Site Servicing & Stormwater Management Report

2465070 Ontario Ltd
2375 St-Laurent Blvd., Ottawa, ON

Prepared for:

Graebeck Construction Ltd.
160 Terence Matthews Crescent,
Kanata, ON
K2M 0B2

Attention: Mr. Evan Cory

LRL File No.: 130828

December 13, 2017

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1 INTRODUCTION

LRL Associates Ltd. (LRL) has been retained by Graebeck Construction Ltd. to prepare a site servicing and stormwater management report in support of their site plan control application for a proposed site development. This report presents the proposed servicing plan for the proposed development in regards to water and sanitary services, as well as stormwater management.

This report has been prepared in consideration of the survey carried out by Annis, O'Sullivan, Vollebekk Ltd. dated August 11th, 2017. Should there be any discrepancies in the existing infrastructure and/or connections to existing services, which may relate to site servicing considerations, LRL should be advised in order to review the report recommendations. This report should be read in conjunction with the Civil plans prepared by LRL.

2 SITE DESCRIPTION

The subject property is located within the suburban boundary of the City of Ottawa; Ward 10 Gloucester-Southgate, within the Greens Creek Study Area. The proposed development will be a motorsports warehouse, located at 2375 St-Laurent Blvd. The total area of the property is approximately 0.659 ha.

The proposed development is located in an industrial area bounded by other light industrial properties and a parks and open space zone to the south. The property is currently a virgin site.

The proposed development will include a two-storey warehouse/garage with office space. The total footprint area of the proposed main building is 930m^2. There will also be a future building addition of 1000m^2 which will be built at a later date. The service calculations take into account both the proposed building and the future expansion.

3 SCOPE OF WORK

As per applicable guidelines, the scope of work includes the following:

Water services

- Calculate the expected water supply demand at average and peak conditions.
- Calculate the fire flow as per the Fire Underwriter Survey (FUS) method.
- Describe the proposed water distribution network and connection to the existing system.

Sanitary services

- Describe the existing sanitary sewers available to receive wastewater from the building.
- Calculate peak allowable release flow rate for the subject site.
- Calculate peak actual release flow rate and compare to allowable release.
- Describe the proposed sanitary sewer system.

Stormwater management

- Calculate the allowable stormwater release rate.
- Calculate the anticipated post development stormwater release rates.
- Demonstrate how the target quality and quantity objectives will be achieved.
- Describe the proposed storm sewer system.

4 WATER SUPPLY AND FIRE PROTECTION

4.1 Existing Water Supply Services

An existing 300mm dia. watermain extending along St-Laurent Blvd. is present north of the subject property. From this watermain, a 200mm dia. water service extends into the subject site and is capped off just inside the property line at the northeast corner. There are two existing fire hydrants near the northeast and northwest corners of the property on St-Laurent Blvd. The subject site is located in Pressure Zone 2C. Please refer to Appendix H for the St-Laurent Blvd. As-Built Drawings.

4.2 Water Supply Demand

As per MOE and City of Ottawa Design Guidelines, the average water demand for the subject light industrial development was calculated. A daily and hourly peak factor of **1.5** and **1.8**, respectively were used. The average daily water demand for the site is **0.27L/s**, maximum daily is **0.40L/s**, and maximum hourly is **0.72L/s**. Please refer to Appendix A for the water demand calculation sheet.

The fire flow demand was estimated in accordance with the Fire Underwriters Survey (FUS). This method is based on the floor area of the building to be protected, type and combustibility of the structural frame and the separation distances with adjoining buildings. The fire flow demand was calculated to be **150.0L/s**. Please refer to Appendix A for the fire flow calculation sheet.

The City of Ottawa has provided boundary conditions to LRL Associates for this project. Please refer to Appendix I for boundary conditions. Using the provided HGLs, minimum, maximum and maximum day + fire pressures were calculated at the St-Laurent Blvd. connection. Head losses were then calculated from the connection to the proposed building for the maximum daily demand, maximum hourly demand and maximum daily demand + fire flow. For each of these scenarios, the relevant pressures were determined. Adequate water supply/pressure is available and meets the City of Ottawa standards as per section 4.2.2 of the Ottawa Design Guidelines – Water distribution. For the maximum daily demand, a minimum and maximum pressure of **60.89** and **69.57** psi were calculated; these land within the 50 to 80 psi MOE range.

For the maximum hourly demand, a minimum and maximum pressure of **60.63** and **69.31** psi were calculated; these land within the 40 to 80 psi MOE range. For the maximum daily demand + fire flow, a pressure of **57.33** psi was calculated; this is above the minimum 20 psi MOE requirement. A pressure reducing valve is not required based on the above analysis. Please refer to Appendix A for pressure loss calculations.

Summary Table	
Average Water Demand Rate	23065 L/day
Factors	1.5(max daily) & 1.8(max hourly)
Average Day Demand (L/s)	0.27
Maximum Daily Demand (L/s)	0.40
Peak Hour Demand (L/s)	0.72
FUS Fire Flow Requirement (L/s)	150.0
Max Day+Fire Flow (L/s)	150.4

4.3 Water supply servicing design

The proposed building will be serviced by a new 50mm dia. HDPE "Gold Stripe" water service; to be installed 2.4m below grade. The proposed service will connect to the existing 200mm dia. service stubbed at the property line; located at the northeast corner of the site. One 200mm x 100mm reducer and one 100mm x 50mm reducer will be installed to allow for the proposed water service.

Fire flow protection is to be provided by the existing fire hydrants located near the northeast and northwest corners of the property on St-Laurent Blvd. The existing northwest hydrant is located 40m from the proposed building's front entrance.

5 SANITARY DRAINAGE

5.1 Existing Sanitary Sewer Services

An existing 300mm dia. sanitary sewer extending along St-Laurent Blvd. is present north of the subject property. Please refer to Appendix H for the St-Laurent Blvd. As-Built Drawings.

5.2 Sanitary Sewer Servicing Design

The new building, including the future addition, will be serviced with a new 150mm dia. sanitary service, which will connect to the existing 300mm dia. sanitary sewer on St-Laurent Blvd. A new monitoring manhole (SAN MH1) is to be installed along the proposed 150mm service; near the property line. The new proposed 150mm PVC sanitary service will be installed at a minimum slope of 1.0%, as per the City of Ottawa Sewer Design Guidelines.

The parameters used to calculate the site's allowable sanitary flows are: Light Industrial average flow demand of 35,000 L/ha/day, an industrial peaking factor of 7.25 (as per Appendix 4-B of the Ottawa Sewer Design Guidelines) and an infiltration rate of 0.28 L/s/ha. Based on these parameters and the total site area of 0.659 ha, the total allowable sanitary flow was estimated to be **2.12 L/s**. Refer to Appendix B for the site's sanitary sewer design sheet.

As per Table 8.2.1.3.B of the Ontario Building Code, the site's anticipated sanitary flow is **3,700 L/day (0.04 L/s)**. The proposed building and future addition will have 2 water closets and 12 loading bays. Under the "Warehouse" item: 2 water closets x 950 L/day = 1900 L/day and 12 loading bays x 150 L/day = 1800 L/day; for a total of 3,700 L/day (0.04 L/s).

The site's anticipated sanitary flow is lower than its allowable flow. The proposed sanitary service has been sized to accommodate the peak allowable flow.

6 STORMWATER MANAGEMENT

6.1 Existing Stormwater Infrastructure

An existing 1200mm dia. storm sewer extending along St-Laurent Blvd. is present north of the subject property. Please refer to Appendix H for the St-Laurent Blvd. As-Built Drawings.

6.2 Stormwater management Concept

The information below should be read in conjunction with LRL drawings C401 and C701, as well as Appendix C (the stormwater management design sheets). The pervious and impervious runoff coefficients have been increased by 25% for the 100yr event; as per the Ottawa Sewer Design Guidelines.

The pre-development 5yr allowable release rate has been calculated using a C coefficient of 0.5 as per the City Pre-Application Consultation Memo, a calculated time of concentration of 36 minutes using the FAA/Rational Method, a calculated intensity of 47.2mm/hr as per City of Ottawa guidelines, and a total site area of 0.659ha. The allowable release rate was calculated to be **29.98L/s**.

The post-development conditions (100 year storm event) were designed using a restricted release flow of **43.22L/s** using Hydrovex Vertical Vortex Flow Regulator model 150VHV-2 to be installed in proposed CBMH5.

The 100year storm runoff from proposed catchment areas CA-01 to CA-06 will be controlled at proposed CBMH5. Runoff above the 100year will back out of all proposed CBMHs and pond around each drainage structure until it flows overland, making its way to St-Laurent Blvd. through the spill out point located at the northeast side of the entrance at the property line. Stormwater will not back up through the system and make its way out of CB1 (located at the bottom of the loading dock area) due to a proposed Armtec flap gate to be installed on the CB's

south inlet. Stormwater from the 5yr storm event will always remain underground; it will never back up/out of the drainage structures and pond overland.

The 100yr storage required for this site is **219.82m3**. The 100yr storage provided is **222.41m3**. This is a combination of the overland ponding storage of 62.78m3 (refer to Appendix J for the Overland Ponding Volume Table), StormTech chambers storage of 133.00m3 (refer to Appendix E for StormTech System Design Sheets) and the underground pipes and drainage structures storage of 26.63m3. This storage capacity will be possible using a Hydrovex Vertical Vortex Flow Regulator model 150VHV-2 to be installed in proposed CBMH5 at an allowable release rate of **43.22L/s**. Refer to Appendix D for Hydrovex Vertical Vortex Flow Regulator Report.

6.3 Design Criteria

Stormwater quantity and quality control measures are taken into account for this site to reduce post development stormwater runoff to allowable levels.

6.3.1 Water Quality

The enhanced 80% TSS removals requirement will be met though the proposed Stormceptor STC 300 oil/grit separator which will provide adequate water quality treatment. Please refer to Appendix F for the Stormceptor Report. An isolator row has been incorporated into the StormTech system as well providing additional on-site quality treatment.

6.3.2 Water Quantity

All storm events up to and including the 100 year event will be controlled to the 5 year pre-development level. The site's major overland flow route has been designed to ensure that storm events beyond the 100 year design storm can be safely conveyed overland towards the St-Laurent Blvd. right of way. The minor system (the on-site storm sewer system) is sized to convey the 5 year storm event flows from the site to the municipal storm sewer on St-Laurent Blvd.

6.4 Method of Analysis

The Rational Method was used to calculate the runoff from the development. The Intensity-Duration-Frequency (IDF) curve formulas of the MacDonald Cartier International Airport, City of Ottawa, were used to calculate the peak storm flows.

6.5 Allowable Release Rate

The pre-development 5yr allowable release rate has been calculated using a C coefficient of 0.5 as per the City Pre-Application Consultation Memo, a calculated time of concentration of 36

minutes using the FAA/Rational Method, a calculated intensity of 47.2mm/hr as per City of Ottawa guidelines, and a total site area of 0.659ha.

7 EROSION AND SEDIMENT CONTROL

During construction, erosion and sediment controls will be provided primarily via a sediment control fence to be erected along the perimeter of the site where runoff has the potential of leaving the site. Inlet sediment control devices are also to be provided in any catchbasin and/or manhole in and around the site that may be impacted by the site construction. Construction and maintenance requirements for erosion and sediment controls are to comply with Ontario Provincial Standard Specification (OPSS) # 577. Refer to LRL drawing C.101 for erosion and sediment control details.

8 CONCLUSIONS

In accordance with the report objectives, the analyses of the proposed development can be summarized as follows:

Water Service

- The anticipated maximum domestic water demand of the site is 0.72L/s.
- The maximum required fire flow was calculated at 150.0L/s using the FUS method.
- There are two existing fire hydrants located near the northeast and northwest corners of the property on St-Laurent Blvd. within a 90m radius. The existing northwest hydrant is located 40m from the proposed building's front entrance.
- The new development will be serviced with by a new 150mm dia. water service connected to the existing 200mm dia. service stubbed at the property line; located at the northeast corner of the site.

Sanitary Service

- The total allowable sanitary flow was estimated to be 2.12 L/s.
- The site's anticipated sanitary flow is 0.04 L/s.
- The proposed building will be serviced by a new 150mm sanitary service which will be connected to the existing 300mm dia. sanitary sewer on St-Laurent Blvd.
- A new monitoring manhole will be installed on the proposed 150mm sanitary service.

Stormwater Management

- The proposed storm system's 100yr post-development release rate of 43.22 L/s will meet the 5yr pre-development allowable release rate of 43.22 L/s.
- Stormwater quantity control objectives will be met through on-site stormwater storage.

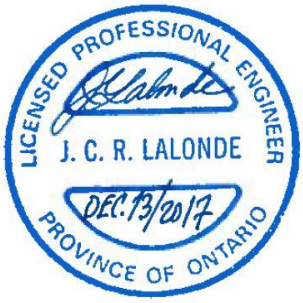
- Stormwater quality control objectives will be met on-site through the use of a Stormceptor STC 300 oil/grit separator. An isolator row has been incorporated into the StormTech system as well providing additional on-site quality treatment.

9 LIMITATIONS AND USE OF REPORT

The report conclusions are applicable only to the project described in the report. Any changes require a review by LRL Associates Ltd. to insure compatibility with the recommendations contained in this report. We trust the information presented in this report meets City of Ottawa requirements. Please do not hesitate to contact us should you have any questions or concerns.

Prepared by:

LRL Associates Ltd.



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APPENDIX A

Water Demand and Fire Flow Calculations

Water Service Calculations

LRL File No. : 170721
Project : 2465070 Ontario Ltd
Date : December 13, 2017
Designed by : Guillaume Courtois

Water Demand

Total site area: 0.659 ha

$Q_{average}$ = 35 m^3 / ha·day (As per MOE guidelines)

$Q_{average}$ = 23.065 m^3 / day
$Q_{average}$ = 23065 L / day
$Q_{average}$ = 0.27 L / s

Maximum daily peak factor: 1.5
Maximum daily demand = 34598 L / day
= 0.40 L / s

Maximum hour peak factor: 1.8
Maximum hour demand = 62276 L / day
= 0.72 L / s

Water Service Pipe Sizing

Q = VA

Where: V = velocity
A = area of watermain pipe
Q = water supply flow rate

By deriving the above formula, we can obtain the diameter of the pipe:

Minimum pipe diameter: $d = (4Q/\pi V)^{1/2}$
d = 0.023 m
d = 23 mm

Proposed pipe diameter: 50 mm (I.D. = 41mm)

Fire Flow Calculations

LRL File No. : 170721
Project : 2465070 Ontario Ltd
Date : December 13, 2017
Method : Fire Underwriters Survey (FUS)
Designed by : Guillaume Courtois

Step	Task	Term	Options	Multiplier	Choose:	Value	unit	Fire Flow
Structural Framing Material								
1	Choose frame used for building	Coefficient C related to the type of construction	Wood Frame	1.5	Non-combustible construction	0.8		
			Ordinary Construction	1.0				
			Non-combustible construction	0.8				
			Fire resistive construction <2 hrs	0.7				
			Fire resistive construction >2 hrs	0.6				
Floor Space Area								
2	Choose type of housing	Type of housing	Single family dwelling	0	Building - no. of units per floor	1	unit(s)	
			Townhouse - no. of units	0				
			Building - no. of units per floor	1				
3	Enter area of a unit	Enter floor space area of one unit (excluding basement)		1	1930.0		sq.m.	
4	Obtain fire flow before reductions	Required fire flow	**Fire Flow = 220 x C x Area^0.5**				L/min	**8,000**
							L/s	133.3
Reductions or surcharge due to factors affecting burning								
5	Choose combustibility of contents	Occupancy hazard reduction or surcharge	Non-combustible	-0.25	Combustible	0		
			Limited combustible	-0.15				
			Combustible	0				
			Free burning	0.15			L/min	**8,000**
			Rapid burning	0.25			L/s	133.3
6	Choose reduction for sprinklers	Sprinkler reduction	Sprinklers (NFPA13)	-0.30	False	0		
			Water supply is standard for both the system and fire department hose lines	-0.10	False	0	L/min	**8,000**
			Fully supervised system	-0.10	False	0	L/s	133.3
7	Choose separation	Exposure distance between units	North side	Over 45m	0			
			East side	10.1 to 20m	0.15			
			South side	Over 45m	0		L/min	**9,000**
			West side	Over 45m	0	0.15	L/s	150.0
Net required fire flow								
8	Obtain fire flow, duration, and volume				Minimum required fire flow rate (rounded to nearest 1000)		L/min	**9,000**
					Minimum required fire flow rate		L/s	**150.0**
					Required duration of fire flow		hr	**2**

Note: The above calculations take into account both the current proposed building of 930m^2 and the future proposed building of 1000m^2.

Pipe Pressure Losses Calculations

LRL File No. :	170721
Project :	2465070 Ontario Ltd
Date :	December 13, 2017
Designed :	Guillaume Courtois

Piezometric Head Equation (Derived from Bernoulli's Equation)

$$h = \frac{p}{\gamma} + z$$

Where:

h = HGL (m)

p = Pressure (Pa)

γ = Specific weight (N/m3) = 9810

z = Elevation of centreline of pipe (m) = 80.91

Water Pressure at St-Laurent Blvd. Connection			
HGL (m)		Pressure	
		kPa	psi
Minimum =	124.5	427.62	62.02
Maximum =	130.6	487.46	70.70
Max. Day + Fire =	124	422.71	61.31

Hazen Williams Equation

$$h_f = \frac{10.67 \times Q^{1.85} \times L}{C^{1.85} \times d^{4.87}}$$

Where:

h_f = Head loss over the length of pipe (m)

Q = Volumetric flow rate (m^3/s)

L = Length of pipe (m)

C = Pipe roughness coefficient

d = Pipe diameter (m)

Scenario 1: maximum daily demand

Q (L/s)	0.40	
C	150	
L (m.)	31.5	
I.D. (mm)	41	
V (m/s)	0.30	
h_f (m)	0.09	
Head Loss (psi)	0.13	
Min. Pressure (psi)	61.89	
Max. Pressure (psi)	70.57	
Service Obv. @ Street Connection (m)	81.10	
Service Obv. @ Building Connection (m)	81.80	
Pressure Adjustment (psi)	-1.00	(due to service elevation difference from street to building)
Adjusted Min. Pressure (psi)	60.89	(must not be less than 50psi)
Adjusted Max. Pressure (psi)	69.57	(must not be more than 80psi)

Scenario 2: maximum hourly demand

Q (L/s)	0.72	
C	150	
L (m.)	31.5	
I.D. (mm)	41	
V (m/s)	0.55	
h_f (m)	0.28	
Head Loss (psi)	0.39	
Min. Pressure (psi)	61.63	
Max. Pressure (psi)	70.31	
Service Obv. @ Street Connection (m)	81.10	
Service Obv. @ Building Connection (m)	81.80	
Pressure Adjustment (psi)	-1.00	(due to service elevation difference from street to building)
Adjusted Min. Pressure (psi)	60.63	(must not be less than 40psi)
Adjusted Max. Pressure (psi)	69.31	(must not be more than 80psi)

Scenario 3: maximum daily demand + fire flow (from street connection to hydrant at northwest of site)

Q (L/s)	150.40	
C	150	
L (m.)	9.3	
I.D. (mm)	155	
V (m/s)	7.97	
h_f (m)	2.47	
Head Loss (psi)	3.51	
Pressure (psi)	57.80	
Service Obv. @ Street Connection (m)	81.12	
Service Obv. @ Hydrant Connection (m)	81.45	
Pressure Adjustment (psi)	-0.47	(due to service elevation difference from street to hydrant)
Adjusted Pressure (psi)	57.33	(must not be less than 20psi)

APPENDIX B

Sanitary Sewer Calculation Sheet

LRL File No. 170721
Project: 2465070 Ontario Ltd
Location: 2375 St-Laurent Blvd., Ottawa, ON
Date: December 13, 2017

Sanitary Design Parameters

Average Daily Flow = 350 L/p/day
Commercial & Institutional Flow = 50000 L/ha/day
Light Industrial Flow = 35000 L/ha/day
Heavy Industrial Flow = 55000 L/ha/day
Maximum Residential Peak Factor = 4.0
Commercial & Institutional Peak Factor = 1.5
Industrial Peak Factor = as per Appendix 4-B = 7.25
Extraneous Flow = 0.28 L/s/gross ha

Pipe Design Parameters

Minimum Velocity = 0.60 m/s
Manning's n = 0.013

LOCATION			RESIDENTIAL AREA AND POPULATION						COMMERCIAL		INDUSTRIAL			INSTITUTIONAL		C+I+I	INFILTRATION			TOTAL	PIPE							MANHOLE	
CATCHMENT / STREET	FROM MH	TO MH	AREA (Ha)	POP.	CUMMULATIVE AREA (Ha)	CUMMULATIVE POP.	PEAK FACT.	PEAK FLOW (l/s)	AREA (Ha)	ACCU. AREA (Ha)	AREA (Ha)	ACCU. AREA (Ha)	PEAK FACT.	AREA (Ha)	ACCU. AREA (Ha)	PEAK FLOW (l/s)	TOTAL AREA (Ha)	ACCU. AREA (Ha)	INFILT. FLOW (l/s)	FLOW (l/s)	LENGTH (m)	DIA. (mm)	SLOPE (%)	MATERAIL	CAP. (FULL) (l/s)	VEL. (FULL) (m/s)	Ratio (Q/Q_{FULL})	UP INVERT (m)	DOWN INVERT (m)
Site	Bldg	MH01	0.000	0.0	0.0	0.0	4.0	0.00	0.000	0.000	0.659	0.659	7.25	0.0	0.0	1.94	0.659	0.659	0.18	2.12	18.3	150	1.00%	PVC	15.23	0.86	0.14		
	MH01	TRUNK	0.000	0.0	0.0	0.0	4.0	0.00	0.000	0.000	0.000	0.659	7.25	0.0	0.0	1.94	0.000	0.659	0.18	**2.12**	16.8	150	1.00%	PVC	15.23	0.86	0.14		

NOTES

Existing inverts and slopes are estimated. They are to be confirmed on-site.

Designed: G.C.	PROJECT: 2465070 Ontario Ltd		
Checked: G.C.	LOCATION: 2375 St-Laurent Blvd., Ottawa, ON		
Dwg. Reference: C.401	File Ref.: 170721	Date: December 13, 2017	Sheet No. 1 of 1

APPENDIX C

Stormwater Management Design Sheets

LRL Associates Ltd.

