



CREATIVITY BEYOND ENGINEERING

Storm Water Management Report for

Central Disposal Inc
Arcadian Ave, Waukesha, WI 53188

Project No. 3230241

February 26, 2024

Prepared By:

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PURPOSE

raSmith has been retained by Central Disposal Inc. to prepare a Stormwater Management Plan for a redevelopment facility location on Arcadian Ave in Waukesha, WI 53188. The project is located south of the corner of Arcadian Ave and Tesch Ct. The site is entirely classified by USGS Web Soil Survey as primarily hydraulic soil group D. Preliminary geotechnical borings have been included in the appendix of this report. The site was a landfill site and mostly has a crushed compacted asphalt drivable surface over it. Reports by other consultants address the environmental engineering aspects of this project as it relates to the previous landfill activities. The site generally drains from southeast to northwest with some runoff draining towards the right of way and some draining to the adjacent property.

No wetlands, floodplains or environmental corridors have been identified near this site. Copies of the FIRMette, WDNR surface data water viewer, and 7.5 min map can be found in the appendix of this report.

The proposed project consists of the construction of two new buildings, some asphalt drive aisles, and wet detention ponds to provide storm water quality and quantity treatment.

Storm water management for this redevelopment site is regulated by the City of Waukesha Municipal Code Chapter 32 and the Wisconsin Department of Natural Resources NR 151. The analysis presented in this report addresses post-construction water quantity, water quality, and infiltration requirements. This report also includes the site's storm sewer design.

RUNOFF MANAGEMENT REGULATIONS

The property is 4.0 acres. The total site under investigation is 3.55 acres (excluding some unchanged front yard area). Stormwater requirements are triggered by more than 0.5 acres of impervious surface being added to the site and over 1 acre of disturbance. This site is considered redevelopment as it relates to storm water requirements.

Water Quantity: Chapter 32 of the Waukesha code requires that the proposed peak discharge rate for the 1-yr, 2-yr, 10-yr, and 100-yr 24-hr storm events must be no more than the existing peak discharge rate the same storm event

Water Quality: Chapter 32 of the Waukesha code and NR 151.122, total suspended solids (TSS) in the runoff from redevelopment pavement areas from the must be reduced by 40% as compared with no controls.

Site Infiltration: Per NR 151, redevelopment sites are exempt from infiltration requirements.

METHODS OF ANALYSIS

Hydrologic analysis included in this report was performed using the HydroCAD hydrologic simulation computer model, version 10.10 by HydroCAD Software Solutions LLC. The discharges were generated using the SCS Dimensionless Unit Hydrograph Method for a 24-hour duration storm. Model parameters include drainage area, SCS runoff curve number, time of concentration and 24-hour precipitation with an MSE3 distribution.

Table 1 – Design Storm Events

Per Chapter 32.10 Table 3

Frequency (years)	Duration (hours)	Rainfall Depth (inches)
1	24	2.40
2	24	2.70
10	24	3.81
100	24	6.18

WATER QUANTITY DESIGN**Existing Conditions**

The existing site conditions have been divided into two watersheds. Watershed E-1 drains to the southwest and towards the adjacent property via overland flow. Watershed E-2 drains towards the right of way through the main driveway via overland flow. Please see the existing hydrology exhibit in the appendix of this report for more information.

Table 3 – Pre-Development Stormwater Quantity Summary

Watershed ID	Watershed Characteristics			Peak Discharge (cfs)			
	Area	CN	Tc	1-year	2-year	10-year	100-year
E-1	0.59	91	6.0	1.58	1.85	2.85	4.96
E-2	2.96	90	6.3	7.49	8.83	13.79	24.34
Total	3.55	-	-	9.07	10.67	16.64	29.29

Proposed Conditions

The proposed site is split up between 3 watersheds.

1. Watershed P-1 drains some of the redevelopment impervious area towards the adjacent property to the southwest via overland flow (similar to E-1).
2. Watershed P-2 drains some of the redevelopment impervious area towards the right of way through the driveway to the northwest via overland flow (similar to E-2).
3. Watershed P-3 drains the remainder of the redevelopment area to a wet detention pond for stormwater treatment. This pond then discharges to the right of way to the north via a new culvert installed in the existing berm.

A wet detention pond is proposed as the site's main BMP to meet the required discharge rates and storm water quality requirements. An outlet control structure will detain the runoff with a steel weir plate and allow for the sediment in the runoff to settle in the permanent pool. The outlet from the pond is an 18" pipe at elevation 856.50. This pipe connects to an outlet control structure at elevation 856.50. The outlet control structure has a 6' wide steel plate with a 2.5" orifice at elevation 856.50. This outlet control structure has an 18" pipe leaving it at elevation 856.50 which then discharged at 856.00 at grade towards the north.

Table 4 – Post-Development Stormwater Quantity Summary

Watershed ID	Watershed Characteristics			Peak Discharge (cfs)			
	Area	CN	Tc	1-year	2-year	10-year	100-year
P-1	0.60	95	6.0	1.88	2.16	3.16	5.26
P-2	1.00	91	6.0	2.68	3.14	4.83	8.42
P-3	1.95	93	6.0	5.65	6.54	9.80	16.68
Wet Pond*	-	-	-	0.20	0.62	4.22	10.69
Required	-	-	-	9.07	10.67	16.64	29.29
Total	3.55	-	-	4.71	5.45	9.35	23.81

WATER QUALITY DESIGN

Water quality treatment will be obtained by the wet detention pond. The pond was designed to reduce the average annual total suspended solids (TSS) load for all of the redevelopment areas onsite and the existing compacted crushed asphalt which was remaining untouched. Storm water quality was evaluated using the Source Loading and Management Model (WinSLAMM). The results are shown in Table 5 with the applicable computer generated information located in the appendix.

Table 5 – Post-Development TSS Load

TSS Before (lbs)	TSS After (lbs)	Removal (%)
3220	1925	40.22%

STORM SEWER DESIGN

The site storm sewer has been designed using the rational method. Each proposed storm sewer run has been analyzed using the 10-year and 100-year storm events using “Hydraflow Storm Sewers Extension for AutoCAD Civil 3D, Version 12”. See appendix for results of the Storm Sewer Calculations and storm sewer plan.

CONSTRUCTION COST ESTIMATE OF STORMWATER BMP

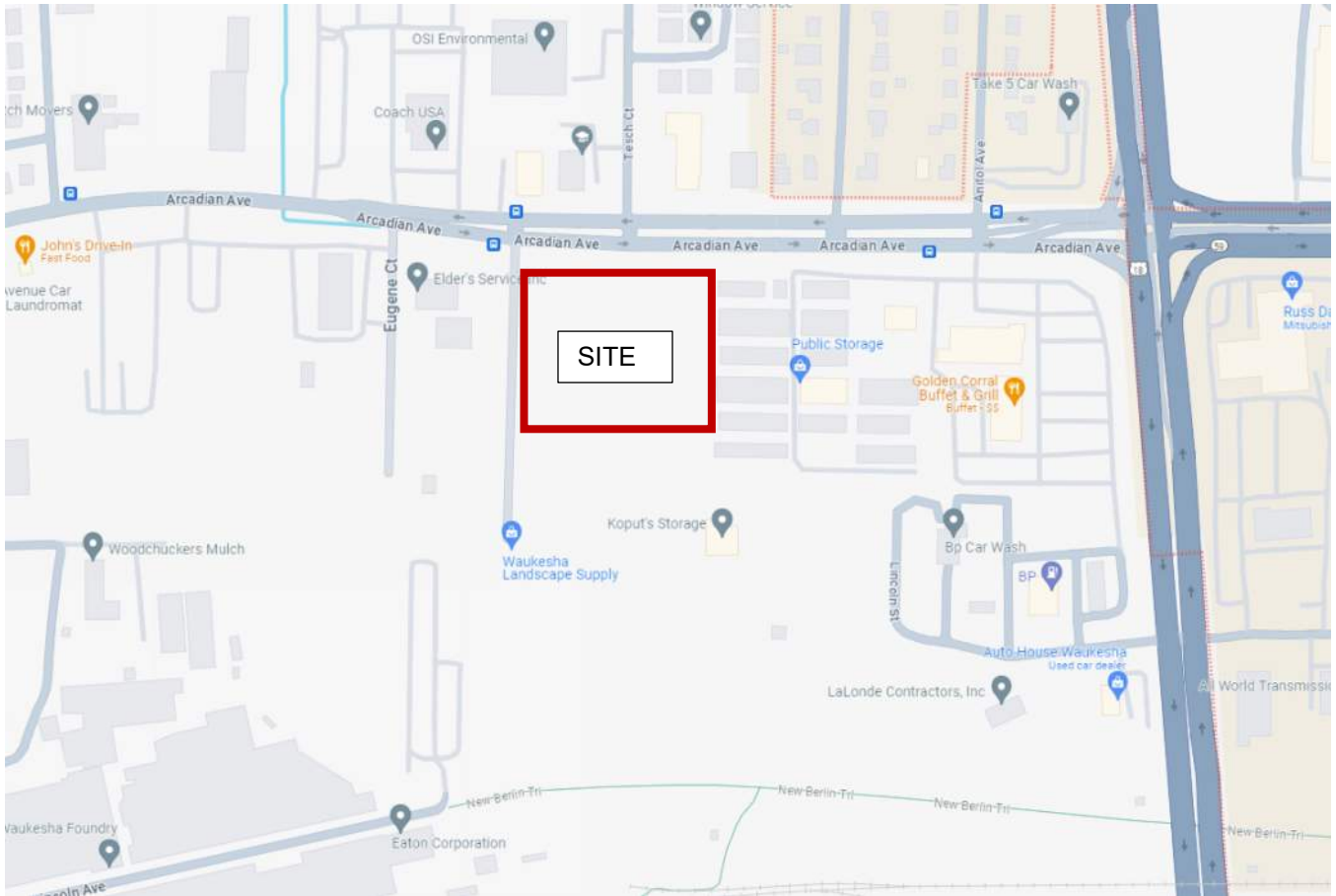
For the purpose of financial assurance, per City code section 32.08(c), it is estimated that the wet pond basin shall cost \$80,000.

