D.B. Gray Engineering Inc.

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

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SITE SERVICING STUDY & STORMWATER MANAGEMENT REPORT

436 ATHLONE AVENUE
OTTAWA, ONTARIO

REPORT NO. 22027

MAY 10, 2022

CONTENTS

LIST OF APPENDICES

1.0 INTRODUCTION

This report has been prepared in support of the Site Plan Control application for the proposed 3.5-storey, 16-unit apartment building located at 436 Athlone Avenue in Ottawa, Ontario. The property is currently occupied by an existing single family dwelling to be demolished. Refer to Pre-Application Consultation meeting notes in Appendix A.

This report forms part of the servicing and stormwater management design for the proposed development. Also refer to drawings C-1 to C-3 prepared by D.B. Gray Engineering Inc.

2.0 WATER SERVICING

2.1 WATER SUPPLY FOR FIREFIGHTING

There is an existing municipal Class AA fire hydrant located at the intersection of Athlone Avenue and Byron Avenue. It is 50 m unobstructed distance to the far side of the front façade of the proposed building, which is less than the maximum 90 m permitted by the Ontario Building Code; therefore, a private fire hydrant is not required.

As per City of Ottawa Technical Bulletin ISTB-2021-03, when calculating the required fire flow where pipe sizing is not affected, the Ontario Building Code Method is to be used. Using the Ontario Building Code Method the required fire flow was calculated to be 3,600 L/min (60 L/s) at a minimum required pressure of 140 kPa (20 psi). Refer to calculations in Appendix B.

The boundary conditions in the 150 mm Athlone Avenue municipal watermain provided by the City of Ottawa for the 60 L/s fire flow at the subject property indicate a hydraulic grade line (HGL) of 89.1 m. Refer to Appendix B. This HGL calculates to 170 kPa (25 psi). Since the pressure is above the required minimum pressure of 140 kPa (20 psi), there is an adequate water supply for firefighting from the existing municipal water distribution system.

As per City of Ottawa Technical Bulletin ISTB-2018-02, the aggregate flow of all contributing fire hydrants within 150 m of the building shall not be less than the required fire flow. As per City of Ottawa Technical Bulletin ISTB-2018-02 Appendix I, Class AA fire hydrants within 75 m can contribute 5,700 L/min (95 L/s).

The existing municipal Class AA fire hydrant discussed above can contribute 5,700 L/min (95 L/s), which is greater than the required fire flow of 3,600 L/min (60 L/s).

2.2 DOMESTIC WATER SUPPLY

As per

i. the City of Ottawa Water Design Guidelines for the populations,
ii. City of Ottawa Technical Bulletin ISTB-2021-03 for the consumption rate, and
iii. the Ministry of the Environment Water Design Guidelines for the peaking factors, and

based on the 12 – 1 bedroom apartment units and 4 – 2 bedroom apartment units, the average daily demand was calculated to be 0.1 L/s, the maximum daily demand was calculated to be 0.8 L/s and the maximum hourly demand was calculated to be 1.2 L/s. Refer to calculations in Appendix B.

The boundary conditions in the 150 mm Athlone Avenue municipal watermain provided by the City of Ottawa at the subject property indicate a minimum HGL of 108.6 m and a maximum HGL of 114.7 m. Refer to Appendix B. Based on these boundary conditions the pressure at the water meter is calculated to vary between 335 kPa (49 psi) and 395 kPa (57 psi). This is an acceptable range for the proposed development.

Using the American Water Works Association Manual of Water Supply Practices M22 for fixture values, and based on an average water pressure at the water meter of 365 kPa (53 psi), the peak demand was calculated to be 2.3 L/s. A 38 mm water service connecting to the 150 mm Athlone Avenue municipal watermain is proposed to service the development. The peak demand will produce an acceptable velocity of 2.0 m/s (6.6 ft/s) in the proposed 38 mm water service. Refer to calculations in Appendix B.

3.0 SANITARY SERVICING

As per

i. the City of Ottawa Sewer Design Guidelines for the populations,
ii. City of Ottawa Technical Bulletin ISTB-2018-01 for the consumption rate, Harmon Formula correction factor and infiltration allowance, and
iii. the Harmon Formula for the peaking factor, and

based on the 12 – 1 bedroom apartment units and 4 – 2 bedroom apartment units, the post-development sanitary flow rate was calculated to be 0.28 L/s. A 150 mm sanitary service at 1% slope (15.23 L/s capacity) is proposed to service the development. At the design flow rate the sanitary service will only be at 2% of its capacity. The proposed 150 mm sanitary service will connect to the existing 225 mm Athlone Avenue municipal sanitary sewer, which at 3.01% slope has a capacity of 77.90 L/s. The pre-development sanitary flow rate was calculated to be 0.05 L/s. Refer to calculations in Appendix C. The 0.23 L/s post-development increase in flow is expected to have an acceptable impact on the 225 mm Athlone Avenue municipal sanitary sewer.

The basement plumbing fixtures will drain to a sanitary sump and be pumped to the sanitary drain.

4.0 STORMWATER MANAGEMENT

4.1 QUALITY CONTROL

The Rideau Valley Conservation Authority has stated: *"Based on the proposed site plan, the RVCA will not require any additional on-site water quality controls. Best management practices are encouraged where possible to be integrated in the ultimate design."* Refer to Appendix D. As such, no permanent stormwater quality control measures are proposed.

An Erosion & Sediment Control Plan has been developed to be implemented during construction. Refer to drawing C-2 and notes 2.1 to 2.5 on drawing C-3. Sediment capture filter sock inserts are to be installed in all existing catch-basins adjacent to the site, and any material deposited on the public road is to be removed.

4.2 QUANTITY CONTROL

The stormwater quantity control criterion is to control the post-development peak flows with the use of flow control roof drains to the pre-development 2-year peak flow rate using the post-development roof area, a calculated pre-development runoff coefficient not more than 0.50 and a calculated time of concentration not less than 10 minutes. It was calculated that the pre-development conditions reflect a 5-year runoff coefficient of 0.53. The individual runoff coefficients were each increased by 25% to a maximum of 1.00 to calculate the pre-development conditions during the 100-year event. Using the Bransby Williams Formula the pre-development time of concentration was calculated to be 2 minutes. Using the Rational Method with a time of concentration of 10 minutes, the pre-development flow rates were calculated to be 13.91 L/s during the 100-year event and 7.13 L/s during the 5-year event. Using the Rational Method with the post-development roof area of 224 sq.m, a time of concentration of 10 minutes and runoff coefficient of 0.50, the target release rate was calculated to be 2.39 L/s. The Rational and Modified Rational Methods were used to calculate the post-development flow rates and corresponding storage volumes. Refer to calculations in Appendix D.

Drainage Area I (Uncontrolled Flow Off Site – 278 sq.m)
Other than roof storage, stormwater from the property will drain uncontrolled off site. The flow rates are calculated at a time of concentration of 10 minutes.

	100-Year Event	5-Year Event
Maximum Flow Rate	9.03 L/s	4.65 L/s

Drainage Area II (Roof – 183 sq.m)
The 2 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 equal. The opening at the top of the flow control weir is to be a minimum 50 mm in diameter. A minimum of 4 scuppers each a minimum 150 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 or 200 mm depth at the roof drains. Refer to structural.

