SERVICING & STORMWATER MANAGEMENT REPORT
1083-1095 MERIVALE ROAD

Project No.: CCO-22-3530

City File No.: D07-12-23-0078

Prepared for:

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Prepared by:

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Rev01: May 24, 2023
Rev02: October 27, 2023

McINTOSH PERRY

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1.0 PROJECT DESCRIPTION

1.1 Purpose

McIntosh Perry (MP) has been retained by CSV Architects to prepare this Servicing and Stormwater Management Report in support of the Site Plan Control process for the proposed development located at 1083-1095 Merivale Road 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 available services will adequately service the proposed development.

This report should be read in conjunction with the following drawings:

- CCO-22-3530, C101 – Grading, Drainage, Erosion & Sediment Control Plan
- CCO-22-3530, C102 – Site Servicing Plan
- CCO-22-3530, PRE – Pre-Development Drainage Area Plan (*Appendix E*)
- CCO-22-3530, POST – Post-Development Drainage Area Plan (*Appendix F*)

1.2 Site Description

Figure 1: Site Map

The subject property, herein referred to as the site, is located at 1083-1095 Merivale Road within the River ward. The site covers approximately *0.51 ha* and is located at the intersection of Merivale

Road and Kirkwood Avenue. The site is zoned for Residential Fourth Density (R4UC) and Traditional Mainstreet Use (TM & TM12) and Residential Fourth Density (R4UC). See Site Location Plan in *Appendix 'A'* for more details.

1.3 Proposed Development and Statistics

The proposed development consists of the addition of a 6-storey apartment building with a 711 m^2 footprint. Parking and drive aisles will be reconfigured as part of the development, complete with new landscaped areas. Refer to *Site Plan* prepared by CSV Architects and included in *Appendix B* for further details.

1.4 Existing Conditions and Infrastructures

The site is currently developed containing an existing 1-storey home at 1083 Merivale Road, and an existing 2 ½-storey apartment building with asphalt parking areas at 1095 Merivale Road. The existing buildings are serviced via connections to the existing 525 mm sanitary sewer, and the existing 305 mm diameter watermain within Merivale Road. There are no known storm service connections on Merivale Road.

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):

- Merivale Road
  - 305 mm diameter UCI watermain, a
  - 525mm diameter concrete sanitary sewer, tributary to the Cave Creek Collector, and a
  - 525/675 mm diameter concrete storm sewer, tributary to the Ottawa River approximately 5.6km downstream.

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, provided 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 since the since the parcels of land are anticipated to be amalgamated into a single parcel, and there is no proposed industrial use. As a result, the stormwater management system meets the exemption requirements under O.Reg 525/90.

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 proposed site were reviewed in order to identify infrastructure available to service the proposed development.

A topographic survey (AB22300) of the site was completed by Fairhall Moffat & Woodland on August 9th, 2021.

The Site Plan (A1) was prepared by CSV Architects (*Site Plan*).

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-2018-04 City of Ottawa, March 2018. *(ISTB-2018-04)*
  - 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)*
  - Technical Bulletin ISTB-2021-03 City of Ottawa, August 2021. *(ISTB-2021-03)*

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 August 17th, 2022, regarding the proposed site servicing. Specific design parameters to be incorporated within this design include the following:

- Pre-development and post-development flows shall be calculated using a time of concentration (Tc) no less than 10 minutes.
- Control 5 through 100-year post-development flows to the 2-year pre-development flows with a combined C value to a maximum of 0.50.
- Based on further consultation with City Staff, the portion of the site tributary to the Emperor Road storm sewer is permitted to be unrestricted due to challenges with the existing topography.

4.0 WATERMAIN

4.1 Existing Watermain

The site is located within the 2W2C pressure zone, as per the Water Distribution System mapping included in *Appendix C*. There are two municipal fire hydrants on Merivale Road and one hydrant on Kirkwood Avenue available to service the development. The existing building is serviced via a 200 mm diameter PVC water service connected to the 305 mm diameter UCI watermain located within Merivale Road.

4.2 Proposed Watermain

Due to the anticipated water demand for the two buildings, the site is proposed to be serviced with a double water service connection to the existing 305 mm diameter watermain as per City Guidelines to provide redundancy. This will be achieved by installing an additional 200mm diameter water service adjacent to the existing 200mm diameter service and separated by a new valve box on the 305mm diameter Merivale watermain. The two services will be connected within the site and will each include an isolation valve at the property line. *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

Site Area	0.51 ha
Residential	280 L/day/person
Residential Apartment – Average	1.8 person/unit
Max Day Peaking Factor - Residential	4.5 x avg. day
Peak Hour Peaking Factor - Residential	6.7 x avg. day

The OBC and Fire Underwriters Survey 2020 (FUS) methods were utilized to estimate the required fire flow for the proposed building. Fire flow requirements were calculated per City of Ottawa Technical Bulletin *ISTB-2018-02*. The estimated OBC and FUS fire flows were calculated separately for the proposed building, and the highest demand was utilized for design. The following parameters were utilized in the calculation:

FUS:

- Type of construction – Non-Combustible Construction
- Occupancy Type – Limited Combustible
- Sprinkler Protection – Standard Sprinkler System

OBC:

- Type of construction – Non-Combustible Construction
- Occupancy Type: Group C

- Water Supply Coefficient (K): 10

The results of the FUS calculations yielded a required fire flow of *6,000 L/min* (100.00 L/s), and the results of the OBC calculation yielded a required fire flow of *6,300 L/min* (105.0 L/s). The detailed calculations for the FUS and OBC can be found in *Appendix C*.

The city provided the estimated water pressures at both 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 *Table 2*, below.

Table 2: Summary of Estimated Water Demand

Scenario	Proposed Demands (L/S)	Connection 1 HGL (m H_2O)*/kPa
Average Day Demand	0.65	48.5 / 476.2
Max Day + Fire Flow Demand (FUS)	102.90	39.8 / 390.8
Max Day + Fire Flow Demand (OBC)	107.90	56.3 / 387.9
Peak Hourly Demand	4.38	40.0 / 392.8
**Adjusted for an estimated watermain elevation of 84.26m at the connection point.*		

The normal operating pressure range is anticipated to be 392.8 kPa to 476.2 kPa and will not be less than 275 kPa (40 psi) or exceed 689 kPa (100 psi).

To confirm the adequacy of fire flow to protect the proposed development, existing and proposed fire hydrants within 150 m of the proposed building were analysed per City of Ottawa *ISTB 2018-02* Appendix I Table 1. The results are summarized below. A hydrant coverage figure can be found in *Appendix C*.

Table 3: 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.)
1083-1095 Merivale Road	6,300 (OBC) 6,000 (FUS)	2 Public 1 Private	1 Public	20,900

5.0 SANITARY DESIGN

5.1 Existing Sanitary Sewer

There is an existing 150 mm diameter sanitary sewer lateral servicing the 1095 Merivale property which is connected to the 525 mm diameter concrete sanitary sewer located within Merivale Road, tributary to the Cave Creek Collector. No changes are proposed to the sanitary servicing of the existing building.

5.2 Proposed Sanitary Sewer

A new 150 mm diameter gravity sanitary service will be extended from the existing private 1200 mm diameter maintenance hole located on site to service the proposed building. Refer to drawing C102 for a detailed servicing layout.

Table 4, below, summarizes the wastewater design criteria identified by the *Ottawa Sewer Guidelines*.

Table 4: Sanitary Design Criteria

Design Parameter	Value
Site Area	0.51 ha
Residential	280 L/person/day
Average Apartment	1.8 persons/unit
Residential Peaking Factor (Proposed)	3.50
Extraneous Flow Allowance	0.33 L/s/ha

Table 5 below, summarizes the estimated wastewater flow from the existing and proposed buildings. Refer to *Appendix D* for detailed calculations.

Table 5: Summary of Estimated Sanitary Flow

Design Parameter	Total Flow (L/s)
Total Estimated Average Dry Weather Flow	0.77
Total Estimated Peak Dry Weather Flow	2.62
Total Estimated Peak Wet Weather Flow	2.77

As noted above, the development is proposed to be serviced via a proposed 150 mm sanitary service connection to the existing 150 mm sanitary service.

The full flowing capacity of a 150 mm diameter service at 1.94% slope is calculated to be *22.13 L/s*, and therefore the anticipated *2.77 L/s* peak wet weather is only expected to occupy a maximum of 13% of the total capacity of the pipe. As a result, upgrades to the existing sanitary service are not required. Due to the complexity of the downstream network the City will need to advise of any downstream constraints that may impact the allowable release rate for the site.

6.0 STORM SEWER DESIGN

6.1 Existing Storm Sewers

Stormwater runoff from the existing building and parking lot is conveyed through a service connection to the 300mm diameter concrete storm sewer located within Emperor Avenue. Surface runoff from front of the site is directed towards the Merivale Road Right of Way (ROW).

6.2 Proposed Storm Sewers

The proposed development will be serviced through a new 300 mm diameter service lateral connected to the existing 525 mm diameter storm sewer within Merivale Road.

Runoff collected on the roof of the proposed building will be stored and controlled internally using six (6) roof drains. Drain controls 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 the ¼ open position 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 proposed surface parking lot and landscaped areas tributary to Merivale Road will be directed towards catch basins and catch basin maintenance holes within the new drive aisle. Flow restriction will be utilized to restrict storm runoff to the allowable release rate, creating the need for on-site storage.

Runoff from the rear parking area will be directed to the Emperor Avenue ROW without flow restriction, based on coordination with City Staff included in *Appendix 'G'.*

Foundation drainage for the proposed building is proposed to be conveyed via a 150 mm diameter storm lateral without flow attenuation connected to the new 300 mm diameter storm service.

See CCO-22-3530 - *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

As per *Section 6.2*, stormwater management for the proposed development will be provided by ground surface and roof storage. The controlled stormwater flow for the proposed building and front drive aisle will be directed to the existing 525 mm diameter storm sewer within Merivale Road. Uncontrolled stormwater flow from the existing building and reconfigured rear parking lot will be directed to the Emperor Avenue ROW.

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 controls are not anticipated to be required due to the distance to the outlet.

Quantity Control

- Any storm events greater than the 5-year, up to 100-year, and including the 100-year storm event must be detained on site.
- Post-development flow to be restricted to the 2-year storm event, based on a calculated time of concentration of at least 10 minutes and a combined maximum rational method coefficient of 0.50. Refer to *Section 7.2* for further details.
- Based on further consultation with City Staff, the portion of the site directing runoff to the Emperor Road ROW is permitted to be unrestricted.

7.2 Runoff Calculations

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

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

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
Undeveloped and Grass	0.20

As per the *City of Ottawa - Sewer Design Guidelines*, the 5-year '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 site does not contain any 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 6*. See CCO-22-3530 - *PRE* in *Appendix E* and *Appendix G* for calculations.

Table 6: Pre-Development Runoff Summary

Drainage Area (Outlet)	Area (ha)	C (2-5/100-Year)	Q (L/s)		
			2-Year	5-Year	100-Year
A1 (Merivale)	0.23	0.64/0.72	31.82	43.17	83.42
A2 (Emperor)	0.28	0.63/0.71	37.96	51.49	99.52
Total	0.51		69.78	94.66	182.94

7.4 Post-Development Drainage

To meet the stormwater objectives, the development will contain flow attenuation via rooftop and surface storage. *Table 7,* below, summarizes the required restricted flow to the Merivale ROW.

Table 7: Required Restricted Flow

Drainage Area	Area (ha)	C (2/5-Year)	Q (L/s) 2-Year
A1	0.23	0.50	25.00

Based on the criteria listed in *Section 7.1*, the development will be required to restrict flow to the 2-year storm event with a maximum runoff coefficient of 0.5. The target release rate to the Merivale ROW during the 100-year event was calculated to be *25.00 L/s*. See *Appendix G* for calculations.

The proposed site drainage limits are demonstrated on the Post-Development Drainage Area Plan. See CCO-22-3530 - *POST* in *Appendix F* of this report for more details. A summary of the post-development controlled runoff calculations can be found below.

Table 8: 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	0.07	3.97	5.30	21.0	21.6
B2	0.13	8.53	8.75	35.3	37.2
B3	0.04	5.41	10.59	-	-
Total (Merivale)	0.23	17.92	24.64	56.37	58.78
B4	0.28	53.54	104.21	-	-
Total (Emperor)	0.28	53.54	104.21	-	-
Site Total	0.51	71.45	128.85	56.37	58.78

Runoff from area B1 will be controlled and stored on the roof of the proposed building (B1) using six (6) roof drains. Drain controls 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 the ¼ open position 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.

As shown in *Table 9*, below, roof runoff will be restricted to a maximum release rate of 5.30 L/s, allowing for a proposed 21.6 m^3 of roof storage.

Table 9: Roof Drainage Summary

Drainage Area	Area (ha)	# of Roof Drains	Storage Depth (mm)		Total Flow Rate (L/s)	
			5-Year	100-Year	5-Year	100-Year
B1	0.07	6	60	130	3.97	5.30

Runoff for area B2 will flow overland towards the proposed catch basins and be collected on site. A Tempest LMF85 ICD located at the outlet of the downstream maintenance hole will be used to restrict runoff from area B2 to the allowable release rate. Flow restriction will result in maximum ponding depths of *21 cm* and *30 cm* during the 5- and 100-year events, respectively. The maximum head and flow rate during the 100-year event will be *1.87m* and *8.75 L/s*, respectively. A maximum *37.2 m^3* of surface storage is proposed with a spill elevation of 87.10.

7.5 Quality Control

As noted in *Section 7.1*, quality controls are not anticipated to be required due to the distance to the outlet.

8.0 EROSION AND SEDIMENT CONTROL

8.1 Temporary Measures

Before construction begins, temporary silt fence, straw bale or rock flow check dams will be installed at all-natural runoff outlets from the property. It is crucial that these controls be maintained throughout construction and inspection of sediment and erosion control will be facilitated by the Contractor or Contract Administration staff throughout the construction period.

