ADEQUACY OF PUBLIC SERVICING REPORT

140055-6.04.03

1640 – 1660 Carling Avenue

CITY OF OTTAWA

Prepared for Hobin Architecture Inc.
by IBI Group

December 9, 2022
Revised November 1, 2023

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1 INTRODUCTION

1.1 Objective

IBI Group Professional Services (Canada) Inc. (hereinafter referred to as IBI, or IBI Group) has been retained as a subconsultant for Hobin Architecture Inc (HAI). to prepare this Adequacy of Public Services Report in support of a zoning application to the City of Ottawa. Hobin Architecture Inc. has been retained as prime and architectural consultant by RioCan Management Inc (RioCan). This report will provide stakeholders with a conceptual level layout of the proposed development sufficient to support the zoning application for the subject lands.

1.2 Location

The subject property is approximately 2.28 Ha in size and is located in the City of Ottawa, at 1640 and 1660 Carling Avenue. The site is bound to the north by Carling Avenue with existing commercials lands; to the east by the Carling Mazda Dealership commercials lands; to the south by future residential lands to be constructed (Claridge Homes – 6 Towers); and bound to the west by Clyde Ave N, with existing commercials lands. Refer to **Figure 1.1** below for key map of site location, and **Appendix A** for a copy of the concept redevelopment plan.

Figure 1.1 – Key Map of Subject Lands

1.3 Proposed Development

RioCan is proceeding with the zoning application for redevelopment of it 1640-1660 Carling Avenue site. The proposed development would combine a mix of high density mixed-use residential towers and a park block.

The current concept plan identifies 4 residential – rental buildings and 2 residential buildings. Total anticipated units is 1754 along with 2 public parks and a public plaza. Approximately 2.28 Ha in total; a copy of the plan is included in **Appendix A**.

Vehicular access to the subject lands is primarily proposed off Carling Ave and Clyde Ave N and through the construction of a new 20m public right-of-way through the subject lands.

1.4 Previous Studies

The following reports have been referenced prior to completing this assessment:

- **Site Servicing & Storm Water Management Report** - Delcan, September 2006. This report provides details on the existing stormwater management, waste water management, water supply and includes drawings of the existing site.
- **1640-1660 Carling Avenue, Amendment to Site Servicing and Stormwater Management Report** - Application for Revision to Site Plan D07-12-10-0138, Restaurant Conversion (Boston Pizza) - Delcan, July 2010. This report provides details of the Boston Pizza parcel on the site.

1.5 Pre-Consultation

A pre-consultation meeting was hosted virtually by the City of Ottawa on September 13th, 2022. Notes of the meeting were circulated by City staff on September 26th, 2022 a copy of the pre-consult notes are included in **Appendix A**. To proceed with project development a rezoning for the site is necessary, to change the site from commercial to mixed use/residential zoning. With respect to servicing, there were no specific concerns flagged during the pre-consult.

An informal meeting with the City of Ottawa was held on November 17, 2022, where the city stated their intent to replace and upgrade the sanitary sewer trunk on Carling Avenue flowing eastwards. The City of Ottawa was undertaking a review to confirm if this upgrade would be able to accommodate the increase of sanitary flow proposed from this development. The City has since confirmed that these upgrades will be completed within the next year, and that there are no downstream servicing concerns with the proposed redevelopment plan. Refer to correspondence in **Appendix C**.

1.6 Environmental Issues

No environmental issues were identified during the pre-consultation meeting held with the City of Ottawa on September 13th, 2022.

There are no identified Municipals Drains or watercourses within the proximity to this subject development.

1.7 Geotechnical Considerations

EXP has been retained by RioCan to prepare a Geotechnical investigation. Report is expected in the Spring of 2023 along with Phase 2 ESA and the hydrogeological report.

1.8 Existing Infrastructure

Figure 2.1 Conceptual Watermain Layout, Figure 3.1 Conceptual Sanitary Sewer Layout and Figure 4.1 Conceptual Storm Sewer Layout which can all be found in Appendix B, C and D respectively show the existing infrastructure. The existing sanitary and storm sewers on-site will be decommissioned as new infrastructure will be constructed to better accommodate the re-development.

2 WATER DISTRIBUTION

2.1 Existing Conditions

The subject site is located within Pressure Zone 1W of the City of Ottawa's water distribution system. There is an existing 200mm diameter watermain along Carling Avenue and a 200mm diameter watermain along Clyde Avenue North.

2.2 Design Criteria

2.2.1 Water Demands

As previously noted, the proposed development will consist of 4 residential – rental buildings and 2 residential buildings. Total anticipated units is 1715, for high level analysis purposes a 66-33% split was used to differentiate between 1 bedroom and 2 bedroom units. Based on projected populations taken from Table 4.1 of the City Design Guidelines, a watermain demand calculation sheet was prepared; a copy is included in **Appendix B** and the total water demands are summarized as follows:

Average Day	9.15 l/s
Maximum Day	22.88 l/s
Peak Hour	50.33 l/s
Fire Flow	6,000 l/min

2.2.2 System Pressure

The 2010 City of Ottawa Water Distribution Guidelines states that the preferred practice for design of a new distribution system is to have normal operating pressures range between 345 kPa (50 psi) and 552 kPa (80 psi) under maximum daily flow conditions. Other pressure criteria identified in the guidelines are as follows:

Minimum Pressure	Minimum system pressure under peak hour demand conditions shall not be less than 276 kPa (40 psi)
Fire Flow	During the period of maximum day demand, the system pressure shall not be less than 140 kPa (20 psi) during a fire flow event.
Maximum Pressure	Maximum pressure at any point in the distribution system shall not exceed 689 kPa (100 psi). In accordance with the Ontario Building/Plumbing Code, the maximum pressure should not exceed 552 kPa (80 psi). Pressure reduction controls may be required for buildings where it is not possible/feasible to maintain the system pressure below 552 kPa

2.2.3 Boundary Conditions

The City of Ottawa has provided the hydraulic boundary conditions at both the Carling Avenue and Clyde Avenue Connections. A copy of the boundary conditions is included in **Appendix B** and summarized in the tables that follow:

Table 2-1 Boundary Conditions – Carling Avenue Connection

CRITERIA	HYDRAULIC HEAD
Max HGL (Basic Day)	107.9 m
Peak Hour	114.3 m
Max Day + Fireflow (100.0 L/s)	104.8 m

Table 2-2 Boundary Conditions – Clyde Avenue Connection

CRITERIA	HYDRAULIC HEAD
Max HGL (Basic Day)	107.7 m
Peak Hour	114.3 m
Max Day + Fireflow (100.0 L/s)	104.4 m

Detailed water model analysis and results will provided at the next design stage.

2.2.4 Watermain Layout

The conceptual watermain layout for this development is shown on **Figure 2.1** in **Appendix B.** A 200 mm diameter main will be extended from Carling Avenue. The 200 mm diameter watermain will continue through the public road in the site and connect to Clyde Avenue North, closing the loop. This watermain will service all 6 proposed residential and mixed-use residential structures, as well as the public park.

A hydraulic model using the InfoWater program will be produced during detailed design that will confirm the watermain sizes. Based on the pressures provided by the boundary conditions it is expected that all the watermain pressure and fire flow requirements will be met for this phase. As the proposed watermain layout is well looped without dead end mains it is expected that all the requirements will be achieved at the detailed design phase.

Each building will have two watermain servicing connections for redundancy due to having more than 50 units.

3 WASTEWATER DISPOSAL

3.1 Existing Conditions

The existing 1640 – 1660 Carling Ave wastewater system is shown in **Figure 3.1** in **Appendix C.** The existing peak sanitary flow for all buildings was estimated to be 14.1 L/s as shown in the Delcan Design Sheet also provided in **Appendix C.** Serviced by a 200 mm diameter sanitary pipe that outlets into a 300 mm diameter sewer on Carling Avenue.

The existing sanitary main on Carling Avenue is approaching its end-of-life stage and the City of Ottawa already has planned to replace and upgrade the sanitary main to a larger size to accommodate the increased flow from both the 1660 Carling Ave project and the Claridge Homes – 6 Towers project. The City of Ottawa has confirmed that this upgrade shall occur before the expected development of 1640 – 1660 Carling, and that the upgrade will account for the increase density resulting from the rezoning of this parcel. Refer to correspondence provided in **Appendix C**.

3.2 Design Criteria

The sanitary flows for the subject lands are determined based on current City of Ottawa design criteria and the population densities established in the MSS, which includes, but is not limited to the following:

3.2.1 Design Flow:

Average Residential Flow	-	280 l/cap/day
Average Commercial/Institution Flow	-	28,000 l/Ha/day
Peak Residential Factor	-	Harmon Formula
Peak Commercial/Institution Factor	-	1.0
Infiltration Allowance	-	0.33 l/sec/Ha

3.2.2 Population Density per Table 4.1:

2 Bedroom Unit	-	2.1 person/unit
1 Bedroom Unit	-	1.4 person/unit

3.3 Proposed Wastewater Disposal System

It is proposed that the subject lands discharge into the existing wastewater disposal system, the 300 mm diameter sanitary sewer along Carling Avenue. The connection point will now be 22 m upstream, to the west of the previous connection point along the Carling Avenue Sanitary main.

The proposed total flow from the subject lands would increase the total peak flow from 14.1 L/s to 28.6 L/s, a net increase of 14.5 L/s. This additional flow may stress the existing sanitary system. Development restrictions may be required to coincide with the timing of the sanitary sewer upgrade.

The proposed Sanitary sewers will consist of 300mm to 200mm diameter sewers, constructed to current City of Ottawa design standards. A conceptual Sanitary Sewer layout is provided on

Figure 3.1, and a Sanitary Drainage Area Plan **Figure 3.2**, and a conceptual **Sanitary Sewer Design Sheet** have been prepared for this Adequacy of Public Servicing Report in order to confirm approximate pipes sizes and sewer crossing information that corresponds with the grade raise restriction, unit types and macro grading concept of the proposed redevelopment plan. These documents can be found in **Appendix C.**

3.3.1 Proposed Population Calculations

As previously noted, the high level analysis concept development plan anticipates 526 two bedroom units, and 1228 single bedroom units, along with 0.67 ha of commercial area. The total anticipated design population is indicated below.

Table 3-1

UNIT TYPE	# OF UNITS	POPULATION DENSITY	POPULATION
2 Bedroom	526	2.1 pp/unit	1104
1 Bedroom	1228	1.4 pp/unit	1720
TOTAL	1754	-	**2824**

3.3.2 Design Flows

Design flows for the proposed development lands are determined in the following table.

Table 3-2

POP	280 L/POP/DAY	PEAK FACTOR	PEAK FLOW	AREA	TOTAL FLOW
2824	280	2.97	27.55 L/s	2.28 ha	**28.56 L/s**

Based on the results, peak flows estimated from the proposed concept plan are larger than the existing peak flows from the subject lands. Once the upgrade of the Carling Avenue Sanitary Sewer is completed it will accommodate the discharge and have no negative impact on downstream infrastructure. The city has recommended a Zoning hold be placed on this parcel until such time as the Carling Avenue sanitary works have been completed.

4 STORMWATER MANAGEMENT

4.1 Existing Conditions

The existing 1640 – 1660 Carling Ave stormwater system is shown in Figure 4.1 in **Appendix D**. The existing development plan currently has two discharge locations. The Carling Avenue and Clyde Avenue N stormwater connections both discharge into a 375 mm diameter stormwater main at their respective locations.

The existing development includes an oil and grit separator at each connection, for water quality control. The oil and grit separators include 80% TSS removal.

4.2 Synopsis of Previous Studies

The Delcan 2006 Site Servicing and Stormwater Management Report from 2006 can be found in **Appendix D**, which highlights the existing conditions noted above in section 4.1.

Additionally, the report identified a total 100-year maximum release rate of 235 L/s. This is based on a 5-year restriction with a c-value of 0.50 and a Tc of 20 minutes. This represents a level of service of 103.07 L/s/ha.

4.3 Proposed Stormwater Management Plan

The stormwater management system for the site will incorporate standard urban drainage design and stormwater management features may include:

- a dual drainage concept
- routing of surface runoff
- underground storage
- roof top storage

The stormwater management system will be developed based on the MOE *Stormwater Management Planning and Design Manual* (March 2003) and the *City of Ottawa Sewer Design Guidelines* (October 2012). Additionally, the system has incorporated, wherever possible given the existing trunk sewer inlet capacity restrictions, the new guidelines set forth within the Technical Bulletin ISDTP-2014-1 and PIEDTB-2016-01.

4.4 Minor Storm Sewer Design Criteria

The minor storm flow estimates were reviewed by the rational method. A conceptual Storm sewer layout **Figure 4.1**, a conceptual Storm Drainage Area Plan **Figure 4.2**, and a conceptual **Storm Sewer Design Sheet** have been prepared for this adequacy of public servicing report in order to confirm approximate pipes sizes and sewer crossing information that corresponds with the grade raise restriction, unit types and macro grading concept of the proposed phase. These documents can be found in **Appendix D.** Criteria used in the minor storm sewer design include, but are not limited to the following:

- Intensity 2 year curve (local and minor collector roads)
- Initial Time of Concentration 10 min
- Approximate Average Runoff Coefficients used for this assessment only:
  Average Subject Area 0.50

- Velocities 0.80 m/s to 6.0 m/s
- Manning roughness coefficient 0.013 (smooth wall pipes)
- Minimal allowable slopes Refer to below table

Table 4-1 Minimal allowable slopes

DIAMETER (MM)	SLOPE (%)
250	0.432
300	0.340
375	0.250
450	0.195
525	0.160

- Minimum depth of cover of 2.0 m

The minimum minor system capture of ICDs for 1660 Carling Avenue will be based on the maximum release rate identified above. The subject site will be modelled using DDSWMM and XPSWMM to confirm minor and major system flows. Hydrographs from the site will be downloaded to XPSWMM hydraulic model to confirm hydraulic grade line within the proposed storm sewers. Due to the very restrictive nature of the release rate, it is anticipated that the future public right-of-way will require an underground storm water storage system. This may impact the amount of useable space in the boulevard for public owned street trees. The maximum allowable release rate will be pro-rated by area to each block. It is anticipated that each block, including the public park, will incorporate underground or roof top storage measures.

4.5 Major System

Inlet control devices (ICDs) will be proposed to control the surcharge in the minor system downstream of the site during infrequent storm events and maximize the use of available on-site storage. Emergency flow routes have been provided. Freeboard to each building entrance will comply with current City of Ottawa ODSG.

Major flow up to the 100 year event will be retained on-site, flows in excess of the 100 year event will flow along the emergency flow routes as shown on the macro grading plan.

4.6 Hydrological Analysis

The dual drainage system will be evaluated during detailed design stage using the DDSWMM hydrological model, while the minor system hydraulic grade line analysis will be evaluated using the XPSWMM dynamic model.

The primary focus of the hydrological analysis will be to evaluate surface flow and ponding conditions during the 100-year storm event in order to satisfy City of Ottawa Sewer Design Guidelines (2012) in terms of velocity x depth.

4.7 Conceptual Storm Sewer System

Figure 4.1 in **Appendix D** illustrates a conceptual layout of the storm sewer network to service the redevelopment plan. The Storm Drainage Area **Figure 4.2** and Storm Sewer Design sheet, also found in **Appendix D,** have been updated to illustrate the existing downstream infrastructure is suitably sized to accommodate the proposed development. The storm sewers for the subject lands will be designed to meet City of Ottawa and MOE requirements. Two branches are proposed with one connecting to Carling Avenue, and the other connecting to Clyde Avenue N, similar to the existing system. The existing connection locations will have to be relocated to accommodate the construction of the new towers.

The Storm Water Management system shall be designed so that each block will be self-contained. The storm water flow allocation for each catchment shall be pro-rated based on area. Table 4-2 below shows the conceptual area of each block, and it's percentage of the total site area. The designed flow allocation for each area is based on the product of the pro-rated area and the level of service of 103.07 L/s/ha.

Table 4-2 Pro-Rated Flow Allocation

BLOCK	AREA (HA)	PERCENTAGE	PRO-RATED FLOW (L/S)
Block 1	0.24	10.53%	24.74
Block 2	0.16	7.02%	16.49
Block 3	0.28	12.28%	28.86
Block 4	0.2	8.77%	20.61
Block 5	0.24	10.53%	24.74
Block 6	0.33	14.47%	34.01
Park 1	0.18	7.89%	18.55
Park 2	0.25	10.96%	25.77
STR 1	0.31	13.60%	31.95
STR 2	0.09	3.95%	9.28
SUMS	2.28		235

The entire site has a maximum discharge amount of 235 L/s as per the Delcan 2006 report. The site has two connection locations, one on Clyde Avenue and one on Carling Avenue. The stormwater allocation amount between the two branches is as follows:

Table 4-3 Carling vs Clyde Connections Flow Allocation

BLOCK	FLOW (L/S)	TOTAL
Carling Avenue Connection		
Block 1	24.74	175.21 L/s
Block 2	16.49	
Block 3	28.86	
Block 4	20.61	
Block 6	34.01	
Park 1	18.55	
STR 1	31.95	
Clyde Avenue Connection		
Block 5	24.74	59.79 L/s
Park 2	25.77	
STR 2	9.28	

4.8 Storm Water Quantity Control

The table below shows the anticipated amount of storage necessary within each block to meet the pro-rated level service identified above. The intent is that each block operates independently of others. Rooftop, surface, or underground storage solutions maybe implemented at detailed design for each area. Stormwater storage within public spaces, such as the roads or park blocks, shall not be sized to accommodate additional volume from the private development blocks.

Table 4-4 Anticipated Storage Volume

BLOCK	STORAGE (M^3)
Block 1	42.34
Block 2	28.23
Block 3	49.40
Block 4	35.29
Block 5	42.34
Block 6	58.22
Park 1	9.04
Park 2	14.32

BLOCK	STORAGE (M^3)
STR 1	73.30
STR 2	21.28

Park Block SWM – The anticipated storage within the park blocks is 9.04 m^3 and 14.32 m^3 as noted above. It is anticipated the grading of each park block can accommodate its stormwater management onsite and on surface, however based on park amenities and other constraints, underground storage may be required during detailed design.

Road Segment SWM – The anticipated storage within the road segments is 73.30 m^3 and 21.28 m^3 as noted above. It is anticipated the grading of each road segments can accommodate its stormwater management onsite and on surface, however based on final grading and other constraints, underground storage may be required during detailed design.

4.9 Storm Water - Water Quality Control

As per the existing conditions identified in section 4.1, on site water quality control is required. Therefore, each of the outlets will require new oil and grit separators sized to provide 80% TSS removal.

5 GRADING AND ROADS

5.1 Site Grading

The existing grades within portions of the proposed development lands vary due to the existing topography of the site. The final grading plan will require the balancing of various requirements including but not limited to geotechnical constraints, minimum/maximum slopes, overland routing of stormwater, all to ensure the site is graded in accordance with municipal standards.

A conceptual macro grading plan has been prepared to identify the conceptual grading of the proposed development. Refer to F**igure 6.1** in **Appendix E**.

A retaining wall is anticipated along the south and eastern property lines.

5.2 Road Network

The concept plan delineates the proposed road pattern for the development. The proposed municipal road within the development is to be designed to a 20.0m non-standard local road ROW, with 7.5m wide asphalt at travel lanes, widening to 12.5m where roadside parking is provided.

There are 38 road-side parking spaces along the public road through the development. There are an additional 896 underground parking spaces. The breakdown of the underground parking spaces can be seen in Table 5-1 and a parking concept plan can be seen in **Appendix E.**

Table 5-1 Parking Spaces

LOCATION	LEVELS	TOTAL SPOTS
STREET	-	38
BUILDING 1	3	120
BUILDING 2	3	160
BUILDING 3	1	116
BUILDING 4	3	150
BUILDING 5&6 (INTERCONNECTED)	4	450

Noise attenuation features and housing noise provisions will be required for road noise generated by Carling Avenue and Clyde Avenue North. Refer to the Noise Feasibility Study prepared by Gradient Wind.

Sidewalks and pathways will be provided as agreed in the draft conditions of subdivision.

5.3 Intersection Improvements

Any intersection improvements will be identified in the Traffic Impact Study.

6 SOURCE CONTROLS

6.1 General

Oil and grit separators are provided as stormwater treatment prior to connections to existing infrastructure. On site measures may include the following:

- flat site grading where possible
- vegetation planting
- groundwater recharge in landscaped areas

6.2 Lot Grading

Where possible, all of the proposed blocks within the development will make use of gentle surface slopes on hard surfaces such as asphalt and concrete. In accordance with local municipal standards, all grading will be between 0.5 and 5.0 percent for hard surfaces and 2.0 and 7.0 percent for all landscaped areas. Significant grade changes will be accomplished through the use of terracing (3:1 max slope), ramps and/or retaining walls. All street and parking lot catchbasins shall be equipped with 3.0m subdrains on opposite sides of a curbside catchbasin running parallel to the curb, and with 3.0m subdrains extending out from all 4 sides of parking lot catchbasins.

6.3 Vegetation

As with most subdivision agreements, the developer will be required to complete a vegetation and planting program. Vegetation throughout the development including planting along roadsides and within the individual blocks provides opportunities to re-create lost vegetation.

6.4 Groundwater Recharge

Groundwater recharge targets have not been identified for this site. Perforated sub-drain systems will be implemented at capture locations in all vegetated areas. This will promote increased infiltration during low flow events before water is collected by the storm sewer system.

7 CONVEYANCE CONTROLS

7.1 General

Besides source controls, the development also proposes to use several conveyance control measures to improve runoff quality. These will include:

- vegetated swales; and
- catchbasin sumps and manhole sumps.

7.2 Catchbasins and Maintenance Hole Sumps

All catchbasins within the development, either rear yard or street, will be constructed with minimum 600 mm deep sumps. These sumps trap pollutants, sand, grit and debris which can be mechanically removed prior to being flushed into the minor pipe system. Both rear yard and street catchbasins will be to OPSD 705.02. All storm sewer maintenance holes serving local sewers less than 900 mm diameter shall be constructed with a 300 mm sump as per City standards.

8 SEDIMENT AND EROSION CONTROL PLAN

8.1 General

During construction, existing stream and conveyance systems can be exposed to significant sediment loadings. A conceptual sediment and erosion control will be detailed during the detailed design stages. Although construction is only a temporary situation, it will be proposed to introduce a number of mitigative construction techniques to reduce unnecessary construction sediment loadings. These may include:

- groundwater in trench will be pumped into a filter mechanism prior to release to the environment;
- bulkhead barriers will be installed at the nearest downstream manhole in each sewer which connects to an existing downstream sewer;
- seepage barriers will be constructed in any temporary drainage ditches;
- filter cloths will remain on open surface structure such as manholes and catchbasins until these structures are commissioned and put into use; and
- Silt fence on the site perimeter.

8.2 Trench Dewatering

Although little groundwater is expected during construction of municipal services, any trench dewatering using pumps will be discharged into a filter trap made up of geotextile filters and straw bales similar in design to the OPSD 219.240 Dewatering Trap. These will be constructed in a bowl shape with the fabric forming the bottom and the straw bales forming the sides. Any pumped groundwater will be filtered prior to release to the existing surface runoff. The contractor will inspect and maintain the filters as needed including sediment removal and disposal and material replacement as needed.

