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*Stormwater Management - Grading & Drainage - Storm & Sanitary Sewers - Watermains*

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# SITE SERVICING & STORMWATER MANAGEMENT REPORT

## PROPOSED REDEVELOPMENT OF WESTGATE SC
## PHASE 1B (BUILDING B)
## 1309 CARLING AVENUE
OTTAWA, ONTARIO

REPORT NO. 25013

MAY 9, 2025
REVISED JULY 7, 2025

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# LIST OF APPENDICES

## 1.0 INTRODUCTION

This report has been prepared in support of the Site Plan Control application for the Phase 1B redevelopment of Westgate Shopping Centre located on a 3.05 hectare property at 1309 Carling Avenue in Ottawa, Ontario. Phase 1B includes a 2,572 $m^2$ one-storey retail building and the construction of a new parking area. Phase 1B is part of a multi-phase, multi-year development that is expected to be built over many years. The ultimate development may not include the currently proposed building and the currently proposed site layout may be different. Refer to Pre-Application Consultation meeting notes in Appendix A.

This report forms part of the site servicing and stormwater management design for the proposed development. Also refer to drawings C-1 to C-14 prepared by D.B. Gray Engineering Inc.

## 2.0 WATER SERVICING

### 2.1 WATER SUPPLY FOR FIREFIGHTING

The existing Building A has a sprinkler system with the fire department connection located at the NW corner of the building. The proposed Phase 1B Building will have a sprinkler system internally branched off within the existing Building A. The sprinkler system is expected to be designed, installed and maintained in accordance with NFPA standards and the Fire Underwriters Survey. Refer to Appendix B. The closest existing fire hydrant is an onsite private located at the northwest corner of the Phase 1B Building. It is about 80 m unobstructed distance to the existing fire department connection (FDC), which is greater than the maximum 45 m required by the Ontario Building Code (OBC); therefore, an additional fire hydrant is required. A private fire hydrant is proposed to be located next to the Phase 1B Building loading docks. It is a 40 m unobstructed distance to the existing FDC.

In accordance with City of Ottawa Technical Bulletin IWSTB-2024-05, when calculating the required fire flow on private property in urban areas, the OBC method is to be used. Using the OBC method, the required fire flow of the existing Building A and Phase 1B Building is calculated to be 9,000 L/min (150 L/s). In accordance with City of Ottawa Technical Bulletin IWSTB-2024-05, when the OBC method yields a required fire flow of 9,000 L/min (150 L/s), the Fire Underwriters Survey (FUS) method is to be used instead. The Phase 1B Building is expected to be of noncombustible construction (Type II) in accordance with the Fire Underwriters Survey. Refer to Appendix B. Using the FUS method, the required fire flow of the existing Building A and Phase 1B Building is calculated to be 7,000 L/min (116.7 L/s). Refer to calculations in Appendix B.

The boundary conditions in the 400 mm Carling Avenue municipal watermain provided by the City of Ottawa for the 116.7 L/s fire flow at the subject property indicate a hydraulic grade line (HGL) of 125.0 m at Connection 1. Refer to Appendix B. This HGL calculates to 498 kPa (72 psi). Since the pressure is above the Ontario Building Code's minimum required pressure of 140 kPa (20 psi), there is an adequate water supply for firefighting from the existing municipal water distribution system. Fire hydrant flow tests were also performed on the two nearest existing private fire hydrants. Refer to Appendix B. Using the Hazen-Williams Formula, it is calculated that 116.7 L/s is available from each of the two fire hydrants tested, one at 337 (49 psi) and the other at 350 kPa (51 psi). Since the pressure is greater than the required minimum of 140 kPa (20 psi), there is an adequate water supply for firefighting from the existing

private water distribution system. (Using the Hazen-Williams Formula, 169.0 L/s and 172.2 L/s is available at 140 kPa (20 psi) at the two fire hydrants tested.)

### 2.2 DOMESTIC WATER SUPPLY

In accordance with the City of Ottawa Water Design Guidelines for the consumption rate and peaking factors, the average daily demand is calculated to be 1.0 L/s, the maximum daily demand is calculated to be 1.5 L/s, and the maximum hourly demand is calculated to be 2.7 L/s. Refer to calculations in Appendix B.

The boundary conditions in the 400 mm Carling Avenue municipal watermain provided by the City of Ottawa at the subject property indicate a minimum HGL of 124.4 m and a maximum HGL of 132.8 m. Refer to Appendix B. Based on these boundary conditions, the pressure at the water meter is calculated to vary between 481 kPa (70 psi) and 563 kPa (82 psi). This is an acceptable range of water pressures; however, since the water pressure may be above 80 psi at times, a pressure reducing valve may be required to be installed immediately after the water meter.

The fire hydrant flow tests performed on the two nearest existing private fire hydrants measured the static pressure to be 78 and 80 psi which is within the above range of pressures, and, therefore, agrees with the boundary conditions. This indicates that range of water pressures in the private watermain is acceptable, and a pressure reducing valve may be required. Refer to Appendix B.

A 150 mm water service connecting to the existing 200 mm private watermain is currently servicing the existing Building A sprinkler system and will also service the Phase 1B Building sprinkler system. The same 150 mm water service will provide an adequate domestic water supply to the Phase 1B Building.

## 3.0 SANITARY SERVICING

In accordance with

i. the City of Ottawa Sewer Design Guidelines for the peaking factor, and
ii. City of Ottawa Technical Bulletin ISTB-2018-01 for the average daily flow and infiltration allowance,

the post-development sanitary flow rate of the existing Building A is calculated to be 1.24 L/s, and the post-development sanitary flow rate of the Phase 1B Building is calculated to be 1.24 L/s. A 200 mm sanitary sewer service at 2% slope (46.38 L/s capacity) is proposed to service the Phase 1B Building. At the design flow rate the sanitary sewer service will only be at 3% of its capacity. The proposed 200 mm sanitary sewer service will connect to an existing 250 mm private sanitary sewer, which at 0.3% slope has a capacity of 32.57 L/s. The pre-development sanitary flow rate is calculated to be 2.49 L/s. Refer to calculations in Appendix C. The Phase 1B redevelopment is expected to have a negligible impact on the existing sanitary sewers.

## 4.0 STORMWATER MANAGEMENT

### 4.1 QUANTITY CONTROL

As per the conceptual stormwater management design that was approved as part of the Master Site Plan: The stormwater quantity control criterion is to control the Phase 1B post-development peak flows to 97.5

L/s/ha. Phase 1B of the redevelopment includes 6,882 $m^2$ of the property; therefore, the maximum allowable release rate for Phase 1B is calculated to be 67.10 L/s.

The Rational and Modified Rational Methods are used to calculate the post-development flow rates and corresponding storage volumes. Refer to calculations in Appendix D.

It is calculated that the pre-development conditions reflect a runoff coefficient of 1.00 during the 100-year event and 0.90 during the 2-year event. Using the Rational Method with a time of concentration of 10 minutes, the pre-development flow rates are calculated to be 341.62 L/s during the 100-year event and 132.25 L/s during the 2-year event.

**Drainage Area I** (Roof – 2,572 $m^2$)
The 4 roof drains are to be flow control type roof drains, which will restrict the flow of stormwater and cause it to pond on the roof. Each roof drain is to be installed with a single-parabolic slotted weir and release 0.01242 L/s/mm (5 USgpm/in). Roof drains are to be Watts with an Accutrol Weir RD-100-A1 or approved equivalent. The opening at the top of the flow control weir is to be a minimum 50 mm in diameter. A minimum of 10 scuppers each a minimum 750 mm wide, are to be installed 150 mm above the roof drains. Refer to architectural for exact locations and details. The roof is to be designed to carry the load of water having a 50 mm depth at the scuppers (i.e. 200 mm depth at the roof drains). Refer to structural.

| | 100-Year Event | 2-Year Event |
|---|---|---|
| Maximum Release Rate | 7.47 L/s | 5.15 L/s |
| Maximum Depth at Roof Drains | 150 mm | 104 mm |
| Maximum Volume Stored | 118.54 $m^3$ | 38.70 $m^3$ |

**Drainage Area II** (4,310 $m^2$)
An inlet control device (ICD) located in the outlet pipe of catch basin / manhole CB/MH-8 will restrict the flow of stormwater and cause it to backup into the upstream infrastructure and pond above CB/MH-1, CB/MH-2, CB/MH-3, CB/MH-5, CB/MH-6, CB/MH-7 and CB/MH-8. The ICD will be a plug style with a round orifice located at the bottom of the plug manufactured by Pedro Plastics or approved equivalent, sized by the manufacturer for a release rate of 59.63 L/s at 1.67 m. It is calculated that an orifice area of 17,057 sq.mm ($\pm$147 mm dia.) with a discharge coefficient of 0.61 will restrict the outflow rate to 59.63 L/s at a head of 1.67 m. Based on this orifice the maximum outflow rate for the 2-year storm event is calculated to be 36.74 L/s at 0.64 m. Since some of the restricted stormwater is proposed to be stored using underground infrastructure, an average release rate equal to 50% of the maximum release rate is used to calculate the required storage volumes. The underground infrastructure will consist of 88 – Soleno HydroStor HS31 open bottom chambers or approved equivalent surrounded by clear stone wrapped in geotextile fabric.

| | 100-Year Event | 2-Year Event |
|---|---|---|
| Maximum Release Rate | 59.63 L/s | 36.74 L/s |
| Maximum Water Elevation | 74.13 m | 73.09 m |
| Maximum Volume Stored | 138.66 $m^3$ | 43.14 $m^3$ |

**Summary**

| | 100-Year Event | 2-Year Event |
|---|---|---|
| Maximum Allowable Release Rate | 67.10 L/s | 67.10 L/s |
| Maximum Release Rate | 67.10 L/s | 41.88 L/s |
| Maximum Volume Required | 257.21 $m^3$ | 81.83 $m^3$ |
| Maximum Volume Stored | 257.21 $m^3$ | 81.83 $m^3$ |

The maximum Phase 1B post-development release rate during the 100-year event is calculated to be 67.10 L/s, which is 80% less than the pre-development flow rate during the 100-year event and equal to the maximum allowable release rate. To achieve the maximum allowable release rate, a maximum storage volume of 257.21 $m^3$ is required and provided during the 100-year event. The maximum Phase 1B post-development release rate during the 2-year event is calculated to be 41.88 L/s, which is 68% less than the pre-development flow rate during the 2-year event and 38% less than the maximum allowable release rate. A maximum storage volume of 81.83 $m^3$ is required and provided during the 2-year event. The Phase 1B post-development reduction in flow is expected to have a positive impact on the existing storm sewers.

## 4.2 QUALITY CONTROL

Erosion & Sediment Control Plans have been developed to be implemented during construction. Refer to drawings C-10 and C-11, and notes on drawing C-12. Sediment capture filter sock inserts are to be installed in all existing and proposed catch-basins and catch-basin/manholes adjacent to and within the site, and any material deposited on the public road is to be removed.

## 4.3 STORM SERVICING

The peak unrestricted Phase 1B Building roof flow rate during the 2-year event is calculated to be 49.43 L/s. A 300 mm storm sewer service at 2% slope (136.76 L/s capacity) is proposed to service the building. At the peak unrestricted 2-year flow rate the storm sewer service would only be at 36% of its capacity. The peak restricted Phase 1B Building roof flow rate during the 2-year event is calculated to be 5.15 L/s. At the peak restricted 2-year flow rate the storm sewer service will only be at 4% of its capacity. Refer to calculations in Appendix D. The proposed 300 mm storm sewer service will connect to a realigned 450 mm private storm sewer, which at 0.2% slope has a capacity of 132.09 L/s.

