SERVICING & STORMWATER MANAGEMENT REPORT
273-281 BELL STREET SOUTH, OTTAWA

Building Perspective Prepared by Edge Architects LTD.

Project No.: CCO-22-0477

City File No.: D07-12-XX-XXXX

Prepared for:

Gavcap Properties INC.
67 Kingsway Crescent
Toronto, Ontario
M8X 2R5

Prepared by:

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

April 8th, 2022

McINTOSH PERRY

TABLE OF CONTENTS

LIST OF TABLES

APPENDICES

1.0 PROJECT DESCRIPTION

1.1 Purpose

McIntosh Perry (MP) has been retained by Gavcap Properties INC. to prepare this Servicing and Stormwater Management Report in support of the Site Plan Control for the proposed development located at 273-281 Bell Street South 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-22-0477, C101 – Grading, Drainage, Erosion & Sediment Control Plan
- CCO-22-0477, C102 – Site Servicing Plan
- CCO-22-0477, PRE – Pre-Development Drainage Area Plan (***Appendix E***)
- CCO-22-0477, 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 273-281 Bell Street South within the Capital Ward. The site covers approximately ***0.10 ha*** and is located along Bell Street South between Plymouth Street and Orangeville Street. The site is zoned Residential Fourth Density(R4UD).

1.3 Proposed Development and Statistics

The proposed development consists of the construction of a new 6-storey residential building. The building will contain ***49*** residential units, with surface parking provided with access from Arthur Lane South. Refer to the ***Site Plan*** prepared by Edge Architects LTD in ***Appendix B*** for further details.

1.4 Existing Conditions and Infrastructures

The site currently contains five 2-storey detached residential dwellings with asphalt parking areas fronting Arthur Lane South. The site currently slopes from Arthur Lane South towards Bell Street.

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):

- **Bell Street South**
    - 203 mm diameter PVC watermain, and
    - A 900 mm diameter concrete combined sewer.
- **Arthur Lane South**
    - 152 mm diameter PVC watermain, and
    - A 300 mm diameter PVC combined sewer.

1.5 Approvals

The proposed development is subject to the City of Ottawa site plan control 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 parcels are anticipated to be amalgamated into a single parcel and industrial usage is not proposed. In accordance with Section 3(1)1 of O. Reg. 525/98, the alteration or change in service connection qualifies for an ECA exemption from Subsubsections 53 (1) and (3) of the Act.

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 of the site was completed by Annis, O'Sullivan, Vollebek Ltd and dated September 9th, 2021.

The Site Plan (SP.01) was prepared by Edge Architects Ltd and dated March 31st, 2022 (***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-2018-03 City of Ottawa, March 2018. ***(ISTB-2018-03)***
  - Technical Bulletin ISTB-2019-01 City of Ottawa, January 2019. ***(ISTB-2019-01)***
  - Technical Bulletin ISTB-2019-02 City of Ottawa, February 2019. ***(ISTB-2019-02)***
- Ottawa Design Guidelines – Water Distribution City of Ottawa, July 2010. (***Ottawa Water Guidelines***)
  - Technical Bulletin ISD-2010-2 City of Ottawa, December 15, 2010. ***(ISD-2010-2)***
  - Technical Bulletin ISDTB-2014-02 City of Ottawa, May 2014. **(ISDTB-2014-02)**
  - Technical Bulletin ISTB-2018-02 City of Ottawa, March 2018. ***(ISTB-2018-02)***

Ministry of Environment, Conservation and Parks:

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

3.0 PRE-CONSULTATION SUMMARY

A pre-consultation meeting was held with City staff on June 23rd, 2021, 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 for the proposed development to the 2-year pre-development flows with a combined C value to a maximum of 0.50.
- Quality controls are not required for this site due to the combined sewer outlet.

4.0 WATERMAIN

4.1 Existing Watermain

There is an existing 203 mm diameter PVC watermain within Bell Street South, and an existing 152 mm diameter PVC watermain within Arthur Lane South. The site is located within the 1W pressure zone, as per the Water Distribution System mapping included in ***Appendix C***. There is a municipal fire hydrant fronting the site along Bell Street South available to service the proposed development. A municipal fire hydrant fronting the site along Arthur Lane South is proposed to be relocated to the southeast corner of the site and will also be available to service the proposed development. Two additional hydrants are available to service the proposed development; One is located on Bell Street, south of Plymouth Street, and the other on Plymouth Street, east of Bell Street. See the Hydrant Coverage Figure in ***Appendix C*** for hydrant locations.

4.2 Proposed Watermain

It is proposed to service the proposed development with a 150 mm diameter water service connection to the existing 203 mm diameter watermain located within Bell Street South. Refer to drawing ***C102*** for a detailed servicing layout.

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	0.104 ha
Residential	280 L/day/person
Residential Apartment – 1 Bedroom	1.4 persons/unit
Residential Apartment – 2 Bedroom	2.1 persons/unit
Max Day Peaking Factor - Residential	4.9 x avg. day
Peak Hour Peaking Factor - Residential	7.4 x avg. day

The water analysis results have been summarized in ***Table 2***, below.

Table 2: Summary of Estimated Water Demand

Design Parameter	Total Flow (L/s) Proposed
Average Daily Demand	0.23
Max Day Demand	1.14
Max Day Demand + FUS (316.67 L/s)	317.81

Peak Hour Demand	1.73

The Fire Underwriters Survey 1999 (FUS) method was utilized to estimate the required fire flow for the site. Fire flow requirements were calculated per City of Ottawa Technical Bulletin ***ISTB-2018-02.*** The following parameters were coordinated with the architect:

- Type of construction – Wood Frame Construction
- Occupancy Type – Limited Combustible
- Sprinkler Protection – Standard Water Supply Sprinklered

The results of the calculations yielded a required fire flow of ***19,000 L/min*** (316.67 L/s). The detailed calculations for the FUS can be found in ***Appendix C***.

The City provided the estimated water pressures at both for the average day scenario, peak hour scenario and the max day plus fire flow scenario for the demands indicated by the correspondence in ***Appendix C***. The resulting pressures for the boundary conditions results are shown in ***Table 3***, below.

Table 3: Boundary Conditions Results

Street	Scenario	m H2O	Pressure (kPa)
Bell Street South	**Minimum HGL**	37.1	364.0
	Maximum HGL	45.0	441.5
	Maximum Daily + Fire Flow Demand	16.7	163.8

The normal operating pressure range is anticipated to be 364 kPa to 441.5 kPa and will not be less than 275 kPa (40 psi) or exceed 689 kPa (100 psi). The proposed watermains will meet the minimum required 20 psi (140 kPa) from the ***Ottawa Water Guidelines*** at the ground level under maximum day demand and fire flow conditions.

To confirm the adequacy of fire flow to protect the proposed development, public fire hydrants within 150 m of the proposed building were analysed per City of Ottawa ***ISTB 2018-02*** Appendix I Table 1. Based on City guidelines (***ISTB-2018-02***), the existing hydrants can provide adequate fire protection to the proposed development. The results are summarized in ***Table 4***, below.

Table 4: Fire Protection Confirmation

Building	Fire Flow Demand (L/min.)	Fire Hydrant(s) within 75m	Fire Hydrant(s) within 150m	Combined Fire Flow (L/min.)
273-281 Bell Street South	19,000 (FUS)	2 public	2 public	19,000

5.0 SANITARY DESIGN

5.1 Existing Sanitary Sewer

There is an existing 900 mm diameter combined sewer within Bell Street South, fronting the subject site and an existing 300 mm diameter combined sewer is located within Arthur Lane South.

Table 5, below, summarizes the wastewater design criteria identified by the ***Ottawa Sewer Guidelines***.

Table 5: Sanitary Design Criteria

Design Parameter	Value
Site Area	0.10 ha
Residential	280 L/person/day
Single Family Home	3.4 persons/unit
1 Bedroom Apartment	1.4 persons/unit
2 Bedroom Apartment	2.1 persons/unit
Residential Peaking Factor (Proposed)	3.62
Residential Peaking Factor (Existing)	3.71
Extraneous Flow Allowance	0.33 L/s/ha

Table 6, below, summarizes the estimated wastewater flow based on existing conditions.

Table 6: Summary of Estimated Existing Sanitary Flow

Design Parameter	Total Flow (L/s)
Total Estimated Average Dry Weather Flow	0.06
Total Estimated Peak Dry Weather Flow	0.21
Total Estimated Peak Wet Weather Flow	0.24

5.2 Proposed Sanitary Sewer

It is proposed to service the proposed building with a 200 mm diameter sanitary service connection to the 900 mm diameter combined sewer within Bell Street South. Refer to drawing ***C102*** for a detailed servicing layout.

Table 7, below, summarizes the estimated wastewater flow from the proposed development. Refer to ***Appendix D*** for detailed calculations.

Table 7: Summary of Estimated Sanitary Flow

Design Parameter	Total Flow (L/s)
Total Estimated Average Dry Weather Flow	0.24
Total Estimated Peak Dry Weather Flow	0.85
Total Estimated Peak Wet Weather Flow	0.88

Although the proposed development will result in a ***0.64 L/s*** increase in sanitary flow, the total flow to the combined sewer will be significantly lower than existing conditions due to the attenuation of stormwater runoff. Refer to *Section 8.0* for more information on combined sewer flow.

6.0 STORM SEWER DESIGN

6.1 Existing Storm Sewers

Stormwater runoff from the site is currently tributary to the Preston Street combined sewershed. There is an existing 900 mm diameter storm sewer within Bell Street South, and a 300 mm diameter combined sewer within Arthur Lane South.

6.2 Proposed Storm Sewers

A new 250 mm diameter perforated pipe subdrain is proposed to collect surface runoff at the rear of the site. The runoff will then be conveyed to a 250 mm diameter storm service at CB1. Runoff will travel through a swale and the proposed 250 mm diameter storm service towards Bell Street South, where a 300 mm diameter storm service is proposed to be connected to the existing 900 mm diameter combined sewer within Bell Street South. Refer to drawing ***C102*** for a detailed servicing layout.

Runoff collected on the two roofs of the proposed building will be stored and controlled internally using one roof drain per roof. The roof drains will be used to limit the flow from the roof to the specified allowable release rate. For calculation purposes a Watts Accutrol roof drain was used estimate a reasonable roof flow. Other products maybe specified at detailed building design so long as release rates and storage volumes are respected.

Foundation and roof drainage is proposed to be conveyed without flow attenuation via the 250/300 mm diameter storm service.

See CCO-22-0477 - *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

The following design criteria have been employed in developing the stormwater management design for the site as directed by the City:

Quality Control

- Quality controls are not required for this site due to the combined sewer outlet.

Quantity Control

- Any storm events greater than 2-year, up to 100-year, and including 100-year storm event must be detained on site.
- Post-development to be restricted to the 2-year storm event, based on a calculated time of concentration greater than 10 minutes and a rational method coefficient of 0.50. Refer to *Section 7.2* for further details.

7.2 Runoff Calculations

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

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

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 balanced 'C' value must be increased by 25% for a 100-year storm event to a maximum of 1.0.

7.3 Pre-Development Drainage

It has been assumed that the site contains no stormwater management controls for flow attenuation. The estimated pre-development peak flows for the 2, 5, and 100-year events are summarized below in ***Table 8***. See CCO-22-0477 - *PRE* in ***Appendix E*** and ***Appendix G*** for calculations.

Table 8: Pre-Development Runoff Summary

Drainage Area	Area (ha)	Q (L/s)		
		2-Year	5-Year	100-Year
A1	0.10	12.78	17.34	33.69

7.4 Post-Development Drainage

To meet the stormwater objectives the development will contain rooftop control.