SUMMARY

This analysis of the proposed wet detention basin indicates that the requirements of the City of Waukesha Chapter 32 and the Wisconsin Department of Natural Resources NR 151 have been satisfied.

Appendix A – General Project Information

Vicinity Maps

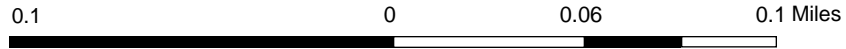




Surface Water Data Viewer Map



- ### Legend
- Wetland Indicators
 - Lake Class Areas
 - Riverine/ditch Class Areas
 - Wetland Class Areas
 - Wetland Class Points
 - Dammed pond
 - Excavated pond
 - Filled/draind wetland
 - Wetland too small to delineate
 - Filled excavated pond
 - Filled Points
 - Wetland Class Areas
 - Filled Areas
 - Lake Class Areas
 - Riverine/ditch Class Areas
 - Wetland Class Areas
 - Wetland Class Points
 - Dammed pond
 - Excavated pond
 - Filled/draind wetland
 - Wetland too small to delineate
 - Filled excavated pond
 - Filled Points
 - Wetland Class Areas
 - Filled Areas
 - Wetland Identifications and Confirmations
 - NRCS Wetspots
 - Municipality
 - State Boundaries
 - County Boundaries
 - Major Roads**
 - Interstate Highway
 - State Highway
 - US Highway



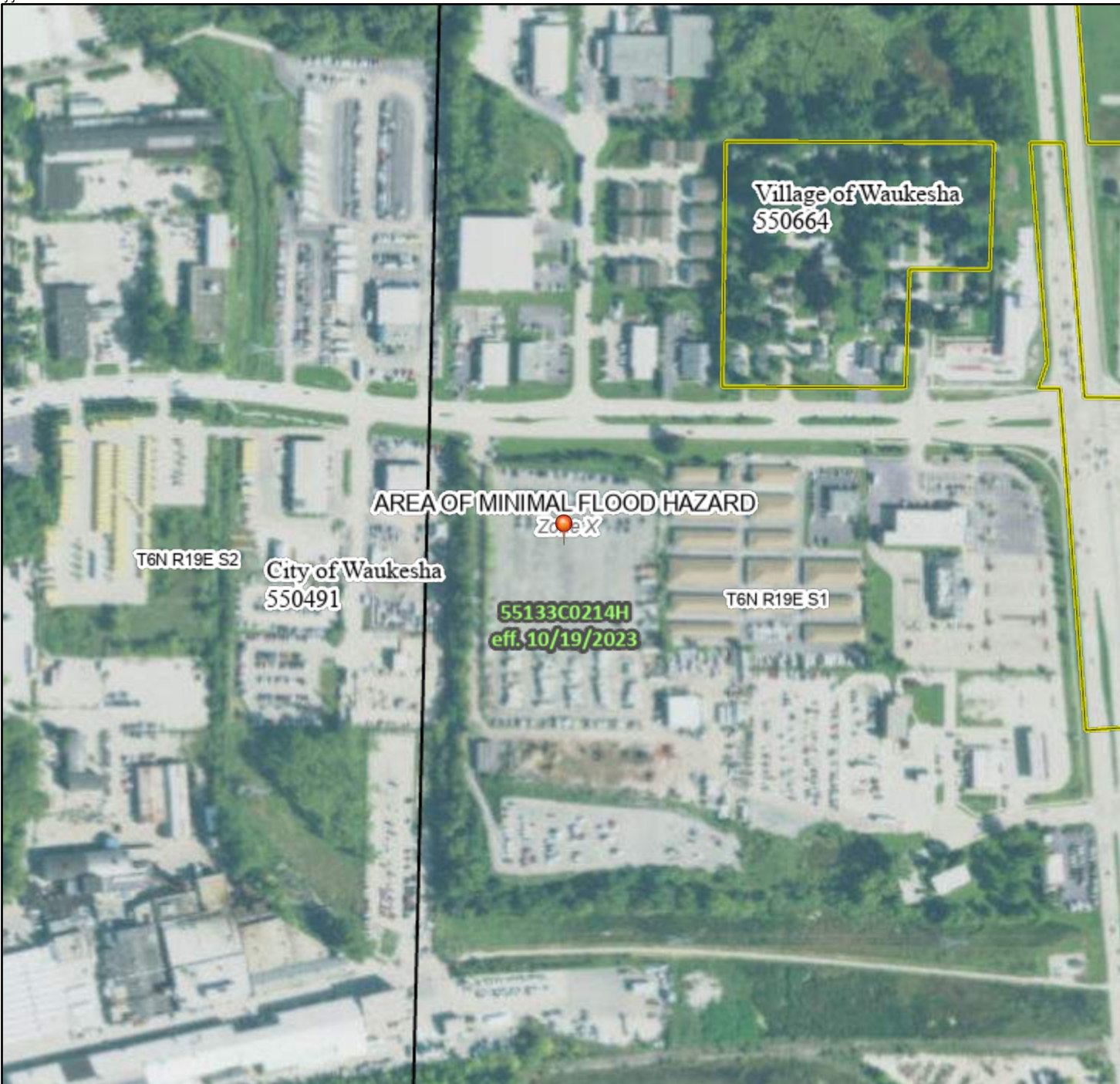
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DISCLAIMER: The information shown on these maps has been obtained from various sources, and are of varying age, reliability and resolution. These maps are not intended to be used for navigation, nor are these maps an authoritative source of information about legal land ownership or public access. No warranty, expressed or implied, is made regarding accuracy, applicability for a particular use, completeness, or legality of the information depicted on this map. For more information, see the DNR Legal Notices web page: <http://dnr.wi.gov/legal/>

Notes

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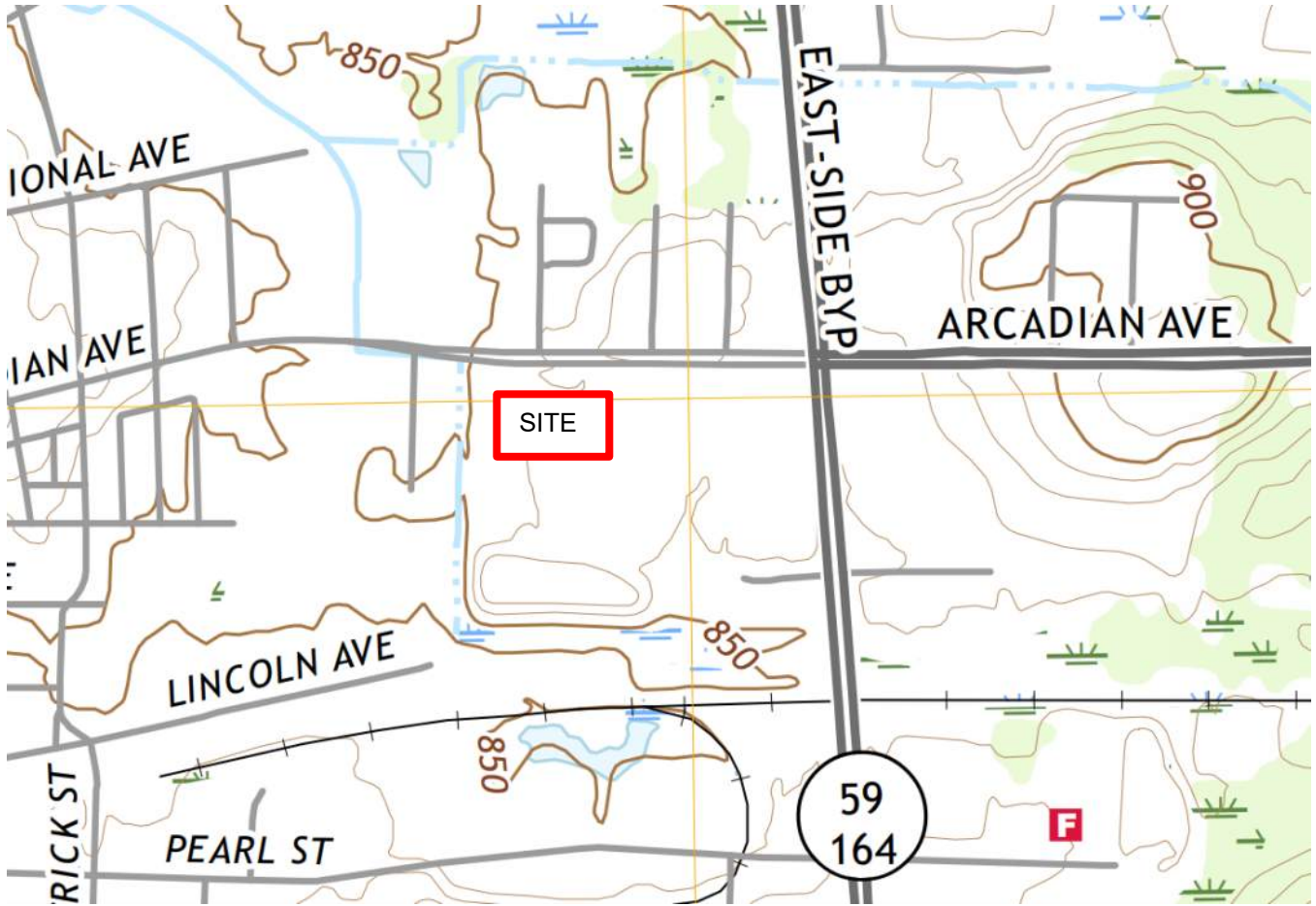
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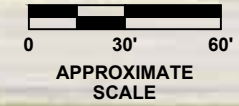
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U.H.K.O.D.W.R.U.S.U.S.R.V.H

USGS 7.5 min Map



Appendix B – Soils Information

ARCADIAN AVE.



ELDER'S SERVICE & TOWING (1523 ARCADIAN AVE.)

PROPOSED CURBING

PROPOSED BUILDING




PROPOSED BUILDING

GATE POST

PUBLIC STORAGE FACILITY (1643 ARCADIAN AVE.)

