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36 Years

Claridge Developments
Proposed High-Rise Residential and Care Facility
1705 Carling Avenue
City of Ottawa

Servicing and Stormwater Management Report

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SERVICING AND STORMWATER MANAGEMENT REPORT

PROPOSED HIGH-RISE RESIDENTIAL AND CARE FACILITY
1705 CARLING AVENUE
OTTAWA, ONTARIO

Prepared by:

NOVATECH
Suite 200, 240 Michael Cowpland Drive
Kanata, Ontario
K2M 1P6

April 15, 2020

Novatech File: 120010
Ref No. R-2020-051

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Engineers, Planners & Landscape Architects

April 15, 2020

Planning and Infrastructure Approvals
City of Ottawa
110 Laurier Avenue West
Ottawa, Ontario, K1P 1J1

Attention: Shawn Wessel, Project Manager – Infrastructure Approvals

Dear Mr. Wessel:

Reference: 1705 Carling Avenue, Ottawa, ON
Servicing and Stormwater Management Report
Our File No.: 120010

Please find enclosed the 'Servicing and Stormwater Management Report' for the above noted project. This report has been prepared in support of a Zoning By-Law Amendment and Site Plan Control applications and is submitted for your review and approval.

Should you have any questions or require additional information, please contact the undersigned.

Yours truly,

NOVATECH

Alex McAuley, P. Eng.
Project Manager | Land Development Engineering

Encl.

cc: Shawn Malhotra, Claridge Homes
Vincent Denomme, Claridge Homes

Suite 200, 240 Michael Cowpland Drive, Ottawa ON K2M 1P6 Tel: 613.254.9643 Fax: 613.254.5867 www.novatech-eng.com

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1.0 INTRODUCTION

Novatech has been retained to prepare a Servicing and Stormwater Management Report for the proposed residence located at 1705 Carling Avenue, Ottawa, Ontario. This report will support a Site Plan Application for the subject development. **Figure 1** Key Plan shows the site location.

2.0 EXISTING CONDITIONS

The site is approximately 0.893 hectares and is currently developed consisting of mostly hard surface with minimal grassed areas. There are existing buildings on the site including: The Rosebowl Steakhouse Restaurant and Webbs Motel which consists of three buildings (80 units) with associated parking and an entrance from Carling Avenue. There is also a residence at the rear of the property with access from Tillbury Avenue.

There is an approximate grade change 3.75m across the site from the southeast corner to the northwest corner. **Figure 2** shows the existing site conditions.

3.0 PROPOSED DEVELOPMENT

The five existing buildings on the site will be demolished, and any existing services will be abandoned prior to the development construction. Refer to Removals Plan (120010-RP) for the existing building services to be removed.

The proposed development includes two independent buildings. The proposed building on the west side of the site is a nine-storey, 160-unit retirement home which includes both assisted care and non-assisted care units. The proposed building on the east side of the site is a 22-storey, 194-unit residential rental tower with a 165 m^2 commercial retail space at ground level. The main entrances to both buildings face in the interior of the site with access from Carling Avenue. Surface parking is proposed as well as a two level underground parking garage for each building. The approximate footprint of the two buildings is 3,115m^2. Refer to **Figure 3** for the proposed site layout.

4.0 SITE CONSTRAINTS

A geotechnical report was completed by Paterson Group entitled 'Geotechnical Investigation Proposed Residential Development' dated February 16, 2018. The report indicates that bedrock is present within the site area which will require removal. This also means that any potential post-construction settlement should be negligible. The report also indicates the presence of groundwater and a Permit to Take Water may be required for the construction activities.

5.0 WATER SERVICING

The site can be serviced from either the 150mm diameter watermain on Carling Avenue or the 150mm diameter watermain along Tillbury Avenue. It is proposed that the development connect to the watermain on Tillbury Avenue.

It is proposed to service the development with a 150mm diameter watermain loop. In accordance with the City design guidelines, two service connections to City infrastructure will be provided to each building. It is also proposed to extend the existing 150mm diameter watermain on Carling Avenue to the west in order to install a new fire hydrant. The new hydrant is required in order to meet Ontario Building Code minimum distance (45m) from a hydrant to the fire department building connection. Refer to the General Plan of Services drawing (120010-GP) for the water servicing information.

Domestic Demands

The City of Ottawa Water Distribution Design Guidelines were used to calculate the theoretical water demand for the proposed development. The following total water demand has been calculated for the both buildings:

Ave Day Demand = 2.79 L/s
Maximum Daily Demand = 6.96 L/s
Peak Hour Demand = 15.31 L/s

The water demand for the proposed development was submitted to the City of Ottawa to obtain boundary conditions provided from the City's water model. The boundary conditions were used to confirm that the existing water infrastructure will meet the required pressures in the average day and peak hour conditions. Refer to **Table 5.1** for the results of the hydraulic analysis for the domestic demands.

Table 5.1 Domestic Demand Water Analysis Results Summary

Condition	Service Connection Location	Demand (L/s)	Min/Max Allowable Operating Pressures (psi)	Limits of Design Operating Pressures (psi)
High Pressure	Tillbury	2.79	80psi (Max)	49.2
Peak Hour	Tillbury	15.31	40psi (Min)	40.0

Therefore, the existing watermain along Tillbury Avenue can provide adequate pressures for domestic use. Since the expected pressure during Peak Hour conditions is at the lower allowable limit it is recommended that booster pumps be installed in each of the proposed buildings. The use of booster pumps will improve the water pressure on the upper floors of the two towers.

Fire Protection

The proposed development is to be sprinklered with the Siamese connections at each building located just south of each building's main entrance. In addition to the proposed fire hydrant on Carling Avenue, there are existing fire hydrants along both Carling Avenue and Tillbury Avenue, within the vicinity of the proposed development, that will provide fire protection for the site. Since Carling Avenue is an Arterial road, only hydrants on the same side as the proposed development are considered. Refer to **Figure 4** for the existing hydrant locations.

Boundary conditions were requested for fire protection from the existing 150mm diameter watermain on Tillbury Avenue. The City indicated that there is 100 L/s (6,000L/min) of available flow at a pressure of 27 psi.

The required fire demands for the retirement home and rental building are calculated using the Fire Underwriters Survey (FUS) Guidelines and is calculated to be 100L/s (6,000L/min) and 83 L/s (4,980L/min), respectively. Refer to **Appendix A** for a copy of the FUS fire flow calculations.

The fire flow required for the proposed development as indicated previously is up to 100 L/s (6,000L/min) based on the FUS guidelines. As per the City of Ottawa *Technical Bulletin ISTB-2018-02 Appendix I*, the aggregate fire flow of all contributing fire hydrants within 150m of the site should not be less than the required fire flow. In the case of the proposed development there are three class AA (blue top) hydrants within 150m of site.

As per *Table 1 Maximum flow to be considered from a given hydrant* in *Appendix I* of *Technical Bulletin ISTB-2018-02*, the combined flows from the existing hydrants are summarized in **Table 5.1**.

Table 5.1: Combined Hydrant Flow Summary

Fire Hydrants < 75m from Building	Fire Hydrants > 75m < 150m from Building	Combined Fire Flow
1 x 5,700 L/min	2 x 3,800 L/min	13,300 L/min

Therefore, the combined fire flow from the existing hydrants of 13,300 L/min exceeds the required fire flow of 6,000 L/min.

Therefore, based on the boundary condition information provided by the City, the existing watermain infrastructure can provide adequate flow and pressure for domestic demand and fire protection for the proposed development. Refer to **Appendix A** for water demands, fire flow calculations, boundary conditions, hydraulic analysis calculations, and the hydrant location **Figure 4**.

6.0 SANITARY SERVICING

There are multiple sanitary sewers surrounding the site including: a 250mm diameter sanitary sewer along the north side of Carling Avenue, a 225mm diameter sanitary sewer along both the east and west section of Tillbury Avenue and a 300mm diameter sanitary sewer along Golden Avenue. Each of these options was reviewed to service the site and it was determined that a connection to the existing 225mm diameter sanitary along Tillbury Avenue to the west of the site was the preferred option.

Refer to the General Plan of Services (120010-GP) for information on the proposed sanitary servicing.

Sanitary flows for the proposed are calculated using the City of Ottawa Sewer Design Guidelines as outlined in **Table 6.1** below.

Table 6.1 Wastewater Design Flow Parameters

Parameter	Value
Average Residential Flow	280 L/person/day
Peaking Factor, Domestic	Harmon Equation
Average Assisted Care (Nursing Home) Flow	450 L/bed/day
Average Commercial (Retail) Flow	5 L/m^2/day
Commercial peak Factor	1.0
Extraneous Flow	0.28 L/s/ha
Residential Population Density by Unit Type	
One Bedroom/Bachelor Unit	1.4
Two Bedroom Unit	2.1

Based on the above parameters, peak sanitary flows from the proposed development are calculated to be 6.10L/s. The existing 225mm sanitary sewer along Tillbury Avenue connects to an existing 300mm diameter sanitary sewer along Tillbury at Brierwood Avenue. A downstream analysis was completed of this existing sanitary sewer system and its drainage area. This analysis confirms sufficient available capacity in the existing downstream sanitary sewer to service the proposed development. Refer to **Appendix B** for the existing and proposed sanitary sewer design sheets.

7.0 STORM SERVICING

There are multiple storm sewers surrounding the subject site which include: an existing 300mm diameter storm sewer along the south side of Carling Avenue, a 375mm diameter storm sewer along the west section of Tillbury Avenue and a 300mm diameter storm sewer along Golden Avenue.

The site currently sheet drains mainly in a northerly direction towards Tillbury Avenue and is captured by a private storm sewer system which outlets to the existing Tillbury Avenue storm sewer. The south portion of the site currently sheet drains uncontrolled to Carling Avenue.

It is proposed to maintain a similar drainage split so that some drainage will continue to drain uncontrolled to Carling Avenue, with the majority of the development including the buildings and parking areas be serviced by the existing storm sewer on Tillbury Avenue. Stormwater from the paved driving and parking areas, building runoff, and a large portion of the rear landscaped area will be conveyed to an underground storage system and through a private storm sewer system. The underground storage system will connect to the existing Tillbury Avenue storm sewers. Foundation drainage will also be pumped to this private storm sewer system, downstream of the

underground storage system (refer to Mechanical drawings for details). Refer to the General Plan of Services (120010-GP) for information on the existing and proposed storm servicing.

Refer to **Appendix C** for the storm sewer design sheets.

8.0 STORMWATER MANAGEMENT

8.1 Stormwater Management Criteria

The following Stormwater Management criteria was followed for the stormwater management design of the proposed development:

- Control post-development flow from the site to the 1:5 year predevelopment level for all storm events up to and including 1:100 year storm.
- Pre-development flow are to be calculated using the smaller of a runoff coefficient of 0.4 or the actual existing runoff coefficient.
- Use either a time of concentration (Tc) of 20 minutes or a calculated pre-development Tc, but not less than 10 minutes.
- Maximum ponding on the parking lot surface during 1:100 year storm event to be no greater than 300mm.
- Best Management Practices are to be used where possible for quality control of stormwater.

8.2 Existing Site Drainage

As indicated previously, the majority of the existing site generally drains to the northwest west where it is captured by an existing private storm sewer system and directed to the storm sewers on Tillbury Avenue. A small portion of the site fronting on Carling Avenue drains to the Carling Avenue storm sewer. Refer to **Figure 5,** Pre-Development Drainage Area Plan in **Appendix C**, which shows the existing site topography and existing drainage patterns.

The pre-development area was used to determine the allowable release rate. The allowable release rate for each pre-development drainage area is shown in **Table 8.1** below, with a total allowable release rate for the site of 103.4 L/s. Supporting calculations are included in **Appendix C** for reference.

Table 8.1 Stormwater Release Rates

PRE-DEVELOPMENT RELEASE RATE			
Pre-Development Drainage Area	**Pre-Development C Value**	**Q_{5YR} (L/s)**	**Q_{100YR} (L/s)***
To Carling Ave.	0.84	13.2	25.2
To Tillbury Ave.	0.81	197.7	377.9
Total Pre-Development Release Rate for Site		**210.9**	**403.1**
ALLOWABLE RELEASE RATE			
Outlet	**Allowable C Value**	**Q_{5YR} (L/s)**	**Q_{100YR} (L/s)***
To Carling Ave.	0.4	6.3	6.3
To Tillbury Ave.	0.4	97.1	97.1
Total Allowable Release Rate for Site			**103.4**

*Runoff coefficient is increased by 25% up to a maximum of 1.00 for 100-year predevelopment flows

8.3 Quantity Control

The drainage area fronting on Carling Avenue is proposed to drain uncontrolled to the Carling Avenue right-of-way per the existing conditions. Therefore, quantity control will not be provided along the Carling Avenue outlet. As shown in **Table 8.2** the uncontrolled flow to the Carling Avenue exceeds the allowable release rate, but this represents a substantial reduction from pre-development levels.

Runoff from the site that drains north to Tillbury Avenue, for storms up to and including the 100-year storm event, will be controlled to the allowable release rate.

The landscaped areas along the west and east property lines will drain uncontrolled to the Tillbury Avenue right-of-way.

The building roofs, parking lot and rear landscaped area will be controlled and stored an underground storage tank. The proposed underground stormwater storage system will provide sufficient volume to meet the allowable release rate before the stormwater is conveyed to the Tillbury Avenue storm sewer. Refer to **Appendix C** for details on storage volume calculations.

Table 8.2 Pre-Development to Post-Development Reduction Summary

Storm Event	Pre-Development Release Rate (L/s)	Allowable Release Rate (L/s)	Post-Development Release Rate (L/s)	Reduction from Pre to Post
To Carling Ave.				
1:5 Year	13.2 *	6.3	7.2*	45%
1:100 Year	25.2*	6.3	14.5*	42%
To Tillbury Ave.				
1:5 Year	197.7*	97.1	59.0	70%
1:100 Year	377.9*	97.1	88.9	76%
Site Total				
1:5 Year	210.9*	103.4	66.2	69%
1:100 Year	403.1*	103.4	103.4	74%

*Uncontrolled flow

Refer to the **Figure 6** in **Appendix C** for an outline of the proposed drainage areas. A summary of the stormwater management calculations is provided below in **Table 8.2** with detailed release rate calculations found in **Appendix C.**

8.4 Quality Control

The Rideau Valley Conservation Authority indicated that Best Management Practices are to be used where possible for quality control of stormwater. Correspondence from the Rideau Valley Conservation Authority is provided in **Appendix F** for reference. Therefore, Best Management Practices will be implemented where possible including:

- Surface drainage via grassed swales where possible;
- Construction of swales at minimal slopes where possible;
- 300mm deep sumps in all storm maintenance holes;
- 600mm deep sumps in all catchbasins.

8.5 Major Overland Flow Route

A major overland flow route will be provided for storms greater than the 100-year storm event. Stormwater will be directed to the rear parking area (adjacent to the proposed landscaped area) which will allow stormwater to flow overland into and through the landscaped area to the Tillbury Avenue right-of-way. The major overland system is shown on the Grading Plan (120010-GR).

9.0 EROSION AND SEDIMENT CONTROL

9.1 Temporary Measures

Temporary erosion and sediment control measures will be implemented during construction. Silt fence and filter socks in catchbasins will be used as erosion and sediment control measures.

Erosion and sediment control measures should be inspected daily and after every rain event to determine maintenance, repair or replacement requirements. Sediments or granulars that enter site sewers shall be removed immediately by the contractor. These measures will be implemented prior to the commencement of construction and maintained in good order until vegetation has been established. Refer to the Grading Plans (120010-GR) for additional information.

10.0 CONCLUSIONS AND RECOMMENDATIONS

- Water servicing for the proposed development will be provided by connecting to the existing 150mm diameter watermain on Tillbury Avenue. The existing watermain infrastructure can provide adequate flow and pressure for domestic use.
- As per the City of Ottawa Technical Bulletin ISTB 2018-02 the multiple fire hydrants within the direct vicinity of the proposed development will provide adequate flow and pressure for fire protection.
- The sanitary service for the proposed building will connect to the existing 225mm diameter sanitary sewer in Tillbury Avenue. The existing sanitary sewer has adequate capacity to service the proposed development.
- Quantity control of stormwater will be provided through storage of stormwater within an underground storage system at the rear of the site. An inlet control device will be used to control the release of stormwater to the allowable release rate prior to outletting to the City storm sewer system.
- Best Management Practices are proposed, where possible, to provide quality control of stormwater as requested by the Rideau Valley Conservation Authority.
- An overland flow route is provided;
- Erosion and sediment control measures will be implemented prior to and during construction.

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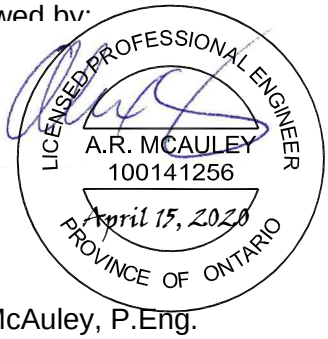
Prepared by:

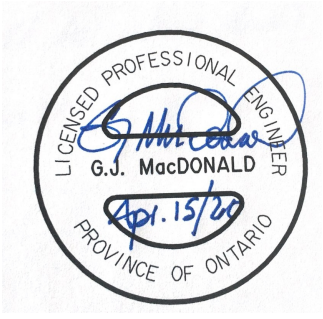
Aden Rongve, B.Eng.
Engineering Intern

Reviewed by:



Alex McAuley, P.Eng.
Project Manager| Land Development

Reviewed by:



Greg MacDonald, P. Eng.
Director, Land Development and Public Sector Infrastructure

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CITY OF OTTAWA

1705 CARLING AVE
PROPOSED HIGH-RISE
RESIDENTIAL AND CARE FACILITY

KEY PLAN

APR 15/20	120010	FIG1

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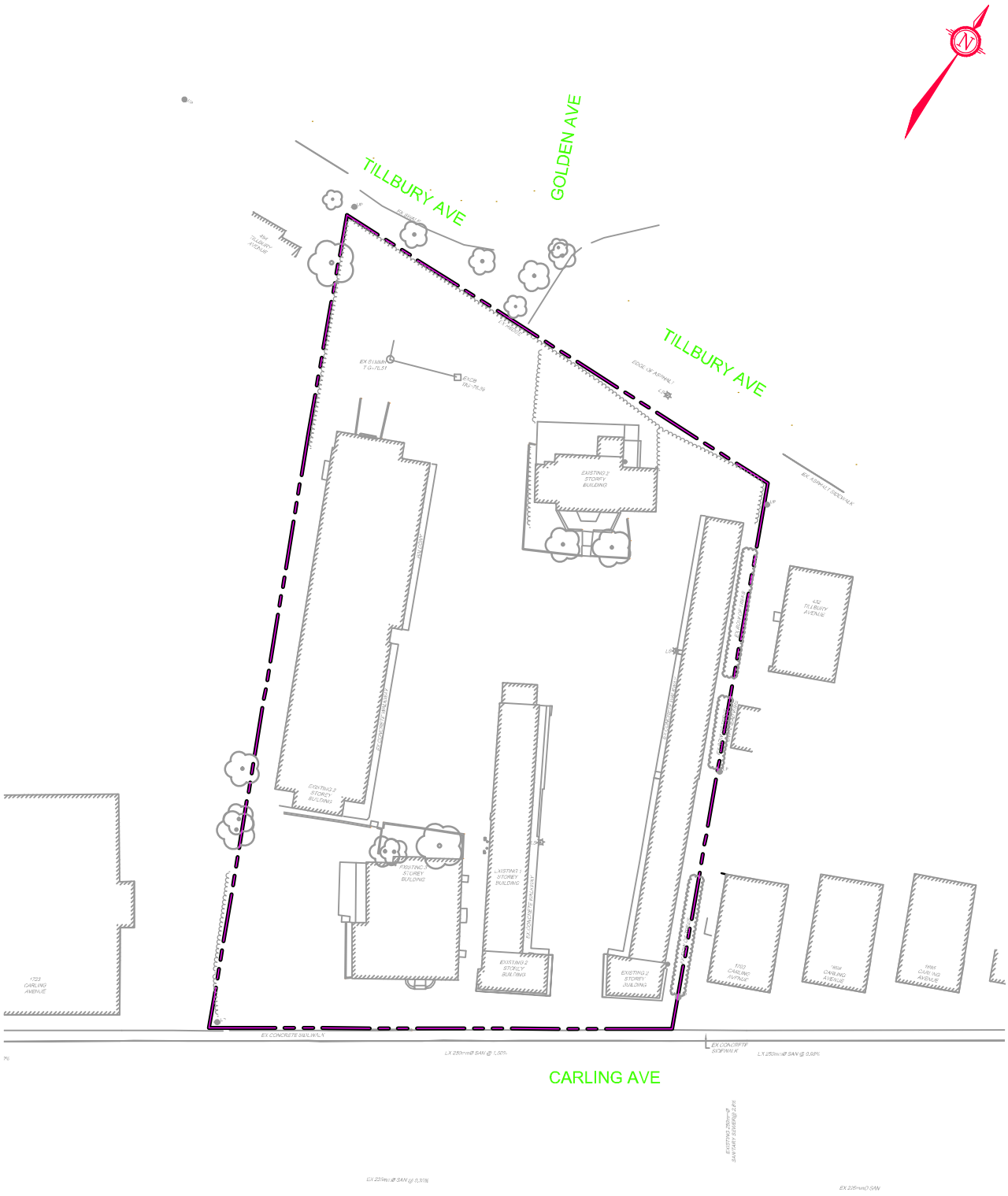

