

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

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SITE SERVICING STUDY & STORMWATER MANAGEMENT REPORT

366 WINONA AVENUE
OTTAWA, ONTARIO

REPORT NO. 21142

JUNE 3, 2022

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1.0 INTRODUCTION

This report has been prepared in support of the Site Plan Control application for two proposed 3-storey (4-level including basement apartments), 8-unit apartment buildings located at 366 Winona 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-7 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 on the east side of the Winona Avenue right-of-way; approximately 44 m unobstructed distance to the far side of the front façade of the furthest (south) proposed building, which is less than the maximum 90 m required 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 2,700 L/min (45 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 Winona Avenue municipal watermain provided by the City of Ottawa for the 45 L/s fire flow at the subject property indicate a hydraulic grade line (HGL) of 104.1 m. Refer to Appendix B. This HGL calculates to 368 kPa (53 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 2,700 L/min (45 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 16 1-bedroom apartment units, the average daily demand was calculated to be 0.1 L/s, the maximum daily demand was calculated to be 0.7 L/s and the maximum hourly demand was calculated to be 1.0 L/s. Refer to calculations in Appendix B.

The boundary conditions in the 150 mm Winona Avenue municipal watermain provided by the City of Ottawa at the subject property indicate a minimum HGL of 108.7 m and a maximum HGL of 115.5 m. Refer to Appendix B. Based on these boundary conditions the pressure at the water meter is calculated to vary between 435 kPa (63 psi) and 502 kPa (73 psi). This is an acceptable range for the proposed development.

Using the American Water Works Association (AWWA) Manual of Water Supply Practices M22 for fixture values, and based on an average water pressure at the water meter of 469 kPa (68 psi); the peak demand was calculated to be 1.8 L/s. A 38 mm water service connecting to the 150 mm Winona Avenue municipal watermain is proposed to service each proposed building. The peak demand will produce an acceptable velocity of 1.8 m/s (5.9 ft/s) and pressure drop in the proposed 38 mm water services. 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 16 1-bedroom apartment units, the post-development sanitary flow rate was calculated to be 0.13 L/s for each building. A 150 mm sanitary service at 1% slope (14.43 L/s capacity) is proposed to service each building. At the design flow rate the sanitary service will only be at 1% of its capacity. The proposed 150 mm sanitary services will connect to the existing 225 mm Winona Avenue municipal sanitary sewer, which at 2.84% slope has a capacity of 78.94 L/s. The pre-development sanitary flow rate was calculated to be 0.05 L/s (single family dwelling). Refer to calculations in Appendix C. The 0.21 L/s post-development increase in flow is expected to have an acceptable impact on the 225 mm Winona 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 site plan provided, the RVCA does not require any on-site water quality control requirements. Best management practices are encouraged to be integrated where possible.”* Refer to Appendix D. 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 2.6 on drawing C-4. In summary: to filter out construction sediment a silt fence barrier will be installed around the perimeter of the site where runoff will drain off the site; sediment capture filter sock inserts are to be installed in all existing catch-basins adjacent to the site and all new catch basins as they are installed; and any material deposited on the public road is to be removed.

4.2 QUANTITY CONTROL

The stormwater management criteria for quantity control are to control the post development peak flows for the 5-year and 100-year storm events to peak flows during the 5-year storm event using a pre-development runoff coefficient or 0.50, whichever is less; and a calculated time of concentration (but not less than 10 minutes). It is calculated that the pre-development conditions reflect a 5-year runoff coefficient of 0.48 and a time of concentration of about 1 minute. Therefore, based on runoff coefficient of 0.48, a 10 minute time of concentration; and using the Rational Method; the maximum allowable release rate is 8.30 L/s for all storm events. The Modified Rational Method is used to calculate the required storage volume. The runoff coefficients for the 100 year event are increased by 25% to maximum 1.00. Refer to calculations in Appendix D.

Drainage Area I (Uncontrolled Flow Off Site – 56 sq.m)

The runoff from the perimeter of the site will be allowed to flow uncontrolled off the site. The flow rates are calculated at a time of concentration of 10 minutes.

	100-Year Event	5-Year Event
Maximum Flow Rate	2.11 L/s	1.09 L/s

Drainage Area II (Roof – 543 sq.m)

An inlet control device (ICD) located in the outlet of catch basin/manhole CB/MH-2 will control the release of stormwater from the property. The ICD will restrict the flow and force the stormwater to back up into two depressed landscaped areas (in the rear yard above catch basin CB-1 and a small area in front yard near the northeast corner of the property above CB-3). The ICD will discharge a storm sewer connection connecting to the 450 mm municipal storm sewer in Winona Avenue. The ICD shall be a Hydrovex "VHV Vertical Vortex Flow Regulator" (or approved equal) and shall be sized by the manufacturer for a discharge rate of 6.19 L/s at 2.03 m head. It is calculated that an orifice area of 4,418 sq.mm. (75 mm in diameter) and a discharge coefficient of 0.222 will restrict the outflow rate to 6.19 L/s at 2.03 m. Based on this orifice the maximum outflow rate for the 1:5 year storm event is calculated to be 6.04 L/s at 1.94 m.

	100-Year Event	5-Year Event
Maximum Release Rate	6.19 L/s	6.04 L/s
Water Elevation	65.87	65.77
Maximum Volume Stored	7.64 cu.m	2.02 cu.m

The Entire Site:

	100-Year Event	5-Year Event
Pre-development Release Rate	16.29 L/s	8.30 L/s
Maximum Allowable Release Rate	8.30 L/s	8.30 L/s
Maximum Release Rate	8.30 L/s	7.14 L/s
Maximum Volume Required & Stored	7.64 cu.m	2.02 cu.m

The maximum post-development release rate during the 100-year event for the entire property was calculated to be equal to the maximum allowable and 49% less than the pre-development flow rate. The

maximum post-development release rate during the 5-year event for the entire property was calculated to be 14% less than to the maximum allowable and pre-development flow rate. The post-development reduction in flow is expected to have a positive impact on the 450 mm Winona Avenue municipal storm sewer.

