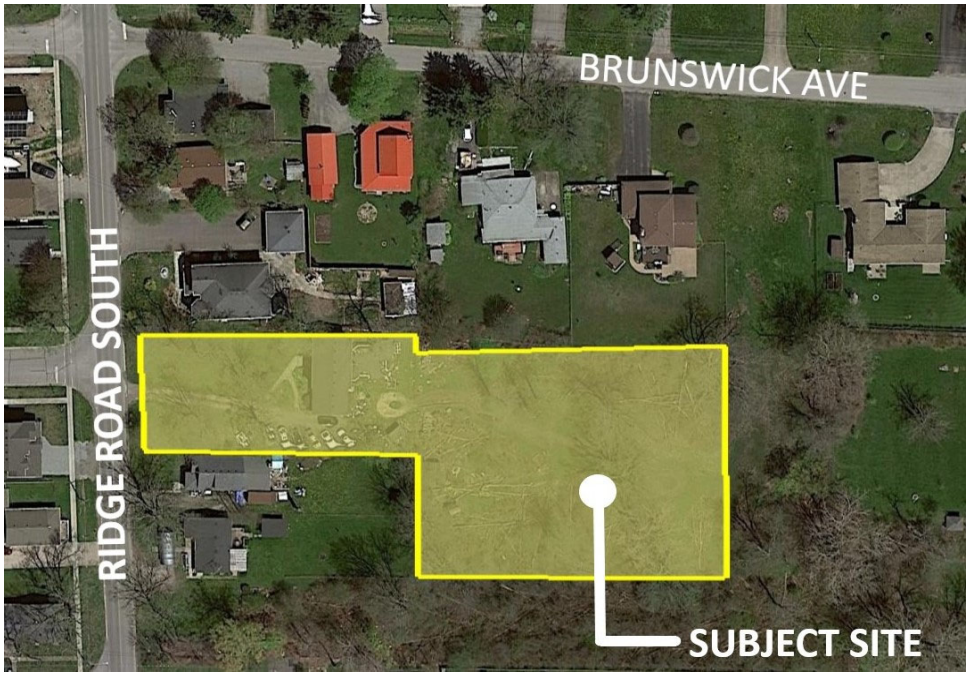
272 RIDGE ROAD SOUTH, FORT ERIE, ON

FUNCTIONAL SERVICING & STORMWATER MANAGEMENT REPORT

OCTOBER 2022

CLIENT: **5038257 ONTARIO INC.**
(c/o CRAIG DEVRIES)

MUNICIPALITY: **TOWN OF FORT ERIE**



ARIK ENGINEERING LTD.
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PROJECT # 22127

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FUNCTIONAL SERVICING & STORMWATER MANAGEMENT REPORT

272 RIDGE ROAD SOUTH

FORT ERIE, ON

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1.0 INTRODUCTION

1.1. STUDY OBJECTIVE

ARIK Engineering Ltd., has been retained by **5038257 Ontario Inc. (c/o Craig DeVries)** to prepare a functional servicing and stormwater management report for the proposed development at 272 Ridge Road South, Fort Erie, Ontario. The proposed development is located at east side of Ridge Road South. The development is bounded by Ridge Road South to the west, existing residential area to the north, south and east. There is an existing building located at the subject property which will need to be demolished. The proposed development comprises of approximately area of 0.54 ha.

An illustration of the project location is presented in key plan **Exhibit 1**.

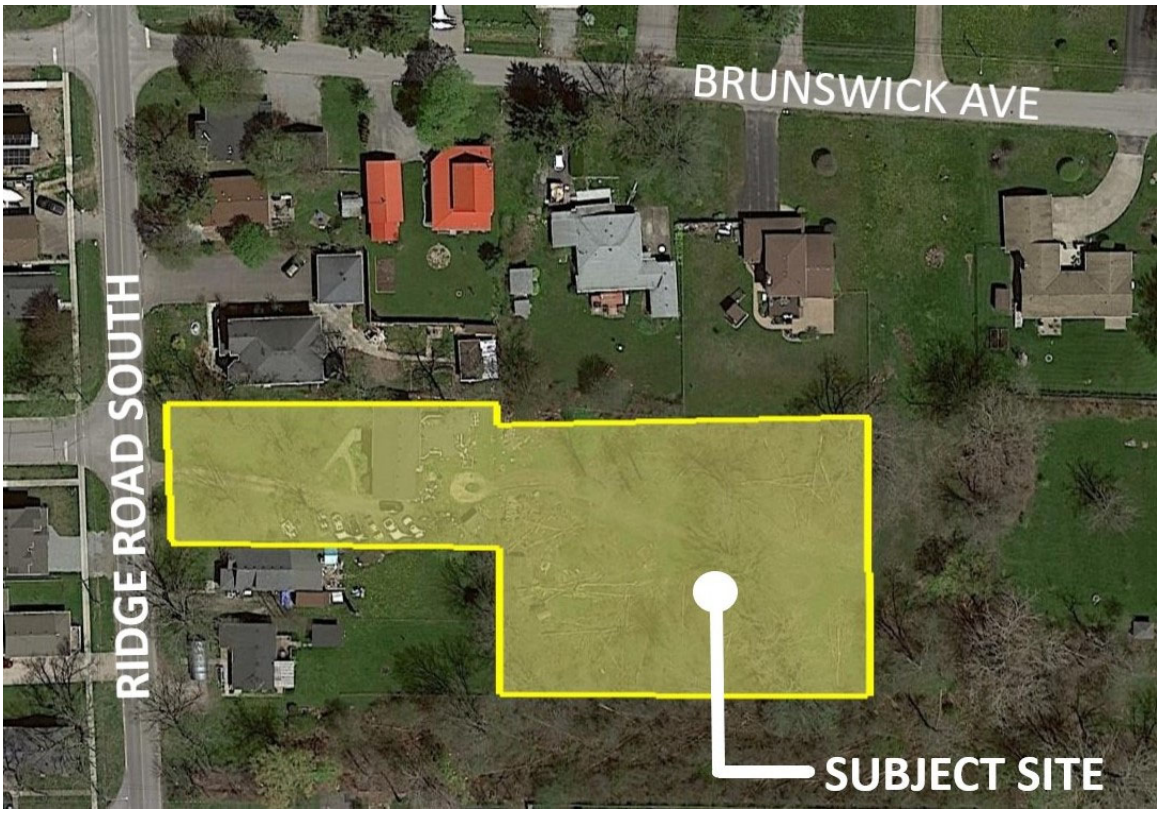


Exhibit 1: Key Plan

The objective of this report is to prepare a functional site servicing and grading design for the subject development based on existing municipal sanitary, storm sewers and watermains.

The report will also describe stormwater management servicing concept related to stormwater quantity and quality in accordance with the current drainage and stormwater management policies and design criteria established by the Town of Fort Erie.

Figure A1 represents the proposed site plan for the subject lands in **Appendix A** for reference.

1.2. EXISTING TOPOGRAPHY AND DRAINAGE PATTERN

The subject property generally drains towards the mid-south portion of the property. The existing topography varies from a high elevation of approximately 181.3m along the northwest and northeast corners of the property to a low elevation of 180.2m along the mid-south portion of the property corner. There is an existing building is located at the west part of the property which is fronting on Ridge Road South. **Figure A2** represents the existing topography in **Appendix A**.

1.3. PROPOSED SITE PLAN DEVELOPMENT

The development will include construction of 18 townhouse units and associated visitor parking area. The site plan of the proposed development is attached in the **Appendix A** for reference.

2.0 DESIGN OF PRIVATE SANITARY, WATER AND STORM SERVICES

The Proposed development is located in the Town of Fort Erie and it is bounded by existing municipal roads which contain municipal sanitary sewers, storm sewers and watermains which can be utilized to servicing the subject lands. The design criteria used in this functional servicing report are based on the Town of Fort Erie current design and construction standards.

Existing municipal sewers and watermain on Ridge Road South will be able to service the proposed development. There is an existing 200mm sanitary sewer available on Ridge Road South will be able to service the proposed development.

There is an existing 1200mm municipal storm sewer available on Ridge Road South which drains from north to south. The existing 1200mm storm sewer on Ridge Road South may not have adequate capacity to accommodate uncontrolled post-development flows, therefore, onsite stormwater management storage will need to be provided and the post-development outflows from the site will have to match with the pre-development flow conditions.

An existing 150mm municipal watermain is available on Ridge Road South which can be utilized for water servicing of the subject development.

2.1. SANITARY SERVICES

Sanitary service for the subject site will be provided through the existing municipal sanitary sewer available on Ridge Road South. A profile drawing (refer to drawing # ISE-15T-MATA13 5 of 8 and 6 of 8) in **Appendix B** for reference) shows that there is an existing 200mm sanitary sewer is located along Ridge Road South. It is our understanding from the town as-built drawing that the site is currently being sanitary serviced from the existing 200mm sanitary sewer on Ridge Road South. The size of the existing sanitary service for the existing house is unknow.

The town staff has recommended to complete the third-party sanitary modeling analysis to confirm the available capacity of the existing 200mm sanitary sewer on Ridge Road South with respect to the proposed development. A 200mm PVC sanitary service has been proposed from the existing 200mm municipal sanitary sewer on Ridge Road South to service the subject development. **DWG 2** in **Appendix C** represents the proposed sanitary service connection for the proposed development. **Table C-2** represents the approximate sanitary flow generated from the subject development.

2.2. WATER SERVICES

An existing 150mm municipal watermain is available on Ridge Road South. A profile drawing (refer to drawing # ISE-15T-MATA13 5 of 8 and 6 of 8) in **Appendix B** for reference) shows that the site is currently water serviced which will needs to be abandoned as part of the proposed development. A new 150mm PVC water service has been proposed from the existing 150mm municipal watermain on Ridge Road South to service the subject development. **DWG 2** in **Appendix C** represents the water service connection for the proposed development.

Hydrant flow test is recommended for the hydrants on Ridge Road South prior to approval to know the available domestic and fire flow in the vicinity of the development.

2.3. STORMWATER MANAGEMENT ANALYSIS AND DESIGN

As mentioned earlier, the existing municipal storm sewer on Ridge Road South will be able to provide storm servicing for the site. The stormwater management quantity control for the proposed development will be managed by providing underground storage chambers.

Stormwater quality will be managed by providing oil and grit separator (OGS) upstream of the storage chamber. **DWG 2** represents the storm servicing and location of the onsite storage system; **DWG 3** shows the grading plan, **DWG 5** represents storm drainage area plan and **Table C-1** depicts the storm sewer analysis and design for the subject site in **Appendix C**.

2.3.1. RAINFALL DATA & STORMWATER MODELING

The Chicago 3-hour storm has been used to determine the pre-development and post-development peak flows and onsite storage. Chicago storms are considered to a better estimate for the urban development peak flows. The stormwater management simulation was completed using SWMHYMO hydrologic model for 5 year and 100-year storm events in conformance with the Town of Fort Erie engineering standards. The model has been widely used in similar hydrologic analyses related to stormwater management across the province of Ontario and recognized as a reliable modelling tool available to simulate the hydrologic response to both rural and urban watershed under different storm events.

2.3.2. PRE-DEVELOPMENT CONDITIONS

Pre-development analysis was performed based on the existing topographic survey. The subject property generally drains from north to south towards the mid-south portion of the property. The allowable discharge rate for the site has been established based on pre-development conditions using CALIB NASHYD commend in SWMHYMO. **Figure D1** in **Appendix D** represents the pre-development drainage area boundary.

Table 1 represents a summary of hydrological parameters which has been utilized to develop the SWMHYMO model for the pre-development conditions.

Table 1: SWMHYMO MODEL INPUT PARAMETERS - PRE-DEVELOPMENT CONDITIONS

AREA ID	AREA (HA)	CN	INITIAL ABSTRACTION (IA) mm	TIME OF PEAK (TP) HRS
101	0.54	80	0.80	0.22

Using the **Table 1** pre-development input parameters, the SWMHYMO model was simulated for 5 and 100-year design storm events. A summary of the pre-development peak flows is depicted in **Table 2.** Refer to **Appendix D** for SWMHYMO model pre-development conditions output files.

Table 2: PEAK FLOWS (cms) - PRE-DEVELOPMENT CONDITIONS 3HOUR CHICAGO STORM

AREA ID	AREA (HA)	5 YEAR FLOW (cms)	100 YEAR FLOW (cms)
101	0.54	0.024	0.055

2.3.3. POST-DEVELOPMENT CONDITIONS

Overall proposed preliminary site grading has been established based on the proposed site plan layout and existing topography to minimize the cut and fill for the entire site. Based on the existing topography, the entire site currently drains from north to south towards the mid-south portion of the property. Under the post-development conditions, the site has been proposed to drain towards the existing storm sewer on Ridge Road South at the allowable pre-development discharge rate during post-development conditions under 5-year and 100-year storm events. **Figure D2** represents the post-development drainage area plan in **Appendix D**.

Table 3 represents a summary of the hydrological model parameters which has been used in the assessment of post development peak flows.

Table 3: SWMHYMO MODEL INPUT PARAMETERS - POST-DEVELOPMENT CONDITIONS

AREA ID	AREA (HA)	CN	IMP (%)	LGI - Flow Length (m)	AVERAGE SLOPE (%)	IAPER (PERV.) (mm)	IAIMP (IMPERV.) (mm)	MNP (PERV.)	MNI (IMPERV.)
201	0.54	80	58	60	2.0	0.8	0.7	0.25	0.013

Using the **Table 3** post-development hydrological parameters, the SWMHYMO model was simulated for 5 and 100-year design storm events. A summary of the post-development peak flows is depicted in **Table 4.** Refer to **Appendix D** for SWMHYMO model post-development conditions output files.

Table 4: PEAK FLOWS (cms) - POST-DEVELOPMENT CONDITIONS 3HOUR CHICAGO STORM (UNCONTROLLED)

AREA ID	AREA (HA)	5 YEAR FLOW (cms)	100 YEAR FLOW (cms)
201	0.54	0.076	0.129
Total	**0.54**	**0.076**	**0.129**

2.3.4. STORMWATER QUANTITY CONTROL DESIGN

The proposed development will require onsite stormwater quantity control. The outflow rate of the site will be based on post-development outflow to match with pre-development conditions under 5-year and 100-year storm events. The onsite stormwater quantity control will be established by providing stormwater storage ADS underground chambers or equivalent which will detain storm runoff and control the post-development flows to pre-development conditions. The outlet of the proposed storage tank will be discharged to the existing 1200mm storm sewer on Ridge Road South.

Table 5 depicts the hydrologic simulation results of the proposed onsite stormwater storage system. **Appendix D** represents the SWMHYMO output files for the onsite stormwater quantity control.

Table 5: POST-DEVELOPMENT CONDITIONS 3HOUR CHICAGO STORM ONSITE STORMWATER MANAGEMENT QUANTITY CONTROL

Description	5 YEAR STORM EVENT	100 YEAR STORM EVENT
PRE-DEVELOPMENT PEAK FLOWS - ALLOWABLE DISCHARGE RATE FOR THE SITE (cms) (Area 101)	0.024	0.055
UNCONTROLLED POST-DEVELOPMENT PEAK FLOWS (cms) (Area 201)	0.076	0.129
OUTFLOW RATE BASED ON REQUIRED STORAGE (cms)	0.023	0.035
REQUIRED ONSITE STORAGE (m3)	52.0	112.0

It has been noted in **Table 5** that the controlled post-development peak flows during post-development conditions are less than pre-development conditions under 5 year and 100-year storm events. **Appendix D** represents SWMHYMO model output files.

The post-development outflow rate will be discharged through the proposed 133mm orifice in the 300mm storm sewer which will be connected to the existing 1200mm storm sewer on Ridge Road South. The ADS chamber or equivalent stormwater storage system with inlets and outlet will be provided in the parking area as shown on the site servicing plan in **Appendix C**. Orifice size calculations, stage, storage and discharge curves are presented in **Appendix D**. Design for the storage chamber system was completed by ADS Inc. and included in **Appendix E**.

2.3.5. STORMWATER QUALITY CONTROL DESIGN

Enhanced Level 1 water quality treatment has been proposed. Stormwater quality will be controlled by providing oil and grit separator (OGS) upstream of the storage system which will control the water quality for the first flush. Ministry of Environment, Conservation and Parks (MECP) Level 1 (Enhanced) water quality criteria has been used to design the required OGS.

Design for the OGS was completed by ADS Inc. and included in **Appendix E**.

3.0 EROSION AND SEDIMENT CONTROL MEASURES

Erosion and sedimentation control measures must be implemented onsite during pre-grading activities, construction of primary and secondary services. All erosion and sediment control measures shall follow the manual "Erosion & Sediment Control Guideline for Urban Construction – December 2006".

Design and implementation of an affective erosion control plan is very important for minimizing potential adverse environmental affects originating from onsite construction activities. Site specific erosion control measures can prevent erosion during construction to deal with sediments at the source and reduce the sediment transport from the construction site. Erosion control mitigation measures must be implemented through regular maintenance and monitoring specially after any storm event until the entire site has been constructed and all proposed/disturbed grass areas are stabilized.

Sediment transport during construction can be prevented by installation of sediment/silt control fence around the perimeter of the site. Sediment control fence consists of non-woven synthetic fabric material (geotextile) stretched across attached to the supporting post and wire fence. This measure significantly reduces the amount of sediment leaving the construction site and decrease the velocity of flow. Silt fence shall be installed as per OPSD – 219.130.

It is also required to provide storm drain inlet protection which consists of control the sediment entering into existing and proposed rear yard and street catch basins prior to the permanent stabilization of disturbed areas. Rear yard catch basins grate shall be covered by the filter cloth material with clear stone material whereas street catch basins will require to provide silt sack under the grate in the street catch basin.

It is recommended to lower the grade at the property approximately between 100mm and 150mm below the top of curb during pre-grading activity so that sediment leaving the site can be reduced. Vehicle tracking control/mud mats are also required to install at the entrance of construction site to prevent sediment transport from the construction site as per the erosion control guidelines.

DWG 4 in **Appendix C** represents erosion and sediment control plan.

4.0 CONCLUSION SUMMARY

Following are the conclusions for this functional servicing and stormwater management report:

1. There are adequate servicing infrastructures available to service the proposed development.

2. Proposed grading for the entire site has been designed with respect to existing grades all around the subject property and the proposed grades within the site have been set to minimize cut/fill in the proposed development.

3. Municipal sanitary sewers are available in the vicinity of the development and the proposed site will be serviced from the existing 200mm sanitary sewer available on Ridge Road South.

4. The existing 150mm municipal watermain is available on Ridge Road South which will be utilized for the domestic and fire flow requirements for the site. Hydrant flow test is recommended for the hydrants on Ridge Road South prior to approval to know the available domestic and fire flow in the vicinity of the development.

5. Onsite stormwater management quantity and quality controls are required for the subject development. Quantity control will require the post-development peak flows to match with pre-development peak flow conditions under 5-year and 100-year storm events. Onsite storage has been designed to maintained by providing underground storage system with an orifice control outlet discharge into the existing storm sewers on Ridge Road South. Stormwater quality will be maintained by providing OGS upstream of the storage system

6. Functional servicing and stormwater management design concepts presented in this report has been used as a basis for the detailed engineering design for the proposed development of the site.

7. Erosion and sedimentation control measures must be implemented onsite during pre-grading activities, construction of primary and secondary services to reduce the potential adverse environmental affects originating from onsite construction activities.

In conclusion, proposed sanitary, water and stormwater management servicing provided in this report are sufficient and in accordance with the Town of Fort Erie current development engineering design guidelines.

Respectfully Submitted By:

ARIK ENGINEERING LTD.

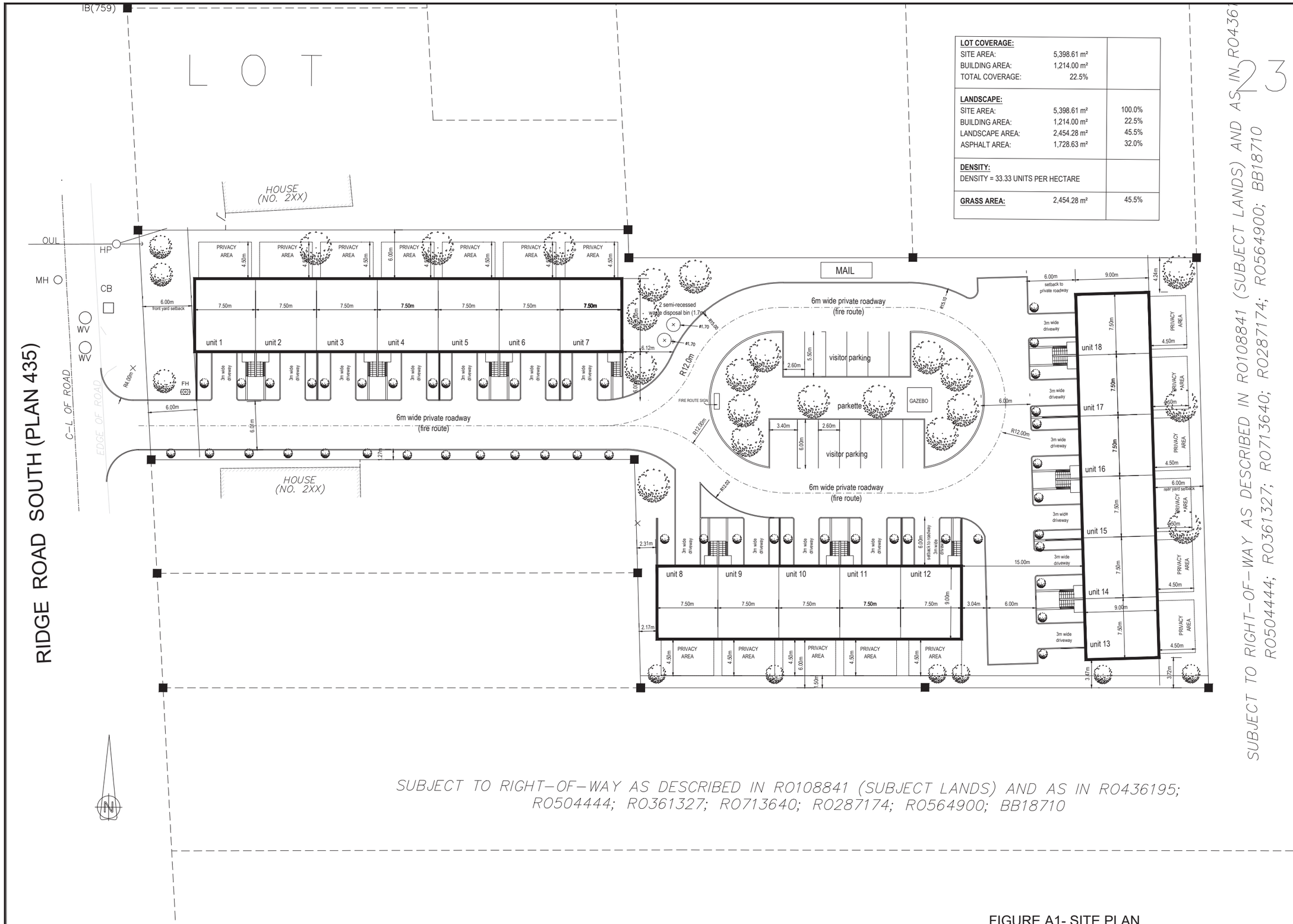
_____

Abdul Razzak, MEng., P.Eng.

