Site Servicing and Stormwater Management Report
Residential Development
229 + 241 Beechwood Ave.
Ottawa, ON

Client:
229 Beechwood Holdings Inc. and 241 Beechwood Holdings Inc.
C/O Bintee Dev Inc.
226 Argyle Avenue
Ottawa, ON K2P 1B9

Submitted for:
Site Plan Control Application

Project Name:
229, 241 Beechwood Avenue

Project Number:
OTT-00238207-C0

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Date Submitted:
December 15, 2020

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December 15, 2020

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1 Introduction

1.1 Overview

EXP Services Inc. (EXP) was retained by 229 Beechwood Holdings Inc. and 241 Beechwood Holdings Inc. to prepare a Functional Site Servicing and Stormwater Management Report for the proposed redevelopment of 229 and 241 Beechwood Ave. in support of a Site Plan Control Application.

The 0.2106 hectare site is situated along Beechwood Avenue between Green Avenue and Corona Avenue, as illustrated in **Figure 2-1** below. The site is within the City of Ottawa urban boundary and situated in Rideau-Rockcliffe (Ward 13). The description of the subject property is noted below:

- PIN 04226-205 comprised of:
  - Lot 10, PIN 04226-0120
  - Part 2 Plan 4R-5284, PIN 04226-0121
  - Lot 11, PIN 04226-0120
  - Lot 12, PIN 04226-0122
  - Part 1 Plan 4R-5284, PIN 04226-0123
  - Carsdale Avenue, PIN 04226-0189
  - Lot 24, PIN 04226-0136
  - Part 3 Plan 4R-1168, PIN 04226-0166
  - Lot 25, PIN 04226-0137
  - Part 4 Plan 4R-1168, PIN 04226-0167
  - Lot 26, PIN 04226-0138
  - Part 5 Plan 4R-1168, PIN 04226-0168

The proposed development will consist of two (2) residential buildings – 229 Beechwood and 241 Beechwood. 229 Beechwood is three floors tall with a basement level and will be comprised of 47 total living units. 241 Beechwood is four floors tall with a basement level and will be comprised of 55 total living units. There will be four (4) parking spots and one (1) handicap parking spot for each building.

This report will discuss the adequacy of the adjacent municipal watermain, sanitary sewers and storm sewers to provide the required water supply, convey the sewage and stormwater flows that will result from the proposed development.

2 Existing Conditions

Within the site, there are five (5) existing buildings. The current zoning of the property is R4 - Residential Fourth Density Zone and includes residential dwellings. The following summarizes the current building uses within the property.

- Existing Building 1 (Lot 26) 2 Storey vinyl sided dwelling.
- Existing Building 2 (Lot 25) 2 Storey stucco and metal sided dwelling.
- Existing Building 3 (Lot 24) 2 Storey stucco and metal sided dwelling.
- Existing Building 4 (Lot 12) 3 Storey brick dwelling.
- Existing Building 5 (Lot 11) 2 Storey metal sided dwelling.

The topography of the subject site is sloped from the rear (west) towards the front (east) at approximately 10% grade. A local site access road, Carsdale Avenue, bisects the proposed development from north to south between existing lot 12 and existing lot 24.

Currently, there is one (1) vehicular access point to the site, from Beechwood Avenue. Inbound and outbound traffic may enter or exit the site from either the north or south direction along Beechwood Ave.



Figure 2-1 - Site Location

3 Existing Infrastructure

The proposed site includes five (5) buildings that will be removed during the redevelopment of the site. From review of the sewer and watermain mapping, as-built drawings and Utility Central Registry (UCC) plans, the following summarizes the onsite and adjacent offsite infrastructure:

Within proposed property

- 200-250mm dia. PVC sanitary sewer running from west to east along Carsdale Avenue.
- 675mm dia. PVC storm sewer running from west to east along Carsdale Avenue.
- Each lot is assumed to have private sanitary and watermain service connections.

On Beechwood Avenue

- 300mm dia. concrete sanitary sewer running from north to south along Beechwood Avenue.
- 1200mm dia. concrete reinforced storm sewer running from north to south along Beechwood Avenue.
- 254mm dia. unlined cast iron watermain along Beechwood Avenue.

4 Pre-Consultation / Permits / Approvals

A pre-consultation meeting was held with the City prior to design commencement. This teleconference meeting, held May 5, 2020, outlined the submission requirements and provided information to assist with the development proposal.

The proposed site is located within the Rockcliffe Park Heritage District and will required approvals under the Ontario Heritage Act. The site will also require an application for Site Plan Control (complex) and potential variances. This site is located in a design priority area and will therefore be subject to UDRP consultation and review.

Generally, an Environmental Compliance Approval (ECA) would be obtained from the Ministry of Environment, Conservation and Parks (MECP), formerly the Ministry of the Environment and Climate Change (MOECC), for any onsite private Sewage Works. The onsite Sewage Works would generally include the onsite stormwater works such as flow controls, associated stormwater detention, and treatment works. However, an Approval Exemption under Ontario Regulation 525/98 can be applied. Under Section 3 of O'Reg 525/98, Section 53 (1) and (3) do not apply to the alteration, extension, replacement or a change to a stormwater management facility that 1) is designed to service one lot or parcel of land, b) discharges into a storm sewer that is not a combined sewer, c) does not service industrial land or a structure located on industrial land, and finally d) is not located on industrial land. Based on this exemption, if the stormwater management works within the site remain located within one property parcel, then an Approval Exemptions under O'Reg 525/98 would apply and therefore not necessitate an ECA.

In addition, various design guidelines were referred to in preparing the current report including:

- Bulletin ISDTB-2012-4 (20 June 2012)
  - Technical Bulletin ISDTB-2014-01 (05 February 2014)
  - Technical Bulletin PIEDTB-2016-01 (September 6, 2016)
  - Technical Bulletin ISDTB-2018-01 (21 March 2018)
  - Technical Bulletin ISDTB-2018-04 (27 June 2018)
- Ottawa Design Guidelines – Water Distribution, July 2010 (WDG001), including:

  - Technical Bulletin ISDTB-2014-02 (May 27, 2014)
  - Technical Bulletin ISTB-2018-02 (21 March 2018)
- Stormwater Management Planning and Design Manual, Ontario Ministry of the Environment and Climate Change, March 2003 (SMPDM).
- Design Guidelines for Drinking-Water Systems, Ontario Ministry of the Environment and Climate Change, 2008 (GDWS).
- Fire Underwriters Survey, Water Supply for Public Fire Protection (FUS), 1999.
- Ontario Building Code 2012, Ministry of Municipal Affairs and Housing.

5 Water Servicing

5.1 Existing Water Servicing

The subject site is located within the City of Ottawa's water distribution system 1E pressure zone. The site is not currently serviced by any large diameter watermain connection. From GeoOttawa, it is shown that a 254mm dia. watermain runs along Beechwood Avenue towards the east of the proposed development site. It is assumed that each of the five (5) existing buildings on the site are serviced individually from this 254mm dia. watermain. Figure 5-1 below illustrates the existing watermains (in blue) in the subject site area.

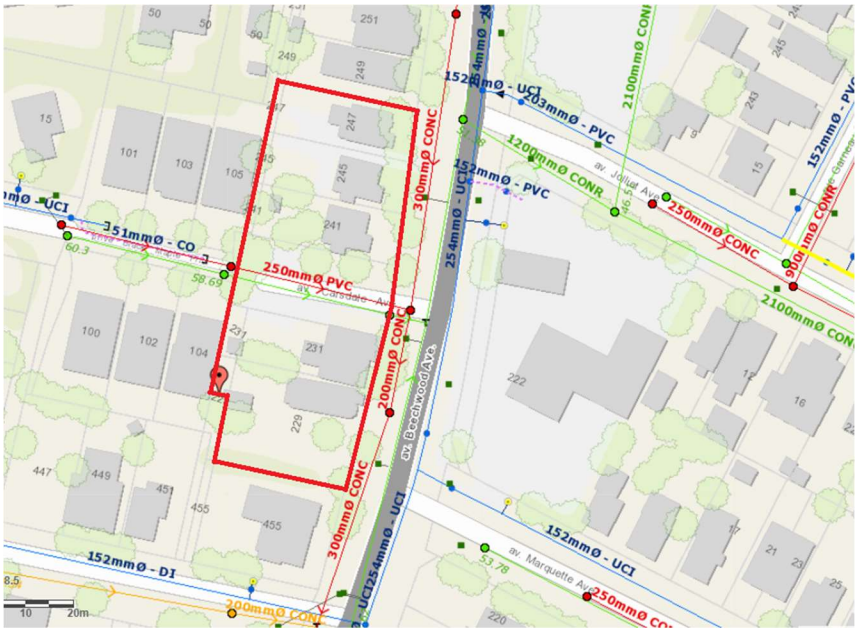


Figure 5-1 – Watermains Near Proposed Site

5.2 Water Servicing Proposal

The proposed development will consist of two (2) multiple family residential buildings – 229 Beechwood Avenue and 241 Beechwood Avenue. 229 Beechwood Ave. is comprised of 47 residential units and 241 Beechwood Ave. is comprised of 54 residential units.

Water supply for the site will be provided by the existing 254mm dia. watermain running along Beechwood Avenue. Each building, 229 and 241 Beechwood Ave., will be serviced by their own 50mm dia. PVC watermain approximately 19m and 20m in length respectively. The Site Servicing Plan in **Appendix E** illustrates the water servicing of the property.

5.3 Water Servicing Design

The water servicing requirements for the proposed buildings are designed in accordance with the City Design Guidelines (July 2010). The following steps indicate the basic methodology that was used in our analysis:

- Estimated water demands under average day, maximum day and peak hour conditions. As the total population estimate was less than 500, MECP Design Guidelines (Table 3-3) peaking factors were used.
- Estimated the required fire flow (RFF) based on the Fire Underwriters Survey (FUS).
- Obtained hydraulic boundary conditions (HGL) from the City, based on the above water demands and required fire flows.
- Boundary condition data and water demands were used to estimate the pressure at the proposed building, and this was compared to the City's design criteria.

Since the average day demand for each individual building did not exceed 50 m^3 per day, redundant watermains are not required as per Section 4.31 of the WDG001. Please refer to **Table A-1** in **Appendix A** for detailed calculations of the total water demands.

A review of the estimated watermain pressure at each building connection, based on the boundary conditions provided, was completed. **Table A-5** & **Table A-6** in **Appendix A** illustrates the anticipated pressures at each building connection.

Based on the hydraulic grade line (HGL) provided by the City it is evident that high pressures already exist in the water distribution system at the property. Static pressures of ± 70 psi – 87 psi are typically available. Due of the relatively short distance that would be necessary between the buildings and the watermain connection, minimal pressure loss is anticipated. The pressure available at the building connection would be within ±3 psi of the pressure in the city main based on a 50mm supply.

Under peak hour conditions the anticipated pressure at the building is within ±3 psi of the city's distribution main pressure. Anticipated pressure losses at the top floor are approximately 16 and 21 psi for 229 and 241 Beechwood Ave respectively.

Based on the results, the installation of a 50mm watermain is proposed. Pressure reducing measures are required as operating pressures are higher than 80 psi.

5.4 Water Servicing Design Criteria

Table 5-1 below summarizes the Design Criteria that was used to establish the water demands and the required fire flows, based on the proposed building uses. The design parameters that apply to this project and used for calculations are identified below.

Table 5-1 - Summary of Water Supply Design Criteria

Design Parameter	Value	Applies
Population Density – Single-family Home	3.4 persons/unit	
Population Density – Semi-detached Home	2.7 persons/unit	
Population Density – Townhome or Terrace Flat	1.8 persons/unit	
Population Density – Bachelor Apartment	1.4 persons/unit	✓
Population Density – Bachelor + Den Apartment	1.4 persons/unit	
Population Density – One Bedroom Apartment	1.4 persons/unit	✓
Population Density – One Bedroom plus Den Apartment	1.4 persons/unit	
Population Density – Two Bedroom Apartment	2.1 persons/unit	✓
Population Density – Two Bedroom plus Den Apartment	2.1 persons/unit	
Population Density – Three Bedroom Apartment	3.1 persons/unit	
Average Day Demands – Residential	350 L/person/day	✓
Average Day Demands – Commercial / Institutional	28,000 L/gross ha/day	
Average Day Demands – Light Industrial / Heavy Industrial	35,000 or 55,000 L/gross ha/day	
Maximum Day Demands – Residential	2.5 x Average Day Demands	✓
Maximum Day Demands – Commercial / Institutional	1.5 x Average Day Demands	
Peak Hour Demands – Residential	5.5 x Average Day Demands	✓
Peak Hour Demands – Commercial / Institutional	2.7 x Average Day Demands	
Fire Flow Requirements Calculation	FUS	✓
Depth of Cover Required	2.4m	✓
Maximum Allowable Pressure	551.6 kPa (80 psi)	✓
Minimum Allowable Pressure	275.8 kPa (40 psi)	✓
Minimum Allowable Pressure during fire flow conditions	137.9 kPa (20 psi)	✓

5.5 Estimated Water Demands

The following

Table 5-2 below summarizes the anticipated water demands for the proposed development based on following:

- 229 Beechwood Ave. Building having 47 residential units. Estimated residential population of 70 persons.
- 241 Beechwood Ave. Building having 54 residential units. Estimated residential population of 83 persons.

Table 5-2 : Water Demand Summary

Water Demand Conditions	229 Beechwood Water Demands (L/sec)	241 Beechwood Water Demands (L/sec)	Total Water Demands (L/sec)
Average Day	0.28	0.34	0.62
Max Day	1.35	1.61	2.96
Peak Hour	2.04	2.43	4.48

5.6 Boundary Conditions

Hydraulic Grade Line (HGL) boundary conditions were obtained from the City for design purposes. A copy of the correspondence received from the City is provided in **Appendix B**.

The following hydraulic grade line (HGL) boundary conditions were provided:

- Minimum HGL = 107.8 m
- Maximum HGL = 118.2 m
- Connection A: Max Day + Fire Flow (217 L/s) = 102.0 m
- Connection B: Max Day + Fire Flow (250 L/s) = 100.2 m

The provided HGL ranges of 107.8 m – 118.2 m were used to estimate pressures at the building. Under Max Day Plus fire flow conditions, the HGL of 102.0 m and 100.2 m was used for 229 and 241 Beechwood Avenue respectively.

5.7 Fire Flow Requirements

Water for fire protection will be available utilizing the proposed fire hydrants located along on Beechwood Avenue. The required fire flows for the proposed buildings were calculated based on typical values as established by the Fire Underwriters Survey 1999 (FUS).

The following equation from the Fire Underwriters document "Water Supply for Public Fire Protection", 1991, was used for calculation of the on-site supply rates required to be supplied by the hydrants:

$F = 200 * C * \sqrt{(A)}$

where:

F = Required Fire flow in Litres per minute
C = Coefficient related to type of Construction
A = Total Floor Area in square metres

Table 5-3 summarizes the parameters used for estimating the Required Fire Flows (RFF) based on the Fire Underwriters Survey (FUS) and the latest City of Ottawa Technical Bulletins. The RFFs were estimated in accordance with ISTB-2018-02, and based on floor areas provided by the architect, which are illustrated in **Appendix D.** The following summarizes the parameters used for both proposed buildings.

- Type of Construction Non-combustible

- Occupancy Limited combustible
- Sprinkler Protection Fully Supervised Automatic Sprinkler

Table 5-3 - Summary of Design Parameters Used in Calculating Required Fire Flows (RFF) Using FUS

Design Parameter	Value
Coefficient Related to type of Construction C	1.0 (229 Beechwood) 1.0 (241 Beechwood)
Total Floor Area (m2)	2,010 (229 Beechwood) 2,416 (241 Beechwood)
Fire Flow. Prior to rounding to closest 1,000 (L/min),	9,862 (229 Beechwood) 10,813 (241 Beechwood)
Fire Flow. Rounded to closest 1,000 (L/min),	10,000 (229 Beechwood) 11,000 (241 Beechwood)
Reduction Due to Occupancy Non-combustible (-25%), Limited Combustible (-15%), Combustible (0%), Free Burning (+15%), Rapid Burning (+25%)	-15% (229 Beechwood) -15% (241 Beechwood)
Reduction due to Sprinkler (Max 50%) Sprinkler Conforming to NFPA 13 (-30%), Standard Water Supply (-10%), Fully Supervised Sprinkler (-10%)	0% (229 Beechwood) 0% (241 Beechwood)
Exposures	+56% (229 Beechwood) +56% (241 Beechwood)
Required Fire Flow, RFF, before rounded to closest 1,000 (L/min)	13,260 (229 Beechwood) 14,586 (241 Beechwood)

The estimated required fire flows (RFF) rounded to the closest 1,000, based on the FUS methods are: 13,000 L/min (or 216 L/sec) for 229 Beechwood Ave. and 15,000 L/min (or 250 L/sec) for 241 Beechwood Ave. Please refer to **Table A-3** and **Table A-4** in **Appendix A.**

5.8 Review of Hydrant Spacing

A review of the hydrant spacing was completed to ensure compliance with Appendix I of Technical Bulletin ISTB-2018-02. As per Section 3 of Appendix I all hydrants within 150 metres were reviewed to assess the total possible available flow from these contributing hydrants.

For each hydrant the distance to the proposed building was determined to arrive at the contribution of fire flow from each. All hydrants are expected to be of Class AA as per Section 5.1 of Appendix I. For each hydrant the straight-line distance, distance measured along a fire route or roadway, whether its location is accessible, and its contribution to the required fire flow.

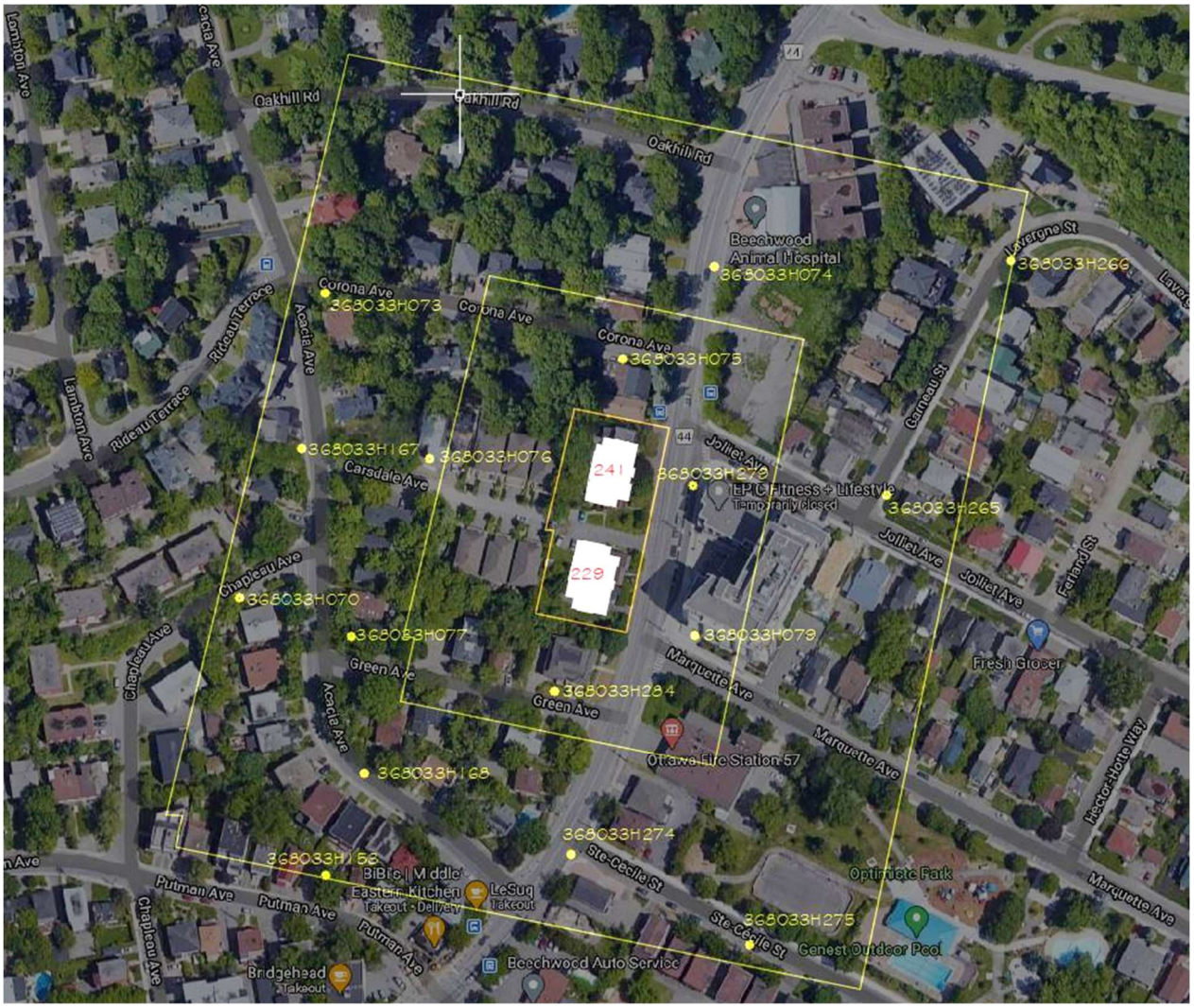


Figure 5-2 below illustrates all the hydrants that are within the 75 metre and 150 metre offsets from the subject property. Fire hydrants that are denoted with a number having a HP versus H represents a PRIVATE hydrant rather than a CITY owner hydrant.

All hydrants were reviewed to determine if they were accessible or non-accessible. A hydrant would not be accessible if they were located on the opposite side of a median, limiting fire truck access.