Based on the criteria listed in *Section 7.2*, the development will be required to restrict flow to the 2-year storm event. It is estimated that the target release rate during the 100-year event will be ***16.08 L/s***. While post-development flows for the 100-year event will moderately exceed the 2-year pre-development flow rate, there will be a significant reduction in combined flow due to the attenuation of stormwater runoff. Refer to *Section 8.0* for additional information on combined flow.

The proposed site drainage limits are demonstrated on the Post-Development Drainage Area Plan. See CCO-22-0477 - *POST* in ***Appendix F*** of this report for more details. A summary of the post-development runoff calculations can be found in ***Table 9***, below.

Table 9: Post-Development 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	0.04	0.48	0.84	18.0	19.1
B2	0.03	0.42	0.78	12.1	12.9
B3	0.04	7.48	14.46	-	-
Total	**0.10**	**8.38**	**16.08**	**30.12**	**32.01**

Runoff for area B1 will be stored on the roof of the proposed building and restricted using one Watts Accutrol roof drain (or equivalent product) to a maximum release rate of ***0.84 L/s*** and will provide up to ***19.1 m^3*** of storage.

Runoff for area B2 will be stored on the roof of the proposed building and restricted using one Watts Accutrol roof drain (or equivalent product) to a maximum release rate of ***0.78 L/s*** and will provide up to ***12.9 m^3*** of storage.

Foundation drainage is proposed to be connected to the 250 mm diameter storm service upstream of CB3. The internal servicing layout is to be reviewed by the mechanical engineer.

Runoff for area B3 will be unrestricted due to the overland flow route paths around the property.

8.0 COMBINED SEWER FLOW

It has been assumed that the site contains no stormwater management controls for flow attenuation. The pre-development and post-development combined flow rates can be seen in ***Table 10***, below.

Table 10: Combined Flow Comparison

Flow Type	5-Year		100-Year	
	Pre-Development (L/s)	Post-Development (L/s)	Pre-Development (L/s)	Post-Development (L/s)
Sanitary	0.24	0.88	0.24	0.88
Storm	17.34	8.38	33.69	16.08
Combined Flow	**17.58**	**9.26**	**33.93**	**16.74**

As seen in ***Table 10***, above, the post-development combined flow will be significantly lower than the pre-development combined flow. Reductions in flow for the 5-year and 100-year storms will be **8.32 L/s** and **17.19 L/s**, respectively. As such, it is anticipated that there will be no capacity concerns within the existing 900 mm diameter combined sewer due to an overall reduction in flow rates by 50%. Due to the complexity of the system, the City will need to confirm as well as advise of any downstream constraints.

9.0 EROSION AND SEDIMENT CONTROL

9.1 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.

9.2 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.

10.0 SUMMARY

- A new 6-storey residential building is proposed to be constructed at 273-281 Bell Street South. The ***Site Plan*** proposes 49 units, with street access from Arthur Lane South and Bell Street South.
- The FUS method estimated fire flow indicated that ***19,000 L/min*** is required for the proposed development.
- The development is estimated to have a peak wet weather flow of ***0.88 L/s***.
- Based on City of Ottawa guidelines, the development will be required to attenuate post-development 5 and 100-year flows to the 2-year release rate of ***12.78 L/s***.
- To meet the stormwater objectives the development will contain ***32.01 m^3*** of rooftop storage for flow attenuation.
- The proposed combined flow during the 100-year storm is ***16.74 L/s***, a reduction of 50% from existing conditions; and
- Quality controls are not required for this site due to the combined sewer outlet.

11.0 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 273-281 Bell Street South.

This report is respectfully being submitted for approval.

Regards,

McIntosh Perry Consulting Engineers Ltd.

Alison J. Gosling, P.Eng.
Project Engineer, Land Development
T: 613.714.4629
E: a.gosling@mcintoshperry.com

12.0 STATEMENT OF LIMITATIONS

This report was produced for the exclusive use of Gavcap Properties 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

LEGEND

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

REFERENCE

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

CLIENT: GAVCAP PROPERTIES INC

PROJECT: 273-281 BELL STREET SOUTH

TITLE: SITE LOCATION

McINTOSH PERRY
115 Walgreen Road, RR3, Carp, ON K0A1L0
Tel: 613-836-2184 Fax: 613-836-3742
www.mcintoshperry.com

PROJECT NO:	CCO-22-0477
Date	Apr., 07, 2022
GIS	SK
Checked By	FV

FIGURE: 1

C:\Users\s.klassen\McIntosh Perry\GIS - Documents\Projects\2022\CCO\CCO-22-0477 Gavcap Properties\aprx\Key Maps\LandDevelopment\CCO-22-0477_KeyMap_OptionD.aprx

APPENDIX B
BACKGROUND DOCUMENTS

McINTOSH PERRY

Hello Jeff,

Please forward the below information to the applicant regarding a development proposal at **269-281 Bell Street , Ottawa for Proposed six storey building fronting Bell St and three storey building (purpose built rental) via the rear lane, shared private courtyard, slab on grade construction with surface level parking.** Note that the information is considered preliminary and the assigned Development Review Project Manager may modify and/or add additional requirements and conditions upon review of an application if deemed necessary.

Key points

- Please provide the new Sanitary sewer discharge and we confirm if sanitary sewer main has the capacity.
- Please submit the boundary conditionon request asap to confirm that the require fire flows can be achieved as well as availability of the domestic water pressure on the City street in front of the development.
- Please note that this project will be subject to an Environmental Compliance Approval (ECA) for Private Sewage Works. (Any connection to a combined Sewer system require the Ministry (MECP) approval)

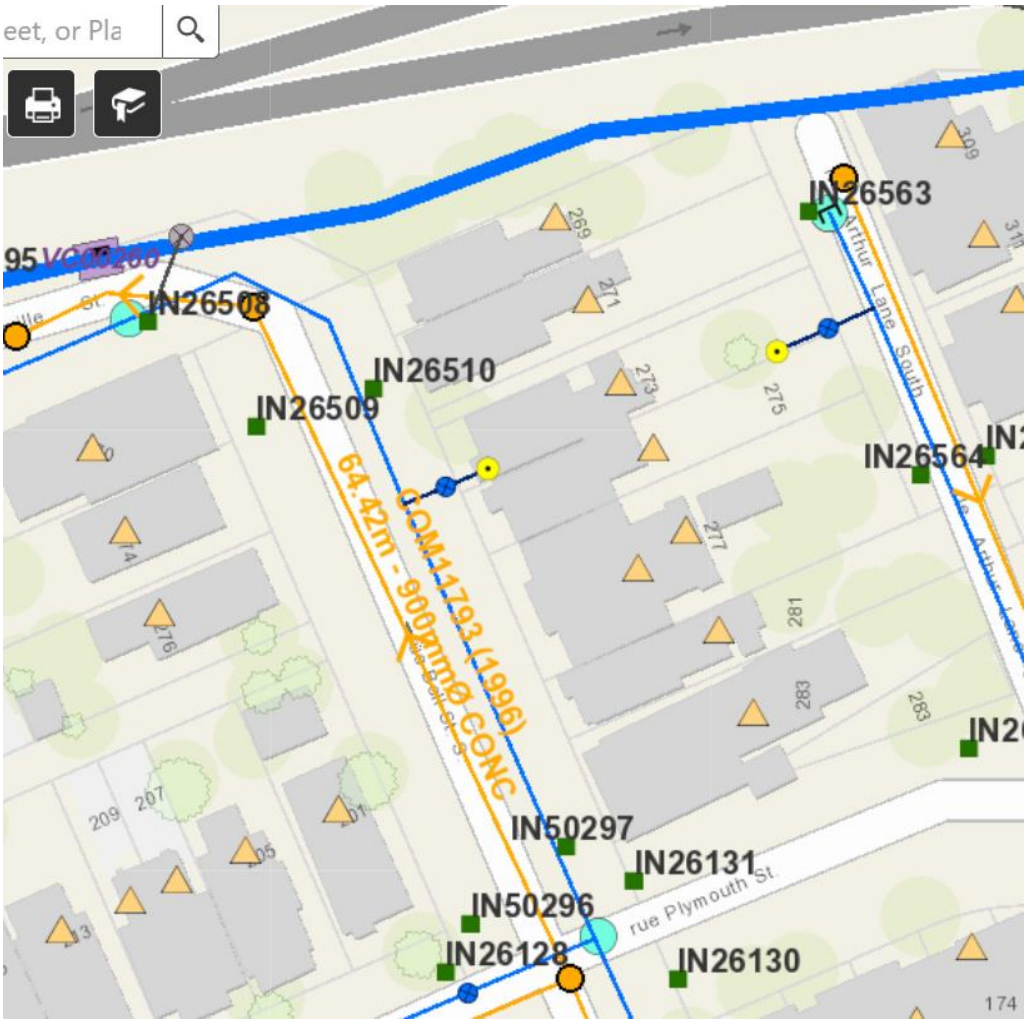
General:

- It is the sole responsibility of the consultant to investigate the location of existing underground utilities in the proposed servicing area and submit a request for locates to avoid conflict(s). The location of existing utilities and services shall be documented on an **Existing Conditions Plan**.
- Any easements on the subject site shall be identified and respected by any development proposal and shall adhere to the conditions identified in the easement agreement. A **legal survey plan** shall be provided, and all easements shall be shown on the engineering plans.
- A deep excavation and dewatering operations have the potential to cause damages to the neighboring adjacent buildings/ City infrastructure. Document that construction activities (excavation, dewatering, vibrations associated with construction, etc.) will not have an impact on any adjacent buildings and infrastructure.
- Existing buildings require a CCTV inspection and report to ensure existing services to be re-used are in good working order and meet current minimum size requirements. Located services to be placed on site servicing plans.
- All underground and above ground building footprints and permanent walls need to be shown on the plans to confirm that any permanent structure does not extend either above or below into the existing property lines and sight triangles.

- Reference documents for information purposes:
  - Ottawa Sewer Design Guidelines (October 2012)
  - Technical Bulletin PIEDTB-2016-01
  - Technical Bulletins ISTB-2018-01, ISTB-2018-02 and ISTB-2018-03.
  - Ottawa Design Guidelines - Water Distribution (2010)
  - Geotechnical Investigation and Reporting Guidelines for Development Applications in the City of Ottawa (2007)

- City of Ottawa Slope Stability Guidelines for Development Applications (revised 2012)
- City of Ottawa Environmental Noise Control Guidelines (January 2016)
- City of Ottawa Accessibility Design Standards (2012) (City recommends development be in accordance with these standards on private property)
- Ottawa Standard Tender Documents (latest version)
- Ontario Provincial Standards for Roads & Public Works (2013)
- Record drawings and utility plans are also available for purchase from the City (Contact the City's Information Centre by email at InformationCentre@ottawa.ca or by phone at (613) 580-424 x.44455).

Please note that this is the applicant responsibility to refer to the latest applicable guidelines while preparing reports and studies.



Disclaimer:
The City of Ottawa does not guarantee the accuracy or completeness of the data and information contained on the above image(s) and does not assume any responsibility or liability with respect to any damage or loss arising from the use or interpretation of the image(s) provided. This image is for schematic purposes only.