Storm Design Sheet

LRL File No.	170721
Project:	2465070 Ontario Ltd
Location:	2375 St-Laurent, Ottawa, ON
Date:	13 Dec 2017
Designed:	Guillaume Courtois
Drawing Reference:	C701

Post-development Catchments

CATCHMENT	Grass C=0.20	Gravel C=0.80	Bldg. / Asph. / Conc. C=0.90	Total Area (ha)	Combined C
CA-01	0.054	0.000	0.303	0.357	0.79
CA-02	0.000	0.000	0.012	0.012	0.90
CA-03	0.007	0.000	0.097	0.104	0.85
CA-04	0.019	0.000	0.034	0.053	0.65
CA-05	0.021	0.000	0.058	0.079	0.71
CA-06	0.010	0.000	0.044	0.054	0.77

LRL File No.	170721
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Drawing Ref.:	C701

Stormwater Management Design Sheet

Allowable Release Rate (5 Year Pre-development)

Time of Concentration:

$$Tc = G(1.1 - c)L^{0.5} / (100 \times S)^{1/3}$$ as per FAA/Rational Method Equation

where: c =	0.5	Runoff Coefficient as per City pre-consultation application memo
G =	3.26	Constant
L =	137.65	Longest watercourse length (in meters) in watershed
S =	0.0025	Average slope of watercouse
Tc =	**36**	**min**

Intensity:

$$I_5 = 998.071 / (Tc + 6.053)^{0.814}$$ as per City of Ottawa Guidelines

where: Tc =	36	Time of Concentration in min.
I_5 =	**47.2**	**mm/hr**

Allowable Release:

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

where: C =	0.5	Runoff Coefficient as per City pre-consultation application memo
I =	47.2	mm/hr
Tc =	36	min
Total Site Area =	0.659	ha
Q =	**43.22**	**L/s**

Catchment Area and Runoff Coeffecient (Post-development)

	Individual Watersheds	Total Area (ha)	Grass Area (ha)	Gravel Area (ha)	Bldg. / Asph. / Conc. Area (ha)	∑C * A	C weighted (1:5 yr)	C weighted (1:100 yr)
Controlled	**CA-1**	**0.357**	0.054	0.000	0.303	0.284	**0.79**	**0.99**
	CA-2	**0.012**	0.000	0.000	0.012	0.011	**0.90**	**1.00**
	CA-3	**0.104**	0.007	0.000	0.097	0.089	**0.85**	**1.00**
	CA-4	**0.053**	0.019	0.000	0.034	0.034	**0.65**	**0.81**
	CA-5	**0.079**	0.021	0.000	0.058	0.056	**0.71**	**0.89**
	CA-6	**0.054**	0.010	0.000	0.044	0.042	**0.77**	**0.96**

						1:5 YEAR	1:100 YEAR
	Total Site Area =	**0.659**	ha	**∑C=**		**0.78**	**0.98**
Controlled	Bldg. / Asph. / Conc. Area =	0.548	ha	C=		0.90	**1.00**
	Gravel Area =	0.000	ha	C=		0.80	**1.00**
	Grass Area =	0.111	ha	C=		0.20	**0.25**
	Total Controlled =	**0.659**	ha	**∑C=**		**0.78**	**0.98**

LRL File No.	170721
Project:	2465070 Ontario Ltd
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Date:	13 Dec 2017
Designed:	Guillaume Courtois
Drawing Ref.:	C701

Stormwater Management Design Sheet

Post-development Stormwater Management

5 Year Post-development:

$I_5 = 998.071 / (Tc + 6.053)^{0.814}$ as per City of Ottawa Guidelines

where: I = intensity in mm/hr
Tc = Time of Concentration

1:5 YEAR STORM EVENT					
Time (min)	**Intensity (mm/hr)**	**Peak Flow (L/s)**	**Release Rate (L/s)**	**Storage Rate (L/s)**	**Storage Volume (m^3)**
10	104.2	149.29	43.22	106.07	63.64
15	83.6	119.72	43.22	76.50	68.85
20	70.3	100.66	43.22	57.43	68.92
25	60.9	87.25	43.22	44.03	66.05
30	53.9	77.27	43.22	34.05	61.28
35	48.5	69.52	43.22	26.29	55.22
40	44.2	63.31	43.22	20.09	48.21
45	40.6	58.21	43.22	14.99	40.48
50	37.7	53.95	43.22	10.73	32.18
55	35.1	50.33	43.22	7.10	23.44
60	32.9	47.20	43.22	3.98	14.33

100 Year Post-development:

Intensity:

$I_{100} = 1735.688 / (Tc + 6.014)^{0.820}$ as per City of Ottawa Guidelines

where: I = intensity in mm/hr
Tc = Time of Concentration

1:100 YEAR STORM EVENT					
Time (min)	**Intensity (mm/hr)**	**Peak Flow (L/s)**	**Release Rate (L/s)**	**Storage Rate (L/s)**	**Storage Volume (m^3)**
10	178.6	319.80	43.22	276.58	165.95
15	142.9	255.93	43.22	212.70	191.43
20	120.0	214.83	43.22	171.61	205.93
25	103.8	185.99	43.22	142.77	214.15
30	91.9	164.54	43.22	121.32	218.37
35	82.6	147.90	43.22	104.68	219.82
40	75.1	134.59	43.22	91.36	219.27
45	69.1	123.67	43.22	80.45	217.21
50	64.0	114.54	43.22	71.32	213.96
55	59.6	106.79	43.22	63.57	209.76
60	55.9	100.11	43.22	56.89	204.79

Onsite Stormwater Retention

Total Storage Required =	**219.82**	**m^3**	
Overland Ponding Storage =	62.78	m^3	refer to LRL Plan C601
Pipe Storage =	11.61	m^3	
Drainage Structures Storage =	15.02	m^3	
Stormtech Chambers Storage =	133.00	m^3	refer to LRL Plan C902
Total Available Storage =	**222.41**	**m^3**	
Supplementary Storage Required =	0.00	m^3	

LRL Associates Ltd.
Storm Design Sheet

LRL File No. 170721
Project: 2465070 Ontario Ltd
Location: 2375 St-Laurent, Ottawa, ON
Date: 13 Dec 2017
Designed: Guillaume Courtois
Drawing Reference: C701

Storm Design Parameters

Rational Method Q = 2.78CIA

Q = Peak flow in litres per second (L/s)
A = Drainage area in hectares (ha)
C = Runoff coefficient
I = Rainfall intensity (mm/hr)

Runoff Coefficient (C)
Grass 0.2
Gravel 0.8
Bldg. / Asph. / Conc. 0.9

IDF Curve Ottawa Macdonald-Cartier International Airport
Storm Event 5 years
Formula $I = a / (T_c + b)^c$
a = 998.07 b = 6.053 c = 0.814

Pipe Design Parameters

Minimum velocity = 0.80 m/s
Maximum velocity = 3.00 m/s
Manning's Coeff. "n" = 0.013

LOCATION			AREA (ha)			FLOW						STORM SEWER									MANHOLE							WATERSHED		AVAILABLE STORAGE			
CATCHMENT / STREET	From Structure	To Structure	Grass C=0.20	Gravel C=0.80	Bldg./ Asph./ Conc. C=0.90	Indiv. 2.78AC	Accum. 2.78AC	Time of Conc. (min.)	Rainfall Intensity (mm/hr)	Peak Flow Q (L/s)	ICD Controlled Flow Q (L/s)	Pipe Diameter (mm)	Type	Slope (%)	Length (m)	Capacity Full (L/s)	Spare Capacity (L/s)	Velocity Full (m/s)	Time of Flow (min.)	Ratio (Q/Q_{FULL})	Up Invert (m)	Down Invert (m)	T/G Up Stream (m)	T/G Down Stream (m)	Up Depth obv (m)	Down Depth obv (m)	Up Depth inv (m)	Total Area (ha)	Combined C	Pipe Storage (m^3)	Upstream CB/MH Size (m)	Water Depth (m)	CB/MH Storage (m^3)
CA-01	CBMH1	CBMH2	0.054	0.000	0.303	0.79	0.79	36.43	47.2	37.19		300	PVC	0.34%	45.0	56.39	19.20	0.80	0.94	0.66	80.95	80.80	83.25	83.30	2.00	2.20	2.30	0.357	0.79	3.18	1.20	2.30	2.60
CA-02	CB1	CBMH2	0.000	0.000	0.012	0.03	0.03	36.43	47.2	1.42		200	PVC	1.00%	16.0	32.80	31.38	1.04	0.26	0.04	81.03	80.87	82.93	83.30	1.70	2.23	1.90	0.012	0.90	0.50	0.60	1.90	0.68
CA-03	CBMH2	CBMH5	0.007	0.000	0.097	0.25	1.06	37.37	46.4	49.35		300	PVC	1.19%	28.5	105.49	56.14	1.49	0.32	0.47	80.77	80.43	83.30	83.30	2.23	2.57	2.53	0.104	0.85	2.01	1.20	2.53	2.86
CA-04	CBMH3	CBMH4	0.019	0.000	0.034	0.10	0.10	36.43	47.2	4.51		300	PVC	0.34%	63.2	56.39	51.87	0.80	1.32	0.08	80.95	80.74	83.25	83.30	2.00	2.26	2.30	0.053	0.65	4.47	1.20	2.30	2.60
CA-05	CBMH4	CBMH5	0.021	0.000	0.058	0.16	0.25	37.75	46.0	11.62		300	PVC	1.23%	20.4	107.25	95.63	1.52	0.22	0.11	80.68	80.43	83.30	83.30	2.32	2.57	2.62	0.079	0.71	1.44	1.20	2.62	2.96
CA-06	CBMH5	STC300	0.010	0.000	0.044	0.12	1.43	37.97	45.8	65.67	43.22	300	PVC	4.00%	5.0	193.40	150.18	2.74	0.03	0.22	80.37	80.17	83.30	83.54	2.63	3.07	2.93	0.054	0.77	N/A	1.20	2.93	3.31
	STC300	EX. MH	0.000	0.000	0.000	0.00	1.43	38.00	45.8	65.63	43.22	300	PVC	0.34%	16.3	56.39	13.16	0.80	0.34	0.77	80.10	80.04	83.54	83.37	3.14	3.03	3.44	N/A	N/A	N/A	N/A	N/A	N/A

11.61	15.02

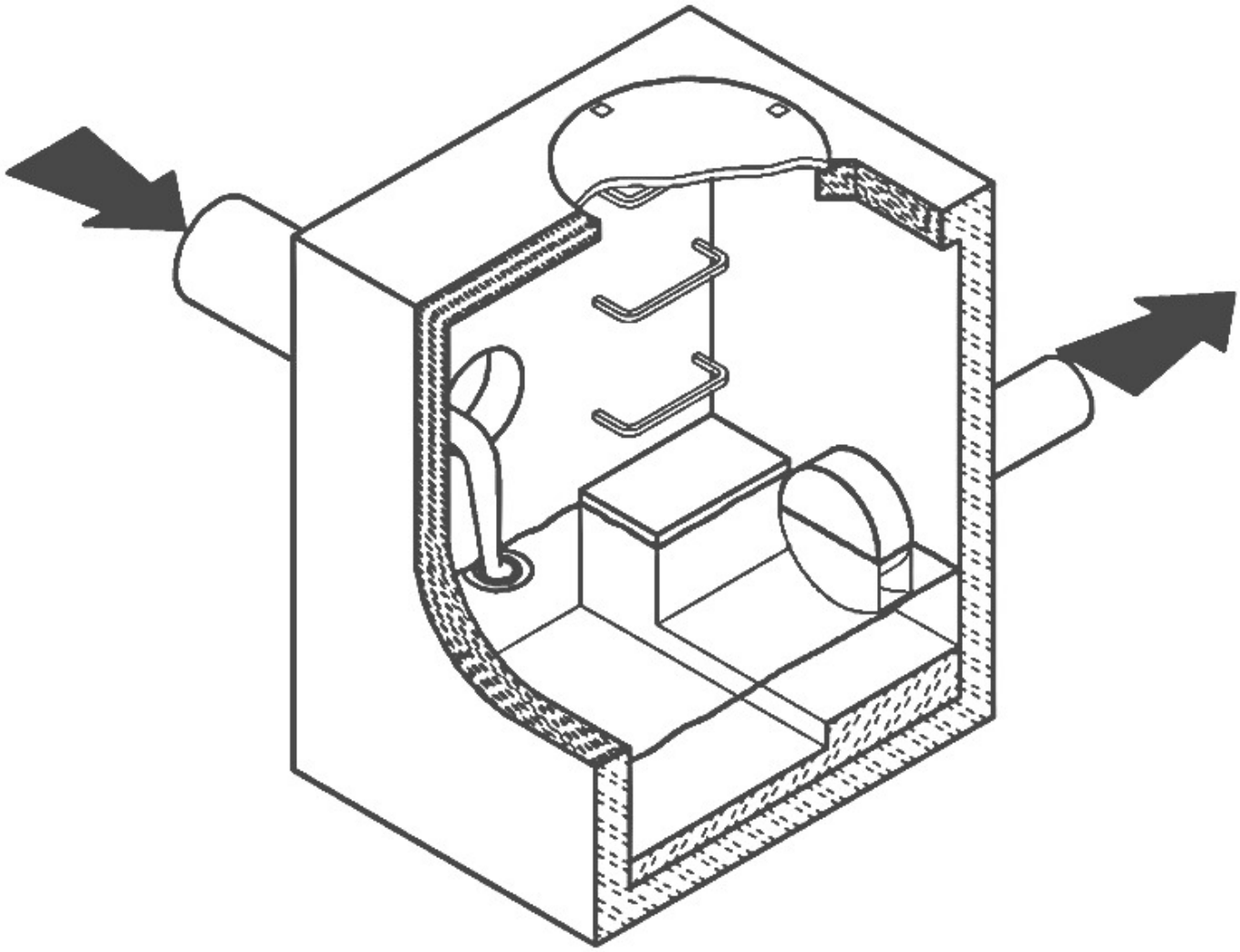
HWL	83.47
Total Storage	26.63

APPENDIX D

Hydrovex Vertical Vortex Flow Regulator Report

CSO/STORMWATER MANAGEMENT

HYDROVEX® VHV / SVHV
Vertical Vortex Flow Regulator



JOHN MEUNIER

APPLICATIONS

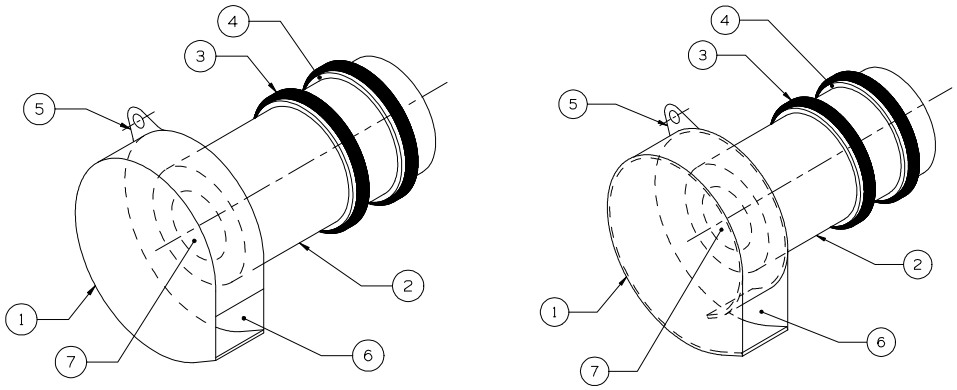
One of the major problems of urban wet weather flow management is the runoff generated after a heavy rainfall. During a storm, uncontrolled flows may overload the drainage system and cause flooding. Due to increased velocities, sewer pipe wear is increased dramatically and results in network deterioration. In a combined sewer system, the wastewater treatment plant may also experience significant increases in flows during storms, thereby losing its treatment efficiency.

A simple means of controlling excessive water runoff is by controlling excessive flows at their origin (manholes). **John Meunier Inc.** manufactures the **HYDROVEX® VHV / SVHV** line of vortex flow regulators to control stormwater flows in sewer networks, as well as manholes.

The vortex flow regulator design is based on the fluid mechanics principle of the forced vortex. This grants flow regulation without any moving parts, thus reducing maintenance. The operation of the regulator, depending on the upstream head and discharge, switches between orifice flow (gravity flow) and vortex flow. Although the concept is quite simple, over 12 years of research have been carried out in order to get a high performance.

The **HYDROVEX® VHV / SVHV** Vertical Vortex Flow Regulators **(refer to Figure 1)** are manufactured entirely of stainless steel, and consist of a hollow body (**1**) (in which flow control takes place) and an outlet orifice (**7**). Two rubber "O" rings (**3**) seal and retain the unit inside the outlet pipe. Two stainless steel retaining rings (**4**) are welded on the outlet sleeve to ensure that there is no shifting of the "O" rings during installation and use.

1. BODY
2. SLEEVE
3. O-RING
4. RETAINING RINGS (SQUARE BAR)
5. ANCHOR PLATE
6. INLET
7. OUTLET ORIFICE



VHV *SVHV*

FIGURE 1: HYDROVEX® VHV-SVHV VERTICAL VORTREX FLOW REGULATORS

ADVANTAGES

- The **HYDROVEX® VHV / SVHV** line of flow regulators are manufactured entirely of stainless steel, making them durable and corrosion resistant.
- Having no moving parts, they require minimal maintenance.
- The geometry of the **HYDROVEX® VHV / SVHV** flow regulators allows a control equal to an orifice plate, having a cross section area 4 to 6 times smaller. This decreases the chance of blockage of the regulator, due to sediments and debris found in stormwater flows. **Figure 2** illustrates the comparison between a regulator model 100 SVHV-2 and an equivalent orifice plate. One can see that for the same height of water, the regulator controls a flow approximately four times smaller than an equivalent orifice plate.
- Installation of the **HYDROVEX® VHV / SVHV** flow regulators is quick and straightforward and is performed after all civil works are completed.
- Installation requires no special tools or equipment and may be carried out by any contractor.
- Installation may be carried out in existing structures.

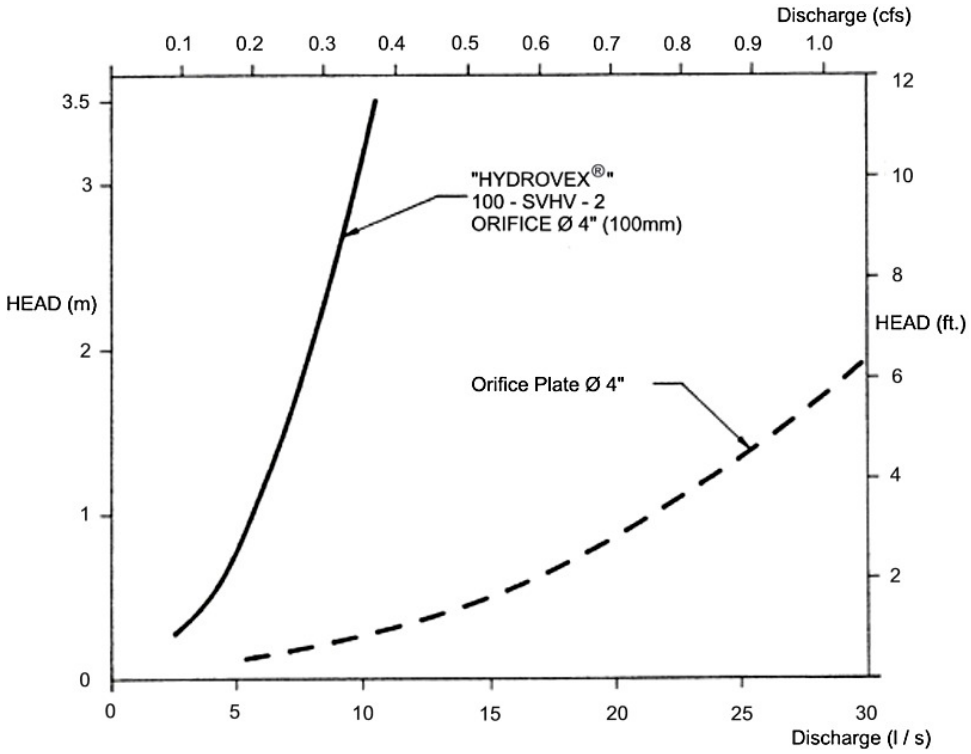


FIGURE 2: DISCHARGE CURVE SHOWING A HYDROVEX® FLOW REGULATOR VS AN ORIFICE PLATE

SELECTION

Selection of a **VHV or SVHV** regulator can be easily made using the selection charts found at the back of this brochure (see **Figure 3**). These charts are a graphical representation of the maximum upstream water pressure (head) and the maximum discharge at the manhole outlet. The maximum design head is the difference between the maximum upstream water level and the invert of the outlet pipe. All selections should be verified by John Meunier Inc. personnel prior to fabrication.

