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- Environmental Restoration

Block 1 & 2 Development

22 Pickering Place

Servicing and Stormwater Management Report

SERVICING AND STORMWATER MANAGEMENT REPORT

BLOCK 1 & 2 DEVELOPEMENT
22 PICKERING PLACE
CITY OF OTTAWA

Prepared By:

NOVATECH
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario
K2M 1P6

Prepared: August 1, 2024

Novatech File: 119240
Ref: R-2024-090

NOVATECH
Engineers, Planners & Landscape Architects

August 1, 2024

City of Ottawa
Planning and Growth Management Department
110 Laurier Avenue West, 4th Floor
Ottawa, Ontario
K1P 1J1

Attention: **Tracey Scaramozzino RPP/MCIP**

Dear Ms. Scaramozzino:

Reference: **Block 1 & 2, 22 Pickering Place, City of Ottawa**
Servicing and Stormwater Management Report
Our File No.: 119240

Please find enclosed the 'Servicing and Stormwater Management Report' for the above noted project. This report is submitted for review in support of the Site Plan Application for the proposed development.

Should you have any questions or require additional information, please contact the undersigned.

Sincerely,

NOVATECH

Matthew Hrehoriak, P.Eng.
Project Manager, Land Development Engineering

cc: Bonnie Martell, Colonnade Bridgeport

Suite 200, 240 Michael Cowpland Drive, Ottawa ON K2M 1P6 Tel: 613.254.9643 Fax: 613.254.5867 www.novatech-eng.com

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LIST OF ENGINEERING DRAWINGS

1.0 INTRODUCTION

Novatech has been retained by Colonnade Bridgeport to prepare a Servicing and Stormwater Management Report for the proposed residential development located at 22 Pickering Place within the City of Ottawa. The proposed site is denoted as Block 1 & 2 on the proposed plan of subdivision (Formally Registered Plan No. 320 City of Ottawa). The development is part of the 25 Pickering Place development which includes the construction of a proposed public right-of-way (Bannermount Avenue) and the rehabilitation of the existing Pickering Place and Avenue K public right-of-way. The proposed subdivision design has been reviewed and approved by the City of Ottawa and registration and construction is imminent. The detailed design for the subdivision works is outlined within a separate Novatech report titled '25 Pickering Place Servicing and Stormwater management Report'. The purpose of this report is to support the site plan application for the subject development on Block 1 & 2. **Figure 1** Key Plan shows the site location.

2.0 EXISTING CONDITIONS

The two development Blocks 1 & 2 are approximately 0.42 hectares in size and are currently vacant. The site was previously occupied by the Dustbane Products Limited warehouse and office buildings which were demolished in the spring of 2024. The site is bound by Bannermount Avenue to the north, a future development (Block 3) to the east, existing parking lot to the south, and Pickering Place to the west. **Figure 2** shows the existing site conditions.

3.0 PROPOSED DEVELOPMENT

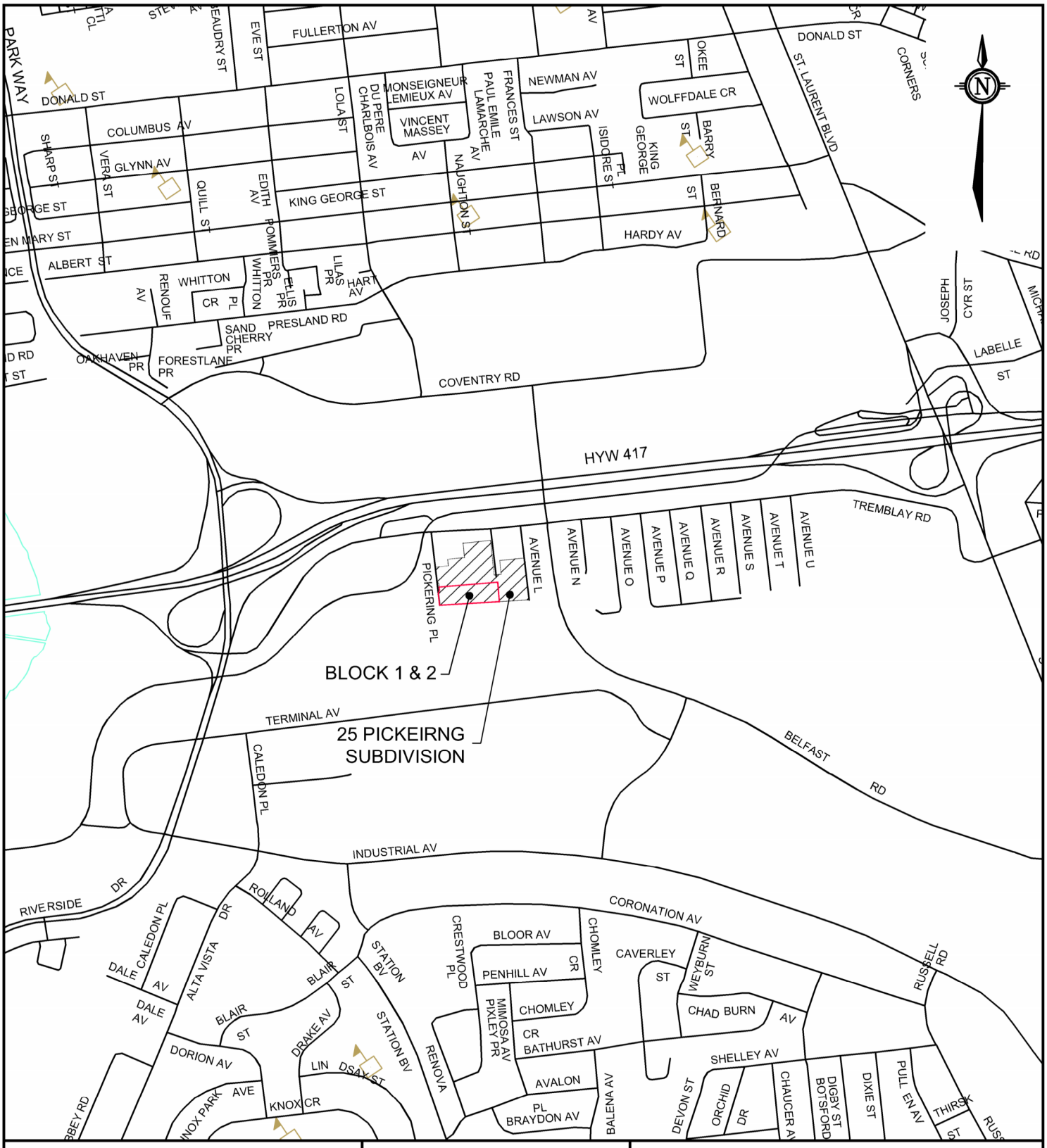
It is proposed to develop Blocks 1 &2 with two high-rise multi-residential towers connected by an underground parking garage. Access to the parking garage will be provided from Pickering Place. A movers/ garbage site access will be provided from Pickering Place for Block 1 and Bannermount Avenue for Block 2. Block 1 will be (28) storeys in height with a footprint of 1966m^2 and 309 units. Block 2 will be (14) storeys in height with a footprint of 2242m^2 and 174 units. The proposed towers will be serviced from the sewers and watermain in Bannermount Avenue and Pickering Avenue. **Figure 3** shows the proposed site plan.

It should be noted that this report should be read in conjunction with the following engineering drawings:
General Plan of Services (dwg 119240-SPGP)
Grading Plan (dwg 119240-SPGR)
Notes and Details Plan (dwg 119240-SPND)
Erosion and Sediment Control Plan (dwg 119240-SPESC)

4.0 SITE CONSTRAINTS

A geotechnical investigation was completed by Pinchin Ltd. and a report prepared entitled 'Geotechnical Investigation, Proposed Residential Development' dated March 2, 2020. The report included the following recommendations:

- It should be noted that bedrock was encountered between 6.4 to 9.1m below existing grade.
- It should be noted that ground water was observed at approximately 1.5-3.0m below existing grade.
- During construction, groundwater volumes pumped could exceed 50,000 L/day and it would be required to register on the Environmental Activity and Sector Registry (EASR).