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CITY OF OTTAWA

1705 CARLING AVE
PROPOSED HIGH-RISE
RESIDENTIAL AND CARE FACILITY

EXISTING CONDITIONS

APR 15/20	120010	FIG2

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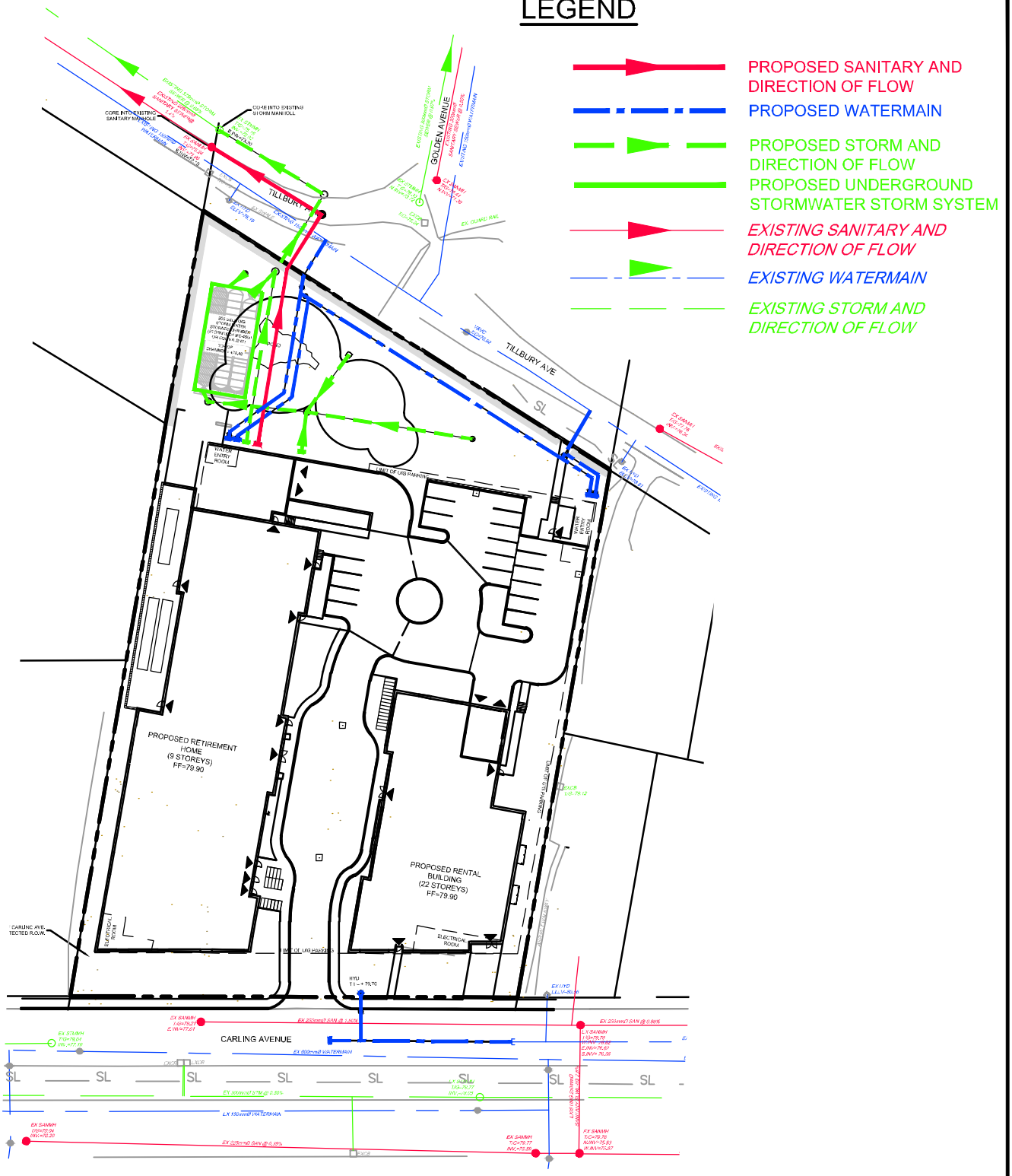

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CITY OF OTTAWA

1705 CARLING AVE
PROPOSED HIGH-RISE
RESIDENTIAL AND CARE FACILITY

SERVICING OVERALL PLAN

APR 15/20	120010	FIG 3

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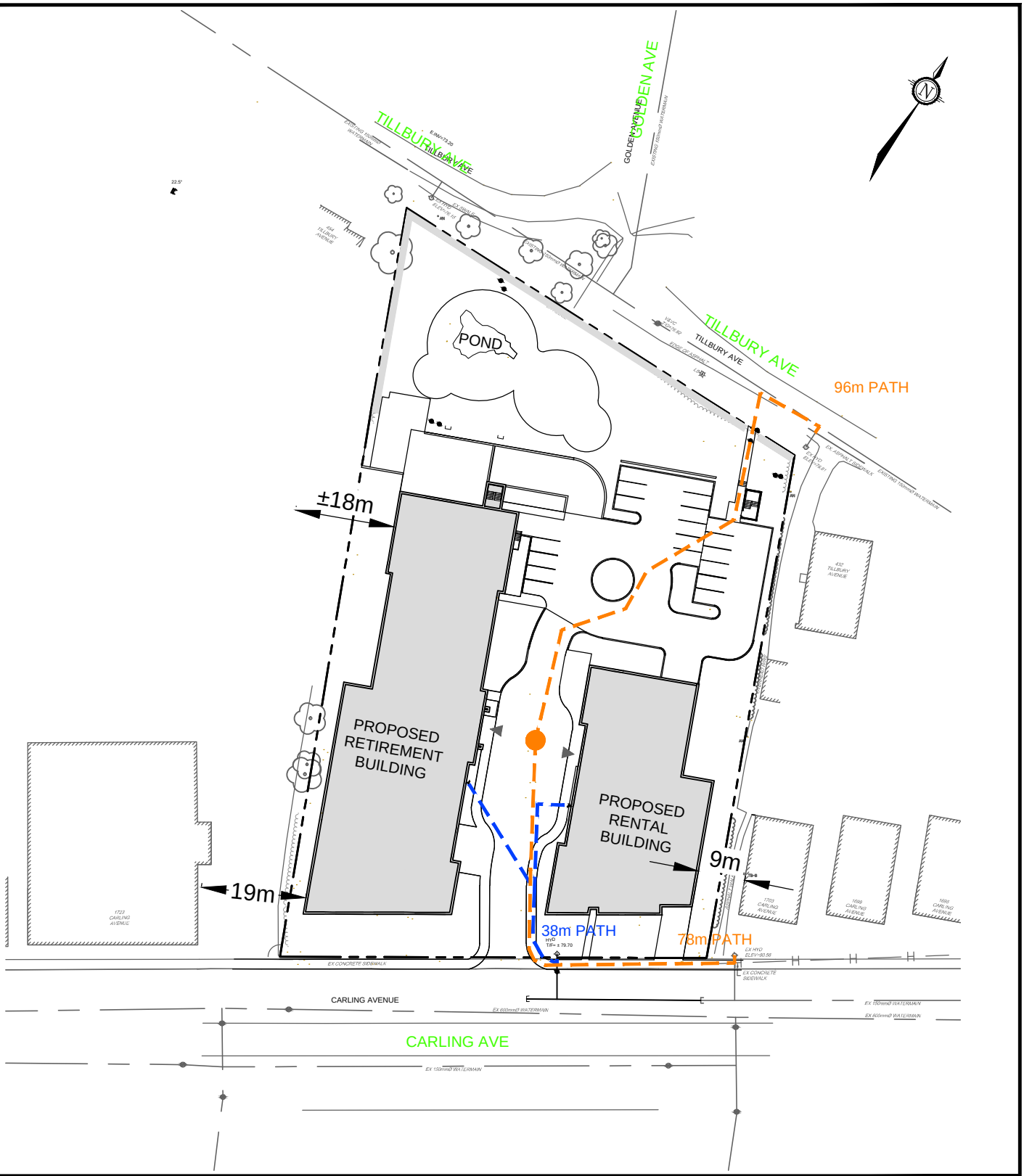
APPENDIX A
Water Servicing Information



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LEGEND

- ROUTE FROM PROPOSED BUILDING TO HYDRANT
- ROUTE FROM PROPOSED SIAMESE TO HYDRANT
- 10m — DISTANCE TO ADJACENT BUILDING

1705 CARLING AVE
PROPOSED HIGH-RISE RESIDENTIAL AND CARE FACILITY

FIRE HYDRANT COVERAGE PLAN

SCALE 1 : 1000 (0, 10, 20, 30, 40)

DATE APR 15/20 | JOB 120010 | FIGURE FIG-4

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1705 CARLING AVE
PROPOSED HIGH-RISE RESIDENTIAL AND CARE FACILITY
HYDRAULIC ANALYSIS

JOB NO. 120010
Apr. 15, 2020

Water Demand Calculations

Node	Assisted Living Beds		Residential Population		Commercial	Assisted Living Demand (L/s)			Residential Demand (L/s)			Commercial Demand (L/s)			Total Demand (L/s)		
	Units					Avg Day	Max. Daily	Peak Hour	Avg Day	Max. Daily	Peak Hour	Avg Day	Max. Daily	Peak Hour	Avg Day	Max. Daily	Peak Hour
	Assisted Living Units	Total Beds	Rental Apartments	Total Population	Floor Area (m^2)												
Retirement Home Building	52	68	108	194		0.35	0.89	1.95	1.01	2.53	5.56				1.36	3.41	7.51
Rental Tower (22 storeys) Building			194	349	165				1.41	3.53	7.78	0.01	0.01	0.03	1.42	3.55	7.80
														Site Total	2.79	6.96	15.31

Design Parameters:

- Number of beds = 1.3 beds/unit
- Average Apartment = 1.8 persons/unit

Ontario Building Code Table 8.2.1.3B:

- Nursing Homes, Rest Homes, etc.	450	L/Bed/Day
- Stores	5	L/m^2 floor space

Section 4.0 Ottawa Sewer Design Guidelines

- Average Domestic Flow	350	L/Day

Peaking Factors: Table 3-3 Moe Guideline for Drinking Water systems (pop < 500)

Max. Daily Demand:

- Residential	2.5	x Avg.Day

Peak Hourly Demand:

- Residential	2.2	x Max Day

Commercial Peaking Factor (Section 4.0 Ottawa Sewer Design Guidelines)

Max. Daily Demand:	1.5	x Avg. Day
Peak Hourly Demand:	1.8	x Max. Day

FUS - Fire Flow Calculations

As per 1999 Fire Underwriter's Survey Guidelines

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Engineers, Planners & Landscape Architects

Novatech Project #: 120010
Project Name: 1705 Carling
Date: Apr-15-2020
Input By: LGB
Reviewed By: ARM

Legend: Input by User; No Information or Input Required

Building Description: 9-storey retirement tower
Fire Resistive Construction

Step			Choose		Value Used	Total Fire Flow (L/min)
Base Fire Flow						
1	**Construction Material**			**Multiplier**		
	Coefficient related to type of construction C	Wood frame		1.5	0.6	
		Ordinary construction		1		
		Non-combustible construction		0.8		
		Modified Fire resistive construction (2 hrs)	Yes	0.6		
		Fire resistive construction (> 3 hrs)		0.6		
2	**Floor Area**					
	A	Building Footprint (m^2)	1800			
		Number of Floors/Storeys	9			
		Protected Openings (1 hr)	Yes			
		Area of structure considered (m^2)			**2,700**	
	F	**Base fire flow without reductions**				**7,000**
		$F = 220\ C\ (A)^{0.5}$				
Reductions or Surcharges						
3	**Occupancy hazard reduction or surcharge**			**Reduction/Surcharge**		
	(1)	Non-combustible		-25%	-15%	**5,950**
		Limited combustible	Yes	-15%		
		Combustible		0%		
		Free burning		15%		
		Rapid burning		25%		
4	**Sprinkler Reduction**			**Reduction**		
	(2)	Adequately Designed System (NFPA 13)	Yes	-30%	-30%	**-2,975**
		Standard Water Supply	Yes	-10%	-10%	
		Fully Supervised System	Yes	-10%	-10%	
				Cumulative Total	**-50%**	
5	**Exposure Surcharge (cumulative %)**				**Surcharge**	
	(3)	North Side	30.1- 45 m		5%	**2,975**
		East Side	10.1 - 20 m		15%	
		South Side	30.1- 45 m		5%	
		West Side	0 - 3 m		25%	
				Cumulative Total	**50%**	
Results						
6	**(1) + (2) + (3)**	**Total Required Fire Flow, rounded to nearest 1000L/min**			**L/min**	**6,000**
		(2,000 L/min < Fire Flow < 45,000 L/min)		or	L/s	**100**
				or	USGPM	1,585
7	**Storage Volume**	Required Duration of Fire Flow (hours)			Hours	2
		Required Volume of Fire Flow (m^3)			m^3	720

FUS - Fire Flow Calculations

As per 1999 Fire Underwriter's Survey Guidelines

NOVATECH
Engineers, Planners & Landscape Architects

Novatech Project #: 120010
Project Name: 1705 Carling
Date: Apr-15-2020
Input By: LGB
Reviewed By: ARM

Legend: Input by User; No Information or Input Required

Building Description: 22-storey rental tower
Fire Resistive Construction

Step			Choose		Value Used	Total Fire Flow (L/min)
Base Fire Flow						
1	**Construction Material**			**Multiplier**		
	Coefficient related to type of construction C	Wood frame		1.5	0.6	
		Ordinary construction		1		
		Non-combustible construction		0.8		
		Modified Fire resistive construction (2 hrs)	Yes	0.6		
		Fire resistive construction (> 3 hrs)		0.6		
2	**Floor Area**					
	A	Building Footprint (m^2)	1000			
		Number of Floors/Storeys	22			
		Protected Openings (1 hr)	Yes			
		Area of structure considered (m^2)			**1,500**	
	F	**Base fire flow without reductions**				**5,000**
		F = 220 **C** (**A**)$^{0.5}$				
Reductions or Surcharges						
3	**Occupancy hazard reduction or surcharge**			**Reduction/Surcharge**		
	(1)	Non-combustible		-25%	-15%	**4,250**
		Limited combustible	Yes	-15%		
		Combustible		0%		
		Free burning		15%		
		Rapid burning		25%		
4	**Sprinkler Reduction**			**Reduction**		
	(2)	Adequately Designed System (NFPA 13)	Yes	-30%	-30%	**-1,700**
		Standard Water Supply	Yes	-10%	-10%	
		Fully Supervised System	No	-10%		
				Cumulative Total	**-40%**	
5	**Exposure Surcharge (cumulative %)**				**Surcharge**	
	(3)	North Side	30.1- 45 m		5%	**2,125**
		East Side	0 - 3 m		25%	
		South Side	30.1- 45 m		5%	
		West Side	10.1 - 20 m		15%	
				Cumulative Total	**50%**	
Results						
6	**(1) + (2) + (3)**	**Total Required Fire Flow, rounded to nearest 1000L/min**			**L/min**	**5,000**
		(2,000 L/min < Fire Flow < 45,000 L/min)		or	L/s	**83**
				or	USGPM	1,321
7	**Storage Volume**	Required Duration of Fire Flow (hours)			Hours	1.75
		Required Volume of Fire Flow (m^3)			m^3	525

Aden Rongve

From: Wessel, Shawn <shawn.wessel@ottawa.ca>
Sent: Thursday, March 26, 2020 2:06 PM
To: Alex McAuley
Cc: Greg MacDonald; Aden Rongve
Subject: RE: 1705 Carling Ave - Boundary Conditions
Attachments: 1705 Carling March 2020.pdf

Good afternoon Mr. McAuley.

I hope this email finds you, your family and colleagues well during these trying times.

Please find requested boundary conditions below:

Please refer to Guidelines and Technical bulletin ISDTB-2014-02 concerning basic day demands greater than 0.5 L/s.

The following are boundary conditions, HGL, for hydraulic analysis at 1705 Carling (zone 1W) assumed to be connected to the 152mm on Tillsbury (see attached PDF for location).

Minimum HGL = 108.0m

Maximum HGL = 114.5m

Max Day + Fire Flow (83 L/s) = 102.0m

Max Day + Fire Flow (100 L/s) = 99.0m

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

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

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

Thank you

Regards,

Shawn Wessel, A.Sc.T.,rcji

Project Manager - Infrastructure Approvals
Gestionnaire de projet – Approbation des demandes d'infrastructures

Development Review Central Branch | Direction de l'examen des projets d'aménagement, Centrale
Planning, Infrastructure and Economic Development Department | Direction générale de la planification de l'infrastructure et du développement économique
City of Ottawa | Ville d'Ottawa
110 Laurier Ave. W. | 110, avenue Laurier Ouest, Ottawa ON K1P 1J1
(613) 580 2424 Ext. | Poste 33017
Int. Mail Code | Code de Courrier Interne 01-14
shawn.wessel@ottawa.ca

Please consider the environment before printing this email

From: Alex McAuley
Sent: March 23, 2020 2:22 PM
To: Wessel, Shawn
Cc: Greg MacDonald ; Aden Rongve
Subject: 1705 Carling Ave - Boundary Conditions

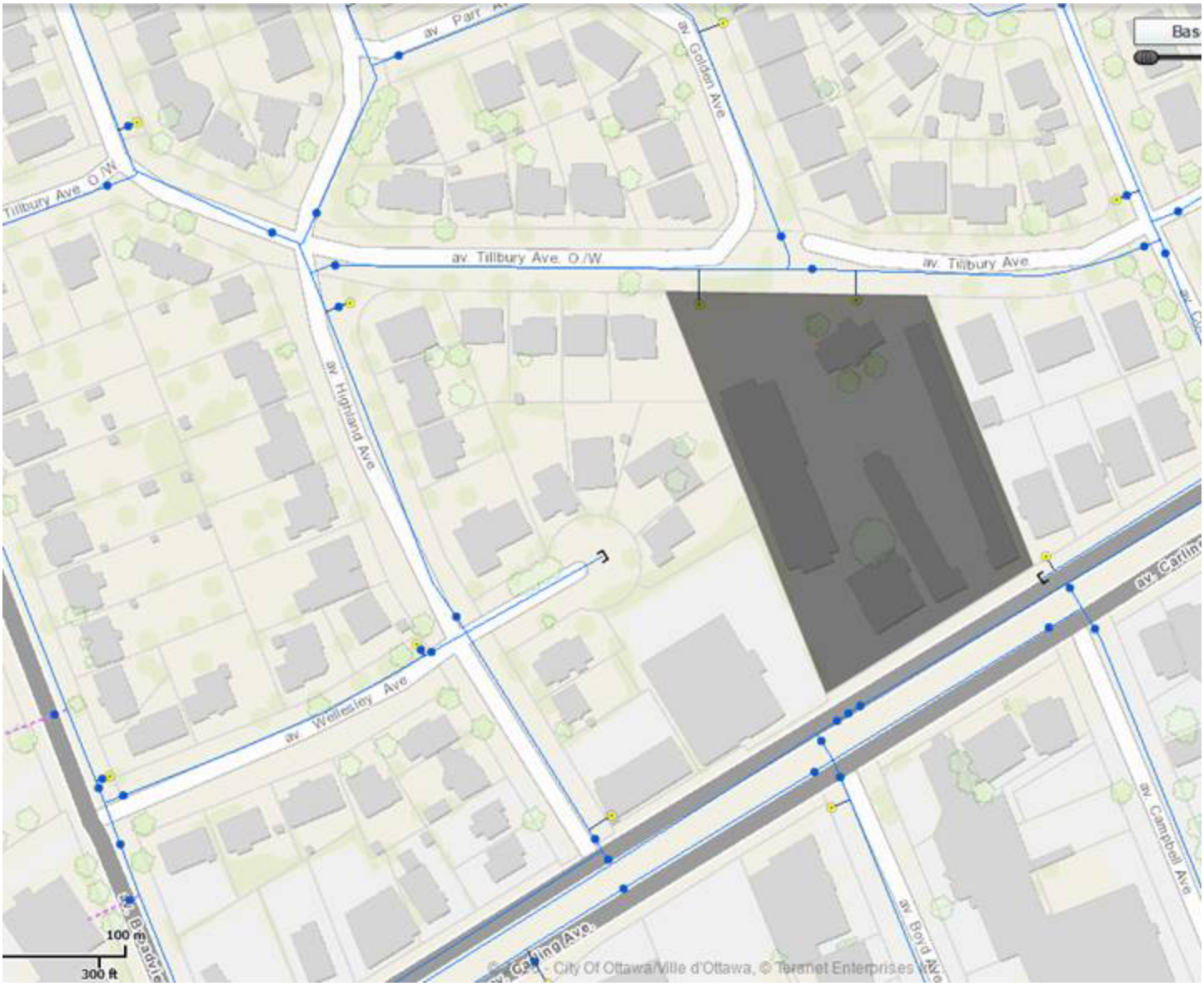
Hi Shawn,
We are working on the detailed servicing for a proposed site plan at 1705 Carling Ave with two residential/retirement towers. Please see location plan below for reference.
We are proposing to connect to the existing 150mm watermain along Tillbury Ave.

