Site Servicing and Stormwater Management Report
2028 Merivale Road, Ottawa, ON

Client:
Pegasus Development Corporation
1914 Merivale Road,
Ottawa, ON K2G 1E8

Submitted for:
Zoning By-law Amendment and Site Plan Control

Project Name:
2028 Merivale Road

Project Number:
OTT-24015379-A0

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Date Submitted:
2025-12-17

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1 Introduction

1.1 Overview

EXP Services Inc. (EXP) was retained by Pegasus Development Corporation to prepare a Site Servicing and Stormwater Management Report for the proposed redevelopment of 2028 Merivale Road in support of a Proposed Zoning By-law Amendment and Site Plan Applications.

The 0.39-hectare site is situated along Merivale Road as illustrated in **Figure 1-1** below. The site is within the City of Ottawa urban boundary and situated in Ward 9 (Knoxdale-Merivale). The description of the subject property is noted below:

- Part of Lot 24, Concession 1, Rideau Front, City of Ottawa, Part 2-4, PIN 046190228

The proposed development will consist of nine (9) lots containing a total of six (6) bungalows that will face Cassone Crt (lots 1-6) and 3 lots within a Planned Unit Development (lots 7 to 9).

This report will discuss the adequacy of the adjacent municipal watermain, sanitary sewers and storm sewers to provide the required water supply, convey the sewage and stormwater flows that will result from the proposed development. This report provides a design brief for submission, along with the engineering drawings, for City approval.

Figure 1-1 - Site Location

2 Existing Conditions

The existing property is within the Pineglen neighborhood and is located on the south side of Cassone Court.

The existing site topography slopes from a high point middle of the site towards Merivale Road and Miriam Avenue. Drainage outlets to 2 existing catchbasins (one on Merivale Road and one on Cassone Court). A single residential home is situated on the property.

3 Existing Infrastructure

The site includes a single-family detached home 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 infrastructure within the subject property and the infrastructure on the adjacent streets along the frontage of the property and adjacent offsite infrastructure:

Within property

- A well, and septic system within the property that will be abandoned.

Cassone Court:

- 150mm watermain.
- 300mm storm sewer.
- 250mm sanitary sewer.
- Gas / Bell / Streetlighting/ Hydro.

The As-built drawing for Cassone Court was obtained from the City of Ottawa and are included in **Appendix F** for reference.

3.1 Pre-Consultation / Permits / Approvals

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

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

- Technical Bulletin ISDTB-2010-02 (15 December 2010)
- 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)
- 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 2020, Ministry of Municipal Affairs and Housing.

4 Water Servicing

4.1 Existing Water Servicing

The site is within the City of Ottawa 2W2C pressure zone and supplied from the Britannia and Lemieux Island Water Purification Plants. The existing home is serviced by an onsite well which will be abandoned prior to development.

4.2 Water Servicing Proposal

The proposed development will consist of 9-bungalow units. An architectural site plan is provided in **Appendix B.** The site will be serviced from the existing 406mm watermain on Merivale Road. A 250mm diameter watermain will be installed to replace a portion of the existing 150mm diameter watermain in Cassone Court.

Water supply for each lot will be provided by individual water services connecting to either the existing 150mm diameter watermain or the proposed 250mm diameter watermain. The proposed servicing is detailed on Drawing C100.

4.3 Water Servicing Design

The water servicing requirements for the proposed development 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.
- Estimated the required fire flow (RFF) based on the Fire Underwriters Survey (FUS).
- Obtained hydraulic boundary conditions (HGL) from the City, based on the above water demands and required fire flows.
- Boundary condition data and water demands were used to estimate the pressure at the proposed blocks, and this was compared to the City's design criteria.

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

4.4 Water Servicing Design Criteria

The design parameters that were used to establish water and fire flow demands are summarized **Table 4-1**.

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	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	9.5 x Average Day Demands (MECP)	✓
Maximum Day Demands – Commercial / Institutional	1.5 x Average Day Demands	
Peak Hour Demands – Residential	14.3 x Average Day Demands (MECP)	✓
Peak Hour Demands – Commercial / Institutional	2.7 x Average Day Demands	
Fire Flow Requirements Calculation	FUS	✓
Depth of Cover Required	2.4m	✓
Maximum Allowable Pressure	551.6 kPa (80 psi)	✓
Minimum Allowable Pressure	275.8 kPa (40 psi)	✓
Minimum Allowable Pressure during fire flow conditions	137.9 kPa (20 psi)	✓

4.5 Estimated Water Demands

Table 4-2 below summarizes the anticipated domestic water demands for all proposed residential blocks under average day, maximum day and peak hour conditions.

Table 4-2 : Water Demand Summary

Water Demand Conditions	Estimated Water Demands (L/sec)		
	9 New Single Family Unit	6 Existing Single Family Unit	Total
Average Day	0.10	0.07	0.17
Max Day	0.25	0.17	0.41
Peak Hour	0.55	0.36	0.91

4.6 Boundary Conditions

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

The following hydraulic grade line (HGL) boundary conditions are summarized in **Table 4-3** below:

Table 4-3 : Boundary Conditions and Pressures Summary

Water Demand Conditions	HGL or Head (m)
Minimum HGL (m)	125.8
Max Day + Fire Flow (m)	125.9
Maximum HGL (m)	131.9

4.7 Fire Flow Requirements

Water for fire protection will be available utilizing the existing fire hydrant located along Cassone Court. The required fire flows for the proposed blocks 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

The proceeding **Table 4-4** 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 illustrates in **Appendix B.**

The following summarizes the parameters used for both proposed blocks.

- Type of Construction — Non-combustible
- Occupancy — Limited combustible
- Sprinkler Protection — no sprinkler system

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

Design Parameter	Overall Site
Coefficient Related to type of Construction., C	1.5
Total Floor Area (m2)	1556
Fire Flow prior to reduction (L/min)	13,000
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%)	0%
Increase due to Exposures	+39%
Can the Total Fire Flow be Capped at 10,000 L/min (167 L/sec) based on "TECHNCAL BULLETIN ISTB-2018-02", (yes/no)	yes
Total RFF	167

The estimated required fire flows (RFFs) based on the FUS methods is 167 L/sec.

4.8 Modeling Analysis

The hydraulic modeling analysis was conducted by using Bentley OpenFlows WaterGEMS hydraulic software to evaluate water system capacity, for both the existing system and the proposed system, to accommodate domestic water demands and the required fire protection flows.

Total six (6) scenarios were included. The following summarizes the modelling scenarios that were analyzed. Please refer to Figure A2 in Appendix A which illustrates the water distribution system layout.

- Scenario 1A: Average Day Demand (with existing 150mm watermain)
- Scenario 1B: Max Day Demand Plus Fire Flow (with existing 150mm watermain))
- Scenario 1C: Peak Hour Demand (with existing 150mm watermain))
- Scenario 2A: Average Day Demand (with upgraded 55m of 200mm water system)
- Scenario 2B: Max Day Demand Plus Fire Flow (with upgraded 55m of 200mm water system)
- Scenario 2C: Peak Hour Demand (with upgraded 55m of 200mm water system)

The results of the modeling scenarios (1C & 2C) under peak hour demand conditions are summarized in **Table 4-5** and **Table 4-6**. The complete results for all scenarios are provided in **Appendix B**.

Table 4-5 : Summary of Peak Hour Demand Modeling Results of Scenario 1C

Junction	Elevation (m)	Demand (L/s)	HGL (m)	Pressure (psi)
J-100	90.95	0.00	125.80	49
J-105	90.71	0.36	125.80	50
J-110	90.84	0.36	125.80	50
J-115	90.30	0.18	125.78	50

Table 4-6 : Summary of Peak Hour Demand Modeling Results of Scenario 2C

Junction	Elevation (m)	Demand (L/s)	HGL (m)	Pressure (psi)
J-100	90.95	0.00	125.80	49
J-105	90.71	0.36	125.80	50
J-110	90.84	0.36	125.80	50
J-115	90.30	0.18	125.78	50

The calculated range of working pressures anticipated within the development under peak hour conditions was estimated at between 49 psi and 50 psi under Scenario 1C, and between 49 psi and 50 psi under Scenario 2C. This meets the minimum 40 psi as per City of Ottawa Guidelines.

Table 4-7 and **Table 4-8** provide modeling results for the Maximum Day Demand plus Fire Flow conditions under Scenarios 1B and 2B. For both scenarios, the modeling assumed two hydrants are operating together to supply the fire protection flow to the system.

Table 4-7 : Summary of Maximum Day Demand Plus Fire Flow Modeling Results of Scenario 1B

Junction	Elevation (m)	Demand (L/s)	Fire Flow (L/s)	Pressure (psi)
J-100	90.95	0.00	0.00	50
J-105 (New Hydrant)	90.71	0.17	50.00	25
J-110 (Exist Hydrant)	90.84	0.17	50.00	20
J-115	90.30	0.08	0.00	21
Total		0.41	100.00	

Table 4-8 : Summary of Maximum Day Demand Plus Fire Flow Modeling Results of Scenario 2B

Junction	Elevation (m)	Demand (L/s)	Fire Flow (L/s)	Pressure (psi)
J-100	90.95	0.00	0.00	50
J-105 (New Hydrant)	90.71	0.17	90.00	34
J-110 (Exist Hydrant)	90.84	0.17	77.00	24
J-115	90.30	0.08	0.00	25
Total		0.41	167.00	

The existing 150 mm diameter watermain along Cassone Cres can provide a maximum of approximately 100 L/s fire flow under the maximum day demand conditions. This falls short of the required fire flow of 167 L/s. With the proposed upgrade (replacement of approximately 55m of existing 150mm with 200 mm PVC DR 18), the water system can provide the full required fire flow of 167 L/s with the minimum system residual pressure of 24 psi. this satisfies the City of Ottawa's design requirements.

Overall, the hydraulic modeling confirms that the existing 150 mm watermain is insufficient to supply the required fire flow for the development. The proposed 200 mm watermain upgrade enables the system to meet both domestic demand and fire flow requirements under all modeled scenarios. The upgraded configuration provides adequate service pressure and satisfies the City of Ottawa's design criteria for fire protection.

4.9 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 contribution of flow from these contributing hydrants. It was determined that an extra hydrant would be required for the development. For each hydrant the distance to the proposed block was determined to arrive at the contribution of fire flow from each. The hydrant is Class AA as per Section 5.1 of Appendix I. For each hydrant the straight-line distance, distance measured along a fire route or roadway, whether its location is accessible, and its contribution to the required fire flow.

Table 4-9 : Fire Flow Based on Hydrant Spacing

Block Number	Required Fire Flow (L/min)	Available Fire Flow Based on Hydrant Spacing as per ISTB-2018-02 (L/min)
Units 1-9	10,000 (Capped @ 167 L/sec)	±11,400

The total minimum available contribution of flow from the existing hydrant and proposed hydrant was estimated at 11,400 L/min for the 9 proposed units, whereas the maximum required fire flows (RFF) for each block is capped at 10,000 L/min. Therefore, the available flows from hydrants exceed each building's fire flow requirements as identified in Appendix I of Technical Bulletin ISTB-2018-02. Additional information on the available flows from hydrants is provided in **Table B3**.

4.10 Water Age Analysis

A review of the age of the water within the proposed system was completed to ensure than an appropriate size of watermain was selected, which was not unnecessarily oversized. The maximum residence time was estimated based on volume of water within the private system between the connection point on Merivale Road and the cul-de-sac end of Cassone Cres. The following summarizes the watermain lengths, and volumes used in this analysis:

Total length of 200mm watermains: 57.0 m
Total length of 150mm watermains: 37.0 m
Total length of 50mm watermain services: 38.0 m
Total length of 25mm watermain services: 187.5 m

Volume of water within all watermains/services: 3.618 m3 or 3,618 litres

The time required for full exhaustion of the 3.618 m^3 of water was calculated based on the water demands in **Table 4-2**. In addition, the minimum night demand of 0.02 L/sec was calculated using MOECC Table 3.3 with a minimum peaking factor of 0.10. the estimated water ages under different water uses scenarios are summarized below:

- Minimum night 60.8 hrs
- Average day 6.1 hrs
- Maximum day 2.4 hrs
- Peak hour 1.1 hrs

Although a time of 60.8 hours (was calculated based on a minimum demand of 0.02 L/sec), it should be notes that this demand rate would apply only during an 8-hour nighttime period. After the 8-hour nighttime period, an average rate of 0.17 L/sec would apply during the 16-hour daytime period. Based on this, the time required for the full exhaustion of 3.618 m3, would approximately 8.0 + 5.3 = 13.3 hours.

5 Sewage Servicing

5.1 Existing Sewage Conditions

Sewage from the existing onsite residential home is discharged into a septic tank.

5.2 Proposed Sewage Conditions

It is proposed to provide single sanitary sewer service connections from each proposed lot to the existing sanitary sewers on Cassone Court. The sanitary sewer laterals were sized based on a population flow with an area-based infiltration allowance. Individual 135mm diameter sanitary sewer laterals are proposed with a minimum 1.0% slope, having a capacity of 11.5 L/sec based on Manning's Equation under full flow conditions. **Table 5-1** below summarizes the design parameters used.

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 – Bachelor Apartment	1.4 persons/unit	
Population Density – Bachelor + Den Apartment	1.4 persons/unit	
Population Density – One Bedroom Apartment	1.4 persons/unit	
Population Density – One Bedroom plus Den Apartment	1.4 persons/unit	
Population Density – Two Bedroom Apartment	2.1 persons/unit	
Population Density – Two Bedroom plus Den Apartment	2.1 persons/unit	
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	✓

The total estimated peak sanitary flow rate from the proposed property is **0.72 L/sec** (all units) based on City Design Guidelines. Sewage rates below include a total infiltration allowance of 0.33 L/ha/sec based on the total gross site area.

The minimum sewer capacity of the 250mm diameter connecting sanitary sewer run on Cassone Court (with a slope of 0.47%) has a calculated full flow capacity of 42.3 L/sec. The 250mm diameter pipe then connects into a 375mm diameter pipe downstream of the sewer run on Merivale Road. The total estimated peak sewage flow of the existing lots and the proposed lots combined is 0.98 L/s compared to the existing single home with an estimated peak sewage flow of 0.47 L/sec. It is anticipated that the increase in peak sewage flows can be accommodated in the downstream sanitary sewer system.

6 Storm Servicing & Stormwater Management

As the proposed site is located within Rideau Vallge Conservation Authority (RVCA) jurisdiction, the stormwater works are subject to both RVCA and City of Ottawa (COO) approval. There is an existing 300 mm diameter storm sewer along Cassone Court. Under the existing conditions, the runoff from the development site flows to Cassone Court and discharges to this 300 mm storm sewer. Under the post-development conditions, the runoffs from the development site will be collected by the proposed onsite storm sewer system and discharge to the existing 300 mm storm sewer with restricted rates.

6.1 Design Criteria & Constraints

From the pre-consultation notes (Jan 16, 2025) the following summarizes the stormwater management design criteria and constraints that will be followed:

- The stormwater sewer is designed for a 2-year storm event. Flows to the storm sewer in excess of the 2-year storm release rate, up to and including the 100-year storm event, must be retained on site.
- The post-development runoff shall be the lower of the existing coefficient or a maximum equivalent ‘C’ of 0.5, whichever is less.
- All drive lanes and parking areas must not pond within the 2-year storm event. Ponding is permitted in these are during the 5-year storm event.
- The site is required to provide 80% TSS removal.

The proposed stormwater system is designed in conformance with the above-noted criteria along with the latest version of the City of Ottawa Design Guidelines (October 2012). Additional design criteria that relate to this design report is provided in the proceeding sections below.

6.2 Minor System Design Criteria

- Onsite storm sewer was sized based on the Rational Method and Manning’s Equation under free flow conditions for the 5-year storm using a 10-minute inlet time.
- Since a detailed site plan was available for the site, including building footprints, calculations of the average runoff coefficients for each drainage area were completed.
- Minimum sewer slopes to be based on minimum velocities for storm sewers of 0.80 m/sec.

6.3 Major System Design Criteria

- The major system has been designed to accommodate on-site detention with sufficient capacity to attenuate the 100-year design storm. On-site storage is calculated based on the 100-year + 20% design storm with on-site detention storage provided using underground infiltration trenches.
- Overland flow routes are provided.
- The vertical distance from the spill elevation on the street and the ground elevation at the buildings is at least 150mm.
- The emergency overflow spill elevation is at least 30 cm below the lowest building opening.

6.4 Runoff Coefficients

Average runoff coefficients for all subcatchments were calculated using PCSWMM's area weighting routine. This modelling software has a GIS engine which allows for catchment (or polygon) definition including attributes. The runoff coefficients for all catchments were area weighted to derive at average runoff coefficients based on hard surfaces (concrete or asphalt) having an imperviousness of 100%, soft surfaces (landscaping surfaces) having a percent imperviousness of 0%. The conversion from an imperviousness percent to a runoff coefficient was taken as C = (IMP*0.70) / 100 + 0.20, with the imperviousness (IMP) as a percentage.

Since the site plan included building footprints, driveways, roads, and lane, etc., the estimation of the actual level of imperviousness and runoff coefficients was completed. For this detailed design stage imperviousness levels and corresponding runoff coefficients were based on the actual building footprints.

Area weighting was again used to apply imperviousness and average runoff coefficients for the development site and external drainage area.

Table 6-1 summarize the estimated imperviousness and runoff coefficient C values for both pre-development and post-development conditions.

Table 6-1 – Summary of Runoff Coefficients

Location	Area (hectares)	Pre-Development		Post-Development	
		Cavg	Imp (%)	Cavg	Imp (%)
Development Site	0.3862	0.32	16.8%	0.57	53.2%

6.5 Pre-Development Conditions

PCSWMM was used to evaluate the drainage conditions and determine the runoffs under the pre-development conditions. For this, a Digital Terrain Model (DTM) ground surface model was prepared based on elevation information collected from the topographic survey for the development site.

The subject site is developed with a single-family residential dwelling fronting Cassone Court, including an asphalt driveway, landscaped yard areas, and gently sloping terrain. Ground elevations range from approximately 92.0 m to 94.5 m, with the higher elevations located near the west-central portion of the property and sloping generally eastward toward Merivale Road.

An existing retaining wall is present along the south property line, separating the site from the adjacent property at 2032 Merivale Road. The retaining wall prevents surface runoff from flowing directly south, maintaining drainage within the subject site boundary. Under existing conditions, the majority of the site drains eastward by overland flow toward Cassone Court, where runoff is collected by the existing roadside swale and catch basin (OF1) located near the northeast property corner. A small portion of the site, primarily within the southwest section, drains westward toward a local low point identified as OF3 (Ponding Area), where minor surface ponding may occur before infiltrating or overflowing toward the adjacent natural area. For the purpose of pre-development hydrologic analysis, the site was divided into three subcatchments (PRE_SC1 to PRE_SC3) according to topographic flow divides and surface slopes. The characteristics of each subcatchment are summarized below:

- Subcatchment PRE_SC1 represents the small, grassed portion at the southwest corner of the property, draining toward the local low point (OF3).

- PRE_SC2 and PRE_SC3 encompass the main developed areas of the property, including the dwelling, landscaped lawn, and asphalt driveway, all draining toward Cassone Court.

Overall, the site's pre-development drainage pattern is dominated by overland sheet flow toward Cassone Court and Merivale Road, with limited runoff directed westward. There are no storm sewers or defined swales within the property boundary. The

existing ground surface and retaining wall effectively contain and direct drainage toward the municipal right-of-way. **Figure 6-1** illustrates these pre-development conditions and the following **Table 6-2** provides modeled pre-development peak runoff rates.