Example:

✓ Maximum design head	2m (6.56 ft.)
✓ Maximum discharge	6 L/s (0.2 cfs)
✓ Using **Figure 3** - VHV	model required is a **75 VHV-1**

INSTALLATION REQUIREMENTS

All **HYDROVEX® VHV / SVHV** flow regulators can be installed in circular or square manholes. **Figure 4** gives the various minimum dimensions required for a given regulator. ***It is imperative to respect the minimum clearances shown to ensure easy installation and proper functioning of the regulator.***

SPECIFICATIONS

In order to specify a **HYDROVEX®** regulator, the following parameters must be defined:

- The model number (ex: 75-VHV-1)
- The diameter and type of outlet pipe (ex: 6" diam. SDR 35)
- The desired discharge (ex: 6 l/s or 0.21 CFS)
- The upstream head (ex: 2 m or 6.56 ft.) *
- The manhole diameter (ex: 36" diam.)
- The minimum clearance "H" (ex: 10 inches)
- The material type (ex: 304 s/s, 11 Ga. standard)

* ***Upstream head is defined as the difference in elevation between the maximum upstream water level and the invert of the outlet pipe where the HYDROVEX® flow regulator is to be installed.***

PLEASE NOTE THAT WHEN REQUESTING A PROPOSAL, WE SIMPLY REQUIRE THAT YOU PROVIDE US WITH THE FOLLOWING:

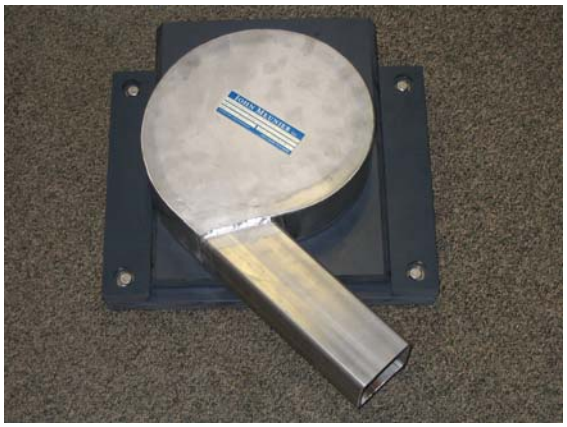
- ***project design flow rate***
- ***pressure head***
- ***chamber's outlet pipe diameter and type***

Typical VHV model in factory

OPTIONS

FV – SVHV (mounted on sliding plate)

VHV-1-O (standard model with odour control inlet)



FV – VHV-O (mounted on sliding plate with odour control inlet)

VHV with Gooseneck assembly in existing chamber without minimum release at the bottom

VHV with air vent for minimal slopes

HYDROVEX®

VHV Vertical Vortex Flow Regulator

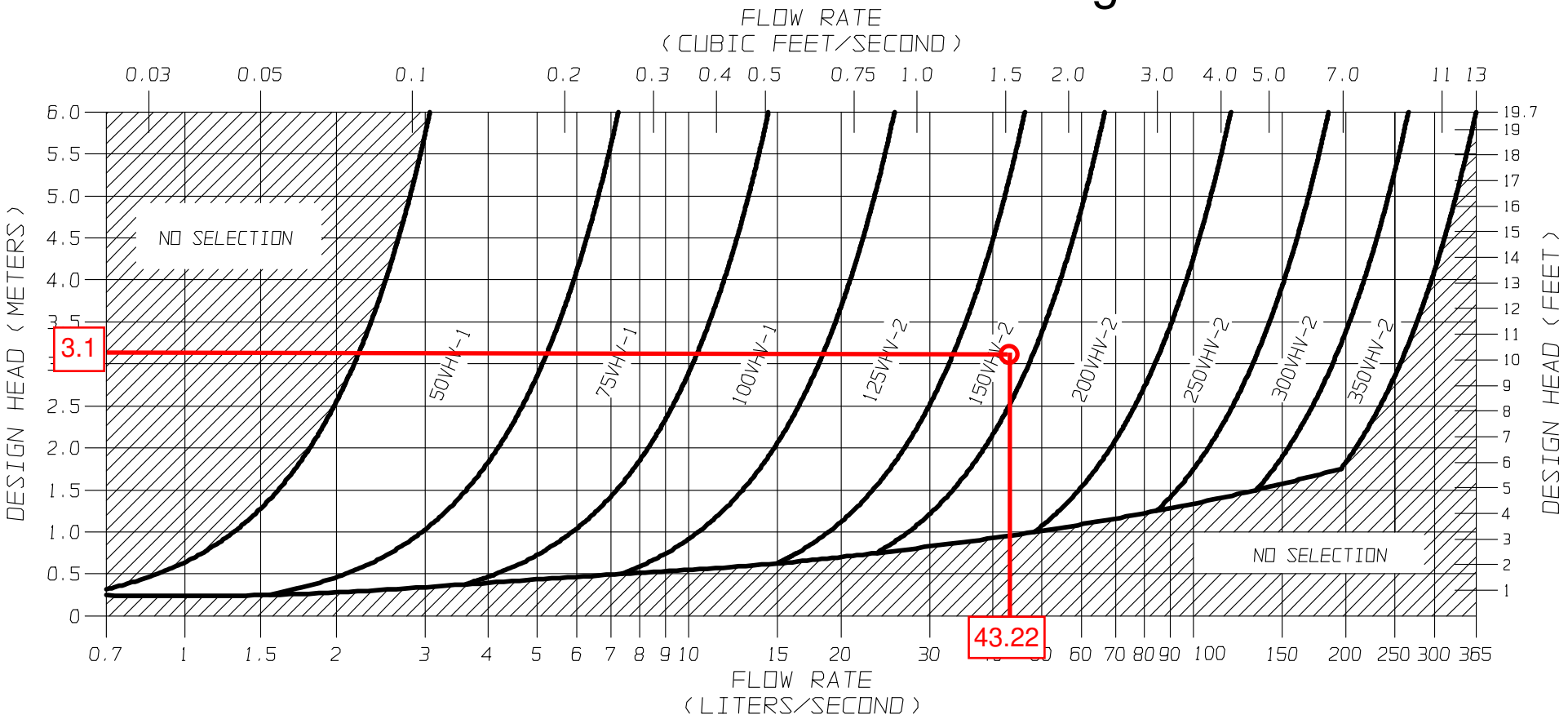
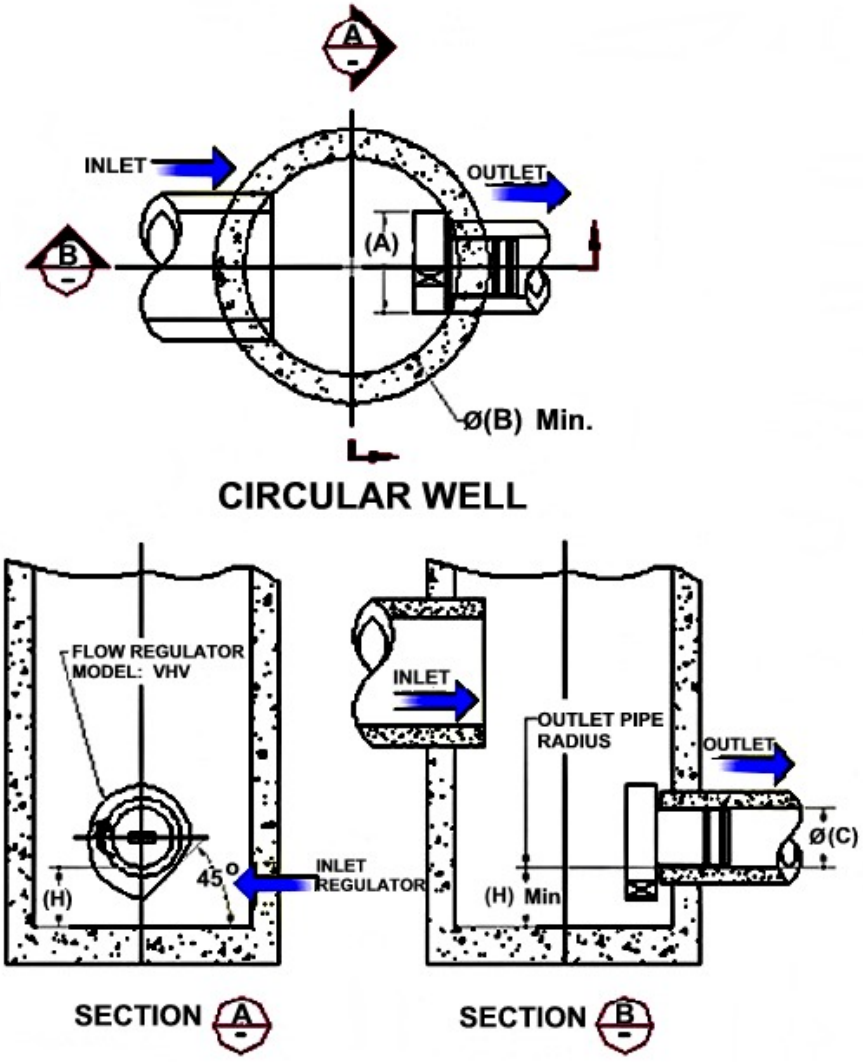


FIGURE 3 - VHV

JOHN MEUNIER

FLOW REGULATOR TYPICAL INSTALLATION IN CIRCULAR MANHOLE
FIGURE 4 (MODEL VHV)

Model Number	Regulator Diameter		Minimum Manhole Diameter		Minimum Outlet Pipe Diameter		Minimum Clearance	
	A (mm)	**A** (in.)	**B** (mm)	**B** (in.)	**C** (mm)	**C** (in.)	**H** (mm)	**H** (in.)
50VHV-1	150	6	600	24	150	6	150	6
75VHV-1	250	10	600	24	150	6	150	6
100VHV-1	325	13	900	36	150	6	200	8
125VHV-2	275	11	900	36	150	6	200	8
150VHV-2	350	14	900	36	150	6	225	9
200VHV-2	450	18	1200	48	200	8	300	12
250VHV-2	575	23	1200	48	250	10	350	14
300VHV-2	675	27	1600	64	250	10	400	16
350VHV-2	800	32	1800	72	300	12	500	20



INSTALLATION

The installation of a **HYDROVEX®** regulator may be undertaken once the manhole and piping is in place. Installation consists of simply fitting the regulator into the outlet pipe of the manhole. **John Meunier Inc.** recommends the use of a lubricant on the outlet pipe, in order to facilitate the insertion and orientation of the flow controller.

MAINTENANCE

HYDROVEX® regulators are manufactured in such a way as to be maintenance free; however, a periodic inspection (every 3-6 months) is suggested in order to ensure that neither the inlet nor the outlet has become blocked with debris. The manhole should undergo periodically, particularly after major storms, inspection and cleaning as established by the municipality

GUARANTY

The **HYDROVEX®** line of **VHV / SVHV** regulators are guaranteed against both design and manufacturing defects for a period of 5 years. Should a unit be defective, **John Meunier Inc.** is solely responsible for either modification or replacement of the unit.

John Meunier Inc.
ISO 9001 : 2008

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Revised: 2011-05-03

APPENDIX E

StormTech System Design Sheets

ADVANCED DRAINAGE SYSTEMS, INC.

2465070 ONTARIO LTD

2375 ST-LAURENT BLVD., OTTAWA, ON

STORMTECH CHAMBER SPECIFICATIONS

1. CHAMBERS SHALL BE STORMTECH MC-3500 OR APPROVED EQUAL.
2. CHAMBERS SHALL BE MADE FROM VIRGIN, IMPACT-MODIFIED POLYPROPYLENE COPOLYMERS.
3. CHAMBER ROWS SHALL PROVIDE CONTINUOUS, UNOBSTRUCTED INTERNAL SPACE WITH NO INTERNAL SUPPORT PANELS THAT WOULD IMPEDE FLOW OR LIMIT ACCESS FOR INSPECTION.
4. THE STRUCTURAL DESIGN OF THE CHAMBERS, THE STRUCTURAL BACKFILL, AND THE INSTALLATION REQUIREMENTS SHALL ENSURE THAT THE LOAD FACTORS SPECIFIED IN THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, SECTION 12.12, ARE MET FOR: 1) LONG-DURATION DEAD LOADS AND 2) SHORT-DURATION LIVE LOADS, BASED ON THE AASHTO DESIGN TRUCK WITH CONSIDERATION FOR IMPACT AND MULTIPLE VEHICLE PRESENCES.
5. CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F2418, "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
6. CHAMBERS SHALL BE DESIGNED AND ALLOWABLE LOADS DETERMINED IN ACCORDANCE WITH ASTM F2787, "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
7. ONLY CHAMBERS THAT ARE APPROVED BY THE SITE DESIGN ENGINEER WILL BE ALLOWED. THE CHAMBER MANUFACTURER SHALL SUBMIT THE FOLLOWING UPON REQUEST TO THE SITE DESIGN ENGINEER FOR APPROVAL BEFORE DELIVERING CHAMBERS TO THE PROJECT SITE:
   a. A STRUCTURAL EVALUATION SEALED BY A REGISTERED PROFESSIONAL ENGINEER THAT DEMONSTRATES THAT THE SAFETY FACTORS ARE GREATER THAN OR EQUAL TO 1.95 FOR DEAD LOAD AND 1.75 FOR LIVE LOAD, THE MINIMUM REQUIRED BY ASTM F2787 AND BY AASHTO FOR THERMOPLASTIC PIPE.
   b. A STRUCTURAL EVALUATION SEALED BY A REGISTERED PROFESSIONAL ENGINEER THAT DEMONSTRATES THAT THE LOAD FACTORS SPECIFIED IN THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, SECTION 12.12, ARE MET. THE 50 YEAR CREEP MODULUS DATA SPECIFIED IN ASTM F2418 MUST BE USED AS PART OF THE AASHTO STRUCTURAL EVALUATION TO VERIFY LONG-TERM PERFORMANCE.
   c. STRUCTURAL CROSS SECTION DETAIL ON WHICH THE STRUCTURAL EVALUATION IS BASED.
8. CHAMBERS AND END CAPS SHALL BE PRODUCED AT AN ISO 9001 CERTIFIED MANUFACTURING FACILITY.

IMPORTANT - NOTES FOR THE BIDDING AND INSTALLATION OF MC-3500 CHAMBER SYSTEM

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

   STORMTECH RECOMMENDS 3 BACKFILL METHODS:
   - STONESHOOTER LOCATED OFF THE CHAMBER BED.
   - BACKFILL AS ROWS ARE BUILT USING AN EXCAVATOR ON THE FOUNDATION STONE OR SUBGRADE.
   - BACKFILL FROM OUTSIDE THE EXCAVATION USING A LONG BOOM HOE OR EXCAVATOR.
4. THE FOUNDATION STONE SHALL BE LEVELED AND COMPACTED PRIOR TO PLACING CHAMBERS.
5. JOINTS BETWEEN CHAMBERS SHALL BE PROPERLY SEATED PRIOR TO PLACING STONE.
6. MAINTAIN MINIMUM - 9" (230 mm) SPACING BETWEEN THE CHAMBER ROWS.
7. INLET AND OUTLET MANIFOLDS MUST BE INSERTED A MINIMUM OF 12" (300 mm) INTO CHAMBER END CAPS.
8. EMBEDMENT STONE SURROUNDING CHAMBERS MUST BE A CLEAN, CRUSHED, ANGULAR STONE 3/4-2" (20-50 mm) MEETING THE AASHTO M43 DESIGNATION OF #3 OR #4.^J
9. STONE MUST BE PLACED ON THE TOP CENTER OF THE CHAMBER TO ANCHOR THE CHAMBERS IN PLACE AND PRESERVE ROW SPACING..^J
10. ADS RECOMMENDS THE USE OF "FLEXSTORM CATCH IT" INSERTS DURING CONSTRUCTION FOR ALL INLETS TO PROTECT THE SUBSURFACE STORMWATER MANAGEMENT SYSTEM FROM CONSTRUCTION SITE RUNOFF.

NOTES FOR CONSTRUCTION EQUIPMENT

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

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

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

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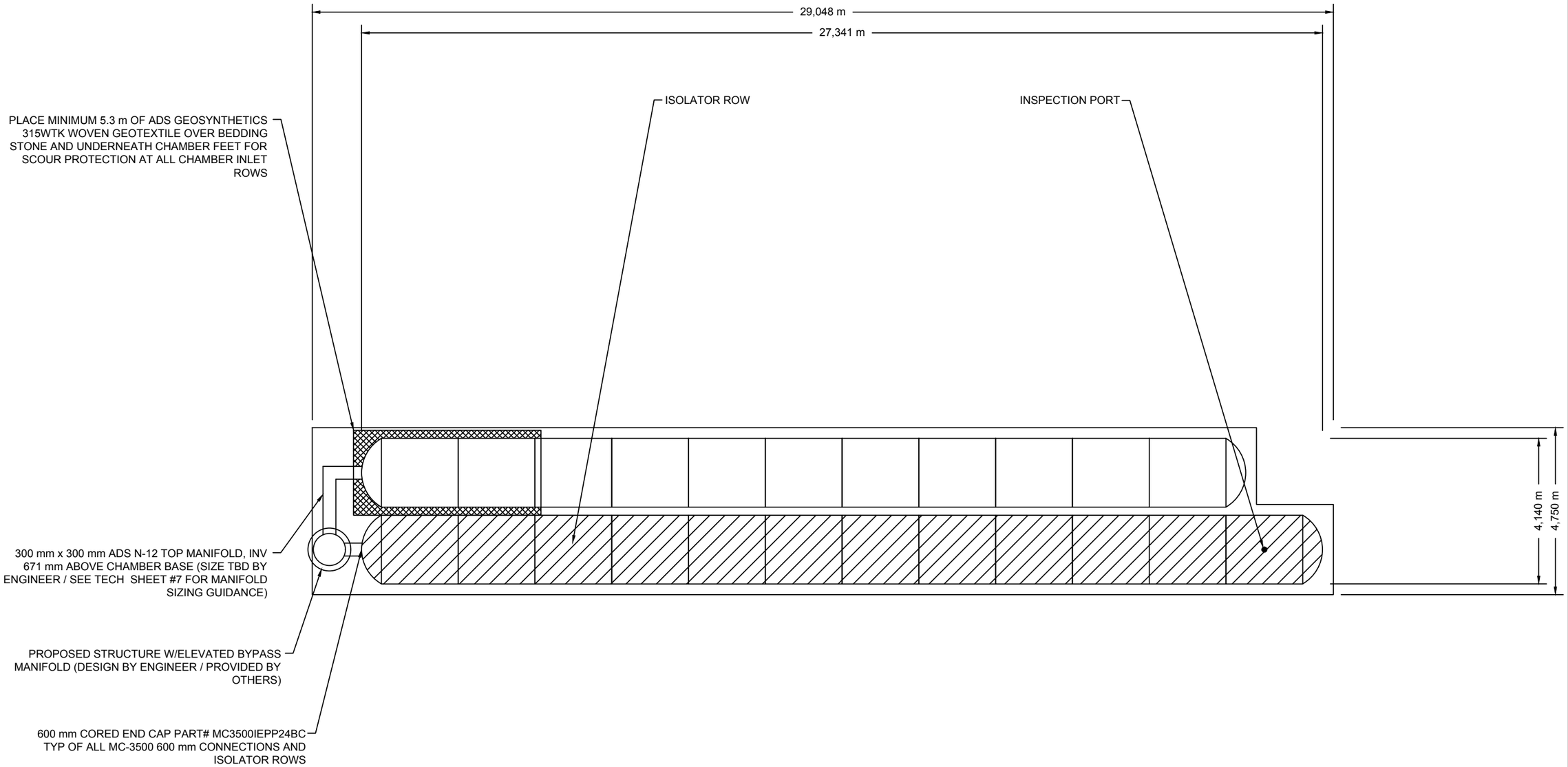
CONCEPTUAL LAYOUT

(23) STORMTECH MC-3500 CHAMBERS
(4) STORMTECH MC-3500 END CAPS
INSTALLED WITH 305 mm COVER STONE, 229 mm BASE STONE, 40% STONE VOID
INSTALLED SYSTEM VOLUME: 133 m³
AREA OF SYSTEM: 133 **m²**
PERIMETER OF SYSTEM: 68 **m**



2465070 ONTARIO LTD
2375 ST-LAURENT BLVD., OTTAWA,

DATE: 12/06/2017 | DRAWN: GC | CHECKED: ---
PROJECT #: Tool

REV	DRW	CHK	DESCRIPTION

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

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

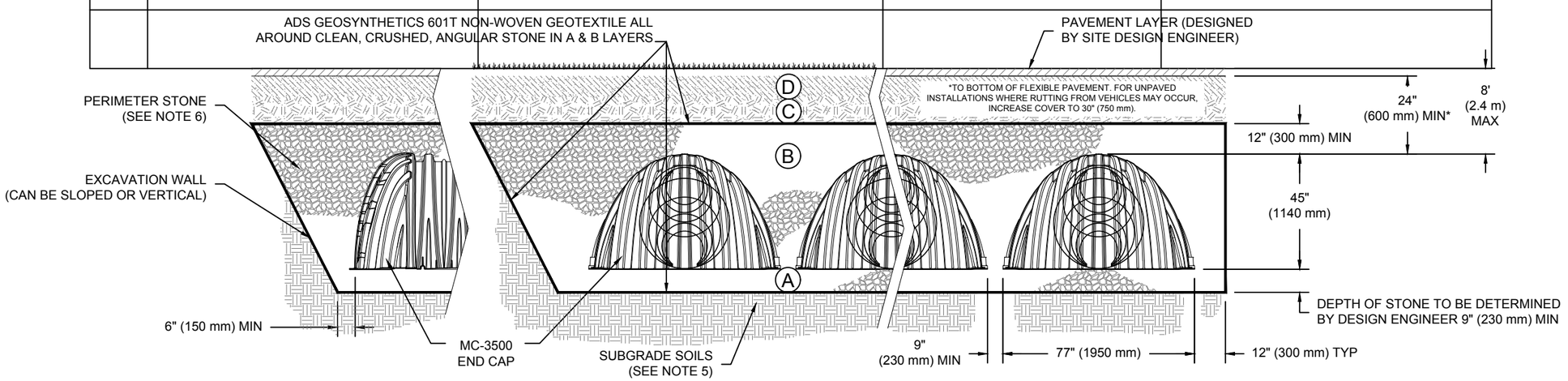
NOT TO SCALE

THIS DRAWING HAS BEEN PREPARED BASED ON INFORMATION PROVIDED TO ADS UNDER THE DIRECTION OF THE SITE DESIGN ENGINEER OR OTHER PROJECT REPRESENTATIVE. THE SITE DESIGN ENGINEER SHALL REVIEW THIS DRAWING PRIOR TO CONSTRUCTION. IT IS THE ULTIMATE RESPONSIBILITY OF THE SITE DESIGN ENGINEER TO ENSURE THAT THE PRODUCT(S) DEPICTED AND ALL ASSOCIATED DETAILS MEET ALL APPLICABLE LAWS, REGULATIONS, AND PROJECT REQUIREMENTS.

