)

Location of Building:

Building 3		
Distance to Nearest Building to the North	13.4 m	15%
Distance to Nearest Building to the South	7.3 m	20%
Distance to Nearest Building to the East	-	0%
Distance to Nearest Building to the West	12.1 m	15%
Total Spacial Separation to Adjacent Structures		50%

Fire Underwriters Survey

Water Supply for Public Fire Protection (2020) Calculations

Dorchester Panoramic - Building 4

Required Fire Flow in Litres per Minute	F=	4,000	(L/m)
		66.67	(L/s)
		1,057	(USgmp)

Type of Construction

Non-Combustible Construction (unprotected metal structural components, masonry o	C=	0.80

Total Floor Area in square metres	A=	1638	(m2)
= Main Floor + 25% of Adjacent Floor Areas (1092*1.5)			

2. Combustibility of Contents *(may not reduce fire flow demand below 2,000 L/min)*

Limited Combustible	=	-15%

3. Sprinkler Systems

Is there a complete automatic sprinkler protection system per NFPA (Yes/No).	Yes	-30%
Water supply standard for both system and fire department hose lines (Yes/No).	Yes	-10%
Is system fully monitored (Yes/No).	Yes	-10%
Total Sprinker Reduction to Overall Fire Flow Demand		-50%

4. Spacial Separation of Neighbouring Structures (within 45 metres)

Location of Building:

Building 4		
Distance to Nearest Building to the North	31.0 m	0%
Distance to Nearest Building to the South	-	0%
Distance to Nearest Building to the East	7.3 m	20%
Distance to Nearest Building to the West	14.7 m	15%
Total Spacial Separation to Adjacent Structures		35%

Note: Calculation assumes each tower is split from the adjacent tower/amenity space with firewalls

Fire Underwriters Survey

Water Supply for Public Fire Protection (2020) Calculations

Dorchester Panoramic - Building 5

Required Fire Flow in Litres per Minute	F=	5,000	(L/m)
		83.33	(L/s)
		1,321	(USgmp)

Type of Construction

Non-Combustible Construction (unprotected metal structural components, masonry o	C=	0.80

Total Floor Area in square metres	A=	1816.5	(m2)
= Main Floor + 25% of Adjacent Floor Areas (1211*1.5)			

2. Combustibility of Contents *(may not reduce fire flow demand below 2,000 L/min)*

Limited Combustible	=	-15%

3. Sprinkler Systems

Is there a complete automatic sprinkler protection system per NFPA (Yes/No).	Yes	-30%
Water supply standard for both system and fire department hose lines (Yes/No).	Yes	-10%
Is system fully monitored (Yes/No).	Yes	-10%
Total Sprinker Reduction to Overall Fire Flow Demand		-50%

4. Spacial Separation of Neighbouring Structures (within 45 metres)

Location of Building:

Building 5		
Distance to Nearest Building to the North	25.8 m	10%
Distance to Nearest Building to the South	-	0%
Distance to Nearest Building to the East	13.7 m	15%
Distance to Nearest Building to the West	22.4 m	10%
Total Spacial Separation to Adjacent Structures		35%

Note: Calculation assumes each tower is split from the adjacent tower/amenity space with firewalls

Fire Underwriters Survey

Water Supply for Public Fire Protection (2020) Calculations

Dorchester Panoramic - Building 6

Required Fire Flow in Litres per Minute	F=	4,000	(L/m)
		66.67	(L/s)
		1,057	(USgmp)

Type of Construction

Non-Combustible Construction (unprotected metal structural components, masonry o	C=	0.80

Total Floor Area in square metres	A=	1636.5	(m2)
= Main Floor + 25% of Adjacent Floor Areas (1091*1.5)			

2. Combustibility of Contents *(may not reduce fire flow demand below 2,000 L/min)*

Limited Combustible	=	-15%

3. Sprinkler Systems

Is there a complete automatic sprinkler protection system per NFPA (Yes/No).	Yes	-30%
Water supply standard for both system and fire department hose lines (Yes/No).	Yes	-10%
Is system fully monitored (Yes/No).	Yes	-10%
Total Sprinker Reduction to Overall Fire Flow Demand		-50%

4. Spacial Separation of Neighbouring Structures (within 45 metres)

Location of Building:

Building 6		
Distance to Nearest Building to the North	44.0 m	0%
Distance to Nearest Building to the South	-	0%
Distance to Nearest Building to the East	22.4 m	10%
Distance to Nearest Building to the West	15.0 m	15%
Total Spacial Separation to Adjacent Structures		25%

Note: Calculation assumes each tower is split from the adjacent tower/amenity space with firewalls

Fire Underwriters Survey

Water Supply for Public Fire Protection (2020) Calculations

Dorchester Panoramic - Building 7, Floors 2-4

Required Fire Flow in Litres per Minute	F=	6,000	(L/m)
		100.00	(L/s)
		1,585	(USgmp)
Type of Construction			
Non-Combustible Construction (unprotected metal structural components, masonry o	C=	0.80	
Total Floor Area in square metres	A=	4251	(m2)
Main floor + 25% of floors immediately above and below (2834+2834*0.25*2)			
2. Combustibility of Contents *(may not reduce fire flow demand below 2,000 L/min)*			
Limited Combustible	=	-15%	
3. Sprinkler Systems			
Is there a complete automatic sprinkler protection system per NFPA (Yes/No).	Yes	-30%	
Water supply standard for both system and fire department hose lines (Yes/No).	Yes	-10%	
Is system fully monitored (Yes/No).	Yes	-10%	
Total Sprinker Reduction to Overall Fire Flow Demand		-50%	
4. Spacial Separation of Neighbouring Structures (within 45 metres)			
Location of Building:			
Building 7			
Distance to Nearest Building to the North	-	0%	
Distance to Nearest Building to the South	23.6 m	10%	
Distance to Nearest Building to the East	16.2 m	15%	
Distance to Nearest Building to the West	44.8 m	0%	
Total Spacial Separation to Adjacent Structures		25%	
Additions			
Is roof wood shingles or shakes (Yes/No).	No		

