SERVICING & STORMWATER MANAGEMENT REPORT
439 CHURCHILL AVENUE, OTTAWA

Building Perspective Prepared by Open Plan Architects Inc.

Project No.: CCO-21-3806

City File No.: D07-12-22-0074

Prepared for:

Grepault Developments
5882 Leitrim Road
Ottawa, Ontario
K0A 1K0

Prepared by:

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March 25th, 2022

Revised November 4th, 2022

McINTOSH PERRY

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1.0 PROJECT DESCRIPTION

1.1 Purpose

McIntosh Perry (MP) has been retained by Grepault Developments to prepare this Servicing and Stormwater Management Report in support of the Site Plan Control for the proposed development located at 439 Churchill Avenue 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-21-3806, C101 – Grading, Drainage, Erosion & Sediment Control Plan
- CCO-21-3806, C102 – Site Servicing Plan
- CCO-21-3806, PRE – Pre-Development Drainage Area Plan (*Appendix E*)
- CCO-21-3806, 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 439 Churchill Avenue within the Kitchissippi Ward. The site covers approximately *0.05 ha* and is located along Churchill Avenue between Byron Avenue and Melbourne Avenue. The site is zoned for Mixed Use/Commercial use (LC1). See Site Location Plan in *Appendix A* for more details.

1.3 Proposed Development and Statistics

The proposed development consists of a 3-storey residential building addition to the existing commercial building. In addition, residential units are proposed as a 3-storey floor above the commercial space. The building will contain *4* residential units and *0.02 ha* of commercial space. The asphalt drive is proposed to be replaced as part of the development. Refer to *Site Plan* prepared by Open Plan Architects Inc in *Appendix B* for further details.

1.4 Existing Conditions and Infrastructures

The site currently contains a 2-storey detached building containing commercial units and a drive aisle along the northern property line. The site currently slopes from the property line along Churchill Avenue to the north-east corner of the site.

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):

- Churchill Avenue
  - 406 mm diameter PVC watermain,
  - 250 mm diameter PVC sanitary sewer tributary to the West Nepean Trunk collector sewer, and
  - A 375 mm diameter PVC storm sewer tributary to the Ottawa River approximately 1.95 km downstream.

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 required for the development since the development is located on one parcel of land, does not propose industrial usage, and is not located within a combined sewershed. 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 (96-21) of the site was completed by Farley, Smith & Denis Surveying Ltd and dated March 25th, 2021.

The Site Plan (A000) was prepared by Open Plan Architects and dated August 8th, 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 January 27th, 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 rooftop to the 2-year pre-development flows with a combined C value to a maximum of 0.50 based on correspondence with City dated March 18th, 2022.
- Quality controls are not required for this site due to the development design, as per RVCA requirements.

4.0 WATERMAIN

4.1 Existing Watermain

There is an existing 406 mm diameter PVC watermain within Churchill Avenue. 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 Churchill Avenue that is available to service the development.

Based on the Novatech design drawing (Contract ISD13-5003), there are two water services connected between the existing building and the 406 mm diameter municipal watermain within Churchill Avenue. A site visit confirmed that the service laterals have a diameter of 50 mm.

4.2 Proposed Watermain

It is proposed to service the proposed building addition through the existing building. The existing service laterals are adequately sized to accommodate the development. A mechanical consultant will need to review and confirm whether upgrades to the existing building are required to accommodate the addition.

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	0.106 ha
Residential	280 L/day/person
Residential Apartment – 2 Bedroom	2.1 person/unit
Max Day Peaking Factor - Residential	9.5 x avg. day
Peak Hour Peaking Factor - Residential	14.3 x avg. day
Commercial Space	28,000 L/gross ha/day
Max Day Peaking Factor - Commercial	1.5 x avg. day
Peak Hour Peaking Factor - Commercial	1.8 x avg. day

The water analysis results have been summarized in *Table 2*, below. The fire flow demand accounted for both the existing above-ground floor area and the proposed area.

Table 2: Summary of Estimated Water Demand

Design Parameter	Total Flow (L/s) Proposed
Average Daily Demand	0.04
Max Day Demand	0.29
Max Day Demand + FUS (233.33 L/s)	233.62
Max Day Demand + OBC (60 L/s)	60.29
Peak Hour Demand	0.44

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 – Combustible
- Sprinkler Protection – Non-Sprinklered System

The results of the calculations yielded a required fire flow of *14,000 L/min* (233.3 L/s) using the FUS method and *3,600 L/min* (60 L/s) using the OBC method. The detailed calculations for the FUS and OBC 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

Scenario	Proposed Demands (L/s)	Connection 1 HGL (m H_2O)*/kPa
Average Day Demand	0.04	39.2 / 384.6
Maximum Daily + Fire Flow Demand	233.62	33.4 / 327.7
Peak Hourly Demand	0.44	33.1 / 324.7
**Adjusted for an estimated ground elevation of 78.0m above the connection point.*		

The normal operating pressure range is anticipated to be 325 kPa to 385 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, 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. A hydrant summary can be found in *Table 4*, below. Refer to *Appendix C* for a Hydrant Coverage Figure.

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.)
439 Churchill Ave	14,000 (FUS) 3,600 (OBC)	1 public	3 public	17,100

5.0 SANITARY DESIGN

5.1 Existing Sanitary Sewer

There is an existing 250 mm diameter sanitary sewer within Churchill Avenue, fronting the subject site. The subject site currently contributes wastewater to the Churchill Avenue sewer system tributary to the West Nepean trunk sewer.

A CCTV inspection of the existing sanitary service was completed by Aqua Drain on February 21st, 2021. The inspection indicated that the existing lateral transitions from a 100 mm to a 150 mm service and was constructed of CI, VCT, and PVC. Refer to *Appendix D* for inspection report.

5.2 Proposed Sanitary Sewer

It is proposed to service the proposed building addition through the existing building. Per Aqua Drains' recommendations, a cast-in-place lateral liner should be installed to fix existing cracks and protect the lateral from root infiltration. A mechanical consultant will need to review and confirm whether upgrades to the existing building are required to accommodate the addition.

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

Table 5: Sanitary Design Criteria

Design Parameter	Value
Site Area	0.05 ha
Residential	280 L/person/day
2 Bedroom Apartment	2.1 persons/unit
Commercial Space	28,000 L/gross ha/day
Residential Peaking Factor	3.74
Commercial Peaking Factor	1.5
Extraneous Flow Allowance	0.33 L/s/ha

Table 6, below, summarizes the estimated wastewater flow from the proposed development. Refer to *Appendix D* for detailed calculations.

Table 6: Summary of Estimated Sanitary Flow

Design Parameter	Total Flow (L/s)
Total Estimated Average Dry Weather Flow	0.04
Total Estimated Peak Dry Weather Flow	0.12
Total Estimated Peak Wet Weather Flow	0.14

The CCTV inspection indicates that there is a positive slope from the building towards the City sewer. The full flowing capacity of a 150 mm diameter service at an assumed 0.1% slope is estimated to be *4.8 L/s* and at an assumed 1% slope is *15.2 L/s*. Per *Table 6*, a peak wet weather flow of *0.14 L/s* will be conveyed within the 150 mm diameter service, therefore, the existing system is expected to be adequately sized for the development.

6.0 STORM SEWER DESIGN

6.1 Existing Storm Sewers

Stormwater runoff from the site is currently tributary to the Ottawa River within the Ottawa Central sub-watershed. There is an existing 375 mm diameter storm sewer within Churchill Avenue that is available to service the site. The existing sewer is tributary to the Ottawa River approximately 1.95 km downstream (outlet ID OUT16599).

6.2 Proposed Storm Sewers

A new 200 mm diameter storm service is proposed to be extended from 375 mm storm sewer within Churchill Avenue to the rear of the site. Refer to drawing *C102* for a detailed servicing layout.

Runoff collected on the roof of the proposed building addition will be stored and controlled internally using four roof drains. 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 drainage is proposed be pumped to the surface (design by others).

See CCO-21-3806 - *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 and the RVCA:

Quality Control

- Based on coordination with the RVCA, quality controls are not required for this site. Refer to *Appendix B* for pre-consultation with the RVCA.

Quantity Control

- Any storm events greater than 5 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 for the rooftop area only, 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 7*. See CCO-21-3806 - *PRE* in *Appendix E* and *Appendix G* for calculations.

Table 7: Pre-Development Runoff Summary

Drainage Area	Area (ha)	Q (L/s)	
		5-Year	100-Year
A1	0.05	11.56	22.05

7.4 Post-Development Drainage

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

Based on the criteria listed in *Section 7.2.1*, the development will be required to restrict flow on the rooftop to the 2-year storm event. It is estimated that the target release rate during the 100-year event will be *2.38 L/s*.

The proposed site drainage limits are demonstrated on the Post-Development Drainage Area Plan. See CCO-21-3806 - *POST* in *Appendix F* of this report for more details. A summary of the post-development runoff calculations can be found below.

Table 8: 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	0.01	0.60	0.96	2.90	3.02
B2	0.01	0.60	1.08	3.68	4.13
B3	0.02	2.51	9.29	-	-
Total	0.05	3.71	11.33	6.58	7.15

Runoff for area B1 will be stored on the roof of the existing building and restricted using two Watts Accutrol roof drains (or equivalent product) to a maximum release rate of *0.96 L/s* and will provide up to *3.02 m^3* of storage.

Runoff for area B2 will be stored on the roof of the proposed building addition and restricted using two Watts Accutrol roof drains (or equivalent product) to a maximum release rate of *1.08 L/s* and will provide up to *4.13 m^3* of storage.

Foundation drainage is proposed to be pumped to the surface (design by others).

Runoff for area B3 will be unrestricted, based on coordination with City staff.

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 is 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 3-storey addition to the existing building and 3-storey building addition is proposed to be constructed at 439 Churchill Avenue. The *Site Plan* proposes 4 units to the existing 2 commercial units, with street access from Churchill Avenue.
- The FUS method estimated fire flow indicated that *14,000 L/min* is required for the proposed development.
- The development is estimated to have a combined peak wet weather flow of *0.14 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 *2.38 L/s* for the rooftop.
- To meet the stormwater objectives the development will contain *7.15 m^3* of rooftop storage for flow attenuation;
- The proposed release rate during the 100-year storm is *11.33 L/s*, a reduction of 49% from existing conditions; and
- Quality controls are not required for this site as the development 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 439 Churchill Avenue North.

This report is respectfully being submitted for approval.

Regards,

McIntosh Perry Consulting Engineers Ltd.

