Servicing and Stormwater Management Brief

Rear Building Replacement
Revisions to Site Plan Control Application
1871 Merivale Road
Nepean, Ontario K2G 1E3

Prepared for:

Benson Auto Parts
700 Education Road
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Attention: Mr. Marty Benson

LRL File No.: 130828.05

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1 INTRODUCTION

LRL Associates Ltd. was retained by Benson Auto Parts. to undertake a Stormwater Management Analysis pertaining to the revisions to the site located at 1871 Merivale Road to accommodate the reconstruction of a building located on the East portion of the existing site. The following brief outlines the proposed development and demonstrates the minor impact the reconstruction of this building has on the previously approved site plan application (Application No. D07-12-17-0054). This brief has been prepared to support the previously completed design and Site Servicing and Stormwater Management Report for the subject property prepared by LRL Associates with a revision date of October 26, 2018.

2 PROJECT OVERVIEW

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. The subject property is 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.

Currently this site is being redeveloped for a building expansion. The original scope of work that was approved under the previous site plan on November 06, 2018 included demolishing a portion (262 m^2) of an existing 1170 m^2 building on the west half of the site. Once the building was demolished, an expansion of a two-storey warehouse/garage and office space building with a footprint of 1115 m^2 was erected on the western extent of the site. Refer to Site Development Plan C201 for the permitted phase as per Site Plan Application No. D07-12-17-0054 (#17529).

Initially, it was intended that this new building would be attached to the portion of the existing building which remained after the demolition. However, to improve aesthetics and warehouse conditions, it is proposed to demolish the existing warehouse and construct a new 1-storey building with a similar footprint. Refer to Site Development Plan C201 for the location of proposed building.

The proposed building has a footprint of 835 m^2 and the existing building which is now proposed to be demolished has a footprint of 917m^2. Therefore, this project is introducing a reduction of 82 m^2 of building area and making minor internal site layout changes for vehicular maneuverability and parking. This proposed construction does not increase the impervious area of the original design, as the entire site was hardscape previously.

3 STORMWATER MANAGEMENT

3.1 Design Criteria

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

For quality control, two oil-grit separators have been proposed through phase 1 which will provide an enhanced level of protection i.e. 80% TSS removal.

For quantity control, all post-development storm events including 100-year event will be controlled to the 5-year pre-development level. The site's major overland route has been designed (through phase 1) to ensure that storm events exceeding 100-year can be conveyed safely towards the Jamie Avenue right of way. The minor system storm sewer within the site is sized to convey the 5-year stormwater flow from the site to the municipal storm sewer on Jamie Avenue.

3.2 Existing Conditions and Stormwater Quantity

As a result of no increase in overall pervious area of the site, the proposed building and minor site changes have been designed to have zero increase on the previously controlled release rate. The extent of the site development is isolated on the east portion which results in only minor updates to the previous stormwater management design. The impact is isolated to the controlled post-development catchment area CA-01. Refer to C702 for the post development catchment plan.

As per the original design, for each of the site's catchment areas, post-development runoff generated by minor and major storm events will be equal or less than the runoff generated during pre-development conditions. Table 1 below summarizes the characteristics for each catchment in the original approved design, as well as the catchments as a result of this proposed development.

Table 1: SWM Catchment Runoff Coefficient Calculations

SWM Catchment Name	2018 Approved Site Plan Catchment Characteristic			Proposed SWM Catchments		
	Controlled/ Uncontrolled	Runoff Coefficient	Area (ha)	Controlled/ Uncontrolled	Runoff Coefficient	Area (ha)
CA-01	Controlled	0.85	0.140	Controlled	0.81	0.161
CA-02	Controlled	0.87	0.137	Controlled	0.87	0.144
CA-03	Controlled	0.88	0.125	Controlled	0.88	0.139
CA-04	Controlled	0.84	0.135	Controlled	0.84	0.135
CA-05	Uncontrolled	0.70	0.044	N/A	-	-
	Total	0.85	0.58	Total	0.85	0.58

As demonstrated in the table above, the overall area and runoff coefficient for the site remains unchanged. These values ensure that there will be no surplus runoff generated leaving the site; therefore, additional on-site stormwater management quantity control detention measures are not required. Refer to Appendix A for the Pre and Post Development Catchments Plans, C701 and C702 in the design drawings. Refer to Appendix B for the pre and post development runoff coefficients calculations.

3.3 Stormwater Management Concept

The information below should be read in conjunction with Section 5.2 of phase 1 Site Servicing and Stormwater Management Report (Appendix H) and drawing C702. Table 2 shows the summary of release rate.

Table 2- Release Rate Summary (modified from a Table in Section 5.2 of Phase 1 Report)

Outlet	Uncontrolled Release (L/s)	Controlled Release (L/s)	Total Release (L/s)	Remarks
Storm System/Site Outlet #2	5.47	29.52	34.99	Phase 2
Storm System/Site Outlet #3	N/A	14.99	14.99	Phase 1

To restrict flows from phase 2 to the established release rate of 29.52 L/s, a VHV Vertical Vortex Flow Regulator model 150VHV-2 is proposed at STM MH2, refer to C.401 for details. For additional detail of Hydrovex VHV, refer to Appendix D of Phase 1 report.

Refer to Storm Design Sheet included in Appendix B for the calculations of proposed storm sewer network capacity.

3.4 Water Quality

The original design proposed two Stormceptor STC 300 oil/grit separators (one for each storm connection) which provided water quality treatment; where the enhanced 80% TSS removals requirement is met. The Stormceptor proposed originally will remain in the same location on site. Refer to Stormceptor sizing report included within the appendices of the *Phase 1 Site Servicing and Stormwater Management Report* (Appendix H) for details on OGS model and performance.

4 WATER SUPPLY AND FIRE PROTECTION

4.1 Water Supply Demand and Fire Flow

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 3.33 L/min and a daily and hourly peak factor of 1.5 and 1.8, respectively.

For the proposed building, it was assumed that future use could lead to additional bathrooms. Therefore, it has been assumed that there would be 8 water closets, and 8 lavatories. The peak water demand for the proposed building was calculated for the 33.6 fixtures units (as per Hydraulic Load Table 7.6.3.A O.B.C).

The average daily water demand for the new building is 1.86 L/s, maximum daily is 2.80 L/s, and maximum hourly is 5.03 L/s. Please refer to Appendix C for the water demand calculation sheet. The proposed building has an approximately 20% smaller gross floor area than previously contemplated in approved *Phase 1 Site Servicing and Stormwater Management Report* (Appendix H). Therefore, it is anticipated that pressures received from boundary conditions in Phase 1 for all scenarios would still be above minimum required pressures stated in the City Water Design guidelines.

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 133.3 L/s.

There are two fire hydrants, one within 45 m and another within 150 m from the building, that are available to supply the required fire flow demand. Please refer to Appendix D for the fire flow calculation sheet and fire hydrant locations.

4.2 Water Service Design

As per the approved site servicing plan in 2018, there was a 50 mm dia. service connection to the building which was proposed to be demolished. This connection was to be removed, with one new connection to the entire building. However, now that this proposal is to construct a new building, which is to be no longer connected to the west service garage building, it is proposed to re-install a 100mm service to the watermain along Jamie Avenue to feed the proposed new building as shown on Site Servicing Plan C401.

5 SANITARY SERVICE

5.1 Existing Sanitary Sewer Services

The site is currently being serviced by a 150 mm 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 675 mm 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 E for the Jamie Avenue As-Built Drawings, as well as the sanitary sewer distribution maps.

5.2 Sanitary Sewer Servicing Design

As per the approved site servicing plan in 2018, a monitoring manhole (SAN MH2) was installed along the existing 100 mm dia. service, which is located in the east end of the proposed building. It is proposed to remove the existing 100 mm dia. sanitary service and install a new 150 mm dia. PVC pipe for the proposed building as shown on Site Servicing Plan C401.

6 CONCLUSION

This Servicing and Stormwater Management Brief for the building replacement proposed at 1871 Merivale Road presents the details for the servicing requirements for the subject building. In accordance with the report objectives, the servicing requirements for the development are summarized below:

Stormwater

- The proposed building is located on the east portion of the site. Therefore, the existing 250 mm storm service connecting to Jamie avenue at the east outlet will remain to collect and convey runoff generated.
- The remainder of the site will remain as per the original design.
- Stormwater quality objectives will be met with the use of an oil/grit separator.

Domestic Water

- The anticipated water demand for the site is 1.86 L/s (average daily), 2.80 L/s (maximum daily), and 5.03 L/s (maximum hourly).

- The maximum required fire flow was calculated to be 133.3 L/s using the FUS method.
- Two fire hydrants, one within 45 m and another within 150 m from the building exterior, are located along Jamie Avenue and are available to service the proposed building.
- The new building will be serviced with a 100 mm dia. service lateral connected to the existing 300 mm watermain on Jamie Avenue.

Sanitary

- The new building will be serviced with a 150 mm dia. sanitary servicing to be connected to the monitoring sanitary manhole (SAN MH2) as per the approved site plan (Phase 1).

7 Report Conditions and Limitations

The report conclusions are applicable only to this specific project described in the preceding pages. Any changes, modifications or additions will require a subsequent review by LRL Associates Ltd. to ensure the compatibility with the recommendations contained in this document.

If you have any questions or comments, please contact the undersigned.

Prepared by:

LRL Associates Ltd.

Amr Salem

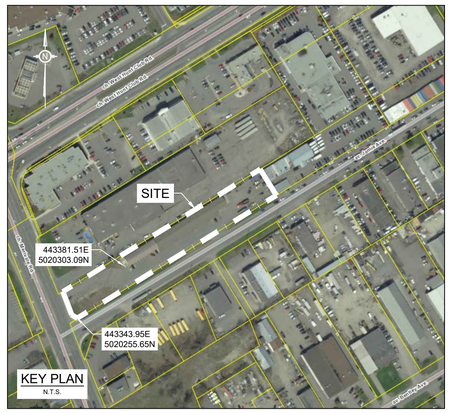
Civil Designer

Mohan Basnet, P.Eng.

Civil Engineer

APPENDIX A

Civil Engineering Design Drawings



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:

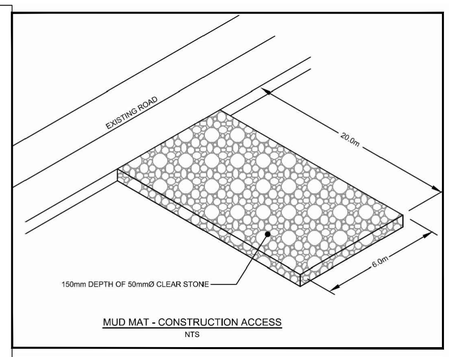
- PRIOR TO THE REMOVAL OF ANY VEGETATIVE COVER, MOVING OF SOIL AND CONSTRUCTION:
- INSTALL SILT FENCE IMMEDIATELY DOWNSTREAM FROM AREAS TO BE DISTURBED (SEE PLAN FOR LOCATION).
- INSTALL INLET SEDIMENT CONTROL DEVICES
- INSTALL GEOSOCK INSERTS WITH AN OVERFLOW IN ALL THE DOWNSTREAM CATCHBASINS AND MANHOLES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



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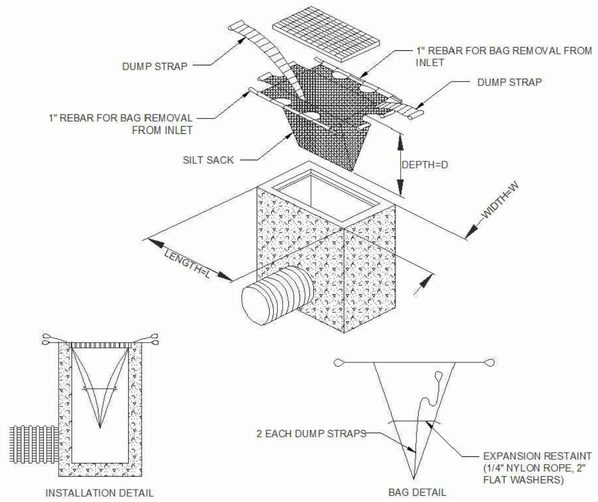

INLET SEDIMENT CONTROL DEVICE
N.T.S.

LEGEND:

	PROPERTY LINE
	PROPOSED CURB
DC	PROPOSED DEPRESSED CURB
	PROPOSED DOOR ENTRANCE/EXIT
	PROPOSED GRASS AREA
	0.3m WIDE (MIN.) STEP JOINT
	PROPOSED HEAVY DUTY ASPHALT
	PROPOSED LIGHT DUTY ASPHALT
	PROPOSED INTERLOCKING PAVERS
	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
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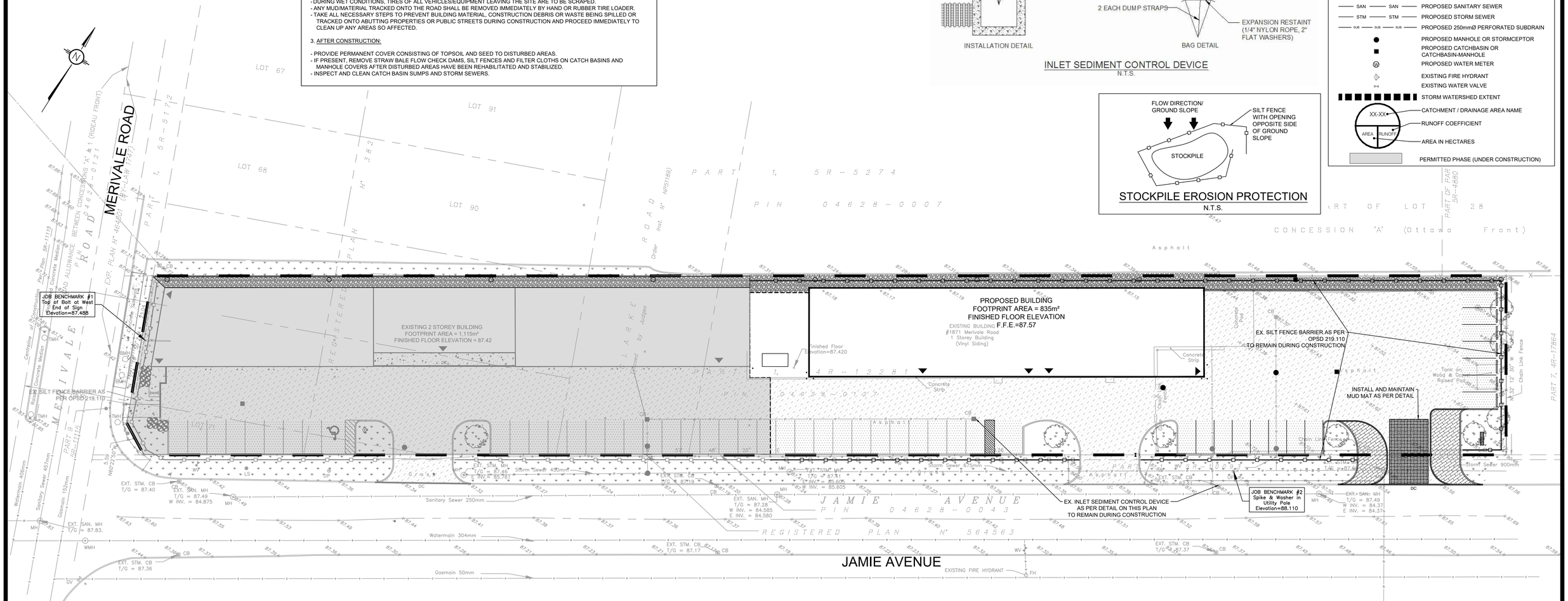
×50.00BC	PROPOSED BOTTOM OF CURB ELEVATION
×50.00TC	PROPOSED TOP OF CURB ELEVATION
×50.00EX	MATCH INTO EXISTING ELEVATION
×79.19	EXISTING ELEVATION
	MAJOR OVERLAND FLOW ROUTE
WTR — WTR	PROPOSED WATER SERVICE
SAN — SAN	PROPOSED SANITARY SEWER
STM — STM	PROPOSED STORM SEWER
SUB — SUB — SUB	PROPOSED 250mmØ PERFORATED SUBDRAIN
●	PROPOSED MANHOLE OR STORMCEPTOR
■	PROPOSED CATCHBASIN OR CATCHBASIN-MANHOLE
W	PROPOSED WATER METER
	EXISTING FIRE HYDRANT
	EXISTING WATER VALVE
	STORM WATERSHED EXTENT
XX-XX / AREA / RUNOFF	CATCHMENT / DRAINAGE AREA NAME; RUNOFF COEFFICIENT; AREA IN HECTARES
	PERMITTED PHASE (UNDER CONSTRUCTION)

STOCKPILE EROSION PROTECTION
N.T.S.



USE AND INTERPRETATION OF DRAWINGS

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

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

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

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

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

UNAUTHORIZED CHANGES:

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

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

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

GENERAL NOTES:

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

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

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

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

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LICENSED PROFESSIONAL ENGINEER
M. BASNET
100501996
2020-09-22
PROVINCE OF ONTARIO

NOT AUTHENTIC UNLESS SIGNED AND DATED

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5430 Canotek Road I Ottawa, ON. K1J 9G2
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No.	REVISIONS	BY	DATE
04	ISSUED FOR APPROVAL	A.S.	22 SEP 2020
03	ISSUED FOR APPROVAL	A.S.	26 AUG 2020
02	ISSUED FOR APPROVAL	A.S.	10 JUL 2020
01	ISSUED FOR APPROVAL	M.L.	13 JAN 2020

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

DESIGNED BY:	DRAWN BY:	APPROVED BY:
V.J.	M.S.	V.J.

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

DRAWING TITLE
SEDIMENT AND EROSION CONTROL PLAN

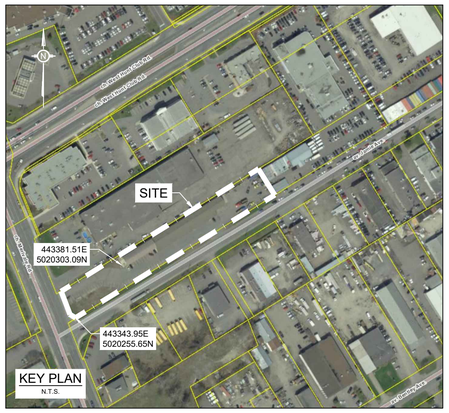
PROJECT NO.
130828.05

DATE
NOVEMBER 2019

C101

D07-12-20-0008

#17529



LEGEND:

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	PROPOSED CURB
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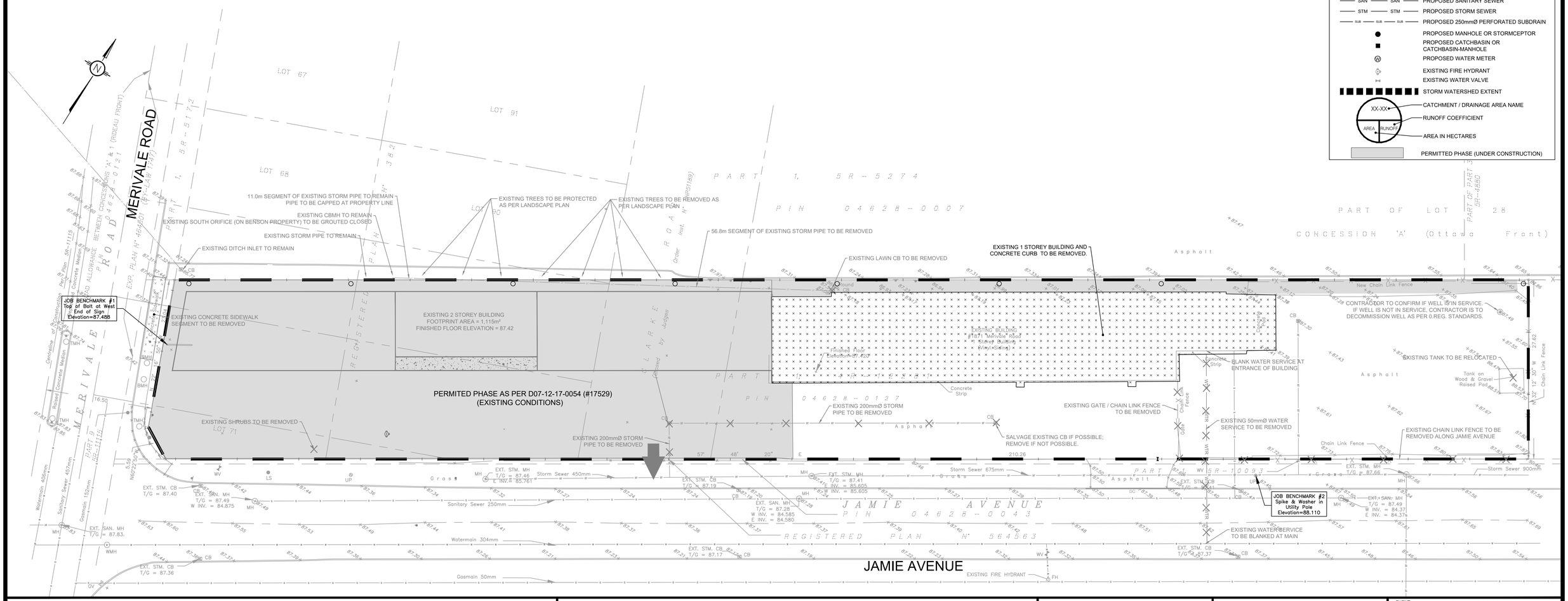
×50.00EX	MATCH INTO EXISTING ELEVATION
×70.19	EXISTING ELEVATION
	MAJOR OVERLAND FLOW ROUTE
WTR WTR	PROPOSED WATER SERVICE
SAN SAN	PROPOSED SANITARY SEWER
STM STM	PROPOSED STORM SEWER
SUB SUB SUB	PROPOSED 250mmØ PERFORATED SUBDRAIN
	PROPOSED MANHOLE OR STORMCEPTOR
	PROPOSED CATCHBASIN OR CATCHBASIN-MANHOLE
W	PROPOSED WATER METER
	EXISTING FIRE HYDRANT
SHE	EXISTING WATER VALVE
	STORM WATERSHED EXTENT
XX-XX / AREA / RUNOFF	CATCHMENT / DRAINAGE AREA NAME; RUNOFF COEFFICIENT; AREA IN HECTARES
	PERMITTED PHASE (UNDER CONSTRUCTION)



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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

LICENSED PROFESSIONAL ENGINEER
M. BASNET
100501996
2020-09-22
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
01	ISSUED FOR APPROVAL	A.S.	22 SEP 2020

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

DESIGNED BY:	DRAWN BY:	APPROVED BY:
V.J.	M.S.	V.J.

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

DRAWING TITLE
EXISTING CONDITIONS & DEMOLITION PLAN

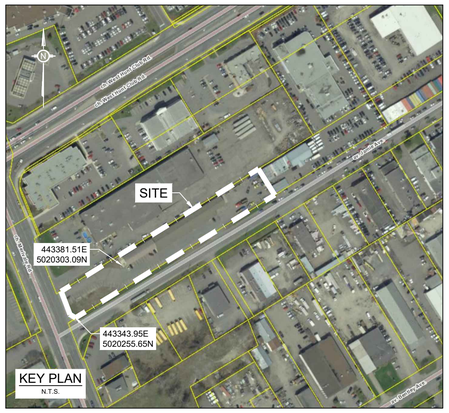
PROJECT NO.
130828.05

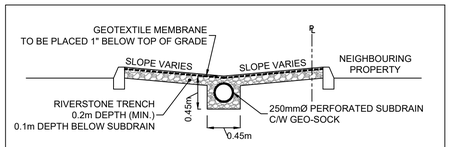
DATE
SEPTEMBER 2020

C.102

D07-12-20-0008

#17529





SWALE & SUBDRAIN - TYPICAL SECTION A-A

(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.

SITE AND PARKING INFORMATION

TYPE OF BUILDING OR USE
STOREFRONT INDUSTRY (GROUP "F" DIVISION "2")

FIRE ACCESS
FIRE TRUCK ACCESS ROUTE IS FROM JAMIE AVENUE AND SHALL CONFORM TO OBC 2012 - 3.2.5.4, 3.2.5.5 AND 3.2.5.6.

DESCRIPTION OF LAND
PART OF LOTS 69, 70, 71, 87, 88 & 89 AND PART OF CLARKE ROAD (CLOSED BY JUDGES ORDER, INST. No. NP51189), REGISTERED PLAN No. 382 AND PART OF LOT 28, CONCESSION 'A' (RIDEAU FRONT), GEOGRAPHIC TOWNSHIP OF NEPEAN, NOW CITY OF OTTAWA, DESIGNATED AS PART 1, 4R-12281 AS IN ALL OF PIN 04628-017.

BUILDING AREA
BUILDING AREA = +/- 1,115m2 (EXIST.) + 835m2 (PROP.)
(33.5% OF SITE)

SITE AREA
SITE AREA = +/- 5,824.94m2 (WITHIN LIMIT OF CONTRACT)

LANDSCAPING AREA
TOTAL LANDSCAPE AREA = 926m2

926 / 5,824.94 = 15.9% OF SITE AREA

47.4% OF PARKING LOT

ZONING BY-LAW
ZONING = ARTERIAL MAINSTREET ZONE AM 10

MIN. LOT AREA = NO MINIMUM

MIN. FRONTAGE - NO MINIMUM

MIN. FRONT YARD SETBACK = NO MINIMUM

MIN. SIDE YARD SETBACK = NO MINIMUM

MIN. REAR YARD SETBACK = NO MINIMUM

PARKING CALCULATION / BUILDING USES
SERVICE AND REPAIR GARAGE = 2/BAY = 12x2 = 24
SALES/SHOWROOM = 2/100m2 = 205m2 / 100 x 2 = 4
STORAGE = 1/100m2 = 1,115m2 = 835m2 / 100 x 1 = 20
WHEELCHAIR ACCESSIBLE = 2

50 PARKING SPACES ARE REQUIRED.
BARRIER FREE PARKING SPACES THAT ARE REQUIRED = 1
BARRIER FREE PARKING SPACES THAT ARE PROVIDED = 2
TOTAL PARKING SPACES PROVIDED = 51

BICYCLE PARKING
SERVICE AND REPAIR GARAGE = 1 / 500m2 = 870m2 / 500 = 1.7
SALES/SHOWROOM = 1 / 250m2 = 205m2 / 250 = 0.8
OTHER = 1 / 1,500m2 = (915 + 1,168)m2 / 250 = 1.4

4 BICYCLE SPACES ARE REQUIRED.
TOTAL PARKING SPACES PROVIDED = 7
REQUIRED BICYCLE PARKING WAS PROVIDED THROUGH PHASE 1 OF PROPOSED DEVELOPMENT (SEE ARCHITECTURAL PLAN A1 FOR DETAILS)

PARKING AND AISLE

	BYLAW	PROVIDED
CIRCULATION LANE (2 WAY)	6.7m (22'-0")	6.7m (22'-0")
REGULAR PARKING (WIDTH 90°)	2.6m (8'-6")	2.6m (8'-6")
REGULAR PARKING (LENGTH 90°)	5.2m (17'-1")	5.2m (17'-1")
REGULAR PARKING (WIDTH PP)	2.6m (8'-6")	2.6m (8'-6")
REGULAR PARKING (LENGTH PP)	6.7m (22'-0")	6.7m (22'-0")
WHEELCHAIR ACCESSIBLE (WIDTH)	3.66m (12'-0")	4.10m (13'-5")

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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LEGEND:

- PROPERTY LINE
- PROPOSED CURB
- PROPOSED DEPRESSED CURB
- DC — PROPOSED DOOR ENTRANCE/EXIT
- PROPOSED GRASS AREA
- 0.3m WIDE (MIN.) STEP JOINT
- PROPOSED HEAVY DUTY ASPHALT
- PROPOSED LIGHT DUTY ASPHALT
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- PROPOSED SILT FENCE AS PER OPSD 219.110
- ×50.00 — PROPOSED ELEVATION
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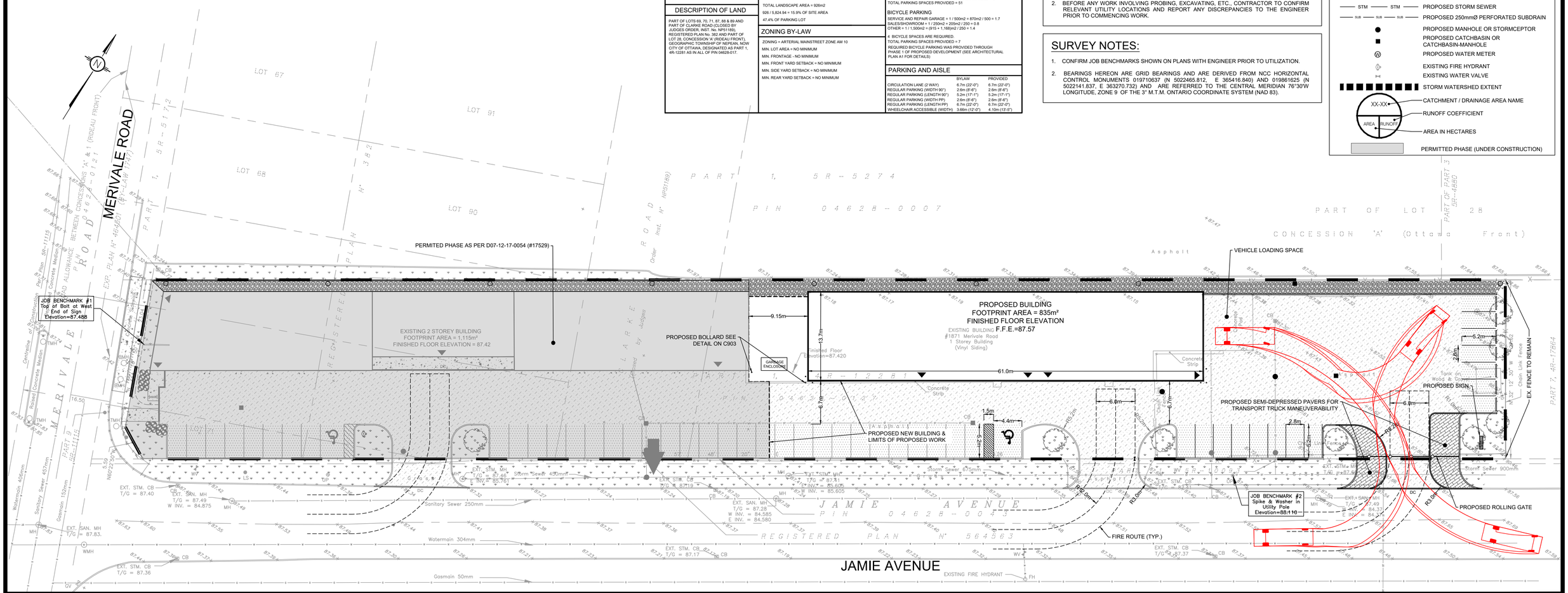
- ×50.00BC — PROPOSED BOTTOM OF CURB ELEVATION
- ×50.00TC — PROPOSED TOP OF CURB ELEVATION
- ×50.00EX — MATCH INTO EXISTING ELEVATION
- ×70.19 — EXISTING ELEVATION
- MAJOR OVERLAND FLOW ROUTE
- WTR — PROPOSED WATER SERVICE
- SAN — PROPOSED SANITARY SEWER
- STM — PROPOSED STORM SEWER
- SUB — PROPOSED 250mmØ PERFORATED SUBDRAIN
- PROPOSED MANHOLE OR STORMCEPTOR
- PROPOSED CATCHBASIN OR CATCHBASIN-MANHOLE
- PROPOSED WATER METER
- EXISTING FIRE HYDRANT
- EXISTING WATER VALVE
- STORM WATERSHED EXTENT
- XX-XX — CATCHMENT / DRAINAGE AREA NAME
- RUNOFF COEFFICIENT
- AREA — AREA IN HECTARES
- PERMITTED PHASE (UNDER CONSTRUCTION)



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

LICENSED PROFESSIONAL ENGINEER
M. BASNET
100501996
2020-09-22
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 APPROVAL	A.S.	22 SEP 2020
03	ISSUED FOR APPROVAL	A.S.	26 AUG 2020
02	ISSUED FOR APPROVAL	A.S.	10 JUL 2020
01	ISSUED FOR APPROVAL	M.L.	13 JAN 2020

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

DESIGNED BY:	DRAWN BY:	APPROVED BY:
V.J.	M.S.	V.J.

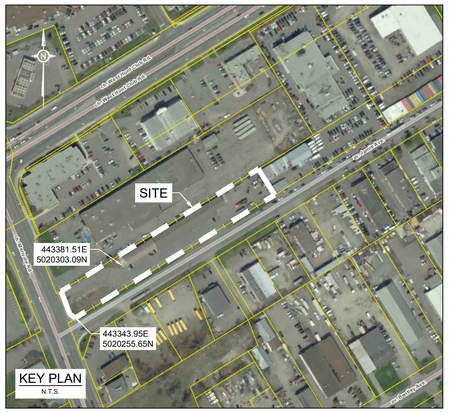
PROJECT
PROPOSED BENSON AUTO PARTS AND EAST BUILDING
COMMERCIAL DEVELOPMENT
1871 MERIVALE ROAD, NEPEAN, ON

DRAWING TITLE
SITE DEVELOPMENT PLAN

PROJECT NO. 130828.05
DATE NOVEMBER 2019
C201

D07-12-20-0008

#17529



PAVEMENT STRUCTURE

COURSE	MATERIAL	THICKNESS (mm)	
		AUTOMOBILE PARKING	TRUCK ROUTE (HEAVY TRAFFIC)
SURFACE	HL.3 A/C (PG 58-28)	50	40
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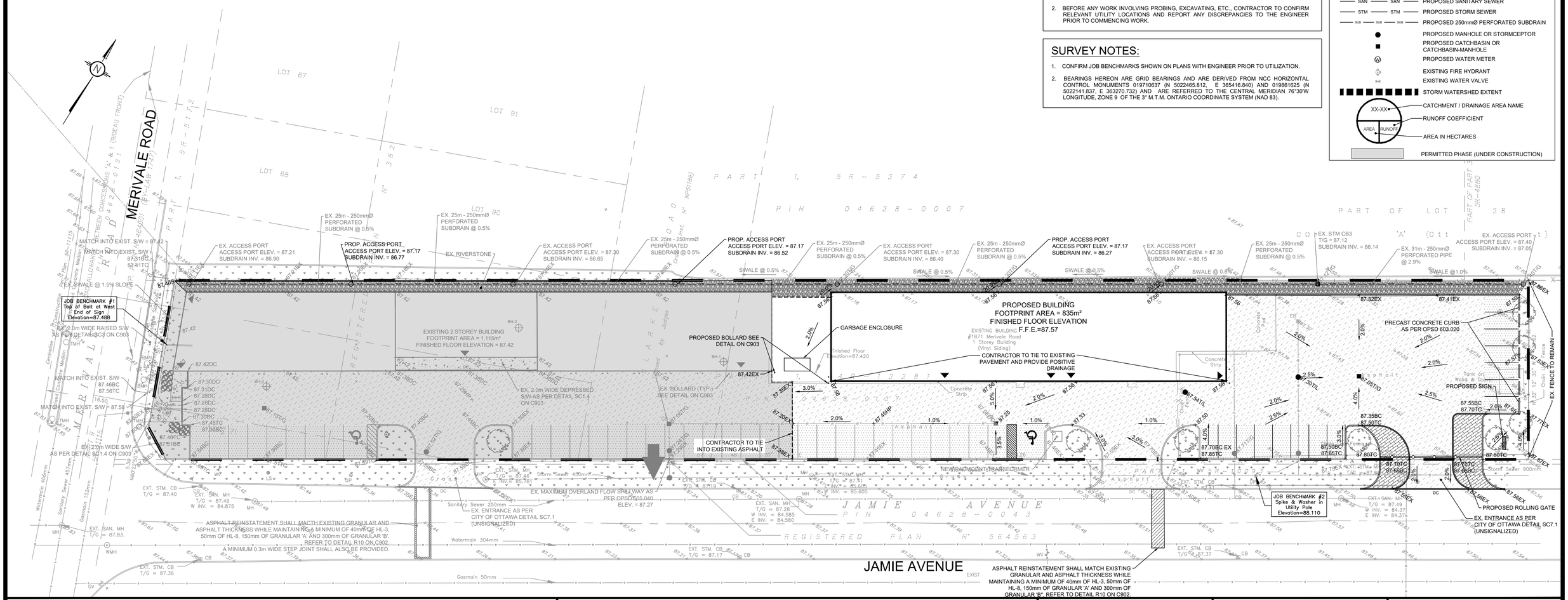

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LICENSED PROFESSIONAL ENGINEER
M. BASNET
100501996
2020-09-23
PROVINCE OF ONTARIO

NOT AUTHENTIC UNLESS SIGNED AND DATED

LRL
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5430 Canotek Road I Ottawa, ON, K1J 9G2
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CLIENT
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MR. GERRY BENSON
700 EDUCATION ROAD, CORNWALL, ONTARIO
K6H 6B8 , TEL. 613-936-7850

DESIGNED BY:	DRAWN BY:	APPROVED BY:
V.J.	M.S.	V.J.

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

DRAWING TITLE
GRADING AND DRAINAGE PLAN

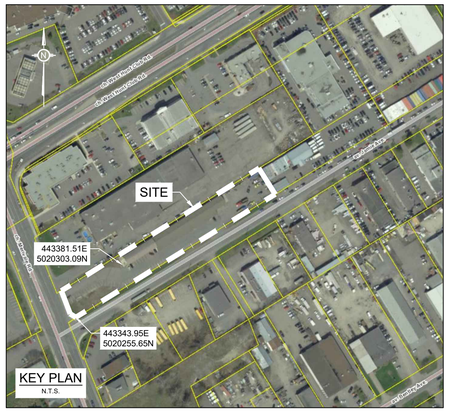
PROJECT NO.
130828.05

DATE
NOVEMBER 2019

C301

D07-12-20-0008

#17529



INLET CONTROL DEVICE INFO	
HYDROVEX 150VHV-2 VERTICAL VORTEX FLOW REGULATOR	100 YEAR
HEAD (m)	1.89
HIGH WATER LEVEL (m)	87.44
CONTROLLED RELEASE RATE (L/s)	29.52

HYDROVEX®

VHV Vertical Vortex Flow Regulator

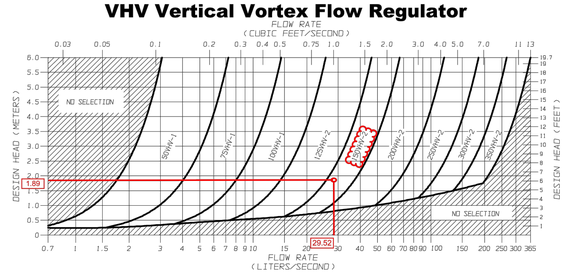


FIGURE 3 - VHV

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.
2. OBTAIN AND PAY FOR ALL NECESSARY PERMITS AND APPROVALS FROM THE MUNICIPAL AUTHORITIES PRIOR TO COMMENCING CONSTRUCTION; SUCH AS, BUT NOT LIMITED TO: ROAD CUT PERMITS, SEWER PERMITS, WATER PERMIT, ETC. THE APPROVAL OF THIS PLAN DOES NOT EXEMPT THE CONTRACTOR FROM THE REQUIREMENTS TO OBTAIN THE VARIOUS PERMITS/APPROVALS REQUIRED TO COMPLETE THE CONSTRUCTION PROJECT.
3. FILTER FABRIC TO BE INSTALLED AND MAINTAINED BETWEEN THE FRAME AND COVER OF ALL CATCHBASINS AND CATCHBASIN MANHOLES DURING THE CONSTRUCTION PERIOD TO MINIMIZE SEDIMENTS ENTERING THE STORM SEWER SYSTEM. ALL GRASSED AREAS MUST BE COMPLETED PRIOR TO THE REMOVAL OF THE FILTER FABRIC IN THE CATCH BASINS.
4. 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.
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 2.0m 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:

1. UNDERGROUND UTILITIES, AS REPORTED ON THIS DRAWING, ARE NOT BASED ON AN ACTUAL "FIELD LOCATE" BY THE RESPECTIVE UTILITY AGENCIES BUT HAVE BEEN COMPILED FROM DATA OBTAINED FROM THE CITY OF OTTAWA PUBLIC UTILITIES REGISTRY.
2. BEFORE ANY WORK INVOLVING PROBING, EXCAVATING, ETC., CONTRACTOR TO CONFIRM RELEVANT UTILITY LOCATIONS AND REPORT ANY DISCREPANCIES TO THE ENGINEER PRIOR TO COMMENCING WORK.

SURVEY NOTES:

1. CONFIRM JOB BENCHMARKS SHOWN ON PLANS WITH ENGINEER PRIOR TO UTILIZATION.
2. BEARINGS HEREON ARE GRID BEARINGS AND ARE DERIVED FROM NCC HORIZONTAL CONTROL MONUMENTS 019710637 (N 5022465.812, E 365416.840) AND 019861625 (N 5022141.837, E 363270.732) AND ARE REFERRED TO THE CENTRAL MERIDIAN 76°30'W LONGITUDE, ZONE 9 OF THE 3° M.T.M. ONTARIO COORDINATE SYSTEM (NAD 83).