8.3 Bulkhead Barriers

At the first new manhole constructed within the development that is immediately upstream of an existing sewer a temporary ½ diameter bulkhead will be constructed over the lower half of the outletting sewer. This bulkhead will trap any sediment carrying flows thus preventing any construction-related contamination of existing sewers. The bulkheads will be inspected and maintained including periodic sediment removal as needed and removed prior to top course asphalt being laid.

8.4 Seepage Barriers

In order to further reduce sediment loading to the stormwater management facility, seepage barriers will be installed on any surface water courses at appropriate locations that may become evident during construction. These barriers will be Light Duty Straw Bale Barriers per OPSD 219.100 and Heavy-Duty Silt Fence Barriers per OPSD 219.130; locations are shown on the Sediment and Erosion Control Plan included in **Appendix E**. They are typically made of layers of straw bales or geotextile fabric staked in place. All seepage barriers will be inspected and maintained as needed.

8.5 Surface Structure Filters

All catchbasins, and to a lesser degree manholes, convey surface water to sewers. However, until the surrounding surface has been completed these structures should be covered in some fashion to prevent sediment from entering the minor storm sewer system. Until landscaped areas are sodded or until streets are asphalted and curbed, catchbasins and manholes will be constructed with geotextile filter bags or a geotextile filter fabric located between the structure frame and cover respectively. These will stay in place and be maintained during construction and build until it is appropriate to remove same.

8.6 Stockpile Management

During construction of any development similar to that proposed by the Owner, both imported and native soils are stockpiled. Mitigative measures and proper management to prevent these materials entering the sewer systems is needed. Significant excess material will be generated from the subject lands and will need to be disposed of off-site in a manner consistent with all MOE regulations.

During construction of the deeper municipal services, water, sewers and service connections, imported granular bedding materials are temporarily stockpiled on site. These materials are however quickly used up and generally before any catchbasins are installed.

Contamination of the environment as a result of stockpiling of imported construction materials is generally not a concern provided the above noted seepage barriers are installed. These materials are quickly used and the mitigative measures stated previously, especially the ½ diameter sewer bulkheads and filter fabric in catchbasins and manholes help to manage these concerns.

The roadway granular materials are not stockpiled on site. They are immediately placed in the roadway and have little opportunity of contamination. Lot grading sometimes generates stockpiles of native materials. However, this is only a temporary event since the materials are quickly moved off site.

To assist in the control of transporting sediment off-site into municipal roads, mud mats will be employed at the construction entrances.

9 CONCLUSIONS

Water and stormwater systems required to accommodate the orderly development of the 1640-1660 Carling Avenue Development are available to service the subject site. Wastewater systems will be able to accommodate the development once the City of Ottawa completes upgrades to the sanitary system on the Carling Avenue. Phasing the construction of the towers can be organized to not stress the existing wastewater system until necessary upgrades are completed. The attached figures and supporting conceptual analysis illustrate that the lands can be re-zoned and developed in an orderly and effective manner and in accordance with the City of Ottawa's current level of service requirements.

The use of lot level controls, conveyance controls and end of pipe controls outlined in the report will result in effective treatment of surface stormwater runoff from the site. Adherence to the proposed sediment and erosion control plan during construction will minimize harmful impacts on surface water.

This report outlined a conceptual servicing scheme to support the rezoning application of the proposed development. Detail design of the infrastructure would be completed upon issuance of draft plan approval and would be subject to various governmental approvals prior to construction, including but not limited to the following:

- Certificate of Authorization (C of A) for sewers and SWM: Ministry of Environment;
- Commence Work Order: City of Ottawa;

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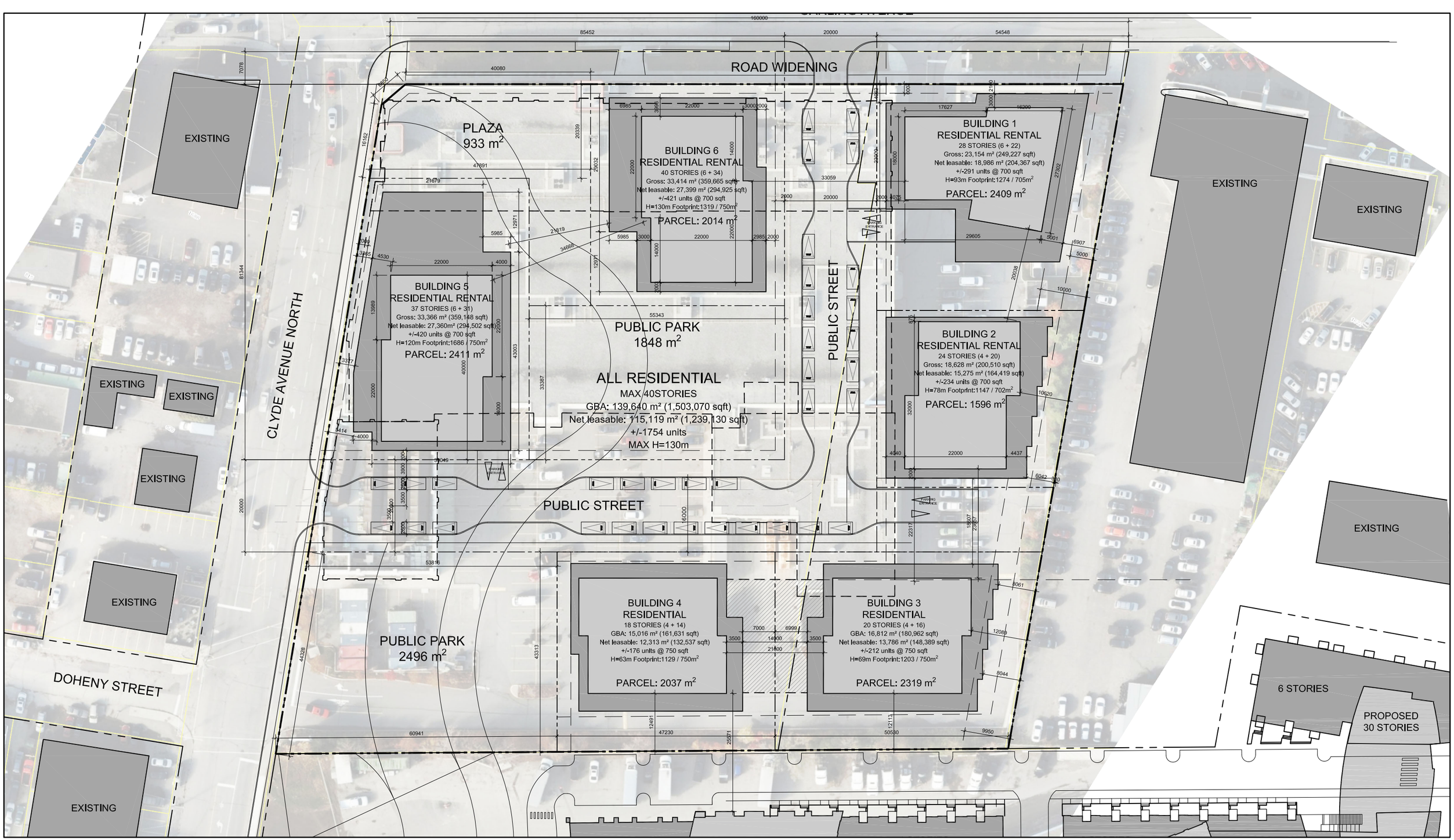
APPENDIX A

- Conceptual Site Plan
- Notes of Pre-Consultation Meeting with City of Ottawa
- Existing Conditions – Delcan Servicing Plan



HOBIN

1640 - 1660 CARLING AVE

Concept Plan - Full Build Out - South west corner park

SCALE: 1:750

23.09.06

ROAD WIDENING

EXISTING

EXISTING

EXISTING

EXISTING

EXISTING

EXISTING

EXISTING

EXISTING BOSTON PIZZA
Gross footprint: 470.1 m² (5,060 sqft)
PARCEL: 2410 m²

28
PARKING
BOSTON PIZZA PARKING RATE
28 SPACES / 497m² = 5.63 / 100m2 (5.23 / 1000 sqft)

GARBAGE

EXISTING GYM AND RECREATION FACILITY

CLYDE AVENUE NORTH

PH 1 RESIDENTIAL
MAX 20 STORIES
GBA: 31,828 m² (342,594 sqft)
Net leasable: 26,099 m² (280,927 sqft)
+/-388 units
MAX H=69m

PUBLIC STREET

PUBLIC PARK
2496 m²

BUILDING 4
RESIDENTIAL
18 STORIES (4 + 14)
GBA: 15,016 m² (161,631 sqft)
Net leasable: 12,313 m² (132,537 sqft)
+/-176 units @ 750 sqft
H=63m Footprint:1129 / 750m²
PARCEL: 2037 m²

BUILDING 3
RESIDENTIAL
20 STORIES (4 + 16)
GBA: 16,812 m² (180,962 sqft)
Net leasable: 13,786 m² (148,389 sqft)
+/-212 units @ 750 sqft
H=69m Footprint:1203 / 750m²
PARCEL: 2319 m²

6 STORIES

PROPOSED
30 STORIES

DOHENY STREET

1640 - 1660 CARLING AVE

Concept Plan - Phase 1 - South west corner park

SCALE: 1:750

23.09.06

HOBIN

Pre-Application Consultation Meeting Notes

Property Address: 1640-1660 Carling Avenue
PC2022-0215
September 13, 2022; 2:30 PM – 3:30 PM – Microsoft Teams

Attendees:

City of Ottawa:

Kersten Nitsche – *File Lead, Planner III*
Masha Wakula Vakula – *Planner I*
Mohammed Fawzi – *Infrastructure PM*
Patrick McMahon – *Transportation PM*
Christopher Moise – *Urban Design*
Mike Russett – *Parks Planner*
Amber Chen – *Student Planner*

Applicants:

Doug Van Den Ham – *Hobin Architecture*
Patrick Bisson – *Hobin Architecture*
Paul Black – *Fotenn Consultants Inc.*
Bipin Dhillon – *Fotenn Consultants Inc.*
Stuart Craig – *RioCan REIT*
Vanessa Leon – *RioCan REIT*
Basel Ansari – *Parsons Corporation*
Ryan Magladry – *IBI Group*

Community Representatives:

N/A

Regrets:

Mark Richardson – *Forester, City of Ottawa*

Subject: 1640-1660 Carling Avenue

Meeting notes:

Opening & attendee introduction

- Introduction of meeting attendees

Overview of Proposal

- Zoning By-law Amendment Application
  - Currently not looking for a Site Plan Control Application

- Arterial Mainstreet Zone, Subzone 10 (AM10)
- Redevelopment of the site: highest profile building is put in the corner of Carling and Clyde, transitioning down towards east and south to create a valley of building forms
- Harder landscape, urban plaza is proposed with possible retail and commercial uses
- Internal public street is proposed
- Various public spaces are proposed in the middle of the site
- The 8-storey building is intended for seniors
- Need roughly 900 parking spaces on the site

Planning – Kersten Nitsche

- If you move forward with introducing a public road, you will need a Plan of Subdivision application
- Buildings on the south side facing Claridge; what's the intention for those buildings? Will there be access crossing?
- What is your anticipated timing for the zoning application?
    - Answer: Ideally early 2024 for approval
- Do you anticipate/will you be talking to Claridge? It would be ideal to link the public roads with each other
- As noted by Urban Design, we recommend a conceptual context plan be developed to help envision the future context. Please include the site at 861 Clyde as well as any other sites in the immediate vicinity that are undergoing or have the potential for redevelopment.
- Overall, it seems that the tower separation and maximizing the number of buildings has led the site layout. Within the contextual analysis, please ensure that you analyze and consider the public spaces first.

Urban Design – Christopher Moise

- This proposal runs along one of the City's Design Priority Areas and must attend the City's UDRP. We recommend the proposal attend an Informal visit (prior to a full submission and is not a public meeting), with the City's UDRP to further discuss and evaluate various scenarios of development for the whole site;
- We appreciate the design material submitted for the pre-consultation meeting and have the following comments/questions about the design:
    - **Secondary plan**: There is no secondary planning document to help direct development for this site, however the property to the south at 861 Clyde developed 'conceptual context framework plans' to help envision the future context around the site on adjacent streets and blocks- (see attached). We recommend this proposal do a similar exercise and use that to guide the discussion with staff and at the UDRP;
    - **High-rise guidelines**: We recommend the proposal fully considers the guidelines especially with regard to: Floorplate max 750m2; Separation distance 23m between towers; 11.5m to adjacent property lines;
    - **Parks**: We recommend the location and size be considered further, especially considering a shadow study of the built form on and around the site;

- A scoped Design Brief is a required submittal (and separate from any UDRP submission) for all Site Plan/Re-zoning applications. Please see the Design Brief Terms of Reference provided and consult the City's website for details regarding the UDRP schedule.
    - ***Note. The Design Brief submittal should have a section which addresses these pre-consultation comments;***

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

Parks Comments – Mike Russett

- Formal comments pending.
- Please review the provisions of Parkland Dedication By-law 2022-280.

Infrastructure Notes and Comments – Mohammed Fawzi

Available Infrastructure:

Carling Avenue:

- *Sanitary: 225mm Conc (Install N/A)
- Storm: 375mm Conc (Install N/A)
- Water: 203mm UCI (Install 1958)
- Storm: 225mm Conc (Install 1959)
- **Water: 610mm COO (Install 1955)

- *Sanitary capacity to be evaluated and confirmed. Please send an email with proposed sanitary flows to determine if constraints are present.
- **No connections to large diameter watermains are permissible. A watermain protection plan may be required during detailed design in the event construction to large watermain is in close proximity.

Clyde Avenue:

- Sanitary: 225mm Conc (Install 1955)
- Storm: 300mm Conc (Install 1961)
- Water: 203mm UCI (Install 1955)

Water Boundary Conditions:

- Will be provided at request of consultant. Requests must include the location of the service and the expected loads required by the proposed development. Please provide the following and submit Fire Flow Calculation Sheet per FUS method with the request:
    - Location of service
    - Type of development and amount of required fire flow (per FUS method – include FUS calculation sheet with request)
    - Average Daily Demand (l/s)
    - Maximum Hourly Demand (l/s)
    - Maximum Daily Demand (l/s)
- Water Supply Redundancy – Fire Flow:
    - Applicant to ensure that a second service with an inline valve chamber be provided where the average daily demand exceeds 50 m^3 / day (0.5787 l/s per day)
- Water services larger than 19 mm require a Water Data Card. Please complete card and submit.

Stormwater Management (Quantity Control):

- Coefficient (C) of runoff determined **as per existing conditions** but in no case more than 0.5.
- TC = To be calculated, minimum 10 minutes
- Any storm events greater than 2 year, up to 100 year, and including 100-year storm event must be detained on site.
- Foundation drains are to be independently connected to sewer main unless being pumped with appropriate back up power, sufficient sized pump and back flow prevention.
- Roof drains are to be connected downstream of any incorporated ICD within the SWM system.

Stormwater Management (Quality Control):

- Rideau Valley Conservation Authority to provide Quality Controls.

Noise Study:

- Noise study required – due to proximity to existing Arterial Road (Carling Avenue).

Phase I and Phase II ESA:

- Phase I ESA is required; Phase II ESA may be required depending on the results of the Phase I ESA. Phase I ESA must include an EcoLog ERIS Report.
- Phase I ESA and Phase II ESAs must conform to clause 4.8.4 of the Official Plan that requires that development applications conform to Ontario Regulation 153/04.

Required Studies

- Assessment of Adequacy of Public Services
- Geotechnical Study
- Phase I ESA
- Phase II ESA (depends on outcome of Phase I)
- Noise Study

Required Plans

- Site Servicing Layout Plan

Snow Storage:

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

Exterior Site Lighting:

- Any proposed light fixtures (both pole-mounted and wall mounted) must be part of the approved Site Plan. All external light fixtures must meet the criteria for Full Cut-off Classification as recognized by the Illuminating Engineering Society of North America (IESNA or IES), and must result in minimal light spillage onto adjacent properties (as a guideline, 0.5 fc is normally the maximum allowable spillage). In order to satisfy these criteria, the please provide the City with a Site Lighting Plan, and Certification (Statement) Letter from an acceptable professional engineer stating that the design is compliant.

Relevant information

- The Servicing Study Guidelines for Development Applications are available at the following address: https://ottawa.ca/en/city-hall/planning-and-development/information-developers/development-application-review-process/development-application-submission/guide-preparing-studies-and-plans#servicing-study-guidelines-development-applications
- 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)
- 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).
- Any proposed work in utility easements requires written consent of easement owner.
- Please note that these comments are considered preliminary based on the information available to date and therefore maybe amended as additional details become available and presented to the City. It is the responsibility of the applicant to verify the above information. The applicant may contact me for follow-up questions related to engineering/infrastructure prior to submission of an application if necessary.

Transportation – Patrick McMahon

- Follow Traffic Impact Assessment Guidelines
    - Start this process as soon as possible. Applicant advised that their application will not be deemed complete until the submission of the draft step 1-4.
- Traffic calming measures will be evaluated at the time of submission of TIA Step 4 if the public roadway is pursued. Traffic calming measures shall reference best management practices from the Canadian Guide to Neighbourhood Traffic Calming, published by the Transportation Association of Canada, and/or Ontario Traffic Manual, and/or the City of Ottawa's Draft Traffic Calming Design Guidelines.
- Site triangles at the following locations on the final plan will be required:
    - Local at Clyde: 3 metres x 3 metres
    - Local at Carling: 5 metres x 5 metres
- Noise Impact Studies required for the following:
    - Road
    - Stationary (at time of site plan) if there will be any exposed mechanical equipment due to the proximity to neighbouring noise sensitive land uses.
- On site plan:
    - Show all details of the roads abutting the site up to and including the opposite curb; include such items as pavement markings, accesses and/or sidewalks.
    - Turning templates will be required for all accesses showing the largest vehicle to access the site; required for internal movements and at all access (entering and exiting and going in both directions).
    - Show all curb radii measurements; ensure that all curb radii are reduced as much as possible
    - Show lane/aisle widths.
- Show the 44.5m ROW protection for Carling Avenue.
- Minor realignment of the bus pad on Carling may be required, to be confirmed at site plan.
- Providing at least one bicycle parking pace per unit is encouraged rather than the minimum 0.5/unit. With Carling's reduced vehicular capacity, sustainable transportation infrastructure will be increasingly important.
- Consideration should be given to aligning the local through Doheny and through the site.

Foresting – Mark Richardson

TCR requirements:

- A Tree Conservation Report (TCR) must be supplied for review along with the suite of other plans/reports required by the City
    - an approved TCR is a requirement of Site Plan approval.
    - The TCR may be combined with the LP provided all information is supplied
- Any removal of privately-owned trees 10cm or larger in diameter, or city-owned trees of any diameter requires a tree permit issued under the Tree Protection Bylaw (Bylaw 2020 – 340); the permit will be based on an approved TCR and made available at or near plan approval.
- The Planning Forester from Planning and Growth Management as well as foresters from Forestry Services will review the submitted TCR
    - If tree removal is required, both municipal and privately-owned trees will be addressed in a single permit issued through the Planning Forester
    - Compensation may be required for city owned trees – if so, it will need to be paid prior to the release of the tree permit
- The TCR must contain 2 separate plans:
    - Plan/Map 1 - show existing conditions with tree cover information
    - Plan/Map 2 - show proposed development with tree cover information
    - Please ensure retained trees are shown on the landscape plan
- the TCR must list all trees on site, as well as off-site trees if the CRZ extends into the developed area, by species, diameter and health condition
- please identify trees by ownership – private onsite, private on adjoining site, city owned, co-owned (trees on a property line)
- If trees are to be removed, the TCR must clearly show where they are, and document the reason they cannot be retained
- All retained trees must be shown, and all retained trees within the area impacted by the development process must be protected as per City guidelines available at Tree Protection Specification or by searching Ottawa.ca
    - the location of tree protection fencing must be shown on the plan
    - show the critical root zone of the retained trees
- the City encourages the retention of healthy trees; if possible, please seek opportunities for retention of trees that will contribute to the design/function of the site.
- For more information on the process or help with tree retention options, contact Mark Richardson mark.richardson@ottawa.ca or on City of Ottawa

LP tree planting requirements:

For additional information on the following please contact tracy.smith@Ottawa.ca

Minimum Setbacks

- Maintain 1.5m from sidewalk or MUP/cycle track or water service laterals.
- Maintain 2.5m from curb
- Coniferous species require a minimum 4.5m setback from curb, sidewalk or MUP/cycle track/pathway.
- Maintain 7.5m between large growing trees, and 4m between small growing trees. Park or open space planting should consider 10m spacing, except where otherwise approved in naturalization / afforestation areas. Adhere to Ottawa Hydro's planting guidelines (species and setbacks) when planting around overhead primary conductors.

Tree specifications

- Minimum stock size: 50mm tree caliper for deciduous, 200cm height for coniferous.
- Maximize the use of large deciduous species wherever possible to maximize future canopy coverage
- Tree planting on city property shall be in accordance with the City of Ottawa's Tree Planting Specification; and include watering and warranty as described in the specification (can be provided by Forestry Services).
- Plant native trees whenever possible
- No root barriers, dead-man anchor systems, or planters are permitted.
- No tree stakes unless necessary (and only 1 on the prevailing winds side of the tree)

Hard surface planting

- Curb style planter is highly recommended
- No grates are to be used and if guards are required, City of Ottawa standard (which can be provided) shall be used.
- Trees are to be planted at grade

Soil Volume

- Please document on the LP that adequate soil volumes can be met:

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

Please note that these soil volumes are not applicable in cases with Sensitive Marine Clay.

Sensitive Marine Clay

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

Tree Canopy Cover

- The landscape plan shall show how the proposed tree planting will replace and increase canopy cover on the site over time, to support the City's 40% urban forest canopy cover target.
- At a site level, efforts shall be made to provide as much canopy cover as possible, through tree planting and tree retention, with an aim of 40% canopy cover at 40 years, as appropriate.
- Indicate on the plan the projected future canopy cover at 40 years for the site.

City Surveyor

- The determination of property boundaries, minimum setbacks and other regulatory constraints are a critical component of development. An Ontario Land Surveyor (O.L.S.)