4.3 STORM SERVICING

The roofs of the proposed buildings are pitched. Runoff from the roofs will drain to grade via eaves troughs and down spouts. The foundation drains will drain to a storm sump and be pumped to the storm drain. Each building will be serviced by a 150 mm storm sewer service connection connecting to the 450 mm municipal storm sewer in Winona Avenue.

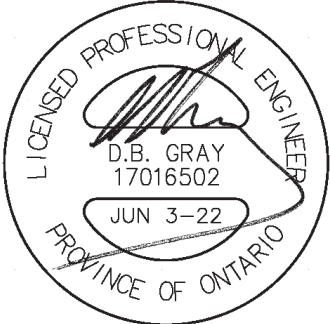
The peak unrestricted flow rate in the last segment of the proposed private storm sewer system during the 5-year event was calculated to be 9.10 L/s. The last segment (250 mm in diameter at 0.43% slope – 39.41 L/s capacity – connecting to the 450 mm municipal storm sewer in Winona Avenue) will only be at 23% of its capacity. Refer to calculations in Appendix D.

5.0 CONCLUSIONS

1. A private onsite fire hydrant is not required.
2. There is an adequate water supply for firefighting from the existing municipal water distribution system.
3. The aggregate flow of all contributing fire hydrants within 150 m of the building is greater than the required fire flow.
4. There is an acceptable range of water pressures in the existing municipal water distribution system.
5. The peak demand will produce an acceptable pressure drop in the proposed water service connections.
6. The post-development sanitary flow rate will be adequately handled by the proposed sanitary service connections.
7. The post-development increase in sanitary flow is expected to have an acceptable impact on the existing municipal sanitary sewer.
8. The Rideau Valley Conservation Authority does not require permanent stormwater quality control measures; and no permanent measures are proposed.
9. An Erosion & Sediment Control Plan has been developed to be implemented during construction.
10. The maximum post-development release rate during the 100-year event was calculated to be equal to the maximum allowable and 49% less than the pre-development flow rate. The maximum post-development release rate during the 5-year event was calculated to be 14% less than to the maximum allowable and pre-development flow rate.
11. The post-development reduction in flow is expected to have a positive impact on the 450 mm Winona Avenue municipal storm sewer.

12. The unrestricted flow rate during the 5-year event will be adequately handled by the proposed storm sewer system.

Prepared by D.B. Gray Engineering Inc.



NOT VALID UNLESS
SIGNED & DATED

APPENDIX A

PRE-APPLICATION CONSULTATION MEETING NOTES

Pre-Application Consultation Meeting Notes

366 Winona Street

[Pre-Application Consultation File Number]

Thursday, May 6, 2021

Attendees:

City of Ottawa:

Jean-Charles Renaud, File Lead

Holly Newitt, Student Planner

Mark Richardson, Planning Forester

Nishant Jhamb, Civil Engineer

Randolph Wang, Urban Design

Applicant Team:

Serene Shahzadeh, Novatech

Murray Chown, Novatech

Community Association Representative:

Gary Ludington

Subject: 366 Winona

Meeting Notes:

Opening & attendee introduction

- Introduction of meeting attendees

Proposal Overview

Serene Shahzadeh, Novatech

- Development proposal of two 8-unit low rise residential apartment buildings
 - Lot is currently Zoned R4-UD
 - Lot is to be served in half with one 8-unit building on each new parcel
 - No parking is proposed
- The proposal is compliant with Zoning Bylaw
- Soft landscaping is proposed across the site except for walkways and built structures
- Balconies are proposed for units
- Ground floor units will have access to the street, while the core of the building will be accessed through side entrances

Preliminary Comments from Related Discipline

Jean-Charles Renaud, File Lead:

- Want to confirm lot area as minimum lot area for zoning is 300m² without a minor variance
- Want to flag requirements for the percentage of windows on front facades and percentage of soft landscaping in front and rear yards
- Want to know how high the ramps will be and will they require guardrails? – to keep in mind as on property lines
- Discussed space allotted for bike and waste storage – is this a placeholder? Are you providing the minimum bike parking requirement or 1:1, is it all combined in one enclosure or internally separated?
 - Note that the size of the enclosure will impact amenity space available as the lot minus built structures and walkways is considered amenity space
- Encouraged to incorporate trees and landscaping in rear yard when developing a landscaping plan – noted attractive front yard
- Please consider design features to reduce bird collisions

Randolph Wang, Urban Design:

- A Design Brief is required as part of the site plan control submission. The Terms of Reference is attached for convenience.
- The proposed development is intended to meet all requirements of the zoning and the design appears to be appropriate with respect to placement of buildings and overall massing. Moving forward,
 - Please study and confirm additional building setback that may be required by hydro.
 - Please provide floor plans and building sections for a better understanding of the grading and relationship between the ground floor and the public realm.
 - Provide visual cues of and emphasis on the main entrances. It was indicated at the meeting that both main entrances would be located in the middle of the site. Considerations may be given to the following:
 - Installation of building elements (such as a canopy) between the two buildings along with landscaping treatments to offer weather protection of the entrances and to support way finding.
 - Mirroring the two buildings both in terms of floor plans and façade treatments.
 - Maximize opportunities for soft landscaping, including tree planting in both the front yard and the rear yard.

