SERVICING & STORMWATER MANAGEMENT REPORT
5646-5650 MANOTICK MAIN STREET

Project No.: CCO-22-2383

Prepared for:

Hawkins Properties
650a Eagleson Road
Ottawa, ON

Prepared by:

McIntosh Perry Consulting Engineers Ltd.
115 Walgreen Road
Carp, ON K0A 1L0

June 6, 2023

McINTOSH PERRY

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1.0 PROJECT DESCRIPTION

1.1 Purpose

McIntosh Perry (MP) has been retained by Hawkins Properties. to prepare this Servicing and Stormwater Management Report in support of the Site Plan Control process for the proposed development located at 5646-5650 Manotick Main Street within the City of Ottawa.

The main purpose of this report is to present a servicing and stormwater management design for the development in accordance with the recommendations and guidelines provided by the City of Ottawa (City), the Rideau Valley Conservation Authority (RVCA), and the Ministry of the Environment, Conservation and Parks (MECP). This report will address the water, sanitary and storm sewer servicing for the development, ensuring that existing and proposed services will adequately service the proposed development.

1.2 Site Description

The subject property, herein referred to as the site, is located at 5646-5650 Manotick Main within the Rideau-Jock Ward. The site covers approximately 0.41 ha and is located at the intersection of Manotick Main Street and Mahogany Harbour Lane. The site is zoned Rural Commercial (RC1). See Site Location Plan in Appendix 'A' for more details.

1.3 Proposed Development and Statistics

The proposed development consists of a 1-storey drive-through restaurant and a 5-bay carwash, complete with new drive aisles and parking areas with access from Manotick Main Street. Refer to Site Plan prepared by Rossman Architecture for reference.

1.4 Existing Conditions and Infrastructure

The site is currently developed containing a 2-storey commercial building and attached carwash. The existing building is serviced by an on-site well and septic system.

Sewer and watermain mapping collected from the City of Ottawa indicate that the following services exist across the property frontages within the adjacent municipal rights-of-way(s):

- Manotick Main Street
  - 305 mm diameter PVC watermain,

1.5 Approvals

The proposed development is subject to the City of Ottawa site plan control approval process. Site plan control requires the City to review, provide concurrence and approve the engineering design package. Permits to construct can be requested once the City has issued a site plan agreement.

An Environmental Compliance Approval (ECA) through the Ministry of Environment, Conservation and Parks (MECP) is not anticipated to be required for the development since the development is does not outlet to a combined sewershed and does not propose industrial usage.

2.0 BACKROUND STUDIES, STANDARDS, AND REFERENCES

2.1 Background Reports / Reference Information

As-built drawings of existing services, provided by the City of Ottawa Information centre, within the vicinity of the site were reviewed in order to identify infrastructure available to service the proposed development.

2.2 Applicable Guidelines and Standards

City of Ottawa:

- Ottawa Sewer Design Guidelines, City of Ottawa, SDG002, October 2012. (Ottawa Sewer Guidelines)
  - Technical Bulletin ISTB-2014-01 City of Ottawa, February 2014. (ISTB-2014-01)
  - Technical Bulletin PIEDTB-2016-01 City of Ottawa, September 2016. (PIEDTB-2016-01)
  - Technical Bulletin ISTB-2018-01 City of Ottawa, January 2018. (ISTB-2018-01)
  - Technical Bulletin ISTB-2018-03 City of Ottawa, March 2018. (ISTB-2018-03)
  - Technical Bulletin ISTB-2019-01 City of Ottawa, January 2019. (ISTB-2019-01)
  - Technical Bulletin ISTB-2019-02 City of Ottawa, February 2019. (ISTB-2019-02)
- Ottawa Design Guidelines – Water Distribution City of Ottawa, July 2010. (Ottawa Water Guidelines)
  - Technical Bulletin ISD-2010-2 City of Ottawa, December 15, 2010. (ISD-2010-2)
  - Technical Bulletin ISDTB-2014-02 City of Ottawa, May 2014. (ISDTB-2014-02)
  - Technical Bulletin ISTB-2018-02 City of Ottawa, March 2018. (ISTB-2018-02)

Ministry of Environment, Conservation and Parks:

- Stormwater Planning and Design Manual, Ministry of the Environment, March 2003. (MECP Stormwater Design Manual)
- Design Guidelines for Sewage Works, Ministry of the Environment, 2008. (MECP Sewer Design Guidelines)

Other:

- Water Supply for Public Fire Protection, Fire Underwriters Survey, 2020. (FUS Guidelines)

3.0 PRE-CONSULTATION SUMMARY

A pre-consultation meeting was held with City staff on July 21st, 2022, regarding the proposed site servicing. Specific design parameters to be incorporated include:

- Control 5 through 100-year post-development flows to the 2-year pre-development level, with a combined C value to a maximum of 0.50.
- Enhanced water quality protection will be required for the development per the RVCA

4.0 WATERMAIN

4.1 Existing Watermain

The site is located within the 3SW pressure zone, as per the Water Distribution System mapping included in Appendix C. There are two municipal fire hydrant along Manotick Main Street available to service the development.

4.2 Proposed Watermain

It is proposed to service the new buildings with a shared 50 mm diameter water service connection to the 305 mm diameter watermain within Manotick Main Street.

The Ontario Building Code method was utilized to estimate the required fire flow for the proposed buildings. The following parameters were assumed:

Restaurant:

- K Value – 39 (Combustible Construction)
- Occupancy Type – Group E

Car Wash:

- K Value – 18 (Non-combustible Construction)
- Occupancy Type – F-2

The results of the OBC calculations yielded a required fire flow of 2,700 L/min (45 L/s) for both buildings. The detailed calculations for the OBC can be found in Appendix C.

Table 1, below, summarizes the water supply design criteria obtained from the Ottawa Water Guidelines and utilized for the water analysis.

Table 1: Water Supply Design Criteria and Water Demands

Site Area	0.41 ha
Commercial	28,000 L/gross ha/d
Max Day Peaking Factor (Commercial)	1.5 x avg. day
Peak Hour Peaking Factor (Commercial)	1.8 x max day

The City provided the estimated water pressures at both for the average day scenario, peak hour scenario and the max day plus fire flow scenario for the demands indicated by the correspondence in Appendix C. The resulting pressures for the boundary conditions results are shown in Tables 2 and 3, below. Boundary conditions have been provided for the current pressure zone (3SW) as well as the future pressure zone (SUC).

Note the estimated water demand has decreased slightly from the values presented in the boundary condition request based on updates to the commercial area. Due to the decrease being minor, the validity of the boundary condition results is not anticipated to be impacted.

Table 2: Boundary Conditions Results – Current 3SW Pressure Zone

Scenario	Estimated Demands (L/s)	HGL (m H_2O)* / kPa
Average Day Demand	0.02	69.7 / 688.3
Maximum Daily + Fire Flow Demand (OBC)	0.02 + 45	58.7 / 576.2
Peak Hourly Demand	0.04	52.9 / 519.3
* Adjusted for an estimated ground elevation of 87.4m above the connection point.		

The normal operating pressure range for the current pressure zone is anticipated to be 519.3 kPa to 688.3 kPa and will not be less than 275kPa (40 psi) or exceed 689 kPa (100 psi). The watermains will meet the minimum required 20 psi (140 kPa) from the Ottawa Water Guidelines at the ground level under maximum day demand and fire flow conditions. It is anticipated that pressure reducing valves will be required as pressure is expected to exceed 80 psi in the average day condition.

Table 3: Boundary Conditions Results – Future SUC Pressure Zone

Scenario	Estimated Demands (L/s)	HGL (m H_2O)* / kPa
Average Day Demand	0.02	60.3 / 591.1
Maximum Daily + Fire Flow Demand (OBC)	0.02 + 45	53.4 / 524.2
Peak Hourly Demand	0.04	54.9 / 539.0
* Adjusted for an estimated ground elevation of 87.4m above the connection point.		

The normal operating pressure range for the future pressure zone is anticipated to be 539.0 kPa to 591.1 kPa and will not be less than 275kPa (40 psi) or exceed 689 kPa (100 psi). The watermains will meet the minimum required 20 psi (140 kPa) from the Ottawa Water Guidelines at the ground level under maximum day demand and fire flow conditions. It is anticipated that pressure reducing valves will be required as pressure is expected to exceed 80 psi in the average day condition.

To confirm the adequacy of fire flow to protect the proposed development, public fire hydrants within 150m of the proposed buildings were analysed per City of Ottawa ISTB 2018-02 Appendix I Table 1. The results are summarized below.

Table 4: Fire Protection Confirmation

Building	Fire Flow Demand (L/min.)	Fire Hydrant(s) within 75m (5,700 L/min)	Fire Hydrant(s) within 150m (3,800 L/min)	Combined Fire Flow (L/min.)
5646-5650 Manotick Main Street	2,700	1 Public	1 Public	9,500

Based on City guidelines (ISTB-2018-02), the existing hydrants provide adequate protection for the proposed development. A hydrant coverage figure can be found in Appendix C.

5.0 SANITARY DESIGN

5.1 Existing Sanitary Sewer

There is no existing sanitary sewer within Manotick Main Street available to service the proposed development. The subject site is currently serviced by an on-site septic system which will be removed as part of the development.

5.2 Proposed Sanitary Sewer

A new septic system located in the rear yard landscaped area will be installed and sized to accommodate the development. The proposed system will treat wastewater flows from the proposed car wash and restaurant. McIntosh Perry will coordinate with the Ottawa Septic System Office for the required permits and approvals.

Private Sewage Systems

- Approval for on-site septic treatment will be governed by the OBC as it is understood that the Daily Design Flow for the proposed buildings will be less than 10,000 litres per day.
- Septic systems will be constructed with all appropriate setbacks, treatment units and stipulations as per applicable Ontario Regulations.

For further design information pertaining to the on-site sewage system, please refer to the septic system application.

6.0 STORM SEWER DESIGN

6.1 Existing Storm Sewers

Stormwater runoff from the site is currently tributary to the Rideau River within the Lower Rideau River sub-watershed. There is no existing storm sewer available to service the proposed development, however there is an existing catch basin fronting the subject site. The existing catch basin outlets through existing culverts to the existing municipal ditch northwest of the site.

6.2 Proposed Storm Sewers

The proposed development will be serviced through a new 200-250 mm diameter storm service. The proposed storm service will discharge runoff to the existing municipal catch basin fronting the subject site. The municipal catch basin will convey runoff through existing culverts to the municipal ditch along Manotick Main Street. Runoff will travel approximately 200m before discharging to the Rideau River.

Runoff collected on the roof of the proposed buildings will be stored and controlled internally using 1 roof drain per building. The roof drains will be used to limit the flow from the roof to the specified allowable release rate. Roof drainage will outlet to surface and be directed towards proposed catch basins. For calculation purposes a Watts Accutrol roof drain in various positions was used to estimate a reasonable roof flow. Other products may be specified at detailed building design provided release rates and storage volumes are respected.

Runoff from the drive aisle and parking lot will be collected by a series of catch basins and catch basin maintenance holes. A Tempest LMF95 ICD within the outlet of MH2 will restrict flow to the allowable release rate. Restricted flow will be directed to an Oil & Grit Separator unit, and then to the municipal catch basin fronting the subject site.

Runoff from the side and rear yard landscaped areas will be unrestricted and will be compensated for in areas with flow attenuation.

Foundation drainage is not required based on the Geotechnical Report prepared by Terrapex Environmental Ltd.

See CCO-22-2383 - POST include in Appendix F of this report for more details. The Stormwater Management design for the subject property will be outlined in Section 7.0 of this report.