LEGEND:

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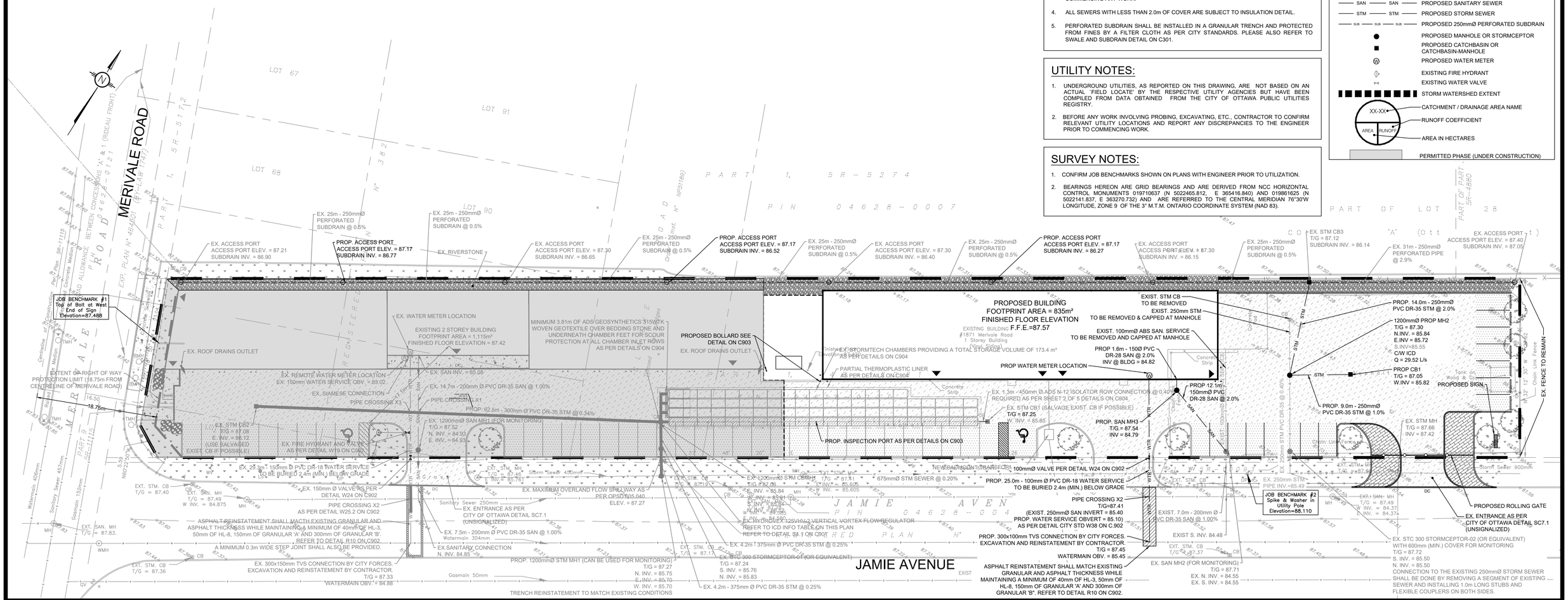

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PROJECT
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DRAWING TITLE
SITE SERVICING PLAN

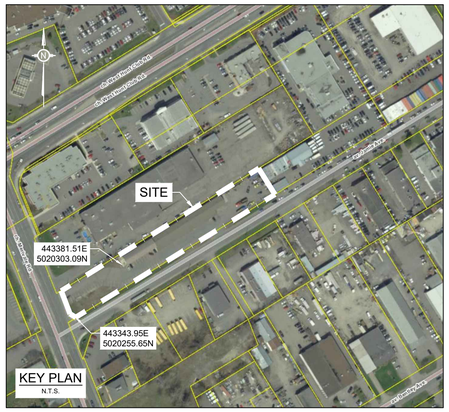
PROJECT NO. 130828.05

DATE NOVEMBER 2019

C401

D07-12-20-0008

#17529



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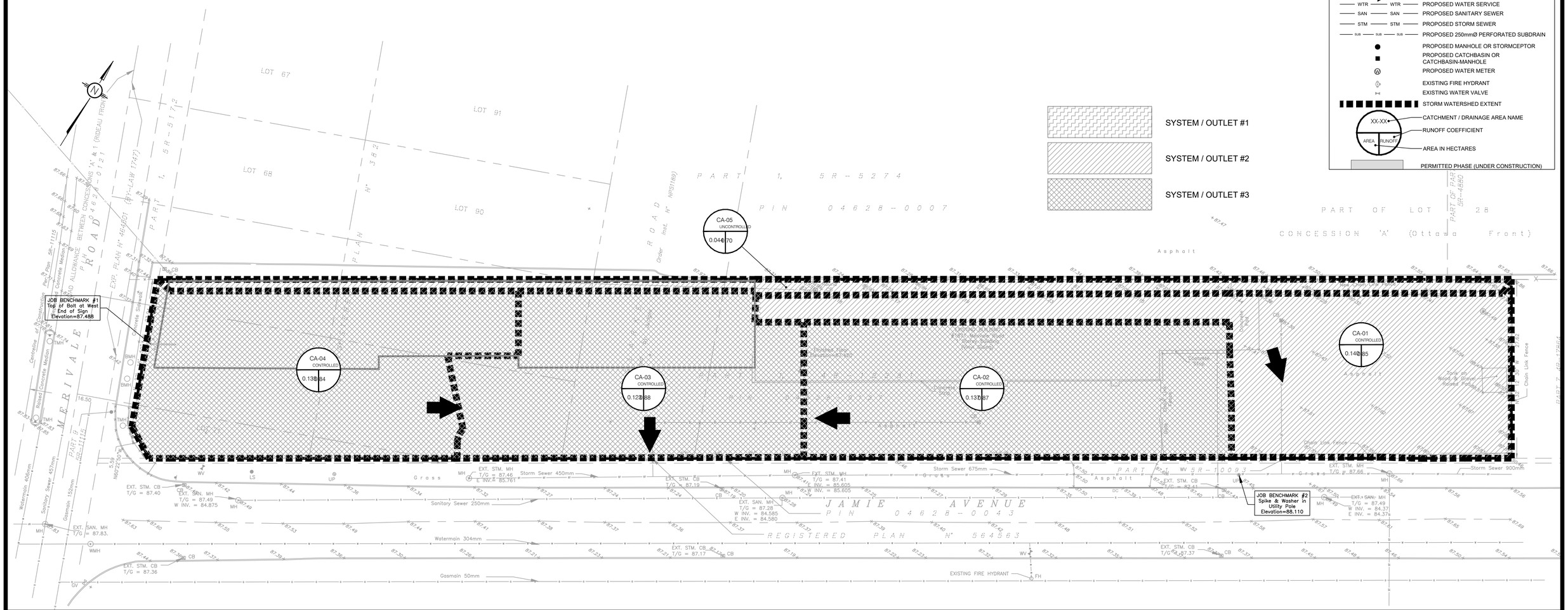
SYSTEM / OUTLET #1

SYSTEM / OUTLET #2

SYSTEM / OUTLET #3



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5m 2 0 5 10m

SCALE: 1:300

LICENSED PROFESSIONAL ENGINEER
M. BASNET
100501996
2020-09-22
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

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01	ISSUED FOR APPROVAL	M.L.	13 JAN 2020

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

DESIGNED BY:	DRAWN BY:	APPROVED BY:
V.J.	M.S.	V.J.

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

DRAWING TITLE
PRE-DEVELOPMENT CATCHMENTS PLAN

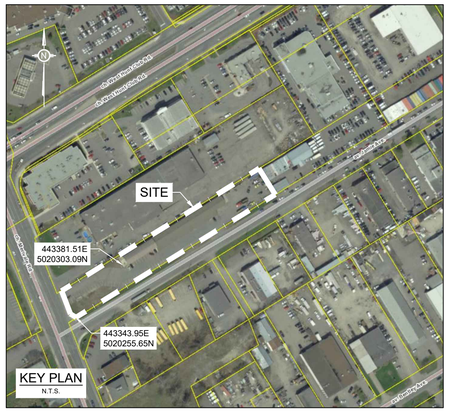
PROJECT NO.
130828.05

DATE
NOVEMBER 2019

C701

D07-12-20-0008

#17529



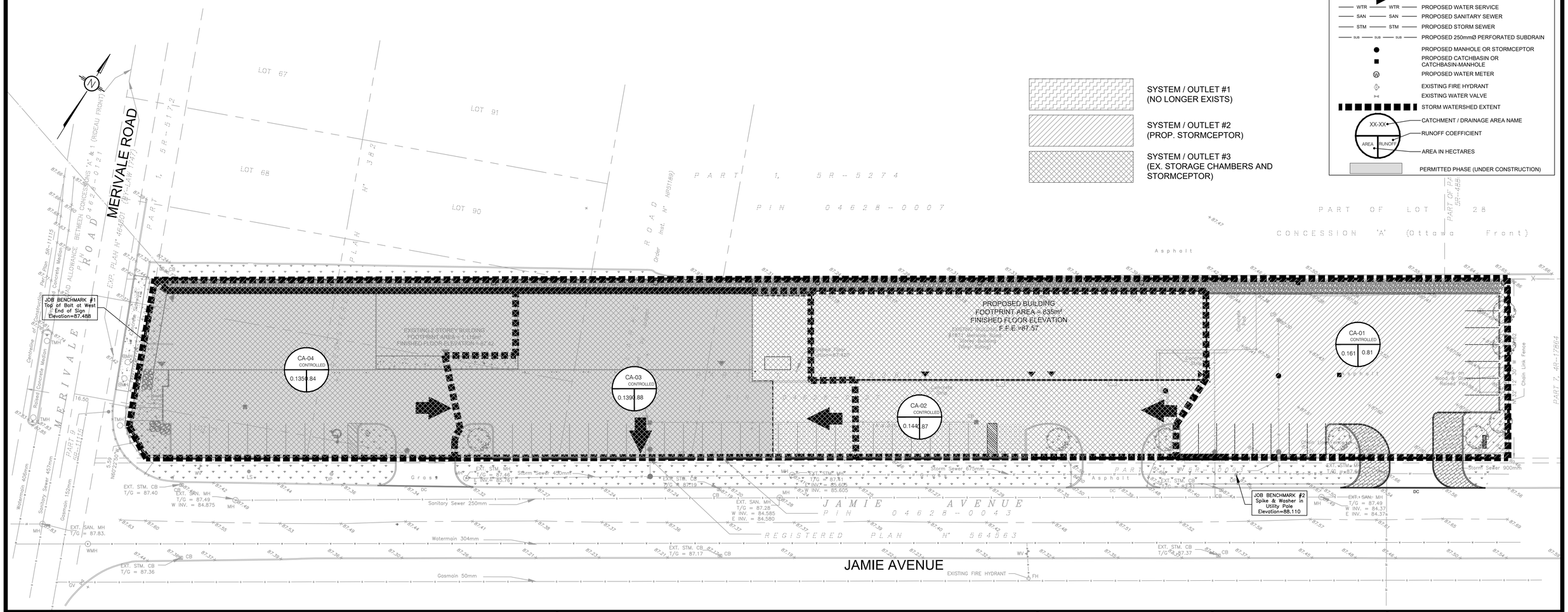
LEGEND:

	PROPERTY LINE
	PROPOSED CURB
DC	PROPOSED DEPRESSED CURB
	PROPOSED DOOR ENTRANCE/EXIT
	PROPOSED GRASS AREA
	0.3m WIDE (MIN.) STEP JOINT
	PROPOSED HEAVY DUTY ASPHALT
	PROPOSED LIGHT DUTY ASPHALT
	PROPOSED INTERLOCKING PAVERS
	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
×50.00EX	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
SUB SUB SUB	PROPOSED 250mmØ PERFORATED SUBDRAIN
	PROPOSED MANHOLE OR STORMCEPTOR
	PROPOSED CATCHBASIN OR CATCHBASIN-MANHOLE
W	PROPOSED WATER METER
	EXISTING FIRE HYDRANT
	EXISTING WATER VALVE
	STORM WATERSHED EXTENT
XX-XX	CATCHMENT / DRAINAGE AREA NAME
RUNOFF	RUNOFF COEFFICIENT
AREA	AREA IN HECTARES
	PERMITTED PHASE (UNDER CONSTRUCTION)

SYSTEM / OUTLET #1
(NO LONGER EXISTS)

SYSTEM / OUTLET #2
(PROP. STORMCEPTOR)

SYSTEM / OUTLET #3
(EX. STORAGE CHAMBERS AND STORMCEPTOR)



USE AND INTERPRETATION OF DRAWINGS

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COMMERCIAL DEVELOPMENT
1871 MERIVALE ROAD, NEPEAN, ON

DRAWING TITLE
POST DEVELOPMENT CATCHMENTS PLAN

PROJECT NO.
130828.05

DATE
NOVEMBER 2019

C702

D07-12-20-0008

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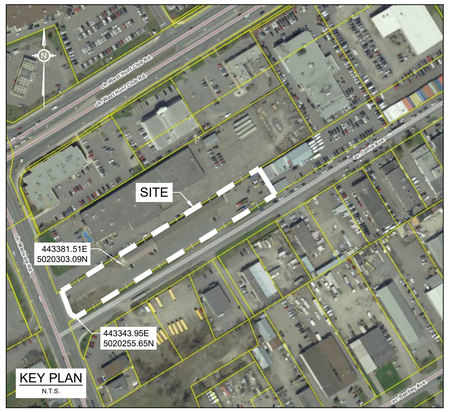

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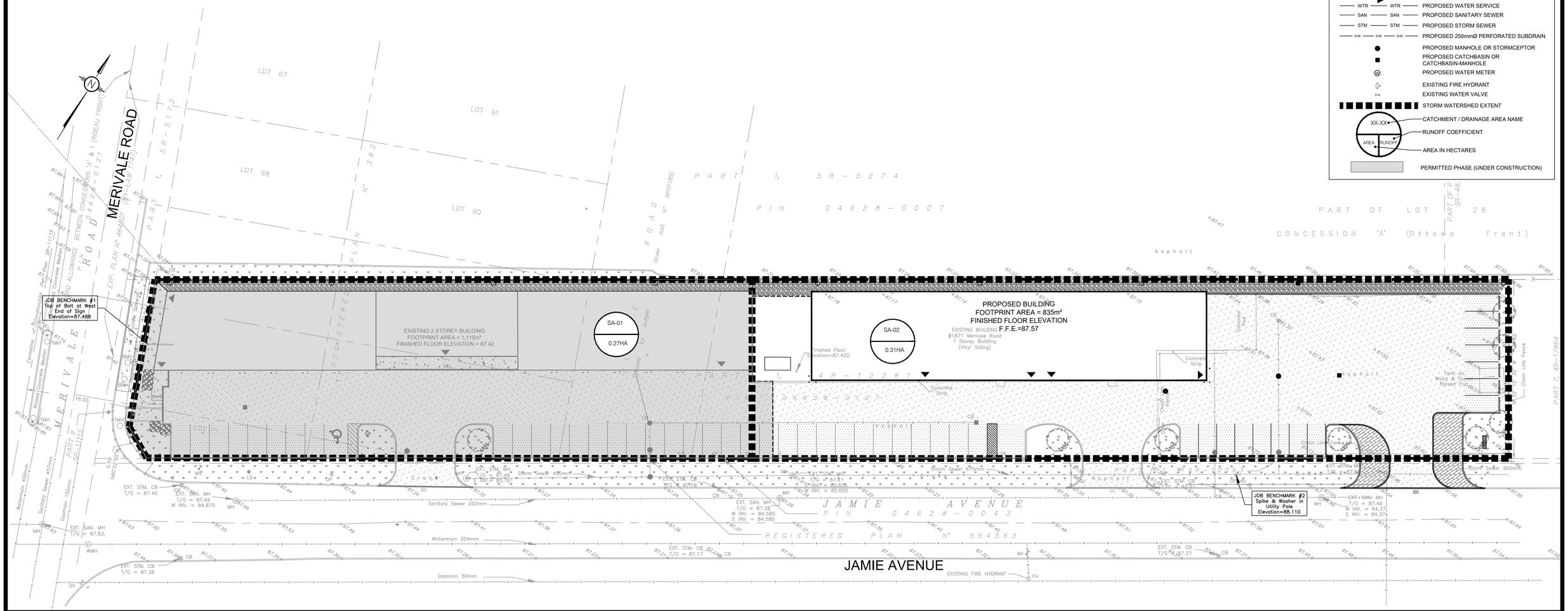

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DESIGNED BY:	DRAWN BY:	APPROVED BY:
V.J.	M.S.	V.J.

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

DRAWING TITLE
SANITARY DRAINAGE AREA PLAN

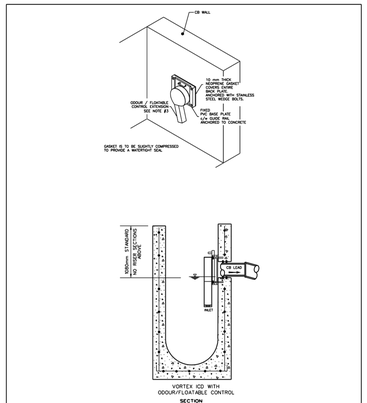
PROJECT NO.
130828.05

DATE
NOVEMBER 2019

C703

D07-12-20-0008

#17529



VORTEX ICD WITH ODOUR/FLOATABLE CONTROL

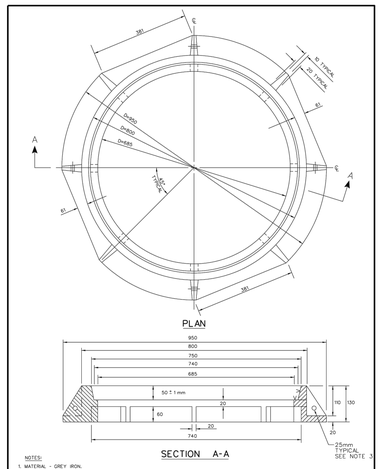
SECTION

NOTES:

1. VORTEX ICD'S ARE USED TO RESTRICT FLOWS BELOW 15L / s. The (LOWEST) RESTRICTION ALLOWED TYPically IS 8L / s PRODUCTS MAY SLIGHTLY DIFFER AS SHOWN ABOVE.
2. CURVES ARE AVAILABLE FROM THE MANUFACTURER. SEE MS - 22.15 FOR APPROVED PRODUCTS.
3. ODOUR CONTROL TYPE IS TO BE USED IN CB'S THAT ARE CONNECTED TO A COMBINED SEWER DIRECTLY. FOR STORM SEWERS ODOUR / FLOATABLE CONTROL EXTENSIONS ARE NOT REQUIRED.
4. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS SHOWN OTHERWISE.

N.T.S.

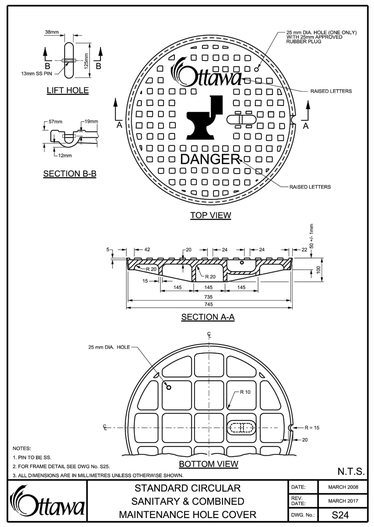
Ottawa	VORTEX ICD INSTALLATION	DATE: MARCH 2008 REV. DATE: MARCH 2009 DWG. No.: S4.1



NOTES:

1. MATERIAL - GREY IRON.
2. FOR MAINTENANCE HOLE COVER SEE DWG S24, S24.1, S24.2.
3. OPSD 400.001+OSTAG HOOKS ARE ALSO ACCEPTED.

Ottawa	STANDARD CIRCULAR FRAME FOR MAINTENANCE HOLES (MODIFIED OPSD-401.020)	DATE: MAY 2001 REV. DATE: MARCH 2016 DWG. No.: S25

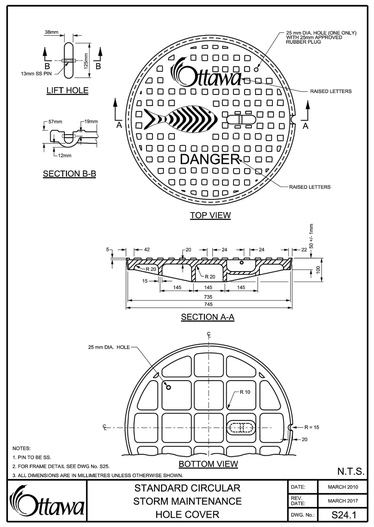


NOTES:

1. PIN TO BE SS.
2. FOR FRAME DETAIL SEE DWG No. S25.
3. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE SHOWN.

N.T.S.

Ottawa	STANDARD CIRCULAR SANITARY & COMBINED MAINTENANCE HOLE COVER	DATE: MARCH 2006 REV. DATE: MARCH 2017 DWG. No.: S24

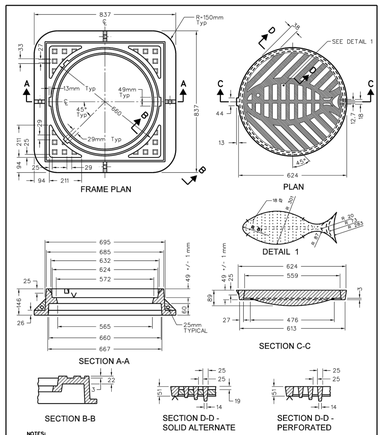


NOTES:

1. PIN TO BE SS.
2. FOR FRAME DETAIL SEE DWG No. S25.
3. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE SHOWN.

N.T.S.

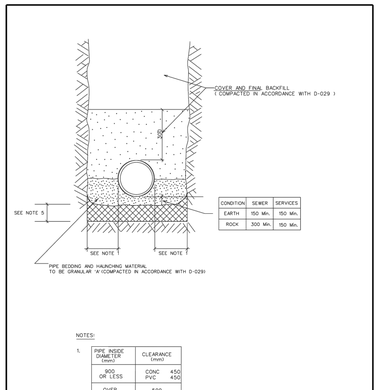
Ottawa	STANDARD CIRCULAR STORM MAINTENANCE HOLE COVER	DATE: MARCH 2010 REV. DATE: DWG. No.: S24.1



NOTES:

1. ALL DIMENSIONS SHOWN ARE FOR FINISHED CASTINGS ONLY. PATTERN MAKERS AND CASTING SHOP SHOULD MAKE ALLOWANCES ACCORDINGLY.
2. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS SHOWN OTHERWISE.
3. FOR NEW CONSTRUCTION WHERE SURFACE INLETS ARE SPECIFIED.
4. COMPARES WITH GRATE DIMENSIONS NOT EXACTLY THE SAME AS SHOWN ABOVE WILL ALSO BE CONSIDERED.
5. ALTERNATE SOLID COVER TO HAVE EYE 25mm Dia. HOLE WITH 25mm APPROVED PLUG

Ottawa	HEAVY DUTY "FISH" TYPE ROUND CATCH BASIN COVER (MODIFIED OPSD-400.07)	DATE: MAY 2005 REV. DATE: MARCH 2017 DWG. No.: S19

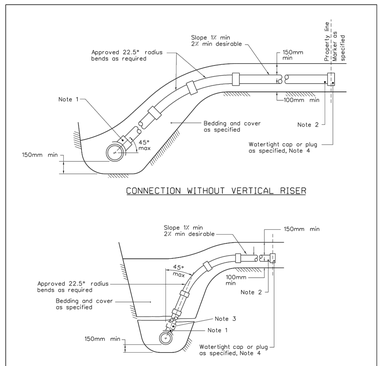


CONDITION	SEWER	SERVICES
EARTH	150 Min.	150 Min.
ROCK	300 Min.	150 Min.

NOTES:

1. PIPE INSIDE DIAMETER (mm) / CLEARANCE (mm)
   - 900 OR LESS: CONC 450, PVC 450
   - OVER 900: 500
2. FINAL BACKFILL - APPROVED NATIVE MATERIAL OR SELECT SUBGRADE IN ACCORDANCE WITH F-2120.
3. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS SHOWN OTHERWISE.
4. INITIAL BACKFILL MATERIAL - CONCRETE PIPE - SAND, GRANULAR 'A' - PVC PIPE - GRANULAR 'A'
5. WHEN APPROVED BY THE CONTRACT ADMINISTRATOR, POOR SOILS SHALL BE EXCAVATED TO CREATE A FOUNDATION THAT SHALL BE FILLED TO THE BOTTOM OF THE BEDDING WITH GRANULAR 'B'.

Ottawa	SINGLE TRENCH (SEWER & SEWER SERVICES)	DATE: MAY 2001 REV. DATE: MARCH 2016 DWG. No.: S6

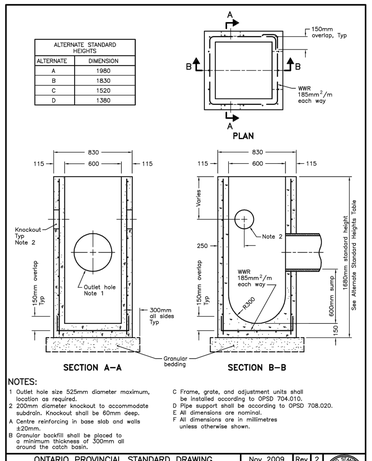


NOTES:

1. ALL DIAMETERS OF SERVICE CONNECTIONS TO FLEXIBLE MAIN SEWER SHALL BE MADE USING APPROVED TEE OR WYE FITTINGS.
2. SANITARY SERVICES TO BE 150mm AND STORM SERVICES TO BE 100mm FOR NEW RESIDENCES UNLESS SPECIFIED OTHERWISE. SERVICE PIPE AND RADIUS BENDS TO BE APPROVED CSA B182.2, SDR28 PRODUCTS UNLESS SPECIFIED OTHERWISE.
3. APPROVED CONTROLLED SETTLEMENT JOINTS OPTIONAL FOR SERVICE CONNECTIONS TO MAIN SEWERS UP TO 5m DEEP; WHERE APPROVED, CONNECTIONS TO SEWERS OVER 5m DEEP REQUIRE APPROVED CONTROLLED SETTLEMENT JOINTS.
4. CAP OR PLUG AT THE PROPERTY LINE SHALL BE ADEQUATELY BRACED TO WITHSTAND TESTING PRESSURE.
5. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE SHOWN.

Ottawa	SEWER SERVICE CONNECTIONS FOR FLEXIBLE MAIN SEWER PIPE (MODIFIED OPSD-1006.020)	DATE: MARCH 2006 REV. DATE: MARCH 2013 DWG. No.: S11.1

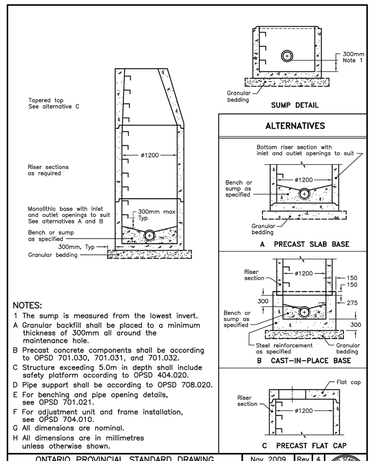
ALTERNATE STANDARD HEIGHTS	
ALTERNATE	DIMENSION
A	1980
B	1830
C	1520
D	1380



NOTES:

1 Outlet hole size 525mm diameter maximum, location as required.
2 200mm diameter knockout to accommodate subdrain. Knockout shall be 60mm deep.
A Centre reinforcing in base slab and walls 420mm.
B Granular backfill shall be placed to a minimum thickness of 300mm all around the catch basin.
C Frame, grate, and adjustment units shall be installed according to OPSD 704.010.
D Pipe support shall be according to OPSD 708.020.
E All dimensions are nominal.
F All dimensions are in millimetres unless otherwise shown.

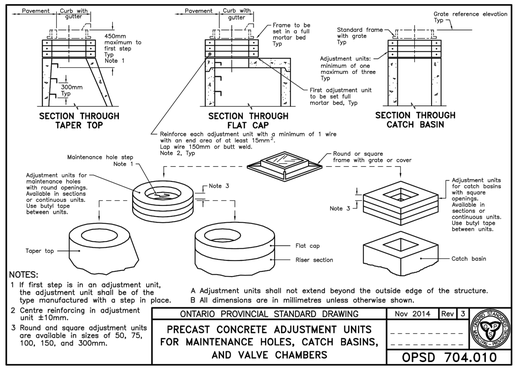
ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2009	Rev 2
PRECAST CONCRETE CATCH BASIN 600x600mm		OPSD 705.010



NOTES:

1 The sump is measured from the lowest invert.
A Granular backfill shall be placed to a minimum thickness of 300mm all around the maintenance hole.
B Precast concrete components shall be according to OPSD 701.030, 701.031, and 701.032.
C Structure exceeding 5.0m in depth shall include safety platform according to OPSD 404.020.
D Pipe support shall be according to OPSD 708.020.
E For benching and pipe opening details, see OPSD 701.021.
F For adjustment unit and frame installation, see OPSD 704.010.
G All dimensions are nominal.
H All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2009	Rev 4
PRECAST CONCRETE MAINTENANCE HOLE 1200mm DIAMETER		OPSD 701.010

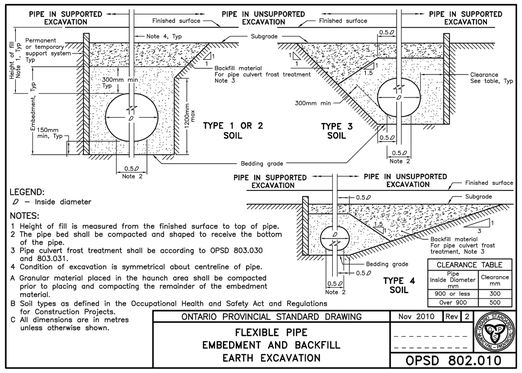


NOTES:

1 If first step is in an adjustment unit, the adjustment unit shall be of the type manufactured with a step in place.
2 Centre reinforcing in adjustment unit ±10mm.
3 Round and square adjustment units are available in sizes of 50, 75, 100, 150, and 300mm.

A Adjustment units shall not extend beyond the outside edge of the structure.
B All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2014	Rev 3
PRECAST CONCRETE ADJUSTMENT UNITS FOR MAINTENANCE HOLES, CATCH BASINS, AND VALVE CHAMBERS		OPSD 704.010



LEGEND:

D – Inside diameter

NOTES:

1 Height of fill is measured from the finished surface to top of pipe.
2 The pipe bed shall be compacted and shaped to receive the bottom of the pipe.
3 Pipe culvert frost treatment shall be according to OPSD 803.030 and 803.031.
4 Condition of excavation is symmetrical about centreline of pipe.
A Granular material placed in the haunch area shall be compacted prior to placing and compacting the remainder of the embedment material.
B Soil types as defined in the Occupational Health and Safety Act and Regulations for Construction Projects.
C All dimensions are in metres unless otherwise shown.

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

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2010	Rev 2
FLEXIBLE PIPE EMBEDMENT AND BACKFILL EARTH EXCAVATION		OPSD 802.010

USE AND INTERPRETATION OF DRAWINGS

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

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

LICENSED PROFESSIONAL ENGINEER
M. BASNET
100501996
2020-09-22
PROVINCE OF ONTARIO

NOT AUTHENTIC UNLESS SIGNED AND DATED

LRL
ENGINEERING | INGÉNIERIE
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No.	REVISIONS	BY	DATE
04	ISSUED FOR APPROVAL	A.S.	22 SEP 2020
03	ISSUED FOR APPROVAL	A.S.	26 AUG 2020
02	ISSUED FOR APPROVAL	A.S.	10 JUL 2020
01	ISSUED FOR APPROVAL	M.L.	13 JAN 2020

CLIENT

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

DESIGNED BY:	DRAWN BY:	APPROVED BY:
V.J.	M.S.	V.J.

PROJECT

PROPOSED BENSON AUTO PARTS AND EAST BUILDING
COMMERCIAL DEVELOPMENT
1871 MERIVALE ROAD, NEPEAN, ON

DRAWING TITLE

CONSTRUCTION DETAILS PLAN

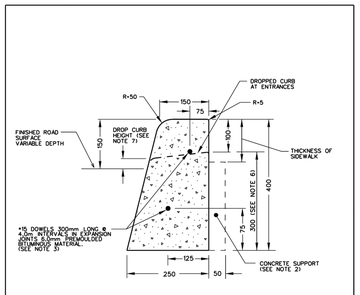
PROJECT NO.
130828.05

DATE
NOVEMBER 2019

C901

D07-12-20-0008

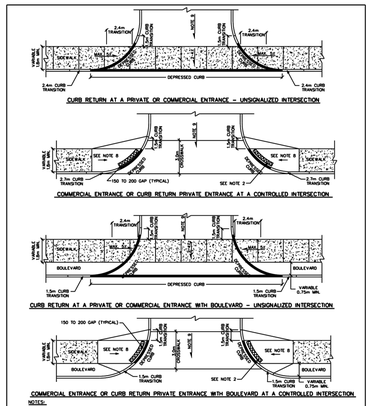
#17529



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. E. IN 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 DROP CURB AT ENTRANCES USE 250.
7. DROP CURB HEIGHT MINIMUM 0mm, DESIRED 15mm, MAXIMUM 25mm.

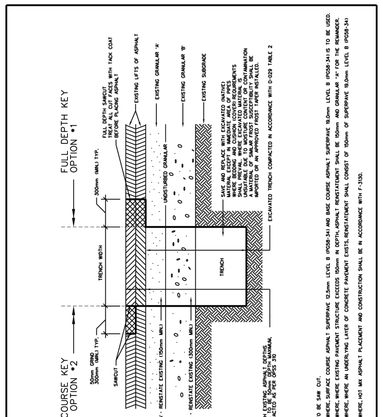
Ottawa	CONCRETE BARRIER CURB FOR GRANULAR BASE PAVEMENT (MODIFIED OPSD-600.110)	DATE: JAN. 2003 REV. DATE: MARCH 2007 DWG. No.: SC1.1



NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS SHOWN OTHERWISE.
2. APPROVED RED X WIDTH OF CURB RAMP (1500MM) TACTILE WALKING SURFACE INDICATOR, PLACED AS PER OPSD-401.010 AND DETAILED AS PER SC7.
3. CURB DETAILS SEE SC1.1, SC1.2 AND SC1.3.
4. SIDEWALK DETAILS SEE SC2 AND SC3.
5. CURB RAMPS AS PER SC6 AND SC7.
6. CONTROLLED MEANS SIGNALIZED OR A 4-WAY STOP INTERSECTION.
7. SUBJECT TO AVOIDANCE OF MEDIANS, CROSSWALK LINES TO BE CENTRED ON THE CURB RAMP.
8. FOR CURB RAMPS, SLOPE OF 2% TO 5%, MAXIMUM 8%.
9. MAXIMUM SLOPE VARIES, SEE PRIVATE APPROACH BYLAW

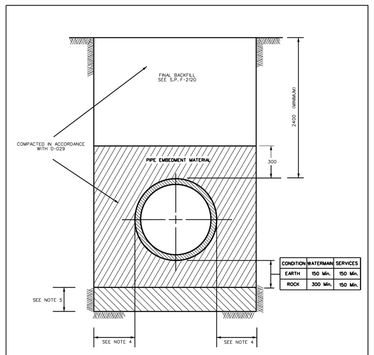
Ottawa	CURB RETURN ENTRANCES	DATE: MARCH 2007 REV. DATE: MARCH 2017 DWG. No.: SC7.1



NOTES

1. ALL EXISTING ASPHALT TO BE SAW CUT.
2. FULL DEPTH SURFACE: 40mm SURFACE ASPHALT, 50mm SUBSURFACE ASPHALT, LEVEL B (PG58-34) AND BASE COURSE ASPHALT SUBSURFACE 150mm, LEVEL B (PG58-34) TO BE USED.
3. UNLESS SPECIFIED ELSEWHERE, WHERE EXISTING PAVEMENT STRUCTURE EXCEEDS 150mm IN DEPTH, ASPHALT REINSTATEMENT SHALL BE 150mm AND GRANULAR 'A' FOR THE REMAINDER.
4. UNLESS SPECIFIED ELSEWHERE, WHERE AN UNDERLYING LAYER OF CONCRETE PAVEMENT EXISTS, REINSTATEMENT SHALL CONSIST OF 150mm OF SUBSURFACE ASPHALT, LEVEL B (PG58-34).
5. UNLESS SPECIFIED ELSEWHERE, HOT MIX ASPHALT PLACEMENT AND CONSTRUCTION SHALL BE IN ACCORDANCE WITH F-3130.

Ottawa	STANDARD TRENCH REINSTATMENT IN PAVED SURFACE	DATE: MAY 2001 REV. DATE: MARCH 2017 DWG. No.: R10



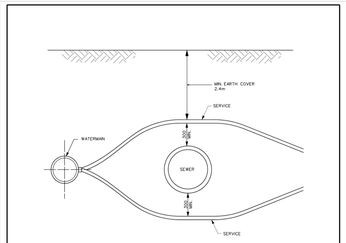
NOTES:

1. PIPE EMBEDMENT MATERIAL - GRANULAR 'A'.
2. FINAL BACKFILL - APPROVED NATIVE MATERIAL OR SELECT SUBGRADE IN ACCORDANCE WITH F-2020
3. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS SHOWN OTHERWISE.

OUTSIDE DIA (MM)	CLEARANCE (MM)
900 or LESS	450
OVER 900	500

5. WHEN APPROVED BY THE CONTRACT ADMINISTRATOR, POOR SOILS SHALL BE EXCAVATED TO CREATE A FOUNDATION THAT SHALL BE FILLED TO THE BEDDING WITH GRANULAR 'B'.

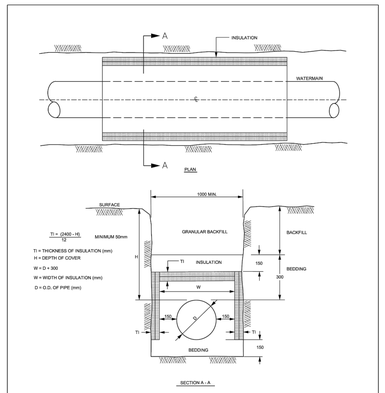
Ottawa	STANDARD TRENCH DETAIL	DATE: MAY 2001 REV. DATE: MARCH 2016 DWG. No.: W17



NOTES:

1. WHERE SEWER IS AT SAME ELEVATION AS WATERMAIN, SERVICES CAN BE INSTALLED OVER THE SEWER WITH A MINIMUM OF 2.4m COVER
2. WHERE THE 2.4m MINIMUM COVER IS NOT POSSIBLE THE SERVICE SHALL BE INSTALLED 300mm BELOW SEWER.
3. FOR OPEN ENDED STRUCTURES SUCH AS CATCH BASIN LEADS, CULVERTS, ETC., INSTALLATION SHALL BE IN ACCORDANCE WITH DETAIL W23.
4. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS SHOWN OTHERWISE.

Ottawa	SERVICE INSTALLATION AT SEWER CROSSING	DATE: MAY 2001 REV. DATE: NONE DWG. No.: W38

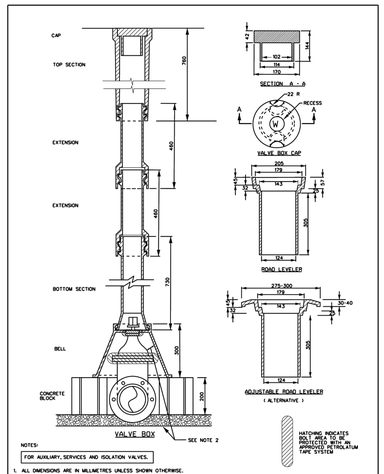


NOTES

FOR 150 - 450mm (NOMINAL DIAMETER) WATERMAINS, WHERE THE DEPTH OF COVER IS LESS THAN 2400mm

1. INCREMENTS OF THICKNESS SHALL BE ADJUSTABLE TO 25mm.
2. IN PROXIMITY OF MAINTENANCE HOLES, CULVERTS, CATCHBASINS, ETC., INSULATION SHALL BE PLACED PER DETAIL W23
3. DEPTH OF COVER LESS THAN 1200mm REQUIRES SPECIAL DESIGN
4. STAGGER JOINTS OF MULTIPLE SHEETS.
5. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS SHOWN OTHERWISE.

Ottawa	THERMAL INSULATION FOR WATERMAINS IN SHALLOW TRENCHES	DATE: MAY 2001 REV. DATE: MARCH 2013 DWG. No.: W22



NOTES:

FOR AUXILIARY, SERVICES AND ISOLATION VALVES.

1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS SHOWN OTHERWISE.
2. FOR 200 AND 250mm VALVES ADD BEDDING BELOW THE CONCRETE BLOCKS AS REQUIRED TO RAISE BELL HIGH ENOUGH TO PREVENT CONTACT WITH THE VALVE BONNET.

Ottawa	VALVE BOX ASSEMBLY	DATE: MAY 2001 REV. DATE: MARCH 2016 DWG. No.: W24

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100501996
2020-09-22
PROVINCE OF ONTARIO

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01	ISSUED FOR APPROVAL	M.L.	13 JAN 2020

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

DESIGNED BY:	DRAWN BY:	APPROVED BY:
V.J.	M.S.	V.J.

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

DRAWING TITLE
CONSTRUCTION DETAILS PLAN

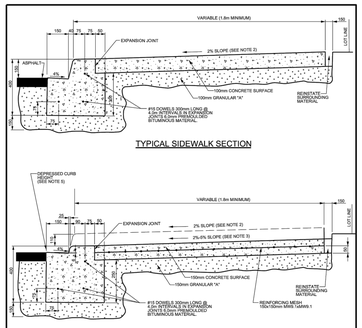
PROJECT NO.
130828.05

DATE
NOVEMBER 2019

C902

D07-12-20-0008

#17529



NOTES:
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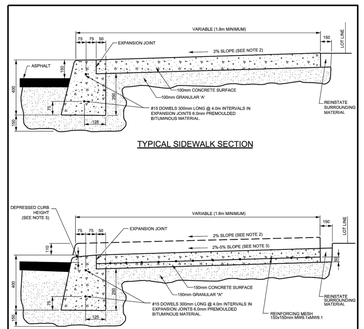
2. THE MAXIMUM SLOPE IS NOT TO EXCEED 2%.
3. FOR CURB RAMPS, SLOPE OF 2% TO 5%, MAXIMUM 8%.
4. EXPANSION AND DUMMY JOINTS AS PER SC3.
5. DEPRESSED CURB HEIGHT - FOR PEDESTRIAN CURB RAMPS 0 TO 6 mm AND FOR PRIVATE ENTRANCES 0 TO 25mm.

N.T.S.

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



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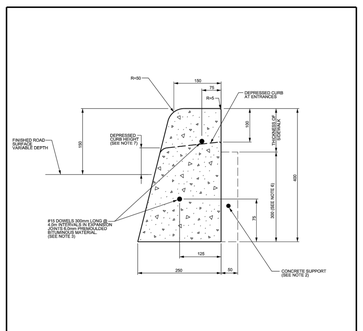
2. THE MAXIMUM SLOPE IS NOT TO EXCEED 2%.
3. FOR CURB RAMPS, SLOPE OF 2% TO 5%, MAXIMUM 8%..
4. EXPANSION AND DUMMY JOINTS AS PER SC5.
5. DEPRESSED CURB HEIGHT - FOR PEDESTRIAN CURB RAMPS 0 TO 6 mm AND FOR PRIVATE ENTRANCES 0 TO 25mm.

