STORM WATER MANAGEMENT PLAN

FOR

Metal Era

1600 & 1700 Airport Road
Waukesha, WI

August 24, 2015

PREPARED BY:
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CJ Engineering
9205 W. Center Street Suite 214
Milwaukee, WI 53222
Ph. 414-443-1312

CJE Job No.: 1506R0-SWMP

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Introduction:

The proposed expansion and redevelopment of the Metal Era site located at 1600 & 1700 Airport Road will consist of two new building additions on the north and east sides of the existing 1600 building with new drives and loading areas and expanded parking in the south and north parts of the site. (See the proposed conditions plans in the appendix). The proposed development will be constructed in three phases; with the south parking lot expansion being done in phase 1, the east building addition, east drives and loading dock and the northeast parking being done in phase 2 and the north building addition , loading areas and drives and northwest parking being done in phase 3. Most of the phase 3 expansion is over existing impervious area. In order to meet the City of Waukesha and WI DNR storm water requirements two storm water facilities area being proposed. There will be an underground "Stormtech" system installed under the phase 1 parking lot as part of the phase 1 construction. Also as part of this development a new rain garden / bio-retention basin will be installed in the south part of the site near the intersection of Airport Road and Aviation Drive that will be constructed as part of the phase 2 expansion. The storm water facilities and analysis are based on the ultimate post-construction conditions. The storm water facility will not have any exposed permanent water surfaces since the site is close to the Airport. Storm water runoff from portions of the new development will be directed to these new storm water management facilities through a new storm sewer system, which has been sized for the 100-year design storm event. The site after the ultimate development will meet and exceed the storm water requirements for runoff quantity and quality control for redevelopment per NR 151 and the Chapter 32 of the City of Waukesha code of ordnances.

Storm water requirements per the WI DNR – NR 151, and City of Waukesha Storm water ordnance – Chapter 32 :

Runoff Quantity Control:
Not to exceed the predevelopment conditions

Runoff Quality Control:
40% to total suspend sediment (TSS) loads from parking areas and roads shall be removed prior to discharge. (Per NR 151.122 (2))

Developed Site: (See the Proposed Conditions Plan: Appendix "B").

Soil Types:	Per the soil survey for Waukesha County the underlying soils consists of Theresa Silt-Loam, HSG B, Dodge Silt-Loam, HSG B and Hochheim Loam, HSG B.
Cover & CN:	CN 61, 75-100% Grass Cover, Good condition, HSG C. CN 98, Paved Parking, Drives & Roofs (impervious surface)
Area:	Site = 10.80 acres Offsite contributing Area = 2.2 acres

24-Hour Rainfall Values:

2-Year: 2.7”
10-Year: 4.0”
100-Year: 5.6”

All rainfall values per the City of Waukesha stormwater ordnance

Method of Analysis:

The storm water runoff quantity was calculated using the methods outlines in TR-55 (“Urban Hydrology for Small Watersheds” by the U.S. Department of Agriculture’s Soil Conservation Services). Calculations were performed with the “HydroCAD 7.10” computer software. Water quality calculations were done using WinSLAMM for Windows version 9.4.0.

Drainage Summary: (See Summary of Calculations in Appendix)

Area	**2 Year Storm**	**10 Year Storm**	**100 Year Storm**
Existing Conditions			
Subcatchment 1 (Existing Site Area)	17.00 cfs	36.39 cfs	62.70 cfs
Proposed Conditions			
Subcatchment 1 (Area to proposed undrgrd - pond 1)	3.25 cfs	5.25 cfs	7.68 cfs
Underground - Pond 1 (out)	0.65 cfs	0.89 cfs	1.23 cfs
Subcatchment 2 (Area to proposed rain garden - pond 2)	4.90 cfs	8.02 cfs	11.84 cfs
Rain garden - Pond 2 (out)	0.77 cfs	1.56 cfs	6.35 cfs
Subcatchment 3 (Undetained Area)	16.13 cfs	32.22 cfs	53.44 cfs
Total proposed runoff (Reach 1)	**17.00 cfs**	**34.10 cfs**	**56.22 cfs**
Allowable Discharge	**17.00 cfs**	**36.39 cfs**	**62.70 cfs**

Water Quality:

WDNR requirements for redevelopment for water quality per section NR151.122 (2) table 1, requires the project to remove over 40% of the total suspended solids (TSS) from parking areas and roads prior to discharge off site, as quantified using WinSLAMM for Windows version 9.4.0 (See appendix for calculation results and inputs). This is achieved by the proposed *Stormtech* underground storm water facility and new rain garden (bio-retention basin) in the south part of the site . Proposed catch basins with sumps will also be installed in the new parking and driveway areas which will provide some additional water quality, but were not included in the WinSLAMM analysis. The TSS out of each area and total removal of site is as summarized below:

	Before Drainage System	After Controls	% Reduction
Area to underground Storm water facility (Pond 1)	1280 lbs	306.6 lbs	76.05%
Area to Rain Garden (Bio-retention Basin) (Pond 2)	373.6 lbs	47.4 lbs	87.3%
Untreated Area	603.1 lbs	603.1 lbs	0.0%
Total	2256.4 lbs	957.1 lbs	**57.6%**

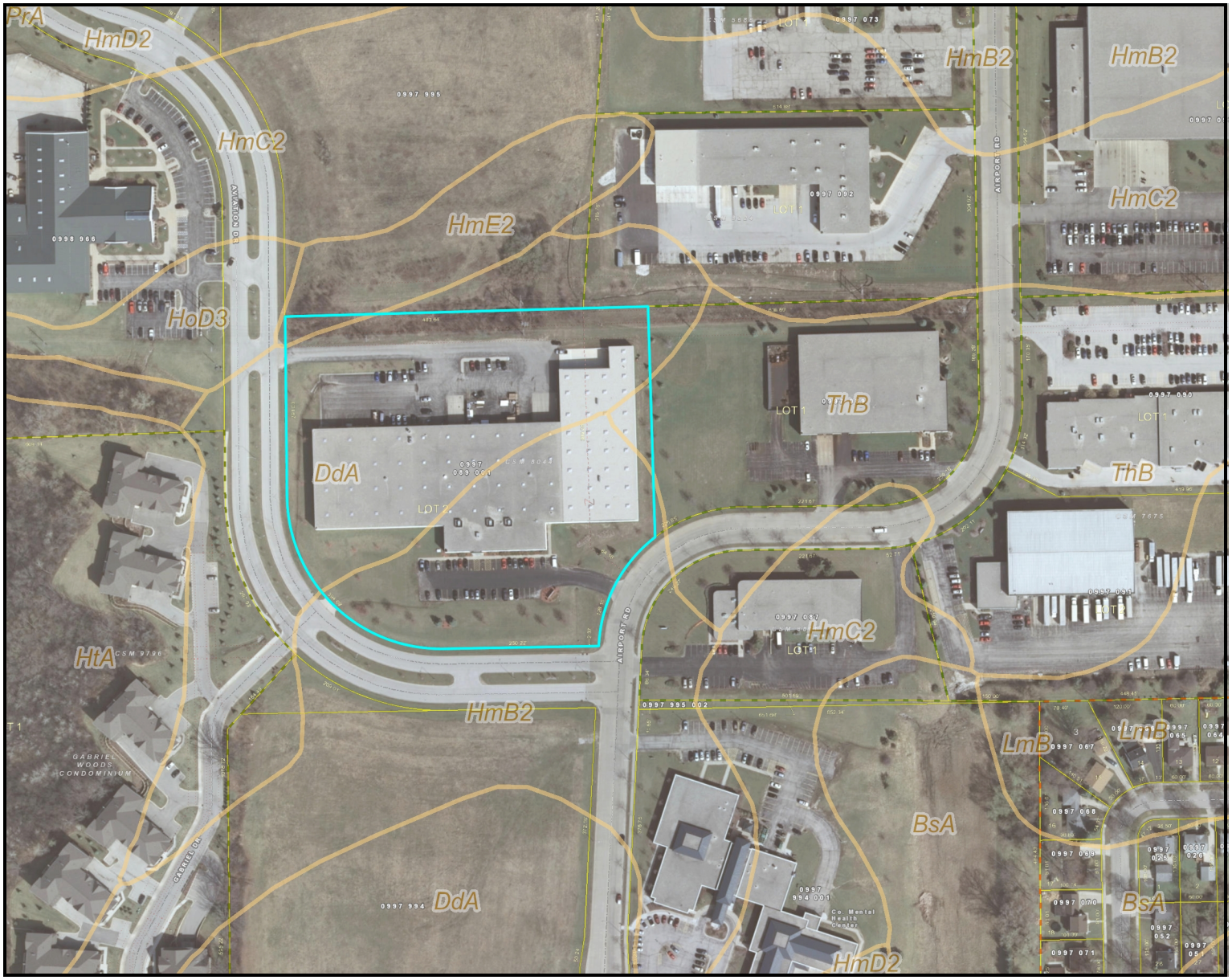
Conclusion:

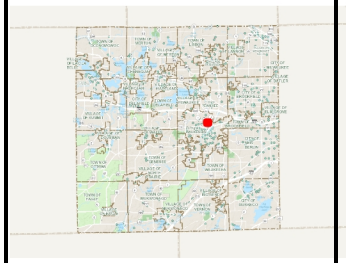
The proposed peak runoff rates under post-redevelopment conditions are reduced to no more than the peak runoff rate under the existing conditions. The storm water underground basin and rain garden will provide water quality so that over 40% of TSS will be removed from the proposed runoff from the parking and drives areas after redevelopment. Therefore, the proposed redevelopment meets and exceeds the storm water management and water quality requirements for the City of Waukesha and NR 151.

APPENDIX

LAND INFORMATION SYSTEMS DIVISION

Waukesha County GIS Map





Legend

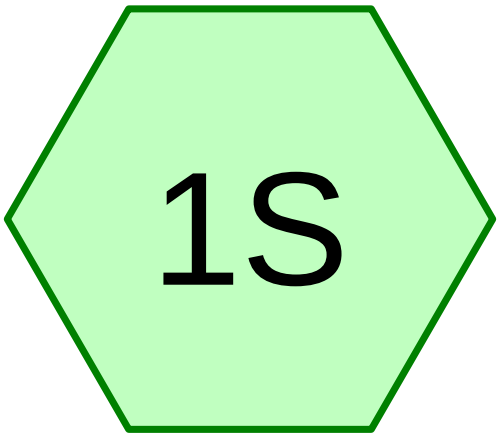
- Soils
- Plats
  - Assessor Plat
  - CSM
  - Condo Plat
  - Subdivision Plat

0 250.00 Feet

The information and depictions herein are for informational purposes and Waukesha County specifically disclaims accuracy in this reproduction and specifically admonishes and advises that if specific and precise accuracy is required, the same should be determined by procurement of certified maps, surveys, plats, Flood Insurance Studies, or other official means. Waukesha County will not be responsible for any damages which result from third party use of the information and depictions herein, or for use which ignores this warning.

Notes:

Printed: 8/20/2015



EXISTING

Subcat Reach Pond Link

Drainage Diagram for CJE1506-Exst
Prepared by {enter your company name here} 8/21/2015

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: EXISTING Runoff Area=13.000 ac Runoff Depth>0.78"
Flow Length=300' Tc=9.5 min CN=77 Runoff=17.00 cfs 0.847 af

Total Runoff Area = 13.000 ac Runoff Volume = 0.847 af Average Runoff Depth = 0.78"

Subcatchment 1S: EXISTING

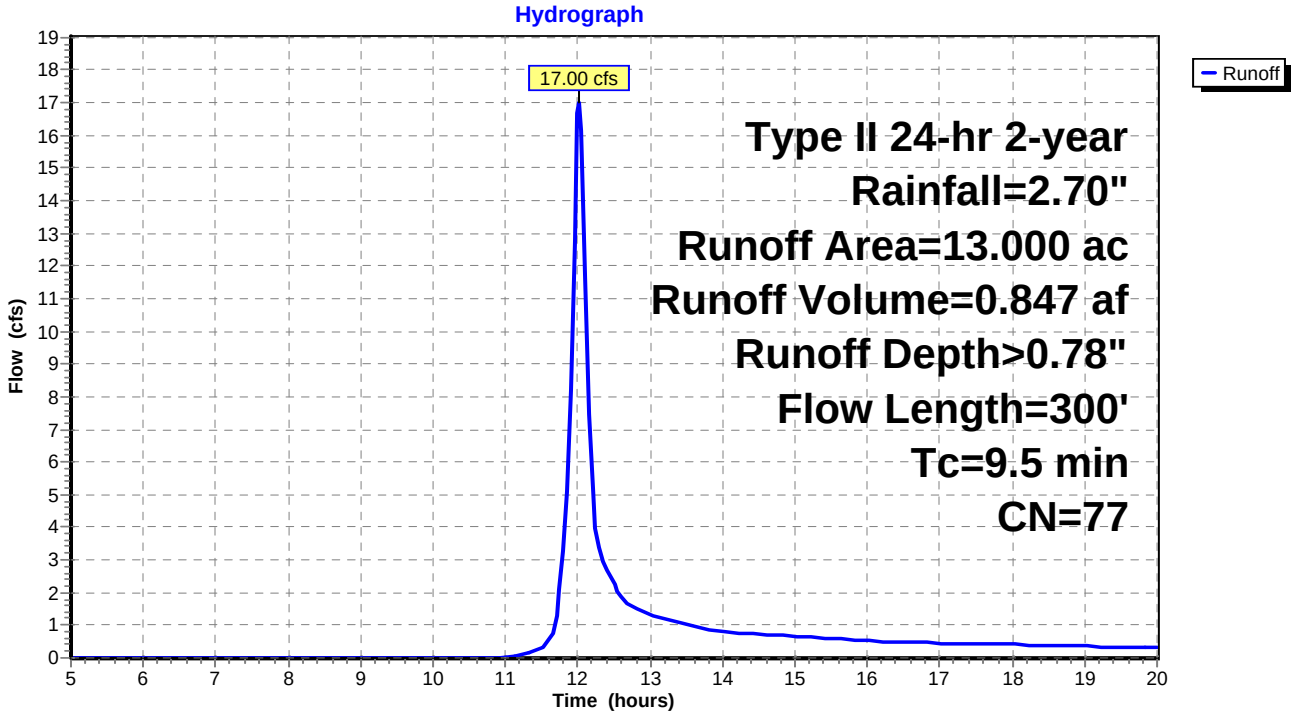
Runoff = 17.00 cfs @ 12.02 hrs, Volume= 0.847 af, Depth> 0.78"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-year Rainfall=2.70"

Area (ac)	CN	Description
3.230	98	Roofs
2.280	98	Paved parking & Walks
5.290	61	>75% Grass cover, Good, HSG B
2.200	61	>75% Grass cover, Good, HSG B - offsite area
13.000	77	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.3	100	0.0400	0.2		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 2.57"
1.2	200	0.0300	2.8		**Shallow Concentrated Flow, B-C** Unpaved Kv= 16.1 fps
9.5	300	Total			

Subcatchment 1S: EXISTING



Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: EXISTING Runoff Area=13.000 ac Runoff Depth>1.66"
Flow Length=300' Tc=9.5 min CN=77 Runoff=36.39 cfs 1.796 af

Total Runoff Area = 13.000 ac Runoff Volume = 1.796 af Average Runoff Depth = 1.66"

Subcatchment 1S: EXISTING

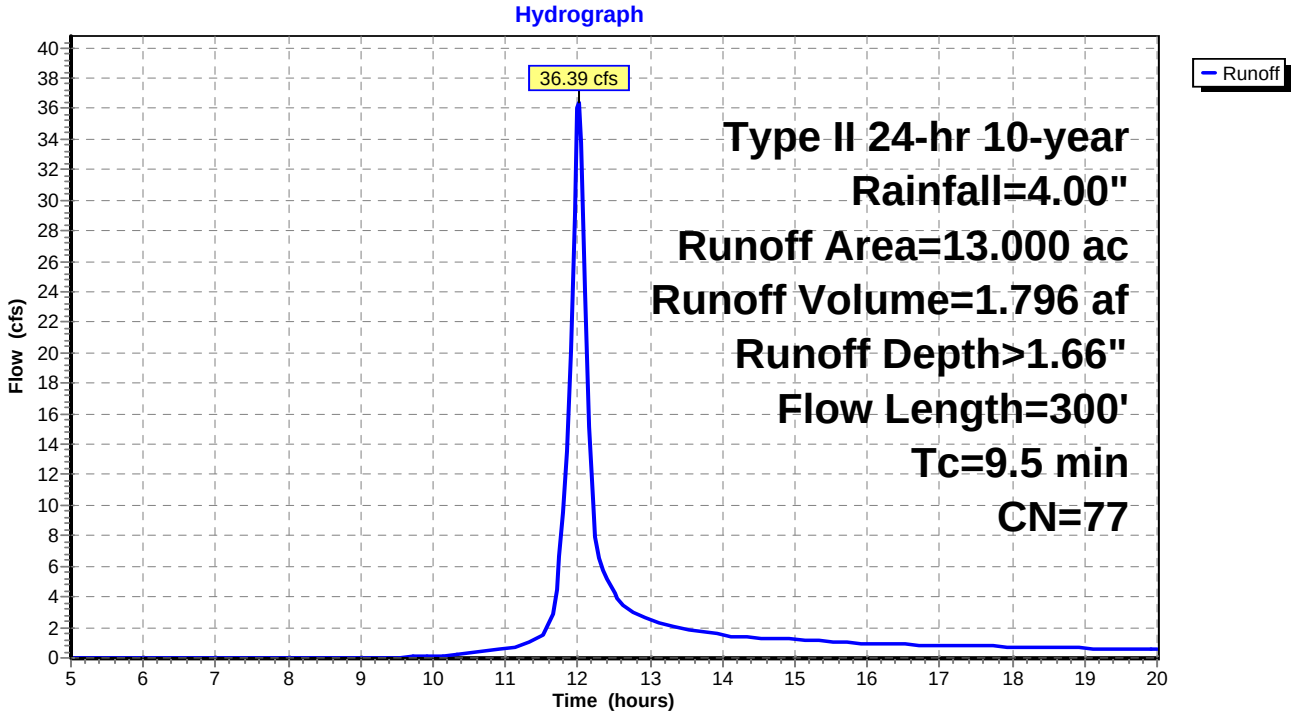
Runoff = 36.39 cfs @ 12.01 hrs, Volume= 1.796 af, Depth> 1.66"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-year Rainfall=4.00"

Area (ac)	CN	Description
3.230	98	Roofs
2.280	98	Paved parking & Walks
5.290	61	>75% Grass cover, Good, HSG B
2.200	61	>75% Grass cover, Good, HSG B - offsite area
13.000	77	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.3	100	0.0400	0.2		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 2.57"
1.2	200	0.0300	2.8		**Shallow Concentrated Flow, B-C** Unpaved Kv= 16.1 fps
9.5	300	Total			

Subcatchment 1S: EXISTING



Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: EXISTING Runoff Area=13.000 ac Runoff Depth>2.89"
Flow Length=300' Tc=9.5 min CN=77 Runoff=62.70 cfs 3.136 af

Total Runoff Area = 13.000 ac Runoff Volume = 3.136 af Average Runoff Depth = 2.89"

Subcatchment 1S: EXISTING

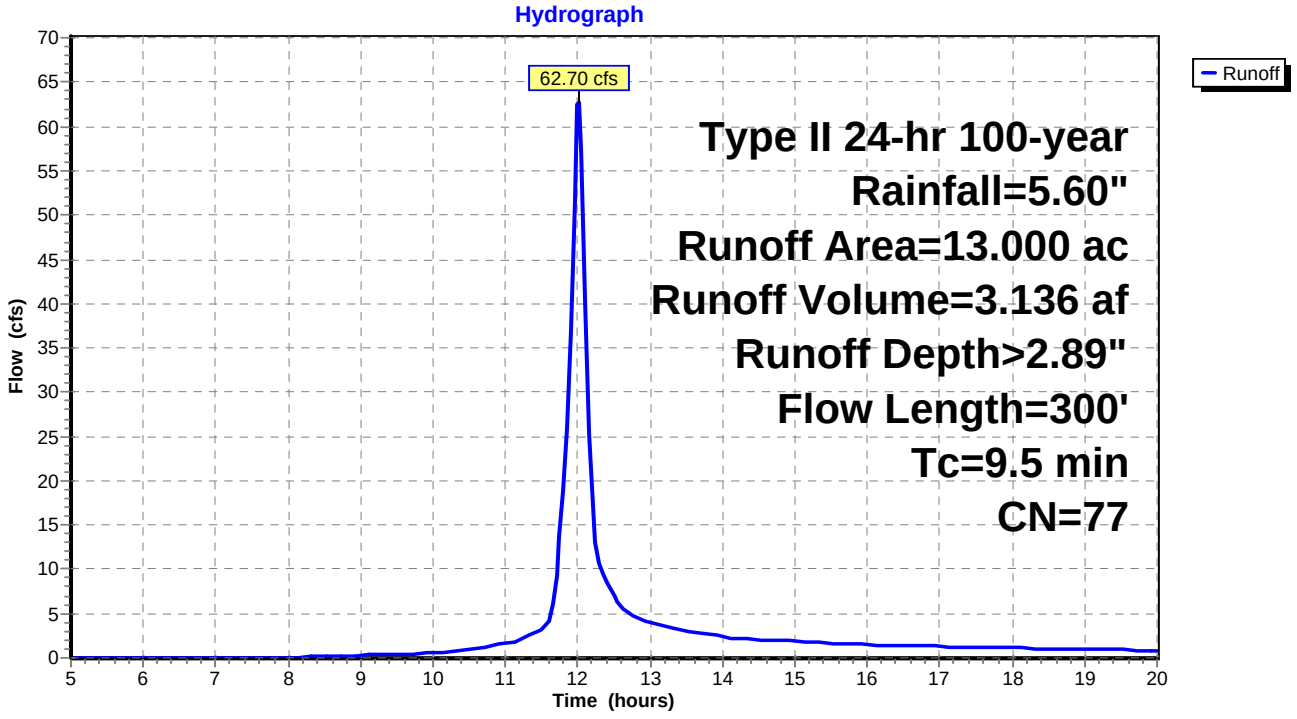
Runoff = 62.70 cfs @ 12.01 hrs, Volume= 3.136 af, Depth> 2.89"

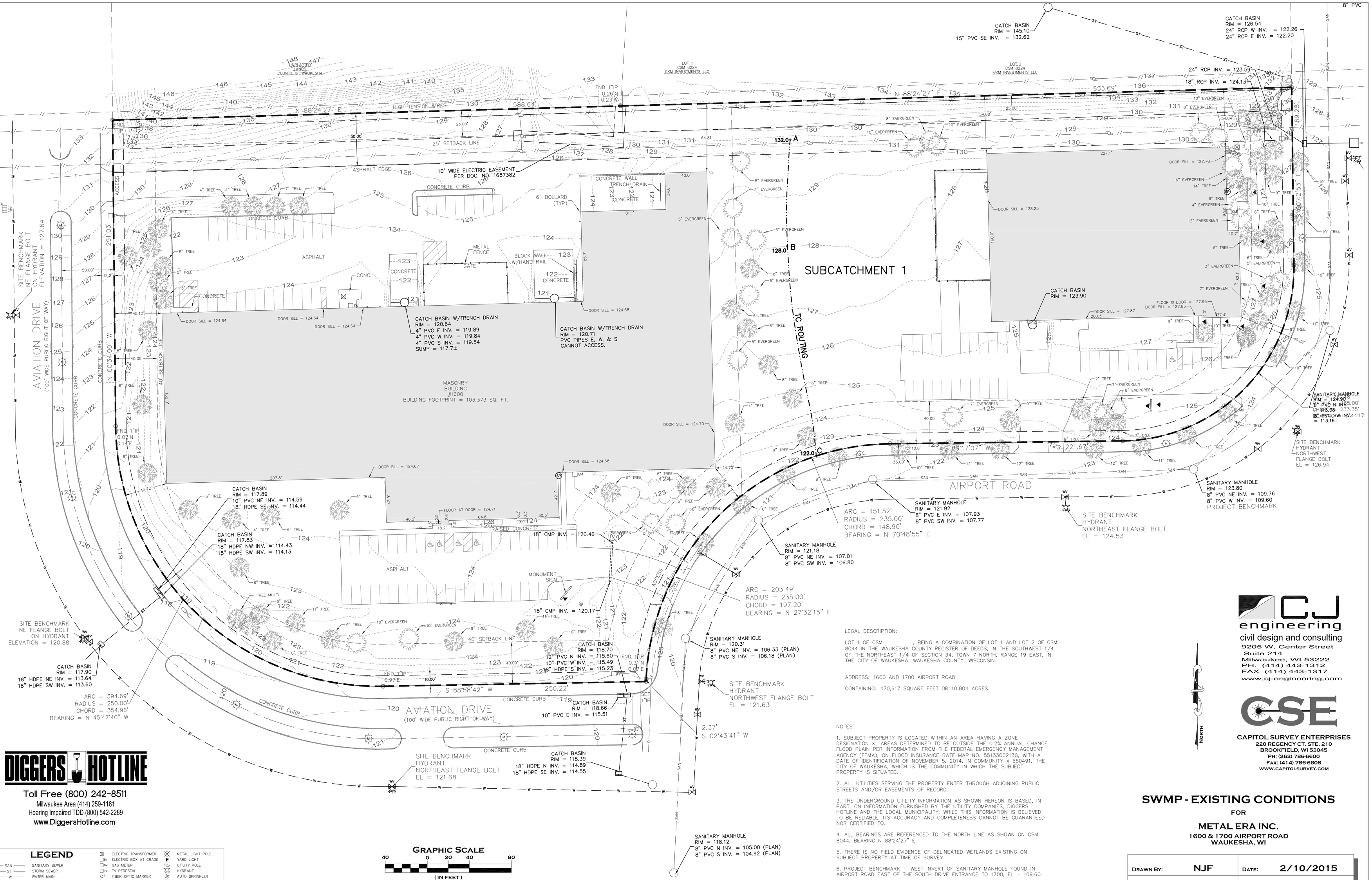
Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-year Rainfall=5.60"

Area (ac)	CN	Description
3.230	98	Roofs
2.280	98	Paved parking & Walks
5.290	61	>75% Grass cover, Good, HSG B
2.200	61	>75% Grass cover, Good, HSG B - offsite area
13.000	77	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.3	100	0.0400	0.2		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 2.57"
1.2	200	0.0300	2.8		**Shallow Concentrated Flow, B-C** Unpaved Kv= 16.1 fps
9.5	300	Total			

Subcatchment 1S: EXISTING





LEGEND

SAN — SANITARY SEWER	ELECTRIC TRANSFORMER	METAL LIGHT POLE
ST — STORM SEWER	ELECTRIC BOX AT GRADE	YARD LIGHT
W — WATER MAIN	GAS METER	UTILITY POLE
G — BURIED GAS LINE	TV PEDESTAL	HYDRANT
TEL — BURIED TELEPHONE LINE	FIBER OPTIC MARKER	AUTO SPRINKLER
E — BURIED ELECTRIC LINE	TELEPHONE PEDESTAL	WATER VALVE
// — OVERHEAD UTILITY LINES	AIR CONDITIONER	GAS VALVE
FO — BURIED FIBER OPTIC LINE	METAL SIGN	
EDGE OF TREES AND BRUSH	BOLLARD	
	MAIL BOX	

GRAPHIC SCALE

40 0 20 40 80

(IN FEET)

1 INCH = 40 FT.

DIGGERS HOTLINE

Toll Free (800) 242-8511

Milwaukee Area (414) 259-1181

Hearing Impaired TDD (800) 542-2289

www.DiggersHotline.com

LEGAL DESCRIPTION:

LOT 1 OF CSM , BEING A COMBINATION OF LOT 1 AND LOT 2 OF CSM 8044 IN THE WAUKESHA COUNTY REGISTER OF DEEDS, IN THE SOUTHWEST 1/4 OF THE NORTHEAST 1/4 OF SECTION 34, TOWN 7 NORTH, RANGE 19 EAST, IN THE CITY OF WAUKESHA, WAUKESHA COUNTY, WISCONSIN.