We are requesting water boundary conditions based on the following:
Fire Flows will be between 83L/s and 100L/s for the sprinklered buildings.
Average Day Demand 2.79 L/s
Maximum Day Demand (2.5 x avg. day) 6.96 L/s
Peak Hour Demand (2.2 x avg. day) 15.31 L/s

Please let us know if you have any questions.

Thank you,

Alex McAuley, P.Eng., Project Manager | Land Development Engineering
NOVATECH Engineers, Planners & Landscape Architects
240 Michael Cowpland Drive, Suite 200, Ottawa, ON, K2M 1P6 | Tel: 613.254.9643 Ext: 292 | Cell: 613.261.9166 | Fax: 613.254.5867



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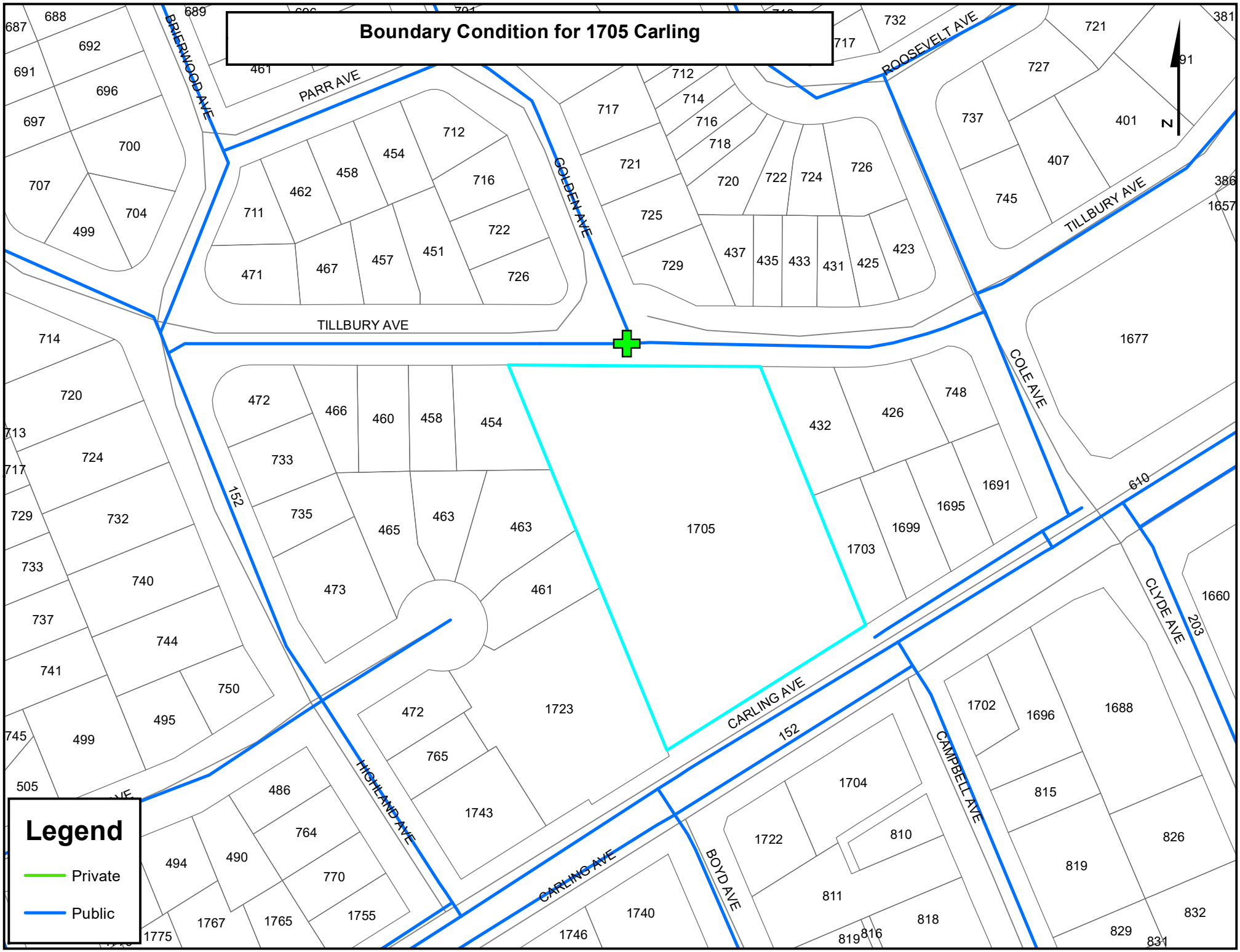
Boundary Condition for 1705 Carling
TILLBURY AVE
CARLING AVE
COLE AVE
CLYDE AVE
CAMPBELL AVE
BOYD AVE
HIGHLAND AVE
GOLDEN AVE
BRIERWOOD AVE
PARR AVE
ROOSEVELT AVE
152
203
610
1705
1723
1677
1660
1657
1743
1740
1746
1775
1767
1765
1755
1722
1704
1702
1696
1688
1691
1695
1699
1703
748
426
432
472
466
460
458
454
733
735
473
465
463
461
712
716
722
726
717
721
725
729
714
718
720
722
724
726
437
435
433
431
425
423
737
727
401
407
745
711
462
458
454
712
716
722
726
471
467
457
451
688
692
696
700
704
499
687
691
697
707
720
724
732
740
744
750
495
499
741
737
733
729
713
717
714
764
770
486
490
494
505
745
815
826
819
832
829
831
818
816
811
810
386
381
91
N
Legend
Private
Public

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1705 CARLING AVENUE
PROPOSED HIGH-RISE RESIDENTIAL AND CARE FACILITY
REITREMENT HOME - HYDRAULIC ANALYSIS

JOB #: 120010
DATE:April 15, 2020

CALCULATED WATER DEMNADS:

PROPOSED DEVELOPMENT (9 STOREY RETIREMENT HOME BUILDING)

AVERAGE DAY =	2.79	L/s
MAXIMUM DAY =	6.96	L/s
PEAK HOUR =	15.31	L/s
MAX DAY + FIRE =	106.96	L/s

CITY OF OTTAWA BOUNDARY CONDITIONS:

BOUNDAY CONDITIONS BASED ON (ZONE 1W) CONNECTION TO 150mm DIA. TILLBURY AVENUE.

MINIMUM HGL =	108	m
MAXIMUM HGL =	114.5	m
MAX DAY + FIRE =	99	m

WATERMAIN ANALYSIS:

1705 CARLING AVENUE WATERMAIN CONNECTIONS

FINSIHED FLOOR GROUND ELEVATION = 79.9 m

HIGH PRESSURE TEST = MAX HGL - AVG GROUND ELEV x 1.42197 PSI/m < 80 PSI

HIGH PRESSURE = 49.2 PSI

LOW PRESSURE TEST = MIN HGL - AVG GROUND ELEV x 1.42197 PSI/m > 40 PSI

LOW PRESSURE = 40.0 PSI

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1705 CARLING AVENUE
PROPOSED HIGH-RISE RESIDENTIAL AND CARE FACILITY
RENTAL BUILDING - HYDRAULIC ANALYSIS

JOB #: 120010
DATE: April 15, 2020

CALCULATED WATER DEMNADS:

PROPOSED DEVELOPMENT (22 STOREY BUILDING)

AVERAGE DAY =	2.79	L/s
MAXIMUM DAY =	6.96	L/s
PEAK HOUR =	15.31	L/s
MAX DAY + FIRE =	89.96	L/s

CITY OF OTTAWA BOUNDARY CONDITIONS:

BOUNDAY CONDITIONS BASED ON (ZONE 1W) CONNECTION TO 150mm DIA. TILLBURY AVENUE.

MINIMUM HGL =	108	m
MAXIMUM HGL =	114.5	m
MAX DAY + FIRE =	102	m

WATERMAIN ANALYSIS:

1705 CARLING AVENUE WATERMAIN CONNECTIONS

FINSIHED FLOOR GROUND ELEVATION = 79.9 m

HIGH PRESSURE TEST = MAX HGL - AVG GROUND ELEV x 1.42197 PSI/m < 80 PSI

HIGH PRESSURE = 49.2 PSI

LOW PRESSURE TEST = MIN HGL - AVG GROUND ELEV x 1.42197 PSI/m > 40 PSI

LOW PRESSURE = 40.0 PSI

APPENDIX B
Sanitary Servicing Information

PROJECT #: 1120010
PROJECT NAME: PROPOSED HIGH-RISE RESIDENTIAL AND CARE FACILITY
LOCATION: 1705 CARLING AVENUE

NOVATECH
Engineers, Planners & Landscape Architects

DATE PREPARED: APR 15,2020

Existing Condition Sanitary Flows

Location			Residential		Institutional		Cumulative		Peak Factor		Institutional		Residential	Infiltration		Peak Design Flow (l/s)	PIPE					
Street / Area	From	To	Population	Area (ha)	Area (ha)	Accu. Area (ha)	Pop.	Area (ha)	Res Peak Factor	Insti Peak Factor	Peak Flow (l/s)	Accu. Peak Flow	Peak Flow (l/s)	Infilt. Flow (l/s)	Accu Infil. Flow		Size (mm)	Slope (%)	Length (m)	Capacity (l/s)	Full Flow Vel. (m/s)	Q/Q_{full} (%)
GOLDEN 1	**101**	**102**	23.8	0.69			23.8	0.69	3.7		0.0	0.00	**0.29**	0.23	0.23	0.51	300	0.50	63.2	68.3	0.97	0.8%
GOLDEN 2	**102**	**103**	6.8	0.19			30.6	0.88	3.7		0.0	0.00	**0.37**	0.06	0.29	0.66	225	0.64	35.8	35.9	0.90	1.8%
GOLDEN 3	**-**	**103**	74.8	1.67			74.8	1.67	3.6		0.0	0.00	**0.88**	0.55	0.55	1.43	N/A					
PARR 1	**103**	**104**	13.6	0.38			119.0	2.93	3.6		0.0	0.00	**1.38**	0.13	0.97	2.35	200	0.32	72.8	18.5	0.59	12.7%
PARR 2	**104**	**105**	0.0	0.00			119.0	2.93	3.6		0.0	0.00	**1.38**	0.00	0.97	2.35	200	0.32	10.7	18.5	0.59	12.7%
BRIER 1	**-**	**105**	85.0	1.90			85.0	1.90	3.6		0.0	0.00	**0.99**	0.63	0.63	1.62	N/A					
BRIER 2	**105**	**106**	6.8	0.17			210.8	5.00	3.5		0.0	0.00	**2.40**	0.06	1.65	4.05	300	0.19	46.8	42.1	0.60	9.6%
BRIER 3	**106**	**109**	0.0	0.00			210.8	5.00	3.5		0.0	0.00	**2.40**	0.00	1.65	4.05	300	1.50	14.5	118.3	1.68	3.4%
TILLBURY 1	**107***	**108**	**27.2**	**0.63**			**27.2**	**0.63**	**3.7**		**0.0**	**0.00**	**0.33**	**0.21**	**0.21**	**0.53**	**225**	**1.34**	**82.3**	**51.9**	**1.31**	**1.0%**
TILLBURY2	**108**	**109**	3.4	0.11			30.6	0.74	**3.7**		0.0	0.00	0.37	0.04	0.04	0.40	225	0.28	82.3	23.7	0.60	1.7%
HIGHLAND 1	**-**	**109**	61.2	2.54	0.42	0.42	61.2	2.54	3.6	1.0	0.14	0.14	**0.72**	0.84	0.84	1.70	N/A					
TILLBURY 3	**109**	**110**	6.8	0.25	0.00	0.42	309.4	8.53	3.5	1.0	0.0	0.14	**3.47**	0.08	2.78	6.38	300	0.19	62.6	42.1	0.60	15.2%
HIGHLAND 2	**-**	**110**	85.0	1.79			85.0	1.79	3.6		0.0	0.00	**0.99**	0.59	0.59	1.59	N/A					
TILLBURY 4	**110**	**111**	13.6	0.42	0.00	0.42	408.0	10.74	3.4	1.0	0.0	0.14	**4.51**	0.14	3.51	8.16	300	0.27	85.3	50.2	0.71	16.3%
CARLING 1	**-**	**111**	1347.0	53.82	33.49	33.49	1347.0	53.82	3.2	1.5	16.28	16.28	**13.84**	17.76	17.76	47.88	N/A					
BROADVIEW 1	**-**	**111**	64.6	1.58			64.6	1.58	3.6		0.0	0.00	**0.76**	0.52	0.52	1.28	N/A					
TILLBURY 5	**111**	**112**	6.8	0.32	0.00	33.91	1826.4	66.5	3.1	1.5	0.0	16.42	**18.31**	0.11	21.90	56.62	450	0.29	83.5	152.7	0.96	37.1%

***Site proposed to be connected into MH107**

Ontario Building Code Table 8.2.1.3B:		
Single Family	3.4	persons/unit
Average Apartments	1.8	persons/unit
Duplex	2.3	persons/unit
Semi-detached	2.7	persons/unit
Section 4.0 Ottawa Sewer Design Guidelines		
- Average Domestic Flow Existing Development	280	l/person/day
- Average Domestic Flow Proposed Development	280	l/person/day
- Institutional / Commercial Flow	28000	l/ha/day
- Foundation Drain Allowance	3.0	l/ha/day
- Wet & Dry Weather Extraneous Flows	0.33	L/s/ha
Residential Peaking Factor	Harmon Equation	
Institutional / Commercial Peaking Factor	1.0	
Institutional / Commercial Peaking Factor > 20%	1.5	

Notes: Used the Average Apt./Persons Per Unit Value of 1.8 when determining the apartment populations.
The number of units in an apartment buildings are assumed values.
Pipe information taken from Geo Ottawa, downstream inverts used from GeoOttawa

PROJECT #: 120010
PROJECT NAME: PROPOSED HIGH-RISE RESIDENTIAL AND CARE FACILITY
LOCATION: 1705 CARLING AVENUE

NOVATECH
Engineers, Planners & Landscape Architects

DATE PREPARED: APR 15, 2020

1705 CARLING AVENUE SANITARY FLOWS

		RESIDENTIAL							ASSISTED CARE			COMMERCIAL			INFILTRATION			Total Flow (L/s)	PIPE					
		# of Units		TOTAL					TOTAL			TOTAL												
FROM	TO	1 Bed / Bachelor	2 Bed Units	Population 1 Brm/Bach (1.4 per)	Population 2 Brm (2.1 per)	Accum. Pop.	Peak Factor	Peak Flow (L/s)	No. of Beds	Peak Factor	Peak Flow (L/s)	Retail Space (m^2)	Peak Factor	Peak Flow (L/s)	Total Area (ha)	Accum. Area (ha)	Infilt. Flow (L/s)		Size (mm)	Slope (%)	Length (m)	Capacity (L/s)	Full Flow Vel. (m/s)	Q/Q_{full} (%)
BLDG	SANMH1	203	99	284	208	492	3.4	5.39	52	1.5	0.41	165	1.0	0.01	0.89	0.89	0.29	6.10	200	4.02	31.1	65.7	2.09	9.3%
SANMH1	SANMH2					492	3.4	5.39	52	1.5	0.41	165	1.0	0.01		0.89	0.29	6.10	200	2.07	11.1	47.1	1.50	12.9%
SANMH1	SANMH2					492	3.4	5.39	52	1.5	0.41	165	1.0	0.01		0.89	0.29	6.10	200	2.88	22.2	55.6	1.77	11.0%

Design Parameters:

Section 4.0 Ottawa Sewer Design Guidelines

- Residential	280	L/person/day
- Assisted Care (Nursing Home)	450	L/bed/day
- Commercial Retail Space	5	$L/m^2/day$
- Extraneous Flows	0.33	L/s/ha
Residential Peaking Factor	Harmon Equation	
Assisted Care Peaking Factor	1.5	

APPENDIX C
Stormwater Management Calculations

LEGEND

- 6.71 / EX-2 / 0.70 — DRAINAGE AREA (hectares) / ID / RUNOFF COEFFICIENT (C)
- STORM DRAINAGE AREA
- EXISTING OVERLAND FLOW DIRECTION

0.838 / EX-2 / 0.81

0.055 / EX-1 / 0.84

TILLBURY AVE

GOLDEN AVENUE

CARLING AVENUE

454 TILLBURY AVENUE

1703 CARLING AVENUE

1699 CARLING AVENUE

JOB BENCHMARK
TOP OF HYDRANT SPINDLE
ELEVATION=80.56

NOVATECH
Engineers, Planners & Landscape Architects
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada K2M 1P6

Telephone (613) 254-9643
Facsimile (613) 254-5867
Website www.novatech-eng.com

1705 CARLING AVE
PROPOSED HIGH-RISE RESIDENTIAL AND CARE FACILITY

PRE-DEVELOPMENT STORM DRAINAGE AREAS

SCALE 1 : 500 (0 5 10 15 20)