Fire Underwriters Survey

Water Supply for Public Fire Protection (2020) Calculations

Dorchester Panoramic - Building 8, Floors 2-4

Required Fire Flow in Litres per Minute	F=	7,000	(L/m)
		116.67	(L/s)
		1,849	(USgmp)

Type of Construction

Non-Combustible Construction (unprotected metal structural components, masonry o	C=	0.80

Total Floor Area in square metres	A=	4251	(m2)
Main floor + 25% of floors immediately above and below (2834+2834*0.25*2)			

2. Combustibility of Contents *(may not reduce fire flow demand below 2,000 L/min)*

Limited Combustible	=	-15%

3. Sprinkler Systems

Is there a complete automatic sprinkler protection system per NFPA (Yes/No).	Yes	-30%
Water supply standard for both system and fire department hose lines (Yes/No).	Yes	-10%
Is system fully monitored (Yes/No).	Yes	-10%
Total Sprinker Reduction to Overall Fire Flow Demand		-50%

4. Spacial Separation of Neighbouring Structures (within 45 metres)

Location of Building:

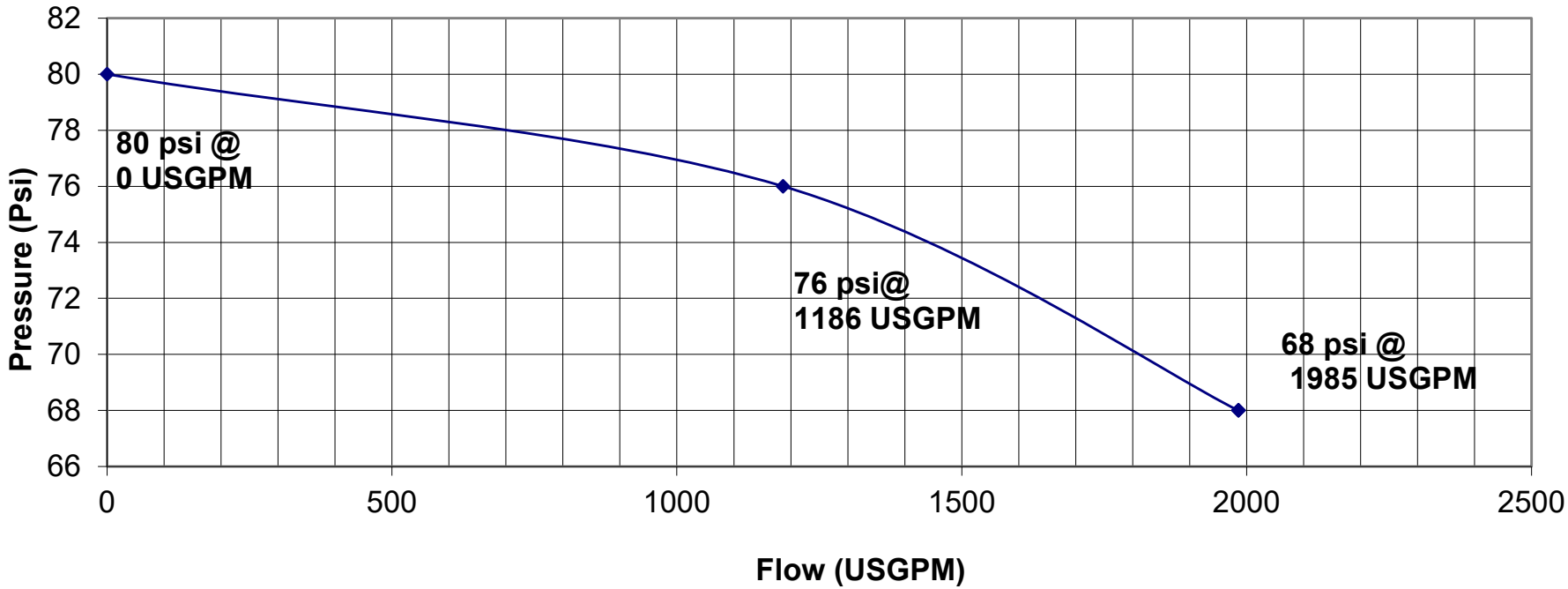
Building 8		
Distance to Nearest Building to the North	-	0%
Distance to Nearest Building to the South	24.6 m	10%
Distance to Nearest Building to the East	14.6 m	15%
Distance to Nearest Building to the West	16.2 m	15%
Total Spacial Separation to Adjacent Structures		40%

Additions

Is roof wood shingles or shakes (Yes/No).	No

NIAGARA REGIONAL FIRE PROTECTION INC.					
Flow Test Location: East side of Dorchester Avenue, approximately 75m south of Da					
Static Pressure (Psi)		Pitot Reading 1	50	# of Outlets Flowed 1	1
	80	Outlet Size 1	2.5	# of Outlets Flowed 2	2
Residual Pressure 1 (Psi)		Pitot Reading 2	35	# of Outlets Flowed 3	2
	76	Outlet Size 2	2.5	Graph Data:	
Residual Pressure 2 (Psi)		Pitot Reading 3	35	Pressure Values (y-axis)	Flow Values (x-axis)
	68	Outlet Size 3	2.5	80	0
Residual Pressure 3 (Psi)		Flow 1 Calculated		76	1186
	68		1186.5	68	1985
		Flow 2 Calculated		68	1985
			1985.4	Date & Time of Test :	March 14/2025
Coefficient value		Flow 3 Calculated			1:30PM
	0.9		1985.4	Performed by:	Alex & Dylan

