MORRISON HERSHFIELD

Site Servicing and Stormwater Management Design Brief

1354 and 1376 Carling Avenue Development – Phase 2

Ottawa, Ontario

Ottawa, Ontario

Presented to:

HL General Partner Inc. on behalf of Holloway Lodging Limited Partnership

Project: 210292700 June 22, 2021

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TABLE OF CONTENTS

		Page
1	INTRODUCTION	2
1.1	Site Description and Proposed Development	2
1.2	Background Documents	3
1.3	Consultation and Permits	4
1.4	Available Existing Infrastructure	4
2	GEOTECHNICAL STUDY	5
3	WATER SERVICES	6
3.1	Design Criteria	6
3.2	Adequacy of Supply for Domestic and Fire Flows	7
3.3	Check of High Pressures	8
3.4	Reliability Requirements	8
3.5	Summary and Conclusions	8
4	SANITARY SERVICING	8
4.1	Background and Existing Infrastructure	8
4.2	Review of Ground Water and Soil Conditions	8
4.3	Proposed Servicing and Calculations	8
4.4	Capacity of Receiving Sewer	9
4.5	Summary and Conclusions	9
5	STORM SERVICING AND STORMWATER MANAGEMENT	9
5.1	Background	9
5.2	Storm Servicing Strategy including Analysis of Existing Infrastructure	10
5.3	Proposed Storm Servicing	10
5.4	Grading	14
5.5	Erosion and Sediment Control	14
6	CONCLUSIONS	16
7	APPENDICES	17

1 Introduction

1.1 Site Description and Proposed Development

This report describes the site servicing and stormwater management design and calculations pertaining to Phase 2 of the 1354 and 1376 Carling Avenue development. Phase 2 will be constructed at 1354 Carling Avenue.

The redevelopment at 1354 and 1376 Carling Avenue consists of two phases comprised of residential and commercial units. The site plan includes new residential towers with underground parking, residential and retail plazas, garden units and a neighborhood park.

The existing site currently serves the predevelopment to phase one, which contains a demolished section of the property, and an existing Travelodge hotel. The existing Talisman Hotel will be maintained and protected throughout ongoing construction.

Existing infrastructure in the vicinity of the site is described in **Section 1.4** below.

Design drawings for proposed site servicing, grading, and erosion control are provided in **Appendix A**.

The format of this report matches that of the development servicing study checklist found in Section 4 of the City of Ottawa's Servicing Study Guidelines for Development Applications. A completed copy of the checklist is provided in **Appendix H**.

1.1.1 Statement of Objectives and Servicing Criteria

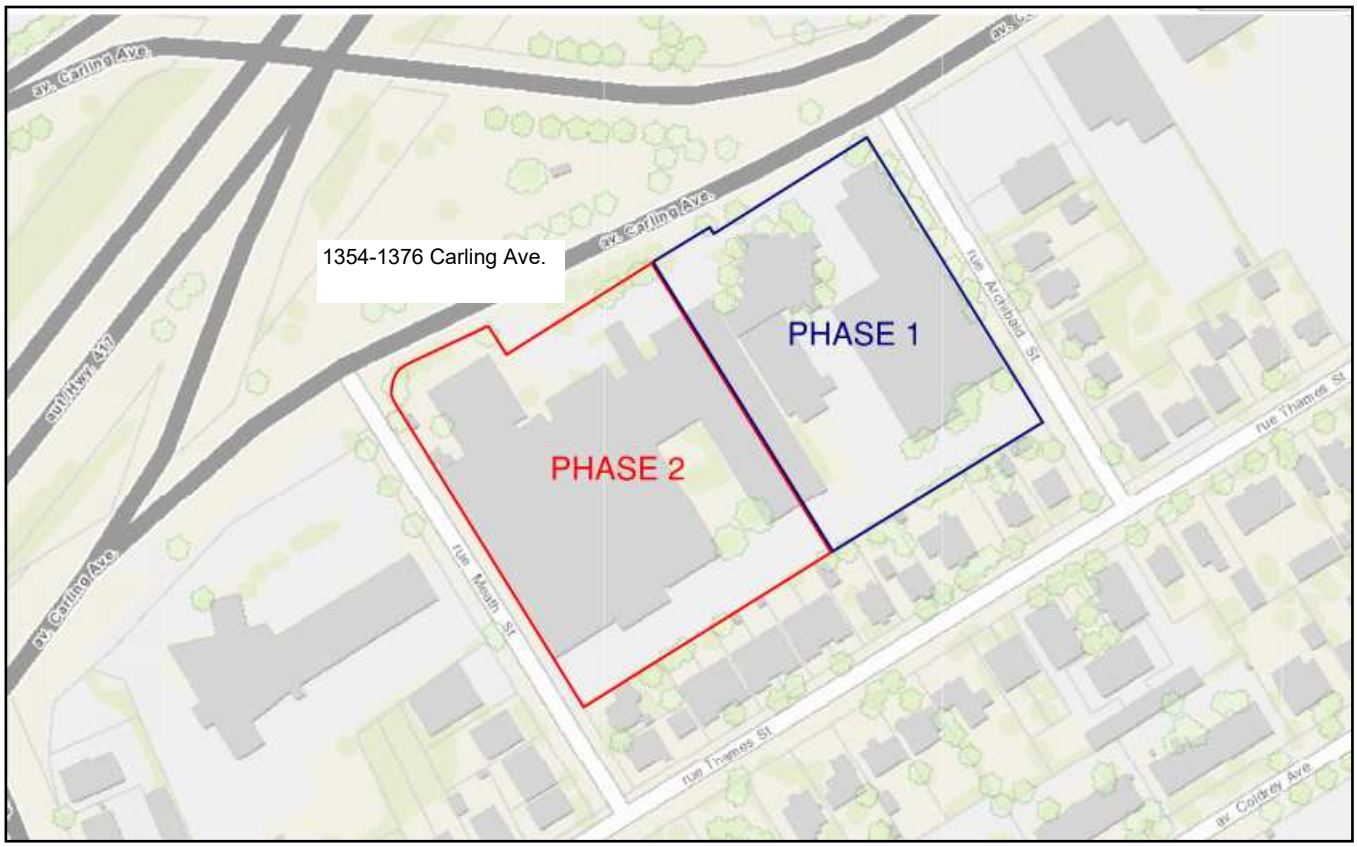
The objective of this design brief is to demonstrate that the proposed design meets the servicing requirements for the proposed development, while adhering to the appropriate regulatory requirements.

1.1.2 Location Map and Plan

The location of the site is illustrated in **Figure 1**. A detailed site layout is illustrated on the drawings in **Appendix A**.

The proposed development at 1354 Carling Ave. is entirely within a property parcel occupied by the Travelodge Hotel and the heritage building. The proposed site is located within Ward 16, represented by Councillor Riley Brockington.

Figure 1 - Key Plan



1.2 Background Documents

Existing conditions are shown on the Topographic and Legal Survey (**Appendix E**).

Documents reviewed in preparing this servicing brief include:

- Phase 1 Functional Servicing and Stormwater Management Report Rev 3, David Schaeffer Engineering, December 2018
- Ottawa Sewer Design Guidelines, City of Ottawa, SDG002, October 2012. (City Standards)
- Technical Bulletin ISTB-2018-01 City of Ottawa, March 21, 2018. (ISTB-2018-01)
- Technical Bulletin ISTB-2018-03 City of Ottawa, June 27, 2018. (ISTB-2018-03)
- Ottawa Design Guidelines – Water Distribution City of Ottawa, July 2010. (Water Supply Guidelines)
- Technical Bulletin ISD-2010-2 City of Ottawa, December 15, 2010. (ISD-2010-2)
- Technical Bulletin ISDTB-2014-02 City of Ottawa, May 27, 2014. (ISDTB-2014-02)
- Technical Bulletin ISDTB-2018-02 City of Ottawa, March 21, 2018. (ISDTB-2018-02)
- NFPA 13 – Standard for the Installation of Sprinkler Systems National Fire Protection Association, 2016. (NFPA Standards)
- Geotechnical Investigation Paterson Group Inc., PG3736-1, January 9, 2017. (Geotechnical Report)

1.3 Consultation and Permits

1.3.1 Pre-consultation Meetings

A pre-consultation meeting was held with representatives from the city and the consultant design team for Phase 1 of the 1354 & 1376 Carling Avenue development (David Schaffer Engineering Ltd.) on February 21, 2017. The full comments regarding site servicing and stormwater management requirements can be found in **Appendix F**.

1.3.2 Adherence to Zoning and Related Requirements

The site is currently zoned AM10 – Arterial Mainstreet Zone.

1.4 Available Existing Infrastructure

Sewer and watermain mapping collected from the City of Ottawa, and related documentation pertaining to the development of phase two, indicate that the following infrastructure exists in and surrounding the subject site.

Carling Avenue

- 2100mm diameter concrete storm trunk
- 1800mm diameter concrete storm trunk
- 900mm diameter concrete sanitary trunk
- 400mm diameter PVC watermain

Thames Street

- 600mm diameter concrete storm sewer
- 300mm diameter PVC sanitary sewer
- 200mm diameter PVC watermain

Archibald Street

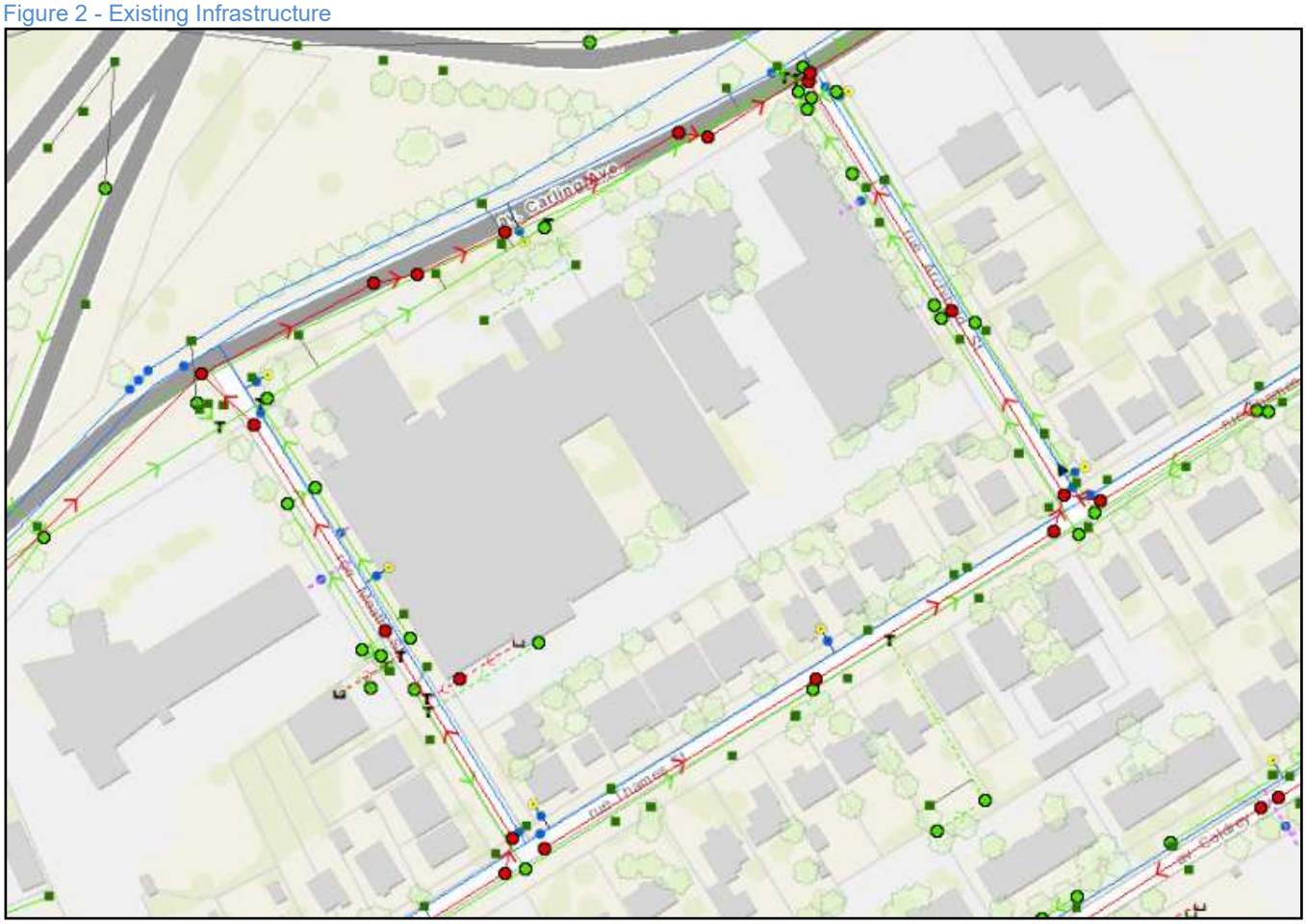
- 900mm diameter concrete storm sewer
- 675mm diameter concrete storm sewer
- 225mm diameter concrete sanitary sewer
- 150mm diameter UCI watermain

Meath Street

- 300mm diameter concrete storm sewer
- 400mm diameter PVC storm sewer
- 525mm diameter PVC storm sewer
- 300mm diameter concrete sanitary sewer
- 200mm diameter PVC watermain

Corresponding structures and services can be found in **Figure 2.**

Figure 2 - Existing Infrastructure



Existing infrastructure and utilities are shown in detail on Plan C901 found in **Appendix A.**

2 Geotechnical Study

A Geotechnical Investigation was undertaken by Paterson Group and is documented as Report PG3736-1 Revision 2, September 14, 2017.

The investigation determined the conditions of the subsoil and groundwater through boreholes and provided recommendations to the design based off the geotechnical information gathered.

Thirteen boreholes were drilled to a maximum depth of 10m below the existing ground surface. The subsurface profile at the borehole locations within the area of the investigation consist of an asphalt and granular road pavement structure overlying stiff silty clay. A layer of glacial till was encountered beneath the clay deposits. Contained within the glacial till deposits exists grey silty clay to sandy silt with gravel, cobbles and boulders.

A supplementary investigation was carried out which consisted of five boreholes drilled to a maximum depth of 15m below the existing ground surface. The supplementary investigation showed similar characteristics to the first thirteen boreholes but allowing the borehole the gather information about the bedrock profile. A Rock Quality Designation (RQD) value was calculated for each drilled section of bedrock. Based on geological mapping, the proposed site is located in an area where evidence of limestone and dolomite make up the bedrock profile ranging from 5m to 15m.

Groundwater was measured in the monitoring wells that were installed during the geotechnical investigation. After data collection of groundwater levels, the long-term groundwater level should be expected at a 4m depth.

Recommendations regarding the installation of water and sewer services provided in the geotechnical report will be incorporated into the contract specifications.

3 Water Services

3.1 Design Criteria

The water service is designed in accordance with the 2010 City of Ottawa Water Design Guidelines (including Technical Bulletins) as well as MOE Design Guidelines for Drinking Water Systems. The proposed development lies within the City of Ottawa 2W pressure zone as shown by the Pressure Zone map in **Appendix B**.

The required domestic water demand and pressure design parameters for the new building have been calculated based on the criteria summarized in **Table 1**:

Table 1– Summary of Water Demand Parameters

Design Parameter	Value
Average Daily Demand - Residential	350 L/person/day[1]
Average Daily Demand – Commercial	28000 L/gross ha/d[1]
Max. Daily Peaking Factor - Residential	2.5 x Average Daily[2]
Max. Daily Peaking Factor - Commercial	1.5 x Average Daily[2]
Max. Hourly Peaking Factor - Residential	2.2 x Maximum Daily[2]
Max. Hourly Peaking Factor - Commercial	1.8 x Average Daily[2]
Minimum Depth of Cover	2.4m from top of watermain to finished grade
Desired pressure range during normal operating conditions	350kPa and 480kPa
Min. pressure during normal operating conditions	275kPa
Max. pressure during normal operating conditions	552kPa
Min. pressure during maximum hourly demand	276kPa
Min. pressure during maximum daily demand + fire flow	140kPa

[1] Daily average based on Appendix 4-A from Water Supply Guidelines
[2] Residential Max. Daily and Max. Hourly peaking factors City of Ottawa Water Distribution Guidelines, 2010, Table 4.1

Required Fire Flows (RFF) were calculated for each building in accordance with the Fire Underwriters Survey method (1999 – as clarified by City Technical Bulletin ISTB 2018-02), and are summarized in **Table 2**:

Table 2– Required Fire Flow

Building	Required Fire Flow (L/min)	Required Fire Flow (L/sec)
A	17000	283
B	16000	267
D	13000	217

Table 3 summarizes the water demand/fire flow for the development based on the Ottawa Design Guidelines (2010 - including Technical Bulletins):

Table 3– Summary of Water Demand Calculations

Design Parameter	Water Demand (L/s)
Average Daily Demand	3.82 (5.51 m^3/d)
Maximum Daily Demand	9.52
Maximum Hourly Demand	20.90
Fire Flow (for Building with highest RFF)	283
Total Max Daily Demand + Fire Flow	293

Domestic and fire flow calculations are provided in **Appendix B**.

3.2 Adequacy of Supply for Domestic and Fire Flows

The buildings will be serviced from the existing 200mm diameter Meath St. watermain. The minimum pressure in this watermain under the Max Day Demand + fire, Maximum Hourly, and Max day scenarios have been determined based on boundary conditions received from the City of Ottawa. A copy of the correspondence and boundary conditions is provided in **Appendix G.**

A 200mm diameter water service connection to the existing watermain on Meath St. has been determined to meet applicable requirements.

A summary of the demands and performance of the proposed 200mm diameter water service is provided in **Table 3**.

Table 4– Summary of Water Servicing Design Parameters/Calculation Results

	Scenario			Source of Data
	Max Day + Fire	**Max Hourly**	**Average Day**	
Flow Demand (L/s)	292.84	20.90	9.51	Calculated for 1354 Carling Ave
Boundary Condition: Available Pressure under Future Conditions (kPa)	426.79	497.40	593.50	Provided by City of Ottawa for 200mm Watermain[1]
Residual Pressure at Service Tee including pipe losses (200mm diameter pipe) (kPa)	395.37	496.87	497.06	Calculated for Phase 2
Minimum Allowable Pressure (kPa)	140	276	275	City of Ottawa Water Design Guidelines

[5] The City of Ottawa Boundary Conditions for 200mm water service assumed to be connected to proposed 200mm water main. Boundary conditions collected as part of phase 1, 2 and ultimate conditions by DSEL.

The number of available fire hydrants within proximity of the buildings was analyzed in accordance with Technical Bulletin ISTB-2018-02 dated March 21, 2018, Appendix I. The following table demonstrates that the fire flow (calculated by the FUS method) can be provided by hydrants within 150m of the building.

Table 5 – Availability of Fire Flow from Hydrants

Building	Required Fire Flow (L/min)	Fire Hydrant(s) within 75m	Fire Hydrant(s) within 150m	Combined Available Fire Flow (L/min.)
A	17,000	3	2	24,700
B	16,000	3	1	20,900
D	13,000	4	3	34,200
[1]Refer to Fire Underwriters Survey Calculations in appendix B.				

Based on the boundary conditions provided by the City of Ottawa, sufficient supply is available for fire flow. A certified fire protection system specialist will need to be employed to design the building fire suppression system and confirm the actual fire flow demand.

3.3 Check of High Pressures

The site is within Pressure Zone Carlington 2W, which operates at a maximum head of 131 m (City of Ottawa Water Master Plan, 2013 Table 2-2). At the finished ground elevation of minimum 74.0m, this results in a maximum static head of 57m, equivalent to a pressure of 559 kPa. This slightly exceeds the maximum pressure range indicated in **Table 1**. Furthermore, the residual pressure under average day conditions (**Table 4**) also exceeds the desired pressure range under normal operating conditions. It is therefore recommended that a pressure reducing valve (PRV) be installed within the water entry room.

3.4 Reliability Requirements

Because the average daily demand is equal to 330.48 m^3/d and exceeds 50 m^3/d, dual service connections are required to avoid creation of a vulnerable service area. A new valve will be required on the existing watermain between the two connections.

3.5 Summary and Conclusions

The proposed phase 2 development will be serviced by an existing 200mm diameter water service connected to the existing 200mm diameter watermain in Meath St.

4 Sanitary Servicing

4.1 Background and Existing Infrastructure

The sanitary service design is in accordance with the 2012 Ottawa City Sewer Design Guidelines. The site will be serviced by the existing 300mm sanitary sewer in Meath St.

The subject site lies within the Cave Creek Collector Sewer catchment area, as shown by the trunk sewer mapping included in Appendix C. Based on the pre-consultation meeting with the City of Ottawa, 1354 and 1376 Carling Avenue are currently serviced by an existing 300 mm diameter sanitary sewer within Meath Street.

4.2 Review of Ground Water and Soil Conditions

Recommendations regarding the installation of piped services that are provided in the geotechnical report will be incorporated into the contract specifications. Based off the Paterson Group Geotechnical Report, groundwater infiltration into excavations during pipe installation should be low to moderate.

4.3 Proposed Servicing and Calculations

The proposed development will require a new 200mm diameter PVC sanitary service. The new 200mm diameter PVC sanitary service will connect to a new proposed 1200mm sanitary manhole, connecting

to the existing 300mm diameter sanitary sewer in Meath St. The 300mm diameter concrete sewer in Meath St was installed in 2016. The sanitary servicing design parameters are summarized in **Table 6**.