Stormwater Management Criteria and Information:

- **Water Quantity Control:** In the absence of area specific SWM criteria please control post-development runoff from the subject site, up to and including the **100-year storm event**, to **a 2-year pre-development level.** The pre-development runoff coefficient will need to be determined **as per existing conditions** but in no case more than 0.5. [**If 0.5 applies it needs to be clearly demonstrated in the report that the pre-development runoff coefficient is greater than 0.5**]. The time of concentration (T_c) used to determine the pre-development condition should be calculated. *Tc should not be less than 10 min. since IDF curves become unrealistic at less than 10 min; T_c of 10 minutes shall be used for all post-development calculations*].
- Any storm events greater than the established **2-year allowable** release rate, up to and including the **100-year storm event**, shall be detained on-site. The SWM measures required to avoid impact on downstream sewer system will be subject to review.
- Document how any foundation drainage system will be integrated into the servicing design and show the positive outlet on the plan. Foundation drainage is to be independently connected to sewer main unless being pumped with appropriate back up power, sufficient sized pump and back flow prevention. **It is recommended that the foundation drainage system be drained by a sump pump connection to the storm sewer to minimize risk of basement flooding as it will provide the best protection from the uncontrolled sewer system compared to relying on the backwater valve.**
- **Water Quality Control:** Please consult with the local conservation authority (RVCA) regarding water quality criteria prior to submission of a Site Plan Control Proposal application to establish any water quality control restrictions, criteria and measures for the site. Correspondence and clearance shall be provided in the Appendix of the report.
- Please note that as per *Technical Bulletin PIEDTB-2016-01 section 8.3.11.1 (p.12 of 14)* **there shall be no surface ponding on private parking areas during the 5-year storm rainfall event**.
- Please note that the minimum orifice dia. for a plug style **ICD is 83mm and the minimum flow rate from a vortex ICD is 6 L/s** in order to reduce the likelihood of plugging.
- Post-development site grading shall match existing property line grades in order to minimize disruption to the adjacent residential properties. A **topographical plan of survey** shall be provided as part of the submission and a note provided on the plans.
- Please provide a **Pre-Development Drainage Area Plan** to define the pre-development drainage areas/patterns. **Existing drainage patterns shall be maintained and discussed as part of the proposed SWM solution**.
- **If rooftop control** and storage is proposed as part of the SWM solutions sufficient details (Cl. 8.3.8.4) shall be discussed and document in the report and on the plans. Roof drains are to be connected downstream of any incorporated ICDs within the SWM system and not to the foundation drain system. Provide a **Roof Drain Plan** as part of the submission.
- If **Window wells** are proposed, they are to be indirectly connected to the footing drains. A detail of window well with indirect connection is required, as is a note at window well location speaking to indirect connection.
- There must be at least **15cm of vertical clearance** between the spill elevation and the ground elevation at the building envelope that is in proximity of the flow route or ponding area. The exception in this case would be at reverse sloped loading dock locations. At these locations, a minimum of 15cm of vertical clearance must be provided below

loading dock openings. Ensure to provide discussion in report and ensure grading plan matches if applicable.

- Rear yard on grade parking to be permeable pavement. Refer to City Standard Detail Drawings SC26 (maintenance/temp parking areas), SC27 or permeable asphalt materials. No gravel or stone dust parking areas permitted.
- Street catch basins are not to be located at any proposed entrances.

Storm Sewer:

- A 300mm Combined sewer PVC (1996) is available on Arthur Lane South and 900mm combined sewer Conc (1996) is available on Bell Street

Sanitary Sewer

- A 300mm Combined sewer PVC (1996) is available on Arthur Lane South and 900mm combined sewer Conc (1996) is available on Bell Street
- Please provide the new Sanitary sewer discharge and we confirm if sanitary sewer main has the capacity.
- Please apply the wastewater design flow parameters *in Technical Bulletin PIEDTB-2018-01.*
- A backwater valve is required on the sanitary service for protection.
- Include correspondence from the Architect within the Appendix of the report confirming the number of residential units per building **and a unit type breakdown for each of the buildings** to support the calculated building populations.

Water :

- 152mm PVC (1996) is available on Arthur Lane South and 203mm PVC(1996) is available on Bell Street South
- Existing residential service to be blanked at the main.
- **Water Supply Redundancy:** Residential buildings with a basic day demand greater than $50m^3$/day (0.57 L/s) are required to be connected to a minimum of two water services separated by an isolation valve to avoid a vulnerable service area as per the *Ottawa Design Guidelines - Water Distribution, WDG001, July 2010 Clause 4.3.1 Configuration.* The basic day demand for this site not expected to exceed $50m^3$/day.
- Please **review Technical Bulletin ISTB-2018-0**, maximum fire flow hydrant capacity is provided in Section 3 Table 1 of Appendix I. A **hydrant coverage figure** shall be provided and **demonstrate there is adequate fire protection for the proposal**. Two or more public hydrants are anticipated to be required to handle fire flow.
- Boundary conditions are required to confirm that the require fire flows can be achieved as well as availability of the domestic water pressure on the City street in front of the development. Use Table 3-3 of the MOE Design Guidelines for Drinking-Water System to determine Maximum Day and Maximum Hour peaking factors for 0 to 500 persons and use Table 4.2 of the Ottawa Design Guidelines, Water Distribution for 501 to 3,000 persons. Please provide the following information to the City of Ottawa via email to request water distribution network boundary conditions for the subject site. Please note that once this information has been provided to the City of Ottawa it takes approximately 5-10 business days to receive boundary conditions.
    - Type of Development and Units
    - Site Address
    - A plan showing the proposed water service connection location.
    - **Average Daily Demand** (L/s)
    - **Maximum Daily Demand** (L/s)

- **Peak Hour Demand** (L/s)
- **Fire Flow** (L/min)

[*Fire flow demand requirements shall be based on* ***Fire Underwriters Survey (FUS)*** *Water Supply for Public Fire Protection 1999*]

Exposure separation distances shall be defined on a figure to support the FUS calculation and required fore flow (RFF).

- **Hydrant capacity shall be assessed to demonstrate the RFF can be achieved**. Please identify which hydrants are being considered to meet the RFF on a fire hydrant coverage plan as part of the boundary conditions request.

Snow Storage:

- Any portion of the subject property which is intended to be used for permanent or temporary snow storage shall be as shown on the approved site plan and grading plan. Snow storage shall not interfere with approved grading and drainage patters or servicing. Snow storage areas shall be setback from the property lines, foundations, fencing or landscaping a minimum of 1.5m. Snow storage areas shall not occupy driveways, aisles, required parking spaces or any portion of a road allowance. If snow is to be removed from the site please indicate this on the plan(s).

Sensitive marine clay-

If Sensitive marine clay soils are present in this area that are susceptible to soil shrinkage that can lead to foundation and building damages. All six (6) conditions listed in the Tree Planting in Sensitive Marine Clay Soils-2017 Guidelines are required to be satisfied. Note that if the plasticity index of the soil is determined to be less than 40% a minimum separation between a street tree and the proposed building foundations of 4.5m will need to be achieved. A memorandum addressing the Tree in Clay Soil Guidelines prepared by a geotechnical engineer is required to be provided to the City.
https://ottawa.ca/en/city-hall/planning-and-development/community-plans-and-design-guidelines/design-and-planning/completed-guidelines/tree-planting-sensitive-marine-clay-soils-2017-guidelines

Severance:

- If severance is planned, this needs to be addressed in servicing to satisfy severance requirements. Where a large parcel with multiple buildings is planned, City will require an ultimate servicing plan so as to appropriately understand how severance requirements are being met.

Gas pressure regulating station

A gas pressure regulating station may be required depending on HVAC needs (typically for 12+ units). Be sure to include this on the Grading, Site Servicing, SWM and Landscape plans. This is to ensure that there are no barriers for overland flow routes (SWM) or conflicts with any proposed grading or landscape features with installed structures and has nothing to do with supply and demand of any product.

Gas Pressure Regulating Station.pdf

Source Protection Policy Screening (SPPS):
Here is a summary of the Source Protection policy screening for 269-281 Bell Street.

1. The address lies within the Mississippi-Rideau Source Protection Region and is subject to the policies of the Mississippi-Rideau Source Protection Plan.

2. The area is not located within a Surface Water Intake Protection Zone (IPZ) where significant threat policies apply.

3. The area is not located within a Wellhead Protection Area (WHPA).

4. The area is not located within a Significant Groundwater Recharge Area (SGRA).

5. The area is located within a Highly Vulnerable Aquifer (HVA). There are no legally-binding source protection policies related to activities within Highly Vulnerable Aquifers.

In terms of the development application, please note that the address is not located in an area where activities could be considered a significant threat to drinking water sources and there are no legally-binding source protection policies.

CCTV sewer inspection

CCTV sewer inspection required for pre and post construction conditions to ensure no damage to City Assets surrounding site.

Road Reinstatement

Where servicing involves three or more service trenches, either a full road width or full lane width 40 mm asphalt overlay will be required, as per amended Road Activity By-Law 2003-445 and City Standard Detail Drawing R10. The amount of overlay will depend on condition of roadway and width of roadway(s).

Permits and Approvals:

- Please note that this project will be subject to an Environmental Compliance Approval (ECA) for Private Sewage Works. (Any connection to a combined Sewer system required the Ministry (MECP) approval)
  Environmental Compliance Approval | Ontario.ca

Required Engineering Plans and Studies:
PLANS:

- Existing Conditions and Removals Plan
- Site Servicing Plan
- Grade Control and Drainage Plan

- Erosion and Sediment Control Plan
- Roof Drainage Plan
- Foundation Drainage System Detail (if applicable)
- Topographical survey

REPORTS:

- Site Servicing and Stormwater Management Report
- Geotechnical Study/Investigation
- Noise Control Study
- Phase I ESA
- Phase II ESA (Depending on recommendations of Phase I ESA)

Please refer to the **City of Ottawa Guide to Preparing Studies and Plans [Engineering]:** Specific information has been incorporated into both the Guide to Preparing Studies and Plans for a site plan. The guide outlines the requirement for a statement to be provided on the plan about where the property boundaries have been derived from.
Added to the general information for servicing and grading plans is a note that an O.L.S. should be engaged when reporting on or relating information to property boundaries or existing conditions. The importance of engaging an O.L.S. for development projects is emphasized.

Phase One Environmental Site Assessment:

- A Phase I ESA is required to be completed in accordance with Ontario Regulation 153/04 in support of this development proposal to determine the potential for site contamination. Depending on the Phase I recommendations a Phase II ESA may be required.
- The Phase I ESA shall provide all the required Environmental Source Information as required by O. Reg. 153/04. ERIS records are available to public at a reasonable cost and need to be included in the ESA report to comply with O.Reg. 153/04 and the Official Plan. The City will not be in a position to approve the Phase I ESA without the inclusion of the ERIS reports.
- Official Plan Section 4.8.4:

https://ottawa.ca/en/city-hall/planning-and-development/official-plan-and-master-plans/official-plan/volume-1-official-plan/section-4-review-development-applications#4-8-protection-health-and-safety

Geotechnical Investigation:

- A Geotechnical Study/Investigation shall be prepared in support of this development proposal.
- Rreducing the groundwater level in this area can lead to potential damages to surrounding structures due to excessive differential settlements of the ground. The impact of groundwater lowering on adjacent properties needs to be discussed and investigated to ensure there will be no short term and long term damages associated with lowering the groundwater in this area.
- Geotechnical Study shall be consistent with the **Geotechnical Investigation and Reporting Guidelines for Development Applications**.

https://documents.ottawa.ca/sites/default/files/documents/cap137602.pdf

Noise Study:

- A **Transportation Noise Assessment** is required as the subject development is located within 500 m of Hwy #417.
- A **Stationary Noise Assessment** is required in order to assess the noise impact of the proposed sources of stationary noise (mechanical HVAC system/equipment) of the development onto the surrounding residential area to ensure the noise levels do not exceed allowable limits specified in the City Environmental Noise Control Guidelines. https://ottawa.ca/en/city-hall/planning-and-development/community-plans-and-design-guidelines/design-and-planning/completed-guidelines/environmental-noise-control-guidelines

Fourth (4th) Review Charge:
Please be advised that additional charges for each review, after the 3rd review, will be applicable to each file. There will be no exceptions.

