Stormwater Management Report

Shell Canada
Heritage Hills, Ottawa, ON

January, 2019

Quality information

Prepared by	Checked by	Approved by
		
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Revision History

Revision	Revision date	Details	Authorized	Name	Position

Distribution List

# Hard Copies	PDF Required	Association / Company Name

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Executive Summary

AECOM has been retained by Shell Canada Products to design and construct the proposed commercial development on the parcel of land located at the northwest corner of Terry Fox Drive and Kanata Road in the City of Ottawa, Ontario. The Shell site encompasses the east half of the Heritage Hills Plaza. AECOM has completed this storm water management report to support the development application.

The Heritage Hills Plaza is currently draining through a 1200 mm diameter municipal storm sewer located near the intersection of Kanata Avenue and Terry Fox Drive. Pre-development peak runoff rates generated in the 5-year and 100-year storm events were determined to be 68.2 L/s and 117.0 L/s respectively. The post-development runoff rate is required to be controlled to maximum rate equalling the pre-development 5-year storm event rate of 68.2 L/s.

A small landscaped portion of the Shell property will runoff uncontrolled into the City's system at a rate of 3.7 L/s during the 100 year storm event. Removing this flow from the maximum allowable discharge rate provides a maximum discharge rate from the Shell property underground storm system of 64.5 L/s.

A 150 mm orifice plate was determined to restrict flow to a rate of 68.5 L/s, very closely matching the desired rate of 64.5l/s.

The excess stormwater will be retained in the underground storm infrastructure to attenuate the flow rate. The available storage capacity provided is 92.6 cu.m, exceeding the required volume of 86.6 cu.m.

The stormwater quality will be maintained by installing Stormceptor EOS-750. The EOS-750 will provide 80% TSS removal and capture 1,380 L of oil.

Site grading was targeted to capture the stormwater internally and maintain the existing drainage patterns. Erosion and sediment control measures were also proposed during the construction period.

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1. Introduction

AECOM has been retained by Shell Canada Products to design and construct the proposed commercial development on the parcel of land located at the north west corner of Terry Fox Drive and Kanata Road in the City of Ottawa, Ontario. AECOM has completed this storm water management report to support the development application.

The subject parcel of land was part of Heritage Hills Retail Plaza Site being developed by numbered company “7873794 Canada Inc.” through their engineers NOVATECH. A Development Servicing Study and Stormwater Management Report (R-2018-158) prepared by NOVATECH addressed the storm drainage from the west half of Heritage Hills Plaza, as shown in the NOVATECH Drawing 118133-SWM (attached in Appendix A - Figures). This report should be reviewed in conjunction with the NOVATECH’s report. The stormwater management criteria for the Shell site has been confirmed with the City by NOVATECH and communicated to AECOM through e-mail (copy attached in Appendix C – Correspondence).

2. Pre-Development Runoff

Heritage Hills Plaza is currently draining through a 1200 mm diameter municipal storm sewer located near the intersection of Kanata Avenue and Terry Fox Drive. The pre-development runoff co-efficient was assessed to be 0.2. The pre-development peak runoff rate in a 5-year storm event and 100-year storm event has been calculated based on City of Ottawa IDF. The time of concentration was assumed to be 10 minutes. The runoff results in 5 year and 100-year storm events are shown in the Table 2.1.

Table 2.1: Predevelopment Peak Runoff

Storm		5 Year	100 Year
IDF Coefficients	a)	998.071	1735.688
	b)	6.053	6.014
	c)	0.814	0.82
Tc		10 min	10 min
Area		1.179 Ha	1.179 Ha
Intensity		104.19 mm/hr	178.56 mm/hr
C		0.20	0.20
Peak Runoff		68.2 L/s	117.0 L/s

3. Post Development Runoff

The site has been divided into 9 sub-catchment areas according to their drainage pattern as shown in Figure C104.0 (Appendix A). Two catchments (A-1 and A-2) are in Heritage Hills Plaza which will drain through the Shell property and its drainage system. Eight sub-catchments, Sub-catchments A1 – A8 are controlled and drain through the storm sewer system. Sub-catchment 9 is uncontrolled, draining away from the property. The uncontrolled sub-catchment is the landscaped areas draining to the south and east. The post development runoff coefficients have been calculated for both controlled and uncontrolled areas and are shown in Table 3.1 and Table 3.2 below.

Table 3.1: Post Development Runoff Coefficient Calculation (Controlled Area)

Catchment		Area 1	Area 2	Area 3	Area 4	Area 5	Area 6	Area 7	Area 8	Total
	C	(m^2)	(m^2)	(m^2)	(m^2)	(m^2)	(m^2)	(m^2)	(m^2)	(m^2)
Building Roof	0.90	0	0	220	110	0	0	0	0	330
Hard Surface	0.90	687	463	314	315	340	680	350	996	4145
Landscape	0.25	33	57	76	46	0	0	0	274	485
Total Area		720	520	610	470	340	680	350	1270	4960
Composite C		0.87	0.83	0.82	0.84	0.90	0.90	0.90	0.76	0.84

Table 3.2: Post Development Runoff Coefficient Calculation (Uncontrolled Area)

Catchment		Area 9	Total
	C	(m^2)	(m^2)
Building Roof	0.90	0	0
Hard Surface	0.90	0	0
Landscape	0.25	297	297
Total Area		297	297
Composite C		0.25	0.25

Post Development runoff for the 5 year and 100-year storm events for both controlled and uncontrolled areas were calculated using a 10 minute concentration time. The details are given in Table 3.3 and Table 3.4.

Table 3.3: Post-Development Peak Runoff - Controlled Area

Storm		5 Year	100 Year
IDF Coefficients	a)	998.071	1735.688
	b)	6.053	6.014
	c)	0.814	0.82
Tc		10 min	10 min
Area		0.496 Ha	0.496 Ha
Intensity		104.2 mm/hr	178.6 mm/hr
C		0.84	0.84
Peak Runoff		120.1 L/s	205.8 L/s

Table 3.4: Post-Development Peak Runoff – Uncontrolled Area

Storm		5 Year	100 Year
IDF Coefficients	a)	998.071	1735.688
	b)	6.053	6.014
	c)	0.814	0.82
Tc		10 min	10 min
Area		0.030 Ha	0.030 Ha
Intensity		104.2 mm/hr	178.6 mm/hr
C		0.25	0.25
Peak Runoff		2.2 L/s	3.7 L/s

4. Stormwater discharge

The post-development flow from a 100 year storm event shall not exceed the pre-development runoff for the five (5) year storm event. Since there is one subcatchment that has uncontrolled flow away from site, allowable discharge from the site has been calculated by subtracting 100-year uncontrolled flow from 5-year predevelopment flow and is provided in Table 4.1.

Table 4.1: Allowable Discharge Rate from Controlled Areas

Storm	5 Year
Predevelopment Peak Runoff	68.2 L/s
Post-Development Uncontrolled Flow	3.7 L/s
Allowable Outflow	64.5 L/s

Stormwater discharge rate will be controlled through an orifice plate proposed at the outlet of CBMH#02. The orifice was designed to control the flows from the site to the allowable release rate. The maximum water elevation upstream of the orifice is assumed to be at lowest CB Rim elevation 96.300 m. The downstream water elevation is assumed to be at the centroid of the orifice resulting in a maximum head of 2.056 m.

It was determined that a 150 mm orifice plate will restrict the discharge rate to a flow close to the desired rate. Table 4.2 shows the orifice design parameters and maximum flow.

Table 4.2: Orifice Design

Max Water Level (u/s)	205.780 m
Orifice Tube Invert (d/s)	203.750 m
Max Head	2.056 m
Orifice Diameter	150 mm
Co-efficient	0.61
Maximum Discharge	68.5 L/s

5. Stormwater Detention Storage

The detention storage system is required to attenuate peak flow from controlled areas and release at allowable rates. The storage volume requirement is calculated in Table 5.1 based on the orifice discharge rate of 68.5 L/S in a 100-year storm event. Total storage required is 86.6 cu.m.

Table 5.1: Post Development 100 Year Storm Flows & Storage Volume

Storm Duration	Storm Intensity	Peak Runoff (In flow)	Release Rate	Storage Rate	Storage Required
(min)	(mm/hr)	(L/s)	(L/s)	(L/s)	(m^3)
0	0.0	0.0	0.0		0.0
5	242.7	279.7	68.5	211.2	63.37
10	178.6	205.8	68.5	137.3	82.38
15	142.9	164.7	68.5	96.2	86.58
20	120.0	138.2	68.5	69.8	83.72

Storm Duration	Storm Intensity	Peak Runoff (In flow)	Release Rate	Storage Rate	Storage Required
(min)	(mm/hr)	(L/s)	(L/s)	(L/s)	(m^3)
25	103.8	119.7	68.5	51.2	76.81
30	91.9	105.9	68.5	37.4	67.33
40	75.1	86.6	68.5	18.1	43.52
50	64.0	73.7	68.5	5.2	15.71
60	55.9	64.4	68.5	0.0	0.00
70	49.8	57.4	68.5	0.0	0.00
80	45.0	51.8	68.5	0.0	0.00
90	41.1	47.4	68.5	0.0	0.00
100	37.9	43.7	68.5	0.0	0.00
120	32.9	37.9	68.5	0.0	0.00
360	13.7	15.8	68.5	0.0	0.00
720	7.8	9.0	68.5	0.0	0.00
1440	4.4	5.1	68.5	0.0	0.00
Total					**86.6 cu.m**

The stormwater will be stored in storm sewer pipes, catch basins and catch-basin manholes before discharging into City's storm water system (Drawing 103.0 – Appendix A). The volume of storage provided is given in Table 5.2. The total storage provided is 92.6 cu.m, which is greater than the storage required in 100-year storm event.