APPENDIX A

Figure A1: Site Plan

Figure A2: Existing Topography



LOT COVERAGE:		
SITE AREA:	5,398.61 m²	
BUILDING AREA:	1,214.00 m²	
TOTAL COVERAGE:	22.5%	
LANDSCAPE:		
SITE AREA:	5,398.61 m²	100.0%
BUILDING AREA:	1,214.00 m²	22.5%
LANDSCAPE AREA:	2,454.28 m²	45.5%
ASPHALT AREA:	1,728.63 m²	32.0%
DENSITY:		
DENSITY = 33.33 UNITS PER HECTARE		
GRASS AREA:	2,454.28 m²	45.5%

FIGURE A1- SITE PLAN

NOTE:

GENERAL CONTRACTOR TO VERIFY ALL DIMENSIONS AND CONDITIONS AT THE PROJECT SITE.

ANY UNAUTHORIZED ALTERATION, PUBLICATION, COPYING OR USE OF THE DRAWING WITHOUT THE WRITTEN CONSENT FROM SIRLIN GILLER AND MALEK ARCHITECTS IS STRICTLY PROHIBITED AND SHALL BE DEEMED AN INFRINGEMENT UNDER THE COPYRIGHT ACT.

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DATE	NO.	DESCRIPTION	BY
08/30/2022	3	CLIENT REVIEW	SH
07/07/2022	2	CLIENT REVIEW	SH
05/13/2022	1	CLIENT REVIEW	DO

FINAL DATE ABOVE SUPERSEDES ALL PREVIOUS ISSUES

REVISIONS

KEY TO DETAIL LOCATION

DETAIL NOTATION
DRAWING NUMBER

CONTRACTOR MUST CHECK AND VERIFY ALL DIMENSIONS AND CONDITIONS ON THE JOB AND REPORT ANY DISCREPANCIES TO THE ARCHITECTS BEFORE PROCEEDING WITH THE WORK

DRAWINGS ARE NOT TO BE SCALED.

SG&M Architects
193 Roe Avenue
Toronto, ON M5M 2J1
Tel: (416) 781-6125
www.sgm-arch.com

NORTH

THE CANADIAN BLOCK TOWNHOMES DEVLEOPMENT
272 RIDGE ROAD, FORT ERIE, ON

SCALE	1:200
DRAWN	DO
CHECKED	LM
DATE	2022-05-13
PROJ. NO.	2021-52

A1-1
DRAWING NO.

ASSOCIATION OF ONTARIO LAND SURVEYORS
PLAN SUBMISSION FORM
2184385

THIS PLAN IS NOT VALID UNLESS IT IS AN EMBOSSED ORIGINAL COPY ISSUED BY THE SURVEYOR In accordance with Regulation 1026, Section 29(3).

PLAN OF SURVEY SHOWING TOPOGRAPHICAL INFORMATION

PART OF LOT 23
BROKEN FRONT CONCESSION LAKE ERIE
GEOGRAPHIC TOWNSHIP OF BERTIE
TOWN OF FORT ERIE
REGIONAL MUNICIPALITY OF NIAGARA

0 10 20 30 40 50 m

SCALE 1 : 500

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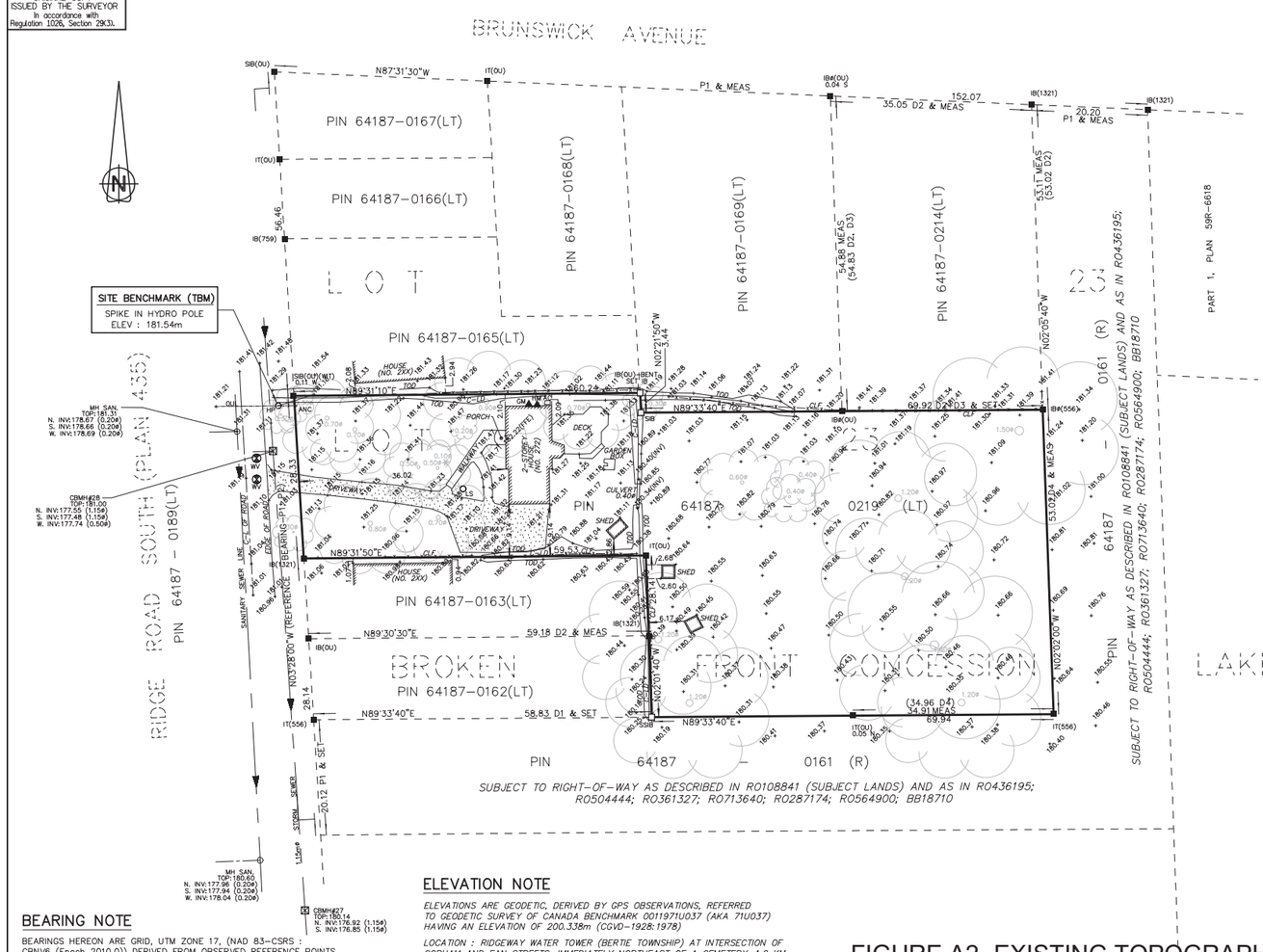

SUBJECT TO RIGHT–OF–WAY AS DESCRIBED IN RO108841 (SUBJECT LANDS) AND AS IN RO436195; RO504444; RO361327; RO713640; RO287174; RO564900; BB18710

LEGEND

—□—	DENOTES	SURVEY MONUMENT PLANTED
—■—	DENOTES	SURVEY MONUMENT FOUND
SIB	DENOTES	STANDARD IRON BAR (25mmX25mmX120cm)
SSIB	DENOTES	SHORT STANDARD IRON BAR (25mmX25mmX60cm)
IB	DENOTES	IRON BAR (15mmX15mmX60cm)
IB⊕	DENOTES	ROUND IRON BAR (20mm DIA X 60cm)
IP	DENOTES	IRON PIPE
WIT	DENOTES	WITNESS
OU	DENOTES	ORIGIN UNKNOWN
PIN	DENOTES	PROPERTY IDENTIFIER NUMBER
(556)	DENOTES	M. T. GRAY, OLS
(759)	DENOTES	C. J. CLARKE, OLS
(1321)	DENOTES	RASCH & HYDE LTD., OLS
P1	DENOTES	SURVEYOR'S REAL PROPERTY REPORT BY RASCH & HYDE LTD., DATED AUGUST 6, 2010 (FILE:10FO30)
P2	DENOTES	SURVEYOR'S REAL PROPERTY REPORT BY RASCH & CHAMBERS LTD., DATED NOVEMBER 20, 1992 (FILE:92F104; J-405)
D1	DENOTES	INSTR. RO504440; PIN 64187-0162(LT)
D2	DENOTES	INSTR. RO361327; PIN 64187-0214(LT)
D3	DENOTES	INSTR. RO501223; PIN 64187-0169(LT)
D4	DENOTES	INSTR. RO108841; PIN 64187-0219(LT)
C–L	DENOTES	CENTRELINE
HP	DENOTES	HYDRO/UTILITY POLE
OUL	DENOTES	OVERHEAD UTILITY/HYDRO LINE
ANC	DENOTES	GUY ANCHOR
HM	DENOTES	HYDRO METER
AC	DENOTES	AIR CONDITIONER
GM	DENOTES	GAS METER
MH	DENOTES	MANHOLE
WV	DENOTES	WATER VALVE
CB	DENOTES	CATCH BASIN
(INV)	DENOTES	INVERT OF CULVERT
ø	DENOTES	DIAMETER
	DENOTES	CONIFEROUS TREE (TREE CANOPY NOT TO SCALE)
	DENOTES	DECIDUOUS TREE (TREE CANOPY NOT TO SCALE)
+100.00	DENOTES	EXISTING GROUND ELEVATION
TOD	DENOTES	TOP OF DITCH
C–LD	DENOTES	CENTRELINE OF DITCH
CLF	DENOTES	CHAIN LINK FENCE

N–NORTH; S–SOUTH; W–WEST; E–EAST

BEARING NOTE

BEARINGS HEREON ARE GRID, UTM ZONE 17, (NAD 83–CSRS : CBNV6 (Epoch 2010.0)) DERIVED FROM OBSERVED REFERENCE POINTS (ORPs) USING THE CAN–NET VRS NETWORK AND ARE REFERRED TO THE CENTRAL MERIDIAN OF UTM ZONE 17 (81° WEST LONGITUDE)

ROTATION NOTE

FOR THE PURPOSES OF COMPARISON THE ASTRONOMIC BEARINGS ON P1 AND P2 HAVE BEEN ROTATED 2°27'20" COUNTER–CLOCKWISE

ELEVATION NOTE

ELEVATIONS ARE GEODETIC, DERIVED BY GPS OBSERVATIONS, REFERRED TO GEODETIC SURVEY OF CANADA BENCHMARK 0011971U037 (AKA 71U037) HAVING AN ELEVATION OF 200.338m (CGVD–1928:1978)

LOCATION : RIDGEWAY WATER TOWER (BERTIE TOWNSHIP) AT INTERSECTION OF GORHAM AND FAN STREETS, IMMEDIATELY NORTHEAST OF A CEMETERY, 1.2 KM SOUTHWEST OF POST OFFICE, TABLET IN TOP OF CONCRETE BASE, 30.5 m SOUTHWEST OF ENTRANCE GATE TO CEMETERY, 19.5 m FROM CENTRE LINE OF GORHAM STREET, 4.87 m FROM EAST EDGE OF BASE 1.82 m NORTH OF LADDER TO TOP OF TOWER.

ALL FUTURE GRADE WORK ON SITE TO BE BASED ON SITE BENCHMARK. ANY ELEVATION DISCREPANCIES TO BE REPORTED TO RASCH & HYDE LTD.

METRIC NOTE

DISTANCES AND ELEVATIONS SHOWN ON THIS PLAN ARE IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048

SURVEYOR'S CERTIFICATE

I CERTIFY THAT :

1. THIS SURVEY AND PLAN ARE CORRECT AND IN ACCORDANCE WITH THE SURVEYS ACT, AND THE SURVEYORS ACT AND THE REGULATIONS MADE UNDER THEM.
2. THIS SURVEY WAS COMPLETED ON THE 8th DAY OF APRIL 2022.

SEPTEMBER 14, 2022
DATE

HAROLD D. HYDE
ONTARIO LAND SURVEYOR

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FIGURE A2- EXISTING TOPOGRAPHY

RASCH + HYDE LTD.
Ontario Land Surveyors

P.O. Box 6, 1333 Highway #3 East, Unit B
DUNNVILLE, ONT, N1A 2X1
905–774–7188
(FAX 905–774–4000)

P.O. Box 550, 74 Jarvis Street
FORT ERIE, ONT, L2A 5Y1
905–871–9757
(FAX 905–871–9748)

HAROLD D. HYDE O.L.S.

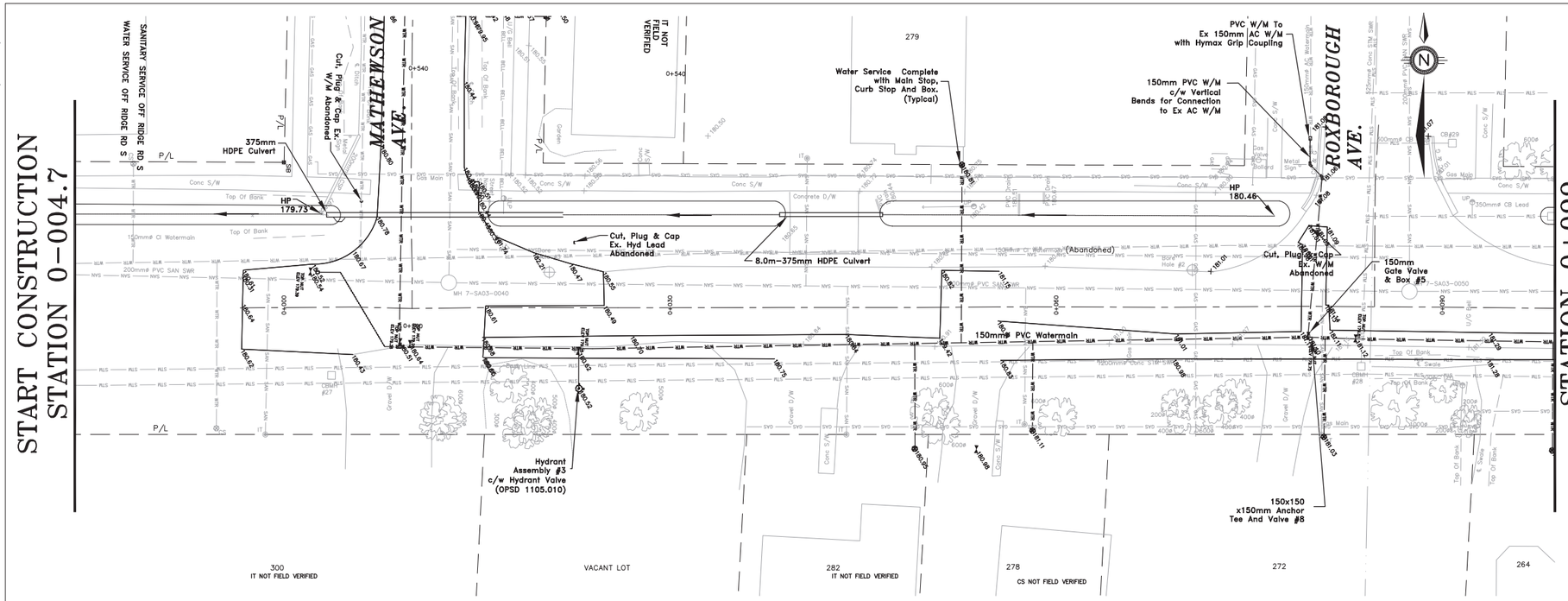
SCALE 1 : 500	SURVEY : 21F149	DRWN BY : J.H.

APPENDIX B

As-Built/Existing Drawings

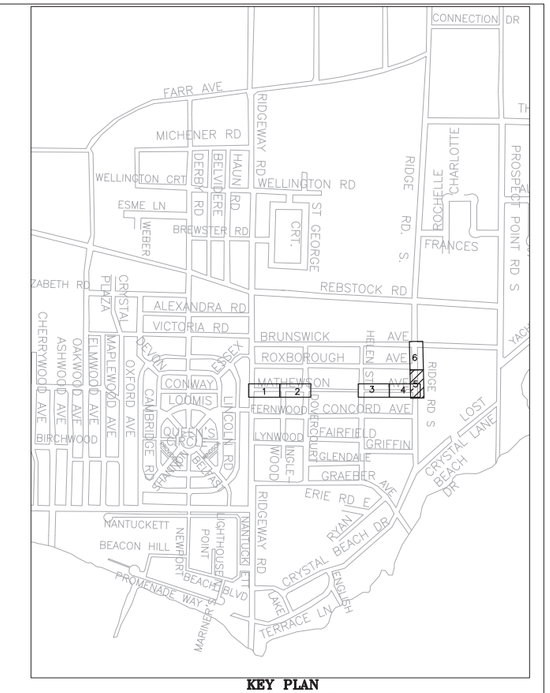
Checked by Bell — July 30, 2014
Checked by Eskridge — July 30, 2014
Checked by Lee — July 30, 2014
Checked by Cole — July 30, 2014

START CONSTRUCTION
STATION 0+004.7

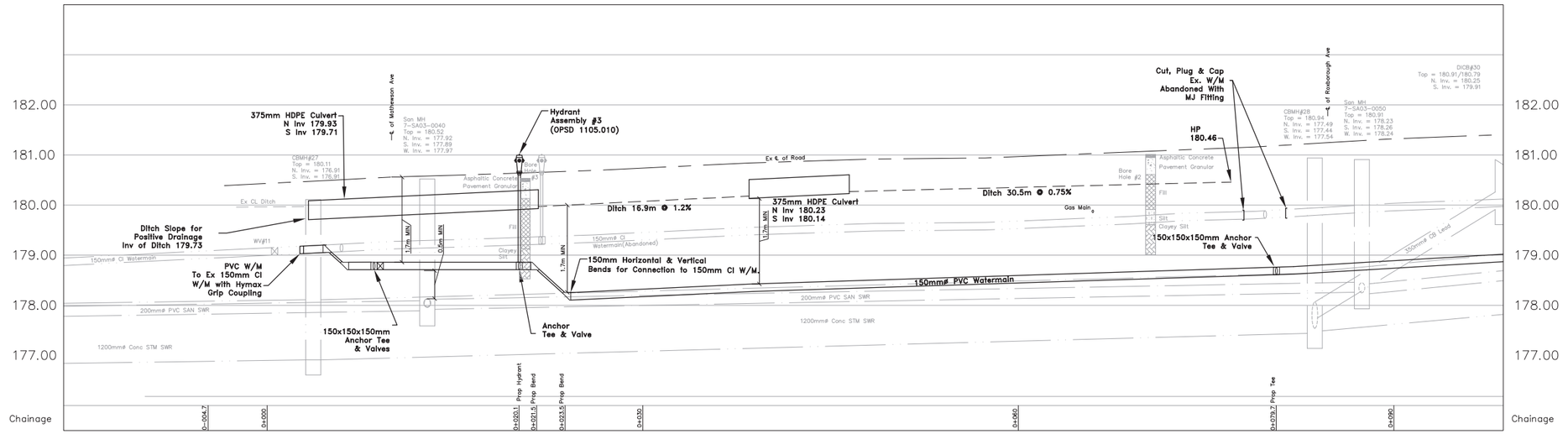


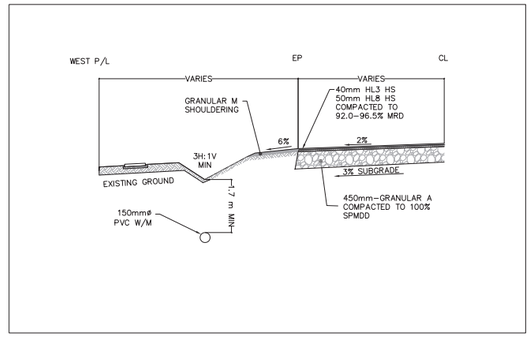
STATION 0+099
SEE SHEET 6 OF 7

RIDGE RD S



KEY PLAN
NOT TO SCALE





LEGEND

EXISTING

- Watermain
- Water Valve
- Fire Hydrant
- Curb Stop

PROPOSED

- Watermain
- Watermain
- Water Valve
- Fire Hydrant
- Curb Stop
- Cap
- Sample Station
- Shoulder

REV.	ISSUE	DATE	BY
6	ISSUE FOR AS BUILT	OCT 22 -2015	GR
5	ISSUE FOR CONSTRUCTION	MAY 11 -2015	SLB
4	ISSUE FOR TENDER	MAR 17-2015	SLB
3	ISSUE FOR REVIEW	MAR 13-2015	SLB
2	ISSUE FOR REVIEW	NOV 12-2014	LJS
1	ISSUE FOR REVIEW	JULY 29-2014	LJS

BENCH MARK

SANITARY MANHOLE #7-SA06-0060
LOCATED ON THE EAST SIDE OF RIDGEWAY RD. ADJACENT TO MATHEWSON AVE..
ELEVATION = 180.600m

LICENSED PROFESSIONAL ENGINEER
G. STOJANOVIC
100083722
PROVINCE OF ONTARIO

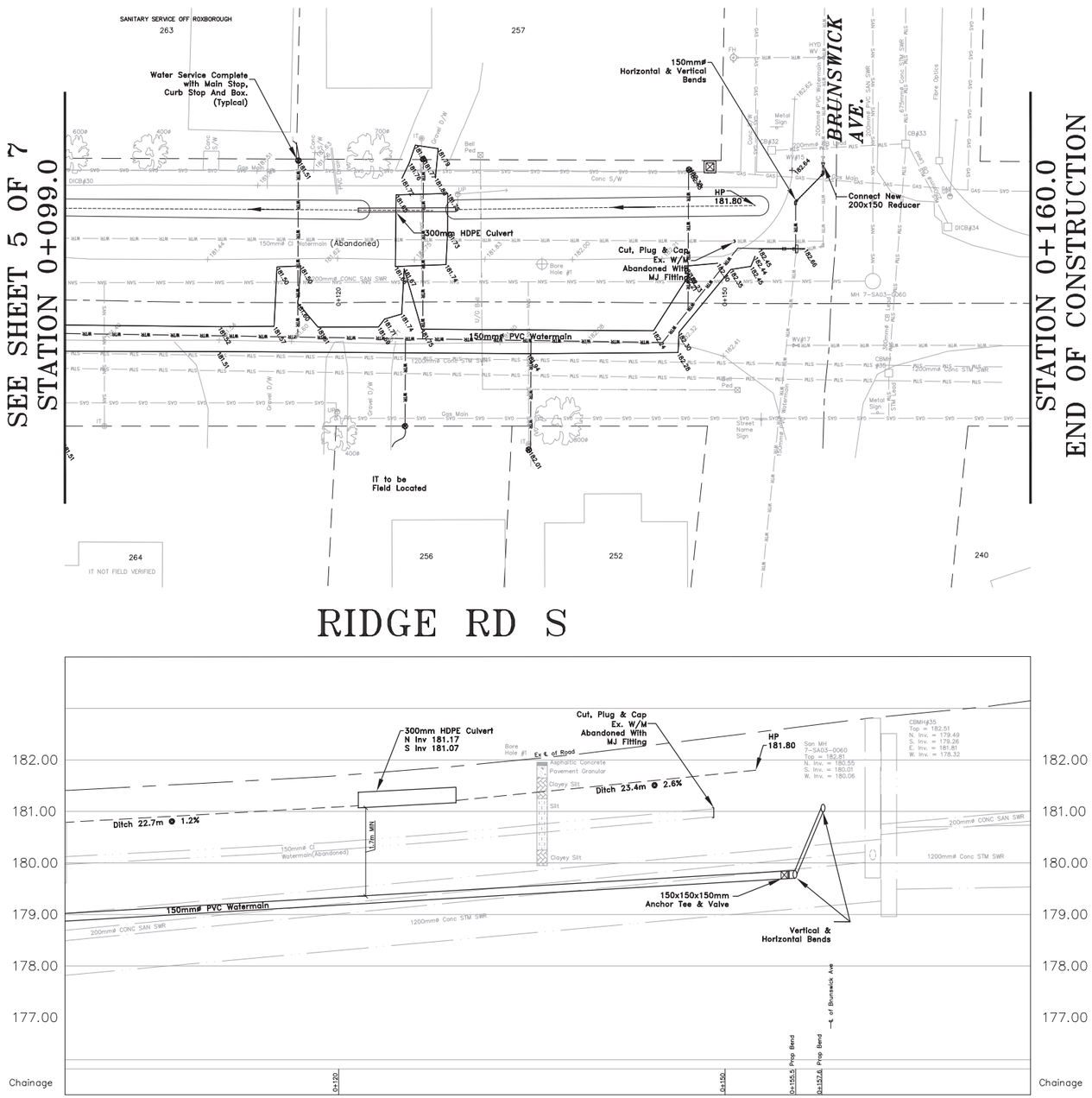
FORT ERIE ONTARIO
Our Focus: Your Future
INFRASTRUCTURE SERVICES