Water Graph



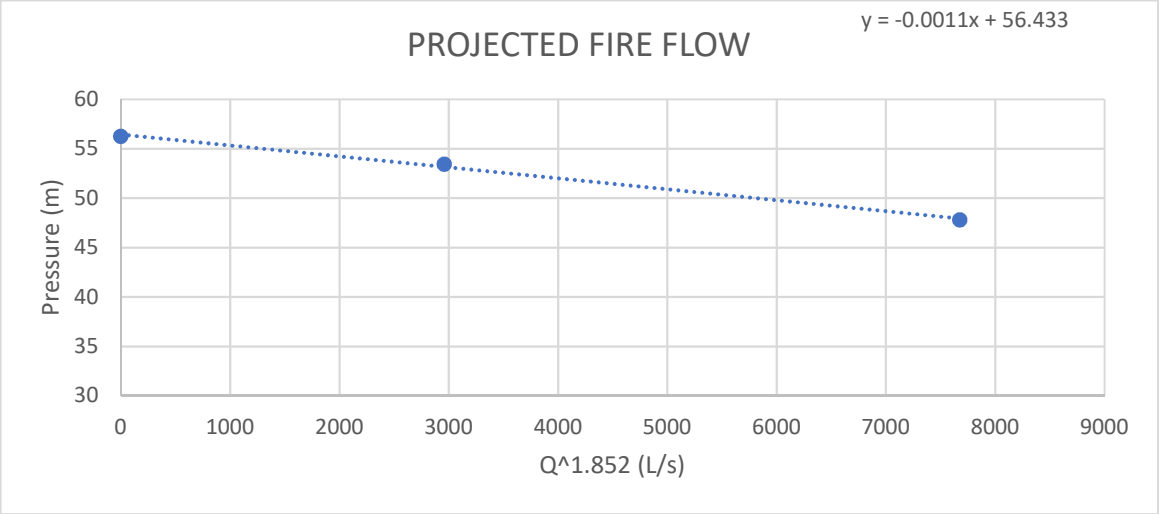
FIRE FLOW CALCULATION SHEET

Project: Dorchester Panoramic
Project Number: 20136
Date: March 18, 2025
Prepared By: Kurt Tiessen, P.Eng.
Reviewed By: Jason Schooley, P.Eng.

Flow Test Provided by: Niagara Regional Fire Protection
Data of Test: March 14, 2025
Hydrant Location: East side of Dorchester, Approx 75m south of Dawson

FLOW TEST RESULTS

TEST	PRESSURE (psi)	FLOW RATE (USGPM)	FLOW RATE (L/s)	$Q^{1.852}$	PRESSURE (m)
STATIC	80	0	0	0	56.26
RESIDUAL 1	76	1186.5	74.86	2958.49	53.44
RESIDUAL 2	68	1985.4	125.26	7676.11	47.82



FIRE FLOW FORMULA (y = ax + b)

a =	-0.0011
b =	56.433

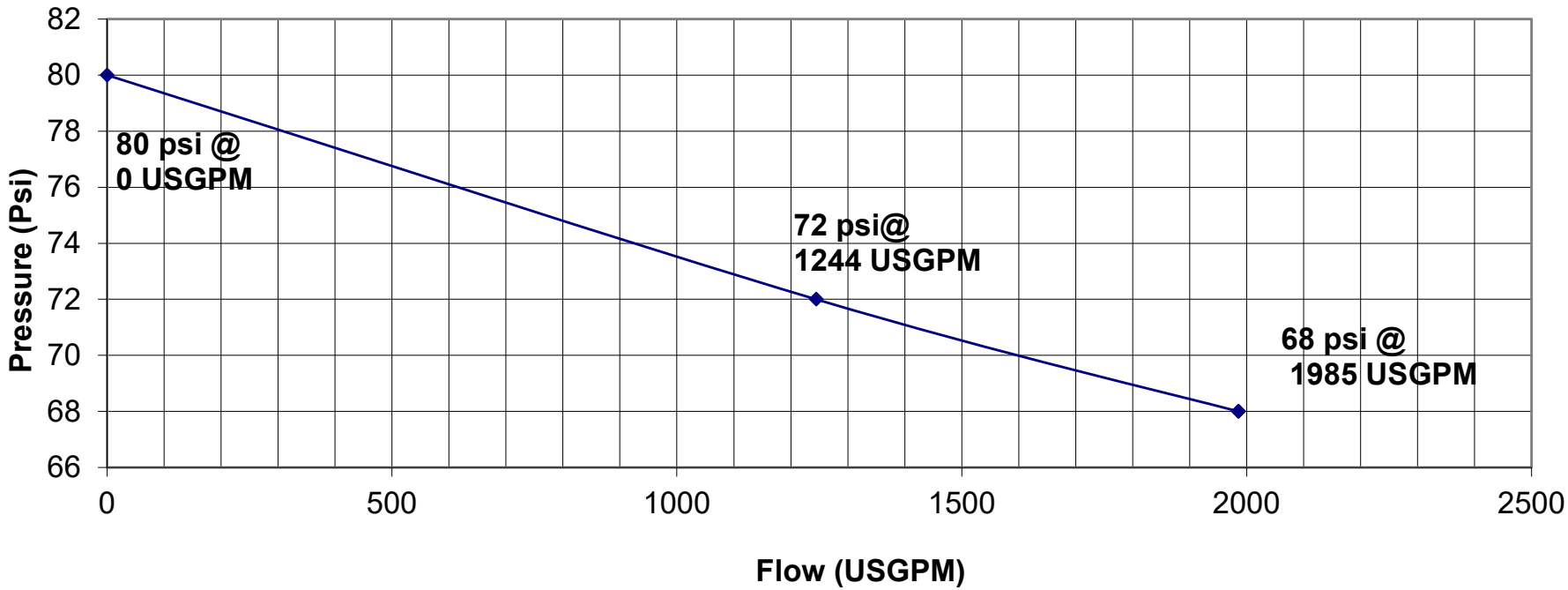
FIRE FLOW AT A SPECIFIED PRESSURE

Pressure =	20	psi
Pressure =	14.064	m
$Q^{1.852}$ =	38517.27	
Flow, Q =	**299.26**	**L/s**
Flow, Q =	4743.46	USGPM