The peak unrestricted flow rate draining into the Phase 1B private storm sewer system during the 2-year event is calculated to be 88.75 L/s. A 375 mm storm sewer at 0.27% slope (91.10 L/s capacity) is proposed to connect to the existing 900 mm private storm sewer, which at 0.4% slope has a capacity of 1,193 L/s. At the peak unrestricted 2-year flow rate the proposed 375 mm storm sewer would be at 97% of its capacity. The peak restricted flow rate draining into the Phase 1B private storm sewer system during the 2-year event is calculated to be 36.74 L/s. At the peak restricted 2-year flow rate the proposed 375 mm storm sewer will only be at 40% of its capacity. Refer to calculations in Appendix D.

The rainwater leaders inside the Phase 1B Building are to be constructed to withstand the pressure from a water column the height of the rainwater leader. Pressure tests are to be performed on the systems in accordance with the mechanical engineer's instructions.

## 5.0 CONCLUSIONS

1. A private fire hydrant is required and provided.

2. There is an adequate water supply for firefighting from the existing municipal water distribution system.

3. Based on fire hydrant flow tests there is an adequate water supply for firefighting from the existing private water distribution system.

4. There is an acceptable range of water pressures in the existing municipal water distribution system.

5. Based on fire hydrant flow tests the water pressure in the existing private water distribution system is acceptable.

6. Since the water pressure may be above 80 psi at times, a pressure reducing valve may be required to be installed immediately after the water meter.

7. The Phase 1B Building sanitary flow rate will be adequately handled by the proposed sanitary sewer service.

8. The Phase 1B redevelopment is expected to have a negligible impact on the existing sanitary sewers.

9. The maximum Phase 1B post-development release rate during the 100-year event will be equal to the maximum allowable release rate.

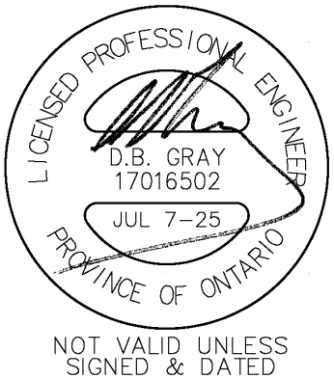
10. The Phase 1B post-development reduction in stormwater flow is expected to have a positive impact on the existing storm sewers.

11. Erosion & Sediment Control Plans have been developed to be implemented during construction.

12. The Phase 1B peak unrestricted flow rates during the 2-year event will be adequately handled by the proposed storm sewer service and private storm sewer systems.

13. The rainwater leaders inside the Phase 1B Building are to be constructed to withstand the pressure from a water column the height of the rainwater leader. Pressure tests are to be performed on the systems in accordance with the mechanical engineer's instructions.

Prepared by D.B. Gray Engineering Inc.



# APPENDIX A

## PRE-APPLICATION CONSULTATION MEETING NOTES

File No.: PC2024-0461

December 4, 2024

Mark McElligott
Fotenn
Via email: mcelligott@fotenn.com

**Subject: Pre-Consultation: Meeting Feedback**
**Proposed Site Plan Control Application – 1309 Carling Avenue**

Please find below information regarding next steps as well as consolidated comments from the above-noted pre-consultation meeting held on November 15, 2024.

## Pre-Consultation Preliminary Assessment

| | | | | |
|---|---|---|---|---|
| **1** ☐ | **2** ☐ | **3** ☐ | **4** ☒ | **5** ☐ |

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

## Supporting Information and Material Requirements

1. The attached **Study and Plan Identification List** outlines the information and material that has been identified, during this phase of pre-consultation, as either required (R) or advised (A) as part of a future complete application submission.

    a. The required plans and studies must meet the City's Terms of Reference (ToR) and/or Guidelines, as available on Ottawa.ca. These ToR and Guidelines outline the specific requirements that must be met for each plan or study to be deemed adequate.

## Consultation with Technical Agencies

1. You are encouraged to consult with technical agencies early in the development process and throughout the development of your project concept. A list of technical agencies and their contact information is enclosed.

## Proposal Overview

1. Proposed 30,000 sq ft (2,787 sqm) food store. It would abut the existing Shoppers Drug Mart store. The remainder of the existing Westgate shopping mall building would be demolished. The existing surface parking lot would be

realigned per the concept site plan. There would be a total 725 parking spaces (101 spaces removed; 137 spaces added).

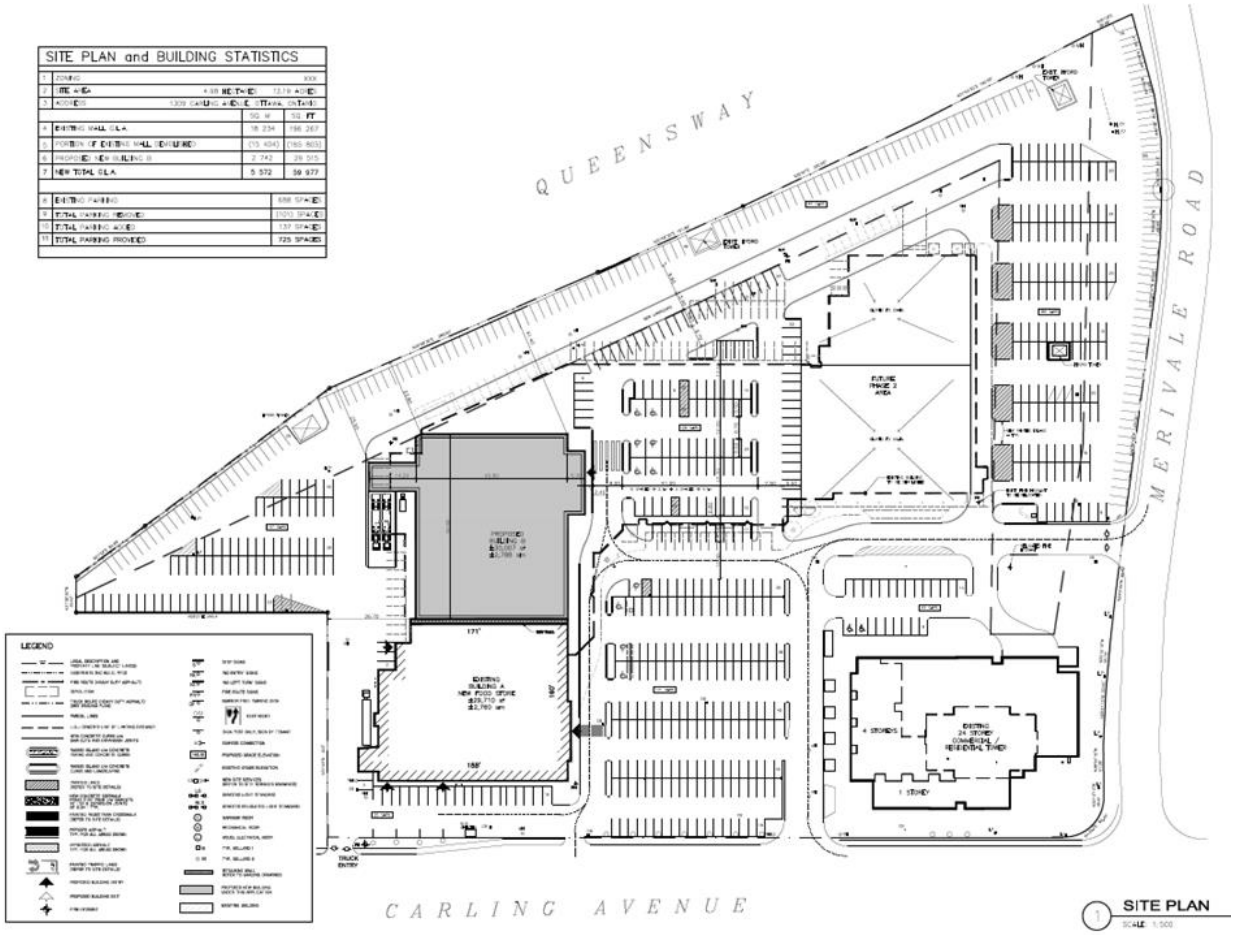



*Figure 1 Conceptual Site Plan (dated October 28, 2024, prepared by LLA Architecture)*

## Planning

Comments:

1. The site is subject to Area Specific Policies #31 - Westgate in Volume 2C of the Official Plan. These policies outline specific requirements during future development onsite.

    a. This development can be considered an interim phase within the wider scope of the Area-Specific Policy.

    b. Policies 31.3, 31.8 and 31.14 refer to new development (not to phase 2) therefore please ensure compliance.

*31.3 Applications for new development shall demonstrate how they provide pedestrian and cycling facilities, Privately-Owned Public Spaces (POPS), streets, and other considerations, consistent with Schedule 31.A - Designation Plan, Volume 2C - Official Plan, and the wider objectives for this policy area.*

*31.8 The Westgate promenade and shared space, shown on Schedule 31.A - Designation Plan, Volume 2C - Official Plan, are to be designed and function as private roads. Active building facades will abut the Westgate POPS. The Westgate Promenade is to be designed to accommodate all users with an emphasis on active modes of transportation. Intersections are to be pedestrianized, using appropriate design cues, to ensure motor vehicle drivers are aware of these pedestrian priority areas. Animated ground floor frontages facing the Westgate promenade are also required.*

*31.14 Pedestrian and cycling connections are required, as identified on Schedule 31.A - Designation Plan, Volume 2C - Official Plan, across private land in the Westgate Lands and Westgate-Carling South Transition Area, at time of redevelopment, to connect the surrounding community to the mid-block crossing points on Carling Avenue, as designated for the policy area.*

c. Policy 31.7(a) requires 40% POPS be provided in "second phase of Westgate Lands redevelopment". Given the understanding that this is an interim phase the 40% is not required at this time but it is strongly suggested that it be advanced through this application if possible.

d. Although many of the cycling policies are not applicable through this interim plan, proper cycling and/or pedestrian connections through the site are still required.

2. The site is located within the Inner Urban Area transect in the City's Official Plan and is designated as a Hub (whole site) and as Corridor - Mainstreet (along Carling Avenue). Additionally, the O-train station identified at abutting corner of Carling and Merivale.

3. The site is zoned AM10[2393] S368, please provide a Zoning Confirmation Report.

    a. It was confirmed by the By-law Interpreters and Zoning Plans Examiners that (10)(b)(ii)2) in AM10 is not applicable in this case.

4. A new phasing plan will be required to be approved through this new application.

5. Any existing easements on site should be clearly identified and related details provided.

## Urban Design

Comments:

6. Staff require an Urban Design Brief, architectural plans (Site Plan, Building Elevations, etc.), and a Landscape Plan. Please refer to the attached Urban Design Brief Terms of Reference.

7. Design Priority Area – the proposal at the scale proposed would not require a visit to the UDRP.

8. Please provide a revised phasing diagram and timeline estimate for each development phase taking the current proposal into consideration.

9. Staff are keen to see the Carling Avenue frontage developed to align with the original development plan and phasing strategy.