DATE APR 15/20 | JOB 120010 | FIGURE FIG5

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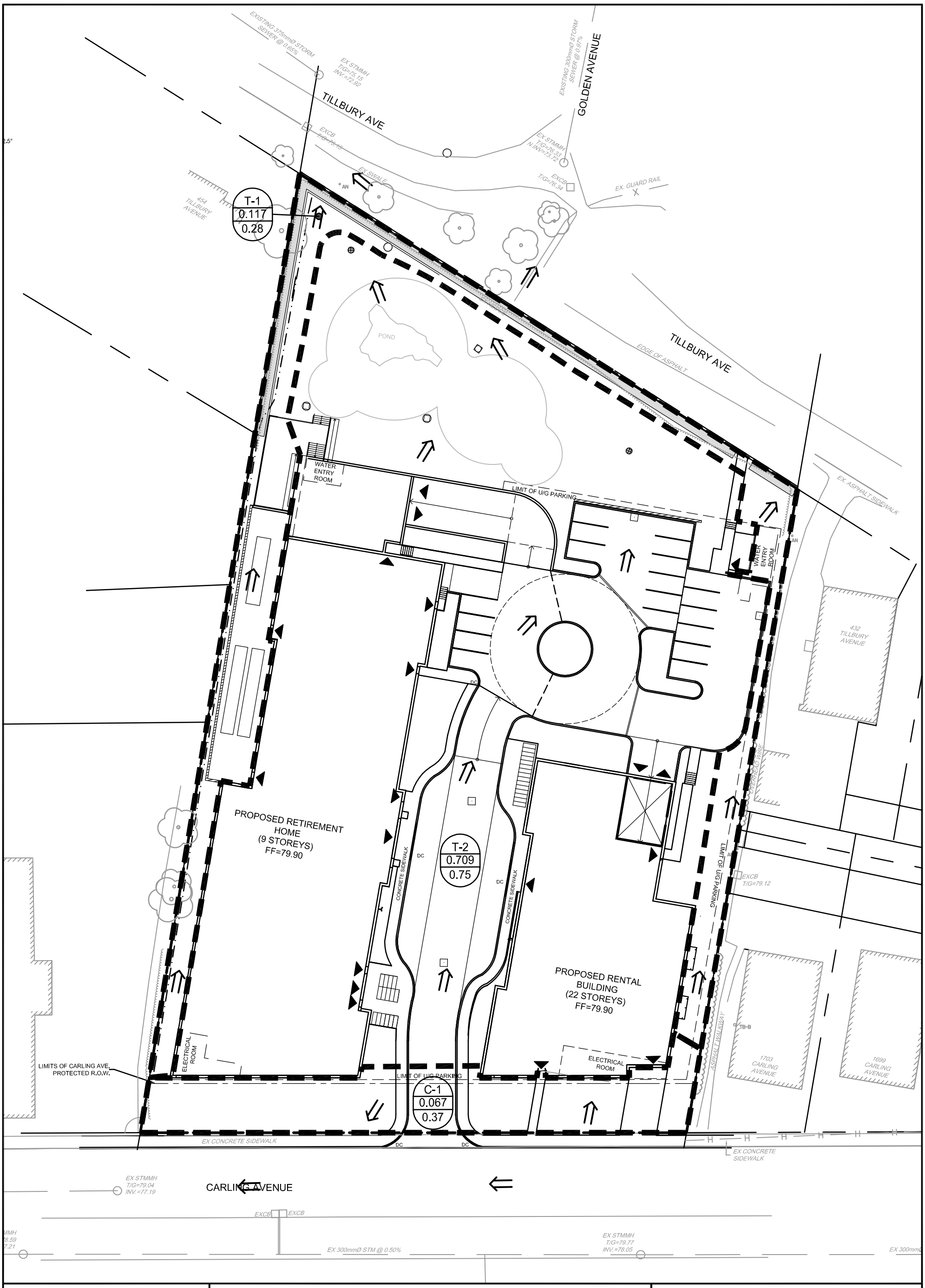

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1705 CARLING AVE
PROPOSED HIGH-RISE RESIDENTIAL AND CARE FACILITY

POST-DEVELOPMENT DRAINAGE AREA PLAN

SCALE 1 : 500 (0, 5m, 10m, 20m)

DATE APR 15/20 | JOB 120010 | FIGURE FIG6

SHT11X17.DWG - 279mmX432mm

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PROJECT #: 120010
PROJECT NAME: PROPOSED HIGH-RISE RESIDENTIAL AND CARE FACILITY
LOCATION: 1705 CARLING AVENUE

NOVATECH
Engineers, Planners & Landscape Architects

DATE PREPARED: APRIL 15, 2020

5 Year Storm Sewer Design Sheet

LOCATION		AREA (Ha)			FLOW					PROPOSED SEWER							
FROM	TO	TOTAL AREA	R= 0.2	R= 0.9	INDIV 2.78 AR	ACCUM 2.78 AR	TIME OF CONC.	RAINFALL INTENSITY I	*PEAK FLOW Q (l/s)	PIPE SIZE (mm)	PIPE SLOPE (%)	LENGTH (m)	CAPACITY (l/s)	FULL FLOW VELOCITY (m/s)	TIME OF FLOW (min.)	EXCESS CAPACITY (l/s)	Q/Qfull
LCB 5	CBMH 2	0.030	0.025	0.004	0.02	0.02	10.00	104.19	2.56	150	2.13	29.2	22.25	1.26	0.39	19.69	0.12
RYCB 7	CBMH 2	0.0270	0.019	0.008	0.03	0.03	10.00	104.19	3.26	150	0.81	12.3	13.72	0.78	0.26	10.46	0.24
ROOF & PARKING	CBMH 2	0.563	0.050	0.513	1.31	1.31	10.00	104.19	136.65	300	3.07	7.2	169.60	2.40	0.05	32.95	0.81
CBMH 2	CBMH 1	0.0630	0.039	0.024	0.08	1.45	10.39	102.19	148.18	450	0.35	17.3	168.84	1.06	0.27	20.66	0.88
CBMH 1	STORAGE	0.000	0.000	0.000	0.00	1.45	10.66	100.84	146.22	450	1.57	1.9	357.60	2.25	0.01	211.38	0.41
LCB6	STORAGE	0.020	0.016	0.004	0.02	0.02	10.00	104.19	1.94	150	11.80	3.4	52.37	2.96	0.02	50.43	0.04
FOUND. DRAINAGE	STMMH 2	0.000	0.000	0.000	0.00	0.00	0.00	0.00	2.00	150	0.99	30.2	15.17	0.86	0.59	13.17	0.13
STORAGE	STMMH 2	0.000	0.000	0.000	0.00	0.00	0.00	0.00	53.50	300	0.78	5.1	85.49	1.21	0.07	31.99	0.63
STMMH 3	STMMH 4	0.000	0.000	0.000	0.00	0.00	10.00	104.19	53.50	300	0.82	15.8	87.65	1.24	0.21	34.15	0.61
STMMH 4	EX	0.000	0.000	0.000	0.00	0.00	10.21	103.08	53.50	300	2.34	21.3	148.07	2.09	0.17	94.57	0.36

***Note: Flow from Storage Chamber will be controlled by ICD.**

Definitions
Q = 2.78 AIR
Q = Peak Flow, in Litres per second (L/s)
A = Area in hectares (ha)
I = 2 YEAR Rainfall Intensity (mm/h)
R = Runoff Coefficient

Notes:
1) Ottawa Rainfall-Intensity Curve
2) Min Velocity = 0.76 m/sec.
3) 5 Year intensity = 998.071 / (time + 6.053)$^{0.814}$

PROJECT #: 120010
PROJECT NAME: PROPOSED HIGH-RISE RESIDENTIAL AND CARE FACILITY
LOCATION: 1705 CARLING AVE

NOVATECH
Engineers, Planners & Landscape Architects

DATE PREPARED: APRIL 15, 2020

TABLE 1A: Pre-Development Release Rate

Area	Surface	Ha	"C"	C_{avg}	$*C_{100}$	$Q_{5\ Year}$ (L/s)	$Q_{100\ Year}$ (L/s)
EX-1 (to Carling Ave)	Hard	0.050	0.90	0.84	0.93	**13.2**	**25.2**
0.055	Soft	0.005	0.20				
EX-2 (to Golden/Tillbury Ave)	Hard	0.736	0.90	0.81	0.91	**197.7**	**377.9**
0.838	Soft	0.102	0.20				

* Runoff Coefficient increases by 25% up to a maximum value of 1.00 for the 100-Year event

TABLE 1B: Allowable Release Rate

Outlet Options	Area (ha)	"C"	Tc (min)	$Q_{5\ Year}$ (L/s)
to Carling Ave	0.055	0.40	10	6.3
to Golden/Tillbury Ave	0.838	0.40	10	97.1

Time of Concentration	Tc=	10	min
Intensity (5 Year Event)	I_5=	104.19	mm/hr
Intensity (100 Year Event)	I_{100}=	178.56	mm/hr

100 year Intensity = 1735.688 / (Time in min + 6.014) $^{0.820}$
5 year Intensity = 998.071 / (Time in min + 6.053) $^{0.814}$

Equations:
Flow Equation
Q = 2.78 x C x I x A
Where:
C is the runoff coefficient
I is the rainfall intensity, City of Ottawa IDF
A is the total drainage area

PROJECT #: 120010
PROJECT NAME: PROPOSED HIGH-RISE RESIDENTIAL AND CARE FACILITY
LOCATION: 1705 CARLING AVE

NOVATECH
Engineers, Planners & Landscape Architects

DATE PREPARED: APRIL 15, 2020

TABLE 2: Time of Concentration (Airport Formula)

Area ID	C	Slope (%)	Length (m)	Length (ft)	Tc (min)	Tp (min)
PRE	0.76	2.7	145	476	10	6
POST - C-1	0.37	1.9	7	23	5	3
POST - T-1	0.28	1.8	130	427	25	15

$$T_c = \frac{1.8(1.1-C)L^{0.5}}{S^{0.33}}$$

Table 3: Post-Development C-1 Uncontrolled Flow (Carling Ave)

Runoff Coefficient "C"

Area	Surface	Ha	"C"	C_{avg}	*C_{100}
Total	Hard	0.016	0.90	0.37	0.43
0.067	Soft	0.051	0.20		

Runoff Coefficient Equation

$C = (A_{hard} \times 0.9 + A_{soft} \times 0.2)/A_{Tot}$

* Runoff Coefficient increases by 25% up to a maximum value of 1.00 for the 100-Year event

Uncontrolled Flow

Outlet Options	Area (ha)	C_{avg}	Tc (min)	$Q_{5\ Year}$ (L/s)	$Q_{100\ Year}$ (L/s)
Carling Avenue	0.067	0.37	10	**7.2**	**14.5**

Time of Concentration	Tc=	10	min
Intensity (5 Year Event)	I_5=	104.19	mm/hr
Intensity (100 Year Event)	I_{100}=	178.56	mm/hr

100 year Intensity = 1735.688 / (Time in min + 6.014) $^{0.820}$
5 year Intensity = 998.071 / (Time in min + 6.053) $^{0.814}$
2 year Intensity = 732.951 / (Time in min + 6.199) $^{0.810}$

Equations:
Flow Equation
$Q = 2.78 \times C \times I \times A$
Where:
C is the runoff coefficient
I is the rainfall intensity, City of Ottawa IDF
A is the total drainage area

Table 4: Post-Development T-1 Uncontrolled Flow (Tillbury Ave)

Runoff Coefficient "C"

Area	Surface	Ha	"C"	C_{avg}	*C_{100}
Total	Hard	0.013	0.90	0.28	0.34
0.117	Soft	0.104	0.20		

Runoff Coefficient Equation

$C = (A_{hard} \times 0.9 + A_{soft} \times 0.2)/A_{Tot}$

* Runoff Coefficient increases by 25% up to a maximum value of 1.00 for the 100-Year event

Uncontrolled Flow

Outlet Options	Area (ha)	C_{avg}	Tc (min)	$Q_{5\ Year}$ (L/s)	$Q_{100\ Year}$ (L/s)
Tillbury Avenue	0.117	0.28	25	**5.5**	**11.3**

Time of Concentration	Tc=	25	min
Intensity (5 Year Event)	I_5=	60.90	mm/hr
Intensity (100 Year Event)	I_{100}=	103.85	mm/hr

100 year Intensity = 1735.688 / (Time in min + 6.014)$^{0.820}$
5 year Intensity = 998.071 / (Time in min + 6.053)$^{0.814}$
2 year Intensity = 732.951 / (Time in min + 6.199)$^{0.810}$

Equations:
Flow Equation
Q = 2.78 x C x I x A
Where:
C is the runoff coefficient
I is the rainfall intensity, City of Ottawa IDF
A is the total drainage area

Table 5: Post-Development T-2 Controlled Flow (Tillbury Ave)

Runoff Coefficient "C"

			5 Year Event		100 Year Event	
Area	Surface	Ha	"C"	C_{avg}	"C" + 25%	$*C_{avg}$
Total	Hard	0.558	0.90	0.75	1.00	0.84
0.709	Soft	0.146	0.20		0.25	
	Pond	0.005	0.00		0.00	

5 YEAR EVENT QUANTITY STORAGE REQUIREMENT

0.709 =Area (ha)
0.75 = C

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Allowable Runoff (L/s)*	Net Flow to be Stored (L/s)	Storage Req'd (m^3)
5 YEAR	20	70.25	103.75	26.8	77.00	92.40
	25	60.90	89.94	26.8	63.19	94.78
	30	**53.93**	**79.65**	**26.8**	**52.90**	**95.21**
	35	48.52	71.66	26.8	44.91	94.30
	40	44.18	65.26	26.8	38.51	92.41

* Release rate for storage is based on 1/2 the allowable to account for falling head on the orifice control.

100 YEAR EVENT QUANTITY STORAGE REQUIREMENT

0.709 =Area (ha)
0.84 = C

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Allowable Runoff (L/s)*	Net Flow to be Stored (L/s)	Storage Req'd (m^3)
100 YEAR	25	103.85	171.58	38.8	132.78	199.17
	30	91.87	151.79	38.8	112.99	203.38
	35	**82.58**	**136.44**	**38.8**	**97.64**	**205.04**
	40	75.15	124.16	38.8	85.36	204.86
	45	69.05	114.09	38.8	75.29	203.28

* Release rate for storage is based on 1/2 the allowable to account for falling head on the orifice control.

Equations:

Flow Equation

$Q = 2.78 \times C \times I \times A$

Where:

C is the runoff coefficient
I is the rainfall intensity, City of Ottawa IDF
A is the total drainage area

Runoff Coefficient Equation

$C_5 = (A_{hard} \times 0.9 + A_{soft} \times 0.2)/A_{Tot}$

$C_{100} = (A_{hard} \times 1.0 + A_{soft} \times 0.25)/A_{Tot}$

ORIFICE SIZING

Orifice Control Sizing

$Q = 0.62 \times A \times (2gh) \times 0.5$

Where:

Q is the release rate in m^3/s
A is the orifice area in m^2
g is the acceleration due to gravity, 9.81 m/s^2
h is the head of water above the orifice centre in m
d is the diameter of the orifice in m

Control Device		
Circular Plug Type ICD	161	mm

Design Event	**Flow**	**Head**	**Elevation**	**Orifice Area (m^2)**	**Circ (mm)**
1:5 Year	53.5	0.92	75.40	0.020316	161.0
1:100 Year	77.6	1.92	76.40	0.020395	161.0

Outlet Invert	74.40

Table 6: Post-Development Stormwater Mangement Summary

Area ID	Area (ha)	1:5 Year Weighted Cw	1:100 Year Weighted Cw	Outlet Location	5 Year Storm Event				100 Year Storm Event			
					Release (L/s)	Ponding Depth (m)	Req'd Vol (cu.m)	Max. Vol. Provided (cu.m.)	Release (L/s)	Ponding Depth (m)	Req'd Vol (cu.m)	Max. Vol. Provided (cu.m.)
C-1	0.067	0.37	0.43	Carling	7.2	N/A	N/A	N/A	14.5	N/A	N/A	N/A
T-1	0.117	0.28	0.34	Tillbury	5.5	N/A	N/A	N/A	11.3	N/A	N/A	N/A
T-2	0.709	0.75	0.84	Tillbury	53.5	0.00	95.2	205	77.6	0.00	205	205
Total					**66.2**				**103.4**			
Allowable					**103.4**				**103.4**			

ADVANCED DRAINAGE SYSTEMS, INC.

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Carling Ave

Ottawa

STORMTECH CHAMBER SPECIFICATIONS

1. CHAMBERS SHALL BE STORMTECH MC-4500 OR APPROVED EQUAL.
2. CHAMBERS SHALL BE MANUFACTURED FROM VIRGIN, IMPACT-MODIFIED POLYPROPYLENE COPOLYMERS.
3. CHAMBER ROWS SHALL PROVIDE CONTINUOUS, UNOBSTRUCTED INTERNAL SPACE WITH NO INTERNAL SUPPORT PANELS THAT WOULD IMPEDE FLOW OR LIMIT ACCESS FOR INSPECTION.
4. THE STRUCTURAL DESIGN OF THE CHAMBERS, THE STRUCTURAL BACKFILL, AND THE INSTALLATION REQUIREMENTS SHALL ENSURE THAT THE LOAD FACTORS SPECIFIED IN THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, SECTION 12.12, ARE MET FOR: 1) LONG-DURATION DEAD LOADS AND 2) SHORT-DURATION LIVE LOADS, BASED ON THE AASHTO DESIGN TRUCK WITH CONSIDERATION FOR IMPACT AND MULTIPLE VEHICLE PRESENCES.
5. CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F2418, "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
6. CHAMBERS SHALL BE DESIGNED AND ALLOWABLE LOADS DETERMINED IN ACCORDANCE WITH ASTM F2787, "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
7. ONLY CHAMBERS THAT ARE APPROVED BY THE SITE DESIGN ENGINEER WILL BE ALLOWED. THE CHAMBER MANUFACTURER SHALL SUBMIT THE FOLLOWING UPON REQUEST TO THE SITE DESIGN ENGINEER FOR APPROVAL BEFORE DELIVERING CHAMBERS TO THE PROJECT SITE:
   a. A STRUCTURAL EVALUATION SEALED BY A REGISTERED PROFESSIONAL ENGINEER THAT DEMONSTRATES THAT THE SAFETY FACTORS ARE GREATER THAN OR EQUAL TO 1.95 FOR DEAD LOAD AND 1.75 FOR LIVE LOAD, THE MINIMUM REQUIRED BY ASTM F2787 AND BY AASHTO FOR THERMOPLASTIC PIPE.
   b. A STRUCTURAL EVALUATION SEALED BY A REGISTERED PROFESSIONAL ENGINEER THAT DEMONSTRATES THAT THE LOAD FACTORS SPECIFIED IN THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, SECTION 12.12, ARE MET. THE 50 YEAR CREEP MODULUS DATA SPECIFIED IN ASTM F2418 MUST BE USED AS PART OF THE AASHTO STRUCTURAL EVALUATION TO VERIFY LONG-TERM PERFORMANCE.
   c. STRUCTURAL CROSS SECTION DETAIL ON WHICH THE STRUCTURAL EVALUATION IS BASED.
8. CHAMBERS AND END CAPS SHALL BE PRODUCED AT AN ISO 9001 CERTIFIED MANUFACTURING FACILITY.

IMPORTANT - NOTES FOR THE BIDDING AND INSTALLATION OF MC-4500 CHAMBER SYSTEM

1. STORMTECH MC-4500 CHAMBERS SHALL NOT BE INSTALLED UNTIL THE MANUFACTURER'S REPRESENTITIVE HAS COMPLETED A PRE-CONSTRUCTION MEETING WITH THE INSTALLERS.
2. STORMTECH MC-4500 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH MC-3500/MC-4500 CONSTRUCTION GUIDE".
3. CHAMBERS ARE NOT TO BE BACKFILLED WITH A DOZER OR EXCAVATOR SITUATED OVER THE CHAMBERS.