Silt fences will be installed where shown on the final engineering plans, specifically along the downstream property limits. The Contractor, at their discretion or at the instruction of the City, Conservation Authority or the Contract Administrator shall increase the quantity of sediment and erosion controls on-site to ensure that the site is operating as intended and no additional sediment finds its way off site. The rock flow, straw bale & silt fence check dams and barriers shall be inspected weekly and after rainfall events. Care shall be taken to properly remove sediment from the fences and check dams as required. Fibre roll barriers are to be installed at all existing curb inlet catch basins and filter fabric is to be placed under the grates of all existing catch basins and manholes along the frontage of the site and any new structures immediately upon installation. The measures for the existing/proposed structures are to be removed only after all areas have been paved. Care shall be taken at the removal stage to ensure that any silt that has accumulated is properly handled and disposed of. Removal of silt fences without prior removal of the sediments shall not be permitted.

Although not anticipated, work through winter months shall be closely monitored for erosion along sloped areas. Should erosion be noted, the Contractor shall be alerted and shall take all necessary steps to rectify the situation. Should the Contractor's efforts fail at remediating the eroded areas, the Contractor shall contact the City and/or Conservation Authority to review the site conditions and determine the appropriate course of action. As the ground begins to thaw, the Contractor shall place silt fencing at all required locations as soon as ground conditions warrant. Please see the *Site Grading, Drainage and* Sediment *& Erosion Control Plan* for additional details regarding the temporary measures to be installed and their appropriate OPSD references.

8.2 Permanent Measures

It is expected that the Contractor will promptly ensure that all disturbed areas receive topsoil and seed/sod and that grass be established as soon as possible. Any areas of excess fill shall be removed or levelled as soon as possible and must be located a sufficient distance from any watercourse to ensure that no sediment is washed out into the watercourse. As the vegetation growth within the site provides a key component to the control of sediment for the site, it must be properly maintained once established. Once the construction is complete, it will be up to the landowner to maintain the vegetation and ensure that the vegetation is not overgrown or impeded by foreign objects.

9.0 SUMMARY

- A new 6-storey *711 m²* building is proposed to be constructed west of the existing apartment building at 1083-1095 Merivale Road.
- It is proposed to service the new building by extending a 200 mm diameter water service and 150 mm diameter sanitary services to the existing 200 mm diameter water service and 150 mm diameter sanitary service, respectively. A new water service connection to the existing 305 mm diameter watermain within Merivale Road is proposed. A new 300 mm diameter storm service is proposed to collect and control drainage within the development area.
- The proposed storm system will service the development area via catch basins and roof collection. The storm system will connect to the existing 525 mm diameter concrete storm sewer located within Merivale Road.
- Stormwater management for the site will include storage for the 5- through 100-year storm events and will be provided in the front drive aisle and on the roof.
- Quality controls are not anticipated to be required due to the distance to the outlet.

10.0 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 1083-1095 Merivale Road.

This report is respectfully being submitted for approval.

Regards,

McIntosh Perry Consulting Engineers Ltd.

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11.0 STATEMENT OF LIMITATIONS

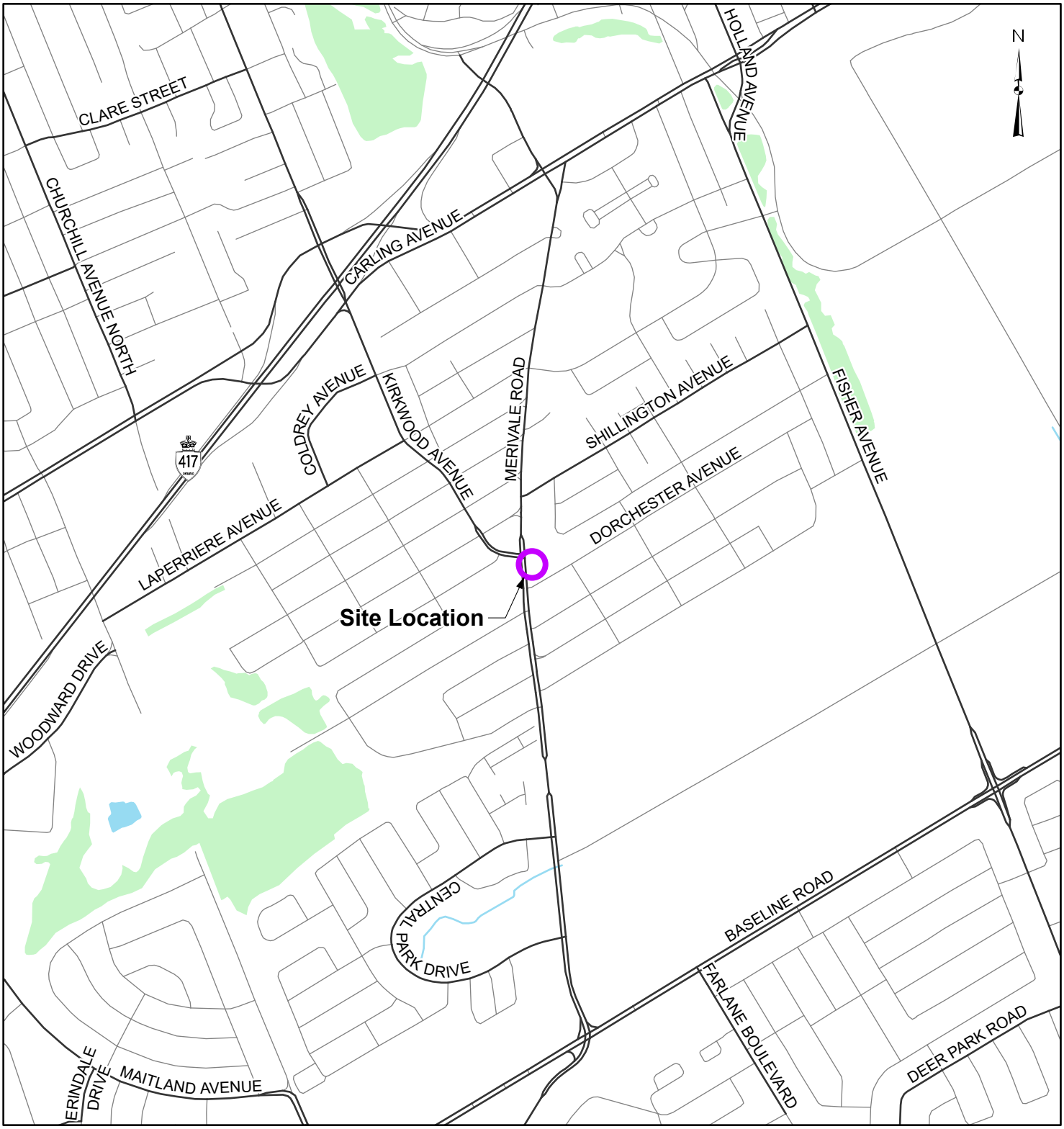
This report was produced for the exclusive use of CSV Architects Inc. The purpose of the report is to assess the existing stormwater management system and provide recommendations and designs for the post-construction scenario that are in compliance with the guidelines and standards from the Ministry 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 1:15,000 Metres

LEGEND

- Local Road
- Major Road
- Watercourse
- Waterbody
- Wooded Area
- siteLocation

REFERENCE

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

CLIENT: CSV ARCHITECTS

PROJECT: 1083-1095 MERIVALE ROAD

TITLE: SITE LOCATION

McINTOSH PERRY
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www.mcintoshperry.com

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APPENDIX B
BACKGROUND DOCUMENTS

McINTOSH PERRY

Formal Pre- Application Consultation Meeting Notes

File #: PC2022-0202

File Type: Site Plan Control

Location: 1083 Merivale Road

Wednesday August 17, 2022 from 1 pm to 2 pm

Attendees

City of Ottawa
Katie Morphet (File Lead, Planner II)
Ben Brummelhuis, Planning Student
Burl Walker (Parks)
Josiane Gervais (Transportation)
Mary Dickinson (Affordable Housing)
Matthew Ippersiel (Urban Design)
Urja Modi (Planner I)

Applicant Team
Jessie Smith
Jill Macdonald
Stephanie Fogel
Cara Uy
Keith Lau
Curtis Melanson

Note: Eric Lalande from the RVCA was unable to attend.

Notes & Comments

1. As the proposed building will be located within the TM and TM12 zone the most restrictive of the two zones will apply (TM12)
2. As per the TM12 zone, the 5th storey and above will have the be setback 2 m.
3. The maximum front yard setback is 2m.
4. Section 197 (5) (o) of the Zoning By-law sets out that "determining the front yard setback, a lot that abuts any of the following streets designated "Traditional Mainstreet" in the Official Plan is to be treated as though it fronts that street"
5. Maximum private approach needs to be 45 m or less.
6. There are currently three private approaches proposed off Merivale. This needs to meet the private approach by-law.
7. Parking requirements are currently not met
    - 1.5 for residential, and office 0.5.
    - Would require a ZBLA if a reduction is sought
8. Rationale required for complete submission. Please includes all the relevant existing OP policies, new OP policies, CDP, and design guidelines.
    - If submission is after the new OP is approved by the Ministry then just focus on New OP.

Engineering Comments (Bruce Bramah):

9. Please find the attached comments titled “Bruce Bramah Preconsult Notes”

Urban Design Comments (Matthew Ippersiel):

10. Conceptually, the proposed courtyard space between the two buildings is strongly supported.
11. Relocate the loading zone fronting onto Merrivale Road to the south side of the building. This will likely require reconfiguring the ground floor and relocating the garbage/recycling room. With the paved loading area eliminated, the building setback should be reduced, which may permit increasing the size of the courtyard space.
12. As the design of the building at 1083 progresses, please ensure that the front of the façade facing Merrivale does not read as the back of the building. This would help to achieve the vision of the Merrivale Road North CDP to have the street mature as a vibrant urban mainstreet.
    - Use clear windows and doors, to make the pedestrian level façade of walls facing the street highly transparent.
    - Try to have animated ground-floor internal uses front towards the street (though it is understandable that it may be preferable to have some resident amenities front and/or open up onto the courtyard).
    - The front entrance currently looks very small. It should read as the primary entrance to the building and be prominently designed with a direct pedestrian connection to the street. Consider a through-lobby, rather than a hallway connecting to the lobby in the rear.
13. It is recommended that the bike storage, currently shown in the basement, be relocated to the ground floor or to an exterior location. If located outside, please ensure it is located on a concrete pad and sheltered.
14. There are a number of relevant policy and guideline documents that should help guide the design of this development. Please reference the following documents and any others that may apply:
    - The Urban Design Guidelines for Development along Traditional Mainstreets
    - The Merrivale Road North Community Design Plan
15. Please note that the proposed property is located in a Design Priority Area and as such, the Official Plan sets an expectation for an elevated level of attention to be paid to design of the building, its materiality, and the treatment of the public realm as a part of development applications.
16. An Urban Design Brief is required as a part of your submission. This may be combined with your Planning Rationale report. Please refer to the attached Urban Design Brief Terms of Reference to inform the content of the brief.
17. A Formal Review with the City’s Urban Design Review Panel (UDRP) is required. Please contact the Panel Coordinator to schedule the meeting. Providing the coordinator with an early “heads-up” as to which meeting is being targeted, once it is known, is recommended. A full list of upcoming panel meeting dates, submission deadlines and other information can be found on the UDRP website.

Transportation Comments (Josiane Gervais):

18. Follow Transportation Impact Assessment Guidelines:

- Submit a Screening Form at your earliest convenience to josiane.gervais@ottawa.ca. A Transportation Impact Assessment is required if any of the triggers on the screening form are satisfied.
- Start this process asap. The application **will not be deemed complete** until the submission of the draft Step 4 is provided, including the functional draft RMA package (if applicable) and/or monitoring report (if applicable).
- Request base mapping asap if RMA is required. Contact Engineering Services (https://ottawa.ca/en/city-hall/planning-and-development/engineering-services)
- An update to the *TRANS Trip Generation Manual* has been completed (October 2020). This manual is to be utilized for this TIA. A copy of this document can be provided upon request.

19. ROW protection on Merivale between Carling and Kirkwood is 26m even and between Kirkwood and Carldwell is 34m even. Future ROW line must be shown on the site plan.
20. Clear throat requirements for <100 apartment units on an arterial is 15m. Ensure this length is provided. The clear throat length is measured from the ends of the driveway curb return radii at the roadway and the point of first conflict on-site. The minimum throat length provided must be maintained with the future ROW protection.
21. The short term parking spaces shown conflict with the clear throat length.
22. The loading area (lay-by) through the signalized intersection is not supported.
23. A single access on Merivale, as far south as possible, is permitted. The access must meet the City's Private Approach Bylaw. However, most vehicular activity is encouraged to take place via the Panet St access.
24. TMP includes:
    - Transit Priority Corridor (Isolated Measures) along Merivale (Affordable Network)
    - Transit Priority Corridor (Continuous Lanes) along Merivale (2031 Network Concept)
25. The Merivale Road (Baseline Road to Carling Avenue) Transit Priority Environmental Assessment Study was completed. The EA functional plan can be provided upon request.
26. There is ambiguity whether the site is considered strictly residential or if it is institutional (i.e. care facility). If the site is strictly residential, then AODA legislation only applies for areas accessible to the public (i.e. outdoor pathways, accessible visitor parking stalls, etc.). However, if the site is institutional, then AODA applies to the whole site.
    - Ensure all crosswalks located internally on the site provide a TWSI at the depressed curb, per requirements of the Integrated Accessibility Standards Regulation under the AODA.
    - Clearly define accessible parking stalls and ensure they meet AODA standards (include an access aisle next to the parking stall and a pedestrian curb ramp at the end of the access aisle, as required).
    - Please consider using the City's Accessibility Design Standards, which provide a summary of AODA requirements. https://ottawa.ca/en/city-hall/creating-equal-inclusive-and-diverse-city/accessibility-services/accessibility-design-standards-features#accessibility-design-standards
27. On site plan:
    - Ensure site access meets the City's Private Approach Bylaw.
    - Show all details of the roads abutting the site up to and including the opposite curb; include such items as pavement markings, accesses and/or sidewalks.
    - Turning movement diagrams required for all accesses showing the largest vehicle to access/egress the site.
    - Turning movement diagrams required for internal movements (loading areas, garbage).