10. Staff support the addition of a food store on the property but would prefer to see the food store in the base of a mixed-use development.

11. If large format retail is deemed to be an appropriate interim use (approximately 20 years), staff would prefer that the new plaza be constructed at the rear or the site so that public road edges could be developed over time with mixed-use developments as originally planned.

Feel free to contact Nader Kadri, Planner III – Urban Design, for follow-up questions.

## Engineering

Comments:

*12.* The Stormwater Management Criteria, for the subject site, is to be based on the ***"Site Servicing and Stormwater Management Report – 1309 Carling Avenue Phase 1"****, Project No. 18-1028. Prepared by DSEL, revision 3, dated July 2019,* and the "***Assessment of Adequacy of Public Services – 1309 & 1335 Carling Avenue****", Project No. 15-793. Prepared by DSEL, revision 2, dated May 2016* reports*:*

    a. Application of the IDF information derived from the Meteorological Services of Canada rainfall data, taken from the MacDonald Cartier Airport, collected 1966 to 1997.

    b. A calculated time of concentration (cannot be less than 10 minutes).

    c. Flows to the storm sewer in excess of the established allowable storm release rate, up to and including the 100-year storm event, must be detained on site.

a. Storm sewer outlets should not be submerged.

d. The quantity control criteria is to attenuate all storms up to and including the City of Ottawa 100-year design event on site to an equivalent rate of 97.5 L/s/ha.

e. Quality control is not required for the proposed development due to the site's distance from the outlet; however, opportunities to enhance water quality by use of LIDs and best-management practices are recommended and encouraged for this application.

13. Deep Services (Storm, Sanitary and/or Water Supply) shall be as contemplated in the aforementioned reports. If servicing locations change from what was proposed in the Adequacy of Public Services report, contact the City Project Manager to confirm design criteria.

Water

a. Serviced internally from existing private watermains.

Sanitary

b. 250 mm dia. SAN Sewer on Carling Avenue

c. 1050 mm dia Conc. SAN Sewer on Merivale Avenue. Connection to be into existing maintenance hole.

Stormwater

d. 375 mm dia. STM Sewer on Merivale Avenue

Servicing Details

e. Connections to trunk sewers and easement sewers are typically not permitted. Contact City Project Manager if a connection to a trunk sewer is required. Additional submission/design requirements will be confirmed at the time of the request.

f. A sanitary monitoring maintenance hole will be required. Place the monitoring maintenance hole outside of vehicular traffic paths, and place as close to the property line (on the private property side) as possible.

g. Review provision of a high-level sewer.

h. Sewer connections to be made above the springline of the sewermain as per:

i. Std Dwg S11.1 for flexible main sewers – connections made using approved tee or wye fittings.

ii. Std Dwg S11 (For rigid main sewers) – lateral must be less that 50% the diameter of the sewermain,

iii. Std Dwg S11.2 (for rigid main sewers using bell end insert method) – for larger diameter laterals where manufactured inserts are not available; lateral must be less that 50% the diameter of the sewermain,

iv. Connections to manholes permitted when the connection is to rigid main sewers where the lateral exceeds 50% the diameter of the sewermain. – Connect obvert to obvert with the outlet pipe unless pipes are a similar size.

14. An MECP Environmental Compliance Approval **Private Sewage Works** may be required for the proposed development. A Ministry contact has been provided below but please work with City staff on the need (or not) of an application.

    a. Shannon Hamilton-Browne at (613) 521-3450 or Shannon.Hamilton-Browne@ontario.ca

15. Water

    a. Capacity should be verified. Submit a request for boundary conditions to the City of Ottawa Project Manager.

    b. A Water Data Card will be required for each building to determine the meter size. A Water Data Card can be submitted post-approval, prior to issuing a Commence Work Notification.

    c. Water Boundary condition requests must include the location of the service (map or plan with connection location(s) indicated) and the expected loads required by the proposed development, including calculations. Please provide the following information:

        i. Location of service

        ii. Type of development

        iii. The amount of fire flow required (per OBC or FUS).

        iv. Average daily demand: ___ l/s.

        v. Maximum daily demand: ___l/s.

        vi. Maximum hourly daily demand: ___ l/s.

16. Sewer Capacity (sanitary and storm)

a. Submit the proposed wastewater peak flow for this phase to the City of Ottawa Project Manager to confirm available capacity and/or any specific design criteria.

b. Submit the proposed stormwater peak flow for this phase to the City of Ottawa Project Manager to confirm available capacity and/or any specific design criteria.

17. Fire-fighting flow rate(s) shall be calculated per the FUS2020 methodology.

18. A site-specific Geotechnical investigation is required (including, where applicable, detailed sensitive marine clay investigation). Consider shoring/encroachments details and impacts to neighbouring properties and/or the public realm.

19. A Slope stability investigation will be required if there are any retaining walls with heights more than 1.0m proposed on-site.

Feel free to contact Tyler Cassidy, P.Eng., Project Manager, for follow-up questions.

**Noise**

Comments:

20. Noise study is not required.

Feel free to contact Reed Adams, TPM, for follow-up questions.

**Transportation**

Comments:

21. TIA:

    a. Not required

22. ROW:

    a. Ensure that the development proposal complies with the Right-of-Way protection requirements of the Official Plan's Schedule C16.

        i. Any requests for exceptions to ROW protection requirements must be discussed with Transportation Planning and concurrence provided by Transportation Planning management.

23. Site Plan:

    a. As the proposed site is commercial and for general public use, AODA legislation applies.

i. Ensure all crosswalks located internally on the site provide a TWSI at the depressed curb, per requirements of the Integrated Accessibility Standards Regulation under the AODA.

ii. Clearly define accessible parking stalls and ensure they meet AODA standards (include an access aisle next to the parking stall and a pedestrian curb ramp at the end of the access aisle, as required).

iii. Please consider using the City's Accessibility Design Standards, which provide a summary of AODA requirements.

b. Show all details of the roads abutting the site; include such items as pavement markings, accesses and/or sidewalks.

c. Turning movement diagrams required for all accesses showing the largest vehicle to access/egress the site.

d. Turning movement diagrams required for internal movements (loading areas, garbage).

e. Show all curb radii measurements; ensure that all curb radii are reduced as much as possible and fall within TAC guidelines (Figure 8.5.1).

f. Show dimensions for site elements (i.e. lane/aisle widths, access width and throat length, parking stalls, sidewalks, pedestrian pathways, etc.)

Feel free to contact Reed Adams, Transportation Project Manager, for follow-up questions.

**Transportation Planning (Cycling)**

Comments:

24. Please ensure that any works to either the Merivale Road frontage or the Carling Avenue frontage do not compromise city plans to add transit and cycling reserved lanes. The cycling facilities will be upgraded from the existing Carling westbound bike lanes and the Merivale southbound bike lanes to cycle tracks (ie. grade-separated from motor traffic).

Feel free to contact Robin Bennett, Project Manager – Cycling Programs, for follow-up questions.

**Environmental Planner**

Comments:

1. The City's Bird Safe Design Guidelines will apply to this application. Please review the document and incorporate mitigation measures as necessary.

2. The City has strong guidance for tree planting to help meet the urban forest canopy goals as well as to reduce the impacts of climate change and the urban heat island effect. Seek out opportunities for additional plantings where possible.

3. The parking lots are a high priority for tree planting as the large tracts of impermeable surface represent a particularly high risk of contributing the urban heat island.

4. Please note that the City prefers tree plantings to be of native and non-invasive species.

Feel free to contact Mark Elliott, Environmental Planner, for follow-up questions.

**Parkland**

Comments:

5. Cash-in-lieu of parkland conveyance will be required as a condition of site plan approval based on a rate of 2% of the gross land area for commercial uses in accordance with the provisions of Parkland Dedication By-law No. 2022-280. For commercial redevelopment, gross land area is defined as the portion of the property that is impacted by the proposed development.

Feel free to contact Burl Walker, Parks Planner, for follow-up questions.

**Other**

6. The High Performance Development Standard (HPDS) is a collection of voluntary and required standards that raise the performance of new building projects to achieve sustainable and resilient design and will be applicable to Site Plan Control and Plan of Subdivision applications.

    a. The HPDS was passed by Council on April 13, 2022, but is not in effect at this time, as Council has referred the 2023 HPDS Update Report back to staff with the direction to bring forward an updated report to Committee at a later date. The timing of an updated report to Committee is unknown at this time, and updates will be shared when they are available.

    b. Please refer to the HPDS information at ottawa.ca/HPDS for more information.

**Submission Requirements and Fees**

1. The following application type is required: New Complex Site Plan Control ($72,000.22 plus Initial Engineering Design Review and Inspection Fee plus

Consevantion Authority Fee $125.00). Please note that this is based on the 2024 fees which are subject to change in 2025.

   a. Additional information regarding fees related to planning applications can be found here.

2. The attached **Study and Plan Identification List** outlines the information and material that has been identified as either required (R) or advised (A) as part of a future complete application submission.

   a. The required plans and studies must meet the City's Terms of Reference (ToR) and/or Guidelines, as available on Ottawa.ca. These ToR and Guidelines outline the specific requirements that must be met for each plan or study to be deemed adequate.

3. All of the above comments or issues should be addressed to ensure the effectiveness of the application submission review.

Should there be any questions, please do not hesitate to contact myself or the contact identified for the above areas / disciplines.

Yours Truly,
Mélanie Gervais, MCIP, RPP

Encl. Study and Plan Identification List (SPIL)
Pre-con Supplementary Development Information
HPDS Overview for Applicants
HPDS Example Checklist
Urban Design Brief Terms of Reference

c.c.
Nader Kadri, Urban Design
Tyler Cassidy, IPM
Reed Adams, TPM
Burl Walker, Parks
Robin Bennett, Transportation Planning
Samantha Gatchene, Planning
Nathan Li, Planning

# APPENDIX B

## WATER SERVICING

D.B. Gray Engineering Inc.

*Stormwater Management - Grading & Drainage - Storm & Sanitary Sewers - Watermains*

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Ottawa, Ontario K1T 4E9

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d.gray@dbgrayengineering.com

March 4, 2025

# 1309 Carling Avenue

## Existing Building A and Phase 1B Building

Ottawa, Ontario

# FIRE FLOW CALCULATIONS

## OBC Method

Q = Required water supply in litres
= $KVS_{Total}$

K = Water supply coefficient as per OBC A-3.2.5.7. Table 1
= 10 Building is of noncombustible construction with fire separations with fire resistance ratings.

V = Building volume in cubic meters

| | Floor Area (sq.m) | Height (m) | Volume (cu.m) |
|---|---|---|---|
| 1st Floor: | 5,580 | 6.1 | 34,038 |
| | | | 34,038 |

$S_{Total}$ = Total of spatial coefficients from exposure distances
= $1.0 + S_{Side\ 1} + S_{Side\ 2} + S_{Side\ 3} + S_{Side\ 4}$

| | Spatial Coefficient | Exposure Distance (m) | |
|---|---|---|---|
| $S_{Side\ 1}$ | 0.5 | 0.4 | (to north property line) |
| $S_{Side\ 2}$ | 0.0 | 88 | (east to Existing Building) |
| $S_{Side\ 3}$ | 0.0 | 38 | (to centerline of Carling Avenue) |
| $S_{Side\ 4}$ | 0.0 | 28 | (to centerline of Blohm Drive) |
| $S_{Total}$ | 1.5 | | |

Q = 510,570 L
= 9,000 L/min as per OBC A-3.2.5.7. Table 2
= 150 L/s

D.B. Gray Engineering Inc.