ADDRESS: 1600 AND 1700 AIRPORT ROAD

CONTAINING: 470,617 SQUARE FEET OR 10.804 ACRES.

NOTES

1. SUBJECT PROPERTY IS LOCATED WITHIN AN AREA HAVING A ZONE DESIGNATION X: AREAS DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOOD PLAIN PER INFORMATION FROM THE FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA), ON FLOOD INSURANCE RATE MAP NO. 55133C0213G, WITH A DATE OF IDENTIFICATION OF NOVEMBER 5, 2014, IN COMMUNITY # 550491, THE CITY OF WAUKESHA, WHICH IS THE COMMUNITY IN WHICH THE SUBJECT PROPERTY IS SITUATED.

2. ALL UTILITIES SERVING THE PROPERTY ENTER THROUGH ADJOINING PUBLIC STREETS AND/OR EASEMENTS OF RECORD.

3. THE UNDERGROUND UTILITY INFORMATION AS SHOWN HEREON IS BASED, IN PART, ON INFORMATION FURNISHED BY THE UTILITY COMPANIES, DIGGERS HOTLINE AND THE LOCAL MUNICIPALITY. WHILE THIS INFORMATION IS BELIEVED TO BE RELIABLE, ITS ACCURACY AND COMPLETENESS CANNOT BE GUARANTEED NOR CERTIFIED TO.

4. ALL BEARINGS ARE REFERENCED TO THE NORTH LINE AS SHOWN ON CSM 8044, BEARING N 88°24'27" E.

5. THERE IS NO FIELD EVIDENCE OF DELINEATED WETLANDS EXISTING ON SUBJECT PROPERTY AT TIME OF SURVEY.

6. PROJECT BENCHMARK – WEST INVERT OF SANITARY MANHOLE FOUND IN AIRPORT ROAD EAST OF THE SOUTH DRIVE ENTRANCE TO 1700, EL = 109.60.

7. SITE BENCHMARK – HYDRANT FLANGE BOLTS AS SHOWN HEREON.

8. ELEVATIONS BASED ON INFORMATION FROM THE CITY OF WAUKESHA AND ARE AT CITY OF WAUKESHA DATUM.

NORTH

CJ engineering
civil design and consulting
9205 W. Center Street
Suite 214
Milwaukee, WI 53222
PH. (414) 443-1312
FAX (414) 443-1317
www.cj-engineering.com

CSE
CAPITOL SURVEY ENTERPRISES
220 REGENCY CT. STE. 210
BROOKFIELD, WI 53045
PH: (262) 786-6600
FAX: (414) 786-6608
WWW.CAPITOLSURVEY.COM

SWMP - EXISTING CONDITIONS

FOR

METAL ERA INC.

1600 & 1700 AIRPORT ROAD
WAUKESHA, WI

DRAWN BY:	NJF	DATE:	2/10/2015
CHECKED BY:	CAJ	DRAWING NO.	SV1.0
CSE JOB NO.:	15-001	SHEET	1 OF 1

CJ engineering
civil design and consulting
9205 W. Center Street
Suite 214
Milwaukee, WI 53222
PH. (414) 443-1312
FAX (414) 443-1317
www.cj-engineering.com

N

SITE BENCHMARK
NE FLANGE BOLT
ON HYDRANT
ELEVATION = 127.64

AVIATION DRIVE
(100' WIDE PUBLIC RIGHT OF WAY)

SUBCACHTMENT 3

SUBCACHTMENT 2

SUBCACHTMENT 1

POND 1

POND 2

PHASE III
PROPOSED BUILDING ADDITION
APPROX 31,773 SF
WAREHOUSE: 26,773 SF
MANUFACTURING: 5,000 SF
124 FIRST FLOOR ELEV. 124.70
(MATCH EXISTING BLDG.)

PHASE II
PROPOSED NEW BUILDING ADDITION
(TYPE OF CONSTRUCTION: IIB)
APPROX 36,000 SF
WAREHOUSE: 31,000 SF
MANUFACTURING: 5,000
FIRST FLOOR ELEV. 124.70
(MATCH EXISTING BLDG.)

MASONRY
BUILDING
#1600
BUILDING FOOTPRINT = 103,373 SQ. FT.

MASONRY
BUILDING
#1700
BUILDING FOOTPRINT =
37,270 SQ. FT.
BLDG. HT. = 24.36'

AIRPORT ROAD
(70' WIDE PUBLIC RIGHT OF WAY)

CONCRETE CURB

CONCRETE

ASPHALT

ACCESS

BLOCK RETAINING WALL

METAL FENCE

6" BOLLARD (TYP)

TC ROUTING

PROPOSED RET. WALL

PROPOSED 10' RET. WALL

CONCRETE WALL
TRENCH DRAIN
CONCRETE

PROPOSED CATCH BASIN
RIM 123.7

PROPOSED CATCH BASIN
RIM 123.6

PROPOSED CATCH BASIN #6
RIM 125.50
8" S INV. 120.25

PROPOSED CATCH BASIN #7
RIM 123.65
8" N INV. 119.75
12" SW INV. 119.50

PROPOSED CATCH BASIN #5
RIM 122.40
(CONNECT TO UNDERGRO
STORM SWER SYSTEM
- SEE DETAIL)

PROPOSED CATCH BASIN #4
RIM 120.75
8" N INV. 118.00

PROPOSED CATCH BASIN #2
RIM 121.50
12" E INV. 118.00
12" NW INV. 117.75

PROPOSED CATCH BASIN #1
RIM 121.50
12" W INV. 118.25

PROPOSED TRENCH DRAIN
RIM 120.5
(CONNECT TO
BLDG. SUMP)

PROPOSED 12" INV. 119.50
(FROM ROOF DRAINS & SUMP)

PROPOSED STORM MH #9
RIM 123.00
12" N INV. 119.15
12" NE INV. 119.15
18" SW INV. 119.00

PROPOSED STORM MH #8
RIM 123.00
12" INV. 117.20 EXISTING ASPHALT

PROPOSED STORM MH #7
RIM 123.00
12" INV. 117.20 EXISTING ASPHALT

PROPOSED STORM SEWER
TO BE DESIGNED
AS PART OF PHASE III
CONSTRUCTION DOCUMENTS

PROPOSED 6" STORM SEWER
70' PVC
@ S=0.50%

PROPOSED 8" STORM SEWER
24" PVC
@ S=2.50%

PROPOSED 12" STORM SEWER
30" PVC
@ S=2.50%

PROPOSED 8" STORM SEWER
80' PVC
@ S=0.625%

PROPOSED 12" STORM SEWER
90' PVC
@ S=0.833%

PROPOSED 12" STORM SEWER
160' PVC
@ S=0.219%

PROPOSED 18" STORM SEWER
180' PVC
@ S=0.195%

PROPOSED 6" SAN. LATERAL
(FUTURE - PHASE 2)

PROPOSED 6" WATER SERVICE
(FUTURE - PHASE 2)

PROPOSED 18" ENDSCETION
INV. 118.25

PROPOSED STORM OUTLET
STRUCTURE
36" DIA. STORM INLET
INSTALL OVER EXISTING
12" STORM SEWER

PROPOSED LIGHT

PROPOSED LIGHT POLE

UNDERGROUND STORM
WATER SYSTEM
(SEE DETAIL)

EXST. RAISED CONCRETE

18" CMP INV. = 120.46

18" CMP
INV. 120.17

MONUMENT
SIGN

16x16
OVHD

CATCH BASIN
RIM = 145.10
15" PVC SE INV. = 132.62

CATCH BASIN
RIM = 123.90

CATCH BASIN
RIM = 117.89
10" PVC NE INV. = 114.59
18" HDPE SE INV. = 114.44

CATCH BASIN
RIM = 117.83
18" HDPE NW INV. = 114.43
18" HDPE SW INV. = 114.13
PROPOSED 6" E INV. 115.65

CATCH BASIN
RIM = 117.90
18" HDPE NE INV. = 113.64
18" HDPE SW INV. = 113.60

CATCH BASIN
RIM = 118.66
10" PVC E INV. = 115.51

CATCH BASIN
RIM = 118.39
18" HDPE N INV. = 114.89
18" HDPE SE INV. = 114.55

CATCH BASIN
RIM = 118.70
12" PVC N INV. = 115.60
10" PVC W INV. = 115.49
18" HDPE S INV. = 115.23

SANITARY MANHOLE
RIM = 121.92
8" PVC E INV. = 107.93
8" PVC SW INV. = 107.77

SANITARY MANHOLE
RIM = 121.18
8" PVC NE INV. = 107.01
8" PVC SW INV. = 106.80

SANITARY MANHOLE
RIM = 120.31
8" PVC NE INV. = 106.33 (PLAN)
8" PVC S INV. = 106.18 (PLAN)

SANITARY MANHOLE
RIM = 123.80
8" PVC NE INV. = 109.76
8" PVC W INV. = 109.60

SITE BENCHMARK
HYDRANT
NORTHWEST FLANGE BOLT
EL = 126.94

SITE BENCHMARK
HYDRANT
NORTHEAST FLANGE BOLT
EL = 124.53

SITE BENCHMARK
HYDRANT
NORTHWEST FLANGE BOLT
EL = 121.63

SITE BENCHMARK
HYDRANT
NORTHEAST FLANGE BOLT
EL = 121.68

SITE BENCHMARK
NE FLANGE BOLT
ON HYDRANT
ELEVATION = 120.88

FND 1"IP
0.26'N
0.23'W

SET 1"IP

N 88°24'27" E 588.64'

N 00°34'00" W 291.03'

S 88°58'42" W 250.22'

S 02°43'41" W 2.37'

ARC = 394.69'
RADIUS = 250.00'
CHORD = 354.96'
BEARING = N 45°47'40" W

ARC = 203.49'
RADIUS = 235.00'
CHORD = 197.20'
BEARING = N 27°32'15" E

10' WIDE ELECTRIC EASEMENT
PER DOC. NO. 1687382

UNPLATTED
LANDS
COUNTY OF WAUKESHA

LOT 1
CSM 8224
GKM INVESTMENTS LLC

HIGH TENSION WIRES

25' SETBACK LINE

25' BUILDING SETBACK LINE

40' SETBACK LINE

24" RCP INV. = 123.59
18" RCP INV. = 124.13

DOOR SILL = 124.64
DOOR SILL = 124.64
DOOR SILL = 124.64
DOOR SILL = 124.68
DOOR SILL = 124.70
DOOR SILL = 124.67
DOOR SILL = 124.68
DOOR SILL = 128.25
DOOR SILL = 127.78
DOOR SILL = 127.87
DOOR SILL = 127.83
FLOOR @ DOOR = 127.95
FLOOR AT DOOR = 124.71

TO OBTAIN LOCATIONS OF
PARTICIPANTS UNDERGROUND
FACILITIES BEFORE YOU
DIG IN WISCONSIN

CALL DIGGERS HOTLINE
1-800-242-8511
TOLL FREE
WIS STATUTE 182.0175(1974)
REQUIRES A MINIMUM 3 DAY
NOTICE BEFORE YOU EXCAVATE
MILW. AREA 259-1181

LEGEND

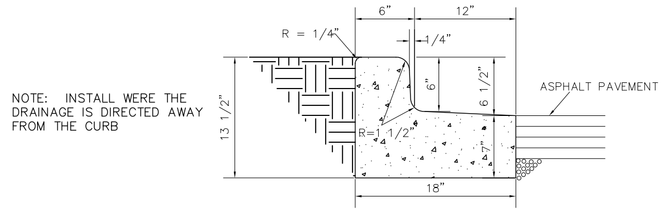
96	EXISTING CONTOUR
96	PROPOSED CONTOUR
x 96.5	PROPOSED ELEVATION
ST	PROPOSED STORM SEWER
x x x x x x x x	PROPOSED SAW CUT
	PROPOSED SILT FENCE

GRAPHIC SCALE
40 0 20 40 80
1 inch = 40 ft

CJE NO.: I506R0
AUGUST 24, 2015

METAL ERA
1600 & 1700 AIRPORT ROAD
WAUKESHA, WISCONSIN

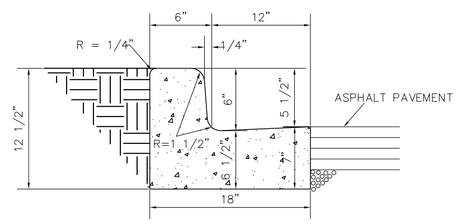
ULTIMATE CONDITIONS
SWMP - PROPOSED CONDITIONS



NOTE: INSTALL WERE THE DRAINAGE IS DIRECTED AWAY FROM THE CURB

HIGH SIDE CONCRETE CURB (H.S. C&G) DETAIL

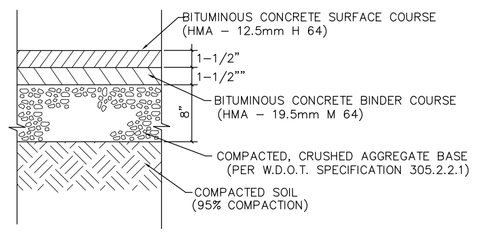
NOT TO SCALE



NOTE: INSTALL WERE THE DRAINAGE IS DIRECTED TOWARDS THE CURB

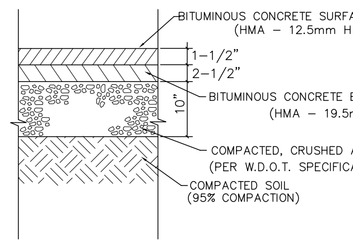
LOW SIDE CONCRETE CURB (L.S. C&G) DETAIL

NOT TO SCALE



STANDARD ASPHALT PAVEMENT (PARKING TRAFFIC AREA)

NOT TO SCALE



HEAVY DUTY ASPHALT PAVEMENT (TRUCK TRAFFIC AREA)

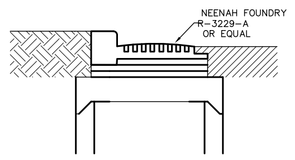
NOT TO SCALE

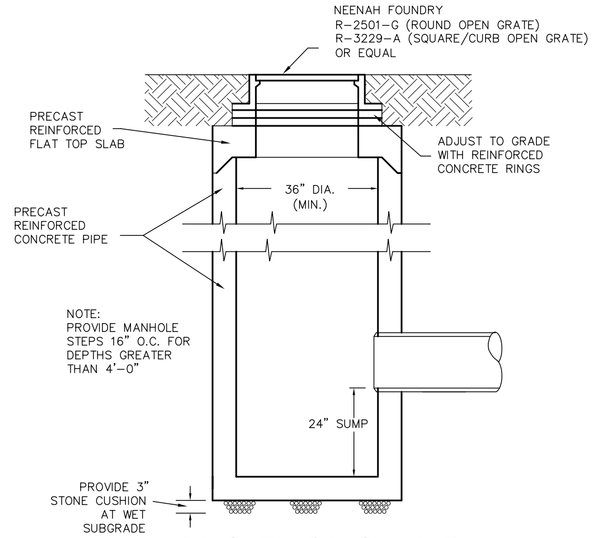
PHASE 2 & 3

CONCRETE PAVEMENT (LOADING DOCKS)

NOT TO SCALE

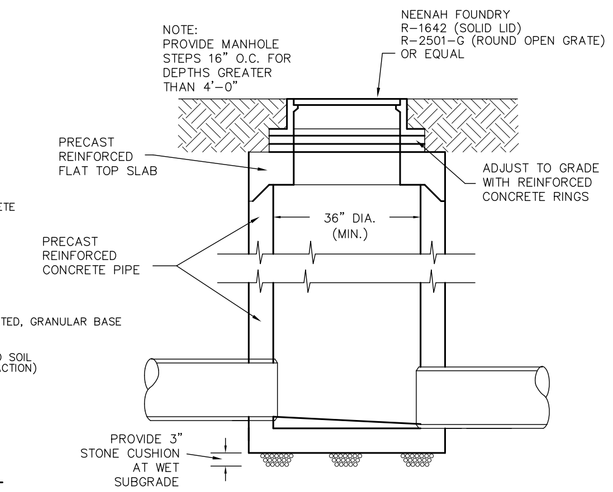
PHASE 2 & 3





PRECAST CATCH BASIN

NOT TO SCALE



PRECAST STORM INLET/MH

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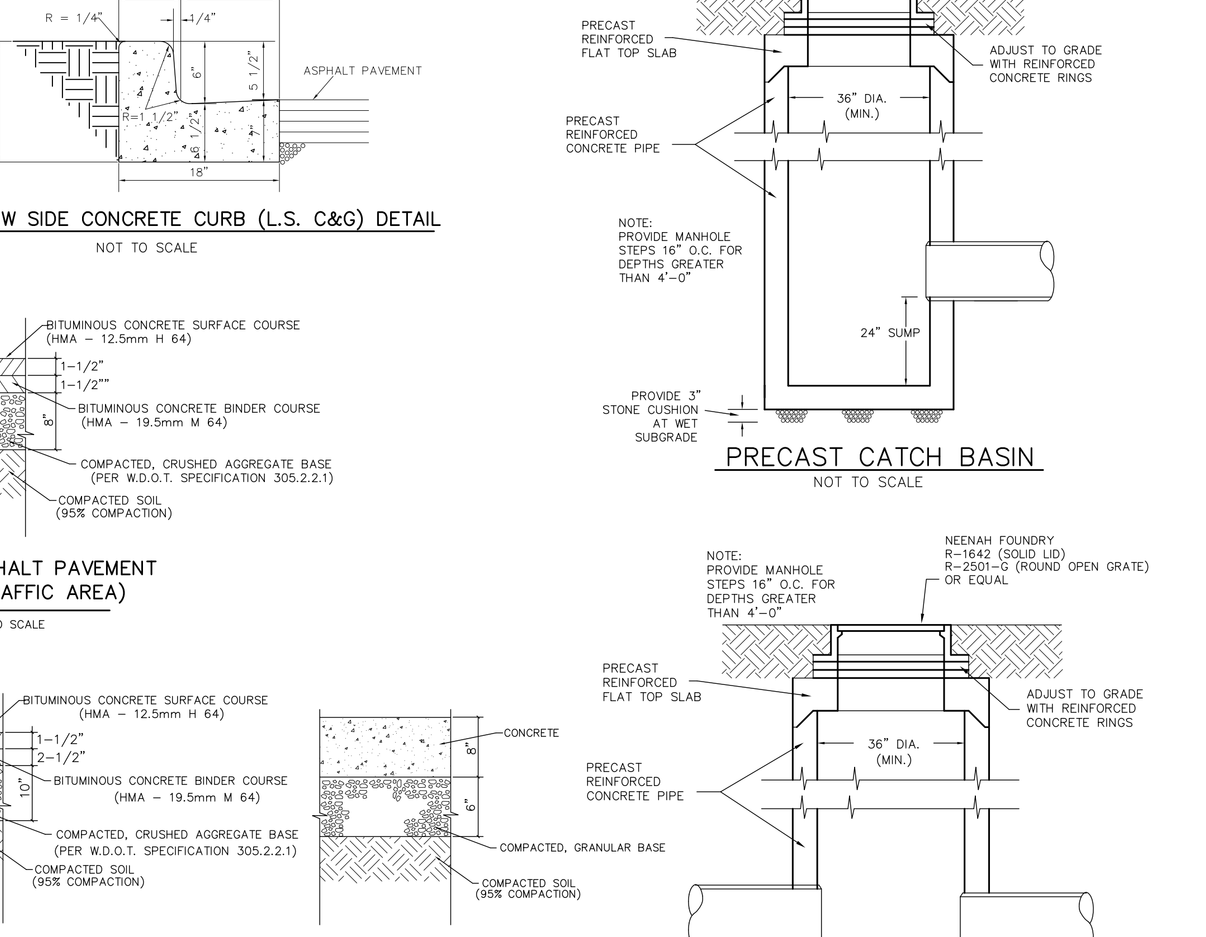
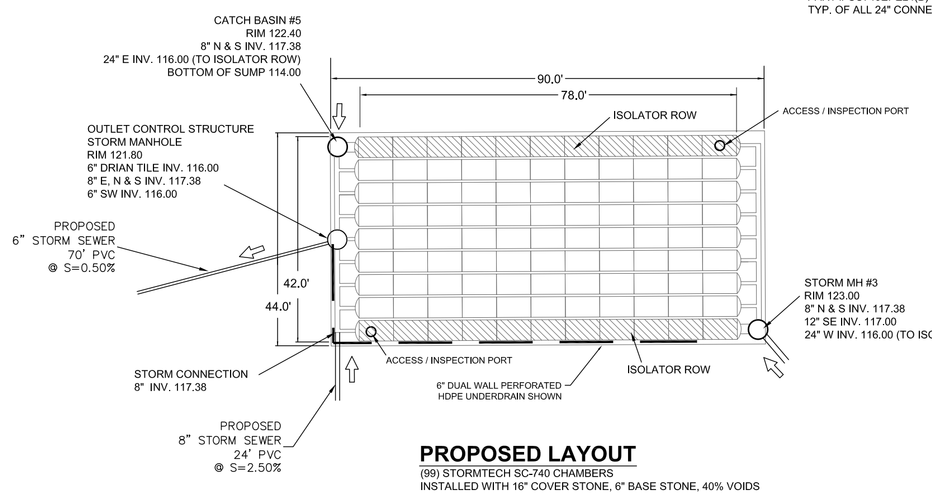


CROSS SECTION OF
PERFORATED PORTION OF UNDERDRAIN

RAIN GARDEN / BIORETENTION BASIN DETAIL

NOT TO SCALE

PHASE 2



PROPOSED LAYOUT

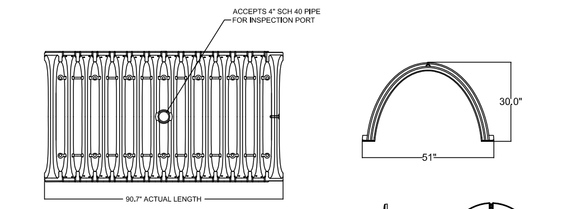
(99) STORMTECH SC-740 CHAMBERS
INSTALLED WITH 16" COVER STONE, 6" BASE STONE, 40% VOIDS

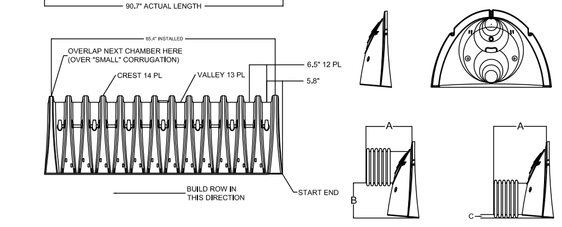
PLAN VIEW

NOT TO SCALE

ACCESS / INSPECTION PORT
8" PREFABRICATED END CAP
PART # SC740EPERS(T)
TYP. OF ALL 8" CONNECTIONS

24" PREFABRICATED END CAP
PART # SC740EPE24(B)
TYP. OF ALL 24" CONNECTIONS





NOMINAL CHAMBER SPECIFICATIONS
SIZE (W x H x INSTALLED LENGTH) = 51.0" x 30.0" x 85.4"
CHAMBER STORAGE = 45.9 CUBIC FEET
MINIMUM INSTALLED STORAGE = 74.9 CUBIC FEET
WEIGHT = 75 LBS.

