

Engineering

- Land/Site Development
- Municipal Infrastructure
- Environmental/Water Resources
- Traffic/Transportation
- Recreational

Planning

- Land/Site Development
- Planning Application Management
- Municipal Planning
- Urban Design
- Expert Witness (LPAT)
- Wireless Industry

Landscape Architecture

- Streetscapes & Public Amenities
- Open Space, Parks & Recreation
- Community & Residential
- Commercial & Institutional
- Environmental Restoration



PROPOSED COMMERCIAL DEVELOPMENT 3493, 3497 & 3499 INNES ROAD

Development Servicing Study and
Stormwater Management Report

**PROPOSED COMMERCIAL DEVELOPMENT
3493, 3497 & 3499 INNES ROAD**

**DEVELOPMENT SERVICING STUDY AND
STORMWATER MANAGEMENT REPORT**

Prepared by:

NOVATECH

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

December 22, 2022
Revised June 9th, 2023

Ref: R-2022-171
Novatech File No. 118204

June 9th, 2023

6587712 Canada Inc.
1085 Boulevard de la Carriere,
Gatineau, Quebec
J8Y 6V4

Attention: Ms. Valérie Lapensée

**Re: Development Servicing Study and Stormwater Management Report
Proposed Commercial Development
3493, 3497 & 3499 Innes Road, Ottawa, ON
Novatech File No.: 118204**

Enclosed is a copy of the revised 'Development Servicing Study and Stormwater Management Report' for the proposed commercial development of the 3493, 3497 & 3499 Innes Road properties in the City of Ottawa. This report addresses the approach to site servicing and stormwater management, and it is being submitted in support of concurrent Zoning By-Law and Site Plan Control applications.

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

Yours truly,

NOVATECH



François Thauvette, P. Eng.
Senior Project Manager

cc: Natasha Baird, P. Eng. (City of Ottawa)
Rheal Labelle (Hobin Architecture Incorporated)

TABLE OF CONTENTS

1.0	INTRODUCTION	1
1.1	Location and Site Description	1
1.2	Pre-Consultation Information	1
1.3	Proposed Development	1
1.4	Reference Material	2
2.0	SITE SERVICING	2
2.1	Sanitary Sewage	2
2.2	Water for Domestic Use and Fire Protection	3
2.2.1	Water Demands and Watermain Analysis	4
2.3	Storm Drainage and Stormwater Management	6
2.3.1	Stormwater Management Criteria and Objectives	7
2.3.2	Pre-Development Conditions and Allowable Release Rate	7
2.3.3	Post-Development Conditions	7
2.3.3.1	Area OS-1: Uncontrolled Flows from Off-Site Areas	8
2.3.3.2	Area A-0 – Uncontrolled Direct Runoff - Back	8
2.3.3.3	Area A-1 – Uncontrolled Direct Runoff – West Side	8
2.3.3.4	Area A-2 – Controlled Flow from Parking Lot – West Side	8
2.3.3.5	Area A-3 – Controlled Flow from Building A Roof	9
2.3.3.6	Area A-4 – Uncontrolled Direct Runoff - Front	10
2.3.3.7	Area A-5 – Controlled Flow from Parking Lot – East Side	10
2.3.3.8	Area A-6 – Controlled Flow from Roof of Retail B	10
2.3.3.9	Summary of Post- Development Flows	11
2.3.3.10	Stormwater Quality Control	11
3.0	SITE GRADING	12
4.0	GEOTECHNICAL INVESTIGATIONS	13
5.0	EROSION AND SEDIMENT CONTROL	13
6.0	CONCLUSION	13

LIST OF FIGURES

Figure 1 Aerial Plan

LIST OF APPENDICES

Appendix A: Project Correspondence

Appendix B: Development Servicing Study Checklist

Appendix C: Sanitary Sewage Calculations, Sanitary Sewer Design Sheet

Appendix D: Water Demands, FUS Calculations, Watermain Boundary Conditions,
Schematic of the Hydraulic Model and Modelling Results

Appendix E: IDF Curves, SWM Calculations

Appendix F: Inlet Control Device (ICD) Information

Appendix G: Control Flow Roof Drain Information

Appendix H: Stormwater Quality Treatment Unit Information

Appendix I: Engineering Drawings

LIST OF PLANS

General Plan of Services (118204-GP)

Grading and Erosion & Sediment Control Plan (118204-GR)

Pre-Development Storm Drainage Area Plan (118204-STM)

Post-Development Stormwater Management Plan (118204-SWM)

1.0 INTRODUCTION

Novatech has been retained by 6587712 Canada Inc. to complete the site servicing, grading, and stormwater management design for the proposed commercial development. This report is being submitted in support of concurrent Zoning By-Law Amendment and Site Plan Control applications.

1.1 Location and Site Description

The subject site consists of the three properties (3493, 3497 and 3499 Innes Road) which have recently been merged. The merged properties cover an approximate area of 0.600 hectares, based on the proposed Innes Road Right-of-Way Protection. Most of the site is undeveloped, with the exception of a single-story building, garage, and driveway. The subject site is surrounded by an existing commercial property to the west and existing residential lots to the north and east. The legal description of the subject site is designated as Part of Lot 5, Concession 2 (Ottawa Front), Geographic Township of Gloucester, City of Ottawa.

Figure 1: Aerial view of the site



1.2 Pre-Consultation Information

A pre-consultation meeting was held with the City of Ottawa on February 18, 2021, 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. Based on a review of **O. Reg. 525/98: Approval Exemptions**, a Ministry of the Environment, Conservation and Parks (MECP) Environmental Compliance Approval (ECA) will not be required, unless the property is severed. Refer to **Appendix A** for a summary of the correspondence related to the proposed development.

1.3 Proposed Development

The proposed development will consist of two (2) single-storey commercial buildings, with at-grade loading spaces and associated surface parking lots. The proposed commercial development will be serviced by the municipal sanitary sewer, storm sewer and watermain in

Innes Road. The existing buildings on site will be demolished to accommodate the proposed development.

1.4 Reference Material

¹ The Geotechnical Investigation Proposed Development – 3493 -3499 Innes Road - (Report No.: PG5775-LET.01), prepared by Paterson Group on April 5, 2021.

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, the expected sewage flows, and the 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 General Plan of Services (118204-GP) and 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 in the report to confirm that each applicable item is deemed complete and ready for review by City of Ottawa Infrastructure Approvals. Enclosed in **Appendix B** of the report is a completed checklist.

2.1 Sanitary Sewage

The existing building is currently being serviced by the existing 250mm dia. PVC sanitary sewer in Innes Road. Under post-development conditions the proposed development will be serviced by a new on-site sanitary sewer system with a new connection to the municipal sanitary sewer in Innes Road.

The City of Ottawa design criteria and Section 8 of the Ontario Building Code (OBC) were used to calculate the theoretical sanitary flows for the proposed development. The following design criteria were taken from the City of Ottawa Sewer Design Guidelines and subsequent Technical Bulletins:

Commercial Use

- Average Commercial Sewage Flow: 2.8 L/m²/day (ISTB-2018-01)
- Average Sanitary sewage flow (Take-out Restaurant)
 - 190 L per 9.25m²/day (OBC Table 8.2.1.3.B)
- Commercial Peaking Factor = 1.5 (City Water Table 4.2)
- Infiltration Allowance: 0.33 L/s/ha x 0.600 ha site = 0.20 L/s (ISTB-2018-01)

Table 1 identifies the theoretical sanitary flows for the proposed commercial development based on the above design criteria, including a take-out Restaurant in Building B.

Table 1: Theoretical Post-Development Sanitary Flows (with a Take-Out Restaurant)

Building	Use	Floor Area (m ²)/Seats	Average Flow (L/s)	Peaking Factor	Peak Flow (L/s) *
Retail Building A	Mattress Showroom	841m ²	0.03	1.5	0.04
Retail Building B	Commercial	403m ²	0.11		0.16
	Take-out Restaurant**	403m ²			
Infiltration (ha)		0.600	0.20	-	0.20
Sub-Total		-	0.34*	-	0.40*

*Represents rounded values

**Take-out Restaurant was used in the calculations as this would generate a higher sanitary flow than compared to typical commercial use.

Table 1.1 identifies the theoretical sanitary flows for the proposed commercial development based on the above design criteria assuming a typical commercial use for Building B (i.e., not including a take-out Restaurant).

Table 1.1: Theoretical Post-Development Sanitary Flows (without a Take-Out Restaurant)

Building	Use	Floor Area (m ²)/Seats	Average Flow (L/s)	Peaking Factor	Peak Flow (L/s) *
Retail Building A	Mattress Showroom	841m ²	0.03	1.5	0.04
Retail Building B	Commercial	806m ²	0.03		0.04
Infiltration (ha)		0.600	0.20	-	0.20
Sub-Total		-	0.26*	-	0.28*

*Represents rounded values

As requested by the City of Ottawa, the calculations above identify 2 scenarios: Building B commercial flows both including and excluding a take-out restaurant. Under both scenarios, the minimum pipe velocity is not met as the total flow is so minimal. Tenants will have to have a program in place to inspect the plumbing regularly and/or to flush toilets and run the taps more frequently to ensure self-cleansing of the sewer line is achieved. On-site sanitary sewer system pipe slopes have been established to help achieve self-cleansing of the sewers.

A 200mm dia. PVC sanitary sewer at a minimum slope of 1.0% has a full flow conveyance capacity of 34.2 L/s and should have enough capacity to convey the theoretical sanitary flows from the proposed development. Refer to **Appendix C** for detailed sanitary sewage calculations and the Sanitary Sewer Design Sheet.

2.2 Water for Domestic Use and Fire Protection

The existing building is currently being serviced by the 400mm dia. DI watermain in Innes Road. Under post-development conditions, the proposed development will continue to be serviced by the municipal watermain in Innes Road. Both commercial buildings will be fully sprinklered with their respective fire department (siamese) connections located within 45m of the proposed on-site fire hydrant. The water meters will be located within the water entry rooms of the respective buildings, with remote meters on the exterior face of the buildings. The subject site is located

within the City of Ottawa 2E watermain pressure zone. Innes Road will be considered as the fire route for this property.

To determine if the proposed private watermain network and on-site hydrant 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 Water Demands and Watermain Analysis

The theoretical water demands for the proposed development are based on the design criteria from the City of Ottawa Water Distribution Guidelines and section 8 of the Ontario Building Code (OBC). The Fire Underwriters Survey (FUS) method was used to calculate the fire flows based on general assumptions and information provided by the architect. The water demands are calculated based on the following criteria:

- Average Commercial Sewage Flow: 2.8 L/m²/day (ISTB-2018-01)
- Average Sanitary sewage flow (Take-out Restaurant)
 - 190 L per 9.25m²/day (OBC Table 8.2.1.3.B)
- Maximum Day Demand Peaking Factor = 1.5 x Avg. Day Demand (City Water Table 4.2)
- Peak Hour Demand Peaking Factor = 1.8 x Max. Day Demand (City Water Table 4.2)

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

Table 2: Theoretical Water Demand for Proposed Development (with a Restaurant)

Building	Use	Area (m ²)	Avg. Day Demand (L/s)	Max. Day Demand (L/s)	Peak Hour Demand (L/s)	Fire Flow (L/s)
Retail Building A	Mattress Showroom	841m ²	0.03	0.04	0.07	100
Retail Building B	Commercial	403m ²	0.01	0.02	0.04	100
	Take-out Restaurant**	403m ²	0.10	0.14	0.26	
Total for Site			0.14*	0.20*	0.37*	-

*Represents rounded values

** Take-out Restaurant was used in the calculations as this would generate a higher sanitary flow than compared to typical commercial use.

Table 2.1 identifies the theoretical domestic water demands and fire flow requirements for the development based on the above design criteria assuming a typical commercial use for Building B (i.e., not including a take-out Restaurant).

Table 2.1: Theoretical Water Demand for Proposed Development (without a Restaurant)

Building	Use	Area (m ²)	Avg. Day Demand (L/s)	Max. Day Demand (L/s)	Peak Hour Demand (L/s)	Fire Flow (L/s)
Retail Building A	Mattress Showroom	841m ²	0.03	0.04	0.07	100
Retail Building B	Commercial	806m ²	0.03	0.04	0.07	100
Total for Site			0.06*	0.08*	0.14*	-

*Represents rounded values

The fire flow requirement for each building is expected to be in the order of 100 L/s, including both sprinkler system and hose allowances in accordance with the OBC and NFPA 13. The sprinkler system 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. Refer to **Appendix D** for detailed calculations and correspondence from the City of Ottawa.

Table 2.2 summarizes the total theoretical combined fire flow available from the nearby fire hydrants in the event multiple hydrants were used and compares it to the fire flow demands based on FUS calculations.

Table 2.2: Theoretical Fire Protection Summary Table

Building	Fire Flow Demand (L/s)	Fire Hydrant(s) within 75m (~ 95 L/s each)*	Fire Hydrant(s) within 150m (~ 63 L/s each)*	Theoretical Combined Available Fire Flow (L/s)
Retail Building A	100	3	2	>100
Retail Building B	100	3	2	

*Per City of Ottawa Technical Bulletin ISTB-2018-02

Preliminary domestic water demands, and fire flow requirements were provided to the City of Ottawa. **Table 2.3** summarizes preliminary hydraulic analysis results based on municipal watermain boundary conditions provided by the City of Ottawa.

Table 2.3: Hydraulic Boundary Conditions Provided by the City

Municipal Watermain Boundary Condition	Boundary Condition	Normal Operating Pressure Range (psi)	Anticipated WM Pressure (psi)*
Minimum HGL (Peak Hour Demand)	127.4 m	40 psi (min.)	~ 54 psi
Maximum HGL (Avg. Day Demand)	130.9 m	50 - 70 psi	~ 59 psi
HGL (Max Day + 67 L/s Fire Flow)	129.1 m	20 psi (min.)	~ 57 psi
HGL (Max Day + 167 L/s Fire Flow)	128.1 m	20 psi (min.)	~ 55 psi

*Based on an approximate roadway elevation of 91.3m in Innes Road at the service connection (central site entrance). Design pressure = (HGL – watermain elevation) x 1.42197 PSI/m.

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 pressures 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.

The hydraulic model EPANET was used to analyzing the performance of the proposed watermain configuration for three (3) theoretical conditions:

- Peak Hour Demand
- Maximum HGL
- Maximum Day + Fire Flow 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. **Tables 2.4, 2.5, and 2.6** summarize the hydraulic model results.

Table 2.4: Peak Hour Demand

Operating Condition	Minimum System Pressure	Maximum System Pressure
Peak Hour demand of 0.07 L/s at J4 (Bldg A) and 0.30 L/s at J10 (Bldg B)	Minimum system pressure of 346.8 kPa (50.3 psi) is available at J10 (Bldg B)	Maximum system pressure 382.6 kPa (55.4 psi) is available at Node J6 (on-site watermain)

Table 2.5: Maximum HGL

Operating Condition	Minimum System Pressure	Maximum System Pressure
Average Day demand of 0.03 L/s at J4 (Bldg A) and 0.11 L/s at J10 (Bldg B).	Minimum system pressure of 381.1 kPa (55.3 psi) is available at J10 (Bldg B)	Maximum system pressure 416.9 kPa (60.4 psi) is available at Node J6 (on-site watermain)

Table 2.6: Maximum Day + Fire Flow Demand

Operating Condition	Minimum System Pressure	Maximum System Pressure
Max Day demand of 0.04 L/s at J4 (Bldg A) and 0.16 L/s at J10 (Bldg B) and a demand of 100 L/s at Node J8 (on-site hydrant)	Minimum system pressure of 281.1 kPa (40.7 psi) is available at Node J8 (on-site hydrant)	Maximum system pressure 327.3 kPa (47.4 psi) is available at Node J6 (on-site watermain)

The hydraulic analysis indicates that the municipal watermain and private on-site watermain will provide adequate water and system pressures during 'Peak Hour', Max HGL and 'Max Day + Fire Flow' conditions. Pressure reducing valves will not be required as system pressures are not expected to exceed 80 psi during any of the conditions shown in the tables above. Refer to **Appendix D** for detailed calculations, City of Ottawa boundary conditions, the hydraulic modeling schematic, modeling results and correspondence from the City of Ottawa.

2.3 Storm Drainage and Stormwater Management

The existing building is currently being serviced by the existing 1050mm dia. concrete storm sewer in Innes Road. Under post-development conditions, the existing storm lateral will be removed, and the proposed development will be serviced by an on-site storm sewer system with a new connection to the municipal storm sewer in Innes Road. As indicated on the City Record Drawings, the 1050mm dia. municipal storm sewer fronting the subject site is equipped with an inlet control device (ICD) at the downstream end, to control flows prior to discharging into the

450mm dia. sewer in Pagé Road. As a result, the storm sewer being proposed for this development will need to connect above the 100-year HGL elevation of the sewer (89.30m). The approach for the stormwater management design for the site is discussed in the subsequent sections of the report.

2.3.1 Stormwater Management Criteria and Objectives

The stormwater management (SWM) criteria have been provided during pre-consultation meetings with the City of Ottawa and the RVCA. The SWM criteria and objectives are as follows:

- Direct site flows to the municipal storm sewer, rather than maintain existing drainage patterns.
- Provide a dual drainage system (i.e., minor, and major system flows).
- Control post-development storm flows, up to an including the 100-year design event, to the maximum allowable release rate, using a runoff coefficient equivalent to existing conditions, but in no case greater than $C=0.5$, a time of concentration no less than 10 minutes and a 5-year rainfall intensity from City of Ottawa IDF curves.
- Ensure that no surface ponding will occur on the paved surfaces (parking stalls and drive aisles) 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) as required by the RVCA prior to releasing flows from the subject site.
- Provide guidelines to ensure that site preparation and construction is in accordance with the current Best Management Practices for Erosion and Sediment Control.

Refer to **Appendix A** for correspondence from the City of Ottawa and RVCA.

2.3.2 Pre-Development Conditions and Allowable Release Rate

It is assumed that there are currently no on-site stormwater quantity or stormwater quality control measures in place. The uncontrolled pre-development flows from the 0.600 ha site have been calculated using the Rational Method to be approximately 38.1 L/s during the 2-year design event, 51.7 L/s during the 5-year design event and 108.8 L/s during the 100-year design event. The 5-year allowable release rate for the 0.600 ha site, as specified by the City of Ottawa, was calculated to be 51.7 L/s, and excludes any contributing (minor) off-site flows. The allowable release rate was calculated as follows:

$$\begin{aligned}
 T_c &= 10 \text{ min} & C &= 0.30 \\
 I_{5yr} &= 104.2 \text{ mm/hr} & A &= 0.600 \text{ ha} \\
 \\
 Q_{allow} &= 2.78 \text{ CIA} \\
 &= 2.78 \times 0.30 \times 104.2 \times 0.600 \\
 &= 51.7 \text{ L/s}
 \end{aligned}$$

Refer to **Appendix E** for detailed calculations and to Pre-Development Storm Drainage Area Plan (118204-STM) for details.

2.3.3 Post-Development Conditions

The proposed development will be serviced by a new on-site storm sewer system and extending a new 300mm dia. outlet pipe to the existing 1050mm dia. concrete storm sewer in Innes Road. Stormwater runoff from the site will be directed to various catchbasins located within the paved areas. To mitigate the stormwater related impacts due to the increase in imperviousness of the

site, stormwater runoff will be attenuated using control flow drains on the proposed building roofs as well as inlet control devices (ICD) within the on-site storm sewer system. Flows will be controlled for storms up to and including the 100-year design event. Due to the existing grades, runoff from a small portion of the site will drain uncontrolled off site. Refer to the enclosed Post-Development Stormwater Management Plan (118204-SWM) for sub-catchment areas.

2.3.3.1 Area OS-1: Uncontrolled Flows from Off-Site Areas

The uncontrolled post-development flows from sub-catchment area OS-1 were calculated using the Rational Method to be approximately 2.2 L/s during the 2-year design event, 3.0 L/s during the 5-year design event and 6.5 L/s during the 100-year design event. Refer to the Stormwater Management Plan (118204-SWM) and to **Appendix E** for detailed SWM calculations.

Due to the existing topography of the area, the runoff from this (grassed) sub-catchment area will sheet drain onto the subject site, near the southwest property corner as it currently does. These minor flows will simply be directed to proposed CB 112 and directed towards the municipal storm sewer in Innes Road via the on-site storm sewer system.

2.3.3.2 Area A-0 – Uncontrolled Direct Runoff - Back

The uncontrolled post-development flow from this sub-catchment area was calculated using the Rational Method to be approximately 2.8 L/s during the 2-year design event, 3.8 L/s during the 5-year design event and 8.2 L/s during the 100-year design event. Refer to **Appendix E** for detailed SWM calculations.

This is a significant improvement when compared to pre-development conditions, when most of the site was draining to the localized low-lying area near the northeast property corner.

2.3.3.3 Area A-1 – Uncontrolled Direct Runoff – West Side

The uncontrolled post-development flow from this sub-catchment area was calculated using the Rational Method to be approximately 0.9 L/s during the 2-year design event, 1.2 L/s during the 5-year design event and 2.5 L/s during the 100-year design event. Refer to **Appendix E** for detailed SWM calculations.

As described above, this area receives minor flows from Area OS-1 due to the existing topography in the area. The combined (uncontrolled) flows will be captured by CB 112 and directed towards the municipal storm sewer in Innes Road via the on-site storm sewer system.

2.3.3.4 Area A-2 – Controlled Flow from Parking Lot – West Side

The post-development flow from this sub-catchment area will be attenuated by an ICD installed in the outlet pipe of CBMH 106. Stormwater runoff from this sub-catchment area will be temporarily stored underground within the storm sewer system and on the paved parking lot prior to being discharged into the downstream storm sewer system.

Table 3 summarizes the post-development design flow from this sub-catchment area as well as the ICD specifications, the anticipated ponding elevations, storage volumes required and storage volume provided for the 2-year, 5-year and 100-year design events.

Table 3: Stormwater Flows, ICD & Surface Storage

Design Event	Controlled Site Flows from Area A-2					
	ICD Type	Peak Flow	Ponding Depth/Elev.	~Average Flow (50% Qpeak)	Storage Vol. Required*	Max Storage Provided
2-Year	Tempest Vortex LMF Model 100 ICD	11.1.L/s	0.00 m (91.47 m)	5.6 L/s	19.1 m ³	105.8 m ³
5-Year		11.6 L/s	0.09 m (91.59 m)	5.8 L/s	28.9 m ³	
100-Year		11.8 L/s	0.16 m (91.66 m)	5.9 L/s	69.3 m ³	
100-Year (+20%)		11.8 L/s	0.18 m (91.68 m)	>5.9 L/s	88.2 m ³	

*Storage volumes are based on the 50% Qpeak flow rates, which generally represents the average flow.

Refer to **Appendix E** for detailed SWM calculations and to **Appendix F** for ICD information.

As indicated in the table above, this sub-catchment area will provide sufficient storage for the 2-year, 5-year and 100-year design events. The site has been designed to ensure that no stormwater will pond on the paved drive aisles and/or parking stalls during the 2-year storm event. Furthermore, the site grading design will ensure that surface ponding depths will not touch the building envelope or lowest building openings during the 100-year+20% stress test.

2.3.3.5 Area A-3 – Controlled Flow from Building A Roof

The post-development flow from this sub-catchment area will be attenuated using Watts adjustable ‘Accutrol’ control flow roof drains (model number RD-100-A-ADJ: all set to have 1/4 exposed weirs) prior to being directed to the proposed storm service.

Table 3.1 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 the 2-year, 5-year and 100-year design events.

Table 3.1: Retail A - Controlled Flow Roof Drains

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)
			2 Yr	5 Yr	100 Yr	2 Yr	5 Yr	100 Yr	2 Yr	5 Yr	100 Yr	
RD 1	1	RD-100-A-ADJ (1/4 Exposed)	0.75	0.83	0.95	0.09	0.11	0.15	6.1	8.9	19.5	21.1
RD 2	1	RD-100-A-ADJ (1/4 Exposed)	0.79	0.83	0.95	0.10	0.11	0.15	6.9	10.1	22.1	23.3
Total Roof (0.084 ha)	2	-	1.5*	1.7*	1.9*	-	-	-	13.0*	19.0*	41.6*	44.4*

*Table represents rounded values

Refer to **Appendix E** for detailed SWM calculations and **Appendix G** for the control flow roof drain information. As indicated in the table above, the building roof will provide sufficient storage for the 2-year, 5-year and 100-year design events.

2.3.3.6 Area A-4 – Uncontrolled Direct Runoff - Front

The uncontrolled post-development flow from this sub-catchment area was calculated using the Rational Method to be approximately 4.9 L/s during the 2-year design event, 6.6 L/s during the 5-year design event and 13.0 L/s during the 100-year design event. Refer to **Appendix E** for detailed SWM calculations.

2.3.3.7 Area A-5 – Controlled Flow from Parking Lot – East Side

The post-development flow from this sub-catchment area will be attenuated by an ICD installed in the outlet pipe of CBMH 124. Stormwater runoff from this sub-catchment area will be temporarily stored underground within the storm sewer system and on the paved parking lot prior to being discharged into the downstream storm sewer system.

Table 3.2 summarizes the post-development design flow from this sub-catchment area as well as the ICD specifications, the anticipated ponding elevations, storage volumes required and storage volume provided for the 2-year, 5-year and the 100-year design events.

Table 3.2: Stormwater Flows, ICD & Surface Storage

Design Event	Controlled Site Flows from Area A-5					
	ICD Type	Peak Flow	Ponding Depth/Elev.	~Average Flow (50% Qpeak)	Storage Vol. Required*	Max Storage Provided
2-Year	Tempest Vortex LMF Model 100 ICD	11.5 L/s	0.00 m (91.52 m)	5.8 L/s	11.9 m ³	52.1 m ³
5-Year		11.8 L/s	0.06 m (91.61 m)	5.9 L/s	18.6 m ³	
100-Year		12.2 L/s	0.14 m (91.69 m)	6.1 L/s	46.0 m ³	
100-Year (+20%)		12.2 L/s	0.19 m (91.69 m)	>6.1 L/s	59.0 m ³	

*Storage volumes are based on the 50% Qpeak flow rates, which generally represents the average flow.

Refer to **Appendix E** for detailed SWM calculations and to **Appendix F** for ICD information.

As indicated in the table above, this sub-catchment area will provide sufficient storage for the 2-year, 5-year and 100-year design events, but cannot provide sufficient storage for larger storm events (i.e., 100-year + 20%). The site has been designed to ensure that no stormwater will pond on the paved drive aisles and/or parking stalls during the 2-year storm event. Furthermore, the site grading design will ensure that surface ponding depths will not touch the building envelope or lowest building openings during the 100-year+20% stress test. During a large storm, exceeding the 100-year design event, stormwater within the paved areas will overflow towards Innes Road.

2.3.3.8 Area A-6 – Controlled Flow from Roof of Retail B

The post-development flow from this sub-catchment area will be attenuated using Watts adjustable 'Accutrol' control flow roof drains (model number RD-100-A-ADJ: all set to have 1/4 exposed weirs) 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 the 2-year, 5-year and 100-year design events.

Table 3.3: Retail B - Controlled Flow Roof Drains

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)
			2 Yr	5 Yr	100 Yr	2 Yr	5 Yr	100 Yr	2 Yr	5 Yr	100 Yr	
RD 3	1	RD-100-A-ADJ (1/4 Exposed)	0.79	0.83	0.95	0.10	0.11	0.15	5.8	8.6	18.9	20.3
RD 4	1	RD-100-A-ADJ (1/4 Exposed)	0.79	0.83	0.95	0.10	0.11	0.15	6.5	9.5	20.9	22.2
Total Roof (0.080 ha)	2	-	1.6*	1.7*	1.9*	-	-	-	12.3*	18.1*	39.8*	42.5*

*Table represents rounded values

Refer to **Appendix E** for detailed SWM calculations and **Appendix G** for the control flow roof drain information. As indicated in the table above, the building roof will provide sufficient storage for the 2-year, 5-year and 100-year design events.

2.3.3.9 Summary of Post- Development Flows

Table 3.4 compares the post-development site flows from the proposed development to the uncontrolled pre-development flows and to the maximum allowable release rate specified by the City of Ottawa, during the 2-year, 5-year, and the 100-year design events.

Table 3.4: Stormwater Flow Comparison Table

Design Event	Pre-Development Conditions		Drainage Areas A-0 to A-6							
	Ex. Site Flows (L/s)	Max Release Rate (L/s)	Post-Development Conditions							
			A-0 Flow (L/s)	A-1 Flow (L/s)	A-2 Flow (L/s)	A-3 Flow (L/s)	A-4 Flow (L/s)	A-5 Flow (L/s)	A-6 Flow (L/s)	Total Flow (L/s)
2-Yr	38.1	51.7	2.8	0.9	11.1	1.5	4.9	11.5	1.6	34.3
5-Yr	51.7		3.8	1.2	11.6	1.7	6.6	11.8	1.7	38.3
100-Yr	108.8		8.2	2.5	11.8	1.9	13.0	12.2	1.9	51.5

As indicated in the table above, the 2-year, 5-year and 100-year post-development flows will be less than the maximum allowable release rate for the site. Furthermore, this represents a significant reduction in total site flow rate when compared to the respective pre-development conditions. Refer to **Appendix E** for detailed SWM calculations.

2.3.3.10 Stormwater Quality Control

The subject site is located within the jurisdiction of the Rideau Valley Conservation Authority (RVCA). Based on preliminary feedback from the RVCA, surface parking lots and drive aisles will require an 'Enhanced' Level of Protection (i.e.: 80% TSS removal). Landscaped areas and roof tops are considered clean for the purposes of water quality and aquatic habitat protection.

To achieve this level of quality control protection, a new oil-grit separator unit (CDS Model PMSU 2015-4-C) will be installed along the storm sewer outlet pipe from the site. Stormwater runoff collected by the on-site storm sewer system (0.471 ha tributary area) will be directed through the

proposed treatment unit. The contributing area includes the proposed paved parking lot, landscaped areas, loading dock areas and controlled building roofs.

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. 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 2015-4-C will exceed the target removal rate, providing a net annual 83.3% TSS removal. The CDS unit has a treatment capacity of approximately 20 L/s, a sediment storage capacity of 0.838 m³; an oil storage capacity of 232 L and will treat a net annual volume of approximately 98.1% for the tributary area. The on-site catchbasins and storm manhole structures will be equipped with sumps to promote additional settling of sediment.

Maintenance and Monitoring of the Storm Sewer and Stormwater Management Systems

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 ICDs should be inspected to ensure they are free of debris; and the oil-grit separator should be inspected at regular intervals and maintained when necessary to ensure optimum performance. Refer to **Appendix H** 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 existing site generally slopes in a northeastern direction down towards the back property corner. Based on a review of the City's 1:1000 mapping, the northeast property corner of the property represents a localized low-lying area with an elevation of approximately 89.9m. The high points on the subject site are the northwest corner at an elevation of approximately 92.0m and the southeast corner at an approximate elevation of 91.8m. The elevation along the west property line, adjacent to the proposed Retail A building, remains relatively flat at an elevation of approximately 91.0m. The elevation of 91.0m also represents the major overland spill elevation for the neighbouring properties to the north. Under current conditions, the site appears to be sunken as it drops down from the back of sidewalk along Innes Road. Under post-development conditions, the elevation of the site will be raised to ensure the buildings are above the elevation of Innes Road. Raising the site is also necessary to provide adequate cover over the on-site storm sewer system, which needs to be above the 100-year HGL of the 1050mm dia. storm sewer in Innes Road. Raising the site and properly grading it will also significantly reduce the amount of runoff being directed towards the low-lying area near the northeast property corner, by ensuring the major overland flow route is directed towards Innes Road. Another benefit is that it will also minimize the amount of (shallow) bedrock excavation required on-site. The finished floor elevations of the proposed buildings have been set at 92.05m for Proposed Commercial Building A and 92.10 for Proposed Commercial Building B, respectively to accommodate the proposed elevation of the site. The major overland flow route is shown on the design drawings. Refer to the enclosed Grading and ESC Plan (118204-GR) for details.