- Show all curb radii measurements; ensure that all curb radii are reduced as much as possible and fall within TAC guidelines (Figure 8.5.1).
- Show dimensions for site elements (i.e. lane/aisle widths, access width and throat length, parking stalls, sidewalks, pedestrian pathways, etc.)
- Sidewalk is to be continuous across access as per City Specification 7.1.
- Parking stalls at the end of dead-end parking aisles require adequate turning around space.

28. Noise Impact Studies required for the following:
    - Road, as the site is within proximity to Merivale and Kirkwood
    - Stationary, due to the proximity to neighboring exposed mechanical equipment and/or if there will be any exposed mechanical equipment due to the proximity to neighboring noise sensitive land uses.
29. Please find the attached Screening form pdf.

Parks Planning Comments (Burl Walker):

30. According to the Site Plan submitted by CSV Architects and dated August 16, 2022, the applicant is proposing to develop a 5-storey residential building with 57 dwelling units and to construct a 3-storey elevator addition to an existing residential building at 1095 Merivale Road. Building access, landscaped amenities and parking will be shared between 1083 and 1095 Merivale Road. The existing single-detached dwelling at 1083 Merivale Road will be demolished. The proposed development would result in a net increase of 56 dwelling units.

31. According to the property reports on geoOttawa, 1083 Merivale Road has a lot area of 754 sq. m and 1095 Merivale Road has an area of 4,396 sq m. The combined lot area is 5,150 sq. m.

32. The site plan control application will be subject to the City's new Parkland Dedication By-law No. 2022-280, which came into force and took effect on September 1, 2022.

33. The proposed addition to the existing building at 1095 Merivale Road does not generate an increase in density providing a net dwelling unit gain. This addition is exempt from parkland dedication under subsection 11(1) of Parkland Dedication By-law No. 2022-280.

34. For the purpose of these comments, we have assumed that the proposed 5-storey residential building would be considered a mid-rise apartment building as defined by the Zoning By-law. The corresponding parkland dedication requirement is as follows:

    - Conveyance of parkland: 1 ha per 300 dwelling units
    - Cash-in-lieu of parkland dedication: 1 ha per 500 dwelling units
    - Combination thereof

    The required conveyance shall not exceed an amount equivalent to 15% of the gross land area.

35. Cash-in-lieu of parkland dedication is recommended for the proposed development rather land conveyance due to the relatively small redevelopment area of the site.

36. Parkland Dedication By-law No. 2022-280 provides an exemption from parkland dedication for non-profit housing, which the applicant may wish to explore in the event that they may be eligible. The applicable subsections of the By-law are as follows:

    DEFINITIONS

    1. In this by-law:

    "non-profit housing" means housing which is or is intended to be offered primarily to persons or households of low income and which is owned or operated by:

    (i) a non-profit corporation being a corporation, no part of the income of which is payable to or otherwise available for the personal benefit of a member or shareholder thereof; or

    (ii) a non-profit housing co-operative having the same meaning as in the Co-operative Corporations Act, R.S.O. 1990, c. C.35, as may be amended from time to time;

    EXEMPTIONS

    11.(2) No conveyance of land or payment of cash-in-lieu under this by-law is required in the case of the development or redevelopment of:

    (e) residential purposes, or the residential portion of a mixed-use development, that are erected and owned by non-profit housing, provided that satisfactory evidence is provided to the Treasurer that the dwelling units and/or rooming units are intended for persons of low or modest incomes and that the dwelling units and/or rooming units are being made available at values that are initially, and will continue to be, below current market levels in the City;

Affordable Housing Comments (Mary Dickenson):

37. Shepherds of Good Hope is a not-for-profit housing provider which exempts them from paying any planning fees for development applications. Engineering Design Review and Inspection fees and Conservation Authority fees will still apply.
38. This project will likely meet the criteria to be considered a High Social Impact Project according to the attached Council report (an agreement with Housing Services is not yet in place, but may be at the time of application). Applicable measures include prioritized application review, reduction in circulation timeframe from 28 days to 14 days, alternate security options, and consideration for use of a letter of undertaking as opposed to an agreement whenever possible.
39. Please don't hesitate to contact me, Mary Dickinson, mary.dickinson@ottawa.ca, 613-316-6053, with any questions on the above.

Forestry Comments (Mark Richardson):

40. A Tree Conservation Report (TCR) must be supplied for review along with the suite of other plans/reports required by the City
    a. an approved TCR is a requirement of Site Plan approval.
    b. The TCR may be combined with the LP provided all information is supplied
41. Any removal of privately-owned trees 10cm or larger in diameter, or city-owned trees of any diameter requires a tree permit issued under the Tree Protection Bylaw (Bylaw 2020 – 340); the permit will be based on an approved TCR and made available at or near plan approval.
42. The Planning Forester from Planning and Growth Management as well as foresters from Forestry Services will review the submitted TCR
    a. If tree removal is required, both municipal and privately-owned trees will be addressed in a single permit issued through the Planning Forester
    b. Compensation may be required for city owned trees – if so, it will need to be paid prior to the release of the tree permit
43. The TCR must contain 2 separate plans:
    a. Plan/Map 1 - show existing conditions with tree cover information
    b. Plan/Map 2 - show proposed development with tree cover information
    c. Please ensure retained trees are shown on the landscape plan
44. The TCR must list all trees on site, as well as off-site trees if the CRZ extends into the developed area, by species, diameter and health condition
45. Please identify trees by ownership – private onsite, private on adjoining site, city owned, co-owned (trees on a property line)
46. If trees are to be removed, the TCR must clearly show where they are, and document the reason they cannot be retained
47. All retained trees must be shown, and all retained trees within the area impacted by the development process must be protected as per City guidelines available at Tree Protection Specification or by searching Ottawa.ca
    a. the location of tree protection fencing must be shown on the plan
    b. show the critical root zone of the retained trees
48. The City encourages the retention of healthy trees; if possible, please seek opportunities for retention of trees that will contribute to the design/function of the site.

    For more information on the process or help with tree retention options, contact Mark Richardson mark.richardson@ottawa.ca or on City of Ottawa

LP tree planting requirements:

For additional information on the following please contact tracy.smith@Ottawa.ca

Minimum Setbacks

- Maintain 1.5m from sidewalk or MUP/cycle track or water service laterals.
- Maintain 2.5m from curb
- Coniferous species require a minimum 4.5m setback from curb, sidewalk or MUP/cycle track/pathway.
- Maintain 7.5m between large growing trees, and 4m between small growing trees. Park or open space planting should consider 10m spacing, except where otherwise approved in naturalization / afforestation areas. Adhere to Ottawa Hydro's planting guidelines (species and setbacks) when planting around overhead primary conductors.

Tree specifications

- Minimum stock size: 50mm tree caliper for deciduous, 200cm height for coniferous.
- Maximize the use of large deciduous species wherever possible to maximize future canopy coverage
- Tree planting on city property shall be in accordance with the City of Ottawa's Tree Planting Specification; and include watering and warranty as described in the specification (can be provided by Forestry Services).
- Plant native trees whenever possible
- No root barriers, dead-man anchor systems, or planters are permitted.
- No tree stakes unless necessary (and only 1 on the prevailing winds side of the tree)

Hard surface planting

- Curb style planter is highly recommended
- No grates are to be used and if guards are required, City of Ottawa standard (which can be provided) shall be used.
- Trees are to be planted at grade

Soil Volume

- Please document on the LP that adequate soil volumes can be met:

Tree Type/Size	Single Tree Soil Volume (m3)	Multiple Tree Soil Volume (m3/tree)
Ornamental	15	9
Columnar	15	9
Small	20	12
Medium	25	15
Large	30	18
Conifer	25	15

Please note that these soil volumes are not applicable in cases with Sensitive Marine Clay.

Sensitive Marine Clay

- Please follow the City's 2017 Tree Planting in Sensitive Marine Clay guidelines

Tree Canopy Cover

- The landscape plan shall show how the proposed tree planting will replace and increase canopy cover on the site over time, to support the City's 40% urban forest canopy cover target.
- At a site level, efforts shall be made to provide as much canopy cover as possible, through tree planting and tree retention, with an aim of 40% canopy cover at 40 years, as appropriate.
- Indicate on the plan the projected future canopy cover at 40 years for the site.

Development Review – Pre-application consultation Checklist (Municipal Servicing)

Date: **Aug 17, 2022**

Site Location: **1083/1095 Merivale**

Type of Development: x Residential (☐ townhomes, ☐ stacked, ☐ singles, x apartments),
x Office Space, ☐ Commercial, ☐ Retail, ☐ Institutional, ☐ Industrial, other_____

Owner/Agent:

Assigned Planner: **Urja Modi**

Attendees:

Water:
Connection point: 305mm UCI on Merivale Rd.

Water redundancy would be required for this development based on the number of proposed units.

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

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

- Water boundary condition requests must include the location of the service(s) and the expected loads required by the proposed developments. Please provide all the following information:
  - Location of service(s)
  - Type of development and the amount of fire flow required (as per FUS, 2020).
  - Average daily demand: ___ l/s.
  - Maximum daily demand: ___l/s.
  - Maximum hourly daily demand: ___ l/s.
- Fire protection (Fire demand, Hydrant Locations)

Sanitary Sewers:
Connection point: 525mm conc on Merivale Rd.

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

- The designer should be aware there may be limited capacity in the downstream sanitary sewer system. The sanitary demand needs to be coordinated with the City Planning Dept. to determine if the existing sanitary sewer system has sufficient capacity to support the proposed rezoning. Provide sanitary demands to the City project manager for coordination.

Storm Sewers:
Connection point: 525mm conc on Merivale Rd

Storm Water Management:
Quality Control:

- Rideau Valley Conservation Authority to provide quality control requirements for property.

Quantity Control:

- Allowable Runoff coefficient (C): C = the lesser of the existing pre-development conditions to a maximum of 0.5.
- Time of concentration (Tc): Tc = pre-development; maximum Tc = 10 min
- Allowable flowrate: Control the 100-year/5-year storm events to the existing 2-year storm event.

Development Review – Pre-application consultation Checklist (Municipal Servicing)

Ministry of Environment, Conservation and Parks (MECEP)

All development applications should be considered for an Environmental Compliance Approval, under MECP regulations.

a. The consultants determine if an approval for sewage works under Section 53 of OWRA is required and determines what type of application. The City's project manager may help confirm and coordinate with the MECP as required.
b. The project will be either transfer of review (standard), transfer of review (additional), direct submission, or exempt as per O. Reg. 525/98.
c. Pre-consultation is not required if applying for standard or additional works (Schedule A of the Agreement) under Transfer Review.
d. Pre-consultation with local District office of MECP is recommended for direct submission.
e. Consultant completes an MECP request form for a pre-consultation. Sends request to moeccottawasewage@ontario.ca
f. ECA applications are required to be submitted online through the MECP portal. A business account required to submit ECA application. For more information visit https://www.ontario.ca/page/environmental-compliance-approval
g. It is unclear if the proposed development will remain as one property. An ECA will be required where the stormwater management services more than one property parcel.

NOTE: Site Plan Approval, or Draft Approval, is required before any Ministry of the Environment and Climate Change (MOECC) application is sent.

General Service Design Comments

- The City of Ottawa requests that all new services be located within the existing service trench to minimize necessary road cuts.
- Monitoring manholes should be located within the property near the property line in an accessible location to City forces and free from obstruction (i.e. not a parking).
- Where service length is greater than 30 m between the building and the first maintenance hole / connection, a cleanout is required.
- The City of Ottawa Standard Detail Drawings should be referenced where possible for all work within the Public Right-of-Way.
- The upstream and downstream manhole top of grate and invert elevations are required for all new sewer connections.

Services crossing the existing watermain or sewers need to clearly provide the obvert/invert elevations to demonstration minimum separation distances. A watermain crossing table may be provided.

All development applications should be considered for an Environmental Compliance Approval (ECA) by the Ministry of the Environment, Conservation, and Parks (MECP);

a. Consultant determines if an approval for sewage works under Section 53 of OWRA is required. Consultant then determines what type of application is required and the City's project manager confirms. (If the consultant is not clear if an ECA is required, they will work with the City to determine what is required. If the consultant it is still unclear or there is a difference of opinion only then will the City PM approach the MECP.
b. The project will be either transfer of review (standard), transfer of review (additional), direct submission, or exempt as per O. Reg. 525/98.
c. Pre-consultation is not required.
d. Standard Works ToR Draft ECA's are sent to the local MECP office (moeccottawasewage@ontario.ca).for information only
e. Additional ToR draft ECAs require a project summary/design brief and require a response from the local MECP (10 business day window)
f. **Site Plan Approval, or Draft Approval, is required before an application is sent to the MECP**

Refer to application tables for lists of required supporting plans and studies

---

– Site Plan Control – Municipal servicing

Legend:

The letter **S** indicates that the study or plan is required with application submission.
The letter **M** indicates that the study or plan may be required with application submission.

