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Proposed Hotel and Restaurant Development 300 Moodie Drive

Development Servicing Study and Stormwater Management Report

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PROPOSED HOTEL AND RESTAURANT DEVELOPMENT 300 MOODIE DRIVE

DEVELOPMENT SERVICING STUDY AND STORMWATER MANAGEMENT REPORT

Prepared by:

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April 16, 2018
Revised June 28, 2018

Ref: R-2018-029
Novatech File No. 118007

June 28, 2018

Colonnade Hotel Investment LP
16 Concourse Gate, Suite 200
Ottawa, ON
K2E 7S8

Attention: Mr. Cal Kirkpatrick

Dear Sir:

Re: Development Servicing Study and Stormwater Management Report
Proposed Hotel and Restaurant Development
300 Moodie Drive, Ottawa, ON
Novatech File No.: 118007

Enclosed is a copy of the revised 'Development Servicing Study and Stormwater Management Report' for the proposed development located at 300 Moodie Drive, in the City of Ottawa. This report addresses the approach to site servicing and stormwater management and is submitted in support of a site plan control application.

Please contact the undersigned, should you have any questions or require additional information.

Yours truly,

NOVATECH

François Thauvette, P. Eng.
Senior Project Manager

FT/sm

cc: Gabrielle Schaeffer (City of Ottawa)
Shawn Hickey (SiteCast Construction Corp.)

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1.0 INTRODUCTION

The new Hotel and Restaurant are being proposed by Colonnade Hotel Investment LP and Novatech has been retained to complete the site servicing and stormwater management design for this project.

1.1 Purpose

This report addresses the approach to site servicing and stormwater management and is being submitted in support of a site plan control application.

1.2 Location and Site Description

The subject site is located at 300 Moodie Drive, in the City of Ottawa. The site is approximately 0.931 hectares in size and is currently developed. The existing buildings and associated parking lots will be demolished to accommodate the proposed development. The site is located west of Moodie Drive, north of Fitzgerald Road and south of the Ottawa-Carleton Trailway, part of the TransCanada Trail (formerly a Rail Corridor). Developed lots are located west of the subject site. The legal description of the subject site is designated as Part of Lot 10, Concession 2 (Ottawa Front), Geographic Township of Nepean, City of Ottawa.

Figure 1 – **Aerial Plan** provides an aerial view of the site.

1.3 Pre-Consultation Information

A pre-consultation meeting was held with the City of Ottawa on August 22, 2017, at which time the client was advised of the general submission requirements. The Rideau Valley Conservation Authority (RVCA) was also consulted regarding the proposed development and a pre-consultation meeting has been requested with the Ministry of Environment and Climate Change (MOECC). Refer to **Appendix A** for a summary of the correspondence related to the proposed development.

1.4 Proposed Development

The proposed development will consist of a 6-storey hotel, a restaurant (separate building), as well as associated parking lots and landscaped areas. The proposed buildings will be serviced by extending new services to the municipal sanitary sewer, storm sewer and watermain in Moodie Drive. Construction will be phased.

Access to the site will be provided through an existing right-in, right-out entrance off Moodie Drive and a full movement entrance off Fitzgerald Road. The existing buildings and associated parking lots will be demolished to accommodate the proposed development.

1.5 Reference Material

[1] The Geotechnical Investigation Report (Ref. No. PG4148-1), prepared by Paterson Group on June 23, 2017.

[2] The Geotechnical Memorandum (Ref. No. PG4148-Memo.01R), prepared by Paterson Group on April 18, 2018.

2.0 SITE SERVICING

The objective of the site servicing design is to provide proper sewage outlets, a suitable domestic water supply and to ensure that appropriate fire protection is provided for the proposed development. The servicing criteria, expected sewage flows and water demands are to conform to the requirements of the City of Ottawa municipal design guidelines for sewer and water distribution systems. Refer to the subsequent sections of the report for further details.

The City of Ottawa Servicing Study Guidelines for Development Applications requires that a Development Servicing Study Checklist be included to confirm that each applicable item is deemed complete and ready for review by City of Ottawa Infrastructure Approvals. A completed checklist is enclosed in **Appendix B** of the report.

2.1 Sanitary Sewage

The proposed development will be serviced by a new 200mm dia. sanitary sewer connected to the existing 525mm dia. sanitary sewer in Moodie Drive. Each building will have a separate 200mm dia. service connection to the on-site sanitary sewer system.

The City of Ottawa design criteria were used to calculate the theoretical sanitary flows for the proposed development. The following design criteria were taken from Section 4 – 'Sanitary Sewer Systems' and Appendix 4-A - 'Daily Sewage Flow for Various Types of Establishments' of the City of Ottawa Sewer Design Guidelines:

Hotel and Restaurant uses

- Average Daily Hotel (with full housekeeping) Sewage Flow: 225 L/person/day
- Average Daily Hotel Room Occupancy: 1.8 people/room
- Average Hotel Dining Room Sewage Flow: 125 L/seat/day
- Average Hotel (non-resident staff) Sewage Flow: 40 L/staff/day
- Hotel Peaking Factor = 3.5 (Harmon Equation)
- Average Restaurant Sewage Flow: 125 L/seat/day
- Commercial Peaking Factor = 1.5
- Infiltration Allowance: 0.28 L/s/ha x 0.931 ha site = 0.26 L/s

Table 1 identifies the theoretical sanitary flows for the proposed development based on the above design criteria.

Table 1: **Theoretical Post-Development Sanitary Flows**

Type of Use	Room/Seat/ Staff Count	Design Population	Average Flow (L/s)	Peaking Factor	Peak Flow (L/s)	Total Flow (L/s)
Hotel Rooms	135 rooms	243	0.63	3.5	2.20	2.20
Hotel Dining Room	74 seats	74	0.11	1.5	0.16	0.16
Hotel Non-Res. Staff	15 staff	15	<0.01	1.5	0.01	0.01
Sub-Total for Hotel	-	**332**	**0.75**	-	**2.37**	**2.37**
Restaurant	**350 seats**	**350**	**0.51**	**1.5**	**0.76**	**0.76**
Infiltration Allowance	-	-	-	-	-	0.26
Total	-	**682**	**1.26**	-	-	**3.39***

*Includes an infiltration allowance of 0.28 L/s/ha

A 200mm dia. sanitary gravity sewer at a minimum slope of 1.0% has a full flow conveyance capacity of 34.2 L/s and will have sufficient capacity to convey the theoretical sanitary flows for both the proposed hotel and restaurant.

2.2 Water

The proposed development will be serviced by a new 200mm dia. watermain connected to the existing 300mm dia. watermain in Moodie Drive. The proposed water service will be reduced to a 150mm dia. line before entering the proposed hotel and reduced to a 50mm dia. service line before entering the restaurant. The watermain has been sized to provide the required domestic water demand and fire flow. A shut-off valve will be provided on the proposed watermain at the property line as well as on each building service. The water meters will be in the mechanical rooms inside each building; while the remote meters will be located on the exterior face of the buildings.

To determine if the existing 300mm dia. municipal watermain network has adequate capacity to accommodate the proposed development, a hydraulic analysis was completed based on boundary conditions provided by the City of Ottawa.

2.2.1 Domestic Water Demand

The City of Ottawa design criteria were used to calculate the theoretical water demand for the proposed development. The following design criteria were taken from Section 4 – 'Water Distribution Systems' of the Ottawa Design Guidelines – Water Distribution and Table 3-3 from the MOE design guidelines for drinking water systems:

- Average Daily Hotel Room (with full housekeeping) Water Demand: 225 L/person/day
- Average Daily Hotel Room Occupancy: 1.8 people/room
- Average Hotel Dining Room Water Demand: 125 L/seat/day
- Average Hotel (non-resident staff) Water Demand: 40 L/person/day
- Average Restaurant Water Demand: 125 L/seat/day
- Maximum Day Demand Peaking Factor = 3.5 (value interpolated from MOE Table 3.3)
- Peak Hour Demand Peaking Factor = 5.2 (value interpolated from MOE Table 3.3)

The following design criteria were taken from Section 4.2.2 – 'Watermain Pressure and Demand Objectives' of the City of Ottawa Design Guidelines for Water Distribution:

- Normal operating pressure are to range between 345 kPa (50 psi) and 483 kPa (70 psi) under Max Day demands
- Minimum system pressures are to be 276 kPa (40 psi) under Peak Hour demands
- Minimum system pressures are to be 140 kPa (20 psi) under Max Day + Fire Flow demands

Table 2 identifies the theoretical domestic water demands for the development based on the above design criteria.

Table 2: **Theoretical Water Demand for Proposed Development**

Type of Use	Room/Seat/ Staff Count	Design Population	Average Day Demand (L/s)**	Max. Day Demand (L/s)	Peak Hour Demand (L/s)
Hotel Rooms	135 rooms	243	0.63	2.20	3.28
Hotel Dining Room	74 seats	74	0.11	0.38	0.57
Hotel Non-Res. Staff	15 staff	15	<0.01	0.04	0.05
Sub-Total for Hotel	-	**332**	**0.75**	**2.62**	**3.90**
Restaurant	350 seats	350	0.51	1.78	2.65
Total for Site	-	-	**1.26**	**4.40**	**6.55**

Values taken from **Table 1 above.

2.2.1.1 Water Supply for Fire-Fighting

The proposed hotel will be fully sprinklered and supplied with a fire department siamese connection. The siamese connection will be located on the south side of the building, within 45m of an existing municipal fire hydrant near the intersection of Fitzgerald Road and Moodie Drive. The restaurant will not be sprinklered, but will be near the municipal fire hydrant located along the west side of Moodie Drive, just south of the existing site entrance.

The Fire Underwriters Survey (FUS) was used to estimate fire flow requirements for the proposed buildings. Based on information provided by the architect, non-combustible construction materials were used in the calculations for both the hotel and the restaurant.

Table 2.1 summarizes the Fire Flow Requirements for the proposed Hotel and Restaurant based on FUS calculations.

Table 2.2.1: Fire Flow Requirements for the Proposed Development

Type of Uses	Fire Flow Demand USGPM (L/s)
Proposed Hotel	2,642 USGPM (167 L/s)
Proposed Restaurant	1,321 USGPM (83 L/s)

Refer to **Appendix C** for a copy of the preliminary FUS fire flow calculations.

The fire flow requirements include both sprinkler system and hose allowances in accordance with the OBC and NFPA 13. The sprinkler systems will be designed by the fire protection (sprinkler) contractor as this process involves detailed hydraulic calculations based on building layout, pipe runs, head losses, fire pump requirements, etc. Booster pumps will not be required for the restaurant, but may be required for the proposed hotel. It should be noted that fire flow requirements calculated using the FUS method tend to generate higher values when compared to flows being calculated using the OBC and NFPA.

2.2.1.2 Boundary Conditions and Summary of Watermain Analysis Results

Preliminary water demands and fire flow requirements for the proposed development were provided to the City of Ottawa. These values were used to generate the municipal watermain network boundary conditions. **Table 2.2** summarizes the boundary conditions provided by the City of Ottawa for the existing municipal watermain network.

Table 2.2: Hydraulic Boundary Condition Provided by the City

Municipal Watermain Boundary Condition	300mm dia. Watermain (Moodie Drive)
Minimum HGL	127.6m*
Maximum HGL	132.7m*
Max Day + Fire Flow*	126.9m*

*Values assumed to be the same for the 300mm dia. watermain on Fitzgerald Road.

The hydraulic model EPANET was used to analyzing the performance of the proposed watermain for two theoretical conditions:

1) Maximum Day + Fire Flow Demand
2) Peak Hour Demand

A schematic representation of the hydraulic network depicts the node and pipe numbers used in the model. The model is based on hydraulic boundary conditions provided by the City of Ottawa. The model indicates that adequate pressure will exist throughout the watermain system under the specified design conditions. **Table 2.3** and **Table 2.4** summarize the hydraulic model results. Refer to **Appendix C** for City of Ottawa boundary conditions, the hydraulic modeling schematic and modeling results.

Table 2.3: Maximum Day + Fire Flow Demand (167 L/s) for Hotel

Operating Condition	Minimum System Pressure	Maximum System Pressure
A Max Day Demand of 1.8 L/s at Node J2 (Restaurant), a Max Day + Fire Flow of 85.6 L/s at Node J9 (Hotel) and a Fire Flow of 84 L/s at Node J8 (Hydrant)	A minimum system pressure of 318.0 kPa (46.1 psi) is available at Node J9 (Hotel)	A maximum system pressure of 395.6 kPa (57.4 psi) is available at Node J3 (Moodie Drive Watermain)

Table 2.4: Peak Hour Demand

Operating Condition	Minimum System Pressure	Maximum System Pressure
A Peak Hour Demand of 2.7 L/s at Node J2 (Restaurant) and a Peak Hour Demand of 3.9 L/s at Node J9 (Hotel)	A minimum system pressure of 363.9 kPa (52.8 psi) is available at Node J8 (Hydrant)	A maximum system pressure of 403.2 kPa (58.5 psi) is available at Nodes J3, J6 and J7 (Moodie Drive and Fitzgerald Road Watermains)

As indicated in the summary tables above, the existing municipal watermain network should have sufficient water supply for the proposed development. Furthermore, the existing municipal watermains will provide adequate system pressures for both 'Max Day + Fire Flow' and 'Peak Hour' conditions, within the normal operating pressure ranges specified by the City of Ottawa.

2.3 Storm Drainage and Stormwater Management

The proposed storm outlet for the site is the existing 375mm dia. storm sewer on Moodie Drive. The proposed storm drainage and stormwater management design for the site is discussed in the following sections of the report.

2.3.1 Stormwater Management Criteria and Objectives

The stormwater management criteria and objectives for the site are as follows:

- Provide a dual drainage system (i.e. minor and major system flows);
- Maximize the use of rooftop and surface storage available on site;
- Control the 100-year post-development flow from the site to an allowable release rate corresponding to the 2-year peak flow with an applied runoff coefficient of 0.5, as specified by the City of Ottawa in the pre-consultation process. Post-development peak flows exceeding the allowable release rate are to be controlled on-site prior to release into the existing 375mm storm sewer on Moodie Drive.
- Ensure that no surface ponding will occur on the paved surfaces (i.e. private drive aisles or parking lots) during the 2-year storm event.

- Provide on-site water quality control equivalent to an 'Enhanced' Level of Protection (i.e., minimum 80% TSS removal) prior to releasing flows from the site, as required by the Conservation Authority.
- Provide guidelines to ensure that site preparation and construction is in accordance with the current Best Management Practices for Erosion and Sediment Control.

2.3.2 Pre-Development Conditions and Allowable Release Rate

As the site is currently developed, the current conditions are not representative of the pre-development site conditions. To better represent the pre-development conditions, the City of Ottawa has stated that the maximum allowable release rate from the site is to be calculated using the Rational Method based on a 2-year return period and a runoff coefficient of 0.50.

T_c = 10 min C =0.50
I_{2yr} = 76.8 mm/hr A = 0.931 ha

Q_{allow} = 2.78 CIA
= 2.78 (0.50) (76.8) (0.931)
= 99.4 L/s

Using a 10-minute Time of Concentration, the allowable release rate for the 0.931 ha site was calculated to be 99.4 L/s.

2.3.3 Post-Development Conditions

The proposed site will be serviced by an on-site storm sewer system connected to the existing 375mm dia. storm sewer in Moodie Drive.

Parking Lot

Storm runoff from the parking area will be directed to various catchbasins and catchbasin manholes:

- Runoff volumes up to the 2-year event will be stored underground in the oversized (525mm dia.) storm sewers.
- Runoff volumes for larger storms will be stored on the parking lot surface to a maximum ponding depth of 0.25m during the 100-year event.
- Peak flows from the parking lot will be controlled using an inlet control device (ICD) installed in STM MH 4.

Hotel / Restaurant Rooftops

Runoff from the hotel and restaurant will be stored and attenuated on the rooftops using control flow roof drains. The rooftops will provide storage for storms up to and including the 100-year event. The building service laterals will connect to the on-site storm sewers downstream of the ICD controlling the flows from the parking lot.

Uncontrolled Areas

Runoff from several small areas around the perimeter of the site will be uncontrolled and will flow overland off-site towards Moodie Drive or Fitzgerald Road.

Off Site Areas

Runoff from a small area along the west property line and a small area near the northwest corner of the property will be captured by the on-site storm sewer system. These small areas have been included in catchments A-2 and A-3 respectively, and have been accounted for in the stormwater management design.

2.3.4 Hydrologic and Hydraulic Modelling

The performance of the proposed stormwater management system was evaluated using a dual-drainage model created in PCSWMM. The PCSWMM model simulates the storage and routing of flows through the proposed storm drainage network. The results of the analysis were used to:

- Calculate the storage volumes and release rates for the building rooftops.
- Calculate the storm sewer hydraulic grade line and ponding elevations for the 2-year, 5-year, and 100-year storm events.
- Calculate the peak flows from uncontrolled areas of the site.
- Determine the allowable release rate from the parking lot and size the proposed ICD in STM MH 4.
- Calculate the total runoff from the site.

The design storms used in the hydrologic analysis model include the 3-hour Chicago distribution and the 12-hour SCS Type II distribution for return periods of 1:2 years, 1:5 years and 1:100 years. IDF data was taken from the *City of Ottawa Sewer Design Guidelines* (OSDG) (October 2012). The 3-hour Chicago storm distribution was found to generate the highest peak flows and the model results from this distribution are documented in the following tables.

The model schematic, parameters and output files are provided in **Appendix D**.

2.3.5 Model Results

The following sections outline the stormwater management scheme for each area of the proposed site, and provide post-development peak flow results from each area.

2.3.5.1 Areas DR-1, DR-2 and DR-3 – Uncontrolled Runoff

The runoff from sub-catchments DR-1, DR-2 and DR-3 flows overland towards the existing storm sewers in Moodie Drive or Fitzgerald Road. The uncontrolled post-development flows from each sub-catchment were obtained from the PCSWMM model and are summarized in **Table 3.1** below. Refer to **Appendix D** for SWM calculations.

Table 3.1: Stormwater Flows (Uncontrolled Runoff)

Design Event	DR-1 Flow (L/s)	DR-2 Flow (L/s)	DR-3 Flow (L/s)	Total Flow (L/s)
5-Year	5.7	9.4	0.7	15.8
100-Year	18.9	26.9	3.7	49.5

2.3.5.2 Areas A-1 through A-6 – Controlled Flow from Parking Lot

The runoff from sub-catchments A-1 through A-6 is captured by the proposed on-site storm sewer system, and will be attenuated by the ICD installed in the outlet pipe of STM MH 4. The runoff will be temporarily stored within the underground pipes and on the parking lot surface prior to being discharged into the on-site storm sewer system.

The controlled post-development flows, ponding elevations, and required storage volumes from each sub-catchment were obtained from the PCSWMM model and are summarized in **Table 3.2**.

Table 3.2: Stormwater Flows, ICD & Ponding (Controlled Flow from Parking Lot)

Design Event	Sub-Catchment Areas A-1 through A-6				
	ICD Type	Design Flow (L/s)	Ponding Elevation (m)	Storage Vol. Required (m^3)	Max Storage Provided (m^3)
2-Year	150 VHV-2 Hydrovex ICD	36.1 L/s	89.28 m	45.8 m^3	281.6 m^3
5-Year		38.0 L/s	89.43 m	79.4 m^3	
100-Year		39.0 L/s	89.52 m	211.2 m^3	

Refer to **Appendix D** for SWM calculations and **Appendix E** for ICD information. As indicated in the table above, the sub-catchment areas will provide sufficient storage for the 2-year, 5-year and 100-year design events. Furthermore, no stormwater will pond on the private paved surfaces (i.e. drive aisles or parking lots) during the 2-year storm event, as the lowest top of grate elevation for catchbasins on site is 89.30 m.

2.3.5.3 Area R-1 – Controlled Flow from Hotel Roof

The post-development flow from sub-catchment R-1 will be attenuated using four (4) Watts adjustable 'Accutrol' control flow roof drains (model number RD-100-A-ADJ) prior to being directed to the proposed storm service.

Table 3.3 summarizes the post-development design flows from this sub-catchment area as well as the type of roof drains, the maximum anticipated ponding depths, storage volumes required and storage volumes provided for both the 5-year and the 100-year design events.

Table 3.3: Stormwater Flows and Roof Drains (Hotel Roof)

Roof Drain ID & Drainage Area (ha)	Number of Roof Drains	Watts Roof Drain Model ID (Weir Opening)	Controlled Flow per Drain (L/s)		Approximate Ponding Depth Above Drains (m)		Storage Volume Required (m^3)		Max. Storage Available (m^3)
			1:5 Year	1:100 Year	1:5 Year	1:100 Year	1:5 Year	1:100 Year	
RD-1 (0.022 ha)	1	RD-100-A-ADJ (1/4 Exposed)	0.79	0.95	0.11	0.14	3.9	8.9	9.8
RD-2 (0.045 ha)	1	RD-100-A-ADJ (1/4 Exposed)	0.79	0.95	0.11	0.15	10.6	22.8	23.4
RD-3 (0.035 ha)	1	RD-100-A-ADJ (1/4 Exposed)	0.79	0.95	0.11	0.15	7.5	16.5	17.6

Roof Drain ID & Drainage Area (ha)	Number of Roof Drains	Watts Roof Drain Model ID (Weir Opening)	Controlled Flow per Drain (L/s)		Approximate Ponding Depth Above Drains (m)		Storage Volume Required (m^3)		Max. Storage Available (m^3)
			1:5 Year	1:100 Year	1:5 Year	1:100 Year	1:5 Year	1:100 Year	
RD-4 (0.020 ha)	1	RD-100-A-ADJ (1/4 Exposed)	0.79	0.87	0.10	0.13	3.4	8.1	9.4
Total Roof (0.122 ha)	**4**	**-**	**3.2**	**3.7**	**-**	**-**	**25.5**	**56.2**	**60.2**

Refer to **Appendix D** for detailed SWM calculations and to **Appendix F** for roof drain information. As indicated in the table above, the building roof will provide sufficient storage for both the 5-year and 100-year design events.

2.3.5.4 Area R-2 – Controlled Flow from Restaurant Roof

The post-development flow from sub-catchment R-2 will be attenuated using two (2) Watts adjustable 'Accutrol' control flow roof drains (model number RD-100-A-ADJ) prior to being directed to the proposed storm service.

Table 3.4 summarizes the post-development design flows from this sub-catchment area as well as the type of roof drains, the maximum anticipated ponding depths, storage volumes required and storage volumes provided for both the 5-year and the 100-year design events.

Table 3.4: Stormwater Flows and Roof Drains (Restaurant Roof)

Roof Drain ID & Drainage Area (ha)	Number of Roof Drains	Watts Roof Drain Model ID (Weir Opening)	Controlled Flow per Drain (L/s)		Approximate Ponding Depth Above Drains (m)		Storage Volume Required (m^3)		Max. Storage Available (m^3)
			1:5 Year	1:100 Year	1:5 Year	1:100 Year	1:5 Year	1:100 Year	
RD-1 (0.022 ha)	1	RD-100-A-ADJ (1/4 Exposed)	0.79	0.87	0.10	0.13	3.9	9.2	10.8
RD-2 (0.025 ha)	1	RD-100-A-ADJ (1/4 Exposed)	0.79	0.95	0.10	0.13	4.7	10.6	12.5
Total Roof (0.046 ha)	**2**	**-**	**1.6**	**1.8**	**-**	**-**	**8.7**	**19.7**	**23.4**

Refer to **Appendix D** for detailed SWM calculations and to **Appendix F** for roof drain information. As indicated in the table above, the building roof will provide sufficient storage for both the 5-year and 100-year design events.

2.3.5.5 Stormwater Flow Summary

Table 3.5 provides a summary of the total post-development flows from the site, and compares them to the pre-development uncontrolled flow rates and the site's allowable release rate.

Table 3.5: Stormwater Flows Comparison Table

Design Event	Pre-Development Conditions		Post-Development Conditions					
	Uncontrolled Flow (L/s)	Allowable Release Rate (L/s)	DR-1 to DR-3 Flow (L/s)	A-1 to A-6 Flow (L/s)	R-1 Flow (L/s)	R-2 Flow (L/s)	Total Flow (L/s)	Reduction in Flow (L/s or %)***
5-Yr	202.8	99.4	15.8	38.0	3.2	1.6	58.5****	144.3 or 71%
100-Yr	388.9	99.4	49.5	39.0	3.7	1.8	93.6****	295.3 or 76%

***Reduced flow compared to pre-development uncontrolled conditions

****Total flow is slightly less than the sum of flows due to differences in the time to peak. Refer to the modelling results in Appendix D.

As indicated in the table above, the 100-year post-development flows from the site will be less than the allowable release rate specified by the City of Ottawa. Furthermore, this represents significant reductions in total site flow rate when compared to the respective pre-development conditions.

2.3.6 Stormwater Quality Control

The subject site is located within the jurisdiction of the Rideau Valley Conservation Authority (RVCA) and is within the Stillwater Creek sub-watershed. An 'Enhanced' Level of Protection, equivalent to a long-term average removal of 80% Total Suspended Solids (TSS), with at least 90% of the total rainfall being captured and treated, is required.

To achieve this level of quality control protection, a new oil-grit separator unit (CDS Model PMSU 2020_5) will be installed downstream of STM MH 3 and STM MH 4. Stormwater runoff collected by the on-site storm sewer system (0.76 ha tributary area) will be directed through the proposed treatment unit. The contributing area includes the proposed paved parking areas, landscaped areas as well as the hotel roof.

As stated above, the proposed oil-grit separator has been sized to provide an 'Enhanced' Level of water quality treatment prior to discharging the stormwater into the municipal storm sewer, Stillwater Creek and ultimately into the Ottawa River. Echelon Environmental and Contech Stormwater Solutions Inc. have modeled and analyzed the tributary area to provide a CDS unit capable of meeting the TSS removal requirements. The model parameters for the TSS removal were based on historical rainfall data for Ottawa from the Ontario Climate Centre. It was determined that a CDS Model PMSU 2020_5 will exceed the target removal rate, providing a net annual 82.7% TSS removal. The CDS unit has a treatment capacity of approximately 31 L/s, a sediment storage capacity of 1.67m^3; an oil storage capacity of 376 L and will treat a net annual volume of approximately 97.8% for the tributary area.

The CB and CBMH structures will be equipped with sumps to promote additional settling of sediment. It is expected that the proposed treatment train approach will be used to provide the requisite level of water quality control.

<u>Maintenance and Monitoring of the Storm Sewer and Stormwater Management Systems</u>

It is recommended that the client implement a maintenance and monitoring program for both the on-site storm sewers and the stormwater management systems: The storm drainage system

should be inspected routinely (at least annually); the ICD should be inspected to ensure it is fitted securely and free of debris; and the oil-grit separator should be inspected at regular intervals and maintained when necessary to ensure optimal performance. Refer to **Appendix G** for the CDS unit design parameters, sizing analysis, operation, design, performance and maintenance summary parameters as well as the annual TSS removal efficiency data.