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11.0 STATEMENT OF LIMITATIONS

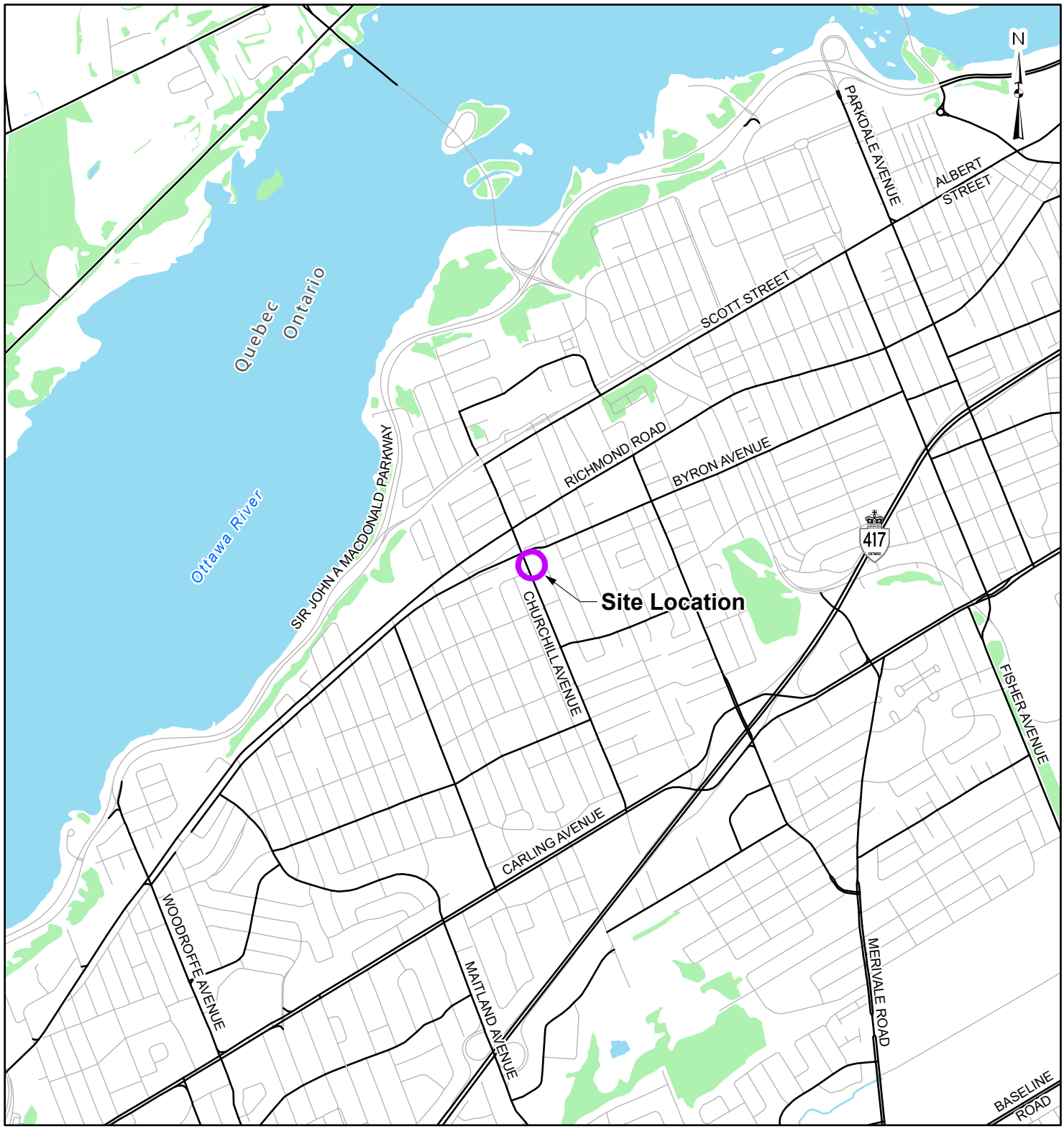
This report was produced for the exclusive use of Grepault Developments Ltd. The purpose of the report is to assess the existing stormwater management system and provide recommendations and designs for the post-construction scenario that are in compliance with the guidelines and standards from the Ministry 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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LEGEND

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

REFERENCE

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

CLIENT: GREPAULT DEVELOPMENTS LTD.

PROJECT: 439 CHURCHILL AVE, OTTAWA, ON

TITLE: SITE LOCATION

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APPENDIX B
BACKGROUND DOCUMENTS

McINTOSH PERRY

Site Plan Control Pre-consultation

439 Churchill Avenue N

Applicant: Olivia Gauthier
Owner: Hartman Management Corporation
Meeting Date: January 27, 2021

Attendees: **Applicant Team**
Olivia Gauthier, 2B Developments
Isabel Depault, Owner

City of Ottawa
Kimberley Baldwin, Planner
Randolph Wang, Urban Designer
Fawzi Mohammed, Engineer
Mark Richardson, Forester
Shukufa Sultonmamad, Planning Assistant

Meeting Notes & Comments

*Proposal***:** Proposed 4-storey mixed-use development, that will contain 4 residential units and two commercial units. The development will consist of a third-floor addition to existing two-storey building that will contain 1 residential unit and a 4 storey rear addition that will contain 3 residential units. The two commercial units in the existing building will remain. Existing detached garage to be removed. Four parking spaces are proposed in the rear yard.

Planning Comments – Kimberley Baldwin

Planning Policy

- OP - General Urban Area - focus is on development that is compatible with the surrounding neighbourhood.
- No Secondary Plan or CDP

*Zoning***:**

- LC(772)
- Proposal currently requires several variances from the bylaw:
    - Minimum interior side yard setback: 5m for a mixed residential / non-residential use building, from that portion of a lot line abutting a residential zone (Note: adjacent property to the north is zoned residential). Plans are currently showing a 1.2m side yard (2.5 for existing and 1.2 for the addition)
    - Minimum Rear yard setback: 7.5m. We have concerns with a proposed rear yard setback of 6m. Intent of the required rear yard setback in the underlying zoning is to minimize undesirable impacts on existing/planned amenity spaces of adjacent residential areas.

- the proposed balconies on the north and east façades may cause overlook into adjacent residential properties. For a lot of this depth, we discourage balconies that project into the rear yards or into side yards that abut rear yards of adjacent residential properties.
- Consider alternate floor plan that allows for the rear staircase to be internalized within the building, rather than projecting into the rear yard.
- Building height: what is the proposed building height? Dimensions not provided on concept plans. Max height in zoning is 12.5m
- Landscape buffer abutting residential zone: Minimum 3m
- All storage must be contained within a building - In your site plan submission, please provide architectural details of what that waste storage building will look like. Better yet, it would be ideal to have this storage area designed into the main building, rather than as an accessory structure.
- Parking - concerns with the proposed parking layout and functionality
    - vehicles reversing for a long distance from parking spots to the street. Churchill is a busy street with a cycle track. Vehicles should be entering and existing the site in a forward motion for the safety of pedestrians, cyclists and vehicles along Churchill.
    - Both existing driveways are narrow (2.5m) - Could present challenges if the adjacent sites to the south is ever redeveloped.
    - Demolishing a garage and establishing a parking lot (a surface parking area comprised of 4 or more spaces) – Review Zoning Bylaw Provisions for parking lots. Eg. Section 107 – Aisle and Driveway Provisions and Section 110– Landscaping Provisions for Parking Lots will now apply.
- Floor Plans are incomplete - in your next submission, please clearly label all the interior spaces as either commercial or residential. What is proposed for the basement?
- Removing door on the front façade? Preference would be to see the two doors remain, especially if two commercial uses continue to exist.
- Bicycle parking - show where bicycle parking will be provided for each use. Ideally 1 dedicated bicycle space for each unit, since the property is located in a neighbourhood where extensive cycling networks are available.
- Summary - Please reconsider the built form, location of stairs and balconies, rear yard landscaping, waste storage areas, and parking layout prior to filing a site plan application.

Urban Design Comments- Randolph Wang

- A Design Brief is required as part of the Site Plan Control application submission and a scoped Design Brief is required for a rezoning application. The Terms of Reference of the Design Brief is attached for convenience.
- It is extremely important to conduct a careful study of the following as indicated in the Design Brief Terms of Reference:
    - The relationship with the approved development at 435 Churchill.
    - The relationship with any potential development at the remaining lots along Churchill zoned LC.
    - The relationship with the properties on the east side of the rear yard fence.
    - The front yard condition along Churchill, including what has been contemplated in the approved development at 435 Churchill and what might be ideal to support existing and future businesses and residents along Churchill.
- With respect to the design presented at the meeting, please consider the following:
    - A more formal and enlarged lobby for the commercial units.
    - A double door (associated with the enlarged lobby).
    - Size and location of the two third floor windows on the Churchill façade to streamline the overall design (three different windows on a small façade may be a little bit too busy).
    - Removal of the north-facing balcony on the third floor to avoid conflict with the approved building at 435 Churchill.
    - Retaining the brick façades of the existing building. If only the Churchill façade is retained, please make sure sufficient brick returns on the south and north facades.

    - Improved front yard condition that is streamlined with the approved development at 435 Churchill. If possible, please introduce a street tree.
    - Installation of bike racks.
- Hope these are helpful. If you have any questions about these comments, please feel free to reach out.

Forester Comments – Mark Richardson

- If there are trees on site or on adjacent sites that may be damaged by the development, a Tree Conservation Report (TCR) must be supplied along with the suite of other plans/reports required by the City
    - An approved TCR is a requirement of Site Plan approval.
    - The TCR may be combined with the Landscape Plan
- As of January 1 2021, any removal of privately or publicly (City) owned trees 10cm or larger in 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.
- The Planning Forester from Planning and Growth Management as well as foresters from Forestry Services will review the submitted TCR.
    - If tree removal is required, both municipal and privately-owned trees will be addressed in a single permit issued through the Planning Forester.
- The TCR must list all trees on site by species, diameter and health condition.
- The TCR must list all trees on adjacent sites if they have a critical root zone that extends onto the development site.
- If trees are to be removed, the TCR must clearly show where they are, and document the reason they cannot be retained.
- 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 listed on Ottawa.ca.
    - securities may be required for retained trees.
    - the location of tree protection fencing must be shown on a plan.
    - show the critical root zone of the retained trees.
    - if excavation will occur within the critical root zone, please show the limits of excavation.
- The City encourages the retention of healthy trees; please seek opportunities where possible for the 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

Engineering Comments- Mohammed Fawzi

Available Infrastructure:

Churchill Avenue:
Sanitary: 250mm PVC (Install 2013)
Storm: 375mm PVC (Install 2013)
Water: 400mm PVC (Install 2014)

Water Boundary Conditions:

Will be provided at request of consultant. Requests must include the location of the service and the expected loads required by the proposed development. Please provide the following and submit Fire Flow Calculation Sheet per FUS method with the request:

- Location of service
- Type of development and amount of required fire flow (per FUS method – include FUS calculation sheet with request)
- Average Daily Demand (l/s)
- Maximum Hourly Demand (l/s)
- Maximum Daily Demand (l/s)
- Water Supply Redundancy – Fire Flow:
  Applicant to ensure that a second service with an inline valve chamber be provided where the average daily demand exceeds 50 m^3 / day (0.5787 l/s per day)

Water services larger than 19 mm require a Water Data Card. Please complete card and submit.

Stormwater Management (Quantity Control):

- Coefficient (C) of runoff determined as per existing conditions but in no case more than 0.5.
- TC = To be calculated, minimum 10 minutes
- Any storm events greater than 5 year, up to 100 year, and including 100-year storm event must be detained on site.
- Foundation drains are to be independently connected to sewer main unless being pumped with appropriate back up power, sufficient sized pump and back flow prevention.
- Roof drains are to be connected downstream of any incorporated ICD within the SWM system.

Stormwater Management (Quality Control):

- Rideau Valley Conservation Authority to provide Quality Controls.

Noise Study:

- Noise study required – property fronts Major Collector road.

Phase I and Phase II ESA:

- Phase I ESA is required; Phase II ESA may be required depending on the results of the Phase I ESA. Phase I ESA must include an EcoLog ERIS Report.
- Phase I ESA and Phase II ESAs must conform to clause 4.8.4 of the Official Plan that requires that development applications conform to Ontario Regulation 153/04.
- Record of Site Condition needed due to increase in sensitive land use.

Required Studies

- Stormwater Management Report
- Site Servicing Study
- Geotechnical Study
- Phase I ESA
- Phase II ESA (depends on outcome of Phase I)
- Noise Study

Required Plans

- Site Servicing Plan
- Grade Control and Drainage Plan
- Erosion and Sediment Control Plan (Can be combined with Grading Plan)

Relevant information

1. The Servicing Study Guidelines for Development Applications are available at the following address: https://ottawa.ca/en/city-hall/planning-and-development/information-developers/development-application-review-process/development-application-submission/guide-preparing-studies-and-plans#servicing-study-guidelines-development-applications
2. Servicing and site works shall be in accordance with the following documents:
   - Ottawa Sewer Design Guidelines (October 2012)
   - 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 Park and Pathway Development Manual (2012)
   - City of Ottawa Accessibility Design Standards (2012)
   - Ottawa Standard Tender Documents (latest version)
   - Ontario Provincial Standards for Roads & Public Works (2013)
3. 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) 580-2424 x.44455).
4. Any proposed work in utility easements requires written consent of easement owner.
5. CCTV Report and Footage of sewer service laterals required if existing services ae to be reused.

