ENGINEERING | INGÉNIERIE

Site Servicing & Stormwater Management Report

Benson Auto Parts Development
1871 Merivale Road
Ottawa, Ontario

Prepared for:

Benson Auto Parts
700 Education Road
Cornwall, Ontario
K6H 6B8

Attention: Mr. Marty Benson

Application File No.: D07-12-17-0054
LRL File No.: 130828

August, 25, 2017
Rev.2: June 05, 2018

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APPENDICES

LRL Associates Ltd. (LRL) has been retained by Benson Auto Parts to prepare a site servicing and stormwater management report in support of their site plan control application for a proposed expansion of their existing facility. 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 Fairfall Moffatt & Woodland Ltd dated August 9th, 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.

1 SITE DESCRIPTION

The subject property is located within the urban boundary of the City of Ottawa; Ward 9 Knoxdale-Merivale, in the Merivale Industrial Park Jamie Sector. As illustrated in Figure 1, the proposed expansion of the development will be part of the Benson Auto Parts property, located at 1871 Merivale Road; East of Merivale Road, and north of Jamie Avenue. The total area of the property measures approximately 0.582 ha.

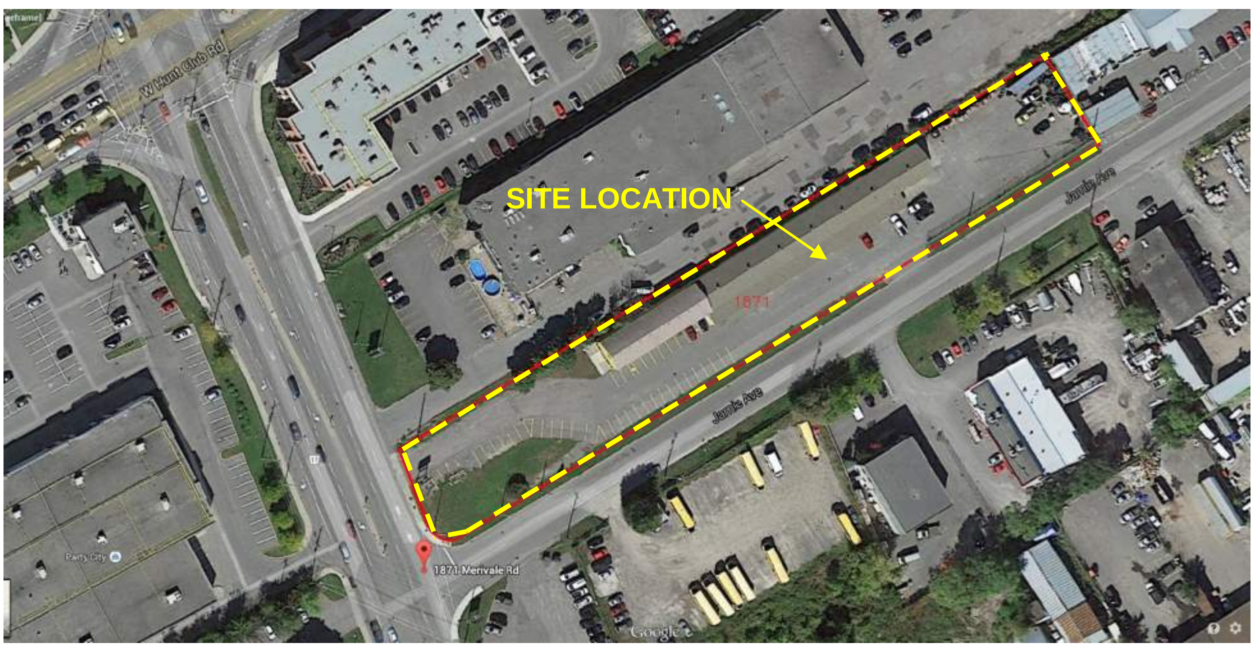

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Figure 1 Aerial view of Benson site at 1871 Merivale Road, Ottawa, ON (via Google Earth, imagery date: September 24, 2014)

The proposed development is located in an industrial area bounded by commercial properties to the north and east of the lot. The site is comprised of an auto parts garage, office and asphalt parking lot.

The proposed expansion of the development will include demolishing a portion ($262m^2$) of the existing $1170m^2$, two-storey, office space. In its place, a two-storey warehouse/garage and office space building (total footprint area of $1185m^2$) will be built.

2 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 flow rates from the development.
- Describe the proposed sanitary sewer system.
- Verify available capacity in the downstream sanitary sewer.
- Verify the capacity of the existing lateral sanitary sewer

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.
- Verify the capacity of the existing lateral storm sewer

3 WATER SUPPLY AND FIRE PROTECTION

3.1 Existing Water Supply Services

The proposed site is currently being serviced by a 50mm water service that is connected to the existing 300mm dia. PVC watermain extending along Jamie Avenue. There is an existing fire hydrant south of the site on Jamie Avenue and two hydrants west of the site on the east side of Merivale Road. The subject site is located in Pressure Zone 2W. Please refer to Appendix H for the Jamie Avenue As-Built Drawings.

3.2 Water Supply Demand

As per the AWWA Standards and the City of Ottawa Design Guidelines, the average water demand for industrial developments was calculated using an average water demand per fixture unit of **3.33L/min** and a daily and hourly peak factor of **1.5** and **1.8**, respectively. The peak water demand was calculated for the 50 fixtures units included in the new and existing building. The average daily water demand for the new and existing building is **2.78L/s**, maximum daily is **4.16L/s**, and maximum hourly is **7.49L/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 **183.3L/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 Jamie Avenue connection. Head losses were then calculated from the street 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 **59.49** and **70.58** psi were calculated; these land within the 50 to 80 psi MOE range. For the maximum hourly demand, a minimum and maximum pressure of **59.43** and **70.52** psi were calculated; these land within the 40 to 80 psi MOE range. For the maximum daily demand + fire flow, a pressure of **25.37** 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	239760 L/day
Units	50
Factors	1.5(max daily) & 1.8(max hourly)
Average Day Demand (L/s)	2.78
Maximum Daily Demand (L/s)	4.16
Peak Hour Demand (L/s)	7.49
FUS Fire Flow Requirement (L/s)	183.3
Max Day+Fire Flow (L/s)	187.46

3.3 Water supply servicing design

The existing 50mm water service at the south-east corner of the existing building will be removed during construction to eliminate the use of two separate water meters within the building.

The proposed building will now be serviced by one new 150mm dia. service. The proposed service will connect to a new fire hydrant (to be located east of the first entrance on Jamie Street) before connecting to the proposed building.

Fire flow protection is to be provided by a proposed sprinkler system, and the proposed fire hydrant. The new hydrant will be located within 45m of the building's siamese connection, as required by the City of Ottawa. The hydrant will be installed on private property.

4 SANITARY DRAINAGE

4.1 Existing Sanitary Sewer Services

The site is currently being serviced by a 100mm dia. ABS service, located at the south-east corner of the existing building. The sewage is currently conveyed from this 100mm dia. Service easterly through a 250mm dia. sanitary sewer on Jamie Avenue, then southerly through a 450mm dia. sanitary sewer on Sunderland Street, easterly to a 675mm dia. sanitary sewer on Bentley Avenue, crossing the train tracks and making its way to the lift station located at 8 Antares Drive in Ottawa. Please refer to Appendix H for the Jamie Avenue As-Built Drawings, as well as the sanitary sewer distribution maps.

4.2 Sanitary Sewer Servicing Design

A monitoring manhole (SAN MH2) is to be installed along the existing 100mm service, located at the south-east corner of the existing building. The segment of pipe from SAN MH2 to Jamie Avenue shall be replaced and upsized with a 200mm PVC pipe.

The new building will be serviced with a new 200mm dia. sanitary service, which will connect to the existing 250mm dia. sanitary sewer on Jamie Avenue. A new monitoring manhole (SAN MH1) is to be installed along the proposed 200mm service; near the property line. The new proposed 200mm 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: Commercial average flow demand of 50,000 L/ha/day, a commercial peaking factor of 1.5 and an infiltration rate of 0.28 L/s/ha. Based on these parameters and the total site area of 0.582 ha, the total allowable sanitary flow was estimated to be **0.90 L/s**. Refer to Appendix B for the site sanitary sewer design sheet.

As per Appendix 4-A of the City of Ottawa Sewer Design Guidelines, the site's anticipated sanitary flow is **10,400 L/day (0.12 L/s)**. 30 cars per day are anticipated to be serviced, and from those 30 cars, 75% (23 cars) are anticipated to be washed. Under the "Service Stations" item: 30 cars x 40 L/day = 1200 L/day, under the "(Car) Wash" item: 23 cars x 400 L/day = 9200 L/day; for a total of 10,400 L/day (0.12 L/s). To be on the conservative side, we have assumed all vehicles to be trucks.

5 STORMWATER MANAGEMENT

5.1 Existing Stormwater Infrastructure

The information below should be read in conjunction with LRL drawing C701.

The existing site has three storm service connections. Drainage from existing CA-03 is captured by existing CB1 and is conveyed to the Jamie Street 675mm dia. storm sewer. The south half of the existing rooftops, the asphalt drive aisle and parking lot within existing CA-04 and existing CA-05 are captured by existing CB2 and CB3, respectively. Existing 200mm PVC storm pipes convey the captured drainage through these CBs and to the 450mm dia. storm sewer along Jamie Avenue. Surface runoff from existing CA-01 is captured by CB-4, which is connected to an existing manhole located on the neighboring property. Finally, existing CA-02 includes drainage from the north side of the existing rooftops and some grassed area along the property boundary. Existing CA-02 is captured by a landscaping catchbasin believed to be connected to the existing manhole located on the neighboring property.

Please also refer to Appendix H for the Jamie Avenue As-Built Drawings.

5.2 Stormwater management Concept

The information below should be read in conjunction with LRL drawings C401, C701, C702 and 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 and post development catchments are divided in three systems; as the property currently has three outlets.

System #1:

Existing CA-01 and CA-02 currently outlet to an existing manhole located on the neighboring side of the property line; in a small shared grass ditch. In post-development conditions CA-06, a much smaller runoff area, will outlet to this existing manhole (0.017ha post; opposed to 0.233ha pre).

System #2:

The area of existing CA-03 will remain mostly untouched. No regrading or paving will be done in this location. Existing CA-03 and proposed CA-01 & CA-05 both use the same outlet.

As per City request, the area of CA-05 shall not be controlled due to the potential for contamination; also, surcharging of the perforated pipe may cause disturbance of the storage media.

A proposed 103mm ICD orifice plate is to be installed in existing CB1. This will ensure that the combined post release rate of proposed CA-01(29.52L/s controlled) & CA-05(5.47L/s uncontrolled) match the total existing release rate of **34.99L/s**.

System #3:

In pre-development conditions System #3 is comprised of existing CA-04 and CA-5. In post-development conditions it is comprised of proposed CA-02, CA-03 and CA-04.

The pre-development 5yr allowable release rate has been calculated using the pre-conditions System #3 (existing CA-04 and CA-05) only. The allowable release rate was calculated to be **29.98L/s**.

LRL's analysis determined that the existing 200mm dia. storm sewer does not provide sufficient capacity; even for the minor 5 year storm event. Therefore, LRL proposes to upgrade the on-site storm network to 300mm dia. storm pipes.

The post-development conditions (100 year storm event) were designed using a restricted release flow of **14.99L/s** using a Hydrovex Vertical Vortex Flow Regulator model 125VHV-2 to be installed in proposed CBMH1.

The 100year storm runoff from proposed catchment areas CA-02 to CA-04 will be controlled at proposed CBMH1. Runoff above the 100year will back out of proposed CB1, CB2 and CBMH1 and pond around each drainage structure until it flows overland, making its way to Jamie Avenue through the spill out point located at the property line; just south of proposed CBMH1.

As underground storage and surface storage is included in the design, an average release rate of 14.99 L/s was assumed to determine the site's storage requirements; this is equal to 50% of the peak allowable rate. The 100yr storage required for this site is **167.00m3**. The 100yr storage provided is **179.05m3**. This is a combination of the StormTech chambers storage of 173.40m3 (refer to Appendix E for StormTech System Design Sheets) and the underground pipes and drainage structures storage of 5.65m3. This storage capacity will be possible using a Hydrovex Vertical Vortex Flow Regulator model 125VHV-2 to be installed in proposed CBMH1 at an allowable release rate of **14.99L/s**. Refer to Appendix D for Hydrovex Vertical Vortex Flow Regulator Report.

Please refer to table below for a summary of the post-development release rates:

Release Rate Summary Table				
Outlet	**Uncontrolled Release**	**Controlled Release**	**Total Release**	**ICD**
Storm System / Site Outlet #2	5.47 L/s	29.52 L/s	34.99 L/s	103mm dia. ICD Orifice Plate
Storm System / Site Outlet #3	N/A	14.99 L/s	14.99 L/s	125VHV-2

5.3 Design Criteria

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

5.3.1 Water Quality

We have proposed two Stormceptor STC 300 oil/grit separators (one for each storm connection) which provide water quality treatment; where the enhanced 80% TSS removals requirement is met. Please refer to Appendix F – Stormceptor Reports. An isolator row has been incorporated into the StormTech system as well providing additional on-site quality treatment.

5.3.2 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 Jamie Avenue right of way. The minor system (storm sewer) within the site is sized to convey the 5 year storm event flows from the site to the municipal storm sewer on Jamie Avenue.

5.4 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.

5.5 Allowable Release Rate

The 5-year pre-development maximum allowable release rate was calculated from the rational method. Runoff from post-development conditions must be controlled to the pre-development runoff coefficient or a maximum of C=0.5, for both minor and major storms (5 year up to 100 year storms), using a time of concentration not less than 10 minutes. The areas used for the outlets 2 and 3 are 0.142ha and 0.207ha respectively.

6 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.

7 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 7.49L/s.
- The maximum required fire flow was calculated at 183.3 L/s using the FUS method.
- There is an existing fire hydrant located south of the building on Jamie Street within the 90m radius. There are also two (2) hydrants located on the east side of Merivale Road that are within 90m radius
- The new hydrant will be located within the 45m radius distance between the fire hydrant and the building Siamese connection.
- The new development/expansion will be serviced with a new 150mm dia. watermain connected to the new 150mm dia. watermain hydrant lead on Jamie Avenue.

Sanitary Service

- The sanitary design flow from the proposed development is 2.58 L/s.
- The proposed building will be serviced by a new 200mm sanitary service connection to the existing 250mm dia. sanitary sewer on Jamie Avenue.
- A new monitoring manhole will be installed on the existing 100mm sanitary service that is connected to the existing 250mm dia. sanitary sewer on Jamie Avenue.

Stormwater Management

- In regards to Storm System / Outlet #1, in post-development conditions, a much smaller runoff area will outlet to the existing manhole in the shared ditch (0.017ha post; opposed to 0.233ha pre).
- The Storm System / Outlet #2 post-development release rates of 5.47 L/s (uncontrolled) and 29.52 L/s (controlled) will meet the existing pre-development release rate of 34.99 L/s onto Jamie Avenue.
- The Storm System / Outlet #3 post-development release rate of 14.99 L/s (controlled) will lower than the pre-development maximum allowable release rate of 29.98 L/s onto Jamie Avenue.
- 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 two Stormceptor STC 300 oil/grit separators (one for each storm connection).

8 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 your current requirements. Please do not hesitate to contact us should you have any questions or concerns.

Prepared by:

LRL Associates Ltd.

Guillaume Courtois, C.E.T., rcji
Civil Engineering Technologist

Jean-Claude Lalonde, P.Eng
Senior Project Engineer

APPENDIX A

Water Demand and Fire Flow Calculations

Water Supply Calculations

LRL File No.	130828
Project	Proposed Benson Commercial Development
Date	October 26, 2017
Designed:	Guillaume Courtois
Checked:	M.Gagnon

Domestic Commercial Flow Demand

Total Building Floor Area =	**3285**	m^2			(Includes existing and proposed building)
Site Total Area =	**0.58**	ha			
Total Fixture Unit =	50	ea.			(As per OBC)
Average Demand Per Fixture Unit =	3.33	L/min			
Average Commercial Water Demand =	**166.50**	L/min	2.78	L/s	(42gpm as per AWWA #M22)
Maximum Daily Peak Factor =	1.5				(As per City of Ottawa)
Maximum Daily Commercial =	**249.75**	L/d	4.16	L/s	
Maximum Hourly Peak Factor =	1.8				(As per City of Ottawa)
Maximum Hourly Commercial =	**449.55**	L/d	7.49	L/s	

Therefore,

Total Domestic Flow =	**7.49**	**L/s**
Total Fire Flow =	**183.3**	**L/s**

LICENSED PROFESSIONAL ENGINEER
M. GAGNON
26/10/17
PROVINCE OF ONTARIO

Fire Flow Calculations

LRL File No.	130828
Project	Proposed Benson Commercial Development
Date	October 26, 2017
Method	Fire Underwriters Survey (FUS)
Designed by	Guillaume Courtois

New Building	3285	
	3,285	m^2

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	Ordinary Construction	1		
			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	units	
			Townhouse - no. of units	0				
			Building - no. of units per floor	1				
	Enter no. of storeys	Number of floors/storeys for the building (excluding the basement)				2	floors	
3	Enter area of a unit	Enter floor space area of one unit		1	3285.0	1,643	sq.m.	
4	Obtain fire flow before reductions	Required fire flow	**Fire Flow = 220 x C x Area^0.5**				L/min	**13,000**
							L/s	216.7
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	**13,000**
			Rapid burning	0.25			L/s	216.7
6	Choose reduction for sprinklers	Sprinkler reduction	Sprinklers (NFPA13)	-0.30	True	-0.3		
			Water supply is standard for both the system and fire department hose lines	-0.10	False	0	L/min	**9,100**
			Fully supervised system	-0.10	False	0	L/s	151.7
7	Choose separation	Exposure distance between units	North side	10.1 to 20m	0.15			
			East side	Over 45m	0			
			South side	Over 45m	0		L/min	**11,000**
			West side	Over 45m	0	0.15	L/s	183.3
Net required fire flow								
8	Obtain fire flow, duration, and volume	Minimum required fire flow rate (rounded to nearest 1000)					L/min	**11,000**
		Minimum required fire flow rate					L/s	**183.3**
		Required duration of fire flow					hr	**2.25**

Pipe Pressure Losses Calculations

LRL File No.	130828
Project	Proposed Benson Commercial Development
Date	October 26, 2017
Designed:	Guillaume Courtois
Checked:	M.Gagnon

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) =	**84.73**

Water Pressure at Jamie Avenue Connection			
HGL (m)		Pressure	
		kPa	psi
Minimum =	**126.7**	411.73	59.72
Maximum =	**134.5**	488.24	70.81
Max. Day + Fire =	**127.4**	418.59	60.71

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)	**4.16**	
C	**100**	
L (m.)	**29.3**	
I.D. (mm)	**155**	
V (m/s)	0.22	
h_f (m)	0.02	
Head Loss (psi)	0.03	
Min. Pressure (psi)	59.69	
Max. Pressure (psi)	70.78	
Service Obv. @ Street Connection (m)	**84.88**	
Service Obv. @ Building Connection (m)	**85.02**	
Pressure Adjustment (psi)	-0.20	(due to service elevation difference from street to building)
Adjusted Min. Pressure (psi)	59.49	(must not be less than 50psi)
Adjusted Max. Pressure (psi)	70.58	(must not be more than 80psi)

Scenario 2: maximum hourly demand

Q (L/s)	**7.49**	
C	**100**	
L (m.)	**29.3**	
I.D. (mm)	**155**	
V (m/s)	0.40	
h_f (m)	0.06	
Head Loss (psi)	0.09	
Min. Pressure (psi)	59.62	
Max. Pressure (psi)	70.72	
Service Obv. @ Street Connection (m)	**84.88**	
Service Obv. @ Building Connection (m)	**85.02**	
Pressure Adjustment (psi)	-0.20	(due to service elevation difference from street to building)
Adjusted Min. Pressure (psi)	59.43	(must not be less than 40psi)
Adjusted Max. Pressure (psi)	70.52	(must not be more than 80psi)

Scenario 3: maximum daily demand + fire flow

Q (L/s)	**187.46**	
C	**100**	
L (m.)	**29.3**	
I.D. (mm)	**155**	
V (m/s)	9.93	
h_f (m)	24.72	
Head Loss (psi)	35.15	
Pressure (psi)	25.56	
Service Obv. @ Street Connection (m)	**84.88**	
Service Obv. @ Building Connection (m)	**85.02**	
Pressure Adjustment (psi)	-0.20	(due to service elevation difference from street to building)
Adjusted Pressure (psi)	25.37	(must not be less than 20psi)

APPENDIX B

Sanitary Sewer Calculation Sheet

LRL File No.	130828
Project:	Proposed Benson Commercial Development
Location:	1871 Merivale Road, Nepean, ON
Date:	October 26, 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
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 FLOW (l/s)	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)		LENGTH (m)	DIA. (mm)	SLOPE (%)	MATERAIL	CAP. (FULL) (l/s)	VEL. (FULL) (m/s)	Ratio (Q/Q_{FULL})	UP INVERT (m)	DOWN INVERT (m)
SA-01	PROP. BLDG	MH01	0.000	0.0	0.0	0.0	4.0	0.00	0.270	0.270	0.00	0.00	0.0	0.0	0.0	0.23	0.27	0.27	0.08	0.31	14.7	200	1.00%	PVC	32.80	1.04	0.01	85.08	84.93
	MH01	TRUNK	0.000	0.0	0.0	0.0	4.0	0.00	0.000	0.270	0.00	0.00	0.0	0.0	0.0	0.23	0.00	0.27	0.08	0.31	7.5	200	1.00%	PVC	32.80	1.04	0.01	84.93	84.85
SA-02	EX. BLDG	MH02	0.000	0.0	0.0	0.0	4.0	0.00	0.310	0.310	0.00	0.00	0.0	0.0	0.0	0.27	0.31	0.31	0.09	0.36	15.6	100	1.00%	ABS	5.17	0.66	0.07	84.69	84.53
	MH02	TRUNK	0.000	0.0	0.0	0.0	4.0	0.00	0.000	0.580	0.00	0.00	0.0	0.0	0.0	0.50	0.00	0.31	0.09	0.59	7.1	200	1.00%	PVC	32.80	1.04	0.02	84.53	84.41
																				0.90									

NOTES				
Existing inverts and slopes are estimated. They are to be confirmed on-site.	Designed: G.C.	PROJECT: Proposed Benson Commercial Development		
	Checked: M.G.	LOCATION: 1817 Merivale Road, Ottawa		
	Dwg. Reference: C.401	File Ref.: 130828	Date: October 26, 2017	Sheet No. 1 of 1

APPENDIX C

Stormwater Management Design Sheets

LRL Associates Ltd.
Storm Design Sheet

LRL File No.	130828
Project:	Benson Commercial Development
Location:	1871 Merivale Rd., Nepean, ON
Date:	26 Oct 2017
Designed:	Guillaume Courtois
Checked:	Michel Gagnon
Drawing Reference:	C.702

Storm System / Site Outlet #2

Pre-development Catchments					
CATCHMENT	Grass C=0.20	River Stones C=0.70	Bldg. / Asph. / Conc. C=0.90	Total Area (ha)	Combined C
CA-03	0.010	0.000	0.132	0.142	0.85

Post-development Catchments					
CATCHMENT	Grass C=0.20	River Stones C=0.7	Bldg. / Asph. / Conc. C=0.90	Total Area (ha)	Combined C
CA-01	0.011	0.000	0.129	0.140	0.85
CA-05	0.000	0.027	0.000	0.027	0.70

LICENSED PROFESSIONAL ENGINEER
M. GAGNON
26/10/17
PROVINCE OF ONTARIO

LRL Associates Ltd.
Storm Design Sheet

LRL File No.	130828		
Project:	Benson Commercial Development		
Location:	1871 Merivale Rd., Nepean, ON		
Date:	26 Oct 2017		
Designed:	Guillaume Courtois		
Checked:	Michel Gagnon		
Drawing Reference:	C701 & C702		

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	0.7
Bldg. / Asph. / Conc.	0.9

IDF Curve: Ottawa Macdonald-Cartier International Airport
Storm Event: 5 years
Formula: $I = a / (T_c + b)^c$
a = 998.071 b = 6.053 c = 0.814

Pipe Design Parameters

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

Pre and Post-Conditions at Storm System / Site Outlet #2

LOCATION			AREA (ha)			FLOW						STORM SEWER									MANHOLE							WATERSHED		FLOW CONTROL		
CATCHMENT / STREET	From Structure	To Structure	Grass C=0.20	River Stones C=0.70	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)	Controlled Peak 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	Controlled / Uncontrolled	Controlled Flow (Max.)	ICD
PRE-DEVELOPMENT																																
CA-03	EX. CB	Trunk	0.010	0.000	0.132	0.34	0.34	10.00	104.19	34.99	N/A	250	PVC	0.44%	24.0	39.45	4.46	0.80	0.50	0.89	85.59	85.49	87.00	87.60	1.16	1.86	1.41	0.142	0.85	Uncontrolled		
POST-DEVELOPMENT																																
CA-05 (uncontrolled)	CB3	EX. CB	0.000	0.027	0.000	0.05	0.05	10.00	104.19	5.47	N/A	250	HDPE	6.00%	9.3	145.67	140.19	2.97	0.05	0.04	86.14	85.58	87.12	87.30	0.73	1.47	0.98	0.027	0.70	Uncontrolled		
CA-01 (controlled)	EX. CB	MH2	0.011	0.000	0.129	0.33	0.38	10.05	103.92	39.64	29.52	250	PVC	0.44%	20.3	39.67	0.03	0.80	0.42	1.00	85.59	85.50	87.30	87.72	1.46	1.97	1.71	0.140	0.85	Controlled	29.52 L/s	Orifice Plate
	MH2	Trunk	0.000	0.000	0.000	0.00	0.38	10.48	101.75	38.81	29.52	250	PVC	0.44%	3.4	39.45	0.64	0.80	0.07	0.98	85.50	85.49	87.72	87.60	1.97	1.86	2.22	0.000	0.00	Controlled	29.52 L/s	

__Note:__ Post-Development Controlled Peak Flow of **29.52 L/s** is the result of the Pre-Development Peak Flow of 34.99 L/s minus the Post-Development Uncontrolled Peak Flow of 5.47 L/s.