*Stormwater Management - Grading & Drainage - Storm & Sanitary Sewers - Watermains*

700 Long Point Circle
Ottawa, Ontario K1T 4E9

613-425-8044
d.gray@dbgrayengineering.com

March 4, 2025

# 1309 Carling Avenue

## Existing Building A and Phase 1B Building

Ottawa, Ontario

## FIRE FLOW CALCULATIONS

## FUS Method

RFF = Required Fire Flow in litres per minute
= $220CA^{0.5}$

C = Construction Coefficient related to the type of construction of the building
= 0.8 Type II Noncombustible Construction

A = Total Effective Floor Area in square meters of the building

| | | |
|---|---|---|
| Mezzanine: | 178 | sq.m |
| 1st Floor: | 5,402 | sq.m |
| | 5,580 | sq.m |

RFF = 13,147 L/min
= 13,000 L/min (rounded to nearest 1,000 L/min)

Occupancy and Contents Adjustment Factor

| | | |
|---|---|---|
| | -15% | Limited Combustible Contents |
| = | -1,950 | L/min Occupancy and Contents Adjustment Factor |

RFF = 11,050 L/min

Automatic Sprinkler Protection Credit

| | | |
|---|---|---|
| | 30% | Sprinkler system designed, installed and maintained in accordance with NFPA standards |
| | 10% | Standard water supply for both the sprinkler system and fire department hose lines |
| = | 4,420 | L/min - Automatic Sprinkler Protection Credit |

Exposure Adjustment Charge

| Side | Charge | Distance | Construction | Length | Storeys | Factor |
|---|---|---|---|---|---|---|
| North | 0% | over 30 m | | | | |
| East | 0% | over 30 m | | | | |
| South | 0% | over 30 m | | | | |
| West | 5% | 20.1 m to 30 m | Type III | 31 | 6 | 186 |

5% Exposure Adjustment Charge
= 553 L/min Exposure Adjustment Charge

RFF = 7,183 L/min
= 7,000 L/min (rounded to nearest 1,000 L/min)
= 116.7 L/s

| | | | | | | |
|---|---|---|---|---|---|---|
| 116.7 L/s Fire Flow HGL: | 125.0 | m | | | | |
| Grade Elevation at Connection 1 (approximate) | 74.0 | m | | | | |
| Static Pressure at Fire Hydrant: | 51.0 | m | 500 | kPa | 72.5 | psi |

# WATER SUPPLY
# FOR
# PUBLIC FIRE PROTECTION

*A Guide to Recommended Practice in Canada*

2020

**Fire Underwriters Survey**

## Construction Coefficient (C)

Note that the construction typology used by the insurance industry and public fire protection differs from the terms of reference in the National Building Code of Canada (NBC).

The following Construction Types and Coefficients are used in the required fire flow formula:

| | | |
|---|---|---|
| C | = | 1.5 for **Type V** Wood Frame Construction |
| | = | 0.8 for **Type IV-A** Mass Timber Construction |
| | = | 0.9 for **Type IV-B** Mass Timber Construction |
| | = | 1.0 for **Type IV-C** Mass Timber Construction |
| | = | 1.5 for **Type IV-D** Mass Timber Construction |
| | = | 1.0 for **Type III** Ordinary Construction |
| | = | 0.8 for **Type II** Noncombustible Construction |
| | = | 0.6 for **Type I** Fire Resistive Construction |

When determining the predominate Construction Coefficient of a building, the following reference terms are used by fire underwriters and fire departments.

**Wood Frame Construction (Type V)**
A building is considered to be of Wood Frame construction (Type V) when structural elements, walls, arches, floors, and roofs are constructed entirely or partially of wood or other material.

Note: Includes buildings with exterior wall assemblies that are constructed with any materials that do not have a fire resistance rating that meets the acceptance criteria of CAN/ULC-S114. May include exterior surface brick, stone, or other masonry materials where they do not meet the acceptance criteria.

**Mass Timber (Type IV)**
Mass timber construction, including Encapsulated Mass Timber, Heavy Timber and other forms of Mass Timber are considered as one of the following sub-types relating to the fire resistance ratings of assemblies as follows:

- Type IV-A (Encapsulated Mass Timber)
    - A building is considered to be of Mass Timber Type IV-A (Encapsulated Mass Timber) construction when structural elements, walls, arches, and floors have a minimum 2-hour fire resistance rating and the roof has a minimum 1 hour fire resistance rating. Additionally all elements of the building must meet the requirements set out for Encapsulated Mass Timber Construction within the 2020 National Building Code of Canada . For types of mass timber construction that do not fully meet these criteria, treat as Type IV-B, Type IV-C or Type IV-D.
- Type IV-B (Rated Mass Timber)
    - A building is considered to be of Mass Timber Type IV-B (Rated Mass Timber) construction when the building assemblies include mass timber construction elements and all structural elements, exterior walls, interior bearing walls and roof have a minimum 1-hour fire resistance rating.

- Type IV-C (Ordinary Mass Timber)
    - A building is considered to be of Mass Timber Type IV-C (Partially Rated Mass Timber) construction when exterior walls are of Mass Timber construction with a minimum 1-hour fire resistance rating. Other structural elements, interior bearing walls and the roof may not have a fire resistance rating.
- Type IV-D (Un-Rated Mass Timber)
    - A building is considered to be of Mass Timber Type IV-D (Un-Rated Mass Timber) construction when exterior walls do not have a minimum 1-hour fire resistance rating, regardless of the fire resistance rating of other structural elements, interior bearing walls and the roof.

**Ordinary Construction (Type III also known as joisted masonry)**

A building is considered to be of Ordinary construction (Type III) when exterior walls are of masonry construction (or other approved material) with a minimum 1-hour fire resistance rating, but where other elements such as interior walls, arches, floors and/or roof do not have a minimum 1 hour fire resistance rating.

**Noncombustible Construction (Type II)**

A building is considered to be of Noncombustible construction (Type II) when all structural elements, walls, arches, floors, and roofs are constructed with a minimum 1-hour fire resistance rating and are constructed with noncombustible materials.

**Fire-Resistive Construction (Type I)**

A building is considered to be of Fire-resistive construction (Type I) when all structural elements, walls, arches, floors, and roofs are constructed with a minimum 2-hour fire resistance rating, and all materials used in the construction of the structural elements, walls, arches, floors, and roofs are constructed with noncombustible materials.

**Items of Note Regarding Construction Coefficients**

i. Unprotected noncombustible construction (example unprotected steel) should be considered within ordinary construction or noncombustible construction based on the minimum fire resistance rating of the structural elements, exterior walls, and interior bearing walls;
    - If minimum fire resistance rating of exterior walls is 1 hr, apply Ordinary Construction Coefficient (1.0)
    - If minimum fire resistance rating of all structural elements, walls, arches, floors, and roofs is 1 hr, apply Noncombustible Construction Coefficient (0.8).

ii. If a building cannot be defined within a single Construction Coefficient, the Construction Coefficient is determined by the predominate Construction Coefficient that makes up more than 66% or over of the Total Floor Area.

## Automatic Sprinkler Protection

The required fire flow may be reduced by up to 50 percent for complete Automatic Sprinkler Protection depending upon adequacy of the system. Where only part of a building is protected by Automatic Sprinkler Protection, credit should be interpolated by determining the percentage of the Total Floor Area being protected by the automatic sprinkler system.

To be able to apply the full 50 percent reduction, the following areas should be reviewed to determine the appropriate level of credit for having Automatic Sprinkler Protection as per the table below:

**Table 4 Sprinkler Credits**

| Automatic Sprinkler System Design | Credit | |
|---|---|---|
| | With complete building coverage | With partial building coverage of X% |
| Automatic sprinkler protection designed and installed in accordance with NFPA 13 | 30% | 30% × Percentage of Total Floor Area Serviced by Sprinkler System |
| Water supply is standard for both the system and Fire Department hose lines | 10% | 10% × Percentage of Total Floor Area Serviced by Sprinkler System |
| Fully supervised system | 10% | 10% × Percentage of Total Floor Area Serviced by Sprinkler System |

### Automatic Sprinkler Protection Designed and Installed in Accordance with Applicable NFPA Standards (30%)

The initial credit for Automatic Sprinkler Protection is a maximum of 30% based on the system being designed and installed in accordance with the applicable criteria of NFPA 13, *Standard for Installation of Sprinkler Systems,* NFPA 13R, *Standard for the Installation of Sprinkler Systems in Low-Rise Residential* Occupancies, or NFPA 13D, *Standard for the Installation of Sprinkler Systems in One- and Two-Family Dwellings and Manufactured Homes* and being maintained in accordance with the applicable criteria of NFPA 25, *Standard for the Inspections, Testing and Maintenance of Water-Based Fire* (see Recognition of Automatic Sprinkler Protection).

### Water Supply is Standard for both the Sprinkler System and Fire Department Hose Lines (10%)

To qualify to apply an additional 10% reduction, a water supply that is standard for both the sprinkler system and fire department hose lines is required, to qualify the following conditions should be satisfied:

a) Sprinkler system is supplied by a pressurized water supply system (public or private) that is designed and built with no major non-conformance issues (i.e. water supply system is designed in accordance with Part 1 of the Water Supply for Public Fire Protection to qualify for fire insurance grading recognition).

b) Calculated demand for maximum sprinkler design area operation in addition to hose stream requirements are below the available water supply curve (at the corresponding flow rate and pressure). An appropriate safety margin is used to take into account the difference between the available water supply curve at the time of hydrant flow testing as compared to the available water supply curve during Maximum Day Demand.

c) Volume of water available is adequate for the total flow rate including the maximum sprinkler design area operation plus required hose streams plus Maximum Day Demand for the full duration of the design fire event.
d) Residual pressure at all points in the water supply system can be maintained at not less than 150 kPa during the flowing of the sprinkler and required hose streams (plus Maximum Day Demand).

**Fully Supervised System (10%)**

To qualify to apply an additional 10% reduction, an automatic sprinkler system should be fully supervised. The purpose of the supervisory signal is to ensure that malfunctions of the automatic sprinkler system will be discovered and corrected promptly, while the water flow alarm serves to notify emergency services of the fire as soon as the automatic sprinkler system activates.

- a distinctive supervisory signal to indicate conditions that could impair the satisfactory operation of the sprinkler system (a fault alarm), which is to sound and be displayed, either at a location within the building that is constantly attended by qualified personnel (such as a security room), or at an approved remotely located receiving facility (such as a monitoring facility of the sprinkler system manufacturer); and
- a water flow alarm to indicate that the sprinkler system has been activated, which is to be transmitted to an approved, proprietary alarm-receiving facility, a remote station, a central station or the fire department.