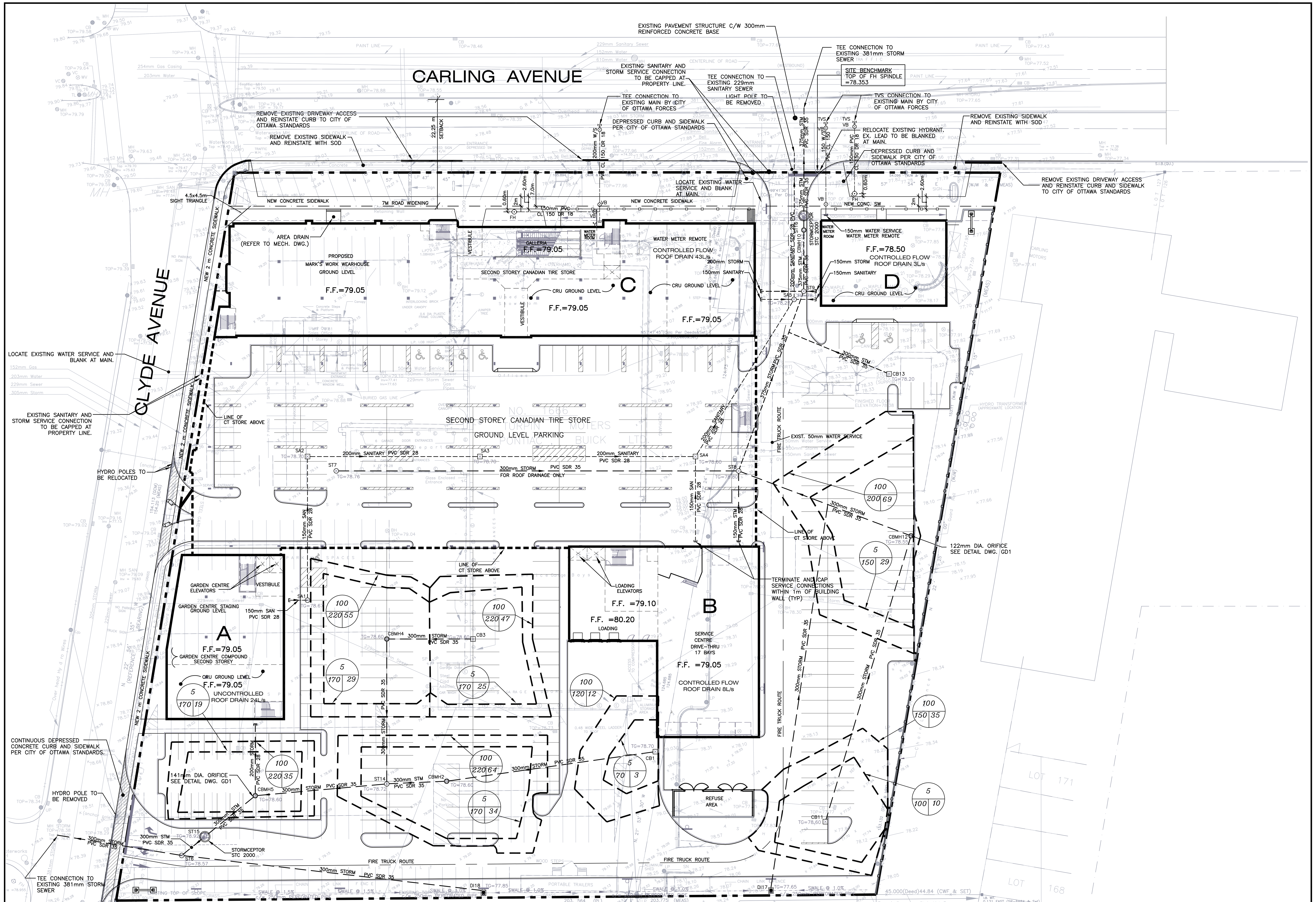
needs to be consulted at the outset of a project to ensure properties are properly defined and can be used as the geospatial framework for the development.
- Topographic details may also be required for a project and should be either carried out by the O.L.S. that has provided the Legal Survey or done in consultation with the O.L.S. to ensure that the project is integrated to the appropriate control network.
- Questions regarding the above requirements can be directed to the City's Surveyor, Bill Harper, at Bill.Harper@ottawa.ca

Waste Services

- New multi-unit residential development, defined as containing six (6) or more units, intending to receive City waste collection services will be required, as of June 1, 2022, to participate in the City's Green Bin program in accordance with Council's approval of the multi-residential waste diversion strategy. The development must include adequate facilities for the proper storage of allocated garbage, recycling, and green bin containers and such facilities built in accordance with the approved site design. Questions regarding this change and requirements can be directed to Andre.Laplante@ottawa.ca.

Conclusion and Next Steps

- Leading up to Formal Submission – if you want to run through some changes, the city staff would be happy to hear – reach out.
- If you have questions reach out to Kersten Nitsche.
- Additional information regarding fees related to planning applications can be found here.
- Plans are to be standard A1 size (594 mm x 841 mm) sheets, utilizing an appropriate Metric scale (1:200, 1:250, 1:300, 1:400 or 1:500).
- All PDF submitted documents are to be unlocked and flattened.



MANHOLE NO.	OPENING (mm)	I.C.D. TYPE
CBMH #5	141	PLATE
CBMH #12	122	PLATE

NOTES: GENERAL

1. ALL MATERIALS AND CONSTRUCTION METHODS TO BE IN ACCORDANCE WITH CITY OF OTTAWA STANDARDS AND ONTARIO PROVINCIAL STANDARDS.
2. CONTRACTOR IS RESPONSIBLE FOR ALL LAYOUT FOR CONSTRUCTION PURPOSES.
3. ALL ELEVATIONS ARE GEODETIC AND UTILIZE METRIC UNITS.
4. JOB BENCH MARK – CONFIRM WITH DELCAN CORPORATION PRIOR TO UTILIZATION.
5. ALL GROUND SURFACES SHALL BE EVENLY GRADED WITHOUT PONDING AREAS AND WITHOUT LOW POINTS EXCEPT WHERE APPROVED SWALE OR CATCH BASIN OUTLETS ARE PROVIDED.
6. THE OWNER AGREES TO PREPARE AND IMPLEMENT AN EROSION AND SEDIMENT CONTROL PLAN TO THE SATISFACTION OF THE CITY OF OTTAWA, APPROPRIATE TO THE SITE CONDITIONS, PRIOR TO UNDERTAKING ANY SITE ALTERATIONS (FILLING, GRADING, REMOVAL OF VEGETATION, ETC) AND DURING ALL PHASES OF SITE PREPERATION AND CONSTRUCTION IN ACCORDANCE WITH THE CURRENT BEST MANAGEMENT PRACTICES FOR EROSION AND SEDIMENT CONTROL SUCH AS BUT NOT LIMITED TO INSTALLING FILTER CLOTHS ACROSS MAINTENCANCE HOLE/ CATCHBASIN LIDS TO PREVENT SEDIMENTS FROM ENTERING STRUCTURES AND INSTALL AND MAINTAIN A LIGHT DUTY SILT FENCE BARRIER AS REQUIRED.
7. ABUTTING PROPERTY GRADE TO BE MATCHED.
8. REFER TO SOIL REPORT PREPARED BY TROW ASSOCIATES INC. ENTITLED "GEOTECHNICAL INVESTIGATION PROPOSED CANADIAN TIRE STORE #290 1650 AND 1666 CARLING AVE OTTAWA, ONTARIO". PREPARED SEPTEMBER 2, 2005.
9. CONTRACTOR IS TO SUBMIT TRAFFIC MANAGEMENT PLAN TO CITY OF OTTAWA FOR APPROVAL PRIOR TO CONSTRUCTION ON CARLING AVE. AND CLYDE AVE.
10. RESTORE PAVEMENT STRUCTURE AND SURFACES ON EXISTING ROADS TO A CONDITION AT LEAST EQUAL TO ORIGINAL AND TO THE SATISFACTION OF THE MUNICIPAL AUTHORITIES. REINSTATE ANY SUBDRAINS ENCOUNTERED DURING CONSTRUCTION OF ENTRANCES AND SERVICES.
11. REFER TO ARCHITECT'S SITE PLAN FOR BUILDING DIMENSIONS AND SITE LAYOUT. DIMENSIONS AND LAYOUT INFORMATION SHALL BE CONFIRMED PRIOR TO COMMENCEMENT OF CONSTRUCTION. REFER TO LANDSCAPE PLAN FOR DETAILS OF LANDSCAPE AREAS.
12. ALL MATERIAL SUPPLIED AND PLACED FOR PARKING LOT AND ACCESS ROAD CONSTRUCTION SHALL BE TO OPSS STANDARDS AND SPECIFICATIONS UNLESS OTHERWISE NOTED. (CONSTRUCTION OPSS 206, 310 & 314 MATERIALS OPSS 1001, 1003 & 1010).
13. STRIP AND REMOVE ALL TOPSOIL FROM IMPROVED AREAS.
14. ALL EDGES OF DISTURBED PAVEMENT SHALL BE SAW CUT TO FORM A NEAT AND STRAIGHT LINE PRIOR TO PLACING NEW PAVEMENT.
15. CURBS TO BE CONSTRUCTED AS PER CITY OF OTTAWA STANDARD DETAIL SC1.1
16. SUPPLY AND INSTALL ALL PIPING AND APPURTENANCES AS SHOWN TO WITHIN 1.0m OF BUILDING WALLS. PROVIDE TEMPORARY CAPS.
17. OBTAIN AND PAY FOR ALL NECESSARY PERMITS AND APPROVALS FROM THE CITY OF OTTAWA PRIOR TO COMMENCING CONSTRUCTION.
18. ALL GRASSED AREAS MUST BE COMPLETED PRIOR TO THE REMOVAL OF THE FILTER FABRIC IN THE CATCH BASINS.
19. REFER TO CONSTRUCTION SPECIFICATIONS, SITE WORK GENERAL REQUIREMENTS FOR SCOPE OF WORK. REPORT ANY DISCREPANCIES TO THE ENGINEER.
20. REMOVE FROM SITE ALL EXCESS EXCAVATED MATERIAL UNLESS OTHERWISE DIRECTED FROM THE ENGINEER. EXCAVATE AND REMOVE ALL ORGANIC MATERIAL AND DEBRIS LOCATED WITHIN THE PROPOSED BUILDING, PARKING AND ROADWAY LOCATIONS.
21. THE POSITION OF ALL POLE LINES, CONDUITS, WATERMAINS, SEWERS AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES ARE NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, DETERMINE THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND ASSUME ALL LIABILITY FOR DAMAGE TO THEM.
22. CONTRACTOR TO PROVIDE AS CONSTRUCTED DRAWINGS OF ALL SITE SERVICE INSTALLATION WORKS
23. ALL EXISTING ABOVE GROUND AND BELOW GROUND INFRASTRUCTURE TO BE DEMOLISHED AND REMOVED FROM THE SITE INCLUDING EXISTING CAR DEALERSHIP SIGNS, CURBS AND POSTS LOCATED WITHIN THE ROAD ALLOWANCE.
24. COORDINATE AND SCHEDULE ALL WORK WITH OTHER TRADES AND CONTRACTORS.

NOTES: WATERMAIN

1. ALL WATER MAIN WORK AND MATERIAL SHALL BE IN ACCORDANCE WITH CITY OF OTTAWA STANDARDS. NO WATER WORKS SHALL COMMENCE UNLESS A CITY INSPECTOR IS ON SITE.
2. ALL WATER MAIN TO BE INSTALLED AT MINIMUM COVER OF 2.4m.
3. WATER MAIN TRENCH AND BEDDING AS PER CITY OF OTTAWA DETAIL W17. GRANULAR 'A', BEDDING TO BE COMPACTED TO 98% MAXIMUM DRY DENSITY.
4. CONCRETE THRUST BLOCKS AS PER CITY OF OTTAWA DETAILS W25.3 AND W25.4.
5. CATHODIC PROTECTION REQUIRED FOR ALL IRON FITTINGS PER CITY DETAILS W40 AND W42.
6. IF WATER MAIN MUST BE DEFLECTED TO MEET ALIGNMENT, ENSURE THAT THE AMOUNT OF DEFLECTION USED IS LESS THAN HALF THAT RECOMMENDED BY THE MANUFACTURER.
7. PROVIDE INSULATION AT ALL OPEN STRUCTURE AS PER CITY OF OTTAWA DETAIL W23.
8. HYDRANT LOCATION AND INSTALLATION AS PER CITY OF OTTAWA DETAILS W18 AND W19.
9. WATERMAIN CROSSING SEWER AS PER CITY OF OTTAWA DETAILS W25 AND W25.2.
10. TRACER WIRE TO BE INSTALLED ALONG ALL WATERMAINS AND LATERALS AS PER CITY OF OTTAWA DETAIL W36.
11. WATER SERVICE TO BE CHLORINATED AND PRESSURE TESTED AS PER AWWA STANDARDS AND COORDINATED WITH CITY OFFICIAL.
12. NEW WATERMAIN SHALL BE CHLORINATED AND FULLY TESTED PRIOR TO CONNECTION TO MUNICIPAL SYSTEM.
13. WATER VALVES TO BE OPERATED BY CITY OFFICIAL ONLY.
14. CONNECTION/TAPPING OF EXISTING WATERMAIN TO BE DONE LIVE; 48 HOURS NOTICE MUST BE PROVIDED TO AFFECTED RESIDENTS PRIOR TO WATER SHUT DOWN.
15. CONNECTION OF WATER SERVICES AND HYDRANT LEADS TO EXISTING MAIN BY CITY FORCES. EXCAVATION, BACKFILLING AND REINSTATEMENT BY CONTRACTOR.
16. VALVE AND BOX FOR NEW WATER SERVICE CONNECTION TO BE LOCATED 0.30 m FROM PROPERTY LINE BASED ON NEW ROAD WIDENING.

NOTES: SEWER

1. MANHOLES AND CATCH BASINS SHALL BE AS NOTED IN MANHOLE SCHEDULE ON DWG. SS-1. STORM MANHOLES TO HAVE 0.3m SUMPS. CATCH BASINS AND CATCH BASIN MANHOLES TO HAVE 0.6m SUMPS
2. SEWER TRENCH AS PER CITY OF OTTAWA DETAIL S6. GRANULAR 'A' BEDDING TO BE COMPACTED TO 98% MAXIMUM DRY DENSITY.
3. ALL WORK SHALL BE PERFORMED, AS APPLICABLE IN ACCORDANCE WITH O.P.S.S. 407, AND 410.
4. ALL MANHOLES, AND CATCH BASINS TO BE BACKFILLED WITH MIN. 0.3m HORIZ. THICKNESS OF SAND OR APPROVED BACKFILL.
5. SANITARY SEWER AND STORM SEWER PIPING SHALL BE AS NOTED IN PIPING SCHEDULE ON DWG. SS-1.
6. FRAMES AND COVERS FOR MANHOLES AND CATCH BASINS ARE AS NOTED IN MANHOLE SCHEDULE ON DWG. SS-1.
7. FOR PIPE COVER OF 1.8m AND LESS, INSTALL INSULATION AS PER INSULATION DETAIL ON DRAWING GD1.
8. NEW MH/CB/CBMH STRUCTURES SHALL HAVE PREFORMED OPENINGS WITH GASKETED CONNECTIONS AND EXTERNALLY SEALED AND WATERTIGHT.
9. CONTRACTOR TO CONFIRM ELEVATION OF EXISTING STORM AND SANITARY SEWERS AT PROPOSED CONNECTION POINTS AND REPORT ANY DISCREPANCIES TO THE ENGINEER BEFORE COMMENCING ANY WORK.
10. CONNECTION OF SEWERS FROM MAIN TO PROPERTY LINE IS TO BE INSPECTED BY CITY OFFICIAL PRIOR TO BACKFILLING.
11. CONTRACTOR TO PROVIDE CCTV INSPECTION OF SANITARY SEWER AND STORM SEWER INSTALLATIONS.

WATERMAIN TABLE

STATION	SURFACE ELEV.	TOP OF WM ELEV.	NOTES
BUILDING A, B, C			
0+000	78.17 ±	75.60 ±	200x200mm CUT-IN TEE
0+005.7	78.00	75.60	EX. 229mm SANITARY SEWER CROSSING INV. 74.4±
0+016	78.40	76.00	VALVE AND VALVE BOX
0+020.3	79.00	76.00	CAP WITHIN 1.0m OF BUILDING WALL
BUILDING D			
0+000	77.66 ±	75.20 ±	200x150mm TAPPING VALVE AND SLEEVE
0+006.2	77.58	75.10	EX. 229mm SANITARY SEWER CROSSING INV. 74.2±
0+016.4	77.82	75.40	VALVE AND VALVE BOX
0+019.4	77.90	75.40	CAP WITHIN 1.0m OF BUILDING WALL

SANITARY AND STORM MAINTENANCE HOLE SCHEDULE

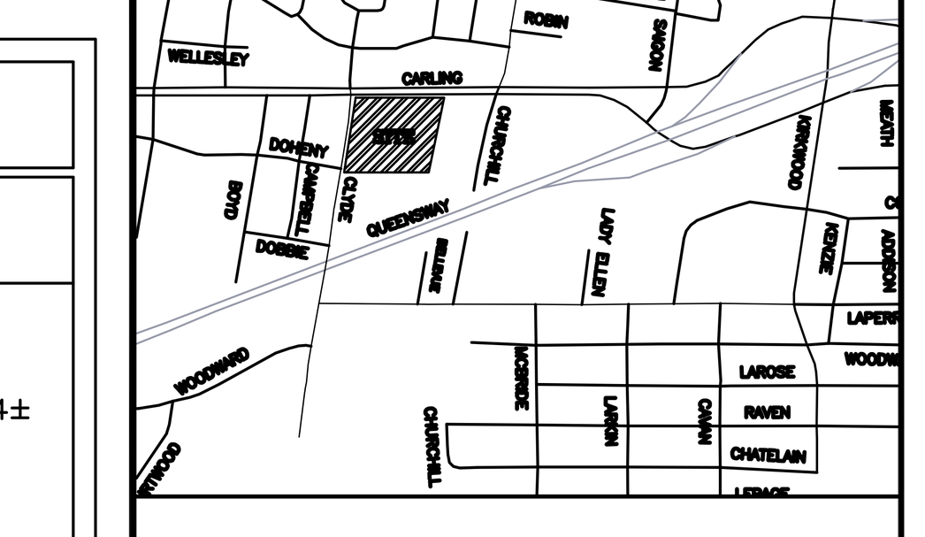
STRUCTURE NO.	TYPE	T/G	DOWNSTREAM INVERT	UPSTREAM INVERT #1	UPSTREAM INVERT #2	UPSTREAM INVERT #3	DETAIL No. STRUCTURE	DETAIL No. GRATE	COMMENT
SA1	SAN	78.81	76.46	76.52	–	–	701.010	401.030	OPSD
SA2	SAN	78.70	76.21	76.27	–	–	701.010	S19.1	
SA3	SAN	78.70	75.96	75.97	–	–	701.010	S19.1	
SA4	SAN	78.60	75.64	75.67	76.20(S)	–	701.010	S19.1	
SA5	SAN	78.23	75.36	75.39	75.95(W)	–	701.010	S24	SOLID
EX. SEWER	SAN	77.58	74.22(EX.)	74.74	–	75.95	–	–	TEE CONNECTION
BLDG 'A'	SAN	FF/79.05	76.60	–	–	–	–	–	
BLDG 'B'	SAN	FF/79.05	76.58	–	–	–	–	–	
BLDG 'C'	SAN	FF/79.05	76.09	–	–	–	–	–	
BLDG 'D'	SAN	FF/78.50	76.05	–	–	–	–	–	
CB1	STM	78.70	77.15	–	–	–	705.010	S19.1	
CBMH2	STM	78.60	76.99	77.00	–	–	701.010	S19.1	
ST14	STM	78.72	76.86	76.95(E)	76.92(N)	–	701.010	S24	PERFORATED
CBMH 5	STM	78.60	76.74	77.40(N)	76.77(E)	–	M4 (M–CON)	S19.1	REFER TO NOTE 1
ST15	STM	78.92	76.67	76.69	–	–	STC 2000	EMBOSSED	STORMCEPTOR
ST6	STM	78.57	76.61	76.64(N)	76.64(E)	–	701.010	S24	PERFORATED
EX. SEWER	STM	78.35	76.47	76.52	–	–	–	–	TEE CONNECTION
CB3	STM	78.60	77.15	–	–	–	705.010	S19.1	
CBMH 4	STM	78.60	77.02	77.08	–	–	701.010	S19.1	
ST7	STM	78.76	77.31	–	–	–	701.010	S24	SOLID
ST8	STM	78.80	76.82	77.02(W)	76.90(E)	77.05(S)	701.010	S24	SOLID
ST9	STM	78.19	76.65	76.68(S)	76.85(W)	76.91(E)	701.010	S24	PERFORATED
CBMH 10	STM	77.66	76.58	76.59	–	–	701.010	S19.1	
ST16	STM	77.69	76.52	76.55	–	–	STC 2000	EMBOSSED	STORMCEPTOR
EX. SEWER	STM	77.82	76.33±	76.36	–	–			TEE CONNECTION
CB11	STM	78.60	77.30	–	–	–	705.010	S19.1	
CBMH12	STM	78.55	77.03	77.09	–	–	701.010	S19.1	
CB13	STM	78.20	76.82	–	–	–	705.010	S19.1	
DI17	STM	77.65	77.24	–	–	–	705.030	403.010	GRATE TO MATCH SLOPE
DI18	STM	77.85	76.85	–	–	–	705.030	403.010	GRATE TO MATCH SLOPE
BLDG 'A'	STM	FF/79.05	77.55	–	–	–	–	–	
BLDG 'B'	STM	FF/79.05	77.20	–	–	–	–	–	
BLDG 'C'	STM	FF/79.05	76.94	–	–	–	–	–	
BLDG 'D'	STM	FF/78.50	76.94	–	–	–	–	–	

SANITARY AND STORM PIPING SCHEDULE

FROM	TO	SEWER TYPE	LENGTH (m)	DIA. (mm)	MATERIAL	CLASS	SLOPE (%)	COMMENT
SA1	SA2	SAN.	30	150	P.V.C.	SDR28	0.65	
SA2	SA3	SAN.	36	200	P.V.C.	SDR28	0.65	
SA3	SA4	SAN.	45	200	P.V.C.	SDR28	0.65	
SA4	SA5	SAN.	38	200	P.V.C.	SDR28	0.65	
SA5	EX. SEWER	SAN.	31	200	P.V.C.	SDR28	2.00	
BLDG 'A'	SA1	SAN.	4	150	P.V.C.	SDR28	2.00	CAP WITHIN 1.0m OF BUILDING WALL
BLDG 'B'	SA4	SAN.	19	150	P.V.C.	SDR28	2.00	CAP WITHIN 1.0m OF BUILDING WALL
BLDG 'C'	SA5	SAN.	7	150	P.V.C.	SDR28	2.00	CAP WITHIN 1.0m OF BUILDING WALL
BLDG 'D'	SA5	SAN.	5	150	P.V.C.	SDR28	2.00	CAP WITHIN 1.0m OF BUILDING WALL
CB1	CBMH2	STM	43	300	P.V.C.	SDR35	0.34	
CBMH2	ST14	STM	13	300	P.V.C.	SDR35	0.34	
ST14	CBMH5	STM	27	300	P.V.C.	SDR35	0.34	
CBMH5	ST15	STM	13	300	P.V.C.	SDR35	0.35	
ST15	ST6	STM	6	300	P.V.C.	SDR35	0.35	
ST6	EX. SEWER	STM	26	300	P.V.C.	SDR35	0.38	
DI18	ST6	STM	63	300	P.V.C.	SDR35	0.34	
CB3	CBMH4	STM	18	300	P.V.C.	SDR35	0.34	
CBMH4	ST14	STM	30	300	P.V.C.	SDR35	0.34	
ST7	ST8	STM	84	300	P.V.C.	SDR35	0.34	
ST8	ST9	STM	39	375	P.V.C.	SDR35	0.36	
ST9	CBMH10	STM	13	375	P.V.C.	SDR35	0.44	
CBMH10	ST16	STM	3	375	P.V.C.	SDR35	0.90	
ST16	EX. SEWER	STM	22	375	P.V.C.	SDR35	0.75	
CB11	CBMH12	STM	62	300	P.V.C.	SDR35	0.34	
CBMH12	ST8	STM	38	300	P.V.C.	SDR35	0.34	
CB13	TEE	STM	21	300	P.V.C.	SDR35	0.34	
DI17	TEE	STM	81	300	P.V.C.	SDR35	0.34	
BLDG 'A'	CBMH5	STM	15	200	P.V.C.	SDR28	1.00	CAP WITHIN 1.0m OF BUILDING WALL
BLDG 'B'	ST8	STM	15	150	P.V.C.	SDR28	1.00	CAP WITHIN 1.0m OF BUILDING WALL
BLDG 'C'	ST9	STM	9	200	P.V.C.	SDR28	1.00	CAP WITHIN 1.0m OF BUILDING WALL
BLDG 'D'	ST9	STM	3	150	P.V.C.	SDR28	1.00	CAP WITHIN 1.0m OF BUILDING WALL

I.C.D. TABLE

MANHOLE NO.	OPENING (mm)	I.C.D. TYPE
CBMH #5	141	PLATE
CBMH #12	122	PLATE



LEGEND

- PROPOSED SANITARY SEWER
- PROPOSED STORM SEWER
- PROPOSED WATERMAIN
- PROPOSED CURB
- PROPOSED SWALE c/w 200mm PERFORATED PIPE
- PROPOSED DITCH INLET
- PROPOSED STORM MAINTENANCE HOLE
- PROPOSED CATCHBASIN MAINTENANCE HOLE
- PROPOSED CATCH BASIN
- PROPOSED SANITARY MAINTENANCE HOLE
- FH PROPOSED FIRE HYDRANT
- VB PROPOSED WATER VALVE c/w VALVE BOX
- × 78.45 PROPOSED ELEVATION
- 78.30 PROPOSED TOP OF CONCRETE/CURB ELEVATION
- TG=78.55 PROPOSED TOP OF GRATE ELEVATION
- PROPOSED RETAINING WALL
- PROPOSED HANDRAIL
- 4.0% OVERLAND FLOW DIRECTION
- BUILDING ENTRANCE

100 — RETURN PERIOD – YEARS
210 — VOLUME – m3
62 — MAXIMUM PONDING DEPTH – mm

NOTES:

1. INSTALL SLUICE GATE ON NORTH INLET OF CBMH5. MEDIUM DUTY ARMTEC DELUXE MODEL 20–10C; 203mm DIA. WITH EXTENDED NON–PROJECTING STEM (GALV. ASTM A123) AND T–WRENCH HANDLE (GALV. ASTM A123). M–CON TYPE M–4 BOX MH WITH FLAT TOP. TOP SLAB TO 78.37 MAX. TO ALLOW INSTALLATION OF VALVE OPERATOR. VALVE OPERATOR AS PER OPSD 1101.020.