ACCEPTABLE FILL MATERIALS: STORMTECH MC-3500 CHAMBER SYSTEMS

BEGIN COMPACTIONS AFTER 24" (600 mm) OF MATERIAL OVER THE CHAMBERS IS REACHED. COMPACT ADDITIONAL LAYERS IN 12" (300 mm) MAX LIFTS TO A MIN. 95% PROCTOR DENSITY FOR WELL GRADED MATERIAL AND 95% RELATIVE DENSITY FOR PROCESSED AGGREGATE MATERIALS.		**EMBEDMENT STONE:** FILL SURROUNDING THE CHAMBERS FROM THE FOUNDATION STONE ('A' LAYER) TO THE 'C' LAYER ABOVE.	CLEAN, CRUSHED, ANGULAR STONE, NOMINAL SIZE DISTRIBUTION BETWEEN 3/4-2 INCH (20-50 mm)	AASHTO M43[1] 3, 4
D	A	**FOUNDATION STONE:** FILL BELOW CHAMBERS FROM THE SUBGRADE UP TO THE FOOT (BOTTOM) OF THE CHAMBER.	CLEAN, CRUSHED, ANGULAR STONE, NOMINAL SIZE DISTRIBUTION BETWEEN 3/4-2 INCH (20-50 mm)	AASHTO M43[1] 3, 4 NO COMPACTION REQUIRED.
PLATE COMPACT OR ROLL TO ACHIEVE A FLAT SURFACE	**INITIAL FILL:** FILL MATERIAL FOR LAYER 'C' STARTS FROM THE TOP OF THE EMBEDMENT STONE ('B' LAYER) TO 24" (600 mm) ABOVE THE TOP OF THE CHAMBER. NOTE THAT PAVEMENT SUBBASE MAY BE A PART OF THE 'C' LAYER.	GRANULAR WELL-GRADED SOIL/AGGREGATE MIXTURES, <35% FINES OR PROCESSED AGGREGATE. MOST PAVEMENT SUBBASE MATERIALS CAN BE USED IN LIEU OF THIS LAYER.		

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



NOTES:

1. MC-3500 CHAMBERS SHALL CONFORM TO THE REQUIREMENTS OF ASTM F2418 "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".^J
2. MC-3500 CHAMBERS SHALL BE DESIGNED IN ACCORDANCE WITH ASTM F2787 "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".^J
3. "ACCEPTABLE FILL MATERIALS" TABLE ABOVE PROVIDES MATERIAL LOCATIONS, DESCRIPTIONS, GRADATIONS, AND COMPACTION REQUIREMENTS FOR FOUNDATION, EMBEDMENT, AND FILL MATERIALS.^J
4. THE "SITE DESIGN ENGINEER" REFERS TO THE ENGINEER RESPONSIBLE FOR THE DESIGN AND LAYOUT OF THE STORMTECH CHAMBERS FOR THIS PROJECT.^J
5. THE SITE DESIGN ENGINEER IS RESPONSIBLE FOR ASSESSING THE BEARING RESISTANCE (ALLOWABLE BEARING CAPACITY) OF THE SUBGRADE SOILS AND THE DEPTH OF FOUNDATION STONE WITH CONSIDERATION FOR THE RANGE OF EXPECTED SOIL MOISTURE CONDITIONS.^J
6. PERIMETER STONE MUST BE EXTENDED HORIZONTALLY TO THE EXCAVATION WALL FOR BOTH VERTICAL AND SLOPED EXCAVATION WALLS.
7. ONCE LAYER 'C' IS PLACED, ANY SOIL/MATERIAL CAN BE PLACED IN LAYER 'D' UP TO THE FINISHED GRADE. MOST PAVEMENT SUBBASE SOILS CAN BE USED TO REPLACE THE MATERIAL REQUIREMENTS OF LAYER 'C' OR 'D' AT THE SITE DESIGN ENGINEER'S DISCRETION.

2465070 ONTARIO LTD
2375 ST-LAURENT BLVD., OTTAWA,
DATE: 12/06/2017 | DRAWN: GC | CHECKED: ---
PROJECT #: Tool

REV	DESCRIPTION	DRW	CHK
	23		

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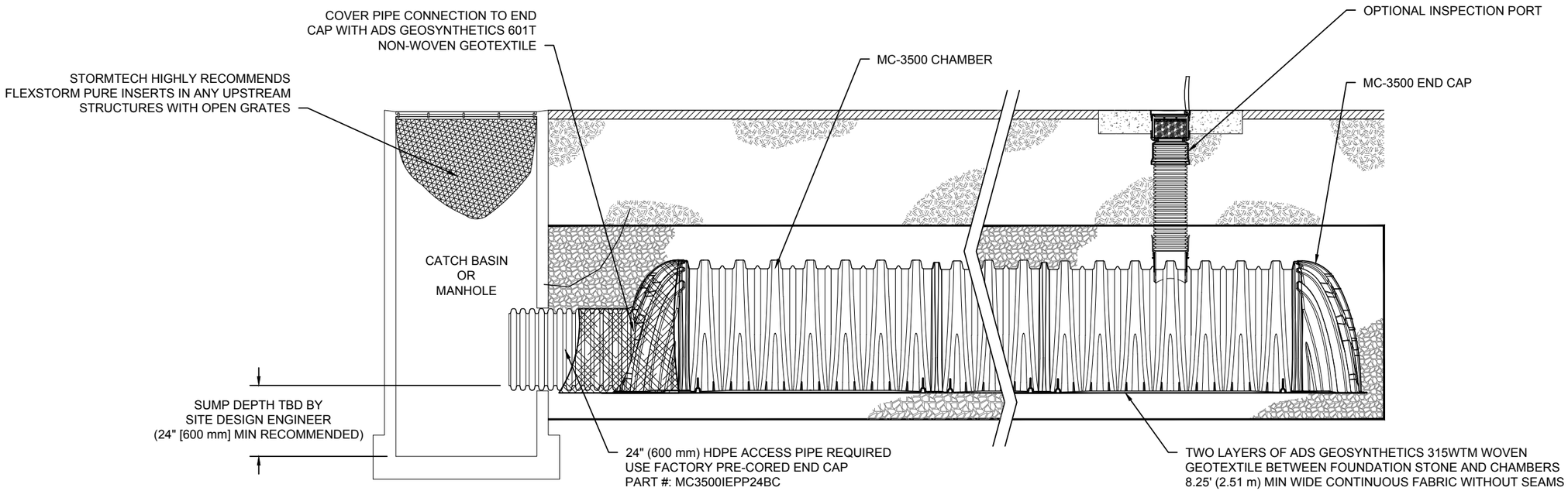


MC-3500 ISOLATOR ROW DETAIL
NTS

INSPECTION & MAINTENANCE

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

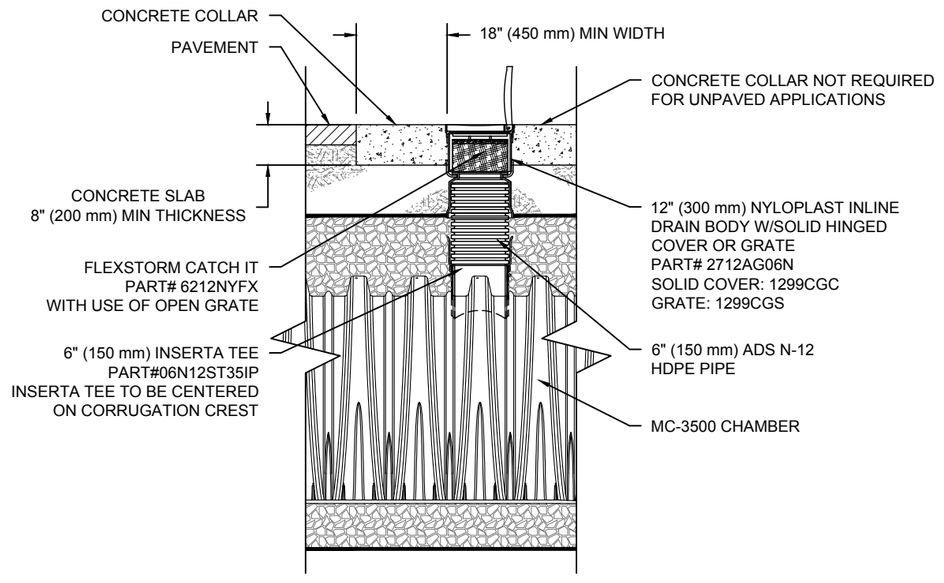
STEP 2) CLEAN OUT ISOLATOR ROW USING THE JETVAC PROCESS
- A. A FIXED CULVERT CLEANING NOZZLE WITH REAR FACING SPREAD OF 45" (1.1 m) OR MORE IS PREFERRED
- B. APPLY MULTIPLE PASSES OF JETVAC UNTIL BACKFLUSH WATER IS CLEAN
- C. VACUUM STRUCTURE SUMP AS REQUIRED

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

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

NOTES

1. INSPECT EVERY 6 MONTHS DURING THE FIRST YEAR OF OPERATION. ADJUST THE INSPECTION INTERVAL BASED ON PREVIOUS OBSERVATIONS OF SEDIMENT ACCUMULATION AND HIGH WATER ELEVATIONS.^J
2. CONDUCT JETTING AND VACTORING ANNUALLY OR WHEN INSPECTION SHOWS THAT MAINTENANCE IS NECESSARY.



MC-3500 6" INSPECTION PORT DETAIL
NTS

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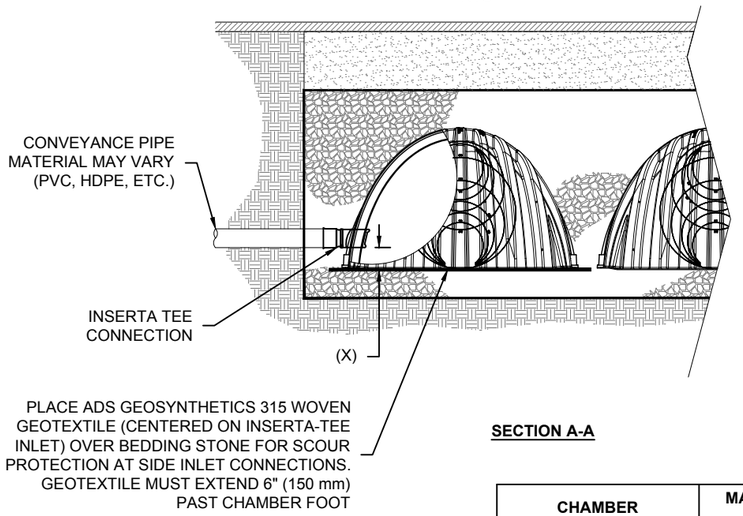
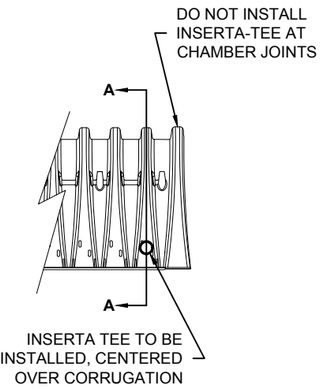
INSERTA TEE DETAIL

NTS





SECTION A-A

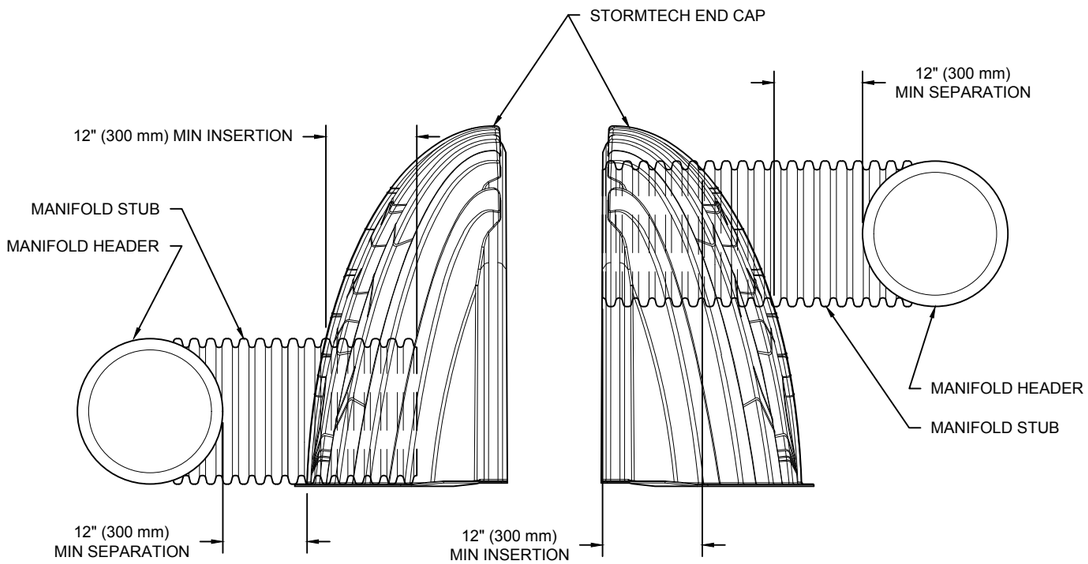
SIDE VIEW

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

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

MC-SERIES END CAP INSERTION DETAIL

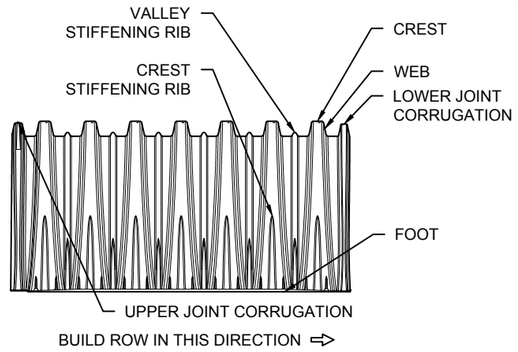
NTS

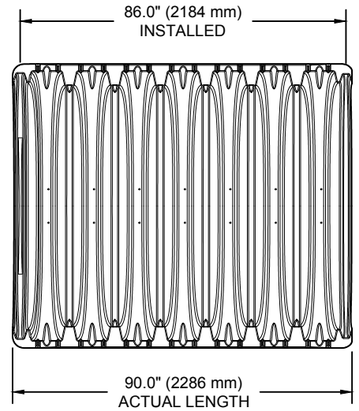


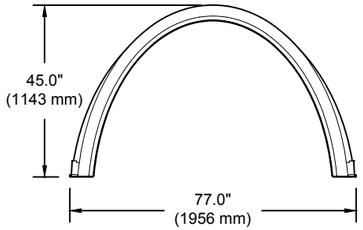
NOTE: MANIFOLD STUB MUST BE LAID HORIZONTAL
FOR A PROPER FIT IN END CAP OPENING.

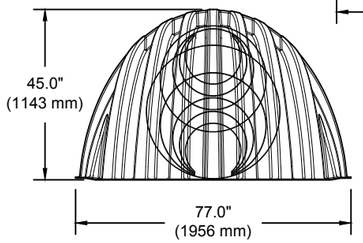
MC-3500 TECHNICAL SPECIFICATION

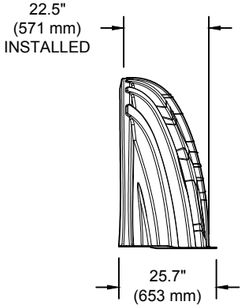
NTS











NOMINAL CHAMBER SPECIFICATIONS

SIZE (W X H X INSTALLED LENGTH)	77.0" X 45.0" X 86.0"	(1956 mm X 1143 mm X 2184 mm)
CHAMBER STORAGE	109.9 CUBIC FEET	(3.11 m³)
MINIMUM INSTALLED STORAGE*	178.9 CUBIC FEET	(5.06 m³)
WEIGHT	135.0 lbs.	(61.2 kg)

NOMINAL END CAP SPECIFICATIONS

SIZE (W X H X INSTALLED LENGTH)	77.0" X 45.0" X 22.5"	(1956 mm X 1143 mm X 571 mm)
END CAP STORAGE	14.9 CUBIC FEET	(0.42 m³)
MINIMUM INSTALLED STORAGE*	46.0 CUBIC FEET	(1.30 m³)
WEIGHT	50.0 lbs.	(22.7 kg)

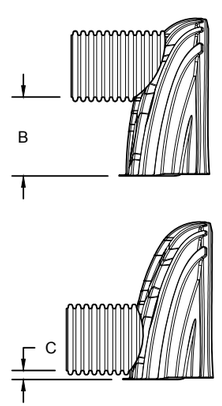
*ASSUMES 12" (305 mm) STONE ABOVE, 9" (229 mm) STONE FOUNDATION AND BETWEEN CHAMBERS,
12" (305 mm) STONE PERIMETER IN FRONT OF END CAPS AND 40% STONE POROSITY

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

PART #	STUB	B	C
MC3500IEPP06T	6" (150 mm)	33.21" (844 mm)	---
MC3500IEPP06B		---	0.66" (17 mm)
MC3500IEPP08T	8" (200 mm)	31.16" (791 mm)	---
MC3500IEPP08B		---	0.81" (21 mm)
MC3500IEPP10T	10" (250 mm)	29.04" (738 mm)	---
MC3500IEPP10B		---	0.93" (24 mm)
MC3500IEPP12T	12" (300 mm)	26.36" (670 mm)	---
MC3500IEPP12B		---	1.35" (34 mm)
MC3500IEPP15T	15" (375 mm)	23.39" (594 mm)	---
MC3500IEPP15B		---	1.50" (38 mm)
MC3500IEPP18TC	18" (450 mm)	20.03" (509 mm)	---
MC3500IEPP18BC		---	1.77" (45 mm)
MC3500IEPP24TC	24" (600 mm)	14.48" (368 mm)	---
MC3500IEPP24BC		---	2.06" (52 mm)
MC3500IEPP30BC	30" (750 mm)	---	

NOTE: ALL DIMENSIONS ARE NOMINAL

CUSTOM PRECORED INVERTS ARE AVAILABLE UPON REQUEST. INVENTORIED MANIFOLDS INCLUDE 12-24" (300-600 mm) SIZE ON SIZE AND 15-48" (375-1200 mm) ECCENTRIC MANIFOLDS.
CUSTOM INVERT LOCATIONS ON THE MC-3500 END CAP CUT IN THE FIELD ARE NOT RECOMMENDED FOR PIPE SIZES GREATER THAN 10" (250 mm)
THE INVERT LOCATION IN COLUMN 'B' ARE THE HIGHTEST POSSIBLE FOR THE PIPE SIZE.



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APPENDIX F

Stormceptor Reports

Brief Stormceptor Sizing Report - 2465070 ONTARIO LTD

Project Information & Location			
Project Name	2465070 ONTARIO LTD	**Project Number**	170721
City	Ottawa	**State/ Province**	Ontario
Country	Canada	**Date**	12/7/2017
Designer Information		**EOR Information (optional)**	
Name	Guillaume Courtois	**Name**	
Company	LRL Associates Ltd.	**Company**	
Phone #	613-842-3434	**Phone #**	
Email	gcourtois@lrl.ca	**Email**	

Stormwater Treatment Recommendation

The recommended Stormceptor Model(s) which achieve or exceed the user defined water quality objective for each site within the project are listed in the below Sizing Summary table.

Site Name	Proposed Yonaka Warehouse
Target TSS Removal (%)	80
TSS Removal (%) Provided	81
Recommended Stormceptor Model	STC 300

The recommended Stormceptor Model achieves the water quality objectives based on the selected inputs, historical rainfall records and selected particle size distribution.

Stormceptor Sizing Summary	
Stormceptor Model	**% TSS Removal Provided**
STC 300	81
STC 750	87
STC 1000	88
STC 1500	87
STC 2000	89
STC 3000	90
STC 4000	92
STC 5000	92
STC 6000	93
STC 9000	95
STC 10000	95
STC 14000	96
StormceptorMAX	Custom

Sizing Details

Drainage Area	
Total Area (ha)	0.659
Imperviousness %	83.0

Rainfall	
Station Name	OTTAWA MACDONALD-CARTIER INT'L A
State/Province	Ontario
Station ID #	6000
Years of Records	37
Latitude	45°19'N
Longitude	75°40'W

Water Quality Objective	
TSS Removal (%)	80.0
Runoff Volume Capture (%)	
Oil Spill Capture Volume (L)	
Peak Conveyed Flow Rate (L/s)	
Water Quality Flow Rate (L/s)	

Up Stream Storage	
Storage (ha-m)	Discharge (cms)
0.000	0.000
0.022	0.043

Up Stream Flow Diversion	
Max. Flow to Stormceptor (cms)	

Particle Size Distribution (PSD)
The selected PSD defines TSS removal

Fine Distribution		
Particle Diameter (microns)	Distribution %	Specific Gravity
20.0	20.0	1.30
60.0	20.0	1.80
150.0	20.0	2.20
400.0	20.0	2.65
2000.0	20.0	2.65

Notes

• Stormceptor performance estimates are based on simulations using PCSWMM for Stormceptor, which uses the EPA Rainfall and Runoff modules.
• Design estimates listed are only representative of specific project requirements based on total suspended solids (TSS) removal defined by the selected PSD, and based on stable site conditions only, after construction is completed.
• For submerged applications or sites specific to spill control, please contact your local Stormceptor representative for further design assistance.

For Stormceptor Specifications and Drawings Please Visit:
http://www.imbriumsystems.com/technical-specifications

APPENDIX G

Complete Set of Civil Plans

EROSION AND SEDIMENT CONTROL MEASURES:

** CONTRACTOR IS RESPONSIBLE FOR ALL INSTALLATION, MONITORING, REPAIR AND REMOVAL OF ALL EROSION AND SEDIMENT CONTROL FEATURES **

1. PRIOR TO START OF CONSTRUCTION:

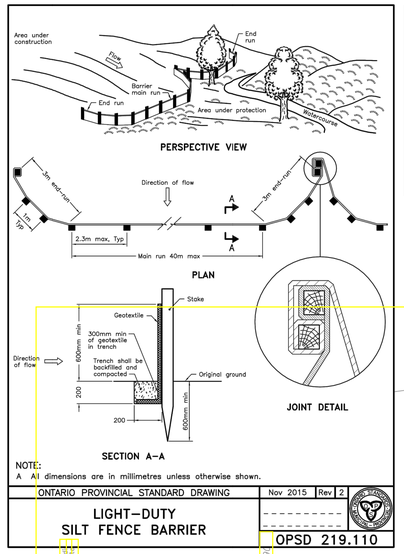
- PRIOR TO THE REMOVAL OF ANY VEGETATIVE COVER, MOVING OF SOIL AND CONSTRUCTION:
- INSTALL SILT FENCE IMMEDIATELY DOWNSTREAM FROM AREAS TO BE DISTURBED (SEE PLAN FOR LOCATION).
- INSTALL GEOSOCK INSERTS WITH AN OVERFLOW IN ALL THE DOWNSTREAM CATCHBASINS AND MANHOLES
- INSTALL SILTSACK FILTERS IN ALL CONCRETE CATCH BASINS STRUCTURES
- INSPECT MEASURES IMMEDIATELY AFTER INSTALLATION.