	100-Year Event	5-Year Event
Maximum Release Rate	2.93 L/s	2.16 L/s
Maximum Depth at Roof Drains	118 mm	87 mm
Maximum Volume Stored	3.91 cu.m	1.57 cu.m

Summary
The maximum post-development release rate during the 100-year event for the entire property was calculated to be 11.96 L/s, which is 14% less than the pre-development flow rate during the 100-year event. The maximum post-development release rate during the 100-year event through the flow control roof drains was calculated to be 2.93 L/s, which is 22% more than the target release rate. The maximum post-development release rate during the 5-year event for the entire property was calculated to be 6.81 L/s, which is 4% less than the pre-development flow rate during the 5-year event. The maximum post-development release rate during the 5-year event through the flow control roof drains was calculated to be 2.16 L/s, which is 10% less than the target release rate. The post-development reduction in flow is expected to have a positive impact on the 525 mm Athlone Avenue municipal storm sewer.

	100-Year Event	5-Year Event
Pre-Development Flow Rate	13.91 L/s	7.13 L/s
Target Release Rate	2.39 L/s	2.39 L/s
Maximum Release Rate	11.96 L/s	6.81 L/s
Maximum Volume Required	3.91 cu.m	1.57 cu.m
Maximum Volume Stored	3.91 cu.m	1.57 cu.m

4.3 STORM SERVICING

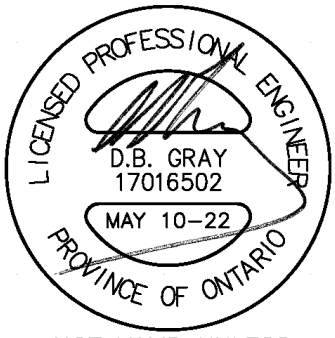
The peak unrestricted roof flow rate during the 5-year event was calculated to be 4.77 L/s. A 150 mm storm service at 1% slope (15.23 L/s capacity) is proposed to service the development. At the design flow rate the storm service will only be at 31% of its capacity. The proposed 150 mm storm service will connect to the existing 525 mm Athlone Avenue municipal storm sewer, which at 0.46% slope has a capacity of 303.69 L/s. Refer to calculations in Appendix D.

The foundation drains will drain to a storm sump and be pumped to the storm drain.

5.0 CONCLUSIONS

1. A private fire hydrant is not required.
2. There is an adequate water supply for firefighting from the existing municipal water distribution system.
3. There is an acceptable range of water pressures in the existing municipal water distribution system.
4. The post-development sanitary flow rate will be adequately handled by the proposed sanitary service.
5. The post-development increase in sanitary flow is expected to have an acceptable impact on the existing municipal sanitary sewer.
6. The Rideau Valley Conservation Authority does not require permanent stormwater quality control measures. As such, no permanent measures are proposed.
7. An Erosion & Sediment Control Plan has been developed to be implemented during construction.
8. The post-development reduction in stormwater flow is expected to have a positive impact on the existing municipal storm sewer.
9. The unrestricted flow rate during the 5-year event will be adequately handled by the proposed storm service.

Prepared by D.B. Gray Engineering Inc.



NOT VALID UNLESS
SIGNED & DATED

APPENDIX A

PRE-APPLICATION CONSULTATION MEETING NOTES

Pre-Application Consultation Meeting Notes

436 Athlone Avenue, Ottawa
Meeting Date: Tuesday, February 15, 2022
PC2022-0023
MS Teams

Attendees:

City of Ottawa:
Jean-Charles Renaud, File Lead, Planner
Christopher Moise, Urban Designer
Wally Dubyk, Transportation
Sarah McLaughlin, Engineering
Parthvi Patel, Student Planner

Applicant Team:
Jonathan Harris, RJH Architect
Rosaline Hill, Architect
Tony Mak, Engineer
Allison Sterling, Planner

Community Association:
Heather Mitchell

Subject: Development of 3-storey apartment building with 16 units at 436 Athlone Avenue

Proposal Details:

- The building frontage will have two entrances; a shared building entrance and an entrance to a single unit. The backyard will contain bike parking sheds and a garbage shed.
- The applicant is seeking for a decrease in the required rear yard setback and parking than what is outlined in the Zoning By-Law.

Technical Comments – City Staff

Planning Comments – Jean-Charles Renaud

- Alongside considering the Official Plan, consider the intent of the new R4 Plan in designating this area of having a maximum of 12 units.
- The R4 provisions include parking prohibitors to ensure the front yard does not become a parking area. The city would like to see an active front yard to act as a prohibitor, this can be combined with a landscape element.
- If required, ensure that you include railings to the ramp and stairs, as its proximity to the side yard might be impactful to the neighboring property.
- When justifying the reduction in the rear yard setback, ensure that you are not relying entirely on lining up with the neighboring property to the north as it was built under the old Zoning By-Law, and it also benefits from a corner yard context. Consider investigating more ways to increase the rear-yard and provide more green space.

Alternatively, look into design articulation to alleviate massing impacts that you will have on rear-yard neighbours who are also offering their side yard.

Urban Design Comments – Christopher Moise

- This proposal does not run along or does not meet the threshold in one of the City's Design Priority Areas and need not attend the City's UDRP. Staff will be responsible for evaluating the proposal and providing design direction;
- We appreciate the strong approach this proposal makes to relate and fit within its neighbourhood context for its street facing facade, however, we have the following comments/questions that will need to be addressed when a full submission is made:
    - *Rear yard amenity*: Is suitable amenity space provided? Will new trees be provided?
    - *Garbage/bike storage*: We appreciate that these storage facilities are protected, however, a large portion of the yard is being taken up by these services, we recommend efficiencies be investigated to reduce this. Internalizing the garbage storage would be another way to free space in the rear yard for amenity and landscaping/trees;
    - Additional details:
        - *Entrances*: What do each of the entrances service? Will they have canopies? Are they all necessary?
        - *Ramp:* If there is an entrance at grade can the external ramp be removed and replaced with a small internal lift? We have concerns about placing the ramp in the front yard as it will require a guard rail and retaining wall along the side lot line;
        - *Rear yard massing:* Can the rear yard facing elevation provide similar articulation to soften a potential box massing?
        - *Materiality:* As a variety of materials are envisioned, we recommend any metal/vinyl siding be limited in quantity as they do not improve the neighbourhood character. Perhaps a cementitious panel/siding would suit a pairing with masonry better;

- A scoped Design Brief is a required submittal for all Site Plan/Re-zoning applications and can be combined with the Planning Rationale. Please see the Design Brief Terms of Reference provided.
    - *Note. The Design Brief submittal should have a section which addresses these pre-consultation comments;*
- This is an exciting project in an area full of potential. We look forward to helping you achieve its goals with the highest level of design resolution. We are happy to assist and answer any questions regarding the above. Good luck.

Transportation Comments – Wally Dubyk

- Road, Sewer and Water works targeted to start along Athlone Avenue this season
- Athlone Avenue is classified as a Local. There are no additional protected ROW limits identified in the OP.
- The development site proposes 15 units and no parking spaces. This development would not generate sufficient traffic to warrant a TIA report.

- The purchaser, tenant or sub-lessee acknowledges the unit being rented/sold is not provided with any on-site parking and should a tenant/purchaser have a vehicle for which they wish to have parking that alternative and lawful arrangements will need to be made to accommodate their parking need at an alternative location. The Purchaser/Tenant also acknowledges that the availability and regulations governing on-street parking vary; that access to on-street parking, including through residential on-street parking permits issued by the City cannot be guaranteed now or in the future; and that a purchaser, tenant, or sub-lessee intending to rely on on-street parking for their vehicle or vehicles does so at their own risk.
- Please keep in mind that on street parking is not a viable option for tenants. Ensure that potential tenants are aware that there is no provision for parking.
- Permanent structures such as curbing, stairs, retaining walls, and underground parking foundation also bicycle parking racks are not to extend into the City's right-of-way limits.
- The closure of an existing private approach shall reinstate the boulevard to City standards.
- The Owner shall be required to enter into maintenance and liability agreement for all pavers, plant and landscaping material placed in the City right-of-way and the Owner shall assume all maintenance and replacement responsibilities in perpetuity.
- Bicycle parking spaces are required as per Section 111 of the Ottawa Comprehensive Zoning By-law. Bicycle parking spaces should be located in safe, secure places near main entrances and preferably protected from the weather.