   STORMTECH RECOMMENDS 3 BACKFILL METHODS:
   - STONESHOOTER LOCATED OFF THE CHAMBER BED.
   - BACKFILL AS ROWS ARE BUILT USING AN EXCAVATOR ON THE FOUNDATION STONE OR SUBGRADE.
   - BACKFILL FROM OUTSIDE THE EXCAVATION USING A LONG BOOM HOE OR EXCAVATOR.
4. THE FOUNDATION STONE SHALL BE LEVELED AND COMPACTED PRIOR TO PLACING CHAMBERS.
5. JOINTS BETWEEN CHAMBERS SHALL BE PROPERLY SEATED PRIOR TO PLACING STONE.
6. MAINTAIN MINIMUM - 9" (230 mm) SPACING BETWEEN THE CHAMBER ROWS.
7. INLET AND OUTLET MANIFOLDS MUST BE INSERTED A MINIMUM OF 12" (300 mm) INTO CHAMBER END CAPS.
8. EMBEDMENT STONE SURROUNDING CHAMBERS MUST BE A CLEAN, CRUSHED, ANGULAR STONE 3/4-2" (20-50 mm) MEETING THE AASHTO M43 DESIGNATION OF #3 OR #4.
9. STONE SHALL BE BROUGHT UP EVENLY AROUND CHAMBERS SO AS NOT TO DISTORT THE CHAMBER SHAPE. STONE DEPTHS SHOULD NEVER DIFFER BY MORE THAN 12" (300 mm) BETWEEN ADJACENT CHAMBER ROWS.
10. STONE MUST BE PLACED ON THE TOP CENTER OF THE CHAMBER TO ANCHOR THE CHAMBERS IN PLACE AND PRESERVE ROW SPACING.
11. ADS RECOMMENDS THE USE OF "FLEXSTORM CATCH IT" INSERTS DURING CONSTRUCTION FOR ALL INLETS TO PROTECT THE SUBSURFACE STORMWATER MANAGEMENT SYSTEM FROM CONSTRUCTION SITE RUNOFF.

NOTES FOR CONSTRUCTION EQUIPMENT

1. STORMTECH MC-4500 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH MC-3500/MC-4500 CONSTRUCTION GUIDE".
2. THE USE OF EQUIPMENT OVER MC-4500 CHAMBERS IS LIMITED:
   - NO EQUIPMENT IS ALLOWED ON BARE CHAMBERS.
   - NO RUBBER TIRED LOADER, DUMP TRUCK, OR EXCAVATORS ARE ALLOWED UNTIL PROPER FILL DEPTHS ARE REACHED IN ACCORDANCE WITH THE "STORMTECH MC-3500/MC-4500 CONSTRUCTION GUIDE".
   - WEIGHT LIMITS FOR CONSRUCTION EQUIPMENT CAN BE FOUND IN THE "STORMTECH MC-3500/MC-4500 CONSTRUCTION GUIDE".
3. FULL 36" (900 mm) OF STABILIZED COVER MATERIALS OVER THE CHAMBERS IS REQUIRED FOR DUMP TRUCK TRAVEL OR DUMPING.

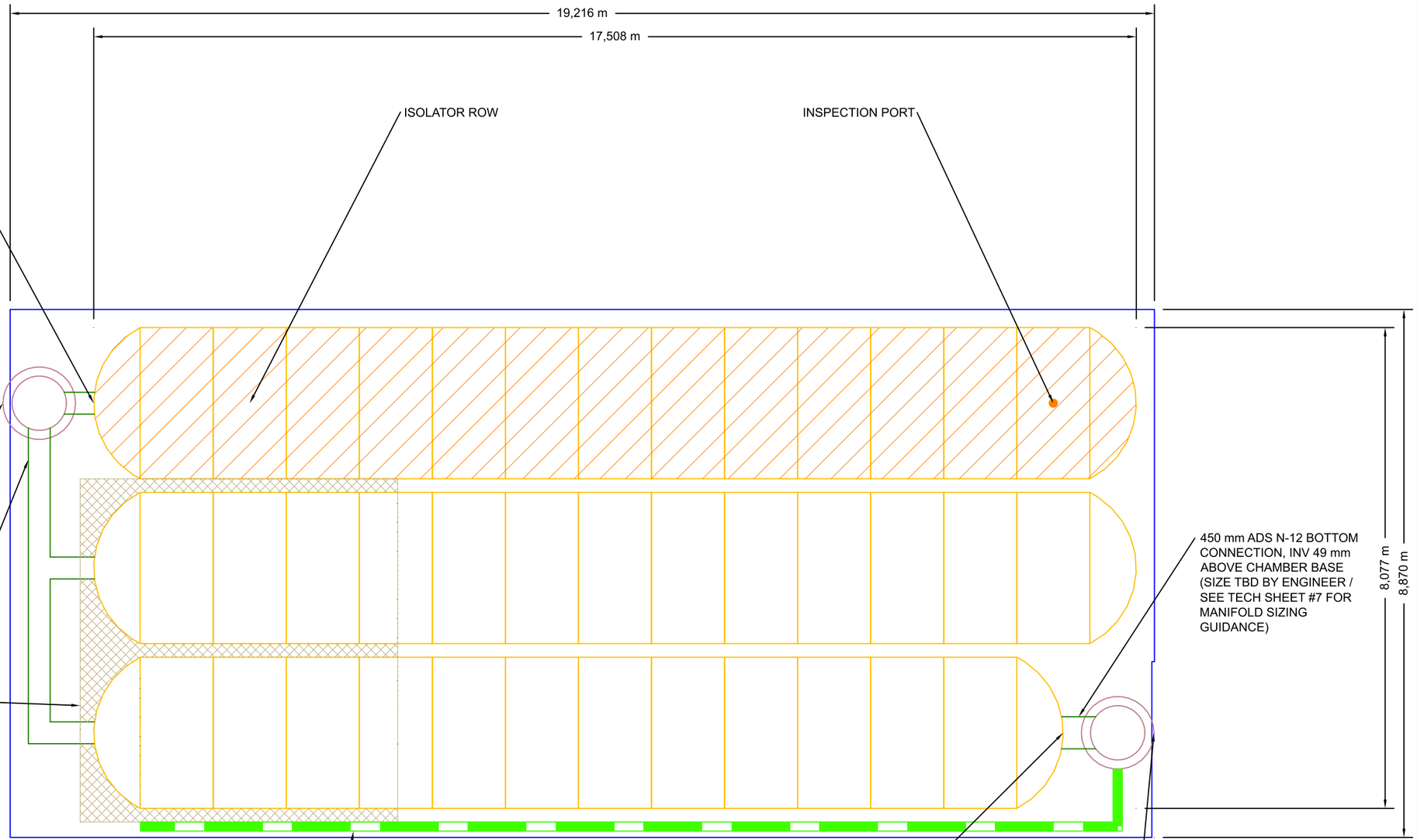
USE OF A DOZER TO PUSH EMBEDMENT STONE BETWEEN THE ROWS OF CHAMBERS MAY CAUSE DAMAGE TO CHAMBERS AND IS NOT AN ACCEPTABLE BACKFILL METHOD. ANY CHAMBERS DAMAGED BY USING THE "DUMP AND PUSH" METHOD ARE NOT COVERED UNDER THE STORMTECH STANDARD WARRANTY.

CONTACT STORMTECH AT 1-888-892-2694 WITH ANY QUESTIONS ON INSTALLATION REQUIREMENTS OR WEIGHT LIMITS FOR CONSTRUCTION EQUIPMENT.

CONCEPTUAL LAYOUT

(38) STORMTECH MC-4500 CHAMBERS
(6) STORMTECH MC-4500 END CAPS
INSTALLED WITH 305 mm COVER STONE, 229 mm BASE STONE, 40% STONE VOID
INSTALLED SYSTEM VOLUME: 213 m³
AREA OF SYSTEM: 170 **m²**
PERIMETER OF SYSTEM: 56 **m**

COMPUTER GENERATED CONCEPTUAL LAYOUT - NOT FOR CONSTRUCTION



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REV	DRW	CHK	DESCRIPTION

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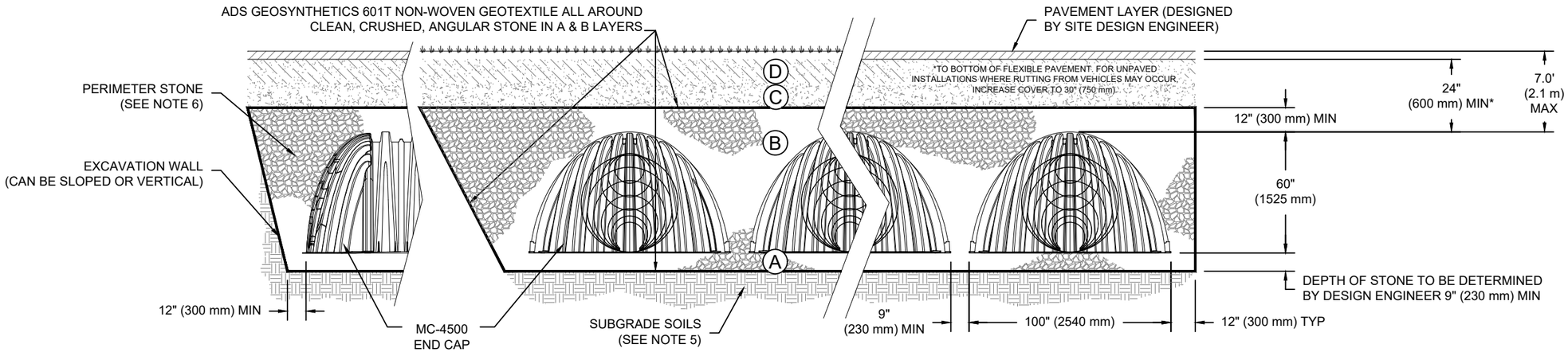
NOT TO SCALE

ACCEPTABLE FILL MATERIALS: STORMTECH MC-4500 CHAMBER SYSTEMS

MATERIAL LOCATION		DESCRIPTION	AASHTO MATERIAL CLASSIFICATIONS	COMPACTION / DENSITY REQUIREMENT
D	**FINAL FILL:** FILL MATERIAL FOR LAYER 'D' STARTS FROM THE TOP OF THE 'C' LAYER TO THE BOTTOM OF FLEXIBLE PAVEMENT OR UNPAVED FINISHED GRADE ABOVE. NOTE THAT PAVEMENT SUBBASE MAY BE PART OF THE 'D' LAYER	ANY SOIL/ROCK MATERIALS, NATIVE SOILS, OR PER ENGINEER'S PLANS. CHECK PLANS FOR PAVEMENT SUBGRADE REQUIREMENTS.	N/A	PREPARE PER SITE DESIGN ENGINEER'S PLANS. PAVED INSTALLATIONS MAY HAVE STRINGENT MATERIAL AND PREPARATION REQUIREMENTS.
C	**INITIAL FILL:** FILL MATERIAL FOR LAYER 'C' STARTS FROM THE TOP OF THE EMBEDMENT STONE ('B' LAYER) TO 24" (600 mm) ABOVE THE TOP OF THE CHAMBER. NOTE THAT PAVEMENT SUBBASE MAY BE A PART OF THE 'C' LAYER.	GRANULAR WELL-GRADED SOIL/AGGREGATE MIXTURES, <35% FINES OR PROCESSED AGGREGATE. MOST PAVEMENT SUBBASE MATERIALS CAN BE USED IN LIEU OF THIS LAYER.	AASHTO M145[1] A-1, A-2-4, A-3 OR AASHTO M43[1] 3, 357, 4, 467, 5, 56, 57, 6, 67, 68, 7, 78, 8, 89, 9, 10	BEGIN COMPACTIONS AFTER 24" (600 mm) OF MATERIAL OVER THE CHAMBERS IS REACHED. COMPACT ADDITIONAL LAYERS IN 12" (300 mm) MAX LIFTS TO A MIN. 95% PROCTOR DENSITY FOR WELL GRADED MATERIAL AND 95% RELATIVE DENSITY FOR PROCESSED AGGREGATE MATERIALS.
B	**EMBEDMENT STONE:** FILL SURROUNDING THE CHAMBERS FROM THE FOUNDATION STONE ('A' LAYER) TO THE 'C' LAYER ABOVE.	CLEAN, CRUSHED, ANGULAR STONE, NOMINAL SIZE DISTRIBUTION BETWEEN 3/4-2 INCH (20-50 mm)	AASHTO M43[1] 3, 4	NO COMPACTION REQUIRED.
A	**FOUNDATION STONE:** FILL BELOW CHAMBERS FROM THE SUBGRADE UP TO THE FOOT (BOTTOM) OF THE CHAMBER.	CLEAN, CRUSHED, ANGULAR STONE, NOMINAL SIZE DISTRIBUTION BETWEEN 3/4-2 INCH (20-50 mm)	AASHTO M43[1] 3, 4	PLATE COMPACT OR ROLL TO ACHIEVE A FLAT SURFACE. [2] [3]

PLEASE NOTE:
1. THE LISTED AASHTO DESIGNATIONS ARE FOR GRADATIONS ONLY. THE STONE MUST ALSO BE CLEAN, CRUSHED, ANGULAR. FOR EXAMPLE, A SPECIFICATION FOR #4 STONE WOULD STATE: "CLEAN, CRUSHED, ANGULAR NO. 4 (AASHTO M43) STONE".
2. STORMTECH COMPACTION REQUIREMENTS ARE MET FOR 'A' LOCATION MATERIALS WHEN PLACED AND COMPACTED IN 9" (230 mm) (MAX) LIFTS USING TWO FULL COVERAGES WITH A VIBRATORY COMPACTOR.
3. WHERE INFILTRATION SURFACES MAY BE COMPROMISED BY COMPACTION, FOR STANDARD DESIGN LOAD CONDITIONS, A FLAT SURFACE MAY BE ACHIEVED BY RAKING OR DRAGGING WITHOUT COMPACTION EQUIPMENT. FOR SPECIAL LOAD DESIGNS, CONTACT STORMTECH FOR COMPACTION REQUIREMENTS.



NOTES:

1. MC-4500 CHAMBERS SHALL CONFORM TO THE REQUIREMENTS OF ASTM F2418 "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
2. MC-4500 CHAMBERS SHALL BE DESIGNED IN ACCORDANCE WITH ASTM F2787 "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
3. "ACCEPTABLE FILL MATERIALS" TABLE ABOVE PROVIDES MATERIAL LOCATIONS, DESCRIPTIONS, GRADATIONS, AND COMPACTION REQUIREMENTS FOR FOUNDATION, EMBEDMENT, AND FILL MATERIALS.
4. THE "SITE DESIGN ENGINEER" REFERS TO THE ENGINEER RESPONSIBLE FOR THE DESIGN AND LAYOUT OF THE STORMTECH CHAMBERS FOR THIS PROJECT.
5. THE SITE DESIGN ENGINEER IS RESPONSIBLE FOR ASSESSING THE BEARING RESISTANCE (ALLOWABLE BEARING CAPACITY) OF THE SUBGRADE SOILS AND THE DEPTH OF FOUNDATION STONE WITH CONSIDERATION FOR THE RANGE OF EXPECTED SOIL MOISTURE CONDITIONS.
6. PERIMETER STONE MUST BE EXTENDED HORIZONTALLY TO THE EXCAVATION WALL FOR BOTH VERTICAL AND SLOPED EXCAVATION WALLS.
7. ONCE LAYER 'C' IS PLACED, ANY SOIL/MATERIAL CAN BE PLACED IN LAYER 'D' UP TO THE FINISHED GRADE. MOST PAVEMENT SUBBASE SOILS CAN BE USED TO REPLACE THE MATERIAL REQUIREMENTS OF LAYER 'C' OR 'D' AT THE SITE DESIGN ENGINEER'S DISCRETION.

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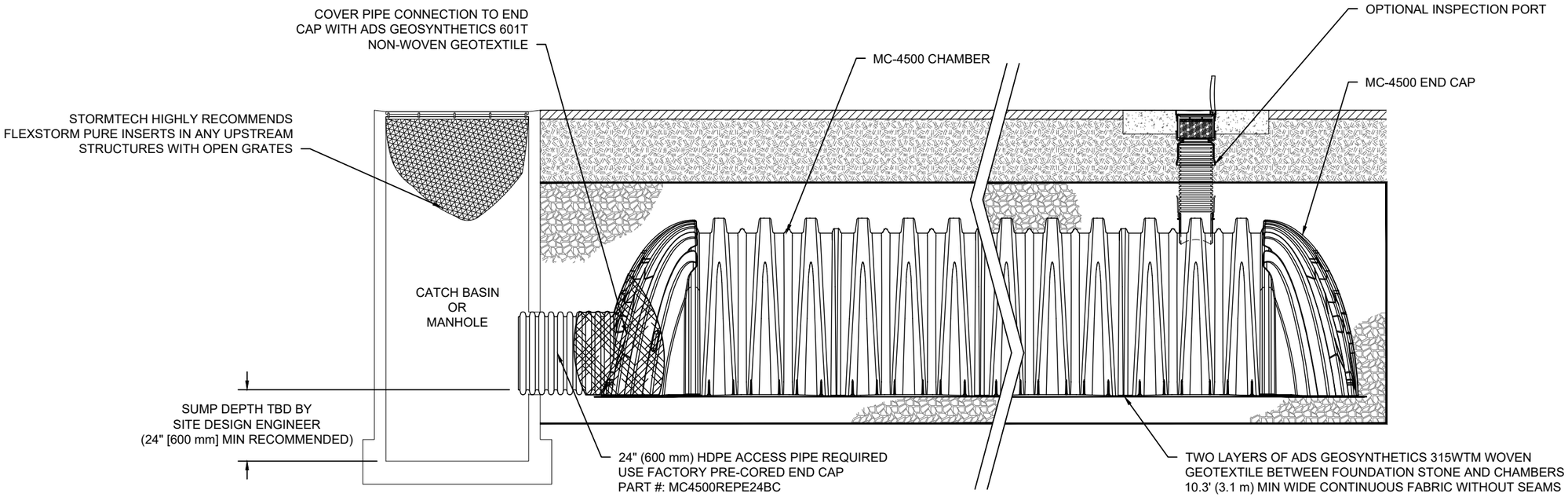


MC-4500 ISOLATOR ROW DETAIL
NTS

INSPECTION & MAINTENANCE

STEP 1) INSPECT ISOLATOR ROW FOR SEDIMENT
- A. INSPECTION PORTS (IF PRESENT)
  - A.1. REMOVE/OPEN LID ON NYLOPLAST INLINE DRAIN
  - A.2. REMOVE AND CLEAN FLEXSTORM FILTER IF INSTALLED
  - A.3. USING A FLASHLIGHT AND STADIA ROD, MEASURE DEPTH OF SEDIMENT AND RECORD ON MAINTENANCE LOG
  - A.4. LOWER A CAMERA INTO ISOLATOR ROW FOR VISUAL INSPECTION OF SEDIMENT LEVELS (OPTIONAL)
  - A.5. IF SEDIMENT IS AT, OR ABOVE, 3" (80 mm) PROCEED TO STEP 2. IF NOT, PROCEED TO STEP 3.
- B. ALL ISOLATOR ROWS
  - B.1. REMOVE COVER FROM STRUCTURE AT UPSTREAM END OF ISOLATOR ROW
  - B.2. USING A FLASHLIGHT, INSPECT DOWN THE ISOLATOR ROW THROUGH OUTLET PIPE
    - i) MIRRORS ON POLES OR CAMERAS MAY BE USED TO AVOID A CONFINED SPACE ENTRY
    - ii) FOLLOW OSHA REGULATIONS FOR CONFINED SPACE ENTRY IF ENTERING MANHOLE
  - B.3. IF SEDIMENT IS AT, OR ABOVE, 3" (80 mm) PROCEED TO STEP 2. IF NOT, PROCEED TO STEP 3.