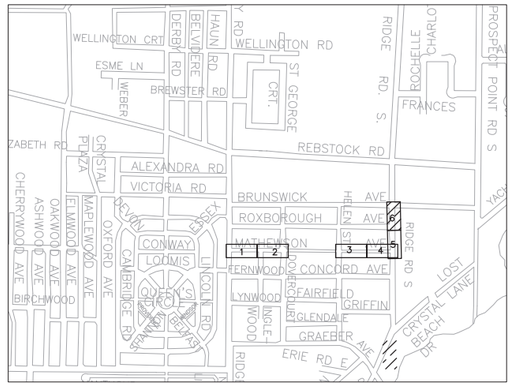
HERSHEY STREET MATHEWSON AVENUE
RIDGE ROAD SOUTH - WATERMAIN REPLACEMENTS

DSN.	DSN. CKD.	DWN.	DWG. CKD.
LS/SB	GS	LS/SLB	GS
SCALE: NTS		PROJECT NO.: ISE-15T-MATA13	
DATE: JULY, 2014		DWG. NO.: 5 OF 8	REV.: 6

G:\PROJECTS\Projects 2014\Hershey-Mathewson-Ridge\acad\Hershey-Mathewson-Ridge_Issue for construction 05 Ridge

Checked by Bell – July 30, 2014
Checked by Fabridge – July 30, 2014
Checked by CNP – July 30, 2014
Checked by Cobe – July 30, 2014





KEY PLAN
NOT TO SCALE

G:\PROJECTS\Projects 2014\Hershey-Mathewson-Ridge\acad\Hershey-Mathewson-Ridge_Issue for construction 06 Ridge

LEGEND

EXISTING
- Watermain
- Water Valve
- Fire Hydrant
- Curb Stop

PROPOSED
- Watermain
- Watermain
- Water Valve
- Fire Hydrant
- Curb Stop
- Cap
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BENCH MARK

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LOCATED ON THE EAST SIDE OF RIDGEWAY RD. ADJACENT TO MATHEWSON AVE..
ELEVATION = 180.600m

LICENSED PROFESSIONAL ENGINEER
G. STOJANOVIC
100083722
May 11, 2015
PROVINCE OF ONTARIO

FORT ERIE ONTARIO
Our Focus: Your Future
INFRASTRUCTURE SERVICES

HERSHEY STREET MATHEWSON AVENUE
RIDGE ROAD SOUTH – WATERMAIN REPLACEMENTS

DSN.	DSN. CKD.	DWN.	DWG. CKD.
LS/SB	GS	LS/SLB	GS

SCALE	PROJECT NO.
NTS	ISE-15T-MATA13

DATE	DWG. NO.	REV.
JULY, 2014	6 OF 8	6

APPENDIX C

ENGINEERING DRAWINGS:

Cover Page

DWG 1: General Notes and Details

DWG 2: Site Servicing Plan

DWG 3: Site Grading Plan

DWG 4: Erosion & Sediment Control Plan

DWG 5: Storm Drainage Area Plan

Table C1: Storm Sewer Analysis & Design Calculations

Table C2: Sanitary Sewer Analysis & Design Calculations

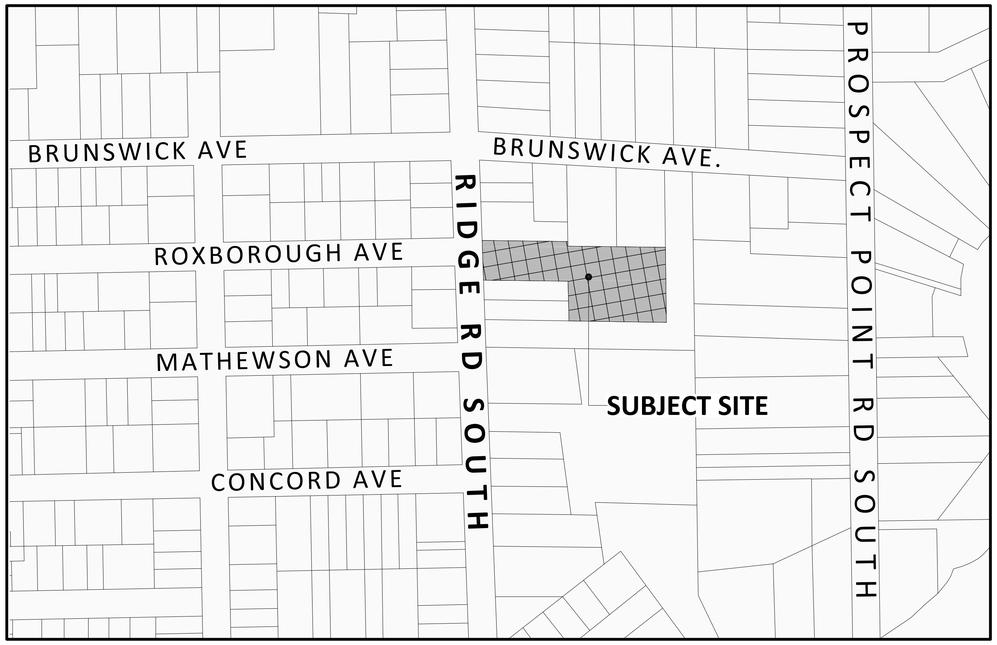
ARIK ENGINEERING LTD.
Where Community Design & Develop

260 Nebo Road, Unit 205, Hamilton
Ontario, L8W 3K5
email: info@arikengineering.com
web: www.arikengineering.com
phone: +1-289-965-9772

MUNICIPALITY:

TOWN OF FORT ERIE

272 RIDGE ROAD SOUTH



KEY PLAN
N.T.S

LIST OF DRAWINGS

DWG-1	GENERAL NOTES AND DETAILS
DWG-2	SITE SERVICING PLAN
DWG-3	SITE GRADING PLAN
DWG-4	EROSION & SEDIMENT CONTROL PLAN
DWG-5	STORM DRAINAGE AREA PLAN

OWNER:
5038257 ONTARIO INC
(C/O CARIG DEVRIES)

PROJECT NUMBER: 22127

OCTOBER 12, 2022

MUNICIPALITY: TOWN OF FORT ERIE

272 RIDGE ROAD SOUTH

STANDARD NOTES FOR PRIMARY & SECONDARY SERVICES:

A. SEWERS

SANITARY AND STORM SEWERS

a) CONSTRUCTION OF SANITARY AND STORM SEWERS AND PRIVATE SERVICES SHALL BE IN ACCORDANCE WITH TOWN OF FORT ERIE STANDARDS & SPECIFICATIONS (LATEST EDITION) AND MINISTRY OF ENVIRONMENT AND CONSERVATION PARKS (MECP) GUIDELINES (LATEST EDITION).
b) COVER AND BEDDING MATERIAL FOR CONCRETE PIPE SHALL BE GRANULAR 'A' MATERIAL AS PER OPSD 802.030 OR 802.033, CLASS 'B' BEDDING, OR AS PER GEOTECHNICAL SPECIFICATIONS.
c) COVER AND BEDDING MATERIAL FOR PVC PIPE SHALL BE GRANULAR 'A' MATERIAL AS PER OPSD 802.010 OR 802.013 OR AS PER GEOTECHNICAL SPECIFICATION.
d) ALL SEWERS SHALL BE CLEANED AND FLUSHED PRIOR TO VIDEO INSPECTION.
e) MANHOLE FRAMES AND COVERS SHALL BE AS PER OPSD 401.010 (STORM-OPEN, SANITARY-CLOSED).
f) SANITARY SEWER (200MM TO 675MM DIA) SHALL BE PVC PIPE, CSA B182.2. SDR-35.
g) STORM SEWER (300MM TO 675MM DIA.) SHALL BE PVC PIPE, CSA B182.2, SDR-35.
h) STORM SEWER > 675MM DIA. SHALL BE CONCRETE PIPE, CSA A257.2 (AS SPECIFIED)
i) ALTERNATE MATERIALS MAY BE ACCEPTABLE IF APPROVAL HAS BEEN OBTAINED FROM THE TOWN OF FORT ERIE.
j) THE CONNECTION TO THE MAIN SANITARY SEWER SHALL BE MADE WITH APPROVED MANUFACTURED TEE. APPROVED SADDLES SHALL BE USED FOR CONNECTING TO EXISTING SEWER MAIN.
k) MINIMUM SLOPE FOR PRIVATE SERVICES TO BE 2.0%.
l) TOP OF SANITARY PRIVATE SERVICES AT STREET LINE TO BE 2.75M (MIN.) BELOW CENTRELINE ROAD ELEVATION AT THAT POINT OR AS DETAILED.
m) TOP OF STORM PRIVATE DRAINS AT STREET LINE TO BE 1.5M (MIN.) BELOW CENTRELINE ROAD ELEVATION AT THAT POINT OR AS DETAILED.
n) BUILDING RAINWATER LEADERS SHALL NOT BE CONNECTED TO THE STORM PRIVATE DRAIN BUT SHALL DISCHARGE ONTO THE GROUND SURFACE VIA SPLASH PADS.
o) SUMP PUMPS WITH CHECK VALVES SHALL BE INSTALLED IN THE BUILDING TO PUMP THE BUILDING WEEPING TILES TO THE GRADE OUTSIDE THE BUILDING. THE SUMP OUTLET PIPE SHALL EXTEND A MINIMUM OF 150MM ABOVE THE PROPOSED GRADE AT THE DWELLING .
p) SANITARY SERVICE SIZE FOR EACH UNIT SHALL BE 100MM PVC SDR28 @ MINIMUM 2.0% SLOPE.

CATCH BASINS

a. ALL CATCH BASIN CONNECTIONS TO BE 250mm DIA PVC CSA B182.2, SDR-35 OR AS DETAILED.
b. CATCH BASIN AS PER OPSD705.010.
c. CATCH BASIN COVER IN ASPHALT AREA AS PER OPSD 400.100.
d. CATCH BASIN COVER IN GRASS AREA SHALL BE BEEHIVE TYPE GRATE.

B. WATERMAINS AND WATER SERVICES

WATER SERVICES

a) GRANULAR A MATERIAL IS TO BE USED FOR BEDDING UNDER THE WATERMAIN. BALANCE OF TRENCH BACKFILL MATERIAL TO GROUND LEVEL IS ACCORDING TO THE TOWN SPECIFICATIONS.
b) CONCRETE THRUST BLOCK OR APPROVED RESTRAINING DEVICES ALE REQUIRED AS PER OPSD-1103.010, 1103.020.
c) ALL VALVES, HYDRANTS WATER METERS TO BE INSTALLED AS PER TOWN OF FORT ERIE STANDARDS AND SPECIFICATIONS.
d) TO BE INSTALLED TO A MINIMUM COVER OF 1.7m.
e) WATER SERVICE SIZE FOR EACH UNITE SHELL BE 20MM Ø TYPE K SOFT COPPER. COMPLETE WITH CURB STOP AND BOX AS PER OPSD 1104.010

C. ROADWORKS

1. SIDEWALKS, CURBS, AND GUTTERS

a) CONCRETE CURB AND GUTTER AS PER OPSD 600.110 - (BARRIER TYPE).
b) CURB DEPRESSION AT DRIVEWAYS AS PER OPSD 600.040 AND OPSD 310-050.
c) 1.5M WIDE CONCRETE SIDEWALK AS PER COUNTY STANDARD AND SPECIFICATIONS.
d) MAXIMUM DRIVEWAY SLOPE NOT MORE THAN 8.0% AND NOT LESS THAN 2.0%.
e) 150MM FILTER WRAPPED CORRUGATED SUBDRAINS TO BE INSTALLED CONTINUOUSLY BELOW THE CURB AND GUTTER AND CONNECTED TO THE STORM OUTLET OR AS DETAILED ON SERVICING AND GRADING PLANS.

D. COMPACTION REQUIREMENTS

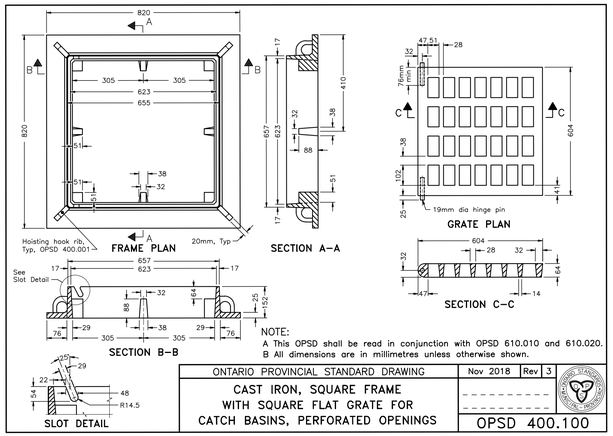
a) ALL BEDDING AND BACKFILL MATERIAL, ROAD SUB-GRADES AND GENERALLY ALL MATERIAL USED FOR LOT GRADING AND FILL SECTIONS, ETC., SHALL BE COMPACTED TO MIN. 100% SPD (UNLESS OTHERWISE RECOMMENDED BY THE GEOTECHNICAL ENGINEER). ALL MATERIAL SHALL BE PLACED IN LAYERS NOT EXCEEDING 300MM LIFTS.
b) ALL GRANULAR ROAD BASE MATERIALS SHALL BE COMPACTED TO 100% SPD.
c) FOR ALL SEWERS AND WATERMAINS IN FILL SECTIONS, THE COMPACTION SHALL BE CERTIFIED BY A GEOTECHNICAL ENGINEER PRIOR TO LAYING OF PIPE.
d) REFER TO GEOTECHNICAL REPORT FOR ADDITIONAL ON SITE SOIL INFORMATION AND RECOMMENDATION.

E. SILTATION AND EROSION CONTROL

a) SILTATION CONTROL BARRIERS SHALL BE PLACED AS DETAILED.
b) ALL SILTATION CONTROL MEASURES SHALL BE CLEANED AND MAINTAINED AFTER EACH RAINFALL AS DIRECTED AND TO THE SATISFACTION OF THE OF HALDINAND COUNTY.
c) ADDITIONAL SILT CONTROL LOCATIONS MAY BE REQUIRED AS DETERMINED BY THE HALDIMAND COUNTY.
d) SEDIMENT CONTROL FENCES AS PER OPSD 219.130

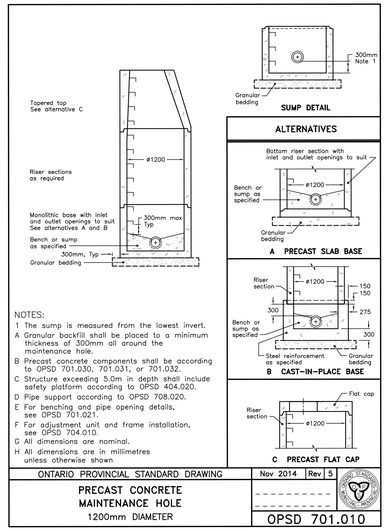
F. GENERAL NOTES

2. EXISTING SEWERS, WATERMAINS & UTILITIES ALIGNMENTS AND ELEVATIONS ARE ONLY PROVIDED FOR INFORMATION PURPOSES. THE CONTRACTOR ONSITE SHALL BE RESPONSIBLE TO LOCATE ALL EXISTING SEWERS, WATERMAINS & UTILITIES ALIGNMENT & ELEVATIONS PRIOR TO START OF CONSTRUCTION.
3. THE BIDDER/CONTRACTOR MUST REVIEW/VERIFY EXISTING SOIL CONDITIONS ONSITE.
4. THE CONTRACTOR WILL BE RESPONSIBLE FOR COSTS ASSOCIATED WITH THE CROSSING OF ANY EXISTING SEWERS, WATERMAINS AND UTILITIES INCLUDING ANY SUPPORTS AND PRECAUTIONS REQUIRED ON SITE SPECIFIC BASIS.
5. THE BIDDER/CONTRACTOR MUST VERIFY ALL DIMENSIONS ON ALL THE DRAWINGS. ANY ERRORS AND/OR OMISSIONS MUST BE REPORTED TO THE ENGINEER IMMEDIATELY.



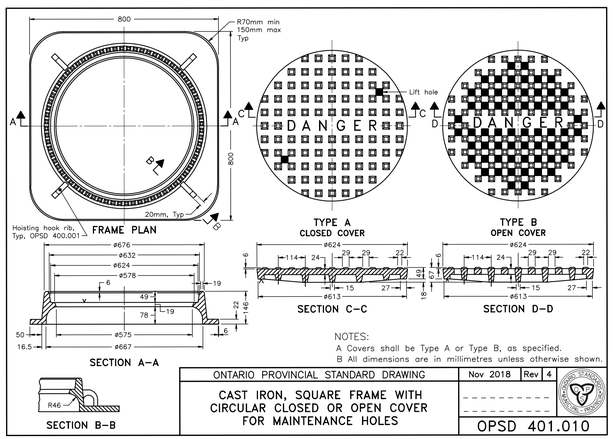
NOTE:
A This OPSD shall be read in conjunction with OPSD 610.010 and 610.020.
B All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2018	Rev 3
CAST IRON, SQUARE FRAME WITH SQUARE FLAT GRATE FOR CATCH BASINS, PERFORATED OPENINGS		OPSD 400.100



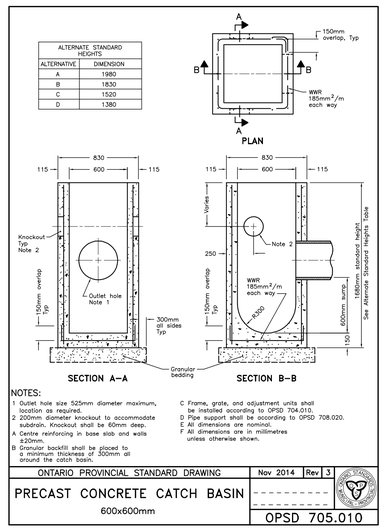
NOTES:
1 The sump is measured from the lowest invert.
A Granular backfill shall be placed to a minimum thickness of 300mm all around the maintenance hole.
B Precast concrete components shall be according to OPSD 701.030, 701.031, or 701.032.
C Structure exceeding 5.0m in depth shall include safety platform according to OPSD 404.020.
D Pipe support 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 2014	Rev 5
PRECAST CONCRETE MAINTENANCE HOLE 1200mm DIAMETER		OPSD 701.010



NOTES:
A Covers shall be Type A or Type B, as specified.
B All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2018	Rev 4
CAST IRON, SQUARE FRAME WITH CIRCULAR CLOSED OR OPEN COVER FOR MAINTENANCE HOLES		OPSD 401.010



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 2014	Rev 3
PRECAST CONCRETE CATCH BASIN 600x600mm		OPSD 705.010

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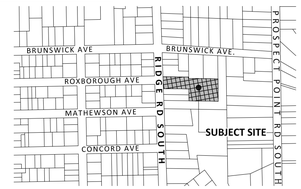
web: www.arikengineering.com
phone: +1-289-965-9772

SITE BENCH MARK

- TOPOGRAPHIC INFORMATION IS BASED ON RASCH & HYDE LTD. DATED APRIL 11, 2022.
- ELEVATIONS ARE GEODETIC, DERIVED BY GPS OBSERVATIONS, REFERRED TO GEODETIC SURVEY OF CANADA BENCHMARK 0011971U037 (AKA 71U037) HAVING AN ELEVATION OF 200.338m (CGVD-1928:1978).

KEY PLAN (NOT TO SCALE)



REVISIONS RECORD

No.	BY	DD/MM/YYYY	DESCRIPTION
1.	A.R	12/10/2022	FIRST SUBMISSION

NOT ISSUED FOR CONSTRUCTION

DATE: OCTOBER 12, 2022
DESIGN BY: A.R
DRAWN BY: A.J
CHECKED BY: A.R
SCALE: N/A

LICENSED PROFESSIONAL ENGINEER
A. RAZZAK
100505914
OCT 12,2022
PROVINCE OF ONTARIO
ENGINEER'S STAMP

LEGEND

N/A

PROJECT: 272 RIDGE ROAD SOUTH

OWNER: 5038257 ONTARIO INC (C/O CARIG DEVRIES)

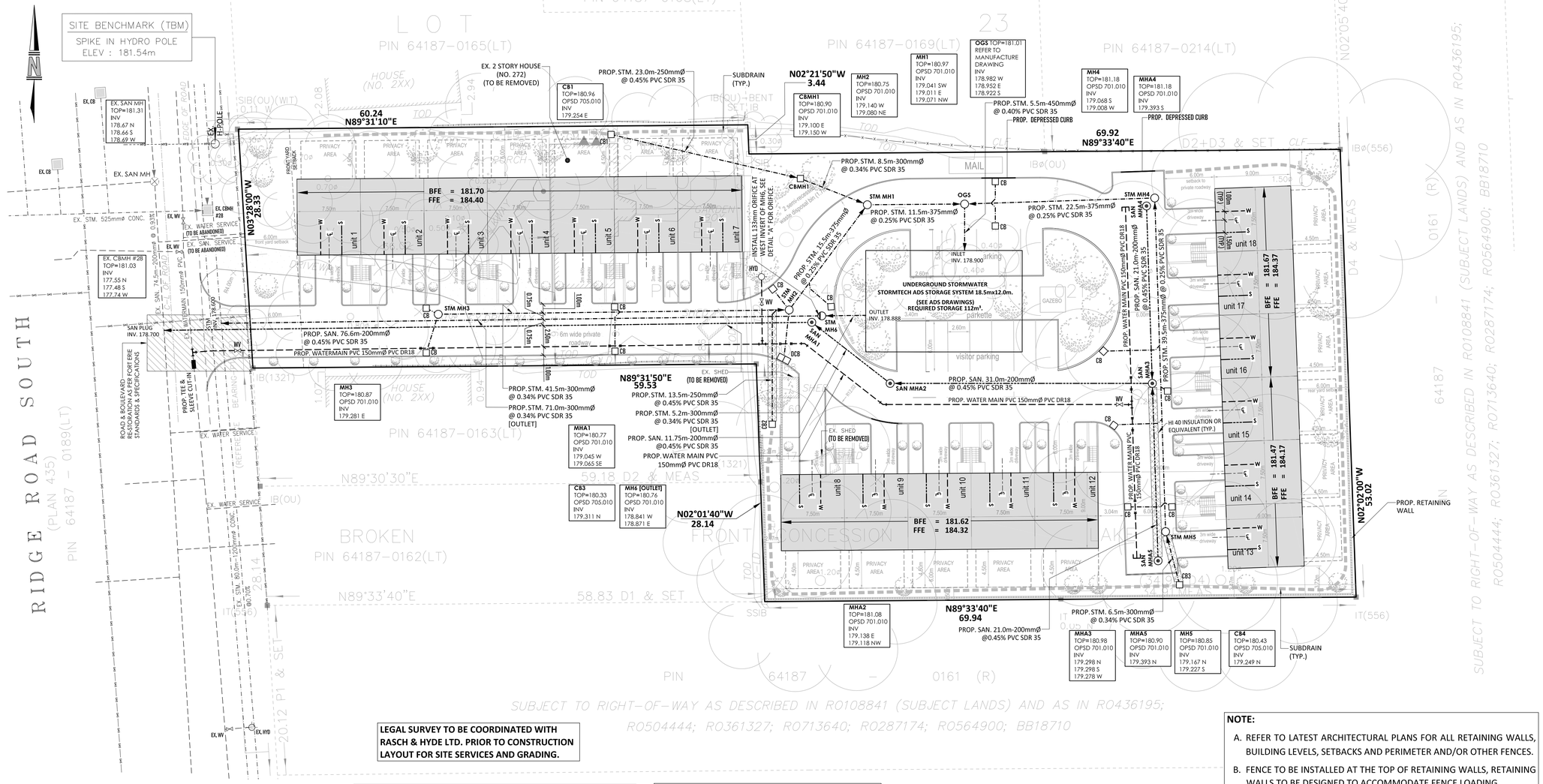
MUNICIPALITY: TOWN OF FORT ERIE

GENERAL NOTES AND DETAILS

PROJECT NUMBER: 22127
DRAWING: DWG-1

272 RIDGE ROAD SOUTH

d:\arik eng\jobs 2022\22127_272 ridge road south, town of fort erie\engineering\detailed design\1st submission\autocad drawing\current 13 October 2022 1:32 am



LEGAL SURVEY TO BE COORDINATED WITH RASCH & HYDE LTD. PRIOR TO CONSTRUCTION LAYOUT FOR SITE SERVICES AND GRADING.

