Site Servicing and Stormwater Management Report 116 & 118 Carruthers Avenue, Ottawa, ON

Client:
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MA Precious Holdings.
116 & 118 Carruthers Avenue
Ottawa, ON, K2V 0L3

Submitted for:
Site Plan Control

Project Name:
116 & 118 Carruthers Avenue

Project Number:
OTT-24006545-A0

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Date Submitted:
October 23, 2024
January 29, 2025 (R1)

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1 Introduction

1.1 Overview

EXP Services Inc. (EXP) was retained by MA Precious Holdings to prepare a Site Servicing and Stormwater Management Report for the proposed redevelopment of 116 & 118 Carruthers Avenue in support of a Site Plan Application.

The 0.0456-hectare site is located 60m southeast of the Carruthers Avenue and Lyndale Avenue intersection, on Carruthers Avenue. **Figure 1-1** Illustrates the site location. The site is situated in Ward 15 (Kitchissippi). The proposed site development will consist of a four-storey apartment building comprised of 17 units, consisting of a mix of studio, 1-bedroom, and 2-bedroom apartments.

This report discusses 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. This report provides a design brief for submission, along with the engineering drawings, for City approval.

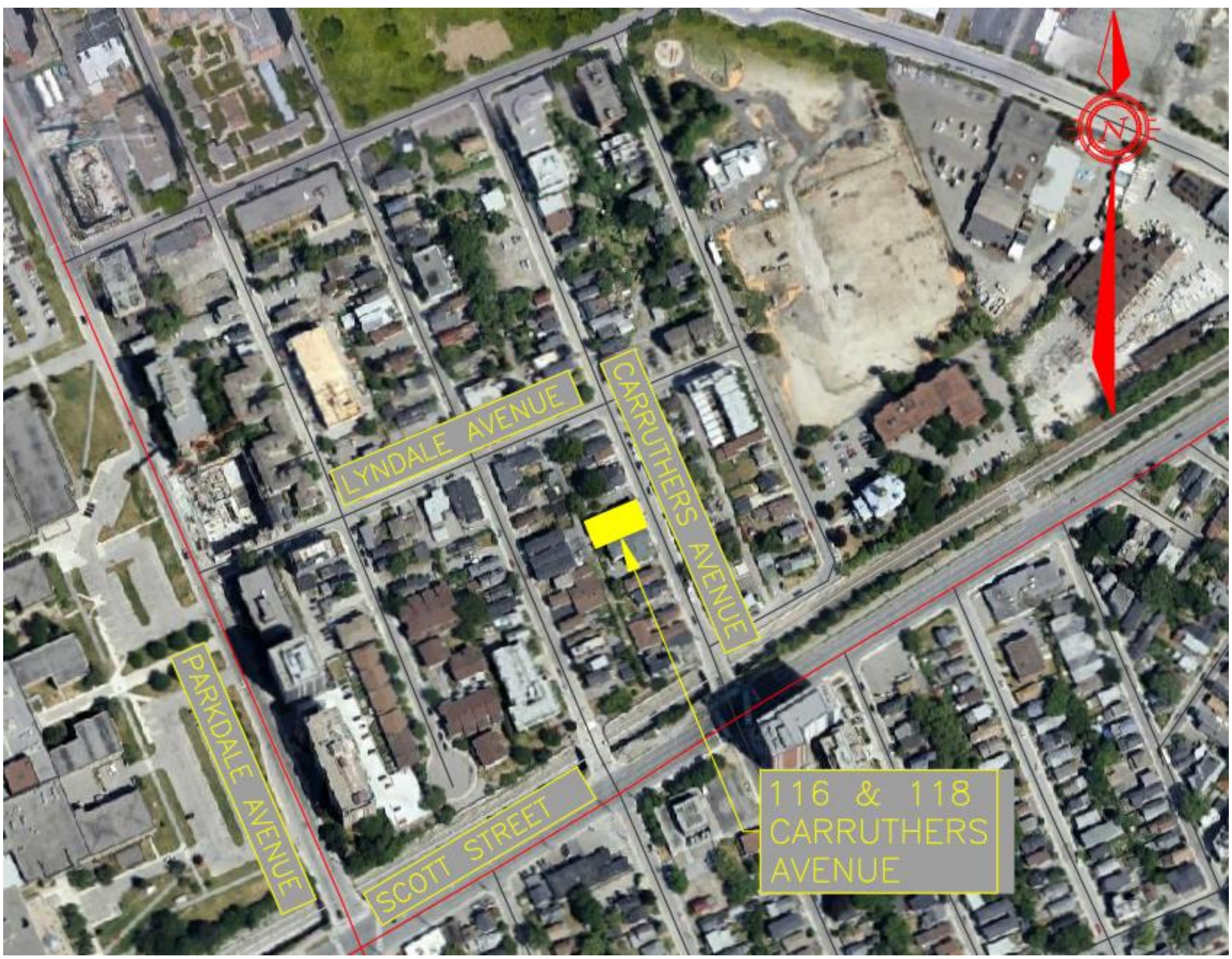


Figure 1-1 - Site Location

2 Existing Conditions

Within the property, there are two (2) existing municipal addresses. The following summarizes the current land use conditions:

- 116 Carruthers Ave — semi-detached single-family dwelling with additions at rear of property
- 118 Carruthers Ave — semi-detached single-family dwelling with additions at rear of property

The existing topography of the subject site falls in a north easterly direction from the rear of the property towards the front of the property towards Carruthers Avenue.

3 Existing Infrastructure

The site includes two semi-detached single-family dwellings 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:

<u>Within property (116 & 118 Carruthers Avenue)</u>

- Storm, sanitary, and watermain laterals to the property that will be removed during the redevelopment of the site.

<u>On Carruthers Avenue</u>

- 152mm PVC DR-18 watermain
- 250mm PVC SDR-35 sanitary sewer
- 375mm PVS SDR-35 storm sewer
- 32mm gas
- Bell / Streetlighting/ Hydro

UCC as-built drawings for Carruthers Avenue were obtained and are included in **Appendix F**.

3.1 Pre-Consultation / Permits / Approvals

A pre-consultation meeting was held with the City of Ottawa prior to design commencement. This meeting, held June 26, 2024, outlined the submission requirements and provided information to assist with the development proposal. Please refer to the email correspondence included in **Appendix E**.

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; 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. The onsite Sewage Works would generally include the onsite stormwater works such as flow controls, associated stormwater detention, and treatment works. Proposed stormwater management infrastructure complies with all of the above noted exemption requirements. Therefore, the proposed private stormwater management infrastructure would not require 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-2018-03 (21 March 2018)
  - Technical Bulletin ISDTB-2018-04 (27 June 2018)
  - Technical Bulletin ISDTB-2019-02 (08 July 2019)
- 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), 2020.
- Ontario Building Code 2012, Ministry of Municipal Affairs and Housing.

4 Water Servicing

4.1 Existing Water Servicing

The subject site is currently serviced by the existing 152mm watermain on Carruthers Avenue. The existing residential buildings within 116 & 118 Carruthers Avenue are serviced by laterals that will be removed during construction.

4.2 Water Servicing Proposal

The proposed development at 116 & 118 Carruthers Avenue will consist of a 4-storey apartment building with 17 units. Architectural site plans are provided in **Appendix F.**

Water supply for the apartment building will be provided by a 100mm water service lateral connecting to the existing 152mm watermain on Carruthers Avenue. Along with the service, a shutoff valve will be installed at the property line. The proposed servicing plan is provided in drawing C-100**.**

4.3 Water Servicing Design

The water servicing requirements for the proposed building is 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, residential peaking factors were based on MECP Table 3-3.
- Estimated the required fire flow (RFF) based on the Fire Underwriters Survey (FUS) and Ontario Building Code (OBC).
- 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.

- The proposed 100mm water service should be insulated as necessary per City of Ottawa standard details W22, and W23.

4.4 Water Servicing Design Criteria

Table 4-1 below summarizes the Design Criteria that was used to establish the water demands and the required fire flows, based on the proposed building uses.

Table 4-1 - 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 (Studio)	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	
Average Day Demands – Residential	280 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	9.50 x Average Day Demands	✓
Maximum Day Demands – Commercial / Institutional	1.5 x Average Day Demands	
Peak Hour Demands – Residential	14.30 x Average Day Demands	✓
Peak Hour Demands – Commercial / Institutional	2.7 x Average Day Demands	
Fire Flow Requirements Calculation	FUS & OBC	✓
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)	✓

4.5 Estimated Water Demands

Table 4-2 below summarizes the anticipated water demands for the proposed development based on the above noted design criteria and an apartment building having 17 units and estimated population of 26.6 persons.

Table 4-2 : Water Demand Summary

Water Demand Conditions	Total Water Demands (L/sec)
Average Day	0.09
Max Day	0.82
Peak Hour	1.23

Please refer to **Table B1** in **Appendix B** for detailed calculations of the total water demands.

4.6 Fire Flow Requirements

Fire flow requirements were calculated using both the OBC and FUS methods and is summarized below. Water for fire protection will be available using the existing fire hydrants located along Carruthers Avenue.

4.6.1 Fire Flow Requirements (FUS)

The required fire flows for the proposed buildings were calculated based on typical values as established by the Fire Underwriters Survey 2020 (FUS).

The following equation from the Fire Underwriters document "Water Supply for Public Fire Protection", 2020, 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 4-3 below 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 F.**

The following summarizes the parameters used for the proposed apartment building.

- Type of Construction — Wood Frame
- Occupancy — Limited combustible
- Sprinkler Protection — Adequate Sprinkler Conforms to NFPA13

Table 4-3 - Summary of Design Parameters Used in Calculating Required Fire Flows (RFF) Using FUS

Design Parameter	Value
Coefficient Related to type of Construction C	1.5
Total Floor Area (m^2)	812.0
Fire Flow prior to reduction (L/min)	9,000
Reduction Due to Occupancy Non-combustible (-25%), Limited Combustible (-15%), Combustible (0%), Free Burning (+15%), Rapid Burning (+25%)	-15%
Reduction due to Sprinkler (Max 50%) Sprinkler Conforming to NFPA 13 (-30%), Standard Water Supply (-10%), Fully Supervised Sprinkler (-10%)	-40%
Exposures	+47%
Can the Total Fire Flow be Capped at 10,000 L/min (167 L/sec) based on "TECHNCAL BULLETIN ISTB-2018-02", (yes/no)	No
Total RFF	8,000 L/min (133.3 L/sec)

The estimated required fire flows (RFF) based on the FUS methods is 133.3 L/sec for the proposed 4-storey apartment building. Please refer to **Table B2** in **Appendix B** for detailed calculations.

4.6.2 Fire Flow Requirements (OBC)

The required fire flow for the proposed building was estimated based on OBC Div B A-3.2.5.7. The following equation was used.

Q = K x V x Stot

where:

Q = Minimum supply of water in liters

K = water supply coefficient from Table 1 OBC Div B A-3.2.5.7.

V = total building volume in cubic meters

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

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

Spatial coefficients are a function of exposure distance and can be found in Figure 1 OBC Div B A-3.2.5.7.

The required minimum water supply flow rate is a function of Q and is given in Table 2 OBC Div B A-3.2.5.7.

Table 4-4: Summary of Design Parameters Used in Calculating Required Fire Flows (RFF) Using OBC below summarizes the parameters used for estimating the Required Fire Flows (RFF) based on the Ontario Building Code (OBC) and the latest City of Ottawa Technical Bulletins.

Table 4-4: Summary of Design Parameters Used in Calculating Required Fire Flows (RFF) Using OBC

Item	Design Value
Floors Above Grade	4 floors
Sprinklered	Yes
North Exposure Distance, Spatial Coefficient	4.43m, 0.5
East Exposure Distance, Spatial Coefficient	13.83m, 0.0
South Exposure Distance, Spatial Coefficient	10.06m, 0.0
West Exposure Distance, Spatial Coefficient	21.6, 0.0
S_{tot}	1.5
V(m^3)	((210+210+196+196)/4) m^2 x 12.57m = 2552.35m^3
K	Based on wood frame construction and residential occupancy group C, K=23
Q	88,056.1 L
Required Minimum Water Supply Flow Rate (L/min)	2700 L/min (45 L/sec)

The estimated required fire flows (RFF) based on the OBC method is 45.0 L/sec for the proposed 4-storey apartment building. Refer to **Table B3** in **Appendix B** for further details.

4.7 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 of Ottawa is provided in **Appendix E**.

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

- Minimum HGL = 107.7 m
- Maximum HGL = 115.2 m
- Max Day + Fire Flow (OBC - 45.0 L/sec) = 108.6 m

  Max Day + Fire Flow (FUS - 133.3 L/sec) = 97.6 m

A review of the estimated watermain pressures at the building connection, based on the boundary conditions provided, was completed using a single water service servicing to the building. **Table B4** in **Appendix B** provides calculations of anticipated pressures at the building connection based on using a single 100mm water service.

Based on the results, a single 100mm service would result in a pressure of ±75.6 psi during average day conditions, 64.9 psi during max day conditions and 64.8 psi during peak hour conditions. Additionally, a pressure analysis was completed to check the flow and pressure using a 100mm dia. water service to supply for the sprinkler system demands. An assumed conservative sprinkler demand of 30 L/sec was used to this analysis based on the size of the building. The exact sprinkler demands will have to be confirmed by the mechanical engineer at the building permit stage. A residual pressure of ±64.1 psi is estimated for sprinkler system demands. Based on the given analysis, expected pressure at building FFE will be between the allowable range of 40 psi-80 psi. Therefore, no pressure boosting or reducing measures are anticipated for this development.

4.8 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.

A review of the available fire hydrants within 150m distance along the fire route from the building was carried out which is summarized in the **Table 4-5** – below.

Table 4-5 – Existing Hydrants

Hydrant #	Location	Color Code	City/Private	Distance from the Building (m)	Fire Flow Contribution for Class AA Hydrant (L/min)
364029H051	Carruthers	Blue	City	6	5,700
364029H414	Carruthers	Blue	City	97	3,800
364029H050	Carruthers	Blue	City	135	3,800
Total					13,300

Please refer to **Figure A2** in **Appendix A** for location of the above noted hydrants. As noted in the table above, there are 3 existing hydrants available within 150m from the building contributing to 13,300 L/min of available flows which is more than the required fire flow of 8000 L/min. Therefore, the proposed development shall have sufficient hydrant coverage with the existing hydrants.

5 Sewage Servicing

5.1 Existing Sewage Conditions

The existing residential buildings within the subject property are currently serviced by the existing 250 mm sanitary sewer on Carruthers Avenue. The existing sanitary laterals are to be removed during construction.

5.2 Proposed Sewage Conditions

A proposed 150mm sanitary lateral will serve the development and connect to the existing 250mm municipal sanitary sewer on Carruthers Avenue. The sanitary sewer system was designed based on a population count and associated per capita flow with an area-based infiltration allowance. A 150 mm diameter sanitary lateral is proposed with a 2% slope, having a capacity of 20.8 L/sec based on Manning's Equation under full flow conditions. **Table 5-1** below summarizes the design parameters used. A sump pump will be required within the mechanical room to discharge a floor drain to the proposed 150mm sanitary lateral. Design of a sump pump will be provided by a mechanical consultant. All proposed sanitary sewer will be insulated per City of Ottawa standard detail S35 as required.

Table 5-1– 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 – Studio 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	
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	1.5	
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	✓

Table 5-2 – Summary of Anticipated Sewage Rates

Sewage Condition	Sanitary Sewage Flow (L/sec)
Peak Residential	0.318
Infiltration Flow	0.015
Peak Design Flow	0.333

The proposed 150mm sanitary lateral at 2.0% will be at 1.6% of its capacity with a peak sanitary flow from the proposed development of **0.333 L/sec.** Please refer to **Table C-1** in **Appendix C** for detailed calculations.

6 Stormwater Management

6.1 Design Criteria

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”.

6.2 System Design Criteria

A summary of the design criteria is provided below:

- For separated sewer systems built up until 2016, the design of the storm sewers is based on a 5-year storm.
- A calculated time of concentration (cannot be less than 10 minutes).
- Flows to the storm sewer in excess of the 5-year storm release rate, up to and including the 100-year storm event, must be detained on site
- The quantity control criteria (100-year post-development to 5-year pre-development using the lesser of c = 0.5 and the actual pre-development runoff coefficient).
- 50% of the peak allowable rate shall be applied to estimate the required volume where underground storage is used.
- On-site storm sewers to be design to 5-year free flow conditions.

6.3 Time of Concentration

A minimum time of concentration of 10-minutes was used (refer to **Table D-2** in **Appendix D**).

6.4 Pre-Development Conditions

Under pre-development conditions, stormwater runoff from the 0.0456-hectare site drains from the rear to the front of the property and discharges to Carruthers Avenue. Only a single drainage area "E1" for the entire site was considered, discharging on to Carruthers Avenue. The average run-off coefficient was calculated as 0.83. Based on this runoff coefficient, the pre-development flows were estimated as shown in **Table 6-1** below.

Table 6-1 – Summary of Pre-Development Flows

Return Period Storm	Total Peak Flows (L/sec) (C=0.83)	Total Peak Flows (L/sec) (C=0.5)
2-year	8.1	4.9
5-year	11.0	***6.6***
100-year	22.6	14.1

6.5 Allowable Release Rate

The allowable release rate of 6.6 L/sec from the proposed site was calculated based on a 5-year storm event, a time of concentration (Tc) of 10 minutes, and a runoff coefficient of 0.50. **Table D-4** in **Appendix D** provides detailed calculations on the allowable peak flow.

6.6 Runoff Coefficients

Post-development runoff coefficients used were based on areas taken from CAD. The site was divided into seven (7) drainage areas: R-L, R-A, R-B, R-C, R-D, corresponding to roof areas and areas P-1, and P-2, corresponding to ground surface areas on each side of the proposed apartment building. Average runoff coefficients were calculated for each drainage area in excel. The runoff coefficients for the post-development drainage areas are summarized in **Table 6-2** below.

Table 6-2 – Summary of Runoff Coefficients

Location	Area (hectares)	Post-Development Runoff Coefficient, C_{AVG}
R-L (Roof/Balcony)	0.0015	0.90
R-A (Roof)	0.0059	0.90
R-B (Roof)	0.0053	0.90
R-C (Roof)	0.0043	0.90
R-D (Roof)	0.0042	0.90
P1 (West)	0.0118	0.51
P2 (East)	0.0127	0.63

Table D-4 in **Appendix D** provides detailed calculations for runoff coefficients under post development conditions.

6.7 Proposed Stormwater System

As a result of the changes onsite the overall post-development runoff coefficient will change over pre-development conditions. Under post-development conditions the site will have a runoff coefficient of 0.72 compared to the pre-development runoff coefficient of 0.83. The decrease in overall runoff coefficient is a result of increased soft landscaped areas under post-development conditions.

Post development catchments are depicted in drawing C-500. A total seven (7) catchments (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:

- Flow-controlled roof drains (Watts Accutrol) with separate storm lateral from foundation drain.
- Foundation drain will be pumped from a sump pit.
- Window wells will be indirectly connected to the foundation drain outlet.
- Runoff from ground surface areas will be collected by catchbasins and detained in underground storage pipes (ADS HP Storm Pipe). Discharge rates will be attenuated by vortex flow regulators (Hydrovex) such that total post-development runoff rates during the 100 years storm event are less than or equal to pre-development runoff rates for the 5 years storm event with a runoff coefficient equal to C=0.5.
- Stormwater runoff generated on-site will ultimately discharge to the existing 375mm municipal storm sewer on Carruthers Avenue.
- All proposed storm sewer will be insulated per City of Ottawa standard detail S35 as required.

Table 6-3 – Summary of Post-Development Flows below summarizes peak post development flowrates from the site under post development conditions for the 2-, 5-, and 100-year storm events.

Table 6-3 – Summary of Post-Development Flows

Return Period Storm	Unattenuated Peak Flow Rates (L/sec)	Allowable Peak Flow Rates (L/sec)	Attenuated Peak Flows Rates (L/sec)
2-year	7.0	4.9	3.3
5-year	9.6	6.6	4.0
100-year	19.2	6.6	6.6

6.8 Flow Attenuation & Storage

Stormwater flow attenuation from rooftop catchments will be achieved by using Watts Accutrol roof drains. 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. Detailed storage volume calculations for roof areas R-A to R-D are provided in **Table D-8 to D-11** in **Appendix D.** Detailed roof drain discharge rate calculations are provided in **Table D-7** in **Appendix D.**

Stormwater flow attenuation from ground surface catchments P-1, and P-2 will be achieved by using Hydrovex flow regulators in conjunction with ADS HP Storm underground HDPE pipes that will be used for stormwater detention. 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. Required storage volume calculations considered 50% of the peak allowable rate per City of Ottawa guidance. Detailed storage volume calculations for catchments P-1, and P-2 are provided in **Table D-12 to D-13** in **Appendix D.** Hydrovex flow regulator selection chart is included in **Appendix D.**

Table 6-4 – Summary of Post-Development Storage below summarizes storage requirements and specifies the selected control device for each post-development catchment.

Table 6-4 – Summary of Post-Development Storage Requirements and Control Method

Area No.	Release Rate (L/s)			Storage Required (m^3) (MRM)			Storage Provided (m^3)			Control Method
	2-yr	5-yr	100-yr	2-yr	5-yr	100-yr	Roof	U/G Storage Pipe	Totals	
R-L	0.28	0.38	0.73	0.00	0.00	0.00	0.00	0.00	0.00	Uncontrolled
R-A	**(0.32)**	**(0.32)**	**(0.32)**	0.54	0.87	2.18	2.30	0.00	2.30	Watts Accutrol 1 weir - Closed
R-B	**(0.72)**	**(0.78)**	**(0.91)**	0.20	0.36	1.07	1.40	0.00	1.40	Watts Accutrol 1 weir – ¼ Open
R-C	**(0.32)**	**(0.32)**	**(0.32)**	0.32	0.53	1.42	1.50	0.00	1.50	Watts Accutrol 1 weir – Closed
R-D	**(0.32)**	**(0.32)**	**(0.32)**	0.30	0.50	1.35	1.50	0.00	1.50	Watts Accutrol 1 weir – Closed
P1	**(0.52)**	**(0.70)**	**(1.50)**	0.74	0.99	2.10	0.00	2.72	2.72	Hydrovex 50VHV-1 ICD
P2	**(0.86)**	**(1.17)**	**(2.50)**	0.88	1.19	2.53	0.00	2.16	2.16	Hydrovex 50VHV-1 ICD
Totals	**(3.30)**	**(4.00)**	**(6.60)**	2.98	4.44	10.65	6.70	4.88	11.58	

The Above noted controls result in the peak post-development flowrate from the site for the 100-year storm event being less than that of the pre-development site during the 5-year storm event with a runoff coefficient of C=0.5.

6.9 Foundation and Under Slab Drains

As noted in the Geotech report prepared by EXP Services Inc., foundation and under slab drains will be required for the proposed development. The foundation and under slab drain will be collected in a sump pump within the mechanical room (refer to mechanical drawings for details) and will be pumped to STMH 1 from a 150mm storm lateral.

6.10 Storm Sewer Design

Foundation drain & under slab drain, roof drains, and underground storage pipes will all discharge into a 1200mm manhole STMH 1 within the property. Foundation drains and roof drains are unrestricted, and each have their own lateral 150mm dia. at 2.0% slope having a full flow capacity of 22.3 L/sec, discharging to STMH 1. Window wells will be indirectly connected to the foundation drain. All runoff generated on-site will ultimately collect in STMH 1 and discharge from a 200mm storm lateral at minimum 1% slope to the 375mm municipal storm sewer on Carruthers Avenue. All storm sewers were sized for the 5-year peak flow with no overcapacity. Refer to **Table D14** in **Appendix D** for detailed storm sewer sizing calculations.

7 Erosion & Sediment Control

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

- Filter bags shall be installed between the frame and cover of all adjacent catch basins and catch basin manhole structures.
- Silt fencing will be used to control runoff around the construction area. Silt fencing locations are identified on the Erosion and sediment control plan (C-300).
- 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.