Application Submission Information

Application Type: **Site Plan Control, Standard, Staff Approval (based on plans discussed at the teleconference meeting of January 27, 2021)**

For information on Site Plan Control Thresholds under the Site Plan Control By-law, please visit: https://documents.ottawa.ca/sites/documents/files/siteplan_thresholds_en.pdf

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

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

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

Application Submission Requirements

For information on the preparation of Studies and Plans and the City's Planning and Engineering requirements, please visit: https://ottawa.ca/en/city-hall/planning-and-development/information-

developers/development-application-review-process/development-application-submission/guide-preparing-studies-and-plans

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

All plans and drawings must be produced on A1-sized paper and folded to 21.6 cm x 27.9 cm (8½“x 11”).

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

Alison Gosling

From: Fawzi, Mohammed <mohammed.fawzi@ottawa.ca>
Sent: March 18, 2022 2:50 PM
To: Alison Gosling
Subject: RE: 21-3806 - 439 Churchill - SWM Questions

Follow Up Flag: Follow up
Flag Status: Completed

Hi Alison,

My apologies I confused the address with another on-going development, you can disregard my comment regarding the “next submission”.

The calculations looks good to me. As long as the roofs can be controlled to the 2-year, the remaining area can be left uncontrolled.

Best Regards,

Mohammed Fawzi, E.I.T.
Project Manager
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 20120, Mohammed.Fawzi@ottawa.ca

Please note that due to the current situation, I am working remotely. Email is currently the best way to contact me

---

From: Fawzi, Mohammed
Sent: March 18, 2022 2:47 PM
To: Alison Gosling <a.gosling@mcintoshperry.com>
Subject: RE: 21-3806 - 439 Churchill - SWM Questions

Hi Alison,

Looks good to me!

I can take a detailed look once pre/post drainage plans are available…I’m assuming at the next submission.

Thank Alison and have a great weekend.

Best Regards,

Mohammed Fawzi, E.I.T.
Project Manager
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 20120, Mohammed.Fawzi@ottawa.ca

Please note that due to the current situation, I am working remotely. Email is currently the best way to contact me

---

From: Alison Gosling <a.gosling@mcintoshperry.com>
Sent: March 16, 2022 4:21 PM
To: Fawzi, Mohammed <mohammed.fawzi@ottawa.ca>
Subject: RE: 21-3806 - 439 Churchill - SWM Questions

Hi Mohammed,

Controlling the roof areas to a 2 year release rate of 2.38 L/s is possible (Area B1 & B2). Adding in the uncontrolled areas around the site (Area B3), the post-development will reduce stormwater runoff by 49% from existing conditions. Stormwater calculations are attached for your reference.

Please let me know if you have any questions.

Thank you,

Alison Gosling, P.Eng.
Project Engineer, Land Development
T. 613.714.4629
a.gosling@mcintoshperry.com | www.mcintoshperry.com
McINTOSH PERRY
Turning Possibilities Into Reality

From: Alison Gosling <a.gosling@mcintoshperry.com>
Sent: March 14, 2022 8:33 AM

To: Fawzi, Mohammed <mohammed.fawzi@ottawa.ca>
Subject: RE: 21-3806 - 439 Churchill - SWM Questions

Hi Mohammed,

Absolutely. Feel free to discuss with the stormwater modelling group as well.

We will do a check of the SWM with just the roof area controlled to the 2 year, as noted below.

Thank you,

Alison Gosling, P.Eng.
Project Engineer, Land Development
T. 613.714.4629
a.gosling@mcintoshperry.com | www.mcintoshperry.com
McINTOSH PERRY
Turning Possibilities Into Reality

From: Fawzi, Mohammed <mohammed.fawzi@ottawa.ca>
Sent: March 11, 2022 2:31 PM
To: Alison Gosling <a.gosling@mcintoshperry.com>
Subject: RE: 21-3806 - 439 Churchill - SWM Questions

Hi Alison,

I'll have to look into the matter of providing you with the grading plan for 440 Highcroft a little further as it may not be permissible for me to do so. I'll get back to you on that.

In regards to the stormwater management question:

The roofs (assuming they are flat) can be controlled to the 2 year rate based on C=0.5, if possible. Surface drainage can be excluded from stormwater management.

Hope this helps. Thanks Alison.

Best Regards,

Mohammed Fawzi, E.I.T.
Project Manager
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 20120, Mohammed.Fawzi@ottawa.ca

Please note that due to the current situation, I am working remotely. Email is currently the best way to contact me

From: Alison Gosling <a.gosling@mcintoshperry.com>
Sent: March 09, 2022 1:12 PM
To: Fawzi, Mohammed <mohammed.fawzi@ottawa.ca>
Subject: 21-3806 - 439 Churchill - SWM Questions

Good afternoon Mohammed,

We wanted to touch base with you regarding the development at 439 Churchill and associated grading and stormwater management.

There appears to be a development approval north of the site and a development under construction east of the site. The development applications were found for 435 Churchill. Would you be able to provide the grading design for 440 Highcroft? We would like to coordinate grading along the property line.

The second question is related to the stormwater management. Based on the site size, the target release rate for the site is quite small – 6.72 L/s. The stormwater management system employs rooftop storage, which provides a restriction up to 1.32 L/s. It is estimated that the remainder of the site (driveway and rear yard) would exceed the target release rate by 5.45 L/s (12.17 L/s total including rooftop attenuation).

In order to meet the target, the site would need to construct:

- Perimeter curbs and walls
- Surface storage and/or underground tank storage
- A low flow ICD, which would control water less then 6 L/s

In our experience, City staff often request larger sized ICDs to avoid nuisance ponding and ICD removal. We would like to request a slight increase to the overall site release rate from 6.72 L/s to 12.17 L/s. Based on the pre-development calculation, this would result in a decrease of 45% from existing conditions. A discussion can be added to the stormwater report to justify the reduction.

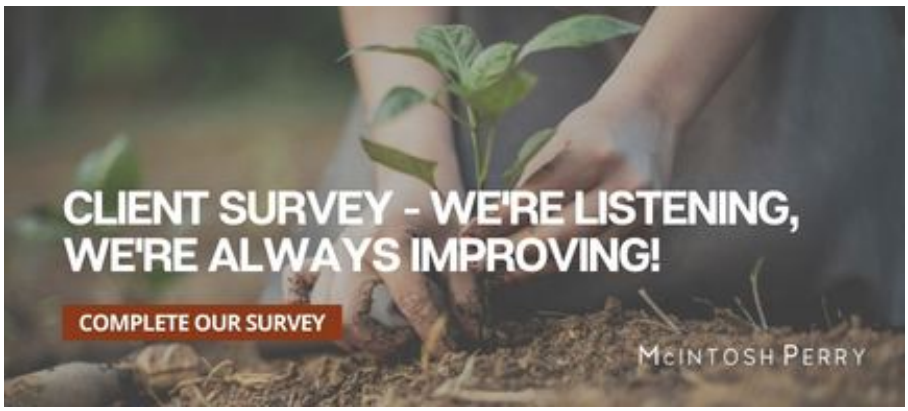
Please let me know if you would prefer to discuss over the phone or if you have any questions.

Thank you,

Alison Gosling, P.Eng.
Project Engineer, Land Development
T. 613.714.4629
a.gosling@mcintoshperry.com | www.mcintoshperry.com

McINTOSH PERRY

Turning Possibilities Into Reality



CANADA BEST MANAGED COMPANIES | Platinum member

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This e-mail originates from the City of Ottawa e-mail system. Any distribution, use or copying of this e-mail or the information it contains by other than the intended recipient(s) is unauthorized. Thank you.

Le présent courriel a été expédié par le système de courriels de la Ville d'Ottawa. Toute distribution, utilisation ou reproduction du courriel ou des renseignements qui s'y trouvent par une personne autre que son destinataire prévu est interdite. Je vous remercie de votre collaboration.

'

Alison Gosling

From: Eric Lalande <eric.lalande@rvca.ca>
Sent: March 7, 2022 2:36 PM
To: Francis Valenti
Cc: Alison Gosling
Subject: RE: 21-3806 - 439 Churchill Ave N - Quality Control Requirement

Follow Up Flag: Follow up
Flag Status: Completed

Hi Francis,

Based on the description provided, the RVCA does not have any further quality control requirements. The RVCA encourages best management practices to be integrated where possible as part of the overall site design.

Thank you,

Eric Lalande, MCIP, RPP
Planner, RVCA
613-692-3571 x1137

From: Francis Valenti <F.Valenti@McIntoshPerry.com>
Sent: Monday, March 7, 2022 1:48 PM
To: Eric Lalande <eric.lalande@rvca.ca>
Cc: Alison Gosling <a.gosling@mcintoshperry.com>
Subject: 21-3806 - 439 Churchill Ave N - Quality Control Requirement

Good afternoon,

We wanted to touch base with you regarding the development at 439 Churchill Avenue North.

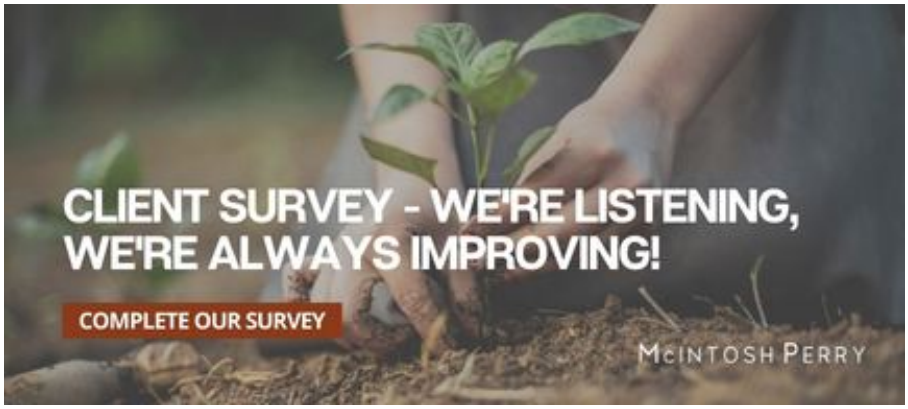
The development will consist of a third-floor single unit residential addition to the existing two-storey commercial building, and a 3-storey rear addition that will contain 3 residential units. Water from the existing building currently flows overland towards Highcroft Avenue. Water from the proposed development will be collected on site and conveyed to the 375mm diameter storm sewer within Churchill Avenue North. As shown in the attached figured, water will travel approximately 1.95km before discharging into the Ottawa River at Outlet #16599.

Due to the distance to the outlet, it is not anticipated that quality controls will be required for the proposed development. Can you please review and confirm?