7.0 PROPOSED STORMWATER MANAGEMENT

7.1 Design Criteria and Methodology

Stormwater management for the site will be provided through roof storage and surface storage. The controlled stormwater flow will be directed to the existing municipal catch basin fronting the subject site. The quantitative and qualitative properties of the storm runoff for both the pre- and post-development flows are further detailed below.

In summary, the following design criteria have been employed in developing the stormwater management design for the site as directed by the RVCA and City:

Quality Control

- Quality control up to an enhanced level of treatment will be required based on distance to the outlet.

Quantity Control

- Post-development runoff to be restricted to the 2-year storm event, based on a calculated time of concentration of at least 10 minutes and a maximum rational method coefficient of 0.50. Refer to Section 7.2 for further details.

7.2 Runoff Calculations

Runoff calculations presented in this report are derived using the Rational Method, given as:

$$Q = 2.78CIA \quad \text{(L/s)}$$

Where: C = Runoff coefficient
I = Rainfall intensity in mm/hr (City of Ottawa IDF curves)
A = Drainage area in hectares

It is recognized that the Rational Method tends to overestimate runoff rates. As a result, the conservative calculation of runoff ensures that any SWM facility sized using this method is expected to function as intended. The following coefficients were used to develop an average C for each area:

Roofs/Concrete/Asphalt	0.90
Gravel	0.60
Undeveloped and Grass	0.20

As per the City of Ottawa - Sewer Design Guidelines, the 5-year balanced 'C' value must be increased by 25% for a 100-year storm event to a maximum of 1.0.

7.3 Pre-Development Drainage

It has been assumed that the existing development contained no stormwater management controls for flow attenuation. The estimated pre-development peak flows for the 2-, 5-, and 100-year events are summarized below in Table 5. A pre-development drainage area plan can be found in Appendix E.

Table 5: Pre-Development Runoff Summary

Drainage Area	Area (ha)	Q (L/s)		
		2-Year	5-Year	100-Year
A1	0.41	38.94	52.83	104.23

7.4 Post-Development Drainage

To meet the stormwater objectives the development will employ combination of flow attenuation with roof and surface storage.

Based on the criteria listed in Section 7.2, the development will be required to restrict flow to the 2-year storm event. It is estimated that the target release rate during the 100-year event will be 38.94 L/s. See Appendix G for calculations.

The proposed site drainage limits are demonstrated on the Post-Development Drainage Area Plan. See CCO-22-2383 - POST in Appendix F of this report for more details. A summary of the post-development runoff calculations can be found below.

Table 6: Post-Development Controlled Runoff Summary

Drainage Area	Area (ha)	5-year Peak Flow (L/s)	100-year Peak Flow (L/s)	100-year Storage Required (m^3)	100-year Storage Available (m^3)
B1	0.03	0.79	1.23	11.74	11.88
B2	0.02	0.57	0.93	9.14	9.17
B3	0.21	11.35	11.51	69.55	70.46
B4	0.15	12.02	24.70		
Total	0.41	24.73	38.37	90.43	91.51

Runoff from areas B1 & B2 will be controlled and stored on the roof of the proposed buildings (B1 & B2) using 1 roof drain per building. The roof drains will be used to limit the flow from the roof to the specified allowable release rate.

For calculation purposes a Watts Accutrol roof drain in various positions was used to estimate a reasonable roof flow. Other products may be specified at detailed building design provided release

rates and storage volumes are respected. Runoff from areas B1 & B2 will outlet to surface and be directed towards proposed catch basins.

Runoff for area B3 will be collected by a series of catch basins and catch basin maintenance holes before discharging to the existing municipal catch basin fronting the subject site. A Tempest LMF95 ICD within the outlet of MH2 will be used to restrict runoff to the allowable release rate. Flow exceeding the allowable release rate will be stored in the parking area. The parking area will have a maximum ponding depth of 20 cm and 25 cm during the 5- and 100-year events, respectively. The design head will be 1.98 m and 2.03 m during the 5- and 100-year events, respectively.

Runoff from area B4 will be directed to the adjacent right-of-way without restriction and will be compensated for in areas with flow attenuation.

As seen in Table 7 below, roof runoff will be restricted to a maximum release rate of 2.16 L/s, allowing for a proposed 21.05 m^3 of roof storage. Emergency roof scuppers have been proposed to ensure roof ponding does not exceed 150mm.

Table 7: Roof Drainage Summary

Drainage Area	Area (ha)	# of Roof Drains	Storage Depth (mm)		Flow Per Roof Drain (L/s)		Total Flow Rate (L/s)	
			5-Year	100-Year	5-Year	100-Year	5-Year	100-Year
B1	0.03	1	75	145	0.79	1.23	0.79	1.23
B2	0.02	1	75	145	0.57	0.93	0.57	0.93

7.5 Quality Control

As noted in Section 7.1, quality controls are required for the development. Per drawing C102, an oil & grit separator is proposed to be installed at the downstream end of the proposed storm servicing. The oil & grit separator structure will provide an enhanced level of treatment (80% TSS removal) for the rooftops (B1 & B2) and the parking lot (B3).

8.0 SUMMARY

- A 1-storey drive-through restaurant and 5-bay car wash are proposed to be constructed at 5646-5650 Manotick Main Street. The development is proposed within 0.41 ha of the site.
- It is proposed to service the new buildings through a new 50 mm diameter shared water service connection to the existing 305 mm diameter watermain within Manotick Main Street.
- Wastewater flows will be treated by a proposed on-site septic system.
- It is proposed to service the development area via roof storage and surface storage. The storm system will discharge controlled runoff to the existing municipal catch basin within Manotick Main Street.
- Quality controls will be provided by an Oil & Grit Separator unit.

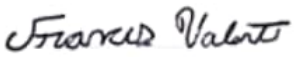
9.0 RECOMMENDATION

Based on the information presented in this report, we recommend that City of Ottawa approve this Servicing and Stormwater Management report in support of the proposed development at 5646-5650 Manotick Main Street.

This report is respectfully being submitted for approval.

Regards,

McIntosh Perry Consulting Engineers Ltd.



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10.0 STATEMENT OF LIMITATIONS

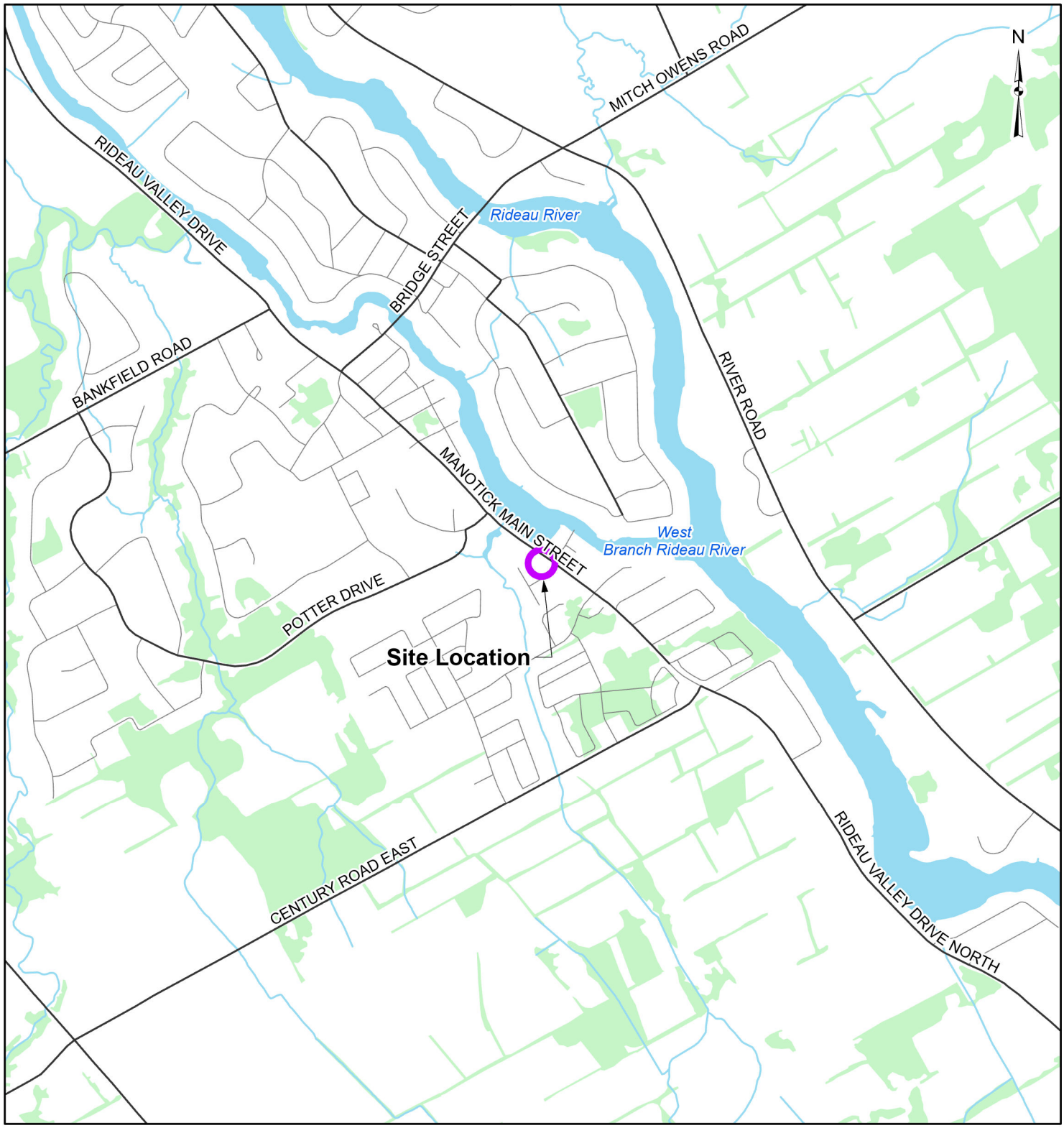
This report was produced for the exclusive use of Hawkins Properties. The purpose of the report is to assess the existing stormwater management system and provide recommendations and designs for the post-construction scenario that are in compliance with the guidelines and standards from the Ministry of the Environment, Parks and Climate Change, City of Ottawa and local approval agencies. McIntosh Perry reviewed the site information and background documents listed in Section 2.0 of this report. While the previous data was reviewed by McIntosh Perry and site visits were performed, no field verification/measures of any information were conducted.

Any use of this review by a third party, or any reliance on decisions made based on it, without a reliance report is the responsibility of such third parties. McIntosh Perry accepts no responsibility for damages, if any, suffered by any third party as a result of decisions or actions made based on this review.

The findings, conclusions and/or recommendations of this report are only valid as of the date of this report. No assurance is made regarding any changes in conditions subsequent to this date. If additional information is discovered or becomes available at a future date, McIntosh Perry should be requested to re-evaluate the conclusions presented in this report, and provide amendments, if required.

APPENDIX A
KEY PLAN

McINTOSH PERRY



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Scale 1:20,000 Metres

LEGEND

- Site Location
- Local Road
- Major Road
- Watercourse
- Waterbody
- Wooded Area

REFERENCE

GIS data provided by the Ontario Ministry of Northern Development, Mines, Natural Resources and Forestry, 2022.

CLIENT: HAWKINS PROPERTIES

PROJECT: 5646-5650 MANOTICK MAIN

TITLE: SITE LOCATION

McINTOSH PERRY
115 Walgreen Road, RR3, Carp, ON K0A1L0
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APPENDIX B
BACKGROUND DOCUMENTS

McINTOSH PERRY

Site Plan Pre-Application Consultation

5646 and 5650 Manotick Main Street

Meeting Date: July 21, 2022

PC2022-0111

Applicant: McIntosh Perry.