2. DURING CONSTRUCTION:

- WORK TO BE DONE IN THE VICINITY OF MAJOR WATERWAYS TO BE CARRIED OUT FROM JULY AND SEPTEMBER ONLY.
- MINIMIZE THE EXTENT OF DISTURBED AREAS AND THE DURATION OF EXPOSURE.
- PROTECT DISTURBED AREAS FROM RUNOFF.
- PROVIDE TEMPORARY COVER SUCH AS SEEDING OR MULCHING IF DISTURBED AREA WILL NOT BE REHABILITATED WITHIN 30 DAYS.
- INSPECT SILT FENCES, FILTER CLOTHS AND CATCH BASIN SUMPS WEEKLY AND AFTER EVERY MAJOR STORM EVENT. CLEAN AND REPAIR WHEN NECESSARY.
- PLAN TO BE REVIEWED AND REVISED AS REQUIRED DURING CONSTRUCTION
- EROSION CONTROL FENCING TO BE ALSO INSTALLED AROUND THE BASE OF ALL STOCKPILES.
- DO NOT LOCATE TOPSOIL PILES (IF ANY) AND EXCAVATION MATERIAL CLOSER THAN 2.5m FROM ANY PAVED SURFACE, OR ONE WHICH IS TO BE PAVED BEFORE THE PILE IS REMOVED. ALL TOPSOIL PILES (IF ANY) ARE TO BE SEEDED IF THEY ARE TO REMAIN ON SITE LONG ENOUGH FOR SEEDS TO GROW (LONGER THAN 30 DAYS).
- CONTROL WIND-BLOWN DUST OFF SITE TO ACCEPTABLE LEVELS BY SEEDING TOPSOIL PILES AND OTHER AREAS TEMPORARILY (PROVIDE WATERING AS REQUIRED).
- ALL EROSION CONTROL MEASURES TO REMAIN IN PLACE UNTIL ALL DISTURBED GROUND SURFACES HAVE BEEN STABILIZED EITHER BY PAVING OR RESTORATION OF VEGETATIVE GROUND COVER.
- NO ALTERNATE METHODS OF EROSION PROTECTION SHALL BE PERMITTED UNLESS APPROVES BY THIS CONSULTING ENGINEER AND THE CITY DEPARTMENT OF PUBLIC WORKS.
- CONTRACTOR RESPONSIBLE FOR CITY ROADWAY AND SIDEWALK TO BE CLEANED OF ALL SEDIMENT FROM VEHICULAR TRACKING ETC. AT THE END OF EACH WORK DAY.
- PROVIDE GRAVEL ENTRANCE WHEREVER EQUIPMENT LEAVES THE SITE TO PREVENT MUD TRACKING ONTO PAVED SURFACES. GRAVEL BED SHALL BE A MINIMUM OF 15m LONG, 4M WIDE AND 0.3m DEEP AND SHALL CONSIST OF COARSE (50mm CRUSHERT-RUN LIMESTONE) MATERIAL. MAINTAIN GRAVEL ENTRANCE IN CLEAN CONDITION.
- DURING WET CONDITIONS, TIRES OF ALL VEHICLES/EQUIPMENT LEAVING THE SITE ARE TO BE SCRAPED.
- ANY MUD/MATERIAL TRACKED ONTO THE ROAD SHALL BE REMOVED IMMEDIATELY BY HAND OR RUBBER TIRE LOADER.
- TAKE ALL NECESSARY STEPS TO PREVENT BUILDING MATERIAL, CONSTRUCTION DEBRIS OR WASTE BEING SPILLED OR TRACKED ONTO ABUTTING PROPERTIES OR PUBLIC STREETS DURING CONSTRUCTION AND PROCEED IMMEDIATELY TO CLEAN UP ANY AREAS SO AFFECTED.

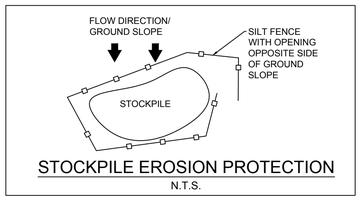
3. AFTER CONSTRUCTION:

- PROVIDE PERMANENT COVER CONSISTING OF TOPSOIL AND SEED TO DISTURBED AREAS.
- REMOVE ANY STRAW BALE FLOW CHECK DAMS, SILT FENCES AND FILTER CLOTHS ON CATCH BASINS AND MANHOLE COVERS AFTER DISTURBED AREAS HAVE BEEN REHABILITATED AND STABILIZED.
- INSPECT AND CLEAN CATCH BASIN SUMPS AND STORM SEWERS.



NOTE:
A All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2015	Rev 2
LIGHT–DUTY SILT FENCE BARRIER		OPSD 219.110



STOCKPILE EROSION PROTECTION
N.T.S.

LEGEND:

- PROPERTY LINE
- PROPOSED CURB
- PROPOSED DEPRESSED CURB
- PROPOSED TERRACING (3:1 MAX. SLOPE)
- PROPOSED DOOR ENTRANCE/EXIT
- EXISTING GRASS AREA TO REMAIN
- PROPOSED CONCRETE FEATURES (SIDEWALK AND LOADING RAMP)
- PROPOSED HEAVY DUTY ASPHALT
- PROPOSED LIGHT DUTY ASPHALT
- ASPHALT TO BE REINSTATED TO MATCH EXISTING CONDITIONS
- 0.3m WIDE (MIN.) STEP JOINT
- PROPOSED SILT FENCE AS PER OPSD 219.110
- ×50.00 PROPOSED ELEVATION
- ×50.00DC PROPOSED DEPRESSED CURB ELEVATION
- ×50.00BC PROPOSED BOTTOM OF CURB ELEVATION
- ×50.00TC PROPOSED TOP OF CURB ELEVATION
- ×50.00TG PROPOSED TOP OF GRATE ELEVATION
- ×50.00EX MATCH INTO EXISTING ELEVATION
- 79.19 EXISTING ELEVATION
- PROPOSED OVERLAND MAJOR FLOW ROUTE
- SAN SAN PROPOSED SANITARY SEWER
- STM STM PROPOSED STORM SEWER
- WTR WTR PROPOSED WATER SERVICE
- PROPOSED MANHOLE OR STORMSEPTOR
- PROPOSED CATCHBASIN OR CATCHBASIN-MANHOLE
- PROPOSED WATER VALVE
- PROPOSED PIPE REDUCER
- PROPOSED PIPE INSULATION
- PROPOSED 100 YEAR HIGH WATER LEVEL
- STORM WATERSHED EXTENT
- WS-XX CONTROLLED AREA RUNOFF — WATERSHED NAME, RUNOFF COEFFICIENT, AREA IN HECTARES

PROPOSED SILT FENCE BARRIER AS PER OPSD 219.110

PROPOSED SILT FENCE BARRIER AS PER OPSD 219.110

PROPOSED SILT FENCE BARRIER AS PER OPSD 219.110

PROPOSED SILT FENCE BARRIER AS PER OPSD 219.110

PROP. WAREHOUSE
F.F.E.=84.20

FUTURE ADDITION

ST-LAURENT BLVD.

HYDRO CORRIDOR

USE AND INTERPRETATION OF DRAWINGS

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5m 0 5 10m
SCALE: 1:250

No.	REVISIONS	BY	DATE
01	ISSUED FOR SPA	G.M.C.	13 DEC 2017

LICENSED PROFESSIONAL ENGINEER J. C. R. LALONDE DEC. 13/2017 PROVINCE OF ONTARIO

NOT AUTHENTIC UNLESS SIGNED AND DATED

LRJ
ENGINEERING | INGÉNIERIE
5430 Canotek Road | Ottawa, ON, K1J 9G2
www.lrl.ca | (613) 842-3434

CLIENT
GRAEBECK CONSTRUCTION LTD.

DESIGNED BY:	DRAWN BY:	APPROVED BY:
G.M.C.	G.M.C.	J.C.L.

PROJECT
2465070 ONTARIO LTD.
2375 ST-LAURENT BLVD., OTTAWA, ON

DRAWING TITLE
EROSION AND SEDIMENT CONTROL PLAN

PROJECT NO. 170721
DATE 13 DEC 2017

C101

NOTES: GENERAL

1. ALL ELEVATIONS ARE GEODETIC AND UTILIZE METRIC UNITS.
2. CONFIRM JOB BENCH MARK WITH LRL PRIOR TO UTILIZATION.
3. ALL EDGES OF DISTURBED PAVEMENT SHALL BE SAW CUT PRIOR TO PLACING NEW PAVEMENT. PAVEMENT REINSTATEMENT SHALL BE WITH STEP JOINTS OF 300mm WIDTH MINIMUM.
4. CURBS TO BE BARRIER, CONSTRUCTED AS PER OPSD 600.110.
5. ALL SIDEWALK CONSTRUCTION TO BE AS PER OPSD 310.010 & OPSD 310.050.
6. ALL MATERIAL SUPPLIED AND PLACED FOR PARKING LOT AND ACCESS ROAD CONSTRUCTION SHALL BE TO OPSS STANDARDS AND SPECIFICATIONS UNLESS OTHERWISE NOTED. CONSTRUCTION TO OPSS 206, 310 & 314. MATERIALS TO OPSS 1001, 1003 & 1010.
7. OBTAIN AND PAY FOR ALL NECESSARY PERMITS AND APPROVALS FROM THE MUNICIPAL AUTHORITIES PRIOR TO COMMENCING CONSTRUCTION; SUCH AS, BUT NOT LIMITED TO: ROAD CUT PERMITS, SEWER PERMITS, WATER PERMIT, ETC. THE APPROVAL OF THIS PLAN DOES NOT EXEMPT THE CONTRACTOR FROM THE REQUIREMENTS TO OBTAIN THE VARIOUS PERMITS/APPROVALS REQUIRED TO COMPLETE THE CONSTRUCTION PROJECT.
8. FILTER FABRIC TO BE INSTALLED AND MAINTAINED BETWEEN THE FRAME AND COVER OF ALL CATCHBASINS AND CATCHBASIN MANHOLES DURING THE CONSTRUCTION PERIOD TO MINIMIZE SEDIMENTS ENTERING THE STORM SEWER SYSTEM. ALL GRASSED AREAS MUST BE COMPLETED PRIOR TO THE REMOVAL OF THE FILTER FABRIC IN THE CATCH BASINS.
9. REMOVE FROM SITE ALL EXCESS EXCAVATED MATERIAL UNLESS OTHERWISE DIRECTED FROM THE ENGINEER. EXCAVATE AND REMOVE ALL ORGANIC MATERIAL AND DEBRIS, IF ANY, LOCATED WITHIN THE PROPOSED BUILDING, PARKING AND ROADWAY LOCATIONS.
10. EXISTING ASPHALT ROADWAY TO BE SAWCUT AND MILLED WHERE ENTRANCE DRIVEWAY IS PROPOSED.

PAVEMENT STRUCTURE

COURSE	MATERIAL	THICKNESS (mm) AUTOMOBILE PARKING	THICKNESS (mm) TRUCK ROUTE (HEAVY TRAFFIC)
SURFACE	HL.3 A/C (PG 58-28)	50	40
BINDER	HL.8 A/C (PG 58-28)	-	40
BASECOURSE	GRANULAR "A"	150	150
SUBBASE	GRANULAR "B" TYPE II	300	350

NOTE:
IN PREPARATION FOR PAVEMENT CONSTRUCTION AT THIS SITE, ANY SURFICIAL OR NEAR SURFACE/SUBGRADE LEVEL TOPSOIL AND ANY SOFT, WET OR DELETERIOUS MATERIALS SHOULD BE REMOVED FROM THE PROPOSED PAVED AREAS. THE EXPOSED SUBGRADE SHOULD BE INSPECTED AND APPROVED BY GEOTECHNICAL PERSONNEL AND ANY SOFT AREAS EVIDENT SHOULD BE SUBEXCAVATED AND REPLACED WITH SUITABLE EARTH BORROW APPROVED BY THE GEOTECHNICAL ENGINEER. THE SUBGRADE SHOULD BE SHAPED AND CROWNED TO PROMOTE DRAINAGE OF THE SITE CB'S. FOLLOWING APPROVAL OF THE PREPARATION OF THE SUBGRADE, THE PAVEMENT GRANULARS MAY BE PLACED.

LEGEND:

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- PROPOSED DOOR ENTRANCE/EXIT
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- PROPOSED CONCRETE FEATURES (SIDEWALK AND LOADING RAMP)
- PROPOSED HEAVY DUTY ASPHALT
- PROPOSED LIGHT DUTY ASPHALT
- ASPHALT TO BE REINSTATED TO MATCH EXISTING CONDITIONS
- 0.3m WIDE (MIN.) STEP JOINT
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- ×50.00 PROPOSED ELEVATION
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- ×50.00TG PROPOSED TOP OF GRATE ELEVATION
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- 75.19 EXISTING ELEVATION
- PROPOSED OVERLAND MAJOR FLOW ROUTE
- SAN SAN PROPOSED SANITARY SEWER
- STM STM PROPOSED STORM SEWER
- WTR WTR PROPOSED WATER SERVICE
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PROJECT
2465070 ONTARIO LTD.
2375 ST-LAURENT BLVD., OTTAWA, ON

DRAWING TITLE
GRADING AND DRAINAGE PLAN

PROJECT NO. 170721
DATE 13 DEC 2017

C301

NOTES: GENERAL

1. ALL EDGES OF DISTURBED PAVEMENT SHALL BE SAW CUT PRIOR TO PLACING NEW PAVEMENT. PAVEMENT REINSTATEMENT SHALL BE WITH STEP JOINTS OF 300mm WIDTH MINIMUM.
2. OBTAIN AND PAY FOR ALL NECESSARY PERMITS AND APPROVALS FROM THE MUNICIPAL AUTHORITIES PRIOR TO COMMENCING CONSTRUCTION; SUCH AS, BUT NOT LIMITED TO: ROAD CUT PERMITS, SEWER PERMITS, WATER PERMIT, ETC. THE APPROVAL OF THIS PLAN DOES NOT EXEMPT THE CONTRACTOR FROM THE REQUIREMENTS TO OBTAIN THE VARIOUS PERMITS/APPROVALS REQUIRED TO COMPLETE THE CONSTRUCTION PROJECT.
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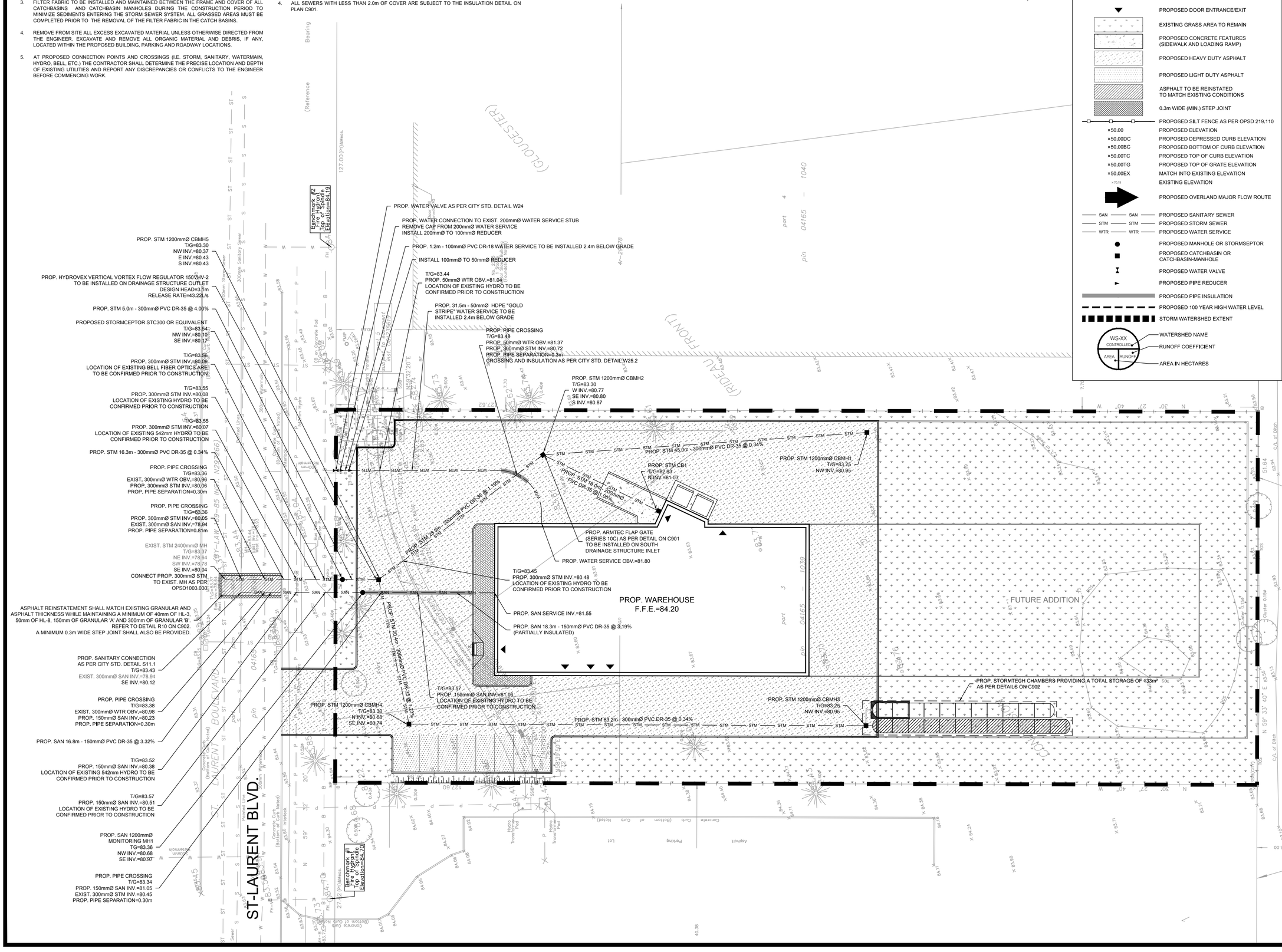
5. AT PROPOSED CONNECTION POINTS AND CROSSINGS (I.E. STORM, SANITARY, WATERMAIN, HYDRO, BELL, ETC.) THE CONTRACTOR SHALL DETERMINE THE PRECISE LOCATION AND DEPTH OF EXISTING UTILITIES AND REPORT ANY DISCREPANCIES OR CONFLICTS TO THE ENGINEER BEFORE COMMENCING WORK.

NOTES: SEWER

1. SEWER BEDDING AS PER PIPE TRENCH DETAIL WITH GRANULAR 'A' BEDDING COMPACTED TO 95% OF ITS SPMDD.
2. ALL WORK SHALL BE PERFORMED, AS APPLICABLE IN ACCORDANCE WITH OPSS 407, AND 410.
3. CONTRACTOR TO CONFIRM ELEVATION OF EXISTING SEWERS AT PROPOSED CONNECTION POINTS AND REPORT ANY DISCREPANCIES TO THE ENGINEER BEFORE COMMENCING ANY WORK.
4. ALL SEWERS WITH LESS THAN 2.0m OF COVER ARE SUBJECT TO THE INSULATION DETAIL ON PLAN C901.



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LICENSED PROFESSIONAL ENGINEER — J. C. R. LALONDE — DEC. 13/2017 — PROVINCE OF ONTARIO

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CLIENT

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DESIGNED BY:	DRAWN BY:	APPROVED BY:
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PROJECT

2465070 ONTARIO LTD.
2375 ST-LAURENT BLVD., OTTAWA, ON

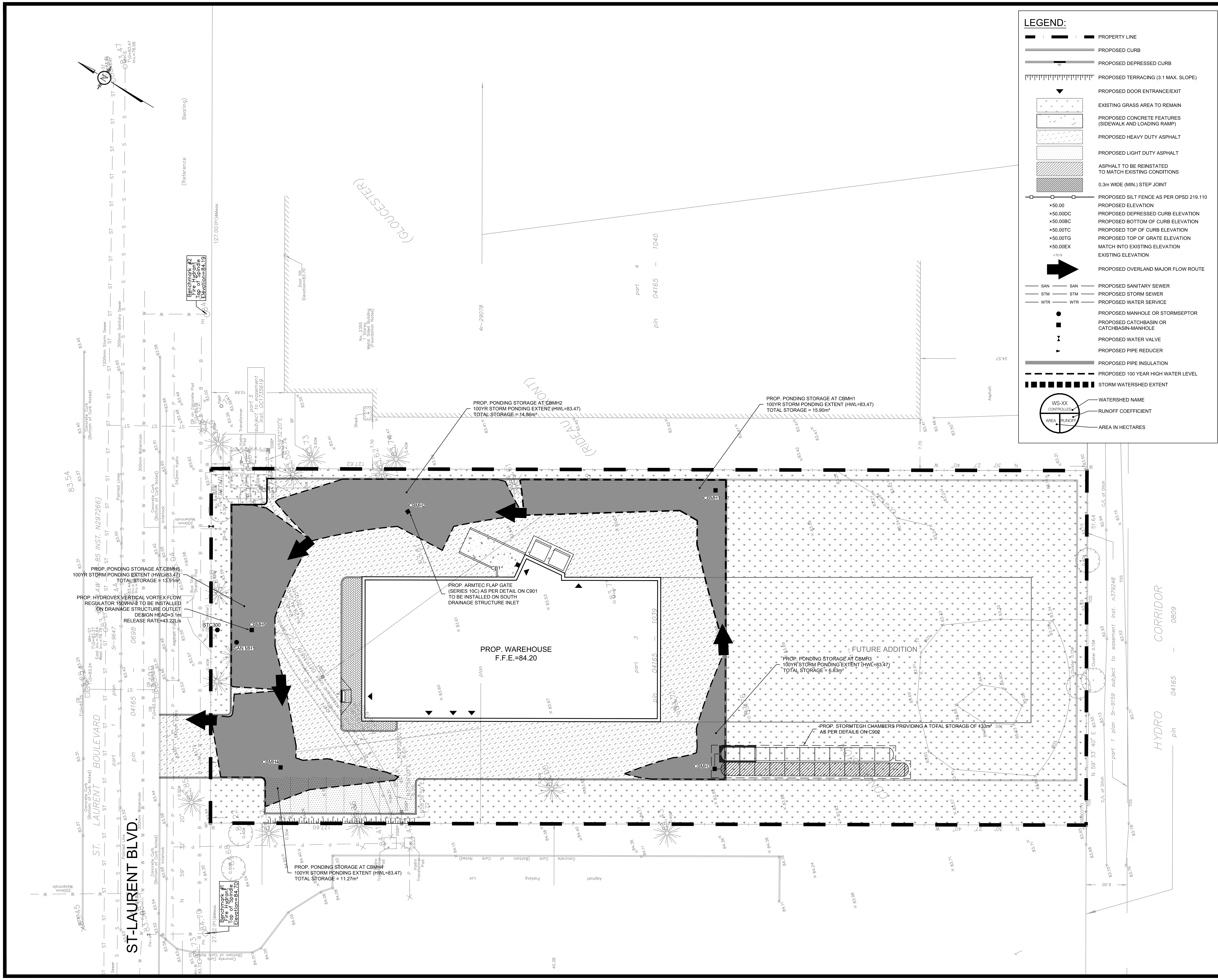
DRAWING TITLE

SERVICING PLAN

PROJECT NO.
170721

DATE
13 DEC 2017

C401



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5m 0 5 10m

SCALE: 1:250

No.	REVISIONS	BY	DATE
01	ISSUED FOR SPA	G.M.C.	13 DEC 2017

LICENSED PROFESSIONAL ENGINEER
J. C. R. LALONDE
DEC. 13/2017
PROVINCE OF ONTARIO

NOT AUTHENTIC UNLESS SIGNED AND DATED

LRL
ENGINEERING | INGÉNIERIE
5430 Canotek Road | Ottawa, ON, K1J 9G2
www.lrl.ca | (613) 842-3434

CLIENT
GRAEBECK CONSTRUCTION LTD.