3.0 SITE GRADING

The elevation of the existing site varies from approximately 90.0m along the west property line down to approximately 88.0m at the northeast property corner. The existing site generally slopes in a north-easterly direction.

The finished floor elevation (FFE) of the proposed hotel will be set at an elevation of 90.05m, while the proposed restaurant will be set at an elevation of 89.85m. The building and general site elevations will work well with the grades along the property lines as well as the existing private entrances off Moodie Drive and Fitzgerald Road. The grades along the property lines will need to be maintained, where possible. The grade will change slightly, where the entrance is being closed off Fitzgerald Road. Refer to the enclosed Grading and Erosion & Sediment Control Plans for details.

3.1 Major System Overflow Route

In the case of a major rainfall event exceeding the design storms provided for, the stormwater located within the parking area will overflow towards the lower downstream sub-catchment areas and ultimately flow towards Moodie Drive and/or towards an existing DICB located northeast of the subject site. The hotel and restaurant building floor elevations have been set to be a minimum of 0.3m above the major system overflow points. The major system overflow route is shown on the enclosed Grading and Erosion & Sediment Control Plan.

4.0 GEOTECHNICAL INVESTIGATIONS

A Geotechnical Investigation Report and subsequent Geotechnical Memorandum have been prepared by Paterson Group for the proposed project. Refer to the Geotechnical Report[1] and to the Geotechnical Memorandum[2] for subsurface conditions, construction recommendations and geotechnical inspection requirements.

5.0 EROSION AND SEDIMENT CONTROL

To mitigate erosion and to prevent sediment from entering the storm sewer system, temporary erosion and sediment control measures will be implemented on-site during construction in accordance with the Best Management Practices for Erosion and Sediment Control. This includes the following temporary measures:

- Filter bags will be placed under the grates of nearby catchbasins, manholes and will remain in place until vegetation has been established and construction is completed.
- Silt fencing will be placed per OPSS 577 and OPSD 219.110 along the surrounding construction limits;
- Mud mats will be installed at the site entrances.
- Street sweeping and cleaning will be performed, as required, to suppress dust and to provide safe and clean roadways adjacent to the construction site.

- On-site dewatering is to be directed to a sediment trap and/or gravel splash pad and discharged safely to an approved outlet as directed by the engineer.

The temporary erosion and sediment control measures will be implemented prior to construction and will remain in place during all phases of construction. Regular inspection and maintenance of the erosion control measures will be undertaken.

In addition, the following measures will provide permanent erosion and sediment control on the proposed site:

- A CDS type Oil/Grit Separator will be installed to provide water quality control prior to releasing stormwater from sub-catchment areas A-1 to A-6 and R-1.

6.0 CONCLUSION

This report has been prepared in support of a site plan control application for the proposed development located at 300 Moodie Drive.

The conclusions are as follows:

- The proposed buildings will be serviced by the municipal watermain, sanitary and storm sewers in Moodie Drive.
- The hotel will be sprinklered and supplied with a fire department siamese connection. The siamese connection will be located within 45m of an existing municipal fire hydrant. The restaurant will not be sprinklered, however fire protection will be provided by a nearby municipal fire hydrant.
- A total of four (4) Watts adjustable Accutrol roof drains will control post-development flows from sub-catchment area R-1 (the proposed hotel roof).
- A total of two (2) Watts adjustable Accutrol roof drains will control post-development flows from sub-catchment area R-2 (the proposed restaurant roof).
- The runoff from sub-catchment areas A-1 through A-6 will be controlled by a 150 VHV-2 Hydrovex ICD installed within the outlet pipe STM MH 4.
- The total post-development site flow will be approximately 58.5 L/s during the 5-year design event and 93.6 L/s during the 100-year event, both less than the allowable release rate of 99.4 L/s. Post-development flows will be reduced by approximately 144.3 L/s (or 71%) during the 5-year event and by as much as 295.3 L/s (or 76%) during the 100-year design event when compared to current conditions.
- An oil / grit separator unit (CDS Model PMSU 2020_5) will provide an 'Enhanced' Level of water quality control for the portion of the site discharging to the 375mm dia. municipal storm sewer in Moodie Drive.
- Regular inspection and maintenance of the storm sewer system, including the ICD, CDS treatment unit and controlled flow roof drains is recommended to ensure that the storm drainage system is clean and operational.
- Erosion and sediment controls are to be provided both during construction and on a permanent basis.

It is recommended that the proposed site servicing and stormwater management design be approved for implementation.

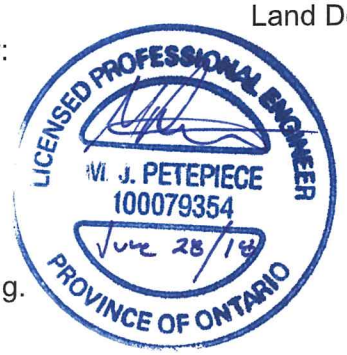
NOVATECH
Prepared by:

Stephen Matthews, B.A. (Env.)
Senior Design Technologist

Servicing Reviewed by:

François Thauvette, P. Eng.
Senior Project Manager
Land Development & Public-Sector Engineering

Stormwater Reviewed by:



Michael Petepiece, P. Eng.
Senior Project Manager
Water Resources

APPENDIX A

Correspondence

Steve Matthews

From: Shawn Hickey <shickey@sitecast.ca>
Sent: February-13-18 2:55 PM
To: Robert Woodman; Francois Thauvette; Jennifer Luong
Cc: Mark Doll; Lee Sheets; Shawn Hickey
Subject: Moodie Drive Hampton INN; SPA requirements, Earth bins, Pre-consultation meeting minutes with CITY
Attachments: Required List of Plans and Studies.pdf; 300 Moodie Pre-Consultation Meeting Minutes and Comments.pdf; Estimate_1117_from_EarthBin_Products.pdf

Good afternoon, some light data for reference and use.

Shawn Hickey, CCS., GSC., FTCA
President | SiteCast Construction 613-225-4650
shickey@sitecast.ca

From: Bonnie Chen
Sent: Tuesday, February 13, 2018 9:46 AM
To: Shawn Hickey <shickey@sitecast.ca>; Mark Doll <MDoll@sitecast.ca>
Subject: Moodie Hotel

Shawn/Mark

List of things I needed to send you for Moodie:

- Pre consultation minutes
- Site plan submission requirements
- EarthBin quote from Innovation (note we had a discount for inquiring back in 2016, and you will need to add in their "PM FEE" if you haven't installed them before. They essentially send someone to monitor the installation. The quote is also for 6 bins – 3 garbage, 3 recycle)

Let me know if I missed anything, thanks
Bonnie

Bonnie Chen
Development Project Coordinator | Colonnade BridgePort | www.colonnadebridgeport.ca
100 Argyle Avenue, Suite 100 | Ottawa | Ontario | K2P 1B6
P. 613.225.8118 x 380 | F. 613. 225.3898 | bchen@colonnade.ca

File Number: PC2017-0222

August 23, 2017

300 Moodie Drive Pre-Consultation Meeting Minutes

Date: Tuesday August 22, 2017, 2:30pm to 3:30pm

Location: Room 4103E City Hall

Attendance:

Stream Shen (Planner, City of Ottawa)
Elsa La Corte (Project Manager, City of Ottawa)
Rosanna Baggs (Transportation Project Manager, City of Ottawa)
Mark Young (Urban Designer, City of Ottawa)
Seana Turkington (Planning Student, City of Ottawa)
Kelly Rhodenizer (Colonnade Bridgeport)
Cal Kirkpatrick (Colonnade Bridgeport)
John Riddell (Novatech)

Comments from Applicant:

1. The applicant proposes a 6-storey hotel (Hampton Inn Suites, currently in negotiation) and a quick service restaurant (e.g. Tim Hortons, Starbucks) with a drive-thru on the site of 300 Moodie.
2. All zoning requirements will be met.
3. Access will be provided through an existing right-in right-out entrance from Moodie and a full movement entrance from Fitzgerald.
4. Existing contamination within the soil and ground water.
5. The applicant is applying for Brownfield and Bell's Corner CIP grant from the City.
6. The proposal will include some on-site stormwater storage and quality control. Existing services are available on Moodie Drive and Fitzgerald Road.

Comments from City Staff:

Planning

7. The project will be subject to a Site Plan Control application, manager approval, with public consultation. Form and fee can be found: http://ottawa.ca/en/city-hall/planning-

and-development/how-develop-property/development-application-review-process-2-1#site-plan-control

8. Please review and conform to the basic plans and studies requirements outlined here: http://ottawa.ca/en/city-hall/planning-and-development/how-develop-property/development-application-review-process-2-3
9. The site is located within 300m from the active CN rail freight line Beachburg Subdivision and adjacent to the Carleton Place Rail Corridor (currently used as Trans Canada Trails), which is to be treated as a future rail line.
10. A 30m buffer is required from building wall to the property line abutting Carleton Place Rail Corridor. Parking and Drive-thru can be located within the setback.
11. Consider locating the hotel building at the corner of Moodie and Fitzgerald with the CRU unit along Moodie.
12. Please ensure that the drive-thru does not wrap around the building as per the Drive-thru design guideline.
13. Please ensure that there is appropriate treatment at grade for the hotel use and a corner treatment with landscaping. Consider a possible direct backdoor pedestrian connection from the intersection to the hotel.
14. Please provide pedestrian connection on-site and consider a pedestrian connection to the adjacent trail. If one is not provided, please provide some rationale within the TIA.
15. Please ensure that a 3m landscaping buffer is provided around the parking lot.
16. A 24m ROW protection is required for Fitzgerald with possible ROW dedication.
17. A noise and vibration study is required for the hotel as it relates to the Arterial Road Moodie, and the two railway corridors. The Carleton Place Rail Corridor is to be treated as active rail for the purpose of the study.
18. Please show the lane configuration for both roads, and clearly indicate clear throat length, corner radii, truck turning template and loading.
19. Please provide the required amount of bike storage on-site, preferably within the hotel building.
20. Please provide a tree conservation report and consider retention of existing trees.
21. Please provide a brief description of all easements on-site.
22. Staff encourages the applicant to share the updated design for preliminary comments upon completion.
23. Please consult with Ward Councillor once the design is finalized.
24. The pre-consultation meeting comments and list of required plans and studies will lapse on August 22, 2018.

25. Staff reserves the right for further comment upon application submission.

Please contact me at stream.shen@ottawa.ca or at 613-580-2424 ext. 24488 if you have any questions.

Sincerely,

Stream Shen MCIP RPP
Planner II
Development Review - West

APPLICANT'S STUDY AND PLAN IDENTIFICATION LIST

Legend: **S** indicates that the study or plan is required with application submission.
A indicates that the study or plan may be required to satisfy a condition of approval/draft approval.

For information and guidance on preparing required studies and plans refer to:

http://ottawa.ca/en/development-application-review-process-0/guide-preparing-studies-and-plans

S/A	Number of copies	ENGINEERING		S/A	Number of copies
S	16	1. Site Servicing Plan	2. Assessment of Adequacy of Public Services / Site Servicing Study / Brief		6
S	16	3. Grade Control and Drainage Plan	4. Geotechnical Study / Slope Stability Study	S	7
	2	5. Composite Utility Plan	6. Groundwater Impact Study		6
	5	7. Servicing Options Report	8. Wellhead Protection Study		6
S	9	9. Community Transportation Study and / or Transportation Impact Study / Brief	10.Erosion and Sediment Control Plan / Brief		6
S	8	11.Storm water Management Report / Brief	12.Hydro geological and Terrain Analysis		8
S	7	13.Hydraulic Water main Analysis	14.Noise / Vibration Study	S	3
	35/50/55	15.Roadway Modification Design Plan	16.Confederation Line Proximity Study		9

S/A	Number of copies	PLANNING / DESIGN / SURVEY		S/A	Number of copies
	50	17.Draft Plan of Subdivision	18.Plan Showing Layout of Parking Garage		2
	30	19.Draft Plan of Condominium	20.Planning Rationale	S	3
S	16	21.Site Plan	22.Minimum Distance Separation (MDS)		3
	20	23.Concept Plan Showing Proposed Land Uses and Landscaping	24.Agrology and Soil Capability Study		5
	3	25.Concept Plan Showing Ultimate Use of Land	26.Cultural Heritage Impact Statement		3
S	16	27.Landscape Plan	28.Archaeological Resource Assessment Requirements: **S** (site plan) **A** (subdivision, condo)		3
S	2	29.Survey Plan	30.Shadow Analysis		3
S	3	31.Architectural Building Elevation Drawings (dimensioned)	32.Design Brief (includes the Design Review Panel Submission Requirements)		Available online
	6	33.Wind Analysis			

S/A	Number of copies	ENVIRONMENTAL		S/A	Number of copies
S	3	34.Phase 1 Environmental Site Assessment	35.Impact Assessment of Adjacent Waste Disposal/Former Landfill Site		6
S	3	36.Phase 2 Environmental Site Assessment (depends on the outcome of Phase 1)	37.Assessment of Landform Features		7
S	3	38.Record of Site Condition	39.Mineral Resource Impact Assessment		4
S	3	40.Tree Conservation Report	41.Environmental Impact Statement / Impact Assessment of Endangered Species		11
	4	42.Mine Hazard Study / Abandoned Pit or Quarry Study	43.Integrated Environmental Review (Draft, as part of Planning Rationale)		3

S/A	Number of copies	ADDITIONAL REQUIREMENTS		S/A	Number of copies
		44.	45.		

Meeting Date: 2017-Aug-22

Application Type: *Site Plan Control*

File Lead (Assigned Planner): Stream Shen

Infrastructure Approvals Project Manager: Elsa La Corte

Site Address (Municipal Address): 300 Moodie

*Preliminary Assessment: 1☒ 2☐ 3☐ 4☐ 5☐

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

It is important to note that the need for additional studies and plans may result during application review. If following the submission of your application, it is determined that material that is not identified in this checklist is required to achieve complete application status, in accordance with the Planning Act and Official Plan requirements, the Planning, Infrastructure and Economic Development Department *will notify you of outstanding material required within the required 30 day period. Mandatory pre-application consultation will not shorten the City's standard processing timelines, or guarantee that an application will be approved. It is intended to help educate and inform the applicant about submission requirements as well as municipal processes, policies, and key issues in advance of submitting a formal*

Francois Thauvette

From: Schaeffer, Gabrielle <gabrielle.schaeffer@Ottawa.ca>
Sent: Wednesday, March 21, 2018 10:51 AM
To: Steve Matthews
Cc: Shen, Stream; Francois Thauvette; Lee Sheets
Subject: RE: 300 Moodie Redevelopment - SWM water quantity control criteria

Hi Francois,

I received your voicemail. Yes, a 10 minute time of concentration for both pre and post development is acceptable.

Regards,
Gabrielle

From: Schaeffer, Gabrielle
Sent: Tuesday, March 13, 2018 9:34 AM
To: 'Steve Matthews' <S.Matthews@novatech-eng.com>
Cc: Shen, Stream <Stream.Shen@ottawa.ca>; Francois Thauvette <f.thauvette@novatech-eng.com>; Lee Sheets <l.sheets@novatech-eng.com>
Subject: RE: 300 Moodie Redevelopment - SWM water quantity control criteria

Hi Steve,

Yes, the SWM control requirement is the 2 year event in this area based on a Dual Drainage study that was completed in 2016 by Parsons. They determined that the pipe's level of service on both the Fitzgerald and Moodie storm sewers fronting this site is less than the 2 year storm event.

Regards,
Gabrielle

From: Steve Matthews [mailto:S.Matthews@novatech-eng.com]
Sent: Monday, March 12, 2018 3:57 PM
To: Schaeffer, Gabrielle <gabrielle.schaeffer@Ottawa.ca>
Cc: Shen, Stream <Stream.Shen@ottawa.ca>; Francois Thauvette <f.thauvette@novatech-eng.com>; Lee Sheets <l.sheets@novatech-eng.com>
Subject: RE: 300 Moodie Redevelopment - SWM water quantity control criteria

Hi Gabrielle,

Thank you for the information that you provided on the development of the 300 Moodie Drive property.

Can you please confirm that the allowable is to be based on the **2-year** event and provide some background as to why this governs over the typical 5-year control event in the City of Ottawa? Was there a specific study that suggests limiting the level of service in this area to the 2-year event?

Thank you again for clarifying this for us as it would mean significantly more on-site storage required than we were anticipating and the existing municipal sewers are very shallow.

Regards,
Steve

Stephen Matthews, B.A.(Env), Senior Design Technologist
NOVATECH Engineers, Planners & Landscape Architects
240 Michael Cowpland Drive, Suite 200, Ottawa, ON, K2M 1P6 | Tel: 613.254.9643 x 223 | Fax: 613.254.5867

From: Schaeffer, Gabrielle [mailto:gabrielle.schaeffer@Ottawa.ca]
Sent: March-12-18 12:48 PM
To: Francois Thauvette <f.thauvette@novatech-eng.com>
Cc: Steve Matthews <S.Matthews@novatech-eng.com>; Shen, Stream <Stream.Shen@ottawa.ca>
Subject: RE: 300 Moodie Redevelopment - SWM water quantity control criteria

Hi Francois,

I reviewed the pre-consultation notes and List of Studies/Plans required. In addition to the studies indicated, a Site Servicing Study will also need to be provided.

To answer your question below:

SWM Criteria for 300 Moodie Drive.

- The allowable release rate is to be calculated using:
  - the 2-yr storm event using the IDF information derived from the Meteorological Services of Canada rainfall data, taken from the MacDonald Cartier Airport, collected 1966 to 1997,
  - the pre-development runoff coefficient or a maximum equivalent 'C' of 0.5, whichever is less (§ 8.3.7.3), and
  - a calculated time of concentration (Cannot be less than 10 minutes).
- Flows to the storm sewer in excess of the 2-year pre-development storm release rate, up to and including the 100-year storm event, must be detained on site.
- No surface ponding is permitted during the 2 year storm event on parking lots and drive aisles.
- The emergency overflow spill elevation must be 30cm below the lowest building opening.
- The plan view drawing must show the maximum ponding elevation based on the emergency spill contour line.
- SWM calculations using the modified rational method is acceptable, however, if a combination of surface ponding and underground storage is used, the consultant is reminded to either: (a) use a dynamic computer model or (b) use the modified rational method assuming an average release rate of 50% of the area-specific peak flow rate where above and below ground storage is provided.

If you have any questions, please feel free to contact me.

Regards,
Gabrielle Schaeffer, P.Eng
Project Manager - Infrastructure Approvals

City of Ottawa
Development Review - West Branch
Planning, Infrastructure and Economic Development Department

110 Laurier Ave., 4th Floor East;
Ottawa ON K1P 1J1
Mail Code 01-14
Tel: 613-580-2424 x 22517
Fax: 613-560-6006

From: Francois Thauvette [mailto:f.thauvette@novatech-eng.com]
Sent: Thursday, March 08, 2018 2:03 PM
To: Schaeffer, Gabrielle <gabrielle.schaeffer@Ottawa.ca>
Cc: Steve Matthews <S.Matthews@novatech-eng.com>
Subject: RE: 300 Moodie Redevelopment - SWM water quantity control criteria

Hi Gabrielle,

Have you had a chance to look into the SWM criteria for the site? Please advise.

Regards,

François Thauvette, P. Eng., Senior Project Manager | Land Development & Public Sector Engineering
NOVATECH Engineers, Planners & Landscape Architects
240 Michael Cowpland Drive, Suite 200, Ottawa, ON, K2M 1P6 | Tel: 613.254.9643 Ext: 219 | Cell: 613.276.0310 | Fax: 613.254.5867

From: Francois Thauvette
Sent: Monday, March 5, 2018 3:45 PM
To: 'gabrielle.schaeffer@ottawa.ca' <gabrielle.schaeffer@ottawa.ca>
Cc: Steve Matthews <S.Matthews@novatech-eng.com>
Subject: 300 Moodie Redevelopment - SWM water quantity control criteria

Hi Gabrielle,

As discussed, we are sending this e-mail requesting the SWM water quantity control criteria for the proposed site. We have already contacted the RVCA to obtain the water quality control criteria, which is an 'Enhanced' Level of protection (i.e. 80% TSS removal).

Regards,

François Thauvette, P. Eng., Senior Project Manager | Land Development & Public Sector Engineering
NOVATECH Engineers, Planners & Landscape Architects
240 Michael Cowpland Drive, Suite 200, Ottawa, ON, K2M 1P6 | Tel: 613.254.9643 Ext: 219 | Cell: 613.276.0310 | Fax: 613.254.5867

'

'

Steve Matthews

From: Jamie Batchelor <jamie.batchelor@rvca.ca>
Sent: February-28-18 8:50 AM
To: Francois Thauvette
Cc: Eric Lalande
Subject: RE: 300 Moodie Drive - Request for SWM Water Quality Control Requirements

Good Morning Francois,

The site outlets to an existing storm sewer that is less than 700 metres upstream of a direct outlet to Stillwater Creek. No municipal facility provides quality treatment for the stormwater entering the watercourse, which under current standards requires 80% TSS removal. Therefore the RVCA advises that on-site water quality treatment must be provided in the stormwater management plan to mitigate the impacts on surface water quality and aquatic habitat in Stillwater Creek.

If you have any questions do not hesitate to contact me.

Jamie Batchelor, MCIP, RPP
Planner
Rideau Valley Conservation Authority
3889 Rideau Valley Drive
613-692-3571 ext 1191
jamie.batchelor@rvca.ca

From: Francois Thauvette [mailto:f.thauvette@novatech-eng.com]
Sent: Tuesday, February 27, 2018 1:40 PM
To: Jamie Batchelor <jamie.batchelor@rvca.ca>
Cc: Eric Lalande <eric.lalande@rvca.ca>
Subject: 300 Moodie Drive - Request for SWM Water Quality Control Requirements

Hi Jamie,

Since Eric is out of the office this week, I am sending you this e-mail requesting SWM water quality control requirements for a proposed development located at 300 Moodie Drive, in the City of Ottawa. The proposed development will include a hotel and a restaurant as well as associated parking lots. The subject site appears to be located in the Still Water Creek sub-watershed. Please provide the water quality control criteria required for the on-site SWM design.

Regards,

François Thauvette, P. Eng., Senior Project Manager | Land Development & Public Sector Engineering
NOVATECH Engineers, Planners & Landscape Architects
240 Michael Cowpland Drive, Suite 200, Ottawa, ON, K2M 1P6 | Tel: 613.254.9643 Ext: 219 | Cell: 613.276.0310 | Fax: 613.254.5867

Francois Thauvette

From: MOECCOttawaSewage (MOECC) <MOECCOttawaSewage@ontario.ca>
Sent: Monday, April 9, 2018 11:03 AM
To: Francois Thauvette
Cc: Steve Matthews; Diamond, Emily (MOECC)
Subject: RE: 300 Moodie Drive - MOECC Pre-Consultation Request
Attachments: 300 Moodie -MOECC Pre-Submission Consultation Request Form.pdf

Good morning,

The MOECC Ottawa District Office has received your pre-submission consultation request. Emily Diamond, Senior Environmental Officer, assigned to your file will contact you.

Thank you,

Jéhanne Hurlbut
District Administrative Assistant (Bilingual)
Ontario Ministry of the Environment and Climate Change
Ottawa District Office
103-2430 Don Reid Drive
Ottawa, ON K1H 1E1
Ph: (613) 521-3450 X 221

From: Francois Thauvette [mailto:f.thauvette@novatech-eng.com]
Sent: Tuesday, April 3, 2018 10:05 AM
To: MOECCOttawaSewage (MOECC) <MOECCOttawaSewage@ontario.ca>
Cc: Steve Matthews <S.Matthews@novatech-eng.com>
Subject: 300 Moodie Drive - MOECC Pre-Consultation Request

Hi,

Please see attached **Pre-Submission Consultation Request Form** for the proposed development located at 300 Moodie Drive in the City of Ottawa.

Regards,

François Thauvette, P. Eng., Senior Project Manager | Land Development & Public Sector Engineering
NOVATECH Engineers, Planners & Landscape Architects
240 Michael Cowpland Drive, Suite 200, Ottawa, ON, K2M 1P6 | Tel: 613.254.9643 Ext: 219 | Cell: 613.276.0310 | Fax: 613.254.5867

APPENDIX B

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.

☑ 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

☑ Identification of system constraints

☑ Identify boundary conditions

☑ Confirmation of adequate domestic supply and pressure

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

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

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

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

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

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

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

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

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

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

4.3 Development Servicing Report: Wastewater

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

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

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

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

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

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.

N/A ☐ Description of proposed sewer network including sewers, pumping stations, and forcemains.

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

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

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

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

☑ Special considerations such as contamination, corrosive environment etc.

4.4 Development Servicing Report: Stormwater Checklist

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

☑ Analysis of available capacity in existing public infrastructure.

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

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

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

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

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

N/A ☐ Watercourse and hazard lands setbacks.

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

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

- [x] 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.
- [x] 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.
- [x] 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.
- [x] Descriptions of how the conveyance and storage capacity will be achieved for the development.
- [x] 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.
- [x] 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:

NOTED ☐ 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.

NOTED ☐ 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

TBD ☐ 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 C

Water Demands, Boundary Conditions, Schematic of the Hydraulic Model, Hydraulic Modelling Results and FUS Calculations

Steve Matthews

From: Schaeffer, Gabrielle <gabrielle.schaeffer@Ottawa.ca>
Sent: April-11-18 11:51 AM
To: Steve Matthews
Cc: Francois Thauvette
Subject: RE: 300 Moodie Drive - Municipal WM Boundary Condition Request
Attachments: 300 Moodie April 2018.pdf

Hello,

The following are boundary conditions, HGL, for hydraulic analysis at 300 Moodie (zone 2W) assumed to be connected to the 305mm on Moodie (see attached PDF for location).
Minimum HGL = 127.6m
Maximum HGL = 132.7m
Max Day + Fire Flow (167 L/s) = 126.9m

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

Regards,
Gabrielle

From: Steve Matthews <S.Matthews@novatech-eng.com>
Sent: Wednesday, April 11, 2018 11:42 AM
To: Schaeffer, Gabrielle <gabrielle.schaeffer@Ottawa.ca>
Cc: Francois Thauvette <f.thauvette@novatech-eng.com>
Subject: RE: 300 Moodie Drive - Municipal WM Boundary Condition Request

Thanks for getting back to us Gabrielle.
Have a great day,
Steve

Stephen Matthews, B.A.(Env), Senior Design Technologist
NOVATECH Engineers, Planners & Landscape Architects
240 Michael Cowpland Drive, Suite 200, Ottawa, ON, K2M 1P6 | Tel: 613.254.9643 x 223 | Fax: 613.254.5867

From: Schaeffer, Gabrielle [mailto:gabrielle.schaeffer@Ottawa.ca]
Sent: April-11-18 11:36 AM
To: Steve Matthews <S.Matthews@novatech-eng.com>
Cc: Francois Thauvette <f.thauvette@novatech-eng.com>
Subject: RE: 300 Moodie Drive - Municipal WM Boundary Condition Request

Hi Steve/Francois,

I am waiting on the water team to get back to me. I received a call this morning about it so I expect to receive an email from them soon.