For information on preparing required studies and plans refer to:

http://ottawa.ca/en/development-application-review-process-0/guide-preparing-studies-and-plans

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

Meeting Date: ***2022-Aug-17***

Application Type: ***Site Plan Control***

File Lead: ***Urja Modi***

Engineer/Project Manager: ***Bruce Bramah***

Site Address: **1803 Merivale**

*Preliminary Assessment: 1☐ 2☐ 3☐ 4☐ 5☐

*One (1) indicates that considerable revisions are required before a planning application is submitted, while five (5) suggest that proposal appears to meet the City's key land use policies and guidelines. This assessment is purely advisory and does not consider technical aspects of the proposal, or in any way guarantee application approval.

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

REQUIRED ENGINEERING STUDIES AND ASSESSMENTS

Notes:

2. Assessment of Adequacy of Public Services (water, stormwater, sanitary) - required as per Official Plan section 4.4.1. for proposals in a Public Service Area to determine limits of both service supply and demand. May be a brief at submission stage.

4. Geotechnical Study / Slope Stability Study – required as per Official Plan section 4.8.3. All plans of subdivision to demonstrate the soils are suitable for development. May be required at submission stage under unique circumstances (sensitive marine clays, in conjunction with trees, may provide a lower threshold of ROW width; Schedule K or topography may define slope stability concerns.

7. Servicing Options Report (water, stormwater, sanitary) - required as per Official Plan section 4.4.1 for proposed amendments in a Public Service Area to define servicing balance and co-ordination from the Assessment of Adequacy of Public Services.

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

14. Noise and Vibration Study – a Noise Study will be required if noise sensitive development is proposed within 250 metres of an existing or proposed highway or a railway right-of-way, or 100 metres of an arterial or collector roadway or rapid-transit corridor. A Vibration Study will be required if the proposed development is within 75 metres of either an existing or proposed railway ROW. A Noise Study may also be required if the proposed development is adjacent to an existing or proposed stationary noise source.

35. An Impact Assessment of an Adjacent Waste Disposal/Former Landfill Site study is required for development proposals within 500 metres of a solid waste disposal site or other appropriate influence area or former landfill site. For contaminated sites a Record of Site Condition or letter of continued use is required.

39.A Mineral Resource Impact Assessment study is required, as per Official Plan section 3.7.4 adjacent to an unlicensed Limestone Resource or Sand and Gravel Resource Area (very limited uses considered within 500 metres of Limestone Resource Area or 300 metres of Sand and Gravel Resource Area). A study is required;

- adjacent to, or within 300 metres of, a licensed pit
- adjacent to, or within 500 metres of, a licensed quarry

APPENDIX C
WATERMAIN CALCULATIONS

McINTOSH PERRY

McINTOSH PERRY

CCO-22-3530 - 1083-1095 Merivale Road - Existing Water Demands

Project:	1083-1095 Merivale Road
Project No.:	CCO-22-3530
Designed By:	FV
Checked By:	CH
Date:	May 23, 2023
Site Area:	0.51 gross ha

Residential (Existing)	NUMBER OF UNITS		UNIT RATE	
Average Apartment	57	units	1.8	persons/unit

Total Population 103 persons

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)
Mobile Home Parks	1,000	L/(Space/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	0.33	L/s
	Commercial/Industrial/ Institutional	0.00	L/s

MAXIMUM DAILY DEMAND

DEMAND TYPE	AMOUNT		UNITS
Residential	6.7	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	2.24	L/s
	Commercial/Industrial/ Institutional	0.00	L/s

MAXIMUM HOUR DEMAND

DEMAND TYPE	AMOUNT		UNITS
Residential	10.1	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	3.37	L/s
	Commercial/Industrial/ Institutional	0.00	L/s

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

AVERAGE DAILY DEMAND	0.33	L/s
MAXIMUM DAILY DEMAND	2.24	L/s
MAXIMUM HOUR DEMAND	3.37	L/s

McINTOSH PERRY

CCO-22-3530 - 1083-1095 Merivale Road - Proposed Water Demands

Project:	1083-1095 Merivale Road
Project No.:	CCO-22-3530
Designed By:	FV
Checked By:	CH
Date:	May 23, 2023
Site Area:	0.51 gross ha

Residential (Existing)	NUMBER OF UNITS		UNIT RATE	
Average Apartment		57 units	1.8	persons/unit
Residential (Proposed)	NUMBER OF UNITS		UNIT RATE	
Studio Apartment		70 units	1.4	persons/unit
Total Population		201 persons		

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)	
Mobile Home Parks	1,000	L/(Space/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	0.65	L/s
	Commercial/Industrial/ Institutional	0.00	L/s

MAXIMUM DAILY DEMAND

DEMAND TYPE	AMOUNT		UNITS
Residential	4.5	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	2.90	L/s
	Commercial/Industrial/ Institutional	0.00	L/s

MAXIMUM HOUR DEMAND

DEMAND TYPE	AMOUNT		UNITS
Residential	6.7	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	4.38	L/s
	Commercial/Industrial/ Institutional	0.00	L/s

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

AVERAGE DAILY DEMAND	0.65	L/s
MAXIMUM DAILY DEMAND	2.90	L/s
MAXIMUM HOUR DEMAND	4.38	L/s

McINTOSH PERRY

CCO-22-3530 - 1083-1095 Merivale Road - OBC Fire Calculations - Proposed Building

Project:	1083-1095 Merivale Road
Project No.:	CCO-22-3530
Designed By:	FV
Checked By:	CH
Date:	May 23, 2023

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

Water Supply for Fire-Fighting - Apartment Building

Building is classified as Group : C - Residential (from table 3.2.2.55)

Building is of noncombustible construction with fire separations and fire-resistance ratings provided in accordance with subsections 3.2.2., including loadbearing walls, columns and arches

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	10	
V	12,792	(Total building volume in m³.)
Stot	1.6	(From figure 1 pg A-32)
Q =	204,667.20 L	

→

From Figure 1 (A-32)

Snorth	1.7	m	0.5
Seast	26	m	0.0
Ssouth	8.67	m	0.1
Swest	69	m	0.0

*approximate distances

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

6300 L/min if Q > 190,000 L and < 270,000 L

1664 gpm

McINTOSH PERRY

CCO-22-3530 - 1083-1095 Merivale Road - Fire Underwriters Survey - Proposed Building

Project:	1083-1095 Merivale Road
Project No.:	CCO-22-3530
Designed By:	FV
Checked By:	CH
Date:	May 23, 2023

From the Fire Underwriters Survey (2020)

From Part II – Guide for Determination of Required Fire Flow Copyright I.S.O.:
City of Ottawa Technical Bulletin ISTB-2018-02 Applied Where Applicable

A. BASE REQUIREMENT (Rounded to the nearest 1000 L/min)

F = 220 x C x √A Where: F = Required fire flow in liters per minute
C = Coefficient related to the type of construction.
A = The total floor area in square meters (including all storey's, but excluding basements at least 50 percent below grade) in the building being considered.

Construction Type Non-Combustible Construction

C 0.8 A 4,263.9 m^2

Total Floor Area (per the 2020 FUS Page 20 - Total Effective Area) 2,842.6 m^2

Calculated Fire Flow	9,383.6 L/min
	9,000.0 L/min

B. REDUCTION FOR OCCUPANCY TYPE (No Rounding)

From Page 24 of the Fire Underwriters Survey:

Limited Combustible -15%

Fire Flow	7,650.0 L/min

C. REDUCTION FOR SPRINKLER TYPE (No Rounding)

Standard Water Supply Sprinklered -40%

Reduction	-3,060.0 L/min

D. INCREASE FOR EXPOSURE (No Rounding)

	Separation Distance (m)	Cons.of Exposed Wall	Length Exposed Adjacent Wall (m)	Height (Stories)	Length-Height Factor	
Exposure 1	10.1 to 20	Ordinary - Mass Timber (Unprotected)	13.88	4	55.5	7%
Exposure 2	10.1 to 20	Ordinary - Mass Timber (Unprotected)	34.29	3	102.9	10%
Exposure 3	20.1 to 30	Ordinary - Mass Timber (Unprotected)	19.23	4	76.9	3%
Exposure 4	Over 30 m	Wood frame	N/A	N/A	N/A	0%
					% Increase*	20%

Increase*	1,530.0 L/min

E. Total Fire Flow (Rounded to the Nearest 1000 L/min)

Fire Flow	6,120.0 L/min
Fire Flow Required**	6,000.0 L/min

*In accordance with Part II, Section 4, the Increase for separation distance is not to exceed 75%
**In accordance with Section 4 the Fire flow is not to exceed 45,000 L/min or be less than 2,000 L/min

McINTOSH PERRY

CCO-22-3530 - 1083-1095 Merivale Road - Boundary Condition Unit Conversion

Project:	1083-1095 Merivale Road
Project No.:	CCO-22-3530
Designed By:	FV
Checked By:	CH
Date:	May 23, 2023

Boundary Conditions Unit Conversion

Merivale Road

Scenario	Height (m)	Elevation (m)	m H_2O	PSI	kPa
Avg. DD	132.8	84.3	48.5	69.1	476.2
Fire Flow (100 L/s or 6,000 L/min)	124.1	84.3	39.8	56.7	390.8
Fire Flow (105 L/s or 6,300 L/min)	123.8	84.3	39.5	56.3	387.9
Peak Hour	124.3	84.3	40.0	57.0	392.8

Francis Valenti

From: Bramah, Bruce <bruce.bramah@ottawa.ca>
Sent: May 9, 2023 9:58 AM
To: Francis Valenti
Subject: RE: 22-3530 - Boundary Condition Request - 1083-1095 Merivale Road
Attachments: 1083-1095 Merivale Road May 2023.pdf

Good morning Francis,

The following are boundary conditions, HGL, for hydraulic analysis at 1095 Merivale Road (zone 2W2C) assumed to be a dual connection to the 305 mm on Merivale Road (see attached PDF for location).

Both Connections:

Minimum HGL: 124.3 m

Maximum HGL: 132.8 m

Max Day + Fire Flow (100 L/s): 124.1 m

Max Day + Fire Flow (105 L/s): 123.8 m

These are for current conditions and are based on computer model simulation.

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.

Thank you,
--
Bruce Bramah, EIT
Project Manager
Planning, Real Estate and Economic Development Department / Direction générale de la planification, des biens immobiliers et du développement économique
Development Review - South Branch
City of Ottawa | Ville d'Ottawa
110 Laurier Avenue West Ottawa, ON | 110, avenue. Laurier Ouest. Ottawa (Ontario) K1P 1J1
613.580.2424 ext./poste 29686, Bruce.Bramah@ottawa.ca

From: Francis Valenti <F.Valenti@McIntoshPerry.com>
Sent: April 24, 2023 12:02 PM
To: Bramah, Bruce <bruce.bramah@ottawa.ca>
Subject: 22-3530 - Boundary Condition Request - 1083-1095 Merivale Road

Good afternoon,

We would like to request boundary conditions for the proposed development located at 1083-1095 Merivale Road. The proposed development consists of a new 6-storey apartment building, complete with new landscaping, drive aisles, and parking areas. The proposed connection (dual) will be to the existing 305 mm diameter watermain located within Merivale Road.

- The estimated fire flow is 6,300 L/min based on the OBC method
- The estimated fire flow is 6,000 L/min based on the FUS method
- Average Daily Demand: 0.65 L/s
- Maximum Daily Demand: 2.90 L/s
- Maximum hourly daily demand: 4.38 L/s

Please find attached a map showing the proposed connection location and calculations prepared for the demands listed above.

Thanks,

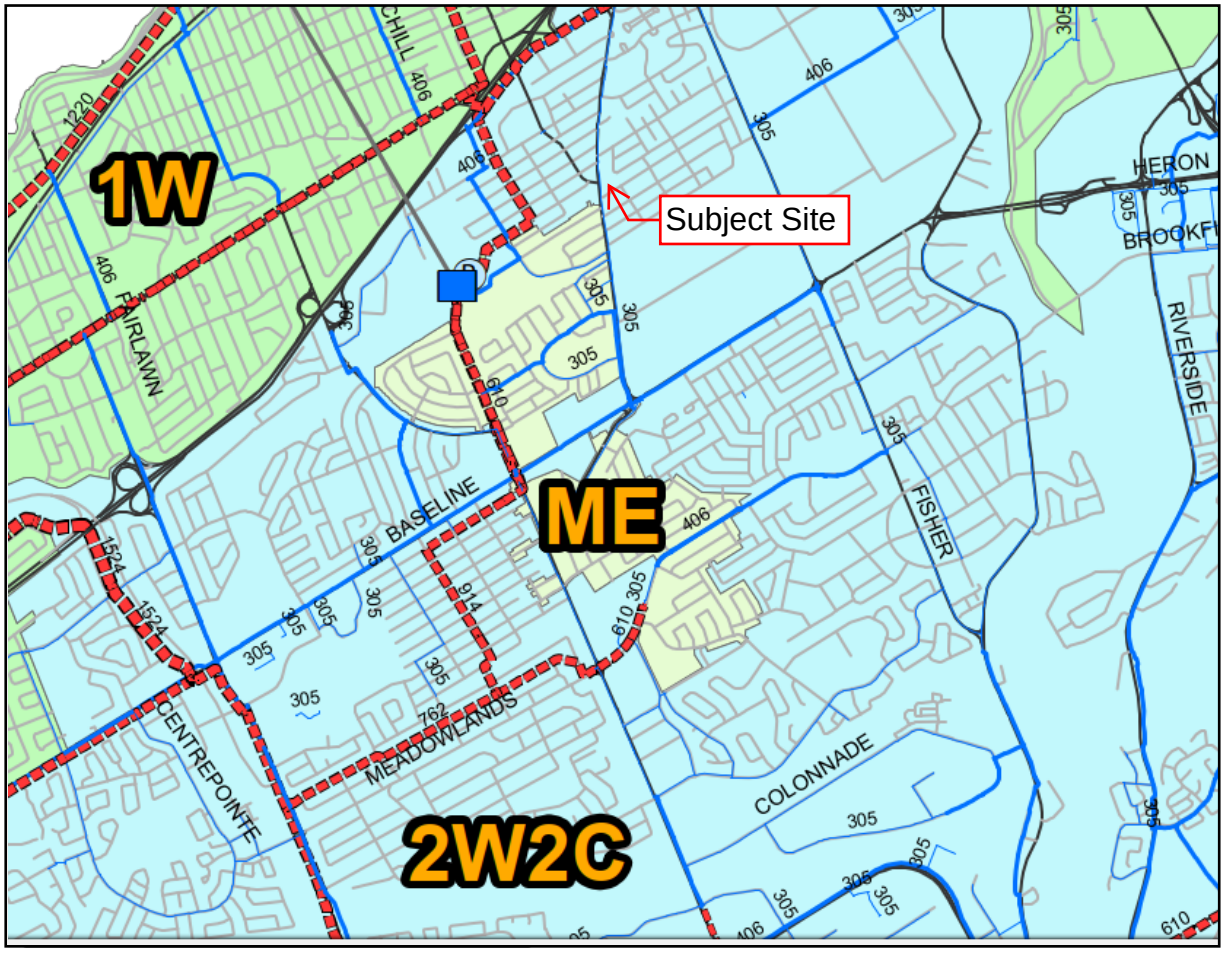
Francis Valenti, EIT
Engineering Intern
T. 613.714.6895 | **C.** 613.808.2123
F.Valenti@McIntoshPerry.com | www.mcintoshperry.com