Table 6– Summarization of Sanitary Servicing Design Parameters

Design Parameter	Value
Gross Area	1.03 ha
Residential Average Flow	280 L/person/day
Residential Peaking Factor	3.82
Commercial Average Flow	28,000 L/ha/day
Commercial Peaking Factor	1.0
Infiltration and Inflow Allowance	0.33 L/ha/s
Sanitary Sewer Sizing Based on the Manning's Equation	$Q = \frac{1}{n}\pi A \mathrm{R}^{2/3} S^{1/2}$
Manning's Coefficient 'n'	0.013
Minimum Depth of Cover	2.5m from obvert of sewer to grade
Minimum Full Flowing Velocity	0.6m/s
Maximum Full Flowing Velocity	3.0m/s
Note: As per Sections 4 and 6 of the City of Ottawa Sewer Design Guidelines, October 2012 incl. all Tech. Bulletins as of November 2019. Residential Peaking Factor based on Harmon's Equation.	

The proposed development will produce a sanitary flow of 11.9 L/s as calculated by the occupancy-based calculation. The proposed 200mm PVC service lateral (at 2.0% slope) has a maximum capacity of 46.0 L/s. This is sufficient for the calculated sanitary flow.

4.4 Capacity of Receiving Sewer

The servicing and stormwater management report for Phase 1 of the development prepared by David Schaffer Engineering Ltd. included an analysis of the local municipal sanitary sewers located across the frontage of the site. An extract from this report can be found in **Appendix C.** Based on the sanitary analysis, the controlling section of the Meath Street sanitary sewer is located between Node 1B and 1D with an available residual capacity of 57.1 L/s; detailed calculations are included in **Appendix C.**

4.5 Summary and Conclusions

The proposed development will be serviced by a 200mm diameter PVC sanitary service that has been determined to meet all required servicing constraints and associated design criteria/requirements.

Site servicing calculations and a summary of the estimated peak wastewater flow can be found in **Appendix C**.

5 Storm Servicing and Stormwater Management

5.1 Background

Stormwater flow patterns show existing drainage towards Meath St along the southern laneway behind the existing Travelodge Hotel.

The City of Ottawa's Sewer Design Guidelines require the 100-year post-development storm flow to be restricted to the 5-year pre-development runoff with an assumed pre-development coefficient no greater than 0.5.

For the proposed development, quantity control meeting the City of Ottawa requirements is proposed to be provided through the use of on-site detention. Flow control is to be provided by a stormwater tank with a design storage derived from the 100-year allowable release rate

An existing trunk sewer located on Carling Ave currently receives water runoff from the existing site and will be the main sewer that collects water runoff from the new developed stormwater management system that is proposed.

5.2 Storm Servicing Strategy including Analysis of Existing Infrastructure

The stormwater management design has been completed by restricting the 100-year post-development flow to the 5-year pre-development runoff (calculated at a pre-development runoff coefficient of 0.5) to meet the capacity of downstream sewers. The 100-year flow will be detained on site. The required underground storage volume has been calculated using the Modified Rational Method.

5.3 Proposed Storm Servicing

Proposed storm servicing is indicated on Drawing C001 in **Appendix A**. The proposed pre-development and post-development catchment areas, runoff coefficients and catchment total areas are indicated on the Drainage Area Plans, also in **Appendix A**.

5.3.1 Design Criteria (Minor and Major Systems)

For the design of stormwater management (SWM), the City of Ottawa's criteria for a Commercial/ Institutional/ Industrial development in an existing area will be applied (Section 8.3.7.3 of the City of Ottawa Sewer Design Guidelines), except where modified as described in the following summary of the City's key SWM requirements:

- On-site SWM measures required to avoid impact on downstream system (i.e. existing storm sewers).
- Runoff to be controlled to the 5-year pre-development level.
- Pre-development flow to be calculated using the smaller of a runoff coefficient of 0.5 or the actual existing runoff coefficient. Use either a T_c of 20 minutes or calculated the pre-development T_c but not less than 10 minutes.
- All flow depths must be controlled on-site (i.e. no spill to adjacent properties or rights-of-way for flows up to the 100-year event).

Key drainage design requirements from the City of Ottawa Sewer Design Guidelines include:

- The minor system (underground storm sewers) is designed to capture the 5-year event (minimum). Inlet Control Devices should be utilized to minimize surcharging during the 100-year event.
- The minor system is designed to convey the 5-year event, with the hydraulic grade line (HGL) below the crown of the pipe (except where impacted by boundary conditions – in which case the HGL shall not exceed 0.3m below the underside of the footings during the 100-year event).

- For events greater than the 100 year return period, spillage should not be directed to neighbouring private property.

- The site grading ensures that the property being developed is higher than the spill elevation of the adjacent municipal ROW. This is considered especially critical if underground parking is being proposed. The grading ensures sufficient positive drainage away from the building, with a minimum slope from the building to the street of 2% and building openings a minimum of 0.3m above the 100-year ponding level. If reduced lot grading is considered for an increase in travel time and infiltration, the 2% minimum grade is still maintained for at least 4m from the building.

- The maximum water depth on streets (public, private and parking lots), static or dynamic, is 350 mm.

- Where underground storage is utilized, the design must ensure that backwater from the downstream system does not impact the required storage.

In addition to the City of Ottawa's guidelines, requirements for storm water quality control have been considered. The Rideau Valley Conservation Authority (RVCA) was contacted for input, and confirmed that stormwater quality control is not required for this site. Correspondence with the RVCA is provided in **Appendix F.**

5.3.2 Stormwater Quantity Control

5.3.2.1 Runoff Coefficient and Peak Flows

Table 7 indicates the runoff coefficient for each catchment. The 100-year runoff coefficients include a 25% increase (to a maximum of 1.0) as required by the City of Ottawa Sewer Design Guidelines Section 5.4.5.2.1.

Table 7– Pre-development Runoff Coefficients (development area)

	Pre-Development Runoff Coefficients	
Storm Event	**5-Year Storm**	**100-Year Storm**
Areas Description	**Existing**	**Existing**
Site Area (in ha)	1.01	1.01
Runoff Coefficient	0.79	0.99

Intensity (i) is calculated using the formula:

$$i = \frac{A}{(T_d + C)^B}$$

Where A, B and C are all factors of the IDF Return Period, T_d being the time of concentration and A the drainage area (Detailed calculations provided in **Appendix D**).

Time of concentration is determined using the inlet time graph (Appendix 5D Ottawa City Sewer Design Guidelines) which results in a value of 10 minutes. With the pre and post-development runoff coefficients and rainfall intensity, the peak flows for each drainage area can be calculated using the Rational Method. The results (using actual runoff coefficients) are summarized in **Table 8**.

Table 8– Pre-Development Peak Flows

	Pre-Development Peak Flows (actual runoff coefficients)			
Return Period (Years)	**Intensity, I (mm/hr)**	**Area (ha)**	**Runoff Coefficient, R (Note 1)**	**Runoff Rate, Q (L/s)**
2	90.7	1.01	0.79	170.3
5	123.3	1.01	0.79	231.0
100	211.7	1.01	0.99	494.8
Note 1: For 100-year event, Runoff Coefficient is increased by 25% to a maximum of 1.0.				

To calculate the allowable release rate, the following criteria are applied:

Return Period	5	year
Maximum Runoff Coefficient	0.5	
Time of Concentration	10	Minutes

Table 9– Allowable Release Rate

Return Period (Years)	**Intensity, I (mm/hr)**	**Area (ha)**	**Runoff Coefficient, R**	**Runoff Rate, Q (L/s)**
5	104.2	1.04	0.50	145.7

The allowable release rate for the site has been calculated to be 145.7 L/s.

The project will result in the existing area being partially covered with impervious surfaces. The post-development runoff coefficients are indicated in **Table 10**:

Table 10– Overall Post-Development Runoff Coefficients

	Overall Post-Development Runoff Coefficients	
Storm Event	**5-Year Storm**	**100-Year Storm**
Areas Description	**Proposed Phase 2 site**	**Proposed Phase 2 site**
Project Area (in ha)	1.01	1.01
Weighted Runoff Coefficient	**0.86**	**0.96**

5.3.2.2 Stormwater Management Concept

Uncontrolled Drainage Areas

Due to the existing building elevation of the heritage pavilion and the existing elevations at the site limits on Meath St, a portion of the development will be uncontrolled. The runoff from the section is overland to the west, draining to existing curb inlet catch basins on Meath St. Approximately 62 m^2 west of Building A will be unattenuated. The unattenuated section north of Buildings A and B is comprised of 880 m^2 of concrete sidewalk and grass with positive drainage away from the building. The existing elevations along Carling Ave will direct stormwater runoff to two proposed catch basins.

Table 11 provides a summary of the characteristics of the uncontrolled areas.

Table 11– Post-Development Uncontrolled Release

	Post-Development Uncontrolled Release	
Storm Event	**5-Year Storm**	**100-Year Storm**
Drainage area (ha)	0.095	0.095
Runoff Coefficient	0.40	0.50
Peak Flow (L/s)	11.0	23.7

The allowable release rate is therefore calculated to be **122.0 L/s**, by subtracting the peak flow from the uncontrolled areas from the pre-development allowable release rate that was calculated to be 145.7 L/s.

Controlled Drainage Areas

The drainage from the controlled areas will all be captured and directed to an underground storage tank located below the proposed multi-storey development plaza within the parking garage structure.

The drainage from the building roofs will be captured and outlet to the SWM system via roof drains (by others). Approximately 40% of the proposed developed gross area is covered by building roof overhangs.

The landscaped/pedestrian path areas surrounding the proposed development will be captured via mechanical drains (by others) and directed to the underground tank. Lastly, a series of mechanical drains captures water runoff along the asphalt access/egress routes and directed to the underground storage tank.

Stormwater will outlet from the tank to the existing 400mm sewer on Meath St and will be controlled to the allowable release rate using and ICD. As indicated by the proposed storage calculations, the required underground storage for the tank is 260m³. This will be provided using a cistern to be designed by the Mechanical Engineer and installed in the underground parking garage under the site.

The tank is designed such that the tank volume is based on the 100-year storm event, and therefore the 100-year is approximately at the top of the tank. A summary of the SWM results is provided in **Appendix D**.

Summary

Table 12 summarizes the proposed release rates and confirms that the total release rate does not exceed the allowable release rate.

Table 12 – Post-Development Controlled Peak Flows

	Post-Development Controlled Peak Flows (L/s)
Allowable Release Rate	145.7
Release Rate from Uncontrolled Drainage Areas	23.7
Release Rate from Controlled Drainage Areas	122.0

5.3.2.3 Impact on Existing Stormwater Infrastructure

Overall runoff from the site to the storm sewers will be significantly reduced by the proposed development:

Table 13 – Pre-Development Peak Flows vs. Post-Development Controlled Peak Flows

	Pre-Development Peak Flow	Post-Development Controlled Peak Flow
Storm Event	**5-Year Storm**	**5-Year Storm**
Total runoff (L/s)	231.0	122.0

Design calculations for the new storm service are provided in **Appendix D**.

5.3.3 Storm Water Quality Control

It was confirmed that the RVCA does not require quality control for this project. Correspondence is provided in **Appendix F**.

5.3.4 Pre-Consultation with the Ontario Ministry of the Environment and Conservation and Parks, and Conservation Authority

The Ministry of Environment, Conservation and Parks (MECP) was contacted for input and confirmed that an ECA is not required for the site. Correspondence is provided in **Appendix F**.

5.3.5 Minor and Major Systems

The minor storm servicing system consists of the sewers described above, and as indicated on the design drawings provided in **Appendix A**.

The major system consists of overland flow to Carling Avenue and Meath St. To the extent possible, the site will be graded to accommodate unattenuated storm runoff. Proposed grades will be based off existing topography that surrounds the proposed site development, and elevations set forth for phase one construction.

5.3.6 Impacts to Receiving Watercourses

No negative impacts to receiving watercourses are anticipated.

5.3.7 100 Year Flood Levels and Major Flow Routing

The site is not within a 100-year floodplain.

5.4 Grading

The proposed grading plan is shown in Drawing C002 in **Appendix A**. The development will be tied into the existing grades on Meath St, Carling Ave, the existing easement along the southern project limits, and match line to Phase 1.

5.5 Erosion and Sediment Control

As described in the servicing guidelines, an erosion and sediment control plan is required for implementation during the construction phase. To minimize the migration of sediments, measures such

as silt fencing and sediment capture devices for catch-basins and mechanical drains downstream of the site and around the building are to be installed to capture and retain sediment. Additionally, all stockpiles are to be covered.

During construction, all erosion control features shall be maintained and repaired as necessary and adjacent roadways kept free of construction debris and sediment this responsibility falls under the prevue of the Contractor.

Refer to **Appendix A** for a copy of the proposed erosion and sediment control plan.

6 Conclusions

In conclusion the proposed development meets all required servicing constraints and associated design criteria/requirements as well as the additional City of Ottawa requirements identified in the pre-consultation phase. It is recommended that this report be submitted to the City of Ottawa in support of the application for site plan approval.

Sincerely,

Morrison Hershfield Limited

James Fookes, P.Eng., C.Eng.
Senior Municipal Engineer

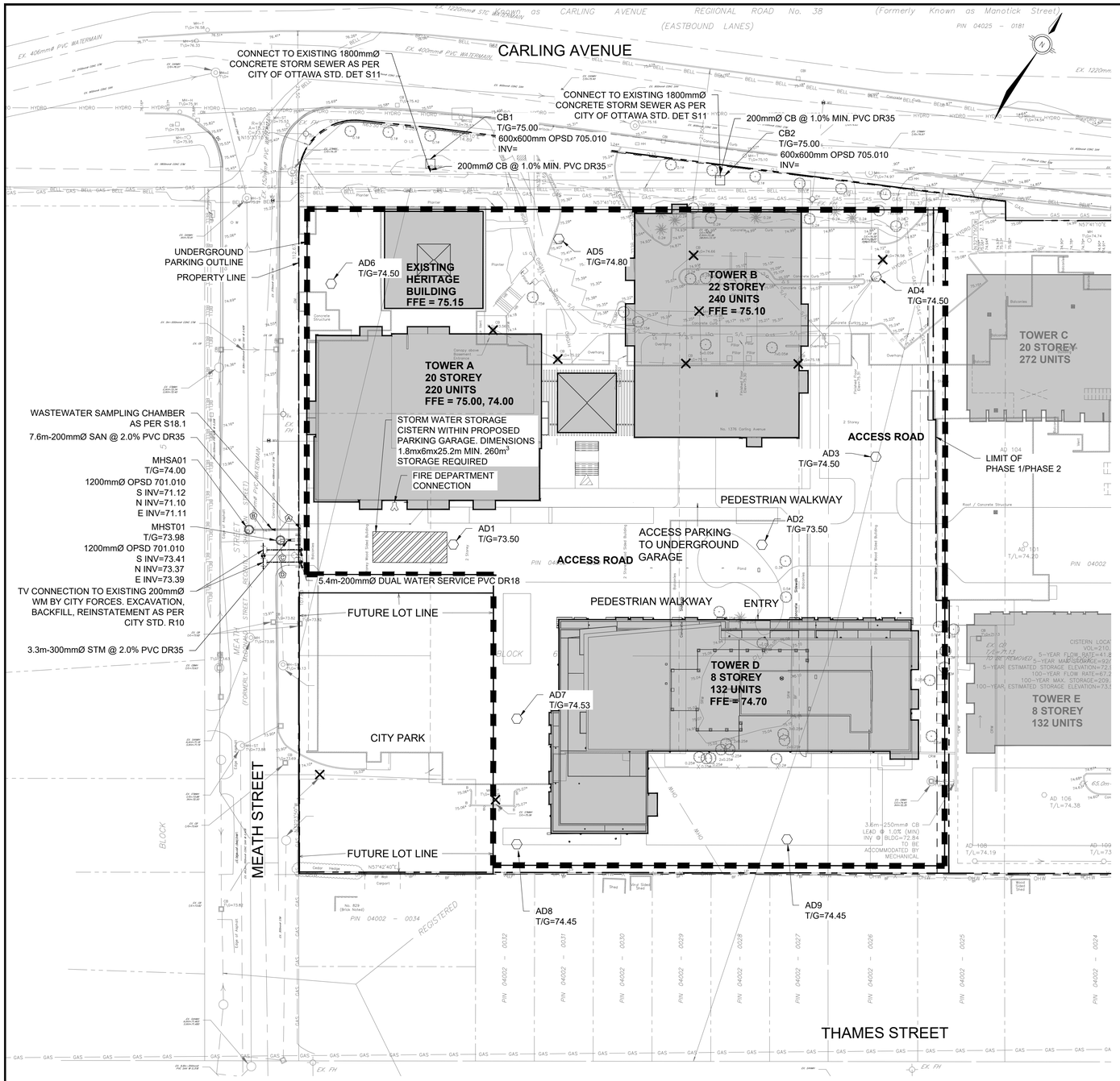
Dillon O'Neil, EIT
Municipal Engineer-in-Training

7 Appendices

Appendix A Site Servicing, Grading and Erosion and Sediment Control, Drainage Area Plans
Appendix B Water Demand and FUS Calculations
Appendix C Sanitary Flow Calculations
Appendix D Storm Sewer Design Calculations
Appendix E Topographic Survey
Appendix F Regulatory Correspondence
Appendix G Non-Regulatory Correspondence
Appendix H Checklist

Appendix A

Site Servicing, Grading, Erosion and Sediment Control, Catchments Plans and Details



PIPE CROSSING TABLE				
CROSSING	LOWER PIPE	HIGHER PIPE	CLEARANCE	SURFACE ELEVATION
A	200mmØ SAN OBV=71.40	406mmØ STM INV=73.41	2.01m±*	74.01m
B	152mmØ WM OBV=70.66	200mmØ STM INV=71.16	0.50m±**	74.01m
C	150mmØ WM OBV=73.00	406mmØ STM INV=73.51	0.51m±**	73.98m
D	150mmØ WM OBV=73.00	406mmØ STM INV=73.51	051m±**	73.97m

NOTE :
* PIPE CROSSING AS PER CITY STANDARD S10.
** PIPE CROSSING AS PER CITY STANDARD W25.

NOTES:

GENERAL

1. COORDINATES ARE IN MTM ZONE 9 (76°30' WEST LONGITUDE) NAD-83 (ORIGINAL)
2. OBTAIN ALL NECESSARY PERMITS AND APPROVALS FROM THE CITY OF OTTAWA PRIOR TO STARTING CONSTRUCTION
3. SERVICES ARE TO BE CONSTRUCTED TO 2.0m FROM FACE OF BUILDING.
4. REFER TO "FUNCTIONAL SITE SERVICING AND STORMWATER MANAGEMENT DESIGN BRIEF, 1354 AND 1376 CARLING AVENUE DEVELOPMENT - PHASE 2" PREPARED BY MORRISON HERSHFIELD FOR SITE SERVICING REPORT
5. REFER TO GEOTECHNICAL INVESTIGATION REPORT (NO. PG3736-1 DATED APRIL 12, 2018) PREPARED BY PATERSON GROUP FOR SUBSURFACE CONDITIONS, CONSTRUCTION RECOMMENDATIONS AND GEOTECHNICAL INSPECTION REQUIREMENTS. THE GEOTECHNICAL CONSULTANT SHALL REVIEW EXCAVATIONS PRIOR TO THE PLACEMENT OF GRANULAR MATERIAL.
6. CONTRACTOR TO VERIFY ALL EXISTING UTILITY ELEVATIONS AT CONNECTION AND CROSSING LOCATIONS PRIOR TO CONSTRUCTION AND ADVISE THE ENGINEER OF ANY DISCREPANCIES.
7. UNLESS DIRECTED OTHERWISE ANY DAMAGED ASPHALT OR CURB (REGARDLESS OF WHETHER WITHIN OR EXTERNAL TO THE SITE) SHALL BE REINSTATED IN ACCORDANCE WITH CITY STD. DET. R10 AND S1.
8. UNLESS DIRECTED OTHERWISE THE CONTRACTOR SHALL REINSTATE ALL SIGNS, LIGHTING AND OTHER STREET FURNITURE DISTURBED BY THE WORK.
9. THE CONTRACTOR SHALL DEVELOP AND IMPLEMENT TRAFFIC MANAGEMENT PLANS FOR WORK IN RIGHT OF WAY IN ACCORDANCE WITH OTM BOOK 7.
10. CLAY SEALS SHALL BE IN ACCORDANCE WITH CITY OF OTTAWA STANDARD DETAIL S8 AND SHALL BE INSTALLED AT 50m INTERVALS IN ALL PIPE TRENCHES. CLAY SEAL TO EXTEND FULL TRENCH WIDTH AND FROM BOTTOM OF TRENCH EXCAVATION TO UNDERSIDE OF ROAD STRUCTURE, WITH A MINIMUM THICKNESS OF 1m ALONG PIPE.
11. LOCATE AND CAP ANY EXISTING STORM, SANITARY AND WATER SERVICES AT THE PROPERTY LINE. ABANDON EXISTING SERVICES WITHIN THE R.O.W. PER STANDARD CITY OF OTTAWA DETAIL S11.4. (TYPICAL)
12. SUBMIT SHOP DRAWINGS FOR APPROVAL FOR ALL PRECAST STRUCTURE, GRATES & COVERS, TRENCH DRAINS.