Gabrielle

From: Steve Matthews <S.Matthews@novatech-eng.com>
Sent: Wednesday, April 11, 2018 11:23 AM
To: Schaeffer, Gabrielle <gabrielle.schaeffer@Ottawa.ca>
Cc: Francois Thauvette <f.thauvette@novatech-eng.com>
Subject: RE: 300 Moodie Drive - Municipal WM Boundary Condition Request

Hi Gabrielle,

We would like to follow-up again to see if we can receive the watermain boundary conditions for the 300 Moodie Drive site. We are tying to finalize the analysis for submission of the site plan documents and require the boundary conditions to proceed.

Can you please confirm if the details provided in the email chain below were forwarded to the City's Water Division and who it is with, so that we can follow-up with them on timing to receive the information?

Thank you,
Steve

Stephen Matthews, B.A.(Env), Senior Design Technologist
NOVATECH Engineers, Planners & Landscape Architects
240 Michael Cowpland Drive, Suite 200, Ottawa, ON, K2M 1P6 | Tel: 613.254.9643 x 223 | Fax: 613.254.5867

From: Francois Thauvette
Sent: April-06-18 10:59 AM
To: 'gabrielle.schaeffer@ottawa.ca' <gabrielle.schaeffer@ottawa.ca>
Cc: Steve Matthews <S.Matthews@novatech-eng.com>
Subject: RE: 300 Moodie Drive - Municipal WM Boundary Condition Request

Hi Gabrielle,

I am following up to see if the 300 Moodie Drive water demands have been sent off to the City's Water Division? We require the watermain boundary conditions as soon as possible to complete our design, which includes a hydraulic network analysis (required as part of the SPA submission).

Regards,

François Thauvette, P. Eng., Senior Project Manager | Land Development & Public Sector Engineering
NOVATECH Engineers, Planners & Landscape Architects
240 Michael Cowpland Drive, Suite 200, Ottawa, ON, K2M 1P6 | Tel: 613.254.9643 Ext: 219 | Cell: 613.276.0310 | Fax: 613.254.5867

From: Francois Thauvette
Sent: Monday, April 2, 2018 4:22 PM
To: 'gabrielle.schaeffer@ottawa.ca' <gabrielle.schaeffer@ottawa.ca>

Cc: Steve Matthews <S.Matthews@novatech-eng.com>
Subject: 300 Moodie Drive - Municipal WM Boundary Condition Request

Hi Gabrielle,

I am sending this e-mail to request the municipal WM boundary conditions for the existing 300mm dia. watermain running along the west side of Moodie Drive. Based on preliminary calculations, using the City of Ottawa and MOE design guidelines for drinking water systems, the water demands for the proposed site (hotel and restaurant) are as follows:

Hotel:
- Average Day Demand = 0.75 L/s
- Max Day Demand = 2.62 L/s (Avg. Demand x 3.5, per MOE Table 3.3)
- Peak Hour Demand = 3.90 L/s (Avg. Demand x 5.2, per MOE Table 3.3)
- Fire Flow = 167 L/s (based on FUS calculations for a sprinklered building with non-combustible construction)

Restaurant:
- Average Day Demand = 0.51 L/s
- Max Day Demand = 1.78 L/s (Avg. Demand x 3.5, per MOE Table 3.3)
- Peak Hour Demand = 2.65 L/s (Avg. Demand x 5.2, per MOE Table 3.3)
- Fire Flow = 83 L/s (based on FUS calculations for a sprinklered building with non-combustible construction)

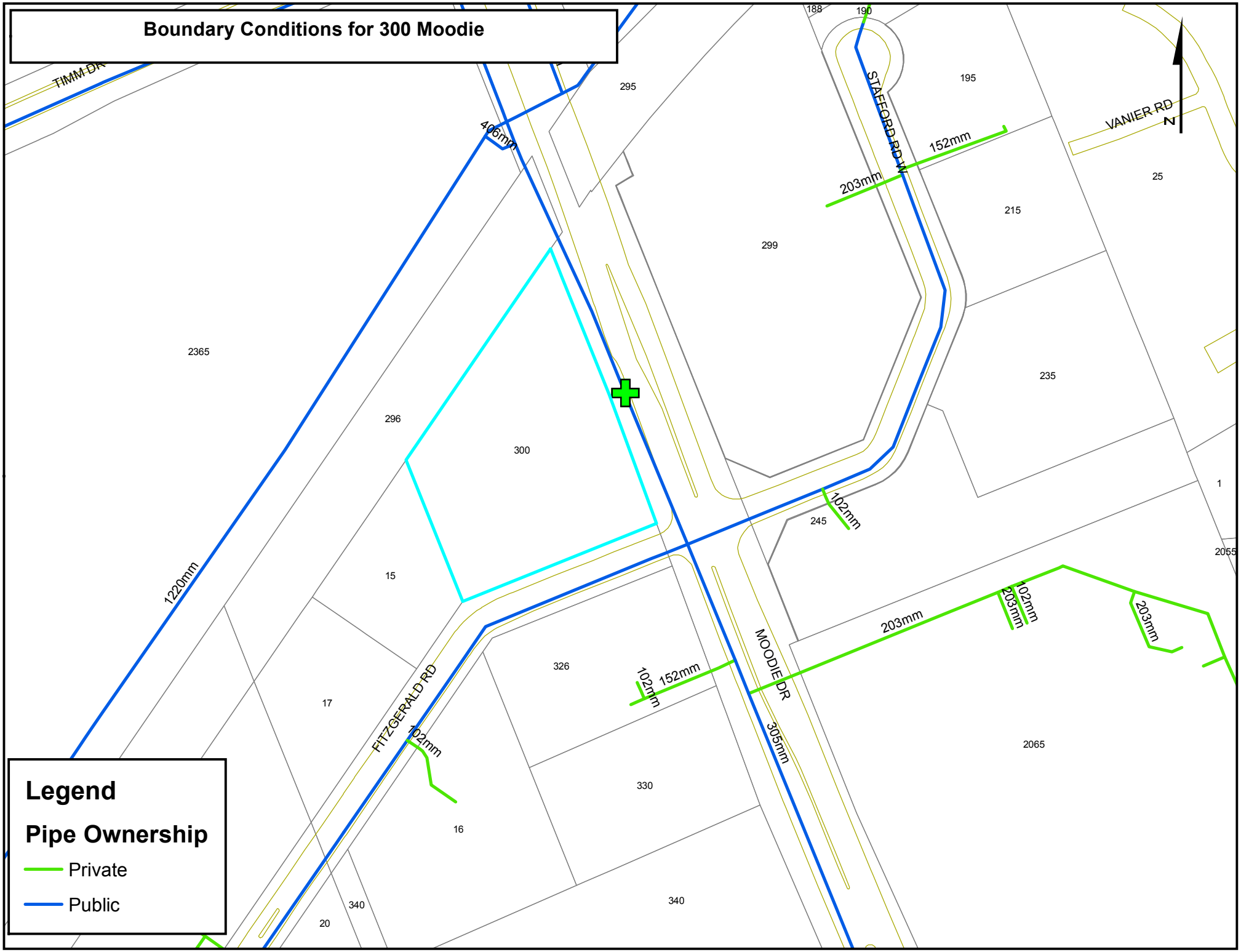
Site (Hotel & Restaurant):
- Average Day Demand = 1.26 L/s
- Max Day Demand = 4.40 L/s (Avg. Demand x 3.5, per MOE Table 3.3)
- Peak Hour Demand = 6.55 L/s (Avg. Demand x 13.7, per MOE Table 3.3)

Refer to the attached sketch and to the FUS calculations sheets for details. Please note that the hotel and restaurant will be serviced from 2 separate municipal hydrants.

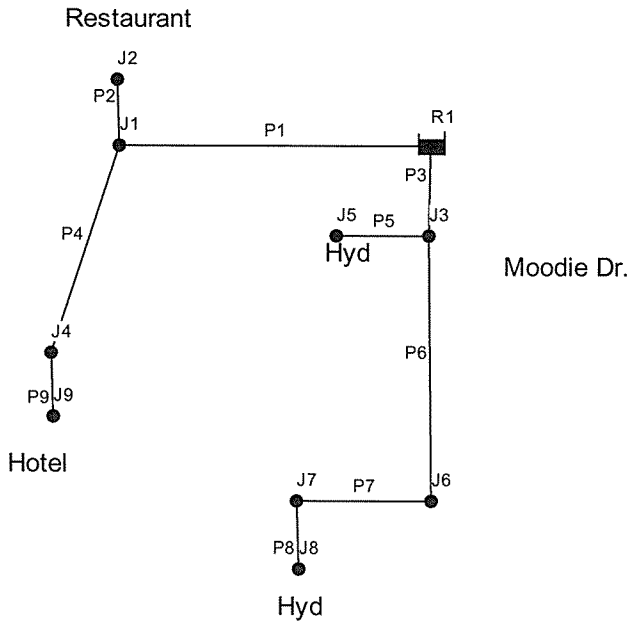
Please review and provide municipal watermain boundary conditions.

Regards,

François Thauvette, P. Eng., Senior Project Manager | Land Development & Public Sector Engineering
NOVATECH Engineers, Planners & Landscape Architects
240 Michael Cowpland Drive, Suite 200, Ottawa, ON, K2M 1P6 | Tel: 613.254.9643 Ext: 219 | Cell: 613.276.0310 | Fax: 613.254.5867


Boundary Conditions for 300 Moodie
TIMM DR
406mm
295
188
190
195
STAFFORD RD W
152mm
203mm
VANIER RD
N
25
215
299
2365
235
296
300
1
245
102mm
2055
15
1220mm
203mm
102mm
203mm
203mm
MOODIE DR
326
102mm
152mm
17
FITZGERALD RD
102mm
305mm
2065
330
16
340
340
20
Legend
Pipe Ownership
Private
Public

300 Moodie Drive



300 Moodie Drive

Max Day + Fire Flow Demand (from hydrant)
Network Table - Nodes

Node ID	Elevation m	Demand L/s	Head m	Pressure m	Pressure kPa	Pressure psi
Junc J1	87	0	126.9	39.9	391.42	56.77
Junc J2	89.85	1.78	126.64	36.79	360.91	52.35
Junc J4	87	0	126.89	39.89	391.32	56.76
Junc J3	86.5	0	126.64	40.14	393.77	57.11
Junc J5	90.4	0	126.64	36.24	355.51	51.56
Junc J6	86.5	0	125.48	38.98	382.39	55.46
Junc J7	86.5	0	125.2	38.7	379.65	55.06
Junc J8	90.5	167	121.01	30.51	299.30	43.41
Junc J9	90.05	2.62	126.89	36.84	361.40	52.42
Resvr R1	126.9	-171.4	126.9	0	0.00	0.00

Max Day + Fire Flow Demand (from hydrant)
Network Table - Links

Link ID	Length m	Diameter mm	Roughness	Flow L/s	Velocity m/s	Unit Headloss m/km
Pipe P1	16.2	200	110	4.4	0.14	0.19
Pipe P2	7	50	100	1.78	0.91	37.08
Pipe P4	28.4	200	110	2.62	0.08	0.07
Pipe P3	13.3	300	120	167	2.36	19.27
Pipe P5	5.2	150	100	0	0	0
Pipe P6	60.5	300	120	-167	2.36	19.27
Pipe P7	14.6	300	120	167	2.36	19.27
Pipe P8	5.3	150	100	167	9.45	790.24
Pipe P9	10	150	100	2.62	0.15	0.36

300 Moodie Drive

Max Day + Fire Flow Demand (1/2 from hydrant & 1/2 at hotel)
Network Table - Nodes

Node ID	Elevation m	Demand L/s	Head m	Pressure m	Pressure kPa	Pressure psi
Junc J1	87	0	126.1	39.1	383.57	55.63
Junc J2	89.85	1.78	125.84	35.99	353.06	51.21
Junc J4	87	0	124.76	37.76	370.43	53.73
Junc J3	86.5	0	126.83	40.33	395.64	57.38
Junc J5	90.4	0	126.83	36.43	357.38	51.83
Junc J6	86.5	0	126.5	40	392.40	56.91
Junc J7	86.5	0	126.42	39.92	391.62	56.80
Junc J8	90.5	84	125.25	34.75	340.90	49.44
Junc J9	90.05	85.6	122.47	32.42	318.04	46.13
Resvr R1	126.9	-171.38	126.9	0	0.00	0.00

Max Day + Fire Flow Demand (1/2 from hydrant & 1/2 at hotel)
Network Table - Links

Link ID	Length m	Diameter mm	Roughness	Flow L/s	Velocity m/s	Unit Headloss m/km
Pipe P1	16.2	200	110	87.38	2.78	49.15
Pipe P2	7	50	100	1.78	0.91	37.08
Pipe P4	28.4	200	110	85.6	2.72	47.31
Pipe P3	13.3	300	120	84	1.19	5.4
Pipe P5	5.2	150	100	0	0	0
Pipe P6	60.5	300	120	-84	1.19	5.4
Pipe P7	14.6	300	120	84	1.19	5.4
Pipe P8	5.3	150	100	84	4.75	221.34
Pipe P9	10	150	100	85.6	4.84	229.21

300 Moodie Drive

Peak Hour Demand
Network Table - Nodes

Node ID	Elevation m	Demand L/s	Head m	Pressure m	Pressure kPa	Pressure psi
Junc J1	87	0	127.59	40.59	398.19	57.75
Junc J2	89.85	2.65	127.05	37.2	364.93	52.93
Junc J4	87	0	127.59	40.59	398.19	57.75
Junc J3	86.5	0	127.6	41.1	403.19	58.48
Junc J5	90.4	0	127.6	37.2	364.93	52.93
Junc J6	86.5	0	127.6	41.1	403.19	58.48
Junc J7	86.5	0	127.6	41.1	403.19	58.48
Junc J8	90.5	0	127.6	37.1	363.95	52.79
Junc J9	90.05	3.9	127.58	37.53	368.17	53.40
Resvr R1	127.6	-6.55	127.6	0	0.00	0.00

Peak Hour Demand
Network Table - Links

Link ID	Length m	Diameter mm	Roughness	Flow L/s	Velocity m/s	Unit Headloss m/km
Pipe P1	16.2	200	110	6.55	0.21	0.41
Pipe P2	7	50	100	2.65	1.35	77.48
Pipe P4	28.4	200	110	3.9	0.12	0.15
Pipe P3	13.3	300	120	0	0	0
Pipe P5	5.2	150	100	0	0	0
Pipe P6	60.5	300	120	0	0	0
Pipe P7	14.6	300	120	0	0	0
Pipe P8	5.3	150	100	0	0	0
Pipe P9	10	150	100	3.9	0.22	0.75

FUS - Fire Flow Calculations

As per 1999 Fire Underwriter's Survey Guidelines

NOVATECH
Engineers, Planners & Landscape Architects

Novatech Project #: 118007
Project Name: 300-320 Moodie Drive
Date: 02/04/2018
Input By: S.Matthews
Reviewed By: F.Thauvette

Legend: Input by User; No Information or Input Required

Building Description: 6 Storey Hotel
Non-combustible construction

Step			Input	Multiplier Options	Value Used	Total Fire Flow (L/min)
Base Fire Flow						
1	**Construction Material**					
	Coefficient related to type of construction **C**	Wood frame		1.5	0.8	
		Ordinary construction		1		
		Non-combustible construction	Yes	0.8		
		Fire resistive construction (< 3 hrs)		0.7		
		Fire resistive construction (> 3 hrs)		0.6		
2	**Floor Area**					
	A	Building Footprint (m^2)	1232			
		Number of Floors/Storeys	6			
		Area of structure considered (m^2)			**7,392**	
	F	**Base fire flow without reductions**				**15,000**
		F = 220 **C** (**A**)$^{0.5}$				
Reductions or Surcharges						
3	**Occupancy hazard reduction or surcharge**					
	(1)	Non-combustible		-25%	-15%	**12,750**
		Limited combustible	Yes	-15%		
		Combustible		0%		
		Free burning		15%		
		Rapid burning		25%		
4	**Sprinkler Reduction**					
	(2)	Adequately Designed System (NFPA 13)	Yes	-30%	-30%	**-5,100**
		Standard Water Supply	Yes	-10%	-10%	
		Fully Supervised System		-10%		
				Cumulative Total	**-40%**	
5	**Exposure Surcharge (cumulative %)**					
	(3)	North Side	30.1- 45 m		5%	**1,913**
		East Side	> 45.1m		0%	
		South Side	> 45.1m		0%	
		West Side	20.1 - 30 m		10%	
				Cumulative Total	**15%**	
Results						
6	**(1) + (2) + (3)**	**Total Required Fire Flow, rounded to nearest 1000L/min**			**L/min**	**10,000**
		(2,000 L/min < Fire Flow < 45,000 L/min)		or	L/s	**167**
				or	USGPM	2,642
7	**Storage Volume**	Required Duration of Fire Flow (hours)			Hours	2
		Required Volume of Fire Flow (m^3)			m^3	1200

FUS - Fire Flow Calculations

As per 1999 Fire Underwriter's Survey Guidelines

NOVATECH
Engineers, Planners & Landscape Architects

Novatech Project #: 118007
Project Name: 300-320 Moodie Drive
Date: 02/04/2018
Input By: S.Matthews
Reviewed By: F.Thauvette

Legend: Input by User; No Information or Input Required

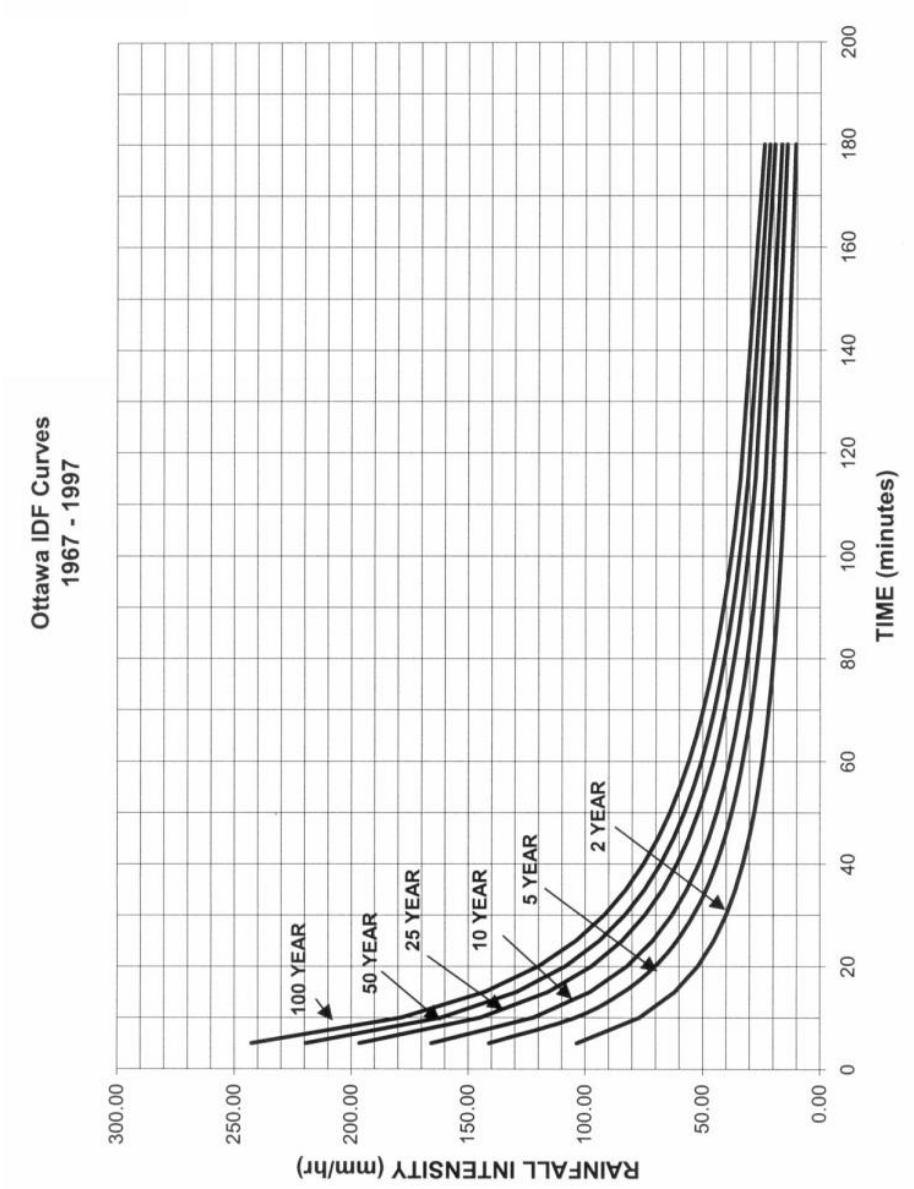
Building Description: 1 Storey Restaurant
Ordinary construction

Step			Input	Multiplier Options	Value Used	Total Fire Flow (L/min)
Base Fire Flow						
1	**Construction Material**					
	Coefficient related to type of construction C	Wood frame		1.5	1	
		Ordinary construction	Yes	1		
		Non-combustible construction		0.8		
		Fire resistive construction (< 3 hrs)		0.7		
		Fire resistive construction (> 3 hrs)		0.6		
2	**Floor Area**					
	A	Building Footprint (m^2)	465			
		Number of Floors/Storeys	1			
		Area of structure considered (m^2)			**465**	
	F	**Base fire flow without reductions**				**5,000**
		F = 220 C (A)$^{0.5}$				
Reductions or Surcharges						
3	**Occupancy hazard reduction or surcharge**					
	(1)	Non-combustible		-25%	0%	**5,000**
		Limited combustible		-15%		
		Combustible	Yes	0%		
		Free burning		15%		
		Rapid burning		25%		
4	**Sprinkler Reduction**					
	(2)	Adequately Designed System (NFPA 13)	No	-30%		**0**
		Standard Water Supply	No	-10%		
		Fully Supervised System		-10%		
				Cumulative Total	**0%**	
5	**Exposure Surcharge (cumulative %)**					
	(3)	North Side	> 45.1m		0%	**250**
		East Side	> 45.1m		0%	
		South Side	30.1- 45 m		5%	
		West Side	> 45.1m		0%	
				Cumulative Total	**5%**	
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