4.0 GEOTECHNICAL INVESTIGATIONS

The Geotechnical Investigation Proposed Development – 3493 -3499 Innes Road - (Report No.: PG5775-LET.01), prepared by Paterson Group on April 5, 2021. This Geotechnical Investigation Report was prepared for the proposed development. Refer to the Geotechnical Report¹ 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 entrance(s).
- 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 Model PMSU 2015-4-C type Oil/Grit Separator will be installed to provide water quality control prior to releasing stormwater from sub-catchment areas A-2, A-3, A-5, and A-6.

6.0 CONCLUSION

This report has been prepared in support of concurrent Zoning By-Law Amendment and Site Plan Control applications for the proposed commercial development along Innes Road. The conclusions are as follows:

- The proposed development will be serviced by the municipal watermain, sanitary and storm sewers in Innes Road.
- The Commercial buildings will be sprinklered and supplied with fire department (siamese) connections. The fire department connections for each building will be located within 45m of a nearby fire hydrant along Innes Road.

The proposed stormwater design, including both quantity and quality control measures, will ultimately reduce peak flows into the storm sewer system.

- Post-development flow from sub-catchment areas A-2 and A-5 will be controlled by inlet control devices (ICD) installed within the on-site storm sewer system, while

flows from the building roofs area A-3 and A-6 will be attenuated by control flow roof drains.

- The total post-development flow from the subject site will be approximately 34.3 L/s during the 2-year design event, 38.3 L/s during the 5-year event and 51.5 L/s during the 100-year event, all less than the maximum allowable release rate of 51.7 L/s. The post-development flows are also significantly reduced when compared to current uncontrolled conditions.
- Erosion and sediment controls will be provided both during construction and on a permanent basis. An oil / grit separator unit (CDS Model PMSU 2015-4-C) will provide an 'Enhanced' Level of water quality control for the controlled flows from the site discharging into the municipal storm sewer in Innes Road.
- The proposed development also provides an opportunity to improve site drainage by significantly reducing the amount of water being directed to the low-lying area near the northeast property corner and directing it into the municipal storm sewer system.
- Regular inspection and maintenance of the storm sewer system, including the inlet control devices, control flow roof drains and the water quality treatment unit is recommended to ensure that the storm drainage system is clean and operational.

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

NOVATECH

Prepared by:



Chris Visser
Project Coordinator

Reviewed by:



François Thauvette, P. Eng.
Senior Project Manager

APPENDIX A
Project Correspondence

Chris Visser

From: Valerie Lapensee <valerie@matelaslapensee.ca>
Sent: Thursday, September 15, 2022 4:50 PM
To: Kamal Chaouni
Cc: Kayla Blakely; Rheal Labelle
Subject: RE: Pre-Consultation Follow-Up for Zoning By-law Amendment & Site Plan Control - 3493 to 3499 Innes Road

Amazing news!

Thank you! 😊



VALÉRIE LAPENSÉE

1085 boul. de la Carrière
Gatineau, QC, Canada J8Y 6V4

T: 819-777-4877
F: 819-777-3220

 GATINEAU  ORLÉANS  KANATA

www.matelaslapensee.ca



De : Kamal Chaouni
Envoyé : 15 septembre 2022 15:21
À : Valerie Lapensee <valerie@matelaslapensee.ca>
Cc : Kayla Blakely <k.blakely@novatech-eng.com>; Rheal Labelle <rlabelle@hobinarc.com>
Objet : FW: Pre-Consultation Follow-Up for Zoning By-law Amendment & Site Plan Control - 3493 to 3499 Innes Road

Hi Valérie,

As per the below email, the City confirmed there are no additional submission requirements for the updated proposal. As such, we will proceed with preparing the applications and studies as planned, and will continue to coordinate with Hobin to work towards submission.

Please don't hesitate to let me know if you have any questions.

Best,

Kamal Chaouni, B.E.S.(Pl), Planner

NOVATECH Engineers, Planners & Landscape Architects

240 Michael Cowpland Drive, Suite 200, Ottawa, ON, K2M 1P6 | Tel: 613.254.9643 Ext: 224 | Fax: 613.254.5867

The information contained in this email message is confidential and is for exclusive use of the addressee.

From: Murshid, Shoma <Shoma.Murshid@ottawa.ca>
Sent: Thursday, September 15, 2022 2:40 PM
To: Kamal Chaouni <k.chaouni@novatech-eng.com>

Cc: Kayla Blakely <k.blakely@novatech-eng.com>

Subject: RE: Pre-Consultation Follow-Up for Zoning By-law Amendment & Site Plan Control - 3493 to 3499 Innes Road

Good afternoon Kamal,

I apologize for the delay in responding. Please go ahead and make your submission for site plan control. The previous pre-consultation follow-up email and its requirements still stand, save and except the submission fees, which have now been updated as of July/August 2022.

Best wishes,

Shoma Murshid, MCIP, RPP

(she/ her/ elle)

File Lead, Planner II

Responsable de dossier, urbaniste II

City of Ottawa/ Ville d'Ottawa

Development Review (Suburban Services, East)/ Examen des projets d'aménagement (Services suburbains Est)

Planning, Real Estate and Economic Development Department / Direction générale de la planification, des biens immobiliers et du développement économique

110 Laurier Avenue West, 4th Floor, Ottawa ON K1P 1J1/ 110, avenue Laurier Ouest, 4^e étage, Ottawa (Ontario) K1P 1J1

Mail Code/ Code de courrier : 01-14

Tel/ Tél: (613) 580-2424 ext. 15430

Fax/ Téléc. : (613) 580-4751

e-mail/ courriel : shoma.murshid@ottawa.ca

www.ottawa.ca

From: Kamal Chaouni <k.chaouni@novatech-eng.com>

Sent: September 15, 2022 2:03 PM

To: Murshid, Shoma <Shoma.Murshid@ottawa.ca>

Cc: Kayla Blakely <k.blakely@novatech-eng.com>

Subject: RE: Pre-Consultation Follow-Up for Zoning By-law Amendment & Site Plan Control - 3493 to 3499 Innes Road

CAUTION: This email originated from an External Sender. Please do not click links or open attachments unless you recognize the source.

ATTENTION : Ce courriel provient d'un expéditeur externe. Ne cliquez sur aucun lien et n'ouvrez pas de pièce jointe, excepté si vous connaissez l'expéditeur.

Hi Shoma,

I'm just following up to see if you've had a chance to review to the updated proposal for 3493 Innes. Please let me know if a follow-up meeting is necessary.

Thank you,

Kamal Chaouni, B.E.S.(PI), Planner

NOVATECH Engineers, Planners & Landscape Architects

240 Michael Cowpland Drive, Suite 200, Ottawa, ON, K2M 1P6 | Tel: 613.254.9643 Ext: 224 | Fax: 613.254.5867

The information contained in this email message is confidential and is for exclusive use of the addressee.

From: Kamal Chaouni

Sent: Wednesday, August 31, 2022 12:54 PM

To: Murshid, Shoma <Shoma.Murshid@ottawa.ca>

Cc: Kayla Blakely <k.blakely@novatech-eng.com>; valerie@matelaslapensee.ca

Subject: RE: Pre-Consultation Follow-Up for Zoning By-law Amendment & Site Plan Control - 3493 to 3499 Innes Road

Hi Shoma,

I'm reaching out further to your previous communications with my colleagues regarding our client's proposal to rezone and redevelop the properties located 3493, 3497 and 3499 Innes Road for commercial use. A previous pre-application consultation was held with City staff on February 18, 2021 for the subject lands (File No. PC2018-0297). Our client has since been working with their architect to prepare the attached preliminary design package. We note the following revisions that have been made to address design considerations:

- Modified vehicular access from Innes Road to a single full-movement access as exists today;
- Increased clear throat length to eliminate potential traffic queuing concern;
- Increased building setback from the west lot line to allow access for maintenance;
- Addition of terraces to the front of the buildings to complement the streetscape;
- Provision of a 0.75m buffer along the parking lot perimeter abutting the commercial property to accommodate vehicle overhang;
- Refinement of architectural treatment, materials and glazing as shown on the elevation drawings.

In light of the above changes, we would like to follow up with staff for any additional comments prior to proceeding with formal applications. We also wish to confirm there are no changes to submission requirements.

We have reviewed the proposal under the City's new 2021 Official Plan (OP) and believe this proposal continues to be in keeping with the land use and built form policies. We note that, in conformance with Mainstreet Corridor policies, the proposed one-storey buildings are intended to reflect a two-storey built form by virtue of their façade height and design.

We note that the development continues to be designed with consideration for severance which will be sought concurrent with the site plan application in order to allow for independent servicing.

We would be pleased to conduct a follow up meeting with City staff to discuss this proposal further if you wish.

Thank you,

Kamal Chaouni, B.E.S.(Pl), Planner

NOVATECH Engineers, Planners & Landscape Architects

240 Michael Cowpland Drive, Suite 200, Ottawa, ON, K2M 1P6 | Tel: 613.254.9643 Ext: 224 | Fax: 613.254.5867

The information contained in this email message is confidential and is for exclusive use of the addressee.

From: Murshid, Shoma <Shoma.Murshid@ottawa.ca>

Sent: Friday, February 26, 2021 3:01 PM

To: Kayla Blakely <k.blakely@novatech-eng.com>

Cc: Richardson, Mark <Mark.Richardson@ottawa.ca>; Young, Mark <Mark.Young@ottawa.ca>; Mashaie, Sara <sara.mashaie@ottawa.ca>; Giampa, Mike <Mike.Giampa@ottawa.ca>; Francois Thauvette <f.thauvette@novatech-eng.com>; Greg Mignon <g.mignon@novatech-eng.com>; Michel et France Lapensee <mfgolf@hotmail.com>; Rehman, Sami <Sami.Rehman@ottawa.ca>; Wood, Mary Ellen <MaryEllen.Wood@ottawa.ca>

Subject: Pre-Consultation Follow-Up for Zoning By-law Amendment & Site Plan Control - 3493 to 3499 Innes Road

Good afternoon Kayla,

Thank you for meeting with us last Thursday, February 18, 2021, to discuss two new one-storey retail buildings at 3493 to 3499 Innes Road (ranging in GFA from approximately 775 to 845 m²), as per the attached concept. The subject lands are three parcels of land within the General Urban Area

designation and currently zoned R1WW. You wish to rezone the lands to LC6. You wish to pursue a design that allows for a possible severance in the future (or maybe before site plan control approval). I understand there is still a confirmation required whether the lands have merged in title. The City will only permit one service connection per parcel. If you wish to seek more than one service connection and it is “merged”, you will need to submit a severance application and get the deeds created prior to the site plan control approval. If a severance is pursued, this proposal may trigger an MECP ECA review. Please confirm your servicing intent within your Planning Rationale. If this is phased, please indicate the phasing details on the site plan and include the timing for the construction of each building within the Planning Rationale.

I offer the **following planning notes and comments** for your consideration when preparing a final formal submission for site plan control:

- Please review and consider retaining as much of the hedgerow and trees to the east as possible.
- Please provide shade/canopy trees along the street frontage and consider any existing hydro wires and setbacks.
- Please ensure that the current proposal is also considering and accommodating policies, as set out in the draft Official Plan for Mainstreet Corridor.
- When seeking reduced setbacks/buffer for the parking lot perimeter, ensure that there is sufficient space to accommodate the overhang of cars/trucks and that it does not affect the existing and/or fence(s).
- When seeking reduced setbacks to proposed buildings, first ensure there is adequate space between the existing property lines and the proposed buildings in order that there be access for the maintenance of building walls/roof, etc.
- If you wish to pursue a severance application, contact Committee of Adjustment Planner, Lucy Ramirez. Lucy Ramirez can be contacted at:
Lucy.Ramirez@ottawa.ca

She will outline the process under Committee of Adjustment (for submission, process, etc.)

- Please consult with Councillor Dudas before you submit your site plan.
- One vehicular access point is a requirement, as far east of Page Road as possible.
- Please do not forget to design and identify locations of temporary (and/or permanent) snow storage, garbage/green-bin/recyclable pick-up, emergency and protective service turn-arounds (in other words, demonstrate truck turning movements) on your submission documents.
- I do not think it will be required, but double-check with Addressing and Signs plus Fire & Protective Services that addressing on a private lane and Private Road Naming agreement will not be required, re wayfinding. If it is required, I suggest a condition that the private road agreement be entered into and registered prior to the finalization of the severance and can also be dealt with concurrently with the site plan control process.
- The expressed severance request may trigger MECP ECA.
- As part of the site plan control, I would require a JUMA and easements and/or blanket easements be registered, particularly as it is to be developed in phases. The easement(s) for JUMA can be created through the Committee of Adjustment process and we would require the easement to be shown on a registered R-Plan so that the easement can be appropriately described.
- Show the phasing details on the site plan.

Site Plan Control/Zoning By-law Amendment Categories, Required Plans/Studies and Fees for Submission:

I understand the intent is to submit the Site Plan Control and Zoning By-law Amendment applications concurrently. Note, when submitted concurrently, there will be a 10% deduction to the planning fee component of each application.

This proposal triggers Application for “New Development, Standard Non-Rural (Staff Approval, No Public Consultation)” site plan control, as it is approximately 1620 m2 GFA in total for proposed retail uses requiring approximately 55 required parking spaces under the Zoning By-law. This site plan control category has a submission fee requirement that is (planning fee component) \$18,780.86 + the Initial Design Review and Inspection Fee, based on the value of Infrastructure and Landscaping (sliding scale between \$1,000 to \$10K) plus an Initial Conservation Authority Fee of \$1,040.

This proposal also triggers “Zoning By-law Amendment (Major)”. This development application has a submission fee requirement that is (planning fee component) \$21,722.94 + another Initial Conservation Authority Fee of \$390.00.

Plans and reports required at the time of zoning by-law amendment/site plan control submission (PDFs only) shall be:

Site Plan (showing phase details, if applicable)
Grade Control and Drainage Plan
Landscape Plan/can be combined with TCR
TCR
Legal Survey Plan
Topographical Plan of Survey Plan with a published Bench Mark
Planning Rationale
Erosion and Sediment Control Plan
Site Servicing Plan
Traffic Impact Assessment (proceed to scoping)
Site Servicing Study (can be combined with Stormwater Management Report)
Stormwater Management Report
Geotechnical Study
Noise/Vibration Study
Elevations
Floor Plans
Phase 1
ESA

Comments from Engineering, Sara Mashaie:

High-level engineering-related notes below (#1 to #4), and the attached Servicing Memo. The Servicing Memo reflects the engineering design and submission requirements for the Zoning By-law Amendment and Site Plan Control applications, among other relevant information applicable to the said applications. **The Applicant is to consult both the Servicing Memo and the notes listed below.** Note the submission requirements listed below as well.

1. Servicing: please note the existing 250mm. dia. sanitary sewer, 1050mm. dia. storm trunk sewer, and the 400mm. dia. watermain (feedermain) on Innes Rd.

With this, there are two things to consider:

- a. Please note that the City will permit connection to the existing 400mm dia. feedermain on Innes Rd.

- b. The 1050mm. storm trunk sewer in Innes Rd. is controlled at the downstream end by a 279mm. orifice, where it connects to the 450mm. storm sewer on Pagé Rd. This would mean that the 1050mm. storm sewer surcharges and that connections or increased flows to it may be a concern. If a gravity connection is proposed to the 1050mm storm pipe, the Applicant should be aware that the storm pipe will have backwater effects on their system. This should be considered in the design as well as for suitable 100-year + major system flow paths. Any background studies or as-built information for the preparation of submission can be requested from the City, including plan and profiles for the municipal services on Innes Rd. and master infrastructure servicing studies (with updates).

As part of the servicing component, the Applicant is recommended to consult the City's geoOttawa website: (<http://maps.ottawa.ca/geoOttawa/>) for basic information regarding the municipal services on Innes Rd.

2. Geotechnical Considerations: There is varying fill in this area – from silty sand to silty clay, to clay, to bedrock. The requested geotechnical report will have to outline the suitability of the soil conditions and land topography with respect to the type of development proposed.

Please also note the involvement of the Rideau Valley Conservation Authority (RVCA) with respect to the geotechnical considerations and water quality objectives, among other comments which they may have. The comments provided by the RVCA are to be integrated accordingly in the submission.

3. MECP ECA: This site may be subject to an MECP Environmental Compliance Approval (ECA) for the Site Plan Control application. Please consult the Servicing Memo for further information. Please note that an ECA will be required as part of the severance application, should severance be sought by the Applicant.

4. Utilities: Please note the presence of overhead utilities, among other utilities for which coordination with applicable agencies will be required at the time of submission and development.

Requested Zoning By-law Amendment submission documents:

- Site Servicing Report
- Stormwater Management Report (can be combined with the Site Servicing Report)
 - *Essentially, is the municipal system capable of providing the development with water within the City's required pressure range and have sufficient capacity on the municipal sewer side to support the development? Will stormwater management objectives be met? The report should cover these points accordingly.*

- Geotechnical Report
 - *Similar to the above, what is the suitability of the site for development from a geotechnical perspective? The report should provide recommendations accordingly.*

Requested Site Plan Control Submission Documents:

- Site Servicing Plan
- Site Servicing Report
- Stormwater Management Report (can be combined with the Site Servicing Report)
- Grade Control and Drainage Plan
- Erosion and Sediment Control Plan (can be combined with the Grade Control and Drainage Plan)
- Geotechnical Report

Design Review Comments, Mark Young:

1. Please ensure that all internal pedestrian access pathways connect to the existing public sidewalk.
2. Please provide glazing and appropriate fenestration along Innes Road (Kanata retail location discussed)
3. Please ensure the building design utilizes noble materials facing the public realm (brick, stone, wood etc.)
4. Please work to retain the cedar hedge at the rear of the property.
5. Please work to maintain the health of the trees on abutting properties.
6. Please provide new landscaping across the frontage of the site. If overhead wires are present, please ensure that the associated Hydro planting guidelines are followed.
7. Please consider providing some clearance between the proposed building and the western property line.
8. A design brief is required in support of the application. Please see attached terms of reference.
9. Depending on the timing of the applications, please ensure that the relevant Official Plan directives are followed. The new Official Plan indicates that this site will now be in a Mainstreet Corridor designation.

Comments from PIED Forestry, Mark Richardson:

1. a Tree Conservation Report (TCR) must be supplied for review along with the suite of other plans/reports required by the City
 - a. an approved TCR is a requirement of Site Plan approval.
2. As of January 1 2021, any removal of privately or publicly (City) owned trees 10cm or larger in diameter requires a tree permit issued under the Tree Protection Bylaw (Bylaw 2020 – 340); the permit will be based on an approved TCR and made available at or near plan approval.
3. The Planning Forester from Planning and Growth Management as well as foresters from Forestry Services will review the submitted TCR
 - a. If tree removal is required, both municipal and privately-owned trees will be addressed in a single permit issued through the Planning Forester
 - b. Compensation may be required for city owned trees – if so, it will need to be paid prior to the release of the tree permit
4. the TCR must list all trees on site by species, diameter and health condition

5. the TCR must list all trees on adjacent sites if they have a critical root zone that extends onto the development site
6. If trees are to be removed, the TCR must clearly show where they are, and document the reason they cannot be retained
7. All retained trees must be shown and all retained trees within the area impacted by the development process must be protected as per City guidelines available at [Tree Protection Specification](#) or by searching Ottawa.ca
 - a. securities may be required for retained trees
 - b. the location of tree protection fencing must be shown on a plan
 - c. show the critical root zone of the retained trees
 - d. if excavation will occur within the critical root zone, please show the limits of excavation
8. the City encourages the retention of healthy trees; if possible, please seek opportunities for retention of trees that will contribute to the design/function of the site.
9. For more information on the process or help with tree retention options, contact Mark Richardson mark.richardson@ottawa.ca or on [City of Ottawa](#)

LP tree planting requirements:

For additional information on the following please contact Tracy.Smith@Ottawa.ca

Minimum Setbacks

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

Tree specifications

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

Hard surface planting

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

Soil Volume

- Please ensure adequate soil volumes are met:

Tree Type/Size	Single Tree Soil Volume (m3)	Multiple Tree Soil Volume (m3/tree)
Ornamental	15	9
Columnar	15	9
Small	20	12

Medium	25	15
Large	30	18
Conifer	25	15

Sensitive Marine Clay

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

Comments from Transportation Engineering Review, Mike Giampa:

1. A TIA is warranted, the consultant should proceed to scoping.
2. The application will not be deemed complete until the submission of the draft step 2-4, including the functional draft RMA package (if applicable) and/or monitoring report (if applicable).
3. Although a full review of the TIA Strategy report (Step 4) is not required prior to an application, it is strongly recommended.
4. Synchro files are required at Step 4.
5. ROW protection on Innes is 37.5m.
6. A Road Noise Impact Study and Stationary Study is required. Retail uses proposed along an arterial (see attached “Microsoft Teams-image” excerpt for why we require a study to investigate the noise levels within the proposed construction) require a noise study. Any exposed mechanical at your subject site and within 100 metres of residential uses requires the stationary noise study investigation as well.
7. The current design is not meeting the Clear throat requirements as per TAC guidelines for arterial roads. Please see attached excerpt, “Clear Throat Length – TAC”.
8. The inclusion of two full movement accesses will not be permitted as they violate the private approach bylaw for spacing. More significant, two full movement accesses could conflict with the continuous two-way left turn lane on Innes. My recommendation is to build a single access as far from the Page/Innes intersection as feasible. Contact me for further discussion.

Comments from Parks & Recreation, Mary Ellen Wood:

With respect to the proposed ZBLA and Site Plan control pre-consultation at the above noted address Parks has have following comments:

- No conveyance of land or payment of money in-lieu under the Parkland dedication by-law is required for the existing commercial use at 3497 Innes Road.
- Cash-in-lieu of parkland dedication will be requested for the undeveloped parcel at 3499 Innes Road and the parcel with the existing shed/garage at 3493 Innes Road.
- If the proposal changes, please circulate to Parks for review and revised comments may apply.

Closing Thoughts:

If there is a need for clarifications or a need for more information, please do not hesitate to contact me.

***Minimum Drawing and File Requirements- All Plans** -Please note that Plans are to be submitted on standard **A1 size** (594mm x 841mm) sheets, saved as PDFs, utilizing an appropriate Metric scale

(1:200, 1:250, 1:300, 1:400, or 1:500). **Provide individual PDF of the DWGs (plans – i.e. not 2 or more sheets per PDF) and for reports please provide one PDF file of the reports. All PDF documents are to be unlocked and flattened.**

Best wishes,

Shoma

Shoma Murshid, MCIP, RPP

File Lead, Planner II

Responsable de dossier, urbaniste II

City of Ottawa/ Ville d'Ottawa

Development Review (Suburban Services, East)/ Examen des projets d'aménagement (Services suburbains Est)

Planning, Infrastructure, and Economic Development Department/ Service de la planification, de l'infrastructure et du développement économique

110 Laurier Avenue West, 4th Floor, Ottawa ON K1P 1J1/ 110, avenue Laurier Ouest, 4^e étage, Ottawa (Ontario) K1P 1J1

Mail Code/ Code de courrier : 01-14

Tel/ Tél: (613) 580-2424 ext. 15430

Fax/ Téléc. : (613) 580-4751

e-mail/ courriel : shoma.murshid@ottawa.ca

www.ottawa.ca

'
This e-mail originates from the City of Ottawa e-mail system. Any distribution, use or copying of this e-mail or the information it contains by other than the intended recipient(s) is unauthorized. Thank you.

Le présent courriel a été expédié par le système de courriels de la Ville d'Ottawa. Toute distribution, utilisation ou reproduction du courriel ou des renseignements qui s'y trouvent par une personne autre que son destinataire prévu est interdite. Je vous remercie de votre collaboration.

'
This e-mail originates from the City of Ottawa e-mail system. Any distribution, use or copying of this e-mail or the information it contains by other than the intended recipient(s) is unauthorized. Thank you.

Le présent courriel a été expédié par le système de courriels de la Ville d'Ottawa. Toute distribution, utilisation ou reproduction du courriel ou des renseignements qui s'y trouvent par une personne autre que son destinataire prévu est interdite. Je vous remercie de votre collaboration.

Francois Thauvette

From: Jamie Batchelor <jamie.batchelor@rvca.ca>
Sent: Monday, December 17, 2018 3:10 PM
To: Francois Thauvette
Subject: RE: Request for Stormwater Quality Control Criteria - 3493 Innes Rd Development

Follow Up Flag: Follow up
Flag Status: Flagged

Good Afternoon Francois,

Stormwater from this site is directed to existing storm sewers on Innes Road which ultimately outlets to the Chapel Hill Stormwater Management Facility approximately 1.7km downstream. The Chapel Hill Stormwater Management Facility was designed as a detention pond and was not designed for water quality treatment. Therefore, onsite water quality controls for enhanced (80% TSS) would be required.

Jamie Batchelor, MCIP,RPP
Planner
jamie.batchelor@rvca.ca



3889 Rideau Valley Drive
PO Box 599, Manotick ON K4M 1A5
T 613-692-3571 | 1-800-267-3504 F 613-692-0831 | www.rvca.ca

This message may contain information that is privileged or confidential and is intended to be for the use of the individual(s) or entity named. If you are not the intended recipient of this e-mail, any use, review, revision, retransmission, distribution, dissemination, copying, printing, or taking of any action in reliance upon this e-mail, is strictly prohibited. If you have received this e-mail in error, please contact the sender and any copy of the e-mail and any printout thereof, immediately. Your cooperation is appreciated.

From: Francois Thauvette <f.thauvette@novatech-eng.com>
Sent: Monday, December 10, 2018 12:43 PM
To: Jamie Batchelor <jamie.batchelor@rvca.ca>
Subject: RE: Request for Stormwater Quality Control Criteria - 3493 Innes Rd Development

Hi Jamie,

To clarify, this is for commercial/office use, not industrial use.

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

The information contained in this email message is confidential and is for exclusive use of the addressee.

From: Francois Thauvette

Sent: Monday, December 10, 2018 12:26 PM

To: Jamie Batchelor <jamie.batchelor@rvca.ca>

Subject: Request for Stormwater Quality Control Criteria - 3493 Innes Rd Development

Hi Jamie,

We are working on a proposed commercial/warehouse development (Matelas Lapensée Mattresses) at 3493 Innes Road and would like to know the stormwater quality control criteria for this project. The development would include a small building and associated surface parking lot. Please review and 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

The information contained in this email message is confidential and is for exclusive use of the addressee.

APPENDIX B

Development Servicing Study Checklist

Servicing study guidelines for development applications

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

- Executive Summary (for larger reports only).
- Date and revision number of the report.
- Location map and plan showing municipal address, boundary, and layout of proposed development.
- Plan showing the site and location of all existing services.
- Development statistics, land use, density, adherence to zoning and official plan, and reference to applicable subwatershed and watershed plans that provide context to which individual developments must adhere.
- Summary of Pre-consultation Meetings with City and other approval agencies.
- Reference and confirm conformance to higher level studies and reports (Master Servicing Studies, Environmental Assessments, Community Design Plans), or in the case where it is not in conformance, the proponent must provide justification and develop a defensible design criteria.
- Statement of objectives and servicing criteria.
- Identification of existing and proposed infrastructure available in the immediate area.
- Identification of Environmentally Significant Areas, watercourses and Municipal Drains potentially impacted by the proposed development (Reference can be made to the Natural Heritage Studies, if available).
- Concept level master grading plan to confirm existing and proposed grades in the development. This is required to confirm the feasibility of proposed stormwater management and drainage, soil removal and fill constraints, and potential impacts to neighbouring properties. This is also required to confirm that the proposed grading will not impede existing major system flow paths.
- Identification of potential impacts of proposed piped services on private services (such as wells and septic fields on adjacent lands) and mitigation required to address potential impacts.
- Proposed phasing of the development, if applicable.

- Reference to geotechnical studies and recommendations concerning servicing.

- All preliminary and formal site plan submissions should have the following information:
 - Metric scale

 - North arrow (including construction North)

 - Key plan

 - Name and contact information of applicant and property owner

 - Property limits including bearings and dimensions

 - Existing and proposed structures and parking areas

 - Easements, road widening and rights-of-way

 - Adjacent street names

4.2 Development Servicing Report: Water

- Confirm consistency with Master Servicing Study, if available
- Availability of public infrastructure to service proposed development
- Identification of system constraints
- Identify boundary conditions
- Confirmation of adequate domestic supply and pressure
- Confirmation of adequate fire flow protection and confirmation that fire flow is calculated as per the Fire Underwriter's Survey. Output should show available fire flow at locations throughout the development.
- Provide a check of high pressures. If pressure is found to be high, an assessment is required to confirm the application of pressure reducing valves.
- 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
- Check on the necessity of a pressure zone boundary modification.
- Reference to water supply analysis to show that major infrastructure is capable of delivering sufficient water for the proposed land use. This includes data that shows that the expected demands under average day, peak hour and fire flow conditions provide water within the required pressure range

- Description of the proposed water distribution network, including locations of proposed connections to the existing system, provisions for necessary looping, and appurtenances (valves, pressure reducing valves, valve chambers, and fire hydrants) including special metering provisions.
- Description of off-site required feeder mains, booster pumping stations, and other water infrastructure that will be ultimately required to service proposed development, including financing, interim facilities, and timing of implementation.
- Confirmation that water demands are calculated based on the City of Ottawa Design Guidelines.
- Provision of a model schematic showing the boundary conditions locations, streets, parcels, and building locations for reference.

4.3 Development Servicing Report: Wastewater

- Summary of proposed design criteria (Note: Wet-weather flow criteria should not deviate from the City of Ottawa Sewer Design Guidelines. Monitored flow data from relatively new infrastructure cannot be used to justify capacity requirements for proposed infrastructure).
- Confirm consistency with Master Servicing Study and/or justifications for deviations.
- Consideration of local conditions that may contribute to extraneous flows that are higher than the recommended flows in the guidelines. This includes groundwater and soil conditions, and age and condition of sewers.
- Description of existing sanitary sewer available for discharge of wastewater from proposed development.
- Verify available capacity in downstream sanitary sewer and/or identification of upgrades necessary to service the proposed development. (Reference can be made to previously completed Master Servicing Study if applicable)
- Calculations related to dry-weather and wet-weather flow rates from the development in standard MOE sanitary sewer design table (Appendix 'C') format.
- Description of proposed sewer network including sewers, pumping stations, and forcemains.
- 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).
- Pumping stations: impacts of proposed development on existing pumping stations or requirements for new pumping station to service development.
- Forcemain capacity in terms of operational redundancy, surge pressure and maximum flow velocity.
- 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.
- Set-back from private sewage disposal systems.
- 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.
- Confirm consistency with sub-watershed and Master Servicing Study, if applicable study exists.
- Storage requirements (complete with calculations) and conveyance capacity for minor events (1:5 year return period) and major events (1:100 year return period).
- Identification of watercourses within the proposed development and how watercourses will be protected, or, if necessary, altered by the proposed development with applicable approvals.
- Calculate pre and post development peak flow rates including a description of existing site conditions and proposed impervious areas and drainage catchments in comparison to existing conditions.
- Any proposed diversion of drainage catchment areas from one outlet to another.
- Proposed minor and major systems including locations and sizes of stormwater trunk sewers, and stormwater management facilities.
- 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.
- Identification of potential impacts to receiving watercourses
- Identification of municipal drains and related approval requirements.
- Descriptions of how the conveyance and storage capacity will be achieved for the development.
- 100 year flood levels and major flow routing to protect proposed development from flooding for establishing minimum building elevations (MBE) and overall grading.

- Inclusion of hydraulic analysis including hydraulic grade line elevations.
- Description of approach to erosion and sediment control during construction for the protection of receiving watercourse or drainage corridors.
- 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.
- Identification of fill constraints related to floodplain and geotechnical investigation.