Mark Richardson, Planning Forester:

TCR requirements:

- a Tree Conservation Report (TCR) must be supplied for review along with the suite of other plans/reports required by the City
 - an approved TCR is a requirement of Site Plan approval.
- As of January 1 2021, any removal of privately-owned trees 10cm or larger in diameter, or publicly (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.
- The Planning Forester from Planning and Growth Management as well as foresters from Forestry Services will review the submitted TCR

- If tree removal is required, both municipal and privately-owned trees will be addressed in a single permit issued through the Planning Forester
- Compensation may be required for city owned trees – if so, it will need to be paid prior to the release of the tree permit
- the TCR must list all trees on site by species, diameter and health condition
- please identify trees by ownership – private onsite, private on adjoining site, city owned, co-owned (trees on a property line)
- the TCR must list all trees on adjacent sites if they have a critical root zone that extends onto the development site
- If trees are to be removed, the TCR must clearly show where they are, and document the reason they cannot be retained
- All retained trees must be shown and all retained trees within the area impacted by the development process must be protected as per City guidelines available at [Tree Protection Specification](#) or by searching Ottawa.ca
 - the location of tree protection fencing must be shown on a plan
 - show the critical root zone of the retained trees
 - if excavation will occur within the critical root zone, please show the limits of excavation
- the City encourages the retention of healthy trees; if possible, please seek opportunities for retention of trees that will contribute to the design/function of the site.
- For more information on the process or help with tree retention options, contact Mark Richardson mark.richardson@ottawa.ca or on [City of Ottawa](#)

LP tree planting requirements:

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.
- 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

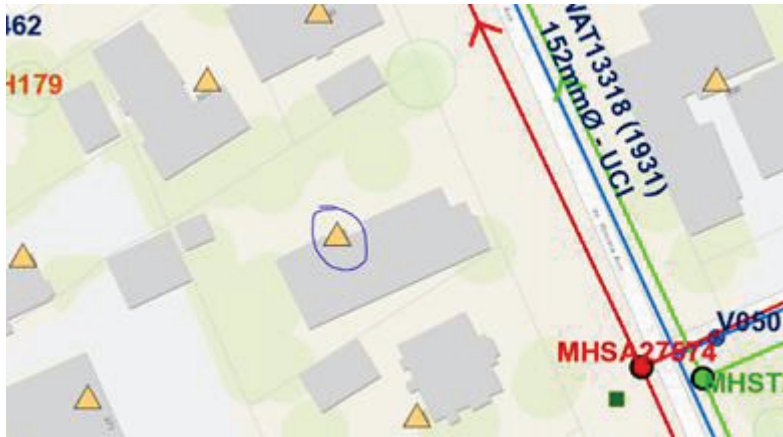
For additional information on the following please contact adam.palmer@Ottawa.ca

Nishant Jhamb, Civil Engineer

- Concern- Winona Avenue is serviced with a 150mm UCI mm watermain. There are concerns that the 152mm UCI watermain may not provide the required fire flow for both the buildings.
- Winona Ave. is scheduled for full road reconstruction including replacement of sewer and watermain. Proposed new watermain is 250mm PVC pipe. This work is anticipated to start in spring/summer 2022. Please note that once the road is resurfaced, a road cut permit will not be issued on Winona Ave. for 3 years, so it is **recommended to expedite the site plan control submissions.** <https://ottawa.ca/en/business/permits-and-licenses/right-way/road-cut-permit#resurfacing-requirement>
- Winona Ave. reconstruction is currently in design stage, proposed size of sanitary sewer and storm sewer is not known at this point.
- It is the sole responsibility of the consultant to investigate the location of existing underground utilities in the proposed servicing area and submit a request for locates to avoid conflict(s). The location of existing utilities and services shall be documented on an **Existing Conditions Plan.**
- Any easements on the subject site shall be identified and respected by any development proposal and shall adhere to the conditions identified in the easement agreement. A **legal survey plan** shall be provided and all easements shall be shown on the engineering plans.
- A deep excavation and dewatering operations have the potential to cause damages to the neighboring adjacent buildings/ City infrastructure. Document that construction activities (excavation, dewatering, vibrations associated with construction, etc.) will not have an impact on any adjacent buildings and infrastructure.

- Reference documents for information purposes:
 - Ottawa Sewer Design Guidelines (October 2012)
 - Technical Bulletin PIETB-2016-01
 - Technical Bulletins ISTB-2018-01, ISTB-2018-02 and ISTB-2018-03.
 - Ottawa Design Guidelines - Water Distribution (2010)
 - Geotechnical Investigation and Reporting Guidelines for Development Applications in the City of Ottawa (2007)
 - City of Ottawa Slope Stability Guidelines for Development Applications (revised 2012)
 - City of Ottawa Environmental Noise Control Guidelines (January 2016)
 - City of Ottawa Accessibility Design Standards (2012) (City recommends development be in accordance with these standards on private property)
 - Ottawa Standard Tender Documents (latest version)
 - Ontario Provincial Standards for Roads & Public Works (2013)
 - Record drawings and utility plans are also available for purchase from the City (Contact the City's Information Centre by email at InformationCentre@ottawa.ca or by phone at (613) 580-424 x.44455).

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



Disclaimer:

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

Stormwater Management Criteria and Information:

- **Water Quantity Control:** In the absence of area specific SWM criteria please control post-development runoff from the **roof only**, up to and including the **100-year storm event**, to a **5-year pre-development level**. The pre-development runoff coefficient will need to be determined **as per existing conditions** but in no case more than 0.5. **[If 0.5 applies it needs to be clearly demonstrated in the report that the pre-development runoff coefficient is greater than 0.5]**. The time of concentration (T_c) used to determine the pre-development condition should be calculated. *T_c should not be less than 10 min. since IDF curves become unrealistic at less than 10 min; T_c of 10 minutes shall be used for all post-development calculations*].
- Any storm run-off from the lot (except roof) can be allowed to drain freely towards the right-of way. Ensure that the storm water does not flows towards the neighboring properties. Please note this is a site-specific criteria and should not set precedence on other sites.
- 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 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.
- 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.

Storm Sewer:

- A 400mm dia. CONC storm sewer (1981) is available

Sanitary Sewer Maclaren St:

- A 225 mm dia. Conc Sanitary sewer (1931) is available
- Please provide the new Sanitary sewer discharge and we(City) can confirm if sanitary sewer main has the capacity.
- Please apply the wastewater design flow parameters *in Technical Bulletin PIEDTB-2018-01*.
- A backwater valve is required on the sanitary service for protection.
- Include correspondence from the Architect within the Appendix of the report confirming the number of residential units per building **and a unit type breakdown for each of the buildings** to support the calculated building populations.