8 Conclusions and Recommendations

- A 100mm dia. water service will service the proposed development for domestic as well sprinkler demands. The pressure analysis showed expected pressure at the building FFE to be within the allowable range of 40-80 psi.
- A 150mm dia. sanitary service at 2.0% slope will service the proposed development for sanitary demands and will discharge to 250mm dia. sanitary sewer within Carruthers Ave. ROW.
- Storm servicing and stormwater management will comprise of flow-controlled roof drains and ponding on the roof as well as underground storage pipes within the pathways on either side of the proposed building to achieve the SWM criteria noted in the pre-consultation meeting notes. As shown in section 6 of this report, SWM criteria will be successfully met for the proposed development. Storm servicing will comprise of two separate service laterals from the building for foundation drains and roof drains as well as on site catchbasins, sewers, underground storage pipes and a 200mm dia. storm sewer service connection to 375mm dia. municipal storm sewer within Carruthers Ave. ROW.
- Erosion and sediment control methods will be used during construction to limit erosion potential.

9 Legal Notification

This report was prepared by EXP Services Inc. for the account of MA Precious Holdings.

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 - Figures

Figure A-1 – Site Location Plan

Figure A-2 - Hydrant Location Plan

FIGURE A1: SITE LOCATION PLAN

Figure A2: Hydrant Location Plan

Appendix B – Water Servicing Tables

Table B-1 – Water Demand Chart

Table B-2 – Fire Flow Requirements Based on Fire Underwriters Survey (FUS) 2020

Table B-3 – Fire Flow Requirements Based on Ontario Building Code (OBC)

Table B-4 – Estimated Water Pressure at Proposed Building FFE

TABLE B-1: Water Demand Chart

Location: 116-118 Carruthers Ave.
Project No: OTT-24006545-A0
Designed by: A. Jariwala
Checked By: A. Jariwala
Date Revised: August 2024

Water Consumption
Residential = **280** L/cap/day
Commercial = 5.0 L/m^2/day

Population Densities

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

Proposed Buildings	No. of Residential Units: Singles/Semis/Towns: Single Family	Semi-Detached	Duplex	Townhome	Apartments: Studio	1 Bedroom	2 Bedroom	3 Bedroom	4 Bedroom	Avg Apt.	Total Persons (pop)	Residential Demands in (L/sec): Avg. Day Demand (L/day)	Peaking Factors (x Avg Day): Max Day	Peak Hour	Max Day Demand (L/day)	Peak Hour Demand (L/day)	Commercial: Area (m^2)	Avg Demand (L/day)	Peaking Factors (x Avg Day): Max Day	Peak Hour	Max Day Demand (L/day)	Peak Hour Demand (L/day)	Total Demands (L/sec): Avg Day (L/s)	Max Day (L/s)	Max Hour (L/s)
Appartment Building					8	5	4				26.6	7,448	9.50	14.30	70,756	106,506							0.086	0.819	1.233
Total =					8	5	4				26.6	7,448			70,756	106,506							0.09	0.82	1.23

PEAKING FACTORS FROM MOECC TABLE 3-3 (Peaking Factors for Water Systems Servicing Fewer Than 500 persons)

Dwelling Units Serviced	Equiv Pop	Night Min Factor	Maximum Day Factor	Peak Hour Factor
10	30	0.10	9.50	14.30
50	150	0.10	4.90	7.40
100	300	0.20	3.60	5.40
150	450	0.30	3.00	4.50
167	500	0.40	2.90	4.30

TABLE B2: FIRE FLOW REQURIEMENTS BASED ON FIRE UNDERWRITERS SURVEY(FUS) 2020
PROJECT: OTT-24006545-A0
Building: **116-118 Carruthers 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	Wood Frame	1.5	
	Ordinary Construction	1			
	Non-combustible Construction	0.8			
	Fire Resistive Construction	0.6			
	Fourth Floor		196	812.0 m²	
	Third Floor		196		
	Second Floor		210		
	First Floor		210		
	Basement (At least 50% below grade, not included)		205		
Fire Flow (F)	F = 220 * C * SQRT(A)				9,404
Fire Flow (F)	Rounded to nearest 1,000				**9,000**

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%	-1,350	7,650
	Limited Combustible	-15%				
	Combustible	0%				
	Free Burning	15%				
	Rapid Burning	25%				
Choose Reduction Due to Sprinkler System	**Adequate** Sprinkler Conforms to NFPA13	-30%	Adequate Sprinkler Conforms to NFPA13	-30%	-2,295	5,355
	No Sprinkler	0%				
	Standard Water Supply for Fire Department Hose Line and for Sprinkler System	-10%	Standard Water Supply for Fire Department Hose Line and for Sprinkler System	-10%	-765	4,590
	Not Standard Water Supply or Unavailable	0%				
	Fully Supervised Sprinkler System	-10%	Not Fully Supervised or N/A	0%	0	4,590
	Not Fully Supervised or N/A	0%				

Task	Exposures	Separation Dist (m)	Cond	Separation Conditon	Exposed Wall type	Exposed Wall Length: Length (m)	No of Storeys	Length-Height Factor	Sub-Conditon	Charge (%)	Total Charge (%)	Total Exposure Charge (L/min)	Fire Flow Total (L/min)
Choose Structure Exposure Distance	West	21.6	4	20.1 to 30	Type V	11.22	3	33.66	4B	2%	47%	3,596	8,186
	East	13.83	3	10.1 to 20	Type V	11.22	2	22.44	3B	11%			
	South	10.06	2	3.1 to 10	Type V	17.8	2	35.6	2B	16%			
	North	4.43	2	3.1 to 10	Type V	19.32	4	77.28	2D	18%			
Obtain Required Fire Flow	Total Required Fire Flow, Rounded to the Nearest 1,000 L/min =												**8,000**
	Total Required Fire Flow, L/s =												**133.3**

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

Type V	Wood Frame
Type IV-III (U)	Mass Timber or Ordinary with Unprotected Openings
Type IV-III (P)	Mass Timber or Ordinary with Protected Openings
Type II-I (U)	Noncombustible or Fire Resistive with Unprotected Openings
Type II-I (P)	Noncombustible or Fire Resistive with Protected Openings

Conditons 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	5

TABLE B3: FIRE FLOW REQUIREMENTS BASED ON ONTARIO BUILDING CODE
PROJECT: OTT-24006545-A0
Building: 116-118 Carruthers Ave.

3. Buildings Requiring On-Site Water Supply
   (a) Except for sprinklered buildings and as required by Items 3(c) and 3(e), buildings should have a supply of water available for firefighting purposes not less than the quantity derived from the following formula:

$$Q = K \cdot V \cdot S_{tot}$$

where

Q = minimum supply of water in litres

K = water supply coefficient from Table 1

V = total building volume in cubic metres

S_{tot} = total of spatial coefficient values from property line exposures on all sides as obtained from the formula:

$$S_{tot} = 1.0 + [S_{side1} + S_{side2} + S_{side3} + \ldots \text{ etc.}]$$

where

S_{side} values are established from Figure 1, as modified by Items 3(d) and 3(f), and

S_{tot} need not exceed 2.0.

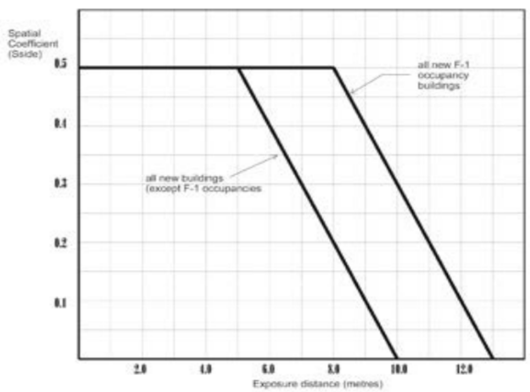


Figure 1
Spatial Coefficient vs Exposure Distance

	Direction				
	North	East	South	West	
Distance	4.43	13.83	10.06	21.6	Stot
S	0.5	0	0	0	1.5

Q	88056.08	
K	23	
V	2552.35	4 storeys basment ommitted
Stot	1.5	

RFF	2700	L/min
	45	L/sec

Table 1

Water Supply Coefficient - K

Type of Construction	Classification by Group or Division in Accordance with Table 3.1.2.1. of the Building Code				
	A-2 B-1 B-2 B-3 C D	A-4 F-3	A-1 A-3	E F-2	F-1
Building is of noncombustible construction with fire separations and fire-resistance ratings provided in accordance with Subsection 3.2.2., including loadbearing walls, columns and arches.	10	12	14	17	23
Building is of noncombustible construction or of heavy timber construction conforming to Article 3.1.4.6. Floor assemblies are fire separations but with no fire-resistance rating. Roof assemblies, mezzanines, loadbearing walls, columns and arches do not have a fire-resistance rating.	16	19	22	27	37
Building is of combustible construction with fire separations and fire-resistance ratings provided in accordance with Subsection 3.2.2., including loadbearing walls, columns and arches. Noncombustible construction may be used in lieu of fire-resistance rating where permitted in Subsection 3.2.2.	18	22	25	31	41
Building is of combustible construction. Floor assemblies are fire separations but with no fire-resistance rating. Roof assemblies, mezzanines, loadbearing walls, columns and arches do not have a fire-resistance rating.	23	28	32	39	53
Column 1	2	3	4	5	6

Table 2

Part 3 Buildings under the Building Code	Required Minimum Water Supply Flow Rate, L/min
One-storey building with building area not exceeding 600 m²	1 800
All other buildings	2 700 (if Q ≤ 108 000 L)(1) 3 600 (if Q > 108 000 L and ≤ 135 000 L)(1) 4 500 (if Q > 135 000 L and ≤ 162 000 L)(1) 5 400 (if Q > 162 000 L and ≤ 190 000 L)(1) 6 300 (if Q > 190 000 L and ≤ 270 000 L)(1) 9 000 (if Q > 270 000 L)(1)

Notes to Table 2:
(1) $Q = KVS_{tot}$ as referenced in Paragraph 3(a)

TABLE B4

ESTIMATED WATER PRESSURE AT PROPOSED BUILDING FFE

Description	From	To	Demand (L/sec)	Pipe Length (m)	Pipe Dia (mm)	Dia (m)	Q (m3/sec)	Area (m2)	C	Vel (m/s)	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)
Avg Day Conditons																				
Single 100mm water service	Main	Building	0.09	7 m	50	0.050	0.0001	0.001963	110	0.0439	0.00011	0.0008	61.75	62.06	-0.3	524.3	(76.0)	521.3	(75.6)	0.4
Max Day Conditons																				
Single 100mm watermain	Main	Building	0.82	7 m	50	0.050	0.0008	0.001963	110	0.4171	0.00736	0.0522	61.75	62.06	-0.3	450.8	(65.4)	447.2	(64.9)	0.5
Peak Hour Conditons																				
Single 100mm watermain	Main	Building	1.23	7 m	50	0.050	0.0012	0.001963	110	0.6278	0.01569	0.1114	61.75	62.06	-0.3	450.8	(65.4)	446.6	(64.8)	0.6
Max Day plus Sprinkler Demands																				
Single 100mm watermain	Main	Building	1.23	7 m	100	0.100	0.0308	0.007854	110	3.924	0.20829	1.4789	61.75	62.06	-0.3	459.6	(66.7)	442.0	(64.1)	2.5

Water Demand Info

Average Demand =	0.09	L/sec
Max Day Demand =	0.82	L/sec
Peak Hr Deamand =	1.23	L/sec
Fireflow Requriement =	133.3	L/sec
Max Day Plus FF Demand =	134.2	L/sec
Assumed Sprinkler Demands =	30.0	L/sec

Pipe Lengths

From watermain to building =	7 m
Hazen Williams C Factor for Friction Loss in Pipe, C=	110

Boundary Conditon

	Min HGL	Max HGL	Max Day + Fireflow	Max Day + FireFlow (OBC)	
HGL (m)	107.7	115.2	97.6	108.6	(From City of Ottawa)
Approx Ground Elev (m) =	61.75	61.75	61.75	61.75	
Approx Bldg FF Elev (m) =	62.06	62.06	62.06	62.06	
Pressure (m) =	45.95	53.45	35.85	46.85	
Pressure (Pa) =	450,770	524,345	351,689	459,599	
Pressure (psi) =	65.4	76.0	51.0	66.7	

Appendix C – Sanitary Servicing Tables

Table C-1 – Sanitary Demand Chart

TABLE C1 : SANITARY DEMAND CHART

LOCATION				RESEDENTIAL AREAS AND POPULAITONS												INFILTRATION				SEWER DATA						
					NUMBER OF UNITS							POPULATION				AREA (ha)										
Street	U/S MH	D/S MH	Desc	Area (ha)	Singles	Semis	Towns	1-Bed Apt.	2-Bed Apt.	3-Bed Apt.	4-Bed Apt.	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)
Carruthers	BLDG			0.046				13	4			26.6	26.6	3.69	0.318	0.046	0.046	0.015	***0.333***	150	148.01	2.00	9.90	20.8	1.6%	1.7
				0.046				**13**				**27**				**0.046**										

Residential Avg. Daily Flow, q (L/p/day) = 280
Residential Correction Factor, K = 0.80
Manning N = 0.013
Peak extraneous flow, I (L/s/ha) = 0.33

Peak Population Flow, (L/sec) = P*q*M/86.4
Peak Extraneous Flow, (L/sec) = I*Ac
Residential Peaking Factor, M = 1 + (14/(4+P^0.5)) * K
A_c = Cumulative Area (hectares)
P = Population (thousands)
Sewer Capacity, Qcap (L/sec) = $1/N \; S^{1/2} \; R^{2/3} \; A_c$
(Manning's Equation)

Unti Type	Persons/Unit
Singles	3.0
Semi-Detached	2.7
Townhomes	2.7
Single Apt. Unit	1.4
2-bed Apt. Unit	2.1
3-bed Apt. Unit	3.1
4-bed Apt. Unit	3.8

Designed:	Project:
A. Jariwala, P.Eng.	OTT-24006545-A0
Checked:	**Location:**
A. Jariwala, P.Eng.	116-118 Carruthers Ave., Ottawa, ON
File Reference:	**Page No:**
24006545 - Sanitary - SAN Design Sheet.xlsx	**1 of 1**

Appendix D – Stormwater Servicing Tables

Table D-1 – Calculation of Average Runoff Coefficients for Pre-Development Conditions

Table D-2 – Calculation of Catchment Time of Concentration for Pre-Development Conditions

Table D-3 – Calculation of Peak Runoff for Pre-Development Conditions

Table D-4 – Calculation of Allowable Release Rate With C=0.5

Table D-5 – Average Runoff Coefficients for Post-Development Conditions

Table D-6 – Summary Of Post-Development Peak Flows (Uncontrolled and Controlled)

Table D-7 – 2-Year, 5-Year & 100-Year Roof Drains Design Sheet - Using Flow Controlled Roof Drains

Table D-8 – Storage Volumes Roof Area R-A (2 Year, 5 Year And 100 Year Storms) (MRM)

Table D-9 – Storage Volumes Roof Area R-B (2 Year, 5 Year And 100 Year Storms) (MRM)

Table D-10 – Storage Volumes Roof Area R-C (2 Year, 5 Year And 100 Year Storms) (MRM)

Table D-11 – Storage Volumes Roof Area R-D (2 Year, 5 Year And 100 Year Storms) (MRM)

Table D-12 – Storage Volumes Area P-1 (2 Year, 5 Year And 100 Year Storms) (MRM)

Table D-13 – Storage Volumes Area P-2 (2 Year, 5 Year And 100 Year Storms) (MRM)

Table D-14 – Storm Sewer Design Sheet – 5-Year

Hydrovex Flow Regulator Slection & Literature & Sizing Chart

TABLE D1

CALCULATION OF AVERAGE RUNOFF COEFFICIENTS FOR PRE-DEVELOPMENT CONDITIONS

Area No.	Roof Areas		Asphalt/Conc./Pavers		Reserved		Gravel		Grassed Areas		Sum AC	Total Area (m^2)	C_{AVG}
	C=0.90		C=0.90				C=0.70		C=0.20				
	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			
E1 (SITE)	249.89	224.9	64.42	58.0			136.02	95.2	5.75	1.1	379.2	456.07	0.83

TABLE D2

CALCULATION OF CATCHMENT TIME OF CONCENTRATION FOR PRE-DEVELOPMENT CONDITIONS

Catchment No.	Area (ha)	High Elev (m)	Low Elev (m)	Flow Path Length (m)	Indiv Slope	Avg. C	Time of Conc. Tc (mins)	Description
E1 (SITE)	0.0456	62.69	61.85	29.6	2.8	0.83	1.86	10 minutes

Notes

1) For Catchments with Runoff Coefficient less than C=0.40, Time of Concentration Based on Federal Aviation Formula (Airport Method), from MTO Drainage Manual Equation 8.16, where: $T_C = 3.26 * (1.1-C) * L^{0.5} / S_W^{0.33}$

2) For Catchments with Runoff Coefficient greater than C=0.40, Time of Concentration Based on Bransby Williams Equation, from MTO Drainage Manual Equation 8.15, where: $T_C = 0.057 * L / (S_W^{0.2} * A^{0.1})$

TABLE D3

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)
E1 (SITE)	OFFSITE	0.0456	10	76.81	0.83	**8.1**	104.19	0.83	**11.0**	178.56	1.00	**22.6**

<u>Notes</u>

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

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

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

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 D4

CALCULATION OF ALLOWABLE RELEASE RATE WITH C=0.5

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)
E1 (SITE)	OFFSITE	0.0456	10	76.81	0.50	**4.9**	104.19	0.50	**6.6**	178.56	0.63	**14.1**

Allowable release rate

<u>Notes</u>

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

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

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

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 D5

AVERAGE RUNOFF COEFFICIENTS FOR POST-DEVELOPMENT CONDITIONS

Area No.	Roof Areas		Asphalt/Conc./Pavers		Gravel		Grassed Areas		Sum AC	Total Area (m^2)	C_{AVG}
	C=0.90		C=0.90		C=0.70		C=0.20				
	Area (m^2)	A * C	Area (m^2)	A * C	Area (m^2)	A * C	Area (m^2)	A * C			
R-L	15	13.2							13.2	14.61	0.90
R-A	59	52.7							52.7	58.58	0.90
R-B	53	47.6							47.6	52.91	0.90
R-C	43	38.8							38.8	43.10	0.90
R-D	42	37.6							37.6	41.72	0.90
P1			52	46.4			66	13.3	59.6	117.79	0.51
P2	16	14.0	7	5.9	79	55.4	26	5.2	80.6	127.35	0.63
Totals									330.0	456	0.72
Notes											

TABLE D6

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

Area No	Area (ha)	Time of Conc, Tc (min)	Storm = 2 yr				Storm = 5 yr				Storm = 100 yr				ICD
			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)	
R-L	0.0015	10	0.90	76.81	0.28	0.28	0.90	104.19	0.38	0.38	1.00	178.56	0.73	0.73	Uncontrolled
R-A	0.0059	10	0.90	76.81	1.13	**(0.32)**	0.90	104.19	1.53	**(0.32)**	1.00	178.56	2.91	**(0.32)**	Watts Accutrol 1 weir - Closed
R-B	0.0053	10	0.90	76.81	1.02	**(0.72)**	0.90	104.19	1.38	**(0.78)**	1.00	178.56	2.63	**(0.91)**	Watts Accutrol 1 weir - 1/4 Open
R-C	0.0043	10	0.90	76.81	0.83	**(0.32)**	0.90	104.19	1.12	**(0.32)**	1.00	178.56	2.14	**(0.32)**	Watts Accutrol 1 weir - Closed
R-D	0.0042	10	0.90	76.81	0.80	**(0.32)**	0.90	104.19	1.09	**(0.32)**	1.00	178.56	2.07	**(0.32)**	Watts Accutrol 1 weir - Closed
P1	0.0118	10	0.51	76.81	1.27	**(0.52)**	0.51	104.19	1.73	**(0.70)**	0.63	178.56	3.70	**(1.50)**	Hydrovex 50 VHV-1
P2	0.0127	10	0.63	76.81	1.72	**(0.86)**	0.63	104.19	2.33	**(1.17)**	0.79	178.56	5.00	**(2.50)**	Hydrovex 50 VHV-1
Post-Dev Site	**0.0456**				7.0	**(3.3)**			9.6	**(4.0)**			19.2	**(6.6)**	
Pre-Dev Site (C=0.5)						4.9				6.6				6.6	

__Notes__

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

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

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

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

5) Time of Concentration, Tc = ***__10 mins__***

5) Controlled release rate (Q_{CAP}) is denoted by **(1.03)**

Table D7: 2-year, 5-year & 100-year Roof Drains Design Sheet - Using Flow Controlled Roof Drains

Project: OTT-24006545-A0
Location: 116-118 Carruthers Ave., Ottawa, ON
Date: October 2024

Area #	Roof Drain Type	No Drains per Area	No of Weirs per Drain	Weir Position	Runoff Coeff (Cavg) 2-year & 5-year	Runoff Coeff (Cavg) 100-year	Drainage Area m^2	Drainage Area ha	2-year Event: Runoff Rate (L/sec)	2yr Ponding Depth (mm)	Roof Drain Capacity Per Weir (gpm)	Roof Drain Capacity Per Drain per weir (gpm)	Roof Drain Capacity Per Drain (L/sec)	Total Flow From Roof Drains (L/sec)	5-year Event: Runoff Rate (L/sec)	5yr Ponding Depth (mm)	Roof Drain Capacity Per Weir (gpm)	Roof Drain Capacity Per Drain per weir (gpm)	Roof Drain Capacity Per Drain (L/sec)	Total Flow From Roof Drains (L/sec)
R-A	RD1	1	1	2-Closed	0.90	1.00	58.58	0.0059	1.126	92	5.0	5.0	0.315	0.315	1.527	108	5.0	5.0	0.315	0.315
R-B	RD2	1	1	3-1/4 open	0.90	1.00	52.91	0.0053	1.017	78	11.4	11.4	0.719	0.719	1.379	96	12.3	12.3	0.776	0.776
R-C	RD3	1	1	2-Closed	0.90	1.00	43.10	0.0043	0.828	89	5.0	5.0	0.315	0.315	1.124	106	5.0	5.0	0.315	0.315
R-D	RD4	1	1	2-Closed	0.90	1.00	41.72	0.0042	0.802	88	5.0	5.0	0.315	0.315	1.088	105	5.0	5.0	0.315	0.315
Totals					0.9	0.9	**196.3**	**0.0196**	**3.77**		**26.40**		**1.67**	**1.67**	**5.12**		**27.30**		**1.72**	**1.72**
Min										**78**						**96**				
Max										**92**						**108**				

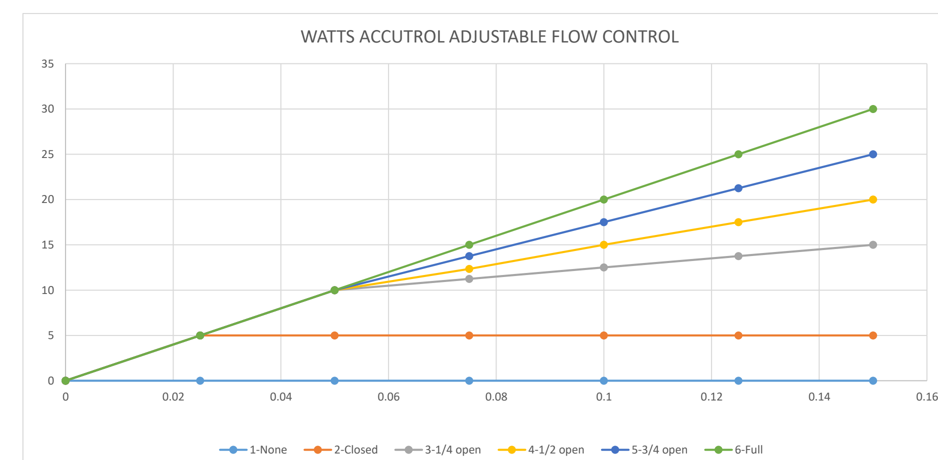
Area #	100-year Event: Runoff Rate (L/sec)	100yr Ponding Depth (mm)	Roof Drain Capacity Per Weir (gpm)	Roof Drain Capacity Per Drain per weir (gpm)	Roof Drain Capacity Per Drain (L/sec)	Total Flow From Roof Drains (L/sec)	Storage Required (*MRM*) 2-year (m^3)	Storage Required 5-year (m^3)	Storage Required 100-year (m^3)	Maximum Storage Provided at Spill Elevation: Area Available for Storage (m^2)	Max Prism Depth (mm)	Max Prisim Volume (m^3)	% Volume Used for Ponding 2-year	% Volume Used for Ponding 5-year	% Volume Used for Ponding 100-year	
R-A	2.908	147	5.0	5.0	0.315	0.315	0.54	0.87	2.18	46.9	150	2.3	23%	37%	93%	R-A
R-B	2.627	138	14.4	14.4	0.908	0.908	0.20	0.36	1.07	27.6	150	1.4	14%	26%	78%	R-B
R-C	2.139	147	5.0	5.0	0.315	0.315	0.32	0.53	1.42	30.2	150	1.5	21%	35%	94%	R-C
R-D	2.071	146	5.0	5.0	0.315	0.315	0.30	0.50	1.35	29.2	150	1.5	20%	34%	92%	R-D
Totals	**9.74**		**29.40**		**1.85**	**1.85**	**1.34**	**2.26**	**6.02**	**134**		**6.7**				
Min		**138**														
Max		**147**														