Construction approach – Please contact the Right-of-Ways Permit Office TMconstruction@ottawa.ca early in the Site Plan process to determine the ability to construct site and copy File Lead and Project manager on this request.

Please note that these comments are considered preliminary based on the information available to date and therefore maybe amended as additional details become available and presented to the City. It is the responsibility of the applicant to verify the above information. The applicant may contact me for follow-up questions related to engineering/infrastructure prior to submission of an application if necessary.

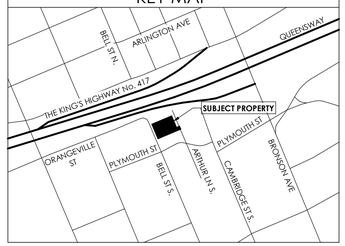
If you have any questions or require any clarification, please let me know.

Regards,
Nishant Jhamb, P.Eng
Project Manager |Gestionnaire de projet
Planning, Infrastructure and Economic Development Department - Services de la planification, de l'infrastructure et du développement économique
Development Review - Central 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 23112, nishant.jhamb@ottawa.ca

SITE LEGEND

- ENTRANCE/EXIT
- PARKING COUNT
- BARRIER FREE PARKING
- HP HYDRO POLE
- FH FIRE HYDRANT

KEY MAP



ZONING DATA CHART

273-281 BELL STREET S.
OTTAWA, ON

PROPOSED SITE PLAN

PREPARED BY EDGE ARCHITECTS LTD.
MARCH 31, 2022

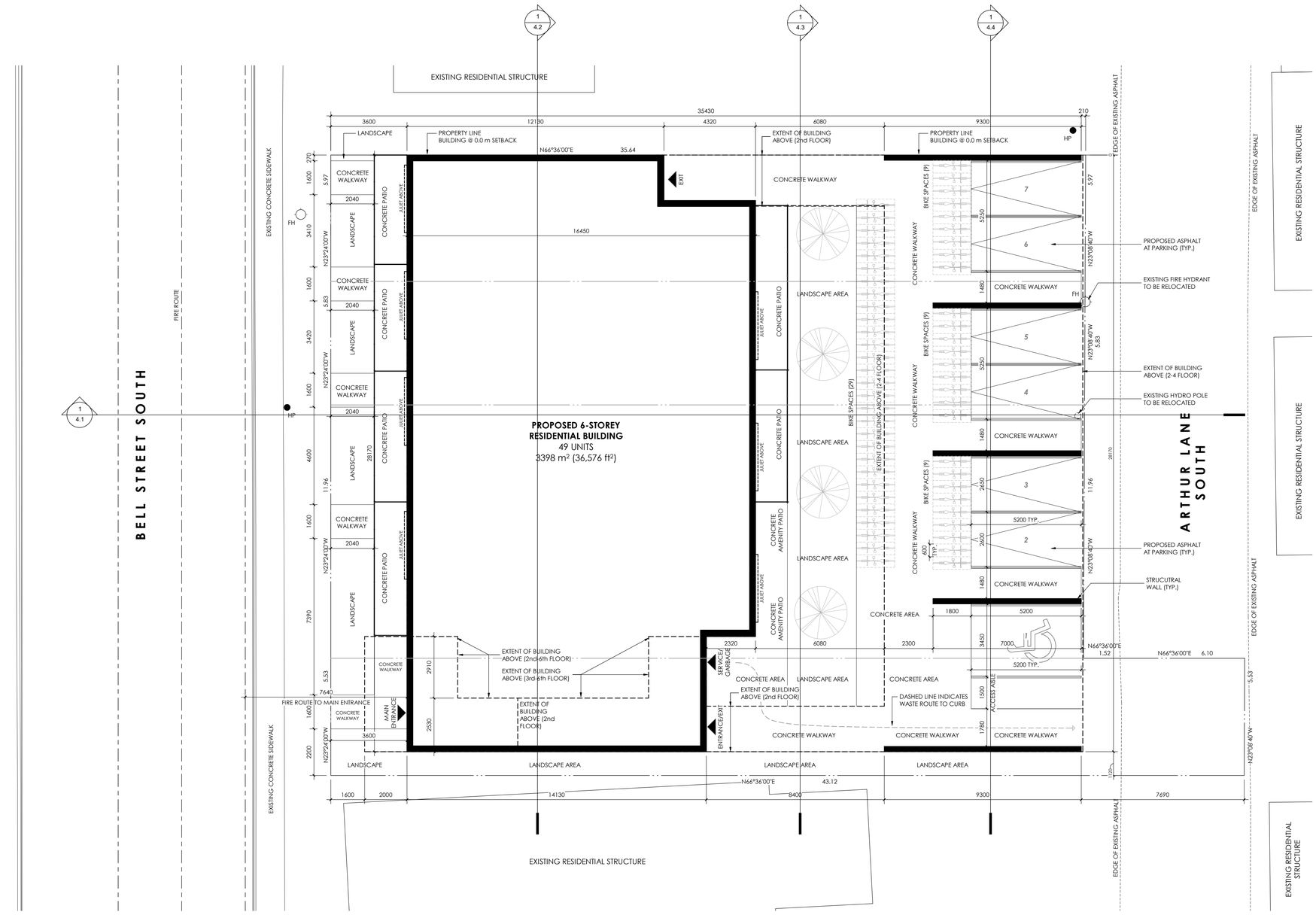
ZONING COMPLIANCE CHART
CURRENT ZONING: R4UD (RESIDENTIAL FOURTH DENSITY ZONE); BY-LAW 2008-250

USE	MULTI-RESIDENTIAL DEVELOPMENT	
	REQUIRED	PROVIDED
MINIMUM LOT AREA	---	1,084.0m²
LOT WIDTH	---	29.3m
FRONT YARD SETBACK (W)	---	3.6 m
INT. SIDE YARD SETBACK (N)	---	0 m
INT. SIDE YARD SETBACK (S)	---	1.3 m
REAR YARD SETBACK (E)	---	0.1m
MAX. BLDG. HEIGHT	---	6 STOREYS
LANDSCAPED	---	481.8 m²
PARKING	---	7 SPACES (PARKING PROVIDED @ 0.159 SPACES/UNIT)
BARRIER-FREE PARKING	---	1 SPACE (TYPE A)
BIKE PARKING	---	56 SPACES

GENERAL NOTES:
1. PROPERTY BOUNDARY INFORMATION AND SITE CONTEXT FROM SURVEY FROM 'ANNIS, O'SULLIVAN, VOLLEBEKK LTD.'
2. ALL FINAL LOT DIMENSIONS ARE TO BE PREPARED BY THE PROJECTS SURVEYOR. ALL DIMENSIONS ARE SUBJECT TO APPROVAL OF THE MUNICIPAL AUTHORITY.
4. LIGHTING TO BE DIRECTED ONTO SITE AND NOT TO INFRINGE ON ADJACENT PROPERTIES.
5. REGULAR PARKING SPACES ARE 2.6m X 5.2m MIN.
6. BARRIER FREE PARKING SPACES ARE 3.4m X 5.2m FOR TYPE A AND 2.4m X 5.2m FOR TYPE B: AND SHALL MEET ALL CITY OF WATERLOO REQUIREMENTS INCLUDING A MINIMUM 1.5m WIDE ACCESS AISLE.
7. GARBAGE & RECYCLING STORAGE TO BE LOCATED INTERNALLY.
8. SNOW TO BE PICKED UP AND TAKEN OFF-SITE FOR DISPOSAL.

PROPERTY REPORT:
PART OF LOTS 22,23,24
(EAST BELL STREET)
REGISTERED PLAN 33
CITY OF OTTAWA

DEVELOPER	R-HAUZ SOLUTIONS INC.
SURVEYOR	ANNIS O'SULLIVAN VOLLEBEKK LTD.
ENGINEERS	MCINTOSH PERRY CONSULTING ENGINEERS LTD. HAMMERSCHLAG & JOFFE INC. GRADIENT WIND ENGINEERING INC. TERRAPEX ENVIRONMENTAL LTD. BLUMETRIC ENVIRONMENTAL INC. BIRNIE ELECTRICAL LTD.
PLANNER	FOTENN PLANNING + DESIGN



1 SP.01 **SITE PLAN**

1 : 100 (0 1 2 4 m)

TRUE NORTH | PROJECT NORTH

ISSUED FOR:

SCHEMATIC DESIGN

DEVELOPED DESIGN

SITE PLAN APPROVAL

BUILDING PERMIT

BIDDING/TENDER

NO.	REVISION DESCRIPTION	DATE

PRELIMINARY
NOT FOR CONSTRUCTION
2022.03.31

EDGE
ARCHITECTS LTD
www.edgeltd.ca

ARCHITECT'S SEAL

PROJECT NAME
273-281 BELL ST MULTI-RES
273-281 BELL STREET SOUTH
OTTAWA, ONTARIO

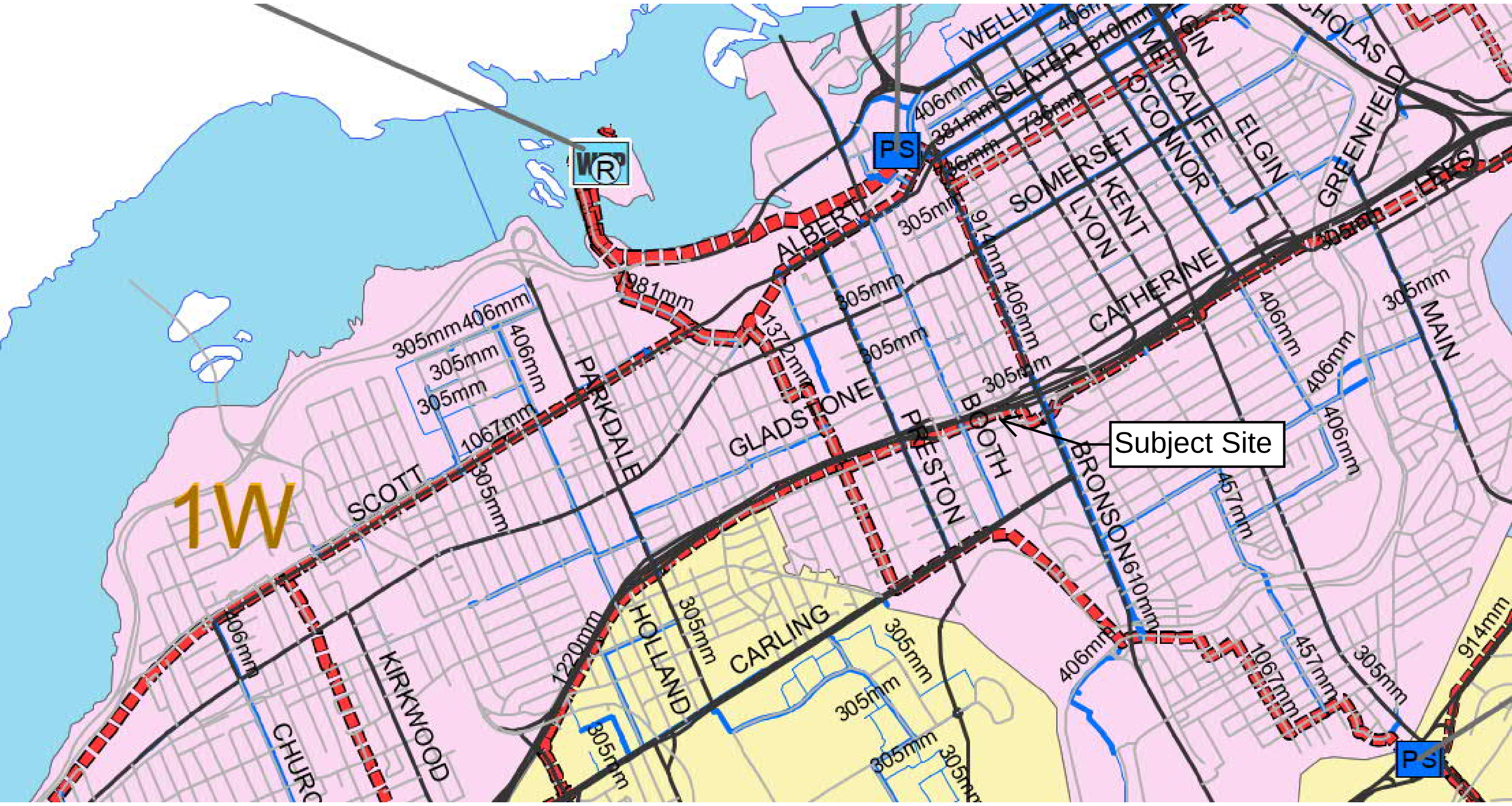
CLIENT
GAVCAP INC.