Water:

- A 152 mm dia. UCI watermain (1931) is available
- Existing residential service to be blanked at the main.
- **Water Supply Redundancy:** Residential buildings with a basic day demand greater than 50m³/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 50m³/day.

- Please **review Technical Bulletin ISTB-2018-0**, maximum fire flow hydrant capacity is provided in Section 3 Table 1 of Appendix I. A **hydrant coverage figure** shall be provided and **demonstrate there is adequate fire protection for the proposal**. Two or more public hydrants are anticipated to be required to handle fire flow.
- Boundary conditions are required to confirm that the require fire flows can be achieved as well as availability of the domestic water pressure on the City street in front of the development. Use Table 3-3 of the MOE Design Guidelines for Drinking-Water System to determine Maximum Day and Maximum Hour peaking factors for 0 to 500 persons and use Table 4.2 of the Ottawa Design Guidelines, Water Distribution for 501 to 3,000 persons. Please provide the following information to the City of Ottawa via email to request water distribution network boundary conditions for the subject site. Please note that once this information has been provided to the City of Ottawa it takes approximately 5-10 business days to receive boundary conditions.
 - Type of Development and Units
 - Site Address
 - A plan showing the proposed water service connection location.
 - **Average Daily Demand** (L/s)
 - **Maximum Daily Demand** (L/s)
 - **Peak Hour Demand** (L/s)
 - **Fire Flow** (L/min)
 - *[Fire flow demand requirements shall be based on **Fire Underwriters Survey (FUS) Water Supply for Public Fire Protection 1999**]*
 - *Exposure separation distances shall be defined on a figure to support the FUS calculation and required fore flow (RFF).*
 - **Hydrant capacity shall be assessed to demonstrate the RFF can be achieved**. Please identify which hydrants are being considered to meet the RFF on a fire hydrant coverage plan as part of the boundary conditions request.

Other Construction project- Winona Ave. full road reconstruction including sewer and watermain. Anticipated start spring/summer 202

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.

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.

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).

Source Protection policy screening:

Here is a summary of the Source Protection policy screening for 366 Winona Avenue.

- The address lies within the Mississippi-Rideau Source Protection Region and is subject to the policies of the Mississippi-Rideau Source Protection Plan.
- The area is not located within a Surface Water Intake Protection Zone (IPZ) where significant threat policies apply.
- The area is not located within a Wellhead Protection Area (WHPA).
- The area is not located within a Significant Groundwater Recharge Area (SGRA).
- The area is located within a Highly Vulnerable Aquifer (HVA). There are no legally-binding source protection policies related to activities within Highly Vulnerable Aquifers.

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

Sensitive marine clay-

If Sensitive marine clay soils are present in this area that are susceptible to soil shrinkage that can lead to foundation and building damages. All six (6) conditions listed in the Tree Planting in

Sensitive Marine Clay Soils-2017 Guidelines are required to be satisfied. Note that if the plasticity index of the soil is determined to be less than 40% a minimum separation between a street tree and the proposed building foundations of 4.5m will need to be achieved. A memorandum addressing the Tree in Clay Soil Guidelines prepared by a geotechnical engineer is required to be provided to the City. <https://ottawa.ca/en/city-hall/planning-and-development/community-plans-and-design-guidelines/design-and-planning/completed-guidelines/tree-planting-sensitive-marine-clay-soils-2017-guidelines>

Required Engineering Plans and Studies:

Plans:

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

Reports:

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

Please refer to the **City of Ottawa Guide to Preparing Studies and Plans [Engineering]:**

Specific information has been incorporated into both the [Guide to Preparing Studies and Plans](#) for a site plan. The guide outlines the requirement for a statement to be provided on the plan about where the property boundaries have been derived from.

Added to the general information for servicing and grading plans is a note that an O.L.S. should be engaged when reporting on or relating information to property boundaries or existing conditions. The importance of engaging an O.L.S. for development projects is emphasized.

Phase One Environmental Site Assessment:

- A Phase I ESA is required to be completed in accordance with Ontario Regulation 153/04 in support of this development proposal to determine the potential for site contamination. Depending on the Phase I recommendations a Phase II ESA may be required.
- The Phase I ESA shall provide all the required Environmental Source Information as required by O. Reg. 153/04. ERIS records are available to public at a reasonable cost and need to be included in the ESA report to comply with O.Reg. 153/04 and the Official Plan. The City will not be in a position to approve the Phase I ESA without the inclusion of the ERIS reports.
- Official Plan Section 4.8.4: <https://ottawa.ca/en/city-hall/planning-and-development/official-plan-and-master-plans/official-plan/volume-1-official-plan/section-4-review-development-applications#4-8-protection-health-and-safety>

Geotechnical Investigation:

- A Geotechnical Study/Investigation shall be prepared in support of this development proposal.
- 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/default/files/documents/cap137602.pdf>

Noise Study:

- A **Transportation Noise Assessment** is required as the subject development is located within 100m proximity of Churchill Ave. and Richmond 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

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.

Preliminary Comments from Community Association Representative:

Gary Ludington

- How is the waste going to get out from back of lot?
 - There is a walkway down either side of the lots
- What is the surface between the two buildings?
 - Likely pavers
 - Will slope toward the street for rainwater runoff

- How many bedrooms per unit?
 - Unknown but likely 2-3 as they are large units
- There is no indication of trees in the backyard
 - Absolutely possible

Next Steps:

- We will follow up with meeting minutes and a list of required documents for the submission
- We recommend reaching out to the community association, ward councilor and neighbors
- We recommend 2 standard site plan control applications rather than 1 complex site plan application

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 20, 2022

REVISED

June 3, 2022

366 Winona Avenue
Ottawa, Ontario

Proposed 3-Storey (4-Level) Apartment Building (North Building)

Water Supply for Fire-Fighting 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 As per A-3.2.5.7. Table 1 (Group C Occupancy / Combustible construction - fire separations with no fire resistance ratings as per OBC 3.2.2.)