Runoff Based on the Following:

Storm Frequency (years) =	2	5	100
Time of Conc (mins) =	10	10	10
Storm Intensity (mm/hr) =	76.8	104.2	178.6

Roof Drain Types

Drain Type =	RD1	RD2	RD3
Max Overflow Depth (mm)	150 mm	150 mm	150 mm
Flow Controlled (Yes/No)	Yes	Yes	Yes
Ponding	Yes	Yes	Yes
Weir Desc	Accutrol	Accutrol	Accutrol
No. Weirs	1	2	3



Roof Drains have Following Flow Rates per weir: WATTS Flow Controlled Drain

Weir Position	Flow (gpm) per depth							Max Flow Rate per Weir @150mm (L/s)
	0	25	50	75	100	125	150	
	0	0.025	0.05	0.075	0.1	0.125	0.15	
1-None	0	0	0	0	0	0	0	0.000
2-Closed	0	5	5	5	5	5	5	0.315
3-1/4 open	0	5	10	11	13	14	15	0.946
4-1/2 open	0	5	10	12	15	18	20	1.262
5-3/4 open	0	5	10	14	18	21	25	1.577
6-Full	0	5	10	15	20	25	30	1.890

Table D8 Storage Volumes Roof Area R-A (2 Year, 5 Year and 100 Year Storms) (MRM)

C_{AVG} = 0.90 (dimmensionless)

C_{100} = 1.00

Time Interval = 5 (mins)

Drainage Area = 0.00586 (hectares)

	2 Year: Release Rate = 0.31545 (L/sec); Return Period = 2 (years); IDF Parameters, A = 732.951, B = 0.810, C = 6.199 ($I = A/(T_c+C)$)					5 Year: Release Rate = 0.3155 (L/sec); Return Period = 5 (years); IDF Parameters, A = 998.071, B = 0.814, C = 6.053 ($I = A/(T_c+C)$)					100 Year: Release Rate = 0.3155 (L/sec); Return Period = 100 (years); IDF Parameters, A = 1735.69, B = 0.820, C = 6.014 ($I = A/(T_c+C)$)				
Duration (min)	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	2.5	0.32	2.1	0.00	230.5	3.4	0.315	3.1	0.00	398.6	6.5	0.3	6.2	0.00
5	103.6	1.5	0.32	1.2	0.36	141.2	2.1	0.315	1.8	0.53	242.7	4.0	0.3	3.6	1.09
10	76.8	1.1	0.32	0.8	0.49	104.2	1.5	0.315	1.2	0.73	178.6	2.9	0.3	2.6	1.56
15	61.8	0.9	0.32	0.6	0.53	83.6	1.2	0.315	0.9	0.82	142.9	2.3	0.3	2.0	1.81
20	52.0	0.8	0.32	0.4	0.54	70.3	1.0	0.315	0.7	0.86	120.0	2.0	0.3	1.6	1.97
25	45.2	0.7	0.32	0.3	0.52	60.9	0.9	0.315	0.6	0.87	103.8	1.7	0.3	1.4	2.06
30	40.0	0.6	0.32	0.3	0.49	53.9	0.8	0.315	0.5	0.85	91.9	1.5	0.3	1.2	2.12
35	36.1	0.5	0.32	0.2	0.45	48.5	0.7	0.315	0.4	0.83	82.6	1.3	0.3	1.0	2.16
40	32.9	0.5	0.32	0.2	0.40	44.2	0.6	0.315	0.3	0.80	75.1	1.2	0.3	0.9	2.18
45	30.2	0.4	0.32	0.1	0.34	40.6	0.6	0.315	0.3	0.76	69.1	1.1	0.3	0.8	2.18
50	28.0	0.4	0.32	0.1	0.29	37.7	0.6	0.315	0.2	0.71	64.0	1.0	0.3	0.7	2.18
55	26.2	0.4	0.32	0.1	0.22	35.1	0.5	0.315	0.2	0.66	59.6	1.0	0.3	0.7	2.16
60	24.6	0.4	0.32	0.0	0.16	32.9	0.5	0.315	0.2	0.60	55.9	0.9	0.3	0.6	2.14
65	23.2	0.3	0.32	0.0	0.09	31.0	0.5	0.315	0.1	0.54	52.6	0.9	0.3	0.5	2.11
70	21.9	0.3	0.32	0.0	0.02	29.4	0.4	0.315	0.1	0.48	49.8	0.8	0.3	0.5	2.08
75	20.8	0.3	0.32	0.0	-0.05	27.9	0.4	0.315	0.1	0.42	47.3	0.8	0.3	0.5	2.04
80	19.8	0.3	0.32	0.0	-0.12	26.6	0.4	0.315	0.1	0.35	45.0	0.7	0.3	0.4	2.00
85	18.9	0.3	0.32	0.0	-0.19	25.4	0.4	0.315	0.1	0.29	43.0	0.7	0.3	0.4	1.96
90	18.1	0.3	0.32	0.0	-0.27	24.3	0.4	0.315	0.0	0.22	41.1	0.7	0.3	0.4	1.91
95	17.4	0.3	0.32	-0.1	-0.34	23.3	0.3	0.315	0.0	0.15	39.4	0.6	0.3	0.3	1.86
100	16.7	0.2	0.32	-0.1	-0.42	22.4	0.3	0.315	0.0	0.08	37.9	0.6	0.3	0.3	1.81
105	16.1	0.2	0.32	-0.1	-0.50	21.6	0.3	0.315	0.0	0.01	36.5	0.6	0.3	0.3	1.76
110	15.6	0.2	0.32	-0.1	-0.58	20.8	0.3	0.315	0.0	-0.07	35.2	0.6	0.3	0.3	1.70
115	15.0	0.2	0.32	-0.1	-0.66	20.1	0.3	0.315	0.0	-0.14	34.0	0.6	0.3	0.2	1.64
120	14.6	0.2	0.32	-0.1	-0.73	19.5	0.3	0.315	0.0	-0.22	32.9	0.5	0.3	0.2	1.59
Max =					**0.54**					**0.87**					**2.18**

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

Table D9 Storage Volumes Roof Area R-B (2 Year, 5 Year and 100 Year Storms) (MRM)

C_{AVG} = 0.90 (dimmensionless)

C_{100} = 1.00

Time Interval = 5 (mins)

Drainage Area = 0.00529 (hectares)

	2 Year: Release Rate = 0.71923 (L/sec); Return Period = 2 (years); IDF Parameters, A = 732.951, B = 0.810, C = 6.199 ($I = A/(T_c+C)$)					5 Year: Release Rate = 0.7760 (L/sec); Return Period = 5 (years); IDF Parameters, A = 998.071, B = 0.814, C = 6.053 ($I = A/(T_c+C)$)					100 Year: Release Rate = 0.9085 (L/sec); Return Period = 100 (years); IDF Parameters, A = 1735.69, B = 0.820, C = 6.014 ($I = A/(T_c+C)$)				
Duration (min)	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	2.2	0.72	1.5	0.00	230.5	3.1	0.776	2.3	0.00	398.6	5.9	0.9	5.0	0.00
5	103.6	1.4	0.72	0.7	0.20	141.2	1.9	0.776	1.1	0.33	242.7	3.6	0.9	2.7	0.80
10	76.8	1.0	0.72	0.3	0.18	104.2	1.4	0.776	0.6	0.36	178.6	2.6	0.9	1.7	1.03
15	61.8	0.8	0.72	0.1	0.09	83.6	1.1	0.776	0.3	0.30	142.9	2.1	0.9	1.2	1.07
20	52.0	0.7	0.72	0.0	-0.04	70.3	0.9	0.776	0.2	0.18	120.0	1.8	0.9	0.9	1.03
25	45.2	0.6	0.72	-0.1	-0.18	60.9	0.8	0.776	0.0	0.05	103.8	1.5	0.9	0.6	0.93
30	40.0	0.5	0.72	-0.2	-0.34	53.9	0.7	0.776	-0.1	-0.11	91.9	1.4	0.9	0.4	0.80
35	36.1	0.5	0.72	-0.2	-0.51	48.5	0.6	0.776	-0.1	-0.28	82.6	1.2	0.9	0.3	0.64
40	32.9	0.4	0.72	-0.3	-0.68	44.2	0.6	0.776	-0.2	-0.46	75.1	1.1	0.9	0.2	0.47
45	30.2	0.4	0.72	-0.3	-0.86	40.6	0.5	0.776	-0.2	-0.64	69.1	1.0	0.9	0.1	0.29
50	28.0	0.4	0.72	-0.3	-1.04	37.7	0.5	0.776	-0.3	-0.83	64.0	0.9	0.9	0.0	0.10
55	26.2	0.3	0.72	-0.4	-1.23	35.1	0.5	0.776	-0.3	-1.03	59.6	0.9	0.9	0.0	-0.10
60	24.6	0.3	0.72	-0.4	-1.42	32.9	0.4	0.776	-0.3	-1.22	55.9	0.8	0.9	-0.1	-0.31
65	23.2	0.3	0.72	-0.4	-1.61	31.0	0.4	0.776	-0.4	-1.42	52.6	0.8	0.9	-0.1	-0.52
70	21.9	0.3	0.72	-0.4	-1.80	29.4	0.4	0.776	-0.4	-1.63	49.8	0.7	0.9	-0.2	-0.74
75	20.8	0.3	0.72	-0.4	-2.00	27.9	0.4	0.776	-0.4	-1.83	47.3	0.7	0.9	-0.2	-0.96
80	19.8	0.3	0.72	-0.5	-2.19	26.6	0.4	0.776	-0.4	-2.04	45.0	0.7	0.9	-0.2	-1.18
85	18.9	0.3	0.72	-0.5	-2.39	25.4	0.3	0.776	-0.4	-2.24	43.0	0.6	0.9	-0.3	-1.41
90	18.1	0.2	0.72	-0.5	-2.59	24.3	0.3	0.776	-0.5	-2.45	41.1	0.6	0.9	-0.3	-1.64
95	17.4	0.2	0.72	-0.5	-2.79	23.3	0.3	0.776	-0.5	-2.66	39.4	0.6	0.9	-0.3	-1.87
100	16.7	0.2	0.72	-0.5	-2.99	22.4	0.3	0.776	-0.5	-2.88	37.9	0.6	0.9	-0.4	-2.11
105	16.1	0.2	0.72	-0.5	-3.19	21.6	0.3	0.776	-0.5	-3.09	36.5	0.5	0.9	-0.4	-2.34
110	15.6	0.2	0.72	-0.5	-3.39	20.8	0.3	0.776	-0.5	-3.30	35.2	0.5	0.9	-0.4	-2.58
115	15.0	0.2	0.72	-0.5	-3.59	20.1	0.3	0.776	-0.5	-3.52	34.0	0.5	0.9	-0.4	-2.82
120	14.6	0.2	0.72	-0.5	-3.79	19.5	0.3	0.776	-0.5	-3.73	32.9	0.5	0.9	-0.4	-3.06
Max =					**0.20**					**0.36**					**1.07**

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

Table D10 Storage Volumes Roof Area R-C (2 Year, 5 Year and 100 Year Storms) (MRM)

C_{AVG} = 0.90 (dimmensionless)

C_{100} = 1.00

Time Interval = 5 (mins)

Drainage Area = 0.00431 (hectares)

	2 Year					5 Year					100 Year				
	Release Rate = 0.315 (L/sec)					Release Rate = 0.3155 (L/sec)					Release Rate = 0.3155 (L/sec)				
	Return Period = 2 (years)					Return Period = 5 (years)					Return Period = 100 (years)				
	IDF Parameters, A = 732.951, B = 0.810					IDF Parameters, A = 998.071, B = 0.814					IDF Parameters, A = 1735.69, B = 0.820				
	(I = A/(T_c+C)), C = 6.199					(I = A/(T_c+C)), C = 6.053					(I = A/(T_c+C)), C = 6.014				
Duration (min)	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	1.8	0.32	1.5	0.00	230.5	2.5	0.315	2.2	0.00	398.6	4.8	0.3	4.5	0.00
5	103.6	1.1	0.32	0.8	0.24	141.2	1.5	0.315	1.2	0.36	242.7	2.9	0.3	2.6	0.78
10	76.8	0.8	0.32	0.5	0.31	104.2	1.1	0.315	0.8	0.48	178.6	2.1	0.3	1.8	1.09
15	61.8	0.7	0.32	0.4	0.32	83.6	0.9	0.315	0.6	0.53	142.9	1.7	0.3	1.4	1.26
20	52.0	0.6	0.32	0.2	0.29	70.3	0.8	0.315	0.4	0.53	120.0	1.4	0.3	1.1	1.35
25	45.2	0.5	0.32	0.2	0.26	60.9	0.7	0.315	0.3	0.51	103.8	1.2	0.3	0.9	1.39
30	40.0	0.4	0.32	0.1	0.21	53.9	0.6	0.315	0.3	0.48	91.9	1.1	0.3	0.8	1.41
35	36.1	0.4	0.32	0.1	0.15	48.5	0.5	0.315	0.2	0.44	82.6	1.0	0.3	0.7	1.42
40	32.9	0.4	0.32	0.0	0.09	44.2	0.5	0.315	0.2	0.39	75.1	0.9	0.3	0.6	1.40
45	30.2	0.3	0.32	0.0	0.03	40.6	0.4	0.315	0.1	0.33	69.1	0.8	0.3	0.5	1.38
50	28.0	0.3	0.32	0.0	-0.04	37.7	0.4	0.315	0.1	0.27	64.0	0.8	0.3	0.5	1.35
55	26.2	0.3	0.32	0.0	-0.11	35.1	0.4	0.315	0.1	0.21	59.6	0.7	0.3	0.4	1.32
60	24.6	0.3	0.32	-0.1	-0.18	32.9	0.4	0.315	0.0	0.14	55.9	0.7	0.3	0.4	1.28
65	23.2	0.2	0.32	-0.1	-0.26	31.0	0.3	0.315	0.0	0.08	52.6	0.6	0.3	0.3	1.23
70	21.9	0.2	0.32	-0.1	-0.33	29.4	0.3	0.315	0.0	0.01	49.8	0.6	0.3	0.3	1.18
75	20.8	0.2	0.32	-0.1	-0.41	27.9	0.3	0.315	0.0	-0.07	47.3	0.6	0.3	0.3	1.13
80	19.8	0.2	0.32	-0.1	-0.49	26.6	0.3	0.315	0.0	-0.14	45.0	0.5	0.3	0.2	1.07
85	18.9	0.2	0.32	-0.1	-0.57	25.4	0.3	0.315	0.0	-0.21	43.0	0.5	0.3	0.2	1.02
90	18.1	0.2	0.32	-0.1	-0.65	24.3	0.3	0.315	-0.1	-0.29	41.1	0.5	0.3	0.2	0.96
95	17.4	0.2	0.32	-0.1	-0.73	23.3	0.3	0.315	-0.1	-0.37	39.4	0.5	0.3	0.2	0.90
100	16.7	0.2	0.32	-0.1	-0.81	22.4	0.2	0.315	-0.1	-0.44	37.9	0.5	0.3	0.1	0.83
105	16.1	0.2	0.32	-0.1	-0.89	21.6	0.2	0.315	-0.1	-0.52	36.5	0.4	0.3	0.1	0.77
110	15.6	0.2	0.32	-0.1	-0.97	20.8	0.2	0.315	-0.1	-0.60	35.2	0.4	0.3	0.1	0.70
115	15.0	0.2	0.32	-0.2	-1.06	20.1	0.2	0.315	-0.1	-0.68	34.0	0.4	0.3	0.1	0.63
120	14.6	0.2	0.32	-0.2	-1.14	19.5	0.2	0.315	-0.1	-0.76	32.9	0.4	0.3	0.1	0.57
Max =					**0.32**					**0.53**					**1.42**

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

Table D11 Storage Volumes Roof Area R-D (2 Year, 5 Year and 100 Year Storms) (MRM)

C_{AVG} = 0.90 (dimmensionless)
C_{100} = 1.00
Time Interval = 5 (mins)
Drainage Area = 0.00417 (hectares)

	2 Year					5 Year					100 Year				
	Release Rate = 0.315 (L/sec)					Release Rate = 0.3155 (L/sec)					Release Rate = 0.3155 (L/sec)				
	Return Period = 2 (years)					Return Period = 5 (years)					Return Period = 100 (years)				
	IDF Parameters, A = 732.951, B = 0.810					IDF Parameters, A = 998.071, B = 0.814					IDF Parameters, A = 1735.69, B = 0.820				
	(I = A/(T_c+C), C = 6.199					(I = A/(T_c+C), C = 6.053					(I = A/(T_c+C), C = 6.014				
Duration (min)	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	1.7	0.32	1.4	0.00	230.5	2.4	0.315	2.1	0.00	398.6	4.6	0.3	4.3	0.00
5	103.6	1.1	0.32	0.8	0.23	141.2	1.5	0.315	1.2	0.35	242.7	2.8	0.3	2.5	0.75
10	76.8	0.8	0.32	0.5	0.29	104.2	1.1	0.315	0.8	0.46	178.6	2.1	0.3	1.8	1.05
15	61.8	0.6	0.32	0.3	0.30	83.6	0.9	0.315	0.6	0.50	142.9	1.7	0.3	1.3	1.21
20	52.0	0.5	0.32	0.2	0.27	70.3	0.7	0.315	0.4	0.50	120.0	1.4	0.3	1.1	1.29
25	45.2	0.5	0.32	0.2	0.23	60.9	0.6	0.315	0.3	0.48	103.8	1.2	0.3	0.9	1.33
30	40.0	0.4	0.32	0.1	0.18	53.9	0.6	0.315	0.2	0.45	91.9	1.1	0.3	0.8	1.35
35	36.1	0.4	0.32	0.1	0.13	48.5	0.5	0.315	0.2	0.40	82.6	1.0	0.3	0.6	1.35
40	32.9	0.3	0.32	0.0	0.07	44.2	0.5	0.315	0.1	0.35	75.1	0.9	0.3	0.6	1.33
45	30.2	0.3	0.32	0.0	0.00	40.6	0.4	0.315	0.1	0.29	69.1	0.8	0.3	0.5	1.31
50	28.0	0.3	0.32	0.0	-0.07	37.7	0.4	0.315	0.1	0.23	64.0	0.7	0.3	0.4	1.28
55	26.2	0.3	0.32	0.0	-0.14	35.1	0.4	0.315	0.1	0.17	59.6	0.7	0.3	0.4	1.24
60	24.6	0.3	0.32	-0.1	-0.21	32.9	0.3	0.315	0.0	0.10	55.9	0.6	0.3	0.3	1.20
65	23.2	0.2	0.32	-0.1	-0.29	31.0	0.3	0.315	0.0	0.03	52.6	0.6	0.3	0.3	1.15
70	21.9	0.2	0.32	-0.1	-0.36	29.4	0.3	0.315	0.0	-0.04	49.8	0.6	0.3	0.3	1.10
75	20.8	0.2	0.32	-0.1	-0.44	27.9	0.3	0.315	0.0	-0.11	47.3	0.5	0.3	0.2	1.05
80	19.8	0.2	0.32	-0.1	-0.52	26.6	0.3	0.315	0.0	-0.18	45.0	0.5	0.3	0.2	0.99
85	18.9	0.2	0.32	-0.1	-0.60	25.4	0.3	0.315	-0.1	-0.26	43.0	0.5	0.3	0.2	0.93
90	18.1	0.2	0.32	-0.1	-0.68	24.3	0.3	0.315	-0.1	-0.33	41.1	0.5	0.3	0.2	0.87
95	17.4	0.2	0.32	-0.1	-0.76	23.3	0.2	0.315	-0.1	-0.41	39.4	0.5	0.3	0.1	0.81
100	16.7	0.2	0.32	-0.1	-0.84	22.4	0.2	0.315	-0.1	-0.49	37.9	0.4	0.3	0.1	0.75
105	16.1	0.2	0.32	-0.1	-0.93	21.6	0.2	0.315	-0.1	-0.57	36.5	0.4	0.3	0.1	0.68
110	15.6	0.2	0.32	-0.2	-1.01	20.8	0.2	0.315	-0.1	-0.65	35.2	0.4	0.3	0.1	0.61
115	15.0	0.2	0.32	-0.2	-1.09	20.1	0.2	0.315	-0.1	-0.73	34.0	0.4	0.3	0.1	0.55
120	14.6	0.2	0.32	-0.2	-1.18	19.5	0.2	0.315	-0.1	-0.81	32.9	0.4	0.3	0.1	0.48
Max =					**0.30**					**0.50**					**1.35**

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

Table D12 Storage Volumes Area P-1 (2 Year, 5 Year and 100 Year Storms) (MRM)

C_{AVG} = 0.51 (dimmensionless)

C_{100} = 0.63

Time Interval = 5 (mins)

Drainage Area = 0.01178 (hectares)

Actual Release Rate (L/sec) = 1.50

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) = 0.75

	Release Rate = 0.2581 (L/sec); Return Period = 2 (years); IDF Parameters, A = 732.951, B = 0.810, C = 6.199 (I = A/(T_c+C))					Release Rate = 0.3501 (L/sec); Return Period = 5 (years); IDF Parameters, A = 998.071, B = 0.814, C = 6.053 (I = A/(T_c+C))					Release Rate = 0.7500 (L/sec); Return Period = 100 (years); IDF Parameters, A = 1735.69, B = 0.820, C = 6.014 (I = A/(T_c+C))				
Duration (min)	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	2.8	0.26	2.5	0.00	230.5	3.8	0.350	3.5	0.00	398.6	8.3	0.8	7.5	0.00
5	103.6	1.7	0.26	1.5	0.44	141.2	2.3	0.350	2.0	0.60	242.7	5.0	0.8	4.3	1.28
10	76.8	1.3	0.26	1.0	0.61	104.2	1.7	0.350	1.4	0.83	178.6	3.7	0.8	2.9	1.77
15	61.8	1.0	0.26	0.8	0.69	83.6	1.4	0.350	1.0	0.93	142.9	3.0	0.8	2.2	1.99
20	52.0	0.9	0.26	0.6	0.73	70.3	1.2	0.350	0.8	0.98	120.0	2.5	0.8	1.7	2.08
25	45.2	0.7	0.26	0.5	0.74	60.9	1.0	0.350	0.7	0.99	103.8	2.2	0.8	1.4	2.10
30	40.0	0.7	0.26	0.4	0.73	53.9	0.9	0.350	0.5	0.98	91.9	1.9	0.8	1.2	2.08
35	36.1	0.6	0.26	0.3	0.71	48.5	0.8	0.350	0.5	0.95	82.6	1.7	0.8	1.0	2.02
40	32.9	0.5	0.26	0.3	0.69	44.2	0.7	0.350	0.4	0.92	75.1	1.6	0.8	0.8	1.94
45	30.2	0.5	0.26	0.2	0.66	40.6	0.7	0.350	0.3	0.87	69.1	1.4	0.8	0.7	1.84
50	28.0	0.5	0.26	0.2	0.62	37.7	0.6	0.350	0.3	0.82	64.0	1.3	0.8	0.6	1.72
55	26.2	0.4	0.26	0.2	0.58	35.1	0.6	0.350	0.2	0.77	59.6	1.2	0.8	0.5	1.60
60	24.6	0.4	0.26	0.1	0.54	32.9	0.5	0.350	0.2	0.71	55.9	1.2	0.8	0.4	1.47
65	23.2	0.4	0.26	0.1	0.49	31.0	0.5	0.350	0.2	0.64	52.6	1.1	0.8	0.3	1.33
70	21.9	0.4	0.26	0.1	0.44	29.4	0.5	0.350	0.1	0.57	49.8	1.0	0.8	0.3	1.18
75	20.8	0.3	0.26	0.1	0.39	27.9	0.5	0.350	0.1	0.50	47.3	1.0	0.8	0.2	1.03
80	19.8	0.3	0.26	0.1	0.34	26.6	0.4	0.350	0.1	0.43	45.0	0.9	0.8	0.2	0.87
85	18.9	0.3	0.26	0.1	0.29	25.4	0.4	0.350	0.1	0.36	43.0	0.9	0.8	0.1	0.71
90	18.1	0.3	0.26	0.0	0.23	24.3	0.4	0.350	0.1	0.28	41.1	0.9	0.8	0.1	0.55
95	17.4	0.3	0.26	0.0	0.17	23.3	0.4	0.350	0.0	0.21	39.4	0.8	0.8	0.1	0.38
100	16.7	0.3	0.26	0.0	0.12	22.4	0.4	0.350	0.0	0.13	37.9	0.8	0.8	0.0	0.21
105	16.1	0.3	0.26	0.0	0.06	21.6	0.4	0.350	0.0	0.05	36.5	0.8	0.8	0.0	0.04
110	15.6	0.3	0.26	0.0	0.00	20.8	0.3	0.350	0.0	-0.03	35.2	0.7	0.8	0.0	-0.14
115	15.0	0.2	0.26	0.0	-0.06	20.1	0.3	0.350	0.0	-0.12	34.0	0.7	0.8	0.0	-0.31
120	14.6	0.2	0.26	0.0	-0.12	19.5	0.3	0.350	0.0	-0.20	32.9	0.7	0.8	-0.1	-0.49
Max =					**0.74**					**0.99**					**2.10**