Ward 5- West Carleton - March

Proposal Summary: Demolish the existing buildings at 5646 and 5650 Manotick Main Street and redevelop the land with a car was hand drive-thru restaurant.

Attendees:

Sean Harrigan, File Lead, City of Ottawa

Brian Morgan, Infrastructure Project Manager, City of Ottawa

Mark Elliot, Environmental Planner, City of Ottawa

Patrick McMahon, Transportation Project Manager, City of Ottawa

Tessa Di Iorio, Hydrogeologist, City of Ottawa

Jasdeep Brar, Planning Student, City of Ottawa

Consultation Team

Bridgette Alchawa, Planner, McIntosh Perry

Mimmo Laduca – Project Manager

Peter Cai – Architect

Curtis Melanson – Engineer

Jade Hawkins

Regrets

Eric Lalande, Rideau Valley Conservation Authority

Meeting Minutes

Proposal Details

- Demolish the existing two storey building with retail commercial use with an attached car wash on the ground floor with residential units above.
- Construct a 304 square metre restaurant with a drive-thru and new 223 square metre four bay carwash.
- Restaurant requires a Zoning By-law Amendment and Site Plan Control.

Planning Comments

Provided by Sean Harrigan

- The subject site is designated Village by Schedule B9 of the Official Plan. As per Official Plan section 9.4, villages are to be considered as rural neighbourhoods that should evolve into 15-minute neighbourhoods. Development should also maintain the rural and village character and facilitate the use of active transportation for short trips within each village.
- The site is further designated Mixed Residential-Commercial by Schedule A of the Village of Manotick Secondary Plan (Official Plan, Volume 2). The permitted uses include a variety of residential uses and a limited range of commercial and retail uses which would not compete with uses located in the Village Core. The Mud Creek Subwatershed Study (2015) will be used to evaluated any proposed development.
- Active transportation is a main objective/goal for Villages, as per the Official Plan and Secondary Plan. This should be reflected in the development design, Site Plan, and Planning Justification Report.
- The subject site is zoned RC1[152r] – Rural Commercial Zone, Subzone 1, exception 152. The exception prohibits a restaurant/bar and will have to be removed through a Zoning By-law Amendment for the proposed development.
- A **Planning Justification Report** will be required. This report must discuss how the proposed development and Zoning By-law Amendment adheres to the Official Plan, including the Village Secondary Plan. The report should also address the Secondary Plan's direction that this area should consist of residential development with limited commercial/retail, particularly when municipal wastewater services are extended to this area (the City does not have a timeframe for the extension at this point).
- A **Site Plan** is required and must show the property boundaries, dimensions of existing and proposed structures, zoning table, and other requirements listed in the Site Plan section within the Guide to preparing studies and plans | City of Ottawa.
- As per Zoning By-law Section 101, the parking requirements are:
    - 10 spots per 100m^2 of gross floor area for the restaurant (31 spots required for the 304 m^2 restaurant)
    - 0 spots for the car wash

Please ensure the **Site Plan** lists the required and provided parking spaces per land use. In addition to the required vehicle parking, I would strongly recommend bicycle parking to help achieve the Official Plan's active transportation goal.

- Official Plan policy 4.7.2(9) provides guidance that new development that relies upon private sewage system should maintain a minimum area of 800m^2 of undeveloped land for the sewage system. The intent of this policy is to maintain sufficient space for the required septic system as well as a backup location should the proposed system fail anytime in the future. Please ensure the **Site Plan** illustrates the total undeveloped land maintained for the sewage system. The Hydrogeological Report should provide justification if the proposed development does not achieve the 800m^2.
- A **Landscape Plan** is required and should clearly illustrate the location and details of any existing and proposed vegetation. This plan may be combined with the **Tree Conservation Report** provided the details are clearly visible. I strongly recommend planting additional trees adjacent to parking and along the street frontage, and potentially between noise/visual nuisance generators and adjacent properties (i.e. visual buffer between drive thru menu and adjacent residential properties).
- Through preliminary review, I anticipate that the proposed rezoning to permit a restaurant with a drive thru might be appropriate development given the applicable policies (i.e. a drive thru is prohibit in the village core, so limited competition with village core uses. Although, restaurants in general may compete with village core uses). However, this will have to be thoroughly discussed in the **Planning Justification Report**. Also, while the proposed rezoning might be appropriate, I have significant concerns with the scale of development and limitations imposed by lot size. In particular, I anticipate significant challenges in finding a site layout that achieves minimum parking requirements, sufficient space for a septic system, clear throat requirements, and adequate stormwater management.

Engineering Comments

Provided by Brian Morgan

- Based on the City's Official Plan "4.4.1 – Seriving in Public Service Area" and Section 2.3.2, staff would strongly recommend connecting to municipal water services. This would negate the need for a well.
- The **Septic Impact Assessment** should discuss the existing system: location, size, age, condition, and capacity. Please include a calculation of the proposed outflow requirements. Note that septic flows above 10,000 litres/day require eCA approval from the MECP. Records at the OSSO office indicate that a septic permit was applied for in 19990, but no record of its completion or inspection. If it was installed, please provide proof of the installation and when this was done.
- It is understood that the car wash facility includes an oil/grit separator and holding tank. Please provide whatever information you have on this facility. Staff are concerned about excessive or contaminated runoff being directed towards

neighbouring lots or City streets. Please confirm if a permit was issued for the car wash.

- City records do not indicate the outlet for the catch basin located in the right-of-way. The outlet of this feature should be indicated on the Site Plan.
- The City will require proof that the fuel tank was removed.
- This application will require a **Phase 1 ESA.**
- The **Site Plan** should provide information on the existing site including: water, sewer and servicing locations, parking layout, surface types, building locations, basic grading.
- During the Pre-Application Consultation, the applicant's engineer consultant asked for confirmation regarding some of the requirements for the site. I have consulted with the Senior Engineer and can confirm that:
    - The stormwater management criteria for this site is 100-year post to 2-year pre-development.
    - Stormwater management control will be required for this site
    - The 'C' values to be used on this project are given on Table 5.7 as provided in the Sewer Design Guidelines, Second Edition, Document SDG002, October 2012, City of Ottawa (Guidelines) including technical bulletins ISDTB-2014-01, PIEDTB-2016-01, ISTB 2018-01, and ISTB-2018-04.

Table 5.7 Runoff Coefficients for Various Soil Conditions

Topography and Vegetation	Soil Texture		
	Open Sandy Loam	Clay and Silt Loam	Tight Clay
Woodland			
Flat 0-5 % Slope	0.10	0.30	0.40
Rolling 5-10 % Slope	0.25	0.35	0.50
Hilly 10-30 % Slope	0.30	0.50	0.60
Pasture			
Flat 0-5 % Slope	0.10	0.30	0.40
Rolling 5-10 % Slope	0.16	0.36	0.55
Hilly 10-30 % Slope	0.22	0.42	0.60
Cultivated			
Flat 0-5 % Slope	0.30	0.50	0.60
Rolling 5-10 % Slope	0.40	0.60	0.70
Hilly 10-30 % Slope	0.53	0.72	0.82

For paved areas and roofs use: 0.9
For Gravel Surfaces use: 0.25 to 0.7
For Road shoulders use: 0.7

    - The City will require a Noise Report regarding the car wash bays.

Guide to preparing City of Ottawa Studies and Plans: [Guide to preparing studies and plans | City of Ottawa]

To request City of Ottawa plan(s) or report information please contact the ISD Information Centre: Information Centre(613) 580-2424 ext. 44455

Transportation Comments

Provided by Patrick McMahon

- Submit a **TIA Screening Form**. After review, a TIA may be required. Please start this process as soon as possible. Communication with the City is required after every submission.
- On site plan/survey:
    - Show the ROW protection along the frontage.
    - Show lane/aisle widths.
- The clear throat requirement for a restaurant greater than 200 m2 off of an arterial road is 40m. The site layout is not compatible and should be re-oriented to maximize this as much as possible.
- Indicate how many queueing spaces are intended to be provided for the drive-thru. At least seven before the menu board and a total of 11 are required.
- As the proposed site is commercial and for general public use, AODA legislation applies. Provide a pathway for pedestrians to Manotick Main from the restaurant use.
- Manotick Main Street is to be resurfaced in the next 1-2 years fronting this development, which will come with paved shoulders.
- No corner triangle is required.
- A stationary noise study is required for the car wash.

Hydrogeology Comments

Provided by Tessa Di Iorio

- The site is located within the Mud Creek Subwatershed Study (SWS) and all development is expected to comply with the regulations within that document.
- A **Hydrogeological and Terrain Analysis** will be required to assess the well and septic suitability
- Well:
    - Please confirm the water quantity requirement for the new development and compare the existing requirement (including all uses for the well; proposed restaurant, car wash, etc.). If the new development has a greater requirement for water, then a Well Pump test will be required to confirm the change in use can be supported by the existing well.
    - Water quality sampling is required to confirm quality meets Ontario Drinking Water Standards, Objectives and Guidelines. Note that the City of Ottawa has Hydrogeological and Terrain Analysis Guidelines (March 2021) that are in full effect. City Guidelines identify that the ‘subdivision suite’ of parameters needs to be assessed as well as metals. In addition, since the site was previously a gas station, testing should also include petroleum hydrocarbons, VOCs, and BTEX.

    - If the existing well will be used as the supply well, the well should be inspected to ensure it meets current standards outlined in O. Reg. 903 under the Ontario Water Resources Act.
    - The **Hydrogeological Report** should also indlcude an assessment of potential contaminant sources (including the previous activities onsite) and discuss how the well will be protected from contamination in the long term.
    - Please confirm if the former buried gas tanks were decommissioned and removed.
    - As a proposed restaurant, the well would be servicing the public and would fall under O. Reg. 319 (Small Drinking Water Systems) under the Health Protection and Promotion Act administered by Ottawa Public Health (OPH). OPH will need to be notified that the system will be servicing the public (see section 5 of O. Reg. 319). It is understood that OPH will conduct a risk assessment and the owner will need to complete the requirements outlined by OPH prior to the provision of water.
    - Please note that if this site is connected to municipal water , the well assessments (i.e. pump test and water quality sampling) will not be required. However, the potential impact of proposed activities onsite on adjacent wells and best management practices to protect local well users will still need to be addressed in a **Hydrogeological Report**.
- Septic:
    - If there is an increase in septic volume required (based on current standards), then a **Septic Impact Assessment** will be required. If the septic flow is greater than 10,000 L/day then the assessment should be done based on MECP Guideline D-5-4 and City Guidelines.

The hydrogeological consultant is welcome to contact the City's Hydrogeologist (Tessa Di iorio: tessa.diiorio@ottawa.ca) if they would like to discuss the requirements related to the Hydrogeological or Septic Impact Assessment.

Environmental Comments

Provided by Mark Elliot

- The site is located within the Mud Creek Subwatershed Study (SWS) and all development is expected to comply with the regulations within that document.
- The nearest heritage features are more than 120 metres away and therefore do not trigger the need for an Environmental Impact Statement (EIS) under the requirements of the Old OP (section 4.7.8.7) or the new OP (section 5.6.4.1.4). These conditions are reiterated but not substantively altered in the Mud Creek SWS.
- Stormwater would be a concern for this site due to the expansion of impervious surface. The SWS encourages the use of lot-level retention through low-impact design measures in section 4.5.1 but does not require any specific measures. The Stormwater Management Report noted by staff engineers would be a sufficient vehicle through which to address these concerns.