PRESSURE AT SPECIFIED FIRE FLOW

Flow (Q) =	0	L/s
$Q^{1.852}$	0.00	
Pressure =	56.43	m
Pressure =	80.25	psi

NIAGARA REGIONAL FIRE PROTECTION INC.					
Flow Test Location: East side of Dorchester Avenue, approximately 170m south of D					
Static Pressure (Psi)		Pitot Reading 1	55	# of Outlets Flowed 1	1
	80	Outlet Size 1	2.5	# of Outlets Flowed 2	2
Residual Pressure 1 (Psi)		Pitot Reading 2	35	# of Outlets Flowed 3	2
	72	Outlet Size 2	2.5	Graph Data:	
Residual Pressure 2 (Psi)		Pitot Reading 3	35	Pressure Values (y-axis)	Flow Values (x-axis)
	68	Outlet Size 3	2.5	80	0
Residual Pressure 3 (Psi)		Flow 1 Calculated		72	1244
	68		1244.4	68	1985
		Flow 2 Calculated		68	1985
			1985.4	Date & Time of Test :	March 14/2025
Coefficient value		Flow 3 Calculated			2:00PM
	0.9		1985.4	Performed by:	Alex & Dylan



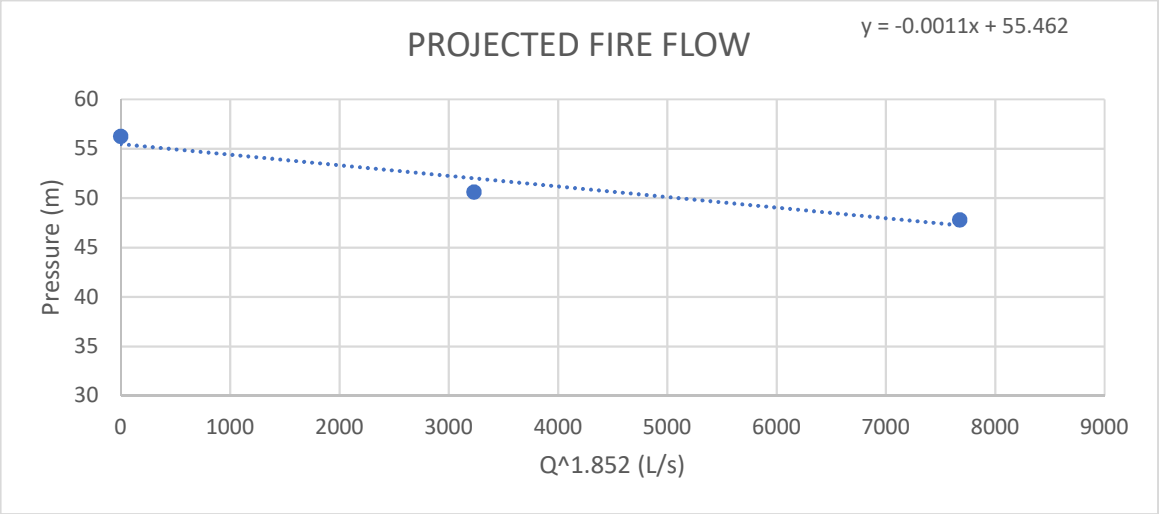
FIRE FLOW CALCULATION SHEET

Project: Dorchester Panoramic
Project Number: 20136
Date: March 18, 2025
Prepared By: Kurt Tiessen, P.Eng.
Reviewed By: Jason Schooley, P.Eng.

Flow Test Provided by: Niagara Regional Fire Protection
Data of Test: March 14, 2025
Hydrant Location: East side of Dorchester, Approx 170m south of Dawson

FLOW TEST RESULTS

TEST	PRESSURE (psi)	FLOW RATE (USGPM)	FLOW RATE (L/s)	$Q^{1.852}$	PRESSURE (m)
STATIC	80	0	0	0	56.26
RESIDUAL 1	72	1244.4	78.51	3231.42	50.63
RESIDUAL 2	68	1985.4	125.26	7676.11	47.82



FIRE FLOW FORMULA (y = ax + b)

a =	-0.0011
b =	55.462

FIRE FLOW AT A SPECIFIED PRESSURE

Pressure =	20	psi
Pressure =	14.064	m
$Q^{1.852}$ =	37634.55	
Flow, Q =	**295.54**	**L/s**
Flow, Q =	4684.45	USGPM

PRESSURE AT SPECIFIED FIRE FLOW

Flow (Q) =	0	L/s
$Q^{1.852}$	0.00	
Pressure =	55.46	m
Pressure =	78.87	psi

UPPER CANADA CONSULTANTS
ENGINEERS / PLANNERS

APPENDIX B

Sanitary Sewer Calculations

UPPER CANADA CONSULTANTS
3-30 HANNOVER DRIVE
ST.CATHARINES, ONTARIO
L2W 1A3

DESIGN FLOWS

RESIDENTIAL: 255 LITRES/PERSON/DAY (AVERAGE DAILY FLOW)
INFILTRATION RATE: 0.286 L / s / ha (M.O.E FLOW ALLOWANCE IS BETWEEN 0.10 & 0.28 L / s / ha)
COMMERCIAL FLOW: 28.0 m^3/ha/day
POPULATION DENSITY: 1.6 PERSONS / UNIT

SEWER DESIGN

PIPE ROUGHNESS: 0.013 FOR MANNING'S EQUATION
PIPE SIZES: 1.016 IMPERIAL EQUIVALENT FACTOR
PERCENT FULL: TOTAL PEAK FLOW / CAPACITY