STEP 2) CLEAN OUT ISOLATOR ROW USING THE JETVAC PROCESS
- A. A FIXED CULVERT CLEANING NOZZLE WITH REAR FACING SPREAD OF 45" (1.1 m) OR MORE IS PREFERRED
- B. APPLY MULTIPLE PASSES OF JETVAC UNTIL BACKFLUSH WATER IS CLEAN
- C. VACUUM STRUCTURE SUMP AS REQUIRED

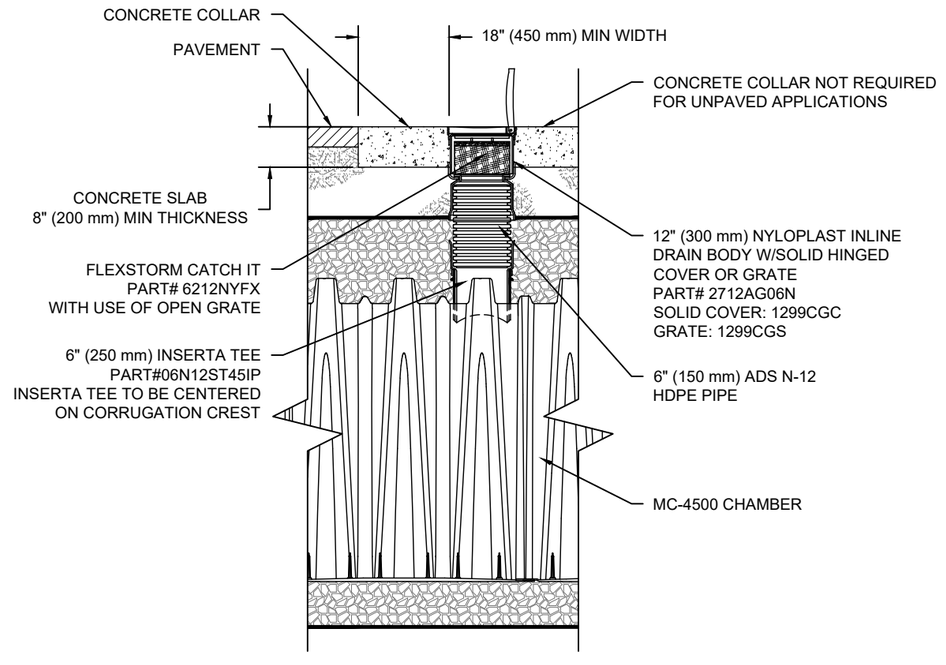
STEP 3) REPLACE ALL COVERS, GRATES, FILTERS, AND LIDS; RECORD OBSERVATIONS AND ACTIONS.

STEP 4) INSPECT AND CLEAN BASINS AND MANHOLES UPSTREAM OF THE STORMTECH SYSTEM.

NOTES

1. INSPECT EVERY 6 MONTHS DURING THE FIRST YEAR OF OPERATION. ADJUST THE INSPECTION INTERVAL BASED ON PREVIOUS OBSERVATIONS OF SEDIMENT ACCUMULATION AND HIGH WATER ELEVATIONS.

2. CONDUCT JETTING AND VACTORING ANNUALLY OR WHEN INSPECTION SHOWS THAT MAINTENANCE IS NECESSARY.



MC-4500 6" INSPECTION PORT DETAIL
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Carling Ave
Ottawa

DATE: 04/07/2020 | DRAWN: AM | CHECKED: ---
PROJECT #: Tool

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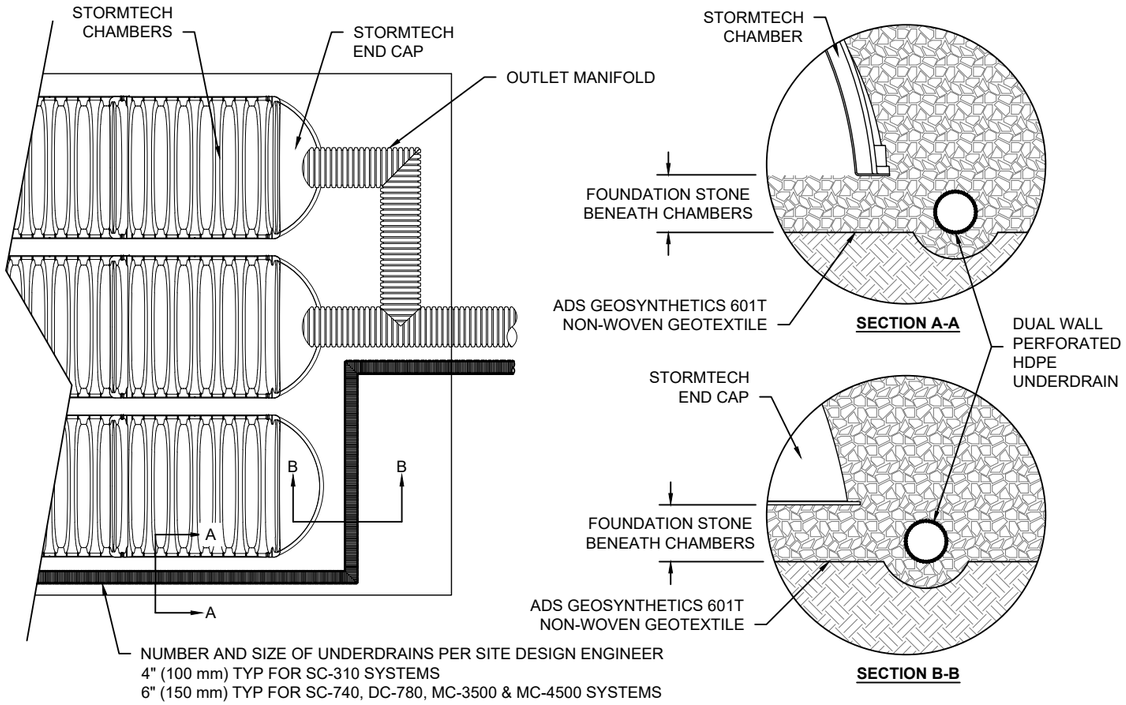
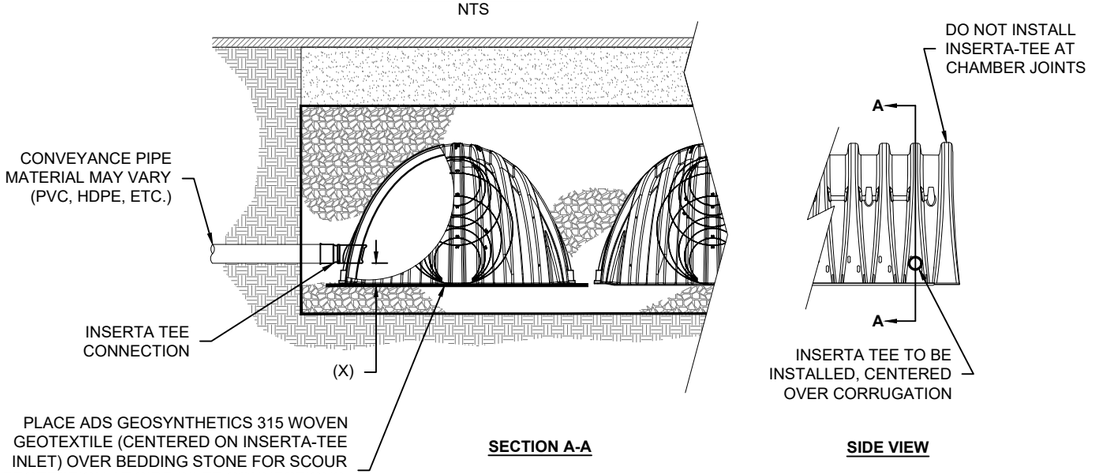
UNDERDRAIN DETAIL

NTS



INSERTA TEE DETAIL

NTS

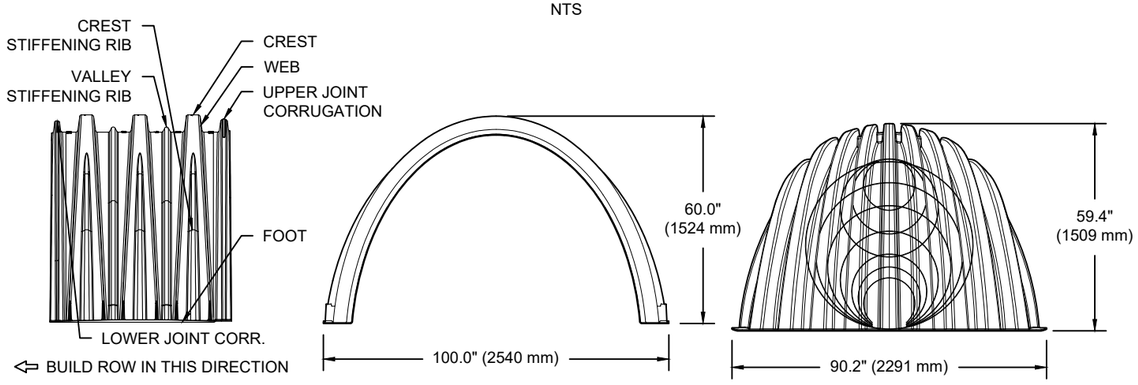


NOTE:
PART NUMBERS WILL VARY BASED ON INLET PIPE MATERIALS.
CONTACT STORMTECH FOR MORE INFORMATION.

CHAMBER	MAX DIAMETER OF INSERTA TEE	HEIGHT FROM BASE OF CHAMBER (X)
SC-310	6" (150 mm)	4" (100 mm)
SC-740	10" (250 mm)	4" (100 mm)
DC-780	10" (250 mm)	4" (100 mm)
MC-3500	12" (300 mm)	6" (150 mm)
MC-4500	12" (300 mm)	8" (200 mm)
INSERTA TEE FITTINGS AVAILABLE FOR SDR 26, SDR 35, SCH 40 IPS GASKETED & SOLVENT WELD, N-12, HP STORM, C-900 OR DUCTILE IRON		

MC-4500 TECHNICAL SPECIFICATION

NTS



NOMINAL CHAMBER SPECIFICATIONS

SIZE (W X H X INSTALLED LENGTH)	100.0" X 60.0" X 48.3"	(2540 mm X 1524 mm X 1227 mm)
CHAMBER STORAGE	106.5 CUBIC FEET	(3.01 m³)
MINIMUM INSTALLED STORAGE*	162.6 CUBIC FEET	(4.60 m³)
WEIGHT	130.0 lbs.	(59.0 kg)

NOMINAL END CAP SPECIFICATIONS

SIZE (W X H X INSTALLED LENGTH)	90.2" X 59.4" X 30.7"	(2291 mm X 1509 mm X 781 mm)
END CAP STORAGE	35.7 CUBIC FEET	(1.01 m³)
MINIMUM INSTALLED STORAGE*	108.7 CUBIC FEET	(3.08 m³)
WEIGHT	135.0 lbs.	(61.2 kg)

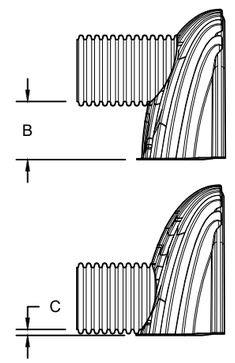
*ASSUMES 12" (305 mm) STONE ABOVE, 9" (229 mm) STONE FOUNDATION AND BETWEEN CHAMBERS, 12" (305 mm) STONE PERIMETER IN FRONT OF END CAPS AND 40% STONE POROSITY.

STUBS AT BOTTOM OF END CAP FOR PART NUMBERS ENDING WITH "B"
STUBS AT TOP OF END CAP FOR PART NUMBERS ENDING WITH "T"

PART #	STUB	B	C
MC4500REPE06T	6" (150 mm)	42.54" (1.081 m)	---
MC4500REPE06B		---	0.86" (22 mm)
MC4500REPE08T	8" (200 mm)	40.50" (1.029 m)	---
MC4500REPE08B		---	1.01" (26 mm)
MC4500REPE10T	10" (250 mm)	38.37" (975 mm)	---
MC4500REPE10B		---	1.33" (34 mm)
MC4500REPE12T	12" (300 mm)	35.69" (907 mm)	---
MC4500REPE12B		---	1.55" (39 mm)
MC4500REPE15T	15" (375 mm)	32.72" (831 mm)	---
MC4500REPE15B		---	1.70" (43 mm)
MC4500REPE18TC	18" (450 mm)	29.36" (746 mm)	---
MC4500REPE18BC		---	1.97" (50 mm)
MC4500REPE24TC	24" (600 mm)	23.05" (585 mm)	---
MC4500REPE24BC		---	2.26" (57 mm)
MC4500REPE30BC	30" (750 mm)	---	2.95" (75 mm)
MC4500REPE36BC	36" (900 mm)	---	3.25" (83 mm)
MC4500REPE42BC	42" (1050 mm)	---	3.55" (90 mm)

NOTE: ALL DIMENSIONS ARE NOMINAL

CUSTOM PRECORED INVERTS ARE AVAILABLE UPON REQUEST. INVENTORIED MANIFOLDS INCLUDE 12-24" (300-600 mm) SIZE ON SIZE AND 15-48" (375-1200 mm) ECCENTRIC MANIFOLDS.
CUSTOM INVERT LOCATIONS ON THE MC-4500 END CAP CUT IN THE FIELD ARE NOT RECOMMENDED FOR PIPE SIZES GREATER THAN 10" (250 mm)
THE INVERT LOCATION IN COLUMN 'B' ARE THE HIGHTEST POSSIBLE FOR THE PIPE SIZE.



Carling Ave
Ottawa

DATE: 04/07/2020 | DRAWN: AM | CHECKED: --- | PROJECT #: Tool

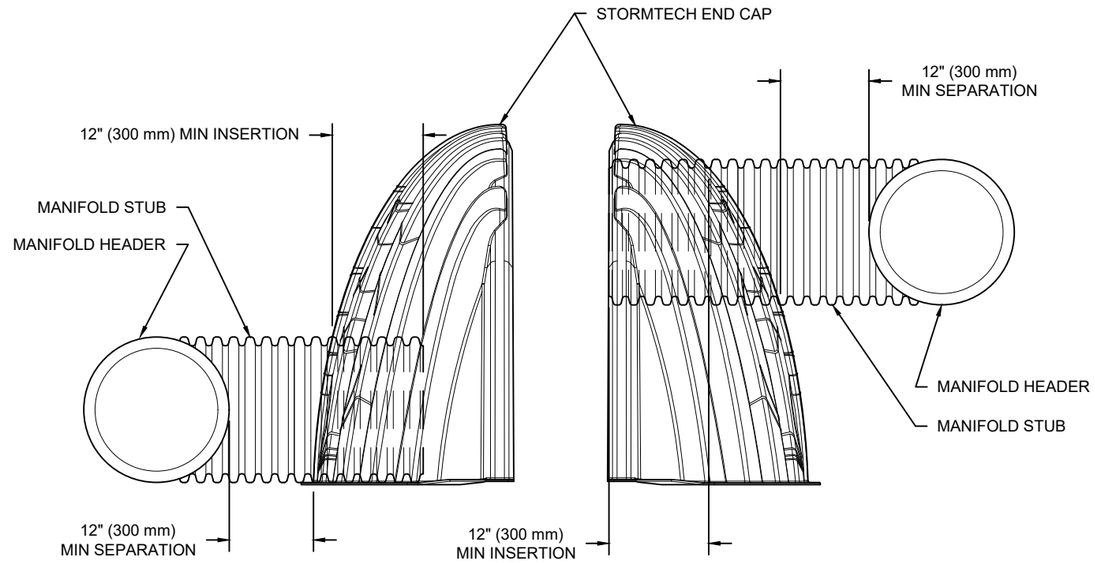
REV	DRW	CHK	DESCRIPTION

StormTech
Detention • Retention • Water Quality
70 INWOOD ROAD, SUITE 3 | ROCKY HILL | CT | 06067
860-529-8188 | 888-892-2694 | WWW.STORMTECH.COM

ADS
ADVANCED DRAINAGE SYSTEMS, INC.
4640 TRUEMAN BLVD
HILLIARD, OH 43026
1-800-733-7473

MC-SERIES END CAP INSERTION DETAIL

NTS



NOTE: MANIFOLD STUB MUST BE LAID HORIZONTAL
FOR A PROPER FIT IN END CAP OPENING.

Carling Ave
Ottawa

DATE: 04/07/2020 | DRAWN: AM | CHECKED: ---

PROJECT #: Tool

REV	DRW	CHK	DESCRIPTION

StormTech
Detention•Retention•Water Quality
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APPENDIX D
Development Servicing Study Checklist

4. Development Servicing Study Checklist

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

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

4.1 General Content

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

☒ Date and revision number of the report.

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

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

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

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

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

☒ Statement of objectives and servicing criteria.

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

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

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

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

N/A ☐ Proposed phasing of the development, if applicable.

☒ Reference to geotechnical studies and recommendations concerning servicing.

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

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

4.2 Development Servicing Report: Water

N/A ☐ Confirm consistency with Master Servicing Study, if available

☒ Availability of public infrastructure to service proposed development

N/A ☐ Identification of system constraints

☒ Identify boundary conditions

☒ Confirmation of adequate domestic supply and pressure

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

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

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

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

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

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

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

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

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

N/A ☐ Provision of a model schematic showing the boundary conditions locations, streets, parcels, and building locations for reference.

4.3 Development Servicing Report: Wastewater

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

N/A ☐ Confirm consistency with Master Servicing Study and/or justifications for deviations.

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

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

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

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

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

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

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

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

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

N/A ☐ Special considerations such as contamination, corrosive environment etc.

4.4 Development Servicing Report: Stormwater Checklist

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

N/A ☐ Analysis of available capacity in existing public infrastructure.

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

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

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

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

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

N/A ☐ Watercourse and hazard lands setbacks.

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

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

☒ Storage requirements (complete with calculations) and conveyance capacity for minor events (1:5 year return period) and major events (1:100 year return period).

N/A ☐ Identification of watercourses within the proposed development and how watercourses will be protected, or, if necessary, altered by the proposed development with applicable approvals.

☒ Calculate pre and post development peak flow rates including a description of existing site conditions and proposed impervious areas and drainage catchments in comparison to existing conditions.

N/A ☐ Any proposed diversion of drainage catchment areas from one outlet to another.

☒ Proposed minor and major systems including locations and sizes of stormwater trunk sewers, and stormwater management facilities.

N/A ☐ If quantity control is not proposed, demonstration that downstream system has adequate capacity for the post-development flows up to and including the 100-year return period storm event.

N/A ☐ Identification of potential impacts to receiving watercourses

N/A ☐ Identification of municipal drains and related approval requirements.

☒ Descriptions of how the conveyance and storage capacity will be achieved for the development.

☒ 100 year flood levels and major flow routing to protect proposed development from flooding for establishing minimum building elevations (MBE) and overall grading.

N/A ☐ Inclusion of hydraulic analysis including hydraulic grade line elevations.

☒ Description of approach to erosion and sediment control during construction for the protection of receiving watercourse or drainage corridors.

N/A ☐ Identification of floodplains – proponent to obtain relevant floodplain information from the appropriate Conservation Authority. The proponent may be required to delineate floodplain elevations to the satisfaction of the Conservation Authority if such information is not available or if information does not match current conditions.

N/A ☐ Identification of fill constraints related to floodplain and geotechnical investigation.

4.5 Approval and Permit Requirements: Checklist

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

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

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

N/A ☐ Changes to Municipal Drains.