GENERAL NOTES FOR SERVICING:

1. ALL MUNICIPAL AND PRIVATE SANITARY, STORM AND WATERMAIN SERVICES TO BE INSTALLED AS PER THE CURRENT TOWN STANDARDS AND SPECIFICATIONS.
2. EXISTING MUNICIPAL AND PRIVATE SEWERS, WATERMAINS AND UTILITIES ALIGNMENTS AND THEIR ELEVATIONS ARE ONLY PROVIDED FOR INFORMATION PURPOSES. THE CONTRACTOR ONSITE SHALL BE RESPONSIBLE TO LOCATE ALL EXISTING SEWERS, WATERMAINS AND UTILITIES ALIGNMENT AND ELEVATIONS PRIOR TO START OF CONSTRUCTION.
3. THE BIDDER/CONTRACTOR MUST REVIEW/VERIFY EXISTING SOIL CONDITIONS ONSITE.
4. THE CONTRACTOR WILL BE RESPONSIBLE FOR COST ASSOCIATED WITH THE CROSSING OF ANY EXISTING SEWERS, WATERMAINS AND UTILITIES INCLUDING ANY SUPPORTS AND PRECAUTIONS REQUIRED ON SITE SPECIFIC BASIS.
5. THE BIDDER/CONTRACTOR MUST VERIFY ALL DIMENSIONS ON ALL THE DRAWINGS. ANY ERRORS AND/OR OMISSIONS MUST BE REPORTED TO THE ENGINEER IMMEDIATELY.

STANDARD SERVICING NOTES :

1. THE PROPERTY OWNER IS RESPONSIBLE FOR RESTORATION OF ALL DAMAGED AND/OR DISTURBED PROPERTY WITHIN THE TOWN RIGHT-OF-WAY TO TOWN STANDARDS.
2. IF, FOR UNFORESEEN REASONS, THE OWNER AND/OR HIS/HER REPRESENTATIVE MUST ENCROACH ONTO PRIVATE LANDS TO UNDERTAKE ANY WORKS, HE/SHE MUST OBTAIN WRITTEN PERMISSION FROM THE ADJACENT PROPERTY OWNERS PRIOR TO ENTERING UPON THE PRIVATE PROPERTY TO PERFORM ANY WORKS. COPIES OF THESE LETTERS OF CONSENT MUST BE SUBMITTED TO DEVELOPMENT ENGINEERING DIVISION, PRIOR TO ANY WORK BEING PERFORMED. FAILURE TO COMPLY WITH THE ABOVE IS AT THE PROPERTY OWNERS OWN RISK.
3. REFER TO LANDSCAPING PLAN FOR TREE PRESERVATIONS AND PROPOSED TREES WITH RESPECT TO THE SITE SERVICING.
4. ALL PRIVATE WATER, SANITARY AND STORM SERVICE CONNECTIONS TO BE CONSTRUCTED AS PER TOWN OF FORT ERIE ENGINEERING STANDARDS AND GUIDELINES.
5. CONTRACTOR IS RESPONSIBLE TO LOCATE ALL EXISTING UTILITIES AROUND THE DEVELOPMENT PRIOR TO START CONSTRUCTION AND NOTIFY TO THE OWNER AND THE ENGINEER.
6. All CB LEADS ARE 250mm PVC SDR-35, UNLESS OTHERWISE NOTED.

ONSITE STORMWATER MANAGEMENT REQUIREMENTS:

1. POST-DEVELOPMENT FLOWS TO MATCH WITH PRE-DEVELOPMENT CONDITIONS UNDER 5-YEAR & 100 YEAR STORM EVENTS.
2. STORMWATER MANAGEMENT ONSITE QUANTITY CONTROL REQUIRED STORAGE OF 112m³ IS TO BE PROVIDED AT THE ALLOWABLE DISCHARGE RATE OF 0.035cms WITH AN ORIFICE SIZE OF 133mm DIAMETER.
3. REFER TO ADS STORMTECH DESIGN/DRAWINGS FOR UNDERGROUND STORAGE SYSTEM.

- **ALL EXISTING MUNICIPAL SANITARY AND STORM SEWERS LOCATION AND INVERTS WHERE PROPOSED SITE SERVICES WILL TIE IN TO BE VERIFIED ON SITE PRIOR TO CONSTRUCTION.**
- **ALL EXISTING UTILITIES TO BE LOCATED ON SITE.**
- **MINIMUM BASEMENT FLOOR ELEVATION SHALL BE BASED ON INVERT OF THE SANITARY SERVICE. CONTRACTOR MUST VERIFY SANITARY SERVICE INVERT PRIOR TO SETTING BASEMENT FOUNDATION LEVEL.**

RAINWATER ROOF LEADERS AND SUMP PUMPS:

- ALL RAINWATER LEADERS SHALL DISCHARGE ONTO SPLASH PADS AND THEN TO GRASSED OR LANDSCAPED AREAS A MINIMUM OF 1.20M FROM THE BUILDING FACE.
- SUMP PUMP WITH CHECK VALVE SHALL BE INSTALLED IN EACH DWELLING TO PUMP BUILDING WEEPING TILES TO THE GRADE OUTSIDE THE BUILDING , THE SUMP PUMP OUTLET PIPE SHALL EXTEND A MINIMUM OF 150MM ABOVE THE PROPOSED GRADE AT THE DWELLING PRIOR TO DISCHARGE TO THE GRADE OUTSIDE THE BUILDING.

NOTE:

A. REFER TO LATEST ARCHITECTURAL PLANS FOR ALL RETAINING WALLS, BUILDING LEVELS, SETBACKS AND PERIMETER AND/OR OTHER FENCES.

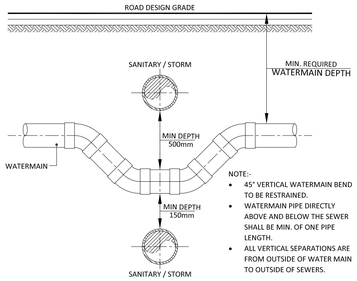
B. FENCE TO BE INSTALLED AT THE TOP OF RETAINING WALLS, RETAINING WALLS TO BE DESIGNED TO ACCOMMODATE FENCE LOADING.

C. RETAINING WALLS TO BE DESIGNED BY OTHERS.

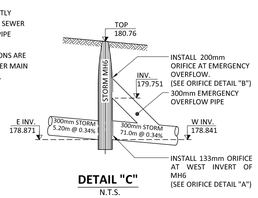
D. MINIMUM BASEMENT FLOOR ELEVATION SHALL BE BASED ON INVERT OF THE SANITARY SERVICE. CONTRACTOR MUST VERIFY SANITARY SERVICE INVERT PRIOR TO SETTING BASEMENT FOUNDATION LEVEL.

E. PROVIDE INSULATION ON SANITARY SERVICE WHERE COVER FORM THE FINISH GRADE LESS THEN 1.2m.

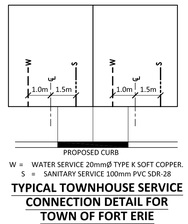
F. CONTRACTOR MUST REVIEW SERVICING AND GRADING PLAN FOR SERVICING CONFLICTS AND NOTIFY TO THE ENGINEER PRIOR TO CONSTRUCTION.



WATERMAIN CROSSING DETAIL
N.T.S.

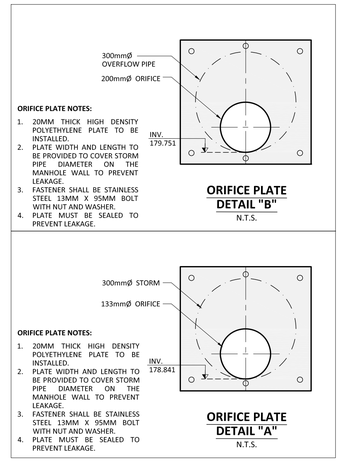


DETAIL "C"
N.T.S.



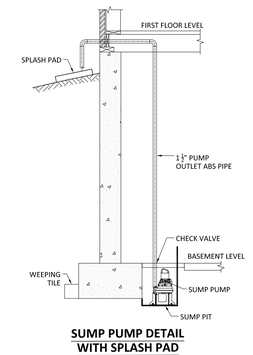
W = WATER SERVICE 20mmØ TYPE K SOFT COPPER.
S = SANITARY SERVICE 100mm PVC SDR-28

TYPICAL TOWNHOUSE SERVICE CONNECTION DETAIL FOR TOWN OF FORT ERIE
N.T.S.



ORIFICE PLATE DETAIL "B"
N.T.S.

ORIFICE PLATE DETAIL "A"
N.T.S.



SUMP PUMP DETAIL WITH SPLASH PAD
N.T.S.

ARIK ENGINEERING LTD.
Where Community Design & Develop
260 Nebo Road, Unit 205, Hamilton Ontario, L8W 3K5
email: info@arikengineering.com
web: www.arikengineering.com
phone: +1-289-965-9772

SITE BENCH MARK

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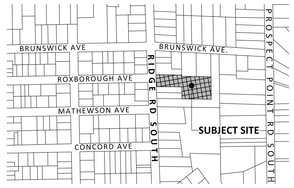
KEY PLAN (NOT TO SCALE)



REVISIONS RECORD

No.	BY	DD/MM/YYYY	DESCRIPTION
1.	A.R	12/10/2022	FIRST SUBMISSION

NOT ISSUED FOR CONSTRUCTION

DATE: OCTOBER 12, 2022
DESIGN BY: A.R
DRAWN BY: A.J
CHECKED BY: A.R
SCALE: 1:250

LICENSED PROFESSIONAL ENGINEER A. RAZZAK 100505914 OCT 12,2022 PROVINCE OF ONTARIO
ENGINEER'S STAMP

LEGEND

- EXISTING STORM SEWER & MANHOLE
- EXISTING SANITARY SEWER & MANHOLE
- PROPOSED STORM SEWER & MANHOLE
- PROPOSED SANITARY SEWER & MANHOLE
- EXISTING WATERMAIN
- PROPOED WATERMAIN
- PROPOSED CURB & GUTTER
- EXISTING CURB & GUTTER
- DEPRESSED CURB
- EXISTING DEPRESSED CURB
- EXISTING CURB STOP
- PROPOSED WATER VALVE
- EXISTING WATER VALVE
- EXISTING CATCHBASIN
- PROPOSED CATCHBASIN
- PROPOSED DOUBLE CATCHBASIN
- EXISTING HYDRANT
- PROPOSED HYDRANT
- PROPOSED CATCHBASIN MANHOLE
- WM — PROPOSED WATER METER
- BFP — PROPOSED BACKFLOW PREVENTER
- PROPOSED RETAINING WALL
- TW[000.00] — PROPOSED TOP OF RETAINING WALL
- BW[000.00] — PROPOSED BOTTOM OF RETAINING WALL
- PROPOSED SUBDRAIN
- EXISTING FENCE
- PROPOSED FENCE
- HYDRO POLE
- PROPOSED TRANSFORMER
- EXISTING BELL LINES
- EXISTING HYDRO LINES
- EXISTING GAS LINES
- FFE — FIRST FLOOR ELEVATION
- BFE — BASEMENT FLOOR ELEVATION
- PROPOSED MAILBOX
- EXISTING TREE
- PROPOSED LIGHT POLE
- EXISTING LIGHT POLE
- FD-1 — PROPOSED FLOOR DRAIN
- RAINWATER LEADER

PROJECT:
272 RIDGE ROAD SOUTH

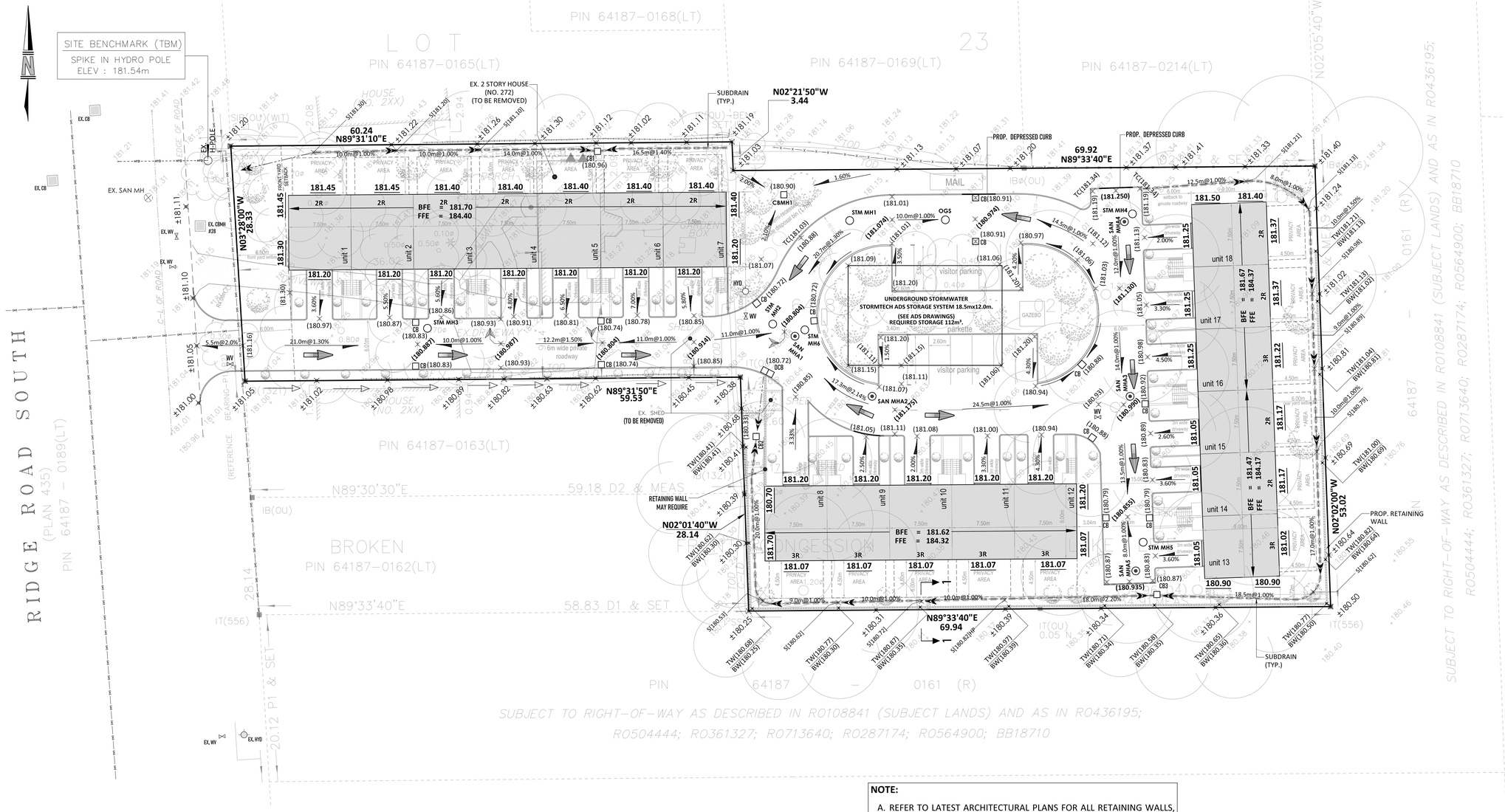
OWNER:
5038257 ONTARIO INC
(C/O CARIG DEVRIES)

MUNICIPALITY:
TOWN OF FORT ERIE

SITE SERVICING PLAN

PROJECT NUMBER: 22127
DRAWING: DWG-2

272 RIDGE ROAD SOUTH



GENERAL LOT GRADING NOTES

1. ALL RETAINING WALLS 1.0M OR HIGHER SHALL BE DESIGNED AND CERTIFIED BY THE STRUCTURAL ENGINEER.
2. IF A RETAINING WALL BE REQUIRED, THE TOP OF WALL ELEVATION SHALL BE SET 150MM ABOVE THE PROPOSED SIDE YARD SWALE WHERE APPLICABLE.
3. RETAINING WALL 0.60M IN HEIGHT OR MORE WILL REQUIRE CONSTRUCTION OF A FENCE OR GUARD RAIL AT THE TOP OF THE REAR OF THE WALL. GUARDS FOR THE RETAINING WALLS SHALL BE DESIGNED AND CONSTRUCTED IN ACCORDANCE WITH THE REQUIREMENTS OF EXTERIOR GUARD AS PER THE ONTARIO BUILDING CODE.
4. ADJOINING PROPERTIES GRADE SHALL MEET EXISTING OR PROPOSED ELEVATIONS WITH SODDED SLOPES (MIN. 3H TO 1V) AND/OR RETAINING WALLS AS SPECIFIED.
5. TOP OF FOUNDATION WALLS FOR BUILDINGS SHALL BE MINIMUM 150MM ABOVE FINISHED GRADE.
6. MINIMUM DRIVEWAY SLOPES SHALL BE 2% AND MAXIMUM SLOPE 8.0%.
7. ALL FILL PLACED SHALL BE COMPACTED TO A MINIMUM 95% SPD (UNLESS OTHERWISE RECOMMENDED BY THE GEOTECHNICAL ENGINEER). ALL MATERIAL SHALL BE PLACED IN LAYERS NOT EXCEEDING 300MM LIFTS.
8. FOR TREE PROTECTION /REMOVAL AND HOARDING FENCE DETAILS REFER TO TREE PROTECTION PLAN AND REPORT PREPARED BY THE ARBORIST.
9. GRADING SHALL FOLLOW STRICTLY WITH THIS DRAWING. ANY CHANGES, UNLESS APPROVED PRIOR TO CONSTRUCTION BY THE MUNICIPALITY, SHALL RESULT IN NON-ACCEPTANCE OF THE MUNICIPALITY.
10. IF GRADING IS REQUIRED ON LANDS ADJACENT TO THE DEVELOPMENT WHICH ARE NOT OWNED BY THE DEVELOPER, THEN THE DEVELOPER MUST OBTAIN WRITTEN AGREEMENT FROM THE ADJACENT PROPERTY OWNER TO ALLOW THE DEVELOPER TO GRADE ON THE ADJACENT LANDS, OTHERWISE RETAINING WALLS SHALL BE USED.
11. WRITTEN AGREEMENT FROM THE ADJACENT LANDOWNER SHALL BE OBTAINED PRIOR TO ENTERING THE LANDS. IF AGREEMENT NOT BE OBTAINED OR IS WITHDRAWN PRIOR TO COMMENCING THE CONSTRUCTION, THEN THE DEVELOPER MUST LIMIT ACTIVITIES TO THE LIMITS OF THEIR DEVELOPMENT SITE.

RAINWATER ROOF LEADERS AND SUMP PUMPS:

- ALL RAINWATER LEADERS SHALL DISCHARGE ONTO SPLASH PADS AND THEN TO GRASSED OR LANDSCAPED AREAS A MINIMUM OF 1.20M FROM THE BUILDING FACE.
- SUMP PUMP WITH CHECK VALVE SHALL BE INSTALLED IN EACH DWELLING TO PUMP BUILDING WEEPING TILES TO THE GRADE OUTSIDE THE BUILDING. THE SUMP PUMP OUTLET PIPE SHALL EXTEND A MINIMUM OF 150MM ABOVE THE PROPOSED GRADE AT THE DWELLING PRIOR TO DISCHARGE TO THE GRADE OUTSIDE THE BUILDING.

SITE PLAN ROAD PAVEMENT STRUCTURE

(TO BE CONFIRMED BY GEOTECHNICAL ENGINEER)

LIGHT DUTY PAVEMENT STRUCTURE

ASPHALTIC CONCRETE WEARING COURSE OPSS HL3 OR HL3A - 40MM
BINDER COURSE OPSS HL8 - 50MM
BASE COURSE OPSS GRANULAR "A" - 150MM
SUB-BASE COURSE OPSS GRANULAR "B" TYPE II - 200MM

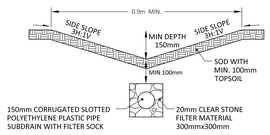
HEAVY DUTY (TRUCK ROUTE) PAVEMENT STRUCTURE

ASPHALTIC CONCRETE WEARING COURSE OPSS HL3 OR HL3A - 40MM
BINDER COURSE OPSS HL8 - 65MM
BASE COURSE OPSS GRANULAR "A" - 150MM
SUB-BASE COURSE OPSS GRANULAR "B" TYPE II - 350MM

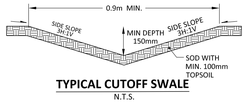
NOTE:
PAVEMENT STRUCTURE DEPTHS OVER THE ADS STORMTECH CHAMBERS TO BE CONFIRMED BY THE GEOTECHNICAL ENGINEER.

SUBDRAIN TO BE INSTALLED AS SHOWN AS WELL AS UNDER OF THE CURBS.

LEGAL SURVEY TO BE COORDINATED WITH RASCH & HYDE LTD. PRIOR TO CONSTRUCTION LAYOUT FOR SITE SERVICES AND GRADING.



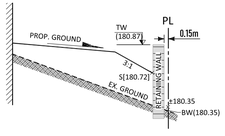
TYPICAL CUTOFF SWALE WITH SUBDRAIN
N.T.S.



TYPICAL CUTOFF SWALE
N.T.S.