<u>Forestry Comments – Mark Richardson</u>

TCR requirements:

1. a Tree Conservation Report (TCR) must be supplied for review along with the suite of other plans/reports required by the City
    a. an approved TCR is a requirement of Site Plan approval.
    b. The TCR may be combined with the LP provided all information is supplied
2. Any removal of privately-owned trees 10cm or larger in diameter, or city-owned trees of any diameter requires a tree permit issued under the Tree Protection Bylaw (Bylaw 2020 – 340); the permit will be based on an approved TCR and made available at or near plan approval.
3. The Planning Forester from Planning and Growth Management as well as foresters from Forestry Services will review the submitted TCR
    a. If tree removal is required, both municipal and privately-owned trees will be addressed in a single permit issued through the Planning Forester
    b. Compensation may be required for city owned trees – if so, it will need to be paid prior to the release of the tree permit
4. the TCR must list all trees on site, as well as off-site trees if the CRZ extends into the developed area, by species, diameter, and health condition
5. please identify trees by ownership – private onsite, private on adjoining site, city owned, co-owned (trees on a property line)
6. If trees are to be removed, the TCR must clearly show where they are, and document the reason they cannot be retained

7. All retained trees must be shown, and all retained trees within the area impacted by the development process must be protected as per City guidelines available at Tree Protection Specification or by searching Ottawa.ca
    a. the location of tree protection fencing must be shown on the plan
    b. show the critical root zone of the retained trees
    c. if excavation will occur within the critical root zone, please show the limits of excavation
8. the City encourages the retention of healthy trees; if possible, please seek opportunities for retention of trees that will contribute to the design/function of the site.
9. For more information on the process or help with tree retention options, contact Mark Richardson mark.richardson@ottawa.ca or on City of Ottawa

LP tree planting requirements:

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

Minimum Setbacks

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

Tree specifications

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

Hard surface planting

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

Soil Volume

- Please ensure adequate soil volumes are met:

Tree Type/Size	Single Tree Soil Volume (m3)	Multiple Tree Soil Volume (m3/tree)

Ornamental	15	9
Columnar	15	9
Small	20	12
Medium	25	15
Large	30	18
Conifer	25	15

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

Sensitive Marine Clay

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

Tree Canopy Cover

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

Engineer Comments - Sarah McLaughlin

General:

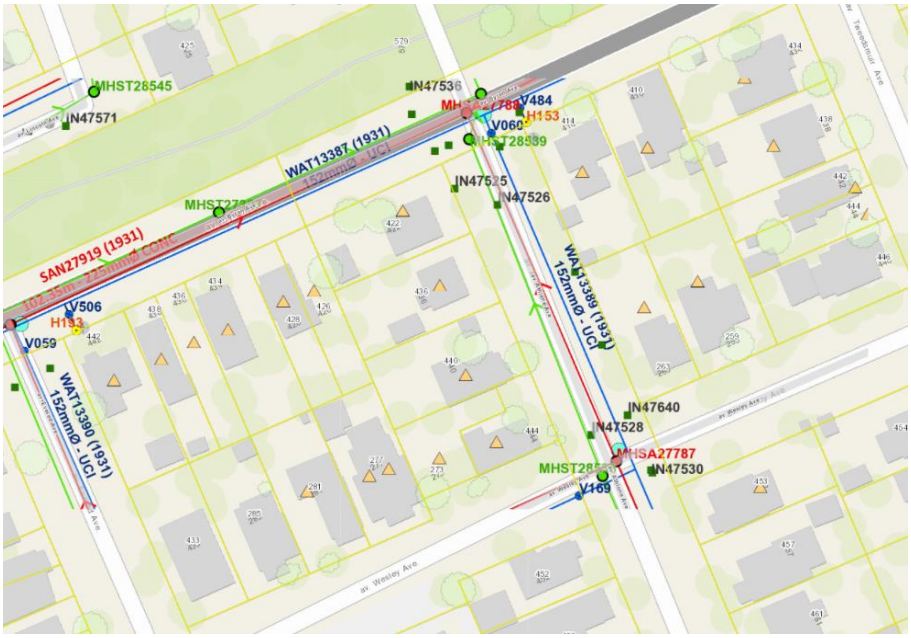
- It is the sole responsibility of the consultant to investigate the location of existing underground utilities in the proposed servicing area and submit a request for locates to avoid conflict(s). The location of existing utilities and services shall be documented on an **Existing Conditions Plan**.
- Any easements on the subject site shall be identified and respected by any development proposal and shall adhere to the conditions identified in the easement agreement. A **legal survey plan** shall be provided, and all easements shall be shown on the engineering plans.
- **Concern** about sanitary and storm sewer capacity, please provide the new sanitary and storm sewer discharge and we confirm if sanitary sewer main has the capacity. Also provide the size proposed sanitary service.
- A deep excavation and dewatering operations have the potential to cause damages to the neighboring adjacent buildings/ City infrastructure. Document that construction activities (excavation, dewatering, vibrations associated with construction, etc.) will not have an impact on any adjacent buildings and infrastructure.
- CCTV of existing building laterals is required if existing laterals are to be re-used to ensure existing services are in good working order and meet current minimum size requirements. Located services to be placed on site servicing plans.

Reference documents for information purposes:

- Ottawa Sewer Design Guidelines (October 2012)
- Technical Bulletin PIEDTB-2016-01
- Technical Bulletins ISTB-2018-01, ISTB-2018-02 and ISTB-2018-03.
- Ottawa Design Guidelines - Water Distribution (2010)
- Technical Bulletin ISTB-2021-03

- Geotechnical Investigation and Reporting Guidelines for Development Applications in the City of Ottawa (2007)
- City of Ottawa Slope Stability Guidelines for Development Applications (revised 2012)
- City of Ottawa Environmental Noise Control Guidelines (January 2016)
- City of Ottawa Accessibility Design Standards (2012) (City recommends development be in accordance with these standards on private property)
- Ottawa Standard Tender Documents (latest version)
- Ontario Provincial Standards for Roads & Public Works (2013)
- Record drawings and utility plans are also available for purchase from the City (Contact the City's Information Centre by email at InformationCentre@ottawa.ca or by phone at (613) 580-424 x.44455).

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



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Stormwater Management Criteria and Information:

- **Water Quantity Control:** Considering the size of the site, it would be acceptable to control the **roof portion only** (**100-year storm event, to a 2-year pre-development level**) and leave the remainder of the site uncontrol as long as the uncontrolled portion is directed towards the right of way. This approach should be discussed in the SWM report. Also, the grading plan should clearly demonstrate that the runoff from the uncontrolled portion of the site will be directed towards the ROW and that there are no increased flows draining onto adjacent properties (e.g., rear yard must drain to ROW).
    - Reference: Technical Bulletin PIEDTB-2016-01