Delcan

DATE	REV.	DESCRIPTION	BY
SEPT 22 06	4	REVISED PER CITY COMMENTS	AG
AUG 23 06	3	ISSUED FOR 3RD SUBMISSION	DRY
JUNE 8 06	2	RE–SUBMISSION	DRY
DEC 21 05	1	ISSUED FOR SITE PLAN AGREEMENT	DRY

REVISION RECORD

TURNER FLEISCHER ARCHITECTS INC.
67 Lesmill Road
Toronto, Ontario M3B 2T8
Tel : 416–425–2222
Fax: 416–425–6717
TFAI

OTTAWA STORE No. 290

NORTH ARROW

STAMP: REGISTERED PROFESSIONAL ENGINEER D.R. YAEGER PROVINCE OF ONTARIO

STAMP: LICENSED PROFESSIONAL ENGINEER Alain Grégoire PROVINCE OF ONTARIO

CANADIAN TIRE REAL ESTATE LIMITED

CONTRACTOR MUST CHECK AND VERIFY ALL DIMENSIONS AND BE RESPONSIBLE FOR SAME REPORTING ANY DISCREPANCIES BEFORE COMMENCING WORK. LATEST APPROVED DRAWING ONLY TO BE USED FOR CONSTRUCTION, PRINTS ARE NOT TO BE SCALED.

PROJECT: 1650–1660 CARLING AVENUE + CLYDE AVENUE OTTAWA ONTARIO

DRAWING TITLE: SITE SERVICING

DRAWING No.: SS1

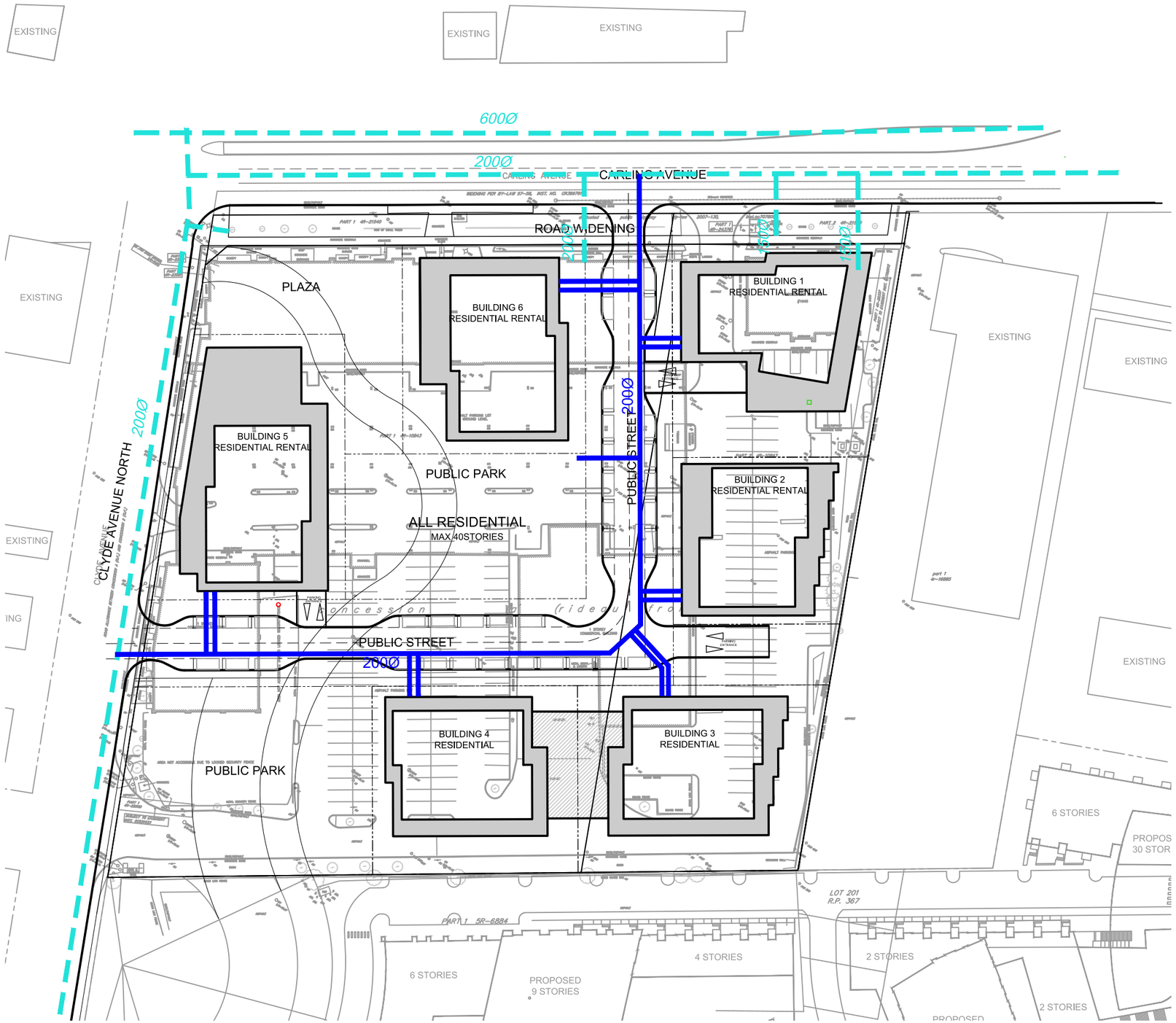
SCALE 1:300 | JOB No. SO1229EOA

FILE NAME CTC290–AUG–15–2006.DWG | PLOT DATE AUGUST–2006

\ISO\ASP\SO1229\EOA\DWGS\ISSUED FOR 4th SUBMISSION\CTC290-SEPT 22 2006.dwg - Thu, 19 Oct 2006 - 19:36

APPENDIX B

- Figure 2.1 Conceptual Watermain Layout
- Watermain Demand Calculation Sheet
- FUS Fire Flow Requirement Calculation
- Water Model Results
- Water Boundary Conditions
- Fireflow Building Material and Sprinkler



N

LEGEND:

EXISTING WATERMAIN C/W DIAMETER

200Ø PROPOSED WATERMAIN C/W DIAMETER

CITY FILE NUMBER: (D02-02-22-0126)

J:\140055_1660Carling\7.0_Production\7.03_Design\04_Civil_Land_Adequacy Report_SheetsSet\Figure 2.1 CONCEPTUAL WATERMAIN LAYOUT.dwg Last Saved By: Ehenrie Last Saved At: Nov. 13, 23

Scale	Project Title	Drawing Title	Sheet No.
IBI 1:1000	1640 - 1660 CARLING AVE	CONCEPTUAL WATERMAIN LAYOUT	FIGURE 2.1 2023-10-31

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WATERMAIN DEMAND CALCULATION SHEET
1660 Carling Ave | Hobin Architecture Inc.
140055-6.0 | Rev #0 | 2023-10-16
Prepared By: AB | Checked By: RM

NODE	RESIDENTIAL				NON-RESIDENTIAL (ICI)			AVERAGE DAILY DEMAND (l/s)			MAXIMUM DAILY DEMAND (l/s)			MAXIMUM HOURLY DEMAND (l/s)			FIRE DEMAND (l/min)
	SINGLE FAMILY UNITS	2 BEDROOM UNITS	1 BEDROOM UNITS	POPULATION	INDUST. (ha)	COMM. (ha)	INSTIT. (ha)	RESIDENTIAL	ICI	TOTAL	RESIDENTIAL	ICI	TOTAL	RESIDENTIAL	ICI	TOTAL	
1660 Carling Ave																	6,000
Building 1		87	204	468				1.52		1.52	3.79		3.79	8.35		8.35	
Building 2		70	164	377				1.22		1.22	3.05		3.05	6.71		6.71	
Building 3		64	148	342				1.11		1.11	2.77		2.77	6.09		6.09	
Building 4		53	123	284				0.92		0.92	2.30		2.30	5.05		5.05	
Building 5		126	294	676				2.19		2.19	5.48		5.48	12.05		12.05	
Building 6		126	295	678				2.20		2.20	5.49		5.49	12.08		12.08	
TOTAL		**526**	**1228**	**2823.80**						**9.15**			**22.88**			**50.33**	

ASSUMPTIONS

POPULATION DENSITY

Single Family	3.4	persons/unit
2 Bedroom Units	2.1	persons/unit
1 Bedroom Units	1.4	persons/unit

WATER DEMAND RATES

Residential	280 l/cap/day
Commercial Shopping Center	2,500 L/(1000m2)/day

PEAKING FACTORS

Maximum Daily		
Residential	2.5	x avg. day
Commercial	1.5	x avg. day
Maximum Hourly		
Residential	2.2	x max. day
Commercial	1.8	x max. day

FIRE DEMANDS

Single Family	10,000 l/min (166.7 l/s)
Semi Detached & Townhouse	10,000 l/min (166.7 l/s)
Medium Density	15,000 l/min (250 l/s)

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FIRE UNDERWRITERS SURVEY

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STEP	Contents	Description		Adjustment Factor		Result	
1	**Building A** (28-storey)	1st Floor Area		Height < 3.0 m	1	1275	m2
		25% of 2nd Floor Area		Height < 3.0 m	1	319	m2
		25% of 3rd Floor Area		Height < 3.0 m	1	319	m3
	Total Effective Floor Area					**1913**	m2
2	**Type of Construction**	**Type V** Wood Frame	1.5	Type II Noncombustible Construction	0.8		
		Type III Ordinary Construction	1.0				
		Type II Noncombustible Construction	0.8				
		Type I Fire Resistive Construction	0.6				
3	**Required Fire Flow**	RFF = 220C$\sqrt{A}$, rounded to nearest 1000 L/min				**8000**	L/min
4	**Occupancy and Contents**	Noncombustible Contents	-25%	Limited Combustible - Residential Occupanices C	-15%	-1200	L/min
		Limited Conbustible Contents	-15%				
		Combustible Contents	0%				
		Free Burning Contents	15%				
		Rapid Burning Contents	25%				
	Fire Flow					**6800**	L/min
5	**Automatic Sprinkler Protection**	Automatic Sprinkler Conforming to NFPA 13	-30%	Yes	-30%	-2040	L/min
		Standard Water Supply for both the system and Fire Department Hose Lines	-10%	No			
		Fully Supervised System	-10%	No			
	Total Sprinkler Adjustment					**-2040**	L/min
6	**Exposure Adjustment**	Based on **Table 6** Exposure Adjustement Charges for Subject Building					
	North	Separation (m)	>30	With protected openings	0%	0	L/min
		Length X Height Factor (m.storeys)	0				
		Construction Type	Type II				
	South	Separation (m)	12	With protected openings	8%	544	L/min
		Length X Height Factor (m.storeys)	864				
		Construction Type	Type II				
	East	Separation (m)	16	With protected openings	4%	272	L/min
		Length X Height Factor (m.storeys)	36				
		Construction Type	Type II				
	West	Separation (m)	26	With protected openings	4%	272	L/min
		Length X Height Factor (m.storeys)	980				
		Construction Type	Type II				
	Fire Flow					**5848**	L/min
7	**Total Required Fire Flow**	Rounded to Nearest 1000 L/min				**6000**	L/min
						100	L/s

Notes 1. Fire flow calculation are based on Fire Underwriters Survey version 2020.

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Prepared By: AB | Checked By: RM

STEP	Contents	Description		Adjustment Factor		Result	
1	**Building A** (24-storey)	1st Floor Area		Height < 3.0 m	1	1150	m2
		25% of 2nd Floor Area		Height < 3.0 m	1	288	m2
		25% of 3rd Floor Area		Height < 3.0 m	1	288	m3
	Total Effective Floor Area					**1725**	m2
2	**Type of Construction**	**Type V** Wood Frame	1.5	Type II Noncombustible Construction	0.8		
		Type III Ordinary Construction	1.0				
		Type II Noncombustible Construction	0.8				
		Type I Fire Resistive Construction	0.6				
3	**Required Fire Flow**	RFF = 220C$\sqrt{A}$, rounded to nearest 1000 L/min				**7000**	L/min
4	**Occupancy and Contents**	Noncombustible Contents	-25%	Limited Combustible - Residential Occupanices C	-15%	-1050	L/min
		Limited Conbustible Contents	-15%				
		Combustible Contents	0%				
		Free Burning Contents	15%				
		Rapid Burning Contents	25%				
	Fire Flow					**5950**	L/min
5	**Automatic Sprinkler Protection**	Automatic Sprinkler Conforming to NFPA 13	-30%	Yes	-30%	-1785	L/min
		Standard Water Supply for both the system and Fire Department Hose Lines	-10%	No			
		Fully Supervised System	-10%	No			
	Total Sprinkler Adjustment					**-1785**	L/min
6	**Exposure Adjustment**	Based on **Table 6** Exposure Adjustement Charges for Subject Building					
	North	Separation (m)	12.0	With protected openings	8%	476	L/min
		Length X Height Factor (m.storeys)	864				
		Construction Type	Type II				
	South	Separation (m)	18	With protected openings	8%	476	L/min
		Length X Height Factor (m.storeys)	480				
		Construction Type	Type II				
	East	Separation (m)	21	With protected openings	0%	0	L/min
		Length X Height Factor (m.storeys)	32				
		Construction Type	Type II				
	West	Separation (m)	>30	With protected openings	0%	0	L/min
		Length X Height Factor (m.storeys)	0				
		Construction Type	Type II				
	Fire Flow					**5117**	L/min
7	**Total Required Fire Flow**	Rounded to Nearest 1000 L/min				**5000**	L/min
						83	L/s

Notes 1. Fire flow calculation are based on Fire Underwriters Survey version 2020.

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FIRE UNDERWRITERS SURVEY

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STEP	Contents	Description		Adjustment Factor		Result	
1	**Building A** (20-storey)	1st Floor Area		Height < 3.0 m	1	1205	m2
		25% of 2nd Floor Area		Height < 3.0 m	1	301	m2
		25% of 3rd Floor Area		Height < 3.0 m	1	301	m3
	Total Effective Floor Area					**1808**	m2
2	**Type of Construction**	**Type V** Wood Frame	1.5	Type II Noncombustible Construction	0.8		
		Type III Ordinary Construction	1.0				
		Type II Noncombustible Construction	0.8				
		Type I Fire Resistive Construction	0.6				
3	**Required Fire Flow**	RFF = 220C$\sqrt{A}$, rounded to nearest 1000 L/min				**7000**	L/min
4	**Occupancy and Contents**	Noncombustible Contents	-25%	Limited Combustible - Residential Occupanices C	-15%	-1050	L/min
		Limited Conbustible Contents	-15%				
		Combustible Contents	0%				
		Free Burning Contents	15%				
		Rapid Burning Contents	25%				
	Fire Flow					**5950**	L/min
5	**Automatic Sprinkler Protection**	Automatic Sprinkler Conforming to NFPA 13	-30%	Yes	-30%	-1785	L/min
		Standard Water Supply for both the system and Fire Department Hose Lines	-10%	No			
		Fully Supervised System	-10%	No			
	Total Sprinkler Adjustment					**-1785**	L/min
6	**Exposure Adjustment**	Based on **Table 6** Exposure Adjustement Charges for Subject Building					
	North	Separation (m)	19.0	With protected openings	8%	476	L/min
		Length X Height Factor (m.storeys)	490				
		Construction Type	Type II				
	South	Separation (m)	22	With protected openings	4%	238	L/min
		Length X Height Factor (m.storeys)	740				
		Construction Type	Type II				
	East	Separation (m)	>30	With protected openings	0%	0	L/min
		Length X Height Factor (m.storeys)	-				
		Construction Type	Type II				
	West	Separation (m)	14	With protected openings	8%	476	L/min
		Length X Height Factor (m.storeys)	576				
		Construction Type	Type II				
	Fire Flow					**5355**	L/min
7	**Total Required Fire Flow**	Rounded to Nearest 1000 L/min				**5000**	L/min
						83	L/s

Notes 1. Fire flow calculation are based on Fire Underwriters Survey version 2020.

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STEP	Contents	Description		Adjustment Factor		Result	
1	**Building A** (18-storey)	1st Floor Area		Height < 3.0 m	1	1130	m2
		25% of 2nd Floor Area		Height < 3.0 m	1	283	m2
		25% of 3rd Floor Area		Height < 3.0 m	1	283	m3
	Total Effective Floor Area					**1695**	m2
2	**Type of Construction**	**Type V** Wood Frame	1.5	Type II Noncombustible Construction	0.8		
		Type III Ordinary Construction	1.0				
		Type II Noncombustible Construction	0.8				
		Type I Fire Resistive Construction	0.6				
3	**Required Fire Flow**	RFF = 220C$\sqrt{A}$, rounded to nearest 1000 L/min				**7000**	L/min
4	**Occupancy and Contents**	Noncombustible Contents	-25%	Limited Combustible - Residential Occupanices C	-15%	-1050	L/min
		Limited Conbustible Contents	-15%				
		Combustible Contents	0%				
		Free Burning Contents	15%				
		Rapid Burning Contents	25%				
	Fire Flow					**5950**	L/min
5	**Automatic Sprinkler Protection**	Automatic Sprinkler Conforming to NFPA 13	-30%	Yes	-30%	-1785	L/min
		Standard Water Supply for both the system and Fire Department Hose Lines	-10%	No			
		Fully Supervised System	-10%	No			
	Total Sprinkler Adjustment					**-1785**	L/min
6	**Exposure Adjustment**	Based on **Table 6** Exposure Adjustement Charges for Subject Building					
	North	Separation (m)	>30	With protected openings	0%	0	L/min
		Length X Height Factor (m.storeys)	-				
		Construction Type	Type II				
	South	Separation (m)	22	With protected openings	0%	0	L/min
		Length X Height Factor (m.storeys)	792				
		Construction Type	Type II				
	East	Separation (m)	14	With protected openings	0%	0	L/min
		Length X Height Factor (m.storeys)	576				
		Construction Type	Type II				
	West	Separation (m)	>30	With protected openings	0%	0	L/min
		Length X Height Factor (m.storeys)	-				
		Construction Type	Type II				
	Fire Flow					**4165**	L/min
7	**Total Required Fire Flow**	Rounded to Nearest 1000 L/min				**4000**	L/min
						67	L/s

Notes 1. Fire flow calculation are based on Fire Underwriters Survey version 2020.

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FIRE UNDERWRITERS SURVEY

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Prepared By: AB | Checked By: RM

STEP	Contents	Description		Adjustment Factor		Result	
1	**Building A** (37-storey)	1st Floor Area		Height < 3.0 m	1	1690	m2
		25% of 2nd Floor Area		Height < 3.0 m	1	423	m2
		25% of 3rd Floor Area		Height < 3.0 m	1	423	m3
	Total Effective Floor Area					**2535**	m2
2	**Type of Construction**	**Type V** Wood Frame	1.5	Type II Noncombustible Construction	0.8		
		Type III Ordinary Construction	1.0				
		Type II Noncombustible Construction	0.8				
		Type I Fire Resistive Construction	0.6				
3	**Required Fire Flow**	RFF = 220C$\sqrt{A}$, rounded to nearest 1000 L/min				**9000**	L/min
4	**Occupancy and Contents**	Noncombustible Contents	-25%	Limited Combustible - Residential Occupanices C	-15%	-1350	L/min
		Limited Conbustible Contents	-15%				
		Combustible Contents	0%				
		Free Burning Contents	15%				
		Rapid Burning Contents	25%				
	Fire Flow					**7650**	L/min
5	**Automatic Sprinkler Protection**	Automatic Sprinkler Conforming to NFPA 13	-30%	Yes	-30%	-2295	L/min
		Standard Water Supply for both the system and Fire Department Hose Lines	-10%	No			
		Fully Supervised System	-10%	No			
	Total Sprinkler Adjustment					**-2295**	L/min
6	**Exposure Adjustment**	Based on **Table 6** Exposure Adjustement Charges for Subject Building					
	North	Separation (m)	>30	With protected openings	0%	0	L/min
		Length X Height Factor (m.storeys)	-				
		Construction Type	Type II				
	South	Separation (m)	>30	With protected openings	0%	0	L/min
		Length X Height Factor (m.storeys)	-				
		Construction Type	Type II				
	East	Separation (m)	22	With protected openings	4%	306	L/min
		Length X Height Factor (m.storeys)	814				
		Construction Type	Type II				
	West	Separation (m)	29	With protected openings	0%	0	L/min
		Length X Height Factor (m.storeys)	14				
		Construction Type	Type II				
	Fire Flow					**5661**	L/min
7	**Total Required Fire Flow**	Rounded to Nearest 1000 L/min				**6000**	L/min
						100	L/s

Notes 1. Fire flow calculation are based on Fire Underwriters Survey version 2020.