V = Building volume in cubic meters

Floor Area (sq.m)	Height (m)	Volume (cu.m)
130	9.7	1,258

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	2.00

$$Q = 57,886 \text{ L}$$

$$= 2,700 \text{ L/min as per OBC A-3.2.5.7. Table 2}$$

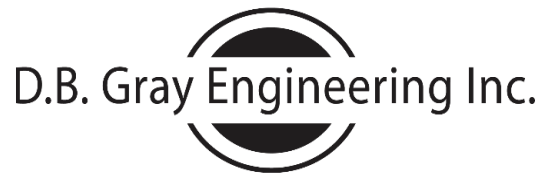
$$= 45 \text{ L/s}$$

Boundary Condition

Max Day + Fire Flow (45 L/s): 104.1 m

Grade Elevation at SE corner: 66.57 m

Static Pressure at Fire Hydrant: 37.5 m 368 kPa 53 psi



Stormwater Management - Grading & Drainage - Storm & Sanitary Sewers - Watermains
 700 Long Point Circle
 Ottawa, Ontario K1T 4E9

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

20-Apr-22
 03-Jun-22

REVISED

366 Winona Avenue Ottawa, Ontario

Two Proposed 3-Storey (4-Level) Apartment Buildings

WATER DEMAND CALCULATIONS

	Number of Units	Persons Per Unit	Population
UNIT TYPE:			
Single Family:	0	3.4	0
Semi- detached:	0	2.7	0
Duplex:	0	2.3	0
Townhouse:	0	2.7	0
APARTMENTS:			
1 Bedroom:	16	1.4	22
2 Bedroom:	0	2.1	0
3 Bedroom:	0	3.1	0
Average Aptarment:	0	1.8	0
TOTAL:			22

DAILY AVERAGE

280	litres / person / day		
4.4	l/min	0.1	l/s
1	USgpm		

MAXIMUM DAILY DEMAND

9.5	(Peaking Factor for a population of 30: Table 3-3 MOE Design Guidelines for Drinking-Water Systems)		
41.4	l/min	0.7	l/s
11	USgpm		

MAXIMUM HOURLY DEMAND

14.3	(Peaking Factor for a population of 30: Table 3-3 MOE Design Guidelines for Drinking-Water Systems)		
62.3	l/min	1.0	l/s
16	USgpm		

Elevation of Water Meter: 64.33 m ASL
 Finish Floor Elevation: 63.43 m ASL

			Static Pressure at Water Meter	
MINIMUM HGL:	108.7	m ASL	63	psi
			435	kPa
MAXIMUM HGL:	115.5	m ASL	73	psi
			502	kPa

366 Winona Avenue
 3-Storey (4-Level) 8-Unit Apartment Building
 Ottawa, Ontario
 Peak Water Demand

WATER FIXTURE VALUE

(AWWA Manual M22 - Sizing Water Service Lines and Meters)

	No.	F.V.	Total
Bathtub		8	0
Toilet - tank	8	6	48
Toilet - flush valve		24	0
Lavs.	8	1.5	12
Bidet		2	0
Urinal - wall flush valve		10	0
Shower	8	2.5	20
K. Sink	8	1.8	14.4
Dishwasher		1.3	0
Clothes Washer	8	3	24
Commercial Sink		4	0
J. Sink		4	0
Commercial Dishwasher		4	0
Commercial Washer		4	0
Hose 1/2 in		5	0
Hose 3/4 in		12	0
			118.4
Peak Demand (fig 4-2 or 4-3 AWWA M22)		24	USgpm
Pressure @ Meter	469	kPa	68 psi
Pressure Factor (table 4-1 AWWA M22)		1.07	
Peak Demand		26	USgpm
Irrigation - hose 1/2 in	1		6 USgpm (includes pressure factor)
TOTAL PEAK DEMAND	122	l/min	32 USgpm 2.0 l/s
	Nominal Size	1.5 in	38 mm
		5.9 ft/s	1.8 m/s



Douglas Gray <d.gray@dbgrayengineering.com>

RE: Request Boundary Conditions Request - 366 Winona Avenue

1 message

Jhamb, Nishant <nishant.jhamb@ottawa.ca>

Fri, Jun 3, 2022 at 7:45 AM

To: Douglas Gray <d.gray@dbgrayengineering.com>

Cc: Caoimhin Kennedy <c.kennedy@dbgrayengineering.com>, Laurent Brosseau <l.brosseau@dbgrayengineering.com>

Hello Doug

The following are boundary conditions, HGL, for hydraulic analysis at [366 Winona Avenue \(zone 1W\)](#) assumed to be connected to the 152 mm watermain on Winona Avenue (see attached PDF for location).

Minimum HGL: 108.7 m

Maximum HGL: 115.0 m

Max Day + Fire Flow (45 L/s): 104.1 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

Nishant Jhamb, P.Eng

Project Manager |Gestionnaire de projet

Planning, Real Estate and Economic Development Department

Development Review - Central Branch

City of Ottawa | Ville d'Ottawa

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

613.580.2424 ext./poste 23112, nishant.jhamb@ottawa.ca

From: Douglas Gray <d.gray@dbgrayengineering.com>

Sent: May 20, 2022 8:22 AM

To: Jhamb, Nishant <nishant.jhamb@ottawa.ca>

Cc: Caoimhin Kennedy <c.kennedy@dbgrayengineering.com>; Laurent Brosseau <l.brosseau@dbgrayengineering.com>

Subject: Request Boundary Conditions Request - 366 Winona Avenue

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ATTENTION : Ce courriel provient d'un expéditeur externe. Ne cliquez sur aucun lien et n'ouvrez pas de pièce jointe, excepté si vous connaissez l'expéditeur.