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

Table D13 Storage Volumes Area P-2 (2 Year, 5 Year and 100 Year Storms) (MRM)

C_{AVG} = 0.63 (dimmensionless)

C_{100} = 0.79

Time Interval = 5 (mins)

Drainage Area = 0.01274 (hectares)

Actual Release Rate (L/sec) = 2.50

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) = 1.25

	Release Rate = 0.4301 (L/sec)					Release Rate = 0.5835 (L/sec)					Release Rate = 1.2500 (L/sec)				
	Return Period = 2 (years)					Return Period = 5 (years)					Return Period = 100 (years)				
	IDF Parameters, A = 732.951		, B = 0.810			IDF Parameters, A = 998.071		, B = 0.814			IDF Parameters, A = 1735.69		, B = 0.820		
	($I = A/(T_c+C)$)		, C = 6.199			($I = A/(T_c+C)$)		, C = 6.053			($I = A/(T_c+C)$)		, C = 6.014		
Duration (min)	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	3.7	0.43	3.3	0.00	230.5	5.2	0.584	4.6	0.00	398.6	11.2	1.3	9.9	0.00
5	103.6	2.3	0.43	1.9	0.57	141.2	3.2	0.584	2.6	0.77	242.7	6.8	1.3	5.5	1.66
10	76.8	1.7	0.43	1.3	0.77	104.2	2.3	0.584	1.7	1.05	178.6	5.0	1.3	3.7	2.25
15	61.8	1.4	0.43	1.0	0.86	83.6	1.9	0.584	1.3	1.16	142.9	4.0	1.3	2.8	2.48
20	52.0	1.2	0.43	0.7	0.88	70.3	1.6	0.584	1.0	1.19	120.0	3.4	1.3	2.1	2.53
25	45.2	1.0	0.43	0.6	0.87	60.9	1.4	0.584	0.8	1.17	103.8	2.9	1.3	1.7	2.49
30	40.0	0.9	0.43	0.5	0.84	53.9	1.2	0.584	0.6	1.12	91.9	2.6	1.3	1.3	2.38
35	36.1	0.8	0.43	0.4	0.79	48.5	1.1	0.584	0.5	1.06	82.6	2.3	1.3	1.1	2.23
40	32.9	0.7	0.43	0.3	0.73	44.2	1.0	0.584	0.4	0.97	75.1	2.1	1.3	0.9	2.05
45	30.2	0.7	0.43	0.2	0.67	40.6	0.9	0.584	0.3	0.88	69.1	1.9	1.3	0.7	1.84
50	28.0	0.6	0.43	0.2	0.59	37.7	0.8	0.584	0.3	0.78	64.0	1.8	1.3	0.5	1.62
55	26.2	0.6	0.43	0.2	0.51	35.1	0.8	0.584	0.2	0.67	59.6	1.7	1.3	0.4	1.38
60	24.6	0.5	0.43	0.1	0.43	32.9	0.7	0.584	0.2	0.56	55.9	1.6	1.3	0.3	1.13
65	23.2	0.5	0.43	0.1	0.34	31.0	0.7	0.584	0.1	0.44	52.6	1.5	1.3	0.2	0.87
70	21.9	0.5	0.43	0.1	0.25	29.4	0.7	0.584	0.1	0.31	49.8	1.4	1.3	0.1	0.60
75	20.8	0.5	0.43	0.0	0.16	27.9	0.6	0.584	0.0	0.18	47.3	1.3	1.3	0.1	0.33
80	19.8	0.4	0.43	0.0	0.07	26.6	0.6	0.584	0.0	0.05	45.0	1.3	1.3	0.0	0.05
85	18.9	0.4	0.43	0.0	-0.03	25.4	0.6	0.584	0.0	-0.08	43.0	1.2	1.3	0.0	-0.24
90	18.1	0.4	0.43	0.0	-0.13	24.3	0.5	0.584	0.0	-0.21	41.1	1.2	1.3	-0.1	-0.54
95	17.4	0.4	0.43	0.0	-0.23	23.3	0.5	0.584	-0.1	-0.35	39.4	1.1	1.3	-0.1	-0.83
100	16.7	0.4	0.43	-0.1	-0.33	22.4	0.5	0.584	-0.1	-0.49	37.9	1.1	1.3	-0.2	-1.13
105	16.1	0.4	0.43	-0.1	-0.43	21.6	0.5	0.584	-0.1	-0.63	36.5	1.0	1.3	-0.2	-1.44
110	15.6	0.3	0.43	-0.1	-0.54	20.8	0.5	0.584	-0.1	-0.77	35.2	1.0	1.3	-0.3	-1.75
115	15.0	0.3	0.43	-0.1	-0.64	20.1	0.5	0.584	-0.1	-0.92	34.0	1.0	1.3	-0.3	-2.06
120	14.6	0.3	0.43	-0.1	-0.75	19.5	0.4	0.584	-0.1	-1.06	32.9	0.9	1.3	-0.3	-2.37
Max =					**0.88**					**1.19**					**2.53**

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

Table D14 5-YEAR STORM SEWER CALCULATION SHEET

Return Period Storm = **5** (5-years, 100-years)
Default Inlet Time= 10 (minutes)
Manning Coefficient = 0.013 (dimensionless)

LOCATION			AREA (hectares)				FLOW (UNRESTRICTED - RATIONAL METHOD)							SEWER DATA										
																				Velocity (m/s)			Hydraulic Ratios	
Location	From Node	To Node	Area No.	Area (ha)	∑ Area (ha)	Average C	Indiv. 2.78*A*R	Accum. 2.78*A*R	Tc (mins)	I (mm/h)	Indiv. Flow (L/sec)	Return Period	Q (L/sec)	Dia (mm) Actual	Dia (mm) Nominal	Type	Slope (%)	Length (m)	Capacity (L/sec)	Vf	Va	Time in Pipe, Tt (min)	Qa/Qf	Va/Vf
Carruthers Ave.	CB 01	STMMH 1	P1	0.0118	0.0118	0.51	0.0166	0.017	10.00	104.19	1.73	5.00	1.7	201.16	200	PVC	2.00	2.56	47.1	1.48	0.46	0.09	0.04	0.31
	CB 01	STMMH 1	P2	0.0127	0.0127	0.63	0.02	0.022	10.00	104.19	2.33	5.00	2.3	201.16	200	PVC	0.50	11.75	23.6	0.74	0.39	0.50	0.10	0.53
	BLDG	STMMH 1	R-A, B, C, D, L	0.0211	0.0211	0.90	0.0528	0.053	10.00	104.19	5.50	5.00	5.5	152	150	PVC	2.00	1.89	22.3	1.22	0.82	0.04	0.25	0.67
	STMMH 1	Municipal STM			0.0456			0.092	10.50	101.62		5.00	9.3	201.16	200	PVC	1.00	7.83	33.3	1.04	0.73	0.18	0.28	0.70

Definitions:
Q = 2.78*AIR, where
Q = Peak Flow in Litres per second (L/s)
A = Watershed Area (hectares)
I = Rainfall Intensity (mm/h)
R = Runoff Coefficients (dimensionless)

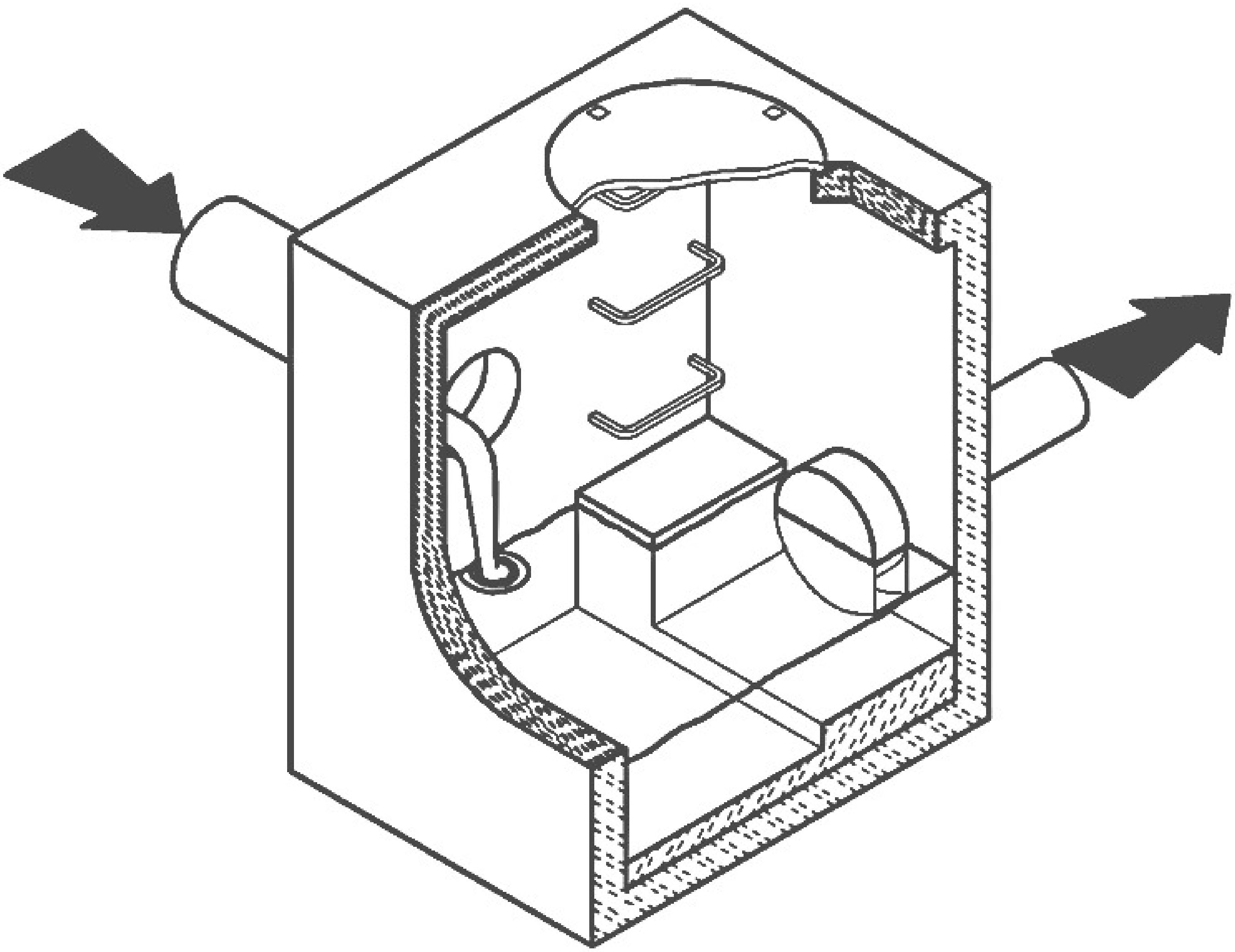
Notes:
Ottawa Rainfall Intensity Values:
From Sewer Desing Guidelines, 2004

	5yr
a =	998.071
b=	0.814
c =	6.053

Designed: **Aaditya Jariwala, P.Eng**
Project: **116-118 Carruthers Ave.**
Checked: **Aaditya Jariwala, P.Eng**
Location: **Ottawa, Ontario**
Dwg Reference: **C100**
File Ref: **24006545- Storm - STM Design Sheet**
Sheet No: **1 of 1**

CSO/STORMWATER MANAGEMENT

® HYDROVEX® VHV / SVHV
Vertical Vortex Flow Regulator



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APPLICATIONS

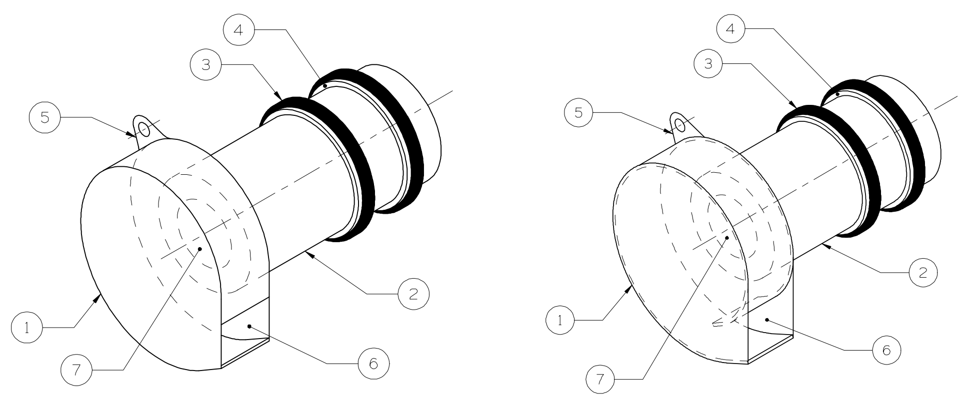
One of the major problems of urban wet weather flow management is the runoff generated after a heavy rainfall. During a storm, uncontrolled flows may overload the drainage system and cause flooding. Due to increased velocities, sewer pipe wear is increased dramatically and results in network deterioration. In a combined sewer system, the wastewater treatment plant may also experience significant increases in flows during storms, thereby losing its treatment efficiency.

A simple means of controlling excessive water runoff is by controlling excessive flows at their origin (manholes). **John Meunier Inc.** manufactures the **HYDROVEX® VHV / SVHV** line of vortex flow regulators to control stormwater flows in sewer networks, as well as manholes.

The vortex flow regulator design is based on the fluid mechanics principle of the forced vortex. This grants flow regulation without any moving parts, thus reducing maintenance. The operation of the regulator, depending on the upstream head and discharge, switches between orifice flow (gravity flow) and vortex flow. Although the concept is quite simple, over 12 years of research have been carried out in order to get a high performance.

The **HYDROVEX® VHV / SVHV** Vertical Vortex Flow Regulators **(refer to Figure 1)** are manufactured entirely of stainless steel, and consist of a hollow body (**1**) (in which flow control takes place) and an outlet orifice (**7**). Two rubber "O" rings (**3**) seal and retain the unit inside the outlet pipe. Two stainless steel retaining rings (**4**) are welded on the outlet sleeve to ensure that there is no shifting of the "O" rings during installation and use.

1. **BODY**
2. **SLEEVE**
3. **O-RING**
4. **RETAINING RINGS (SQUARE BAR)**
5. **ANCHOR PLATE**
6. **INLET**
7. **OUTLET ORIFICE**



VHV ***SVHV***

FIGURE 1: HYDROVEX® VHV-SVHV VERTICAL VORTREX FLOW REGULATORS

ADVANTAGES

- The **HYDROVEX® VHV / SVHV** line of flow regulators are manufactured entirely of stainless steel, making them durable and corrosion resistant.
- Having no moving parts, they require minimal maintenance.
- The geometry of the **HYDROVEX® VHV / SVHV** flow regulators allows a control equal to an orifice plate, having a cross section area 4 to 6 times smaller. This decreases the chance of blockage of the regulator, due to sediments and debris found in stormwater flows. **Figure 2** illustrates the comparison between a regulator model 100 SVHV-2 and an equivalent orifice plate. One can see that for the same height of water, the regulator controls a flow approximately four times smaller than an equivalent orifice plate.
- Installation of the **HYDROVEX® VHV / SVHV** flow regulators is quick and straightforward and is performed after all civil works are completed.
- Installation requires no special tools or equipment and may be carried out by any contractor.
- Installation may be carried out in existing structures.

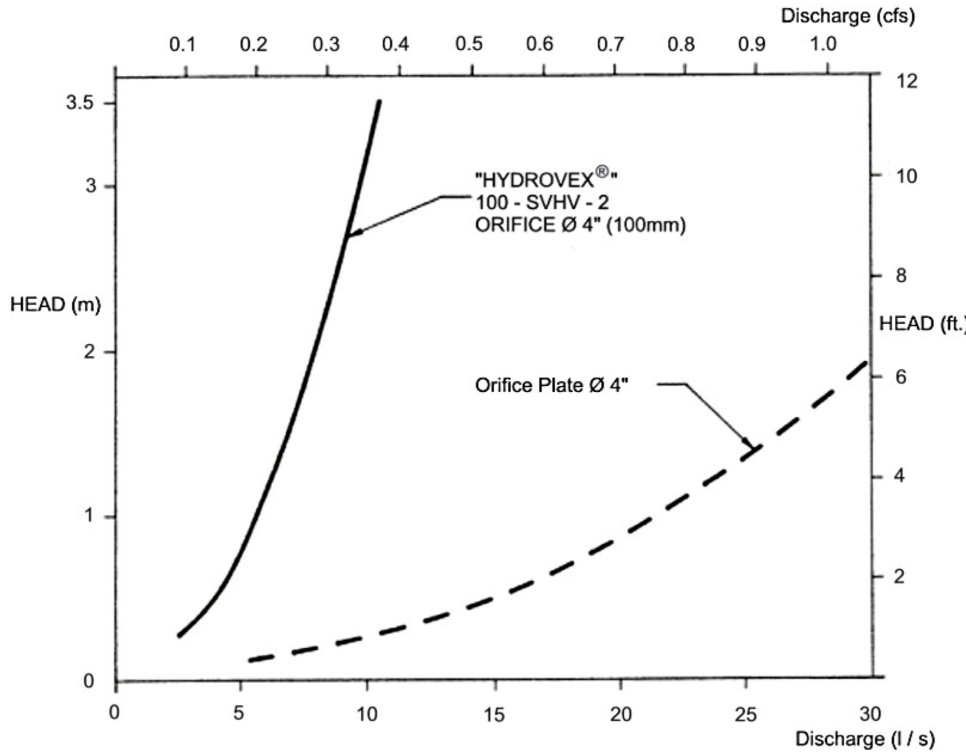


FIGURE 2: DISCHARGE CURVE SHOWING A HYDROVEX® FLOW REGULATOR VS AN ORIFICE PLATE

SELECTION

Selection of a **VHV or SVHV** regulator can be easily made using the selection charts found at the back of this brochure (see **Figure 3**). These charts are a graphical representation of the maximum upstream water pressure (head) and the maximum discharge at the manhole outlet. The maximum design head is the difference between the maximum upstream water level and the invert of the outlet pipe. All selections should be verified by John Meunier Inc. personnel prior to fabrication.

Example:

✓ Maximum design head	2m (6.56 ft.)
✓ Maximum discharge	6 L/s (0.2 cfs)
✓ Using **Figure 3** - VHV	model required is a **75 VHV-1**

INSTALLATION REQUIREMENTS

All **HYDROVEX® VHV / SVHV** flow regulators can be installed in circular or square manholes. **Figure 4** gives the various minimum dimensions required for a given regulator. ***It is imperative to respect the minimum clearances shown to ensure easy installation and proper functioning of the regulator.***

SPECIFICATIONS

In order to specify a **HYDROVEX®** regulator, the following parameters must be defined:

- The model number (ex: 75-VHV-1)
- The diameter and type of outlet pipe (ex: 6" diam. SDR 35)
- The desired discharge (ex: 6 l/s or 0.21 CFS)
- The upstream head (ex: 2 m or 6.56 ft.) *
- The manhole diameter (ex: 36" diam.)
- The minimum clearance "H" (ex: 10 inches)
- The material type (ex: 304 s/s, 11 Ga. standard)

** Upstream head is defined as the difference in elevation between the maximum upstream water level and the invert of the outlet pipe where the HYDROVEX® flow regulator is to be installed.*

PLEASE NOTE THAT WHEN REQUESTING A PROPOSAL, WE SIMPLY REQUIRE THAT YOU PROVIDE US WITH THE FOLLOWING:

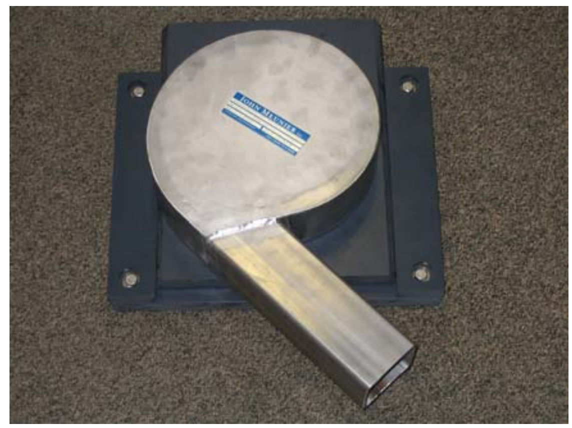
- ***project design flow rate***
- ***pressure head***
- ***chamber's outlet pipe diameter and type***

Typical VHV model in factory

OPTIONS

FV – SVHV (mounted on sliding plate)

VHV-1-O (standard model with odour control inlet)



FV – VHV-O (mounted on sliding plate with odour control inlet)

VHV with Gooseneck assembly in existing chamber without minimum release at the bottom