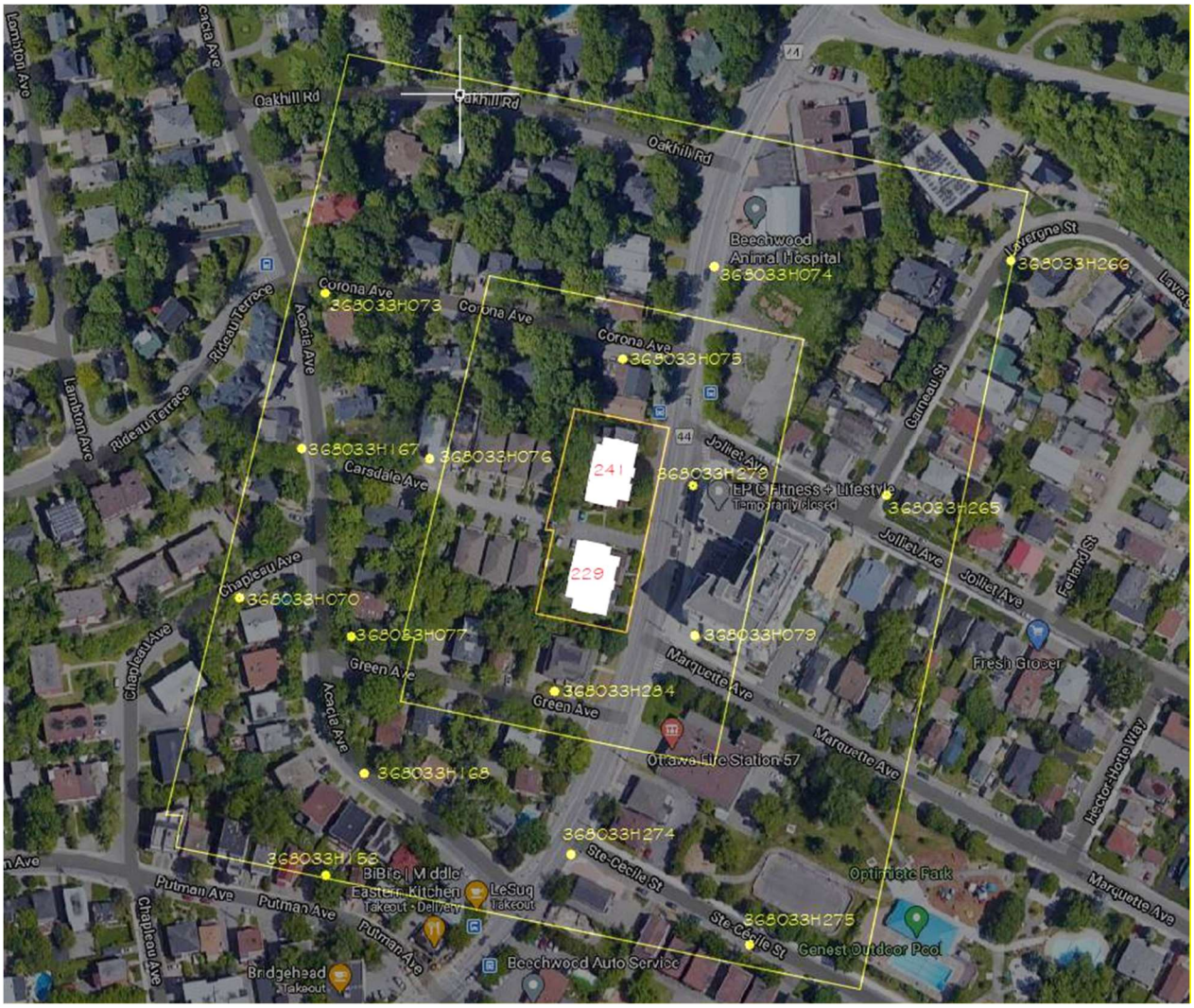


Figure 5-2 – Review of Hydrant Spacing

A summary table of the total fire flows available versus the required fire flows (RFFs) is presented in **Table 5-4** below. Detailed calculations of the available fire flows based on hydrant spacing is provided in **Table A-7** in **Appendix A.**

Table 5-4 –Fire Flows Based on Hydrant Spacing

Building	Required Fire Flow (L/min)	Available Fire Flow Based on Hydrant Spacing as per ISTB-2018-02 (L/min)
229 Beechwood	13,000 (or 217 L/sec)	15,200
241 Beechwood	15,000 (or 250 L/sec)	17,100

The total available contribution of flow from hydrants was estimated at 15,200 L/min for 229 Beechwood Ave. and 17,100 L/min for 241 Beechwood Ave. The maximum required fire flow (RFF) is 13,000 L/min for 229 Beechwood Ave and 15,000 L/min for 241 Beechwood Ave. Therefore, the available flows from hydrants exceed each building's fire flow requirements as identified in Appendix I of Technical Bulletin ISTB-2018-02.

6 Sewage Servicing

6.1 Existing Sewage Conditions

Sewage is currently discharged easterly to the existing 300mm dia. local sanitary sewer on Beachwood Avenue, which then discharges southerly to the Vanier Parkway Collector and then westerly.

6.2 Proposed Sewage Conditions

It is proposed to provide separate sanitary sewer connections from each building to a sanitary manhole on site, which will then discharge to the 300mm dia. sanitary sewer on Beechwood Ave. These manholes will be installed in the frontage of each building, on Beechwood Ave, and be used as a monitoring manhole. The sanitary sewer system was designed based on a population flow with an area-based infiltration allowance. A 150mm diameter sanitary sewer is proposed with a minimum 2% slope, having a capacity of 21.5 L/sec based on Manning's Equation under full flow conditions.

Table 6-1 below summarizes the design parameters used.

Table 6-1 – Summary of Wastewater Design Criteria / Parameters

Design Parameter	Value	Applies
Population Density – Single-family Home	3.4 persons/unit	
Population Density – Semi-detached Home	2.7 persons/unit	
Population Density – Duplex	2.3 persons/unit	
Population Density – Townhome (row)	2.7 persons/unit	
Population Density – Bachelor Apartment	1.4 persons/unit	✓
Population Density – Bachelor + Den Apartment	1.4 persons/unit	
Population Density – One Bedroom Apartment	1.4 persons/unit	✓
Population Density – One Bedroom plus Den Apartment	1.4 persons/unit	
Population Density – Two Bedroom Apartment	2.1 persons/unit	✓
Population Density – Two Bedroom plus Den Apartment	2.1 persons/unit	
Population Density – Three Bedroom Apartment	3.1 persons/unit	
Population Density – Three Bedroom plus Den Apartment	3.1 persons/unit	
Average Daily Residential Sewage Flow	280 L/person/day	✓
Average Daily Commercial / Intuitional Flow	28,000 L/gross ha/day	
Average Light / Heavy Industrial Daily Flow	35,000 / 55,000 L/gross ha/day	
Residential Peaking Factor – Harmon Formula (Min = 2.0, Max =4.0, with K=0.8)	$M = 1 + \frac{14}{4 + P^{0.5}} * k$	✓
Commercial Peaking Factor	1.0-1.5	
Institutional Peaking Factor	1.5	
Industrial Peaking Factor	As per Table 4-B (SDG002)	
Unit of Peak Extraneous Flow (Dry Weather / Wet Weather)	0.05 or 0.28 L/s/gross ha	

Unit of Peak Extraneous Flow (Total I/I)	0.33 L/s/gross ha	✓

The estimated peak sanitary flow rate from the proposed property is **0.94 L/sec** and **1.11 L/sec** for 229 and 241 Beechwood Ave, respectively based on City Design Guidelines. Sewage rates below include a total infiltration allowance of 0.33 L/ha/sec based on the total gross site area.

Table 6-2 – Summary of Anticipated Sewage Rates

Sewage Condition	229 Beechwood Ave Sanitary Sewage Flow (L/sec)	241 Beechwood Ave Sanitary Sewage Flow (L/sec)
Peak Residential Sewage Flow	0.91	1.08
Infiltration Flow (at 0.33 L/ha/sec)	0.03	0.03
Peak Wet Weather Sewage Flow	0.94	1.11

The City of Ottawa was contacted to discuss the downstream sanitary sewer and to determine if any additional analysis would be required to support this Zoning By-law application.

As each building will require its own sanitary sewer connection, 150mm diameter PVC sewers, each having a slope of 2.0% will be installed. The estimated capacity of each 200mm pipe at 2% is 21.5 L/sec.

Drawing **C100** in **Appendix D** illustrates the sanitary servicing of the property.

7 Storm Servicing & Stormwater Management

Since the subject properties are located within the Rideau Valley Conservation Authority (RVCA) sub watershed, Lower Rideau River Falls catchment, stormwater works are therefore subject to both the RVCA and City of Ottawa (COO) approval.

The proposed stormwater system is designed in conformance with the latest version of the City of Ottawa Design Guidelines (October 2012). Section 5 “Storm and Combined Sewer Design” and Section 8 “Stormwater Management”. A summary of the design criteria that relates to this design report is the proceeding sections below.

7.1 Minor System Design Criteria

- The storm sewer was sized based on the Rational Method and Manning’s Equation under free flow conditions for the 2-year storm using a 10-minute inlet time.
- The allowable discharge from the site shall be controlled to 2-year rate with a runoff coefficient of not less than 0.50.
- Onsite storage shall be provided up to the 100-year event based on the controlled allowable discharge previously noted.
- The minimum orifice dia. for a plug style ICD is 83mm and the minimum flow rate from a vortex ICD is recommended at 6 L/s in order to reduce the likelihood of plugging.
- Minimum sewer slopes to be based on minimum velocities for storm sewers of 0.80 m/sec.

7.2 Major System Design Criteria

- 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. Depending on the SWM strategy proposed underground or additional underground storage may be required to satisfy this requirement.
- The major system has been designed to accommodate on-site detention with sufficient capacity to attenuate the 100-year design storm. On-site storage is calculated based on the 100-year design storm with on-site detention storage provided within the underground stormwater storage chambers (stormwater cistern).
- Overland flow routes are provided.
- The vertical distance from the spill elevation on the street and the ground elevation at the buildings is at least 150mm.
- The emergency overflow spill elevation is at least 300mm below the lowest building opening.

7.3 Runoff Coefficients

Runoff coefficients used for were based on actual areas taken from CAD. Runoff coefficients for impervious surfaces (roofs, asphalt, and concrete) were taken as 0.90, whereas those for pervious surfaces (grass/landscaping) were taken as 0.20. Average runoff coefficients were calculated for catchments (or drainage areas) using weighted average method. The runoff coefficients for pre-development and post-development catchments are provided in **Table A-10** and Table A-13 and summarized in **Table 7-1** below. It should be noted that a pre-development runoff coefficient of 0.51 was calculated, however 0.50 was used as per City guidelines.

Table 7-1 – Summary of Runoff Coefficients

Location	Area (hectares)	Pre-Development Runoff Coefficient, C_{AVG}	Post-Development Runoff Coefficient, C_{AVG}
Entire Site	0.2086	0.51	0.71

7.4 Pre-Development Conditions

Under current conditions, it appears that stormwater runoff from the 0.2086-hectare site flows overland towards Beechwood Ave. The overland flow route for stormwater is east towards Beechwood Ave. **Table 7-2** below summarizes the estimated peak flows under pre-development conditions using the standard 10-minute time of concentration (time to inlet).

Table 7-2 – Summary of Pre-Development Flows

Return Period Storm	Total Peak Flows (L/sec)
2-year	22.3
5-year	50.2
100-year	64.7

7.5 Allowable Release Rate

Rather than meeting pre-development released rates, the City of Ottawa imposes a more restrictive stormwater release rate as noted in Section 8.3.7.3 of the SDG002. The allowable discharge release rate from the site was established using the peak flows derived based on a 2-year return period storm, a maximum runoff coefficient of 0.50 and a standard time of concentration of 10 minutes.

The allowable release rate of 22.3 L/sec from the proposed site will be based on a 2-year storm event. **Table A-12** provides detailed calculations on the total allowable peak flow.

7.6 Proposed Stormwater System

Stormwater runoff from the proposed site will drain from a combination of controlled and uncontrolled areas. Although there is no change in the runoff coefficient a reduction in the allowable release rate will result in control of runoff and stormwater detention. A storm drainage plan is illustrated on **Figure 7-1** below. A total of seven (7) subcatchments (or drainage areas) within the development site are shown on this drawing with average runoff coefficients calculated for each drainage area. The stormwater works shall consist of the following elements:

- Runoff from surface areas will be collected by area drains and discharge to underground storage (stormwater cisterns) located in the rear yard, one for each building. This in turn discharges to the proposed storm sewer on Carsdale Ave then to the 1200 mm dia. storm sewer on Beechwood Ave.

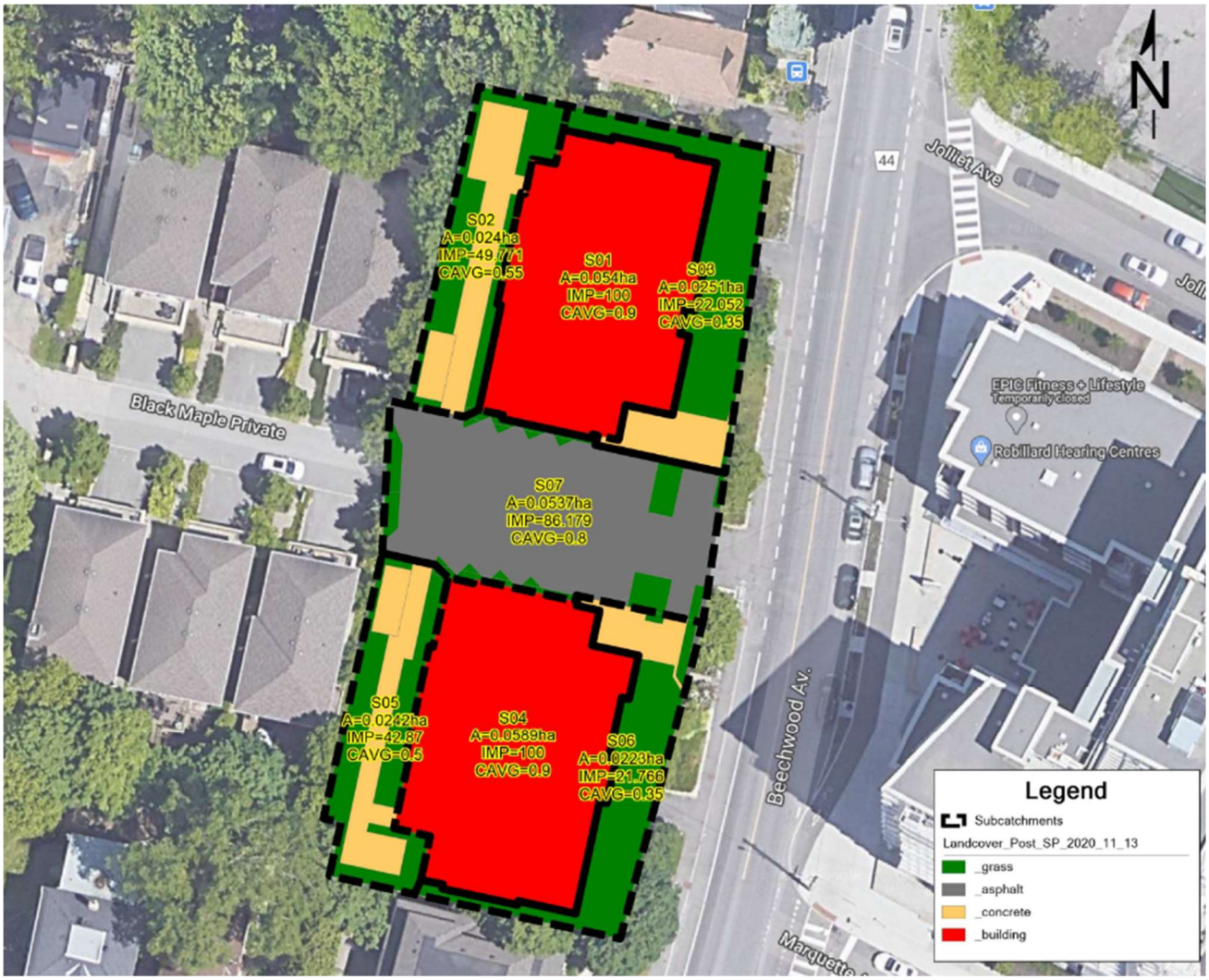


Figure 7-1 – Post-Development Storm Drainage

In order to achieve the quantity control requirements and meet the allowable discharge rates, vortex ICDs will be used at the discharge of each underground storage unit. Additional information on the estimated 100-year volumes is provided in **Table A-15** and Table A-16 in **Appendix A. Table 7-3** below provides a summary of the stormwater peak flows under post-development conditions.

Table 7-3 – Summary of Post-Development Flows

Return Period Storm	Max Allowable Peak Flow (L/sec)	[1]Total Uncontrolled Peak Stormwater Flows (L/sec)	[2]Total Controlled Peak Stormwater Flows (L/sec)
2-year	22.7 L/sec Based on 2-year Storm and C=0.50	30.64	15.44
5-year		41.57	16.71
100-year		82.04	22.19
Note 1-Uncontrolled peak flows, or peak flows that would result if no flow control used. *Note 2-Contolled flows.*			

Since flow control is being utilized onsite, it is necessary to provide appropriate flow attenuation (storage). Additional information on the estimated 100-year volumes is provided in **Section 7.7** below.

7.7 Flow Attenuation & Storage

The attenuation of stormwater will be achieved by utilizing stormwater storage below the rear yard amenity spaces of each building. Using the allowable release rates, the Modified Rational Method was used to determine the 2-year, 5-year, and 100-year volumes that will occur for corresponding release rates.

Table A-15 and Table A-16 provide the storage volumes necessary in the below grade stormwater storage units to attenuate the controlled release rates. **Table A-14** summarizes the combined controlled and uncontrolled flows leaving the subject site.

7.8 Quality Control

It is assumed that a total suspended solids (TSS) removal efficiency of 80% is required, it is therefore proposed to provide an oil grit separator for quality control. The following summarizes the design parameters used in the sizing of the Stormceptor manhole:

Table 7-1: Design Parameters Used for Oil Grit Separator Sizing

Parameter	Value Used
Drainage Area	0.21 hectares
Imperviousness	84.5 %
TSS Removal Requirements	80 %
Runoff Volume Capture	85%
Particle distribution	fine

A Stormceptor model EF04 is necessary to meet the required TSS removal of 80%. The EF04 will provide an approximate TSS removal of 86%.

8 Erosion & Sediment Control

During all construction activities, erosion and sedimentation shall be controlled by the following techniques:

- Filter cloth shall be installed between the frame and cover of all adjacent catch basins and catch basin manhole structures.
- Heavy duty silt fencing will be used to control runoff around the construction area. Silt fencing locations are identified on the site grading and erosion control plan.
- A mud mat will be installed at the construction entrance to help avoid mud from being transported to offsite roads.
- Visual inspection shall be completed daily on sediment control barriers and any damage repaired immediately. Care will be taken to prevent damage during construction operations.
- In some cases, barriers may be removed temporarily to accommodate the construction operations. The affected barriers will be reinstated at night when construction is completed.
- Sediment control devices will be cleaned of accumulated silt as required. The deposits will be disposed of as per the requirements of the contract.
- During the course of construction, if the engineer believes that additional prevention methods are required to control erosion and sedimentation, the contractor will install additional silt fences or other methods as required to the satisfaction of the engineer.
- Construction and maintenance requirements for erosion and sediment controls are to comply with Ontario Provincial Standard Specification (OPSS) OPSS 805 and City of Ottawa specifications.

9 Conclusions and Recommendations

This Servicing & Stormwater Report outlines the rationale which will be used to service the proposed development. The following summarizes the servicing requirements for the site:

Water

- A 50 mm watermain is proposed to service 229 and 241 Beechwood Ave, as the average day demands does not exceed 50 m^3 per day, it is not mandatory to provide twin services as per Section 4.31 of the WDG001.
- The Required Fire Flows (RFFs) were estimated at **13,000 L/min** (217 L/sec) for 229 Beechwood Ave, and **15,000 L/min** (250 L/sec) for 241 Beechwood Ave. The total minimum available flows for firefighting purposes, based on the contribution from hydrants, was estimated at **15,200 L/min** and **17,100 L/min** for each building respectively.
- Based on hydraulic boundary conditions (HGL) provided by the City of Ottawa, a system pressure between ±61 psi – ±63 psi under peak hourly + Fire Flow demands is anticipated at the proposed building. System pressure between **±72 psi** – **±86 psi** under min/max HGL. This exceeds the City's guideline of 40 psi; however, it is anticipated that pressure above 80 psi will occur, therefore pressure reducing valves will be used to used the pressure in each building remains between 80 psi.

Sewage

- Estimated peak sewage flows of **0.94 L/sec** and **1.11 L/sec** are anticipated for 229 and 241 Beechwood respectively.

Stormwater

- For the stormwater system, the allowable capture rate from the entire site was calculated based on a runoff coefficient of 0.50, time of concentration of 10 minutes for a 2-year storm event. The allowable release rate for the entire site was calculated to be **22.27 L/sec**. Runoff in excess of this will be detained onsite for up to the 100-year storm.
- In order to meet the allowable release rate, two underground stormwater storage units will be utilized, with a combined total retention volume of **± 88 m^3**.
- The total 100-year storage volume requirement will be met using the underground stormwater chambers (cisterns), placed below the rear yards of each building. The estimated required storage is **45.4 m^3** and **42.5 m^3** for 229 and 241 Beechwood Ave respectively. The provided storage, using the underground stormwater storage units below the read yards is **48.52m^3** and **48.52m^3** for 229 and 241 Beechwood Ave respectively. Provided storage exceeds the required volumes.

10 Legal Notification

This report was prepared by EXP Services Inc. for the account of 229 Beechwood Holdings Inc. and 241 Beechwood Holdings Inc. C/O Bintee Dev Inc.

Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of such third parties. EXP Services Inc. accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this project.

Appendix A – Design Tables

Table A-1 – Water Demand Chart

Table A-2 – Summary of Required Fire Flows (RFFs)

Table A-3 – Fire Flow Requirements Based on Fire Underwriters Survey (FUS) – 229 Beechwood

Table A-4 – Fire Flow Requirements Based on Fire Underwriters Survey (FUS) – 241 Beechwood

Table A-5 – Estimated Water Pressures at 229 Beechwood Ave

Table A-6 – Estimated Water Pressures at 241 Beechwood Ave

Table A-7 – Available Fire Flows Based on Hydrant Spacing

Table A-8 – NOT USED

Table A-9 – Sanitary Sewer Design Sheet

Table A-10 – Average Runoff Coefficients for Pre-Development Conditions

Table A-11 – Peak Runoff for Pre-Development Conditions

Table A-12 – Allowable Peak Flows (Based on Max C=0.50 with Tc=10mins & 2-yr Storm)

Table A-13 – Average Runoff Coefficients for Post-Development

Table A-14 – Summary of Post-Development Peak Flows (Uncontrolled and Controlled)

Table A-15 – Storage Volumes for 2-year, 5-year and 100-Year Storms (MRM) (229 Beechwood Ave.)

Table A-16 – Storage Volumes for 2-year, 5-year and 100-Year Storms (MRM) (241 Beechwood Ave.)

TABLE A-1
WATER DEMAND CHART

Location:	229 Beechwood
Project No:	OTT-00238207
Designed by:	A. O'Beirn
Checked By:	J. Fitzpatrick
Date Revised:	Dec 2020

Water Consumption
Per Table 4.1 (WDG001)
Residential = **350** L/cap/day
Commercial = 5.0 L/m^2/day

Population Densities (see note 3)

Single Family	3.4	person/unit
Semi-Detahced	2.7	person/unit
Duplex	2.3	person/unit
Townhome (Row)	2.7	person/unit
Bachelor Apartment	1.4	person/unit
1 Bedroom Apartment	1.4	person/unit
2 Bedroom Apartment	2.1	person/unit
3 Bedroom Apartment	3.1	person/unit
4 Bedroom Apartment	4.1	person/unit
Avg. Apartment	1.8	person/unit

Maximum Daily Demand (note 1)

Residential	**2.5**	x avg. day.
Industrial	**1.5**	x avg. day.
Commercial	**1.5**	x avg. day.
Institutional	**1.5**	x avg. day.