Inlet Control Device Parameters

Product :	**Orifice Plate (on outlet of EX. CB)**	
HWL =	87.44	m (highest HWL)
Grate Level =	87.30	m
Invert Level =	85.59	m
Outlet Pipe Dia. =	250	mm
Max. Flow =	***29.52***	L/s
Max. Ponding Depth =	0.14	m (at this structure)
ICD Centerline =	85.72	
HWL Head =	1.72	m (from centerline)
C=	0.61	
Orifice Area =	0.008	m2
Orifice Diameter =	**103**	mm (min. 75mm)

LRL Associates Ltd.
Storm Design Sheet

LRL File No.	130828
Project:	Benson Commercial Development
Location:	1871 Merivale Rd., Nepean, ON
Date:	05 Jun 2018
Designed:	Guillaume Courtois
Drawing Reference:	C701 & C702

Storm System / Site Outlet #3

Post-development Catchments					
CATCHMENT	Grass / Permeable Pavers C=0.20	River Stones C=0.70	Bldg. / Asph. / Conc. C=0.90	Total Area (ha)	Combined C
CA-02	0.005	0.000	0.132	0.137	0.87
CA-03	0.003	0.000	0.120	0.123	0.88
CA-04	0.012	0.000	0.123	0.135	0.84

LRL File No.	130828
Project:	Benson Commercial Development
Location:	1871 Merivale Rd., Nepean, ON
Date:	05 Jun 2018
Designed:	Guillaume Courtois
Drawing Ref.:	C701 & C702

Stormwater Management Design Sheet

Storm System / Site Outlet #3

Allowable Release Rate (5 Year Pre-development)

Intensity:

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

where: I = intensity in mm/hr

Tc = Time of Concentration (20min)

$I_5 = 104.2$

Allowable Release:

C =	0.5	pre condition	as per City of Ottawa Guidelines
I =	104.2	mm/hr	
Tc =	10	min	
Total Site Area =	0.207	ha	
Q =	**29.98**	**L/s**	2.78 x C x I x A

Catchment Area and Runoff Coeffecient (Post-development)

	Individual Watersheds	Total Area (ha)	Grass / Permeable Pavers Area (ha)	River Stones Area (ha)	Bldg. / Asph. / Conc. Area (ha)	∑C * A	C weighted (1:5 yr)	C weighted (1:100 yr)
Controlled	CA-2	0.137	0.005	0.000	0.132	0.120	0.87	1.00
Controlled	CA-3	0.123	0.003	0.000	0.120	0.109	0.88	1.00
Controlled	CA-4	0.135	0.012	0.000	0.123	0.113	0.84	1.00

					1:5 YEAR	1:100 YEAR
	Total Site Area =	**0.395**	ha	**∑C=**	**0.86**	**1.00**
Controlled	Bldg. / Asph. / Conc. Area =	0.375	ha	C=	0.90	**1.00**
Controlled	River Stones Area =	0.000	ha	C=	0.70	**0.88**
Controlled	Grass Area =	0.020	ha	C=	0.20	**0.25**
Controlled	**Total Controlled =**	**0.395**	ha	**∑C=**	**0.86**	**1.00**

LICENSED PROFESSIONAL ENGINEER

J. C. R. LALONDE

JUNE 5/2018

PROVINCE OF ONTARIO

LRL File No.	130828
Project:	Benson Commercial Development
Location:	1871 Merivale Rd., Nepean, ON
Date:	05 Jun 2018
Designed:	Guillaume Courtois
Drawing Ref.:	C701 & C702

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	98.92	14.99	83.93	50.36
15	83.6	79.33	14.99	64.34	57.90
20	70.3	66.69	14.99	51.70	62.05
25	60.9	57.81	14.99	42.82	64.23
30	53.9	51.20	14.99	36.21	65.17
35	48.5	46.06	14.99	31.07	65.25
40	44.2	41.95	14.99	26.96	64.70
45	40.6	38.57	14.99	23.58	63.67
50	37.7	35.75	14.99	20.76	62.27
55	35.1	33.35	14.99	18.36	60.57
60	32.9	31.28	14.99	16.29	58.63

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	196.08	14.99	181.09	108.65
20	120.0	131.72	14.99	116.73	140.07
30	91.9	100.88	14.99	85.89	154.60
40	75.1	82.52	14.99	67.53	162.06
50	64.0	70.23	14.99	55.24	165.71
60	55.9	61.38	14.99	46.39	167.00
70	49.8	54.67	14.99	39.68	166.67
80	45.0	49.40	14.99	34.41	165.19
90	41.1	45.14	14.99	30.15	162.83
100	37.9	41.62	14.99	26.63	159.79
110	35.2	38.66	14.99	23.67	156.19

LICENSED PROFESSIONAL ENGINEER
J. C. R. LALONDE
JUNE 5/2018
PROVINCE OF ONTARIO

LRL File No. 130828
Project: Benson Commercial Development
Location: 1871 Merivale Rd., Nepean, ON
Date: 05 Jun 2018
Designed: Guillaume Courtois
Drawing Ref.: C701 & C702

Stormwater Management Design Sheet

Onsite Stormwater Retention

Total Storage Required =	**167.00**	**m^3**
Overland Ponding =	0.00	m^3
Pipe Storage =	4.42	m^3
CB/MH Storage =	1.23	m^3
Stormtech Chambers =	173.40	m^3
Total Available Storage =	**179.05**	**m^3**
Supplementary Storage Required =	0.00	m^3

refer to LRL Plan C.904

LRL Associates Ltd.
Storm Design Sheet

LRL File No.	130828	
Project:	Benson Commercial Development	
Location:	1871 Merivale Rd., Nepean, ON	
Date:	05 Jun 2018	
Designed:	Guillaume Courtois	
Drawing Reference:	C701 & C702	

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 / Permeable Pavers	0.2
River Stones	0.7
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
Manning's Coeff. "n" = 0.013

Post-Conditions at Storm System / Site Outlet #3

LOCATION			AREA (ha)			FLOW						STORM SEWER								
CATCHMENT / STREET	From Structure	To Structure	Grass / Permeable Pavers C=0.20	River Stones C=0.70	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)	Controlled Peak 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})
CA-02	PR. CB1	PR. CBMH1	0.005	0.000	0.132	0.33	0.33	10.00	104.19	34.70	N/A	SC-740								
CA-04	PR. CB2	PR. CBMH1	0.012	0.000	0.123	0.31	0.31	10.00	104.19	32.76	N/A	300	PVC	0.34%	62.5	56.39	23.63	0.80	1.31	0.58
CA-03	PR. CBMH1	STC300 Stormceptor-01	0.003	0.000	0.120	0.30	0.95	11.31	97.77	92.82	14.99	375	PVC	0.31%	4.2	97.62	4.80	0.88	0.08	0.95
	STC300 Stormceptor-01	PR. MH1					0.95	11.39	97.41	92.47	14.99	375	PVC	0.31%	4.2	97.62	5.15	0.88	0.08	0.95

LOCATION			MANHOLE							WATERSHED		AVAILABLE STORAGE				FLOW CONTROL		
CATCHMENT / STREET	From Structure	To Structure	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)	Controlled / Uncontrolled	Controlled Flow (Max.)	ICD
CA-02	PR. CB1	PR. CBMH1	85.85	85.84	87.08	87.06			1.23	0.137	0.87		0.60	0.71	0.26	Uncontrolled		
CA-04	PR. CB2	PR. CBMH1	86.12	85.91	86.99	87.06	0.57	0.85	0.87	0.135	0.84	4.42	0.60	0.44	0.16	Uncontrolled		
CA-03	PR. CBMH1	STC300 Stormceptor-01	85.84	85.83	87.06	87.24	0.84	1.04	1.22	0.123	0.88		1.20	0.72	0.81	Controlled	29.98 L/s	150VHV-2
	STC300 Stormceptor-01	PR. MH1	85.76	85.75	87.24	87.27	1.10	1.15	1.48				1.20	0.80		Controlled	29.98 L/s	
												4.42			**1.23**			

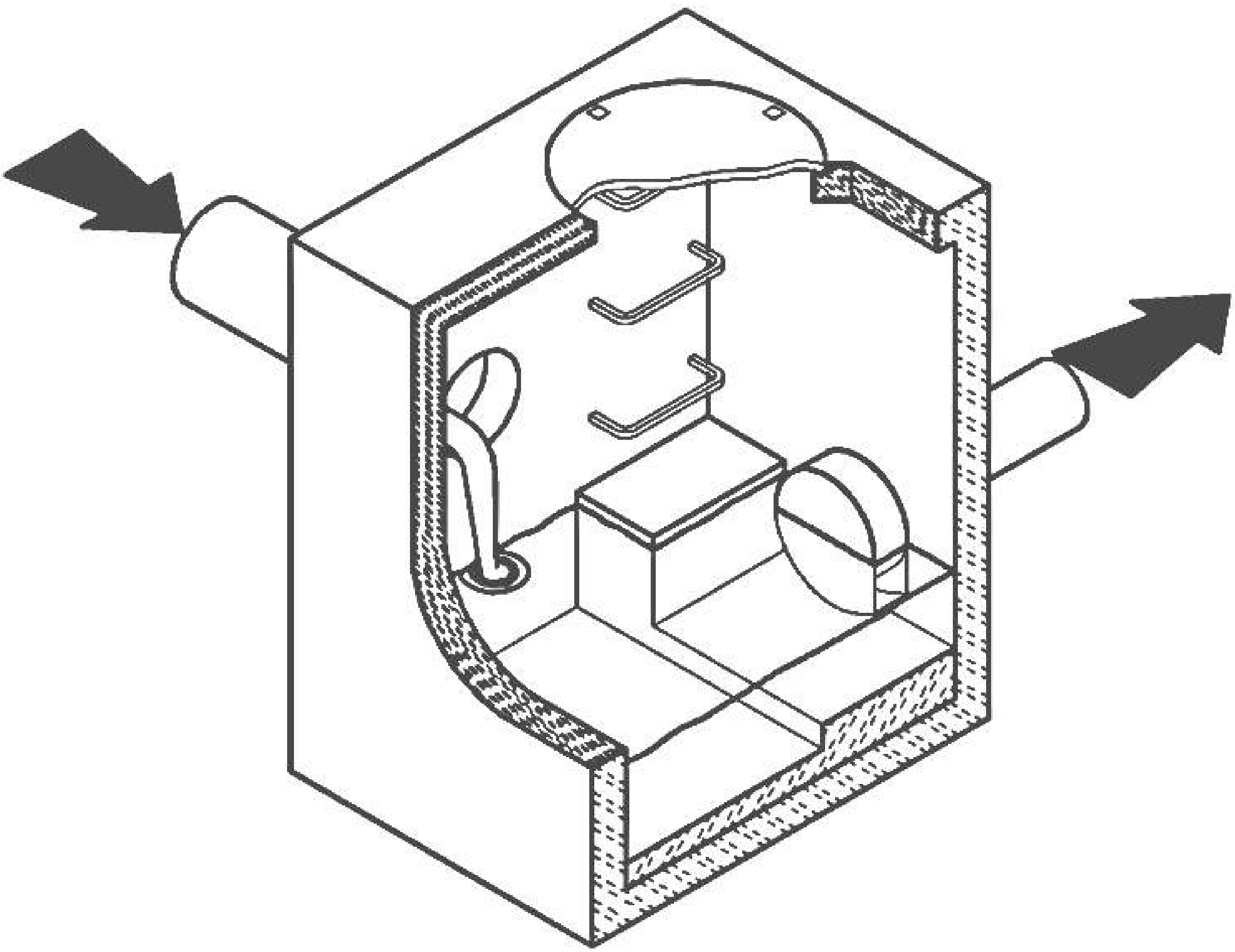
Note: Flow restrictor has been incorporated.

100yr HWL	86.56
Total Storage	5.65

APPENDIX D

Hydrovex Vertical Vortex Flow Regulator Report

® HYDROVEX® VHV / SVHV
Vertical Vortex Flow Regulator



JOHN MEUNIER

APPLICATIONS

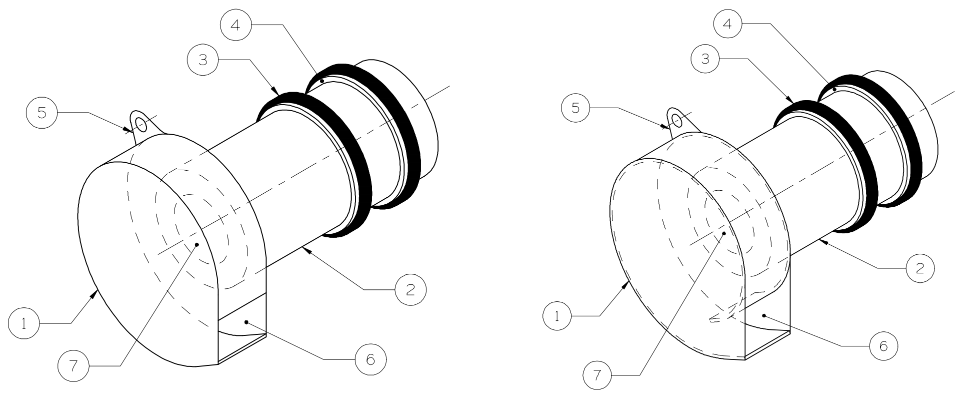
One of the major problems of urban wet weather flow management is the runoff generated after a heavy rainfall. During a storm, uncontrolled flows may overload the drainage system and cause flooding. Due to increased velocities, sewer pipe wear is increased dramatically and results in network deterioration. 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.

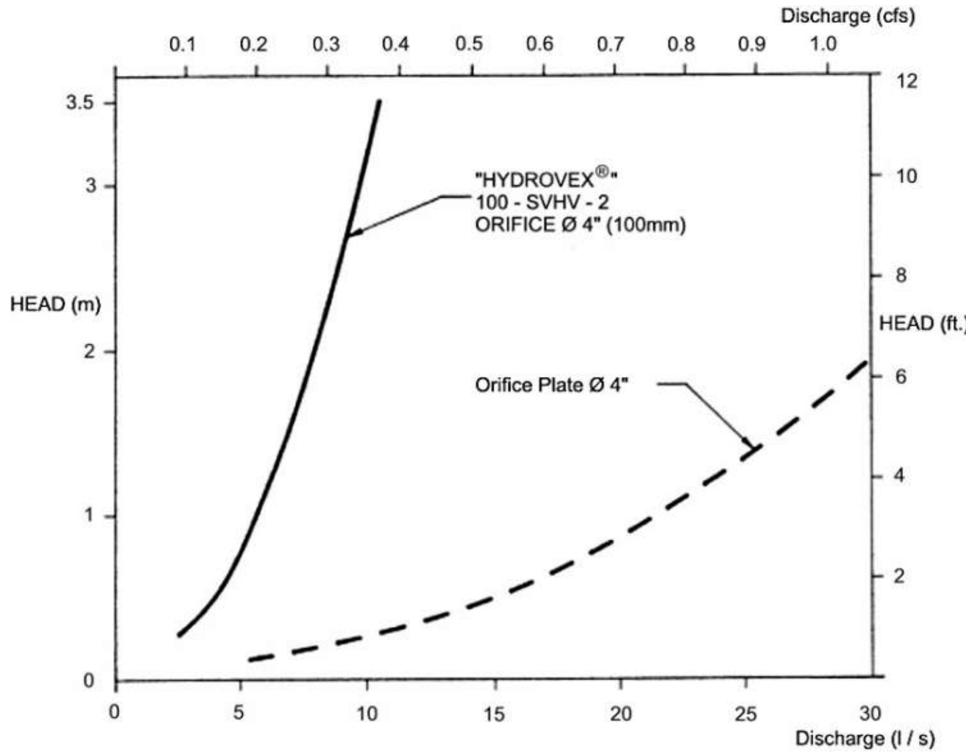


FIGURE 2: DISCHARGE CURVE SHOWING A HYDROVEX® FLOW REGULATOR VS AN ORIFICE PLATE

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:

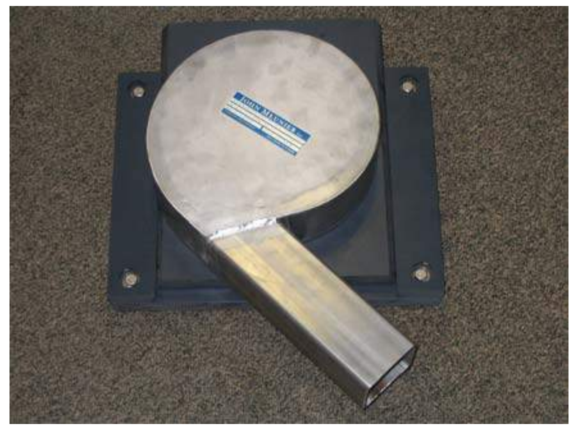
- ***project design flow rate***
- ***pressure head***
- ***chamber's outlet pipe diameter and type***

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

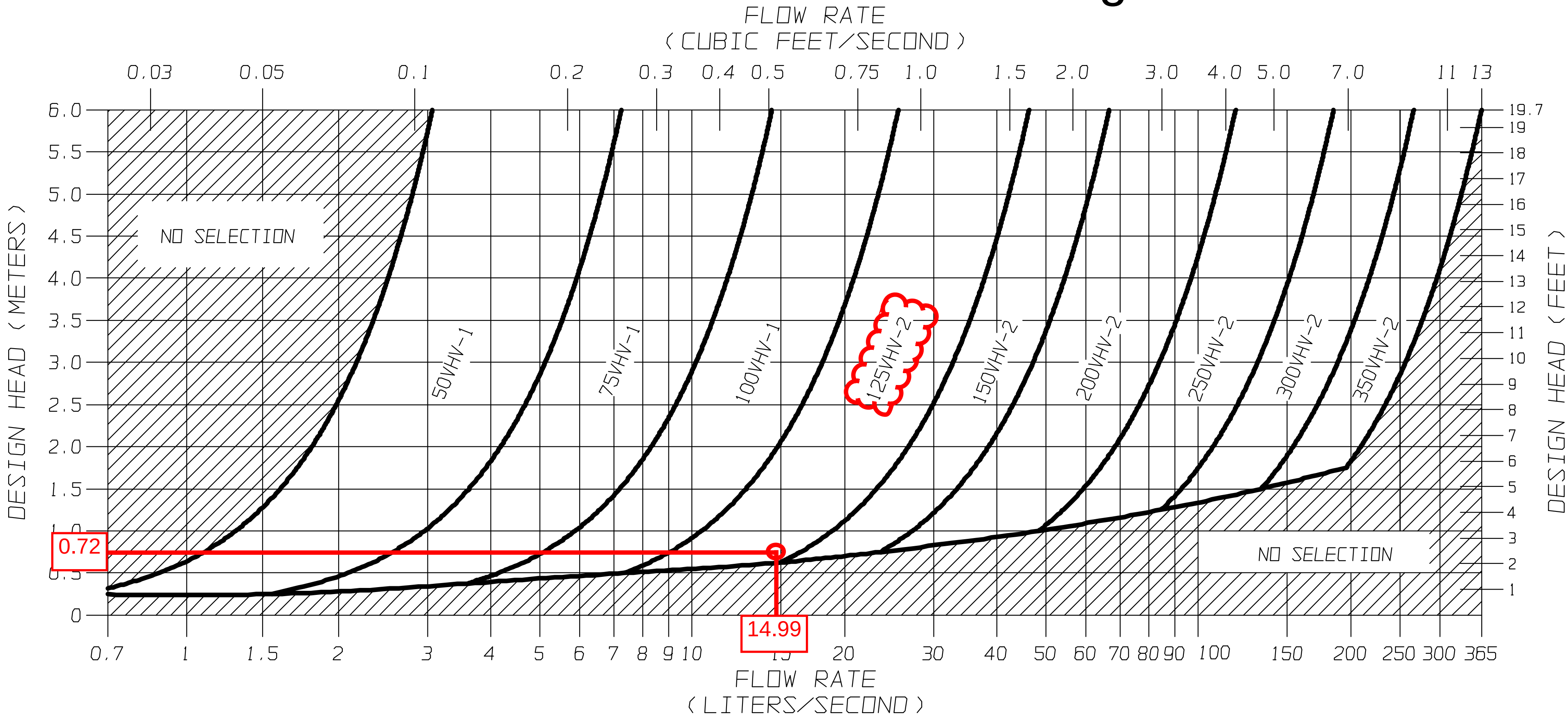
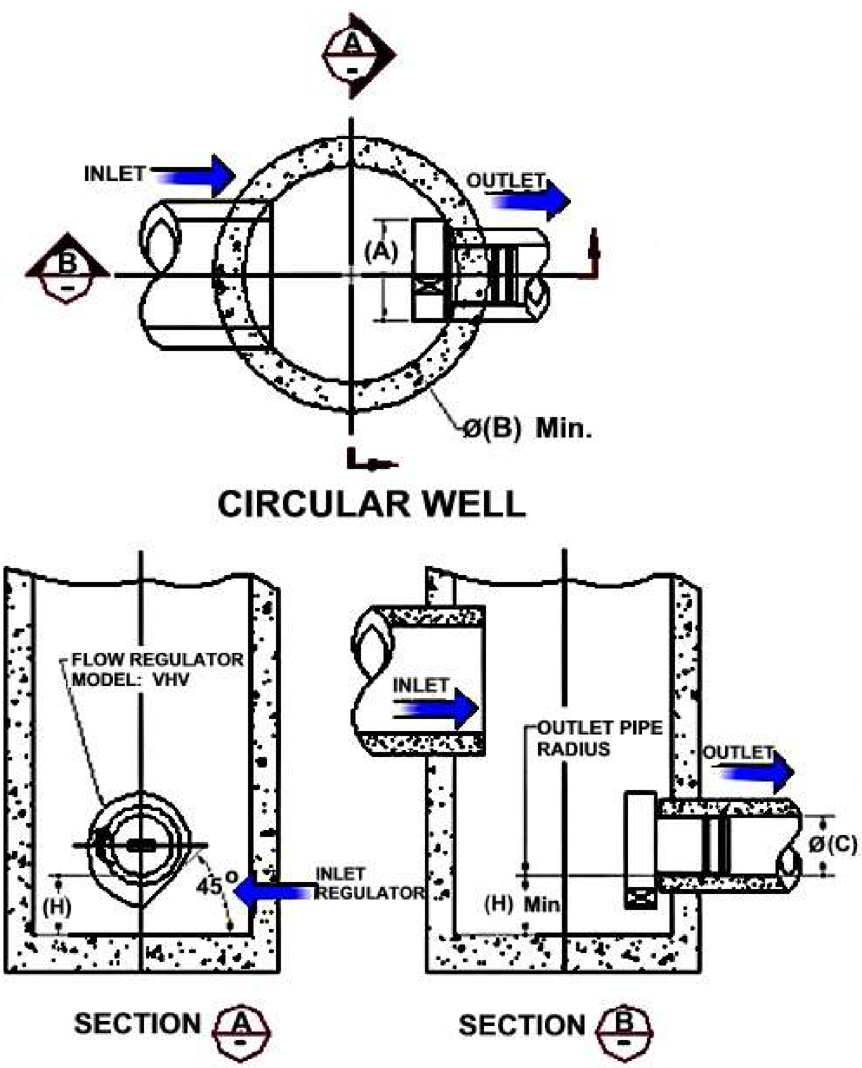


FIGURE 3 - VHV

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.

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2209 Menlo Avenue
Glenside, PA USA 19038
Tel.: 412- 417-6614 www.johnmeunier.com
Fax: 215-885-4741 asteele@johnmeunier.com

APPENDIX E

StormTech System Design Sheets

PROJECT INFORMATION	
ENGINEERED PRODUCT MANAGER:	VIVEK SHARMA 647-463-9803 VIVEK.SHARMA@ADS-PIPE.COM
ADS SALES REP:	HASSAN ELMI 416-985-9757 HASSAN.ELMI@ADS-PIPE.COM
PROJECT NO:	97633

ADVANCED DRAINAGE SYSTEMS, INC.

1871 MERIVALE

OTTAWA, ON

STORMTECH CHAMBER SPECIFICATIONS

1. CHAMBERS SHALL BE STORMTECH SC-740 OR SC-310.
2. CHAMBERS SHALL BE MANUFACTURED FROM VIRGIN POLYPROPYLENE OR POLYETHYLENE RESINS.
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 CSA S6 CL-625 TRUCK AND THE AASHTO DESIGN TRUCK WITH CONSIDERATION FOR IMPACT AND MULTIPLE VEHICLE PRESENCES.
5. CHAMBERS SHALL BE CERTIFIED TO CSA B184, "POLYMERIC SUB-SURFACE STORMWATER MANAGEMENT STRUTURES", AND MEET ASTM F2922 (POLYETHYLENE) OR ASTM F2418-16 (POLYPROPYLENE), "STANDARD SPECIFICATION FOR THERMOPLASTIC 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 OR ASTM F2922 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 THE SC-310/SC-740 SYSTEM

1. STORMTECH SC-310 & SC-740 CHAMBERS SHALL NOT BE INSTALLED UNTIL THE MANUFACTURER'S REPRESENTATIVE HAS COMPLETED A PRE-CONSTRUCTION MEETING WITH THE INSTALLERS.
2. STORMTECH SC-310 & SC-740 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH SC-310/SC-740/SC-780 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 - 150 mm (6") SPACING BETWEEN THE CHAMBER ROWS.
7. EMBEDMENT STONE SURROUNDING CHAMBERS MUST BE A CLEAN, CRUSHED, ANGULAR STONE 20-50 mm (3/4-2").
8. THE CONTRACTOR MUST REPORT ANY KNOWN DISCREPANCIES WITH CHAMBER FOUNDATION MATERIALS BEARING CAPACITIES TO THE SITE DESIGN ENGINEER.
9. 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 SC-310 & SC-740 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH SC-310/SC-740/DC-780 CONSTRUCTION GUIDE".
2. THE USE OF CONSTRUCTION EQUIPMENT OVER SC-310 & SC-740 CHAMBERS IS LIMITED:
   - NO EQUIPMENT IS ALLOWED ON BARE CHAMBERS.
   - NO RUBBER TIRED LOADERS, DUMP TRUCKS, OR EXCAVATORS ARE ALLOWED UNTIL PROPER FILL DEPTHS ARE REACHED IN ACCORDANCE WITH THE "STORMTECH SC-310/SC-740/DC-780 CONSTRUCTION GUIDE".
   - WEIGHT LIMITS FOR CONSTRUCTION EQUIPMENT CAN BE FOUND IN THE "STORMTECH SC-310/SC-740/DC-780 CONSTRUCTION GUIDE".
3. FULL 900 mm (36") OF STABILIZED COVER MATERIALS OVER THE CHAMBERS IS REQUIRED FOR DUMP TRUCK TRAVEL OR DUMPING.

USE OF A DOZER TO PUSH EMBEDMENT STONE BETWEEN THE ROWS OF CHAMBERS MAY CAUSE DAMAGE TO THE CHAMBERS AND IS NOT AN ACCEPTABLE BACKFILL METHOD. ANY CHAMBERS DAMAGED BY 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.