- A **Tree Conservation Report** (TCR) will be required. As noted in the previous discussions for this site, attention should be paid to trees along the property line and their critical root zones. We ask that the applicant seek higher tree coverage pursuant to Urban Forest Canopy Goals in section 4.8.2 of the New OP. The applicant is encouraged to combine tree plantings with on-site stormwater retention through low-impact design measures.
- I have no concerns about endangered species on site other than Butternut which would be addressed in the TCR.

Rideau Valley Conservation Authority Comments

Provided by Eric Lalande

- The RVCA will require enhanced water quality protection for the development on site.

To request City of Ottawa plan(s) or report information please contact the City of Ottawa Information Centre:
informationcentre@ottawa.ca OR (613) 580-2424 ext. 44455

As per section 53 of the Professional Engineers Act, O.Reg. 941/40, R.S.O. 1990, all documents prepared by engineers must be signed and dated on the seal.

Application Submission Information

Application Type**: Site Plan Control – Rural Small**

For information on Site Plan Control Applications, including fees, please visit: https://ottawa.ca/en/city-hall/planning-and-development/information-developers/development-application-review-process/development-application-submission/fees-and-funding-programs/development-application-fees

The application processing timeline generally depends on the quality of the submission. For more information on standard processing timelines, please visit: https://ottawa.ca/en/city-hall/planning-and-development/information-developers/development-application-review-process/development-application-submission/development-application-forms#site-plan-control

Prior to submitting a formal application, it is recommended that you pre-consult with the Ward Councillor.

Application Submission Requirements

For information on the preparation of Studies and Plans and the City's requirements, please visit: https://ottawa.ca/en/city-hall/planning-and-development/information-developers/development-application-review-process/development-application-submission/guide-preparing-studies-and-plans

Please provide electronic copy (PDF) of all plans and studies required.

All identified required plans are to be submitted on standards A1 size sheets and use an appropriate metric scale as per City of Ottawa Servicing and Grading Plan Requirements**, and shall note the survey monument used to establish datum (beyond the local benchmark) on the plans with sufficient information to enable a layperson to locate the document.**

Note that many of the plans and studies collected with this application must be signed, sealed and dated by a qualified engineer, architect, surveyor, planner or designated specialist.

APPENDIX C
WATERMAIN CALCULATIONS

McINTOSH PERRY

McINTOSH PERRY

CCO-22-2383 - 5646-5650 Manotick Main Street - Water Demands

Project:	5646-5650 Manotick Main Street
Project No.:	CCO-22-2383
Designed By:	FV
Checked By:	CJM
Date:	June 2, 2023
Site Area:	0.41 gross ha

Commercial	512 m2	28000 L/gross ha/d

AVERAGE DAILY DEMAND

DEMAND TYPE	AMOUNT	UNITS
Residential	280	L/c/d
Industrial - Light	35,000	L/gross ha/d
Industrial - Heavy	55,000	L/gross ha/d
Shopping Centres	2,500	L/(1000m² /d
Hospital	900	L/(bed/day)
Schools	70	L/(Student/d)
Trailer Park with no Hook-Ups	340	L/(space/d)
Trailer Park with Hook-Ups	800	L/(space/d)
Campgrounds	225	L/(campsite/d)
Restaurant	125	L/seat/d
Motels	150	L/(bed-space/d)
Hotels	225	L/(bed-space/d)
Tourist Commercial	28,000	L/gross ha/d
Other Commercial	28,000	L/gross ha/d

AVERAGE DAILY DEMAND	Residential	0.00	L/s
	Commercial/ Industrial/ Institutional	0.02	L/s

MAXIMUM DAILY DEMAND

DEMAND TYPE	AMOUNT		UNITS
Residential	9.5	x avg. day	L/c/d
Industrial	1.5	x avg. day	L/gross ha/d
Commercial	1.5	x avg. day	L/gross ha/d
Institutional	1.5	x avg. day	L/gross ha/d

MAXIMUM DAILY DEMAND	Residential	0.00	L/s
	Commercial/ Industrial/ Institutional	0.02	L/s

MAXIMUM HOUR DEMAND

DEMAND TYPE	AMOUNT		UNITS
Residential	14.3	x avg. day	L/c/d
Industrial	1.8	x max. day	L/gross ha/d
Commercial	1.8	x max. day	L/gross ha/d
Institutional	1.8	x max. day	L/gross ha/d

MAXIMUM HOUR DEMAND	Residential	0.00	L/s
	Commercial/ Industrial/ Institutional	0.04	L/s

WATER DEMAND DESIGN FLOWS PER UNIT COUNT
CITY OF OTTAWA - WATER DISTRIBUTION GUIDELINES, JULY 2010

AVERAGE DAILY DEMAND	0.02	L/s
MAXIMUM DAILY DEMAND	0.02	L/s
MAXIMUM HOUR DEMAND	0.04	L/s

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McINTOSH PERRY

CCO-22-2383 - 5646-5650 Manotick Main Street - OBC Fire Calculations - NW Building

Project:	5646-5650 Manotick Main Street
Project No.:	CCO-22-2383
Designed By:	FV
Checked By:	CJM
Date:	June 2, 2023

Ontario 2006 Building Code Compendium (Div. B - Part 3)

Water Supply for Fire-Fighting - Drive-Through Restaurant

Building is classified as Group : Group E

Building is of combustible construction. Floor assemblies are fire separations but with no fire-resistance ratings. Roof assemblies, mezzanies, loadbearing walls, columns and arches do not have a fire-resistance rating.

From Div. B A-3.2.5.7. of the Ontario Building Code - 3. Building On-Site Water Supply:

(a) Q = K x V x Stot

where:

Q = minimum supply of water in litres

K = water supply coefficient from Table 1

V = total building volume in cubic metres

Stot = total of spatial coefficient values from the property line exposures on all sides as obtained from the formula:

Stot = 1.0 + [Sside1+Sside2+Sside3+..etc.]

K	39	
V	1,116	(Total building volume in m³.)
Stot	1.2	(From figure 1 pg A-32)
Q =	52,228.80 L	

From Figure 1 (A-32)

Snorth	42.8	m	0.0
Seast	34.4	m	0.0
Ssouth	8.3	m	0.2
Swest	17.4	m	0.0

* approximate distances

From Table 2: Required Minimum Water Supply Flow Rate (L/s)

2700 L/min if Q < 108,000 L

713 gpm

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McINTOSH PERRY

CCO-22-2383 - 5646-5650 Manotick Main Street - OBC Fire Calculations - SE Building

Project:	5646-5650 Manotick Main Street
Project No.:	CCO-22-2383
Designed By:	FV
Checked By:	CJM
Date:	June 2, 2023

Ontario 2006 Building Code Compendium (Div. B - Part 3)

Water Supply for Fire-Fighting - Car Wash

Building is classified as Group : Group F-2

Building is of noncombustible construction or of heavy timber construction conforming to Article 3.1.4.6. Floor assemblies are fire separations but with no fire-resistance rating. Roof assemblies, mezzanines, loadbearing walls, columns and arches do not have a fire-resistance rating.

From Div. B A-3.2.5.7. of the Ontario Building Code - 3. Building On-Site Water Supply:

(a) Q = K x V x Stot

where:

Q = minimum supply of water in litres

K = water supply coefficient from Table 1

V = total building volume in cubic metres

Stot = total of spatial coefficient values from the property line exposures on all sides as obtained from the formula:

Stot = 1.0 + [Sside1+Sside2+Sside3+..etc.]

K	27	
V	1,444	(Total building volume in m³.)
Stot	1.3	(From figure 1 pg A-32)
Q =	50,666.85 L	

→

From Figure 1 (A-32)

Snorth	7.3	m	0.3
Seast	24.6	m	0.0
Ssouth	38.9	m	0.0
Swest	9.6	m	0.0

* approximate distances

From Table 2: Required Minimum Water Supply Flow Rate (L/s)

2700 L/min if Q < 108,000 L

713 gpm

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McINTOSH PERRY

CCO-22-2383 - 5646 Manotick Main Street - Boundary Condition Unit Conversion

Project:	5646 Manotick Main Street
Project No.:	CCO-22-2383
Designed By:	FV
Checked By:	CJM
Date:	June 2, 2023

Boundary Conditions Unit Conversion

Manotick Main - Curent Pressure Zone (3SW)

Scenario	Height (m)	Elevation (m)	m H_2O	PSI	kPa
Avg. DD	157.1	87.4	69.7	99.1	683.3
Max Day + Fire Flow (45 L/s or 2,700 L/min)	146.1	87.4	58.7	83.6	576.2
Peak Hour	140.3	87.4	52.9	75.3	519.3

Manotick Main - Future Pressure Zone (SUC)

Scenario	Height (m)	Elevation (m)	m H_2O	PSI	kPa
Avg. DD	147.7	87.4	60.3	85.7	591.1
Max Day + Fire Flow (45 L/s or 2,700 L/min)	140.8	87.4	53.4	76.0	524.2
Peak Hour	142.3	87.4	54.9	78.2	539.0

Boundary Conditions for 5646 Manotick Main

Information Provided:
Date provided: Dec 2022

Scenario	Demand	
	L/min	L/s
Average Daily Demand	3	0.05
Maximum Daily Demand	4.2	0.07
Peak Hour	7.2	0.12
Fire Flow Demand #1	2700	45.0
Fire Flow Demand #2	4000	66.7

Location:

Results:

Current Pressure Zone 3SW

Connection 1 - Manotick Main

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	157.1	99.1
Peak Hour	140.3	75.3
Max Day plus Fire #1	146.1	83.6
Max Day plus Fire #2	142.4	78.3

[1] Ground Elevation = 87.4m

Future Pressure Zone SUC (2024)

Connection 1 - Manotick Main

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	147.7	85.7
Peak Hour	142.3	78.2
Max Day plus Fire #1	140.8	76.0
Max Day plus Fire #2	137.3	71.1

[1] Ground Elevation = 87.4m

Notes:

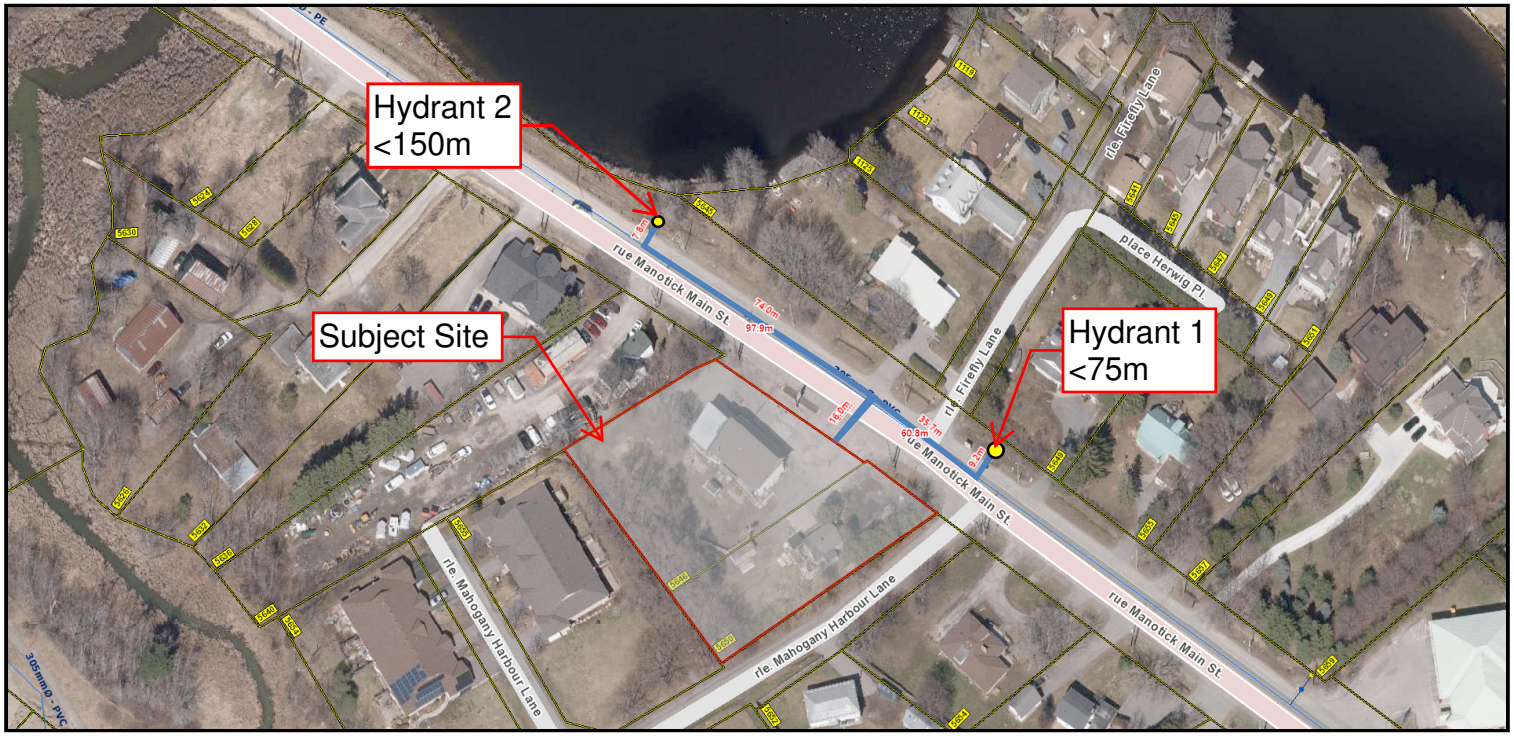
1) As per the Ontario Building Code in areas that may be occupied, the static pressure at any fixture shall not exceed 552 kPa (80 psi.) Pressure control measures to be considered are as follows, in order of preference:
   a) If possible, systems to be designed to residual pressures of 345 to 552 kPa (50 to 80 psi) in all occupied areas outside of the public right-of-way without special pressure control equipment.
   b) Pressure reducing valves to be installed immediately downstream of the isolation valve in the home/ building, located downstream of the meter so it is owner maintained.

Disclaimer

The boundary condition information is based on current operation of the city water distribution system. The computer model simulation is based on the best information available at the time. The operation of the water distribution system can change on a regular basis, resulting in a variation in boundary conditions. The physical properties of watermains deteriorate over time, as such must be assumed in the absence of actual field test data. The variation in physical watermain properties can therefore alter the results of the computer model simulation. Fire Flow analysis is a reflection of available flow in the watermain; there may be additional restrictions that occur between the watermain and the hydrant that the model cannot take into account.

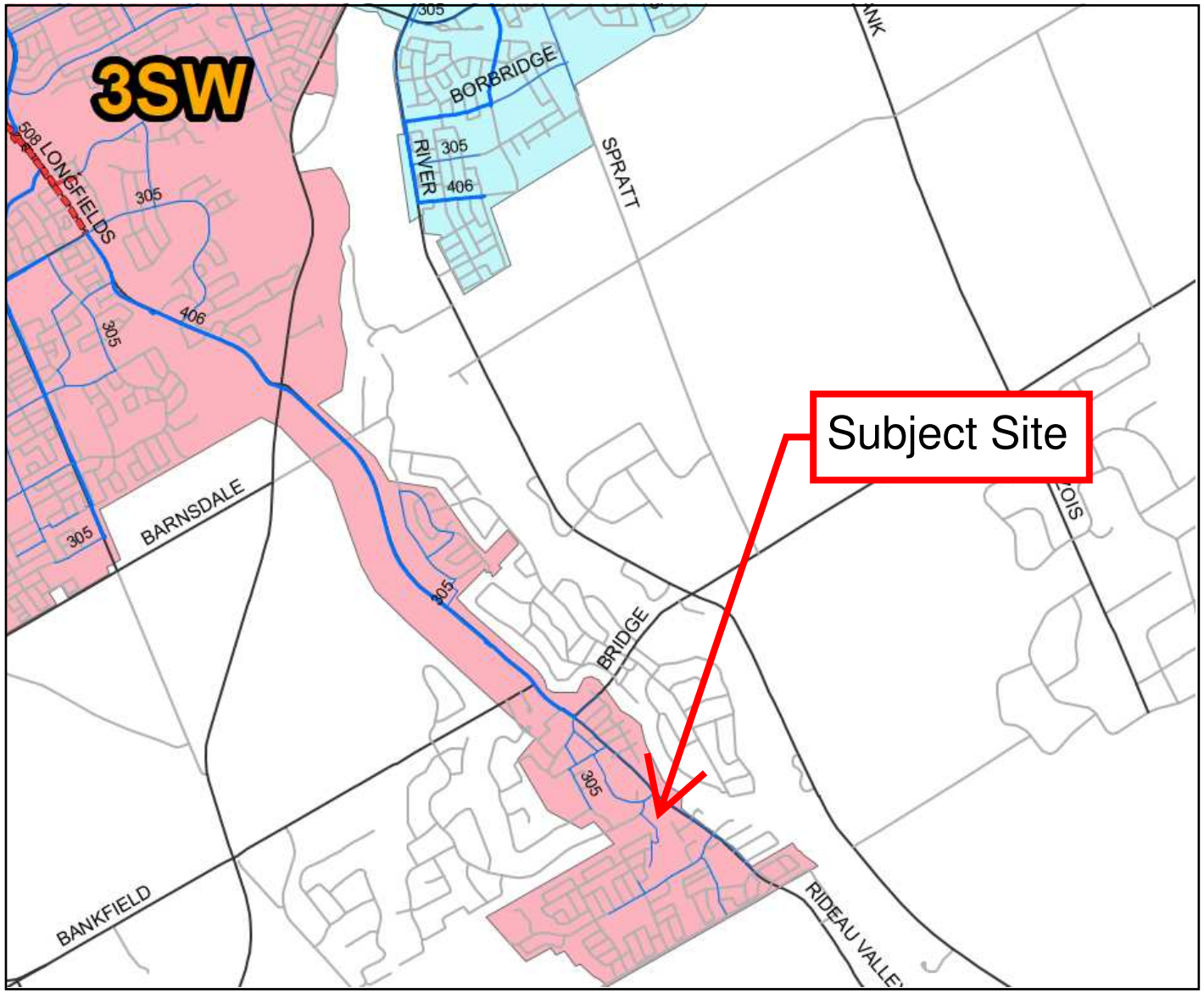
5646-5650 Manotick Main

Hydrant Coverage Figure



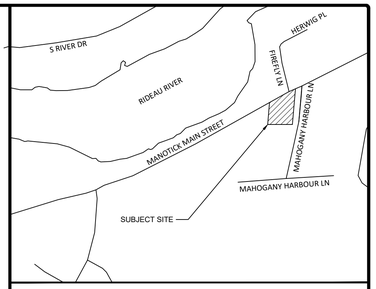
5646-5650 Manotick Main

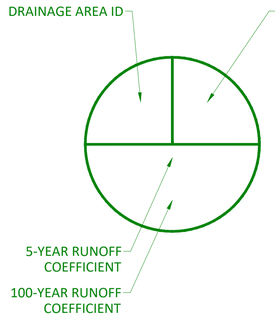
Pressure Zone Figure



APPENDIX E
PRE-DEVELOPMENT DRAINAGE PLAN

McINTOSH PERRY





BENCHMARKS:

No.	DESCRIPTION	ELEVATION
TBM#1	TOP SPINDLE OF FIRE HYDRANT	90.92m

SCALE 1 : 150

0 3 6 9 12 15 Metres

No.	Revision/Issue	Date
00	ISSUED FOR SITE PLAN CONTROL	JUNE 1, 2023

Check and verify all dimensions before proceeding with the work — Do not scale drawings

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Client:
HAWKINS PROPERTIES
650a EAGLESON ROAD,
OTTAWA, ONTARIO, K2M 1H4

Project:
5646 - 5650 MANOTICK MAIN STREET
MANOTICK MAIN STREET
OTTAWA ONTARIO

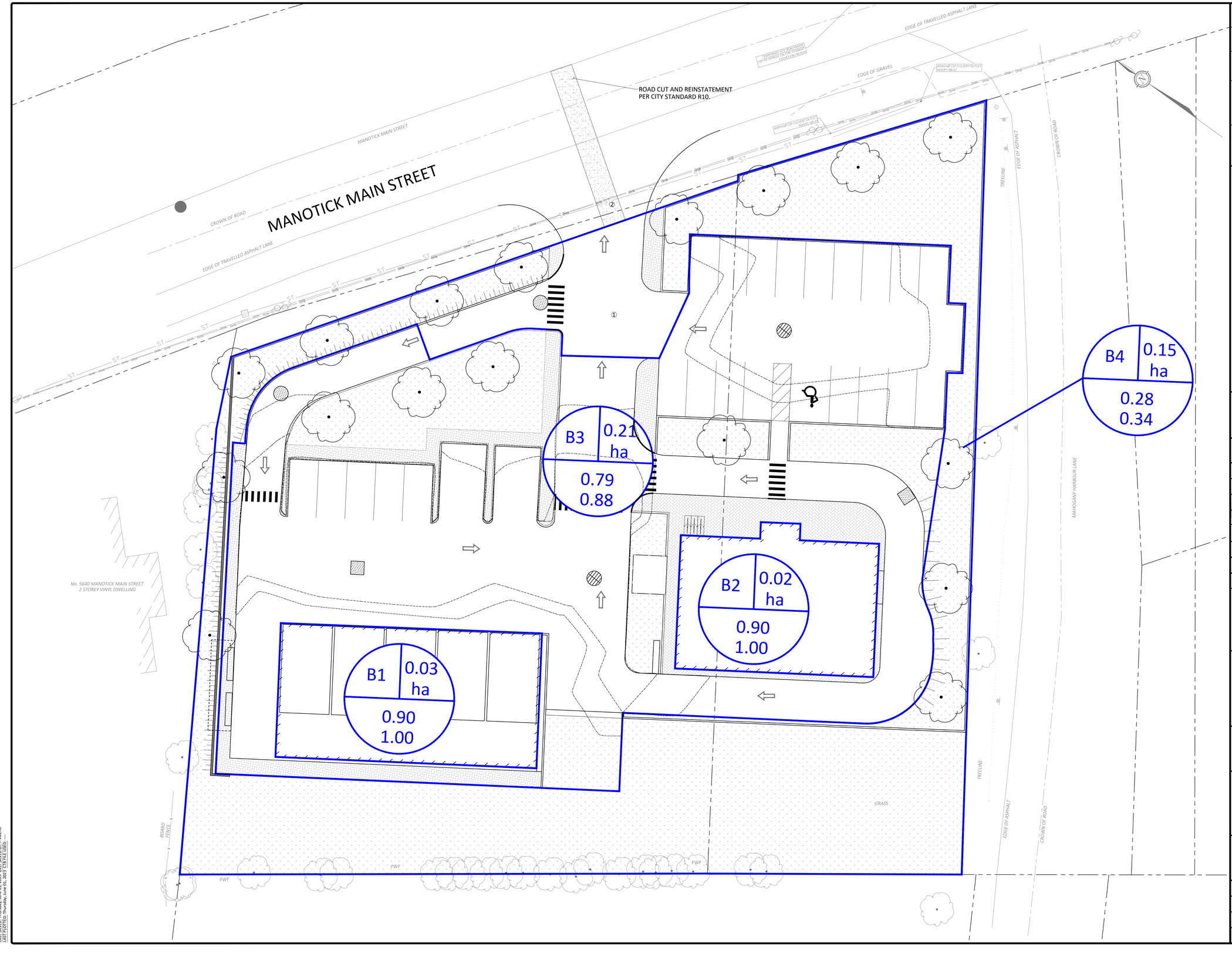
Drawing Title:
PRE-DEVELOPMENT DRAINAGE AREA PLAN

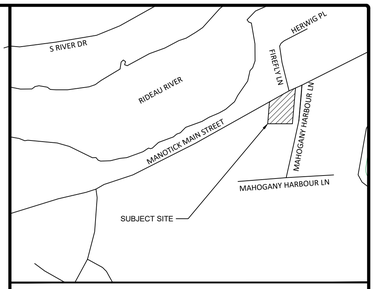
Scale:	1:150	Project Number:	CCO-22-2383
Drawn by:	M.D.		
Checked By:	C.M.	Drawing Number:	PRE
Designed By:	M.D.		