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

PART #	CHAMBER	PIPE SIZE	A	B	C
SC740EPE06T	SC-740	6 in (150 mm)	10,90 in (277 mm)	16,50 in (470 mm)	N/A
SC740EPE06B	SC-740	6 in (150 mm)	10,90 in (277 mm)	N/A	0,50 in (13 mm)
SC740EPE08T	SC-740	8 in (200 mm)	12,20 in (310 mm)	16,50 in (419 mm)	N/A
SC740EPE08B	SC-740	8 in (200 mm)	12,20 in (310 mm)	N/A	0,60 in (15 mm)
SC740EPE10T	SC-740	10 in (250 mm)	13,40 in (340 mm)	14,50 in (368 mm)	N/A
SC740EPE10B	SC-740	10 in (250 mm)	13,40 in (340 mm)	N/A	0,70 in (18 mm)
SC740EPE12T	SC-740	12 in (300 mm)	14,70 in (373 mm)	12,50 in (318 mm)	N/A
SC740EPE12B	SC-740	12 in (300 mm)	14,70 in (373 mm)	N/A	1,20 in (30 mm)
SC740EPE15T	SC-740	15 in (375 mm)	18,40 in (467 mm)	9,00 in (229 mm)	N/A
SC740EPE15B	SC-740	15 in (375 mm)	18,40 in (467 mm)	N/A	1,30 in (33 mm)
SC740EPE18T	SC-740	18 in (450 mm)	19,70 in (500 mm)	5,00 in (127 mm)	N/A
SC740EPE18B	SC-740	18 in (450 mm)	19,70 in (500 mm)	N/A	1,60 in (41 mm)
SC740EPE24B	SC-740	24 in (600 mm)	18,50 in (470 mm)	N/A	0,10 in (3 mm)

*NOTE: ALL DIMENSIONS ARE NOMINAL

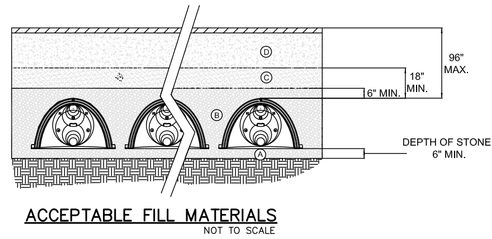
ALL STUBS, EXCEPT FOR THE SC740EPE24B ARE PLACED AT BOTTOM OF END CAP SUCH THAT THE OUTSIDE DIAMETER OF THE STUB IS FLUSH WITH THE BOTTOM OF THE END CAP. FOR ADDITIONAL INFORMATION CONTACT STORMTECH AT 1-800-848-2604.

* FOR THE SC740EPE24B THE 24" STUB LIES BELOW THE BOTTOM OF THE END CAP APPROXIMATELY 1.75", BACKFILL MATERIAL SHOULD BE REMOVED FROM BELOW THE N=12 STUB SO THAT THE FITTING SETS LEVEL.

ACCEPTABLE FILL MATERIALS: STORMTECH SC-310 AND SC-740 CHAMBER SYSTEMS

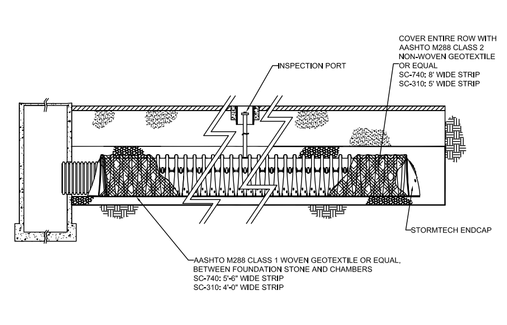
MATERIAL LOCATION	DESCRIPTION	AASHTO M43 DESIGNATION	AASHTO M145 DESIGNATION	COMPACTION/DENSITY REQUIREMENT
D	FILL MATERIAL FROM 18" TO GRADE ABOVE CHAMBERS	ANY SOIL/ROCK MATERIALS, NATIVE SOILS OR PER ENGINEER'S PLANS, CHECK PLANS FOR PAVEMENT SUBGRADE REQUIREMENTS.	N/A	PREPARE PER ENGINEER'S PLANS, PAVED INSTALLATIONS MAY HAVE STRINGENT MATERIAL AND PREPERATION REQUIREMENTS.
C	FILL MATERIAL FOR 6" TO 18" ELEVATION ABOVE CHAMBERS (24" FOR UNPAVED INSTALLATIONS)	GRANULAR WELL-GRADED SOIL/AGGREGATE MIXTURES, < 35% FINES.	3, 357, 4, 467, 5, 56, 57, 6, 67, 68, 7, 78, 8, 89, 9, 10	A-1 A-2 A-3	COMPACT IN 6" LIFTS TO A MINIMUM 95% STANDARD PROCTOR DENSITY, ROLLER GROSS VEHICLE WEIGHT NOT TO EXCEED 12,000 LBS. DYNAMIC FORCE NOT TO EXCEED 20,000 LBS.
B	EMBEDMENT STONE SURROUNDING AND TO A MIN. 6" ELEVATION ABOVE CHAMBERS	CLEAN ANGULAR STONE WITH THE MAJORITY OF PARTICLES BETWEEN 1 & 2 INCH	3, 357, 4, 467, 5, 56, 57	N/A	NO COMPACTION REQUIRED.
A	FOUNDATION STONE BELOW CHAMBERS	CLEAN ANGULAR STONE WITH THE MAJORITY OF PARTICLES BETWEEN 1 & 2 INCH	3, 35, 4, 467, 5, 56, 57	N/A	PLATE COMPACT OR ROLL TO ACHIEVE A 95% STANDARD PROCTOR DENSITY.

PLEASE NOTE: THE LISTED AASHTO DESIGNATIONS ARE FOR GRADATIONS ONLY. THE STONE MUST ALSO BE CLEAN, CRUSHED, ANGULAR.
FOR EXAMPLE, THE STONE MUST BE SPECIFIED AS CLEAN, CRUSHED, ANGULAR NO. 4 STONE. STORMTECH RECOMMENDS HARDNESS AND DURABILITY CRITERIA FOR USE OF RECYCLED CONCRETE IN A AND B LOCATIONS. CONTACT STORMTECH FOR "TECH SHEET #4" ON "RECYCLED CONCRETE STRUCTURAL BACKFILL"



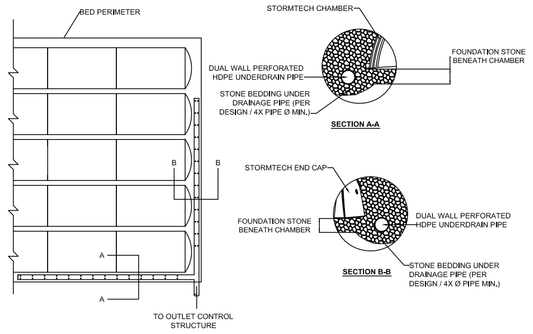
ACCEPTABLE FILL MATERIALS

NOT TO SCALE



ISOLATOR ROW PROFILE VIEW

NOT TO SCALE

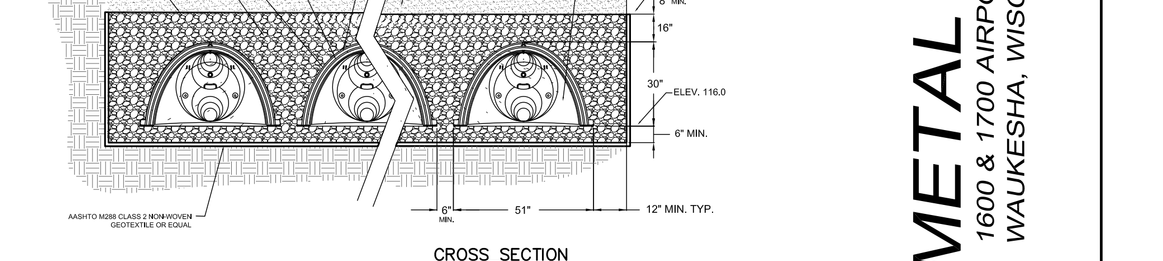


UNDERDRAIN DETAIL

NOT TO SCALE

TECHNICAL STANDARDS

NOT TO SCALE



CROSS SECTION

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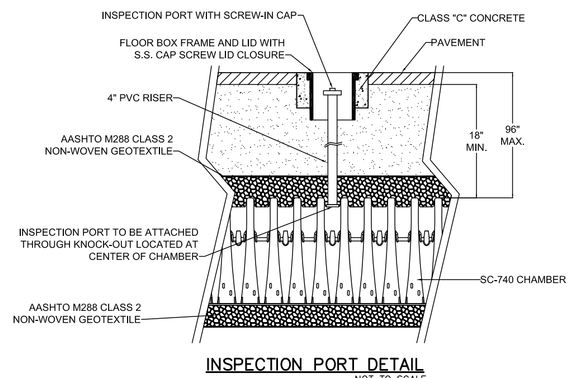

INSPECTION PORT DETAIL

NOT TO SCALE

STORMWATER CHAMBER SPECIFICATIONS

1. CHAMBERS SHALL BE STORMTECH SC-740, SC-310 OR APPROVED EQUAL.
2. CHAMBERS SHALL CONFORM TO THE REQUIREMENTS OF ASTM F2418-05, "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
3. CHAMBER ROWS SHALL PROVIDE CONTINUOUS, UNOBSTRUCTED INTERNAL SPACE WITH NO INTERNAL SUPPORT PANELS.
4. THE STRUCTURAL DESIGN OF THE CHAMBERS, THE STRUCTURAL BACKFILL AND THE INSTALLATION REQUIREMENTS SHALL ENSURE THAT THE LOAD FACTORS SPECIFIED IN THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, SECTION 12.12 ARE MET FOR: 1) LONG-DURATION DEAD LOADS AND 2) SHORT-DURATION LIVE LOADS, BASED ON THE AASHTO DESIGN TRUCK WITH CONSIDERATION FOR IMPACT AND MULTIPLE VEHICLE PRESENCES.
5. ONLY CHAMBERS THAT ARE APPROVED BY THE ENGINEER WILL BE ALLOWED. THE CONTRACTOR SHALL SUBMIT (3 SETS) OF THE FOLLOWING TO THE ENGINEER FOR APPROVAL BEFORE DELIVERING CHAMBERS TO THE PROJECT SITE:
   a. A STRUCTURAL EVALUATION BY A REGISTERED STRUCTURAL ENGINEER THAT DEMONSTRATES THAT THE LOAD FACTORS SPECIFIED IN THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, SECTION 12.12 ARE MET. THE 50-YEAR CREEP MODULUS DATA SPECIFIED IN ASTM F2418-05 MUST BE USED AS A PART OF THE AASHTO STRUCTURAL EVALUATION TO VERIFY LONG-TERM PERFORMANCE.
   b. A CERTIFICATION BY THE MANUFACTURER THAT THE CHAMBERS ARE IN ACCORDANCE WITH ASTM F2418-05.
6. CHAMBERS SHALL BE PRODUCED AT AN ISO 9001 CERTIFIED MANUFACTURING FACILITY.
7. ALL DESIGN SPECIFICATIONS FOR CHAMBERS SHALL BE IN ACCORDANCE WITH THE MANUFACTURER'S LATEST DESIGN MANUAL.
8. THE INSTALLATION OF CHAMBERS SHALL BE IN ACCORDANCE WITH THE MANUFACTURER'S LATEST INSTALLATION INSTRUCTIONS.

STORMTECH PRODUCT SPECIFICATIONS

1.0 GENERAL

1.1 STORMTECH CHAMBERS ARE DESIGNED TO CONTROL STORMWATER RUNOFF, AS A SUBSURFACE RETENTION SYSTEM. STORMTECH CHAMBERS RETAIN AND ALLOW EFFECTIVE INFILTRATION OF WATER INTO THE SOIL, AS A SUBSURFACE DETENTION SYSTEM. STORMTECH CHAMBERS DETAIN AND ALLOW FOR THE METERED FLOW OF WATER TO AN OUTFALL.

2.0 CHAMBER PARAMETERS

2.1 THE CHAMBER SHALL BE INJECTION MOLDED OF POLYPROPYLENE RESIN TO BE INHERENTLY RESISTANT TO ENVIRONMENTAL STRESS CRACKING (ESCR), AND TO HAVE SUFFICIENT LONG-TERM STIFFNESS THROUGH HIGHER TEMPERATURES EXPERIENCED DURING INSTALLATION AND SERVICE.

2.2 THE NOMINAL CHAMBER DIMENSIONS OF THE STORMTECH SC-740 SHALL BE: 51.0 INCHES (1295 MM) WIDE AND 30.0 INCHES (762 MM) HIGH. NOMINAL CHAMBER DIMENSIONS OF THE STORMTECH SC-310 SHALL BE: 51.0 INCHES TALL, 34.0 INCHES WIDE AND 90.7 INCHES LONG. THE INSTALLED LENGTH OF A JOINED CHAMBER SHALL BE 85.4 INCHES.

2.3 THE CHAMBER SHALL HAVE A CONTINUOUSLY CURVED SECTION PROFILE.

2.4 THE CHAMBER SHALL BE OPEN-BOTTOMED.

2.5 THE CHAMBER SHALL INCORPORATE AN OVERLAPPING CORRUGATION JOINT SYSTEM TO ALLOW CHAMBER ROWS OF ALMOST ANY LENGTH TO BE CREATED. THE OVERLAPPING CORRUGATION JOINT SYSTEM SHALL BE EFFECTIVE WHILE ALLOWING A CHAMBER TO BE TRIMMED TO SHORTEN ITS OVERALL LENGTH.

2.6 THE NOMINAL STORAGE VOLUME OF A JOINED STORMTECH SC-740 CHAMBER SHALL BE 74.9 CUBIC FEET PER CHAMBER WHEN INSTALLED PER STORMTECH'S TYPICAL DETAILS (INCLUDES THE VOLUME OF CRUSHED ANGULAR STONE WITHIN AN ASSUMED 40% POROSITY). THIS EQUATES TO 1.47 CUBIC FEET OF STORAGE/SQUARE FOOT OF BED. THE NOMINAL STORAGE VOLUME OF AN INSTALLED STORMTECH SC-310 CHAMBER SHALL BE 31.0 CUBIC FEET PER CHAMBER WHEN INSTALLED PER STORMTECH'S TYPICAL DETAILS (INCLUDES THE VOLUME OF CRUSHED ANGULAR STONE WITH AN ASSUMED 40% POROSITY). THIS EQUATES TO 1.3 CUBIC FEET OF STORAGE/SQUARE FOOT OF BED.

2.7 THE CHAMBER SHALL HAVE FORTY-EIGHT ORIFICES PENETRATING THE SIDEWALLS TO ALLOW FOR LATERAL CONVEYANCE OF WATER.

2.8 THE CHAMBER SHALL HAVE TWO ORIFICES NEAR ITS TOP TO ALLOW FOR EQUALIZATION OF AIR PRESSURE BETWEEN ITS INTERIOR AND EXTERIOR.

2.9 THE CHAMBER SHALL HAVE BOTH OF ITS ENDS OPEN TO ALLOW FOR UNIMPEDED HYDRAULIC FLOWS AND VISUAL INSPECTIONS DOWN A ROW'S ENTIRE LENGTH.

2.10 THE CHAMBER SHALL HAVE 14 CORRUGATIONS.

2.11 THE CHAMBER SHALL HAVE A CIRCULAR, INDENTED, FLAT SURFACE ON THE TOP OF THE CHAMBER FOR AN OPTIONAL 4-INCH INSPECTION PORT.

2.12 THE CHAMBER SHALL BE ANALYZED AND DESIGNED USING AASHTO METHODS FOR THERMOPLASTIC CULVERTS CONTAINED IN THE LRFD BRIDGE DESIGN SPECIFICATIONS, 2ND EDITION, INCLUDING INTERIM REVISIONS THROUGH 2006. THE CHAMBER SHALL ALSO BE ANALYZED PER AASHTO METHODS FOR BURIED STEEL CONSIDER EARTH AND LIVE LOADS AS APPROPRIATE FOR THE MINIMUM TO MAXIMUM SPECIFIED DEPTH OF FILL.

2.13 THE CHAMBER SHALL BE MANUFACTURED IN AN ISO 9001:2000 CERTIFIED FACILITY.

3.0 END CAP PARAMETERS

3.1 END CAPS WITH PRE-FABRICATED PIPE CONNECTIONS SHALL BE INJECTION MOLDED FROM POLYETHYLENE RESIN.

3.2 THE END CAP SHALL BE DESIGNED TO FIT INTO ANY CORRUGATION OF A CHAMBER, WHICH ALLOWS CAPPING A CHAMBER THAT HAS IT'S LENGTH TRIMMED/ SEGMENTING ROWS INTO STORAGE BASINS OF VARIOUS LENGTHS.

3.3 THE END CAP SHALL HAVE SAW GUIDES TO ALLOW EASY CUTTING FOR VARIOUS DIAMETERS OF PIPE THAT MAY BE USED TO INLET THE SYSTEM.

3.4 THE END CAP SHALL HAVE EXCESS STRUCTURAL ADEQUACIES TO ALLOW CUTTING AN ORIFICE OF ANY SIZE AT ANY INVERT ELEVATION.

3.5 THE PRIMARY FACE OF AN END CAP SHALL BE CURVED OUTWARD TO RESIST HORIZONTAL LOADS GENERATED NEAR THE EDGES OF BEDS.

3.6 THE END CAP SHALL BE MANUFACTURED IN AN ISO 9001:2000 CERTIFIED FACILITY.

STORMTECH GENERAL NOTES

1. STORMTECH LLC ("STORMTECH") REQUIRES INSTALLING CONTRACTORS TO USE AND UNDERSTAND STORMTECH'S LATEST INSTALLATION INSTRUCTIONS PRIOR TO BEGINNING SYSTEM INSTALLATION.
2. OUR TECHNICAL SERVICES DEPARTMENT OFFERS INSTALLATION CONSULTATIONS TO INSTALLING CONTRACTORS. CONTACT OUR TECHNICAL SERVICES REPRESENTATIVE AT LEAST 30 DAYS PRIOR TO SYSTEM INSTALLATION TO ARRANGE A PRE-INSTALLATION CONSULTATION. OUR REPRESENTATIVES CAN THEN ANSWER QUESTIONS OR ADDRESS COMMENTS ON THE STORMTECH CHAMBER SYSTEM AND INFORM THE INSTALLING CONTRACTOR OF THE MINIMUM INSTALLATION REQUIREMENTS BEFORE BEGINNING THE SYSTEM'S CONSTRUCTION. CALL **1-888-892-2694** TO SPEAK TO A TECHNICAL SERVICES REPRESENTATIVE OR VISIT **WWW.STORMTECH.COM** TO RECIEVE A COPY OF OUR INSTALLTION INSTRUCTIONS.
3. STORMTECH'S REQUIREMENTS FOR SYSTEMS WITH PAVEMENT DESIGN (ASPHALT, CONCRETE PAVERS, ETC.) MINIMUM COVER IS 18" NOT INCLUDING PAVEMENT. MAXIMUM COVER IS 96", INCLUDING PAVEMENT. FOR INSTALLATIONS THAT DO NOT INCLUDE PAVEMENT, WHERE RUTTING FROM VEHICLES MAY OCCUR, MINIMUM REQUIRED COVER IS 24". MAXIMUM COVER IS 96".
4. THE CONTRACTOR MUST REPORT ANY DISCREPANCIES WITH CHAMBER FOUNDATION MATERIALS BEARING CAPACITIES TO THE DESIGN ENGINEER.
5. AASHTO M288 CLASS 2 NON-WOVEN GEOTEXTILE (FILTER FABRIC) MUST BE USED AS INDICATED IN THE PROJECT PLANS.
6. STONE PLACEMENT BETWEEN CHAMBERS ROWS AND AROUND PERIMETER MUST FOLLOW INSTRUCTIONS AS INDICATED IN THE MOST CURRENT VERSION OF STORMTECH'S INSTALLATION INSTRUCTIONS.
7. BACKFILLING OVER THE CHAMBERS MUST FOLLOW REQUIREMENTS AS INDICATED IN THE MOST CURRENT VERSION OF STORMTECH'S INSTALLATION INSTRUCTIONS.
8. THE CONTRACTOR MUST REFER TO STORMTECH'S INSTALLATION INSTRUCTIONS FOR A TABLE OF ACCEPTABLE VEHICLE LOADS AT VARIOUS DEPTHS OF COVER. THIS INFORMATION IS ALSO AVAILABLE AT STORMTECH'S WEBSITE: **WWW.STORMTECH.COM**. THE CONTRACTOR IS RESPONSIBLE FOR PREVENTING VEHICLES THAT EXCEED STORMTECH'S REQUIREMENTS FROM TRAVELING ACROSS OR PARKING OVER THE STORMWATER SYSTEM. TEMPORARY FENCING, WARNING TAPE AND APPROPRIATELY LOCATED SIGNS ARE COMMONLY USED TO PREVENT UNAUTHORIZED VEHICLES FROM ENTERING SENSITIVE CONSTRUCTION AREAS.
9. THE CONTRACTOR MUST APPLY EROSION AND SEDIMENT CONTROL MEASURES TO PROTECT THE STORMWATER SYSTEM DURING ALL PHASES OF SITE CONSTRUCTION PER LOCAL CODES AND DESIGN ENGINEER'S SPECIFICATIONS.
10. STORMTECH PRODUCT WARRANTY IS LIMITED. SEE CURRENT PRODUCT WARRANTY FOR DETAILS. TO ACQUIRE A COPY CALL STORMTECH AT **1-888-892-2694** OR VISIT **WWW.STORMTECH.COM**.

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METAL ERA
1600 & 1700 AIRPORT ROAD
WAUKESHA, WISCONSIN

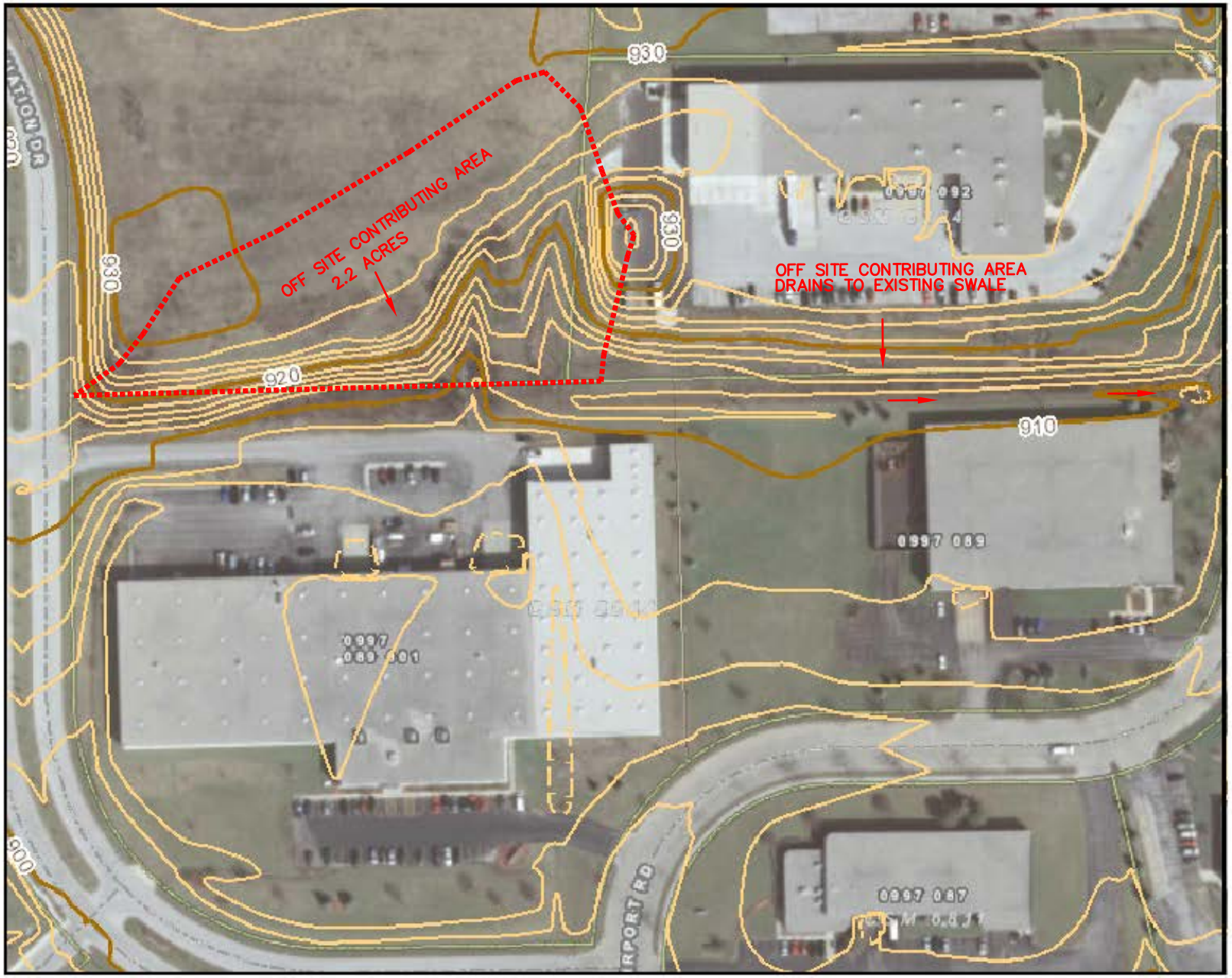
CJE NO.: I506R0
AUGUST 24, 2015

SITE DETAILS

C3.0

LAND INFORMATION SYSTEMS DIVISION

Waukesha County GIS Map



Legend

10' Contour Labels 2005

Contour Lines 2005

- Index Contour Line
- Index Contour Line Approx
- Index Depression Line
- Index Depression Line Approx
- Intermed Depression Line
- Intermed Depression Line App
- Intermediate Contour Line
- Intermediate Contour Line Ap