Peak Hourly Demand (note 1)

Residential	**2.2**	x max. day. =	**5.5**	x avg. day.
Industrial	**1.8**	x max. day. =	**2.7**	x avg. day.
Commercial	**1.8**	x max. day. =	**2.7**	x avg. day.
Institutional	**1.8**	x max. day. =	**2.7**	x avg. day.

	No. of Residential Units											Residential Demands in (L/sec)					Commercial						Total Demands (L/sec)		
	Singles/Semis/Towns				Apartments								Peaking Factors (x Avg Day) (See note 2)						Peaking Factors (x Avg Day)						
Proposed Buildings	Single Family	Semi-Detached	Duplex	Townhome	Studio	1 Bedroom	2 Bedroom	3 Bedroom	4 Bedroom	Avg Apt.	Total Persons (pop)	Avg. Day Demand (L/day)	Max Day	Peak Hour	Max Day Demand (L/day)	Peak Hour Demand (L/day)	Area (m^2)	Avg Demand (L/day)	Max Day	Peak Hour	Max Day Demand (L/day)	Peak Hour Demand (L/day)	Avg Day (L/s)	Max Day (L/s)	Max Hour (L/s)
229 Beechwood - BSMT					10	1					15.4	5,390	4.77	7.21	25,729	38,863							0.06	0.30	0.45
229 Beechwood - 1st Floor					7	3	2				18.2	6,370	4.77	7.21	30,407	45,929							0.07	0.35	0.53
229 Beechwood - 2nd Floor					7	3	2				18.2	6,370	4.77	7.21	30,407	45,929							0.07	0.35	0.53
229 Beechwood - 3rd Floor					7	3	2				18.2	6,370	4.77	7.21	30,407	45,929							0.07	0.35	0.53
Subtotal =					**31**	**10**	**6**				**70**	**24,500**			**116,951**	**176,651**							**0.28**	**1.35**	**2.04**
241 Beechwood - BSMT					7						9.8	3,430	4.77	7.21	16,373	24,731							0.04	0.19	0.29
241 Beechwood - 1st Floor					8	1	2				16.8	5,880	4.77	7.21	28,068	42,396							0.07	0.32	0.49
241 Beechwood - 2nd Floor					8	1	3				18.9	6,615	4.77	7.21	31,577	47,696							0.08	0.37	0.55
241 Beechwood - 3rd Floor					8	1	3				18.9	6,615	4.77	7.21	31,577	47,696							0.08	0.37	0.55
241 Beechwood - 4th Floor					8	1	3				18.9	6,615	4.77	7.21	31,577	47,696							0.08	0.37	0.55
Subtotal =					**39**	**4**	**11**				**83**	**29,155**			**139,171**	**210,215**							**0.34**	**1.61**	**2.43**
Total =					**70**	**14**	**17**				**153**	**53,655**			**256,122**	**386,866**							**0.62**	**2.96**	**4.48**

Notes
1) When Polulation is greater than 500 persons, Max Day and Peak Hour Factors are based on Table 4.2 of City of Ottawa WDG001.
2) When Population is less than 500 persons, Max Day and Peak Hour Factors are based on Table 3-3 of MECP "Design Guidelines for Drinking Water Systems", 2008.
3) Unit densities based on Table 4.1 of City of Ottawa WDG001.

TABLE A2
SUMMARY OF REQUIRED FIREFLOWS (RFFs)

Building #	Description	[1]No of Storeys	Fire Flow, F (L/min)	[2]Type of Constr. Coeff, C	[3]Reduction Due to Occupancy (%)	[4]Reduction Due to Sprinklers (%)	[5]Total Increase due to Exposures (%)	[6]Required Fire Flow in	
								(L/min)	(L/sec)
229 BEECHWOOD AVE	Appartments	3+	10,000	1	-15%	0%	56%	13,000	217
241 BEECHWOOD AVE	Appartments	4+	11,000	1.0	-15%	0%	56%	15,000	250

Notes

1 - If basements are included (<50% below grade) then denoted as +.

2 -Types of constructions: 0.8 for non-combustible, 1.0 for ordinary construction,1.5 for wood frame construction.

3 - Reductions due to Occupancy are -25% for non-combustible or -15% for limited combustible.

4 - Reductions due to Sprinkler Systems

5 – Increase due to exposures were calculated based on FUS and technical bulletin ISTB-2018-02.

6 – Required Fire Flows are rounded to nearest 1,000 L/min.

TABLE A3
FIRE FLOW REQUIREMENTS BASED ON FIRE UNDERWRITERS SURVEY(FUS) 1999 FOR

229 BEECHWOOD AVE

An estimate of the Fire Flow required for a given fire area may be estimated by:

F = 220 * C * SQRT(A)

where: F = required fire flow in litres per minute
A = total floor area in m^2 (including all storeys, but excluding basements at least 50% below grade)
C = coefficient related to the type of construction

Task	Options	Multiplier	Input				Value Used	Fire Flow Total (L/min)
Choose Building Frame (C)	Wood Frame	1.5	Ordinary Construction				1	
	Ordinary Construction	1						
	Non-combustible Construction	0.8						
	Fire Resistive Construction	0.6						
Input Building Floor Areas (A)			Area	% Used	Area Used	Comment		
	Floor 3		567	100%	567			
	Floor 2		567	50%	284			
	Floor 1		580	100%	580			
	BSMT		579	100%	579			
	Basement (At least 50% below grade, not included)				2,010			
Fire Flow (F)	F = 220 * C * SQRT(A)							9,862
Fire Flow (F)	Rounded to nearest 1,000							**10,000**

Reductions/Increases Due to Factors Effecting Burning

Task	Options	Multiplier	Input	Value Used	Fire Flow Change (L/min)	Fire Flow Total (L/min)
Choose Combustibility of Building Contents	Non-combustible	-25%	Limited Combustible	-15%	-1,500	8,500
	Limited Combustible	-15%				
	Combustible	0%				
	Free Burning	15%				
	Rapid Burning	25%				
Choose Reduction Due to Sprinkler System	**Adequate** Sprinkler Conforms to NFPA13	-30%	No Sprinkler	0%	0	8,500
	No Sprinkler	0%				
	Standard Water Supply for Fire Department Hose Line and for Sprinkler System	-10%	Not Standard Water Supply or Unavailable	0%	0	8,500
	Not Standard Water Supply or Unavailable	0%				
	Fully Supervised Sprinkler System	-10%	Not Fully Supervised or N/A	0%	0	8,500
	Not Fully Supervised or N/A	0%				

Choose Structure Exposure Distance	Exposures	Separ-ation Dist (m)	Cond	Separation Conditon	Exposed Wall type	Exposed Wall Length: Length (m)	No of Storeys	Length-Height Factor	Sub-Condition	Charge (%)	Total Charge (%)	Total Exposure Charge (L/min)	
	Front	24	4	20.1 to 30	Type B	30	3	90	4C	8%	56%	4,760	13,260
	Side 1	4	2	3.1 to 10	Type A	18	2	36	2B	18%			
	Back	8	2	3.1 to 10	Type A	20	3	60	2B	18%			
	Side 2	16	3	10.1 to 20	Type A	19	3	30	3A	12%			
Obtain Required Fire Flow	Total Required Fire Flow, Rounded to the Nearest 1,000 L/min =												**13,000**
	Total Required Fire Flow, L/s =												**217**

Exposure Charges for Exposing Walls of Wood Frame Construction (from Table G5)

Type A	Wood-Frame or non-combustible
Type B	Ordinary or fire-resisitve with unprotected openings
Type C	Ordinary or fire-resisitve with semi-protected openings
Type D	Ordinary or fire-resisitve with blank wall

Conditions for Separation

Separation Dist	Condition
0m to 3m	1
3.1m to 10m	2
10.1m to 20m	3
20.1m to 30m	4
30.1m to 45m	5
> 45.1m	6

TABLE A4
FIRE FLOW REQUIREMENTS BASED ON FIRE UNDERWRITERS SURVEY(FUS) 1999 FOR

241 BEECHWOOD AVE

An estimate of the Fire Flow required for a given fire area may be estimated by:

F = 220 * C * SQRT(A)

where: F = required fire flow in litres per minute
A = total floor area in m^2 (including all storeys, but excluding basements at least 50% below grade)
C = coefficient related to the type of construction

Task	Options	Multiplier	Input				Value Used	Fire Flow Total (L/min)
Choose Building Frame (C)	Wood Frame	1.5	Ordinary Construction				1	
	Ordinary Construction	1						
	Non-combustible Construction	0.8						
	Fire Resistive Construction	0.6						
Input Building Floor Areas (A)			Area	% Used	Area Used	Comment		
	Floor 4		535	100%	535			
	Floor 2		535	100%	535			
	Floor 2		535	50%	268			
	Floor 1		551	100%	551			
	BSMT		527	100%	527			
	Basement (At least 50% below grade, not included)				2,416			
Fire Flow (F)	F = 220 * C * SQRT(A)							10,813
Fire Flow (F)	Rounded to nearest 1,000							**11,000**

Reductions/Increases Due to Factors Effecting Burning

Task	Options	Multiplier	Input	Value Used	Fire Flow Change (L/min)	Fire Flow Total (L/min)
Choose Combustibility of Building Contents	Non-combustible	-25%	Limited Combustible	-15%	-1,650	9,350
	Limited Combustible	-15%				
	Combustible	0%				
	Free Burning	15%				
	Rapid Burning	25%				
Choose Reduction Due to Sprinkler System	**Adequate** Sprinkler Conforms to NFPA13	-30%	No Sprinkler	0%	0	9,350
	No Sprinkler	0%				
	Standard Water Supply for Fire Department Hose Line and for Sprinkler System	-10%	Not Standard Water Supply or Unavailable	0%	0	9,350
	Not Standard Water Supply or Unavailable	0%				
	Fully Supervised Sprinkler System	-10%	Not Fully Supervised or N/A	0%	0	9,350
	Not Fully Supervised or N/A	0%				

Choose Structure Exposure Distance	Exposures	Separation Dist (m)	Cond	Separation Conditon	Exposed Wall type	Exposed Wall Length: Length (m)	No of Storeys	Length-Height Factor	Sub-Condition	Charge (%)	Total Charge (%)	Total Exposure Charge (L/min)	
	Front	27	4	20.1 to 30	Type B	18	4	72	4C	8%	56%	5,236	14,586
	Side 1	16	3	10.1 to 20	Type A	19	3	57	3B	13%			
	Back	8	2	3.1 to 10	Type A	20	3	60	2B	18%			
	Side 2	6	2	3.1 to 10	Type A	18	3	30	2A	17%			
Obtain Required Fire Flow										Total Required Fire Flow, Rounded to the Nearest 1,000 L/min =			**15,000**
										Total Required Fire Flow, L/s =			**250**

Exposure Charges for Exposing Walls of Wood Frame Construction (from Table G5)

Type A	Wood-Frame or non-combustible
Type B	Ordinary or fire-resisitve with unprotected openings
Type C	Ordinary or fire-resisitve with semi-protected openings
Type D	Ordinary or fire-resisitve with blank wall

Conditions for Separation

Separation Dist	Condition
0m to 3m	1
3.1m to 10m	2
10.1m to 20m	3
20.1m to 30m	4
30.1m to 45m	5
> 45.1m	6

TABLE A5

ESTIMATED WATER PRESSURE AT PROPOSED BUILDING (229 Beechwood Ave)

Description	From	To	Demand (L/sec)	Pipe Length (m)	Pipe Dia (mm)	Dia (m)	Slope of HGL (m/m)	Head Loss (m)	Elev From (m)	Elev To (m)	*Elev Diff (m)	Pressure From kPa	(psi)	Pressure To kPa	(psi)	Pressure Drop (psi)
Peak Hour Conditons																
50mm service	Main	Basement	2.040	19 m	50	0.050	0.04759	0.9041	57.50	58.90	-1.4	436.5	(63.3)	413.9	(60.0)	3.3
	Basement	Top floor	0.510	11 m	38	0.038	0.0139	0.1577	58.90	70.25	-11.4	413.9	(60.0)	301.1	(43.7)	16.4
100mm service	Main	Basement	2.040	19 m	100	0.100	0.00163	0.0309	57.50	58.90	-1.4	436.5	(63.3)	422.5	(61.3)	2.0
	Basement	Top floor	0.510	11 m	38	0.038	0.0139	0.1577	58.90	70.25	-11.4	422.5	(61.3)	309.6	(44.9)	16.4

Water Demand Info

Average Demand =	0.28	L/sec
Max Day Demand =	1.35	L/sec
Peak Hr Deamand =	2.04	L/sec
Fireflow Requriement =	216	L/sec
Max Day Plus FF Demand =	217.4	L/sec

Boundary Conditon

	Min HGL	Max HGL	Peak Hour+FF HGL
HGL (m)	107.8	118.2	102.0
Approx Ground Elev (m) =	57.5	57.5	57.5
Pressure (m) =	50.3	60.7	44.5
Pressure (Pa) =	493,443	595,467	436,545
Pressure (psi) =	71.6	86.4	63.3

<----- (From City of Ottawa at connnection point)

Pipe Lengths

From watermain to building mech room=	19 m
From mech room to centre top floor =	11.4 m
Hazen Williams C Factor for Friction Loss in Pipe, C=	100

Elevations

At roadway =	57.50
At building (mech room FF) =	58.9
Centre of top floor =	70.25

TABLE A6

ESTIMATED WATER PRESSURE AT PROPOSED BUILDING (241 Beechwood Ave)

Description	From	To	Demand (L/sec)	Pipe Length (m)	Pipe Dia (mm)	Dia (m)	Slope of HGL (m/m)	Head Loss (m)	Elev From (m)	Elev To (m)	*Elev Diff (m)	Pressure From kPa	(psi)	Pressure To kPa	(psi)	Pressure Drop (psi)
Peak Hour Conditons																
50mm service	Main	Basement	2.430	20 m	50	0.050	0.0658	1.3159	58.60	58.72	-0.1	418.9	(60.8)	404.8	(58.7)	2.0
	Basement	Top floor	0.608	14 m	38	0.038	0.01921	0.2748	58.72	73.02	-14.3	404.8	(58.7)	261.8	(38.0)	20.7
100mm service	Main	Basement	2.430	20 m	100	0.100	0.00225	0.045	58.60	58.72	-0.1	418.9	(60.8)	417.3	(60.5)	0.2
	Basement	Top floor	0.608	14 m	38	0.038	0.01921	0.2748	58.72	73.02	-14.3	417.3	(60.5)	274.3	(39.8)	20.7

Water Demand Info

Average Demand =	0.34	L/sec
Max Day Demand =	1.61	L/sec
Peak Hr Deamand =	2.43	L/sec
Fireflow Requriement =	250	L/sec
Max Day Plus FF Demand =	251.6	L/sec

Boundary Conditon

	Min HGL	Max HGL	Peak Hour+FF HGL
HGL (m)	107.8	118.2	100.2
Approx Ground Elev (m) =	57.5	57.5	57.5
Pressure (m) =	50.3	60.7	42.7
Pressure (Pa) =	493,443	595,467	418,887
Pressure (psi) =	71.6	86.4	60.8

<----- (From City of Ottawa at connnection point)

Pipe Lengths

From watermain to building mech room=	20 m
From mech room to centre top floor =	14.3 m
Hazen Williams C Factor for Friction Loss in Pipe, C=	100

Elevations

At roadway =	58.60
At building (mech room FF) =	58.72
Centre of top floor =	73.02

TABLE A7

FIRE FLOW REQUIREMENTS BASED ON HYDRANT SPACING

Hydrant #	229 Beechwood Ave.		241 Beechwood Ave.	
	[1]Distance (m)	[2]Fire Flow Contribution (L/min)	[1]Distance (m)	[2]Fire Flow Contribution (L/min)
368033H279	61	5,700	39	5,700
368033H079	72	5,700	98	3,800
368033H075	117	3,800	99	3,800
368033H284	169	0	131	3,800
368033H265	201	0	174	0
Total Available (L/min)		15,200		17,100
FUS RFF in L/min or (L/sec)		13,000 (217)		15,000 (250)
Meets Requreiment (Yes/No)		Yes		Yes

Notes:

[1]Distance is measured along a road or fire route.

[2]Fire Flow Contribution for Class AA Hydrant from Table 1 of Appendix I, ISTB-2018-02

Table A-9
SANITARY SEWER CALCULATION SHEET

LOCATION			RESIDENTIAL AREAS AND POPULAITONS									COMMERCIAL				INFILTRATION				SEWER DATA						
				NUMBER OF UNITS					POPULATION				AREA (ha)				AREA (ha)										
Street	U/S MH	D/S MH	Area (ha)	Single	Semi	1-Bed Apt.	2-Bed Apt.	3-Bed Apt.	INDIV	ACCU	Peak Factor	Peak Flow (L/sec)	INDIV	ACCU	Peak Factor	Peak Flow (L/sec)	INDIV	ACCU	INFILT FLOW (L/s)	TOTAL FLOW (L/s)	Nom Dia (mm)	Actual Dia (mm)	Slope (%)	Length (m)	Capacity (L/sec)	Q/Q_{CAP} (%)	Full Velocity (m/s)
Beechwood	229	SANMH	0.1054			41	6		70	70.0	4.00	0.91					0.1054	0.105	0.03	0.94	200	150.00	2.0	1.0	21.5	4%	1.72
Beechwood	241	SANMH	0.1031			43	11		83.3	83.3	4.00	1.08					0.1031	0.103	0.03	1.11	200	150.00	2.0	1.0	21.5	5%	1.72
			0.209			**84**	**17**		**153.3**								**0.209**										

Residential Avg. Daily Flow, q (L/p/day) =	280	Commercial Peak	1.5	(when area >20%)		Unit Type	Ppu	
Commercial Avg. Daily Flow (L/gross ha/day) =	28,000	Factor =	1.0	(when area <20%)	Peak Population Flow, (L/sec)	Singles =	3.4	Designed: Alexander O'Beirn, P.Eng.
or L/gross ha/sec =	0.324				= P*q*M/86.4	Semi-Detached =	2.7	
Institutianal Avg. Daily Flow (L/s/ha) =	28,000	Institutional Peak	1.5	(when area >20%)	Peak Extraneous Flow, (L/sec)	1-bed Apt =	1.4	Checked: Jason Fitzpatrick, P.Eng.
or L/gross ha/sec =	0.324	Factor =	1.0	(when area <20%)	= I*Ac	1-bed + Den Apt =	1.4	
Light Industrial Flow (L/gross ha/day) =	35,000				Residential Peaking Factor, M	2-bed Apt. Unit =	2.1	
or L/gross ha/sec =	0.4051	Residential Correct	0.80		= 1 + (14/(4+P^0.5)) * K	2-bed + Den Apt =	2.1	File Reference: OTT-00238207
Light Industrial Flow (L/gross ha/day) =	55,000	Manning N =	0.013		Sewer Capacity, Qcap (L/sec)	3-bed Apt. Unit =	3.1	
or L/gross ha/sec =	0.637	Peak extraneous fl	0.33	(Total I/I)	= $1/N \; S1^{/2} \; R^{2/3} \; A_c$			

Project: 229 + 241 Beechwood

Location: Ottawa, Ontario

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TABLE A10

CALCULATION OF AVERAGE RUNOFF COEFFICIENTS FOR PRE-DEVELOPMENT CONDITIONS

Area No.	Roof Areas C=0.90		Asphalt Areas C=0.90		Concrete / Pavers C=0.90		Gravel C=0.75		Grassed Areas C=0.20		Sum AC	Total Area (m^2)	C_{AVG}
	Area (m^2)	A * C	Area (m^2)	A * C	Area (m^2)	A * C	Area (m^2)	A * C	Area (m^2)	A * C			
Site	585.60	527.0	507.30	456.6	8.30	7.5	94.90	71.2	1426.50	285.30	1347.6	2622.60	0.51

TABLE A11

CALCULATION OF PEAK RUNOFF FOR PRE-DEVELOPMENT CONDITIONS

Area No	Outlet Location	Area (ha)	Time of Conc, Tc (min)	Storm = 2 yr			Storm = 5 yr			Storm = 100 yr		
				I_2 (mm/hr)	Cavg	Q_2 (L/sec)	I_5 (mm/hr)	Cavg	Q_5 (L/sec)	I_{100} (mm/hr)	Cavg	Q_{100} (L/sec)
Site	Beechwood	0.26226	10	76.81	0.51	28.8	104.19	0.51	39.0	178.56	0.64	83.6

Notes

1) Intensity, I = 732.951/(Tc+6.199) $^{0.810}$ (2-year, City of 0ttawa)

2) Intensity, I = 998.071/(Tc+6.053) $^{0.814}$ (5-year, City of 0ttawa)

3) Intensity, I = 1735.688/(Tc+6.014) $^{0.820}$ (100-year, City of Ottawa)

4) Cavg for 100-year is increased by 25% to a maximum of 1.0

5) The standard minimium Time of Concentraion of 10 minutes was used, rather then the calaculted time, since calcualted time was less than 10 minutes.