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1660 Carling Ave | Hobin Architecture Inc.
140055-6.0 | Rev #0 | 2023-10-16
Prepared By: AB | Checked By: RM

STEP	Contents	Description		Adjustment Factor		Result	
1	**Building A** (40-storey)	1st Floor Area		Height < 3.0 m	1	1320	m2
		25% of 2nd Floor Area		Height < 3.0 m	1	330	m2
		25% of 3rd Floor Area		Height < 3.0 m	1	330	m3
	Total Effective Floor Area					**1980**	m2
2	**Type of Construction**	**Type V** Wood Frame	1.5	Type II Noncombustible Construction	0.8		
		Type III Ordinary Construction	1.0				
		Type II Noncombustible Construction	0.8				
		Type I Fire Resistive Construction	0.6				
3	**Required Fire Flow**	RFF = 220C$\sqrt{A}$, rounded to nearest 1000 L/min				**8000**	L/min
4	**Occupancy and Contents**	Noncombustible Contents	-25%	Limited Combustible - Residential Occupanices C	-15%	-1200	L/min
		Limited Conbustible Contents	-15%				
		Combustible Contents	0%				
		Free Burning Contents	15%				
		Rapid Burning Contents	25%				
	Fire Flow					**6800**	L/min
5	**Automatic Sprinkler Protection**	Automatic Sprinkler Conforming to NFPA 13	-30%	Yes	-30%	-2040	L/min
		Standard Water Supply for both the system and Fire Department Hose Lines	-10%	No			
		Fully Supervised System	-10%	No			
	Total Sprinkler Adjustment					**-2040**	L/min
6	**Exposure Adjustment**	Based on **Table 6** Exposure Adjustement Charges for Subject Building					
	North	Separation (m)	>30	With protected openings	0%	0	L/min
		Length X Height Factor (m.storeys)	-				
		Construction Type	Type II				
	South	Separation (m)	>30	With protected openings	0%	0	L/min
		Length X Height Factor (m.storeys)	-				
		Construction Type	Type II				
	East	Separation (m)	26	With protected openings	4%	272	L/min
		Length X Height Factor (m.storeys)	980				
		Construction Type	Type II				
	West	Separation (m)	22	With protected openings	4%	272	L/min
		Length X Height Factor (m.storeys)	814				
		Construction Type	Type II				
	Fire Flow					**5304**	L/min
7	**Total Required Fire Flow**	Rounded to Nearest 1000 L/min				**5000**	L/min
						83	L/s

Notes 1. Fire flow calculation are based on Fire Underwriters Survey version 2020.

Beresniewicz, Arthur

From: Cassidy, Tyler <tyler.cassidy@ottawa.ca>
Sent: Tuesday, October 31, 2023 1:38 PM
To: Beresniewicz, Arthur
Cc: Fawzi, Mohammed; Ryan Magladry
Subject: RE: 1660 Carling Ave - Water Boundary Request
Attachments: 1660 Carling Avenue October 2023.pdf

Hi Arthur,

Please find below the boundary conditions for 1660 Carling Avenue based on the information provided in the email chain below.

The following are boundary conditions, HGL, for hydraulic analysis at 1660 Carling Ave (zone 1W) assumed to be looped with a 203mm, connected to the 203 mm watermain on Carling Avenue and the 203mm watermain on Clyde Avenue (see attached PDF for location).

Connection 1:

Minimum HGL = 107.9 m

Maximum HGL = 114.3 m

Max Day + Fire Flow (100.0 L/s) = 104.8 m

Connection 2:

Minimum HGL = 107.7 m

Maximum HGL = 114.3 m

Max Day + Fire Flow (100.0 L/s) = 104.4 m

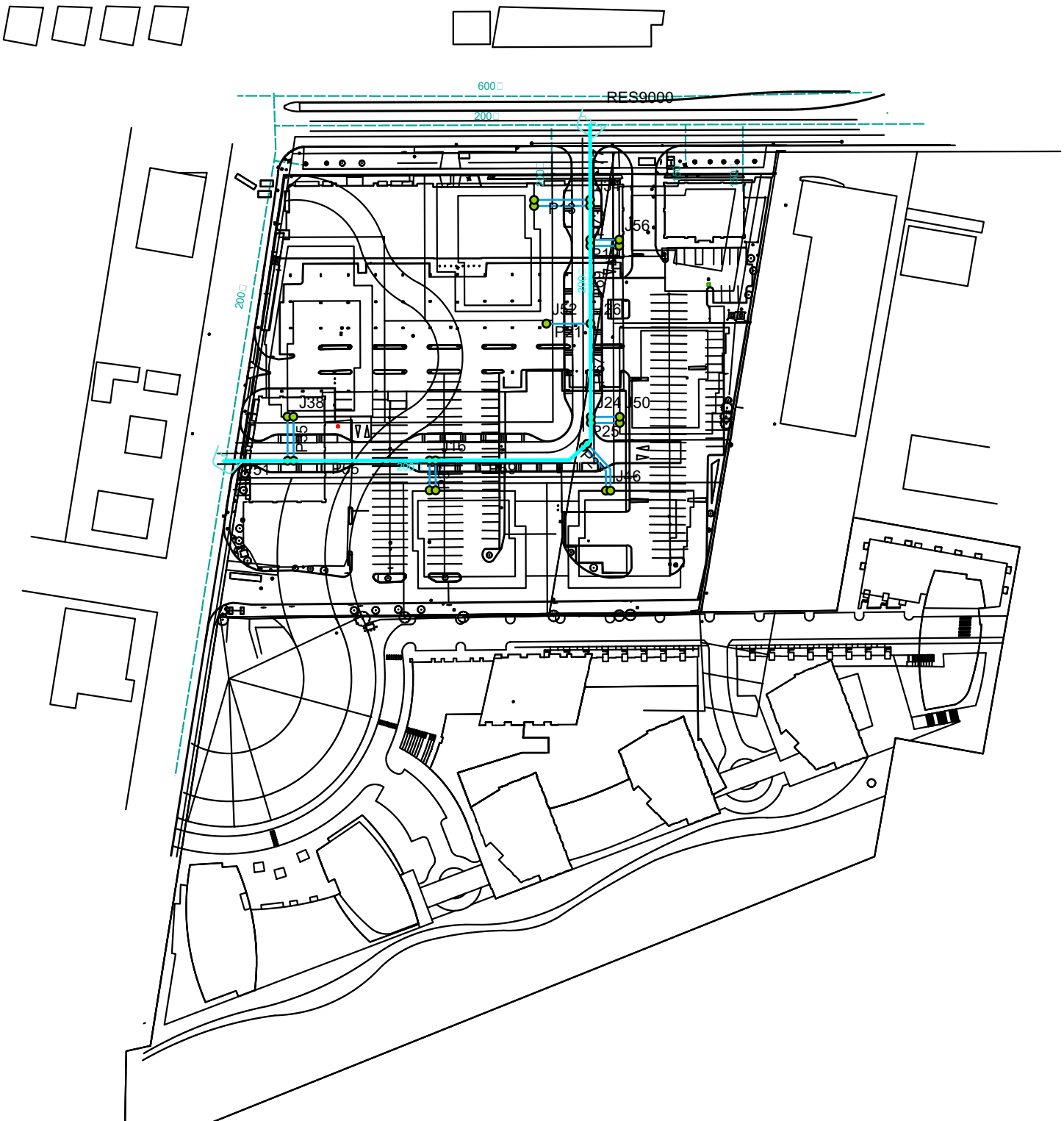
These are for current conditions and are based on computer model simulation.

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

Regards,

Tyler Cassidy, P.Eng
Infrastructure Project Manager,
Planning, Real Estate and Economic Development Department / Direction générale de la planification, des biens immobiliers et du développement économique - South Branch

1640 - 1660 Carling Avenue - Water Model Layout



		ID	Demand (L/s)	Elevation (m)	Head (m)	Pressure (m)
1	☐	J10	0.00	77.10	114.22	37.12
2	☐	J12	0.00	77.10	114.21	37.11
3	☐	J14	0.00	77.10	114.16	37.06
4	☐	J16	0.00	77.10	114.16	37.06
5	☐	J18	0.00	77.10	114.14	37.04
6	☐	J20	0.00	77.10	114.14	37.04
7	☐	J22	0.00	77.10	114.14	37.04
8	☐	J24	0.00	77.10	114.14	37.04
9	☐	J26	0.00	77.10	114.15	37.05
10	☐	J28	0.00	77.10	114.16	37.06
11	☐	J30	0.00	77.10	114.16	37.06
12	☐	J32	0.00	77.10	114.18	37.08
13	☐	J34	0.00	77.10	114.18	37.08
14	☐	J36	6.03	77.10	114.21	37.11
15	☐	J38	6.03	77.10	114.21	37.11
16	☐	J40	2.53	77.10	114.16	37.06
17	☐	J42	2.53	77.10	114.16	37.06
18	☐	J44	3.04	77.10	114.14	37.04
19	☐	J46	3.04	77.10	114.14	37.04
20	☐	J48	3.36	77.10	114.14	37.04
21	☐	J50	3.36	77.10	114.14	37.04
22	☐	J52	0.00	77.10	114.15	37.05
23	☐	J54	4.17	77.10	114.15	37.05
24	☐	J56	4.17	77.10	114.16	37.06
25	☐	J58	6.04	77.10	114.17	37.07
26	☐	J60	6.04	77.10	114.18	37.08

Peak Hour Junction Report

		ID	Demand (L/s)	Elevation (m)	Head (m)	Pressure (m)
1	☐	J10	0.00	77.10	107.65	30.55
2	☐	J12	0.00	77.10	107.65	30.55
3	☐	J14	0.00	77.10	107.63	30.53
4	☐	J16	0.00	77.10	107.63	30.53
5	☐	J18	0.00	77.10	107.63	30.53
6	☐	J20	0.00	77.10	107.63	30.53
7	☐	J22	0.00	77.10	107.63	30.53
8	☐	J24	0.00	77.10	107.63	30.53
9	☐	J26	0.00	77.10	107.66	30.56
10	☐	J28	0.00	77.10	107.69	30.59
11	☐	J30	0.00	77.10	107.69	30.59
12	☐	J32	0.00	77.10	107.72	30.62
13	☐	J34	0.00	77.10	107.73	30.63
14	☐	J36	6.03	77.10	107.64	30.54
15	☐	J38	6.03	77.10	107.64	30.54
16	☐	J40	2.53	77.10	107.63	30.53
17	☐	J42	2.53	77.10	107.63	30.53
18	☐	J44	3.04	77.10	107.63	30.53
19	☐	J46	3.04	77.10	107.63	30.53
20	☐	J48	3.36	77.10	107.63	30.53
21	☐	J50	3.36	77.10	107.63	30.53
22	☐	J52	0.00	77.10	107.66	30.56
23	☐	J54	4.17	77.10	107.69	30.59
24	☐	J56	4.17	77.10	107.69	30.59
25	☐	J58	6.04	77.10	107.72	30.62
26	☐	J60	6.04	77.10	107.73	30.63

Peak Hour Pipe Report

		ID	From Node	To Node	Length (m)	Diameter (mm)	Roughness	Flow (L/s)	Velocity (m/s)	Headloss (m)	HL/1000 (m/k-m)	Status	Flow Reversal Count
1		P13	J34	J60	18.48	204.00	110.00	6.04	0.18	0.01	0.32	Open	0
2		P15	J32	J58	18.48	204.00	110.00	6.04	0.18	0.01	0.32	Open	0
3		P17	J30	J56	9.51	204.00	110.00	4.17	0.13	0.00	0.16	Open	0
4		P19	J28	J54	9.51	204.00	110.00	4.17	0.13	0.00	0.16	Open	0
5		P21	J26	J52	14.50	204.00	110.00	0.00	0.00	0.00	0.00	Open	0
6		P23	J24	J50	9.53	204.00	110.00	3.36	0.10	0.00	0.11	Open	0
7		P25	J22	J48	9.53	204.00	110.00	3.36	0.10	0.00	0.11	Open	0
8		P27	J20	J46	18.39	204.00	110.00	3.04	0.09	0.00	0.09	Open	0
9		P29	J18	J44	17.23	204.00	110.00	3.04	0.09	0.00	0.09	Open	0
10		P31	J16	J42	9.78	204.00	110.00	2.53	0.08	0.00	0.06	Open	0
11		P33	J14	J40	9.77	204.00	110.00	2.53	0.08	0.00	0.06	Open	0
12		P35	J12	J38	14.50	204.00	110.00	6.03	0.18	0.00	0.32	Open	0
13		P37	J10	J36	14.50	204.00	110.00	6.03	0.18	0.00	0.32	Open	0
14		P51	RES9002	J10	20.35	204.00	110.00	18.60	0.57	0.05	2.54	Open	0
15		P53	J10	J12	2.00	204.00	110.00	12.57	0.38	0.00	1.23	Open	0
16		P55	J12	J14	44.71	204.00	110.00	6.54	0.20	0.02	0.37	Open	0
17		P57	J14	J16	2.00	204.00	110.00	4.01	0.12	0.00	0.15	Open	0
18		P59	J16	J18	50.51	204.00	110.00	1.48	0.05	0.00	0.02	Open	0
19		P61	J18	J20	1.50	204.00	110.00	-1.56	0.05	0.00	0.02	Open	0
20		P63	J20	J22	7.34	204.00	110.00	-4.60	0.14	0.00	0.19	Open	0
21		P65	J22	J24	2.00	204.00	110.00	-7.96	0.24	0.00	0.53	Open	0
22		P67	J24	J26	30.66	204.00	110.00	-11.32	0.35	0.03	1.01	Open	0
23		P69	J26	J28	25.49	204.00	110.00	-11.32	0.35	0.03	1.01	Open	0
24		P71	J28	J30	2.00	204.00	110.00	-15.49	0.47	0.00	1.81	Open	0
25		P73	J30	J32	11.13	204.00	110.00	-19.66	0.60	0.03	2.82	Open	0
26		P75	J32	J34	2.00	204.00	110.00	-25.70	0.79	0.01	4.63	Open	0
27		P77	J34	RES9000	24.60	204.00	110.00	-31.74	0.97	0.17	6.84	Open	0

		ID	Static Demand (L/s)	Static Pressure (m)	Static Head (m)	Fire-Flow Demand (L/s)	Residual Pressure (m)	Hydrant Available Flow (L/s)	Hydrant Pressure at Available Flow (m)
1	☐	J52	0.00	27.54	104.64	100.00	25.05	250.56	14.28

		ID	Junctions with Pressure Violation	Node with the Lowest Pressure Violation	Lowest Pressure Violation (m)	Average Pressure Violation (m)
1	☐	J52	0			

Beresniewicz, Arthur

From: Doug Van Den Ham <dougv@hobinarc.com>
Sent: Thursday, October 26, 2023 12:50 PM
To: Beresniewicz, Arthur
Cc: Magladry, Ryan
Subject: RE: 1660 Carling Ave - Water Boundary Request

Hello Arthur,

All buildings in this development would fall under Type II Non-Combustible Construction or Type I Fire Resistive Construction (most likely Type I assuming cast in place concrete structure / slabs).

All buildings would also have a sprinkler system (with fire pump based on proposed building heights) and standpipe connections. There would be monitoring at the alarm level.

As you note below, all of this is subject to revision if there is any major shifts in design direction (ie, client decided to do a mass timber or steel frame building). And as you note, we would resubmit the FUS calcs as required for those changes.

Hope that provides the info you need.

Regards,

Doug

From: Beresniewicz, Arthur <arthur.beresniewicz@arcadis.com>
Sent: Thursday, October 26, 2023 12:01 PM
To: Doug Van Den Ham <dougv@hobinarc.com>
Cc: Magladry, Ryan <ryan.magladry@arcadis.com>
Subject: RE: 1660 Carling Ave - Water Boundary Request

Hi Doug,

As Ryan mentioned the City requires a formal fireflow design declaration form to be included in the submission package. Detailing the building material type and the sprinkler system in the buildings as they impact the fireflow calculations.

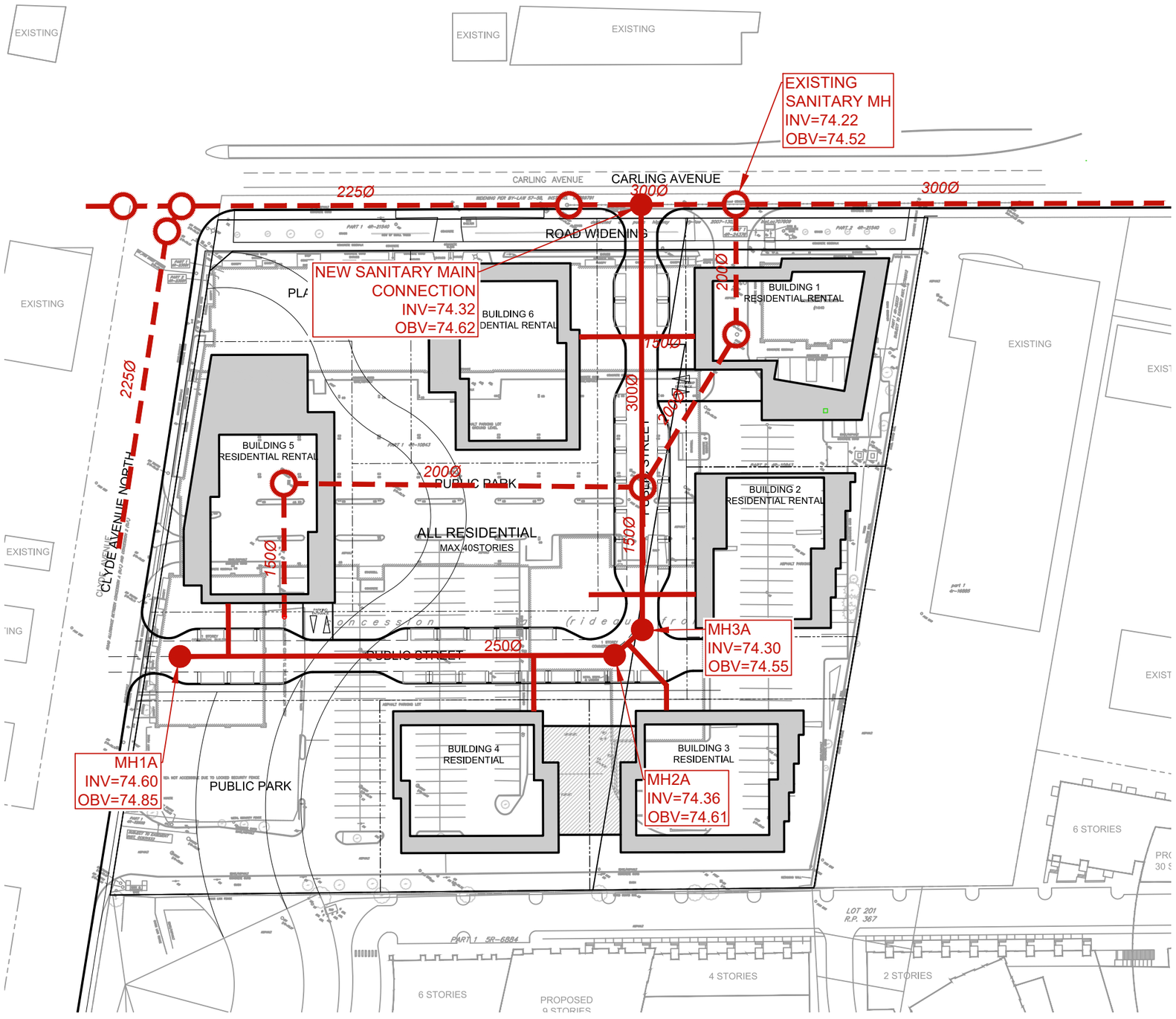
I've attached the form to this email, please let me know if you have any questions and if you would like a disclaimer added that the buildings haven't been designed yet but would generally be designed in a certain fashion and that should these parameters change, a revised FF calc will be required.

Best,

Arthur Beresniewicz EIT
Engineering Intern
Suite 500, 333 Preston Street | Ottawa | ON | K1S 5N4 | Canada
T: +1 613 225 1311 ext 64073
www.arcadis.com

APPENDIX C

- Figure 3.1 1660 Carling Ave Sanitary Sewer Layout
- 1660 Carling Ave Sanitary Sewer Design Sheet
- Figure 3.2 1660 Carling Ave Sanitary Drainage Area Plan
- City of Ottawa Correspondence Regarding Offsite capacity
- Excerpt from Delcan – Sanitary Sewer Design Sheet



N

LEGEND:

- PROPOSED SANITARY SEWERS
- PROPOSED SANITARY MANHOLE
- 200Ø EXISTING SANITARY SEWERS
- EXISTING SANITARY MANHOLE

CITY FILE NUMBER: (D02-02-22-0126)

J:\140055_1660Carling\7.0_Production\7.03_Design\04_Civil_Land_Adequacy Report_SheetsSet\Figure 3.1 CONCEPTUAL SANITARY SEWER LAYOUT.dwg Last Saved By: Eherrle Last Saved At: Nov. 13, 23

Scale	Project Title	Drawing Title	Sheet No.
1:1000	1640 - 1660 CARLING AVE	CONCEPTUAL SANITARY SEWER LAYOUT	FIGURE 3.1
			2023-10-31

IBI GROUP
400-333 Preston Street
Ottawa, Ontario K1S 5N4 Canada
tel 613 225 1311 fax 613 225 9868
ibigroup.com

SANITARY SEWER DESIGN SHEET

DRAFT - 1660 Carling Avenue
CITY OF OTTAWA
Hobin Architecture Inc.