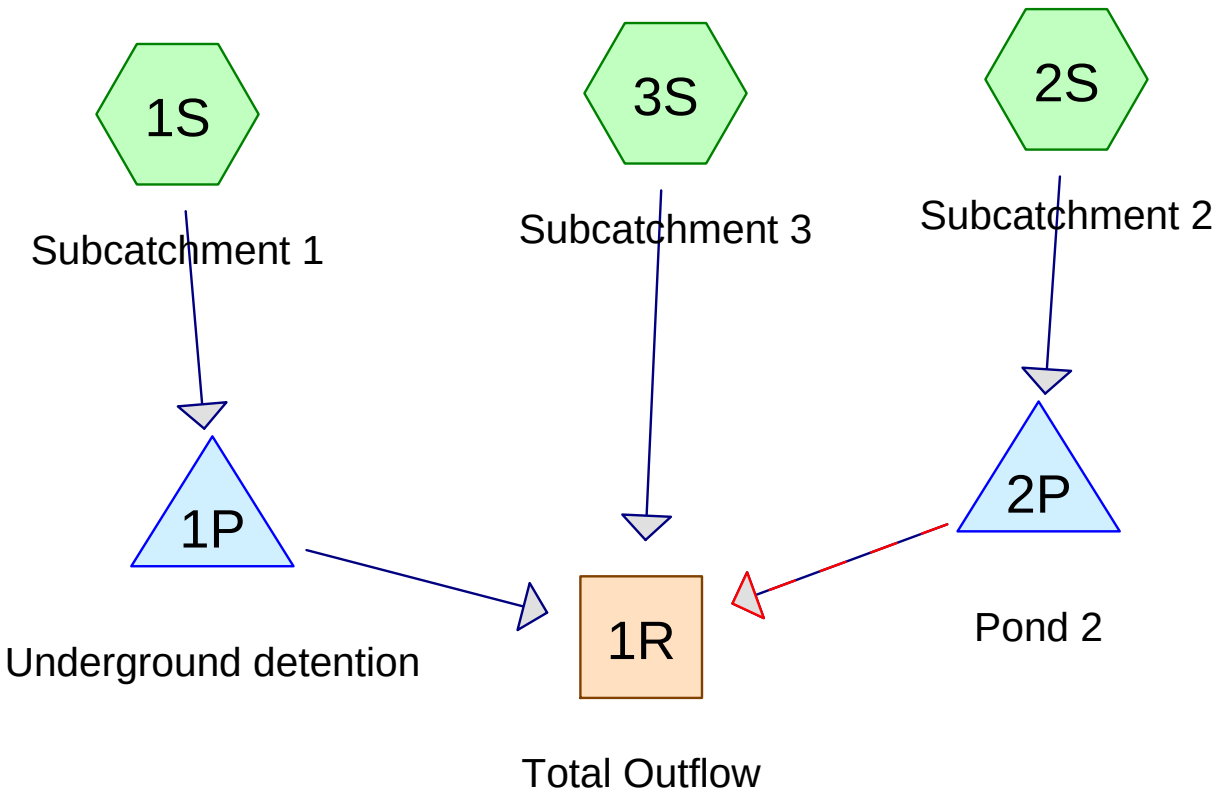
Plats

- Assessor Plat
- CSM
- Condo Plat
- Subdivision Plat

0 150.00 Feet

Notes:

Printed: 8/20/2015



Subcat Reach Pond Link

Drainage Diagram for CJE1506-Prop
Prepared by {enter your company name here} 8/21/2015

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Subcatchment 1 Runoff Area=1.140 ac Runoff Depth>1.75"
Flow Length=181' Tc=9.2 min CN=92 Runoff=3.25 cfs 0.167 af

Subcatchment 2S: Subcatchment 2 Runoff Area=1.760 ac Runoff Depth>1.67"
Flow Length=123' Tc=8.8 min CN=91 Runoff=4.90 cfs 0.245 af

Subcatchment 3S: Subcatchment 3 Runoff Area=10.100 ac Runoff Depth>0.93"
Flow Length=113' Tc=9.2 min CN=80 Runoff=16.13 cfs 0.787 af

Reach 1R: Total Outflow Inflow=17.00 cfs 1.155 af
Outflow=17.00 cfs 1.155 af

Pond 1P: Underground detention Peak Elev=117.08' Storage=3,294 cf Inflow=3.25 cfs 0.167 af
6.0" x 70.0' Culvert Outflow=0.65 cfs 0.156 af

Pond 2P: Pond 2 Peak Elev=119.40' Storage=5,727 cf Inflow=4.90 cfs 0.245 af
Primary=0.77 cfs 0.212 af Secondary=0.00 cfs 0.000 af Outflow=0.77 cfs 0.212 af

Total Runoff Area = 13.000 ac Runoff Volume = 1.199 af Average Runoff Depth = 1.11"

Subcatchment 1S: Subcatchment 1

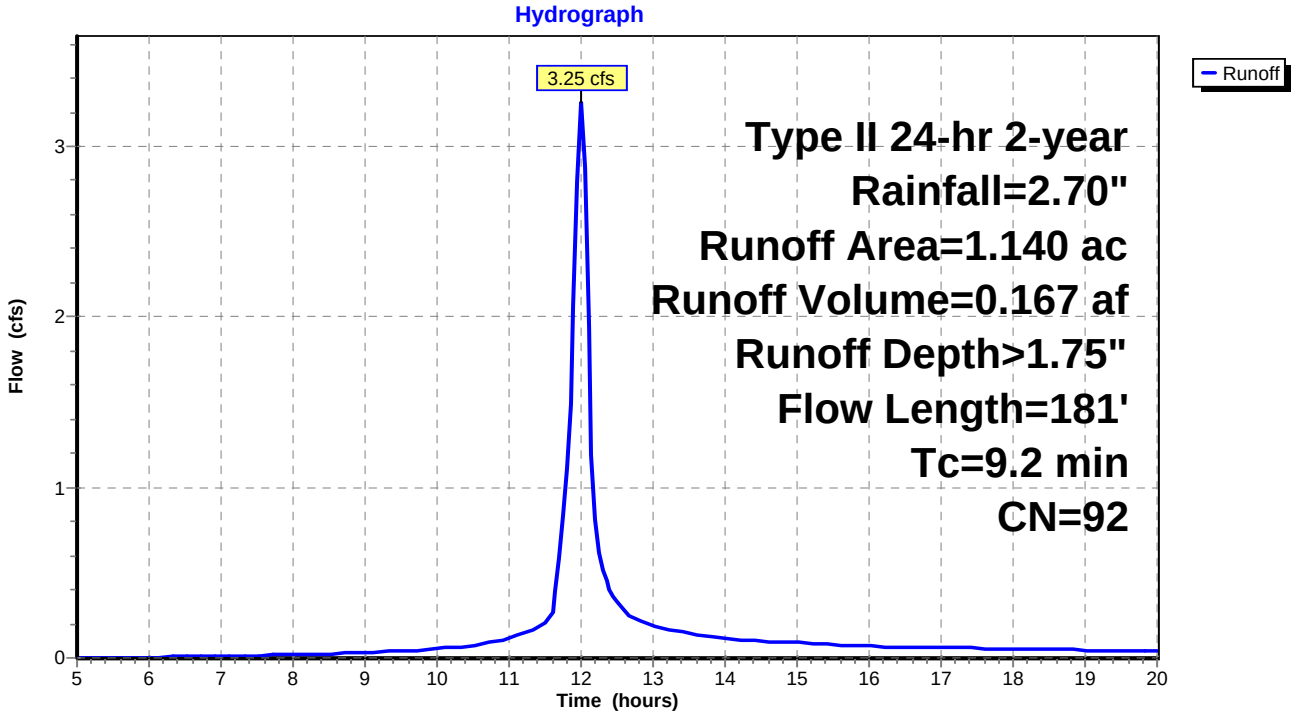
Runoff = 3.25 cfs @ 12.00 hrs, Volume= 0.167 af, Depth> 1.75"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-year Rainfall=2.70"

Area (ac)	CN	Description
0.960	98	Paved parking & roofs
0.180	61	>75% Grass cover, Good, HSG B
1.140	92	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.0	48	0.0100	0.1		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 2.57"
0.8	52	0.0190	1.1		**Sheet Flow, B-C** Smooth surfaces n= 0.011 P2= 2.57"
0.4	81	0.0247	3.2		**Shallow Concentrated Flow, C-D** Paved Kv= 20.3 fps
9.2	181	Total			

Subcatchment 1S: Subcatchment 1



Subcatchment 2S: Subcatchment 2

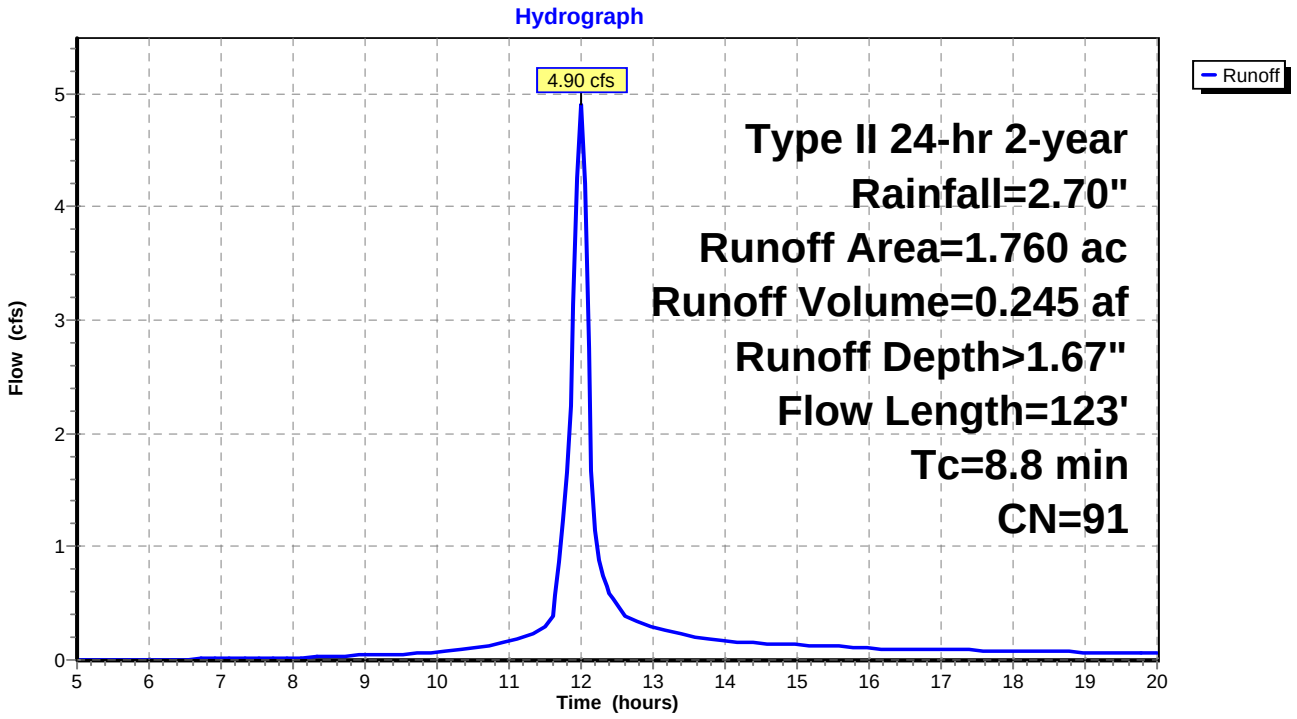
Runoff = 4.90 cfs @ 12.00 hrs, Volume= 0.245 af, Depth> 1.67"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-year Rainfall=2.70"

Area (ac)	CN	Description
0.830	98	Roofs
0.600	98	Paved parking & Walks
0.330	61	>75% Grass cover, Good, HSG B
1.760	91	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.6	70	0.0240	0.2		**Sheet Flow, E-F** Grass: Short n= 0.150 P2= 2.57"
1.1	16	0.1587	0.2		**Sheet Flow, F-G** Grass: Short n= 0.150 P2= 2.57"
0.1	37	0.0078	5.2	9.28	**Circular Channel (pipe), G-H** Diam= 18.0" Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013 Corrugated PE, smooth interior
8.8	123	Total			

Subcatchment 2S: Subcatchment 2



Subcatchment 3S: Subcatchment 3

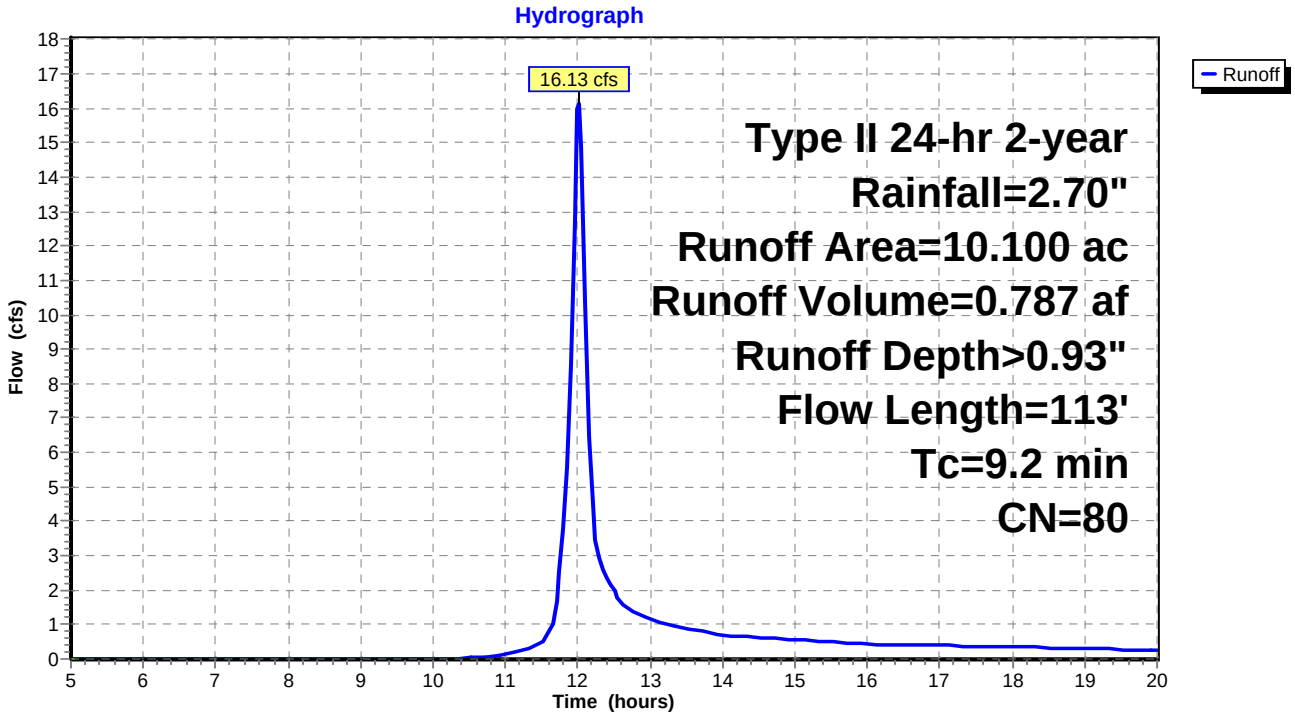
Runoff = 16.13 cfs @ 12.01 hrs, Volume= 0.787 af, Depth> 0.93"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-year Rainfall=2.70"

Area (ac)	CN	Description
3.960	98	Roofs
1.360	98	Paved parking & Walks
2.580	61	>75% Grass cover, Good, HSG B
2.200	61	>75% Grass cover, Good, HSG B - offsite area
10.100	80	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.5	30	0.0100	0.1		**Sheet Flow, J-K** Grass: Short n= 0.150 P2= 2.57"
0.6	45	0.0266	1.2		**Sheet Flow, K-L** Smooth surfaces n= 0.011 P2= 2.57"
3.0	25	0.0330	0.1		**Sheet Flow, L-M** Grass: Short n= 0.150 P2= 2.57"
0.1	13	0.0385	3.2		**Shallow Concentrated Flow, M-N** Unpaved Kv= 16.1 fps
9.2	113	Total			

Subcatchment 3S: Subcatchment 3



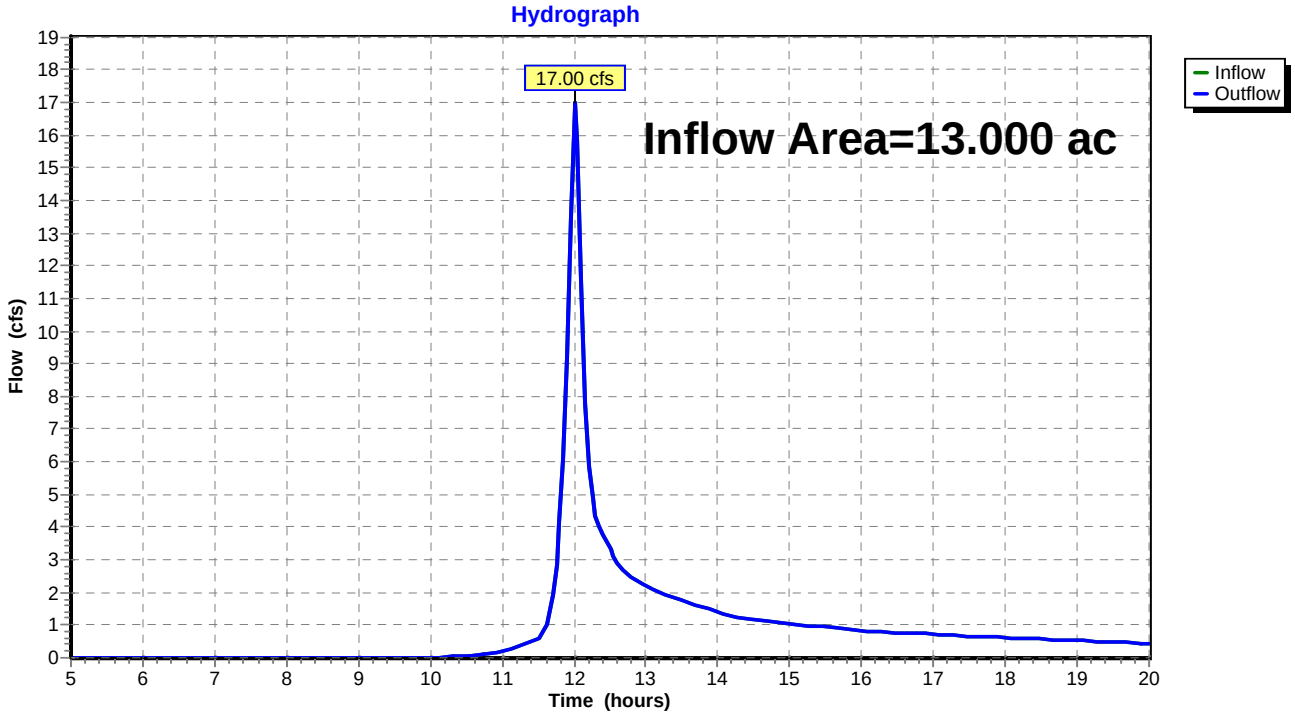
Reach 1R: Total Outflow

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 13.000 ac, Inflow Depth > 1.07" for 2-year event
Inflow = 17.00 cfs @ 12.01 hrs, Volume= 1.155 af
Outflow = 17.00 cfs @ 12.01 hrs, Volume= 1.155 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach 1R: Total Outflow



Pond 1P: Underground detention

Inflow Area = 1.140 ac, Inflow Depth > 1.75" for 2-year event
Inflow = 3.25 cfs @ 12.00 hrs, Volume= 0.167 af
Outflow = 0.65 cfs @ 12.25 hrs, Volume= 0.156 af, Atten= 80%, Lag= 14.6 min
Primary = 0.65 cfs @ 12.25 hrs, Volume= 0.156 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 117.08' @ 12.25 hrs Surf.Area= 3,960 sf Storage= 3,294 cf
Plug-Flow detention time= 85.7 min calculated for 0.156 af (94% of inflow)
Center-of-Mass det. time= 62.4 min (829.5 - 767.1)

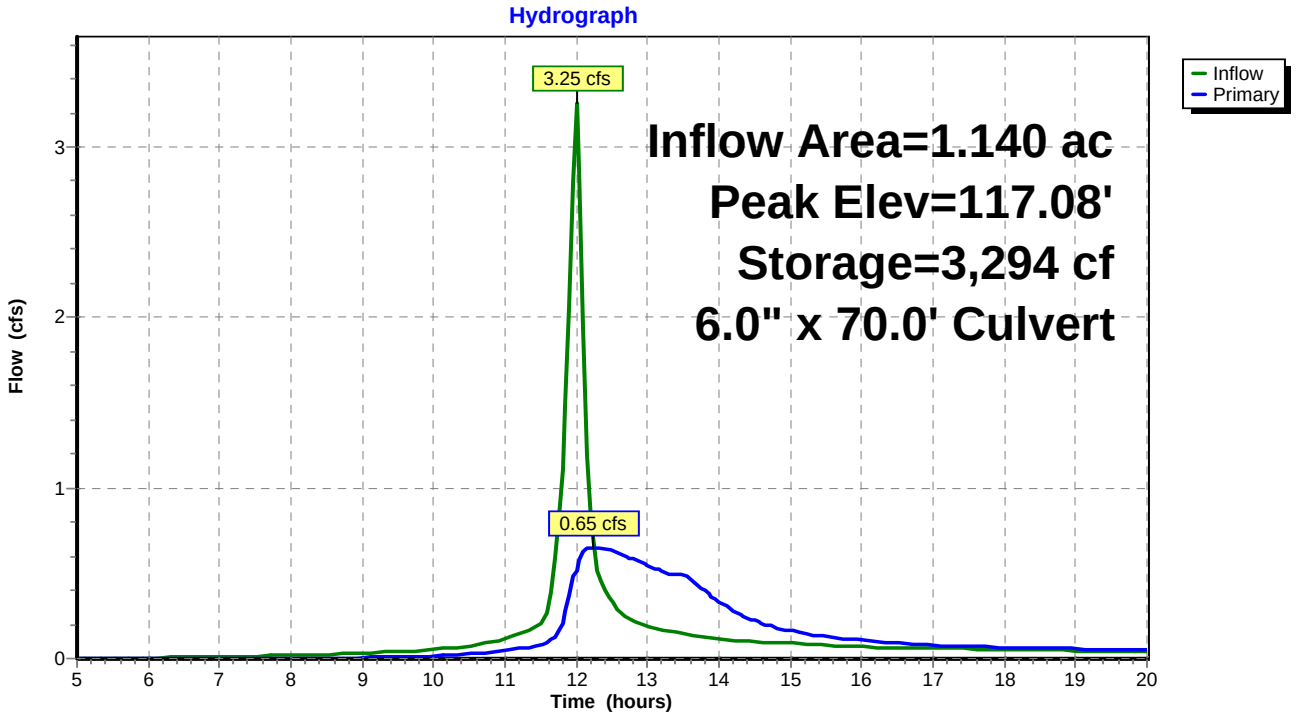
Volume	Invert	Avail.Storage	Storage Description
#1	116.00'	4,524 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc) 15,840 cf Overall - 4,529 cf Embedded = 11,311 cf x 40.0% Voids
#2	116.00'	4,529 cf	**44.6"W x 30.0"H x 78.00'L StormTech SC-740** x 9 Inside #1
		9,054 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
116.00	3,960	0	0
120.00	3,960	15,840	15,840

Device	Routing	Invert	Outlet Devices
#1	Primary	116.00'	**6.0" x 70.0' long Culvert** CPP, square edge headwall, Ke= 0.500 Outlet Invert= 115.65' S= 0.0050 '/' Cc= 0.900 n= 0.011

Primary OutFlow Max=0.65 cfs @ 12.25 hrs HW=117.08' (Free Discharge)
↑—**1=Culvert** (Barrel Controls 0.65 cfs @ 3.3 fps)

Pond 1P: Underground detention



Pond 2P: Pond 2

Inflow Area = 1.760 ac, Inflow Depth > 1.67" for 2-year event
Inflow = 4.90 cfs @ 12.00 hrs, Volume= 0.245 af
Outflow = 0.77 cfs @ 12.30 hrs, Volume= 0.212 af, Atten= 84%, Lag= 17.8 min
Primary = 0.77 cfs @ 12.30 hrs, Volume= 0.212 af
Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 119.40' @ 12.30 hrs Surf.Area= 2,623 sf Storage= 5,727 cf
Plug-Flow detention time= 164.8 min calculated for 0.212 af (87% of inflow)
Center-of-Mass det. time= 122.9 min (893.8 - 770.9)

Volume	Invert	Avail.Storage	Storage Description
#1	116.00'	17,055 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