(1631 ARCADIAN AVE.)

LEGEND:

-  GEOTECHNICAL TEST BORING
-  GEOTECHNICAL TEST BORING / ENVIRONMENTAL VAPOR WELL
-  SITE BOUNDARY

NOTES:


- 1.) TEST BORING LOCATIONS ARE APPROXIMATE.
- 2.) BASE MAP DEVELOPED FROM THE "SITE PLAN" DATED 12-5-2023, PREPARED BY RASMITH.



GILES ENGINEERING ASSOCIATES, INC.
N8 W22350 JOHNSON DRIVE, SUITE A1
WAUKESHA, WI 53186 (262)544-0118
www.gilesengr.com

FIGURE 1
TEST BORING LOCATION PLAN
PROPOSED MATERIAL STORAGE BUILDING
1631 ARCADIAN AVENUE
WAUKESHA, WISCONSIN

DESIGNED	DRAWN	SCALE	DATE	REVISED
GCH	<i>Jed</i>	approx. 1"=60'	01-03-24	--
PROJECT NO.: 1G-2310021			CAD No. 1g2310021-blp	


BORING NO. & LOCATION: 1	<h1>TEST BORING LOG</h1>	 GILES ENGINEERING ASSOCIATES, INC.	
SURFACE ELEVATION: 864.6 feet			PROPOSED MATERIAL STORAGE BUILDING
COMPLETION DATE: 11/08/23			1631 ARCADIAN AVENUE WAUKESHA, WISCONSIN
FIELD REP: DAVIS LUCKETT			PROJECT NO: 1G-2310021

MATERIAL DESCRIPTION	Depth (ft)	Elevation	Sample No. & Type	N	Q _u (tsf)	Q _p (tsf)	Q _s (tsf)	W (%)	PID	NOTES
Fill: Dark Gray Sandy Gravel with Crushed Asphalt -Moist			1-SS	22						
Fill: Dark Brown Sandy Clay, little Gravel-Moist			2-SS	15		2.3		13		
Fill: Dark Gray Sandy Silt, little Gravel, trace Organic Matter (Includes Glass)-Moist	5	860	3-SS	15		1.0		16		
Fill: Dark Gray Sandy Gravel (Includes Asphalt Rubble and Glass)-Moist			4-SS	18						
Fill: Dark Gray Clayey Sand, little Organic Matter (Includes Asphalt Rubble, Wood Debris and Glass)-Moist	10	855	5-SS	11						Strong Petroleum Odor
Fill: Dark Gray Sandy Clay, trace Organic Matter and Gravel-Moist	15	850	6-SS	5				22		
Brown Sandy Silt, trace Gravel-Wet	20	845	7-SS	6						
Gray Sandy Silt, little Gravel (Includes Cobbles and Boulders)-Moist	25	840	8-SS	50/5"						(a)
	30	835	9-SS	50/3"				6		
	35	830	10-SS	67/1"						(a)
Auger Refusal Boring Terminated at about 36 feet (EL. 828.6')										

Water Observation Data		Remarks:
▽	Water Encountered During Drilling: 10 ft.	(a) Poor Sample Recovery
▽	Water Level At End of Drilling:	
⋯	Cave Depth At End of Drilling:	
▽	Water Level After Drilling:	
■	Cave Depth After Drilling:	

Changes in strata indicated by the lines are approximate boundary between soil types. The actual transition may be gradual and may vary considerably between test borings. Location of test boring is shown on the Boring Location Plan.

GILES LOG REPORT: 1G2310021.GPJ GILES.GDT 11/22/23


BORING NO. & LOCATION: 2	TEST BORING LOG	 GILES ENGINEERING ASSOCIATES, INC.	
SURFACE ELEVATION: 862.8 feet			PROPOSED MATERIAL STORAGE BUILDING
COMPLETION DATE: 11/08/23			1631 ARCADIAN AVENUE WAUKESHA, WISCONSIN
FIELD REP: DAVIS LUCKETT			PROJECT NO: 1G-2310021

MATERIAL DESCRIPTION	Depth (ft)	Elevation	Sample No. & Type	N	Q _u (tsf)	Q _p (tsf)	Q _s (tsf)	W (%)	PID	NOTES
Fill: Dark Brown Sandy Gravel, little Silt (Includes Asphalt Rubble)-Moist			1-SS	22						
Fill: Brown fine to medium Sand, little Gravel-Moist		860	2-SS	9						
Fill: Dark Gray Silty fine to medium Sand, little Gravel-Moist	5		3-SS	30				13		
Fill: Dark Gray Sandy Clay, little Organic Matter, trace Gravel (Includes Glass and Wood Debris)-Moist		855	4-SS	22				28		Strong Petroleum Odor
	10		5-SS	22				24		Strong Petroleum Odor
Brown Sandy Clay, trace Gravel-Moist		850	6-SS	7						
	15		7-SS	10				10		(a)
Brown Sandy Silt, little Gravel (Includes Cobbles and Boulders)-Moist		845	8-SS	88						
	20		9-SS	65						

Auger Refusal
Boring Terminated at about 20 feet (EL. 842.8')






Water Observation Data		Remarks:
▽	Water Encountered During Drilling: 11 ft.	(a) Poor Sample Recovery
▼	Water Level At End of Drilling:	
⋯	Cave Depth At End of Drilling:	
▼	Water Level After Drilling:	
■	Cave Depth After Drilling:	

Changes in strata indicated by the lines are approximate boundary between soil types. The actual transition may be gradual and may vary considerably between test borings. Location of test boring is shown on the Boring Location Plan.


BORING NO. & LOCATION: 3	TEST BORING LOG	 GILES ENGINEERING ASSOCIATES, INC.	
SURFACE ELEVATION: 861.8 feet			PROPOSED MATERIAL STORAGE BUILDING
COMPLETION DATE: 11/08/23			1631 ARCADIAN AVENUE WAUKESHA, WISCONSIN
FIELD REP: DAVIS LUCKETT			PROJECT NO: 1G-2310021

MATERIAL DESCRIPTION	Depth (ft)	Elevation	Sample No. & Type	N	Q _u (tsf)	Q _p (tsf)	Q _s (tsf)	W (%)	PID	NOTES
Fill: Gray Sandy Gravel (Includes Asphalt Rubble)-Moist	860		1-SS	18						
			2-SS	15						
Fill: Dark Gray Gravelly fine to medium Sand, little Organic Matter-Moist	5	855	3-SS	9						Strong Petroleum Odor
			4-SS	24						Strong Petroleum Odor
Fill: Dark Gray Clayey fine to medium Sand with Organic Matter (Includes Wood Debris)-Moist	10		5-SS	24						Strong Petroleum Odor
Fill: Brown Sandy Gravel, little Clay-Moist	850		6-SS	12						

Auger Refusal
Boring Terminated at about 14.5 feet (EL. 847.3')

Water Observation Data		Remarks:
	Water Encountered During Drilling: 11 ft.	
	Water Level At End of Drilling:	
	Cave Depth At End of Drilling:	
	Water Level After Drilling:	
	Cave Depth After Drilling:	

Changes in strata indicated by the lines are approximate boundary between soil types. The actual transition may be gradual and may vary considerably between test borings. Location of test boring is shown on the Boring Location Plan.


BORING NO. & LOCATION: 1	<h1>TEST BORING LOG</h1>	 GILES ENGINEERING ASSOCIATES, INC.	
SURFACE ELEVATION: 864.6 feet			PROPOSED MATERIAL STORAGE BUILDING
COMPLETION DATE: 11/08/23			1631 ARCADIAN AVENUE WAUKESHA, WISCONSIN
FIELD REP: DAVIS LUCKETT			PROJECT NO: 1G-2310021

MATERIAL DESCRIPTION	Depth (ft)	Elevation	Sample No. & Type	N	Q _u (tsf)	Q _p (tsf)	Q _s (tsf)	W (%)	PID	NOTES
Fill: Dark Gray Sandy Gravel with Crushed Asphalt -Moist			1-SS	22						
Fill: Dark Brown Sandy Clay, little Gravel-Moist			2-SS	15		2.3		13		
Fill: Dark Gray Sandy Silt, little Gravel, trace Organic Matter (Includes Glass)-Moist	5	860	3-SS	15		1.0		16		
Fill: Dark Gray Sandy Gravel (Includes Asphalt Rubble and Glass)-Moist			4-SS	18						
Fill: Dark Gray Clayey Sand, little Organic Matter (Includes Asphalt Rubble, Wood Debris and Glass)-Moist	10	855	5-SS	11						Strong Petroleum Odor
Fill: Dark Gray Sandy Clay, trace Organic Matter and Gravel-Moist	15	850	6-SS	5				22		
Brown Sandy Silt, trace Gravel-Wet	20	845	7-SS	6						
Gray Sandy Silt, little Gravel (Includes Cobbles and Boulders)-Moist	25	840	8-SS	50/5"						(a)
	30	835	9-SS	50/3"				6		
	35	830	10-SS	67/1"						(a)
Auger Refusal Boring Terminated at about 36 feet (EL. 828.6')										

Water Observation Data		Remarks:
▽	Water Encountered During Drilling: 10 ft.	(a) Poor Sample Recovery
▽	Water Level At End of Drilling:	
⋯	Cave Depth At End of Drilling:	
▽	Water Level After Drilling:	
■	Cave Depth After Drilling:	






Changes in strata indicated by the lines are approximate boundary between soil types. The actual transition may be gradual and may vary considerably between test borings. Location of test boring is shown on the Boring Location Plan.