PROPOSED LAYOUT

83	STORMTECH SC-740 CHAMBERS
8	STORMTECH SC-740 END CAPS
152	STONE ABOVE (mm)
152	STONE BELOW (mm)
40	% STONE VOID
173.4	**INSTALLED SYSTEM VOLUME (m³) (PERIMETER STONE INCLUDED / BASE STONE NOT INCLUDED)**
297	SYSTEM AREA (m²)
112	SYSTEM PERIMETER (m)

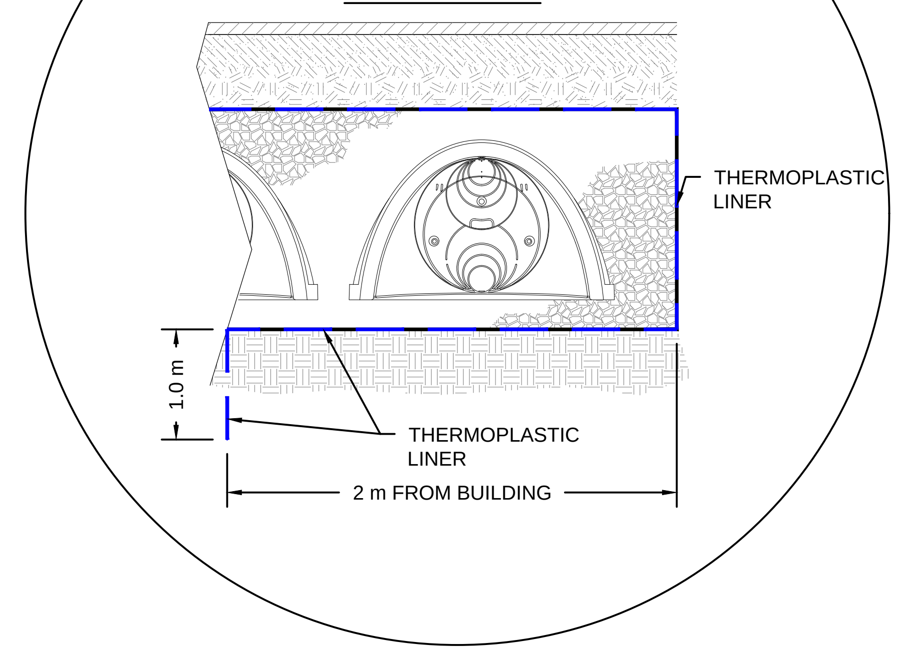
PROPOSED ELEVATIONS

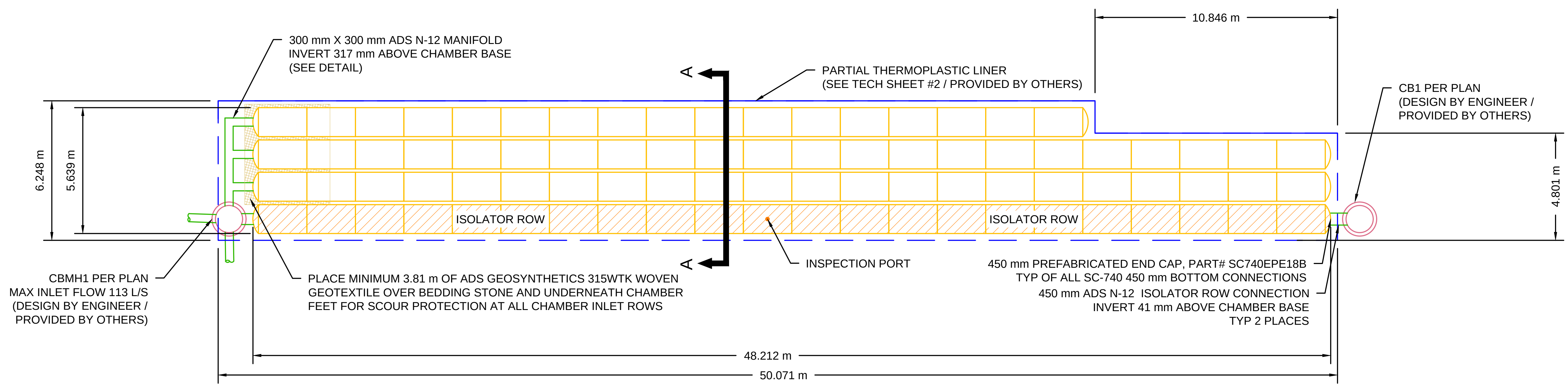
MAXIMUM ALLOWABLE GRADE (TOP OF PAVEMENT/UNPAVED):	89.0020
MINIMUM ALLOWABLE GRADE (UNPAVED WITH TRAFFIC):	87.1740
MINIMUM ALLOWABLE GRADE (UNPAVED NO TRAFFIC):	87.0210
MINIMUM ALLOWABLE GRADE (BASE OF FLEXIBLE PAVEMENT):	87.0210
MINIMUM ALLOWABLE GRADE (TOP OF RIGID PAVEMENT):	87.0210
TOP OF STONE:	86.7160
TOP OF SC-740 CHAMBER:	86.5640
300 mm TOP MANIFOLD INVERT:	86.1190
450 mm ISOLATOR ROW INVERT:	85.8430
BOTTOM OF SC-740 CHAMBER:	85.8020
BOTTOM OF STONE:	85.6500

NOTES

- MANIFOLD SIZE TO BE DETERMINED BY SITE DESIGN ENGINEER. SEE TECH SHEET #7 FOR MANIFOLD SIZING GUIDANCE.
- DUE TO THE ADAPTATION OF THIS CHAMBER SYSTEM TO SPECIFIC SITE AND DESIGN CONSTRAINTS, IT MAY BE NECESSARY TO CUT AND COUPLE ADDITIONAL PIPE TO STANDARD MANIFOLD COMPONENTS IN THE FIELD.
- THE SITE DESIGN ENGINEER MUST REVIEW ELEVATIONS AND IF NECESSARY ADJUST GRADING TO ENSURE THE CHAMBER COVER REQUIREMENTS ARE MET.
- ADS DOES NOT DESIGN OR PROVIDE MEMBRANE LINER SYSTEMS FOR CISTERNS (RAINWATER HARVESTING). TO MINIMIZE THE LEAKAGE POTENTIAL OF LINER SYSTEMS, THE MEMBRANE LINER SYSTEM SHOULD BE DESIGNED BY A KNOWLEDGABLE GEOTEXTILE PROFESSIONAL AND INSTALLED BY A QUALIFIED CONTRACTOR.

SECTION A-A





1871 MERIVALE
OTTAWA, ON

DATE: 04-22-15 | DRAWN: GM
PROJECT #: 97633 | CHECKED: KP

REV	DRW	CHK	DESCRIPTION
04-24-15	GM	KP	NEW VOLUME - 65 m³
07-28-15	GM		NEW VOLUME - 72.3 m³
3-27-17	DL	GFI	REVISED PER COMMENTS
3-28-17	MLB	NPB	REVISED FOR VOLUME/ELEVATIONS
08-24-17	KR	CJD	REVISED INVERTS & IR SIZE
11-06-17	KR	CJD	REVISED PER ENGINEER

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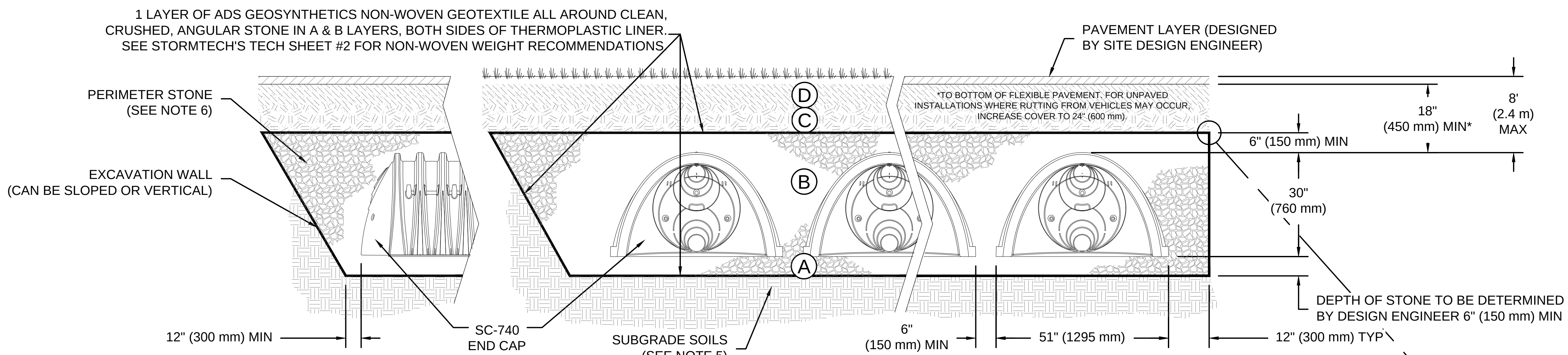
1-800-733-7473

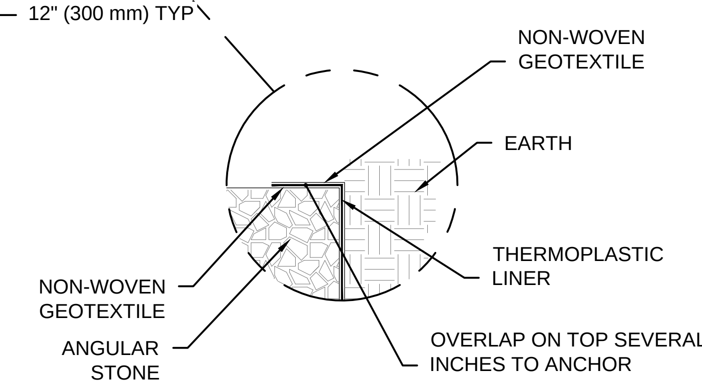
SCALE = 1 : 200

ACCEPTABLE FILL MATERIALS: STORMTECH SC-740 CHAMBER SYSTEMS

MATERIAL LOCATION		DESCRIPTION	AASHTO MATERIAL CLASSIFICATIONS	COMPACTION / DENSITY REQUIREMENT
D	**FINAL FILL:** FILL MATERIAL FOR LAYER 'D' STARTS FROM THE TOP OF THE 'C' LAYER TO THE BOTTOM OF FLEXIBLE PAVEMENT OR UNPAVED FINISHED GRADE ABOVE. NOTE THAT PAVEMENT SUBBASE MAY BE PART OF THE 'D' LAYER	ANY SOIL/ROCK MATERIALS, NATIVE SOILS, OR PER ENGINEER'S PLANS. CHECK PLANS FOR PAVEMENT SUBGRADE REQUIREMENTS.	N/A	PREPARE PER SITE DESIGN ENGINEER'S PLANS. PAVED INSTALLATIONS MAY HAVE STRINGENT MATERIAL AND PREPARATION REQUIREMENTS.
C	**INITIAL FILL:** FILL MATERIAL FOR LAYER 'C' STARTS FROM THE TOP OF THE EMBEDMENT STONE ('B' LAYER) TO 18" (450 mm) ABOVE THE TOP OF THE CHAMBER. NOTE THAT PAVEMENT SUBBASE MAY BE A PART OF THE 'C' LAYER.	GRANULAR WELL-GRADED SOIL/AGGREGATE MIXTURES, <35% FINES OR PROCESSED AGGREGATE. MOST PAVEMENT SUBBASE MATERIALS CAN BE USED IN LIEU OF THIS LAYER.	AASHTO M145[1] A-1, A-2-4, A-3 OR AASHTO M43[1] 3, 357, 4, 467, 5, 56, 57, 6, 67, 68, 7, 78, 8, 89, 9, 10	BEGIN COMPACTIONS AFTER 12" (300 mm) OF MATERIAL OVER THE CHAMBERS IS REACHED. COMPACT ADDITIONAL LAYERS IN 6" (150 mm) MAX LIFTS TO A MIN. 95% PROCTOR DENSITY FOR WELL GRADED MATERIAL AND 95% RELATIVE DENSITY FOR PROCESSED AGGREGATE MATERIALS. ROLLER GROSS VEHICLE WEIGHT NOT TO EXCEED 12,000 lbs (53 kN). DYNAMIC FORCE NOT TO EXCEED 20,000 lbs (89 kN).
B	**EMBEDMENT STONE:** FILL SURROUNDING THE CHAMBERS FROM THE FOUNDATION STONE ('A' LAYER) TO THE 'C' LAYER ABOVE.	CLEAN, CRUSHED, ANGULAR STONE, NOMINAL SIZE DISTRIBUTION BETWEEN 3/4-2 INCH (20-50 mm)	AASHTO M43[1] 3, 357, 4, 467, 5, 56, 57	NO COMPACTION REQUIRED.
A	**FOUNDATION STONE:** FILL BELOW CHAMBERS FROM THE SUBGRADE UP TO THE FOOT (BOTTOM) OF THE CHAMBER.	CLEAN, CRUSHED, ANGULAR STONE, NOMINAL SIZE DISTRIBUTION BETWEEN 3/4-2 INCH (20-50 mm)	AASHTO M43[1] 3, 357, 4, 467, 5, 56, 57	PLATE COMPACT OR ROLL TO ACHIEVE A FLAT SURFACE. [2,3]

PLEASE NOTE:
1. THE LISTED AASHTO DESIGNATIONS ARE FOR GRADATIONS ONLY. THE STONE MUST ALSO BE CLEAN, CRUSHED, ANGULAR. FOR EXAMPLE, A SPECIFICATION FOR #4 STONE WOULD STATE: "CLEAN, CRUSHED, ANGULAR NO. 4 (AASHTO M43) STONE".
2. STORMTECH COMPACTION REQUIREMENTS ARE MET FOR 'A' LOCATION MATERIALS WHEN PLACED AND COMPACTED IN 6" (150 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.





THERMOPLASTIC LINER DETAIL

NOTES:

1. SC-740 CHAMBERS SHALL CONFORM TO THE REQUIREMENTS OF ASTM F2418 "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS", OR ASTM F2922 "STANDARD SPECIFICATION FOR POLYETHYLENE (PE) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
2. SC-740 CHAMBERS SHALL BE DESIGNED IN ACCORDANCE WITH ASTM F2787 "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
3. "ACCEPTABLE FILL MATERIALS" TABLE ABOVE PROVIDES MATERIAL LOCATIONS, DESCRIPTIONS, GRADATIONS, AND COMPACTION REQUIREMENTS FOR FOUNDATION, EMBEDMENT, AND FILL MATERIALS.
4. THE "SITE DESIGN ENGINEER" REFERS TO THE ENGINEER RESPONSIBLE FOR THE DESIGN AND LAYOUT OF THE STORMTECH CHAMBERS FOR THIS PROJECT.
5. THE SITE DESIGN ENGINEER IS RESPONSIBLE FOR ASSESSING THE BEARING RESISTANCE (ALLOWABLE BEARING CAPACITY) OF THE SUBGRADE SOILS AND THE DEPTH OF FOUNDATION STONE WITH CONSIDERATION FOR THE RANGE OF EXPECTED SOIL MOISTURE CONDITIONS.
6. PERIMETER STONE MUST BE EXTENDED HORIZONTALLY TO THE EXCAVATION WALL FOR BOTH VERTICAL AND SLOPED EXCAVATION WALLS.
7. ONCE LAYER 'C' IS PLACED, ANY SOIL/MATERIAL CAN BE PLACED IN LAYER 'D' UP TO THE FINISHED GRADE. MOST PAVEMENT SUBBASE SOILS CAN BE USED TO REPLACE THE MATERIAL REQUIREMENTS OF LAYER 'C' OR 'D' AT THE SITE DESIGN ENGINEER'S DISCRETION.

1871 MERIVALE
OTTAWA, ON

DATE: 04-22-15 | DRAWN: GM
PROJECT #: 97633 | CHECKED: KP

REV	DRW	CHK	DESCRIPTION
04-24-15	GM	KP	NEW VOLUME - 65 m^3
07-28-15	GM		NEW VOLUME - 72.3 m^3
3-27-17	DL	GFI	REVISED PER COMMENTS
3-28-17	MLB	NPB	REVISED FOR VOLUME/ELEVATIONS
08-24-17	KR	CJD	REVISED INVERTS & IR SIZE
11-06-17	KR	CJD	REVISED PER ENGINEER

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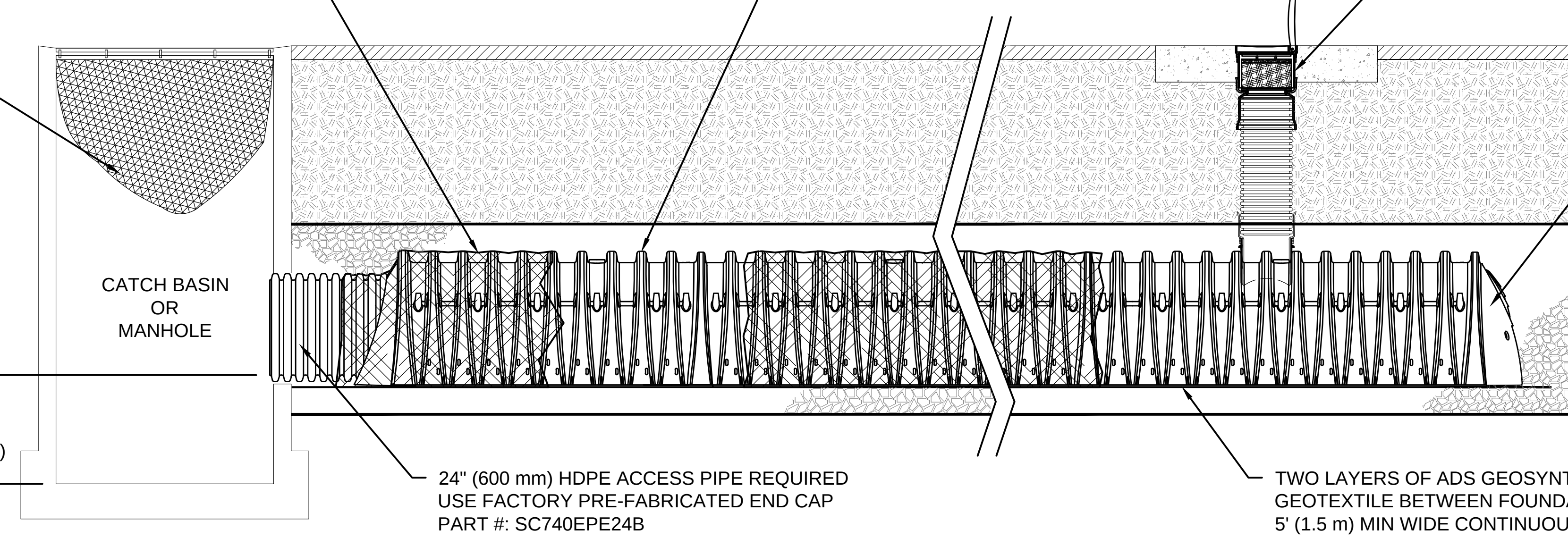


SC-740 ISOLATOR ROW DETAIL

NTS

INSPECTION & MAINTENANCE

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

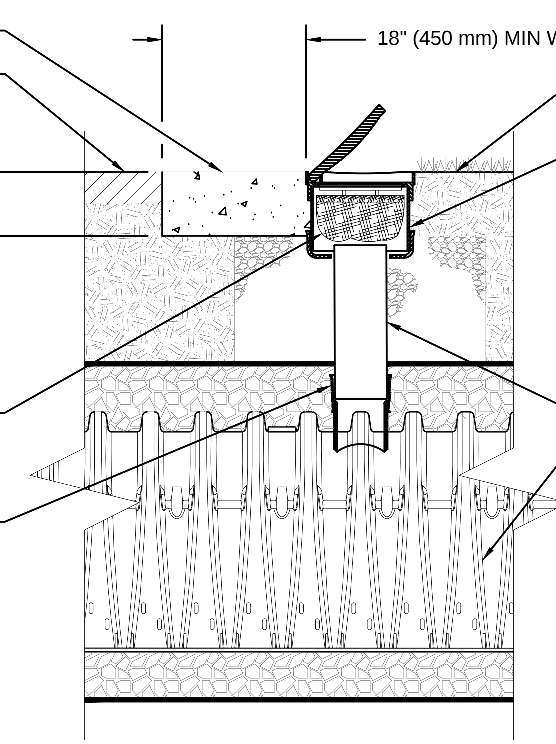
STEP 2) CLEAN OUT ISOLATOR ROW USING THE JETVAC PROCESS
- A. A FIXED CULVERT CLEANING NOZZLE WITH REAR FACING SPREAD OF 45" (1.1 m) OR MORE IS PREFERRED
- B. APPLY MULTIPLE PASSES OF JETVAC UNTIL BACKFLUSH WATER IS CLEAN
- C. VACUUM STRUCTURE SUMP AS REQUIRED

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

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

NOTES

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



* THE PART# **2712AG6IPKIT** CAN BE USED TO ORDER ALL NECESSARY COMPONENTS FOR A SOLID LID INSPECTION PORT INSTALLATION

SC-740 6" INSPECTION PORT DETAIL

NTS

1871 MERIVALE
OTTAWA, ON

DATE: 04-22-15 DRAWN: GM
PROJECT #: 97633 CHECKED: KP

REV	DRW	CHK	DESCRIPTION
04-24-15	GM	KP	NEW VOLUME - 65 m³
07-28-15	GM		NEW VOLUME - 72.3 m³
3-27-17	DL	GFI	REVISED PER COMMENTS
3-28-17	MLB	NPB	REVISED FOR VOLUME/ELEVATIONS
08-24-17	KR	CJD	REVISED INVERTS & IR SIZE
11-06-17	KR	CJD	REVISED PER ENGINEER

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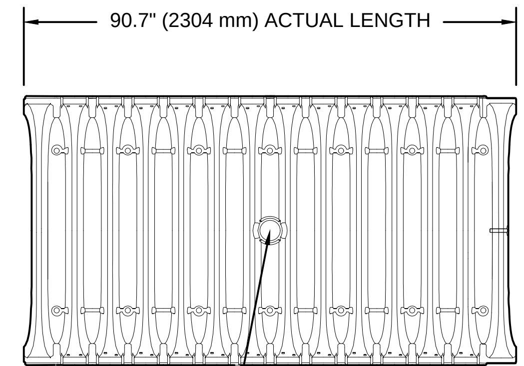
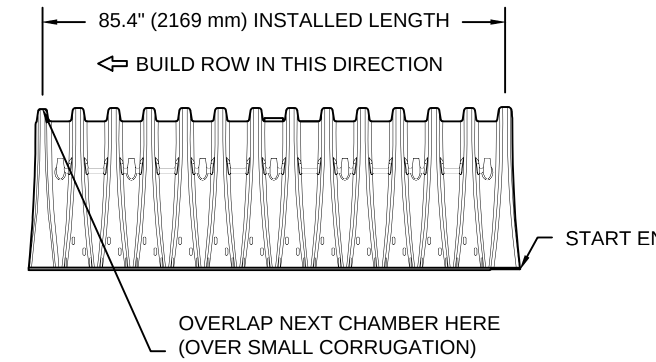
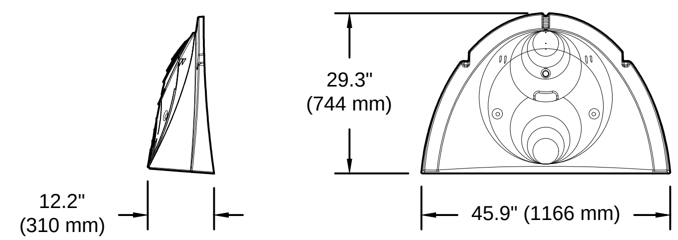
SC-740 TECHNICAL SPECIFICATION

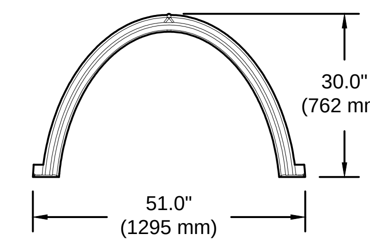
NTS





ACCEPTS 4" (100 mm) SCH 40 PVC PIPE FOR INSPECTION PORT. FOR PIPE SIZES LARGER THAN 4" (100 mm) UP TO 10" (250 mm) USE INSERTA TEE CONNECTION CENTERED ON A CHAMBER CREST CORRUGATION

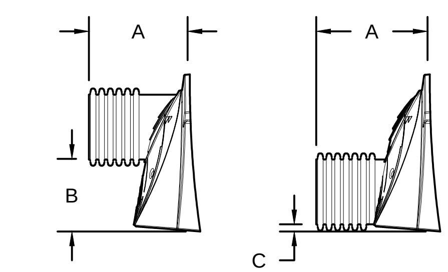




NOMINAL CHAMBER SPECIFICATIONS

SIZE (W X H X INSTALLED LENGTH)	51.0" X 30.0" X 85.4"	(1295 mm X 762 mm X 2169 mm)
CHAMBER STORAGE	45.9 CUBIC FEET	(1.30 m³)
MINIMUM INSTALLED STORAGE*	74.9 CUBIC FEET	(2.12 m³)
WEIGHT	75.0 lbs.	(33.6 kg)

*ASSUMES 6" (152 mm) STONE ABOVE, BELOW, AND BETWEEN CHAMBERS



PRE-FAB STUBS AT BOTTOM OF END CAP FOR PART NUMBERS ENDING WITH "B"
PRE-FAB STUBS AT TOP OF END CAP FOR PART NUMBERS ENDING WITH "T"
PRE-CORED END CAPS END WITH "PC"

PART #	STUB	A	B	C
SC740EPE06T / SC740EPE06TPC	6" (150 mm)	10.9" (277 mm)	18.5" (470 mm)	---
SC740EPE06B / SC740EPE06BPC			---	0.5" (13 mm)
SC740EPE08T /SC740EPE08TPC	8" (200 mm)	12.2" (310 mm)	16.5" (419 mm)	---
SC740EPE08B / SC740EPE08BPC			---	0.6" (15 mm)
SC740EPE10T / SC740EPE10TPC	10" (250 mm)	13.4" (340 mm)	14.5" (368 mm)	---
SC740EPE10B / SC740EPE10BPC			---	0.7" (18 mm)
SC740EPE12T / SC740EPE12TPC	12" (300 mm)	14.7" (373 mm)	12.5" (318 mm)	---
SC740EPE12B / SC740EPE12BPC			---	1.2" (30 mm)
SC740EPE15T / SC740EPE15TPC	15" (375 mm)	18.4" (467 mm)	9.0" (229 mm)	---
SC740EPE15B / SC740EPE15BPC			---	1.3" (33 mm)
SC740EPE18T / SC740EPE18TPC	18" (450 mm)	19.7" (500 mm)	5.0" (127 mm)	---
SC740EPE18B / SC740EPE18BPC			---	1.6" (41 mm)
SC740EPE24B*	24" (600 mm)	18.5" (470 mm)	---	0.1" (3 mm)

ALL STUBS, EXCEPT FOR THE SC740EPE24B ARE PLACED AT BOTTOM OF END CAP SUCH THAT THE OUTSIDE DIAMETER OF THE STUB IS FLUSH WITH THE BOTTOM OF THE END CAP. FOR ADDITIONAL INFORMATION CONTACT STORMTECH AT 1-888-892-2694.

* FOR THE SC740EPE24B THE 24" (600 mm) STUB LIES BELOW THE BOTTOM OF THE END CAP APPROXIMATELY 1.75" (44 mm). BACKFILL MATERIAL SHOULD BE REMOVED FROM BELOW THE N-12 STUB SO THAT THE FITTING SITS LEVEL.