Hi Nishant

Please provide the boundary conditions at 366 Winona Ave. We have calculated the following expected demands based on two 8-unit apartment buildings.

Average daily demand: 0.1 L/s.

Maximum daily demand: 0.7 L/s.

Maximum hourly daily demand: 1.0 L/s

Fire Flow demand: 45.0 L/s

Fire Flow + Max Day: 45.7 L/s

Our calculations are attached.

Thanks, Doug



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

700 Long Point Circle

Tel: 613-425-8044

Ottawa, Ontario K1T 4E9

d.gray@dbgrayengineering.com

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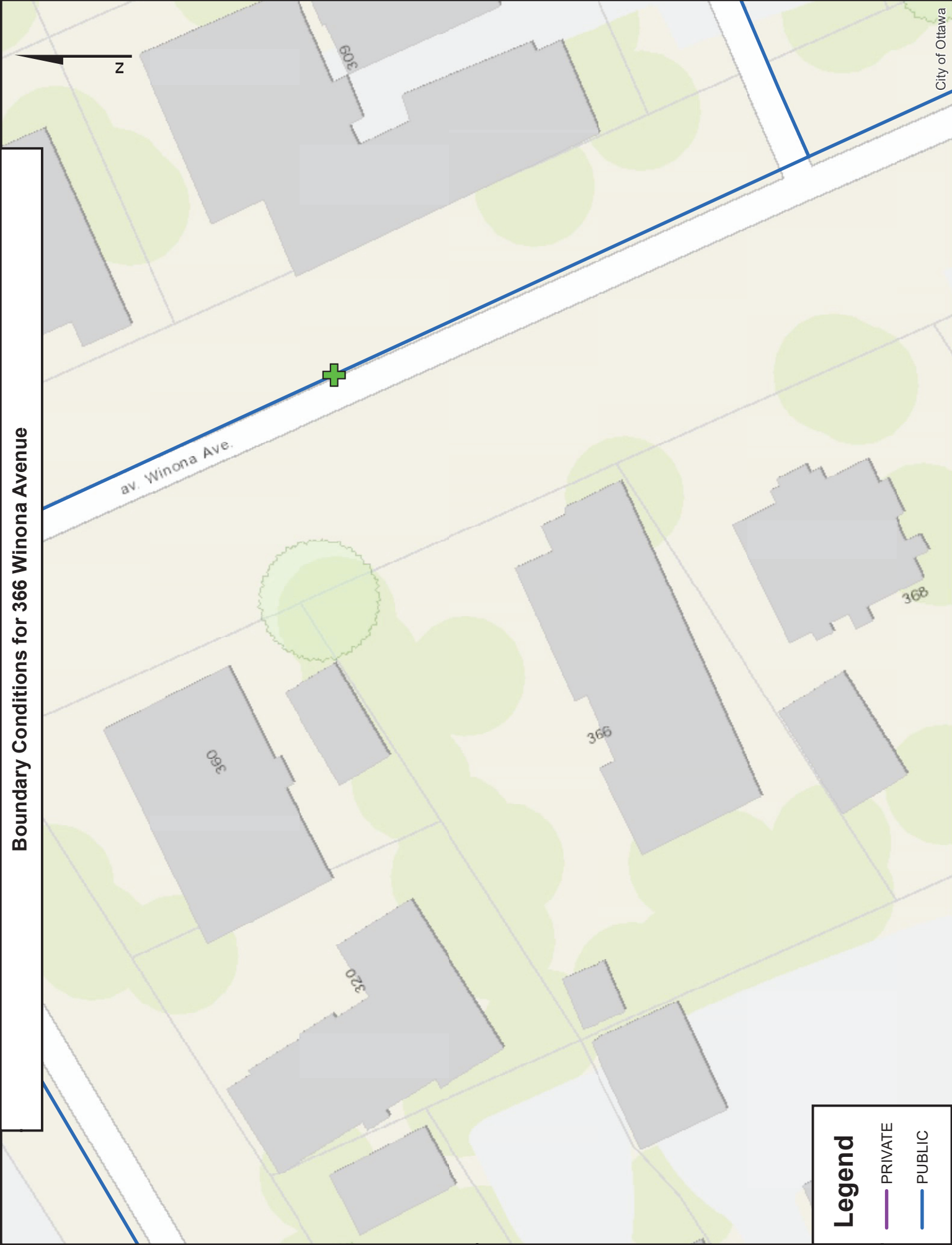
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366 Winona Avenue May 2022.pdf

611K

Boundary Conditions for 366 Winona Avenue



Legend

— PRIVATE

— PUBLIC

APPENDIX C

SANITARY SERVICING



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

364-366 Winona Avenue
 Two 8-unit Apartment Buildings
 Ottawa, Ontario

June 3, 2022

Residential Average Daily Flow: 280 L/capita/day
 Commercial Average Daily Flow: 28,000 L/ha/day
 Institutional Average Daily Flow: 28,000 L/ha/day
 Light Industrial Average Daily Flow: 35,000 L/ha/day
 Heavy Industrial Average Daily Flow: 55,000 L/ha/day
 Infiltration Allowance: 0.33 L/s/ha

Residential Peaking Factor: Hammon Formula
 Hammon Formula Correction Factor: 0.8
 Commercial Peaking Factor: 1.5
 Institutional Peaking Factor: 1.5
 Industrial Peaking Factor: Ministry of the Environment
 Manning's Roughness Coefficient: 0.013