SEWERS

13. ALL STORM SEWERS, SANITARY SEWERS AND CATCH BASINS LEADS SHALL BE PVC DR 35 UNLESS OTHERWISE SPECIFIED.
14. REFER TO APPROPRIATE CITY STANDARD DETAILS FOR SEWER INSTALLATION.
22. ALL SEWER MATERIALS AND CONSTRUCTION METHODS SHALL BE IN ACCORDANCE WITH THE 2021 EDITION OF THE CITY OF OTTAWA STANDARD SPECIFICATIONS AND STANDARD DRAWINGS. PVC PIPE TO BE CLASS 150 DR18 TO LATEST EDITION OF A.W.W.A. SPECIFICATION C900 AND CSA B137.3 LATEST AMENDMENT WITH GASKETED BELL AND SPIGOT COUPLINGS.
23. MAINTENANCE HOLES AND CATCH BASIN MAINTENANCE HOLES ON STORM SEWERS LESS THAN 900mm DIAMETER SHALL BE CONSTRUCTED WITH A 300mm SUMP. BENCHING SHALL BE INSTALLED IN MAINTENANCE HOLES ON STORM SEWERS 900mm AND ABOVE.
24. STORM SEWER MAINTENANCE HOLE COVERS SHALL BE IN ACCORDANCE WITH CITY OF OTTAWA STANDARD DETAIL S24.1 ON FRAMES TO DETAIL S25.
25. CONTRACTOR SHALL MAINTAIN EXISTING SEWER FLOWS DURING CONSTRUCTION IN ACCORDANCE WITH CITY OF OTTAWA SPECIFICATIONS.
26. ALL MAINTENANCE HOLES, CATCHBASINS AND CLEANOUTS SHALL BE ADJUSTED TO POST-CONSTRUCTION GRADE.
27. CCTV INSPECTION OF ALL SEWERS SHALL BE COMPLETED AS PER CITY OF OTTAWA SPECIFICATIONS PRIOR TO THE INSTALLATION OF BASE COURSE ASPHALT.

WATERMAINS

28. ALL WATERMAIN MATERIALS AND CONSTRUCTION METHODS SHALL BE IN ACCORDANCE WITH THE 2021 EDITION OF THE CITY OF OTTAWA STANDARD SPECIFICATIONS AND STANDARD DRAWINGS. PVC PIPE TO BE CLASS 150 DR18 TO LATEST EDITION OF A.W.W.A. SPECIFICATION C900 AND CSA B137.3 LATEST AMENDMENT WITH GASKETED BELL AND SPIGOT COUPLINGS.
29. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING A WATER PERMIT AS REQUIRED FROM THE CITY OF OTTAWA, AND COMPLYING WITH ALL CITY OF OTTAWA REQUIREMENTS. THE CITY MAY REQUIRE THAT CERTAIN ACTIVITIES (E.G. VALVE OPERATION, CONNECTION OF NEW WATER SERVICE TO EXISTING WATERMAIN, DISINFECTION) BE CARRIED OUT ONLY BY CITY FORCES.
30. ALL VALVES 300mm DIAMETER AND SMALLER SHALL INCLUDE A VALVE BOX AS PER W24.
31. THE NEW WATERMAIN IS TO BE INSTALLED WITH A MINIMUM OF 2.4m COVER (INCLUDING HYDRANT LEAD). WHERE 2.4m COVER IS NOT POSSIBLE, PROVIDE INSULATION IN ACCORDANCE WITH CITY OF OTTAWA STANDARD DETAILS W22 & W23.
32. THRUST RESTRAINT SHALL BE PROVIDED BY BOTH RESTRAINING/RETAINING RINGS AND THRUST BLOCKS AT ALL DEAD END CAPS, PLUGS, VALVES, BENDS AND REDUCERS AS PER CITY OF OTTAWA STANDARD DETAILS W25.3, W25.4, W25.5 AND W25.6. ALL TEMPORARY THRUST RESTRAINTS ARE THE RESPONSIBILITY OF THE CONTRACTOR.
33. TRACER WIRE SHALL BE PROVIDED FOR ALL NEW PVC WATERMAINS IN ACCORDANCE WITH THE SPECIFICATIONS AND CITY OF OTTAWA STANDARD DETAIL W36.
34. CATHODIC PROTECTION SHALL BE PROVIDED FOR ALL NEW WATERMAINS IN ACCORDANCE WITH THE SPECIFICATIONS AND CITY OF OTTAWA STANDARD DETAILS W39, W40, W41, W42 AND W47. CATHODIC PROTECTION OF EXISTING WATERMAINS SHALL ALSO BE PROVIDED AT CONNECTIONS BETWEEN EXISTING AND NEW WATERMAINS.
35. ADJUST ALL VALVE CHAMBERS, VALVE BOXES AND HYDRANTS TO FINISHED GRADE.

UTILITY NOTE

36. THE POSITION OF POLE LINES, CONDUITS, WATERMAINS, SEWERS AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWING, AND, WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK THE CONTRACTOR SHALL INFORM HIMSELF OF THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES, AND SHALL ASSUME ALL LIABILITY FOR DAMAGE TO THEM. THE CONTRACTOR WILL BE RESPONSIBLE FOR SUPPORTING AND PROTECTING ANY EXISTING UTILITIES, AS REQUIRED, IN ACCORDANCE WITH THE UTILITY OWNERS' REQUIREMENTS. CONTRACTOR IS REQUIRED TO OBTAIN LOCATES, IN ADVANCE OF EXCAVATION WORK, AND FORWARD COPIES OF THE LOCATES TO THE CONSULTANT AND THE OWNER PRIOR TO EXCAVATION.
37. ALL CROSSING OF EX. UTILITIES TO BE IN ACCORDANCE WITH CITY STD. DET. S10

LEGEND

- NEW STORM SEWER
- NEW SANITARY SEWER
- NEW WATERMAIN
- NEW MANHOLE
- NEW CATCH BASIN
- NEW AREA DRAIN - TO BE CONNECTED TO MECHANICAL SYSTEM IN PARKING GARAGE
- NEW WATER VALVE AND VALVE BOX
- NEW FIRE HYDRANT
- NEW ENTRANCE
- NEW FIRE DEPARTMENT CONNECTION
- EXISTING MANHOLE
- EXISTING CATCH BASIN
- EXISTING WATER VALVE
- EXISTING FIRE HYDRANT
- EXISTING LIGHT STANDARD
- REMOVALS
- REDUCER
- WASTEWATER SAMPLING CHAMBER

1:400 HORIZONTAL
0m 7.5 15

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No.	YYYY-MM-DD	ISSUED
1	2021-06-16	ISSUED FOR SITE PLAN CONTROL

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STAMP
LICENSED PROFESSIONAL ENGINEER J.G. FOKKES Jun 22, 2021 PROVINCE OF ONTARIO

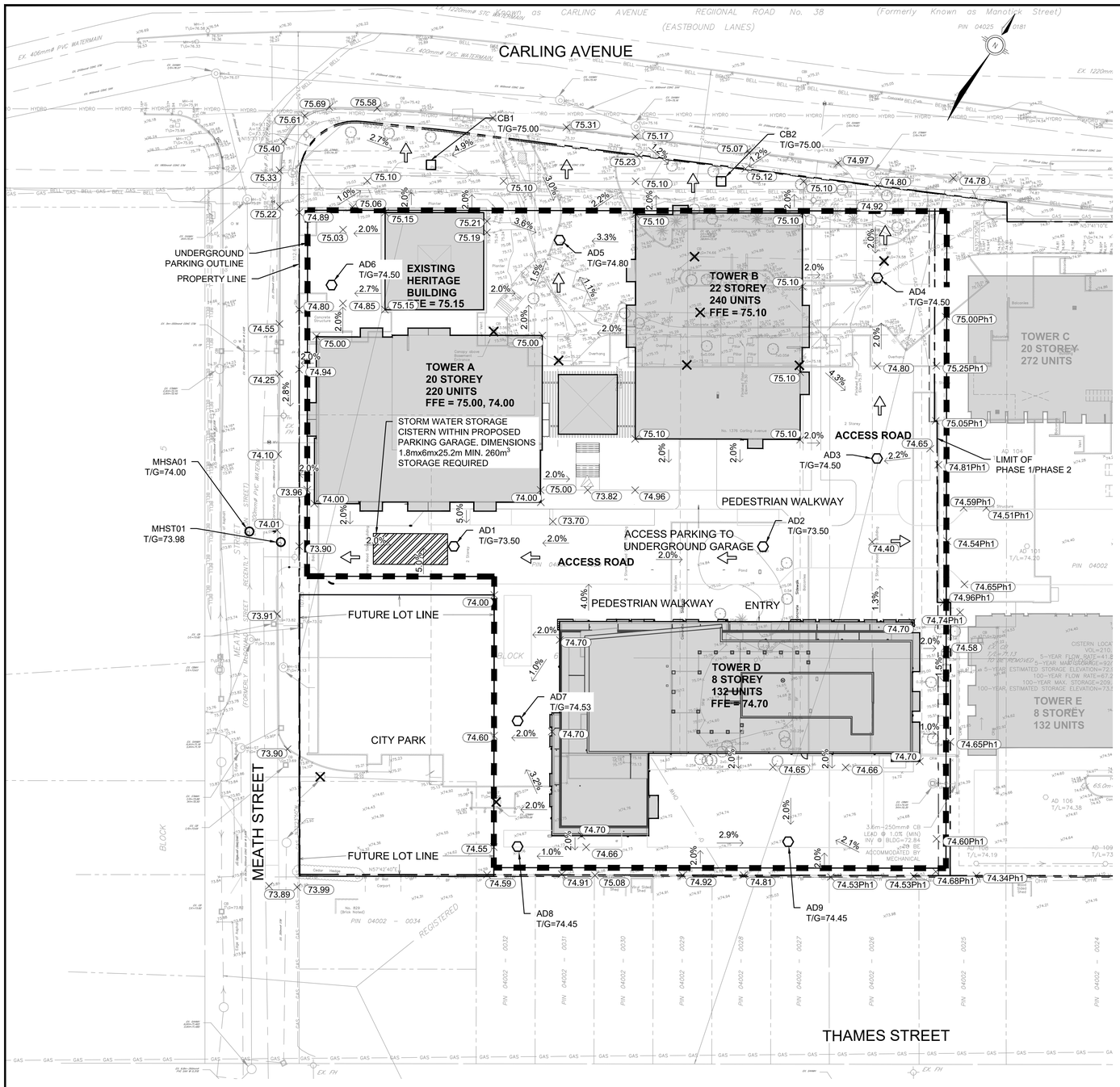
PERMIT TO PRACTICE

MORRISON HERSHFIELD
200 - 2932 Baseline Road
Ottawa, Ontario, K2H 1B1
Tel: (613) 739-2910

PROJECT
1354 & 1376 CARLING AVENUE
DEVELOPMENT - PHASE 2

DRAWING
SITE SERVICING PLAN

DESIGN	DATE	SCALE
DO	2021-06-07	1:400
DRAWN: SC	PROJECT NO.: 210292799	
CHECKED: NC	DRAWING NO: C901	VERSION
APPROVED: JF		



NOTES:

GRADING

1. ALL ELEVATIONS ARE GEODETIC.
2. REFER TO ARCHITECTURAL AND LANDSCAPE DRAWINGS FOR LAYOUT, DIMENSIONS AND SURFACE FINISHES.
3. THIS DRAWING SHALL BE READ IN CONJUNCTION WITH ALL OTHER DRAWINGS.
4. ALL ELEVATIONS BY CURBS ARE EDGE OF PAVEMENT UNLESS OTHERWISE INDICATED.
5. REFER TO GEOTECHNICAL INVESTIGATION REPORT (NO. PG3736-1 DATED APRIL 12, 2018) PREPARED BY PATERSON GROUP FOR SUBSURFACE CONDITIONS, CONSTRUCTION RECOMMENDATIONS AND GEOTECHNICAL INSPECTION REQUIREMENTS. THE GEOTECHNICAL CONSULTANT SHALL REVIEW EXCAVATIONS PRIOR TO THE PLACEMENT OF GRANULAR MATERIAL.
6. REFER TO TOPOGRAPHIC SURVEY PREPARED BY ANNIS, O'SULLIVAN, VOLLEBEKK LTD. DATED JANUARY 22, 2016.
7. REINSTATE ALL DISTURBED/DAMAGED AREAS TO THEIR ORIGINAL CONDITION OR BETTER.
8. PROVIDE POSITIVE DRAINAGE, MATCHING EXISTING OVERALL DRAINAGE PATTERN INDICATED.
9. ALL WORK AND MATERIALS SHALL BE IN ACCORDANCE WITH CITY OF OTTAWA AND/OR ONTARIO PROVINCIAL STANDARDS.
10. ALL TOPSOIL, ORGANIC OR DELETERIOUS MATERIAL MUST BE ENTIRELY REMOVED FROM BENEATH THE PROPOSED PAVED.
11. ALL AREAS SHALL DRAIN AT A MINIMUM OF 1%. ANY DISCREPANCIES PREVENTING THIS SHALL BE REPORTED TO THE ENGINEER PRIOR TO CONTINUING WORK.
12. BLEND NEW EARTHWORK INTO EXISTING, PROVIDING VERTICAL CURVES OR ROUNDING AT ALL TOP AND BOTTOM OF SLOPES.
13. ALL SIDEWALKS CONSTRUCTED IN CITY ROW. SHALL BE MONOLITHIC CONCRETE CURB AND SIDEWALK PER STD. DETAIL SC 2 UNLESS OTHERWISE INDICATED.
14. SAW CUT AND KEY GRIND ASPHALT AT ALL TIE-INS.
15. PROVIDE LINE PAINTING. (REINSTATEMENT OF EXISTING LINES WITHIN RIGHT-OF-WAY ONLY)
16. SNOW IS TO BE REMOVED FROM THE PARKING GARAGE RAMP. ON SITE SNOW STORAGE IS NOT PROPOSED FOR THIS AREA.
17. PROPOSED GRADES ALONG THE PROPERTY LIMITS ARE TO MATCH ELEVATIONS OF EXISTING TOP OF CURB.

UTILITY NOTE

18. THE POSITION OF POLE LINES, CONDUITS, WATERMAINS, SEWERS AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWING, AND, WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK THE CONTRACTOR SHALL INFORM HIMSELF OF THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES, AND SHALL ASSUME ALL LIABILITY FOR DAMAGE TO THEM. THE CONTRACTOR WILL BE RESPONSIBLE FOR SUPPORTING AND PROTECTING ANY EXISTING UTILITIES, AS REQUIRED, IN ACCORDANCE WITH THE UTILITY OWNERS' REQUIREMENTS. CONTRACTOR IS REQUIRED TO OBTAIN LOCATES, IN ADVANCE OF EXCAVATION WORK, AND FORWARD COPIES OF THE LOCATES TO THE CONSULTANT AND THE OWNER PRIOR TO EXCAVATION. HAND EXCAVATION IS REQUIRED PER UTILITY OWNERS REQUIREMENTS.

LEGEND

- NEW MANHOLE
- NEW CATCH BASIN
- NEW AREA DRAIN
- × 74.78 — PROPOSED ELEVATION
- ×74.88 — EXISTING ELEVATION
- 7.9% — PROPOSED SLOPE DIRECTION
- × 73.50T/G — PROPOSED FINISH GRADE AT TOP OF GRATE
- × 75.00Ph1 — ELEVATION FROM PHASE-1
- DIRECTION OF MAJOR OVERLAND FLOW
- PROPOSED CURB
- DC — PROPOSED DEPRESSED CURB
- PROPERTY EXTENTS
- UNDERGROUND PARKING GARAGE EXTENTS

1:400
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No.	YYYY-MM-DD	ISSUED
1	2021-06-17	ISSUED FOR SITE PLAN CONTROL

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LICENSED PROFESSIONAL ENGINEER
J.G. FOOKES
Jun 22, 2021
PROVINCE OF ONTARIO

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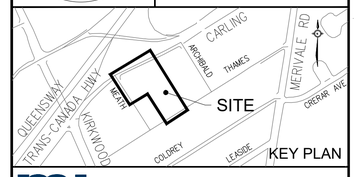

MORRISON HERSHFIELD
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Tel: (613) 739-2910

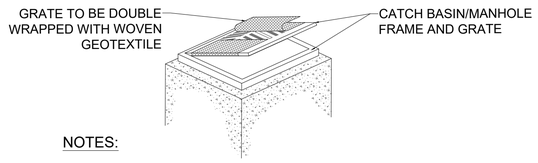
PROJECT
1354 & 1376 CARLING AVENUE
DEVELOPMENT - PHASE 2

DRAWING
GRADING PLAN

DESIGN	DATE	SCALE
DO	2021-06-07	1:400
DRAWN: SC	PROJECT NO.: 210292799	
CHECKED: NC	DRAWING NO: C902	VERSION
APPROVED: JF		

EROSION AND SEDIMENT CONTROL NOTES:

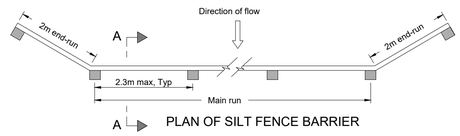
1. THE CONTRACTOR SHALL IMPLEMENT BEST MANAGEMENT PRACTICES, TO PROVIDE FOR PROTECTION OF THE AREA DRAINAGE SYSTEM AND THE RECEIVING WATERCOURSE, DURING CONSTRUCTION ACTIVITIES. THIS INCLUDES LIMITING THE AMOUNT OF EXPOSED SOIL, USING FILTER CLOTH UNDER THE GRATES OF CATCHBASINS AND MANHOLES, AND INSTALLING SILT FENCES AND OTHER EFFECTIVE SEDIMENT TRAPS. THE CONTRACTOR ACKNOWLEDGES THAT FAILURE TO IMPLEMENT APPROPRIATE EROSION AND SEDIMENT CONTROL MEASURES MAY BE SUBJECT TO PENALTIES IMPOSED BY ANY APPLICABLE REGULATORY AGENCY TO BE PAID FOR AT THE CONTRACTOR'S EXPENSE.
2. EROSION AND SEDIMENT CONTROL MEASURES ARE TO BE IMPLEMENTED PRIOR TO CONSTRUCTION AND REMAIN IN PLACE UNTIL VEGETATION IS ESTABLISHED AND APPROVAL IS GRANTED BY THE ENGINEER TO REMOVE MEASURES.
3. REGULAR INSPECTION AND MAINTENANCE OF THE EROSION AND SEDIMENT MEASURES SHALL BE UNDERTAKEN. THE IMPLEMENTATION AND ADJUSTMENT AND/OR CORRECTIVE MAINTENANCE OF THE EROSION AND SEDIMENT MEASURES IS AN INTEGRAL PART OF THE PLAN AND MUST BE PERFORMED.
4. CATCH BASIN AND AREA DRAIN SEDIMENT PROTECTION SHALL BE PROVIDED FOR ALL CATCH BASINS, CATCH BASIN MAINTENANCE HOLES, DITCH INLETS, AREA DRAINS, AND OPEN GRATE MAINTENANCE HOLES WITHIN THE WORK AREA, WITHIN 50m OF THE WORK AREA, OR WHICH RECEIVE RUN-OFF FROM THE WORK AREA. CATCH BASIN INLET PROTECTION IS REQUIRED BOTH FOR EXISTING STRUCTURES (INCLUDING STRUCTURES WHICH WILL BE REMOVED AS PART OF THE WORK) AND NEW STRUCTURES INSTALLED AS PART OF THE WORK. CATCH BASIN SEDIMENT PROTECTION SHALL INVOLVE BOTH (i) WRAPPING GRATE WITH FILTER CLOTH, AND (ii) SURROUNDING CATCH BASIN OR DRAIN WITH SEDIMENT CAPTURE FILTER SOCK. SEDIMENT CAPTURE FILTER SOCK SHALL BE STACKED (IN SOFT GROUND) OR HELD IN PLACE USING SANDBAGS (IN PAVED AREAS). CATCH BASIN SEDIMENT PROTECTION SHALL BE INSPECTED REGULARLY AND MAINTAINED AS NECESSARY. ANY VISIBLE ACCUMULATION OS SEDIMENT SHALL BE REMOVED AND DISPOSED OFF-SITE.
5. ALL SEDIMENT CONTROL MEASURES SHALL BE INSPECTED ON A REGULAR BASIS AND FOLLOWING STORM EVENTS FOR INTEGRITY AND FUNCTION BY THE CONTRACTOR. ANY REQUIRED REPAIRS TO EROSION AND SEDIMENT CONTROL MEASURES TO BE COMPLETED WITHIN 24 HOURS
6. ALL SEDIMENT CONTROL MEASURES ARE TO BE MAINTAINED BY THE CONTRACTOR AS NECESSARY. SEDIMENTS REMOVED FROM THE CONTROL MEASURES (SILT FENCES, CATCHBASIN SEDIMENT CONTROLS, ETC.) SHALL BE DISPOSED OF IN ACCORDANCE WITH MOECC GUIDELINES
7. IF NECESSARY, ADDITIONAL SEDIMENT CONTROL MEASURES MAY BE INSTALLED AS DIRECTED BY THE ENGINEER OR THE RIDEAU VALLEY CONSERVATION AUTHORITY
8. ONCE NEW CATCH BASINS AND AREA DRAINS ARE INSTALLED, GEOTEXTILE FILTER FABRIC SHALL BE PLACED AS PER NOTE 4, AND SHALL REMAIN IN PLACE UNTIL THE COMPLETION OF CONSTRUCTION ACTIVITIES.
9. CONTRACTOR IS RESPONSIBLE TO KEEP THE ROADS FREE AND CLEAN FROM MUD OR DEBRIS.



NOTES:

1. TO BE USED UNDER APPROPRIATE DRAINAGE CIRCUMSTANCES, DURING THE CONSTRUCTION PERIOD.
2. WOVEN GEOTEXTILE TO HAVE A MINIMUM EQUIVALENT OPENING, SIZE OF 0.15mm AND A MAXIMUM EQUIVALENT OPENING SIZE OF 0.25mm.
3. WOVEN GEOTEXTILE TO BE REPLACED PERIODICALLY WHEN ACCUMULATED SEDIMENTS INTERFERE WITH DRAINAGE.
4. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN.