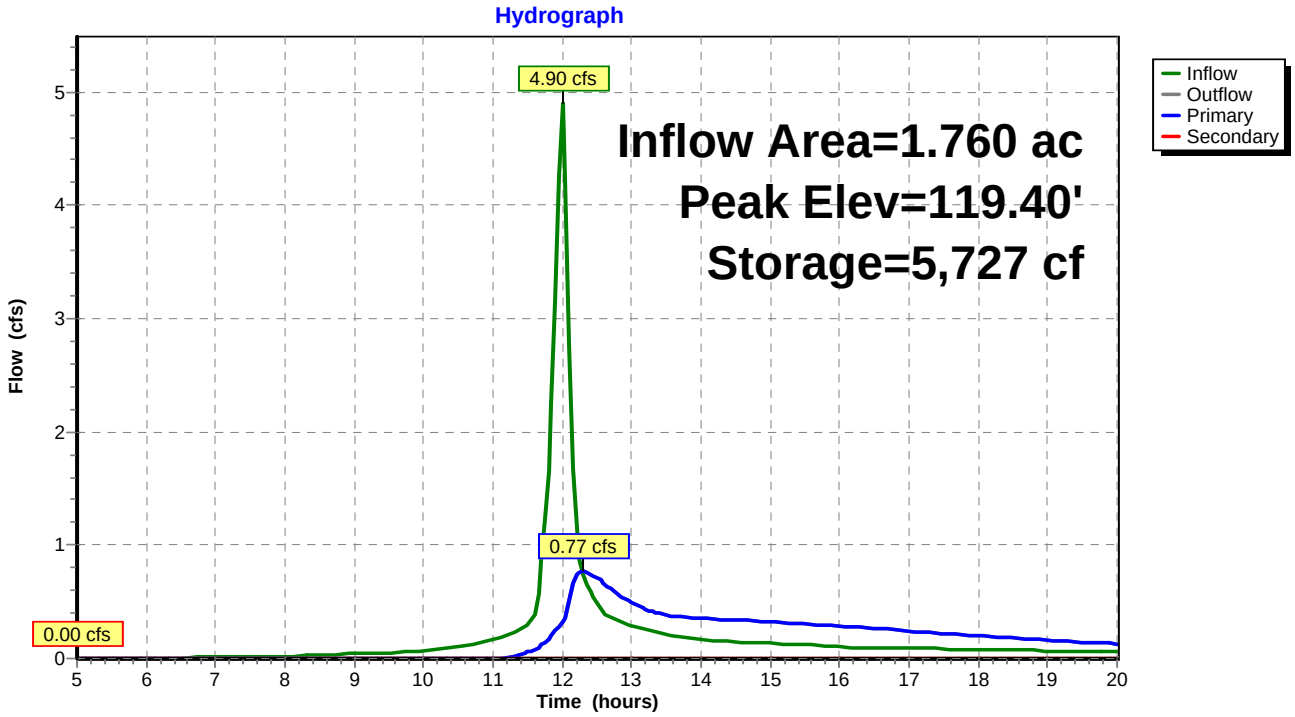
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
116.00	1,856	40.0	0	0
117.00	1,856	40.0	742	742
118.00	1,856	100.0	1,856	2,598
119.00	2,384	100.0	2,120	4,718
120.00	2,978	100.0	2,681	7,399
121.00	3,639	100.0	3,309	10,708
122.00	4,318	100.0	3,979	14,686
122.50	5,157	100.0	2,369	17,055

Device	Routing	Invert	Outlet Devices
#1	Primary	116.00'	**12.0" x 45.0' long Culvert** CPP, square edge headwall, Ke= 0.500 Outlet Invert= 115.60' S= 0.0089 '/' Cc= 0.900 n= 0.010
#2	Device 1	117.00'	**4.0" x 50.0' long Culvert** CPP, projecting, no headwall, Ke= 0.900 Outlet Invert= 116.85' S= 0.0030 '/' Cc= 0.900 n= 0.011
#3	Device 1	121.00'	**24.0" Horiz. Orifice/Grate** Limited to weir flow C= 0.600
#4	Device 1	119.00'	**6.0" Vert. Orifice/Grate** C= 0.600
#5	Secondary	121.50'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=0.77 cfs @ 12.30 hrs HW=119.40' (Free Discharge)
└**1=Culvert** (Passes 0.77 cfs of 6.44 cfs potential flow)
  └**2=Culvert** (Barrel Controls 0.40 cfs @ 4.6 fps)
  └**3=Orifice/Grate** (Controls 0.00 cfs)
  └**4=Orifice/Grate** (Orifice Controls 0.37 cfs @ 2.2 fps)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=116.00' (Free Discharge)
└**5=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 2P: Pond 2



Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Subcatchment 1 Runoff Area=1.140 ac Runoff Depth>2.92"
Flow Length=181' Tc=9.2 min CN=92 Runoff=5.25 cfs 0.278 af

Subcatchment 2S: Subcatchment 2 Runoff Area=1.760 ac Runoff Depth>2.83"
Flow Length=123' Tc=8.8 min CN=91 Runoff=8.02 cfs 0.415 af

Subcatchment 3S: Subcatchment 3 Runoff Area=10.100 ac Runoff Depth>1.88"
Flow Length=113' Tc=9.2 min CN=80 Runoff=32.22 cfs 1.582 af

Reach 1R: Total Outflow Inflow=34.10 cfs 2.214 af
Outflow=34.10 cfs 2.214 af

Pond 1P: Underground detention Peak Elev=117.91' Storage=5,510 cf Inflow=5.25 cfs 0.278 af
6.0" x 70.0' Culvert Outflow=0.89 cfs 0.265 af

Pond 2P: Pond 2 Peak Elev=120.53' Storage=9,064 cf Inflow=8.02 cfs 0.415 af
Primary=1.56 cfs 0.368 af Secondary=0.00 cfs 0.000 af Outflow=1.56 cfs 0.368 af

Total Runoff Area = 13.000 ac Runoff Volume = 2.274 af Average Runoff Depth = 2.10"

Subcatchment 1S: Subcatchment 1

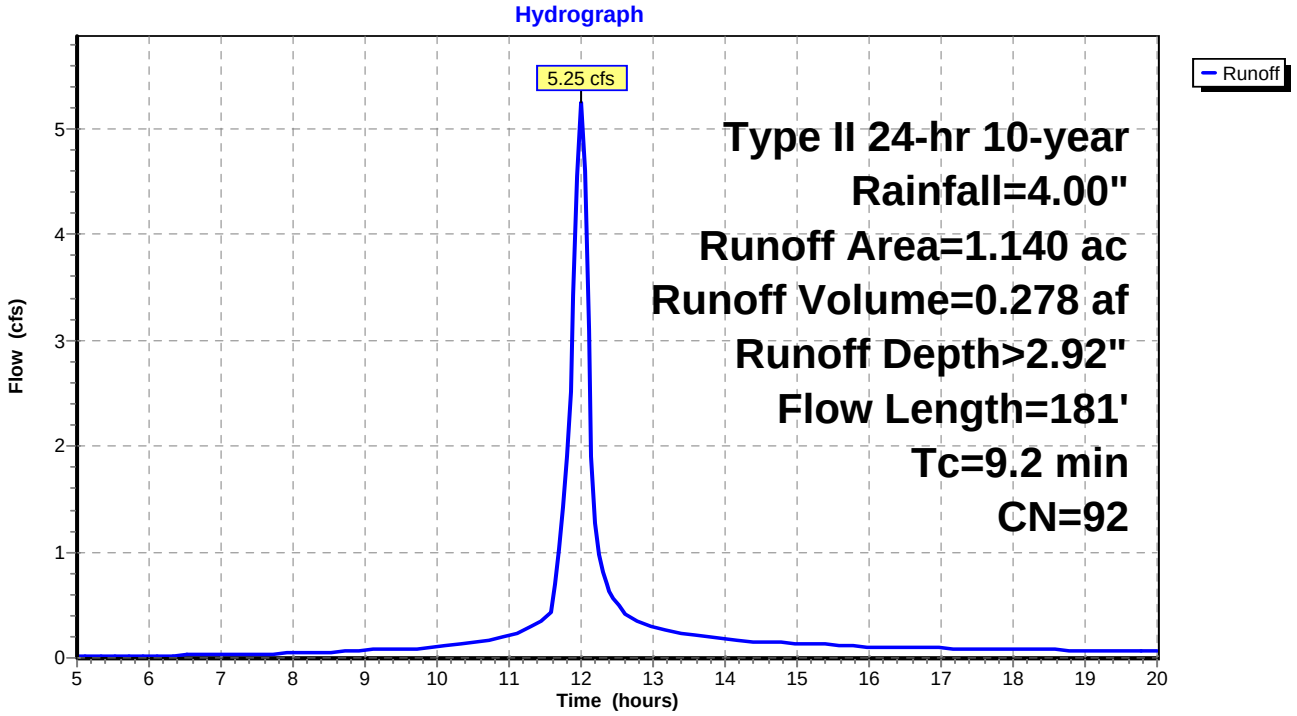
Runoff = 5.25 cfs @ 12.00 hrs, Volume= 0.278 af, Depth> 2.92"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-year Rainfall=4.00"

Area (ac)	CN	Description
0.960	98	Paved parking & roofs
0.180	61	>75% Grass cover, Good, HSG B
1.140	92	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.0	48	0.0100	0.1		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 2.57"
0.8	52	0.0190	1.1		**Sheet Flow, B-C** Smooth surfaces n= 0.011 P2= 2.57"
0.4	81	0.0247	3.2		**Shallow Concentrated Flow, C-D** Paved Kv= 20.3 fps
9.2	181	Total			

Subcatchment 1S: Subcatchment 1



Subcatchment 2S: Subcatchment 2

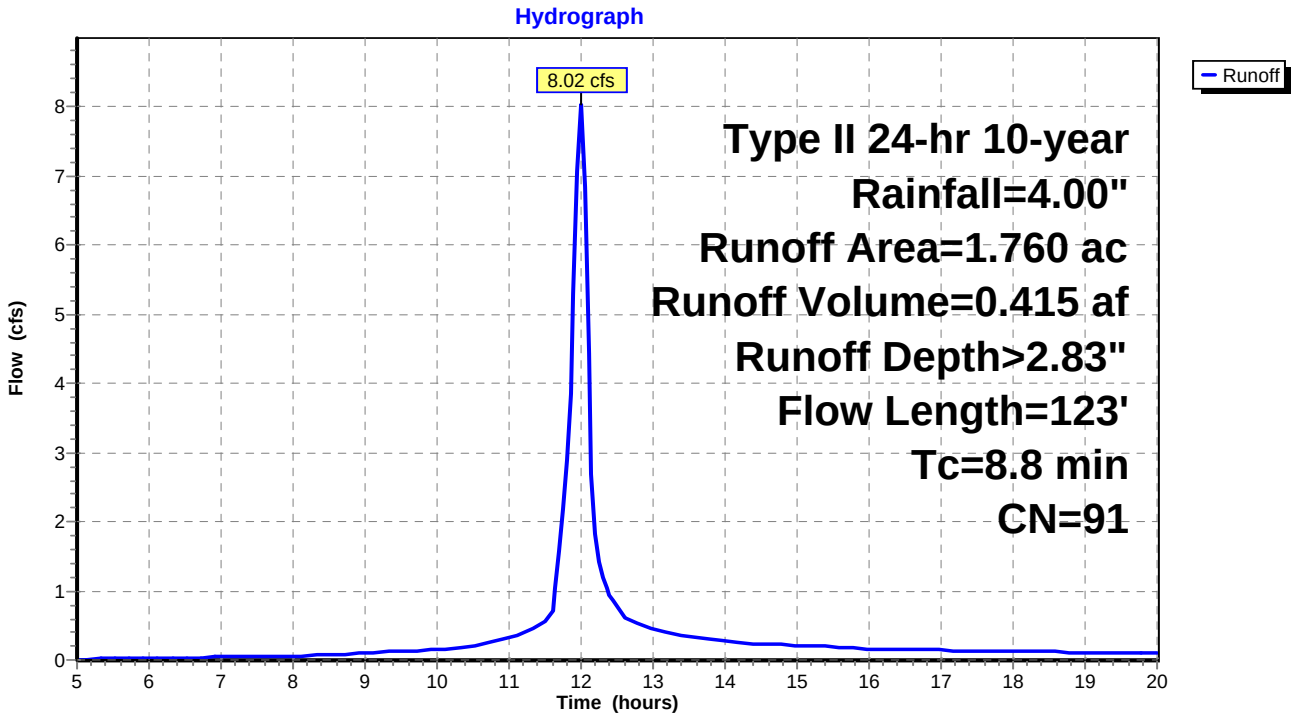
Runoff = 8.02 cfs @ 12.00 hrs, Volume= 0.415 af, Depth> 2.83"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-year Rainfall=4.00"

Area (ac)	CN	Description
0.830	98	Roofs
0.600	98	Paved parking & Walks
0.330	61	>75% Grass cover, Good, HSG B
1.760	91	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.6	70	0.0240	0.2		**Sheet Flow, E-F** Grass: Short n= 0.150 P2= 2.57"
1.1	16	0.1587	0.2		**Sheet Flow, F-G** Grass: Short n= 0.150 P2= 2.57"
0.1	37	0.0078	5.2	9.28	**Circular Channel (pipe), G-H** Diam= 18.0" Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013 Corrugated PE, smooth interior
8.8	123	Total			

Subcatchment 2S: Subcatchment 2



Subcatchment 3S: Subcatchment 3

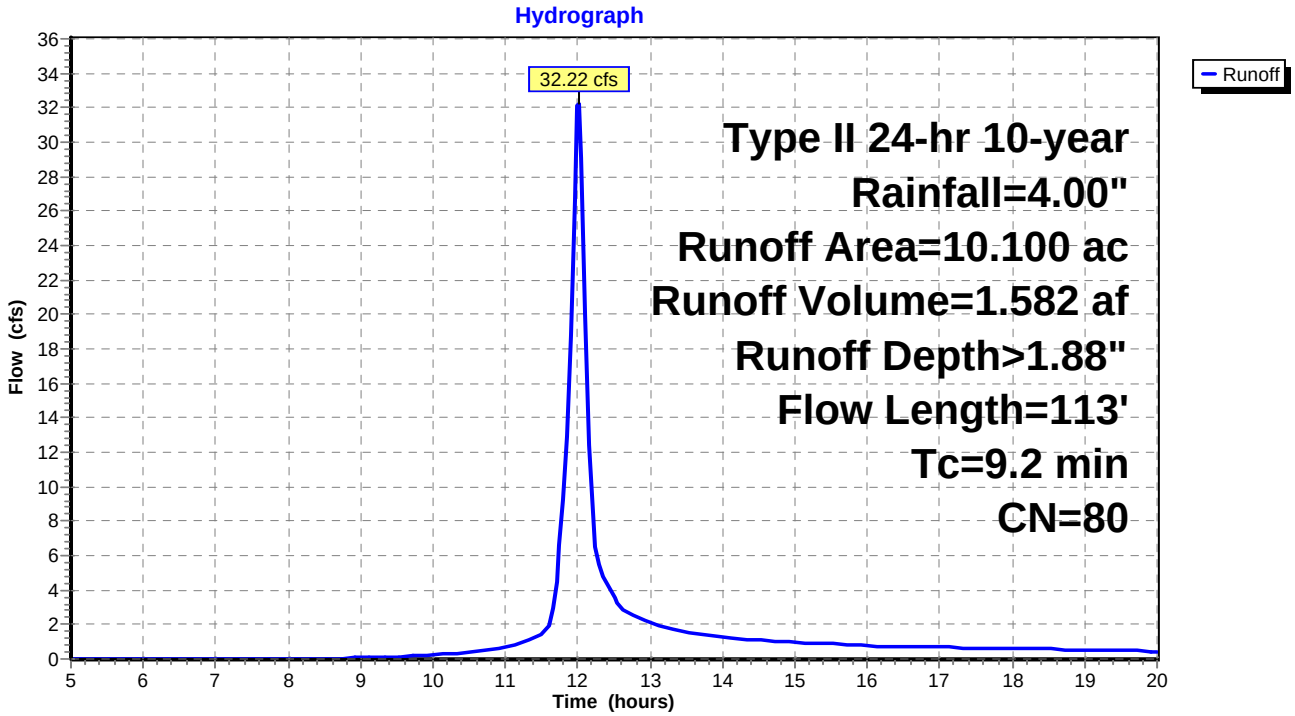
Runoff = 32.22 cfs @ 12.01 hrs, Volume= 1.582 af, Depth> 1.88"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-year Rainfall=4.00"

Area (ac)	CN	Description
3.960	98	Roofs
1.360	98	Paved parking & Walks
2.580	61	>75% Grass cover, Good, HSG B
2.200	61	>75% Grass cover, Good, HSG B - offsite area
10.100	80	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.5	30	0.0100	0.1		**Sheet Flow, J-K** Grass: Short n= 0.150 P2= 2.57"
0.6	45	0.0266	1.2		**Sheet Flow, K-L** Smooth surfaces n= 0.011 P2= 2.57"
3.0	25	0.0330	0.1		**Sheet Flow, L-M** Grass: Short n= 0.150 P2= 2.57"
0.1	13	0.0385	3.2		**Shallow Concentrated Flow, M-N** Unpaved Kv= 16.1 fps
9.2	113	Total			

Subcatchment 3S: Subcatchment 3



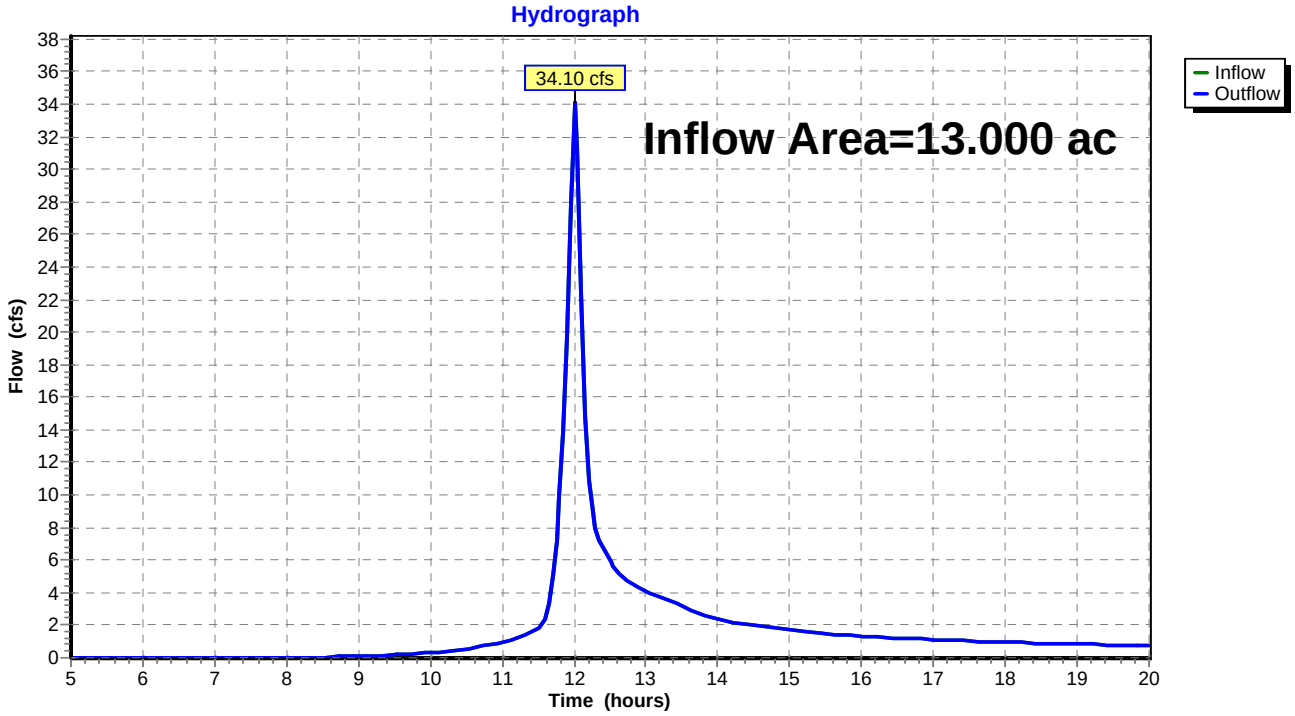
Reach 1R: Total Outflow

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 13.000 ac, Inflow Depth > 2.04" for 10-year event
Inflow = 34.10 cfs @ 12.01 hrs, Volume= 2.214 af
Outflow = 34.10 cfs @ 12.01 hrs, Volume= 2.214 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach 1R: Total Outflow



Pond 1P: Underground detention

[82] Warning: Early inflow requires earlier time span

Inflow Area = 1.140 ac, Inflow Depth > 2.92" for 10-year event
Inflow = 5.25 cfs @ 12.00 hrs, Volume= 0.278 af
Outflow = 0.89 cfs @ 12.27 hrs, Volume= 0.265 af, Atten= 83%, Lag= 16.4 min
Primary = 0.89 cfs @ 12.27 hrs, Volume= 0.265 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 117.91' @ 12.27 hrs Surf.Area= 3,960 sf Storage= 5,510 cf
Plug-Flow detention time= 89.3 min calculated for 0.264 af (95% of inflow)
Center-of-Mass det. time= 71.1 min (826.9 - 755.8)

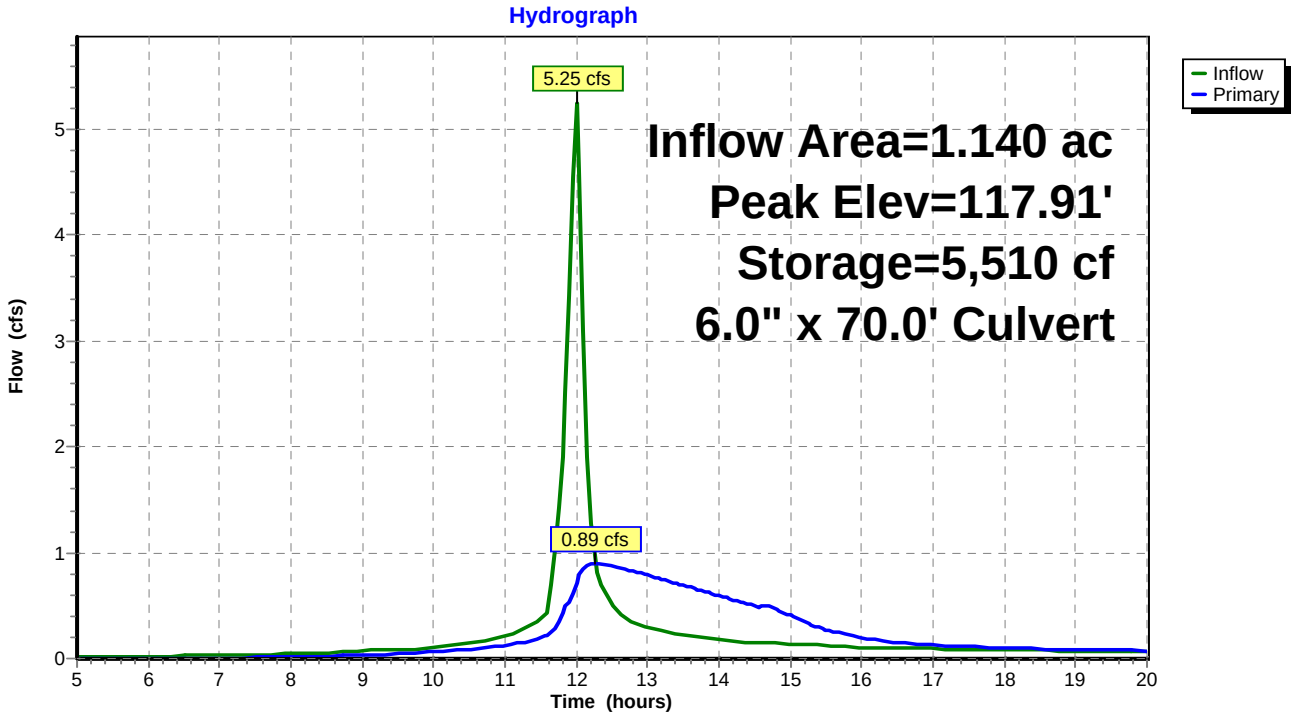
Volume	Invert	Avail.Storage	Storage Description
#1	116.00'	4,524 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc) 15,840 cf Overall - 4,529 cf Embedded = 11,311 cf x 40.0% Voids
#2	116.00'	4,529 cf	**44.6"W x 30.0"H x 78.00'L StormTech SC-740**x 9 Inside #1
		9,054 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
116.00	3,960	0	0
120.00	3,960	15,840	15,840

Device	Routing	Invert	Outlet Devices
#1	Primary	116.00'	**6.0" x 70.0' long Culvert** CPP, square edge headwall, Ke= 0.500 Outlet Invert= 115.65' S= 0.0050 '/' Cc= 0.900 n= 0.011

Primary OutFlow Max=0.89 cfs @ 12.27 hrs HW=117.91' (Free Discharge)
1=Culvert (Barrel Controls 0.89 cfs @ 4.6 fps)

Pond 1P: Underground detention



Pond 2P: Pond 2

[82] Warning: Early inflow requires earlier time span

Inflow Area = 1.760 ac, Inflow Depth > 2.83" for 10-year event
Inflow = 8.02 cfs @ 12.00 hrs, Volume= 0.415 af
Outflow = 1.56 cfs @ 12.23 hrs, Volume= 0.368 af, Atten= 81%, Lag= 14.2 min
Primary = 1.56 cfs @ 12.23 hrs, Volume= 0.368 af
Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 120.53' @ 12.23 hrs Surf.Area= 3,327 sf Storage= 9,064 cf
Plug-Flow detention time= 134.8 min calculated for 0.368 af (89% of inflow)
Center-of-Mass det. time= 97.5 min (856.3 - 758.9)

Volume	Invert	Avail.Storage	Storage Description
#1	116.00'	17,055 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