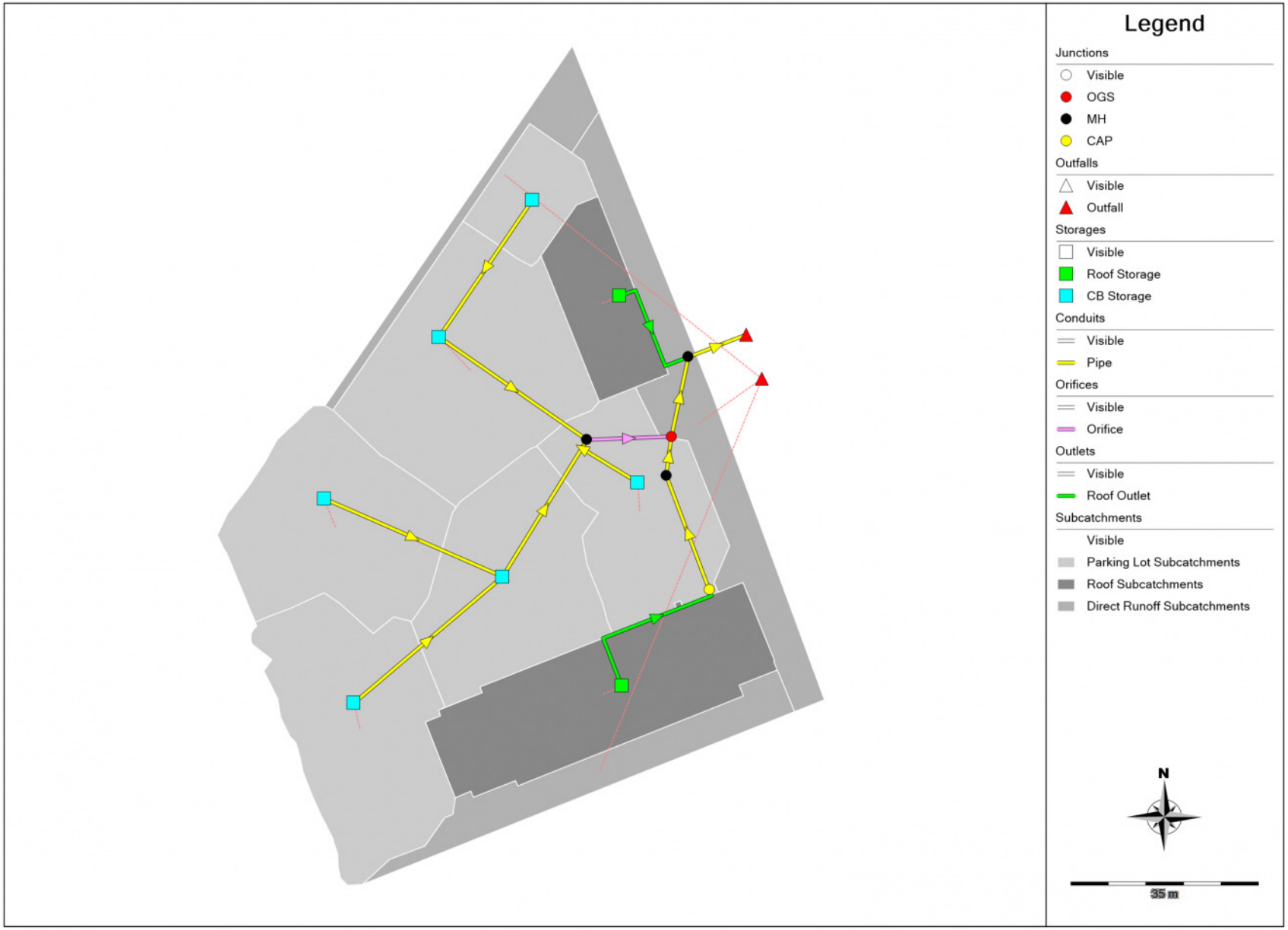
APPENDIX D

IDF Curves and SWM Calculations

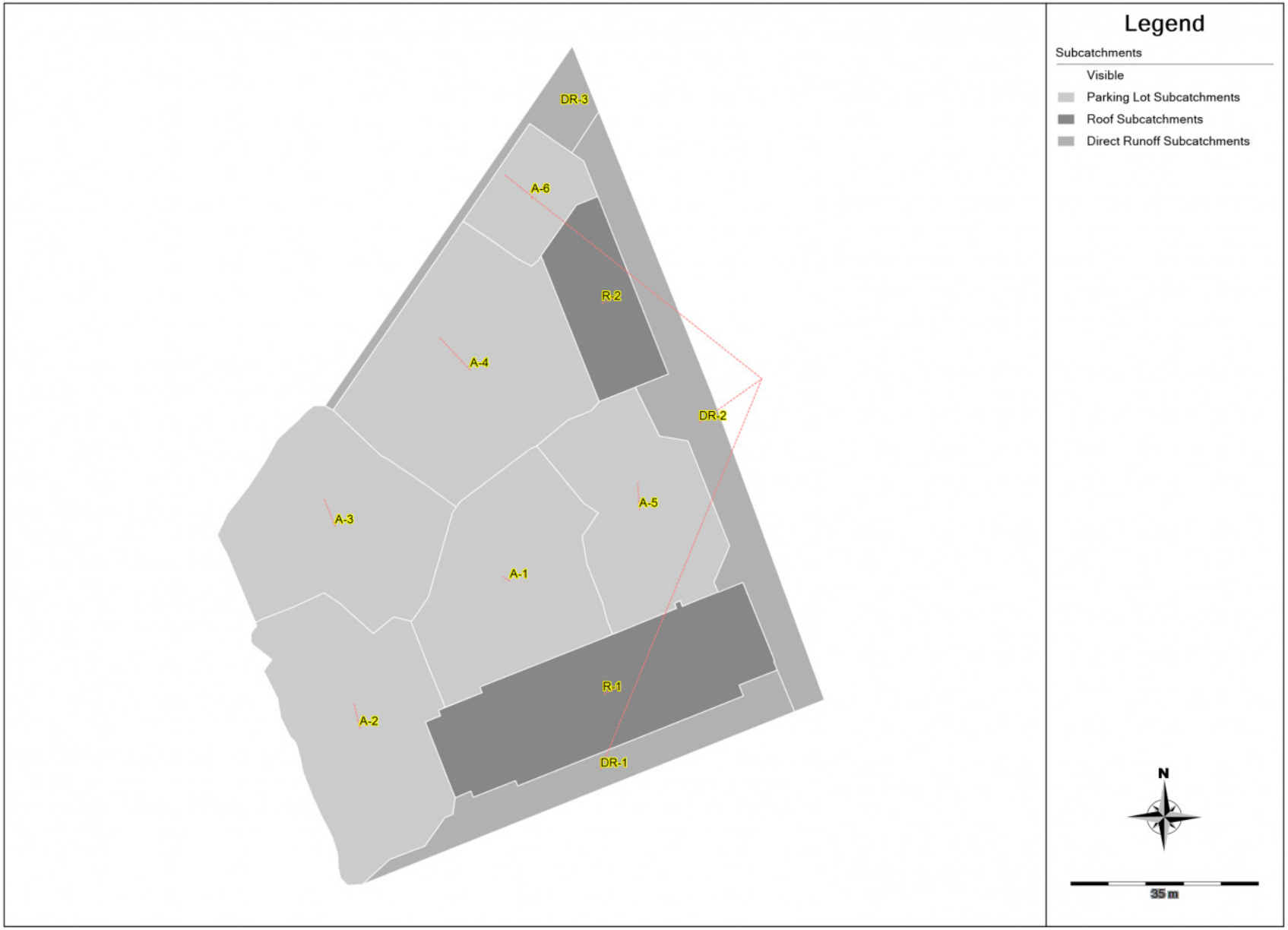
APPENDIX 5-A OTTAWA INTENSITY DURATION FREQUENCY (IDF) CURVE



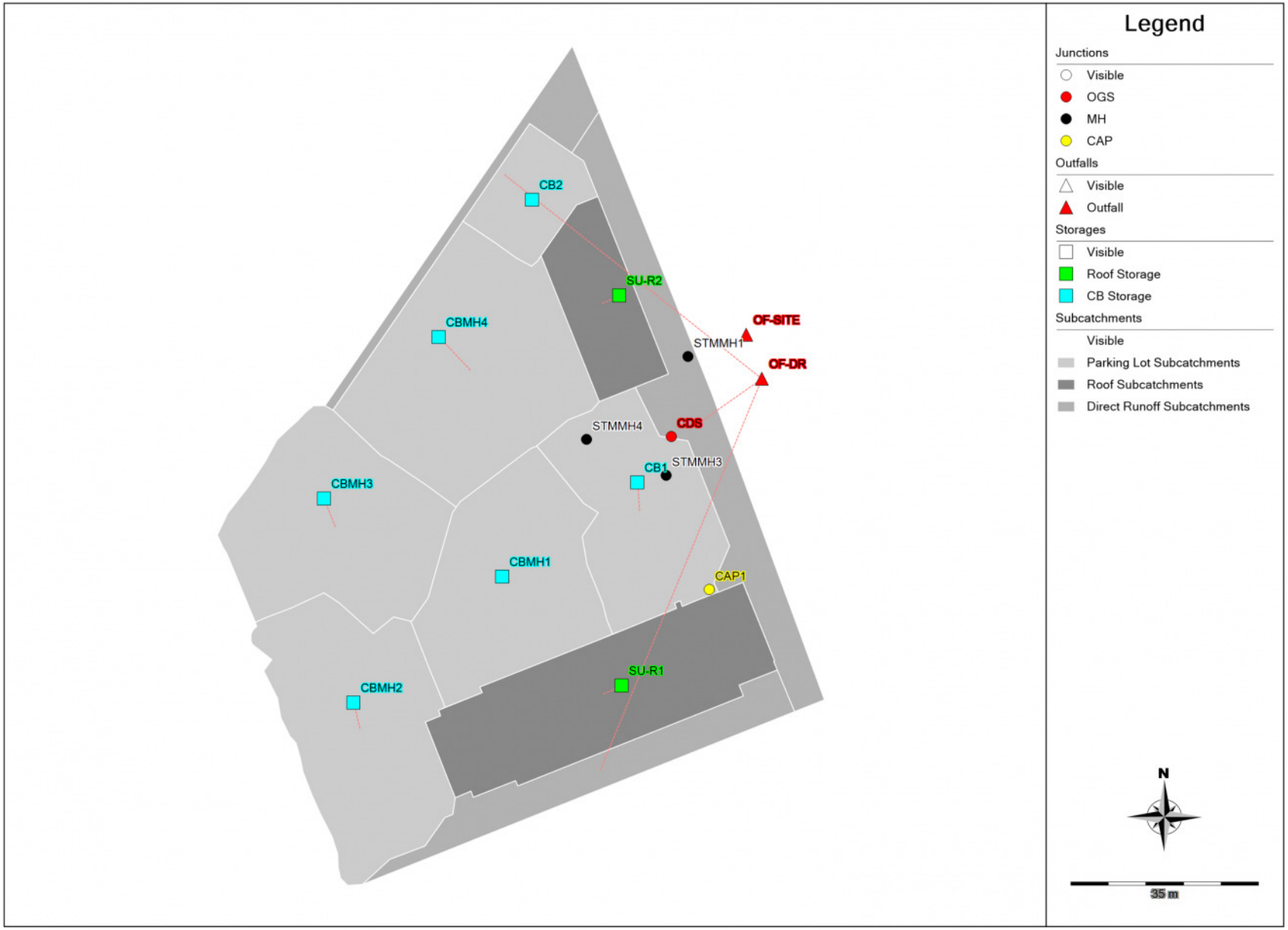
Overall Model Schematic



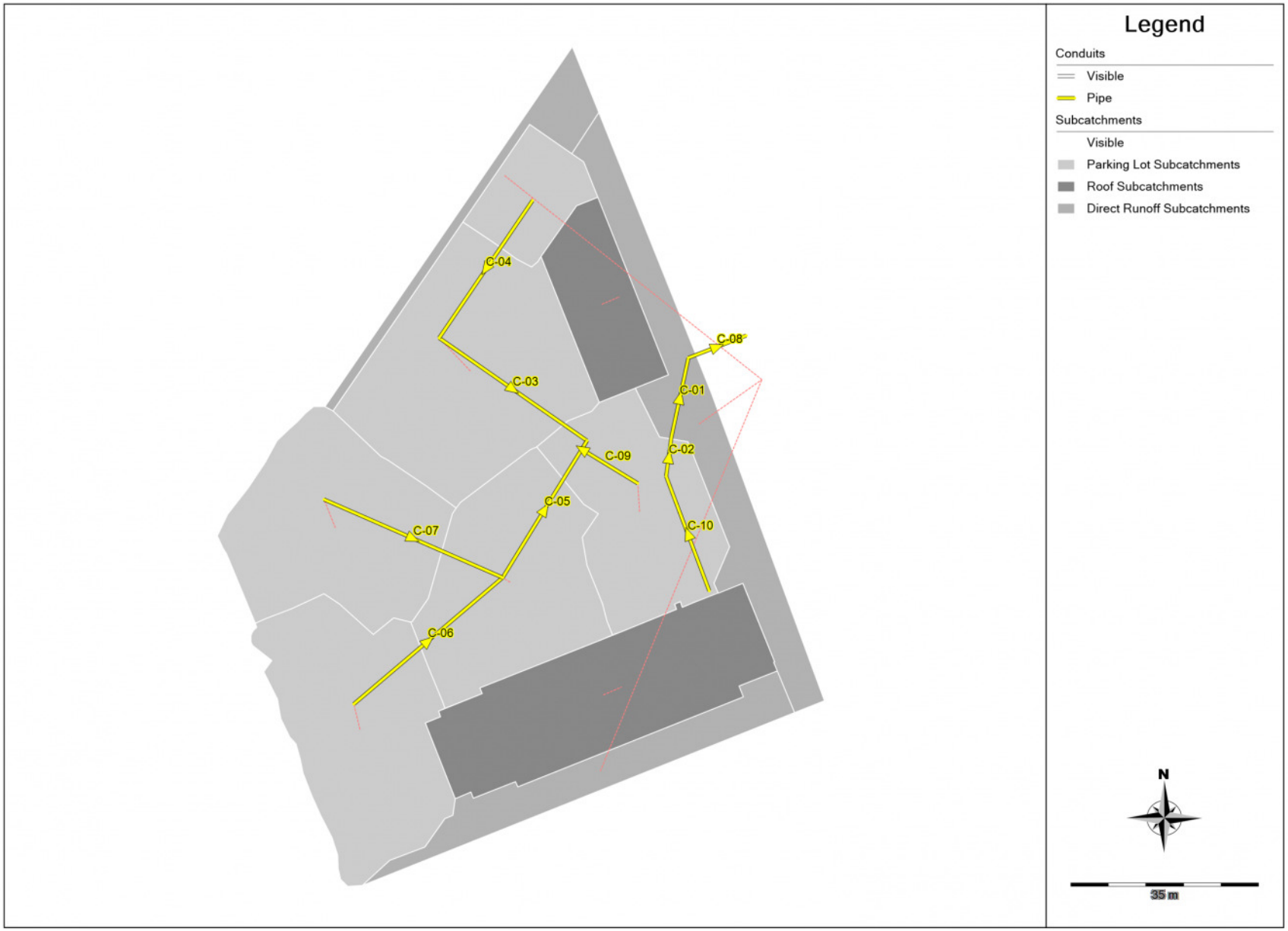
Subcatchments



Junctions, Outfalls and Storages



Conduits


Legend
Conduits
Visible
Pipe
Subcatchments
Visible
Parking Lot Subcatchments
Roof Subcatchments
Direct Runoff Subcatchments
C-01
C-02
C-03
C-04
C-05
C-06
C-07
C-08
C-09
C-10
N
35 m

```
EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.012)
--------------------------------------------------------------

PCSWMM Model for 300 & 320 Moodie Drive Site Plan


*************
Element Count
*************
Number of rain gages ...... 1
Number of subcatchments ... 11
Number of nodes ........... 15
Number of links ........... 13
Number of pollutants ...... 0
Number of land uses ....... 0


****************
Raingage Summary
****************
                                                  Data       Recording
Name                 Data Source                  Type       Interval
------------------------------------------------------------------------
Raingage             C3hr-100yr                   INTENSITY   10 min.


********************
Subcatchment Summary
********************
Name                        Area     Width   %Imperv    %Slope Rain Gage            Outlet
------------------------------------------------------------------------------------------
A-1                         0.11     72.84     94.29    1.6000 Raingage             CBMH1
A-2                         0.13     73.36     81.43    1.4000 Raingage             CBMH2
A-3                         0.12     64.28     81.43    1.8000 Raingage             CBMH3
A-4                         0.15     68.79     97.14    1.1000 Raingage             CBMH4
A-5                         0.09     84.40     77.14    1.7000 Raingage             CB1
A-6                         0.04     42.51     94.29    1.9000 Raingage             CB2
DR-1                        0.05     74.03     10.00    2.0000 Raingage             OF-DR
DR-2                        0.08    125.03     30.00    1.5000 Raingage             OF-DR
DR-3                        0.03      5.27      4.29    2.0000 Raingage             OF-DR
R-1                         0.12    102.45    100.00    1.5000 Raingage             SU-R1
R-2                         0.05     37.96    100.00    1.5000 Raingage             SU-R2


************
```

```
Node Summary
************
                                    Invert      Max.    Ponded    External
Name                 Type            Elev.     Depth      Area    Inflow
-----------------------------------------------------------------------------
CAP1                 JUNCTION        88.10      1.80       0.0
CDS                  JUNCTION        87.59      2.16       0.0
STMMH1               JUNCTION        87.51      1.94       0.0
STMMH3               JUNCTION        87.84      1.61       0.0
STMMH4               JUNCTION        87.66      1.92       0.0
OF-DR                OUTFALL         88.71      0.00       0.0
OF-SITE              OUTFALL         87.44      0.41       0.0
CB1                  STORAGE         87.96      1.59       0.0
CB2                  STORAGE         87.87      1.68       0.0
CBMH1                STORAGE         87.73      1.82       0.0
CBMH2                STORAGE         87.81      1.74       0.0
CBMH3                STORAGE         87.81      1.74       0.0
CBMH4                STORAGE         87.74      1.81       0.0
SU-R1                STORAGE        108.05      1.00       0.0
SU-R2                STORAGE        101.85      1.00       0.0


************
Link Summary
************
Name             From Node        To Node          Type            Length    %Slope Roughness
-----------------------------------------------------------------------------------------------
C-01             CDS              STMMH1           CONDUIT           15.2    0.3289    0.0130
C-02             STMMH3           CDS              CONDUIT            7.3    0.9607    0.0130
C-03             CBMH4            STMMH4           CONDUIT           33.5    0.2087    0.0130
C-04             CB2              CBMH4            CONDUIT           31.0    0.1938    0.0130
C-05             CBMH1            STMMH4           CONDUIT           30.0    0.1998    0.0130
C-06             CBMH2            CBMH1            CONDUIT           36.4    0.1925    0.0130
C-07             CBMH3            CBMH1            CONDUIT           36.3    0.1928    0.0130
C-08             STMMH1           OF-SITE          CONDUIT           11.6    0.3460    0.0130
C-09             CB1              STMMH4           CONDUIT           14.1    2.0598    0.0130
C-10             CAP1             STMMH3           CONDUIT           22.8    1.0085    0.0130
C10              STMMH4           CDS              ORIFICE
OL1              SU-R1            CAP1             OUTLET
OL2              SU-R2            STMMH1           OUTLET


**********************
Cross Section Summary
**********************
                                  Full     Full     Hyd.     Max.   No. of     Full
```

Conduit	Shape	Depth	Area	Rad.	Width	Barrels	Flow
C-01	CIRCULAR	0.38	0.11	0.09	0.38	1	100.56
C-02	CIRCULAR	0.20	0.03	0.05	0.20	1	32.15
C-03	CIRCULAR	0.53	0.22	0.13	0.53	1	196.46
C-04	CIRCULAR	0.45	0.16	0.11	0.45	1	125.53
C-05	CIRCULAR	0.53	0.22	0.13	0.53	1	192.25
C-06	CIRCULAR	0.53	0.22	0.13	0.53	1	188.71
C-07	CIRCULAR	0.53	0.22	0.13	0.53	1	188.86
C-08	CIRCULAR	0.38	0.11	0.09	0.38	1	103.13
C-09	CIRCULAR	0.20	0.03	0.05	0.20	1	47.08
C-10	CIRCULAR	0.20	0.03	0.05	0.20	1	32.94

```
************************************************************
NOTE: The summary statistics displayed in this report are
based on results found at every computational time step,
not just on results from each reporting time step.
************************************************************

***************
Analysis Options
***************
Flow Units ..... LPS
Process Models:
  Rainfall/Runoff ..... YES
  RDII ..... NO
  Snowmelt ..... NO
  Groundwater ..... NO
  Flow Routing ..... YES
  Ponding Allowed ..... NO
  Water Quality ..... NO
Infiltration Method ..... HORTON
Flow Routing Method ..... DYNWAVE
Starting Date ..... 03/27/2018 00:00:00
Ending Date ..... 04/03/2018 00:00:00
Antecedent Dry Days ..... 0.0
Report Time Step ..... 00:01:00
Wet Time Step ..... 00:05:00
Dry Time Step ..... 00:05:00
Routing Time Step ..... 5.00 sec
Variable Time Step ..... YES
Maximum Trials ..... 8
Number of Threads ..... 1
Head Tolerance ..... 0.001500 m
```

Runoff Quantity Continuity	Volume hectare-m	Depth mm
Initial LID Storage	0.000	0.501
Total Precipitation	0.068	71.667
Evaporation Loss	0.000	0.000
Infiltration Loss	0.009	9.627
Surface Runoff	0.060	62.721
Final Storage	0.000	0.501
Continuity Error (%)	-0.944	

Flow Routing Continuity	Volume hectare-m	Volume 10^6 ltr
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	0.060	0.599
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	0.000	0.000
External Outflow	0.060	0.599
Flooding Loss	0.000	0.000
Evaporation Loss	0.000	0.000
Exfiltration Loss	0.000	0.000
Initial Stored Volume	0.001	0.006
Final Stored Volume	0.001	0.007
Continuity Error (%)	-0.257	

```
**************************
Time-Step Critical Elements
**************************
Link C-08 (3.49%)
Link C-02 (1.52%)

******************************
Highest Flow Instability Indexes
******************************
Link C10 (121)
Link C-01 (1)

************************
```

```
Routing Time Step Summary
************************
Minimum Time Step           :     0.80 sec
Average Time Step           :     4.95 sec
Maximum Time Step           :     5.00 sec
Percent in Steady State     :     0.00
Average Iterations per Step :     2.00
Percent Not Converging      :     0.00


**************************
Subcatchment Runoff Summary
**************************
```

Subcatchment	Total Precip mm	Total Runon mm	Total Evap mm	Total Infil mm	Total Runoff mm	Total Runoff 10^6 ltr	Peak Runoff LPS	Runoff Coeff
A-1	71.67	0.00	0.00	2.49	69.61	0.08	53.41	0.971
A-2	71.67	0.00	0.00	8.14	64.22	0.08	56.48	0.896
A-3	71.67	0.00	0.00	8.13	64.23	0.08	53.47	0.896
A-4	71.67	0.00	0.00	1.24	70.88	0.10	71.99	0.989
A-5	71.67	0.00	0.00	9.99	62.54	0.06	41.99	0.873
A-6	71.67	0.00	0.00	2.48	69.53	0.02	17.18	0.970
DR-1	71.67	0.00	0.00	39.66	33.93	0.02	18.91	0.473
DR-2	71.67	0.00	0.00	30.78	42.55	0.04	26.85	0.594
DR-3	71.67	0.00	0.00	45.27	26.87	0.01	3.71	0.375
R-1	71.67	0.00	0.00	0.00	71.82	0.09	61.01	1.002
R-2	71.67	0.00	0.00	0.00	71.83	0.03	22.82	1.002

```
******************
Node Depth Summary
******************
```

Node	Type	Average Depth Meters	Maximum Depth Meters	Maximum HGL Meters	Time of Max Occurrence days hr:min	Reported Max Depth Meters
CAP1	JUNCTION	0.00	0.05	88.15	0 03:07	0.05
CDS	JUNCTION	0.23	0.24	87.83	0 01:04	0.24
STMMH1	JUNCTION	0.31	0.32	87.83	0 01:04	0.32
STMMH3	JUNCTION	0.00	0.05	87.89	0 01:40	0.05
STMMH4	JUNCTION	0.20	1.86	89.52	0 01:33	1.86
OF-DR	OUTFALL	0.00	0.00	88.71	0 00:00	0.00
OF-SITE	OUTFALL	0.38	0.38	87.82	0 00:00	0.38
CB1	STORAGE	0.03	1.57	89.53	0 01:19	1.57
CB2	STORAGE	0.04	1.65	89.52	0 01:33	1.65
CBMH1	STORAGE	0.13	1.79	89.52	0 01:30	1.79
CBMH2	STORAGE	0.05	1.71	89.52	0 01:31	1.71
CBMH3	STORAGE	0.05	1.71	89.52	0 01:32	1.71
CBMH4	STORAGE	0.12	1.78	89.52	0 01:34	1.78
SU-R1	STORAGE	0.01	0.15	108.20	0 02:00	0.15
SU-R2	STORAGE	0.00	0.14	101.99	0 01:44	0.14

```
******************
Node Inflow Summary
******************
```

Node	Type	Maximum Lateral Inflow LPS	Maximum Total Inflow LPS	Time of Max Occurrence days hr:min	Lateral Inflow Volume 10^6 ltr	Total Inflow Volume 10^6 ltr	Flow Balance Error Percent
CAP1	JUNCTION	0.00	3.70	0 01:21	0	0.0883	0.000
CDS	JUNCTION	0.00	42.70	0 01:33	0	0.533	0.003
STMMH1	JUNCTION	0.00	44.50	0 01:33	0	0.557	0.000
STMMH3	JUNCTION	0.00	3.70	0 03:15	0	0.0883	0.000
STMMH4	JUNCTION	0.00	87.42	0 01:09	0	0.477	-0.188
OF-DR	OUTFALL	49.47	49.47	0 01:15	0.0597	0.0597	0.000
OF-SITE	OUTFALL	0.00	44.50	0 01:33	0	0.557	0.000
CB1	STORAGE	41.99	41.99	0 01:10	0.0582	0.0582	0.144
CB2	STORAGE	17.18	25.35	0 01:09	0.0243	0.0287	0.031
CBMH1	STORAGE	53.41	111.84	0 01:05	0.0759	0.251	0.053
CBMH2	STORAGE	56.48	56.48	0 01:10	0.0803	0.0841	0.074
CBMH3	STORAGE	53.47	90.92	0 01:05	0.0758	0.0846	0.169
CBMH4	STORAGE	71.99	121.18	0 01:07	0.103	0.167	0.195
SU-R1	STORAGE	61.01	61.01	0 01:10	0.0883	0.0883	0.034
SU-R2	STORAGE	22.82	22.82	0 01:10	0.033	0.033	0.035

```
**********************
Node Surcharge Summary
**********************

Surcharging occurs when water rises above the top of the highest conduit.
```

Node	Type	Max. Height	Min. Depth

Node	Type	Hours Surcharged	Above Crown Meters	Below Rim Meters
STMMH4	JUNCTION	2.77	1.322	0.063

****
Node Flooding Summary
****

No nodes were flooded.