Table 6-2 – Summary of Pre-Development Flows

Return Period Storm	Total Peak Flows (L/sec)			
	OUTFALL-1	OUTFALL-2	OUTFALL-3	TOTAL
Chicago_3hr_2-year	9.56	5.35	0.3	**15.21**
Chicago_3hr_5-year	21.28	13.0	4.73	39.01
Chicago_3hr_100-year	63.23	38.8	24.07	126.1
SCS_Type II_2-year	9.47	5.75	1.96	17.18
SCS_Type II_5-year	22.1	13.5	8.25	43.85
SCS_Type II_100-year	58.69	35.9	24.28	118.87

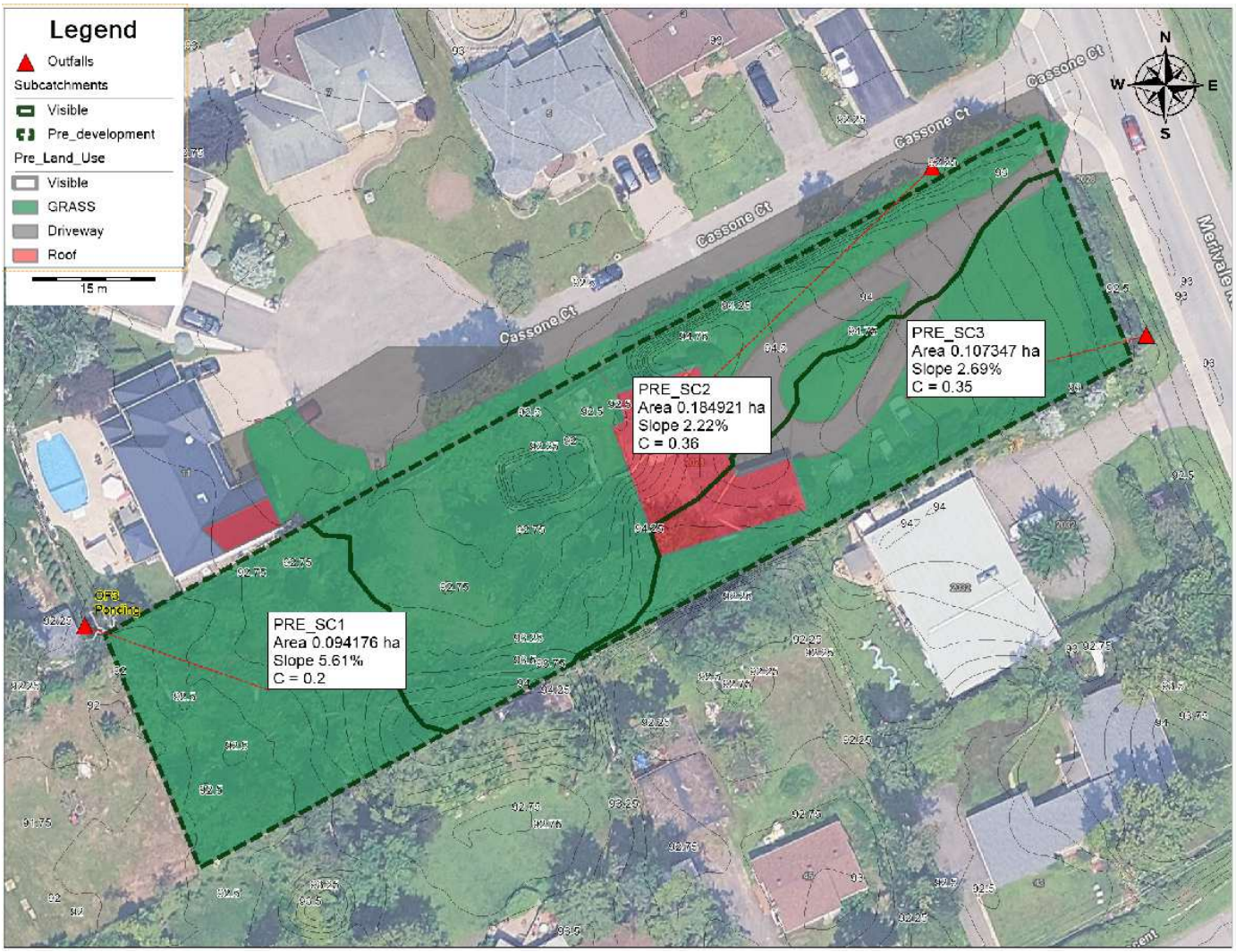

Figure 6-1 – Pre-development Sub-catchments

Figure 6-2 presents the modeled 2-year peak runoff rates under the pre-development conditions.

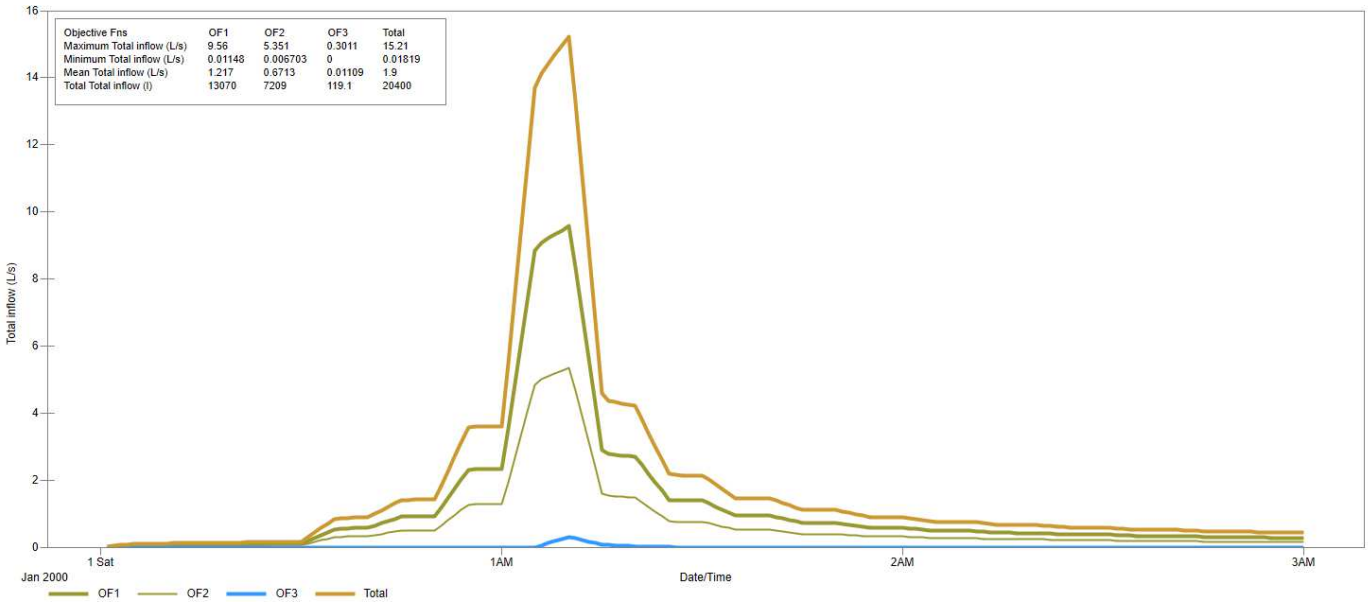

Figure 6-2 – Chicago 2-yr Peak Runoffs under Pre-development Sub-catchments

6.6 Allowable Release Rate

Under the post-development conditions, runoffs from the development site will be collected by the proposed storm sewer system and discharge to the existing 300 mm diameter storm sewer along Cassone Ct. The allowable release rate was calculated at **15.2 L/sec** based on a Chicago 2-year storm event under the pre-development conditions.

6.7 Proposed Stormwater System

The proposed stormwater system the development site includes the conventional gravity storm sewers, the rear yard drainage swale with a perforated underdrain, and the front yard shallow swales with raised inlets and a perforated underdrain system. The collected runoffs from the development site are discharged to the existing 300 mm storm sewer on Cassone Ct with the restricted overall flows equal to or below the maximum allowable discharge rate of 15.2 L/sec.

A post-development storm drainage plan is illustrated on **Figure 6-3**. A total seventeen (17) subcatchments (or drainage areas) within the development site are shown on this figure with average runoff coefficients calculated for each drainage area.

Design sheet for the 2-year sizing of the storm sewer system is included for reference in Appendix D. Under the 2-year storm event adequate capacity is provided within the proposed storm sewer system. The sub-catchment data was used in PCSWMM for dual drainage modeling and ensure the sufficient sewer capacity and the restricted discharge rate to the existing storm sewer.

Figure 6-3 – Post-development Sub-catchments

6.8 Stormwater Model Development

PCSWMM was used to create a hydrologic/hydraulic model of the stormwater system. The model includes both the minor system (storm sewer), for estimating peak flows and runoff volumes and the major system (roads and swales, etc.). Calculations of runoff was completed based on the PCSWMM's EPA SWM 5 engine.

Subcatchment parameters were taken from City of Ottawa's SDG002 Design parameters. The following design parameters and assumptions are noted in **Table 6-3** below:

Table 6-3 : Subcatchment Parameters

Parameter	PCSWMM Parameter	Value
Infiltration Loss Method		Horton
Maximum Infiltration Rate	Max. Infil. Rate	76 mm/hr
Minimum Infiltration Rate	Min. Infil. Rate	13.2 mm/hr
Decay Constant (1/hr)	Decay Constant	4.14
Manning N (Impervious)	N Impev	0.013
Manning N (Pervious)	N Perv	0.25
Depression Storage – Impervious Surfaces	Dstore Imperv	1.57 mm
Depression Storage – Pervious Surfaces	Dstore Perv	4.67 mm
Zero Percent Impervious	Zero Imper	varies
Subcatchment Slopes	Slope	varies

6.9 Storm Events Modeled

The SDG002 guidelines specify the use of the Chicago and SCS Type II distributions for generation of stormwater runoff. The 3-hr, and 6-hr Chicago (for urban), and 6-hr, 12-hr, or 24-hr SCS Type II (for rural) are generally used. For this project the 3-hr Chicago storms and 12-hr SCS Type II storms were modelled. In summary six (6) storm events were modelled including:

- 3-hour 2-year Chicago storm. (10 min timestep), with total rainfall of 31.88mm.
- 3-hour 5-year Chicago storm. (10 min timestep), with total rainfall of 42.54mm.
- 3-hour 100-year Chicago storm. (10 min timestep), with total rainfall of 71.58mm.
- 12-hour 2-year SCS Type II storm. (6 min timestep), with total rainfall of 43.2mm.
- 12-hour 5-year SCS Type II storm. (6 min timestep), with total rainfall of 57.6mm.
- 12-hour 100-year SCS Type II storm. (6 min timestep), with total rainfall of 96.0mm

6.10 Model Development

The subcatchment (or storm drainage areas) were developed in Autodesk CIVIL 3D and imported into PCSWMM. PCSWMM was then used to generate impervious levels for each subcatchment with the area-weighting command. Storm sewers and manholes were imported from CIVIL 3D as GIS shape files and the node and conduit elevations, and sizes were inputted based on the preliminary sizing completed with the Rational Method analysis. Connections between the catchbasin nodes and the sewer main were converted to OUTLETS or ORIFICE to represent the ICDs. Once all the minor system components were inputted, the major system was defined connecting inlets. The major system (overflow routes) was modeled as triangular conduits to represent the gutter system along edge of pavement and driveways.

Figure 6-4: Model Schematic Showing Minor and Major System Components

Figure 6-4 above presents a portion of the PCSWMM model which demonstrates the object connectivity. the yellow lines and blue circles represent the storm sewer system and manholes, with red solid lines representing the ORIFICE links (or ICDs). The dashed light blue lines represent the perforated underdrains. Catch basins are shown as red squares.

6.11 Modeled Catchbasin and Infiltration Trench

The on-site storage is required to control the post-development peak flows to the maximum allowable discharge as discussed in Section 6.6 for modeled storm events, including the 100-year storm. A granular infiltration trench system, 2.0 m wide and 700 mm deep, is proposed to meet runoff storage needs and will be installed as part of both rear yard and front yard drainage systems. Runoffs collected by catchbasins will be temporarily stored within the granular infiltration trenches and release to the existing 300 mm storm sewer on Cassone at two outlet locations: one connects to the storm manhole at the end of Cul-de-sac, and the other connects directly to the 300 mm storm sewer approximately 30 m west of Merivale Rd. **Figure 6-5** illustrates the typical section of the proposed infiltration trench with perforated underdrain and catchbasin.

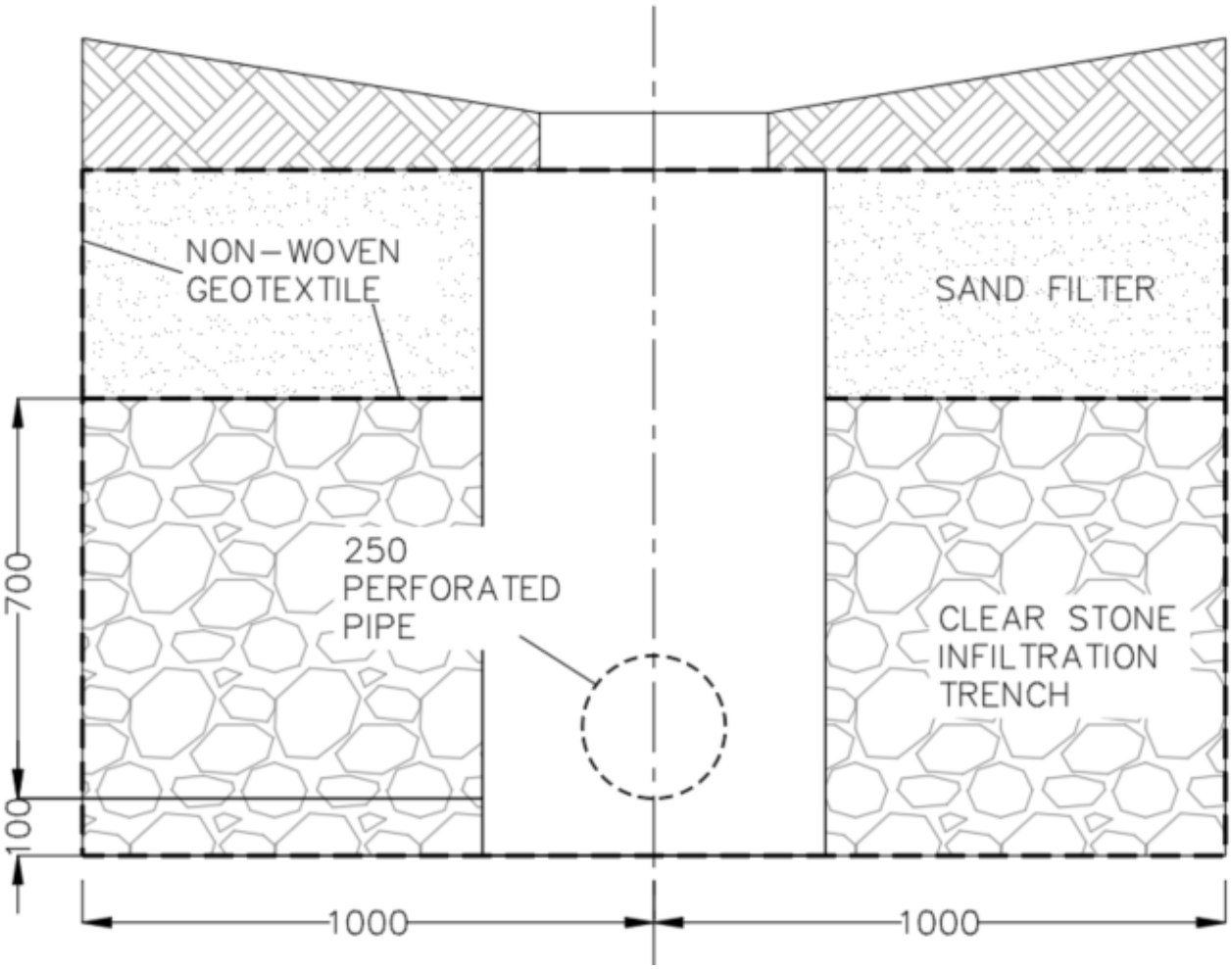

Figure 6-5: Infiltration Trench and Catchbasin Section Details

The total length of the proposed infiltration trench is 211 m. The estimated available storage volume is 118.2 m^3, calculated based on the total volume of clear stone trench storage layer using a typical void ratio of 0.4:

$$Va = L \times W \times D \times n$$

Where:

Va = Available storage (m^3)

L = Trench clear stone layer length (m)

W = Trench clear stone layer width (m)

D = Trench clear stone layer depth above pipe invert (m)

n = Void ratio in trench clear stone layer (0.40)

in addition to the subsurface trench storage, surface ponding storage is also available within the proposed front yard swale. The maximum ponding depth is 300 mm.

All catchbasins were established as storage nodes in PCSWMM, with these storage nodes having a volume relationship which was assigned based on the clear stone storage layer and the maximum depth and area of ponding. **Figure 6-6** below illustrates a typical storage curve used at a front yard catch basin.

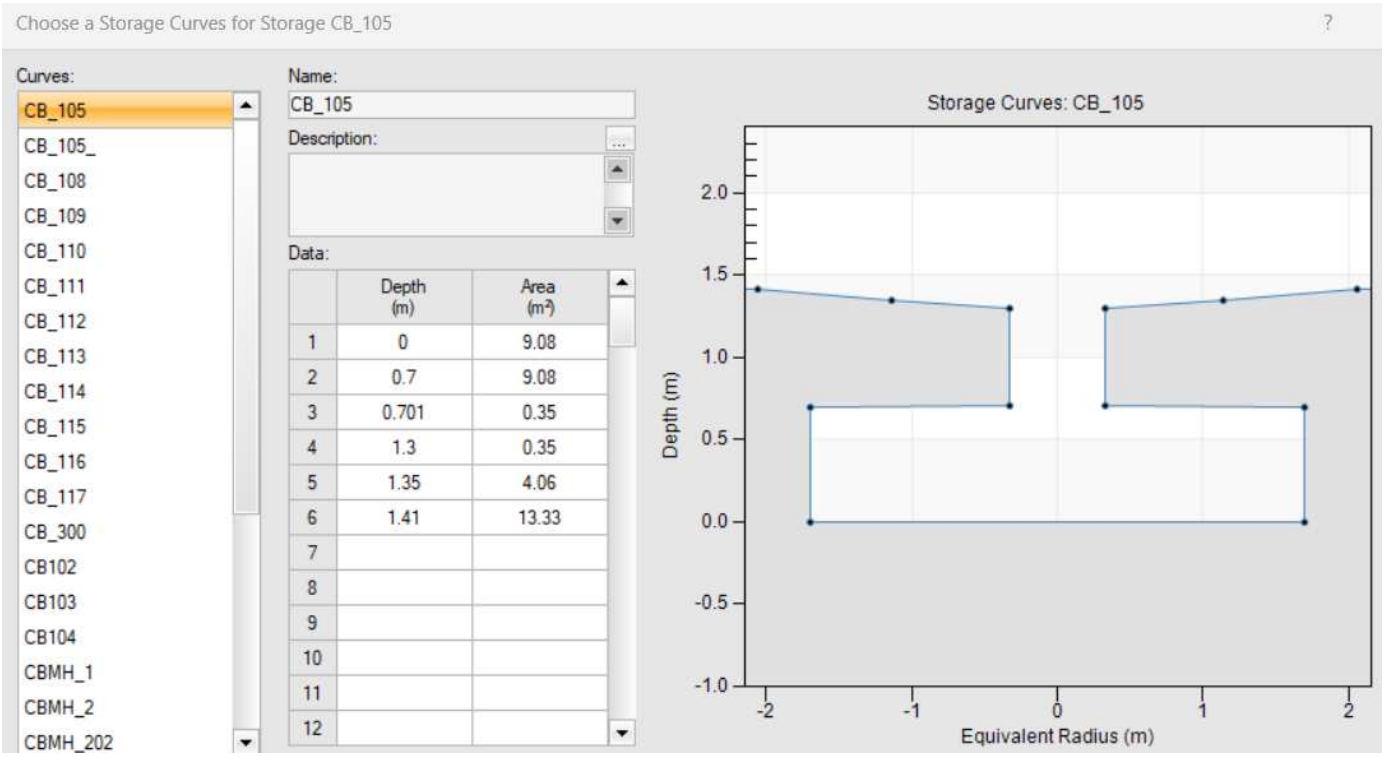

Figure 6-6: Representation of Storage Curves for Modelling of Catchbasins at Front Yard Swale

6.12 Orifice Control

Two circular orifice devices were proposed to control the peak discharges to the existing 300 mm storm sewer on Cassone Ct. **Table 6-4** summarizes installation details and sizes of two proposed orifices.

Table 6-4 : Flow Control Orifices Details

Description	Installation MH	Orifice Size	Invert
Orifice 1	CBMH_202	55 mm Circular	90.64 m
Orifice 2	CB_117	60 mm Circular	91.35 m

6.13 Stormwater Model Results

Table 6-5 summarizes the peak flows and storage volumes at each outfall locations and modeled storage volumes under various design storm events.