**Additional Reductions for Community Level Automatic Sprinkler Protection of Area**

Buildings located within communities or subdivisions that are completely sprinkler protected may apply up to a maximum additional 25% reduction in required fire flows beyond the normal maximum of 50% reduction for sprinkler protection of an individual building.
This additional reduction may be applied where all the following conditions are met:

a) the community has a bylaw requiring all buildings that may be built within 30 m of the subject building to be fully sprinkler protected. I.e. future development will not create unsprinklered buildings within 30 m of the subject building, and
b) all buildings within 30 meters of the subject building are fully sprinkler protected with systems that are designed and installed in accordance with the applicable criteria of NFPA 13, *Standard for Installation of Sprinkler Systems,* NFPA 13R, *Standard for the Installation of Sprinkler Systems in Low-Rise Residential* Occupancies, or NFPA 13D, *Standard for the Installation of Sprinkler Systems in One- and Two-Family Dwellings and Manufactured Homes,* and
c) the community has in place a Fire Prevention Program that provides a system of ensuring that installed fire sprinkler systems are inspected, tested, and maintained in accordance with NFPA 25: *Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems*, and
d) the community maintains the pressure and flow rate requirements for fire sprinkler installations. I.e. the community does not make significant reductions to the operating pressures or flows across the distribution network.

**Adjustment of Sprinkler Reductions for Community Level Oversight of Sprinkler Maintenance, Testing and Water Supply Requirements**

The reduction in required fire flows for sprinkler protection may be reduced or eliminated if

a) the community does not have a Fire Prevention Program that provides a system of ensuring that installed fire sprinkler systems are inspected, tested, and maintained in accordance with NFPA 25: *Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems*, or
b) the community does not maintain the pressure and flow rate requirements for fire sprinkler installations, or otherwise allows the flow rates and pressure levels that were available during sprinkler system design to significantly degrade, increasing the probability of inadequate water supply for effective sprinkler operation.

## Recognition of Automatic Sprinkler Protection

A property should be considered as "sprinkler protected" for the purposes of determining required fire flows, if the building has an automatic fire sprinkler system:

- designed and installed throughout all areas in accordance with NFPA 13, *Standard for Installation of Sprinkler Systems*, and maintained in accordance with the NFPA 25, *Standard for the Inspections, Testing and Maintenance of Water-Based Fire Protection Systems*, and
- supplied by water infrastructure capable of meeting all pressure and flow requirements of the sprinkler system concurrently with Max Day Demand (if connected to a domestic system)

Evidence of the sprinkler system design, installation should be acquired from the party responsible for the building (the owner, building engineer or property manager) or the municipal fire prevention office.

On site, the sprinkler system should carry test tags verifying that a qualified person has conducted tests including:

- flushing and hydrostatic tests of both the underground and overhead piping in accordance with NFPA 13;
- full-flow main drain test within the previous 48 months.
- dry-pipe trip test (if applicable) conducted within the last 48 months
- fire-pump test (if applicable) conducted within the last 48 months

## Items of Note for Sprinkler Systems

i. It is important to note that installation of automatic sprinkler systems provides a highly effective and reliable system of fire protection however, this does not preclude the need for manual fire flows entirely as some fires, for various reasons, grow beyond the capability of sprinkler protection to be effective, and in these cases, manual fire fighting intervention is required.

D.B. Gray Engineering Inc.

*Stormwater Management - Grading & Drainage - Storm & Sanitary Sewers - Watermains*

700 Long Point Circle
Ottawa, Ontario K1T 4E9

613-425-8044
d.gray@dbgrayengineering.com

March 4, 2025

# 1309 Carling Avenue

## Existing Building A and Phase 1B Building

Ottawa, Ontario

## WATER DEMAND CALCULATIONS

| | | | | | | |
|---|---|---|---|---|---|---|
| Average Daily Demand: | 3.05 | ha | | | | |
| | 28,000 | L/ha/day | | | | |
| | 85,400 | L/day | | | | |
| | 24 | hour day | | | | |
| | 59.3 | L/min | 1.0 | L/s | 15.7 | USgpm |
| Maximum Daily Demand: | 1.5 | (Peaking factor as per City of Ottawa Water Design Guidelines) | | | | |
| | 89.0 | L/min | 1.5 | L/s | 23.5 | USgpm |
| Maximum Hourly Demand: | 1.8 | (Peaking factor as per City of Ottawa Water Design Guidelines) | | | | |
| | 160.1 | L/min | 2.7 | L/s | 42.3 | USgpm |

---

| | | | | | | |
|---|---|---|---|---|---|---|
| Elevation of Water Meter: | 75.37 | m | | | | |
| Finished Floor Elevation: | 74.47 | m | | | | |
| Minimum HGL: | 124.4 | m | | | | |
| Static Pressure at Water Meter: | 49.0 | m | 481 | kPa | 70 | psi |
| Maximum HGL: | 132.8 | m | | | | |
| Static Pressure at Water Meter: | 57.4 | m | 563 | kPa | 82 | psi |

D.B. Gray Engineering Inc.

Ryan Faith <r.faith@dbgrayengineering.com>

# RE: Request for Boundary Conditions - 1309 Carling Avenue

1 message

**Thakur, Roshni** <roshni.thakur@ottawa.ca> Wed, Feb 19, 2025 at 8:54 AM
To: Ryan Faith <r.faith@dbgrayengineering.com>
Cc: "Cassidy, Tyler" <tyler.cassidy@ottawa.ca>, Douglas Gray <d.gray@dbgrayengineering.com>

Good morning Ryan,

The following are boundary conditions, HGL, for hydraulic analysis at 1309 Carling Avenue Crescent (zone 2W2C) assumed to be connected via two connections to the 406mm watermain on Carling Avenue (see attached PDF for location).

Both Connections:

Minimum HGL = 124.4 m

Maximum HGL = 132.8 m

Max Day + Fire Flow (116.7 L/s) = 125.0 m (Connection 1), 124.8 m (Connection 2)

*The maximum pressure is estimated to be more than 80 psi. A pressure check at completion of construction is recommended to determine if pressure control is required.*

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. Fire Flow analysis is a reflection of available flow in the watermain; there may be additional restrictions that occur between the watermain and the hydrant that the model cannot take into account.*

Best Regards,
**Roshni Thakur**

**Engineering Graduate**

Planning, Development and Building Services department (PDBS)/ Direction générale des services de la planification, de l'aménagement et du bâtiment (DGSPAB)

Development Review – South Branch | Examen du Développement - Succursale Sud

City of Ottawa | Ville d'Ottawa

110 Laurier Avenue West Ottawa, ON | 110, avenue Laurier Ouest. Ottawa (Ontario) K1P 1J1

613-580-2424 ext. 15380, roshni.thakur@ottawa.ca

---

**From:** Ryan Faith <r.faith@dbgrayengineering.com>
**Sent:** January 22, 2025 10:56 AM
**To:** Thakur, Roshni <roshni.thakur@ottawa.ca>
**Cc:** Cassidy, Tyler <tyler.cassidy@ottawa.ca>; Douglas Gray <d.gray@dbgrayengineering.com>
**Subject:** Fwd: Request for Boundary Conditions - 1309 Carling Avenue



Hi Roshni,

See below. Applicant wants to submit ASAP so I'd appreciate if this can be expedited or at least not wait until Tyler returns.

Thanks,

**Ryan Faith**
**D.B. Gray Engineering Inc.**
700 Long Point Circle
Ottawa, Ontario K1T 4E9
613-425-8044

---------- Forwarded message ---------
From: **Ryan Faith** <r.faith@dbgrayengineering.com>
Date: Wed, Jan 22, 2025 at 10:51 AM
Subject: Request for Boundary Conditions - 1309 Carling Avenue
To: Tyler Cassidy <tyler.cassidy@ottawa.ca>
Cc: Douglas Gray <d.gray@dbgrayengineering.com>

Hi Tyler,

Please provide the boundary conditions for the 400 mm Carling Avenue municipal watermain at 1309 Carling Avenue. Existing points of connection can be seen on geoOttawa south of the Shoppers Drug Mart and south of the new residential tower. We have calculated the following expected demands:

Fire flow demand: 116.7 L/s
Average daily demand: 1.6 L/s
Maximum daily demand: 2.4 L/s
Maximum hourly demand: 4.3 L/s

Calculations are attached.

Thanks,

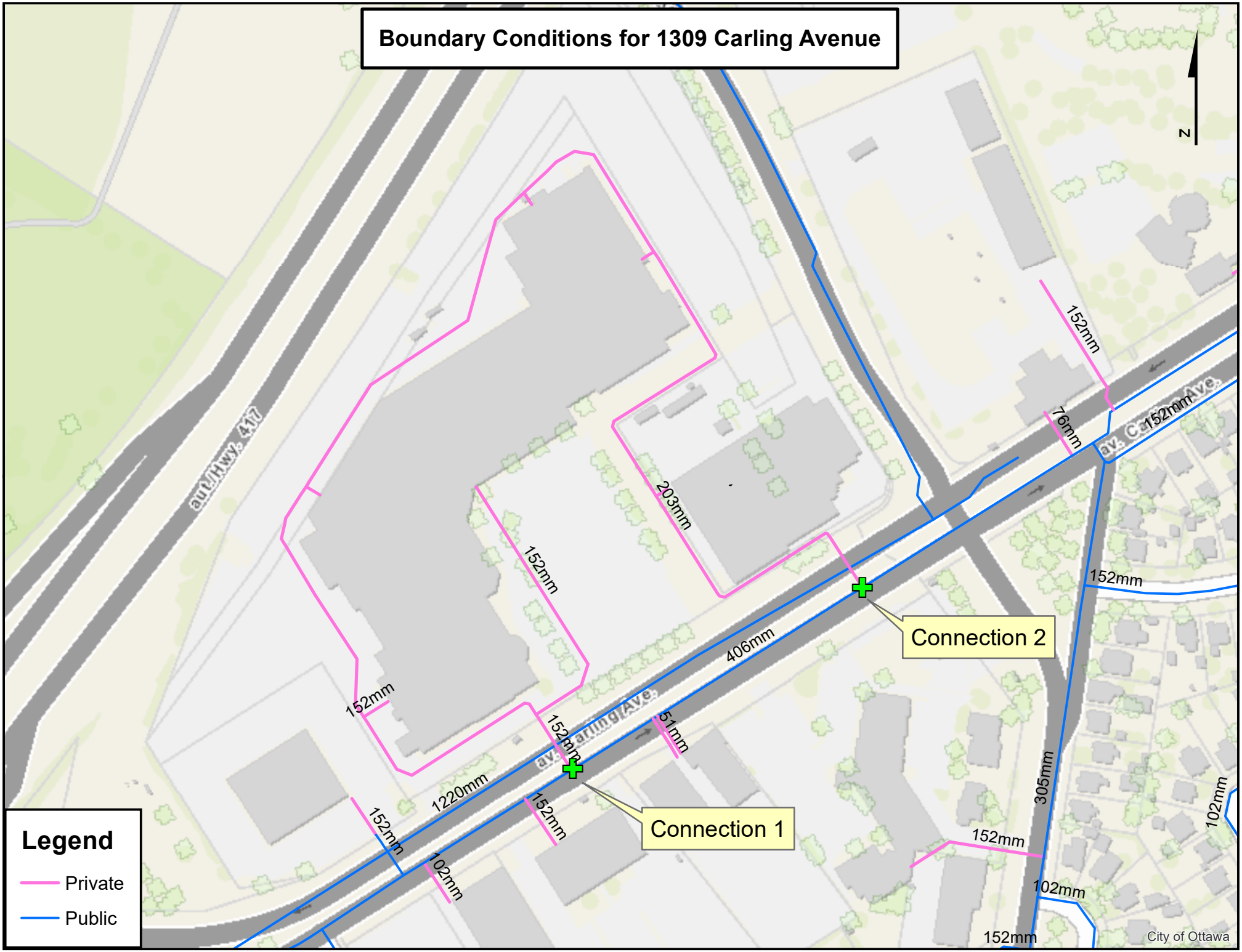
**Ryan Faith**
**D.B. Gray Engineering Inc.**
700 Long Point Circle
Ottawa, Ontario K1T 4E9
613-425-8044