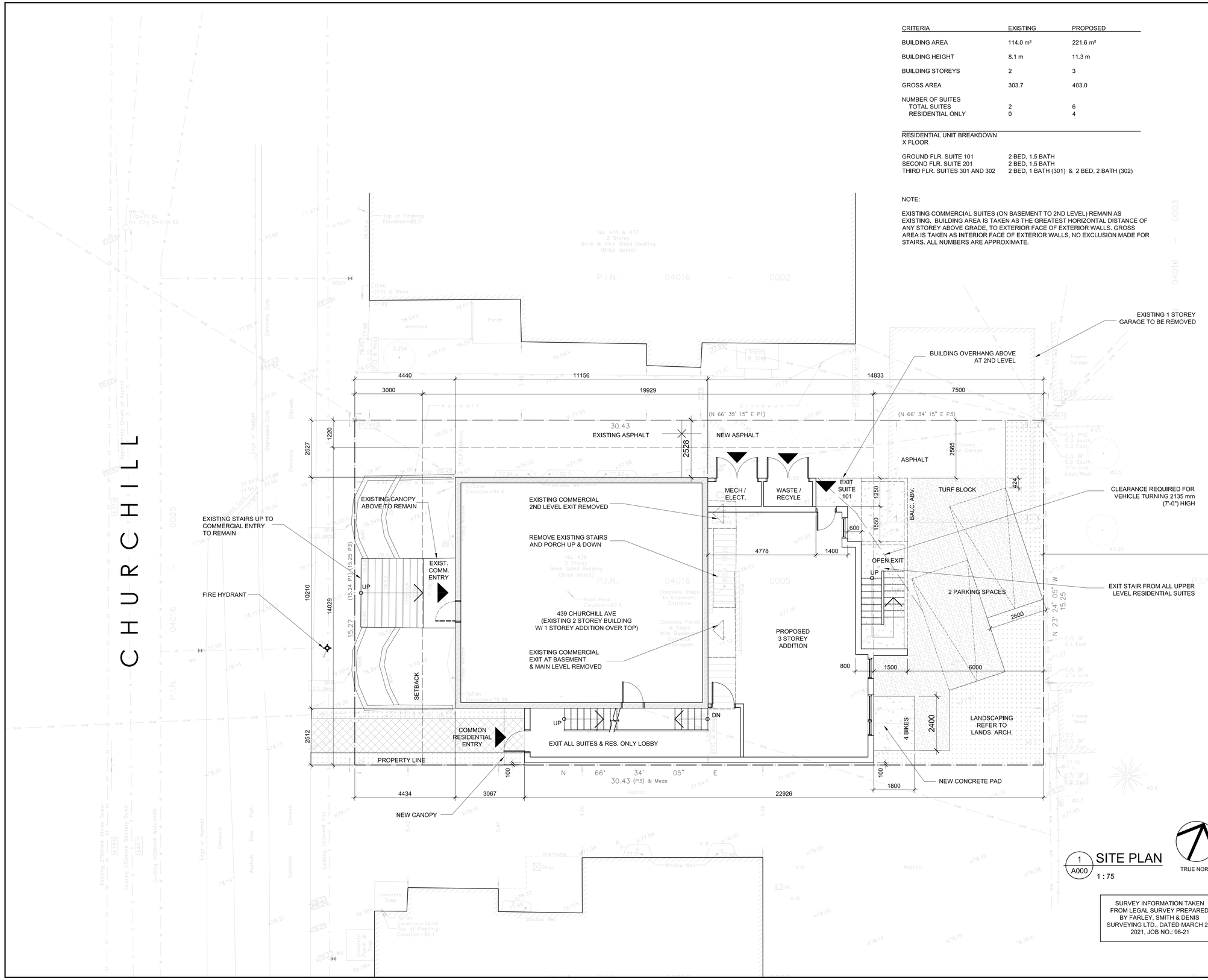
Thanks,

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

Turning Possibilities Into Reality



CANADA BEST MANAGED COMPANIES Platinum member



1 A000 SITE PLAN
1 : 75

TRUE NORTH

SURVEY INFORMATION TAKEN FROM LEGAL SURVEY PREPARED BY FARLEY, SMITH & DENIS SURVEYING LTD., DATED MARCH 25, 2021, JOB NO.: 96-21

CRITERIA	EXISTING	PROPOSED
BUILDING AREA	114.0 m²	221.6 m²
BUILDING HEIGHT	8.1 m	11.3 m
BUILDING STOREYS	2	3
GROSS AREA	303.7	403.0
NUMBER OF SUITES		
TOTAL SUITES	2	6
RESIDENTIAL ONLY	0	4

RESIDENTIAL UNIT BREAKDOWN
X FLOOR

GROUND FLR. SUITE 101	2 BED, 1.5 BATH
SECOND FLR. SUITE 201	2 BED, 1.5 BATH
THIRD FLR. SUITES 301 AND 302	2 BED, 1 BATH (301) & 2 BED, 2 BATH (302)

NOTE:

EXISTING COMMERCIAL SUITES (ON BASEMENT TO 2ND LEVEL) REMAIN AS EXISTING. BUILDING AREA IS TAKEN AS THE GREATEST HORIZONTAL DISTANCE OF ANY STOREY ABOVE GRADE, TO EXTERIOR FACE OF EXTERIOR WALLS. GROSS AREA IS TAKEN AS INTERIOR FACE OF EXTERIOR WALLS, NO EXCLUSION MADE FOR STAIRS. ALL NUMBERS ARE APPROXIMATE.

CLIENT :

Grepault Developments Ltd.
5882 Leitrim Road
Ottawa, ON K0A 1K0
613-818-9810

rev. / issue	description	date MM/DD/YY
02	ISSUED FOR CITY COMMENTS & COORDINATION	08 AUG. 2022
01	ISSUED FOR SITE PLAN CONTROL	12 APR. 2022

professional stamp

project north

Kristopher D. Benes, OAA, MRAIC, LEED AP

OPA open plan architects inc.
architecture | interiors | concepts

2305 HILLARY AVE. | OTTAWA | ON | K1H 7J2
613.883.5090 | info@openplan.ca

project

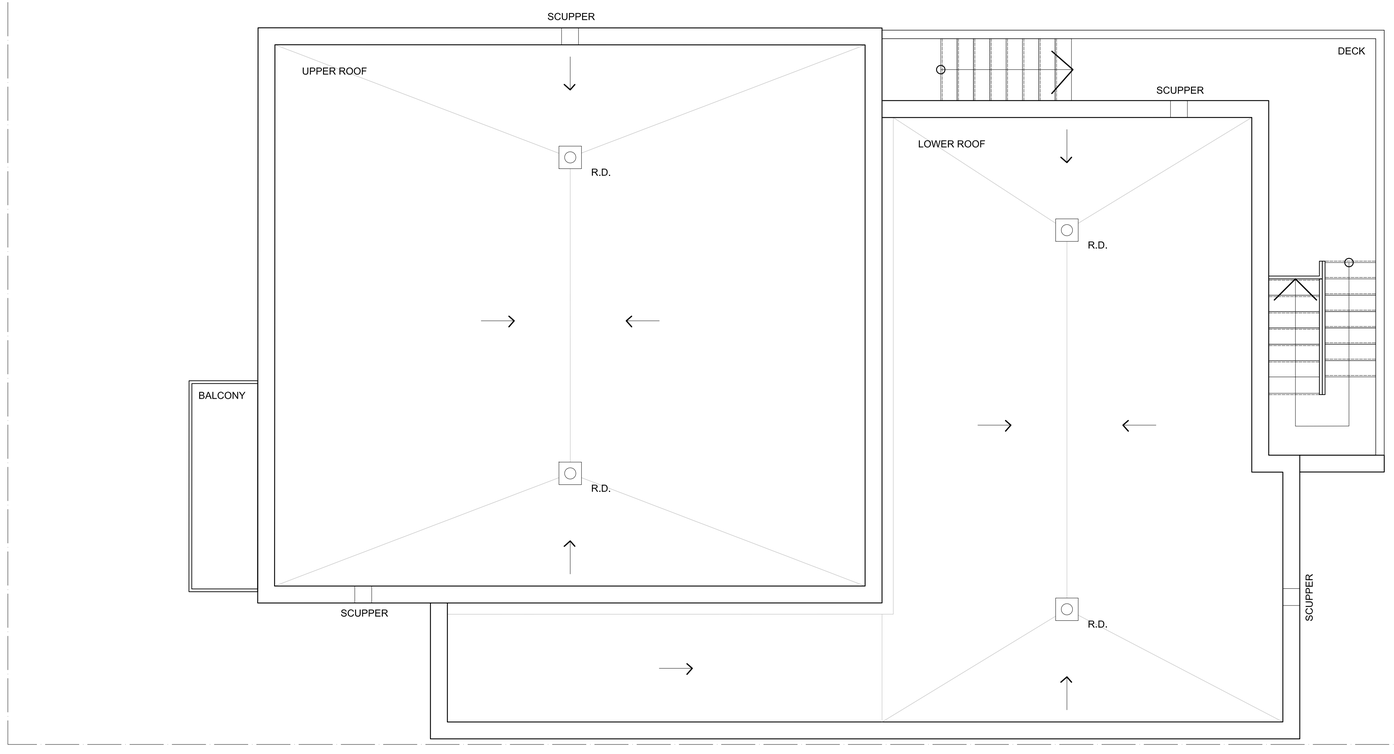
439 CHURCHILL AVENUE
ADDITION
OTTAWA, ON

drawing

SITE PLAN

drawn	KDB	date	AUGUST 2019
approved	KDB	revision	0
project no.	2117	scale	AS SHOWN
drawing no.	A000		

DWG# 18752 D07#



CLIENT :

Grepault Developments Ltd.
5882 Leitrim Road
Ottawa, ON K0A 1K0
613-818-9810

rev. / issue	description	date MM/DD/YY
01	ISSUED FOR COORDINATION	08 MAR. 2022

professional stamp

project north

Kristopher D. Benes, OAA, MRAIC, LEED AP

OPA open plan architects inc.
architecture | interiors | concepts

2305 HILLARY AVE. | OTTAWA | ON | K1H 7J2
613.883.5090 | info@openplan.ca

project

439 CHURCHILL AVENUE ADDITION
OTTAWA, ON

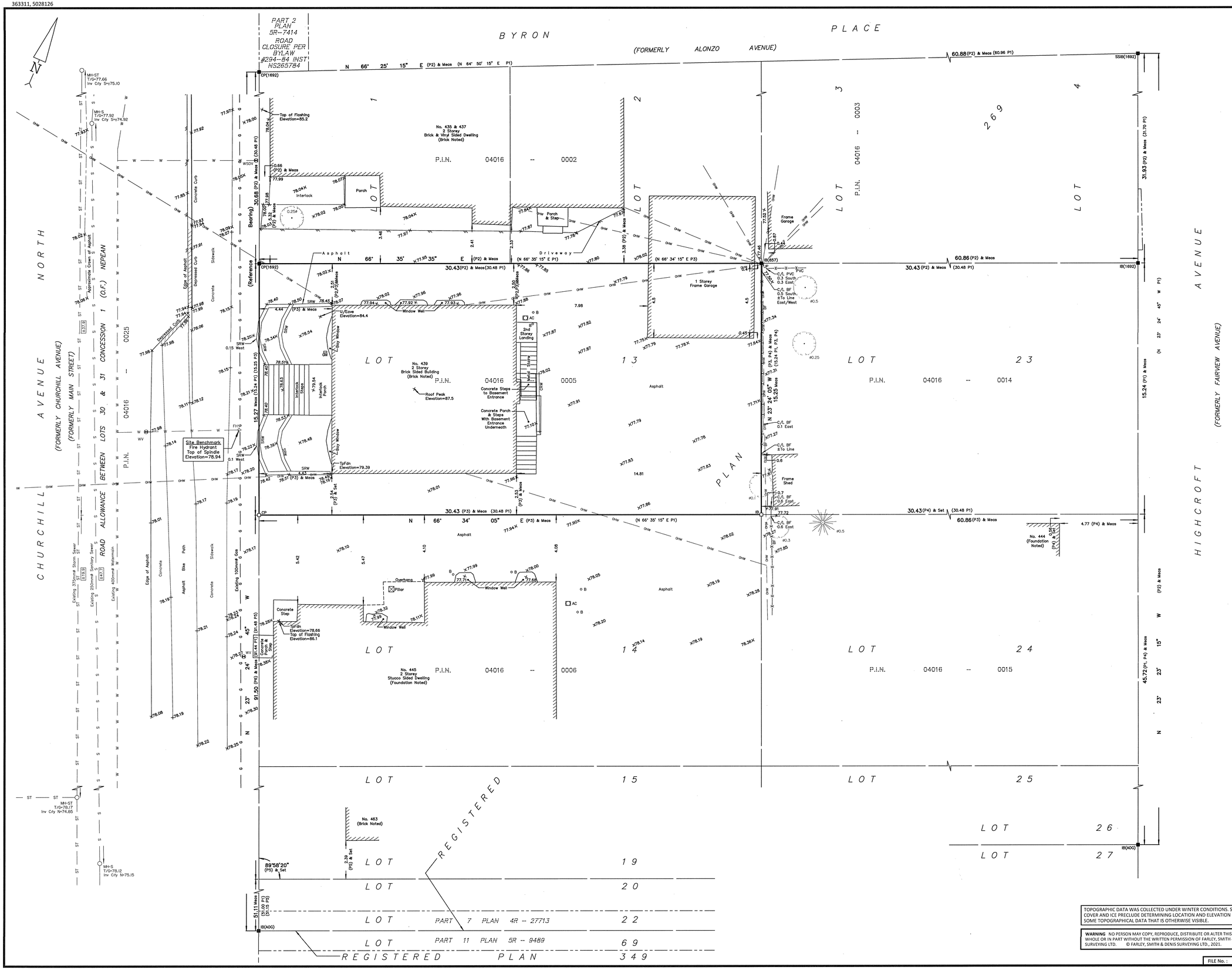
drawing

CONCEPTUAL ROOF PLAN

drawn	KDB	date	MARCH 2022
approved	KDB	revision	0
project no.	2117	scale	1 : 200

drawing no.