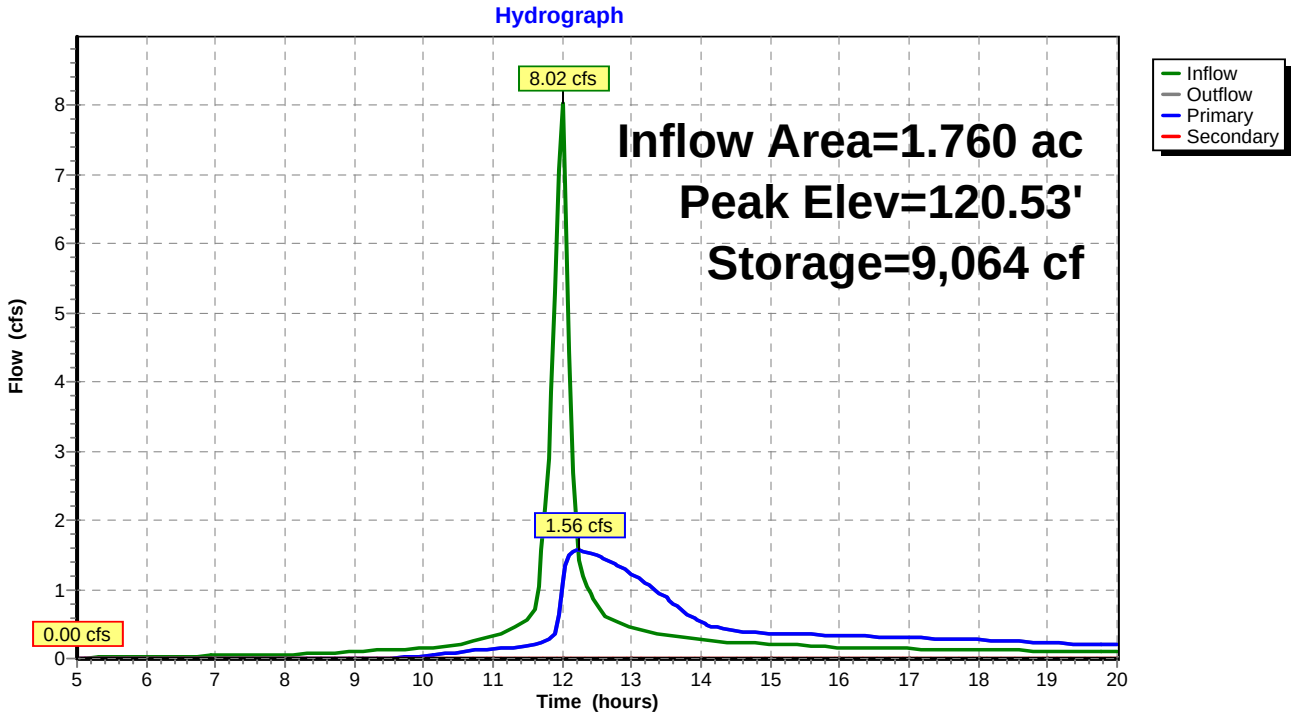
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
116.00	1,856	40.0	0	0
117.00	1,856	40.0	742	742
118.00	1,856	100.0	1,856	2,598
119.00	2,384	100.0	2,120	4,718
120.00	2,978	100.0	2,681	7,399
121.00	3,639	100.0	3,309	10,708
122.00	4,318	100.0	3,979	14,686
122.50	5,157	100.0	2,369	17,055

Device	Routing	Invert	Outlet Devices
#1	Primary	116.00'	**12.0" x 45.0' long Culvert** CPP, square edge headwall, Ke= 0.500 Outlet Invert= 115.60' S= 0.0089 '/' Cc= 0.900 n= 0.010
#2	Device 1	117.00'	**4.0" x 50.0' long Culvert** CPP, projecting, no headwall, Ke= 0.900 Outlet Invert= 116.85' S= 0.0030 '/' Cc= 0.900 n= 0.011
#3	Device 1	121.00'	**24.0" Horiz. Orifice/Grate** Limited to weir flow C= 0.600
#4	Device 1	119.00'	**6.0" Vert. Orifice/Grate** C= 0.600
#5	Secondary	121.50'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=1.56 cfs @ 12.23 hrs HW=120.53' (Free Discharge)
└**1=Culvert** (Passes 1.56 cfs of 7.59 cfs potential flow)
  ├**2=Culvert** (Barrel Controls 0.49 cfs @ 5.6 fps)
  ├**3=Orifice/Grate** (Controls 0.00 cfs)
  └**4=Orifice/Grate** (Orifice Controls 1.07 cfs @ 5.4 fps)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=116.00' (Free Discharge)
└**5=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 2P: Pond 2



Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Subcatchment 1 Runoff Area=1.140 ac Runoff Depth>4.38"
Flow Length=181' Tc=9.2 min CN=92 Runoff=7.68 cfs 0.416 af

Subcatchment 2S: Subcatchment 2 Runoff Area=1.760 ac Runoff Depth>4.28"
Flow Length=123' Tc=8.8 min CN=91 Runoff=11.84 cfs 0.628 af

Subcatchment 3S: Subcatchment 3 Runoff Area=10.100 ac Runoff Depth>3.18"
Flow Length=113' Tc=9.2 min CN=80 Runoff=53.44 cfs 2.673 af

Reach 1R: Total Outflow Inflow=56.22 cfs 3.639 af
Outflow=56.22 cfs 3.639 af

Pond 1P: Underground detention Peak Elev=119.48' Storage=8,227 cf Inflow=7.68 cfs 0.416 af
6.0" x 70.0' Culvert Outflow=1.23 cfs 0.401 af

Pond 2P: Pond 2 Peak Elev=121.36' Storage=12,065 cf Inflow=11.84 cfs 0.628 af
Primary=6.35 cfs 0.565 af Secondary=0.00 cfs 0.000 af Outflow=6.35 cfs 0.565 af

Total Runoff Area = 13.000 ac Runoff Volume = 3.717 af Average Runoff Depth = 3.43"

Subcatchment 1S: Subcatchment 1

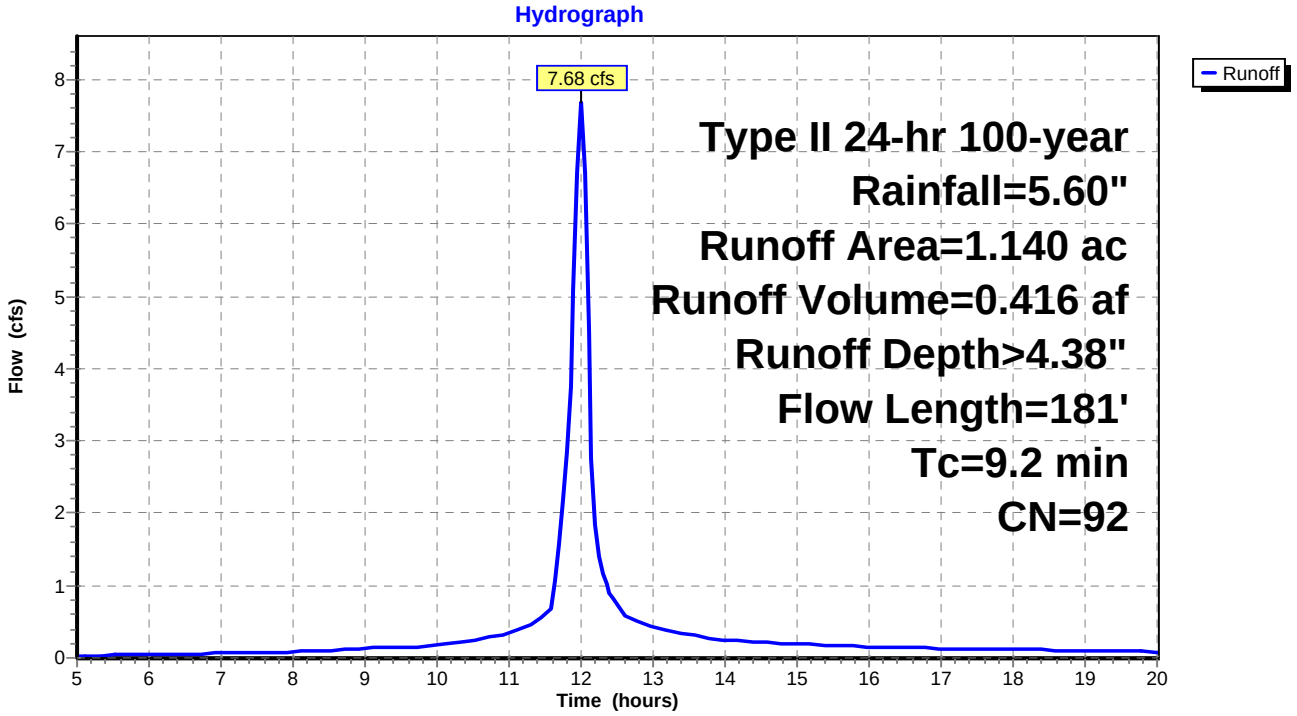
Runoff = 7.68 cfs @ 12.00 hrs, Volume= 0.416 af, Depth> 4.38"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-year Rainfall=5.60"

Area (ac)	CN	Description
0.960	98	Paved parking & roofs
0.180	61	>75% Grass cover, Good, HSG B
1.140	92	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.0	48	0.0100	0.1		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 2.57"
0.8	52	0.0190	1.1		**Sheet Flow, B-C** Smooth surfaces n= 0.011 P2= 2.57"
0.4	81	0.0247	3.2		**Shallow Concentrated Flow, C-D** Paved Kv= 20.3 fps
9.2	181	Total			

Subcatchment 1S: Subcatchment 1



Subcatchment 2S: Subcatchment 2

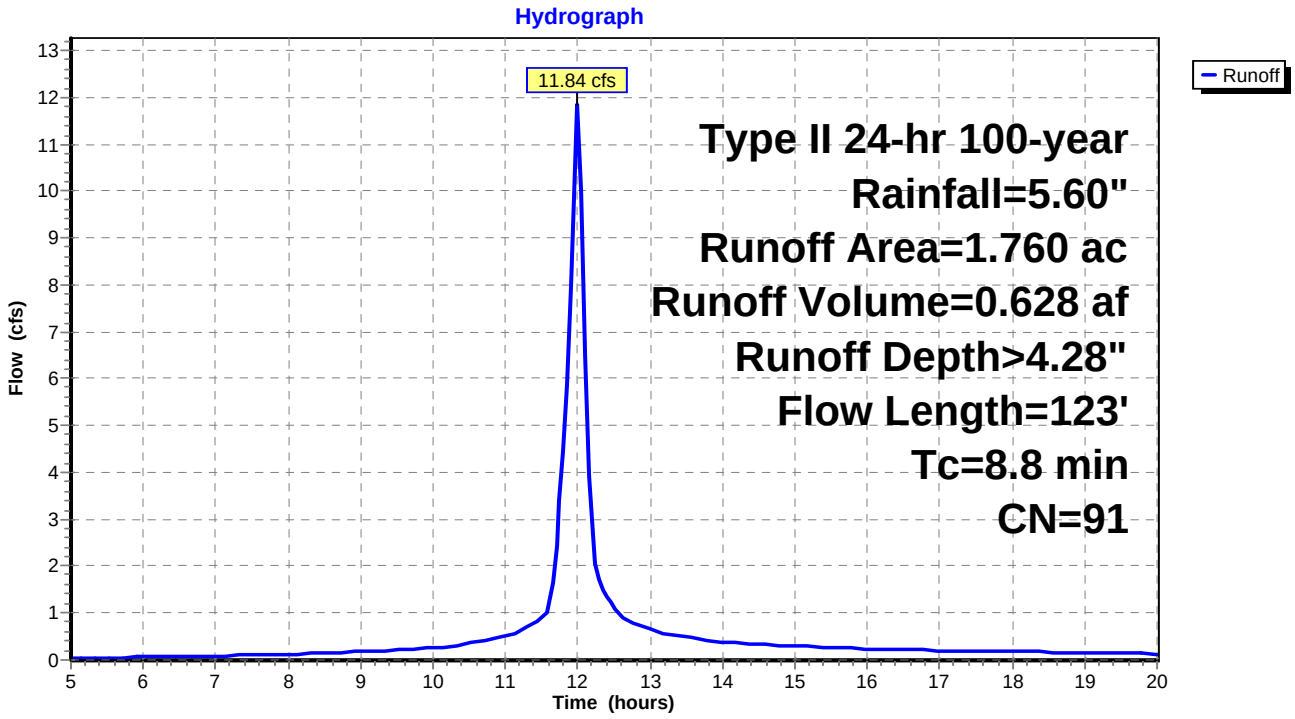
Runoff = 11.84 cfs @ 12.00 hrs, Volume= 0.628 af, Depth> 4.28"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-year Rainfall=5.60"

Area (ac)	CN	Description
0.830	98	Roofs
0.600	98	Paved parking & Walks
0.330	61	>75% Grass cover, Good, HSG B
1.760	91	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.6	70	0.0240	0.2		**Sheet Flow, E-F** Grass: Short n= 0.150 P2= 2.57"
1.1	16	0.1587	0.2		**Sheet Flow, F-G** Grass: Short n= 0.150 P2= 2.57"
0.1	37	0.0078	5.2	9.28	**Circular Channel (pipe), G-H** Diam= 18.0" Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013 Corrugated PE, smooth interior
8.8	123	Total			

Subcatchment 2S: Subcatchment 2



Subcatchment 3S: Subcatchment 3

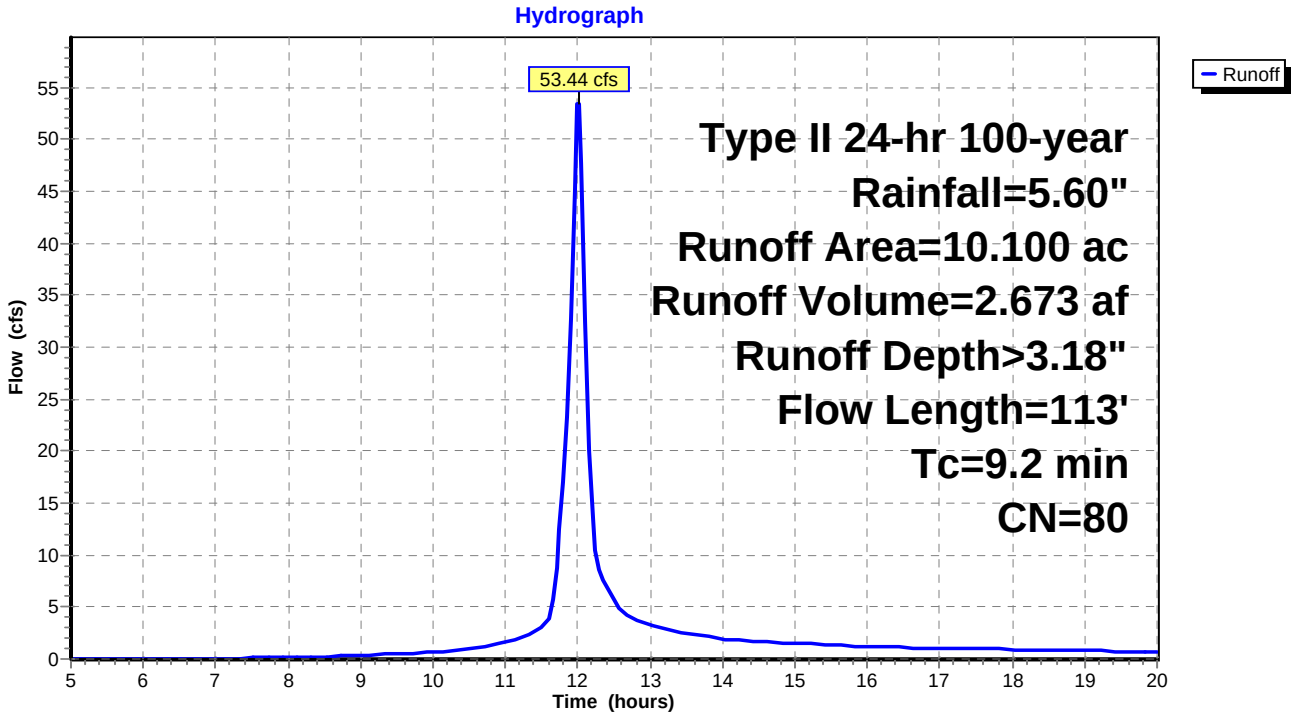
Runoff = 53.44 cfs @ 12.00 hrs, Volume= 2.673 af, Depth> 3.18"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-year Rainfall=5.60"

Area (ac)	CN	Description
3.960	98	Roofs
1.360	98	Paved parking & Walks
2.580	61	>75% Grass cover, Good, HSG B
2.200	61	>75% Grass cover, Good, HSG B - offsite area
10.100	80	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.5	30	0.0100	0.1		**Sheet Flow, J-K** Grass: Short n= 0.150 P2= 2.57"
0.6	45	0.0266	1.2		**Sheet Flow, K-L** Smooth surfaces n= 0.011 P2= 2.57"
3.0	25	0.0330	0.1		**Sheet Flow, L-M** Grass: Short n= 0.150 P2= 2.57"
0.1	13	0.0385	3.2		**Shallow Concentrated Flow, M-N** Unpaved Kv= 16.1 fps
9.2	113	Total			

Subcatchment 3S: Subcatchment 3



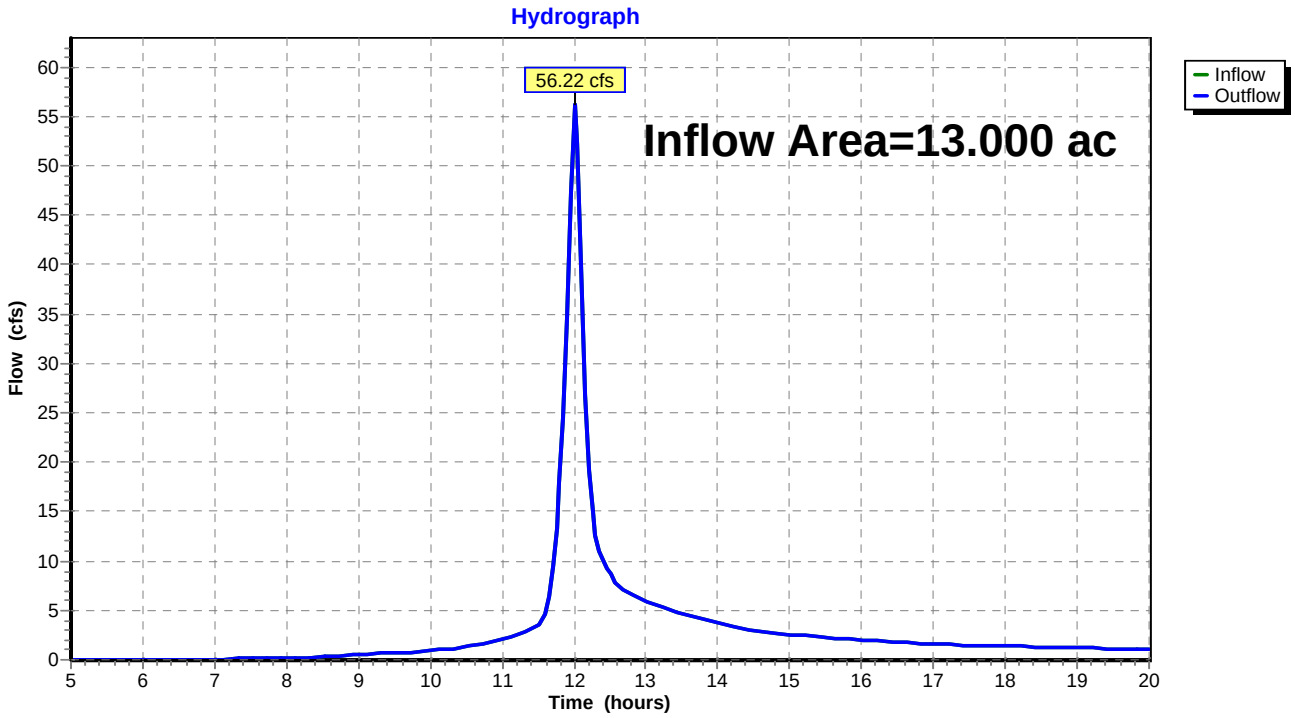
Reach 1R: Total Outflow

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 13.000 ac, Inflow Depth > 3.36" for 100-year event
Inflow = 56.22 cfs @ 12.01 hrs, Volume= 3.639 af
Outflow = 56.22 cfs @ 12.01 hrs, Volume= 3.639 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach 1R: Total Outflow



Pond 1P: Underground detention

[82] Warning: Early inflow requires earlier time span

Inflow Area = 1.140 ac, Inflow Depth > 4.38" for 100-year event
Inflow = 7.68 cfs @ 12.00 hrs, Volume= 0.416 af
Outflow = 1.23 cfs @ 12.29 hrs, Volume= 0.401 af, Atten= 84%, Lag= 17.3 min
Primary = 1.23 cfs @ 12.29 hrs, Volume= 0.401 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 119.48' @ 12.29 hrs Surf.Area= 3,960 sf Storage= 8,227 cf
Plug-Flow detention time= 93.5 min calculated for 0.399 af (96% of inflow)
Center-of-Mass det. time= 78.3 min (826.5 - 748.2)

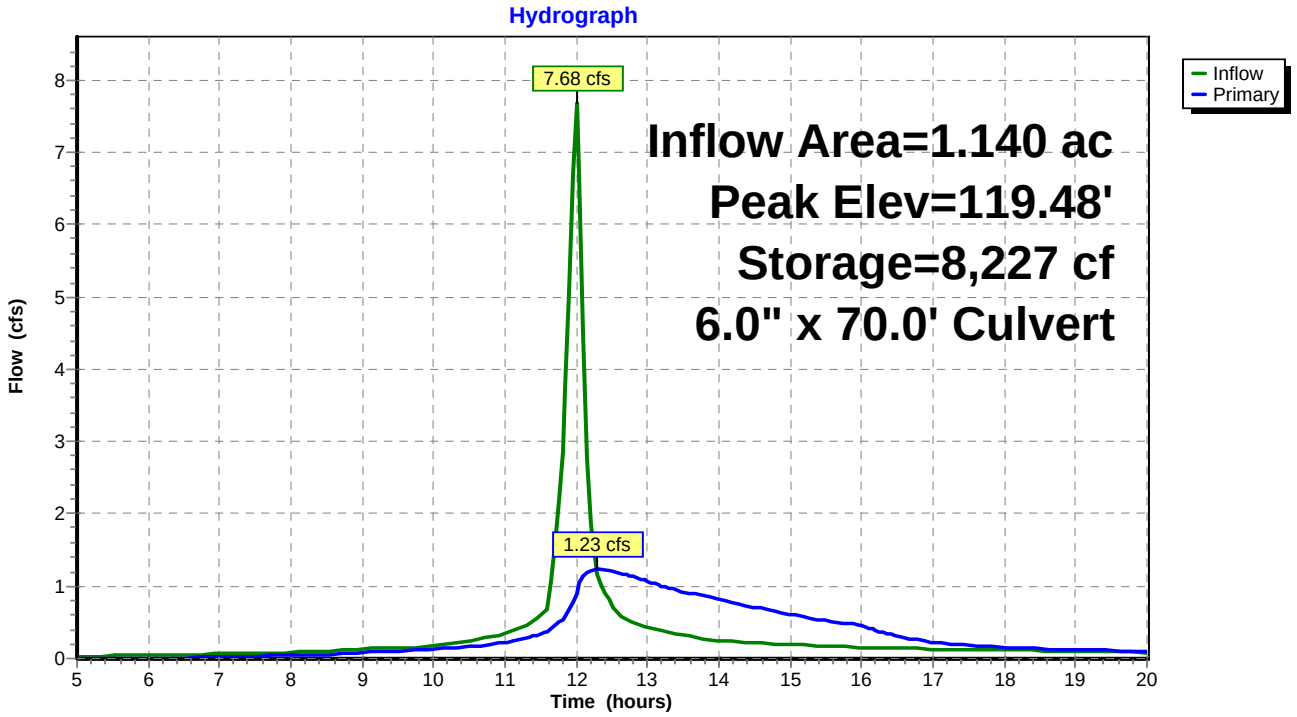
Volume	Invert	Avail.Storage	Storage Description
#1	116.00'	4,524 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc) 15,840 cf Overall - 4,529 cf Embedded = 11,311 cf x 40.0% Voids
#2	116.00'	4,529 cf	**44.6"W x 30.0"H x 78.00'L StormTech SC-740**x 9 Inside #1
		9,054 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
116.00	3,960	0	0
120.00	3,960	15,840	15,840

Device	Routing	Invert	Outlet Devices
#1	Primary	116.00'	**6.0" x 70.0' long Culvert** CPP, square edge headwall, Ke= 0.500 Outlet Invert= 115.65' S= 0.0050 '/' Cc= 0.900 n= 0.011

Primary OutFlow Max=1.23 cfs @ 12.29 hrs HW=119.48' (Free Discharge)
1=Culvert (Barrel Controls 1.23 cfs @ 6.3 fps)

Pond 1P: Underground detention



Pond 2P: Pond 2

[82] Warning: Early inflow requires earlier time span

Inflow Area = 1.760 ac, Inflow Depth > 4.28" for 100-year event
Inflow = 11.84 cfs @ 12.00 hrs, Volume= 0.628 af
Outflow = 6.35 cfs @ 12.12 hrs, Volume= 0.565 af, Atten= 46%, Lag= 7.2 min
Primary = 6.35 cfs @ 12.12 hrs, Volume= 0.565 af
Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 121.36' @ 12.12 hrs Surf.Area= 3,884 sf Storage= 12,065 cf
Plug-Flow detention time= 111.9 min calculated for 0.563 af (90% of inflow)
Center-of-Mass det. time= 77.9 min (828.4 - 750.6)

Volume	Invert	Avail.Storage	Storage Description
#1	116.00'	17,055 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