GILES LOG REPORT: 1G2310021.GPJ GILES.GDT 12/28/23

BORING NO. & LOCATION: 2	<h1>TEST BORING LOG</h1>	 GILES ENGINEERING ASSOCIATES, INC.	
SURFACE ELEVATION: 862.8 feet			PROPOSED MATERIAL STORAGE BUILDING
COMPLETION DATE: 11/08/23			1631 ARCADIAN AVENUE WAUKESHA, WISCONSIN
FIELD REP: DAVIS LUCKETT			PROJECT NO: 1G-2310021


MATERIAL DESCRIPTION	Depth (ft)	Elevation	Sample No. & Type	N	Q _u (tsf)	Q _p (tsf)	Q _s (tsf)	W (%)	PID	NOTES
Fill: Dark Brown Sandy Gravel, little Silt (Includes Asphalt Rubble)-Moist			1-SS	22						
Fill: Brown fine to medium Sand, little Gravel-Moist		860	2-SS	9						
Fill: Dark Gray Silty fine to medium Sand, little Gravel-Moist	5		3-SS	30				13		
Fill: Dark Gray Sandy Clay, little Organic Matter, trace Gravel (Includes Glass and Wood Debris)-Moist		855	4-SS	22				28		Strong Petroleum Odor
	10		5-SS	22				24		Strong Petroleum Odor
Brown Sandy Clay, trace Gravel-Moist		850	6-SS	7						
	15		7-SS	10				10		(a)
Brown Sandy Silt, little Gravel (Includes Cobbles and Boulders)-Moist		845	8-SS	88						
			9-SS	65						

Auger Refusal
Boring Terminated at about 20 feet (EL. 842.8')

Water Observation Data		Remarks:
	Water Encountered During Drilling: 11 ft.	(a) Poor Sample Recovery
	Water Level At End of Drilling:	
	Cave Depth At End of Drilling:	
	Water Level After Drilling:	
	Cave Depth After Drilling:	






Changes in strata indicated by the lines are approximate boundary between soil types. The actual transition may be gradual and may vary considerably between test borings. Location of test boring is shown on the Boring Location Plan.

GILES LOG REPORT: 1G2310021.GPJ GILES.GDT 12/28/23


BORING NO. & LOCATION: 3	TEST BORING LOG	 GILES ENGINEERING ASSOCIATES, INC.	
SURFACE ELEVATION: 861.8 feet			PROPOSED MATERIAL STORAGE BUILDING
COMPLETION DATE: 11/08/23			1631 ARCADIAN AVENUE WAUKESHA, WISCONSIN
FIELD REP: DAVIS LUCKETT			PROJECT NO: 1G-2310021

MATERIAL DESCRIPTION	Depth (ft)	Elevation	Sample No. & Type	N	Q _u (tsf)	Q _p (tsf)	Q _s (tsf)	W (%)	PID	NOTES
Fill: Gray Sandy Gravel (Includes Asphalt Rubble)-Moist	860		1-SS	18						
			2-SS	15						
Fill: Dark Gray Gravelly fine to medium Sand, little Organic Matter-Moist	5	855	3-SS	9						Strong Petroleum Odor
			4-SS	24						Strong Petroleum Odor
Fill: Dark Gray Clayey fine to medium Sand with Organic Matter (Includes Wood Debris)-Moist	10		5-SS	24						Strong Petroleum Odor
Fill: Brown Sandy Gravel, little Clay-Moist	850		6-SS	12						

Auger Refusal
Boring Terminated at about 14.5 feet (EL. 847.3')






Water Observation Data		Remarks:
	Water Encountered During Drilling: 11 ft.	
	Water Level At End of Drilling:	
	Cave Depth At End of Drilling:	
	Water Level After Drilling:	
	Cave Depth After Drilling:	

Changes in strata indicated by the lines are approximate boundary between soil types. The actual transition may be gradual and may vary considerably between test borings. Location of test boring is shown on the Boring Location Plan.

BORING NO. & LOCATION: 4	<h1>TEST BORING LOG</h1>	 GILES ENGINEERING ASSOCIATES, INC.	
SURFACE ELEVATION: 107.1 feet			PROPOSED MATERIAL STORAGE BUILDING
COMPLETION DATE: 12/18/23			1631 ARCADIAN AVENUE WAUKESHA, WISCONSIN
FIELD REP: DAVIS LUCKETT			PROJECT NO: 1G-2310021


MATERIAL DESCRIPTION	Depth (ft)	Elevation	Sample No. & Type	N	Q _u (tsf)	Q _p (tsf)	Q _s (tsf)	W (%)	PID	NOTES
Fill: Dark Brown Sandy Clay, little Gravel (Includes Crushed Asphalt)-Moist	-	-	1-SS	12						
			2-SS	14		1.0	19			
Fill: Dark Brown lean Clay, little Sand, trace Gravel and Organic Material-Moist	5	-	3-SS	12		1.5		16		
			4-SS	50/2"		2.5	11		(a) (b)	
Gray lean Clay, little Sand-Moist	10	-	5-SS	10				23		

Boring Terminated at about 11 feet (EL. 96.1')

Water Observation Data		Remarks:
	Water Encountered During Drilling:	(a) Boulder Present at 7 feet (b) Poor Sample Recovery
	Water Level At End of Drilling:	
	Cave Depth At End of Drilling:	
	Water Level After Drilling:	
	Cave Depth After Drilling:	






Changes in strata indicated by the lines are approximate boundary between soil types. The actual transition may be gradual and may vary considerably between test borings. Location of test boring is shown on the Boring Location Plan.

GILES LOG REPORT: 1G2310021.GPJ GILES.GDT 12/28/23

BORING NO. & LOCATION: 5	<h1>TEST BORING LOG</h1>	 GILES ENGINEERING ASSOCIATES, INC.	
SURFACE ELEVATION: 106.5 feet			PROPOSED MATERIAL STORAGE BUILDING
COMPLETION DATE: 12/18/23			1631 ARCADIAN AVENUE WAUKESHA, WISCONSIN
FIELD REP: DAVIS LUCKETT			PROJECT NO: 1G-2310021


MATERIAL DESCRIPTION	Depth (ft)	Elevation	Sample No. & Type	N	Q _u (tsf)	Q _p (tsf)	Q _s (tsf)	W (%)	PID	NOTES
Fill: Dark Brown Gravelly Sand, little Clay (Includes Asphalt rubble)-Moist	105		1-SS	29						
Fill: Dark Brown Sandy Clay, trace Gravel-Moist			2-SS	14		1.0		22		
Fill: Black fine Sand, trace Gravel and Organic Matter-Moist	5		3-SS	20				17		
Fill: Dark Brown Sandy Clay, little Gravel (Includes Cobbles and Boulders)-Moist	100		4-SS	16		4.5+		14		
Fill: Dark Brown lean Clay, trace Organic Matter-Moist	10		5-SS	18		1.5		36		
Fill: Brown lean Clay, little Sand-Moist	95		6-SS	25		1.5		21		(a)
Brown Clayey fine to medium Sand, little Gravel-Wet	15		7-SS	14						
Brown Sandy Clay, trace Gravel-Wet	20		8-SS	23				9		(b)
Gray Silty fine to medium Sand, trace Gravel-Moist	25		9-SS	50/5"						
Gray Gravelly fine to medium Sand-Moist	30		10-SS	50/4"						

Boring Terminated at about 31 feet (EL. 75.5')

Water Observation Data		Remarks:
	Water Encountered During Drilling: 14 ft.	(a) No SPT Recovery - Auger Sample Obtained (b) Poor Sample Recovery
	Water Level At End of Drilling:	
	Cave Depth At End of Drilling:	
	Water Level After Drilling:	
	Cave Depth After Drilling:	






Changes in strata indicated by the lines are approximate boundary between soil types. The actual transition may be gradual and may vary considerably between test borings. Location of test boring is shown on the Boring Location Plan.

GILES LOG REPORT: 1G2310021.GPJ GILES.GDT 12/28/23


BORING NO. & LOCATION: 6	<h1>TEST BORING LOG</h1>	 GILES ENGINEERING ASSOCIATES, INC.	
SURFACE ELEVATION: 105.2 feet			PROPOSED MATERIAL STORAGE BUILDING
COMPLETION DATE: 12/18/23			1631 ARCADIAN AVENUE WAUKESHA, WISCONSIN
FIELD REP: DAVIS LUCKETT			PROJECT NO: 1G-2310021

MATERIAL DESCRIPTION	Depth (ft)	Elevation	Sample No. & Type	N	Q _u (tsf)	Q _p (tsf)	Q _s (tsf)	W (%)	PID	NOTES
±4" Crushed Asphalt-Concrete		105								
Fill: Brown fine Sand, little Silt and Gravel-Moist			1-SS	27						
Fill: Brown Gravelly fine to medium Sand (Includes Cobbles and Boulders)-Moist			2-SS	36						
Fill: Dark Brown Silty fine Sand, little Gravel (Includes Asphalt rubble) (Includes Cobbles and Boulders)-Moist	5	100	3-SS	50/2"						
Fill: Gray Gravelly fine to medium Sand-Moist			4-SS	25						
Fill: Black Silty fine to medium Sand, little Organic Matter-Moist	10	95	5-SS	6				20		

Boring Terminated at about 11 feet (EL. 94.2')






Water Observation Data		Remarks:
	Water Encountered During Drilling:	
	Water Level At End of Drilling:	
	Cave Depth At End of Drilling:	
	Water Level After Drilling:	
	Cave Depth After Drilling:	

Changes in strata indicated by the lines are approximate boundary between soil types. The actual transition may be gradual and may vary considerably between test borings. Location of test boring is shown on the Boring Location Plan.


BORING NO. & LOCATION: 7	<h1>TEST BORING LOG</h1>	 GILES ENGINEERING ASSOCIATES, INC.	
SURFACE ELEVATION:			PROPOSED MATERIAL STORAGE BUILDING
COMPLETION DATE: 12/18/23			1631 ARCADIAN AVENUE WAUKESHA, WISCONSIN
FIELD REP: DAVIS LUCKETT			PROJECT NO: 1G-2310021

MATERIAL DESCRIPTION	Depth (ft)	Elevation	Sample No. & Type	N	Q _u (tsf)	Q _p (tsf)	Q _s (tsf)	W (%)	PID	NOTES
Fill: Dark Brown Silty fine to medium Sand, little Gravel-Moist			1-SS	19						
			2-SS	32			9		(a)	
Fill: Brown Sandy Clay, little Gravel-Moist	5		3-SS	15		1.8		10		
			4-SS	15						Strong Petroleum Odor
Fill: Black Gravelly Sand (Includes crushed Asphalt, Wood debris, and Glass)-Moist	10		5-SS	29				69		Slight Petroleum Odor

Boring Terminated at about 11 feet

Water Observation Data		Remarks:
	Water Encountered During Drilling:	(a) Poor Sample Recovery
	Water Level At End of Drilling:	
	Cave Depth At End of Drilling:	
	Water Level After Drilling:	
	Cave Depth After Drilling:	

Changes in strata indicated by the lines are approximate boundary between soil types. The actual transition may be gradual and may vary considerably between test borings. Location of test boring is shown on the Boring Location Plan.