MUNICIPALITY: CITY OF NIAGARA FALLS
PROJECT : 5259 DORCHESTER RD
PROJECT NO: 20136

SANITARY SEWER DESIGN SHEET

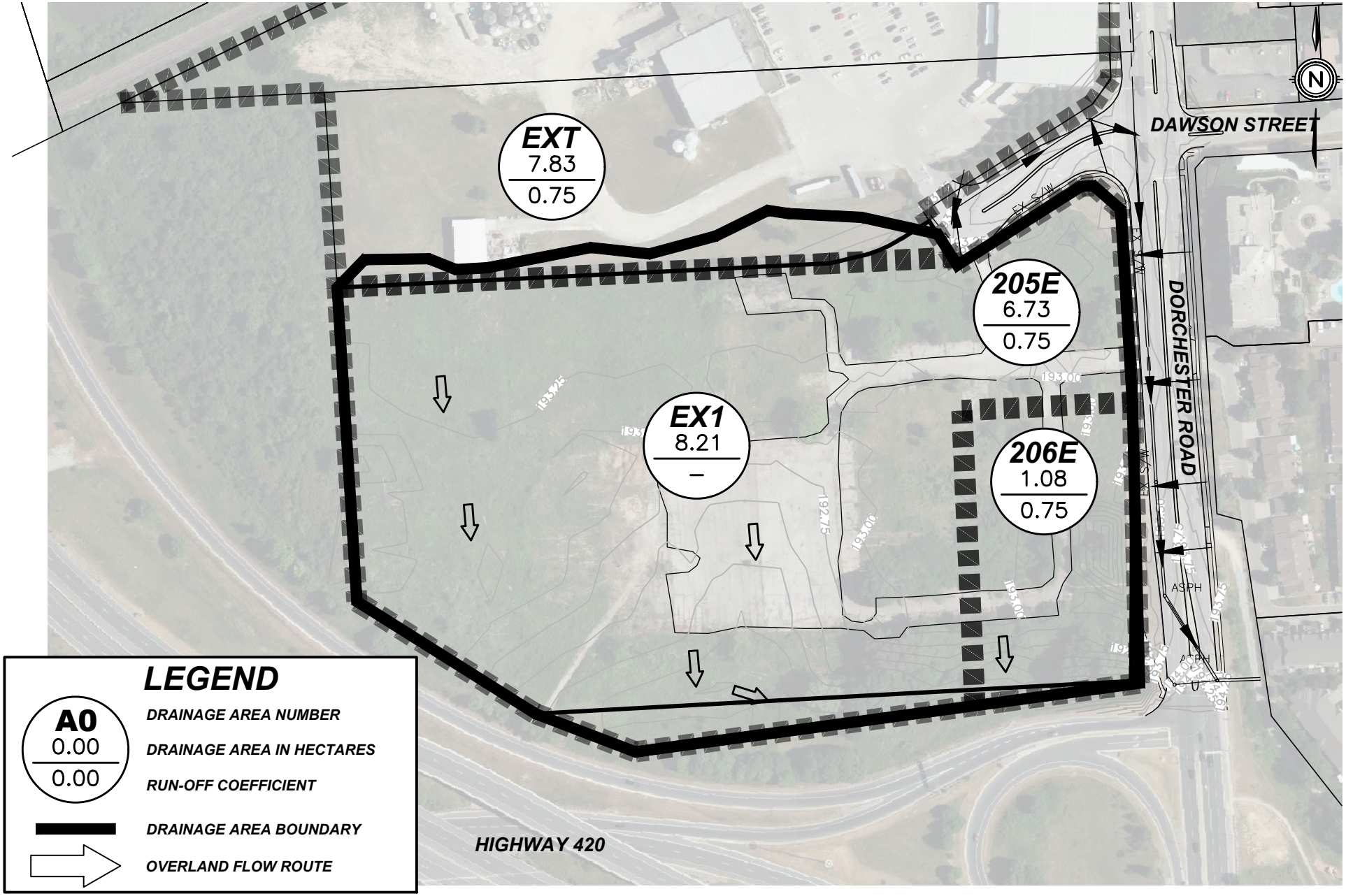
Peaking Factor= $M = 1 + \frac{14}{4 + P^{0.5}}$ Where P = design population in thousands

LOCATION			AREA		POPULATION				ACCUMULATED PEAK FLOW				DESIGN FLOW					
Location and Description	**From M.H**	**To M.H.**	**Increment (hectares)**	**Accumulated (hectares)**	**Number of Units**	**Population Density (persons/unit)**	**Population Increment**	**Total Population Served**	**Peaking Factor**	**Flow (L/s)**	**Infiltration Flow L/s**	**Total Peak Flow (L/s)**	**Pipe Diameter (mm)**	**Pipe Length (m)**	**Pipe Slope (%)**	**Full Flow Velocity (m/s)**	**Full Flow Capacity (L/s)**	**Percent Full**
5259 DORCHESTER ROAD	MH 'A'	MH 'B'																
Residential					1782	1.6	2851	2851	3.46	29.13								
Commercial			0.183			28 m^3/ha/day			2.00	0.12								
	PROP	EX MH		7.54				2851	3.46	29.24	2.16	31.40	250	10.0	0.40	0.77	39.24	80.0%
	EX MH	EX MH		7.54						29.24	2.16	31.40	1200	165.0	0.26	1.78	2073.93	1.5%

UPPER CANADA CONSULTANTS
ENGINEERS / PLANNERS

APPENDIX C

Figure 1 – Existing Overall Storm Drainage Area Plan
Figure 2 – Proposed Overall Storm Drainage Area Plan