McINTOSH PERRY

Turning Possibilities Into Reality

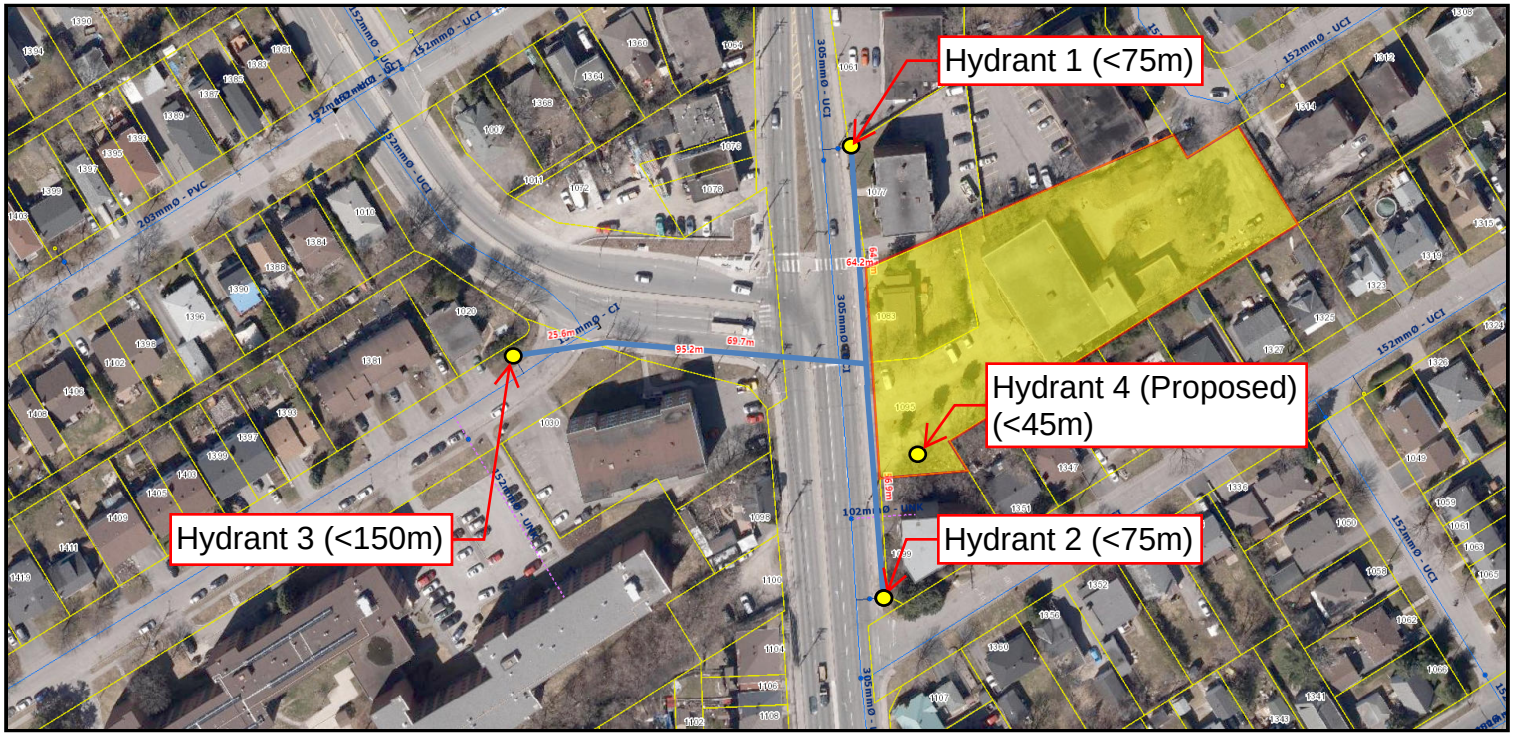
1083-1095 Merivale Road

Pressure Zone Figure



1083-1095 Merivale Road

Hydrant Coverage Figure



APPENDIX D
SANITARY CALCULATIONS

McINTOSH PERRY

McINTOSH PERRY

CCO-22-3530 - 1083-1095 Merivale Road - Existing Sanitary Demands

Project:	1083-1095 Merivale Road		
Project No.:	CCO-22-3530		
Designed By:	FV		
Checked By:	CH		
Date:	May-23		
Site Area	0.51	Gross ha	
Residential (Existing)			
Average Apartment	57	1.80	Persons per unit
Total Population	103	Persons	

DESIGN PARAMETERS

Institutional/Commercial Peaking Factor	1	
Residential Peaking Factor	3.59	* *Using Harmon Formula* = 1+(14/(4+P^0.5))*0.8 *where P = population in thousands, Harmon's Correction Factor = 0.8*
Mannings coefficient (n)	0.013	
Demand (per capita)	280	L/day
Infiltration allowance	0.33	L/s/Ha

EXTRANEOUS FLOW ALLOWANCES

Infiltration / Inflow	Flow (L/s)
Dry	0.03
Wet	0.14
Total	0.17

AVERAGE DAILY DEMAND

DEMAND TYPE	AMOUNT	UNITS	POPULATION / AREA	Flow (L/s)
Residential	280	L/c/d	103	0.33
Industrial - Light**	35,000	L/gross ha/d		0
Industrial - Heavy**	55,000	L/gross ha/d		0
Commercial / Amenity	2,800	L/(1000m² /d)	0.00	0.00
Hospital	900	L/(bed/day)		0
Schools	70	L/(Student/d)		0
Trailer Parks no Hook-Ups	340	L/(space/d)		0
Trailer Park with Hook-Ups	800	L/(space/d)		0
Campgrounds	225	L/(campsite/d)		0
Mobile Home Parks	1,000	L/(Space/d)		0
Motels	150	L/(bed-space/d)		0
Hotels	225	L/(bed-space/d)		0
Office	75	L/7.0m^2/d		0
Tourist Commercial	28,000	L/gross ha/d		0
Other Commercial	28,000	L/gross ha/d		0

AVERAGE RESIDENTIAL FLOW	0.33	L/s
PEAK RESIDENTIAL FLOW	1.20	L/s
AVERAGE ICI FLOW	0.00	L/s
PEAK INSTITUTIONAL/COMMERCIAL FLOW	0.00	L/s
PEAK INDUSTRIAL FLOW	0.00	L/s
TOTAL PEAK ICI FLOW	0.00	L/s

TOTAL SANITARY DEMAND

TOTAL ESTIMATED AVERAGE DRY WEATHER FLOW	0.36	L/s
TOTAL ESTIMATED PEAK DRY WEATHER FLOW	1.22	L/s
TOTAL ESTIMATED PEAK WET WEATHER FLOW	1.37	L/s

McINTOSH PERRY

CCO-22-3530 - 1083-1095 Merivale Road - Proposed Sanitary Demands

Project:	1083-1095 Merivale Road		
Project No.:	CCO-22-3530		
Designed By:	FV		
Checked By:	CH		
Date:	May-23		
Site Area	0.51	Gross ha	
Residential (Existing)			
Average Apartment	57	1.80	Persons per unit
Residential (Proposed)			
Average Apartment	70	1.80	Persons per unit
Total Population	229	Persons	

DESIGN PARAMETERS

Institutional/Commercial Peaking Factc	1	
Residential Peaking Factor	3.50	* *Using Harmon Formula* = 1+(14/(4+P^0.5))*0.8
		where P = population in thousands, Harmon's Correction Factor = 0.8
Mannings coefficient (n)	0.013	
Demand (per capita)	280	L/day
Infiltration allowance	0.33	L/s/Ha

EXTRANEOUS FLOW ALLOWANCES

Infiltration / Inflow	Flow (L/s)
Dry	0.03
Wet	0.14
Total	0.17

AVERAGE DAILY DEMAND

DEMAND TYPE	AMOUNT	UNITS	POPULATION / AREA	Flow (L/s)
Residential	280	L/c/d	229	0.74
Industrial - Light**	35,000	L/gross ha/d		0
Industrial - Heavy**	55,000	L/gross ha/d		0
Commercial / Amenity	2,800	L/(1000m² /d)	0.00	0.00
Hospital	900	L/(bed/day)		0
Schools	70	L/(Student/d)		0
Trailer Parks no Hook-Ups	340	L/(space/d)		0
Trailer Park with Hook-Ups	800	L/(space/d)		0
Campgrounds	225	L/(campsite/d)		0
Mobile Home Parks	1,000	L/(Space/d)		0
Motels	150	L/(bed-space/d)		0
Hotels	225	L/(bed-space/d)		0
Office	75	L/7.0m^2/d		0
Tourist Commercial	28,000	L/gross ha/d		0
Other Commercial	28,000	L/gross ha/d		0

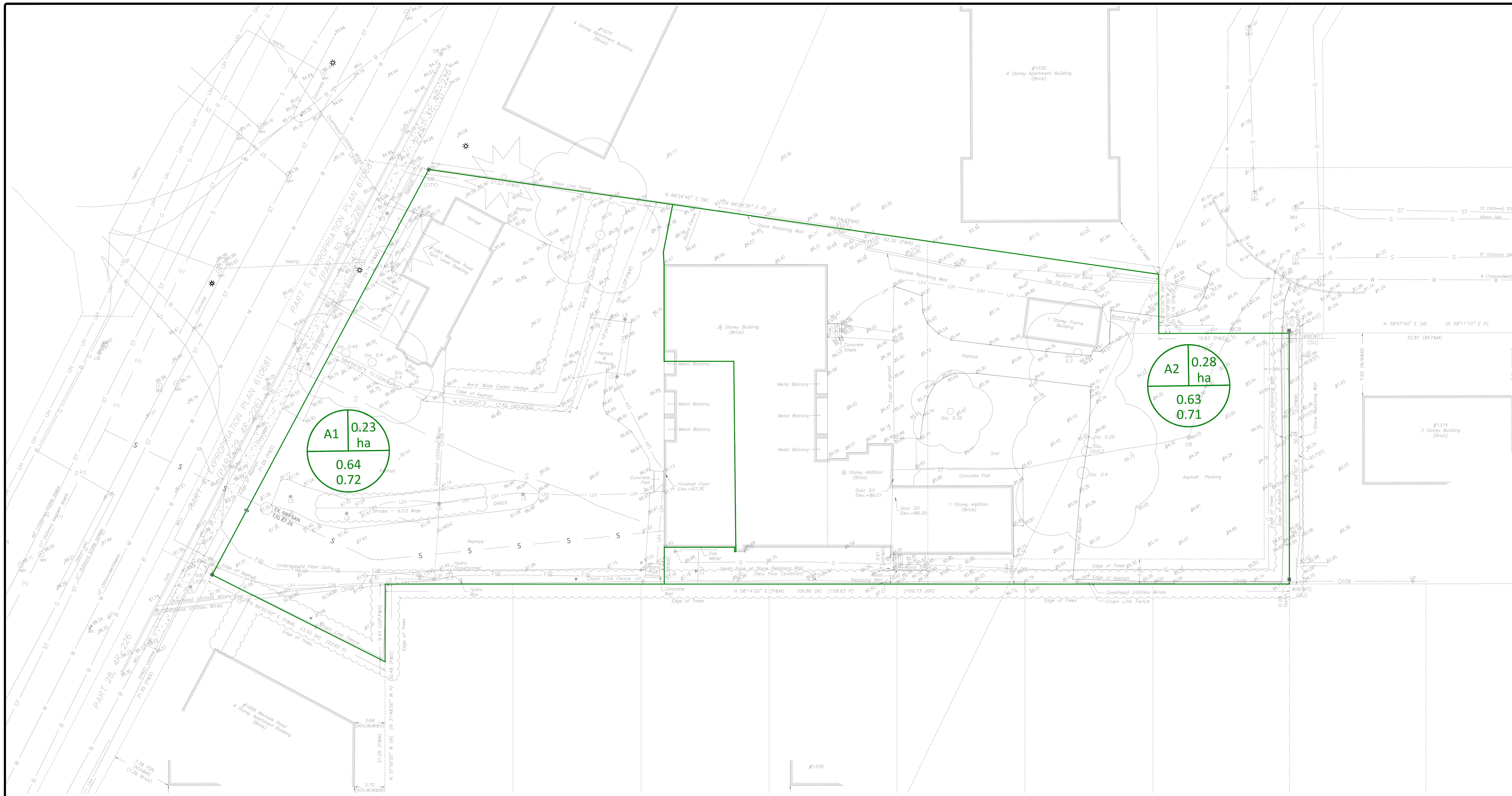
AVERAGE RESIDENTIAL FLOW	0.74	L/s
PEAK RESIDENTIAL FLOW	2.60	L/s
AVERAGE ICI FLOW	0.00	L/s
PEAK INSTITUTIONAL/COMMERCIAL FLOW	0.00	L/s
PEAK INDUSTRIAL FLOW	0.00	L/s
TOTAL PEAK ICI FLOW	0.00	L/s