BORING NO. & LOCATION: 8	<h1>TEST BORING LOG</h1>	 GILES ENGINEERING ASSOCIATES, INC.	
SURFACE ELEVATION:			PROPOSED MATERIAL STORAGE BUILDING
COMPLETION DATE: 12/18/23			1631 ARCADIAN AVENUE WAUKESHA, WISCONSIN
FIELD REP: DAVIS LUCKETT			PROJECT NO: 1G-2310021

MATERIAL DESCRIPTION	Depth (ft)	Elevation	Sample No. & Type	N	Q _u (tsf)	Q _p (tsf)	Q _s (tsf)	W (%)	PID	NOTES
±6" Gravel			1-SS	19						
Fill: Dark Brown fine to medium Sand, little Gravel and Silt-Moist			2-SS	10						
Fill: Dark Brown Sandy Clay, little Gravel-Moist	5		3-SS	14	1.5	3.0		13		
Fill: Black fine to medium Sand, little Gravel and Clay (Includes Glass)-Moist			4-SS	11						
	10		5-SS	9						(a)
			6-SS	9						(a)
Fill: Gray lean Clay, trace Sandy Gravel, and Wood debris-Moist	15		7-SS	10	0.8	0.8		26		
Brown Silty fine Sand, little Gravel-Moist	20	▽	8-SS	13						
	25		9-SS	45						(a)

Boring Terminated at about 27 feet

Water Observation Data		Remarks:
▽	Water Encountered During Drilling: 19.5 ft.	(a) Poor Sample Recovery
▽	Water Level At End of Drilling:	
⋯	Cave Depth At End of Drilling:	
▽	Water Level After Drilling:	
■	Cave Depth After Drilling:	

Changes in strata indicated by the lines are approximate boundary between soil types. The actual transition may be gradual and may vary considerably between test borings. Location of test boring is shown on the Boring Location Plan.

GILES LOG REPORT: 1G2310021.GPJ GILES.GDT 12/28/23



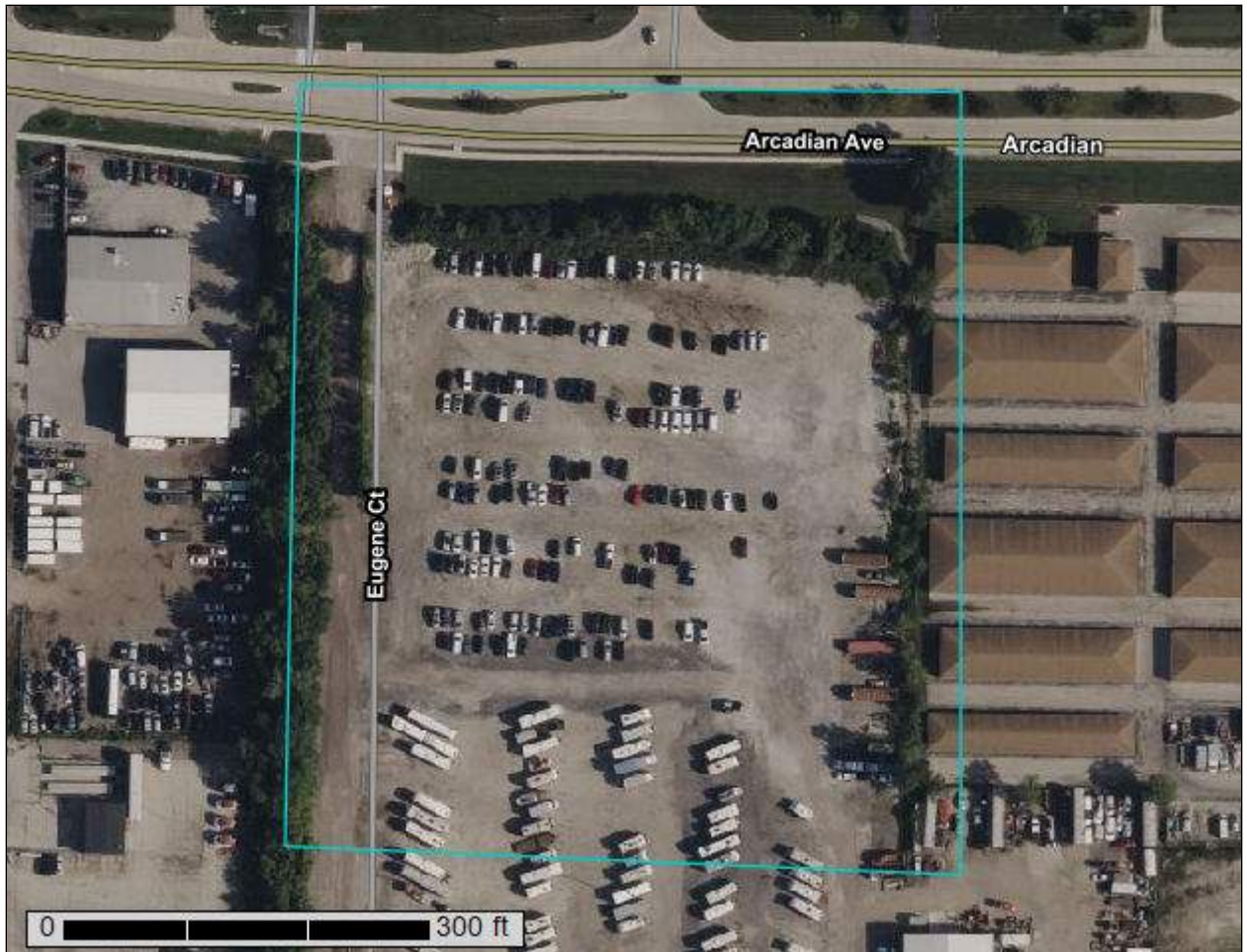
United States
Department of
Agriculture

NRCS

Natural
Resources
Conservation
Service

A product of the National
Cooperative Soil Survey,
a joint effort of the United
States Department of
Agriculture and other
Federal agencies, State
agencies including the
Agricultural Experiment
Stations, and local
participants

Custom Soil Resource Report for Milwaukee and Waukesha Counties, Wisconsin



Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (<http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/>) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (<https://offices.sc.egov.usda.gov/locator/app?agency=nrcs>) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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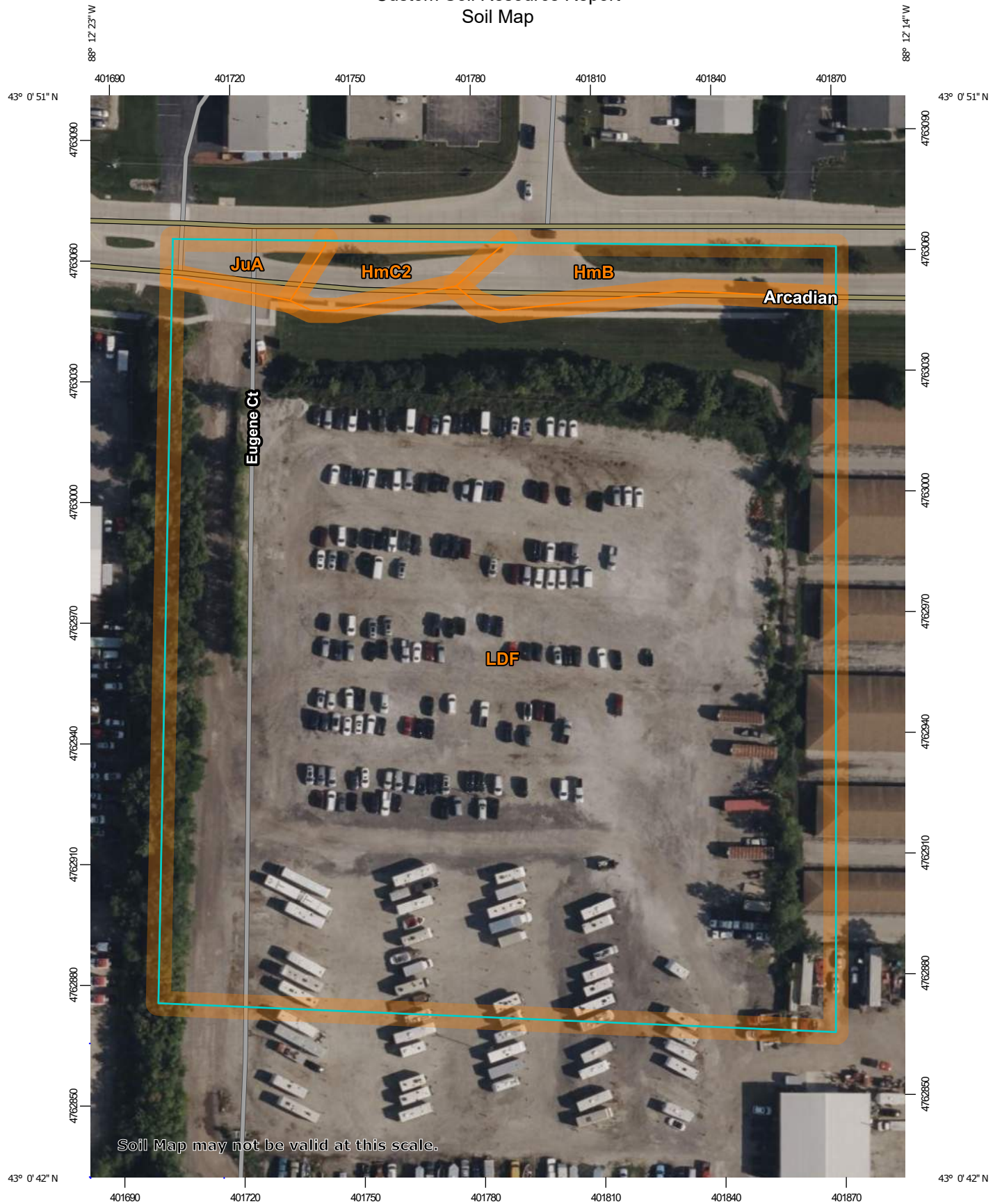
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Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report Soil Map



Soil Map may not be valid at this scale.