4.5 Approval and Permit Requirements: Checklist

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

- Conservation Authority as the designated approval agency for modification of floodplain, potential impact on fish habitat, proposed works in or adjacent to a watercourse, cut/fill permits and Approval under Lakes and Rivers Improvement Act. The Conservation Authority is not the approval authority for the Lakes and Rivers Improvement Act. Where there are Conservation Authority regulations in place, approval under the Lakes and Rivers Improvement Act is not required, except in cases of dams as defined in the Act.
- Application for Certificate of Approval (CofA) under the Ontario Water Resources Act.
- Changes to Municipal Drains.
- Other permits (National Capital Commission, Parks Canada, Public Works and Government Services Canada, Ministry of Transportation etc.)

4.6 Conclusion Checklist

- Clearly stated conclusions and recommendations
- Comments received from review agencies including the City of Ottawa and information on how the comments were addressed. Final sign-off from the responsible reviewing agency.
- All draft and final reports shall be signed and stamped by a professional Engineer registered in Ontario

APPENDIX C

Sanitary Sewage Calculations, Sanitary Sewer Design Sheet

3493, 3497 and 3499 Innes Road - Proposed Commercial Development (with Restaurant)

SANITARY SEWAGE ANALYSIS

Commercial		
Retail Building A (Mattress Showroom)	841	m ²
Retail Building B (Commercial)	403	m ²
Retail Building B (Take Out Restaurant)*	403	m ²
Total Commercial Space	1,647	m²
Average Flow - Commercial	2.8	L/m ² /day
Average Flow - Take-Out Restaurant	190	L/9.25m ² /day
Commercial Peaking Factor	1.5	
Average Commercial Flow - Retail A	0.03	L/s
Peak Commercial Flow - Retail A	0.04	L/s
Average Commercial Flow - Retail B	0.11	L/s
Peak Commercial Flow - Retail B	0.16	L/s
Total Peak Commercial Flow	0.20	L/s
Extraneous Flow		
Site Area	0.6	ha
Infiltration Allowance	0.33	L/s/ha
Peak Extraneous Flows	0.20	L/s
Total Peak Sanitary Flow	0.40	L/s

* Take Out Restaurant was used in the calculations as this would generate a higher Sanitary flow than compared to typical commercial use.

**3493, 3497 and 3499 Innes Road - Proposed
 Commercial Development (with no Restaurant)
 SANITARY SEWAGE ANALYSIS**

Commercial		
Retail Building A (Mattress Showroom)	841	m ²
Retail Building B (Commercial)	806	m ²
Total Commercial Space	1,647	m ²
Average Flow - Commercial	2.8	L/m ² /day
Commercial Peaking Factor	1.5	
Average Commercial Flow - Retail A	0.03	L/s
Peak Commercial Flow - Retail A	0.04	L/s
Average Commercial Flow - Retail B	0.03	L/s
Peak Commercial Flow - Retail B	0.04	L/s
Total Peak Commercial Flow	0.08	L/s
Extraneous Flow		
Site Area	0.6	ha
Infiltration Allowance	0.33	L/s/ha
Peak Extraneous Flows	0.20	L/s
Total Peak Sanitary Flow	0.28	L/s

3493, 3497 & 3499 Innes - Commercial Development Sanitary Sewer Design Sheet



PROJECT : 118204
 DESIGNED BY: CV
 CHECKED BY: FT
 DATE: June 6, 2023

Location			Commercial / Institutional		Peak Factor		Commercial / Institutional		Infiltration		PEAK DESIGN FLOW (l/s)	Pipe Data					
Street / Area	From	To	Area (ha)	Accu. Area (ha)	Res Peak Factor	Comm Peak Factor	Peak Flow (l/s)	Accu. Peak Flow	Infil. Flow (l/s)	Accu Infil. Flow		Size (mm)	Slope (%)	Length (m)	Capacity (l/s)	Full Flow Vel. (m/s)	Q/Q _{full} (%)
BLDG A	BLDG	SANMH 103	0.082	0.082	3.8	1.5	0.04	0.04	0.10	0.10	0.14	200	1.0	5.6	32.8	1.04	0.4%
BLDG A	SANMH 103	SANMH 105	0.000	0.082	3.8	1.5	0.00	0.04	0.00	0.10	0.14	200	2.0	21.2	46.3	1.48	0.3%
BLDG B	BLDG	SANMH 107	0.082	0.082	3.8	1.5	0.04	0.04	0.10	0.10	0.14	200	3.0	6.0	56.8	1.81	0.2%
BLDG B	SANMH 107	SANMH 105	0.000	0.082	3.8	1.5	0.00	0.04	0.00	0.10	0.14	200	3.0	18.4	56.8	1.81	0.2%
BLDG A & B	SANMH 105	SANMH 101	0.000	0.164	3.8	1.5	0.00	0.08	0.00	0.20	0.28	200	3.0	12.1	56.8	1.81	0.5%
BLDG A & B	SANMH 101	MAIN	0.000	0.164	3.8	1.5	0.00	0.08	0.00	0.20	0.28	200	3.0	25.2	56.8	1.81	0.5%

City of Ottawa Sewer Design Guidelines

Institutional / Commercial Flow	28000	L/ha/day
Extraneous Flows	0.33	L/s/ha
Residential Peaking Factor	Harmon Equation, Correction Factor = 0.8	
Institutional / Commercial Peaking Factor	1.5	
Take-Out Restaurant	190	L/9.25m ² /day

APPENDIX D

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

3493, 3497 and 3499 Innes Road: 1-Storey Commercial Buildings (Retail A) WATER ANALYSIS

DOMESTIC WATER DEMANDS

Commercial Use	Post-Development	
Retail Building A (Mattress Showroom)	841	m ²
Average Day Demand (28,000 L/ha/day) - Retail A	0.03	L/s
Maximum Day Demand (1.5 x avg. day)	0.04	L/s
Peak Hour Demand (1.8 x max. day)	0.07	L/s
Total Average Day Demand	0.03	L/s
Total Maximum Day Demand	0.04	L/s
Total Peak Hour Demand	0.07	L/s

BOUNDARY CONDITIONS

Peak Hour =	127.4	m
Maximum HGL =	130.9	m
Max Day + Fire Flow =	128.8	m

PRESSURE TESTS

Existing ground elevation at connection	91.3	m
---	------	---

Low Pressure Pressure = (Min. HGL - (Existing Ground Elevation - Watermain Elevation)) x 1.42 PSI/m (should be > 40 PSI)	54.0	PSI
High Pressure Pressure = (Max HGL - (Existing Ground Elevation - Watermain Elevation)) x 1.42 PSI/m (should be between 50- 70 PSI)	59.0	PSI
Max Day + Fire Flow Pressure = (Max Day + Fire Flow - (Existing Ground Elevation - Watermain Elevation)) x 1.42 PSI/m (should be > 20 PSI)	56.0	PSI

3493, 3497 and 3499 Innes Road: 1-Storey Commercial Buildings - Retail B (with Restaurant) WATER ANALYSIS

DOMESTIC WATER DEMANDS

Commercial Use	Post-Development	
Retail Building B (Commercial)	403	m ²
Average Day Demand (28,000 L/ha/day) - Retail A	0.01	L/s
Maximum Day Demand (1.5 x avg. day)	0.02	L/s
Peak Hour Demand (1.8 x max. day)	0.04	L/s
Retail Building B (Take-Out Restaurant)*	403	m ²
Average Day Demand (L/9.25m ² /day) - Retail B	0.10	L/s
Maximum Day Demand (1.5 x avg. day)	0.14	L/s
Peak Hour Demand (1.8 x max. day)	0.26	L/s
Total Average Day Demand	0.11	L/s
Total Maximum Day Demand	0.16	L/s
Total Peak Hour Demand	0.29	L/s

* Take Out Restaurant was used in the calculations as this would generate a higher Sanitary flow than compared to typical commercial use.

BOUNDARY CONDITIONS

Peak Hour =	127.4	m
Maximum HGL =	130.9	m
Max Day + Fire Flow =	128.8	m

PRESSURE TESTS

Existing ground elevation at connection	91.3	m
---	------	---

Low Pressure Pressure = (Min. HGL - (Existing Ground Elevation - Watermain Elevation)) x 1.42 PSI/m (should be > 40 PSI)	54.0	PSI
High Pressure Pressure = (Max HGL - (Existing Ground Elevation - Watermain Elevation)) x 1.42 PSI/m (should be between 50- 70 PSI)	59.0	PSI
Max Day + Fire Flow Pressure = (Max Day + Fire Flow - (Existing Ground Elevation - Watermain Elevation)) x 1.42 PSI/m (should be > 20 PSI)	56.0	PSI

3493, 3497 and 3499 Innes Road: 1-Storey Commercial Buildings - Retail B (without Restaurant) WATER ANALYSIS

DOMESTIC WATER DEMANDS

Commercial Use	Post-Development	
Retail Building B (Commercial)	806	m ²
Average Day Demand (28,000 L/ha/day) - Retail A	0.03	L/s
Maximum Day Demand (1.5 x avg. day)	0.04	L/s
Peak Hour Demand (1.8 x max. day)	0.07	L/s
Total Average Day Demand	0.03	L/s
Total Maximum Day Demand	0.04	L/s
Total Peak Hour Demand	0.07	L/s

* Take Out Restaurant was used in the calculations as this would generate a higher Sanitary flow than compared to typical commercial use.

BOUNDARY CONDITIONS

Peak Hour =	127.4	m
Maximum HGL =	130.9	m
Max Day + Fire Flow =	128.8	m

PRESSURE TESTS

Existing ground elevation at connection	91.3	m
---	-------------	----------

Low Pressure Pressure = (Min. HGL - (Existing Ground Elevation - Watermain Elevation)) x 1.42 PSI/m (should be > 40 PSI)	54.0	PSI
High Pressure Pressure = (Max HGL - (Existing Ground Elevation - Watermain Elevation)) x 1.42 PSI/m (should be between 50- 70 PSI)	59.0	PSI
Max Day + Fire Flow Pressure = (Max Day + Fire Flow - (Existing Ground Elevation - Watermain Elevation)) x 1.42 PSI/m (should be > 20 PSI)	56.0	PSI

FUS - Fire Flow Calculations

As per 2020 Fire Underwriter's Survey Guidelines



Engineers, Planners & Landscape Architects

Novatech Project #: 118204
 Project Name: 3493-3499 Innes Road
 Date: 6/6/2023
 Input By: Chris Visser
 Reviewed By: François Thauvette

Legend
 Input by User
 No Information or Input Required

Building Description: Retail Building A
 Type II - Non-combustible construction

Step	Choose	Value Used	Total Fire Flow (L/min)			
Base Fire Flow						
1	Construction Material		Multiplier			
	C	Type V - Wood frame	1.5			
		Type IV - Mass Timber	Varies			
		Type III - Ordinary construction	1			
		Type II - Non-combustible construction	Yes 0.8			
Type I - Fire resistive construction (2 hrs)		0.6				
2	Floor Area					
	A	Building Footprint (m ²)	841			
		Number of Floors/Storeys	1.65			
		Protected Openings (1 hr)	No			
		Area of structure considered (m ²)	1,535			
F	Base fire flow without reductions		7,000			
Reductions or Surcharges						
3	Occupancy hazard reduction or surcharge		FUS Table 3			
	(1)	Non-combustible	-25%			
		Limited combustible	-15%			
		Combustible	0%			
		Free burning	Yes 15%			
Rapid burning		25%				
4	Sprinkler Reduction		FUS Table 4			
	(2)	Adequately Designed System (NFPA 13)	Yes -30%			
		Standard Water Supply	Yes -10%			
		Fully Supervised System	No -10%			
		Cumulative Sub-Total		-40%		
Area of Sprinklered Coverage (m²)		1,535	111%			
		Cumulative Total	-44%			
5	Exposure Surcharge		FUS Table 6			
	(3)	North Side	20.1 - 30 m 2%			
		East Side	>30m 0%			
		South Side	>30m 0%			
		West Side	10.1 - 20 m 15%			
Cumulative Total		17%				
Results						
6	(1) + (2) + (3)	Total Required Fire Flow, rounded to nearest 1000L/min		L/min	6,000	
		(2,000 L/min < Fire Flow < 45,000 L/min)		or	L/s	100
				or	USGPM	1,585

Novatech Project #: 118204
 Project Name: 3493-3499 Innes Road
 Date: 6/6/2023
 Input By: Chris Visser
 Reviewed By: François Thauvette

Building Description: Retail Building A
Type II - Non-combustible construction
 Automatic Sprinklers Yes
 Retail Building B
 Type V - Wood frame

FUS - Table 6 worksheet

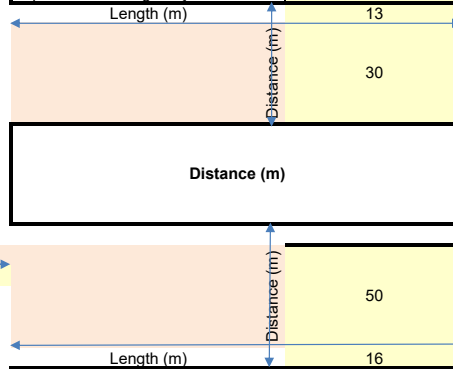
To be used only if adjacent *Exposed Building* construction is known



Calculated Exposure Charges	
Table 6	
North Side	2%
East Side	0%
South Side	0%
West Side	15%
Total	17%

Exposed Building North	
Description/Address	Ex. Residential
Height (storeys*)	2
Construction Type	Type V - Wood frame
Protected Openings	No
Length-Height Factor	26
Automatic Sprinklers	No
Exposure Surcharge Adjustment	2%

(Both bldgs fully sprinklered)



Exposed Building West	
Description/Address	Commercial
Height (storeys*)	1
Construction Type	Type V - Wood frame
Protected Openings	No
Length-Height Factor	14
Automatic Sprinklers	No
Exposure Surcharge Adjustment	15%

Exposed Building East	
Description/Address	Retail Building B
Height (storeys*)	1.65
Construction Type	Type V - Wood frame
Protected Openings	No
Length-Height Factor	66
Automatic Sprinklers	Yes
Exposure Surcharge Adjustment	0%

* Storey assumption is based on 4m or fraction thereof. Adjust number of stories for non-standard storey heights (i.e. 10m single storey warehouse)

Source of Information	

Exposed Building South	
Description/Address	South Side - Innes Road
Height (storeys*)	2
Construction Type	Type V - Wood frame
Protected Openings	No
Length-Height Factor	32
Automatic Sprinklers	No
Exposure Surcharge Adjustment	0%

Legend Input by User
 No Information or Input Required

FUS - Fire Flow Calculations

As per 2020 Fire Underwriter's Survey Guidelines



Engineers, Planners & Landscape Architects

Novatech Project #: 118204
 Project Name: 3493-3499 Innes Road
 Date: 6/6/2023
 Input By: Chris Visser
 Reviewed By: François Thauvette

Legend
 Input by User
 No Information or Input Required

Building Description: Retail Building B
 Type II - Non-combustible construction

Step		Choose		Value Used	Total Fire Flow (L/min)		
Base Fire Flow							
1	Construction Material			Multiplier			
	Coefficient related to type of construction C	Type V - Wood frame		1.5	0.8		
		Type IV - Mass Timber		Varies			
		Type III - Ordinary construction		1			
		Type II - Non-combustible construction	Yes	0.8			
Type I - Fire resistive construction (2 hrs)			0.6				
2	Floor Area						
	A	Building Footprint (m ²)	806				
		Number of Floors/Storeys	1.65				
		Protected Openings (1 hr)	No				
		Area of structure considered (m ²)		1,471			
F	Base fire flow without reductions			7,000			
Reductions or Surcharges							
3	Occupancy hazard reduction or surcharge		FUS Table 3	Reduction/Surcharge			
	(1)	Non-combustible		-25%	15%		
		Limited combustible		-15%			
		Combustible		0%			
		Free burning	Yes	15%			
Rapid burning			25%				
4	Sprinkler Reduction		FUS Table 4	Reduction			
	(2)	Adequately Designed System (NFPA 13)	Yes	-30%	-30%		
		Standard Water Supply	Yes	-10%	-10%		
		Fully Supervised System	No	-10%			
		Cumulative Sub-Total			-40%		
	Area of Sprinklered Coverage (m²)	1,471	111%				
		Cumulative Total	-44%				
5	Exposure Surcharge		FUS Table 6	Surcharge			
	(3)	North Side	20.1 - 30 m		2%		
		East Side	3.1 - 10 m		15%		
		South Side	>30m		0%		
		West Side	>30m		0%		
		Cumulative Total	17%				
Results							
6	(1) + (2) + (3)	Total Required Fire Flow, rounded to nearest 1000L/min			L/min	6,000	
		(2,000 L/min < Fire Flow < 45,000 L/min)			or	L/s	100
					or	USGPM	1,585

Novatech Project #: 118204
 Project Name: 3493-3499 Innes Road
 Date: 6/6/2023
 Input By: Chris Visser
 Reviewed By: François Thauvette

Building Description: Retail Building B
Type II - Non-combustible construction
 Automatic Sprinklers Yes
 Retail Building B
 Type V - Wood frame

FUS - Table 6 worksheet

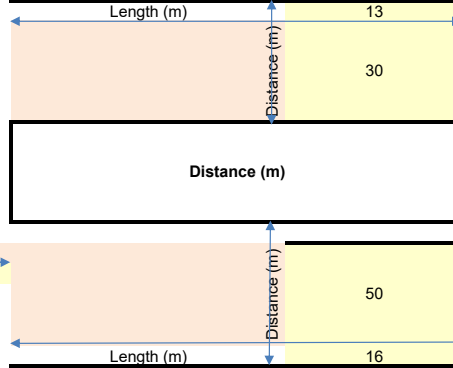
To be used only if adjacent *Exposed Building* construction is known



Calculated Exposure Charges	
Table 6	
North Side	2%
East Side	15%
South Side	0%
West Side	0%
Total	17%

Exposed Building North	
Description/Address	Ex. Residential
Height (storeys*)	2
Construction Type	Type V - Wood frame
Protected Openings	No
Length-Height Factor	26
Automatic Sprinklers	No
Exposure Surcharge Adjustment	2%

(Both bldgs fully sprinklered)



Exposed Building West	
Description/Address	Retail Building a
Height (storeys*)	1.65
Construction Type	Type V - Wood frame
Protected Openings	No
Length-Height Factor	66
Automatic Sprinklers	No
Exposure Surcharge Adjustment	0%

Exposed Building East	
Description/Address	Ex. Residential
Height (storeys*)	2
Construction Type	Type V - Wood frame
Protected Openings	No
Length-Height Factor	16
Automatic Sprinklers	Yes
Exposure Surcharge Adjustment	15%

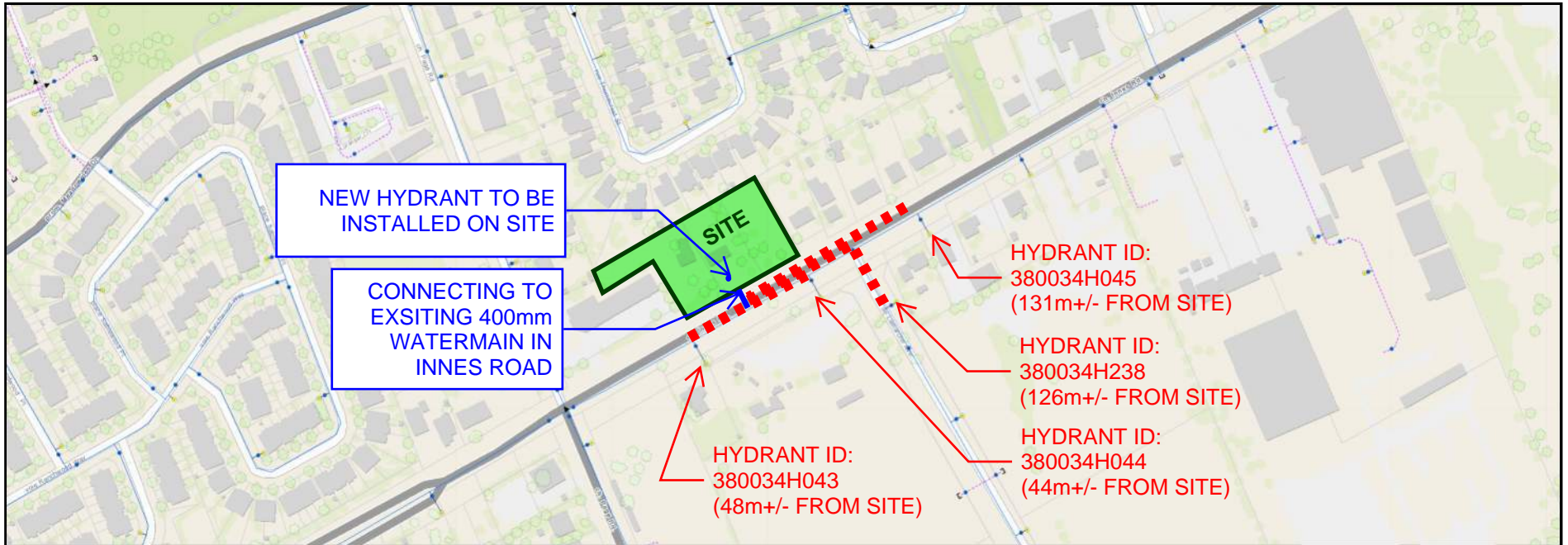
* Storey assumption is based on 4m or fraction thereof. Adjust number of stories for non-standard storey heights (i.e. 10m single storey warehouse)

Source of Information	

Exposed Building South	
Description/Address	South Side - Innes Road
Height (storeys*)	2
Construction Type	Type V - Wood frame
Protected Openings	No
Length-Height Factor	32
Automatic Sprinklers	No
Exposure Surcharge Adjustment	0%

Legend Input by User
 No Information or Input Required

FIRE HYDRANT SKETCH AND WATER INFRASTRUCTURE



Chris Visser

From: Baird, Natasha <Natasha.Baird@ottawa.ca>
Sent: Friday, November 25, 2022 1:49 PM
To: Francois Thauvette; Mashaie, Sara
Cc: Chris Visser; Kayla Blakely; Kamal Chaouni
Subject: RE: 3493, 3497 and 3499 Innes Road - Storm sewer and SWM inquiries
Attachments: 3493-3497Innis_25Nov2022.docx

Hi François,

Please find boundary conditions attached. The boundary conditions for fire demands range from 67 l/s to 167 l/s. Please interpolate the results for fires within this range.

Thanks,

Please take that I will be away from December 24, 2022 to January 8, 2023.

I will be working remotely until further notice. Given technical constraints, my phone might not be reliable at this time. The best way to correspond will be via email. Please feel free to leave me a phone number if it is urgent.

Natasha Baird, P.Eng. ing., LEED Green Associate

Senior Engineer | Ingénieure principale

Development Review, East Group | Examen des projets d'aménagement, groupe est

*Please consider your environmental responsibility before printing this e-mail

From: Francois Thauvette <f.thauvette@novatech-eng.com>
Sent: October 14, 2022 2:09 PM
To: Mashaie, Sara <sara.mashaie@ottawa.ca>; Baird, Natasha <Natasha.Baird@ottawa.ca>
Cc: Chris Visser <c.visser@novatech-eng.com>; Kayla Blakely <k.blakely@novatech-eng.com>; Kamal Chaouni <k.chaouni@novatech-eng.com>
Subject: RE: 3493, 3497 and 3499 Innes Road - Storm sewer and SWM inquiries

CAUTION: This email originated from an External Sender. Please do not click links or open attachments unless you recognize the source.

ATTENTION : Ce courriel provient d'un expéditeur externe. Ne cliquez sur aucun lien et n'ouvrez pas de pièce jointe, excepté si vous connaissez l'expéditeur.

Hi Natasha – We look forward to working with you on this file. Please let us know if there are any Master Servicing Studies or Master SWM Reports that would directly impact the subject site. Based on a review of the geoOttawa website, we understand that we will be dealing with an unusual situation in terms of storm drainage and SWM, as the 1050mm dia. storm sewer (outlet for the subject site) is equipped with an ICD at the downstream end, before flowing

south into a 450mm dia. sewer down Pagé Road. Please advise what the implications are on the subject site in terms of HGL and SWM design considerations.

Regards,

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

NOVATECH Engineers, Planners & Landscape Architects

Please note that I am working from home. Email or MS Teams are the best ways to contact me.

240 Michael Cowpland Drive, Suite 200, Ottawa, ON, K2M 1P6 | Tel: 613.254.9643 Ext: 219 | Cell: 613.276.0310 | Fax: 613.254.5867

The information contained in this email message is confidential and is for exclusive use of the addressee.

From: Mashaie, Sara <sara.mashaie@ottawa.ca>

Sent: Friday, October 14, 2022 1:57 PM

To: Francois Thauvette <f.thauvette@novatech-eng.com>

Cc: Chris Visser <c.visser@novatech-eng.com>; Baird, Natasha <Natasha.Baird@ottawa.ca>

Subject: FW: 3493, 3497 and 3499 Innes Road - Request for WM Boundary Conditions

Hi François,

Thank you for your email.

Please note that I have moved to another position. I have included the Senior Engineer (Natasha Baird) in c.c. of this email, and she will tend to the request.

Regards,

Sara Mashaie, P.Eng., ing.

Project Manager | Gestionnaire de Projet

LMS Project | Projet SGT

Planning, Real Estate and Economic Development Department | Direction générale de la planification, des biens

immobiliers et du développement économique

City of Ottawa | Ville d'Ottawa

sara.mashaie@ottawa.ca

From: Francois Thauvette <f.thauvette@novatech-eng.com>

Sent: October 14, 2022 1:53 PM

To: Mashaie, Sara <sara.mashaie@ottawa.ca>

Cc: Chris Visser <c.visser@novatech-eng.com>

Subject: 3493, 3497 and 3499 Innes Road - Request for WM Boundary Conditions

CAUTION: This email originated from an External Sender. Please do not click links or open attachments unless you recognize the source.

ATTENTION : Ce courriel provient d'un expéditeur externe. Ne cliquez sur aucun lien et n'ouvrez pas de pièce jointe, excepté si vous connaissez l'expéditeur.

We are sending this e-mail to request municipal watermain boundary conditions for the above-noted development. This request is for two (2) separate 1-storey commercial buildings located at (now merged properties) 3493, 3497 and 3499

Innes Road, in Ottawa. Attached is a sketch showing the subject site and nearby existing watermain infrastructure and hydrants.

The anticipated water demands for the proposed Commercial development are as follows:

Retail Building A

- Average Day Demand = 0.03 L/s
- Maximum Day Demand = 0.04 L/s
- Peak Hour Demand = 0.07 L/s
- Fire Flow Demand = 67 L/s

Retail Building B

- Average Day Demand = 0.43 L/s
- Maximum Day Demand = 0.65 L/s
- Peak Hour Demand = 1.17 L/s
- Fire Flow Demand = 83 L/s

See attached calculation sheets for details.

Based on a review of geoOttawa, there are 2 blue bonnet hydrants within 75m of the subject and at least another 2 blue bonnet hydrants within 150m of the site (see attached Hydrant Sketch for details). There appears to be sufficient fire hydrant coverage for firefighting purposes, therefore an on-site hydrant is not anticipated to be required.

Regards,

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

NOVATECH Engineers, Planners & Landscape Architects

Please note that I am working from home. Email or MS Teams are the best ways to contact me.

240 Michael Cowpland Drive, Suite 200, Ottawa, ON, K2M 1P6 | Tel: 613.254.9643 Ext: 219 | Cell: 613.276.0310 | Fax: 613.254.5867

The information contained in this email message is confidential and is for exclusive use of the addressee.

This e-mail originates from the City of Ottawa e-mail system. Any distribution, use or copying of this e-mail or the information it contains by other than the intended recipient(s) is unauthorized. Thank you.

Le présent courriel a été expédié par le système de courriels de la Ville d'Ottawa. Toute distribution, utilisation ou reproduction du courriel ou des renseignements qui s'y trouvent par une personne autre que son destinataire prévu est interdite. Je vous remercie de votre collaboration.

This e-mail originates from the City of Ottawa e-mail system. Any distribution, use or copying of this e-mail or the information it contains by other than the intended recipient(s) is unauthorized. Thank you.

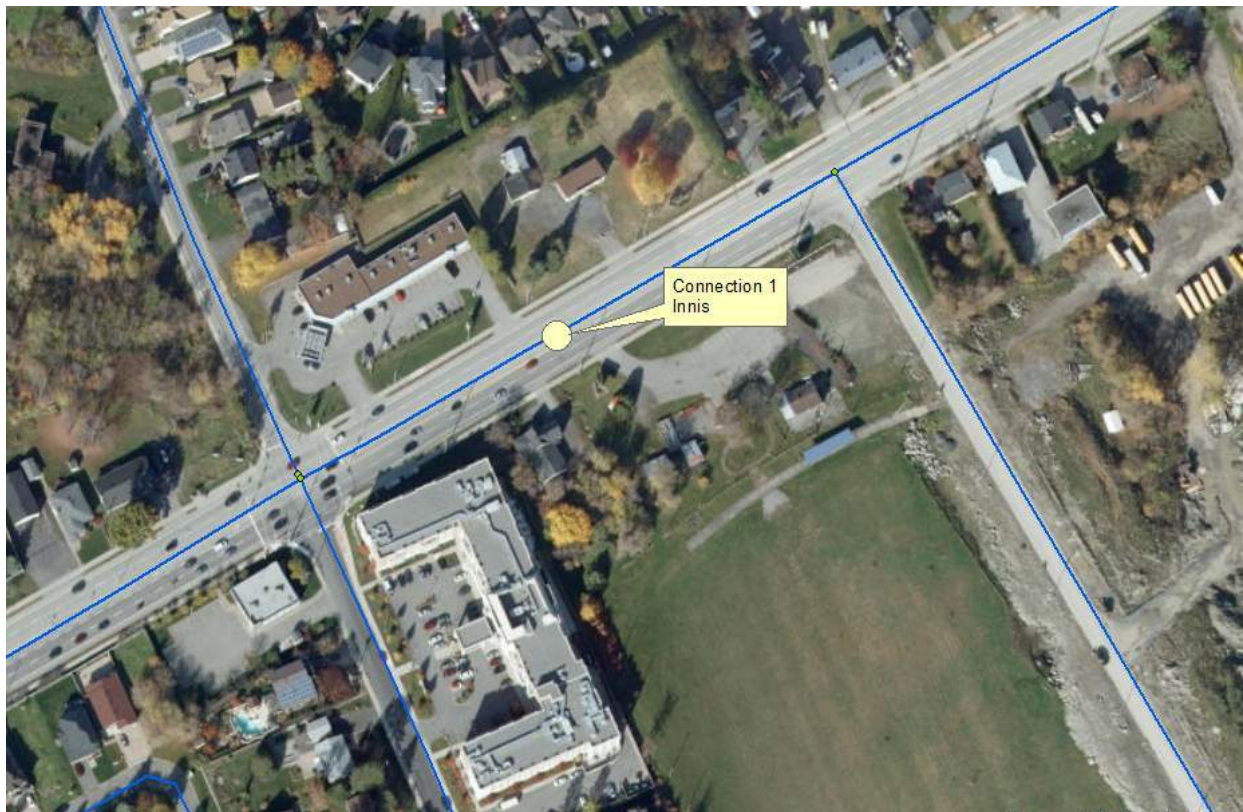
Le présent courriel a été expédié par le système de courriels de la Ville d'Ottawa. Toute distribution, utilisation ou reproduction du courriel ou des renseignements qui s'y trouvent par une personne autre que son destinataire prévu est interdite. Je vous remercie de votre collaboration.