VHV with air vent for minimal slopes

VHV Vertical Vortex Flow Regulator

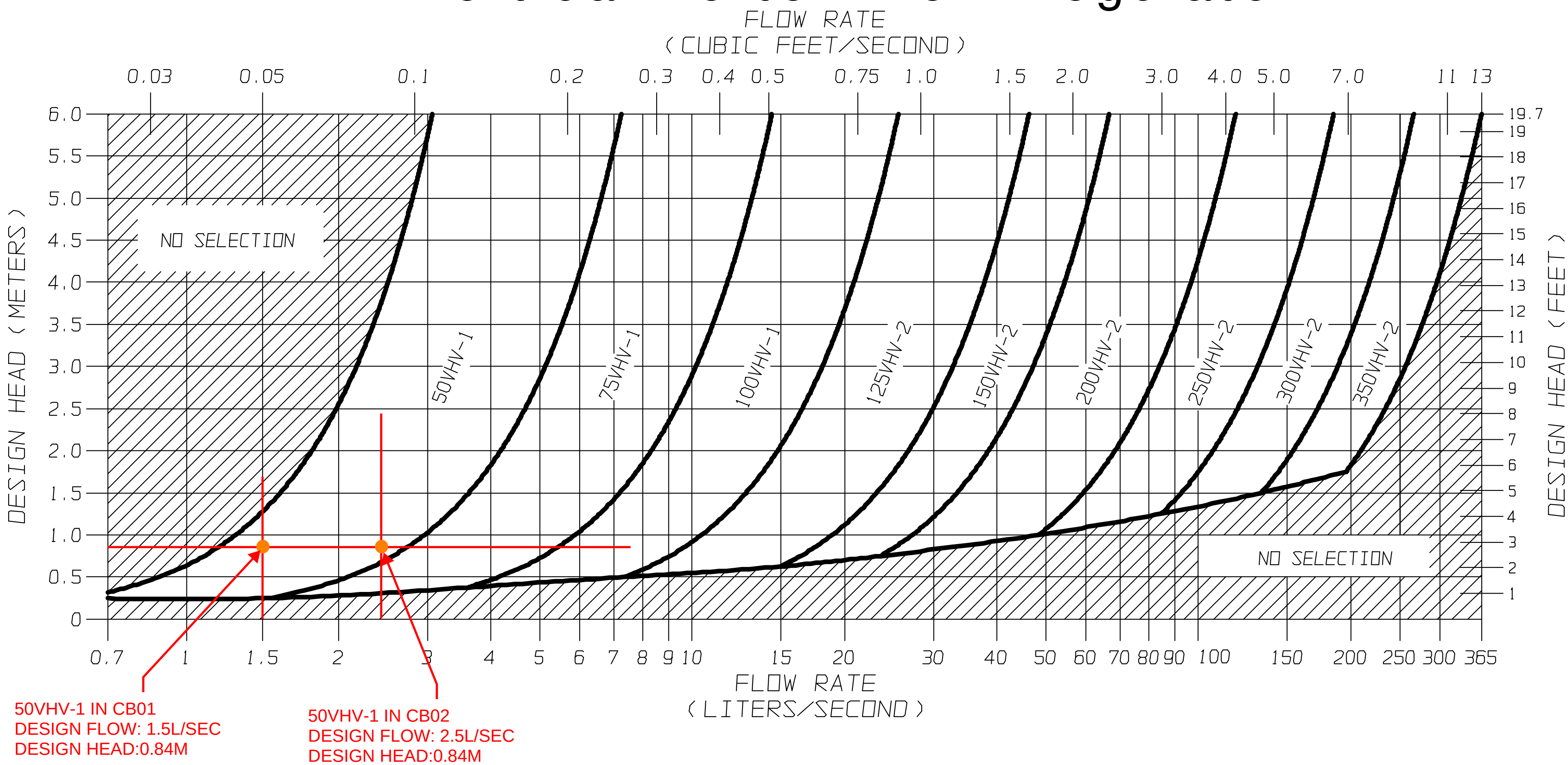


FIGURE 3 - VHV

HYDROVEX®

SVHV Vertical Vortex Flow Regulator

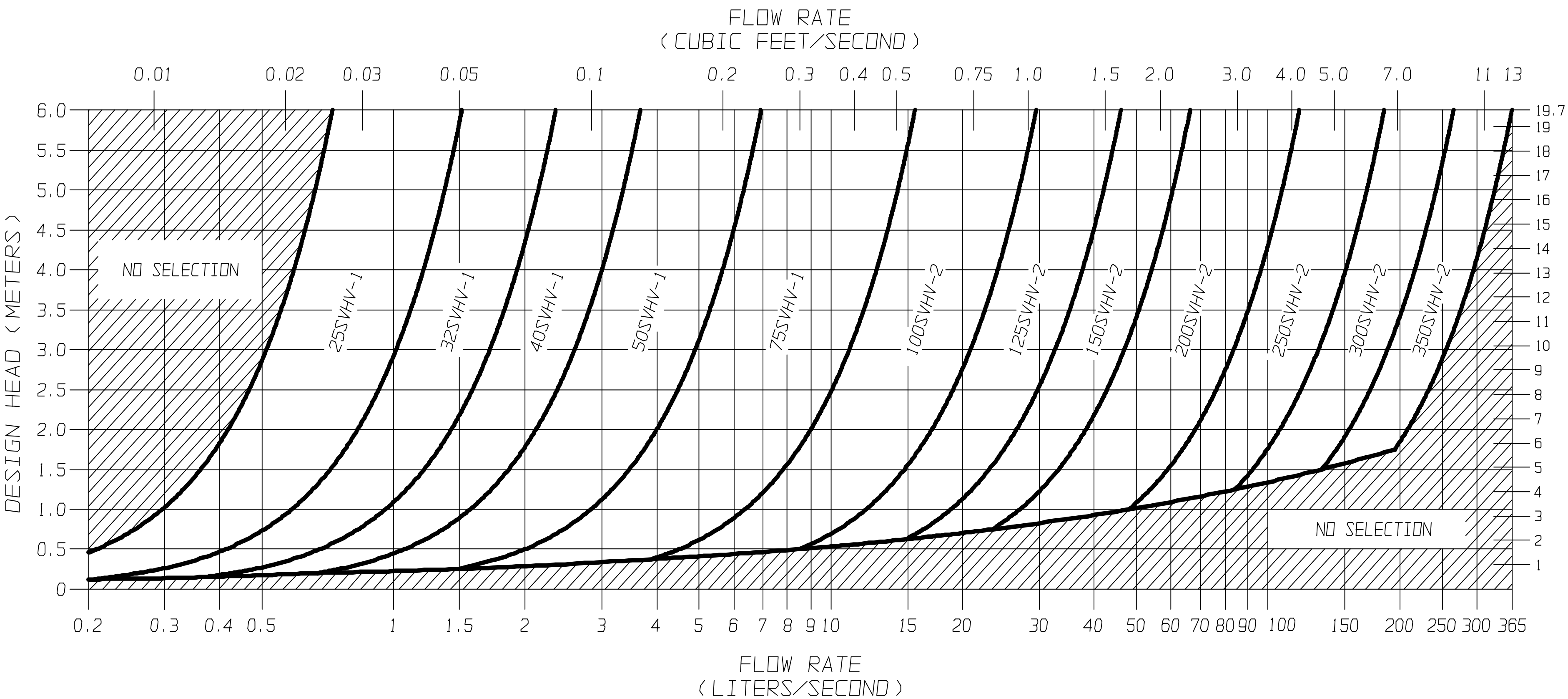


FIGURE 3 - SVHV

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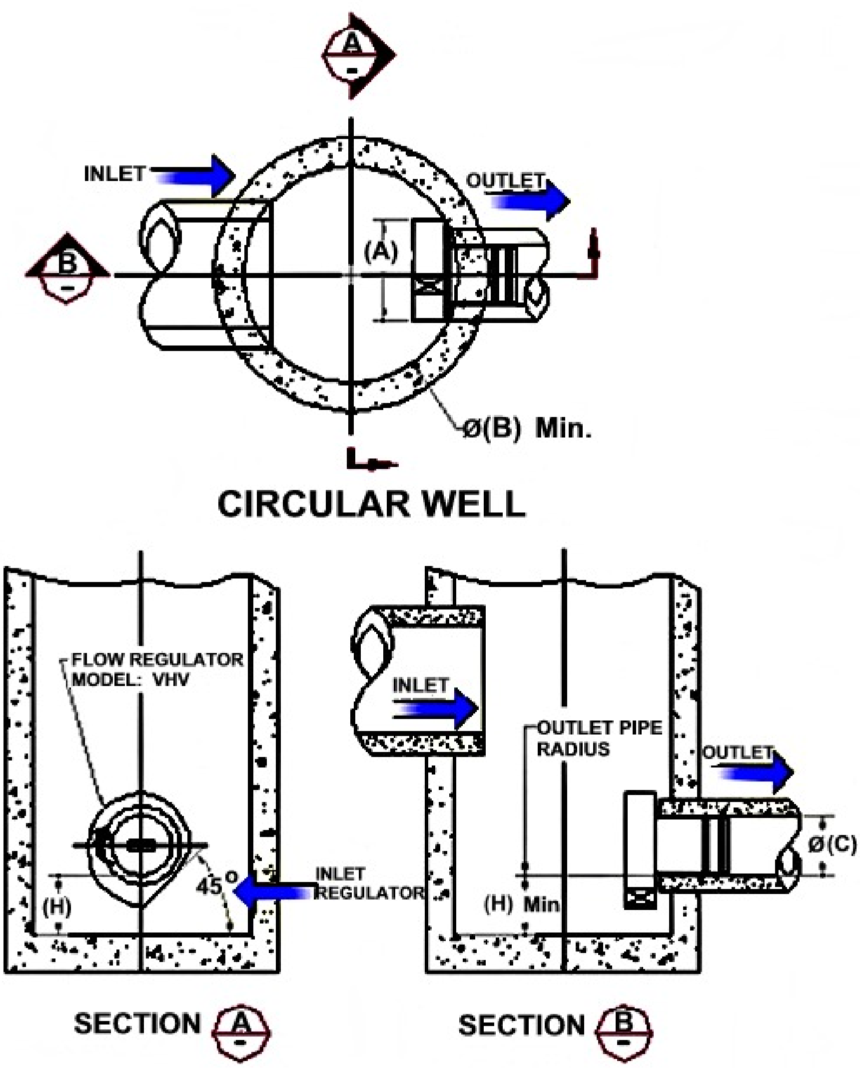
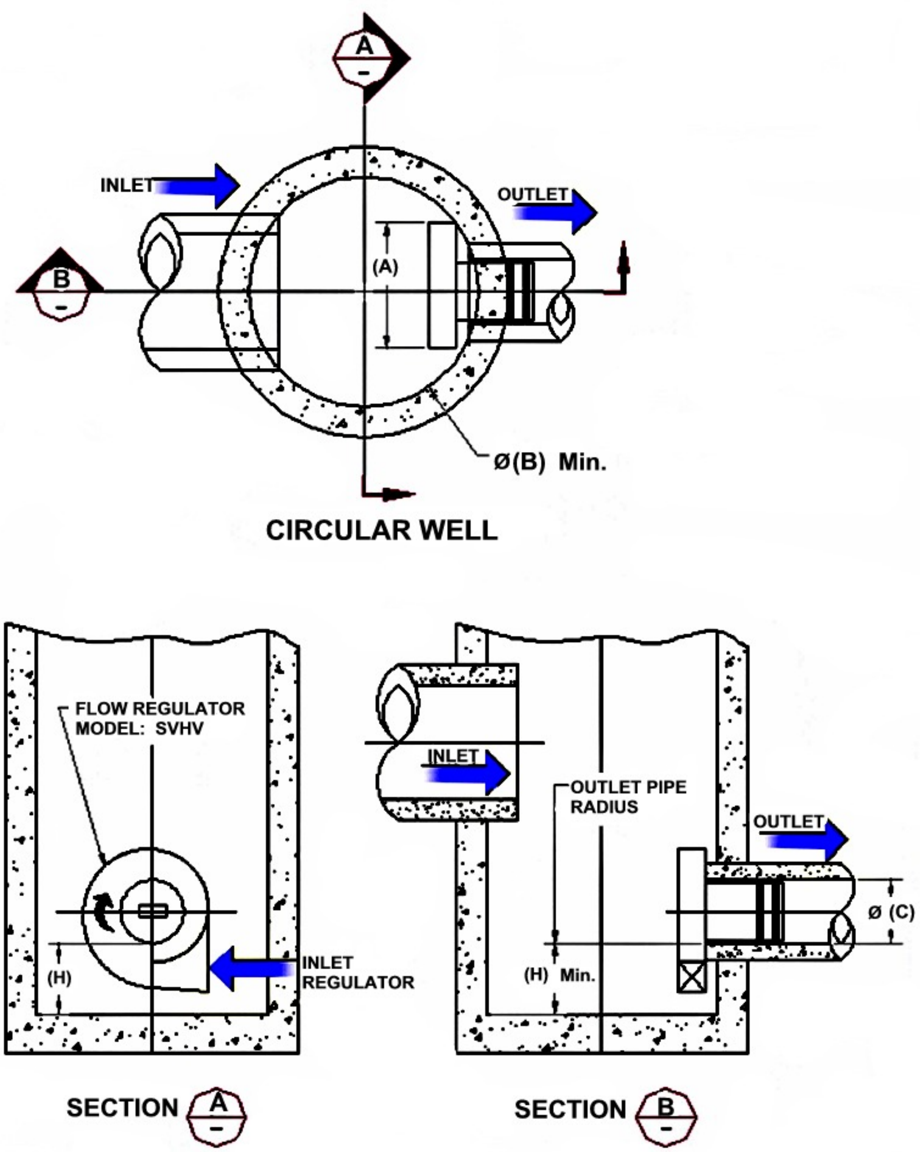
FLOW REGULATOR TYPICAL INSTALLATION IN CIRCULAR MANHOLE
FIGURE 4 (MODEL VHV)

Model Number	Regulator Diameter		Minimum Manhole Diameter		Minimum Outlet Pipe Diameter		Minimum Clearance	
	A (mm)	**A** (in.)	**B** (mm)	**B** (in.)	**C** (mm)	**C** (in.)	**H** (mm)	**H** (in.)
50VHV-1	150	6	600	24	150	6	150	6
75VHV-1	250	10	600	24	150	6	150	6
100VHV-1	325	13	900	36	150	6	200	8
125VHV-2	275	11	900	36	150	6	200	8
150VHV-2	350	14	900	36	150	6	225	9
200VHV-2	450	18	1200	48	200	8	300	12
250VHV-2	575	23	1200	48	250	10	350	14
300VHV-2	675	27	1600	64	250	10	400	16
350VHV-2	800	32	1800	72	300	12	500	20



FLOW REGULATOR TYPICAL INSTALLATION IN CIRCULAR MANHOLE
FIGURE 4 (MODEL SVHV)

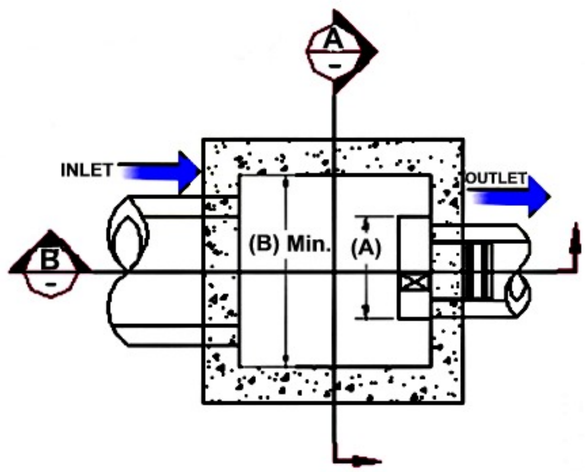
Model Number	Regulator Diameter		Minimum Manhole Diameter		Minimum Outlet Pipe Diameter		Minimum Clearance	
	A (mm)	**A** (in.)	**B** (mm)	**B** (in.)	**C** (mm)	**C** (in.)	**H** (mm)	**H** (in.)
25 SVHV-1	125	5	600	24	150	6	150	6
32 SVHV-1	150	6	600	24	150	6	150	6
40 SVHV-1	200	8	600	24	150	6	150	6
50 SVHV-1	250	10	600	24	150	6	150	6
75 SVHV-1	375	15	900	36	150	6	275	11
100 SVHV-2	275	11	900	36	150	6	250	10
125 SVHV-2	350	14	900	36	150	6	300	12
150 SVHV-2	425	17	1200	48	150	6	350	14
200 SVHV-2	575	23	1600	64	200	8	450	18
250 SVHV-2	700	28	1800	72	250	10	550	22
300 SVHV-2	850	34	2400	96	250	10	650	26
350 SVHV-2	1000	40	2400	96	250	10	700	28



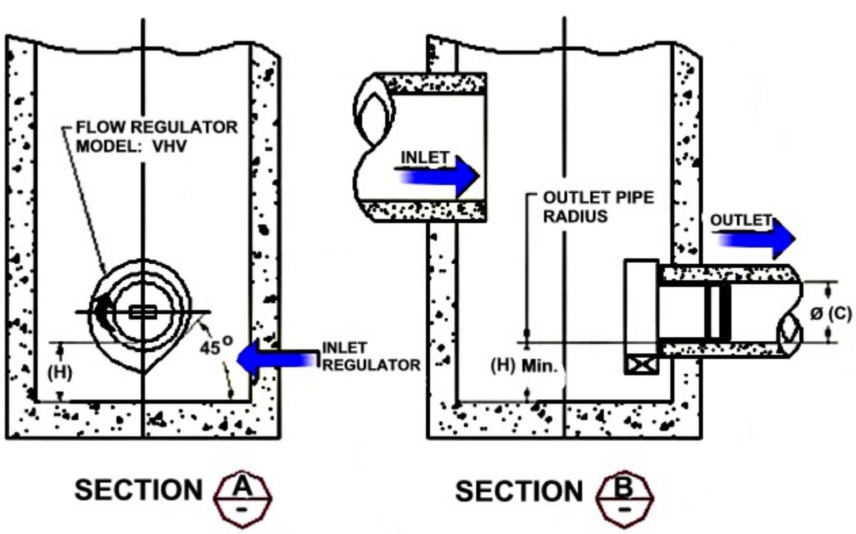
FLOW REGULATOR TYPICAL INSTALLATION IN SQUARE MANHOLE
FIGURE 4 (MODEL VHV)

Model Number	Regulator Diameter		Minimum Chamber Width		Minimum Outlet Pipe Diameter		Minimum Clearance	
	A (mm)	**A** (in.)	**B** (mm)	**B** (in.)	**C** (mm)	**C** (in.)	**H** (mm)	**H** (in.)
50VHV-1	150	6	600	24	150	6	150	6
75VHV-1	250	10	600	24	150	6	150	6
100VHV-1	325	13	600	24	150	6	200	8
125VHV-2	275	11	600	24	150	6	200	8
150VHV-2	350	14	600	24	150	6	225	9
200VHV-2	450	18	900	36	200	8	300	12
250VHV-2	575	23	900	36	250	10	350	14
300VHV-2	675	27	1200	48	250	10	400	16
350VHV-2	800	32	1200	48	300	12	500	20

NOTE: *In the case of a square manhole, the outlet flow pipe must be centered on the wall to ensure enough clearance for the unit.*



SQUARE / RECTANGULAR WELL

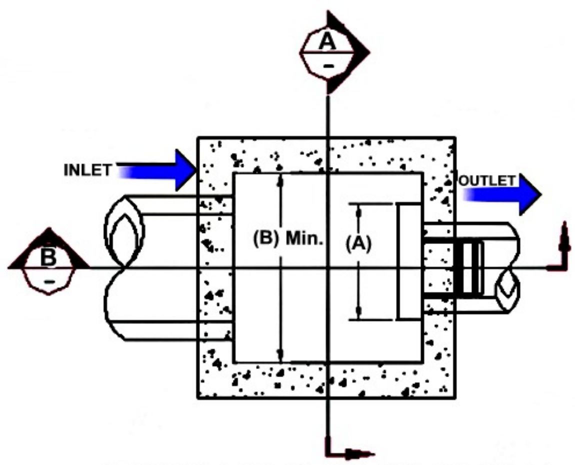


SECTION A SECTION B

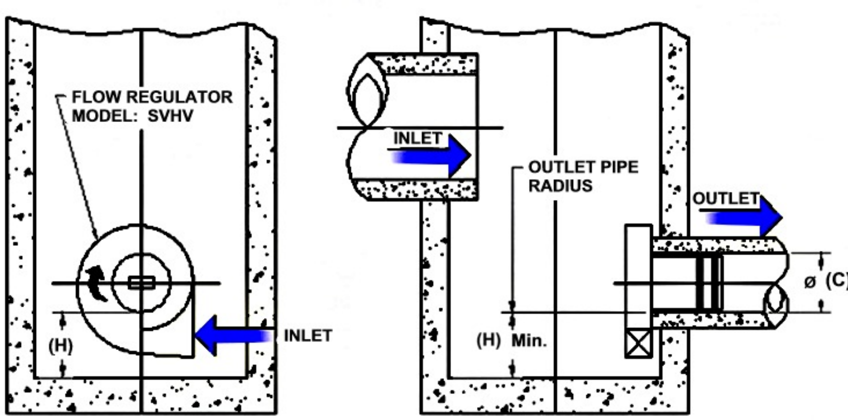
FLOW REGULATOR TYPICAL INSTALLATION IN SQUARE MANHOLE
FIGURE 4 (MODEL SVHV)

Model Number	Regulator Diameter		Minimum Chamber Width		Minimum Outlet Pipe Diameter		Minimum Clearance	
	A (mm)	**A** (in.)	**B** (mm)	**B** (in.)	**C** (mm)	**C** (in.)	**H** (mm)	**H** (in.)
25 SVHV-1	125	5	600	24	150	6	150	6
32 SVHV-1	150	6	600	24	150	6	150	6
40 SVHV-1	200	8	600	24	150	6	150	6
50 SVHV-1	250	10	600	24	150	6	150	6
75 SVHV-1	375	15	600	24	150	6	275	11
100 SVHV-2	275	11	600	24	150	6	250	10
125 SVHV-2	350	14	600	24	150	6	300	12
150 SVHV-2	425	17	600	24	150	6	350	14
200 SVHV-2	575	23	900	36	200	8	450	18
250 SVHV-2	700	28	900	36	250	10	550	22
300 SVHV-2	850	34	1200	48	250	10	650	26
350 SVHV-2	1000	40	1200	48	250	10	700	28

NOTE: *In the case of a square manhole, the outlet flow pipe must be centered on the wall to ensure enough clearance for the unit.*



SQUARE / RECTANGULAR WELL



SECTION A   SECTION B

INSTALLATION

The installation of a **HYDROVEX®** regulator may be undertaken once the manhole and piping is in place. Installation consists of simply fitting the regulator into the outlet pipe of the manhole. **John Meunier Inc.** recommends the use of a lubricant on the outlet pipe, in order to facilitate the insertion and orientation of the flow controller.

MAINTENANCE

HYDROVEX® regulators are manufactured in such a way as to be maintenance free; however, a periodic inspection (every 3-6 months) is suggested in order to ensure that neither the inlet nor the outlet has become blocked with debris. The manhole should undergo periodically, particularly after major storms, inspection and cleaning as established by the municipality

GUARANTY

The **HYDROVEX®** line of **VHV / SVHV** regulators are guaranteed against both design and manufacturing defects for a period of 5 years. Should a unit be defective, **John Meunier Inc.** is solely responsible for either modification or replacement of the unit.

John Meunier Inc.
ISO 9001 : 2008

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Appendix E – Consultation / Correspondence

City of Ottawa Memo from Pre-Consultation Meeting.

Email on Water System Boundary Conditions.

File No.: PC2024-0232

July 8, 2024

Q9 Planning + Design
c/o Dayna Edwards
43-C Eccles Street
Ottawa, ON
K1R 6S3

Via email: dayna@q9planning.com

Subject: Pre-Consultation: Meeting Feedback
Proposed Site Plan Control Application – 116-118 Carruthers Avenue

Please find below information regarding next steps as well as consolidated comments from the above-noted pre-consultation meeting held on June 26, 2024.

Pre-Consultation Preliminary Assessment

1 ☐	**2** ☐	**3** ☒	**4** ☐	**5** ☐

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

Next Steps

1. As per the provincial Bill 185, *Cutting Red Tape to Build More Homes Act*, applicants are no longer required to partake in pre-consultation, but they may choose to participate. Should your team wish to continue with the pre-consultation process, pre-consultation fees still apply. Staff encourage further pre-consultation steps to take place.
2. Alternatively, should your team wish to skip any further pre-consultation steps, and proceed directly to applying for the required applications, please be advised that upon application, the City will assess whether the submission is "complete" or "incomplete". Staff will review the submission to ensure all the material outlined on the Study Plan and Identification List (SPIL) is provided and that this material meets the City's Terms of Reference. Should it be deemed "incomplete" the submission will be put on hold.

3. In your next pre-consultation submission or application submission, please ensure that all comments detailed herein are addressed. A detailed cover letter stating how each comment has been addressed must be included with the submission materials. Please coordinate the numbering of your responses within the cover letter with the comment number(s) herein.

Supporting Information and Material Requirements

4. The attached **Study and Plan Identification List** outlines the information and material that has been identified, during this phase of pre-consultation, as either required (R) or advised (A) as part of a future complete application submission.
    a. The required plans and studies must meet the City's Terms of Reference (ToR) and/or Guidelines, as available on Ottawa.ca. These ToR and Guidelines outline the specific requirements that must be met for each plan or study to be deemed adequate.

Consultation with Technical Agencies

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

Planning (Adrian van Wyk / Nastassia Pratt)

Comments:

6. The proposed development would require a Complex Site Plan Control application, which is subject to a fee of $72,000.22.
7. Zoning compliance must be fully explained by providing a Zoning Confirmation Report when submitting a complete application.
8. The proposed height of the building requires explanation:
    a. What is the height of the mechanical penthouse?
    b. What is the height of the parapet above the fourth storey?
    c. What is the height of the basement level above and below grade?

    The overall height of the building appears tall for a four-storey apartment building.

    The mechanical penthouse appears very large and contributes to the appearance of a 5.5-storey building. Permitted projections above the maximum allowable height may be erected only to such height or area as is necessary to accomplish the purpose they are to serve and that is necessary to operate effectively and safely.