NOTE: ALL DIMENSIONS ARE NOMINAL

1871 MERIVALE
OTTAWA, ON

DATE: 04-22-15 DRAWN: GM
PROJECT #: 97633 CHECKED: KP

REV	DRW	CHK	DESCRIPTION
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3-27-17	DL	GFI	REVISED PER COMMENTS
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08-24-17	KR	CJD	REVISED INVERTS & IR SIZE
11-06-17	KR	CJD	REVISED PER ENGINEER

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APPENDIX F

Stormceptor Reports

Brief Stormceptor Sizing Report - Benson Auto Parts - Stormceptor 01

Project Information & Location			
Project Name	Benson Auto Parts	**Project Number**	130828
City	Ottawa	**State/ Province**	Ontario
Country	Canada	**Date**	11/13/2017
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	Benson Auto Parts - Stormceptor 01
Target TSS Removal (%)	80
TSS Removal (%) Provided	84
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	84
STC 750	90
STC 1000	90
STC 1500	90
STC 2000	91
STC 3000	92
STC 4000	93
STC 5000	94
STC 6000	95
STC 9000	96
STC 10000	96
STC 14000	97
StormceptorMAX	Custom

Sizing Details

Drainage Area	
Total Area (ha)	0.41
Imperviousness %	95.0

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
0.018	0.030

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

Brief Stormceptor Sizing Report - Benson Auto Parts - Stormceptor 02

Project Information & Location			
Project Name	Benson Auto Parts	**Project Number**	130828
City	Ottawa	**State/ Province**	Ontario
Country	Canada	**Date**	11/13/2017
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	Benson Auto Parts - Stormceptor 02
Target TSS Removal (%)	80
TSS Removal (%) Provided	84
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	84
STC 750	90
STC 1000	91
STC 1500	91
STC 2000	93
STC 3000	94
STC 4000	95
STC 5000	96
STC 6000	96
STC 9000	98
STC 10000	98
STC 14000	98
StormceptorMAX	Custom

Sizing Details

Drainage Area	
Total Area (ha)	0.14
Imperviousness %	100.0

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

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
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Notes

• Stormceptor performance estimates are based on simulations using PCSWMM for Stormceptor, which uses the EPA Rainfall and Runoff modules.
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APPENDIX G

Complete Set of Civil Plans

KEY PLAN
N.T.S.

EROSION AND SEDIMENT CONTROL MEASURES:

** CONTRACTOR IS RESPONSIBLE FOR ALL INSTALLATION, MONITORING, REPAIR AND REMOVAL OF ALL EROSION AND SEDIMENT CONTROL FEATURES **
** SEDIMENT AND EROSION CONTROL MEASURES MAY BE MODIFIED IN THE FIELD AT THE DISCRETION OF THE CITY OF OTTAWA SITE INSPECTOR OR CONSERVATION AUTHORITY.

1. PRIOR TO START OF CONSTRUCTION:

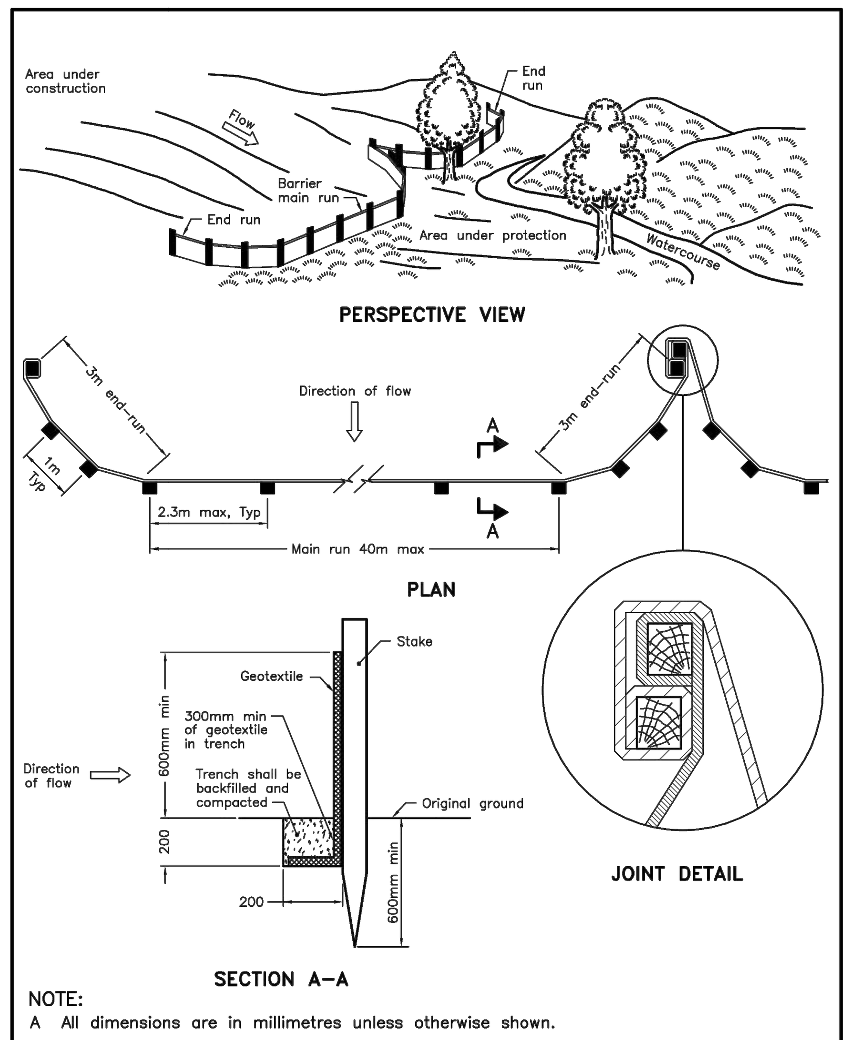
- PRIOR TO THE REMOVAL OF ANY VEGETATIVE COVER, MOVING OF SOIL AND CONSTRUCTION:
- INSTALL SILT FENCE IMMEDIATELY DOWNSTREAM FROM AREAS TO BE DISTURBED (SEE PLAN FOR LOCATION).
- INSTALL INLET SEDIMENT CONTROL DEVICES
- INSTALL GEOSOCK INSERTS WITH AN OVERFLOW IN ALL THE DOWNSTREAM CATCHBASINS AND MANHOLES
- 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 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 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 STRUCTURE 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.
- IF PRESENT, REMOVE 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.

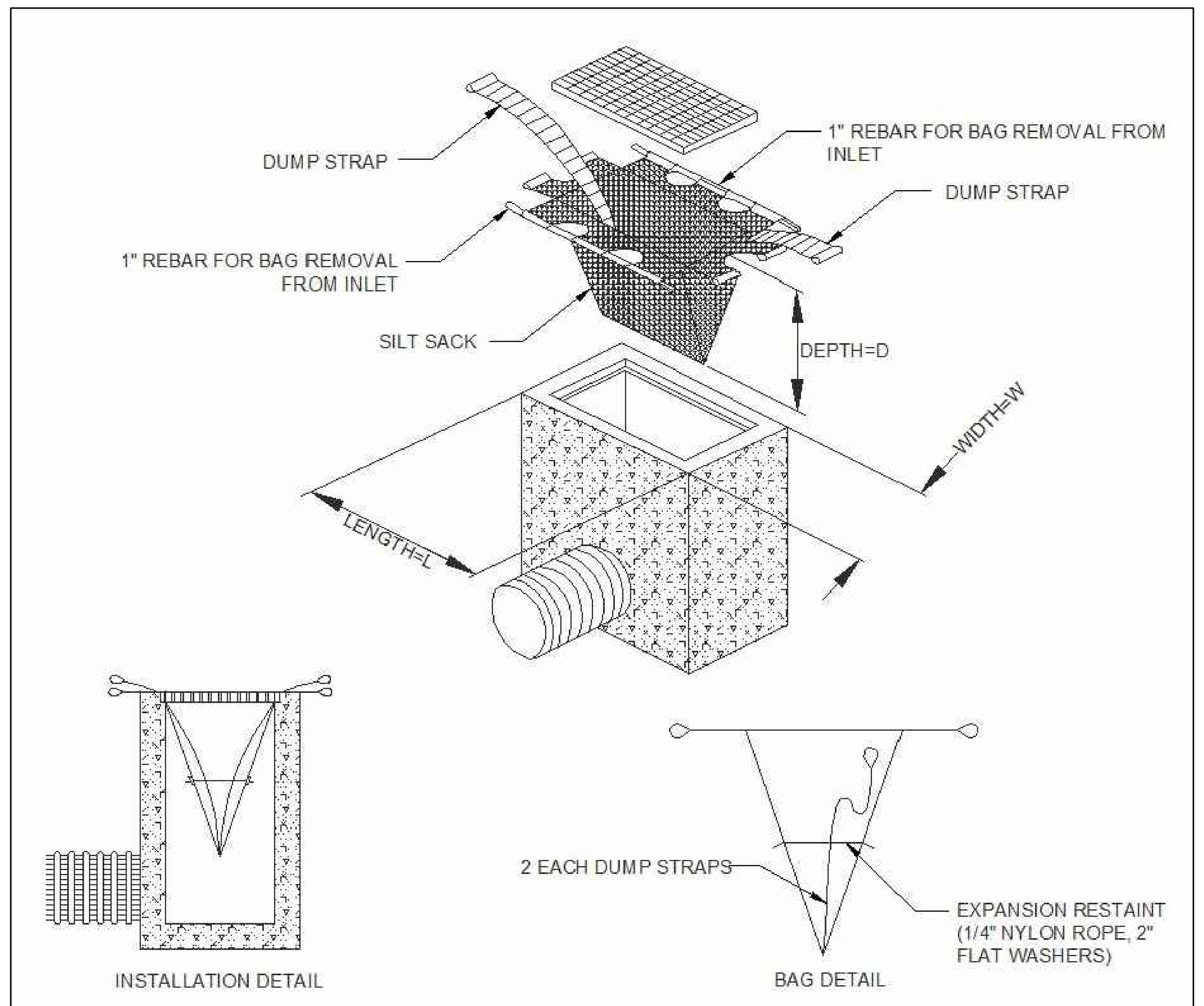


NOTE:
A All dimensions are in millimetres unless otherwise shown.

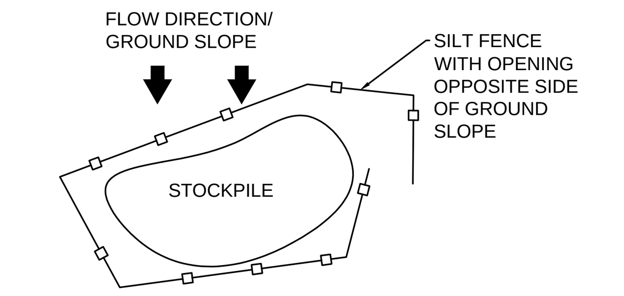
ONTARIO PROVINCIAL STANDARD DRAWING | Nov 2015 | Rev 2

LIGHT–DUTY SILT FENCE BARRIER

OPSD 219.110



INLET SEDIMENT CONTROL DEVICE
N.T.S.



STOCKPILE EROSION PROTECTION
N.T.S.

LEGEND:

	PROPERTY LINE
	PROPOSED CURB
DC	PROPOSED DEPRESSED CURB
	PROPOSED DOOR ENTRANCE/EXIT
	PROPOSED GRASS AREA (IF POSSIBLE, EXISTING GRASS MAY REMAIN.)
	PROPOSED CONCRETE FEATURES/SLAB
	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
×50.00HP	PROPOSED HIGH POINT ELEVATION
×50.00T/G	PROPOSED TOP OF GRATE ELEVATION
×50.00DC	PROPOSED DEPRESSED CURB ELEVATION
×50.00BC	PROPOSED BOTTOM OF CURB ELEVATION
×50.00TC	PROPOSED TOP OF CURB ELEVATION
×50.00S	PROPOSED SWALE ELEVATION
×50.00EX	MATCH INTO EXISTING ELEVATION
×70.19	EXISTING ELEVATION
	MAJOR OVERLAND FLOW ROUTE
WTR WTR	PROPOSED WATER SERVICE
SAN SAN	PROPOSED SANITARY SEWER
STM STM	PROPOSED STORM SEWER
FM FM FM	PROPOSED 75mmØ FORCEMAIN
SUB SUB SUB	PROPOSED 250mmØ PERFORATED SUBDRAIN
	PROPOSED PIPE INSULATION AS PER DETAIL ON C903
	PROPOSED MANHOLE OR STORMCEPTOR
	PROPOSED CATCHBASIN OR CATCHBASIN-MANHOLE
W	PROPOSED WATER METER
R	PROPOSED REMOTE WATER METER
P	PROPOSED SUBMERGIBLE SUMP PUMP
	PROPOSED FIRE HYDRANT
	PROPOSED WATER VALVE
	PROPOSED SIAMESE CONNECTION
	PROPOSED BOLLARD (SEE DETAIL ON C903)
BH-1	BOREHOLE LOCATION
	PROPOSED 100 YEAR HIGH WATER LEVEL
	STORM WATERSHED EXTENT
XX-XX	CATCHMENT / DRAINAGE AREA NAME
RUNOFF	RUNOFF COEFFICIENT
AREA	AREA IN HECTARES

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5m 2 0 5 10m
SCALE: 1:300

APPROVED ☐ REFUSED ☐
THIS ____ DAY OF ____________, 20____

DERRICK MOODIE
MANAGER, DEVELOPMENT REVIEW – WEST
PLANNING, INFRASTRUCTURE & ECONOMIC DEVELOPMENT DEPARTMENT, CITY OF OTTAWA

LICENSED PROFESSIONAL ENGINEER
J. C. R. LALONDE
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

No.	REVISIONS	BY	DATE
04	ISSUED FOR SPA	G.C.	05 JUN 2018
03	AS PER CITY COMMENTS	G.C.	26 OCT 2017
02	AS PER CITY COMMENTS	G.C.	25 AUG 2017
01	ISSUED FOR SPA	G.C.	24 MAR 2017

CLIENT
BENSON AUTO PARTS
MR. GERRY BENSON
700 EDUCATION ROAD, CONRWALL, ONTARIO
K6H 6B8 , TEL. 613-936-7850

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

PROJECT
PROPOSED BENSON AUTO PARTS COMMERCIAL DEVELOPMENT
1871 MERIVALE ROAD, NEPEAN, ON

DRAWING TITLE
EROSION AND SEDIMENT CONTROL PLAN

PROJECT NO. 130828
DATE 05 JUNE 2018

C101

D07-12-17-0054

LEGEND:

- PROPERTY LINE
- PROPOSED CURB
- PROPOSED DEPRESSED CURB
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- MAJOR OVERLAND FLOW ROUTE
- WTR PROPOSED WATER SERVICE
- SAN PROPOSED SANITARY SEWER
- STM PROPOSED STORM SEWER
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APPROVED ☐ REFUSED ☐

THIS _____ DAY OF ___________, 20____

DERRICK MOODIE
MANAGER, DEVELOPMENT REVIEW – WEST
PLANNING, INFRASTRUCTURE & ECONOMIC DEVEVELOPMENT DEPARTMENT, CITY OF OTTAWA

LICENSED PROFESSIONAL ENGINEER
J. C. R. LALONDE
June 5/2018
PROVINCE OF ONTARIO

NOT AUTHENTIC UNLESS SIGNED AND DATED

LRL
ENGINEERING | INGÉNIERIE
5430 Canotek Road | Ottawa, ON, K1J 9G2
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CLIENT
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DESIGNED BY: G.C. | DRAWN BY: G.C. | APPROVED BY: M.G.

PROJECT
PROPOSED BENSON AUTO PARTS COMMERCIAL DEVELOPMENT
1871 MERIVALE ROAD, NEPEAN, ON

DRAWING TITLE
DEMOLITION PLAN

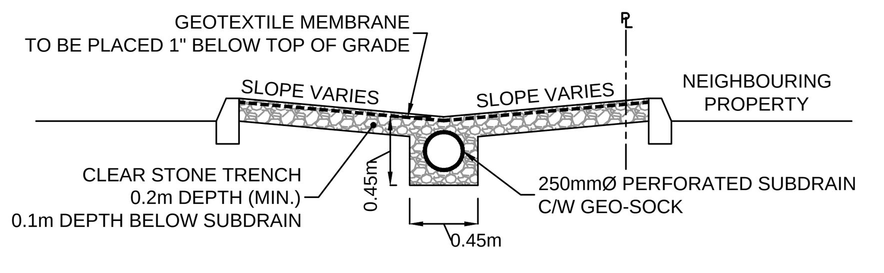
PROJECT NO. 130828

DATE 05 JUNE 2018

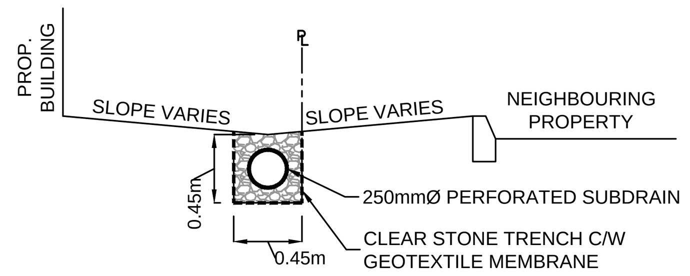
C102

D07-12-17-0054

KEY PLAN
N.T.S.



SWALE & SUBDRAIN - TYPICAL SECTION A-A
(N.T.S.)



SWALE & SUBDRAIN - TYPICAL SECTION B-B
(N.T.S.)

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	250	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.

GENERAL NOTES:

1. ALL EDGES OF DISTURBED PAVEMENT SHALL BE SAW CUT TO FORM A CLEAN CUT LINE PRIOR TO PLACING NEW PAVEMENT. PAVEMENT REINSTATEMENT SHALL BE WITH STEP JOINTS OF 500mm WIDTH MINIMUM.
2. CURBS TO BE BARRIER, CONSTRUCTED AS PER DETAIL SC1.1 ON C903.
3. ALL SIDEWALK CONSTRUCTION TO BE AS PER DETAILS SC1.4 AND SC2 ON C903.
4. 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.
5. 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.
6. INLET SEDIMENT CONTROL DEVICES 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.
7. 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.

UTILITY NOTES:

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- WTR PROPOSED WATER SERVICE
- SAN PROPOSED SANITARY SEWER
- STM PROPOSED STORM SEWER
- FM PROPOSED 75mmØ FORCEMAIN
- SUB PROPOSED 250mmØ PERFORATED SUBDRAIN
- PROPOSED PIPE INSULATION AS PER DETAIL ON C903
- PROPOSED MANHOLE OR STORMCEPTOR
- PROPOSED CATCHBASIN OR CATCHBASIN-MANHOLE
- PROPOSED WATER METER
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CONTRACTOR TO VERIFY ALL DIMENSIONS AND NOTIFY THE ENGINEER OF ANY DISCREPANCIES BEFORE WORK COMMENCES. DO NOT SCALE DRAWINGS.

5m 2 0 5 10m
SCALE: 1:300

APPROVED ☐ REFUSED ☐

THIS _____ DAY OF ___________, 20____

DERRICK MOODIE
MANAGER, DEVELOPMENT REVIEW – WEST
PLANNING, INFRASTRUCTURE & ECONOMIC
DEVEVELOPMENT DEPARTMENT, CITY OF OTTAWA

LICENSED PROFESSIONAL ENGINEER
J. C. R. LALONDE
June 5/2018
PROVINCE OF ONTARIO

NOT AUTHENTIC UNLESS SIGNED AND DATED

LRL
ENGINEERING | INGÉNIERIE
5430 Canotek Road | Ottawa, ON, K1J 9G2
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04	ISSUED FOR SPA	G.C.	05 JUN 2018
03	AS PER CITY COMMENTS	G.C.	26 OCT 2017
02	AS PER CITY COMMENTS	G.C.	25 AUG 2017
01	ISSUED FOR SPA	G.C.	24 MAR 2017

CLIENT
BENSON AUTO PARTS
MR. GERRY BENSON
700 EDUCATION ROAD, CONRWALL, ONTARIO
K6H 6B8 , TEL. 613-936-7850

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

PROJECT
PROPOSED BENSON AUTO PARTS
COMMERCIAL DEVELOPMENT
1871 MERIVALE ROAD, NEPEAN, ON

DRAWING TITLE
GRADING AND DRAINAGE PLAN

PROJECT NO.
130828

DATE
05 JUNE 2018

C301

D07-12-17-0054

WATERMAIN				
STATION	DESCRIPTION	OBVERT (m)	T/G (m)	DEPTH TO OBV. (m)
0+000	City Connection	84.88	87.33	2.45
0+007	Pipe Crossing X2	85.45	87.39	1.94
0+013	150mm Valve	85.07	87.47	2.4
0+017	Hydrant Tee	84.99	87.39	2.4
0+020	Pipe Crossing X3	84.85	87.25	2.4
0+029	Building Connection	85.02	87.42	2.4

MANHOLE				
MANHOLE	INVERT (m)	T/G (m)	DEPTH TO OBV. (m)	DEPTH TO INV. (m)
EX STM CB1	85.59	87.3	1.46	1.71
PR. STM CB1	85.85	87.08	0.78	1.23
PR. STM CB2	86.12	86.99	0.57	0.87
PR. STM CBMH1	85.84	87.06	0.77	1.22
PR. STC 300 (1)	85.83	87.24	1.11	1.41
PR. STM MH1	85.75	87.27	1.22	1.52
PR. STC 300 (2)	85.50	87.72	1.97	2.22
PR. SAN MH1	84.93	87.52	2.39	2.59
PR. SAN MH2	84.55	87.59	2.94	3.04

INLET CONTROL DEVICE INFO	
HYDROVEX 125VHV-2 VERTICAL VORTEX FLOW REGULATOR	100 YEAR
HEAD (m)	0.72
HIGH WATER LEVEL (m)	86.56
CONTROLLED RELEASE RATE (L/s)	14.99

PIPE CROSSING TABLE						
CROSSING ID	PROP. 300mm STM SEWER OBVERT	PROP. 200mm SAN SERVICE OBVERT	EXIS. 250mm SANITARY SEWER OBVERT	PROP. 150mm WATER SERVICE OBVERT	GROUND ELEVATION	SEPARATION
X1	86.33	85.19	N/A	N/A	87.25	0.84
X2	N/A	N/A	85.05	85.45	87.39	0.25
X3	86.33	N/A	N/A	84.85	87.25	1.18

HYDROVEX®

VHV Vertical Vortex Flow Regulator

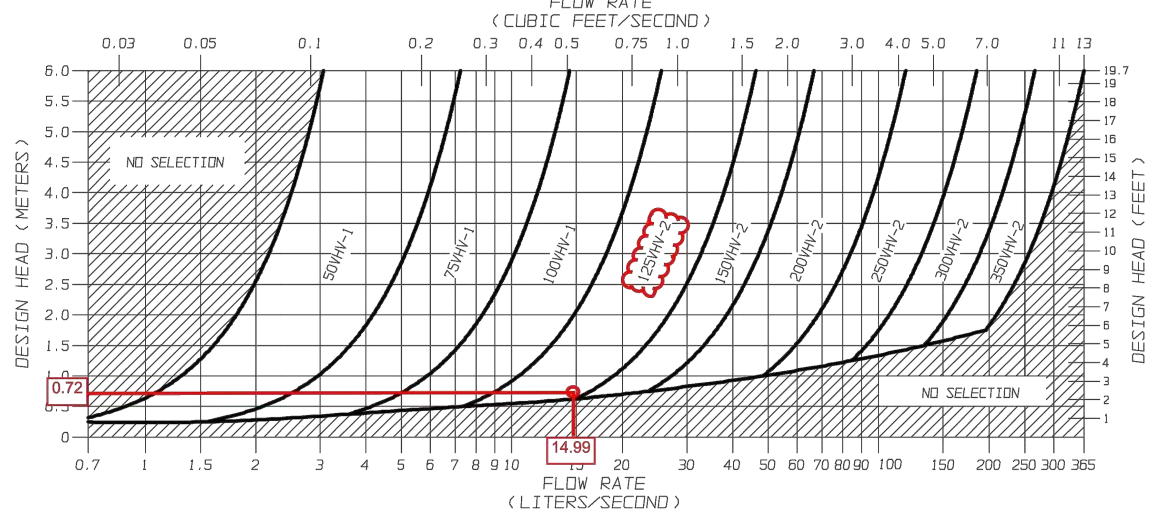

FIGURE 3 - VHV

JOHN MEUNIER

NOTES: GENERAL

1. ALL EDGES OF DISTURBED PAVEMENT SHALL BE SAW CUT TO FORM A NEAT AND STRAIGHT LINE PRIOR TO PLACING NEW PAVEMENT. PAVEMENT REINSTATEMENT SHALL BE WITH STEP JOINTS OF 300mm WIDTH MINIMUM.
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5. AT PROPOSED UTILITY CONNECTION POINTS AND CROSSINGS (I.E. STORM SEWER, SANITARY SEWER, WATER, 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 1.5m OF COVER ARE SUBJECT TO INSULATION DETAIL.
5. PERFORATED SUBDRAIN SHALL BE INSTALLED IN A GRANULAR TRENCH AND PROTECTED FROM FINES BY A FILTER CLOTH AS PER CITY STANDARDS. PLEASE ALSO REFER TO SWALE AND SUBDRAIN DETAIL ON C301.