DRAWING TITLE
OVERALL SITE PLAN

PROJECT NUMBER	DRAWING NUMBER
21077	SP.01
SCALE: 1 : 100	
SHEET SIZE: 24x36	

APPENDIX C
WATERMAIN CALCULATIONS

McINTOSH PERRY


1W
Subject Site
PS
PS
WELLINGTON
SLATER
SOMERSET
METCALFE
O'CONNOR
ELGIN
GREENFIELD
KENT
LYON
ALBERT
CATHERINE
GLADSTONE
PRESTON
BOOTH
BRONSON
PARKDALE
SCOTT
HOLLAND
CARLING
KIRKWOOD
MAIN
1981mm
1372mm
1067mm
1220mm
914mm
610mm
457mm
406mm
305mm

McINTOSH PERRY

CO-22-0477 - 273-281 Bell Street - Water Demands

Project:	273-281 Bell Street
Project No.:	CO-22-0477
Designed By:	FV
Checked By:	AG
Date:	April 7, 2022
Site Area:	0.10 gross ha

Residential	**NUMBER OF UNITS**		**UNIT RATE**	
1 Bedroom Apartment	**45 units**		1.4	persons/unit
2 Bedroom Apartment	**4 units**		2.1	persons/unit
Total Population	**72 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**	**0.23** L/s
	Commercial/Industrial/ Institutional	**0.00** L/s

MAXIMUM DAILY DEMAND

DEMAND TYPE	AMOUNT		UNITS
Residential	4.9	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**	**1.14**	**L/s**
	Commercial/Industrial/ Institutional	**0.00**	**L/s**

MAXIMUM HOUR DEMAND

DEMAND TYPE	AMOUNT		UNITS
Residential	7.4	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**	**1.73**	**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	0.23	L/s
MAXIMUM DAILY DEMAND	1.14	L/s
MAXIMUM HOUR DEMAND	1.73	L/s

McINTOSH PERRY

CO-22-0477 - 273-281 Bell Street South - Fire Underwriters Survey

Project:	273-281 Bell Street South
Project No.:	CO-22-0477
Designed By:	FV
Checked By:	AG
Date:	April 7, 2022

From the Fire Underwriters Survey (1999)

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

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 Wood Frame

C 1.5 **A** **3,398.0** m^2

Calculated Fire Flow	**19,236.5 L/min**
	19,000.0 L/min

B. REDUCTION FOR OCCUPANCY TYPE (No Rounding)

From note 2, Page 18 of the Fire Underwriter Survey:

Limited Combustible -15%

Fire Flow	**16,150.0 L/min**

C. REDUCTION FOR SPRINKLER TYPE (No Rounding)

Standard Water Supply Sprinklered -40%

Reduction	**-6,460.0 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	3.1 to 10	Wood frame	14.93	2	29.9	17%
Exposure 2	20.1 to 30	Non-Combustible	10.4	2	20.8	8%
Exposure 3	0 to 3	Wood frame	24.14	2	48.3	23%
Exposure 4	10.1 to 20	Wood frame	10.8	2	21.6	12%
					% Increase*	**60%**

Increase*	**9,690.0 L/min**

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

Fire Flow	**19,380.0 L/min**
Fire Flow Required**	**19,000.0 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

CO-22-0477 - 273-281 Bell Street - Boundary Condition Unit Conversion

Project:	273-281 Bell Street
Project No.:	CO-22-0477
Designed By:	FV
Checked By:	AG
Date:	April 7, 2022

Boundary Conditions Unit Conversion

Bell Street

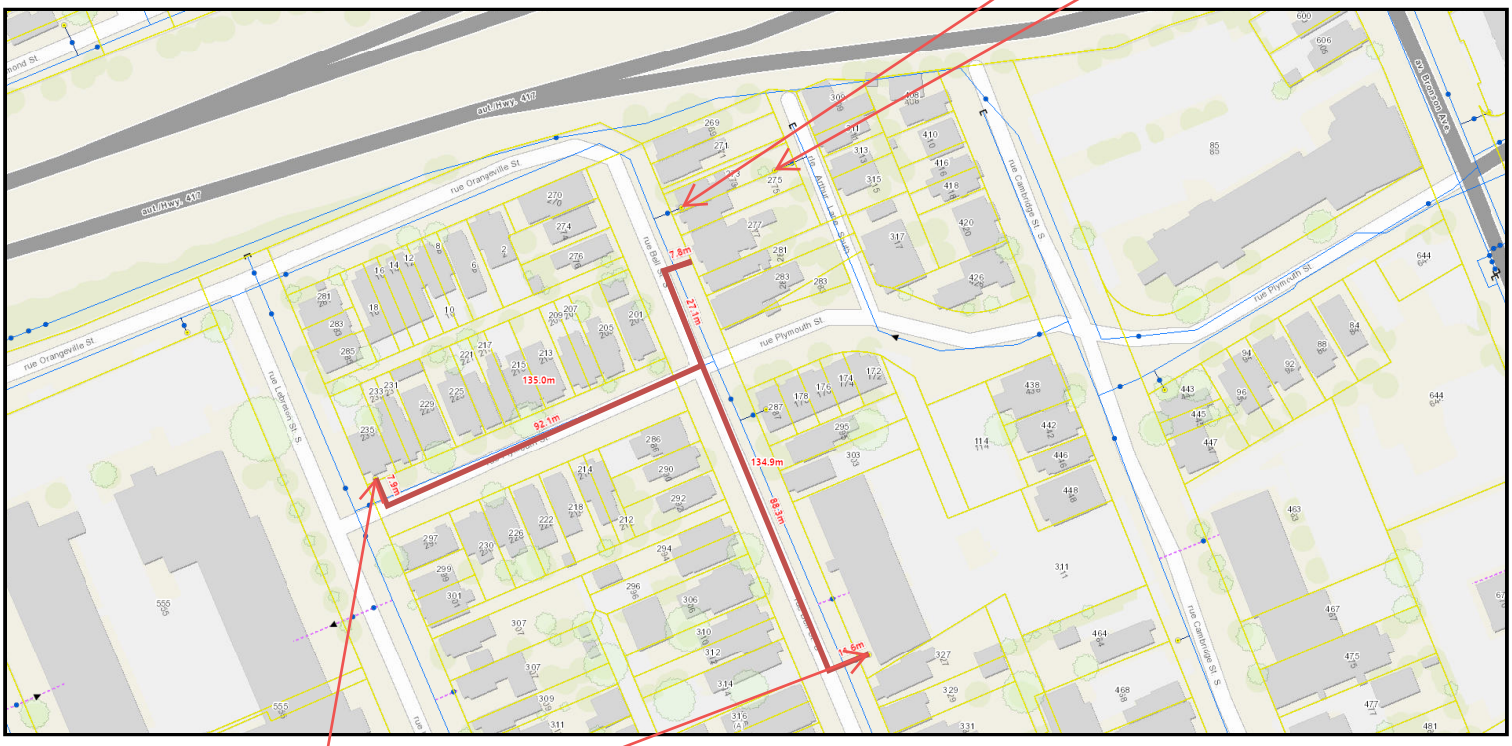
Scenario	Height (m)	Elevation (m)	m H_2O	PSI	kPa
Avg. DD	115.1	70.1	45.0	64.0	441.5
Fire Flow (316.7 L/s or 19,000 L/min)	86.8	70.1	16.7	23.8	163.8
Peak Hour	107.2	70.1	37.1	52.8	364.0

Arthur Lane South

Scenario	Height (m)	Elevation (m)	m H_2O	PSI	kPa
Avg. DD	115.1	70.8	44.3	63.0	434.6
Available Fire Flow @ 20 PSI	84.9	70.8	14.1	20.0	137.9
Peak Hour	107.0	70.8	36.2	51.5	355.1

273-281 Bell Street South

Hydrant Coverage Figure



APPENDIX D
SANITARY CALCULATIONS

McINTOSH PERRY

McINTOSH PERRY

CCO-22-0477 - 273-281 Bell Street South - Sanitary Demands

Project:	273-281 Bell Street South
Project No.:	CCO-22-0477
Designed By:	AJG
Checked By:	AJG
Date:	Apr-22

Site Area	0.10	Gross ha	
1 Bedroom	45	1.40	Persons per unit
2 Bedroom	4	2.10	Persons per unit
Total Population	72	Persons	
Commercial Area	0.00	m^2	
Amenity Space	0.00	m^2	

DESIGN PARAMETERS

Institutional/Commercial Peaking Factor	1.5	
Residential Peaking Factor	3.62	** 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	0.01
Wet	0.03
Total	**0.03**

AVERAGE DAILY DEMAND

DEMAND TYPE	AMOUNT	UNITS	POPULATION / AREA	Flow (L/s)
Residential	280	L/c/d	72	0.23
Industrial - Light**	35,000	L/gross ha/d		0
Industrial - Heavy**	55,000	L/gross ha/d		0
Commercial / Amenity	2,800	L/(1000m^2 /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	0.23	L/s
PEAK RESIDENTIAL FLOW	0.85	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	0.24	L/s
TOTAL ESTIMATED PEAK DRY WEATHER FLOW	0.85	L/s
TOTAL ESTIMATED PEAK WET WEATHER FLOW	0.88	L/s

McINTOSH PERRY

CCO-22-0477 - 273-281 Bell Street South - Existing - Sanitary Demands

Project:	273-281 Bell Street South - Existing		
Project No.:	CCO-22-0477		
Designed By:	AJG		
Checked By:	AJG		
Date:	Apr-22		
Site Area	0.10	Gross ha	
Single Family	5	3.40	Persons per unit
Total Population	17	Persons	
Commercial Area	0.00	m^2	
Amenity Space	0.00	m^2	

DESIGN PARAMETERS

Institutional/Commercial Peaking Factor	1.5	
Residential Peaking Factor	3.71	* *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	0.01
Wet	0.03
Total	**0.03**

AVERAGE DAILY DEMAND

DEMAND TYPE	AMOUNT	UNITS	POPULATION / AREA	Flow (L/s)
Residential	280	L/c/d	17	0.06
Industrial - Light**	35,000	L/gross ha/d		0
Industrial - Heavy**	55,000	L/gross ha/d		0
Commercial / Amenity	2,800	L/(1000m^2 /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