N.T.S.

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



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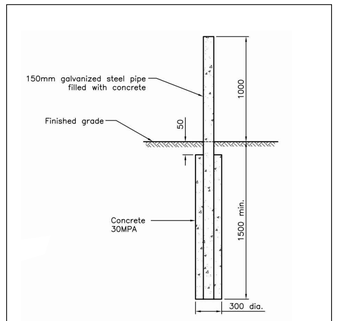
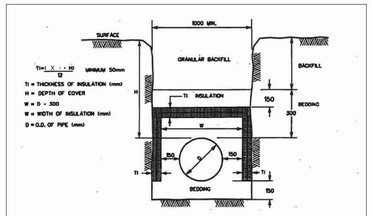
1. THE FULL CURB DEPTH SHALL BE CARRIED THROUGH THE DEPRESSED ACCESS CROSSING.
2. A CONCRETE SUPPORT IS REQUIRED WHEN BUILT ADJACENT TO THE SIDEWALK.
3. IF AN EXTRUSION CURBING MACHINE IS USED, THE EXPANSION BITUMINOUS MATERIAL AND THE #15 DOWELS ARE TO BE PLACED AT THE END OF THE EXTRUSION.
4. ALL DIMENSIONS 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 25).
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



BOLLARD DETAIL (TYP.)

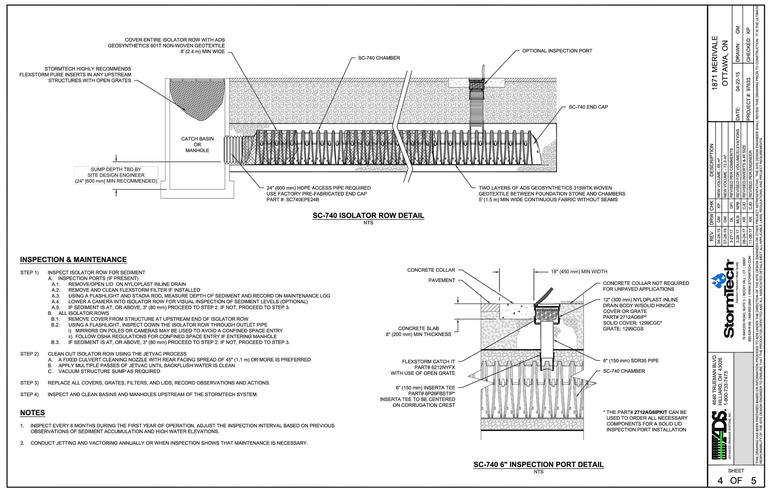


NOTES:
-EXTRUDED POLYSTYRENE INSULATION BOARDS HIGHLOAD 40 PER ASTM C578, TYPE VI
-FOR STORM INSULATION USE AN X VALUE OF 2000 IN THE ABOVE "TI" EQUATION.
-FOR SANITARY INSULATION USE AN X VALUE OF 2500 IN THE ABOVE "TI" EQUATION.
-FOR WATERMAIN INSULATION USE AN X VALUE OF 2400 IN THE ABOVE "TI" EQUATION.
-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^{-5})
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



INSPECTION & MAINTENANCE

STEP 1) INSPECT ISOLATOR ROW FOR SEDIMENT
A. INSPECTION PORTS (IF PRESENT):
A.1. REMOVE/OPEN LID ON NYLOFLAST 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.

1871 MERIVALE
OTTAWA, ON

DATE	DRAWN	CHECKED
04-22-15	GM	

PROJECT # 17503

REV	DATE	DRN	CHK	DESCRIPTION
1	07-16-15	GM		REVISED PER CITY COMMENTS
2	07-21-15	GM		REVISED PER CITY COMMENTS
3	08-17-15	A.K.	A.R.	REVISED PER CITY COMMENTS
4	11-06-17	A.K.	J.D.	REVISED PER CITY COMMENTS
5	11-06-17	A.K.	J.D.	REVISED PER CITY COMMENTS

StormTech
6420 STATION HILL DR
SUITE 100
COLLEGE STATION, TX 77845
979.693.7926 | WWW.STORMTECH.COM

ADS
4640 TRUEMAN BLVD
HILLIARD, OH 43026
1.800.733.7473

THESE DRAWINGS WERE PREPARED AND REVIEWED BY QUALIFIED PERSONNEL OF ADS IN ACCORDANCE WITH GENERALLY ACCEPTED ENGINEERING PRACTICE AND ARE BASED ON THE INFORMATION AND SPECIFICATIONS PROVIDED TO ADS AT THE TIME OF PREPARATION. ADS MAKES NO REPRESENTATIONS OR WARRANTIES OF ANY KIND REGARDING THESE DRAWINGS OR ANY OTHER ADS PRODUCT OR SERVICE INCLUDING ANY WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR ANY WARRANTIES ARISING FROM COURSE OF DEALING OR USAGE OF TRADE. ADS ASSUMES NO RESPONSIBILITY FOR THE DESIGN OF SITE IMPROVEMENTS INCLUDING BUT NOT LIMITED TO PAVEMENTS, FOUNDATIONS, GRADES, SLOPES, EMBANKMENTS, RETAINING WALLS, WATER, SEWER, UTILITIES, OR DRAINAGE STRUCTURES. ADS ASSUMES NO RESPONSIBILITY FOR THE DESIGN OF STRUCTURES OR FACILITIES WITHIN WHICH THE STORMTECH CHAMBER SYSTEM MAY BE INSTALLED. THE SITE DESIGN ENGINEER IS RESPONSIBLE FOR ASSUMING THE DESIGN AND ENSURING THE SUITABILITY OF THE STORMTECH CHAMBER SYSTEM FOR A GIVEN APPLICATION.

SHEET
4 OF 5

USE AND INTERPRETATION OF DRAWINGS

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

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

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

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

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

UNAUTHORIZED CHANGES:

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

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

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

GENERAL NOTES:

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

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

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

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

LICENSED PROFESSIONAL ENGINEER
M. BASNET
100501996
2020-09-22
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 APPROVAL	A.S.	22 SEP 2020
03	ISSUED FOR APPROVAL	A.S.	26 AUG 2020
02	ISSUED FOR APPROVAL	A.S.	10 JUL 2020
01	ISSUED FOR APPROVAL	M.L.	13 JAN 2020

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

DESIGNED BY:	DRAWN BY:	APPROVED BY:
V.J.	M.S.	V.J.

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

DRAWING TITLE
CONSTRUCTION DETAILS PLAN

PROJECT NO.
130828.05

DATE
NOVEMBER 2019

C903

D07-12-20-0008

#17529

APPENDIX B

SWM Catchment Runoff Coefficient Calculations
Storm Sewer Design Sheet

LRL Associates Ltd.
Storm Design Sheet

LRL File No.	130828.05
Project:	Benson Commercial Development- Building Replacement
Location:	1871 Merivale Rd., Nepean, ON
Date:	August 2020
Designed:	Amr Salem
Drawing Reference:	C.702

SWM Catchment Runoff Coefficient Calculations

As per Original Site Plan Approval					
CATCHMENT	Grass C=0.20	River Stones C=0.70	Bldg. / Asph. / Conc. C=0.90	Total Area (ha)	Combined C
CA-04	0.012	0.000	0.123	0.135	0.84

Altered to Account for Proposed Site Changes					
CATCHMENT	Grass C=0.20	River Stones C=0.7	Bldg. / Asph. / Conc. C=0.90	Total Area (ha)	Combined C
CA-01	0.008	0.045	0.108	0.161	0.81
CA-02	0.006	0.000	0.138	0.144	0.87
CA-03	0.003	0.000	0.136	0.139	0.88

LRL Associates Ltd.

Storm Design Sheet

LRL File No.	130828
Project:	Benson Auto-Parts
Location:	1871 Merivale
Date:	September 21, 2020
Designed:	Amr Salem
Drawing Reference:	C.401

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	0.20
Gravel	0.80
Asphalt / rooftop	0.90

Ottawa Macdonald-Cartier International Airport IDF curve equation (5 year event, intensity in mm/hr)

$I = 998.071 / (T_c + 6.053)^{0.814}$

Min. velocity = 0.80 m/s

Manning's "n" = 0.013

LOCATION			AREA (ha)			FLOW						STORM SEWER							
WATERSHED / STREET	From MH	To MH	C = 0.20	C = 0.80	C = 0.90	Indiv. 2.78AC	Accum. 2.78AC	Time of Conc. (min.)	Rainfall Intensity (mm/hr)	Peak Flow Q (L/s)	Controlled Flow Q (L/s)	Pipe Diameter (mm)	Type	Slope (%)	Length (m)	Capacity Full (L/s)	Velocity Full (m/s)	Time of Flow (min.)	Ratio (Q/Q_{FULL})
CA01	EX. ACCESS PORTS	STM CB3	0.000	0.015	0.000	0.034	0.03	10.00	104.2	3.50	2.34	250	HDPE	0.50%	175.0	42.0	0.86	3.40	0.08
	STM CB3	STM MH2	0.000	0.000	0.000	0.000	0.03	13.40	89.1	2.99	1.90	250	PVC	2.00%	14.0	84.1	1.71	0.14	0.04
	CB1	STM MH2	0.01	0.02	0.13	0.375	0.38	10.00	104.2	39.10	4.24	250	PVC	1.00%	9.0	59.5	1.21	0.12	0.66
	STM MH2	EX. STM	0.00	0.02	0.00	0.000	0.41	13.54	88.6	36.22	4.24	250	PVC	0.40%	15.0	37.6	0.77	0.33	0.96

APPENDIX C

Proposed Building Water Demands

Water Supply Calculations

LRL File No.	130828
Project	Proposed Benson Commercial Development- Building Replacement
Date	Aug, 2020
Designed:	Mohan Basnet

Domestic Commercial Flow Demand

Total Building Floor Area =	**835**	m^2			(Proposed Building)
Site Total Area =	**0.58**	ha			
Total Fixture Unit (Hydraulic Load) =	33.6	ea.			(As per OBC, assume 8 water closet, and 8 lavatory sink
Average Demand Per Fixture Unit =	3.33	L/min			
Average Commercial Water Demand =	**111.89**	L/min	1.86	L/s	
Maximum Daily Peak Factor =	1.5				(As per City of Ottawa)
Maximum Daily Commercial =	**167.83**	L/d	2.80	L/s	
Maximum Hourly Peak Factor =	1.8				(As per City of Ottawa)
Maximum Hourly Commercial =	**302.10**	L/d	5.03	L/s	

Therefore,

Total Domestic Flow =	**5.03**	**L/s**
Total Fire Flow =	**133.3**	**L/s**

APPENDIX D

FUS Fire Flow Calculation
Fire Hydrant Location Figure

Fire Flow Calculations

LRL File No. 130828.04

Project: Proposed Benson Commercial Development- Building Replacement

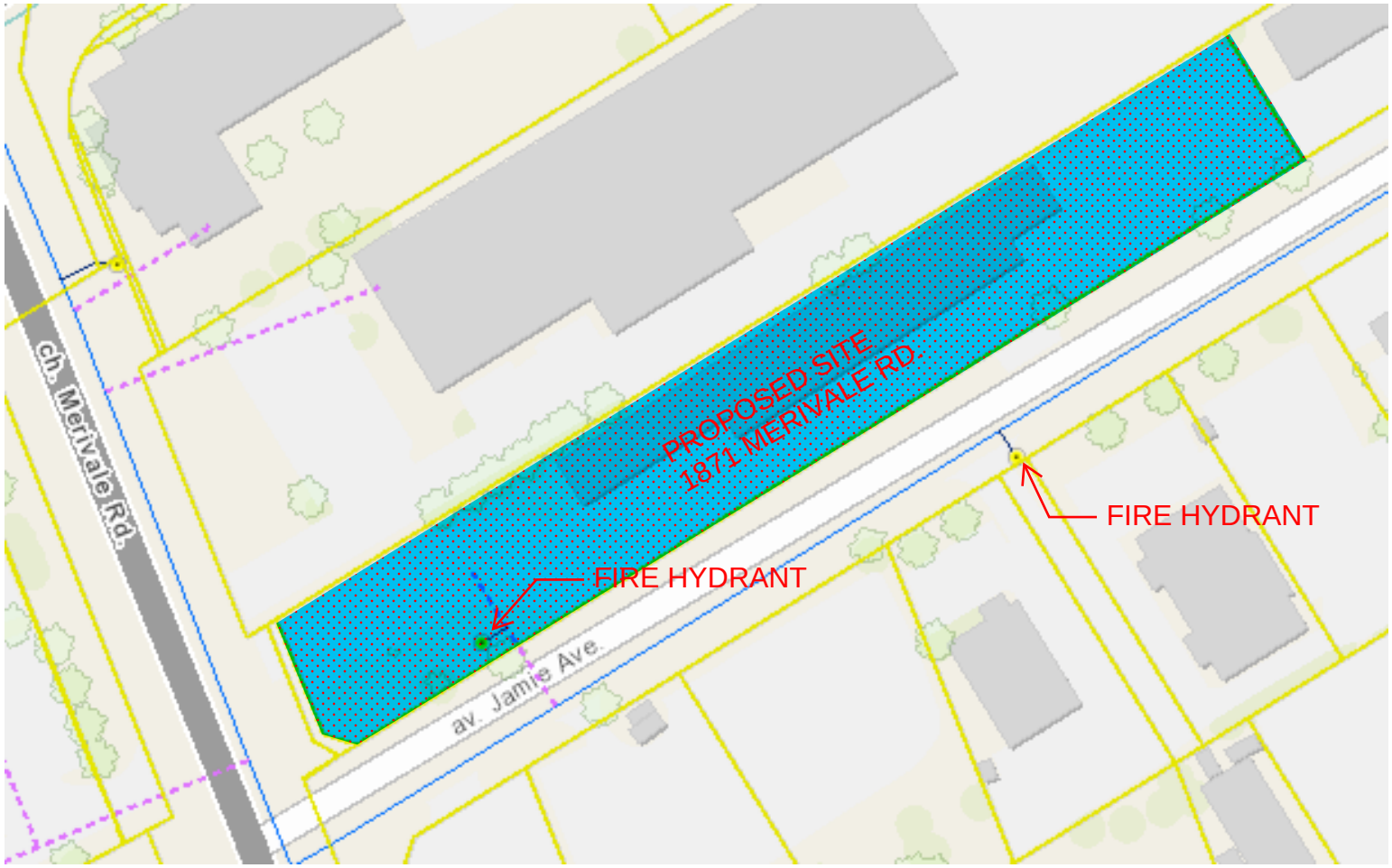
Date: August, 2020

Method: Fire Underwriters Survey (FUS)

Prepared by: Mohan Basnet

New Building	835	
	835	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)				1	floor	
3	Enter area of a unit	Enter floor space area of one unit		1	835.0	835	sq.m.	
4	Obtain fire flow before reductions	Required fire flow	**Fire Flow = 220 x C x Area^0.5**				L/min	**6,000**
							L/s	100.0
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	**6,000**
			Rapid burning	0.25			L/s	100.0
6	Choose reduction for sprinklers	Sprinkler reduction	Sprinklers (NFPA13)	-0.30	False	0		
			Water supply is standard for both the system and fire department hose lines	-0.10	False	0	L/min	**6,000**
			Fully supervised system	-0.10	False	0	L/s	100.0
7	Choose separation	Exposure distance between units	North side	20.1 to 30m	0.1			
			East side	Over 45m	0			
			South side	Over 45m	0		L/min	**8,000**
			West side	3.1 to 10m	0.2	0.3	L/s	133.3
Net required fire flow								
8	Obtain fire flow, duration, and volume	Minimum required fire flow rate (rounded to nearest 1000)					L/min	**8,000**
		Minimum required fire flow rate					L/s	**133.3**
		Required duration of fire flow					hr	**2**



SCALE : N.T.S.

PROJECT

DRAWING TITLE

FIRE HYDRANT LOCATION

CLIENT

BENSON COMMERCIAL DEVELOPMENT

DATE

MAY 13, 2020

PROJECT

130828

LRL
ENGINEERING | INGÉNIERIE
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APPENDIX E

Jamie Avenue As-Builts and Sanitary Mapping

No.	Revisions	By	Date

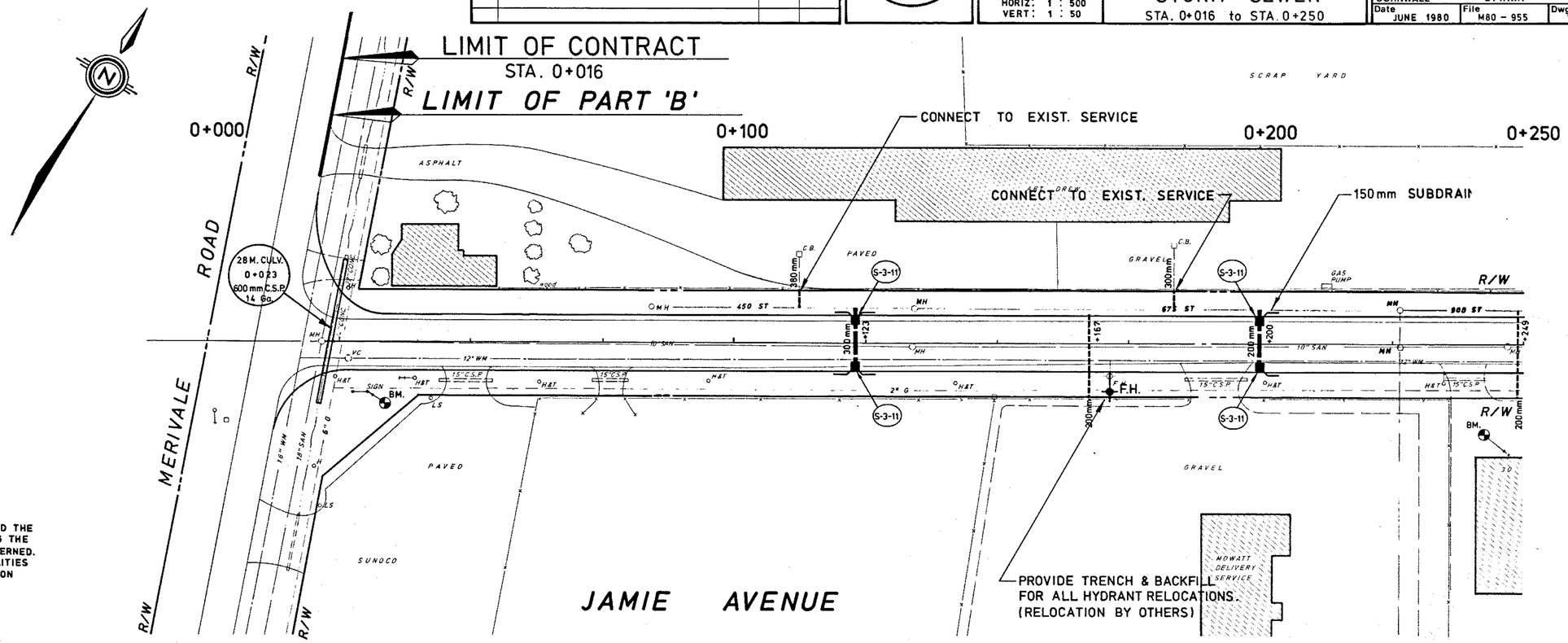
REGISTERED PROFESSIONAL ENGINEER — W.M. HARDING — PROVINCE OF ONTARIO

Des. W.M.H.	Chkd. L.D.S.	Project: BENTLEY, JAMIE & GIFFORD ROAD RECONSTRUCTION
Dwn. D.K.L.	Chkd. W.M.H.	Dwg. Title: JAMIE AVENUE STORM SEWER STA. 0+016 to STA. 0+250
Scale HORIZ: 1 : 500 VERT: 1 : 50		

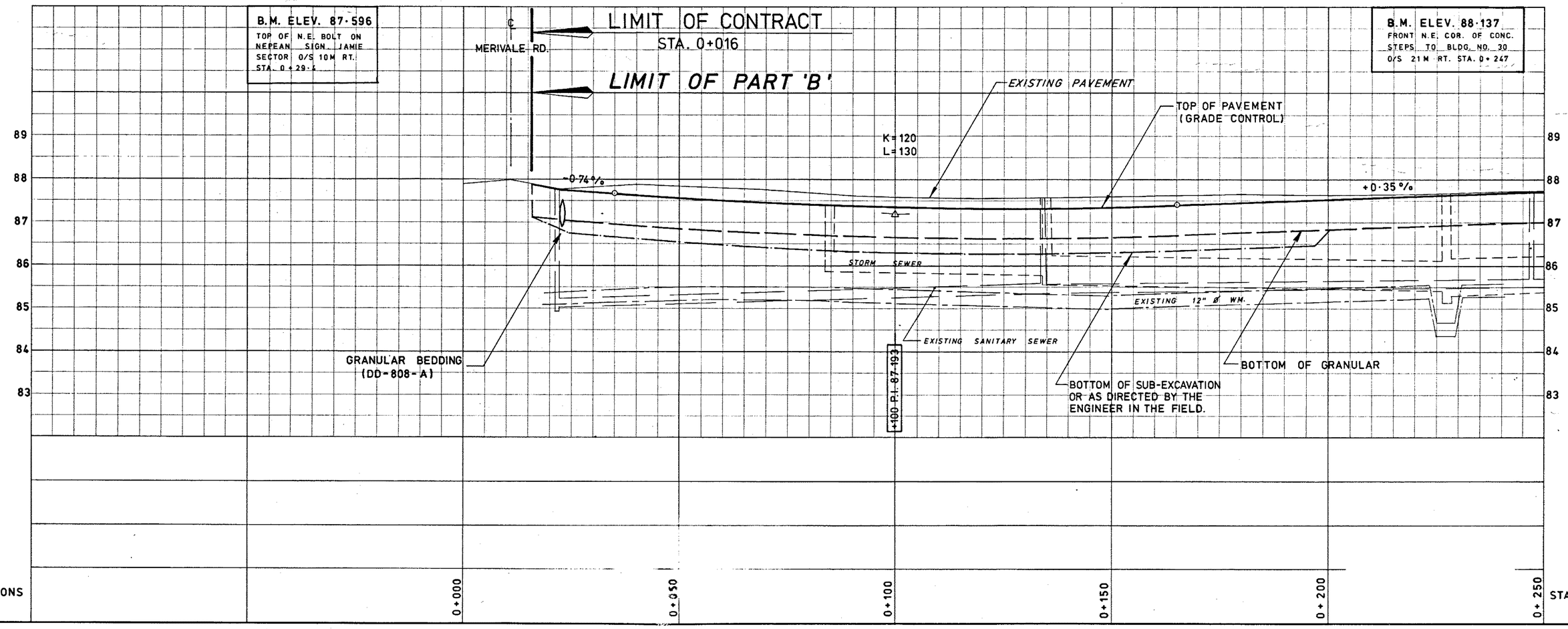
CITY OF NEPEAN

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

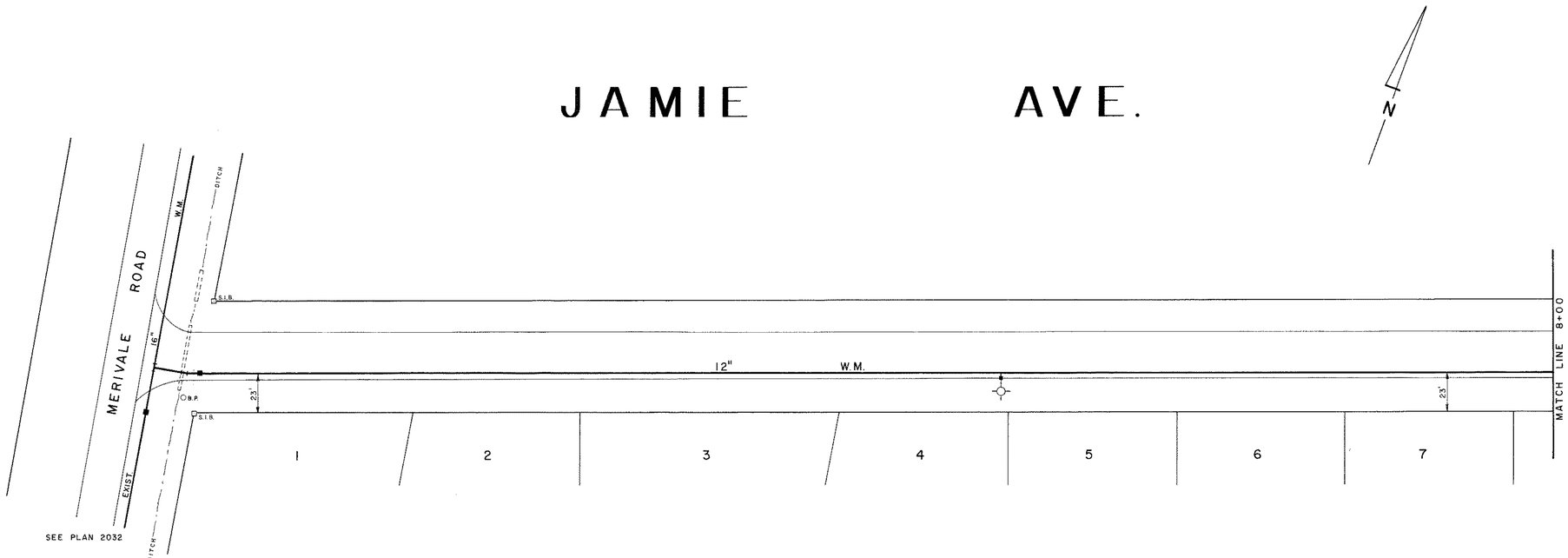
Date	File	Dwg.
JUNE 1980	M80 – 955	12 of 25

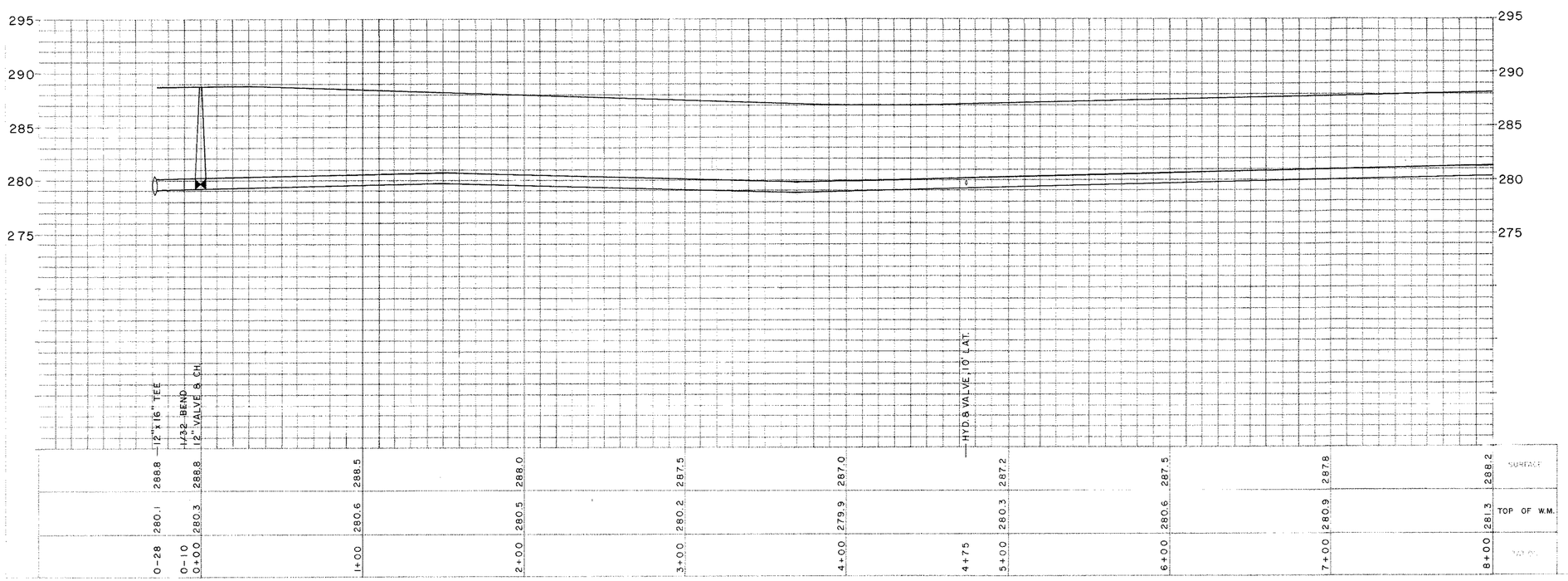


NOTE
THE LOCATION OF UTILITIES IS APPROXIMATE ONLY, AND THE EXACT LOCATION SHOULD BE DETERMINED BY CONSULTING THE MUNICIPAL AUTHORITIES AND UTILITY COMPANIES CONCERNED. THE CONTRACTOR SHALL PROVE THE LOCATION OF UTILITIES AND SHALL BE RESPONSIBLE FOR ADEQUATE PROTECTION FROM DAMAGE DURING CONSTRUCTION.



JAMIE AVE.





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

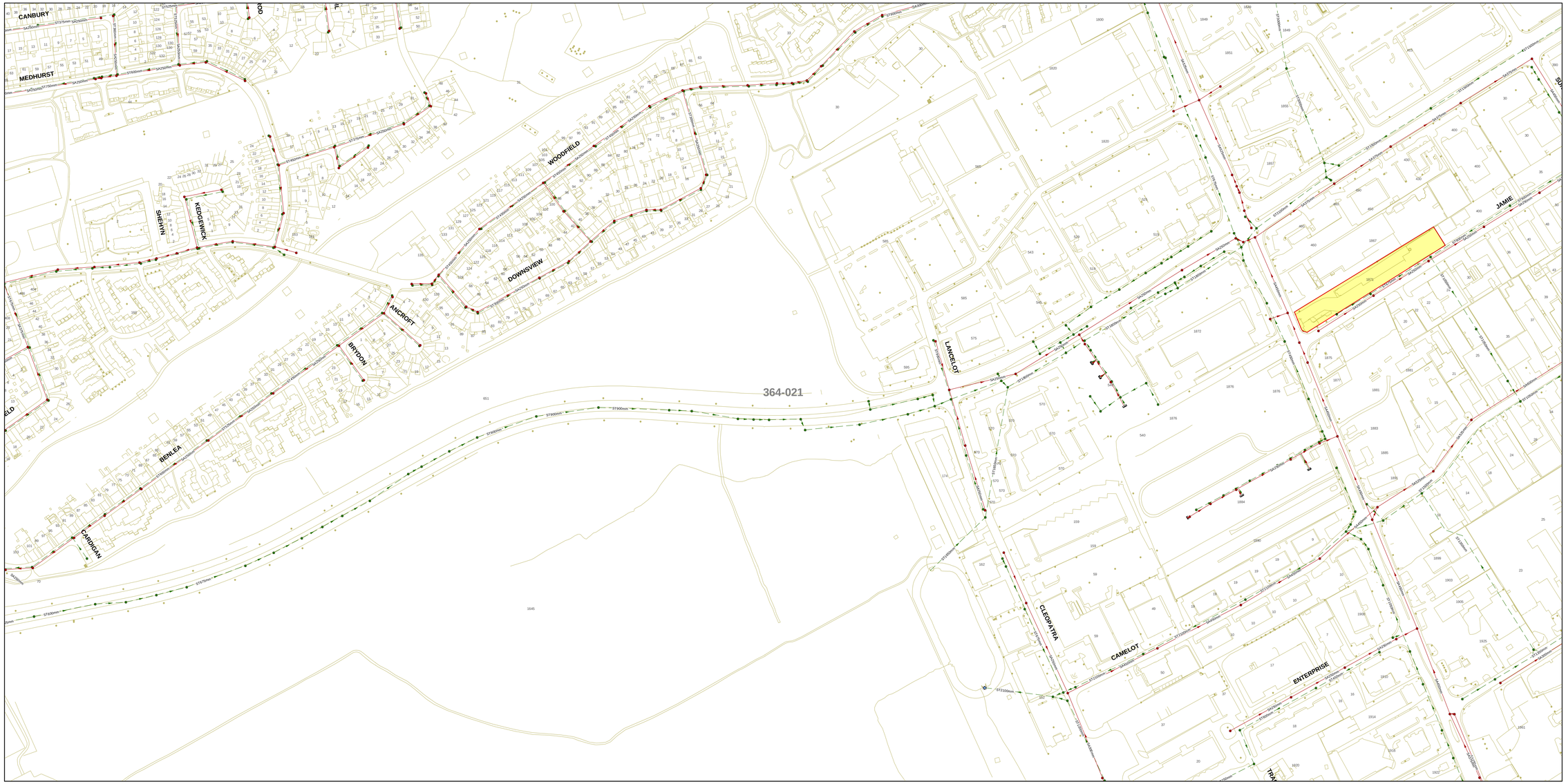
REGIONAL MUNICIPALITY OF OTTAWA-CARLETON
WORKS DEPARTMENT

12" WATER MAIN

JAMIE AVENUE

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

		M. J. W.	
W. L. KEAY	P. E. ABBO	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.

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

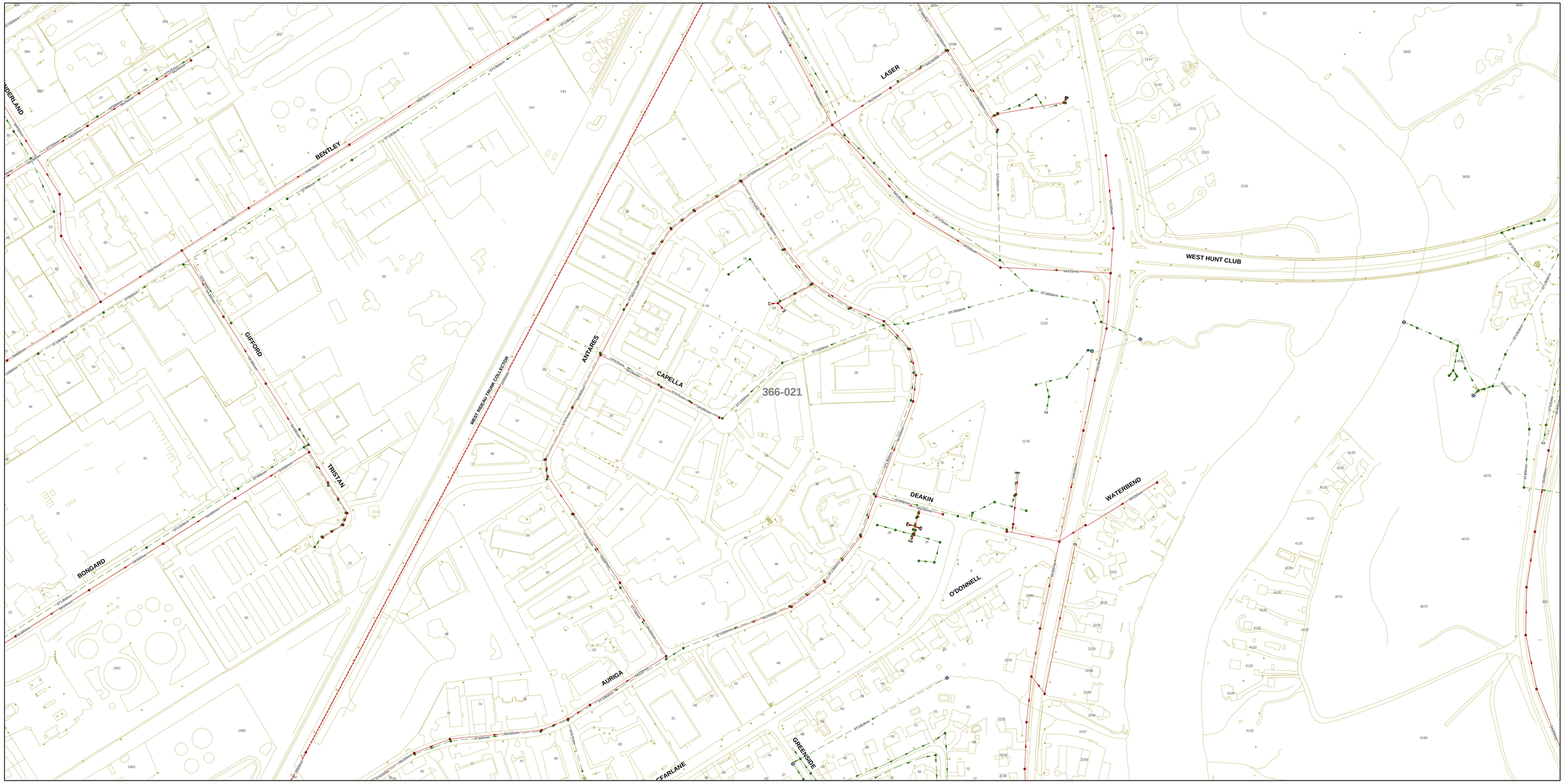
PIPE EQUIVALENTS

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

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.

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

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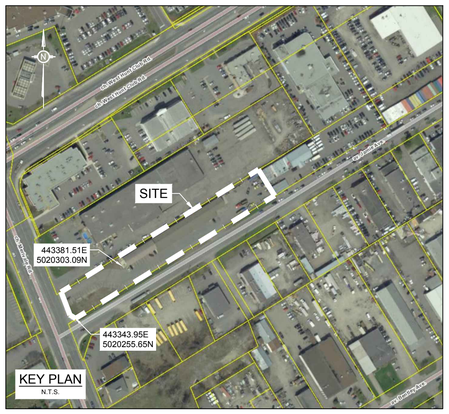
364-020	366-020	368-020
364-019	366-019	368-019

Appendix F

Civil Engineering Drawings (Phase 1)



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:

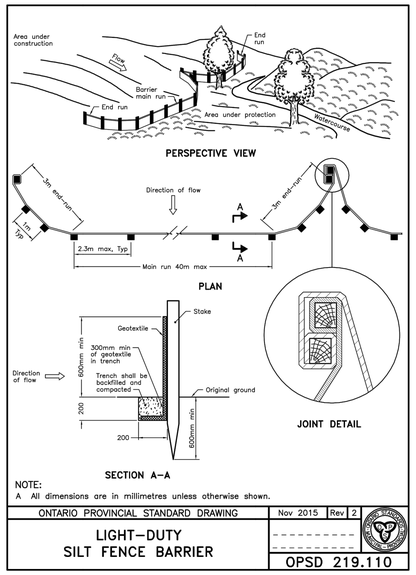
- PRIOR TO THE REMOVAL OF ANY VEGETATIVE COVER, MOVING OF SOIL AND CONSTRUCTION:
- INSTALL SILT FENCE IMMEDIATELY DOWNSTREAM FROM AREAS TO BE DISTURBED (SEE PLAN FOR LOCATION).
- INSTALL INLET SEDIMENT CONTROL DEVICES
- INSTALL GEOSOCK INSERTS WITH AN OVERFLOW IN ALL THE DOWNSTREAM CATCHBASINS AND MANHOLES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

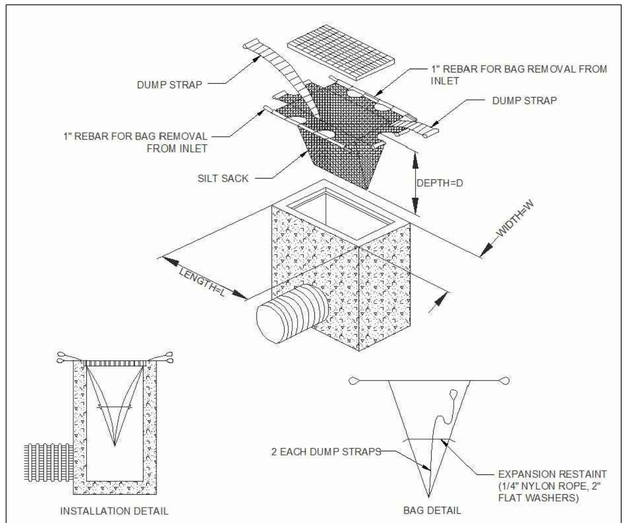
3. AFTER CONSTRUCTION:

- 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
- 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
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- PROPOSED FIRE HYDRANT
- PROPOSED WATER VALVE
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- PROPOSED BOLLARD (SEE DETAIL ON C903)
- BH-1 BOREHOLE LOCATION
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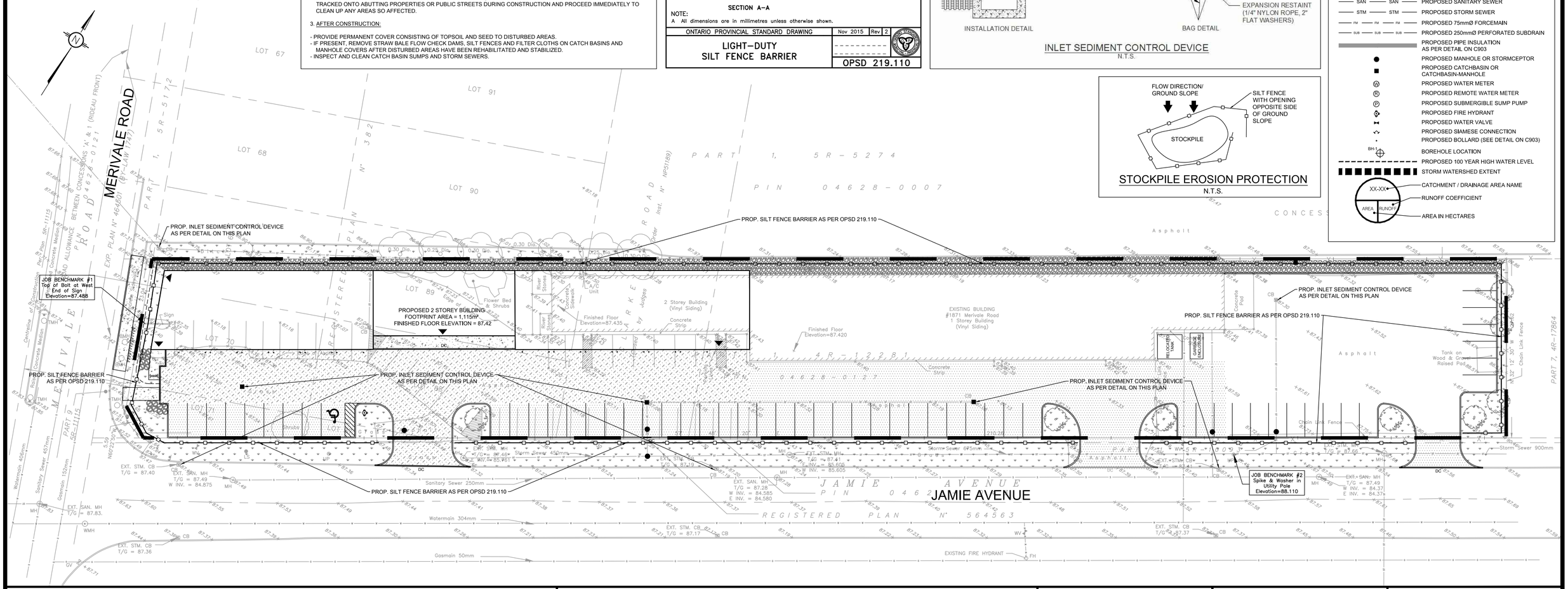
- XX-XX — CATCHMENT / DRAINAGE AREA NAME; RUNOFF COEFFICIENT; AREA IN HECTARES



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

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

APPROVED
By Derrick Moodie at 11:52 am, Nov 06, 2018

LICENSED PROFESSIONAL ENGINEER J. C. R. LALONDE OCT 24/2018 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

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08	AS PER CITY COMMENTS	G.C.	26 OCT 2018
07	AS PER CITY COMMENTS	G.C.	03 OCT 2018
06	AS PER CITY COMMENTS	G.C.	30 AUG 2018
05	AS PER CITY COMMENTS	G.C.	20 JUL 2018
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.	J.C.