UTILITY NOTES:

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SCALE: 1:300

APPROVED ☐ REFUSED ☐

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MANAGER, DEVELOPMENT REVIEW – WEST
PLANNING, INFRASTRUCTURE & ECONOMIC DEVEVELOPMENT DEPARTMENT, CITY OF OTTAWA

LICENSED PROFESSIONAL ENGINEER
J. C. R. LALONDE
June 5/2018
PROVINCE OF ONTARIO

NOT AUTHENTIC UNLESS SIGNED AND DATED

LRL
ENGINEERING | INGÉNIERIE
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CLIENT
BENSON AUTO PARTS
MR. GERRY BENSON
700 EDUCATION ROAD, CONRWALL, ONTARIO
K6H 6B8 , TEL. 613-936-7850

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

PROJECT
PROPOSED BENSON AUTO PARTS COMMERCIAL DEVELOPMENT
1871 MERIVALE ROAD, NEPEAN, ON

DRAWING TITLE
SITE SERVICING PLAN

PROJECT NO. 130828
DATE 05 JUNE 2018

C401

D07-12-17-0054

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5m 2 0 5 10m
SCALE: 1:300

APPROVED ☐ REFUSED ☐
THIS ____ DAY OF ____________, 20____
DERRICK MOODIE
MANAGER, DEVELOPMENT REVIEW – WEST
PLANNING, INFRASTRUCTURE & ECONOMIC DEVELOPMENT DEPARTMENT, CITY OF OTTAWA

LICENSED PROFESSIONAL ENGINEER
J. C. R. LALONDE
June 4/2018
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

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CLIENT
BENSON AUTO PARTS
MR. GERRY BENSON
700 EDUCATION ROAD, CONRWALL, ONTARIO
K6H 6B8 , TEL. 613-936-7850

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

PROJECT
PROPOSED BENSON AUTO PARTS
COMMERCIAL DEVELOPMENT
1871 MERIVALE ROAD, NEPEAN, ON

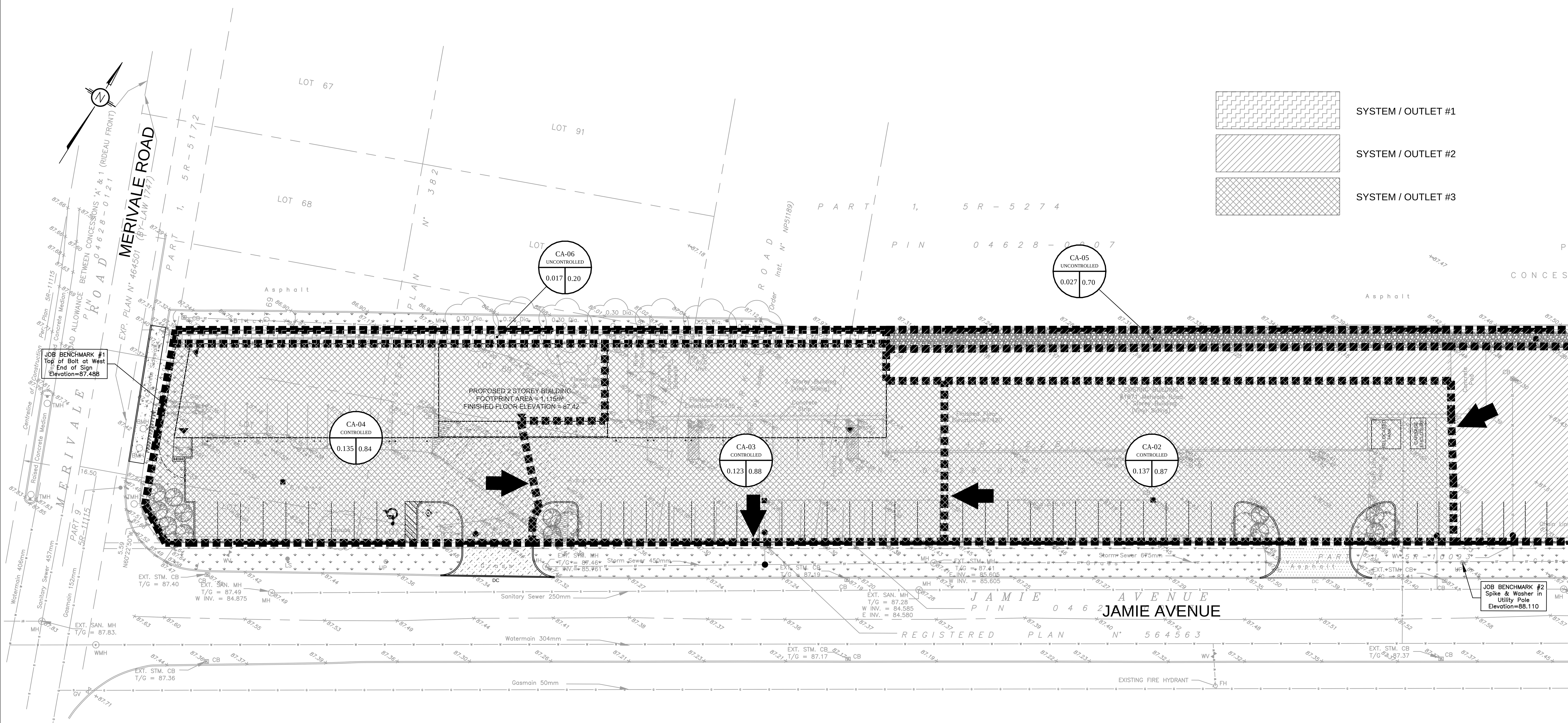
DRAWING TITLE
PRE-DEVELOPMENT
CATCHMENTS PLAN

PROJECT NO.
130828

DATE
05 JUNE 2018

C701

D07-12-17-0054



LEGEND:

- PROPERTY LINE
- PROPOSED CURB
- PROPOSED DEPRESSED CURB
- PROPOSED DOOR ENTRANCE/EXIT
- PROPOSED GRASS AREA (IF POSSIBLE, EXISTING GRASS MAY REMAIN.)
- PROPOSED CONCRETE FEATURES/SLAB
- 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
- ×50.00HP PROPOSED HIGH POINT ELEVATION
- ×50.00T/G PROPOSED TOP OF GRATE ELEVATION
- ×50.00DC PROPOSED DEPRESSED CURB ELEVATION
- ×50.00BC PROPOSED BOTTOM OF CURB ELEVATION
- ×50.00TC PROPOSED TOP OF CURB ELEVATION
- ×50.00S PROPOSED SWALE ELEVATION
- ×50.00EX MATCH INTO EXISTING ELEVATION
- ×70.19 EXISTING ELEVATION
- MAJOR OVERLAND FLOW ROUTE
- WTR PROPOSED WATER SERVICE
- SAN PROPOSED SANITARY SEWER
- STM PROPOSED STORM SEWER
- FM PROPOSED 75mmØ FORCEMAIN
- SUB PROPOSED 250mmØ PERFORATED SUBDRAIN
- PROPOSED PIPE INSULATION AS PER DETAIL ON C903
- PROPOSED MANHOLE OR STORMCEPTOR
- PROPOSED CATCHBASIN OR CATCHBASIN-MANHOLE
- PROPOSED WATER METER
- PROPOSED REMOTE WATER METER
- PROPOSED SUBMERGIBLE SUMP PUMP
- PROPOSED FIRE HYDRANT
- PROPOSED WATER VALVE
- PROPOSED SIAMESE CONNECTION
- PROPOSED BOLLARD (SEE DETAIL ON C903)
- BH-1 BOREHOLE LOCATION
- PROPOSED 100 YEAR HIGH WATER LEVEL
- STORM WATERSHED EXTENT
- XX-XX CATCHMENT / DRAINAGE AREA NAME
- RUNOFF COEFFICIENT
- AREA IN HECTARES

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5m 2 0 5 10m

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June 5/2018
PROVINCE OF ONTARIO

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DESIGNED BY:	DRAWN BY:	APPROVED BY:
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PROJECT
PROPOSED BENSON AUTO PARTS
COMMERCIAL DEVELOPMENT
1871 MERIVALE ROAD, NEPEAN, ON

DRAWING TITLE
POST DEVELOPMENT
CATCHMENTS PLAN

PROJECT NO.
130828

DATE
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C702

D07-12-17-0054

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LICENSED PROFESSIONAL ENGINEER
J. C. R. LALONDE
June 5/2018
PROVINCE OF ONTARIO

NOT AUTHENTIC UNLESS SIGNED AND DATED

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K6H 6B8 , TEL. 613-936-7850

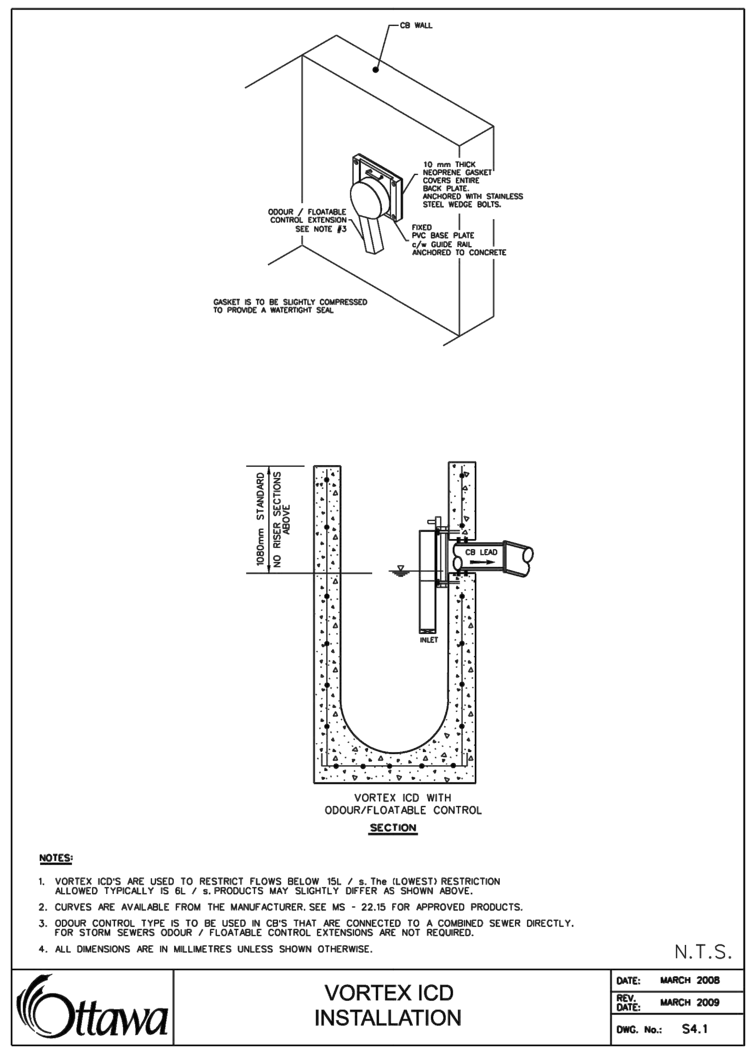
DESIGNED BY: G.C.
DRAWN BY: G.C.
APPROVED BY: M.G.

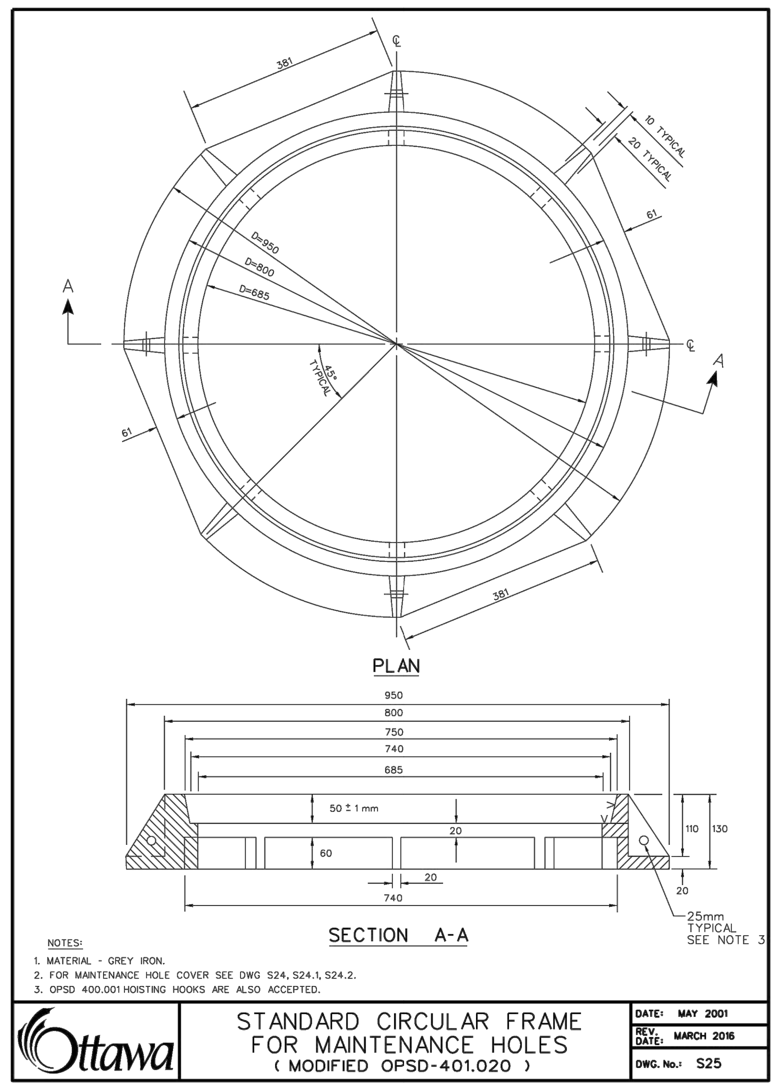
PROJECT
PROPOSED BENSON AUTO PARTS
COMMERCIAL DEVELOPMENT
1871 MERIVALE ROAD, NEPEAN, ON

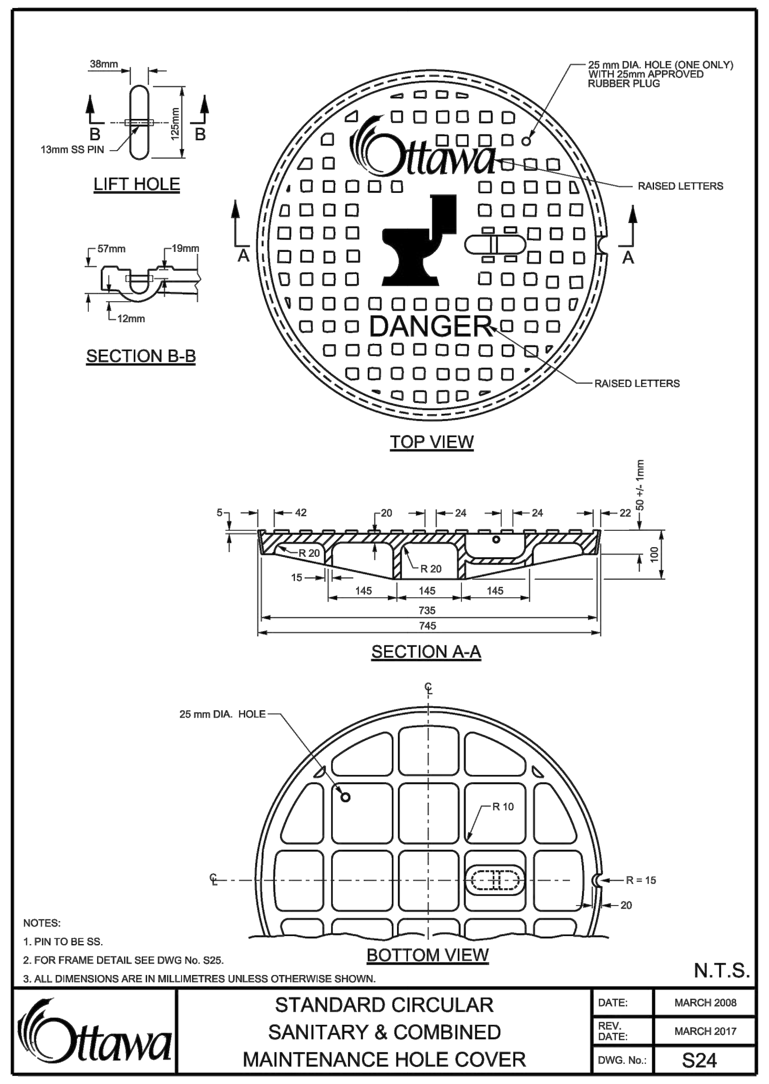
DRAWING TITLE
SANITARY DRAINAGE
AREA PLAN

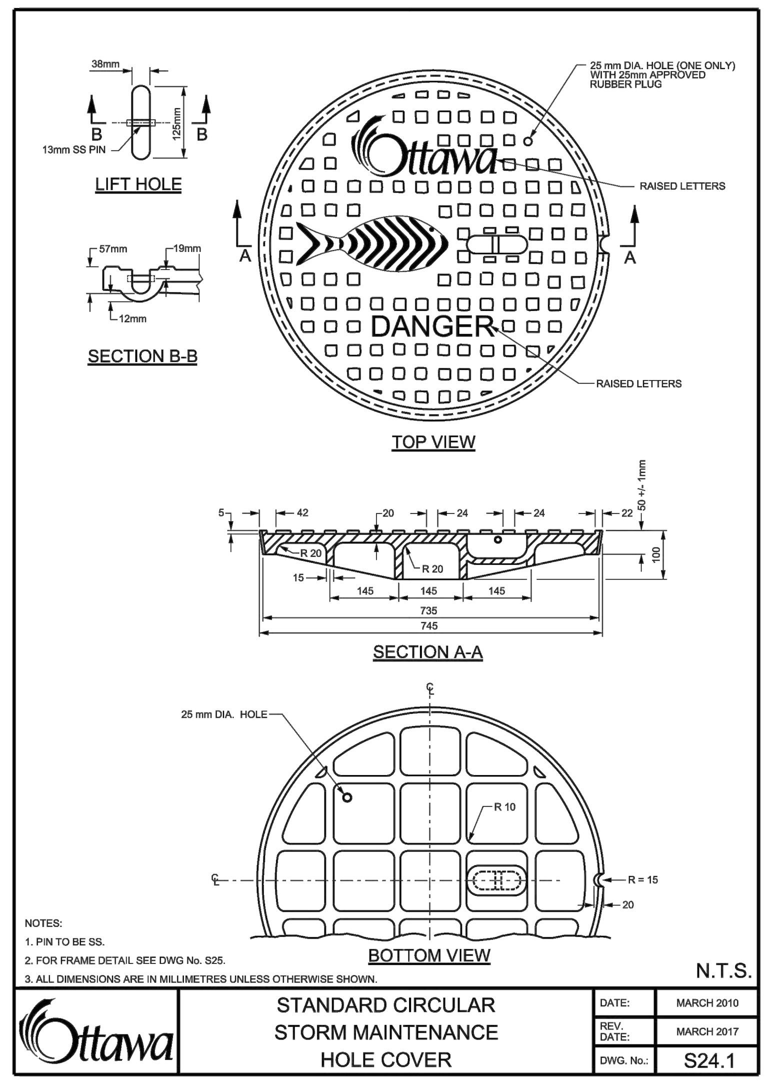
PROJECT NO. 130828
DATE 05 JUNE 2018
C703