LOCATION				RESIDENTIAL										ICI AREAS								INFILTRATION ALLOWANCE			FIXED FLOW (L/s)		TOTAL FLOW	PROPOSED SEWER DESIGN						
				AREA	UNIT TYPES				AREA	POPULATION		RES	PEAK	AREA (Ha)						ICI	PEAK	AREA (Ha)		FLOW				CAPACITY	LENGTH	DIA	SLOPE	VELOCITY	AVAILABLE CAPACITY	
STREET	AREA ID	FROM MH	TO MH	w/ Units (Ha)	SF	TH/SD	1 Bed APT	2 Bed APT	w/o Units (Ha)	IND	CUM	PEAK FACTOR	FLOW (L/s)	INSTITUTIONAL IND	INSTITUTIONAL CUM	COMMERCIAL IND	COMMERCIAL CUM	INDUSTRIAL IND	INDUSTRIAL CUM	PEAK FACTOR	FLOW (L/s)	IND	CUM	(L/s)	IND	CUM	(L/s)	(L/s)	(m)	(mm)	(%)	(full) (m/s)	L/s	(%)
																													0.00	0	0.00			
Carling Avenue																																		
		BLDG 4	*1A*	*0.24*			*123*	*53*		*283.5*	*283.5*	*3.47*	*3.19*	*0.00*	*0.0*	*0.00*	*0.00*	*0.00*	*0.0*	*1.00*	*0.00*	*0.24*	*0.24*	*0.08*	*0.00*	*0.0*	*3.27*	*15.89*	*12.50*	*150*	*1.00*	*0.871*	*12.62*	*79.43%*
		BLDG 5	*1A*				*294*	*126*		*676.2*	*676.2*	*3.32*	*7.28*	*0.00*	*0.0*	*0.28*	*0.28*	*0.00*	*0.0*	*1.50*	*0.14*	*0.28*	*0.28*	*0.09*	*0.00*	*0.0*	*7.51*	*34.22*	*12.00*	*200*	*1.00*	*1.055*	*26.71*	*78.05%*
Street 1		1A	2A						0.41	24.6	984.3	3.24	10.35	0.00	0.0	0.00	0.28	0.00	0.0	1.50	0.14	0.41	0.93	0.31	0.00	0.0	10.79	31.02	98.10	250	0.25	0.612	20.23	65.22%
		BLDG 3	*1A*	*0.41*			*148*	*64*		*341.6*	*341.6*	*3.44*	*3.81*	*0.00*	*0.0*	*0.00*	*0.00*	*0.00*	*0.0*	*1.00*	*0.00*	*0.41*	*0.41*	*0.14*	*0.00*	*0.0*	*3.95*	*15.89*	*25.00*	*150*	*1.00*	*0.871*	*11.94*	*75.16%*
Street 1		2A	3A							0.0	1325.9	3.17	13.64	0.00	0.0	0.00	0.28	0.00	0.0	1.50	0.14	0.00	1.34	0.44	0.00	0.0	14.22	31.02	8.50	250	0.25	0.612	16.80	54.17%
		BLDG 2	*3A*	*0.25*			*164*	*70*		*376.6*	*376.6*	*3.43*	*4.18*	*0.00*	*0.0*	*0.00*	*0.00*	*0.00*	*0.0*	*1.00*	*0.00*	*0.25*	*0.25*	*0.08*	*0.00*	*0.0*	*4.27*	*34.22*	*12.00*	*200*	*1.00*	*1.055*	*29.95*	*87.53%*
		BLDG 1	*3A*	*0.18*			*204*	*87*		*468.3*	*468.3*	*3.39*	*5.15*	*0.00*	*0.0*	*0.00*	*0.00*	*0.00*	*0.0*	*1.00*	*0.00*	*0.18*	*0.18*	*0.06*	*0.00*	*0.0*	*5.21*	*15.89*	*12.00*	*150*	*1.00*	*0.871*	*10.68*	*67.24%*
		BLDG 6	*3A*				*295*	*126*		*677.6*	*677.6*	*3.32*	*7.30*	*0.00*	*0.0*	*0.25*	*0.25*	*0.00*	*0.0*	*1.50*	*0.12*	*0.25*	*0.25*	*0.08*	*0.00*	*0.0*	*7.50*	*34.22*	*14.00*	*200*	*1.00*	*1.055*	*26.72*	*78.08%*
Street 1		3A	EX. MAIN						0.27	16.2	2864.6	2.97	27.55	0.00	0.0	0.00	0.53	0.00	0.0	1.50	0.26	0.27	2.29	0.76	0.00	0.0	28.56	45.12	95.80	300	0.20	0.618	16.55	36.69%
Carling Avenue		*EX MAIN*	*EX MH*							*0.0*	*2864.6*	*2.97*	*27.55*	*0.00*	*0.0*	*0.00*	*0.53*	*0.00*	*0.0*	*1.50*	*0.26*	*0.00*	*2.29*	*0.76*	*0.00*	*0.0*	*28.56*	*45.12*	*22.00*	*300*	*0.20*	*0.618*	*16.55*	*36.69%*

Design Parameters:

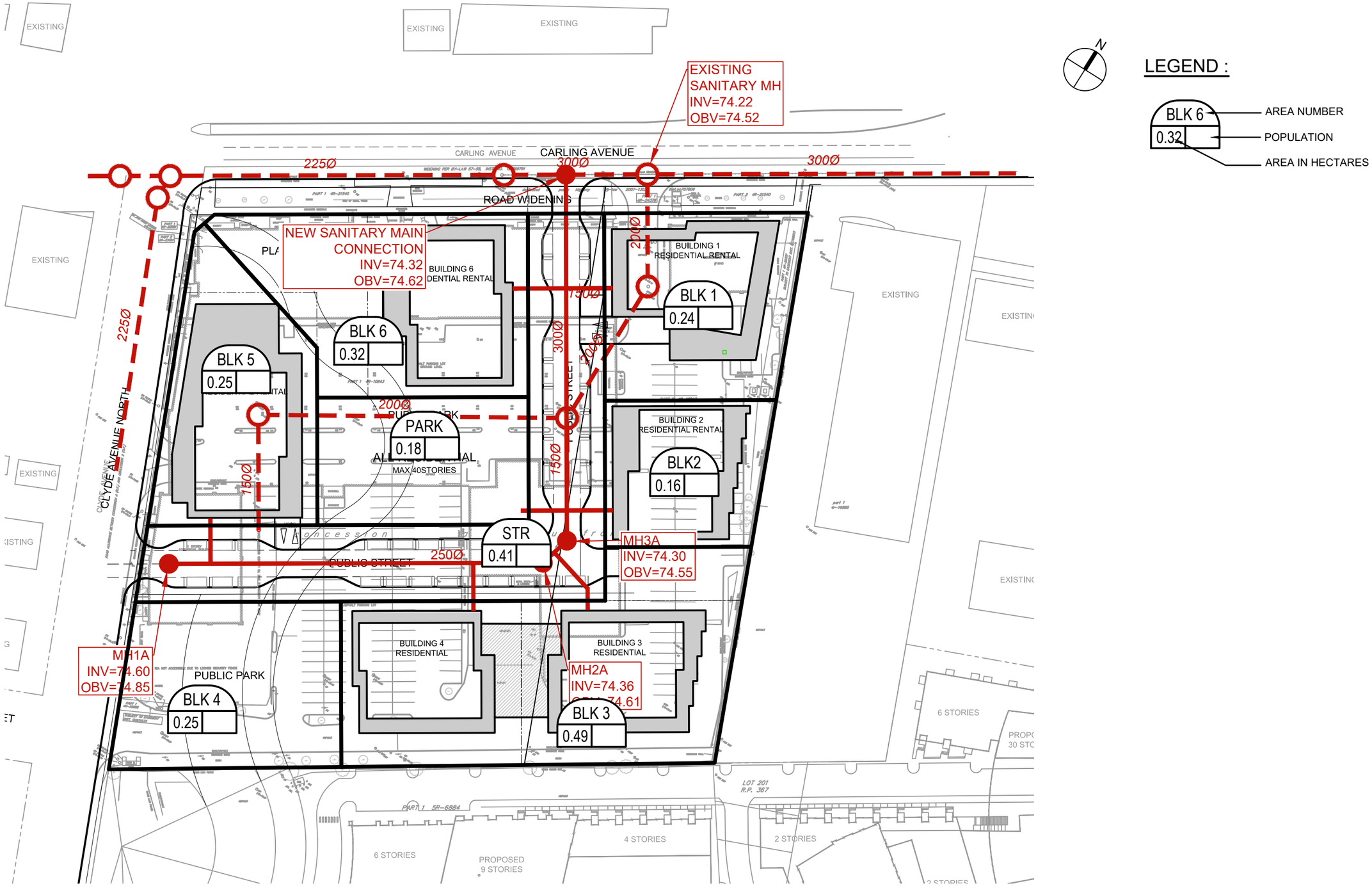
Residential			ICI Areas			
SF	3.4	p/p/u	INST	28,000	L/Ha/day	
TH/SD	2.7	p/p/u	COM	28,000	L/Ha/day	
1 Bed	1.4	p/p/u	IND	35,000	L/Ha/day	MOE Chart
2 Bed	2.1	p/p/u		17000	L/Ha/day	
Other	60	p/p/Ha				

Notes:
1. Mannings coefficient (n) = 0.013
2. Demand (per capita): 280 L/day 200 L/day
3. Infiltration allowance: 0.33 L/s/Ha
4. Residential Peaking Factor:
   Harmon Formula = 1+(14/(4+(P/1000)^0.5))0.8
   where K = 0.8 Correction Factor
5. Commercial and Institutional Peak Factors based on total area, 1.5 if greater than 20%, otherwise 1.0

Designed: RM
Checked: RM
Dwg. Reference: 140055

No.	Revision	Date
1.	Draft - Coordination with City for Rezoning	2022-11-15

File Reference: 140055-6.04.04
Date: 2022-11-15
Sheet No: 1 of 1



N

LEGEND :

BLK 6 — AREA NUMBER
0.32 — POPULATION
AREA IN HECTARES

CITY FILE NUMBER: (D02-02-22-0126)

Scale	Project Title	Drawing Title	Sheet No.
NTS	1640 - 1660 CARLING AVE	CONCEPTUAL SANITARY TRIBUTARY AREA PLAN	FIGURE 3.2
			2023-10-31

From: Tousignant, Eric <Eric.Tousignant@ottawa.ca>
Sent: Monday, December 5, 2022 3:06 PM
To: Ryan Magladry
Cc: Arthur Beresniewicz; Fawzi, Mohammed
Subject: RE: PC2022-0215 - 1640/1660 Carling Avenue - Follow-up

Goof Afternoon Ryan

The Carling sanitary sewer is due for replacement next year. We will be upsizing it to account for future development.

Regards
Eric

From: Ryan Magladry <rmagladry@IBIGroup.com>
Sent: December 05, 2022 1:58 PM
To: Tousignant, Eric <Eric.Tousignant@ottawa.ca>
Cc: Arthur Beresniewicz <arthur.beresniewicz@ibigroup.com>; Tousignant, Eric <Eric.Tousignant@ottawa.ca>; Fawzi, Mohammed <mohammed.fawzi@ottawa.ca>
Subject: Re: PC2022-0215 - 1640/1660 Carling Avenue - Follow-up

Good afternoon Eric and Mohammed,
Quickly touching base to see if you were able to confirm that the Carling Avenue sani upgrades are able to accommodate the rezoning of the 1660 Carling Site (Canadian Tire).

Thanks,

Ryan Magladry CET

Project Manager

Suite 500, 333 Preston Street

Ottawa ON K1S 5N4 Canada

tel 1 613 225 1311 cell 1 613 795 5610

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IBI Group is now proudly a part of Arcadis.

From: Ryan Magladry <rmagladry@IBIGroup.com>
Sent: Thursday, November 17, 2022 10:47 AM
To: Fawzi, Mohammed <mohammed.fawzi@ottawa.ca>
Cc: Arthur Beresniewicz <arthur.beresniewicz@ibigroup.com>; Tousignant, Eric <Eric.Tousignant@ottawa.ca>
Subject: Re: PC2022-0215 - 1640/1660 Carling Avenue - Follow-up

Hi Mohammed,
Attached is our current storm layout, showing existing and proposed. We would likely add offline potential U/G storage to this sketch prior to wrapping up our report.

The storm sewer on Carling is very shallow. It will likely require insulated pipes between Building 1 & 6, until we can get the grade up to provide adequate cover.

Let us know if there is anything else.

Ryan Magladry CET

Project Manager

Suite 500, 333 Preston Street

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Canadian Tire - Carling Ave and Clyde Ave
City of Ottawa

Manning's "n" = 0.013

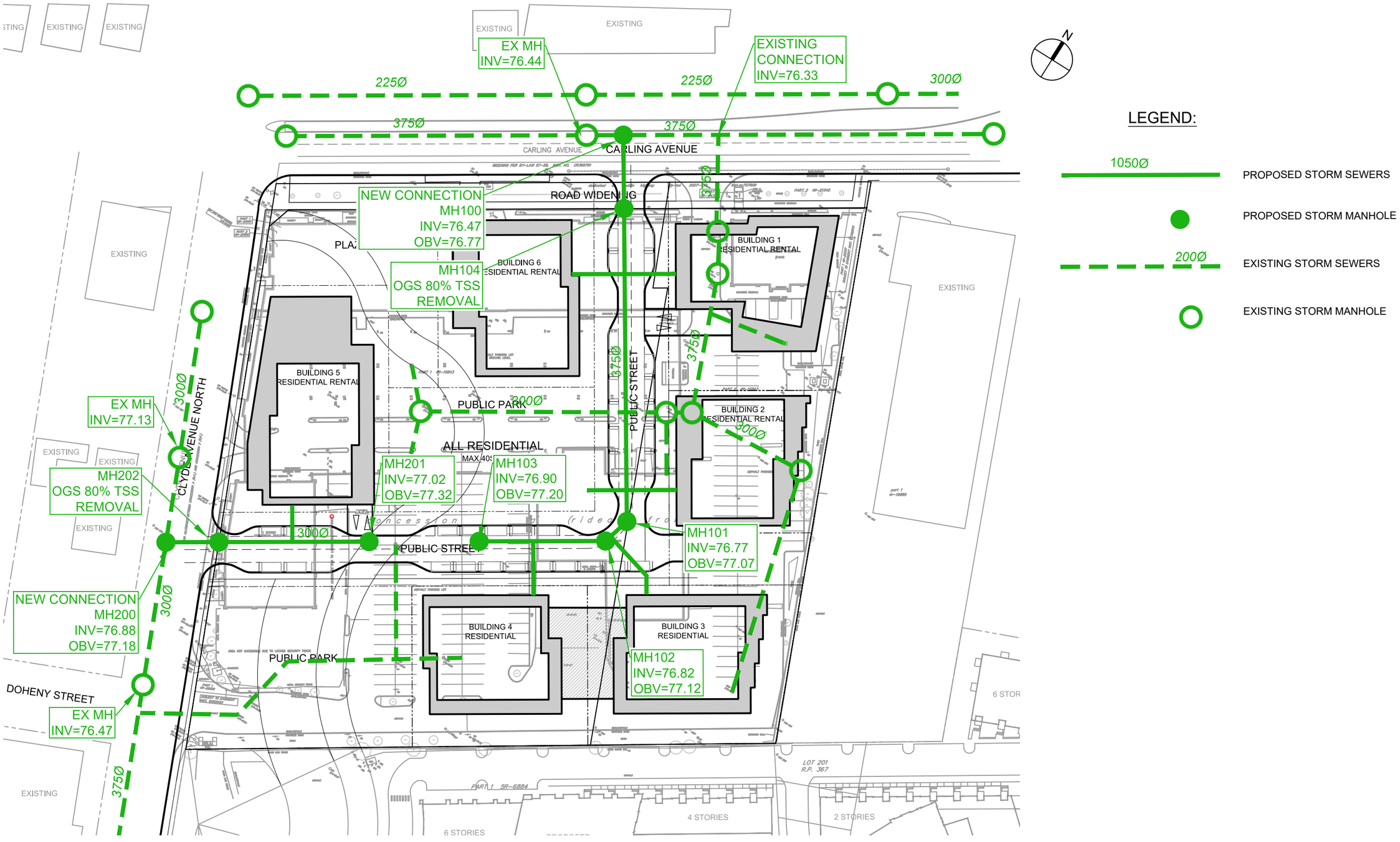
Junction Losses	
Angle	Drop
Degree	m
0	0.01
45	0.03
90	0.06

Sanitary Sewer

Location		Design Flow			Pipe Selection					Profile							
From	To	Bldg Incr.	Parking Incr.	Cum	D	So	Capacity	Velocity	Length	Surface U/S	Surface D/S	Invert U/S	Invert D/S	Junction Angle	Bend Loss	Depth of Cover D/S	Okay
MH	MH	L/s	L/s	L/s	mm	%	L/s	m/s	m	m	m	m	m	degree	m	m	
Carling Avenue outlet - 228 mm sanitary sewer; invert approx. 74.22 m																	
A	1	2.1		2.1	150	2.00	21.5	1.22	4	78.83	78.81	76.60	76.52	90	0.06	2.14	Yes
1	2			2.1	200	0.65	26.4	0.84	30	78.81	78.70	76.46	76.27	90	0.06	2.24	Yes
2	3		0.5	2.6	200	0.65	26.4	0.84	36	78.70	78.70	76.21	75.97	0	0.01	2.53	Yes
3	4		0.5	3.1	200	0.65	26.4	0.84	45	78.70	78.60	75.96	75.67	45	0.03	2.73	Yes
4	5	3.4		6.5	200	0.65	26.4	0.84	38	78.60	78.23	75.64	75.39	45	0.03	2.64	Yes
5	6	7.6		14.1	200	2.00	46.3	1.47	31	78.23	77.58	75.36	74.74	90	0.06	2.64	Yes

APPENDIX D

- Figure 4.1 1660 Carling Ave Storm Sewer Layout
- 1660 Carling Ave Storm Design Sheet
- Figure 4.2 1660 Carling Ave Storm Drainage Area Plan
- 1660 Carling Ave Storm Water Management Sheet
- Excerpt from Delcan - Stormwater Management Report
- Excerpt from Delcan – Storm Sewer Design Sheet



CITY FILE NUMBER: (D02-02-22-0126)

J:\140055_1660Carling\7.0_Production\7.03_Design\04_Civil_Land_Adequacy Report_SheetsSet\Figure 4.1 CONCEPTUAL STORM SEWER LAYOUT.dwg Last Saved By: Eherrle Last Saved At: Nov. 13, 23

Scale	Project Title	Drawing Title	Sheet No.
NTS	1640 - 1660 CARLING AVE	CONCEPTUAL STORM SEWER LAYOUT	FIGURE 4.1 2023-10-31

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STORM SEWER DESIGN SHEET

DRAFT - 1660 Carling Avenue
CITY OF OTTAWA
RioCan

LOCATION				AREA (Ha)										RATIONAL DESIGN FLOW														SEWER DATA								
STREET	AREA ID	FROM	TO	C= 0.20	C= 0.25	C= 0.40	C= 0.50	C= 0.57	C= 0.65	C= 0.69	C= 0.75	C= 0.76	C= 0.90	IND 2.78AC	CUM 2.78AC	INLET (min)	TIME IN PIPE	TOTAL (min)	i (2) (mm/hr)	i (5) (mm/hr)	i (10) (mm/hr)	i (100) (mm/hr)	2yr PEAK FLOW (L/s)	5yr PEAK FLOW (L/s)	10yr PEAK FLOW (L/s)	100yr PEAK FLOW (L/s)	FIXED FLOW IND	FIXED FLOW CUM	DESIGN FLOW (L/s)	CAPACITY (L/s)	LENGTH (m)	PIPE SIZE (mm) DIA	PIPE SIZE (mm) W	PIPE SIZE (mm) H	SLOPE (%)	VELOCITY (m/s)	AVAIL CAP (2yr) (L/s)	AVAIL CAP (2yr) (%)
Street No. 1 (W)	Building 5	BLDG 5	MAIN 200								0.24			0.50	0.50	12.16	0.32	12.48	69.39	94.00	110.14	160.93	34.72	47.04	55.11	80.53	0.00	0.00	34.72	17.11	10.00	200			0.25	0.528	-17.61	-102.95%
Street No. 1 (W)	Publick Park 2	BLDG 5	MAIN 200			0.25								0.28	0.28	10.46	0.32	10.77	75.09	101.83	119.36	174.48	20.87	28.31	33.18	48.50	0.00	0.00	20.87	17.11	10.00	200			0.25	0.528	-3.77	-22.02%
Street No. 1 (W)		MH 201	MH 200										0.09	0.23	1.00	12.16	0.98	13.14	69.39	94.00	110.14	160.93	69.64	94.34	110.53	161.51	0.00	0.00	69.64	50.44	40.50	300			0.25	0.691	-19.19	-38.05%
Clyde Avenue North		MH 200	EX MH											0.00	1.00	13.14	0.17	13.32	66.54	90.09	105.54	154.17	66.77	90.41	105.91	154.73	0.00	0.00	66.77	100.88	14.50	300			1.00	1.383	34.11	33.81%
Street No. 1 (W)	Building 4	BLDG 4	MAIN 200								0.20			0.42	0.42	11.71	0.46	12.16	70.82	95.97	112.46	164.34	29.53	40.02	46.89	68.53	0.00	0.00	29.53	17.11	14.50	200			0.25	0.528	-12.42	-72.62%
Street No. 1 (E)	Building 1	BLDG 1	MAIN 100								0.24			0.50	0.50	10.00	0.46	10.46	76.81	104.19	122.14	178.56	38.43	52.14	61.12	89.35	0.00	0.00	38.43	17.11	14.50	200			0.25	0.528	-21.32	-124.65%
Street No. 1 (E)	Building 2	BLDG 2	MAIN 100								0.16			0.33	0.33	10.46	0.46	10.92	75.09	101.83	119.36	174.48	25.05	33.97	39.82	58.21	0.00	0.00	25.05	17.11	14.50	200			0.25	0.528	-7.94	-46.42%
Street No. 1 (E)	Building 3	BLDG 3	MAIN 100								0.28			0.58	0.58	10.92	0.79	11.71	73.46	99.59	116.72	170.60	42.88	58.14	68.14	99.59	0.00	0.00	42.88	17.11	25.00	200			0.25	0.528	-25.78	-150.67%
Street No. 1 (E)	Building 6	BLDG 6	MAIN 100								0.33			0.69	0.69	12.48	0.46	12.94	68.44	92.69	108.60	158.67	47.09	63.78	74.72	109.18	0.00	0.00	47.09	17.11	14.50	200			0.25	0.528	-29.98	-175.23%
Street No. 1 (E)	Public Park 1	PARK	MAIN 100			0.18								0.20	0.20	0.00	0.46	0.46	167.22	230.48	271.61	398.62	33.47	46.13	54.36	79.79	0.00	0.00	33.47	17.11	14.50	200			0.25	0.528	-16.36	-95.64%
Street No. 1 (E)		MH 103	MH 102											0.00	0.42	13.32	0.71	14.02	66.05	89.43	104.76	153.03	27.54	37.29	43.68	63.81	0.00	0.00	27.54	91.46	34.00	375			0.25	0.802	63.91	69.88%
Street No. 1 (E)		MH 102	MH 101											0.00	1.00	14.02	0.16	14.18	64.18	86.86	101.73	148.59	64.23	86.93	101.81	148.71	0.00	0.00	64.23	91.46	7.75	375			0.25	0.802	27.23	29.77%
Street No. 1 (E)		MH 101	MH 100										0.31	0.78	3.50	14.18	1.75	15.93	63.77	86.29	101.07	147.62	223.09	301.91	353.61	516.46	0.00	0.00	223.09	91.46	84.20	375			0.25	0.802	-131.64	-143.94%
Carling Ave		MH 100	EX MH											0.00	3.50	15.93	0.37	16.31	59.65	80.66	94.45	137.90	208.70	282.21	330.44	482.45	0.00	0.00	208.70	101.84	20.00	375			0.31	0.893	-106.86	-104.93%
																															375						