'



'

**1309 Carling Avenue February 2025.pdf**
1060K


Boundary Conditions for 1309 Carling Avenue
N
Connection 2
Connection 1
406mm
1220mm
305mm
203mm
152mm
152mm
152mm
152mm
152mm
152mm
152mm
152mm
152mm
152mm
102mm
102mm
102mm
76mm
51mm
Legend
Private
Public
City of Ottawa

| DATE | 24-May-23 |
|---|---|

| | | | |
|---|---|---|---|
| CLIENT | LLA Architecture+ Inc. | INSPECTOR NAME | Chris Lytle |
| BUILDING NAME | Westgate Mall | COMPANY | Avangard Fire & Life Safety |
| STREET | 1309 Carling Avenue | STREET | 2979 Merivale Road |
| CITY | Ottawa, Ontario | CITY | Ottawa, Ontario |
| SITE CONTACT | 0 | PHONE # | (613) 223-2223 |
| PHONE # | 0 | LICENSE # | 400129528 |

# FIRE HYDRANT FLOW TEST RESULTS

## HYDRANT #1 FLOW TEST

FLOW HYDRANT LOCATION: HYDRANT #1 (SEE ATTACHED MAP)

PRESSURE GAUGE HYDRANT LOCATION: HYDRANT #2 (SEE ATTACHED MAP)

DEVICES USED TO MEASURE FLOW/PRESSURE: HOSE MONSTER

| STATIC PRESSURE (PSI) | NOZZLE SIZE (INCH) | PITOT READING (PSI) | GPM | RESIDUAL PRESSURE (PSI) |
|---|---|---|---|---|
| 80 | 1x 2.5" | 22 | 787 | 74 |
| | | | | |

## HYDRANT #2 FLOW TEST

FLOW HYDRANT LOCATION: HYDRANT #3 (SEE ATTACHED MAP)

PRESSURE GAUGE HYDRANT LOCATION: HYDRANT #4 (SEE ATTACHED MAP)

DEVICES USED TO MEASURE FLOW/PRESSURE: HOSE MONSTER

| STATIC PRESSURE (PSI) | NOZZLE SIZE (INCH) | PITOT READING (PSI) | GPM | RESIDUAL PRESSURE (PSI) |
|---|---|---|---|---|
| 78 | 1x 2.5" | 22 | 787 | 72 |
| | | | | |

## HYDRANT #3 FLOW TEST

FLOW HYDRANT LOCATION:

PRESSURE GAUGE HYDRANT LOCATION:

DEVICES USED TO MEASURE FLOW/PRESSURE:

| STATIC PRESSURE (PSI) | NOZZLE SIZE (INCH) | PITOT READING (PSI) | GPM | RESIDUAL PRESSURE (PSI) |
|---|---|---|---|---|
| | | | | |
| | | | | |

## HYDRANT #4 FLOW TEST

FLOW HYDRANT LOCATION:

PRESSURE GAUGE HYDRANT LOCATION:

DEVICES USED TO MEASURE FLOW/PRESSURE:

| STATIC PRESSURE (PSI) | NOZZLE SIZE (INCH) | PITOT READING (PSI) | GPM | RESIDUAL PRESSURE (PSI) |
|---|---|---|---|---|
| | | | | |
| | | | | |


Hampton Park
(Dog Park)
Trans-Canada Hwy
Capital City Dance
ServiceOntario
HYDRANT #4
Superior Photo
Westgate Mall
Merivale Rd
Merivale Rd
417
HYDRANT #2
Rhythm Apartments
HYDRANT #3
Mada Ottawa
Canada Post
38
HYDRANT #1

# APPENDIX C

## SANITARY SERVICING

# SANITARY SEWER CALCULATIONS

D.B. Gray Engineering Inc.

*Stormwater Management - Grading & Drainage - Storm & Sanitary Sewers - Watermains*

700 Long Point Circle
Ottawa, Ontario K1T 4E9

613-425-8044
d.gray@dbgrayengineering.com

Project: 1309 Carling Avenue
Phase 1B Redevelopment
Ottawa, Ontario

Date: May 9, 2025

| Location | | Commercial | | | | Infiltration | Q | Sewer Data | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Individual | Cumulative | | | Cumulative | Total | | Nominal | Actual | | | $Q_{Full}$ | |
| From | To | Area (ha) | Area (ha) | Peaking Factor | Flow Rate (L/s) | Flow Rate (L/s) | Flow Rate (L/s) | Length (m) | Diameter (mm) | Diameter (mm) | Slope (%) | Velocity (m/s) | Capacity (L/s) | $Q / Q_{Full}$ |
| | | | | | | | | | | | | | | |
| Existing Building | Novatech 109 | 3.05 | 3.0500 | 1.5 | 1.48 | 1.01 | 2.49 | | | | | | | |
| | | | | | | | | | | | | | | |
| Existing Building A | MH-SA.1 | 1.525 | 1.5250 | 1.5 | 0.74 | 0.50 | 1.24 | | | | | | | |
| | | | | | | | | | | | | | | |
| Proposed Building B | MH-SA.1 | 1.525 | 1.5250 | 1.5 | 0.74 | 0.50 | 1.24 | 8.9 | 200 | 200 | 2 | 1.48 | 46.38 | 3% |
| | | | | | | | | | | | | | | |
| MH-SA.1 | Novatech 107 | 0.0000 | 3.0500 | 1.5 | 1.48 | 1.01 | 2.49 | 15.8 | 250 | 250 | 0.3 | 0.66 | 32.57 | 8% |
| | | | | | | | | | | | | | | |

Commercial Average Daily Flow: 28,000 L/ha/day
Commercial Peaking Factor: 1.5

Infiltration Allowance: 0.33 L/s/ha

Manning's Roughness Coefficient: 0.013

# APPENDIX D

## STORMWATER MANAGEMENT

# SUMMARY TABLES

## 100-YEAR EVENT

| Drainage Area | Pre-Development Flow Rate (L/s) | Maximum Allowable Release Rate (L/s) | Maximum Release Rate (L/s) | Maximum Volume Required (cu.m) | Maximum Volume Stored (cu.m) |
|---|---|---|---|---|---|
| AREA I (Roof) | - | - | 7.47 | 118.54 | 118.54 |
| AREA II | - | - | 59.63 | 138.66 | 138.66 |
| TOTAL | 341.62 | 67.10 | 67.10 | 257.21 | 257.21 |

## 2-YEAR EVENT

| Drainage Area | Pre-Development Flow Rate (L/s) | Maximum Allowable Release Rate (L/s) | Maximum Release Rate (L/s) | Maximum Volume Required (cu.m) | Maximum Volume Stored (cu.m) |
|---|---|---|---|---|---|
| AREA I (Roof) | - | - | 5.15 | 38.70 | 38.70 |
| AREA II | - | - | 36.74 | 43.14 | 43.14 |
| TOTAL | 132.25 | 67.10 | 41.88 | 81.83 | 81.83 |

May 9, 2025

# PHASE 1B REDEVELOPMENT
# 1309 Carling Avenue
Ottawa, Ontario

# STORMWATER MANAGEMENT CALCULATIONS
# Modified Rational Method

# PRE-DEVELOPMENT CONDITIONS

## 100-YEAR EVENT

| | | | C |
|---|---|---|---|
| Roof Area: | 6,300 | sq.m | 1.00 |
| Hard Area: | 582 | sq.m | 1.00 |
| Gravel Area: | 0 | sq.m | 0.875 |
| Soft Area: | 0 | sq.m | 0.25 |
| Total Catchment Area: | 6,882 | sq.m | 1.00 |
| Area (A): | 6,882 | sq.m | |
| Time of Concentration: | 10 | min | |
| Rainfall Intensity (i): | 179 | mm/hr | |
| Runoff Coeficient (C): | 1.00 | | |

100-Year Pre-Development Flow Rate (2.78AiC): 341.62 L/s

# 2-YEAR EVENT

| | | | C |
|---|---|---|---|
| Roof Area: | 6,300 | sq.m | 0.90 |
| Hard Area: | 582 | sq.m | 0.90 |
| Gravel Area: | 0 | sq.m | 0.70 |
| Soft Area: | 0 | sq.m | 0.20 |
| Total Catchment Area: | 6,882 | sq.m | 0.90 |

| | | |
|---|---|---|
| Area (A): | 6,882 | sq.m |
| Time of Concentration: | 10 | min |
| Rainfall Intensity (i): | 77 | mm/hr |
| Runoff Coeficient (C): | 0.90 | |

5-Year Pre-Development Flow Rate (2.78AiC): 132.25 L/s

# MAXIMUM ALLOWABLE RELEASE RATE

| | | |
|---|---|---|
| Area (A): | 6,882 | sq.m |
| Criterion: | 97.5 | L/s/ha |

Maximum Allowable Release Rate (2.78AiC): 67.10 L/s

# 100-YEAR EVENT

## DRAINAGE AREA I (Roof)

(100-YEAR EVENT)

| | | | C |
|---|---|---|---|
| Total Catchment Area: | 2,572 | sq.m | 1.00 |

| | | |
|---|---|---|
| No. of Roof Drains: | 4 | |
| Slots per Wier: | 1 | 0.01242 L/s/mm/slot (5 USgpm/in/slot) |
| Depth at Roof Drains: | 150 | mm |
| Maximum Release Rate: | 7.47 | L/s |

| | | |
|---|---|---|
| Pond Area: | 2,364 | sq.m |
| Maximum Volume Stored: | 118.54 | cu.m |
| Maximum Volume Required: | 118.54 | cu.m |