Table 5.2: Stormwater Storage Volume Calculations

Description	Number	Length	Width/ Diameter	Area	Depth	Storage Volume
		(m)	(m)	(m^2)	(m)	(m^3)
ExCB4	1.0		1.20	1.13	2.10	2.38
ExCB5	1.0		1.20	1.13	2.10	2.38
STMH3	1.0		1.50	1.77	2.18	3.86
CB1	1.0		1.20	1.13	1.95	2.21
CBMH1	1.0		1.80	2.54	2.55	6.49
CB2	1.0		1.20	1.13	2.00	2.26
CB3	1.0		1.20	1.13	2.10	2.38
CBMH3	1.0		1.20	1.13	2.28	2.57
CBMH2	1.0		1.80	2.54	2.43	6.19
900mm Pipe		35.8	0.90	0.64		22.77
600mm Pipe		138.3	0.60	0.28		39.11
Total						**92.6 cu.m**

6. Stormwater Quality Management

Mississippi Valley Conservation Authority (MVCA) was contacted by NOVATECH for defining water quality requirements for the Shell property. MVCA recommended a Normal Level of treatment for water quality for this site and requested the Owner to demonstrate measures in treating all the runoff from this industrial area on site (copy of e-mail attached in Appendix C).

The stormwater sewer system will include a Stormceptor to capture oil and grit from runoff prior to entering the City's system. Stormceptor sizing was determined using PCSWMM software. The EOS - 750 will provide 80 % TSS removal and can capture 1,380 L of oil spill. The detailed Stormceptor sizing report is attached at Appendix B. The Stormceptor will be installed downstream of CBMH2 as shown on drawings.

7. Storm Drainage and Site Grading

The proposed grading will maintain the existing drainage patterns as much as possible as shown in the appended grading drawing (Appendix A: Drawing C-102). The site has been designed to direct the storm runoff into the onsite underground stormwater management system. Controlled flow from the proposed underground system will then be directed to the existing municipal drainage system. The overall site grading ensures that the existing drainage pattern on adjacent properties has not been altered and the major system doesn't directly flow onto adjacent properties and stormwater runoff from the proposed development is self-contained.

8. Erosion and Sediment Control during Construction

As this development requires site grading and excavation, there will be a potential for soil erosion and off site release of sediment during the construction phase. To ensure the quality of stormwater runoff during construction, it is essential that effective erosion and sedimentation controls be in place and maintained throughout the site during all construction activities (see Drawing C-100.0 in Appendix A). It is recommended that the following be implemented on a temporary basis to assist in achieving acceptable runoff quality during construction:

- Installation and maintenance of silt fences around the entire perimeter of the site for the duration of the construction period;
- Provision of a mud mat construction entrance to control the tracking of sediment and debris onto neighboring streets;
- Provision of sediment trap basins and rock flow check dams;
- Installation and maintenance of catch basin sediment barriers throughout the site and during all construction activities to reduce and trap sediment on site. Constant attention will be paid to maintaining them silt free. All catch basin grates shall be covered with geo-textile filter fabric during the period of construction of the proposed works;
- Silt traps and silt fences will be removed only after sodding and paving operations are completed;
- Reduce stormwater drainage velocities where possible;
- All topsoil stockpiles to be surrounded with sediment control fencing.

Appendix A

Figures

LEGEND

Symbol	Description
	PROPOSED BARRIER CURB
DC	PROPOSED DEPRESSED CURB
	DRAINAGE AREA LIMITS
1:5 YR / 1:100 YR	APPROXIMATE PONDING LIMITS
A-2	POST-DEVELOPMENT AREA ID
0.170	POST-DEVELOPMENT DRAINAGE AREA (ha)
0.82	1:5 YEAR WEIGHTED RUNOFF COEFICIENT
STM MH	PROPOSED STORM MANHOLE
CBMH	PROPOSED CATCHBASIN MANHOLE
CB	PROPOSED CATCHBASIN
RD	CONTROLLED FLOW ROOF DRAIN
OD	UNCONTROLLED OVERFLOW ROOF DRAIN
	PROPOSED STORM SEWER AND FLOW DIRECTION
ICD	PROPOSED INLET CONTROL DEVICE
	EMERGENCY OVERLAND FLOW ROUTE
	PROPOSED BUILDING ENTRANCE / EXIT
STM MH	EXISTING STORM MH & SEWER
CB	EXISTING CATCHBASIN C/W CATCHBASIN LEAD
	MAXIMUM 3:1 SIDESLOPE

ROOF DRAIN TABLE: AREA R-1 (ROOF DRAINS 1 to 10)

AREA ID *	ROOF DRAIN No. (WATTS MODEL)	ROOF DRAIN OPENING SETTING	1:5 YEAR RELEASE RATE	APPROX. 5 YR PONDING DEPTH	1:100 YEAR RELEASE RATE	APPROX. 100 YR PONDING DEPTH
R-1	RD 1 (RD-100-A-ADJ)	1/2 EXPOSED	0.79 L/s	9 cm	1.10 L/s	13 cm
R-1	RD 2 (RD-100-A-ADJ)	1/2 EXPOSED	0.79 L/s	8 cm	0.95 L/s	10 cm
R-1	RD 3 (RD-100-A-ADJ)	1/2 EXPOSED	0.79 L/s	9 cm	1.10 L/s	13 cm
R-1	RD 4 (RD-100-A-ADJ)	1/2 EXPOSED	0.79 L/s	9 cm	1.10 L/s	13 cm
R-1	RD 5 (RD-100-A-ADJ)	3/4 EXPOSED	1.10 L/s	11 cm	1.58 L/s	15 cm
R-1	RD 6 (RD-100-A-ADJ)	3/4 EXPOSED	1.10 L/s	11 cm	1.58 L/s	15 cm
R-1	RD 7 (RD-100-A-ADJ)	3/4 EXPOSED	1.10 L/s	11 cm	1.58 L/s	15 cm
R-1	RD 8 (RD-100-A-ADJ)	3/4 EXPOSED	1.10 L/s	11 cm	1.58 L/s	15 cm
R-1	RD 9 (RD-100-A-ADJ)	1/2 EXPOSED	0.95 L/s	10 cm	1.26 L/s	14 cm
R-1 (CANOPY)	RD 10 (UN-CONTROLLED)	- - -	0.42 L/s	- - -	0.79 L/s	- - -

* REFER TO THE 'DEVELOPMENT SERVICING STUDY AND STORMWATER MANAGEMENT REPORT' (R-2018-158) PREPARED BY NOVATECH FOR DRAINAGE AREA IDENTIFIERS AND STORMWATER MANAGEMENT DETAILS.

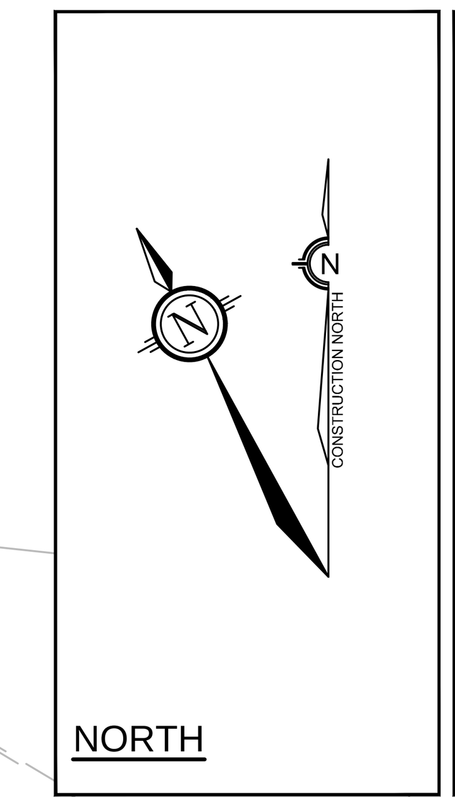
**ALL CONTROLLED FLOW ROOF DRAINS FOR THE PROPOSED BUILDING TO BE WATTS 'ADJUSTABLE ACCUTROL' ROOF DRAINS.

AREA A-2: INLET CONTROL DEVICE DATA - CB 2

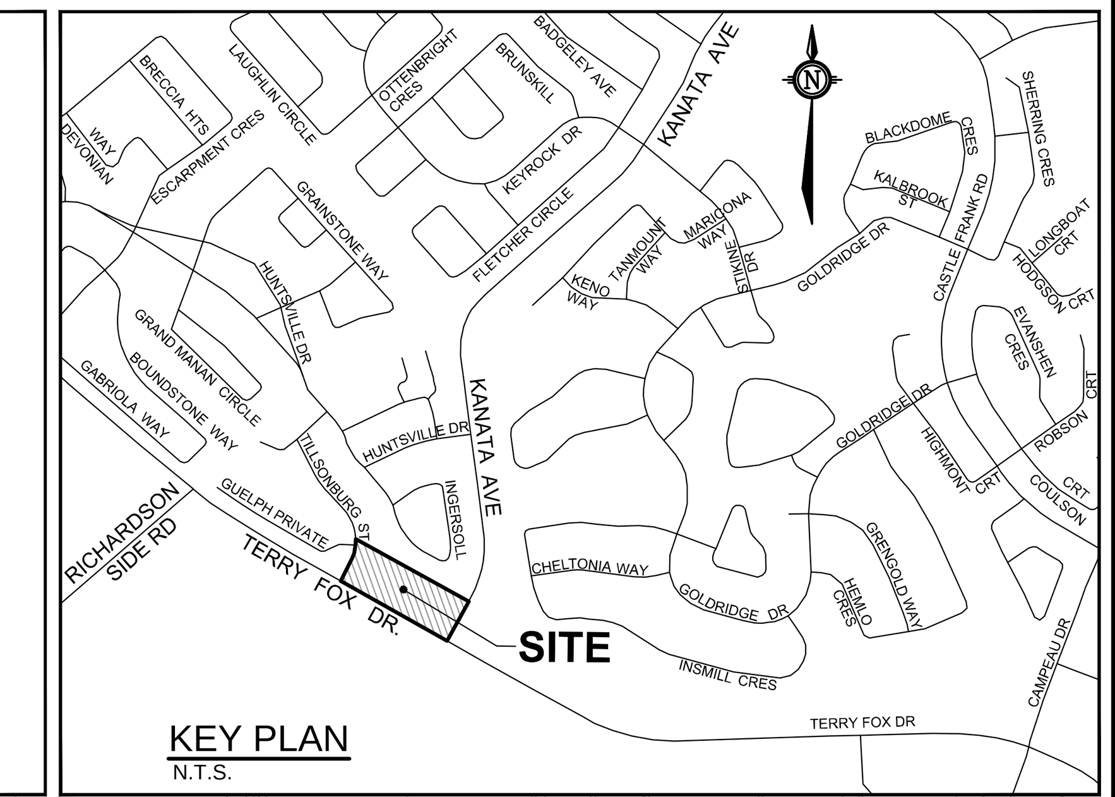
DESIGN EVENT	ICD TYPE (VORTEX MODEL)	DIAMETER OF OUTLET PIPE (mm)	DESIGN FLOW (L/s)	DESIGN HEAD (m)	WATER DEPTH (m)	VOLUME (m^3)
1:5 YR		300				
1:100 YR		300				