Table 6-5 : Peak Flows and Storage Volumes at Outfalls

Storm Event	Outfall_1	Outfall_2	Total
Chicago_3h_2yr	5.67 L/sec & 21.4 m^3	4.15 L/sec & 7.6 m^3	9.80 L/sec & 29.0 m^3
Chicago_3h_5yr	6.29 L/sec & 35.0 m^3	4.96 L/sec & 12.8 m^3	11.23 L/sec & 47.8 m^3
Chicago_3h_100yr	7.82 L/sec & 76.9 m^3	7.11 L/sec & 31.5 m^3	14.91 L/sec & 108.4 m^3
SCS_12hr_2yr	5.75 L/sec & 22.5 m^3	4.32 L/sec & 8.3 m^3	10.07 L/sec & 30.8 m^3
SCS_12hr_5yr	6.39 L/sec & 37.4 m^3	5.15 L/sec & 14.4 m^3	11.54 L/sec & 51.8 m^3
SCS_12hr_100yr	7.78 L/sec & 76.1 m^3	7.25 L/sec & 32.2 m^3	15.03 L/sec & 108.3 m^3

As discussed in Section 6.6, the allowable release rate was established at 15.2 L/sec based on a 2-year storm event under the pre-development conditions. Under the post-development conditions, the modeled the SCS 12hr 100-year peak flow is 15.03 L/sec and total required on-site storage volume to meet this condition is 108.3 m^3.

6.14 Stormwater Quality Control

Stormwater treatment achieving 80% TSS removal will be provided through a combination of enhanced dry swales, sand filter media, and clear stone infiltration trench with perforated underdrain pipes. The infiltration trenches will be constructed with a filter media layer to provide filtration prior to percolation through the trench. Grasses within the swales should be maintained at a height of no less than 75 mm to improve suspended solid filtration performance.

According to MOECC Table 3-2, the quality control volume requirements are shown below.

- Level of Protection: Enhanced
- TSS Removal Rate: 80%
- % Imperviousness: 55.7%
- Storage Requirement: 30 m^3/ha

Quality control will be provided for the entire development site area of 0.4838 ha, including both the development site and the adjacent drainage-contributing area. The unadjusted quality control storage requirement is calculated as:

0.4838 ha x 30 m^3/ha = 14.51 m^3.

Given the enhanced grass swales are proposed, the water quality storage requirement (Vq) is adjusted using MOECC's Previous Catchbasin Adjustment Equation 4.19 as follows:

$$Vq = (A \times S) - (CBV \times f)$$

Where:

Vq = Adjusted volume of water quality storage required (m^3)

A = Development areas (m^2)

S = Quality control storage requirement (30 m^3/ha)

CBV = Volume of previous catchbasin storage (m^3)

f = Longevity factor (0.5 for soil percolation rate < 25 mm as per MOECC Table 4.12)

The estimated storage volume per typical rear yard catch basin, based on City's standard detail S30, is 0.08 m^3. With a total 16 catch basins proposed across the site, including both rear and front yard locations, the total CBV is 1.28 m^3.

Thus, the adjusted quality control storage requirement is calculated as:

Vq = 0.4038 ha x 30 m^3/ha – (1.28 m^3 x 0.5) = 13.87 m^3.

The minimum required depth of the infiltration trench, used to accommodate the additional quality storage below the perforated underdrain pipe, is calculated as follows:

D = Vq / (L x W x n)

Where:

Vq = Adjusted volume of water quality storage required (m^3)

D = Depth of clear stone storage required for quality control (m)

L = Lenth of infiltration trench (211 m)

W = Width of infiltration trench (2 m)

n = Void ratio in trench storage layer (0.40 for clear stone)

Therefore:

D = 13.87 / (211 x 2 x 0.40) = 0.082 m

To meet the water quality control requirement, the clear stone layer beneath the perforated underdrain pipes must have a minimum design depth of 100 mm.

7 Erosion & Sediment Control

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

- Filter cloth shall be installed between the frame and cover of all adjacent catch basins and catch basin manhole structures.
- Heavy duty silt fencing will be used to control runoff around the construction area. Silt fencing locations are identified on the site grading and erosion control plan.
- A mud mat will be installed at the construction entrance to help avoid mud from being transported to offsite roads.
- Visual inspection shall be completed daily on sediment control barriers and any damage repaired immediately. Care will be taken to prevent damage during construction operations.
- In some cases, barriers may be removed temporarily to accommodate the construction operations. The affected barriers will be reinstated at night when construction is completed.
- Sediment control devices will be cleaned of accumulated silt as required. The deposits will be disposed of as per the requirements of the contract.

- During the course of construction, if the engineer believes that additional prevention methods are required to control erosion and sedimentation, the contractor will install additional silt fences or other methods as required to the satisfaction of the engineer.
- Construction and maintenance requirements for erosion and sediment controls are to comply with Ontario Provincial Standard Specification (OPSS) OPSS 805 and City of Ottawa specifications.

8 Conclusions and Recommendations

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

Water

- Single water services shall connect into each single-family home.
- The Required Fire Flows (RFFs) were estimated at **10,000 L/min** (167 L/sec). The total available flows for firefighting purposes, based on the contribution from hydrants, was estimated at **11,400 L/min**.
- Based on hydraulic boundary conditions (HGL) provided by the City of Ottawa, a system pressure of between **49 psi** and **50 psi** under peak hourly demands is anticipated at all 9 units. This exceeds the City's guideline of 40 psi.

Sewage

- The total estimated peak sewage flow is 0.98 L/sec. The existing sanitary sewer in Cassone Court has a capacity of 43.2 L/sec.

Stormwater

- For the stormwater system, the allowable capture rate from the entire site was calculated based on a runoff coefficient of 0.59, time of concentration of 10 minutes for a 5-year storm event. The allowable release rate for the entire site was calculated to be **15.2 L/sec**. Runoff in excess of this will be detained onsite for up to the 100-year storm.
- The 100-year peak flows from the entire site, including both the development site and the adjacent drainage-contributing area, is **15.0 L/sec.**
- To meet the allowable release rate, a total retention volume of **108.3 m^3** is required for the SCS Type II 12 hr 100-yr storm.
- Runoff from the surface areas will be collected and detained in the underground infiltration trenches under the enhanced grass swales along both the rear yard and front yard.
- Two circular orifice devices were proposed to control the peak discharges to the existing 300 mm storm sewer on Cassone Ct.
- Quality control requirements are to provide Enhanced Level of Protection (80% TSS removal) for treatment of stormwater runoff. The treatment of stormwater runoff will occur within the enhanced grass swales and clear stone trench layer. An estimated quality volume of **13.87 m^3** based on MOECC guidelines will provide a minimum 24 -hour detention of runoff. Approximately **21.1 m^3** of clear stone layer is provided.

Erosion & Sediment Control

- 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 Pegasus Development Corporation.

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

Pre-Development Drainage Areas – Drawing C500 (Included Seperately)

Post-Development Drainage Areas – Drawing C501 (Included Seperately)

Figure A1 – Fire Hydrant Locations

Figure A2 – Local Drainage Routes and Contour Map

Figure A3 – Water Model System Layout

exp Services Inc.
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Ottawa, ON K2B 8H6
www.exp.com

DESIGN AC	2028 MERIVALE ROAD	SCALE 1:2500
DRAWN AC	PROPOSED DEVELOPMENT	SKETCH NO
DATE JULY 2025	FIRE HYDRANT LOCATIONS	FIG A1
FILE NO OTT-24015379		

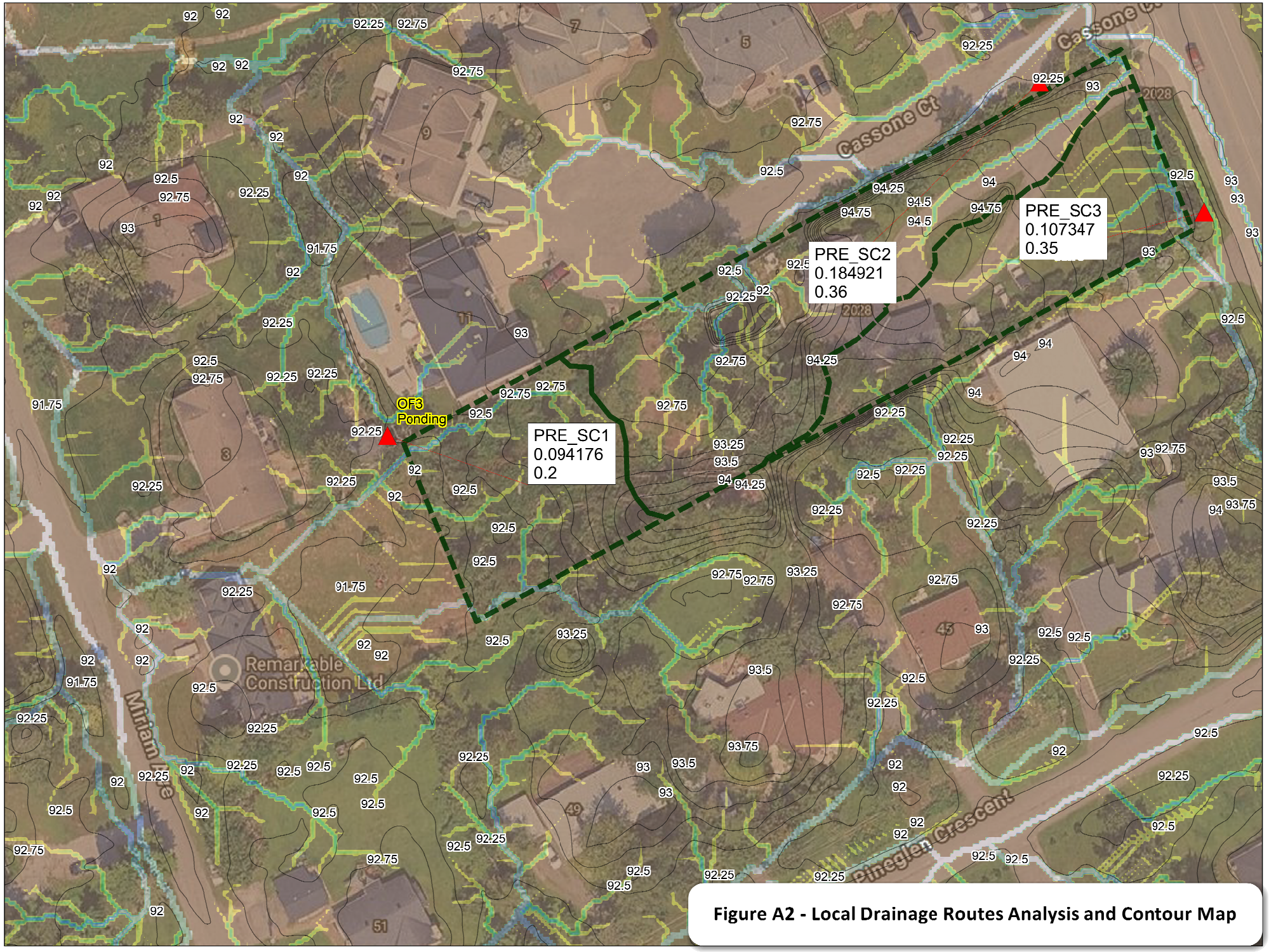


Figure A2 - Local Drainage Routes Analysis and Contour Map

FIGURE A3 - WATER MODEL SYSTEM LAYOUT

Appendix B – Water Servicing Tables

Table B1 – Water Demand Chart

Table B2 – Fire Flow Requirements Based on Fire Underwriters Survey (FUS)

Table B3 – Available Fire Flows Based on Hydrant Spacing

Table B4 – WaterGEMS Model Results

TABLE B1_1

Water Demand Chart

Junction Number	No. of Units											Total Pop	Residential Demands					Commercial						Total Demands in (L/sec)			Description
	Singles/Semis/Towns					Apartments							Avg Day Demand (L/day)	Max Day Peaking Factor	Max Hour Peaking Factor	Max Day Demand (L/day)	Peak Hourly Demand (L/day)	Area (m^2)	Avg Demand (L/day)	Peaking Factors (x Avg Day)		Max Day Demand (L/day)	Peak Hour Demand (L/day)	Avg Day (L/s)	Max Day (L/s)	Peak Hour (L/s)	
	Existing Single Family	New Single Family	Semi	Duplex	Townhome	Bachelor	1-Bed Apt	2-Bed Apt	3-Bed Apt	4-Bed Apt	Avg Apt.									Max Day	Peak Hour						
J-115	1	3										13.6	3,808	2.50	5.50	9,520	20,944							0.04	0.11	0.24	End of 50mm Service (3 New & 1 Existing)
J-110	2	3										17.0	4,760	2.50	5.50	11,900	26,180							0.06	0.14	0.30	50mm Service/150mm WM (3 New & 2 Existing)
J-105	3	3										20.4	5,712	2.50	5.50	14,280	31,416							0.07	0.17	0.36	150mm WM/250mm WM (3 New & 3 Existing)
Totals =	6	9										30.6	14,280			35,700	78,540							0.17	0.41	0.91	

Unit Densities	Persons/Unit
Singles	3.4
Semi-Detached	2.7
Duplex	2.3
Townhome	2.7
Bachelor Apt Unit	1.4
1-Bed Apt Unit	1.4
2-Bed Apt Unit	2.1
3-Bed Apt Unit	3.1
4-Bed Apt Unit	4.1
Avg. Apt Unit	1.8

Residential

Residential Consumption (L/pers/day) =	280
Max Day Peaking Factor (* avg day) =	2.5
Peak Hour Factor (* avg day) =	5.5

Based on Table 4.2 of SDG002 (Section 4.2.8)

Industrrial/Commercial/Institutional Water Consumption

Light Industrial (L/gross ha/day) =	35,000
Heavy Industrial (L/gross ha/day) =	55,000
Commer/Instit (L/m^2 floor/day) =	5
Max Day Peaking Factor (* avg day) =	1.5
Peak Hour Factor (* avg day) =	2.7

Project:

2028 Merivale Road

Designed:	Location:
Jason Fitzpatrick, P.Eng.	
Checked:	Ottawa, Ontario
Bruce Thomas, P.Eng.	
File Reference:	Page No:
24015379 Water - Demand Chart Oct 18, 2025.xlsx	1 of 1

TABLE B2
FIRE FLOW REQ Summary of Required Fire Flows (RFF) for 2028 Merivale Road
Building # / Type: **Combined Fire Area = Bungalows lots 1-9**

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					
Input Building Floor Areas (A)			Area	% Used	Area Used	1556.0 m²	
	Area		1556	100%	1556		
Fire Flow (F)	F = 220 * C * SQRT(A)						13,017
Fire Flow (F)	Rounded to nearest 1,000						**13,000**

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%	-1,950	11,050
	Limited Combustible	-15%				
	Combustible	0%				
	Free Burning	15%				
	Rapid Burning	25%				
Choose Reduction Due to Sprinkler System	**Adequate** Sprinkler Conforms to NFPA13	-30%	No Sprinkler	0%	0	11,050
	No Sprinkler	0%				
	Standard Water Supply for Fire Department Hose Line and for Sprinkler System	-10%	Not Standard Water Supply or Unavailable	0%	0	11,050
	Not Standard Water Supply or Unavailable	0%				
	Fully Supervised Sprinkler System	-10%	Not Fully Supervised or N/A	0%	0	11,050
	Not Fully Supervised or N/A	0%				

Choose Structure Exposure Distance	Exposures	Separ-ation Dist (m)	Cond	Separation Conditon	Exposing Wall type	Exposed Wall Length: Length (m)	No of Storeys	Length-height Factor	Sub-Conditon	Charge (%)	Total Charge (%)	Total Exposure Charge (L/min)	
	Side 1	38	5	30.1 to 45	Type A	15	2	30	5A	5%	39%	4,310	15,360
	Side 2	50	6	> 45.1	Type A	15	2	30	6	0%			
	Front	9.7	2	3.1 to 10	Type A	13.4	2	26.8	2A	17%			
	Back	10	2	3.1 to 10	Type A	13.4	2	26.8	2A	17%			

Obtain Required Fire Flow		
	Total Required Fire Flow, Rounded to the Nearest 1,000 L/min =	**15,000**
	Total Required Fire Flow (RFF), L/sec =	**250**
	Can the Total Fire Flow be Capped at 10,000 L/min (167 L/sec) based on "TECHNCAL BULLETIN ISTB-2018-02", (yes/no) =	**Yes**
	Total Required Fire Flow (RFF). If RFF < 167 use RFF (L/sec) =	**167**

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

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

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 to 45m	5
> 45.1m	6

TABLE B3

AVAILABLE FIRE FLOWS BASED ON HYDRANT SPACING

Lot Number	Existing or NEW lot	Street / Location	Proposed Hydrant, HYD-1		Existing Hydrant, 366020H050		Contribution of All Hydrants L/min (L/sec)	FUS RFF in L/min or (L/sec)	Meets Requreiment (Yes/No)
			[1]Distance to Hydrant	[2]Fire Flow Contribution (L/min)	[1]Distance to Hydrant	[2]Fire Flow Contribution (L/min)			
Lot 1	NEW	Cassone Court	32m	5700	67	5700	11,400 (190)	10000 (167)	Yes
Lot 2	NEW	Cassone Court	17m	5700	52	5700	11,400 (190)	10001 (167)	Yes
Lot 3	NEW	Cassone Court	5m	5700	38	5700	11,400 (190)	10002 (167)	Yes
Lot 4	NEW	Cassone Court	8m	5700	25	5700	11,400 (190)	10003 (167)	Yes
Lot 5	NEW	Cassone Court	20m	5700	15	5700	11,400 (190)	10004 (167)	Yes
Lot 6	NEW	Cassone Court	31m	5700	3	5700	11,400 (190)	10005 (167)	Yes
Lot 7	NEW	Cassone Court	52m	5700	15	5700	11,400 (190)	10006 (167)	Yes
Lot 8	NEW	Cassone Court	65m	5700	28	5700	11,400 (190)	10007 (167)	Yes
Lot 9	NEW	Cassone Court	74m	5700	43	5700	11,400 (190)	10008 (167)	Yes
Civic # 1	Existing	Cassone Court	32m	5700	66	5700	11,400 (190)	10009 (167)	Yes
Civic # 3	Existing	Cassone Court	14m	5700	48	5700	11,400 (190)	10010 (167)	Yes
Civic # 5	Existing	Cassone Court	5m	5700	29	5700	11,400 (190)	10011 (167)	Yes
Civic # 7	Existing	Cassone Court	36m	5700	10	5700	11,400 (190)	10012 (167)	Yes
Civic # 9	Existing	Cassone Court	41m	5700	10	5700	11,400 (190)	10013 (167)	Yes
Civic # 11	Existing	Cassone Court	41m	5700	10	5700	11,400 (190)	10014 (167)	Yes

Notes

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

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

Scenario Summary Report
Scenario: 1A_EXISTING_ADD

Scenario Summary

ID	39
Label	1A_EXISTING_ADD
Notes	
Active Topology	<I> Base Active Topology
Physical	ADD_EXISTING
Demand	<I> Base Demand
Initial Settings	<I> Base Initial Settings
Operational	<I> Base Operational
Age	<I> Base Age
Constituent	<I> Base Constituent
Trace	<I> Base Trace
Fire Flow	<I> Base Fire Flow
Energy Cost	<I> Base Energy Cost
Transient	<I> Base Transient
Pressure Dependent Demand	<I> Base Pressure Dependent Demand
Failure History	<I> Base Failure History
SCADA	<I> Base SCADA
User Data Extensions	<I> Base User Data Extensions
Steady State/EPS Solver Calculation Options	<I> Base Calculation Options
Transient Solver Calculation Options	<I> Base Calculation Options

Hydraulic Summary

Time Analysis Type	Steady State	Use simple controls during steady state?	True
Friction Method	Hazen-Williams	Is EPS Snapshot?	False
Accuracy	0.001	Start Time	12:00:00 AM
Trials	40	Calculation Type	Hydraulics Only

FlexTable: Junction Table

Label	Elevation (m)	Demand (L/s)	Hydraulic Grade (m)	Pressure (psi)
J-100	90.95	0.00	131.90	58
J-105	90.71	0.07	131.90	58
J-110	90.84	0.07	131.90	58
J-115	90.30	0.03	131.90	59