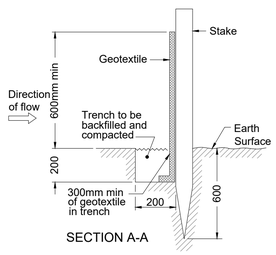
CATCH BASIN /MANHOLE PROTECTION DETAIL
N.T.S.

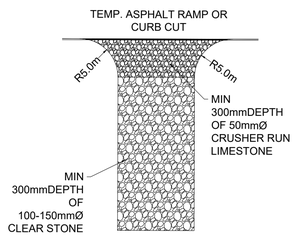


NOTES:

1. WOVEN GEOTEXTILE TO HAVE A MINIMUM EQUIVALENT OPENING, SIZE OF 0.15mm AND A MAXIMUM EQUIVALENT OPENING SIZE OF 0.25mm.
2. WOVEN GEOTEXTILE TO HAVE A HORIZONTAL OVERLAP OF 100mm AT JOINTS.
3. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN.

LIGHT DUTY SILT FENCE BARRIER
AS PER OPSD 219.110
N.T.S.





NOTES:

1. INSTALL AT ALL SITE ACCESS LOCATIONS.
2. TEMPORARY CONSTRUCTION ACCESS SHALL BE REMOVED ON COMPLETION OF THE WORK AND ALL DISTURBED AREAS SHALL BE RESTORED TO ORIGINAL OR BETTER CONDITION.

LEGEND

- NEW CATCH BASINS SEDIMENT PROTECTION (SEE NOTE 8)
- LIGHT DUTY SILT FENCE BARRIER (PER OPSD 219.110) (INSTALL AROUND ALL CONSTRUCTION AND STAGING AREAS, IN ADDITION TO SITE PERIMETER AS SHOWN)
- PROPOSED UNDERGROUND PARKING GARAGE EXTENTS
- PROPOSED AREA DRAIN SEDIMENT PROTECTION (SEE NOTE 8)

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LICENSED PROFESSIONAL ENGINEER
J.G. FOPKES
Jun 22, 2021
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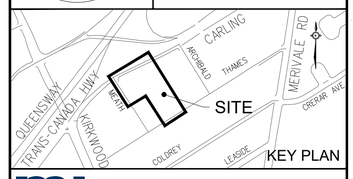

MORRISON HERSHFIELD
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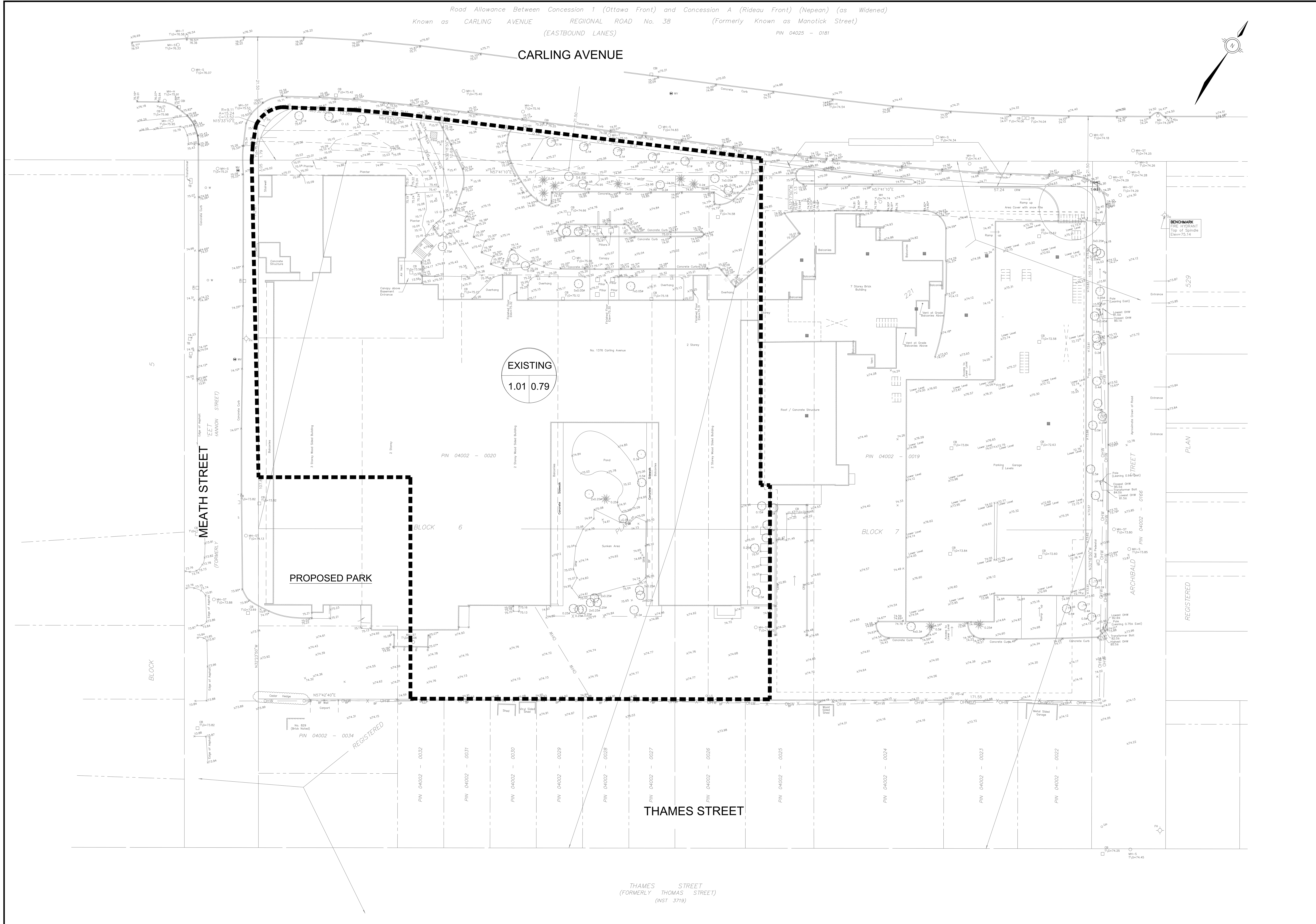
Ottawa, Ontario, K2H 1B1
Tel: (613) 739-2910

PROJECT
1354 & 1376 CARLING AVENUE
DEVELOPMENT - PHASE 2

DRAWING
EROSION AND SEDIMENT CONTROL PLAN

DESIGN	DATE	SCALE
DO	2021-06-17	1:400
DRAWN: SC	PROJECT NO.: 210292799	
CHECKED: NC	DRAWING NO: C903	VERSION
APPROVED: JF		



LEGEND

AREA ID — DRAINAGE AREA CHARACTERISTICS

RUNOFF COEFFICIENT % — AREA ha

HORIZONTAL

0m 7.5 15

PRELIMINARY
NOT FOR CONSTRUCTION

No.	YYYY-MM-DD	ISSUED
1	2021-06-17	ISSUED FOR SITE PLAN CONTROL

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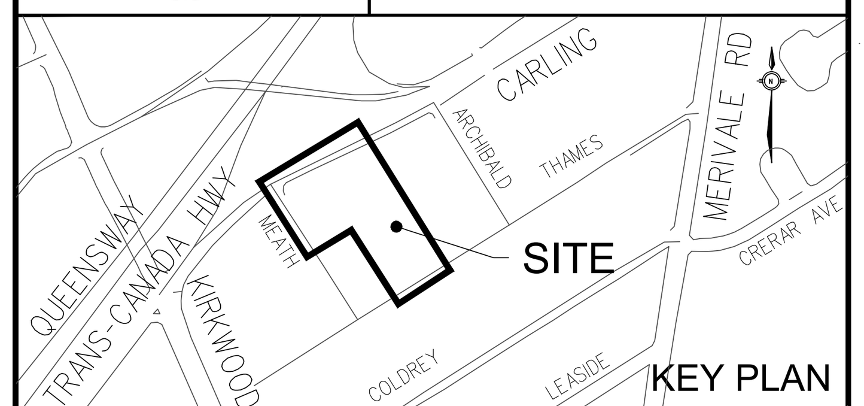

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Ottawa, Ontario, K2H 1B1
Tel: (613) 739-2910

PROJECT

1354 & 1376 CARLING AVENUE
DEVELOPMENT - PHASE 2

DRAWING

EXISTING STORM DRAINAGE AREA PLAN

DESIGN	DO	DATE	2021-06-07	SCALE	1:400
DRAWN	SC	PROJECT NO.	210292799		
CHECKED	NC	DRAWING NO	C904	VERSION	
APPROVED	JF				

HORIZONTAL
0m 7.5 15

LEGEND

AREA ID — DRAINAGE AREA CHARACTERISTICS
RUNOFF COEFFICIENT % — AREA ha

PROPOSED CATCHMENTS

PROPOSED PARKING GARAGE LIMITS

PROPERTY LIMITS

No.	YYYY-MM-DD	ISSUED
1	2021-06-17	ISSUED FOR SITE PLAN CONTROL

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LICENSED PROFESSIONAL ENGINEER
J.G. FOKKES
Jun 22, 2021
PROVINCE OF ONTARIO

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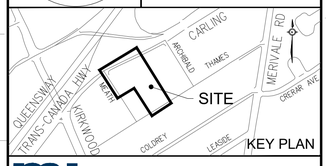


KEY PLAN

MORRISON HERSHFIELD
200 - 2932 Baseline Road
Ottawa, Ontario, K2H 1B1
Tel: (613) 739-2910

PROJECT
1354 & 1376 CARLING AVENUE
DEVELOPMENT - PHASE 2

DRAWING
PROPOSED STORM DRAINAGE AREA PLAN

DESIGN	DATE	SCALE
DO	2021-06-07	1:400
DRAWN: SC	PROJECT NO.: 210292799	
CHECKED: NC	DRAWING NO: C905	VERSION:
APPROVED: JF		

Appendix B

Water Demand and FUS Calculations

1. 1354 Carling Ave. Phase II - Water Demand Calculations

Project No.	210292700
Date	09-Jun-21
Prepared By:	D O'Neil
Checked By	J Fookes

Residential Area and Population

As per City of Ottawa Water Distrubtion Guidelines, 2010, Table 4.1

Unit Type	Person Per Unit	No. of Units	Population
Single Family	3.4		0.0
Semi-detached	2.7		0.0
Duplex	2.3		0.0
Townhouse (row)	2.7		0.0
Apartments:			
Bachelor	1.4		0.0
1 Bedroom	1.4		0.0
2 Bedroom	2.1		0.0
2 Bedroom	3.1		0.0
Average Apt.	1.8	518	932.4
		Total Population	932.4

Residential Average Daily Demand *(OWDG, Table 4.2)* = 350 L/c/day

Average Residential Daily Demand= 226.6 L/min

Max Daily Demand Peaking Factor (OWDG, Table 4.2)*= 2.5 x avg. day

Max Hour Demand Peaking Factor (OWDG, Table 4.2)*= 2.2 x max day

Max Daily Residential Demand= 566.5625 L/min

Max Hourly Residential Demand= 1246.4375 L/min

Commercial / Industrial / Institutional Area and Demand

As per City of Ottawa Water Distrubtion Guidelines, 2010, Table 4.2

Property Type	Amount	Units	Quantity	Average Flow Rate (L/min)
Other Commercial	28,000	L/gross ha/d	0.1495	2.9
			Average I/C/I Daily Demand	2.9

Property Type Commercial

Max Daily Demand Peaking Factor (OWDG, Table 4.2)= 1.50 x avg. day

Max Hourly Demand Peaking Factor (OWDG, Table 4.2)= 1.80 x max day

Max Daily I/C/I Demand= 4.36 L/min

Max Hourly I/C/I Demand= 7.85 L/min

Total Average Daily Demand=	229.5 L/min
Total Maximum Daily Demand=	570.92 L/min
Total Maximum Hourly Demand=	1254.29 L/min

2a. 1354 Carling Ave. Phase II - FUS Calculations

Project Name	Civil Servicing for Proposed Development at 1354 Carling Avenue
Project Number	210292700
Site Address	1354 Carling Ave. Ottawa, Ontario
Completed By	Dillon O'Neil
Date	9-Jun-21

(Per Fire Underwriters Survey, Water Supply for Public Fire Protection, 1999)

1. Determine Estimated Fire Flow based on Building Floor Area

F= 220 C √A

F= Required flow in litres / minute
A= Total floor area in m^2
C= Coefficient related to Construction
= 1.5 for wood frame construction
= 1.0 for ordinary construction
= 0.8 for non-combustible construction
= 0.6 for fire-resistive construction

C= 0.8

Floor Areas

Building A

Floor	Area (m²)	Floor	Area (m²)
Build	1630	L11	778
L2	1007	L12	778
L3	1007	L13	778
L4	1007	L14	778
L5	1007	L15	778
L6	1007	L16	778
L7	951	L17	778
L8	778	L18	778
L9	778	L19	778
L10	778	L20	778
Total			17730

Area excl. basement at least 50% below grade = 17730 m^2

A= 17730 m^2

F=	23435.1 L/min	
Round to nearest 1000 L/m, F =	23000.0 L/min	
	23000.0 L/min	Total

2. Adjust flow based on Fire hazard and contents

A	Non-combustible	-25%
B	Limited Combustible	-15%
C	Combustible	0%
D	Free Burning	15%
E	Rapid Burning	25%

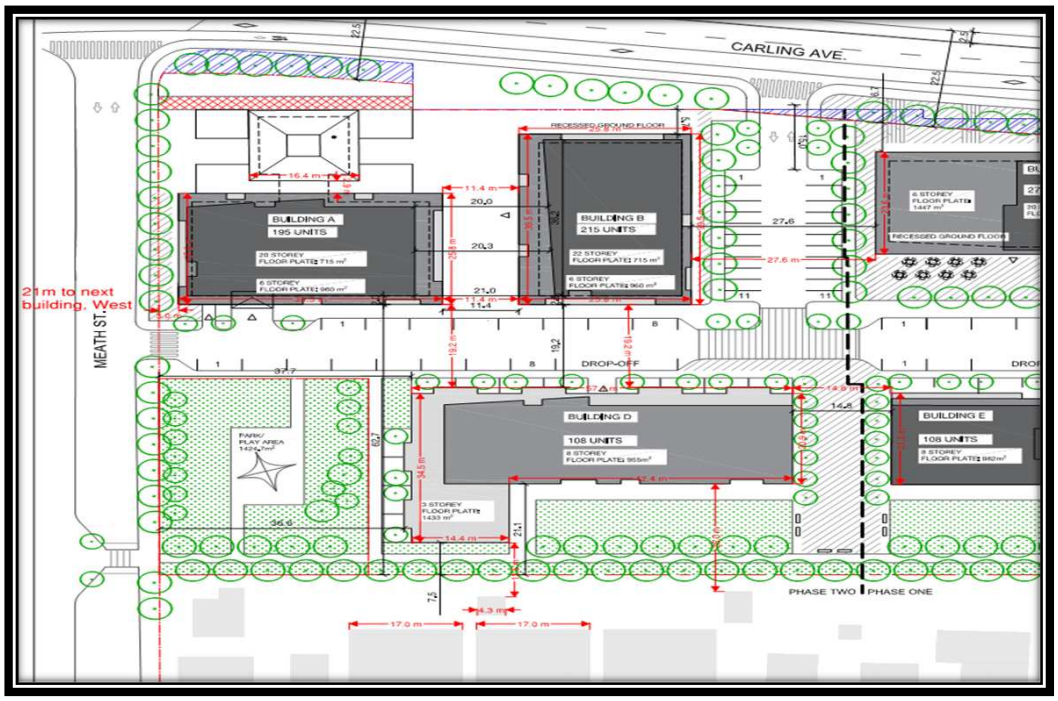
Type of Construction (A,B,C,D)	B		
Adjustment Factor	-15%		
Flow From 1.	23000.0	L/min	Building A
Adjusted Flow	19550.0	L/min	
Minimum Flow (2000 L/min)	19550.0	L/min	
Flow	19550.0	L/min	
Total flow required for Building A	19550.0	L/min	Total

3. Reduce flow from No. 2. based on automatic sprinkler protection

Flow from 2.	19550.0	L/min	
Complete Automatic Sprinkler Protection (yes/no)	Yes		
Reduction	30%		
Water supply is standard (yes/no)	Yes		
Additional Reduction	10%		
Sprinkler System is fully supervised (yes/no)	No		
Additional Reduction	0%		
Total Reduction	40%		
Flow after Sprinkler Reduction	11730.0	L/min	Building A
Total using individual approach	**11730.0**	**L/min**	

4. Adjacent Structures / Fire Separation with other buildings

Figure 1: Adjacent Buildings



Exposure charge based on Table G5:

Building A:

Side	Construction Type	Storeys	Length (m)	LH Factor
North	Block masonry, aluminum panels, windows/window wall	1	16.4	16.4
East	Block masonry, aluminum panels, windows/window wall	22	39.5	869
South	Block masonry, aluminum panels, windows/window wall	8	57.1	456.8
West	Block masonry, aluminum panels, windows/window wall	5	16.5	82.5

Building A

Side	Separation Distance (m)	Exposure Charge	LH Factor
North	2.9	16%	16.4
East	11.4	12%	869
South	19.2	12%	456.8
West	24	6%	82.5

Cumulative Increase (Max 75%)	46%	Building A	
Flow Increased for Adjacent Structures	17125.8	L/min	Building A
Maximum Permitted Flow (45 000 L/min)	17125.8	L/min	
Minimum Permitted Flow (2 000 L/min)	17125.8	L/min	
Required Fire Flow (rounded to nearest 1000 L/m)	17000.0	L/min	
	283.33	L/s	

Confirmation that required fire flow is available from hydrants within 150m of building:

Building A

Hydrant	Distance from building (m)	Class	Contribution to required fire flow (L/m)
1 (exisitng)	3.5	AA	5700
2 (existing)	32.6	AA	5700
3 (exisitng)	60	AA	5700
4 (exisitng)	91	AA	3800
5 (existing)	110	AA	3800
		Available Flow	24700

Required Flow (FUS calc) 17125.8 L/min

2b. 1354 Carling Ave. Phase II - FUS Calculations

Project Name	Civil Servicing for Proposed Development at 1354 Carling Avenue
Project Number	210292700
Site Address	1354 Carling Ave. Ottawa, Ontario
Completed By	Dillon O'Neil
Date	9-Jun-21

(Per Fire Underwriters Survey, Water Supply for Public Fire Protection, 1999)

1. Determine Estimated Fire Flow based on Building Floor Area

F= 220 C √A

F= Required flow in litres / minute
A= Total floor area in m^2
C= Coefficient related to Construction
= 1.5 for wood frame construction
= 1.0 for ordinary construction
= 0.8 for non-combustible construction
= 0.6 for fire-resistive construction

C= 0.8

Floor Areas

Building B

Floor	Area (m²)	Floor	Area (m²)
Build	1630	L12	777
L2	1007	L13	777
L3	1007	L14	777
L4	1007	L15	777
L5	1007	L16	777
L6	1007	L17	777
L7	951	L18	777
L8	777	L19	777
L9	777	L20	777
L10	777	L21	777
L11	777	L22	777
Total			19271

Area excl. basement at least 50% below grade = 19271 m^2

A= 19271 m^2

F=	24432.3 L/min	
Round to nearest 1000 L/m, F =	24000.0 L/min	
Round to nearest 1000 L/m, F =	24000.0 L/min	Building B
	24000.0 L/min	Total

2. Adjust flow based on Fire hazard and contents

A	Non-combustible	-25%
B	Limited Combustible	-15%
C	Combustible	0%
D	Free Burning	15%
E	Rapid Burning	25%

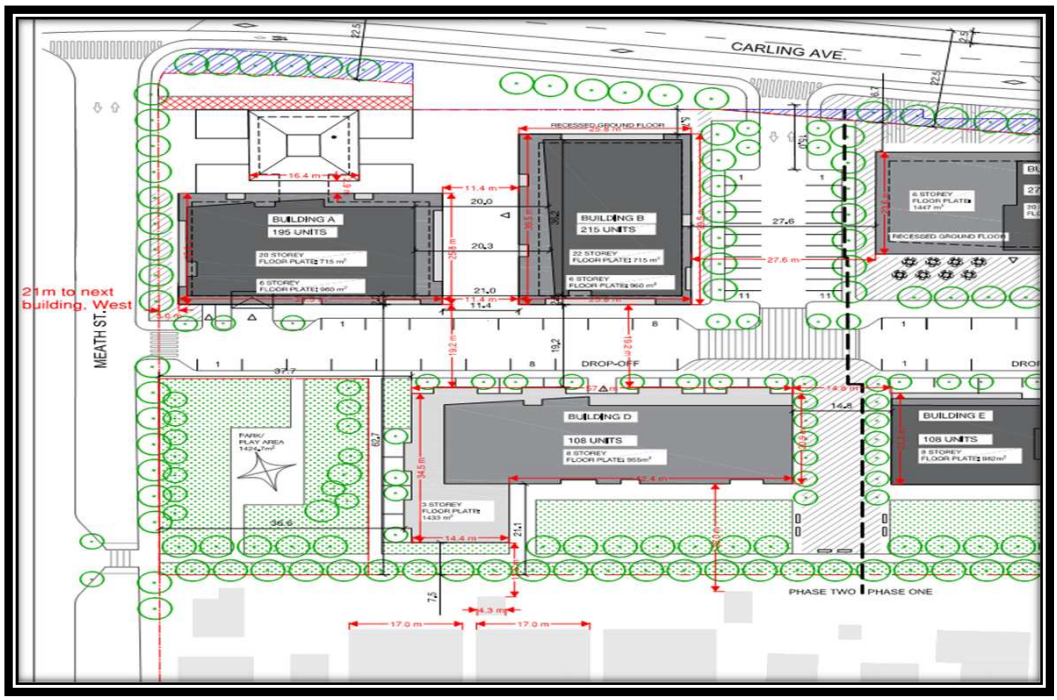
Type of Construction (A,B,C,D)	B		
Adjustment Factor	-15%		
Flow From 1.	24000.0	L/min	Building B
Adjusted Flow	20400.0	L/min	
Minimum Flow (2000 L/min)	20400.0	L/min	
Flow	20400.0	L/min	
Total flow required for Building B	20400.0	L/min	Total