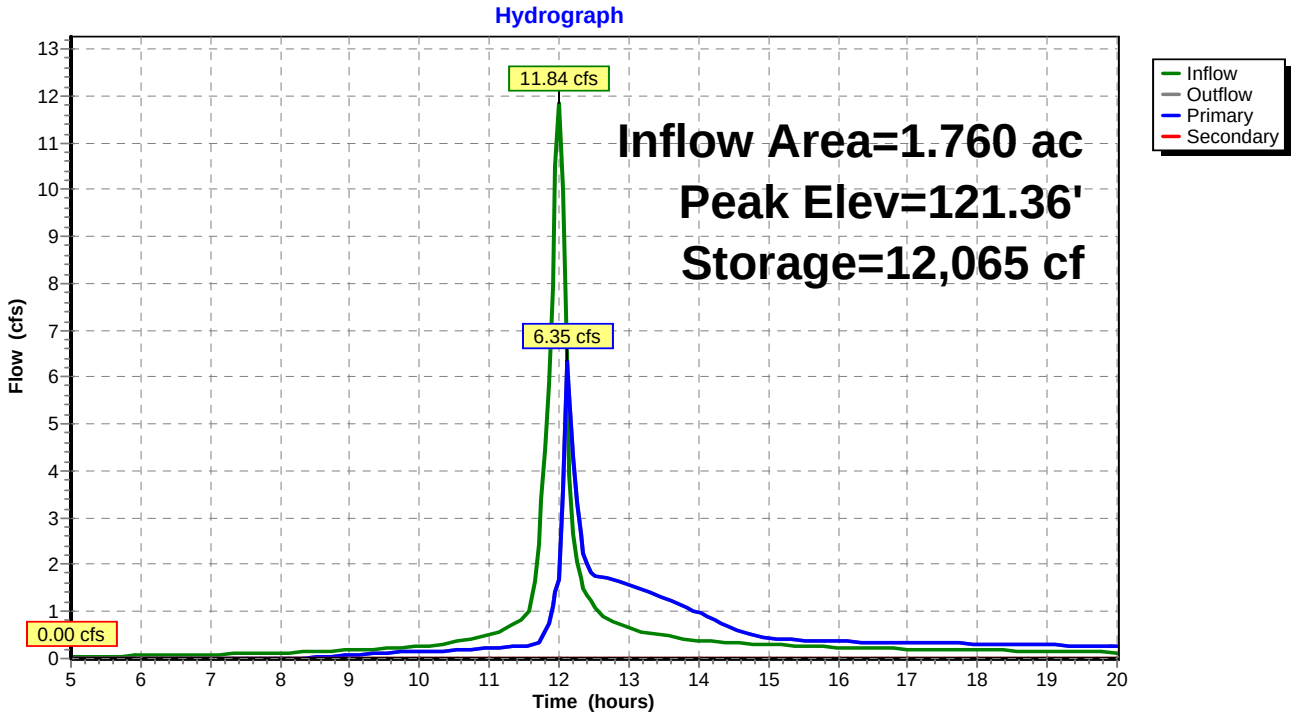
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
116.00	1,856	40.0	0	0
117.00	1,856	40.0	742	742
118.00	1,856	100.0	1,856	2,598
119.00	2,384	100.0	2,120	4,718
120.00	2,978	100.0	2,681	7,399
121.00	3,639	100.0	3,309	10,708
122.00	4,318	100.0	3,979	14,686
122.50	5,157	100.0	2,369	17,055

Device	Routing	Invert	Outlet Devices
#1	Primary	116.00'	**12.0" x 45.0' long Culvert** CPP, square edge headwall, Ke= 0.500 Outlet Invert= 115.60' S= 0.0089 '/' Cc= 0.900 n= 0.010
#2	Device 1	117.00'	**4.0" x 50.0' long Culvert** CPP, projecting, no headwall, Ke= 0.900 Outlet Invert= 116.85' S= 0.0030 '/' Cc= 0.900 n= 0.011
#3	Device 1	121.00'	**24.0" Horiz. Orifice/Grate** Limited to weir flow C= 0.600
#4	Device 1	119.00'	**6.0" Vert. Orifice/Grate** C= 0.600
#5	Secondary	121.50'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=5.99 cfs @ 12.12 hrs HW=121.34' (Free Discharge)
└**1=Culvert** (Passes 5.99 cfs of 8.32 cfs potential flow)
  ├**2=Culvert** (Barrel Controls 0.55 cfs @ 6.3 fps)
  ├**3=Orifice/Grate** (Weir Controls 4.08 cfs @ 1.9 fps)
  └**4=Orifice/Grate** (Orifice Controls 1.37 cfs @ 7.0 fps)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=116.00' (Free Discharge)
└**5=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 2P: Pond 2



CJE1506 - Area to underground - Output Summary

SLAMM for Windows Version 9.4.0

Data file name: \\Storage-057f\cjesto1\WinSLAMM\CJE1506 - Area to underground.dat
Data file description: CJE0826-west pond
Rain file name: \\Storage\cjesto1\WinSLAMM\Rain Files\MKE1969.RAN
Particulate Solids Concentration file name: \\Storage\cjesto1\WinSLAMM\WI_AVG01.psc
Runoff Coefficient file name: \\Storage\cjesto1\WinSLAMM\WI_SL01.rsv
Particulate Residue Delivery file name: \\Storage\cjesto1\WinSLAMM\WI_DLV01.prr
Residential Street Delivery file name: \\Storage\cjesto1\WinSLAMM\WI_STR04.std
Institutional Street Delivery file name: \\Storage\cjesto1\WinSLAMM\WI_STR04.std
Commercial Street Delivery file name: \\Storage\cjesto1\WinSLAMM\WI_STR04.std
Industrial Street Delivery file name: \\Storage\cjesto1\WinSLAMM\WI_STR04.std
Other Urban Street Delivery file name: \\Storage\cjesto1\WinSLAMM\WI_STR04.std
Freeway Street Delivery file name: \\Storage\cjesto1\WinSLAMM\WI_STR04.std
Pollutant Relative Concentration file name: \\Storage\cjesto1\WinSLAMM\WI_GEO01.ppd
Apply Street Delivery Files to Adjust the After Event Load Street Dirt Mass Balance: False
Model Run Start Date: 01/05/69 Model Run End Date: 12/31/69
Date of run: 08-23-2015 Time of run: 09:05:28
Total Area Modeled (acres): 0.96
Years in Model Run: 0.99

	Runoff Volume (cu ft)	Percent Runoff Volume Reduction	Particulate Solids Conc. (mg/L)	Particulate Solids Yield (lbs)	Percent Particulate Solids Reduction
Source Area Total without Controls:	82156	0 %	249.6	1280	0 %
Total Before Drainage System:	82156	0.00%	249.6	1280	0.00%
Total After Drainage System:	82156	0.00%	249.6	1280	0.00%
Total After Outfall Controls:	19645	76.09%	250.0	306.6	76.05%
Annualized Total After Outfall Controls:	19918			310.8	

CJE1506 - Area to underground
Data file name: \\Storage-057f\cjesto1\WinSLAMM\CJE1506 - Area to underground.dat
SLAMM Version 9.4.0
Rain file name: \\Storage\cjesto1\WinSLAMM\Rain Files\MKE1969.RAN
Particulate Solids Concentration file name: \\Storage\cjesto1\WinSLAMM\WI_AVG01.psc
Runoff Coefficient file name: \\Storage\cjesto1\WinSLAMM\WI_SL01.rsv
Particulate Residue Delivery file name: \\Storage\cjesto1\WinSLAMM\WI_DLV01.prr
Residential Street Delivery file name: \\Storage\cjesto1\WinSLAMM\WI_STR04.std
Institutional Street Delivery file name: \\Storage\cjesto1\WinSLAMM\WI_STR04.std
Commercial Street Delivery file name: \\Storage\cjesto1\WinSLAMM\WI_STR04.std
Industrial Street Delivery file name: \\Storage\cjesto1\WinSLAMM\WI_STR04.std
Other Urban Street Delivery file name: \\Storage\cjesto1\WinSLAMM\WI_STR04.std
Freeway Street Delivery file name: \\Storage\cjesto1\WinSLAMM\WI_STR04.std
Apply Street Delivery Files to Adjust the After Event Load Street Dirt Mass Balance:
 False
Pollutant Relative Concentration file name: \\Storage\cjesto1\WinSLAMM\WI_GEO01.ppd
Seed for random number generator: -42
Study period starting date: 01/05/69 Study period ending date: 12/31/69
Date: 08-23-2015 Time: 09:05:41
Fraction of each type of Drainage System serving study area:
1. Grass Swales 0
2. Undeveloped roadside 0
Curb and Gutters, `valleys', or sealed swales in:
3. Poor condition (or very flat) 0
4. Fair condition 0
5. Good condition (or very steep) 1
Site information:
CJE0826-west pond

	<===== Areas for each Source (acres) =====>				
Source Area	Resi-dential Areas	Institu-tional Areas	Commercial Areas	Industrial Areas	Other Urban Areas
Roofs 1	0.000	0.000	0.000	0.000	0.000
Roofs 2	0.000	0.000	0.000	0.000	0.000
Roofs 3	0.000	0.000	0.000	0.000	0.000
Roofs 4	0.000	0.000	0.000	0.000	0.000
Roofs 5	0.000	0.000	0.000	0.000	0.000
Paved Parking/Storage 1	0.000	0.000	0.000	0.960	0.000
Paved Parking/Storage 2	0.000	0.000	0.000	0.000	0.000
Paved Parking/Storage 3	0.000	0.000	0.000	0.000	0.000
Unpaved Prkng/Storage 1	0.000	0.000	0.000	0.000	0.000
Unpaved Prkng/Storage 2	0.000	0.000	0.000	0.000	0.000
Playground 1	0.000	0.000	0.000	0.000	0.000
Playground 2	0.000	0.000	0.000	0.000	0.000
Driveways 1	0.000	0.000	0.000	0.000	0.000
Driveways 2	0.000	0.000	0.000	0.000	0.000
Driveways 3	0.000	0.000	0.000	0.000	0.000
Sidewalks/Walks 1	0.000	0.000	0.000	0.000	0.000
Sidewalks/Walks 2	0.000	0.000	0.000	0.000	0.000
Street Area 1	0.000	0.000	0.000	0.000	0.000
Street Area 2	0.000	0.000	0.000	0.000	0.000
Street Area 3	0.000	0.000	0.000	0.000	0.000
Large Landscaped Area 1	0.000	0.000	0.000	0.000	0.000
Large Landscaped Area 2	0.000	0.000	0.000	0.000	0.000
Undeveloped Area	0.000	0.000	0.000	0.000	0.000
Small Landscaped Area 1	0.000	0.000	0.000	0.000	0.000
Small Landscaped Area 2	0.000	0.000	0.000	0.000	0.000
Small Landscaped Area 3	0.000	0.000	0.000	0.000	0.000
Isolated/Water Body Area	0.000	0.000	0.000	0.000	0.000
Other Pervious Area	0.000	0.000	0.000	0.000	0.000
Other Dir Cnctd Imp Area	0.000	0.000	0.000	0.000	0.000
Other Part Cnctd Imp Area	0.000	0.000	0.000	0.000	0.000

CJE1506 - Area to underground

Total	0.000	0.000	0.000	0.960	0.000

Freeway Source Area	Area (acres)
Pavd Lane & Shldr Area 1	0.000
Pavd Lane & Shldr Area 2	0.000
Pavd Lane & Shldr Area 3	0.000
Pavd Lane & Shldr Area 4	0.000
Pavd Lane & Shldr Area 5	0.000
Large Turf Areas	0.000
Undeveloped Areas	0.000
Other Pervious Areas	0.000
Other Directly Conctd Imp	0.000
Other Partially Conctd Imp	0.000
Total	0.000

Total of All Source Areas	0.960
Total of All Source Areas less All Isolated Areas	0.960

Outfall Control Practice: Biofiltration Device
Fraction of Runoff from Outfall Routed to Outfall Biofilters: 1
Control Practice 1 : Wet Detention Ponds
1. Area served by detention ponds (acres)= 0
2. Particle Size Distribution file name:
3. Initial stage elevation (ft): 0
4. Peak to Average Flow Ratio: 0
5. Maximum flow allowed into pond (cfs): No maximum value entered
6. Outlet Characteristics:
7. Pond stage and surface area

Entry Number	Stage (ft)	Pond Area (acres)	Natural Seepage (in/hr)	Other Outflow (cfs)
0	0.00	0.0000	0.00	0.00

1. Top Area (square feet) = 4524
2. Bottom Area (square feet) = 4524
3. Depth (ft): 4.5
4. Depth of Biofilter that is Rock Filled (ft) 4
5. Fraction of Rock Filled Volume as Voids = 0.4
6. Engineered Soil Depth (ft) = 0
7. Engineered Soil Void Ratio = 0
8. Infiltration Rate (in/hr) = 0.3
9. Infiltration Rate Coefficient of Variation 0
10. Random Infiltration Rate Generation? No
11. Infiltration Rate Fraction (Side): 1
12. Infiltration Rate Fraction (Bottom): 1
13. Biofilter Width (ft) - for Cost Purposes Only: 50
14. Number of Biofiltration Control Devices = 1
15. Biofilter Peak to Average Flow Ratio = 3.8
16. Percent Solids Reduction Due to Flow Through Engineered Soil = 0
17. Particle Size Distribution File:
18. Engineered Soil Media:
19. Engineered Soil Infiltration Rate: 0
21. Biofilter Outlet/Discharge Characteristics:
Biofilter Outlet/Discharge Option Number 1
Outlet type: Orifice
1. Underdrain outlet diameter (ft): 0.5
2. Invert elevation above datum (ft): 0.5
3. Number of underdrain outlets: 1
Biofilter Outlet/Discharge Option Number 2

CJE1506 - Area to underground
Outlet type: Broad Crested Weir
1. Weir crest length (ft): 20
2. Weir crest width (ft): 10
3. Height of datum to bottom of weir opening: 4
4. Default weir coefficients: Yes
Weir Coefficient: 0

Source Area Control Practice Information

Land Use: Industrial
Paved Parking/Storage 1 Source area number: 96
The Source Area is directly connected or draining to a directly connected area

Drainage System

Outfall

Pollutants to be Analyzed and Printed:

Pollutant Name	Pollutant Type
Solids	Particulate

CJE1506 - Area to Rain Garden - Output Summary

SLAMM for Windows Version 9.4.0

Data file name: \\Storage-057f\cjesto1\WinSLAMM\CJE1506 - Area to Rain Garden.dat
Data file description: cje1346
Rain file name: C:\Program Files\WinSLAMM\Rain Files\WI Milwaukee 69.RAN
Particulate Solids Concentration file name: C:\PROGRA~1\WINSLAMM\WI_AVG01.PSC
Runoff Coefficient file name: C:\PROGRA~1\WINSLAMM\WI_SL06 DEC06.RSV
Particulate Residue Delivery file name: C:\PROGRA~1\WINSLAMM\WI_DLV01.PRR
Residential Street Delivery file name: C:\Program Files\WinSLAMM\WI_Com Inst Indust Dec06.std
Institutional Street Delivery file name: C:\Program Files\WinSLAMM\WI_Com Inst Indust Dec06.std
Commercial Street Delivery file name: C:\Program Files\WinSLAMM\WI_Com Inst Indust Dec06.std
Industrial Street Delivery file name: C:\Program Files\WinSLAMM\WI_Com Inst Indust Dec06.std
Other Urban Street Delivery file name: C:\Program Files\WinSLAMM\WI_Com Inst Indust Dec06.std
Freeway Street Delivery file name: C:\Program Files\WinSLAMM\WI_Com Inst Indust Dec06.std
Pollutant Relative Concentration file name: C:\PROGRA~1\WINSLAMM\WI_GEO01.PPD
Apply Street Delivery Files to Adjust the After Event Load Street Dirt Mass Balance: False
Model Run Start Date: 03/28/69   Model Run End Date: 12/06/69
Date of run: 08-23-2015   Time of run: 09:02:37
Total Area Modeled (acres): 0.6
Years in Model Run: 0.67

	Runoff Volume (cu ft)	Percent Runoff Volume Reduction	Particulate Solids Conc. (mg/L)	Particulate Solids Yield (lbs)	Percent Particulate Solids Reduction
Source Area Total without Controls:	46095	0 %	129.8	373.6	0 %
Total Before Drainage System:	46095	0.00%	129.8	373.6	0.00%
Total After Drainage System:	46095	0.00%	129.8	373.6	0.00%
Total After Outfall Controls:	11754	74.50%	64.54	47.36	87.32%
Annualized Total After Outfall Controls:	17655			71.13	

Data file name: \\Storage-057f\cjesto1\WinSLAMM\CJE1506 - Area to Rain Garden.dat
SLAMM Version 9.4.0
Rain file name: C:\Program Files\WinSLAMM\Rain Files\WI Milwaukee 69.RAN
Particulate Solids Concentration file name: C:\PROGRA~1\WINSLAMM\WI_AVG01.PSC
Runoff Coefficient file name: C:\PROGRA~1\WINSLAMM\WI_SL06 DEC06.RSV
Particulate Residue Delivery file name: C:\PROGRA~1\WINSLAMM\WI_DLV01.PRR
Residential Street Delivery file name: C:\Program Files\WinSLAMM\WI_Com Inst Indust Dec06.std
Institutional Street Delivery file name: C:\Program Files\WinSLAMM\WI_Com Inst Indust Dec06.std
Commercial Street Delivery file name: C:\Program Files\WinSLAMM\WI_Com Inst Indust Dec06.std
Industrial Street Delivery file name: C:\Program Files\WinSLAMM\WI_Com Inst Indust Dec06.std
Other Urban Street Delivery file name: C:\Program Files\WinSLAMM\WI_Com Inst Indust Dec06.std
Freeway Street Delivery file name: C:\Program Files\WinSLAMM\WI_Com Inst Indust Dec06.std
Apply Street Delivery Files to Adjust the After Event Load Street Dirt Mass Balance: False
Pollutant Relative Concentration file name: C:\PROGRA~1\WINSLAMM\WI_GEO01.PPD
Seed for random number generator: -42
Study period starting date: 03/28/69 Study period ending date: 12/06/69
Start of Winter Season: 12/06 End of Winter Season: 03/28
Date: 08-23-2015 Time: 09:02:48
Fraction of each type of Drainage System serving study area:
1. Grass Swales 0
2. Undeveloped roadside 0
Curb and Gutters, `valleys', or sealed swales in:
3. Poor condition (or very flat) 0.5
4. Fair condition 0.5
5. Good condition (or very steep) 0
Site information:
cje1346

	<===== Areas for each Source (acres) =====>				
Source Area	Residential Areas	Institutional Areas	Commercial Areas	Industrial Areas	Other Urban Areas
Roofs 1	0.000	0.000	0.000	0.000	0.000
Roofs 2	0.000	0.000	0.000	0.000	0.000
Roofs 3	0.000	0.000	0.000	0.000	0.000
Roofs 4	0.000	0.000	0.000	0.000	0.000
Roofs 5	0.000	0.000	0.000	0.000	0.000
Paved Parking/Storage 1	0.000	0.000	0.600	0.000	0.000
Paved Parking/Storage 2	0.000	0.000	0.000	0.000	0.000
Paved Parking/Storage 3	0.000	0.000	0.000	0.000	0.000
Unpaved Prkng/Storage 1	0.000	0.000	0.000	0.000	0.000
Unpaved Prkng/Storage 2	0.000	0.000	0.000	0.000	0.000
Playground 1	0.000	0.000	0.000	0.000	0.000
Playground 2	0.000	0.000	0.000	0.000	0.000
Driveways 1	0.000	0.000	0.000	0.000	0.000
Driveways 2	0.000	0.000	0.000	0.000	0.000
Driveways 3	0.000	0.000	0.000	0.000	0.000
Sidewalks/Walks 1	0.000	0.000	0.000	0.000	0.000
Sidewalks/Walks 2	0.000	0.000	0.000	0.000	0.000
Street Area 1	0.000	0.000	0.000	0.000	0.000
Street Area 2	0.000	0.000	0.000	0.000	0.000
Street Area 3	0.000	0.000	0.000	0.000	0.000
Large Landscaped Area 1	0.000	0.000	0.000	0.000	0.000
Large Landscaped Area 2	0.000	0.000	0.000	0.000	0.000
Undeveloped Area	0.000	0.000	0.000	0.000	0.000
Small Landscaped Area 1	0.000	0.000	0.000	0.000	0.000
Small Landscaped Area 2	0.000	0.000	0.000	0.000	0.000

CJE1506 - Area to Rain Garden

Small Landscaped Area 3	0.000	0.000	0.000	0.000	0.000
Isolated/Water Body Area	0.000	0.000	0.000	0.000	0.000
Other Pervious Area	0.000	0.000	0.000	0.000	0.000
Other Dir Cnctd Imp Area	0.000	0.000	0.000	0.000	0.000
Other Part Cnctd Imp Area	0.000	0.000	0.000	0.000	0.000
Total	0.000	0.000	0.600	0.000	0.000

Freeway Source Area	Area (acres)
Pavd Lane & Shldr Area 1	0.000
Pavd Lane & Shldr Area 2	0.000
Pavd Lane & Shldr Area 3	0.000
Pavd Lane & Shldr Area 4	0.000
Pavd Lane & Shldr Area 5	0.000
Large Turf Areas	0.000
Undeveloped Areas	0.000
Other Pervious Areas	0.000
Other Directly Conctd Imp	0.000
Other Partially Conctd Imp	0.000
Total	0.000

Total of All Source Areas	0.600
Total of All Source Areas less All Isolated Areas	0.600

Outfall Control Practice: Biofiltration Device
Fraction of Runoff from Outfall Routed to Outfall Biofilters: 1
Control Practice 1 : Wet Detention Ponds
1. Area served by detention ponds (acres)= 0
2. Particle Size Distribution file name:
3. Initial stage elevation (ft): 0
4. Peak to Average Flow Ratio: 0
5. Maximum flow allowed into pond (cfs): No maximum value entered
6. Outlet Characteristics:
7. Pond stage and surface area

Entry Number	Stage (ft)	Pond Area (acres)	Natural Seepage (in/hr)	Other Outflow (cfs)
0	0.00	0.0000	0.00	0.00

1. Top Area (square feet) = 4318
2. Bottom Area (square feet) = 1856
3. Depth (ft): 6
4. Depth of Biofilter that is Rock Filled (ft) 0
5. Fraction of Rock Filled Volume as Voids = 0
6. Engineered Soil Depth (ft) = 2
7. Engineered Soil Void Ratio = 0.4
8. Infiltration Rate (in/hr) = 0.3
9. Infiltration Rate Coefficient of Variation 0
10. Random Infiltration Rate Generation? No
11. Infiltration Rate Fraction (Side): 1
12. Infiltration Rate Fraction (Bottom): 1
13. Biofilter Width (ft) - for Cost Purposes Only: 50
14. Number of Biofiltration Control Devices = 1
15. Biofilter Peak to Average Flow Ratio = 3.8
16. Percent Solids Reduction Due to Flow Through Engineered Soil = 0
17. Particle Size Distribution File: \\Storage-057f\cjesto1\WinSLAMM\NURP.CPZ
18. Engineered Soil Media: Compost-Sand
19. Engineered Soil Infiltration Rate: 2.1

21. Biofilter Outlet/Discharge Characteristics:
Biofilter Outlet/Discharge Option Number 1
Outlet type: Orifice
1. Underdrain outlet diameter (ft): 0.5
2. Invert elevation above datum (ft): 1
3. Number of underdrain outlets: 1
Biofilter Outlet/Discharge Option Number 2
Outlet type: Broad Crested Weir
1. Weir crest length (ft): 8
2. Weir crest width (ft): 5
3. Height of datum to bottom of weir opening: 5.5
4. Default weir coefficients: Yes
Weir Coefficient: 0
Biofilter Outlet/Discharge Option Number 3
Outlet type: Vertical Stand Pipe
1. Stand pipe diameter (ft): 0.33
2. Stand pipe height above datum (ft): 3

Source Area Control Practice Information

Land Use: Commercial
Paved Parking/Storage 1 Source area number: 66
The Source Area is directly connected or draining to a directly connected area

Drainage System

Outfall

Pollutants to be Analyzed and Printed:

Pollutant Name	Pollutant Type
Solids	Particulate

CJE1506 - Area untreated - Output Summary

SLAMM for Windows Version 9.4.0

Data file name: \\Storage-057f\cjesto1\WinSLAMM\CJE1506 - Area untreated.dat
Data file description: cje1346
Rain file name: C:\Program Files\WinSLAMM\Rain Files\WI Milwaukee 69.RAN
Particulate Solids Concentration file name: C:\PROGRA~1\WINSLAMM\WI_AVG01.PSC
Runoff Coefficient file name: C:\PROGRA~1\WINSLAMM\WI_SL06 DEC06.RSV
Particulate Residue Delivery file name: C:\PROGRA~1\WINSLAMM\WI_DLV01.PRR
Residential Street Delivery file name: C:\Program Files\WinSLAMM\WI_Com Inst Indust Dec06.std
Institutional Street Delivery file name: C:\Program Files\WinSLAMM\WI_Com Inst Indust Dec06.std
Commercial Street Delivery file name: C:\Program Files\WinSLAMM\WI_Com Inst Indust Dec06.std
Industrial Street Delivery file name: C:\Program Files\WinSLAMM\WI_Com Inst Indust Dec06.std
Other Urban Street Delivery file name: C:\Program Files\WinSLAMM\WI_Com Inst Indust Dec06.std
Freeway Street Delivery file name: C:\Program Files\WinSLAMM\WI_Com Inst Indust Dec06.std
Pollutant Relative Concentration file name: C:\PROGRA~1\WINSLAMM\WI_GEO01.PPD
Apply Street Delivery Files to Adjust the After Event Load Street Dirt Mass Balance: False
Model Run Start Date: 03/28/69 Model Run End Date: 12/06/69
Date of run: 08-23-2015 Time of run: 09:07:01
Total Area Modeled (acres): 1.36
Years in Model Run: 0.67

	Runoff Volume (cu ft)	Percent Runoff Volume Reduction	Particulate Solids Conc. (mg/L)	Particulate Solids Yield (lbs)	Percent Particulate Solids Reduction
Source Area Total without Controls:	74419	0 %	129.8	603.1	0 %
Total Before Drainage System:	74419	0.00%	129.8	603.1	0.00%
Total After Drainage System:	74419	0.00%	129.8	603.1	0.00%
Total After Outfall Controls:	74419	0.00%	129.8	603.1	0.00%
Annualized Total After Outfall Controls:	111782			905.9	