A103



TOPOGRAPHIC PLAN OF SURVEY OF

LOT 13
REGISTERED PLAN 269
CITY OF OTTAWA

FARLEY, SMITH & DENIS SURVEYING LTD. 2021

Scale 1: 100

0 2.5 5 7.5 10 metres

Metric Note
Distances and coordinates on this plan are in metres and can be converted to feet by dividing by 0.3048.

Distance Note
Distances shown on this plan are ground distances and can be converted to grid distances by multiplying by the combined scale factor of 0.99994.

Bearing Note
Bearings are MTM grid, referred to easterly limit of Churchill Avenue North, having a bearing of N 23°24'45" W as shown on plan by (1692) dated October 19, 2018 (File No. 432-18) and are referred to the Central Meridian of MTM Zone 9 (76°30' West Longitude) Nad-83 (Original).

For bearing comparisons, a rotation of 11°34'45" counter-clockwise was applied to bearings on P1.

For bearing comparisons, a rotation of 00°44'45" counter-clockwise was applied to bearings on P3 & P4.

Elevation Notes
1. Elevations shown are geodetic and are referred to Geodetic Datum CGVD-1928 :1978.
2. Elevations are derived from City of Ottawa benchmark monument No. N-11 Index No. 78 having a published elevation of 78.90 metres.
3. It is the responsibility of the user of this information to verify that the job benchmark has not been altered or disturbed and that it's relative elevation and description agrees with the information shown on this drawing.

Utility Notes
1. This drawing cannot be accepted as acknowledging all of the utilities and it will be the responsibility of the user to contact the respective utility authorities for confirmation.
2. Only visible surface utilities were located.
3. Underground utility data derived from City of Ottawa utility sheet reference: Sheets No. E-04-23, E-04-28, 15340p24, 15350p25, Plan no.1836 sheet 1 of 1, Plan no. 16858 sheets 29 and 30 of 111.
4. Sanitary and storm sewer grades and inverts were compiled from: Field measurement & City of Ottawa Utility Sheets.
5. A field location of underground plant by the pertinent utility authority is mandatory before any work involving breaking ground, probing, excavating etc.

Notes & Legend

	Denotes	
☐—	"	Survey Monument Planted
—■	"	Survey Monument Found
SIB	"	Standard Iron Bar
SSIB	"	Short Standard Iron Bar
IB	"	Iron Bar
CP	"	Concrete Pin
Meas	"	Measured
(P1)	"	Registered Plan 269
(P2)	"	Plan by (1692) dated October 19, 2018 (File No. 432-18)
(P3)	"	Plan by (AOG) dated November 22, 2005 (Job No. 6732-05-F)
(P4)	"	Plan by (AOG) dated June 23, 1999 (Dwg No. 3529J24)
(P5)	"	Plan by (1473) dated February 6, 2002 (Ref. No.8-269)
(P6)	"	Plan by (1319) dated December 20, 1990 (Ref. No. 6-269)
MH-ST	"	Maintenance Hole (Storm)
MH-S	"	Maintenance Hole (Sanitary)
ST	"	Underground Storm Sewer
S	"	Underground Sanitary Sewer
W	"	Underground Water
G	"	Underground Gas
OHW	"	Overhead Wires
UP	"	Utility Pole
FH	"	Fire Hydrant
WV	"	Water Valve
GM	"	Gas Meter
B	"	Bollard
AC	"	Air Conditioner
Ø	"	Diameter
BF	"	Board Fence
PVC	"	Plastic \ Vinyl Fence
SRW	"	Stone Retaining Wall
Inv.	"	Invert
T/G	"	Top of Grate
U/Eave	"	Underside of Eave
TpFdn	"	Top of Foundation
C/L	"	Centreline
+65.00	"	Location of Elevations
+65.00	"	Top of Concrete Curb/Retaining Wall Elevation
	"	Property Line
	"	Deciduous Tree - The Symbol shown denotes location and trunk diameter only. Size of its' root system/overhead canopy may be smaller/larger than the symbol size depicted on this plan.
	"	Coniferous Tree - The Symbol shown denotes location and trunk diameter only. Size of its' root system/overhead canopy may be smaller/larger than the symbol size depicted on this plan.

Surveyor's Certificate
I certify that :
1. This survey and plan are correct and in accordance with the Surveys Act, the Surveyors Act and the Regulations made under them.
2. The survey was completed on the 10th day of March, 2021.

March 25/2021
Date

Emad Alrefaai
Ontario Land Surveyor

ASSOCIATION OF ONTARIO LAND SURVEYORS
PLAN SUBMISSION FORM
V-10910

THIS PLAN IS NOT VALID UNLESS IT IS AN EMBOSSED ORIGINAL COPY ISSUED BY THE SURVEYOR
In accordance with Regulation 1026, Section 29 (3).

TOPOGRAPHIC DATA WAS COLLECTED UNDER WINTER CONDITIONS. SNOW COVER AND ICE PRECLUDE DETERMINING LOCATION AND ELEVATION OF SOME TOPOGRAPHICAL DATA THAT IS OTHERWISE VISIBLE.

FILE No. : 96-21

FARLEY, SMITH & DENIS SURVEYING LTD.
ONTARIO LAND SURVEYORS
CANADA LAND SURVEYORS
190 COLONNADE ROAD, OTTAWA, ONTARIO K2E 7J5
TEL. (613) 727-8226 FAX. (613) 727-1826

J:\2021\96-21_439 Churchill Ave_topo\Final\96-21_439 Churchill Ave_Lt13 RP269_T_F.dwg

AQUA-DRAIN SEWER SERVICES INC
P.O. BOX 41081, Ottawa, Ontario K1G 5K9
Tel.: 613-731-5500 • Fax: 613-822-0463
1-866-809-1504 • www.aquadrain.ca

VIDEO CAMERA INSPECTION REPORT

YOUR HOME OTTAWA

JASON GREENER
439 CHURCHILL AVENUE NORTH
OTTAWA

FEB. 26, 2021
SANITARY

AQUA-DRAIN SEWER SERVICES INC
P.O. BOX 41081, Ottawa, Ontario K1G 5K9
Tel.: 613-731-5500 • Fax: 613-822-0463
1-866-809-1504 • www.aquadrain.ca

CAMERA INSPECTION REPORT

CUSTOMER	YOUR HOME OTTAWA	START	MAIN CLEANOUT
		END	CONNECTION TO CITY SEWER
LOCATION	439 CHURCHILL AVENUE NORTH	C/O DISTANCE TO WALL:	0.6 M
	OTTAWA	PIPE DIAMETER (S)	100/150 mm
RESIDENT	JASON GREENER	PIPE MATERIAL (S)	CI/VCT/PVC
TELEPHONE. #:	613-818-1119	SEWER TYPE	SANITARY
DATE	February 26, 2021	FLOW:	DOWNSTREAM - CAMERA WITH FLOW
OPERATOR	SCOTT GALLANT		

INSPECTION DONE ON PULLBACK: YES: X NO:

DISTANCE (M)	CODE - DESCRIPTION
0.0	START OF INSPECTION: MAIN CLEANOUT
0.4	WYE - WYE CONNECTION TO MAIN SEWER
2.4	MC/DC - PIPE CHANGES FROM 100 mm CI TO 150 mm VCT
3.4	OPJ/OFJ - OPEN & OFFSET JOINT
5.2	OPJ/BKJ - OPEN & BROKEN JOINT
6.3	MC - PIPE CHANGES MATERIAL FROM VCT TO PVC
6.3	OPJ/OFJ - OPEN & OFFSET JOINT AT MATERIAL CHANGE
16.4	LBD - LINE BENDS DOWN
16.7	LBD - LINE BENDS DOWN
17.1	END OF INSPECTION - CONNECTION TO CITY SEWER

NOTES:
INSPECTION OF SANITARY LATERAL SEWER
INSPECTION FROM MAIN CLEANOUT IN FLOOR
OPEN & BROKEN JOINTS IN VITRIFIED CLAY TILE PIPE AS NOTED

CODE DESCRIPTION

CRC - CIRCULAR CRACK
LGC - LONGITUDINAL CRACK BEG/END
FRC - FRACTURE BEG/END
PFL - PARTIAL COLLAPSE
CFL - COLLAPSE
PUN - PUNCTURE
MSP - MISSING PIPE BEG/END
BSG - START OF SAG
ESG - END OF SAG
OPJ - OPEN JOINT
OFJ - OFFSET JOINT
BKJ - BROKEN JOINT
EXG - EXPOSED GASKET
EXR - EXPOSED REBAR
LBL - LINE BENDS LEFT
LBR - LINE BENDS RIGHT
LBD - LINE BENDS DOWN
DEF - PIPE DEFORMAT'N/OVAL
SC 3 - CONNECTION AT 3 O'CLOCK
WYE 3 - WYE CONNECTION AT
PSC - PROTRUDING CONNECTION AT
AIF - ACTIVE INFILTRATION
CAL - CALCITE, LT/MED/HVY
DEB - DEBRIS, LT/MED/HVY
GRS - GREASE, LT/MED/,HVY
RTS - ROOTS, LT/MED/HVY
DC - PIPE DIAMETER CHANGE FROM_____ TO:_____
MC - PIPE MATERIAL CHANGE FROM_____ TO:
OBS - OBSTRUCTION IN PIPE
C/O - CLEAN-OUT
MAIN - MAIN SEWER IN BLDG.
CITY - CITY SEWER
FD - FLOOR DRAIN
MH - MANHOLE