AREA A-3: INLET CONTROL DEVICE DATA - CB 3

DESIGN EVENT	ICD TYPE (CIRCULAR PLUG)	DIAMETER OF OUTLET PIPE (mm)	DESIGN FLOW (L/s)	DESIGN HEAD (m)	WATER ELEVATION (m)	VOLUME (m^3)
1:5 YR		300				
1:100 YR		300				



NORTH



KEY PLAN
N.T.S.

NOT FOR CONSTRUCTION

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

PRELIMINARY

OWNER INFORMATION
7873794 CANADA INC.
43 AURIGA DRIVE, 2nd FLOOR,
NEPEAN, ONTARIO, K2E 7Y8
DENNIS LAURIN
PHONE: (613) 656-0672
dennis.laurin@laurin.ca

No.	REVISION	DATE	BY
1	ISSUED FOR DESIGN COORDINATION	JAN 17/19	MS

SCALE 1:300

DESIGN SM / MS — CHECKED MS — DRAWN SM — CHECKED SM / MS — APPROVED MS

FOR REVIEW ONLY

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

LOCATION
CITY OF OTTAWA - 471 TERRY FOX DRIVE
HERITAGE HILLS RETAIL PLAZA

DRAWING NAME
STORMWATER MANAGEMENT PLAN

PROJECT No. 118133
REV # 1
DRAWING No. 118133-SWM

D07-12-18-XXXX

XXXXX

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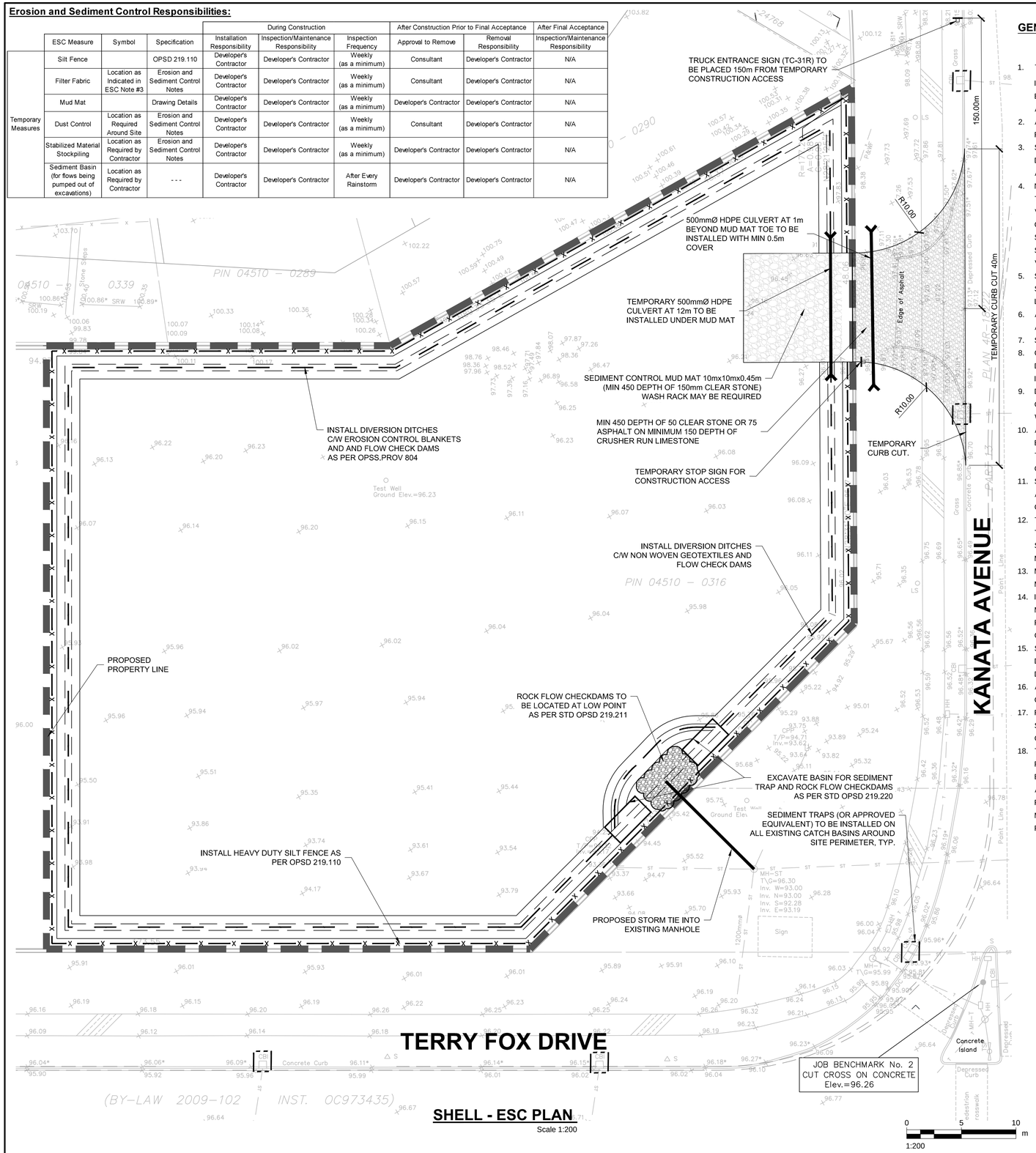
Erosion and Sediment Control Responsibilities:

	ESC Measure	Symbol	Specification	During Construction: Installation Responsibility	During Construction: Inspection/Maintenance Responsibility	During Construction: Inspection Frequency	After Construction Prior to Final Acceptance: Approval to Remove	After Construction Prior to Final Acceptance: Removal Responsibility	After Final Acceptance: Inspection/Maintenance Responsibility
Temporary Measures	Silt Fence		OPSD 219.110	Developer's Contractor	Developer's Contractor	Weekly (as a minimum)	Consultant	Developer's Contractor	N/A
	Filter Fabric	Location as Indicated in ESC Note #3	Erosion and Sediment Control Notes	Developer's Contractor	Developer's Contractor	Weekly (as a minimum)	Consultant	Developer's Contractor	N/A
	Mud Mat		Drawing Details	Developer's Contractor	Developer's Contractor	Weekly (as a minimum)	Developer's Contractor	Developer's Contractor	N/A
	Dust Control	Location as Required Around Site	Erosion and Sediment Control Notes	Developer's Contractor	Developer's Contractor	Weekly (as a minimum)	Consultant	Developer's Contractor	N/A
	Stabilized Material Stockpiling	Location as Required by Contractor	Erosion and Sediment Control Notes	Developer's Contractor	Developer's Contractor	Weekly (as a minimum)	Developer's Contractor	Developer's Contractor	N/A
	Sediment Basin (for flows being pumped out of excavations)	Location as Required by Contractor	---	Developer's Contractor	Developer's Contractor	After Every Rainstorm	Developer's Contractor	Developer's Contractor	N/A



SHELL - ESC PLAN

Scale 1:200

GENERAL NOTES:

1. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROPER INSTALLATION, MAINTENANCE, AND REMOVAL OF ALL TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES DURING CONSTRUCTION AND AS DIRECTED BY THE ENGINEER.
2. ADDITIONAL EROSION AND SEDIMENT CONTROL (ESC) MEASURES MAY BE REQUIRED AND SHALL BE DETERMINED BY THE ENGINEER.
3. SILT CONTROL FENCING SHALL BE INSTALLED ACCORDING TO THIS DRAWING AND MAINTAINED UNTIL COMPLETION OF THE LANDSCAPING AND SITE STABILIZATION.
4. NO CONSTRUCTION ACTIVITY OR MACHINERY SHALL INTRUDE BEYOND THE SILT/SNOW FENCE OR LIMIT OF DEVELOPMENT. ALL CONSTRUCTION VEHICLES SHALL LEAVE THE SITE AT DESIGNATED LOCATIONS AS SHOWN ON THE PLANS. ALL MATERIALS AND EQUIPMENT SHALL BE STORED ON SITE IN A DESIGNATED AREA. NO MATERIAL OR EQUIPMENT SHALL BE STORED ON THE MUNICIPAL RIGHT OF WAY. NO CONSTRUCTION VEHICLES WILL PARK ON THE MUNICIPAL ROADS.
5. STOCKPILES SHALL BE SET BACK FROM ANY WATERCOURSE AND STABILIZED AGAINST EROSION AS SOON AS POSSIBLE. A SETBACK OF AT LEAST 15m FROM ANY TOP OF BANK OR WATERCOURSE IS REQUIRED.
6. ALL EXPOSED SOILS SHALL BE IMMEDIATELY STABILIZED WITH A SEED AND MULCH APPLICATION AS DIRECTED BY THE ENGINEER.
7. SERVICING OF CONSTRUCTION EQUIPMENT ON-SITE IS PROHIBITED.
8. CLEANING OF EXISTING ROAD(S) AT SITE ACCESS POINTS SHALL BE DONE DAILY DURING CONSTRUCTION OR AS NECESSARY THROUGH REGULAR INSPECTION OR AS DIRECTED BY THE ENGINEER.
9. DUST CONTROL TO BE REVIEWED DAILY. WATER TRUCK TO BE PROVIDED ON-SITE AND ALL HAUL ROAD / WORKING AREAS TO BE SPRAYED WITH WATER AS REQUIRED TO ENSURE DUST IS CONTROLLED ON-SITE.
10. ALL RE-GRADED AREAS WITHIN THE SITE WHICH ARE NOT OCCUPIED BY BUILDINGS, ROADWAYS, SIDEWALKS OR DRIVEWAYS SHALL BE TOP-SOILED AND SODDED / SEEDED IMMEDIATELY AFTER COMPLETION OF FINAL GRADING OPERATIONS OR AS DIRECTED BY THE ENGINEER.
11. SEDIMENT TRAPS (OR APPROVED EQUIVALENT) ARE TO BE INSTALLED AT ALL CATCHBASINS AND CATCHBASIN MANHOLE LOCATIONS UPON COMPLETION OF SERVICING.
12. THE ESC STRATEGIES ON THESE PLANS ARE NOT STATIC AND MAY NEED TO BE UPGRADED / AMENDED AS SITE CONDITION CHANGES TO PREVENT SEDIMENT RELEASE TO THE NATURAL ENVIRONMENT. FAILED ESC MEASURE MUST BE REPAIRED IMMEDIATELY.
13. MATERIALS TO REPAIR DAMAGED EROSION AND SEDIMENT CONTROL MEASURES MUST BE KEPT ON-SITE AT ALL TIMES.
14. INSPECTION OF THE PROPOSED EROSION AND SEDIMENT CONTROL MEASURES WILL OCCUR ON A WEEKLY BASIS, AFTER SIGNIFICANT RAINFALL OR SNOW MELT EVENTS AND DAILY DURING EXTENDED RAIN OR SNOW MELT PERIODS.
15. SEDIMENT / SILT SHALL BE REMOVED FROM THE SEDIMENT CONTROL DEVICE AND THE CATCHBASIN BUFFERS AFTER STORM EVENTS AND DISPOSED OF IN AREAS AS APPROVED BY THE ENGINEER.
16. ALL LITTER AND DEBRIS SHALL BE MONITORED AND DISPOSED OF DAILY OR AS NECESSARY THROUGH REGULAR INSPECTION.
17. ROCK CHECK DAMS ARE TO BE CLEANED OF ALL ACCUMULATED SEDIMENT AS SOON AS SEDIMENT HAS ACCUMULATED TO DEPTH GREATER THAN 50% OF THE UPSTREAM CHECK DAM.
18. THE SILT FENCE MUST BE INSPECTED WEEKLY AND IMMEDIATELY AFTER RAINFALL OR SIGNIFICANT SNOW MELT EVENTS FOR RIPS AND TEARS, BROKEN STAKES, BLOW OUTS (STRUCTURAL FAILURE) AND ACCUMULATION OF SEDIMENT. THE SILT FENCE MUST BE FIXED AND / OR REPLACED IMMEDIATELY WHEN DAMAGED. ACCUMULATED SEDIMENT MUST BE REMOVED FROM THE SILT FENCE WHEN ACCUMULATION REACHES 50% OF THE HEIGHT OF THE FENCE.

SEDIMENT CONTROL CONSTRUCTION SCHEDULE:

1. INSTALL PERIMETER ENVIRONMENTAL FENCE AND CONSTRUCTION VEHICLE ACCESS.
2. EXCAVATE PERIMETER SWALES AND INSTALL CHECK DAMS.
3. STRIP SITE OF TOPSOIL AND REMOVE OFF SITE.
4. INSTALL MINOR STORM SEWER SYSTEM ALONG WITH OTHER SERVICES.
5. INSTALL CATCHBASIN FILTRATION ON ALL CATCHBASINS AND CATCHBASIN MANHOLES.
6. SEDIMENT CONTROL MEASURES ARE TO BE MAINTAINED UNTIL ALL AREAS OF THE SITE HAVE BEEN STABILIZED WITH SOD OR ASPHALT.

MUD MAT:

STONE SIZE - USE CLEAR CRUSHED 100mm STONE.

THICKNESS - NOT LESS THAN 300mm

LENGTH - AS REQUIRED

WIDTH - 10m MINIMUM, BUT NOT LESS THAN THE WIDTH AT POINTS WHERE INGRESS OR EGRESS OCCURS.

FILTER CLOTH - NON-WOVEN GEOTEXTILE WILL BE PLACED OVER THE ENTIRE AREA PRIOR TO PLACING STONE.

MAINTENANCE - THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHT-OF-WAY. THIS MAY REQUIRE PERIODIC TOP DRESSING WITH ADDITIONAL STONE AS CONDITIONS DEMAND AND REPAIR AND/ OR CLEANOUT OF ANY MEASURES USED TO TRAP SEDIMENTS. ALL SEDIMENTS SPILLED, DROPPED, WASHED OR TRACKED ONTO PUBLIC RIGHT-OF-WAY MUST BE REMOVED IMMEDIATELY.

TIRE WASH STATION - WHEELS SHALL BE CLEANED TO REMOVE SEDIMENT PRIOR TO ENTRANCE ONTO PUBLIC RIGHT-OF-WAY. WHEN WASHING IS REQUIRED IT SHALL BE DONE ON A DESIGNATED AREA STABILIZED WITH STONE AND WHICH DRAINS INTO AN APPROVED SEDIMENT TRAPPING DEVICE.

INSPECTION AND MAINTENANCE - INSPECTION AND REQUIRED MAINTENANCE SHALL BE PROVIDED PERIODICALLY AND AFTER SIGNIFICANT RAINFALL AND SNOWMELT.

LEGEND:

- HEAVY DUTY SILT FENCE
- MUD MAT CLEAR STONE
- MUD MAT LIMESTONE
- ULTIMATE PROPERTY LIME

AECOM

PROJECT

Shell Canada Projects
HERITAGE HILLS
Kanata (NTI)

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Ottawa, Ontario

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www.aecom.com

REGISTRATION

LEGAL DESCRIPTION
BLOCK 170, PLAN 4M-1413

ISSUE/REVISION

C	2019.02.01	ISSUED FOR SPA
B	2019.01.11	ISSUED FOR SPA
A	2018.12.14	ISSUED FOR REVIEW
I/R	DATE	DESCRIPTION

KEY PLAN

PROJECT NUMBER

60546152

SHEET TITLE

SITE EROSION AND
SEDIMENT CONTROL PLAN

AECOM FILE NAME

C100.0-ESC-HEH

SHEET NUMBER

C100.0

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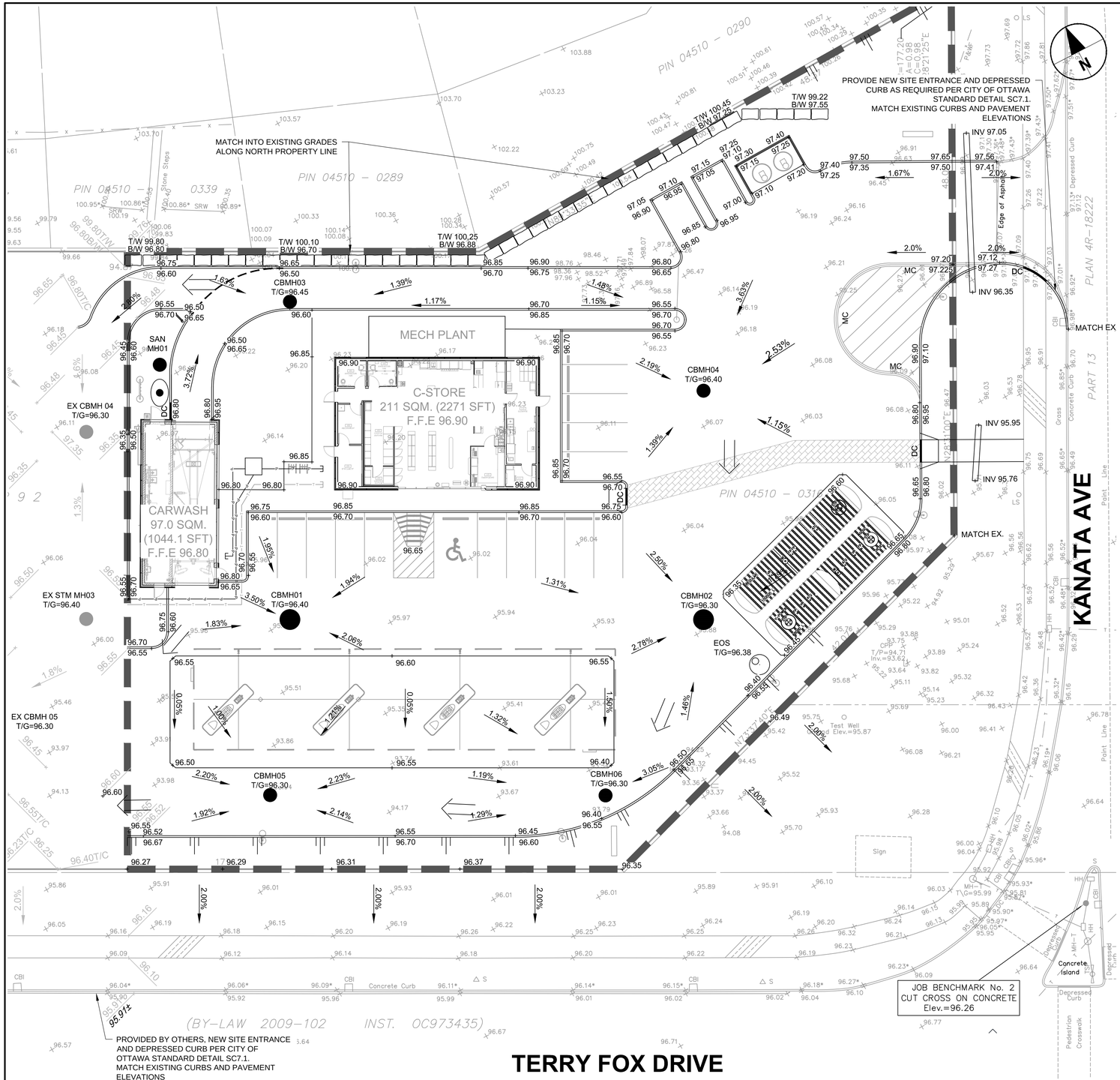