CJE1506 - Area untreated

Data file name: \\Storage-057f\cjesto1\WinSLAMM\CJE1506 - Area untreated.dat
SLAMM Version 9.4.0
Rain file name: C:\Program Files\WinSLAMM\Rain Files\WI Milwaukee 69.RAN
Particulate Solids Concentration file name: C:\PROGRA~1\WINSLAMM\WI_AVG01.PSC
Runoff Coefficient file name: C:\PROGRA~1\WINSLAMM\WI_SL06 DEC06.RSV
Particulate Residue Delivery file name: C:\PROGRA~1\WINSLAMM\WI_DLV01.PRR
Residential Street Delivery file name: C:\Program Files\WinSLAMM\WI_Com Inst Indust Dec06.std
Institutional Street Delivery file name: C:\Program Files\WinSLAMM\WI_Com Inst Indust Dec06.std
Commercial Street Delivery file name: C:\Program Files\WinSLAMM\WI_Com Inst Indust Dec06.std
Industrial Street Delivery file name: C:\Program Files\WinSLAMM\WI_Com Inst Indust Dec06.std
Other Urban Street Delivery file name: C:\Program Files\WinSLAMM\WI_Com Inst Indust Dec06.std
Freeway Street Delivery file name: C:\Program Files\WinSLAMM\WI_Com Inst Indust Dec06.std
Apply Street Delivery Files to Adjust the After Event Load Street Dirt Mass Balance: False
Pollutant Relative Concentration file name: C:\PROGRA~1\WINSLAMM\WI_GEO01.PPD
Seed for random number generator: -42
Study period starting date: 03/28/69 Study period ending date: 12/06/69
Start of Winter Season: 12/06 End of Winter Season: 03/28
Date: 08-23-2015 Time: 09:07:16
Fraction of each type of Drainage System serving study area:
1. Grass Swales 0
2. Undeveloped roadside 0
Curb and Gutters, `valleys', or sealed swales in:
3. Poor condition (or very flat) 0.5
4. Fair condition 0.5
5. Good condition (or very steep) 0

Site information:
cje1346

	|<===== Areas for each Source (acres) =====>|				
Source Area	Residential Areas	Institutional Areas	Commercial Areas	Industrial Areas	Other Urban Areas
Roofs 1	0.000	0.000	0.000	0.000	0.000
Roofs 2	0.000	0.000	0.000	0.000	0.000
Roofs 3	0.000	0.000	0.000	0.000	0.000
Roofs 4	0.000	0.000	0.000	0.000	0.000
Roofs 5	0.000	0.000	0.000	0.000	0.000
Paved Parking/Storage 1	0.000	0.000	0.940	0.000	0.000
Paved Parking/Storage 2	0.000	0.000	0.420	0.000	0.000
Paved Parking/Storage 3	0.000	0.000	0.000	0.000	0.000
Unpaved Prkng/Storage 1	0.000	0.000	0.000	0.000	0.000
Unpaved Prkng/Storage 2	0.000	0.000	0.000	0.000	0.000
Playground 1	0.000	0.000	0.000	0.000	0.000
Playground 2	0.000	0.000	0.000	0.000	0.000
Driveways 1	0.000	0.000	0.000	0.000	0.000
Driveways 2	0.000	0.000	0.000	0.000	0.000
Driveways 3	0.000	0.000	0.000	0.000	0.000
Sidewalks/Walks 1	0.000	0.000	0.000	0.000	0.000
Sidewalks/Walks 2	0.000	0.000	0.000	0.000	0.000
Street Area 1	0.000	0.000	0.000	0.000	0.000
Street Area 2	0.000	0.000	0.000	0.000	0.000
Street Area 3	0.000	0.000	0.000	0.000	0.000
Large Landscaped Area 1	0.000	0.000	0.000	0.000	0.000
Large Landscaped Area 2	0.000	0.000	0.000	0.000	0.000
Undeveloped Area	0.000	0.000	0.000	0.000	0.000
Small Landscaped Area 1	0.000	0.000	0.000	0.000	0.000
Small Landscaped Area 2	0.000	0.000	0.000	0.000	0.000
Small Landscaped Area 3	0.000	0.000	0.000	0.000	0.000

	CJE1506 - Area untreated				
Isolated/Water Body Area	0.000	0.000	0.000	0.000	0.000
Other Pervious Area	0.000	0.000	0.000	0.000	0.000
Other Dir Cnctd Imp Area	0.000	0.000	0.000	0.000	0.000
Other Part Cnctd Imp Area	0.000	0.000	0.000	0.000	0.000
Total	0.000	0.000	1.360	0.000	0.000

Freeway Source Area	Area (acres)
Pavd Lane & Shldr Area 1	0.000
Pavd Lane & Shldr Area 2	0.000
Pavd Lane & Shldr Area 3	0.000
Pavd Lane & Shldr Area 4	0.000
Pavd Lane & Shldr Area 5	0.000
Large Turf Areas	0.000
Undeveloped Areas	0.000
Other Pervious Areas	0.000
Other Directly Conctd Imp	0.000
Other Partially Conctd Imp	0.000
Total	0.000

Total of All Source Areas	1.360
Total of All Source Areas less All Isolated Areas	1.360

Source Area Control Practice Information

Land Use: Commercial

Paved Parking/Storage 1 Source area number: 66

The Source Area is directly connected or draining to a directly connected area

Paved Parking/Storage 2 Source area number: 67

The Source Area is draining to a pervious area (partially connected impervious area)

The SCS Hydrologic Soil Type is Silty

Drainage System

Outfall

Pollutants to be Analyzed and Printed:

Pollutant Name	Pollutant Type
Solids	Particulate

Computations For Sewers of Drainage System

Project Name Metal Era **Project Location** Waukesha, WI **Date** 08/19/15

CJE Job No. CJE1506 **Designed By** CAJ **Checked By** _____ **Sheet** 1 **of** 1

Location of Sewer			Drainage Area			Rainfall and Runoff Data					Total Runoff	Design Computations							Time of Flow in Sewer		Remarks		
			a	A	C	Ca	Σ Ca			I	Q												
In	From	To	Individual Area in Acres	Accumulated Area in Acres	Individual Impervious Coefficient	Individual Ca	Accumulated Ca	Rainfall Frequency Curve Used (years)	Initial Time of Concentration (min.)	Rainfall Intensity in. per hr. = I	Total Runoff Cu. Ft. per Sec. CIA=Q	Length of Sewer (ft)	Inside Size of Sewer (in)	Necessary Drop in Length Given (ft)	Actual Drop in Length Given (ft)	Mannings Roughness Coefficient	Parts Full for Actual Drop	Velocity ft. per sec. for Actual Drop	Time of Flow in Section (min.)	Total Elapsed Time at End of Section (min.)	Invert (In)	Invert (Out)	Slope
	1	2	0.33	0.33	0.8	0.26	0.26	100	10.0	7.29	1.93	80	12	0.17	0.25	0.011	0.69	3.34	0.4	10.4	118.25	118.00	0.00313
	2	3	0.30	0.63	0.8	0.24	0.50	100	10.4	7.19	3.63	90	12	0.66	0.75	0.011	0.77	5.56	0.3	10.7	117.75	117.00	0.00833
	4	5	0.28	0.28	0.8	0.22	0.22	100	10.0	7.29	1.63	20	8	0.26	0.50	0.011	0.63	7.05	0.0	10.0	117.5	117.00	0.02500
	6	7	0.05	0.05	0.8	0.04	0.04	100	10.0	7.29	0.29	80	8	0.03	0.50	0.011	0.35	2.70	0.5	10.5	120.25	119.75	0.00625
	7	9	0.23	0.28	0.8	0.18	0.22	100	10.5	7.17	1.61	160	12	0.32	0.35	0.013	0.79	2.42	1.1	11.6	119.5	119.15	0.00219
	8	9	0.83	0.83	0.9	0.75	0.75	100	10.0	7.29	5.45	30	12	0.70	0.75	0.013	0.79	8.16	0.1	10.1	119.9	119.15	0.02500
	9	10		1.11			0.97	100	11.6	6.92	6.72	190	18	0.77	0.75	0.013	0.84	4.25	0.7	12.3	119	118.25	0.00395

CJ engineering
civil design and consulting
9205 W. Center Street
Suite 214
Milwaukee, WI 53222
PH. (414) 443-1312
FAX (414) 443-1317
www.cj-engineering.com

N

SITE BENCHMARK
NE FLANGE BOLT
ON HYDRANT
ELEVATION = 127.64

AVIATION DRIVE
(100' WIDE PUBLIC RIGHT OF WAY)

CATCH BASIN
RIM = 145.10
15" PVC SE INV. = 132.62

24" RCP INV. = 123.59
18" RCP INV. = 124.13

10' WIDE ELECTRIC EASEMENT
PER DOC. NO. 1687382

PROPOSED
STORM SEWER
TO BE DESIGNED
AS PART OF PHASE III
CONSTRUCTION DOCUMENTS

UNPLATTED
LANDS
COUNTY OF WAUKESHA

LOT 1
CSM 8224
GKM INVESTMENTS LLC

FND 1"IP
0.26'N
0.23'W

N 88°24'27" E
588.64'

HIGH TENSION WIRES

PROPOSED
RET. WALL

25' SETBACK LINE

25' BUILDING SETBACK LINE

PROPOSED
CATCH BASIN
RIM 123.7

PROPOSED
CATCH BASIN
RIM 123.6

16x16
OVHD

ASPHALT

CONCRETE WALL
TRENCH DRAIN
CONCRETE

PROPOSED
TRENCH DRAIN
RIM 120.5
(CONNECT TO
BLDG. SUMP)

PHASE III
PROPOSED BUILDING ADDITION
APPROX 31,773 SF
WAREHOUSE: 26,773 SF
MANUFACTURING: 5,000 SF
124 FIRST FLOOR ELEV. 124.70
(MATCH EXISTING BLDG.)

PHASE II
PROPOSED NEW BUILDING ADDITION
(TYPE OF CONSTRUCTION: IIB)
APPROX 36,000 SF
WAREHOUSE: 31,000 SF
MANUFACTURING: 5,000
FIRST FLOOR ELEV. 124.70
(MATCH EXISTING BLDG.)

MASONRY
BUILDING
#1600
BUILDING FOOTPRINT = 103,373 SQ. FT.

MASONRY
BUILDING
#1700
BUILDING FOOTPRINT =
37,270 SQ. FT.
BLDG. HT. = 24.36'

METAL FENCE

CONCRETE

DOOR SILL = 128.25

DOOR SILL = 127.78

BLOCK RETAINING WALL

DOOR SILL = 127.87

DOOR SILL = 127.83

FLOOR @ DOOR = 127.95

6" BOLLARD (TYP)

DOOR SILL = 124.64

DOOR SILL = 124.68

DOOR SILL = 124.70

DOOR SILL = 124.67

PROPOSED
CATCH BASIN #6
RIM 125.50
8" S INV. 120.25

CATCH BASIN
RIM = 123.90

PROPOSED
8" STORM SEWER
90° PVC
@ S=0.625%

PROPOSED
CATCH BASIN #7
RIM 123.65
8" N INV. 119.75
12" SW INV. 119.50

PROPOSED
12" STORM SEWER
30' PVC
@ S=2.50%

PROPOSED
12" INV. 119.50
(FROM ROOF
DRAINS & SUMP)

PROPOSED
6" SAN. LATERAL
(FUTURE - PHASE 2)

PROPOSED
STORM MH #9
RIM 123.00
12" N INV. 119.15
12" NE INV. 119.15
18" SW INV. 119.00

PROPOSED
6" STORM SEWER
70' PVC
@ S=0.50%

PROPOSED
CATCH BASIN #5
RIM 122.40
(CONNECT TO UNDERGRO
STORM SWER SYSTEM
- SEE DETAIL)

UNDERGROUND STORM
WATER SYSTEM
(SEE DETAIL)

PROPOSED
STORM MH #3
RIM 123.00
12" INV. 117.00 EXISTING ASPHALT

EXST. RAISED CONCRETE

18" CMP INV. = 120.46

PROPOSED
RAIN GARDEN
(BIO-RETENTION BASIN)

18" CMP
INV. 120.17

MONUMENT
SIGN

PROPOSED
LIGHT POLE

PROPOSED
CATCH BASIN #4
RIM 120.75
87.4 N INV. 118.00

PROPOSED
CATCH BASIN #2
RIM 121.50
12" E INV. 118.00
12" NW INV. 117.75

PROPOSED
CATCH BASIN #1
RIM 121.50
12" W INV. 118.25

PROPOSED
8" STORM SEWER
24" PVC
@ S=2.50%

PROPOSED
12" STORM SEWER
90° PVC
@ S=0.833%

PROPOSED
12" STORM SEWER
160' PVC
@ S=0.219%

PROPOSED
STORM SEWER
18" PVC
@ S=0.195%

PROPOSED
6" WATER SERVICE
(FUTURE - PHASE 2)

PROPOSED
18" ENDSCEITON
INV. 118.25

PROPOSED
STORM OUTLET
STRUCTURE
36" DIA. STORM INLET
INSTALL OVER EXISTING
12" STORM SEWER

ARC = 203.49'
RADIUS = 235.00'
CHORD = 197.20'
BEARING = N 27°32'15" E

ARC = 394.69'
RADIUS = 250.00'
CHORD = 354.96'
BEARING = N 45°47'40" W

S 88°58'42" W
250.22'

BERM (TOP EL. 124.0)

S 02°43'41" W
2.37'

AVIATION DRIVE
(100' WIDE PUBLIC RIGHT OF WAY)

AIRPORT ROAD
(70' WIDE PUBLIC RIGHT OF WAY)

ACCESS

CONCRETE CURB

CONCRETE

ASPHALT

CATCH BASIN
RIM = 117.89
10" PVC NE INV. = 114.59
18" HDPE SE INV. = 114.44

CATCH BASIN
RIM = 117.83
18" HDPE NW INV. = 114.43
18" HDPE SW INV. = 114.13
PROPOSED 6" E INV. 115.65

SITE BENCHMARK
NE FLANGE BOLT
ON HYDRANT
ELEVATION = 120.88

CATCH BASIN
RIM = 117.90
18" HDPE NE INV. = 113.64
18" HDPE SW INV. = 113.60

CATCH BASIN
RIM = 118.66
10" PVC E INV. = 115.51

CATCH BASIN
RIM = 118.39
18" HDPE N INV. = 114.89
18" HDPE SE INV. = 114.55

CATCH BASIN
RIM = 118.70
12" PVC N INV. = 115.60
10" PVC W INV. = 115.49
18" HDPE S INV. = 115.23

SITE BENCHMARK
HYDRANT
NORTHEAST FLANGE BOLT
EL = 121.68

SITE BENCHMARK
HYDRANT
NORTHWEST FLANGE BOLT
EL = 121.63

SITE BENCHMARK
HYDRANT
NORTHWEST
FLANGE BOLT
EL = 126.94

SITE BENCHMARK
HYDRANT
NORTHEAST FLANGE BOLT
EL = 124.53

SANITARY MANHOLE
RIM = 121.92
8" PVC E INV. = 107.93
8" PVC SW INV. = 107.77

SANITARY MANHOLE
RIM = 121.18
8" PVC NE INV. = 107.01
8" PVC SW INV. = 106.80

SANITARY MANHOLE
RIM = 120.31
8" PVC NE INV. = 106.33 (PLAN)
8" PVC S INV. = 106.18 (PLAN)

SANITARY MANHOLE
RIM = 123.80
8" PVC NE INV. = 109.76
8" PVC W INV. = 109.60

TREE
EVERGREEN
SHRUB

TO OBTAIN LOCATIONS OF
PARTICIPANTS UNDERGROUND
FACILITIES BEFORE YOU
DIG IN WISCONSIN

CALL DIGGERS HOTLINE
1-800-242-8511
TOLL FREE
WIS STATUTE 182.0175(1974)
REQUIRES A MINIMUM 3 DAY
NOTICE BEFORE YOU EXCAVATE
MEMB. AREA 259-1181

LEGEND

96	EXISTING CONTOUR
96	PROPOSED CONTOUR
x 96.5	PROPOSED ELEVATION
ST	PROPOSED STORM SEWER
x x x x x x x x	PROPOSED SAW CUT
	PROPOSED SILT FENCE

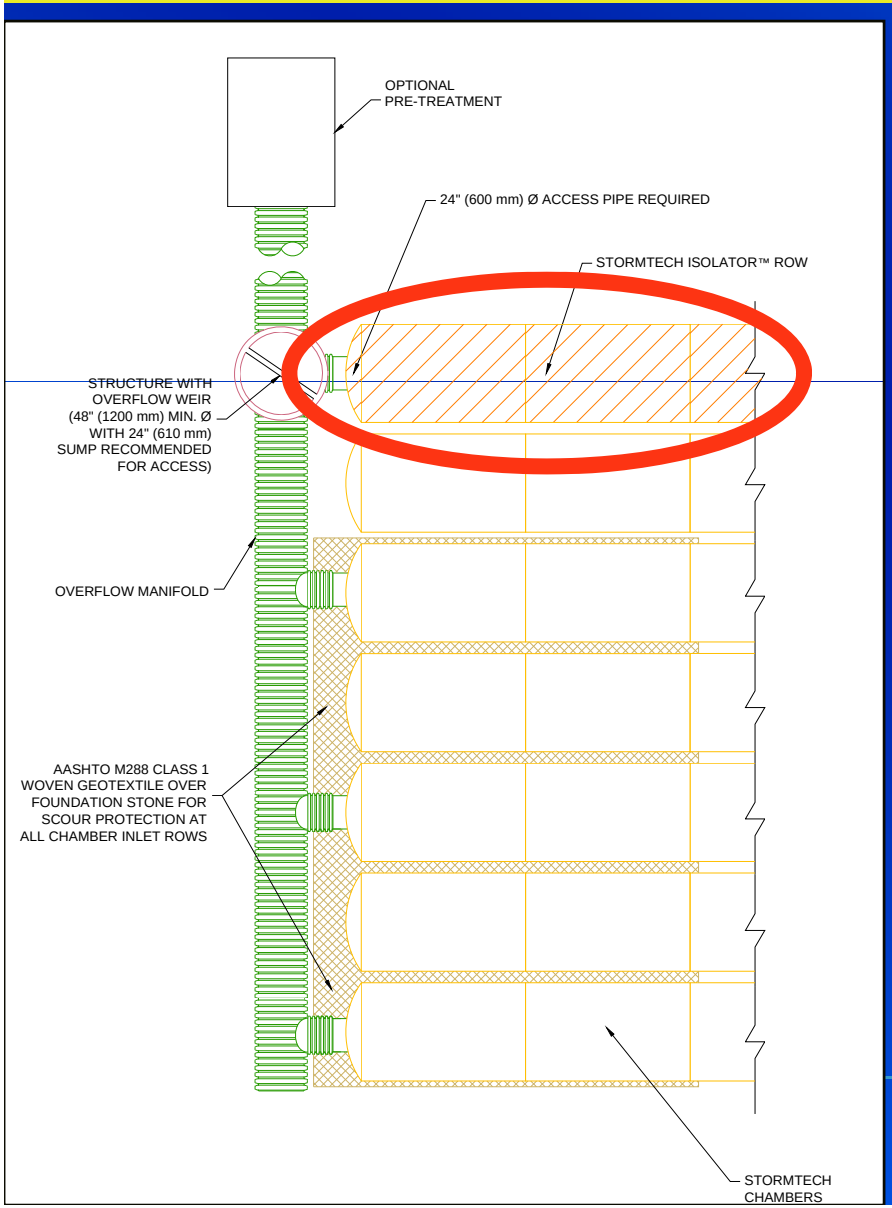
GRAPHIC SCALE
40 0 20 40 80
1 inch = 40 ft

CJE NO.: I506R0
AUGUST 24, 2015

METAL ERA
1600 & 1700 AIRPORT ROAD
WAUKESHA, WISCONSIN

ULTIMATE CONDITIONS
STORM SEWER AREAS

Pre-Treatment

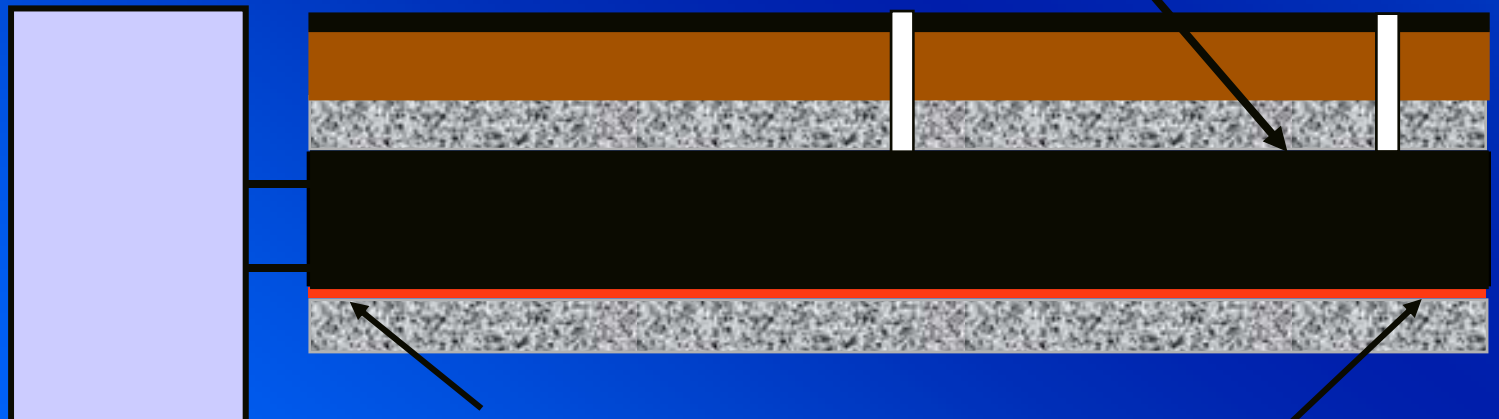


Isolator Row

Isolator™ Inlet Control System

StormTech™

Wrap Outside of row in a Non-Woven fabric. This isolates the sediment but allows water to escape.

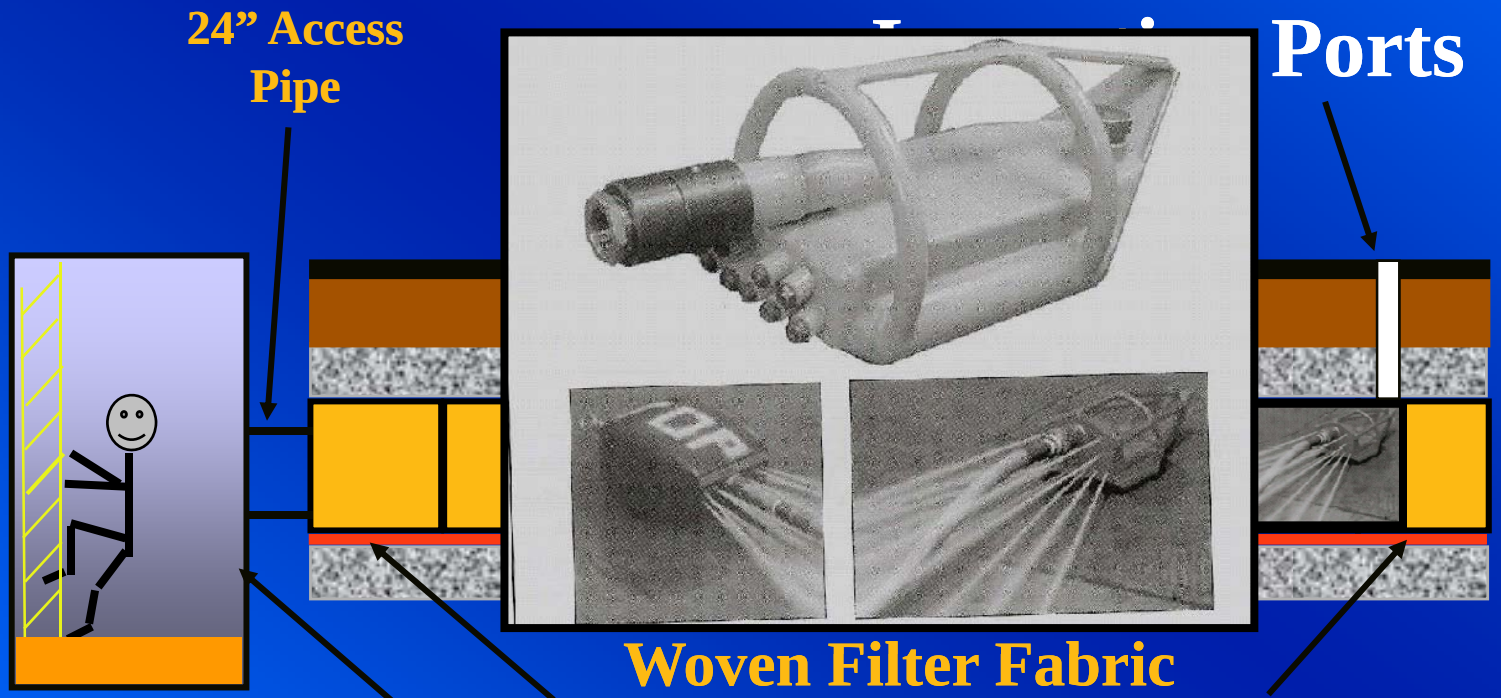


Woven Fabric between stone & chamber.
This lines the bottom of the Isolator Row.

Inspection & Maintenance

Inspection and Maintenance

Inspection & Maintenance



Inspection & Maintenance

During Construction (no flows yet)

Inspection & Maintenance

After 1 Year of Operation

System had very poor inlet protection during installation. Sediment loads in geographical areas that have sanding practices usually only accumulate to 6-7 CF annually.

Inspection & Maintenance

Jet-Vac Process

Inspection & Maintenance

Pre-Jet-Vac

Post-Jet-Vac

Inspection & Maintenance

Just Prior to Jet-Vac