NOVATECH
Engineers, Planners & Landscape Architects
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada K2M 1P6

Telephone (613) 254-9643
Facsimile (613) 254-5867
Website www.novatech-eng.com

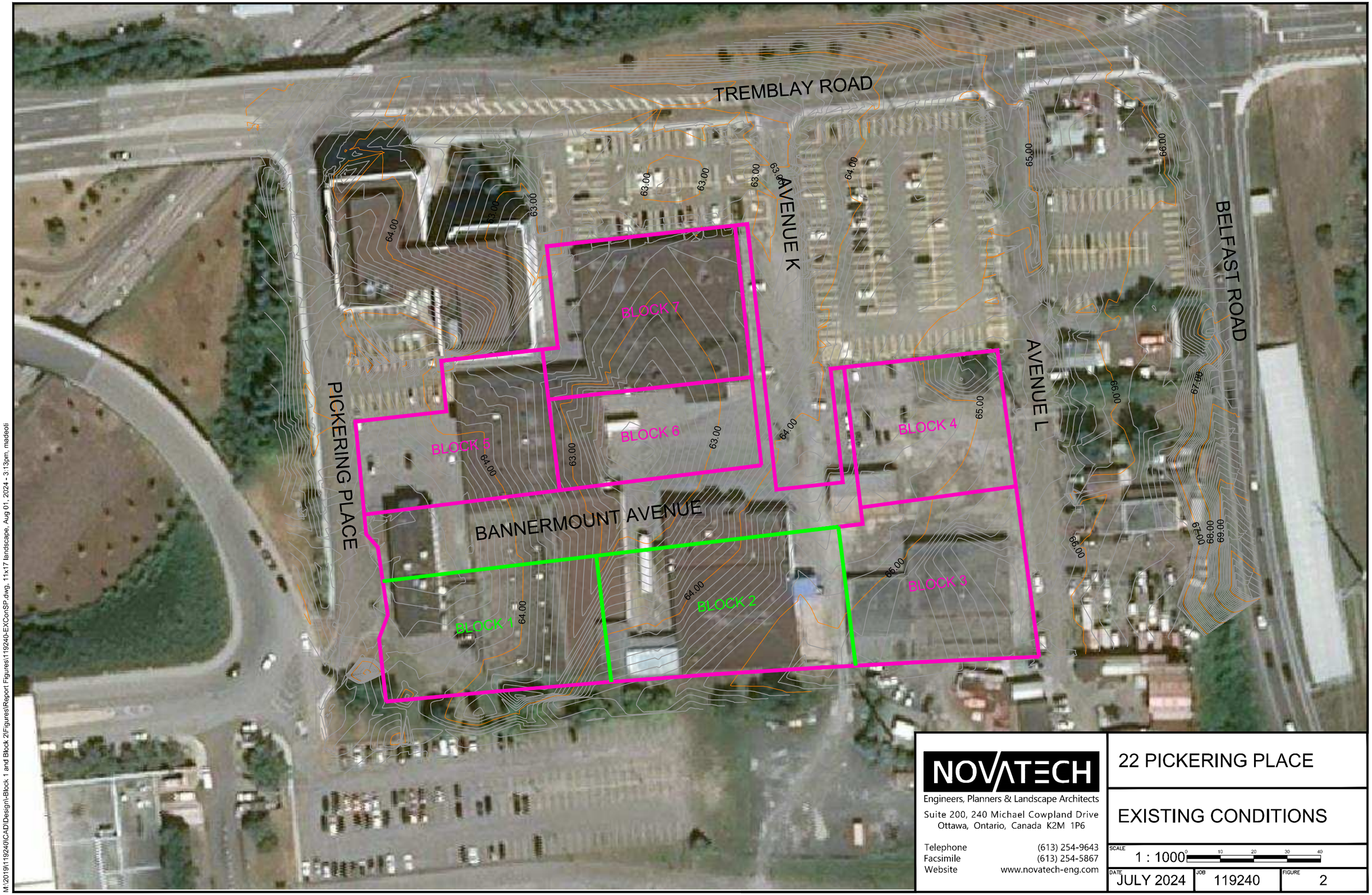
KEY PLAN

22 PICKERING PLACE

DATE	JOB	FIGURE
JUL 2024	119240	1

M:\2019\119240\CAD\Design\-Block 1 and Block 2\Figures\Report Figures\119240-KPSP.dwg, Sheet 8x11 Keyplan, Aug 01, 2024 - 2:38pm, madeoti

SHT8X11.DWG - 216mmx279mm



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NOVATECH
Engineers, Planners & Landscape Architects
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada K2M 1P6

Telephone (613) 254-9643
Facsimile (613) 254-5867
Website www.novatech-eng.com

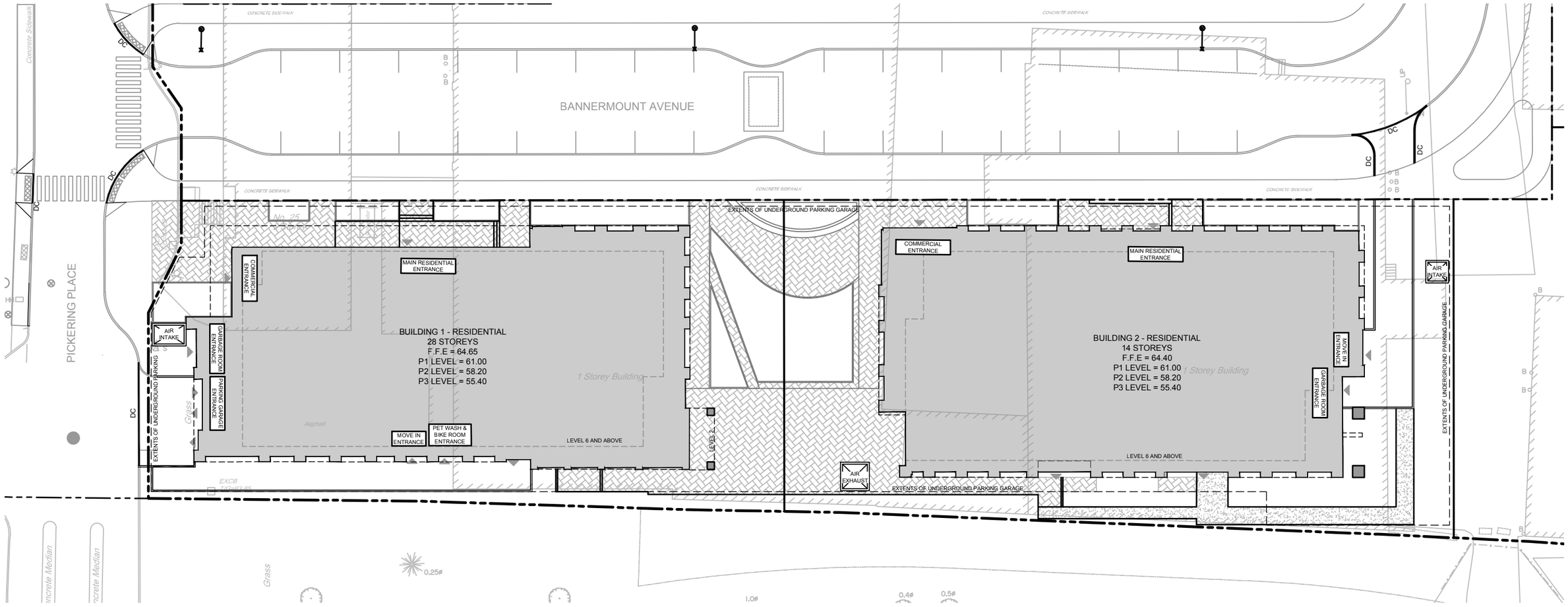
22 PICKERING PLACE

EXISTING CONDITIONS

SCALE 1 : 1000 (0 10 20 30 40)

DATE JULY 2024 | JOB 119240 | FIGURE 2

SHT11X17.DWG - 279mmX432mm



M:\2019\119240\CAD\Design\-Block 1 and Block 2\Figures\Report Figures\119240-PRSP.dwg, PRSP, Jul 30, 2024 - 1:24pm, madeoti

NOVATECH
Engineers, Planners & Landscape Architects
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada K2M 1P6
Telephone (613) 254-9643
Facsimile (613) 254-5867
Website www.novatech-eng.com

22 PICKERING PLACE
CITY OF OTTAWA

PROPOSED SITE PLAN
BLOCK 1 & 2

SCALE 1 : 400 (0, 4, 8, 12, 16)
DATE JUL 2024
JOB 119240
FIGURE 3

SHT11X17.DWG - 279mmX432mm

5.0 REFERENCE AND SUPPORTING DOCUMENT

The following documents will be referenced in conjunction with this report:

- 25 Pickering Place Ottawa, Ontario - Servicing and Stormwater Management Report R-2022-170, Prepared by Novatech revised September 20, 2023 (Novatech SWM Report)

6.0 WATER SERVICING

The subject development is located within the City of Ottawa 1E pressure zone. As previously indicated, the development blocks are part of a larger development (25 Pickering Place plan of subdivision) which includes the construction of Bannermount Avenue and the reconstruction of Pickering Plance and Avenue K. As part of the subdivision works the existing 150mm diameter watermain in Pickering Place and Avenue K will be upgraded with a new 200mm diameter watermain which will be looped through the new Bannermount right-of -way.