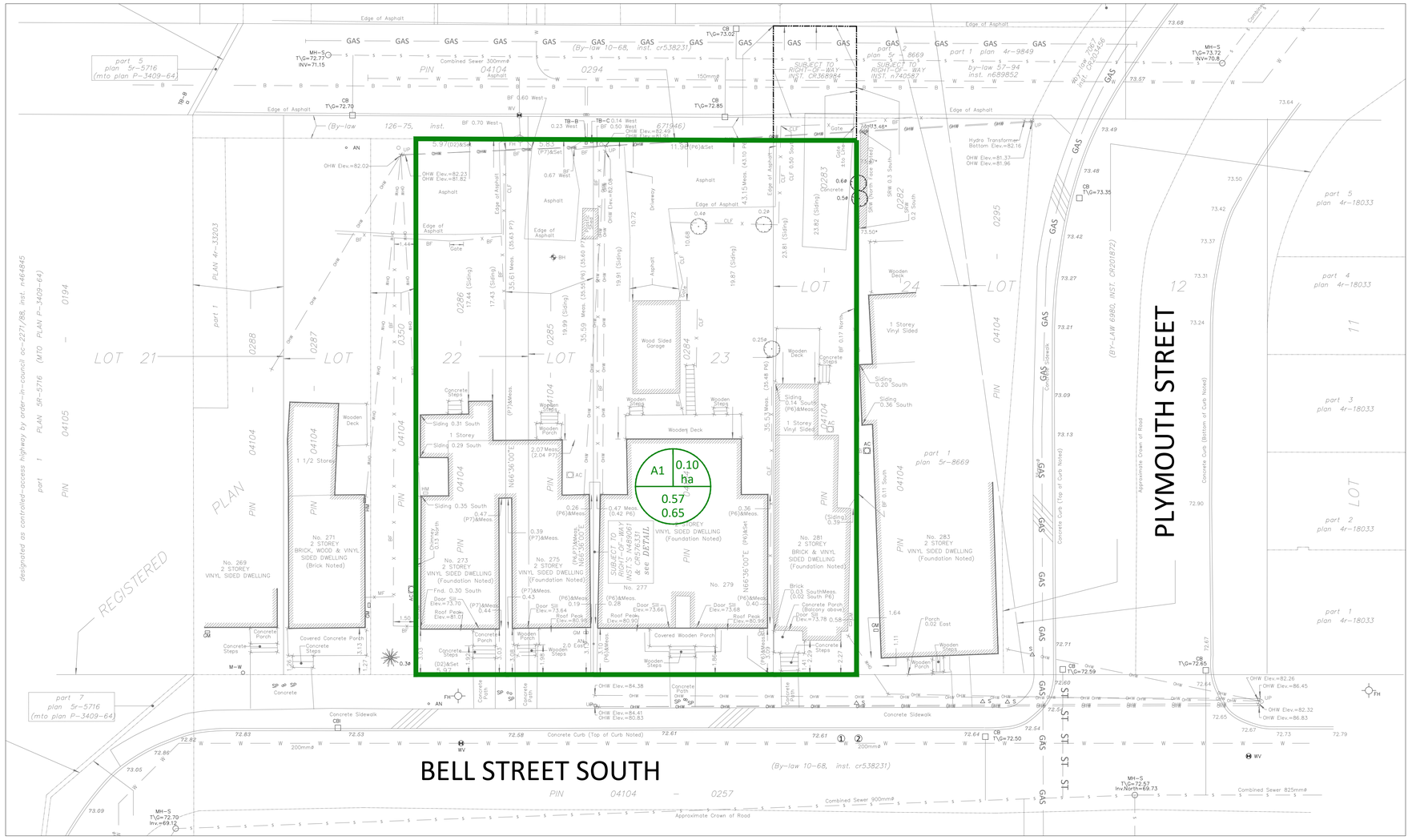
AVERAGE RESIDENTIAL FLOW	0.06	L/s
PEAK RESIDENTIAL FLOW	0.20	L/s
AVERAGE ICI FLOW	0.00	L/s
PEAK INSTITUTIONAL/COMMERCIAL FLOW	0.00	L/s
PEAK INDUSTRIAL FLOW	0.00	L/s
TOTAL PEAK ICI FLOW	0.00	L/s

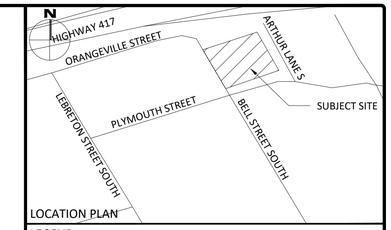
TOTAL SANITARY DEMAND

TOTAL ESTIMATED AVERAGE DRY WEATHER FLOW	0.06	L/s
TOTAL ESTIMATED PEAK DRY WEATHER FLOW	0.21	L/s
TOTAL ESTIMATED PEAK WET WEATHER FLOW	0.24	L/s

APPENDIX E
PRE-DEVELOPMENT DRAINAGE PLAN

McINTOSH PERRY





LOCATION PLAN

LEGEND

	CONCRETE BARRIER CURB		LIMIT OF CONSTRUCTION
	CONCRETE WALKWAY		DRAINAGE SWALE
	PROPOSED ASPHALT		DRAINAGE DITCH
LSCB#	LANDSCAPING CATCHBASIN		SLOPING AT 3:1 UNLESS SPECIFIED
CBMH# T/G	CATCHBASIN MANHOLE	95.50	SURFACE ELEVATION
CB# T/G	CATCHBASIN	95.50 (S)	SWALE ELEVATION
MH#A T/G	SANITARY SEWER MANHOLE	T/W95.50 B/W94.25	TOP OF WALL ELEVATION, BOTTOM OF WALL ELEVATION
HYD B/F	FIRE HYDRANT		OVERLAND FLOW ROUTE
	WATER VALVE		SILT FENCE BARRIER
	WATER METER		STRAW BALE CHECK DAM
	REMOTE WATER METER		MUD MAT

FOR REVIEW ONLY
NOT FOR CONSTRUCTION

No.	Revisions	Date
1	ISSUED FOR REVIEW	APR. 07, 2022

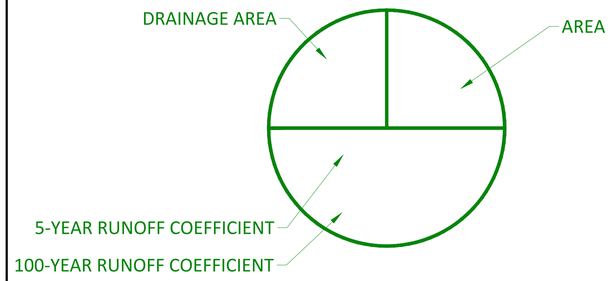
Check and verify all dimensions before proceeding with the work — Do not scale drawings

SCALE 1 : 150
0 5 10 15 Metres

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. THE CONTRACTOR IS TO OBTAIN AND PAY FOR ALL NECESSARY PERMITS AND APPROVALS FROM THE CITY BEFORE COMMENCING CONSTRUCTION.
3. THE CONTRACTOR IS RESPONSIBLE FOR ALL LAYOUT.
4. THE CONTRACTOR IS TO DETERMINE THE EXACT LOCATION, SIZE, MATERIAL AND ELEVATION OF ALL EXISTING UTILITIES PRIOR TO COMMENCING CONSTRUCTION. PROTECT AND ASSUME ALL RESPONSIBILITY FOR EXISTING UTILITIES WHETHER OR NOT SHOWN ON THESE DRAWINGS. IF THERE IS ANY DISCREPANCY THE CONTRACTOR IS TO NOTIFY THE ENGINEER PROMPTLY.
5. 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.
6. EXCAVATE AND DISPOSE OF ALL EXCESS EXCAVATED MATERIAL, SUCH AS ASPHALT, CURBING AND DEBRIS, OFF SITE AS DIRECTED BY THE ENGINEER AND THE CITY.
7. TOPSOIL TO BE STRIPPED AND STOCKPILED FOR REHABILITATION. CLEAN FILL TO BE PLACED IN FILL AREAS AND COMPACTED TO 95% STANDARD PROCTOR DENSITY.
8. ALL DISTURBED AREAS TO BE RESTORED TO ORIGINAL CONDITION OR BETTER UNLESS OTHERWISE SPECIFIED.
9. 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.
10. DO NOT ALTER GRADING OF THE SITE WITHOUT PRIOR APPROVAL OF THE ENGINEER/CITY.
11. ALL ROADWAY, PARKING LOT, AND GRADING WORKS TO BE UNDERTAKEN IN ACCORDANCE WITH CITY STANDARDS AND SPECIFICATIONS. THE CONTRACTOR IS TO PROVIDE POSITIVE DRAINAGE AWAY FROM THE BUILDING.
12. CONTACT THE CITY FOR INSPECTION OF ROUGH GRADING OF PARKING LOTS, ROADWAYS AND LANDSCAPED AREAS PRIOR TO PLACEMENT OF ASPHALT AND TOPSOIL. ALL DEFICIENCIES NOTED SHALL BE RECTIFIED TO THE CITY'S SATISFACTION PRIOR TO PLACEMENT OF ANY ASPHALT, TOPSOIL, SEED & MULCH AND/OR SOD.
13. ALL DIMENSIONS AND INVERTS MUST BE VERIFIED PRIOR TO CONSTRUCTION, IF THERE IS ANY DISCREPANCY THE CONTRACTOR IS TO NOTIFY THE ENGINEER PROMPTLY.
14. ELECTRICAL, GAS, TELEPHONE AND TELEVISION SERVICE LOCATIONS ARE SUBJECT TO THE INDIVIDUAL AGENCY:
    - ELECTRICAL SERVICE - HYDRO ONE,
    - GAS SERVICE - ENBRIDGE,
    - TELEPHONE SERVICE - BELL CANADA,
    - TELEVISION SERVICE - ROGERS.
16. INSTALLATION TO BE IN ACCORDANCE WITH CURRENT CODES AND STANDARDS OF APPROVAL AGENCIES HYDRO ONE, BELL AND THE CITY.
17. CONTRACTOR TO ENSURE ALL APPLICABLE OPS AND CITY STANDARD SPECIFICATIONS ARE FOLLOWED DURING CONSTRUCTION
18. ALL PROPOSED CURB TO BE CONCRETE BARRIER CURB UNLESS OTHERWISE SPECIFIED.