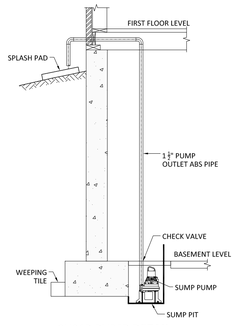
NOTE:

A. REFER TO LATEST ARCHITECTURAL PLANS FOR ALL RETAINING WALLS, BUILDING LEVELS, SETBACKS AND PERIMETER AND/OR OTHER FENCES.
B. FENCE TO BE INSTALLED AT THE TOP OF RETAINING WALLS, RETAINING WALLS TO BE DESIGNED TO ACCOMMODATE FENCE LOADING.
C. RETAINING WALLS TO BE DESIGNED BY OTHERS.
D. MINIMUM BASEMENT FLOOR ELEVATION SHALL BE BASED ON INVERT OF THE SANITARY SERVICE. CONTRACTOR MUST VERIFY SANITARY SERVICE INVERT PRIOR TO SETTING BASEMENT FOUNDATION LEVEL.
E. PROVIDE INSULATION ON SANITARY SERVICE WHERE COVER FORM THE FINISH GRADE LESS THEN 1.2m.
F. CONTRACTOR MUST REVIEW SERVICING AND GRADING PLAN FOR SERVICING CONFLICTS AND NOTIFY TO THE ENGINEER PRIOR TO CONSTRUCTION.



TYPICAL RETAINING WALL CROSS SECTION
SECTION 1-1
N.T.S.

- RETAINING WALLS TO BE DESIGNED BY STRUCTURE ENGINEER.
- RETAINING WALLS 0.60m IN HEIGHT OR GREATER REQUIRE A FENCE OR RAILING.
- IF FENCE TO BE INSTALLED AT THE TOP OF RETAINING WALLS, RETAINING WALLS TO BE DESIGNED TO ACCOMMODATE FENCE LOADING.



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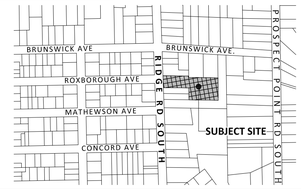

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NOT ISSUED FOR CONSTRUCTION

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DRAWN BY: A.J
CHECKED BY: A.R
SCALE: 1:250

LICENSED PROFESSIONAL ENGINEER A. RAZZAK 100505914 OCT 12,2022 PROVINCE OF ONTARIO
ENGINEER'S STAMP

LEGEND

±000.00	EXISTING GROUND ELEVATION TO REMAIN
---000.00---	CONTOUR ELEVATION
+000.00	EXISTING GROUND ELEVATION
(000.00)	PROPOSED DESIGN GRADE
TC(000.00)	PROPOSED TOP OF CURB DESIGN GRADE
000.00	APPROXIMATE GRADE AT THE BUILDING
S[000.00]	PROPOSED SWALE ELEVATION
	PROPOSED RETAINING WALL
TW[000.00]	PROPOSED TOP OF RETAINING WALL
BW[000.00]	PROPOSED BOTTOM OF RETAINING WALL
FFE	FIRST FLOOR ELEVATION
BFE	BASEMENT FLOOR ELEVATION
	DIRECTION OF MAJOR DRAINAGE ROUTE
	SHEET FLOW DIRECTION
1.00%	ROAD/PARKING/GRASS AREA SLOPE
5m@1.00%	GRASS SWALE
	PROPOSED CURB & GUTTER
	EXISTING CURB & GUTTER
	DEPRESSED CURB
	EXISTING DEPRESSED CURB
	EXISTING STORM MANHOLE
	EXISTING SANITARY MANHOLE
	PROPOSED STORM MANHOLE
	PROPOSED SANITARY MANHOLE
	PROPOSED SUBDRAIN
	EXISTING CATCHBASIN
	PROPOSED CATCHBASIN
	PROPOSED DOUBLE CATCHBASIN
	EXISTING HYDRANT
	PROPOSED HYDRANT
	PROPOSED CATCHBASIN MANHOLE
X X	EXISTING FENCE
X X	PROPOSED FENCE
EX. HYDRO POLE	HYDRO POLE
	PROPOSED TRANSFORMER
BELL BELL	EXISTING BELL LINES
HYD HYD	EXISTING HYDRO LINES
GAS GAS	EXISTING GAS LINES
FD-1	PROPOSED FLOOR DRAIN
	EXISTING TREE
	PROPOSED LIGHT POLE
	EXISTING LIGHT POLE

PROJECT:
272 RIDGE ROAD SOUTH

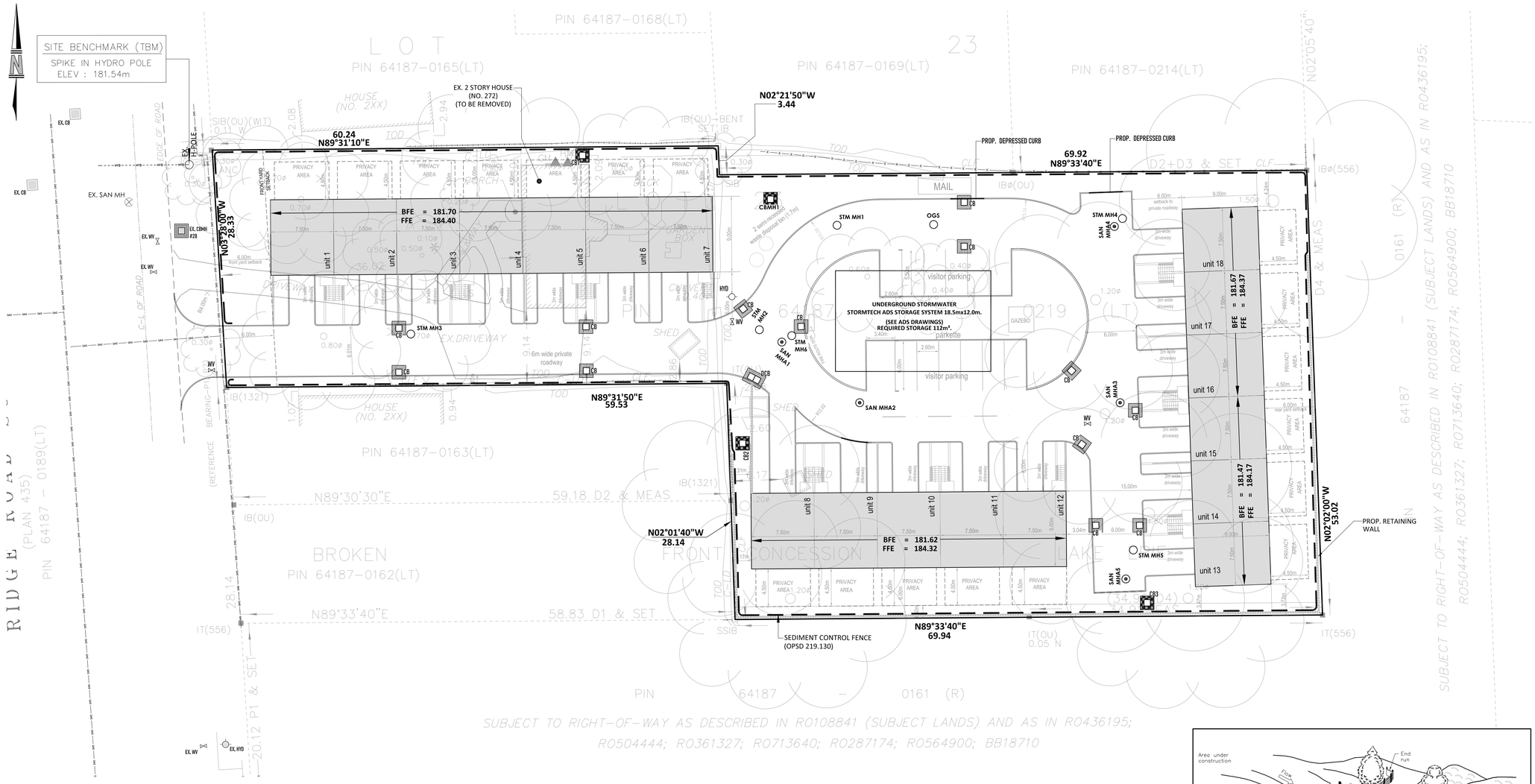
OWNER:
5038257 ONTARIO INC
(C/O CARIG DEVRIES)

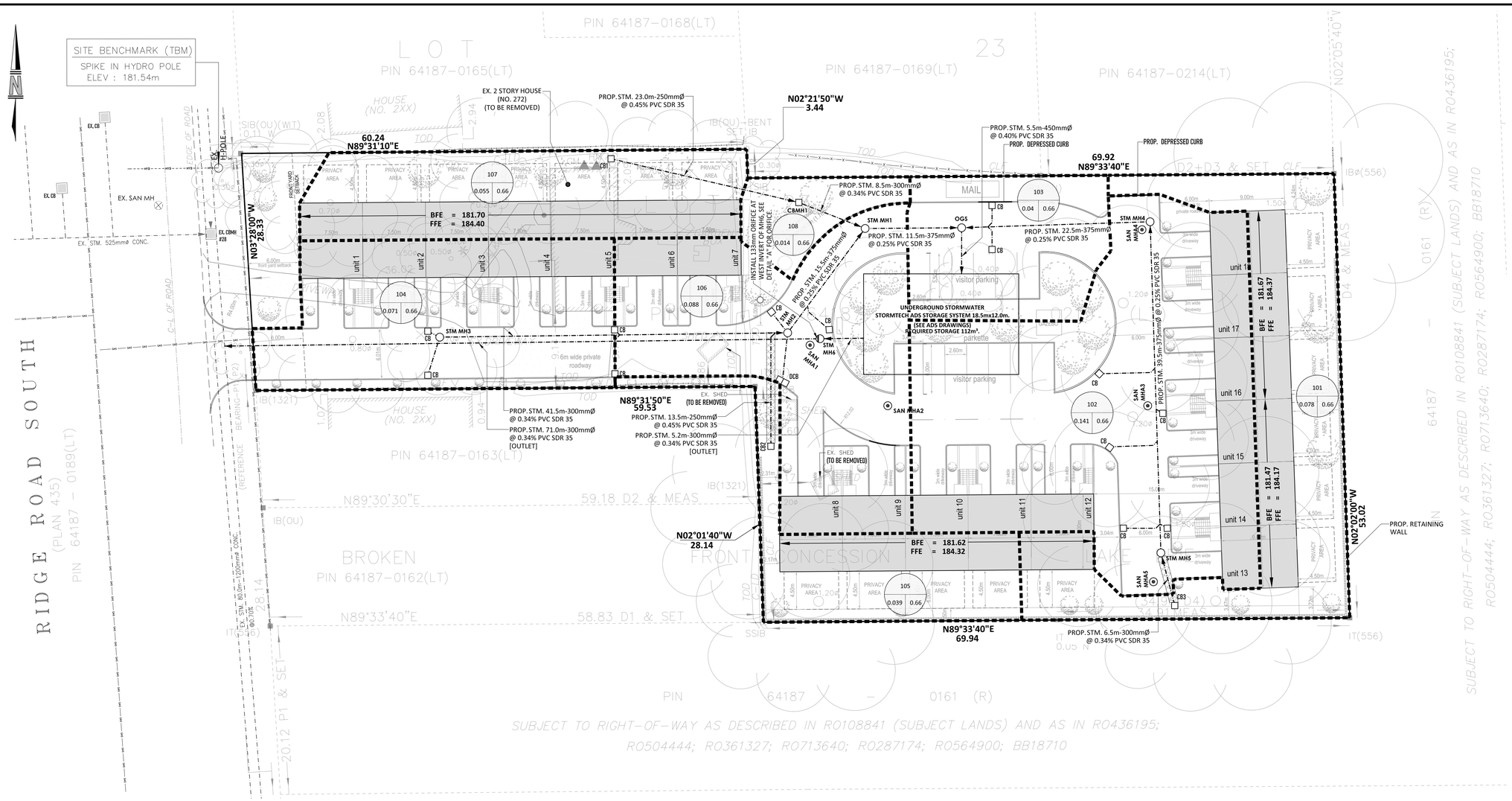
MUNICIPALITY:
TOWN OF FORT ERIE

SITE GRADING PLAN

PROJECT NUMBER: 22127
DRAWING: DWG-3

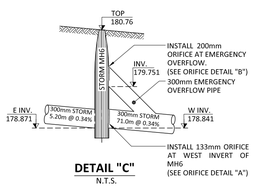
272 RIDGE ROAD SOUTH


SITE BENCHMARK (TBM)
SPIKE IN HYDRO POLE
ELEV : 181.54m
EX. 2 STORY HOUSE
(NO. 272)
(TO BE REMOVED)
60.24
N89°31'10"E
N03°28'00"W
28.33
N02°21'50"W
3.44
69.92
N89°33'40"E
PROP. DEPRESSED CURB
PROP. DEPRESSED CURB
BFE = 181.70
FFE = 184.40
unit 1
unit 2
unit 3
unit 4
unit 5
unit 6
unit 7
UNDERGROUND STORMWATER
STORMTECH ADS STORAGE SYSTEM 18.5mx12.0m.
(SEE ADS DRAWINGS)
REQUIRED STORAGE 112m³.
visitor parking
parkette
6m wide private roadway
N89°31'50"E
59.53
BFE = 181.62
FFE = 184.32
unit 8
unit 9
unit 10
unit 11
unit 12
N02°01'40"W
28.14
N89°33'40"E
69.94
SEDIMENT CONTROL FENCE
(OPSD 219.130)
N02°10'00"W
33.02
PROP. RETAINING WALL
BFE = 181.67
FFE = 184.37
BFE = 181.47
FFE = 184.17
unit 13
unit 14
unit 15
unit 16
unit 17
unit 18
STM MH1
STM MH2
STM MH3
STM MH4
STM MH5
STM MH6
SAN MHA1
SAN MHA2
SAN MHA3
SAN MHA4
SAN MHA5
CBMH1
OGS
HYD
MAIL
GAZEBO
PIN 64187–0168(LT)
PIN 64187–0165(LT)
PIN 64187–0169(LT)
PIN 64187–0214(LT)
PIN 64187–0163(LT)
PIN 64187–0162(LT)
RIDGE ROAD (PLAN 435)
PIN 64187 – 0189(LT)
FRONT CONCESSION LAKE ERIE
BROKEN
SUBJECT TO RIGHT–OF–WAY AS DESCRIBED IN RO108841 (SUBJECT LANDS) AND AS IN RO436195;
RO504444; RO361327; RO713640; RO287174; RO564900; BB18710
PIN 64187 – 0161 (R)
EX. CB
EX. SAN MH
EX. CBMH #28
EX. WV
EX. HYD
EX. H.HOLE
EX. IB
EX. CLF
EX. SSIB
EX. TOD
EX. IT
EX. IBØ
EX. IB(OU)
EX. IB(1321)
EX. IT(556)
EX. IT(OU)
EX. SHED
EX. DRIVEWAY
EX. PORCH
EX. CONCRETE
EX. HOUSE (NO. 2XX)
EX. GAZEBO
EX. PARKETTE
EX. BRICK
EX. CONCRETE BOX
EX. 2 semi-recessed waste disposal bin (1.7m)
EX. 6m wide private roadway
EX. 3m wide driveway
EX. 4m wide driveway
EX. 6m wide driveway
EX. 7m wide driveway
EX. 9m wide driveway
EX. 15m wide driveway
EX. 20m wide driveway
EX. 6.00m setback to private roadway
EX. 6.00m front yard setback
EX. 6.00m rear yard setback
EX. 7.50m rear yard setback
EX. 9.00m rear yard setback
EX. 1.50m side yard setback
EX. 4.50m side yard setback
EX. 6.00m side yard setback
EX. 7.50m side yard setback
EX. 9.00m side yard setback
EX. PRIVACY AREA
EX. FRONT YARD SETBACK
EX. 0.30ø
EX. 0.40ø
EX. 0.50ø
EX. 0.70ø
EX. 0.80ø
EX. 1.20ø
EX. 2.20ø
EX. 2.60ø
EX. 3.40ø
EX. 5.40ø
EX. 6.00m
EX. 7.50m
EX. 9.00m
EX. 15.00m
EX. 36.02
EX. 28.14
EX. 59.18 D2 & MEAS
EX. 58.83 D1 & SET
EX. 59.18 D2 & MEAS
EX. 2012 P1 & SET
EX. 34.90 (D4) OU
EX. 0.05 N
EX. 1.07 W
EX. 2.08
EX. 2.94
EX. 0.94
EX. 1.02
EX. 9.14
EX. 0.06
EX. 2.60
EX. 1.17
EX. 0.20
EX. 0.10
EX. 0.15
EX. 0.11 W
EX. 0.30 W
EX. 0.30 S
EX. 0.30 E
EX. 0.30 N

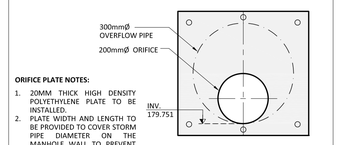


ONSITE STORMWATER MANAGEMENT REQUIREMENTS:

1. POST-DEVELOPMENT FLOWS TO MATCH WITH PRE-DEVELOPMENT CONDITIONS UNDER 5-YEAR & 100 YEAR STORM EVENTS.
2. STORMWATER MANAGEMENT ONSITE QUANTITY CONTROL REQUIRED STORAGE OF 112m^3 IS TO BE PROVIDED AT THE ALLOWABLE DISCHARGE RATE OF 0.035cms WITH AN ORIFICE SIZE OF 133mm DIAMETER.
3. REFER TO ADS STORMTECH DESIGN/DRAWINGS FOR UNDERGROUND STORAGE SYSTEM.

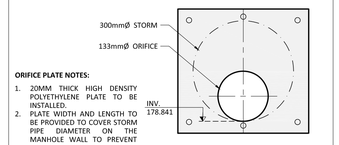


DETAIL "C"
N.T.S.



ORIFICE PLATE NOTES:
1. 20MM THICK HIGH DENSITY POLYETHYLENE PLATE TO BE INSTALLED.
2. PLATE WIDTH AND LENGTH TO BE PROVIDED TO COVER STORM PIPE DIAMETER ON THE MANHOLE WALL TO PREVENT LEAKAGE.
3. FASTENER SHALL BE STAINLESS STEEL 13MM X 95MM BOLT WITH NUT AND WASHER.
4. PLATE MUST BE SEALED TO PREVENT LEAKAGE.

ORIFICE PLATE DETAIL "B"
N.T.S.



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ORIFICE PLATE DETAIL "A"
N.T.S.

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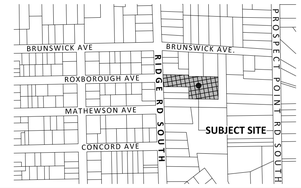

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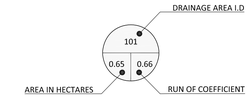
LICENSED PROFESSIONAL ENGINEER A. RAZZAK 100505914 OCT 12,2022 PROVINCE OF ONTARIO
ENGINEER'S STAMP

LEGEND

- EXISTING STORM SEWER & MANHOLE
- PROPOSED STORM SEWER & MANHOLE
- DIRECTION OF MAJOR DRAINAGE ROUTE
- STORM DRAINAGE AREA



PROJECT: 272 RIDGE ROAD SOUTH

OWNER: 5038257 ONTARIO INC (C/O CARIG DEVRIES)

MUNICIPALITY: TOWN OF FORT ERIE

STORM DRAINAGE AREA PLAN

PROJECT NUMBER: 22127
DRAWING: DWG-5

272 RIDGE ROAD SOUTH

	TOWN OF FORT ERIE
ARIK FILE NO.	22127
PROJECT NAME	272 RIDGE ROAD SOUTH
Storm Pipe Manning "n" Value	0.013

I = A*(t+B)^c	IDF Parameters (Town of Fort Erie)		
	2-YEAR STM	5-YEAR STM	100-YEAR STM
A	628.05	747.93	1083.55
c	-0.7960	-0.7680	-0.7350
B	6.652	6.800	6.618

TABLE C-1 - STORM SEWER ANALYSIS & DESIGN CALCULATIONS

ARIK ENGINEERING LTD.
Where Community Design & Develop
260 Nebo Road, Unit 205, Hamilton
Ontario, L8W 3K5
email: info@arikengineering.com
web: www.arikengineering.com
phone: +1-289-965-9772

	DESIGNED BY:	AR	DATE PREPARED:	October 7, 2022
	REVIEWED BY:	AR	DATE PRINT:	October 12, 2022

NOTES	U/S MANHOLE ID FROM	D/S MANHOLE ID TO	STORM FREQUENCY (YEAR)	AREA (HA)	CUMULATIVE AREA (HA)	COEFFICIENT OF RUNOFF (C)	AxC	CUMULATIVE (AxC)	INITIAL TIME OF CONCENTRATION (min)	TIME IN PIPE (min)	CUMULATIVE TIME (min)	INTENSITY I (mm/hr)	FLOW IN PIPE (m^3/s)	BASE FLOW (IF APPLICABLE)(m^3/s)	FLOW ADDED (m^3/s)	TOTAL DESIGN FLOW Q (m^3/s)	STM. SEWER LENGTH (m)	STM. SEWER DIAMETER (mm)	STM. SEWER SLOPE %	STM. SEWER CAPACITY (m^3/s)	STM. SEWER VELOCITY (m/s)	STM. SEWER % FULL
AREA 101	CB3	MH5	100-YEAR STM	0.078	0.078	0.66	0.051	0.051	10.00	0.13	10.13	137.32	0.020		0.000	0.020	6.50	300	0.34	0.059	0.81	33.3%
AREA 102	MH5	MH4	100-YEAR STM	0.141	0.219	0.66	0.093	0.145	10.13	0.82	10.96	136.51	0.055		0.000	0.055	39.50	375	0.25	0.091	0.80	59.9%
AREA 103	MH4	OGS	100-YEAR STM	0.040	0.259	0.66	0.026	0.171	10.96	0.47	11.42	131.79	0.063		0.000	0.063	22.50	375	0.25	0.091	0.80	68.4%
AREA 104	MH3	MH2	100-YEAR STM	0.071	0.110	0.66	0.047	0.073	10.27	0.86	11.13	135.68	0.027		0.000	0.027	41.50	300	0.34	0.059	0.81	46.4%
AREA 105	CB2	MH3	100-YEAR STM	0.039	0.039	0.66	0.026	0.026	10.00	0.27	10.27	137.32	0.010		0.000	0.010	13.50	250	0.45	0.042	0.82	23.6%
AREA 106	MH2	MH1	100-YEAR STM	0.088	0.198	0.66	0.058	0.131	11.13	0.32	11.45	130.83	0.047		0.000	0.047	15.50	375	0.25	0.091	0.80	51.9%
AREA 107	CB1	CBMH-1	100-YEAR STM	0.055	0.055	0.66	0.036	0.036	10.00	0.47	10.47	137.32	0.014		0.000	0.014	23.00	250	0.45	0.042	0.82	33.3%
AREA 108	CBMH-1	MH1	100-YEAR STM	0.014	0.069	0.66	0.009	0.046	10.47	0.18	10.64	134.55	0.017		0.000	0.017	8.50	300	0.34	0.059	0.81	28.9%
	MH1	OGS	100-YEAR STM	0.000	0.267	0.66	0.000	0.176	11.45	0.24	11.69	129.11	0.063		0.000	0.063	11.50	375	0.25	0.091	0.80	69.1%
	OGS	INLET	100-YEAR STM	0.000	0.526	0.66	0.000	0.347	11.69	0.08	11.77	127.87	0.123		0.000	0.123	5.50	450	0.40	0.188	1.15	65.6%
Allowable Discharge Rate (0.035 cms)	OUTLET	MH6	100-YEAR STM	0.000	0.000	0.66	0.000	0.000	10.00	0.11	10.11	137.32	0.000	0.035	0.035	0.035	5.20	300	0.34	0.059	0.81	59.4%
	MH6	EXSTM	100-YEAR STM	0.000	0.000	0.66	0.000	0.000	10.11	1.47	11.57	136.67	0.000		0.035	0.035	71.00	300	0.34	0.059	0.81	59.4%