Block 1 will be serviced by two 200mmm diameter service laterals that connect to the new 200mm diameter watermain in Pickering Place and Bannermount Avenue. Block 2 will also be serviced by two 200mm diameter service laterals that connect to the new 200mm diameter watermain in Bannermount Avenue. Refer to the General Plan of Services drawing (119240-SPGP) for additional servicing details.

The water demand and fire flow calculations have been calculated using criteria from Section 4 of the City of Ottawa Water Distribution Guidelines. The required fire demand was calculated using the 2020 Fire Underwriters Survey (FUS) Guidelines. The water demands were calculated based on a total population of 772 people from a total of 483 units based on the following criteria:

Water Demands:

- Average Daily Demand = 280 L/capita/day
- Commercial Flow Demand = 28000 L/gross ha/day
- Studio Apartment Population = 1.4 Person/Unit
- 1-Bedroom Apartment Population = 1.4 Person/Unit
- 2-Bedroom Apartment Population = 2.1 Person/Unit
- Residential Maximum Daily Demand = 2.5 x Average Daily Demand
- Residential Peak Hour Demand = 2.2 x Maximum Daily Demand
- Commercial Maximum Daily Demand = 1.5 x Average Daily Demand
- Commercial Peak Hour Demand = 1.8 x Maximum Daily Demand
- Fire Flow = Fire Underwriters Survey (FUS)

The water demands and fire flow calculations are provided in **Appendix A** for reference. A summary of the water demands, and fire flow requirements for each block are provided below in **Table 6.1.**

Table 6.1: Water Demand Summary

Area	Ave. Daily Demand (L/s)	Max. Daily Demand (L/s)	Peak Hour Demand (L/s)	Fire Flow (L/s)
Block 1	1.65	4.11	9.05	**67.0**
Block 2	0.86	2.15	4.74	
Total	**2.51**	**6.26**	**13.79**	

As per the City of Ottawa Technical Bulletin ISDTB-2014-02, the proposed development areas will require two service connections as the average day demands are greater than 50 cubic meters of water per day. The two services will be separated by an isolation valve within the municipal watermain system in the event maintenance on the system is required.

The City of Ottawa provided boundary conditions from the City's water model based on water demand information provided during the detailed subdivision design. The boundary conditions were used to determine whether the existing watermain infrastructure surrounding the development has capacity for the proposed development. The boundary conditions are provided below in **Table 6.2**.

Table 6.2: Water Boundary Conditions

Criteria	Head (m)
Connection to Existing 300mm Watermain Tremblay Road	
Minimum HGL	109.1
Maximum HGL	118.9
Max Day + Fire Flow HGL	114.6
Connection to Existing 300mm Watermain in Belfast Road	
Minimum HGL	108.9
Maximum HGL	118.9
Max Day + Fire Flow HGL	112.3

These boundary conditions were used to create a hydraulic model using EPANET for analyzing the performance of the proposed watermain system for the three revised theoretical conditions: 1) High Pressure check under Average Day conditions, 2) Peak Hour demand, 3) Maximum Day + Fire Flow Demand. The following **Table 6.3** summarizes the results from the hydraulic water analysis.

Table 6.3: Water Analysis Results Summary

Condition	Demand (L/s)	Min/Max Allowable Operating Pressures (psi)	Limits of Design Operating Pressures (psi)
High Pressure	9.85*	80psi (Max)	79.24*
Max Day + Fire Flow	91.61*	20psi (Min)	66.78*
Peak Hour	54.17*	40psi (Min)	61.69*

** Updated domestic demands and Limits of Design*

The above noted results from the hydraulic analysis include the proposed domestic demands from the Block 1 & 2 development and the anticipated domestic demands from the future development blocks. The fire flows are based on the Block 1 and 2 requirements. Refer to the '25 Pickering Place Servicing and Stormwater Management Report' for more details.

Based on the proceeding analysis it can be concluded that the watermain will provide adequate flow and pressures for the fire flow + maximum day demand and peak hour demand. The proposed fire hydrants surrounding the development on Pickering Place, Bannermount Avenue

and Avenue K will provide the required fire protection for the proposed development. Refer to **Appendix A** for hydraulic calculations and City of Ottawa boundary conditions.

7.0 SANITARY SERVICING

As part of the subdivision works the existing 225mm diameter sanitary sewer in Pickering Place and Avenue K will be replaced with a new 250mm diameter sanitary sewer. A new 250mm diameter sanitary sewer will be constructed in Bannermount Avenue which connects to the sewer in Pickering Place. Blocks 1 & 2 will be serviced from the sanitary sewer in Bannermount Avenue with two 200mm diameter service laterals. Refer to the General Plan of Services drawing (119240-SPGP) for additional servicing details.

Sanitary flows for the proposed development are calculated from criteria in Section 4 of the *City of Ottawa Sewer Design Guidelines* (October 2012). The calculations are based on a total population 772 people from a total of 483 units using the following design criteria:

- Average Daily Demand = 280 L/capita/day
- Commercial Flow Demand = 28000 L/gross ha/day
- Studio Apartment Population = 1.4 Person/Unit
- 1-Bedroom Apartment Population = 1.4 Person/Unit
- 2-Bedroom Apartment Population = 2.1 Person/Unit
- Residential Peaking Factor = Harmon Equation (max peaking factor = 4.0)
- Commercial Peaking Factor = 1.5
- Peak Extraneous Flows (Infiltration) = 0.33L/s/ha

Detailed sanitary flow calculations are provided in **Appendix B** for reference. The peak sanitary flows including infiltration are summarized below in **Table 7.1**.

Table 7.1: Sanitary Flow Summary

Building	Peak Residential Flows (L/s)	Peak Commercial Flows (L/s)	Extraneous Flows (L/s)	Total (L/s)
Block 1	5.22	0.01	0.06	**5.29**
Block 2	2.82	0.01	0.07	**2.90**
Total	**8.04**	**0.02**	**0.14**	**8.19**

The Block 1 & 2 developments were allocated 3.66 L/s and 4.12 L/s in the '25 Pickering Place Servicing and Stormwater Management Report'. Although the total allotted flow of 7.78L/s is marginally less than the proposed theoretical peak flow of 8.19 L/s it is our understanding that the City's system currently has capacity for the proposed development, and flow reserves are based on a 'first come first serve basis'.

8.0 STORM SERVICING & STORMWATER MANGEMENT

As part of the subdivision works the existing storm sewers in Pickering Place and Avenue K will be replaced with a new storm sewer with pipes ranging in size from 375mm to 525mm in diameter. A new storm sewer will be constructed in Bannermount Avenue with pipes also ranging in size from 375mm to 525mm in diameter which connect to the sewer in Pickering Place. Blocks 1 & 2 will be serviced from the new storm sewer in Bannermount Avenue with two 250mm diameter

service laterals. Refer to the General Plan of Services drawing (119240-SPGP) for servicing details.

8.1 Stormwater Management Criteria

The stormwater management strategy for the site has been developed based on criteria provided by the City of Ottawa and Rideau Valley Conservation Authority (RVCA).

8.1.1 Stormwater Quality Control

The quality control requirement for the development is enhanced level treatment or 80% removal of total suspended solids. The quality control will be provided in the downstream municipal oil and grit separator systems in Pickering Place and Avenue K. No additional quality control measures will be provided on the development blocks as the runoff is considered clean as there is generally only runoff from roof and landscape areas.

8.1.2 Stormwater Quantity Control – Allowable Release Rate

The allowable release rate for the overall development was calculated to be 288 L/s which was based on the following criteria:

- The 5-year IDF information from the MacDonald Cartier Airport.
- The pre-development runoff coefficient or a maximum 'C' of 0.50, whichever is less.
- A calculated time of concentration (Cannot be less than 10 minutes).
- Flows to the storm sewer in excess of the 5-year storm release rate, up to and including the 100-year storm event, must be detained on site.