- The pre-development runoff coefficient will need to be determined **as per existing conditions** but in no case more than 0.5. [**If 0.5 applies it needs to be clearly demonstrated in the report that the pre-development runoff coefficient is greater than 0.5**]. The time of concentration (T_c) used to determine the pre-development condition should be calculated. *Tc should not be less than 10 min. since IDF curves become unrealistic at less than 10 min; T_c of 10 minutes shall be used for all post-development calculations*].
- The SWM measures required to avoid impact on downstream sewer system will be subject to review.
- Please note that foundation drainage is to be independently connected to sewer main unless being pumped with appropriate back up power, sufficient sized pump, and back flow prevention. **It is recommended that the foundation drainage system be drained by a sump pump connection to the storm sewer to minimize risk of basement flooding as it will provide the best protection from the uncontrolled sewer system compared to relying on the backwater valve.**
- **Water Quality Control:** Please consult with the local conservation authority (RVCA) regarding water quality criteria prior to submission of a Site Plan Control Proposal application to establish any water quality control restrictions, criteria, and measures for the site. Correspondence and clearance shall be provided in the Appendix of the report.
- Please note that as per *Technical Bulletin PIEDTB-2016-01 section 8.3.11.1 (p.12 of 14)* **there shall be no surface ponding on private parking areas during the 2-year storm rainfall event**.
- **Underground Storage:** Please note that the Modified Rational Method for storage computation in the Sewer Design Guidelines was originally intended to be used for above ground storage (i.e., parking lot) where the change in head over the orifice varied from 1.5 m to 1.2 m (assuming a 1.2 m deep CB and a max ponding depth of 0.3 m). This change in head was small and hence the release rate fluctuated little, therefore there was no need to use an average release rate.
    - When underground storage is used, the release rate fluctuates from a maximum peak flow based on maximum head down to a release rate of zero. This difference is large and has a significant impact on storage requirements. **We therefore require that an average release rate equal to 50% of the peak allowable rate shall be applied to estimate the required volume. Alternatively, the consultant may choose to use a submersible pump in the design to ensure a constant release rate.**
    - In the event that there is a disagreement from the designer regarding the required storage, The City will require that the designer demonstrate their rationale utilizing dynamic modelling, that will then be reviewed by City modellers in the Water Resources Group.
    - Please provide information on UG storage pipe. Provide required cover over pipe and details, chart of storage values, capacity etc. How will this pipe be cleaned of sediment and debris?
    - Provide information on type of underground storage system including product name and model, number of chambers, chamber configuration, confirm invert of chamber system, top of chamber system, required cover over system and details, interior bottom slope (for self-cleansing), chart of storage values, length, width and height, capacity, entry ports (maintenance) etc.
    - Provide a cross section of underground chamber system showing invert and obvert/top, major and minor HWLs, top of ground, system volume provided

during major and minor events. UG storage to provide actual 2- and 100-year event storage requirements.
    - In regard to all proposed UG storage, ground water levels (and in particular HGW levels) will need to be reviewed to ensure that the proposed system does not become surcharged and thereby ineffective.
    - Modeling can be provided to ensure capacity for both storm and sanitary sewers for the proposed development by City's Water Distribution Dept. – Modeling Group, through PM and upon request.
- Please note that the minimum orifice dia. for a plug style **ICD is 83mm and the minimum flow rate from a vortex ICD is 6 L/s** in order to reduce the likelihood of plugging.
- Post-development site grading shall match existing property line grades in order to minimize disruption to the adjacent residential properties. A **topographical plan of survey** shall be provided as part of the submission and a note provided on the plans.
- Please provide a **Pre-Development Drainage Area Plan** to define the pre-development drainage areas/patterns. **Existing drainage patterns shall be maintained and discussed as part of the proposed SWM solution**.
- **If rooftop control** and storage is proposed as part of the SWM solutions sufficient details (Cl. 8.3.8.4) shall be discussed and document in the report and on the plans. Roof drains are to be connected downstream of any incorporated ICDs within the SWM system and not to the foundation drain system. Provide a **Roof Drain Plan** as part of the submission.
- If **Window wells** are proposed, they are to be indirectly connected to the footing drains. A detail of window well with indirect connection is required, as is a note at window well location speaking to indirect connection.
- There must be at least **15cm of vertical clearance** between the spill elevation and the ground elevation at the building envelope that is in proximity of the flow route or ponding area. The exception in this case would be at reverse sloped loading dock locations. At these locations, a minimum of 15cm of vertical clearance must be provided below loading dock openings. Ensure to provide discussion in report and ensure grading plan matches if applicable.
- Rear yard on grade parking to be permeable pavement. Refer to City Standard Detail Drawings SC26 (maintenance/temp parking areas), SC27 or permeable asphalt materials. No gravel or stone dust parking areas permitted.

Storm Sewer:

- A 525 mm dia. CONC storm sewer (UNK) is available within Athlone Avenue**.**

Sanitary Sewer:

- A 225 mm dia. CONC Sanitary sewer (UNK) is available within Athlone Avenue.
- Please provide the new Sanitary sewer discharge and we confirm if sanitary sewer main has the capacity. An analysis and demonstration that there is sufficient/adequate residual capacity to accommodate any increase in wastewater flows in the receiving and downstream wastewater system is required to be provided. Needs to be demonstrated that there is adequate capacity to support any increase in wastewater flow.
- Please apply the wastewater design flow parameters *in Technical Bulletin PIEDTB-2018-01.*
- Sanitary sewer monitoring maintenance hole is required to be installed at the property line (on the private side of the property) as per City of Ottawa Sewer-Use By-Law 2003-514 (14) *Monitoring Devices*.

- A backwater valve is required on the sanitary service for protection.

Water:

- A 152 mm dia. UCI watermain (1931) is available within Athlone Avenue**.**
- Existing residential service to be blanked at the main.
- **Water Supply Redundancy:** Residential buildings with a basic day demand greater than 50m^3/day (0.57 L/s) are required to be connected to a minimum of two water services separated by an isolation valve to avoid a vulnerable service area as per the *Ottawa Design Guidelines - Water Distribution, WDG001, July 2010 Clause 4.3.1 Configuration.* The basic day demand for this site not expected to exceed 50m^3/day.
- Please **review Technical Bulletin ISTB-2018-02**, maximum fire flow hydrant capacity is provided in Section 3 Table 1 of Appendix I. A **hydrant coverage figure** shall be provided and **demonstrate there is adequate fire protection for the proposal**. Two or more public hydrants are anticipated to be required to handle fire flow.
- Boundary conditions are required to confirm that the require fire flows can be achieved as well as availability of the domestic water pressure on the City street in front of the development. Use Table 3-3 of the MOE Design Guidelines for Drinking-Water System to determine Maximum Day and Maximum Hour peaking factors for 0 to 500 persons and use Table 4.2 of the Ottawa Design Guidelines, Water Distribution for 501 to 3,000 persons. Please provide the following information to the City of Ottawa via email to request water distribution network boundary conditions for the subject site. Please note that once this information has been provided to the City of Ottawa it takes approximately 5-10 business days to receive boundary conditions.
    - Type of Development and Units
    - Site Address
    - A plan showing the proposed water service connection location.
    - **Average Daily Demand** (L/s)
    - **Maximum Daily Demand** (L/s)
    - **Peak Hour Demand** (L/s)
    - **Fire Flow** (L/min)

[*Fire flow demand requirements shall be based on **Fire Underwriters Survey (FUS)** Water Supply for Public Fire Protection 1999*]
[Fire flow demand requirements shall be based on ISTB-2021-03]
Note: The OBC method can be used if the fire demand for the private property is less than 9,000 L/min. If the OBC fire demand reaches 9000 L/min, then the FUS method is to be used. Exposure separation distances shall be defined on a figure to support the FUS calculation and required fore flow (RFF).

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

Snow Storage:

- Any portion of the subject property which is intended to be used for permanent or temporary snow storage shall be as shown on the approved site plan and grading plan. Snow storage shall not interfere with approved grading and drainage patters or servicing. Snow storage areas shall be setback from the property lines, foundations, fencing or landscaping a minimum of 1.5m. Snow storage areas shall not occupy

driveways, aisles, required parking spaces or any portion of a road allowance. If snow is to be removed from the site, please indicate this on the plan(s).

Trees:

- Please note that a new Tree By-law is now in effect.

General Bulletin_New Tree Protection Bylaw.