3. Reduce flow from No. 2. based on automatic sprinkler protection

Flow from 2.	20400.0	L/min	
Complete Automatic Sprinkler Protection (yes/no)	Yes		
Reduction	30%		
Water supply is standard (yes/no)	Yes		
Additional Reduction	10%		
Sprinkler System is fully supervised (yes/no)	No		
Additional Reduction	0%		
Total Reduction	40%		
Flow after Sprinkler Reduction	12240.0	L/min	Building B
Total using individual approach	**12240.0**	**L/min**	

4. Adjacent Structures / Fire Separation with other buildings

Figure 1: Adjacent Buildings



Exposure charge based on Table G5:

Building B:				
Side	Construction Type	Storeys	Length (m)	LH Factor
North	Block masonry, aluminum panels, windows/window wall	-	>45m	0
East	Block masonry, aluminum panels, windows/window wall	6	23.6	141.6
South	Block masonry, aluminum panels, windows/window wall	8	57.1	456.8
West	Block masonry, aluminum panels, windows/window wall	20	25.8	516

Building B

Side	Separation Distance (m)	Exposure Charge	LH Factor
North	>45m	0%	0
East	27.6	8%	141.6
South	19.2	12%	456.8
West	11.4	12%	516

Cumulative Increase (Max 75%)	32%	Building B	
Flow Increased for Adjacent Structures	16156.8	L/min	Building B
Maximum Permitted Flow (45 000 L/min)	16156.8	L/min	
Minimum Permitted Flow (2 000 L/min)	16156.8	L/min	
Required Fire Flow (rounded to nearest 1000 L/m)	16000.0	L/min	
	266.67	L/s	

Confirmation that required fire flow is available from hydrants within 150m of building:

Building B

Hydrant	Distance from building (m)	Class	Contribution to required fire flow (L/m)
1 (exisitng)	3	AA	5700
2 (existing)	55	AA	5700
3 (exisitng)	68	AA	5700
4 (exisitng)	105	AA	3800
		Available Flow	20900

Required Flow (FUS calc) 16156.8 L/min

2c. 1354 Carling Ave. Phase II - FUS Calculations

Project Name	Civil Servicing for Proposed Development at 1354 Carling Avenue
Project Number	210292700
Site Address	1354 Carling Ave. Ottawa, Ontario
Completed By	Dillon O'Neil
Date	9-Jun-21

(Per Fire Underwriters Survey, Water Supply for Public Fire Protection, 1999)

1. Determine Estimated Fire Flow based on Building Floor Area

F= 220 C √A

F= Required flow in litres / minute
A= Total floor area in m^2
C= Coefficient related to Construction
= 1.5 for wood frame construction
= 1.0 for ordinary construction
= 0.8 for non-combustible construction
= 0.6 for fire-resistive construction

C= 0.8

Floor Areas

Building D

Floor	Area (m²)
Build	1483
L2	1483
L3	1483
L4	1483
L5	1483
L6	1483
L7	1483
L8	1483
Total	11864

Area excl. basement at least 50% below grade = 11864 m^2

A= 11864 m^2

F=	19170.3 L/min	
Round to nearest 1000 L/m, F =	19000.0 L/min	
Round to nearest 1000 L/m, F =	19000.0 L/min	Building D
	19000.0 L/min	Total

2. Adjust flow based on Fire hazard and contents

A	Non-combustible	-25%
B	Limited Combustible	-15%
C	Combustible	0%
D	Free Burning	15%
E	Rapid Burning	25%

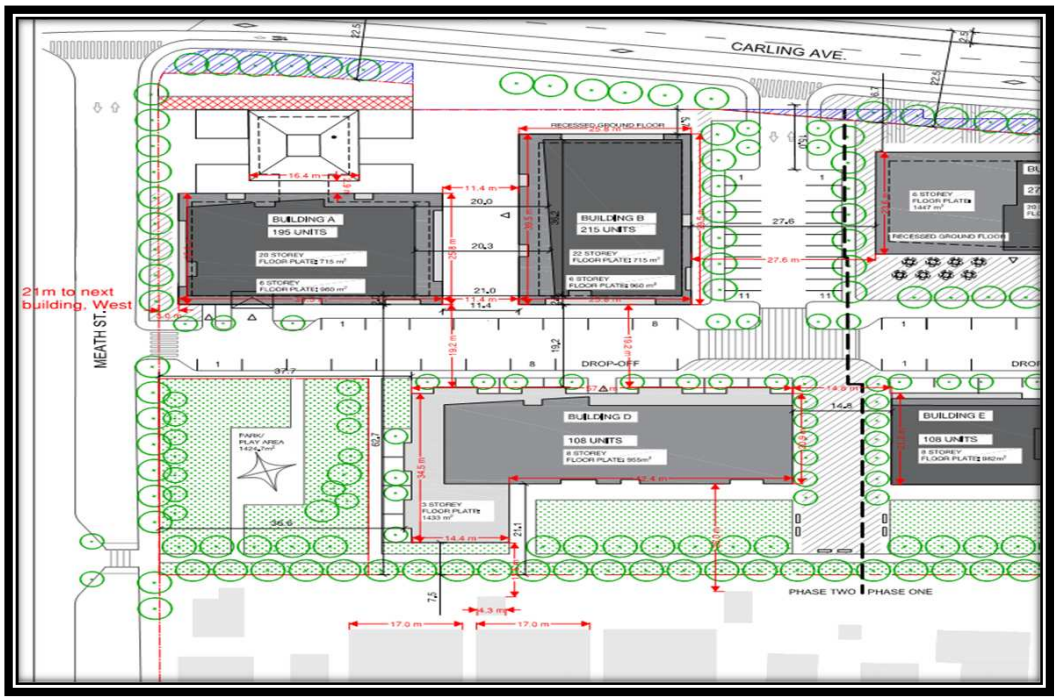
Type of Construction (A,B,C,D)	B		
Adjustment Factor	-15%		
Flow From 1.	19000.0 L/min		Building D
Adjusted Flow	16150.0 L/min		
Minimum Flow (2000 L/min)	16150.0 L/min		
Flow	16150.0 L/min		
Total flow required for Building D	16150.0 L/min		Total

3. Reduce flow from No. 2. based on automatic sprinkler protection

Flow from 2.	16150.0 L/min	
Complete Automatic Sprinkler Protection (yes/no)	Yes	
Reduction	30%	
Water supply is standard (yes/no)	Yes	
Additional Reduction	10%	
Sprinkler System is fully supervised (yes/no)	No	
Additional Reduction	0%	
Total Reduction	40%	
Flow after Sprinkler Reduction	9690.0 L/min	Building D
Total using individual approach	**9690.0 L/min**	

4. Adjacent Structures / Fire Separation with other buildings

Figure 1: Adjacent Buildings



Exposure charge based on Table G5:

Building D:				
Side	Construction Type	Storeys	Length (m)	LH Factor
North	N/A	13	25.8	335.4
East	Fire resistive with unprotected openings	8	21.2	169.6
South	Fire resistive with unprotected openings	1	4.3	4.3
West	Fire resistive with unprotected openings		>45m	0

Building D			
Side	Separation Distance (m)	Exposure Charge	LH Factor
North	19.2	12%	335.4
East	14.8	12%	169.6
South	12.5	7%	4.3
West	>45m	0%	0

Cumulative Increase (Max 75%)	31%	Building D	
Flow Increased for Adjacent Structures	12693.9	L/min	Building D
Maximum Permitted Flow (45 000 L/min)	12693.9	L/min	
Minimum Permitted Flow (2 000 L/min)	12693.9	L/min	
Required Fire Flow (rounded to nearest 1000 L/m)	13000.0	L/min	
	216.67	L/s	

Confirmation that required fire flow is available from hydrants within 150m of building:

Building D

Hydrant	Distance from building (m)	Class	Contribution to required fire flow (L/m)
1 (exisitng)	50	AA	5700
2 (existing)	63	AA	5700
3 (exisitng)	68	AA	5700
4 (exisitng)	70	AA	5700
5 (exisitng)	105	AA	3800
6 (exisitng)	116	AA	3800
7 (exisitng)	123	AA	3800
		Available Flow	34200

Required Flow (FUS calc) 12693.9 L/min

3. 1354 Carling Ave. Phase II - Water Demand Calculations

P_{Road}= 61.90 (psi) Dynamic pressure (existing boundary conditions)
P_{Road}= 426.7856 (kPa)

Proposed Service off 200mm watermain at Meath

Length

L= 7 (m)
23 (ft)

Size

d= 200 (mm)
8 (in)

Flow

Q = 0.293 (m3/s)
4642 (Usg/min)

Velocity

$$V = \frac{1.274Q}{d^2}$$

V= 9.33 (m/s)

Head Loss

$$P_d = \frac{4.52Q^{1.85}}{C^{1.85}d^{4.87}}$$

$$P = 0.434hSG$$

Pipe Diameter	C-Factor
150	100
200-250	110
300-600	120
600+	130

SG= specific gravity of water
= 1
C = 110
P_d= 0.1983566 (psi)
h= 0.457043 (ft/ft)
10.4964 (ft)

Pressure Loss

P_{ROAD}= 61.90 (psi)
P_L= 4.56 (psi)
$P_{AT\ METER}$= 57.34 (psi)
$P_{AT\ METER}$= 395.37712 (kPa)

Min Allowable Pressure (Max Hourly Demand) 140 (kpa) OK

PHASE 2

ARCHIBALD (BLDG C)

	Height (m)	Elevation (m)		m H_2O	PSI	kPa
Avg. DD	134.6	73.95		60.7	86.3	595.0
Peak Hour	124.8	73.95		50.9	72.3	498.8
Max Day + FF	113.7	73.95		39.8	56.6	389.9

ARCHIBALD (BLDG E)

	Height (m)	Elevation (m)		m H_2O	PSI	kPa
Avg. DD	134.4	74.04		60.4	85.9	592.1
Peak Hour	124.7	74.04		50.7	72.1	497.0
Max Day + FF	89.5	74.04		15.5	22.0	151.7

MEATH

	Height (m)	Elevation (m)		m H_2O	PSI	kPa
Avg. DD	134.5	74		60.5	86.1	593.5
Peak Hour	124.7	74		50.7	72.1	497.4
Max Day + FF	117.5	74		43.5	61.9	426.7

4. 1354 Carling Ave. Phase II - Water Demand Calculations

P_{Road}= 72.10 (psi) Dynamic pressure
P_{Road}= 497.1122 (kpa)

Proposed Service off 200mm watermain at Meath

Length

L= 7 (m)
23 (ft)

Size

d= 200 (mm)
8 (in)

Flow

Q = 0.0209 (m3/s)
331 (Usg/min)

Velocity

$$V = \frac{1.274Q}{d^2}$$

V= 0.67 (m/s)

Head Loss

$$P_d = \frac{4.52Q^{1.85}}{C^{1.85}d^{4.87}}$$

$$P = 0.434hSG$$

Pipe Diameter	C-Factor
150	100
200-250	110
300-600	120
600+	130

SG= specific gravity of water
= 1
C = 110
P_d= 0.0015018 (psi)
h= 0.003460 (ft/ft)
0.0795 (ft)

Pressure Loss

P_{ROAD}= 72.10 (psi)
P_L= 0.03 (psi)
$P_{AT\ METER}$= 72.07 (psi)
$P_{AT\ METER}$= 496.87 (kpa)

Min Allowable Pressure (Max Hourly Demand) 276 (kpa) OK

Table 4
Boundary Conditions - Proposed Conditions (Phase 2)

Design Parameter	Meath Street	Archibald Street (BLDG C)	Archibald Street (BLDG E)
	Boundary Condition[2] (m H_2O / kPa)	Boundary Condition[2] (m H_2O / kPa)	Boundary Condition[2] (m H_2O / kPa)
Average Daily Demand	60.5 / 593.5	60.7 / 595.0	60.4 / 592.1
Max Day + Fire Flow	43.5 / 426.7	39.8 / 389.9	15.5 / 151.7
Peak Hour	50.7 / 497.4	50.9 / 498.8	50.7 / 497.0

1) Boundary conditions supplied by the City of Ottawa for the demands indicated in the correspondence; assumed ground elevation of 74.0m for Meath Street, 73.95m for Archibald Street (BLDG C), and 74.04m for Archibald Street (BLDG E). See ***Appendix B.***

5. 1354 Carling Ave. Phase II - Water Demand Calculations

Scenario: *Max Daily Demand*

P_{Road}= 72.10 (psi) Dynamic Pressure
P_{Road}= 497.11 (kpa)

Proposed Service off 200mm watermain at Meath

Length

L= 7 (m)
22.967 (ft)

Size

d= 200 (mm)
8 (in)

Flow

Q = 0.0095 (m3/s)
151 (USG/min)

Velocity

$$V = \frac{1.274Q}{d^2}$$

V= 0.30 (m/s)

Head Loss

$$P_d = \frac{4.52Q^{1.85}}{C^{1.85}d^{4.87}}$$

$$P = 0.434hSG$$

Pipe Diameter	C-Factor
150	100
200-250	110
300-600	120
600+	130

SG= specific gravity of water
= 1
C = 110
P_d= 0.00035 (psi)
h= 0.000807 (ft/ft)
0.0185 (ft)

Pressure Loss

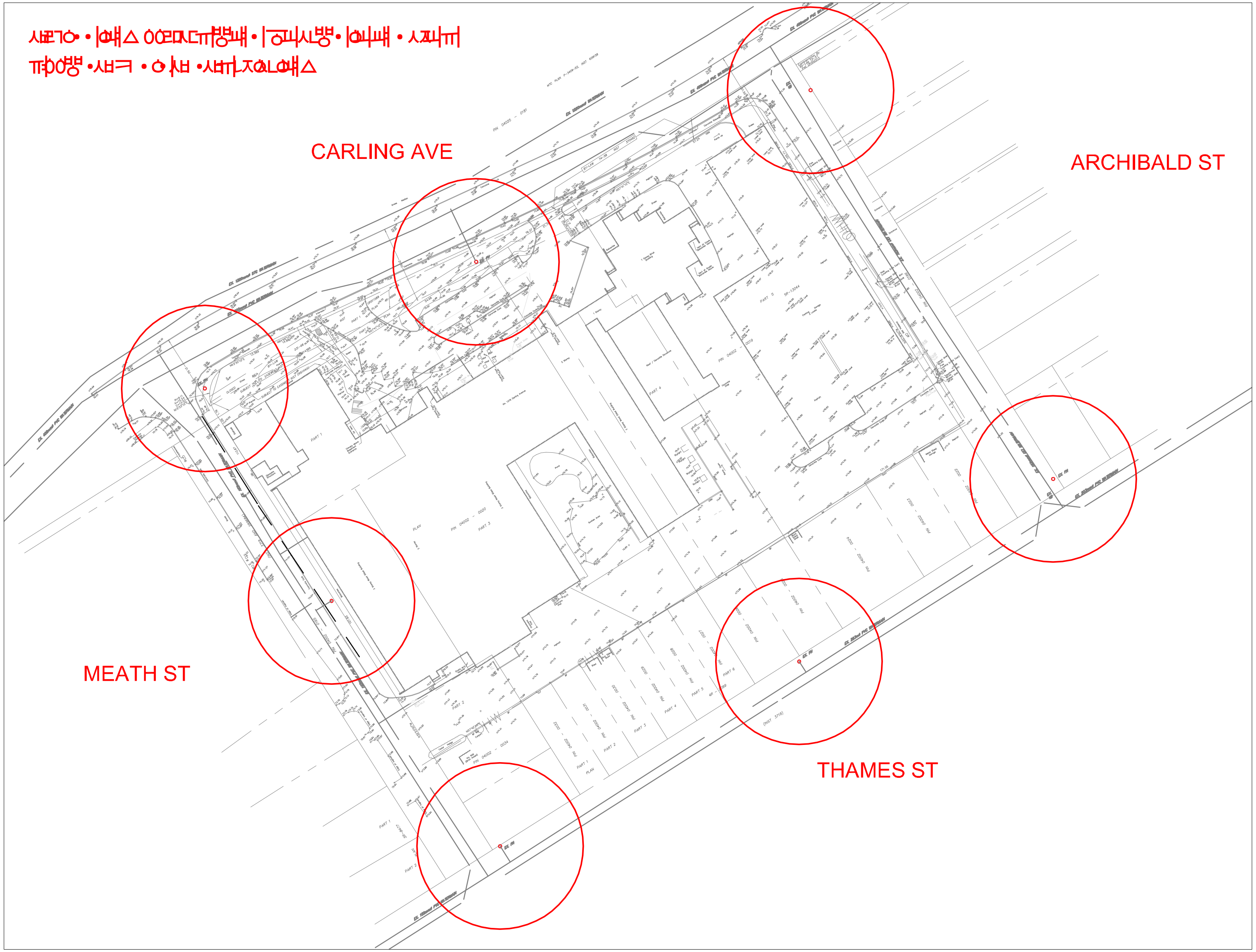
P_{ROAD}= 72.10 (psi)
P_L= 0.00804 (psi)
$P_{AT\ METER}$= 72.09 (psi)
$P_{AT\ METER}$= 497.06 (kpa)

Min Allowable Pressure (Max Daily Demand) 345 (kpa) OK

Table 4
Boundary Conditions - Proposed Conditions (Phase 2)

Design Parameter	Meath Street	Archibald Street (BLDG C)	Archibald Street (BLDG E)
	Boundary Condition[2] (m H_2O / kPa)	Boundary Condition[2] (m H_2O / kPa)	Boundary Condition[2] (m H_2O / kPa)
Average Daily Demand	60.5 / 593.5	60.7 / 595.0	60.4 / 592.1
Max Day + Fire Flow	43.5 / 426.7	39.8 / 389.9	15.5 / 151.7
Peak Hour	50.7 / 497.4	50.9 / 498.8	50.7 / 497.0

1) Boundary conditions supplied by the City of Ottawa for the demands indicated in the correspondence; assumed ground elevation of 74.0m for Meath Street, 73.95m for Archibald Street (BLDG C), and 74.04m for Archibald Street (BLDG E). See ***Appendix B.***


CARLING AVE
ARCHIBALD ST
MEATH ST
THAMES ST

City of Ottawa - Water Distribution System Facilities & Feedermains

CARP
WELLS/RESERVOIRS/P.S

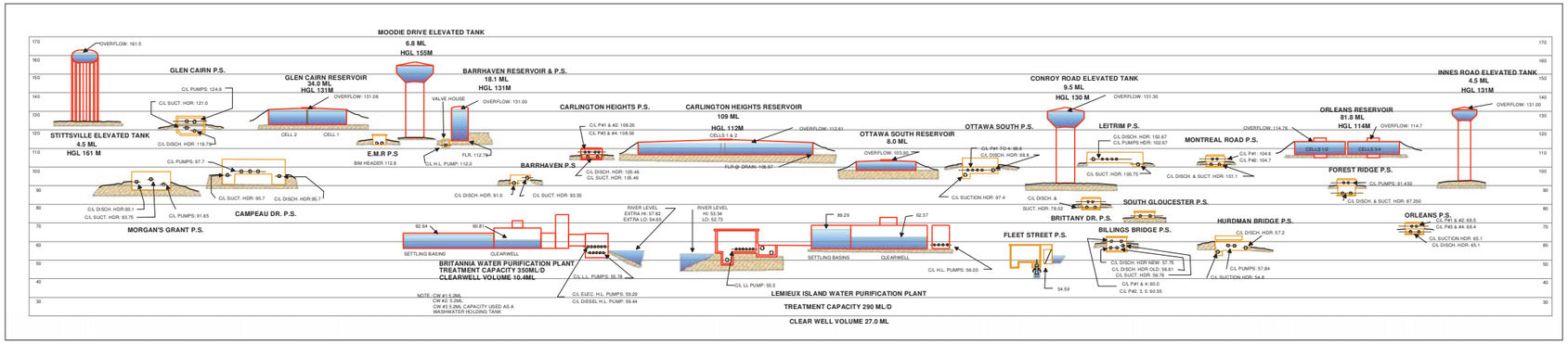
RICHMOND
WELLS

MUNSTER
WELLS/RESERVOIRS/P.S

VARS
WELLS/RESERVOIRS/TREATMENT PLANT & P.S

ORLEANS P.S.
FOREST RIDGE P.S
Ogilvie Rd. Backup P.S.
ORLEANS RES.
MONTREAL ROAD P.S.
BRITTANY DRIVE P.S.
FLEET STREET P.S.
LEMIEUX ISLAND PURIFICATION PLANT & P.S. & RES.
BRITANNIA PURIFICATION PLANT & P.S. & RES.
MORGAN'S GRANT P.S.
CAMPEAU DR. P.S.
ENERGY MINES & RESOURCES P.S.
GLEN CAIRN P.S. & RES
STITTSVILLE ELEVATED TANK
Abbott/Iber St. Backup P.S.
MOODIE ELEVATED TANK
BARRHAVEN P.S.
BARRHAVEN RES. & P.S.
Merivale Rd. Backup P.S.
OTTAWA SOUTH P.S & RES.
HURDMAN P.S.
Innes Rd Backup P.S.
Innes Rd/BearBrook Rd Backup P.S.
INNES RD ELEVATED TANK
BILLINGS BRIDGE P.S.
CONROY RD ELEVATED TANK
CARLINGTON HEIGHTS P.S. & RES.
SOUTH GLOUCESTER P.S. (INACTIVE)
LEITRIM P.S.
SHADOW RIDGE P.S. & WELLS
SHADOW RIDGE WELL