Map Scale: 1:1,310 if printed on A portrait (8.5" x 11") sheet.


0 15 30 60 90 Meters

0 50 100 200 300 Feet

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 16N WGS84


MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)




















Soils







 Soil Map Unit Polygons

 Soil Map Unit Lines


 Soil Map Unit Points

Special Point Features






-  Blowout
-  Borrow Pit
-  Clay Spot
-  Closed Depression
-  Gravel Pit
-  Gravelly Spot
-  Landfill
-  Lava Flow
-  Marsh or swamp
-  Mine or Quarry
-  Miscellaneous Water
-  Perennial Water
-  Rock Outcrop
-  Saline Spot
-  Sandy Spot
-  Severely Eroded Spot
-  Sinkhole
-  Slide or Slip
-  Sodic Spot

-  Spoil Area
-  Stony Spot
-  Very Stony Spot
-  Wet Spot
-  Other
-  Special Line Features


Water Features

 Streams and Canals

Transportation

-  Rails
-  Interstate Highways
-  US Routes
-  Major Roads
-  Local Roads

Background

 Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
 Web Soil Survey URL:
 Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Milwaukee and Waukesha Counties, Wisconsin
 Survey Area Data: Version 19, Sep 8, 2023

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Aug 4, 2022—Sep 13, 2022

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background

MAP LEGEND

MAP INFORMATION

imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
HmB	Hochheim loam, 2 to 6 percent slopes	0.3	3.7%
HmC2	Hochheim loam, 6 to 12 percent slopes, eroded	0.2	1.9%
JuA	Juneau silt loam, 1 to 3 percent slopes	0.1	1.3%
LDF	Landfill	7.4	93.0%
Totals for Area of Interest		8.0	100.0%

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate

Custom Soil Resource Report

pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Milwaukee and Waukesha Counties, Wisconsin

HmB—Hochheim loam, 2 to 6 percent slopes

Map Unit Setting

National map unit symbol: 2t03x
Elevation: 820 to 1,330 feet
Mean annual precipitation: 29 to 31 inches
Mean annual air temperature: 43 to 46 degrees F
Frost-free period: 135 to 155 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Hochheim and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hochheim

Setting

Landform: Drumlins
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Crest, side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Loamy till and/or calcareous, dense loamy till

Typical profile

Ap - 0 to 9 inches: loam
Bt - 9 to 17 inches: clay loam
C - 17 to 33 inches: gravelly loam
Cd - 33 to 79 inches: gravelly loam

Properties and qualities

Slope: 2 to 6 percent
Depth to restrictive feature: 20 to 40 inches to densic material
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 60 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 5.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: D
Ecological site: F095XB007WI - Loamy Upland with Carbonates
Forage suitability group: Mod AWC, adequately drained (G095BY005WI)
Other vegetative classification: Mod AWC, adequately drained (G095BY005WI)
Hydric soil rating: No

Minor Components

Theresa

Percent of map unit: 7 percent
Landform: Drumlins
Landform position (two-dimensional): Summit, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Concave
Across-slope shape: Linear
Ecological site: F095XB007WI - Loamy Upland with Carbonates
Hydric soil rating: No

Lamartine

Percent of map unit: 3 percent
Landform: Drumlins
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Linear
Ecological site: F095XB005WI - Moist Loamy or Clayey Lowland
Hydric soil rating: No

HmC2—Hochheim loam, 6 to 12 percent slopes, eroded

Map Unit Setting

National map unit symbol: 2t03r
Elevation: 900 to 1,340 feet
Mean annual precipitation: 31 to 33 inches
Mean annual air temperature: 43 to 46 degrees F
Frost-free period: 135 to 175 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Hochheim, eroded, and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hochheim, Eroded

Setting

Landform: Drumlins
Landform position (two-dimensional): Shoulder, summit
Landform position (three-dimensional): Crest, side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Loamy till and/or calcareous, dense loamy till

Typical profile

Ap - 0 to 7 inches: loam
Bt - 7 to 16 inches: clay loam

Custom Soil Resource Report

C - 16 to 33 inches: gravelly sandy loam

Cd - 33 to 79 inches: gravelly sandy loam

Properties and qualities

Slope: 6 to 12 percent

Depth to restrictive feature: 20 to 40 inches to densic material

Drainage class: Well drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Calcium carbonate, maximum content: 60 percent

Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)

Available water supply, 0 to 60 inches: Low (about 4.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 4e

Hydrologic Soil Group: D

Ecological site: F095XB007WI - Loamy Upland with Carbonates

Forage suitability group: Mod AWC, adequately drained (G095BY005WI)

Other vegetative classification: Mod AWC, adequately drained (G095BY005WI)

Hydric soil rating: No

Minor Components

Theresa

Percent of map unit: 5 percent

Landform: Drumlins

Landform position (two-dimensional): Summit

Landform position (three-dimensional): Crest

Down-slope shape: Convex

Across-slope shape: Convex

Ecological site: F095XB007WI - Loamy Upland with Carbonates

Hydric soil rating: No

Hochheim

Percent of map unit: 5 percent

Landform: Drumlins

Landform position (two-dimensional): Backslope, shoulder

Landform position (three-dimensional): Side slope, head slope

Down-slope shape: Convex

Across-slope shape: Linear

Ecological site: F095XB006WI - Shallow Upland

Hydric soil rating: No

JuA—Juneau silt loam, 1 to 3 percent slopes

Map Unit Setting

National map unit symbol: g94f

Custom Soil Resource Report

Elevation: 670 to 1,100 feet
Mean annual precipitation: 28 to 36 inches
Mean annual air temperature: 37 to 55 degrees F
Frost-free period: 135 to 170 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Juneau and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Juneau

Setting

Landform: Drainageways, drumlins
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Silty alluvium over loamy till

Typical profile

Ap - 0 to 7 inches: silt loam
A - 7 to 22 inches: silt loam
Ab,Bb,Btb1,B - 22 to 44 inches: silt loam
Btb3,C - 44 to 60 inches: clay loam

Properties and qualities

Slope: 1 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Occasional
Frequency of ponding: None
Calcium carbonate, maximum content: 20 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: High (about 11.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 1
Hydrologic Soil Group: B
Ecological site: F095XB010WI - Loamy and Clayey Upland
Forage suitability group: High AWC, adequately drained (G095BY008WI)
Other vegetative classification: High AWC, adequately drained (G095BY008WI)
Hydric soil rating: No

LDF—Landfill

Map Unit Setting

National map unit symbol: sjkz

Custom Soil Resource Report

Elevation: 660 to 980 feet

Mean annual precipitation: 30 to 38 inches

Mean annual air temperature: 43 to 48 degrees F

Frost-free period: 150 to 190 days

Farmland classification: Not prime farmland

Map Unit Composition

Urban land, landfill: 100 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Urban Land, Landfill

Setting

Parent material: Human transported material

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 8s

Hydric soil rating: Unranked

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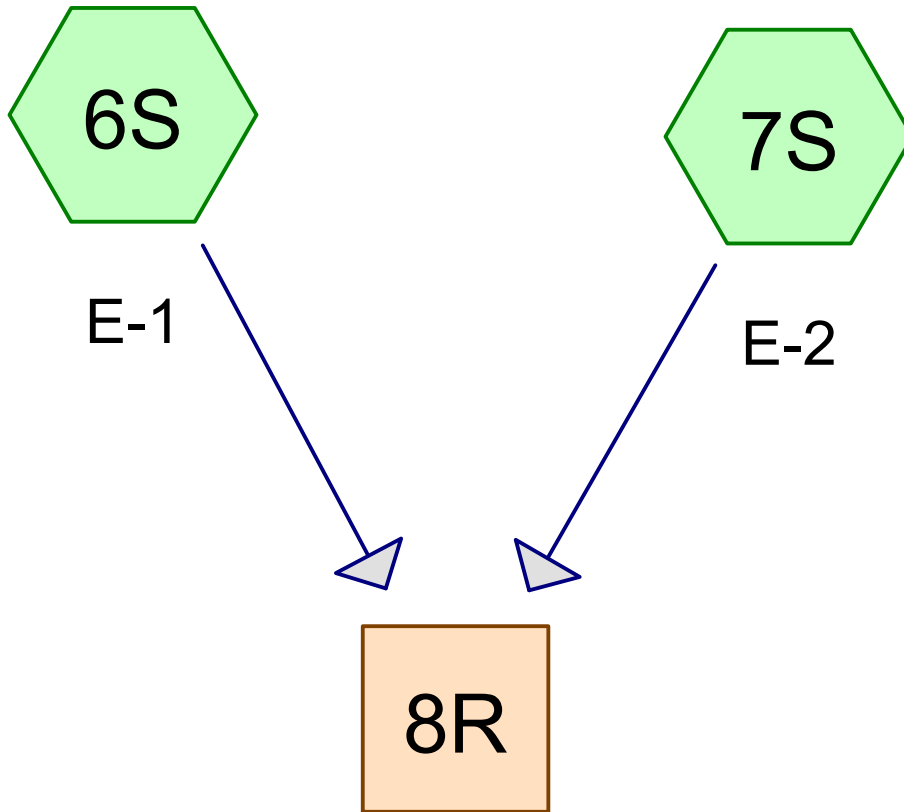
Custom Soil Resource Report

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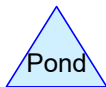
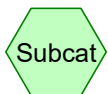
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Appendix C – Storm Water Quantity Calculations