FlexTable: Pipe Table

Label	Start Node	Stop Node	Diameter (mm)	Hazen-Williams C	Flow (L/s)	Velocity (m/s)	Length (m)
P-110	J-110	J-115	50.0	100.0	0.03	0.02	38
P-100	J-100	J-105	150.0	100.0	0.17	0.01	57
P-105	J-105	J-110	150.0	100.0	0.10	0.01	37
P-10	R-1	J-100	400.0	120.0	0.17	0.00	5

FlexTable: Reservoir Table

ID	Label	Elevation (m)	Hydraulic Grade (m)	Is Active?
37	R-1	131.90	131.90	True

Scenario Summary Report
Scenario: 1B_EXISTING_MDD_TWO_HYDRANTS

Scenario Summary

ID	49
Label	1B_EXISTING_MDD_TWO_HYDRANTS
Notes	
Active Topology	<I> Base Active Topology
Physical	MDD+FIRE_TWO HYDRANTS_EXISTING
Demand	Two Hydrants_Existing
Initial Settings	<I> Base Initial Settings
Operational	<I> Base Operational
Age	<I> Base Age
Constituent	<I> Base Constituent
Trace	<I> Base Trace
Fire Flow	<I> Base Fire Flow
Energy Cost	<I> Base Energy Cost
Transient	<I> Base Transient
Pressure Dependent Demand	<I> Base Pressure Dependent Demand
Failure History	<I> Base Failure History
SCADA	<I> Base SCADA
User Data Extensions	<I> Base User Data Extensions
Steady State/EPS Solver Calculation Options	MDD
Transient Solver Calculation Options	<I> Base Calculation Options

Hydraulic Summary

Time Analysis Type	Steady State	Use simple controls during steady state?	True
Friction Method	Hazen-Williams	Is EPS Snapshot?	False
Accuracy	0.001	Start Time	12:00:00 AM
Trials	40	Calculation Type	Hydraulics Only

FlexTable: Junction Table

Label	Elevation (m)	Demand (L/s)	Hydraulic Grade (m)	Pressure (psi)
J-100	90.95	0.00	125.89	50
J-105	90.71	50.17	108.40	25
J-110	90.84	50.17	105.26	20
J-115	90.30	0.08	105.25	21

FlexTable: Pipe Table

Label	Start Node	Stop Node	Diameter (mm)	Hazen-Williams C	Flow (L/s)	Velocity (m/s)	Length (m)
P-110	J-110	J-115	50.0	100.0	0.08	0.04	38
P-100	J-100	J-105	150.0	100.0	100.41	5.68	57
P-105	J-105	J-110	150.0	100.0	50.25	2.84	37
P-10	R-1	J-100	400.0	120.0	100.41	0.80	5

FlexTable: Reservoir Table

ID	Label	Elevation (m)	Hydraulic Grade (m)	Is Active?
37	R-1	125.90	125.90	True

Scenario Summary Report
Scenario: 1C_EXISTING_PHD

Scenario Summary

ID	44
Label	1C_EXISTING_PHD
Notes	
Active Topology	<I> Base Active Topology
Physical	PHD_EXISTING
Demand	<I> Base Demand
Initial Settings	<I> Base Initial Settings
Operational	<I> Base Operational
Age	<I> Base Age
Constituent	<I> Base Constituent
Trace	<I> Base Trace
Fire Flow	<I> Base Fire Flow
Energy Cost	<I> Base Energy Cost
Transient	<I> Base Transient
Pressure Dependent Demand	<I> Base Pressure Dependent Demand
Failure History	<I> Base Failure History
SCADA	<I> Base SCADA
User Data Extensions	<I> Base User Data Extensions
Steady State/EPS Solver Calculation Options	PHD
Transient Solver Calculation Options	<I> Base Calculation Options

Hydraulic Summary

Time Analysis Type	Steady State	Use simple controls during steady state?	True
Friction Method	Hazen-Williams	Is EPS Snapshot?	False
Accuracy	0.001	Start Time	12:00:00 AM
Trials	40	Calculation Type	Hydraulics Only

FlexTable: Junction Table

Label	Elevation (m)	Demand (L/s)	Hydraulic Grade (m)	Pressure (psi)
J-100	90.95	0.00	125.80	49
J-105	90.71	0.36	125.80	50
J-110	90.84	0.36	125.80	50
J-115	90.30	0.18	125.78	50

FlexTable: Pipe Table

Label	Start Node	Stop Node	Diameter (mm)	Hazen-Williams C	Flow (L/s)	Velocity (m/s)	Length (m)
P-110	J-110	J-115	50.0	100.0	0.18	0.09	38
P-100	J-100	J-105	150.0	100.0	0.91	0.05	57
P-105	J-105	J-110	150.0	100.0	0.55	0.03	37
P-10	R-1	J-100	400.0	120.0	0.91	0.01	5

FlexTable: Reservoir Table

ID	Label	Elevation (m)	Hydraulic Grade (m)	Is Active?
37	R-1	125.80	125.80	True

Scenario Summary Report
Scenario: 2A_PROPOSED_ADD

Scenario Summary

ID	54
Label	2A_PROPOSED_ADD
Notes	
Active Topology	<I> Base Active Topology
Physical	ADD_PROPOSED
Demand	<I> Base Demand
Initial Settings	<I> Base Initial Settings
Operational	<I> Base Operational
Age	<I> Base Age
Constituent	<I> Base Constituent
Trace	<I> Base Trace
Fire Flow	<I> Base Fire Flow
Energy Cost	<I> Base Energy Cost
Transient	<I> Base Transient
Pressure Dependent Demand	<I> Base Pressure Dependent Demand
Failure History	<I> Base Failure History
SCADA	<I> Base SCADA
User Data Extensions	<I> Base User Data Extensions
Steady State/EPS Solver Calculation Options	<I> Base Calculation Options
Transient Solver Calculation Options	<I> Base Calculation Options

Hydraulic Summary

Time Analysis Type	Steady State	Use simple controls during steady state?	True
Friction Method	Hazen-Williams	Is EPS Snapshot?	False
Accuracy	0.001	Start Time	12:00:00 AM
Trials	40	Calculation Type	Hydraulics Only

FlexTable: Junction Table

Label	Elevation (m)	Demand (L/s)	Hydraulic Grade (m)	Pressure (psi)
J-100	90.95	0.00	131.90	58
J-105	90.71	0.07	131.90	58
J-110	90.84	0.07	131.90	58
J-115	90.30	0.03	131.90	59

FlexTable: Pipe Table

Label	Start Node	Stop Node	Diameter (mm)	Hazen-Williams C	Flow (L/s)	Velocity (m/s)	Length (m)
P-110	J-110	J-115	50.0	100.0	0.03	0.02	38
P-105	J-105	J-110	150.0	100.0	0.10	0.01	37
P-100	J-100	J-105	200.0	100.0	0.17	0.01	57
P-10	R-1	J-100	400.0	120.0	0.17	0.00	5

FlexTable: Reservoir Table

ID	Label	Elevation (m)	Hydraulic Grade (m)	Is Active?
37	R-1	131.90	131.90	True

Scenario Summary Report
Scenario: 2B_PROPOSED_MDD_TWO_HYDRANTS

Scenario Summary

ID	60
Label	2B_PROPOSED_MDD_TWO_HYDRANTS
Notes	
Active Topology	<I> Base Active Topology
Physical	MDD+FIRE_TWO HYDRANTS_PROPOSED
Demand	Two Hydrants_Proposed
Initial Settings	<I> Base Initial Settings
Operational	<I> Base Operational
Age	<I> Base Age
Constituent	<I> Base Constituent
Trace	<I> Base Trace
Fire Flow	<I> Base Fire Flow
Energy Cost	<I> Base Energy Cost
Transient	<I> Base Transient
Pressure Dependent Demand	<I> Base Pressure Dependent Demand
Failure History	<I> Base Failure History
SCADA	<I> Base SCADA
User Data Extensions	<I> Base User Data Extensions
Steady State/EPS Solver Calculation Options	MDD
Transient Solver Calculation Options	<I> Base Calculation Options

Hydraulic Summary

Time Analysis Type	Steady State	Use simple controls during steady state?	True
Friction Method	Hazen-Williams	Is EPS Snapshot?	False
Accuracy	0.001	Start Time	12:00:00 AM
Trials	40	Calculation Type	Hydraulics Only

FlexTable: Junction Table

Label	Elevation (m)	Demand (L/s)	Hydraulic Grade (m)	Pressure (psi)
J-100	90.95	0.00	125.88	50
J-105	90.71	90.17	114.78	34
J-110	90.84	77.17	107.81	24
J-115	90.30	0.08	107.80	25

FlexTable: Pipe Table

Label	Start Node	Stop Node	Diameter (mm)	Hazen-Williams C	Flow (L/s)	Velocity (m/s)	Length (m)
P-110	J-110	J-115	50.0	100.0	0.08	0.04	38
P-105	J-105	J-110	150.0	100.0	77.25	4.37	37
P-100	J-100	J-105	200.0	100.0	167.41	5.33	57
P-10	R-1	J-100	400.0	120.0	167.41	1.33	5

FlexTable: Reservoir Table

ID	Label	Elevation (m)	Hydraulic Grade (m)	Is Active?
37	R-1	125.90	125.90	True

Scenario Summary Report
Scenario: 2C_PROPOSED_PHD

Scenario Summary

ID	56
Label	2C_PROPOSED_PHD
Notes	
Active Topology	<I> Base Active Topology
Physical	PHD_PROPOSED
Demand	<I> Base Demand
Initial Settings	<I> Base Initial Settings
Operational	<I> Base Operational
Age	<I> Base Age
Constituent	<I> Base Constituent
Trace	<I> Base Trace
Fire Flow	<I> Base Fire Flow
Energy Cost	<I> Base Energy Cost
Transient	<I> Base Transient
Pressure Dependent Demand	<I> Base Pressure Dependent Demand
Failure History	<I> Base Failure History
SCADA	<I> Base SCADA
User Data Extensions	<I> Base User Data Extensions
Steady State/EPS Solver Calculation Options	PHD
Transient Solver Calculation Options	<I> Base Calculation Options

Hydraulic Summary

Time Analysis Type	Steady State	Use simple controls during steady state?	True
Friction Method	Hazen-Williams	Is EPS Snapshot?	False
Accuracy	0.001	Start Time	12:00:00 AM
Trials	40	Calculation Type	Hydraulics Only

FlexTable: Junction Table

Label	Elevation (m)	Demand (L/s)	Hydraulic Grade (m)	Pressure (psi)
J-100	90.95	0.00	125.80	49
J-105	90.71	0.36	125.80	50
J-110	90.84	0.36	125.80	50
J-115	90.30	0.18	125.78	50

FlexTable: Pipe Table

Label	Start Node	Stop Node	Diameter (mm)	Hazen-Williams C	Flow (L/s)	Velocity (m/s)	Length (m)
P-110	J-110	J-115	50.0	100.0	0.18	0.09	38
P-105	J-105	J-110	150.0	100.0	0.55	0.03	37
P-100	J-100	J-105	200.0	100.0	0.91	0.03	57
P-10	R-1	J-100	400.0	120.0	0.91	0.01	5

FlexTable: Reservoir Table

ID	Label	Elevation (m)	Hydraulic Grade (m)	Is Active?
37	R-1	125.80	125.80	True

Appendix C – Sanitary Servicing Tables

Table C1 – Sanitary Sewer Design Sheet

Table C1: SANITARY SEWER CALCULATION SHEET

LOCATION				RESEDENTIAL AREAS AND POPULAITONS											COMMERCIAL			INDUSTRIAL			INSTITUTIONAL		INFILTRATION			TOTAL FLOW (L/s)	SEWER DATA						
					NUMBER OF UNITS							POPULATION				AREA (ha)			AREA (ha)					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	Peak Flow (L/sec)	INDIV	ACCU	Peak Factor (per MOE)	AREA (Ha)	ACCU AREA (Ha)	INDIV	ACCU	INFILT FLOW (L/s)		Nom Dia (mm)	Actual Dia (mm)	Slope (%)	Length (m)	Capacity (L/sec)	Q/Q_{CAP} (%)	Full Velocity (m/s)
Cassone Crt.	**300**	**301**		**0.1340**	**3.00**							**10.2**	**10.2**	**3.73**	**0.12**									**0.1340**	**0.134**	**0.04**	**0.17**	**200**	**253.4**	**0.65**	**34.12**	**49.7**	**0%**	**0.98**
	301	MHSA45981											**10.2**												**0.134**			**200**	**253.4**	**0.50**	**15.24**	**43.6**		**0.86**
	MHSA45981	MHSA19226	Exis Homes	0.6973	6.00							20.4	**30.6**	3.68	0.36									**0.6973**	**0.8313**	0.27	0.64							
			Prop Homes	**0.3121**	**6.00**							20.4	**51**	3.65	0.60									**0.3121**	**1.1434**	0.38	0.98	250	253.4	0.47	100.27	42.3	2%	0.83
				1.14	**15**							**51.0**												**1.143**									

Residential Avg. Daily Flow, q (L/p/day) =	280	Commercial Peak Factor =	1.5	(when area >20%)	Peak Population Flow, (L/sec) =	P*q*M/86.4	Unti Type	Persons/Unit	
Commercial Avg. Daily Flow (L/gross ha/day) =	28,000		1.0	(when area <20%)	Peak Extraneous Flow, (L/sec) =	I*Ac	Singles	3.4	
or L/gross ha/sec =	0.324				Residential Peaking Factor, M =	1 + (14/(4+P^0.5)) * K	Semi-Detached	5.7	
Institutianal Avg. Daily Flow (L/s/ha) =	28,000	Institutional Peak Factor =	1.5	(when area >20%)	A_c = Cumulative Area (hectares)		Townhomes	2.7	
or L/gross ha/sec =	0.324		1.0	(when area <20%)	P = Population (thousands)		Single Apt. Unit	1.4	
Light Industrial Flow (L/gross ha/day) =	35,000						2-bed Apt. Unit	2.1	
or L/gross ha/sec =	0.40509	Residential Correction Factor, K =	0.80		Sewer Capacity, Qcap (L/sec) =	$1/N \; S^{1/2} \; R^{2/3} \; A_c$	3-bed Apt. Unit	3.1	
Light Industrial Flow (L/gross ha/day) =	55,000	Manning N =	0.013		(Manning's Equation)		4-bed Apt. Unit	4.1	
or L/gross ha/sec =	0.637	Peak extraneous flow, I (L/s/ha) =	0.33	(Total I/I)					

Designed:	Project:
A. Cole, EIT	2028 Merivale Rd
Checked:	Location:
B. Thomas, P.Eng.	Ottawa, Ontario
File Reference:	Page No:
24015379 SAN - Sewer Design Sheet, June 2025.xlsx	**1 of 1**

EXP Services Inc.
2028 Merivale Road, Ottawa, ON
OTT-24015379-A0
2025-12-17

Appendix D – Stormwater Servicing

Table D1_Storm Sewer Design Sheet

PCSWMM Report

TABLE D1: 2-YEAR STORM SEWER CALCULATION SHEET

Return Period Storm = **2-year** (2-year, 5-year, 100-year)
Default Inlet Time= 10 (minutes)
Manning Coefficient = 0.013 (dimensionless)

From Node	To Node	AREA INFO				FLOW (UNRESTRICTED)							INDIV CAP FLOW (L/s)	CUMUL CAP FLOW (L/s)	SEWER DATA									
		Area No.	Area (ha)	∑ Area (ha)	Average R	Indiv. 2.78*A*R	Accum. 2.78*A*R	Tc (mins)	I (mm/h)	Indiv. Flow	Return Period	Q (L/s)			Dia (mm) Actual	Dia (mm) Nominal	Type	Slope (%)	Length (m)	Capacity, Q_{CAP} (L/sec)	Velocity (m/s)		Time in Pipe, Tt (min)	Hydraulic Ratios	
																					Vf	Va		Q/Q_{CAP}	Va/Vf
CB_114	CB_115	S3	0.0281	0.0281	0.51	0.040	0.040	10.00	76.81	3.06	2-year	3.1			251.5	250	PVC	0.30	13.34	33.08	0.66	0.35	0.63	0.09	0.53
CB_115	CB_116	S2	0.0183	0.0464	0.50	0.025	0.065	10.63	74.46	1.89	2-year	4.9			251.5	250	PVC	0.30	17.17	33.08	0.66	0.39	0.73	0.15	0.59
CB_116	MH_201	S1	0.0161	0.0161	0.38	0.017	0.082	11.36	71.94	1.22	2-year	5.9			251.5	250	PVC	0.30	26.44	33.08	0.66	0.42	1.05	0.18	0.63
MH-201	MH_200	S4	0.0637	0.0798	0.65	0.115	0.197	12.42	68.62	7.90	2-year	13.5			299.4	300	POLY	0.65	36.03	77.52	1.10	0.69	0.86	0.17	0.63
MH_200	**MHST43602**						**0.197**	**13.28**	**66.15**		**2-year**	**13.1**	4.2	**4.2**	299.4	300	PVC	0.40	15.71	60.81	0.87	0.57	0.46	0.21	0.66
CB_113	CB_112	S5	0.0289	0.0289	0.50	0.040	0.040	10.00	76.81	3.09	2-year	3.1			251.5	250	PVC	0.30	12.68	33.08	0.66	0.35	0.60	0.09	0.53
CB_112	CB_111	S6	0.0174	0.0463	0.50	0.024	0.064	10.60	74.57	1.80	2-year	4.8			251.5	250	PVC	0.30	10.94	33.08	0.66	0.39	0.47	0.15	0.59
CB_111	CB_110	S7	0.0164	0.0627	0.49	0.022	0.087	11.07	72.94	1.63	2-year	6.3			251.5	250	PVC	0.30	12.93	33.08	0.66	0.44	0.48	0.19	0.67
CB_110	CB_109	S8	0.0195	0.0822	0.51	0.028	0.114	11.55	71.32	1.97	2-year	8.2			251.5	250	PVC	1.65	13.90	77.58	1.56	0.86	0.27	0.11	0.55
CB_108	CB_109	S10	0.0210	0.0210	0.37	0.022	0.022	10.00	76.81	1.66	2-year	1.7			251.5	250	PVC	0.34	12.20	35.22	0.71	0.22	0.93	0.05	0.31
CB_109	MH_202	S9	0.0196	0.1228	0.52	0.028	0.164	11.82	70.45	2.00	2-year	11.6			251.5	250	PVC	1.98	30.25	84.99	1.70	0.99	0.51	0.14	0.58
CB_101	CB_102	S17	0.0204	0.0204	0.68	0.039	0.039	10.00	76.81	2.96	2-year	3.0			251.5	250	PVC	0.50	12.88	42.71	0.86	0.41	0.52	0.07	0.48
CB_102	CB_103	S16	0.0198	0.0402	0.69	0.038	0.077	10.52	74.86	2.84	2-year	5.7			251.5	250	PVC	0.50	10.69	42.71	0.86	0.50	0.36	0.13	0.58
CB_103	CB_104	S15	0.0178	0.0580	0.73	0.036	0.113	10.88	73.58	2.66	2-year	8.3			251.5	250	PVC	0.50	12.96	42.71	0.86	0.57	0.38	0.19	0.67
CB_104	CB_105	S14	0.0187	0.0767	0.67	0.035	0.147	11.26	72.29	2.52	2-year	10.7			251.5	250	PVC	0.50	8.53	42.71	0.86	0.57	0.25	0.25	0.67
CB_105	MH_202	S13	0.0200	0.0967	0.79	0.044	0.191	11.50	71.47	3.14	2-year	13.7			251.5	250	PVC	0.50	13.33	42.71	0.86	0.60	0.37	0.32	0.70
CB-107	MH_202	S11	0.0211	0.0211	0.42	0.025	0.025	10.00	76.81	1.89	2-year	1.9			251.5	250	PVC	0.50	13.00	42.71	0.86	0.27	0.82	0.04	0.31
MH_202	**Ex. 300mm ST**	S12	0.0195	0.2601	0.68	0.037	0.417	12.33	68.88	2.54	2-year	**28.7**	5.7	**5.7**	251.5	250	PVC	1.00	7.29	60.40	1.21	0.86	0.14	0.48	0.71
TOTALS =			**0.3863**			**0.615**								**9.8**											

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)

Ottawa Rainfall Intensity Values from Sewer Design Guidelines, SDG002

	a	b	c
2-year	732.951	6.199	0.810
5-year	998.071	6.053	0.814
100-year	1735.688	6.014	0.820

Designed:	Project:	
Zhidong Pan, P.Eng.	2028 Merivale Road	
Checked:	Location:	
B. Thomas, P.Eng.	Ottawa, Ontario	
Dwg Reference:	File Ref:	Sheet No:
	24015379 STM - Sewer Design Sheets, June 2025.xlsx	1 of 1

PCSWMM Report

24015379_PCSWMM_Sub2

Model 24015379_2028 Merivale_Post-development_Sub2.inp

exp Services Inc.