Location From To	Residential										Non-Residential			Infiltration			Q				Sewer Data																
	Individual		Semi Detached		Duplex		Apartment (1 Bed)		Apartment (2 Bed)		Apartment (3 Bed)		Area (ha)	Population	Area (ha)	Daily Flow L/ha/day	Peaking Factor	Flow Rate (L/s)	Cumulative Peaking Factor	Area (ha)	Individual Area (ha)	Cumulative Flow Rate (L/s)	Area (ha)	Cumulative Flow Rate (L/s)	Total Flow Rate (L/s)	Length (m)	Nominal Diameter (mm)	Actual Diameter (mm)	Slope (%)	Velocity (m/s)	Q _{Full} Capacity (L/s)						
	ppu = 3.4	ppu = 3.4	ppu = 2.7	ppu = 2.7	ppu = 2.3	ppu = 2.3	ppu = 1.4	ppu = 1.4	ppu = 2.1	ppu = 2.1	ppu = 3.1	ppu = 3.1																				(Average)					
	1											0.0299	3	0.0299	3	3.2	0.04				0.00	0.0299	0.0299	0.01	0.05												
364 WINONA	Existing											0.0299	11	0.0299	11	3.2	0.12				0.00	0.0299	0.0299	0.01	0.13	12.6	150	147	1.00	0.85	14.43	0.01					
366 WINONA	Existing										0.0299	11	0.0299	11	3.2	0.12					0.00	0.0299	0.0299	0.01	0.13	12.8	150	147	1.00	0.85	14.43	0.01					

EXISTING

PROPOSED

APPENDIX D

STORMWATER MANAGEMENT



Douglas Gray <d.gray@dbgrayengineering.com>

RE: RVCA Stormwater Management Comments - 366 Winona Avenue

1 message

Eric Lalande <eric.lalande@rvca.ca>
To: Laurent Brosseau <l.brosseau@dbgrayengineering.com>
Cc: Douglas Gray <d.gray@dbgrayengineering.com>

Wed, May 25, 2022 at 11:41 AM

Hi Laurent,

Based on the site plan provided, the RVCA does not require any on-site water quality control requirements. Best management practices are encouraged to be integrated where possible.

Thank you,

Eric Lalande, MCIP, RPP

Planner, RVCA

613-692-3571 x1137

From: Laurent Brosseau <l.brosseau@dbgrayengineering.com>
Sent: Tuesday, May 24, 2022 5:03 PM
To: Eric Lalande <eric.lalande@rvca.ca>
Cc: Douglas Gray <d.gray@dbgrayengineering.com>
Subject: RVCA Stormwater Management Comments - 366 Winona Avenue

Hi Eric,

We are working on 2 proposed 3 storey low-rise apartment buildings on a combined 600 sq.m of land at 366 Winona Avenue in Ottawa.

Please comment on the stormwater management for the site.

I have attached a site plan for your reference.

Thank you,

--

Laurent Brosseau

D. B. GRAY ENGINEERING INC.

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

6/5/22, 9:02 AM

D.B. Gray Engineering Inc. Mail - RE: RVCA Stormwater Management Comments - 366 Winona Avenue

700 Long Point Circle

Tel: 613-425-8044

Ottawa, Ontario K1T 4E9

l.brosseau@dbgrayengineering.com

Summary Tables

ONE HUNDRED 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 (Uncontrolled Flow Off Site)	-	-	2.11	-	-
AREA II	-	-	6.19	7.64	7.64
TOTAL	16.29	8.30	8.30	7.64	7.64

FIVE 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 (Uncontrolled Flow Off Site)	-	-	1.09	-	-
AREA II	-	-	6.04	2.02	2.02
TOTAL	8.30	8.30	7.14	2.02	2.02

366 Winona Avenue

Ottawa, Ontario

STORMWATER MANAGEMENT CALCULATIONS

Rational Method

PRE-DEVELOPMENT CONDITIONS

100-Year Flow Rate

			C
Roof Area:	165	sq.m	1.00
Asphalt/Concrete Area:	73	sq.m	1.00
Gravel Area:	0	sq.m	0.875
Landscaped Area:	<u>361</u>	<u>sq.m</u>	<u>0.25</u>
Total Catchment Area:	599	sq.m	0.55

Bransby William Formula

$$T_c = \frac{0.057 \cdot L}{S_w^{0.2} \cdot A^{0.1}} \text{ min}$$

Sheet Flow Distance (L):	20	m
Slope of Land (Sw):	5	%
Area (A):	0.0599	ha

Time of Concentration (Sheet Flow): 1.1 min

Area (A):	599	sq.m
Time of Concentration:	10	min
Rainfall Intensity (i):	179	mm/hr
Runoff Coefficient (C):	0.55	

100-Year Pre-Development Flow Rate (2.78AiC): 16.29 L/s

5-Year Flow Rate

(Maximum Allowable Release Rate)

			C
Roof Area:	165	sq.m	0.90
Asphalt/Concrete Area:	73	sq.m	0.90
Gravel Area:	0	sq.m	0.70
Landscaped Area:	<u>361</u>	<u>sq.m</u>	<u>0.20</u>
Total Catchment Area:	599	sq.m	0.48

Area (A):	599	sq.m
Time of Concentration:	10	min
Rainfall Intensity (i):	104	mm/hr
Runoff Coefficient (C):	0.48	

5-Year Pre-Development Flow Rate (2.78AiC): 8.30 L/s

ONE HUNDRED-YEAR EVENT

DRAINAGE AREA I (Uncontrolled Flow Off Site)

(ONE HUNDRED-YEAR EVENT)

			C
Roof:	38	sq.m	1.00
Asphalt/Concrete:	0	sq.m	1.00
Permeable Pavers:	0	sq.m	0.375
Landscaped:	18	sq.m	0.25
	<hr/>		<hr/>
Total Catchment Area:	56	sq.m	0.76
Area (A):	56	sq.m	
Time of Concentration:	10	min	
Rainfall Intensity (i):	179	mm/hr	
Runoff Coefficient (C):	0.76		
Release Rate (2.78AiC):	2.11	L/s	

DRAINAGE AREA II

(ONE HUNDRED-YEAR EVENT)

			C
Roof:	270	sq.m	1.00
Asphalt/Concre	24	sq.m	1.00
Permeable Pave	107	sq.m	0.375
Landscaped:	142	sq.m	0.25