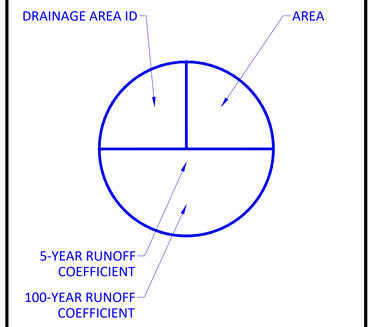
FILENAME: \\Ottawa\01 Project - Projects\2022 Jobs\CCO\CCO-22-2383 Hawkins Properties_2Bch_5646 Manotick Main St\12 - Drawings\CCO-22-2383 - Manotick Main Street - Design.dwg
LAST SAVED: Thursday, June 01, 2023 LAST SAVED BY: I Valeri
LAST PLOTTED: Thursday, June 01, 2023 CTB FILE USED: ----

APPENDIX F
POST-DEVELOPMENT DRAINAGE PLAN

McINTOSH PERRY







BENCHMARKS:

No.	DESCRIPTION	ELEVATION
TBM#1	TOP SPINDLE OF FIRE HYDRANT	90.92m

SCALE 1 : 150

0 3 6 9 12 15 Metres

No.	Revision/Issue	Date
00	ISSUED FOR SITE PLAN CONTROL	JUNE 2, 2023

Check and verify all dimensions before proceeding with the work

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Stamp:

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Client:
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650a EAGLESON ROAD,
OTTAWA, ONTARIO, K2M 1H4

Project:
5646 - 5650 MANOTICK MAIN STREET
MANOTICK MAIN STREET
OTTAWA ONTARIO

Drawing Title:
POST-DEVELOPMENT DRAINAGE AREA PLAN

Scale:	1:150	Project Number:	CCO-22-2383
Drawn by:	M.D.		
Checked By:	C.M.	Drawing Number:	POST
Designed By:	M.D.		

FILENAME: I:\Ottawa\01 Project - Proposals\2022 Jobs\CCO\CCO-22-2383 Hawkins Properties_2Bch_5646 Manotick Main St\12 - Drawings\CCO-22-2383 - Manotick Main Street - Design.dwg
LAST SAVED: Thursday, June 01, 2023 LAST SAVED BY: F.Valerio
LAST PLOTTED: Thursday, June 01, 2023 CTB FILE USED: ----

APPENDIX G
STORMWATER MANAGEMENT CALCULATIONS

McINTOSH PERRY

Tc (min)	Intensity (mm/hr)		
	2-Year	5-Year	100-Year
20	52.0	70.3	120.0
10	76.8	104.2	178.6

C-Values	
Impervious	0.90
Gravel	0.60
Pervious	0.20

Pre-Development Runoff Coefficient

Drainage Area	Impervious Area (m^2)	Gravel (m^2)	Pervious Area (m^2)	Average C (5-year)	Average C (100-year)
A1	1,441	0	2,634	0.45	0.52

Pre-Development Runoff Calculations

Drainage Area	Area (ha)	C 2/5-Year	C 100-Year	Tc (min)	Q (L/s)		
					2-Year	5-Year	100-Year
A1	0.41	0.45	0.52	10	38.94	52.83	104.23
Total	0.41				38.94	52.83	104.23

Post-Development Runoff Coefficient

Drainage Area	Impervious Area (m^2)	Gravel (m^2)	Pervious Area (m^2)	Average C (5-year)	Average C (100-year)	
B1	289	0	0	0.90	1.00	NW Building
B2	223	0	0	0.90	1.00	SE Building
B3	1,745	0	335	0.79	0.88	Surface Restricted
B4	169	0	1,314	0.28	0.34	Surface Unsrestricted

Post-Development Runoff Calculations

Drainage Area	Area (ha)	C 2/5-Year	C 100-Year	Tc (min)	Q (L/s)			
					2-Year	5-Year	100-Year	
B1	0.03	0.90	1.00	10	5.55	7.54	14.35	NW Building
B2	0.02	0.90	1.00	10	4.29	5.82	11.08	SE Building
B3	0.21	0.79	0.88	10	34.96	47.42	90.77	Surface Restricted
B4	0.15	0.28	0.34	10	8.86	12.02	24.70	Surface Unsrestricted
Total	0.41				53.66	72.80	140.90	

Required Restricted Flow

Drainage Area	Area (ha)	C 2/5-Year	Tc (min)	Q (L/s)
				2-Year
A1	0.41	0.45	10	38.94

Post-Development Restricted Runoff Calculations

Drainage Area	Unrestricted Flow (L/S)		Restricted Flow (L/S)		Storage Required (m^3)		Storage Provided (m^3)	
	5-year	100-Year	5-Year	100-Year	5-Year	100-Year	5-Year	100-Year
B1	7.54	14.35	0.79	1.23	5.81	11.74	6.14	11.88
B2	5.82	11.08	0.57	0.93	4.61	9.14	4.74	9.17
B3	47.42	90.77	11.35	11.51	26.41	69.55	29.80	70.46
B4	12.02	24.70	12.02	24.70				
Total	72.80	140.90	24.73	38.37	36.83	90.43	40.69	91.51

CCO-22-2383 - 5646-5650 Manotick Main - Roof Storage - Area B1

5-Year Storm Event

Tc (min)	I (mm/hr)	B1 Runoff (L/s)	Allowable Outflow (L/s)	Runoff to be Stored (L/s)	Storage Required (m^3)
10	104.2	7.54	0.79	6.75	4.05
20	70.3	5.08	0.79	4.30	5.15
30	53.9	3.90	0.79	3.11	5.60
40	44.2	3.20	0.79	2.41	5.78
50	37.7	2.73	0.79	1.94	5.81
60	32.9	2.38	0.79	1.59	5.73
70	29.4	2.13	0.79	1.34	5.62
80	26.6	1.92	0.79	1.14	5.45

Maximum Storage Required 5-Year (m^3) =	5.81

100-Year Storm Event

Tc (min)	I (mm/hr)	B1 Runoff (L/s)	Allowable Outflow (L/s)	Runoff to be Stored (L/s)	Storage Required (m^3)
40	75.1	6.04	1.23	4.81	11.54
50	64.0	5.14	1.23	3.91	11.73
60	55.9	4.49	1.23	3.26	11.74
70	49.8	4.00	1.23	2.77	11.64
80	45.0	3.62	1.23	2.39	11.45
90	41.1	3.30	1.23	2.07	11.20
100	37.9	3.05	1.23	1.82	10.89
110	35.2	2.83	1.23	1.60	10.55

Maximum Storage Required 100-Year (m^3) =	11.74

Storage Parameters	
Roof Area (m^2)	289.06
Usable Roof Area (%)	85%
Usable Roof Area (m^2)	245.70

5-Year Storage Summary	
Max. Storage Available (m^3)	6.14
Storage Required (m^3)	5.81
Max. Ponding Depth (m)	0.075

100-Year Storage Summary	
Max. Storage Available (m^3)	11.88
100-Year Storage Required (m^3)	11.74
Max. Ponding Depth (m)	0.145

Roof Drain Flow (B1)

Roof Drains Summary		
Type of Control Device	Watts Drainage - Accutrol Weir	
Number of Roof Drains	1	
Roof Drain Position	1/2 Open	
	5-Year	100-Year
Rooftop Storage Available (m^3)	6.14	11.88
Rooftop Storage Required (m^3)	5.81	11.74
Storage Depth (m)	0.075	0.145
Flow (Per Roof Drain) (L/s)	0.79	1.23
Total Flow (L/s)	0.79	1.23

Flow Rate Vs. Build-Up (Individual Drain)	
Depth (mm)	Flow (L/s)
0	0.00
5	0.06
10	0.13
15	0.19
20	0.25
25	0.32
30	0.38
35	0.44
40	0.50
45	0.57
50	0.63
55	0.66
60	0.69
65	0.73
70	0.76
75	0.79
80	0.82
85	0.85
90	0.88
95	0.91
100	0.95
105	0.98
110	1.01
115	1.04
120	1.07
125	1.10
130	1.14
135	1.17
140	1.20
145	1.23
150	1.26

	Roof Drain Flow		
	Individual Flow (l/s)	Storage Depth (mm)	Cumulative Flow (l/s)
	0.00	0	0.00
	0.06	5	0.06
	0.13	10	0.13
	0.19	15	0.19
	0.25	20	0.25
	0.32	25	0.32
	0.38	30	0.38
	0.44	35	0.44
	0.50	40	0.50
	0.57	45	0.57
	0.63	50	0.63
	0.66	55	0.66
	0.69	60	0.69
	0.73	65	0.73
	0.76	70	0.76
5-Year	0.79	75	0.79
	0.82	80	0.82
	0.85	85	0.85
	0.88	90	0.88
	0.91	95	0.91
	0.95	100	0.95
	0.98	105	0.98
	1.01	110	1.01
	1.04	115	1.04
	1.07	120	1.07
	1.10	125	1.10
	1.14	130	1.14
	1.17	135	1.17
	1.20	140	1.20
100-Year	1.23	145	1.23
	1.26	150	1.26

* Roof Drain model to be Accutrol Weirs, See attached sheets
* Roof Drain Flow information taken from Watts Drainage website

Note: The flow leaving through a restricted roof drain is based on flow vs. head information

5-Year Storm Event

Tc (min)	I (mm/hr)	B2 Runoff (L/s)	Allowable Outflow (L/s)	Runoff to be Stored (L/s)	Storage Required (m^3)
10	104.2	5.82	0.57	5.25	3.15
20	70.3	3.93	0.57	3.36	4.03
30	53.9	3.01	0.57	2.44	4.40
40	44.2	2.47	0.57	1.90	4.56
50	37.7	2.11	0.57	1.54	4.61
60	32.9	1.84	0.57	1.27	4.57
70	29.4	1.64	0.57	1.07	4.51
80	26.6	1.49	0.57	0.92	4.41

Maximum Storage Required 5-Year (m^3) =	4.61

100-Year Storm Event

Tc (min)	I (mm/hr)	B2 Runoff (L/s)	Allowable Outflow (L/s)	Runoff to be Stored (L/s)	Storage Required (m^3)
10	178.6	11.08	0.93	10.15	6.09
20	120.0	7.44	0.93	6.51	7.82
30	91.9	5.70	0.93	4.77	8.59
40	75.1	4.66	0.93	3.73	8.96
50	64.0	3.97	0.93	3.04	9.12
60	55.9	3.47	0.93	2.54	9.14
70	49.8	3.09	0.93	2.16	9.07
80	45.0	2.79	0.93	1.86	8.94

Maximum Storage Required 100-Year (m^3) =	9.14

Storage Parameters	
Roof Area (m^2)	223.25
Usable Roof Area (%)	85%
Usable Roof Area (m^2)	189.76