November 21, 2025

Table of Contents

Summary 1: Subcatchment statistics

Name	24015379_2028 Merivale_Post-development_Rev6
Max. width (m)	43.089
Min. width (m)	10.048
Max. area (ha)	0.0636
Min. area (ha)	0.0161
Total area (ha)	0.3862
Max. length of overland flow (m)	20.9992
Min. length of overland flow (m)	5.9621
Max. slope (%)	2.1
Min. slope (%)	1.8
Max. imperviousness (%)	83.819
Min. imperviousness (%)	23.71
Max. imp. roughness	0.013
Min. imp. roughness	0.01
Max. perv. roughness	0.25
Min. perv. roughness	0.1
Max. imp. depression storage (mm)	1.57
Min. imp. depression storage (mm)	0.05
Max. perv. depression storage (mm)	4.67
Min. perv. depression storage (mm)	0.05

Summary 2: Node statistics

Name	24015379_2028 Merivale_Post-development_Rev6
Max. ground elev. (m)	93.34
Min. ground elev. (m)	92.34
Max. invert elev. (m)	91.9
Min. invert elev. (m)	90.2
Max. depth (m)	2.2
Min. depth (m)	1.13

Summary 3: Conduit statistics

Name	24015379_2028 Merivale_Post-development_Rev6
Max. roughness	0.013
Min. roughness	0.013
Max. entry loss coef.	0
Min. entry loss coef.	0
Max. exit loss coef.	0
Min. exit loss coef.	0
Max. avg. loss coef.	0
Min. avg. loss coef.	0
Max. length (m)	36.03
Min. length (m)	8.702
Total length (m)	272.396
Max. slope (m/m)	0.021
Min. slope (m/m)	0.003

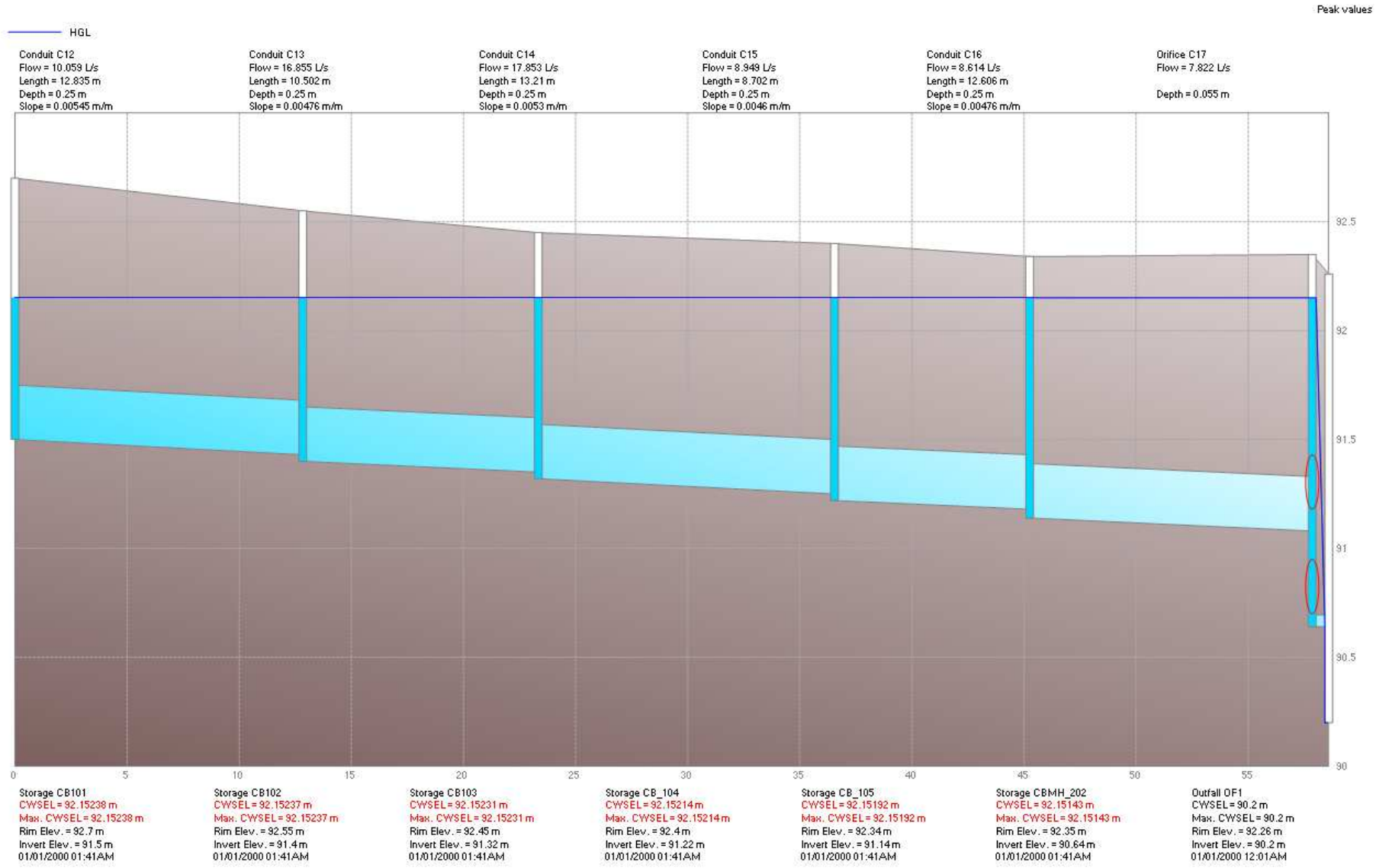


Figure 1: Node CB101 to Node OF1

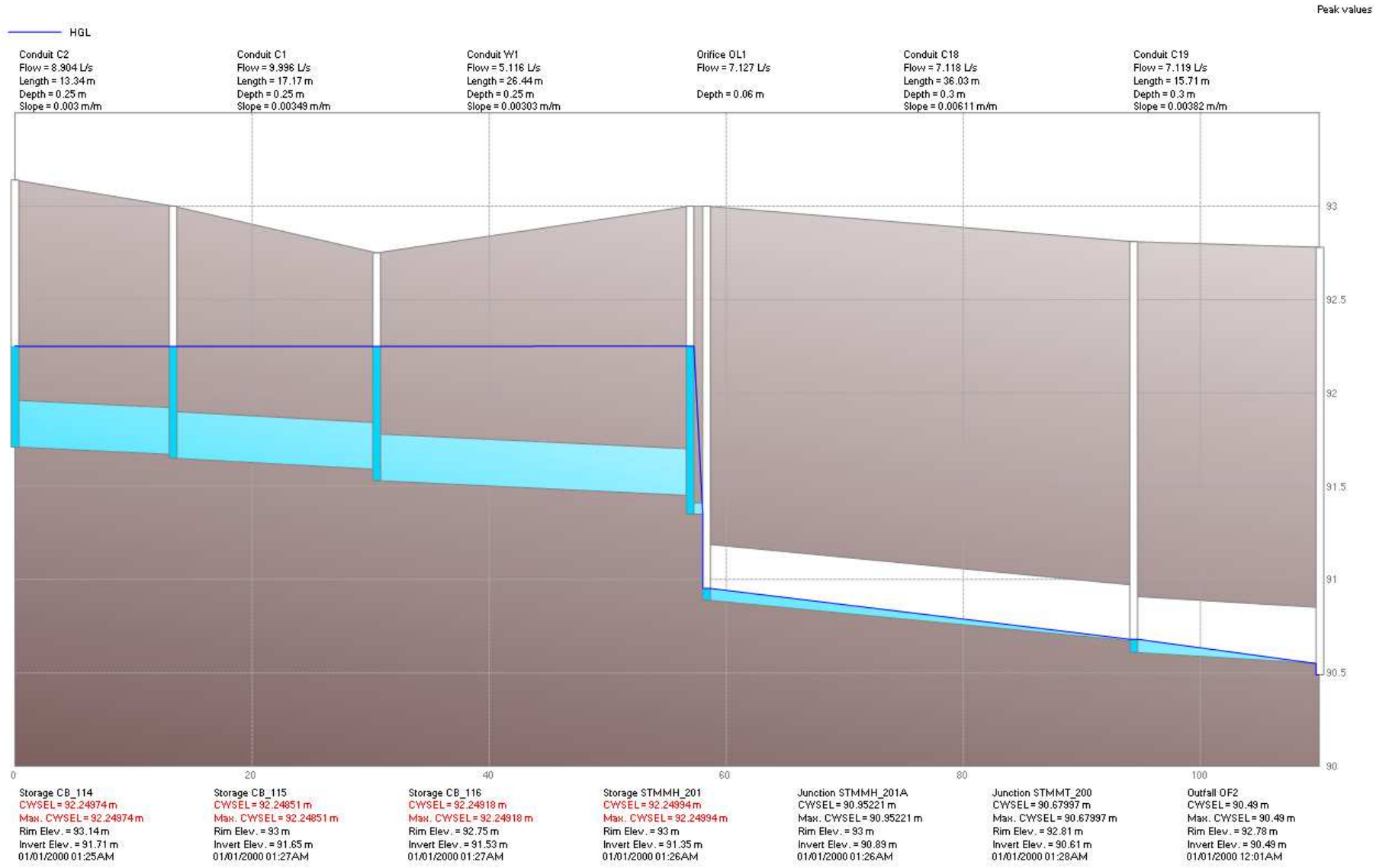


Figure 2: Node CB_114 to Node OF2

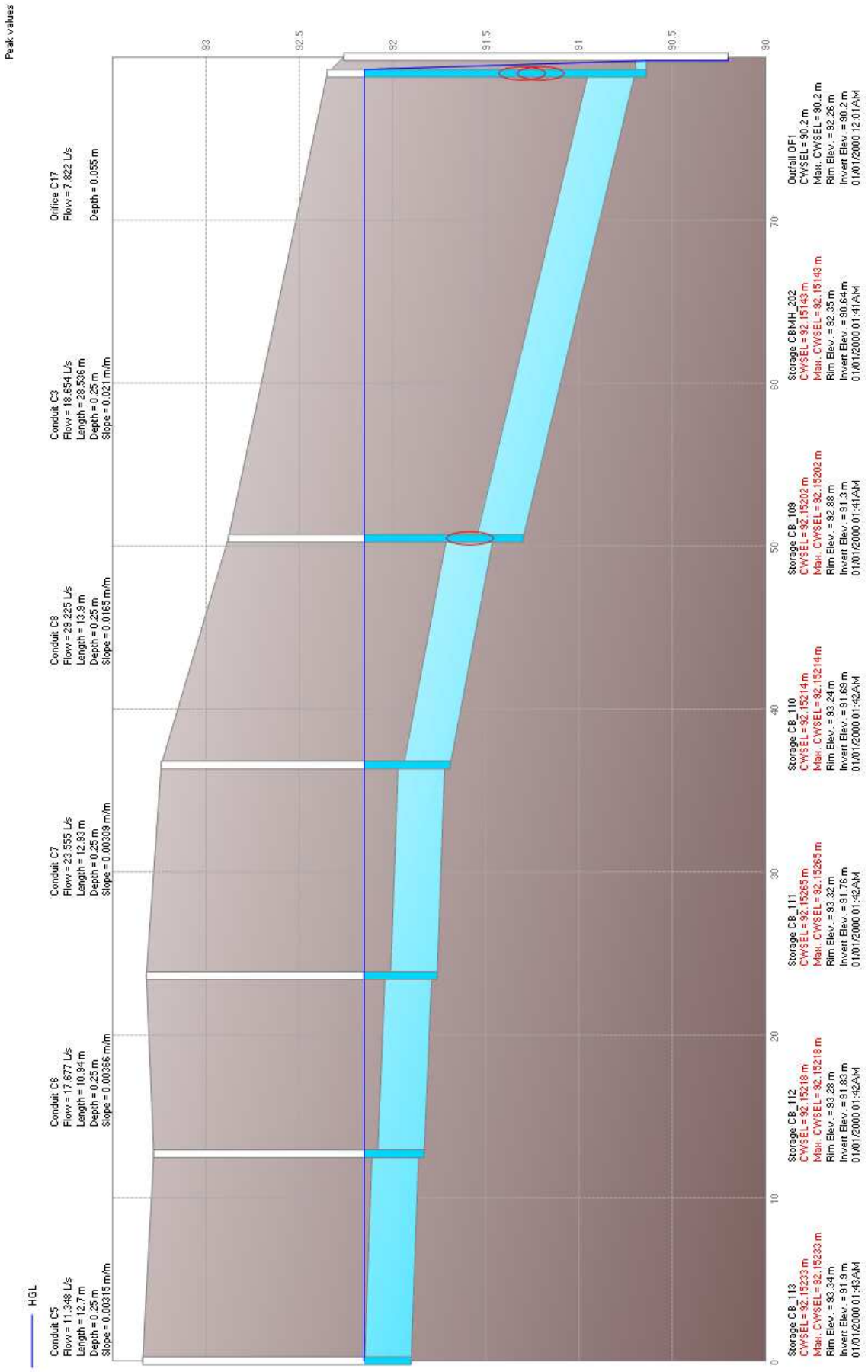


Figure 3: Node CB_113 to Node OF1

Table 1: Subcatchments

Name	Outlet	Area (ha)	Width (m)	Flow Length (m)	Slope (%)	Imperv. (%)	C_VALUE
S1	CB_116	0.0161	14.123	11.4	2.1	25.232	0.38
S10	CB_108	0.021	15.385	13.65	2.1	28.511	0.4
S11	CB_107	0.0211	10.048	20.999	1.957	38.726	0.47
S12	CBMH_202	0.0195	30.733	6.345	2.1	67.179	0.67
S13	CB_105	0.02	31.511	6.347	2.1	83.819	0.79
S14	CB_104	0.0187	31.365	5.962	2.1	66.442	0.67
S15	CB103	0.0178	29.421	6.05	2.1	76.22	0.73
S16	CB102	0.0198	28.787	6.878	2.1	69.597	0.69
S17	CB101	0.0204	30.088	6.78	1.8	69.281	0.68
S2	CB_115	0.0183	25.594	7.15	2.1	43.267	0.5
S3	CB_114	0.0281	28.821	9.75	2.1	44.384	0.51
S4	STMMH_201	0.0636	43.089	14.76	1.8	64.098	0.65
S5	CB_113	0.0289	30.262	9.55	2.1	43.497	0.5
S6	CB_112	0.0174	24.336	7.15	2.1	42.977	0.5
S7	CB_111	0.0164	22.937	7.15	2.1	41.431	0.49
S8	CB_110	0.0195	27.273	7.15	2.1	43.687	0.51
S9	CB_109	0.0196	27.413	7.15	2.1	46.215	0.52

Table 2: Storages

Name	Invert Elev. (m)	Rim Elev. (m)	Depth (m)	Storage Curve	Curve Name
CB_104	91.22	92.4	1.18	TABULAR	CB_104
CB_105	91.14	92.34	1.2	TABULAR	CB_105
CB_107	91.25	92.38	1.13	TABULAR	CB_107
CB_108	91.51	92.81	1.3	TABULAR	CB_108_
CB_109	91.3	92.88	1.58	TABULAR	CB_109_
CB_110	91.69	93.24	1.55	TABULAR	CB_110_
CB_111	91.76	93.32	1.56	TABULAR	CB_111_
CB_112	91.83	93.28	1.45	TABULAR	CB_112_
CB_113	91.9	93.34	1.44	TABULAR	CB_113_
CB_114	91.71	93.14	1.43	TABULAR	CB_114_
CB_115	91.65	93	1.35	TABULAR	CB_115_
CB_116	91.53	92.75	1.22	TABULAR	CB_116
CB101	91.5	92.7	1.2	TABULAR	CB101
CB102	91.4	92.55	1.15	TABULAR	CB102
CB103	91.32	92.45	1.13	TABULAR	CB103

Table 2: Storages (continued...)

Name	Invert Elev. (m)	Rim Elev. (m)	Depth (m)	Storage Curve	Curve Name
CBMH_202	90.64	92.35	1.71	TABULAR	CBMH_202
STMMH_201	91.35	93	1.65	TABULAR	STMMH_201

Table 3: Outfalls

Name	Invert Elev. (m)	Rim Elev. (m)	Tide Gate	Fixed Stage (m)
OF1	90.2	92.26	NO	0
OF2	90.49	92.78	NO	0

Table 4: Conduits

Name	Inlet Node	Outlet Node	Tag	Length (m)	Roughness	Inlet Elev. (m)	Outlet Elev. (m)	Geom1 (m)	Geom2 (m)	Cross-Section
C1	CB_115	CB_116	SUB	17.17	0.013	91.65	91.59	0.25	0	CIRCULAR
C11	CB_107	CBMH_202	SUB	14.645	0.013	91.25	91.18	0.25	0	CIRCULAR
C12	CB101	CB102	SUB	12.835	0.013	91.5	91.43	0.25	0	CIRCULAR
C13	CB102	CB103	SUB	10.502	0.013	91.4	91.35	0.25	0	CIRCULAR
C14	CB103	CB_104	SUB	13.21	0.013	91.32	91.25	0.25	0	CIRCULAR
C15	CB_104	CB_105	SUB	8.702	0.013	91.22	91.18	0.25	0	CIRCULAR
C16	CB_105	CBMH_202	SUB	12.606	0.013	91.14	91.08	0.25	0	CIRCULAR
C18	STMMH_201A	STMMT_200	SWR	36.03	0.013	90.89	90.67	0.3	0	CIRCULAR
C19	STMMT_200	OF2	SWR	15.71	0.013	90.61	90.55	0.3	0	CIRCULAR
C2	CB_114	CB_115	SUB	13.34	0.013	91.71	91.67	0.25	0	CIRCULAR
C3	CB_109	CBMH_202	SWR	28.536	0.013	91.3	90.7	0.25	0	CIRCULAR
C5	CB_113	CB_112	SUB	12.7	0.013	91.9	91.86	0.25	0	CIRCULAR
C6	CB_112	CB_111	SUB	10.94	0.013	91.83	91.79	0.25	0	CIRCULAR
C7	CB_111	CB_110	SUB	12.93	0.013	91.76	91.72	0.25	0	CIRCULAR
C8	CB_110	CB_109	SUB	13.9	0.013	91.69	91.46	0.25	0	CIRCULAR
C9	CB_108	CB_109	SUB	12.2	0.013	91.51	91.46	0.25	0	CIRCULAR
W1	CB_116	STMMH_201	SUB	26.44	0.013	91.53	91.45	0.25	0	CIRCULAR

Table 5: Orifices

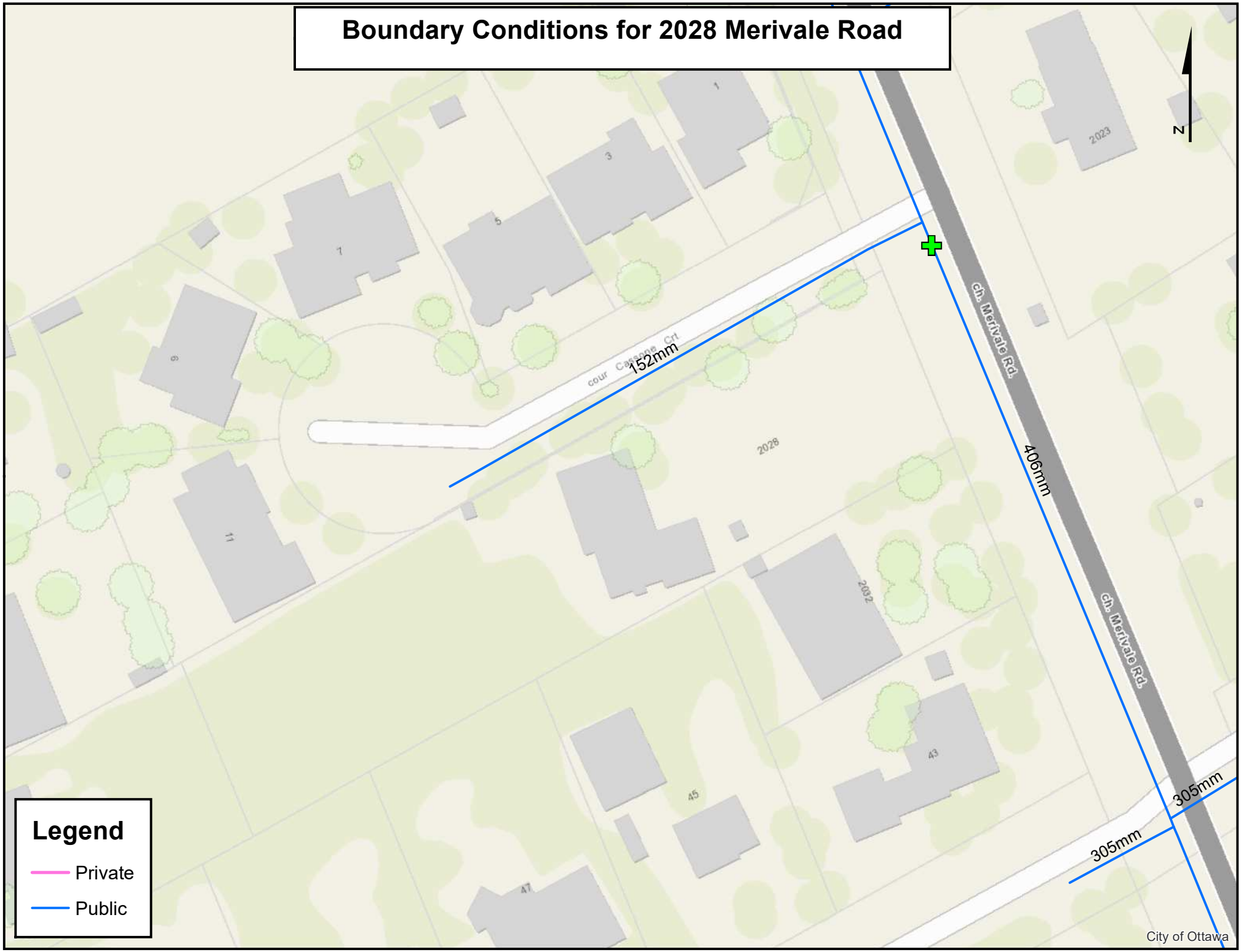
Name	Inlet Node	Outlet Node	Tag	Type	Cross-Section	Height (m)	Inlet Elev. (m)
C17	CBMH_202	OF1	SWR	SIDE	CIRCULAR	0.055	90.64
OL1	STMMH_201	STMMH_201A		SIDE	CIRCULAR	0.06	91.35

Appendix E – Consultation / Correspondence

Pre-Consultation Meeting Minutes

Email Received from City of Ottawa on Water System Boundary Conditions.