AQUA-DRAIN
SEWER SERVICES INC

Mar. 3, 2021

Your Home Ottawa

Attention: Jason Greener

Telephone: 613-818-1119

Email: greener.jay@gmail.com

Location: 439 Churchill Avenue North

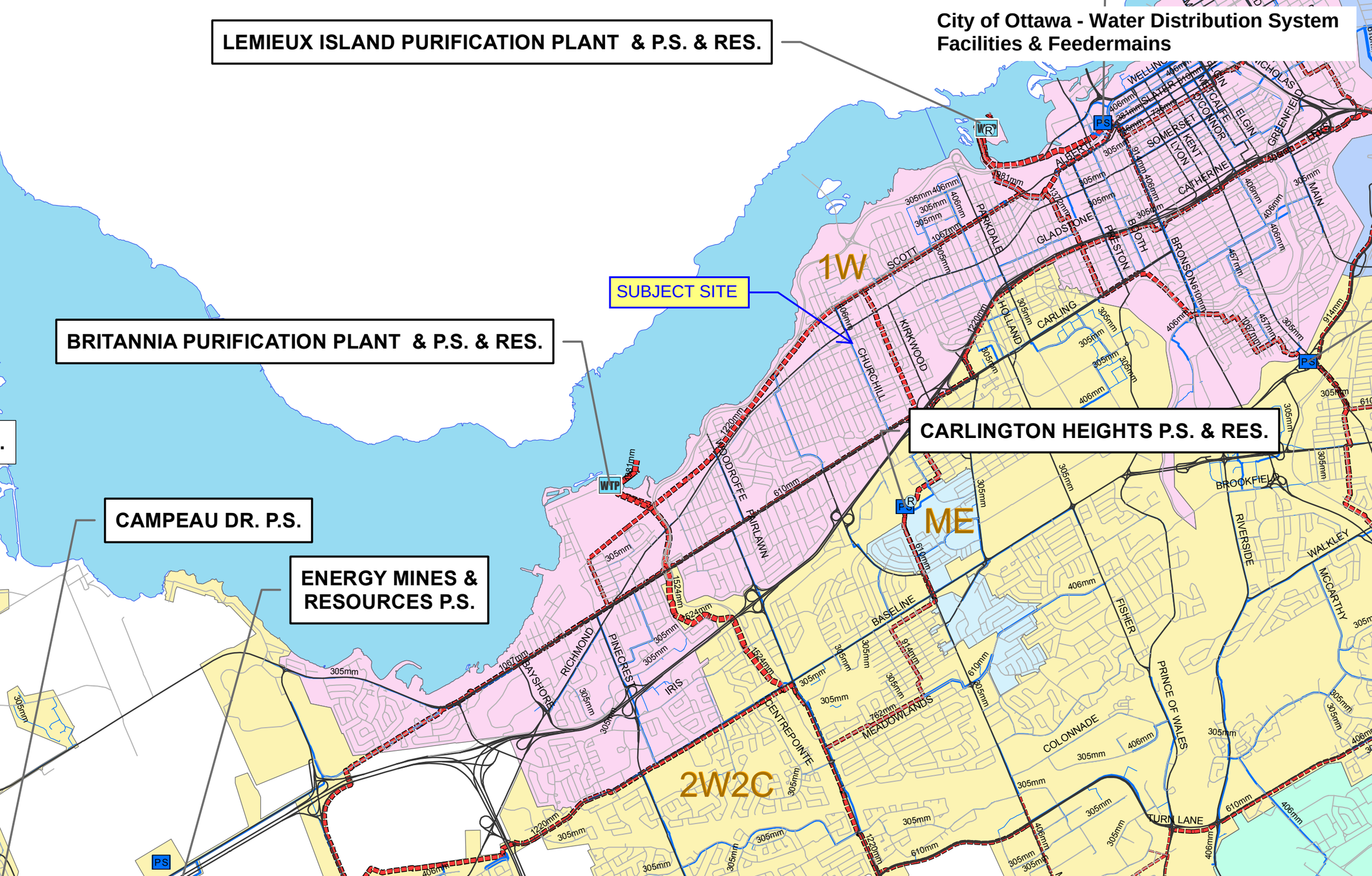
On February 26, 2021, Aqua Drain Sewer Services Inc. provided a video inspection of the sanitary lateral from 439 Churchill Avenue North.
Following a review of the video and inspection report, the following issues were found.
In the vitrified clay tile (VCT) pipe, at 3.4 M there is an open and offset joint, at 5.2 M the open joint is cracked and broken and at 6.3 M at the change in pipe material from vitrified clay tile (VCT) pipe to polyvinyl chloride (PVC) pipe the joint is open and offset.
These deficiencies could permit root infiltration through these openings. In order to prevent future problems, a cast-in-place (CIPP) lateral liner should be installed. A quotation has been provided for this.
If you have any questions or concerns regarding the quotation please call Patrice Brule at 613-913-6095.

Mark Rogers

Mark Rogers, B.A.Sc. (Civil Eng.)
Aquadrain Sewer Services Inc.
613-731-5500 ext 108

APPENDIX C
WATERMAIN CALCULATIONS

McINTOSH PERRY


City of Ottawa - Water Distribution System
Facilities & Feedermains
LEMIEUX ISLAND PURIFICATION PLANT & P.S. & RES.
BRITANNIA PURIFICATION PLANT & P.S. & RES.
CAMPEAU DR. P.S.
ENERGY MINES & RESOURCES P.S.
SUBJECT SITE
CARLINGTON HEIGHTS P.S. & RES.
1W
ME
2W2C
WTP
PS
WR
SCOTT
PARKDALE
GLADSTONE
ALBERT
SLATER
WELLINGTON
BRONSON
CARLING
HOLLAND
CHURCHILL
KIRKWOOD
WOODROFFE
FAIRLAWN
RICHMOND
BAYSHORE
PINECREST
IRIS
BASELINE
MEADOWLANDS
CENTREPOINTE
COLONNADE
FISHER
PRINCE OF WALES
RIVERSIDE
BROOKFIELD
WALKLEY
MCCARTHY
TURN LANE

McINTOSH PERRY

CCO-21-3806 - 439 Churchill Avenue - Water Demands

Project:	439 Churchill Avenue
Project No.:	CCO-21-3806
Designed By:	FV
Checked By:	AG
Date:	March 23, 2022
Site Area:	0.05 gross ha

Residential	**NUMBER OF UNITS**		**UNIT RATE**	
2 Bedroom Apartment	**4**	**units**	2.1	persons/unit
Total Population	**9**	**persons**	280	L/c/d
Commercial				
Commercial Suites	**0.02**	**ha**	28000	L/gross ha/d

AVERAGE DAILY DEMAND

DEMAND TYPE	AMOUNT	UNITS	
Residential	280	L/c/d	
Industrial - Light	35,000	L/gross ha/d	
Industrial - Heavy	55,000	L/gross ha/d	
Shopping Centres	2,500	L/(1000m² /d	
Hospital	900	L/(bed/day)	
Schools	70	L/(Student/d)	
Trailer Park with no Hook-Ups	340	L/(space/d)	
Trailer Park with Hook-Ups	800	L/(space/d)	
Campgrounds	225	L/(campsite/d)	
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**	**0.03**	**L/s**
	Commerical/Industrial/ Institutional	**0.01**	**L/s**

MAXIMUM DAILY DEMAND

DEMAND TYPE	AMOUNT		UNITS
Residential	9.5	x avg. day	L/c/d
Industrial	1.5	x avg. day	L/gross ha/d
Commercial	1.5	x avg. day	L/gross ha/d
Institutional	1.5	x avg. day	L/gross ha/d
MAXIMUM DAILY DEMAND	**Residential**	**0.28**	**L/s**
	Commerical/Industrial/ Institutional	**0.01**	**L/s**

MAXIMUM HOUR DEMAND

DEMAND TYPE	AMOUNT		UNITS
Residential	14.3	x avg. day	L/c/d
Industrial	1.8	x max. day	L/gross ha/d
Commercial	1.8	x max. day	L/gross ha/d
Institutional	1.8	x max. day	L/gross ha/d
MAXIMUM HOUR DEMAND	**Residential**	**0.42**	**L/s**
	Commerical/Industrial/ Institutional	**0.02**	**L/s**

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

AVERAGE DAILY DEMAND	0.04	L/s
MAXIMUM DAILY DEMAND	0.29	L/s
MAXIMUM HOUR DEMAND	0.44	L/s

McINTOSH PERRY

CCO-21-3806 - 439 Churchill Avenue - Fire Underwriters Survey

Project:	439 Churchill Avenue
Project No.:	CCO-21-3806
Designed By:	FV
Checked By:	AG
Date:	March 23, 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** **664.8** m^2

Caluclated Fire Flow	**8,508.6 L/min**
	9,000.0 L/min

B. REDUCTION FOR OCCUPANCY TYPE (No Rounding)

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

Combustible	0%

Fire Flow	**9,000.0 L/min**

C. REDUCTION FOR SPRINKLER TYPE (No Rounding)

Non-Sprinklered	0%

Reduction	**0.0 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	Non-Combustible	21.42	2	42.8	18%
Exposure 2	10.1 to 20	Wood frame	7.4	1	7.4	12%
Exposure 3	3.1 to 10	Non-Combustible	17.15	2	34.3	18%
Exposure 4	30.1 to 45	Non-Combustible	21.8	3	65.4	5%
					% Increase*	**53%**

Increase*	**4,770.0 L/min**

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

Fire Flow	**13,770.0 L/min**
Fire Flow Required**	**14,000.0 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-21-3806 - 439 Churchill Avenue - OBC Fire Calculations

Project:	439 Churchill Avenue
Project No.:	CCO-21-3806
Designed By:	FV
Checked By:	AG
Date:	March 23, 2022

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

***Water Supply for Fire-Fighting* - Store/Office & Warhouse Building**

Building is classified as Group : **D, E and F2 up to 2 Storeys** (from table 3.2.2.55)

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

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

(a) Q = K x V x Stot

where:

Q = minimum supply of water in litres

K = water supply coefficient from Table 1

V = total building volume in cubic metres

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

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

K	**23**	(from Table 1 pg A-31) (Worst case occupancy {E / F2} 'K' value used)
V	**2,504**	(Total building volume in m³.)
Stot	**2.0**	(From figure 1 pg A-32)
Q =	**115,187.68 L**	

From Figure 1 (A-32)

Snorth	2.5	m	0.5
Seast	7.5	m	0.3
Ssouth	0.1	m	0.5
Swest	4.3	m	0.5

*approximate distances

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

3600 L/min **ifQ > 108,000 L and < 135,000 L**
951 gpm

115 Walgreen Road, R.R.3. Carp, ON K0A 1L0 | T. 613-836-2184 | F. 613-836-3742
info@mcintoshperry.com | www.mcintoshperry.com

McINTOSH PERRY

CCO-21-3806 - 439 Churchill Avenue - Boundary Condition Unit Conversion

Project:	439 Churchill Avenue
Project No.:	CCO-21-3806
Designed By:	FV
Checked By:	AG
Date:	March 23, 2022

Boundary Conditions Unit Conversion

CHURCHILL AVENUE

Scenario	Height (m)	Elevation (m)	m H_2O	PSI	kPa
Avg. DD	114.8	75.6	39.2	55.8	384.6
Fire Flow (267 L/s or 16,000 L/min)	109.0	75.6	33.4	47.5	327.7
Peak Hour	108.7	75.6	33.1	47.1	324.7

Alison Gosling

Subject: RE: 21-3806 - 439 Churchill - Boundary Condition Request

From: Fawzi, Mohammed <mohammed.fawzi@ottawa.ca>
Sent: February 25, 2022 1:18 PM
To: Alison Gosling <a.gosling@mcintoshperry.com>
Subject: RE: 21-3806 - 439 Churchill - Boundary Condition Request

Hi Alison,

The following are boundary conditions, HGL, for hydraulic analysis at 439 Churchill Avenue North (zone 1W) assumed to be connected to the 406 mm watermain on Churchill Avenue North (see attached PDF for location).

Minimum HGL: 108.7 m

Maximum HGL: 114.8 m

Max Day + Fire Flow (233.3 L/s): 109.0 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.

Best Regards,

Mohammed Fawzi, E.I.T.
Project Manager
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 20120, Mohammed.Fawzi@ottawa.ca

Please note that due to the current situation, I am working remotely. Email is currently the best way to contact me

From: Alison Gosling <a.gosling@mcintoshperry.com>
Sent: February 14, 2022 2:26 PM
To: Fawzi, Mohammed <mohammed.fawzi@ottawa.ca>
Subject: 21-3806 - 439 Churchill - Boundary Condition Request

Good afternoon Mohammed,

We would like to request boundary conditions for 439 Churchill Avenue. The proposed development contains 4 two-bedroom residential units in addition to the existing commercial space. It is proposed to service the development via the 406 mm diameter watermain within Churchill Ave.

- The estimate fire flow is 14,000 L/min based on the FUS
- Average Daily Demand: 0.04 L/s
- Maximum Daily Demand: 0.29 L/s
- Maximum hourly daily demand: 0.44 L/s

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

Let me know if you have any questions.