5-Year Storage Summary	
Max. Storage Available (m^3)	4.74
Storage Required (m^3)	4.61
Max. Ponding Depth (m)	0.075

100-Year Storage Summary	
Max. Storage Available (m^3)	9.17
100-Year Storage Required (m^3)	9.14
Max. Ponding Depth (m)	0.145

Roof Drain Flow (B2)

Roof Drains Summary		
Type of Control Device	Watts Drainage - Accutrol Weir	
Number of Roof Drains	1	
Roof Drain Position	1/4 Open	
	5-Year	100-Year
Rooftop Storage Available (m^3)	4.74	9.17
Rooftop Storage Required (m^3)	4.61	9.14
Storage Depth (m)	0.075	0.145
Flow (Per Roof Drain) (L/s)	0.57	0.93
Total Flow (L/s)	0.57	0.93

Flow Rate Vs. Build-Up (Individual Drain)	
Depth (mm)	Flow (L/s)
0	0.00
5	0.06
10	0.13
15	0.19
20	0.25
25	0.32
30	0.38
35	0.44
40	0.50
45	0.57
50	0.63
55	0.65
60	0.66
65	0.68
70	0.69
75	0.71
80	0.73
85	0.74
90	0.76
95	0.77
100	0.79
105	0.80
110	0.82
115	0.84
120	0.85
125	0.87
130	0.88
135	0.90
140	0.91
145	0.93
150	0.95

	Roof Drain Flow		
	Individual Flow (l/s)	Storage Depth (mm)	Cumulative Flow (l/s)
	0.00	0	0.00
	0.06	5	0.06
	0.13	10	0.13
	0.19	15	0.19
	0.25	20	0.25
	0.32	25	0.32
	0.38	30	0.38
	0.44	35	0.44
	0.50	40	0.50
	0.57	45	0.57
	0.63	50	0.63
	0.65	55	0.65
	0.66	60	0.66
	0.68	65	0.68
	0.69	70	0.69
5-Year	0.71	75	0.71
	0.73	80	0.73
	0.74	85	0.74
	0.76	90	0.76
	0.77	95	0.77
	0.79	100	0.79
	0.80	105	0.80
	0.82	110	0.82
	0.84	115	0.84
	0.85	120	0.85
	0.87	125	0.87
	0.88	130	0.88
	0.90	135	0.90
	0.91	140	0.91
100-Year	0.93	145	0.93
	0.95	150	0.95

* Roof Drain model to be Accutrol Weirs, See attached sheets
* Roof Drain Flow information taken from Watts Drainage website

Note: The flow leaving through a restricted roof drain is based on flow vs. head information

Storage Requirements for Area B3

5-Year Storm Event

Tc (min)	I (mm/hr)	Runoff (L/s) B3	Allowable Outflow (L/s)	Runoff to be Stored (L/s)	Storage Required (m^3)
10	104.2	48.78	11.35	37.43	22.46
20	70.3	33.35	11.35	22.00	26.41
30	53.9	25.89	11.35	14.54	26.17
40	44.2	21.47	11.35	10.12	24.30
50	37.7	18.52	11.35	7.17	21.50

Maximum Storage Required 5-year =	26	m^3

100-Year Storm Event

Tc (min)	I (mm/hr)	Runoff (L/s) B3	Allowable Outflow (L/s)	Runoff to be Stored (L/s)	Storage Required (m^3)
10	178.6	92.95	11.51	81.44	48.86
20	120.0	63.16	11.51	51.65	61.98
30	91.9	48.88	11.51	37.37	67.26
40	75.1	40.34	11.51	28.83	69.18
50	64.0	34.69	11.51	23.18	69.55
60	55.9	30.58	11.51	19.07	68.64
70	49.8	27.48	11.51	15.97	67.05

Maximum Storage Required 100-year =	70	m^3

5-Year Storm Event Storage Summary

		Water Elev. (m) =		89.65		
Location	T/G	INV. (out)	Area (m^2)	Depth (m)	Head (m)	Volume (m^3)
CB6	89.49	88.14	457.9	0.16	1.98	19.2
CBMH5	89.50	87.90		0.15		
CBMH3	89.45	87.87	207.5	0.20		10.6

Storage Available (m^3) = 29.8
Storage Required (m^3) = 26.4

100-Year Storm Event Storage Summary

		Water Elev. (m) =		89.70		
Location	T/G	INV. (out)	Area (m^2)	Depth (m)	Head (m)	Volume (m^3)
CB6	89.49	88.14	618.3	0.21	2.03	46.2
CBMH5	89.50	87.90		0.20		
CBMH3	89.45	87.87	346.9	0.25		24.3

Storage Available (m^3) = 70.5
Storage Required (m^3) = 69.6

STORM SEWER DESIGN SHEET

PROJECT: CCO-22-2383
LOCATION: 5646-5650 Manotick Main Street
CLIENT: Hawkins Properties

McINTOSH PERRY

LOCATION				CONTRIBUTING AREA (ha)				RATIONAL DESIGN FLOW									SEWER DATA								
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	18	19	20	21	22	23	24	25	26	27	28
STREET	AREA ID	FROM MH	TO MH	C-VALUE	AREA	INDIV AC	CUMUL AC	INLET (min)	TIME IN PIPE	TOTAL (min)	i (5) (mm/hr)	i (10) (mm/hr)	i (100) (mm/hr)	5yr PEAK FLOW (L/s)	ROOF FIXED FLOW (L/s)	DESIGN FLOW (L/s)	CAPACITY (L/s)	LENGTH (m)	PIPE SIZE (mm) DIA	W	H	SLOPE (%)	VELOCITY (m/s)	AVAIL CAP (5yr) (L/s)	(%)
Manotick Main St	B1+B3	CB6	CBMH5	0.79	0.07	0.05	0.05	10.00	0.34	10.34	104.19	122.14	178.56	14.84	0.79	15.63	34.22	21.50	200			1.00	1.055	18.59	54.32%
	B1+B3	CBMH5	MH2	0.79	0.07	0.06	0.11	10.34	0.40	10.74	102.43	120.07	175.51	31.05	0.79	31.05	34.22	25.46	200			1.00	1.055	3.16	9.25%
	B2+B3	CB4	CBMH3	0.79	0.07	0.05	0.05	10.00	0.29	10.29	104.19	122.14	178.56	15.82	0.57	16.39	34.22	18.65	200			1.00	1.055	17.83	52.10%
	B2+B3	CBMH3	MH2				0.05	10.29	0.35	10.65	102.66	120.34	175.91	15.59	0.57	16.16	34.22	22.24	200			1.00	1.055	18.06	52.78%
	B1+B2+B3	MH2	OGS1				0.16	10.74	0.33	11.07	100.43	117.71	172.05	45.70	1.36	47.06	62.04	24.28	250			1.00	1.224	14.98	24.15%
	B1+B2+B3	OGS	EX. CB				0.16	11.07	0.10	11.18	98.85	115.85	169.32	44.98	1.36	46.34	62.04	7.67	250			1.00	1.224	15.70	25.31%

Definitions:
Q = 2.78CIA, where:
Q = Peak Flow in Litres per Second (L/s)
A = Area in Hectares (ha)
i = Rainfall intensity in millimeters per hour (mm/hr)
[i = 998.071 / (TC+6.053)^0.814] 5 YEAR
[i = 1174.184 / (TC+6.014)^0.816] 10 YEAR
[i = 1735.688 / (TC+6.014)^0.820] 100 YEAR

Notes:
1. Mannings coefficient (n) = 0.013

Designed:
FV

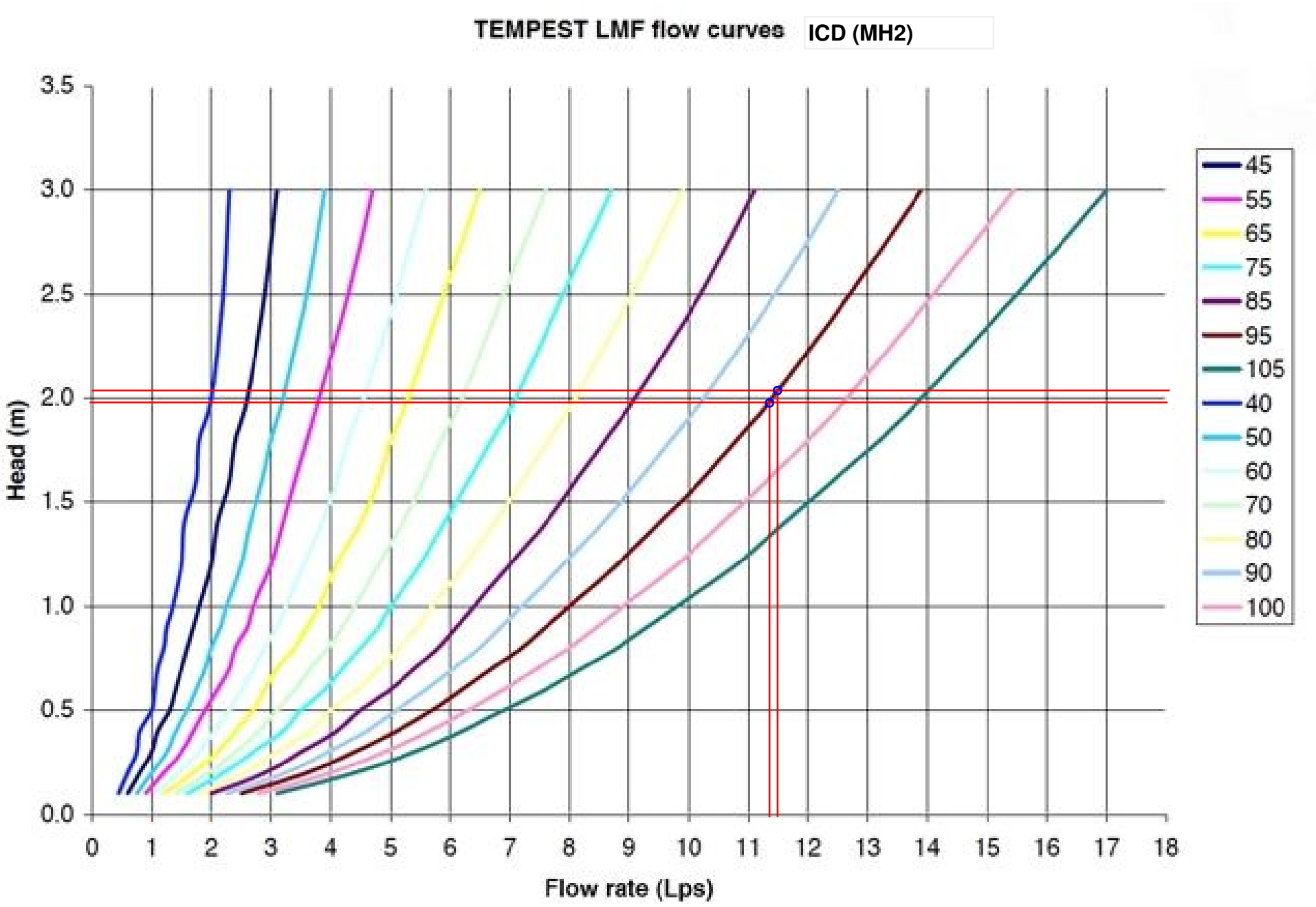
Checked:
CH

Project No.:
CCO-22-2383

No.	Revision	Date
1.	ISSUED FOR CSITE PLAN CONTROL	2023.06.02

Date:
2023.06.02

Sheet No:
1 of 1


TEMPEST LMF flow curves
ICD (MH2)
Head (m)
Flow rate (Lps)
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
45
55
65
75
85
95
105
40
50
60
70
80
90
100

APPENDIX H
CITY OF OTTAWA DESIGN CHECKLIST

McINTOSH PERRY

City of Ottawa

4. Development Servicing Study Checklist

The following section describes the checklist of the required content of servicing studies. It is expected that the proponent will address each one of the following items for the study to be deemed complete and ready for review by City of Ottawa Infrastructure Approvals staff.