Exiting Conditions



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Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	1-yr	MSE 24-hr	3	Default	24.00	1	2.40	2
2	2-yr	MSE 24-hr	3	Default	24.00	1	2.70	2
3	10-yr	MSE 24-hr	3	Default	24.00	1	3.81	2
4	50-yr	MSE 24-hr	3	Default	24.00	1	5.38	2
5	100-yr	MSE 24-hr	3	Default	24.00	1	6.18	2

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Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.367	80	>75% Grass cover, Good, HSG D (7S)
3.186	91	Gravel (6S, 7S)
3.553	90	TOTAL AREA

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Soil Listing (selected nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
0.000	HSG C	
0.367	HSG D	7S
3.186	Other	6S, 7S
3.553		TOTAL AREA

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Existing Conditions

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Ground Covers (selected nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	0.000	0.367	0.000	0.367	>75% Grass cover, Good	7S
0.000	0.000	0.000	0.000	3.186	3.186	Gravel	6S, 7S
0.000	0.000	0.000	0.367	3.186	3.553	TOTAL AREA	

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Existing Conditions
MSE 24-hr 3 1-yr Rainfall=2.40"

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Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment6S: E-1

Runoff Area=25,779 sf 0.00% Impervious Runoff Depth=1.52"
Tc=6.0 min CN=91 Runoff=1.58 cfs 0.075 af

Subcatchment7S: E-2

Runoff Area=128,976 sf 0.00% Impervious Runoff Depth=1.44"
Flow Length=585' Tc=6.3 min CN=90 Runoff=7.49 cfs 0.356 af

Reach 8R: Exiting Conditions

Inflow=9.07 cfs 0.431 af
Outflow=9.07 cfs 0.431 af

Total Runoff Area = 3.553 ac Runoff Volume = 0.431 af Average Runoff Depth = 1.45"
100.00% Pervious = 3.553 ac 0.00% Impervious = 0.000 ac

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Existing Conditions
MSE 24-hr 3 1-yr Rainfall=2.40"

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Summary for Subcatchment 6S: E-1

Runoff = 1.58 cfs @ 12.13 hrs, Volume= 0.075 af, Depth= 1.52"
Routed to Reach 8R : Exiting Conditions

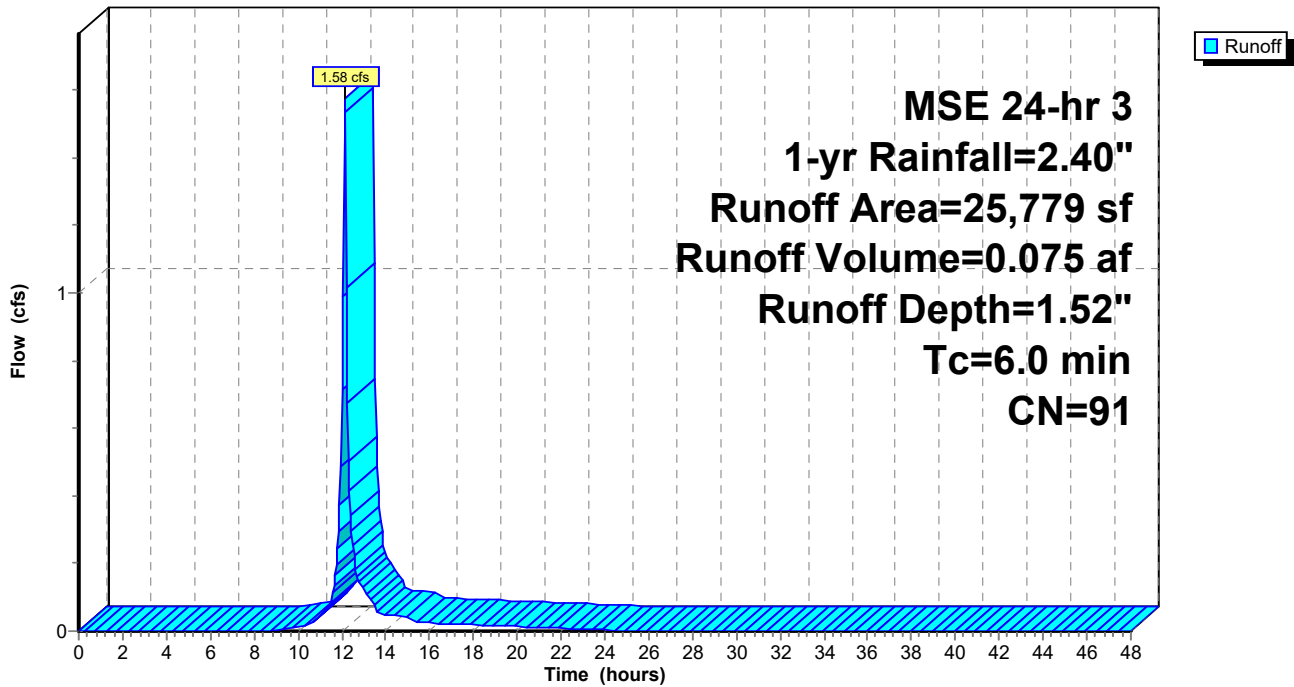
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 1-yr Rainfall=2.40"

	Area (sf)	CN	Description
*	25,779	91	Gravel
	25,779		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 6S: E-1

Hydrograph



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Existing Conditions
MSE 24-hr 3 1-yr Rainfall=2.40"

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Summary for Subcatchment 7S: E-2

Runoff = 7.49 cfs @ 12.14 hrs, Volume= 0.356 af, Depth= 1.44"
Routed to Reach 8R : Exiting Conditions

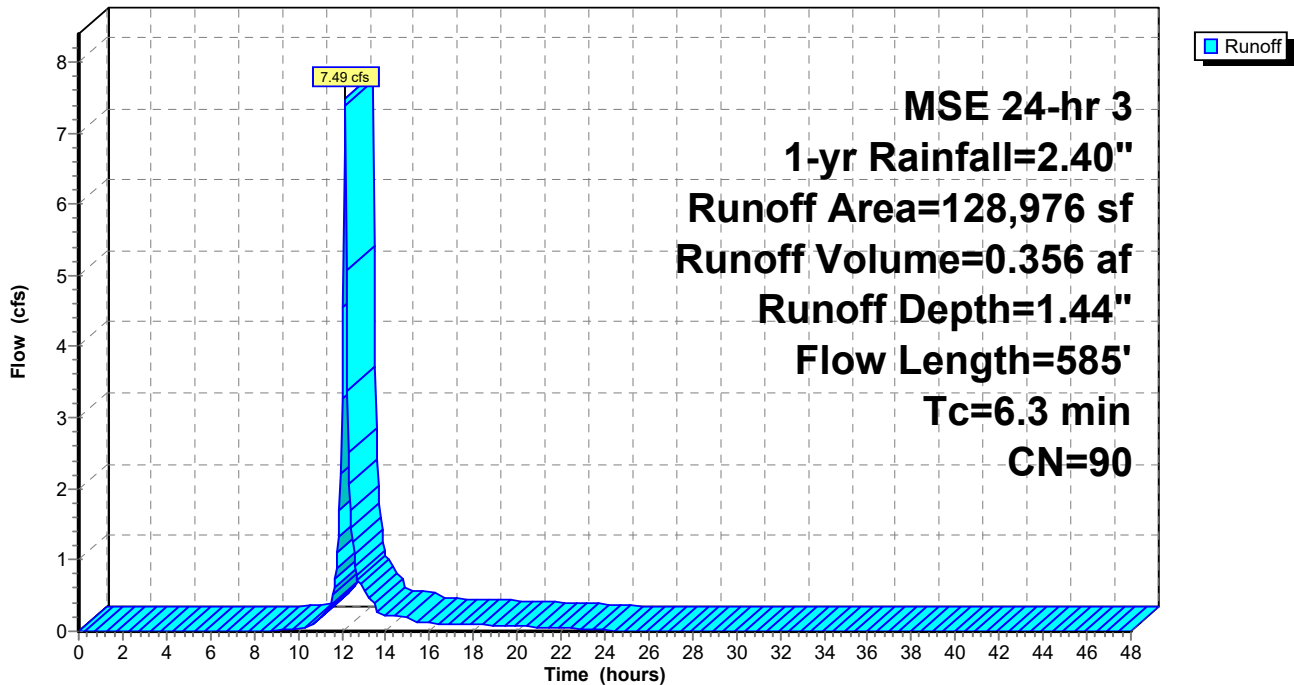
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 1-yr Rainfall=2.40"

	Area (sf)	CN	Description
*	113,003	91	Gravel
	15,973	80	>75% Grass cover, Good, HSG D
	128,976	90	Weighted Average
	128,976		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.4	100	0.0198	0.70		Sheet Flow, Surface -Gravel n= 0.023 P2= 2.70"
3.9	485	0.0168	2.09		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
6.3	585	Total			

Subcatchment 7S: E-2

Hydrograph



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Existing Conditions
MSE 24-hr 3 1-yr Rainfall=2.40"

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Summary for Reach 8R: Exiting Conditions