Total Catchment Area: 543 sq.m 0.68

Water Elevation: 65.87 m

Invert of Outlet Pipe - CB/MH-2: 63.80 m

Centroid of ICD Orifice: 63.84 m
(ICD in Outlet Pipe of CB/MH-2)

Head: 2.03 m

Orifice Diameter: 75 mm

Orifice Area: 4418 sq.mm

Coefficient of Discharge: 0.222

Maximum Release Rate: 6.19 L/s

CB/MH	Top Area (sq.m)	Depth (m)	Volume
CB-1	76	0.28	6.98 cu.m
CB-3	14	0.15	0.66 cu.m

Achieved Volume: 7.64 cu.m

Maximum Volume Required: 7.64 cu.m

Time (min)	i (mm/hr)	2.78AiC (L/s)	Release Rate (L/s)	Stored Rate (L/s)	Stored Volume (cu.m)
5	243	24.94	6.19	18.75	5.62
10	179	18.35	6.19	12.16	7.30
15	143	14.68	6.19	8.49	7.64
20	120	12.33	6.19	6.14	7.36
25	104	10.67	6.19	4.48	6.72
30	92	9.44	6.19	3.25	5.85
35	83	8.49	6.19	2.30	4.82
40	75	7.72	6.19	1.53	3.68
45	69	7.10	6.19	0.91	2.45
50	64	6.57	6.19	0.38	1.15
55	60	6.13	6.13	0.00	0.00
60	56	5.74	5.74	0.00	0.00
65	53	5.41	5.41	0.00	0.00
70	50	5.12	5.12	0.00	0.00
75	47	4.86	4.86	0.00	0.00
80	45	4.62	4.62	0.00	0.00
85	43	4.41	4.41	0.00	0.00
90	41	4.22	4.22	0.00	0.00

FIVE-YEAR EVENT

DRAINAGE AREA I (Uncontrolled Flow Off Site)

(FIVE-YEAR EVENT)

			C
Roof:	38	sq.m	0.90
Asphalt/Concrete:	0	sq.m	0.90
Permeable Pavers:	0	sq.m	0.30
Landscaped:	18	sq.m	0.20
Total Catchment Area:	56	sq.m	0.68
Area (A):	56	sq.m	
Time of Concentration:	10	min	
Rainfall Intensity (i):	104	mm/hr	
Runoff Coefficient (C):	0.68		
Release Rate (2.78AiC):	1.09	L/s	

DRAINAGE AREA II

(FIVE-YEAR EVENT)

			C
Roof:	270	sq.m	0.90
Asphalt/Concrete	24	sq.m	0.90
Permeable Pave	107	sq.m	0.30
Landscaped:	142	sq.m	0.20

Total Catchment Area: 543 sq.m 0.60

Water Elevation: 65.77 m

Invert of Outlet Pipe - CB/MH-2: 63.80 m

Centroid of ICD Orifice: 63.84 m
(ICD in Outlet Pipe of CB/MH-2)

Head: 1.94 m

Orifice Diameter: 75 mm

Orifice Area: 4418 sq.mm

Coefficient of Discharge: 0.222

Maximum Release Rate: 6.04 L/s

CB/MH	Top Area (sq.m)	Depth (m)	Volume
CB-1	33	0.18	1.99 cu.m
CB-3	2	0.05	0.03 cu.m

Achieved Volume: 2.02 cu.m

Maximum Volume Required: 2.02 cu.m

Time (min)	i (mm/hr)	2.78AiC (L/s)	Release Rate (L/s)	Stored Rate (L/s)	Stored Volume (cu.m)
5	141	12.76	6.04	6.72	2.01
10	104	9.42	6.04	3.37	2.02
15	84	7.55	6.04	1.51	1.36
20	70	6.35	6.04	0.31	0.37
25	61	5.50	5.50	0.00	0.00
30	54	4.87	4.87	0.00	0.00
35	49	4.38	4.38	0.00	0.00
40	44	3.99	3.99	0.00	0.00
45	41	3.67	3.67	0.00	0.00
50	38	3.40	3.40	0.00	0.00
55	35	3.17	3.17	0.00	0.00
60	33	2.98	2.98	0.00	0.00
65	31	2.81	2.81	0.00	0.00
70	29	2.65	2.65	0.00	0.00
75	28	2.52	2.52	0.00	0.00
80	27	2.40	2.40	0.00	0.00
85	25	2.29	2.29	0.00	0.00
90	41	3.72	3.72	0.00	0.00



D.B. Gray Engineering Inc.

STORM SEWER CALCULATIONS

Rational Method FIVE YEAR EVENT

Project: 364-366 Winona Avenue
 2, 8 unit appartement buildings
 Ottawa, Ontario

Stormwater Management - Grading & Drainage - Storm & Sanitary Sewers - Watermains
 613-425-8044
 d.gray@dbgrayengineering.com

700 Long Point Circle
 Ottawa, Ontario K1T 4E9

Date: May 25, 2022 Manning's Roughness Coefficient: 0.013

Location	Individual							Cumulative			Sewer Data					
	Roof C = 0.90 (ha)	Hard C = 0.90 (ha)	Permeable C = 0.30 (ha)	Soft C = 0.20 (ha)	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}
	To															
CB-1	0.0139	0.0010	0.0045	0.0105	0.0469	10.00	104	4.88	26.3	250	251	0.43	0.80	39.41	0.55	0.12
CB-3	0.0032	0.0003	0.0015	0.0028	0.0116	10.00	104	1.20	5.6	250	251	0.43	0.80	39.41	0.12	0.03
CB/MH-2 Existing 450 ST	0.0097	0.0003	0.0049	0.0040	0.0313	10.55	101	9.10	13.7	250	251	0.43	0.80	39.41	0.29	0.23
EXISTING WINONA AVE MUNICIPAL STORM SEWER																
										450	457	2.1	2.62	430.52		

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**