Each block in the overall 25 Pickering Place development was allocated a portion of this total release rate. The allocated release rates for Blocks 1 and 2 are summarized below in **Table 8.1**.

Table 8.1 Allowable Release Rates

Development Area	Area (ha)	*Area %	Allowable Release Rate (L/s)
Block 1	0.196	13.7%	22
Block 2	0.224	15.7%	25

**Note: Area % is based on the percentage of the total subdivision development area.*

Refer to the '25 Pickering Place Servicing Stormwater Management Report' for detailed calculations on the allowable release rate allocation.

8.1.3 Post-Development Conditions

The post-development conditions will include both uncontrolled direct runoff and controlled site flows. Stormwater from the roof and central courtyard area above will be captured by roof drains and area deck drains. Storm flows will be conveyed by the internal building plumbing to the underground storage tanks located north-west corner of block 1 and north-east corner of block 2. Stormwater collected within the storage tank will be pumped to the municipal storm sewer in Bannermount Avenue. The pumps which will be detailed during the building permit phase of the project by the Mechanical Engineer will be designed to control the release of

stormwater from the Block 1 & 2 tanks to a maximum rate of 8.0 L/s (126.8 USGPM) and 16.5 L/s (261.5 USGPM) respectively.

Table 8.2 and **Table 8.3** below summarizes the total post-development flows from Block 1 & 2 in the 5-year and 100-year event.

Table 8.2: Post-Development Stormwater Management Summary (Block 1)

Area ID	Area (ha)	1:5 Year Weighted Cw	5 Year Storm Event		100 Year Storm Event		
			Release (L/s)	Req'd Vol (cu.m)	Release (L/s)	Req'd Vol (cu.m)	Max. Vol. Provided (cu.m.)
DR 1&2	0.041	0.61	7.2	N/A	14.0	N/A	N/A
A1, A2 & R1	0.156	0.90	8.0	23.7	8.0	59.3	70.0
Total			**15.2**		**22.0**		
Allowable			**22.0**		**22.0**		

Table 8.3: Post-Development Stormwater Management Summary (Block 2)

Area ID	Area (ha)	1:5 Year Weighted Cw	5 Year Storm Event		100 Year Storm Event		
			Release (L/s)	Req'd Vol (cu.m)	Release (L/s)	Req'd Vol (cu.m)	Max. Vol. Provided (cu.m.)
DR 1&2	0.017	0.90	4.4	N/A	8.4	N/A	N/A
A1, A2 & R1	0.207	0.73	16.5	16.8	16.5	48.7	50.0
Total			**20.9**		**24.9**		
Allowable			**25.0**		**25.0**		

As indicated in the **Table 8.2 and 8.3** above, the 5-year and 100-year post-development flows will be less than or equal to the target allowable release rate for the site. Refer to **Appendix C** for the detailed drainage area plan and stormwater management calculations.

8.2 Major Overland Flow Route

A major overland flow route will be provided for storms greater than the 100-year storm event. Stormwater will be directed to the Bannermount Avenue right-of-way. The major overland system is shown on the Grading Plan (119240-SPGR).

9.0 EROSION AND SEDIMENT CONTROL

Temporary erosion and sediment control measures will be implemented on-site during construction in accordance with the Best Management Practices for Erosion and Sediment Control. This includes the following temporary measures:

- Filter socks (catchbasin inserts) will be placed in existing and proposed catchbasins and catchbasin manholes, and will remain in place until vegetation has been established and construction is completed;
- Silt fencing will be placed along the surrounding construction limits;
- Mud mats will be installed at the site entrances;
- Strawbale or rock check dams will be installed in swales and ditches;

- The contractor will be required to perform regular street sweeping and cleaning as required, to suppress dust and to provide safe and clean roadways adjacent to the construction site;

Erosion and sediment control measures should be inspected daily and after every rain event to determine maintenance, repair or replacement requirements. Sediments or granulars that enter site sewers shall be removed immediately by the contractor. These measures will be implemented prior to the commencement of construction and maintained in good order until vegetation has been established. Refer to the Grading Plan (119240-SPESC) for additional information.

10.0 CONCLUSIONS AND RECOMMENDATIONS

Watermain

The analysis of the existing and proposed watermain network confirms the following:

- The new 200mm dia. municipal watermain fronting the development in Pickering Place and Bannermount Avenue will adequately service the proposed developments.
- It is anticipated that there are adequate pressures in the existing watermain infrastructure to meet the required domestic demands for the development.
- It is anticipated that there is adequate flow to service the proposed fire protections system.

Sanitary Servicing

The analysis of the existing and proposed sanitary system confirms the following:

- The proposed development will be adequately serviced by the new 250mm diameter municipal sanitary sewer in Bannermount Avenue.
- It is anticipated there is adequate capacity within the City system, and it is our understanding that the flow reserve is on a 'first come first serve basis'.

Stormwater Management

The following provides a summary of the storm sewer and stormwater management system:

- The proposed storm service connection for block 1 & 2 is to connect to the new storm sewer in Bannermount Avenue.
- Storm sewers (minor system) have been designed to convey the uncontrolled 2-year peak flow using the Rational Method.
- Quantity control of stormwater will be provided by mechanical pumps and underground storage tanks.
- Quality control of will be provided through the installation of an Oil and Grit Separator Unit.
- A major overland flow route is provided to Bannermount Avenue

Erosion and Sediment control

- Erosion and sediment control measures (i.e. filter fabric, catchbasin inserts, silt fences, etc.) will be implemented prior to construction and are to remain in place until vegetation is established.

11.0 CLOSURE

The preceding report is respectfully submitted for review and approval. Please contact the undersigned should you have questions or require additional information.

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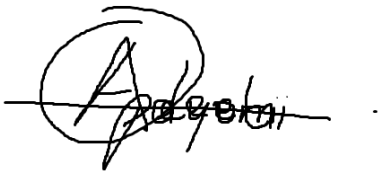
Prepared by:



Micheal Adeoti, E.I.T, M.Eng.
Engineer in Training
Land Development Engineering

Reviewed by:

Matthew Hrehoriak, P.Eng
Project Manager
Land Development Engineering

APPENDIX A
Water Servicing Information

NOVATECH
Engineers, Planners & Landscape Architects

22 Pickering Place - Block 1 Block 2
WATER DEMAND

JOB NO. 119240
DATE PREPARED: APRIL 2024

Building	Residential Demand (L/s)							Commercial Demand (L/s)				Total Demand (L/s)		
	Apartment Unit Count			Total Population	Avg Day	Max. Daily	Peak Hour	Floor Area (m^2)	Avg Day	Max. Daily	Peak Hour	Avg Day	Max. Daily	Peak Hour
	Studio	1-Bed	2-Bed											
Building 1	54	150	105	507	1.64	4.11	9.04	130.4	0.004	0.006	0.011	1.65	4.11	9.05
Building 2	46	96	32	265	0.86	2.15	4.72	148.5	0.005	0.007	0.013	0.86	2.15	4.74
Total	100	246	137	772								**2.51**	**6.27**	**13.78**

Design Parameters:

Studio Apartment	**1.4**	person/unit
1-Bedroom Apartment	**1.4**	person/unit
2-Bedroom Apartment	**2.1**	person/unit

Section 4.0 Ottawa Sewer Design Guidelines

- Average Domestic Flow	280	L/person/day
- Commerical Flow	28000	L/(gross ha/day)

Peaking Factors: Table 4.2 City of Ottawa Water Distribution Guidelines

Max. Daily Demand:

- Residential	2.5	x Avg Day
- Commercial	1.5	x Avg Day

Peak Hourly Demand:

- Residential	2.2	x Max Day
- Commercial	1.8	x Max Day

FUS - Fire Flow Calculations

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Novatech Project #: 119240
Project Name: 22 Pickering Place
Date: 4/25/2024
Input By: Micheal Adeoti
Reviewed By: Matthew Hrehoriak
Drawing Reference: Hobin Archi. Site Plan (A1.00) - 20240422

Legend: Input by User
No Input Required
Reference: Fire Underwriter's Survey Guideline (2020)
Formula Method

Building Description: 28 Storey Building with Podium (Block 1)
Type II - Non-combustible construction