****
Storage Volume Summary
****

Storage Unit	Average Volume 1000 m3	Avg Pcnt Full	Evap Pcnt Loss	Exfil Pcnt Loss	Maximum Volume 1000 m3	Max Pcnt Full	Time of Max Occurrence days hr:min	Maximum Outflow LPS
CB1	0.000	1	0	0	0.011	76	0 01:19	22.84
CB2	0.000	1	0	0	0.013	63	0 01:33	21.04
CBMH1	0.000	1	0	0	0.012	57	0 01:30	104.18
CBMH2	0.000	1	0	0	0.013	62	0 01:31	60.59
CBMH3	0.000	1	0	0	0.038	68	0 01:32	17.97
CBMH4	0.001	1	0	0	0.078	70	0 01:34	23.06
SU-R1	0.002	0	0	0	0.060	1	0 02:00	3.70
SU-R2	0.001	0	0	0	0.021	1	0 01:44	1.80

****
Outfall Loading Summary
****

Outfall Node	Flow Freq Pcnt	Avg Flow LPS	Max Flow LPS	Total Volume 10^6 ltr
OF-DR	2.50	5.58	49.47	0.060
OF-SITE	53.62	2.31	44.50	0.557
System	28.06	7.89	93.63	0.617

****
Link Flow Summary
****

Link	Type	Maximum |Flow| LPS	Time of Max Occurrence days hr:min	Maximum |Veloc| m/sec	Max/ Full Flow	Max/ Full Depth
C-01	CONDUIT	42.70	0 01:33	0.51	0.42	0.71
C-02	CONDUIT	3.70	0 01:39	0.61	0.12	0.27
C-03	CONDUIT	48.82	0 01:09	0.23	0.25	1.00
C-04	CONDUIT	21.04	0 01:05	0.16	0.17	1.00
C-05	CONDUIT	70.47	0 01:09	0.33	0.37	1.00
C-06	CONDUIT	60.59	0 01:05	0.28	0.32	1.00
C-07	CONDUIT	43.02	0 01:05	0.20	0.23	1.00
C-08	CONDUIT	44.50	0 01:33	0.43	0.43	0.89
C-09	CONDUIT	22.84	0 01:04	0.73	0.49	1.00
C-10	CONDUIT	3.70	0 03:15	0.69	0.11	0.23
C10	ORIFICE	39.00	0 01:33			1.00
OL1	DUMMY	3.70	0 01:21			
OL2	DUMMY	1.80	0 01:15			

****
Flow Classification Summary
****

Conduit	Adjusted /Actual Length	Fraction of Time in Flow Class: Dry	Up Dry	Down Dry	Sub Crit	Sup Crit	Up Crit	Down Crit	Norm Ltd	Inlet Ctrl
C-01	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
C-02	1.00	0.00	0.89	0.00	0.09	0.02	0.00	0.00	1.00	0.00
C-03	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
C-04	1.00	0.00	0.93	0.00	0.07	0.00	0.00	0.00	0.98	0.00
C-05	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
C-06	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
C-07	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
C-08	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
C-09	1.00	0.00	0.91	0.00	0.09	0.00	0.00	0.00	0.98	0.00
C-10	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00

```
*************************
Conduit Surcharge Summary
*************************

-------------------------------------------------------------------------------
                                                          Hours        Hours
                        --------- Hours Full --------   Above Full   Capacity
Conduit                 Both Ends  Upstream  Dnstream   Normal Flow   Limited
-------------------------------------------------------------------------------
C-03                         2.70      2.70      2.77      0.01         0.01
C-04                         2.66      2.66      2.70      0.01         0.01
C-05                         2.71      2.71      2.77      0.01         0.01
C-06                         2.65      2.65      2.70      0.01         0.01
C-07                         2.65      2.65      2.70      0.01         0.01
C-09                         2.83      2.83      3.93      0.01         0.01


Analysis begun on:  Thu Jun 21 15:43:54 2018
Analysis ended on:  Thu Jun 21 15:43:57 2018
Total elapsed time: 00:00:03
```

Structures	Size (mm)	Area (m^2)	T/G	Inv IN	Inv OUT
CB 1	600 x 600	0.36	89.40	-	87.96
STM MH 4	1500	1.77	89.58	87.67	87.66
CBMH 1	1500	1.77	89.40	87.74	87.73
CBMH 2	1200	1.13	89.35	-	87.81
CBMH 3	1200	1.13	89.30	-	87.81
CBMH 4	1200	1.13	89.30	87.81	87.74
CB 2	600 x 600	0.36	89.35	-	87.87

PI = 3.141592654
pipe I.D.= 533
525 mm dia. U/G Pipe Volume

End Area	0.223	(m^2)
Total Length	130.7	(m)
Pipe Volume	29.2	(m^3)

U/G Pipe Size	525mm dia	525mm dia	525mm dia	525mm dia
Pipe Segment	STMMH 4 - CBMH 1	CBMH 1 - CBMH 2	CBMH 1 - CBMH 3	STMMH 4 - CBMH 4
Centre to Centre	30.0	36.4	36.3	33.5
Inside Structure	1.5	1.35	1.35	1.35
U/G Storage Length	28.5	35.1	35.0	32.2

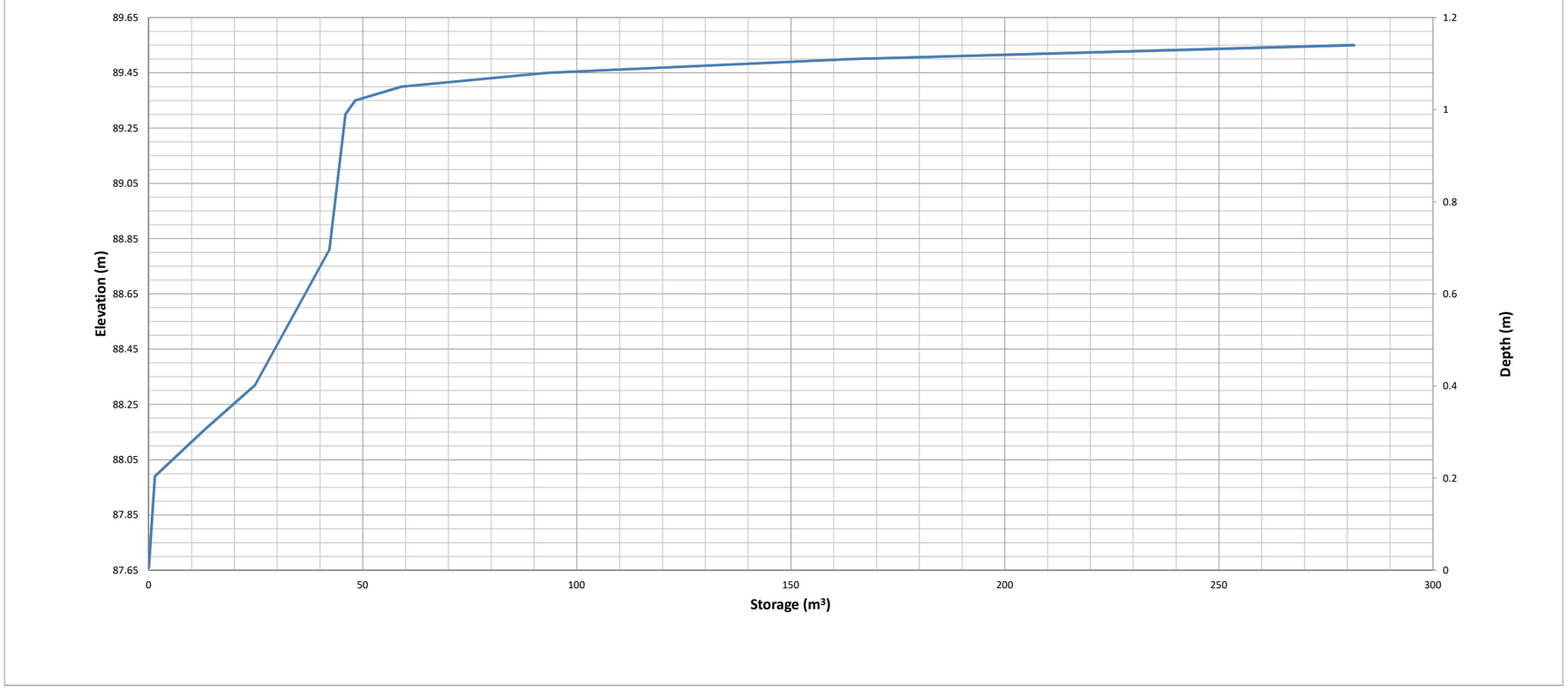
450mm dia
CBMH 4 - CB 2
30.9
0.6
30.3

PI = 3.14159265
pipe I.D.= 457
450 mm dia. U/G Pipe Volume

End Area	0.164	(m^2)
Total Length	30.3	(m)
Pipe Volume	5.0	(m^3)

Area A-1 to A-6: Storage Table

								Underground Storage	Surface Storage @ CB 1		Surface Storage @ CBMH 1		Surface Storage @ CBMH 2		Surface Storage @ CBMH 3		Surface Storage @ CBMH 4		Surface Storage @ CB 2		Total Storage
System Elevation (m)	CB 1 Volume (m^3)	STM MH 4 Volume (m^3)	CBMH 1 Volume (m^3)	CBMH 2 Volume (m^3)	CBMH 3 Volume (m^3)	CBMH 4 Volume (m^3)	CB 2 Volume (m^3)	U/G Volume (m^3)	Surface Ponding Area (m^2)	Surface Ponding Volume (m^3)	Surface Ponding Area (m^2)	Surface Ponding Volume (m^3)	Surface Ponding Area (m^2)	Surface Ponding Volume (m^3)	Surface Ponding Area (m^2)	Surface Ponding Volume (m^3)	Surface Ponding Area (m^2)	Surface Ponding Volume (m^3)	Surface Ponding Area (m^2)	Surface Ponding Volume (m^3)	**Total Volume (m^3)**
87.66	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**0**
87.99	-	0.58	0.46	0.20	0.20	-	-	1.45	-	-	-	-	-	-	-	-	-	-	-	-	**1.4**
88.16	-	0.88	0.76	0.40	0.40	0.48	-	13.15	-	-	-	-	-	-	-	-	-	-	-	-	**13.1**
88.32	0.13	1.17	1.04	0.58	0.58	0.66	0.16	24.78	-	-	-	-	-	-	-	-	-	-	-	-	**24.8**
88.81	0.31	2.03	1.91	1.13	1.13	1.21	0.34	42.18	-	-	-	-	-	-	-	-	-	-	-	-	**42.2**
89.30	0.48	2.90	2.77	1.69	1.69	1.76	0.51	45.92	-	-	-	-	-	-	0.0	0.00	0.0	0.00	-	-	**45.9**
89.35		2.99	2.86	1.74			0.53	46.18	-	-	-	-	0.0	0.00	25.87	0.65	56.01	1.40	0.0	0.00	**48.2**
89.40		3.07	2.95					45.82	0.0	0.00	0.0	0.00	17.08	0.43	103.84	3.89	223.26	8.38	20.8	0.52	**59.0**
89.45		3.16						46.44	42.79	1.07	40.5	1.01	68.34	2.56	232.86	12.31	503.09	26.54	83.19	3.12	**93.1**
89.50		3.25						46.53	128.95	5.36	157.21	5.96	150.58	8.04	409.75	28.37	855.83	60.51	170.52	9.46	**164.2**
89.55		3.34						46.62	236.12	14.49	334.86	18.26	278.65	18.77	593.70	53.46	1098.17	109.36	275.61	20.62	**281.6**



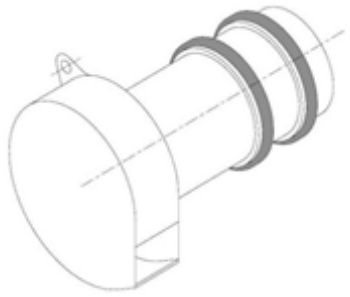
APPENDIX E

INLET CONTROL DEVICE (ICD) INFORMATION

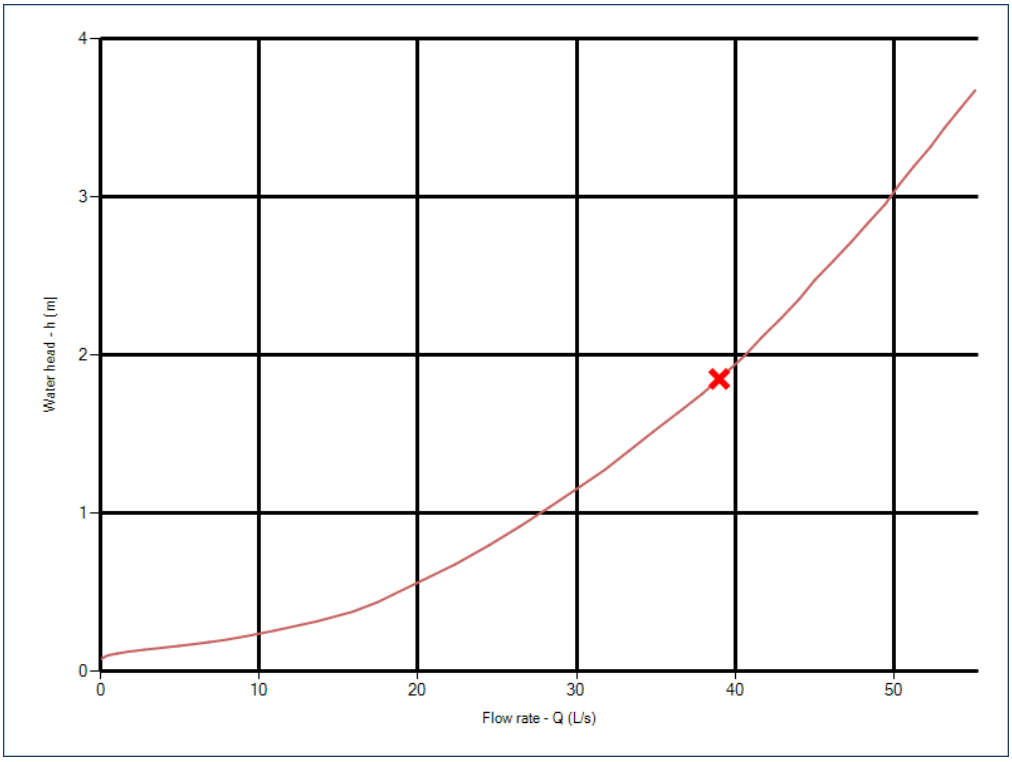
DATA SHEET
HYDROVEX® VHV
VORTEX REGULATOR

GENERAL INFORMATION

Application	Stormwater	
Project name	300 MOODIE DRIVE, OTTAWA, ON	
Project number	HYX-8401	
Regulator ID		
Design flow (Q)	39	L/s
Design head (h)	1.85	m
Outlet pipe diameter (C)	375	mm
Model	150 VHV-2,15PV,OF	
item #	PRIPHY301404	
Quantity	1	
Minimum clearance (H)	225	mm
Minimum manhole diameter (B)	1200	mm

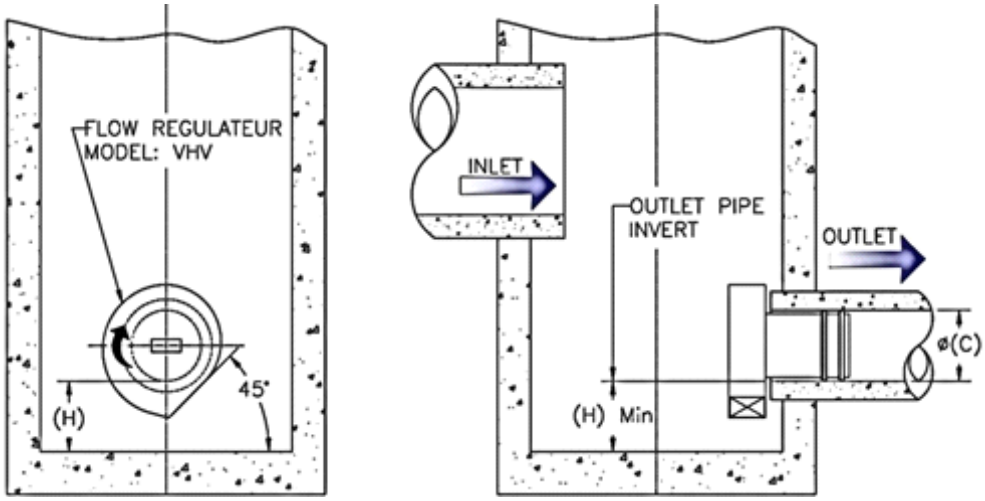


RATING CURVE



Q (L/s)	h (m)
0.000	0.076
1.023	0.112
3.873	0.148
6.822	0.184
10.915	0.256
17.429	0.436
24.463	0.796
30.042	1.156
34.832	1.516
39.285	1.876
42.920	2.236
46.183	2.596
49.466	2.956
52.301	3.316
55.136	3.676
77.999	7.276
79.547	7.576

TYPICAL INSTALLATION



SPECIFICATIONS

The regulator shall be of the static type and shall operate using vortex principles with no moving parts. The flow will be regulated over the entire head range using only the hydraulic properties of the unit and the fluid flowing through it. The regulator shall be self-activating and shall not require instrumentation or external power.

Each regulator is comprised of a vortex chamber where flow control occurs. An outlet sleeve is welded to the vortex chamber to allow the regulator to be installed into a standard outlet pipe. Water tightness shall be obtained using two Neoprene o-rings located on the outlet sleeve and held in place using welded square bars.

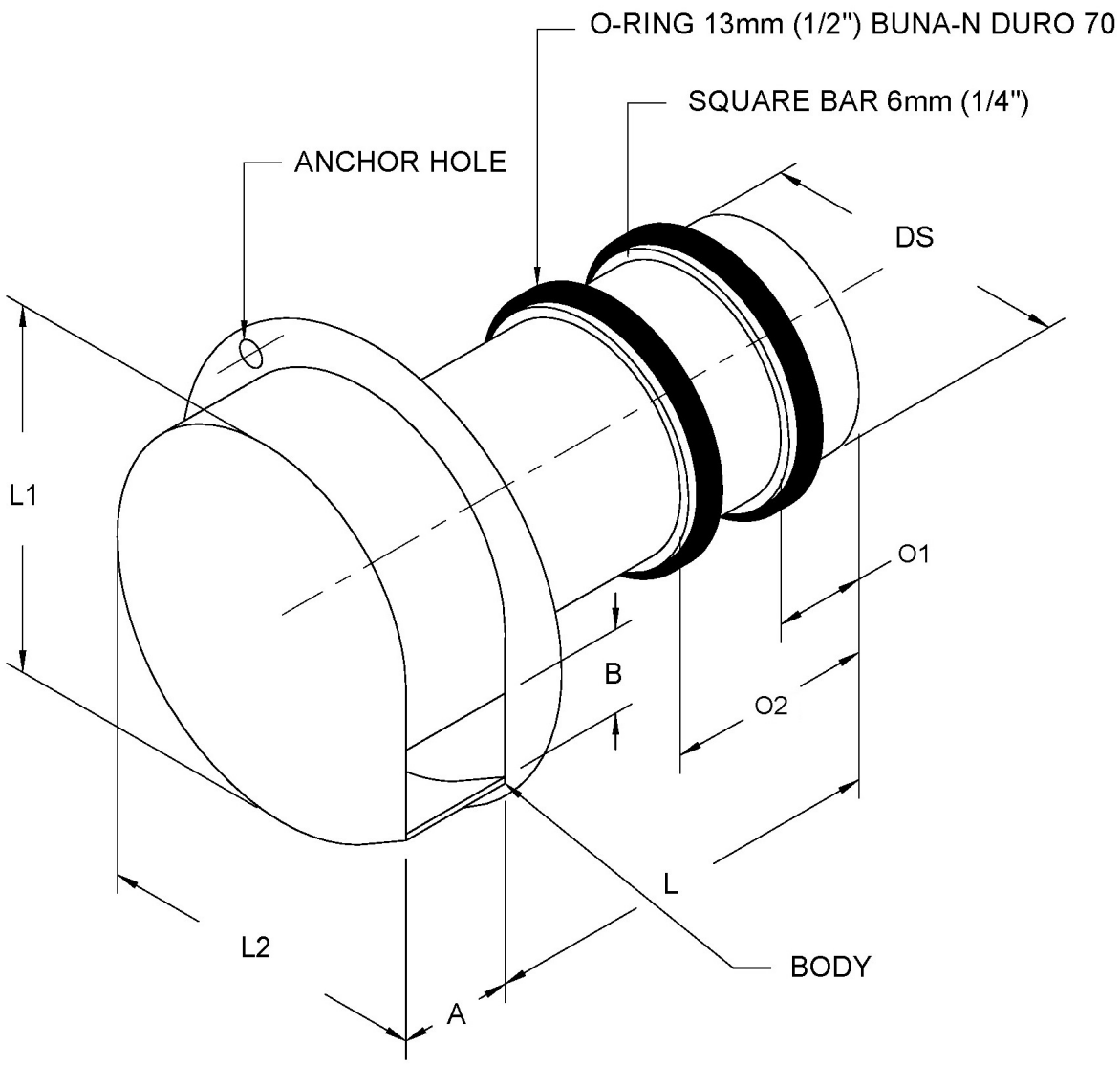
The regulator shall be fabricated entirely of stainless steel type 304 and continuously welded, as manufactured by Veolia Water Technologies Canada Inc. (John Meunier), 514-334-7230, cso@veolia.com.

VEOLIA

HYDROVEX®

Project name:	300 MOODIE DRIVE, OTTAWA, ON
Project number:	HYX-8401
Regulator ID:	
Flow rate (Q):	39 L/s
Design head (h):	1.85 m
Model:	150 VHV-2,15PV,OF
Item #:	PRIPHY301404
Quantity:	1

Dimensions	
A	150
B	123
L1	394
L2	344
L	200
DS	350
O1	38
O2	100
Ø VENT	N/A



All dimensions in millimeters unless otherwise specified

2018-04-04

APPENDIX F

CONTROLLED FLOW
ROOF DRAIN INFORMATION

WATTS®	Adjustable Accutrol Weir Tag: _____	Adjustable Flow Control for Roof Drains

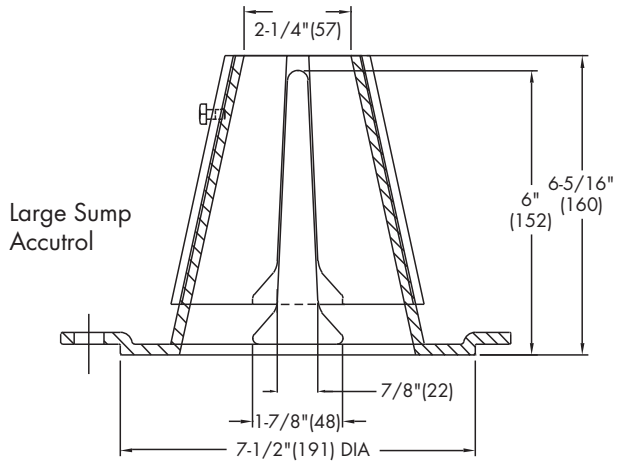
ADJUSTABLE ACCUTROL (for Large Sump Roof Drains only)

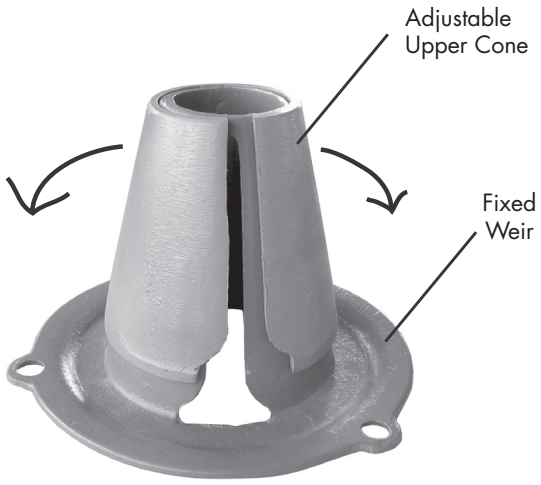
For more flexibility in controlling flow with heads deeper than 2", Watts Drainage offers the Adjustable Accutrol. The Adjustable Accutrol Weir is designed with a single parabolic opening that can be covered to restrict flow above 2" of head to less than 5 gpm per inch, up to 6" of head. To adjust the flow rate for depths over 2" of head, set the slot in the adjustable upper cone according to the flow rate required. Refer to Table 1 below.
Note: Flow rates are directly proportional to the amount of weir opening that is exposed.

EXAMPLE:

For example, if the adjustable upper cone is set to cover 1/2 of the weir opening, flow rates above 2"of head will be restricted to 2-1/2 gpm per inch of head.

Therefore, at 3"of head, the flow rate through the Accutrol Weir that has 1/2 the slot exposed will be:
[5 gpm (per inch of head) x 2 inches of head] + 2-1/2 gpm (for the third inch of head) = 12-1/2 gpm.





1/2 Weir Opening Exposed Shown Above

TABLE 1. Adjustable Accutrol Flow Rate Settings

Weir Opening Exposed	1"	2"	3"	4"	5"	6"
	Flow Rate (gallons per minute)					
Fully Exposed	5	10	15	20	25	30
3/4	5	10	13.75	17.5	21.25	25
1/2	5	10	12.5	15	17.5	20
1/4	5	10	11.25	12.5	13.75	15
Closed	5	5	5	5	5	5

Job Name _____ Contractor _____

Job Location _____ Contractor's P.O. No. _____

Engineer _____ Representative _____

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A Watts Water Technologies Company

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300-320 Moodie Drive **Hotel**
Project No. 118007
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA R-1 **Controlled Roof Drain 1**

OTTAWA IDF CURVE

Area =	0.022	ha	Qallow =	0.79	L/s
C =	0.90		Vol(max) =	3.9	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	7.77	6.98	2.09
10	104.19	5.74	4.95	2.97
15	83.56	4.60	3.81	3.43
20	70.25	3.87	3.08	3.69
25	60.90	3.35	2.56	3.84
30	53.93	2.97	2.18	3.92
35	48.52	2.67	1.88	3.95
40	44.18	2.43	1.64	3.94
45	40.63	2.24	1.45	3.91
50	37.65	2.07	1.28	3.85
55	35.12	1.93	1.14	3.77
60	32.94	1.81	1.02	3.68
65	31.04	1.71	0.92	3.58
70	29.37	1.62	0.83	3.47
75	27.89	1.54	0.75	3.35
90	24.29	1.34	0.55	2.95
105	21.58	1.19	0.40	2.51
120	19.47	1.07	0.28	2.03

300-320 Moodie Drive
Project No. 118007
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA R-1 **Controlled Roof Drain 1**

OTTAWA IDF CURVE

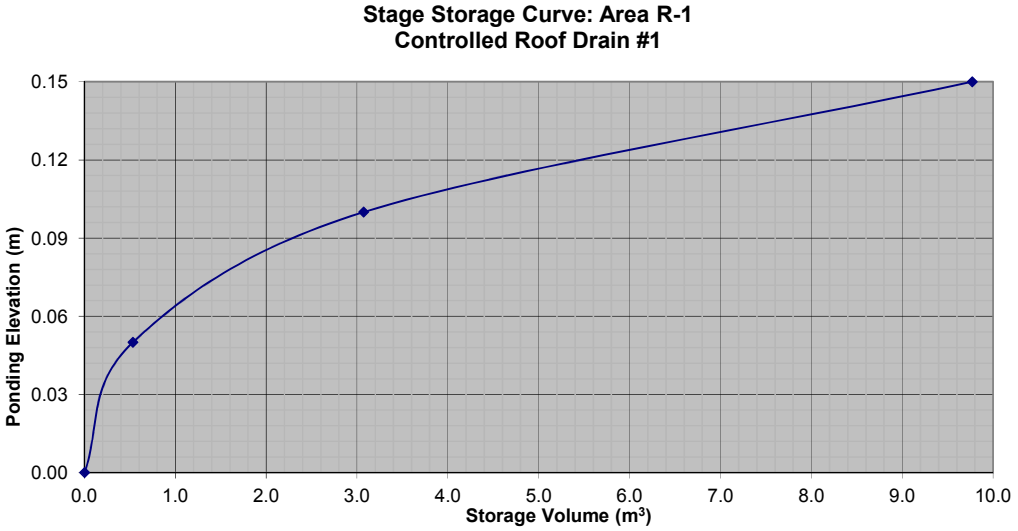
Area =	0.022	ha	Qallow =	0.95	L/s
C =	1.00		Vol(max) =	8.9	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	14.84	13.89	4.17
10	178.56	10.92	9.97	5.98
15	142.89	8.74	7.79	7.01
20	119.95	7.34	6.39	7.66
25	103.85	6.35	5.40	8.10
30	91.87	5.62	4.67	8.40
35	82.58	5.05	4.10	8.61
40	75.15	4.60	3.65	8.75
45	69.05	4.22	3.27	8.84
50	63.95	3.91	2.96	8.88
55	59.62	3.65	2.70	8.90
60	55.89	3.42	2.47	8.89
65	52.65	3.22	2.27	8.85
70	49.79	3.05	2.10	8.80
75	47.26	2.89	1.94	8.73
90	41.11	2.51	1.56	8.45
105	36.50	2.23	1.28	8.08
120	32.89	2.01	1.06	7.65

Watts Accutrol Flow Control Roof Drains:		RD-100-A-ADJ set to 1/4 Exposed			
Design Event	**Flow/Drain (L/s)**	**Total Flow (L/s)**	**Ponding (cm)**	**Storage (m^3) Required**	**Provided**
1:5 Year	0.79	0.79	11	3.9	9.8
1:100 Year	0.95	0.95	14	8.9	9.8

Roof Drain Storage Table for Area R-1

Elevation	Area RD 1	Total Volume
m	m^2	m^3
0.00	0	0
0.05	21.32	0.5
0.10	80.32	3.1
0.15	187.56	9.8



300-320 Moodie Drive **Hotel**
Project No. 118007
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA R-1 **Controlled Roof Drain 2**