Boundary Conditions 3493-3497 Innis Road

Provided Information

Scenario	Demand	
	L/min	L/s
Average Daily Demand	27.6	0.46
Maximum Daily Demand	41.4	0.69
Peak Hour	74.4	1.24
Fire Flow Demand # 1	4020	67.0
Fire Flow Demand # 2	10000	166.7

Location



Results

Connection 1 – Innis Road

Demand Scenario	Head (m)	Pressure ¹ (psi)
Maximum HGL	130.9	56.2
Peak Hour	127.4	51.3
Max Day plus Fire #1	129.1	53.7
Max Day plus Fire #2	128.1	52.3

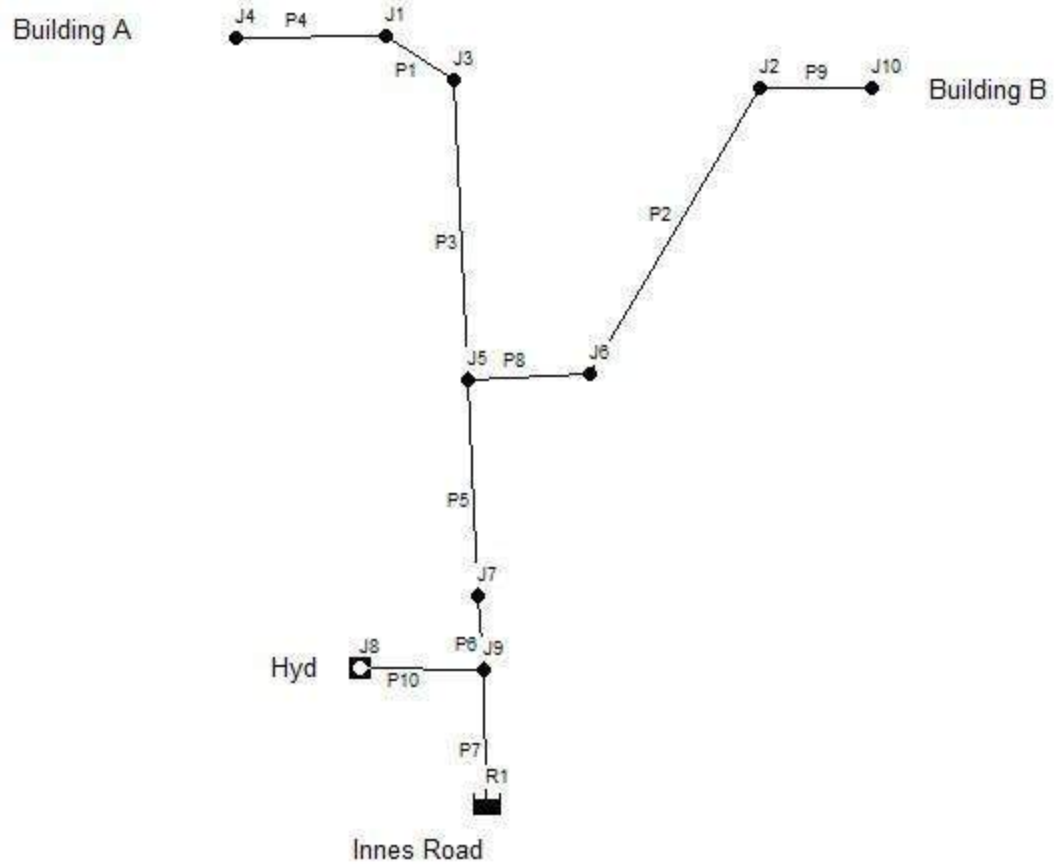
¹ Ground Elevation = 91.3 m

Notes

Disclaimer

The boundary condition information is based on current operation of the city water distribution system. The computer model simulation is based on the best information available at the time. The operation of the water distribution system can change on a regular basis, resulting in a variation in boundary conditions. The physical properties of watermains deteriorate over time, as such must be assumed in the absence of actual field test data. The variation in physical watermain properties can therefore alter the results of the computer model simulation. Fire Flow analysis is a reflection of available flow in the watermain; there may be additional restrictions that occur between the watermain and the hydrant that the model cannot take into account.

3493, 3497 & 3499 Innes Rd. - Proposed Commercial Development Proposed Watermain Schematic



3493, 3497 & 3499 Innes Rd. - Proposed Commercial Development Water Model Results

Peak Hour Demand
 Network Table - Nodes

Node ID	Elevation m	Demand L/s	Head m	Pressure m	Pressure kPa	Pressure psi
Junc J1	89.2	0	127.4	38.2	374.74	54.35
Junc J4	92	0.07	127.4	35.4	347.27	50.37
Junc J3	89.2	0	127.4	38.2	374.74	54.35
Junc J5	88.5	0	127.4	38.9	381.61	55.35
Junc J6	88.4	0	127.4	39	382.59	55.49
Junc J7	88.5	0	127.4	38.9	381.61	55.35
Junc J8	91.9	0	127.4	35.5	348.26	50.51
Junc J9	88.5	0	127.4	38.9	381.61	55.35
Junc J2	89.3	0	127.4	38.1	373.76	54.21
Junc J10	92.05	0.3	127.4	35.35	346.78	50.30
Resvr R1	127.4	-0.37	127.4	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 P4	15.1	150	100	0.07	0	0
Pipe P1	5.4	150	100	-0.07	0	0
Pipe P3	13.7	150	100	-0.07	0	0
Pipe P5	2.7	150	100	-0.37	0.02	0.01
Pipe P6	1	150	100	-0.37	0.02	0.01
Pipe P7	22.9	150	100	-0.37	0.02	0.01
Pipe P8	4.6	150	100	0.3	0.02	0.01
Pipe P2	21.2	150	100	0.3	0.02	0.01
Pipe P9	5.8	150	100	0.3	0.02	0.01
Pipe P10	4	150	100	0	0	0

3493, 3497 & 3499 Innes Rd. - Proposed Commercial Development Water Model Results

Max HGL check
 Network Table - Nodes

Node ID	Elevation m	Demand L/s	Head m	Pressure m	Pressure kPa	Pressure psi
Junc J1	89.2	0	130.9	41.7	409.08	59.33
Junc J4	92	0.03	130.9	38.9	381.61	55.35
Junc J3	89.2	0	130.9	41.7	409.08	59.33
Junc J5	88.5	0	130.9	42.4	415.94	60.33
Junc J6	88.4	0	130.9	42.5	416.93	60.47
Junc J7	88.5	0	130.9	42.4	415.94	60.33
Junc J8	91.9	0.00	130.90	39.00	382.59	55.49
Junc J9	88.5	0.00	130.9	42.40	415.94	60.33
Junc J2	89.3	0.00	130.90	41.60	408.10	59.19
Junc J10	92.05	0.11	130.9	38.85	381.12	55.28
Resvr R1	130.9	-0.14	130.9	0	0.00	0.00

Max HGL check
 Network Table - Links

Link ID	Length m	Diameter mm	Roughness	Flow L/s	Velocity m/s	Unit Headloss m/km
Pipe P4	15.1	150	100	0.03	0	0
Pipe P1	5.4	150	100	-0.03	0	0
Pipe P3	13.7	150	100	-0.03	0	0
Pipe P5	2.7	150	100	-0.14	0.01	0
Pipe P6	1	150	100	-0.14	0.01	0
Pipe P7	22.9	150	100	-0.14	0.01	0
Pipe P8	4.6	150	100	0.11	0.01	0
Pipe P2	21.2	150	100	0.11	0.01	0
Pipe P9	5.8	150	100	0.11	0.01	0
Pipe P10	4	150	100	0	0	0

3493, 3497 & 3499 Innes Rd. - Proposed Commercial Development Water Model Results

Max Day + Fire Flow Demand
 Network Table - Nodes

Node ID	Elevation m	Demand L/s	Head m	Pressure m	Pressure kPa	Pressure psi
Junc J1	89.2	0	121.77	32.57	319.51	46.34
Junc J4	92	0.04	121.77	29.77	292.04	42.36
Junc J3	89.2	0	121.77	32.57	319.51	46.34
Junc J5	88.5	0	121.77	33.27	326.38	47.34
Junc J6	88.4	0	121.77	33.37	327.36	47.48
Junc J7	88.5	0	121.77	33.27	326.38	47.34
Junc J8	91.9	100	120.55	28.65	281.06	40.76
Junc J9	88.5	0	121.77	33.27	326.38	47.34
Junc J2	89.3	0	121.77	32.47	318.53	46.20
Junc J10	92.05	0.16	121.77	29.72	291.55	42.29
Resvr R1	128.8	-100.2	128.8	0	0.00	0.00

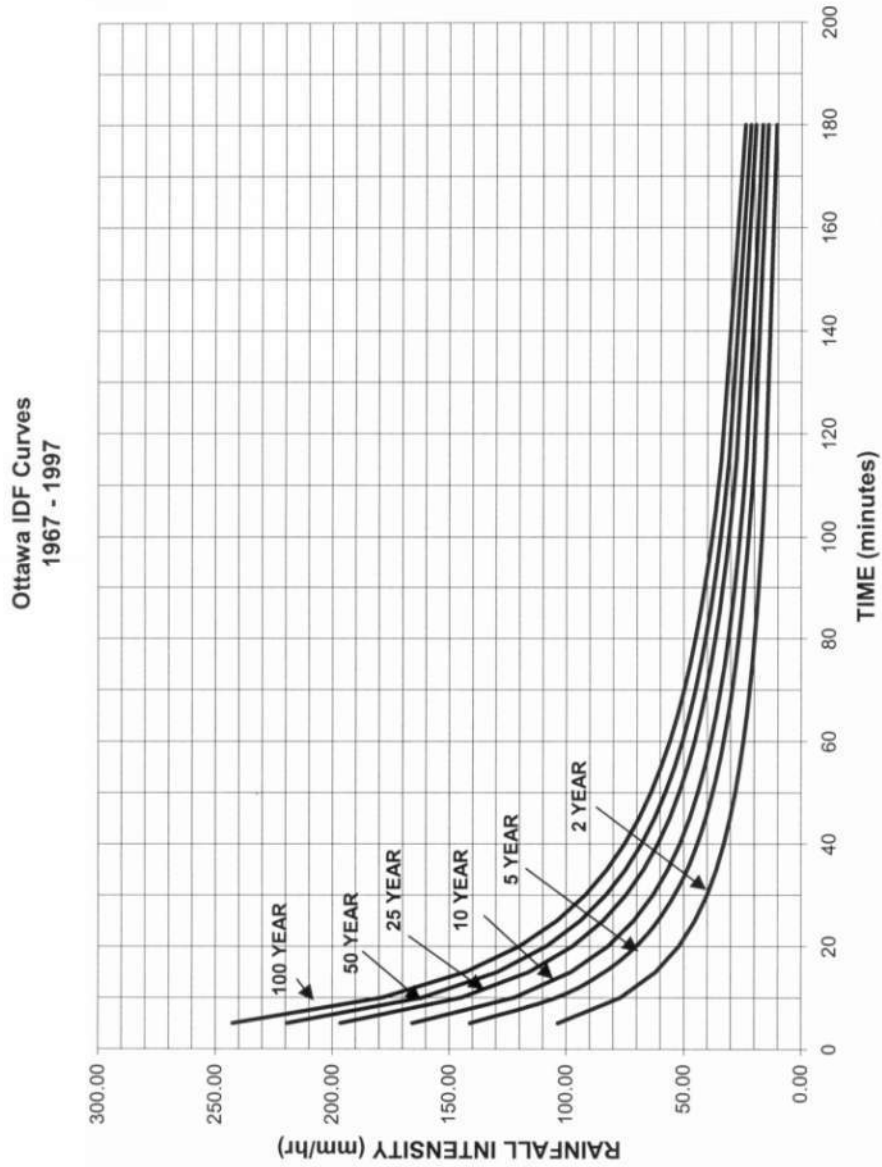
Max Day + Fire Flow Demand
 Network Table - Links

Link ID	Length m	Diameter mm	Roughness	Flow L/s	Velocity m/s	Unit Headloss m/km
Pipe P4	15.1	150	100	0.04	0	0
Pipe P1	5.4	150	100	-0.04	0	0
Pipe P3	13.7	150	100	-0.04	0	0
Pipe P5	2.7	150	100	-0.2	0.01	0
Pipe P6	1	150	100	-0.2	0.01	0
Pipe P7	22.9	150	100	-100.2	5.67	306.83
Pipe P8	4.6	150	100	0.16	0.01	0
Pipe P2	21.2	150	100	0.16	0.01	0
Pipe P9	5.8	150	100	0.16	0.01	0
Pipe P10	4	150	100	-100	5.66	305.7

APPENDIX E
IDF Curves, SWM Calculations

APPENDIX 5-A

OTTAWA INTENSITY DURATION FREQUENCY (IDF) CURVE



Proposed Commercial Development 3493, 3497 & 3499 Innes Road

Pre - Development Stormwater Flows											
Description	Area (ha)	A _{imperv} (ha) C=0.9	A _{gravel} (ha) C=0.7	A _{pervious} (ha) C=0.2	Weighted C _{w5}	Weighted C _{w100}	2-Year Flow (L/s)	5-Year Flow (L/s)	100-Year Flow (L/s)	Allowable C _w	Allowable Flows
											5-year (L/s)
Off-Site Tributary Area OS-1	0.053	0.000	0.000	0.053	0.20	0.25	2.2	3.0	6.5	0.20	- - -
Subject Site to be Developed	0.600	0.032	0.072	0.496	0.30	0.37	38.1	51.7	108.8	0.30	51.7

T_c = 10mins

Post - Development Stormwater Flows																
Area	Description	Area (ha)	A _{imp} (ha) C=0.9	A _{perv} (ha) C=0.2	C _s	C ₁₀₀	Uncontrolled Flow (L/s)			Controlled Flow (L/s)			Storage Required (m ³)			Storage Provided (m ³)
							2-year	5-year	100-year	2-year	5-year	100-year	2-year	5-year	100-year	
OS-1	Off-Site Tributary Area OS-1	0.053	0.000	0.053	0.20	0.25	2.2	3.0	6.5	-	-	-	-	-	-	-
A-0	Uncontrolled Direct Runoff - Back	0.066	0.000	0.066	0.20	0.25	2.8	3.8	8.2	-	-	-	-	-	-	-
A-1	Uncontrolled Direct Runoff - West Side	0.016	0.001	0.015	0.26	0.31	0.9	1.2	2.5	-	-	-	-	-	-	-
A-2	Controlled Flow from Parking Lot - West Side	0.174	0.158	0.016	0.83	0.93	-	-	-	11.1	11.6	11.8	19.1	28.9	69.3	105.8
A-3	Controlled Flow Roof Drains - Retail A	0.084	0.084	0.000	0.90	1.00	-	-	-	1.5	1.7	1.9	13.0	18.9	41.7	44.4
A-4	Uncontrolled Direct Runoff - Front	0.051	0.018	0.033	0.45	0.51	4.9	6.6	13.0	-	-	-	-	-	-	-
A-5	Controlled Flow from Parking Lot - East Side	0.129	0.118	0.011	0.84	0.94	-	-	-	11.5	11.8	12.2	11.9	18.6	46.0	52.1
A-6	Controlled Flow Roof Drains - Retail B	0.080	0.080	0.000	0.90	1.00	-	-	-	1.6	1.7	1.9	12.3	18.1	39.8	42.6
Totals :		0.600	-	-	-	-	8.6	11.6	23.7	25.7	26.7	27.8	56.3	84.6	196.8	244.8
				0.14				Total On-Site Stormwater Flows			34.3	38.3	51.5			
OGS Calcs				0.467	0.440	0.027	0.86	0.96			28.0	29.8	34.3			

T_c = 10mins

Proposed Commercial Development Novatech Project No. 118204 Uncontrolled Runoff - 1:2 YEAR EVENT AREA OS-1 Off-Site Tributary Area OS-1				
OTTAWA IDF CURVE				
Area = 0.053 ha		Qallow = 2.2 L/s		
C = 0.20		Vol(max) = 0.0 m3		
Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	103.57	3.02	0.78	0.23
10	76.81	2.24	0.00	0.00
15	61.77	1.80	-0.44	-0.40
20	52.03	1.52	-0.72	-0.87
25	45.17	1.32	-0.92	-1.39
30	40.04	1.17	-1.07	-1.93
35	36.06	1.05	-1.19	-2.50
40	32.86	0.96	-1.28	-3.08
45	30.24	0.88	-1.36	-3.67
50	28.04	0.82	-1.42	-4.27
55	26.17	0.76	-1.48	-4.88
60	24.56	0.72	-1.53	-5.49
65	23.15	0.68	-1.57	-6.11
70	21.91	0.64	-1.60	-6.73
75	20.81	0.61	-1.64	-7.36
90	18.14	0.53	-1.71	-9.25
105	16.13	0.47	-1.77	-11.16
120	14.56	0.43	-1.82	-13.09
135	13.30	0.39		0.00
150	12.25	0.36	-1.89	-16.97

Proposed Commercial Development Novatech Project No. 118204 Uncontrolled Runoff - 1:5 YEAR EVENT AREA OS-1 Off-Site Tributary Area OS-1				
OTTAWA IDF CURVE				
Area = 0.053 ha		Qallow = 3.0 L/s		
C = 0.20		Vol(max) = 0.0 m3		
Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	4.12	1.08	0.32
10	104.19	3.04	0.00	0.00
15	83.56	2.44	-0.60	-0.54
20	70.25	2.05	-0.99	-1.19
25	60.90	1.78	-1.26	-1.90
30	53.93	1.57	-1.47	-2.64
35	48.52	1.42	-1.63	-3.41
40	44.18	1.29	-1.75	-4.21
45	40.63	1.19	-1.86	-5.01
50	37.65	1.10	-1.94	-5.83
55	35.12	1.03	-2.02	-6.66
60	32.94	0.96	-2.08	-7.49
65	31.04	0.91	-2.14	-8.33
70	29.37	0.86	-2.19	-9.18
75	27.89	0.81	-2.23	-10.03
90	24.29	0.71	-2.33	-12.60
105	21.58	0.63	-2.41	-15.20
120	19.47	0.57	-2.47	-17.82
135	17.76	0.52	-2.52	-20.45
150	16.36	0.48	-2.57	-23.09

Proposed Commercial Development Novatech Project No. 118204 Uncontrolled Runoff - 1:100 YEAR EVENT AREA OS-1 Off-Site Tributary Area OS-1				
OTTAWA IDF CURVE				
Area = 0.053 ha		Qallow = 6.5 L/s		
C = 0.25		Vol(max) = 0.0 m3		
Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	8.86	2.34	0.70
10	178.56	6.52	0.00	0.00
15	142.89	5.22	-1.30	-1.17
20	119.95	4.38	-2.14	-2.57
25	103.85	3.79	-2.73	-4.09
30	91.87	3.35	-3.16	-5.70
35	82.58	3.01	-3.50	-7.36
40	75.15	2.74	-3.78	-9.06
45	69.05	2.52	-4.00	-10.79
50	63.95	2.33	-4.18	-12.55
55	59.62	2.18	-4.34	-14.33
60	55.89	2.04	-4.48	-16.12
65	52.65	1.92	-4.60	-17.93
70	49.79	1.82	-4.70	-19.74
75	47.26	1.73	-4.79	-21.57
90	41.11	1.50	-5.02	-27.10
105	36.50	1.33	-5.19	-32.67
120	32.89	1.20	-5.32	-38.29
135	30.00	1.10	-5.42	-43.93
150	27.61	1.01	-5.51	-49.59

Proposed Commercial Development Novatech Project No. 118204 Uncontrolled Runoff - 1:100 YR + 20% IDF Increase AREA OS-1 Off-Site Tributary Area OS-1				
OTTAWA IDF CURVE				
Area = 0.053 ha		Qallow = 7.8 L/s		
C = 0.25		Vol(max) = 0.0 m3		
Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	291.24	10.63	2.81	0.84
10	214.27	7.82	0.00	0.00
15	171.47	6.26	-1.56	-1.41
20	143.94	5.25	-2.57	-3.08
25	124.62	4.55	-3.27	-4.91
30	110.24	4.02	-3.80	-6.84
35	99.09	3.62	-4.20	-8.83
40	90.17	3.29	-4.53	-10.87
45	82.86	3.02	-4.80	-12.95
50	76.74	2.80	-5.02	-15.06
55	71.55	2.61	-5.21	-17.19
60	67.07	2.45	-5.37	-19.34
65	63.18	2.31	-5.52	-21.51
70	59.75	2.18	-5.64	-23.69
75	56.71	2.07	-5.75	-25.88
90	49.33	1.80	-6.02	-32.51
105	43.80	1.60	-6.22	-39.21
120	39.47	1.44	-6.38	-45.94
135	36.00	1.31	-6.51	-52.72
150	33.13	1.21	-6.61	-59.51

Proposed Commercial Development Novatech Project No. 118204 Uncontrolled Runoff - 1:2 YEAR EVENT AREA A-0 Un-Controlled Runoff - West Side				
OTTAWA IDF CURVE				
Area = 0.066 ha		Qallow = 2.8 L/s		
C = 0.20		Vol(max) = 0.0 m3		
Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	103.57	3.80	0.98	0.29
10	76.81	2.82	0.00	0.00
15	61.77	2.27	-0.55	-0.50
20	52.03	1.91	-0.91	-1.09
25	45.17	1.66	-1.16	-1.74
30	40.04	1.47	-1.35	-2.43
35	36.06	1.32	-1.50	-3.14
40	32.86	1.21	-1.61	-3.87
45	30.24	1.11	-1.71	-4.61
50	28.04	1.03	-1.79	-5.37
55	26.17	0.96	-1.86	-6.13
60	24.56	0.90	-1.92	-6.90
65	23.15	0.85	-1.97	-7.68
70	21.91	0.80	-2.01	-8.46
75	20.81	0.76	-2.05	-9.25
90	18.14	0.67	-2.15	-11.62
105	16.13	0.59	-2.23	-14.03
120	14.56	0.53	-2.28	-16.45
135	13.30	0.49		0.00
150	12.25	0.45	-2.37	-21.32

Proposed Commercial Development Novatech Project No. 118204 Uncontrolled Runoff - 1:5 YEAR EVENT AREA A-0 Un-Controlled Runoff - West Side				
OTTAWA IDF CURVE				
Area = 0.066 ha		Qallow = 3.8 L/s		
C = 0.20		Vol(max) = 0.0 m3		
Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	5.18	1.36	0.41
10	104.19	3.82	0.00	0.00
15	83.56	3.07	-0.76	-0.68
20	70.25	2.58	-1.25	-1.49
25	60.90	2.23	-1.59	-2.38
30	53.93	1.98	-1.84	-3.32
35	48.52	1.78	-2.04	-4.29
40	44.18	1.62	-2.20	-5.28
45	40.63	1.49	-2.33	-6.30
50	37.65	1.38	-2.44	-7.33
55	35.12	1.29	-2.53	-8.36
60	32.94	1.21	-2.61	-9.41
65	31.04	1.14	-2.68	-10.47
70	29.37	1.08	-2.75	-11.53
75	27.89	1.02	-2.80	-12.60
90	24.29	0.89	-2.93	-15.83
105	21.58	0.79	-3.03	-19.10
120	19.47	0.71	-3.11	-22.39
135	17.76	0.65	-3.17	-25.69
150	16.36	0.60	-3.22	-29.01

Proposed Commercial Development Novatech Project No. 118204 Uncontrolled Runoff - 1:100 YEAR EVENT AREA A-0 Un-Controlled Runoff - West Side				
OTTAWA IDF CURVE				
Area = 0.066 ha		Qallow = 8.2 L/s		
C = 0.25		Vol(max) = 0.0 m3		
Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	11.13	2.94	0.88
10	178.56	8.19	0.00	0.00
15	142.89	6.55	-1.64	-1.47
20	119.95	5.50	-2.69	-3.23
25	103.85	4.76	-3.43	-5.14
30	91.87	4.21	-3.98	-7.16
35	82.58	3.79	-4.40	-9.25
40	75.15	3.45	-4.74	-11.38
45	69.05	3.17	-5.02	-13.56
50	63.95	2.93	-5.26	-15.77
55	59.62	2.73	-5.46	-18.00
60	55.89	2.56	-5.63	-20.26
65	52.65	2.41	-5.78	-22.52
70	49.79	2.28	-5.91	-24.81
75	47.26	2.17	-6.02	-27.10
90	41.11	1.89	-6.30	-34.05
105	36.50	1.67	-6.52	-41.05
120	32.89	1.51	-6.68	-48.11
135	30.00	1.38	-6.81	-55.20
150	27.61	1.27	-6.92	-62.32

Proposed Commercial Development Novatech Project No. 118204 Uncontrolled Runoff - 1:100 YR + 20% IDF Increase AREA A-0 Un-Controlled Runoff - West Side				
OTTAWA IDF CURVE				
Area = 0.066 ha		Qallow = 9.8 L/s		
C = 0.25		Vol(max) = 0.0 m3		
Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	291.24	13.36	3.53	1.06
10	214.27	9.83	0.00	0.00
15	171.47	7.87	-1.96	-1.77
20	143.94	6.60	-3.23	-3.87
25	124.62	5.72	-4.11	-6.17
30	110.24	5.06	-4.77	-8.59
35	99.09	4.55	-5.28	-11.09
40	90.17	4.14	-5.69	-13.66
45	82.86	3.80	-6.03	-16.28
50	76.74	3.52	-6.31	-18.92
55	71.55	3.28	-6.55	-21.60
60	67.07	3.08	-6.75	-24.31
65	63.18	2.90	-6.93	-27.03
70	59.75	2.74	-7.09	-29.77
75	56.71	2.60	-7.23	-32.52
90	49.33	2.26	-7.57	-40.85
105	43.80	2.01	-7.82	-49.26
120	39.47	1.81	-8.02	-57.73
135	36.00	1.65	-8.18	-66.24
150	33.13	1.52	-8.31	-74.78

Proposed Commercial Development Novatech Project No. 118204 Uncontrolled Runoff - 1:2 YEAR EVENT AREA A-1 Un-Controlled Runoff - West Side				
OTTAWA IDF CURVE				
Area = 0.016 ha		Qallow = 0.9 L/s		
C = 0.26		Vol(max) = 0.0 m3		
Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	103.57	1.20	0.31	0.09
10	76.81	0.89	0.00	0.00
15	61.77	0.72	-0.17	-0.16
20	52.03	0.60	-0.29	-0.34
25	45.17	0.52	-0.37	-0.55
30	40.04	0.46	-0.43	-0.77
35	36.06	0.42	-0.47	-0.99
40	32.86	0.38	-0.51	-1.22
45	30.24	0.35	-0.54	-1.46
50	28.04	0.33	-0.57	-1.70
55	26.17	0.30	-0.59	-1.94
60	24.56	0.28	-0.61	-2.18
65	23.15	0.27	-0.62	-2.43
70	21.91	0.25	-0.64	-2.67
75	20.81	0.24	-0.65	-2.92
90	18.14	0.21	-0.68	-3.67
105	16.13	0.19	-0.70	-4.43
120	14.56	0.17	-0.72	-5.19
135	13.30	0.15	0.00	0.00
150	12.25	0.14	-0.75	-6.73

Proposed Commercial Development Novatech Project No. 118204 Uncontrolled Runoff - 1:5 YEAR EVENT AREA A-1 Un-Controlled Runoff - West Side				
OTTAWA IDF CURVE				
Area = 0.016 ha		Qallow = 1.2 L/s		
C = 0.26		Vol(max) = 0.0 m3		
Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	1.64	0.43	0.13
10	104.19	1.21	0.00	0.00
15	83.56	0.97	-0.24	-0.22
20	70.25	0.81	-0.39	-0.47
25	60.90	0.71	-0.50	-0.75
30	53.93	0.63	-0.58	-1.05
35	48.52	0.56	-0.65	-1.36
40	44.18	0.51	-0.70	-1.67
45	40.63	0.47	-0.74	-1.99
50	37.65	0.44	-0.77	-2.31
55	35.12	0.41	-0.80	-2.64
60	32.94	0.38	-0.83	-2.97
65	31.04	0.36	-0.85	-3.31
70	29.37	0.34	-0.87	-3.64
75	27.89	0.32	-0.88	-3.98
90	24.29	0.28	-0.93	-5.00
105	21.58	0.25	-0.96	-6.03
120	19.47	0.23	-0.98	-7.07
135	17.76	0.21	-1.00	-8.11
150	16.36	0.19	-1.02	-9.16

Proposed Commercial Development Novatech Project No. 118204 Uncontrolled Runoff - 1:100 YEAR EVENT AREA A-1 Un-Controlled Runoff - West Side				
OTTAWA IDF CURVE				
Area = 0.016 ha		Qallow = 2.5 L/s		
C = 0.31		Vol(max) = 0.0 m3		
Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	3.40	0.90	0.27
10	178.56	2.50	0.00	0.00
15	142.89	2.00	-0.50	-0.45
20	119.95	1.68	-0.82	-0.99
25	103.85	1.45	-1.05	-1.57
30	91.87	1.29	-1.21	-2.19
35	82.58	1.16	-1.34	-2.82
40	75.15	1.05	-1.45	-3.48
45	69.05	0.97	-1.53	-4.14
50	63.95	0.90	-1.61	-4.82
55	59.62	0.84	-1.67	-5.50
60	55.89	0.78	-1.72	-6.19
65	52.65	0.74	-1.76	-6.88
70	49.79	0.70	-1.80	-7.58
75	47.26	0.66	-1.84	-8.28
90	41.11	0.58	-1.93	-10.40
105	36.50	0.51	-1.99	-12.54
120	32.89	0.46	-2.04	-14.69
135	30.00	0.42	-2.08	-16.86
150	27.61	0.39	-2.11	-19.03

Proposed Commercial Development Novatech Project No. 118204 Uncontrolled Runoff - 1:100 YR + 20% IDF Increase AREA A-1 Un-Controlled Runoff - West Side				
OTTAWA IDF CURVE				
Area = 0.016 ha		Qallow = 3.0 L/s		
C = 0.31		Vol(max) = 0.0 m3		
Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	291.24	4.08	1.08	0.32
10	214.27	3.00	0.00	0.00
15	171.47	2.40	-0.60	-0.54
20	143.94	2.02	-0.99	-1.18
25	124.62	1.75	-1.26	-1.88
30	110.24	1.54	-1.46	-2.62
35	99.09	1.39	-1.61	-3.39
40	90.17	1.26	-1.74	-4.17
45	82.86	1.16	-1.84	-4.97
50	76.74	1.07	-1.93	-5.78
55	71.55	1.00	-2.00	-6.60
60	67.07	0.94	-2.06	-7.42
65	63.18	0.88	-2.12	-8.25
70	59.75	0.84	-2.16	-9.09
75	56.71	0.79	-2.21	-9.93
90	49.33	0.69	-2.31	-12.48
105	43.80	0.61	-2.39	-15.04
120	39.47	0.55	-2.45	-17.63
135	36.00	0.50	-2.50	-20.23
150	33.13	0.46	-2.54	-22.83

Proposed Commercial Development Storage Calculations Using Average Novatech Project No. 118204 Retention Rate Equal to 50% of the Qpeak

REQUIRED STORAGE - 1:2 YEAR EVENT

AREA A-2 Controlled Site Flows + Underground Storage

OTTAWA IDF CURVE Qpeak = 11.1 L/s
 Area = 0.174 ha Qavg = 5.8 L/s
 C = 0.83 Vol(max) = 19.1 m³
 (Vol calculated for Qallow-avg)

Time (min)	Intensity (mm/hr)	Q (L/s)	Qret (L/s)	Vol (m ³)
5	103.57	41.80	36.25	10.87
10	76.81	30.99	25.44	15.27
15	61.77	24.93	19.38	17.44
20	52.03	21.00	15.45	18.54
25	45.17	18.23	12.68	19.02
30	40.04	16.16	10.61	19.10
35	36.06	14.55	9.00	18.90
40	32.86	13.26	7.71	18.51
45	30.24	12.20	6.65	17.96
50	28.04	11.32	5.77	17.30
55	26.17	10.56	5.01	16.54
60	24.56	9.91	4.36	15.70
65	23.15	9.34	3.79	14.79
70	21.91	8.84	3.29	13.83
75	20.81	8.40	2.85	12.82
80	19.14	7.92	2.47	11.77
85	17.76	7.51	2.14	10.68
90	16.13	6.51	0.96	6.05
100	14.56	5.88	0.33	2.35
125	13.30	5.37	0.00	0.00
150	12.25	4.94	-0.61	-5.45