Step			Choose		Value Used	Total Fire Flow (L/min)
Base Fire Flow						
1	**Construction Material**			**Multiplier**		
	Coefficient related to type of construction **C**	Type V - Wood frame		1.5	0.8	
		Type IV - Mass Timber		Varies		
		Type III - Ordinary construction		1		
		Type II - Non-combustible construction	Yes	0.8		
		Type I - Fire resistive construction (2 hrs)		0.6		
2	**Floor Area**					
	A	Podium Level Footprint (m^2)	1162			
		Total Floors/Storeys (Podium)	5			
		Tower Footprint (m^2)	807			
		Total Floors/Storeys (Tower)	23			
		Protected Openings (1 hr)	Yes			
		A, Total Effective Floor Area (m^2)			**1,743**	
	F	**Base fire flow without reductions**				**7,000**
		F = 220 **C** (**A**)$^{0.5}$				
Reductions or Surcharges						
3	**Occupancy hazard reduction or surcharge**		**FUS Table 3**	**Reduction/Surcharge**		
	(1)	Non-combustible	Yes	-25%	-25%	**5,250**
		Limited combustible		-15%		
		Combustible		0%		
		Free burning		15%		
		Rapid burning		25%		
4	**Sprinkler Reduction**		**FUS Table 4**	**Reduction**		
	(2)	Adequately Designed System (NFPA 13)	Yes	-30%	-30%	**-2,598**
		Standard Water Supply	Yes	-10%	-10%	
		Fully Supervised System	Yes	-10%	-10%	
				Cumulative Sub-Total	**-50%**	
		Area of Sprinklered Coverage (m^2)	24117	99%		
				Cumulative Total	**-49%**	
5	**Exposure Surcharge per**		**FUS Table 5**		**Surcharge**	
	(3)	North Side	3.1 - 10 m		20%	**1,838**
		East Side	10.1 - 20 m		15%	
		South Side	>30m		0%	
		West Side	>30m		0%	
				Cumulative Total	**35%**	
Results						
6	**(1) + (2) + (3)**	**Total Required Fire Flow, rounded to nearest 1000L/min**			**L/min**	**4,000**
		(2,000 L/min < Fire Flow < 45,000 L/min)		or	L/s	**67**
				or	USGPM	1,057

FUS - Fire Flow Calculations

NOVATECH
Engineers, Planners & Landscape Architects

Novatech Project #: 119240
Project Name: 22 Pickering Place
Date: 4/25/2024
Input By: Micheal Adeoti
Reviewed By: Matthew Hrehoriak
Drawing Reference: Hobin Archi. Site Plan (A1.00) - 20240422

Legend: Input by User
No Input Required
Reference: Fire Underwriter's Survey Guideline (2020)
Formula Method

Building Description: 14 Storey Building with Podium (Block 2)
Type II - Non-combustible construction

Step			Choose		Value Used	Total Fire Flow (L/min)
Base Fire Flow						
1	**Construction Material**			**Multiplier**		
	Coefficient related to type of construction **C**	Type V - Wood frame		1.5	0.8	
		Type IV - Mass Timber		Varies		
		Type III - Ordinary construction		1		
		Type II - Non-combustible construction	Yes	0.8		
		Type I - Fire resistive construction (2 hrs)		0.6		
2	**Floor Area**					
	A	Podium Level Footprint (m^2)	1193			
		Total Floors/Storeys (Podium)	5			
		Tower Footprint (m^2)	891			
		Total Floors/Storeys (Tower)	9			
		Protected Openings (1 hr)	Yes			
		A, Total Effective Floor Area (m^2)			**1,790**	
	F	**Base fire flow without reductions**				**7,000**
		F = 220 **C** (**A**)$^{0.5}$				
Reductions or Surcharges						
3	**Occupancy hazard reduction or surcharge**		**FUS Table 3**	**Reduction/Surcharge**		
	(1)	Non-combustible	Yes	-25%	-25%	**5,250**
		Limited combustible		-15%		
		Combustible		0%		
		Free burning		15%		
		Rapid burning		25%		
4	**Sprinkler Reduction**		**FUS Table 4**	**Reduction**		
	(2)	Adequately Designed System (NFPA 13)	Yes	-30%	-30%	**-2,620**
		Standard Water Supply	Yes	-10%	-10%	
		Fully Supervised System	Yes	-10%	-10%	
				Cumulative Sub-Total	**-50%**	
		Area of Sprinklered Coverage (m^2)	13958	100%		
				Cumulative Total	**-50%**	
5	**Exposure Surcharge per**		**FUS Table 5**		**Surcharge**	
	(3)	North Side	3.1 - 10 m		20%	**1,838**
		East Side	>30m		0%	
		South Side	>30m		0%	
		West Side	10.1 - 20 m		15%	
				Cumulative Total	**35%**	
Results						
6	**(1) + (2) + (3)**	**Total Required Fire Flow, rounded to nearest 1000L/min**			**L/min**	**4,000**
		(2,000 L/min < Fire Flow < 45,000 L/min)		or	L/s	**67**
				or	USGPM	1,057

Maximum HGL EPANET Hydraulic Analysis

```
******************************************************************
*                          E P A N E T                           *
*                  Hydraulic and Water Quality                   *
*                  Analysis for Pipe Networks                    *
*                        Version 2.2                             *
******************************************************************
```

Input File: (AD) MAX HGL.net

Link - Node Table:

Link ID	Start Node	End Node	Length m	Diameter mm
1	RES-A	1	20	300
2	1	2	70	300
3	2	3	130	300
4	3	4	140	200
5	4	5	18	200
6	5	6	69	200
7	6	7	3	200
8	7	8	36	200
9	8	9	14.5	200
10	9	10	12	200
11	10	11	8	200
15	11	14	19.5	200
16	14	15	19	200
17	15	2	44	200
12	11	12	70	200
13	12	13	22.5	200
14	13	RES-B	52	200
18	12	1	83	150
19	RES-A	RES-B	130	300

Node Results at 0:00 Hrs:

Node ID	Demand LPS	Head m	Pressure m	Quality hours
5	1.65	118.89	54.89	0.00
7	0.86	118.89	54.93	0.00
15	2.57	118.89	55.68	0.00
10	1.77	118.89	54.98	0.00
8	1.63	118.89	55.02	0.00
14	0.00	118.89	55.39	0.00
6	0.00	118.89	54.90	0.00
4	0.00	118.89	54.73	0.00

Maximum Pressure = 55.73m or 79.24psi

9	0.00	118.89	54.93	0.00
1	0.00	118.90	53.65	0.00
12	0.00	118.90	53.55	0.00
13	0.00	118.90	53.40	0.00

Node Results at 0:00 Hrs: (continued)

Node ID	Demand LPS	Head m	Pressure m	Quality hours	
11	0.00	118.89	55.10	0.00	
2	0.00	118.90	55.73	0.00	
3	0.00	118.90	54.85	0.00	
RES-A	-6.40	118.90	0.00	0.00	Reservoir
RES-B	-2.08	118.90	0.00	0.00	Reservoir

Link Results at 0:00 Hrs:

Link ID	Flow LPS	VelocityUnit m/s	Headloss m/km	Status
1	6.38	0.09	0.05	Open
2	5.64	0.08	0.04	Open
3	2.06	0.03	0.01	Open
4	2.06	0.07	0.05	Open
5	2.06	0.07	0.05	Open
6	0.41	0.01	0.00	Open
7	0.41	0.01	0.00	Open
8	-0.45	0.01	0.00	Open
9	-2.08	0.07	0.05	Open
10	-2.08	0.07	0.05	Open
11	-3.85	0.12	0.15	Open
15	-1.00	0.03	0.01	Open
16	-1.00	0.03	0.01	Open
17	-3.57	0.11	0.13	Open
12	-2.84	0.09	0.09	Open
13	-2.10	0.07	0.05	Open
14	-2.10	0.07	0.05	Open
18	-0.74	0.04	0.03	Open
19	0.02	0.00	0.00	Open

Node Results at 24:00 Hrs:

Node ID	Demand LPS	Head m	Pressure m	Quality hours

5	1.65	118.89	54.89	2.21	
7	0.86	118.89	54.93	2.56	
15	2.57	118.89	55.68	0.41	
10	1.77	118.89	54.98	0.66	
8	1.63	118.89	55.02	0.77	
14	0.00	118.89	55.39	0.58	
6	0.00	118.89	54.90	3.67	
4	0.00	118.89	54.73	2.13	
9	0.00	118.89	54.93	0.71	
1	0.00	118.90	53.65	0.06	
12	0.00	118.90	53.55	0.39	
13	0.00	118.90	53.40	0.22	
11	0.00	118.89	55.10	0.64	
2	0.00	118.90	55.73	0.31	
3	0.00	118.90	54.85	1.54	
RES-A	-6.38	118.90	0.00	0.00	Reservoir
RES-B	-2.10	118.90	0.00	0.00	Reservoir

Link Results at 24:00 Hrs:

Link ID	Flow LPS	Velocity m/s	Unit Headloss m/km	Status
1	6.38	0.09	0.05	Open
2	5.64	0.08	0.04	Open
3	2.06	0.03	0.01	Open
4	2.06	0.07	0.05	Open
5	2.06	0.07	0.05	Open
6	0.41	0.01	0.00	Open
7	0.41	0.01	0.00	Open
8	-0.45	0.01	0.00	Open
9	-2.08	0.07	0.05	Open
10	-2.08	0.07	0.05	Open
11	-3.85	0.12	0.15	Open
15	-1.00	0.03	0.01	Open
16	-1.00	0.03	0.01	Open
17	-3.57	0.11	0.13	Open
12	-2.84	0.09	0.09	Open
13	-2.10	0.07	0.05	Open
14	-2.10	0.07	0.05	Open
18	-0.74	0.04	0.03	Open
19	0.00	0.00	0.00	Open

Maximum Day + Fire Flow EPANET Hydraulic Analysis

```
******************************************************************
*                          E P A N E T                           *
*                  Hydraulic and Water Quality                   *
*                  Analysis for Pipe Networks                    *
*                        Version 2.2                             *
******************************************************************
```

Input File: MAX DAY + FF.net

Link - Node Table:

Link ID	Start Node	End Node	Length m	Diameter mm
1	RES-A	1	20	300
2	1	2	70	300
3	2	3	130	300
4	3	4	140	200
5	4	5	18	200
6	5	6	69	200
7	6	7	3	200
8	7	8	36	200
9	8	9	14.5	200
10	9	10	12	200
11	10	11	8	200
15	11	14	19.5	200
16	14	15	19	200
17	15	2	44	200
12	11	12	70	200
13	12	13	22.5	200
14	13	RES-B	52	200
18	12	1	83	150
19	RES-A	RES-B	130	300

Node Results:

Node ID	Demand LPS	Head m	Pressure m	Quality
5	4.11	112.76	48.76	0.00
7	2.15	112.40	48.44	0.00
15	6.42	113.14	49.93	0.00
10	4.43	112.37	48.46	0.00
8	4.08	112.23	48.36	0.00
14	0.00	112.85	49.35	0.00
6	0.00	112.41	48.42	0.00
4	0.00	112.88	48.72	0.00

Minimum Pressure = 46.97m or 66.78psi

9	67.00	112.18	48.22	0.00
1	0.00	114.43	49.18	0.00
12	0.00	112.54	47.19	0.00
13	0.00	112.47	46.97	0.00

Node Results: (continued)

Node ID	Demand LPS	Head m	Pressure m	Quality	
11	0.00	112.52	48.73	0.00	
2	0.00	114.04	50.87	0.00	
3	0.00	113.94	49.89	0.00	
RES-A	-263.33	114.60	0.00	0.00	Reservoir
RES-B	175.14	112.30	0.00	0.00	Reservoir

Link Results:

Link ID	Flow LPS	VelocityUnit m/s	Headloss m/km	Status
1	107.59	1.52	8.53	Open
2	83.11	1.18	5.49	Open
3	29.61	0.42	0.80	Open
4	29.61	0.94	7.60	Open
5	29.61	0.94	6.63	Open
6	25.50	0.81	5.02	Open
7	25.50	0.81	5.02	Open
8	23.35	0.74	4.74	Open
9	19.27	0.61	3.52	Open
10	-47.73	1.52	16.04	Open
11	-52.16	1.66	18.90	Open
15	-47.07	1.50	16.81	Open
16	-47.07	1.50	15.63	Open
17	-53.49	1.70	20.48	Open
12	-5.08	0.16	0.26	Open
13	19.40	0.62	3.20	Open
14	19.40	0.62	3.18	Open
18	-24.48	1.39	22.80	Open
19	155.75	2.20	17.69	Open

Peak Hour Minimum HGL EPANET Hydraulic Analysis

```
******************************************************************
*                          E P A N E T                           *
*                  Hydraulic and Water Quality                   *
*                  Analysis for Pipe Networks                    *
*                        Version 2.2                             *
******************************************************************
```

Input File: (PH) MIN HGL.net

Link - Node Table:

Link ID	Start Node	End Node	Length m	Diameter mm
1	RES-A	1	20	300
2	1	2	70	300
3	2	3	130	300
4	3	4	140	200
5	4	5	18	200
6	5	6	69	200
7	6	7	3	200
8	7	8	36	200
9	8	9	14.5	200
10	9	10	12	200
11	10	11	8	200
15	11	14	19.5	200
16	14	15	19	200
17	15	2	44	200
12	11	12	70	200
13	12	13	22.5	200
14	13	RES-B	52	200
18	12	1	83	150
19	RES-A	RES-B	130	300

Node Results:

Node ID	Demand LPS	Head m	Pressure m	Quality hours
5	9.05	108.75	44.75	0.00
7	4.74	108.74	44.78	0.00
15	14.13	108.82	45.61	0.00
10	9.74	108.77	44.86	0.00
8	8.98	108.74	44.87	0.00
14	0.00	108.81	45.31	0.00
6	0.00	108.74	44.75	0.00
4	0.00	108.77	44.61	0.00

Minimum Pressure = 43.39m or 61.69psi

9	0.00	108.75	44.79	0.00
1	0.00	109.07	43.82	0.00
12	0.00	108.88	43.53	0.00
13	0.00	108.89	43.39	0.00

Node Results: (continued)

Node ID	Demand LPS	Head m	Pressure m	Quality hours	
11	0.00	108.79	45.00	0.00	
2	0.00	108.99	45.82	0.00	
3	0.00	108.97	44.92	0.00	
RES-A	-83.52	109.10	0.00	0.00	Reservoir
RES-B	36.88	108.90	0.00	0.00	Reservoir

Link Results:

Link ID	Flow LPS	VelocityUnit m/s	Headloss m/km	Status
1	41.69	0.59	1.47	Open
2	34.63	0.49	1.08	Open
3	12.30	0.17	0.16	Open
4	12.30	0.39	1.47	Open
5	12.30	0.39	1.30	Open
6	3.25	0.10	0.11	Open
7	3.25	0.10	0.11	Open
8	-1.49	0.05	0.03	Open
9	-10.47	0.33	1.12	Open
10	-10.47	0.33	0.97	Open
11	-20.21	0.64	3.27	Open
15	-8.20	0.26	0.65	Open
16	-8.20	0.26	0.61	Open
17	-22.33	0.71	4.04	Open
12	-12.01	0.38	1.27	Open
13	-4.95	0.16	0.25	Open
14	-4.95	0.16	0.25	Open
18	-7.07	0.40	2.28	Open
19	41.83	0.59	1.54	Open

APPENDIX B
Sanitary Servicing Information

PROJECT #: 119240
PROJECT NAME: 22 Pickering Place
LOCATION: OTTAWA

NOVATECH
Engineers, Planners & Landscape Architects

DATE PREPARED: April 2024

Building	RESIDENTIAL						COMMERCIAL		INFILTRATION			Total Flow (l/s)
	Studio	1-Bed	2-Bed	Pop.	Peak Factor	Peak Flow (l/s)	Area (m^2)	Peak Flow (L/s)	Total Area (ha)	Accum. Area (ha)	Infilt. Flow (l/s)	
Building 1	54	150	105	507	3.2	5.22	130.4	0.01	0.197	0.197	0.06	5.29
Building 2	46	96	32	265	3.3	2.82	148.5	0.01	0.224	0.224	0.07	2.90
Total	**100**	**246**	**137**	**772**		**8.04**		**0.01**	**0.421**		**0.14**	**8.19**