TABLE A12

ESTIMATION OF ALLOWABLE PEAK FLOWS (Based on Max C=0.50 with Tc=10mins & 2-yr Storm)

Area No	Outlet Location	Area (ha)	Time of Conc, Tc (min)	Storm = 2 yr			Storm = 5 yr			Storm = 100 yr		
				I_2 (mm/hr)	Cavg	Q_{ALLOW} (L/sec)	I_5 (mm/hr)	Cavg	Q_{ALLOW} (L/sec)	I_5 (mm/hr)	Cavg	Q_{ALLOW} (L/sec)
Site	Beechwood	0.20856	10	76.81	0.50	**22.27**	104.19	0.50	30.21	178.56	0.63	64.70

Allowable Discharge (based on 2-yr storm)

Notes

1) Intensity, I = 732.951/(Tc+6.199) $^{0.810}$ (2-year, City of 0ttawa)

2) Intensity, I = 998.071/(Tc+6.053) $^{0.814}$ (5-year, City of 0ttawa)

3) Intensity, I = 1735.688/(Tc+6.014) $^{0.820}$ (100-year, City of Ottawa)

4) Cavg for 100-year is increased by 25% to a maximum of 1.0

5) Allowable Discharge Rate is based on 2-year storm at Tc=10 minutes, and discharging to storm sewer on Beechwood Avenue

TABLE A13

AVERAGE RUNOFF COEFFICIENTS FOR POST-DEVELOPMENT CONDITIONS

$C_{ASPH/CONC}$ = 0.90 C_{ROOF} = 0.90 C_{GRASS} = 0.20

Area No.	Asphalt & Conc Areas (m^2)	A * C_{ASPH}	Roof Areas (m^2)	A * C_{ROOF}	Grassed Areas (m^2)	A * C_{GRASS}	Sum AC	Total Area (m^2)	C_{AVG} (see note)	Comment
S01								540	0.90	North Building Roof
S02								240	0.55	North Back Yard
S03								251	0.35	North Front Yard
S04								589	0.90	South Building Roof
S05								242	0.50	South Back Yard
S06								223	0.35	South Front Yard
S07								537	0.80	Carsdale Ave ROW
Totals								2622	0.71	

Notes

1) Cavg derived with area-weighting command in PCSWMM

TABLE A14

SUMMARY OF POST-DEVELOPMENT PEAK FLOWS (Uncontrolled and Controlled)

			Storm = 2 yr				Storm = 5 yr				Storm = 100 yr			
Area No	Area (ha)	Time of Conc, Tc (min)	C_{AVG}	I_2 (mm/hr)	Q (L/sec)	Q_{CAP} (L/sec)	C_{AVG}	I_5 (mm/hr)	Q (L/sec)	Q_{CAP} (L/sec)	C_{AVG}	I_{100} (mm/hr)	Q (L/sec)	Q_{CAP} (L/sec)
S01	0.0540	10	0.90	76.81	10.38	**(5.50)**	0.90	104.19	14.08	**(5.50)**	1.00	178.56	26.81	**(5.50)**
S02	0.0240	10	0.55	76.81	2.82		0.55	104.19	3.82		0.69	178.56	8.19	
S03	0.0251	10	0.35	76.81	1.88	**1.88**	0.35	104.19	2.54	**2.54**	0.44	178.56	5.45	**5.45**
S04	0.0589	10	0.90	76.81	11.32	**(5.50)**	0.90	104.19	15.35	**(5.50)**	1.00	178.56	29.24	**(5.50)**
S05	0.0242	10	0.50	76.81	2.58		0.50	104.19	3.50		0.63	178.56	7.51	
S06	0.0223	10	0.35	76.81	1.67	**1.67**	0.35	104.19	2.26	**2.26**	0.44	178.56	4.84	**4.84**
total (storm)	**0.2085**				**30.64**	**14.54**			**41.57**	**15.81**			**82.04**	**21.29**
foundation drain (note 7)						0.90				0.90				0.90
total sanitary flow (note 8)														
Totals	**0.2085**					**15.442**				**16.705**				**22.194**
Allowable rates for comparison						***22.27***				***22.27***				***22.27***

Notes

1) Intensity, I = 732.951/(Tc+6.199) $^{0.810}$ (2-year, City of 0ttawa)

2) Intensity, I = 998.071/(Tc+6.053) $^{0.814}$ (5-year, City of 0ttawa)

3) Intensity, I = 1735.688/(Tc+6.014) $^{0.820}$ (100-year, City of Ottawa)

4) Cavg for 100-year is increased by 25% to a maximum of 1.0

5) Time of Concentration, Tc = ***10 mins***

6) For Flows under column Qcap which are shown in brackets ***(0.0)*** *, denotes flows that are controlled*

7) Foundaion Drain allowance based on Section 5.4.7 of SDG002 = ***0.45 L/s/home***

8) Allownce for sanitary flow if connecting to combined sewer

Table A15 Storage Volumes for 2-year, 5-Year and 100-Year Storms (MRM) (229 Beechwood Ave.)

Area No: **S04, S05**

C_{AVG} = 0.78 (2-yr)

C_{AVG} = 0.78 (5-yr)

C_{AVG} = 0.98 (100-yr, Max 1.0)

Time Interval = 10.00 (mins)

Drainage Area = 0.0831 (hectares)

Actual Release Rate (L/sec) = 5.50

Percentage of Actual Rate (City of Ottawa requirement) = 50% (Set to 50% when U/G storage used)

Release Rate Used for Estimation of 100-year Storage (L/sec) = 2.75

Intensity Incr (%) = 20% Use 20% for Climate Change

Duration (mins)	Release Rate = 2.75 (L/sec), Return Period = 2 (years), IDF Parameters, A = 733.0, B = 0.810, C = 6.199 (I = A/(T_c+C))					Release Rate = 2.75 (L/sec), Return Period = 5 (years), IDF Parameters, A = 998.1, B = 0.814, C = 6.053 (I = A/(T_c+C))					Release Rate = 2.75 (L/sec), Return Period = 100 (years), IDF Parameters, A = 1735.7, B = 0.820, C = 6.014 (I = A/(T_c+C))					Release Rate = 2.75 (L/sec), Return Period = 100+20% (years), IDF Parameters, A = 1735.7, B = 0.820, C = 6.014 (I = A/(T_c+C))				
	Rainfall Intensity, I (mm/hr)	Peak Flow (L/sec)	Release Rate (L/sec)	Storage Rate (L/sec)	Storage (m^3)	Rainfall Intensity, I (mm/hr)	Peak Flow (L/sec)	Release Rate (L/sec)	Storage Rate (L/sec)	Storage (m^3)	Rainfall Intensity, I (mm/hr)	Peak Flow (L/sec)	Release Rate (L/sec)	Storage Rate (L/sec)	Storage (m^3)	Rainfall Intensity, I (mm/hr)	Peak Flow (L/sec)	Release Rate (L/sec)	Storage Rate (L/sec)	Storage (m^3)
0	167.2	30.3	2.8	27.5	0.0	230.5	41.7	2.8	39.0	0.0	398.6	90.2	2.8	87.4	0.0	478.3	108.2	2.8	105.5	0.0
10	76.8	13.9	2.8	11.2	6.7	104.2	18.9	2.8	16.1	9.7	178.6	40.4	2.8	37.7	22.6	214.3	48.5	2.8	45.7	27.4
20	52.0	9.4	2.8	6.7	8.0	70.3	12.7	2.8	10.0	12.0	120.0	27.1	2.8	24.4	29.3	143.9	32.6	2.8	29.8	35.8
30	40.0	7.2	2.8	4.5	8.1	53.9	9.8	2.8	7.0	12.6	91.9	20.8	2.8	18.0	32.5	110.2	24.9	2.8	22.2	39.9
40	32.9	5.9	2.8	3.2	7.7	44.2	8.0	2.8	5.2	12.6	75.1	17.0	2.8	14.3	34.2	90.2	20.4	2.8	17.7	42.4
50	28.0	5.1	2.8	2.3	7.0	37.7	6.8	2.8	4.1	12.2	64.0	14.5	2.8	11.7	35.2	76.7	17.4	2.8	14.6	43.8
60	24.6	4.4	2.8	1.7	6.1	32.9	6.0	2.8	3.2	11.6	55.9	12.6	2.8	9.9	35.6	67.1	15.2	2.8	12.4	44.7
70	21.9	4.0	2.8	1.2	5.1	29.4	5.3	2.8	2.6	10.8	49.8	11.3	2.8	8.5	35.8	59.7	13.5	2.8	10.8	45.2
80	19.8	3.6	2.8	0.8	4.0	26.6	4.8	2.8	2.1	9.9	45.0	10.2	2.8	7.4	35.7	54.0	12.2	2.8	9.5	45.4
90	18.1	3.3	2.8	0.5	2.9	24.3	4.4	2.8	1.6	8.9	41.1	9.3	2.8	6.6	35.4	49.3	11.2	2.8	8.4	45.4
100	16.7	3.0	2.8	0.3	1.7	22.4	4.1	2.8	1.3	7.8	37.9	8.6	2.8	5.8	35.0	45.5	10.3	2.8	7.5	45.2
110	15.6	2.8	2.8	0.1	0.4	20.8	3.8	2.8	1.0	6.7	35.2	8.0	2.8	5.2	34.4	42.2	9.6	2.8	6.8	44.9
120	14.6	2.6	2.8	-0.1	-0.8	19.5	3.5	2.8	0.8	5.6	32.9	7.4	2.8	4.7	33.8	39.5	8.9	2.8	6.2	44.5
130	13.7	2.5	2.8	-0.3	-2.1	18.3	3.3	2.8	0.6	4.4	30.9	7.0	2.8	4.2	33.1	37.1	8.4	2.8	5.6	44.0
140	12.9	2.3	2.8	-0.4	-3.4	17.3	3.1	2.8	0.4	3.2	29.2	6.6	2.8	3.8	32.3	35.0	7.9	2.8	5.2	43.4
150	12.3	2.2	2.8	-0.5	-4.8	16.4	3.0	2.8	0.2	1.9	27.6	6.2	2.8	3.5	31.5	33.1	7.5	2.8	4.7	42.7
160	11.7	2.1	2.8	-0.6	-6.2	15.6	2.8	2.8	0.1	0.6	26.2	5.9	2.8	3.2	30.6	31.5	7.1	2.8	4.4	42.0
170	11.1	2.0	2.8	-0.7	-7.5	14.8	2.7	2.8	-0.1	-0.7	25.0	5.7	2.8	2.9	29.7	30.0	6.8	2.8	4.0	41.2
180	10.6	1.9	2.8	-0.8	-8.9	14.2	2.6	2.8	-0.2	-2.0	23.9	5.4	2.8	2.7	28.7	28.7	6.5	2.8	3.7	40.4
190	10.2	1.8	2.8	-0.9	-10.3	13.6	2.5	2.8	-0.3	-3.3	22.9	5.2	2.8	2.4	27.7	27.5	6.2	2.8	3.5	39.5
200	9.8	1.8	2.8	-1.0	-11.7	13.0	2.4	2.8	-0.4	-4.7	22.0	5.0	2.8	2.2	26.7	26.4	6.0	2.8	3.2	38.6
Max =					**8.1**					**12.6**					**35.8**					**45.4**

Notes

1) Peak flow is equal to the product of 2.78 x C x I x A

2) Rainfall Intensity, $I = A/(Tc+C)^B$

3) Release Rate = Min (Release Rate, Peak Flow)

4) Storage Rate = Peak Flow - Release Rate

5) Storage = Duration x Storage Rate

6) Maximium Storage = Max Storage Over Duration

7) Parameters a,b,c are for City of Ottawa

City of Ottawa IDF Data (from SDG002)

IDF curve equations (Intensity in mm/hr)

100 year Intensity = 1735.688 / (Time in min + 6.014) $^{0.820}$

50 year Intensity = 1569.580 / (Time in min + 6.014) $^{0.820}$

25 year Intensity = 1402.884 / (Time in min + 6.018) $^{0.819}$

10 year Intensity = 1174.184 / (Time in min + 6.014) $^{0.816}$

5 year Intensity = 998.071 / (Time in min + 6.053) $^{0.814}$

2 year Intensity = 732.951 / (Time in min + 6.199) $^{0.810}$

Table A16 Storage Volumes for 2-year, 5-Year and 100-Year Storms (MRM) (241 Beechwood Ave.)

Area No: **S01, S02**

C_{AVG} = 0.79 (2-yr)

C_{AVG} = 0.79 (5-yr)

C_{AVG} = 0.99 (100-yr, Max 1.0)

Time Interval = 10.00 (mins)

Drainage Area = 0.0780 (hectares)

Actual Release Rate (L/sec) = 5.50

Percentage of Actual Rate (City of Ottawa requirement) = 50% (Set to 50% when U/G storage used)

Release Rate Used for Estimation of 100-year Storage (L/sec) = 2.75

Intensity Incr (%) = 20% Use 20% for Climate Change

Duration (mins)	Release Rate = 2.75 (L/sec); Return Period = 2 (years); IDF Parameters, A = 733.0, B = 0.810, C = 6.199 (I = A/(T_c+C))					Release Rate = 2.75 (L/sec); Return Period = 5 (years); IDF Parameters, A = 998.1, B = 0.814, C = 6.053 (I = A/(T_c+C))					Release Rate = 2.75 (L/sec); Return Period = 100 (years); IDF Parameters, A = 1735.7, B = 0.820, C = 6.014 (I = A/(T_c+C))					Release Rate = 2.75 (L/sec); Return Period = 100+20% (years); IDF Parameters, A = 1735.7, B = 0.820, C = 6.014 (I = A/(T_c+C))				
	Rainfall Intensity, I (mm/hr)	Peak Flow (L/sec)	Release Rate (L/sec)	Storage Rate (L/sec)	Storage (m^3)	Rainfall Intensity, I (mm/hr)	Peak Flow (L/sec)	Release Rate (L/sec)	Storage Rate (L/sec)	Storage (m^3)	Rainfall Intensity, I (mm/hr)	Peak Flow (L/sec)	Release Rate (L/sec)	Storage Rate (L/sec)	Storage (m^3)	Rainfall Intensity, I (mm/hr)	Peak Flow (L/sec)	Release Rate (L/sec)	Storage Rate (L/sec)	Storage (m^3)
0	167.2	28.7	2.8	26.0	0.0	230.5	39.6	2.8	36.8	0.0	398.6	85.6	2.8	82.9	0.0	478.3	102.7	2.8	100.0	0.0
10	76.8	13.2	2.8	10.4	6.3	104.2	17.9	2.8	15.2	9.1	178.6	38.3	2.8	35.6	21.4	214.3	46.0	2.8	43.3	26.0
20	52.0	8.9	2.8	6.2	7.4	70.3	12.1	2.8	9.3	11.2	120.0	25.8	2.8	23.0	27.6	143.9	30.9	2.8	28.2	33.8
30	40.0	6.9	2.8	4.1	7.4	53.9	9.3	2.8	6.5	11.7	91.9	19.7	2.8	17.0	30.6	110.2	23.7	2.8	20.9	37.7
40	32.9	5.6	2.8	2.9	7.0	44.2	7.6	2.8	4.8	11.6	75.1	16.1	2.8	13.4	32.1	90.2	19.4	2.8	16.6	39.9
50	28.0	4.8	2.8	2.1	6.2	37.7	6.5	2.8	3.7	11.2	64.0	13.7	2.8	11.0	33.0	76.7	16.5	2.8	13.7	41.2
60	24.6	4.2	2.8	1.5	5.3	32.9	5.7	2.8	2.9	10.5	55.9	12.0	2.8	9.3	33.3	67.1	14.4	2.8	11.7	42.0
70	21.9	3.8	2.8	1.0	4.3	29.4	5.0	2.8	2.3	9.6	49.8	10.7	2.8	7.9	33.4	59.7	12.8	2.8	10.1	42.3
80	19.8	3.4	2.8	0.7	3.2	26.6	4.6	2.8	1.8	8.7	45.0	9.7	2.8	6.9	33.2	54.0	11.6	2.8	8.8	42.5
90	18.1	3.1	2.8	0.4	2.0	24.3	4.2	2.8	1.4	7.7	41.1	8.8	2.8	6.1	32.8	49.3	10.6	2.8	7.8	42.4
100	16.7	2.9	2.8	0.1	0.8	22.4	3.8	2.8	1.1	6.6	37.9	8.1	2.8	5.4	32.3	45.5	9.8	2.8	7.0	42.1
110	15.6	2.7	2.8	-0.1	-0.5	20.8	3.6	2.8	0.8	5.5	35.2	7.6	2.8	4.8	31.7	42.2	9.1	2.8	6.3	41.7
120	14.6	2.5	2.8	-0.2	-1.8	19.5	3.3	2.8	0.6	4.3	32.9	7.1	2.8	4.3	31.1	39.5	8.5	2.8	5.7	41.2
130	13.7	2.4	2.8	-0.4	-3.1	18.3	3.1	2.8	0.4	3.1	30.9	6.6	2.8	3.9	30.3	37.1	8.0	2.8	5.2	40.7
140	12.9	2.2	2.8	-0.5	-4.4	17.3	3.0	2.8	0.2	1.8	29.2	6.3	2.8	3.5	29.5	35.0	7.5	2.8	4.8	40.0
150	12.3	2.1	2.8	-0.6	-5.8	16.4	2.8	2.8	0.1	0.5	27.6	5.9	2.8	3.2	28.6	33.1	7.1	2.8	4.4	39.3
160	11.7	2.0	2.8	-0.7	-7.2	15.6	2.7	2.8	-0.1	-0.7	26.2	5.6	2.8	2.9	27.7	31.5	6.8	2.8	4.0	38.5
170	11.1	1.9	2.8	-0.8	-8.6	14.8	2.5	2.8	-0.2	-2.1	25.0	5.4	2.8	2.6	26.7	30.0	6.4	2.8	3.7	37.7
180	10.6	1.8	2.8	-0.9	-10.0	14.2	2.4	2.8	-0.3	-3.4	23.9	5.1	2.8	2.4	25.7	28.7	6.2	2.8	3.4	36.8
190	10.2	1.7	2.8	-1.0	-11.4	13.6	2.3	2.8	-0.4	-4.7	22.9	4.9	2.8	2.2	24.7	27.5	5.9	2.8	3.2	35.9
200	9.8	1.7	2.8	-1.1	-12.8	13.0	2.2	2.8	-0.5	-6.1	22.0	4.7	2.8	2.0	23.7	26.4	5.7	2.8	2.9	35.0
Max =					**7.4**					**11.7**					**33.4**					**42.5**

Notes

1) Peak flow is equal to the product of 2.78 x C x I x A

2) Rainfall Intensity, $I = A/(Tc+C)^B$

3) Release Rate = Min (Release Rate, Peak Flow)

4) Storage Rate = Peak Flow - Release Rate

5) Storage = Duration x Storage Rate

6) Maximium Storage = Max Storage Over Duration

7) Parameters a,b,c are for City of Ottawa

City of Ottawa IDF Data (from SDG002)

IDF curve equations (Intensity in mm/hr)

100 year Intensity = 1735.688 / (Time in min + 6.014) $^{0.820}$

50 year Intensity = 1569.580 / (Time in min + 6.014) $^{0.820}$

25 year Intensity = 1402.884 / (Time in min + 6.018) $^{0.819}$

10 year Intensity = 1174.184 / (Time in min + 6.014) $^{0.816}$

5 year Intensity = 998.071 / (Time in min + 6.053) $^{0.814}$

2 year Intensity = 732.951 / (Time in min + 6.199) $^{0.810}$

Appendix B – Consultation / Correspondence

Email from City of Ottawa on Water System Boundary Conditions

Pre-Consul Meeting Notes to the File Lead - Simon Deiaco **May 5, 2020**
Re: 229 Beechwood Avenue

Engineering Comments

Infrastructure:

- A 254 mm dia. UCI Watermain (c. 19??) is available.
- A 300 mm dia. Conc. Sanitary Sewer (c. 1933) is available, which drains to Rideau River Trunk/Collector Sewer and onto the Interceptor Sewer.
- A 1200 dia. mm Conc. Storm Sewer (c. 1973) is available, which drains to the Vanier Storm on Jolliet Avenue and Outlets to the Ottawa River near Hillsdale Rd.

Note: New infrastructure was completed on Jolliet Avenue in 2015-2017, although not directly connected to Beechwood Avenue.

The following apply to this site and any development within a separated sewer area:

- Total (San & Stm) allowable release rate will be 2-year pre-development rate
- This site is on a **local road** and within a partially **separated sewer** area and infrastructure is dated.
- Coefficient (C) of runoff will need to be determined **as per existing conditions** but in no case more than 0.5
- TC = 20 minutes or can be calculated
  TC should be not be less than 10 minutes, since IDF curves become unrealistic at less than 10 min.
- Any storm events greater than 5 year, up to 100 year, and including 100-year storm event must be detained on site.
- Two separate sewer laterals (one for sanitary and other for storm) will be required.

Please note:

- Foundation drains are to be independently connected to sewermain (separated or combined) unless being pumped with appropriate back up power, sufficient sized pump and back flow prevention.

- Roof drains are to be connected downstream of any incorporated ICD within the SWM system.

- Boundary Conditions will be provided at request of consultant after providing Average Daily Demands, Peak Hour Demands & Max Day + Fire Flow Demands

- Existing buildings require a CCTV inspection and report to ensure existing services to be re-used are in good working order and meet current minimum size requirements. Located services to be placed on site servicing plans.



CCTV Scan Guideline.pdf

Other:

Environmental Noise Study is required due to site being on Beechwood Avenue.

Water Supply Redundancy – Fire Flow:

Applicant to ensure that a second service with an inline valve chamber be provided where the average daily demand exceeds 50 m^3 / day (0.5787 l/s per day)
FUS Fire Flow Criteria to be used unless a low-rise building, where OBC requirements may be applicable.

Source Protection Policy Screening (SPPS):

1. The addresses lie within the Mississippi-Rideau Source Protection Region and are subject to the policies of the Mississippi-Rideau Source Protection Plan.

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

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

4. The area is not within a Significant Groundwater Recharge Area.

5. The area is not within a Highly Vulnerable Aquifer.

- In terms of the Planning Act application, please note that the addresses are 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.

- Applicant to contact Rideau Valley Conservation Authority (RVCA) for possible restrictions due to quality control. Provide correspondence in Report.

- Where underground storage (UG) and surface ponding are being considered:
    - Show all ponding for 5- and 100-year events
    - Above and below ground storage is permitted although uses ½ Peak Flow Rate or is modeled. Please confirm that this has been accounted for and/or revise.

Rationale:

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 be used 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.

Note that the above will added to upcoming revised Sewer Design Guidelines to account for underground storage, which is now widely used.

Further to above, what will be the actual underground storage provided during the major (100 year) and minor (2 year) storm events?

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?

Note - 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.

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.

For proposed depressed driveways or developments with private lanes, parking areas or with entrances etc. lower than roadway.


S18.pdf


S18.1.pdf

Provided Info:
Please be advised that it is the responsibility of the applicant and their representatives/consultants to verify information provided by the City of Ottawa.
Please contact City View and Release Info Centre at Ext. 44455

Environmental Source Information:

City of Ottawa - Historical Land Use Inventory (HLUI) - Required

Rationale:
The HLUI database is currently undergoing an update. The updated HLUI will include additional sources beyond those included in the current database, making the inclusion of this record search even more important.
Although a municipal historic land use database is not specifically listed as required environmental record in O. Reg 153/04, Schedule D, Part II states the following:

The following are the specific objectives of a records review:

1. To obtain and review records that relate to the Phase I (One) property and to the current and past uses of and activities at or affecting the Phase I (One) property in order to determine if an area of potential environmental concern exists and to interpret any area of potential environmental concern.

2. To obtain and review records that relate to properties in the Phase I (One) study area other than the Phase I (One) property, in order to determine if an area of potential environmental concern exists and to interpret any area of potential environmental concern.

It is therefore reasonable to request that the HLUI search be included in the Phase I ESA to meet the above objectives.

Please submit.

- All existing reports and plans will need to be revised if older than 2 years and must reflect current City Standards, Guidelines, By-laws and Policies.

- Please refer to City of Ottawa website portal **for "Guide to preparing Studies and Plans"** at https://ottawa.ca/en/city-hall/planning-and-development/information-developers/development-application-review-process/development-application-submission/guide-preparing-studies-and-plans.