9. Please show adjacent buildings and demonstrate compatability with the neighbouring context.

10. Please clarify and indicate proposed materials.

11. The 2.44m right of way should be removed and replaced with landscaping. Please see Section 140(6)(a) of the Zoning By-law. As the property abuts a rear travelled laneway, an additional driveway from Carruthers Avenue should not be provided. Solid, permanent features to prevent parking in the front yard will be required.

12. Please consider the location of the proposed visitor parking space in the rear yard and ensure that unnecessary hardscape is limited.

13. The provision of street trees is a priority in this neighbourhood and should be provided wherever possible.

14. The walkway leading up to the front entrance of the building should be at least 1.5m wide for accessibility.

15. A bicycle parking space rate of 1 space per unit will be expected at this location.

16. Please provide floor plans to better understand the internal function of the building.

Urban Design (Christopher Moise)

Submission Requirements:

17. An Urban Design Brief is required. Please see attached customized Terms of Reference to guide the preparation of the submission.
    a. The Urban Design Brief should be structured by generally following the headings highlighted under **Section 3 – Contents of these Terms of Reference**

18. Additional drawings and studies are required as shown on the SPIL. Please follow the terms of reference (Planning application submission information and materials | City of Ottawa) to prepare these drawings and studies. These include (i.e., The UDRP drawings):
    a. Landscape Plan.
    b. Elevations

Comments on Preliminary Design:

19. The following elements of the preliminary design are appreciated:
    a. Main entrance at grade facing public right of way.
    b. Façade massing to relate to the existing low-rise built form.
    c. Rear yard landscaping with room for trees.

d. Garbage and covered bike parking in the rear yard and hidden from the public ROW

20. The following elements of the preliminary design are of concern:

 a. Front yard set-back, show relation to neighbouring properties.

 b. Side yard lane – purpose?

 c. Access doors into lane may create a dangerous conflict between pedestrians and vehicles.

 d. Side elevation materiality.

 e. What is the impact of this change in scale and massing on this street?

Recommendations

21. We recommend the materiality of the side elevations be a cementitious product which is more compatible with a residential neighbourhood (as opposed to a very large wall of corrugated metal which gives an industrial look and will be very visible in the neighbourhood).

22. We recommend taking advantage of the additional side yard separation to the south to increase glazing and make the units more livable.

23. We recommend providing the built form planned context in the 3D modelling illustrations to help analyze the scale of the proposal in its context. This can be ghosted blocks on the neighbouring properties.

Other Comments:

24. This is an exciting project in an area full of potential. We look forward to helping you achieve its goals with the highest level of design resolution. We are happy to assist and answer any questions regarding the above. Good luck.

Engineering (Shawn Wessel / Farbod Azimi)

Comments:

25. The Stormwater Management Criteria, for the subject site, is to be based on the following:

 a. The 5-yr storm event using the IDF information derived from the Meteorological Services of Canada rainfall data, taken from the MacDonald Cartier Airport, collected 1966 to 1997.

 b. For separated sewer systems built up until 2016, the design of the storm sewers were based on a 5-year storm; storm systems after such time are, generally, based on a 2-year level-of-service.

 c. In separated areas, the pre-development runoff shall be the lower of the existing coefficient or a maximum equivalent 'C' of 0.5, whichever is less (§ 8.3.7.3).

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

e. Flows to the storm sewer in excess of the 5-year storm release rate, up to and including the 100-year storm event, must be detained on site.

f. Storm sewer outlets should not be submerged.

g. The quantity control criteria (100-year post-development to 5-year pre-development **or** c = 0.5).

h. Two separate sewer laterals (one for sanitary and other for storm) will be required.

26. Deep Services (Storm, Sanitary and/or Water Supply)

a. Provide existing servicing information and the recommended location for the proposed connections. Services should ideally be grouped in a common trench to minimize the number of road cuts.

b. Provide information on the monitoring manhole requirements – should be located in an accessible location on private property near the property line (ie. Not in a parking area).

c. CCTV sewer inspection of city infrastructure is required to record pre and post construction conditions and ensure there is no damage to City infrastructure.

d. Review provision of a high-level sewer.

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

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

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

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

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

27. Water

A 152 mm dia. PVC Watermain (c. 2001) is available on Carruthers Ave.

a. As per ISTB-2021-03, Industrial, commercial, institutional service areas with a basic day demand greater than 50 m^3/day and residential areas serving 50 or more dwellings shall be connected with a minimum of two watermains, separated by an isolation valve, to avoid the creation of a vulnerable service area. Individual residential facilities with a basic day demand greater than 50 m3/day shall be connected with a minimum of two water services, separated by an isolation valve, to avoid the creation of a vulnerable service area.

b. A Water Data Card will have to be submitted to size the water meter.

c. Existing water services are to be blanked at the watermain.

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

   i. Location of service

   ii. Type of development

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

   iv. Average daily demand: ___ l/s.

   v. Maximum daily demand: ___l/s.

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

   vii. Note: Use Table 3-3 of the MOE Design Guidelines for Drinking-Water System to determine Maximum Day and Maximum Hour peaking factors for 0 to 500 persons and use Table 4.2 of the Ottawa Design Guidelines, Water Distribution for 501 to 3,000 persons.

28. Fire-fighting flow rate(s)

a. Fire flow demand requirements shall be based on ISTB-2021-03.

b. Please review Technical Bulletin ISTB-2018-02, maximum fire flow hydrant capacity is provided in Section 3 Table 1 of Appendix I. A hydrant coverage figure shall be provided and demonstrate there is adequate fire protection for the proposal.

c. Type of development and the amount of fire flow required (L/min). Note: The OBC method can be used if the fire demand for the private property is less than 9,000 L/min. If the OBC fire demand reaches 9000 L/min, then the FUS method is to be used. Fire flow demand requirements are to be based on ISTB-2021-03. Exposure separation distances shall be defined on a figure to support the FUS calculation and required fire flow (RFF).

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

29. Storm Sewer

A 375mm dia. PVC storm sewer (c. 2001) is available on Carruthers Ave.

GeoOttawa shows a removal of the combined sewer on Carruthers Ave.

a. Please provide the estimated new Storm sewer discharge and we will confirm if Storm sewer main has the capacity.

b. Include correspondence from the Architect within the Appendix of the report confirming the number of residential units per building and a unit type breakdown for each of the buildings to support the calculated building populations.

c. Please apply the wastewater design flow parameters in Technical Bulletin PIEDTB-2018-01.

d. A backwater valve is required on the storm service for protection.

30. Sanitary Sewer

A 250mm dia. PVC sanitary sewer (c. 2001) is available on Carruthers Ave.

GeoOttawa shows a removal of the combined sewer on Carruthers Ave.

a. Please provide the estimated new Sanitary sewer discharge and we will confirm if sanitary sewer main has the capacity.

b. Please apply the wastewater design flow parameters in Technical Bulletin PIEDTB-2018-01.

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

31. Stormwater

a. Document how any foundation drainage system will be integrated into the servicing design and show the positive outlet on the plan. Foundation drainage is to be independently connected to sewer main unless being pumped with appropriate back up power, sufficient sized pump and back flow prevention. It is recommended that the foundation drainage system be drained by a sump pump connection to the storm sewer to minimize risk of basement flooding as it will provide the best protection from the uncontrolled sewer system compared to relying on the backwater valve.

b. Please note that as per Technical Bulletin PIEDTB-2016-01 section 8.3.11.1 (p.12 of 14) there shall be no surface ponding on private parking areas during the 2-year storm rainfall event.

c. Underground Storage: Please note that the Modified Rational Method for storage computation in the Sewer Design Guidelines was originally intended to be used for above ground storage (i.e. parking lot) where the change in head over the orifice varied from 1.5 m to 1.2 m (assuming a 1.2 m deep CB and a max ponding depth of 0.3 m). This change in head was small and hence the release rate fluctuated little, therefore there was no need to use an average release rate.

d. When underground storage is used, the release rate fluctuates from a maximum peak flow based on maximum head down to a release rate of zero. This difference is large and has a significant impact on storage requirements. We therefore require that an average release rate equal to

50% of the peak allowable rate shall be applied to estimate the required volume. Alternatively, the consultant may choose to use a submersible pump in the design to ensure a constant release rate.

e. 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.

f. 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. UG storage to provide actual 2- and 100-year event storage requirements.

g. 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.

h. 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.

i. Please note that the minimum orifice dia. for a plug style ICD is 83mm and the minimum flow rate from a vortex ICD is 6 L/s in order to reduce the likelihood of plugging.

j. If rooftop control and storage is proposed as part of the SWM solutions sufficient details (Cl. 8.3.8.4) shall be discussed and document in the report and on the plans. Roof drains are to be connected downstream of any incorporated ICDs within the SWM system and not to the foundation drain system. Provide a Roof Drain Plan as part of the submission. If it is to be controlled, please show the ponding contours of 5 and 100 year on the plan as well as a table discussing on roof drain numbering and corresponding flow rates and weir opening.

k. Due to the limited green space on the property, all roof drains and foundation drainage (weeping tile) systems must be connected independently to the City infrastructure services using their own lateral services, rather than discharging to surface level. Please note that it is no longer permitted to connect the roof drains directly to the weeping tile (SDG 5.7.2, 4.4.1.4) and connect them to the City services using a singular pipe due to the possibility of the flooding issues. If a cistern is required, it can be permitted to use a larger service pipe and connect roof drains down stream of the foundation drain, but the site is tight and not sure if that will work.

l. The cistern will need a detailed drawing showing bottom of the tank, outlet, and emergency overflow elevations and will require a backup pump. Please show emergency overflow (with alarm system), for pumps or gravity discharge on servicing and grading plans as well as elevations to ensure it is not on the low point area to demonstrate that the building and other neighbouring properties will not be adversely affected. Please note 50.0% of peaking factor to be used for all above and underground storage.

m. The location and drainage direction of any proposed scuppers or downspouts for drainage review must be specified. Please note that any roof drains must discharge to surface level towards the street or lane and be at least 1.5m away from building foundation walls to prevent cycling to foundation drains. All proposed scuppers should be located at the front and back sides of the property, not on the sides to prevent damage to neighbouring properties. If scuppers are used on the sides, they should be connected to downspouts with splash pads. A splash pad is required when the downspout is situated less than 1.5 meters from a neighboring property.

n. If Window wells are proposed, they are to be indirectly connected to the footing drains. A detail of window well with indirect connection is required, as is a note at window well location speaking to indirect connection.

o. 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.

32. Grading

a. Please provide an updated survey plan or a Pre-Development Drainage Area Plan to define the pre-development drainage areas/patterns. Existing drainage patterns shall be maintained and discussed as part of the proposed SWM solution.

b. Post-development site grading shall match existing property line grades in order to minimize disruption to the adjacent residential properties. A topographical plan of survey shall be provided as part of the submission and a note provided on the plans.

c. The consultant should demonstrate that any surface water directed towards the laneway can flow unrestricted and will not adversly affect the laneway or the adjacent properties.

d. The proposed driving lane and side walk are to be sloped away from foundation and the drainage is to be directed towards the ROW and the laneway properly without impacting the neighboring properties. Impermeable concrete barrier curbs (no wood) are to be used along edge of property lines to ensure no drainage occurs on neighbouring properties and to retain the water on property at side yards.

e. Laneway is unmaintained and an agreement with other owners is required due to the only access of Lyndale Ave.

f. Rear yard on grade parking to be permeable pavement. Refer to City Standard Detail Drawings SC26 (maintenance/temp parking areas), SC27 or permeable asphalt materials. No gravel or stone dust parking areas permitted.

g. Street catchbasins are not to be located at any proposed entrances.

33. Geotechnical

a. A Geotechnical Study/Investigation shall be prepared in support of this development proposal.

b. Reducing the groundwater level in this area can lead to potential damages to surrounding structures due to excessive differential settlements of the ground. The impact of groundwater lowering on adjacent properties needs to be discussed and investigated to ensure there will be no short term and long-term damages associated with lowering the groundwater in this area.

c. Geotechnical Study shall be consistent with the Geotechnical Investigation and Reporting Guidelines for Development Applications. Geotechnical Investigation and Reporting (ottawa.ca). See the Studies Plans and Identification List for more information.

d. Pre-Construction (Piling/Hoe Ramming or excavation in close proximity to City Assets) and/or Pre-Blasting (if applicable) Survey required for any buildings/dwellings in proximity of 75m of site and circulation of notice of vibration/noise to residents within 150 m of site. Conditions for Pre-Construction/ Pre-Blast Survey & Use of Explosives will be applied to agreements. Refer to City's Standard S.P. No. F-1201 entitled Use of Explosives, as amended. The intent is to protect nearby property owners, City and Utility Assets and, if appliable, unsupported claims against the applicant.

34. Sensitive Marine Clay

If Sensitive marine clay soils are present in this area that are susceptible to soil shrinkage that can lead to foundation and building damages. All six (6) conditions listed in the Tree Planting in Sensitive Marine Clay Soils-2017 Guidelines are required to be satisfied. Note that if the plasticity index of the soil is determined to be less than 40% a minimum separation between a street tree and the proposed building foundations of 4.5m will need to be achieved. A memorandum addressing the Tree in Clay Soil Guidelines prepared by a geotechnical engineer is required to be provided to the City.

https://ottawa.ca/en/planning-development-and-construction/community-design/design-and-planning-guidelines/completed-guidelines/tree-planting-sensitive-marine-clay-soils-2017-guidelines

35. Proximity Study

Due to proximity of site to Transit Way, Rail Corridor or LRT, applicant should contact City LRT Group regarding required building offset from transitway. Noise study is required to review vibration conditions within 75m of Transitway. See Rail Guidelines and CPCS Report as well as OP Annex 17, Zones of Influence and Guidelines for Proximity Study.

36. Gas Pressure regulation station

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

37. Road Reinstatement

Where servicing involves three or more service trenches, either a full road width or full lane width 40 mm asphalt overlay will be required, as per amended Road Activity By- Law 2003-445 and City Standard Detail Drawing R10. The amount of overlay will depend on condition of roadway and width of roadway(s).

38. Snow Storage

Any portion of the subject property which is intended to be used for permanent or temporary snow storage shall be as shown on the approved site plan and grading plan. Snow storage shall not interfere with approved grading and drainage patters or servicing. Snow storage areas shall be setback from the property lines, foundations, fencing or landscaping a minimum of 1.5m. Snow storage areas shall not occupy driveways, aisles, required parking spaces or any portion of a road allowance. If snow is to be removed from the site, please indicate this on the plan(s).

39. Environmental Site Assessment

A Phase I ESA is required to be completed in accordance with Ontario Regulation 153/04 in support of this development proposal to determine the potential for site contamination. Depending on the Phase I recommendations a Phase II ESA may be required.

The Phase I ESA shall provide all the required Environmental Source Information as required by O. Reg. 153/04. ERIS records are available to public at a reasonable cost and need to be included in the ESA report to comply with O.Reg. 153/04 and the Official Plan. The City will not be in a position to approve the Phase I ESA without the inclusion of the ERIS reports.

Official Plan Section 4.8.4:

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

40. A Transportation Noise Assessment is required as the subject development is located within 100m proximity of Scott Street existing Collector Road and 75m proximity of the rail corridor and LRT.

41. A Stationary Noise Assessment is required to assess the noise impact of the proposed sources of stationary noise (mechanical HVAC system/equipment) of the development onto the surrounding residential area to ensure the noise levels do not exceed allowable limits specified in the City Environmental Noise Control Guidelines.

42. Please refer to the City of Ottawa Guide to Preparing Studies and Plans [Engineering]: Planning application submission information and materials. The guide outlines the requirement for a statement to be provided on the plan about where the property boundaries have been derived from.

Feel free to contact Shawn Wessel, Infrastructure Project Manager and Farbod Azimi, Engineering Intern for follow-up questions.

Transportation (Wally Dubyk)

Comments:

43. Right-of-way protection.
    a. See Schedule C16 of the Official Plan.
    b. Any requests for exceptions to ROW protection requirements must be discussed with Transportation Planning and concurrence provided by Transportation Planning management.

44. Proposed development site is within 600 metres from the Tunney's Pasture Station.

45. Carruthers Avenue is classified as a Local Road. There are no additional protected ROW limits identified in the OP. Ensure that the development proposal complies with the Right-of-Way protection requirements of the Official Plan's Schedule C16.

46. The Screening Form has indicated that no TIA Triggers have been met. This development would not generate sufficient traffic to warrant a TIA report. The consultant is to address how they plan to enable and encourage travel by sustainable modes (i.e., to make walking, cycling, transit, carpooling and telework more convenient, accessible, safe, and comfortable). Please complete the City of Ottawa's *TDM Measures Checklist*.

47. The purchaser, tenant or sub-lessee acknowledges the unit being rented/sold is not provided with any on-site parking and should a tenant/purchaser have a vehicle for which they wish to have parking that alternative and lawful arrangements will need to be made to accommodate their parking need at an alternative location. The Purchaser/Tenant also acknowledges that the availability and regulations governing on-street parking vary; that access to on-street parking, including through residential on-street parking permits issued by

the City cannot be guaranteed now or in the future; and that a purchaser, tenant, or sub-lessee intending to rely on on-street parking for their vehicle or vehicles does so at their own risk.

48. All underground and above ground building footprints and permanent walls need to be shown on the plan to confirm that any permanent structure does not extend either above or below into the right of way protection limits.

49. Permanent structures such as curbing, stairs, retaining walls, and underground parking foundation also bicycle parking racks are not to extend into the City's right-of-way limits.

50. The consultant should review the sight distance to the access and any obstructions that may hinder the view of the driver.

51. The concrete sidewalk should be 2.0 metres in width and be continuous and depressed through the proposed access.

52. The closure of an existing private approach shall reinstate the sidewalk, shoulder, curb, and boulevard to City standards.

53. The Owner acknowledges and agrees that all private accesses to Roads shall comply with the City's Private Approach By-Law being By-Law No. 2003-447 as amended https://ottawa.ca/en/living-ottawa/laws-licences-and-permits/laws/law-z/private-approach-law-no-2003-447 or as approved through the Site Plan control process.

54. No private approach shall be constructed within 0.3 metres of any adjacent property measured at the highway line, and at the curb line or roadway edge.

55. The Owner shall be required to enter into maintenance and liability agreement for all pavers, plant and landscaping material placed in the City right-of-way and the Owner shall assume all maintenance and replacement responsibilities in perpetuity.

56. Bicycle parking spaces are required as per Section 111 of the Ottawa Comprehensive Zoning By-law. Bicycle parking spaces should be in safe, secure places near main entrances and preferably protected from the weather.

Feel free to contact Wally Dubyk, Transportation Project Manager, for follow-up questions.

Forestry (Mark Richardson)

Comments:

57. Existing Trees

    a. There are no existing trees on site or close to the site – a Tree Conservation Report is not required.

58. Future Trees

a. City policies require that trees be planted on site – please find suitable planting locations ensuring that an appropriate soil volume is available.

b. All trees are to be shown on a landscape plan

c. Soil Volume - Please demonstrate as per the **Landscape Plan Terms of Reference** that the available soil volumes for new plantings will meet or exceed the following:

Tree Type/Size	Single Tree Soil Volume (m3)	Multiple Tree Soil Volume (m3/tree)
Ornamental	15	9
Columnar	15	9
Small	20	12
Medium	25	15
Large	30	18
Conifer	25	15

d. Minimum Setbacks

   i. Maintain 1.5m from sidewalk or MUP/cycle track or water service laterals.

   ii. Maintain 2.5m from curb

   iii. Coniferous species require a minimum 4.5m setback from curb, sidewalk, or MUP/cycle track/pathway.

e. Adhere to Ottawa Hydro's planting guidelines (species and setbacks) when planting around overhead primary conductors.

f. Tree specifications

   i. Minimum stock size: 50mm tree caliper for deciduous, 200cm height for coniferous.

   ii. Maximize the use of large deciduous species wherever possible to maximize future canopy coverage

g. Tree planting on city property shall be in accordance with the City of Ottawa's Tree Planting Specification; if possible, include watering and warranty as described in the specification.

h. No root barriers, dead-man anchor systems, or planters are permitted.

i. Hard surface planting

   i. If there are hard surface plantings, a planting detail must be provided

   ii. Curb style planter is highly recommended .

iii. No grates are to be used and if guards are required, City of Ottawa standard (which can be provided) shall be used.

j. Trees are to be planted at grade.

k. The City requests that consideration be given to planting native species where ever there is a high probability of survival to maturity.

l. Efforts shall be made to provide as much future canopy cover as possible at a site level, through tree planting and tree retention. The Landscape Plan shall show/document that the proposed tree planting and retention will contribute to the City's overall canopy cover over time. Please provide a projection of the future canopy cover for the site to 40 years.

Feel free to contact Mark Richardson (mark.richardson@ottawa.ca), Planning Forester, for follow-up questions.

Mechanicsville Community Association

Comments:

59. Rear lane between Hinchey and Carruthers is an unmaintained Class 3 & 4 as per the Urban Lanes Policy. The neighboring property owners have an agreement amongst each other to pay for snow clearing and road maintenance. They have recently laid gravel and leveled this lane for their own use. Rear drainage on this lane to neighboring properties and Lyndale is definitely not recommended!!! New property owner of 116 will have to enter into that agreement for maintenance with other property owners on that lane.

60. The neighboring property owners have an agreement amongst each other to pay for snow clearing and road maintenance. They have recently laid gravel and leveled this lane for their own use. Rear drainage on this lane to neighboring properties and Lyndale is definitely not recommended!!! New property owner of 116 will have to enter into that agreement for maintenance with other property owners on that lane.

61. Recommend bike storage within the building and remove the bike rack enclosure. Bike theft is extremely high in this and all other neighborhoods. This internal bike storage will attract a better class of tenant who will want storage for their high value bikes.

62. Without the bike enclosure, the waste containers could be stored and rolled directly out along the heated pathway past the building to Carruthers for pickup. Your maintenance person will appreciate that time-saving feature.

63. The shared driveway that is held under an easement to the south neighbor will be an attractive access by unwanted trespassers. If an arrangement cannot be made to discharge the easement, a tall fence, if allowed is recommended. This ROW should have a permeable material. I would like to know what the setback is to this ROW. I would like to see more windows on that southside if the ROW

stays. From the higher floors there may be a nice view of St Francis church in Hintonburg.

64. The height of this building will be quite imposing compared to the front/back semis built on this street. Keep the height to a minimum including the mechanical room, parapet and rooftop amenity space.

65. Trees- understood there is powerline on the west side of Carruthers but vegetation that could be planted in front is needed. Would like to see tree(s) planted in the rear in the amenity space next to the visitor parking. It will keep tenants and neighbors from parking on that amenity space.

66. Parking - glad to see visitor parking especially for Senior tenants who need temporary parking for homecare. There is little street parking in Mechanicsville and what is available is 1 hour and used by Tunneys Pasture employees. For construction, you may want to rent parking for your construction workers at Tunneys or the church on Stonehurst Avenue (Protection of the Holy Virgin Memorial Church).

Other

67. The High Performance Development Standard (HPDS) is a collection of voluntary and required standards that raise the performance of new building projects to achieve sustainable and resilient design. The HPDS was passed by Council on April 13, 2022.

    a. At this time, the HPDS is not in effect and Council has referred the 2023 HPDS Update Report back to staff with direction to bring forward an updated report to Committee with recommendations for revised phasing timelines, resource requirements and associated amendments to the Site Plan Control By-law by no later than Q1 2024.

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

Submission Requirements and Fees

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

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

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

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

Yours Truly,

Adrian van Wyk (Planner)

Encl. Study and Plan Identification List
List of Technical Agencies to Consult
Urban Design Brief
Supplementary Development Information
HPDS Overview for Applicants
HPDS Example Checklist
ADS Site Plan Checklist

c.c. Nastassia Pratt (Planning)
Christopher Moise (Urban Design)
Shawn Wessel (Infrastructure)
Farbod Azimi (Infrastructure)
Wally Dubyk (Transportation)
Mark Richardson (Forestry)
Dayna Edwards (Q9 Planning)
Info@redlinearchitecture.ca
Lorrie Marlow (Mechanicsville CA)

Alexander Johnson

From:	Wessel, Shawn <shawn.wessel@ottawa.ca>
Sent:	Thursday, September 19, 2024 1:42 PM
To:	Aaditya Jariwala
Cc:	Dayna Edwards
Subject:	RE: 116-118 Carruthers Ave - Request for Water Boundary Conditions
Attachments:	116-118 Carruthers Avenue September 2024.pdf

Good afternoon, Aaditya Jariwala

The following are boundary conditions, HGL, for hydraulic analysis at 116-118 Carruthers Avenue (zone 1W) assumed to be a looped connection to the 152 mm watermain on Carruthers Avenue. (see attached PDF for location).