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

DRAWING TITLE
EROSION AND SEDIMENT CONTROL PLAN

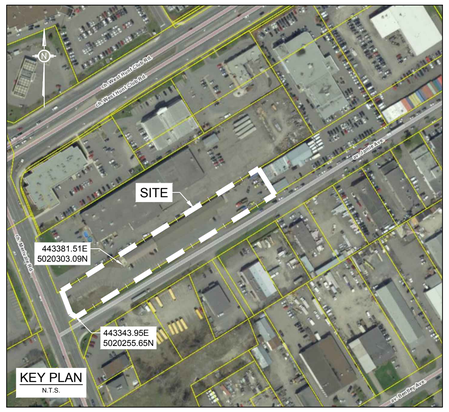
PROJECT NO.
130828

DATE
29 AUG 2018

C101

D07-12-17-0054

#17529



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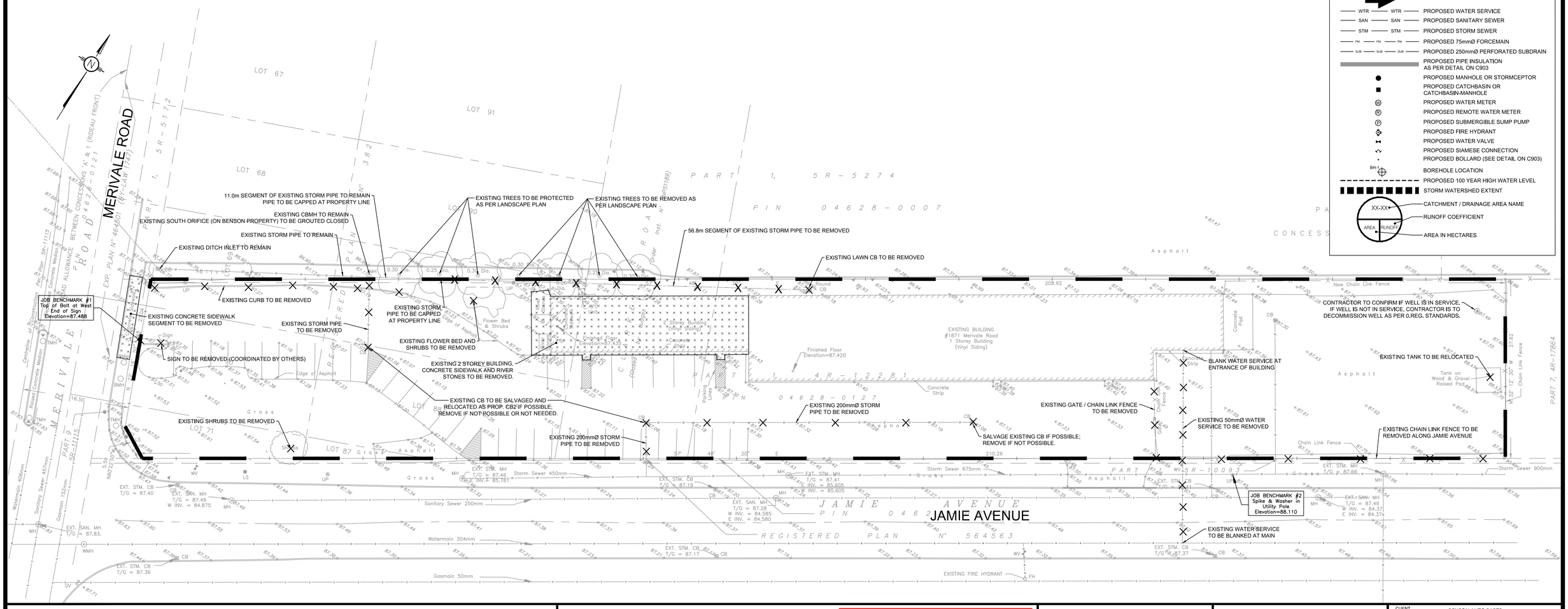

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MANAGER
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APPROVED
By Derrick Moodie at 11:54 am, Nov 06, 2018

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

LICENSED PROFESSIONAL ENGINEER J. C. R. LALONDE OCT 26/2018 PROVINCE OF ONTARIO

NOT AUTHENTIC UNLESS SIGNED AND DATED

LRL
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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, CORNWALL, ONTARIO
K6H 6B8 , TEL. 613-936-7850

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

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

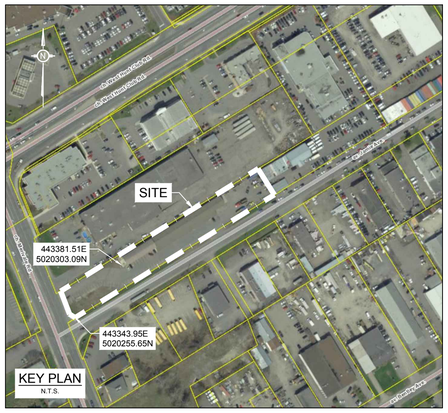
DRAWING TITLE
DEMOLITION PLAN

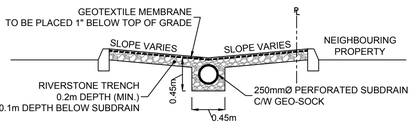
PROJECT NO. 130828
DATE 29 AUG 2018

C102

D07-12-17-0054

#17529





SWALE & SUBDRAIN - TYPICAL SECTION A-A

(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:

1. UNDERGROUND UTILITIES, AS REPORTED ON THIS DRAWING, ARE NOT BASED ON AN ACTUAL 'FIELD LOCATE' BY THE RESPECTIVE UTILITY AGENCIES BUT HAVE BEEN COMPILED FROM DATA OBTAINED FROM THE CITY OF OTTAWA PUBLIC UTILITIES REGISTRY.
2. BEFORE ANY WORK INVOLVING PROBING, EXCAVATING, ETC., CONTRACTOR TO CONFIRM RELEVANT UTILITY LOCATIONS AND REPORT ANY DISCREPANCIES TO THE ENGINEER PRIOR TO COMMENCING WORK.

SURVEY NOTES:

1. CONFIRM JOB BENCHMARKS SHOWN ON PLANS WITH ENGINEER PRIOR TO UTILIZATION.
2. BEARINGS HEREON ARE GRID BEARINGS AND ARE DERIVED FROM NCC HORIZONTAL CONTROL MONUMENTS 019710637 (N 5022465.812, E 365416.840) AND 019861625 (N 5022141.837, E 363270.732) AND ARE REFERRED TO THE CENTRAL MERIDIAN 76°30'W LONGITUDE, ZONE 9 OF THE 3° M.T.M. ONTARIO COORDINATE SYSTEM (NAD 83).

LEGEND:

- PROPERTY LINE
- PROPOSED CURB
- PROPOSED DEPRESSED CURB
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- PROPOSED GRASS AREA (IF POSSIBLE, EXISTING GRASS MAY REMAIN.)
- PROPOSED CONCRETE FEATURES/SLAB
- PROPOSED HEAVY DUTY ASPHALT
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- ASPHALT TO BE REINSTATED TO MATCH EXISTING CONDITIONS
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- PROPOSED SILT FENCE AS PER OPSD 219.110
- ×50.00 PROPOSED ELEVATION
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- PROPOSED MANHOLE OR STORMCEPTOR
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- PROPOSED BOLLARD (SEE DETAIL ON C903)
- BH-1 BOREHOLE LOCATION
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- STORM WATERSHED EXTENT
- XX-XX CATCHMENT / DRAINAGE AREA NAME
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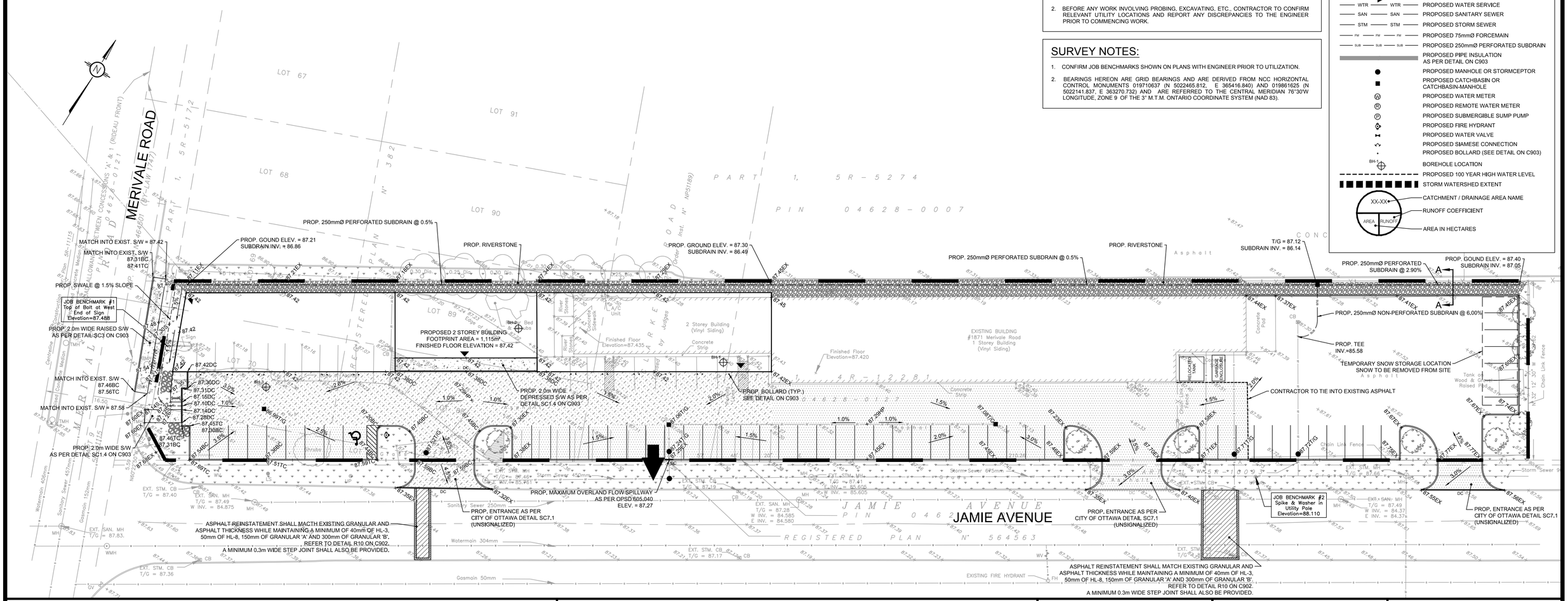
- AREA IN HECTARES



USE AND INTERPRETATION OF DRAWINGS

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

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

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

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

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

UNAUTHORIZED CHANGES:

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

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

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

GENERAL NOTES:

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

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

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

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

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

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

APPROVED
By Derrick Moodie at 11:50 am, Nov 06, 2018

LICENSED PROFESSIONAL ENGINEER
J. C. R. LALONDE
OCT 26/2018
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
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DESIGNED BY:	DRAWN BY:	APPROVED BY:
G.C.	G.C.	J.C.

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

DRAWING TITLE
GRADING AND DRAINAGE PLAN

PROJECT NO.
130828

DATE
29 AUG 2018

C301

D07-12-17-0054

#17529

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
103mm dia. ICD ORIFICE PLATE	100 YEAR
HEAD (m)	1.72
HIGH WATER LEVEL (m)	87.44
CONTROLLED RELEASE RATE (L/s)	29.52

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

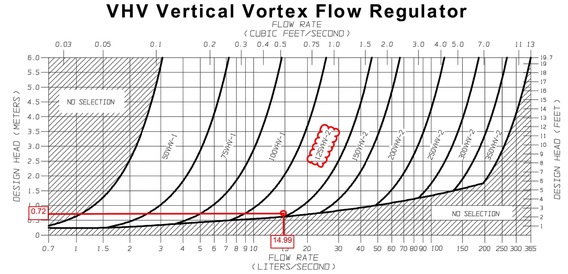

FIGURE 3 - VHV

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.
2. OBTAIN AND PAY FOR ALL NECESSARY PERMITS AND APPROVALS FROM THE MUNICIPAL AUTHORITIES PRIOR TO COMMENCING CONSTRUCTION; SUCH AS, BUT NOT LIMITED TO: ROAD CUT PERMITS, SEWER PERMITS, WATER PERMIT, ETC. THE APPROVAL OF THIS PLAN DOES NOT EXEMPT THE CONTRACTOR FROM THE REQUIREMENTS TO OBTAIN THE VARIOUS PERMITS/APPROVALS REQUIRED TO COMPLETE THE CONSTRUCTION PROJECT.
3. FILTER FABRIC TO BE INSTALLED AND MAINTAINED BETWEEN THE FRAME AND COVER OF ALL CATCHBASINS AND CATCHBASIN MANHOLES DURING THE CONSTRUCTION PERIOD TO MINIMIZE SEDIMENTS ENTERING THE STORM SEWER SYSTEM. ALL GRASSED AREAS MUST BE COMPLETED PRIOR TO THE REMOVAL OF THE FILTER FABRIC IN THE CATCH BASINS.
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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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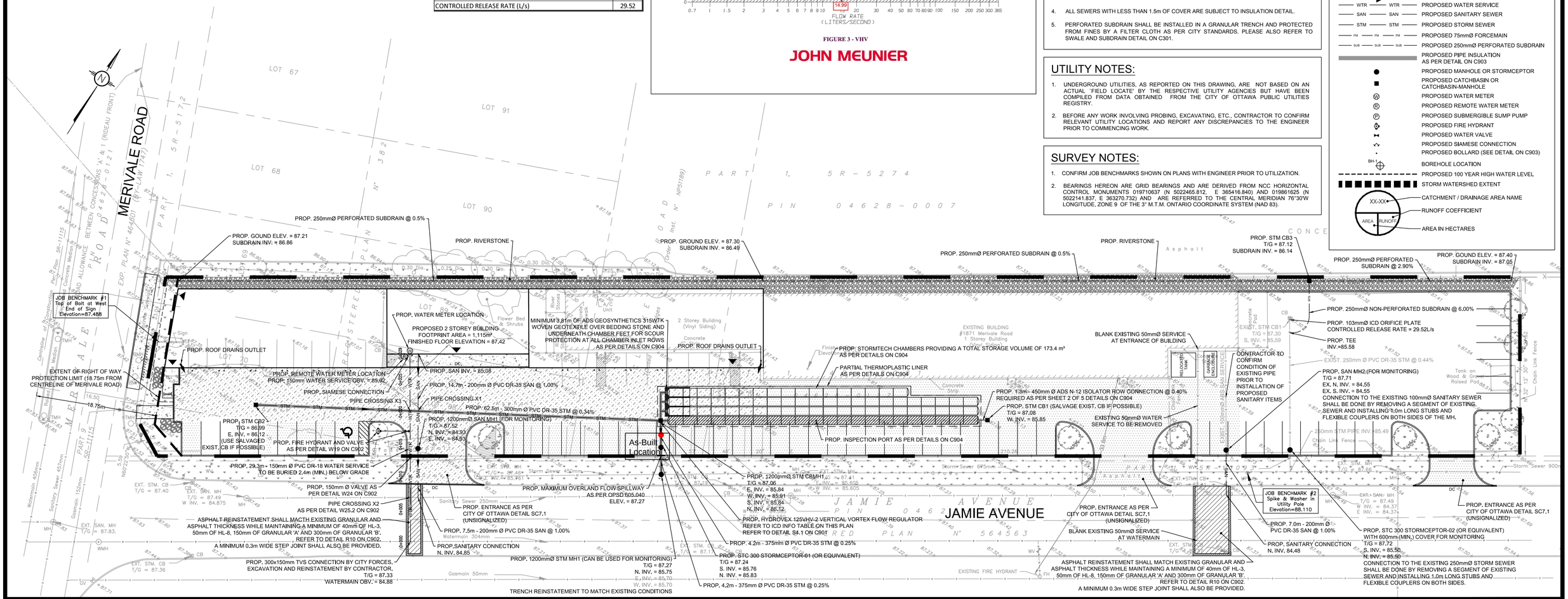

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5m 2 0 5 10m
SCALE: 1:300

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

APPROVED
By Derrick Moodie at 11:47 am, Nov 06, 2018

LICENSED PROFESSIONAL ENGINEER J. C. R. LALONDE OCT 26/2018 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.	J.C.

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

DRAWING TITLE
SITE SERVICING PLAN

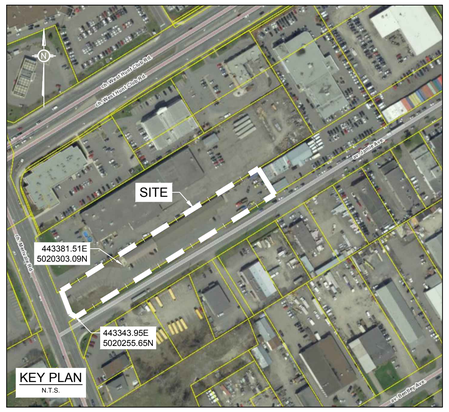
PROJECT NO.
130828

DATE
29 AUG 2018

C401

D07-12-17-0054

#17529



LEGEND:

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WM	PROPOSED WATER METER
RM	PROPOSED REMOTE WATER METER
P	PROPOSED SUBMERGIBLE SUMP PUMP
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	STORM WATERSHED EXTENT
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SYSTEM / OUTLET #1

SYSTEM / OUTLET #2

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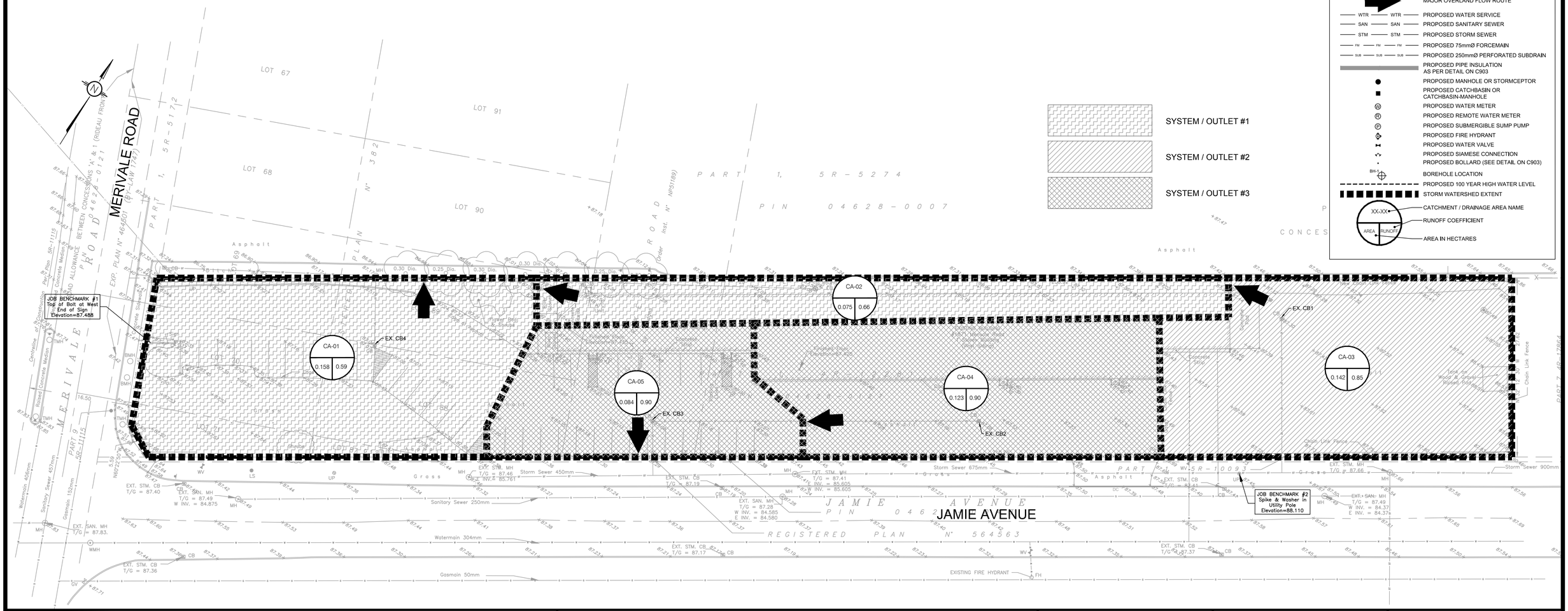

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5m 2 0 5 10m

SCALE: 1:300

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

APPROVED
By Derrick Moodie at 11:48 am, Nov 06, 2018

LICENSED PROFESSIONAL ENGINEER
J. C. R. LALONDE
OCT. 24/2018
PROVINCE OF ONTARIO

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

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

DRAWING TITLE
PRE-DEVELOPMENT
CATCHMENTS PLAN

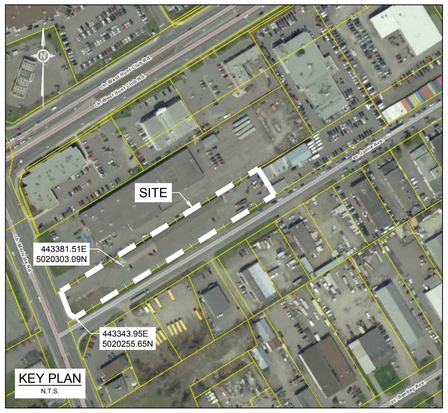
PROJECT NO.
130828

DATE
29 AUG 2018

C701

D07-12-17-0054

#17529



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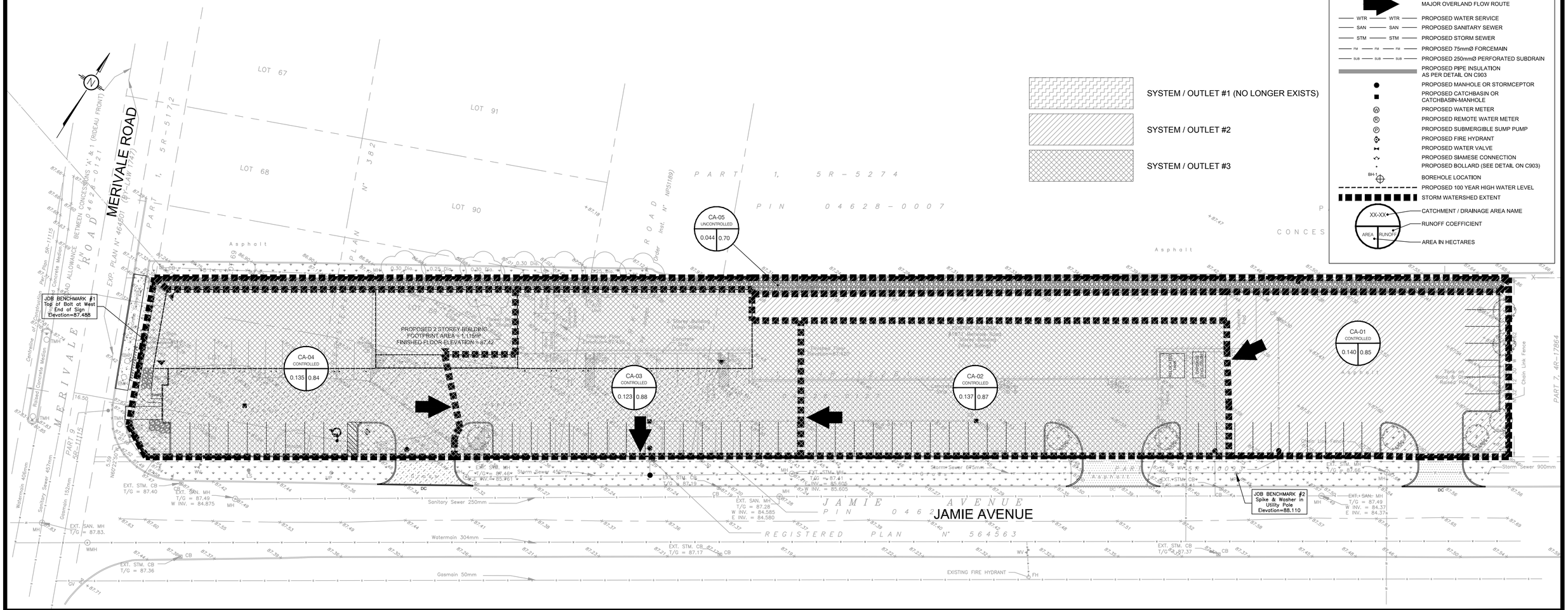

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PLANNING, INFRASTRUCTURE & ECONOMIC DEVELOPMENT DEPARTMENT, CITY OF OTTAWA

APPROVED
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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

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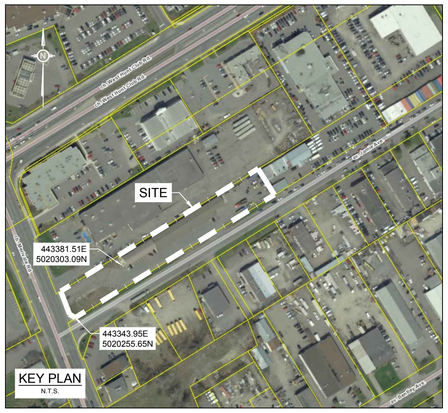

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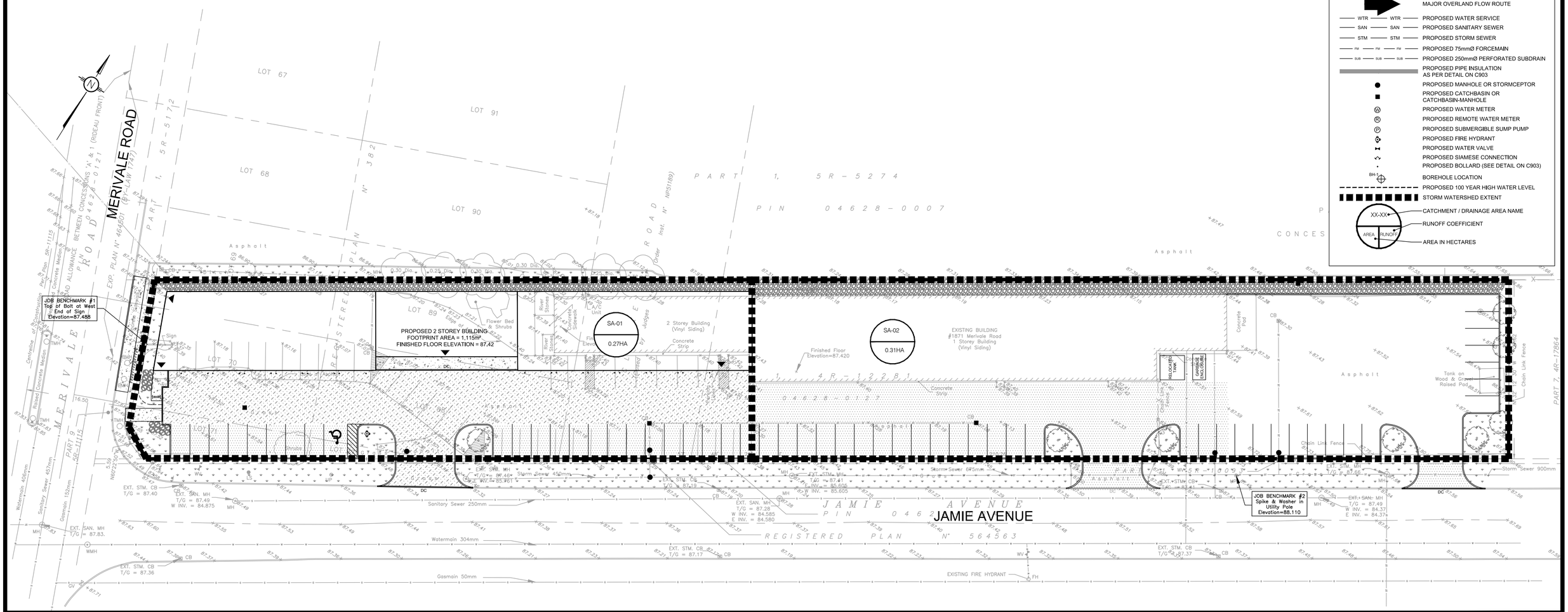

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CONTRACTOR TO VERIFY ALL DIMENSIONS AND NOTIFY THE ENGINEER OF ANY DISCREPANCIES BEFORE WORK COMMENCES. DO NOT SCALE DRAWINGS.

5m 2 0 5 10m

SCALE: 1:300

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

APPROVED
By Derrick Moodie at 11:46 am, Nov 06, 2018

LICENSED PROFESSIONAL ENGINEER
J. C. R. LALONDE
OCT 26 2018
PROVINCE OF ONTARIO

NOT AUTHENTIC UNLESS SIGNED AND DATED

LRL
ENGINEERING | INGÉNIERIE
5430 Canotek Road I Ottawa, ON, K1J 9G2
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No.	REVISIONS	BY	DATE
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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.	J.C.

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

DRAWING TITLE
SANITARY DRAINAGE
AREA PLAN

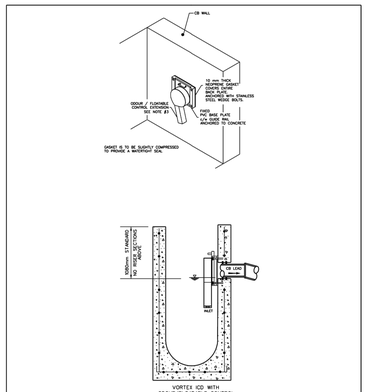
PROJECT NO.
130828

DATE
29 AUG 2018

C703

D07-12-17-0054

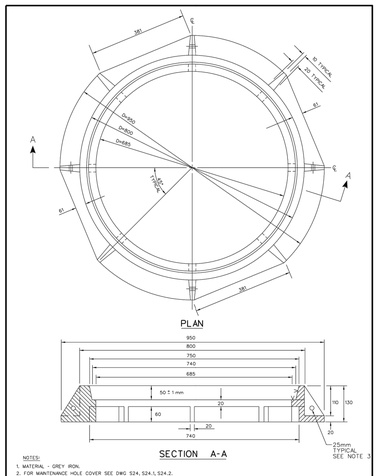
#17529



NOTES:
1. VORTEX ICD'S ARE USED TO RESTRICT FLOWS BELOW 85 L/s The LOWEST RESTRICTION ALLOWED TYPICALLY IS 8L / s PRODUCTS MAY SLIGHTLY DIFFER AS SHOWN ABOVE.
2. CURVES ARE AVAILABLE FROM THE MANUFACTURER SEE MS - 22.15 FOR APPROVED PRODUCTS.
3. ODOUR CONTROL TYPE IS TO BE USED IN CB'S THAT ARE CONNECTED TO A COMBINED SEWER DIRECTLY. FOR STORM SEWERS DOUAR / FLOATABLE CONTROL EXTENSIONS ARE NOT REQUIRED.
4. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS SHOWN OTHERWISE.

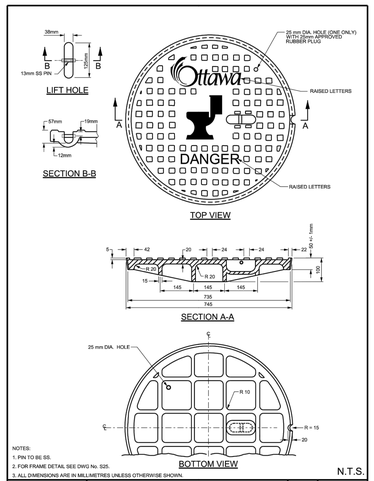
N.T.S.

Ottawa | VORTEX ICD INSTALLATION | DATE: MARCH 2008 | REV. DATE: MARCH 2009 | DWG. No.: S4.1



NOTES:
1. MATERIAL : GREY IRON.
2. FOR MAINTENANCE HOLE COVER SEE DWG S24, S24.1, S24.2.
3. OPSD 400.001 HOISTING HOOKS ARE ALSO ACCEPTED.

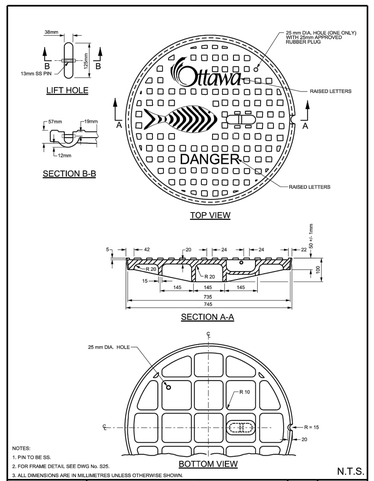
Ottawa | STANDARD CIRCULAR FRAME FOR MAINTENANCE HOLES (MODIFIED OPSD-401.020) | DATE: MAY 2001 | REV. DATE: MARCH 2016 | DWG. No.: S25



NOTES:
1. PIN TO BE SS.
2. FOR FRAME DETAIL SEE DWG No. S25.
3. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE SHOWN.

N.T.S.

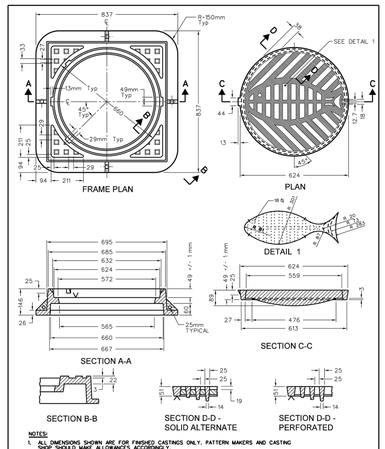
Ottawa | STANDARD CIRCULAR SANITARY & COMBINED MAINTENANCE HOLE COVER | DATE: MARCH 2008 | REV. DATE: MARCH 2017 | DWG. No.: S24



NOTES:
1. PIN TO BE SS.
2. FOR FRAME DETAIL SEE DWG No. S25.
3. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE SHOWN.

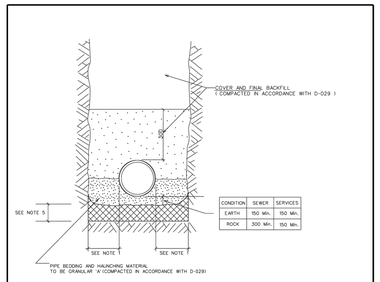
N.T.S.

Ottawa | STANDARD CIRCULAR STORM MAINTENANCE HOLE COVER | DATE: MARCH 2010 | REV. DATE: MARCH 2017 | DWG. No.: S24.1



NOTES:
1. ALL DIMENSIONS SHOWN ARE FOR FINISHED CASTINGS ONLY. PATTERN MAKERS AND CASTING SHOP SHOULD MAKE ALLOWANCES ACCORDINGLY.
2. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS SHOWN OTHERWISE.
3. FOR NEW CONSTRUCTION WHERE SURFACE INLETS ARE SPECIFIED.
4. COMPANIES WITH GRATE DIMENSIONS NOT EXACTLY THE SAME AS SHOWN ABOVE WILL ALSO BE CONSIDERED.
5. ALTERNATE SOLID COVER TO HAVE EYE 25mm Dia. HOLE WITH 25mm APPROVED PLUG

Ottawa | HEAVY DUTY "FISH" TYPE ROUND CATCH BASIN COVER (MODIFIED OPSD-400.07) | DATE: MAY 2005 | REV. DATE: MARCH 2017 | DWG. No.: S19



CONDITION	SEWER	SERVICES
EARTH	150 Min.	150 Min.
ROCK	300 Min.	150 Min.

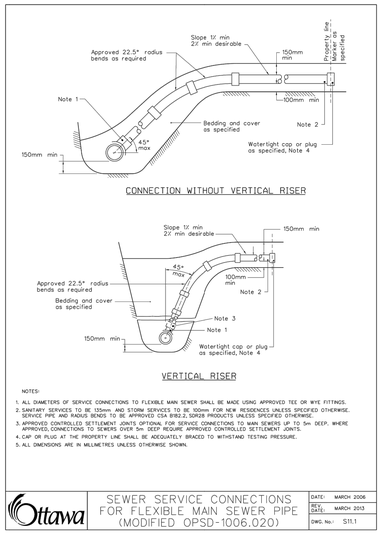
NOTES:

1.

PIPE INSIDE DIAMETER (mm)	CLEARANCE (mm)	
900 OR LESS	CONC	450
	PVC	450
OVER 900	500	

2. FINAL BACKFILL - APPROVED NATIVE MATERIAL OR SELECT SUBGRADE IN ACCORDANCE WITH F-2100.
3. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS SHOWN OTHERWISE.
4. INITIAL BACKFILL MATERIAL - CONCRETE PIPE - SAND, GRANULAR 'A' - PVC PIPE - GRANULAR 'A'
5. WHEN APPROVED BY THE CONTRACT ADMINISTRATOR, POOR SOILS SHALL BE EXCAVATED TO CREATE A FOUNDATION THAT SHALL BE FILLED TO THE BOTTOM OF THE BEDDING WITH GRANULAR 'B'.

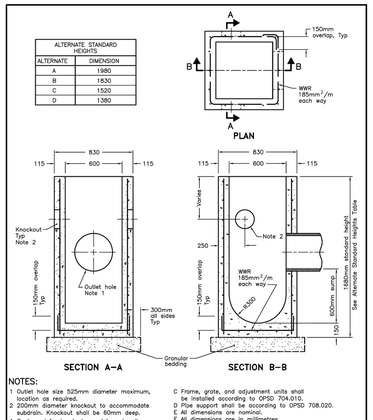
Ottawa | SINGLE TRENCH (SEWER & SEWER SERVICES) | DATE: MAY 2001 | REV. DATE: MARCH 2016 | DWG. No.: S6



NOTES:
1. ALL DIAMETERS OF SERVICE CONNECTIONS TO FLEXIBLE MAIN SEWER SHALL BE MADE USING APPROVED TEE OR WYE FITTINGS.
2. SANITARY SERVICES TO BE 135mm AND STORM SERVICES TO BE 100mm FOR NEW RESIDENCES UNLESS SPECIFIED OTHERWISE. SERVICE PIPE AND RADIUS BENDS TO BE APPROVED CSA B182.2, SDR28 PRODUCTS UNLESS SPECIFIED OTHERWISE.
3. APPROVED CONTROLLED SETTLEMENT JOINTS OPTIONAL FOR SERVICE CONNECTIONS TO MAIN SEWERS UP TO 5m DEEP. WHERE APPROVED, CONNECTIONS TO SEWERS OVER 5m DEEP REQUIRE APPROVED CONTROLLED SETTLEMENT JOINTS.
4. CAP OR PLUG AT THE PROPERTY LINE SHALL BE ADEQUATELY BRACED TO WITHSTAND TESTING PRESSURE.
5. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE SHOWN.

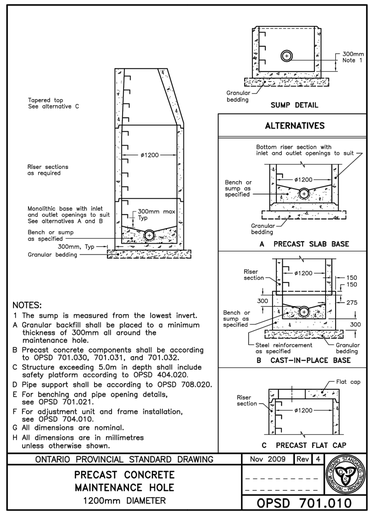
Ottawa | SEWER SERVICE CONNECTIONS FOR FLEXIBLE MAIN SEWER PIPE (MODIFIED OPSD-1006.020) | DATE: MARCH 2006 | REV. DATE: MARCH 2013 | DWG. No.: S11.1

ALTERNATE STANDARD HEIGHTS	
ALTERNATE	DIMENSION
A	1980
B	1830
C	1520
D	1380



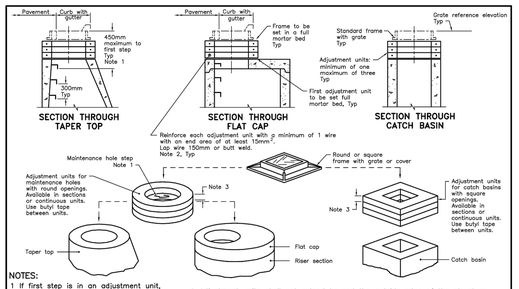
NOTES:
1 Outlet hole size 525mm diameter maximum, location as required.
2 200mm diameter knockout to accommodate subdrain. Knockout shall be 60mm deep.
A Centre reinforcing in base slab and walls ±20mm.
B Granular backfill shall be placed to a minimum thickness of 300mm all around the catch basin.
C Frame, grate, and adjustment units shall be installed according to OPSD 704.010.
D Pipe support shall be according to OPSD 708.020.
E All dimensions are nominal.
F All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING | Nov 2009 | Rev 2
PRECAST CONCRETE CATCH BASIN 600x600mm | OPSD 705.010



NOTES:
1 The sump is measured from the lowest invert.
A Granular backfill shall be placed to a minimum thickness of 300mm all around the maintenance hole.
B Precast concrete components shall be according to OPSD 701.030, 701.031, and 701.032.
C Structure exceeding 5.0m in depth shall include safety platform according to OPSD 404.020.
D Pipe support shall be according to OPSD 708.020.
E For benching and pipe opening details, see OPSD 701.021.
F For adjustment unit and frame installation, see OPSD 704.010.
G All dimensions are nominal.
H All dimensions are in millimetres unless otherwise shown.