- Please ensure you are using the current guidelines, bylaws and standards including materials of construction, disinfection and all relevant reference to OPSS/D and AWWA guidelines - all current and as amended, such as:

- City of Ottawa Sewer Design Guidelines (**CoOSDG**) complete with ISTDB 2012-01, 2014-01, 2016-01, 2018-01 & 2019-02 technical bulletin updates as well as current Sewer, Landscape & Road Standard Detail Drawings as well as Material Specifications (MS Docs).
  Sewer Connection (2003-513) & Sewer Use (2003-514) By-Laws.

- City of Ottawa Water Distribution Design Guidelines (**CoOWDDG**) complete with ISTDB 2010-02, 2014-02 & 2018-02 technical bulletin updates as well as current Watermain/ Services Material Specifications (MS Docs) as well as Water and Road Standard Detail Drawings.
  FUS Fire Flow standards
  Water (2018-167) By-Law

- Ensure to include version date and add **"(as amended)"** when referencing all standards, detail drwaings, by-Laws and guidelines.

- Please contact me by e-mail shawn.wessel@ottawa.ca if you have any questions.

- Please also note that in the event soil and/or groundwater contamination is identified on this site and the proposal is for a more sensitive land use, the MECP will require approximately 1-1.5 years to review the RSC.

- PIED will apply appropriate conditions, based on Environmental Protection Act (Section 168.3.1 (1)) and O.Reg. 153/04 (Parts IV and V) regarding requirements for RSC prior to building permit issuance. Dependent on the levels/types of contamination, timelines for building permit issuance may be longer than expected and we recommend applicant speak to Building Code Services, at the earliest convenience, so as to discuss these timelines in more detail, if deemed applicable.

Pre-Application Consultation Meeting Notes

Property Address: 229 – 247 Beechwood Avenue
PC2020-0099
May 5, 2020 via teleconference

Attendees:

Simon Deiaco, city of Ottawa
Shawn Wessel, City of Ottawa
Christopher Moise, City of Ottawa
Neeti Paudel, City of Ottawa
Mackenzie Kimm, City of Ottawa
Jeremey Silburt, Smart Living Properties
Bod Woodman, Architect
Tino Tolot, Architect
Chris Greenshields, VCA
Lauren Touchant, VCA
Peter Lewis, Rockcliffe Park RA

Subject: 229-247 Beechwood Avenue

Meeting notes:

Opening & attendee introduction

- Introduction of meeting attendees
- **Overview of proposal: (Bob Woodman, Tino Tolot and Jeremy Silburt**)
  - The existing buildings would be removed. Proposing two new low-rise apartments, with no tenant parking. The building at 229 Beechwood would contain 48 units, with 55 units proposed for 241 Beechwood. There would be a mix of bachelor, one and two-bedroom units in each building.
  - The buildings are three storeys above grade and are proposed to be within the maximum height permitted (12.5m).
  - Property slopes to the north and is more significant to the east as shown in the difference in the grades to the proposed entrances. The building at 229 Beechwood has less slope to accommodate, therefore units can enter from grade.
  - Garbage sheds will be located in the rear within an enclosure. Bike parking would be accommodated at 241 Rideau for both buildings.
  - Considering new building features that will allow walls to be moved within the apartment.
  - Rooftop and rear yard amenity spaces are proposed for each building.

Preliminary comments and questions from staff and agencies, including follow-up actions:

- **Planning (Simon Deiaco)**

- Proposed application requires an application for Site Plan Control (complex) and potential variances.
- Site is fronting a long a Traditional Mainstreet (TM), and zoned R4M[1321] which permits the proposed use (low-rise apartment) with a maximum height of 12.5 metres. The site is located along area Y with respect to required parking.
- Exception 1321 outlines additional site specific zoning (see below).
- Visitor parking requirements have not been calculated or demonstrated.
- Due to the grade of the site a survey plan and proper calculation of height needs to be competed early in the design process.
- The property is within the Rockcliffe Park Heritage District and will require approvals under the *Ontario Heritage Act*.
- Site is designated as "Residential – Multiple Family" in the Rockcliffe Secondary Plan.
- Beechwood Avenue will be considered the frontage for both sites for the purpose of determining yards, Section 197, sub 5.
- Located within a design priority area, therefore the project will be subject to UDRP consultation and review.
- Bike parking is to be provided within each building as per the by-law requirements. Staff do not support the proposed arrangement of all bike parking in one building.

- **Urban Design (Christopher Moise)**
  - Staff recommend the proposal attend a visit with the City's UDRP to further discuss and evaluate various scenarios of development for the site. In preparation to that visit, we recommend that the following comments are considered and responded to:
    - Please indicate the material choices for the elevations. Note: Compatibility of materials in this neighbourhood is important and should be considered, especially on the street facing facades;
    - Have grade related units been considered to help integrate such a long street facade?
    - The streetscape should be designed to relate better with the scale and density of the proposal (ie. pedestrian access and mobility similar to nearby projects as across the street), and not a single entrance and front lawn which is more traditionally seen with single family detached dwellings;
    - Due to the sloping grades on the site staff question whether the westerly side yard might be increased to 2.5m (as on the easterly side yard) to respect the shift in heights from the neighbouring property and this one;
    - We also note that the requirement to further set-back the side-yard to 6m at 21m from the front lot line is being employed. This is one of the changes staff are contemplating removing from R4 zones and suggest that the aforementioned increase of the entire westerly side yard set-back to 2.5m will satisfy the intent of this requirement.

- **Engineering (Shawn Wessel)**
  - Please see separate attachment.

- **Transportation (Neeti Paudel)**
  - TIA will be required
  - MMLOS analysis will be required as part of the TIA.
  - Sidewalk needs to be upgraded along the frontage of the properties (2.0m concrete sidewalk).
  - Question: Will Carsdale be the access for waste collection? Yes, that is the plan (JS). Need a hammerhead to provide for vehicle turn around and show on a turning template.
  - Plrase show 23.0m right of way protection limits need to be shown along the site frontage.
  - Follow Traffic Impact Assessment Guidelines
    - Traffic Impact Assessment will be required.
    - Beechwood is a spine cycling route and triggers the location trigger on the TIA.
    - Applicant advised that their application will not be deemed complete until the submission of the draft step 1-4, including the functional draft RMA package (if applicable) and/or monitoring report (if applicable).
  - ROW protection on Beechwood between Marier and Joliet is 23m even. Ensure this is shown on the site plan.
  - Site triangles at the following locations on the final plan will be required:
    - Arterial Road to Local Road: 5 metre x 5 metres
  - Upgrade the sidewalk as per City standards. The existing is a substandard asphalt sidewalk.

  - A cul de sac in the form of hammerhead would be required on Carsdale Avenue for vehicle turnaround. Provide a turning template to show the largest vehicle making the turn.

  - The bus stop on the site frontage on Beechwood may have to be upgraded. OC Transpo will be reviewing this at site plan.

  - On site plan:
    - Show all details of the roads abutting the site up to and including the opposite curb; include such items as pavement markings, accesses and/or sidewalks.
    - Show lane/aisle widths.

- **Environmental (Simon Deiaco)**
  - A TCR will be required as part of the application. Early consideration into the management of trees should be considered. The team should clearly identify what trees are on public versus private property.

- **Parks (Simon Deiaco)**
  - Cash-in-lieu of parkland will be required as part of the approval.

- **Heritage (MacKenzie Kimm)**
  - The project requires a heritage permit for demolition and new construction. This will be a full permit through the Built Heritage Subcommittee, Planning Committee and City Council.
  - There is new fee as part of the process - $5,100 for new construction in the HCD. This will be required as part of the complete application.
  - Submission requirements will be forwarded following the heritage pre-consult meeting.
  - A new heritage consultation process is in place and will require a separate meeting with staff, the applicant and the RPRA Heritage Committee.
  - A Cultural Heritage Impact Statement (CHIS) will be required as part of the heritage and SPC submission. Please refer to the Guide to preparing cultural heritage impact statements available on the City's website.
  - Staff strongly recommend bringing a heritage consultant on board as early in the process as possible, in order provide guidance on the design in the context of the HCD.
  - Staff notes that this proposal would be a departure the existing built form and the current lot fabric. The existing buildings are Category 2 buildings (non-contributing), but the plan does encourage the retention of buildings. This will have to be justified in the CHIS. Measures to mitigate any negative impacts of the new buildings will also need to be included in the CHIS.
  - Staff will provide specific comments on the proposal as part of the separate pre-consultation pilot process. However, it is recommended that the applicant carefully review the Rockcliffe Park HCD plan policies and guidelines prior to the meeting.
  - Of particular note, the HCD plan includes specific direction regarding lot division/consolidation, landscaping (7.3.3 and 7.4.3) and the design of new construction, including:
    - Ensuring the retention of existing lots and general lot sizes in the HCD
    - The location of new buildings on lots;
    - Ensuring new construction contributes to, and does not detract from the HCD and its attributes, particularly the surrounding buildings within the streetscape;
    - Maintaining existing grades and the dominance of soft landscaping
  - Staff note that the design of any new construction on these lots will be critical to determining the appropriateness of the proposal, and whether it can meet the policies and guidelines of the Rockcliffe HCD Plan.
  - Additionally, the HCD plan provides guidelines for the conservation of the public realm, including the retention of the block and street pattern, road widths, and the informal nature of the road edges (no sidewalks). Further information would be required to determine if acquiring part of Carsdale would be appropriate within the HCD plan context.

- **Questions and comments from the Community Association representatives**

  Rockcliffe Park Residents Association (Peter Lewis)

  - Agrees with the comments of the Heritage Planner.
  - The fact that Rockcliffe Park is a Heritage Conservation Area comprised entirely of single-family units will be a major point of resistance to a multi family building - regardless of the zoning.
  - More generally, and this is not restricted to Rockcliffe, we as a larger community - including Lindenlea, Vanier, and New Edinburgh are very concerned by the proliferation of studio and one bedroom apartments in what are essentially family areas.
  - Location map needs to be revised. Noted by applicant.
  - Question to staff - Is there a maximum number of units within the existing R4 zoning. SD – not applicable in this zone, no dwelling unit cap.

  Vanier Community Association (Chris Greenshields)

  - Would this be a R4UU within the new zoning structure? Still some discussions if there is to be a cap.
  - Secondary Plan consistency? Is the project in line with density provisions?
  - SD – Density provisions/values were removed on this site as part of the Beechwood CDP (report ACS2006-PRG-POL-0037, August 2006 report).
  - As per the comments from the RPRA, the VCA encourage a range of units sizes to accommodate for families as well as single persons.
  - Rooftop amenity space, R4 study is looking to potentially remove this provision. If this was to move forward a redesign would be required.
  - Beechwood Ave Community Design Plan should be considered.

Other

- BW – There are many opportunities along Carsdale if ownership of this space could be considered.
- JS - Existing infrastructure in Carsdale. Would be interested in improving the at grade treatment of the street. This would be subject to discussions with the City.

Submission requirements and fees (please see attachments)

Next steps

- Encourage applicant to discuss the proposal with Councillor, community groups and neighbours.
- Additional consultation with Heritage staff will be required.
- Please contact UDRP staff for submission dates and cut-offs.

Alexander O'Beirn

From: Bruce Thomas
Sent: Friday, December 11, 2020 3:31 PM
To: Alexander O'Beirn
Cc: Jason Fitzpatrick
Subject: FW: Request for Boundary Conditions for 229, 241 Beechwood Avenue.

FYI

Bruce Thomas, P.Eng.
EXP | Senior Project Manager
t : +1.613.688.1899 | m : +1.613.852.8753 | e : bruce.thomas@exp.com

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From: Wessel, Shawn <shawn.wessel@ottawa.ca>
Sent: Friday, December 11, 2020 2:31 PM
To: Jason Fitzpatrick <jason.fitzpatrick@exp.com>
Cc: Bruce Thomas <bruce.thomas@exp.com>
Subject: RE: Request for Boundary Conditions for 229, 241 Beechwood Avenue.

exp. CAUTION: This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Please also add the following to the boundary conditions provided in the last email:

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

If you require additional information or clarification, please do not hesitate to contact me anytime.

Thank you

Regards,

Shawn Wessel, A.Sc.T.,rcji
Project Manager - Infrastructure Approvals
Gestionnaire de projet – Approbation des demandes d'infrastructures

Development Review Central Branch | Direction de l'examen des projets d'aménagement, Centrale
Planning, Infrastructure and Economic Development Department | Direction générale de la planification de l'infrastructure et du développement économique
City of Ottawa | Ville d'Ottawa

110 Laurier Ave. W. | 110, avenue Laurier Ouest, Ottawa ON K1P 1J1
(613) 580 2424 Ext. | Poste 33017
Int. Mail Code | Code de Courrier Interne 01-14
shawn.wessel@ottawa.ca

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*****Please also note that, while my work hours may be affected by the current situation and am working from home, I still have access to email, video conferencing and telephone. Feel free to schedule video conferences and/or telephone calls, as necessary.*****

From: Wessel, Shawn
Sent: December 11, 2020 9:21 AM
To: Jason Fitzpatrick <jason.fitzpatrick@exp.com>
Cc: Bruce Thomas <Bruce.Thomas@exp.com>
Subject: RE: Request for Boundary Conditions for 229, 241 Beechwood Avenue.

Good morning Jason.

Just received them.

Here you are, as requested:

The following are boundary conditions, HGL, for hydraulic analysis at 229-241 Beechwood (zone 1E) assumed both connections to be connected to the 254mm on Beechwood Avenue (see attached PDF for location).

Both Connections:

Minimum HGL = 107.8m

Maximum HGL = 118.2m

Connection A: MaxDay + Fire Flow (217 L/s) = 102.0m

Connection B: MaxDay + Fire Flow (250 L/s) = 100.2m

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.

If you require additional information or clarification, please do not hesitate to contact me anytime.

Thank you

Regards,

Shawn Wessel, A.Sc.T.,rcji
Project Manager - Infrastructure Approvals
Gestionnaire de projet – Approbation des demandes d'infrastructures

Development Review Central Branch | Direction de l'examen des projets d'aménagement, Centrale
Planning, Infrastructure and Economic Development Department | Direction générale de la planification de l'infrastructure et du développement économique
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From: Jason Fitzpatrick <jason.fitzpatrick@exp.com>
Sent: December 11, 2020 8:10 AM
To: Wessel, Shawn <shawn.wessel@ottawa.ca>
Cc: Bruce Thomas <Bruce.Thomas@exp.com>
Subject: RE: Request for Boundary Conditions for 229, 241 Beechwood Avenue.

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Hi Shawn,

Can you check with Water Resources on an estimated timeline for providing, as we were hoping to submit shortly.

Jason Fitzpatrick, P.Eng.
EXP | Project Engineer
t : +1.613.688.1899 | m : +1.613.302.7441 | e : jason.fitzpatrick@exp.com

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From: Wessel, Shawn <shawn.wessel@ottawa.ca>
Sent: Monday, December 7, 2020 11:24 AM
To: Jason Fitzpatrick <jason.fitzpatrick@exp.com>
Cc: Bruce Thomas <bruce.thomas@exp.com>
Subject: RE: Request for Boundary Conditions for 229, 241 Beechwood Avenue.

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Thank you Jason.

Sent to WDD for their comments.

If you require additional information or clarification, please do not hesitate to contact me anytime.

Thank you

Regards,

Shawn Wessel, A.Sc.T.,rcji
Project Manager - Infrastructure Approvals
Gestionnaire de projet – Approbation des demandes d'infrastructures

Development Review Central Branch | Direction de l'examen des projets d'aménagement, Centrale
Planning, Infrastructure and Economic Development Department | Direction générale de la planification de l'infrastructure et du développement économique
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shawn.wessel@ottawa.ca

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From: Jason Fitzpatrick <jason.fitzpatrick@exp.com>
Sent: December 07, 2020 11:12 AM
To: Wessel, Shawn <shawn.wessel@ottawa.ca>
Cc: Bruce Thomas <Bruce.Thomas@exp.com>
Subject: FW: Request for Boundary Conditions for 229, 241 Beechwood Avenue.

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Hi Shawn,

We are working with Smart Living Properties on a site plan application, and would appreciate if you could arrange for IAD to provide hydraulic boundary conditions that we will need for water system design.

I have attached a site location plan showing the approximate boundary condition locations. We'd appreciate two boundary condition locations, as there will be two separate connections to the water system. I have attached design tables indicating the water demands and fire flow requirements based on the FUS Method.

The following is a summary of the demands and fire flow requirements we have estimated based on the current proposal.

Avg Day Demand = 0.5 L/sec
Max Day Demand = 3.0 L/sec
Peak Hour Demand = 4.5 L/sec
Fire Flow Requirement = 217 L/sec (229 Beechwood)
= 250 L/sec (241 Beechwood)

If you have any questions, feel free to contact me.

Regards,

Jason Fitzpatrick, P.Eng.
EXP | Project Engineer
t : +1.613.688.1899 | m : +1.613.302.7441 | e : jason.fitzpatrick@exp.com
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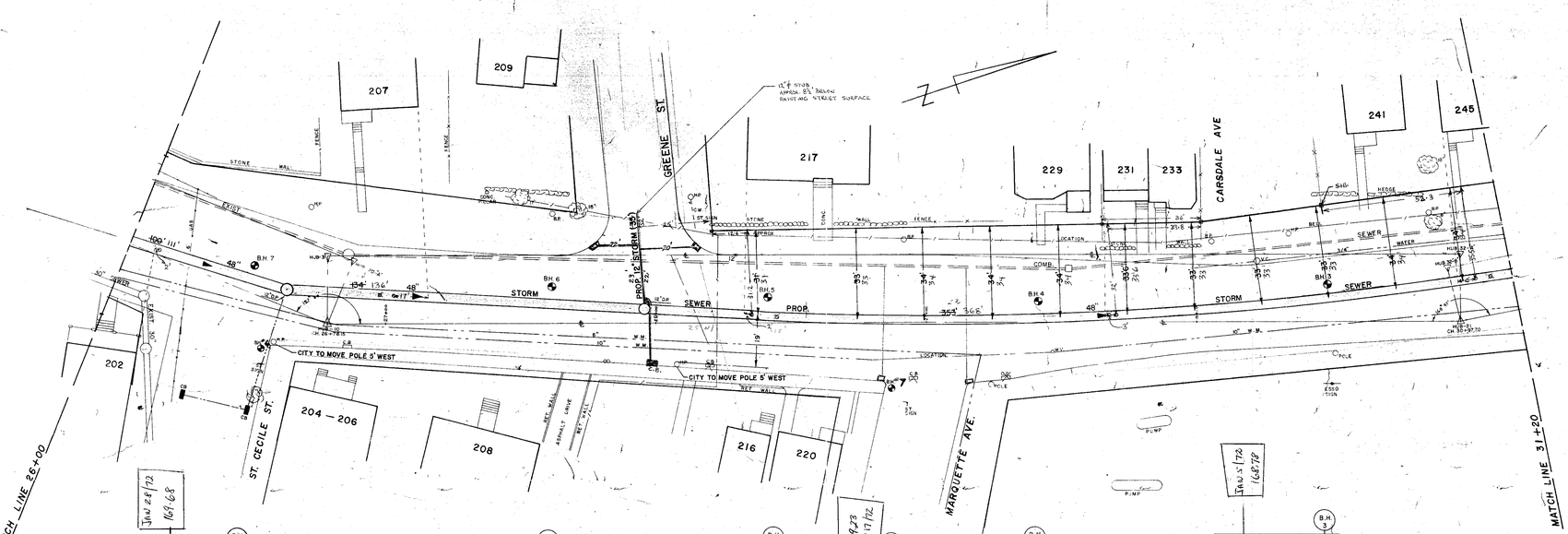
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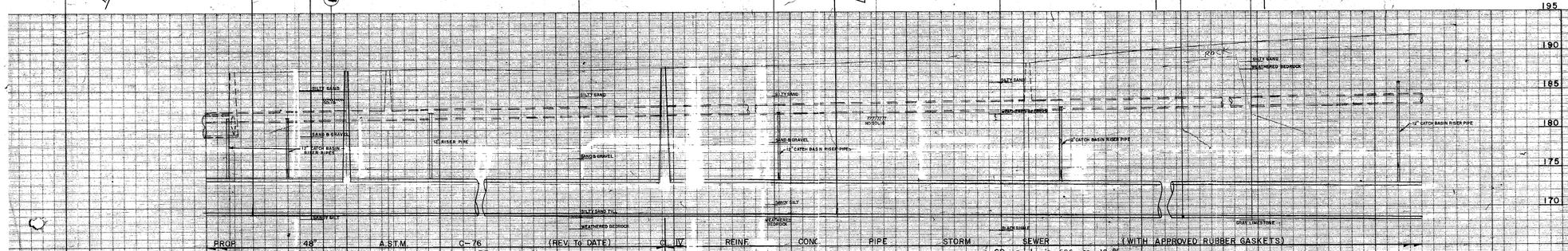
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Appendix C – Background Information

City of Ottawa Vault Drawings (Plan and Profiles)

BEECHWOOD AVENUE





ELEVATIONS	26+00	26+12	26+60	26+78	27+00	27+87	28+00	28+22	28+82	29+00	29+52	30+00	30+78	31+20
ROAD GRADE	197.68	197.68	197.68	197.68	197.68	197.36	197.36	196.22	195.82	195.42	195.12	194.72	194.18	193.78
SURFACE														
INVERT	169.48	169.48	169.48	169.48	169.48	169.36	169.36	168.22	167.82	167.42	167.12	166.72	166.18	165.78
STATIONS	26+00	26+12	26+60	26+78	27+00	27+87	28+00	28+22	28+82	29+00	29+52	30+00	30+78	31+20

NOTES
SEWER BR.

- AS - BUILT - DRAWINGS -

THIS SEWER WAS BUILT BY BENVER CONST.
UNDER CONTRACT No. 71-44 FOR 48" STORM SEWER
IN BEECHWOOD AVE.
FROM 26+60 TO 31+20

WORK START Nov 9/71	DESIGNER E STEWART
WORK COMP. MARCH 14/72	INSPECTOR J. WINKLE
FINAL MEAS. MARCH 14/72	ACCURACY CERTIFIED K. St-Germain INSTRUMENTMAN
FIELD BOOKS	APPROVED
DESIGN	
CONSTR. 3473	
FINAL MEAS. 3473	T.A.H. SURVEYS

UTILITY CHECK

DATE	UTILITY	REMARKS	CHECK BY
MAY/72/70	WATER	AS SHOWN	R.P.L.
"	GAS	NONE	"
"	BELL	"	"
"	HYDRO	"	"

NOTE:
UTILITIES SHOWN ARE TAKEN FROM BEST AVAILABLE RECORDS. CONTRACTOR IS REQUESTED TO CHECK WITH ALL UTILITY COMPANIES BEFORE DIGGING.