SITE GRADING PLAN

Scale 1:200

LEGEND:

- EXISTING SPOT ELEVATION
- PROPOSED SPOT ELEVATION
- PROPOSED CATCH BASIN
- CBMH — PROPOSED STORMWATER / CATCH BASIN MANHOLE
- SMH — PROPOSED SANITARY MANHOLE
- STC — PROPOSED STORMCEPTOR
- PROPOSED OVERLAND FLOW
- PROPOSED MOLOK GARBAGE SYSTEM
- MC — PROPOSED MOUNTABLE CURB (PER SC1.3)
- DC — PROPOSED DEPRESSED CURB (PER SC1.1)
- FFE=96.90 PROPOSED FINISHED FLOOR ELEVATION
- EMERGENCY OVERLAND FLOW
- SITE BOUNDARY
- PROPOSED BARRIER CURB
- PROPOSED ROAD MARKING
- D — PROPOSED STORMWATER
- W — PROPOSED WATER MAIN
- S — PROPOSED SANITARY
- MAXIMUM 3:1 SIDESLOPE
- HYD / VB — PROPOSED HYDRANT AND VALVE
- PROPOSED LIGHT STANDARD
- EXISTING CONCRETE CURB
- SANMH — EXISTING SANITARY MANHOLE
- CBMH / STMMH — EXISTING CATCHBASIN MANHOLE
- EXISTING STORM MANHOLE
- CB — EXISTING CATCHBASIN
- HYD / WV — EXISTING HYDRANT & VALVE
- EXISTING TREES / VEGETATION
- EX UP — EXISTING UTILITY POLE C/W GUY WIRES
- EXISTING FENCE
- EXISTING LIGHT STANDARD

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A	2018.12.06	ISSUED FOR REVIEW
I/R	DATE	DESCRIPTION

KEY PLAN

PROJECT NUMBER

60546152

SHEET TITLE

SITE GRADING PLAN

AECOM FILE NAME

C102.0-GRD-HEH

SHEET NUMBER

C102.0

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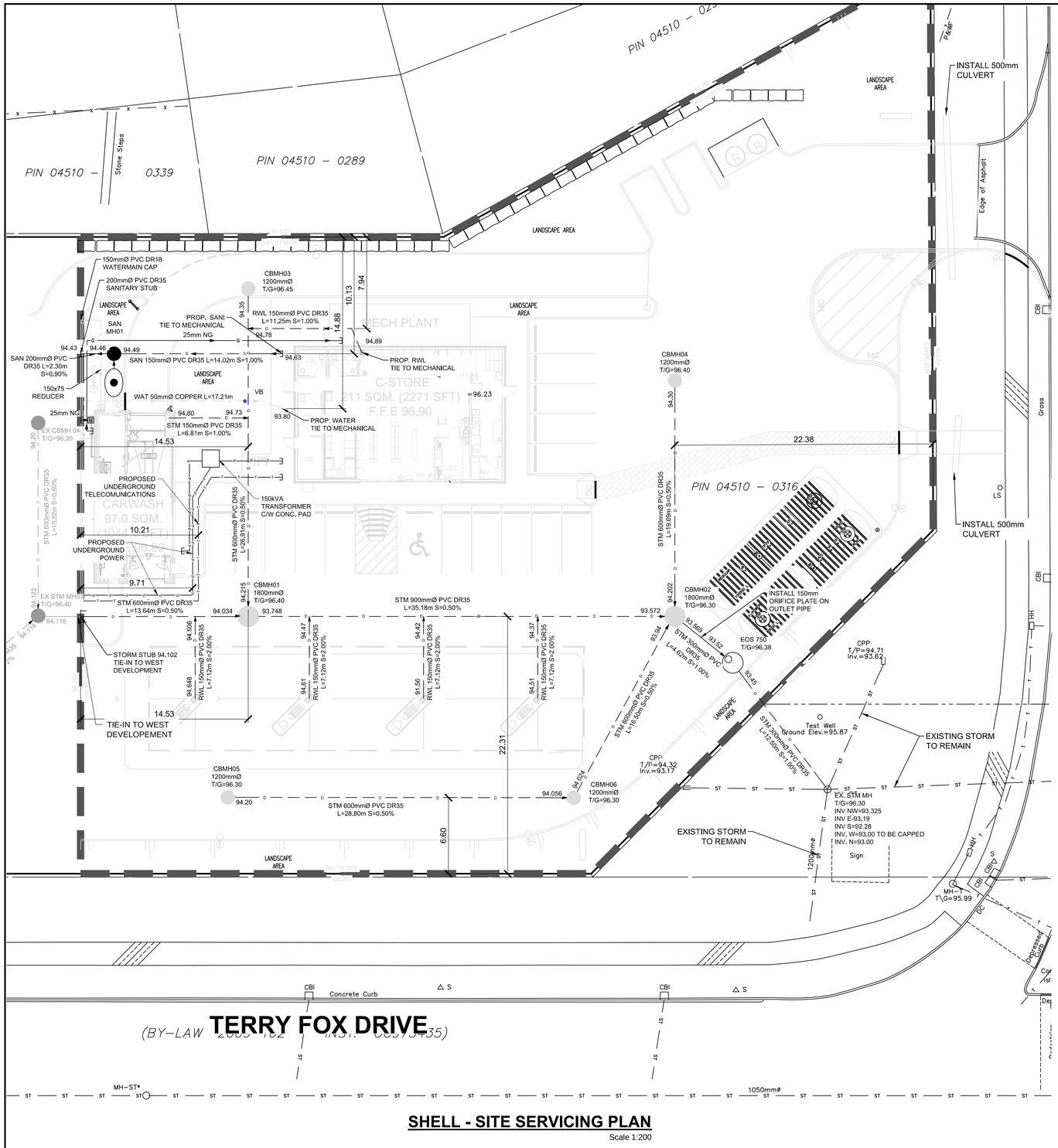

SHELL - SITE SERVICING PLAN

Scale 1:200

0 5 10 m

1:200

LEGEND:

96.44	EXISTING SPOT ELEVATION
96.85 / 97.00	PROPOSED SPOT ELEVATION
	PROPOSED CATCH BASIN
CBMH	PROPOSED STORMWATER / CATCH BASIN MANHOLE
SMH	PROPOSED SANITARY MANHOLE
STC	PROPOSED STORMCEPTOR
2.0%	PROPOSED OVERLAND FLOW
	PROPOSED MOLOK GARBAGE SYSTEM
MC	PROPOSED MOUNTABLE CURB (PER SC1.3)
DC	PROPOSED DEPRESSED CURB (PER SC1.1)
FFE=96.90	PROPOSED FINISHED FLOOR ELEVATION
	SITE BOUNDARY
	PROPOSED BARRIER CURB
	PROPOSED ROAD MARKING
D	PROPOSED STORMWATER
W	PROPOSED WATER MAIN
S	PROPOSED SANITARY
	MAXIMUM 3:1 SIDESLOPE
HYD VB	PROPOSED HYDRANT AND VALVE
	PROPOSED LIGHT STANDARD
	EXISTING CONCRETE CURB
SANMH	EXISTING SANITARY MANHOLE
CBMH STMMH	EXISTING CATCHBASIN MANHOLE
	EXISTING STORM MANHOLE
CB	EXISTING CATCHBASIN
HYD WV	EXISTING HYDRANT & VALVE
	EXISTING TREES / VEGETATION
EX UP	EXISTING UTILITY POLE C/W GUY WIRES
	EXISTING FENCE
	EXISTING LIGHT STANDARD

**TOTAL WATER FLOW REQUIRED IS 110gpm FOR THE 150mm WATER METER

SHELL/ HERITAGE HILLS/ OTTAWA

SANITARY DRAINAGE FOR C-STORE

FIXTURES	LOAD
WATER CLOSET	2X6 = 12
LAVATORY	2X1 = 2
MOP SINK	1X3 = 3
TRIPLE SINK	1X3 = 3
HAND SINK	2X2 = 4
DISHWASHER	1X3 = 3
FLOOR DRAIN	4X3 = 12
HUB DRAIN	6X1.5 = 9
	48 F.U. = ±50GPM

-4"Ø PIPE @ 1% SLOPE GOOD FOR 180 F.U.
-USE 6"Ø PIPE LEAVING BUILDING

GENERAL NOTES

1. THE POSITION OF EXISTING POLE LINES, CONDUITS, WATERMAINS SEWERS AND OTHER UNDERGROUND AND ABOVEGROUND UTILITIES, STRUCTURES AND APPURTENANCES IS NOT NECESSARILY SHOWN ON THE DRAWINGS, AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES, STRUCTURES AND APPURTENANCES IS TO BE CONFIRMED. THE CONTRACTOR SHALL DETERMINE AT THE TIME OF CONSTRUCTION THE POSSIBILITIES OF UTILIZING ALL SUCH UTILITIES, STRUCTURES AND APPURTENANCES. THE CONTRACTOR SHALL INFORM AND SATISFY HIMSELF OF THE EXACT LOCATION OF ALL SUCH UTILITIES, STRUCTURES AND APPURTENANCES AND ASSUME ALL LIABILITY FOR DAMAGE TO THEM DURING CONSTRUCTION.
2. CONTRACTOR IS RESPONSIBLE FOR LOCATING AND PROTECTING ALL UTILITIES AND MUNICIPAL SERVICES (WATER, SANITARY & STORM) DURING CONSTRUCTION. ALL EXISTING INVERTS AND ELEVATIONS MUST BE VERIFIED PRIOR TO CONSTRUCTION. ANY DISCREPANCIES MUST BE REPORTED TO AECOM LTD.