Boundary Conditions for 2028 Merivale Road



Alexander Cole

From: Rasool, Rubina <Rubina.Rasool@ottawa.ca>
Sent: Thursday, April 17, 2025 1:33 PM
To: Alexander Cole
Cc: Bruce Thomas
Subject: RE: 2028 Merivale Boundary Condition
Attachments: 2028 Merivale Road March 2025.pdf

Hello,

The following are boundary conditions, HGL, for hydraulic analysis at 2028 Merivale Road (zone 2W2C) assumed to be connected to the 406mm watermain on Merivale Road (see attached PDF for location).

Minimum HGL = 125.8 m
Maximum HGL = 131.9 m
Max Day + Fire Flow (167 L/s) = 125.9 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. Fire Flow analysis is a reflection of available flow in the watermain; there may be additional restrictions that occur between the watermain and the hydrant that the model cannot take into account.

Rubina

Rubina Rasool
Project Manager
Planning, Infrastructure and Economic Development Department
Development Review – West Branch
City of Ottawa
110 Laurier Avenue West Ottawa, ON K1P 1J1
613-580-2424 Ext. 24221
rubina.rasool@ottawa.ca

From: Alexander Cole <Alexander.Cole@exp.com>
Sent: March 21, 2025 11:45 AM

To: Rasool, Rubina <Rubina.Rasool@ottawa.ca>
Cc: Bruce Thomas <Bruce.Thomas@exp.com>
Subject: RE: 2028 Merivale Boundary Condition

Hi Rubina,

I have attached the proposed preliminary servicing layout to help. The dashed lines in the plan are the existing sewers and water, while the solid lines are the proposed sewers and water. We are proposing all servicing connections into Cassone Crt. When we advance our stormwater management design further, we would like to have a call to discuss.

Please let me know if there is anything else you need.

Alexander Cole
EXP | Engineering Designer
m : +1.613.371.2992 | e : alexander.cole@exp.com
exp.com | legal disclaimer
keep it green, read from the screen

From: Rasool, Rubina <Rubina.Rasool@ottawa.ca>
Sent: Friday, March 21, 2025 8:57 AM
To: Alexander Cole <Alexander.Cole@exp.com>
Cc: Bruce Thomas <bruce.thomas@exp.com>
Subject: Re: 2028 Merivale Boundary Condition

Hi Alexander,

Would you have a site plan of the proposed servicing layout? This will help me understand if the proposal is accepable for a watermain service and water meter configuration. Furthermore, the City would recommend to avoid road cuts in arterial roads and prefer road cuts and accesses off of the side streets.

Thank you,

Rubina

Rubina Rasool

Project Manager

Planning, Infrastructure and Economic Development Department

Development Review – West Branch

City of Ottawa

110 Laurier Avenue West Ottawa, ON K1P 1J1

613-580-2424 Ext. 24221

rubina.rasool@ottawa.ca

From: Alexander Cole <Alexander.Cole@exp.com>
Sent: Thursday, March 20, 2025 3:27 PM
To: Davidson, Amanda <amanda.davidson@ottawa.ca>; Rasool, Rubina <Rubina.Rasool@ottawa.ca>
Cc: Bruce Thomas <Bruce.Thomas@exp.com>
Subject: 2028 Merivale Boundary Condition

Hi Amanda/Rubina,

Appreciated if you could arrange to have Water Resources provide water system boundary condition that we can use for our submission.

The water demands are based on modifications to allow for 9 bungalows.

The following is the average day, max day and peak hour domestic demands based on 280 L/cap/day

Avg Day: **0.17 L/sec**
Max Day: **0.41 L/sec**
Peak Hr: **0.91 L/sec**

The table below shows the required Fire flows (RFFs), with max RFF of 167 L/sec.

The boundary system connection point is illustrated on the attached PDF.

TABLE B2

Summary of Required Fire Flows (RFF) for 2028 Merivale Road

Combined Fire Area = Bungalow 1615 sq ft (x4)	Reference Table	
Combined Fire Area = Bungalows lots 1-9	TABLE B3	167

Thanks,

Alexander Cole
EXP | Engineering Designer
m : +1.613.371.2992 | e : alexander.cole@exp.com
2650 Queensview Drive
Suite 100
Ottawa, ON K2B 8H6
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'

File No.: 2024-0508

January 16, 2025

Benjamin Clare
Gemtec
Via email: Benjamin.clare@gemtec.ca

Subject: **Pre-Consultation: Meeting Feedback**
Proposed Zoning By-Law Amendment Application – 2028 Merivale Rd.

Please find below information regarding next steps as well as consolidated comments from the above-noted pre-consultation meeting held on December 18, 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. A review of the proposal and materials submitted for the above-noted pre-consultation has been undertaken. Please consider proceeding to a subsequent pre-consultation. Complete the pre-consultation Application Form and submit it together with the necessary studies and/or plans to planningcirculations@ottawa.ca.

2. In your subsequent submission, please ensure that all comments or issues detailed herein are addressed. A detailed cover letter stating how each issue 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.

3. Please note, if your development proposal changes significantly in scope, design, or density before formal submission, you may be recommended to complete or repeat the pre-consultation process.

Supporting Information and Material Requirements

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

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

Consultation with Technical Agencies

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

Planning

Comments:

Policy

1. The subject lands are located within 300 meters of a railway line, which is a prescribed area as per O. Reg 254/23, for the purposes of subsection 41 (1.2) of the *Planning Act*. As the development is located within a prescribed area, the development is subject to site plan control. Please refer to the Site Plan Control (By-law No. 2014 - 256) | City of Ottawa for additional information.

Official Plan

2. The subject property is located in the Outer Urban Transect and is designated Neighbourhood, pursuant to Schedule A and B3 of the Official Plan.

3. Section 5.3.1 of Official Plan identifies that Neighbourhoods located in the outer urban area shall accommodate residential growth and allow a variety of low-rise housing types to support the evolution of 15-minute neighbourhoods,

4. Section 6.3 identifies that Neighbourhoods are planned for ongoing gradual, integrated, sustainable, and context-sensitive development.

    a. Policy 2 of Section 6.3.2 states that form-based regulation will be established, having regard for the local context and character of existing development, appropriate interfaces with the public realm and between residential buildings, including provision of reasonable soft landcsaping and screening to support livabilty.

    b. Staff have concerns that the proposed side yard setbacks for Lots 7 and 9 do not adequately respond to the surrounding context. Please consider providing greater side yard setbacks to the adjacent existing residential properties that provides greater separation between the amenity spaces and space for soft landscaping/screening.

5. Section 4.6 of the Official Plan provides the Urban Design directives for development. Policy 6 of Section 4.6.6 states that low-rise buildings shall be designed to respond to context, and transect area policies, and shall include areas for soft landscaping, main entrances at grade, front porches or balconies, where appropriate.

    a. The limited side yard setbacks provided for Lots 7 and 9 may not adequately respond to context and provide limited separation to adjacent residential lots. Please review.

    b. Staff have concerns that the limited corner side yard setback for Lot 1 dooes not provide sufficient opportunity for landscaping (including tree planting) to screen the lot from impacts from Merivale Road.

6. The subject site is located within the Airport Vicinity Development Zone, and the Secondary Bird Hazard zone pertaining to the airport. Please review and provide an analysis in the planning rationale of the proposed development and potential impacts from airport operations. Please review planting restrictions relating to the airport bird hazard zone, and reflect in the landscaping plan.

7. Industrial uses are present northwest of the site. Please review the Ministry of Environment's D-6 Compatibility between Industrial Facilities and provide discussion within the planning rationale.

8. The subject site is located in proximity to a rail corridor. Please review the Federation of Canadian Municipalities and Rail Association of Canada (FCM-RAC) Guidelines for any applicable mitigation measures for safety and noise concerns. The guidelines can be found here: https://fcm.ca/en/resources/land-use-planning-around-rail-corridors

Zoning

9. The subject lands are zoned R1E[1722] (Residential First Density, Subzone E, Urban Exception 1722).

10. It is understood that a zoning amendment will be applied for to permit a modified R1 zone with site-specific performance standards. Please provide detail in the planning rationale on requested relief and the policy and technical justification for site-specific zoning provisions. If a 'planned-unit development' continues to be proposed, note that an R3 zone will be required. See comment 12 below for more details.

11. There are concerns regarding the proposed setback to the corner side lot line for Lot 1, along Merivale Road, with regards to the future road widening.

    a. Please review Section 144 – Alternative Yard Setbacks affecting Low-rise Residential Development in the R1 to R4 Zones within the Greenbelt (Section 144).

i. Clause (d) of 144 (1) states that the minimum front and/or corner side yard setback need not exceed the minimum required in the Residential subzone, but in no case may be less than 1.5m.

ii. The proposed setback for the dwelling located on Lot 1 is 5.74 meters, but is reduced to 0.03 meters when the road widening (protected ROW) is considered. Appropriate setbacks should consider the future road widening dedication and respond accordingly. Please review and provide a more appropriate setback for the lot.

12. Lots 8 and 9 do not have frontage on a public road and would not comply with Section 59 (Frontage on a Public Street) of City of Ottawa Zoning By-law 2008-250.

    a. Clause 2 of Section 59 further states that no person shall sever any land unless the land severed and the land retained each abut to a street, in accordance with subsection (1).

    b. Despite the above, a private laneway within a **Planned Unit Development** may be considered a public street for the purposes of Section 59.

    c. The development of lots 7-9 would be considered a Planned Unit Development (PUD). PUD is not a permitted use in the R1E[1722] zone. A major zoning by-law amendment would be required to permit a PUD.

    d. Where development takes place on a private road as part of a PUD, the recommended approach for addressing the common driveway is a Plan of Condominium.

        i. If it is intended that lots 7 to 9 be freehold/individual units, it is recommend to proceed with a Plan of Condominium to address ownership and common elements, including the shared laneway.

13. A 30cm reserve is located along the south side of Cassone Court. Approval to lift a 30cm reserve will be required, to comply with Section 59 (Frontage on a Public Street) of the zoning by-law.

    a. As per Clause 2 of Section 59, no person shall sever a lot unless that lot has frontage on a public street. The lifting of 30cm reserve will require approval prior to approval of a consent application to ensure the lots have frontage.

Required Applications:

14. Zoning By-law Amendment – Major

a. If the Planned Unit Development is excluded from the proposal, the proposal may proceed by Minor Zoning By-law Amendment to address the site-specific zoning provisions for the remainder of the development.

15. Site Plan Control

    a. The subject lands are in a prescribed area according to Ontario Regulation 254/23, for the purposes of Section 41 (1.2) of the Planning Act. Site Plan Control is required unless written permission is obtained by the General Manager of Planning, Development, and Building Services.

16. Plan of Condominium

17. Lifting of 30cm Reserve

18. Consent to Sever

Feel free to contact Amanda Davidson, amanda.davidson@ottawa.ca, Planner I, with any follow up questions.

Urban Design

Comments:

Submission Requirements

19. A scoped Urban Design Brief is required. Please see attached customized Terms of Reference to guide the preparation of the submission which can be provided in conjunction with the Planning Rationale.

    a. The Urban Design Brief should be structured by generally following the headings highlighted under **Section 3 – Contents of these Terms of Reference.**

20. 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:

    a. Landscape plan.

Comments on Preliminary Design:

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

    a. Reduced corner side yard setback along Merivale.

    b. Minimal setback to adjacent rear yard private amenity space south of the PUD.

Recommendations:

22. Provide additional setback to align with similar side yard condition to the north.

23. Reduce the number of buildings on the PUD to two and increase separation to sensitive private amenity spaces.

24. Provide tree planting in all front and rear yards to screen additional density of the site.

Other Comments:

25. 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.

Feel free to contact Christopher Moise, christopher.moise@ottawa.ca, with any questions.

Engineering

Comments:

26. Water Service

    a. There is an existing watermain on Cassone Court. The 30 cm reserve must be lifted to connect to the the watermain.

    b. The servicing report for the zoning by-law amendmant must clearly demonstrate that there is adequate domestic and fire suppression flows from the watermain to support the development.

    c. Water boundary conditions must be requested prior to submission of the application. The request should include location of the service (map or plan with connection location(s) indicated and fire seperation distances) 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.

d. Existing water services must be blanked at the watermain.

27. Sanitary Service

    a. There is an existing sanitary sewer on Cassone Crt. Please provide the sanitary demands for the City to verify if there are any capaciity constraints within the system. Please include the sanitary demands along with the water boundary condition request.

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

    a. The stormwater sewer is designed for a 2-year storm event. Flows to the storm sewer in excess of the 2-year storm release rate, up to and including the 100-year storm event, must be retainined on site.

    b. The post-development runoff shall be the lower of the existing coefficient or a maximum equivalent ‘C’ of 0.5, whichever is less.

    c. All drive lanes and parking areas must not pond within the 2-year storm event. Ponding is permitted in these are during the 5-year storm event

    d. The site is required to provide 80% TSS removal. Please include calculations and specifications to clearly demonstrate the TSS removal.

    e. A marco-grading plan should be included to support the stormwater management design.

29. Servicing layout: The City recommends to discuss the proposed servicing layout for the site prior to submission to ensure the development meets City standards and water metering requirements.

30. Geotechnical: A geotechnical report will be required for the proposed site. The geotechnical report should clearly discuss the removal of the retaining wall and grade raise restrictions and sloping. Retaining walls in excess of 1.0m must be designed by a Structural Engineer and a Geotechnical Engineer.

31. Hydrogeological: A hydrogeological report is required for this application. The report shall:

    a. outline the risks to private wells as a result of the proposed construction activities

    b. propose a private wells sampling program, including which private wells will be sampled (raw, untreated groundwater) to establish a baseline of groundwater quality (typically this is a certain distance from the development).

c. A Groundwater Characterization Report has been completed for "The Glens" area. This report can be provided by the City, upon request.

32. Record drawings and utility plans are also available for purchase from the City (Contact the City's Information Centre by email at InformationCentre@ottawa.ca or by phone at (613) 580-2424 x.44455). geoOttawa - https://maps.ottawa.ca/geoOttawa/

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

Feel free to contact Rubina Rasool, Project Manager, for follow-up questions.

Noise

Comments:

34. Noise impact studies required for the following:

    a. Road, due to proximity to Merivale Road (arterial). Note that the future state of Merivale Road (i.e., four lanes per the 2017 Barrhaven and Merivale Rail Grade Crossing Separation Study EA) should be evaluated.

    b. Rail, due to proximity to the Via Rail corridor (Smiths Falls subdivision). Include a vibration assessment as part of the noise study.

    c. Aircraft, as the site falls within the airport vicinity development zone.

Feel free to contact Rochelle Fortier-Lesage (rochelle.fortier@ottawa.ca), Transportation Project Manager, for follow-up questions.

Transportation

Comments:

35. TIA not required.

36. Ensure that the development proposal complies with the Right-of-Way protection requirements - See Schedule C16 of the Official Plan.

    a. There is ROW protected listed along the site frontage. It is acknowledged that ROW conveyance does not take place at rezoning, but the concept plan and setbacks must account for the future conveyance which is taken at Site Plan or severance (whichever comes first).

b. Corner triangles on the final plan will be required (measure on the property line/ROW protected line; no structure above or below this triangle). The City requires a 3 metre x 9 metre corner triangle at arterial/local intersection (i.e., Merivale/Cassone), with the longer portion on the higher road segment.

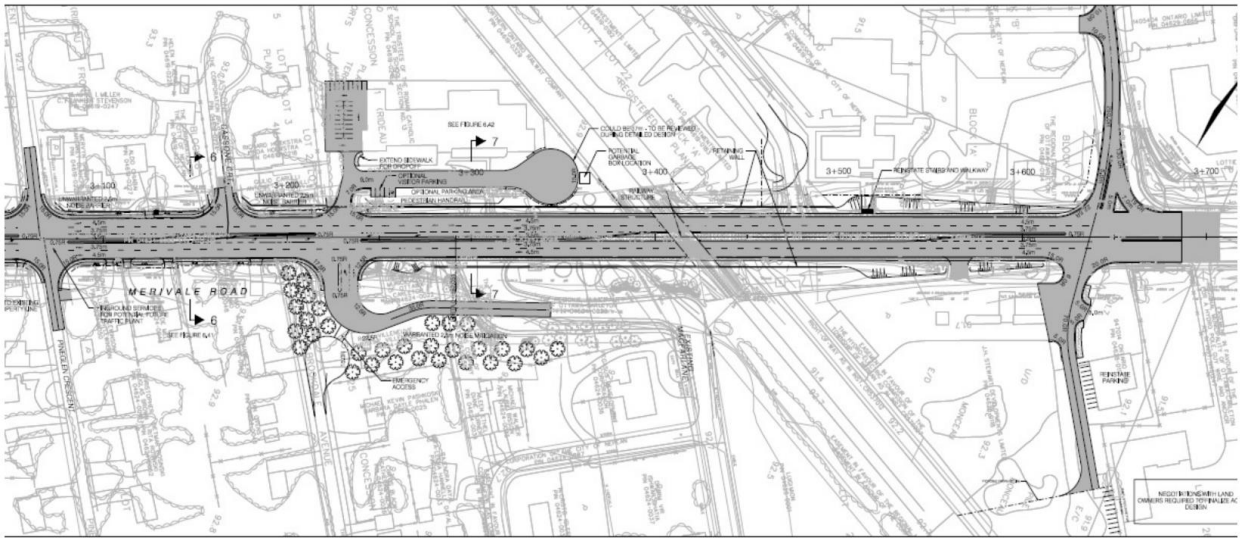
c. ROW and corner triangles must be unincumbered and conveyed at no cost to the City. Additional information on the conveyance process can be provided upon request.

d. Any requests for exceptions to ROW protection requirements must be discussed with Transportation Planning and concurrence provided by Transportation Planning management. The applicant shall submit support evidence and rationale to support any relief to Transportation Planning satisfaction.