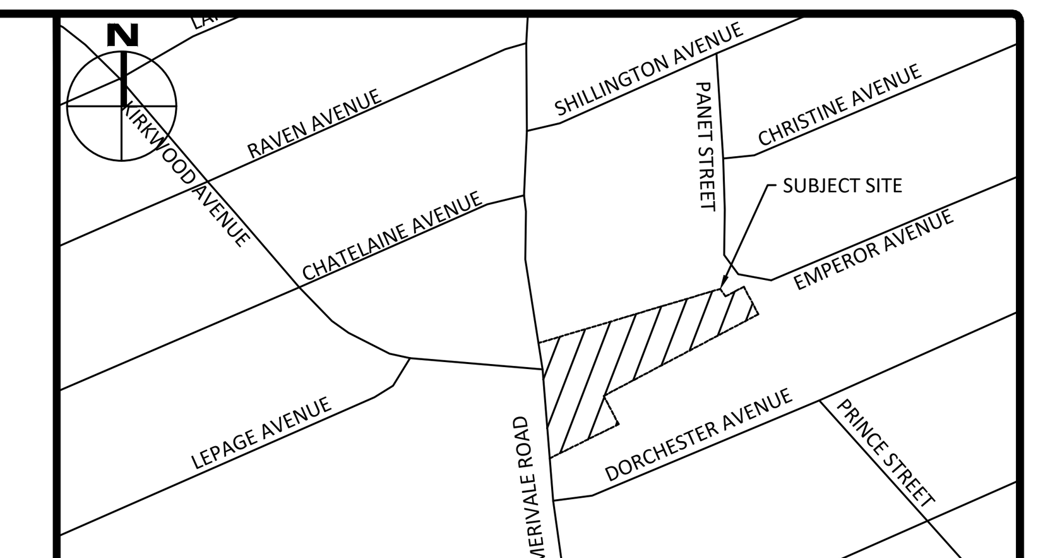
TOTAL SANITARY DEMAND

TOTAL ESTIMATED AVERAGE DRY WEATHER FLOW	0.77	L/s
TOTAL ESTIMATED PEAK DRY WEATHER FLOW	2.62	L/s
TOTAL ESTIMATED PEAK WET WEATHER FLOW	2.77	L/s

APPENDIX E
PRE-DEVELOPMENT DRAINAGE PLAN

McINTOSH PERRY





LOCATION PLAN

LEGEND

FOR REVIEW ONLY
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GENERAL NOTES

1. THE ORIGINAL TOPOGRAPHY, GROUND ELEVATION AND SURVEY DATA SHOWN ARE SUPPLIED FOR INFORMATION PURPOSES ONLY, AND IMPLY NO GUARANTEE OF ACCURACY. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY ALL INFORMATION SHOWN.
2. THIS PLAN IS NOT A CADASTRAL SURVEY SHOWING LEGAL PROPERTY BOUNDARIES AND EASEMENTS. THE PROPERTY BOUNDARIES SHOWN HEREON HAVE BEEN DERIVED INFORMATION SUPPLIED BY (OR SHOWN ON) FAIRHALL MOFFAT & WOODLAND DRAWING 92-A(RF)NP AND CANNOT BE RELIED UPON TO BE ACCURATE OR COMPLETE. THE PRECISE LOCATION OF THE CURRENT PROPERTY BOUNDARIES AND EASEMENTS CAN ONLY BE DETERMINED BY AN UP-TO-DATE LAND TITLES SEARCH AND A SUBSEQUENT CADASTRAL SURVEY PERFORMED AND CERTIFIED BY AN ONTARIO LAND SURVEYOR.
3. THE CONTRACTOR IS TO OBTAIN AND PAY FOR ALL NECESSARY PERMITS AND APPROVALS FROM THE CITY BEFORE COMMENCING CONSTRUCTION.
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6. RESTORE ALL TRENCHES AND SURFACES OF PUBLIC ROAD ALLOWANCES TO CONDITION EQUAL OR BETTER THAN ORIGINAL CONDITION AND TO THE SATISFACTION OF THE CITY AUTHORITIES.
7. EXCAVATE AND DISPOSE OF ALL EXCESS EXCAVATED MATERIAL, SUCH AS ASPHALT, CURBING AND DEBRIS, OFF SITE AS DIRECTED BY THE ENGINEER AND THE CITY.
8. TOPSOIL TO BE STRIPPED AND STOCKPILED FOR REHABILITATION. CLEAN FILL TO BE PLACED IN FILL AREAS AND COMPACTED TO 95% STANDARD PROCTOR DENSITY.
9. ALL DISTURBED AREAS TO BE RESTORED TO ORIGINAL CONDITION OR BETTER UNLESS OTHERWISE SPECIFIED.
10. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL TRAFFIC CONTROL AND SAFETY MEASURES DURING THE CONSTRUCTION PERIOD, INCLUDING THE SUPPLY, INSTALLATION, AND REMOVAL OF ALL NECESSARY SIGNAGE, DELINEATORS, MARKERS AND BARRIERS.
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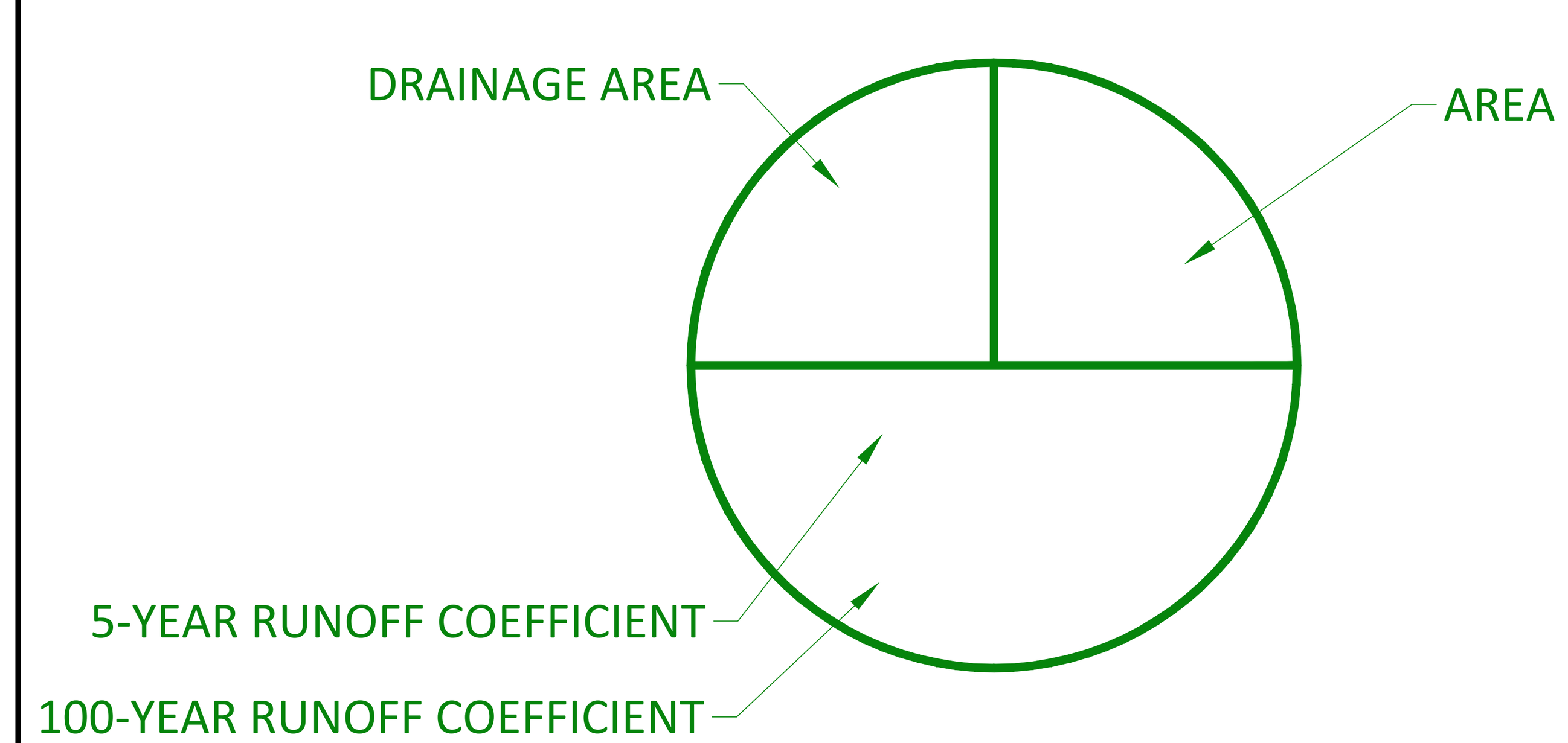

No.	Revisions	Date
1		

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

SCALE 1 : 250 (0, 5, 10, 15, 20, 25 Metres)

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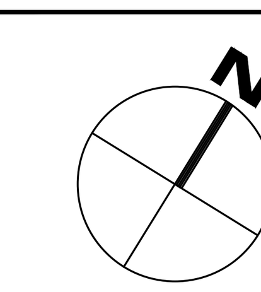
115 Walgreen Road, RR3, Carp, ON K0A 1L0
Tel: 613-836-2184 Fax: 613-836-3742
www.mcintoshperry.com



Stamp:

Client:
CSV ARCHITECTS
190 O'CONNOR STREET, SUITE 100
OTTAWA, ON K2P 2R3

Project:
SHEPHERDS OF GOOD HOPE
1083-1095 MERIVALE ROAD

Drawing Title:
PRE-DEVELOPMENT DRAINAGE AREA PLAN

Scale:	1:250	Project Number:	CCO-22-3530
Drawn By:	NV		
Checked By:	R.P.K.	Drawing Number:	PRE
Designed By:	NV		