1E 1W 2C 2E 2W 3C 3W 4C BARR EMR ME MG MONT SHAD



Legend

Water System Structure

- Pump Station
- Backup Pump Station
- Water Treatment Plant
- Well
- Elevated Tank
- Reservoir

WATERMAINS

Priority, Internal Diameter

- Backbone 1524mm - 1981mm
- Backbone 1067mm - 1372mm
- Backbone 610mm - 914mm
- Backbone 406mm - 508mm
- Backbone 152mm - 305mm
- Distribution 1676mm - 1981mm
- Distribution 1067mm - 1372mm
- Distribution 610mm - 914mm
- Distribution 406mm - 508mm
- Distribution 305mm - 381mm

PRESSURE ZONES

1E, 1W, 2C, 2E, 2W, 3C, 3W, 4C, BARR, EMR, ME, MG, MONT, SHAD

N W E S

Ottawa

Infrastructure Services & Community Sustainability
Infrastructure Services

0 1,000 2,000 4,000 6,000
Meters

FIGURE 1-1

DRAWN BY: D. HESS DATE: 31 July 2013

Appendix C

Sanitary Flow Calculations

1. Sanitary Flow Estimate

1354 Carling Avenue - Phase II

Project No.	21292700
Date	2021-06-09
Prepared By:	Dillon O.
Checked By	J Fookes

Residential Area and Population

As per City of Ottawa Sewer Design Guidelines, 2012, Table 4.2

Unit Type		Person Per Unit	No. of Units	Population
Single Family		3.4		0.0
Semi-detached		2.7		0.0
Duplex		2.3		0.0
Townhouse (row)		2.7		0.0
Apartments:				
	Bachelor	1.4		0.0
	1 Bedroom	1.4		0.0
	2 Bedroom	2.1		0.0
	2 Bedroom	3.1		0.0
	Average Apt	1.8	518	932.4
			Total Population	932.4

Residential Average Flow (*OSDG, Figure 4.3*)= 280 L/c/day

Average Residential Flow Rate= 3.0 L/s

Residential Peaking Factor (Harmon Equation)= 3.819392562

Peak Residential Flow Rate= 11.54093119 L/s

Commercial / Industrial / Institutional Area and Flow

As per City of Ottawa Sewer Design Guidelines, 2012, Figure 4.3)

Property Type	Average Flow (L/ha/d)	Area (ha)	Average Flow Rate (L/s)
Commercial	28,000	0.1495	0.048
Instuitional	28,000		0.000
Light Industrial	35,000		0.000
Heavy Industrial	55,000		0.000
	Total Average I/C/I Flow Rate		0.048

Total I/C/I Area (%) 0.146

Commercial Peaking Factor (*OSDG, Figure 4.3)*= 1.000

Commercial Peak Flow Rate= 0.048 L/s

Institutional Peaking Factor (*OSDG, Figure 4.3)*= 1.000

Institutional Peak Flow Rate= 0.000 L/s

Industrial Peaking Factor (*OSDG, Appendix 4-B)*=

Industrial Peak Flow Rate= 0.000 L/s

Peak I/C/I Flow Rate= 0.048 L/s

Peak Extraneous Flows (design event)

Total Site Area= 1.026 ha

Infiltration Allowance (*OSDG, Figure 4.3)*= 0.330 L/s/ha

Total Infiltration Flow= 0.338 L/s

Average Dry Weather Flow Rate=	3.1 L/s
Peak Dry Weather Flow Rate=	11.6 L/s
Peak Wet Weather Flow Rate=	11.9 L/s

2. Proposed Sanitary Sewer Design Sheet

1354 Carling Phase II

Location			Maintenance Hole Elevations						Pipe						Notes
Building	**From**	**To**	**Invert (upstream)**	**Invert source (upstream)**	**Invert (downstream)**	**Invert source (downstream)**	**Drop in downstream MH**	**Reason**	**Length (m)**	**Length source**	**Diameter (mm)**	**Slope (%)**	**Capacity (Full) (L/s)**	**Velocity (Full) (m/s)**	
Existing Sanitary Sewers on Meath St	1A	1B	71.47	SPA base map	71.19	SPA base map	0.01		69.2	SPA base map	300	0.40%	61	0.87	
	1B	*1C*	71.18	SPA base map	70.91	SPA base map	-		69.0	SPA base map	300	0.40%	61	0.87	
	1C	*1D*	-	SPA base map	-	-	-		19.5	SPA base map	300	0.40%	61	0.87	
Proposed Site Servicing Sanitary Sewer	*Meath St*	*Building*	-	SPA base map	71.12	SPA base map	-		7.4	C001	200	2.00%	46	1.48	

Design Parameters

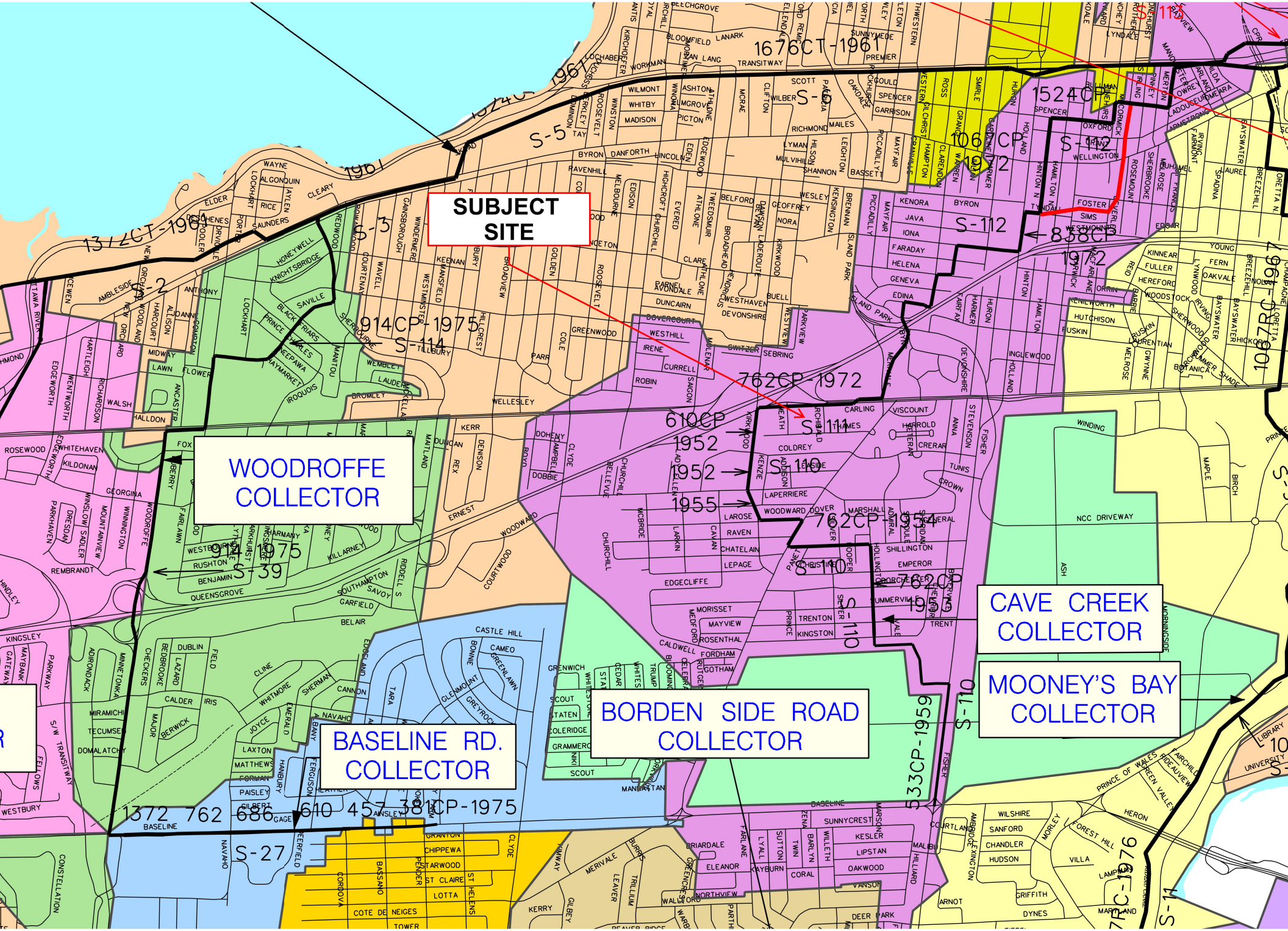
Note 1: Proposed maintenance holes are shown in **bold**.

Manning Roughness Coefficient, n = 0.013

Designed: **D. O'Neil**	Project: **Carling Avenue New Multi-Storey Development Existing and Proposed Sanitary Servicing**		
Checked: **J.Fookes**	Location: **1354 Carling Ave, Ottawa**		
Dwg Reference: **C001**	File Ref: **2.1E+08**	Date: **June 9, 2021**	Sheet No.: **1 of 1**


OUTLET TO THE CAVE CREEK COLLECTOR
1D
1C
1B
1A
SUBJECT SITE
av. Carling Ave.
Kirkwood Ave.
rue Thames St
av. Coldrey Ave
av. Leaside Ave

TRUNK SANITARY SEWERS



2017-03-24_908

SANITARY SEWER CALCULATION SHEET

CLIENT: **Holloway Lodging Corporation**
LOCATION: **1354-1376 Carling Avenue**
FILE REF: **16-908**
DATE: **09-May-18**

DESIGN PARAMETERS

Avg. Daily Flow Res.	350	L/p/d	Peak Fact Res. Per Harmons: Min = 2.0, Max =4.0		Infiltration / Inflow	0.28	L/s/ha
Avg. Daily Flow Comr	50,000	L/ha/d	Peak Fact. Comm.	1.5	Min. Pipe Velocity	0.60	m/s full flowing
Avg. Daily Flow Instit.	50,000	L/ha/d	Peak Fact. Instit.	1.5	Max. Pipe Velocity	3.00	m/s full flowing
Avg. Daily Flow Indus	35,000	L/ha/d	Peak Fact. Indust. per MOE graph		Mannings N	0.013	

Location			Residential Area and Population									Commercial		Institutional		Industrial			Infiltration				Pipe Data							
Area ID	Up	Down	Area	Number of Units by type				Pop.	Cumulative Area	Cumulative Pop.	Peak. Fact.	Q_{res}	Area	Accu. Area	Area	Accu. Area	Area	Accu. Area	Q_{C+I+I}	Total Area	Accu. Area	Infiltration Flow	Total Flow	DIA	Slope	Length	$A_{Hydraulic}$	R	Velocity	Q_{cap}	Q / Q full
			(ha)	Singles	Semi's	Town's	Apt's		(ha)		(-)	(L/s)	(ha)	(ha)	(ha)	(ha)	(ha)	(ha)	(L/s)	(ha)	(ha)	(L/s)	(L/s)	(mm)	(%)	(m)	(m^2)	(m)	(m/s)	(L/s)	(-)
MEATH/THAMES ST	1A	1B	2.060	13	4		6	66.0	2.060	66.0	4.00	1.07		0.00		0.00		0.00	0.0	2.060	2.060	0.577	1.65	300	0.40	54	0.071	0.075	0.87	61.2	0.03
	1B	1C	0.000					0.0	2.060	66.0	4.00	1.07	2.14	2.14		0.00		0.00	1.9	2.140	4.200	1.176	4.10	300	0.40	83	0.071	0.075	0.87	61.2	0.07
OUTLET TO CAVE CREEK	1C	1D	0.000					0.0	2.060	66.0	4.00	1.07		2.14		0.00		0.00	1.9	0.000	4.200	1.176	4.10	300	0.40	21	0.071	0.075	0.87	61.2	0.07
ARCHIBALD/THAMES ST	2A	2B	2.900	24	2		58	191.0	2.900	191.0	4.00	3.09	0.66	0.66		0.00		0.00	0.6	3.560	3.560	0.997	4.66	225	0.24	62	0.040	0.056	0.55	22.0	0.21
OUTLET TO CAVE CREEK	2B	2C	0.230	1			2	7.0	3.130	198.0	4.00	3.21	0.95	1.61		0.00		0.00	1.4	1.180	4.740	1.327	5.93	225	0.32	108	0.040	0.056	0.64	25.4	0.23

Appendix D

Storm Sewer Design Calculations

1. Existing Conditions & Release Rate

1354 Carling Ave. Phase II

Project No.	210292700
Date	9-Jun-21
Prepared By:	Dillon O'Neil
Checked By	J Fookes

Existing Drainage Area Characteristics

Drainage Area	Area, A (ha)	Runoff Coefficient, R
Building	0.5243	0.9
Grass	0.1804	0.3
Asphalt	0.2468	0.9
Gravel	0.0548	0.9
Total	1.01	0.79

Exisitng ground surface is a mix of grass and hard surfaces

Asphalt Area:	R = 0.90
Grassy Area:	R = 0.30
Building Area:	R = 0.90
Gravel Area	R = 0.50
Concrete Area:	R = 0.90

Existing Conditions

Q = RAIN where Q = runoff rate (L/s)
R = runoff coefficient
i = rainfall intensity (mm/hr)
A = drainage area (ha)
N = 2.78

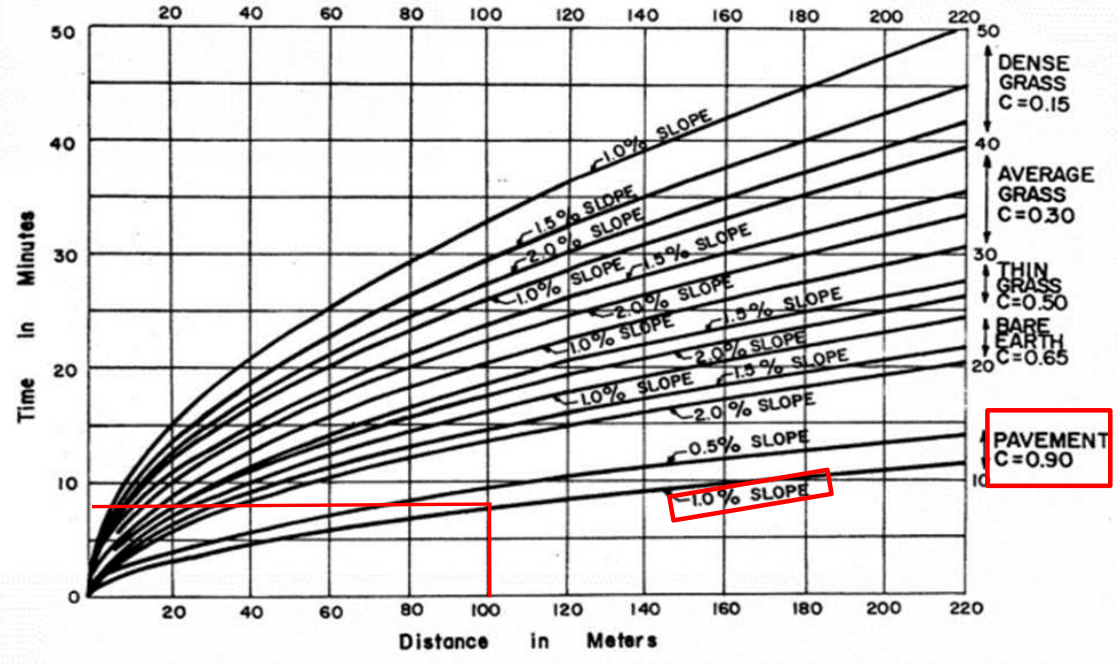
and $i = \frac{A}{(T_d + C)^B}$

Determinination of Time of Concentration, using Inlet Time Graph (City of Ottawa Sewer Design Guidelines, Appendix 5D):

Existing drainage area with longest flow path = Rear Asphalt Laneway
Approx. length of longest flow path (remote point to point of entry) = 100 m
Surface type = Asphalt

Approximate surface slope = <1%

RELATIONSHIP BETWEEN DISTANCE OF REMOTE POINT IN TRIBUTARY AREA TO POINT OF ENTRY TO SEWER AND TIME TAKEN FOR PARTICLE OF WATER TO TRAVEL THIS DISTANCE FOR VARIOUS SURFACE SLOPES AND IMPERVIOUSNESS



T_d = Time of Concentration = 10 mins (minimum of 10 mins)

Return Period (Years)	A	B	C	Intensity, I (mm/hr)	Area (ha)	Runoff Coefficient, R (Note 1)	Runoff Rate, Q (L/s)
2	732.951	0.81	6.199	76.8	1.006	0.79	170.3
5	998.071	0.814	6.053	104.2	1.006	0.79	231.0
100	1735.688	0.82	6.014	178.6	1.006	0.99	494.8

Note 1: For 100-year event, Runoff Coefficient is increased by 25% to a maximum of 1.0.

Allowable Release Rate

Criteria for calculation of allowable release rate:

Return Period	5 year (to suit capacity of downstream sewers)
Maximum Runoff Coefficient	0.5
Time of Concentration	10 minutes

Return Period (Years)	A	B	C	Intensity, I (mm/hr)	Area (ha)	Runoff Coefficient, R	Runoff Rate, Q (L/s)
5	998.071	0.814	6.053	104.2	1.006	0.50	145.7

Allowable release rate from site in 100-year storm is 145.7 L/s

2. Proposed Drainage Areas

1354 Carling Ave. Phase II

Project No.	210292700
Date	9-Jun-21
Prepared By:	Dillon O'Neil
Checked By	J. Fookes

Summary of All Proposed Drainage Areas

Drainage Area	Total Area, A (ha)	Impervious Area (ha)	Pervious Area (ha)	Runoff Coefficient, R (5-year event)	Runoff Coefficient, R (100-year event, Note 2)
ROAD	0.1857	0.186	0.000	0.90	1.00
BLDGA	0.1016	0.102	0.000	0.90	1.00
BLDGB	0.1019	0.102	0.000	0.90	1.00
BLDGD	0.1461	0.146	0.000	0.90	1.00
BLDGH	0.0271	0.027	0.000	0.90	1.00
BLDGF	0.0158	0.016	0.000	0.90	1.00
SWALK1	0.0459	0.046	0.000	0.90	1.00
SWALK2	0.0134	0.013	0.000	0.90	1.00
SWALK3	0.1492	0.149	0.000	0.90	1.00
FLOOR1	0.0738	0.074	0.000	0.90	1.00
FLOOR2	0.019	0.019	0.000	0.90	1.00
GRASS1	0.0052	0.000	0.005	0.30	0.38
GRASS2	0.0051	0.000	0.005	0.30	0.38
GRASS3	0.0471	0.000	0.047	0.30	0.38
Total (Note 2)	0.937			0.86	0.96

(Refer to Proposed Storm Drainage Area Plan)

Note 1: Building area assumed to be 100% impervious with roof drains

Proposed Uncontrolled Drainage Area Characteristics

Drainage Area	Area, A (ha)	Runoff Coefficient, R (5-year event)	Runoff Coefficient, R (100-year event, Note 1)
Uncontrolled	0.095	0.40	0.50
Total	0.095	0.40	0.50

(Refer to Proposed Storm Drainage Area Plan)

Note 2: For 100-year event, Runoff Coefficient is increased by 25% to a maximum of 1.0.

Runoff coefficients used in calculations:

Asphalt Area:	R = 0.90
Grassy Area:	R = 0.30
Planter/Drip line	R = 0.30
Building Area:	R = 0.90
Recessed Floor Area	R = 0.90
Concrete Area:	R = 0.90

Proposed Uncontrolled Runoff

Q = RAIN where Q = runoff rate (L/s)
R = runoff coefficient
i = rainfall intensity (mm/hr)
A = drainage area (ha)
N = 2.78

and $i = \frac{A}{(T_d + C)^B}$

T_d = Time of Concentration = 10 (min)

Return Period (Years)	A	B	C	Intensity, I (mm/hr)	Area (ha)	Runoff Coefficient, R	Runoff Rate, Q (L/s)
5	998.071	0.814	6.053	104.2	0.095	0.40	11.0
100	1735.688	0.82	6.014	178.6	0.095	0.50	23.7

Remaining Allowable Release Rate

Total Allowable Release Rate	145.7 (L/s)
Uncontrolled Runoff (100 year)	23.7 (L/s)
Remaining Allowable Release Rate	122.0 (L/s)

Runoff from remaining drainage areas in 100-year event will be controlled to 122 L/s

3. Proposed Storage

1354 Carling Ave. Phase II

Project No.	210292700
Date	9-Jun-21
Prepared By:	Dillon O'Neil
Checked By	J. Fookes

Proposed Controlled Drainage Area Characteristics

Drainage Area	Area, A (ha)	Runoff Coefficient, R (5-year event)	Runoff Coefficient, R (100-year event, Note 1)
ROAD	0.186	0.90	1.00
BLDGA	0.102	0.90	1.00
BLDGB	0.102	0.90	1.00
BLDGD	0.146	0.90	1.00
BLDGH	0.027	0.90	1.00
BLDGF	0.016	0.90	1.00
SWALK1	0.046	0.90	1.00
SWALK2	0.013	0.90	1.00
SWALK3	0.149	0.90	1.00
FLOOR1	0.074	0.90	1.00
FLOOR2	0.019	0.90	1.00
GRASS1	0.005	0.30	0.38
GRASS2	0.005	0.30	0.38
GRASS3	0.047	0.30	0.38
Total	0.937	0.86	0.96

(Refer to Proposed Storm Drainage Area Plan)

Note 1: For 100-year event, Runoff Coefficient is increased by 25% to a maximum of 1.0.