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

4.6 Conclusion Checklist

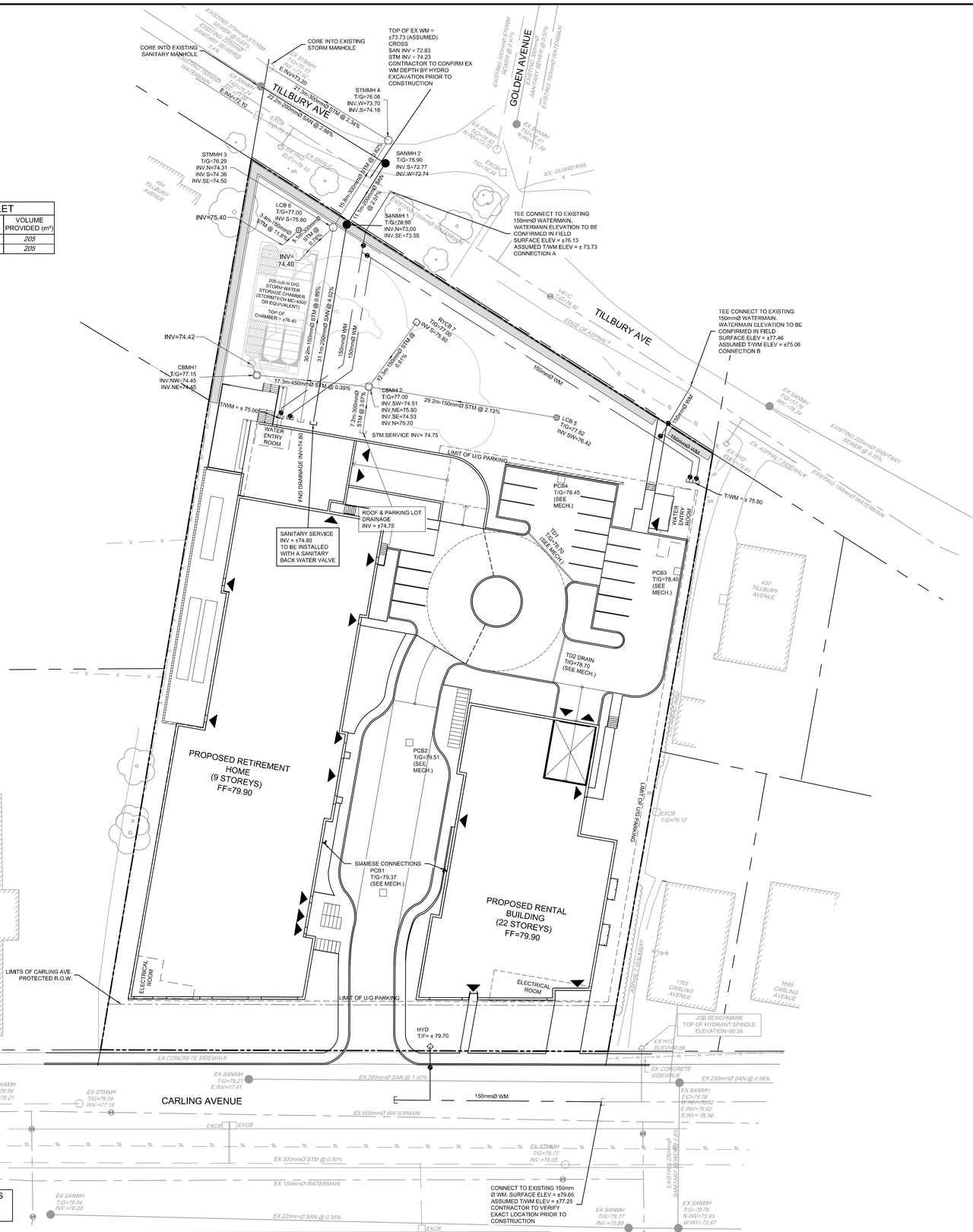
☒ Clearly stated conclusions and recommendations

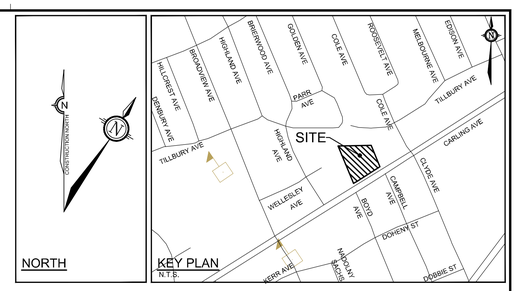
N/A ☐ Comments received from review agencies including the City of Ottawa and information on how the comments were addressed. Final sign-off from the responsible reviewing agency.

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

APPENDIX E
Drawings

INLET CONTROL DEVICE DATA - U/G STORAGE CHAMBER OUTLET						
DESIGN EVENT	ORIFICE DIAMTER (mm)	DIAMETER OF OUTLET PIPE (mm)	DESIGN FLOW (L/s)	UPSTREAM HEAD (m)	REQUIRED VOLUME (m^3)	VOLUME PROVIDED (m^3)
1:5 YR	*161*	*375*	*53.5*	*0.92*	*95*	*205*
1:100 YR	*161*	*375*	*77.6*	*1.92*	*205*	*205*





LEGEND

- PROPERTY LINE
- PROPOSED CURB
- DC — PROPOSED DEPRESSED CURB
- PROPOSED RETAINING WALL
- V&VB — PROPOSED VALVE AND VALVE BOX
- PROPOSED CAP
- WM — PROPOSED WATER METER
- M — PROPOSED REMOTE METER
- PROPOSED SANITARY SERVICE c/w MANHOLE
- PROPOSED STORM SEWER AND MANHOLE
- PROPOSED WATERMAIN
- PROPOSED BUILDING ENTRANCE
- DIRECTION OF FLOW
- PROPOSED LANDSCAPE DRAIN (LCB)
- PROPOSED CATCHBASIN MANHOLE (CBMH)
- PROPOSED PARKING LOT CATCHBASIN (PCB)
- PROPOSED REARYARD CATCH BASIN (RYCB)
- PROPOSED TRENCH DRAIN (TD)
- SIAMESE CONNECTION
- *EXISTING UTILITY POLE C/W GUY WIRES*
- VAVC — *EXISTING WATERMAIN C/W VALVE & VALVE CHAMBER*
- *EXISTING HYDRANT C/W VALVE & LEAD*
- *EXISTING SANITARY MANHOLE & SEWER*
- SANMH — *EXISTING STORM MANHOLE & SEWER*
- STM MH — *EXISTING CATCHBASIN*
- CB — *EXISTING GAS MAIN*
- *EXISTING OVERHEAD WIRES*
- *EXISTING BELL LINE*

GENERAL NOTES:

1. COORDINATE AND SCHEDULE ALL WORK WITH OTHER TRADES AND CONTRACTORS.
2. DETERMINE THE EXACT LOCATION, SIZE, MATERIAL AND ELEVATION OF ALL EXISTING UTILITIES PRIOR TO COMMENCING CONSTRUCTION. PROTECT AND ASSUME RESPONSIBILITY FOR ALL EXISTING UTILITIES WHETHER OR NOT SHOWN ON THIS DRAWING.
3. OBTAIN ALL NECESSARY PERMITS AND APPROVALS FROM THE CITY OF OTTAWA BEFORE COMMENCING CONSTRUCTION.
4. BEFORE COMMENCING CONSTRUCTION OBTAIN AND PROVIDE PROOF OF COMPREHENSIVE, ALL RISK AND OPERATIONAL LIABILITY INSURANCE FOR $2,000,000.00. INSURANCE POLICY TO NAME OWNERS, ENGINEERS AND ARCHITECTS AS CO-INSURED.
5. RESTORE ALL DISTURBED AREAS ON-SITE AND OFF-SITE, INCLUDING TRENCHES AND SURFACES ON PUBLIC ROAD ALLOWANCES TO EXISTING CONDITIONS OR BETTER TO THE SATISFACTION OF THE CITY OF OTTAWA.
6. REMOVE FROM SITE ALL EXCESS EXCAVATED MATERIAL, ORGANIC MATERIAL AND DEBRIS. EXCAVATE AND REMOVE FROM SITE ANY CONTAMINATED MATERIAL (IF ANY) SHALL BE DISPOSED OF AT A LICENSED LANDFILL FACILITY.
7. ALL ELEVATIONS ARE GEODETIC. THE SITE BENCHMARK IS THE TOP OF SPINDLE ON THE HYDRANT ON THE NORTH SIDE OF CARLING AVENUE (ELEV.= 80.56). REFER TO ANNIS, O'SULLIVAN VOLLEBEKK LTD. TOPOGRAPHIC PLAN OF PART OF LOT 30 CONCESSION 1.
8. REFER TO GEOTECHNICAL REPORT PG4423-1, DATED FEB 16, 2018, PREPARED BY PATERSON GROUP INC. FOR SUBSURFACE CONDITIONS, CONSTRUCTION RECOMMENDATIONS, AND GEOTECHNICAL INSPECTION REQUIREMENTS. THE GEOTECHNICAL CONSULTANT IS TO REVIEW ON-SITE CONDITIONS AFTER EXCAVATION PRIOR TO PLACEMENT OF THE GRANULAR MATERIAL.
9. REFER TO ARCHITECT'S AND LANDSCAPE ARCHITECT'S DRAWINGS FOR BUILDING AND HARDSURFACE AREAS AND DIMENSIONS.
10. REFER TO DEVELOPMENT SERVICING STUDY AND STORMWATER MANAGEMENT REPORT**(R-2020-051)** PREPARED BY NOVATECH.
11. SAW CUT AND KEY GRIND ASPHALT AT ALL ROAD CUTS AND ASPHALT.
12. CONTRACTOR TO PROVIDE THE CONSULTANT WITH A GENERAL PLAN OF SERVICES AND GRADING PLAN INDICATING ALL SERVICING AS-BUILT INFORMATION SHOWN ON THIS PLAN. AS-BUILT INFORMATION MUST INCLUDE: PIPE MATERIAL, SIZES, LENGTHS, SLOPES, INVERT AND T/G ELEVATIONS, STRUCTURE LOCATIONS, VALVE AND HYDRANT LOCATION, T/WM ELEVATIONS, ANY ALIGNMENT CHANGES, AND ALL SURFACE ELEVATION AS-BUILT GRADES.
13. REFER TO CITY OF OTTAWA ROAD REINSTATEMENT DETAIL R10 FOR ALL REQUIRED ROAD REINSTATEMENTS.

SEWER NOTES:

1. SPECIFICATIONS:

ITEM	SPEC. No.	REFERENCE
CATCHBASIN (600x600mm)	705.010	OPSD
STORM / SANITARY MANHOLE (1200Ø)	701.010	OPSD
STORM / SANITARY MANHOLE (1500Ø)	701.011	OPSD
CB, FRAME & COVER	400.020	OPSD
STORM / SANITARY MH FRAME	S25	CITY OF OTTAWA
SANITARY COVER	S24	CITY OF OTTAWA
STORM COVER (CLOSED)	S24.1	CITY OF OTTAWA
STORM COVER (OPEN)	S28.1	CITY OF OTTAWA
SEWER TRENCH	S6 & S7	CITY OF OTTAWA
STORM SEWER	PVC DR 35	CITY OF OTTAWA
SANITARY SEWER	PVC DR 35	CITY OF OTTAWA
ELBOW CB	S31	CITY OF OTTAWA
TEE CB	S30	CITY OF OTTAWA
THERMAL INSULATION	1109,030	OPSD
PARKING LOT CATCH BASIN (PCB)		REFER TO MECHANICAL
PARKING LOT TRENCH DRAIN (TD)		REFER TO MECHANICAL

2. SERVICES ARE TO BE CONSTRUCTED TO 1.0m FROM FACE OF BUILDING AT A MINIMUM SLOPE OF 1.0%.
3. PIPE BEDDING, COVER AND BACKFILL ARE TO BE COMPACTED TO AT LEAST 95% OF THE STANDARD PROCTOR MAXIMUM DRY DENSITY. THE USE OF CLEAR CRUSHED STONE AS A BEDDING LAYER SHALL NOT BE PERMITTED.
4. FLEXIBLE CONNECTIONS ARE REQUIRED FOR CONNECTING PIPES TO MANHOLES (FOR EXAMPLE KOR-N-SEAL, PSX: POSITIVE SEAL AND DURASEAL). THE CONCRETE CRADLE FOR THE PIPE CAN BE ELIMINATED.
5. DYE TESTING IS TO BE COMPLETED ON ALL SANITARY SERVICES TO CONFIRM PROPER CONNECTION TO THE SANITARY SEWER MAIN.
6. STORM MANHOLES AND CBMHS ARE TO HAVE 300mm SUMPS UNLESS OTHERWISE INDICATED.
7. CONTRACTOR TO TELEVISE (CCTV) ALL PROPOSED SEWERS, 200mmØ OR GREATER PRIOR TO BASE COURSE ASPHALT. UPON COMPLETION OF CONTRACT, THE CONTRACTOR IS RESPONSIBLE TO FLUSH AND CLEAN ALL SEWERS & APPURTENANCES.
8. INSULATE ALL STORM AND SANITARY SEWERS THAT HAVE LESS THAN 2.0m OF COVER.
9. BACK FLOW VALVES FOR STORM SERVICE CONNECTIONS ARE REQUIRED. REFER TO MECHANICAL DRAWINGS.

WATERMAIN NOTES:

1. SPECIFICATIONS:

ITEM	SPEC. No.	REFERENCE
WATERMAIN TRENCHING	W17	CITY OF OTTAWA
THERMAL INSULATION IN SHALLOW TRENCHES	W22	CITY OF OTTAWA
WATERMAIN CROSSING BELOW SEWER	W25	CITY OF OTTAWA
WATERMAIN	PVC DR 18	
HYDRANT	WSD-24	CITY OF OTTAWA
WATERMAIN VALVE & VALVE BOX	WSD-19	CITY OF OTTAWA

2. SUPPLY AND CONSTRUCT ALL WATERMAINS AND APPURTENANCES IN ACCORDANCE WITH THE CITY OF OTTAWA STANDARDS AND SPECIFICATIONS, EXCAVATION, INSTALLATION, BACKFILL AND RESTORATION OF ALL WATERMAINS BY THE CONTRACTOR. CONNECTIONS AND SHUT-OFFS AT THE MAIN AND CHLORINATION OF THE WATER SYSTEM SHALL BE PERFORMED BY CITY OFFICIALS.
3. WATERMAIN SHALL BE MINIMUM 2.4m DEPTH BELOW GRADE UNLESS OTHERWISE INDICATED.
4. PROVIDE MINIMUM 0.30m CLEARANCE BETWEEN OUTSIDE OF PIPES AT ALL CROSSINGS.
5. WATER SERVICE IS TO BE CONSTRUCTED TO WITHIN 1.0m OF FOUNDATION WALL AND CAPPED, UNLESS OTHERWISE INDICATED.

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

NOT FOR CONSTRUCTION

No.	REVISION	DATE	BY
2.	ISSUED FOR REVIEW	APR 15/20	AAR
1.	ISSUED FOR COORDINATION	MAR 27/20	AAR

SCALE 1:300

1:300
0 3 6 9 12

DESIGN AAR
CHECKED ARM
DRAWN AAR
CHECKED ARM
APPROVED GMAC

FOR REVIEW ONLY

LICENSED PROFESSIONAL ENGINEER G.J. MacDONALD PROVINCE OF ONTARIO April 15/20

LICENSED PROFESSIONAL ENGINEER A.R. MCAULEY 100141266 PROVINCE OF ONTARIO April 15, 2020

NOVATECH
Engineers, Planners & Landscape Architects
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada K2M 1P6
Telephone (613) 254-9643
Facsimile (613) 254-5867
Website www.novatech-eng.com

LOCATION
1705 CARLING AVE, CITY OF OTTAWA
PROPOSED HIGH-RISE RESIDENTIAL AND CARE FACILITY

DRAWING NAME
GENERAL PLAN OF SERVICES

PROJECT No. 120010-00
REV REV # 2
DRAWING No. 120010-GP

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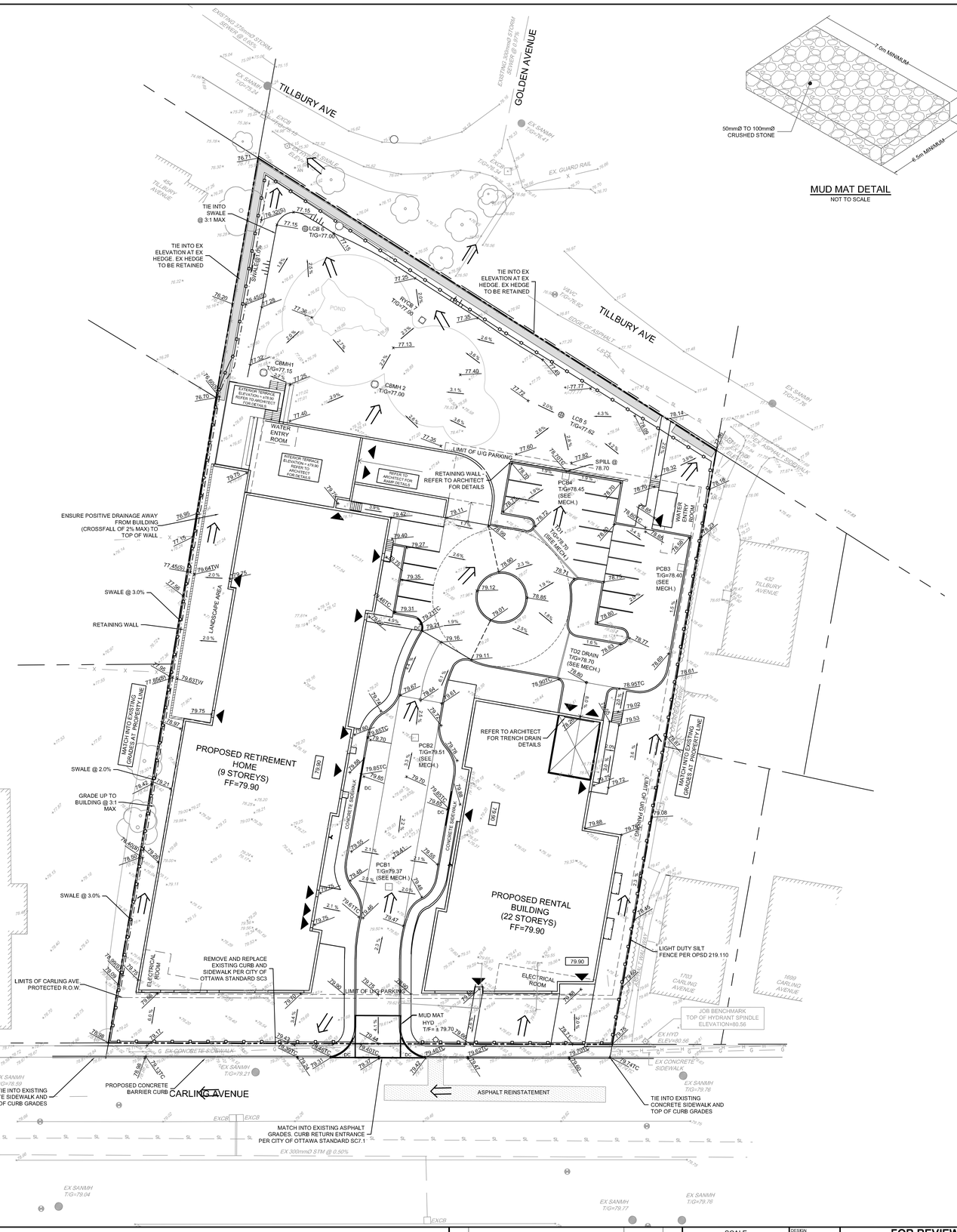

MUD MAT DETAIL
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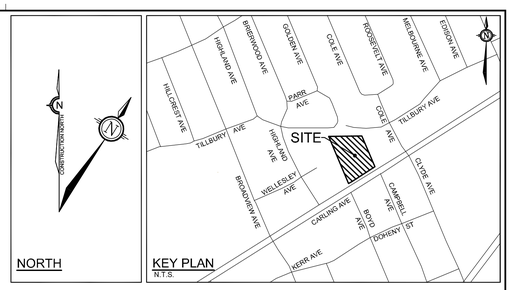

LEGEND

- PROPERTY LINE
- PROPOSED RETAINING WALL
- PROPOSED CURB
- DC PROPOSED DEPRESSED CURB
- 77.40(S) PROPOSED SWALE ELEVATION
- 78.00 PROPOSED ELEVATION
- 78.15TC PROPOSED TOP OF CURB ELEVATION
- 77.15TB PROPOSED TOP OF BERM
- 79.60TW PROPOSED TOP OF WALL
- 78.186W PROPOSED BOTTOM OF WALL
- x 77.73 EXISTING ELEVATION
- PROPOSED BUILDING ENTRANCE
- 2.0% SLOPE AND DIRECTION
- DIRECTION OF MAJOR OVERLAND FLOW
- PROPOSED LANDSCAPE DRAINS
- PROPOSED CATCHBASIN MANHOLE
- PROPOSED CATCHBASIN
- SAN MH PROPOSED SANITARY MANHOLE
- STM MH PROPOSED STORM MANHOLE
- VALVE EXISTING VALVE & VALVE BOX
- EXISTING HYDRANT
- SAN MH EXISTING SANITARY MANHOLE
- STM MH EXISTING STORM MANHOLE
- CB EXISTING CATCHBASIN
- EXISTING HEDGE
- GM EXISTING GAS METER
- UP EXISTING UTILITY POLE
- x PROPOSED FENCELINE
- TERRACING 3:1 SLOPE MAX (UNLESS OTHERWISE INDICATED)
- RETAINING WALL
- 79.00 PROPOSED FINISHED FLOOR ELEVATIONS AT BUILDING ENTRANCES/EXITS
- PROPOSED MUD MAT
- LIGHT DUTY SILT FENCE (OPSD 219.110)
- ASPHALT REINSTATEMENT AREA

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6. REMOVE FROM SITE ALL EXCESS EXCAVATED MATERIAL, ORGANIC MATERIAL AND DEBRIS. EXCAVATE AND REMOVE FROM SITE ANY CONTAMINATED MATERIAL (IF ANY) SHALL BE DISPOSED OF AT A LICENSED LANDFILL FACILITY.
7. ALL ELEVATIONS ARE GEODETIC. THE SITE BENCHMARK IS THE TOP OF SPINDLE ON THE HYDRANT ON THE NORTH SIDE OF CARLING AVENUE (ELEV.= 80.56). REFER TO ANNIS, O'SULLIVAN VOLLEBEKK LTD. TOPOGRAPHIC PLAN OF PART OF LOT 30 CONCESSION 1.
8. REFER TO GEOTECHNICAL REPORT PG4423-1, DATED FEB 16, 2018, PREPARED BY PATERSON GROUP INC. FOR SUBSURFACE CONDITIONS, CONSTRUCTION RECOMMENDATIONS, AND GEOTECHNICAL INSPECTION REQUIREMENTS. THE GEOTECHNICAL CONSULTANT IS TO REVIEW ON-SITE CONDITIONS AFTER EXCAVATION PRIOR TO PLACEMENT OF THE GRANULAR MATERIAL.
9. REFER TO ARCHITECT'S AND LANDSCAPE ARCHITECT'S DRAWINGS FOR BUILDING AND HARDSURFACE AREAS AND DIMENSIONS.
10. REFER TO DEVELOPMENT SERVICING STUDY AND STORMWATER MANAGEMENT REPORT**(R-2020-051)** PREPARED BY NOVATECH.
11. SAW CUT AND KEY GRIND ASPHALT AT ALL ROAD CUTS AND ASPHALT.
12. CONTRACTOR TO PROVIDE THE CONSULTANT WITH A GENERAL PLAN OF SERVICES AND GRADING PLAN INDICATING ALL SERVICING AS-BUILT INFORMATION SHOWN ON THIS PLAN. AS-BUILT INFORMATION MUST INCLUDE: PIPE MATERIAL, SIZES, LENGTHS, SLOPES, INVERT AND T/G ELEVATIONS, STRUCTURE LOCATIONS, VALVE AND HYDRANT LOCATION, T/WM ELEVATIONS, ANY ALIGNMENT CHANGES, AND ALL SURFACE ELEVATION AS-BUILT GRADES.
13. REFER TO CITY OF OTTAWA ROAD REINSTATEMENT DETAIL R10 FOR ALL REQUIRED ROAD REINSTATEMENTS.