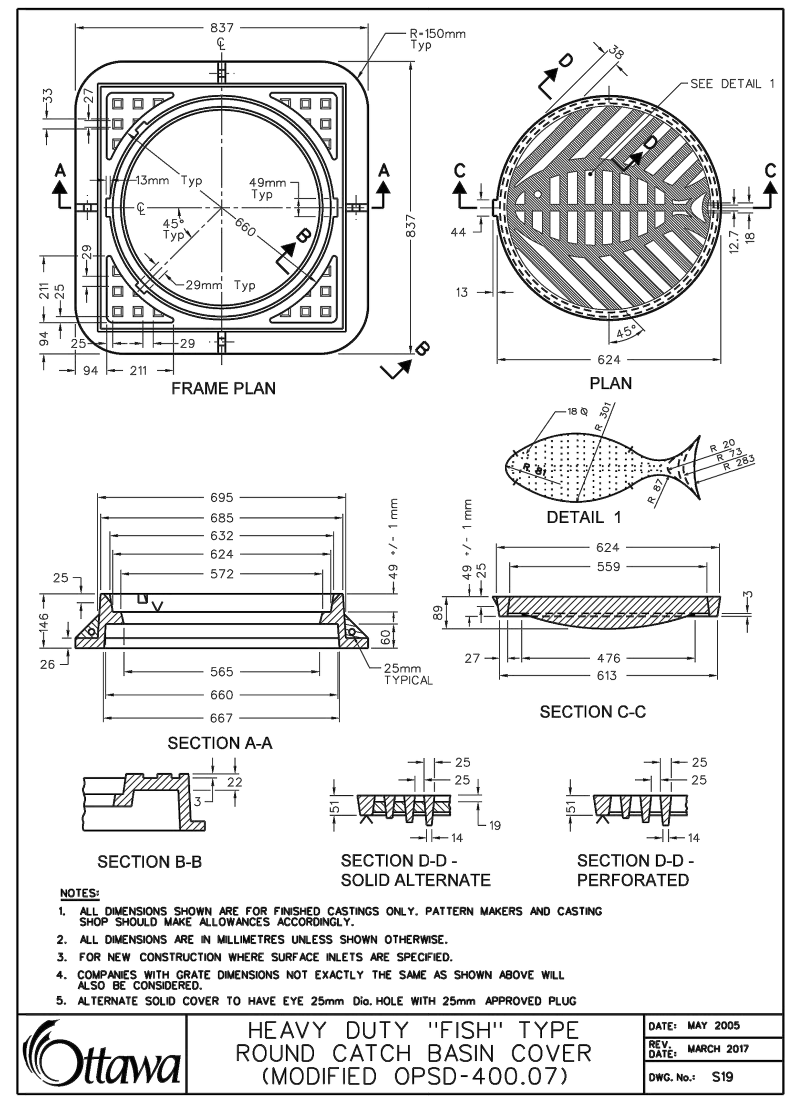
D07-12-17-0054

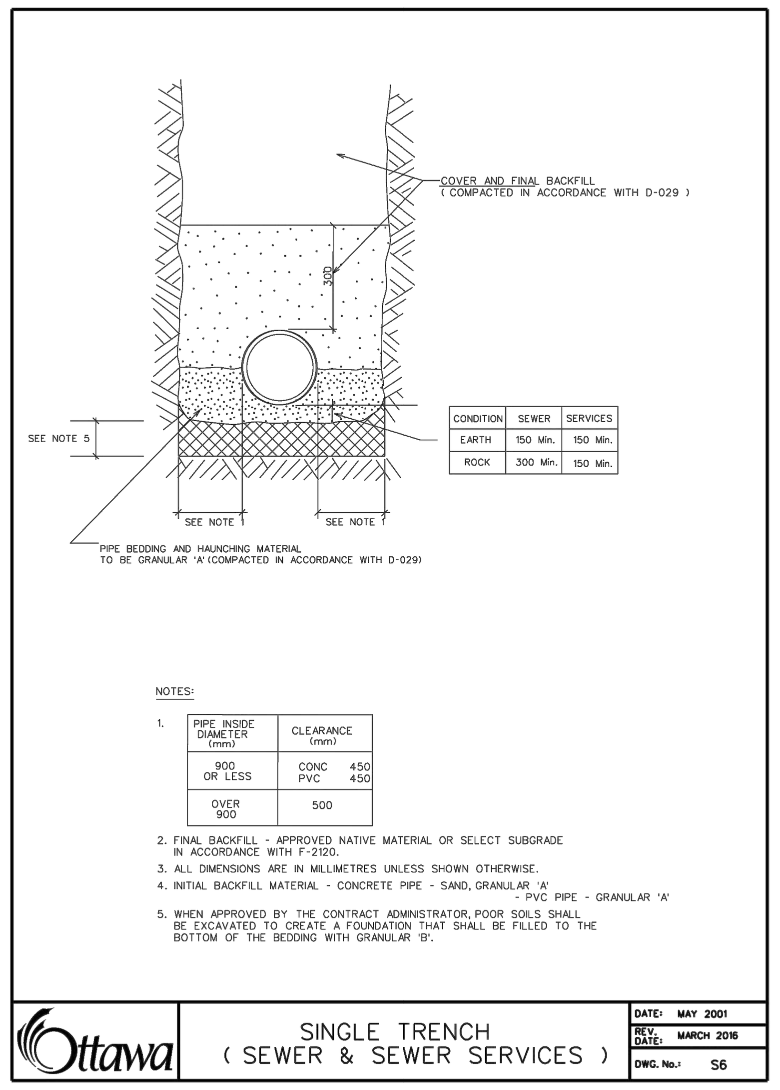


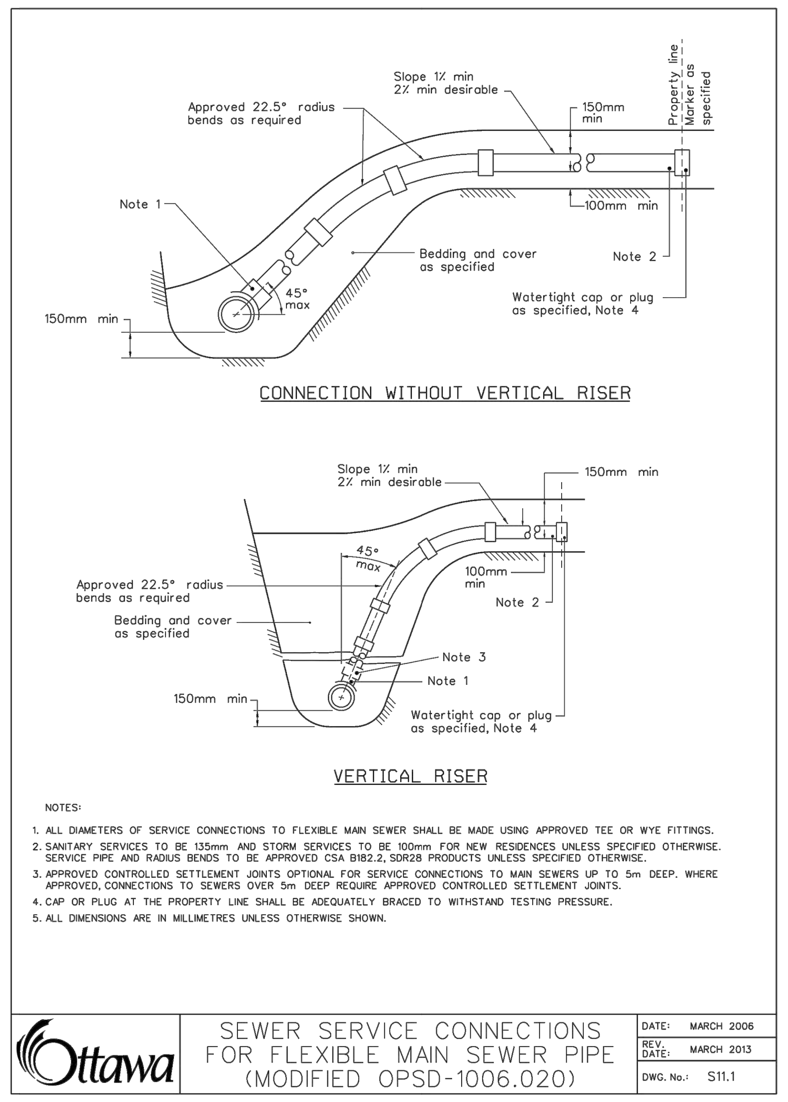


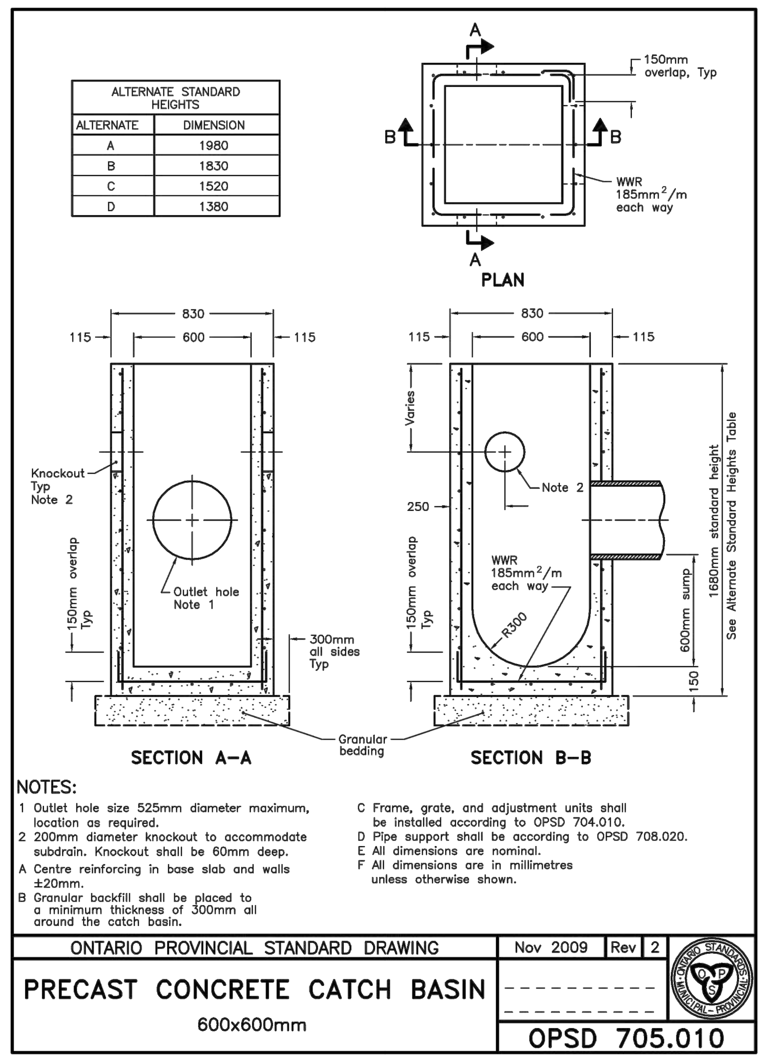


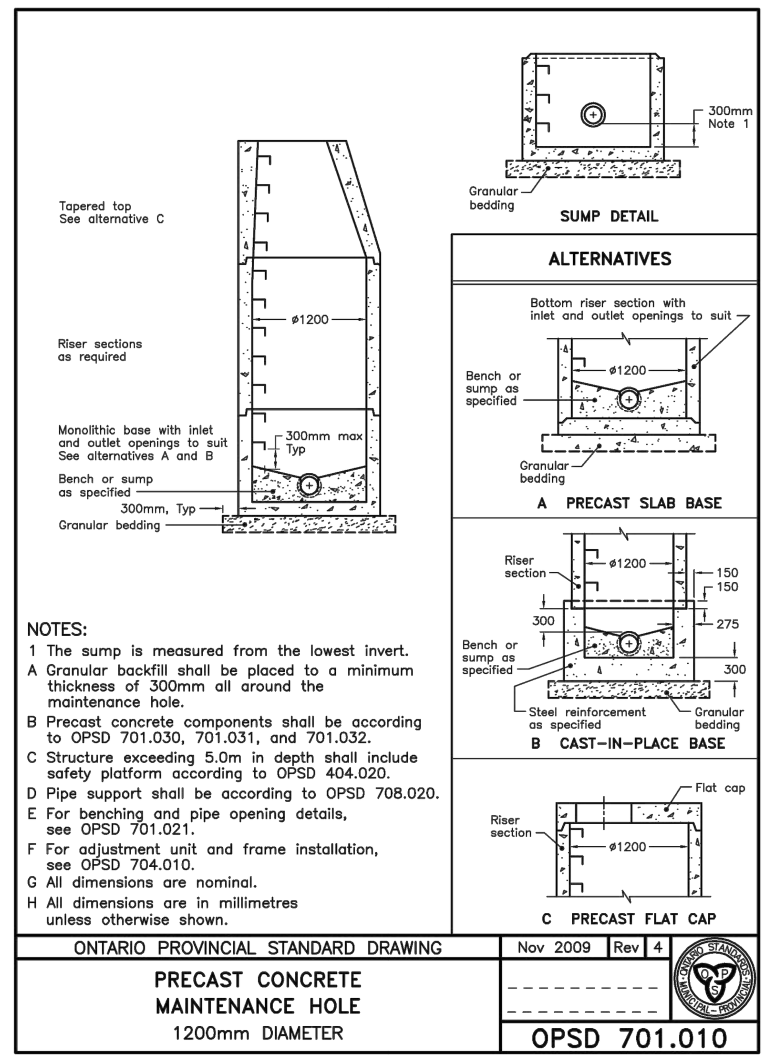


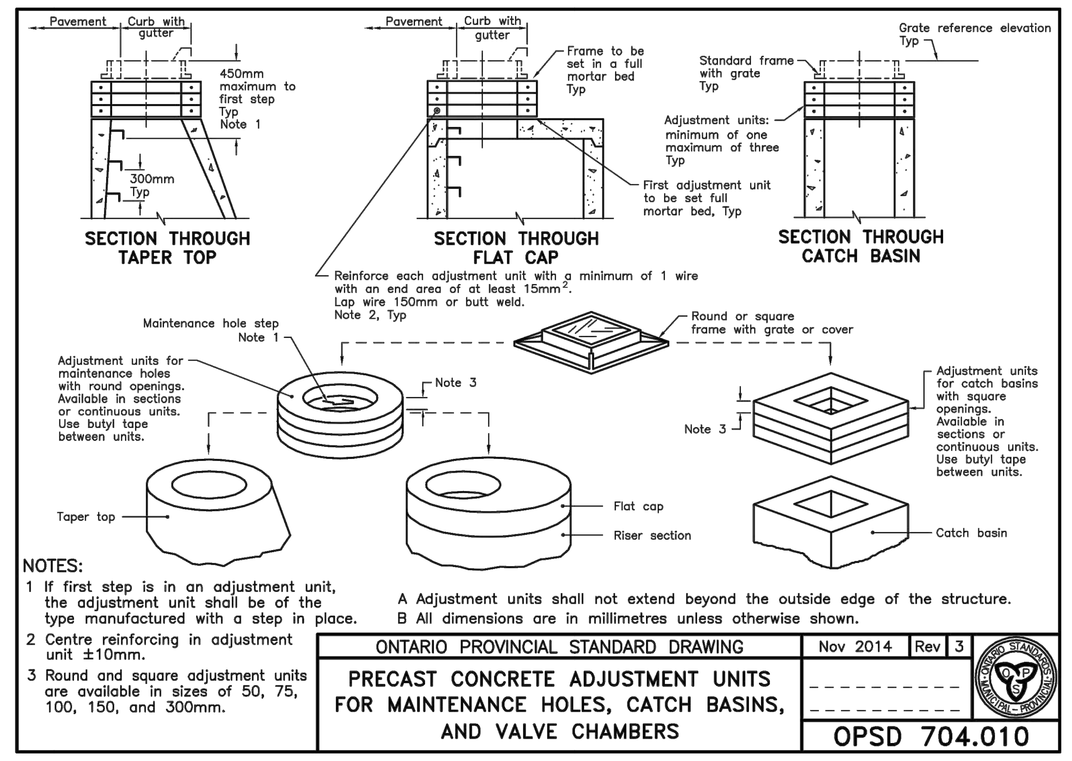


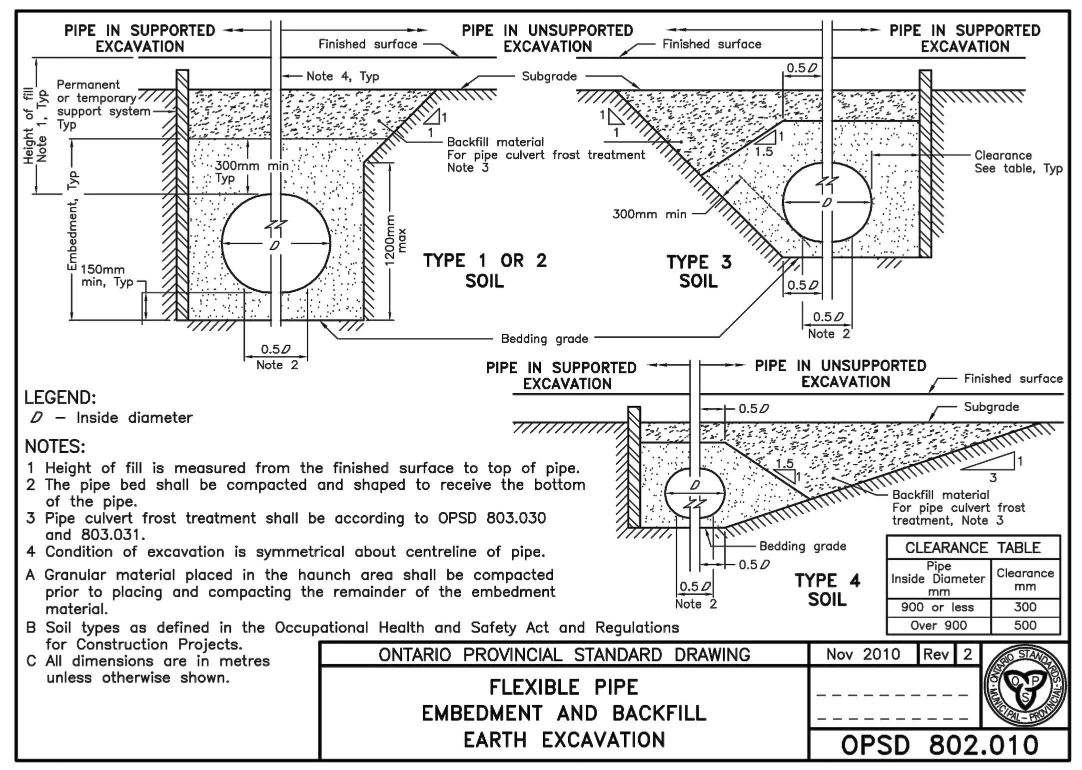












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DEVEVELOPMENT DEPARTMENT, CITY OF OTTAWA

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JUNE 5/2018
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MR. GERRY BENSON
700 EDUCATION ROAD, CONRWALL, ONTARIO
K6H 6B8 , TEL. 613-936-7850

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

PROJECT
PROPOSED BENSON AUTO PARTS
COMMERCIAL DEVELOPMENT
1871 MERIVALE ROAD, NEPEAN, ON

DRAWING TITLE
CONSTRUCTION DETAILS PLAN

PROJECT NO.
130828

DATE
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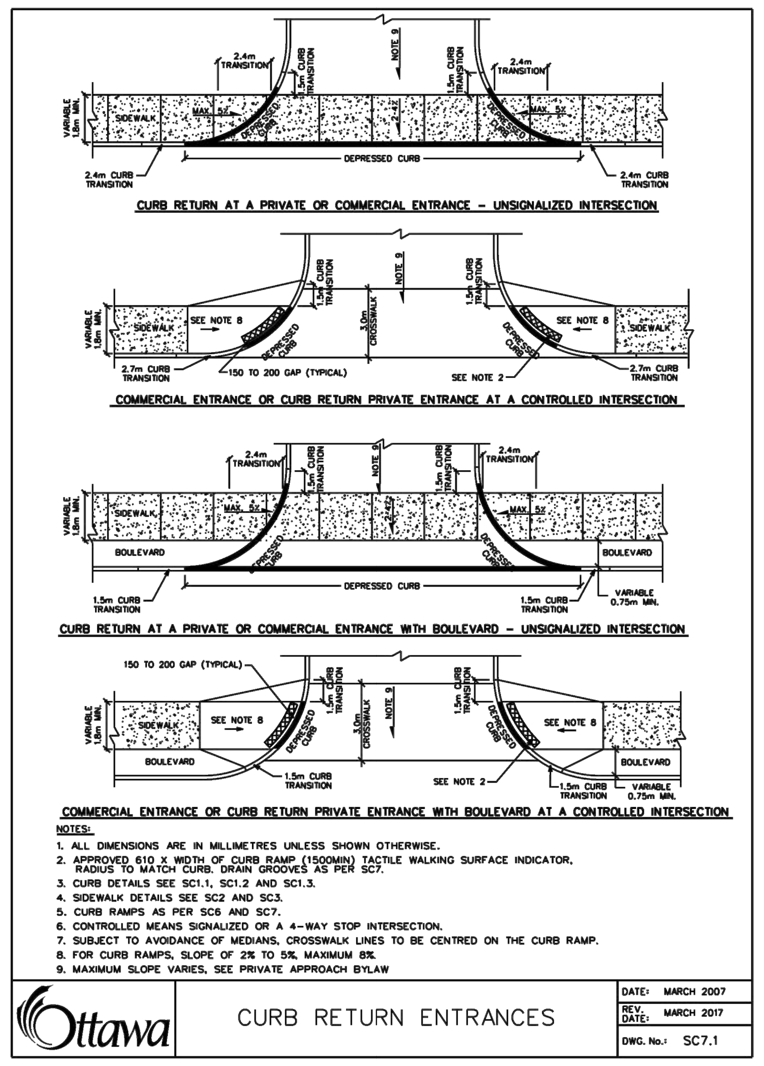
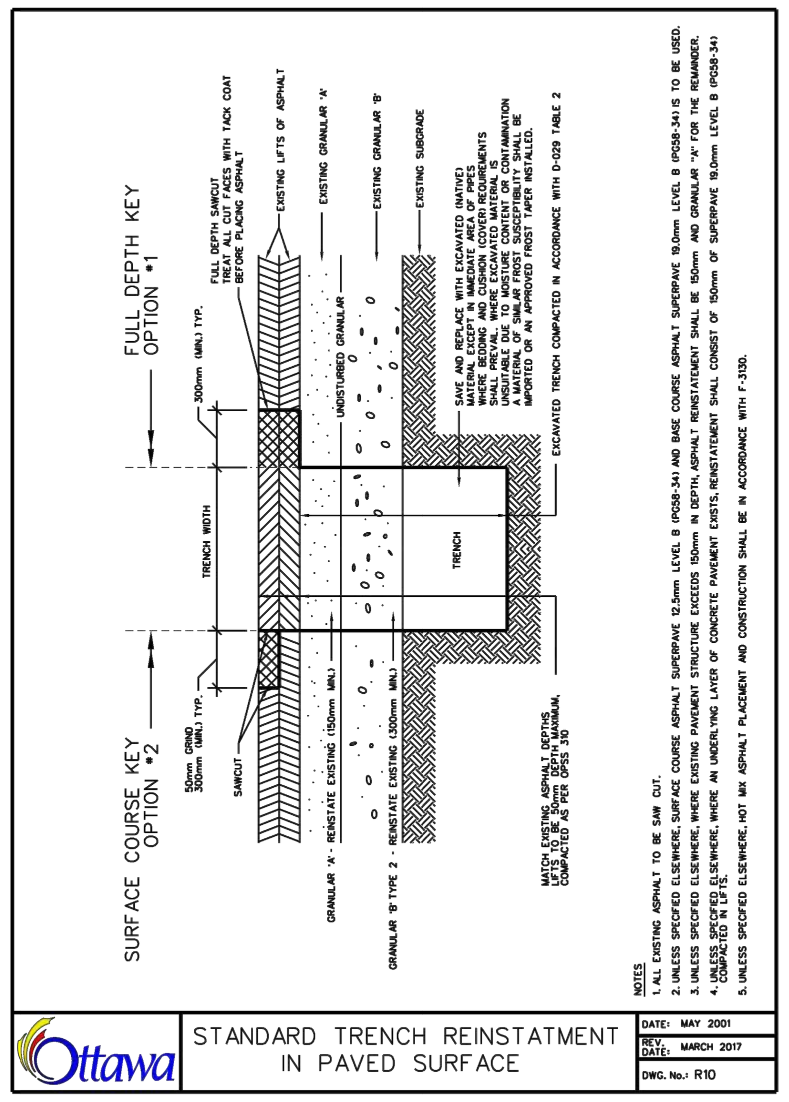
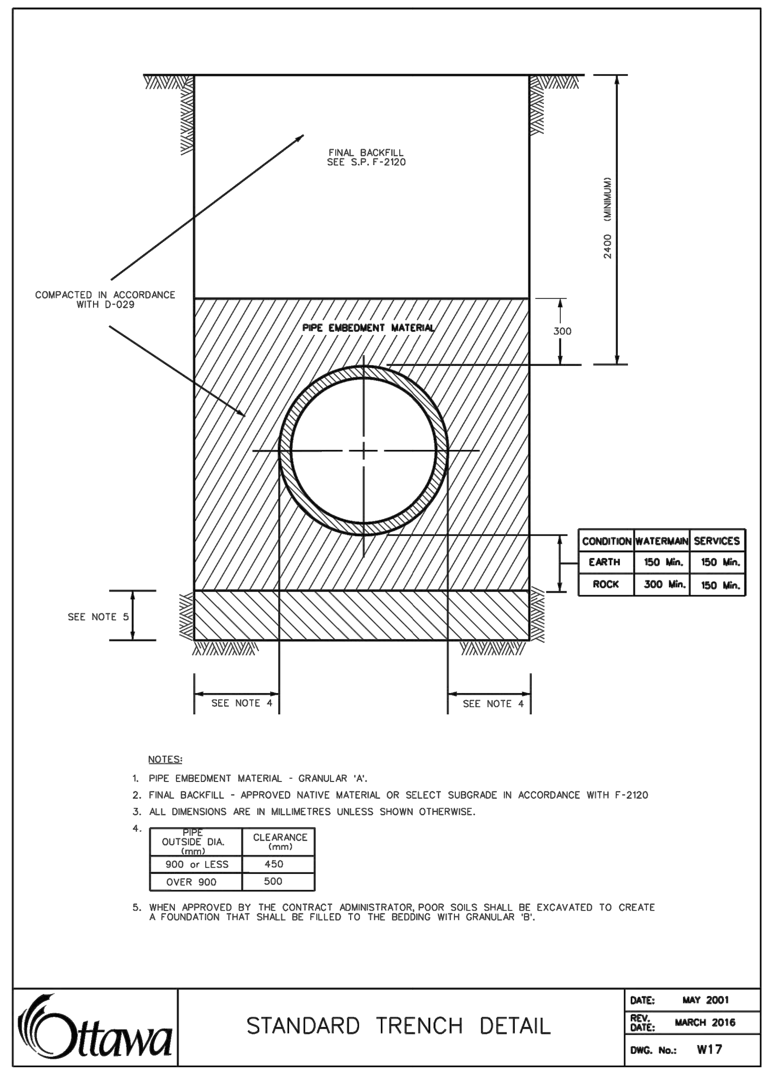
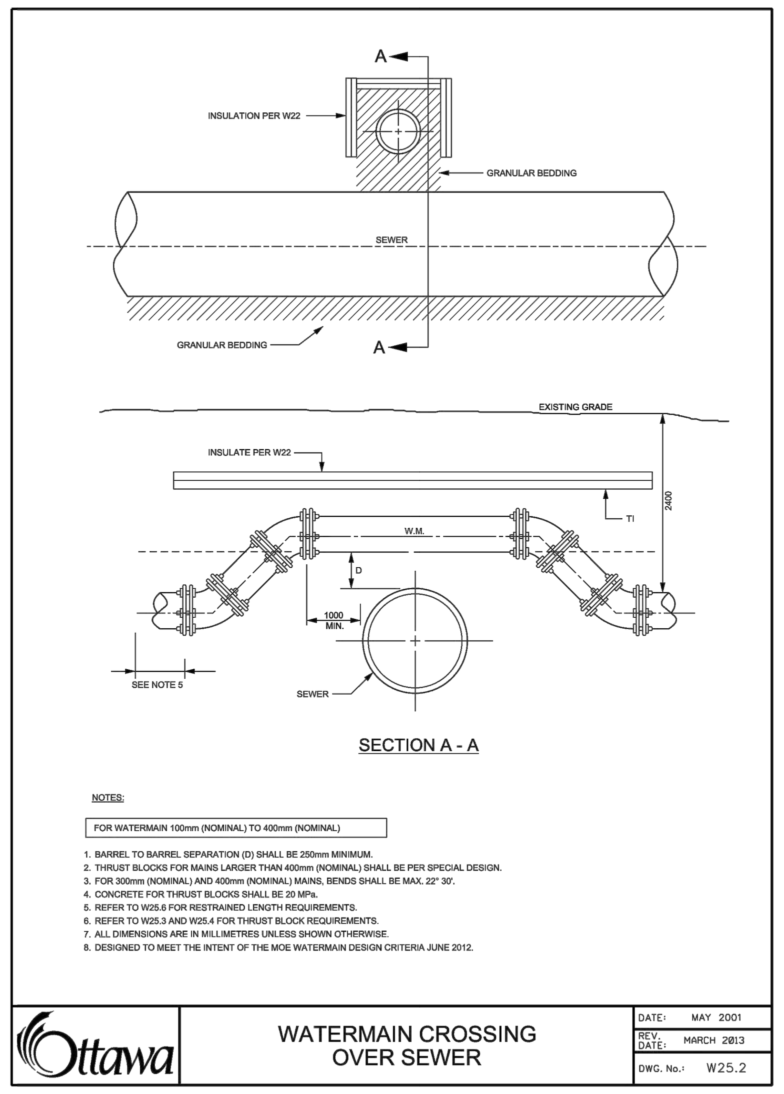
C901