Severance:

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

Gas pressure regulating station

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

Gas Pressure Regulating Station.pd

Regarding Quantity Estimates:

- Please note that external Garbage and/or bicycle storage structures are to be added to QE under Landscaping as it is subject to securities. In addition, sump pumps for Sanitary and Storm laterals and/or cisterns are to be added to QE under Hard items as it is subject to securities, even though it is internal and is spoken to under SWM and Site Servicing Report and Plan.

CCTV sewer inspection

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

Pre-Construction Survey

- Pre-Construction (Piling/Hoe Ramming or close proximity to City Assets) and/or Pre-Blasting (if applicable) Survey required for any buildings/dwellings in proximity of 75m of site and circulation of notice of vibration/noise to residents within 150 m of site. Conditions for Pre-Construction/ Pre-Blast Survey & Use of Explosives will be applied to agreements. Refer to City's Standard S.P. No. F-1201 entitled Use of Explosives, as amended.

Road Reinstatement

- Where servicing involves three or more service trenches, either a full road width or full lane width 40 mm asphalt overlay will be required, as per amended Road Activity By-

Law 2003-445 and City Standard Detail Drawing R10. The amount of overlay will depend on condition of roadway and width of roadway(s).

Permits and Approvals:

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

Required Engineering Plans and Studies:

PLANS:

- Existing Conditions and Removals Plan
- Site Servicing Plan
- Grade Control and Drainage Plan
- Erosion and Sediment Control Plan
- Roof Drainage Plan
- Foundation Drainage System Detail (if applicable)
- Topographical survey

REPORTS:

- Site Servicing and Stormwater Management Report
- Geotechnical Study/Investigation (including sensitive marine clays and unstable slopes)
- Noise Control Study
- Phase I ESA
- Phase II ESA (Depending on recommendations of Phase I ESA)
- Site lighting certificate

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

Phase One Environmental Site Assessment:

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

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

Phase Two Environmental Site Assessment:

- If a Phase II ESA is required and there is indication of contamination present within the site, the site will need to be remediated for the approval.

Geotechnical Investigation:

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

https://documents.ottawa.ca/sites/documents/files/geotech_report_en.pdf

Slope Stability Assessment Reports

- A report addressing the stability of slopes, prepared by a qualified geotechnical engineer licensed in the Province of Ontario, should be provided wherever a site has slopes (existing or proposed) steeper than 5 horizontal to 1 vertical (i.e., 11-degree inclination from horizontal) and/or more than 2 metres in height.
- A report is also required for sites having retaining walls greater than 1 metre high, that addresses the global stability of the proposed retaining walls. https://documents.ottawa.ca/en/document/slope-stability-guidelines-development-applications

Noise Study:

- A **Transportation Noise Assessment** is required as the subject development is located within 100m proximity of an Arterial Road
- A **Stationary Noise Assessment** is required in order to assess the noise impact of the proposed sources of stationary noise (mechanical HVAC system/equipment) of the development onto the surrounding residential area to ensure the noise levels do not exceed allowable limits specified in the City Environmental Noise Control Guidelines.

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

Exterior Site Lighting:

- Any proposed light fixtures (both pole-mounted and wall mounted) must be part of the approved Site Plan. All external light fixtures must meet the criteria for Full Cut-off Classification as recognized by the Illuminating Engineering Society of North America (IESNA or IES), and must result in minimal light spillage onto adjacent properties (as a guideline, 0.5 fc is normally the maximum allowable spillage). In order to satisfy these criteria, the please provide the City with a **Certification (Statement) Letter** from an acceptable professional engineer stating that the design is compliant.

Fourth (4th) Review Charge:

Please be advised that additional charges for each review, after the 3rd review, will be applicable to each file. There will be no exceptions.

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

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

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

Community Comments – Heather Mitchell

- It is appreciated that accessibility considerations are incorporated in the development.
- There is concern with the back lot and the lack of parking in this building. There is street parking on Athlone, residents are concerned that people from this building will park on the road and block the streets with their cars.
- The peaked roof is appreciated

APPENDIX B

WATER SERVICING

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

April 1, 2022

436 Athlone Avenue

3.5-Storey Apartment 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
= 23 Group C Occupancy, Building is of combustible construction with fire separations without fire resistance ratings.

V = Building volume in cubic meters

Floor Area (sq.m)	Height (m)	Volume (cu.m)
218	12.2	2,660

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	1.7	(to north property line)
$S_{Side\ 2}$	0	13	(to centerline of road)
$S_{Side\ 3}$	0.5	1.5	(to south property line)
$S_{Side\ 4}$	0.25	7.5	(to west property line)
S_{Total}	2.25		Need not exceed 2.0

Q = 122,342 L
= 3,600 L/min as per OBC A-3.2.5.7. Table 2
= 60 L/s

---

60 L/s Fire Flow:	89.1	m				
Elevation at Fire Hydrant:	71.8	m				
Static Pressure at Fire Hydrant:	17.3	m	170	kPa	25	psi

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

April 1, 2022

436 Athlone Avenue

3.5-Storey Apartment Building

16 Apartment Units

Ottawa, Ontario

WATER DEMAND CALCULATIONS

	Number of Units	Persons per Unit	Population
1 Bedroom:	12	1.4	17
2 Bedroom:	4	2.1	8
3 Bedroom:	0	3.1	0
Average:	0	1.8	0
Total:	16		25

Average Daily Demand:	280	L/capita/day				
	4.9	L/min	0.1	L/s	1.3	USgpm
Maximum Daily Demand:	9.5	(Peaking factor for a population of 25 from Table 3-3 MOE Design Guidelines for Drinking Water Systems)				
	46.6	L/min	0.8	L/s	12.3	USgpm
Maximum Hourly Demand:	14.3	(Peaking factor for a population of 25 from Table 3-3 MOE Design Guidelines for Drinking Water Systems)				
	70.1	L/min	1.2	L/s	18.5	USgpm

Elevation of Water Meter:	74.41	m				
Finished Floor Elevation:	73.51	m				
Minimum HGL:	108.6	m				
Static Pressure at Water Meter:	34.2	m	335	kPa	49	psi
Maximum HGL:	114.7	m				
Static Pressure at Water Meter:	40.3	m	395	kPa	57	psi

D.B. Gray Engineering Inc.

Ryan Faith <r.faith@dbgrayengineering.com>

RE: Request for Boundary Conditions - 436 Athlone Avenue

1 message

McLaughlin Seymour, Sarah <Sarah.McLaughlin@ottawa.ca> Fri, Apr 1, 2022 at 12:38 PM
To: Ryan Faith <r.faith@dbgrayengineering.com>
Cc: Douglas Gray <d.gray@dbgrayengineering.com>

Hi Ryan,

The following are boundary conditions, HGL, for hydraulic analysis at 436 Athlone Avenue (zone 1W) assumed to be connected to the 152 mm watermain on Athlone Avenue (see attached PDF for location).

Minimum HGL: 108.6 m

Maximum HGL: 114.7 m

Max Day + FF (45 L/s): 97.7 m

Max Day + FF (60 L/s): 89.1 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.

Thanks,

Sarah McLaughlin, P.Eng

Project Manager

Planning, Real Estate and Economic Development Department / Direction générale de la planification, des biens immobiliers et du développement économique

Development Review - Central Branch

City of Ottawa | Ville d'Ottawa

110 Laurier Avenue West Ottawa, ON, K1P 1J1 | 110, avenue Laurier Ouest, Ottawa, ON, K1P 1J1

613.580.2400 ext./poste 26821, sarah.mclaughlin@ottawa.ca

From: McLaughlin Seymour, Sarah
Sent: March 28, 2022 11:33 AM
To: Ryan Faith <r.faith@dbgrayengineering.com>
Cc: Douglas Gray <d.gray@dbgrayengineering.com>
Subject: RE: Request for Boundary Conditions - 436 Athlone Avenue

Hi Ryan,

Thank you for your email. The information has been forwarded to the modeling group for analysis.