DESIGNED BY:	DRAWN BY:	APPROVED BY:
G.M.C.	G.M.C.	J.C.L.

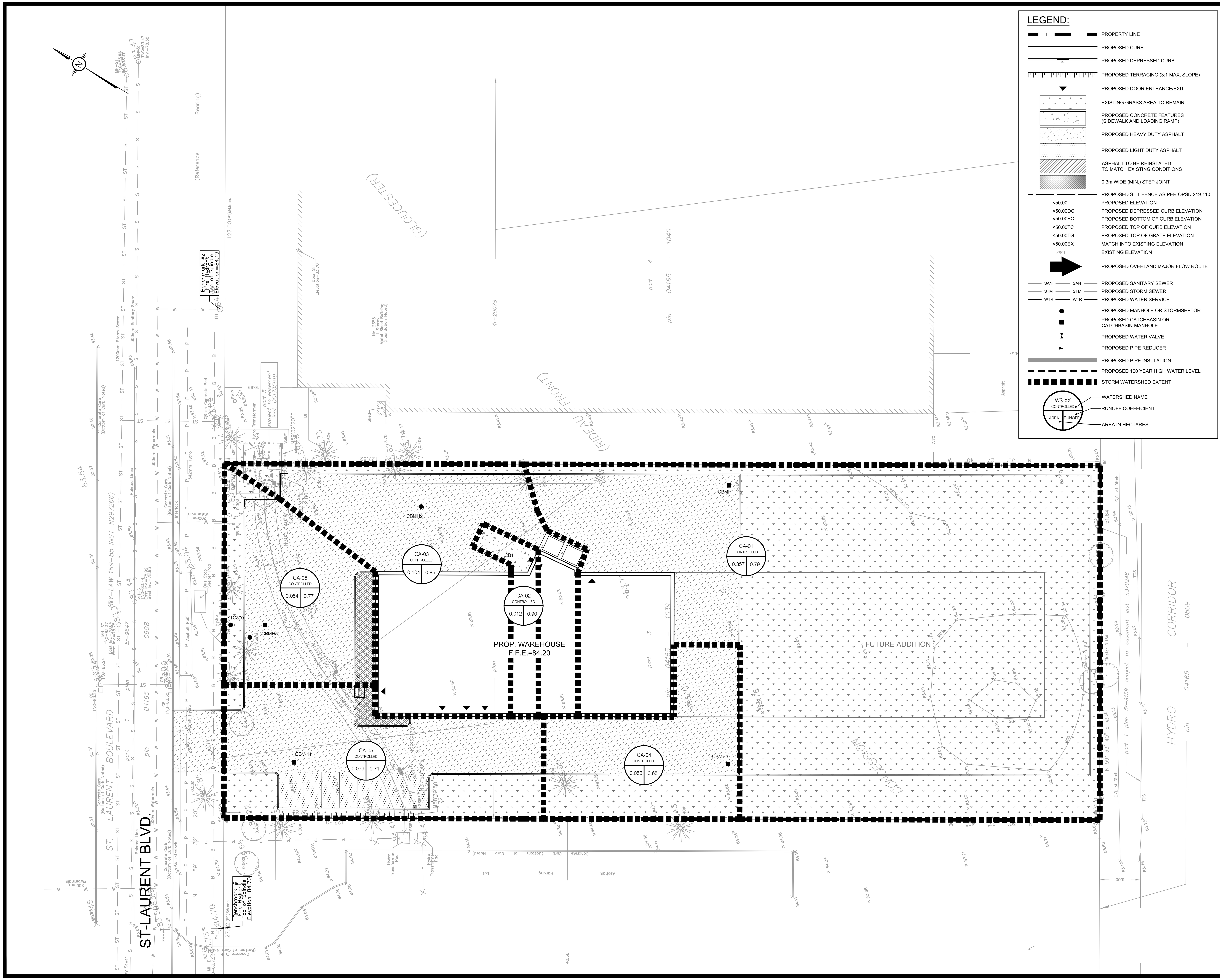
PROJECT
2465070 ONTARIO LTD.
2375 ST-LAURENT BLVD., OTTAWA, ON

DRAWING TITLE
STORMWATER MANAGEMENT PLAN

PROJECT NO.
170721

DATE
13 DEC 2017

C601



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5m 0 5 10m

SCALE: 1:250

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01	ISSUED FOR SPA	G.M.C.	13 DEC 2017

PROFESSIONAL ENGINEER J. C. R. LALONDE DEC 13/2017 LICENSED PROVINCE OF ONTARIO

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DESIGNED BY:	DRAWN BY:	APPROVED BY:
G.M.C.	G.M.C.	J.C.L.

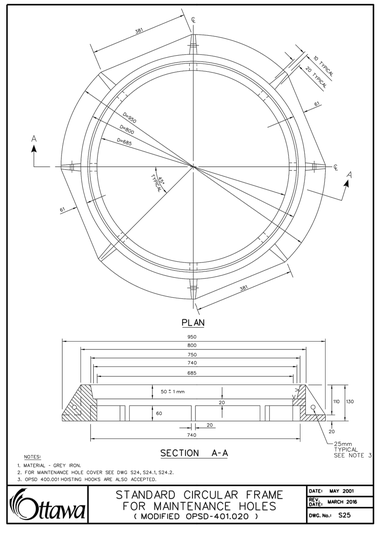
PROJECT
2465070 ONTARIO LTD.
2375 ST-LAURENT BLVD., OTTAWA, ON

DRAWING TITLE
POST-DEVELOPMENT WATERSHED PLAN

PROJECT NO.
170721

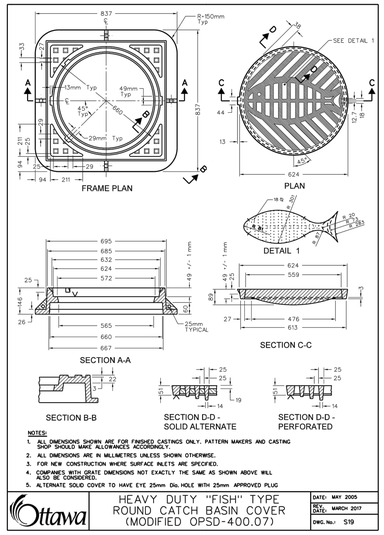
DATE
13 DEC 2017

C701



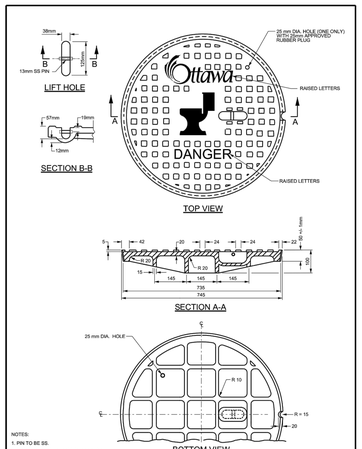
STANDARD CIRCULAR FRAME FOR MAINTENANCE HOLES (MODIFIED OPSD-401.020)

DATE:	MAY 2001
REV. DATE:	MARCH 2018
DWG. No.:	S25



HEAVY DUTY "FISH" TYPE ROUND CATCH BASIN COVER (MODIFIED OPSD-400.07)

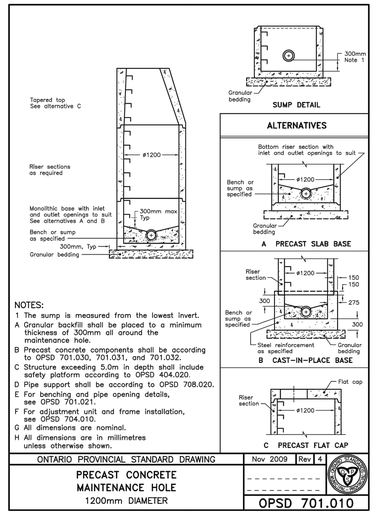
DATE:	MAY 2005
REV. DATE:	MARCH 2017
DWG. No.:	S19



STANDARD CIRCULAR SANITARY & COMBINED MAINTENANCE HOLE COVER

N.T.S.

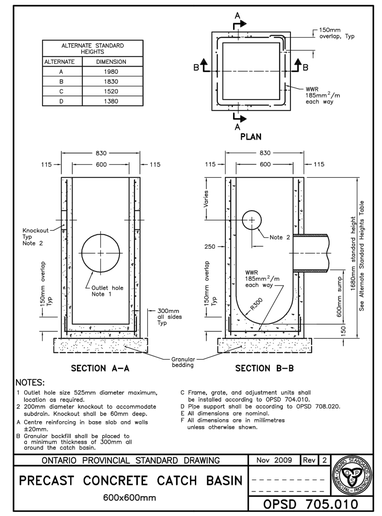
DATE:	MARCH 2008
REV. DATE:	MARCH 2017
DWG. No.:	S24



ONTARIO PROVINCIAL STANDARD DRAWING — Nov 2009 — Rev 4

PRECAST CONCRETE MAINTENANCE HOLE 1200mm DIAMETER

OPSD 701.010



ONTARIO PROVINCIAL STANDARD DRAWING — Nov 2009 — Rev 2

PRECAST CONCRETE CATCH BASIN 600x600mm

OPSD 705.010

SEWER SERVICE CONNECTIONS FOR FLEXIBLE MAIN SEWER PIPE (MODIFIED OPSD-1006.020)

DATE:	MARCH 2006
REV. DATE:	MARCH 2013
DWG. No.:	S11.1

INTERNAL DROP STRUCTURE FOR EXISTING MAINTENANCE HOLES

ONTARIO PROVINCIAL STANDARD DRAWING — Nov 2016 — Rev 4

OPSD 1003.030

Series 10C Flap Gate

Description
The model 10C (for seating heads up to 3.0 metres or 10 feet) incorporates the simplest circular flap gate design, with a double hinge action. The frame and the flap are of cast iron construction with galvanized hinge arms and fasteners. All pivot wear points are bronze bushed. A lifting eye is cast integrally with the flap to permit manual operation.

Installation
The model 10C flap gate is manufactured in a flat back configuration. The gate is easily mounted on either concrete headwalls or pipe flanges, and Armtec can supply flanges for corrugated steel pipe installations.

Use
This economical flap gate is used for low head situations, where back flooding of storm water structures has to be prevented.

Design Data

SIZE ø	A	B	C	D	Pivot Radius
102	228	114	114	76	152
152	280	140	140	95	220
203	343	171	195	102	327
254	406	203	212	104	358
305	483	242	234	105	424
381	565	282	303	112	516
457	635	318	346	129	620
508	700	350	384	141	701
610	813	407	457	143	811
762	984	492	553	154	992
914	1168	584	670	181	1187
1067	1346	673	738	187	1335
1219	1511	756	902	194	1583

Series 10C, 20C, 50C Flow Control Gates 3

NOTES:
1. VORTEX ICD'S ARE USED TO RESTRICT FLOWS BELOW 10L /s /m (LIMITED RESTRICTION ALLOWED TYPICALLY 15 SL / s PRODUCTS MAY SLIGHTLY DIFFER AS SHOWN ABOVE.
2. CURVES ARE AVAILABLE FROM THE MANUFACTURER SEE MS - 22.15 FOR APPROVED PRODUCTS.
3. ODOUR CONTROL TYPE ICD TO BE USED IN CBS THAT ARE CONNECTED TO A COMBINED SEWER DIRECTLY. FOR STORM SEWERS ODOUR / FLOATABLE CONTROL EXTENSIONS ARE NOT REQUIRED.
4. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS SHOWN OTHERWISE.

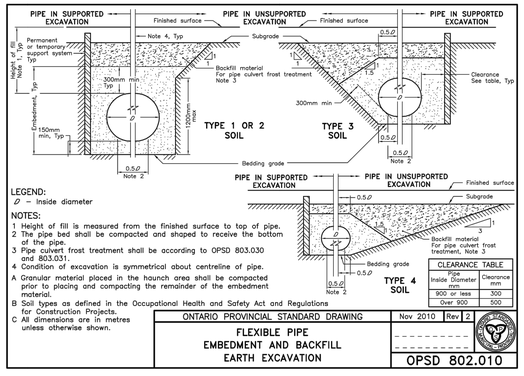
N.T.S.

VORTEX ICD INSTALLATION

DATE:	MARCH 2008
REV. DATE:	MARCH 2009
DWG. No.:	S4.1

STANDARD TRENCH REINSTATMENT IN PAVED SURFACE

DATE:	MAY 2001
REV. DATE:	MARCH 2017
DWG. No.:	R10



CLEARANCE TABLE	
Pipe Inside Diameter mm	Clearance mm
900 or less	300
Over 900	500

ONTARIO PROVINCIAL STANDARD DRAWING — Nov 2010 — Rev 2

FLEXIBLE PIPE EMBEDMENT AND BACKFILL EARTH EXCAVATION

OPSD 802.010

CONCRETE BARRIER CURB FOR GRANULAR BASE PAVEMENT (MODIFIED OPSD-600.110)

N.T.S.

DATE:	JANUARY 2003
REV. DATE:	MARCH 2014
DWG. No.:	SC1.1

MONOLITHIC CONCRETE CURB AND SIDEWALK

N.T.S.

DATE:	MAY 2001
REV. DATE:	MARCH 2016
DWG. No.:	SC2

WATERMAIN CROSSING OVER SEWER

DATE:	MAY 2001
REV. DATE:	MARCH 2013
DWG. No.:	W25.2

VALVE BOX ASSEMBLY

DATE:	MAY 2001
REV. DATE:	MARCH 2016
DWG. No.:	W24

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01	ISSUED FOR SPA	G.M.C.	13 DEC 2017

LICENSED PROFESSIONAL ENGINEER — J. C. R. LALONDE — DEC 13/2017 — PROVINCE OF ONTARIO

NOT AUTHENTIC UNLESS SIGNED AND DATED

LRL
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CLIENT

GRAEBECK CONSTRUCTION LTD.

DESIGNED BY:	DRAWN BY:	APPROVED BY:
G.M.C.	G.M.C.	J.C.L.

PROJECT

2465070 ONTARIO LTD.
2375 ST-LAURENT BLVD., OTTAWA, ON

DRAWING TITLE

CONSTRUCTION DETAIL PLAN

PROJECT NO. 170721

DATE 13 DEC 2017

C901

ADVANCED DRAINAGE SYSTEMS, INC.

2465070 ONTARIO LTD

2375 ST-LAURENT BLVD., OTTAWA, ON

STORMTECH CHAMBER SPECIFICATIONS

1. CHAMBERS SHALL BE STORMTECH MC-3500 OR APPROVED EQUAL.
2. CHAMBERS SHALL BE MADE FROM VIRGIN, IMPACT-MODIFIED POLYPROPYLENE COPOLYMERS.
3. CHAMBER ROWS SHALL PROVIDE CONTINUOUS, UNOBSTRUCTED INTERNAL SPACE WITH NO INTERNAL SUPPORT PANELS THAT WOULD IMPEDE FLOW OR LIMIT ACCESS FOR INSPECTION.
4. THE STRUCTURAL DESIGN OF THE CHAMBERS, THE STRUCTURAL BACKFILL, AND THE INSTALLATION REQUIREMENTS SHALL ENSURE THAT THE LOAD FACTORS SPECIFIED IN THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, SECTION 12.12, ARE MET FOR: 1) LONG-DURATION DEAD LOADS AND 2) SHORT-DURATION LIVE LOADS, BASED ON THE AASHTO DESIGN TRUCK WITH CONSIDERATION FOR IMPACT AND MULTIPLE VEHICLE PRESENCES.
5. CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F2418, "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
6. CHAMBERS SHALL BE DESIGNED AND ALLOWABLE LOADS DETERMINED IN ACCORDANCE WITH ASTM F2787, "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
7. ONLY CHAMBERS THAT ARE APPROVED BY THE SITE DESIGN ENGINEER WILL BE ALLOWED. THE CHAMBER MANUFACTURER SHALL SUBMIT THE FOLLOWING UPON REQUEST TO THE SITE DESIGN ENGINEER FOR APPROVAL BEFORE DELIVERING CHAMBERS TO THE PROJECT SITE:
   a. A STRUCTURAL EVALUATION SEALED BY A REGISTERED PROFESSIONAL ENGINEER THAT DEMONSTRATES THAT THE SAFETY FACTORS ARE GREATER THAN OR EQUAL TO 1.95 FOR DEAD LOAD AND 1.75 FOR LIVE LOAD, THE MINIMUM REQUIRED BY ASTM F2787 AND BY AASHTO FOR THERMOPLASTIC PIPE.
   b. A STRUCTURAL EVALUATION SEALED BY A REGISTERED PROFESSIONAL ENGINEER THAT DEMONSTRATES THAT THE LOAD FACTORS SPECIFIED IN THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, SECTION 12.12, ARE MET. THE 50 YEAR CREEP MODULUS DATA SPECIFIED IN ASTM F2418 MUST BE USED AS PART OF THE AASHTO STRUCTURAL EVALUATION TO VERIFY LONG-TERM PERFORMANCE.
   c. STRUCTURAL CROSS SECTION DETAIL ON WHICH THE STRUCTURAL EVALUATION IS BASED.
8. CHAMBERS AND END CAPS SHALL BE PRODUCED AT AN ISO 9001 CERTIFIED MANUFACTURING FACILITY.

IMPORTANT - NOTES FOR THE BIDDING AND INSTALLATION OF MC-3500 CHAMBER SYSTEM

1. STORMTECH MC-3500 CHAMBERS SHALL NOT BE INSTALLED UNTIL THE MANUFACTURER'S REPRESENTATIVE HAS COMPLETED A PRE-CONSTRUCTION MEETING WITH THE INSTALLERS.
2. STORMTECH MC-3500 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH MC-3500/MC-4500 CONSTRUCTION GUIDE".
3. CHAMBERS ARE NOT TO BE BACKFILLED WITH A DOZER OR AN EXCAVATOR SITUATED OVER THE CHAMBERS.
   STORMTECH RECOMMENDS 3 BACKFILL METHODS:
   - STONESHOOTER LOCATED OFF THE CHAMBER BED.
   - BACKFILL AS ROWS ARE BUILT USING AN EXCAVATOR ON THE FOUNDATION STONE OR SUBGRADE.
   - BACKFILL FROM OUTSIDE THE EXCAVATION USING A LONG BOOM HOE OR EXCAVATOR.
4. THE FOUNDATION STONE SHALL BE LEVELED AND COMPACTED PRIOR TO PLACING CHAMBERS.
5. JOINTS BETWEEN CHAMBERS SHALL BE PROPERLY SEATED PRIOR TO PLACING STONE.
6. MAINTAIN MINIMUM - 9" (230 mm) SPACING BETWEEN THE CHAMBER ROWS.
7. INLET AND OUTLET MANIFOLDS MUST BE INSERTED A MINIMUM OF 12" (300 mm) INTO CHAMBER END CAPS.
8. EMBEDMENT STONE SURROUNDING CHAMBERS MUST BE A CLEAN, CRUSHED, ANGULAR STONE 3/4-2" (20-60 mm) MEETING THE AASHTO M43 DESIGNATION OF #3 OR #4.*J
9. STONE MUST BE PLACED ON THE TOP CENTER OF THE CHAMBER TO ANCHOR THE CHAMBERS IN PLACE AND PRESERVE ROW SPACING. *J
10. ADS RECOMMENDS THE USE OF "FLEXSTORM CATCH IT" INSERTS DURING CONSTRUCTION FOR ALL INLETS TO PROTECT THE SUBSURFACE STORMWATER MANAGEMENT SYSTEM FROM CONSTRUCTION SITE RUNOFF.