# DRAINAGE AREA I (Continued)

(100-YEAR EVENT)

| Time (min) | i (mm/hr) | 2.78AiC (L/s) | Release Rate (L/s) | Stored Rate (L/s) | Required Storage Volume (cu.m) |
|---|---|---|---|---|---|
| 10 | 179 | 127.67 | 7.47 | 120.20 | 72.12 |
| 15 | 143 | 102.17 | 7.47 | 94.70 | 85.23 |
| 20 | 120 | 85.77 | 7.47 | 78.29 | 93.95 |
| 25 | 104 | 74.25 | 7.47 | 66.78 | 100.17 |
| 30 | 92 | 65.69 | 7.47 | 58.21 | 104.79 |
| 35 | 83 | 59.04 | 7.47 | 51.57 | 108.30 |
| 40 | 75 | 53.73 | 7.47 | 46.26 | 111.02 |
| 45 | 69 | 49.37 | 7.47 | 41.90 | 113.13 |
| 50 | 64 | 45.73 | 7.47 | 38.26 | 114.77 |
| 55 | 60 | 42.63 | 7.47 | 35.16 | 116.02 |
| 60 | 56 | 39.97 | 7.47 | 32.49 | 116.97 |
| 65 | 53 | 37.64 | 7.47 | 30.17 | 117.66 |
| 70 | 50 | 35.60 | 7.47 | 28.13 | 118.13 |
| 75 | 47 | 33.79 | 7.47 | 26.32 | 118.42 |
| 80 | 45 | 32.17 | 7.47 | 24.70 | 118.54 |
| 85 | 43 | 30.71 | 7.47 | 23.24 | 118.52 |
| 90 | 41 | 29.39 | 7.47 | 21.92 | 118.38 |
| 95 | 39 | 28.20 | 7.47 | 20.72 | 118.12 |
| 100 | 38 | 27.10 | 7.47 | 19.63 | 117.77 |
| 105 | 36 | 26.10 | 7.47 | 18.62 | 117.33 |
| 110 | 35 | 25.17 | 7.47 | 17.70 | 116.80 |
| 115 | 34 | 24.31 | 7.47 | 16.84 | 116.20 |
| 120 | 33 | 23.52 | 7.47 | 16.05 | 115.54 |
| 125 | 32 | 22.78 | 7.47 | 15.31 | 114.81 |
| 130 | 31 | 22.09 | 7.47 | 14.62 | 114.03 |
| 135 | 30 | 21.45 | 7.47 | 13.98 | 113.20 |
| 140 | 29 | 20.84 | 7.47 | 13.37 | 112.32 |
| 145 | 28 | 20.28 | 7.47 | 12.80 | 111.39 |
| 150 | 28 | 19.74 | 7.47 | 12.27 | 110.42 |
| 180 | 24 | 17.09 | 7.47 | 9.62 | 103.87 |
| 210 | 21 | 15.12 | 7.47 | 7.65 | 96.33 |
| 240 | 19 | 13.59 | 7.47 | 6.12 | 88.07 |
| 270 | 17 | 12.37 | 7.47 | 4.89 | 79.26 |
| 300 | 16 | 11.36 | 7.47 | 3.89 | 70.01 |
| 360 | 14 | 9.81 | 7.47 | 2.34 | 50.50 |
| 420 | 12 | 8.66 | 7.47 | 1.19 | 29.98 |
| 480 | 11 | 7.78 | 7.47 | 0.30 | 8.71 |
| 540 | 10 | 7.07 | 7.07 | 0.00 | 0.00 |
| 600 | 9 | 6.49 | 6.49 | 0.00 | 0.00 |

# DRAINAGE AREA II

(100-YEAR EVENT)

| | | | C |
|---|---|---|---|
| Roof Area: | 0 | sq.m | 1.00 |
| Hard Area: | 4,130 | sq.m | 1.00 |
| Gravel Area: | 0 | sq.m | 0.875 |
| Soft Area: | 180 | sq.m | 0.25 |
| Total Catchment Area: | 4,310 | sq.m | 0.97 |

| | | |
|---|---|---|
| Water Elevation: | 74.13 | m |
| Head: | 1.67 | m |
| Centroid of ICD Orifice: | 72.45 | m |
| Invert of Outlet Pipe of CB/MH-8: | 72.38 | m |
| Orifice Diameter: | 147 | mm |
| Orifice Area: | 17,057 | sq.mm |
| Discharge Coefficient: | 0.61 | |
| Maximum Release Rate: | 59.63 | L/s |

# DRAINAGE AREA II (Continued)

(100-YEAR EVENT)

Surface Storage

| CB/MH | Top Area | Depth | Volume | |
|---|---|---|---|---|
| CB/MH-1 | 224 | 0.13 | 9.53 | cu.m |
| CB/MH-2 | 224 | 0.13 | 9.53 | cu.m |
| CB/MH-3 | 140 | 0.10 | 4.56 | cu.m |
| CB/MH-5 | 94 | 0.08 | 2.42 | cu.m |
| CB/MH-6 | 74 | 0.08 | 1.90 | cu.m |
| CB/MH-7 | 224 | 0.13 | 9.53 | cu.m |
| CB/MH-8 | 224 | 0.13 | 9.53 | cu.m |

Chamber Storage

| No. of Chambers | Volume Per Chamber | No. of Rows | No. of End Caps | Volume Per End Cap | Volume | |
|---|---|---|---|---|---|---|
| 88 | 0.43 | 8 | 16 | 0.02 | 38.16 | cu.m |

Clear Stone Storage

| Length | Width | Depth | Volume | 40% Voids | |
|---|---|---|---|---|---|
| 24.852 | 8.586 | 0.56 | 81.76 | 32.70 | cu.m |

CB/MH Storage

| CB/MH | Invert | Size | Volume | |
|---|---|---|---|---|
| CB/MH-1 | 72.61 | 1.219 | 1.77 | cu.m |
| CB/MH-2 | 72.49 | 1.219 | 1.91 | cu.m |
| CB/MH-3 | 72.69 | 1.219 | 1.68 | cu.m |
| CB/MH-5 | 72.57 | 1.219 | 1.82 | cu.m |
| CB/MH-6 | 72.47 | 1.219 | 1.93 | cu.m |
| CB/MH-7 | 72.47 | 1.219 | 1.93 | cu.m |
| CB/MH-8 | 72.38 | 1.219 | 2.04 | cu.m |

Pipe Storage

| From | Invert | To | Invert | Length | Diameter | Volume | |
|---|---|---|---|---|---|---|---|
| CB/MH-1 | 72.61 | CB/MH-2 | 72.49 | 26.5 | 250 | 1.30 | cu.m |
| CB/MH-2 | 72.49 | CB/MH-8 | 72.38 | 25.6 | 250 | 1.26 | cu.m |
| CB/MH-3 | 72.69 | CB/MH-5 | 72.57 | 26.1 | 250 | 1.28 | cu.m |
| CB/MH-5 | 72.57 | CB/MH-6 | 72.47 | 23.2 | 250 | 1.14 | cu.m |
| CB/MH-6 | 72.47 | CB/MH-7 | 72.39 | 17.8 | 250 | 0.87 | cu.m |
| CB/MH-7 | 72.47 | CB/MH-8 | 72.38 | 26.5 | 300 | 1.87 | cu.m |

Maximum Volume Stored: 138.66 cu.m

Maximum Volume Required: 138.66 cu.m

# DRAINAGE AREA II (Continued)

(100-YEAR EVENT)

| Time (min) | i (mm/hr) | 2.78AiC (L/s) | 50% Release Rate (L/s) | Stored Rate (L/s) | Required Storage Volume (cu.m) |
|---|---|---|---|---|---|
| 10 | 179 | 207.24 | 29.81 | 177.43 | 106.46 |
| 15 | 143 | 165.85 | 29.81 | 136.04 | 122.43 |
| 20 | 120 | 139.22 | 29.81 | 109.41 | 131.29 |
| 25 | 104 | 120.53 | 29.81 | 90.72 | 136.07 |
| 30 | 92 | 106.63 | 29.81 | 76.81 | 138.26 |
| 35 | 83 | 95.84 | 29.81 | 66.03 | 138.66 |
| 40 | 75 | 87.22 | 29.81 | 57.40 | 137.77 |
| 45 | 69 | 80.14 | 29.81 | 50.33 | 135.89 |
| 50 | 64 | 74.23 | 29.81 | 44.41 | 133.24 |
| 55 | 60 | 69.20 | 29.81 | 39.39 | 129.98 |
| 60 | 56 | 64.87 | 29.81 | 35.06 | 126.21 |
| 65 | 53 | 61.10 | 29.81 | 31.29 | 122.03 |
| 70 | 50 | 57.79 | 29.81 | 27.97 | 117.49 |
| 75 | 47 | 54.85 | 29.81 | 25.03 | 112.65 |
| 80 | 45 | 52.22 | 29.81 | 22.40 | 107.54 |
| 85 | 43 | 49.85 | 29.81 | 20.04 | 102.20 |
| 90 | 41 | 47.72 | 29.81 | 17.90 | 96.67 |
| 95 | 39 | 45.77 | 29.81 | 15.96 | 90.95 |
| 100 | 38 | 43.99 | 29.81 | 14.18 | 85.07 |
| 105 | 36 | 42.36 | 29.81 | 12.55 | 79.04 |
| 110 | 35 | 40.86 | 29.81 | 11.04 | 72.89 |
| 115 | 34 | 39.47 | 29.81 | 9.65 | 66.61 |
| 120 | 33 | 38.18 | 29.81 | 8.37 | 60.23 |
| 125 | 32 | 36.98 | 29.81 | 7.17 | 53.75 |
| 130 | 31 | 35.86 | 29.81 | 6.05 | 47.17 |
| 135 | 30 | 34.82 | 29.81 | 5.00 | 40.51 |
| 140 | 29 | 33.84 | 29.81 | 4.02 | 33.78 |
| 145 | 28 | 32.91 | 29.81 | 3.10 | 26.97 |
| 150 | 28 | 32.05 | 29.81 | 2.23 | 20.09 |
| 180 | 24 | 27.74 | 27.74 | 0.00 | 0.00 |

# 2-YEAR EVENT

## DRAINAGE AREA I (Roof)

(2-YEAR EVENT)

| | | | C |
|---|---|---|---|
| Total Catchment Area: | 2,572 | sq.m | 0.90 |

| | | |
|---|---|---|
| No. of Roof Drains: | 4 | |
| Slots per Wier: | 1 | 0.01242 L/s/mm/slot (5 USgpm/in/slot) |
| Depth at Roof Drains: | 104 | mm |
| Maximum Release Rate: | 5.15 | L/s |

| | | |
|---|---|---|
| Pond Area: | 1,121 | sq.m |
| Maximum Volume Stored: | 38.70 | cu.m |
| Maximum Volume Required: | 38.70 | cu.m |

# DRAINAGE AREA I (Continued)

(2-YEAR EVENT)

| Time (min) | i (mm/hr) | 2.78AiC (L/s) | Release Rate (L/s) | Stored Rate (L/s) | Required Storage Volume (cu.m) |
|---|---|---|---|---|---|
| 10 | 77 | 49.43 | 5.15 | 44.28 | 26.57 |
| 15 | 62 | 39.75 | 5.15 | 34.60 | 31.14 |
| 20 | 52 | 33.48 | 5.15 | 28.34 | 34.00 |
| 25 | 45 | 29.07 | 5.15 | 23.92 | 35.88 |
| 30 | 40 | 25.77 | 5.15 | 20.62 | 37.12 |
| 35 | 36 | 23.20 | 5.15 | 18.06 | 37.92 |
| 40 | 33 | 21.15 | 5.15 | 16.00 | 38.41 |
| 45 | 30 | 19.46 | 5.15 | 14.31 | 38.65 |
| 50 | 28 | 18.04 | 5.15 | 12.90 | 38.70 |
| 55 | 26 | 16.84 | 5.15 | 11.70 | 38.59 |
| 60 | 25 | 15.80 | 5.15 | 10.66 | 38.37 |
| 65 | 23 | 14.90 | 5.15 | 9.75 | 38.03 |
| 70 | 22 | 14.10 | 5.15 | 8.96 | 37.61 |
| 75 | 21 | 13.39 | 5.15 | 8.25 | 37.12 |
| 80 | 20 | 12.76 | 5.15 | 7.62 | 36.55 |
| 85 | 19 | 12.19 | 5.15 | 7.05 | 35.93 |
| 90 | 18 | 11.68 | 5.15 | 6.53 | 35.26 |
| 95 | 17 | 11.21 | 5.15 | 6.06 | 34.54 |
| 100 | 17 | 10.78 | 5.15 | 5.63 | 33.78 |
| 105 | 16 | 10.38 | 5.15 | 5.24 | 32.99 |
| 110 | 16 | 10.02 | 5.15 | 4.87 | 32.16 |
| 115 | 15 | 9.68 | 5.15 | 4.54 | 31.31 |
| 120 | 15 | 9.37 | 5.15 | 4.23 | 30.42 |
| 125 | 14 | 9.08 | 5.15 | 3.93 | 29.51 |
| 130 | 14 | 8.81 | 5.15 | 3.66 | 28.58 |
| 135 | 13 | 8.56 | 5.15 | 3.41 | 27.62 |
| 140 | 13 | 8.32 | 5.15 | 3.17 | 26.65 |
| 145 | 13 | 8.09 | 5.15 | 2.95 | 25.66 |
| 150 | 12 | 7.88 | 5.15 | 2.74 | 24.65 |
| 180 | 11 | 6.84 | 5.15 | 1.69 | 18.28 |
| 210 | 9 | 6.06 | 5.15 | 0.91 | 11.51 |
| 240 | 8 | 5.45 | 5.15 | 0.31 | 4.44 |
| 270 | 8 | 4.97 | 4.97 | 0.00 | 0.00 |
| 300 | 7 | 4.57 | 4.57 | 0.00 | 0.00 |