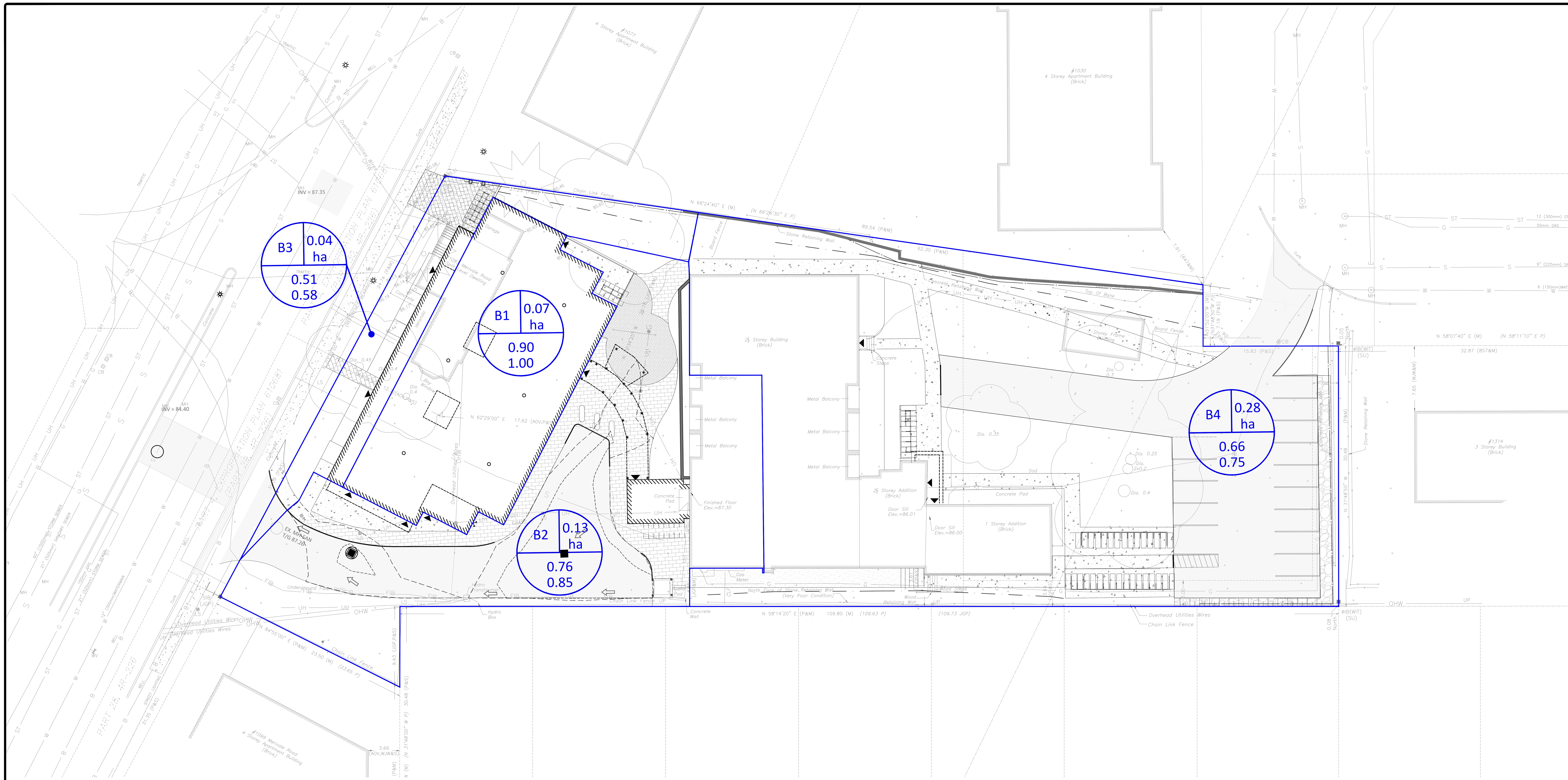
D07-12-XX-XXXX

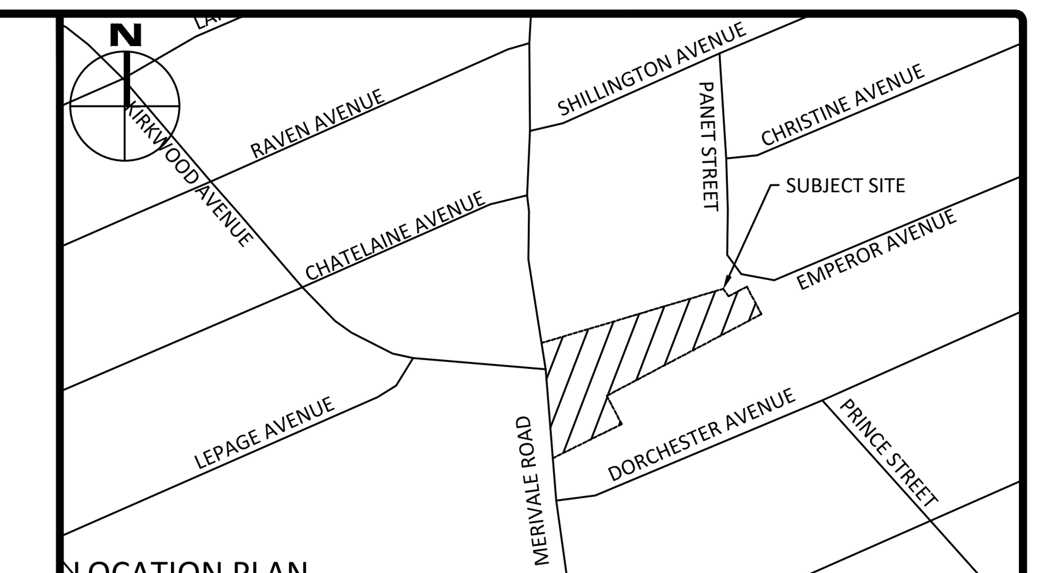
#XXXXX

FILENAME: U:\Ottawa\01 Project - Proposals\2022 Jobs\CCO\CCO-22-3530 CSV_SOGH Apartment_1083 Merivale Road\12 - Drawings\CCO-22-3530 PRESENTATION.dwg
LAST SAVED: Tuesday, May 23, 2023 LAST SAVED BY: F.Valenti
LAST PLOTTED: Tuesday, May 23, 2023 CTB FILE USED: ----

APPENDIX F
POST-DEVELOPMENT DRAINAGE PLAN

McINTOSH PERRY





LOCATION PLAN

LEGEND

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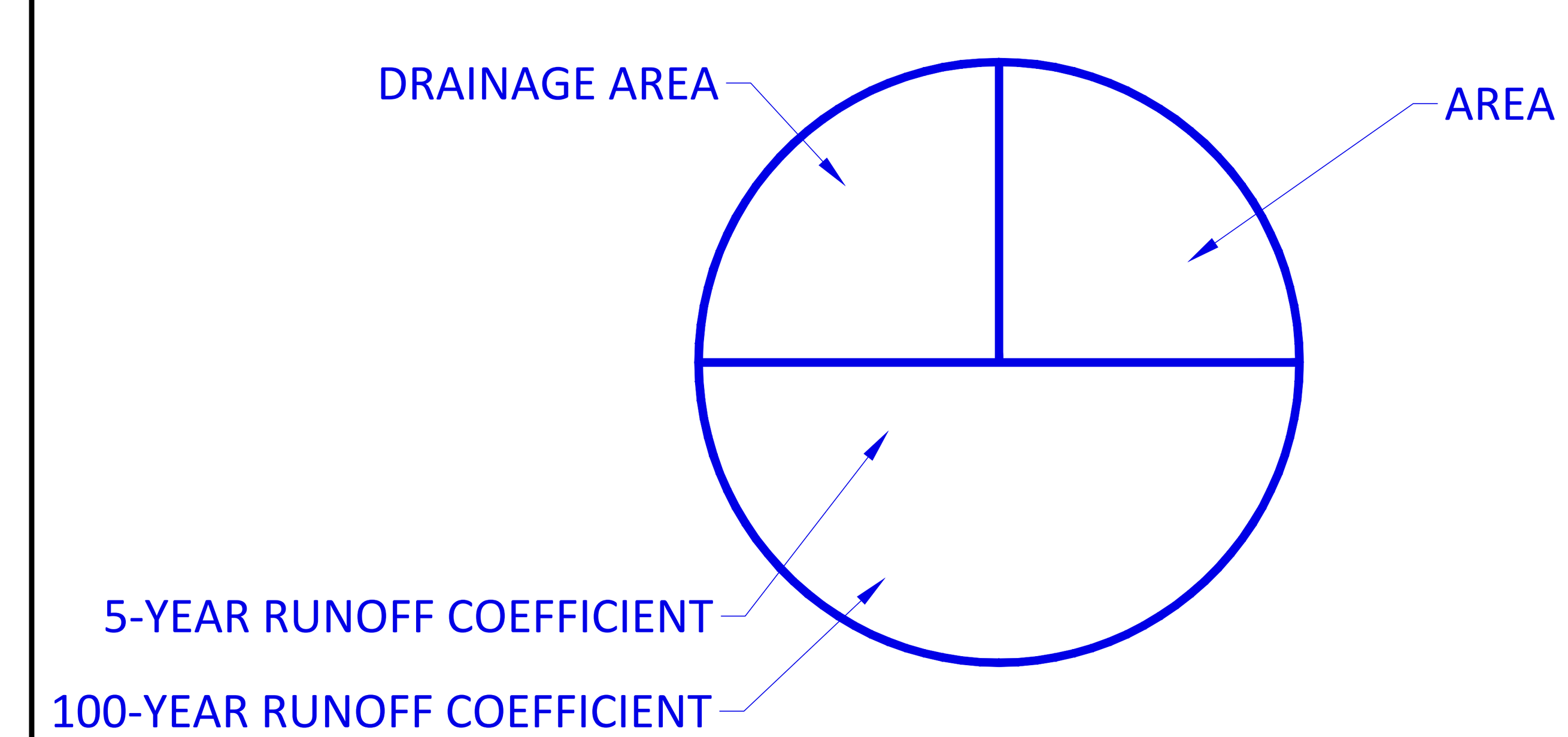

No.	Revisions	Date
2	ISSUED FOR REVIEW	OCT. 27, 2023
1	ISSUED FOR REVIEW	MAY 23, 2023

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

SCALE 1 : 250 (0 5 10 15 20 25 Metres)

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Tel: 613-836-2184 Fax: 613-836-3742
www.mcintoshperry.com

Stamp:

Client: CSV ARCHITECTS
190 O'CONNOR STREET, SUITE 100
OTTAWA, ON K2P 2R3

Project: SHEPHERDS OF GOOD HOPE
1083-1095 MERIVALE ROAD

Drawing Title: POST-DEVELOPMENT DRAINAGE AREA PLAN

Scale:	1:250	Project Number:	CCO-22-3530
Drawn By:	NV		
Checked By:	CH	Drawing Number:	POST
Designed By:	FV		

D07-12-XX-XXXX

#XXXXX

FILENAME: U:\Ottawa\01 Project - Proposals\2022 Jobs\CCO\CCO-22-3530 CSV_SOGH Apartment_1083 Merivale Road\12 - Drawings\CCO-22-3530 PRESENTATION.dwg
LAST SAVED: Thursday, September 28, 2023 LAST SAVED BY: F.Valenti
LAST PLOTTED: Friday, October 27, 2023 CTB FILE USED: ----

APPENDIX G
STORMWATER MANAGEMENT CALCULATIONS

McINTOSH PERRY

CCO-22-3530 - 1083-1095 Merivale Road

Tc (min)	Intensity (mm/hr)		
	2-Year	5-Year	100-Year
20	51.8	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	1,460	0	882	0.64	0.72
A2	1,738	0	1,067	0.63	0.71

Pre-Development Runoff Calculations

Drainage Area	Area (ha)	C 5-Year	C 100-Year	Tc (min)	Q (L/s)			
					2-Year	5-Year	100-Year	
A1	0.23	0.64	0.72	10	31.82	43.17	83.42	*Ex. Merivale*
A2	0.28	0.63	0.71	10	37.96	51.49	99.52	*Ex. Emperor*
Total	0.51				69.78	94.66	182.94	

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	665	0	0	0.90	1.00	*Proposed Building Roof*
B2	1,045	0	265	0.76	0.85	*Surface Restricted Merivale*
B3	162	0	205	0.51	0.58	*Surface Unrestricted Merivale*
B4	1,687	265	853	0.66	0.75	*Surface Unrestricted Emperor*

Post-Development Runoff Calculations

Drainage Area	Area (ha)	C 5-Year	C 100-Year	Tc (min)	Q (L/s)		
					5-Year	100-Year	
B1	0.07	0.90	1.00	10	17.33	33.01	*Proposed Building Roof*
B2	0.13	0.76	0.85	10	28.77	55.14	*Surface Restricted Merivale*
B3	0.04	0.51	0.58	10	5.41	10.59	*Surface Unrestricted Merivale*
B4	0.28	0.66	0.75	10	53.54	104.21	*Surface Unrestricted Emperor*
Total	0.51				105.05	202.95	

Required Restricted Flow

Drainage Area	Area (ha)	C 2-Year	Tc (min)	Q (L/s)	
				2-Year	
A1	0.23	0.50	10	25.00	*Merivale ROW*
A2	0.28	0.50	10	29.95	*Emperor ROW*

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	17.33	33.01	3.97	5.30	9.3	21.0	10.0	21.6
B2	28.77	55.14	8.53	8.75	13.1	35.3	14.3	37.2
B3	5.41	10.59	5.41	10.59				
Total(Merivale)	51.51	98.74	17.92	24.64	22.32	56.37	24.22	58.78
B4	53.54	104.21	53.54	104.21				
Total (Emperor)	53.54	104.21	53.54	104.21				
Site Total	105.05	202.95	71.45	128.85	22.32	56.37	24.22	58.78

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	17.34	3.97	13.36	8.02
20	70.3	11.70	3.97	7.72	9.27
30	53.9	8.97	3.97	4.99	8.99
40	44.2	7.35	3.97	3.38	8.11
50	37.7	6.27	3.97	2.30	6.89
60	32.9	5.47	3.97	1.50	5.40
70	29.4	4.89	3.97	0.92	3.85
80	26.6	4.43	3.97	0.45	2.16

Maximum Storage Required 5-Year (m^3) =	9.27

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)
10	178.6	33.01	5.30	27.71	16.63
20	120.0	22.17	5.30	16.87	20.25
30	91.9	16.98	5.30	11.68	21.03
40	75.1	13.89	5.30	8.59	20.62
50	64.0	11.82	5.30	6.52	19.57
60	55.9	10.33	5.30	5.03	18.12
70	49.8	9.20	5.30	3.90	16.40
80	45.0	8.32	5.30	3.02	14.48

Maximum Storage Required 100-Year (m^3) =	21.03

Storage Parameters	
Roof Area (m^2)	664.96
Usable Roof Area (%)	75%
Usable Roof Area (m^2)	498.72

5-Year Storage Summary	
Max. Storage Available (m^3)	9.97
Storage Required (m^3)	9.27
Max. Ponding Depth (m)	0.06

100-Year Storage Summary	
Max. Storage Available (m^3)	21.61
100-Year Storage Required (m^3)	21.03
Max. Ponding Depth (m)	0.130

Roof Drain Flow (B1)

Roof Drains Summary	
Type of Control Device	Watts Drainage - Accutrol Weir
Number of Roof Drains	6
Roof Drain Position	1/4 Open

	5-Year	100-Year
Rooftop Storage Available (m^3)	9.97	21.61
Rooftop Storage Required (m^3)	9.27	21.03
Storage Depth (m)	0.060	0.130
Flow (Per Roof Drain) (L/s)	0.66	0.88
Total Flow (L/s)	3.97	5.30

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	0.38
	0.13	10	0.76
	0.19	15	1.14
	0.25	20	1.51
	0.32	25	1.89
	0.38	30	2.27
	0.44	35	2.65
	0.50	40	3.03
	0.57	45	3.41
	0.63	50	3.79
	0.65	55	3.88
5-Year	0.66	60	3.97
	0.68	65	4.07
	0.69	70	4.16
	0.71	75	4.26
	0.73	80	4.35
	0.74	85	4.45
	0.76	90	4.54
	0.77	95	4.64
	0.79	100	4.73
	0.80	105	4.83
	0.82	110	4.92
	0.84	115	5.02
	0.85	120	5.11
	0.87	125	5.20
100-Year	0.88	130	5.30
	0.90	135	5.39
	0.91	140	5.49
	0.93	145	5.58
	0.95	150	5.68

*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 B2

5-Year Storm Event

Tc (min)	I (mm/hr)	Runoff (L/s) B2	Allowable Outflow (L/s)	Runoff to be Stored (L/s)	Storage Required (m^3)
10	104.2	28.77	8.53	20.24	12.14
20	70.3	19.41	8.53	10.88	13.06
30	53.9	14.88	8.53	6.35	11.43
40	44.2	12.20	8.53	3.67	8.82
50	37.7	10.41	8.53	1.88	5.64

Maximum Storage Required 5-year =	13.1	m^3

100-Year Storm Event

Tc (min)	I (mm/hr)	Runoff (L/s) B2	Allowable Outflow (L/s)	Runoff to be Stored (L/s)	Storage Required (m^3)
10	178.6	55.16	8.75	46.41	27.84
20	120.0	37.06	8.75	28.31	33.97
30	91.9	28.38	8.75	19.63	35.34
40	75.1	23.19	8.75	14.44	34.66
50	64.0	19.77	8.75	11.02	33.05