NOTES FOR CONSTRUCTION EQUIPMENT

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

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

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

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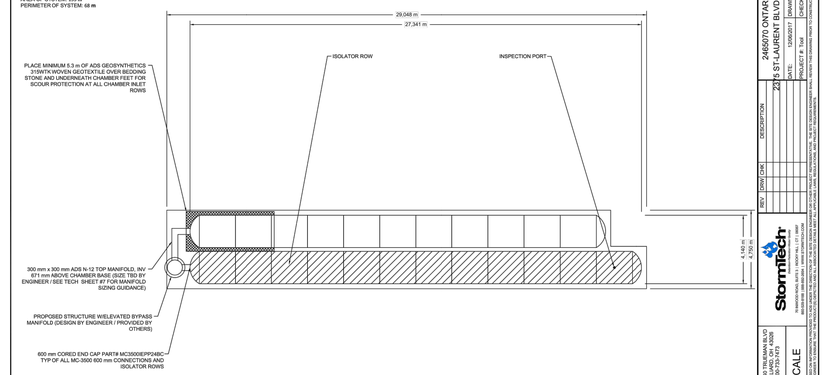
CONCEPTUAL LAYOUT

(23) STORMTECH MC-3500 CHAMBERS
(4) STORMTECH MC-3500 END CAPS
INSTALLED WITH 305 mm COVER STONE, 229 mm BASE STONE, 40% STONE VOID
INSTALLED SYSTEM VOLUME: 133 m³
AREA OF SYSTEM: 133 m²
PERIMETER OF SYSTEM: 68 m



REV	DRWN	CHK	DESCRIPTION

2465070 ONTARIO LTD
2375 ST-LAURENT BLVD, OTTAWA
DATE: 12/05/2017 DRAWN: GC
PROJECT #: Total CHECKED: —

StormTech — 70 INWOOD ANTIS ROAD, SUITE 3 | BRADFORD, ONTARIO L3Z 2A6 | 800-733-7473 | 905-952-2288 | www.stormtech.com

ADS TRUENAIN BLVD HILLIARD, OH 43026 1-800-733-7473 www.ADSpipe.com

NOT TO SCALE

SHEET 2 OF 5

ACCEPTABLE FILL MATERIALS: STORMTECH MC-3500 CHAMBER SYSTEMS

BEGIN COMPACTIONS AFTER 24" (600 mm) OF MATERIAL OVER THE CHAMBERS IS REACHED. COMPACT ADDITIONAL LAYERS IN 12" (300 mm) MAX LIFTS TO A MIN. 95% PROCTOR DENSITY FOR WELL GRADED MATERIAL AND 95% RELATIVE DENSITY FOR PROCESSED AGGREGATE MATERIALS.		**EMBEDMENT STONE:** FILL SURROUNDING THE CHAMBERS FROM THE FOUNDATION STONE ('A' LAYER) TO THE 'C' LAYER ABOVE.	CLEAN, CRUSHED, ANGULAR STONE, NOMINAL SIZE DISTRIBUTION BETWEEN 3/4-2 INCH (20-50 mm)	AASHTO M43[1] 3, 4
D	A	**FOUNDATION STONE:** FILL BELOW CHAMBERS FROM THE SUBGRADE UP TO THE FOOT (BOTTOM) OF THE CHAMBER.	CLEAN, CRUSHED, ANGULAR STONE, NOMINAL SIZE DISTRIBUTION BETWEEN 3/4-2 INCH (20-50 mm)	AASHTO M43[1] 3, 4 NO COMPACTION REQUIRED.
PLATE COMPACT OR ROLL TO ACHIEVE A FLAT SURFACE. NOTE: PLATE COMPACTION EQUIPMENT MUST NOT BE USED ON TOP OF THE CHAMBERS.		**INITIAL FILL:** FILL MATERIAL FOR LAYER 'C' STARTS FROM THE TOP OF THE EMBEDMENT STONE ('B' LAYER) TO A MIN. OF 600 mm) ABOVE THE TOP OF THE CHAMBERS. NOTE: FULL DEPTH COMPACTION MAY BE REQUIRED IF PLASTIC OR CLAY SOILS ARE PRESENT IN THE 'C' LAYER OR IF STORMTECH COMPACTION REQUIREMENTS ARE NOT MET IN 'C' LOCATION MATERIALS WHEN PLACED AND COMPACTED IN 9" (230 mm) (MAX) LIFTS USING TWO FULL COVERAGES WITH A VIBRATORY COMPACTOR. FOR ADDITIONAL INFORMATION SEE STORMTECH COMPACTION REQUIREMENTS. FOR STANDARD DESIGN LOAD CONDITIONS A FLAT SURFACE MAY BE ACHIEVED BY RAKING OR DRAGGING WITHOUT COMPACTION EQUIPMENT. FOR SPECIAL LOAD DESIGNS, CONTACT STORMTECH FOR COMPACTION REQUIREMENTS.	GRANULAR WELL-GRADED SOIL/AGGREGATE MIXTURES, <35% FINES OR PROCESSED AGGREGATE. MOST PAVEMENT LAYER SOURCE MATERIALS WILL QUALIFY. REFER TO ASTM D2487 OR D3282 FOR SOIL CLASSIFICATIONS. WHEN SPECIFYING AGGREGATE, A SPECIFICATION FOR AN STONE WOULD STATE: "CLEAN, CRUSHED, ANGULAR STONE"	

[1] AASHTO M43 SIZES 3, 4 ARE RECOMMENDED. SIZES 357, 467, 4, 5, 56, 57 MAY BE USED AFTER CONSULTING WITH THE STORMTECH ENGINEERING DEPARTMENT.

NOTES:

1. MC-3500 CHAMBERS SHALL CONFORM TO THE REQUIREMENTS OF ASTM F2418 "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".*J
2. MC-3000 CHAMBERS SHALL BE DESIGNED IN ACCORDANCE WITH ASTM F2787 "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".*J
3. "ACCEPTABLE FILL MATERIALS" TABLE ABOVE PROVIDES MATERIAL LOCATIONS, DESCRIPTIONS, GRADATIONS, AND COMPACTION REQUIREMENTS FOR FOUNDATION, EMBEDMENT, AND FILL MATERIALS.*J
4. THE "SITE DESIGN ENGINEER" REFERS TO THE ENGINEER RESPONSIBLE FOR THE DESIGN AND LAYOUT OF THE STORMTECH CHAMBERS FOR THIS PROJECT.*J
5. THE SITE DESIGN ENGINEER IS RESPONSIBLE FOR ASSESSING THE BEARING RESISTANCE (ALLOWABLE BEARING CAPACITY) OF THE SUBGRADE SOILS AND THE DEPTH OF FOUNDATION STONE WITH CONSIDERATION FOR THE RANGE OF EXPECTED SOIL MOISTURE CONDITIONS.*J
6. PERIMETER STONE MUST BE EXTENDED HORIZONTALLY TO THE EXCAVATION WALL FOR BOTH VERTICAL AND SLOPED EXCAVATION WALLS.
7. ONCE LAYER 'C' IS PLACED, ANY SOIL/MATERIAL CAN BE PLACED IN LAYER 'D' UP TO THE FINISHED GRADE. MOST PAVEMENT SUBBASE SOILS CAN BE USED TO REPLACE THE MATERIAL REQUIREMENTS OF LAYER 'C' OR 'D' AT THE SITE DESIGN ENGINEER'S DISCRETION.

REV	DRWN	CHK	DESCRIPTION

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2375 ST-LAURENT BLVD, OTTAWA
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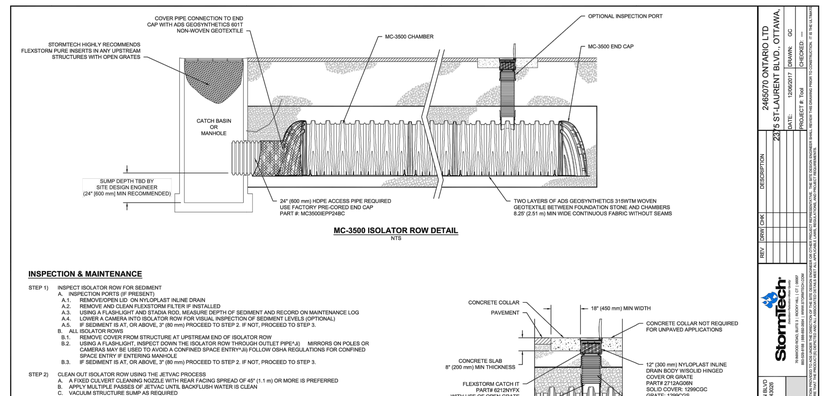
ADS TRUENAIN BLVD HILLIARD, OH 43026 1-800-733-7473 www.ADSpipe.com

SHEET 3 OF 5



MC-3500 ISOLATOR ROW DETAIL
NTS

INSPECTION & MAINTENANCE

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

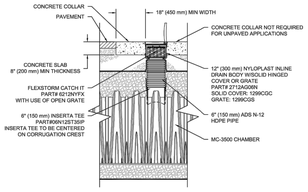
STEP 2) CLEAN OUT ISOLATOR ROW USING THE JETVAC PROCESS
- A. A FIXED CULVERT CLEANING NOZZLE WITH REAR FACING SPREAD OF 45° (1.1 m) OR MORE IS PREFERRED
- B. APPLY MULTIPLE PASSES OF JETVAC UNTIL BACKFLUSH WATER IS CLEAN
- C. VACUUM STRUCTURE SUMP AS REQUIRED

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

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

NOTES

1. INSPECT EVERY 6 MONTHS DURING THE FIRST YEAR OF OPERATION. ADJUST THE INSPECTION INTERVAL BASED ON PREVIOUS OBSERVATIONS OF SEDIMENT ACCUMULATION AND HIGH WATER ELEVATIONS.*J
2. CONDUCT JETTING AND VACTORING ANNUALLY OR WHEN INSPECTION SHOWS THAT MAINTENANCE IS NECESSARY.



MC-3500 6" INSPECTION PORT DETAIL
NTS

REV	DRWN	CHK	DESCRIPTION

2465070 ONTARIO LTD
2375 ST-LAURENT BLVD, OTTAWA
DATE: 12/05/2017 DRAWN: GC
PROJECT #: Total CHECKED: —

StormTech — 70 INWOOD ANTIS ROAD, SUITE 3 | BRADFORD, ONTARIO L3Z 2A6 | 800-733-7473 | 905-952-2288 | www.stormtech.com

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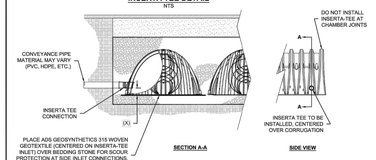
SHEET 4 OF 5

INSERTA TEE DETAIL

NTS



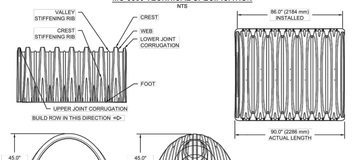
SECTION A-A **SIDE VIEW**

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

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

MC-3500 TECHNICAL SPECIFICATION

NTS



NOMINAL CHAMBER SPECIFICATIONS

SIZE (W X H X INSTALLED LENGTH)	77.0" X 45.0" X 86.0"	(1956 mm X 1143 mm X 2184 mm)
CHAMBER STORAGE	109.0 CUBIC FEET	(3.11 m³)
MINIMUM INSTALLED STORAGE*	178.0 CUBIC FEET	(5.06 m³)
WEIGHT	135.0 lbs.	(61.2 kg)

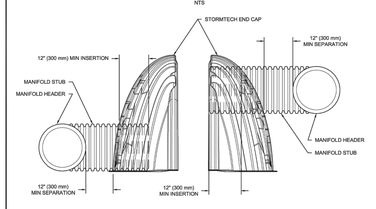
NOMINAL END CAP SPECIFICATIONS

SIZE (W X H X INSTALLED LENGTH)	77.0" X 45.0" X 22.5"	(1956 mm X 1143 mm X 571 mm)
END CAP STORAGE	14.9 CUBIC FEET	(0.42 m³)
MINIMUM INSTALLED STORAGE*	46.0 CUBIC FEET	(1.30 m³)
WEIGHT	50.0 lbs.	(22.7 kg)

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

MC-SERIES END CAP INSERTION DETAIL

NTS



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

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

PART #	STUB	B	C
MC3500IEPP06T	6" (150 mm)	33.21" (844 mm)	---
MC3500IEPP06B			0.66" (17 mm)
MC3500IEPP08T	8" (200 mm)	31.16" (791 mm)	---
MC3500IEPP08B			0.81" (21 mm)
MC3500IEPP10T	10" (250 mm)	29.04" (738 mm)	---
MC3500IEPP10B			0.93" (24 mm)
MC3500IEPP12T	12" (300 mm)	26.36" (670 mm)	---
MC3500IEPP12B			1.35" (34 mm)
MC3500IEPP15T	15" (375 mm)	23.39" (594 mm)	---
MC3500IEPP15B			1.50" (38 mm)
MC3500IEPP18TC	18" (450 mm)	20.03" (509 mm)	---
MC3500IEPP18BC			1.77" (45 mm)
MC3500IEPP24TC	24" (600 mm)	14.48" (368 mm)	---
MC3500IEPP24BC			2.06" (52 mm)
MC3500IEPP30BC	30" (750 mm)	---	---

NOTE: ALL DIMENSIONS ARE NOMINAL

CUSTOM PRECORED INVERTS ARE AVAILABLE UPON REQUEST. INVENTORIED MANIFOLDS INCLUDE 13-24" (330-600 mm) SIZE ON SIZE AND 13-48" (375-1200 mm) ECCENTRIC MANIFOLDS.
CUSTOM INVERT LOCATIONS ON THE MC-3500 END CAP CUT IN THE FIELD ARE NOT RECOMMENDED FOR PIPE SIZES GREATER THAN 10" (250 mm).
THE INVERT LOCATION IN COLUMN 'B' ARE THE HIGHTEST POSSIBLE FOR THE PIPE SIZE.

REV	DRWN	CHK	DESCRIPTION

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SHEET 5 OF 5

USE AND INTERPRETATION OF DRAWINGS

GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION ARE PART OF THE CONTRACT DOCUMENTS AND DESCRIBE USE AND INTENT OF THE DRAWING. THE CONTRACT DOCUMENTS INCLUDE NOT ONLY THE DRAWINGS, BUT ALSO THE OWNER-CONTRACTOR AGREEMENTS, CONDITIONS OF THE CONTRACT, THE SPECIFICATIONS, ADDENDA, AND MODIFICATIONS ISSUED AFTER EXECUTION OF THE CONTRACT. THESE CONTRACT DOCUMENTS ARE COMPLEMENTARY, AND WHAT IS REQUIRED BY ANY ONE SHALL BE BINDING AS IF REQUIRED BY ALL. WORK NOT COMPLETELY DELINEATED HEREON SHALL BE CONSTRUCTED OF THE SAME MATERIALS AND DETAILED SIMILARLY AS WORK SHOWN MORE COMPLETELY ELSEWHERE IN THE CONTRACT DOCUMENTS.

BY USE OF THE DRAWINGS FOR CONSTRUCTION OF THE PROJECT, THE OWNER CONFIRMS THAT HE HAS REVIEWED AND APPROVED THE DRAWINGS. THE CONTRACTOR CONFIRMS THAT HE HAS VISITED THE SITE, FAMILIARIZED HIMSELF WITH THE LOCAL CONDITIONS, VERIFIED FIELD DIMENSIONS AND CORRELATED HIS OBSERVATIONS WITH THE REQUIREMENTS OF THE CONTRACT DOCUMENTS.

AS INSTRUMENTS OF SERVICE, ALL DRAWINGS, SPECIFICATIONS, CADD FILES OR OTHER ELECTRONIC MEDIA AND COPIED THERE OF FURNISHED BY THE ENGINEER ARE HIS PROPERTY. THEY ARE TO BE USED ONLY FOR THIS PROJECT AND ARE NOT TO BE USED ON ANY OTHER PROJECT, INCLUDING REPEATS OF THE PROJECT. CHANGES TO THE DRAWINGS MAY ONLY BE MADE BY THE ENGINEER.

UNLESS THE REVISION TITLE IS "ISSUED FOR CONSTRUCTION", THESE DRAWINGS SHALL BE CONSIDERED PRELIMINARY AND SHALL NOT BE USED AS A CONSTRUCTION DOCUMENT.

THESE DRAWINGS ILLUSTRATES THE WORK TO BE DONE. THE ENGINEER IS NOT RESPONSIBLE FOR THE MEANS, METHODS, TECHNIQUES, SEQUENCES, AND PROCEDURES USED TO DO THE WORK, OR THE SAFETY ASPECTS OF CONSTRUCTION, AND NOTHING ON THESE DRAWINGS EXPRESSED OR IMPLIED CHANGES THIS CONDITION. CONTRACTOR SHALL DETERMINE ALL CONDITIONS AT THE SITE AND SHALL BE RESPONSIBLE FOR KNOWING HOW THEY AFFECT THE WORK. SUBMITTAL OF A BID TO PERFORM THIS WORK IS ACKNOWLEDGEMENT OF THE RESPONSIBILITIES, AND THAT THEY HAVE BEEN FULLY CONSIDERED IN PLANNING OF THE WORK, AND THE BID PRICE. NO CLAIMS FOR EXTRA CHARGES DUE TO THESE CONDITIONS WILL BE FORTHCOMING.

UNAUTHORIZED CHANGES:

IN THE EVENT THE CLIENT, THE CLIENT'S CONTRACTORS OR SUBCONTRACTORS, OR ANYONE FOR WHOM THE CLIENT IS LEGALLY LIABLE MAKES OR PERMITS TO BE MADE ANY CHANGES TO ANY REPORTS, PLANS, SPECIFICATIONS OR OTHER CONSTRUCTION DOCUMENTS PREPARED BY LRL ASSOCIATES LTD. (LRL) WITHOUT OBTAINING LRL'S PRIOR WRITTEN CONSENT, THE CLIENT SHALL ASSUME FULL RESPONSIBILITY FOR THE RESULTS OF SUCH CHANGES. THEREFORE THE CLIENT AGREES TO WAIVE ANY CLAIM AGAINST LRL AND TO RELEASE LRL FROM ANY LIABILITY ARISING DIRECTLY OR INDIRECTLY FROM SUCH UNAUTHORIZED CHANGES.

IN ADDITION, THE CLIENT AGREES, TO THE FULLEST EXTENT PERMITTED BY LAW, TO INDEMNIFY AND HOLD HARMLESS LRL FROM ANY DAMAGES, LIABILITIES OR COST, INCLUDING REASONABLE ATTORNEY'S FEES AND COST OF DEFENSE, ARISING FROM SUCH CHANGES.

IN ADDITION, THE CLIENT AGREES TO INCLUDE IN ANY CONTRACTS FOR CONSTRUCTION APPROPRIATE LANGUAGE THAT PROHIBITS THE CONTRACTOR OR ANY SUBCONTRACTORS OF ANY TIER FROM MAKING ANY CHANGES OR MODIFICATIONS TO LRL'S CONSTRUCTION DOCUMENTS WITHOUT THE PRIOR WRITTEN APPROVAL OF LRL AND THAT FURTHER REQUIRES THE CONTRACTOR TO INDEMNIFY BOTH LRL AND THE CLIENT FROM ANY LIABILITY OR COST ARISING FROM SUCH CHANGES MADE WITHOUT SUCH PROPER AUTHORIZATION.

GENERAL NOTES:

EXISTING SERVICES AND UTILITIES SHOWN ON THESE DRAWINGS ARE TAKEN FROM THE BEST AVAILABLE RECORDS, BUT MAY NOT BE COMPLETE OR TO DATE. CONTRACTOR SHALL VERIFY IN FIELD FOR LOCATION AND ELEVATION OF PIPES AND CHECK WITH THE UTILITY COMPANIES BEFORE DIGGING OR PERFORMING WORK.

CONTRACTOR IS ADVISED TO COLLECT INFORMATION ON SOIL CONDITIONS BEFORE START OF CONSTRUCTION.

THE ENGINEER WAIVES ANY AND ALL RESPONSIBILITY AND LIABILITY FOR PROBLEMS WHICH ARISE FROM FAILURE TO FOLLOW THESE PLANS, SPECIFICATIONS AND THE DESIGN INTENT THEY CONVEY, OR FOR PROBLEMS WHICH ARISE FROM OTHERS' FAILURE TO OBTAIN AND/OR FOLLOW THE ENGINEER'S GUIDANCE WITH RESPECT TO ANY ERRORS, OMISSIONS, INCONSISTENCIES AMBIGUITIES OR CONFLICTS WHICH ARE ALLEGED.

CONTRACTOR TO VERIFY ALL DIMENSIONS AND NOTIFY THE ENGINEER OF ANY DISCREPANCIES BEFORE WORK COMMENCES. DO NOT SCALE DRAWINGS.

No.	REVISIONS	BY	DATE
01	ISSUED FOR SPA	G.M.C.	13 DEC 2017

LICENSED PROFESSIONAL ENGINEER — J. C. R. LALONDE — DEC 13/2017 — PROVINCE OF ONTARIO

NOT AUTHENTIC UNLESS SIGNED AND DATED

LRL
ENGINEERING | INGÉNIERIE
5430 Canotek Road I Ottawa, ON, K1J 9G2
www.lrl.ca I (613) 842-3434

CLIENT
GRAEBECK CONSTRUCTION LTD.

DESIGNED BY:	DRAWN BY:	APPROVED BY:
G.M.C.	G.M.C.	J.C.L.

PROJECT
2465070 ONTARIO LTD.
2375 ST-LAURENT BLVD., OTTAWA, ON

DRAWING TITLE
CONSTRUCTION DETAIL PLAN

PROJECT NO.
170721

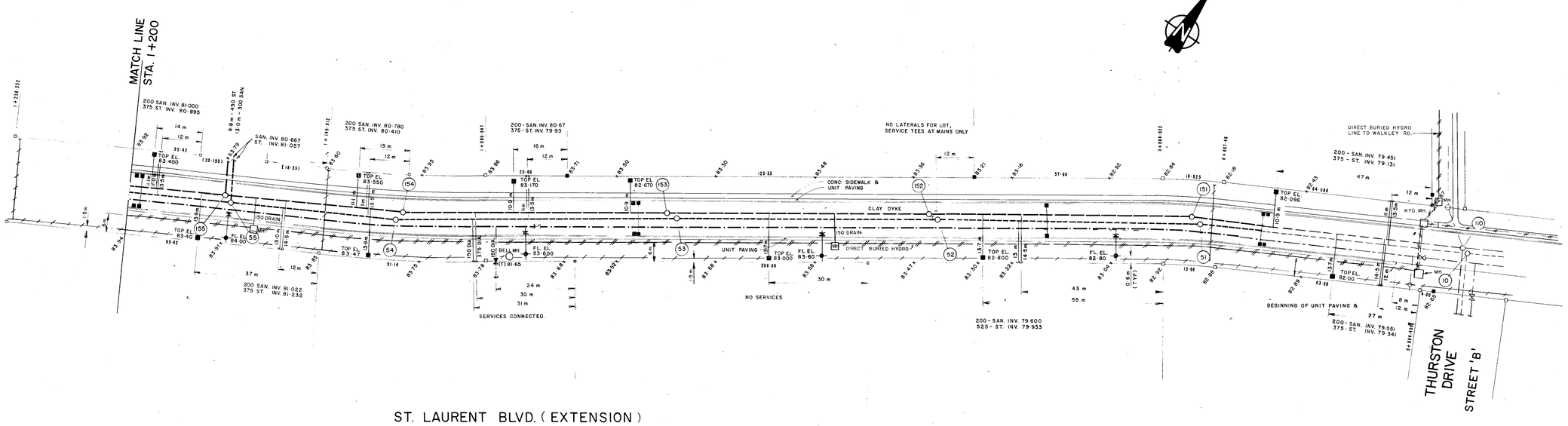
DATE
13 DEC 2017

C902

APPENDIX H

St-Laurent Blvd. As-Built Drawings

2304



ST. LAURENT BLVD. (EXTENSION)

DEC. 1985

J.L.Richards & Associates Limited
Consulting Engineers & Planners
J.L.R. JOB NO. 84 - 8460

Elevations	Existing Surface	Proposed ℄ Road	Top of Water Main	Type & Diameter (sewer)	Inverts Exist. & Prop. (sewer)	℄ Road Stations
	83.98	81.7				1+200
						1+195
	84.08		HYDRANT & VALVE	900 ST.W 1050 ST.S 300 SAN.E	79.480 79.335 79.450	1+175
	84.16	81.91				1+170(M) 1+165 1+155
						1+150
	84.04	81.94				1+135
						1+125
				300 SAN. 1050 ST.	79.272 79.102	1+118.7 1+116.2
	83.91	81.69				1+100
						1+089
			150 SERV.			
			HYDRANT & VALVE			1+080 1+077 1+075
	83.61	81.42	VALVE			1+070
						1+050
	83.47	81.30		1050 ST.W 1200 ST.E 300 SAN.W 300 SAN.E	78.783 78.638 79.030 79.923	1+045 1+035.9 1+032.2
						1+025
	83.57	81.35				1+015
						1+000
	83.71	81.50 HYDRANT & VALVE 81.55				0+990
						0+980
						0+975
	83.41	81.24		1200 ST. 300 SAN.	78.407 78.457	0+955.9 0+953.8
						0+950
	83.16	80.93				0+925
	82.91	80.90 HYDRANT & VALVE				0+900
		80.55				0+881
				1200 ST. 375 SAN. E	78.100 77.858	0+876.2 0+875.3
	82.67	80.24			77.760	0+862.5
						0+850
	82.72					0+825
						0+807.4
						0+804.4
	82.75	HYDRANT & VALVE VALVE				0+800
		80.38 300/600 TEE		600 ST.W 1200 ST.W 1500 ST.E 375 SAN.E 375 SAN.W	78.060 77.750 77.478 77.963 77.950	0+798.9 0+791.4 0+788.4

City Of Ottawa
Department Of Physical Environment
Engineering And Surveys Branch

Notes:
- Utilities shown are taken from best available records. Contractor is requested to check with all utility companies before digging.
- Soil information shown is not guaranteed and contractors are advised to collect additional soils information as deemed necessary.
- Reference bench mark:

Notes: (Sewer Construction Only)
- A minimum of 460 mm vertical clearance to be maintained between sewers and watermains where practical.
- Borehole soil descriptions are not based on sieve analysis but on visual inspection only, except where otherwise noted.
- Soil information taken from:
- Date of television inspection:
- This plan supercedes (in whole or in part) plan no:
- Actual rock line recorded during construction of existing sewer.
- Registered plan no.:
- See additional notes on sheet # 1.
- Proposed storm and sanitary sewers may be constructed in a common trench provided that a minimum horizontal distance of 460mm is maintained between outside barrels of pipe.