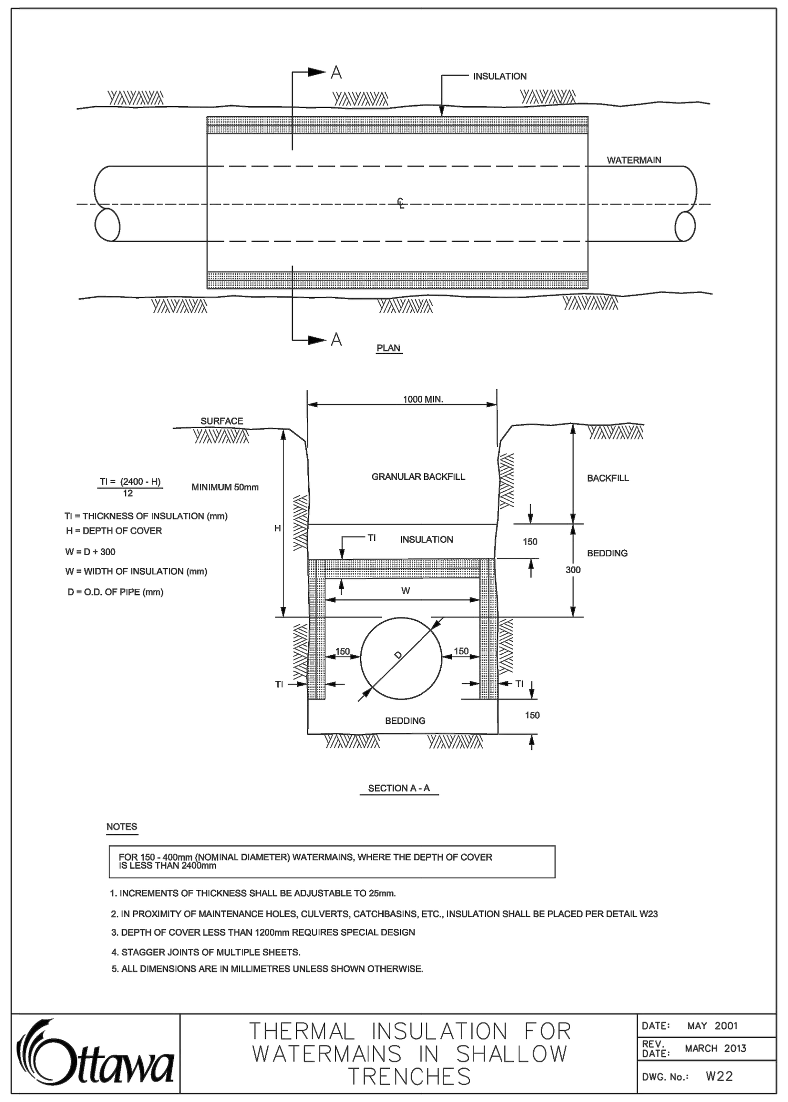
D07-12-17-0054

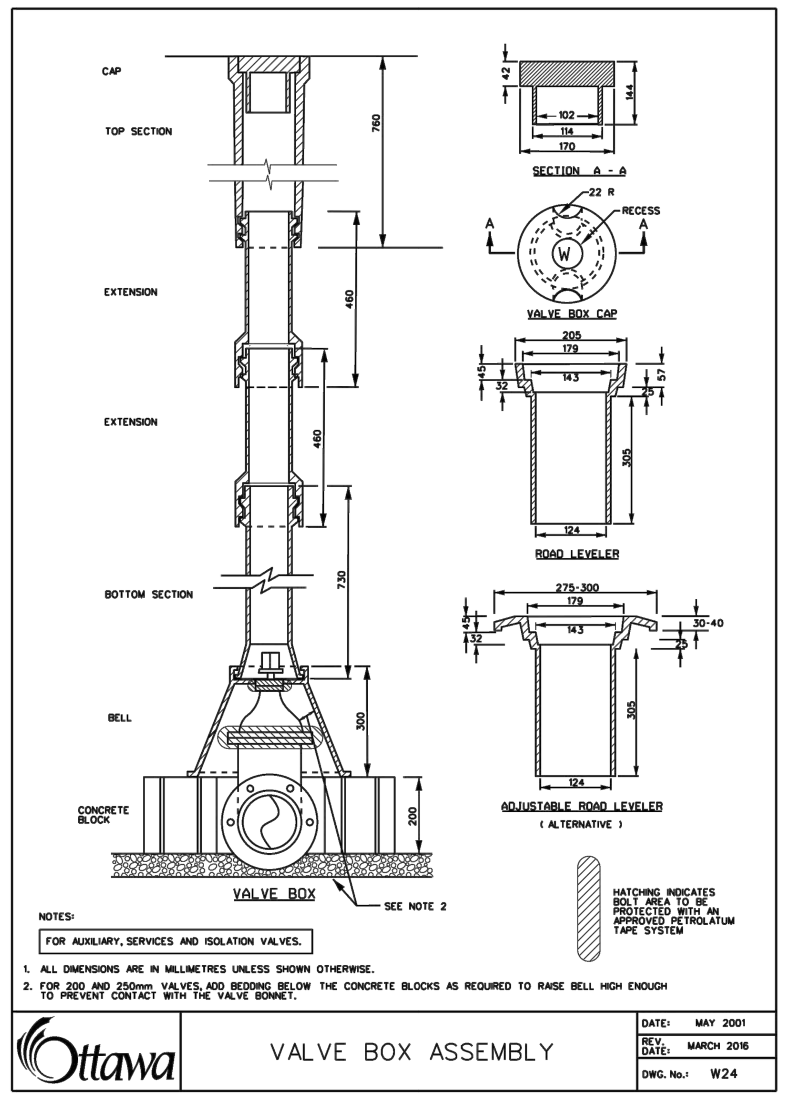


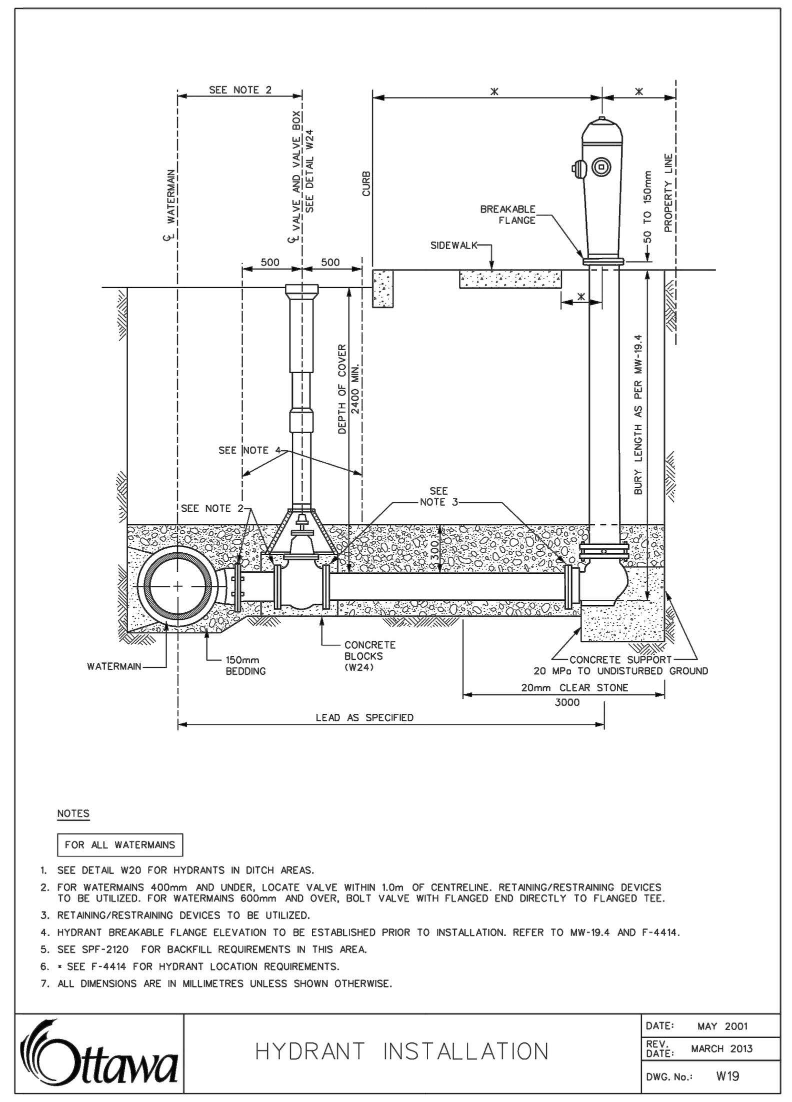












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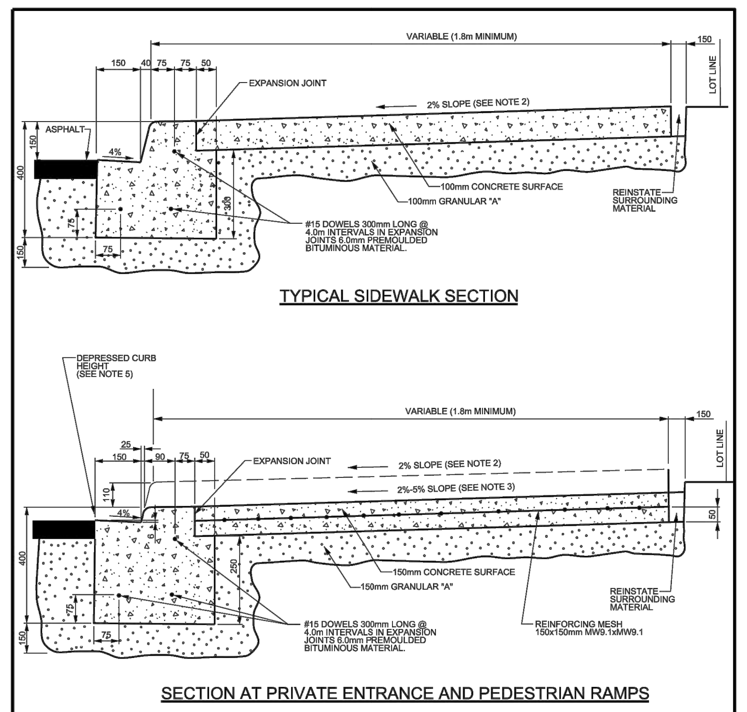


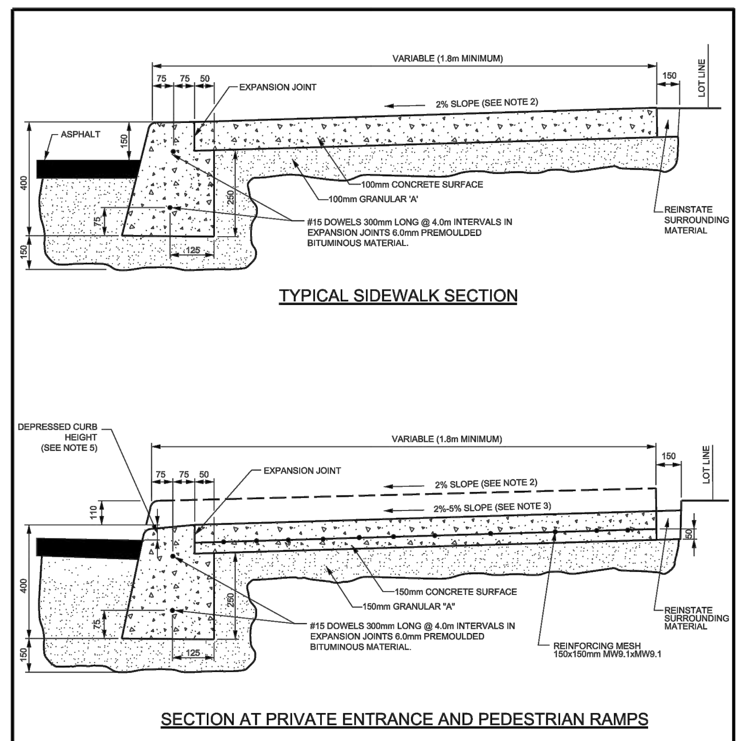
TYPICAL SIDEWALK SECTION

SECTION AT PRIVATE ENTRANCE AND PEDESTRIAN RAMPS

NOTES:
1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS SHOWN OTHERWISE.
2. THE MAXIMUM SLOPE IS NOT TO EXCEED 2%.
3. FOR CURB RAMPS, SLOPE OF 2% TO 5%, MAXIMUM 8%.
4. EXPANSION AND DUMMY JOINTS AS PER SC5.
5. DEPRESSED CURB HEIGHT - FOR PEDESTRIAN CURB RAMPS 0 TO 6 mm AND FOR PRIVATE ENTRANCES 0 TO 25mm.

N.T.S.

Ottawa	CONCRETE CURB AND SIDEWALK	DATE:	MAY 2001
		REV. DATE:	MARCH 2016
		DWG. No.:	SC3



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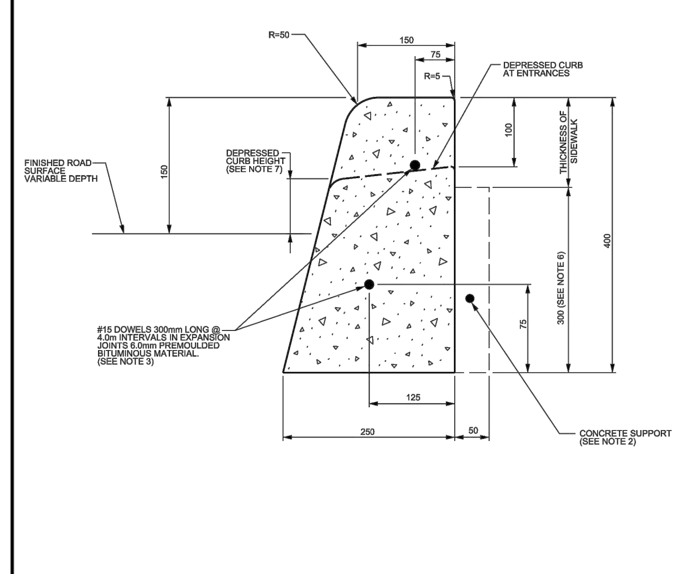
N.T.S.

Ottawa	CONCRETE BARRIER CURB WITH SIDEWALK	DATE:	JANUARY 2003
		REV. DATE:	MARCH 2016
		DWG. No.:	SC1.4

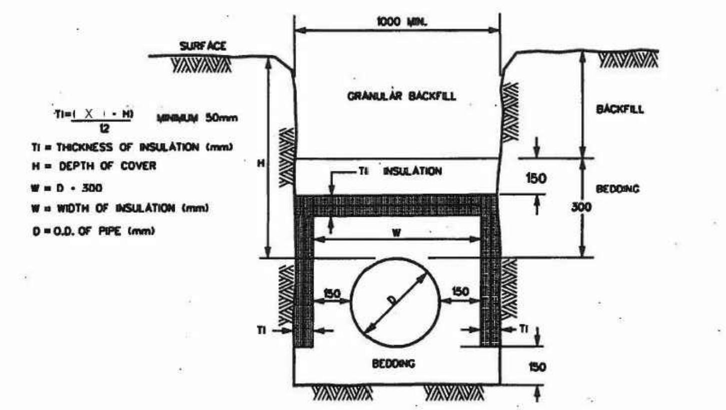


CONCRETE BARRIER CURB

NOTES:
1. THE FULL CURB DEPTH SHALL BE CARRIED THROUGH THE DEPRESSED ACCESS CROSSING.
2. A CONCRETE SUPPORT IS REQUIRED WHEN BUILT ADJACENT TO THE SIDEWALK.
3. IF AN EXTRUSION CURBING MACHINE IS USED, THE EXPANSION BITUMINOUS MATERIAL AND THE #15 DOWELS ARE TO BE PLACED AT THE END OF THE EXTRUSION.
4. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS SHOWN OTHERWISE.
5. DUMMY JOINTS SHALL BE 25mm DEEP, FRONT, BACK AND TOP OF SECTION AT 2m SPACING.
6. FOR DEPRESSED CURB AT ENTRANCES USE 250.
7. DEPRESSED CURB HEIGHT - FOR PEDESTRIAN CURB RAMPS 0 TO 6 mm AND FOR PRIVATE ENTRANCES 0 TO 25mm.

N.T.S.

Ottawa	CONCRETE BARRIER CURB FOR GRANULAR BASE PAVEMENT (MODIFIED OPSD-600.110)	DATE:	JANUARY 2003
		REV. DATE:	MARCH 2014
		DWG. No.:	SC1.1

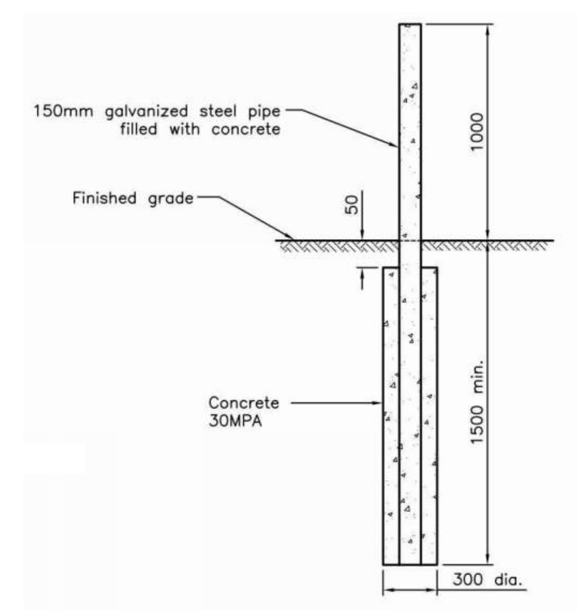


NOTES:
-EXTRUDED POLYSTYRENE INSULATION BOARDS HIGHLOAD 40 PER ASTM C578, TYPE VI
-FOR STORM INSULATION USE AN X VALUE OF 2000 IN THE ABOVE "TI" EQUATION.
-FOR SANITARY INSULATION USE AN X VALUE OF 2500 IN THE ABOVE "TI" EQUATION.
-FOR WATERMAIN INSULATION USE AN X VALUE OF 2400 IN THE ABOVE "TI" EQUATION.
-INCREMENTS OF INSULATION THICKNESS SHALL BE ADJUSTABLE TO 25mm.
-STAGGER JOINTS OF MULTIPLE SHEETS.
-ALL DIMENSIONS ARE IN MILLIMETERS UNLESS SHOWN OTHERWISE.

TYPICAL STORM AND SANITARY SEWER AND WATERMAIN INSULATION DETAIL
(N.T.S.)

Property and Test Method	HIGHLOAD 40
Thermal Resistance, per inch (25 mm), ASTM C518, C177, @ 75°F (24°C) mean temp., ft²•h•°F/Btu (m²•°C/W), R-value (RSI), min.	5.0 (.88)
Compressive Strength[1], ASTM D1621, psi (kPa), min.	40 (275)
Water Absorption, ASTM D2842, % by volume, max. (96 hr water immersion)	0.6
Water Vapour Permeance[2], ASTM E96, perms (ng/Pa•s•m²)	1.0 (57.2 ng/Pa.s.m²)
Maximum Use Temperature, °F (°C)	165 (74)
Coefficient of Linear Thermal Expansion, ASTM D696, in/in•°F (mm/m•°C)	3.5×10^{-5} (6.3×10^{-2})
Flexural Strength, ASTM C203, psi (kPa), min.	70 (480)
Compressive Modulus (typical), ASTM D1621, psi (kPa)	1,400 (9,650)
Complies with CAN/ULC S701, Type	4

CANADA VALUES AND TYPICAL PHYSICAL PROPERTIES OF STYROFOAM HIGHLOAD 40 INSULATION



BOLLARD DETAIL (TYP.)

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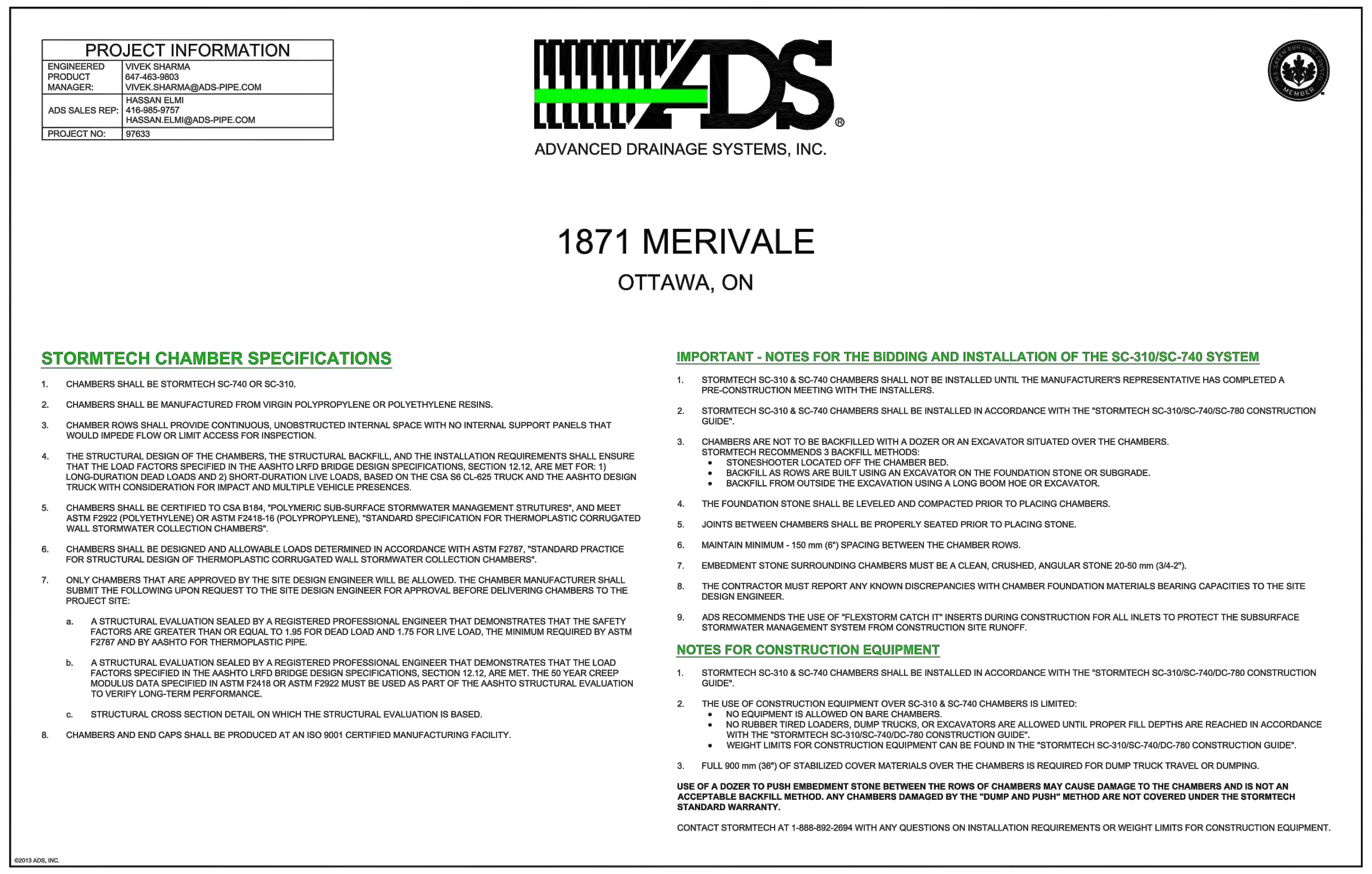