DATE	DESCRIPTION	DRAWN BY	APPD. BY
JAN/M.72	M.H. AT GREENE ST. RELOCATED, RISER PIPES RELOCATED		
DEC/14/71	6" & 10" WATER MAIN RELOCATED, PROP. 48" STORM SEWER RELOCATED	R.P.L.	

REVISIONS

DESIGNED BY: R.P.L. DATE: MAR 48 GRADE

S.A.N. SEWER

STORM SEWER

CITY OF OTTAWA
ENGINEERING DEPARTMENT
SEWER BRANCH

BEECHWOOD AVENUE
26+00 — 31+20

ENGINEER I/C OF SEWER BRANCH

ENGINEER I/C OF ROADS &c
T.H. DOBBIN, P.Eng.
CITY ENGINEER

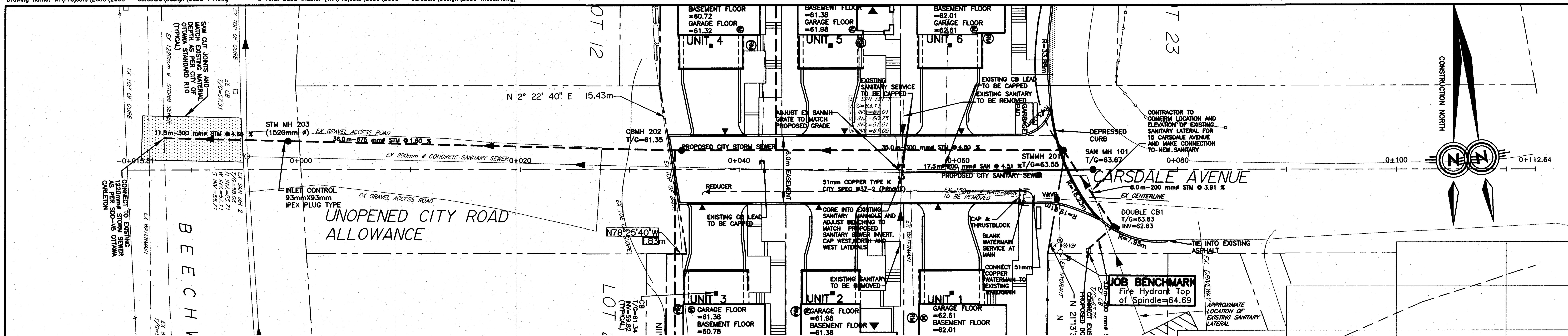
DRAWN BY R.P.L.	SCALE HOR. 1" = 20' VER. 1" = 6'
CHECKED BY	
DATE APRIL 17/70	PLAN No. D-37-d
SURVEY BK 3493	SHT. 6

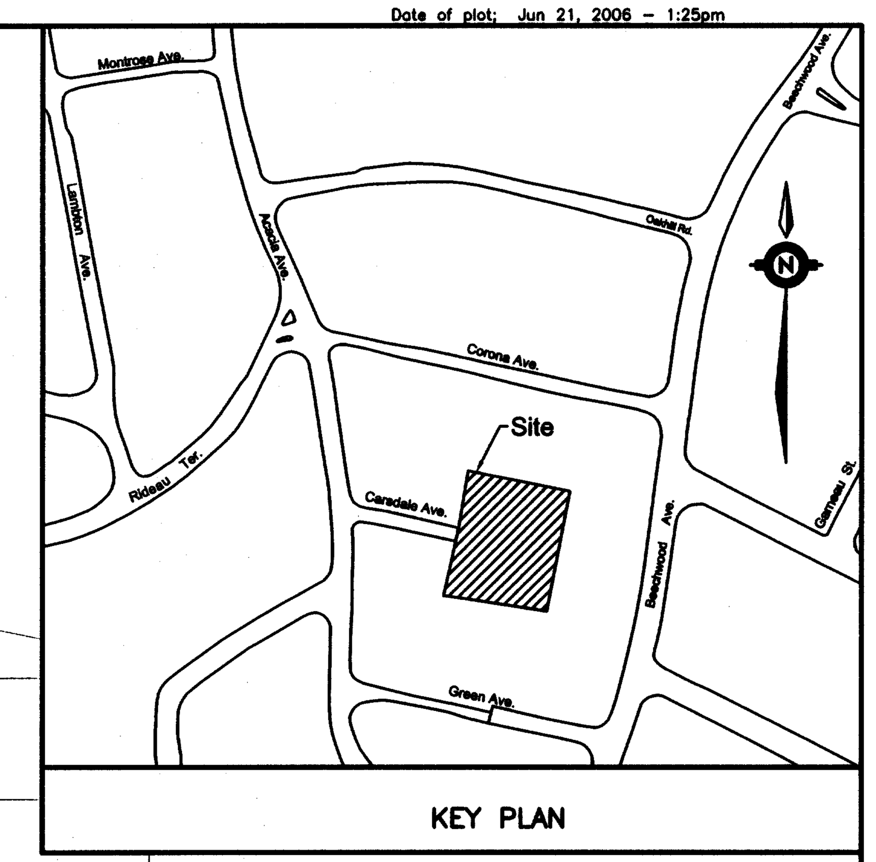
DRAWN FROM OLD PLAN C-33-A

1192

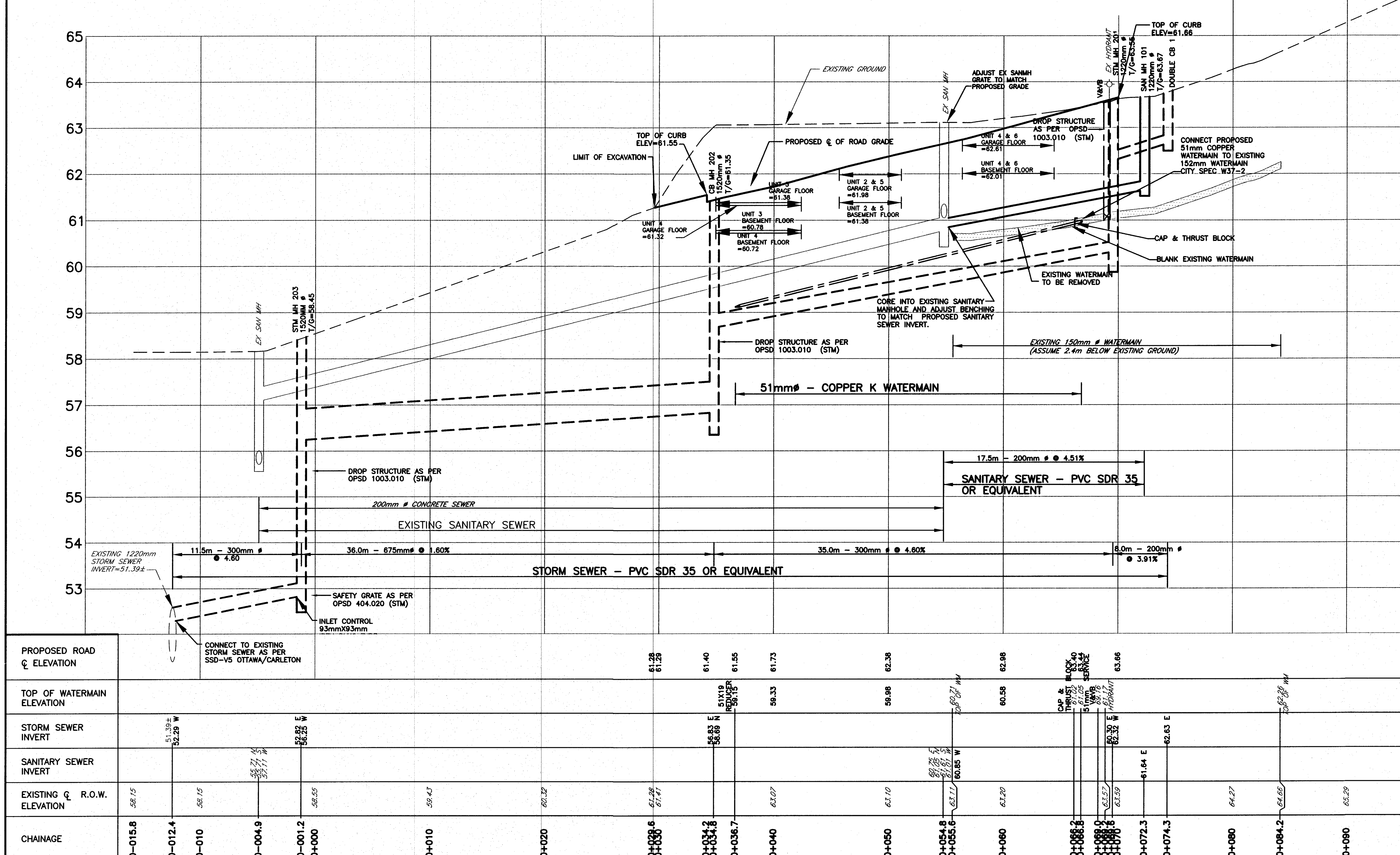
Drawing name; W:\Projects\2600\2630 – Carsdale\Design\2630-P1.dwg x-refs: 2630 master [W:\Projects\2600\2630 – Carsdale\Design\2630 master.dwg]

Date of plot; Jun 21, 2006 – 1:25pm





KEY PLAN



NOTES: WATERMAIN

1. ALL WATERMAIN WORK AND MATERIAL SHALL BE IN ACCORDANCE WITH CITY OF OTTAWA STANDARDS. NO WORK SHALL COMMENCE UNLESS A CITY WATER WORKS INSPECTOR IS ON SITE.
2. INSTALLATION OF WATER METER AND REMOTE RECEPTACLE SHALL BE IN ACCORDANCE WITH CITY OF OTTAWA STANDARDS.
3. ALL WATERMAIN AND WATERMAIN SERVICES TO BE INSTALLED AT MINIMUM COVER OF 2.4m.
4. WATERMAIN BEDDING IS TO BE AS PER CITY OF OTTAWA DETAIL W-17.
5. CATHODIC PROTECTION REQUIRED FOR ALL IRON FITTINGS PER CITY OF OTTAWA DETAILS W-40 AND W-42.
6. UNLESS OTHERWISE NOTED WATER SERVICE LATERALS TO BUILDING SHALL BE 19mm ø C/W STAND.
7. CONNECTIONS TO EXISTING WATERMAIN SHALL BE BY CITY FORCES. EXCAVATION, BEDDING, BACKFILLING AND REINSTATEMENT BY CONTRACTOR.

NOTES: GENERAL

1. CONTRACTOR IS RESPONSIBLE FOR ALL LAYOUT FOR CONSTRUCTION PURPOSES.
2. ALL ELEVATIONS ARE GEODETIC AND UTILIZE METRIC UNITS.
3. STRIP AND REMOVE ALL TOPSOIL FROM IMPROVED AREAS.
4. COORDINATE AND SCHEDULE ALL WORK WITH OTHER TRADES AND CONTRACTORS.
5. ALL EDGES OF DISTURBED PAVEMENT SHALL BE SAW CUT TO FORM A NEAT AND STRAIGHT LINE PRIOR TO PLACING NEW PAVEMENT.
6. CONTRACTOR IS TO COMPLY WITH THE CITY OF OTTAWA REQUIREMENTS FOR TRAFFIC CONTROL WHEN WORKING NEAR CARSDALE AVENUE AND BEECHWOOD AVENUE.
7. RESTORE PAVEMENT STRUCTURE AND SURFACES ON EXISTING ROADS TO A CONDITION AT LEAST EQUAL TO ORIGINAL AND TO THE SATISFACTION OF THE MUNICIPAL AUTHORITIES.
8. REFER TO SITE PLAN BY ARCHIECT FOR BUILDING DIMENSIONS AND SITE LAYOUT. DIMENSIONS AND LAYOUT INFORMATION SHALL BE CONFIRMED PRIOR TO COMMENCEMENT OF CONSTRUCTION.
9. DESIGN ELEVATIONS AS GIVEN ON THIS PLAN ARE TO BE ADHERED TO WITH NO CHANGES WITHOUT PRIOR WRITTEN APPROVAL BY THIS ENGINEER.
10. THE CONTRACTOR SHALL COORDINATE AND PAY FOR ALL CONSTRUCTION RELATED PERMITS, FEES, INSPECTIONS AND APPROVALS REQUIRED BY THE CITY OF OTTAWA.
11. CONTRACTOR TO VERIFY LOCATION AND DEPTH OF ALL UTILITIES PRIOR TO BEGINNING ANY SITE WORK.
12. CORE INTO EXISTING SANITARY MANHOLE AND ADJUST BENCHING TO MATCH PROPOSED SANITARY SEWER INVERT.
13. ALL SANITARY BUILDING SERVICES ARE TO BE 135mmø PVC @ 1.0% (MIN) UNLESS OTHERWISE NOTED.
14. ALL STORM BUILDING SERVICES ARE TO BE 100mmø PVC @ 1.0% (MIN) UNLESS OTHERWISE NOTED.
15. SERVICES TO BE INSTALLED TO WITHIN 1.0m OF THE FOUNDATION WALL AND CAPPED.
16. LOWER OR RAISE EXISTING WATERMAIN TO AVOID CONFLICT IF NECESSARY.
17. ADJUST EXISTING IRON WORK AS REQUIRED TO SUIT NEW GRADING.
18. INSULATE ANY SEWER WITH LESS THAN 1.5m OF COVER WITH 50mm OF HIGH DENSITY THERMAL INSULATION 1.0m WIDE.
19. THE CONTRACTOR SHALL CONFIRM LOCATIONS AND ELEVATIONS OF EXISTING SERVICES AND STRUCTURES TO BE CONNECTED TO AND EXISTING SERVICES THAT MAY BE DAMAGED OR CAUSE CONFLICTS PRIOR TO CONSTRUCTION OF ANY NEW SEWER, WATER AND/OR STORM WATER WORKS. THE ENGINEER SHALL BE INFORMED IMMEDIATELY OF ANY ERRORS, DISCREPANCIES, CONFLICTS, OMISSIONS etc THAT ARE FOUND.
20. BLANK EXISTING BUILDING SEWER SERVICES AND WATER SERVICE AT MAIN
21. ALL MATERIALS AND CONSTRUCTION METHODS TO BE IN ACCORDANCE WITH CITY OF OTTAWA AND ONTARIO PROVINCIAL STANDARDS. ONTARIO PROVINCIAL STANDARDS WILL APPLY WHERE NO CITY STANDARDS ARE AVIABLE.
22. THE CONTRACTOR SHALL PROVIDE A CCTV INSPECTION THE EXISTING AND NEW SANITARY SEWER AND THE STORM SEWER AFTER THE WORK HAVE BEEN INSTALLED.

APPROVED ☑ REFUSED ☐
GRANT K. LINDSAY
Manager
Development Approvals
DATE July 04, 2006

LEGEND

63.99	PROPOSED GRADE
X 63.93	EXISTING GRADE
	EXISTING STORM SEWER
	EXISTING SANITARY SEWER
O/H	EXISTING OVERHEAD HYDRO WIRES
	PROPERTY BOUNDARY (APPROXIMATE)
	EXISTING FIRE HYDRANT
	EXISTING WATERMAIN
	EXISTING FENCE
GAS	EXISTING GASMAIN
⊗	EXISTING VALVE AND VALVE BOX
□	EXISTING CATCH BASIN
○	EXISTING HYDRO POLE
◉	EXISTING WELL
○	EXISTING STORM MANHOLE
	EXISTING TREE
	PROPOSED WATERMAIN
	PROPOSED SANITARY SEWER
	PROPOSED STORM SEWER
■	PROPOSED CATCHBASIN 600mm x 600mm
●	PROPOSED STORM MANHOLE
●	PROPOSED SANITARY MANHOLE 1200mmø
	PROPOSED WATER VALVE
▲	PROPOSED SERVICE LATERAL LOCATION SINGLE SERVICE 135mm SANITARY 200mm STORM 19mm WATERMAIN

Reviewed by
Infrastructure Approvals Division
Signed:
Date: 2006/06/26
14061

D07-12-06-0036

NOTE
THE POSITION OF ALL POLE LINES, CONDUITS, WATERMAINS, SEWERS AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, DETERMINE THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND ASSUME ALL LIABILITY FOR DAMAGE TO THEM.

Ottawa

ADDRESS:
25 CARSDALE AVENUE
OTTAWA, ONTARIO

uniform
URBAN DEVELOPMENTS

No.	REVISION	DATE	BY
6.	ISSUED FOR TENDER	JUNE 21/06	UB
5.	REVISED PER CITY COMMENTS	JUNE 16/06	UB
4.	REVISED PER CITY COMMENTS	JUNE 9/06	UB
3.	REVISED PER CITY COMMENTS	MAY 30/06	UB
2.	REVISED PER CITY COMMENTS	MAY 1/06	UB
1.	ISSUED FOR REVIEWN	JAN 11/06	UB

LICENSED PROFESSIONAL ENGINEER
UDO BOEHME
PROVINCE OF ONTARIO

DME Ltd.
David McManus Engineering Ltd.
400 – 30 Camelot Drive
Nepean Ontario, K2G 5X8
E-mail: mcmanus@dmel.on.ca
Ph. 225-1929 Fax 225-7330

BASEPLAN	DME
DESIGN	UB
CHECKED	UB
CAD	JX
PROJ. MGR.	UB
APPROVED	UB

SCALE
HORZ 1:200
VERT 1:50
0 2 4 6 8

CARSDALE COURT IN ROCKCLIFFE

CITY OF OTTAWA

PLAN AND PROFILE
CARSDALE AVENUE
STA. 0–015.8 to 0+112.6

PROJECT No.	2630
SURVEY BY	D.M.E.
DATE	JANUARY 2006
DRAWING No.	2630–P1

Appendix D – Drawings

C001 - NOTES AND LEGENG SHEET

C100 - SITE SERVICING PLAN

C200 - SITE GRADING PLAN

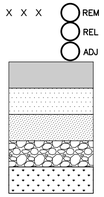
C300 - EROSION AND SEDIMENT CONTROL PLAN

C400 - STORM DRAINAGE PLAN

DESCRIPTION	EXISTING	PROPOSED
SITE FEATURES		
PROPERTY LINE		
TOP OF SLOPE		
TERRACING (3:1 TYPICAL)		
℄ DITCH/SWALE AND DIRECTION OF FLOW		
EDGE OF SHOULDER		
EDGE OF PAVEMENT		
℄ ROAD/ALIGNMENT		
CHAINLINK FENCE	X X	X X
POST AND RAIL FENCE	o o o o o	o o o o o
SIDEWALK (TYPE AS NOTED ON DRAWINGS)		
BARRIER CURB (SC1.1)		
MOUNTABLE CURB (SC1.3)		
DEPRESSED CURB	DC	DC
TACTILE WALKING SURFACE INDICATOR "TWSI" (SC7.3)		
GUARDRAIL		
JERSEY BARRIERS		
BUILDING ENTRY/EXIT WITH RISERS	xR	xR
BUILDING ENTRY/EXIT BARRIER FREE	BF	BF
BUILDING ENTRY/EXIT OVERHEAD DOOR		
POST	POST	POST
SIGN	SIGN	SIGN
BOLLARD	BOLL	BOLL
VEGETATION		
UTILITY AND STRUCTURES		
HYDRO (OVERHEAD)	OH	OH
HYDRO	H	H
POWER	P P	P P
ELECTRICAL	E	E
BELL (OVERHEAD)	OB	OB
BELL	B	B
CABLE (OVERHEAD)	OC	OC
CABLE TV	C	C
FIBRE OPTIC	FO	FO
STREETLIGHT	SL SL	SL SL
GASMAIN	G G	G G
JOINT USE TRENCH – BELL/CABLE TV	BC	BC
JOINT USE TRENCH – HYDRO/BELL/CABLE TV	HBC	HBC
JOINT USE TRENCH – HYDRO/BELL/CABLE TV/GAS	HBCG	HBCG
JOINT USE TRENCH – BELL/CABLE TV/GAS	BCG	BCG
DUCT CROSSING WITH NUMBER AND TYPE OF DUCTS	2H,2C,2B	2H,2C,2B
STREETLIGHT	LS	LS
STREETLIGHT DISCONNECT	SD	SD
HYDRO TRANSFORMER		
HYDRO SWITCHING KIOSK		
HYDRO MANHOLE	H	H
HYDRO METER		
UTILITY POLE AND GUY WIRE	UP	UP
CABLE PEDESTAL	C	C
BELL PEDESTAL	B	B
BELL MANHOLE	B	B
BELL GROUND LEVEL BOX	GLB	GLB
ENDWALL		
COMMUNITY MAILBOX	CMB	CMB
GAS VALVE	GV	GV
GAS METER		
TRAFFIC MANHOLE	TMH	TMH
TRAFFIC HAND HOLE	HH	HH
TRAFFIC JOINT USE POLE	JUP	JUP
TRAFFIC MAST ARM	MAF	MAF
TRAFFIC CONDUIT	T T	T T

DESCRIPTION	EXISTING	PROPOSED
SERVICES AND STRUCTURES		
SANITARY SEWER	SA EX.250mmø SAN ST	250mmø SAN
COMBINATION SEWER	EX.300mmø COMB	300mmø COMB
STORM SEWER	SA EX.375mmø STM ST	375mmø STM
STORM SUBDRAIN	EX.150mmø SUBDRAIN	150mmø SUBDRAIN
STORM CULVERT	EX.600mmø CULVERT	600mmø CULVERT
SANITARY MANHOLE	EX.SAN	SANMH 100
COMBINATION MANHOLE	EX.COMB	COMBMH 100
STORM MANHOLE	EX.STM	STMMH 200
CATCHBASIN MANHOLE	EX.CBMH	CBMH 100
CATCHBASIN	EX.CB	CB1
DOUBLE CATCHBASIN	EX.DCB	DCB1
CATCHBASIN ELBOW (S30)	EX.CBE	CBE
CATCHBASIN TEE (S31)	EX.CBT	CBT
CURB INLET CATCHBASIN	EX.CICB	CICB 1
DITCH INLET CATCHBASIN	EX.DICB	DICB 1
WATERMAIN	200mmø WATERMAIN	200mmø WATERMAIN
IRRIGATION	IR IR	IR IR
VALVE AND VALVE BOX	V&VB	V&VB
VALVE AND VALVE CHAMBER	V&VC	V&VC
FIRE HYDRANT	FH	FH
SIAMESE CONNECTION	SC	SC
WATER METER	M	M
REMOTE WATER METER	RM	RM
45° BEND	45°	45°
22.5° BEND	22°	22°
11.25° BEND	11°	11°
TEE	200X150 TEE	200X150 TEE
REDUCER	200X100 RED	200X100 RED
CROSS	300X200 CROSS	300X200 CROSS
CURB STOP	CS	CS
WATER WELL		
GRADING		
GROUND ELEVATION	X 100.00	X 100.00
SWALE ELEVATION	X 100.00(S)	X 100.00(S)
TOP OF GRATE ELEVATION	T/G=100.00	T/G=100.00
TOP OF WALL ELEVATION	X 100.00 T/W	X 100.00 T/W
BOTTOM OF WALL ELEVATION	X 100.00 B/W	X 100.00 B/W
FINISHED FLOOR ELEVATION	FF=100.00	FF=100.00
TOP OF FOUNDATION ELEVATION	TF=100.00	TF=100.00
BASEMENT FLOOR ELEVATION	BF=100.00	BF=100.00
PARKING LEVEL ELEVATION	P1=100.00	P1=100.00
UNDERSIDE OF FOOTING ELEVATION	USF=100.00	USF=100.00
ORIGINAL GROUND ELEVATION	OG=100.00	OG=100.00
TOP OF ROCK ELEVATION	T/ROCK=100.00	T/ROCK=100.00
CONTOUR LINES	100.00	100.00
SLOPE AND DIRECTION OF FLOW	2.0%	2.0%
OVERLAND FLOW ROUTE ONSITE		
OVERLAND FLOW ROUTE EXTERNAL		
STORMWATER MANAGEMENT		
STORM DRAINAGE AREA BOUNDARY		
STORM DRAINAGE AREA NUMBER STORM DRAINAGE AREA IN HECTARES RUN-OFF COEFFICENT	1 0.06 0.75	1 0.06 0.75
5 YEAR PONDING AREA	5 YR	5 YR
100 YEAR PONDING AREA	100 YR	100 YR
GEOTECHNICAL		
BOREHOLE	BH	BH
TEST PIT	TP	TP
COREHOLE	CH	CH
PIEZOMETER	PIZ	PIZ
MONITORING WELL	MW	MW