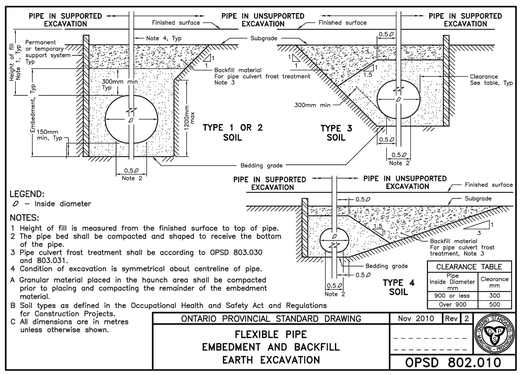
ONTARIO PROVINCIAL STANDARD DRAWING | Nov 2009 | Rev 4
PRECAST CONCRETE MAINTENANCE HOLE 1200mm DIAMETER | OPSD 701.010



NOTES:
1 If first step is in an adjustment unit, the adjustment unit shall be of the type manufactured with a step in place.
2 Centre reinforcing in adjustment unit ±10mm.
3 Round and square adjustment units are available in sizes of 50, 75, 100, 150, and 300mm.

A Adjustment units shall not extend beyond the outside edge of the structure.
B All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING | Nov 2014 | Rev 3
PRECAST CONCRETE ADJUSTMENT UNITS FOR MAINTENANCE HOLES, CATCH BASINS, AND VALVE CHAMBERS | OPSD 704.010



LEGEND:
Ø – Inside diameter

NOTES:
1 Height of fill is measured from the finished surface to top of pipe.
2 The pipe bed shall be compacted and shaped to receive the bottom of the pipe.
3 Pipe culvert frost treatment shall be according to OPSD 803.030 and 803.031.
4 Condition of excavation is symmetrical about centreline of pipe.
A Granular material placed in the haunch area shall be compacted prior to placing and compacting the remainder of the embedment material.
B Soil types as defined in the Occupational Health and Safety Act and Regulations for Construction Projects.
C All dimensions are in metres unless otherwise shown.

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

ONTARIO PROVINCIAL STANDARD DRAWING | Nov 2010 | Rev 2
FLEXIBLE PIPE EMBEDMENT AND BACKFILL EARTH EXCAVATION | OPSD 802.010

USE AND INTERPRETATION OF DRAWINGS

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

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

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

APPROVED
By Derrick Moodie at 11:49 am, Nov 06, 2018

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

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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.	J.C.

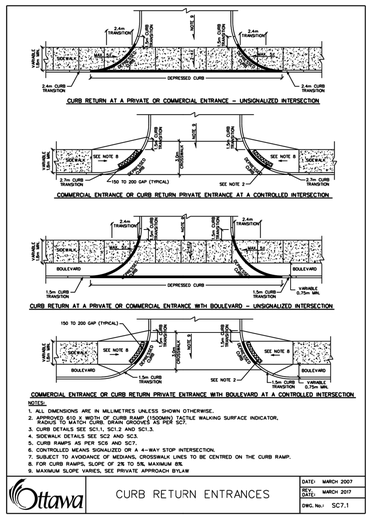
PROJECT
PROPOSED BENSON AUTO PARTS COMMERCIAL DEVELOPMENT
1871 MERIVALE ROAD, NEPEAN, ON

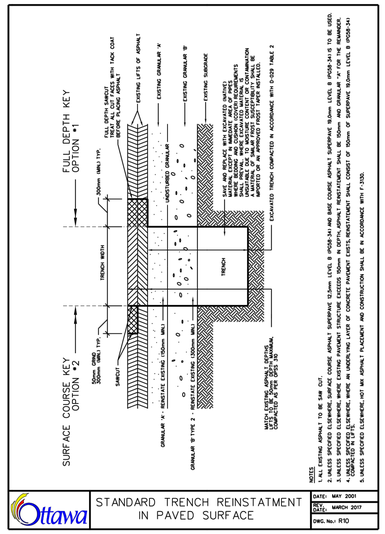
DRAWING TITLE
CONSTRUCTION DETAILS PLAN

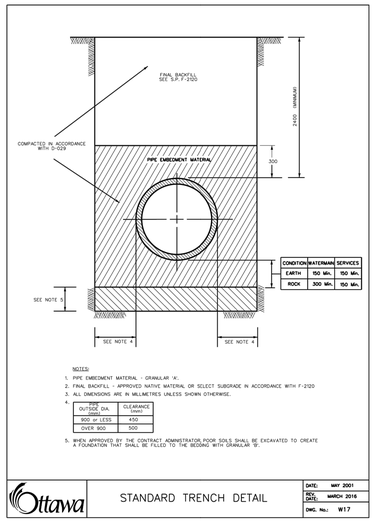
PROJECT NO. 130828
DATE 29 AUG 2018
C901

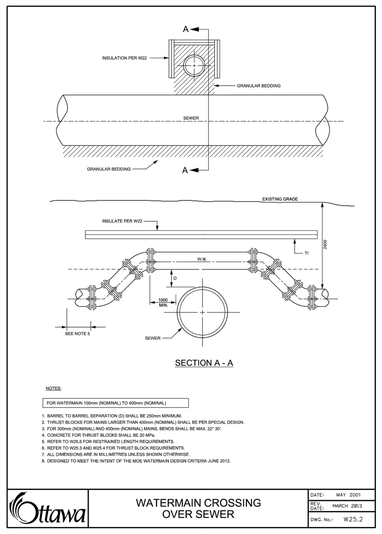
D07-12-17-0054

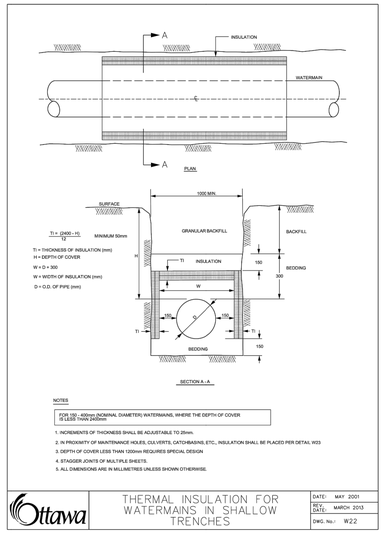
#17529

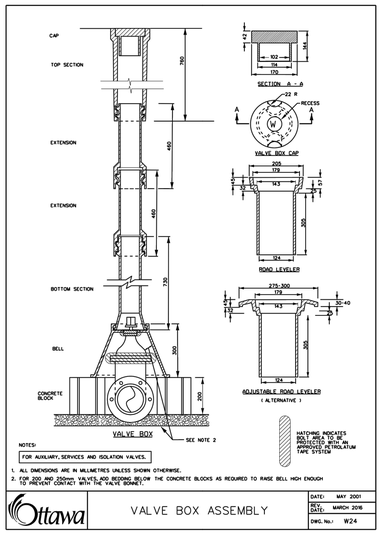


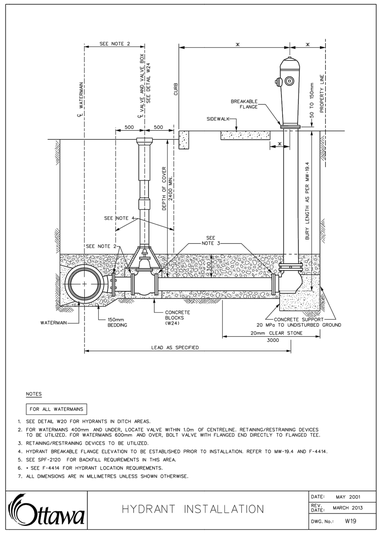












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DERRICK MOODIE
MANAGER
PLANNING, INFRASTRUCTURE & ECONOMIC DEVELOPMENT DEPARTMENT, CITY OF OTTAWA

APPROVED
By Derrick Moodie at 11:54 am, Nov 06, 2018

LICENSED PROFESSIONAL ENGINEER
J. C. R. LALONDE
OCT 26/2018
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

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

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

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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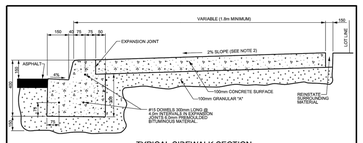
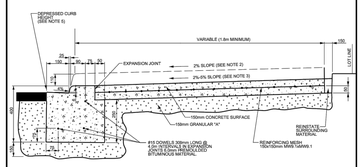
C902

D07-12-17-0054

#17529



TYPICAL SIDEWALK SECTION



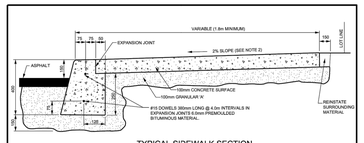
SECTION AT PRIVATE ENTRANCE AND PEDESTRIAN RAMPS

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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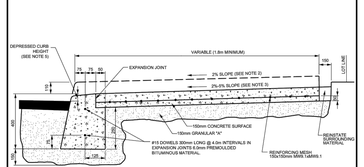

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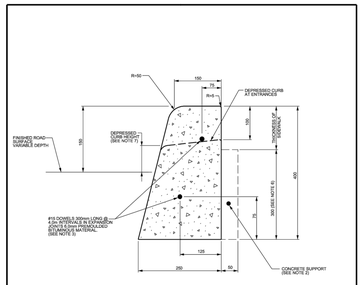
N.T.S.

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



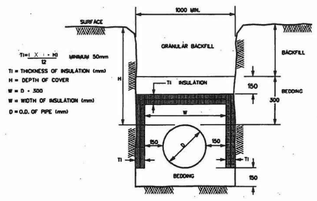
CONCRETE BARRIER CURB

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

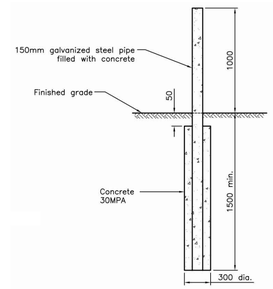


NOTES:
-EXTRUDED POLYSTYRENE INSULATION BOARDS HIGHLOAD 40 PER ASTM C578, TYPE VI
-FOR STORM INSULATION USE AN X VALUE OF 2000 IN THE ABOVE "TI" EQUATION.
-FOR SANITARY INSULATION USE AN X VALUE OF 2500 IN THE ABOVE "TI" EQUATION.
-FOR WATERMAIN INSULATION USE AN X VALUE OF 2400 IN THE ABOVE "TI" EQUATION.
-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•hr•°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^{-5})
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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APPROVED
By Derrick Moodie at 11:53 am, Nov 06, 2018

LICENSED PROFESSIONAL ENGINEER
J. C. R. LALONDE
OCT 24/2018
PROVINCE OF ONTARIO

NOT AUTHENTIC UNLESS SIGNED AND DATED

LRL
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CLIENT
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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.	J.C.

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

DRAWING TITLE
CONSTRUCTION DETAILS PLAN

PROJECT NO.
130828

DATE
29 AUG 2018

C903

D07-12-17-0054

#17529

PROJECT INFORMATION	
ENGINEERED PRODUCT MANAGER:	VIVEK SHARMA 647-403-9605 VSHARMA@ADS-PIPE.COM
ADS SALES REP:	HASSAN ELMI 416-985-9737 HASSAN.ELMI@ADS-PIPE.COM
PROJECT NO:	97833

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:-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 STRUCTURES", 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 FROM A PILE LOCATED DIRECTLY ADJACENT TO THE EXCAVATION 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/SC-780 CONSTRUCTION GUIDE".
2. THE USE OF CONSTRUCTION EQUIPMENT OVER SC-310 & SC-740 CHAMBERS IS LIMITED:
   - NO EQUIPMENT IS ALLOWED ON BARE CHAMBERS.
   - ONLY LIGHT DUTY EQUIPMENT SUCH AS SKIDDERS OR EXCAVATORS ARE ALLOWED UNTIL PROPER FILL DEPTHS ARE REACHED IN ACCORDANCE WITH THE "STORMTECH SC-310/SC-740/SC-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.

REV3 ADS, INC

PROPOSED LAYOUT

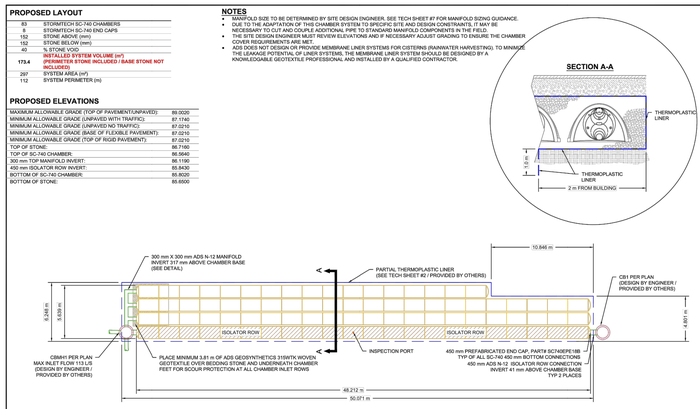
83	STORMTECH SC-740 CHAMBERS
8	STORMTECH SC-740 END CAPS
152	STONE ABOVE (mm)
152	STONE BELOW (mm)
40	% STONE VOID
173.4	**INSTALLED SYSTEM VOLUME (m³) (PERIMETER STONE INCLUDED / BASE STONE NOT INCLUDED)**
297	SYSTEM AREA (m²)
112	SYSTEM PERIMETER (m)

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:	86.7490
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. ON-SITE FIELD TRIMMING AND COUPLING MAY BE REQUIRED. REVIEW ELEVATIONS AND IF NECESSARY ADJUST GRADING TO ENSURE THE CHAMBER INVERT ELEVATIONS 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 KNOWLEDGEABLE GEOTEXTILE PROFESSIONAL AND INSTALLED BY A QUALIFIED CONTRACTOR.



1871 MERIVALE OTTAWA, ON

REV	DATE	DRWN	CHK
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2	26-JUL-18	BJ	GF
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DESCRIPTION: 90% DESIGN - FILL UPDATE; 90% DESIGN - FILL UPDATE; REVISED FOR CITY COMMENTS; REVISED FOR CITY COMMENTS

DATE: 24-JUL-15 | DRAWN: GM | CHECKED: KP | PROJECT # 97833

STORMTECH: 4640 TRUEMAN BLVD HILLIARD, OH 43026 800-733-7473 | 888-892-2694 | WWW.STORMTECH.COM

ADS: 1640 TRUEMAN BLVD HILLIARD, OH 43026 1-800-733-7473

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SCALE = 1 : 200

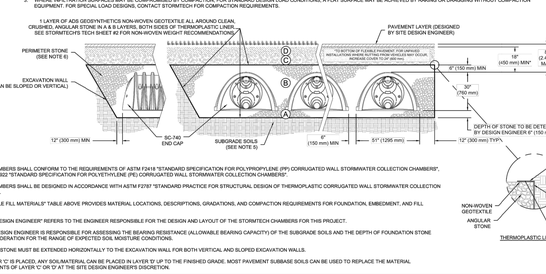
SHEET 2 OF 5

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 SOILROCK MATERIALS, NATIVE SOILS, OR PER ENGINEERS 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 (9" 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 SOILAGGREGGATE MIXTURES, <35% FINES OR PROCESSED AGGREGATE. MOST PAVEMENT SUBBASE MATERIALS CAN BE USED IN LIEU OF THIS LAYER.	AASHTO M145* A-1, A-2-4, A-3 OR AASHTO M43* 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* 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* 3, 357, 4, 467, 5, 56, 57	PLATE COMPACT OR ROLL TO ACHIEVE A FLAT SURFACE. ††

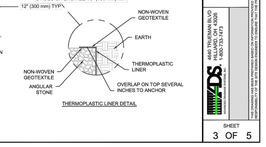
PLEASE NOTE:
1. THE LISTED AASHTO DESIGNATIONS ARE FOR GRADATIONS ONLY. THE STONE MUST ALSO BE CLEAN, CRUSHED, ANGULAR. FOR EXAMPLE, A SPECIFICATION FOR #4 STONE WOULD STATE: "CLEAN, CRUSHED, ANGULAR NO. 4 (AASHTO M43) STONE".
2. STORMTECH COMPACTION REQUIREMENTS ARE MET FOR 'A' LOCATION MATERIALS WHEN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

†† LAYER OF ADS GEOSYNTHETICS NON-WOVEN GEOTEXTILE ALL AROUND CLEAN, CRUSHED, ANGULAR STONE IN A & B LAYERS, BOTH SIDES OF THERMOPLASTIC LINER. SEE STORMTECH'S TECH SHEET #2 FOR NON-WOVEN WEIGHT RECOMMENDATIONS



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.



THERMOPLASTIC LINER DETAIL

1871 MERIVALE OTTAWA, ON

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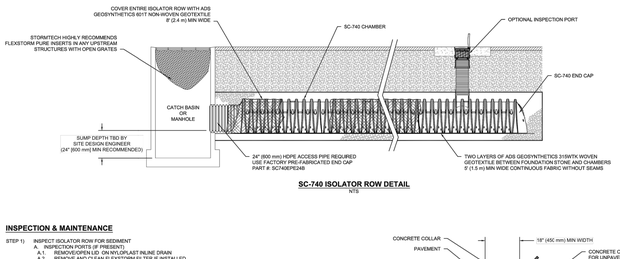
SCALE = 1 : 200

SHEET 3 OF 5



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.

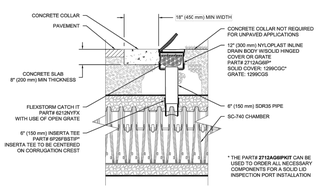
STEP 2) CLEAN OUT ISOLATOR ROW USING THE JETVAC PROCESS
A. A FIXED CULVERT CLEANING NOZZLE WITH REAR FACING SPREAD OF 45" (1.1 m) OR MORE IS PREFERRED
B. APPLY MULTIPLE PASSES OF JETVAC UNTIL BACKFLUSH WATER IS CLEAN
C. VACUUM STRUCTURE SUMP AS REQUIRED

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.



SC-740 6" INSPECTION PORT DETAIL
NTS

1871 MERIVALE OTTAWA, ON

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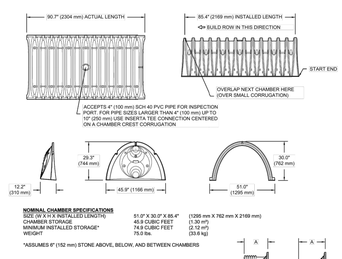
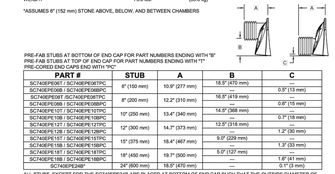
SHEET 4 OF 5

SC-740 TECHNICAL SPECIFICATION

NTS





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	75.8 lbs.	(33.8 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)	16.9" (410 mm)	0.9" (13 mm)
SC740EPE06B / SC740EPE06BPC			16.9" (419 mm)	0.9" (13 mm)
SC740EPE08T / SC740EPE08TPC	8" (200 mm)	12.2" (310 mm)		0.6" (15 mm)
SC740EPE08B / SC740EPE08BPC			14.5" (368 mm)	—
SC740EPE10T / SC740EPE10TPC	10" (250 mm)	13.4" (340 mm)		0.7" (18 mm)
SC740EPE10B / SC740EPE10BPC			12.5" (318 mm)	—
SC740EPE12T / SC740EPE12TPC	12" (300 mm)	14.7" (373 mm)		1.2" (30 mm)
SC740EPE12B / SC740EPE12BPC			9.0" (229 mm)	—
SC740EPE15T / SC740EPE15TPC	15" (375 mm)	18.4" (467 mm)		1.3" (33 mm)
SC740EPE15B / SC740EPE15BPC			5.0" (127 mm)	—
SC740EPE18T / SC740EPE18TPC	18" (450 mm)	19.7" (500 mm)		1.6" (41 mm)
SC740EPE18B / SC740EPE18BPC			—	0.7" (18 mm)
SC740EPE24B*	24" (600 mm)	18.0" (470 mm)	—	0.7" (18 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

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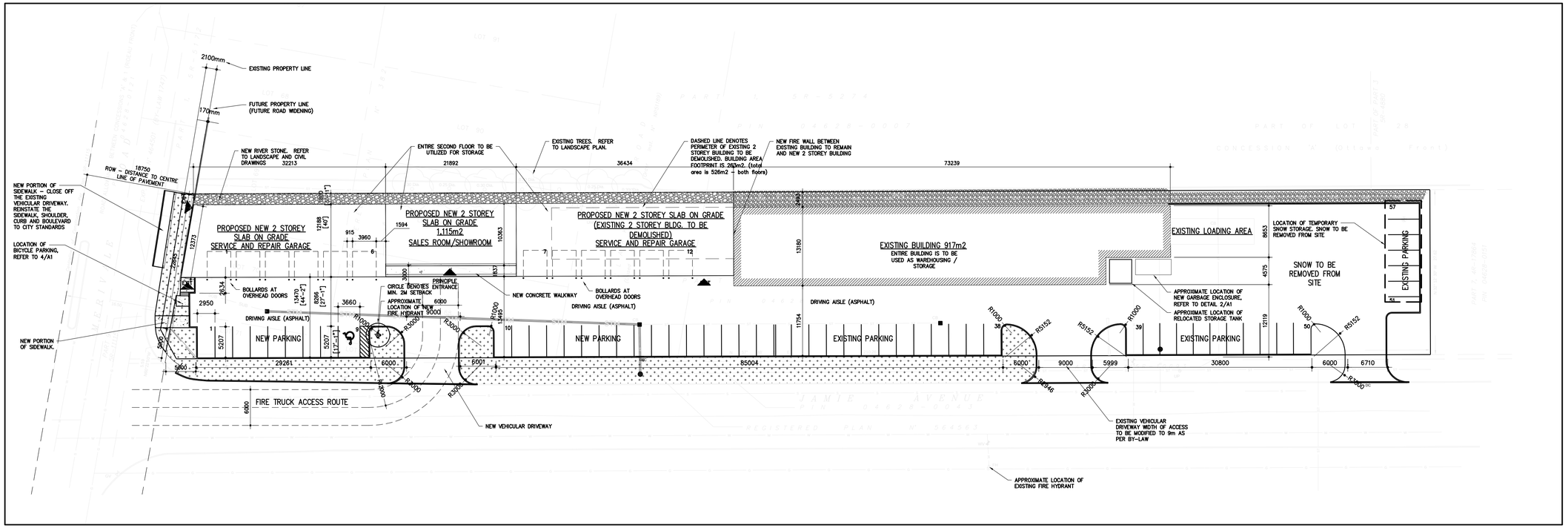
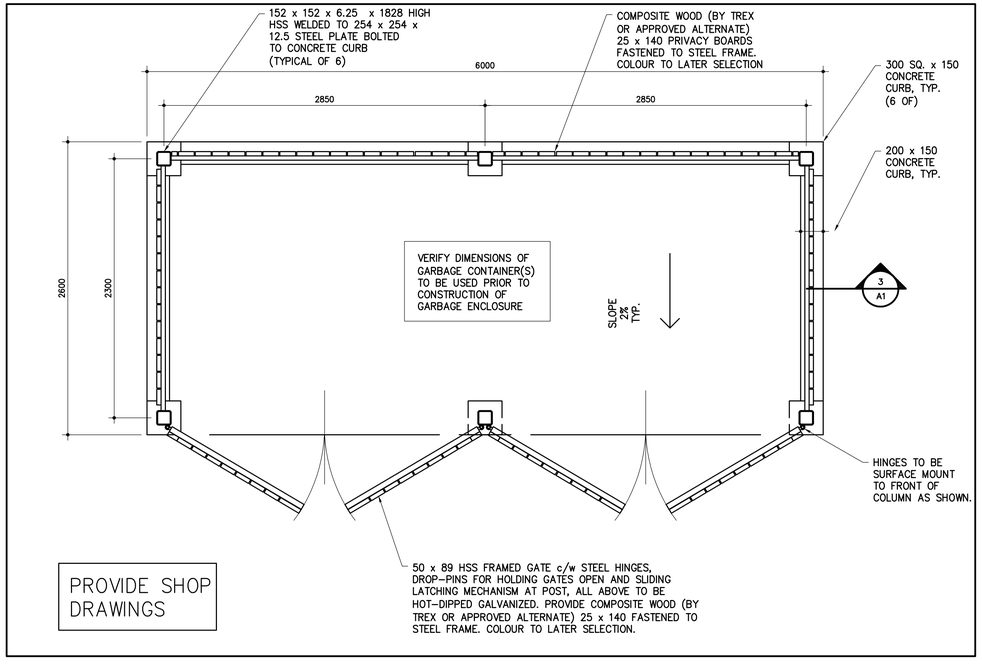
Appendix G

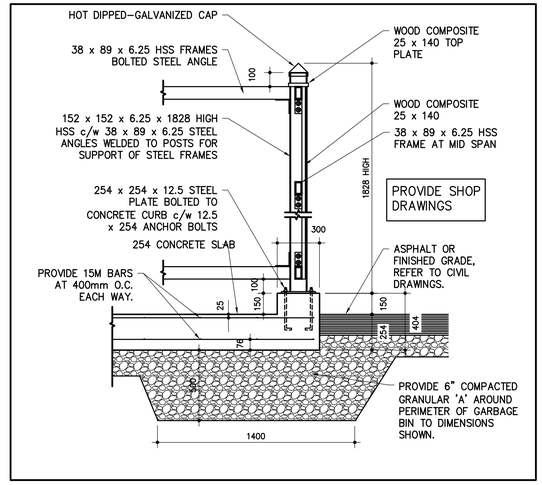
Architectural Site Plan (Phase 1)



1 A1 OVERALL SITE PLAN
SCALE: 1:350



2 A1 GARBAGE ENCLOSURE PLAN
SCALE: 1:25



3 A1 TYPICAL GARBAGE ENCLOSURE SECTION
SCALE: 1:20

SITE AND PARKING INFORMATION

TYPE OF BUILDING OR USE

AUTO REPAIR SHOP (GROUP 'F' DIVISION '2')

FIRE ACCESS

FIRE TRUCK ACCESS ROUTE IS FROM SEVENTH STREET EXTENSION AND SHALL CONFORM TO OBC 2012 –3.2.5.4, 3.2.5.5 AND 3.2.5.6.

DESCRIPTION OF LAND

PART OF LOTS 69, 70, 71, 87, 88 & 89 AND PART OF CLARKE ROAD (CLOSED BY JUDGES ORDER, INST. N° NPS11B9), REGISTERED PLAN N° 382 AND PART OF LOT 28, CONCESSION 'A' (RIDEAU FRONT), GEOGRAPHIC TOWNSHIP OF NEPEAN, NOW CITY OF OTTAWA, DESIGNATED AS PART 1, 4R-12281 AS IN ALL OF PIN 04628-017.

ZONING BY-LAW

ZONING = ARTERIAL MAINSTREET ZONE AM 10

MIN. LOT AREA = NO MINIMUM
MIN. FRONTAGE = NO MINIMUM
MIN. FRONT YARD SETBACK = NO MINIMUM
MIN. SIDE YARD SETBACK = NO MINIMUM
MIN. REAR YARD SETBACK = NO MINIMUM

BICYCLE PARKING

SERVICE AND REPAIR GARAGE = 1/500m² = 870m²/500
(GROUND FLOOR NEW BUILD) = 1.7 TOTAL

SALES/SHOWROOM + SECOND FLOOR OFFICE = 1/250m² = 205m²/250
= 0.8 TOTAL

OTHER = 1/1,500m² = 915m²+ 1,168m²
= 1.4 TOTAL

4 BICYCLE PARKING SPACES ARE REQUIRED.
TOTAL PARKING SPACES PROVIDED: 7

BUILDING AREA

BUILDING AREA = +\- 1,115m²+ 917m² (34.9% OF SITE)

SITE AREA

SITE AREA = +\- 5,824.94m²
(WITHIN LIMIT OF CONTRACT)

LANDSCAPING AREA

TOTAL LANDSCAPE AREA = 436.87m²

436.87 / 5,824.94 = 7.5% OF SITE AREA

13.28% OF PARKING LOT

PARKING CALCULATION/BUILDING USES

SERVICE AND REPAIR GARAGE = 2/BAY = 12x2 = 24
SALES/SHOWROOM = 2/100m² = 205m²/100 x 2 = 4
STORAGE = 1/100m² = 915m² + 1,115m²/100 x 1 = 21
WHEELCHAIR ACCESSIBLE = 1

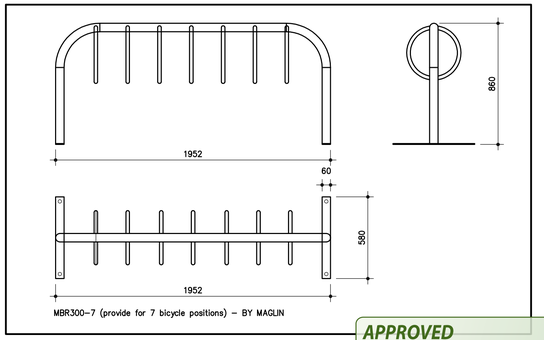
50 PARKING SPACES ARE REQUIRED.
BARRIER FREE PARKING SPACES THAT ARE REQUIRED: 1
BARRIER FREE PARKING SPACES THAT ARE PROVIDED: 1
TOTAL PARKING SPACES PROVIDED: 57 (50 WITH SNOW STORAGE)

GLAZING REQUIREMENTS

TOTAL GLAZED AREA OF WEST FACADE = 48.6m²
TOTAL WEST FACADE AREA = 126.69m²
TOTAL AREA FROM GRADE TO 4.5m (WEST FACADE) = 60.3m²
TOTAL GLAZED % ENTIRE WEST FACADE = 38.36%
TOTAL GLAZED % FOR THE FIRST 4.5m (WEST FACADE) = 80.55%

PARKING AND AISLE

	BYLAW	PROVIDED
CIRCULATION LANE (2 WAY)	6.7m (22'-0")	6.7m (22'-0")
REGULAR PARKING (WIDTH 90°)	2.6m (8'-6")	2.6m (8'-6")
REGULAR PARKING (LENGTH 90°)	5.2m (17'-1")	5.2m (17'-1")
REGULAR PARKING (WIDTH PP)	2.6m (8'-6")	2.6m (8'-6")
REGULAR PARKING (LENGTH PP)	6.7m (22'-0")	6.7m (22'-0")
WHEELCHAIR ACCESSIBLE (WIDTH)	3.66m (12'-0")	3.66m (12'-0")



4 A1 BICYCLE PARKING DETAILS
SCALE: 1:20

APPROVED
By Derrick Moodie at 11:46 am, Nov 06, 2018

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

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R. W. TAYLOR
LICENCE
3920

CLIENT:

BENSON AUTO PARTS

CLIENT REF. #: --

PROJECT:

1871 MERIVALE ROAD
BENSON GARAGE

KEY PLAN:

DISCLAIMER: COPYRIGHT:
THIS DRAWING AND DESIGN IS COPYRIGHT PROTECTED WHICH SHALL NOT BE USED, REPRODUCED OR REVISED WITHOUT WRITTEN PERMISSION BY ARCHITECTURE 49. THE CONTRACTOR SHALL CHECK AND VERIFY ALL DIMENSIONS AND UTILITY LOCATIONS AND REPORT ALL ERRORS AND OMISSIONS PRIOR TO COMMENCING WORK.
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ISSUED FOR – REVISION:

IS	RE	DATE	DESCRIPTION
8		02.11.2018	ISSUED FOR SPA REVISIONS
7		24.10.2018	ISSUED FOR SPA REVISIONS
6		02.10.2018	ISSUED FOR PERMIT REVISIONS
5		04.09.2018	ISSUED FOR SPA REVISION
4		11.06.2018	ISSUED FOR SPA REVISION
3		13.03.2018	ISSUED FOR DISCUSSIONS
2		06.12.2017	ISSUED FOR SPA REVISION
1		09.11.2017	ISSUED FOR SITE PLAN APPROVAL

PROJECT NO: 179-00033-00
DATE: FEBRUARY 2017
ORIGINAL SCALE: AS SHOWN
IF THIS BAR IS NOT 25mm LONG, ADJUST YOUR PLOTTING SCALE. 25mm
DESIGNED BY: RT
DRAWN BY: BW
CHECKED BY: RT
DISCIPLINE: ARCHITECTURAL

TITLE:

SCHEMATIC SITE PLAN AND NOTES

SHEET NUMBER: A1
SHEET #: 1 OF 2

ISSUE: ISSUED FOR SITE PLAN APPROVAL
DATE OF: 02.11.2018
REV #: 0

D07-12-17-0054

#17529

Appendix H

Site Servicing and Stormwater Management Report

(Phase 1)

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.4: October 03, 2018

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

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APPENDICES

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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.

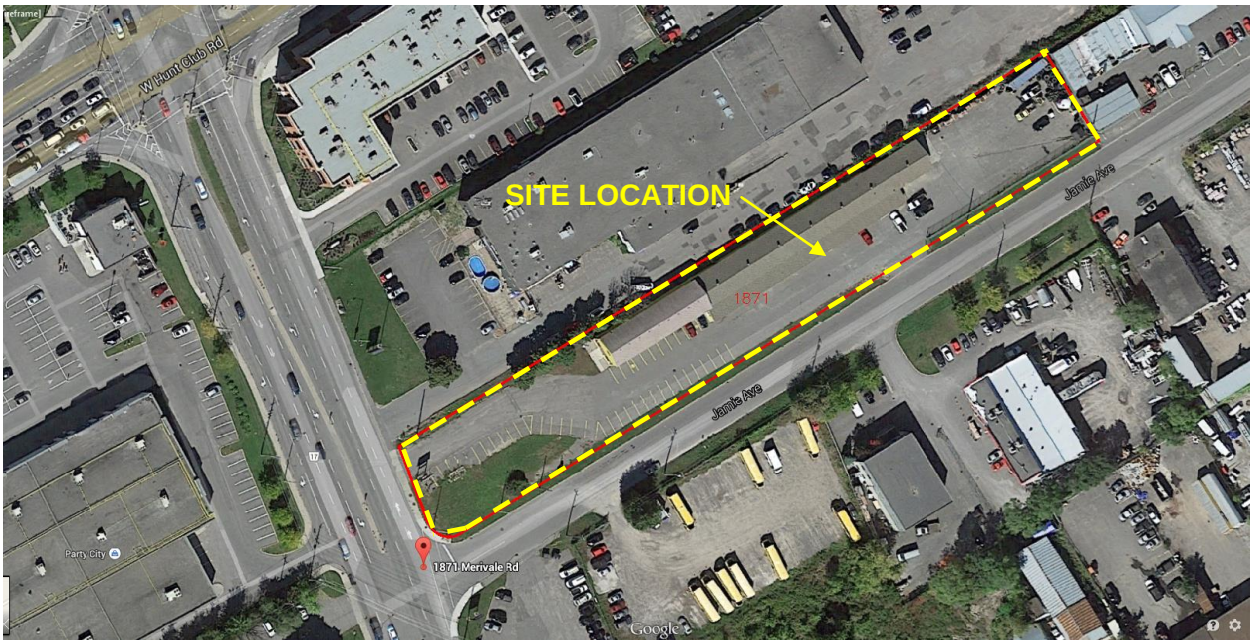

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Figure 1 Aerial view of Benson site at 1871 Merivale Road, Ottawa, ON (via Google Earth, imagery date: September 24, 2014)

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. Taking into account the proposed on-site hydrant and the existing hydrant directly across Jamie Avenue, the minimum number of hydrants needed to deliver the required fire flow to the structure is being provided in accordance with Technical Bulletin ISTB-2018-02 dated March 21, 2018. Please refer to table below and dimensions on plan C401.

Required Fire Flow Estimate (L/min)	Hydrants within 75m	Hydrants between 75-150m	Max. Available Flow (AA-Rated Hydrants)	Sufficient Hydrants to Provide RFF?
11,000	2	0	11,400	Yes

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 and ditch inlet located on the neighboring side of the property line; in a small shared grass ditch. In post-development conditions, no runoff will outlet to this existing manhole.

System #2:

The area of existing CA-03 will remain mostly untouched. Minimal regrading and 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 97mm ICD orifice plate is to be installed in existing CB1. This will ensure that the combined post release rate of proposed CA-01(26.07L/s controlled) & CA-05(8.92L/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

The proposed depths of cover for the proposed storm system are less than the City's Sewer Design Guideline recommendations of 2.0 metres where possible (sections 5.7.1.); due to the required minimum pipe slopes (table 6.1). To rectify this, it is common practice to install insulation where a 2.0 metre depth of cover cannot be met. Where required, and as shown on the Civil plans, the insulation to be installed shall be extruded polystyrene insulation boards highload 40 per ASTM C578, type VI.

The bottom elevation of the proposed StormTech storage chambers is at 85.80m; 2.72m above the groundwater table elevation measured at the time of the subsurface investigation. To account for seasonal fluctuation, 1.5m is added to the groundwater table elevation; still the bottom of the storage chamber will remain a minimum of 1.0m above the high groundwater table.

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

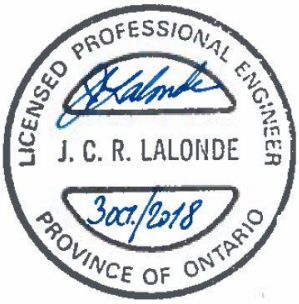
- In regards to Storm System / Outlet #1, in post-development conditions, a much smaller runoff area will outlet to the existing manhole in the shared ditch (0.017ha post; opposed to 0.233ha pre).
- The Storm System / Outlet #2 post-development release rates of 5.47 L/s (uncontrolled) and 29.52 L/s (controlled) 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**

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

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)

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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

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APPENDIX C

Stormwater Management Design Sheets

LRL Associates Ltd.

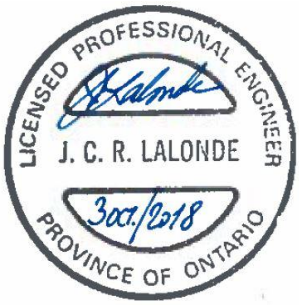
Storm Design Sheet

LRL File No.	130828
Project:	Benson Commercial Development
Location:	1871 Merivale Rd., Nepean, ON
Date:	03 Oct 2018
Designed:	Guillaume Courtois
Checked:	Jean-Claude Lalonde
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	0.044	0.000	0.044	0.70



LRL Associates Ltd.
Storm Design Sheet

LRL File No.	130828	**Storm Design Parameters**			**Pipe Design Parameters**
Project:	Benson Commercial Development	Rational Method Q = 2.78CIA			
Location:	1871 Merivale Rd., Nepean, ON				Maximum velocity = 3.00 m/s
Date:	03 Oct 2018	Q = Peak flow in litres per second (L/s)	Runoff Coefficient (C)	IDF Curve: Ottawa Macdonald-Cartier International Airport	Minimum velocity = 0.80 m/s
Designed:	Guillaume Courtois	A = Drainage area in hectares (ha)	Grass 0.2	Storm Event: 5 years	Manning's Coeff. "n" = 0.013
Checked:	Jean-Claude Lalonde	C = Runoff coefficient	Gravel 0.7	Formula: $I = a / (T_c + b)^c$	
Drawing Reference:	C701 & C702	I = Rainfall intensity (mm/hr)	Bldg. / Asph. / Conc. 0.9	a = 998.071 b = 6.053 c = 0.814	

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	0.044	0.000	0.09	0.09	10.00	104.19	**8.92**	N/A	250	HDPE	6.00%	9.3	145.67	136.74	2.97	0.05	0.06	86.14	85.58	87.12	87.30	0.73	1.47	0.98	0.044	0.70	Uncontrolled		
CA-01 (controlled)	EX. CB	MH2	0.011	0.000	0.129	0.33	0.41	10.05	103.92	43.07	**26.07**	250	PVC	0.44%	20.3	39.67	-3.41	0.80	0.42	1.09	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	0.41	10.48	101.75	42.17	**26.07**	250	PVC	0.44%	3.4	39.45	-2.73	0.80	0.07	1.07	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 **26.07 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 =	***26.07***	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 =	0.007	m2
Orifice Diameter =	**97**	mm (min. 75mm)

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3 Oct./2018
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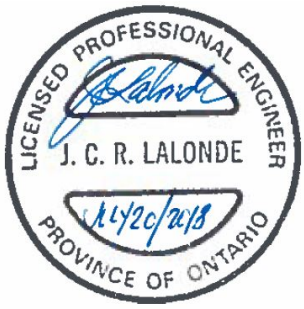
LRL Associates Ltd.

Storm Design Sheet

LRL File No.	130828
Project:	Benson Commercial Development
Location:	1871 Merivale Rd., Nepean, ON
Date:	20 Jul 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:	20 Jul 2018
Designed:	Guillaume Courtois
Drawing Ref.:	C701 & C702

Stormwater Management Design Sheet

Storm System / Site Outlet #3

Allowable Release Rate (5 Year Pre-development)

Time of Concentration:

$$Tc = G\,(1.1 - C)\,L^{0.5} / (S)^{1/3}$$

where: G =	3.26	Constant	
C =	0.9	Runoff Coefficient	
L =	35.56	Longest flow path lenth in metres	
S =	0.93	Slope %	
Tc =	**3.98**	**min.**	(Tc shall not be less than 10min; therefore 10min is used for the following calculations. This is also more conservative.)