Proposed Commercial Development Storage Calculations Using Average Novatech Project No. 118204 Retention Rate Equal to 50% of the Qpeak

REQUIRED STORAGE - 1:1.5 YEAR EVENT

AREA A-2 Controlled Site Flows + Underground Storage

OTTAWA IDF CURVE Qpeak = 11.8 L/s
 Area = 0.174 ha Qavg = 5.8 L/s
 C = 0.83 Vol(max) = 28.9 m³
 (Vol calculated for Qallow-avg)

Time (min)	Intensity (mm/hr)	Q (L/s)	Qret (L/s)	Vol (m ³)
5	141.18	56.97	51.17	15.35
10	104.19	42.05	36.25	21.75
15	83.58	33.72	27.62	25.13
20	70.25	28.35	22.55	27.06
25	60.90	24.57	18.77	28.16
30	53.93	21.76	15.96	28.73
35	48.52	19.58	13.79	28.94
40	44.18	17.83	12.03	28.87
45	40.63	16.40	10.60	28.61
50	37.65	15.19	9.39	28.18
55	35.12	14.17	8.37	27.63
60	32.94	13.29	7.49	26.98
65	31.04	12.53	6.73	26.24
70	29.37	11.85	6.05	25.42
75	27.89	11.25	5.45	24.54
80	24.29	9.80	4.00	21.61
85	21.58	8.71	2.91	18.33
100	19.47	7.86	2.06	14.80
125	17.76	7.17	1.37	11.09
150	16.36	6.60	0.80	7.23

Proposed Commercial Development Storage Calculations Using Average Novatech Project No. 118204 Retention Rate Equal to 50% of the Qpeak

REQUIRED STORAGE - 1:100 YEAR EVENT

AREA A-2 Controlled Site Flows + Underground Storage

OTTAWA IDF CURVE Qpeak = 11.8 L/s
 Area = 0.174 ha Qavg = 5.8 L/s
 C = 0.93 Vol(max) = 69.3 m³
 (Vol calculated for Qallow-avg)

Time (min)	Intensity (mm/hr)	Q (L/s)	Qret (L/s)	Vol (m ³)
5	242.70	108.13	102.23	30.97
10	178.56	80.29	74.99	44.63
15	142.89	64.25	58.35	52.52
20	119.95	53.94	48.04	57.64
25	103.85	46.70	40.80	61.19
30	91.87	41.31	35.41	63.74
35	82.58	37.13	31.23	65.59
40	75.15	33.79	27.89	66.93
45	69.05	31.05	25.15	67.90
50	63.95	28.76	22.86	68.57
55	59.62	26.81	20.91	69.00
60	55.89	25.13	19.23	69.24
65	52.65	23.67	17.77	69.31
70	49.79	22.39	16.49	69.25
75	47.26	21.25	15.35	69.07
80	44.11	18.49	12.59	67.96
105	36.50	16.41	10.51	66.22
120	32.89	14.79	8.89	64.02
135	30.00	13.49	7.59	61.46
150	27.61	12.42	6.52	58.64

Proposed Commercial Development Storage Calculations Using Average Novatech Project No. 118204 Retention Rate Equal to 50% of the Qpeak

REQUIRED STORAGE - 1:100 YR + 20% IDF Increase

AREA A-2 Controlled Site Flows + Underground Storage

OTTAWA IDF CURVE Qpeak = 11.8 L/s
 Area = 0.174 ha Qavg = 5.8 L/s
 C = 0.93 Vol(max) = 88.2 m³
 (Vol calculated for Qallow-avg)

Time (min)	Intensity (mm/hr)	Q (L/s)	Qret (L/s)	Vol (m ³)
5	291.24	130.96	125.06	37.52
10	214.27	96.35	90.45	54.27
15	171.47	77.10	71.20	64.08
20	143.94	64.72	58.82	70.59
25	124.62	56.03	50.13	75.20
30	110.24	49.57	43.67	78.61
35	99.09	44.56	38.66	81.18
40	90.17	40.55	34.65	83.15
45	82.86	37.26	31.36	84.67
50	76.74	34.51	28.61	85.83
55	71.55	32.17	26.27	86.70
60	67.07	30.16	24.26	87.34
65	63.18	28.41	22.51	87.78
70	59.75	26.87	20.97	88.06
75	56.71	25.50	19.60	88.19
80	49.33	22.18	16.28	87.93
105	43.80	19.69	13.79	86.90
120	38.47	17.75	11.85	85.32
135	36.00	16.19	10.29	83.32
150	33.13	14.90	9.00	80.98

Structures	Size (mm)	Area (m ²)	TIG	Inv IN	Inv OUT
CB 100	1200	1.13	91.50	96.12	
CBMH102	1200	1.13	91.50	90.70	90.06
CBMH104	1200	1.13	91.50	90.00	89.95
CBMH106	1200	1.13	91.50	89.91	89.76

PIPE ID#	457.2	(PVC Pipe)	PIPE ID#	533.4	(PVC Pipe)
UIG Storage Pipe Volume	0.164	(m ³)	End Area	0.223	(m ²)
End Area	77.0	(m)	Total Length	26.2	(m)
Total Length	77.0	(m)	Pipe Volume	0.0	(m ³)
Pipe Volume	12.6	(m ³)			

Area A-2: Storage Table

Elevation (m)	System Depth (m)	CB 100 Volume (m ³)	CBMH102 Volume (m ³)	CBMH104 Volume (m ³)	CBMH106 Volume (m ³)	Combined Volume (m ³)	Surface Storage						Total Storage				
							Area (m ²)	Volume (m ³)	Area (m ²)	Volume (m ³)	Area (m ²)	Volume (m ³)	Area (m ²)	Volume (m ³)	Ponding Volume (m ³)	Total Volume (m ³)	
92.00	-	-	-	-	0.00	12.64	-	-	-	-	-	-	-	-	-	-	-
91.16	-	-	-	-	0.45	13.09	-	-	-	-	-	-	-	-	-	-	-
90.45	-	-	0.44	0.57	0.78	14.43	-	-	-	-	-	-	-	-	-	-	-
90.75	0.63	0.71	0.78	0.90	1.12	16.16	-	-	-	-	-	-	-	-	-	-	-
91.10	0.98	1.11	1.18	1.30	1.52	17.74	-	-	-	-	-	-	-	-	-	-	-
91.20	1.08	1.22	1.29	1.41	1.63	18.19	-	-	-	-	-	-	-	-	-	-	-
91.50	1.38	1.56	1.63	1.75	1.97	19.55	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
91.55	1.43	-	-	-	-	-	16.3	0.4	10.1	0.0	16.3	0.5	34.0	0.8	19.8	1.9	1.77
91.60	1.48	-	-	-	-	-	61.1	2.3	40.3	1.5	73.2	2.7	138.2	5.2	11.7	31.3	1.69
91.65	1.53	-	-	-	-	-	137.6	7.3	82.8	4.8	165.1	8.7	304.2	16.2	37.0	86.6	1.74
91.70	1.58	-	-	-	-	-	221.3	16.2	327.2	15.3	277.8	19.8	439.8	34.8	69.2	168.8	1.70

Tempest Vortex LMF Model 100 ICD

1:100 Yr
Flow (L/s) = 11.8
Head (m) = 1.75
Elevation (m) = 91.66
Outlet Pipe Dia (mm) = 305
Volume (m ³) = 69.3

1:5 Yr
Flow (L/s) = 11.6
Head (m) = 1.68
Elevation (m) = 91.59
Outlet Pipe Dia (mm) = 305
Volume (m ³) = 28.9

1:2 Yr
Flow (L/s) = 11.1
Head (m) = 1.56
Elevation (m) = 91.47
Outlet Pipe Dia (mm) = 305
Volume (m ³) = 19.1

Orifice Size - 1:100 yr Flow Check

$Q = 0.62 \times A \times \sqrt{2gh} \times C_d$

Q (m³/s) = 1.102 yr Flow Check
 0.0116 0.0111

g (m/s²) = 9.81 9.81

h (m) = 1.75 1.75

A (m²) = 0.003260366 0.00322

D (m) = 0.064331129 0.06400

D (mm) = 64 64.0

1:5 Yr Flow Check

Q (m³/s) = 1.5 yr
 0.0114

g (m/s²) = 9.81

h (m) = 1.68

A (m²) = 0.00322

D (m) = 0.064

D (mm) = 64

1:2 yr Flow Check

Q (m³/s) = 1.2 yr
 0.0110

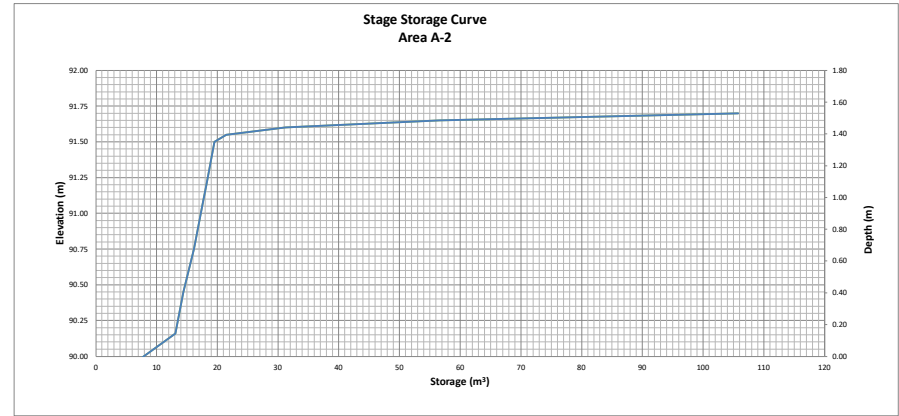
g (m/s²) = 9.81

h (m) = 1.56

A (m²) = 0.00322

D (m) = 0.064

D (mm) = 64



Proposed Commercial Development					
Novatech Project No. 118204					
REQUIRED STORAGE - 1:2 YEAR EVENT					
AREA A-3			Controlled Roof Drain #1		
OTTAWA IDF CURVE					
Area = 0.040 ha		Qallow = 0.75 L/s			
C = 0.90		Vol(max) = 6.1 m3			
Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)	
5	103.57	10.34	9.59	2.88	
10	76.81	7.67	6.92	4.15	
15	61.77	6.17	5.42	4.87	
20	52.03	5.19	4.44	5.33	
25	45.17	4.51	3.76	5.64	
30	40.04	4.00	3.25	5.85	
35	36.06	3.60	2.85	5.98	
40	32.86	3.28	2.53	6.07	
45	30.24	3.02	2.27	6.13	
50	28.04	2.80	2.05	6.15	
55	26.17	2.61	1.86	6.15	
60	24.56	2.45	1.70	6.13	
65	23.15	2.31	1.56	6.09	
70	21.91	2.19	1.44	6.04	
75	20.81	2.08	1.33	5.97	
90	18.14	1.81	1.06	5.73	
105	16.13	1.61	0.86	5.42	
120	14.56	1.45	0.70	5.07	

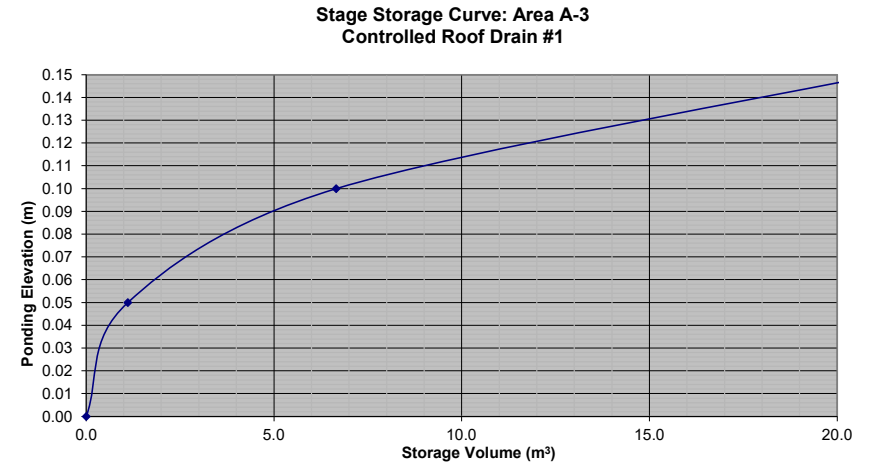
Proposed Commercial Development					
Novatech Project No. 118204					
REQUIRED STORAGE - 1:5 YEAR EVENT					
AREA A-3			Controlled Roof Drain #1		
OTTAWA IDF CURVE					
Area = 0.040 ha		Qallow = 0.83 L/s			
C = 0.90		Vol(max) = 8.9 m3			
Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)	
5	141.18	14.09	13.26	3.98	
10	104.19	10.40	9.57	5.74	
15	83.56	8.34	7.51	6.76	
20	70.25	7.01	6.18	7.42	
25	60.90	6.08	5.25	7.87	
30	53.93	5.38	4.55	8.20	
35	48.52	4.84	4.01	8.43	
40	44.18	4.41	3.58	8.59	
45	40.63	4.06	3.23	8.71	
50	37.65	3.76	2.93	8.79	
55	35.12	3.51	2.68	8.83	
60	32.94	3.29	2.46	8.85	
65	31.04	3.10	2.27	8.85	
70	29.37	2.93	2.10	8.83	
75	27.89	2.78	1.95	8.79	
90	24.29	2.42	1.59	8.61	
105	21.58	2.15	1.32	8.34	
120	19.47	1.94	1.11	8.02	

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
1:2 Year	0.75	0.75	9	6.1	
1:5 Year	0.83	0.83	11	8.9	21.1
1:100 Year	0.95	0.95	15	19.5	

Roof Drain Storage Table for Area RD 1		
Elevation	Area RD 1	Total Volume
m	m ²	m ³
0.00	0	0
0.05	44.313	1.1
0.10	177.525	6.7
0.15	399.525	21.1

Proposed Commercial Development					
Novatech Project No. 118204					
REQUIRED STORAGE - 1:100 YEAR EVENT					
AREA A-3			Controlled Roof Drain #1		
OTTAWA IDF CURVE					
Area = 0.040 ha		Qallow = 0.95 L/s			
C = 1.00		Vol(max) = 19.5 m3			
Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)	
5	242.70	26.92	25.97	7.79	
10	178.56	19.81	18.86	11.31	
15	142.89	15.85	14.90	13.41	
20	119.95	13.31	12.36	14.83	
25	103.85	11.52	10.57	15.85	
30	91.87	10.19	9.24	16.63	
35	82.58	9.16	8.21	17.24	
40	75.15	8.34	7.39	17.72	
45	69.05	7.66	6.71	18.11	
50	63.95	7.09	6.14	18.43	
55	59.62	6.61	5.66	18.69	
60	55.89	6.20	5.25	18.90	
65	52.65	5.84	4.89	19.07	
70	49.79	5.52	4.57	19.21	
75	47.26	5.24	4.29	19.31	
90	41.11	4.56	3.61	19.49	
105	36.50	4.05	3.10	19.52	
120	32.89	3.65	2.70	19.43	

Proposed Commercial Development					
Novatech Project No. 118204					
REQUIRED STORAGE - 1:100 YEAR + 20%					
AREA A-3			Controlled Roof Drain #1		
OTTAWA IDF CURVE					
Area = 0.040 ha		Qallow = 0.95 L/s			
C = 1.00		Vol(max) = 24.7 m3			
Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)	
5	291.24	32.31	31.36	9.41	
10	214.27	23.77	22.82	13.69	
15	171.47	19.02	18.07	16.26	
20	143.94	15.97	15.02	18.02	
25	124.62	13.82	12.87	19.31	
30	110.24	12.23	11.28	20.30	
35	99.09	10.99	10.04	21.09	
40	90.17	10.00	9.05	21.73	
45	82.86	9.19	8.24	22.25	
50	76.74	8.51	7.56	22.69	
55	71.55	7.94	6.99	23.05	
60	67.07	7.44	6.49	23.36	
65	63.18	7.01	6.06	23.62	
70	59.75	6.63	5.68	23.84	
75	56.71	6.29	5.34	24.03	
90	49.33	5.47	4.52	24.42	
105	43.80	4.86	3.91	24.62	
120	39.47	4.38	3.43	24.69	



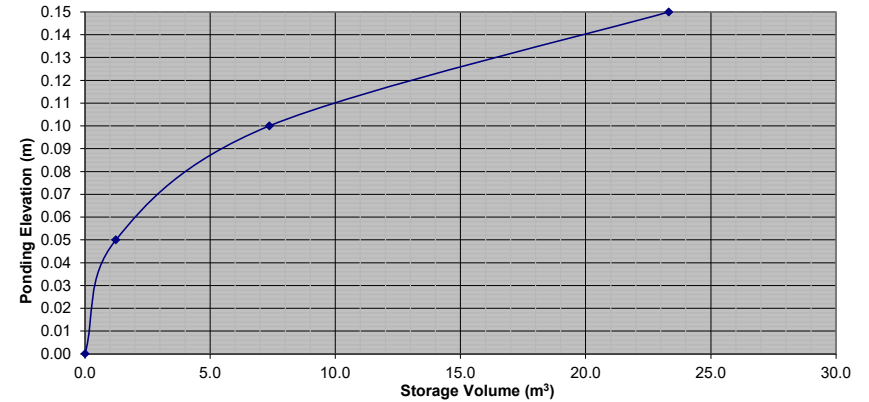
Proposed Commercial Development					
Novatech Project No. 118204					
REQUIRED STORAGE - 1:2 YEAR EVENT					
AREA A-3			Controlled Roof Drain #2		
OTTAWA IDF CURVE					
Area =	0.044	ha	Qallow =	0.79	L/s
C =	0.90		Vol(max) =	6.9	m3
Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)	
5	103.57	11.40	10.61	3.18	
10	76.81	8.46	7.67	4.60	
15	61.77	6.80	6.01	5.41	
20	52.03	5.73	4.94	5.93	
25	45.17	4.97	4.18	6.27	
30	40.04	4.41	3.62	6.51	
35	36.06	3.97	3.18	6.68	
40	32.86	3.62	2.83	6.79	
45	30.24	3.33	2.54	6.86	
50	28.04	3.09	2.30	6.89	
55	26.17	2.88	2.09	6.90	
60	24.56	2.70	1.91	6.89	
65	23.15	2.55	1.76	6.86	
70	21.91	2.41	1.62	6.81	
75	20.81	2.29	1.50	6.76	
90	18.14	2.00	1.21	6.52	
105	16.13	1.78	0.99	6.21	
120	14.56	1.60	0.81	5.85	

Proposed Commercial Development					
Novatech Project No. 118204					
REQUIRED STORAGE - 1:5 YEAR EVENT					
AREA A-3			Controlled Roof Drain #2		
OTTAWA IDF CURVE					
Area =	0.044	ha	Qallow =	0.83	L/s
C =	0.90		Vol(max) =	10.1	m3
Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)	
5	141.18	15.54	14.71	4.41	
10	104.19	11.47	10.64	6.38	
15	83.56	9.20	8.37	7.53	
20	70.25	7.73	6.90	8.28	
25	60.90	6.70	5.87	8.81	
30	53.93	5.94	5.11	9.19	
35	48.52	5.34	4.51	9.47	
40	44.18	4.86	4.03	9.68	
45	40.63	4.47	3.64	9.84	
50	37.65	4.15	3.32	9.95	
55	35.12	3.87	3.04	10.02	
60	32.94	3.63	2.80	10.07	
65	31.04	3.42	2.59	10.09	
70	29.37	3.23	2.40	10.09	
75	27.89	3.07	2.24	10.08	
90	24.29	2.67	1.84	9.96	
105	21.58	2.38	1.55	9.74	
120	19.47	2.14	1.31	9.45	

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
1:2 Year	0.79	0.79	10	6.9	
1:5 Year	0.83	0.83	11	10.1	23.3
1:100 Year	0.95	0.95	15	22.1	

Roof Drain Storage Table for Area RD 2		
Elevation	Area RD 1	Total Volume
m	m ²	m ³
0.00	0	0
0.05	49.081	1.2
0.10	196.324	7.4
0.15	441.729	23.3

Stage Storage Curve: Area A-3
Controlled Roof Drain #2



Proposed Commercial Development					
Novatech Project No. 118204					
REQUIRED STORAGE - 1:100 YEAR EVENT					
AREA A-3			Controlled Roof Drain #2		
OTTAWA IDF CURVE					
Area =	0.044	ha	Qallow =	0.95	L/s
C =	1.00		Vol(max) =	22.1	m3
Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)	
5	242.70	29.69	28.74	8.62	
10	178.56	21.84	20.89	12.53	
15	142.89	17.48	16.53	14.88	
20	119.95	14.67	13.72	16.47	
25	103.85	12.70	11.75	17.63	
30	91.87	11.24	10.29	18.52	
35	82.58	10.10	9.15	19.22	
40	75.15	9.19	8.24	19.78	
45	69.05	8.45	7.50	20.24	
50	63.95	7.82	6.87	20.62	
55	59.62	7.29	6.34	20.93	
60	55.89	6.84	5.89	21.19	
65	52.65	6.44	5.49	21.41	
70	49.79	6.09	5.14	21.59	
75	47.26	5.78	4.83	21.74	
90	41.11	5.03	4.08	22.02	
105	36.50	4.46	3.51	22.14	
120	32.89	4.02	3.07	22.13	

Proposed Commercial Development					
Novatech Project No. 118204					
REQUIRED STORAGE - 1:100 YEAR + 20%					
AREA A-3			Controlled Roof Drain #2		
OTTAWA IDF CURVE					
Area =	0.044	ha	Qallow =	0.95	L/s
C =	1.00		Vol(max) =	27.9	m3
Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)	
5	291.24	35.63	34.68	10.40	
10	214.27	26.21	25.26	15.16	
15	171.47	20.97	20.02	18.02	
20	143.94	17.61	16.66	19.99	
25	124.62	15.24	14.29	21.44	
30	110.24	13.48	12.53	22.56	
35	99.09	12.12	11.17	23.46	
40	90.17	11.03	10.08	24.19	
45	82.86	10.14	9.19	24.80	
50	76.74	9.39	8.44	25.31	
55	71.55	8.75	7.80	25.75	
60	67.07	8.20	7.25	26.12	
65	63.18	7.73	6.78	26.43	
70	59.75	7.31	6.36	26.70	
75	56.71	6.94	5.99	26.94	
90	49.33	6.03	5.08	27.46	
105	43.80	5.36	4.41	27.77	
120	39.47	4.83	3.88	27.92	

Proposed Commercial Development Novatech Project No. 118204 Uncontrolled Runoff - 1:2 YEAR EVENT AREA A-4 Uncontrolled Direct Runoff - Front				
OTTAWA IDF CURVE				
Area = 0.051 ha		Qallow = 4.9 L/s		
C = 0.45		Vol(max) = 0.0 m3		
Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	103.57	6.56	1.70	0.51
10	76.81	4.87	0.00	0.00
15	61.77	3.92	-0.95	-0.86
20	52.03	3.30	-1.57	-1.88
25	45.17	2.86	-2.01	-3.01
30	40.04	2.54	-2.33	-4.19
35	36.06	2.29	-2.58	-5.42
40	32.86	2.08	-2.79	-6.68
45	30.24	1.92	-2.95	-7.97
50	28.04	1.78	-3.09	-9.27
55	26.17	1.66	-3.21	-10.59
60	24.56	1.56	-3.31	-11.92
65	23.15	1.47	-3.40	-13.26
70	21.91	1.39	-3.48	-14.61
75	20.81	1.32	-3.55	-15.97
90	18.14	1.15	-3.72	-20.08
105	16.13	1.02	-3.85	-24.23
120	14.56	0.92	-3.95	-28.41
135	13.30	0.84		0.00
150	12.25	0.78	-4.09	-36.82

Proposed Commercial Development Novatech Project No. 118204 Uncontrolled Runoff - 1:5 YEAR EVENT AREA A-4 Uncontrolled Direct Runoff - Front				
OTTAWA IDF CURVE				
Area = 0.051 ha		Qallow = 6.6 L/s		
C = 0.45		Vol(max) = 0.0 m3		
Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	8.95	2.34	0.70
10	104.19	6.60	0.00	0.00
15	83.56	5.30	-1.31	-1.18
20	70.25	4.45	-2.15	-2.58
25	60.90	3.86	-2.74	-4.12
30	53.93	3.42	-3.19	-5.73
35	48.52	3.08	-3.53	-7.41
40	44.18	2.80	-3.80	-9.13
45	40.63	2.58	-4.03	-10.88
50	37.65	2.39	-4.22	-12.65
55	35.12	2.23	-4.38	-14.45
60	32.94	2.09	-4.52	-16.26
65	31.04	1.97	-4.64	-18.08
70	29.37	1.86	-4.74	-19.92
75	27.89	1.77	-4.84	-21.76
90	24.29	1.54	-5.06	-27.35
105	21.58	1.37	-5.24	-32.99
120	19.47	1.23	-5.37	-38.67
135	17.76	1.13	-5.48	-44.37
150	16.36	1.04	-5.57	-50.10

Proposed Commercial Development Novatech Project No. 118204 Uncontrolled Runoff - 1:100 YEAR EVENT AREA A-4 Uncontrolled Direct Runoff - Front				
OTTAWA IDF CURVE				
Area = 0.051 ha		Qallow = 13.0 L/s		
C = 0.51		Vol(max) = 0.0 m3		
Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	17.71	4.68	1.40
10	178.56	13.03	0.00	0.00
15	142.89	10.43	-2.60	-2.34
20	119.95	8.75	-4.28	-5.13
25	103.85	7.58	-5.45	-8.18
30	91.87	6.70	-6.33	-11.39
35	82.58	6.03	-7.00	-14.71
40	75.15	5.48	-7.55	-18.11
45	69.05	5.04	-7.99	-21.58
50	63.95	4.67	-8.36	-25.09
55	59.62	4.35	-8.68	-28.64
60	55.89	4.08	-8.95	-32.23
65	52.65	3.84	-9.19	-35.84
70	49.79	3.63	-9.40	-39.47
75	47.26	3.45	-9.58	-43.12
90	41.11	3.00	-10.03	-54.16
105	36.50	2.66	-10.37	-65.31
120	32.89	2.40	-10.63	-76.53
135	30.00	2.19	-10.84	-87.81
150	27.61	2.01	-11.02	-99.14

Proposed Commercial Development Novatech Project No. 118204 Uncontrolled Runoff - 1:100 YR + 20% IDF Increase AREA A-4 Uncontrolled Direct Runoff - Front				
OTTAWA IDF CURVE				
Area = 0.051 ha		Qallow = 15.6 L/s		
C = 0.51		Vol(max) = 0.0 m3		
Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	291.24	21.25	5.62	1.69
10	214.27	15.64	0.00	0.00
15	171.47	12.51	-3.12	-2.81
20	143.94	10.50	-5.13	-6.16
25	124.62	9.09	-6.54	-9.81
30	110.24	8.04	-7.59	-13.66
35	99.09	7.23	-8.41	-17.65
40	90.17	6.58	-9.06	-21.73
45	82.86	6.05	-9.59	-25.89
50	76.74	5.60	-10.04	-30.11
55	71.55	5.22	-10.42	-34.37
60	67.07	4.89	-10.74	-38.67
65	63.18	4.61	-11.03	-43.00
70	59.75	4.36	-11.28	-47.36
75	56.71	4.14	-11.50	-51.74
90	49.33	3.60	-12.04	-65.00
105	43.80	3.20	-12.44	-78.37
120	39.47	2.88	-12.76	-91.84
135	36.00	2.63	-13.01	-105.38
150	33.13	2.42	-13.22	-118.97

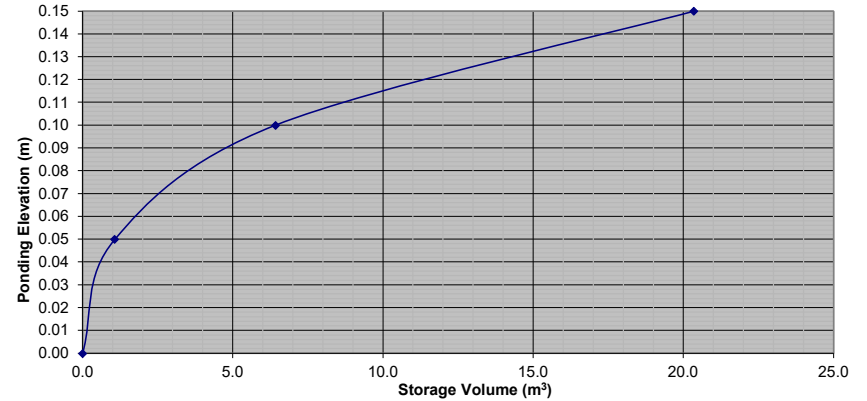
Proposed Commercial Development					
Novatech Project No. 118204					
REQUIRED STORAGE - 1:2 YEAR EVENT					
AREA A-6A		Controlled Roof Drain #3			
OTTAWA IDF CURVE					
Area =	0.039	ha	Qallow =	0.79	L/s
C =	0.90		Vol(max) =	5.8	m3
Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)	
5	103.57	10.11	9.32	2.79	
10	76.81	7.49	6.70	4.02	
15	61.77	6.03	5.24	4.71	
20	52.03	5.08	4.29	5.14	
25	45.17	4.41	3.62	5.43	
30	40.04	3.91	3.12	5.61	
35	36.06	3.52	2.73	5.73	
40	32.86	3.21	2.42	5.80	
45	30.24	2.95	2.16	5.83	
50	28.04	2.74	1.95	5.84	
55	26.17	2.55	1.76	5.82	
60	24.56	2.40	1.61	5.78	
65	23.15	2.26	1.47	5.73	
70	21.91	2.14	1.35	5.66	
75	20.81	2.03	1.24	5.58	
90	18.14	1.77	0.98	5.29	
105	16.13	1.57	0.78	4.94	
120	14.56	1.42	0.63	4.54	

Proposed Commercial Development					
Novatech Project No. 118204					
REQUIRED STORAGE - 1:5 YEAR EVENT					
AREA A-6A		Controlled Roof Drain #3			
OTTAWA IDF CURVE					
Area =	0.039	ha	Qallow =	0.83	L/s
C =	0.90		Vol(max) =	8.6	m3
Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)	
5	141.18	13.78	12.95	3.88	
10	104.19	10.17	9.34	5.60	
15	83.56	8.15	7.32	6.59	
20	70.25	6.85	6.02	7.23	
25	60.90	5.94	5.11	7.67	
30	53.93	5.26	4.43	7.98	
35	48.52	4.73	3.90	8.20	
40	44.18	4.31	3.48	8.36	
45	40.63	3.96	3.13	8.46	
50	37.65	3.67	2.84	8.53	
55	35.12	3.43	2.60	8.57	
60	32.94	3.21	2.38	8.58	
65	31.04	3.03	2.20	8.58	
70	29.37	2.87	2.04	8.55	
75	27.89	2.72	1.89	8.51	
90	24.29	2.37	1.54	8.32	
105	21.58	2.11	1.28	8.04	
120	19.47	1.90	1.07	7.70	

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
1:2 Year	0.79	0.79	10	5.8	
1:5 Year	0.83	0.83	11	8.6	20.3
1:100 Year	0.95	0.95	15	18.9	

Roof Drain Storage Table for Area RD 3		
Elevation	Area RD 1	Total Volume
m	m ²	m ³
0.00	0	0
0.05	42.831	1.1
0.10	171.323	6.4
0.15	385.478	20.3