MUNICIPALITY:	TOWN OF FORT ERIE
ARIK FILE NO.	22127
PROJECT NAME	272 RIDGE ROAD SOUTH

SANITARY DESIGN INFORMATION

Sanitary Flow Generation Rate =	320	L/Person/Day
Infiltration Rate =	0.280	L/S/Ha
Manning n	0.013	

Infiltration Rates	
Infill Developments	0.28 L/S/Ha
New Developments	0.15 L/S/Ha

TABLE C-2 SANITARY SEWER ANALYSIS & DESIGN CALCULATIONS

ARIK ENGINEERING LTD.
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phone: +1-289-965-9772

DESIGNED BY:	AR	Date Prepared	October 7, 2022
REVIEWED BY:	AR	Date Print	October 12, 2022

NOTES	U/S MANHOLE (ID) FROM	D/S MANHOLE (ID) TO	POPULATION DENSITY FACTOR	AREA (HA)	CUMULATIVE AREA (HA)	POPULATION DENSITY (PERSONS/HA)	POPULATION(No. of people)	CUMULATIVE POPULATION (No. of people)	PEAKING FACTOR	FLOW (Q) AVERAGE (l/s)	FLOW (Q) PEAK (l/s)	INFILTRATION FLOW (l/s)	TOTAL DESIGN FLOW (Q) (l/s)	SAN. SEWER LENGTH (m)	SAN. SEWER DIAMETER (mm)	SAN. SEWER SLOPE(%)	SAN. SEWER CAPACITY (l/s)	SAN. SEWER PERCENTAGE FULL (%)	SAN. SEWER VELOCITY (m/s)
	MHA5	MHA3	TOWNHOUSES	0.270	0.270	80	22	22	4.50	0.08	0.37	0.08	0.44	21.00	200	0.45	22.89	1.9%	0.71
	MHA4	MHA3	TOWNHOUSES	0.270	0.270	80	22	22	4.50	0.08	0.37	0.08	0.44	21.00	200	0.45	22.89	1.9%	0.71
	MHA3	MHA2	TOWNHOUSES	0.000	0.540	80	0	44	4.50	0.16	0.73	0.15	0.88	31.00	200	0.45	22.89	3.9%	0.71
	MHA2	MHA1	TOWNHOUSES	0.000	0.540	80	0	44	4.50	0.16	0.73	0.15	0.88	11.75	200	0.45	22.89	3.9%	0.71
	MHA1	EXSAN	TOWNHOUSES	0.000	0.540	80	0	44	4.50	0.16	0.73	0.15	0.88	76.60	200	0.45	22.89	3.9%	0.71

APPENDIX D

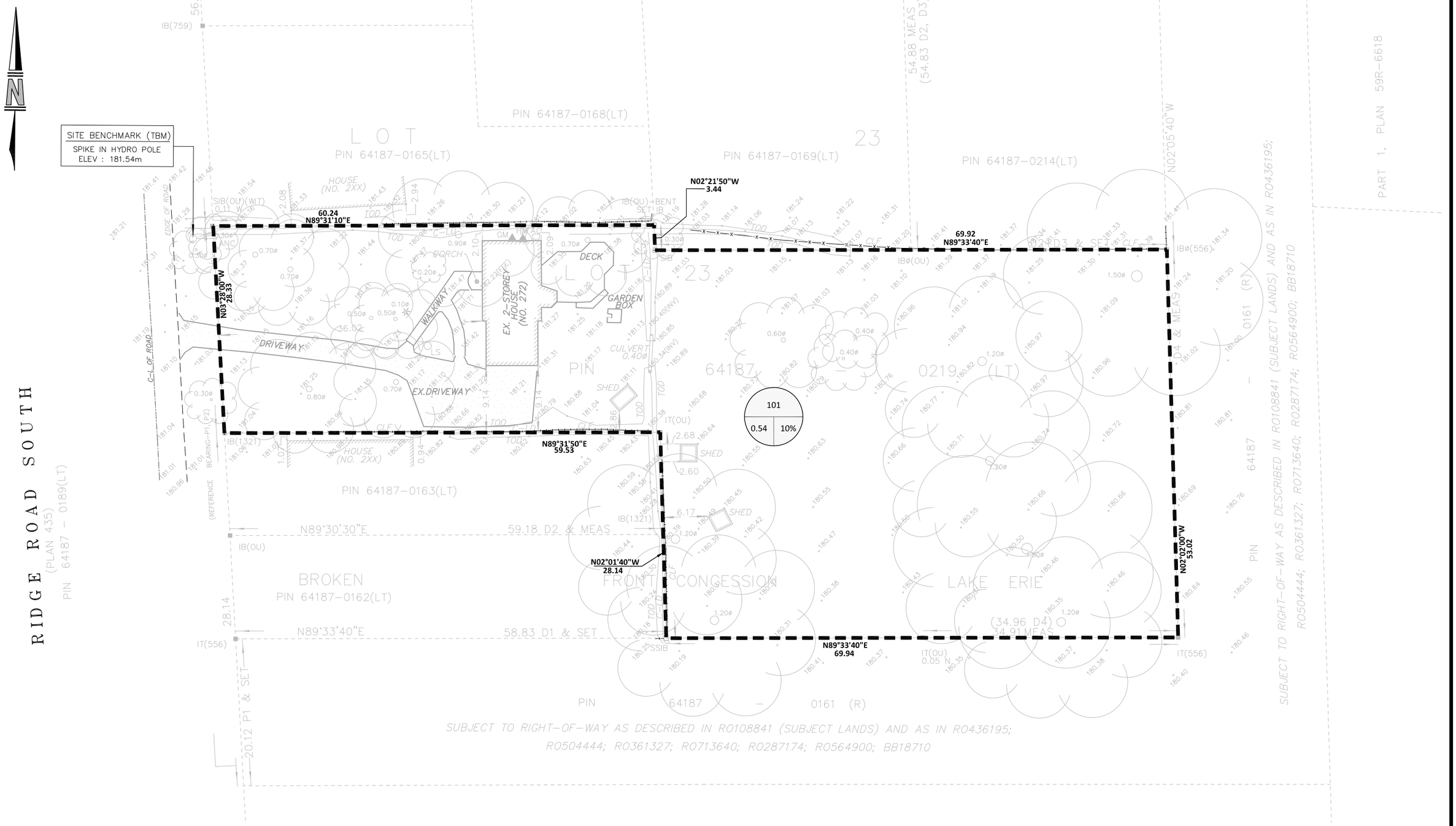
Figure D1: Pre-Development Draiange Area Plan

Figure D2: Post-Development Drainage Area Plan

Time of Concentration & Imperviousness Calculations

SWMHYMO Model Output Files

Stage, Storage & Dischrage Curves and Orifice Calculations



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LEGEND

- PRE-DEVELOPMENT DRAINAGE AREA
- DRAINAGE AREA I.D
- % IMPERVIOUSNESS
- AREA IN HECTARES

PROJECT:

272 RIDGE ROAD SOUTH
TOWN OF FORT ERIE

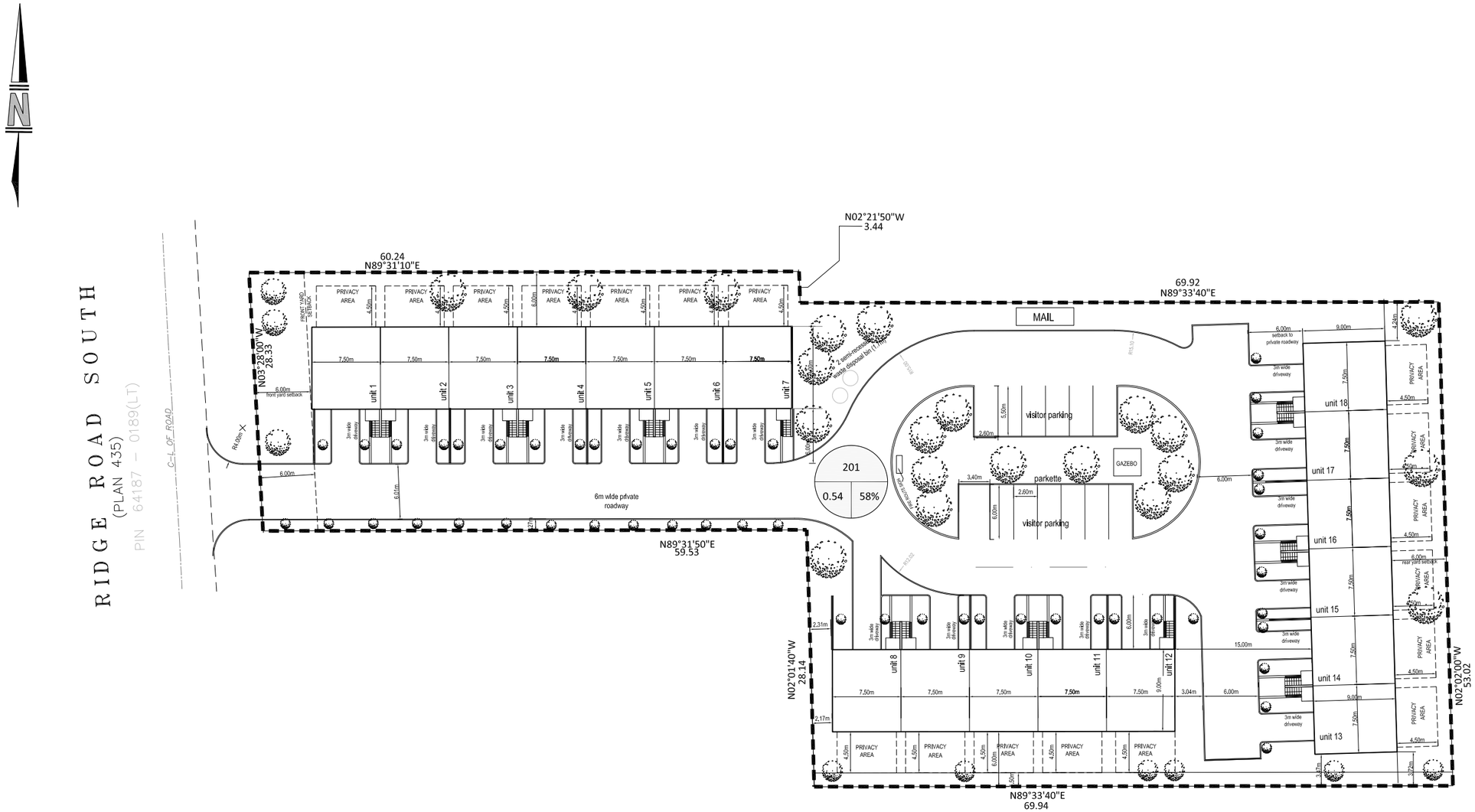
FIGURE -D1

PRE-DEVELOPMENT DRAINAGE AREA PLAN

DATE: OCTOBER 12, 2022
SCALE: 1:500
PROJECT NO. 22127

272 RIDGE ROAD SOUTH

d:\arik eng\jobs 2022\22127_272 ridge road south, town of fort erie\engineering\report\swm report\october 12, 2022\autocad drawing\current October 12, 2022 10:12 AM



ARIK ENGINEERING LTD.
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LEGEND

POST-DEVELOPMENT DRAINAGE AREA

201 — DRAINAGE AREA I.D

0.54 | 58% — % IMPERVIOUSNESS / AREA IN HECTARES

PROJECT:

272 RIDGE ROAD SOUTH
TOWN OF FORT ERIE

FIGURE -D2

POST-DEVELOPMENT DRAINAGE AREA PLAN

DATE: OCTOBER 12, 2022

SCALE: 1:500

PROJECT NO. 22127

272 RIDGE ROAD SOUTH

ENGINEERING
Where Community Design & Develop

272 RIDGE ROAD SOUTH, FORT ERIE

PRE-DVELOPMENT CONDITIONS - TIME OF CONCENTRATION

Airport Formula

For Runoff Coefficient up to 0.4

$$t_c = \frac{3.26(1.1 - C)L^{0.5}}{S^{0.33}} \text{ (min)}$$

C= Runoff Coefficient
L= Length of watershed (m)
S= Slope of watershed (%)

C	L	S	tc	Time of Peak Tp (=0.6Tc)	Velocity
	m	%	minute	hr	m/s
0.32	86	1.30	21.63	0.22	0.07

POST-DEVELOPMENT CONDITIONS IMPERVIOUSNESS CALCULATIONS

GRASS AREA	0.225	ha
IMPERVIOUS AREA	0.315	ha
TOTAL AREA	0.540	ha

IMP (% IMPERVIOUSNESS). 58 %

POST-DEVELOPMENT CONDITIONS RUNOFF COEFFICIENT CALCULATIONS

IMP= (C - 0.25)/0.70
C= (IMP x 0.70) +0.25

C (RUNOFF COEFFICIENT) 0.66

```
================================================================================

   SSSSS  W   W  M   M  H   H  Y   Y  M   M   OOO        999    999    =========
   S      W W W  MM MM  H   H   Y Y   MM MM  O   O      9   9  9   9
   SSSSS  W W W  M M M  HHHHH    Y    M M M  O   O  ##  9   9  9   9   Ver  4.05
       S   W W   M   M  H   H    Y    M   M  O   O       9999   9999   Sept 2011
   SSSSS   W W   M   M  H   H    Y    M   M   OOO           9      9   =========
                                                         9   9  9   9   # 3124689
        StormWater Management HYdrologic Model            999    999    =========

 ********************************************************************************
 ***************************** SWMHYMO Ver/4.05  ********************************
 *********  A single event and continuous hydrologic simulation model  *********
 *********     based on the principles of HYMO and its successors      *********
 *********                  OTTHYMO-83 and OTTHYMO-89.                  *********
 ********************************************************************************
 ********* Distributed by:  J.F. Sabourin and Associates Inc.          *********
 *********                  Ottawa,  Ontario: (613) 836-3884           *********
 *********                  Gatineau, Quebec: (819) 243-6858           *********
 *********                  E-Mail: swmhymo@jfsa.Com                   *********
 ********************************************************************************

 +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
 +++++++++ Licensed user: ARIK ENGINEERING LTD                          +++++++++
 +++++++++                Hannon                SERIAL#:3124689        +++++++++
 +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++

 ********************************************************************************
 *********           ++++++ PROGRAM ARRAY DIMENSIONS ++++++            *********
 *********           Maximum value for ID numbers  :     10           *********
 *********           Max. number of rainfall points: 105408           *********
 *********           Max. number of flow points    : 105408           *********
 ********************************************************************************


 ***********************   D E T A I L E D   O U T P U T   ***********************
 ********************************************************************************
 *         DATE: 2022-09-19     TIME: 09:16:46     RUN COUNTER: 000638         *
 ********************************************************************************
 * Input   filename: C:\SWMHYMO\272RIDG\NEWFOL~1\272RIDG.DAT                     *
 * Output  filename: C:\SWMHYMO\272RIDG\NEWFOL~1\272RIDG.out                     *
 * Summary filename: C:\SWMHYMO\272RIDG\NEWFOL~1\272RIDG.sum                     *
 * User comments:                                                               *
 * 1:_____________________________________________________________________________*
 * 2:_____________________________________________________________________________*
 * 3:_____________________________________________________________________________*
 ********************************************************************************

--------------------------------------------------------------------------------
--
```

```
001:0001----------------------------------------------------------------------------
--
*#**************************************************************************
*#  Project Name: 272 RIDGE ROAD SOUTH, FORT ERIE
*#  Project Numbe: 22127
*#  Date        : AUGUST 10, 2022
*#  Modeller    : ABDUL RAZZAK
*#  Company     : ARIK ENGINEERING LTD.
*#  License #   : 3124689
*#**************************************************************************
--------------------
| START            |  Project  dir.: C:\SWMHYMO\272RIDG\NEWFOL~1\

--------------------  Rainfall dir.: C:\SWMHYMO\272RIDG\NEWFOL~1\

    TZERO =   .00 hrs on        0
    METOUT=   2 (output = METRIC)
    NRUN  = 001
    NSTORM=   0
-------------------------------------------------------------------------------
--
001:0002----------------------------------------------------------------------------
--
*
*
*
*++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
*==================PRE-DEVELOPMENT CONDITIONS=======================
*++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
*
*
*#=================================================
*# 5-YEAR PRE-DEVELOPMENT DRAINAGE AREA 101 (0.54 HA)
*#=================================================
*
--------------------
| CHICAGO STORM    |    IDF curve parameters: A= 747.930
| Ptotal= 40.39 mm |                          B=   6.800
--------------------                          C=    .768
                       used in:   INTENSITY =  A / (t + B)^C

                       Duration of storm  =  3.00 hrs
                       Storm time step    = 10.00 min
                       Time to peak ratio =   .33

              TIME    RAIN |   TIME    RAIN |   TIME    RAIN |   TIME    RAIN
               hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr
               .17   4.218 |   1.00  85.669 |   1.83   7.319 |   2.67   4.036
               .33   5.164 |   1.17  30.359 |   2.00   6.244 |   2.83   3.726
               .50   6.774 |   1.33  16.549 |   2.17   5.465 |   3.00   3.465
```

```
               .67  10.200 |   1.50  11.512 |   2.33   4.875 |
               .83  23.439 |   1.67   8.910 |   2.50   4.411 |

-------------------------------------------------------------------------------
--
001:0003---------------------------------------------------------------------------
--
*
*
*
----------------------
| CALIB NASHYD       |   Area    (ha)=     .54   Curve Number   (CN)=80.00
| 01:000100 DT= 1.00 |   Ia      (mm)=    .800   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .220

     Unit Hyd Qpeak  (cms)=     .094

     PEAK FLOW       (cms)=     .024 (i)
     TIME TO PEAK    (hrs)=    1.233
     RUNOFF VOLUME    (mm)=   15.203
     TOTAL RAINFALL   (mm)=   40.389
     RUNOFF COEFFICIENT   =     .376

     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

-------------------------------------------------------------------------------
--
001:0004---------------------------------------------------------------------------
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*
*
*
*
*#=====================================================
*# 100-YEAR PRE-DEVELOPMENT DRAINAGE AREA 101 (0.54 HA)
*#=====================================================
*
--------------------
| CHICAGO STORM    |    IDF curve parameters: A=1083.550
| Ptotal= 69.58 mm |                          B=   6.618
--------------------                          C=    .735
                         used in:   INTENSITY =  A / (t + B)^C

                         Duration of storm  =  3.00 hrs
                         Storm time step    = 10.00 min
                         Time to peak ratio =   .33

               TIME    RAIN |   TIME    RAIN |   TIME    RAIN |   TIME    RAIN
                hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr
                .17   8.049 |   1.00 137.317 |   1.83  13.498 |   2.67   7.721
```

```
               .33   9.733 |   1.17  51.105 |   2.00  11.631 |   2.83   7.161
               .50  12.551 |   1.33  28.933 |   2.17  10.267 |   3.00   6.688
               .67  18.398 |   1.50  20.611 |   2.33   9.222 |
               .83  39.994 |   1.67  16.224 |   2.50   8.394 |

--------------------------------------------------------------------------------
--
001:0005--------------------------------------------------------------------------
--
*
*
----------------------
| CALIB NASHYD       |   Area    (ha)=     .54   Curve Number   (CN)=80.00
| 01:000100 DT= 1.00 |   Ia      (mm)=    .800   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .220

     Unit Hyd Qpeak  (cms)=     .094

     PEAK FLOW       (cms)=     .055 (i)
     TIME TO PEAK    (hrs)=    1.233
     RUNOFF VOLUME    (mm)=   35.765
     TOTAL RAINFALL   (mm)=   69.583
     RUNOFF COEFFICIENT   =     .514

     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
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001:0006--------------------------------------------------------------------------
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*++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
*==================POST-DEVELOPMENT CONDITIONS=====================
*++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
*
*
*#=======================================
*# 5-YEAR POST-DEVELOPMENT DRAINAGE AREA 201
*#=======================================
*#=========================================================================
*# 5-YEAR POST-DEVELOPMENT TO MATCH WITH PRE-DEVELOPMENT CONDITOINS
*#=========================================================================
*
--------------------
| CHICAGO STORM    |    IDF curve parameters: A= 747.930
| Ptotal= 40.39 mm |                          B=   6.800
--------------------                          C=    .768
```

used in: INTENSITY = A / (t + B)^C

Duration of storm = 3.00 hrs
Storm time step = 10.00 min
Time to peak ratio = .33

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.17	4.218	1.00	85.669	1.83	7.319	2.67	4.036
.33	5.164	1.17	30.359	2.00	6.244	2.83	3.726
.50	6.774	1.33	16.549	2.17	5.465	3.00	3.465
.67	10.200	1.50	11.512	2.33	4.875		
.83	23.439	1.67	8.910	2.50	4.411		

001:0007---
*
*
*

CALIB STANDHYD	Area (ha)= .54
01:000201 DT= 1.00	Total Imp(%)= 58.00 Dir. Conn.(%)= 58.00

		IMPERVIOUS	PERVIOUS (i)	
Surface Area	(ha)=	.31	.23	
Dep. Storage	(mm)=	.70	.80	
Average Slope	(%)=	2.00	2.00	
Length	(m)=	60.00	80.00	
Mannings n	=	.013	.250	
Max.eff.Inten.(mm/hr)	=	85.67	20.35	
over (min)		2.00	22.00	
Storage Coeff. (min)	=	1.62 (ii)	21.85 (ii)	
Unit Hyd. Tpeak (min)	=	2.00	22.00	
Unit Hyd. peak (cms)	=	.63	.05	
				TOTALS
PEAK FLOW	(cms)=	.07	.01	.076 (iii)
TIME TO PEAK	(hrs)=	1.00	1.35	1.000
RUNOFF VOLUME	(mm)=	39.69	15.20	29.405
TOTAL RAINFALL	(mm)=	40.39	40.39	40.389
RUNOFF COEFFICIENT	=	.98	.38	.728

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 80.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```
--------------------------------------------------------------------------------
--
001:0008--------------------------------------------------------------------------
--
*
*
*
*
*
*#============================================================
*# 5-YEAR ONSITE STORAGE @ 5-YEAR PRE-DEVELOPMENT OUTFLOW RATE
*#============================================================
*
---------------------
| ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
|  IN>01:(000201)   |
| OUT<02:(ONSITE)   |    =========  OUTLFOW STORAGE TABLE  =========
---------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                           (cms)    (ha.m.)   |    (cms)    (ha.m.)
                            .000  .0000E+00   |     .027  .6909E-02
                            .011  .1152E-02   |     .029  .8061E-02
                            .016  .2303E-02   |     .031  .9212E-02
                            .019  .3455E-02   |     .033  .1036E-01
                            .022  .4606E-02   |     .035  .1151E-01
                            .025  .5758E-02   |     .000  .0000E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     --------------------       (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (000201)        .54      .076     1.000     29.405
     OUTFLOW<02: (ONSITE)        .54      .023     1.217     29.405

                   PEAK   FLOW   REDUCTION [Qout/Qin](%)=   30.715
                   TIME SHIFT OF PEAK FLOW         (min)=    13.00
                   MAXIMUM  STORAGE   USED       (ha.m.)=.5187E-02

--------------------------------------------------------------------------------
--
001:0009--------------------------------------------------------------------------
--
*
*
*
*
*
*
*#=========================================
*# 100-YEAR POST-DEVELOPMENT DRAINAGE AREA 201
*#=========================================
*
*
```

```
*
--------------------
| CHICAGO STORM    |    IDF curve parameters: A=1083.550
| Ptotal= 69.58 mm |                          B=   6.618
--------------------                          C=    .735
                       used in:   INTENSITY =  A / (t + B)^C

                       Duration of storm  =  3.00 hrs
                       Storm time step    = 10.00 min
                       Time to peak ratio =   .33