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 (10min)

$I_5 =$ **104.2**

Allowable Release:

C =	0.5	pre condition	as per City of Ottawa Guidelines
I =	104.2	mm/hr	
Tc =	10.00	min	
Total Site Area =	0.207	ha	
Q =	**29.98**	**L/s**	2.78 x C x I x A

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July 20/2018
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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**
	CA-3	**0.123**	0.003	0.000	0.120	0.109	**0.88**	**1.00**
	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**
	River Stones Area =	0.000	ha	C=	0.70	**0.88**
	Grass Area =	0.020	ha	C=	0.20	**0.25**
	Total Controlled =	**0.395**	ha	**∑C=**	**0.86**	**1.00**

LRL File No.	130828
Project:	Benson Commercial Development
Location:	1871 Merivale Rd., Nepean, ON
Date:	20 Jul 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

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LRL File No.	130828
Project:	Benson Commercial Development
Location:	1871 Merivale Rd., Nepean, ON
Date:	20 Jul 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	refer to LRL Plan C.904
Total Available Storage =	**179.05**	**m^3**	
Supplementary Storage Required =	0.00	m^3	

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July 20/2018
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LRL Associates Ltd.
Storm Design Sheet

LRL File No.	130828	**Storm Design Parameters**	**Pipe Design Parameters**
Project:	Benson Commercial Development	Rational Method Q = 2.78CIA	
Location:	1871 Merivale Rd., Nepean, ON		
Date:	20 Jul 2018	Q = Peak flow in litres per second (L/s)	Minimum velocity = 0.80 m/s
Designed:	Guillaume Courtois	A = Drainage area in hectares (ha)	Manning's Coeff. "n" = 0.013
Drawing Reference:	C701 & C702	C = Runoff coefficient	
		I = Rainfall intensity (mm/hr)	

Runoff Coefficient (C)		IDF Curve	Ottawa Macdonald-Cartier International Airport
Grass / Permeable Pavers	0.2	Storm Event	5 years
River Stones	0.7	Formula	$I = a / (T_c + b)^c$
Bldg. / Asph. / Conc.	0.9	a = 998.07 b = 6.053 c = 0.814	

Post-Conditions at Storm System / Site Outlet #3

LOCATION			AREA (ha)			FLOW						STORM SEWER									MANHOLE							WATERSHED		AVAILABLE STORAGE				FLOW CONTROL		
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})	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	0.005	0.000	0.132	0.33	0.33	10.00	104.19	34.70	N/A	SC-740									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	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	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	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	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	125VHV-2
	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	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.

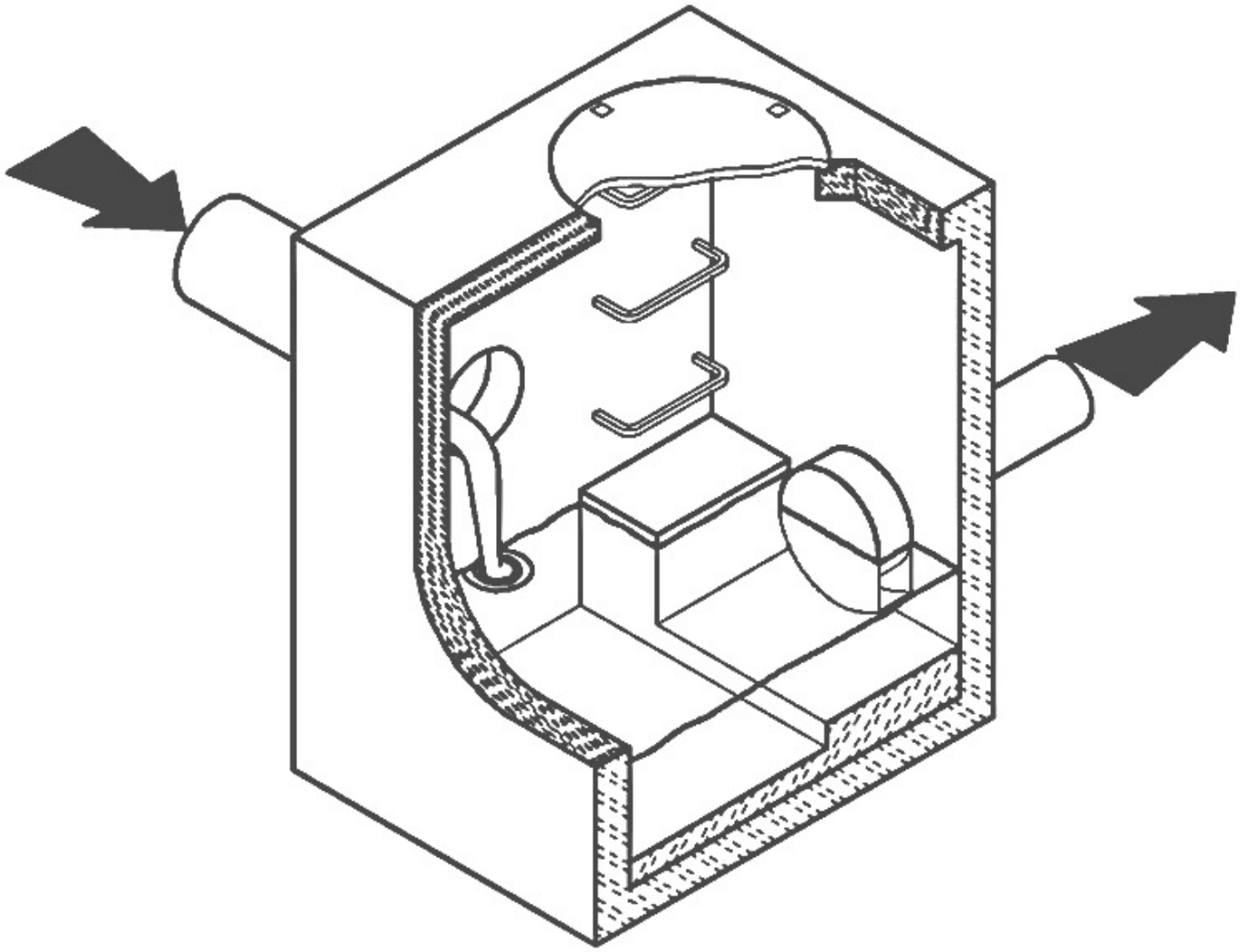
100yr HWL	86.56
Total Storage	5.65

APPENDIX D

Hydrovex Vertical Vortex Flow Regulator Report

CSO/STORMWATER MANAGEMENT

HYDROVEX® VHV / SVHV
Vertical Vortex Flow Regulator



JOHN MEUNIER

APPLICATIONS

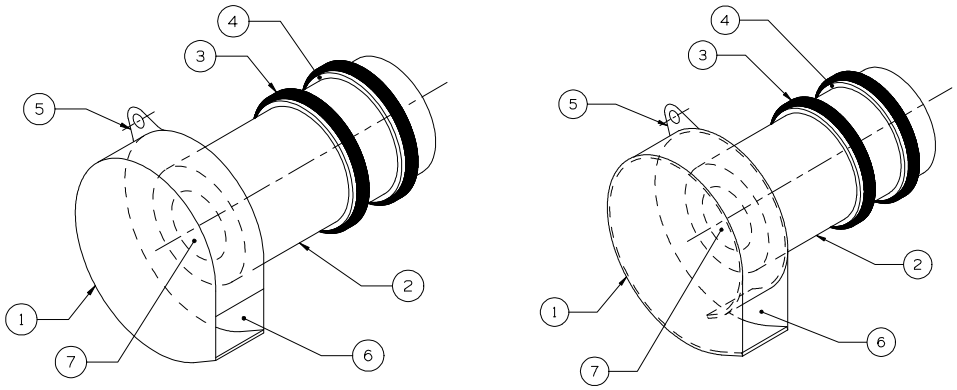
One of the major problems of urban wet weather flow management is the runoff generated after a heavy rainfall. During a storm, uncontrolled flows may overload the drainage system and cause flooding. Due to increased velocities, sewer pipe wear is increased dramatically and results in network deterioration.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

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

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

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

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



VHV ***SVHV***

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

ADVANTAGES

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

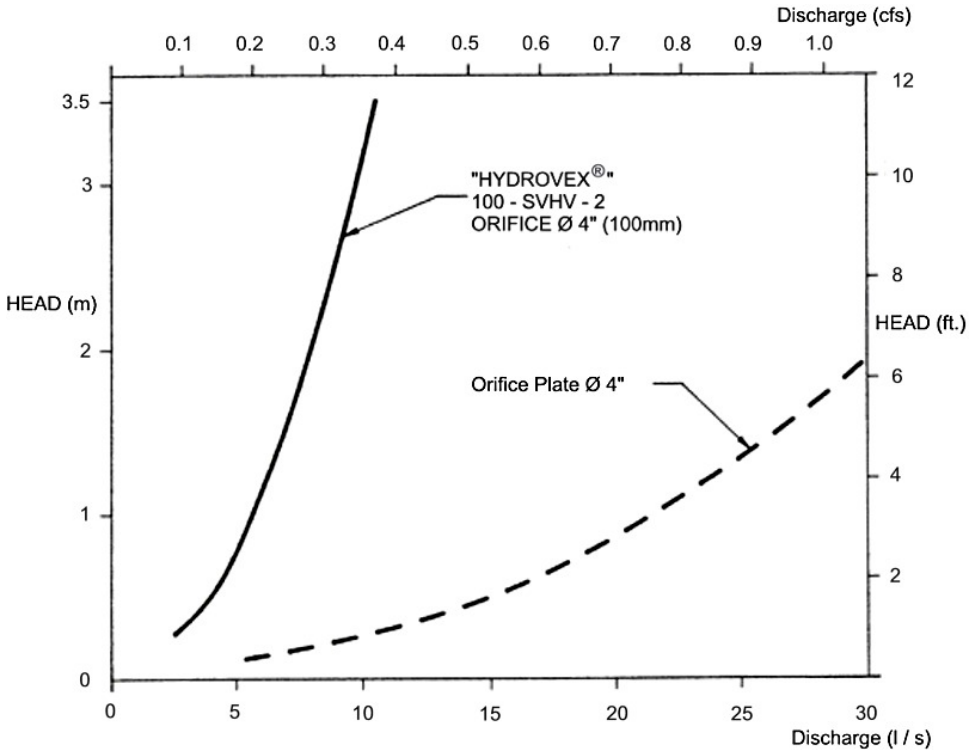


FIGURE 2: DISCHARGE CURVE SHOWING A HYDROVEX® FLOW REGULATOR VS AN ORIFICE PLATE

SELECTION

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

Example:

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

INSTALLATION REQUIREMENTS

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

SPECIFICATIONS

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

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

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

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

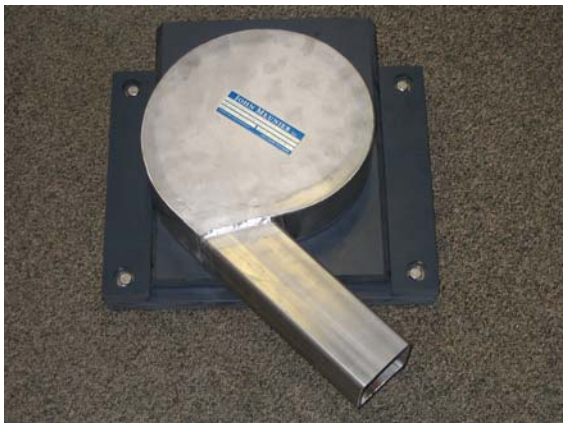
- ***project design flow rate***
- ***pressure head***
- ***chamber's outlet pipe diameter and type***

Typical VHV model in factory

OPTIONS

FV – SVHV (mounted on sliding plate)

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



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

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

VHV with air vent for minimal slopes

HYDROVEX®

VHV Vertical Vortex Flow Regulator

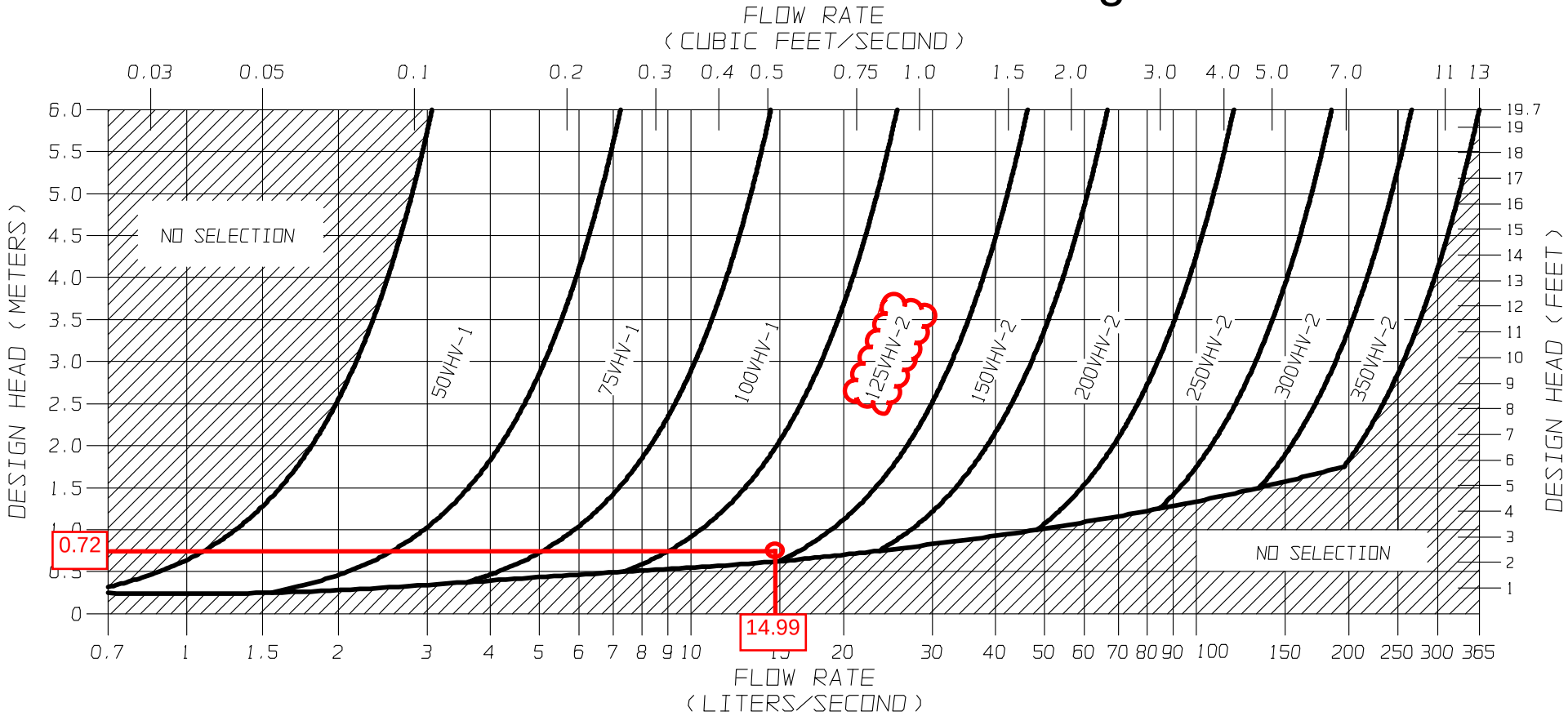
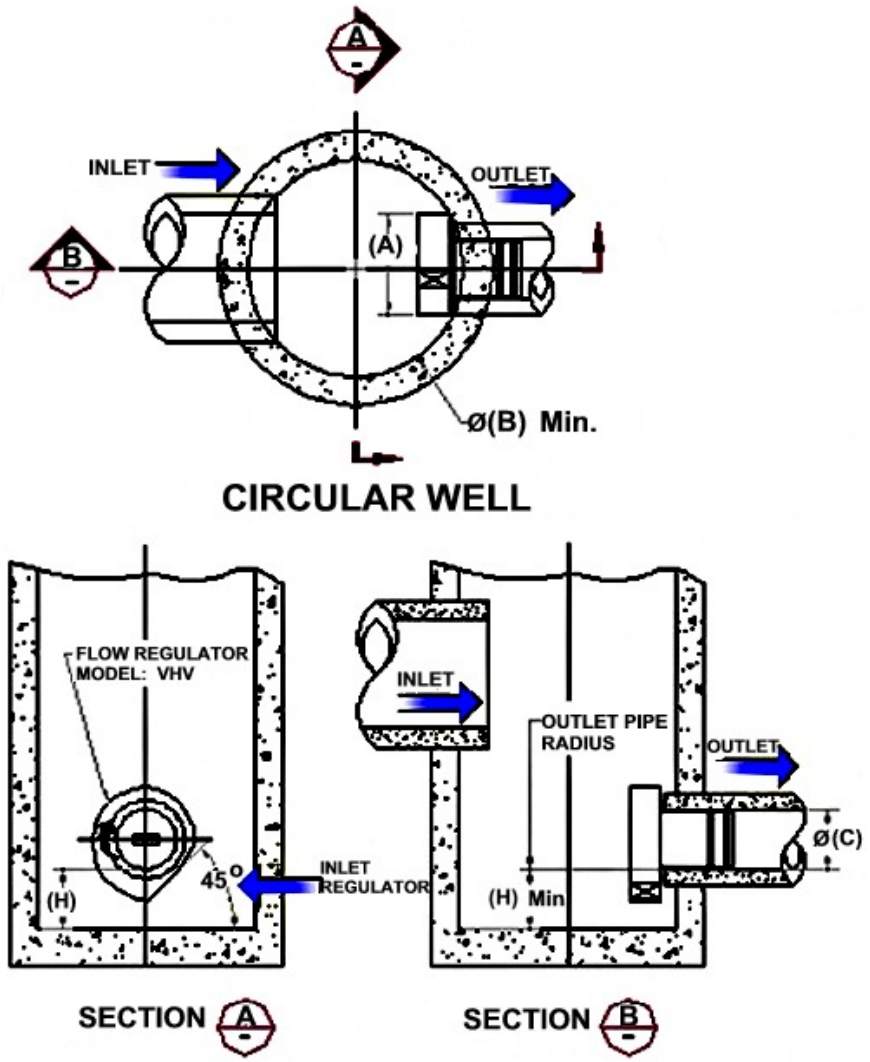


FIGURE 3 - VHV

JOHN MEUNIER

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

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



INSTALLATION

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

MAINTENANCE

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

GUARANTY

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

John Meunier Inc.
ISO 9001 : 2008

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Revised: 2011-05-03

APPENDIX E

StormTech System Design Sheets

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.

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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)

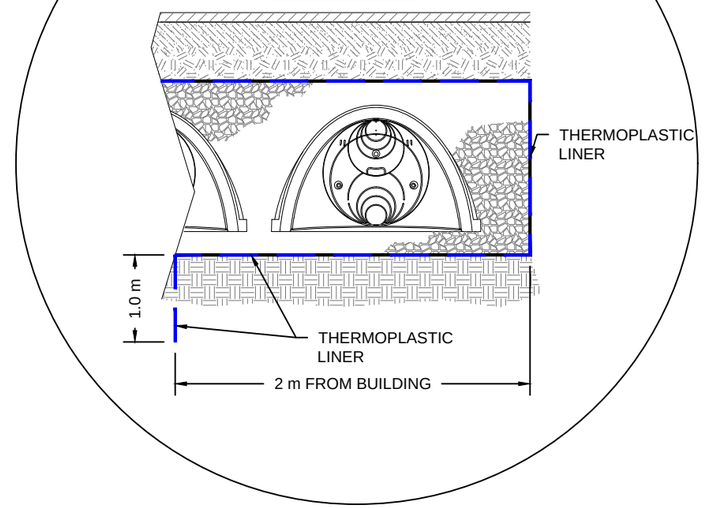
PROPOSED ELEVATIONS

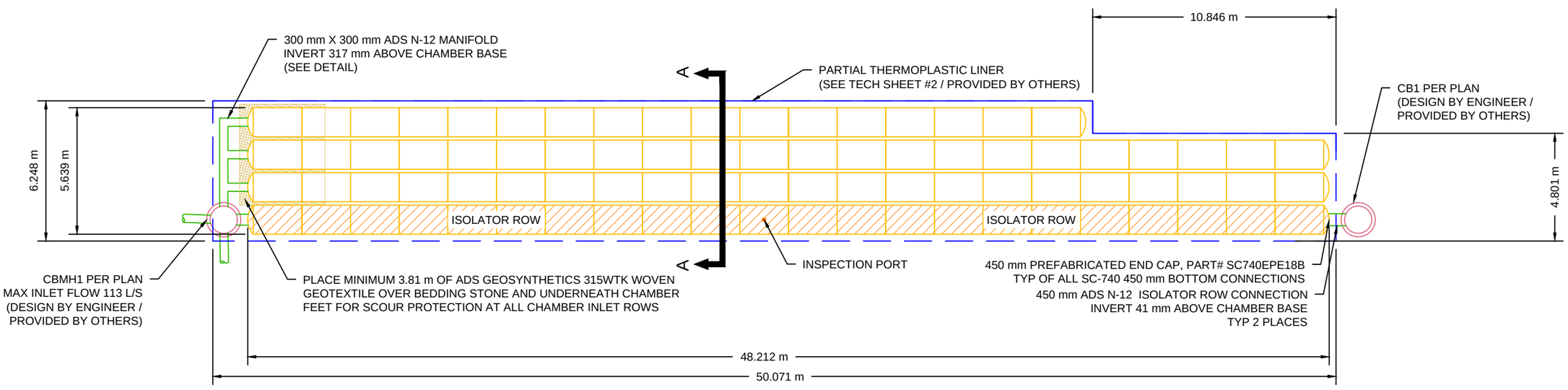
MAXIMUM ALLOWABLE GRADE (TOP OF PAVEMENT/UNPAVED):	89.0020
MINIMUM ALLOWABLE GRADE (UNPAVED WITH TRAFFIC):	87.1740
MINIMUM ALLOWABLE GRADE (UNPAVED NO TRAFFIC):	87.0210
MINIMUM ALLOWABLE GRADE (BASE OF FLEXIBLE PAVEMENT):	87.0210
MINIMUM ALLOWABLE GRADE (TOP OF RIGID PAVEMENT):	87.0210
TOP OF STONE:	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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SCALE = 1 : 200

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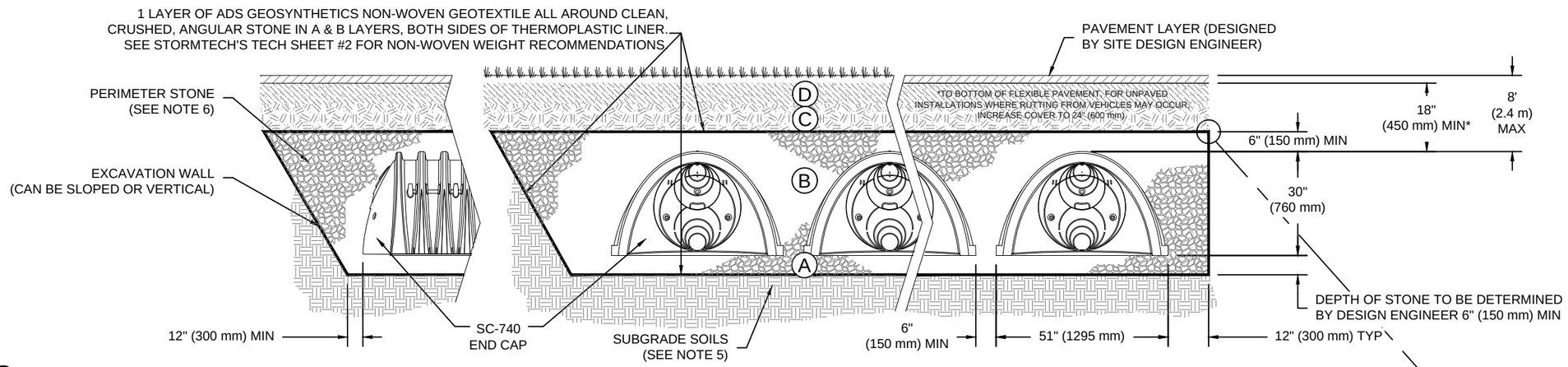
ACCEPTABLE FILL MATERIALS: STORMTECH SC-740 CHAMBER SYSTEMS

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]

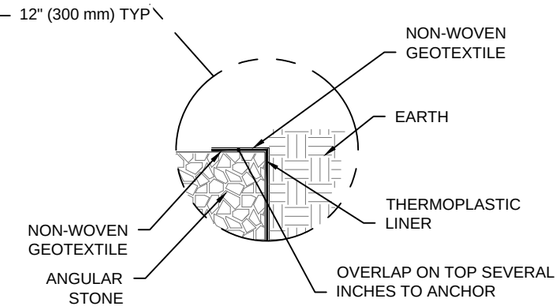
PLEASE NOTE:

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.



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.



THERMOPLASTIC LINER DETAIL

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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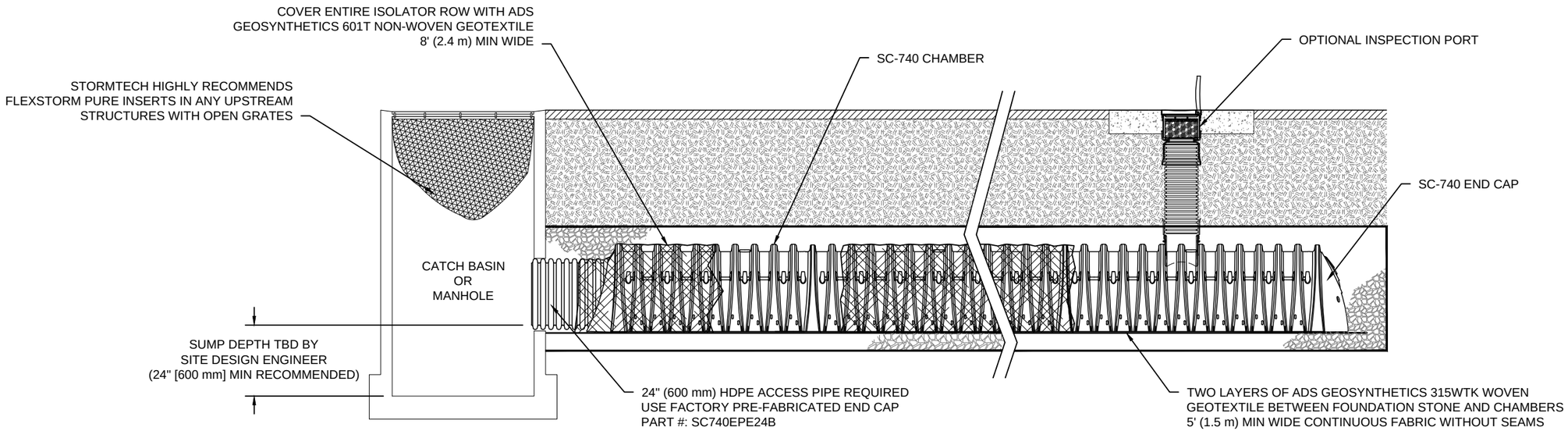


SC-740 ISOLATOR ROW DETAIL

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.

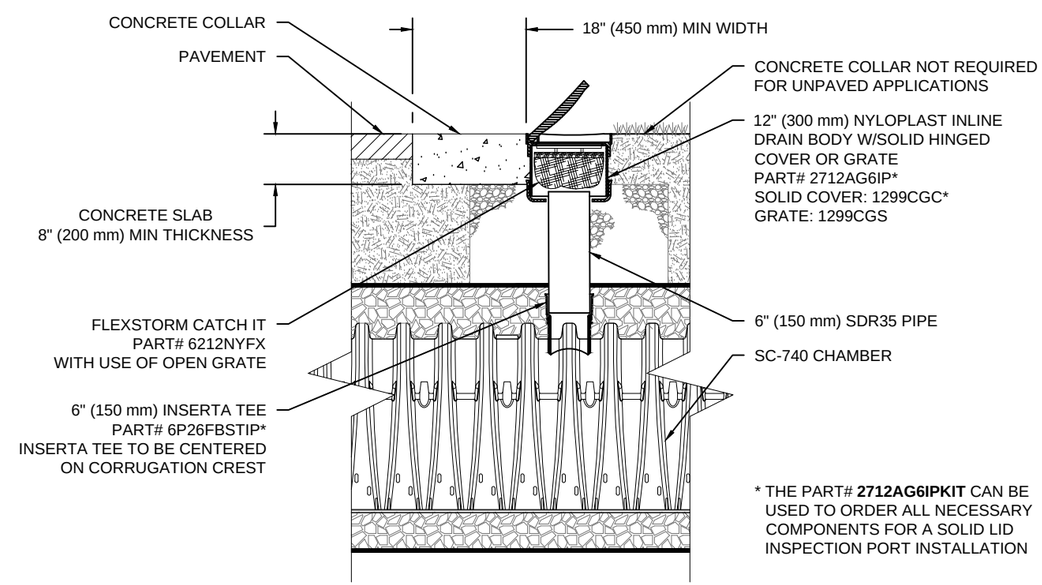
STEP 2) CLEAN OUT ISOLATOR ROW USING THE JETVAC PROCESS
- A. A FIXED CULVERT CLEANING NOZZLE WITH REAR FACING SPREAD OF 45" (1.1 m) OR MORE IS PREFERRED
- B. APPLY MULTIPLE PASSES OF JETVAC UNTIL BACKFLUSH WATER IS CLEAN
- C. VACUUM STRUCTURE SUMP AS REQUIRED

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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4640 TRUEMAN BLVD
HILLIARD, OH 43026
1-800-733-7473

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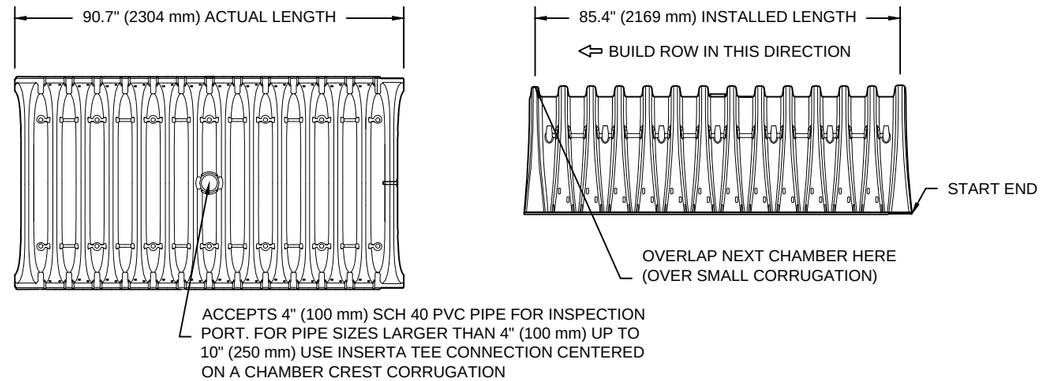
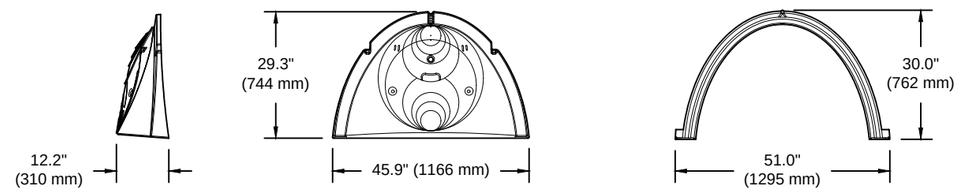
SC-740 TECHNICAL SPECIFICATION

NTS

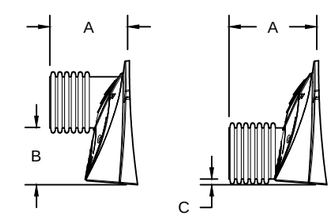




NOMINAL CHAMBER SPECIFICATIONS

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
04-24-15	GM	KP	NEW VOLUME - 65 m³
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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
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.

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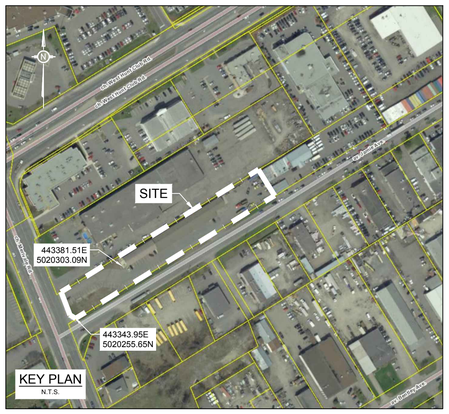
APPENDIX G

Complete Set of Civil Plans



EROSION AND SEDIMENT CONTROL MEASURES:

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

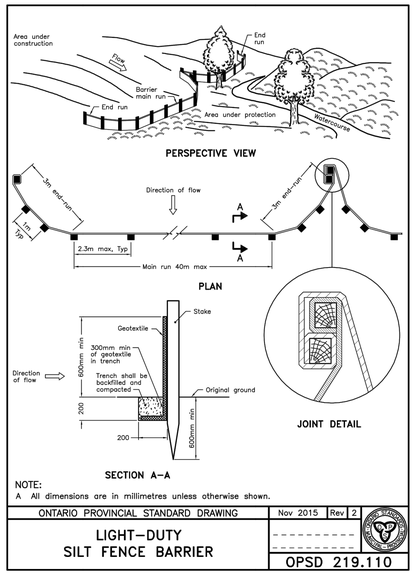
- PRIOR TO THE REMOVAL OF ANY VEGETATIVE COVER, MOVING OF SOIL AND CONSTRUCTION:
- INSTALL SILT FENCE IMMEDIATELY DOWNSTREAM FROM AREAS TO BE DISTURBED (SEE PLAN FOR LOCATION).
- INSTALL INLET SEDIMENT CONTROL DEVICES
- INSTALL GEOSOCK INSERTS WITH AN OVERFLOW IN ALL THE DOWNSTREAM CATCHBASINS AND MANHOLES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

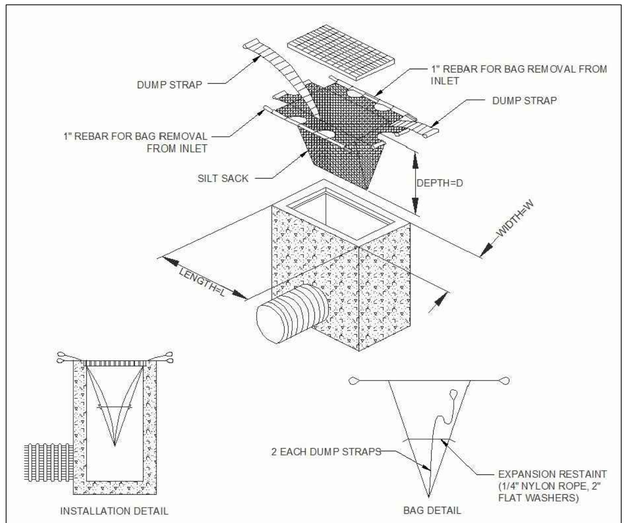
3. AFTER CONSTRUCTION:

- 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

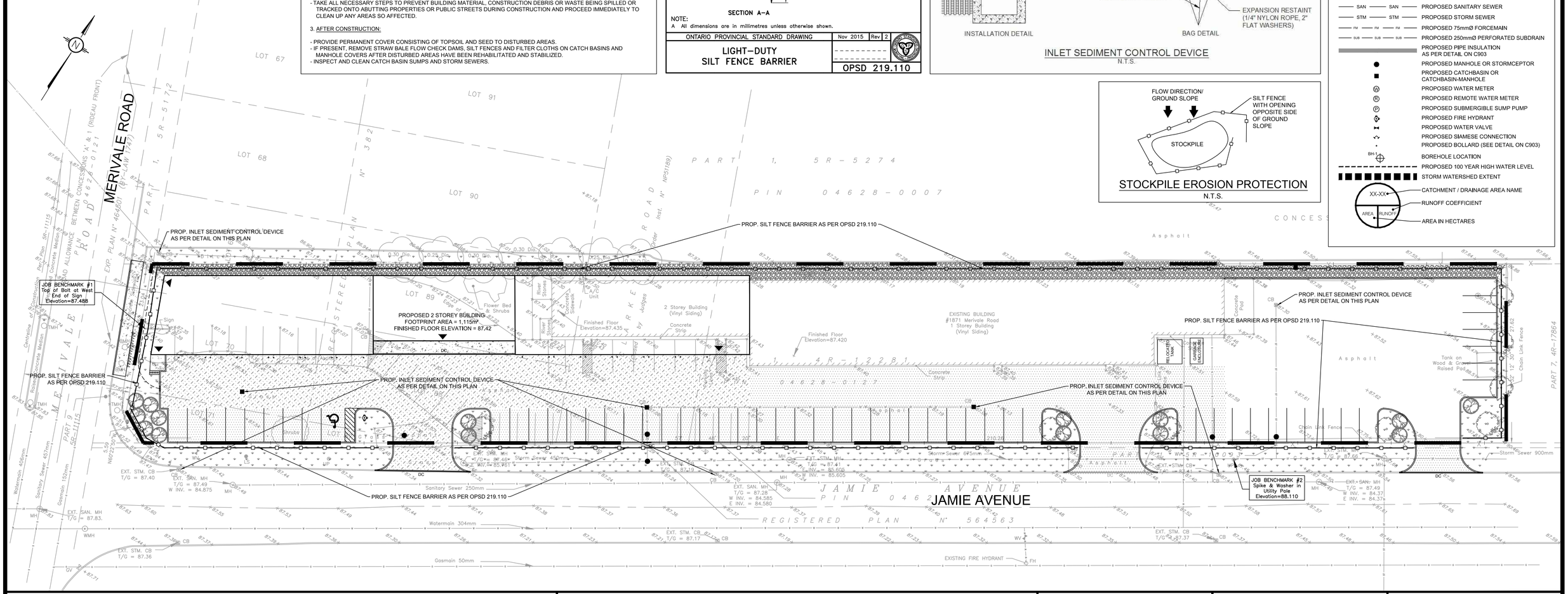


INLET SEDIMENT CONTROL DEVICE
N.T.S.

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; AREA: RUNOFF: RUNOFF COEFFICIENT; AREA IN HECTARES

STOCKPILE EROSION PROTECTION
N.T.S.



USE AND INTERPRETATION OF DRAWINGS

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

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

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

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

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

UNAUTHORIZED CHANGES:

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

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

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

GENERAL NOTES:

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LICENSED PROFESSIONAL ENGINEER J. C. R. LALONDE 30/7/2018 PROVINCE OF ONTARIO

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MR. GERRY BENSON
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K6H 6B8 , TEL. 613-936-7850

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

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

DRAWING TITLE
EROSION AND SEDIMENT CONTROL PLAN

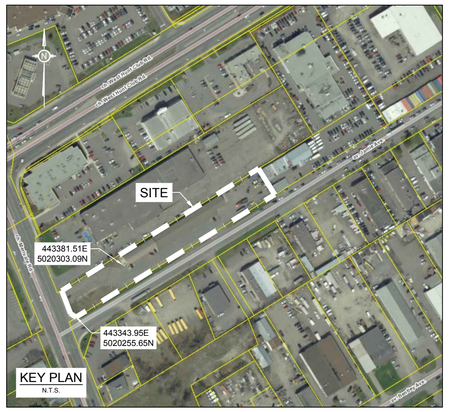
PROJECT NO.
130828

DATE
29 AUG 2018

C101

D07-12-17-0054

#17529



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	ASPHALT TO BE REINSTATED TO MATCH EXISTING CONDITIONS
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×50.00S	PROPOSED SWALE ELEVATION
×50.00EX	MATCH INTO EXISTING ELEVATION
×50.13	EXISTING ELEVATION
	MAJOR OVERLAND FLOW ROUTE
WTR — WTR	PROPOSED WATER SERVICE
SAN — SAN	PROPOSED SANITARY SEWER
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FM — FM — FM	PROPOSED 75mmØ FORCEMAIN
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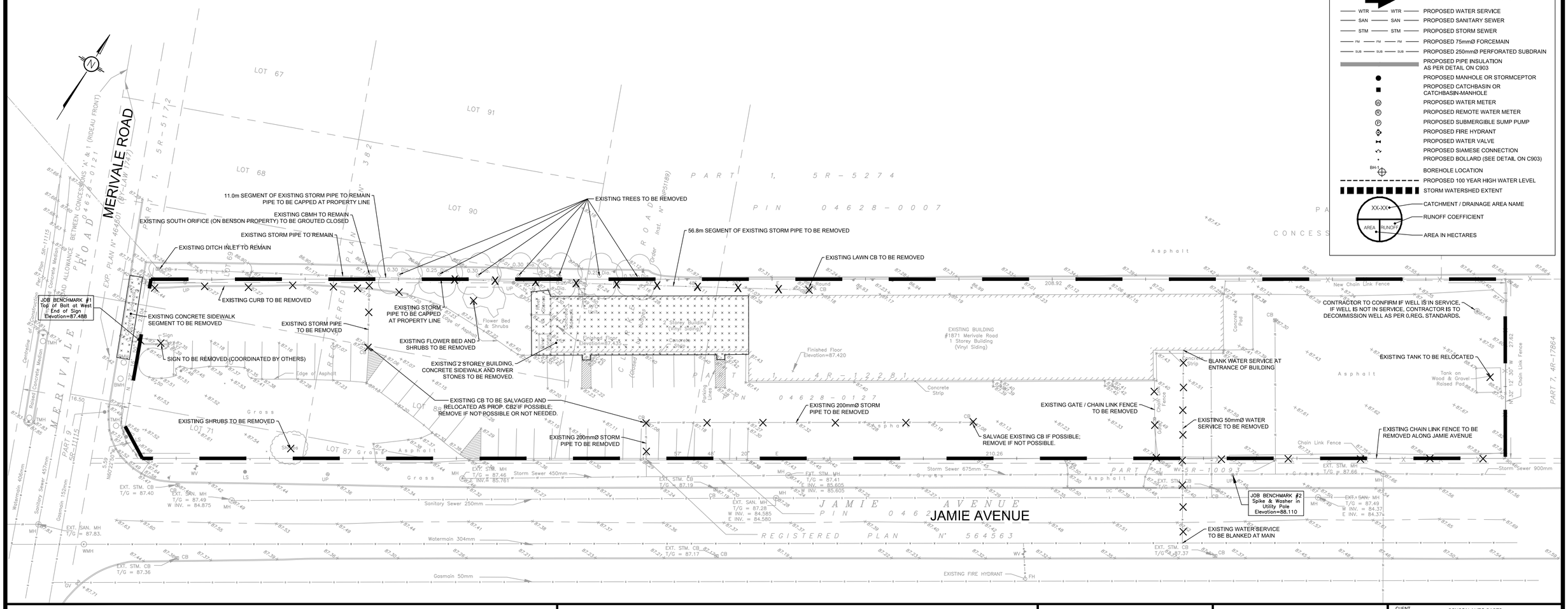

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DRAWING TITLE

DEMOLITION PLAN

PROJECT NO.
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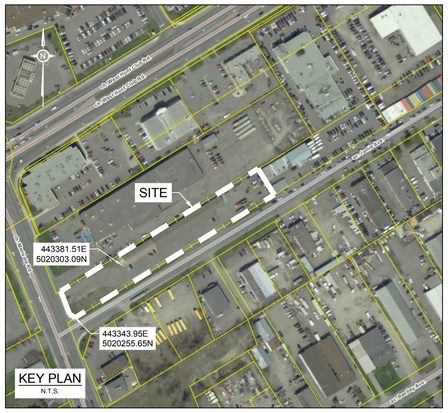
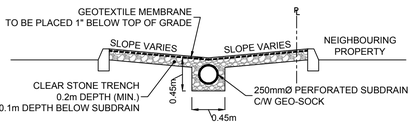


KEY PLAN
N.T.S.