Thank you,

Alison Gosling, P.Eng.
Project Engineer, Land Development
T. 613.714.4629
a.gosling@mcintoshperry.com | www.mcintoshperry.com

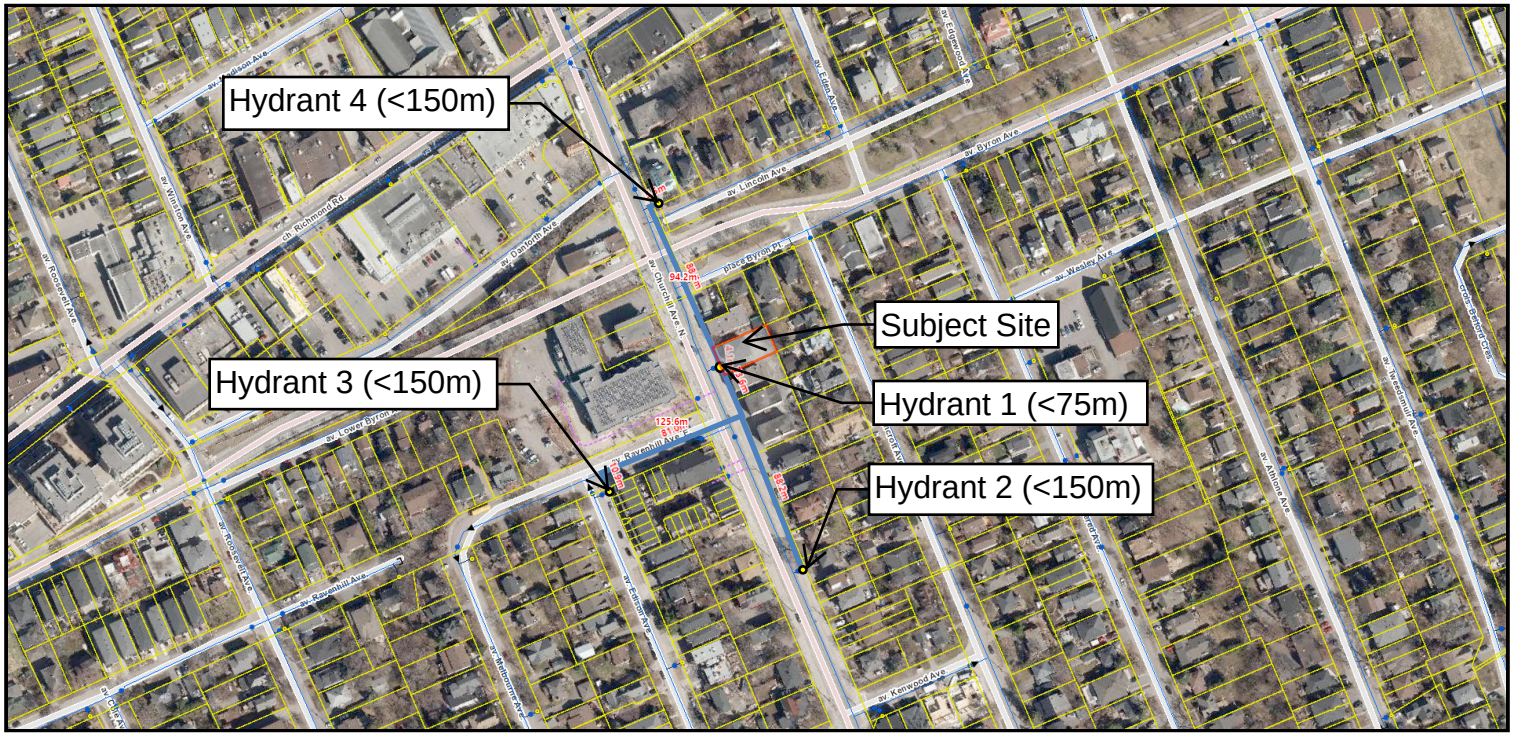
McINTOSH PERRY

Turning Possibilities Into Reality

'

439 Churchill Avenue North

Hydrant Coverage Figure



APPENDIX D
SANITARY CALCULATIONS

McINTOSH PERRY

McINTOSH PERRY

CCO-21-3806 - 439 Churchill Avenue - Sanitary Demands

Project:	439 Churchill Avenue			
Project No.:	CCO-21-3806			
Designed By:	AJG			
Checked By:	AJG			
Date:	March 23, 2022			
Site Area	**0.05**	**Gross ha**		
2 Bedroom	**4**		2.10	Persons per unit
Total Population	**9**	**Persons**		
Commercial Area	**228.00**	**m^2**		
Amenity Space	0.00	m^2		

DESIGN PARAMETERS

Institutional/Commercial Peaking Factor	1.5	
Residential Peaking Factor	3.74	** 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	0.002
Wet	0.01
Total	**0.02**

AVERAGE DAILY DEMAND

DEMAND TYPE	AMOUNT	UNITS	POPULATION / AREA	Flow (L/s)
Residential	280	L/c/d	9	0.03
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)	228.00	0.0074
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

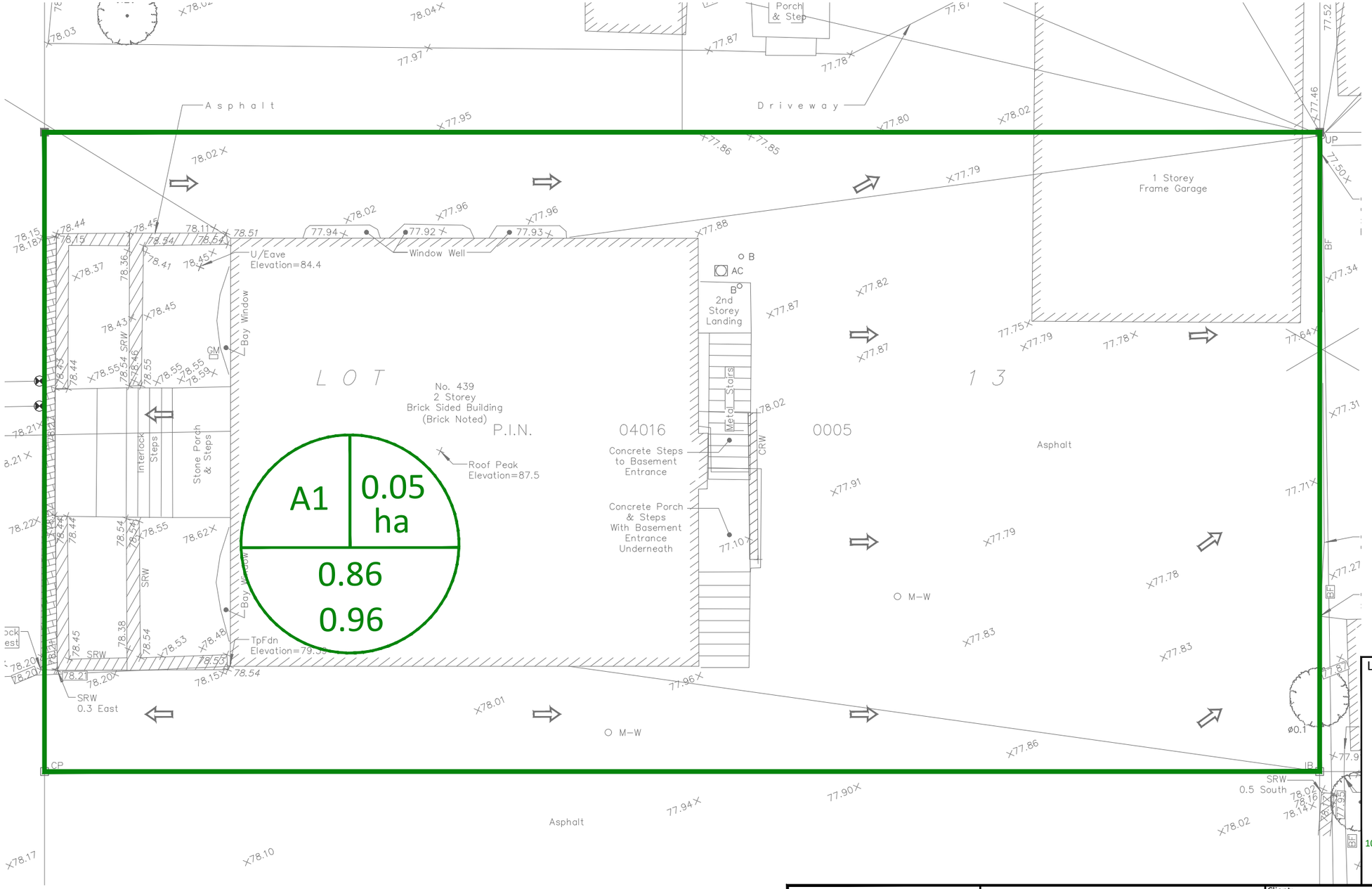
AVERAGE RESIDENTIAL FLOW	0.03	L/s
PEAK RESIDENTIAL FLOW	0.11	L/s
AVERAGE ICI FLOW	0.0074	L/s
PEAK INSTITUTIONAL/COMMERCIAL FLOW	0.011	L/s
PEAK INDUSTRIAL FLOW	0.00	L/s
TOTAL PEAK ICI FLOW	0.011	L/s

TOTAL SANITARY DEMAND

TOTAL ESTIMATED AVERAGE DRY WEATHER FLOW	0.04	L/s
TOTAL ESTIMATED PEAK DRY WEATHER FLOW	0.12	L/s
TOTAL ESTIMATED PEAK WET WEATHER FLOW	0.14	L/s

APPENDIX E
PRE-DEVELOPMENT DRAINAGE PLAN

McINTOSH PERRY



GENERAL NOTES

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3. THE CONTRACTOR IS TO OBTAIN AND PAY FOR ALL NECESSARY PERMITS AND APPROVALS FROM THE CITY OR TOWNSHIP BEFORE COMMENCING CONSTRUCTION.
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7. EXCAVATE AND DISPOSE OF ALL DELETERIOUS MATERIAL, SUCH AS ASPHALT, CURBING, EXISTING STOCKPILES, GRANULAR MATERIALS AND DEBRIS OFF SITE.
8. TOPSOIL TO BE STRIPPED AND REMOVED OFF SITE. 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.
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    - TELEPHONE SERVICE - BELL CANADA,
    - TELEVISION SERVICE - ROGERS.
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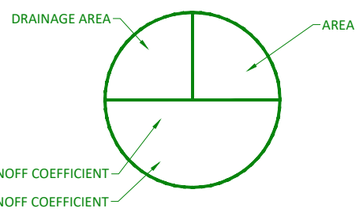
18. ALL PROPOSED CURB SHALL BE CONCRETE BARRIER CURB UNLESS SPECIFIED.
19. ALL EXISTING REDUNDANT PRIVATE APPROACHES FRONTING THIS DEVELOPMENT MUST BE REMOVED TO THE SATISFACTION OF THE CITY OR TOWNSHIP.