LEGEND

A0
0.00
0.00

- DRAINAGE AREA NUMBER
- DRAINAGE AREA IN HECTARES
- RUN-OFF COEFFICIENT
- DRAINAGE AREA BOUNDARY
- OVERLAND FLOW ROUTE

UPPER CANADA CONSULTANTS
ENGINEERS / PLANNERS

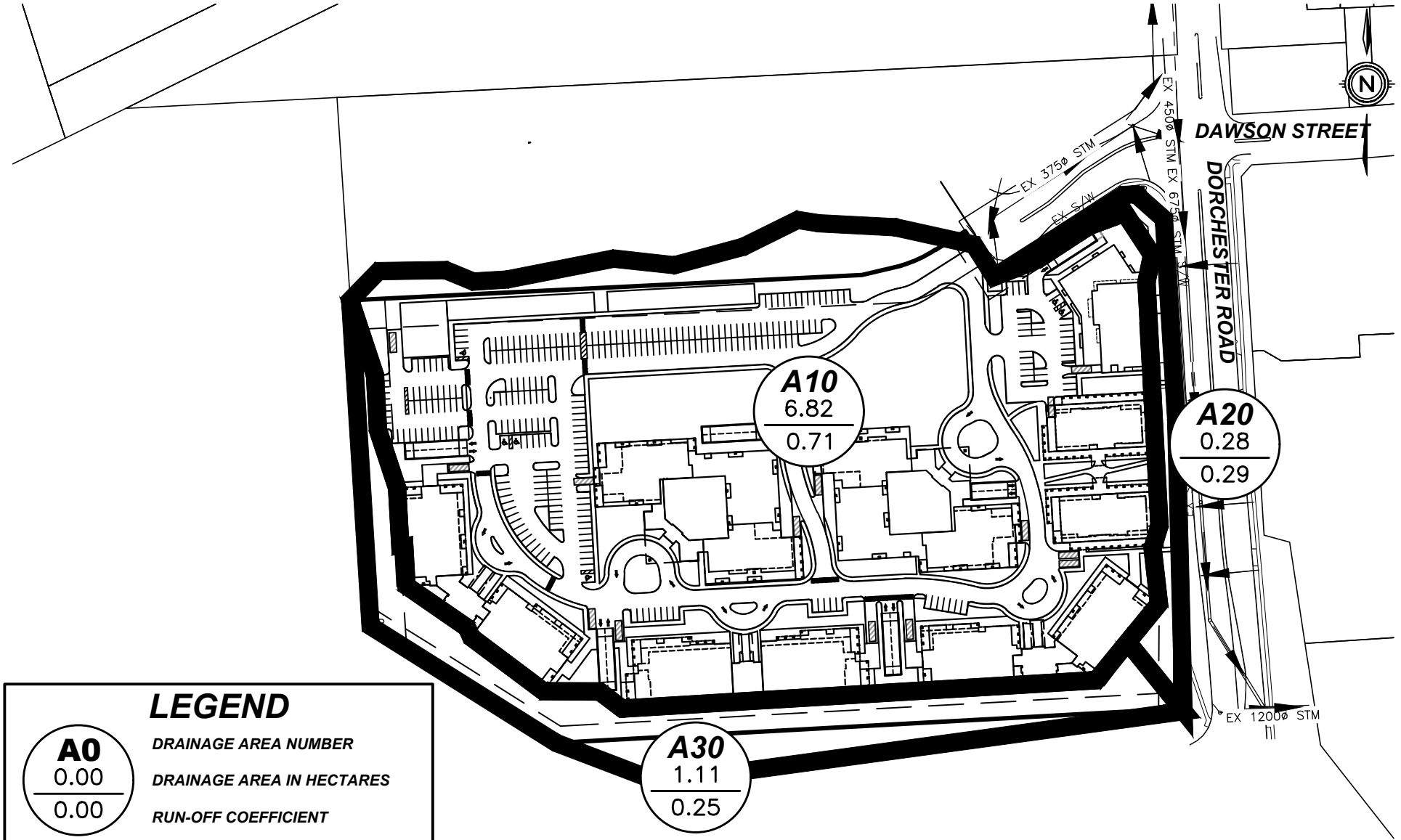
DORCHESTER PANORAMIC

CITY OF NIAGARA FALLS

EXISTING OVERALL STORM DRAINAGE AREA PLAN

DATE	2025–03–14
SCALE	1:2500 m
REF No.	20136
DWG No.	FIGURE 1

DRAWING FILE: F:\20136\Engineering\20136–BASE.dwg PLOTTED: Mar 14, 2025 – 10:20am PLOTTED BY: kurt



LEGEND

A0 0.00 / 0.00 — *DRAINAGE AREA NUMBER* / *DRAINAGE AREA IN HECTARES* / *RUN-OFF COEFFICIENT*

DRAINAGE AREA BOUNDARY

OVERLAND FLOW ROUTE

UPPER CANADA CONSULTANTS
ENGINEERS / PLANNERS

DORCHESTER PANORAMIC

CITY OF NIAGARA FALLS

FUTURE OVERALL STORM DRAINAGE AREA PLAN

DATE	2025–03–14
SCALE	1:2500 m
REF No.	*20136*
DWG No.	*FIGURE 2*

DRAWING FILE: F:\20136\Engineering\20136–BASE.dwg PLOTTED: Mar 14, 2025 – 10:42am PLOTTED BY: kurt

UPPER CANADA CONSULTANTS
ENGINEERS / PLANNERS

APPENDIX D

Weighted Impervious Calculation Sheet
Modified Rational Method Calculations – 2, 5 10, 25, & 100 Year Design Storm Events

Weighted Imperviousness Percentage Calculation Worksheet

Project Name:	Dorchester Panoramic
Project Number:	20136
Date:	March 14, 2025
Person:	K.Tiessen

EX - EXISTING CONDITIONS

	Footprint	*Runoff Coefficient*	*Effective Impervious Area*
Concrete/Granular Driveway and Building Pad	12468.4 m^2	0.70	8727.9 m^2
Vacant Undeveloped Grassed Lands	69648.4 m^2	0.20	13929.7 m^2
TOTAL CATCHMENT IMPERVIOUS AREAS			22,658 m^2
TOTAL CATCHMENT AREA			82,117 m^2
		EFFECTIVE RUNOFF COEFFICIENT	**0.28**

A10 - PROPOSED CONDITIONS

	Footprint	*Runoff Coefficient*	*Effective Impervious Area*
Proposed Limit of Underground Parking Garage/Impervious	49988.0 m^2	0.90	44989.2 m^2
Landcape Area	18208.9 m^2	0.20	3641.8 m^2
TOTAL CATCHMENT IMPERVIOUS AREAS			48,631 m^2
TOTAL CATCHMENT AREA			68,197 m^2
		EFFECTIVE RUNOFF COEFFICIENT	**0.71**