The level of required detail in the Servicing Study will increase depending on the type of application. For example, for Official Plan amendments and re-zoning applications, the main issues will be to determine the capacity requirements for the proposed change in land use and confirm this against the existing capacity constraint, and to define the solutions, phasing of works and the financing of works to address the capacity constraint. For subdivisions and site plans, the above will be required with additional detailed information supporting the servicing within the development boundary.

4.1 General Content

Criteria	Location (if applicable)
☐ Executive Summary (for larger reports only).	N/A
☐ Date and revision number of the report.	On Cover
☐ Location map and plan showing municipal address, boundary, and layout of proposed development.	Appendix A
☐ Plan showing the site and location of all existing services.	Site Servicing Plan (C102)
☐ Development statistics, land use, density, adherence to zoning and official plan, and reference to applicable subwatershed and watershed plans that provide context to which individual developments must adhere.	1.1 Purpose 1.2 Site Description 6.0 Stormwater Management
☐ Summary of pre-consultation meetings with City and other approval agencies.	Appendix B
☐ Reference and confirm conformance to higher level studies and reports (Master Servicing Studies, Environmental Assessments, Community Design Plans), or in the case where it is not in conformance, the proponent must provide justification and develop a defendable design criteria.	1.1 Purpose 1.2 Site Description 6.0 Stormwater Management
☐ Statement of objectives and servicing criteria.	3.0 Pre-Consultation Summary

☐ Identification of existing and proposed infrastructure available in the immediate area.	N/A
☐ Identification of Environmentally Significant Areas, watercourses and Municipal Drains potentially impacted by the proposed development (Reference can be made to the Natural Heritage Studies, if available).	Site Grading Plan (C101)
☐ Concept level master grading plan to confirm existing and proposed grades in the development. This is required to confirm the feasibility of proposed stormwater management and drainage, soil removal and fill constraints, and potential impacts to neighbouring properties. This is also required to confirm that the proposed grading will not impede existing major system flow paths.	Site Grading Plan (C101)
☐ Identification of potential impacts of proposed piped services on private services (such as wells and septic fields on adjacent lands) and mitigation required to address potential impacts.	N/A
☐ Proposed phasing of the development, if applicable.	N/A
☐ Reference to geotechnical studies and recommendations concerning servicing.	Section 2.0 Background Studies, Standards and References
☐ All preliminary and formal site plan submissions should have the following information: o Metric scale o North arrow (including construction North) o Key plan o Name and contact information of applicant and property owner o Property limits including bearings and dimensions o Existing and proposed structures and parking areas o Easements, road widening and rights-of-way o Adjacent street names	Site Grading Plan (C101)

4.2 Development Servicing Report: Water

Criteria	Location (if applicable)
☐ Confirm consistency with Master Servicing Study, if available	N/A
☐ Availability of public infrastructure to service proposed development	N/A
☐ Identification of system constraints	N/A
☐ Identify boundary conditions	Appendix C
☐ Confirmation of adequate domestic supply and pressure	N/A
☐ Confirmation of adequate fire flow protection and confirmation that fire flow is calculated as per the Fire Underwriter's Survey. Output should show available fire flow at locations throughout the development.	Appendix C
☐ Provide a check of high pressures. If pressure is found to be high, an assessment is required to confirm the application of pressure reducing valves.	N/A
☐ Definition of phasing constraints. Hydraulic modeling is required to confirm servicing for all defined phases of the project including the ultimate design	N/A
☐ Address reliability requirements such as appropriate location of shut-off valves	N/A
☐ Check on the necessity of a pressure zone boundary modification.	N/A
☐ Reference to water supply analysis to show that major infrastructure is capable of delivering sufficient water for the proposed land use. This includes data that shows that the expected demands under average day, peak hour and fire flow conditions provide water within the required pressure range	Appendix C, Section 4.2

☐ Description of the proposed water distribution network, including locations of proposed connections to the existing system, provisions for necessary looping, and appurtenances (valves, pressure reducing valves, valve chambers, and fire hydrants) including special metering provisions.	Site Servicing Plan (C101)
☐ Description of off-site required feedermains, booster pumping stations, and other water infrastructure that will be ultimately required to service proposed development, including financing, interim facilities, and timing of implementation.	N/A
☐ Confirmation that water demands are calculated based on the City of Ottawa Design Guidelines.	Appendix C
☐ Provision of a model schematic showing the boundary conditions locations, streets, parcels, and building locations for reference.	N/A

4.3 Development Servicing Report: Wastewater

Criteria	Location (if applicable)
☐ Summary of proposed design criteria (Note: Wet-weather flow criteria should not deviate from the City of Ottawa Sewer Design Guidelines. Monitored flow data from relatively new infrastructure cannot be used to justify capacity requirements for proposed infrastructure).	N/A
☐ Confirm consistency with Master Servicing Study and/or justifications for deviations.	N/A
☐ Consideration of local conditions that may contribute to extraneous flows that are higher than the recommended flows in the guidelines. This includes groundwater and soil conditions, and age and condition of sewers.	N/A
☐ Description of existing sanitary sewer available for discharge of wastewater from proposed development.	Section 5.2 Proposed Sanitary Sewer

☐ Verify available capacity in downstream sanitary sewer and/or identification of upgrades necessary to service the proposed development. (Reference can be made to previously completed Master Servicing Study if applicable)	Section 5.3 Proposed Sanitary Design
☐ Calculations related to dry-weather and wet-weather flow rates from the development in standard MOE sanitary sewer design table (Appendix 'C') format.	N/A
☐ Description of proposed sewer network including sewers, pumping stations, and forcemains.	Section 5.2 Proposed Sanitary Sewer
☐ Discussion of previously identified environmental constraints and impact on servicing (environmental constraints are related to limitations imposed on the development in order to preserve the physical condition of watercourses, vegetation, soil cover, as well as protecting against water quantity and quality).	N/A
☐ Pumping stations: impacts of proposed development on existing pumping stations or requirements for new pumping station to service development.	N/A
☐ Forcemain capacity in terms of operational redundancy, surge pressure and maximum flow velocity.	N/A
☐ Identification and implementation of the emergency overflow from sanitary pumping stations in relation to the hydraulic grade line to protect against basement flooding.	N/A
☐ Special considerations such as contamination, corrosive environment etc.	N/A

4.4 Development Servicing Report: Stormwater Checklist

Criteria	Location (if applicable)
☐ Description of drainage outlets and downstream constraints including legality of outlets (i.e. municipal drain, right-of-way, watercourse, or private property)	Section 6.0 Stormwater Sewer Design & Section 7.0 Proposed Stormwater Management
☐ Analysis of available capacity in existing public infrastructure.	N/A
☐ A drawing showing the subject lands, its surroundings, the receiving watercourse, existing drainage patterns, and proposed drainage pattern.	Pre & Post-Development Plans
☐ Water quantity control objective (e.g. controlling post-development peak flows to pre-development level for storm events ranging from the 2 or 5-year event (dependent on the receiving sewer design) to 100-year return period); if other objectives are being applied, a rationale must be included with reference to hydrologic analyses of the potentially affected subwatersheds, taking into account long-term cumulative effects.	Section 6.0 Stormwater Sewer Design & Section 7.0 Proposed Stormwater Management
☐ Water Quality control objective (basic, normal or enhanced level of protection based on the sensitivities of the receiving watercourse) and storage requirements.	Section 6.0 Stormwater Sewer Design & Section 7.0 Proposed Stormwater Management
☐ Description of the stormwater management concept with facility locations and descriptions with references and supporting information.	Section 6.0 Stormwater Sewer Design & Section 7.0 Proposed Stormwater Management
☐ Set-back from private sewage disposal systems.	N/A
☐ Watercourse and hazard lands setbacks.	N/A
☐ Record of pre-consultation with the Ontario Ministry of Environment and the Conservation Authority that has jurisdiction on the affected watershed.	N/A
☐ Confirm consistency with sub-watershed and Master Servicing Study, if applicable study exists.	N/A
☐ Storage requirements (complete with calculations) and conveyance capacity for minor events (1:5-year return period) and major events (1:100-year return period).	Appendix G

☐ Identification of watercourses within the proposed development and how watercourses will be protected, or, if necessary, altered by the proposed development with applicable approvals.	Site Grading Plan
☐ Calculate pre-and post development peak flow rates including a description of existing site conditions and proposed impervious areas and drainage catchments in comparison to existing conditions.	Section 7.0 Proposed Stormwater Management Appendix G
☐ Any proposed diversion of drainage catchment areas from one outlet to another.	Section 6.0 Stormwater Sewer Design & Section 7.0 Proposed Stormwater Management
☐ Proposed minor and major systems including locations and sizes of stormwater trunk sewers, and stormwater management facilities.	Section 6.0 Stormwater Sewer Design & Section 7.0 Proposed Stormwater Management
☐ If quantity control is not proposed, demonstration that downstream system has adequate capacity for the post-development flows up to and including the 100-year return period storm event.	N/A
☐ Identification of potential impacts to receiving watercourses	N/A
☐ Identification of municipal drains and related approval requirements.	N/A
☐ Descriptions of how the conveyance and storage capacity will be achieved for the development.	Section 6.0 Stormwater Sewer Design & Section 7.0 Proposed Stormwater Management
☐ 100-year flood levels and major flow routing to protect proposed development from flooding for establishing minimum building elevations (MBE) and overall grading.	Site Grading Plan (C101)
☐ Inclusion of hydraulic analysis including hydraulic grade line elevations.	N/A

☐ Description of approach to erosion and sediment control during construction for the protection of receiving watercourse or drainage corridors.	Section 8.0 Sediment & Erosion Control
☐ Identification of floodplains – proponent to obtain relevant floodplain information from the appropriate Conservation Authority. The proponent may be required to delineate floodplain elevations to the satisfaction of the Conservation Authority if such information is not available or if information does not match current conditions.	N/A
☐ Identification of fill constraints related to floodplain and geotechnical investigation.	N/A

4.5 Approval and Permit Requirements: Checklist

The Servicing Study shall provide a list of applicable permits and regulatory approvals necessary for the proposed development as well as the relevant issues affecting each approval. The approval and permitting shall include but not be limited to the following:

Criteria	Location (if applicable)
☐ Conservation Authority as the designated approval agency for modification of floodplain, potential impact on fish habitat, proposed works in or adjacent to a watercourse, cut/fill permits and Approval under Lakes and Rivers Improvement Act. The Conservation Authority is not the approval authority for the Lakes and Rivers Improvement Act. Where there are Conservation Authority regulations in place, approval under the Lakes and Rivers Improvement Act is not required, except in cases of dams as defined in the Act.	N/A
☐ Application for Certificate of Approval (CofA) under the Ontario Water Resources Act.	N/A
☐ Changes to Municipal Drains.	N/A
☐ Other permits (National Capital Commission, Parks Canada, Public Works and Government Services Canada, Ministry of Transportation etc.)	N/A

4.6 Conclusion Checklist

Criteria	Location (if applicable)
☐ Clearly stated conclusions and recommendations	Section 9.0 Summary Section 10.0 Recommendations
☐ Comments received from review agencies including the City of Ottawa and information on how the comments were addressed. Final sign-off from the responsible reviewing agency.	All are stamped
☐ All draft and final reports shall be signed and stamped by a professional Engineer registered in Ontario	All are stamped