Stage Storage Curve: Area A-6A
Controlled Roof Drain #3



Proposed Commercial Development					
Novatech Project No. 118204					
REQUIRED STORAGE - 1:100 YEAR EVENT					
AREA A-6A		Controlled Roof Drain #3			
OTTAWA IDF CURVE					
Area =	0.039	ha	Qallow =	0.95	L/s
C =	1.00		Vol(max) =	18.9	m3
Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)	
5	242.70	26.31	25.36	7.61	
10	178.56	19.36	18.41	11.05	
15	142.89	15.49	14.54	13.09	
20	119.95	13.01	12.06	14.47	
25	103.85	11.26	10.31	15.46	
30	91.87	9.96	9.01	16.22	
35	82.58	8.95	8.00	16.81	
40	75.15	8.15	7.20	17.27	
45	69.05	7.49	6.54	17.65	
50	63.95	6.93	5.98	17.95	
55	59.62	6.46	5.51	18.20	
60	55.89	6.06	5.11	18.40	
65	52.65	5.71	4.76	18.56	
70	49.79	5.40	4.45	18.68	
75	47.26	5.12	4.17	18.78	
90	41.11	4.46	3.51	18.94	
105	36.50	3.96	3.01	18.94	
120	32.89	3.57	2.62	18.84	

Proposed Commercial Development					
Novatech Project No. 118204					
REQUIRED STORAGE - 1:100 YEAR + 20%					
AREA A-6A		Controlled Roof Drain #3			
OTTAWA IDF CURVE					
Area =	0.039	ha	Qallow =	0.95	L/s
C =	1.00		Vol(max) =	24.0	m3
Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)	
5	291.24	31.58	30.63	9.19	
10	214.27	23.23	22.28	13.37	
15	171.47	18.59	17.64	15.88	
20	143.94	15.61	14.66	17.59	
25	124.62	13.51	12.56	18.84	
30	110.24	11.95	11.00	19.80	
35	99.09	10.74	9.79	20.57	
40	90.17	9.78	8.83	21.18	
45	82.86	8.98	8.03	21.69	
50	76.74	8.32	7.37	22.11	
55	71.55	7.76	6.81	22.46	
60	67.07	7.27	6.32	22.76	
65	63.18	6.85	5.90	23.01	
70	59.75	6.48	5.53	23.22	
75	56.71	6.15	5.20	23.39	
90	49.33	5.35	4.40	23.75	
105	43.80	4.75	3.80	23.93	
120	39.47	4.28	3.33	23.97	

Proposed Commercial Development					
Novatech Project No. 118204					
REQUIRED STORAGE - 1:2 YEAR EVENT					
AREA A-6B		Controlled Roof Drain #4			
OTTAWA IDF CURVE					
Area =	0.042	ha	Qallow =	0.79	L/s
C =	0.90		Vol(max) =	6.5	m3
Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)	
5	103.57	10.88	10.09	3.03	
10	76.81	8.07	7.28	4.37	
15	61.77	6.49	5.70	5.13	
20	52.03	5.47	4.68	5.61	
25	45.17	4.75	3.96	5.93	
30	40.04	4.21	3.42	6.15	
35	36.06	3.79	3.00	6.30	
40	32.86	3.45	2.66	6.39	
45	30.24	3.18	2.39	6.45	
50	28.04	2.95	2.16	6.47	
55	26.17	2.75	1.96	6.47	
60	24.56	2.58	1.79	6.45	
65	23.15	2.43	1.64	6.41	
70	21.91	2.30	1.51	6.35	
75	20.81	2.19	1.40	6.29	
90	18.14	1.91	1.12	6.03	
105	16.13	1.70	0.91	5.70	
120	14.56	1.53	0.74	5.33	

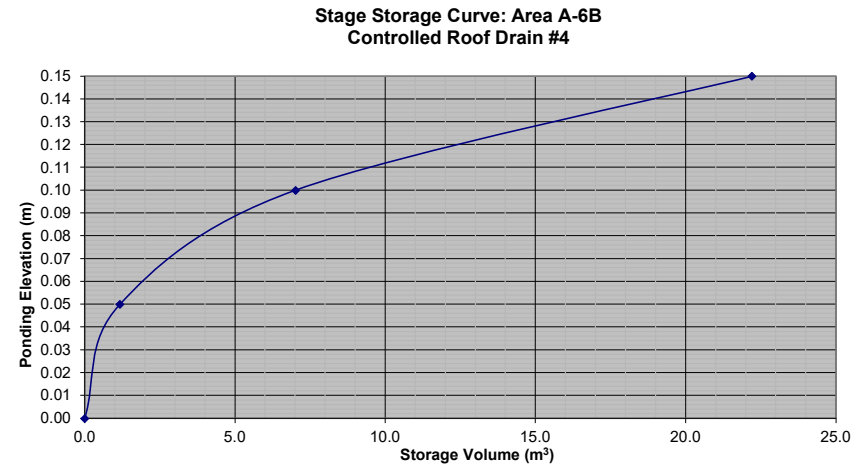
Proposed Commercial Development					
Novatech Project No. 118204					
REQUIRED STORAGE - 1:5 YEAR EVENT					
AREA A-6B		Controlled Roof Drain #4			
OTTAWA IDF CURVE					
Area =	0.042	ha	Qallow =	0.83	L/s
C =	0.90		Vol(max) =	9.5	m3
Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)	
5	141.18	14.84	14.01	4.20	
10	104.19	10.95	10.12	6.07	
15	83.56	8.78	7.95	7.16	
20	70.25	7.38	6.55	7.86	
25	60.90	6.40	5.57	8.35	
30	53.93	5.67	4.84	8.71	
35	48.52	5.10	4.27	8.96	
40	44.18	4.64	3.81	9.15	
45	40.63	4.27	3.44	9.29	
50	37.65	3.96	3.13	9.38	
55	35.12	3.69	2.86	9.44	
60	32.94	3.46	2.63	9.47	
65	31.04	3.26	2.43	9.49	
70	29.37	3.09	2.26	9.48	
75	27.89	2.93	2.10	9.45	
90	24.29	2.55	1.72	9.30	
105	21.58	2.27	1.44	9.06	
120	19.47	2.05	1.22	8.75	

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
1:2 Year	0.79	0.79	10	6.5	
1:5 Year	0.83	0.83	11	9.5	22.2
1:100 Year	0.95	0.95	15	20.9	

Roof Drain Storage Table for Area RD 4		
Elevation	Area RD 1	Total Volume
m	m ²	m ³
0.00	0	0
0.05	46.768	1.2
0.10	187.034	7.0
0.15	420.826	22.2

Proposed Commercial Development					
Novatech Project No. 118204					
REQUIRED STORAGE - 1:100 YEAR EVENT					
AREA A-6B		Controlled Roof Drain #4			
OTTAWA IDF CURVE					
Area =	0.042	ha	Qallow =	0.95	L/s
C =	1.00		Vol(max) =	20.9	m3
Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)	
5	242.70	28.34	27.39	8.22	
10	178.56	20.85	19.90	11.94	
15	142.89	16.68	15.73	14.16	
20	119.95	14.01	13.06	15.67	
25	103.85	12.13	11.18	16.76	
30	91.87	10.73	9.78	17.60	
35	82.58	9.64	8.69	18.25	
40	75.15	8.77	7.82	18.78	
45	69.05	8.06	7.11	19.20	
50	63.95	7.47	6.52	19.55	
55	59.62	6.96	6.01	19.84	
60	55.89	6.53	5.58	20.07	
65	52.65	6.15	5.20	20.27	
70	49.79	5.81	4.86	20.43	
75	47.26	5.52	4.57	20.55	
90	41.11	4.80	3.85	20.79	
105	36.50	4.26	3.31	20.86	
120	32.89	3.84	2.89	20.81	

Proposed Commercial Development					
Novatech Project No. 118204					
REQUIRED STORAGE - 1:100 YEAR + 20%					
AREA A-6B		Controlled Roof Drain #4			
OTTAWA IDF CURVE					
Area =	0.042	ha	Qallow =	0.95	L/s
C =	1.00		Vol(max) =	26.3	m3
Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)	
5	291.24	34.01	33.06	9.92	
10	214.27	25.02	24.07	14.44	
15	171.47	20.02	19.07	17.16	
20	143.94	16.81	15.86	19.03	
25	124.62	14.55	13.60	20.40	
30	110.24	12.87	11.92	21.46	
35	99.09	11.57	10.62	22.30	
40	90.17	10.53	9.58	22.99	
45	82.86	9.67	8.72	23.56	
50	76.74	8.96	8.01	24.03	
55	71.55	8.35	7.40	24.43	
60	67.07	7.83	6.88	24.77	
65	63.18	7.38	6.43	25.06	
70	59.75	6.98	6.03	25.31	
75	56.71	6.62	5.67	25.52	
90	49.33	5.76	4.81	25.97	
105	43.80	5.11	4.16	26.23	
120	39.47	4.61	3.66	26.34	



APPENDIX F

Inlet Control Device (ICD) Information

IPEX Tempest™ Inlet Control Devices

Municipal Technical Manual Series

Vol. I, 2nd Edition

© 2012 by IPEX. All rights reserved. No part of this book may be used or reproduced in any manner whatsoever without prior written permission. For information contact: IPEX, Marketing, 2441 Royal Windsor Drive, Mississauga, Ontario, Canada, L5J 4C7.

The information contained here within is based on current information and product design at the time of publication and is subject to change without notification. IPEX does not guarantee or warranty the accuracy, suitability for particular applications, or results to be obtained therefrom.

PRODUCT INFORMATION: TEMPEST LOW, MEDIUM FLOW (LMF) ICD

Purpose

To control the amount of storm water runoff entering a sewer system by allowing a specified flow volume out of a catch basin or manhole at a specified head. This approach conserves pipe capacity so that catch basins downstream do not become uncontrollably surcharged, which can lead to basement floods, flash floods and combined sewer overflows.

Product Description

Our LMF ICD is designed to accommodate catch basins or manholes with sewer outlet pipes 6" in diameter and larger. Any storm sewer larger than 12" may require custom modification. However, IPEX can custom build a TEMPEST device to accommodate virtually any storm sewer size.

Available in 14 preset flow curves, the LMF ICD has the ability to provide flow rates: 2lps – 17lps (31gpm – 270gpm)

Product Function

The LMF ICD vortex flow action allows the LMF ICD to provide a narrower flow curve using a larger orifice than a conventional orifice plate ICD, making it less likely to clog. When comparing flows at the same head level, the LMF ICD has the ability to restrict more flow than a conventional ICD during a rain event, preserving greater sewer capacity.

Product Construction

Constructed from durable PVC, the LMF ICD is light weight 8.9 Kg (19.7 lbs).

Product Applications

Will accommodate both square and round applications:

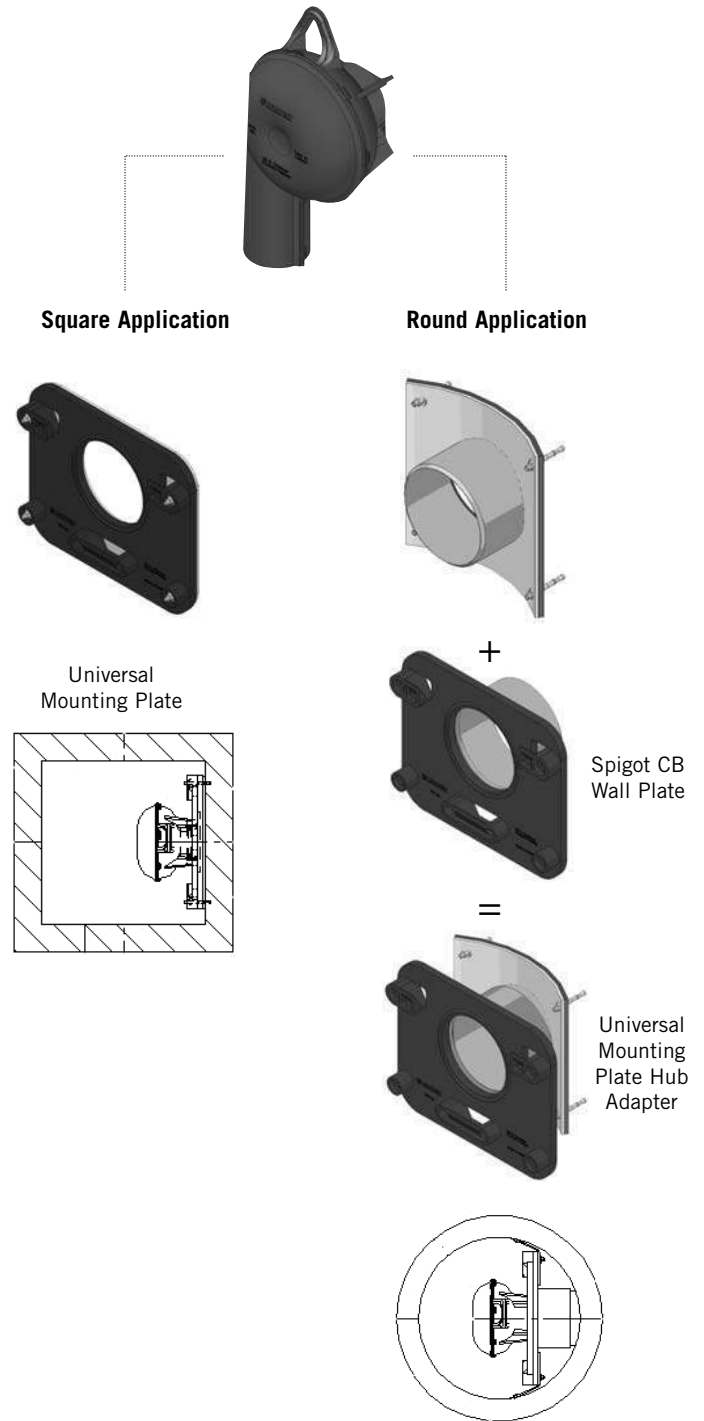


Chart 1: LMF 14 Preset Flow Curves

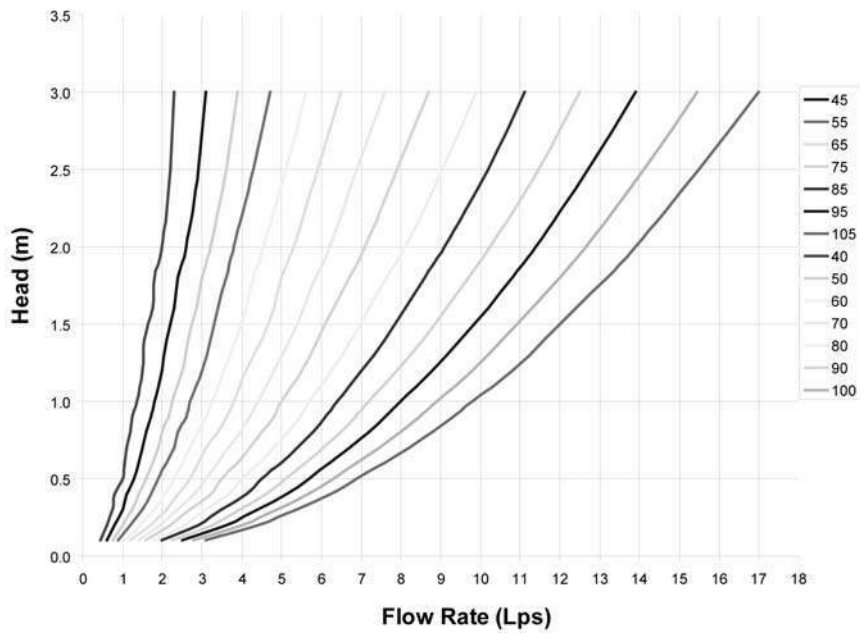
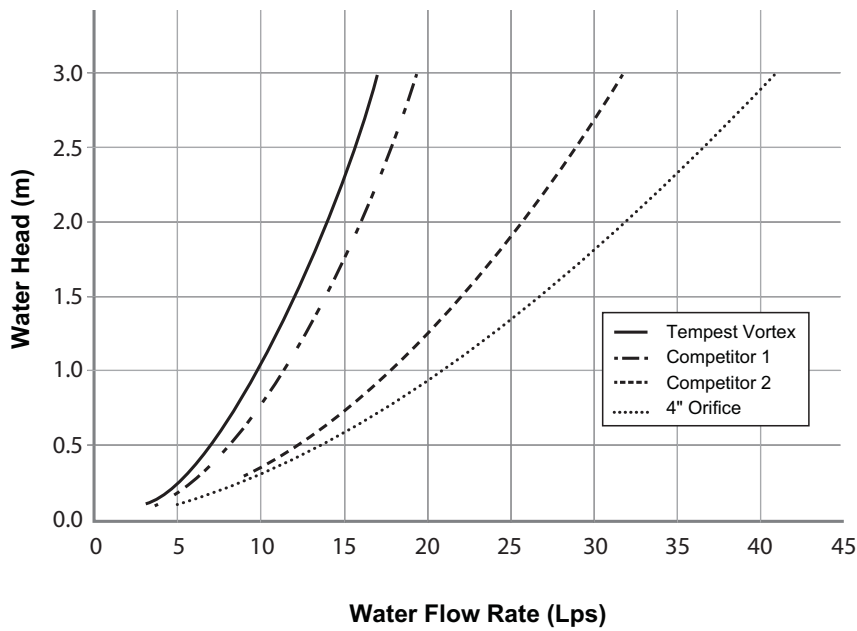


Chart 2: LMF Flow vs. ICD Alternatives



PRODUCT INSTALLATION

Instructions to assemble a TEMPEST LMF ICD into a Square Catch Basin:

STEPS:

1. Materials and tooling verification:
 - Tooling: impact drill, 3/8" concrete bit, torque wrench for 9/16" nut, hand hammer, level, and marker.
 - Material: (4) concrete anchor 3/8 x 3-1/2, (4) washers, (4) nuts, universal mounting plate, ICD device.
2. Use the mounting wall plate to locate and mark the hole (4) pattern on the catch basin wall. You should use a level to ensure that the plate is at the horizontal.
3. Use an impact drill with a 3/8" concrete bit to make the four holes at a minimum of 1-1/2" depth up to 2-1/2". Clean the concrete dust from the holes.
4. Install the anchors (4) in the holes by using a hammer. Thread the nuts on the top of the anchors to protect the threads when you hit the anchors with the hammer. Remove the nuts from the ends of the anchors.
5. Install the universal mounting plate on the anchors and screw the 4 nuts in place with a maximum torque of 40 N.m (30 lbf-ft). There should be no gap between the wall mounting plate and the catch basin wall.
6. From the ground above using a reach bar, lower the ICD device by hooking the end of the reach bar to the handle of the ICD device. Align the triangular plate portion into the mounting wall plate. Push down the device to be sure it has centered in to the universal mounting plate and has created a seal.



WARNING

- Verify that the outlet pipe doesn't protrude into the catch basin. If it does, cut down the pipe flush to the catch basin wall.
- Call your IPEX representative for more information or if you have any questions about our products.

Instructions to assemble a TEMPEST LMF ICD into a Round Catch Basin:

STEPS:

1. Materials and tooling verification.
 - Tooling: impact drill, 3/8" concrete bit, torque wrench for 9/16" nut, hand hammer, level and marker.
 - Material: (4) concrete anchor 3/8 x 3-1/2, (4) washers and (4) nuts, spigot CB wall plate, universal mounting plate hub adapter, ICD device.
2. Use the spigot catch basin wall plate to locate and mark the hole (4) pattern on the catch basin wall. You should use a level to ensure that the plate is at the horizontal.
3. Use an impact drill with a 3/8" concrete bit to make the four holes at a depth between 1-1/2" to 2-1/2". Clean the concrete dust from the holes.
4. Install the anchors (4) in the holes by using a hammer. Thread the nuts on the top of the anchors to protect the threads when you hit the anchors with the hammer. Remove the nuts from the ends of the anchors.
5. Install the CB spigot wall plate on the anchors and screw the 4 nuts in place with a maximum torque of 40 N.m (30 lbf-ft). There should be no gap between the spigot wall plate and the catch basin wall.
6. Apply solvent cement on the hub of the universal mounting plate, hub adapter and the spigot of the CB wall plate, then slide the hub over the spigot. Make sure the universal mounting plate is at the horizontal and its hub is completely inserted onto the spigot. Normally, the corners of the universal mounting plate hub adapter should touch the catch basin wall.
7. From ground above using a reach bar, lower the ICD device by hooking the end of the reach bar to the handle of the ICD device. Align the triangular plate portion into the mounting wall plate. Push down the device to be sure it has centered in to the mounting plate and has created a seal.



WARNING

- Verify that the outlet pipe doesn't protrude into the catch basin. If it does, cut back the pipe flush to the catch basin wall.
- The solvent cement which is used in this installation is to be approved for PVC.
- The solvent cement should not be used below 0°C (32°F) or in a high humidity environment. Refer to the IPEX solvent cement guide to confirm the required curing time or visit the IPEX Online Solvent Cement Training Course available at www.ipexinc.com.
- Call your IPEX representative for more information or if you have any questions about our products.

PRODUCT TECHNICAL SPECIFICATION

General

Inlet control devices (ICD's) are designed to provide flow control at a specified rate for a given water head level and also provide odour and floatable control. All ICD's will be IPEX Tempest or approved equal.

All devices shall be removable from a universal mounting plate. An operator from street level using only a T-bar with a hook will be able to retrieve the device while leaving the universal mounting plate secured to the catch basin wall face. The removal of the TEMPEST devices listed above must not require any unbolting or special manipulation or any special tools.

High Flow (HF) Sump devices will consist of a removable threaded cap which can be accessible from street level with out entry into the catchbasin (CB). The removal of the threaded cap shall not require any special tools other than the operator's hand.

ICD's shall have no moving parts.

Materials

ICD's are to be manufactured from Polyvinyl Chloride (PVC) or Polyurethane material, designed to be durable enough to withstand multiple freeze-thaw cycles and exposure to harsh elements.

The inner ring seal will be manufactured using a Buna or Nitrile material with hardness between Duro 50 and Duro 70.

The wall seal is to be comprised of a 3/8" thick Neoprene Closed Cell Sponge gasket which is attached to the back of the wall plate.

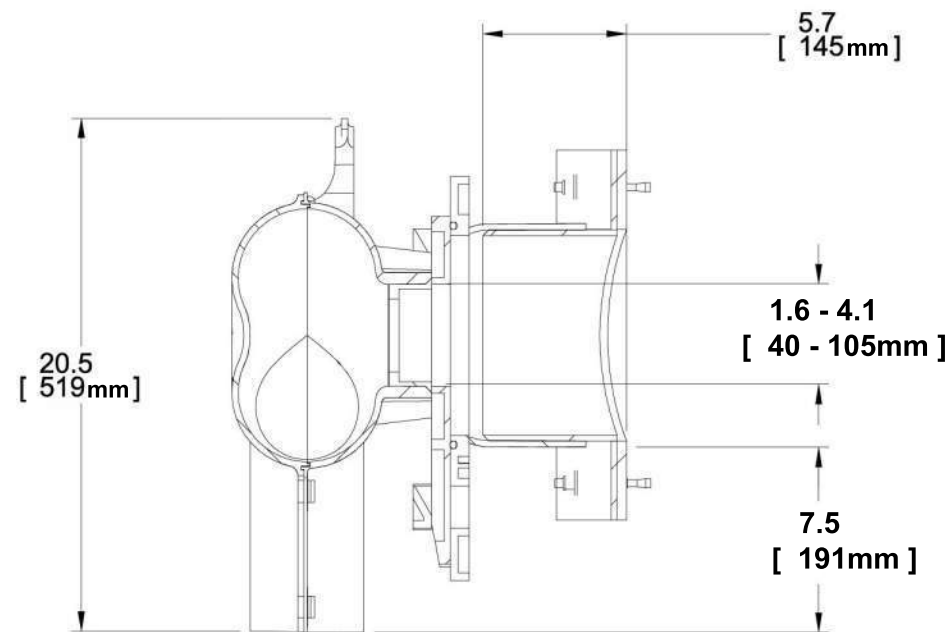
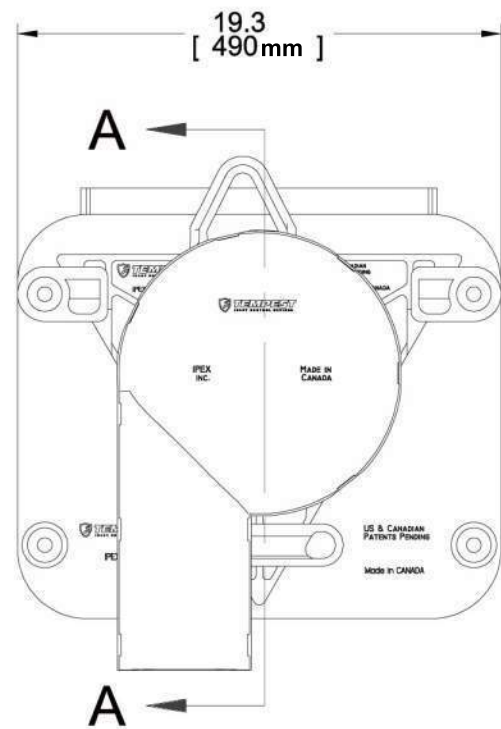
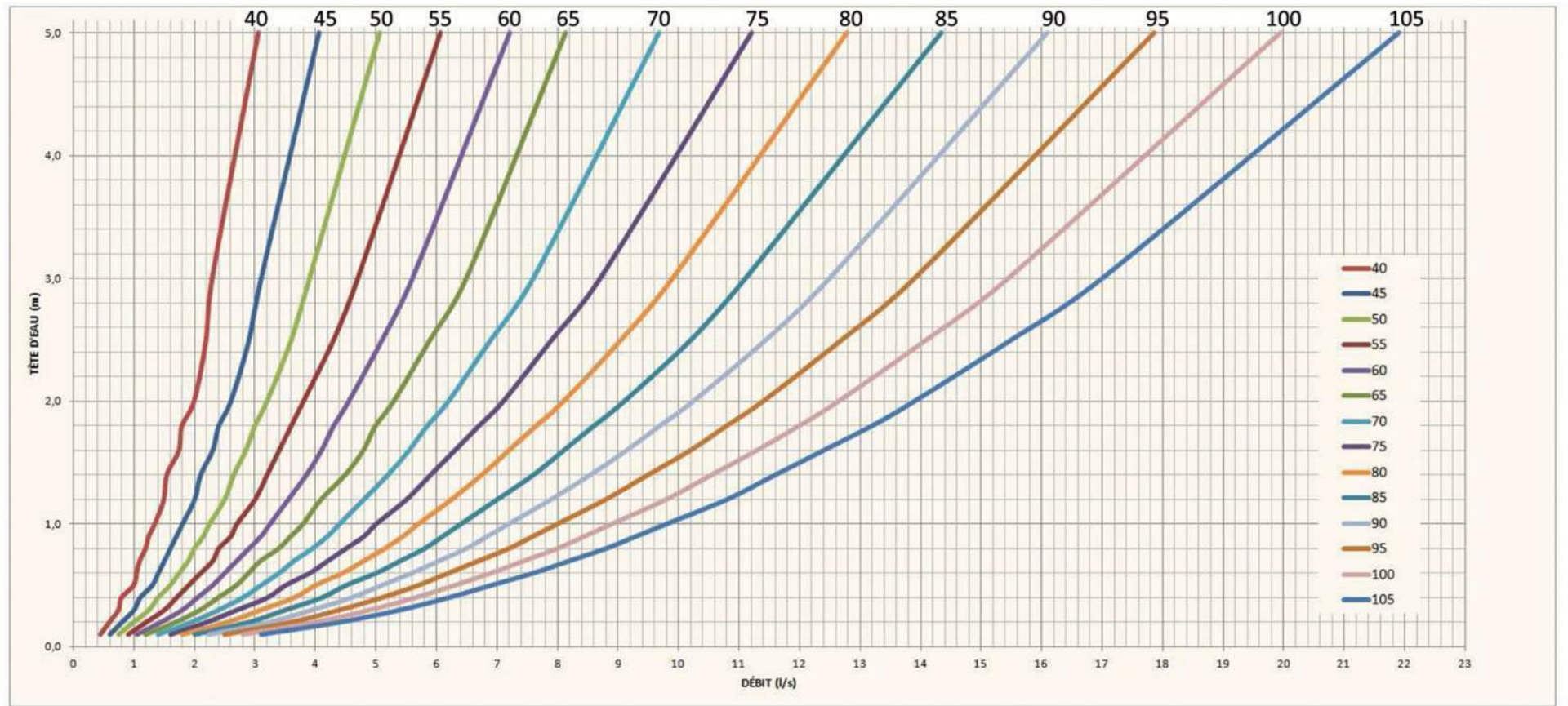
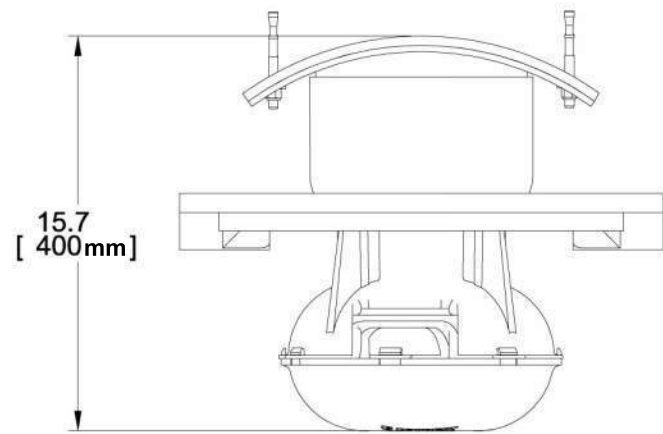
All hardware will be made from 304 stainless steel.

Dimensioning

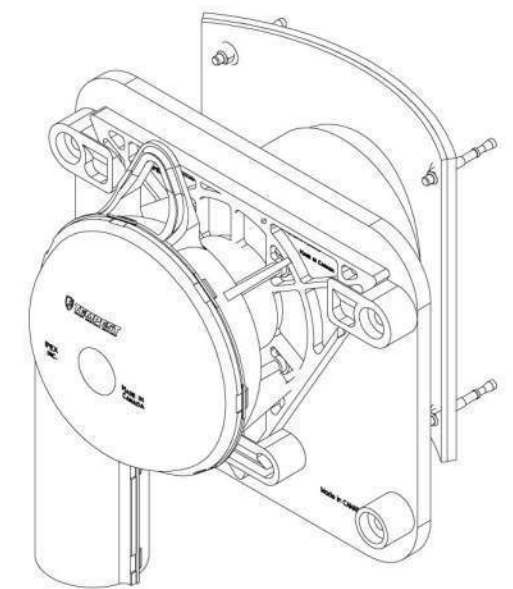
The Low Medium Flow (LMF), High Flow (HF) and the High Flow (HF) Sump shall allow for a minimum outlet pipe diameter of 200mm with a 600mm deep Catch Basin sump.

Installation

Contractor shall be responsible for securing, supporting and connecting the ICD's to the existing influent pipe and catchbasin/manhole structure as specified and designed by the Engineer.



SECTION A-A



APPENDIX G

Control Flow Roof Drain Information



Adjustable Accutrol Weir

Tag: _____

Adjustable Flow Control for Roof Drains

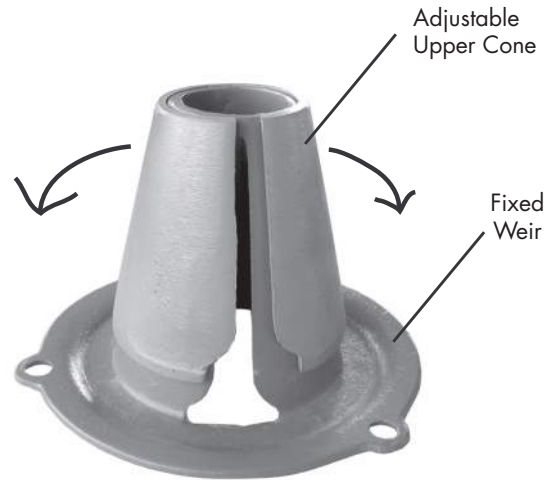
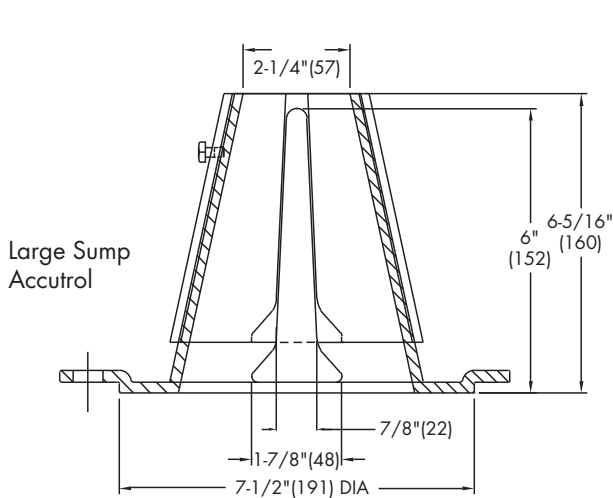
ADJUSTABLE ACCUTROL (for Large Sump Roof Drains only)

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 _____
 Job Location _____
 Engineer _____

Contractor _____
 Contractor's P.O. No. _____
 Representative _____

Watts product specifications in U.S. customary units and metric are approximate and are provided for reference only. For precise measurements, please contact Watts Technical Service. Watts reserves the right to change or modify product design, construction, specifications, or materials without prior notice and without incurring any obligation to make such changes and modifications on Watts products previously or subsequently sold.