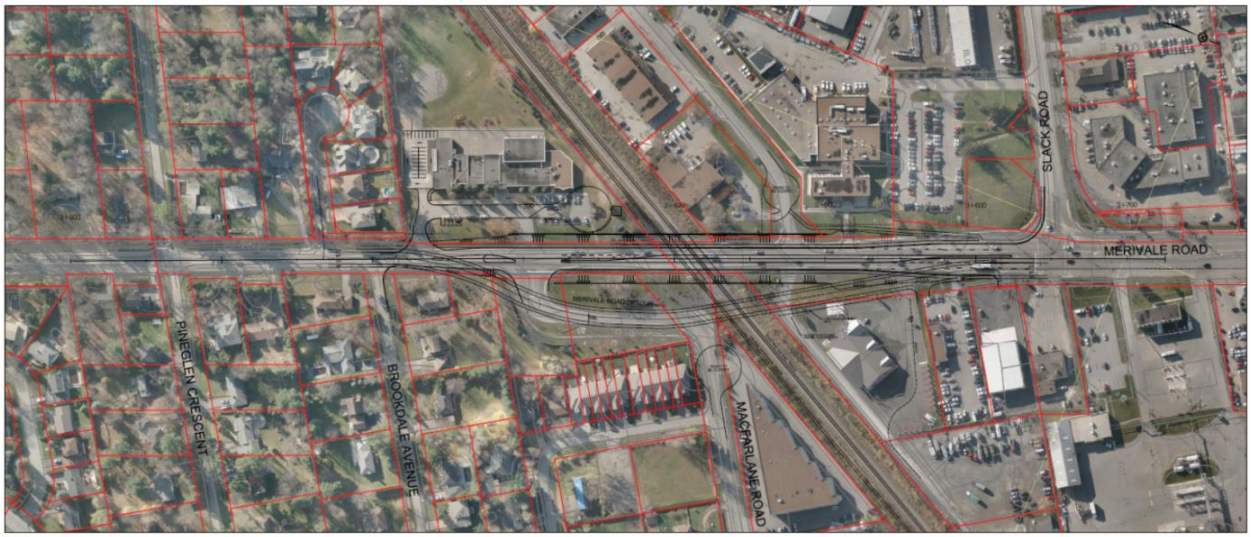
37. The closure of an existing private approach shall reinstate the sidewalk, shoulder, curb, and boulevard to City standards.

38. The Barrhaven and Merivale Rail Grade Crossing Separation Study EA was finalized in May 2017. The recommended solution for this rail crossing is to lower Merivale Road below the railway line using an underpass structure. The EA identified the need for this underpass to accommodate four lanes plus active transportation. A potential detour route was also prepared showing a temporary road location on the east side of the road corridor. Please see preliminary concepts below and note that these are subject to change. Timing for implementation is currently unknown.

Figure 53: Merivale EA Preferred Option (from MCEA, McCormick Rankin Corp., 1997)



TEST PLAN - MERIVALE ROAD
DETOUR - DESIGN 60km/h
(FOR DISCUSSION PURPOSES ONLY)



Feel free to contact Rochelle Fortier-Lesage (rochelle.fortier@ottawa.ca), Transportation Project Manager, for follow-up questions.

Environment

Comments:

39. Area is mapped in Official Plan Schedule C11C as a natural heritage feature however recent review from the City's Natural System's team has determined that as a result of tree loss from past weather events, the significant woodland no longer stretch north across Pineglen, accordingly no EIS is required.

Feel free to contact Matthew Hayley, Environmental Planner, for follow-up questions.

Forestry

Comments:

40. Recent aerial imagery shows the property was significantly treed, despite the impacts of the 2022 Derecho. As the site has since been cleared without the necessary permits and in keeping with OP §4.8.2, a robust tree planting plan will be required to offset the loss of trees on site, to replace the trees in the adjacent rights-of-way, and to provide screening between adjacent properties.

41. Please note that the site is within the Airport Vicinity Development Zone. As per OP §10.2.2 7), it is recommended that the planting of trees and shrubs attractive to birds be limited or avoided on site. Please refer to table C.4 (p. C.12) of the Wildlife Control Procedures Manual.

42. The following Tree Conservation Report (TCR) guidelines have been adapted from the Schedule E of the Tree Protection By-law – for more information on these requirements please contact julian.alvarez-barkham@ottawa.ca

    a. A Tree Conservation Report (TCR) must be supplied for review along with the suite of other plans/reports required by the City

        i. An approved TCR is a requirement of Site Plan approval.

    b. Any removal of privately-owned trees 10cm or larger in diameter within the urban area, or city-owned trees of any diameter requires a tree permit issued under the Tree Protection Bylaw (Bylaw 2020 – 340); the permit will be based on an approved TCR and made available at or near plan approval.

    c. The TCR must contain 2 separate plans:

        i. Plan/Map 1 - show existing conditions with tree cover information.

        ii. Plan/Map 2 - show proposed development with tree cover information.

    d. The TCR must list all trees on site, as well as off-site trees if the CRZ (critical root zone) extends into the developed area, by species, diameter, and health condition.

        i. For ease of review, the Planning Forester suggests that all trees be numbered and referenced in an inventory table.

    e. Please identify trees by ownership – private onsite, private on adjoining site, city owned, co-owned (trees on a property line)

    f. If trees are to be removed, the TCR must clearly show where they are, and document the reason they cannot be retained.

        i. Compensation may be required for the removal of city owned trees.

    g. The removal of trees on a property line will require the permission of both property owners.

    h. All retained trees must be shown, and all retained trees within the area impacted by the development process must be protected as per City guidelines available on the Tree Protection Specification or by searching Ottawa.ca.

        i. The location of tree protection fencing must be shown on the plan.

        ii. Show the critical root zone of the retained trees.

i. The City encourages the retention of healthy trees; if possible, please seek opportunities for retention of trees that will contribute to the design/function of the site.

43. The following Landscape Plan (LP) guidelines have been adapted from Schedule E of the Tree Protection By-law – for more information on these requirements please contact julian.alvarez-barkham@ottawa.ca

a. Please ensure any retained trees are shown on the LP.

b. 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.

iv. Maintain 7.5m between large growing trees, and 4m between small growing trees. Park or open space planting should consider 10m spacing, except where otherwise approved in naturalization / afforestation areas.

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

b. 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.

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

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

e. No tree stakes unless necessary (and only 1 on the prevailing winds side of the tree)

f. Hard surface planting

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

ii. Curb style planter design 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.

c. Trees are to be planted at grade.

d. 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 (m^3)	Multiple Tree Soil Volume (m^3/tree)
Ornamental	15	9
Columnar	15	9
Small	20	12
Medium	25	15
Large	30	18
Conifer	25	15

   i. It is strongly suggested that the proposed species list include a column listing the available soil volume.

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

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

g. 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 Julian Alvarez-Barkham, Forester, for follow-up questions.

Parkland

Comments:

Parkland Dedication

44. The amount of required parkland conveyance is to be calculated as per the City of Ottawa Parkland Dedication By-law No.2022-280 (or as amended):

45. For cash-in-lieu of conveyance of parkland (residential > 18 units/net ha):

46. one hectare per 1,000 net residential units but shall not exceed a maximum of 10% of the gross land area where less than or equal to five hectares.

Form of Parkland Dedication

47. PFP will be requesting cash-in-lieu of conveyance of parkland for parkland dedication in accordance with the Parkland Dedication By-law.

Preliminary Parkland Dedication Calculation

48. PFP requests the following information to confirm and calculate the parkland conveyance:

    a. Gross land area, in square meters

    b. Number of residential units proposed/existing

    c. Gross floor area of proposed residential development

    d. Gross floor area of proposed/existing commercial development

    e. The proportion of commercial/residential development proposed on site.

49. Please note, if the proposed unit count, land use changes or gross floor area changes, then the parkland dedication requirement will be re-evaluated accordingly.

50. Preliminary parkland conveyance calculations based on information provided/identified in the pre-application consultation, is calculated to be X square meters as per the table below.

    a. Residential CILP = (site area sq.m x 10%) x proportionally rate% = x sq.m

Total CILP required for the proposed development = x sq.m

51. Please note, if the proposed unit count, land use changes or gross floor area changes, then the parkland dedication requirement will be re-evaluated accordingly.

52. Cash-in-lieu of conveyance of parkland will be required prior to registration of the Site Plan Agreement. The Owner shall also pay the parkland appraisal fee as referenced in Schedule “B” of the site plan agreement.

53. CREO will provide an appraisal and PFP will calculate the fee for Schedule “B”.

54. Full suite of park conditions will be included when a formal site plan application is submitted.

Reference Documents

55. Please review the following City of Ottawa reference documents which outline the requirements for parkland conveyance and/or cash-in-lieu of parkland.

    a. Official Plan (2021)

    b. Parks and Recreation Facilities Master Plan (2021)

    c. Park Development Manual, 2nd edition

    d. Parkland Dedication By-Law (2022-280) and Planning Act amendments

    e. City of Ottawa Standard Parks Conditions

Please note that the park comments are preliminary and will be finalized (and subject to change) upon receipt of the development application and the requested supporting documentation.

Feel free to contact Louise Cerveny, Parks Planner, for follow-up questions.

Community issues

Comments:

56. The proposed density is a concern, including as it relates to potential impacts from the proposed development on the surrounding privately serviced communities. The existing zoning provides a unified zoning for the entire community reflecting the private services in the surrounding developments. There are concerns that the proposed development may adversely impact water and wells. There should be an environmental review to ensure no impact to existing dwellings and servicing. There are also concerns regarding sewer capacity.

57. Potential impacts on traffic or increased traffic are a concern. With the increased density, there are concerns that the development will contribute to existing safety and traffic concerns. Currently, traffic volume on Merivale Road is a concern, and there are challenges with traffic and pedestrian crossings. Road modifications are challenging due to the railway crossing and other infrastructure constraints in the area. There are concerns that the development will add to current traffic complaints, and impact the future opportunity to widen Merivale Road.

58. The proximity of the development to the railway is a concern. There are ongoing concerns with noise from the airport and railway.

59. There are concerns that the increased density will impact existing mobility challenges and reduce community green space.

60. It is a concern that affordable housing has not been incorporated into the development.

Submission Requirements and Fees

1. Major Zoning By-Law Amendment, Site Plan Control – Complex, Plan of Condominium, Consent to Sever, Lifting of 30cm Reserve
    a. Additional information regarding fees related to planning applications can be found here.
2. The attached **Study and Plan Identification List** outlines the information and material that has been identified as either required (R) or advised (A) as part of a future complete application submission.
    a. The required plans and studies must meet the City's Terms of Reference (ToR) and/or Guidelines, as available on Ottawa.ca. These ToR and Guidelines outline the specific requirements that must be met for each plan or study to be deemed adequate.
3. All of the above comments or issues should be addressed to ensure the effectiveness of the application submission review.

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

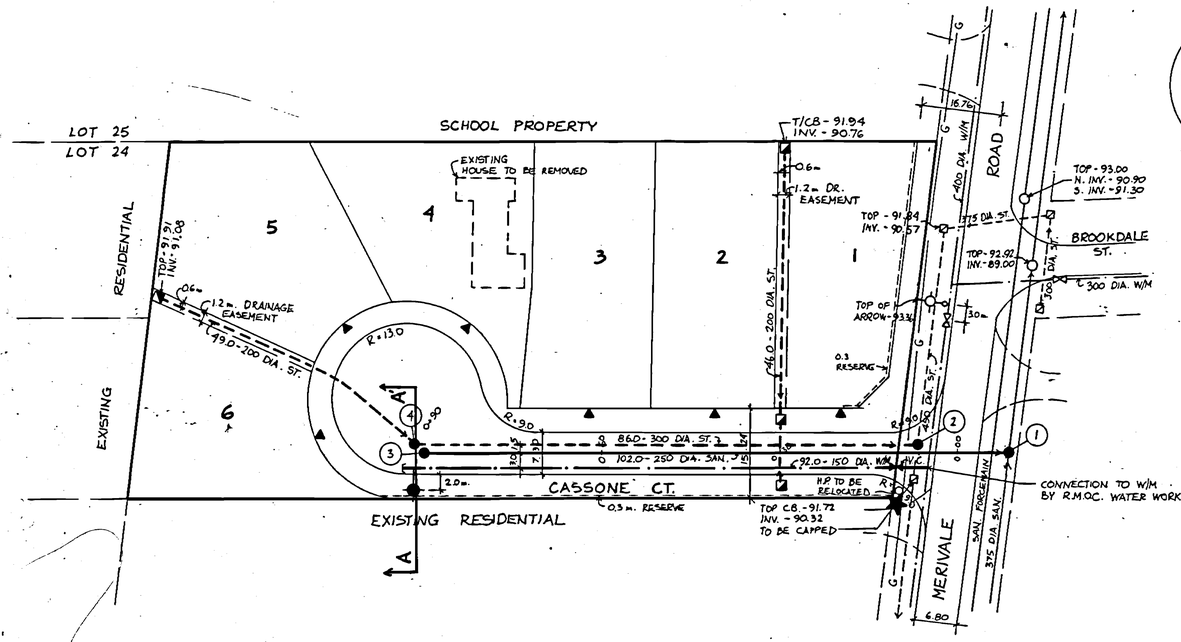
Yours Truly,
Amanda Davidson
Planner, Development Review - West

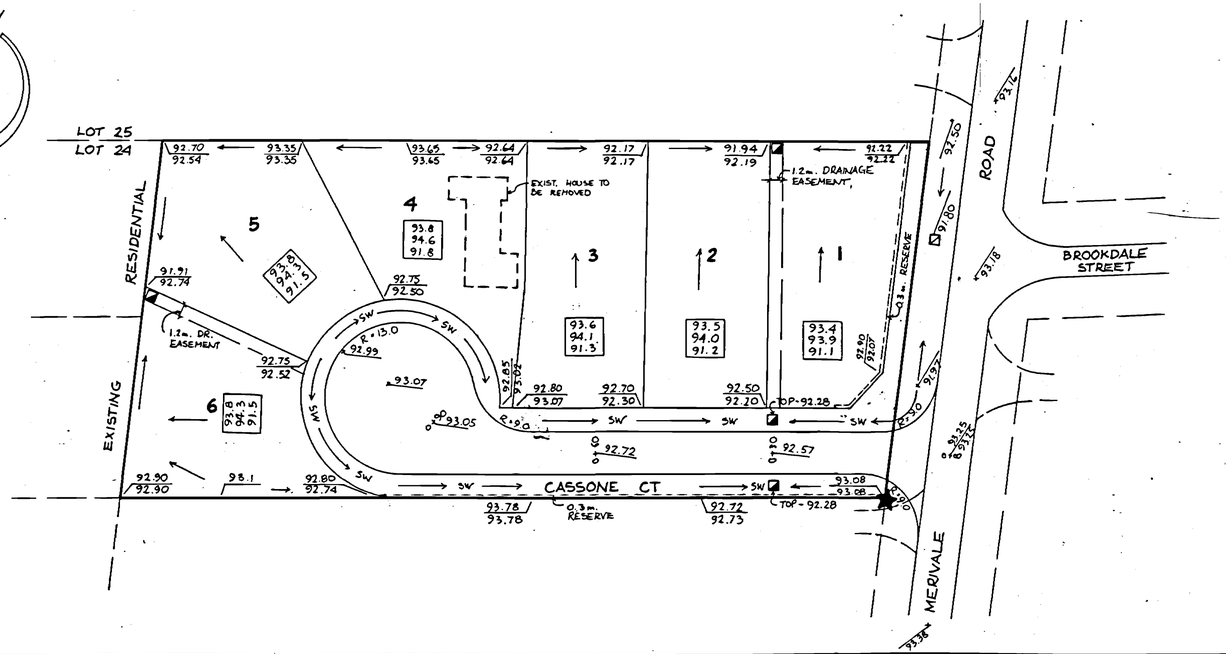
Encl. Study and Plan Identification List
List of Technical Agencies

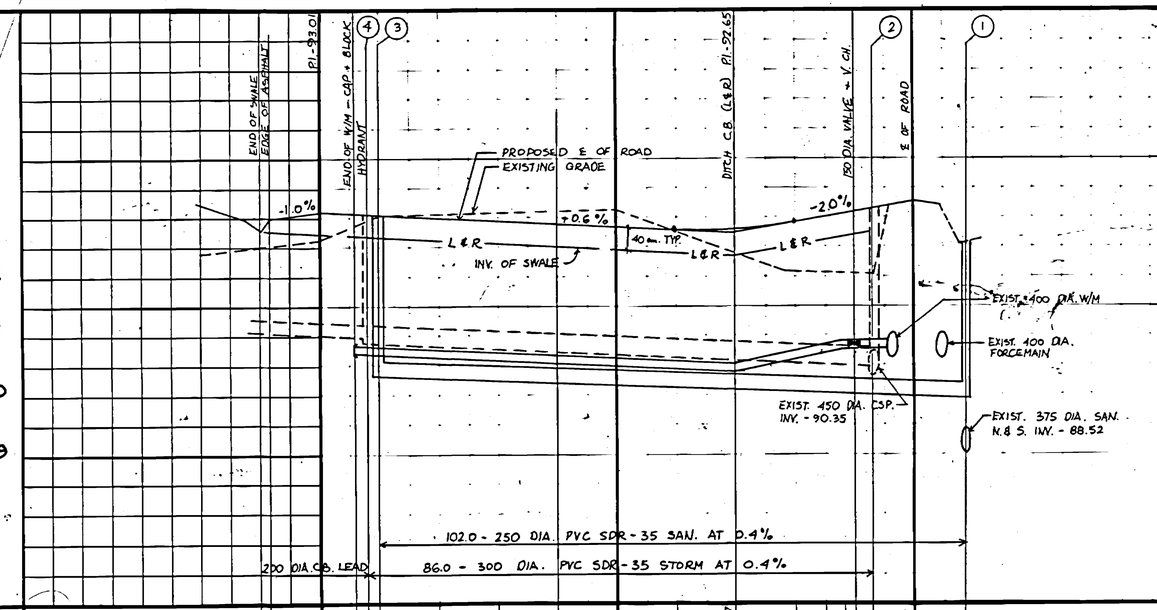
c.c. Kimberley Baldwin, Planner
Rubina Rasool, Infrastructure Project Manager
Rochelle Fortier-Lesage, Transportation Project Manager
Christopher Moise, Planner, Urban Design
Matthew Hayley, Environmental Planner
Julian Alvarez-Barkham, Planning Forester
Louise Cerveny, Parks Planner

Appendix F – Background Information

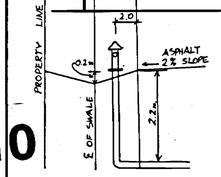
City of Ottawa Vault Drawings







PROPOSED ROAD ℄	92.59	93.07		90.64	91.05	90.78	90.73	90.68	92.22	90.61	90.56	92.57	90.51	90.63	90.80	90.90	90.95		93.25						
TOP OF WATERMAIN				90.84														90.48							
STORM INVERT				90.79																					
SANITARY INVERT				90.30															89.82						
STATION	1+08	1+00	0+94	0+92	0+90	0+80	0+70	0+60	0+50	0+40	0+30	0+20	0+15	0+12	0+10	0+07	0+00		0+085						



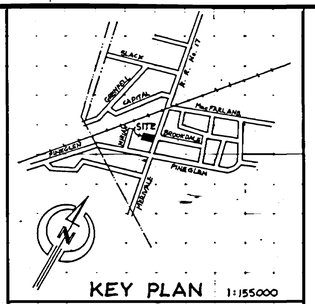
SWALE SECTION A-A'
N.T.S.