A20 - PROPOSED CONDITIONS

	Footprint	*Runoff Coefficient*	*Effective Impervious Area*
Sidewalk/Impervious Area	370.3 m^2	0.90	333.3 m^2
Landcape Area	2454.3 m^2	0.20	490.9 m^2
TOTAL CATCHMENT IMPERVIOUS AREAS			824 m^2
TOTAL CATCHMENT AREA			2,825 m^2
		EFFECTIVE RUNOFF COEFFICIENT	**0.29**

A30 - PROPOSED CONDITIONS

	Footprint	*Runoff Coefficient*	*Effective Impervious Area*
Sidewalk/impervious Area	758.0 m^2	0.90	682.2 m^2
Landcape Area	10334.1 m^2	0.20	2066.8 m^2
TOTAL CATCHMENT IMPERVIOUS AREAS			2,749 m^2
TOTAL CATCHMENT AREA			11,092 m^2
		EFFECTIVE RUNOFF COEFFICIENT	**0.25**

MODIFIED RATIONAL METHOD

PEAK FLOW CALCULATION SHEET (2 YEAR)

PROJECT: 5259 DORCHESTER ROAD, CITY OF NIAGARA FALLS

LOCATION						TIME OF FLOW		STORMWATER ANALYSIS				
DESCRIPTION	**FROM M.H.**	**TO M.H.**	**PIPE LENGTH (m)**	**INCREMENT AREA (hectares)**	**TOTAL AREA (hectares)**	**TO UPPER END (min)**	**IN SECTION (min)**	**RUNOFF COEFF**	**SECTION A X R**	**ACCUMLD A x R**	**RAINFALL INTENSITY (mm/hr)**	**PEAK FLOW (L/s)**
EXISTING CONDITIONS												
EX1 - To MTO ROAD ALLOWANCE	SITE	OUTLET		8.21	8.21	10.00	0.00	0.280	2.299	2.299	65.902	420.8
ALLOWABLE CONDITIONS												
EX1 - To Dorchester STM System	SITE	OUTLET		8.21	8.21	10.00	0.00	0.750	6.158	6.158	65.902	1127.2
FUTURE CONDITIONS												
A10 - Internal STM system to Dorchester	SITE	OUTLET		6.82	6.82	10.00	0.00	0.710	4.842	4.842	65.902	886.4
A20 - Uncontrolled overland to Dorchester	SITE	OUTLET		0.28	0.28	10.00	0.00	0.290	0.081	0.081	65.902	14.9
A30 - Uncontrolled overland to MTO	SITE	OUTLET		1.11	1.11	10.00	0.00	0.250	0.278	0.278	65.902	50.8
											TOTAL	**952.1**
PROVIDED OUTFLOW TO DORCHESTER												**901.3**

DESIGN BY: **UPPER CANADA CONSULTANTS**
30 HANNOVER DRIVE, UNIT 3
ST. CATHARINES, ON L2W 1A3
DESIGN BY: **K. TIESSEN, P.ENG.**
DATE: **MARCH 2025**

RAINFALL PARAMETERS:
Time to Upper End = 10 min.
City of Niagara Falls - 2 Year IDF Curve

a =	521.97	mm/hr
b =	5.28	minutes
c =	0.76	

MODIFIED RATIONAL METHOD

PEAK FLOW CALCULATION SHEET (5 YEAR)

PROJECT: 5259 DORCHESTER ROAD, CITY OF NIAGARA FALLS

LOCATION						TIME OF FLOW		STORMWATER ANALYSIS				
DESCRIPTION	**FROM M.H.**	**TO M.H.**	**PIPE LENGTH (m)**	**INCREMENT AREA (hectares)**	**TOTAL AREA (hectares)**	**TO UPPER END (min)**	**IN SECTION (min)**	**RUNOFF COEFF**	**SECTION A X R**	**ACCUMLD A x R**	**RAINFALL INTENSITY (mm/hr)**	**PEAK FLOW (L/s)**
EXISTING CONDITIONS												
EX1 - To MTO ROAD ALLOWANCE	SITE	OUTLET		8.21	8.21	10.00	0.00	0.280	2.299	2.299	83.954	536.1
ALLOWABLE CONDITIONS												
EX1 - To Dorchester STM System	SITE	OUTLET		8.21	8.21	10.00	0.00	0.750	6.158	6.158	83.954	1436.0
FUTURE CONDITIONS												
A10 - Internal STM system to Dorchester	SITE	OUTLET		6.82	6.82	10.00	0.00	0.710	4.842	4.842	83.954	1129.2
A20 - Uncontrolled overland to Dorchester	SITE	OUTLET		0.28	0.28	10.00	0.00	0.290	0.081	0.081	83.954	18.9
A30 - Uncontrolled overland to MTO	SITE	OUTLET		1.11	1.11	10.00	0.00	0.250	0.278	0.278	83.954	64.7
											TOTAL	**1212.9**
PROVIDED OUTFLOW TO DORCHESTER												**1148.2**

DESIGN BY: **UPPER CANADA CONSULTANTS**
30 HANNOVER DRIVE, UNIT 3
ST. CATHARINES, ON L2W 1A3
DESIGN BY: **K. TIESSEN, P.ENG.**
DATE: **MARCH 2025**

RAINFALL PARAMETERS:
Time to Upper End = 10 min.
City of Niagara Falls - 5 Year IDF Curve

a =	719.50	mm/hr
b =	6.34	minutes
c =	0.77	

MODIFIED RATIONAL METHOD

PEAK FLOW CALCULATION SHEET (10 YEAR)