AECOM

PROJECT

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KEY PLAN

PROJECT NUMBER

60546152

SHEET TITLE

SITE SERVICING PLAN

AECOM FILE NAME

C103.0-SSP-HEH

SHEET NUMBER

C103.0

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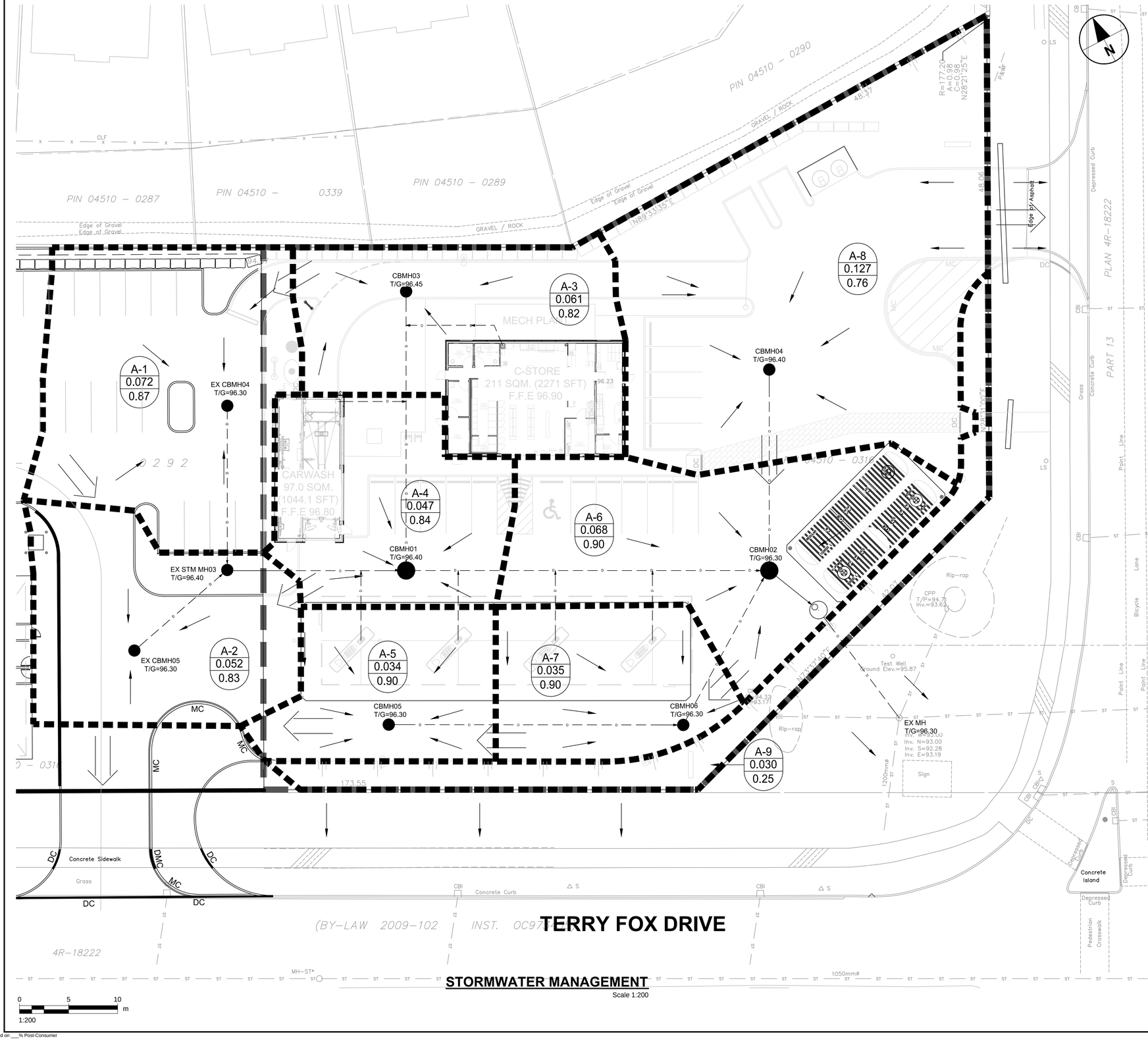

STORMWATER MANAGEMENT

Scale 1:200

LEGEND

- PROPOSED BARRIER CURB
- DC — PROPOSED DEPRESSED CURB
- MC — PROPOSED MOUNTABLE CURB
- DRAINAGE AREA LIMITS
- A-2 / 0.170 / 0.82 — POST-DEVELOPMENT AREA ID; POST-DEVELOPMENT DRAINAGE AREA (ha); 1:5 YEAR WEIGHTED RUNOFF COEFICIENT
- STM MH — PROPOSED STORM MANHOLE
- CBMH — PROPOSED CATCHBASIN MANHOLE
- CB — PROPOSED CATCHBASIN
- PROPOSED STORM SEWER AND FLOW DIRECTION
- EMERGENCY OVERLAND FLOW ROUTE
- STM MH — EXISTING STORM MH & SEWER
- CB — EXISTING CATCHBASIN C/W CATCHBASIN LEAD
- MAXIMUM 3:1 SIDESLOPE

STORM WATER MANAGEMENT ANALYSIS SUMMARY

SITE COMPOSITION

SITE CATCHMENT AREA (HA):	0.526
CONTROLLED AREA (HA):	0.496
UNCONTROLLED AREA (HA):	0.030

STORM FLOWS

PREDEVELOPMENT SITE RELEASE RATE 5 YEAR STORM(L/SEC):	68.2
POST DEVELOPMENT PEAK FLOW 100 Year: (L/SEC)	
CONTROLLED AREA:	205.8
UNCONTROLLED AREA:	3.7
ALLOWABLE SITE RELEASE RATE IN 100 YEAR STORM(L/SEC):	64.6

SITE ORIFICE CONTROL

LOCATION:	CBMH02
ORIFICE PLATE DIA: (mm)	150
INVERT ELEVATION: (m)	94.169
CENTER-LINE ELEV: (m)	94.244
DOWNSTREAM HGL: (m)	94.244
DETENTION STORAGE TWL: (m)	96.300
DESIGN HEAD: (m)	2.056
MAXIMUM RELEASE RATE 100 Year (L/SEC):	68.5

DETENTION STORAGE VOLUME CALCULATIONS

100-YR REQUIRED DETENTION STORAGE VOLUME (CU.M):	86.6
MAXIMUM SITE DETENTION STORAGE AVAILABLE (CU.M):	
DESIGN T.W.L:	96.300
SURFACE PONDING:	0
PIPE STORAGE:	61.88
MH/CB STORAGE	30.70
TOTAL	92.58

ISSUE/REVISION

B	2019.01.11	ISSUED FOR SPA
A	2018.12.06	ISSUED FOR REVIEW
I/R	DATE	DESCRIPTION

KEY PLAN

PROJECT NUMBER

60546152

SHEET TITLE

STORMWATER MANAGEMENT PLAN

AECOM FILE NAME

C104.0-SWM-HEH

SHEET NUMBER

C104.0

AECOM

PROJECT

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Appendix B

Detailed OGS Sizing Report

Detailed Stormceptor Sizing Report – Heritage Hills

Project Information & Location			
Project Name	Shell - Heritage Hills	**Project Number**	60546152
City	Ottawa	**State/ Province**	Ontario
Country	Canada	**Date**	1/17/2019
Designer Information		**EOR Information (optional)**	
Name	Qasim Shafi	**Name**	
Company	AECOM	**Company**	
Phone #	306-657-8890	**Phone #**	
Email	qasim.shafi@aecom.com	**Email**	

Stormwater Treatment Recommendation

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

Site Name	Heritage Hills
Recommended Stormceptor Model	EOS 2000
Target TSS Removal (%)	70.0
TSS Removal (%) Provided	85
PSD	Fine Distribution
Rainfall Station	OTTAWA MACDONALD-CARTIER INT'L A

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

Stormceptor Sizing Summary			
EOS Model	**% TSS Removal Provided**	**% Runoff Volume Captured Provided**	**Oil Spill Capture Volume Provided (L)**
EOS 300	71	89	662
EOS 750	80	96	1,380
EOS 1000	82	96	2,235
EOS 2000	82	96	5,515
EOS 3000	86	98	6,710
EOS 4000	89	100	7,585
EOS 5000	90	100	9,515
EOS 6000	91	100	12,940
EOS 9000	94	100	19,010
EOS 10000	94	100	22,865
EOS 14000	95	100	29,715
StormceptorMAX	Custom	Custom	Custom

Stormceptor
The Stormceptor oil and sediment separator is sized to treat stormwater runoff by removing pollutants through gravity separation and flotation. Stormceptor's patented design generates positive TSS removal for each rainfall event, including large storms. Significant levels of pollutants such as heavy metals, free oils and nutrients are prevented from entering natural water resources and the re-suspension of previously captured sediment (scour) does not occur.
Stormceptor provides a high level of TSS removal for small frequent storm events that represent the majority of annual rainfall volume and pollutant load. Positive treatment continues for large infrequent events, however, such events have little impact on the average annual TSS removal as they represent a small percentage of the total runoff volume and pollutant load.