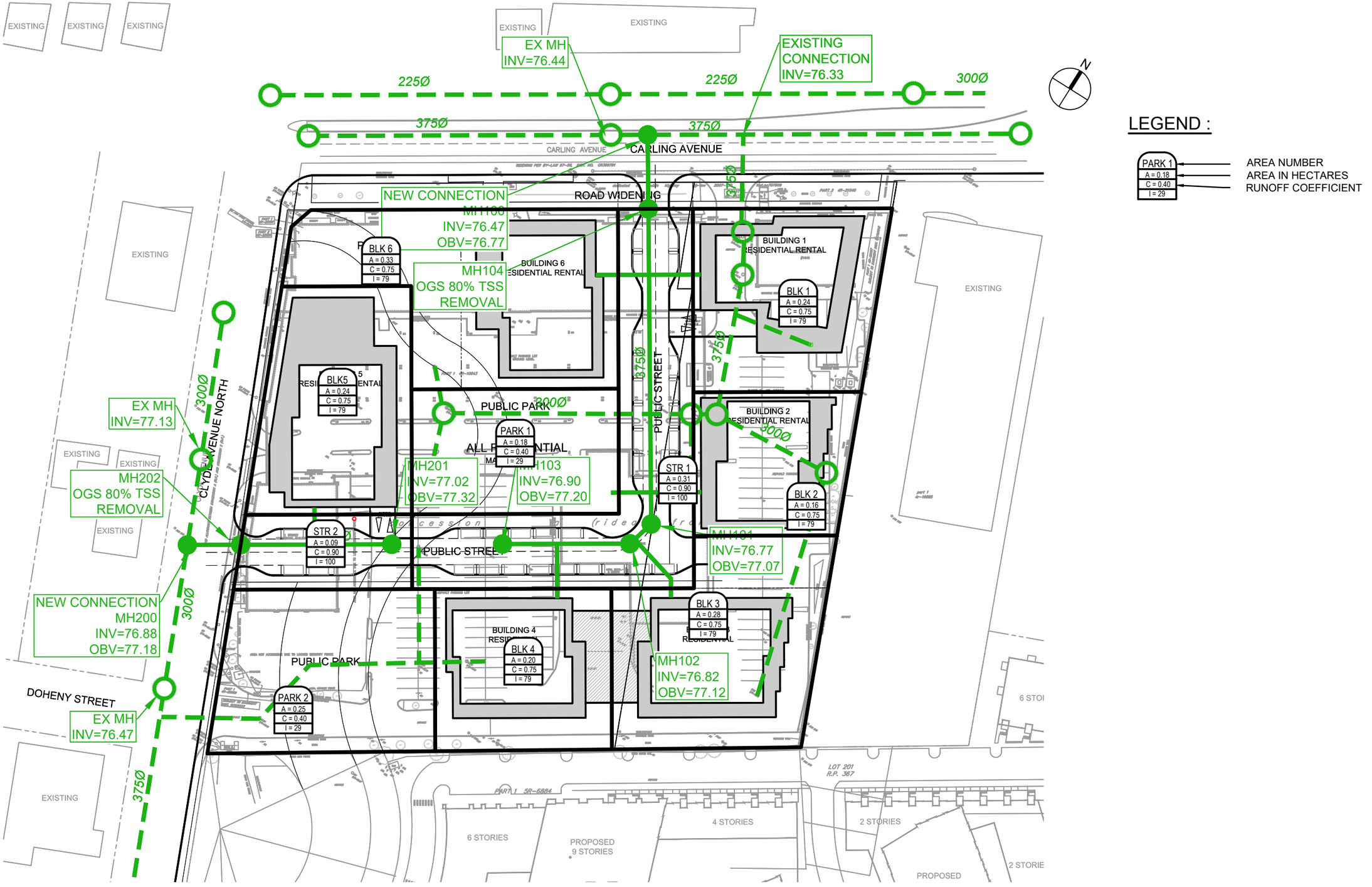
Definitions:
Q = 2.78CiA, where:
Q = Peak Flow in Litres per Second (L/s)
A = Area in Hectares (Ha)
i = Rainfall intensity in millimeters per hour (mm/hr)
[i = 732.951 / (TC+6.199)^0.810] 2 YEAR
[i = 998.071 / (TC+6.053)^0.814] 5 YEAR
[i = 1174.184 / (TC+6.014)^0.816] 10 YEAR
[i = 1735.688 / (TC+6.014)^0.820] 100 YEAR

Notes:
1. Mannings coefficient (n) = 0.013

Designed: AB
Checked: RM
Dwg. Reference: 140055

No.	Revision	Date
1.	Draft - Coordination with City for Rezoning	2022-11-15

File Reference: 140055-6.04.04
Date: 2022-11-15
Sheet No: 1 of 1



LEGEND :

PARK 1
A = 0.18
C = 0.40
I = 29

AREA NUMBER
AREA IN HECTARES
RUNOFF COEFFICIENT

CITY FILE NUMBER: (D02-02-22-0126)

J:\140055_1660Carling\7.0_Production\7.03_Design\04_Civil_Local_Adequacy Report_SheetSet\Figure 4.2 CONCEPTUAL STORM TRIBUTARY AREA PLAN.dwg Last Saved By: Ehenrie Last Saved At: Nov. 13, 23

Scale	Project Title	Drawing Title	Sheet No.
1:1000	1640 - 1660 CARLING AVE	CONCEPTUAL STORM TRIBUTARY AREA PLAN	FIGURE 4.2
			2023-10-31

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Formulas and Descriptions

i_{2yr} = 1:2 year Intensity = $732.951 / (T_c+6.199)^{0.810}$
i_{5yr} = 1:5 year Intensity = $998.071 / (T_c+6.053)^{0.814}$
I_{100yr} = 1:100 year Intensity = $1735.688 / (T_c+6.014)^{0.820}$
T_c = Time of Concentration (min)
C = Average Runoff Coefficient
A = Area (Ha)
Q = Flow = 2.78CiA (L/s)

Maximum Allowable Release Rate

Restricted Flowrate ($Q_{restricted} = 2.78*C*i_{5yr}*A_{site}$ based on C=0.50, Tc=20min)

C =	0.5	
T_c =	20	min
i_{5yr} =	70.25	mm/hr
A_{site} =	0.830	Ha
$Q_{restricted}$ =	81.05	L/s

Total site is 235 L/s per Delcan Site Report

Uncontrolled Release ($Q_{uncontrolled} = 2.78*C*i_{100yr}*A_{uncontrolled}$)

C =	0.39	
T_c =	10	min
i_{100yr} =	178.56	mm/hr
$A_{uncontrolled}$ =	0.00	Ha
$Q_{uncontrolled}$ =	0.00	L/s

Maximum Allowable Release Rate ($Q_{max\ allowable} = Q_{restricted} - Q_{uncontrolled}$)

$Q_{max\ allowable}$ =	81.05	L/s

MODIFIED RATIONAL METHOD (100-Year, 5-Year & 2-Year Ponding)

SWM Statistics of Modified Site Areas			100 year	2 year (Tc =10 min)
Controlled	Area	ICD Flow	Total Storage Required (m3)	Peak Flow
Clyde Road	0.090	9.276	21.28	15.74
Carling Road	0.310	31.952	73.30	54.21
Private Park	0.180	18.553	9.04	13.99
Public Park	0.250	25.768	14.32	19.43
Public SWM	**0.83**	**85.55**	**117.95**	**103.37**
BLOCK 1	0.240	24.74	42.34	
BLOCK 2	0.160	16.49	28.23	
BLOCK 3	0.280	28.86	49.40	
BLOCK 4	0.20	20.61	35.29	
BLOCK 5	0.240	24.74	42.34	
BLOCK 6	0.330	34.01	58.22	
Private SWM	**1.45**	**149.45**	**255.83**	

Uncontrolled	Area	Flow
XZ	0.000	0.00
YY	0.000	0.00
Sum	**0.00**	**0.00**
Total Sum	**0.830**	**235.000**
Allowable		**235.00**
		TRUE

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Drainage Area	*Clyde Road*				
Area (Ha)	0.090	Restricted Flow ICD $_{Actual}$ (L/s)=	9.28		
C =	0.90	Restricted Flow $Q_{r\ for\ swm\ calc}$ (L/s)=	9.28	50% reduction for sub-surface storage	

100-Year Ponding						100-Year +20% Ponding		
T_c Variable (min)	*i_{100yr} (mm/hour)*	*Peak Flow Q_p =2.78xCi_{100yr} A (L/s)*	*Q_r (L/s)*	*Q_p -Q_r (L/s)*	*Volume 100yr (m^3)*	*100YRQ_p 20% (L/s)*	*Qp - Qr (L/s)*	*Volume 100+20 (m^3)*
10	178.56	40.21	9.28	30.93	18.56			
15	142.89	32.18	9.28	22.90	20.61			
20	119.95	27.01	9.28	17.73	**21.28**	32.41	23.14	**27.76**
25	103.85	23.38	9.28	14.11	21.16			
30	91.87	20.69	9.28	11.41	20.54			

Storage (m^3)					100+20		
Overflow	**Required**	**Surface**	**Sub-surface**	**Balance**	**Overflow**	**Required**	**Balance**
0.00	21.28	50.63	0	0.00	0.00	27.76	0.00
					convert to flow with peak Tc (L/s)		0.00

overflows to: Clyde

Drainage Area	*Clyde Road*		
Area (Ha)	0.090		
C =	0.90	Restricted Flow Q_r (L/s)=	9.28

2-Year Ponding					
T_c Variable (min)	*i_{2yr} (mm/hour)*	*Peak Flow Q_p =2.78xCi_{2yr} A (L/s)*	*Q_r (L/s)*	*Q_p -Q_r (L/s)*	*Volume 2yr (m^3)*
10	76.81	17.29	9.28	8.02	4.81
11	73.17	16.48	9.28	7.20	4.75
12	69.89	15.74	9.28	6.46	**4.65**
13	66.93	15.07	9.28	5.79	4.52
14	64.23	14.46	9.28	5.19	4.36

Storage (m^3)				
Overflow	**Required**	**Surface**	**Sub-surface**	**Balance**
0.00	4.65	50.63	0	0.00

overflows to: Clyde

Drainage Area	*Carling Road*				
Area (Ha)	0.310	Restricted Flow ICD $_{Actual}$ (L/s)=	31.95		
C =	0.90	Restricted Flow $Q_{r\ for\ swm\ calc}$ (L/s)=	31.95	50% reduction for sub-surface storage	

100-Year Ponding						100-Year +20% Ponding		
T_c Variable (min)	*i_{100yr} (mm/hour)*	*Peak Flow Q_p =2.78xCi_{100yr} A (L/s)*	*Q_r (L/s)*	*Q_p -Q_r (L/s)*	*Volume 100yr (m^3)*	*100YRQ_p 20% (L/s)*	*Qp - Qr (L/s)*	*Volume 100+20 (m^3)*
10	178.56	138.49	31.95	106.54	63.93			
15	142.89	110.83	31.95	78.88	70.99			
20	119.95	93.04	31.95	61.08	**73.30**	111.64	79.69	**95.63**
25	103.85	80.55	31.95	48.59	72.89			
30	91.87	71.25	31.95	39.30	70.75			

Storage (m^3)					100+20		
Overflow	**Required**	**Surface**	**Sub-surface**	**Balance**	**Overflow**	**Required**	**Balance**
0.00	73.30	174.38	0	0.00	0.00	95.63	0.00
					convert to flow with peak Tc (L/s)		0.00

overflows to: Carling

Drainage Area	*Carling Road*		
Area (Ha)	0.310		
C =	0.90	Restricted Flow Q_r (L/s)=	31.95

2-Year Ponding					
T_c Variable (min)	*i_{2yr} (mm/hour)*	*Peak Flow Q_p =2.78xCi_{2yr} A (L/s)*	*Q_r (L/s)*	*Q_p -Q_r (L/s)*	*Volume 2yr (m^3)*
10	76.81	59.57	31.95	27.62	16.57
11	73.17	56.75	31.95	24.80	16.37
12	69.89	54.21	31.95	22.26	**16.03**
13	66.93	51.91	31.95	19.96	15.57
14	64.23	49.82	31.95	17.87	15.01

Storage (m^3)				
Overflow	**Required**	**Surface**	**Sub-surface**	**Balance**
0.00	16.03	174.38	0	0.00

overflows to: Carling

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Drainage Area	*Private Park*							
Area (Ha)	0.180	Restricted Flow ICD $_{Actual}$ (L/s)=	18.55					
C =	0.40	Restricted Flow $Q_{r\ for\ swm\ calc}$ (L/s)=	18.55	50% reduction for sub-surface storage				
100-Year Ponding						**100-Year +20% Ponding**		
T_c Variable (min)	*i_{100yr} (mm/hour)*	*Peak Flow Q_p =2.78xCi_{100yr} A (L/s)*	*Q_r (L/s)*	*Q_p -Q_r (L/s)*	*Volume 100yr (m^3)*	*100YRQ_p 20% (L/s)*	*Qp - Qr (L/s)*	*Volume 100+20 (m^3)*
5	242.70	48.58	18.55	30.03	9.01			
10	178.56	35.74	18.55	17.19	10.31			
15	142.89	28.60	18.55	10.05	**9.04**	34.32	15.77	**14.19**
20	119.95	24.01	18.55	5.46	6.55			
25	103.85	20.79	18.55	2.23	3.35			

Storage (m^3)					100+20		
Overflow	**Required**	**Surface**	**Sub-surface**	**Balance**	**Overflow**	**Required**	**Balance**
0.00	9.04	101.25	0	0.00	0.00	14.19	0.00
					convert to flow with peak Tc (L/s)		0.00

overflows to: Carling Access

Drainage Area	*Private Park*				
Area (Ha)	0.180				
C =	0.40	Restricted Flow Q_r (L/s)=	18.55		
2-Year Ponding					
T_c Variable (min)	*i_{2yr} (mm/hour)*	*Peak Flow Q_p =2.78xCi_{2yr} A (L/s)*	*Q_r (L/s)*	*Q_p -Q_r (L/s)*	*Volume 2yr (m^3)*
10	76.81	15.37	18.55	-3.18	-1.91
11	73.17	14.65	18.55	-3.91	-2.58
12	69.89	13.99	18.55	-4.56	**-3.29**
13	66.93	13.40	18.55	-5.16	-4.02
14	64.23	12.86	18.55	-5.70	-4.78

Storage (m^3)				
Overflow	**Required**	**Surface**	**Sub-surface**	**Balance**
0.00	-3.29	101.25	0	0.00

overflows to: Carling Access

Drainage Area	*Public Park*							
Area (Ha)	0.250	Restricted Flow ICD $_{Actual}$ (L/s)=	25.77					
C =	0.40	Restricted Flow $Q_{r\ for\ swm\ calc}$ (L/s)=	25.77	50% reduction for sub-surface storage				
100-Year Ponding						**100-Year +20% Ponding**		
T_c Variable (min)	*i_{100yr} (mm/hour)*	*Peak Flow Q_p =2.78xCi_{100yr} A (L/s)*	*Q_r (L/s)*	*Q_p -Q_r (L/s)*	*Volume 100yr (m^3)*	*100YRQ_p 20% (L/s)*	*Qp - Qr (L/s)*	*Volume 100+20 (m^3)*
0	398.62	110.82	25.77	85.05	0.00			
5	242.70	67.47	25.77	41.70	12.51			
10	178.56	49.64	25.77	23.87	**14.32**	59.57	33.80	**20.28**
15	142.89	39.72	25.77	13.96	12.56			
20	119.95	33.35	25.77	7.58	9.09			

Storage (m^3)					100+20		
Overflow	**Required**	**Surface**	**Sub-surface**	**Balance**	**Overflow**	**Required**	**Balance**
0.00	14.32	140.63	0	0.00	0.00	20.28	0.00
					convert to flow with peak Tc (L/s)		0.00

overflows to: Clyde Access

Drainage Area	*Public Park*				
Area (Ha)	0.250				
C =	0.40	Restricted Flow Q_r (L/s)=	25.77		
2-Year Ponding					
T_c Variable (min)	*i_{2yr} (mm/hour)*	*Peak Flow Q_p =2.78xCi_{2yr} A (L/s)*	*Q_r (L/s)*	*Q_p -Q_r (L/s)*	*Volume 2yr (m^3)*
10	76.81	21.35	25.77	-4.42	-2.65
11	73.17	20.34	25.77	-5.43	-3.58
12	69.89	19.43	25.77	-6.34	**-4.56**
13	66.93	18.61	25.77	-7.16	-5.59
14	64.23	17.86	25.77	-7.91	-6.65

Storage (m^3)				
Overflow	**Required**	**Surface**	**Sub-surface**	**Balance**
0.00	-4.56	140.63	0	0.00

overflows to: Clyde Access

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Drainage Area	*BLOCK 1*			
Area (Ha)	0.240	Restricted Flow ICD $_{Actual}$ (L/s)=	24.74	
C =	0.75	Restricted Flow $Q_{r\ for\ swm\ calc}$ (L/s)=	24.74	50% reduction for sub-surface storage

100-Year Ponding						100-Year +20% Ponding		
T_c Variable (min)	i_{100yr} (mm/hour)	Peak Flow $Q_p = 2.78xCi_{100yr}A$ (L/s)	Q_r (L/s)	$Q_p - Q_r$ (L/s)	Volume 100yr (m^3)	100YRQ_p 20% (L/s)	Qp - Qr (L/s)	Volume 100+20 (m^3)
10	178.56	89.35	24.74	64.61	38.77			
15	142.89	71.50	24.74	46.77	42.09			
20	119.95	60.02	24.74	35.29	**42.34**	72.03	47.29	**56.75**
25	103.85	51.97	24.74	27.23	40.84			
30	91.87	45.97	24.74	21.23	38.22			

Storage (m^3)					100+20		
Overflow	Required	Surface	Sub-surface	Balance	Overflow	Required	Balance
0.00	42.34	135.00	0	0.00	0.00	56.75	0.00
					convert to flow with peak Tc (L/s)		0.00

overflows to: F

Drainage Area	*BLOCK 1*		
Area (Ha)	0.240		
C =	0.90	Restricted Flow Q_r (L/s)=	24.74

2-Year Ponding					
T_c Variable (min)	i_{2yr} (mm/hour)	Peak Flow $Q_p = 2.78xCi_{2yr}A$ (L/s)	Q_r (L/s)	$Q_p - Q_r$ (L/s)	Volume 2yr (m^3)
10	76.81	46.12	24.74	21.38	12.83
11	73.17	43.94	24.74	19.20	12.67
12	69.89	41.97	24.74	17.23	**12.41**
13	66.93	40.19	24.74	15.45	12.05
14	64.23	38.57	24.74	13.83	11.62

Storage (m^3)				
Overflow	Required	Surface	Sub-surface	Balance
0.00	12.41	135.00	0	0.00

overflows to: Carling Access

Drainage Area	*BLOCK 2*			
Area (Ha)	0.160	Restricted Flow ICD $_{Actual}$ (L/s)=	16.49	
C =	0.75	Restricted Flow $Q_{r\ for\ swm\ calc}$ (L/s)=	16.49	50% reduction for sub-surface storage

100-Year Ponding						100-Year +20% Ponding		
T_c Variable (min)	i_{100yr} (mm/hour)	Peak Flow $Q_p = 2.78xCi_{100yr}A$ (L/s)	Q_r (L/s)	$Q_p - Q_r$ (L/s)	Volume 100yr (m^3)	100YRQ_p 20% (L/s)	Qp - Qr (L/s)	Volume 100+20 (m^3)
10	178.56	59.57	16.49	43.08	25.85			
15	142.89	47.67	16.49	31.18	28.06			
20	119.95	40.02	16.49	23.52	**28.23**	48.02	31.53	**37.83**
25	103.85	34.64	16.49	18.15	27.23			
30	91.87	30.65	16.49	14.16	25.48			

Storage (m^3)					100+20		
Overflow	Required	Surface	Sub-surface	Balance	Overflow	Required	Balance
0.00	28.23	90.00	0	0.00	0.00	37.83	0.00
					convert to flow with peak Tc (L/s)		0.00

overflows to: offsite

Drainage Area	*BLOCK 2*		
Area (Ha)	0.160		
C =	0.90	Restricted Flow Q_r (L/s)=	16.49

2-Year Ponding					
T_c Variable (min)	i_{2yr} (mm/hour)	Peak Flow $Q_p = 2.78xCi_{2yr}A$ (L/s)	Q_r (L/s)	$Q_p - Q_r$ (L/s)	Volume 2yr (m^3)
10	76.81	30.75	16.49	14.26	8.55
11	73.17	29.29	16.49	12.80	8.45
12	69.89	27.98	16.49	11.49	**8.27**
13	66.93	26.79	16.49	10.30	8.04
14	64.23	25.71	16.49	9.22	7.75

Storage (m^3)				
Overflow	Required	Surface	Sub-surface	Balance
0.00	8.27	90.00	0	0.00

overflows to: Carling Access

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Ottawa, Ontario K1S 5N4 Canada
ibigroup.com

Drainage Area	*BLOCK 3*			
Area (Ha)	0.280	Restricted Flow ICD $_{Actual}$ (L/s)=	28.86	
C =	0.75	Restricted Flow $Q_{r\ for\ swm\ calc}$ (L/s)=	28.86	50% reduction for sub-surface storage

100-Year Ponding						100-Year +20% Ponding		
T_c Variable (min)	i_{100yr} (mm/hour)	Peak Flow $Q_p = 2.78xCi_{100yr}A$ (L/s)	Q_r (L/s)	$Q_p - Q_r$ (L/s)	Volume 100yr (m^3)	100YRQ_p 20% (L/s)	Qp - Qr (L/s)	Volume 100+20 (m^3)
10	178.56	104.24	28.86	75.38	45.23			
15	142.89	83.42	28.86	54.56	49.11			
20	119.95	70.03	28.86	41.17	**49.40**	84.03	55.17	**66.21**
25	103.85	60.63	28.86	31.77	47.65			
30	91.87	53.63	28.86	24.77	44.59			

Storage (m^3)					100+20		
Overflow	Required	Surface	Sub-surface	Balance	Overflow	Required	Balance
0.00	49.40	157.50	0	0.00	0.00	66.21	0.00
					convert to flow with peak Tc (L/s)		0.00

overflows to: F

Drainage Area	*BLOCK 3*		
Area (Ha)	0.280		
C =	0.90	Restricted Flow Q_r (L/s)=	28.86

2-Year Ponding					
T_c Variable (min)	i_{2yr} (mm/hour)	Peak Flow $Q_p = 2.78xCi_{2yr}A$ (L/s)	Q_r (L/s)	$Q_p - Q_r$ (L/s)	Volume 2yr (m^3)
10	76.81	53.81	28.86	24.95	14.97
11	73.17	51.26	28.86	22.40	14.78
12	69.89	48.96	28.86	20.10	**14.48**
13	66.93	46.89	28.86	18.03	14.06
14	64.23	45.00	28.86	16.14	13.56

Storage (m^3)				
Overflow	Required	Surface	Sub-surface	Balance
0.00	14.48	157.50	0	0.00

overflows to: Carling Access

Drainage Area	*BLOCK 4*			
Area (Ha)	0.200	Restricted Flow ICD $_{Actual}$ (L/s)=	20.61	
C =	0.75	Restricted Flow $Q_{r\ for\ swm\ calc}$ (L/s)=	20.61	50% reduction for sub-surface storage

100-Year Ponding						100-Year +20% Ponding		
T_c Variable (min)	i_{100yr} (mm/hour)	Peak Flow $Q_p = 2.78xCi_{100yr}A$ (L/s)	Q_r (L/s)	$Q_p - Q_r$ (L/s)	Volume 100yr (m^3)	100YRQ_p 20% (L/s)	Qp - Qr (L/s)	Volume 100+20 (m^3)
10	178.56	74.46	20.61	53.85	32.31			
15	142.89	59.59	20.61	38.97	35.08			
20	119.95	50.02	20.61	29.41	**35.29**	60.02	39.41	**47.29**
25	103.85	43.30	20.61	22.69	34.04			
30	91.87	38.31	20.61	17.70	31.85			