OTTAWA IDF CURVE

Area =	0.045	ha	Qallow =	0.79	L/s
C =	0.90		Vol(max) =	10.6	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	15.90	15.11	4.53
10	104.19	11.73	10.94	6.56
15	83.56	9.41	8.62	7.76
20	70.25	7.91	7.12	8.54
25	60.90	6.86	6.07	9.10
30	53.93	6.07	5.28	9.51
35	48.52	5.46	4.67	9.81
40	44.18	4.97	4.18	10.04
45	40.63	4.57	3.78	10.22
50	37.65	4.24	3.45	10.35
55	35.12	3.95	3.16	10.44
60	32.94	3.71	2.92	10.51
75	27.89	3.14	2.35	10.57
90	24.29	2.73	1.94	10.50
105	21.58	2.43	1.64	10.33
120	19.47	2.19	1.40	10.09
135	17.76	2.00	1.21	9.80
150	16.36	1.84	1.05	9.47

300-320 Moodie Drive
Project No. 118007
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA R-1 **Controlled Roof Drain 2**

OTTAWA IDF CURVE

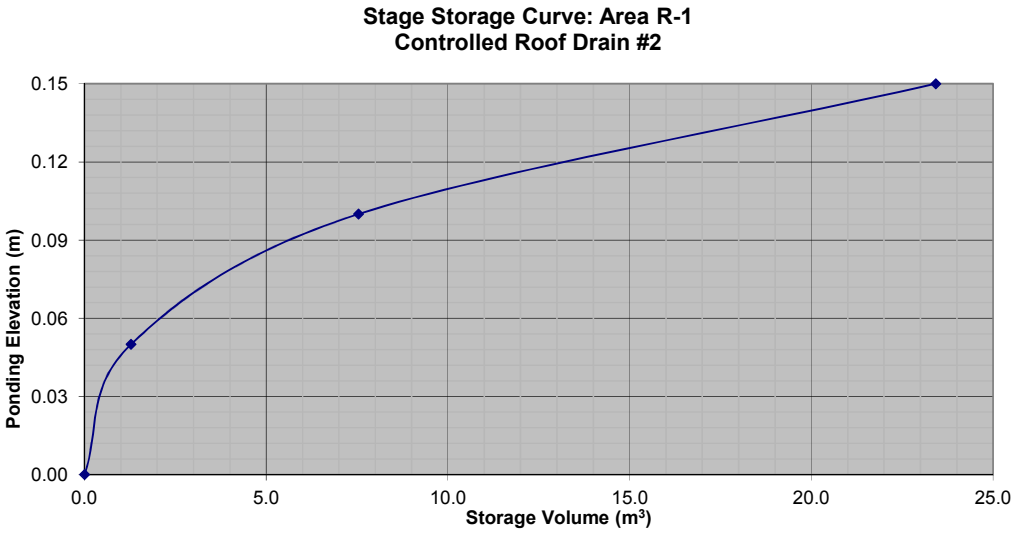
Area =	0.045	ha	Qallow =	0.95	L/s
C =	1.00		Vol(max) =	22.8	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	30.36	29.41	8.82
10	178.56	22.34	21.39	12.83
15	142.89	17.88	16.93	15.23
20	119.95	15.01	14.06	16.87
25	103.85	12.99	12.04	18.06
30	91.87	11.49	10.54	18.98
35	82.58	10.33	9.38	19.70
40	75.15	9.40	8.45	20.28
45	69.05	8.64	7.69	20.76
50	63.95	8.00	7.05	21.15
55	59.62	7.46	6.51	21.48
60	55.89	6.99	6.04	21.75
75	47.26	5.91	4.96	22.33
90	41.11	5.14	4.19	22.64
105	36.50	4.57	3.62	22.78
120	32.89	4.12	3.17	22.79
135	30.00	3.75	2.80	22.70
150	27.61	3.45	2.50	22.54

Watts Accutrol Flow Control Roof Drains:		RD-100-A-ADJ set to 1/4 Exposed			
Design Event	**Flow/Drain (L/s)**	**Total Flow (L/s)**	**Ponding (cm)**	**Storage (m^3) Required**	**Provided**
1:5 Year	0.79	0.79	11	10.6	23.4
1:100 Year	0.95	0.95	15	22.8	23.4

Roof Drain Storage Table for Area R-1

Elevation	Area RD 2	Total Volume
m	m^2	m^3
0.00	0	0
0.05	51.29	1.3
0.10	198.98	7.5
0.15	436.27	23.4



300-320 Moodie Drive **Hotel**
Project No. 118007
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA R-1 **Controlled Roof Drain 3**

OTTAWA IDF CURVE

Area =	0.035	ha	Qallow =	0.79	L/s
C =	0.90		Vol(max) =	7.5	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	12.36	11.57	3.47
10	104.19	9.12	8.33	5.00
15	83.56	7.32	6.53	5.87
20	70.25	6.15	5.36	6.43
25	60.90	5.33	4.54	6.81
30	53.93	4.72	3.93	7.08
35	48.52	4.25	3.46	7.26
40	44.18	3.87	3.08	7.39
45	40.63	3.56	2.77	7.47
50	37.65	3.30	2.51	7.52
55	35.12	3.08	2.29	7.54
60	32.94	2.88	2.09	7.54
75	27.89	2.44	1.65	7.43
90	24.29	2.13	1.34	7.22
105	21.58	1.89	1.10	6.93
120	19.47	1.70	0.91	6.59
135	17.76	1.56	0.77	6.20
150	16.36	1.43	0.64	5.79

300-320 Moodie Drive
Project No. 118007
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA R-1 **Controlled Roof Drain 3**

OTTAWA IDF CURVE

Area =	0.035	ha	Qallow =	0.95	L/s
C =	1.00		Vol(max) =	16.5	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	23.62	22.67	6.80
10	178.56	17.37	16.42	9.85
15	142.89	13.90	12.95	11.66
20	119.95	11.67	10.72	12.87
25	103.85	10.10	9.15	13.73
30	91.87	8.94	7.99	14.38
35	82.58	8.03	7.08	14.88
40	75.15	7.31	6.36	15.27
45	69.05	6.72	5.77	15.58
50	63.95	6.22	5.27	15.82
55	59.62	5.80	4.85	16.01
60	55.89	5.44	4.49	16.16
75	47.26	4.60	3.65	16.42
90	41.11	4.00	3.05	16.47
105	36.50	3.55	2.60	16.39
120	32.89	3.20	2.25	16.20
135	30.00	2.92	1.97	15.95
150	27.61	2.69	1.74	15.63

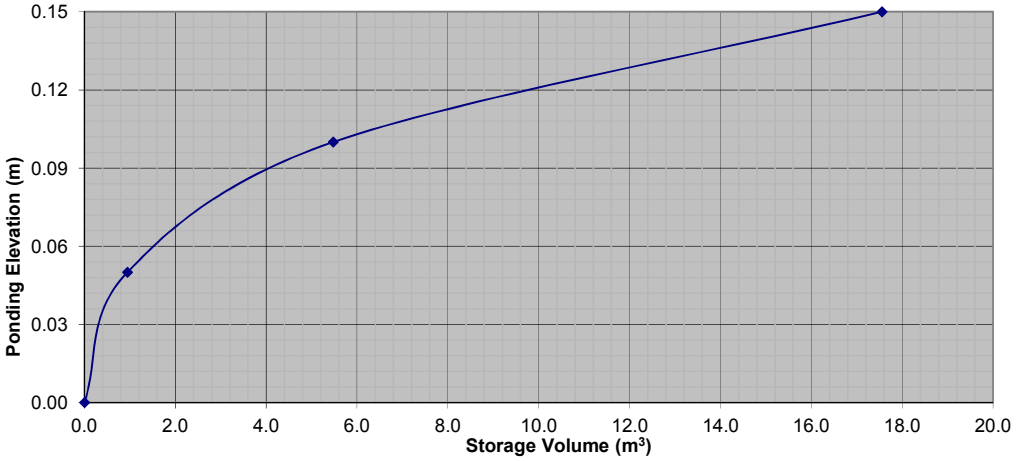
Watts Accutrol Flow Control Roof Drains: RD-100-A-ADJ set to 1/4 Exposed

Design Event	Flow/Drain (L/s)	Total Flow (L/s)	Ponding (cm)	Storage (m^3) Required	Storage (m^3) Provided
1:5 Year	0.79	0.79	11	7.5	17.6
1:100 Year	0.95	0.95	15	16.5	17.6

Roof Drain Storage Table for Area R-1

Elevation	Area RD 3	Total Volume
m	m^2	m^3
0.00	0	0
0.05	37.74	0.9
0.10	143.49	5.5
0.15	339.81	17.6

Stage Storage Curve: Area R-1
Controlled Roof Drain #3



300-320 Moodie Drive **Hotel**
Project No. 118007
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA R-1 **Controlled Roof Drain 4**

OTTAWA IDF CURVE

Area =	0.020	ha	Qallow =	0.79	L/s
C =	0.90		Vol(max) =	3.4	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	7.06	6.27	1.88
10	104.19	5.21	4.42	2.65
15	83.56	4.18	3.39	3.05
20	70.25	3.52	2.73	3.27
25	60.90	3.05	2.26	3.39
30	53.93	2.70	1.91	3.44
35	48.52	2.43	1.64	3.44
40	44.18	2.21	1.42	3.41
45	40.63	2.03	1.24	3.36
50	37.65	1.88	1.09	3.28
55	35.12	1.76	0.97	3.19
60	32.94	1.65	0.86	3.09
65	31.04	1.55	0.76	2.98
70	29.37	1.47	0.68	2.86
75	27.89	1.40	0.61	2.72
90	24.29	1.22	0.43	2.30
105	21.58	1.08	0.29	1.83
120	19.47	0.97	0.18	1.33

300-320 Moodie Drive
Project No. 118007
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA R-1 **Controlled Roof Drain 4**

OTTAWA IDF CURVE

Area =	0.020	ha	Qallow =	0.87	L/s
C =	1.00		Vol(max) =	8.1	m3

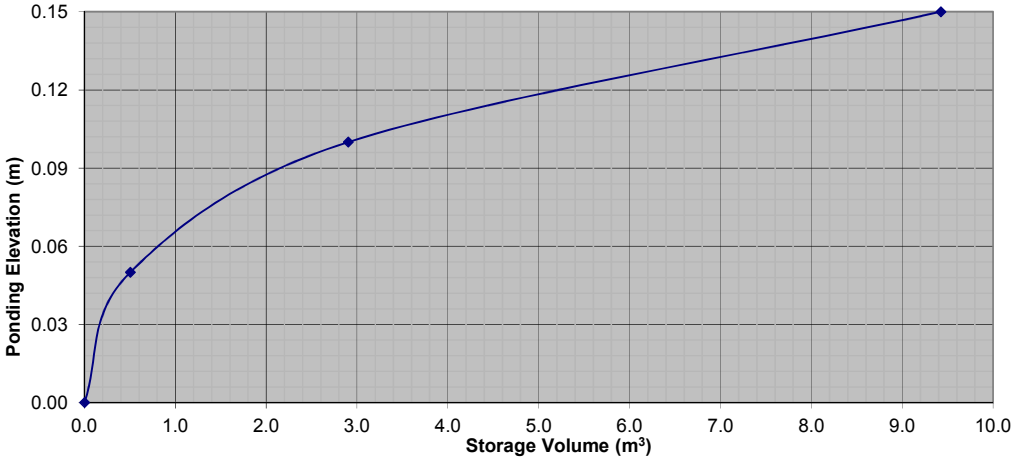
Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	13.49	12.62	3.79
10	178.56	9.93	9.06	5.43
15	142.89	7.94	7.07	6.37
20	119.95	6.67	5.80	6.96
25	103.85	5.77	4.90	7.36
30	91.87	5.11	4.24	7.63
35	82.58	4.59	3.72	7.81
40	75.15	4.18	3.31	7.94
45	69.05	3.84	2.97	8.02
50	63.95	3.56	2.69	8.06
55	59.62	3.32	2.45	8.07
60	55.89	3.11	2.24	8.06
65	52.65	2.93	2.06	8.02
70	49.79	2.77	1.90	7.97
75	47.26	2.63	1.76	7.91
90	41.11	2.29	1.42	7.65
105	36.50	2.03	1.16	7.30
120	32.89	1.83	0.96	6.90

Watts Accutrol Flow Control Roof Drains:		RD-100-A-ADJ set to 1/4 Exposed			
Design Event	**Flow/Drain (L/s)**	**Total Flow (L/s)**	**Ponding (cm)**	**Storage (m^3) Required**	**Provided**
1:5 Year	0.79	0.79	10	3.4	9.4
1:100 Year	0.87	0.87	13	8.1	9.4

Roof Drain Storage Table for Area R-1

Elevation	Area RD 4	Total Volume
m	m^2	m^3
0.00	0	0
0.05	20.17	0.5
0.10	75.82	2.9
0.15	185.02	9.4

Stage Storage Curve: Area R-1
Controlled Roof Drain #4



300-320 Moodie Drive **Restaurant**
Project No. 118007
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA R-2 **Controlled Roof Drain 5**

OTTAWA IDF CURVE

Area =	0.022	ha	Qallow =	0.79	L/s
C =	0.90		Vol(max) =	3.9	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	7.77	6.98	2.09
10	104.19	5.74	4.95	2.97
15	83.56	4.60	3.81	3.43
20	70.25	3.87	3.08	3.69
25	60.90	3.35	2.56	3.84
30	53.93	2.97	2.18	3.92
35	48.52	2.67	1.88	3.95
40	44.18	2.43	1.64	3.94
45	40.63	2.24	1.45	3.91
50	37.65	2.07	1.28	3.85
55	35.12	1.93	1.14	3.77
60	32.94	1.81	1.02	3.68
65	31.04	1.71	0.92	3.58
70	29.37	1.62	0.83	3.47
75	27.89	1.54	0.75	3.35
90	24.29	1.34	0.55	2.95
105	21.58	1.19	0.40	2.51
120	19.47	1.07	0.28	2.03

300-320 Moodie Drive
Project No. 118007
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA R-2 **Controlled Roof Drain 5**

OTTAWA IDF CURVE

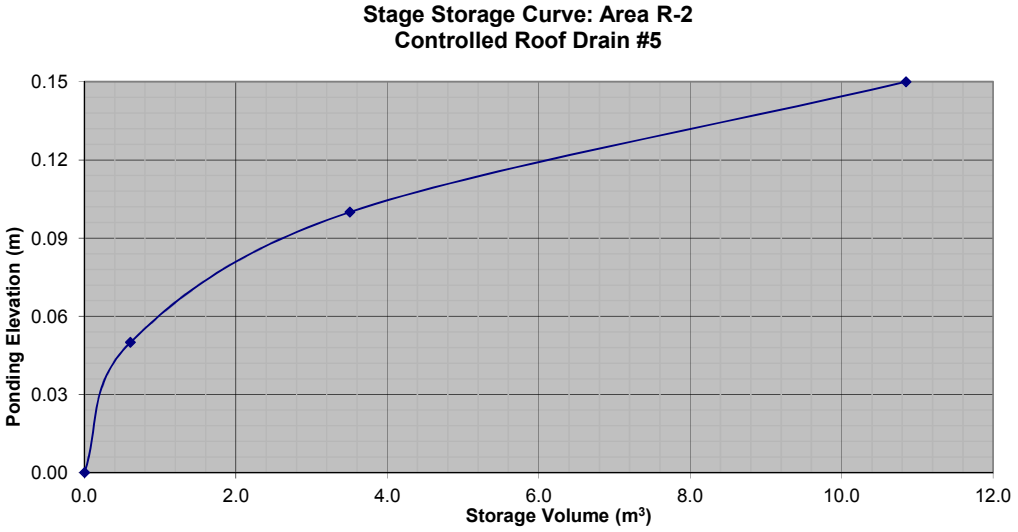
Area =	0.022	ha	Qallow =	0.87	L/s
C =	1.00		Vol(max) =	9.2	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	14.84	13.97	4.19
10	178.56	10.92	10.05	6.03
15	142.89	8.74	7.87	7.08
20	119.95	7.34	6.47	7.76
25	103.85	6.35	5.48	8.22
30	91.87	5.62	4.75	8.55
35	82.58	5.05	4.18	8.78
40	75.15	4.60	3.73	8.94
45	69.05	4.22	3.35	9.05
50	63.95	3.91	3.04	9.12
55	59.62	3.65	2.78	9.16
60	55.89	3.42	2.55	9.17
65	52.65	3.22	2.35	9.16
70	49.79	3.05	2.18	9.14
75	47.26	2.89	2.02	9.09
90	41.11	2.51	1.64	8.88
105	36.50	2.23	1.36	8.58
120	32.89	2.01	1.14	8.22

Watts Accutrol Flow Control Roof Drains:		RD-100-A-ADJ set to 1/4 Exposed			
Design Event	**Flow/Drain (L/s)**	**Total Flow (L/s)**	**Ponding (cm)**	**Storage (m^3)**	
				Required	**Provided**
1:5 Year	0.79	0.79	10	3.9	10.8
1:100 Year	0.87	0.87	13	9.2	10.8

Roof Drain Storage Table for Area R-2

Elevation	Area RD 5	Total Volume
m	m^2	m^3
0.00	0	0
0.05	24.3	0.6
0.10	91.62	3.5
0.15	202.12	10.8



300-320 Moodie Drive **Restaurant**
Project No. 118007
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA R-2 **Controlled Roof Drain 6**

OTTAWA IDF CURVE

Area =	0.025	ha	Qallow =	0.79	L/s
C =	0.90		Vol(max) =	4.7	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	8.83	8.04	2.41
10	104.19	6.52	5.73	3.44
15	83.56	5.23	4.44	3.99
20	70.25	4.39	3.60	4.33
25	60.90	3.81	3.02	4.53
30	53.93	3.37	2.58	4.65
35	48.52	3.03	2.24	4.71
40	44.18	2.76	1.97	4.74
45	40.63	2.54	1.75	4.73
50	37.65	2.36	1.57	4.70
55	35.12	2.20	1.41	4.64
60	32.94	2.06	1.27	4.57
65	31.04	1.94	1.15	4.49
70	29.37	1.84	1.05	4.40
75	27.89	1.74	0.95	4.29
90	24.29	1.52	0.73	3.94
105	21.58	1.35	0.56	3.53
120	19.47	1.22	0.43	3.08

300-320 Moodie Drive
Project No. 118007
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA R-2 **Controlled Roof Drain 6**

OTTAWA IDF CURVE

Area =	0.025	ha	Qallow =	0.95	L/s
C =	1.00		Vol(max) =	10.6	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	16.87	15.92	4.78
10	178.56	12.41	11.46	6.88
15	142.89	9.93	8.98	8.08
20	119.95	8.34	7.39	8.86
25	103.85	7.22	6.27	9.40
30	91.87	6.38	5.43	9.78
35	82.58	5.74	4.79	10.06
40	75.15	5.22	4.27	10.25
45	69.05	4.80	3.85	10.39
50	63.95	4.44	3.49	10.48
55	59.62	4.14	3.19	10.54
60	55.89	3.88	2.93	10.56
65	52.65	3.66	2.71	10.56
70	49.79	3.46	2.51	10.54
75	47.26	3.28	2.33	10.50
90	41.11	2.86	1.91	10.30
105	36.50	2.54	1.59	10.00
120	32.89	2.29	1.34	9.62

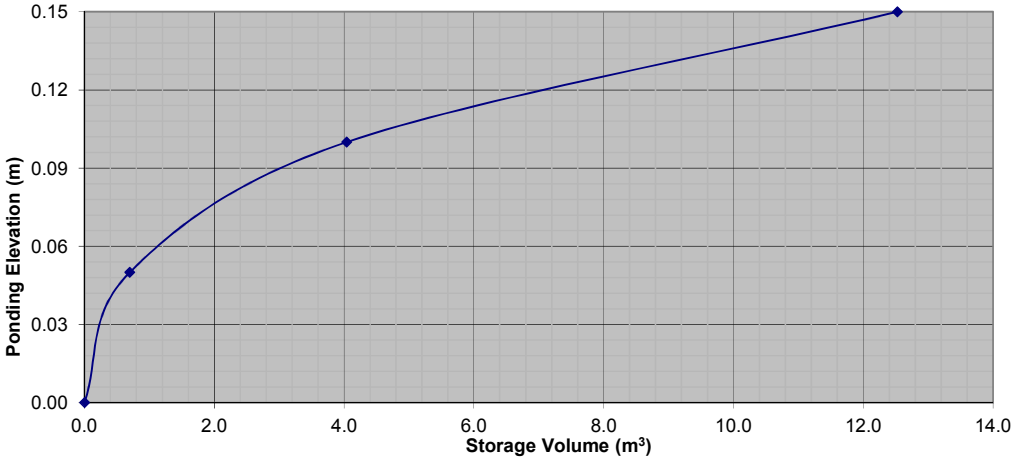
Watts Accutrol Flow Control Roof Drains: RD-100-A-ADJ set to 1/4 Exposed

Design Event	Flow/Drain (L/s)	Total Flow (L/s)	Ponding (cm)	Storage (m^3) Required	Storage (m^3) Provided
1:5 Year	0.79	0.79	10	4.7	12.5
1:100 Year	0.95	0.95	13	10.6	12.5

Roof Drain Storage Table for Area R-2

Elevation	Area RD 6	Total Volume
m	m^2	m^3
0.00	0	0
0.05	27.96	0.7
0.10	105.77	4.0
0.15	233.64	12.5

Stage Storage Curve: Area R-2
Controlled Roof Drain #6



APPENDIX G

WATER QUALITY TREATMENT UNIT INFORMATION

Steve Matthews

From: Gajanan Ramajeyam <ram@echelonenvironmental.ca>
Sent: March-29-18 2:20 PM
To: Steve Matthews
Subject: RE: 300 Moodie - CDS Sizing Request
Attachments: CDS Sizing - 300 Moodle Drive.pdf

Hi Steve,

Thank you for your design request!

I have attached the CDS Sizing with sample drawings for your review. The budgetary price for a PMSU 2020_5 unit is $26,500. The CDS unit capacities you requested are listed below.

Oil Storage Capacity = 376L
Sediment Storage Capacity = 1.668m3

Look forward to working with you on future designs. Have a good long weekend!

Gajanan (Ram) Ramajeyam, PMP
Project Manager | Echelon Environmental
Office: 905.948.0000 Ext. 227 | Fax: 905.948.0577

From: Steve Matthews [mailto:S.Matthews@novatech-eng.com]
Sent: Thursday, March 29, 2018 1:19 PM
To: Gajanan Ramajeyam
Cc: Francois Thauvette; Ben Lidbetter
Subject: 300 Moodie - CDS Sizing Request

Hi Ram,

We are working on another project requiring an oil/grit separator unit. The project is located at 300 Moodie Drive in Bells Corners (west end of the City of Ottawa).

The project details are as follows:
Tributary area to OGS = **0.76 ha**
Imperviousness = **88 %**
Time of concentration = **10 min**
IDF Curve = **Ottawa (104.2mm/hr Intensity for 5yr) (178.6mm/hr Intensity for 100yr)**

We have a requirement to provide quality control treatment to meet the MOECC's **Enhanced Level of Protection** guidelines (i.e. **80% TSS** removal and **90% of annual runoff treated**). The oil/grit separator will have a **375 mm** dia. PVC outlet pipe, along with one **375 mm** dia. PVC inlet pipe at **104** degrees of separation from the outlet and another **200 mm** dia. PVC inlet pipe with **180** degrees of separation through the structure. The approximate cover on the pipes is +/- **1.75 m**. A standard particle distribution (**Fines**) is required for the design. Anticipated peak flow should be in the order of **45 L/s** based on the City's requirement to control the site flows to pre-development levels. As a result, there will be some flow attenuation due to an ICD within the upstream storm structure and proposed controlled flow roof drains on the tributary building.

Can you please size a **CDS unit** for us and provide the design details as well as an approximate cost estimate. I have attached a preliminary sketch of the site showing the proposed location of the unit (highlighted in yellow) and configuration of the inlet and outlet pipes as well as the proposed ICD location. We will also require the specific **oil storage** and **sediment storage capacities** of the specified unit to satisfy MOECC requirements in our Stormwater Management Report.

Thank you for your time and consideration in this matter. If there is any further information you require, please do not hesitate to call.