LEGEND:

Proposed:
- 92.70 Proposed Grade
- SW → Shallow swale
- → Slope
- Sanitary sewer with manhole.
- Storm sewer with manhole
- Watermain with valve & V. Chamber
- Hydrant
- Catchbasin
- Location of lot services
- 93.3 / 93.8 / 91.0 Finish grade around the house / Finish first floor elevation / Underside of footing elevation
- Street Light

Existing:
- 92.74 Existing grade
- Sanitary sewer with manhole
- Storm pipe (CSP) with C.B.
- Watermain with valve & V. Chamber
- Hydrant with valve + Valve Box

NOTES:
1. All sewer works to be constructed to City of Nepean & M.O.E. standards and requirements.
2. All water works to be constructed to R.M.O.C. Water Works standards & requirements.
3. Contractor is responsible for obtaining and payment of all necessary permits.
4. Contractor to verify locations and elevations of all pipes prior to any construction and advised to collect information on soil conditions as deemed necessary.
5. Existing services and utilities shown on this drw'g are taken from best available records, but are not complete. Contractor is required to check in field with utility companies before digging.
6. Pipe sizes shall be as shown on drw'gs or said herein.
7. Material to be as follows:
   Sanitary Lateral: SDR 28, PVC - 125 Dia.
   Storm lateral: SDR 28, PVC - 100 Dia.
   Water service: Type "K" Soft copper pipe (20mm. dia.), from main to lot line.
   Sanitary sewers: SDR 35, PVC pipe
   Storm sewers: SDR 35, PVC pipe
   Watermain: D.I. Class 50
8. Sanitary and storm laterals from sewers to lot line to be at 1% grade min.
9. All grades shown are geodetic and in metric.
10. All watermains and water services shall have 2.2m. min. cover
11. Hydrants are located 2.0 m. from edge of asphalt.
12. Asph. radius at the intersection is 9.0 m. or as shown on plans.
13. Where water service for Lot #1 crosses storm sewer use 1.2 cm. x 2.4 cm. Styrofoam SM, 50mm. thickness.



KEY PLAN 1:155000

NO.	DATE	REVISIONS
2	NOV. 14/89	AS-BUILT
1	JUNE 29/89	GRADES FOR LOT #4

J. C. E. A. REGISTERED PROFESSIONAL ENGINEER PROVINCE OF ONTARIO

DESIGN BY: J.G.

CLIENT: CASSONE CONSTRUCTION LTD.

PROJECT: McINTOSH SUBDIVISION, NEPEAN, ONT.

TITLE: SITE, PROFILE, DRAINAGE & GRADING PLAN

TIME CONSTRUCTION & ENGINEERING LTD.
OTTAWA ONTARIO

DATE: FEB. 1987 | SCALE: V. = 1:50, H. = 1:500 | DRW'G. NO. 87-02-1 | REV.

10

Appendix G – Drawings

Architectural Site Plan Drawings

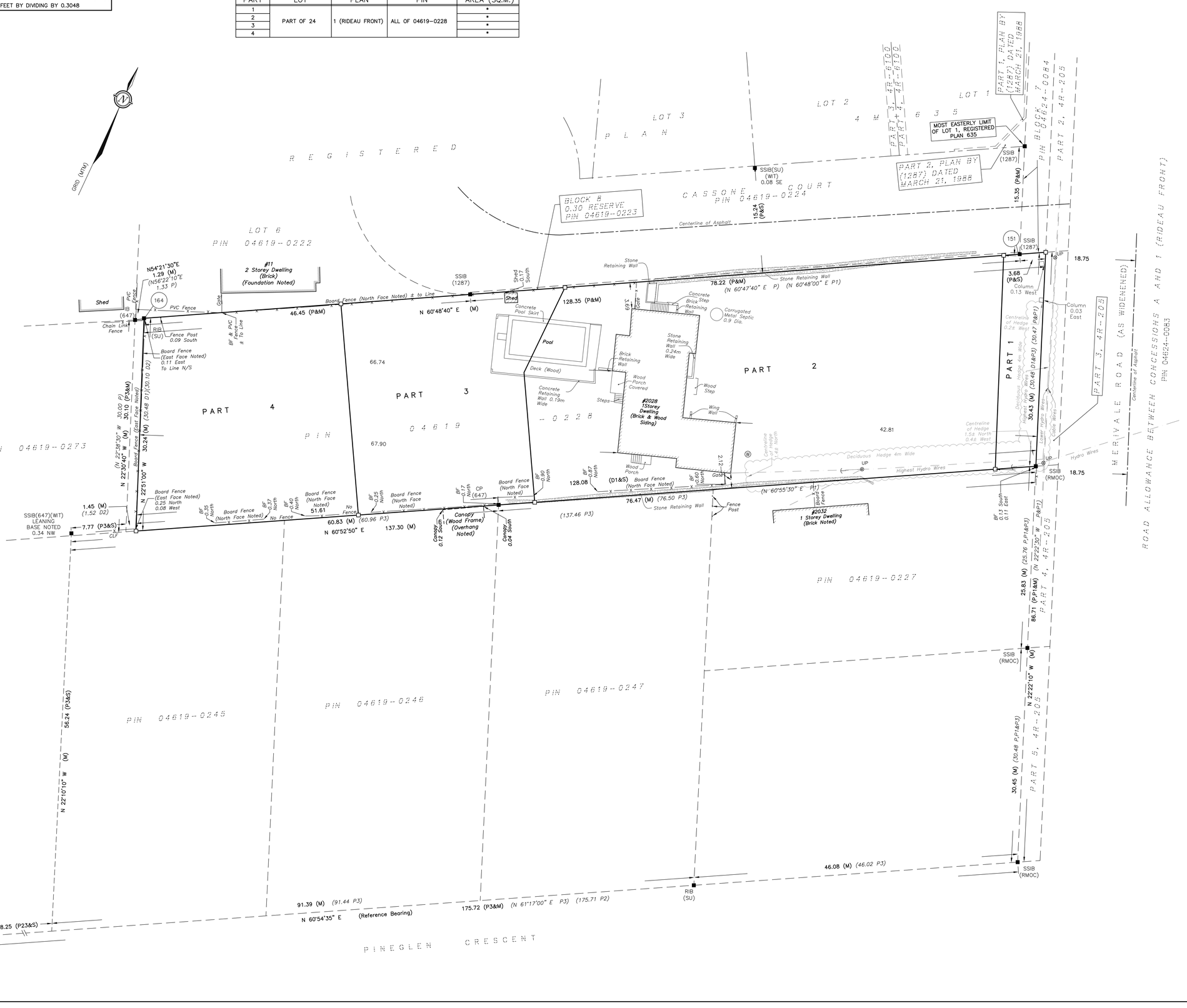
- Site Plan, SP-00
- Topo Survey

Engineering Drawings (included separately)

- Cover, C000
- Notes and Legend, C001
- Existing Conditions, C002
- Site Servicing Plan, C100
- Cassone Crt and Private Entrance Plan and Profiles, C101
- Servicing Tables, C102
- Site Grading Plan, C200
- Erosion and Sediment Control Plan, C300
- Details and Typical Sections, C400
- Details and Typical Sections, C401
- Details and Typical Sections, C402
- Pre-development Storm Drainage Area Plan, C500
- Post-development Storm Drainage Area Plan, C501
- Sanitary Drainage Area Plan, C600

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

SCHEDULE				
PART	LOT	PLAN	PIN	AREA (SQ.M.)
1	PART OF 24	1 (RIDEAU FRONT)	ALL OF 04619-0228	*
2				*
3				*
4				*



PLAN OF SURVEY OF
PART OF LOT 24
CONCESSION 1 (RIDEAU FRONT)
CITY OF OTTAWA

SCALE 1 : 250

0 5 10 20 25 metres

THE INTENDED PLOT SIZE OF THIS PLAN IS 914mm IN WIDTH BY 610mm IN HEIGHT WHEN PLOTTED AT A SCALE OF 1:250.

FAIRHALL, MOFFATT & WOODLAND LIMITED
ONTARIO LAND SURVEYORS

COORDINATES WERE DERIVED FROM REAL TIME NETWORK OBSERVATIONS (SMARTNET) MTM ZONE 9, NAD83 CSRS (2010).

COORDINATES HAVE BEEN DETERMINED TO AN URBAN ACCURACY IN ACCORDANCE WITH SECTION 14(2) OF O.REG 216/10.

POINT ID	NORTHING	EASTING
151	5020492.03	366192.47
164	5020431.24	366083.66

COORDINATES CANNOT IN THEMSELVES BE USED TO RE-ESTABLISH CORNERS OR BOUNDARIES SHOWN ON THIS PLAN.

NOTES

1. BEARINGS ARE GRID AND ARE REFERRED TO THE NORTHERLY LIMIT OF PINEGLEN CRESCENT AS SHOWN ON PLAN BY (647) DATED JANUARY 17, 2023 (FILE 694-22), HAVING A BEARING OF N 60°54'35" E AND ARE REFERRED TO THE CENTRAL MERIDIAN, 76°30'W LONGITUDE MTM ZONE 9, (NAD83 ORIGINAL).

2. DISTANCES ARE GROUND AND CAN BE CONVERTED TO GRID BY MULTIPLYING BY THE COMBINED SCALE FACTOR 0.999937.

3. BEARINGS CAN BE CONVERTED TO NAD83 (CSRS 2010.0) GRID BY APPLYING AN ANGLE ROTATION TO 00°00'00" CLOCKWISE.

LEGEND

■	– SURVEY MONUMENT FOUND
□	– SURVEY MONUMENT SET
SSIB	– SHORT STANDARD IRON BAR
RIB	– ROUND IRON BAR
CP	– CONCRETE PIN
(P)	– REGISTERED PLAN 4M-635
(P1)	– PLAN 4R-205
(P2)	– PLAN BY (647) DATED JANUARY 17, 2023 (FILE 694-22)
(P3)	– PLAN BY (647) DATED MARCH 10, 1954 (REF. NPNRF1-24-2)
(D1)	– INST. CR481386
(D2)	– INST. N481980
(M)	– MEASURED
(S)	– SET
DIA.	– DIAMETER
PIN	– PROPERTY IDENTIFIER NUMBER
(RMOC)	– REGIONAL MUNICIPALITY OF OTTAWA-CARLETON
(647)	– H. R. FARLEY, O.L.S.
(1287)	– FARLEY, SMITH & MURRAY SURVEYING LTD., O.L.S.
(SU)	– SOURCE UNKNOWN
(WIT)	– WITNESS
SE	– SOUTHEAST
NW	– NORTHWEST
Ⓦ	– WELL
⊗ UP	– UTILITY POLE
	– GUY WIRE AND ANCHOR
	– OVERHEAD UTILITY WIRES

SURVEYOR'S CERTIFICATE

I CERTIFY THAT:
1. THIS SURVEY AND PLAN ARE CORRECT AND IN ACCORDANCE WITH THE SURVEYS ACT, THE SURVEYORS ACT, THE LAND TITLES ACT AND THE REGULATIONS MADE UNDER THEM.

2. THE SURVEY WAS COMPLETED ON

DATE

JOHN H. GUTRI
ONTARIO LAND SURVEYOR

THIS PLAN OF SURVEY RELATES TO AOLS PLAN SUBMISSION FORM NUMBER .....

Fairhall Moffatt & Woodland
LIMITED
ONTARIO LAND SURVEYORS
OTTAWA
Surveying and Land Information Services
100-600 TERRY FOX DRIVE, KANATA, ONTARIO K2L 4B6
TEL: (613) 591-2580 FAX: (613) 591-1495
www.fmw.on.ca

JOB No. A E 1 7 5 0 0

E 366161, N 5020459

REFERENCE No. 170(a)-1(RF)-NP

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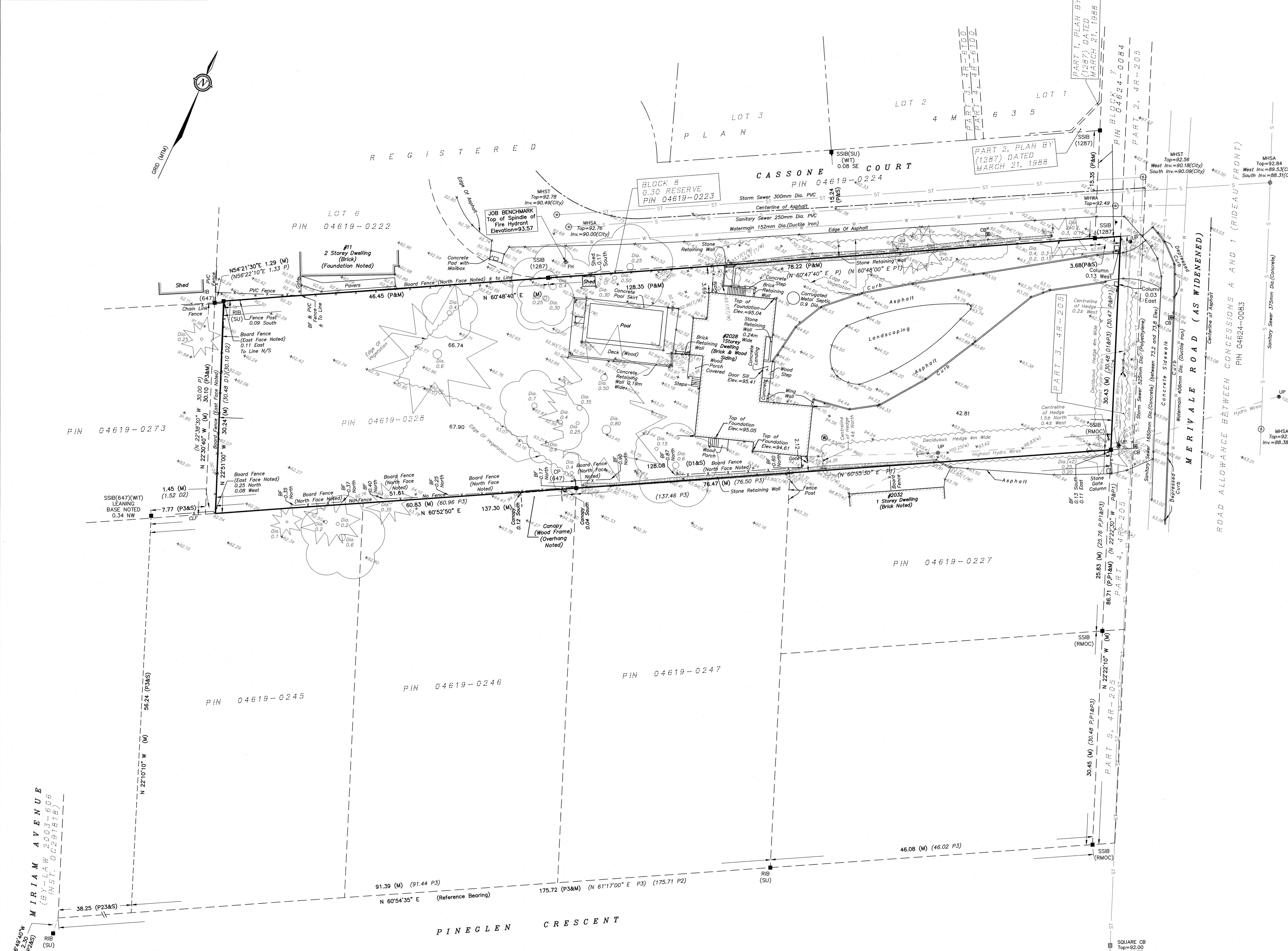
METRIC
DISTANCES AND ELEVATIONS SHOWN ON THIS PLAN ARE IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048



SURVEYOR'S REAL PROPERTY REPORT – PART 1

TOPOGRAPHIC PLAN OF SURVEY OF PART OF LOT 24 CONCESSION 1 (RIDEAU FRONT) CITY OF OTTAWA

SCALE 1 : 250

0 5 10 20 25 metres

FAIRHALL, MOFFATT & WOODLAND LIMITED
ONTARIO LAND SURVEYORS

ELEVATION NOTES

1. **ELEVATIONS SHOWN HEREON ARE REFERRED TO GEODETIC DATUM (CGVD2013).**
2. ELEVATIONS FOR MANHOLE COVERS AND CATCH BASINS HAVE TO BE INDEPENDENTLY CONFIRMED BEFORE THEY CAN BE ACCEPTED FOR FINAL DESIGN OR CONSTRUCTION PURPOSES.
3. IT IS THE RESPONSIBILITY OF THE USER OF THIS INFORMATION TO VERIFY THAT THE JOB BENCHMARK HAS NOT BEEN ALTERED OR DISTURBED AND THAT THEIR RELATIVE ELEVATION AND DESCRIPTION AGREE WITH THE INFORMATION SHOWN ON THIS DRAWING.

UTILITY NOTES

1. THIS DRAWING CANNOT BE ACCEPTED AS ACKNOWLEDGING ALL OF THE UNDERGROUND UTILITIES AND IT WILL BE THE RESPONSIBILITY OF THE USER TO CONTACT THE RESPECTIVE UTILITY AUTHORITIES FOR CONFIRMATION OR LOCATION.
2. UNDERGROUND UTILITIES, AS REPORTED ON THIS DRAWING, ARE NOT BASED ON AN ACTUAL 'FIELD LOCATE' BY THE RESPECTIVE UTILITY AGENCIES BUT HAVE BEEN COMPILED FROM DATA OBTAINED FROM THE FOLLOWING SOURCE:
   a) CITY OF OTTAWA PUBLIC UTILITIES REGISTRY
3. CITY OF OTTAWA PUBLIC UTILITIES REGISTRY ELEVATIONS HAVE BEEN CONVERTED FROM THE VERTICAL DATUM CGVD28 TO THE VERTICAL DATUM CGVD2013 BY SUBTRACTING 0.295 METRES.
4. BEFORE ANY WORK INVOLVING PROBING, EXCAVATING, ETC., A FIELD LOCATION OF UNDERGROUND PLANT BY THE PERTINENT UTILITY AUTHORITY IS MANDATORY.

NOTES

BEARINGS ARE GRID AND ARE REFERRED TO THE NORTHERLY LIMIT OF PINEGLEN CRESCENT AS SHOWN ON PLAN BY (647) DATED JANUARY 17, 2023 (FILE 694–22), HAVING A BEARING OF N 60°54'35" E AND ARE REFERRED TO THE CENTRAL MERIDIAN, 76°30'W LONGITUDE MTM ZONE 9, (NAD83 ORIGINAL).

LEGEND

■	– SURVEY MONUMENT FOUND
SSIB	– SHORT STANDARD IRON BAR
RIB	– ROUND IRON BAR
CP	– CONCRETE PIN
(P)	– REGISTERED PLAN 4M–635
(P1)	– PLAN 4R–205
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(S)	– SET
DIA.	– DIAMETER
PIN	– PROPERTY IDENTIFIER NUMBER
(RMOC)	– REGIONAL MUNICIPALITY OF OTTAWA–CARLETON
(647)	– H. R. FARLEY, O.L.S.
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(SU)	– SOURCE UNKNOWN
(WIT)	– WITNESS
Inv.	– INVERT
SE	– SOUTHEAST
NW	– NORTHWEST
(w)	– ELEVATION OF UTILITY WIRE
(T/W)	– TOP OF RETAINING WALL ELEVATION
CB	– CATCH BASIN
MHSA	– SANITARY MANHOLE
MHST	– STORM MANHOLE
MHWA	– WATER MANHOLE
Ⓦ	– WELL
UP	– UTILITY POLE
	– GUY WIRE AND ANCHOR
FH	– FIRE HYDRANT
	– SIGN
	– CONIFEROUS TREE
	– DECIDUOUS TREE
—W—	– WATERMAIN
— · —	– OVERHEAD UTILITY WIRES
—ST—	– STORM SEWER
—S—	– SANITARY SEWER
═══	– CURB

SURVEYOR'S REAL PROPERTY REPORT – PART 2 REPORT SUMMARY

DESCRIPTION OF LAND

PART OF LOT 24, CONCESSION 1 (RIDEAU FRONT), CITY OF OTTAWA, AS IN ALL OF PIN 04619–0228

REGISTERED EASEMENTS

NONE REGISTERED.

ZONING

COMPLIANCE WITH ZONING, LAND USE, ENVIRONMENTAL AND BUILDING REGULATIONS NOT CERTIFIED BY THIS REPORT.

THIS REPORT WAS PREPARED FOR
OLYMPIA HOMES
THE UNDERSIGNED ACCEPTS NO RESPONSIBILITY FOR USE BY OTHER PARTIES.

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 AUGUST 30, 2024

2024/08/29
DATE

JOHN H. GUTRI
ONTARIO LAND SURVEYOR

ASSOCIATION OF ONTARIO LAND SURVEYORS
PLAN SUBMISSION FORM
V–78099

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

Fairhall Moffatt & Woodland
LIMITED
OTTAWA
ONTARIO LAND SURVEYORS
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100–600 TERRY FOX DRIVE, KANATA, ONTARIO K2L 4B6
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JOB No. AE17500

E 366161, N 5020459

REFERENCE No. 170–1(RF)–NP

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