Minimum HGL: 107.7 m

Maximum HGL: 115.2 m

Max Day+ Fire Flow (45 L/s - OBC): 108.6 m

Max Day+ Fire Flow (133.3 L/s - FUS): 97.6 m

These are for current conditions and are based on computer model simulation.

Disclaimer: The boundary condition information is based on current operation of the city water distribution system. The computer model simulation is based on the best information available at the time. The operation of the water distribution system can change on a regular basis, resulting in a variation in boundary conditions. The physical properties of watermains deteriorate over time, as such must be assumed in the absence of actual field test data. The variation in physical watermain properties can therefore alter the results of the computer model simulation.

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

Thank you

Regards,

Shawn Wessel, A.Sc.T.,rcji
Pronouns: he/him | Pronom: il

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, Development & Building Services Department (PDBS) | Direction générale des services de la planification, de l'aménagement et du bàtiment (DGSPAB)
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

*****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: Aaditya Jariwala <Aaditya.Jariwala@exp.com>
Sent: Wednesday, August 28, 2024 11:12 AM
To: Wessel, Shawn <shawn.wessel@ottawa.ca>; faroob.azimi@ottawa.ca
Cc: Dayna Edwards <dayna@q9planning.com>; van Wyk, Adrian <adrian.vanwyk@ottawa.ca>
Subject: 116-118 Carruthers Ave - Request for Water Boundary Conditions

Good Morning Shawn and Faroob,

I am sending this email to request the water boundary conditions and confirm the sanitary sewer capacity for the proposed development at 116-118 Carruthers Ave. Domestic water and sanitary demands as well as the fire flow demands are noted below. I have also attached a map showing the existing municipal hydrants within 150m distance along the fire route that can be utilized for fire fighting purposes, as requested in the Phase 1 pre-consultation notes. Please provide the water boundary conditions at the marked location on the attached plan. Please also confirm any capacity constraints in the 250mm municipal sanitary sewer on Carruthers Ave.

Water:

Average daily demand: 0.09 L/sec
Max. Daily Demand: 0.82 L/sec
Peak Hourly Demand: 1.23 L/sec
RFF as per OBC: 45 L/sec
RFF as per FUS: 133.3 L/sec

Sanitary:

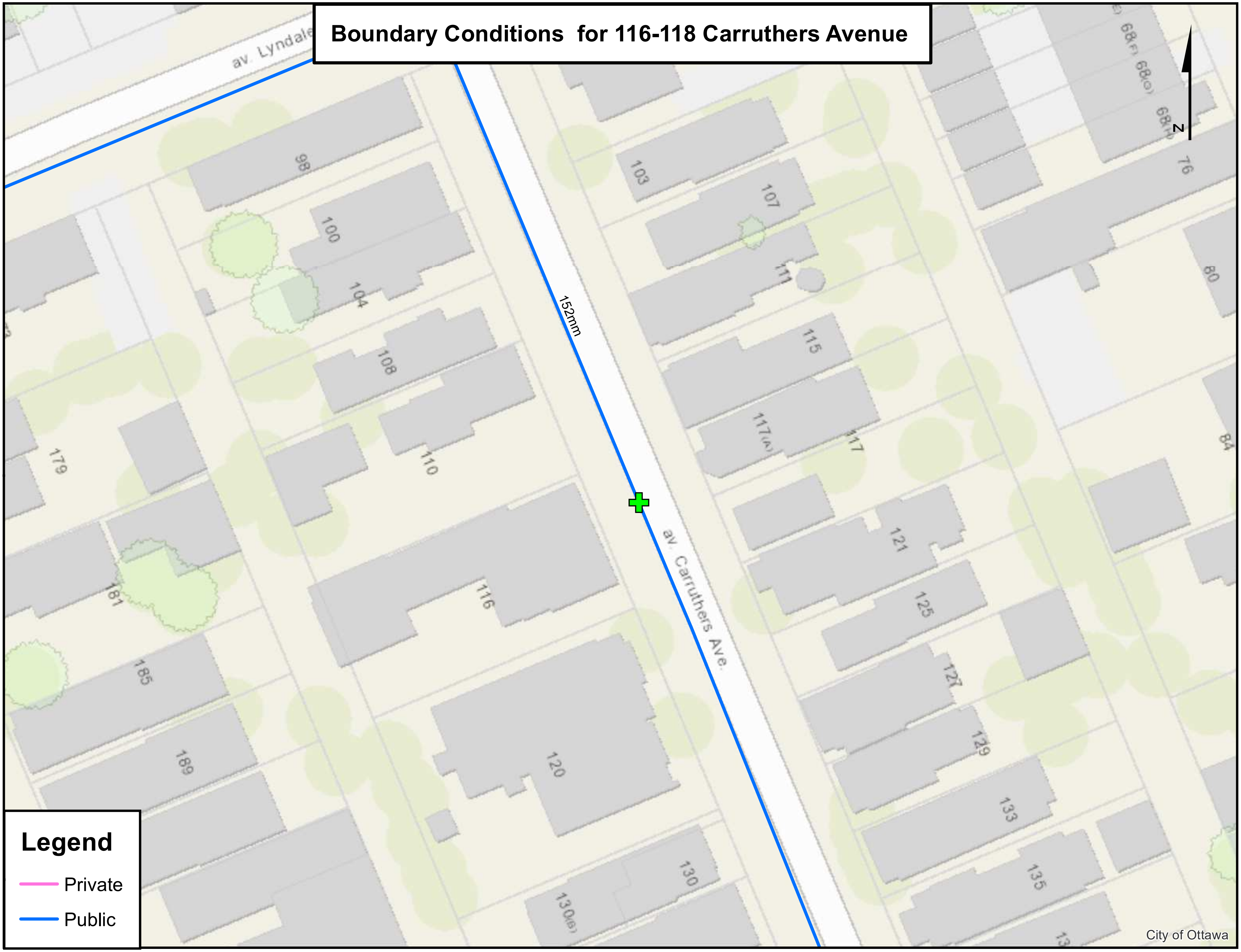
Peak Sanitary Floes including Infiltration Allowance: 0.33 L/sec

I have also attached all the calculations for your reference.

Let me know if you have any questions regarding this.

Best regards,

Aaditya Jariwala, M.Eng, P.Eng.
EXP | Project Manager
t : +1.613.688.1899, 63240 | m : +1.613.816.5961 | e : aaditya.jariwala@exp.com
2650 Queensview Drive
Suite 100
Ottawa, ON K2B 8H6
CANADA


Boundary Conditions for 116-118 Carruthers Avenue
av. Lyndale
152mm
av. Carruthers Ave.
N
98
100
104
108
110
116
120
130
130(B)
179
181
185
189
103
107
111
115
117(A)
117
121
125
127
129
133
135
76
80
84
Legend
Private
Public
City of Ottawa

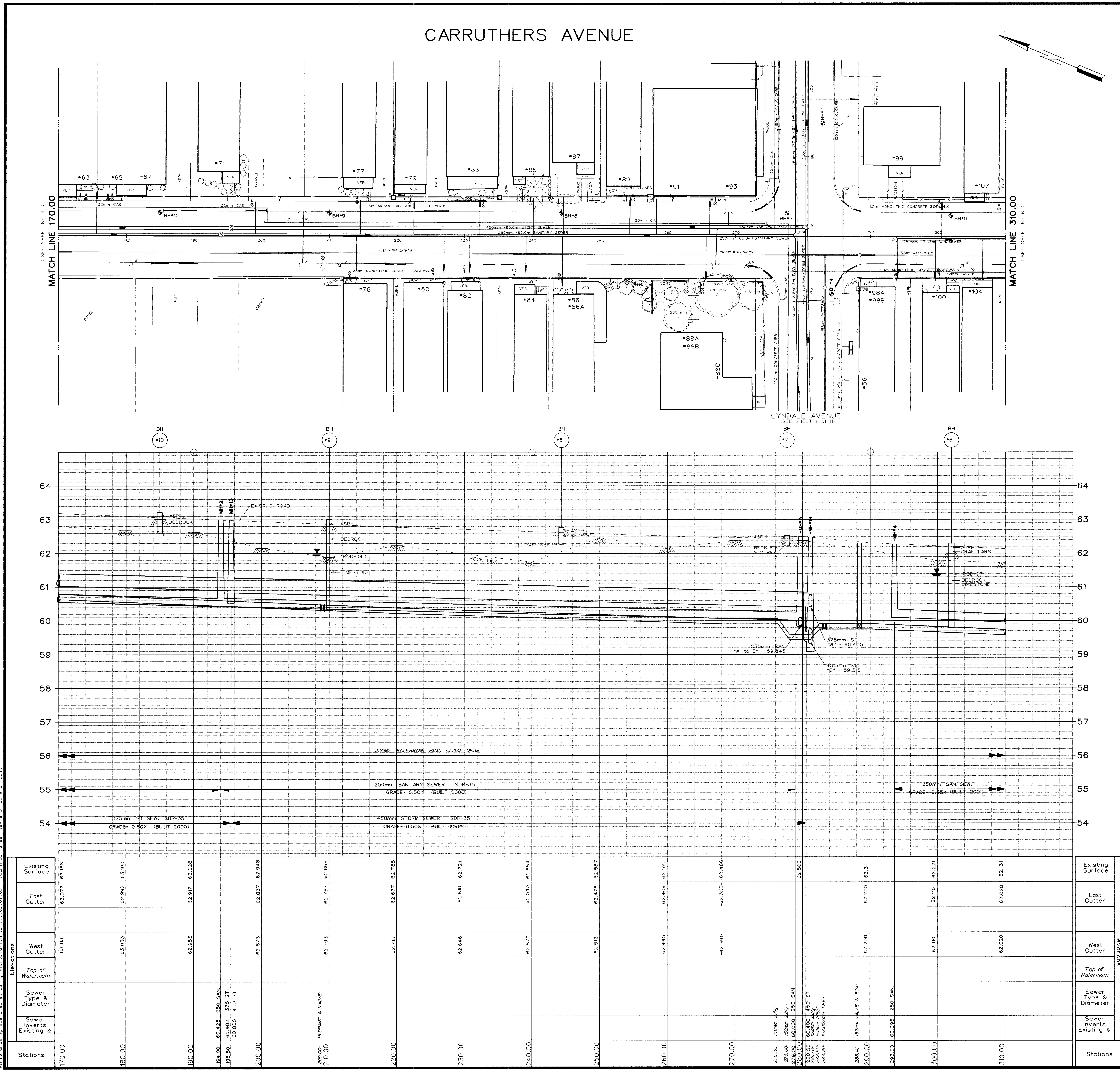
Appendix F – Background Information

City of Ottawa UCC Drawings Topo Survey (11x17) (2 pages)

Architectural Site Plan (11x17) (1 page)

Boundary/Topographic Survey (30x14) (1 page)

3266 (5) CARRUTHERS AVENUE



Revisions:

No.	Date	Description	Drawn By	Approved By

Design:

Designed By	Date	Checked By	Date
REG REHBEIN	JAN/00		

Survey Detail By	Date	Field Checked By	Date
JOHN FRANCE	JUN/99	GUY QUIROUETTE	OCT/99

Drafting By	Date	Checked By	Date
GUY QUIROUETTE	FEB/00		

Chief Design & Construction Engineer
H. V. Pascoe, P.Eng.

Final Measurements:

Construction Type: WATER/SEWERS/ROAD-REHAB.	Inspector: D. BROWN
Work Commenced: JUNE/00	Project Manager: REG REHBEIN
Work Completed: JUNE/01	Field Book #
Contractor: MALONEY	Date: JAN./05
Drafting Revisions: D. BROWN — Date: DEC./04	Checked By: D. BROWN

As Built Notes:

1. Soil information shown is not guaranteed and contractors are advised to collect additional soils information as deemed necessary.
2. Soil information taken from : OMM TROW #MA13549A
3. This plan supercedes (in whole or in part) plan #J-10
4. While illustrations and utilities shown are taken from the best available information, they cannot be guaranteed.
5. The actual rock line was recorded during construction of the existing sanitary sewer.
6. Boreholes prior to construction.
7. See typical cross sections for road structure material depths.
8. All Water information and locations cannot be guaranteed. Please contact the Region of Ottawa Carleton, Environmental Section.

Legal Survey Notes:

Boundary information shown hereon has been compiled and calculated from Teranet data and not based on an actual survey.

Distances shown to survey monuments are for reference purposes only, survey monuments may not define property boundaries.

THIS IS NOT A PLAN OF SURVEY

This plan was compiled from plans and documents recorded in the Land Registry System and has been prepared for property indexing purposes only.

City of Ville d' Ottawa

Department of Urban Planning & Public Works
Engineering Branch
Design And Construction Division
111 SUSSEX DRIVE, SUSSEX PAVILION, 7TH FLOOR, OTTAWA, ONTARIO. K1N 5A1

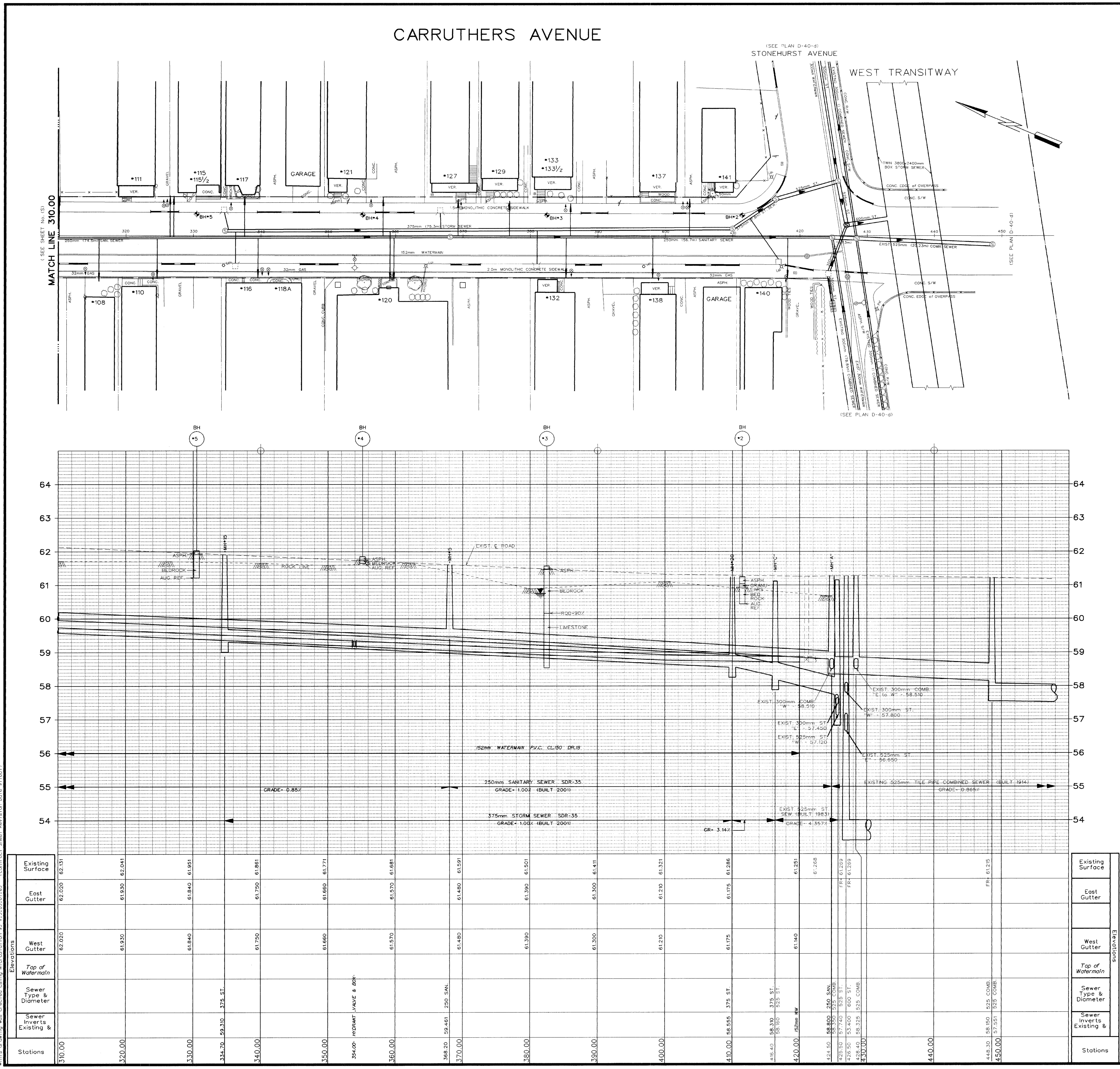
E.M. Robinson Commissioner	**W.R. Cole, P.Eng.** Branch Director

CARRUTHERS AVENUE

FROM STATION 170.00 TO STATION 310.00

Contract No:	Survey Books:	Scales: (See note)	Plan No:
00C3266		HOR. 1:250 VERT. 1:50	3266 Sheet 5 of 11

Filename: 3266s2.dgn
Reference: Ottebdr.dgn
3266bpc.dgn
3266b.dgn



Revisions:

No.	Date	Description	Drawn By	Approved By

Design:

Designed By: REG REHBEIN	Date: JAN/00	Checked By	Date
Survey Detail By: JOHN FRANCE	Date: JUN/99	Field Checked By: GUY QUIROUETTE	Date: OCT/99
Drafting By: GUY QUIROUETTE	Date: FEB/00	Checked By	Date

Chief Design & Construction Engineer
H. V. Pascoe, P.Eng.

Final Measurements:

Construction Type: WATER/SEWERS/ROAD-REHAB.	Inspector: D. BROWN
Work Commenced: JUNE/00	Project Manager: REG REHBEIN
Work Completed: JUNE/01	Field Book #
Contractor: MALONEY	Date: JAN./05
Drafting Revisions: D. BROWN — Date: DEC./04	Checked By: D. BROWN

As Built Notes:

1. Soil information shown is not guaranteed and contractors are advised to collect additional soils information as deemed necessary.
2. Soil information taken from : OMM TROW #MA13549A
3. This plan supercedes (in whole or in part) plan #J-10
4. While illustrations and utilities shown are taken from the best available information, they cannot be guaranteed.
5. The actual rock line was recorded during construction of the existing sanitary sewer.
6. Boreholes prior to construction.
7. See typical cross sections for road structure material depths.
8. All Water information and locations cannot be guaranteed. Please contact the Region of Ottawa Carleton, Environmental Section.

Legal Survey Notes:

Boundary information shown hereon has been compiled and calculated from Teranet data and not based on an actual survey.

Distances shown to survey monuments are for reference purposes only, survey monuments may not define property boundaries.

THIS IS NOT A PLAN OF SURVEY

This plan was compiled from plans and documents recorded in the Land Registry System and has been prepared for property indexing purposes only.

City of Ottawa / Ville d'Ottawa
Department of Urban Planning & Public Works
Engineering Branch
Design And Construction Division
111 SUSSEX DRIVE, SUSSEX PAVILION, 7TH FLOOR, OTTAWA, ONTARIO. K1N 5A1

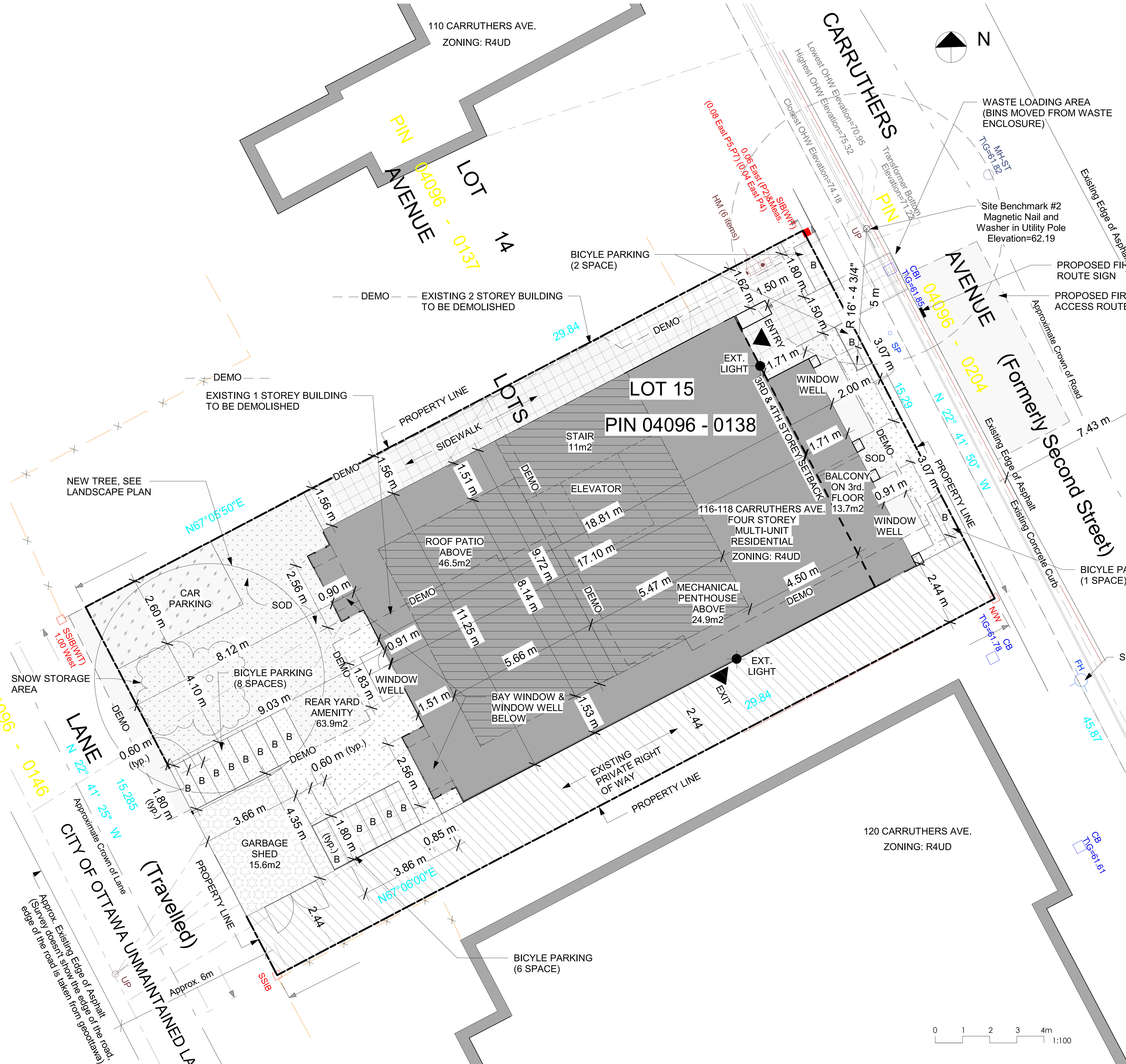
E.M. Robinson — Commissioner
W.R. Cole, P.Eng. — Branch Director

CARRUTHERS AVENUE

FROM STATION 310.00 TO WEST TRANSITWAY

Contract No:	Survey Books:	Scales: (See note)	Plan No:
00C3266		HOR. 1:250 VERT. 1:50	3266 Sheet 6 of 11

Filename: 3266s3.dgn
Reference: Ottebdr.dgn
3266bpc.dgn
3266b.dgn



1 SITE
1:100

116-118 CARRUTHERS AVENUE

SITE PLAN OF SURVEY PART OF LOT 15, WEST CARRUTHERS AVENUE REGISTERED PLAN 35, CITY OF OTTAWA PREPARED BY ANNIS, O'SULLIVAN, VOLLEBEKK LTD., COMPLETED MARCH 1, 2024 R4UD - RESIDENTIAL FOURTH DENSITY ZONE (SEC. 161-162) CITY OF OTTAWA; DWELLING TYPE: 4 STOREY LOW-RISE RESIDENTIAL	**SURVEY INFO.** SURVEY INFO TAKEN FROM TOPOGRAPHIC PLAN OF LOT 15, WEST CARRUTHERS AVENUE REGISTERED PLAN 35, CITY OF OTTAWA PREPARED BY: ANNIS, O'SULLIVAN, VOLLEBEKK LTD., MARCH 1, 2024