Thanks,

Sarah McLaughlin, P.Eng

Project Manager

Planning, Real Estate and Economic Development Department / Direction générale de la planification, des biens immobiliers et du développement économique

Development Review - Central Branch

City of Ottawa | Ville d'Ottawa

110 Laurier Avenue West Ottawa, ON, K1P 1J1 | 110, avenue Laurier Ouest, Ottawa, ON, K1P 1J1

613.580.2400 ext./poste 26821, sarah.mclaughlin@ottawa.ca

From: Ryan Faith <r.faith@dbgrayengineering.com>
Sent: March 28, 2022 10:55 AM
To: McLaughlin Seymour, Sarah <Sarah.McLaughlin@ottawa.ca>
Cc: Douglas Gray <d.gray@dbgrayengineering.com>
Subject: Request for Boundary Conditions - 436 Athlone Avenue

Hi Sarah,

Please provide the boundary conditions for the 150 mm Athlone Avenue watermain at 436 Athlone Avenue. We have calculated the following expected demands:

Average daily demand: 0.1 L/s

Maximum daily demand: 0.8 L/s

Maximum hourly demand: 1.2 L/s

Fire flow demand: 60 L/s (Option 1)

Fire flow + maximum daily demand: 60.8 L/s

We are looking at alternative designs so please also provide the boundary conditions for the following expected demands.

Average daily demand: 0.1 L/s

Maximum daily demand: 0.8 L/s

Maximum hourly demand: 1.2 L/s

Fire flow demand: 45 L/s (Option 2)

Fire flow + maximum daily demand: 45.8 L/s

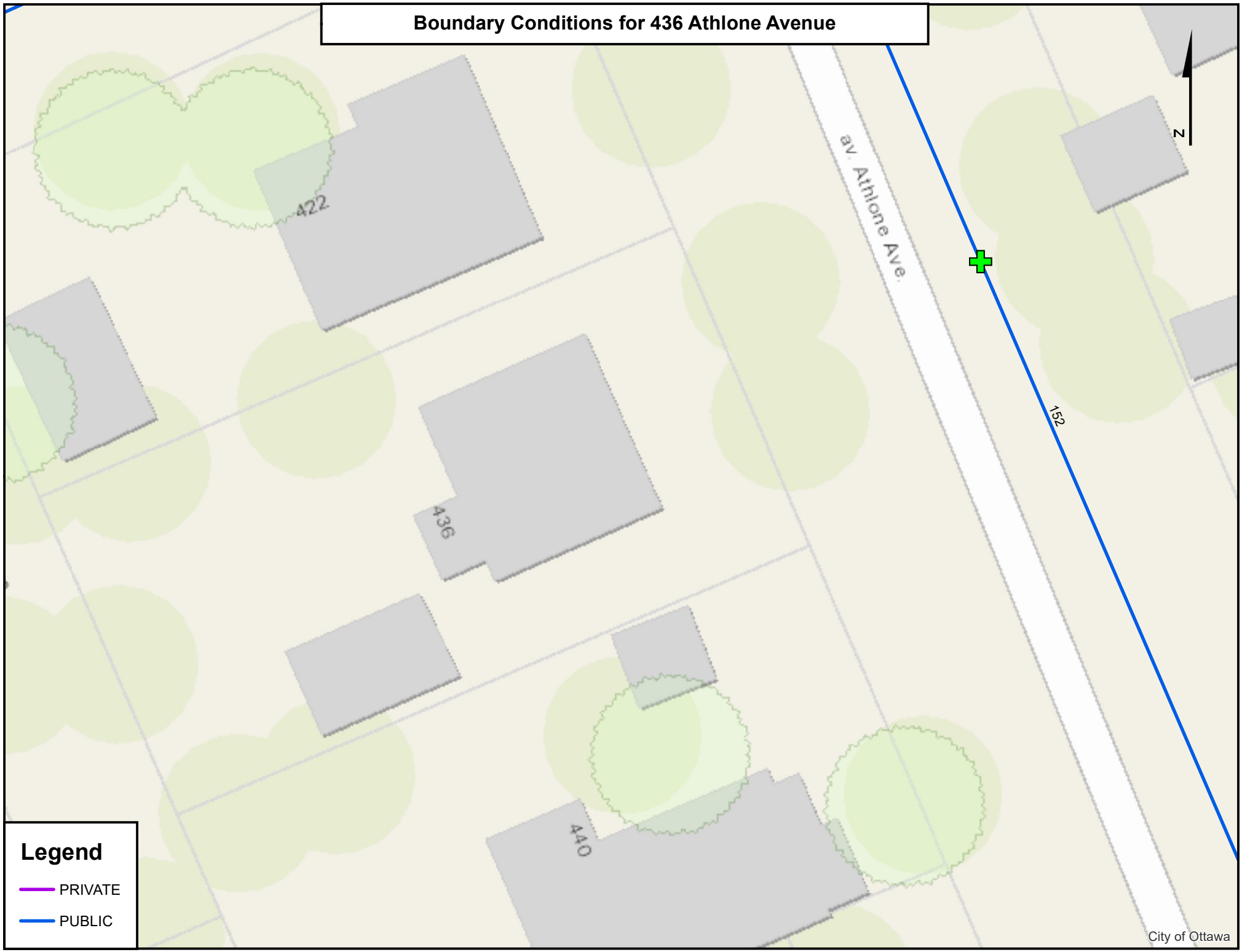
Calculations are attached.

Thanks,

'

'

436 Athlone Avenue March 2022.pdf
685K


Boundary Conditions for 436 Athlone Avenue
av. Athlone Ave.
422
436
440
152
N
Legend
PRIVATE
PUBLIC
City of Ottawa

April 13, 2022

436 Athlone Avenue

3.5-Storey Apartment Building

Ottawa, Ontario

PEAK WATER DEMAND CALCULATIONS

	Number	Fixture Value	Combined
Toilet - Tank:	19	6	114
Shower:	19	2.5	47.5
Lavatory:	19	1.5	28.5
Kitchen Sink:	16	1.8	28.8
Dishwasher:	16	1.3	20.8
Clothes Washer:	16	6	96
Total:			335.6

Demand (as per Figure 4-2 AWWA M22): 38 USgpm

Pressure at Water Meter: 365 kPa 53 psi

Pressure Adjustment Factor (as per Table 4-3 AWWA M22): 0.958

Pressure Adjusted Demand: 138 L/min 2.3 L/s 36 USgpm

Nominal Size: 38 mm 1.5 in

Velocity: 2.0 m/s 6.6 ft/s

APPENDIX C

SANITARY SERVICING

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

SANITARY SEWER CALCULATIONS

Project: 436 Athlone Avenue
3.5-Storey Apartment Building
16 Apartment Units
Ottawa, Ontario

Date: May 3, 2022

Residential Average Daily Flow:	280	L/capita/day	Residential Peaking Factor:	Harmon Formula	
Commercial Average Daily Flow:	28,000	L/ha/day	Harmon Formula Correction Factor:	0.8	
Institutional Average Daily Flow:	28,000	L/ha/day	Commercial Peaking Factor:	1.5	
Light Industrial Average Daily Flow:	35,000	L/ha/day	Institutional Peaking Factor:	1.5	
Heavy Industrial Average Daily Flow:	55,000	L/ha/day	Industrial Peaking Factor:	Ministry of the Environment	
Infiltration Allowance:	0.33	L/s/ha	Manning's Roughness Coefficient:	0.013	