DESCRIPTION	EXISTING	PROPOSED
MISCELLANEOUS		
REMOVED	X X X	REM
RELOCATED		REL
ADJUSTED		ADJ
LIGHT DUTY PAVEMENT REFER TO NOTES FOR COMPOSITION		
HEAVY DUTY PAVEMENT REFER TO NOTES FOR COMPOSITION		
ROAD REINSTATEMENT AS PER CITY STANDARD R10		
RIP-RAP AS PER OPSD 810.010		
LANDSCAPE REINSTATEMENT		



GENERAL NOTES

1. ALL WORKS AND MATERIALS SHALL CONFORM TO THE LATEST REVISIONS OF THE STANDARDS AND SPECIFICATIONS OF THE CITY OF OTTAWA, ONTARIO PROVINCIAL STANDARD DRAWINGS (OPSD) AND SPECIFICATIONS (OPSS), WHERE APPLICABLE.
2. THE LOCATION OF UTILITIES IS APPROXIMATE ONLY, AND THE EXACT LOCATION SHOULD BE DETERMINED BY CONSULTING THE MUNICIPAL AUTHORITIES AND UTILITY COMPANIES CONCERNED. THE CONTRACTOR IS RESPONSIBLE TO PROVIDE THE LOCATION AND STATUS OF UTILITIES AND SHALL BE RESPONSIBLE FOR ADEQUATE PROTECTION OF PLANT AND EQUIPMENT FROM DAMAGE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR REPAIR OR REPLACEMENT OF ANY SERVICES OR UTILITIES DISTURBED DURING CONSTRUCTION, TO THE SATISFACTION OF THE AUTHORITY HAVING JURISDICTION.
3. THE CONTRACTOR SHALL VERIFY THE LOCATION AND ELEVATION OF EXISTING SERVICES PRIOR TO ANY CONSTRUCTION. THE CONTRACTOR SHALL CONFIRM LOCATIONS AND ELEVATIONS OF EXISTING SERVICES AND STRUCTURES TO BE CONNECTED TO AND EXISTING SERVICES THAT MAY BE DAMAGED OR CAUSE CONFLICTS PRIOR TO CONSTRUCTION OF ANY NEW SEWER, WATER AND/OR STORM WATER WORKS. ALL DIMENSIONS SHALL BE CHECKED AND VERIFIED IN THE FIELD BY THE CONTRACTOR PRIOR TO THE START OF CONSTRUCTION. ANY DISCREPANCIES, INTERPRETATIONS, CHANGES AND ADDITIONS TO THESE DRAWINGS MUST BE BROUGHT TO THE ATTENTION OF THE ENGINEER, WHEN NOTED AND BEFORE PROCEEDING WITH CONSTRUCTION WORKS. DO NOT CONTINUE CONSTRUCTION IN AREAS WHERE DISCREPANCIES APPEAR UNTIL SUCH DISCREPANCIES HAVE BEEN RESOLVED.
4. ALL ELEVATIONS ARE GEODETIC AND UTILIZE METRIC UNITS. ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE SPECIFIED. ALL DRAWINGS SHOULD NOT BE SCALED BY THE CONTRACTOR. ANY MISSING OR QUESTIONABLE DIMENSIONS ARE TO BE CONFIRMED WITH THE ENGINEER IN WRITING.
5. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL PERMITS REQUIRED AND BEAR COST OF THE SAME.
6. ALL WORK SHALL BE COMPLETED IN ACCORDANCE WITH THE "OCCUPATIONAL HEALTH AND SAFETY ACT AND REGULATIONS FOR CONSTRUCTION PROJECTS", THE GENERAL CONTRACTOR SHALL BE DEEMED TO BE THE CONSTRUCTOR AS DEFINED IN THE ACT.
7. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL EXCAVATION, BACKFILL AND REINSTATEMENT OF ALL AREAS DISTURBED DURING CONSTRUCTION TO THE SATISFACTION OF THE ENGINEER, THE CITY OF OTTAWA AND THE AUTHORITY HAVING JURISDICTION.
8. ANY AREAS BEYOND THE LIMIT OF THE SITE DISTURBED DURING CONSTRUCTION SHALL BE RESTORED TO ORIGINAL CONDITION OR BETTER TO THE SATISFACTION OF THE AUTHORITY HAVING JURISDICTION AT THE CONTRACTOR'S EXPENSE.
9. THE CONTRACTOR SHALL COMPLY WITH THE CITY OF OTTAWA REQUIREMENTS FOR TRAFFIC CONTROL WHEN WORKING ON CITY STREETS. ALL CONSTRUCTION SIGNAGE MUST CONFORM TO THE M.T.O. MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES (LATEST AMENDMENT).
10. THE SUPPORT OF ALL UTILITIES SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF THE AUTHORITY HAVING JURISDICTION.
11. THERE WILL BE NO SUBSTITUTION OF MATERIALS UNLESS WRITTEN APPROVAL BY THE ENGINEER HAS BEEN OBTAINED.
12. EXCESS EXCAVATED MATERIAL SHALL BE REMOVED FROM THE SITE.
13. THE SITE LAYOUT IS THE RESPONSIBILITY OF THE CONTRACTOR. AS-BUILT SITE SERVICING & GRADING DRAWINGS SHALL BE MAINTAINED ON SITE BY THE CONTRACTOR.
14. ALL EDGES OF DISTURBED PAVEMENT SHALL BE SAW CUT TO FORM A NEAT AND STRAIGHT LINE PRIOR TO PLACING NEW PAVEMENT.
15. FOR GEOTECHNICAL INFORMATION REFER TO GEOTECHNICAL INVESTIGATION REPORT PREPARED BY EXP SERVICES INC DATED AUGUST 9, 2017, PROJECT NO. OTT-00238207-A0
16. THE CONTRACTOR SHALL APPRAISE HIS/HER SELF OF ALL SURFACE AND SUBSURFACE CONDITIONS TO BE ENCOUNTERED AND SHALL CARRY OUT THEIR OWN TEST PITS AS REQUIRED TO MAKE THEIR OWN INDEPENDENT ASSESSMENT OF GROUND CONDITIONS. THE CONTRACTOR SHALL NOT MAKE ANY CLAIM FOR ANY EXTRA COST DUE TO ANY SUCH GROUND CONDITIONS VARYING FROM THOSE ANTICIPATED BY THE CONTRACTOR.
17. DO NOT CONSTRUCT USING DRAWINGS THAT ARE NOT MARKED "ISSUED FOR CONSTRUCTION".
18. FOR TOPOGRAPHICAL INFORMATION REFER TO PLAN PREPARED BY ANIS, O'SULLIVAN, VOLLEBEKK SURVEYING LTD. DATED JUNE 16, 2017.
19. CIVIL DRAWINGS TO BE READ IN CONJUNCTION WITH ARCHITECTURAL, MECHANICAL, ELECTRICAL, STRUCTURAL, LANDSCAPE AND LEGAL DRAWINGS.

SANITARY SEWER NOTES:

1. ALL SANITARY SEWER MATERIALS AND INSTALLATION SHALL CONFORM TO THE LATEST REVISIONS OF THE STANDARDS AND SPECIFICATIONS OF THE CITY OF OTTAWA, ONTARIO PROVINCIAL STANDARD DRAWINGS (OPSD) AND SPECIFICATIONS (OPSS).
2. ALL SANITARY SEWERS SHALL BE PVC SDR 35, IPEX "RING-TITE" (OR EQUIVALENT), AS PER CSA STANDARD 8182.2 OR LATEST AMENDMENT, UNLESS OTHERWISE NOTED.
3. SANITARY SEWER TRENCH AND BEDDING SHALL BE AS PER CITY OF OTTAWA STD. S6 AND S7, CLASS 'B BEDDING UNLESS OTHERWISE NOTED.
4. THE CONTRACTOR SHALL CONDUCT CCTV INSPECTION OF ALL NEWLY INSTALLED SANITARY SEWERS AND EXISTING SEWERS CONNECTED TO. THE TEST SHALL BE PERFORMED IMMEDIATELY AFTER SEWERS INSTALLED.
5. THE CONTRACTOR SHALL CONSTRUCT FLEXIBLE SANITARY SEWERS IN ACCORDANCE WITH OPSD 802.010 AND 802.013. DURING CONSTRUCTION, THE CONTRACTOR SHALL PROTECT THE PIPES FROM HEAVY CONSTRUCTION EQUIPMENT. BEDDING AND BACKFILL SHALL BE COMPACTED TO A MINIMUM OF 95% SPMDD.
6. ALL ABANDONED EXISTING SEWERS TO BE CAPPED AT THE PROPERTY LINE TO THE SATISFACTION OF THE CITY OF OTTAWA'S SEWER OPERATIONS.
7. ALL SANITARY BUILDING CONNECTIONS TO BE EQUIPPED WITH A SANITARY BACKWATER VALVE. REFER TO MECHANICAL DRAWINGS.
8. WITHIN THE FROST ZONE, THE BACKFILL IN THE SERVICE TRENCHES SHOULD MATCH THE SOIL ON SIDES TO MINIMIZE DIFFERENTIAL FROST HEAVING IN THE SUBGRADE.

STORM SEWER NOTES:

1. ALL STORM SEWER MATERIALS AND INSTALLATION SHALL CONFORM TO THE LATEST REVISIONS OF THE STANDARDS AND SPECIFICATIONS OF THE CITY OF OTTAWA, ONTARIO PROVINCIAL STANDARD DRAWINGS (OPSD) AND SPECIFICATIONS (OPSS).
2. ALL PVC STORM SEWERS ARE TO BE SDR 35 APPROVED PER C.S.A. B182.2 OR LATEST AMENDMENT, UNLESS OTHERWISE SPECIFIED.
3. THE CONTRACTOR SHALL CONSTRUCT FLEXIBLE STORM SEWERS IN ACCORDANCE WITH OPSD 802.010 AND 802.013. DURING CONSTRUCTION THE CONTRACTOR SHALL PROTECT THE PIPES FROM HEAVY CONSTRUCTION EQUIPMENT. BEDDING AND BACKFILL SHALL BE COMPACTED TO A MINIMUM OF 95% SPMDD.
4. SEWER BEDDING AS PER CITY STANDARD S6 & S7.
5. ALL ABANDONED EXISTING SEWERS TO BE CAPPED AT THE PROPERTY LINE TO THE SATISFACTION OF THE CITY OF OTTAWA'S SEWER OPERATIONS.
6. WITHIN THE FROST ZONE, THE BACKFILL IN THE SERVICE TRENCHES SHOULD MATCH THE SOIL ON SIDES TO MINIMIZE DIFFERENTIAL FROST HEAVING IN THE SUBGRADE.
7. ALL STORM SERVICES TO BE EQUIPPED WITH APPROVED BACKWATER VALVES. REFER TO MECHANICAL DRAWINGS.
8. THE CONTRACTOR SHALL CONDUCT CCTV INSPECTION OF ALL NEWLY INSTALLED STORM SEWERS AND EXISTING SEWERS CONNECTED TO. THE TEST SHALL BE PERFORMED IMMEDIATELY AFTER SEWERS INSTALLED.

WATERMAIN NOTES:

1. ALL WATERMAIN MATERIALS AND INSTALLATION SHALL CONFORM TO THE LATEST REVISIONS OF THE STANDARDS AND SPECIFICATIONS OF THE CITY OF OTTAWA, ONTARIO PROVICIAL STANDARD DRAWINGS (OPSD) AND SPECIFICATIONS (OPSS).
2. NO WORK SHALL COMMENCE UNLESS A CITY WATER WORKS INSPECTOR IS ON SITE. WATERMAIN CONNECTIONS BY CITY OF OTTAWA FORCES WITH ALL EXCAVATION BACKFILL AND ROAD REINSTATEMENT BY CONTRACTOR.
3. WATERMAINS TRENCH AND BEDDING SHALL BE IN ACCORDANCE WITH CITY OF OTTAWA STANDARD W17, UNLESS OTHERWISE SPECIFIED. BEDDING AND COVER MATERIAL SHALL BE SPECIFIED BY PROJECT GEOTECHNICAL ENGINEER.
4. CATHODIC PROTECTION IS REQUIRED ON ALL METALLIC FITTINGS AS PER CITY OF OTTAWA STD. W40. ALL ANODES SHALL BE A Z-24-48 AS PER CITY OF OTTAWA STD. W44.
5. ALL WATERMAINS TO BE INSTALLED AT MINIMUM COVER OF 2.4m.
6. IF WATERMAIN MUST BE DEFLECTED TO MEET ALIGNMENT, ENSURE THAT THE AMOUNT OF DEFLECTION USED IS LESS THAN HALF THAT RECOMMENDED BY THE MANUFACTURER.
7. DISINFECTION AND TESTING OF WATERMAIN TO BE IN ACCORDANCE WITH CITY OF OTTAWA STANDARDS.
8. WATER METER TO BE INSTALLED AS PER W32.
9. INSULATION FOR WATERMAIN CROSSING OVER AND BELOW SEWER SHALL BE IN ACCORDANCE WITH CITY OF OTTAWA STD. W25.2 AND W25, RESPECTIVELY, WHERE WATERMAN COVER IS LESS THAN 2.4m.

ROAD NOTES:

1. PAVEMENT REINSTATEMENT FOR SERVICE AND UTILITY CUTS SHALL BE IN ACCORDANCE WITH CITY OF OTTAWA STD. R10 AND OPSD 509.010, OPSS 310.
2. GRANULAR "A" SHALL BE PLACED TO A MINIMUM THICKNESS OF 300mm AROUND ALL STRUCTURES WITHIN PAVEMENT AREA.
3. ALL GRANULAR FOR ROADS SHALL BE COMPACTED TO A MINIMUM OF 95% STANDARD PROCTOR MAXIMUM DRY DENSITY.
4. PAVEMENT STRUCTURE:
   PARKING AREAS:
   - 65mm HL-3 ASPHALTIC CONCRETE
   - 150mm GRANULAR "A" CRUSHED LIMESTONE (OPSS 1010)
   - 400mm GRANULAR "B" TYPE II (OPSS 1010)

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PRELIMINARY
NOT FOR CONSTRUCTION

REV	REVISION DESCRIPTION	DATE	BY	APPD
1	ISSUED FOR SITE PLAN CONTROL	15/12/20	SK	BMT

SCALE
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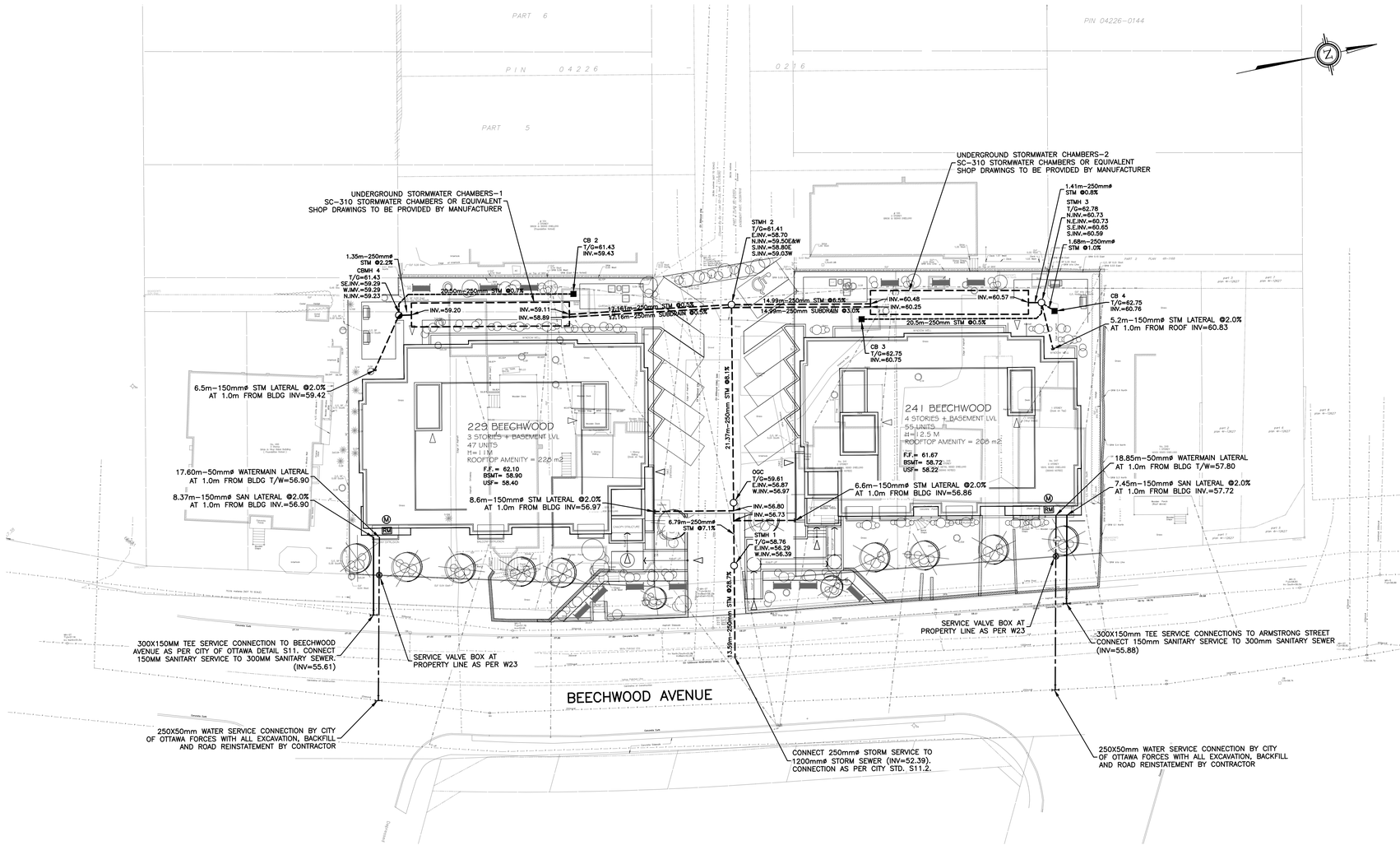
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DESIGN: JLF/ARO
CHECKED: BMT
CAD: SK
PROJECT MANAGER: BMT
APPROVED: BMT

PROJECT: 229-247 BEECHWOOD OTTAWA, ON

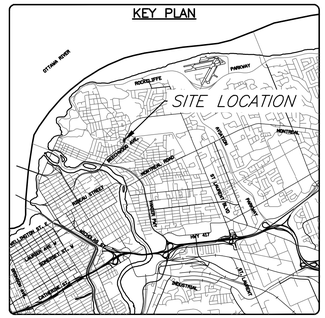
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PROJECT No.: OTT-238207-C0
SURVEY: AOV
DATE: DEC 2020
DRAWING No.: C001

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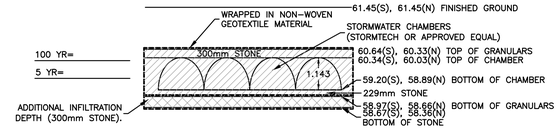


KEY PLAN



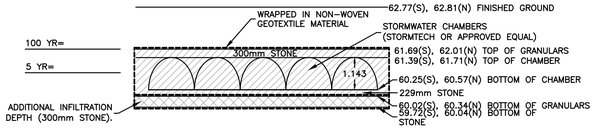
STRUCTURE TABLE

STRUCTURE NUMBER	TYPE	LID ELEV (m)	INVERT IN (m) and DIA (mm)		INVERT OUT (m) and DIA (mm)		STRUCTURE				Comment
							SIZE	REFERENCE	FRAME	COVER	
CB 2	STORM	61.43			59.430	(250)	250 DIA	OPSD 401.020	Ottawa S19	Ottawa S19	
CBMH 1	STORM	61.43	59.290	(250)	59.230	(250)	1200 DIA	OPSD 705.010	Ottawa S19	Ottawa S28.1	
			59.290	(150)							
CB 3	STORM	62.75			60.750	(200)	600x600	OPSD 401.020	Ottawa S19	Ottawa S19	
STMH 3	STORM	62.78	60.730	(250)	60.590	(250)	1200 DIA	OPSD 705.010	Ottawa S25	Ottawa S24.1	
			60.730	(150)							
			60.650	(250)							
CB 4	STORM	62.75			60.76	(250)	600x600	OPSD 401.020	Ottawa S19	Ottawa S19	
STMH 2	STORM	61.41	59.500	(250)	58.700	(250)	1200 DIA	OPSD 705.010	Ottawa S25	Ottawa S24.1	
			59.500	(250)							
			58.800	(250)							
			59.030	(250)							
OGS	STORM	59.61	56.970	(250)	56.870	(250)	1200 DIA	(See Manufacture's Info)			
STMH 1	STORM	58.76	56.390	(250)	56.290	(250)	1200 DIA	OPSD 705.010	Ottawa S25	Ottawa S24.1	



STORM CHAMBERS 1 – CROSS SECTION

N.T.S



STORM CHAMBERS 2 – CROSS SECTION

N.T.S

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SCALE: 0 2m 4m 10m — HORIZONTAL 1:250