ZONING MECHANISMS	REQUIREMENT	PROVIDED	SECTION
A) MINIMUM LOT AREA	450 m²	456.07 m²	Section 162, Table 162A
B) MINIMUM LOT WIDTH	15 m	15.29 m	Section 162, Table 162A
C) MINIMUM LOT DEPTH	N/A	29.84 m	Section 162, Table 162A
D) MINIMUM FRONT YARD SET BACK	Lesser of the average of abutting lots' corresponding FYS (~ 1.99 m) or 4.5 m	2 m	Section 144(1)(a); Section 162, Table 162A
E) MINIMUM INTERIOR SIDE YARD SET BACK	1.5 m	1.5 m, 2.44 m	Section 144, Table 144A
F) MINIMUM REAR YARD SETBACK	%30 of lot depth (8.952m)	9 m	Section 144(3)(a)
G) MINIMUM REAR YARD AREA	25% of lot area (114.32 m2)	138.5 m2	Section 162, Table 162A
H) MAXIMUM BUILDING HEIGHT	14.5 m	TBD < 14.5m	
I) PERCENTAGE OF LANDSCAPE AREA OF THE LOT AREA	30% of lot area (136.82 m2)	30.04% (136.99 m2)	Section 161(8)
J) MINIMUM AREA OF SOFTLANDSCAPING IN REAR YARD AREA	On a lot greater than 450 m2 in area: 50% of rear yard Minimum aggregate area of 25 m2, with a longer dimension </= 2 x shorter dimension	73.63 m2 53.15%	Section 161(15)(b)(i) Section 161(15)(b) (iv)
K) MINIMUM AGGREGATE FRONT YARD SOFTLANDSCAPED AREA	For lot where FYS is 1.5-3m: 20% (7.64 m2)	39.21% (12 m2)	Section 161, Table 161
L) MINIMUM FENESTRATION REQUIREMENT	Front facade: at least 25% windows	34% windows	Section 161(15)(g)
M) MINIMUM FRONT FACADE ADDITIONAL RECESS	At least 20% of front facade minimum of 0.6 m from front setback line	23.6%	Section 161(15)(h)
N) MINIMUM VEHICULE PARKING (RESIDENTS) Area Z on Schedule 1A	0	0	Section 101(2)
O) MINIMUM VEHICULE PARKING (VISITOR)	No Visitor parking spaces are required for the first 12 units, 0.1 per unit parking space per unit after 12 units ((17-12)x0.1=0.5 (1) parking space)	1 30.04% (136.99 m2)	Section 102(2)
P) MINIMUM PARKING SPACE	2.6 m (width) x 5.2 m (length) Maximum width of 3.1 m		Section 106(1)
R) UNIT BREAKDOWN	25% 2 bedroom units (4)	Total unit number=17 Number of 2 bedroom unit=4	Section 161(16)
S) MINIMUM BICYCLE PARKING	0.5 per dwelling unit (17x0.5=8.5= 9 parking spaces)	17 parking spaces	Section 111, Table 111A(b)
T) AMENITY AREA	0	63.9 m² rear yard 13.7 m² balcony 46.5 m² roop top patio	

BUILDING AREAS

BASEMENT		
	BUILDING AREA	205.2 m²
	GFA	145.6 m²
GROUND FLOOR		
	BUILDING AREA	210 m²
	GFA	151 m²
SECOND FLOOR		
	BUILDING AREA	210 m²
	GFA	162.4 m²
THIRD FLOOR		
	BUILDING AREA	196 m²
	GFA	148.5 m²
FOURTH FLOOR		
	BUILDING AREA	196 m²
	GFA	150.5 m²
TOTAL BUILDING AREA		1017.2 m²
TOTAL GFA		758 m²

UNIT BREAKDOWN

	BACHELOR	1 BED	2 BED	TOTAL
BASEMENT	1	1	1	3
GROUND FLOOR	1	1	1	3
SECOND FLOOR	2	1	1	4
THIRD FLOOR	3	1	0	4
FOURTH FLOOR	1	1	1	3
TOTAL	8	5	4	17

GARBAGE REQUIREMENT

GARBAGE, RECYCLING AND COMPOSTING ARE TO BE STORED IN THE GARBAGE SHED AND REMOVED PRIVATELY DURING COLLECTION

SNOW REMOVAL REQUIREMENT

PROPERTY OWNER WILL BE RESPONSIBLE FOR THE REMOVAL AND STORAGE OF SNOW FOR ALL WALKWAYS & WINDOW WELLS THROUGHOUT THE WINTER

AVERAGE GRADE:

CALCULATED FROM EXISTING ELEVATION POINTS AT A DISTANCE EQUAL TO THE MINIMUM FRONT YARD & REAR YARD SETBACKS, AT THE INTERIOR SIDE PROPERTY LINES

AVERAGE GRADE : 62.14m (62.09m + 61.86m + 62.27m + 62.35m) /4

SITE LEGEND

- NEW TREE
- EX. TREE TO BE REMOVED
- NEW SHRUB
- PROPOSED BUILDING
- DEMO — EXISTING BUILDING TO BE DEMOLISHED
- PROPOSED / EXISTING ENTRY / EXIT
- PROPERTY LINE
- DENOTES HARD LANDSCAPING
- DENOTES SOFT LANDSCAPING
- UP — EXISTING UTILITY POLE
- FH — EXISTING FIRE HAYDRANT
- EXISTING PRIVATE RIGHT OF WAY
- SNOW STORAGE AREA
- WASTE COLLECTION AREA
- BYCYCLE PARKING (SOD)
- BYCYCLE PARKING (PAVER)
- BIKE RACKS
- CAR PARKING SPACE (ASPHALT)
- EX. CHAINED LINK/BOARD FENCE
- EXTERIOR LIGHT

WASTE COLLECTION LEGEND

GB	4YD GARBAGE CONTAINER
BB	3-360L BLUE BIN
B	3-360L BLACK BIN
G	240L ORGANICS

SITE NOTES

NEW ROOF DOWN SPOUTS SHALL NOT BE DIRECTED TOWARDS THE ADJACENT PROPERTIES

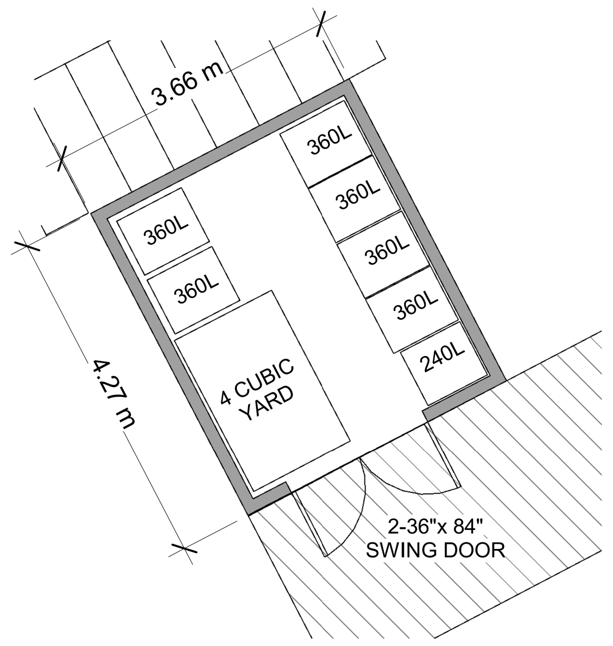
EXCAVATED MATERIAL TO BE REMOVED FROM PROPERTY

ALL GRADE TO SLOPE 2% AWAY FROM FOUNDATION WALL

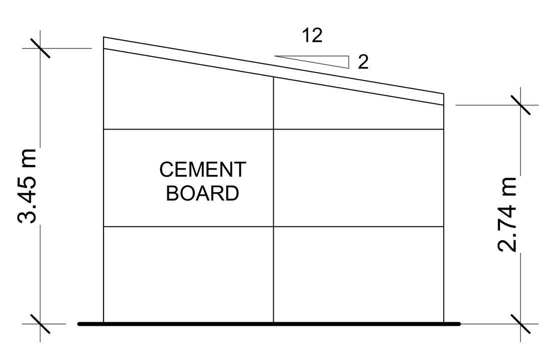
ALL MEASUREMENTS ARE METRIC (ACCOMPANYING IMPERIAL MEAS. MAY APPEAR)

EXISTING GRADING AND DRAINAGE PATTERNS NOT TO BE ALTERED UNLESS OTHERWISE NOTED BY THE CIVIL ENGINEER

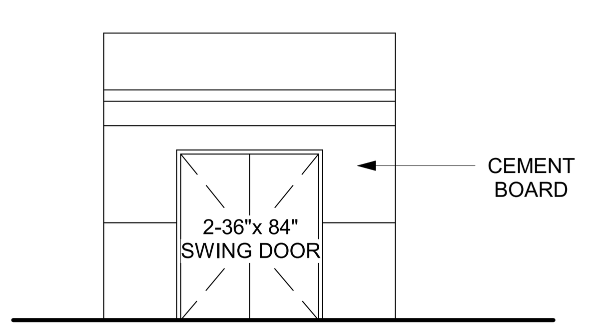
SNOW ACCUMULATION TO BE REMOVED OFF SITE IMMEDIATELY AS NEEDED



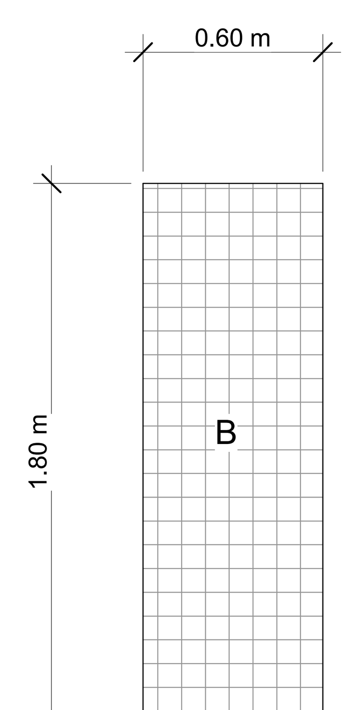
3 GARBAGE ENCLOSURE
1 : 75



4 SIDE ELEVATION
1 : 75

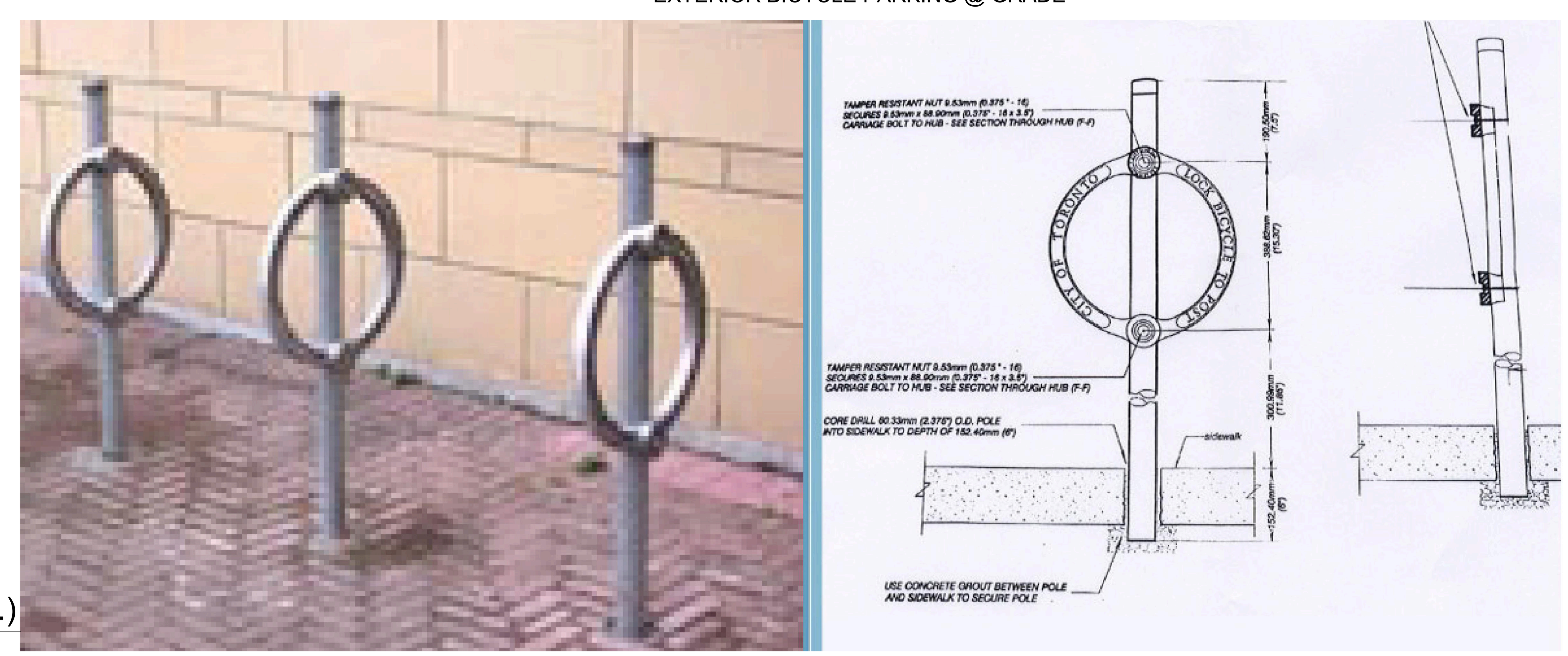


5 FRONT ELEVATION
1 : 75



6 BICYCLE PARKING @ GRADE (TYP.)
1 : 20

EXTERIOR BICYCLE PARKING @ GRADE



REDLINE ARCHITECTURE

REDLINE ARCHITECTURE INC.

Tel: 613-612-2232
info@redlinearchitecture.ca
www.redlinearchitecture.ca

RESPONSIBILITIES:

DO NOT SCALE DRAWINGS

ALL DESIGN AND CONSTRUCTION TO BE IN ACCORDANCE WITH THE ONTARIO BUILDING CODE 2012

ALL CONTRACTORS MUST WORK IN ACCORDANCE WITH ALL LAWS, REGULATIONS AND BYLAWS HAVING JURISDICTION

IT IS THE RESPONSIBILITY OF THE APPROPRIATE CONTRACTOR TO CHECK AND VERIFY ALL DIMENSIONS ON SITE AND REPORT ALL ERRORS AND OMISSIONS TO THE ARCHITECT/DESIGNER

THIS DRAWING MAY NOT BE USED FOR CONSTRUCTION UNTIL SIGNED BY THE ARCHITECT

GENERAL NOTES:

ONTARIO ASSOCIATION OF ARCHITECTS
LEVENT TATAR
LICENCE 9542

116-118 CARRUTHERS AVE.

FOUR STOREY LOW RISE APARTMENT DWELLING

OWNER/DEVELOPER:
MA PRECIOUS HOLDING INC.

ARCHITECT:
REDLINE ARCHITECTURE INC.

APPLICANT:
Q9 PLANNING + DESIGN,
DAYNA EDWARDS
24 KIRKSTALL AVENUE, OTTAWA,
ON K2G 3M5

CIVIL ENGINEER:
EXP SERVICES INC.
100-2650 QUEENSVIEW DRIVE
OTTAWA, ONTARIO K2B 8H6

LANDSCAPING:
JAMES B. LENNOX & ASSOCIATES INC.
3332 CARLING AVE OTTAWA ON. K2H 5A8
CANADA

SURVEYOR:
AOV LTD.
14 CONCOURSE GATE, SUITE 500
OTTAWA, ON. K2E-7S6

CONSULTANTS:

STRUCTURAL - TBD
MECHANICAL - TBD
ELECTRICAL - TBD

NO.	REVISION/ISSUE	DATE (M/D/Y)
9		
8		
7		
6		
5		
4		
3		
2	ISSUED FOR SPA REV.	01/02/25
1	ISSUED FOR SPA	11/12/24

PROJECT:

116-118 CARRUTHERS AVE.

116-118 CARRUTHERS AVE.
OTTAWA, ON K1Y 1N5

SITE PLAN

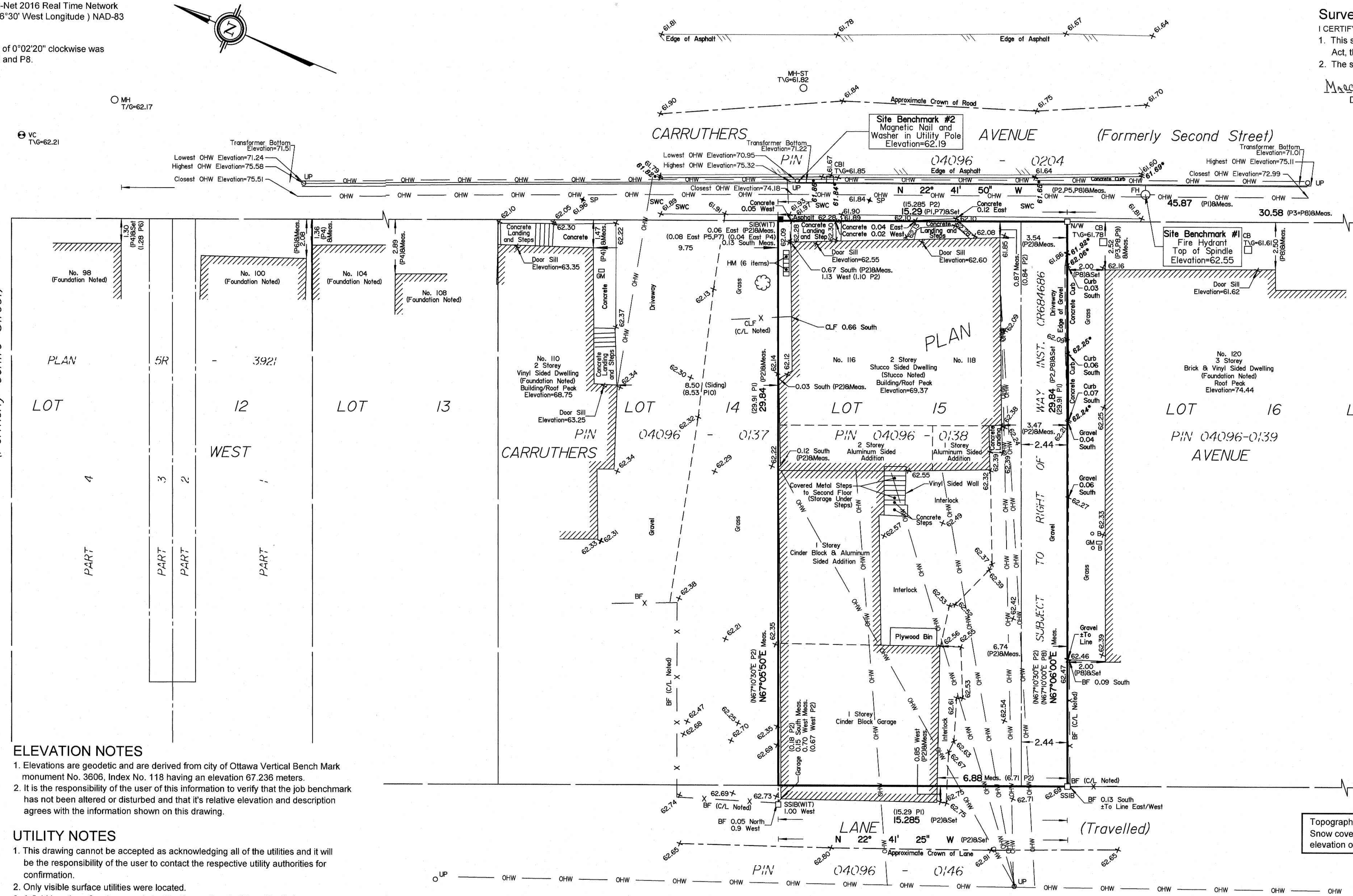
DRAWN BY:	
DATE: MAY 3, 2024	SHEET: A0
SCALE: AS NOTED	

D07-12-24-0153

19212

Bearings are grid, derived from Can-Net 2016 Real Time Network GPS observations, MTM Zone 9 (76°30' West Longitude) NAD-83 (original).

For bearing comparisons, a rotation of 0°02'20" clockwise was applied to bearings on plans P2, P5 and P8.



Surveyor's Certificate

I CERTIFY THAT :

1. This survey and plan are correct and in accordance with the Surveys Act, the Surveyors Act and the regulations made under them.
2. The survey was completed on the 1st day of March, 2024.

March 7, 2024
Date

T. Hartwick
Ontario Land Surveyor

TOPOGRAPHIC PLAN OF SURVEY OF
LOT 15
WEST CARRUTHERS AVENUE
REGISTERED PLAN 35
CITY OF OTTAWA

Surveyed by Annis, O'Sullivan, Vollebekk Ltd.

Scale 1 : 150

6 4.5 3.0 1.5 0 3 6 Metres

Metric

DISTANCES AND COORDINATES SHOWN ON THIS PLAN ARE IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048.

Notes & Legend

	Denotes	
─□─	"	Survey Monument Planted
─■─	"	Survey Monument Found
IB	"	Iron Bar
SIB	"	Standard Iron Bar
SSIB	"	Short Standard Iron Bar
N/W	"	Magnetic Nail and Washer
(WIT)	"	Witness
Meas.	"	Measured
(AOG)	"	Annis, O'Sullivan, Vollebekk Ltd.
(P1)	"	Registered Plan 35
(P2)	"	(1473) Plan dated November 3, 1989
(P3)	"	Plan 4R-21642
(P4)	"	(1319) Plan dated January 10, 1986
(P5)	"	Plan 5R-7356
(P6)	"	Plan 5R-3921
(P7)	"	(1287) Plan dated February 27, 1986
(P8)	"	(1287) Plan dated September 3, 1992
(P9)	"	Plan 4R-21011
(P10)	"	(857) Plan dated May 22, 1981
○ MH-ST	"	Maintenance Hole (Storm Sewer)
○ MH	"	Maintenance Hole (Unidentified)
⊖ VC	"	Valve Chamber (Watermain)
── OHW ──	"	Overhead Wires
○ UP	"	Utility Pole
□ CB	"	Catch Basin
□ CBI	"	Catch Basin Inlet
─○─FH	"	Fire Hydrant
T/G	"	Top of Grate
▭ GM	"	Gas Meter
▭ HM	"	Hydro Meter
∘ SP	"	Water Stand Post
∘ B	"	Bollard
CLF	"	Chain Link Fence
BF	"	Board Fence
SWC	"	Concrete Sidewalk
RWC	"	Concrete Retaining Wall
+ 65.00	"	Location of Elevations
+ 65.00*	"	Top of Concrete Curb Elevation
C/L	"	Centreline
────	"	Property Line
(shrub symbol)	"	Shrub

ELEVATION NOTES

1. Elevations are geodetic and are derived from city of Ottawa Vertical Bench Mark monument No. 3606, Index No. 118 having an elevation 67.236 meters.
2. It is the responsibility of the user of this information to verify that the job benchmark has not been altered or disturbed and that it's relative elevation and description agrees with the information shown on this drawing.

UTILITY NOTES

1. This drawing cannot be accepted as acknowledging all of the utilities and it will be the responsibility of the user to contact the respective utility authorities for confirmation.
2. Only visible surface utilities were located.
3. A field location of underground plant by the pertinent utility authority is mandatory before any work involving breaking ground, probing, excavating etc.

ASSOCIATION OF ONTARIO LAND SURVEYORS
PLAN SUBMISSION FORM
V-69245

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

Topographic data was collected under Winter Conditions. Snow cover and ice preclude determining location and elevation of some topographical data that is otherwise visible.

ANNIS, O'SULLIVAN, VOLLEBEKK LTD.
14 Concourse Gate, Suite 500
Nepean, Ont. K2E 7S6
Phone: (613) 727-0850 / Fax: (613) 727-1079
Email: Nepean@aovltd.com
Ontario Land Surveyors

Job No. 24752-24 MA Precision Holding Inc.Lt 15 RP 35 O D2 | ND

Y:\2024\24752-24_MA Precision Holding Inc_116 Carruthers Avenue_Topo_TH\Drawing\24752-24 MA Precision Holding Inc.Lt 15 RP 35 O D2.dwg

Appendix G – Drawings

Existing Conditions and Removals Plan, C000 (Provided Separately)

Notes & Details, C001 (Provided Separately)

Site Servicing Plan, C100 (Provided Separately)

Site Grading Plan, C200 (Provided Separately)

Erosion and Sediment Control Plan, C300 (Provided Separately)

Pre-Development Conditions, C400 (Provided Separately)

Post Development Conditions, C500 (Provided Separately)