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

PAVEMENT STRUCTURE

COURSE	MATERIAL	THICKNESS (mm)	
		AUTOMOBILE PARKING	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:

1. UNDERGROUND UTILITIES, AS REPORTED ON THIS DRAWING, ARE NOT BASED ON AN ACTUAL 'FIELD LOCATE' BY THE RESPECTIVE UTILITY AGENCIES BUT HAVE BEEN COMPILED FROM DATA OBTAINED FROM THE CITY OF OTTAWA PUBLIC UTILITIES REGISTRY.
2. BEFORE ANY WORK INVOLVING PROBING, EXCAVATING, ETC., CONTRACTOR TO CONFIRM RELEVANT UTILITY LOCATIONS AND REPORT ANY DISCREPANCIES TO THE ENGINEER PRIOR TO COMMENCING WORK.

SURVEY NOTES:

1. CONFIRM JOB BENCHMARKS SHOWN ON PLANS WITH ENGINEER PRIOR TO UTILIZATION.
2. BEARINGS HEREON ARE GRID BEARINGS AND ARE DERIVED FROM NCC HORIZONTAL CONTROL MONUMENTS 019710637 (N 5022465.812, E 365416.840) AND 019861625 (N 5022141.837, E 363270.732) AND ARE REFERRED TO THE CENTRAL MERIDIAN 76°30'W LONGITUDE, ZONE 9 OF THE 3° M.T.M. ONTARIO COORDINATE SYSTEM (NAD 83).

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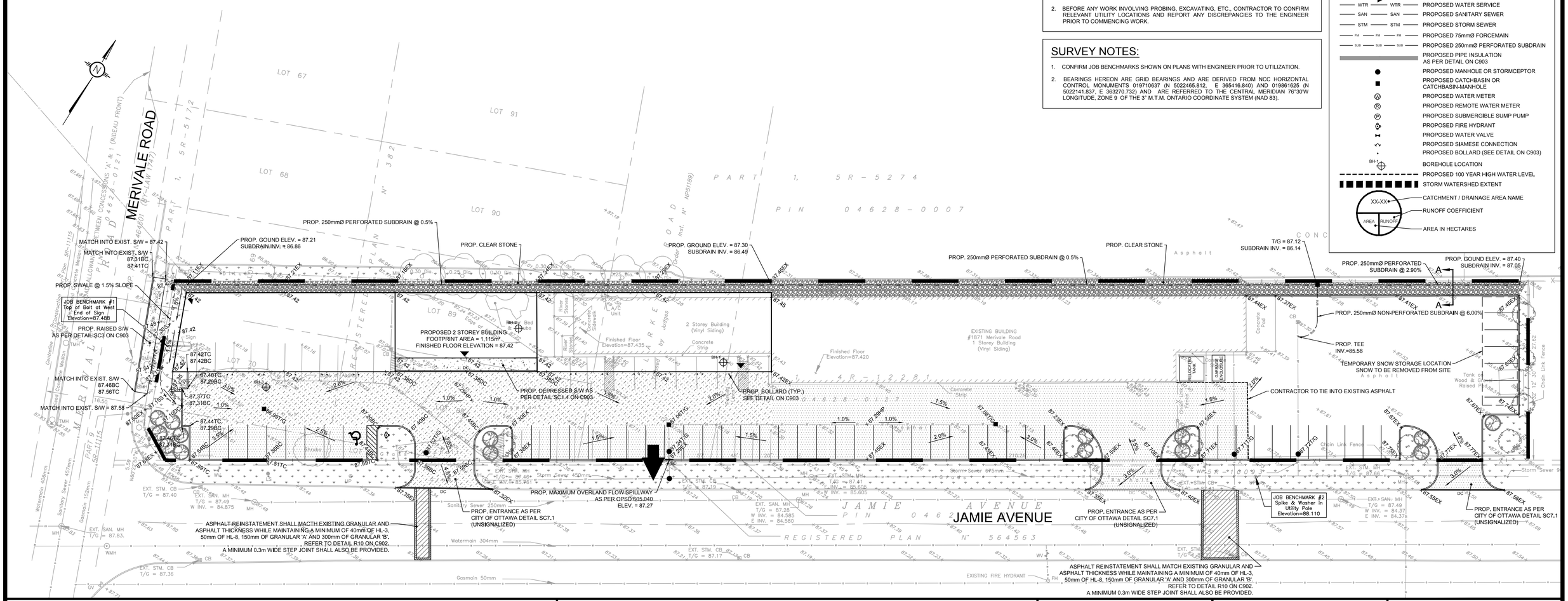

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DRAWING TITLE
GRADING AND DRAINAGE PLAN

PROJECT NO.
130828

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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
103mm dia. ICD ORIFICE PLATE	100 YEAR
HEAD (m)	1.72
HIGH WATER LEVEL (m)	87.44
CONTROLLED RELEASE RATE (L/s)	29.52

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

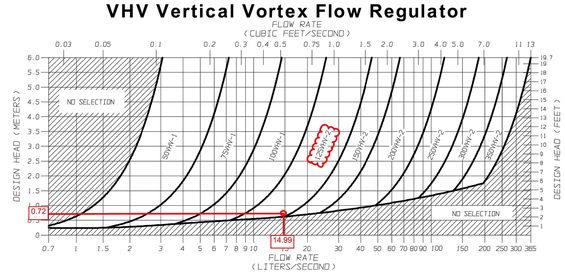

FIGURE 3 - VHV

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.
2. OBTAIN AND PAY FOR ALL NECESSARY PERMITS AND APPROVALS FROM THE MUNICIPAL AUTHORITIES PRIOR TO COMMENCING CONSTRUCTION; SUCH AS, BUT NOT LIMITED TO: ROAD CUT PERMITS, SEWER PERMITS, WATER PERMIT, ETC. THE APPROVAL OF THIS PLAN DOES NOT EXEMPT THE CONTRACTOR FROM THE REQUIREMENTS TO OBTAIN THE VARIOUS PERMITS/APPROVALS REQUIRED TO COMPLETE THE CONSTRUCTION PROJECT.
3. FILTER FABRIC TO BE INSTALLED AND MAINTAINED BETWEEN THE FRAME AND COVER OF ALL CATCHBASINS AND CATCHBASIN MANHOLES DURING THE CONSTRUCTION PERIOD TO MINIMIZE SEDIMENTS ENTERING THE STORM SEWER SYSTEM. ALL GRASSED AREAS MUST BE COMPLETED PRIOR TO THE REMOVAL OF THE FILTER FABRIC IN THE CATCH BASINS.
4. 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.
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:

1. UNDERGROUND UTILITIES, AS REPORTED ON THIS DRAWING, ARE NOT BASED ON AN ACTUAL 'FIELD LOCATE' BY THE RESPECTIVE UTILITY AGENCIES BUT HAVE BEEN COMPILED FROM DATA OBTAINED FROM THE CITY OF OTTAWA PUBLIC UTILITIES REGISTRY.
2. BEFORE ANY WORK INVOLVING PROBING, EXCAVATING, ETC., CONTRACTOR TO CONFIRM RELEVANT UTILITY LOCATIONS AND REPORT ANY DISCREPANCIES TO THE ENGINEER PRIOR TO COMMENCING WORK.

SURVEY NOTES:

1. CONFIRM JOB BENCHMARKS SHOWN ON PLANS WITH ENGINEER PRIOR TO UTILIZATION.
2. BEARINGS HEREON ARE GRID BEARINGS AND ARE DERIVED FROM NCC HORIZONTAL CONTROL MONUMENTS 019710637 (N 5022465.812, E 365416.840) AND 019861625 (N 5022141.837, E 363270.732) AND ARE REFERRED TO THE CENTRAL MERIDIAN 76°30'W LONGITUDE, ZONE 9 OF THE 3° M.T.M. ONTARIO COORDINATE SYSTEM (NAD 83).

LEGEND:

- PROPERTY LINE
- PROPOSED CURB
- PROPOSED DEPRESSED CURB
- PROPOSED DOOR ENTRANCE/EXIT
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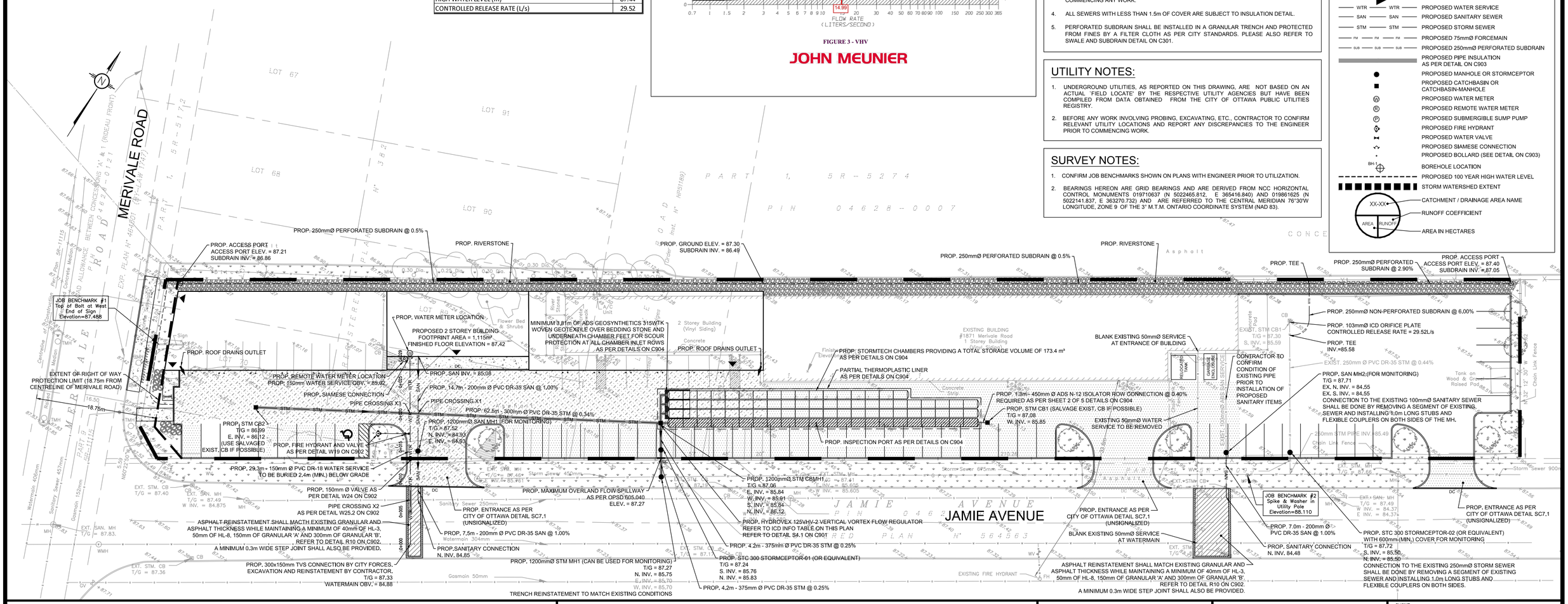

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SCALE: 1:300

LICENSED PROFESSIONAL ENGINEER
J. C. R. LALONDE
OCT 26/18
PROVINCE OF ONTARIO

NOT AUTHENTIC UNLESS SIGNED AND DATED

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CLIENT
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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.	J.C.

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

DRAWING TITLE
SITE SERVICING PLAN

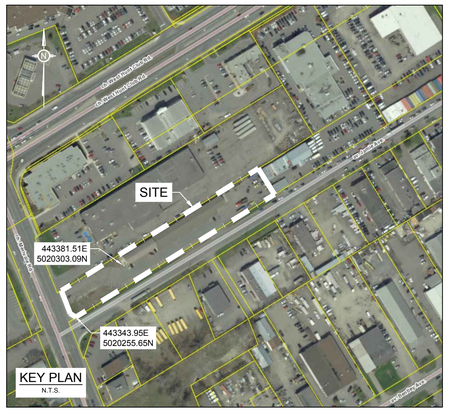
PROJECT NO.
130828

DATE
29 AUG 2018

C401

D07-12-17-0054

#17529



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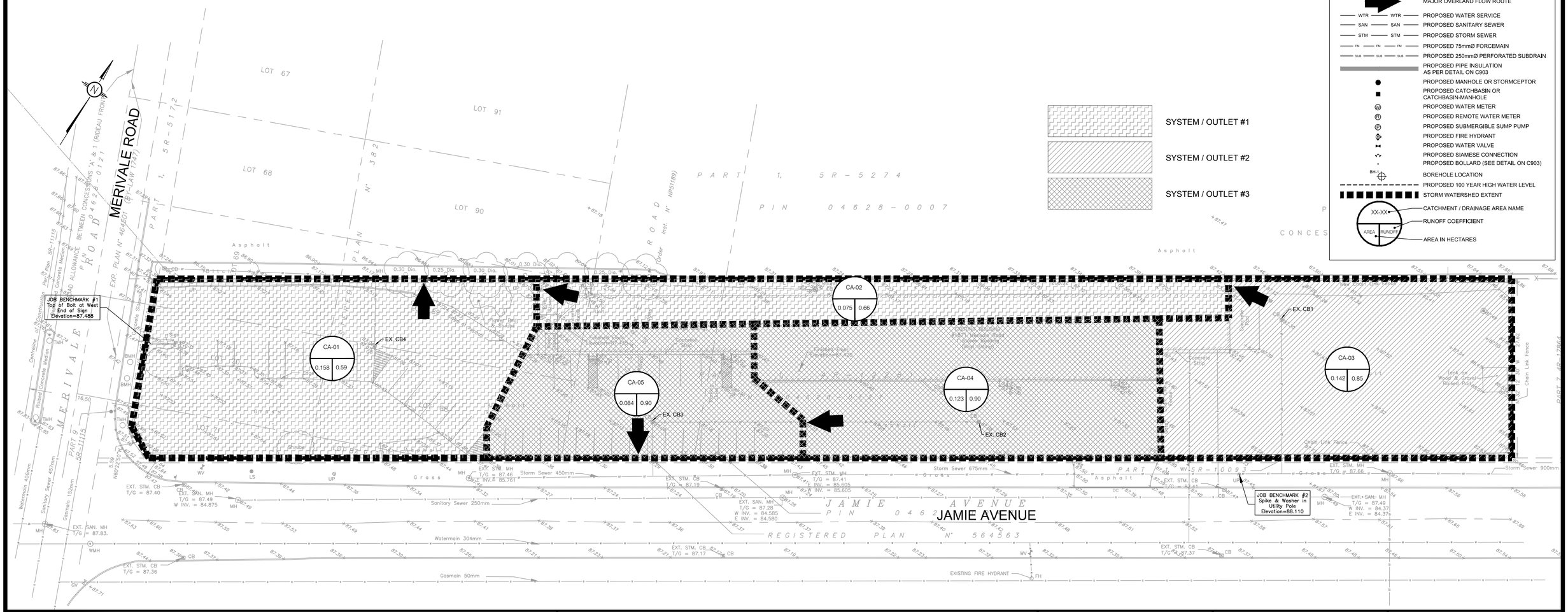

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PROJECT

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COMMERCIAL DEVELOPMENT
1871 MERIVALE ROAD, NEPEAN, ON

DRAWING TITLE

PRE-DEVELOPMENT
CATCHMENTS PLAN

PROJECT NO.
130828

DATE
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D07-12-17-0054

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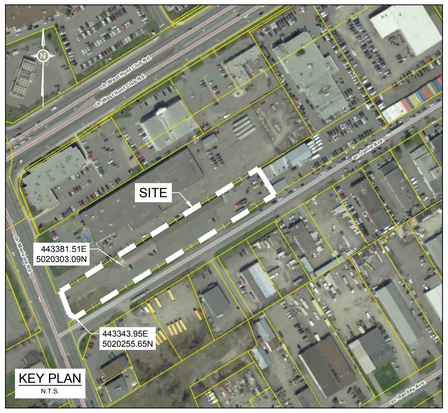

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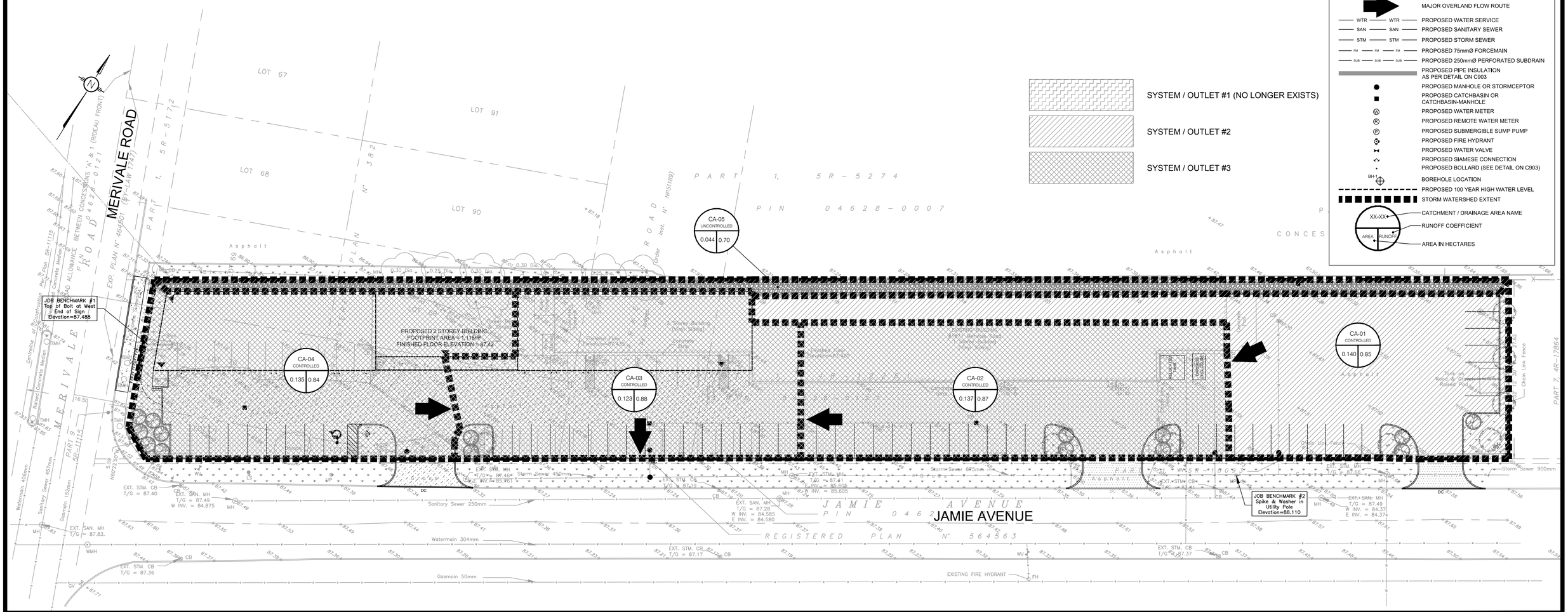

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LICENSED PROFESSIONAL ENGINEER
J. C. R. LALONDE
Oct/2018
PROVINCE OF ONTARIO

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.	J.C.

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

DRAWING TITLE
POST DEVELOPMENT
CATCHMENTS PLAN

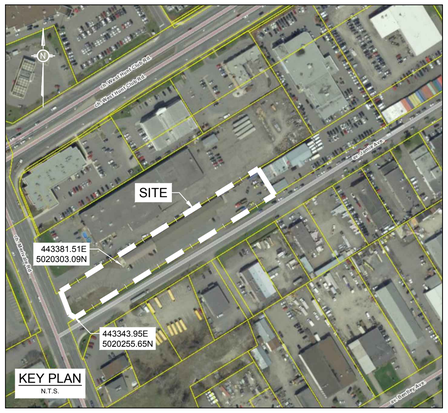
PROJECT NO.
130828

DATE
29 AUG 2018

C702

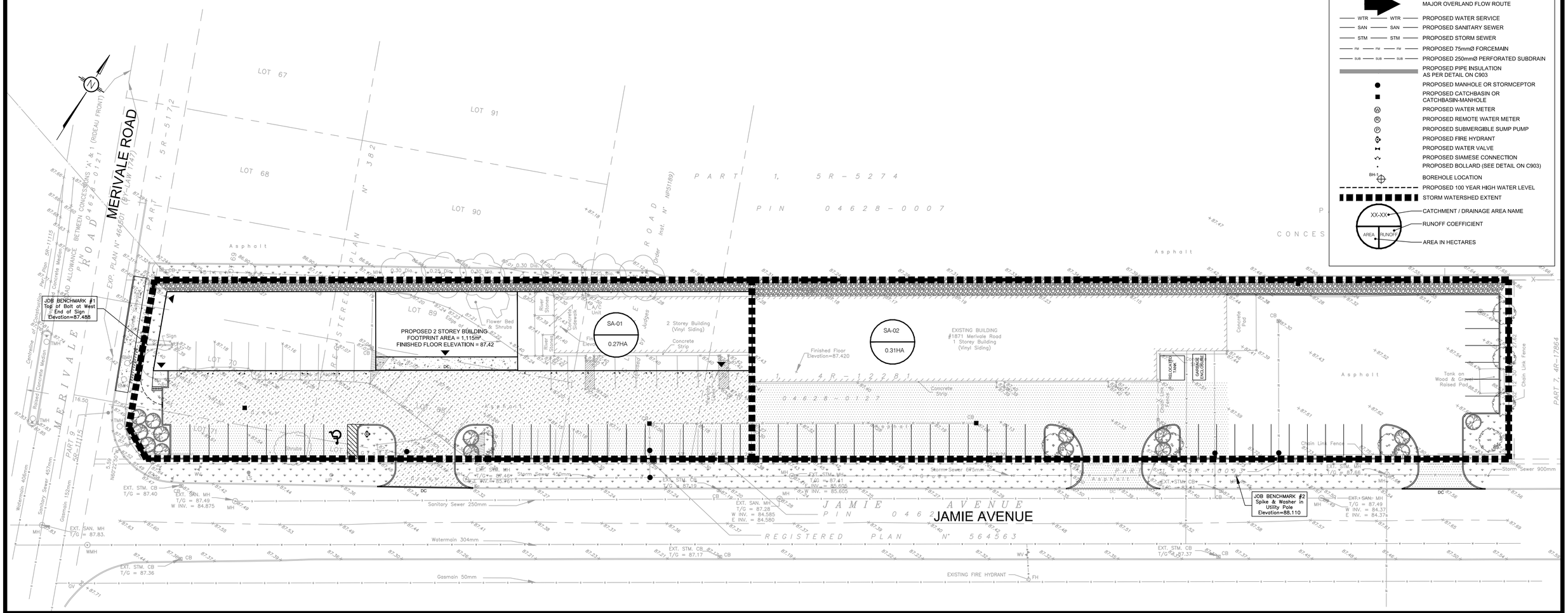
D07-12-17-0054

#17529



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	PROPOSED 75mmØ FORCEMAIN
SUB — 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 / AREA / RUNOFF	CATCHMENT / DRAINAGE AREA NAME; RUNOFF COEFFICIENT; AREA IN HECTARES



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

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5m 2 0 5 10m

SCALE: 1:300

LICENSED PROFESSIONAL ENGINEER
J. C. R. LALONDE
3 OCT 2018
PROVINCE OF ONTARIO

NOT AUTHENTIC UNLESS SIGNED AND DATED

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

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

DRAWING TITLE
SANITARY DRAINAGE
AREA PLAN

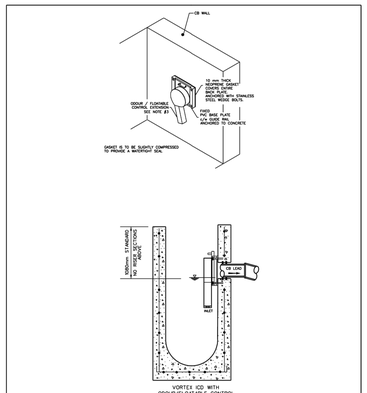
PROJECT NO.
130828

DATE
29 AUG 2018

C703

D07-12-17-0054

#17529

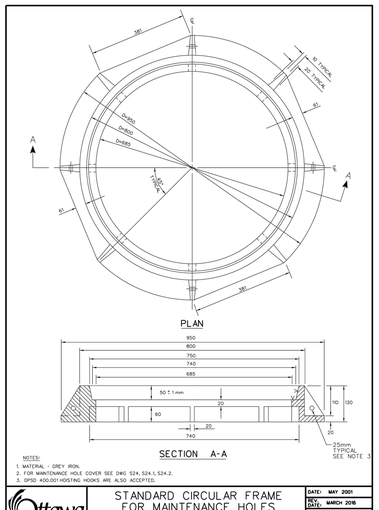


NOTES:

1. VORTEX ICD'S ARE USED TO RESTRICT FLOWS BELOW 15L / s. The LOWEST RESTRICTION ALLOWED TYPICALLY IS 8L / s. PRODUCTS MAY SLIGHTLY DIFFER AS SHOWN ABOVE.
2. CURVES ARE AVAILABLE FROM THE MANUFACTURER. SEE MS - 22.15 FOR APPROVED PRODUCTS.
3. ODOUR CONTROL TYPE IS TO BE USED IN CB'S THAT ARE CONNECTED TO A COMBINED SEWER DIRECTLY. FOR STORM SEWERS DOUAR / FLOATABLE CONTROL EXTENSIONS ARE NOT REQUIRED.
4. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS SHOWN OTHERWISE.

N.T.S.

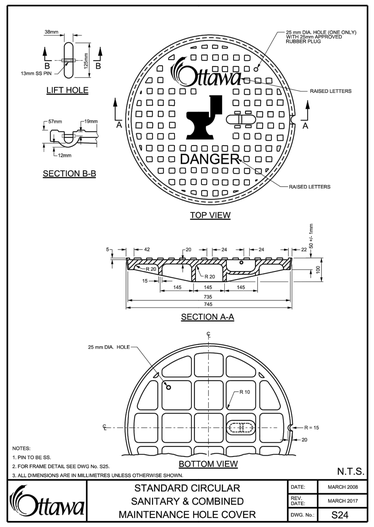
Ottawa	VORTEX ICD INSTALLATION	DATE: MARCH 2008 REV. DATE: MARCH 2009 DWG. No.: S4.1



NOTES:

1. MATERIAL : GREY IRON.
2. FOR MAINTENANCE HOLE COVER SEE DWG S24, S24.1, S24.2.
3. OPSD 400.001 HOISTING HOOKS ARE ALSO ACCEPTED.

Ottawa	STANDARD CIRCULAR FRAME FOR MAINTENANCE HOLES (MODIFIED OPSD-401.020)	DATE: MAY 2001 REV. DATE: MARCH 2016 DWG. No.: S25

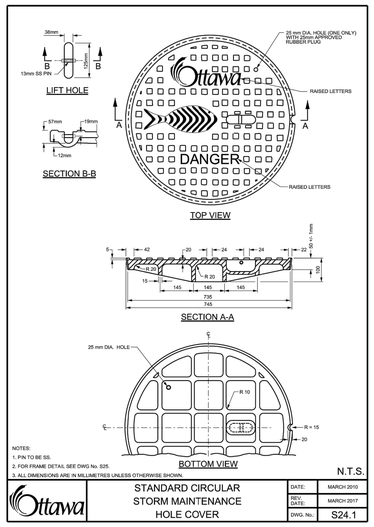


NOTES:

1. PIN TO BE SS.
2. FOR FRAME DETAIL SEE DWG No. S25.
3. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE SHOWN.

N.T.S.

Ottawa	STANDARD CIRCULAR SANITARY & COMBINED MAINTENANCE HOLE COVER	DATE: MARCH 2008 REV. DATE: MARCH 2017 DWG. No.: S24

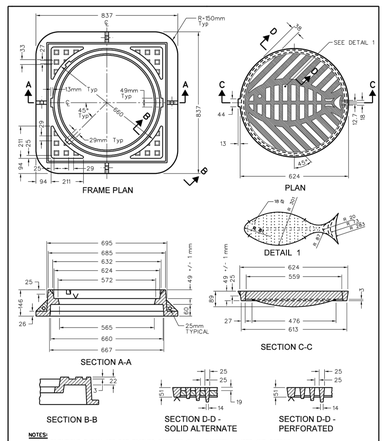


NOTES:

1. PIN TO BE SS.
2. FOR FRAME DETAIL SEE DWG No. S25.
3. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE SHOWN.

N.T.S.

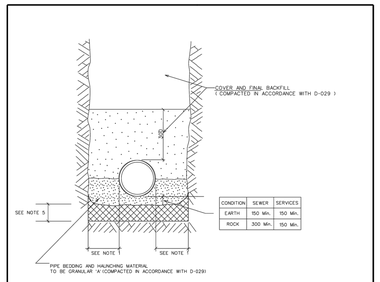
Ottawa	STANDARD CIRCULAR STORM MAINTENANCE HOLE COVER	DATE: MARCH 2010 REV. DATE: MARCH 2017 DWG. No.: S24.1



NOTES:

1. ALL DIMENSIONS SHOWN ARE FOR FINISHED CASTINGS ONLY. PATTERN MAKERS AND CASTING SHOP SHOULD MAKE ALLOWANCES ACCORDINGLY.
2. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS SHOWN OTHERWISE.
3. FOR NEW CONSTRUCTION WHERE SURFACE INLETS ARE SPECIFIED.
4. COMPANIES WITH GRATE DIMENSIONS NOT EXACTLY THE SAME AS SHOWN ABOVE WILL ALSO BE CONSIDERED.
5. ALTERNATE SOLID COVER TO HAVE EYE 25mm Dia. HOLE WITH 25mm APPROVED PLUG

Ottawa	HEAVY DUTY "FISH" TYPE ROUND CATCH BASIN COVER (MODIFIED OPSD-400.07)	DATE: MAY 2005 REV. DATE: MARCH 2017 DWG. No.: S19



CONDITION	SEWER	SERVICES
EARTH	150 Min.	150 Min.
ROCK	300 Min.	150 Min.

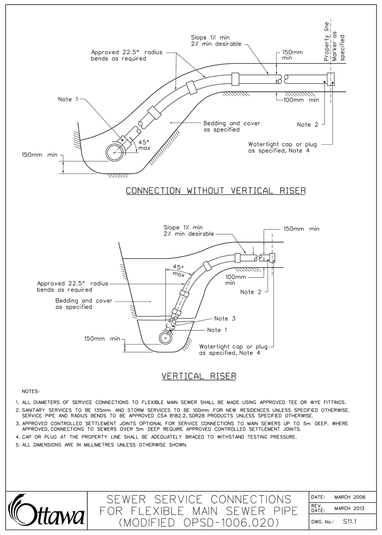
NOTES:

1.

PIPE INSIDE DIAMETER (mm)	CLEARANCE (mm)	
900 OR LESS	CONC	450
	PVC	450
OVER 900	500	

2. FINAL BACKFILL - APPROVED NATIVE MATERIAL OR SELECT SUBGRADE IN ACCORDANCE WITH F-2100.
3. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS SHOWN OTHERWISE.
4. INITIAL BACKFILL MATERIAL - CONCRETE PIPE - SAND, GRANULAR 'A'
   - PVC PIPE - GRANULAR 'A'
5. WHEN APPROVED BY THE CONTRACT ADMINISTRATOR, POOR SOILS SHALL BE EXCAVATED TO CREATE A FOUNDATION THAT SHALL BE FILLED TO THE BOTTOM OF THE BEDDING WITH GRANULAR 'B'.

Ottawa	SINGLE TRENCH (SEWER & SEWER SERVICES)	DATE: MAY 2001 REV. DATE: MARCH 2016 DWG. No.: S6

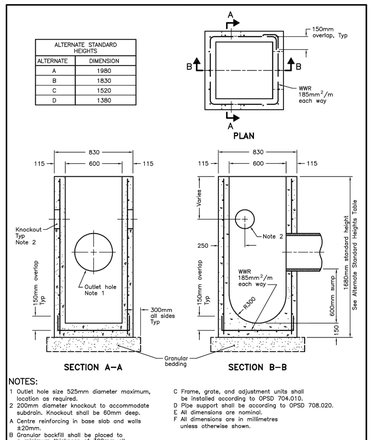


NOTES:

1. ALL DIAMETERS OF SERVICE CONNECTIONS TO FLEXIBLE MAIN SEWER SHALL BE MADE USING APPROVED TEE OR WYE FITTINGS.
2. SANITARY SERVICES TO BE 135mm AND STORM SERVICES TO BE 100mm FOR NEW RESIDENCES UNLESS SPECIFIED OTHERWISE. SERVICE PIPE AND RADIUS BENDS TO BE APPROVED CSA B182.2, SDR28 PRODUCTS UNLESS SPECIFIED OTHERWISE.
3. APPROVED CONTROLLED SETTLEMENT JOINTS OPTIONAL FOR SERVICE CONNECTIONS TO MAIN SEWERS UP TO 5m DEEP. WHERE APPROVED, CONNECTIONS TO SEWERS OVER 5m DEEP REQUIRE APPROVED CONTROLLED SETTLEMENT JOINTS.
4. CAP OR PLUG AT THE PROPERTY LINE SHALL BE ADEQUATELY BRACED TO WITHSTAND TESTING PRESSURE.
5. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE SHOWN.

Ottawa	SEWER SERVICE CONNECTIONS FOR FLEXIBLE MAIN SEWER PIPE (MODIFIED OPSD-1006.020)	DATE: MARCH 2006 REV. DATE: MARCH 2013 DWG. No.: S11.1

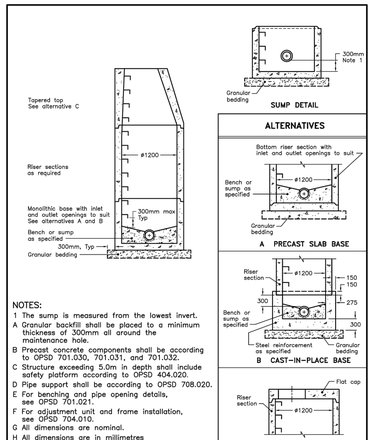
ALTERNATE STANDARD HEIGHTS	
ALTERNATE	DIMENSION
A	1980
B	1830
C	1520
D	1380



NOTES:

1 Outlet hole size 525mm diameter maximum, location as required.
2 200mm diameter knockout to accommodate subdrain. Knockout shall be 60mm deep.
A Centre reinforcing in base slab and walls ±20mm.
B Granular backfill shall be placed to a minimum thickness of 300mm all around the catch basin.
C Frame, grate, and adjustment units shall be installed according to OPSD 704.010.
D Pipe support shall be according to OPSD 708.020.
E All dimensions are nominal.
F All dimensions are in millimetres unless otherwise shown.

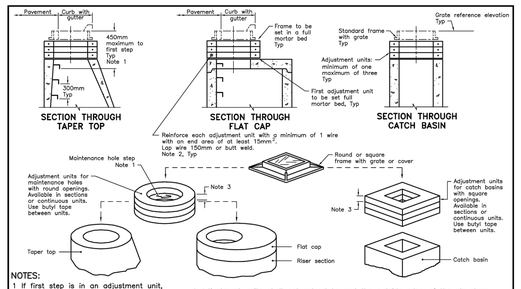
ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2009	Rev 2
PRECAST CONCRETE CATCH BASIN 600x600mm		OPSD 705.010



NOTES:

1 The sump is measured from the lowest invert.
A Granular backfill shall be placed to a minimum thickness of 300mm all around the maintenance hole.
B Precast concrete components shall be according to OPSD 701.030, 701.031, and 701.032.
C Structure exceeding 5.0m in depth shall include safety platform according to OPSD 404.020.
D Pipe support shall be according to OPSD 708.020.
E For benching and pipe opening details, see OPSD 701.021.
F For adjustment unit and frame installation, see OPSD 704.010.
G All dimensions are nominal.
H All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2009	Rev 4
PRECAST CONCRETE MAINTENANCE HOLE 1200mm DIAMETER		OPSD 701.010

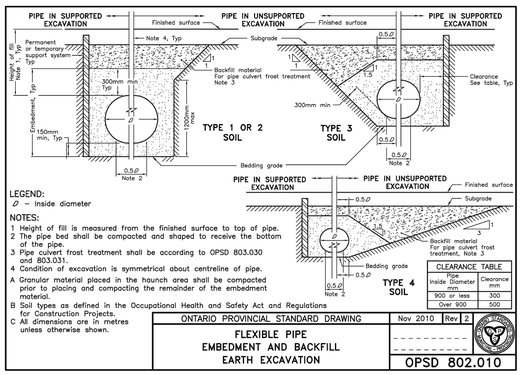


NOTES:

1 If first step is in an adjustment unit, the adjustment unit shall be of the type manufactured with a step in place.
2 Centre reinforcing in adjustment unit ±10mm.
3 Round and square adjustment units are available in sizes of 50, 75, 100, 150, and 300mm.

A Adjustment units shall not extend beyond the outside edge of the structure.
B All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2014	Rev 3
PRECAST CONCRETE ADJUSTMENT UNITS FOR MAINTENANCE HOLES, CATCH BASINS, AND VALVE CHAMBERS		OPSD 704.010



LEGEND:

Ø – Inside diameter

NOTES:

1 Height of fill is measured from the finished surface to top of pipe.
2 The pipe bed shall be compacted and shaped to receive the bottom of the pipe.
3 Pipe culvert frost treatment shall be according to OPSD 803.030 and 803.031.
4 Condition of excavation is symmetrical about centreline of pipe.
A Granular material placed in the haunch area shall be compacted prior to placing and compacting the remainder of the embedment material.
B Soil types as defined in the Occupational Health and Safety Act and Regulations for Construction Projects.
C All dimensions are in metres unless otherwise shown.

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

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2010	Rev 2
FLEXIBLE PIPE EMBEDMENT AND BACKFILL EARTH EXCAVATION		OPSD 802.010

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J. C. R. LALONDE
Oct/2018
PROVINCE OF ONTARIO

NOT AUTHENTIC UNLESS SIGNED AND DATED

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K6H 6B8 , TEL. 613-936-7850

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

DRAWING TITLE
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PROJECT NO.
130828

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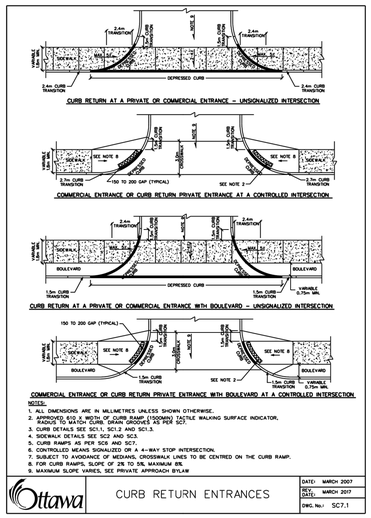
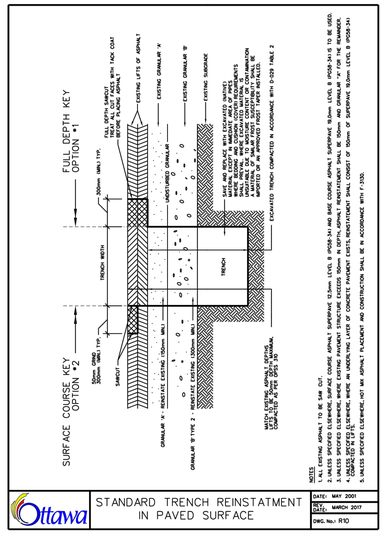
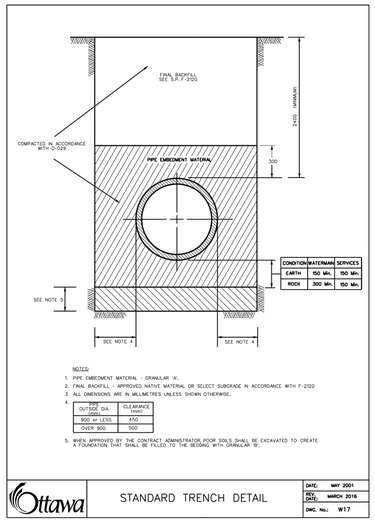
C901

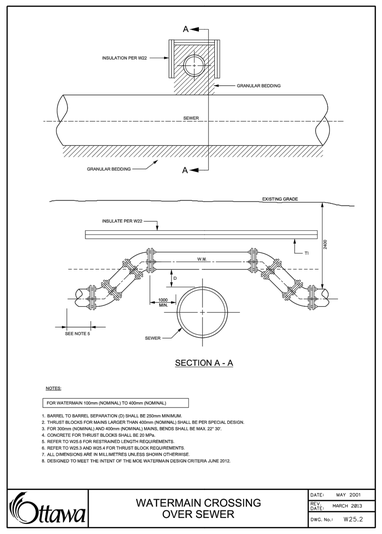
D07-12-17-0054

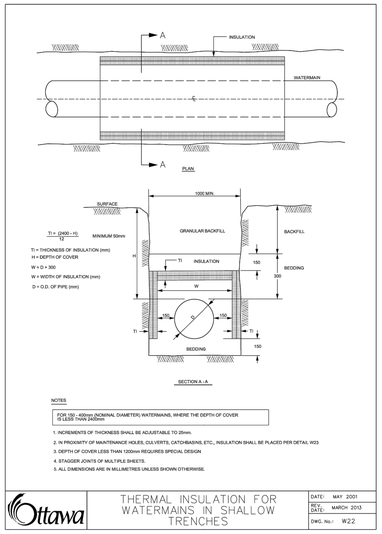
#17529

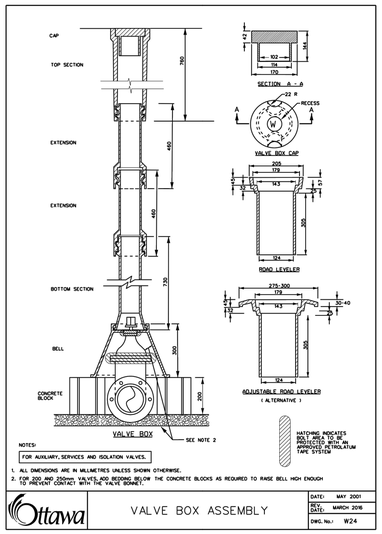


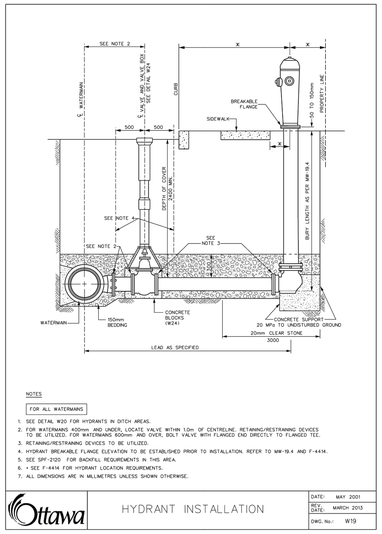












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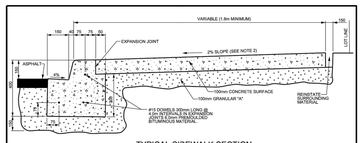
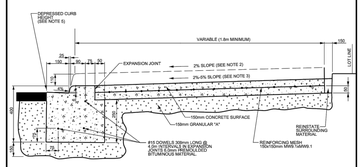


TYPICAL SIDEWALK SECTION

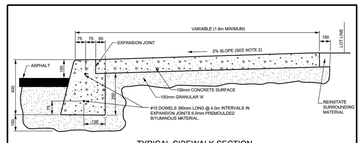


SECTION AT PRIVATE ENTRANCE AND PEDESTRIAN RAMPS

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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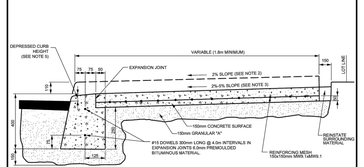

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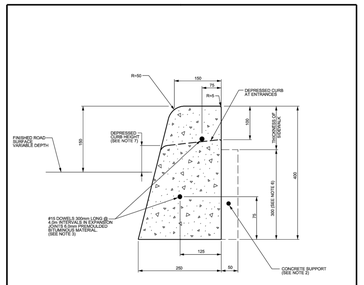
N.T.S.