LEGEND:



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

Stamp: LICENSED PROFESSIONAL ENGINEER 22-0477 A. J GOSLING 100226726 2022-04-07 PROVINCE OF ONTARIO

Client:
GAVCAP PROPERTIES INC.
67 KINGSWAY CRESCENT
TORONTO, ON M8X 2R5

Project:
273-281 BELL STREET SOUTH

Drawing Title:
PRE-DEVELOPMENT DRAINAGE PLAN

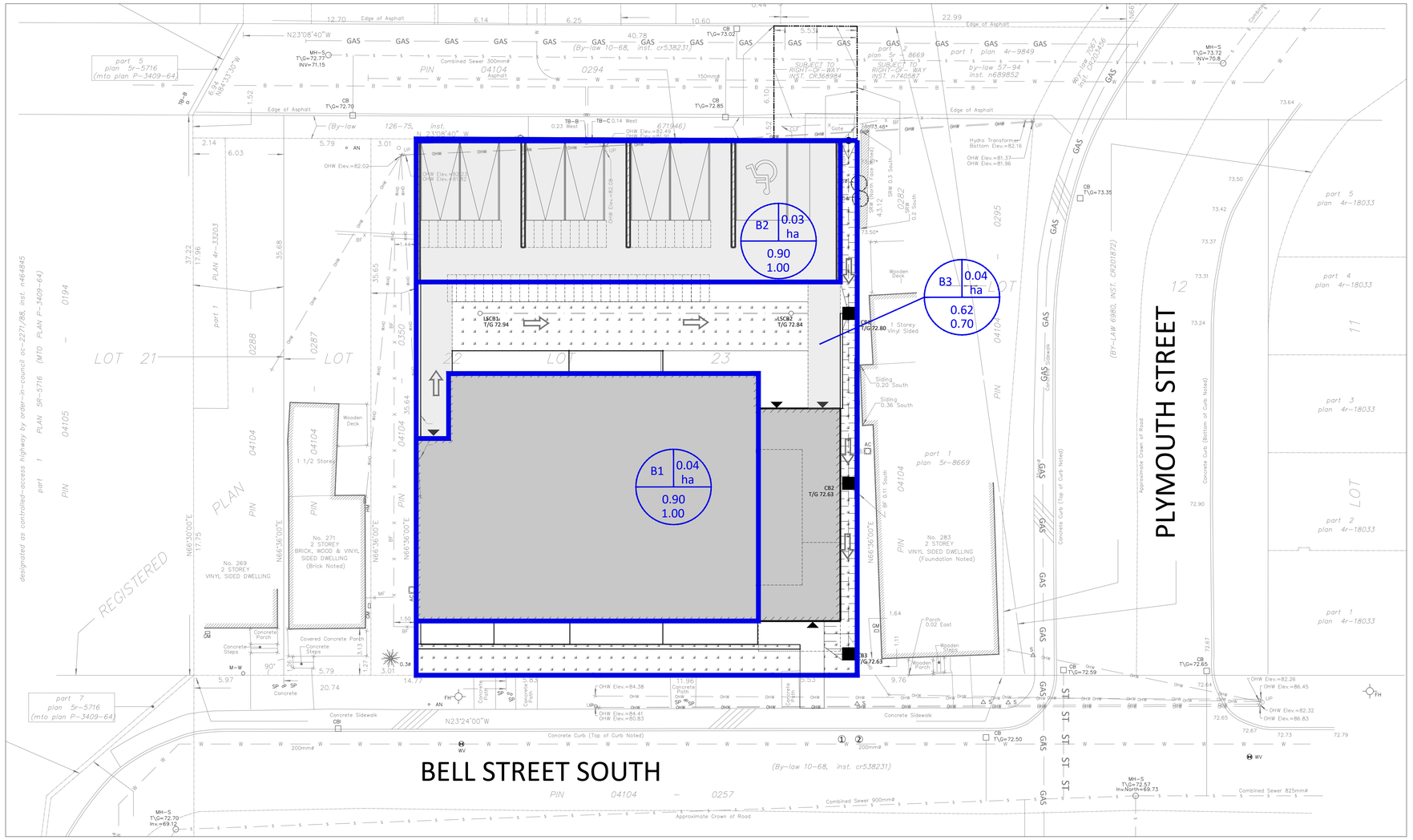
Scale:	1:150	Project Number:	CCO-22-0477
Drawn By:	FV		
Checked By:	AG	Drawing Number:	PRE
Designed By:			

D07-12-XX-XXXX
#XXXXX

FILENAME: L:\Ottawa\901 Project - Proposals\2022 Jobs\CCO\CCO-22-0477 Fr Haus_SPC_269-281 Bell Street\Civil\12 - Drawings\[CCO-22-0477_Presentation.dwg
LAST SAVED: Tuesday, April 05, 2022 LAST SAVED BY: F. Valenti
LAST PLOTTED: Thursday, April 07, 2022 [CTB FILE USED: ---

APPENDIX F
POST-DEVELOPMENT DRAINAGE PLAN

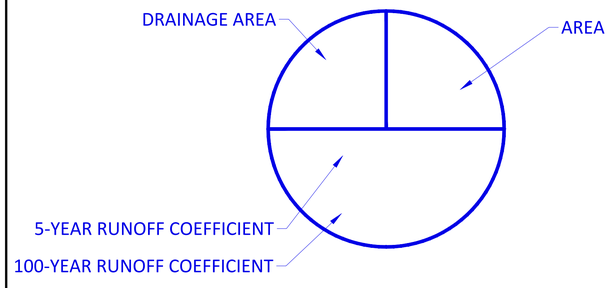
McINTOSH PERRY

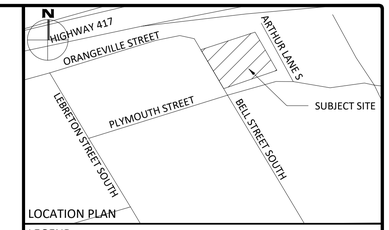


GENERAL NOTES

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. THE CONTRACTOR IS TO OBTAIN AND PAY FOR ALL NECESSARY PERMITS AND APPROVALS FROM THE CITY BEFORE COMMENCING CONSTRUCTION.
3. THE CONTRACTOR IS RESPONSIBLE FOR ALL LAYOUT.
4. THE CONTRACTOR IS TO DETERMINE THE EXACT LOCATION, SIZE, MATERIAL AND ELEVATION OF ALL EXISTING UTILITIES PRIOR TO COMMENCING CONSTRUCTION. PROTECT AND ASSUME ALL RESPONSIBILITY FOR EXISTING UTILITIES WHETHER OR NOT SHOWN ON THESE DRAWINGS. IF THERE IS ANY DISCREPANCY THE CONTRACTOR IS TO NOTIFY THE ENGINEER PROMPTLY.
5. 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.
6. EXCAVATE AND DISPOSE OF ALL EXCESS EXCAVATED MATERIAL, SUCH AS ASPHALT, CURBING AND DEBRIS, OFF SITE AS DIRECTED BY THE ENGINEER AND THE CITY.
7. TOPSOIL TO BE STRIPPED AND STOCKPILED FOR REHABILITATION. CLEAN FILL TO BE PLACED IN FILL AREAS AND COMPACTED TO 95% STANDARD PROCTOR DENSITY.
8. ALL DISTURBED AREAS TO BE RESTORED TO ORIGINAL CONDITION OR BETTER UNLESS OTHERWISE SPECIFIED.
9. 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.
10. DO NOT ALTER GRADING OF THE SITE WITHOUT PRIOR APPROVAL OF THE ENGINEER/CITY.
11. ALL ROADWAY, PARKING LOT, AND GRADING WORKS TO BE UNDERTAKEN IN ACCORDANCE WITH CITY STANDARDS AND SPECIFICATIONS. THE CONTRACTOR IS TO PROVIDE POSITIVE DRAINAGE AWAY FROM THE BUILDING.
12. CONTACT THE CITY FOR INSPECTION OF ROUGH GRADING OF PARKING LOTS, ROADWAYS AND LANDSCAPED AREAS PRIOR TO PLACEMENT OF ASPHALT AND TOPSOIL. ALL DEFICIENCIES NOTED SHALL BE RECTIFIED TO THE CITY'S SATISFACTION PRIOR TO PLACEMENT OF ANY ASPHALT, TOPSOIL, SEED & MULCH AND/OR SOD.
13. ALL DIMENSIONS AND INVERTS MUST BE VERIFIED PRIOR TO CONSTRUCTION, IF THERE IS ANY DISCREPANCY THE CONTRACTOR IS TO NOTIFY THE ENGINEER PROMPTLY.
14. ELECTRICAL, GAS, TELEPHONE AND TELEVISION SERVICE LOCATIONS ARE SUBJECT TO THE INDIVIDUAL AGENCY:
    - ELECTRICAL SERVICE - HYDRO ONE,
    - GAS SERVICE - ENBRIDGE,
    - TELEPHONE SERVICE - BELL CANADA,
    - TELEVISION SERVICE - ROGERS.
16. INSTALLATION TO BE IN ACCORDANCE WITH CURRENT CODES AND STANDARDS OF APPROVAL AGENCIES HYDRO ONE, BELL AND THE CITY.
17. CONTRACTOR TO ENSURE ALL APPLICABLE OPS AND CITY STANDARD SPECIFICATIONS ARE FOLLOWED DURING CONSTRUCTION
18. ALL PROPOSED CURB TO BE CONCRETE BARRIER CURB UNLESS OTHERWISE SPECIFIED.

LEGEND:





LOCATION PLAN

LEGEND

- CONCRETE BARRIER CURB
- CONCRETE WALKWAY
- PROPOSED ASPHALT
- LSCB# LANDSCAPING CATCHBASIN
- CBMH# T/G CATCHBASIN MANHOLE
- CB# T/G CATCHBASIN
- MH#A T/G SANITARY SEWER MANHOLE
- HYD B/F FIRE HYDRANT
- WATER VALVE
- WATER METER
- REMOTE WATER METER
- LIMIT OF CONSTRUCTION
- DRAINAGE SWALE
- DRAINAGE DITCH
- SLOPING AT 3:1 UNLESS SPECIFIED
- 95,50 SURFACE ELEVATION
- 95.50 (S) SWALE ELEVATION
- T/W 95.50 B/W 94.25 TOP OF WALL ELEVATION, BOTTOM OF WALL ELEVATION
- OVERLAND FLOW ROUTE
- SILT FENCE BARRIER
- STRAW BALE CHECK DAM
- MUD MAT

FOR REVIEW ONLY
NOT FOR CONSTRUCTION

No.	Revisions	Date
1	ISSUED FOR REVIEW	APR. 08, 2022

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

SCALE 1 : 150
0 5 10 15 Metres

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

Stamp: LICENSED PROFESSIONAL ENGINEER 32-0477 A.J GOSLING 100226726 2022-04-08 PROVINCE OF ONTARIO

Client:
GAVCAP PROPERTIES INC.
67 KINGSWAY CRESCENT
TORONTO, ON M8X 2R5

Project:
273-281 BELL STREET SOUTH

Drawing Title:
POST-DEVELOPMENT DRAINAGE PLAN

Scale:	1:150
Drawn By:	FV
Checked By:	AG
Designed By:	
Project Number:	CCO-22-0477
Drawing Number:	POST

D07-12-XX-XXXX
#XXXXX

FILENAME: I:\Ottawa\01 Project - Proposals\2022 Jobs\CCO\CCO-22-0477 R-Haul_SPC_269-281 Bell Street\Civil\12 - Drawings\CCO-22-0477_Presentation.dwg
LAST SAVED: Thursday, April 07, 2022 LAST SAVED BY: F.Valenti
LAST PLOTTED: Friday, April 08, 2022 CTB FILE USED: —

APPENDIX G
STORMWATER MANAGEMENT CALCULATIONS

McINTOSH PERRY

CCO-22-0477 - 273-281 Bell Street

Tc (min)	Intensity (mm/hr)		
	2-Year	5-Year	100-Year
10	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 (2/5-year)	Average C (100-year)
A1	558	0	484	0.57	0.65

Pre-Development Runoff Calculations

Drainage Area	Area (ha)	C 2/5-Year	C 100-Year	Tc (min)	Q (L/s)		
					2-Year	5-Year	100-Year
A1	0.10	0.57	0.65	10	12.78	17.34	33.69
Total	**0.10**				**12.78**	**17.34**	**33.69**

Post-Development Runoff Coefficient

Drainage Area	Impervious Area (m^2)	Gravel (m^2)	Pervious Area (m^2)	Average C (2/5-year)	Average C (100-year)	
B1	365	0	0	0.90	1.00	**Roof 1**
B2	264	0	0	0.90	1.00	**Roof 2**
B3	251	0	163	0.62	0.70	**Unrestricted**

Post-Development Runoff Calculations

Drainage Area	Area (ha)	C 2/5-Year	C 100-Year	Tc (min)	Q (L/s)		
					5-Year	100-Year	
B1	0.04	0.90	1.00	10	9.51	18.10	**Roof 1**
B2	0.03	0.90	1.00	10	6.88	13.10	**Roof 2**
B3	0.04	0.62	0.70	10	7.48	14.46	**Unrestricted**
Total	**0.10**				**23.87**	**45.67**	

Required Restricted Flow

Drainage Area	Area (ha)	C 2/5-Year	Tc (min)	Q (L/s)
				2-Year
B1+B2	0.06	0.50	10	6.71
B3	0.04	0.50	10	4.41