PROJECT: 5259 DORCHESTER ROAD, CITY OF NIAGARA FALLS

LOCATION						TIME OF FLOW		STORMWATER ANALYSIS				
DESCRIPTION	**FROM M.H.**	**TO M.H.**	**PIPE LENGTH (m)**	**INCREMENT AREA (hectares)**	**TOTAL AREA (hectares)**	**TO UPPER END (min)**	**IN SECTION (min)**	**RUNOFF COEFF**	**SECTION A X R**	**ACCUMLD A x R**	**RAINFALL INTENSITY (mm/hr)**	**PEAK FLOW (L/s)**
EXISTING CONDITIONS												
EX1 - To MTO ROAD ALLOWANCE	SITE	OUTLET		8.21	8.21	10.00	0.00	0.280	2.299	2.299	99.230	633.6
ALLOWABLE CONDITIONS												
EX1 - To Dorchester STM System	SITE	OUTLET		8.21	8.21	10.00	0.00	0.750	6.158	6.158	99.230	1697.3
FUTURE CONDITIONS												
A10 - Internal STM system to Dorchester	SITE	OUTLET		6.82	6.82	10.00	0.00	0.710	4.842	4.842	99.230	1334.7
A20 - Uncontrolled overland to Dorchester	SITE	OUTLET		0.28	0.28	10.00	0.00	0.290	0.081	0.081	99.230	22.4
A30 - Uncontrolled overland to MTO	SITE	OUTLET		1.11	1.11	10.00	0.00	0.250	0.278	0.278	99.230	76.5
											TOTAL	**1433.6**
PROVIDED OUTFLOW TO DORCHESTER												**1357.1**

DESIGN BY: **UPPER CANADA CONSULTANTS**
30 HANNOVER DRIVE, UNIT 3
ST. CATHARINES, ON L2W 1A3
DESIGN BY: **K. TIESSEN, P.ENG.**

DATE: **MARCH 2025**

RAINFALL PARAMETERS:
Time to Upper End = 10 min.
City of Niagara Falls - 10 Year IDF Curve

a =	577.93	mm/hr
b =	2.44	minutes
c =	0.70	

MODIFIED RATIONAL METHOD

PEAK FLOW CALCULATION SHEET (25 YEAR)

PROJECT: 5259 DORCHESTER ROAD, CITY OF NIAGARA FALLS

LOCATION						TIME OF FLOW		STORMWATER ANALYSIS				
DESCRIPTION	**FROM M.H.**	**TO M.H.**	**PIPE LENGTH (m)**	**INCREMENT AREA (hectares)**	**TOTAL AREA (hectares)**	**TO UPPER END (min)**	**IN SECTION (min)**	**RUNOFF COEFF**	**SECTION A X R**	**ACCUMLD A x R**	**RAINFALL INTENSITY (mm/hr)**	**PEAK FLOW (L/s)**
EXISTING CONDITIONS												
EX1 - To MTO ROAD ALLOWANCE	SITE	OUTLET		8.21	8.21	10.00	0.00	0.280	2.299	2.299	111.462	711.7
ALLOWABLE CONDITIONS												
EX1 - To Dorchester STM System	SITE	OUTLET		8.21	8.21	10.00	0.00	0.750	6.158	6.158	111.462	1906.5
FUTURE CONDITIONS												
A10 - Internal STM system to Dorchester	SITE	OUTLET		6.82	6.82	10.00	0.00	0.710	4.842	4.842	111.462	1499.2
A20 - Uncontrolled overland to Dorchester	SITE	OUTLET		0.28	0.28	10.00	0.00	0.290	0.081	0.081	111.462	25.1
A30 - Uncontrolled overland to MTO	SITE	OUTLET		1.11	1.11	10.00	0.00	0.250	0.278	0.278	111.462	85.9
											TOTAL	**1610.3**
PROVIDED OUTFLOW TO DORCHESTER												**1524.4**

DESIGN BY: **UPPER CANADA CONSULTANTS**
30 HANNOVER DRIVE, UNIT 3
ST. CATHARINES, ON L2W 1A3
DESIGN BY: **K. TIESSEN, P.ENG.**

DATE: **MARCH 2025**

RAINFALL PARAMETERS:
Time to Upper End = 10 min.
City of Niagara Falls - 25 Year IDF Curve

a =	1020.69	mm/hr
b =	7.29	minutes
c =	0.78	

MODIFIED RATIONAL METHOD

PEAK FLOW CALCULATION SHEET (100 YEAR)

PROJECT: 5259 DORCHESTER ROAD, CITY OF NIAGARA FALLS

LOCATION						TIME OF FLOW		STORMWATER ANALYSIS				
DESCRIPTION	**FROM M.H.**	**TO M.H.**	**PIPE LENGTH (m)**	**INCREMENT AREA (hectares)**	**TOTAL AREA (hectares)**	**TO UPPER END (min)**	**IN SECTION (min)**	**RUNOFF COEFF**	**SECTION A X R**	**ACCUMLD A x R**	**RAINFALL INTENSITY (mm/hr)**	**PEAK FLOW (L/s)**
EXISTING CONDITIONS												
EX1 - To MTO ROAD ALLOWANCE	SITE	OUTLET		8.21	8.21	10.00	0.00	0.280	2.299	2.299	133.938	855.3
ALLOWABLE CONDITIONS												
EX1 - To Dorchester STM System	SITE	OUTLET		8.21	8.21	10.00	0.00	0.750	6.158	6.158	133.938	2290.9
FUTURE CONDITIONS												
A10 - Internal STM system to Dorchester	SITE	OUTLET		6.82	6.82	10.00	0.00	0.710	4.842	4.842	133.938	1801.5
A20 - Uncontrolled overland to Dorchester	SITE	OUTLET		0.28	0.28	10.00	0.00	0.290	0.081	0.081	133.938	30.2
A30 - Uncontrolled overland to MTO	SITE	OUTLET		1.11	1.11	10.00	0.00	0.250	0.278	0.278	133.938	103.2
											TOTAL	**1935.0**
PROVIDED OUTFLOW TO DORCHESTER												**1831.7**

DESIGN BY: **UPPER CANADA CONSULTANTS**
30 HANNOVER DRIVE, UNIT 3
ST. CATHARINES, ON L2W 1A3
DESIGN BY: **K. TIESSEN, P.ENG.**
DATE: **MARCH 2025**

RAINFALL PARAMETERS:

Time to Upper End = 10 min.

City of Niagara Falls - 100 Year IDF Curve

a = 1264.60 mm/hr

b = 7.72 minutes

c = 0.78