		Residential													Commercial				Infiltration			Q	Sewer Data						
		Individual									Cumulative				Individual	Cumulative			Individual	Cumulative		Total							
Location		Single	Semi		Apartment	Apartment	Apartment	Apartment	Area	Population	Area	Population	Peaking	Flow Rate	Area	Area	Peaking	Flow Rate	Area	Area	Flow Rate	Flow Rate	Length	Nominal Diameter	Actual Diameter	Slope	Velocity	Q_{Full} Capacity	
From	To	Family	Detached	Duplex	(1 Bed)	(2 Bed)	(3 Bed)	(Average)	(ha)		(ha)		Factor	(L/s)	(ha)	(ha)	Factor	(L/s)	(ha)	(ha)	(L/s)	(L/s)	(m)	(mm)	(mm)	(%)	(m/s)	(L/s)	Q / Q_{Full}
		ppu = 3.4	ppu = 2.7	ppu = 2.3	ppu = 1.4	ppu = 2.1	ppu = 3.1	ppu = 1.8																					
Existing Dwelling	Existing 225 SAN	1							0.0461	3.4	0.0461	3.4	3.2	0.04					0.0461	0.0461	0.02	0.05							
Proposed Building	Existing 225 SAN				12	4			0.0461	25.2	0.0461	25.2	3.2	0.26					0.0461	0.0461	0.02	0.28	14.6	150	150	1	0.86	15.23	0.02
																						Existing 225 mm Athlone Avenue Sanitary Sewer:		225	225	3.01	1.96	77.90	

APPENDIX D

STORMWATER MANAGEMENT

D.B. Gray Engineering Inc.

Ryan Faith <r.faith@dbgrayengineering.com>

RE: RVCA Stormwater Management Comments - 436 Athlone Avenue

1 message

Eric Lalande <eric.lalande@rvca.ca> Thu, Mar 31, 2022 at 9:13 AM
To: Ryan Faith <r.faith@dbgrayengineering.com>

Hi Ryan,

Based on the proposed site plan, the RVCA will not require any additional on-site water quality controls. Best management practices are encouraged where possible to be integrated in the ultimate design.

Thanks,

Eric Lalande, MCIP, RPP

Planner, RVCA

613-692-3571 x1137

From: Ryan Faith <r.faith@dbgrayengineering.com>
Sent: Thursday, March 31, 2022 9:09 AM
To: Eric Lalande <eric.lalande@rvca.ca>
Cc: Douglas Gray <d.gray@dbgrayengineering.com>
Subject: RVCA Stormwater Management Comments - 436 Athlone Avenue

Hi Eric,

We are working on a proposed 3.5 storey apartment building on 461 sq.m of land at 436 Athlone Avenue in Ottawa.

Please comment on the stormwater management for the site.

I have attached a site plan for your reference.

Thanks,

SUMMARY TABLES

ONE HUNDRED YEAR EVENT

Drainage Area	Pre-Development Flow Rate (L/s)	Target Release Rate (L/s)	Maximum Release Rate (L/s)	Maximum Volume Required (cu.m)	Maximum Volume Stored (cu.m)
AREA I (Uncontrolled Flow Off Site)	-	-	9.03	-	-
AREA II (Roof)	-	-	2.93	3.91	3.91
TOTAL	13.91	2.39	11.96	3.91	3.91

FIVE YEAR EVENT

Drainage Area	Pre-Development Flow Rate (L/s)	Target Release Rate (L/s)	Maximum Release Rate (L/s)	Maximum Volume Required (cu.m)	Maximum Volume Stored (cu.m)
AREA I (Uncontrolled Flow Off Site)	-	-	4.65	-	-
AREA II (Roof)	-	-	2.16	1.57	1.57
TOTAL	7.13	2.39	6.81	1.57	1.57

May 6, 2022

436 Athlone Avenue

Ottawa, Ontario

STORMWATER MANAGEMENT CALCULATIONS

Modified Rational Method

PRE-DEVELOPMENT CONDITIONS

ONE HUNDRED YEAR EVENT

			C
Roof Area:	62	sq.m	1.00
Asphalt/Concrete Area:	158	sq.m	1.00
Gravel Area:	0	sq.m	0.875
Landscaped Area:	241	sq.m	0.25
Total Catchment Area:	461	sq.m	0.61

Bransby Williams Formula

$$Tc = \frac{0.057 \bullet L}{Sw^{0.2} \bullet A^{0.1}} \text{ min}$$

Sheet Flow Distance (L):	30	m
Slope of Land (Sw):	2	%
Area (A):	0.0461	ha
Time of Concentration (Sheet Flow):	2	min
Area (A):	461	sq.m
Time of Concentration:	10	min
Rainfall Intensity (i):	179	mm/hr
Runoff Coeficient (C):	0.61	
100 Year Pre-Development Flow Rate (2.78AiC):	13.91	L/s

FIVE YEAR EVENT

			C
Roof Area:	62	sq.m	0.90
Asphalt/Concrete Area:	158	sq.m	0.90
Gravel Area:	0	sq.m	0.70
Landscaped Area:	241	sq.m	0.20
Total Catchment Area:	461	sq.m	0.53

Area (A):	461	sq.m
Time of Concentration:	10	min
Rainfall Intensity (i):	104	mm/hr
Runoff Coeficient (C):	0.53	
5 Year Pre-Development Flow Rate (2.78AiC):	7.13	L/s

TARGET RELEASE RATE

			C
Proposed Roof Area:	224	sq.m	0.50

Area (A):	224	sq.m
Time of Concentration:	10	min
Rainfall Intensity (i):	77	mm/hr (2 year event)
Runoff Coeficient (C):	0.50	
Target Release Rate (2.78AiC):	2.39	L/s

ONE HUNDRED YEAR EVENT

DRAINAGE AREA I (Uncontrolled Flow Off Site)

(ONE HUNDRED YEAR EVENT)

			C
Roof Area:	40	sq.m	1.00
Asphalt/Concrete Area:	110	sq.m	1.00
Gravel Area:	0	sq.m	0.875
Landscaped Area:	128	sq.m	0.25
Total Catchment Area:	278	sq.m	0.65
Area (A):	278	sq.m	
Time of Concentration:	10	min	
Rainfall Intensity (i):	179	mm/hr	
Runoff Coeficient (C):	0.65		
Flow Rate (2.78AiC):	9.03	L/s	

DRAINAGE AREA II (Roof)

(ONE HUNDRED YEAR EVENT)

			C
Total Catchment Area:	183	sq.m	1.00

No. of Roof Drains: 2
Slots per Wier: 1 0.01242 L/s/mm/slot (5 USgpm/in/slot)

Depth at Roof Drains: 118 mm

Maximum Release Rate: 2.93 L/s Pond Area: 99 sq.m

Maximum Volume Stored: 3.91 cu.m

Maximum Volume Required: 3.91 cu.m

Time (min)	i (mm/hr)	2.78AiC (L/s)	Release Rate (L/s)	Stored Rate (L/s)	Required Storage Volume (cu.m)
10	179	9.08	2.93	6.16	3.69
15	143	7.27	2.93	4.34	3.91
20	120	6.10	2.93	3.17	3.81
25	104	5.28	2.93	2.35	3.53
30	92	4.67	2.93	1.75	3.14
35	83	4.20	2.93	1.27	2.67
40	75	3.82	2.93	0.89	2.15
45	69	3.51	2.93	0.58	1.58
50	64	3.25	2.93	0.32	0.97
55	60	3.03	2.93	0.10	0.35
60	56	2.84	2.84	0.00	0.00
65	53	2.68	2.68	0.00	0.00
70	50	2.53	2.53	0.00	0.00
75	47	2.40	2.40	0.00	0.00
80	45	2.29	2.29	0.00	0.00
85	43	2.19	2.19	0.00	0.00
90	41	2.09	2.09	0.00	0.00