Allowable Release Rate from storage (100-year event) = 122.0 (L/s)

Average release rate during 100-year event = 61.02 (L/s) (Refer to attached calculation sheet)

439.35 (m3/h)

Orifice Sizing

Q = CA(2gH)^0.5

C = 0.61

Design Flow Rate = 122.0 (L/s)

Proposed 100-year tank depth = 1.50 (m)

Proposed 100-year head above centreline of orifice = 1.31 (m)

Orifice Area = 39425 (mm2)

Orifice diameter = 224 (mm) (if <75mm then vortex ICD required)

Release Rates during 5-year event

Water depth during 5-year event = 0.81 (m) (based on result of Req. Storage Vol. calc below)

Proposed 5-year head above centreline of orifice = 0.63 (m)

Maximum release rate during 5-year event = 84.37 (L/s) (based on orifice calculation)

Average release rate during 5-year event = 42.19 (L/s)

Required Storage Volume (using Modified Rational Method)

Q = RAIN

Q = runoff rate (L/s)

R = runoff coefficient

i = rainfall intensity (mm/hr)

A = drainage area (ha)

N = 2.78

$$i = \frac{A}{(T_d + C)^B}$$

where i = Rainfall Intensity (mm/hr)

T_d = Time of Concentration (min)

	5-Year Event				100-Year Event			
Time, Td (min)	Intensity (mm/hr)	Peak Flow (L/s)	Average Release Rate (L/s)	Storage Volume (m^3)	Intensity (mm/hr)	Peak Flow (L/s)	Average Release Rate (L/s)	Storage Volume (m^3)
5	141.18	317.4	42.19	82.6	242.70	545.7	61.02	145.4
10	104.19	234.3	42.19	115.2	178.56	401.5	61.02	204.3
15	83.56	187.9	42.19	131.1	142.89	321.3	61.02	234.2

20	70.25	158.0	42.19	138.9	119.95	269.7	61.02	250.4
25	60.90	136.9	42.19	142.1	103.85	233.5	61.02	258.7
30	53.93	121.2	42.19	142.3	91.87	206.6	61.02	262.0
40	44.18	99.3	42.19	137.2	75.15	169.0	61.02	259.0
50	37.65	84.7	42.19	127.4	63.95	143.8	61.02	248.3

minimum time = time of concentration

Storage volume used	142.3 m^3	Storage volume used	262.0 m^3

A storage tank with a minimum volume of 262 m^3 is required.

4. PROPOSED STORM SEWER CALCULATION SHEET

1354 Carling Ave. Phase II

LOCATION					INDIVIDUAL							CUMULATIVE		DESIGN					PROPOSED SEWER												
Description	From	Top of Cover	To	Top of Cover	Asphalt Area	Lawn Areas	Bldg. Area	Green Roof	Conc. Area	Total	R*A*N	Area	R*A*N	Time of Conc.	Storm Event Return Period	Rainfall Intensity	Peak Flow		Length	Size	Area	Grade	Minimum Slope	Full Capacity	Full Velocity	Time of Flow	Reserve Capacity	Q/Qfull	Upstream Invert	Downstream Invert	Notes
		(m)		(m)	(ha)	(ha)	(ha)	(ha)	(ha)	(ha)		(ha)		(min.)	(year)	(mm/hr)	(L/s)	(m^3/s)	(m)	(mm)	(m^2)	(%)	(%)	(L/s)	(m/s)	(min)	(L/s)	(%)	(m)	(m)	
Site Servicing for Phase 2	Cistern		MHST01		0.186	0.057	0.393	0.000	0.301	0.937	2.248	0.937	2.248	10.00	5.00	104.19	234.3	0.234	15	375	0.110	2.000	0.25	248.0	2.25	0.11	13.7	0.9	59.50	59.43	
Site Servicing for Uncontrolled at Building A	New CB at Carling Ave		Carling Ave 1800mm Storm Sewer		0.000	0.022	0.000	0.000	0.022	0.044	0.074	0.044	0.074	10.00	100.00	0.00	0.0	0.000	5	200	0.031	2.000	2.00	46.4	1.48	0.06	46.4	0.0	73.92	-	upstream invert based on OPSD 705.01 1080mm below T/G
Site Servicing for Uncontrolled at Building B	New CB at Carling Ave		Carling Ave 1800mm Storm Sewer		0.000	0.022	0.000	0.000	0.022	0.044	0.074	0.044	0.074	10.00	100.00	178.56	13.2	0.013	5	200	0.031	2.000	2.00	46.4	1.48	0.06	33.2	0.3	73.92	-	upstream invert based on OPSD 705.01 1080mm below T/G

Q = RAIN, where

Q = Peak flow (L/s)
R = Runoff coefficient
A = Area (ha)
I = Rainfall intensity (mm/hr)
N = 2.78

Asphalt Area: R = 0.90
Grassy Area: R = 0.30
Building Area: R = 0.90
Green Roof R = 0.50
Concrete Area: R = 0.90

Mannings Roughness Coefficient = 0.013

Prepared By: Dillon O'Neil

Checked by: James Fookes

Date: June 9, 2021

Project No. 210292700

Appendix E

Topographic Survey

TOPOGRAPHICAL PLAN OF

PART BLOCKS 6 AND 7 REGISTERED PLAN 221 AND PART OF ROAD ALLOWANCE BETWEEN CONCESSION 1 (OTTAWA FRONT) AND CONCESSION A (RIDEAU FRONT) CLOSED BY BY-LAW 231-66, INST 511589 GEOGRAPHIC TOWNSHOP OF NEPEAN CITY OF OTTAWA

Prepared by Annis, O'Sullivan, Vollebekk Ltd.

Scale 1 : 250

10 7.5 5.0 2.5 0 5 10 Metres

Metric

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

Date E.H. Herweyer O.L.S.

Expropriation By By-Law 74-58 Inst 370492

BENCHMARK
FIRE HYDRANT
Top of Spindle
Elev=75.14

Notes & Legend

Denotes

- Deciduous Tree
- Coniferous Tree
- FH Fire Hydrant
- WV Water Valve
- MH-ST Maintenance Hole (Storm Sewer)
- MH-S Maintenance Hole (Sanitary)
- MH-B Maintenance Hole (Bell Telephone)
- MH-T Maintenance Hole (Traffic)
- MH-H Maintenance Hole (Hydro)
- MH-G Maintenance Hole (Gas)
- MH Maintenance Hole (Unidentified)
- VC Valve Chamber (Watermain)
- OHW Overhead Wires
- CB Catch Basin
- DI Ditch Inlet
- GV Gas Valve
- GM Gas Meter
- HM Hydro Meter
- HH Handhole
- TB-B Bell Terminal Box
- TB-C Cable Terminal Box
- TB-T Traffic Terminal Box
- TB Unidentified Terminal Box
- B Bollard
- S Sign
- CLF Chain Link Fence
- BF Board Fence
- SRW Stone Retaining Wall
- CRW Concrete Retaining Wall
- DC Depressed Curb
- UP Utility Pole
- PO-W Wooden Pole
- AN Anchor
- LS Light Standard
- Ø Diameter
- x45.00 Location of Elevations
- 45.00 Top of Concrete Curb Elevation
- C/L Centreline
- Property Line

Bearings are grid bearings and are referred to the Central Meridian of MTM Zone 9 (79°30' West Longitude) NAD-83 (original).

SITE AREA = 18861 m²

BOUNDARY INFORMATION COMPILED FROM PLAN 5R-13044

ELEVATION NOTES

1. Elevations shown are geodetic and are referred to the CGVD28 geodetic datum.
2. It is the responsibility of the user of this information to verify that the job benchmark has not been altered or disturbed and that it's relative elevation and description agrees with the information shown on this drawing.

UTILITY NOTES

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

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Ontario Land Surveyors

Job No. 16427-15 RLney PIBK6-7 PL 221 T F

Appendix F

MECP, RVCA and City of Ottawa Specific Requirements Correspondence

Alison Gosling

From: Diamond, Emily (MOECC) <Emily.Diamond@ontario.ca>
Sent: Tuesday, March 28, 2017 5:53 PM
To: Alison Gosling
Subject: RE: 1354-1376 Carling Avenue - ECA Requirement

Hi Alison,

Yes, I agree with your assumption that this project will meet the exemption set out under Ontario Regulation 525/98 section 3 once the parcels are amalgamated into one.

Regards,

Emily Diamond
Environmental Officer
Ministry of the Environment and Climate Change

Ottawa District Office
2430 Don Reid Drive
Ottawa, Ontario, K1H 1E1
Tel: 613-521-3450 ext 238
Fax: 613-521-5437
e-mail: emily.diamond@ontario.ca

From: Alison Gosling [mailto:AGosling@dsel.ca]
Sent: March-24-17 10:41 AM
To: Diamond, Emily (MOECC)
Cc: Robert Freel
Subject: 1354-1376 Carling Avenue - ECA Requirement

Good morning Emily,

We just wanted to touch base with you regarding a proposed development we are working on located at 1354-1376 Carling Avenue.

Currently comprised of two parcels of land, the existing 1.9ha site currently consists of two lodging buildings and is zoned Arterial Main Street and Residential Fourth Density. Please note that the parcels will be amalgamated into one parcel of land prior to construction.

The phased development proposes to construct four residential/commercial buildings with incremental demolition of the existing buildings. The full build-out will consist of approximately 2,437 m² of commercial space and 914 residential units.

It appears that the existing stormwater management system currently directs flow towards the municipal infrastructure within Meath Street and Archibald Street.

Proposed stormwater controls will use subsurface storage, and surface ponding to attenuated the release rate to City of Ottawa requirements.

As the proposed sewage works and stormwater management facility will be servicing a single parcel of land which will be owned and operated by a single entity, does not discharge to a combined sewer system, and is not proposed to be used for industrial purposes, it is assumed this falls within the exemption requirements for an Environmental Compliance Approval as per O.Reg 525/98, Section 3 (a) & Ontario Water Resources Act Section 53. 6 (c).

I hope you could comment on my assumption that this property would be exempt from requiring an ECA. Please feel free to call to discuss this further.

Thank you,

Alison Gosling, E.I.T.
Project Coordinator / Junior Designer

DSEL
david schaeffer engineering ltd.

120 Iber Road, Unit 103
Stittsville, ON K2S 1E9

phone: (613) 836-0856 ext.542
fax: (613) 836-7183
email: agosling@DSEL.ca

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Alison Gosling

From: Jocelyn Chandler <jocelyn.chandler@rvca.ca>
Sent: Thursday, October 27, 2016 3:49 PM
To: Alison Gosling
Subject: RE: 1376 Carling Ave - RVCA

Follow Up Flag: Follow up
Flag Status: Completed

Hello Alison,
Our records concur with the information you have provided. Given that the stormwater from this site will travel greater than 2 km before outletting to the receiver (the Ottawa River), the RVCA advises that we will not be requiring water quality controls on the stormwater management design for the redevelopment of this site.
Jocelyn

Jocelyn Chandler M.Pl. MCIP, RPP
Planner, RVCA
t) 613-692-3571 x1137
f) 613-692-0831
jocelyn.chandler@rvca.ca
www.rvca.ca
mail: Box 599 3889 Rideau Valley Dr., Manotick, ON K4M 1A5
courier: 3889 Rideau Valley Dr., Nepean, ON K2C 3H1
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From: Alison Gosling [mailto:AGosling@dsel.ca]
Sent: Thursday, October 27, 2016 3:26 PM
To: Jocelyn Chandler <jocelyn.chandler@rvca.ca>
Cc: Robert Freel <RFreel@dsel.ca>
Subject: 1376 Carling Ave - RVCA

Good afternoon Jocelyn,

We wanted to touch base with you regarding a mixed-use development at 1376 Carling Avenue. The development proposes residential towers and at grade commercial units.

The existing stormwater on site discharges to the Carling Avenue storm sewer. Based on the information available, the existing storm sewers servicing the site travels 3.5-3.8 km to an outlet into the Ottawa River, as shown by the figure below.

Can you provide a comment regarding quality controls that maybe required for the site?

Please feel free to call if you have any questions or you would like to discuss.

Thanks in advance,

Alison Gosling, E.I.T.
Project Coordinator / Junior Designer

DSEL
david schaeffer engineering ltd.

120 Iber Road, Unit 103
Stittsville, ON K2S 1E9

phone: (613) 836-0856 ext.542
fax: (613) 836-7183
email: agosling@DSEL.ca

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MEMO

Date: Feb 21, 2017

To / Destinataire	Sean Moore, Planner	
From / Expéditeur	Cody Oram, Senior Engineer, Infrastructure Approvals	
Subject / Objet	**Pre-Application Consultation** **1354 & 1376 Carling Ave. and Ward No. 16,** *Re-development of hotel, a mid-rise apartment building and commercial buildings proposed*	File No. PC2017-0025

Please note the following information regarding the engineering design submission for the above noted site:

1. The Servicing Study Guidelines for Development Applications are available at the following address: http://ottawa.ca/en/development-application-review-process-0/servicing-study-guidelines-development-applications

2. Servicing and site works shall be in accordance with the following documents:

   - ⇨ Ottawa Sewer Design Guidelines (October 2012)
   - ⇨ Ottawa Design Guidelines – Water Distribution (2010)
   - ⇨ Geotechnical Investigation and Reporting Guidelines for Development Applications in the City of Ottawa (2007)
   - ⇨ City of Ottawa Slope Stability Guidelines for Development Applications (revised 2012)
   - ⇨ City of Ottawa Environmental Noise Control Guidelines (January, 2016)
   - ⇨ City of Ottawa Park and Pathway Development Manual (2012)
   - ⇨ City of Ottawa Accessibility Design Standards (2012)
   - ⇨ Ottawa Standard Tender Documents (latest version)
   - ⇨ Ontario Provincial Standards for Roads & Public Works (2013)

3. 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).

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

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

   ii. The pre-development runoff coefficient or a maximum equivalent 'C' of 0.5, whichever is less (§ 8.3.7.3).

   iii. A calculated time of concentration (Cannot be less than 10 minutes).

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

5. Services (Storm, Sanitary & Water Supply)

   i. Attachments at the end of this memo provide information on sewer size and location in respect to the proposed site. Disclaimer: Please be aware that the attached information is for reference only and that all information shown on the attachments is to be verified in the field prior to design and construction. This information does not show all underground and above ground utilities for this area and these utilities should be located and protected prior to and during construction.

   ii. Site services should connect to the existing public mains within Archibald St. and Meath St. Services should be grouped in a common trench to minimize the number of road cuts.

   iii. Connections to trunk sewers and easement sewers are typically not permitted.

   iv. Monitoring manholes are to be located in an accessible location on private property near the property line (ie. Not in a parking area).

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

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

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

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

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

e. *No submerged outlet connections.*

6. Water Boundary condition requests must include the location of the service and the expected loads required by the proposed development. Please provide the following information:

   i. Location of service

   ii. Type of development and the amount of fire flow required (as per FUS, 1999).

   iii. Average daily demand: ___ l/s.

   iv. Maximum daily demand: ___l/s.

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

7. MOECC ECA Requirements

   An MOECC Environmental Compliance Approval (Private Sewage Works) may be required for the proposed development due to the potential for stormwater management across multiple properties. Please contact Ontario Ministry of the Environment and Climate Change, Ottawa District Office to arrange a pre-submission consultation:

For I/C/I applications: Emily Diamond

(613) 521-3450, ext. 238

Emily.Diamond@ontario.ca

8. Phase 1 ESAs and Phase 2 ESAs must conform to clause 4.8.4 of the Official Plan that requires that development applications conform to Ontario Regulation 153/04.

Should you have any questions or require additional information, please contact me directly at (613) 580-2424, x 13422 or by email at cody.oram@ottawa.ca

Fig 1: Sanitary

Fig 2: Storm


av. Carling Ave.
rue Thames St
WAT43565
406mm
WAT43564
406mm
WAT43699
406mm
WAT43568
152mm
WAT43525
152mm
WAT51168
152mm
WAT51167
203mm
WAT51456
203mm
WAT43568
152mm
WAT22798
152mm
WAT44470
152mm
WAT43037
203mm
WAT43008
200mm
1365
1330
815
819
821
1320
1354
1273
835
1376
1291
1293
1301
1305
1307
1311
1313
1319
1321
1325
1327
829
1331
1400
824
826
1304
1302
1308
1310
1292
1294
1286
1282
1290
50 m

Fig 3: Water

Alison Gosling

To: Robert Freel
Subject: RE: 1354/1376 Carling Ave - Job 908 - Sanitary Flows

From: Robert Freel
Sent: April 25, 2018 9:03 AM
To: 'Oram, Cody' <Cody.Oram@ottawa.ca>
Subject: RE: 1354/1376 Carling Ave - Job 908 - Sanitary Flows

Good morning Cody,

We were able to get the water bill for the Travelodge. Based on the attached we see an average existing demand of 66 m^3/d (0.76 L/s) and the max demand is 89.7 m^3/d (1.0 L/s). Based on this information it would appear that the ultimate condition will far exceed the flow of the Phase I condition.

Please let me know if you would like to discuss.

Thank you,

Bobby Freel, P.Eng.
Project Manager / Intermediate Designer

DSEL
david schaeffer engineering ltd.

120 Iber Road, Unit 103
Stittsville, ON K2S 1E9

phone: (613) 836-0856 ext.558
cell: (613) 314-7675
email: rfreel@DSEL.ca

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From: Oram, Cody <Cody.Oram@ottawa.ca>
Sent: April 24, 2018 2:20 PM
To: Robert Freel <RFreel@dsel.ca>
Subject: RE: 1354/1376 Carling Ave - Job 908 - Sanitary Flows

We need to know how much extra flow to put in the model (when compared to existing).
Cody

From: Robert Freel <RFreel@dsel.ca>
Sent: Tuesday, April 24, 2018 12:55 PM
To: Oram, Cody <Cody.Oram@ottawa.ca>
Cc: Baker, Adam <adam.baker@ottawa.ca>
Subject: RE: 1354/1376 Carling Ave - Job 908 - Sanitary Flows

Hi Cody,

Would the model not already take into account the existing flows as it is the current condition?

Thank you,

Bobby Freel, P.Eng.
Project Manager / Intermediate Designer

DSEL
david schaeffer engineering ltd.

120 Iber Road, Unit 103
Stittsville, ON K2S 1E9

phone: (613) 836-0856 ext.558
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From: Oram, Cody <Cody.Oram@ottawa.ca>
Sent: April 24, 2018 10:26 AM
To: Robert Freel <RFreel@dsel.ca>
Cc: Baker, Adam <adam.baker@ottawa.ca>
Subject: RE: 1354/1376 Carling Ave - Job 908 - Sanitary Flows

Hi Bobby,

We need the existing flows to proceed. Below is the comment from our modelling group identifying what they need.

- The report only provides the ultimate wastewater flows. We will need to know the existing flows (so we can compare future to existing) and the interim flow in addition to the ultimate. We can then input these figures into our Cave creek model to determine the downstream impacts.

Regards,

Cody Oram, P.Eng. Senior Engineer
Development Review, South Services
Planning, Infrastructure and Economic Development Department | Services de planification, d'infrastructure et de développement économique
City of Ottawa | Ville d'Ottawa
110 Laurier Avenue West. Ottawa, ON | 110, avenue. Laurier Ouest. Ottawa (Ontario) K1P 1J1
613.580.2424 ext./poste **13422**, fax/téléc:613-580-2576, cody.oram@ottawa.ca

From: Robert Freel <RFreel@dsel.ca>
Sent: Monday, April 23, 2018 4:44 PM
To: Oram, Cody <Cody.Oram@ottawa.ca>; Baker, Adam <adam.baker@ottawa.ca>
Subject: 1354/1376 Carling Ave - Job 908 - Sanitary Flows

Hi Cody,

Below are the updated sanitary flows by phase. I would anticipate the current City model would account for the existing condition present on the site. We would anticipate the most conservative approach would be to use the Ultimate flow with the existing flows in the City model.

For the proposed ultimate design, flows are as follows:

Total Estimated Average Dry Weather Flow Rate	**6.8**	**L/s**
Total Estimated Peak Dry Weather Flow Rate	**24.3**	**L/s**
Total Estimated Peak Wet Weather Flow Rate	**24.9**	**L/s**

The flows for phase 1 of the proposed design are as follows:

Total Estimated Average Dry Weather Flow Rate	**2.9**	**L/s**
Total Estimated Peak Dry Weather Flow Rate	**10.9**	**L/s**
Total Estimated Peak Wet Weather Flow Rate	**11.2**	**L/s**

The flows for phase 2 of the proposed design are as follows:

Total Estimated Average Dry Weather Flow Rate	**4.0**	**L/s**
Total Estimated Peak Dry Weather Flow Rate	**14.7**	**L/s**
Total Estimated Peak Wet Weather Flow Rate	**14.9**	**L/s**

Please let me know if you have any questions.

Thank you,

Bobby Freel, P.Eng.
Project Manager / Intermediate Designer

DSEL
david schaeffer engineering ltd.