Regards,
Steve

Stephen Matthews, B.A.(Env), Senior Design Technologist
NOVATECH Engineers, Planners & Landscape Architects
240 Michael Cowpland Drive, Suite 200, Ottawa, ON, K2M 1P6 | Tel: 613.254.9643 x 223 | Fax: 613.254.5867

CDS ESTIMATED NET ANNUAL SOLIDS LOAD REDUCTION
BASED ON THE RATIONAL RAINFALL METHOD
BASED ON A FINE PARTICLE SIZE DISTRIBUTION

Project Name: 300 Moodle Drive
Location: Bells Corners, ON
OGS #: OGS

Engineer: Novatech Engineering Consultants
Contact: Steve Matthews
Report Date: 29-Mar-17

Area	0.76	ha	**Rainfall Station #**	215	
Weighted C	0.82		**Particle Size Distribution**	FINE	
CDS Model	2020		**CDS Treatment Capacity**	31	l/s

Rainfall Intensity[1] (mm/hr)	Percent Rainfall Volume[1]	Cumulative Rainfall Volume	Total Flowrate (l/s)	Treated Flowrate (l/s)	Operating Rate (%)	Removal Efficiency (%)	Incremental Removal (%)
1.0	10.6%	19.8%	1.7	1.7	5.6	97.3	10.3
1.5	9.9%	29.7%	2.6	2.6	8.4	96.5	9.6
2.0	8.4%	38.1%	3.5	3.5	11.1	95.7	8.0
2.5	7.7%	45.8%	4.3	4.3	13.9	94.9	7.3
3.0	5.9%	51.7%	5.2	5.2	16.7	94.1	5.6
3.5	4.4%	56.1%	6.1	6.1	19.5	93.3	4.1
4.0	4.7%	60.7%	6.9	6.9	22.3	92.5	4.3
4.5	3.3%	64.0%	7.8	7.8	25.1	91.7	3.0
5.0	3.0%	67.1%	8.7	8.7	27.9	90.9	2.7
6.0	5.4%	72.4%	10.4	10.4	33.4	89.3	4.8
7.0	4.4%	76.8%	12.2	12.2	39.0	87.7	3.8
8.0	3.5%	80.3%	13.9	13.9	44.6	86.1	3.0
9.0	2.8%	83.2%	15.6	15.6	50.2	84.5	2.4
10.0	2.2%	85.3%	17.4	17.4	55.7	82.9	1.8
15.0	7.0%	92.3%	26.1	26.1	83.6	74.9	5.2
20.0	4.5%	96.9%	34.7	31.2	100.0	63.0	2.9
25.0	1.4%	98.3%	43.4	31.2	100.0	50.4	0.7
30.0	0.7%	99.0%	52.1	31.2	100.0	42.0	0.3
35.0	0.5%	99.5%	60.8	31.2	100.0	36.0	0.2
40.0	0.5%	100.0%	69.5	31.2	100.0	31.5	0.2
45.0	0.0%	100.0%	78.2	31.2	100.0	28.0	0.0
50.0	0.0%	100.0%	86.8	31.2	100.0	25.2	0.0
							89.2

Removal Efficiency Adjustment[2] = 6.5%

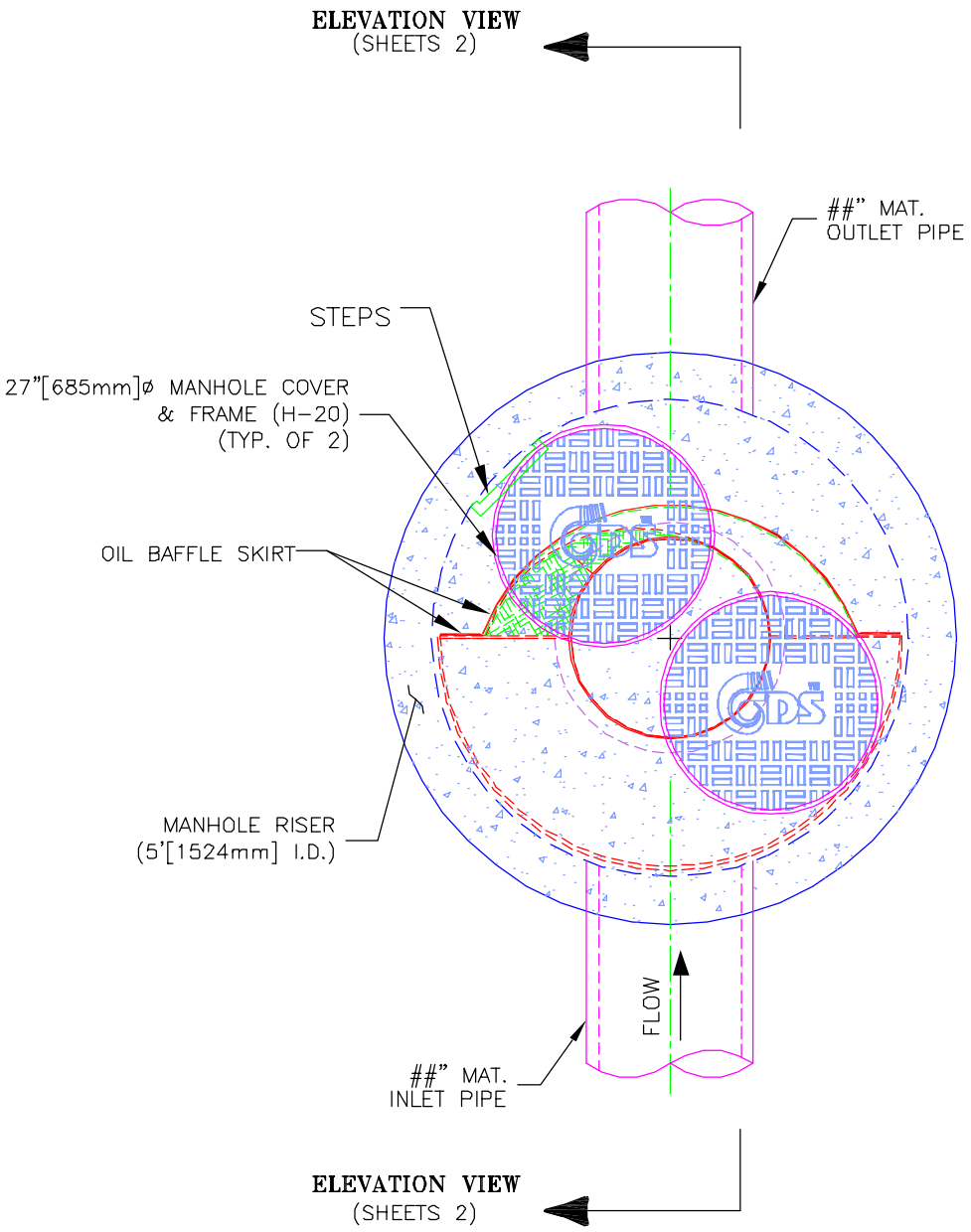
Predicted Net Annual Load Removal Efficiency = 82.7%

Predicted Annual Rainfall Treated = 97.8%

1 - Based on 42 years of hourly rainfall data from Canadian Station 6105976, Ottawa ON

2 - Reduction due to use of 60-minute data for a site that has a time of concentration less than 30-minutes.

PLAN VIEW

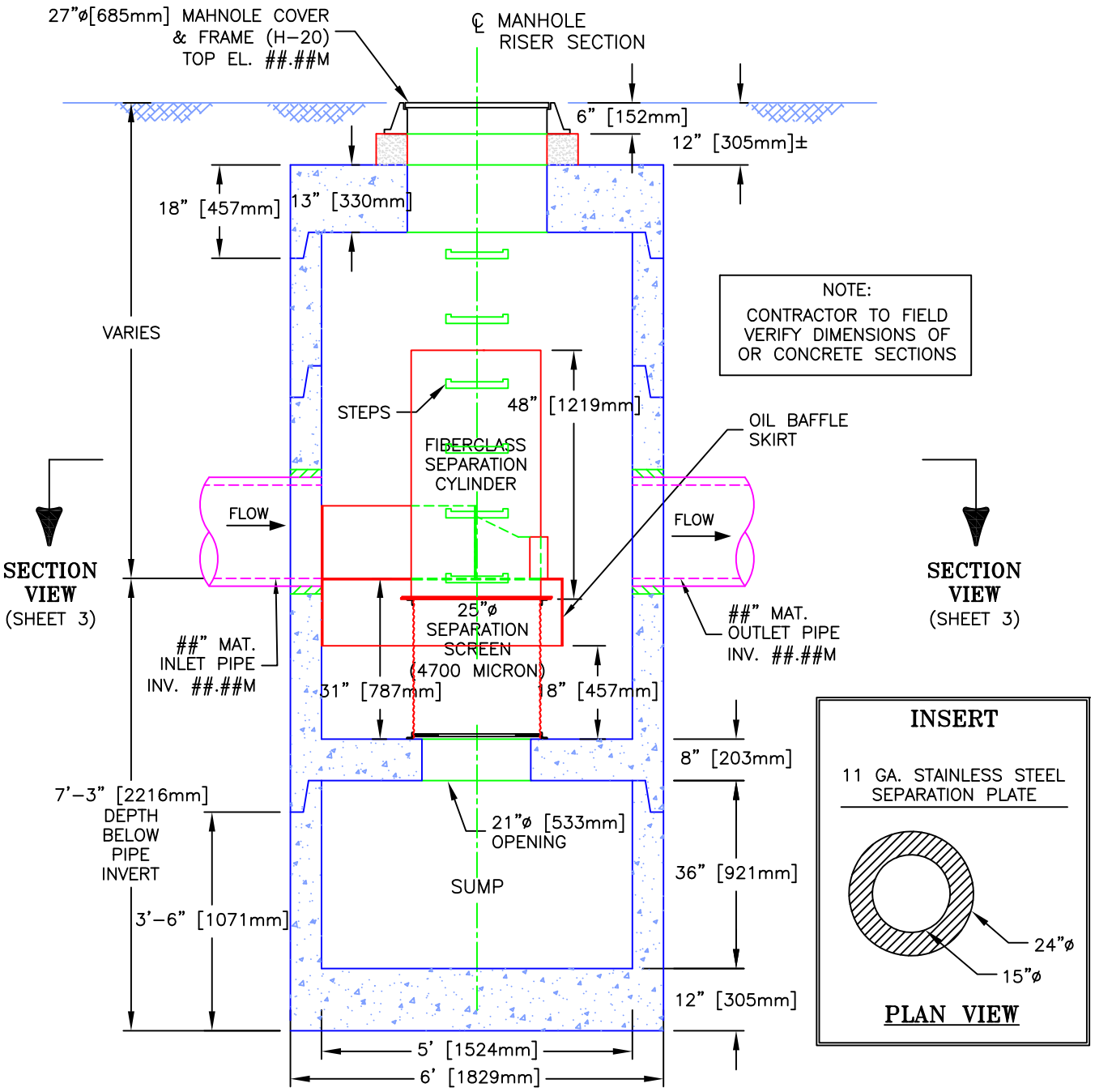


MODEL CDS20_20m, 31 L/s TREATMENT CAPACITY
STORM WATER TREATMENT UNIT

CONTECH STORMWATER SOLUTIONS	PROJECT NAME CITY, STATE	JOB# XX-##-###	SCALE 1" = 2'
		DATE ##/##/##	SHEET
		DRAWN INITIALS	1
		APPROV.	

Echelon Environmental 505 Hood Road, Unit 26, Markham, Ontario L3R 5V6 Tel: (905) 948-0000 Fax: (905) 948-0577

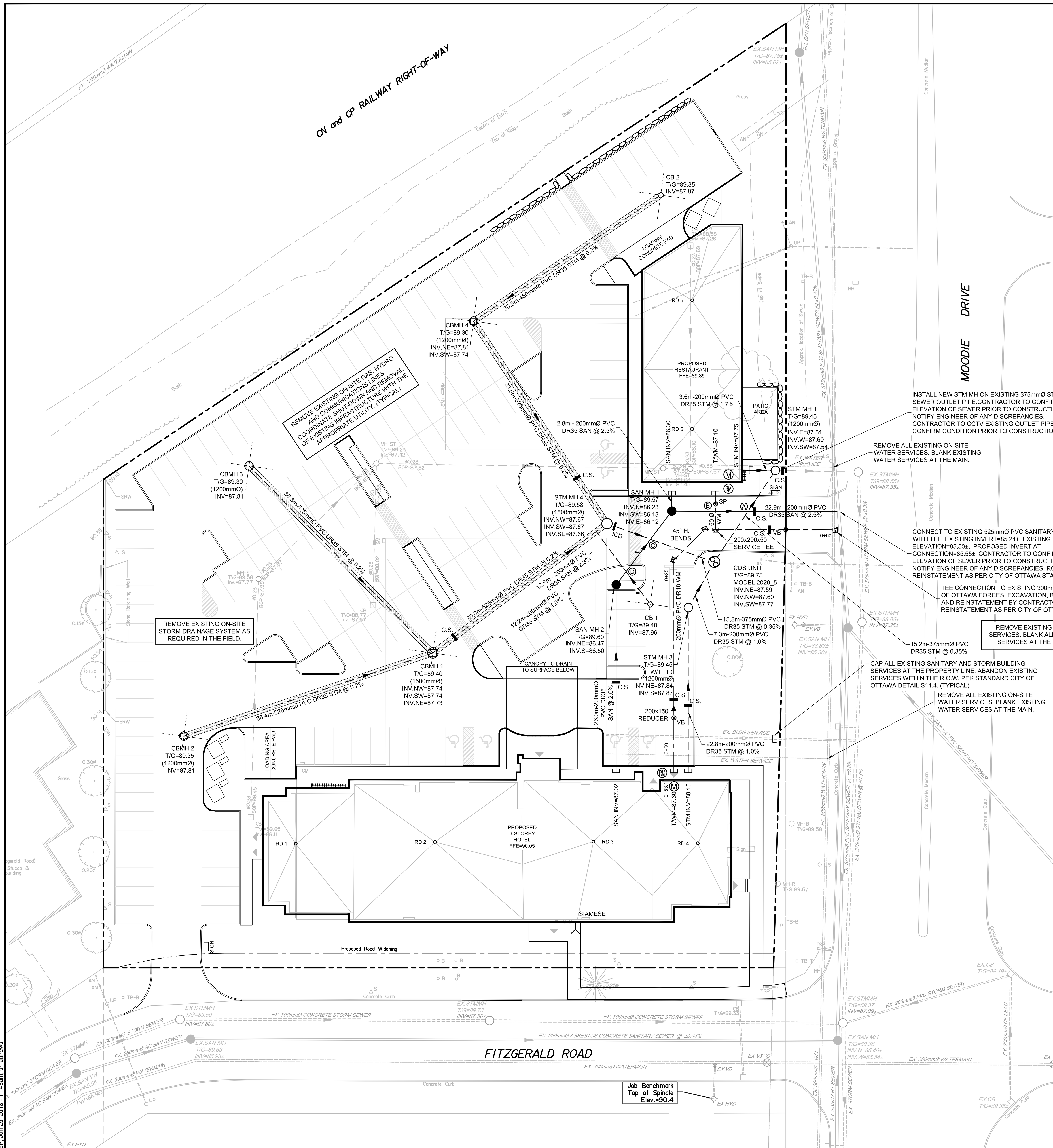
ELEVATION VIEW



MODEL CDS20_20m, 31 L/s TREATMENT CAPACITY STORM WATER TREATMENT UNIT

CONTECH STORMWATER SOLUTIONS	PROJECT NAME CITY, STATE	JOB# XX-##-###	SCALE 1" = 2.5'
		DATE ##/##/##	SHEET 2
		DRAWN INITIALS	
		APPROV.	

Echelon Environmental 505 Hood Road, Unit 26, Markham, Ontario L3R 5V6 Tel: (905) 948-0000 Fax: (905) 948-0577



INLET CONTROL DEVICE DATA TABLE - STM MH 4

DESIGN EVENT	ICD TYPE (HYDROVEX MODEL)	DIAMETER OF OUTLET PIPE (mm)	DESIGN FLOW (L/s)	DESIGN HEAD (m)	WATER ELEVATION (m)	VOLUME (m^3)	AVAILABLE STORAGE
1:2 YR	HYDROVEX (150 VHV-2)	375mmØ PVC	36.1	1.62	89.28	45.8	281.6 m^3
1:5 YR	HYDROVEX (150 VHV-2)	375mmØ PVC	38.0	1.77	89.43	79.4	
1:100 YR	HYDROVEX (150 VHV-2)	375mmØ PVC	39.0	1.86	89.52	211.2	

HOTEL ROOF DRAIN TABLE: AREA R-1 (ROOF DRAINS 1 to 4)

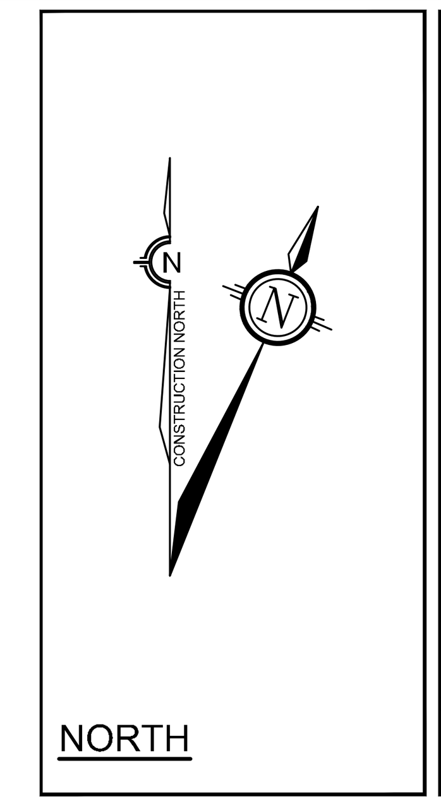
AREA ID *	ROOF DRAIN No. (WATTS MODEL)	ROOF DRAIN OPENING SETTING	1:5 YEAR RELEASE RATE	APPROX. 5-YR PONDING DEPTH	1:100 YEAR RELEASE RATE	APPROX. 100-YR PONDING DEPTH
R-1	RD 1 (RD-100-A-ADJ)	1/4 EXPOSED	0.79 L/s	11 cm	0.95 L/s	14 cm
R-1	RD 2 (RD-100-A-ADJ)	1/4 EXPOSED	0.79 L/s	11 cm	0.95 L/s	15 cm
R-1	RD 3 (RD-100-A-ADJ)	1/4 EXPOSED	0.79 L/s	11 cm	0.95 L/s	15 cm
R-1	RD 4 (RD-100-A-ADJ)	1/4 EXPOSED	0.79 L/s	10 cm	0.87 L/s	13 cm

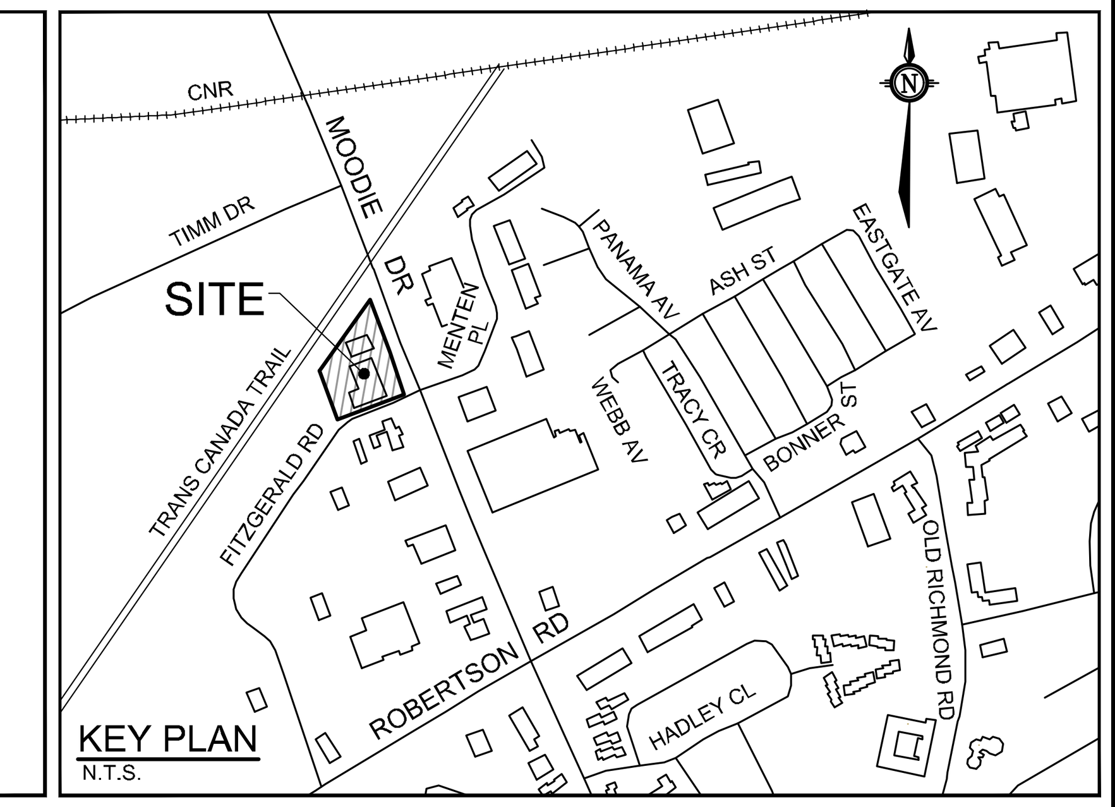
RESTAURANT ROOF DRAIN TABLE: AREA R-2 (ROOF DRAINS 5 to 6)

AREA ID *	ROOF DRAIN No. (WATTS MODEL)	ROOF DRAIN OPENING SETTING	1:5 YEAR RELEASE RATE	APPROX. 5-YR PONDING DEPTH	1:100 YEAR RELEASE RATE	APPROX. 100-YR PONDING DEPTH
R-2	RD 5 (RD-100-A-ADJ)	1/4 EXPOSED	0.79 L/s	10 cm	0.87 L/s	13 cm
R-2	RD 6 (RD-100-A-ADJ)	1/4 EXPOSED	0.79 L/s	10 cm	0.95 L/s	13 cm

* REFER TO THE 'DEVELOPMENT SERVICING STUDY AND STORMWATER MANAGEMENT REPORT' (R-2018-029) PREPARED BY NOVATECH FOR DRAINAGE AREA IDENTIFIERS AND STORMWATER MANAGEMENT DETAILS.

**ALL CONTROLLED FLOW ROOF DRAINS FOR THE PROPOSED BUILDING TO BE WATTS 'ADJUSTABLE ACCUTROL' ROOF DRAINS.

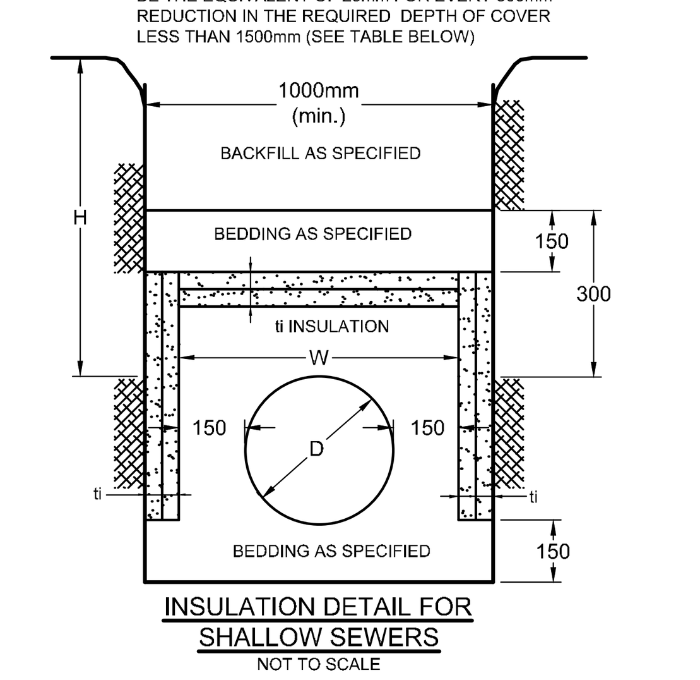




INSULATION NOTES:
1. THE THICKNESS OF SEWER INSULATION SHALL BE THE EQUIVALENT OF 25mm FOR EVERY 300mm REDUCTION IN THE REQUIRED DEPTH OF COVER LESS THAN 1500mm (SEE TABLE BELOW)

ti = THICKNESS OF INSULATION (mm)
h = DEPTH OF COVER
W = D + 300 (1000 min.)
W = WIDTH OF INSULATION (mm)
D = O.D OF PIPE (mm)

COVER (mm)	INSULATION THICKNESS (mm)
1500-1200	75
1200-900	100
900-600	125



INSULATION DETAIL FOR SHALLOW SEWERS
NOT TO SCALE

LEGEND

- SAN MH 1 — PROPOSED SANITARY MH & SEWER
- CBMH 3 — PROPOSED CATCHBASIN MANHOLE & SEWER INCLUDING RADIAL SUBDRAINS (PER GEOTECHNICAL REPORT)
- STM MH 1 — PROPOSED STORM MANHOLE & SEWER
- CB 2 — PROPOSED CATCHBASIN AND LEAD INCLUDING RADIAL SUBDRAINS (PER GEOTECHNICAL REPORT)
- HYD / VB — PROPOSED HYDRANT c/w VALVE & VALVE BOX
- PROPOSED BARRIER CURB
- DC — PROPOSED DEPRESSED CURB
- 200mmØ — PROPOSED WATERMAIN AND DIAMETER
- SP — PROPOSED STANDPOST
- BEND — PROPOSED BEND AND THRUSTBLOCK 11.25°, 22.5°, 45° or TEE
- PROPOSED CAP
- ICD — PROPOSED INLET CONTROL DEVICE
- RD — CONTROLLED FLOW ROOF DRAIN
- THERMAL INSULATION FOR SHALLOW SEWERS
- PROPOSED BUILDING ENTRANCE
- C.S. — PROPOSED CLAY SEAL SEEPAGE BARRIER (PER GEOTECHNICAL REPORT)
- EXISTING CONCRETE CURB
- SANMH — EXISTING SANITARY MANHOLE AND SEWER
- CBMH — EXISTING CATCHBASIN MANHOLE
- STMMH — EXISTING STORM MANHOLE AND SEWER
- CB — EXISTING CATCHBASIN C/W CATCHBASIN LEAD
- HYD — EXISTING HYDRANT
- EX UP — EXISTING UTILITY POLE C/W GUY WIRES
- 300mmØ WM — EXISTING WATERMAIN
- HYD — EXISTING HYDRANT C/W VALVE & LEAD
- LS — EXISTING LIGHT STANDARD
- EXISTING FENCE
- OHW — EXISTING OVERHEAD UTILITY WIRES
- M / RM — PROPOSED WATER METER AND REMOTE METER
- GM — PROPOSED GAS METER

PIPE CROSSING TABLE

CROSSING	LOWER PIPE	HIGHER PIPE	CLEARANCE	SURFACE ELEVATION
A	200mmØ SAN OBV=85.86	375mmØ STM INV=87.56	± 1.7m	89.40 m
B	200mmØ SAN OBV=85.97	50mmØ B/WM=87.02	± 1.0m	89.49 m
C	200mmØ SAN OBV=86.49	375mmØ STM INV=87.64	± 1.1m	89.51 m
D	200mmØ SAN OBV=86.62	200mmØ STM INV=87.90	± 1.3m	89.55 m

PROPOSED WATER SERVICE TABLE

STATION	SURFACE ELEVATION	T/WM ELEVATION	COMMENTS
0+00	88.90±	86.50± *	TEE CONNECTION TO EXISTING 300mmØ WM
0+06.4	89.30	86.80	200mmØ VALVE AND VALVE BOX @ PROPERTY LINE
0+13.4	89.44	86.95	CROSS BELOW 375mmØ STM (±0.6m CLEARANCE)
0+16.2	89.50	87.05	200 x 200 x 50 SERVICE TEE (RESTAURANT)
0+17.7	89.52	87.05	45° HORIZONTAL BEND
0+21.9	89.53	87.05	CROSS BELOW 375mmØ STM (±0.6m CLEARANCE)
0+23.7	89.50	87.05	45° HORIZONTAL BEND
0+25	89.47	87.05	- - -
0+28 to 0+32	89.43±	87.05 **	INSULATE IN PROXIMITY TO OPEN STRUCTURES
0+44.6	89.60	87.20	200 x 150 REDUCER
0+45.6	89.62	87.22	150mmØ VALVE AND VALVE BOX
0+50	89.77	87.27	- - -
0+53.1	89.90	87.30	CAP 1.0m FROM BUILDING FACE

* 300mm x 300mm x 200mm TEE CONNECTION TO EXISTING 300mmØ WATERMAIN. EXACT ELEVATION TO BE FIELD DETERMINED.

** PROVIDE THERMAL INSULATION AS PER CITY OF OTTAWA DETAIL W23 AND DETAIL W22 WHERE COVER IS LESS THAN 2.4m AND/OR ADJACENT TO OPEN STRUCTURES.

WATERMAIN NOTES:

1. 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 BY CITY OF OTTAWA FORCES. CHLORINATION OF THE WATER SYSTEM SHALL BE PERFORMED BY THE CONTRACTOR IN THE PRESENCE CITY OF OTTAWA FORCES.
2. SPECIFICATIONS:

ITEM	SPEC. No.	REFERENCE
WATERMAIN TRENCHING	W17	CITY OF OTTAWA
THERMAL INSULATION IN SHALLOW TRENCHES	W22	CITY OF OTTAWA
THERMAL INSULATION AT OPEN STRUCTURES	W23	CITY OF OTTAWA
50mm SERVICE LINE	W33	CITY OF OTTAWA
50mm SERVICE POST	W35	CITY OF OTTAWA
WATERMAIN	PVC DR 18	

3. WATERMAIN SHALL BE MINIMUM 2.4m DEPTH BELOW GRADE UNLESS OTHERWISE INDICATED.
4. PROVIDE MINIMUM 0.5m 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.