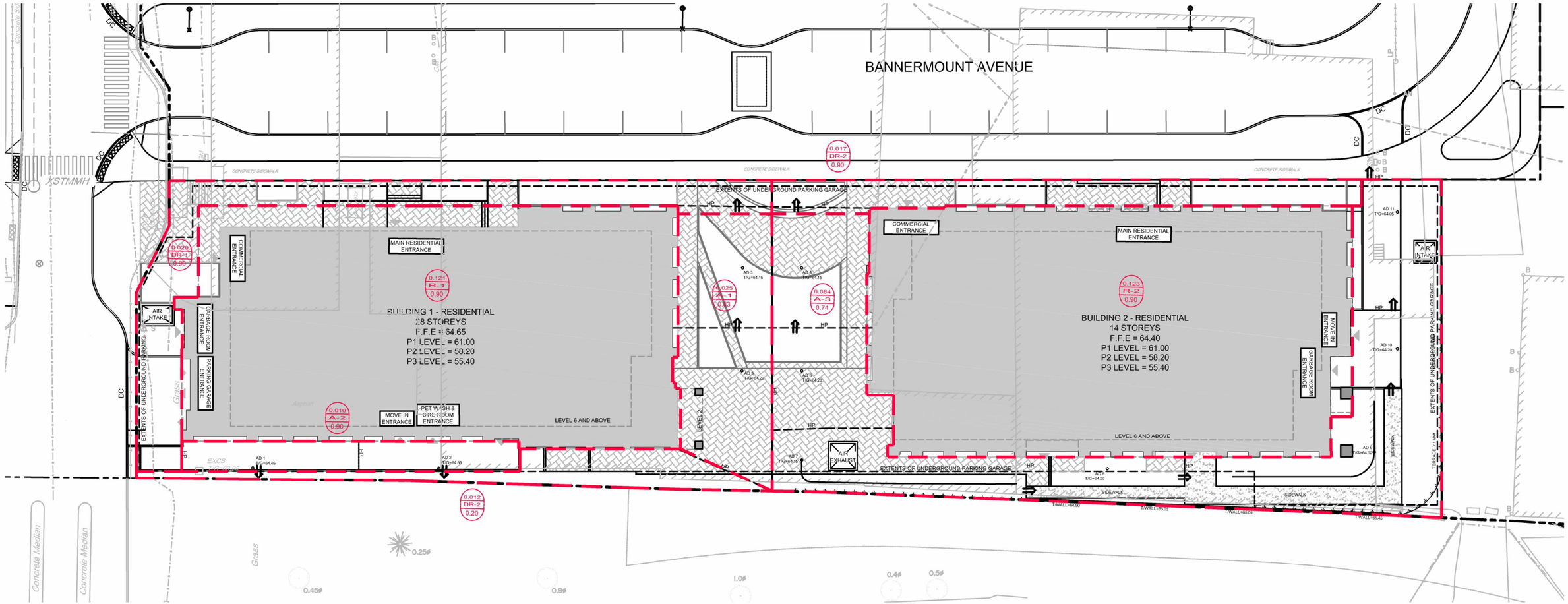
Design Parameters:

- Studio Apartment = 1.4 persons/unit
- 1- Bedroom Apartment = 1.4 persons/unit
- 2-Bedroom Apartment = 2.1 persons/unit

Section 4.0 Ottawa Sewer Design Guidelines

- Average Domestic Flow	280	L/person/day
- Commercial Flow	28000	L/gross ha/day
- Extraneous Flows	0.33	l/s/ha
Residential Peaking Factor	Harmon Equation	
Commercial Peaking Factor	1.5	

APPENDIX C
Stormwater Management Calculations



LEGEND

0.02 — DRAINAGE AREA (Ha)

A5 — DRAINAGE AREA NUMBER

0.20 — RUNOFF COEFFICIENT

DRAINAGE AREA BOUNDARY

NOVATECH
Engineers, Planners & Landscape Architects
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada K2M 1P6

Telephone (613) 254-9643
Facsimile (613) 254-5867
Website www.novatech-eng.com

25 PICKERING PLACE
CITY OF OTTAWA

POST DEVELOPMENT STORMWATER MANAGEMENT PLAN

SCALE 1 : 400 (0, 4, 8, 12, 16)

DATE JUL 2024 | JOB 119240 | FIGURE SWM

SHT11X17.DWG - 279mmX432mm

M:\2019\119240\CAD\Design\-Block 1 and Block 2\119240-SPSWM.dwg, SWM, Aug 01, 2024 - 1:26pm, madeoti

PROJECT #: 119240
PROJECT NAME: 22 Pickering Place (Block 1)
LOCATION: OTTAWA

NOVATECH
Engineers, Planners & Landscape Architects

DATE PREPARED: July 2024

TABLE 2A: Post-Development Runoff Coefficient "C" - DR

Area	Surface	Ha	"C"	C_{avg}	$*C_{100}$
Total	Hard	0.024	0.90	0.61	0.69
0.041	Soft	0.017	0.20		

Runoff Coefficient Equation

$C = (A_{hard} \times 0.9 + A_{soft} \times 0.2)/A_{Tot}$

* Runoff Coefficient increases by 25% up to a maximum value of 1.00 for the 100-Year event

TABLE 2B: Post-Development DR Flows

Outlet Options	Area (ha)	C_{avg}	Tc (min)	$Q_{2\ Year}$ (L/s)	$Q_{5\ Year}$ (L/s)	$Q_{100\ Year}$ (L/s)	$Q_{100\ Year\ +20\%}$ (L/s)
Block 1	0.041	0.61	10	**5.3**	**7.2**	**14.0**	**16.8**

Time of Concentration	Tc=	10	min
Intensity (2 Year Event)	I_2=	76.81	mm/hr
Intensity (5 Year Event)	I_5=	104.19	mm/hr
Intensity (100 Year Event)	I_{100}=	178.56	mm/hr

100 year Intensity = 1735.688 / (Time in min + 6.014) $^{0.820}$
5 year Intensity = 998.071 / (Time in min + 6.053) $^{0.814}$
2 year Intensity = 732.951 / (Time in min + 6.199) $^{0.810}$

PROJECT #: 119240
PROJECT NAME: 22 Pickering Place (Block 1)
LOCATION: OTTAWA

NOVATECH
Engineers, Planners & Landscape Architects

DATE PREPARED: July 2024

TABLE 3A: Post-Development Runoff Coefficient "C"

			5 Year Event		100 Year Event	
Area	Surface	Ha	"C"	C_{avg}	"C" + 25%	$*C_{avg}$
Total	Hard	0.156	0.90		1.00	
0.156	Roof	0.000	0.90	0.90	1.00	1.00
	Soft	0.000	0.20		0.25	

TABLE 3B: 2 YEAR EVENT QUANTITY STORAGE REQUIREMENT

0.156 =Area (ha)
0.90 = C

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Allowable Runoff (L/s)	Net Flow to be Stored (L/s)	Storage Req'd (m^3)
2 YEAR	10	76.81	29.98	8.0	21.98	13.19
	15	61.77	24.11	8.0	16.11	14.50
	20	**52.03**	**20.31**	**8.0**	**12.31**	**14.77**
	25	45.17	17.63	8.0	9.63	14.44
	30	40.04	15.63	8.0	7.63	13.73

TABLE 3C: 5 YEAR EVENT QUANTITY STORAGE REQUIREMENT

0.156 =Area (ha)
0.90 = C

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Allowable Runoff (L/s)	Net Flow to be Stored (L/s)	Storage Req'd (m^3)
5 YEAR	15	83.56	32.61	8.0	24.61	22.15
	20	70.25	27.42	8.0	19.42	23.30
	25	**60.90**	**23.77**	**8.0**	**15.77**	**23.65**
	30	53.93	21.05	8.0	13.05	23.49
	35	48.52	18.94	8.0	10.94	22.97

TABLE 3D: 100 YEAR EVENT QUANTITY STORAGE REQUIREMENT

0.156 =Area (ha)
1.00 = C

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Allowable Runoff (L/s)	Net Flow to be Stored (L/s)	Storage Req'd (m^3)
100 YEAR	35	82.58	35.81	8.0	27.81	58.41
	40	75.15	32.59	8.0	24.59	59.01
	45	**69.05**	**29.95**	**8.0**	**21.95**	**59.25**
	50	63.95	27.74	8.0	19.74	59.21
	55	59.62	25.86	8.0	17.86	58.93