# DRAINAGE AREA II

(2-YEAR EVENT)

| | | | C |
|---|---|---|---|
| Roof Area: | 0 | sq.m | 0.90 |
| Hard Area: | 4,130 | sq.m | 0.90 |
| Gravel Area: | 0 | sq.m | 0.70 |
| Soft Area: | 180 | sq.m | 0.20 |
| Total Catchment Area: | 4,310 | sq.m | 0.87 |

| | | |
|---|---|---|
| Water Elevation: | 73.09 | m |
| Head: | 0.64 | m |
| Centroid of ICD Orifice: | 72.45 | m |
| Invert of Outlet Pipe of CB/MH-8: | 72.38 | m |
| Orifice Diameter: | 147 | mm |
| Orifice Area: | 17,057 | sq.mm |
| Discharge Coefficient: | 0.61 | |
| Maximum Release Rate: | 36.74 | L/s |

# DRAINAGE AREA II (Continued)

(2-YEAR EVENT)

Surface Storage

| CB/MH | Top Area | Depth | Volume | |
|---|---|---|---|---|
| CB/MH-1 | 0 | -0.91 | 0.00 | cu.m |
| CB/MH-2 | 0 | -0.91 | 0.00 | cu.m |
| CB/MH-3 | 0 | -0.94 | 0.00 | cu.m |
| CB/MH-5 | 0 | -0.96 | 0.00 | cu.m |
| CB/MH-6 | 0 | -0.96 | 0.00 | cu.m |
| CB/MH-7 | 0 | -0.91 | 0.00 | cu.m |
| CB/MH-8 | 0 | -0.91 | 0.00 | cu.m |

Chamber Storage

| No. of Chambers | Stage Volume | No. of Rows | No. of End Caps | Stage Volume | Volume | |
|---|---|---|---|---|---|---|
| 88 | 0.26 | 8 | 16 | 0.01 | 23.04 | cu.m |

Clear Stone Storage

| Length | Width | Depth | Volume | 40% Voids | |
|---|---|---|---|---|---|
| 24.852 | 8.586 | 0.20 | 19.42 | 7.77 | cu.m |

CB/MH Storage

| CB/MH | Invert | Size | Volume | |
|---|---|---|---|---|
| CB/MH-1 | 72.61 | 1.219 | 0.56 | cu.m |
| CB/MH-2 | 72.49 | 1.219 | 0.70 | cu.m |
| CB/MH-3 | 72.69 | 1.219 | 0.47 | cu.m |
| CB/MH-5 | 72.57 | 1.219 | 0.61 | cu.m |
| CB/MH-6 | 72.47 | 1.219 | 0.72 | cu.m |
| CB/MH-7 | 72.47 | 1.219 | 0.72 | cu.m |
| CB/MH-8 | 72.38 | 1.219 | 0.83 | cu.m |

Pipe Storage

| From | Invert | To | Invert | Length | Diameter | Volume | |
|---|---|---|---|---|---|---|---|
| CB/MH-1 | 72.61 | CB/MH-2 | 72.49 | 26.5 | 250 | 1.30 | cu.m |
| CB/MH-2 | 72.49 | CB/MH-8 | 72.38 | 25.6 | 250 | 1.26 | cu.m |
| CB/MH-3 | 72.69 | CB/MH-5 | 72.57 | 26.1 | 250 | 1.28 | cu.m |
| CB/MH-5 | 72.57 | CB/MH-6 | 72.47 | 23.2 | 250 | 1.14 | cu.m |
| CB/MH-6 | 72.47 | CB/MH-7 | 72.39 | 17.8 | 250 | 0.87 | cu.m |
| CB/MH-7 | 72.47 | CB/MH-8 | 72.38 | 26.5 | 300 | 1.87 | cu.m |

Maximum Volume Stored: 43.14 cu.m

Maximum Volume Required: 43.14 cu.m

# DRAINAGE AREA II (Continued)

(2-YEAR EVENT)

| Time (min) | i (mm/hr) | 2.78AiC (L/s) | 50% Release Rate (L/s) | Stored Rate (L/s) | Required Storage Volume (cu.m) |
|---|---|---|---|---|---|
| 10 | 77 | 80.13 | 18.37 | 61.77 | 37.06 |
| 15 | 62 | 64.44 | 18.37 | 46.08 | 41.47 |
| 20 | 52 | 54.29 | 18.37 | 35.92 | 43.10 |
| 25 | 45 | 47.12 | 18.37 | 28.76 | 43.14 |
| 30 | 40 | 41.78 | 18.37 | 23.41 | 42.14 |
| 35 | 36 | 37.62 | 18.37 | 19.25 | 40.43 |
| 40 | 33 | 34.29 | 18.37 | 15.92 | 38.21 |
| 45 | 30 | 31.55 | 18.37 | 13.18 | 35.59 |
| 50 | 28 | 29.26 | 18.37 | 10.89 | 32.67 |
| 55 | 26 | 27.30 | 18.37 | 8.94 | 29.49 |
| 60 | 25 | 25.62 | 18.37 | 7.25 | 26.12 |
| 65 | 23 | 24.15 | 18.37 | 5.79 | 22.57 |
| 70 | 22 | 22.86 | 18.37 | 4.49 | 18.88 |
| 75 | 21 | 21.72 | 18.37 | 3.35 | 15.06 |
| 80 | 20 | 20.69 | 18.37 | 2.32 | 11.14 |
| 85 | 19 | 19.77 | 18.37 | 1.40 | 7.13 |
| 90 | 18 | 18.93 | 18.37 | 0.56 | 3.03 |
| 95 | 17 | 18.17 | 18.17 | 0.00 | 0.00 |
| 100 | 17 | 17.47 | 17.47 | 0.00 | 0.00 |
| 105 | 16 | 16.83 | 16.83 | 0.00 | 0.00 |
| 110 | 16 | 16.24 | 16.24 | 0.00 | 0.00 |
| 115 | 15 | 15.70 | 15.70 | 0.00 | 0.00 |
| 120 | 15 | 15.19 | 15.19 | 0.00 | 0.00 |

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# STORM SEWER CALCULATIONS

## Rational Method

## 2-YEAR EVENT

Project: 1309 Carling Avenue
Phase 1B Redevelopment
Ottawa, Ontario

Date: May 9, 2025

Manning's Roughness Coefficient: 0.013

| Location | | Individual | | | | | Cumulative | | | | Sewer Data | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| From | To | Roof C = 0.90 (ha) | Hard C = 0.90 (ha) | Gravel C = 0.70 (ha) | Soft C = 0.20 (ha) | 2.78AC | 2.78AC | Time (min) | Rainfall Intensity (mm/hr) | Q Flow Rate (L/s) | Length (m) | Nominal Diameter (mm) | Actual Diameter (mm) | Slope (%) | Velocity (m/s) | $Q_{Full}$ Capacity (L/s) | Time (min) | $Q / Q_{Full}$ |
| | | | | | | | | | | | | | | | | | | |
| Phase 1B Roof Drains | CB/MH-10 | 0.2572 | | | | 0.6435 | 0.6435 | 10.00 | 77 | 49.43 | 3.5 | 300 | 300 | 2 | 1.93 | 136.76 | 0.03 | 36% |
| | | | | | | | Flow through flow control roof drains: | | | 5.15 | 3.5 | 300 | 300 | 2 | 1.93 | 136.76 | 0.03 | 4% |
| | | | | | | | | | | | | | | | | | | |
| CB/MH-1 | CB/MH-2 | | 0.0780 | | 0.0030 | 0.1968 | 0.1968 | 10.00 | 77 | 15.12 | 26.5 | 250 | 250 | 0.432 | 0.80 | 39.09 | 0.55 | 39% |
| CB/MH-2 | CB/MH-8 | | 0.0920 | | 0.0050 | 0.2330 | 0.4298 | 10.55 | 75 | 32.12 | 25.6 | 250 | 250 | 0.432 | 0.80 | 39.09 | 0.54 | 82% |
| | | | | | | | | | | | | | | | | | | |
| CB/MH-3 | CB/MH-5 | | 0.0510 | | | 0.1276 | 0.1276 | 10.00 | 77 | 9.80 | 26.1 | 250 | 250 | 0.432 | 0.80 | 39.09 | 0.55 | 25% |
| | | | | | | | | | | | | | | | | | | |
| CB-4 | CB/MH-5 | | 0.0030 | | 0.3895 | 0.2241 | 0.2241 | 10.00 | 77 | 17.21 | 20 | 250 | 250 | 0.432 | 0.80 | 39.09 | 0.42 | 44% |
| | | | | | | | | | | | | | | | | | | |
| CB/MH-5 | CB/MH-6 | | 0.0350 | | | 0.0876 | 0.4392 | 10.55 | 75 | 32.84 | 23.2 | 250 | 250 | 0.432 | 0.80 | 39.09 | 0.49 | 84% |
| CB/MH-6 | CB/MH-7 | | 0.0305 | | 0.0020 | 0.0774 | 0.5167 | 11.03 | 73 | 37.75 | 17.8 | 250 | 250 | 0.432 | 0.80 | 39.09 | 0.37 | 97% |
| | | | | | | | | | | | | | | | | | | |
| CB/MH-7 | CB/MH-8 | | 0.0695 | | 0.0040 | 0.1761 | 0.6928 | 11.40 | 72 | 49.74 | 26.5 | 300 | 300 | 0.34 | 0.80 | 56.39 | 0.55 | 88% |
| | | | | | | | | | | | | | | | | | | |
| CB/MH-8 | DSEL STM102 | | 0.0570 | | 0.0040 | 0.1448 | 1.2674 | 11.96 | 70 | 88.75 | 22.2 | 375 | 375 | 0.27 | 0.82 | 91.10 | 0.45 | 97% |
| | | | | | | | Flow through inlet control device: | | | 36.74 | 22.2 | 375 | 375 | 0.27 | 0.82 | 91.10 | 0.45 | 40% |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | Existing 900 mm Private Storm Sewer: | | | 900 | 914 | 0.4 | 1.82 | 1,193 | | |