GRADING NOTES:

1. ALL TOPSOIL, ORGANIC OR DELETERIOUS MATERIAL MUST BE ENTIRELY REMOVED FROM BENEATH THE PROPOSED PAVED AREAS AS DIRECTED BY THE SITE ENGINEER OR GEOTECHNICAL ENGINEER.
2. EXPOSED SUBGRADES IN PROPOSED PAVED AREAS SHOULD BE PROOF ROLLED WITH A LARGE STEEL DRUM ROLLER AND INSPECTED BY THE GEOTECHNICAL ENGINEER PRIOR TO THE PLACEMENT OF GRANULARS.
3. ANY SOFT AREAS EVIDENT FROM THE PROOF ROLLING SHOULD BE SUB-EXCAVATED AND REPLACED WITH SUITABLE MATERIAL THAT IS FROST COMPATIBLE WITH THE EXISTING SOILS AS RECOMMENDED BY THE GEOTECHNICAL ENGINEER.
4. THE GRANULAR BASE SHOULD BE COMPACTED TO AT LEAST 98% OF THE STANDARD PROCTOR MAXIMUM DRY DENSITY VALUE.
5. MINIMUM OF 2% GRADE FOR ALL GRASS AREAS UNLESS OTHERWISE NOTED.
6. MAXIMUM TERRACING GRADE TO BE 3:1 UNLESS OTHERWISE NOTED.
7. ALL GRADES BY CURBS ARE EDGE OF PAVEMENT GRADES UNLESS OTHERWISE INDICATED.
8. ALL CURBS SHALL BE BARRIER CURB (150mm) UNLESS OTHERWISE NOTED AND CONSTRUCTED AS PER CITY OF OTTAWA STANDARDS (SC1.1).
9. REFER TO LANDSCAPE PLAN FOR PLANTING AND OTHER LANDSCAPE FEATURE DETAILS.
13. CONTRACTOR TO PROVIDE THE CONSULTANT WITH A GRADING PLAN INDICATING AS-BUILT ELEVATIONS OF ALL DESIGN GRADES SHOWN ON THIS PLAN.

EROSION AND SEDIMENT CONTROL NOTES:

1. THE CONTRACTOR SHALL IMPLEMENT BEST MANAGEMENT PRACTICES, TO PROVIDE FOR PROTECTION OF THE AREA DRAINAGE SYSTEM AND THE RECEIVING WATERCOURSE, DURING CONSTRUCTION ACTIVITIES. THE CONTRACTOR ACKNOWLEDGES THAT FAILURE TO IMPLEMENT APPROPRIATE EROSION AND SEDIMENT CONTROL MEASURES MAY BE SUBJECT TO PENALTIES IMPOSED BY ANY APPLICABLE REGULATORY AGENCY.
2. 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 PREPARATION 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 MANHOLE/CATCHBASIN LIDS TO PREVENT SEDIMENTS FROM ENTERING STRUCTURES AND INSTALL AND MAINTAIN A LIGHT DUTY SILT FENCE BARRIER AS REQUIRED.
3. THE CONTRACTOR SHALL PLACE FILTER CLOTH UNDER THE CATCHBASIN AND MANHOLE GRATES FOR THE DURATION OF CONSTRUCTION AND WILL REMAIN IN PLACE DURING ALL PHASES OF CONSTRUCTION. FILTER CLOTH SHALL BE NON-WOVEN, POYPROPYLENE, CLASS I PER OPSS 1860.
4. SILT FENCING FOR ENTIRE PERIMETER OF SITE, SHALL BE UTILIZED TO CONTROL EROSION FROM THE SITE DURING CONSTRUCTION. GEOTEXTILE FOR SILT FENCE SHALL BE ACCORDING TO OPSS 1860, TABLE 3.
5. PROVIDE MUD MATS AT ALL CONSTRUCTION ACCESS POINTS TO MINIMIZE SEDIMENT TRANSPORT OFFSITE.

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

NOT FOR CONSTRUCTION

No.	REVISION	DATE	BY
3.	ISSUED FOR REVIEW	APR 15/20	AAR
2.	ISSUED FOR COORDINATION	MAR 27/20	AAR
1.	ISSUED FOR COORDINATION	MAR 25/20	AAR

SCALE 1:300
1:300
0 3 6 9 12

DESIGN AAR
CHECKED ARM
DRAWN AAR
CHECKED ARM
APPROVED GM

FOR REVIEW ONLY

LICENSED PROFESSIONAL ENGINEER G.J. MacDONALD April 15/20 PROVINCE OF ONTARIO

LICENSED PROFESSIONAL ENGINEER A.R. MCAULEY 100141256 April 15, 2020 PROVINCE OF ONTARIO

NOVATECH
Engineers, Planners & Landscape Architects
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada K2M 1P6
Telephone (613) 254-9643
Facsimile (613) 254-5867
Website www.novatech-eng.com

LOCATION
1705 CARLING AVE, CITY OF OTTAWA
PROPOSED HIGH-RISE RESIDENTIAL AND CARE FACILITY

DRAWING NAME
GRADING, EROSION AND SEDIMENT CONTROL PLAN

PROJECT No. 120010-00
REV REV # 3
DRAWING No. 120010-GR

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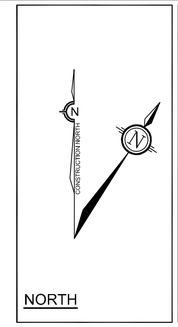

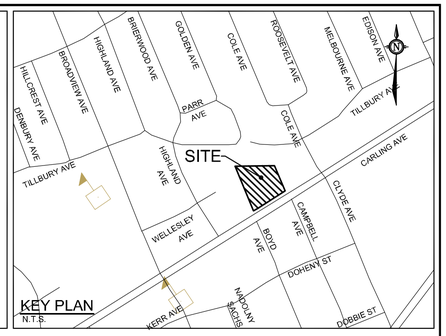

PROPERTY LINE

- V&VB — EXISTING VALVE & VALVE BOX
- EXISTING HYDRANT
- SAN MH — EXISTING SANITARY MANHOLE
- STM MH — EXISTING STORM MANHOLE
- CB — EXISTING CATCHBASIN
- EXISTING HEDGE
- GM — EXISTING GAS METER
- UP — EXISTING UTILITY POLE
- ASPHALT REINSTATEMENT AREA
- OHW — EXISTING OVERHEAD HYDRO WIRE
- G — EXISTING GAS LINE
- H — EXISTING OVERHEAD HYDRO LINE

GENERAL NOTES:

1. COORDINATE AND SCHEDULE ALL WORK WITH OTHER TRADES AND CONTRACTORS.
2. DETERMINE THE EXACT LOCATION, SIZE, MATERIAL AND ELEVATION OF ALL EXISTING UTILITIES PRIOR TO COMMENCING CONSTRUCTION. PROTECT AND ASSUME RESPONSIBILITY FOR ALL EXISTING UTILITIES WHETHER OR NOT SHOWN ON THIS DRAWING.
3. OBTAIN ALL NECESSARY PERMITS AND APPROVALS FROM THE CITY OF OTTAWA BEFORE COMMENCING CONSTRUCTION.
4. BEFORE COMMENCING CONSTRUCTION OBTAIN AND PROVIDE PROOF OF COMPREHENSIVE, ALL RISK AND OPERATIONAL LIABILITY INSURANCE FOR $2,000,000.00. INSURANCE POLICY TO NAME OWNERS, ENGINEERS AND ARCHITECTS AS CO-INSURED.
5. RESTORE ALL DISTURBED AREAS ON-SITE AND OFF-SITE, INCLUDING TRENCHES AND SURFACES ON PUBLIC ROAD ALLOWANCES TO EXISTING CONDITIONS OR BETTER TO THE SATISFACTION OF THE CITY OF OTTAWA.
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13. REFER TO CITY OF OTTAWA ROAD REINSTATEMENT DETAIL R10 FOR ALL REQUIRED ROAD REINSTATEMENTS.

REFER TO 120010-GR, 120010-GP, AND REPORT R-2020-051 FOR ADDITIONAL NOTES

NOTE:
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No.	REVISION	DATE	BY
1.	ISSUED FOR REVIEW	APR 16/20	AAR

SCALE 1:300 (0 3 6 9 12)

DESIGN LW
CHECKED ARM
DRAWN LW
CHECKED ARM
APPROVED GMAC

FOR REVIEW ONLY

LICENSED PROFESSIONAL ENGINEER — A.R. MCAULEY — 100141256 — April 15, 2020 — PROVINCE OF ONTARIO

NOVATECH
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LOCATION
1705 CARLING AVE, CITY OF OTTAWA
PROPOSED HIGH-RISE RESIDENTIAL AND CARE FACILITY

DRAWING NAME
REMOVALS PLAN

PROJECT No. 120010-00
REV REV # 1
DRAWING No. 120010-RP

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PLAN1.DWG - 841mmx594mm

APPENDIX F
Correspondence

Formal Pre-Application Consultation Meeting Minutes
1705 Carling Avenue
PC2019-0308
Monday, December 16, 2:00 p.m. – 3:00 p.m.

Attendees:

- John Bernier, File Lead, City of Ottawa
- Christopher Moise, Urban Designer & Architect, City of Ottawa
- Shawn Wessel, Engineer, City of Ottawa
- Urja Modi, Student Planner, City of Ottawa
- Vincent Denomme, Claridge Homes
- Neil Malhotra, Claridge Homes
- Jim Burghout, Claridge Homes
- Brian Casagrande, Fotenn
- Gary Ludington, Westboro Community Association

Proposal Overview

A site Plan approval was previously obtained for the subject site; however, the agreement was never signed. Currently, a 1-storey motel exists on the lots.

Their proposed development includes two independent buildings that share a podium presence along Carling. The building to the west will be a 4-storey retirement home that tapers down towards the single-detached homes near the subject site and includes 157 retirement units; The building to the east will be a 22-storey building composed of 195 rental units. One of the proposed designs includes 2-3 storey townhouses that front onto Tilbury. The proposal will maintain the notion of the previous approval with 10% park in the corner.

The subject site is currently zoned AM10 and R1. The applicants are anticipating coming in for a Zoning By-Law Amendment and a Site Plan Control to obtain approval for their proposed development.

Preliminary Comments from related discipline

<u>Planning</u>
City staff: John Bernier (File Lead)
City staff have the following comments and concerns regarding the proposed development:

- The proposed development will have to reflect the Urban Design Guideline for high-rise buildings.
- The proposal is broadly supported by Arterial Mainstreet policies, however, the development reads as inward facing with the entrances facing the interior and is setback further than required; the Arterial Mainstreet policies intend for more active frontages by bringing buildings to the streets, City staff recommend putting more accessible and public uses into the podium of the residential building.
    - Applicant: Senior clientele that desire more secure entrances; there will be commercial active frontage with the retirement home on the Carling Avenue side.
- A minimum 50% of glazing will be required.
- The proposed development does not meet the height provisions; there is a cap at 30 metres for the maximum building height.

- The interior side yard setback is 3 metres within the first 21 metres from the street.
- Parking spaces rates haven't changes from the previous approved plan.
    - Applicant: We want to make sure that we have enough parking to meets the needs of apartment building and retirement home; we know what we need for staff and residents themselves, we will likely provide more than required.
- City staff appreciate the design without the three-storey townhouses and the City would rather see that space be used as private amenity space for the development.
- Will some amenities be available to the public?
    - Applicant: Yes, some stuff, for events and etcetera

The applicant team will be required to show details for landscaping, the two parking garages, and amenity spaces when they submit their applications. The applicant team is advised to note that interim changes are occurring while the LRT is expanding to accommodate for buses in this area. There is dedicated bus land along the frontage of this property, OC Transpo can be circulated to see if they can shift their bus-stops, however the applicant team may be required to pay for this because there are policies that require them to contribute.

City staff representing Forestry and Transportation were unable to attend, however the File Lead will discuss with Parks about options for the hedge that exists on the wall. Notes from the absent members will be included in follow-up correspondence. City staff's overall impression about the proposed development is that it is interesting, but it is up to the applicant team to demonstrate compatibility.

<u>Urban Design</u>
City staff: Christopher Moise
City staff have the following comments and concerns regarding the proposed development:

- It is contrary to use high-order transit (the LRT) to propose an increase in density and height but to not decrease the amount of vehicular parking being proposed.
    - Applicant: Trying to balance, do not know when high-order transit is coming
- The protective space at the back was of benefit to the retirement home.
- Now that policy direction has changed (allowing buildings greater than 12 storeys), it is recommended that modelling and massing be done to reflect that; specifically, City staff is concerned about the relationship between the change from 9 to 22 storeys.
- Is there a way to achieve the goals of a retirement home with a tower?
    - Applicant: No
- It is recommended the applicant team use the high-rise guidelines to inform their proposed developments design; there may be a way to support the street without splitting the building.
    - The High-rise Guidelines speak of transitioning using 45-degree-separation; building separation distances are different from the 45-degree-separation.

The applicant team is recommended to further investigate the streetscape and attend an informal UDRP meeting prior to submitting applications for a rezoning and Site Plan Control.

<u>Engineering</u>
City Staff: Shawn Wessel
City staff have the following comments regarding the proposed developments associated heritage:

- Forestry will want to retain hedge
- Contact Enbridge for pressure release or blow off station, can be independent island or beside building, interfere with groundwater management and landscaping

- Servicing from carling or partially from tilbury and carling?
    - Applicant: servicing building similar to previous site plan approval, avoiding Carling, this is preferred route to go, no intention to do anything with Carling
- Once the capital works project starts, there will be a moratorium for 2 years on any work
- Applicant: special advice for stormwater management?
    - City staff: nothing changed from last year, will talk with someone from water department to determine flexibility with surcharge conditions, don't think in Pondcrest area; Flow from Carling goes to Sir John A. MacDonald and then Ottawa River.

The following plans and studies will be required:

- Wind
- Shadow
- Noise, including stationary
- Geotechnical Investigation Report
- Phase 1 ESA; must speak to types of foundations and footings you're going to use
    - Maybe Phase 2 ESA, depending on the outcome from the Phase 1 ESA

Please note this list is not conclusive. City staff will follow-up with additional notes and a complete list of submission requirement for the engineering component.

<u>Preliminary Comments for community association representatives</u>
Gary Ludington, Westboro Community Association
Generally speaking, the community representative (CR) supports the proposed development. Nonetheless, the CR shared the following comments and concerns:

- One concern is the amount of parking being provided; there is already fairly good transit available on Carling Avenue
- Another concern is the dedication of the park and how it will be designed; the CR is concerned that opening up the park will lead to people using it as a pathway between the subject site and the neighbouring area.
- The community would like to see a restaurant, similar to the existing restaurant (Rosebowl).
- One of the biggest issues this area faces is migratory bird flight; the CR is concerned that the birds will find a path into the subject site through the park and proposed open space.
- Basement flooding has been a recent and past issue in the area, what impacts are there going to be if the site drains to Tilbury? Are we still going to have any issues with flooding?
- The CR does not see height as an issue on Carling Avenue.
- The CR wants to see a sun-shadow study take place.

Next Steps
It is recommended that the applicant team gain input from the community member, neighbouring property owners, the Community Association and the Ward Councillor.

City staff ask the applicant team to keep all City staff updated and get their consultant to call Shawn Wessel.

Ambur Lavallee

From: Cara Ruddle
Sent: March-26-18 11:27 AM
To: Ambur Lavallee; Matthew Hrehoriak
Subject: FW: 1705 Carling Avenue - quality control requirements

Cara Ruddle, P.Eng., Senior Project Manager | Land Development Engineering
NOVATECH Engineers, Planners & Landscape Architects
240 Michael Cowpland Drive, Suite 200, Ottawa, ON, K2M 1P6 | Tel: 613.254.9643 Ext: 220 | Cell: 613.261.7719 | Fax: 613.254.5867

From: Jamie Batchelor [mailto:jamie.batchelor@rvca.ca]
Sent: Monday, March 26, 2018 11:26 AM
To: Cara Ruddle <c.ruddle@novatech-eng.com>
Subject: RE: 1705 Carling Avenue - quality control requirements

Hi Cara,

The storm sewer on Carling Avenue runs more than 2km to an outlet of the Ottawa River with no municipal treatment for quality provided. In the opinion of the Conservation Authority, the distance to the outlet is sufficiently far that onsite quality controls would have negligible impact on surface water improvement. The RVCA would therefore accept that stormwater runoff from the site does not require any additional onsite water quality control measures save and except best management practices.

From: Cara Ruddle [mailto:c.ruddle@novatech-eng.com]
Sent: Tuesday, March 20, 2018 1:11 PM
To: Jamie Batchelor <jamie.batchelor@rvca.ca>
Subject: 1705 Carling Avenue - quality control requirements

Jamie:
The site at 1705 Carling Avenue (former Rose Bowl Restaurant) is being re-developed. I am looking for the stormwater quality control requirements to incorporate into our stormwater management design. Can you please provide this information?

Thanks.

Cara Ruddle, P.Eng., Senior Project Manager | Land Development Engineering
NOVATECH Engineers, Planners & Landscape Architects
240 Michael Cowpland Drive, Suite 200, Ottawa, ON, K2M 1P6 | Tel: 613.254.9643 Ext: 220 | Cell: 613.261.7719 | Fax: 613.254.5867