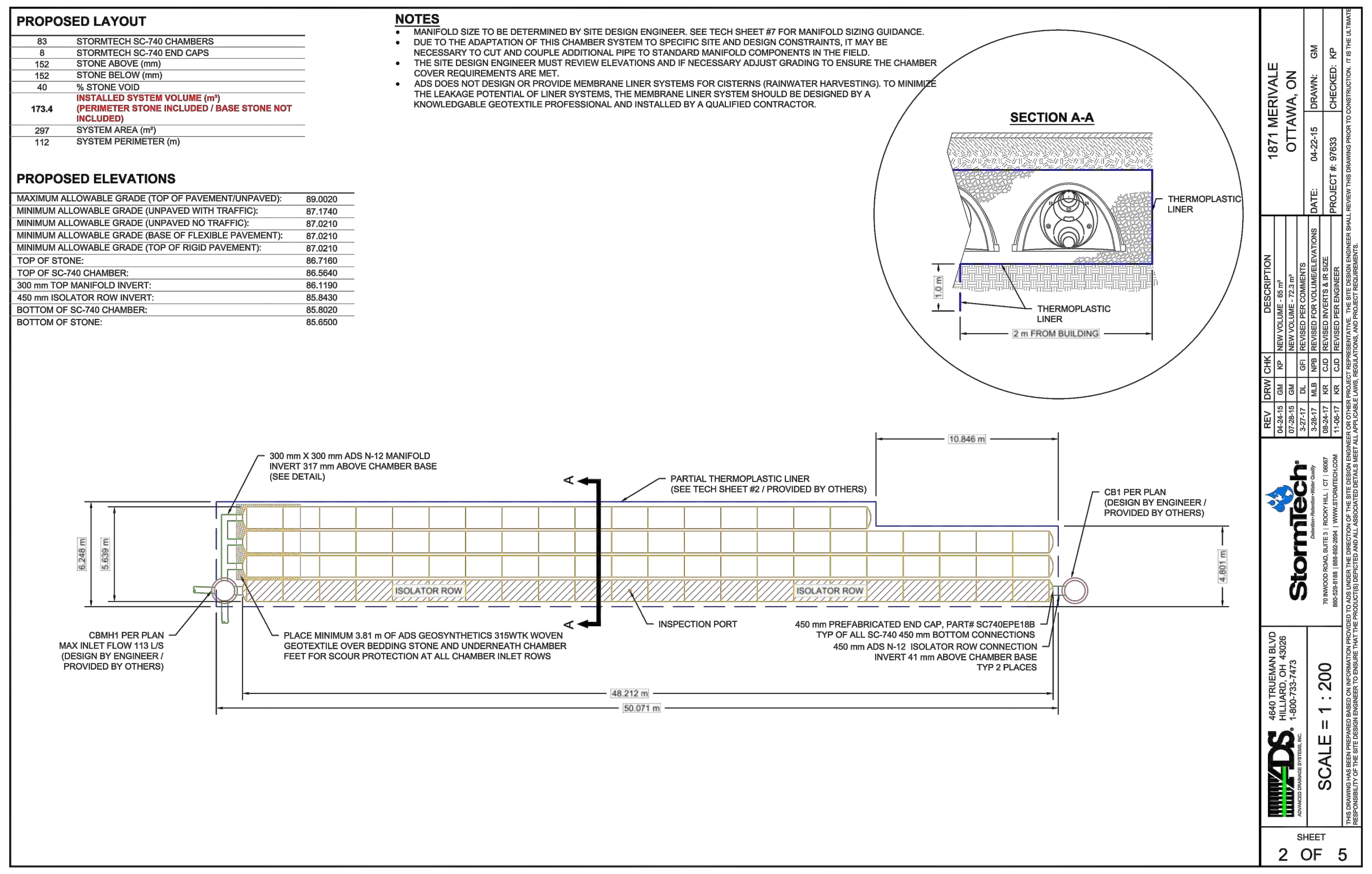

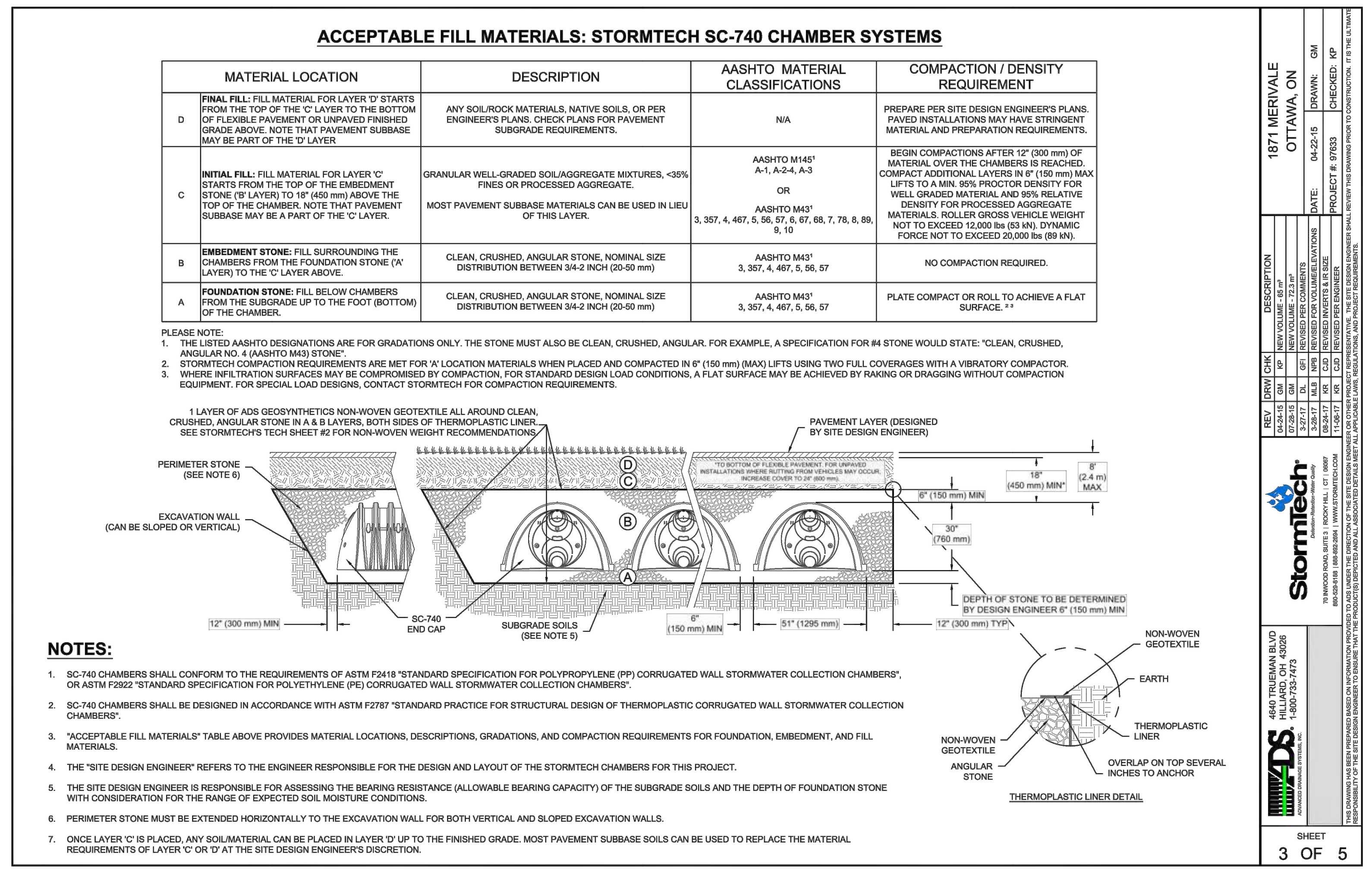

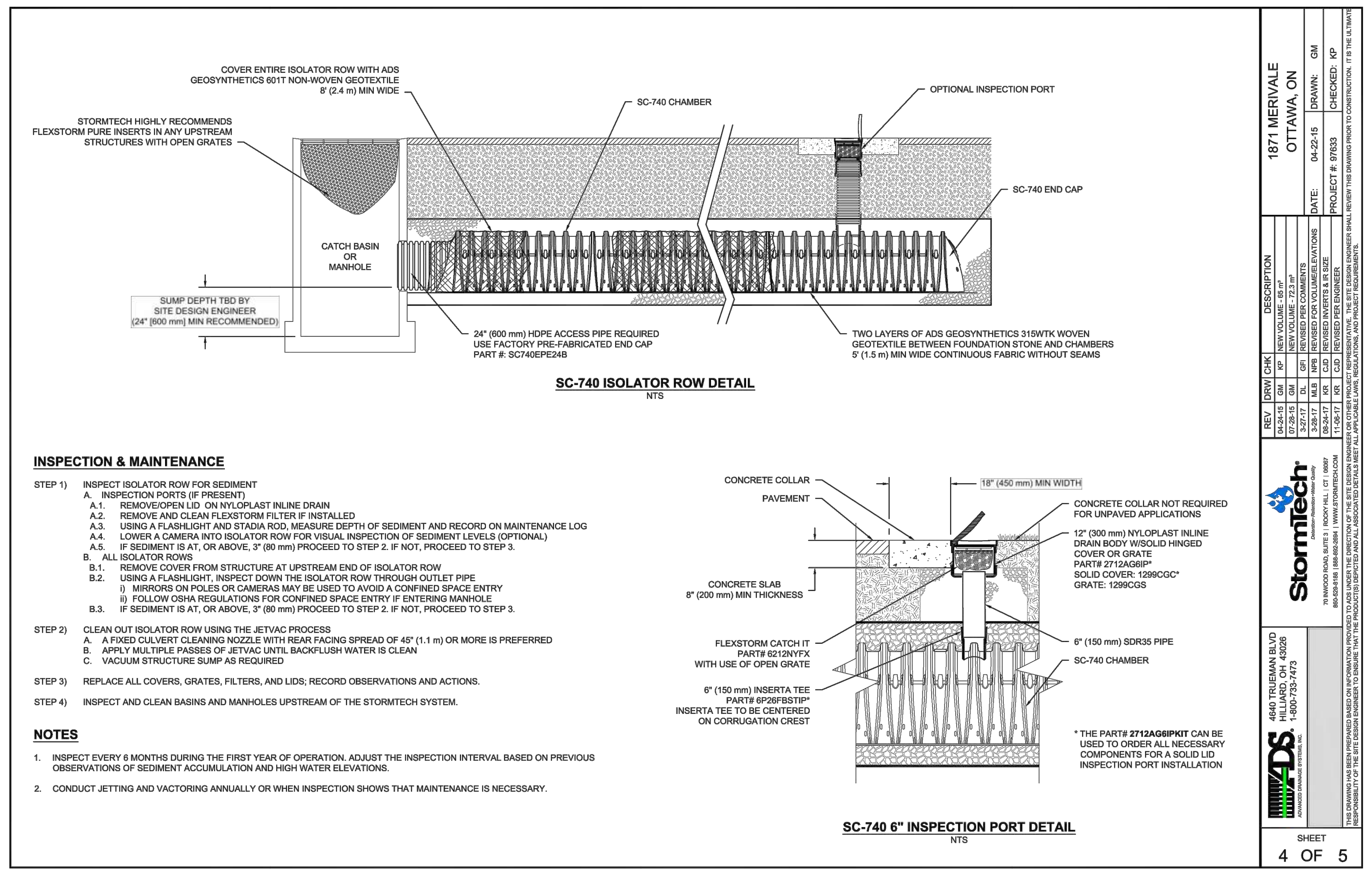

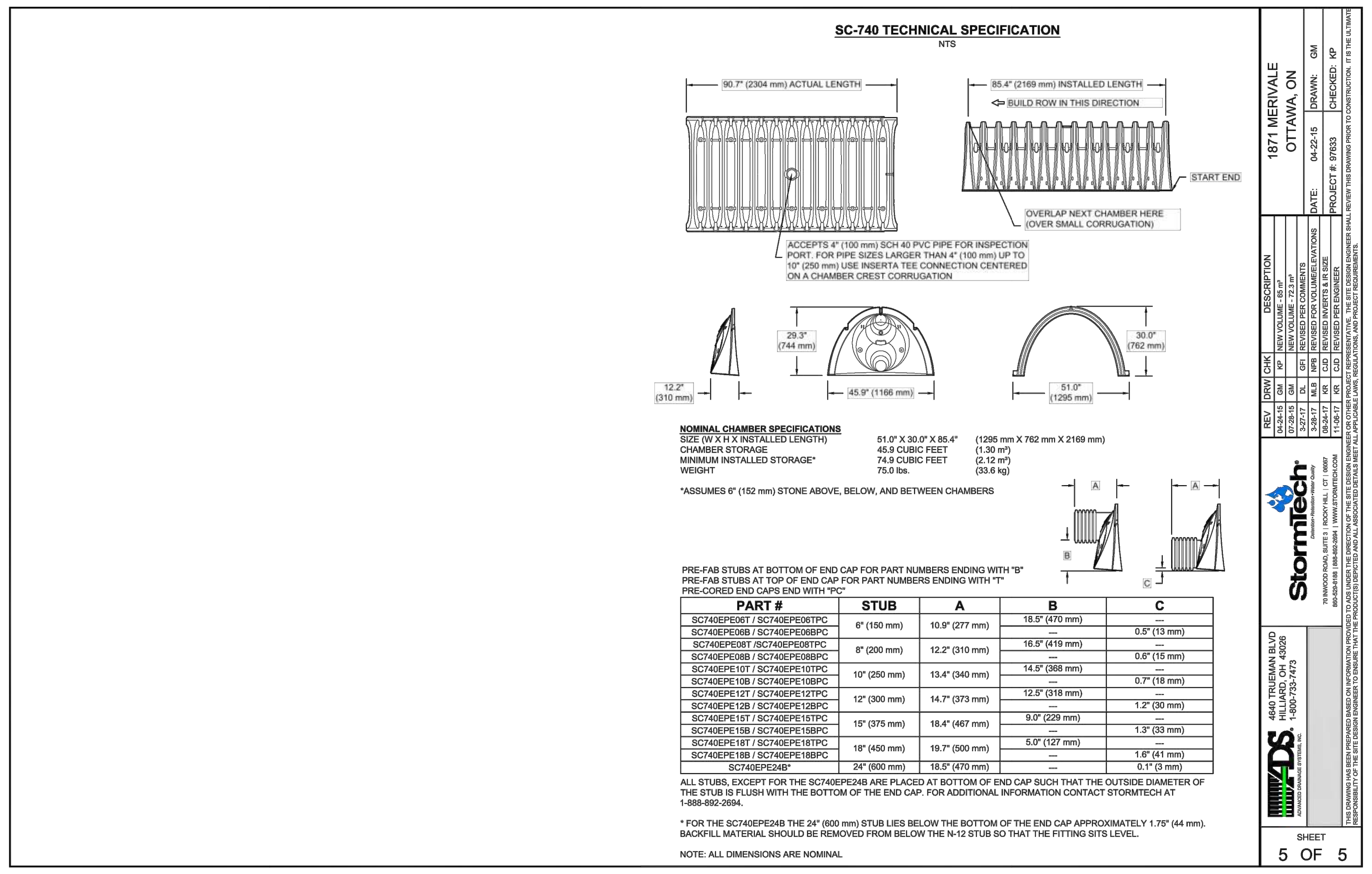

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THESE DRAWINGS ILLUSTRATES THE WORK TO BE DONE. THE ENGINEER IS NOT RESPONSIBLE FOR THE MEANS, METHODS, TECHNIQUES, SEQUENCES, AND PROCEDURES USED TO DO THE WORK, OR THE SAFETY ASPECTS OF CONSTRUCTION, AND NOTHING ON THESE DRAWINGS EXPRESSED OR IMPLIED 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.

APPROVED ☐ REFUSED ☐

THIS ____ DAY OF __________, 20____

DERRICK MOODIE
MANAGER, DEVELOPMENT REVIEW – WEST
PLANNING, INFRASTRUCTURE & ECONOMIC DEVEVELOPMENT DEPARTMENT, CITY OF OTTAWA

LICENSED PROFESSIONAL ENGINEER
J. C. R. LALONDE
JUNE 5/2018
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

No.	REVISIONS	BY	DATE
04	ISSUED FOR SPA	G.C.	05 JUN 2018
03	AS PER CITY COMMENTS	G.C.	26 OCT 2017
02	AS PER CITY COMMENTS	G.C.	25 AUG 2017
01	ISSUED FOR SPA	G.C.	24 MAR 2017

CLIENT
BENSON AUTO PARTS
MR. GERRY BENSON
700 EDUCATION ROAD, CONRWALL, ONTARIO
K6H 6B8 , TEL. 613-936-7850

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

PROJECT
PROPOSED BENSON AUTO PARTS COMMERCIAL DEVELOPMENT
1871 MERIVALE ROAD, NEPEAN, ON

DRAWING TITLE
CONSTRUCTION DETAILS PLAN

PROJECT NO.
130828

DATE
05 JUNE 2018

C904

D07-12-17-0054

APPENDIX H

Jamie Avenue As-Built Drawings

No.	Revisions	By	Date

REGISTERED PROFESSIONAL ENGINEER — W.M. HARDING — PROVINCE OF ONTARIO

Des. W.M.H.	Chkd. L.D.S.
Dwn. D.K.L.	Chkd. W.M.H.
Scale HORIZ: 1 : 500 VERT: 1 : 50	

Project: **BENTLEY, JAMIE & GIFFORD ROAD RECONSTRUCTION**

Dwg. Title: JAMIE AVENUE STORM SEWER STA. 0+016 to STA. 0+250

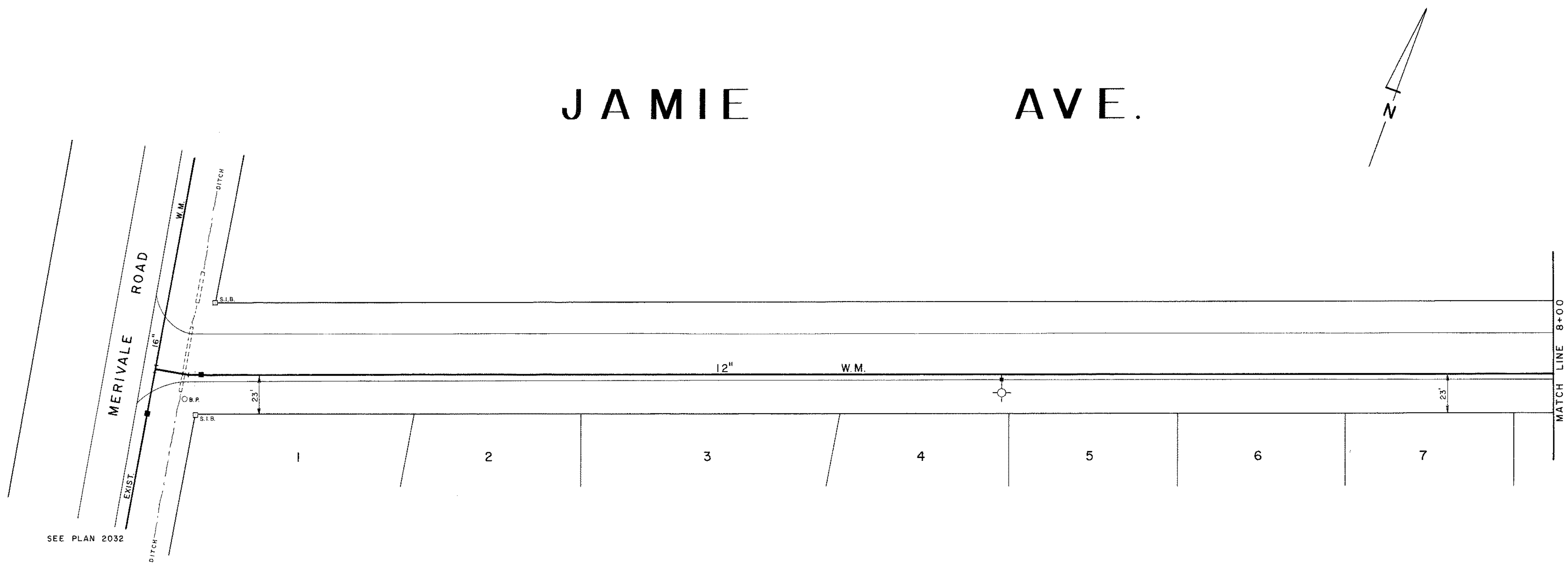
CITY OF NEPEAN

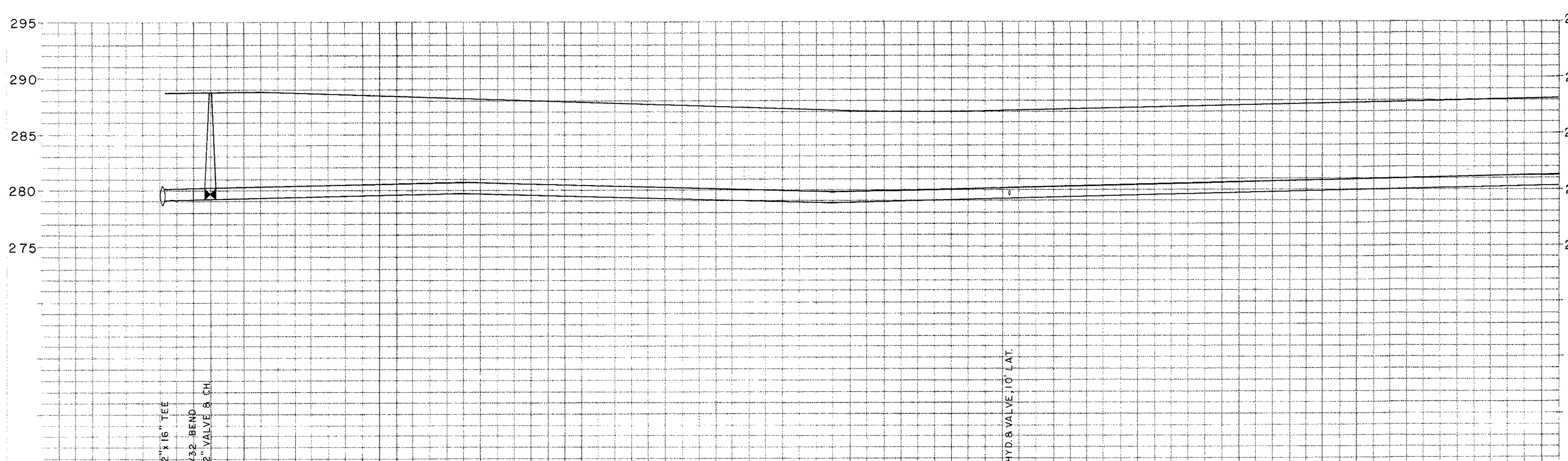
McNEELY ENGINEERING LTD.
Consulting Engineers – Ingenieurs Conseils
CORNWALL OTTAWA ROCKLAND

Date: JUNE 1980 | File: M80 – 955 | Dwg. 12 of 25

NOTE

THE LOCATION OF UTILITIES IS APPROXIMATE ONLY, AND THE EXACT LOCATION SHOULD BE DETERMINED BY CONSULTING THE MUNICIPAL AUTHORITIES AND UTILITY COMPANIES CONCERNED. THE CONTRACTOR SHALL PROVE THE LOCATION OF UTILITIES AND SHALL BE RESPONSIBLE FOR ADEQUATE PROTECTION FROM DAMAGE DURING CONSTRUCTION.





SURFACE	288.8		288.8	288.5	288.0	287.5	287.0		287.2	287.5	287.8	288.2
TOP OF W.M.	280.1		280.3	280.6	280.5	280.2	279.9		280.3	280.6	280.9	281.3
	0-28	0-10	0+00	1+00	2+00	3+00	4+00	4+75	5+00	6+00	7+00	8+00

NOV. /76	THIS PLAN WAS REDRAWN AND MADE "AS BUILT" FROM FIELD PRINT.	M.J.W.	
DATE	REVISIONS	DRN	APPR

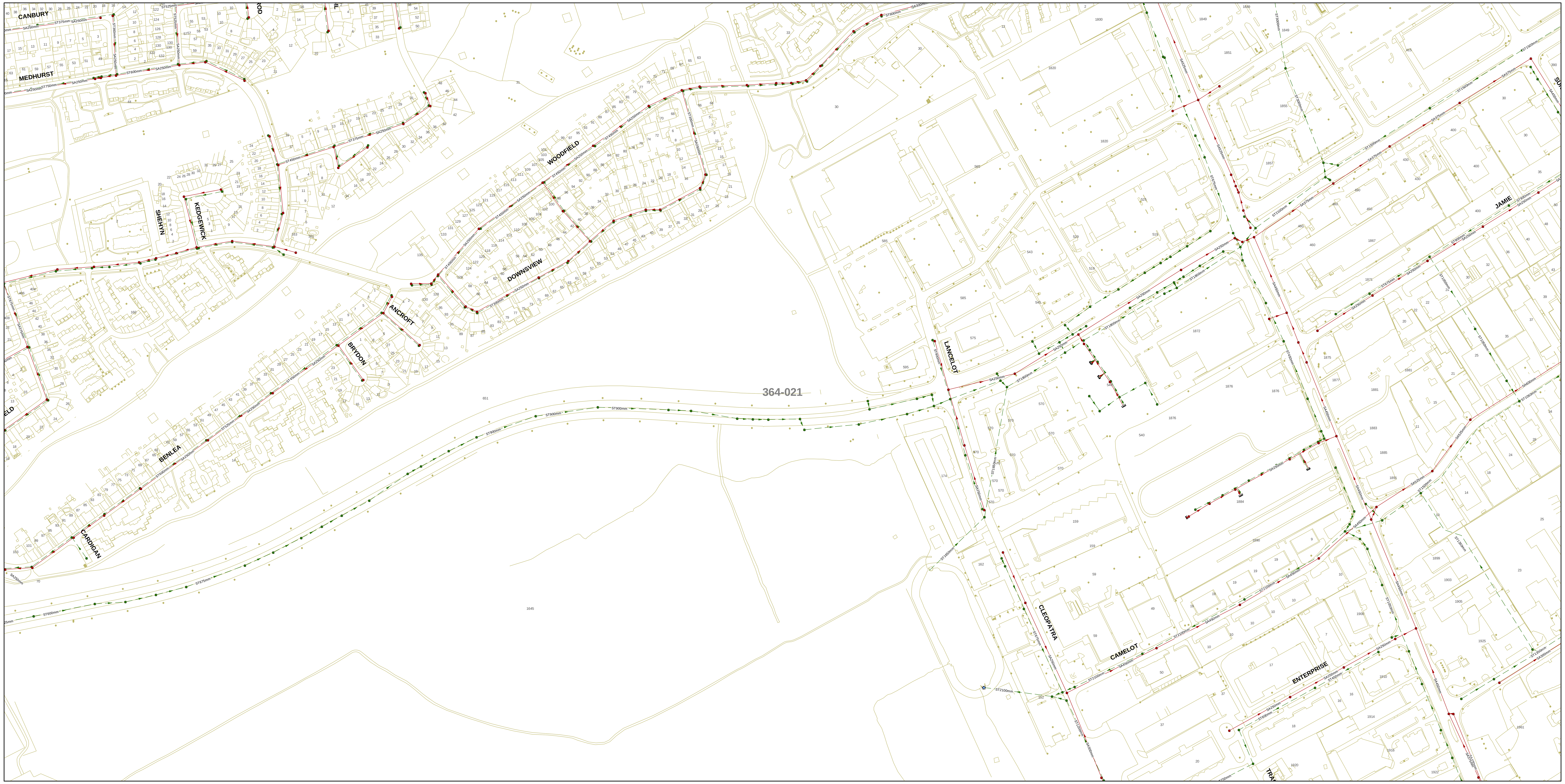
WORKS DEPARTMENT

12" WATER MAIN

JAMIE AVENUE

FROM MERIVALE RD. TO APPROX. 2,200' E.
STA. 0+00 TO 8+00

W. L. KEAY
F. E. AYERS
M. J. W.
NOV/76
N-110
SHEET 1 OF 3



2008
SANITARY & STORM COLLECTION SYSTEM

Department of Infrastructure Services and Community Sustainability

This map was compiled from existing & collected engineering Information from the City of Ottawa Geographic Information System and is protected by copyright. The location of Infrastructure is approximate and should not be used for construction purposes.

0 25 50 100 150 200 250 Meters

Scale 1 : 2500 approx.

Legend

- Regulator
- Storm Pump Station
- Sanitary Pump Station
- Wastewater Treatment Plant
- Storm Outlet
- Storm Manhole
- Storm Pipe
- Sanitary Trunk Sewer
- Sanitary Manhole
- Sanitary Pipe
- Combined Manhole
- Combined Pipe

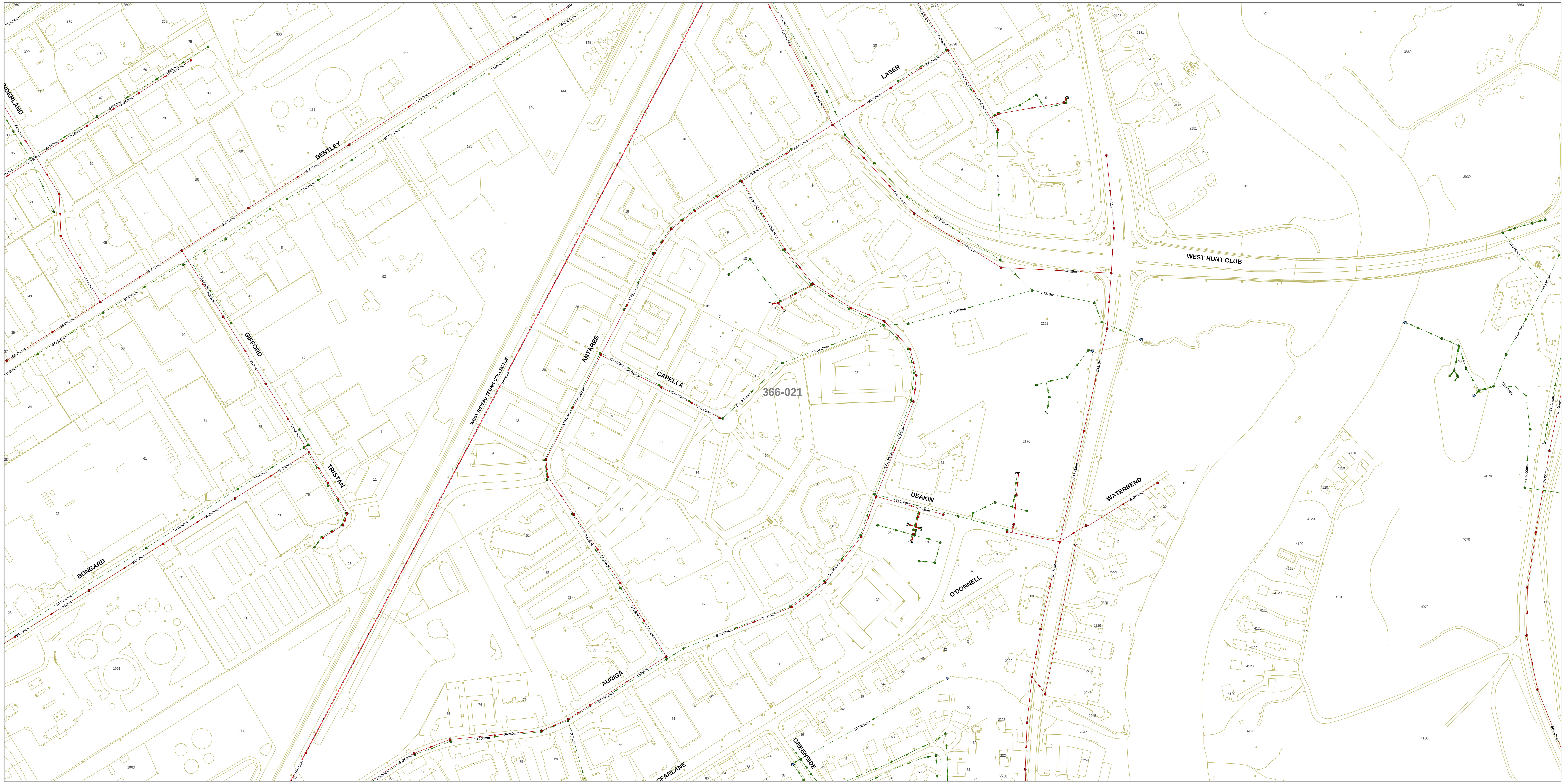
PIPE EQUIVALENTS

nominal (mm)	actual (inches)	nominal (mm)	actual (inches)	nominal (mm)	actual (inches)
100	4	675	27	1800	72
150	6	750	30	1950	78
200	8	825	33	2025	80
250	10	900	36	2100	84
300	12	975	39	2250	90
375	15	1050	42	2400	96
400	16	1200	48	2550	102
450	18	1350	54	2700	108
525	21	1500	60	2850	114
600	24	1650	66	3000	120

PIPE MATERIALS

ABS - ACRYL BUTADENE STYRENE
AC - ASBESTOS CEMENT
BRICK - BRICK
CLAY - CLAY
CONC - CONCRETE
CONPP - CONCRETE PRESSURE PIPE
CONR - REINFORCED CONCRETE PIPE
CONX - EXTRA STRENGTH CONCRETE PIPE
CORI - CORRUGATED IRON PIPE
CSP - CORRUGATED STEEL PIPE
CSPA - ASPHALT COATED CSP
DI - DUCTILE IRON PIPE
FRP - FIBERGLASS REINFORCED PLASTIC PIPE
GALV - GALVANIZED PIPE
KI - KITEC PIPE
PE - POLYETHYLENE PIPE (DR17)
PP - POLYPROPYLENE PIPE
PVC - POLYVINYL CHLORIDE PIPE
ST - STEEL PIPE
STC - CONCRETE LINED STEEL PIPE
UCI - UNLINED CAST IRON PIPE
UNK - UNKNOWN MATERIAL

362-023	364-023	366-023
362-022	364-022	366-022
362-021	364-021	366-021
362-020	364-020	366-020
362-019	364-019	366-019



2008 SANITARY & STORM COLLECTION SYSTEM

Department of Infrastructure Services and Community Sustainability

0 25 50 100 150 200 250 Meters

Scale 1 : 2500 approx.

Ottawa ©

Legend

Regulator	Storm Outlet	Sanitary Manhole
Storm Pump Station	Storm Manhole	Sanitary Pipe
Sanitary Pump Station	Storm Pipe	Combined Manhole
Wastewater Treatment Plant	Sanitary Trunk Sewer	Combined Pipe

PIPE EQUIVALENTS

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ST - STEEL PIPE
STC - CONCRETE LINED STEEL PIPE
UCI - UNLINED CAST IRON PIPE
UNK - UNKNOWN MATERIAL

364-023	366-023	368-023
364-022	366-022	368-022
364-021	366-021	368-021
364-020	366-020	368-020
364-019	366-019	368-019

APPENDIX I

Boundary Conditions

From: Fraser, Mark <Mark.Fraser@ottawa.ca>
Sent: July-05-17 4:01 PM
To: Michel Gagnon
Cc: Marty Benson; Guillaume Courtois
Subject: RE: 1871 Merivale Road
Attachments: 1871 Merivale July 2017.pdf

Hi Michel,

Please find below boundary conditions for hydraulic analysis as requested based on the provided anticipated water demands:

Proposed Development Location: **1871 Merivale Road**
Average Day = 2.78 L/s
Max Day = 4.16 L/s
Peak Hour = 5.0L/s
Fire Flow = 135 L/s

City of Ottawa Boundary Conditions:

The following are boundary conditions, HGL, for hydraulic analysis at 1871 Merivale (Pressure Zone 2W) assumed to be connected to the 305mm on Jamie Ave.:

Minimum HGL = **126.7m**
Maximum HGL = **134.5m**
MaxDay + FireFlow (135 L/s) = **127.4m**

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

Please refer to City of Ottawa, *Ottawa Design Guidelines – Water Distribution*, First Edition, July 2010, WDG001 Clause 4.2.2 for watermain pressure and demand objectives.

Boundary Condition for 1871 Merivale