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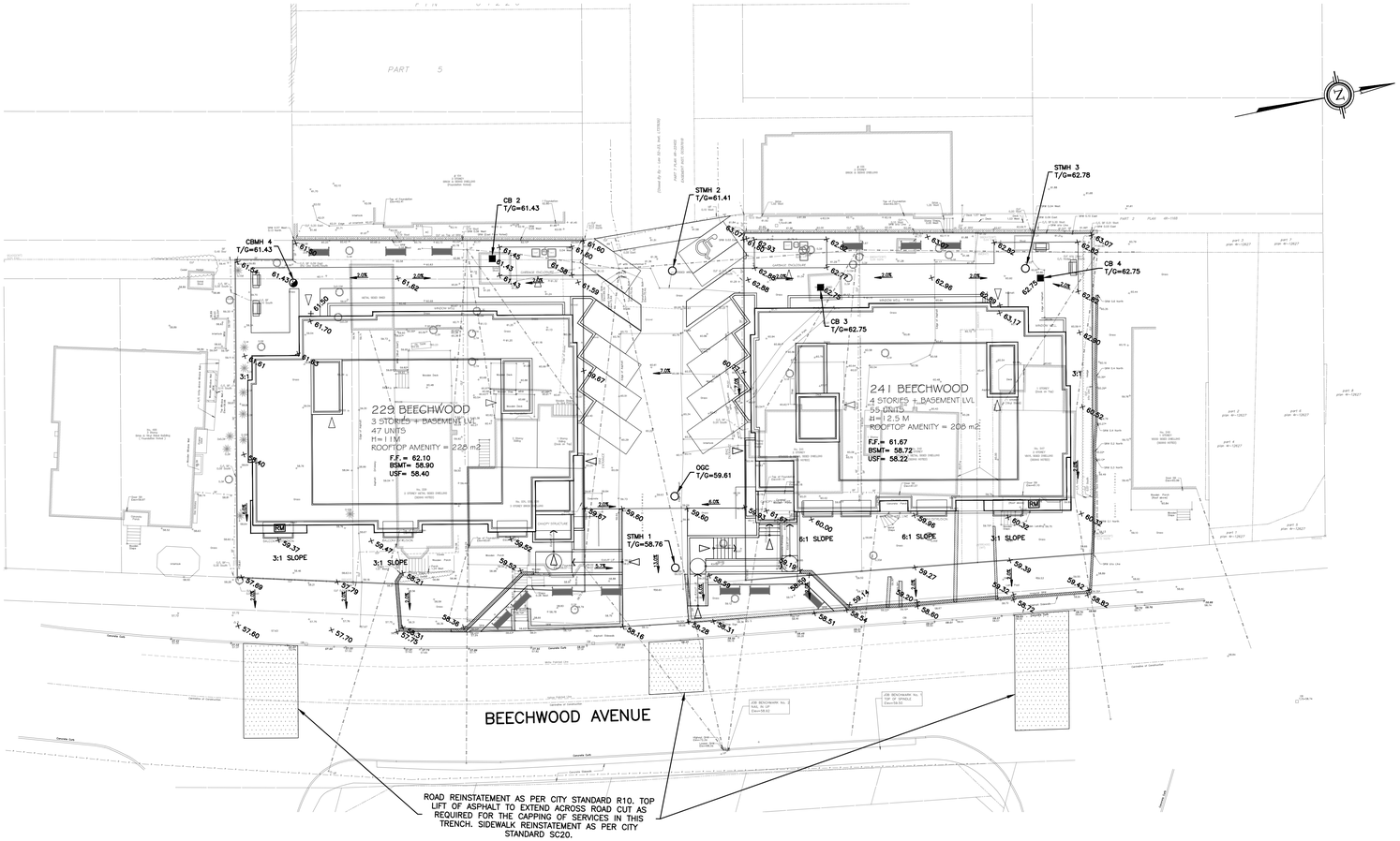
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DESIGN	JLF/ARO
CHECKED	BMT
CAD	SK
PROJECT MANAGER	BMT
APPROVED	BMT

PROJECT: 229–247 BEECHWOOD OTTAWA, ON

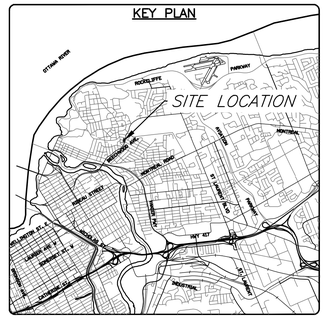
TITLE: SITE SERVICING PLAN

PROJECT No.	OTT-238207-C0
SURVEY	AOV
DATE	DEC 2020
DRAWING No.	C100

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KEY PLAN



GENERAL NOTES FOR GRADING

1. IT SHALL BE THE BUILDER'S RESPONSIBILITY TO ENSURE THAT GRADING AROUND HYDRANTS, TRANSFORMERS, AND UTILITY PEDESTALS, ETC., MEET CURRENT CITY OF OTTAWA, HYDRO AND UTILITY COMPANY REQUIREMENTS.
2. ALL GROUND SURFACES SHALL BE EVENLY GRADED WITHOUT PONDING AREAS AND WITHOUT LOW POINTS EXCEPT WHERE APPROVED SWALE OR CATCH BASIN OUTLETS ARE PROVIDED.
3. CONTRACTOR TO ADJUST EXISTING CATCH BASINS, MANHOLES, FIRE HYDRANTS, VALVE CHAMBERS AND VALVE BOXES TO FINAL GRADE AS REQUIRED.
4. CONTRACTOR SHALL TAKE ALL NECESSARY PRECAUTIONS TO PROTECT EXISTING FOUNDATIONS OF ADJACENT BUILDINGS DURING EXCAVATION AND CONSTRUCTION PERIOD.
5. GRADING IN GRASSED AREAS WILL BE BETWEEN 2% TO 7%. GRADES IN EXCESS OF 7% WILL REQUIRE A MAXIMUM 3:1 TERRACING.
6. NO EXCESS DRAINAGE, DURING OR AFTER CONSTRUCTION, TO BE DIRECTED TOWARDS NEIGHBORING PROPERTIES.
7. EXISTING DRAINAGE PATTERNS TO BE MAINTAINED.
8. ENSURE POSITIVE DRAINAGE AWAY FROM FOUNDATION.
9. NO ALTERATION TO EXISTING GRADES ON THE PROPERTY LINES.
10. UNDERSIDE OF FOOTING TO BE MINIMUM 1.5m BELOW FINISHED GRADE OR INSULATION TO BE PROVIDED. TOP OF FOUNDATION TO BE MAINTAINED 0.15m ABOVE FINISHED GRADE.
11. FOR ADDITIONAL NOTES REFER TO NOTES AND LEGEND SHEET, DRAWING C001

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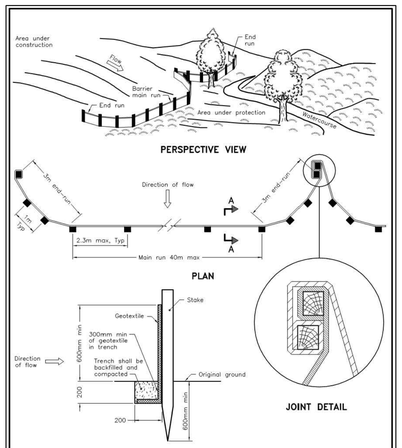
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BASEPLAN	SK
DESIGN	JLF/ARO
CHECKED	BMT
CAD	SK
PROJECT MANAGER	BMT
APPROVED	BMT

PROJECT: 229–247 BEECHWOOD OTTAWA, ON
TITLE: SITE GRADING PLAN

PROJECT No.	OTT-238207-C0
SURVEY	AOV
DATE	DEC 2020
DRAWING No.	C200

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NOTE:
A All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2015	Rev 2
LIGHT–DUTY SILT FENCE BARRIER		OPSD 219.110

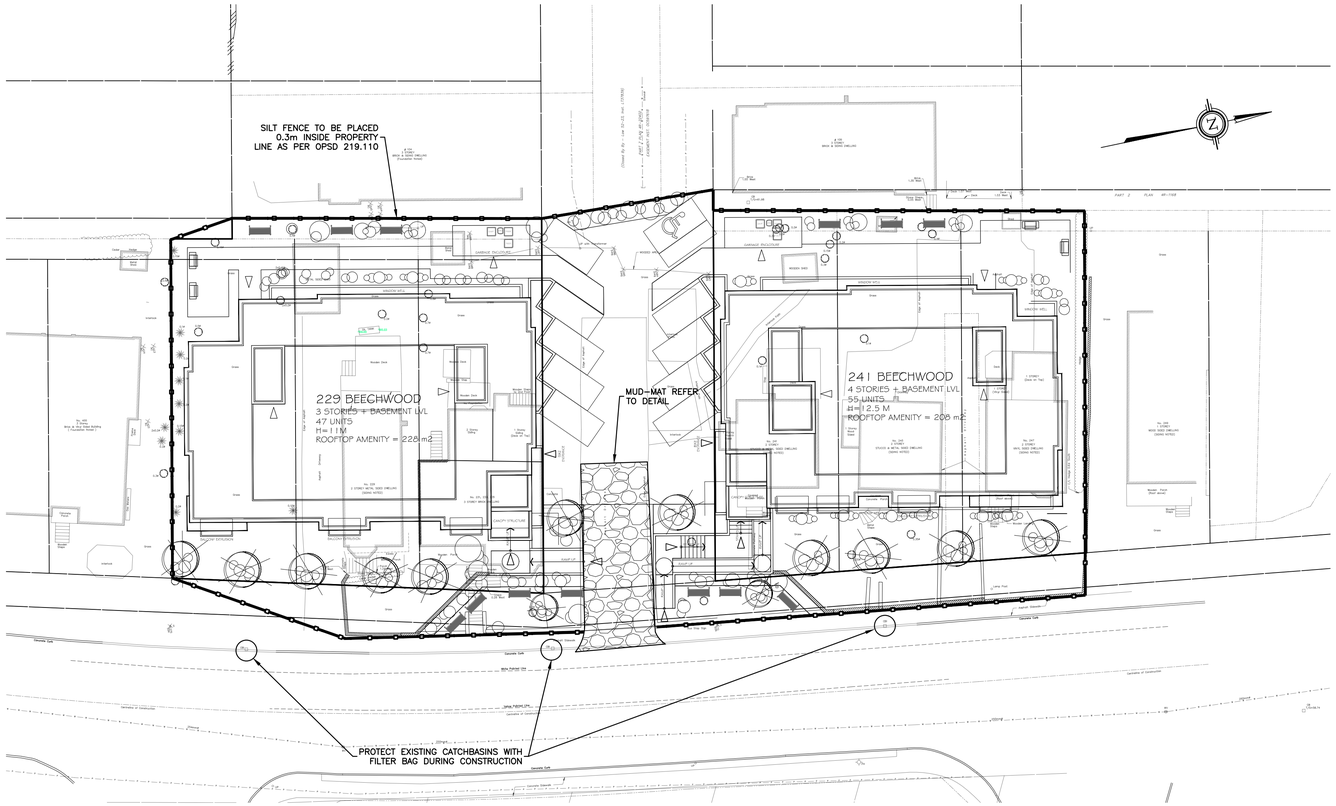
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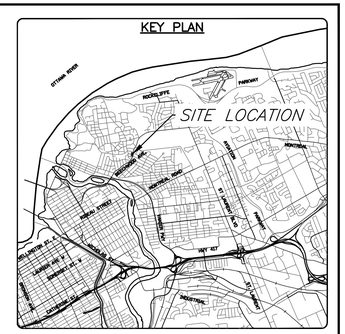
1. WOVEN WIRE FENCE TO BE FASTENED SECURELY TO WOOD POSTS WITH WIRE TIES OR STAPLES.
2. POSTS TO BE SPACED AT 2.3 METRES CENTRE TO CENTRE.
3. WHEN TWO SECTIONS OF FILTER CLOTH ADJOIN EACH OTHER THEY SHALL BE OVERLAPPED BY A MINIMUM OF 500mm.
4. MAINTENANCE SHALL BE PERFORMED AS NEEDED AND MATERIAL REMOVED WHEN "BULGES" DEVELOP IN THE SILT FENCE.
5. WOOD POSTS TO BE HARDWOOD TYPE (50mm x 50mm).
6. GEOTEXTILE TO BE EMBEDDED 200mm INTO GROUND.
7. GEOTEXTILE TO CONFORM TO OPSS 805 STANDARDS.
8. SILT FENCE MUST BE INSTALLED BEFORE COMMENCEMENT OF CONSTRUCTION AND IN ACCORDANCE WITH DETAIL. SILT FENCE CAN BE REMOVED AFTER LANDSCAPING IS COMPLETE.
9. SEDIMENTS MUST BE CLEARED AWAY WHEN THEY REACH HALF THE HEIGHT OF THE FENCE.

EROSION AND SEDIMENT CONTROLS DURING CONSTRUCTION.

DURING ALL CONSTRUCTION ACTIVITIES, EROSION AND SEDIMENTATION SHALL BE CONTROLLED BY THE FOLLOWING TECHNIQUES:

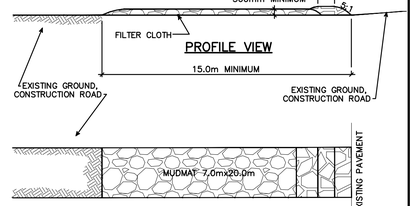
1. LIMITING THE EXTENT OF EXPOSED SOILS AT ANY GIVEN TIME.
2. REVEGETATION OF EXPOSED AREAS AS SOON AS POSSIBLE.
3. MINIMIZATION OF AREA TO BE CLEARED AND DISRUPTION TO ADJACENT AREAS.
4. INSTALLATION OF FILTER CLOTH BETWEEN FRAME AND COVER ON ALL PROPOSED CATCH BASINS AND CATCH BASIN MANHOLES.
5. A SILT FENCE TO BE INSTALLED 0.3m INSIDE THE SITE PROPERTY LINE TO LOCATIONS SHOWN ON THIS DRAWING.
6. A VISUAL INSPECTION SHALL BE COMPLETED DAILY ON SEDIMENT CONTROL BARRIERS AND ANY DAMAGE REPAIRED IMMEDIATELY. CARE WILL BE TAKEN TO PREVENT DAMAGE DURING CONSTRUCTION OPERATIONS.
7. IN SOME CASES SOME BARRIERS MAY BE REMOVED TEMPORARILY TO ACCOMODATE THE CONSTRUCTION OPERATIONS. THE AFFECTED BARRIERS WILL BE REINSTATED AT NIGHT WHEN CONSTRUCTION IS COMPLETED.
8. THE SEDIMENT CONTROL DEVICES WILL BE CLEANED OF ACCUMULATED SILT AS REQUIRED. THE DEPOSITS WILL BE DISPOSED OF AS PER THE REQUIREMENTS OF THE CONTRACT.
9. DURING THE COURSE OF CONSTRUCTION IF THE ENGINEER BELIEVES THAT ADDITIONAL PREVENTION METHODS ARE REQUIRED TO CONTROL EROSION AND SEDIMENTATION, THE CONTRACTOR WILL INSTALL ADDITONAL SILT FENCES OR OTHER METHODS AS REQUIRED TO THE SATISFACTION OF THE ENGINEER.
10. CONSTRUCTION AND MAINTENANCE REQUIRMENTS FOR EROSION AND SEDIMENT CONTROLS TO COMPLY WITH ONTARIO PROVINCIAL STANDARD SPECIFICATION (OPSS) OPSS 805, AND CITY OF OTTAWA SPECIFICATIONS.
11. SEDIMENT AND EROSION CONTROL MEASURES MAY BE MODIFIED IN THE FIELD AT THE DISCRETION OF THE CITY OF OTTAWA SITE INSPECTOR OR CONSERVATION AUTHORITY.





LEGEND

- PROPERTY LINE
- PROPOSED CURB
- SILT FENCE

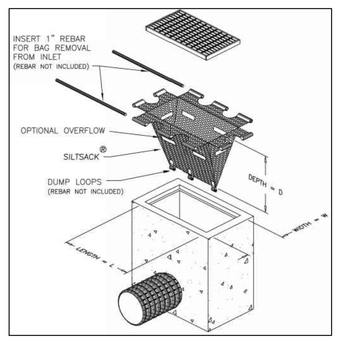


NOTES:

1. STONE – USE CLEAR CRUSHED 100mm STONE.
2. LENGTH – AS REQUIRED BUT NOT LESS THAN 15.0m.
3. THICKNESS – NOT LESS THAN 300mm.
4. WIDTH – 7.0m MINIMUM, NOT LESS THAN THE WIDTH AT POINTS WHERE INGRESS OR EGRESS OCCURS.
5. FILTER CLOTH – WILL BE PLACED OVER THE ENTIRE AREA PRIOR TO PLACING STONE.
6. MAINTENANCE – THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHT–OF–WAY. THIS MAY REQUIRED PERIODIC TOP DRESSING WITH ADDITIONAL STONE AS CONDITIONS DEMAND AND REPAIR AND/OR CLEAN OUT OF ANY MEASURES USED TO TRAP SEDIMENT. ALL SEDIMENT SPILLED, DROPPED OR TRACKED ONTO THE PUBLIC RIGHT–OF–WAY MUST BE REMOVED IMMEDIATELY.
7. PERIODIC INSPECTION AND NEEDED MAINTENANCE SHALL BE PROVIDED AFTER EACH RAIN.

MUD MAT DETAIL

N.T.S



PROVIDE FILTER BAGS AS SHOWN (GEO–SYNTHETICS MANUFACTURER OR APPROVED EQUIVALENT)

FILTER BAG DETAIL

N.T.S

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SCALE: 0 2m 4m 10m — HORIZONTAL 1:250
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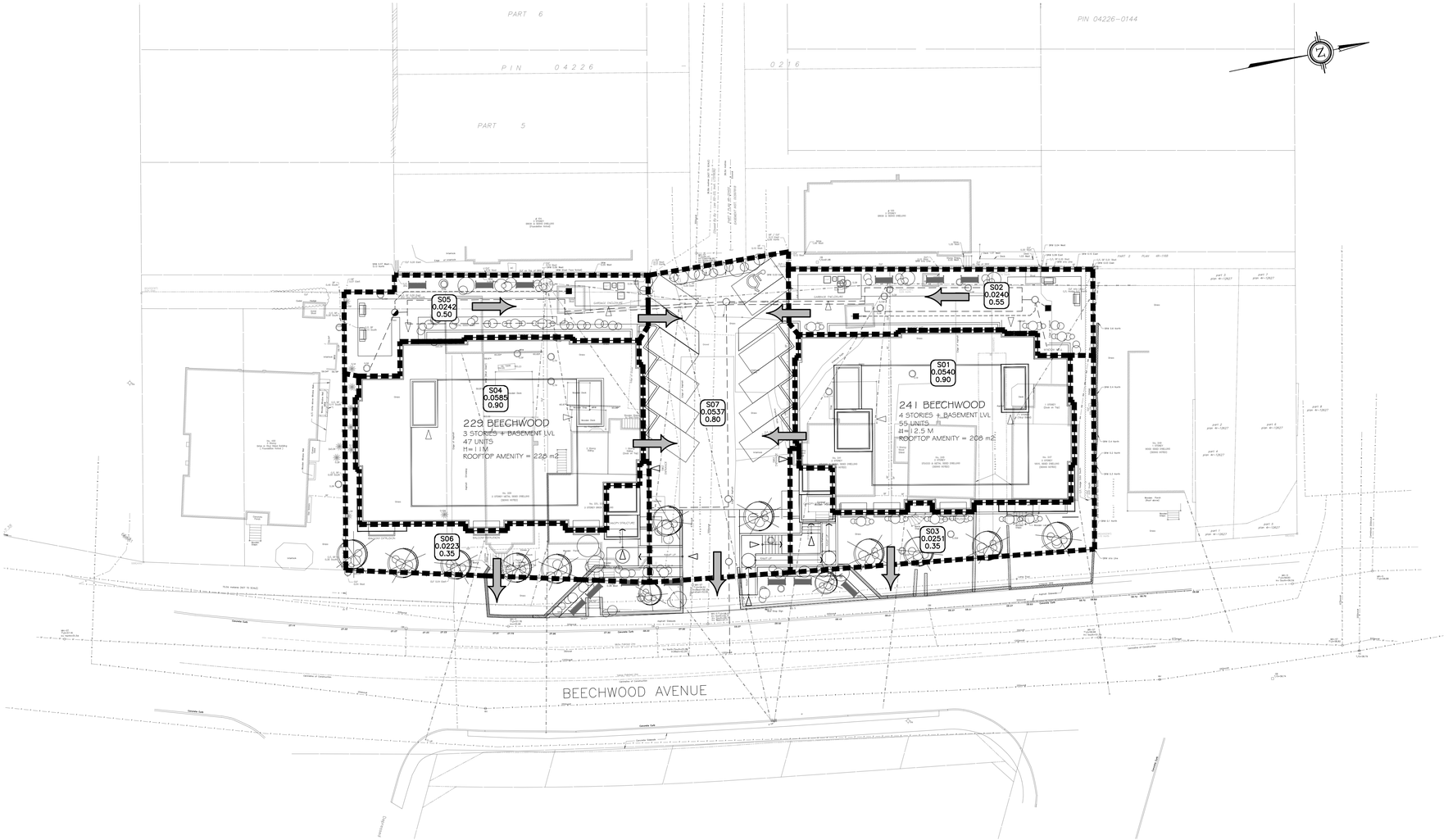
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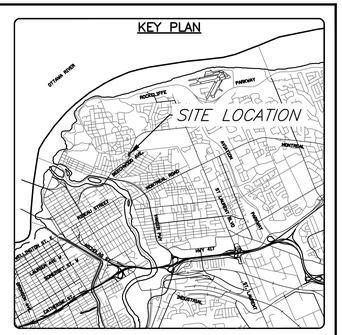
PROJECT: 229–247 BEECHWOOD OTTAWA, ON
TITLE: EROSION AND SEDIMENT CONTROL PLAN

PROJECT No.	OTT–238207–C0
SURVEY	AOV
DATE	DEC 2020
DRAWING No.	C300

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KEY PLAN



LEGEND

- PROPERTY LINE
- ONSITE OVERLAND FLOW ROUTE
- EXTERNAL OVERLAND FLOW ROUTE
- S01 / 0.184 / 0.79 — AREA NO / AREA IN HECTARES / RUNOFF COEFFICIENT
- CATCHMENT AREA

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CHECKED: BMT
CAD: SK
PROJECT MANAGER: BMT
APPROVED: BMT

PROJECT: 229–247 BEECHWOOD OTTAWA, ON

TITLE: STORM DRAINAGE PLAN

PROJECT No.: OTT-238207-C0
SURVEY: AOV
DATE: DEC 2020
DRAWING No.: C400

Filename: \ott\ott-00238207-c0\60_execution\65_drawings\238207-400-stm.dwg
Last Saved: 15/12/2020 6:19:23 PM by: Stephen Kolesnyk
Plotted: 15/12/2020 5:17:28 PM by: Stephen Kolesnyk
References: xref-Topo.dwg; xref-TBlock.dwg; xref-Arch.dwg; xref-Serv.dwg