USA: Tel: (800) 338-2581 • Fax: (828) 248-3929 • Watts.com
 Canada: Tel: (905) 332-4090 • Fax: (905) 332-7068 • Watts.ca
 Latin America: Tel: (52) 81-1001-8600 • Fax: (52) 81-8000-7091 • Watts.com



APPENDIX H
Water Quality Treatment Unit
Information

Chris Visser

From: Patrick <patrick@echelonenvironmental.ca>
Sent: Tuesday, December 6, 2022 3:54 PM
To: Chris Visser
Cc: Francois Thauvette
Subject: RE: CDS Sizing Request - 3493-3499 Innes Road Commercial Development in Ottawa
Attachments: CDS TSSR - 3493-3499 Innes Road - PMSU 2015_4 .pdf

Good afternoon Chris,

I hope everything is going well! For this site I recommend a CDS PMSU 2015_4 which has a treatment flow rate of 20 L/s. All the required information is noted below. This unit has an approximate budget price of \$18,500. If you have any questions I am available on my cell phone to discuss!

- % of net annual TSS removal – See sizing report
- % of net annual treatment volume for the tributary area – see sizing report
- The treatment capacity in L/s – 20 L/s
- The sediment storage capacity in m³ – 0.838m³
- The oil storage capacity in L - 232 L
- The total unit storage capacity in L – 1.590m³

Best regards,

Patrick Graham
Project Manager



*****Please note our new addresses*****

Echelon Environmental Inc.
55 Albert Street
Suite 200
Markham, ON
L3P 2T4
Phone: 1-905-948-0000
Cell: 416-460-5819
Fax: 1-905-948-0577
email patrick@echelonenvironmental.ca

Mailing Address:

Echelon Environmental Inc.
5694 Hwy #7 East
Suite 354
Markham, ON
L3P 0E3

From: Chris Visser <c.visser@novatech-eng.com>
Sent: Friday, December 2, 2022 3:02 PM
To: Patrick <patrick@echelonenvironmental.ca>
Cc: Francois Thauvette <f.thauvette@novatech-eng.com>
Subject: CDS Sizing Request - 3493-3499 Innes Road Commercial Development in Ottawa

Hi Patrick,

We are currently working on a project that requires a stormwater quality control unit to treat water from the paved drive aisles on-site, some of the proposed buildings and landscaped areas. The project proposes to develop commercial buildings and is located at 3493-3499 Innes Road in the City of Ottawa. The project details are as follows:

Tributary area = 0.471 ha
Imperviousness = 86% or $Cw_5=0.80$
Time of concentration = 10min
IDF Curve = City of Ottawa (104.2mm/hr Intensity for 5yr) (178.6mm/hr Intensity for 100yr)

We have a requirement to provide a level of quality control treatment to meet the MOE 'Enhanced' Level of Protection guidelines (i.e. 80% TSS removal and 90% of annual runoff treated). The proposed unit will be installed on a new 300mm dia. PVC outlet pipe with two 300mm dia. PVC inlet pipes (see attached SWM drawing for more information). A standard particle distribution (Fines) should be adequate for the design. Anticipated peak flows should be in the order of 34.2L/s based on the City's requirement to control the site to a predevelopment level of the 5-yr allowable to the municipal sewer. See attached mark-up the proposed site servicing plan for a sketch of the area and proposed water quality treatment unit location (highlighted in yellow).

Can you please size a CDS unit for us and provide the design details as well as an approximate cost estimate.

We will also need the following information on the unit for our SWM Report:

- % of net annual TSS removal
- % of net annual treatment volume for the tributary area
- The treatment capacity in L/s
- The sediment storage capacity in m³
- The oil storage capacity in L
- The total unit storage capacity in L

Thank you for your time and consideration in this matter. We are looking to submit to the city at the end of next week, if you could get us something by then, it would be greatly appreciated. If there is any further information you require, please do not hesitate to call.

Regards,

Chris Visser, Project Coordinator

NOVATECH Engineers, Planners & Landscape Architects

240 Michael Cowpland Drive, Suite 200, Ottawa, ON, K2M 1P6 | Tel: 613.254.9643 Ext: 245 | Fax: 613.254.5867

The information contained in this email message is confidential and is for exclusive use of the addressee.



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



Project Name: 3493-3499 Innes Road
Location: Ottawa, ON
OGS #: 1

Engineer: Novatech
Contact: Chris Visser
Report Date: 6-Dec-22

Area 0.471 ha
Weighted C 0.80
CDS Model 2015-4

Rainfall Station # 215
Particle Size Distribution FINE
CDS Treatment Capacity 20 l/s

<u>Rainfall Intensity¹</u> (mm/hr)	<u>Percent Rainfall Volume¹</u>	<u>Cumulative Rainfall Volume</u>	<u>Total Flowrate</u> (l/s)	<u>Treated Flowrate</u> (l/s)	<u>Operating Rate</u> (%)	<u>Removal Efficiency</u> (%)	<u>Incremental Removal</u> (%)
1.0	10.6%	19.8%	1.0	1.0	5.3	97.3	10.3
1.5	9.9%	29.7%	1.6	1.6	7.9	96.6	9.6
2.0	8.4%	38.1%	2.1	2.1	10.6	95.8	8.0
2.5	7.7%	45.8%	2.6	2.6	13.2	95.1	7.3
3.0	5.9%	51.7%	3.1	3.1	15.9	94.3	5.6
3.5	4.4%	56.1%	3.7	3.7	18.5	93.6	4.1
4.0	4.7%	60.7%	4.2	4.2	21.1	92.8	4.3
4.5	3.3%	64.0%	4.7	4.7	23.8	92.0	3.1
5.0	3.0%	67.1%	5.2	5.2	26.4	91.3	2.8
6.0	5.4%	72.4%	6.3	6.3	31.7	89.8	4.8
7.0	4.4%	76.8%	7.3	7.3	37.0	88.3	3.8
8.0	3.5%	80.3%	8.4	8.4	42.3	86.7	3.1
9.0	2.8%	83.2%	9.4	9.4	47.6	85.2	2.4
10.0	2.2%	85.3%	10.5	10.5	52.8	83.7	1.8
15.0	7.0%	92.3%	15.7	15.7	79.3	76.1	5.3
20.0	4.5%	96.9%	21.0	19.8	100.0	66.4	3.0
25.0	1.4%	98.3%	26.2	19.8	100.0	53.1	0.8
30.0	0.7%	99.0%	31.4	19.8	100.0	44.3	0.3
35.0	0.5%	99.5%	36.7	19.8	100.0	38.0	0.2
40.0	0.5%	100.0%	41.9	19.8	100.0	33.2	0.2
45.0	0.0%	100.0%	47.1	19.8	100.0	29.5	0.0
50.0	0.0%	100.0%	52.4	19.8	100.0	26.6	0.0

89.8

Removal Efficiency Adjustment² = 6.5%

Predicted Net Annual Load Removal Efficiency = 83.3%

Predicted Annual Rainfall Treated = 98.1%

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.

3 - CDS Efficiency based on testing conducted at the University of Central Florida

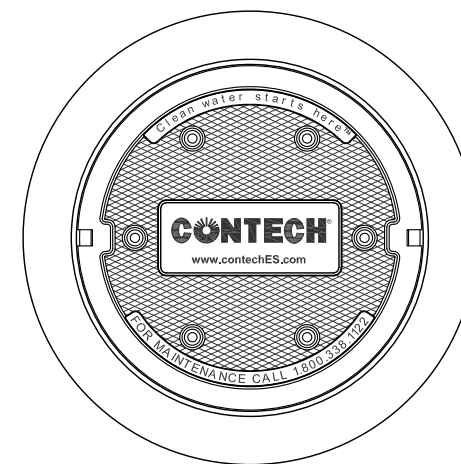
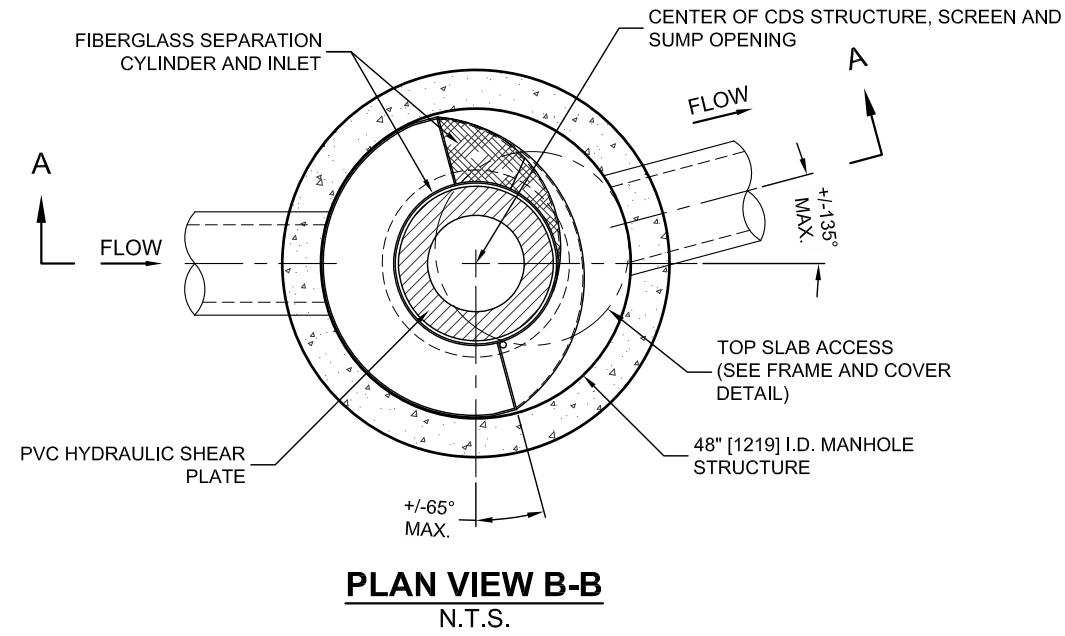
4 - CDS design flowrate and scaling based on standard manufacturer model & product specifications

CDS PMSU2015-4-C DESIGN NOTES

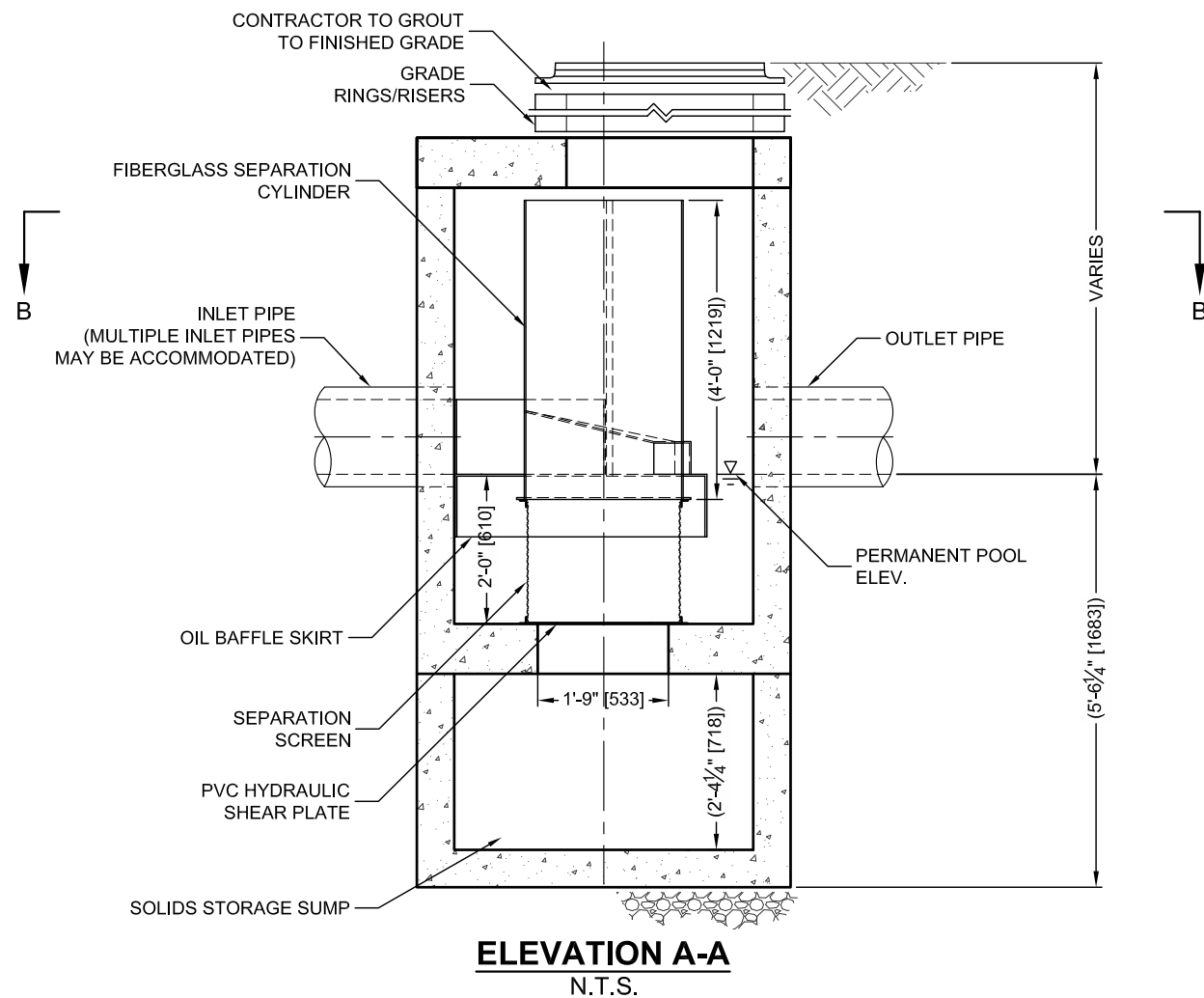
THE STANDARD CDS PMSU2015-4-C CONFIGURATION IS SHOWN. ALTERNATE CONFIGURATIONS ARE AVAILABLE AND ARE LISTED BELOW. SOME CONFIGURATIONS MAY BE COMBINED TO SUIT SITE REQUIREMENTS.

CONFIGURATION DESCRIPTION

- GRATED INLET ONLY (NO INLET PIPE)
- GRATED INLET WITH INLET PIPE OR PIPES
- CURB INLET ONLY (NO INLET PIPE)
- CURB INLET WITH INLET PIPE OR PIPES
- CUSTOMIZABLE SUMP DEPTH AVAILABLE
- ANTI-FLOTATION DESIGN AVAILABLE UPON REQUEST



FRAME AND COVER
(DIAMETER VARIES)
N.T.S.



ELEVATION A-A
N.T.S.

SITE SPECIFIC DATA REQUIREMENTS			
STRUCTURE ID			
WATER QUALITY FLOW RATE (CFS OR L/s)		*	
PEAK FLOW RATE (CFS OR L/s)		*	
RETURN PERIOD OF PEAK FLOW (YRS)		*	
SCREEN APERTURE (2400 OR 4700)		*	
PIPE DATA:	I.E.	MATERIAL	DIAMETER
INLET PIPE 1	*	*	*
INLET PIPE 2	*	*	*
OUTLET PIPE	*	*	*
RIM ELEVATION		*	
ANTI-FLOTATION BALLAST	WIDTH	HEIGHT	
	*	*	
NOTES/SPECIAL REQUIREMENTS:			
* PER ENGINEER OF RECORD			

GENERAL NOTES

1. CONTECH TO PROVIDE ALL MATERIALS UNLESS NOTED OTHERWISE.
2. DIMENSIONS MARKED WITH () ARE REFERENCE DIMENSIONS. ACTUAL DIMENSIONS MAY VARY.
3. FOR FABRICATION DRAWINGS WITH DETAILED STRUCTURE DIMENSIONS AND WEIGHTS, PLEASE CONTACT YOUR CONTECH ENGINEERED SOLUTIONS LLC REPRESENTATIVE. www.contechES.com
4. CDS WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED IN THIS DRAWING.
5. STRUCTURE SHALL MEET AASHTO HS20 AND CASTINGS SHALL MEET HS20 (AASHTO M 306) LOAD RATING, ASSUMING GROUNDWATER ELEVATION AT, OR BELOW, THE OUTLET PIPE INVERT ELEVATION. ENGINEER OF RECORD TO CONFIRM ACTUAL GROUNDWATER ELEVATION.
6. PVC HYDRAULIC SHEAR PLATE IS PLACED ON SHELF AT BOTTOM OF SCREEN CYLINDER. REMOVE AND REPLACE AS NECESSARY DURING MAINTENANCE CLEANING.

INSTALLATION NOTES

- A. ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD.
- B. CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE CDS MANHOLE STRUCTURE (LIFTING CLUTCHES PROVIDED).
- C. CONTRACTOR TO ADD JOINT SEALANT BETWEEN ALL STRUCTURE SECTIONS, AND ASSEMBLE STRUCTURE.
- D. CONTRACTOR TO PROVIDE, INSTALL, AND GROUT PIPES. MATCH PIPE INVERTS WITH ELEVATIONS SHOWN.
- E. CONTRACTOR TO TAKE APPROPRIATE MEASURES TO ASSURE UNIT IS WATER TIGHT, HOLDING WATER TO FLOWLINE INVERT MINIMUM. IT IS SUGGESTED THAT ALL JOINTS BELOW PIPE INVERTS ARE GROUTED.

CONTECH
ENGINEERED SOLUTIONS LLC

www.contechES.com
9025 Centre Pointe Dr., Suite 400, West Chester, OH 45069
800-338-1122 513-645-7000 513-645-7993 FAX

CDS PMSU2015-4-C
INLINE CDS
STANDARD DETAIL



THIS PRODUCT MAY BE PROTECTED BY ONE OR MORE OF THE FOLLOWING U.S. PATENTS: 6,788,848; 6,841,722; 6,911,502; 6,981,783; RELATED FOREIGN PATENTS, OR OTHER PATENT PENDING.

APPENDIX I
Engineering Drawings

LEGEND

PROPOSED ELEVATION
 EXISTING ELEVATION
 PROPOSED TOP OF WALL ELEVATION
 PROPOSED LOW ELEVATION
 PROPOSED TERRACE ELEVATION
 GRADE AND DIRECTION
 MAXIMUM 3:1 SIDESLOPE
 EMERGENCY OVERLAND FLOW ROUTE
 PROPOSED SANITARY MANHOLE
 PROPOSED CATCHBASIN MANHOLE
 PROPOSED STORM MANHOLE
 PROPOSED CATCHBASIN
 PROPOSED HYDRANT AND VALVE
 PROPOSED BARRIER CURB (PER SC1.1)
 PROPOSED DEPRESSED CURB (PER SC1.1)
 PROPOSED INLET CONTROL DEVICE
 PROPOSED ROOF DRAIN
 PROPOSED FINISHED FLOOR ELEVATION
 PROPOSED UNDERSIDE OF FOOTING ELEVATION
 PROPOSED LANDSCAPE WALL

SECTION DETAIL
 PROPOSED BUILDING ENTRANCE
 PROPOSED SILT FENCING (OPSD 219.110)
 PROPOSED MUD MAT / CONSTRUCTION ENTRANCE
 APPROXIMATE PONDING LIMITS
 EXISTING CONCRETE CURB
 EXISTING SANITARY MANHOLE
 EXISTING CATCHBASIN MANHOLE
 EXISTING STORM MANHOLE
 EXISTING CATCHBASIN
 EXISTING HYDRANT & VALVE
 EXISTING TREES / VEGETATION
 EXISTING UTILITY POLE C/W GUY WIRES
 EXISTING FENCE
 EXISTING LIGHT STANDARD

Erosion and Sediment Control Responsibilities:

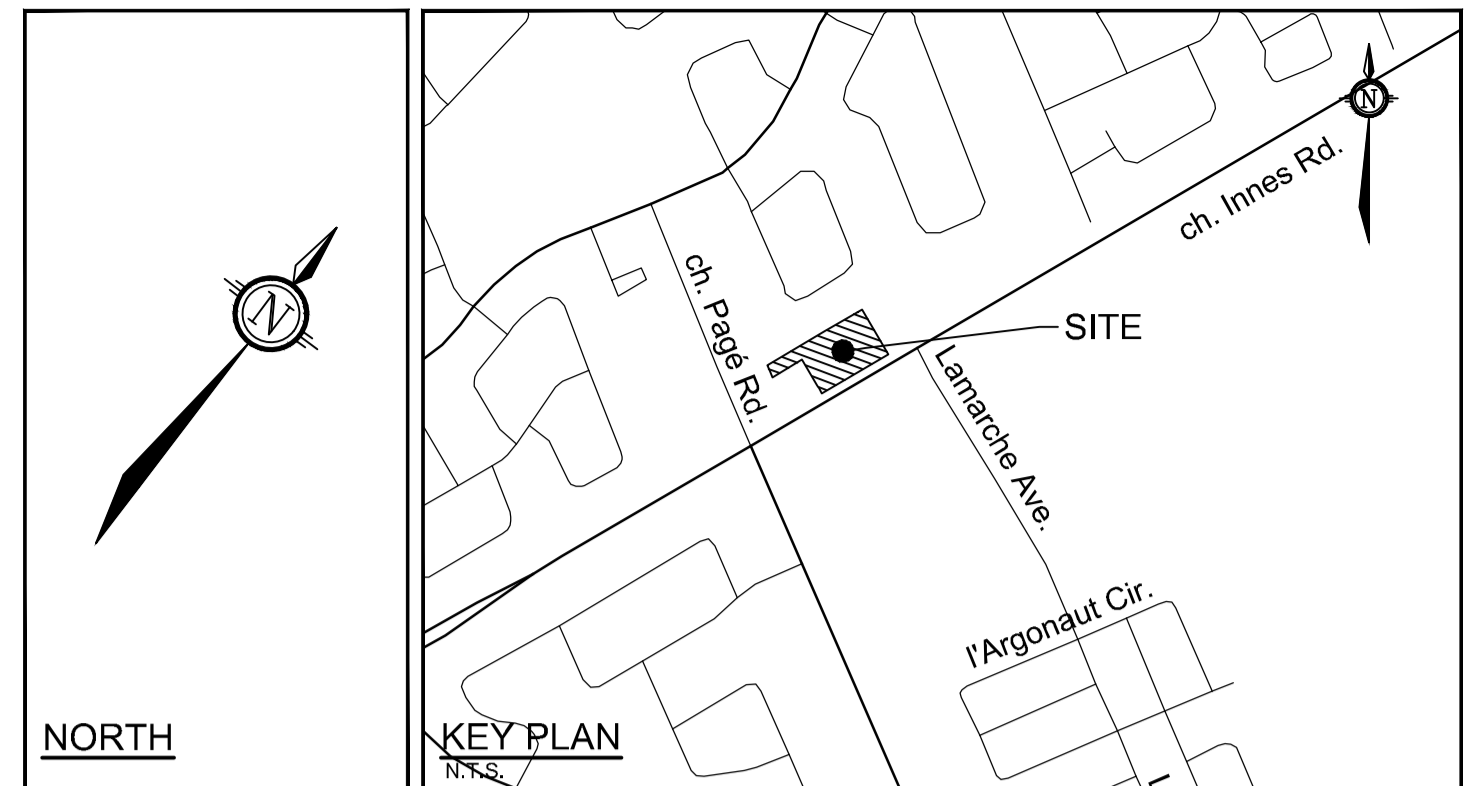
ESIC Measure	Symbol	Sublocation	During Construction		After Construction Prior to Final Acceptance		After Final Acceptance	
			Installation Responsibility	Inspection/Verification Responsibility	Approval to Remove	Removal Responsibility	Inspection/Maintenance Responsibility	Removal Responsibility
Silt Fence	[Symbol]	OPSD 219.110	Developer's Contractor	Developer's Contractor	Consultant	Developer's Contractor	N/A	N/A
Fiber Bags	[Symbol]	Location as Indicated in EIC Note #1	Developer's Contractor	Developer's Contractor	Weekly (as a minimum)	Developer's Contractor	Developer's Contractor	N/A
Mud Mat	[Symbol]	Drawing Details	Developer's Contractor	Developer's Contractor	Weekly (as a minimum)	Developer's Contractor	Developer's Contractor	N/A
Dust Control	[Symbol]	Location as Required Around Site	Developer's Contractor	Developer's Contractor	Weekly (as a minimum)	Consultant	Developer's Contractor	N/A
Stabilized Material (Stockpiles)	[Symbol]	Location as Required by Contractor	Developer's Contractor	Developer's Contractor	Weekly (as a minimum)	Developer's Contractor	Developer's Contractor	N/A
Sediment Basin (for flow being returned to lot excavations)	[Symbol]	Location as Required by Contractor	Developer's Contractor	Developer's Contractor	After Every Rainstorm	Developer's Contractor	Developer's Contractor	N/A

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 HL3 or SUPERPAVE 19.0
 150mm GRANULAR "A"
 450mm GRANULAR "B" TYPE II
 ASPHALT GRADE PG 58-34
 *INSTALLED PER GEOTECHNICAL REPORT

HEAVY DUTY PAVEMENT - ROADWAY RE-INSTATEMENT
 MATCH EXISTING GRANULAR STRUCTURE OF ROADWAY
 MATCH EXISTING ASPHALT THICKNESSES
 NEW ASPHALT GRADE: PG 58-34



GENERAL NOTES:

- COORDINATE AND SCHEDULE ALL WORK WITH OTHER TRADES AND CONTRACTORS.
- 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.
- OBTAIN ALL NECESSARY PERMITS AND APPROVALS FROM THE CITY OF OTTAWA BEFORE COMMENCING CONSTRUCTION.
- 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.
- 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.
- 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.
- ALL ELEVATIONS ARE GEODETIC.
- REFER TO GEOTECHNICAL REPORT (No. PG4564-1, Revision 1, DATED NOVEMBER 7, 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.
- REFER TO ARCHITECT'S AND LANDSCAPE ARCHITECT'S DRAWINGS FOR BUILDING AND HARD SURFACE AREAS AND DIMENSIONS.
- REFER TO STORMWATER MANAGEMENT REPORT (R-2018-158) PREPARED BY NOVATECH ENGINEERING CONSULTANTS LTD.
- SAW CUT AND KEY GRIND ASPHALT AT ALL ROAD CUTS AND ASPHALT TIE IN POINTS AS PER CITY OF OTTAWA STANDARDS (R10).
- PROVIDE LINE/PARKING PAINTING.

GRADING NOTES:

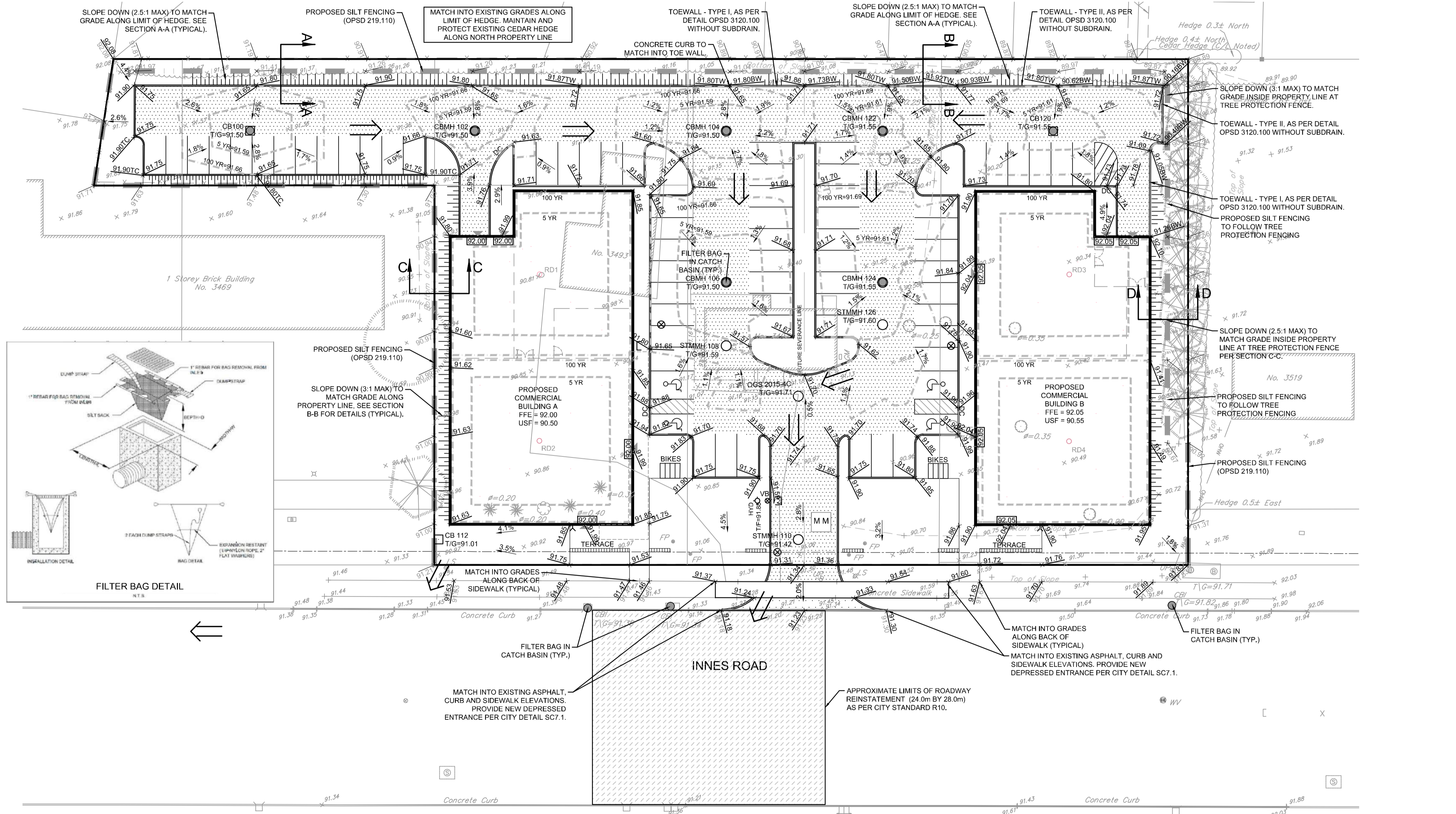
- ALL TOPSOIL, ORGANIC OR DELETERIOUS MATERIAL MUST BE ENTIRELY REMOVED FROM BENEATH THE PROPOSED PAVED AREAS AS DIRECTED BY THE SITE ENGINEER OR GEOTECHNICAL ENGINEER.
- EXPOSED SUBGRADES IN PROPOSED PAVED AREAS SHOULD BE PROOF ROLLED WITH A LARGE STEEL DRUM ROLLER AND INSPECTED BY THE GEOTECHNICAL ENGINEER PRIOR TO THE PLACEMENT OF GRANULARS.
- 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.
- 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.
- MINIMUM OF 2% GRADE FOR ALL GRASS AREAS UNLESS OTHERWISE NOTED.
- MAXIMUM TERRACING GRADE TO BE 3:1 UNLESS OTHERWISE NOTED.
- ALL GRADES BY CURBS ARE EDGE OF PAVEMENT GRADES UNLESS OTHERWISE INDICATED.
- ALL CURBS SHALL BE BARRIER CURB (150mm) UNLESS OTHERWISE NOTED AND CONSTRUCTED AS PER CITY OF OTTAWA STANDARDS (SC1.1). MOUNTABLE CURBS ARE TO BE PER CITY OF OTTAWA STANDARD (SC1.3).
- REFER TO LANDSCAPE PLAN FOR PLANTING AND OTHER LANDSCAPE FEATURE DETAILS.
- CONTRACTOR TO PROVIDE THE CONSULTANT WITH A GRADING PLAN INDICATING AS-BUILT ELEVATIONS OF ALL DESIGN GRADES SHOWN ON THIS PLAN.