              TIME    RAIN |   TIME    RAIN |   TIME    RAIN |   TIME    RAIN
               hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr
               .17   8.049 |   1.00 137.317 |   1.83  13.498 |   2.67   7.721
               .33   9.733 |   1.17  51.105 |   2.00  11.631 |   2.83   7.161
               .50  12.551 |   1.33  28.933 |   2.17  10.267 |   3.00   6.688
               .67  18.398 |   1.50  20.611 |   2.33   9.222 |
               .83  39.994 |   1.67  16.224 |   2.50   8.394 |

-------------------------------------------------------------------------------
--
001:0010----------------------------------------------------------------------
--
*
*
*#==============================================================================
*# 100-YEAR POST-DEVELOPMENT TO MATCH WITH 100-YEAR PRE-DEVELOPMENT CONDITOINS
*#==============================================================================
*
*
*
----------------------
| CALIB STANDHYD     |   Area    (ha)=     .54
| 01:000201 DT= 1.00 |   Total Imp(%)=   58.00   Dir. Conn.(%)=   58.00
----------------------
                             IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=        .31          .23
     Dep. Storage     (mm)=        .70          .80
     Average Slope     (%)=       2.00         2.00
     Length            (m)=      60.00        80.00
     Mannings n             =       .013         .250

     Max.eff.Inten.(mm/hr)=     137.32        54.58
               over (min)         1.00        15.00
     Storage Coeff.  (min)=       1.35 (ii)   14.97 (ii)
     Unit Hyd. Tpeak (min)=       1.00        15.00
     Unit Hyd. peak  (cms)=        .89          .08
                                                        *TOTALS*
     PEAK FLOW       (cms)=        .12          .02          .129 (iii)
     TIME TO PEAK    (hrs)=       1.00         1.22         1.000
```

```
     RUNOFF VOLUME    (mm)=      68.88        35.76         54.973
     TOTAL RAINFALL   (mm)=      69.58        69.58         69.583
     RUNOFF COEFFICIENT   =        .99          .51           .790

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN* =  80.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--
001:0011--------------------------------------------------------------------------
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*
*
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*
*
*#=================================================================
*# 100-YEAR ONSITE STORAGE @ 100-YEAR PRE-DEVELOPMENT OUTFLOW RATE
*#=================================================================
*
---------------------
| ROUTE RESERVOIR   |    Requested routing time step =  1.0 min.
|  IN>01:(000201)   |
| OUT<02:(ONSITE)   |    =========  OUTLFOW STORAGE TABLE  =========
---------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                           (cms)    (ha.m.)   |    (cms)    (ha.m.)
                            .000  .0000E+00   |     .027  .6909E-02
                            .011  .1152E-02   |     .029  .8061E-02
                            .016  .2303E-02   |     .031  .9212E-02
                            .019  .3455E-02   |     .033  .1036E-01
                            .022  .4606E-02   |     .035  .1151E-01
                            .025  .5758E-02   |     .000  .0000E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     --------------------       (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (000201)        .54      .129     1.000     54.973
     OUTFLOW<02: (ONSITE)        .54      .035     1.483     54.973

                   PEAK   FLOW   REDUCTION [Qout/Qin](%)=   26.815
                   TIME SHIFT OF PEAK FLOW         (min)=    29.00
                   MAXIMUM  STORAGE   USED       (ha.m.)=.1120E-01