LEGEND:



SCALE 1 : 100

0 2 4 6 8 10 Metres

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

Client: GREPAULT DEVELOPMENTS
5882 LEITRIM ROAD, OTTAWA, ONTARIO, K0A 1K0

Project: MIXED USE BUILDING
439 CHURCHILL AVENUE NORTH

Drawing Title: PRE-DEVELOPMENT DRAINAGE AREA PLAN

Drawn by:	Checked By:
FV	AG
Scale: 1:100	Project Number: CCO-21-3806

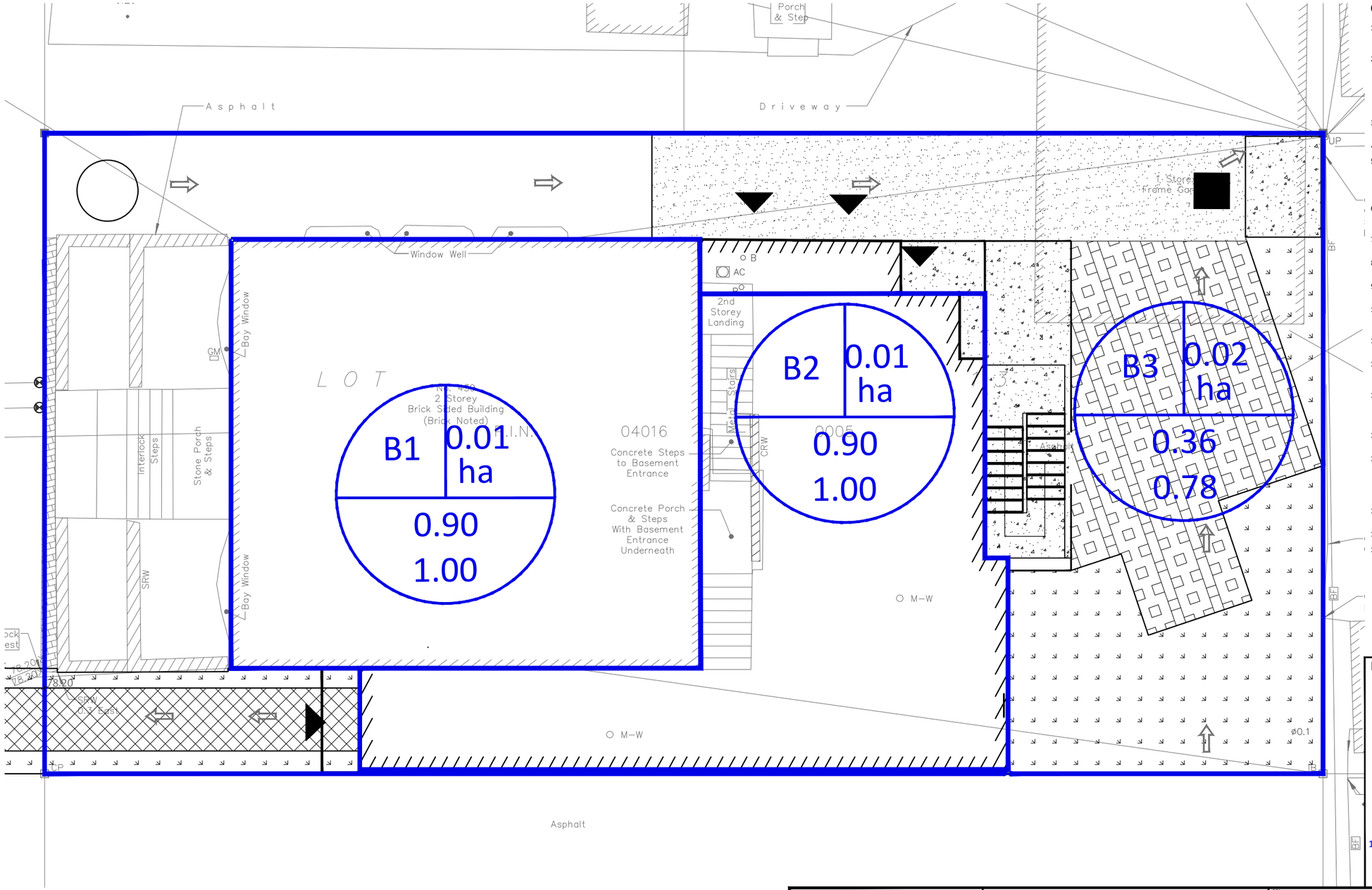
No.	Revisions	Date
4	ISSUED FOR REVIEW	NOV. 04, 2022
3	REVISED PER CITY COMMENTS	AUG. 24, 2022
2	ISSUED FOR REVIEW	AUG. 19, 2022

Drawing Number: PRE

FILENAME: U:\Ottawa\01 Project - Proposals\2021 Jobs\CCO\CCO-21-3806 Grepault Developments_SPC_439 Churchill Ave\Civil\12 - Drawings\CCO-21-3806_PRESENTATION.dwg
LAST SAVED: Thursday, November 03, 2022 LAST SAVED BY: F.Valenti
LAST PLOTTED: Friday, November 04, 2022 CTB FILE USED: ----

APPENDIX F
POST-DEVELOPMENT DRAINAGE PLAN

McINTOSH PERRY



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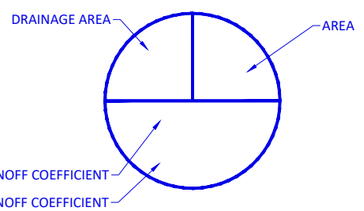
19. ALL EXISTING REDUNDANT PRIVATE APPROACHES FRONTING THIS DEVELOPMENT MUST BE REMOVED TO THE SATISFACTION OF THE CITY OR TOWNSHIP.

LEGEND:



SCALE 1 : 100

0 2 4 6 8 10 Metres

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

Client: GREPAULT DEVELOPMENTS
5882 LEITRIM ROAD, OTTAWA, ONTARIO, K0A 1K0

Project: MIXED USE BUILDING
439 CHURCHILL AVENUE NORTH

Drawing Title: POST-DEVELOPMENT DRAINAGE AREA PLAN

Drawn by:	Checked By:
FV	AG
Scale: 1:100	Project Number: CCO-21-3806

No.	Revisions	Date
3	ISSUED FOR REVIEW	NOV. 04, 2022
2	REVISED PER CITY COMMENTS	AUG. 24, 2022
2	ISSUED FOR REVIEW	AUG. 19, 2022

Drawing Number: POST

FILENAME: U:\Ottawa\01 Project - Proposals\2021 Jobs\CCO\CCO-21-3806 Grepault Developments_SPC_439 Churchill Ave\Civil\12 - Drawing\CCO-21-3806_PRESENTATION.dwg
LAST SAVED: Thursday, November 03, 2022 LAST SAVED BY: FV (Vient)
LAST PLOTTED: Friday, November 04, 2022 CTB FILE USED: ---

APPENDIX G
STORMWATER MANAGEMENT CALCULATIONS

McINTOSH PERRY

CO-21-3806 - 439 Churchill Ave. North - SWM Calculations

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 (2/5-Year)	Average C (100-Year)
A1	438	0	26	0.86	0.96

Pre-Development Runoff Calculations

Drainage Area	Area (ha)	C 2/5-Year	C 100-Year	Tc (min)	Q (L/s) 5-Year	Q (L/s) 100-Year
A1	0.05	0.86	0.96	10	11.56	22.05
Total	**0.05**				**11.56**	**22.05**

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	101	0	0	0.90	1.00	*Roof 1*
B2	122	0	0	0.90	1.00	*Roof 2*
B3	169	0	72	0.36	0.78	*Unrestricted*

Post-Development Runoff Calculations

Drainage Area	Area (ha)	C 2/5-Year	C 100-Year	Tc (min)	Q (L/s) 5-Year	Q (L/s) 100-Year	
B1	0.01	0.90	1.00	10	2.62	5.00	*Roof 1*
B2	0.01	0.90	1.00	10	3.19	6.08	*Roof 2*
B3	0.02	0.36	0.78	10	2.51	9.29	*Unrestricted*
Total	**0.05**				5.81	11.07	

Required Restricted Flow

Drainage Area	Area (ha)	C 5-Year	Tc (min)	Q (L/s) 2-Year
B1+B2	0.02	0.50	10	2.38

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	2.62	5.00	0.60	0.96	1.40	2.90	1.89	3.02
B2	3.19	6.08	0.60	1.08	1.89	3.68	2.30	4.13
Roof Total	**5.81**	**11.07**	**1.20**	**2.04**	**3.30**	**6.58**	**4.18**	**7.15**
B3	2.51	9.29	2.51	9.29				
Site Total	**8.32**	**20.36**	**3.71**	**11.33**	**3.30**	**6.58**	**4.18**	**7.15**

Roof Drain Flow (B1)

Roof Drains Summary		
Type of Control Device	Watts Drainage - Accutrol Weir	
Number of Roof Drains	2	
	5-Year	100-Year
Rooftop Storage (m^3)	1.89	3.02
Storage Depth (mm)	0.025	0.040
Flow (Per Roof Drain) (L/s)	0.30	0.48
Total Flow (L/s)	0.60	0.96

Flow Rate Vs. Build-Up (One Weir)	
0.0463922	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	0.36
0.24	20	0.48
0.30	**25**	**0.60**
0.36	30	0.72
0.42	35	0.84
0.48	**40**	**0.96**
0.54	45	1.08
0.60	50	1.20
0.66	55	1.32
0.72	60	1.44
0.78	65	1.56
0.84	70	1.68
0.90	75	1.80
0.96	80	1.92
1.02	85	2.04
1.08	90	2.16
1.14	95	2.28
1.20	100	2.40
1.26	105	2.52
1.32	110	2.64
1.38	115	2.76
1.44	120	2.88
1.50	125	3.00
1.56	130	3.12
1.62	135	3.24
1.68	140	3.36
1.74	145	3.48
1.80	150	3.60

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

CO-21-3806 - 439 Churchill Ave. North - SWM Calculations

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	2.62	0.60	2.02	1.21
20	70.3	1.77	0.60	1.17	1.40
30	53.9	1.36	0.60	0.76	1.36

Maximum Storage Required 5-year =	1	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	5.00	0.96	4.04	2.42
20	120.0	3.36	0.96	2.40	2.88
30	91.9	2.57	0.96	1.61	2.90
40	75.1	2.10	0.96	1.14	2.74
50	64.0	1.79	0.96	0.83	2.49

Maximum Storage Required 100-year =	3	m^3

5-Year Storm Event Storage Summary

Roof Storage			
Location	Area*	Depth	Volume (m^3)
Roof	75.50	0.025	1.89

Storage Available (m^3) =	1.89
Storage Required (m^3) =	1.40

100-Year Storm Event Storage Summary

Roof Storage			
Location	Area*	Depth	Volume (m^3)
Roof	75.50	0.040	3.02

Storage Available (m^3) =	3.02
Storage Required (m^3) =	2.90

*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	2	
	5-Year	100-Year
Rooftop Storage (m^3)	1.89	3.02
Storage Depth (mm)	0.025	0.045
Flow (Per Roof Drain) (L/s)	0.30	0.54
Total Flow (L/s)	0.60	1.08

Flow Rate Vs. Build-Up (One Weir)	
0.0463922	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	0.36
0.24	20	0.48
0.30	**25**	**0.60**
0.36	30	0.72
0.42	35	0.84
0.48	40	0.96
0.54	**45**	**1.08**
0.60	50	1.20
0.66	55	1.32
0.72	60	1.44
0.78	65	1.56
0.84	70	1.68
0.90	75	1.80
0.96	80	1.92
1.02	85	2.04
1.08	90	2.16
1.14	95	2.28
1.20	100	2.40
1.26	105	2.52
1.32	110	2.64
1.38	115	2.76
1.44	120	2.88
1.50	125	3.00
1.56	130	3.12
1.62	135	3.24
1.68	140	3.36
1.74	145	3.48
1.80	150	3.60

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

CO-21-3806 - 439 Churchill Ave. North - SWM Calculations

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	3.19	0.60	2.59	1.55
20	70.3	2.15	0.60	1.55	1.86
30	53.9	1.65	0.60	1.05	1.89
40	44.2	1.35	0.60	0.75	1.81

Maximum Storage Required 5-year =	1.9	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	6.08	1.08	5.00	3.00
20	120.0	4.08	1.08	3.00	3.60
30	91.9	3.13	1.08	2.05	3.68
50	64.0	2.18	1.08	1.10	3.29

Maximum Storage Required 100-year =	3.7	m^3

5-Year Storm Event Storage Summary

Roof Storage			
Location	Area*	Depth	Volume (m^3)
Roof	91.80	0.025	2.30

Storage Available (m^3) =	2.30
Storage Required (m^3) =	1.89

100-Year Storm Event Storage Summary

Roof Storage			
Location	Area*	Depth	Volume (m^3)
Roof	91.80	0.045	4.13

Storage Available (m^3) =	4.13
Storage Required (m^3) =	3.68

*Area is 75% of the total roof area

Time of Concentration Pre-Development

Drainage Area ID	Sheet Flow Distance (m)	Slope of Land (%)	Tc (min) (5-Year)	Tc (min) (100-Year)
A1	**34**	**2.36**	5	3

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

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