TABLE 3D: 100+20 YEAR EVENT QUANTITY STORAGE REQUIREMENT

0.156 =Area (ha)
1.00 = C

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Allowable Runoff (L/s)	Net Flow to be Stored (L/s)	Storage Req'd (m^3)
100 YEAR	45	82.86	35.93	8.0	27.93	75.42
	50	76.74	33.28	8.0	25.28	75.85
	55	**71.55**	**31.03**	**8.0**	**23.03**	**76.00**
	60	67.07	29.09	8.0	21.09	75.92
	65	63.18	27.40	8.0	19.40	75.65

Equations:

Flow Equation

$Q = 2.78 \times C \times I \times A$

Where:

C is the runoff coefficient
I is the rainfall intensity, City of Ottawa IDF
A is the total drainage area

Runoff Coefficient Equation

$C_5 = (A_{hard} \times 0.9 + A_{soft} \times 0.2)/A_{Tot}$

$C_{100} = (A_{hard} \times 1.0 + A_{soft} \times 0.25)/A_{Tot}$

PROJECT #: 119240
PROJECT NAME: 22 Pickering Place (Block 1)
LOCATION: OTTAWA

NOVATECH
Engineers, Planners & Landscape Architects

DATE PREPARED: July 2024

Table 4: Post-Development Stormwater Mangement Summary

Area ID	Area (ha)	1:5 Year Weighted Cw	1:100 Year Weighted Cw	Outlet Location	Orifice	2 Year Storm Event			5 Year Storm Event			100 Year Storm Event			100 Year + 20% Storm Event		
						Release (L/s)	Ponding Depth (m)	Req'd Vol (cu.m)	Release (L/s)	Ponding Depth (m)	Req'd Vol (cu.m)	Release (L/s)	Ponding Depth (m)	Req'd Vol (cu.m)	Release (L/s)	Max Ponding Depth (m)	Req'd Vol (cu.m)
DR	0.041	0.61	0.69	Block 1	N/A	5.3	N/A	N/A	7.2	N/A	N/A	14.0	N/A	N/A	16.8	N/A	N/A
A-1, A-2 & R-1	0.156	0.90	1.00	Block 1	Pump	8.0		14.8	8.0		23.7	8.0		59.3	8.0		76.0
Total						**13.3**			**15.2**			**22.0**			**24.8**		
Allowable						**22.0**			**22.0**			**22.0**					

PROJECT #: 119240
PROJECT NAME: 22 Pickering Place (Block 2)
LOCATION: OTTAWA

NOVATECH
Engineers, Planners & Landscape Architects

DATE PREPARED: July 2024

TABLE 2A: Post-Development Runoff Coefficient "C" - DR

Area	Surface	Ha	"C"	C_{avg}	*C_{100}
Total	Hard	0.017	0.90	0.90	1.00
0.017	Soft	0.000	0.20		

Runoff Coefficient Equation

$C = (A_{hard} \times 0.9 + A_{soft} \times 0.2)/A_{Tot}$

* Runoff Coefficient increases by 25% up to a maximum value of 1.00 for the 100-Year event

TABLE 2B: Post-Development DR Flows

Outlet Options	Area (ha)	C_{avg}	Tc (min)	$Q_{2\ Year}$ (L/s)	$Q_{5\ Year}$ (L/s)	$Q_{100\ Year}$ (L/s)	$Q_{100\ Year\ +20\%}$ (L/s)
Block 2	0.017	0.90	10	**3.3**	**4.4**	**8.4**	**10.1**

Time of Concentration	Tc=	10	min
Intensity (2 Year Event)	I_2=	76.81	mm/hr
Intensity (5 Year Event)	I_5=	104.19	mm/hr
Intensity (100 Year Event)	I_{100}=	178.56	mm/hr

100 year Intensity = 1735.688 / (Time in min + 6.014) $^{0.820}$
5 year Intensity = 998.071 / (Time in min + 6.053) $^{0.814}$
2 year Intensity = 732.951 / (Time in min + 6.199) $^{0.810}$

PROJECT #: 119240
PROJECT NAME: 22 Pickering Place (Block 2)
LOCATION: OTTAWA

NOVATECH
Engineers, Planners & Landscape Architects

DATE PREPARED: July 2024

TABLE 3A: Post-Development Runoff Coefficient "C"

			5 Year Event		100 Year Event	
Area	Surface	Ha	"C"	C_{avg}	"C" + 25%	$*C_{avg}$
Total	Hard	0.157	0.90		1.00	
0.207	Roof	0.000	0.90	0.73	1.00	0.82
	Soft	0.050	0.20		0.25	

TABLE 3B: 2 YEAR EVENT QUANTITY STORAGE REQUIREMENT

0.207 =Area (ha)
0.73 = C

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Allowable Runoff (L/s)	Net Flow to be Stored (L/s)	Storage Req'd (m^3)
2 YEAR	0	167.22	70.34	16.5	53.84	0.00
	5	103.57	43.56	16.5	27.06	8.12
	10	**76.81**	**32.31**	**16.5**	**15.81**	**9.48**
	15	61.77	25.98	16.5	9.48	8.53
	20	52.03	21.89	16.5	5.39	6.46

TABLE 3C: 5 YEAR EVENT QUANTITY STORAGE REQUIREMENT

0.207 =Area (ha)
0.73 = C

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Allowable Runoff (L/s)	Net Flow to be Stored (L/s)	Storage Req'd (m^3)
5 YEAR	5	141.18	59.38	16.5	42.88	12.86
	10	104.19	43.83	16.5	27.33	16.40
	15	**83.56**	**35.15**	**16.5**	**18.65**	**16.78**
	20	70.25	29.55	16.5	13.05	15.66
	25	60.90	25.61	16.5	9.11	13.67

TABLE 3D: 100 YEAR EVENT QUANTITY STORAGE REQUIREMENT

0.207 =Area (ha)
0.82 = C

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Allowable Runoff (L/s)	Net Flow to be Stored (L/s)	Storage Req'd (m^3)
100 YEAR	15	142.89	67.33	16.5	50.83	45.75
	20	119.95	56.52	16.5	40.02	48.03
	25	**103.85**	**48.93**	**16.5**	**32.43**	**48.65**
	30	91.87	43.29	16.5	26.79	48.22
	35	82.58	38.91	16.5	22.41	47.06

TABLE 3D: 100+20 YEAR EVENT QUANTITY STORAGE REQUIREMENT

0.207 =Area (ha)
0.82 = C

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Allowable Runoff (L/s)	Net Flow to be Stored (L/s)	Storage Req'd (m^3)
100 YEAR	20	143.94	67.83	16.5	51.33	61.59
	25	124.62	58.72	16.5	42.22	63.33
	30	110.24	**51.95**	**16.5**	**35.45**	**63.80**
	35	99.09	46.69	16.5	30.19	63.41
	40	90.17	42.49	16.5	25.99	62.38

Equations:

Flow Equation

$Q = 2.78 \times C \times I \times A$

Where:

C is the runoff coefficient
I is the rainfall intensity, City of Ottawa IDF
A is the total drainage area

Runoff Coefficient Equation

$C_5 = (A_{hard} \times 0.9 + A_{soft} \times 0.2)/A_{Tot}$

$C_{100} = (A_{hard} \times 1.0 + A_{soft} \times 0.25)/A_{Tot}$

PROJECT #: 119240
PROJECT NAME: 22 Pickering Place (Block 2)
LOCATION: OTTAWA

NOVATECH
Engineers, Planners & Landscape Architects

DATE PREPARED: July 2024

Table 4: Post-Development Stormwater Mangement Summary

Area ID	Area (ha)	1:5 Year Weighted Cw	1:100 Year Weighted Cw	Outlet Location	Orifice	2 Year Storm Event			5 Year Storm Event			100 Year Storm Event			100 Year + 20% Storm Event		
						Release (L/s)	Ponding Depth (m)	Req'd Vol (cu.m)	Release (L/s)	Ponding Depth (m)	Req'd Vol (cu.m)	Release (L/s)	Ponding Depth (m)	Req'd Vol (cu.m)	Release (L/s)	Max Ponding Depth (m)	Req'd Vol (cu.m)
DR	0.017	0.90	1.00	Block 2	N/A	3.3	N/A	N/A	4.4	N/A	N/A	8.4	N/A	N/A	10.1	N/A	N/A
A-3 & R-2	0.207	0.73	0.82	Block 2	Pump	16.5		9.5	16.5		16.8	16.5		48.7	16.5	2.86	63.8
Total						**19.8**			**20.9**			**24.9**			**26.6**		
Allowable						**25.0**			**25.0**			**25.0**					

APPENDIX D
Drawings