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

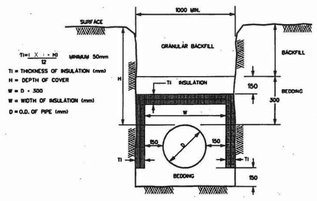


CONCRETE BARRIER CURB

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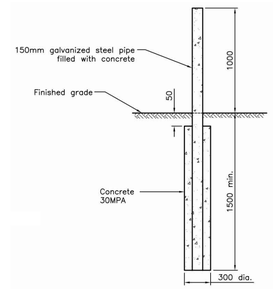
TYPICAL STORM AND SANITARY SEWER AND WATERMAIN INSULATION DETAIL
(N.T.S.)

Property and Test Method	HIGHLOAD 40
Thermal Resistance, per inch (25 mm), ASTM C518, C177, @ 75°F (24°C) mean temp., ft²•hr•°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^{-5})
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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CONTRACTOR TO VERIFY ALL DIMENSIONS AND NOTIFY THE ENGINEER OF ANY DISCREPANCIES BEFORE WORK COMMENCES. DO NOT SCALE DRAWINGS.

LICENSED PROFESSIONAL ENGINEER
J. C. R. LALONDE
30/8/2018
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
07	AS PER CITY COMMENTS	G.C.	03 OCT 2018
06	AS PER CITY COMMENTS	G.C.	30 AUG 2018
05	AS PER CITY COMMENTS	G.C.	20 JUL 2018
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.	J.C.

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

DRAWING TITLE
CONSTRUCTION DETAILS PLAN

PROJECT NO. 130828
DATE 29 AUG 2018
C903

D07-12-17-0054

#17529

PROJECT INFORMATION	
ENGINEERED PRODUCT MANAGER:	VIVEK SHARMA 647-403-9605 VSHARMA@ADS-PIPE.COM
ADS SALES REP:	HASSAN ELMI 416-985-9737 HASSAN.ELMI@ADS-PIPE.COM
PROJECT NO:	97833

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:-06 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 STRUCTURES", 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 FROM A PILE LOCATED DIRECTLY OVER CHAMBERS. 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/SC-780 CONSTRUCTION GUIDE".
2. THE USE OF CONSTRUCTION EQUIPMENT OVER SC-310 & SC-740 CHAMBERS IS LIMITED:
   - NO EQUIPMENT IS ALLOWED ON BARE CHAMBERS.
   - ONLY LIGHT DUTY EQUIPMENT SUCH AS SKIDSTEERS OR EXCAVATORS ARE ALLOWED UNTIL PROPER FILL DEPTHS ARE REACHED IN ACCORDANCE WITH THE "STORMTECH SC-310/SC-740/SC-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.

REV1 ADS, INC.

PROPOSED LAYOUT

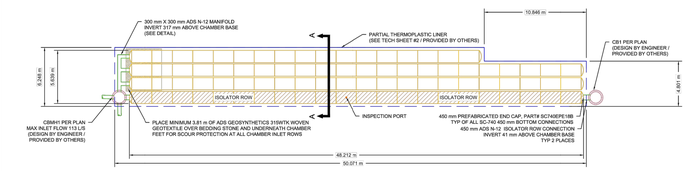
83	STORMTECH SC-740 CHAMBERS
8	STORMTECH SC-740 END CAPS
152	STONE ABOVE (mm)
152	STONE BELOW (mm)
40	% STONE VOID
173.4	**INSTALLED SYSTEM VOLUME (m³) (PERIMETER STONE INCLUDED / BASE STONE NOT INCLUDED)**
297	SYSTEM AREA (m²)
112	SYSTEM PERIMETER (m)

PROPOSED ELEVATIONS

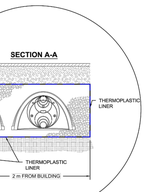
MAXIMUM ALLOWABLE GRADE (TOP OF PAVEMENT/UNPAVED):	89.0020
MINIMUM ALLOWABLE GRADE (UNPAVED WITH TRAFFIC):	87.1740
MINIMUM ALLOWABLE GRADE (UNPAVED NO TRAFFIC):	87.0210
MINIMUM ALLOWABLE GRADE (BASE OF FLEXIBLE PAVEMENT):	87.0210
MINIMUM ALLOWABLE GRADE (TOP OF RIGID PAVEMENT):	87.0210
TOP OF STONE:	86.7490
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.
- ON SITE STORMTECH ENGINEER TO 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 KNOWLEDGEABLE GEOTEXTILE PROFESSIONAL AND INSTALLED BY A QUALIFIED CONTRACTOR.



SECTION A-A



1871 MERIVALE OTTAWA, ON — DATE: 04-23-15 — DRAWN: GM — CHECKED: KP — PROJECT # 97833

REV | DATE | DWN | CHK | DESCRIPTION: 01 | 06-29-17 | BJ | KP | REVISED PER CITY COMMENTS; 02 | 08-30-17 | BJ | KP | REVISED PER CITY COMMENTS; 03 | 10-26-17 | BJ | KP | REVISED PER CITY COMMENTS; 04 | 06-11-18 | BJ | KP | REVISED PER CITY COMMENTS; 05 | 11-08-18 | BJ | KP | REVISED PER ENGINEER

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ADS 1765 FRANKLIN BLVD BRAMPTON, ON L6T 4Z1 1-800-723-7473

SCALE = 1 : 200

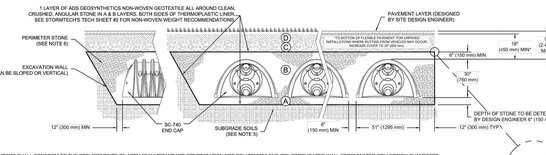
SHEET 2 OF 5

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 SOILROCK MATERIALS, NATIVE SOILS, OR PER ENGINEERS 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 (9" 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 SOILAGGREGATE MIXTURES, <35% FINES OR PROCESSED AGGREGATE. MOST PAVEMENT SUBBASE MATERIALS CAN BE USED IN LIEU OF THIS LAYER.	AASHTO M145* A-1, A-2-4, A-3 OR AASHTO M43* 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* 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* 3, 357, 4, 467, 5, 56, 57	PLATE COMPACT OR ROLL TO ACHIEVE A FLAT SURFACE. ††

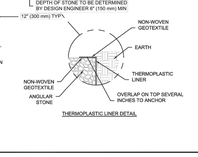
PLEASE NOTE:
1. THE LISTED AASHTO DESIGNATIONS ARE FOR GRADATIONS ONLY. THE STONE MUST ALSO BE CLEAN, CRUSHED, ANGULAR. FOR EXAMPLE, A SPECIFICATION FOR #4 STONE WOULD STATE: "CLEAN, CRUSHED, ANGULAR NO. 4 (AASHTO M43) STONE".
2. STORMTECH COMPACTION REQUIREMENTS ARE MET FOR 'A' LOCATION MATERIALS WHEN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

†† LAYER OF ADS GEOSYNTHETICS NON-WOVEN GEOTEXTILE ALL AROUND CLEAN, CRUSHED, ANGULAR STONE IN A & B LAYERS, BOTH SIDES OF THERMOPLASTIC LINER. SEE STORMTECH'S TECH SHEET #2 FOR NON-WOVEN WEIGHT RECOMMENDATIONS



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.



THERMOPLASTIC LINER DETAIL

1871 MERIVALE OTTAWA, ON — DATE: 04-23-15 — DRAWN: GM — CHECKED: KP — PROJECT # 97833

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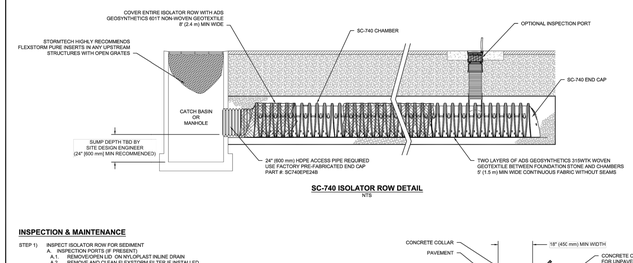
ADS 1765 FRANKLIN BLVD BRAMPTON, ON L6T 4Z1 1-800-723-7473

SHEET 3 OF 5



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.

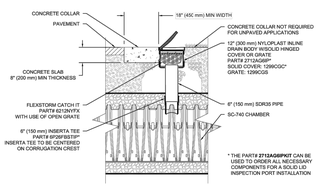
STEP 2) CLEAN OUT ISOLATOR ROW USING THE JETVAC PROCESS
- A. A FIXED CULVERT CLEANING NOZZLE WITH REAR FACING SPREAD OF 45" (1.1 m) OR MORE IS PREFERRED
- B. APPLY MULTIPLE PASSES OF JETVAC UNTIL BACKFLUSH WATER IS CLEAN
- C. VACUUM STRUCTURE SUMP AS REQUIRED

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.



SC-740 6" INSPECTION PORT DETAIL

NTS

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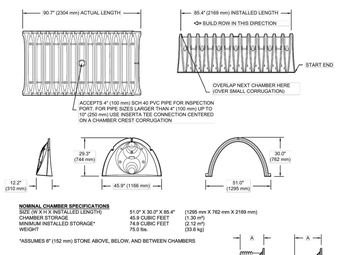
ADS 1765 FRANKLIN BLVD BRAMPTON, ON L6T 4Z1 1-800-723-7473

SHEET 4 OF 5

SC-740 TECHNICAL SPECIFICATION

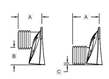
NTS



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	75.8 lbs.	(33.8 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)	16.9" (410 mm)	0.9" (13 mm)
SC740EPE06B / SC740EPE06BPC			16.9" (419 mm)	0.9" (13 mm)
SC740EPE08T / SC740EPE08TPC	8" (200 mm)	12.2" (310 mm)		0.6" (15 mm)
SC740EPE08B / SC740EPE08BPC			14.3" (368 mm)	—
SC740EPE10T / SC740EPE10TPC	10" (250 mm)	13.4" (340 mm)		0.7" (18 mm)
SC740EPE10B / SC740EPE10BPC			12.5" (318 mm)	—
SC740EPE12T / SC740EPE12TPC	12" (300 mm)	14.7" (373 mm)		1.2" (30 mm)
SC740EPE12B / SC740EPE12BPC			9.0" (229 mm)	—
SC740EPE15T / SC740EPE15TPC	15" (375 mm)	18.4" (467 mm)		1.3" (33 mm)
SC740EPE15B / SC740EPE15BPC			5.0" (127 mm)	—
SC740EPE18T / SC740EPE18TPC	18" (450 mm)	19.7" (500 mm)		1.6" (41 mm)
SC740EPE18B / SC740EPE18BPC			—	0.7" (18 mm)
SC740EPE24B*	24" (600 mm)	18.0" (470 mm)	—	0.7" (18 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: 04-23-15 — DRAWN: GM — CHECKED: KP — PROJECT # 97833

REV | DATE | DWN | CHK | DESCRIPTION: 01 | 06-29-17 | BJ | KP | REVISED PER CITY COMMENTS; 02 | 08-30-17 | BJ | KP | REVISED PER CITY COMMENTS; 03 | 10-26-17 | BJ | KP | REVISED PER CITY COMMENTS; 04 | 06-11-18 | BJ | KP | REVISED PER CITY COMMENTS; 05 | 11-08-18 | BJ | KP | REVISED PER ENGINEER

StormTech — 4640 TRUEMAN BLVD HILLIARD, OH 43026 — 1-800-733-7473 — STORMTECH HAS NOT VERIFIED THE ACCURACY OF THE INFORMATION PROVIDED ON THIS DRAWING AND MAKES NO REPRESENTATIONS OR WARRANTIES REGARDING THE ACCURACY OF THE INFORMATION PROVIDED ON THIS DRAWING. THE CUSTOMER SHALL INDEMNIFY AND HOLD STORMTECH HARMLESS FROM ANY DAMAGES, LIABILITIES OR COSTS ARISING FROM THE USE OF THE INFORMATION PROVIDED ON THIS DRAWING. THIS DRAWING MAY NOT BE REPRODUCED IN WHOLE OR IN PART WITHOUT THE WRITTEN PERMISSION OF STORMTECH.

ADS 1765 FRANKLIN BLVD BRAMPTON, ON L6T 4Z1 1-800-723-7473

SHEET 5 OF 5

USE AND INTERPRETATION OF DRAWINGS

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

BY USE OF THE DRAWINGS FOR CONSTRUCTION OF THE PROJECT, THE OWNER CONFIRMS THAT HE HAS REVIEWED AND APPROVED THE DRAWINGS.

APPENDIX H

Jamie Avenue As-Built Drawings

No.	Revisions	By	Date

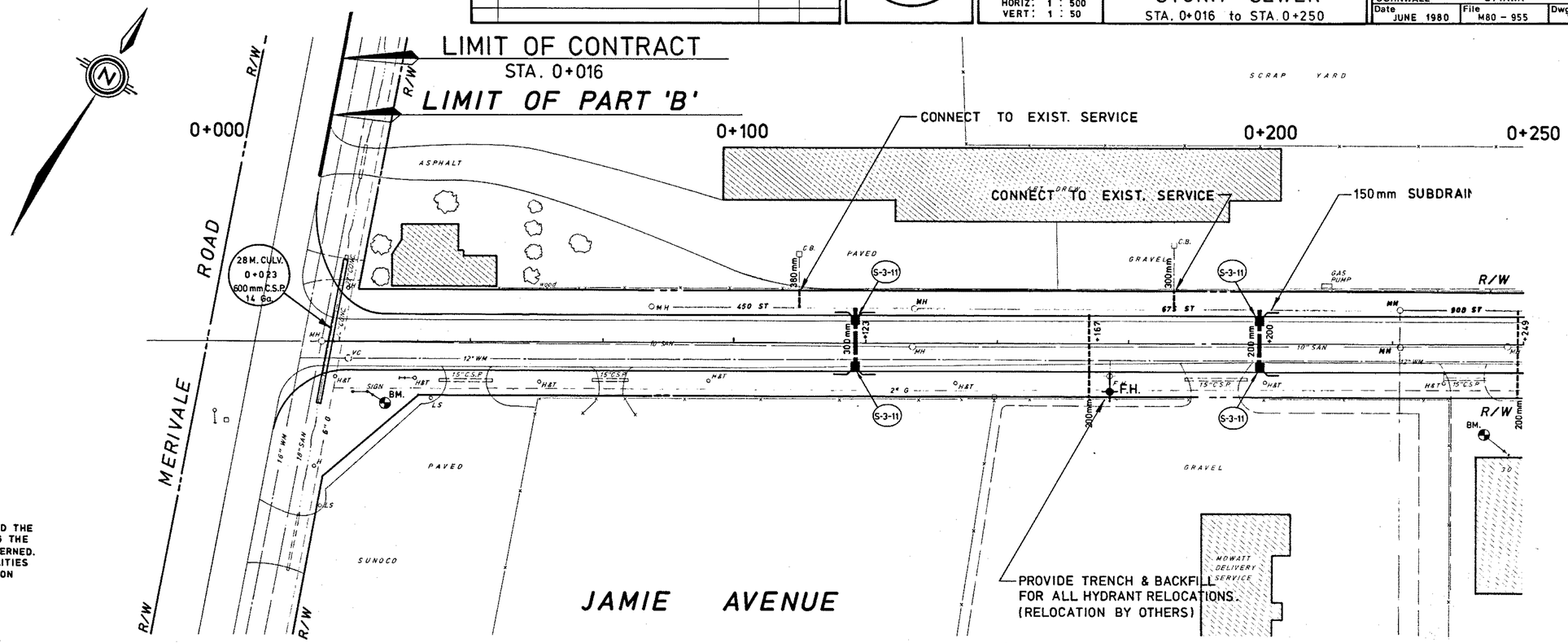
REGISTERED PROFESSIONAL ENGINEER — W.M. HARDING — PROVINCE OF ONTARIO

Des. W.M.H.	Chkd. L.D.S.	Project: BENTLEY, JAMIE & GIFFORD ROAD RECONSTRUCTION
Dwn. D.K.L.	Chkd. W.M.H.	Dwg. Title: JAMIE AVENUE STORM SEWER STA. 0+016 to STA. 0+250
Scale HORIZ: 1 : 500 VERT: 1 : 50		

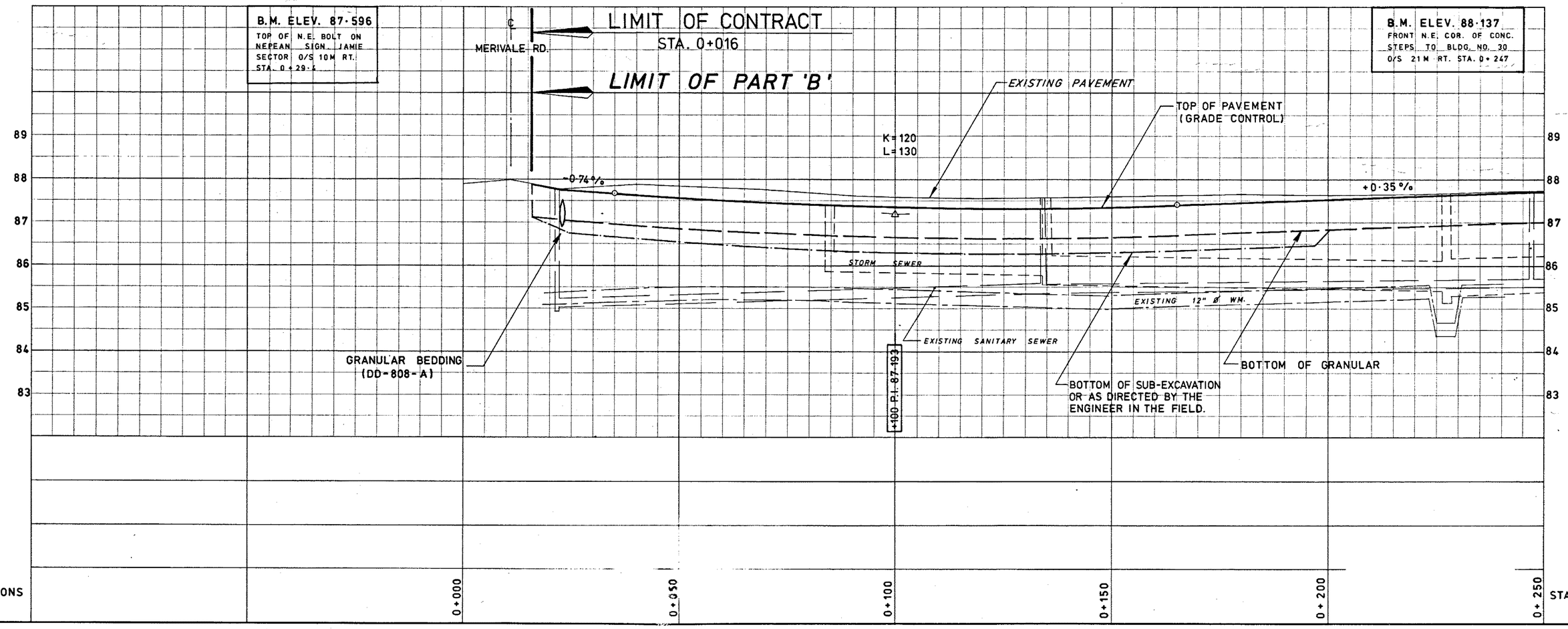
CITY OF NEPEAN

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

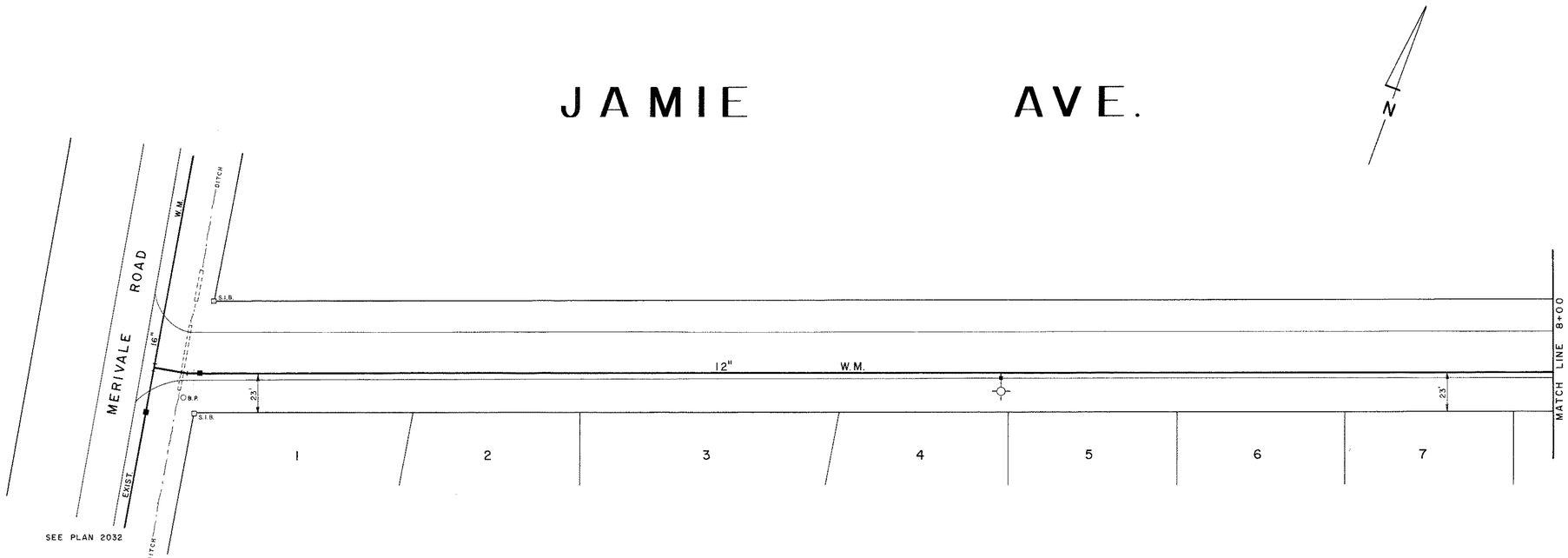
Date	File	Dwg.
JUNE 1980	M80 – 955	12 of 25

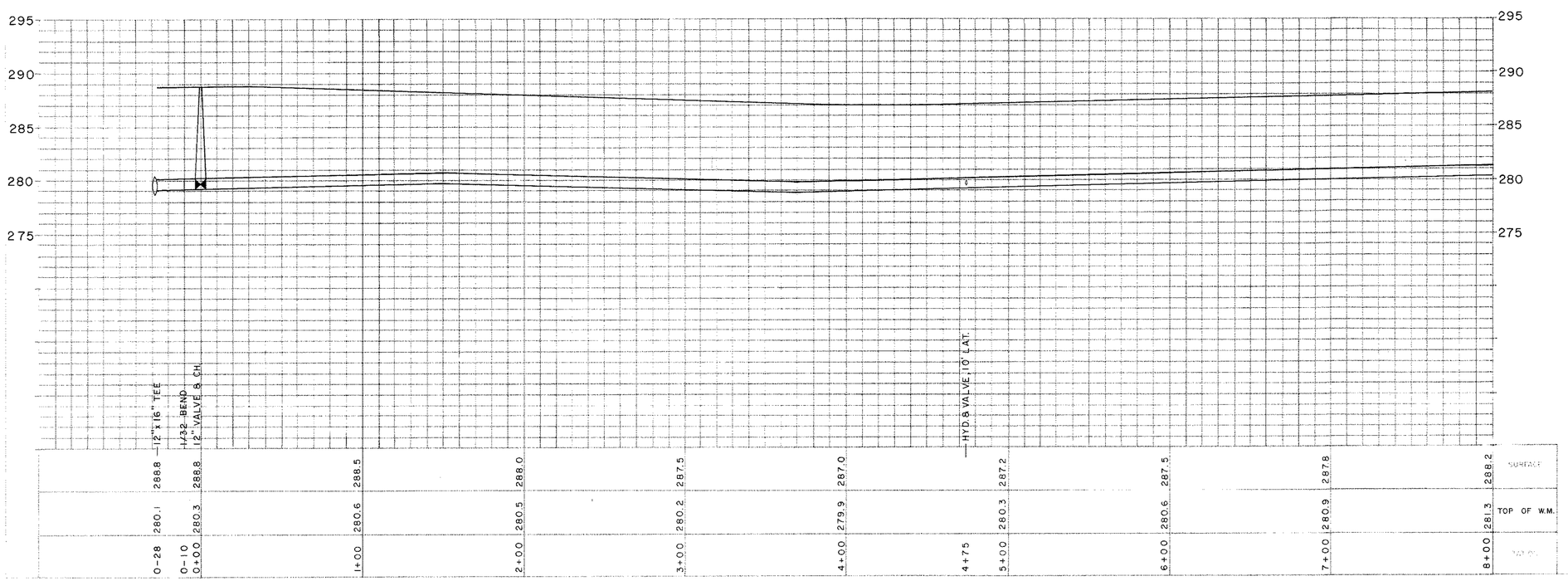


NOTE
THE LOCATION OF UTILITIES IS APPROXIMATE ONLY, AND THE EXACT LOCATION SHOULD BE DETERMINED BY CONSULTING THE MUNICIPAL AUTHORITIES AND UTILITY COMPANIES CONCERNED. THE CONTRACTOR SHALL PROVE THE LOCATION OF UTILITIES AND SHALL BE RESPONSIBLE FOR ADEQUATE PROTECTION FROM DAMAGE DURING CONSTRUCTION.



JAMIE AVE.





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

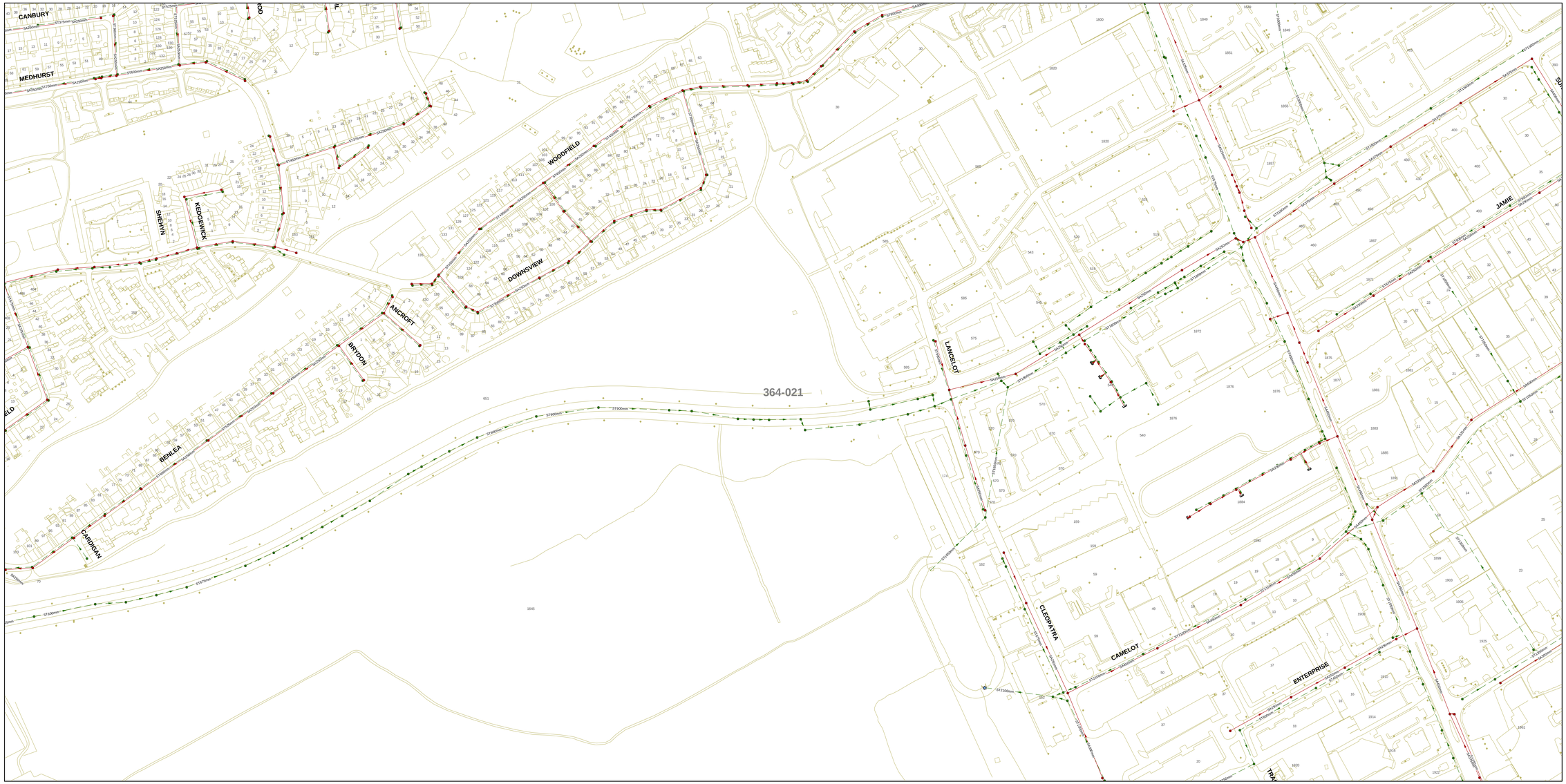
REGIONAL MUNICIPALITY OF OTTAWA-CARLETON
WORKS DEPARTMENT

12" WATER MAIN

JAMIE AVENUE

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

		M. J. W.	
W. L. KEAY	P. E. ABBO	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.

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

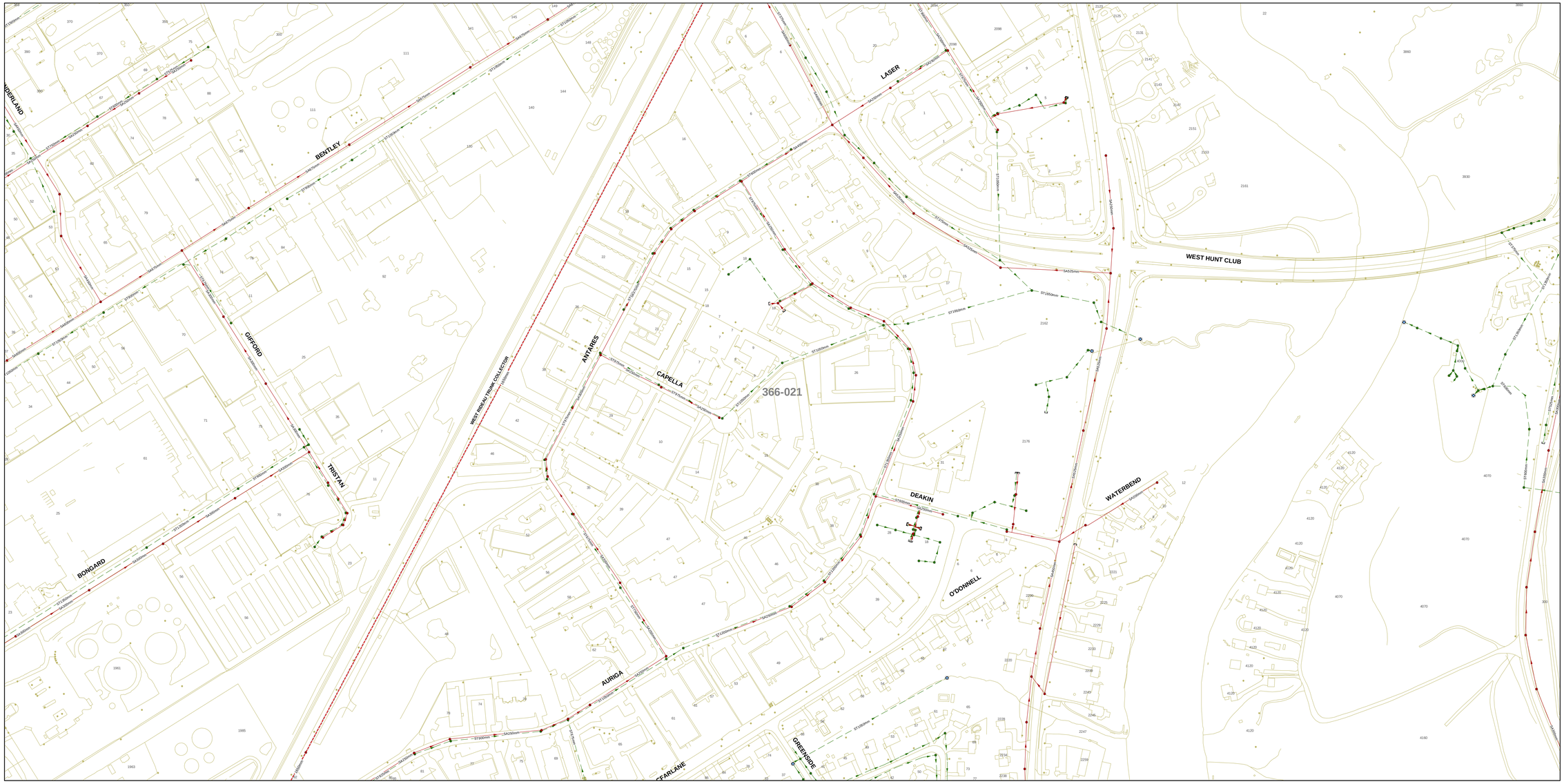
PIPE EQUIVALENTS

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
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0 25 50 100 150 200 250 Meters

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Ottawa ©

Legend

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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:

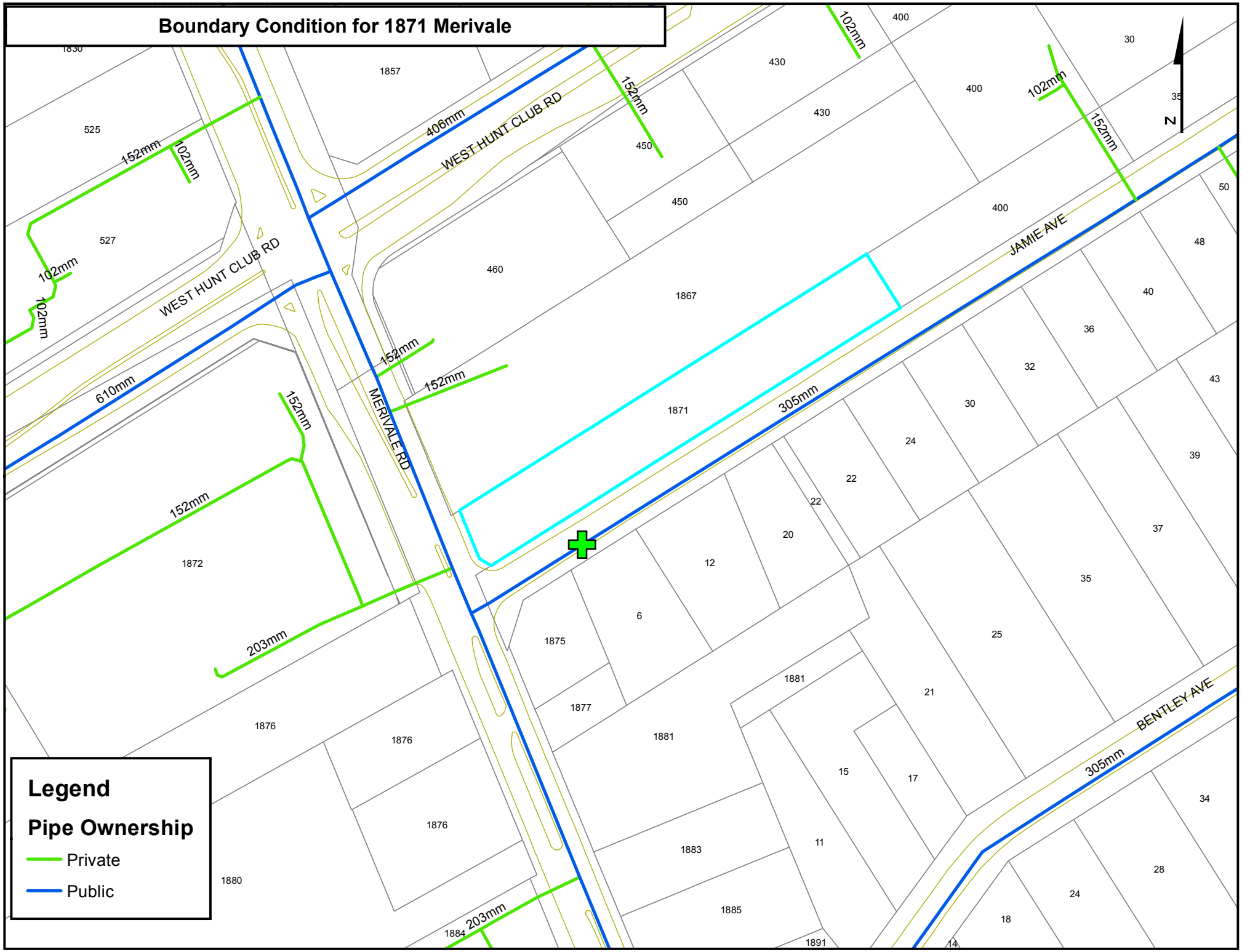
The following are boundary conditions, HGL, for hydraulic analysis at 1871 Merivale (Pressure Zone 2W) assumed to be connected to the 305mm on Jamie Ave.:

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



APPENDIX J

RVCA Correspondence

Guillaume Courtois

From: Eric Lalande <eric.lalande@rvca.ca>
Sent: July-16-18 10:58 AM
To: Guillaume Courtois
Subject: RE: 130828 - Benson, 1871 Merivale Road, Nepean, ON --- RVCA Requirements

Follow Up Flag: Follow up
Flag Status: Flagged

Hi Guillaume,

The RVCA requires an enhanced level of protection (80% TSS removal) for development, prior to outletting to a watercourse. It would appear that the site at 1871 Merivale, outlets to a stormwater facility which provides quality control. As such, no on-site quality controls are required from the RVCA. I would note that the pond was cleaned out in 1998, I am curious when the most recent maintenance was performed. (If you could get that from the City to include in your report, that would be helpful.)

Thank you,

Eric Lalande, MCIP, RPP
Planner, Rideau Valley Conservation Authority
613-692-3571 x1137

From: Jamie Batchelor
Sent: Monday, July 16, 2018 10:41 AM
To: 'Guillaume Courtois' <gcourtois@lrl.ca>
Cc: Eric Lalande <eric.lalande@rvca.ca>
Subject: RE: 130828 - Benson, 1871 Merivale Road, Nepean, ON --- RVCA Requirements

Good Morning Guillaume,

I have forded your request to Eric Lalande who would be the RVCA Planner for this area.

From: Guillaume Courtois [mailto:gcourtois@lrl.ca]
Sent: Monday, July 16, 2018 10:13 AM
To: Jamie Batchelor <jamie.batchelor@rvca.ca>
Subject: 130828 - Benson, 1871 Merivale Road, Nepean, ON --- RVCA Requirements

Hi Jamie,

My name is Guillaume Courtois. I'm the Civil Designer for the proposed Benson project located at 1871 Merivale Road, Nepean, ON. We have received correspondence from the City of Ottawa stating we are to contact the RVCA regarding water quality treatment for the subject site. Would you be able to inform me of the RVCA requirements for this project? Please use the following link for access to our latest project documents for your use:

https://lrl.sharefile.com/d-s6b45783e7874f63a

If you require anything further, or if I should be contacting someone else, please let me know.

Best regards,

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

LRL Associates Ltd.
5430 Canotek Road
Ottawa, Ontario K1J 9G2
Tel: (613) 842-3434 or (877) 632-5664 ext. 221
Fax: (613) 842-4338
Email: gcourtois@lrl.ca
Website: www.LRL.ca