FIVE YEAR EVENT

DRAINAGE AREA I (Uncontrolled Flow Off Site)

(FIVE YEAR EVENT)

			C
Roof Area:	40	sq.m	0.90
Asphalt/Concrete Area:	110	sq.m	0.90
Gravel Area:	0	sq.m	0.70
Landscaped Area:	128	sq.m	0.20
Total Catchment Area:	278	sq.m	0.58
Area (A):	278	sq.m	
Time of Concentration:	10	min	
Rainfall Intensity (i):	104	mm/hr	
Runoff Coeficient (C):	0.58		
Flow Rate (2.78AiC):	4.65	L/s	

DRAINAGE AREA II (Roof)

(FIVE YEAR EVENT)

			C
Total Catchment Area:	183	sq.m	0.90

No. of Roof Drains:	2	
Slots per Wier:	1	0.01242 L/s/mm/slot (5 USgpm/in/slot)

Depth at Roof Drains:	87	mm			
Maximum Release Rate:	2.16	L/s	Pond Area:	54	sq.m
			Maximum Volume Stored:	1.57	cu.m
			Maximum Volume Required:	1.57	cu.m

Time (min)	i (mm/hr)	2.78AiC (L/s)	Release Rate (L/s)	Stored Rate (L/s)	Required Storage Volume (cu.m)
10	104	4.77	2.16	2.61	1.57
15	84	3.83	2.16	1.67	1.50
20	70	3.22	2.16	1.06	1.27
25	61	2.79	2.16	0.63	0.94
30	54	2.47	2.16	0.31	0.56
35	49	2.22	2.16	0.06	0.13
40	44	2.02	2.02	0.00	0.00
45	41	1.86	1.86	0.00	0.00
50	38	1.72	1.72	0.00	0.00
55	35	1.61	1.61	0.00	0.00
60	33	1.51	1.51	0.00	0.00
65	31	1.42	1.42	0.00	0.00
70	29	1.34	1.34	0.00	0.00
75	28	1.28	1.28	0.00	0.00
80	27	1.22	1.22	0.00	0.00
85	25	1.16	1.16	0.00	0.00
90	24	1.11	1.11	0.00	0.00

D.B. Gray Engineering Inc.

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

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STORM SEWER CALCULATIONS

Rational Method

FIVE YEAR EVENT

Project: 436 Athlone Avenue
3.5-Storey Apartment Building
Ottawa, Ontario

Date: May 3, 2022

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)	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}
Roof Drains	Existing 525 ST	0.0183				0.0458	0.0458	10.00	104	4.77	12.2	150	150	1	0.86	15.23	0.24	0.31
										Existing 525 mm Athlone Avenue Storm Sewer:		525	533	0.46	1.36	303.69		

APPENDIX E

DEVELOPMENT SERVICING STUDY CHECKLIST

GENERAL

Executive Summary: **N/A**

Date and revision number of report: **Included**

Location map and plan showing municipal address, boundary and layout of proposed development: **Included**

Plan showing site and location of all existing services: **Included**

Development statistics, land use, density, adherence to zoning and Official Plan and reference to applicable watershed and subwatershed plans: **N/A**

Summary of Pre-Application Consultation meetings with City of Ottawa and other approval agencies: **Included**

Confirmation of conformance with higher level studies: **N/A**

Statement of objectives and servicing criteria: **Included**

Identification of existing and proposed infrastructure available in the immediate area: **Included**

Identification of Environmentally Significant Areas, watercourses and Municipal Drains potentially impacted by the proposed development: **N/A**

Concept level master grading plan to confirm existing and proposed grades in the proposed development: **Included**

Identification of potential impacts of proposed piped services on private services on adjacent lands: **N/A**

Proposed phasing of proposed development: **N/A**

Reference to geotechnical studies: **Included**

All preliminary and formal site plan submissions should have the following information:

- Metric scale: **Included**
- North arrow: **Included**
- Key plan: **Included**
- Property limits: **Included**
- Existing and proposed structures and parking areas: **Included**
- Easements, road widenings and right-of-ways: **N/A**
- Street names: **Included**

WATER SERVICING

Confirmation of conformance with Master Servicing Study: **N/A**

Availability of public infrastructure to service proposed development: **Included**

Identification of system constraints: **Included**

Identification of boundary conditions: **Included**

Confirmation of adequate domestic supply: **Included**

Confirmation of adequate fire flow: **Included**

Check of high pressures: **Included**

Definition of phasing constraints: **N/A**

Address reliability requirements: **N/A**

Check on 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 proposed development: **Included**

Description of proposed water distribution network: **Included**

Description of required off-site infrastructure to service proposed development: **N/A**

Confirmation that water demands are calculated based on the City of Ottawa Water Design Guidelines: **Included**

Provision of a model schematic showing the boundary conditions locations, streets, parcels and building locations: **Included**

SANITARY SERVICING

Summary of proposed design criteria: **Included**

Confirmation of conformance with Master Servicing Study: **N/A**

Consideration of local conditions that may contribute to extraneous flows that are higher than the recommended flows in the City of Ottawa Sewer Design Guidelines: **N/A**

Description of existing sanitary sewer available for discharge of wastewater from proposed development: **Included**

Verification of available capacity in downstream sanitary sewer and/or identification of upgrades necessary to service proposed development: **N/A**

Calculations related to dry-weather and wet-weather flow rates: **Included**

Description of proposed sewer network: **Included**

Discussion of previously identified environmental constraints and impact on servicing: **N/A**

Impacts of proposed development on existing pumping stations or requirements for new pumping station: **N/A**

Forcemain capacity in terms of operational redundancy, surge pressure and maximum flow velocity: **N/A**

Identification and implementation of emergency overflow from sanitary pumping stations in relation to the hydraulic grade line to protect against basement flooding: **N/A**

Special considerations (e.g. contamination, corrosive environment): **N/A**

STORMWATER MANAGEMENT & STORM SERVICING

Description of drainage outlets and downstream constraints: **Included**

Analysis of available capacity in existing public infrastructure: **N/A**

Plan showing subject lands, its surroundings, receiving watercourse, existing drainage pattern and proposed drainage pattern: **Included**

Water quantity control objective: **Included**

Water quality control objective: **Included**

Description of the stormwater management concept: **Included**

Setback from private sewage disposal systems: **N/A**

Watercourse and hazard lands setbacks: **N/A**

Record of pre-consultation with the Ministry of the Environment, Conservation and Parks and the Conservation Authority having jurisdiction on the affected watershed: **N/A**

Confirmation of conformance with Master Servicing Study: **N/A**

Storage requirements and conveyance capacity for minor events (5-year return period) and major events (100-year return period): **Included**

Identification of watercourses within the proposed development and how watercourses will be protected or if necessary altered by the proposed development: **N/A**

Calculation of pre-development and post-development peak flow rates: **Included**

Any proposed diversion of drainage catchment areas from one outlet to another: **N/A**

Proposed minor and major systems: **N/A**

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: **N/A**

Description of how the conveyance and storage capacity will be achieved for the proposed development: **Included**

100-year flood levels and major flow routing: **N/A**

Inclusion of hydraulic analysis including hydraulic grade line elevations: **N/A**

Description of erosion and sediment control during construction: **Included**

Obtain relevant floodplain information from Conservation Authority: **N/A**

Identification of fill constraints related to floodplain and geotechnical investigation: **N/A**

APPROVAL AND PERMIT REQUIREMENTS

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 (e.g. National Capital Commission, Parks Canada, Public Works and Government Services Canada, Ministry of Transportation): **N/A**

CONCLUSIONS

Clearly stated conclusions and recommendations: **Included**

Comments received from review agencies: **N/A**

Signed and stamped by a professional Engineer registered in Ontario: **Included**