Design Methodology
Stormceptor is sized using PCSWMM for Stormceptor, a continuous simulation model based on US EPA SWMM. The program calculates hydrology using local historical rainfall data and specified site parameters. With US EPA SWMM's precision, every Stormceptor unit is designed to achieve a defined water quality objective. The TSS removal data presented follows US EPA guidelines to reduce the average annual TSS load. The Stormceptor's unit process for TSS removal is settling. The settling model calculates TSS removal by analyzing:
• Site parameters
• Continuous historical rainfall data, including duration, distribution, peaks & inter-event dry periods
• Particle size distribution, and associated settling velocities (Stokes Law, corrected for drag)
• TSS load
• Detention time of the system

Hydrology Analysis
PCSWMM for Stormceptor calculates annual hydrology with the US EPA SWMM and local continuous historical rainfall data. Performance calculations of Stormceptor are based on the average annual removal of TSS for the selected site parameters. The Stormceptor is engineered to capture sediment particles by treating the required average annual runoff volume, ensuring positive removal efficiency is maintained during each rainfall event, and preventing negative removal efficiency (scour). Smaller recurring storms account for the majority of rainfall events and average annual runoff volume, as observed in the historical rainfall data analyses presented in this section.

Rainfall Station			
State/Province	Ontario	**Total Number of Rainfall Events**	4093
Rainfall Station Name	OTTAWA MACDONALD-CARTIER INT'L A	**Total Rainfall (mm)**	20978.1
Station ID #	6000	**Average Annual Rainfall (mm)**	567.0
Coordinates	45°19'N, 75°40'W	**Total Evaporation (mm)**	1737.8
Elevation (ft)	370	**Total Infiltration (mm)**	2089.2
Years of Rainfall Data	37	**Total Rainfall that is Runoff (mm)**	17151.1

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

Drainage Area	
Total Area (ha)	0.496
Imperviousness %	90.0

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

Water Quality Objective	
TSS Removal (%)	70.0
Runoff Volume Capture (%)	98.00
Oil Spill Capture Volume (L)	1000
Peak Conveyed Flow Rate (L/s)	64.50
Water Quality Flow Rate (L/s)	64.50

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

Design Details	
Stormceptor Inlet Invert Elev (m)	
Stormceptor Outlet Invert Elev (m)	
Stormceptor Rim Elev (m)	
Normal Water Level Elevation (m)	
Pipe Diameter (mm)	
Pipe Material	
Multiple Inlets (Y/N)	No
Grate Inlet (Y/N)	No

Particle Size Distribution (PSD)

Removing the smallest fraction of particulates from runoff ensures the majority of pollutants, such as metals, hydrocarbons and nutrients are captured. The table below identifies the Particle Size Distribution (PSD) that was selected to define TSS removal for the Stormceptor design.

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

Site Name	Heritage Hills

Site Details

Drainage Area

Total Area (ha)	0.496
Imperviousness %	90.0
Oil Spill Capture Volume (L)	1000

Surface Characteristics

Width (m)	141.00
Slope %	2
Impervious Depression Storage (mm)	0.508
Pervious Depression Storage (mm)	5.08
Impervious Manning's n	0.015
Pervious Manning's n	0.25

Maintenance Frequency

Maintenance Frequency (months) >	12

Infiltration Parameters

Horton's equation is used to estimate infiltration

Max. Infiltration Rate (mm/hr)	61.98
Min. Infiltration Rate (mm/hr)	10.16
Decay Rate (1/sec)	0.00055
Regeneration Rate (1/sec)	0.01

Evaporation

Daily Evaporation Rate (mm/day)	2.54

Dry Weather Flow

Dry Weather Flow (lps)	0

Winter Months

Winter Infiltration	0

TSS Loading Parameters

TSS Loading Function	

Buildup/Wash-off Parameters

Target Event Mean Conc. (EMC) mg/L	
Exponential Buildup Power	
Exponential Washoff Exponent	

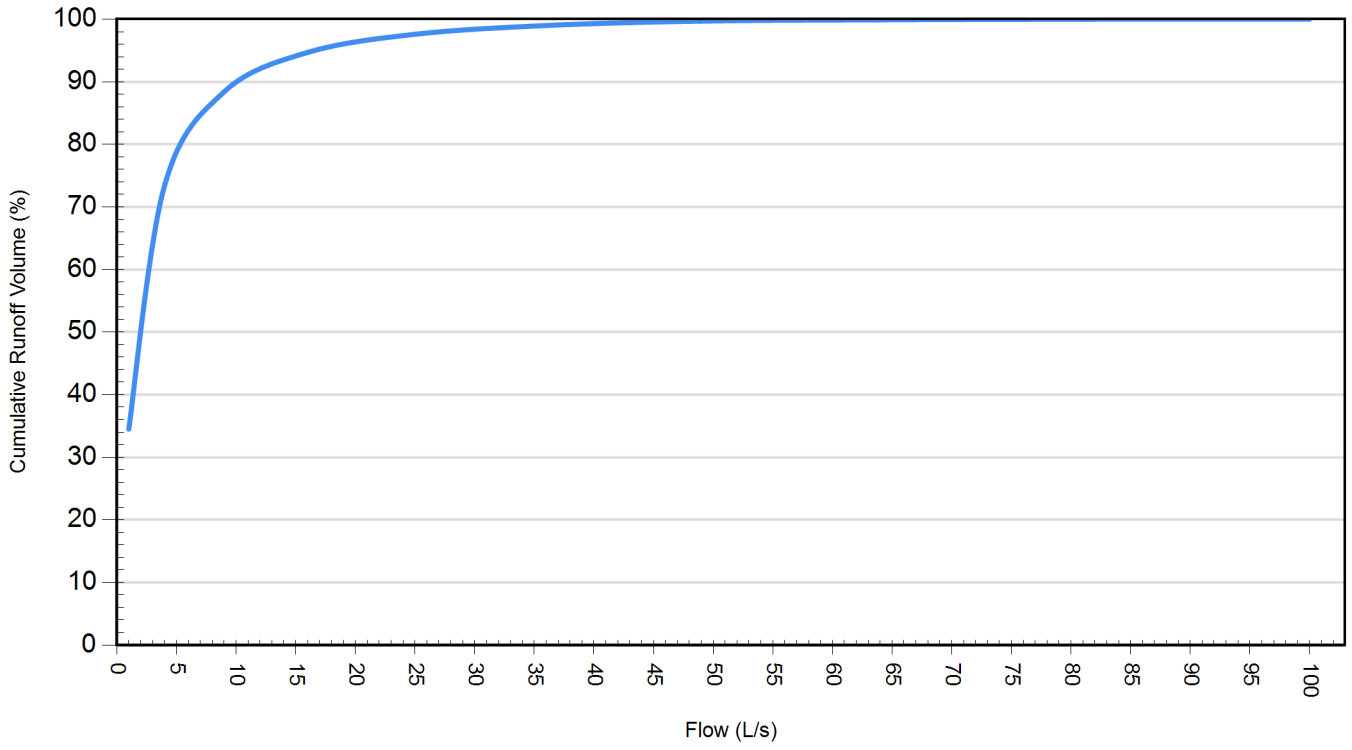
TSS Availability Parameters

Availability Constant A	
Availability Factor B	
Availability Exponent C	
Min. Particle Size Affected by Availability (micron)	