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001:0012--------------------------------------------------------------------------
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*
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*
*
*
      FINISH
-------------------------------------------------------------------------------
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*******************************************************************************
**
     WARNINGS / ERRORS / NOTES
     -------------------------
   Simulation ended on 2022-09-19     at 09:16:47
===============================================================================
==
```
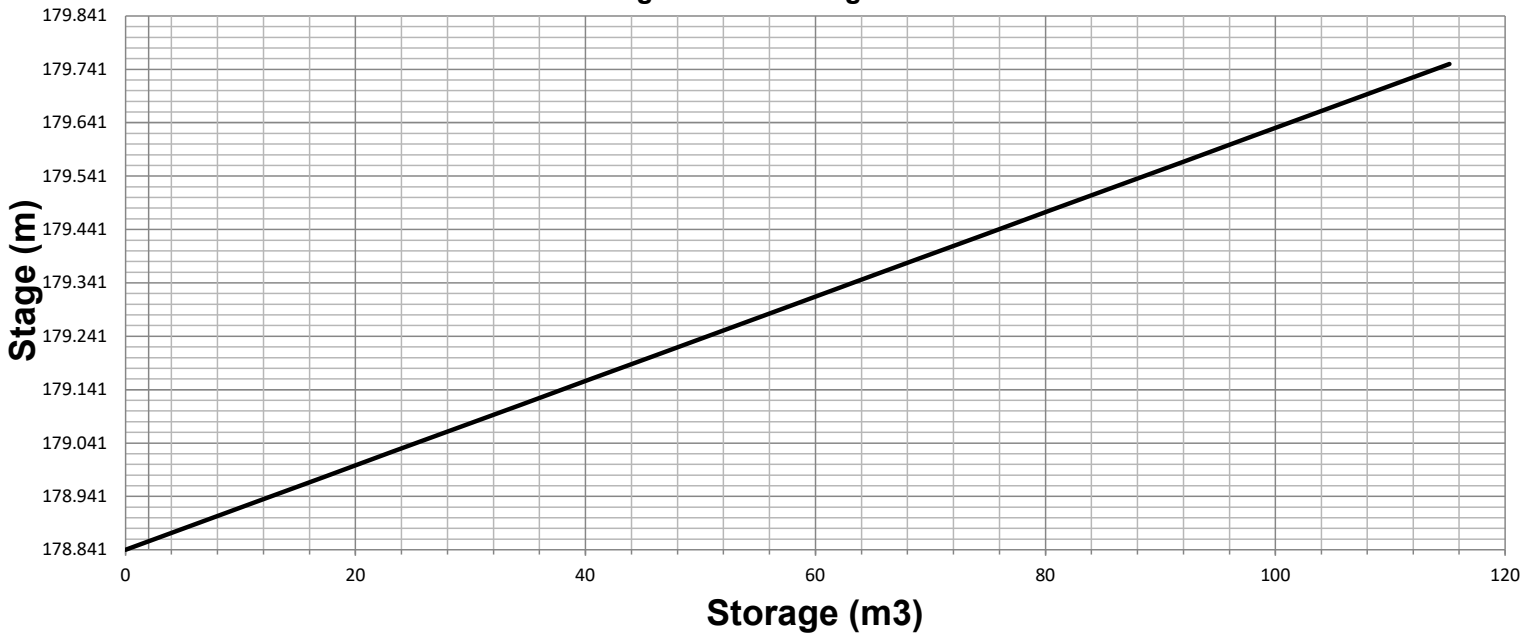

272 RIDGE ROAD SOUTH- STAGE vs STORAGE

Stage vs Storage			
Stage (M)	A (m2)	V (m3)	Cumulative V (m3)
178.841	222.00	0.00	0.00
178.932	222.00	11.52	11.52
179.023	222.00	11.52	23.03
179.114	222.00	11.52	34.55
179.205	222.00	11.52	46.06
179.296	222.00	11.52	57.58
179.387	222.00	11.52	69.09
179.478	222.00	11.52	80.61
179.569	222.00	11.52	92.12
179.660	222.00	11.52	103.64
179.751	222.00	11.52	115.15

Figure 1: 272 Ridge Road South Onsite Stormwater Management Stage Versus Storage Curve

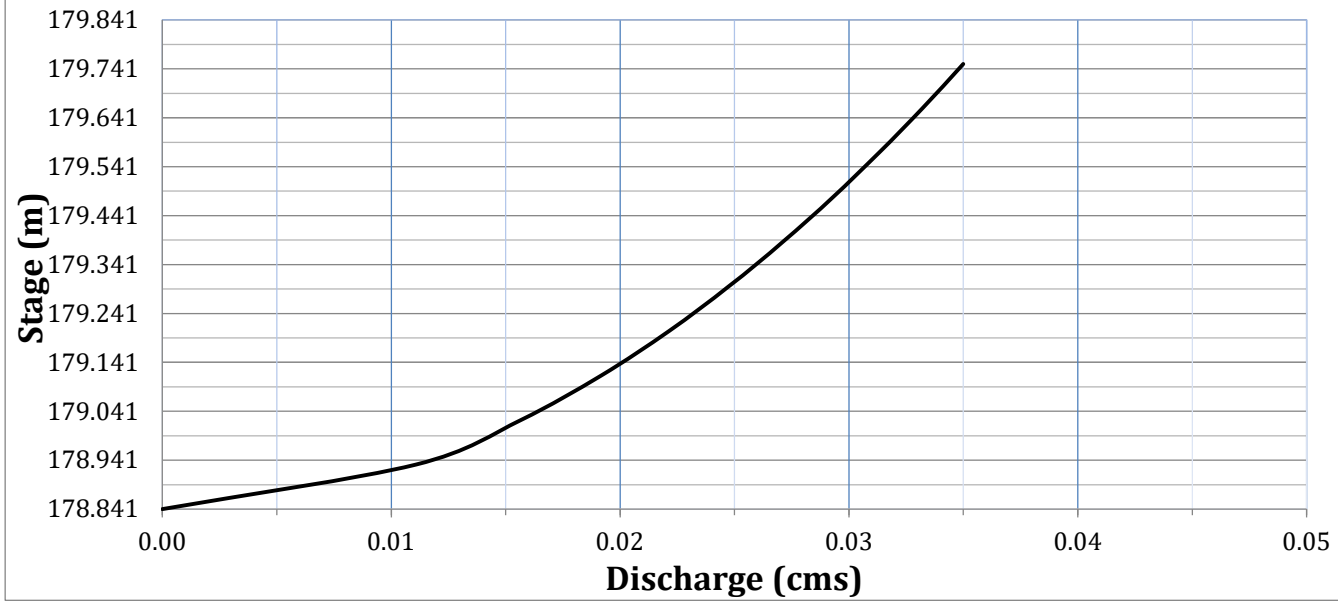


272 RIDGE ROAD SOUTH - STAGE vs DISCHARGE

Stage vs Discharge	
Stage (M)	Discharge (cms)
178.841	0.0000
178.932	0.0111
179.023	0.0157
179.114	0.0192
179.205	0.0221
179.296	0.0247
179.387	0.0271
179.478	0.0293
179.569	0.0313
179.660	0.0332
179.751	0.0350

ORIFICE CALCULATIONS		
Orifice Equation		
Q=Coef*A*SQR(2*g*h)		
Q (Max)=	0.0350	cms
Orifice Coef=	0.6	
Max Head=	0.91	m
Orifice Area=	0.01381	m2
Orifice Dia=	133	mm

Figure 2: 272 Ridge Road South Onsite Stormwater Management Stage Versus Discharge Curve



APPENDIX E

Stormwater Storage Chambers Design

Oil & Grit Separator (OGS) Design

PROJECT INFORMATION	
ENGINEERED PRODUCT MANAGER	
ADS SALES REP	
PROJECT NO.	

Advanced Drainage Systems, Inc.

SiteAssist™
FOR STORMTECH
INSTALLATION INSTRUCTIONS
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272 RIDGE ROAD SOUTH
FORT ERIE, CANADA

SC-740 STORMTECH CHAMBER SPECIFICATIONS

1. CHAMBERS SHALL BE STORMTECH SC-740.
2. CHAMBERS SHALL BE ARCH-SHAPED AND SHALL BE MANUFACTURED FROM VIRGIN, IMPACT-MODIFIED POLYPROPYLENE COPOLYMERS.
3. CHAMBERS SHALL BE CERTIFIED TO CSA B184, "POLYMERIC SUB-SURFACE STORMWATER MANAGEMENT STRUCTURES", AND MEET THE REQUIREMENTS OF ASTM F2418, "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
4. CHAMBER ROWS SHALL PROVIDE CONTINUOUS, UNOBSTRUCTED INTERNAL SPACE WITH NO INTERNAL SUPPORTS THAT WOULD IMPEDE FLOW OR LIMIT ACCESS FOR INSPECTION.
5. 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.
6. CHAMBERS SHALL BE DESIGNED, TESTED AND ALLOWABLE LOAD CONFIGURATIONS DETERMINED IN ACCORDANCE WITH ASTM F2787, "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS". LOAD CONFIGURATIONS SHALL INCLUDE: 1) INSTANTANEOUS (<1 MIN) AASHTO DESIGN TRUCK LIVE LOAD ON MINIMUM COVER 2) MAXIMUM PERMANENT (75-YR) COVER LOAD AND 3) ALLOWABLE COVER WITH PARKED (1-WEEK) AASHTO DESIGN TRUCK.
7. REQUIREMENTS FOR HANDLING AND INSTALLATION:
   - TO MAINTAIN THE WIDTH OF CHAMBERS DURING SHIPPING AND HANDLING, CHAMBERS SHALL HAVE INTEGRAL, INTERLOCKING STACKING LUGS.
   - TO ENSURE A SECURE JOINT DURING INSTALLATION AND BACKFILL, THE HEIGHT OF THE CHAMBER JOINT SHALL NOT BE LESS THAN 50 mm (2").
   - TO ENSURE THE INTEGRITY OF THE ARCH SHAPE DURING INSTALLATION, a) THE ARCH STIFFNESS CONSTANT AS DEFINED IN SECTION 6.2.8 OF ASTM F2418 SHALL BE GREATER THAN OR EQUAL TO 550 LBS/FT/%. AND b) TO RESIST CHAMBER DEFORMATION DURING INSTALLATION AT ELEVATED TEMPERATURES (ABOVE 23° C / 73° F), CHAMBERS SHALL BE PRODUCED FROM REFLECTIVE GOLD OR YELLOW COLORS.
8. ONLY CHAMBERS THAT ARE APPROVED BY THE SITE DESIGN ENGINEER WILL BE ALLOWED. UPON REQUEST BY THE SITE DESIGN ENGINEER OR OWNER, THE CHAMBER MANUFACTURER SHALL SUBMIT A STRUCTURAL EVALUATION FOR APPROVAL BEFORE DELIVERING CHAMBERS TO THE PROJECT SITE AS FOLLOWS:
   - THE STRUCTURAL EVALUATION SHALL BE SEALED BY A REGISTERED PROFESSIONAL ENGINEER.
   - THE STRUCTURAL EVALUATION SHALL DEMONSTRATE 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 SECTIONS 3 AND 12.12 OF THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS FOR THERMOPLASTIC PIPE.
   - THE TEST DERIVED CREEP MODULUS AS SPECIFIED IN ASTM F2418 SHALL BE USED FOR PERMANENT DEAD LOAD DESIGN EXCEPT THAT IT SHALL BE THE 75-YEAR MODULUS USED FOR DESIGN.
9. CHAMBERS AND END CAPS SHALL BE PRODUCED AT AN ISO 9001 CERTIFIED MANUFACTURING FACILITY.

IMPORTANT - NOTES FOR THE BIDDING AND INSTALLATION OF THE SC-740 SYSTEM

1. STORMTECH SC-740 CHAMBERS SHALL NOT BE INSTALLED UNTIL THE MANUFACTURER'S REPRESENTATIVE HAS COMPLETED A PRE-CONSTRUCTION MEETING WITH THE INSTALLERS.
2. STORMTECH SC-740 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH SC-310/SC-740/DC-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 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-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-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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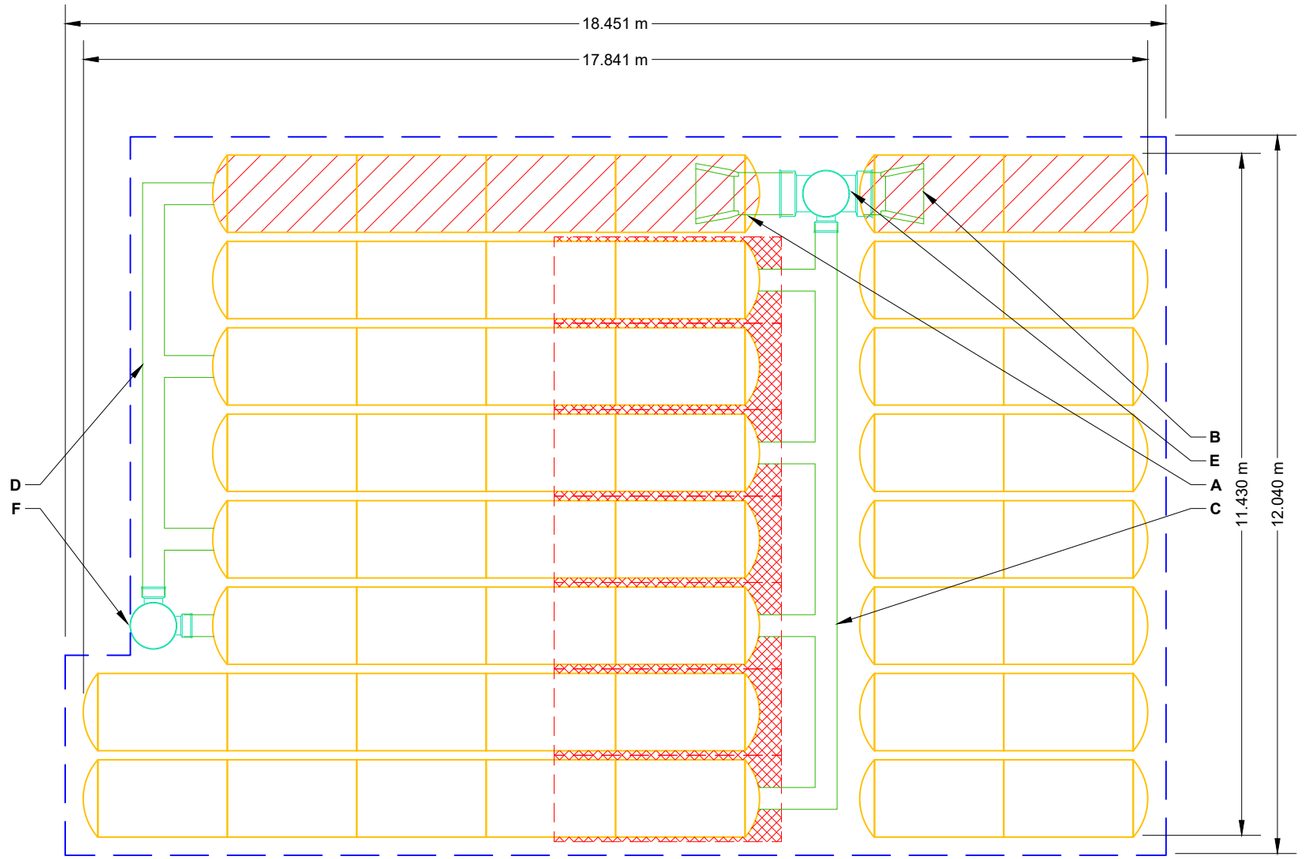
PROPOSED LAYOUT		PROPOSED ELEVATIONS	
50	STORMTECH SC-740 CHAMBERS	MAXIMUM ALLOWABLE GRADE (TOP OF PAVEMENT/UNPAVED):	182.086
32	STORMTECH SC-740 END CAPS	MINIMUM ALLOWABLE GRADE (UNPAVED WITH TRAFFIC):	180.257
152	STONE ABOVE (mm)	MINIMUM ALLOWABLE GRADE (UNPAVED NO TRAFFIC):	180.104
152	STONE BELOW (mm)	MINIMUM ALLOWABLE GRADE (TOP OF RIGID CONCRETE PAVEMENT):	180.104
40	STONE VOID	MINIMUM ALLOWABLE GRADE (BASE OF FLEXIBLE PAVEMENT):	180.104
129.8	INSTALLED SYSTEM VOLUME (m^3) (PERIMETER STONE INCLUDED) (COVER STONE INCLUDED) (BASE STONE INCLUDED)	TOP OF STONE:	179.800
		TOP OF SC-740 CHAMBER:	179.647
		300 mm x 300 mm TOP MANIFOLD INVERT:	179.203
		300 mm x 300 mm BOTTOM MANIFOLD INVERT:	178.916
212.6	SYSTEM AREA (m^2)	300 mm BOTTOM CONNECTION INVERT:	178.916
61.0	SYSTEM PERIMETER (m)	600 mm ISOLATOR ROW PLUS INVERT:	178.888
		BOTTOM OF SC-740 CHAMBER:	178.885
		BOTTOM OF STONE:	178.733

*INVERT ABOVE BASE OF CHAMBER

PART TYPE	ITEM ON LAYOUT	DESCRIPTION	INVERT*	MAX FLOW
PREFABRICATED EZ END CAP	A	600 mm BOTTOM PREFABRICATED EZ END CAP, PART#: SC740ECEZ / TYP OF ALL 600 mm BOTTOM CONNECTIONS AND ISOLATOR PLUS ROWS	3 mm	
FLAMP	B	INSTALL FLAMP ON 600 mm ACCESS PIPE / PART#: SC74024RAMP (TYP 2 PLACES)		
MANIFOLD	C	300 mm x 300 mm TOP MANIFOLD, ADS N-12	318 mm	
MANIFOLD	D	300 mm x 300 mm BOTTOM MANIFOLD, ADS N-12	30 mm	
NYLOPLAST (INLET W/ ISO PLUS ROW)	E	750 mm DIAMETER (610 mm SUMP MIN)		161 L/s IN
NYLOPLAST (OUTLET)	F	750 mm DIAMETER (DESIGN BY ENGINEER)		113 L/s OUT



ISOLATOR ROW PLUS
(SEE DETAIL/TYP 2 PLACES)

PLACE MINIMUM 3.810 m OF ADSPLUS125 WOVEN GEOTEXTILE OVER BEDDING STONE AND UNDERNEATH CHAMBER FEET FOR SCOUR PROTECTION AT ALL CHAMBER INLET ROWS

BED LIMITS

NOTES

- MANIFOLD SIZE TO BE DETERMINED BY SITE DESIGN ENGINEER. SEE TECH NOTE #6.32 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.
- THIS CHAMBER SYSTEM WAS DESIGNED WITHOUT SITE-SPECIFIC INFORMATION ON SOIL CONDITIONS OR BEARING CAPACITY. THE SITE DESIGN ENGINEER IS RESPONSIBLE FOR DETERMINING THE SUITABILITY OF THE SOIL AND PROVIDING THE BEARING CAPACITY OF THE INSITU SOILS. THE BASE STONE DEPTH MAY BE INCREASED OR DECREASED ONCE THIS INFORMATION IS PROVIDED.
- **NOT FOR CONSTRUCTION:** THIS LAYOUT IS FOR DIMENSIONAL PURPOSES ONLY TO PROVE CONCEPT & THE REQUIRED STORAGE VOLUME CAN BE ACHIEVED ON SITE.

272 RIDGE ROAD SOUTH
FORT ERIE, CANADA

DATE: | DRAWN: HN | CHECKED: N/A
PROJECT #:

DESCRIPTION	CHK	DRW	DATE

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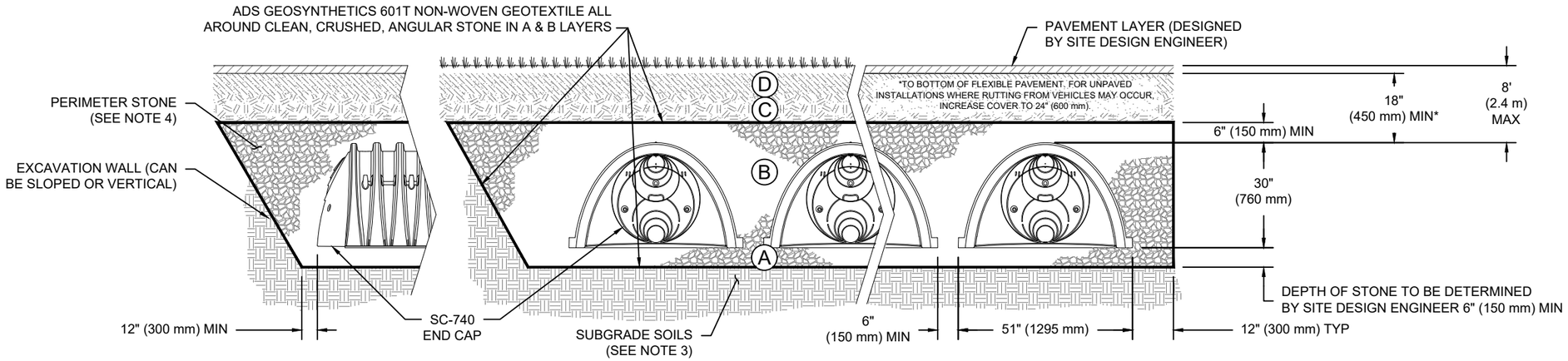
ADS
4640 TRUEMAN BLVD
HILLIARD, OH 43026
1-800-733-7473

SCALE = 1 : 100

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	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	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.
4. 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.



NOTES:

1. CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F2418, "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) 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. 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.
4. PERIMETER STONE MUST BE EXTENDED HORIZONTALLY TO THE EXCAVATION WALL FOR BOTH VERTICAL AND SLOPED EXCAVATION WALLS.
5. REQUIREMENTS FOR HANDLING AND INSTALLATION:
   - TO MAINTAIN THE WIDTH OF CHAMBERS DURING SHIPPING AND HANDLING, CHAMBERS SHALL HAVE INTEGRAL, INTERLOCKING STACKING LUGS.
   - TO ENSURE A SECURE JOINT DURING INSTALLATION AND BACKFILL, THE HEIGHT OF THE CHAMBER JOINT SHALL NOT BE LESS THAN 2".
   - TO ENSURE THE INTEGRITY OF THE ARCH SHAPE DURING INSTALLATION, a) THE ARCH STIFFNESS CONSTANT SHALL BE GREATER THAN OR EQUAL TO 550 LBS/FT/%. THE ASC IS DEFINED IN SECTION 6.2.8 OF ASTM F2418. AND b) TO RESIST CHAMBER DEFORMATION DURING INSTALLATION AT ELEVATED TEMPERATURES (ABOVE 73° F / 23° C), CHAMBERS SHALL BE PRODUCED FROM REFLECTIVE GOLD OR YELLOW COLORS.

272 RIDGE ROAD SOUTH
FORT ERIE, CANADA
DATE:
DRAWN: HN
PROJECT #:
CHECKED: N/A

DATE	DRW	CHK	DESCRIPTION

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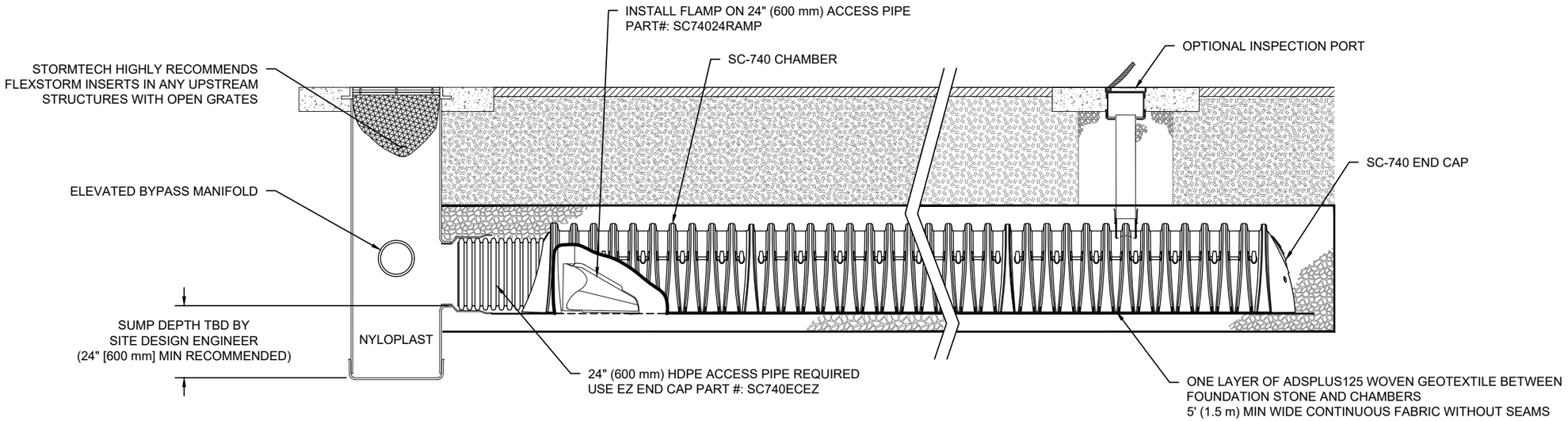

SC-740 ISOLATOR ROW PLUS DETAIL
NTS

INSPECTION & MAINTENANCE

STEP 1) INSPECT ISOLATOR ROW PLUS 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 PLUS 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 PLUS ROWS
  - B.1. REMOVE COVER FROM STRUCTURE AT UPSTREAM END OF ISOLATOR ROW PLUS
  - B.2. USING A FLASHLIGHT, INSPECT DOWN THE ISOLATOR ROW PLUS 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 PLUS 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.

272 RIDGE ROAD SOUTH
FORT ERIE, CANADA
DRAWN: HN
CHECKED: N/A
DATE:
PROJECT #:

DATE	DRW	CHK	DESCRIPTION

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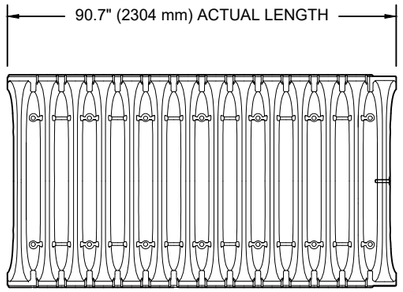
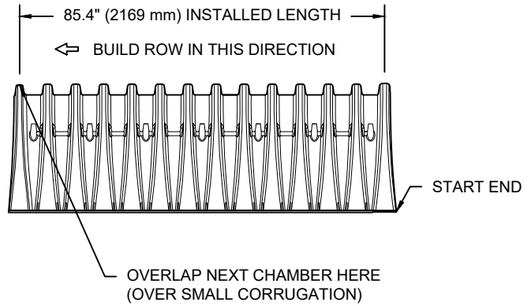
Chamber System
888-892-2694 | WWW.STORMTECH.COM

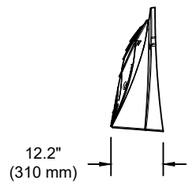
ADS
4640 TRUEMAN BLVD
HILLIARD, OH 43026
1-800-733-7473

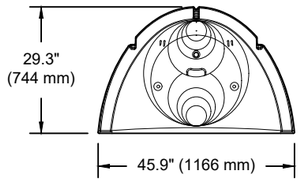
SC-740 TECHNICAL SPECIFICATION

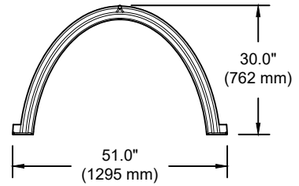
NTS







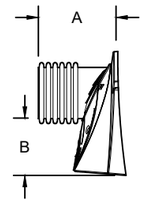


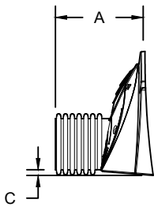


NOMINAL CHAMBER SPECIFICATIONS

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 STUB AT BOTTOM OF END CAP WITH FLAMP END WITH "BR"
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)
SC740ECEZ*	24" (600 mm)	18.5" (470 mm)	---	0.1" (3 mm)

ALL STUBS, EXCEPT FOR THE SC740ECEZ 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 SC740ECEZ 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

272 RIDGE ROAD SOUTH
FORT ERIE, CANADA
DATE:
DRAWN: HN
PROJECT #:
CHECKED: N/A

DATE	DRW	CHK	DESCRIPTION

StormTech®
Chamber System
888-892-2694 | WWW.STORMTECH.COM

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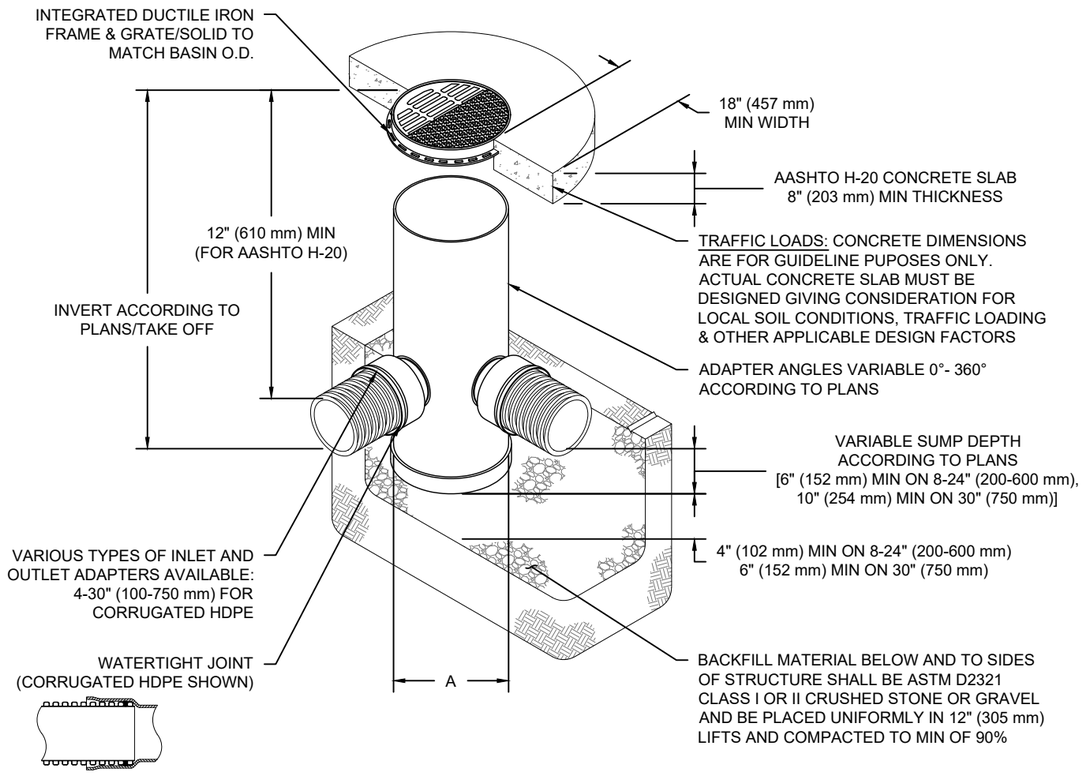
THIS DRAWING HAS BEEN PREPARED BASED ON INFORMATION PROVIDED TO ADS UNDER THE DIRECTION OF THE SITE DESIGN ENGINEER SHALL REVIEW THIS DRAWING PRIOR TO CONSTRUCTION. IT IS THE ULTIMATE RESPONSIBILITY OF THE SITE DESIGN ENGINEER TO ENSURE THAT THE PRODUCT(S) DEPICTED AND ALL ASSOCIATED DETAILS MEET ALL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

NYLOPLAST DRAIN BASIN

NTS



NOTES

1. 8-30" (200-750 mm) GRATES/SOLID COVERS SHALL BE DUCTILE IRON PER ASTM A536 GRADE 70-50-05
2. 12-30" (300-750 mm) FRAMES SHALL BE DUCTILE IRON PER ASTM A536 GRADE 70-50-05
3. DRAIN BASIN TO BE CUSTOM MANUFACTURED ACCORDING TO PLAN DETAILS
4. DRAINAGE CONNECTION STUB JOINT TIGHTNESS SHALL CONFORM TO ASTM D3212 FOR CORRUGATED HDPE (ADS & HANCOR DUAL WALL) & SDR 35 PVC
5. FOR COMPLETE DESIGN AND PRODUCT INFORMATION: **WWW.NYLOPLAST-US.COM**
6. TO ORDER CALL: **800-821-6710**

A	PART #	GRATE/SOLID COVER OPTIONS		
8" (200 mm)	2808AG	PEDESTRIAN LIGHT DUTY	STANDARD LIGHT DUTY	SOLID LIGHT DUTY
10" (250 mm)	2810AG	PEDESTRIAN LIGHT DUTY	STANDARD LIGHT DUTY	SOLID LIGHT DUTY
12" (300 mm)	2812AG	PEDESTRIAN AASHTO H-10	STANDARD AASHTO H-20	SOLID AASHTO H-20
15" (375 mm)	2815AG	PEDESTRIAN AASHTO H-10	STANDARD AASHTO H-20	SOLID AASHTO H-20
18" (450 mm)	2818AG	PEDESTRIAN AASHTO H-10	STANDARD AASHTO H-20	SOLID AASHTO H-20
24" (600 mm)	2824AG	PEDESTRIAN AASHTO H-10	STANDARD AASHTO H-20	SOLID AASHTO H-20
30" (750 mm)	2830AG	PEDESTRIAN AASHTO H-20	STANDARD AASHTO H-20	SOLID AASHTO H-20

272 RIDGE ROAD SOUTH
FORT ERIE, CANADA
DATE:
DRAWN: HN
PROJECT #:
CHECKED: N/A

DATE	DRW	CHK	DESCRIPTION

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Nyloplast®
770-932-2443 | WWW.NYLOPLAST-US.COM
ADS.
4640 TRUEMAN BLVD
HILLIARD, OH 43026
1-800-733-7473

CBMH1

STM MH1

OGS

CB

PROP. STM. 11.5m-375mmØ
@ 0.25% PVC SDR 35

PROP. STM. 22.5m-375mmØ
@ 0.25% PVC SDR 35

CB

WEST INVERT OF MH6, SE
DETAIL "A" FOR ORIFICE.

PROP. STM. 15.5m-375mmØ
@ 0.25% PVC SDR 35

UNDERGROUND STORMWATER
STORMTECH ADS STORAGE SYSTEM 18.5mx12.0m.
(SEE ADS DRAWINGS)
REQUIRED STORAGE 112m³.

OUTLET
INV. 178.888

CB

STM MH2

WV

STM MH6

SAN MHA1

DCB

SAN MHA2

PROP. SAN. 31.0m-200mmØ
@ 0.45% PVC SDR 35

PROP. WATER MAIN PVC 150mmØ PVC DR18

WV

CB

GAZEBO

visitor parking

Project: **272 Ridge Road South**

Chamber Model -	SC-740	
Units -	**Metric**	
Number of chambers -	50	
Voids in the stone (porosity) -	40	%
Base of Stone Elevation -	178.73	m
Amount of Stone Above Chambers -	152	mm
Amount of Stone Below Chambers -	152	mm
	212.64	sq.meters

Min. Area - 157. sq.meters

StormTech SC-740 Cumulative Storage Volumes

Height of System *(mm)*	Incremental Single Chamber *(cubic meters)*	Incremental Total Chamber *(cubic meters)*	Incremental Stone *(cubic meters)*	Incremental Ch & St *(cubic meters)*	Cumulative Chamber *(cubic meters)*	Elevation *(meters)*
1067	0.00	0.00	2.16	2.16	129.780	179.80
1041	0.00	0.00	2.16	2.16	127.619	179.77
1016	0.00	0.00	2.16	2.16	125.459	179.75
991	0.00	0.00	2.16	2.16	123.298	179.72
965	0.00	0.00	2.16	2.16	121.137	179.70
940	0.00	0.00	2.16	2.16	118.977	179.67
914	0.00	0.08	2.13	2.21	116.816	179.64
889	0.00	0.23	2.07	2.30	114.609	179.62
864	0.01	0.40	2.00	2.40	112.310	179.59
838	0.02	0.86	1.82	2.67	109.910	179.57
813	0.02	1.14	1.71	2.84	107.236	179.54
787	0.03	1.35	1.62	2.97	104.395	179.52
762	0.03	1.52	1.55	3.07	101.426	179.49
737	0.03	1.67	1.49	3.16	98.353	179.47
711	0.04	1.79	1.44	3.24	95.190	179.44
686	0.04	1.92	1.39	3.31	91.954	179.42
660	0.04	2.06	1.34	3.40	88.642	179.39
635	0.04	2.16	1.30	3.46	85.246	179.37
610	0.04	2.24	1.26	3.50	81.791	179.34
584	0.05	2.33	1.23	3.56	78.286	179.31
559	0.05	2.41	1.20	3.60	74.730	179.29
533	0.05	2.48	1.17	3.65	71.126	179.26
508	0.05	2.55	1.14	3.69	67.476	179.24
483	0.05	2.63	1.11	3.74	63.784	179.21
457	0.05	2.68	1.09	3.77	60.048	179.19
432	0.05	2.74	1.07	3.80	56.279	179.16
406	0.06	2.80	1.04	3.84	52.475	179.14
381	0.06	2.85	1.02	3.87	48.637	179.11
356	0.06	2.90	1.00	3.90	44.769	179.09
330	0.06	2.94	0.99	3.92	40.871	179.06
305	0.06	2.98	0.97	3.95	36.948	179.03
279	0.06	3.02	0.95	3.97	32.999	179.01
254	0.06	3.05	0.94	3.99	29.028	178.98
229	0.06	3.08	0.93	4.01	25.037	178.96
203	0.06	3.11	0.92	4.03	21.027	178.93
178	0.06	3.13	0.91	4.04	16.999	178.91
152	0.00	0.00	2.16	2.16	12.963	178.88
127	0.00	0.00	2.16	2.16	10.803	178.86
102	0.00	0.00	2.16	2.16	8.642	178.83
76	0.00	0.00	2.16	2.16	6.482	178.81
51	0.00	0.00	2.16	2.16	4.321	178.78
25	0.00	0.00	2.16	2.16	2.161	178.76

ADS OGS Sizing Summary

Project Name:	272 Ridge Road South
Consulting Engineer:	ARIK Engineering Ltd
Location:	Fort Erie, Ontario
Sizing Completed By:	Haider Nasrullah

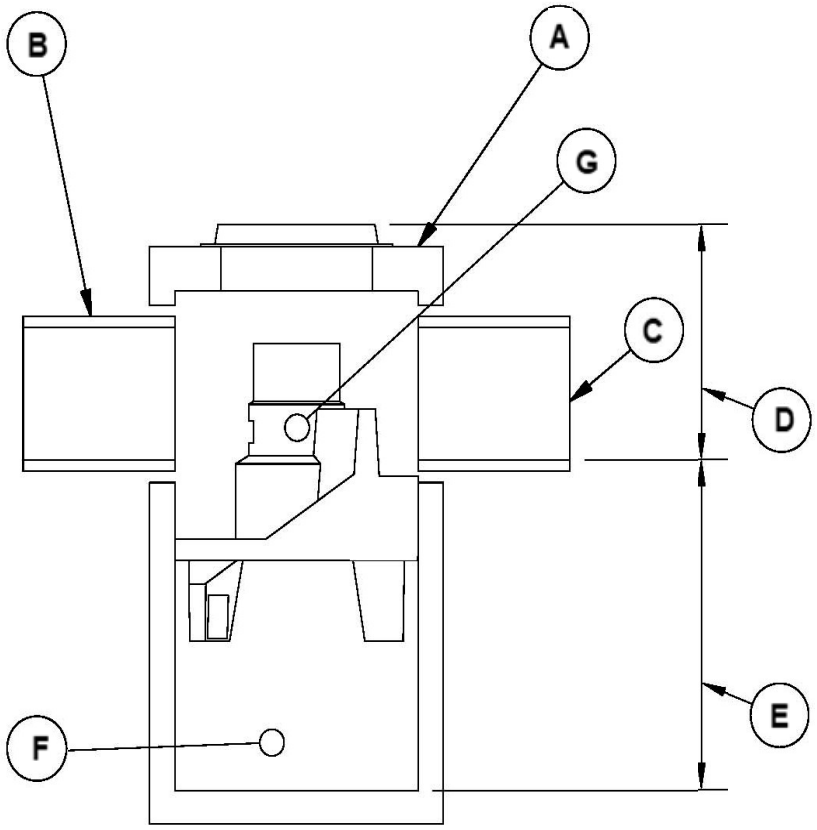
Email: haider.nasrullah@adspipe.com

Treatment Requirements		
Treatment Goal:	Enhanced (MOE)	
Selected Parameters:	80% TSS	90% Volume
Selected Unit:	**FD-4HC**	

Site Details	
Site Area:	0.54 ha
% Impervious:	58%
Rational C:	0.66
Rainfall Station:	Niagara Falls, ONT
Particle Size Distribution:	Fine
Peak Flowrate:	-

Summary of Results		
Model	**TSS Removal**	**Volume Treated**
FD-4HC	92.0%	99.9%
FD-5HC	95.0%	99.9%
FD-6HC	96.0%	99.9%
FD-8HC	98.0%	99.9%

FD-4HC Specification	
Unit Diameter (A):	1,200 mm
Inlet Pipe Diameter (B):	375, 375 mm
Outlet Pipe Diameter (C):	450 mm
Height, T/G to Outlet Invert (D):	2088 mm
Height, Outlet Invert to Sump (E):	1515 mm
Sediment Storage Capacity (F):	0.78 m³
Oil Storage Capacity (G):	723 L
Recommended Sediment Depth for Maintenance:	440 mm
Max. Pipe Diameter:	600 mm
Peak Flow Capacity:	510 L/s



Site Elevations:	
Rim Elevation:	181.01
Inlet Pipe Elevation:	178.952, 178.982
Outlet Pipe Elevation:	178.92

Notes:

Removal efficiencies are based on NJDEP Test Protocols and independently verified.

All units supplied by ADS have numerous local, provincial, and international certifications (copies of which can be provided upon request). The design engineer is responsible for ensuring compliance with applicable regulations.

Project Name:	272 Ridge Road South
Consulting Engineer:	ARIK Engineering Ltd
Location:	Fort Erie, Ontario

Net Annual Removal Efficiency Summary: FD-4HC

Rainfall Intensity[1]	Fraction of Rainfall[1]	FD-4HC Removal Efficiency[2]	Weighted Net-Annual Removal Efficiency
mm/hr	%	%	%
0.50	0.0%	100.0%	0.0%
1.00	11.2%	100.0%	11.2%
1.50	18.6%	100.0%	18.6%
2.00	13.3%	97.6%	12.9%
2.50	2.9%	95.6%	2.8%
3.00	1.5%	94.0%	1.4%
3.50	8.9%	92.6%	8.2%
4.00	5.6%	91.5%	5.2%
4.50	1.0%	90.5%	0.9%
5.00	5.5%	89.6%	4.9%
6.00	4.3%	88.1%	3.7%
7.00	4.4%	86.9%	3.8%
8.00	3.5%	85.8%	3.0%
9.00	2.1%	84.8%	1.8%
10.00	2.3%	84.0%	2.0%
20.00	9.9%	78.8%	7.8%
30.00	2.7%	75.9%	2.1%
40.00	1.1%	73.9%	0.8%
50.00	0.6%	72.3%	0.4%
100.00	0.5%	67.8%	0.4%
150.00	0.1%	65.3%	0.0%
200.00	0.0%	63.6%	0.0%
		Total Net Annual Removal Efficiency:	92.0%
		Total Runoff Volume Treated:	99.9%

Notes:

(1) Rainfall Data: 1965:1990, HLY03, Niagara Falls, ONT, 6135638.

(2) Based on third party verified data and appoximating the removal of a PSD similar to the STC Fine distribution

(3) Rainfall adjusted to 5 min peak intensity based on hourly average.