EROSION AND SEDIMENT CONTROL NOTES:

- 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.
- 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.
- 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.
- TO PREVENT SURFACE EROSION FROM ENTERING ANY STORM SEWER SYSTEM DURING CONSTRUCTION, FILTER BAGS WILL BE PLACED UNDER CURBS OR 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.
- 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.
- FOR MATERIAL STOCKPILING, MINIMIZE THE AMOUNT OF EXPOSED MATERIALS AT ANY GIVEN TIME. APPLY TEMPORARY SEEDING, TAPPS, COMPACTION AND/OR SURFACE ROUGHENING AS REQUIRED TO STABILIZE STOCKPILED MATERIALS THAT WILL NOT BE USED WITHIN 14 DAYS.
- 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.
- 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.
- THE CONTRACTOR ACKNOWLEDGES THAT FAILURE TO IMPLEMENT EROSION AND SEDIMENT CONTROL MEASURES MAY BE SUBJECT TO PENALTIES IMPOSED BY ANY APPLICABLE REGULATORY AGENCY.
- ROADWAYS ARE TO BE SWEEP AS REQUIRED OR AS DIRECTED BY THE ENGINEER AND/OR THE MUNICIPALITY.
- 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.

BENCHMARK NOTES:

- ELEVATIONS SHOWN ARE GEODETIC AND ARE REFERRED TO THE CGVD28 GEODETIC DATUM.
- IT IS THE RESPONSIBILITY OF THE USER OF THIS INFORMATION TO VERIFY THAT THE JOB BENCHMARK HAS NOT BEEN ALTERED OR DISTURBED AND THAT ITS RELATIVE ELEVATION REPORTS AGREES WITH THE INFORMATION SHOWN ON THIS DRAWING.
- BENCHMARK WAS PROVIDED ON SURVEYOR'S REAL PROPERTY REPORT PART 1, PLAN OF PART OF LOT 5, CONCESSION 2 (OTTAWA FRONT) GEOGRAPHIC TOWNSHIP OF GLOUCESTER, CITY OF OTTAWA, SERVED BY ANNIS, O'SULLIVAN AND VOLEBEK LTD.



NOTE:
 THE POSITION OF ALL POLE LINES, CONDUITS, WATERMANS, 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.

OWNER INFORMATION
 6587712 CANADA INC.
 1085 BOULEVARD DE LA CARRIERE,
 GATINEAU, QUEBEC, J8Y 6V4
 VALÉRIE LAPENÉE
 PHONE: (819) 664-4306
 EMAIL: valerie@matelapensee.ca

No.	REVISION	DATE	BY
2.	REVISED AS PER CITY COMMENTS	JUN 7/23	FST
1.	ISSUED FOR SITE PLAN APPROVAL	DEC 22/22	FST

SCALE
 1:300
 0 3 6 9 12

FOR REVIEW ONLY
 DESIGN: CV
 CHECKED: FST
 DRAWN: CV
 CHECKED: FST
 APPROVED: FST

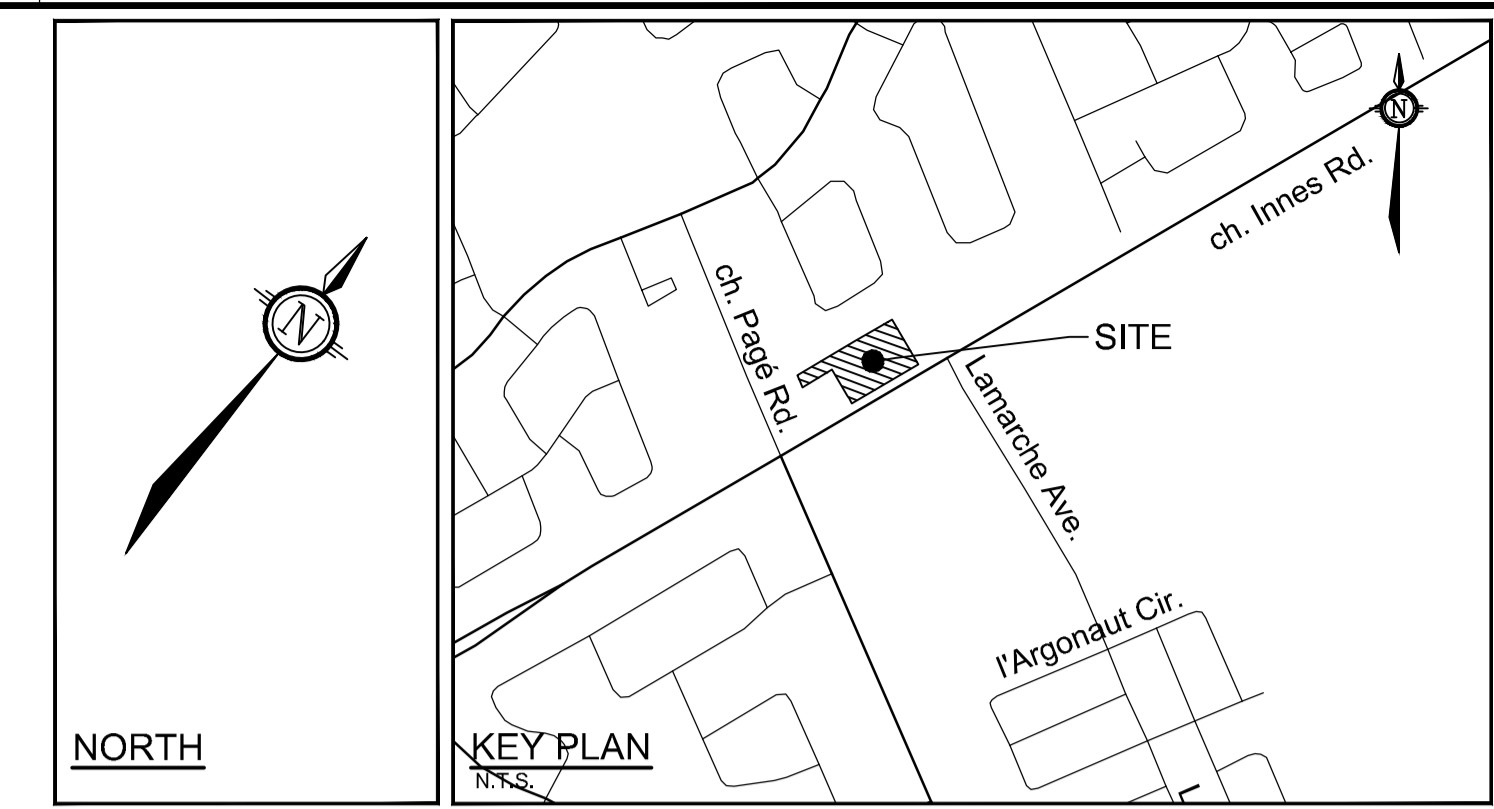
F.S. THAUVETTE
 100041299
 JUNE 9, 2023
 PROVINCE OF ONTARIO

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

LOCATION:
 CITY OF OTTAWA
 3493, 3497 & 3499 INNES ROAD
 DRAWING NAME:
GRADING AND EROSION & SEDIMENT CONTROL PLAN

PROJECT No.: 118204
 REV # 2
 DRAWING No.: 118204-GR

M:\2018\118204-GR\Drawings\118204-GR.dwg, GR, Jul 11, 2023, 2:29pm, cvbsgr



LEGEND

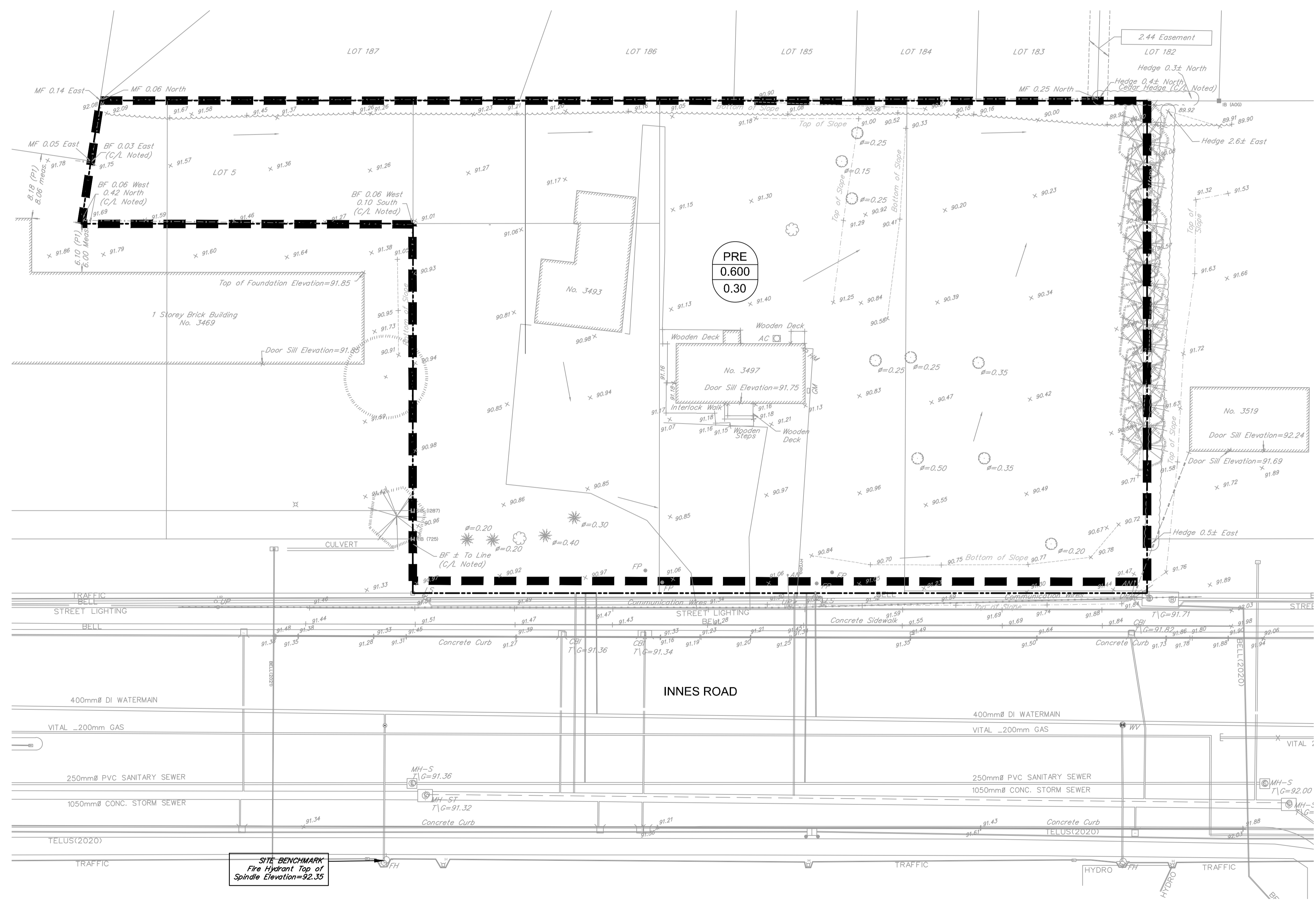
- DRAINAGE AREA LIMITS
- PRE 0.600 PRE-DEVELOPMENT AREA ID
- 0.30 PRE-DEVELOPMENT DRAINAGE AREA (ha)
- 1.5 YEAR WEIGHTED RUNOFF COEFFICIENT
- EXISTING CONCRETE CURB
- ⊗ V&V EXISTING VALVE & VALVE BOX
- ⊙ SP EXISTING SERVICE POST
- ⊕ HYD EXISTING HYDRANT
- CBMH EXISTING CATCHBASIN
- CB EXISTING CATCHBASIN MH
- EX UP EXISTING UTILITY POLE
- CW GUY WIRES
- EXISTING DRAINAGE DIRECTION ARROWS
- ⇨ EXISTING OVERLAND FLOW

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. ALL ELEVATIONS ARE GEODETIC.
4. REFER TO THE GEOTECHNICAL INVESTIGATION PROPOSED DEVELOPMENT - 3493-3499 INNES ROAD - (REPORT NO.: PG5775-LET 01), PREPARED BY PATERSON GROUP ON APRIL 5, 2021. 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.
5. REFER TO THE DEVELOPMENT SERVICING STUDY AND STORMWATER MANAGEMENT REPORT(R-2022-171) PREPARED BY NOVATECH.

BENCHMARK NOTES:

1. ELEVATIONS SHOWN ARE GEODETIC AND ARE REFERRED TO THE CGVD28 GEODETIC DATUM.
2. IT IS THE RESPONSIBILITY OF THE USER OF THIS INFORMATION TO VERIFY THAT THE JOB BENCHMARK HAS NOT BEEN ALTERED OR DISTURBED AND THAT ITS RELATIVE ELEVATION AND DESCRIPTION AGREES WITH THE INFORMATION SHOWN ON THIS DRAWING.
3. BENCHMARK WAS PROVIDED ON SURVEYOR'S REAL PROPERTY REPORT PART 1, PLAN OF PART OF LOT 5, CONCESSION 2 (OTTAWA FRONT) GEOGRAPHIC TOWNSHIP OF GLOUCESTER, CITY OF OTTAWA, SURVEYED BY ANNIS, O'SULLIVAN AND VOLEBEKK LTD.

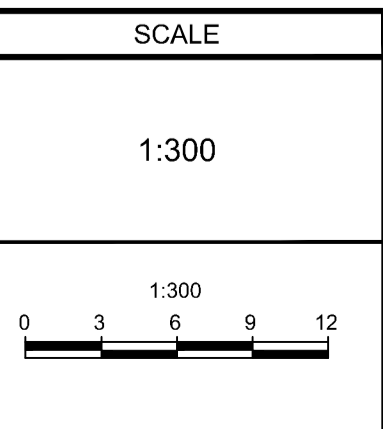


NOTE:
THE POSITION OF ALL POLE LINES, CONDUITS, WATERMANS, SEWERS AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, DETERMINE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

OWNER INFORMATION
6587712 CANADA INC.
1085 BOULEVARD DE LA CARRIERE,
GATINEAU, QUEBEC, J8Y 6V4

VALÉRIE LAPENSÉE
PHONE: (819) 664-4306
EMAIL: valerie@matelapensee.ca

No.	REVISION	DATE	BY
1.	ISSUED AS PER CITY COMMENTS	JUN 7/23	FST



DESIGN

CV

CHECKED FST

DRAWN CVZA

CHECKED FST

APPROVED FST

FOR REVIEW ONLY

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

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

LOCATION
CITY OF OTTAWA
3493, 3497 & 3499 INNES ROAD

DRAWING NAME
**PRE-DEVELOPMENT
STORMWATER DRAINAGE PLAN**

PROJECT No. 118204

REV # 1

DRAWING No. 118204-STM

M:\2018\118204\CAD\Design\118204-SWM.dwg, STM, Jun 08, 2023 - 3:14pm, cvessef

LEGEND

- DC PROPOSED BARRIER CURB
- PROPOSED DEPRESSED CURB
- DRAINAGE AREA LIMITS
- APPROXIMATE PONDING LIMITS
- POST-DEVELOPMENT AREA ID
- POST-DEVELOPMENT DRAINAGE AREA (ha)
- 1:5 YEAR WEIGHTED RUNOFF COEFFICIENT
- STM MH PROPOSED STORM MANHOLE (WT=WATERTIGHT COVER)
- CBMH PROPOSED CATCHBASIN MANHOLE
- CB PROPOSED CATCHBASIN
- RD CONTROLLED FLOW ROOF DRAIN
- PROPOSED STORM SEWER AND FLOW DIRECTION
- ICD PROPOSED INLET CONTROL DEVICE
- EMERGENCY OVERLAND FLOW ROUTE
- PROPOSED LANDSCAPE WALL
- PROPOSED BUILDING ENTRANCE / EXIT
- MAXIMUM 3:1 SIDESLOPE
- FINISHED FLOOR ELEVATION
- UNDERSIDE OF FOOTING ELEVATION
- EXISTING STORM MH & SEWER
- EXISTING CATCHBASIN CW CATCHBASIN LEAD
- EXISTING CONCRETE CURB
- EXISTING VALVE & VALVE BOX
- EXISTING SERVICE POST
- EXISTING HYDRANT
- EXISTING CATCHBASIN
- EXISTING CATCHBASIN MH
- EXISTING UTILITY POLE C/W GUY WIRES

INLET CONTROL DEVICE DATA TABLE: AREA A-2

DESIGN EVENT	ICD TYPE (PLUG TYPE)	OUTLET STRUCTURE	DIAMETER OF OUTLET PIPE (mm)	PEAK DESIGN FLOW (L/s)	DESIGN HEAD (m)	WATER ELEVATION (m)	VOLUME (m ³)	AVAILABLE STORAGE
12 YR	IPXK TEMPEST	CBMH 106	450mmØ PVC	11.3	1.56	91.47	19.1	105.8m ³
1.5 YR	VORTEX LMF 100			11.6	1.68	91.59	28.9	
1:100 YR				11.8	1.75	91.66	66.3	

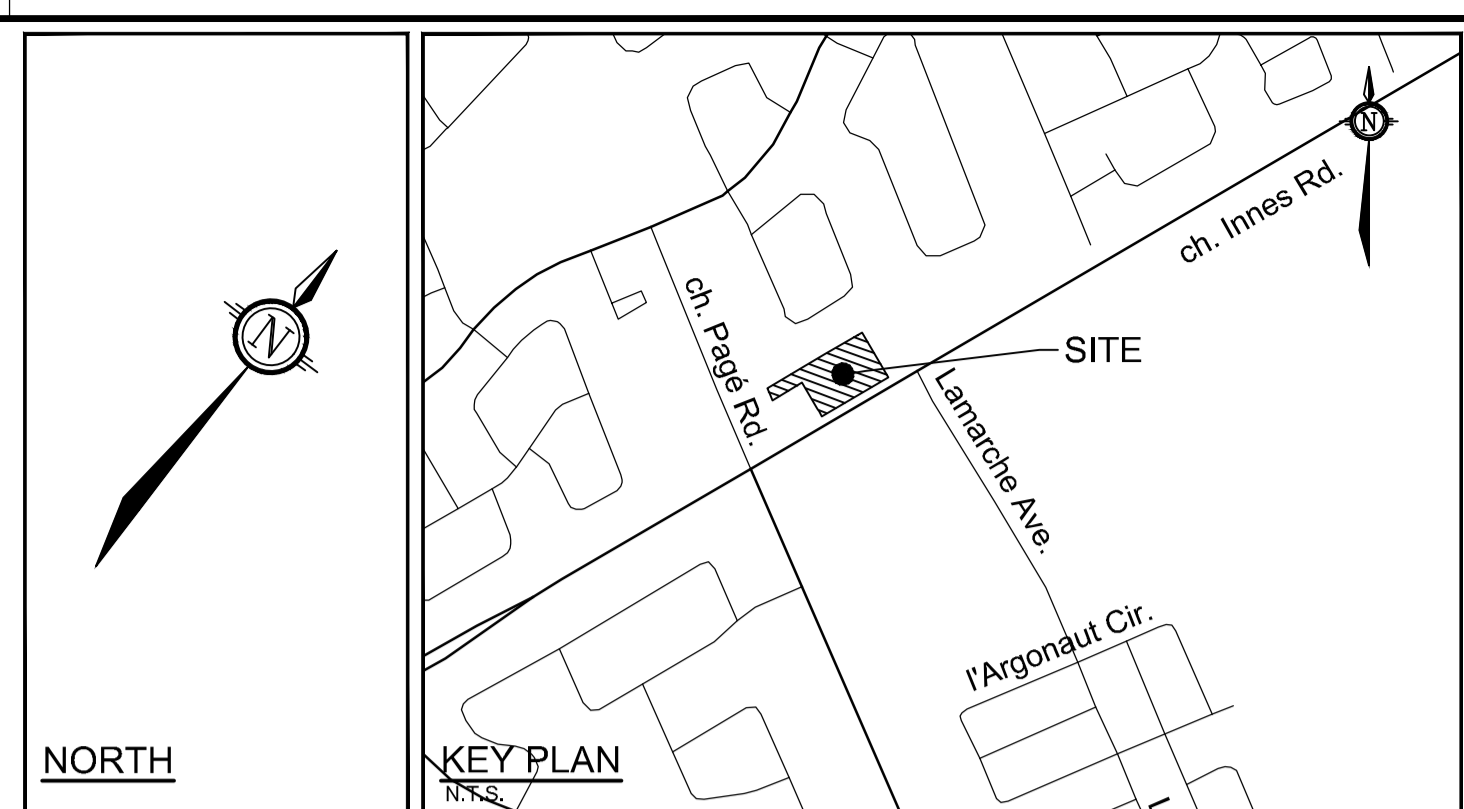
INLET CONTROL DEVICE DATA TABLE: AREA A-5

DESIGN EVENT	ICD TYPE (PLUG TYPE)	OUTLET STRUCTURE	DIAMETER OF OUTLET PIPE (mm)	PEAK DESIGN FLOW (L/s)	DESIGN HEAD (m)	WATER ELEVATION (m)	VOLUME (m ³)	AVAILABLE STORAGE
12 YR	IPXK TEMPEST	CBMH 124	450mmØ PVC	11.3	1.66	91.52	11.9	52.1 m ³
1.5 YR	VORTEX LMF 100			11.6	1.75	91.61	15.6	
1:100 YR				12.2	1.83	91.69	46.0	

ROOF DRAIN TABLE

AREA ID	ROOF DRAIN No. (WATTS MODEL)	ROOF DRAIN OPENING SETTING	2 YEAR RELEASE RATE	APPROX. 2-YR PONDING DEPTH	5-YEAR RELEASE RATE	APPROX. 5-YEAR PONDING DEPTH	100-YEAR RELEASE RATE	APPROX. 100-YR PONDING DEPTH
A-3	RD 1 (RD-100-A-ADJ)	1/4 EXPOSED	0.75 L/s	9 cm	0.83 L/s	11 cm	0.95 L/s	15 cm
A-3	RD 2 (RD-100-A-ADJ)	1/4 EXPOSED	0.79 L/s	10 cm	0.83 L/s	11 cm	0.95 L/s	15 cm
A-6	RD 3 (RD-100-A-ADJ)	1/4 EXPOSED	0.79 L/s	10 cm	0.83 L/s	11 cm	0.95 L/s	15 cm
A-6	RD 4 (RD-100-A-ADJ)	1/4 EXPOSED	0.79 L/s	10 cm	0.83 L/s	11 cm	0.95 L/s	15 cm

*REFER TO THE 'DEVELOPMENT SERVICING STUDY AND STORMWATER MANAGEMENT REPORT' (R-2022-171) PREPARED BY NOVATECH FOR DRAINAGE AREA IDENTIFIERS AND STORMWATER MANAGEMENT DETAILS.
 **ALL CONTROLLED FLOW ROOF DRAINS TO BE WATTS 'ADJUSTABLE ACCUTROL' ROOF DRAINS.

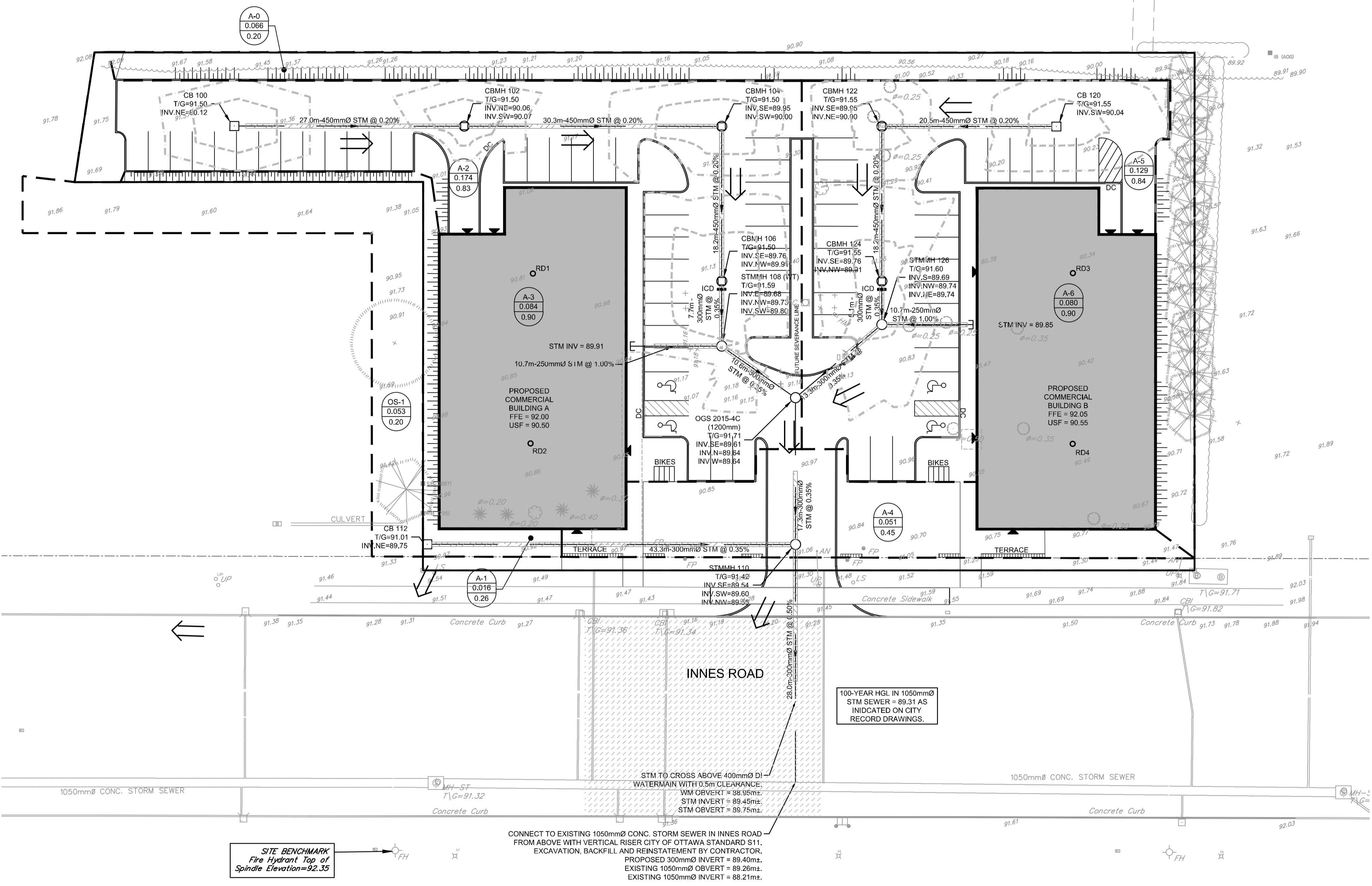


GENERAL NOTES:

- COORDINATE AND SCHEDULE ALL WORK WITH OTHER TRADES AND CONTRACTORS.
- 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.
- OBTAIN ALL NECESSARY PERMITS AND APPROVALS FROM THE CITY OF OTTAWA BEFORE COMMENCING CONSTRUCTION.
- 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.
- COMPLETE ALL WORKS IN ACCORDANCE WITH THE MOST CURRENT CITY OF OTTAWA STANDARDS AND SPECIFICATIONS USING THE CURRENT GUIDELINES, BYLAWS AND STANDARDS INCLUDING MATERIALS OF CONSTRUCTION RECOMMENDATIONS, AND GEOTECHNICAL INSPECTION REQUIREMENTS. THE GEOTECHNICAL CONSULTANT IS TO REVIEW ON-SITE CONDITIONS AFTER EXCAVATION PRIOR TO PLACEMENT OF THE GRANULAR MATERIAL.
- 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.
- 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.
- ALL ELEVATIONS ARE GEODETIC.
- REFER TO THE GEOTECHNICAL INVESTIGATION PROPOSED DEVELOPMENT - 3493-3499 INNES ROAD - (REPORT NO.: PG5775-LET 01), PREPARED BY PATERSON GROUP ON APRIL 5, 2021, 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.
- REFER TO ARCHITECT'S AND LANDSCAPE ARCHITECT'S DRAWINGS FOR BUILDING AND HARDSURFACE AREAS AND DIMENSIONS.
- REFER TO THE DEVELOPMENT SERVICING STUDY AND STORMWATER MANAGEMENT REPORT (R-2022-171) PREPARED BY NOVATECH.
- SAW CUT AND KEY GRIND ASPHALT AT ALL ROAD CUTS AND ASPHALT TIE IN POINTS AS PER CITY OF OTTAWA STANDARDS (R10).

BENCHMARK NOTES:

- ELEVATIONS SHOWN ARE GEODETIC AND ARE REFERRED TO THE CGVD28 GEODETIC DATUM.
- IT IS THE RESPONSIBILITY OF THE USER OF THIS INFORMATION TO VERIFY THAT THE JOB BENCHMARK HAS NOT BEEN ALTERED OR DISTURBED AND THAT IT'S RELATIVE ELEVATION AND DESCRIPTION AGREES WITH THE INFORMATION SHOWN ON THIS DRAWING.
- BENCHMARK WAS PROVIDED ON SURVEYOR'S REAL PROPERTY REPORT PART 1, PLAN OF PART OF LOT 5, CONCESSION 2 (OTTAWA FRONT) GEOGRAPHIC TOWNSHIP OF GLOUCESTER, CITY OF OTTAWA, SURVEYED BY ANNIS, O'SULLIVAN AND VOLEBEKK LTD.

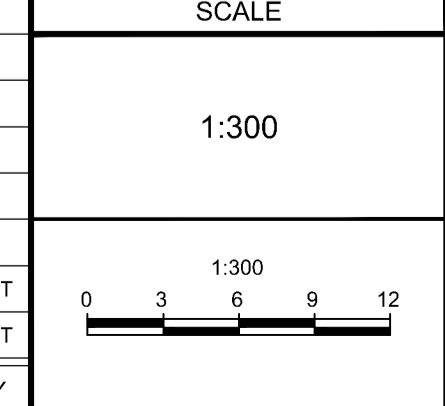


NOTE:
 THE POSITION OF ALL POLE LINES, CONDUITS, WATERMANS, SEWERS AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, DETERMINE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

OWNER INFORMATION
 6587712 CANADA INC.
 1085 BOULEVARD DE LA CARRIERE,
 GATINEAU, QUEBEC, J8Y 6V4

VALÉRIE LAPENSAÉE
 PHONE: (819) 664-4306
 EMAIL: valerie@matelapensee.ca

No.	REVISION	DATE	BY
2.	REVISED AS PER CITY COMMENTS	JUN 7/23	FST
1.	ISSUED FOR SITE PLAN APPROVAL	DEC 22/22	FST



FOR REVIEW ONLY

DESIGN: CV
 CHECKED: FST
 DRAWN: CVZA
 CHECKED: FST
 APPROVED: FST

F.S. THAUETTE
 100041299
 JUNE 9, 2023
 PROVINCE OF ONTARIO

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

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

LOCATION
 CITY OF OTTAWA
 3493, 3497 & 3499 INNES ROAD

DRAWING NAME
 POST-DEVELOPMENT
 STORMWATER MANAGEMENT PLAN

PROJECT No. 118204
 REV # 2
 DRAWING No. 118204-SWM

M:\2018\118204\CAD\Design\118204-SWM.dwg, SWM, Jun 08, 2023, 3:14pm, cnsseer