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	9.51	18.10	0.48	0.84	9.4	18.0	10.9	19.1
B2	6.88	13.10	0.42	0.78	6.4	12.1	6.9	12.9
Roof Total	**16.39**	**31.20**	**0.90**	**1.62**	**15.80**	**30.12**	**17.87**	**32.01**
B3	7.48	14.46	7.48	14.46				
Site Total	**23.87**	**45.67**	**8.38**	**16.08**	**15.80**	**30.12**	**17.87**	**32.01**

CCO-22-0477 - 273-281 Bell Street

Storage Requirements for Area B1

5-Year Storm Event

Tc (min)	I (mm/hr)	Runoff (L/s) B1	Allowable Outflow (L/s)	Runoff to be Stored (L/s)	Storage Required (m^3)
10	104.2	9.51	0.48	9.03	5.42
20	70.3	6.41	0.48	5.93	7.12
30	53.9	4.92	0.48	4.44	7.99
40	44.2	4.03	0.48	3.55	8.53
50	37.7	3.44	0.48	2.96	8.88
60	32.9	3.00	0.48	2.52	9.08
70	29.4	2.68	0.48	2.20	9.25
80	26.6	2.43	0.48	1.95	9.35
90	24.3	2.22	0.48	1.74	9.38
100	22.4	2.04	0.48	1.56	9.38
110	20.8	1.90	0.48	1.42	9.36

Maximum Storage Required 5-year =	9	m^3

100-Year Storm Event

Tc (min)	I (mm/hr)	Runoff (L/s) B1	Allowable Outflow (L/s)	Runoff to be Stored (L/s)	Storage Required (m^3)
10	178.6	18.11	0.84	17.27	10.36
20	120.0	12.17	0.84	11.33	13.59
30	91.9	9.32	0.84	8.48	15.26
40	75.1	7.61	0.84	6.77	16.26
50	64.0	6.49	0.84	5.65	16.94
60	55.9	5.67	0.84	4.83	17.38
70	49.8	5.05	0.84	4.21	17.68
80	45.0	4.56	0.84	3.72	17.87
90	41.1	4.17	0.84	3.33	17.96
100	37.9	3.84	0.84	3.00	18.01
110	35.2	3.57	0.84	2.73	18.01
120	32.9	3.34	0.84	2.50	17.97

Maximum Storage Required 100-year =	18	m^3

5-Year Storm Event Storage Summary

Roof Storage			
Location	Area*	Depth	Volume (m^3)
Roof	273.50	0.040	10.94

Storage Available (m^3) =	10.94
Storage Required (m^3) =	9.38

100-Year Storm Event Storage Summary

Roof Storage			
Location	Area*	Depth	Volume (m^3)
Roof	273.50	0.070	19.14

Storage Available (m^3) =	19.14
Storage Required (m^3) =	18.01

*Area is 75% of the total roof area

Roof Drain Flow (B1)

Roof Drains Summary		
Type of Control Device	Watts Drainage - Accutrol Weir	
Number of Roof Drains	1	
	5-Year	100-Year
Rooftop Storage (m^3)	10.94	19.14
Storage Depth (mm)	0.040	0.070
Flow (Per Roof Drain) (L/s)	0.48	0.84
Total Flow (L/s)	0.48	0.84

Flow Rate Vs. Build-Up (One Weir)	
Depth (mm)	Flow (L/s)
15	0.18
20	0.24
25	0.30
30	0.36
35	0.42
40	0.48
45	0.54
50	0.60
55	0.66

*Roof Drain model to be Accutrol Weirs, See attached sheets

*Roof Drain Flow information taken from Watts Drainage website

CALCULATING ROOF FLOW EXAMPLES

1 roof drain during a 5 year storm
elevation of water = 25mm
Flow leaving 1 roof drain = (1 x 0.30 L/s) = 0.30 L/s

1 roof drain during a 100 year storm
elevation of water = 50mm
Flow leaving 1 roof drain = (1 x 0.60 L/s) = 0.60 L/s

4 roof drains during a 5 year storm
elevation of water = 25mm
Flow leaving 4 roof drains = (4 x 0.30 L/s) = 1.20 L/s

4 roof drains during a 100 year storm
elevation of water = 50mm
Flow leaving 4 roof drains = (4 x 0.60 L/s) = 2.40 L/s

Roof Drain Flow		
Flow (l/s)	Storage Depth (mm)	Drains Flow (l/s)
0.18	15	0.18
0.24	20	0.24
0.30	25	0.30
0.36	30	0.36
0.42	35	0.42
0.48	**40**	**0.48**
0.54	45	0.54
0.60	50	0.60
0.66	55	0.66
0.72	60	0.72
0.78	65	0.78
0.84	**70**	**0.84**
0.90	75	0.90
0.96	80	0.96
1.02	85	1.02
1.08	90	1.08
1.14	95	1.14
1.20	100	1.20
1.26	105	1.26
1.32	110	1.32
1.38	115	1.38
1.44	120	1.44
1.50	125	1.50
1.56	130	1.56
1.62	135	1.62
1.68	140	1.68
1.74	145	1.74
1.80	150	1.80

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

CCO-22-0477 - 273-281 Bell Street

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	6.88	0.42	6.46	3.88
20	70.3	4.64	0.42	4.22	5.07
30	53.9	3.56	0.42	3.14	5.65
40	44.2	2.92	0.42	2.50	6.00
50	37.7	2.49	0.42	2.07	6.21
60	32.9	2.17	0.42	1.75	6.31
70	29.4	1.94	0.42	1.52	6.39
80	26.6	1.76	0.42	1.34	6.42
90	24.3	1.60	0.42	1.18	6.40
100	22.4	1.48	0.42	1.06	6.36

Maximum Storage Required 5-year =	6	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	13.11	0.78	12.33	7.40
20	120.0	8.81	0.78	8.03	9.63
30	91.9	6.74	0.78	5.96	10.73
40	75.1	5.51	0.78	4.73	11.35
50	64.0	4.70	0.78	3.92	11.75
60	55.9	4.10	0.78	3.32	11.96
70	49.8	3.65	0.78	2.87	12.07
80	45.0	3.30	0.78	2.52	12.11
90	41.1	3.02	0.78	2.24	12.07

Maximum Storage Required 100-year =	12	m^3

5-Year Storm Event Storage Summary

Roof Storage			
Location	Area*	Depth	Volume (m^3)
Roof	197.96	0.035	6.93

Storage Available (m^3) =	6.93
Storage Required (m^3) =	6.42

100-Year Storm Event Storage Summary

Roof Storage			
Location	Area*	Depth	Volume (m^3)
Roof	197.96	0.065	12.87

Storage Available (m^3) =	12.87
Storage Required (m^3) =	12.11

*Area is 75% of the total roof area

Roof Drain Flow (B2)

Roof Drains Summary		
Type of Control Device	Watts Drainage - Accutrol Weir	
Number of Roof Drains	1	
	5-Year	100-Year
Rooftop Storage (m^3)	6.93	12.87
Storage Depth (mm)	0.035	0.065
Flow (Per Roof Drain) (L/s)	0.42	0.78
Total Flow (L/s)	0.42	0.78

Flow Rate Vs. Build-Up (One Weir)	
Depth (mm)	Flow (L/s)
15	0.18
20	0.24
25	0.30
30	0.36
35	0.42
40	0.48
45	0.54
50	0.60
55	0.66

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

CALCULATING ROOF FLOW EXAMPLES

1 roof drain during a 5 year storm
elevation of water = 25mm
Flow leaving 1 roof drain = (1 x 0.30 L/s) = 0.30 L/s

1 roof drain during a 100 year storm
elevation of water = 50mm
Flow leaving 1 roof drain = (1 x 0.60 L/s) = 0.60 L/s

4 roof drains during a 5 year storm
elevation of water = 25mm
Flow leaving 4 roof drains = (4 x 0.30 L/s) = 1.20 L/s

4 roof drains during a 100 year storm
elevation of water = 50mm
Flow leaving 4 roof drains = (4 x 0.60 L/s) = 2.40 L/s

Roof Drain Flow		
Flow (l/s)	Storage Depth (mm)	Drains Flow (l/s)
0.18	15	0.18
0.24	20	0.24
0.30	25	0.30
0.36	30	0.36
0.42	**35**	**0.42**
0.48	40	0.48
0.54	45	0.54
0.60	50	0.60
0.66	55	0.66
0.72	60	0.72
0.78	**65**	**0.78**
0.84	70	0.84
0.90	75	0.90
0.96	80	0.96
1.02	85	1.02
1.08	90	1.08
1.14	95	1.14
1.20	100	1.20
1.26	105	1.26
1.32	110	1.32
1.38	115	1.38
1.44	120	1.44
1.50	125	1.50
1.56	130	1.56
1.62	135	1.62
1.68	140	1.68
1.74	145	1.74
1.80	150	1.80

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

Time of Concentration Pre-Development

Drainage Area ID	Sheet Flow Distance (m)	Slope of Land (%)	Tc (min) (5-Year)	Tc (min) (100-Year)
A1	**46**	**0.62**	9	6

Therefore, a Tc of 10 can be used

Tc= (3.26(1.1-c)L^0.5/S^0.33)

c = Balanced Runoff Coefficient

L = Length of drainage area

S = Average slope of watershed

STORM SEWER DESIGN SHEET

PROJECT: 273-281 Bell Street South
CLIENT: Gavcap Properties INC.

McINTOSH PERRY

LOCATION				CONTRIBUTING AREA (ha)				RATIONAL DESIGN FLOW							SEWER DATA						
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	19	20	21	22	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	SLOPE (%)	VELOCITY (m/s)	AVAIL CAP (5yr) (L/s)	(%)
Bell Street South	B1	Roof Drain	250mm STM	0.90	0.04	0.03	0.03	10.00	0.01	10.01	104.19	122.14	178.56	9.51	9.51	87.74	0.55	250	2.00	1.731	78.23	89.16%
Bell Street South	B2	Roof Drain	250mm STM	0.90	0.03	0.02	0.02	10.00	0.01	10.01	104.19	122.14	178.56	6.88	6.88	87.74	0.55	250	2.00	1.731	80.86	92.16%
Bell Street South	B3	LSCB1	LSCB2	0.62	0.04	0.03	0.03	10.00	0.40	10.40	104.19	122.14	178.56	7.42	7.42	43.87	20.67	250	0.50	0.866	36.44	83.08%
		LSCB2	CB1			0.00	0.03	10.40	0.07	10.47	102.14	119.72	175.00	7.28	7.28	44.74	3.84	250	0.52	0.883	37.46	83.73%
		CB1	CB2			0.00	0.03	10.47	0.10	10.57	101.77	119.29	174.37	7.25	7.25	94.09	11.28	250	2.30	1.857	86.83	92.29%
		CB2	CB3			0.00	0.08	10.57	0.10	10.67	101.27	118.70	173.50	23.14	23.14	93.88	11.34	250	2.29	1.853	70.74	75.35%
		CB3	EX. 900mm Combined Sewer				0.08	10.67	0.14	10.81	100.76	118.10	172.63	23.03	23.03	62.04	10.07	250	1.00	1.224	39.01	62.88%

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: AG

Project No.: CCO-22-0477

No.	Revision	Date
1.	Issued for Review	Apr. 07, 2022

Date: Apr. 07, 2022
Sheet No: 1 of 1

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: ○ Metric scale ○ North arrow (including construction North) ○ Key plan ○ Name and contact information of applicant and property owner ○ Property limits including bearings and dimensions ○ Existing and proposed structures and parking areas ○ Easements, road widening and rights-of-way ○ 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