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 $5,000,000.00. 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 AND ENGINEER.
6. REMOVE FROM SITE ALL EXCESS EXCAVATED MATERIAL, ORGANIC MATERIAL AND DEBRIS UNLESS OTHERWISE INSTRUCTED BY ENGINEER. EXCAVATE AND REMOVE FROM SITE ANY CONTAMINATED MATERIAL. ALL CONTAMINATED MATERIAL SHALL BE DISPOSED OF AT A LICENSED LANDFILL FACILITY.
7. ALL ELEVATIONS ARE GEODETIC.
8. REFER TO GEOTECHNICAL INVESTIGATION REPORT (NO. PG4148-1, DATED JUNE 23, 2017) AND GEOTECHNICAL MEMORANDUM (NO. PG4148-MEMO.01R, DATED APRIL 18, 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 HARD SURFACED AREAS AND DIMENSIONS.
10. REFER TO THE 'DEVELOPMENT SERVICING STUDY AND STORMWATER MANAGEMENT REPORT' (R-2018-029) PREPARED BY NOVATECH ENGINEERING CONSULTANTS LTD.
11. SAW CUT AND KEY GRIND ASPHALT AT ALL ROAD CUTS AND ASPHALT TIE IN POINTS AS PER CITY OF OTTAWA STANDARDS (R10).
12. PROVIDE LINE/PARKING PAINTING.
13. CONTRACTOR TO PROVIDE THE CONSULTANT WITH A GENERAL PLAN OF SERVICES 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 LOCATIONS, T/WM ELEVATIONS AND ANY ALIGNMENT CHANGES, ETC.

13. SNOW IS TO BE REMOVED FROM THE SITE. ON-SITE SNOW STORAGE WILL NOT BE PROVIDED.

SEWER NOTES:

1. SUPPLY AND CONSTRUCT ALL SEWERS AND APPURTENANCES IN ACCORDANCE WITH THE MOST CURRENT CITY OF OTTAWA STANDARDS AND SPECIFICATIONS.
2. SPECIFICATIONS:

ITEM	SPEC. No.	REFERENCE
CATCHBASIN (600x600mm)	705.010	OPSD
STORM / SANITARY MANHOLE (1200mmØ)	701.010	OPSD
STORM MANHOLE (1500mmØ)	701.020	OPSD
CB, FRAME & COVER	400.020	OPSD
STORM / SANITARY MH FRAME & COVER	401.010	OPSD
WATERTIGHT MH FRAME AND COVER	401.030	OPSD
SEWER TRENCH	S6	CITY OF OTTAWA
STORM SEWER	PVC DR 35	
SANITARY SEWER	PVC DR 35	
CATCHBASIN LEAD	PVC DR 35	

3. ALL STORM AND SANITARY SERVICE LATERALS SHALL BE EQUIPPED WITH BACKFLOW PREVENTION DEVICES AS PER THE CITY OF OTTAWA STANDARD DETAILS S14 AND S14.1 OR S14.2.
4. INSULATE ALL PIPES (SAN/STM) THAT HAVE LESS THAN 1.5m COVER WITH HI-40 INSULATION PER INSULATION DETAIL FOR SHALLOW SEWERS. PROVIDE 150mm CLEARANCE BETWEEN PIPE AND INSULATION.
5. SERVICES ARE TO BE CONSTRUCTED TO 1.0m FROM FACE OF BUILDING AT A MINIMUM SLOPE OF 1.0%.
6. 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.
7. 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.
8. THE OWNER SHALL REQUIRE THAT THE SITE SERVICING CONTRACTOR PERFORM FIELD TESTS FOR QUALITY CONTROL OF ALL SANITARY SEWERS. LEAKAGE TESTING SHALL BE COMPLETED IN ACCORDANCE WITH OPSS 410.07.16, 410.07.16.04 AND 407.07.24. DYE TESTING IS TO BE COMPLETED ON ALL SANITARY SERVICES TO CONFIRM PROPER CONNECTION TO THE SANITARY SEWER MAIN. THE FIELD TESTS SHALL BE PERFORMED IN THE PRESENCE OF A CERTIFIED PROFESSIONAL ENGINEER WHO SHALL SUBMIT A CERTIFIED COPY OF THE TEST RESULTS.
9. ALL STORM MANHOLES AND CATCHBASIN MANHOLES ARE TO HAVE 300mm SUMPS UNLESS OTHERWISE INDICATED. ALL CATCHBASINS ARE TO HAVE 600mm SUMPS UNLESS OTHERWISE INDICATED.
10. ALL CATCHBASINS, MANHOLES AND/OR CATCHBASIN MANHOLES THAT ARE TO HAVE ICD'S INSTALLED WITHIN THEM ARE TO HAVE 600mm SUMPS.
11. ALL WEEPING TILE CONNECTIONS TO BE MADE TO THE PROPOSED STORM SEWER SYSTEM DOWNSTREAM OF ANY INLET CONTROL DEVICES.
12. 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.

NOT FOR CONSTRUCTION

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.

HILTON WORLDWIDE Hilton Hampton Inn Colonnade SiteCast™ Construction Corp.

OWNER INFORMATION
COLONNADE HOTEL INVESTMENT LP
16 CONCOURSE GATE, SUITE 200
OTTAWA, ONTARIO, K2E 7S8
c/o CAL KIRKPATRICK
PHONE: (613) 225-8118
Ckirkpatrick@Colonnade.ca

No.	REVISION	DATE	BY
3	REVISED PER CITY COMMENTS	JUN 28/18	FST
2	ISSUED FOR SITE PLAN APPROVAL	APR 16/18	FST
1	ISSUED FOR CLIENT REVIEW	APR 9/18	FST

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

DESIGN SM / FST
CHECKED FST
DRAWN SM
CHECKED SM / FST
APPROVED FST

FOR REVIEW ONLY

LICENSED PROFESSIONAL ENGINEER F.S. THAUVETTE 100041399 June 28, 2018 PROVINCE OF ONTARIO

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LOCATION
CITY OF OTTAWA
300 MOODIE DRIVE

DRAWING NAME
GENERAL PLAN OF SERVICES

PROJECT No. 118007
REV REV # 3
DRAWING No. 118007-GP

D07-12-18-0057
#17663

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PLAN24x36.DWG - 914.4mmx609.6mm

Erosion and Sediment Control Responsibilities:

				During Construction			After Construction Prior to Final Acceptance		After Final Acceptance
	ESC Measure	Symbol	Specification	Installation Responsibility	Inspection/Maintenance Responsibility	Inspection Frequency	Approval to Remove	Removal Responsibility	Inspection/Maintenance Responsibility
Temporary Measures	Silt Fence	---- ----	OPSD 219.110	Developer's Contractor	Developer's Contractor	Weekly (as a minimum)	Consultant	Developer's Contractor	N/A
	Filter Fabric	Location as Indicated in ESC Note #3	Erosion and Sediment Control Notes	Developer's Contractor	Developer's Contractor	Weekly (as a minimum)	Consultant	Developer's Contractor	N/A
	Mud Mat	MM	Drawing Details	Developer's Contractor	Developer's Contractor	Weekly (as a minimum)	Developer's Contractor	Developer's Contractor	N/A
	Dust Control	Location as Required Around Site	Erosion and Sediment Control Notes	Developer's Contractor	Developer's Contractor	Weekly (as a minimum)	Consultant	Developer's Contractor	N/A
	Stabilized Material Stockpiling	Location as Required by Contractor	Erosion and Sediment Control Notes	Developer's Contractor	Developer's Contractor	Weekly (as a minimum)	Developer's Contractor	Developer's Contractor	N/A
	Sediment Basin (for flows being pumped out of excavations)	Location as Required by Contractor	---	Developer's Contractor	Developer's Contractor	After Every Rainstorm	Developer's Contractor	Developer's Contractor	N/A

EROSION AND SEDIMENT CONTROL NOTES :

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.

1. ALL EROSION AND SEDIMENT CONTROLS ARE TO BE INSTALLED TO THE SATISFACTION OF THE ENGINEER AND THE CITY OF OTTAWA, THEY ARE TO BE 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. THESE PRACTICES ARE TO BE IMPLEMENTED IN ACCORDANCE WITH THE CURRENT BEST MANAGEMENT PRACTICES FOR EROSION AND SEDIMENT CONTROL AND SHOULD INCLUDE AS A MINIMUM THOSE MEASURES INDICATED ON THE PLAN.

2. EROSION AND SEDIMENT CONTROL MEASURES WILL BE IMPLEMENTED DURING CONSTRUCTION IN ACCORDANCE WITH THE "GUIDELINES ON EROSION AND SEDIMENT CONTROL FOR URBAN CONSTRUCTION SITES" (GOVERNMENT OF ONTARIO, MAY 1987), THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR MEETING ALL REGULATORY AGENCY REQUIREMENTS.

3. TO PREVENT SURFACE EROSION FROM ENTERING ANY STORM SEWER SYSTEM DURING CONSTRUCTION, FILTER CLOTH WILL BE PLACED UNDER GRATES OF NEARBY CATCHBASINS AND STRUCTURES. A LIGHT DUTY SILT FENCE BARRIER WILL ALSO BE INSTALLED AROUND THE CONSTRUCTION AREA (WHERE APPLICABLE). THESE CONTROL MEASURES WILL REMAIN IN PLACE UNTIL CONSTRUCTION IS COMPLETE.

4. TO LIMIT EROSION: MINIMIZE THE AMOUNT OF EXPOSED SOILS AT ANY GIVEN TIME, RE-VEGETATE EXPOSED AREAS AND SLOPES AS SOON AS POSSIBLE AND PROTECT EXPOSED SLOPES WITH NATURAL OR SYNTHETIC MULCHES.

5. FOR MATERIAL STOCKPILING: MINIMIZE THE AMOUNT OF EXPOSED MATERIALS AT ANY GIVEN TIME; APPLY TEMPORARY SEEDING, TARPS, COMPACTION AND/OR SURFACE ROUGHENING AS REQUIRED TO STABILIZE STOCKPILED MATERIALS THAT WILL NOT BE USED WITHIN 14 DAYS.

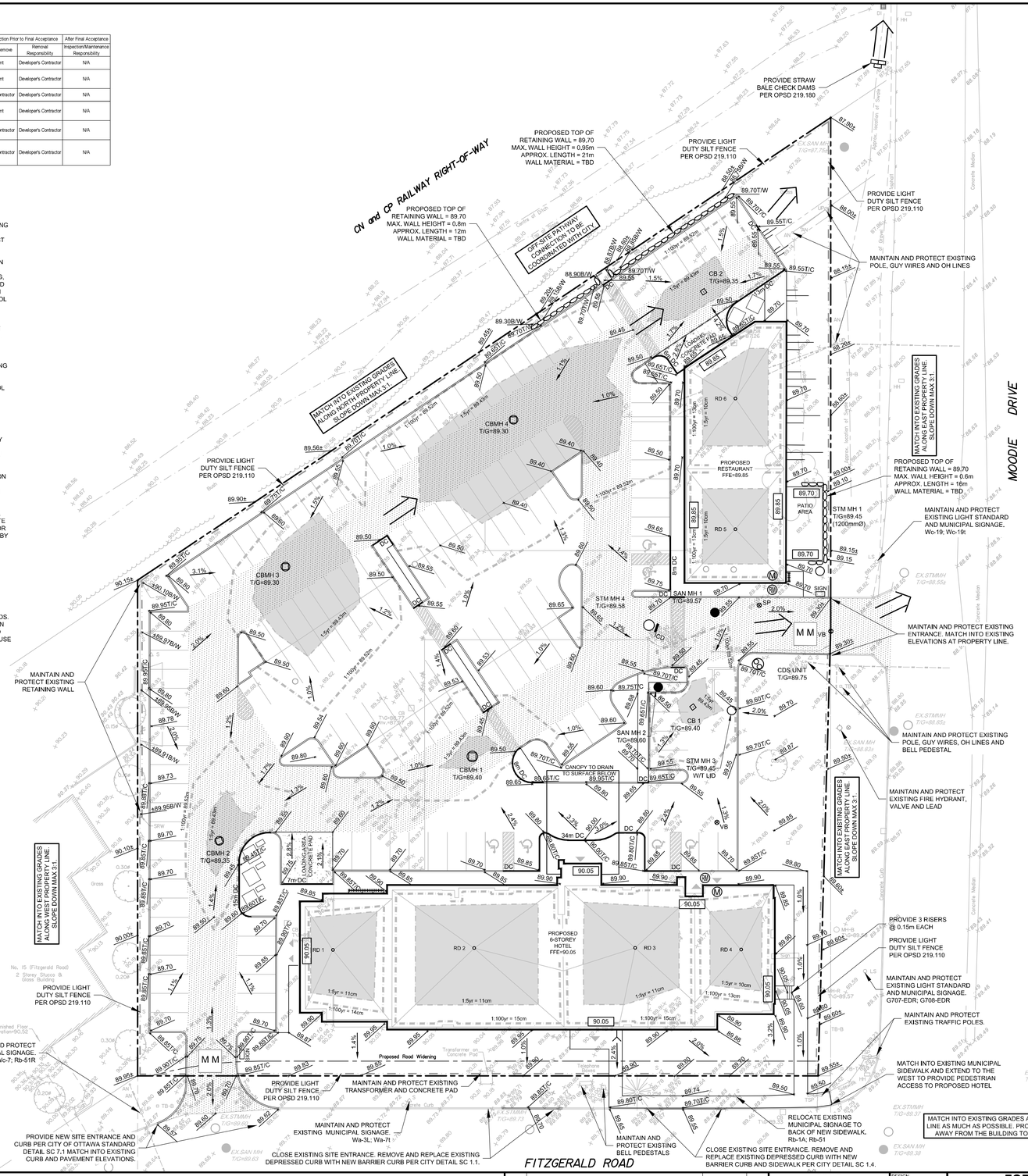
6. THE SEDIMENT CONTROL MEASURES SHALL ONLY BE REMOVED WHEN, IN THE OPINION OF THE ENGINEER, THE MEASURES ARE NO LONGER REQUIRED. NO CONTROL MEASURES MAY BE PERMANENTLY REMOVED WITHOUT PRIOR AUTHORIZATION FROM THE ENGINEER.

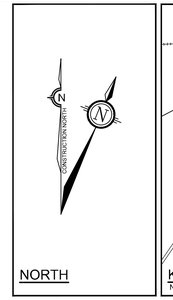
7. THE CONTRACTOR SHALL IMMEDIATELY REPORT TO THE ENGINEER ANY ACCIDENTAL DISCHARGES OF SEDIMENT MATERIAL INTO ANY STORM SEWER SYSTEM. APPROPRIATE RESPONSE MEASURES, INCLUDING ANY REPAIRS TO EXISTING CONTROL MEASURES OR THE IMPLEMENTATION OF ADDITIONAL CONTROL MEASURES, SHALL BE CARRIED OUT BY THE CONTRACTOR WITHOUT DELAY.

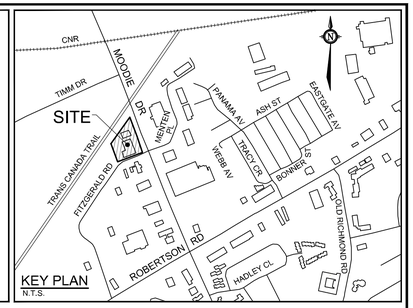
8. THE CONTRACTOR ACKNOWLEDGES THAT FAILURE TO IMPLEMENT EROSION AND SEDIMENT CONTROL MEASURES MAY BE SUBJECT TO PENALTIES IMPOSED BY ANY APPLICABLE REGULATORY AGENCY.

9. ROADWAYS ARE TO BE SWEPT AS REQUIRED OR AS DIRECTED BY THE ENGINEER AND/OR THE MUNICIPALITY.

10. THE CONTRACTOR SHALL ENSURE PROPER DUST CONTROL IS PROVIDED WITH THE APPLICATION OF WATER (AND IF REQUIRED, CALCIUM CHLORIDE) DURING DRY PERIODS. MONITOR DUST LEVELS DURING SITE PREPARATION/EXCAVATION, AND CONSTRUCTION ACTIVITIES, AND WHEN DUST LEVELS BECOME VISUALLY APPARENT SPRAY WATER TO MINIMIZE THE RELEASE OF DUST FROM GRAVEL, PAVED AREAS AND EXPOSED SOILS, USE CHEMICAL DUST SUPPRESSANTS ONLY WHERE NECESSARY ON PROBLEM AREAS.







LEGEND

- 89.65 / 89.86 — PROPOSED ELEVATION / EXISTING ELEVATION
- × 89.44 — EXISTING ELEVATION
- 89.10(S) — PROPOSED SWALE ELEVATION
- 89.85T/C — PROPOSED TOP OF CURB ELEVATION
- 90.05 — PROPOSED TERRACE ELEVATION
- 2.0% — GRADE AND DIRECTION
- MAXIMUM 3:1 SIDESLOPE
- EMERGENCY OVERLAND FLOW ROUTE
- SAN MH 1 — PROPOSED SANITARY MANHOLE
- CBMH 3 — PROPOSED CATCHBASIN MANHOLE
- STM MH 1 — PROPOSED STORM MANHOLE
- CB — PROPOSED CATCHBASIN
- HYD — VVB — PROPOSED HYDRANT AND VALVE
- PROPOSED BARRIER CURB
- DC — PROPOSED DEPRESSED CURB
- ICD — PROPOSED INLET CONTROL DEVICE
- RD — PROPOSED ROOF DRAIN
- FFE=90.05 — PROPOSED FINISHED FLOOR ELEVATION
- PROPOSED BUILDING ENTRANCE
- PROPOSED SILT FENCING (OPSD 219.110)
- M M — PROPOSED MUD MAT / CONSTRUCTION ENTRANCE
- 1:5 YR / 1:100 YR — APPROXIMATE PONDING LIMITS
- EXISTING CONCRETE CURB
- SANMH — EXISTING SANITARY MANHOLE
- CBMH — EXISTING CATCHBASIN MANHOLE
- STMMH — EXISTING STORM MANHOLE
- CB — EXISTING CATCHBASIN
- HYD — VVH — EXISTING HYDRANT & VALVE
- EXISTING TREES / VEGETATION
- EX UP — EXISTING UTILITY POLE C/W GUY WIRES
- EXISTING FENCE
- EXISTING LIGHT STANDARD

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 $5,000,000.00. 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 AND ENGINEER.
6. REMOVE FROM SITE ALL EXCESS EXCAVATED MATERIAL, ORGANIC MATERIAL AND DEBRIS UNLESS OTHERWISE INSTRUCTED BY ENGINEER. EXCAVATE AND REMOVE FROM SITE ANY CONTAMINATED MATERIAL. ALL CONTAMINATED MATERIAL SHALL BE DISPOSED OF AT A LICENSED LANDFILL FACILITY.
7. ALL ELEVATIONS ARE GEODETIC.
8. REFER TO GEOTECHNICAL INVESTIGATION REPORT (NO. PG4148-1, DATED JUNE 23, 2017) AND GEOTECHNICAL MEMORANDUM (NO. PG4148-MEMO.01R, DATED APRIL 18, 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 HARD SURFACE AREAS AND DIMENSIONS.
10. REFER TO THE 'DEVELOPMENT SERVICING STUDY AND STORMWATER MANAGEMENT REPORT' (R-2018-029) PREPARED BY NOVATECH ENGINEERING CONSULTANTS LTD.
11. SAW CUT AND KEY GRIND ASPHALT AT ALL ROAD CUTS AND ASPHALT TIE IN POINTS AS PER CITY OF OTTAWA STANDARDS (R10).
12. PROVIDE LINE/PARKING PAINTING.
13. SNOW IS TO BE REMOVED FROM THE SITE. ON-SITE SNOW STORAGE WILL NOT BE PROVIDED.

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. ANY ADDITIONAL GRANULAR FILL USED BELOW THE PROPOSED PAVEMENT SHOULD BE COMPACTED TO AT LEAST 95% 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.
10. CONTRACTOR TO PROVIDE THE CONSULTANT WITH A GRADING PLAN INDICATING AS-BUILT ELEVATIONS OF ALL DESIGN GRADES SHOWN ON THIS PLAN.

PAVEMENT STRUCTURES:

LIGHT DUTY (NEW PAVEMENT)
50mm HL3 or SUPERPAVE 12.5
150mm GRANULAR "A"
300mm GRANULAR "B" TYPE II
ASPHALT GRADE PG 58-34
*INSTALLED PER GEOTECHNICAL REPORT

HEAVY DUTY (NEW PAVEMENT)
40mm HL3 or SUPERPAVE 12.5
50mm HL8 or SUPERPAVE 19.0
150mm GRANULAR "A"
400mm GRANULAR "B" TYPE II
ASPHALT GRADE PG 58-34
* INSTALLED PER GEOTECHNICAL REPORT

HEAVY DUTY (LOADING DOCKS)
150mm REINFORCED CONCRETE CLASS C1 (MIN 32 MPa)*
100mm GRANULAR "A"
400mm GRANULAR "B" TYPE II
* PER GEOTECHNICAL MEMO

NOT FOR CONSTRUCTION

NOTE:
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HILTON WORLDWIDE — Hilton — Hampton Inn

Colonnade — SiteCast™ Construction Corp.

OWNER INFORMATION
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No.	REVISION	DATE	BY
3	REVISED PER CITY COMMENTS	JUN 28/18	FST
2	ISSUED FOR SITE PLAN APPROVAL	APR 16/18	FST
1	ISSUED FOR CLIENT REVIEW	APR 9/18	FST

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

DESIGN SM / FST
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LOCATION
CITY OF OTTAWA
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DRAWING NAME
GRADING AND EROSION & SEDIMENT CONTROL PLAN

PROJECT No. 118007
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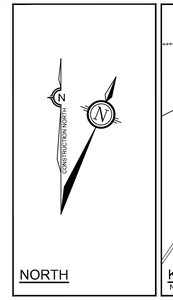

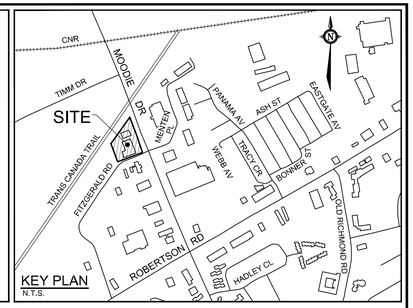

LEGEND

- PROPOSED BARRIER CURB
- DC — PROPOSED DEPRESSED CURB
- DRAINAGE AREA LIMITS
- 1:5 YR / 1:100 YR — APPROXIMATE PONDING LIMITS
- A-1 / 0.109 / 0.86 — POST-DEVELOPMENT AREA ID; POST-DEVELOPMENT DRAINAGE AREA (ha); 1:5 YEAR WEIGHTED RUNOFF COEFICIENT
- STM MH — PROPOSED STORM MANHOLE
- CBMH — PROPOSED CATCHBASIN MANHOLE
- CB — PROPOSED CATCHBASIN
- RD — CONTROLLED FLOW ROOF DRAIN
- OD — UNCONTROLLED OVERFLOW ROOF DRAIN
- PROPOSED STORM SEWER AND FLOW DIRECTION
- ICD — PROPOSED INLET CONTROL DEVICE
- EMERGENCY OVERLAND FLOW ROUTE
- PROPOSED BUILDING ENTRANCE / EXIT
- STM MH — EXISTING STORM MH & SEWER
- CB — EXISTING CATCHBASIN C/W CATCHBASIN LEAD
- MAXIMUM 3:1 SIDESLOPE

INLET CONTROL DEVICE DATA TABLE - STM MH 4

DESIGN EVENT	ICD TYPE (HYDROVEX MODEL)	DIAMETER OF OUTLET PIPE (mm)	DESIGN FLOW (L/s)	DESIGN HEAD (m)	WATER ELEVATION (m)	VOLUME (m^3)	AVAILABLE STORAGE
1:2 YR	HYDROVEX (150 VHV-2)	375mmØ PVC	36.1	1.62	89.28	45.8	
1:5 YR	HYDROVEX (150 VHV-2)	375mmØ PVC	38.0	1.77	89.43	79.4	281.6 m^3
1:100 YR	HYDROVEX (150 VHV-2)	375mmØ PVC	39.0	1.86	89.52	211.2	

HOTEL ROOF DRAIN TABLE: AREA R-1 (ROOF DRAINS 1 to 4)

AREA ID *	ROOF DRAIN No. (WATTS MODEL)	ROOF DRAIN OPENING SETTING	1:5 YEAR RELEASE RATE	APPROX. 5-YR PONDING DEPTH	1:100 YEAR RELEASE RATE	APPROX. 100-YR PONDING DEPTH
R-1	RD 1 (RD-100-A-ADJ)	1/4 EXPOSED	0.79 L/s	11 cm	0.95 L/s	14 cm
R-1	RD 2 (RD-100-A-ADJ)	1/4 EXPOSED	0.79 L/s	11 cm	0.95 L/s	15 cm
R-1	RD 3 (RD-100-A-ADJ)	1/4 EXPOSED	0.79 L/s	11 cm	0.95 L/s	15 cm
R-1	RD 4 (RD-100-A-ADJ)	1/4 EXPOSED	0.79 L/s	10 cm	0.87 L/s	13 cm

RESTAURANT ROOF DRAIN TABLE: AREA R-2 (ROOF DRAINS 5 to 6)

AREA ID *	ROOF DRAIN No. (WATTS MODEL)	ROOF DRAIN OPENING SETTING	1:5 YEAR RELEASE RATE	APPROX. 5-YR PONDING DEPTH	1:100 YEAR RELEASE RATE	APPROX. 100-YR PONDING DEPTH
R-2	RD 5 (RD-100-A-ADJ)	1/4 EXPOSED	0.79 L/s	10 cm	0.87 L/s	13 cm
R-2	RD 6 (RD-100-A-ADJ)	1/4 EXPOSED	0.79 L/s	10 cm	0.95 L/s	13 cm

* REFER TO THE 'DEVELOPMENT SERVICING STUDY AND STORMWATER MANAGEMENT REPORT' (R-2018-029) PREPARED BY NOVATECH FOR DRAINAGE AREA IDENTIFIERS AND STORMWATER MANAGEMENT DETAILS.

**ALL CONTROLLED FLOW ROOF DRAINS FOR THE PROPOSED BUILDING TO BE WATTS 'ADJUSTABLE ACCUTROL' ROOF DRAINS.

NOT FOR CONSTRUCTION

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LICENSED PROFESSIONAL ENGINEER W. J. PETEPIECE 100079354 June 28/18 PROVINCE OF ONTARIO

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