Legend:

	EXISTING	PROPOSED
STORM SEWER		
SANITARY SEWER		
STREET LINE		
LOT LINE		
ROADS & DRIVEWAYS		
Curb	TYPE	TYPE
Asphalt or Concrete	TYPE	TYPE
Surface Treated	TYPE	TYPE
WALKS		
Concrete or Asphalt	TYPE	TYPE
Gravel, Cinder or Dirt	TYPE	TYPE
DEPRESSED ACCESS		
On Curb		
On Sidewalk		
WATERMAIN		PROP
GASMAIN & VALVE		PROP
BELL		PROP
HYDRO		PROP
TRAFFIC		PROP
FIRE ALARM		
CABLEVISION	TV	TV PROP
STEAM LINE	S	S PROP
HYDRANT		
WATER VALVE		
STAND PIPE		
WATER VALVE CHAMBER		
SEWER, TRAFFIC, HYDRO & BELL MANHOLES (may be labeled for clarification)		
TRAFFIC HANDHOLE	TH	TH
GUARD RAIL		PROP
RETAINING WALL	RW	RW PROP
FENCE		PROP
HYDRO POLE	HP	HP
HYDRO POLE & LIGHT	HP	HP
BELL POLE	BP	BP
TRAFFIC LIGHT		
LIGHT STANDARD		
TRAFFIC SIGN		
STREET SIGN		
CULVERT & DITCH		PROP
STANDARD CATCH BASIN & LEAD		
HEAVY DUTY CATCH BASIN & LEAD		
CATCH BASIN TO BE REMOVED & REPLACED WITH STANDARD C.B.		
HEAVY DUTY CATCH BASIN TO BE REMOVED & REPLACED WITH HEAVY DUTY CATCH BASIN		
HOUSE or CATCH BASIN CONNECTION TAKEN FROM T.V. INSPECTION		
HOUSE or CATCH BASIN CONNECTION TAKEN FROM RECORDS		
RELOCATION		
REMOVAL		
SQUARE IRON BAR	SIB	
STANDARD IRON BAR	STD	
ROUND IRON BAR	RIB	
TREE, SHRUB & HEDGE		
BOREHOLE	BH	
ROCK		

- IN PLAN SEWERS 600mm Ø ABOVE ARE SHOWN AS DOUBLE LINE, TO SCALE, USING SAME LINE WEIGHT
- UTILITIES X-OUT ARE ABANDONED, BELL PLANT SO MARKED MAY BECOME ACTIVE

Revisions:

No	Date	Description	Drawn By	Appr'd By
1	MARCH 84	SAN. SEWER SIZE	ARM	A.E.F.
2	NOV. 84	RECORD DWG. (SEWER & WM ONLY)	I.T.	R.C.

Designed By A.E.F. FEB. 85 Date | Structural Check By Date
Survey Detail By J.P.St.J. FEB. 85 Date | Checked By I.T. FEB. 85 Date
Drafting By I.T. Date | Checked By A.E.F. FEB. 85 Date

Final Measurements :

Construction Type SAN. & ST. SEWERS, WM & ROAD CONSTRUCTION | Inspector J. MACKIE J.L.R.
Work Commenced MAY 1985 | Instrumentman
Work Completed | Contractor TAGGART CONST. LTD.
Designer | Date
Drafting Revisions I.T. (J.L.R.) | Checked By

Design And Construction Division

C. Sim P. Eng. Commissioner | D.K. Donaldson P. Eng. Branch Director
Chief Design & Const. Engr. | Senior Design & Constr. Eng. | Senior Const. Coord.

ROAD AND SITE SERVICES
OTTAWA BUSINESS PARK - PHASE II
ST. LAURENT BLVD (EXTENSION)
FROM STREET 'B' TO STATION 1+050

Contract No. 89-53 | Survey Books: | Scales: HOR. 1:500 VERT. 1:50 | Plan No. 2304 Sheet 4 of 8

REVISIONS / RÉVISIONS	DATE	BY
TQL04073-TELECOM 011##4 (OCT 2004) HH AND CONDUIT ADDED TO ST LAURENT	AUG 2011	JM
ROG1411283-ROGERS (MAR 2015) CONDUIT ADDED TO ST LAURENT	AUG 2017	JM
HYDRO,BELL,ENBRIDGE,ROGERS, CITY SEWER, WATER, TRAFFIC, SL COMPILED/DIGITIZED FROM UTILITY/CITY DATA	AUG 2017	JM

LEGEND

Poles: Rogers, Bell, Hydro, Hydro One, Traffic, Utility	R, HB, B, H, H1, T, UP
Poles w/ Light Std.: Bell, Hydro, Hydro-Bell, Traffic, Utility	B, H, HB, T, UP
Manholes-City: Sanitary,Storm,Water, Catchbasin, Generic	S, S, W, CB
Manholes-Utility: Bell,Hydro,Traffic,Allstream, Atria, PWGSC, Group Telecom, Rogers, Street Lighting, OC Transpo	B, H, A, T, AT, E7, R, E, E2
Catch Basins: Heavy Duty, Standard, Curb Inlet, CI for CBMH Ditch Inlet, Rear Yard, Wing Wall	
Pedestals: Allstream, Atria, Bell, Hydro, Gas, Group Telecom, Rogers, Telus, Videotron	A, H, B, H, R, T, V
Hand Holes: Allstream, Atria, Group Telecom, Hydro, Hydro One Traffic, Street Lighting, OC Transpo	
Bell: Bell Dip, Guy Wire, Bell Panel, Telephone Booth	BD
Gas: Reducer, Meter, Valve, Regulator	GR
Hydro: Thermocouple, Transformer, Tower	
OC Transpo: Bus Shelter-No Power, Energized, Isolated	BUS, BUS, BUS
Rogers: Power Supply, Panel, Vault, Amplifier	PS, RAP
Street Lighting: Light Standard, Disconnect	SDB
Streetscape: Decorative Light, Planter Box	
Traffic: Connect Box, Disconnect Box, Ground Rod	TCB, TDB
Water : Reducer, Fire Hydrant, Water Valve, Meter, Wall Hydrant	
Pipe, Duct, Conduit, Lateral	
Culvert	
Abandoned	
Capped	
Buried Cable	
Property Line	

CAUTION/ATTENTION

Although utility locations are established using the best available information, they cannot be guaranteed.
Property lines were compiled from plans and documents recorded in the Land Registry System and are for indexing purposes only.

Bien que l'emplacement des services publics soient établis en utilisant la meilleure information disponible, ils ne peuvent pas être garantis.
Des lignes de propriété ont été compilées en utilisant des plans et des documents enregistrés dans le système de cadastre et sont pour l'indexation seulement.

Ottawa

Department of Public Works and Services / Services et Travaux publics
Infrastructure Services Branch / Direction des services d'infrastructure
Infrastructure Management Division / Division de la gestion de l'infrastructure
100 Constellation Cres., 6th Floor East / 6ème Étage Est, Ottawa, ON K2G 6J8

OTTAWA UTILITY COORDINATING COMMITTEE
CENTRAL REGISTRY

COMITÉ DE COORDINATION DES SERVICES PUBLICS D'OTTAWA
ENREGISTREMENT CENTRAL

UTILITY COORDINATING COMMITTEE — UCC — Ottawa — CCSP — COMITÉ DE COORDINATION DES SERVICES PUBLICS

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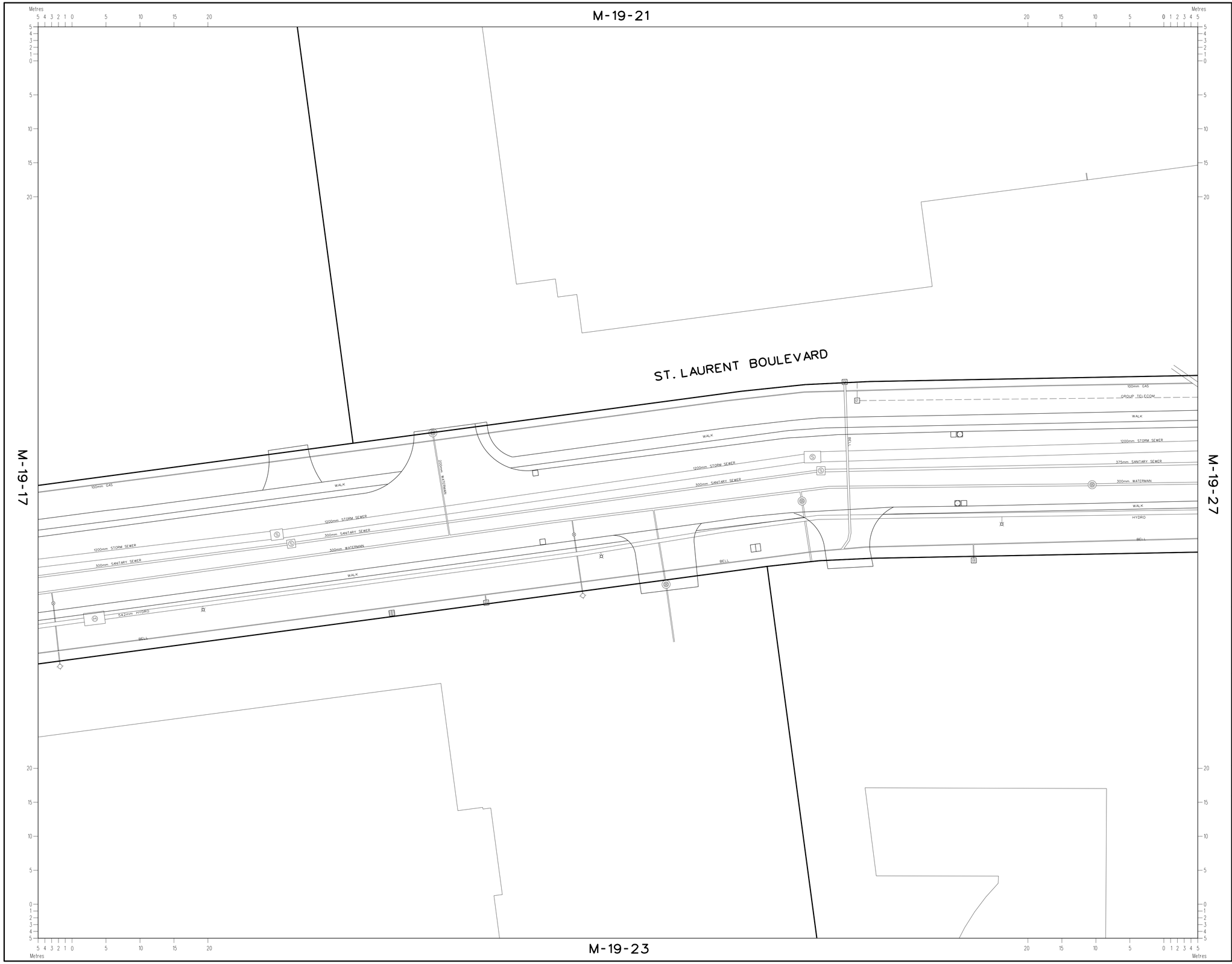
C. COLAIACOVO MANAGER, BUSINESS & TECHNICAL SERVICES	R. ZORGEL COORDINATOR, INFORMATION CENTRE
PRODUCED BY: UCC MAPPING STAFF	SHEET NUMBER
SCALE: 1:250	M-19-17



REVISIONS / RÉVISIONS	DATE	BY
GTL020T002-GROUP TEL (JAN 20021 CONDUIT ADDED TO ST LAURENT	AUG 2011	JM
HYDRO,BELL,ENBRIDGE,ROGERS, CITY SEWER, WATER, TRAFFIC, SL COMPILED/DIGITIZED FROM UTILITY/CITY DATA	AUG 2017	JM

LEGEND

- Poles: Rogers, Bell, Hydro, Hydro One, Traffic, Utility
- Poles w/ Light Std.: Bell, Hydro, Hydro-Bell, Traffic, Utility
- Manholes-City: Sanitary,Storm,Water, Catchbasin, Generic
- Manholes-Utility: Bell,Hydro,Traffic,Allstream, Atria, PWGSC, Group Telecom, Rogers, Street Lighting, OC Transpo
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- Bell: Bell Dip, Guy Wire, Bell Panel, Telephone Booth
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- Hydro: Thermocouple, Transformer, Tower
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- Street Lighting: Light Standard, Disconnect
- Streetscape: Decorative Light, Planter Box
- Traffic: Connect Box, Disconnect Box, Ground Rod
- Water : Reducer, Fire Hydrant, Water Valve, Meter, Wall Hydrant
- Pipe, Duct, Conduit, Lateral
- Culvert
- Abandoned
- Capped
- Buried Cable
- Property Line

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PRODUCED BY: UCC MAPPING STAFF	SHEET NUMBER M-19-22
SCALE: 1:250	

APPENDIX I

Boundary Conditions

Guillaume Courtois

From: Baker, Adam <adam.baker@ottawa.ca>
Sent: December-13-17 9:18 AM
To: Guillaume Courtois
Cc: Oram, Cody
Subject: 2375 St-Laurent - Water Boundary Conditions
Attachments: 2375 St-Laurent Dec 2017.pdf

Follow Up Flag: Follow up
Flag Status: Flagged

Hi Guillaume,

Please find attached the boundary conditions requested for 2375 St-Laurent Blvd:

The following are boundary conditions, HGL, for hydraulic analysis at 2375 St-Laurent (zone 2C) assumed to be connected to the 305mm on St-Laurent (see attached PDF for location).

Minimum HGL = 124.5m

Maximum HGL = 130.6m

Max Day + Fire Flow (150 L/s) = 124.0m

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

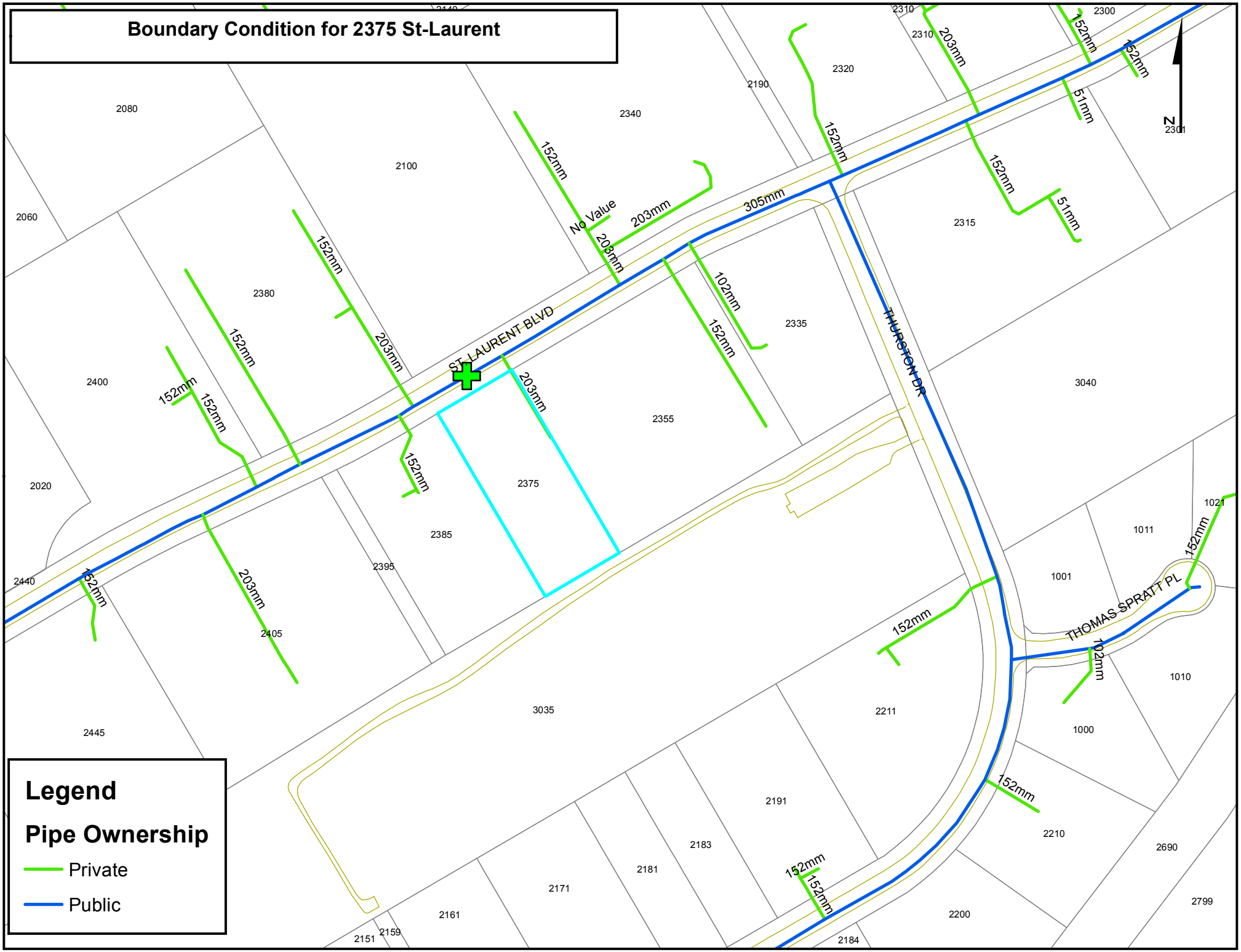
Disclaimer: The boundary condition information is based on current operation of the city water distribution system. The computer model simulation is based on the best information available at the time. The operation of the water distribution system can change on a regular basis, resulting in a variation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

If you have any questions, let me know.

Thanks,

Adam Baker, E.I.T.
Engineering Intern
Planning, Infrastructure and Economic Development Department - Services de la planification, de l'infrastructure et du développement économique
Development Review - South Branch
City of Ottawa | Ville d'Ottawa
110 Laurier Avenue West Ottawa, ON | 110, avenue. Laurier Ouest. Ottawa (Ontario) K1P 1J1
613.580.2424 ext./poste 26552, Adam.Baker@ottawa.ca

'


Boundary Condition for 2375 St-Laurent
ST-LAURENT-BLVD
THURSTON DR
THOMAS SPRATT PL
No Value
305mm
203mm
152mm
102mm
51mm
2375
2355
2335
2315
2340
2320
2310
2300
2301
2100
2080
2060
2380
2400
2020
2440
2445
2405
2395
2385
3035
2211
2191
2183
2181
2171
2161
2159
2151
2184
2200
2210
2690
2799
1001
1011
1021
1010
1000
3040
2190
Legend
Pipe Ownership
Private
Public

APPENDIX J

Overland Ponding Volume Table

Overland Ponding Volume Report

Generated: 2017-12-07 14:40:49
By user: gcourtois
Drawing: W:\FILES 2017\170721\06 CivilDesign\Drawings\LRL Civil Plans\W:\FILES 2017\170721\06 CivilDesign\Drawings\LRL Civil Plans\170721-02.dwg

Volume Summary

Name	Type	Cut Factor	Fill Factor	2d Area (hectares)	Cut (Cu. M.)	Fill (Cu. M.)	Net (Cu. M.)
CBMH1 PONDING VOLUME HWL83.47	full	1.00	1.00	0.02	0.00	15.90	15.90<Fill>
CBMH2 PONDING VOLUME HWL83.47	full	1.00	1.00	0.02	0.00	14.87	14.86<Fill>
CBMH3 PONDING VOLUME HWL83.47	full	1.00	1.00	0.01	0.00	6.83	6.83<Fill>
CBMH4 PONDING VOLUME HWL83.47	full	1.00	1.00	0.02	0.00	11.27	11.27<Fill>
CBMH5 PONDING VOLUME HWL83.47	full	1.00	1.00	0.02	0.00	13.91	13.91<Fill>

Totals

	2d Area (hectares)	Cut (Cu. M.)	Fill (Cu. M.)	Net (Cu. M.)
Total	0.09	0.01	62.78	62.78<Fill>

* Value adjusted by cut or fill factor other than 1.0