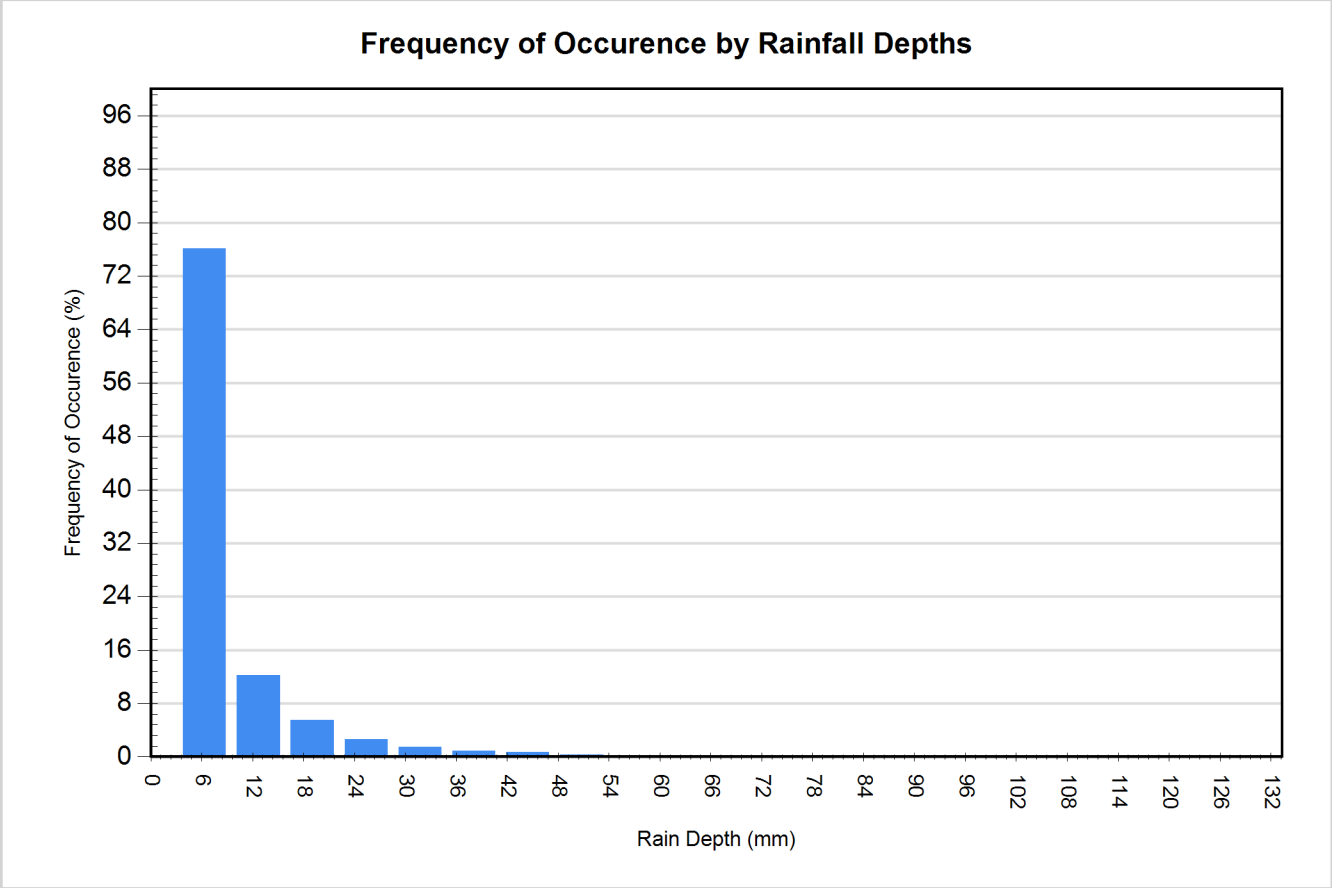
Cumulative Runoff Volume by Runoff Rate			
Runoff Rate (L/s)	**Runoff Volume (m^3)**	**Volume Over (m^3)**	**Cumulative Runoff Volume (%)**
1	29483	56106	34.5
4	62844	22743	73.4
9	75646	9938	88.4
16	81007	4574	94.7
25	83492	2089	97.6
36	84703	877	99.0
49	85324	256	99.7
64	85505	75	99.9
81	85568	13	100.0
100	85580	0	100.0

Cumulative Runoff Volume by Runoff Rate

For area: 0.496(ha), imperviousness: 90.0%, rainfall station: OTTAWA MACDONALD-CARTIER INT'L A



Rainfall Event Analysis				
Rainfall Depth (mm)	**No. of Events**	**Percentage of Total Events (%)**	**Total Volume (mm)**	**Percentage of Annual Volume (%)**
6.35	3113	76.1	5230	24.9
12.70	501	12.2	4497	21.4
19.05	225	5.5	3469	16.5
25.40	105	2.6	2317	11.0
31.75	62	1.5	1765	8.4
38.10	35	0.9	1206	5.8
44.45	28	0.7	1163	5.5
50.80	12	0.3	557	2.7
57.15	7	0.2	378	1.8
63.50	1	0.0	63	0.3
69.85	1	0.0	64	0.3
76.20	1	0.0	76	0.4
82.55	0	0.0	0	0.0
88.90	1	0.0	84	0.4
95.25	0	0.0	0	0.0
101.60	0	0.0	0	0.0
107.95	0	0.0	0	0.0
114.30	1	0.0	109	0.5
120.65	0	0.0	0	0.0
127.00	0	0.0	0	0.0



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

Appendix C

Correspondence

Shafi, Qasim

From: Reid, Jason
Sent: December-12-18 1:10 PM
To: Shafi, Qasim
Subject: FW: Heritage Hills - Shell SWM Criteria
Attachments: 118133-SWM_coord.pdf; 118133-GR_coord.pdf; 20181211-AECOM-Coord.zip

FYI, more info for Heritage Hills

Regards,

Jason Reid, AScT.
AECOM - Transportation
D: 604.444.6520 Cisco: 366.6520

From: Miro Savic [mailto:m.savic@novatech-eng.com]
Sent: Wednesday, December 12, 2018 5:51 AM
To: Reid, Jason
Cc: Santos, Dexter; Lobanova, Olga; Gord Erskine; 'Dennis Laurin' (dennis.laurin@laurin.ca); Steve Matthews; Conrad Stang
Subject: RE: Heritage Hills - Shell SWM Criteria

Jason,

Following my email below, please find attached the stormwater management and grading plan (PDF and Auto CAD) for coordination. The post-development area tributary to the Shell portion of the site is 0.495 ha. The post-development flow from this 0.495 ha area is to be controlled to 68.3 L/s.

Please contact me should you have any questions.

Regards,

Miroslav Savic, P.Eng., Senior Project Manager | Land Development Engineering
NOVATECH Engineers, Planners & Landscape Architects
240 Michael Cowpland Drive, Suite 200, Ottawa, ON, K2M 1P6 | Tel: 613.254.9643 x 265 | Fax: 613.254.5867

From: Miro Savic
Sent: Wednesday, December 12, 2018 8:41 AM
To: 'Reid, Jason' <Jason.Reid@aecom.com>
Cc: 'Santos, Dexter' <Dexter.Santos@aecom.com>; Lobanova, Olga <olga.lobanova@aecom.com>; Gord Erskine <gorderskine@gmail.com>; 'Dennis Laurin' (dennis.laurin@laurin.ca) <dennis.laurin@laurin.ca>; Kuruvilla, Santhosh (Santhosh.Kuruvilla@ottawa.ca) <Santhosh.Kuruvilla@ottawa.ca>; Steve Matthews <S.Matthews@novatech-eng.com>; Conrad Stang <c.stang@novatech-eng.com>
Subject: Heritage Hills - Shell SWM Criteria

Good morning Jason,

The stormwater management criteria for the Shell site has been confirmed with the City of Ottawa as follows:

- The storm outlet for the site is the existing 1200mm diameter municipal storm sewer located near the intersection of Kanata Avenue and Terry Fox Drive
- Control post development flows form the Shell site to the 1:5year pre development level for all storm events up to and including 1:100 year storm.
- The allowable flow is calculated based on the entire 1.179ha site area currently draining to the 1200mm sewer using a runoff coefficient of C=0.2 and a time of concentration of Tc =10min as follows:
  Qallow – 2.78 x C x I x A
  Qallow = 2.78 x 0.2 x 104.2 x 1.179 = 68.3 L/s
- Provide the stormwater quality as per the Mississippi Valley Conservation Authority (MVCA) requirements. See the attached email from the MVCA.

Should you have any questions regarding the above swim criteria please do not hesitate to contact the City's project manager Santhosh Kuruvilla directly. I have copied Santhosh to this email.

Regards,

Miroslav Savic, P.Eng., Senior Project Manager | Land Development Engineering
NOVATECH Engineers, Planners & Landscape Architects
240 Michael Cowpland Drive, Suite 200, Ottawa, ON, K2M 1P6 | Tel: 613.254.9643 x 265 | Fax: 613.254.5867

Shafi, Qasim

From: Niall Oddie <NOddie@mvc.on.ca>
Sent: December-07-18 10:46 AM
To: Miro Savic
Subject: FW: Heritage Hills Retail Plaza - Water Quality Requirements

Miro,

Please see below.

Niall Oddie MCIP, RPP | Environmental Planner | Mississippi Valley Conservation Authority
10970 Highway 7, Carleton Place, Ontario K7C 3P1
www.mvc.on.ca |t. 613 253 0006 ext. 229| f. 613 253 0122 | noddie@mvc.on.ca

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From: Sobha Kunjikutty
Sent: Friday, December 7, 2018 8:56 AM
To: Niall Oddie <NOddie@mvc.on.ca>
Subject: RE: Heritage Hills Retail Plaza - Water Quality Requirements

Hi Niall,
We recommend a Normal Level of treatment for water quality for this site. However, the plan should include and demonstrate measures in treating all the runoff from this industrial area on site (e.g stormwater interceptors such as oil/grit).
Let me know if you have any questions.
Thanks,
Sobha

From: Miro Savic [mailto:m.savic@novatech-eng.com]
Sent: Monday, December 3, 2018 4:07 PM
To: Niall Oddie <NOddie@mvc.on.ca>
Cc: Lee Sheets <l.sheets@novatech-eng.com>
Subject: Heritage Hills Retail Plaza - Water Quality Requirements

Good afternoon Niall,

We are working on a commercial development located at 471 Terry Fox Drive. The development proposal is to construct two one-storey multi-unit commercial buildings as well as a Shell gas bar with a car wash and a convenience store. See the attached site plan for detailes.

The storm runoff from the retail plaza portion of the site (Building 1 and Building 2 with the parking lot) will outlet into the existing municipal storm sewer in Tilsonburg Street. The Tilsonburg storm sewer has a flow splitter to direct runoff from storms up to the 25mm event (water quality) to the existing SWM facility of the west side of terry Fox drive. Therefore, the on-site water quality is not required for this portion of the site.

The storm runoff from the Shell gas station will outlet into the existing 1200mm diameter storm sewer near the intersection of Kanata Avenue and Terry Fox Drive. This storm sewer outlets into the ditch which outlets directly into Carp River bypassing the SWM pond (refer to the attached aerial photo). Could you please confirm the water quality requirements for the Shell portion of the site.

Please contact me should you have any questions.

Regards,

Miroslav Savic, P.Eng., Senior Project Manager | Land Development Engineering
NOVATECH Engineers, Planners & Landscape Architects
240 Michael Cowpland Drive, Suite 200, Ottawa, ON, K2M 1P6 | Tel: 613.254.9643 x 265 | Fax: 613.254.5867