Maximum Storage Required 100-year =	35.3	m^3

5-Year Storm Event Storage Summary

		Water Elev. (m) =		87.01		
Location	T/G	INV. (out)	Area (m^2)	Depth (m)	Head (m)	Volume (m^3)
CB2	86.80	85.22	154.4	0.21	1.64	14.1
CBMH1	86.97	85.08	8.9	0.04	1.78	0.1

Storage Available (m^3) =	14.3	*
Storage Required (m^3) =	13.1	

100-Year Storm Event Storage Summary

		Water Elev. (m) =		87.10		
Location	T/G	INV. (out)	Area (m^2)	Depth (m)	Head (m)	Volume (m^3)
CB2	86.80	85.22	264.2	0.30	1.73	32.8
CBMH1	86.97	85.08	96.4	0.13	1.87	4.4

Storage Available (m^3) =	37.2	*
Storage Required (m^3) =	35.3	

STORM SEWER DESIGN SHEET

PROJECT: CCO-22-3530
LOCATION: 1083-1095 Merivale Road
CLIENT: CSV Architects

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LOCATION				CONTRIBUTING AREA (ha)				RATIONAL DESIGN FLOW								SEWER DATA								
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	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)	DESIGN FLOW (L/s)	CAPACITY (L/s)	LENGTH (m)	PIPE SIZE (mm) DIA	W	H	SLOPE (%)	VELOCITY (m/s)	AVAIL CAP (5yr) (L/s)	(%)
Merivale Road	B1	ROOF	CBMH1	0.90	0.07	0.06	0.06	10.00	0.08	10.08	104.19	122.14	178.56	17.33	17.33	22.47	5.84	150			2.00	1.232	5.13	22.85%
	B2	CB2	CBMH1	0.76	0.13	0.10	0.10	10.00	0.52	10.52	104.19	122.14	178.56	28.77	28.77	40.78	24.89	250			0.43	0.805	12.01	29.45%
	B1+B2	CBMH1	EX. 525mm				0.16	10.52	0.47	10.99	101.55	119.02	173.98	44.93	44.93	66.31	25.63	300			0.43	0.909	21.37	32.24%

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

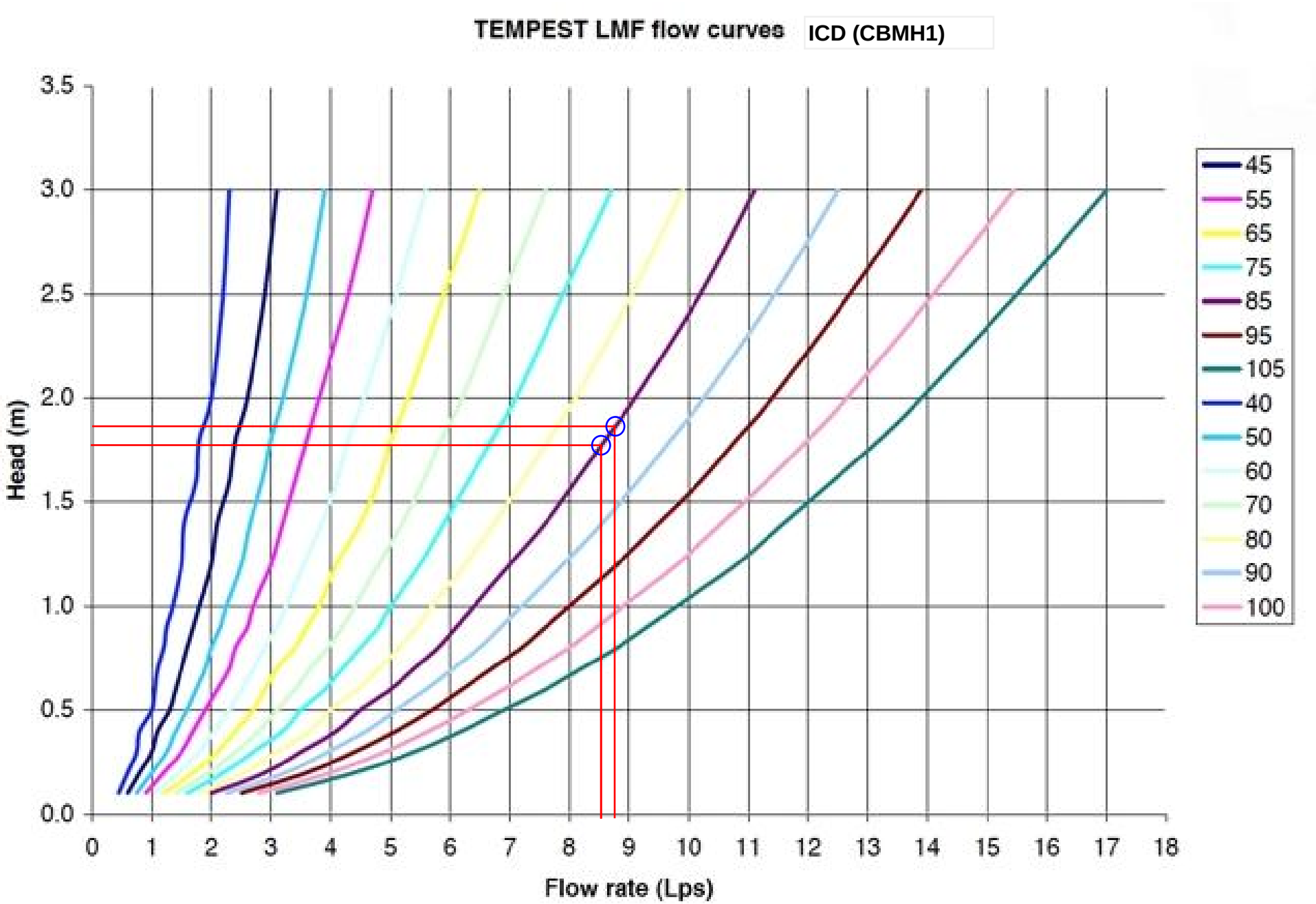
Checked:
JH

Project No.:
CCO-22-3530

No.	Revision	Date
1.	Issued for Review	2023.09.27

Date:
2023.05.08

Sheet No:
1 of 1


TEMPEST LMF flow curves
ICD (CBMH1)
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

Adjustable Accutrol Weir

Tag: _____

Adjustable Flow Control for Roof Drains

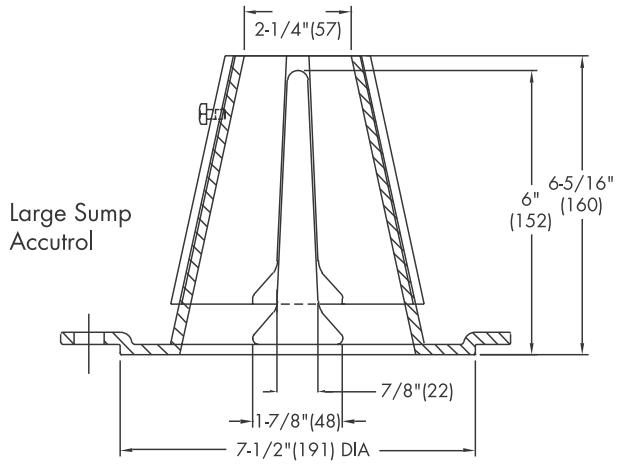
ADJUSTABLE ACCUTROL (for Large Sump Roof Drains only)

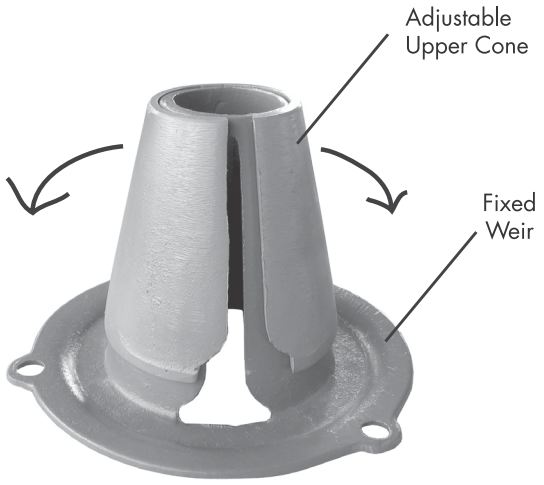
For more flexibility in controlling flow with heads deeper than 2", Watts Drainage offers the Adjustable Accutrol. The Adjustable Accutrol Weir is designed with a single parabolic opening that can be covered to restrict flow above 2" of head to less than 5 gpm per inch, up to 6" of head. To adjust the flow rate for depths over 2" of head, set the slot in the adjustable upper cone according to the flow rate required. Refer to Table 1 below.
Note: Flow rates are directly proportional to the amount of weir opening that is exposed.

EXAMPLE:

For example, if the adjustable upper cone is set to cover 1/2 of the weir opening, flow rates above 2"of head will be restricted to 2-1/2 gpm per inch of head.

Therefore, at 3"of head, the flow rate through the Accutrol Weir that has 1/2 the slot exposed will be:
[5 gpm (per inch of head) x 2 inches of head] + 2-1/2 gpm (for the third inch of head) = 12-1/2 gpm.





1/2 Weir Opening Exposed Shown Above

TABLE 1. Adjustable Accutrol Flow Rate Settings

Weir Opening Exposed	1"	2"	3"	4"	5"	6"
	Flow Rate (gallons per minute)					
Fully Exposed	5	10	15	20	25	30
3/4	5	10	13.75	17.5	21.25	25
1/2	5	10	12.5	15	17.5	20
1/4	5	10	11.25	12.5	13.75	15
Closed	5	5	5	5	5	5

Job Name _____ Contractor _____

Job Location _____ Contractor's P.O. No. _____

Engineer _____ Representative _____

USA: Tel: (800) 338-2581 • Fax: (828) 248-3929 • Watts.com
Canada: Tel: (905) 332-4090 • Fax: (905) 332-7068 • Watts.ca
Latin America: Tel: (52) 81-1001-8600 • Fax: (52) 81-8000-7091 • Watts.com

A Watts Water Technologies Company

Francis Valenti

From: Bramah, Bruce <bruce.bramah@ottawa.ca>
Sent: May 5, 2023 3:08 PM
To: Francis Valenti
Cc: Curtis Melanson
Subject: RE: 22-3530 - Emperor Storm Calcs

Hi Francis,

We have no receiving storm sewer HGL concerns based on the proposed flows to Emperor from the minor site works at the rear of the property. Best management practices shall be used to reduce the 100 year flow as much as possible as discussed in our meeting. The flows to Merivale shall be controlled to the pre-development 2 year as shown in your calculations.

If you have any further questions, please feel free to call me.
Thanks and have a good weekend.
--
Bruce Bramah, EIT
Project Manager
Planning, Real Estate and Economic Development Department / Direction générale de la planification, des biens immobiliers et du développement économique
Development Review - South Branch
City of Ottawa | Ville d'Ottawa
110 Laurier Avenue West Ottawa, ON | 110, avenue. Laurier Ouest. Ottawa (Ontario) K1P 1J1
613.580.2424 ext./poste 29686, Bruce.Bramah@ottawa.ca

From: Francis Valenti <F.Valenti@McIntoshPerry.com>
Sent: April 28, 2023 3:14 PM
To: Bramah, Bruce <bruce.bramah@ottawa.ca>
Cc: Curtis Melanson <c.melanson@mcintoshperry.com>
Subject: RE: 22-3530 - Emperor Storm Calcs

Hi Bruce,

No problem. Please see attached Pre, Post, and the preliminary grading plan.

Cheers,

Francis Valenti, EIT
Engineering Intern
T. 613.714.6895 | **C.** 613.808.2123
F.Valenti@McIntoshPerry.com | www.mcintoshperry.com

From: Bramah, Bruce <bruce.bramah@ottawa.ca>
Sent: Friday, April 28, 2023 2:56 PM
To: Francis Valenti <F.Valenti@McIntoshPerry.com>
Cc: Curtis Melanson <c.melanson@mcintoshperry.com>
Subject: RE: 22-3530 - Emperor Storm Calcs

Hi Francis,

Can you please provide the preliminary grading plan and pre/post development area plan so I can explain the existing conditions to our Asset Management Branch.
Thanks,
--
Bruce Bramah, EIT
Project Manager
Planning, Real Estate and Economic Development Department / Direction générale de la planification, des biens immobiliers et du développement économique
Development Review - South Branch
City of Ottawa | Ville d'Ottawa
110 Laurier Avenue West Ottawa, ON | 110, avenue. Laurier Ouest. Ottawa (Ontario) K1P 1J1
613.580.2424 ext./poste 29686, Bruce.Bramah@ottawa.ca

From: Francis Valenti <F.Valenti@McIntoshPerry.com>
Sent: April 28, 2023 2:40 PM
To: Bramah, Bruce <bruce.bramah@ottawa.ca>
Cc: Curtis Melanson <c.melanson@mcintoshperry.com>
Subject: 22-3530 - Emperor Storm Calcs

Hi Bruce,

Please see attached SWM calcs for 1083-1095 Merivale showing existing and proposed flows to the Emperor ROW. Just a note that we haven't had a chance to revise ponding in the front since updating our areas, so the Merivale numbers will be a little off. I've included a small summary below:

Emperor (Existing Flow)
2-Year: *37.96 L/s*
5-Year: *51.49 L/s*
100-Year: *99.52 L/s*

Emperor (Proposed Flow)
5-Year: *58.23 L/s*
100-Year: *112.60 L/s*

Regards,

Francis Valenti, EIT
Engineering Intern
T. 613.714.6895 | **C.** 613.808.2123
F.Valenti@McIntoshPerry.com | www.mcintoshperry.com

McINTOSH PERRY

Turning Possibilities Into Reality

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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