120 Iber Road, Unit 103
Stittsville, ON K2S 1E9

phone: (613) 836-0856 ext.558
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Appendix G

Non-regulatory Correspondence

Boundary Conditions Unit Conversion

PHASE 1

ARCHIBALD (BLDG C)

	Height (m)	Elevation (m)	m H_2O	PSI	kPa
Avg. DD	134.2	73.95	60.3	85.7	591.1
Peak Hour	125.5	73.95	51.6	73.3	505.7
Max Day + FF	114.1	73.95	40.2	57.1	393.9

ARCHIBALD (BLDG E)

	Height (m)	Elevation (m)	m H_2O	PSI	kPa
Avg. DD	134.2	74.04	60.2	85.6	590.2
Peak Hour	125.4	74.04	51.4	73.1	503.8
Max Day + FF	90.2	74.04	16.2	23.0	158.5

PHASE 2

ARCHIBALD (BLDG C)

	Height (m)	Elevation (m)	m H_2O	PSI	kPa
Avg. DD	134.6	73.95	60.7	86.3	595.0
Peak Hour	124.8	73.95	50.9	72.3	498.8
Max Day + FF	113.7	73.95	39.8	56.6	389.9

ARCHIBALD (BLDG E)

	Height (m)	Elevation (m)	m H_2O	PSI	kPa
Avg. DD	134.4	74.04	60.4	85.9	592.1
Peak Hour	124.7	74.04	50.7	72.1	497.0
Max Day + FF	89.5	74.04	15.5	22.0	151.7

MEATH

	Height (m)	Elevation (m)	m H_2O	PSI	kPa
Avg. DD	134.5	74	60.5	86.1	593.5
Peak Hour	124.7	74	50.7	72.1	497.4
Max Day + FF	117.5	74	43.5	61.9	426.7

Charlotte Kelly

From: Baker, Adam <adam.baker@ottawa.ca>
Sent: October 16, 2018 10:37 AM
To: Charlotte Kelly
Cc: Robert Freel; Oram, Cody
Subject: RE: 1354/1376 Carling Avenue - Boundary Condition Request - Job 908
Attachments: 1376 Carling (Updated) Oct 2018.pdf

Hi Charlotte,

Please see attached your water boundary conditions and some additional comments from our water resources group:

The following are boundary conditions, HGL, for hydraulic analysis at 1376 Carling (zone 2W) assumed to be connected to the 203 mm on Meath and the 152 mm on Archibald (see attached PDF for location).

Phase 1

Minimum HGL = 125.5 m (Building C)

Minimum HGL = 125.4 m (Building E)

Maximum HGL = 134.2 m (Both locations)

Max Day (5.04 L/s) + Fire Flow (111 L/s) = 114.1 m (Building C)

Max Day (2.37 L/s) + Fire Flow (111 L/s) = 90.2 m (Building E)

Phase 2

Minimum HGL = 124.8 m (Building C)

Minimum HGL = 124.7 m (Building E, Meath St)

Maximum HGL = 134.6 m (Building C)

Maximum HGL = 134.4 m (Building E)

Maximum HGL = 134.5 m (Meath St)

Max Day (5.04 L/s) + Fire Flow (111 L/s) = 113.7 m (Building C)

Max Day (2.37 L/s) + Fire Flow (111 L/s) = 89.5 m (Building E)

Max Day (8.74 L/s) + Fire Flow (111 L/s) = 117.5 m (Meath St)

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

Additonally:

- The FUS method should be used if they will be designing a new water main or installing hydrants on their site
- They need to provide redundancy for the Phase 2 connection since the demands are greater than 50 m^3/day

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

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

Thanks,

Adam Baker, EIT
Engineering Intern
Planning, Infrastructure and Economic Development Department - Services de la planification, de l'infrastructure et du développement économique
Development Review - South Branch
City of Ottawa | Ville d'Ottawa
110 Laurier Avenue West Ottawa, ON | 110, avenue. Laurier Ouest. Ottawa (Ontario) K1P 1J1
613.580.2424 ext./poste 26552, Adam.Baker@ottawa.ca

From: Charlotte Kelly <CKelly@dsel.ca>
Sent: Wednesday, October 10, 2018 12:07 PM
To: Baker, Adam <adam.baker@ottawa.ca>
Cc: Robert Freel <RFreel@dsel.ca>
Subject: 1354/1376 Carling Avenue - Boundary Condition Request - Job 908

Hi Adam,

Just to follow up with the questions from the water resources group and your conversation with Bobby:

1) Phase 2 demands do not included Phase 1 demands.
2) Building C and E are proposing individual connections to Archibald. An additional valve is being proposed in Archibald to provide redundancy.
3) We are not contemplating any looped connections.

Please follow up myself or Bobby if any further information is required.

Thank-you,

Charlotte Kelly, E.I.T.
Project Coordinator / Junior Designer

DSEL
david schaeffer engineering ltd.

120 Iber Road, Unit 103
Stittsville, ON K2S 1E9

phone: (613) 836-0856 ext.511
email: ckelly@dsel.ca

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From: Baker, Adam <adam.baker@ottawa.ca>
Sent: October 9, 2018 3:56 PM
To: Charlotte Kelly <CKelly@dsel.ca>; Oram, Cody <Cody.Oram@ottawa.ca>
Cc: Robert Freel <RFreel@dsel.ca>
Subject: RE: 1354/1376 Carling Avenue - Boundary Condition Request - Job 908

Hi Charlotte,

Our water resources group has some questions regarding this water boundary request:

1) Does the Phase 2 demand also include Phase 1 demands?
2) Will Building C and E each have their own connection to Archibald?
3) Will their be a looped watermain on their site between Archibald and Meath?

Could you please provide clarification for each of these points.

Thank you,

Adam Baker, EIT
Engineering Intern
Planning, Infrastructure and Economic Development Department - Services de la planification, de l'infrastructure et du développement économique
Development Review - South Branch
City of Ottawa | Ville d'Ottawa
110 Laurier Avenue West Ottawa, ON | 110, avenue. Laurier Ouest. Ottawa (Ontario) K1P 1J1
613.580.2424 ext./poste 26552, Adam.Baker@ottawa.ca

From: Charlotte Kelly <CKelly@dsel.ca>
Sent: Thursday, September 27, 2018 3:15 PM
To: Baker, Adam <adam.baker@ottawa.ca>; Oram, Cody <Cody.Oram@ottawa.ca>
Cc: Robert Freel <RFreel@dsel.ca>
Subject: 1354/1376 Carling Avenue - Boundary Condition Request - Job 908

Good afternoon Adam and Cody,

We would like to resubmit a request for water boundary conditions for 1354 and 1376 Carling Avenue based on changes to the site plan using the following proposed
development demands:

1. Location of Service / Street Number: 1354/1376 Carling Avenue
2. Type of development and the amount of fire flow required for the proposed development:
    - The proposed Phased development is mixed use residential/commercial. The full build-out proposes 878 residential units and 3291 m^2 of commercial space.

- It is proposed that Phase I of the development will have two connections from the existing 150 mm diameter watermain within Archibald Street, and the Phase II development will have connections from Meath Street as shown by the map below.
- Fire demand based City of Ottawa's Technical Bulletin ISTB-2018-02 has been used to calculate an estimated fire demand of 23,000 L/min, it is anticipated that this will exceed the fire flow available from the City network based on previous results.
- For the purpose of estimating fire flow an alternative method has been evaluated, the National Fire Protection Association (NFPA) standards were utilized. As indicated by Section 11.2.2 from the NFPA Standards, fire flow requirements are to be determined by combining the required flow rate for the sprinkler system, along with the anticipated hose stream. As indicated by Table 11.2.2.1 and Table 11.2.3.1.2 extracted from the NFPA Standards, the max fire flow requirements for ordinary hazard sprinkler systems is 5,700 L/min (1500 gpm) and the anticipated internal and external total combined inside and outside hose stream demand for ordinary hazard is 950 L/min (250 gpm). As a result, the max total fire flow is anticipated to be 6,650 L/min (2,450 gpm).

3.

Phase I

Building C	L/min	L/s
Avg. Daily	121.9	2.03
Max Day	302.5	5.04
Peak Hour	664.1	11.07

Building E	L/min	L/s
Avg. Daily	56.9	0.95
Max Day	142.3	2.37
Peak Hour	313.0	5.22

Phase II

	L/min	L/s
Avg. Daily	210.7	3.51
Max Day	524.2	8.74
Peak Hour	1151.6	19.19

Please find the previous boundary request dated April 23rd 2018 and updated calculation sheets attached. Please let me know if you have any questions.

Kind Regards,

Charlotte Kelly, E.I.T.
Project Coordinator / Junior Designer

DSEL
david schaeffer engineering ltd.

120 Iber Road, Unit 103
Stittsville, ON K2S 1E9

phone: (613) 836-0856 ext.511
email: ckelly@dsel.ca

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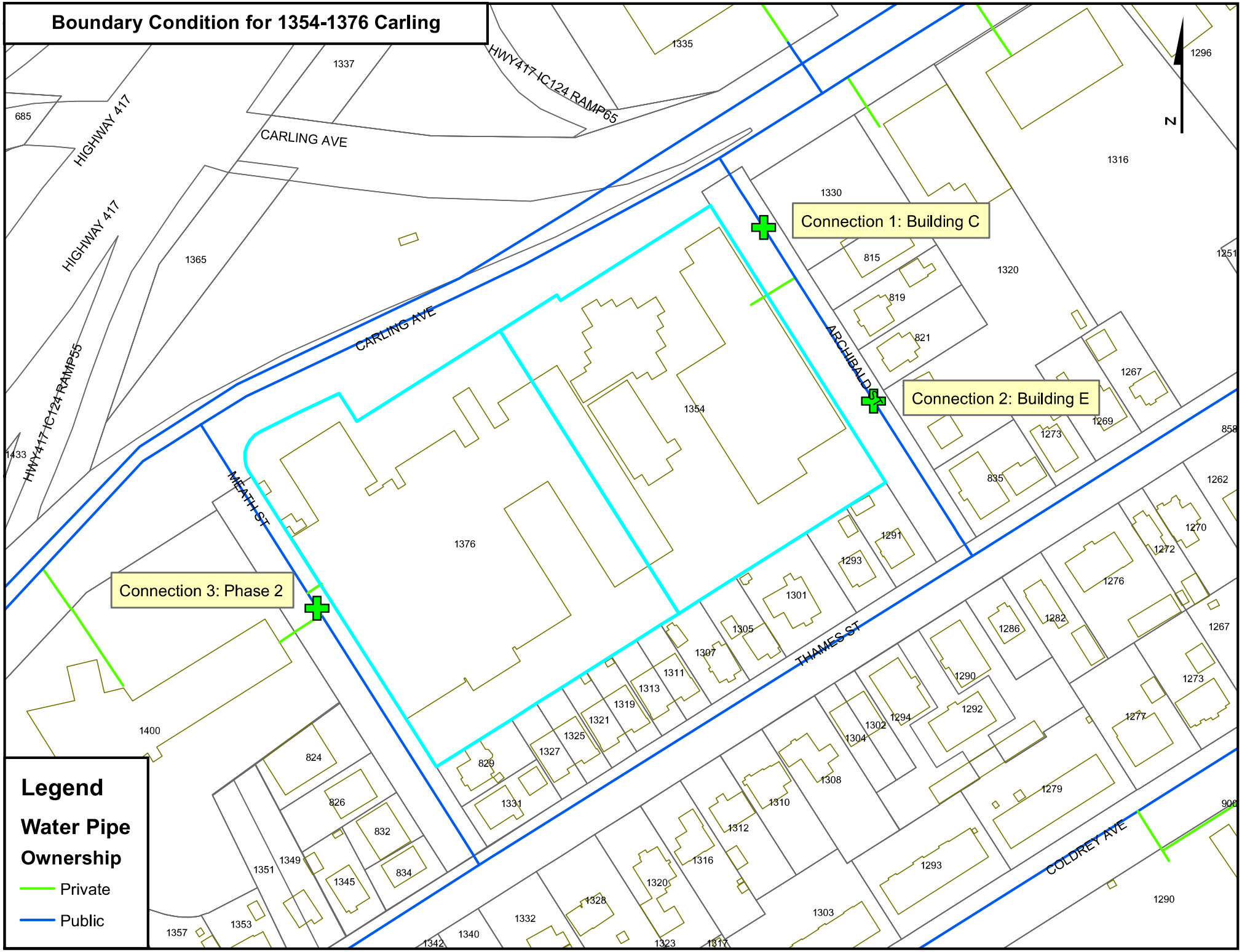
Boundary Condition for 1354-1376 Carling
Connection 1: Building C
Connection 2: Building E
Connection 3: Phase 2
CARLING AVE
HIGHWAY 417
HWY417-IC124-RAMP65
HWY417-IC124-RAMP55
MEATH ST
ARCHIBALD
THAMES ST
COLDREY AVE
N
1354
1376
1365
1400
1316
1320
1279
1290
1293
1303
1308
1310
1312
1331
1335
1337
1296
1251
1267
1262
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1294
1302
1304
1292
1269
1340
1342
1323
1317
1328
1332
1357
1353
1351
1349
1345
834
832
826
824
829
685
1433
858
900
Legend
Water Pipe
Ownership
Private
Public

Appendix H

Site Servicing Checklist

4. Development Servicing Study Checklist

The following section describes the checklist of the required content of servicing studies. It is expected that the proponent will address each one of the following items for the study to be deemed complete and ready for review by City of Ottawa Infrastructure Approvals staff.

The level of required detail in the Servicing Study will increase depending on the type of application. For example, for Official Plan amendments and re-zoning applications, the main issues will be to determine the capacity requirements for the proposed change in land use and confirm this against the existing capacity constraint, and to define the solutions, phasing of works and the financing of works to address the capacity constraint. For subdivisions and site plans, the above will be required with additional detailed information supporting the servicing within the development boundary.

4.1 General Content

N/A ☐ Executive Summary (for larger reports only).

☒ Date and revision number of the report.

☒ Location map and plan showing municipal address, boundary, and layout of proposed development.

☒ Plan showing the site and location of all existing services.

☒ Development statistics, land use, density, adherence to zoning and official plan, and reference to applicable subwatershed and watershed plans that provide context to which individual developments must adhere.

☒ Summary of Pre-consultation Meetings with City and other approval agencies.

☒ Reference and confirm conformance to higher level studies and reports (Master Servicing Studies, Environmental Assessments, Community Design Plans), or in the case where it is not in conformance, the proponent must provide justification and develop a defendable design criteria.

☒ Statement of objectives and servicing criteria.

☒ Identification of existing and proposed infrastructure available in the immediate area.

N/A ☐ Identification of Environmentally Significant Areas, watercourses and Municipal Drains potentially impacted by the proposed development (Reference can be made to the Natural Heritage Studies, if available).

☒ Concept level master grading plan to confirm existing and proposed grades in the development. This is required to confirm the feasibility of proposed stormwater management and drainage, soil removal and fill constraints, and potential impacts to neighbouring properties. This is also required to confirm that the proposed grading will not impede existing major system flow paths.

☒ Identification of potential impacts of proposed piped services on private services (such as wells and septic fields on adjacent lands) and mitigation required to address potential impacts.

☒ Proposed phasing of the development, if applicable.

☒ Reference to geotechnical studies and recommendations concerning servicing.

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

- Metric scale
- North arrow (including construction North)
- Key plan
- Name and contact information of applicant and property owner
- Property limits including bearings and dimensions
- Existing and proposed structures and parking areas
- Easements, road widening and rights-of-way
- Adjacent street names

4.2 Development Servicing Report: Water

☒ Confirm consistency with Master Servicing Study, if available

☒ Availability of public infrastructure to service proposed development

☒ Identification of system constraints

☒ Identify boundary conditions

☒ Confirmation of adequate domestic supply and pressure

☒ Confirmation of adequate fire flow protection and confirmation that fire flow is calculated as per the Fire Underwriter's Survey. Output should show available fire flow at locations throughout the development.

☒ Provide a check of high pressures. If pressure is found to be high, an assessment is required to confirm the application of pressure reducing valves.

N/A ☐ Definition of phasing constraints. Hydraulic modeling is required to confirm servicing for all defined phases of the project including the ultimate design

☒ Address reliability requirements such as appropriate location of shut-off valves

N/A ☐ Check on the necessity of a pressure zone boundary modification.

☒ Reference to water supply analysis to show that major infrastructure is capable of delivering sufficient water for the proposed land use. This includes data that shows that the expected demands under average day, peak hour and fire flow conditions provide water within the required pressure range

☒ Description of the proposed water distribution network, including locations of proposed connections to the existing system, provisions for necessary looping, and appurtenances (valves, pressure reducing valves, valve chambers, and fire hydrants) including special metering provisions.

N/A ☐ Description of off-site required feedermains, booster pumping stations, and other water infrastructure that will be ultimately required to service proposed development, including financing, interim facilities, and timing of implementation.

☒ Confirmation that water demands are calculated based on the City of Ottawa Design Guidelines.

☒ Provision of a model schematic showing the boundary conditions locations, streets, parcels, and building locations for reference.

4.3 Development Servicing Report: Wastewater

☒ Summary of proposed design criteria (Note: Wet-weather flow criteria should not deviate from the City of Ottawa Sewer Design Guidelines. Monitored flow data from relatively new infrastructure cannot be used to justify capacity requirements for proposed infrastructure).

☒ Confirm consistency with Master Servicing Study and/or justifications for deviations.

☒ Consideration of local conditions that may contribute to extraneous flows that are higher than the recommended flows in the guidelines. This includes groundwater and soil conditions, and age and condition of sewers.

☒ Description of existing sanitary sewer available for discharge of wastewater from proposed development.

☒ Verify available capacity in downstream sanitary sewer and/or identification of upgrades necessary to service the proposed development. (Reference can be made to previously completed Master Servicing Study if applicable)

☒ Calculations related to dry-weather and wet-weather flow rates from the development in standard MOE sanitary sewer design table (Appendix 'C') format.

☒ Description of proposed sewer network including sewers, pumping stations, and forcemains.

N/A ☐ Discussion of previously identified environmental constraints and impact on servicing (environmental constraints are related to limitations imposed on the development in order to preserve the physical condition of watercourses, vegetation, soil cover, as well as protecting against water quantity and quality).

N/A ☐ Pumping stations: impacts of proposed development on existing pumping stations or requirements for new pumping station to service development.

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

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

☒ Special considerations such as contamination, corrosive environment etc.

4.4 Development Servicing Report: Stormwater Checklist

☒ Description of drainage outlets and downstream constraints including legality of outlets (i.e. municipal drain, right-of-way, watercourse, or private property)

☒ Analysis of available capacity in existing public infrastructure.

☒ A drawing showing the subject lands, its surroundings, the receiving watercourse, existing drainage patterns, and proposed drainage pattern.

☒ Water quantity control objective (e.g. controlling post-development peak flows to pre-development level for storm events ranging from the 2 or 5 year event (dependent on the receiving sewer design) to 100 year return period); if other objectives are being applied, a rationale must be included with reference to hydrologic analyses of the potentially affected subwatersheds, taking into account long-term cumulative effects.

☒ Water Quality control objective (basic, normal or enhanced level of protection based on the sensitivities of the receiving watercourse) and storage requirements.

☒ Description of the stormwater management concept with facility locations and descriptions with references and supporting information.

N/A ☐ Set-back from private sewage disposal systems.

N/A ☐ Watercourse and hazard lands setbacks.

☒ Record of pre-consultation with the Ontario Ministry of Environment and the Conservation Authority that has jurisdiction on the affected watershed.

N/A ☐ Confirm consistency with sub-watershed and Master Servicing Study, if applicable study exists.

	☒	Storage requirements (complete with calculations) and conveyance capacity for minor events (1:5 year return period) and major events (1:100 year return period).
N/A	☐	Identification of watercourses within the proposed development and how watercourses will be protected, or, if necessary, altered by the proposed development with applicable approvals.
	☒	Calculate pre and post development peak flow rates including a description of existing site conditions and proposed impervious areas and drainage catchments in comparison to existing conditions.
N/A	☐	Any proposed diversion of drainage catchment areas from one outlet to another.
	☒	Proposed minor and major systems including locations and sizes of stormwater trunk sewers, and stormwater management facilities.
N/A	☐	If quantity control is not proposed, demonstration that downstream system has adequate capacity for the post-development flows up to and including the 100-year return period storm event.
N/A	☐	Identification of potential impacts to receiving watercourses
N/A	☐	Identification of municipal drains and related approval requirements.
	☒	Descriptions of how the conveyance and storage capacity will be achieved for the development.
	☒	100 year flood levels and major flow routing to protect proposed development from flooding for establishing minimum building elevations (MBE) and overall grading.
N/A	☐	Inclusion of hydraulic analysis including hydraulic grade line elevations.
	☒	Description of approach to erosion and sediment control during construction for the protection of receiving watercourse or drainage corridors.
N/A	☐	Identification of floodplains – proponent to obtain relevant floodplain information from the appropriate Conservation Authority. The proponent may be required to delineate floodplain elevations to the satisfaction of the Conservation Authority if such information is not available or if information does not match current conditions.
N/A	☐	Identification of fill constraints related to floodplain and geotechnical investigation.

4.5 Approval and Permit Requirements: Checklist

The Servicing Study shall provide a list of applicable permits and regulatory approvals necessary for the proposed development as well as the relevant issues affecting each approval. The approval and permitting shall include but not be limited to the following:

N/A ☐ Conservation Authority as the designated approval agency for modification of floodplain, potential impact on fish habitat, proposed works in or adjacent to a watercourse, cut/fill permits and Approval under Lakes and Rivers Improvement Act. The Conservation Authority is not the approval authority for the Lakes and Rivers Improvement Act. Where there are Conservation Authority regulations in place, approval under the Lakes and Rivers Improvement Act is not required, except in cases of dams as defined in the Act.

N/A ☐ Application for Certificate of Approval (CofA) under the Ontario Water Resources Act.

N/A ☐ Changes to Municipal Drains.

☐ Other permits (National Capital Commission, Parks Canada, Public Works and Government Services Canada, Ministry of Transportation etc.)

4.6 Conclusion Checklist

☒ Clearly stated conclusions and recommendations

☐ Comments received from review agencies including the City of Ottawa and information on how the comments were addressed. Final sign-off from the responsible reviewing agency.

☒ All draft and final reports shall be signed and stamped by a professional Engineer registered in Ontario