Storage (m^3)					100+20		
Overflow	Required	Surface	Sub-surface	Balance	Overflow	Required	Balance
0.00	35.29	112.50	0	0.00	0.00	47.29	0.00
					convert to flow with peak Tc (L/s)		0.00

overflows to: offsite

Drainage Area	*BLOCK 4*		
Area (Ha)	0.200		
C =	0.90	Restricted Flow Q_r (L/s)=	20.61

2-Year Ponding					
T_c Variable (min)	i_{2yr} (mm/hour)	Peak Flow $Q_p = 2.78xCi_{2yr}A$ (L/s)	Q_r (L/s)	$Q_p - Q_r$ (L/s)	Volume 2yr (m^3)
10	76.81	38.43	20.61	17.82	10.69
11	73.17	36.61	20.61	16.00	10.56
12	69.89	34.97	20.61	14.36	**10.34**
13	66.93	33.49	20.61	12.88	10.04
14	64.23	32.14	20.61	11.53	9.68

Storage (m^3)				
Overflow	Required	Surface	Sub-surface	Balance
0.00	10.34	112.50	0	0.00

overflows to: Carling Access

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Drainage Area	*BLOCK 5*			
Area (Ha)	0.240	Restricted Flow ICD $_{Actual}$ (L/s)=	24.74	
C =	0.75	Restricted Flow $Q_{r\ for\ swm\ calc}$ (L/s)=	24.74	50% reduction for sub-surface storage

100-Year Ponding						100-Year +20% Ponding		
T_c Variable (min)	i_{100yr} (mm/hour)	Peak Flow $Q_p = 2.78xCi_{100yr}A$ (L/s)	Q_r (L/s)	$Q_p - Q_r$ (L/s)	Volume 100yr (m^3)	100YRQ_p 20% (L/s)	Qp - Qr (L/s)	Volume 100+20 (m^3)
10	178.56	89.35	24.74	64.61	38.77			
15	142.89	71.50	24.74	46.77	42.09			
20	119.95	60.02	24.74	35.29	**42.34**	72.03	47.29	**56.75**
25	103.85	51.97	24.74	27.23	40.84			
30	91.87	45.97	24.74	21.23	38.22			

Storage (m^3)					100+20		
Overflow	Required	Surface	Sub-surface	Balance	Overflow	Required	Balance
0.00	42.34	135.00	0	0.00	0.00	56.75	0.00
					convert to flow with peak Tc (L/s)		0.00

overflows to: F

Drainage Area	*BLOCK 5*		
Area (Ha)	0.240		
C =	0.90	Restricted Flow Q_r (L/s)=	24.74

2-Year Ponding					
T_c Variable (min)	i_{2yr} (mm/hour)	Peak Flow $Q_p = 2.78xCi_{2yr}A$ (L/s)	Q_r (L/s)	$Q_p - Q_r$ (L/s)	Volume 2yr (m^3)
10	76.81	46.12	24.74	21.38	12.83
11	73.17	43.94	24.74	19.20	12.67
12	69.89	41.97	24.74	17.23	**12.41**
13	66.93	40.19	24.74	15.45	12.05
14	64.23	38.57	24.74	13.83	11.62

Storage (m^3)				
Overflow	Required	Surface	Sub-surface	Balance
0.00	12.41	135.00	0	0.00

overflows to: Clyde Access

Drainage Area	*BLOCK 6*			
Area (Ha)	0.330	Restricted Flow ICD $_{Actual}$ (L/s)=	34.01	
C =	0.75	Restricted Flow $Q_{r\ for\ swm\ calc}$ (L/s)=	34.01	50% reduction for sub-surface storage

100-Year Ponding						100-Year +20% Ponding		
T_c Variable (min)	i_{100yr} (mm/hour)	Peak Flow $Q_p = 2.78xCi_{100yr}A$ (L/s)	Q_r (L/s)	$Q_p - Q_r$ (L/s)	Volume 100yr (m^3)	100YRQ_p 20% (L/s)	Qp - Qr (L/s)	Volume 100+20 (m^3)
10	178.56	122.86	34.01	88.84	53.31			
15	142.89	98.32	34.01	64.31	57.87			
20	119.95	82.53	34.01	48.52	**58.22**	99.04	65.03	**78.03**
25	103.85	71.45	34.01	37.44	56.16			
30	91.87	63.21	34.01	29.20	52.55			

Storage (m^3)					100+20		
Overflow	Required	Surface	Sub-surface	Balance	Overflow	Required	Balance
0.00	58.22	185.63	0	0.00	0.00	78.03	0.00
					convert to flow with peak Tc (L/s)		0.00

overflows to: offsite

Drainage Area	*BLOCK 6*		
Area (Ha)	0.330		
C =	0.90	Restricted Flow Q_r (L/s)=	34.01

2-Year Ponding					
T_c Variable (min)	i_{2yr} (mm/hour)	Peak Flow $Q_p = 2.78xCi_{2yr}A$ (L/s)	Q_r (L/s)	$Q_p - Q_r$ (L/s)	Volume 2yr (m^3)
10	76.81	63.41	34.01	29.40	17.64
11	73.17	60.41	34.01	26.40	17.42
12	69.89	57.71	34.01	23.70	**17.06**
13	66.93	55.26	34.01	21.25	16.57
14	64.23	53.03	34.01	19.02	15.98

Storage (m^3)				
Overflow	Required	Surface	Sub-surface	Balance
0.00	17.06	185.63	0	0.00

overflows to: Carling Access

Canadian Tire - Carling Ave and Clyde Ave
City of Ottawa

			Event - yr	a	b	c
Manning's "n" =	0.013	I = a/(Td + b)^c	5	998	6.05	0.814

Junction Losses	
Angle	Drop
Degree	m
0	0.01
45	0.03
90	0.06

Storm Sewer Design Calculations
Event = 5 Year

Location		Drainage Area				Runoff			Contolled Runoff			Pipe Selection						Profile							
From	To	ID	Area	C	AC	Cum AC	Tc	I	Q	CB Incr.	Roof Incr.	Cum	D	So	Capacity	Velocity	Length	Travel Time	Surface U/S	Surface D/S	Invert U/S	Invert D/S	Junction Angle	Bend Loss	Depth of Cover D/S	Okay
MH	MH		ha				min.	mm/h	m³/s	m³/s	m³/s	m³/s	mm	%	m³/s	m/s	m	min	m	m	m	m	degree	m	m	
Carling Avenue outlet - 381 mm storm sewer; invert approx. 76.33 m																										
7	8	C1	0.00	0.00	0.00	0.00	20.00	70.3	0.000	0.000	0.028	0.028	304	0.34	0.058	0.80	84	1.74	78.76	78.80	77.31	77.02	45	0.03	1.48	Yes
11	12	11	0.18	0.86	0.15	0.15	20.00	70.3	0.030	0.020		0.020	304	0.34	0.058	0.80	62	1.29	78.60	78.55	77.30	77.09	90	0.06	1.16	Yes
17	Tee	9	0.03	0.20	0.01	0.01	20.00	70.3	0.001	0.001		0.001	304	0.34	0.058	0.80	81	1.68	77.65	78.67	77.24	76.96	90	0.06	1.40	Yes
12	8	12	0.20	0.81	0.16	0.32	21.29	67.6	0.060	0.020		0.041	304	0.34	0.058	0.80	38	0.79	78.55	78.80	77.03	76.90	90	0.06	1.60	Yes
13	Tee	13	0.10	0.71	0.07	0.07	20.00	70.3	0.013	0.013		0.013	304	0.34	0.058	0.80	21	0.44	78.20	78.46	76.82	76.75	90	0.06	1.41	Yes
8	9	B	0.00	0.00	0.00	0.39	22.07	66.0	0.071		0.008	0.090	381	0.36	0.110	0.96	39	0.68	78.80	78.19	76.82	76.68	45	0.03	1.13	Yes
9	10	C2 & D	0.00	0.00	0.00	0.39	22.75	64.7	0.070		0.018	0.108	381	0.44	0.121	1.06	13	0.20	78.19	77.66	76.65	76.59	0	0.01	0.69	No
10	16	10	0.04	0.90	0.04	0.43	22.95	64.4	0.076	0.008		0.116	381	0.90	0.173	1.52	3	0.03	77.66	77.69	76.58	76.55	45	0.03	0.75	No
16	Tee	---	0.00	0.00	0.00	0.43	22.99	64.3	0.076			0.116	381	0.75	0.158	1.39	22	0.26	77.69	77.82	76.52	76.36	90	0.06	1.08	Yes
			0.542							0.062	0.054															

Note: C1 is 65% and C2 is 35% respectively of the the total controlled flow from Building C.

Location		Drainage Area				Runoff			Contolled Runoff			Pipe Selection						Profile							
From	To	ID	Area	C	AC	Cum AC	Tc	I	Q	CB Incr.	Roof Incr.	Cum	D	So	Capacity	Velocity	Length	Travel Time	Surface U/S	Surface D/S	Invert U/S	Invert D/S	Junction Angle	Bend Loss	Depth of Cover D/S	Okay
MH	MH		ha				min.	mm/h	m³/s	m³/s	m³/s	m³/s	mm	%	m³/s	m/s	m	min	m	m	m	m	degree	m	m	
Clyde Avenue outlet - 381 mm storm sewer; invert approx. 76.47 m																										
1	2	1	0.12	0.90	0.11	0.11	20.00	70.3	0.021	0.007		0.007	304	0.34	0.058	0.80	43	0.89	78.70	78.60	77.15	77.00	0	0.01	1.30	Yes
2	14	2	0.16	0.90	0.14	0.25	20.89	68.4	0.047	0.007		0.014	304	0.34	0.058	0.80	13	0.27	78.60	78.72	76.99	76.95	0	0.01	1.47	Yes
3	4	3	0.11	0.90	0.10	0.10	20.00	70.3	0.019	0.007		0.007	304	0.34	0.058	0.80	18	0.37	78.60	78.60	77.15	77.08	90	0.06	1.21	Yes
4	14	4	0.12	0.90	0.10	0.20	20.37	69.4	0.039	0.007		0.014	304	0.34	0.058	0.80	30	0.62	78.60	78.72	77.02	76.92	90	0.06	1.49	Yes
14	5	---	0.00	0.00	0.00	0.45	21.16	67.8	0.085			0.028	304	0.34	0.058	0.80	27	0.56	78.72	78.60	76.86	76.77	45	0.03	1.53	Yes
5	15	5 & A	0.08	0.90	0.07	0.52	21.72	66.7	0.097	0.007	0.014	0.049	304	0.35	0.059	0.82	13	0.27	78.60	78.92	76.74	76.70	45	0.03	1.92	Yes
15	6	---	0.00	0.00	0.00	0.52	21.99	66.2	0.096			0.049	304	0.35	0.059	0.82	6	0.12	78.92	78.57	76.67	76.64	45	0.03	1.62	Yes
18	6	16	0.04	0.20	0.01	0.01	20.00	70.3	0.002	0.002		0.002	304	0.34	0.058	0.80	63	1.31	77.85	78.57	76.85	76.64	90	0.06	1.63	Yes
6	Tee	---	0.00	0.00	0.00	0.52	22.11	65.9	0.096			0.051	304	0.38	0.062	0.85	26	0.51	78.57	78.35	76.61	76.52	90	0.06	1.53	Yes
			0.62							0.037	0.014															

3 PROPOSED DEVELOPMENT

The proposed development consists of retail stores fronting Carling Avenue and Clyde Avenue with a vehicle service centre within the property. The building along Carling Avenue has a second storey that extends southward with ground level parking underneath. The overall development has a gross floor area of 13,068 m² and a lot coverage of 9,855 m². The layout includes an at grade loading dock adjacent to the vehicle service centre. The rooftop of the buildings along Clyde Avenue will be used for an outdoor garden centre and roof top storage of storm runoff within the garden centre is not appropriate. The remaining buildings will use control flow roof drains with associated ponding/storage during rainfall events.

The non-building areas will be mostly paved parking with a landscape strip along the south and east sides of the site. On the Carling Avenue and Clyde Avenue frontages there are both hard and soft landscaping areas.

The existing grading along Carling Avenue, Clyde Avenue, and the south boundary will be maintained. The area in front of the buildings along Carling Avenue will continue to drain to the street. A swale will be constructed along the south slope and runoff will be captured by ditch inlets that outlet to the site drainage system. A retaining wall with a maximum height of 1.2 m will be constructed along the east property line. This retaining wall essentially replaces the existing retaining wall within the site and facilitates the overall grading and servicing.

The site will be serviced by a new storm sewer system, sanitary sewer and watermain. The proposed servicing and grading of the site are illustrated on Drawings SS-1 and GD-1. Copies of these drawings are appended to this report.

4 STORM WATER MANAGEMENT AND DRAINAGE

4.1 DESIGN CRITERIA

The storm water management requirements are identified in the City of Ottawa Sewer Design Guidelines as follows:

- allowable peak flow to the City storm sewer based on a 5 year event; Tc = 20 min; C = 0.5
- 100 year runoff to be stored on site and discharge at allowable peak flow
- 5 year rainfall intensity: $i = 998 / (t + 6.053)^{0.814}$
- 100 year rainfall intensity: $i = 1736 / (t + 6.014)^{0.820}$

4.2 ALLOWABLE DISCHARGE

The Rational method was used to calculate the allowable discharge from the site:

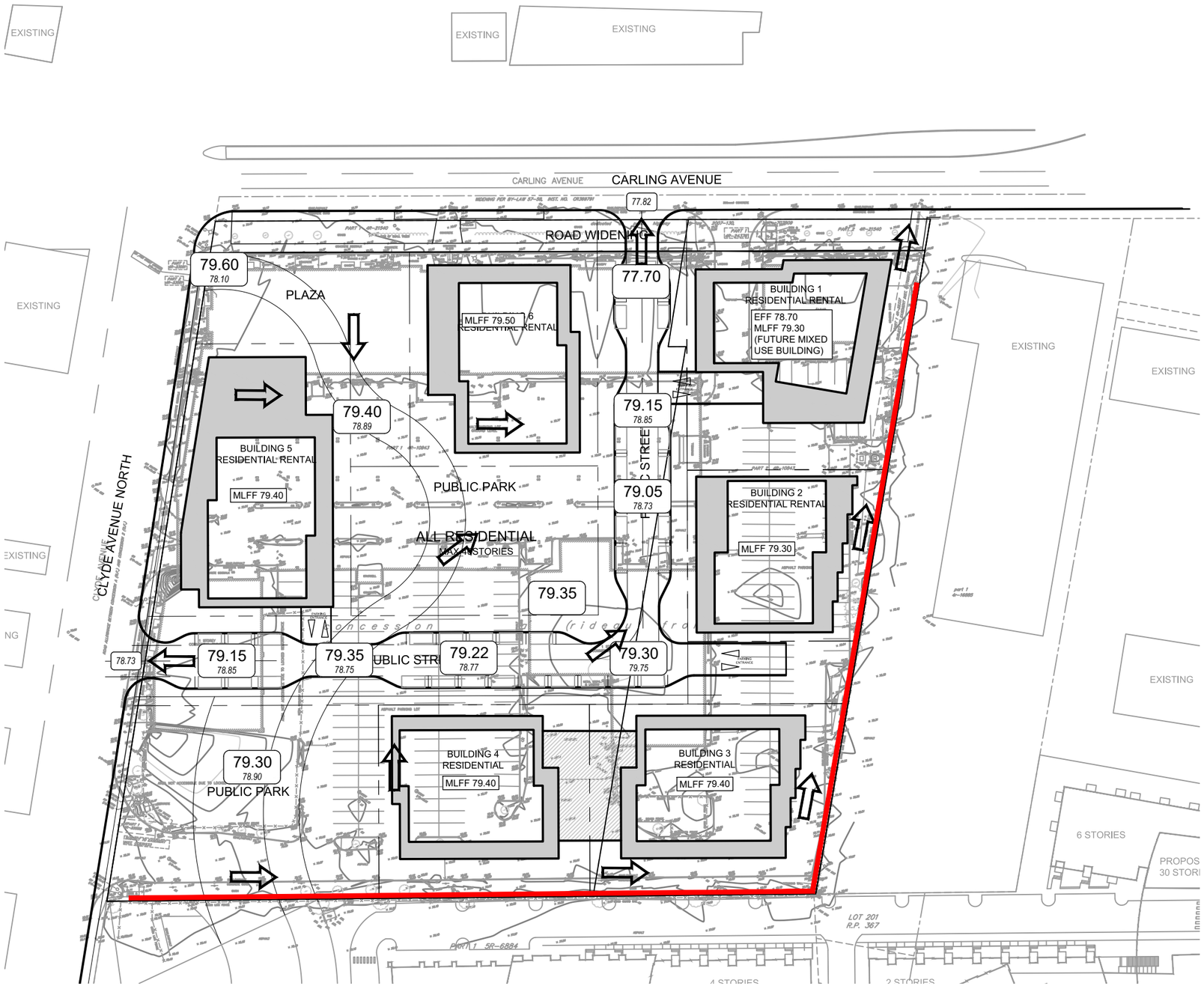
- Area = 2.41 ha
- Runoff coefficient = 0.5
- Tc = 20 min
- 5 year rainfall intensity = 70.2 mm/h
- Allowable discharge = 235 L/s

4.3 STORM DRAINAGE SYSTEM

A storm sewer system has been designed to provide drainage for the proposed development. Due to the size and depth of the existing municipal sewers it is not possible to outlet the entire site to the existing storm sewer on Carling Avenue or Clyde Avenue. The storm drainage system has been designed with two outlets – one to Clyde Avenue at the southwest corner of the site and one to Carling Avenue near the northeast corner of the site. The Clyde Avenue outlet drains the southwest portion of the site and the garden centre located on the roof of the building along Clyde Avenue. The Carling Avenue outlet drains

APPENDIX E

- Figure 6.1 – Macro Grading
- Figure 6.2 – Erosion and Sediment Control Plan

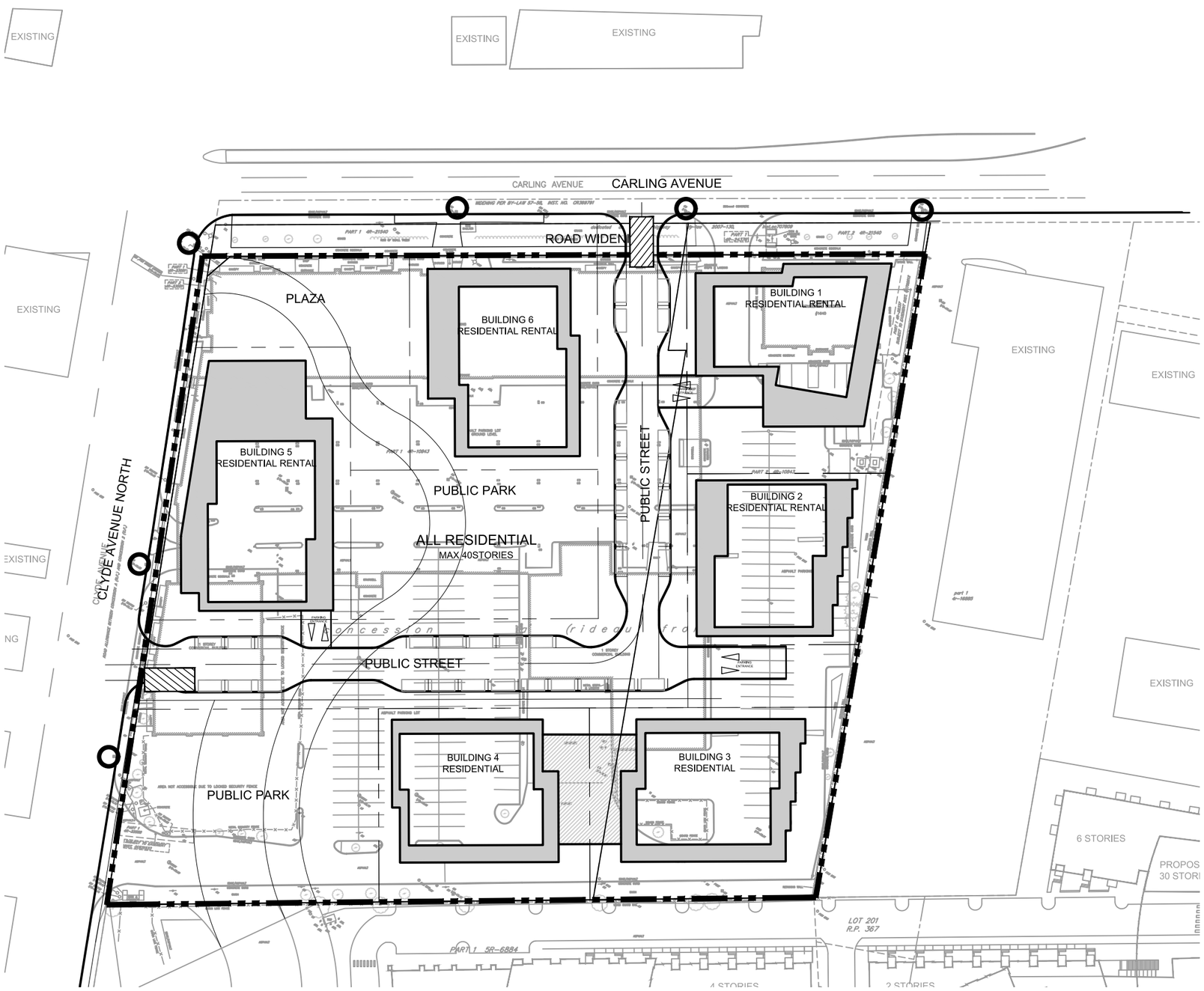


LEGEND:

- 78.85 / 78.55 — PROPOSED GRADE AND EXISTING GRADE
- 106.76 — EXISTING EXISTING GRADE
- PROPOSED MAJOR OVERLAND FLOW ROUTE
- ANTICIPATED RETAINING WALL

CITY FILE NUMBER: (D02-02-22-0126)

Scale	Project Title	Drawing Title	Sheet No.
1:1000	1640 - 1660 CARLING AVE	CONCEPTUAL MACRO GRADING	FIGURE 6.1 2023-10-31



LEGEND :

- LIGHT DUTY SILT FENCE AS PER OPSD-219.110
- SNOW FENCE
- STRAW BALE CHECK DAM AS PER OPSD-219.180
- ROCK CHECK DAM AS PER OPSD-219.210
- CB — SILT SACK PLACED UNDER EXISTING CB COVER
- TEMPORARY MUD MAT 0.15m THICK 50mm CLEAR STONE ON NON WOVEN FILTER CLOTH (7.0m × 15.0)

N

CITY FILE NUMBER: (D02-02-22-0126)

\\140055_1660Carling\7.0_Production\7.03_Design\04_Civil_Local_Adequacy Report_SheetSet\Figure 6.2 Sediment And Erosion Control Plan.dwg Last Saved By: Ehenrie Last Saved At: Nov. 13, 23

Scale	Project Title	Drawing Title	Sheet No.
1:1000	1640 - 1660 CARLING AVE	SEDIMENT AND EROSION CONTROL PLAN	FIGURE 6.2
			2023-10-31