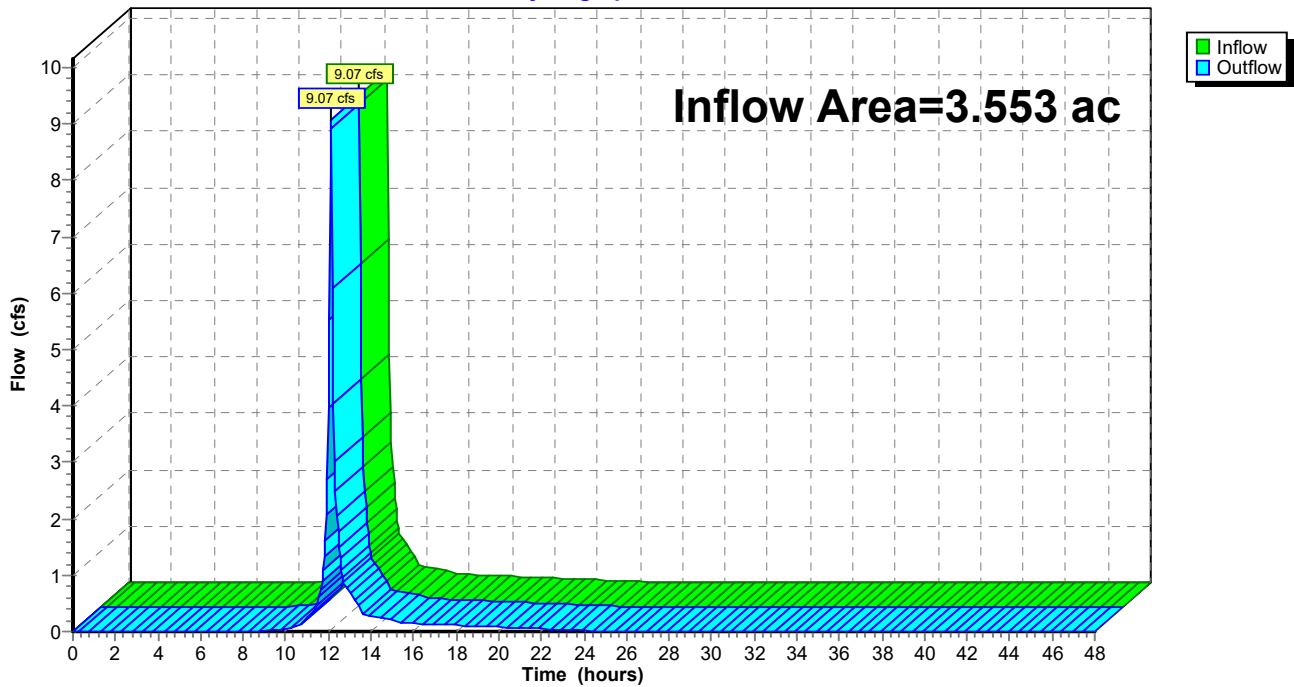
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 3.553 ac, 0.00% Impervious, Inflow Depth = 1.45" for 1-yr event
Inflow = 9.07 cfs @ 12.13 hrs, Volume= 0.431 af
Outflow = 9.07 cfs @ 12.13 hrs, Volume= 0.431 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Reach 8R: Exiting Conditions

Hydrograph



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Existing Conditions
MSE 24-hr 3 2-yr Rainfall=2.70"

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Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment6S: E-1

Runoff Area=25,779 sf 0.00% Impervious Runoff Depth=1.79"
Tc=6.0 min CN=91 Runoff=1.85 cfs 0.088 af

Subcatchment7S: E-2

Runoff Area=128,976 sf 0.00% Impervious Runoff Depth=1.71"
Flow Length=585' Tc=6.3 min CN=90 Runoff=8.83 cfs 0.422 af

Reach 8R: Exiting Conditions

Inflow=10.67 cfs 0.511 af
Outflow=10.67 cfs 0.511 af

Total Runoff Area = 3.553 ac Runoff Volume = 0.511 af Average Runoff Depth = 1.72"
100.00% Pervious = 3.553 ac 0.00% Impervious = 0.000 ac

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Existing Conditions
MSE 24-hr 3 2-yr Rainfall=2.70"
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Summary for Subcatchment 6S: E-1

Runoff = 1.85 cfs @ 12.13 hrs, Volume= 0.088 af, Depth= 1.79"
Routed to Reach 8R : Exiting Conditions

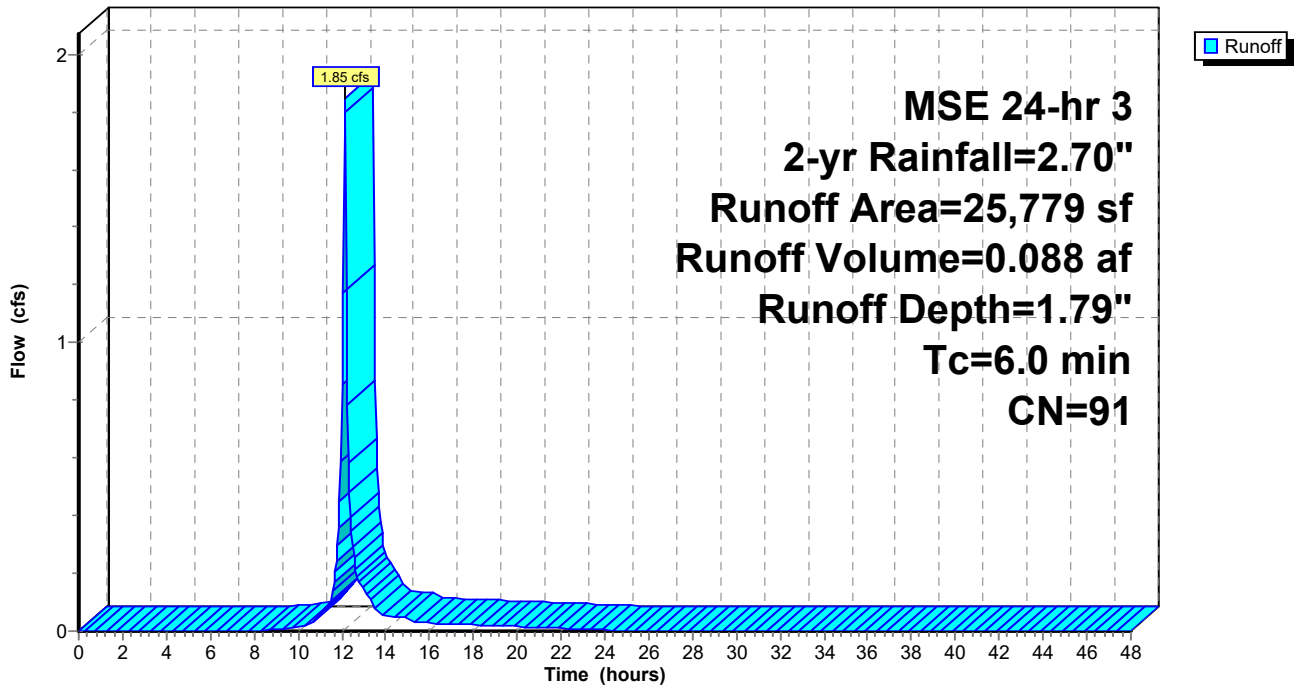
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 2-yr Rainfall=2.70"

Area (sf)	CN	Description
* 25,779	91	Gravel
25,779		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 6S: E-1

Hydrograph



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Existing Conditions
 MSE 24-hr 3 2-yr Rainfall=2.70"
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Summary for Subcatchment 7S: E-2

Runoff = 8.83 cfs @ 12.13 hrs, Volume= 0.422 af, Depth= 1.71"
 Routed to Reach 8R : Exiting Conditions

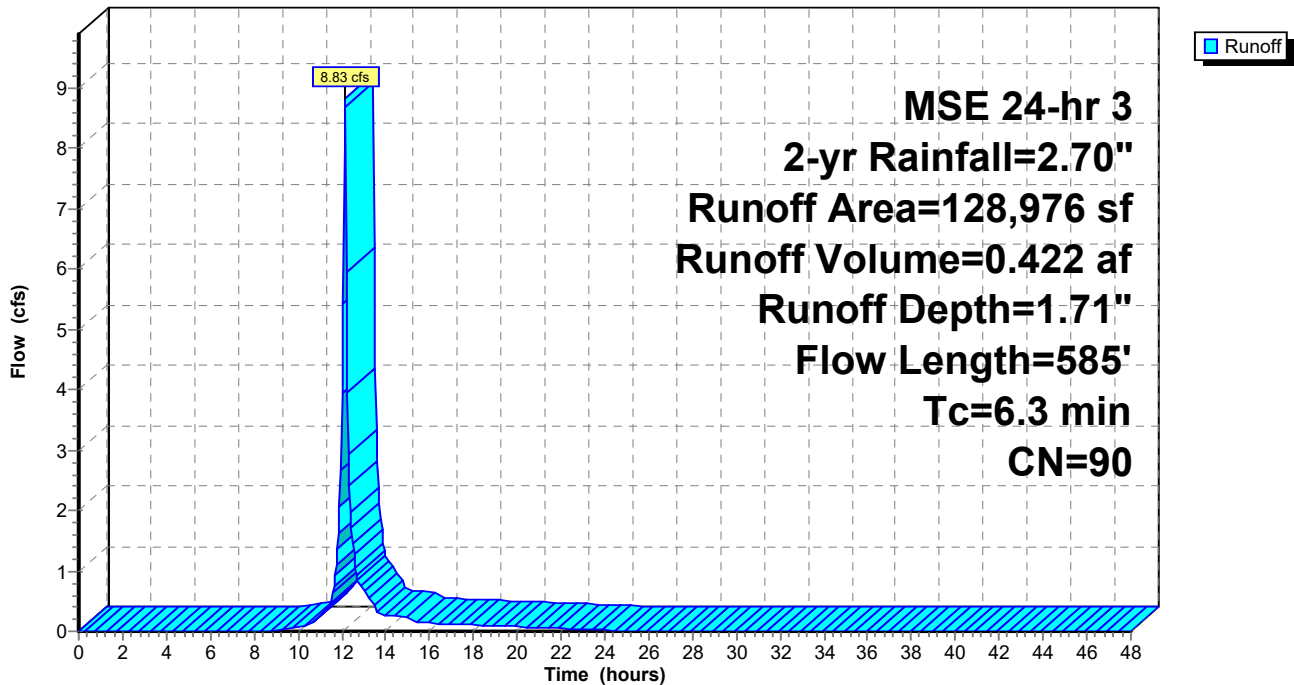
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
 MSE 24-hr 3 2-yr Rainfall=2.70"

	Area (sf)	CN	Description
*	113,003	91	Gravel
	15,973	80	>75% Grass cover, Good, HSG D
	128,976	90	Weighted Average
	128,976		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.4	100	0.0198	0.70		Sheet Flow, Surface -Gravel n= 0.023 P2= 2.70"
3.9	485	0.0168	2.09		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
6.3	585	Total			

Subcatchment 7S: E-2

Hydrograph



Summary for Reach 8R: Exiting Conditions

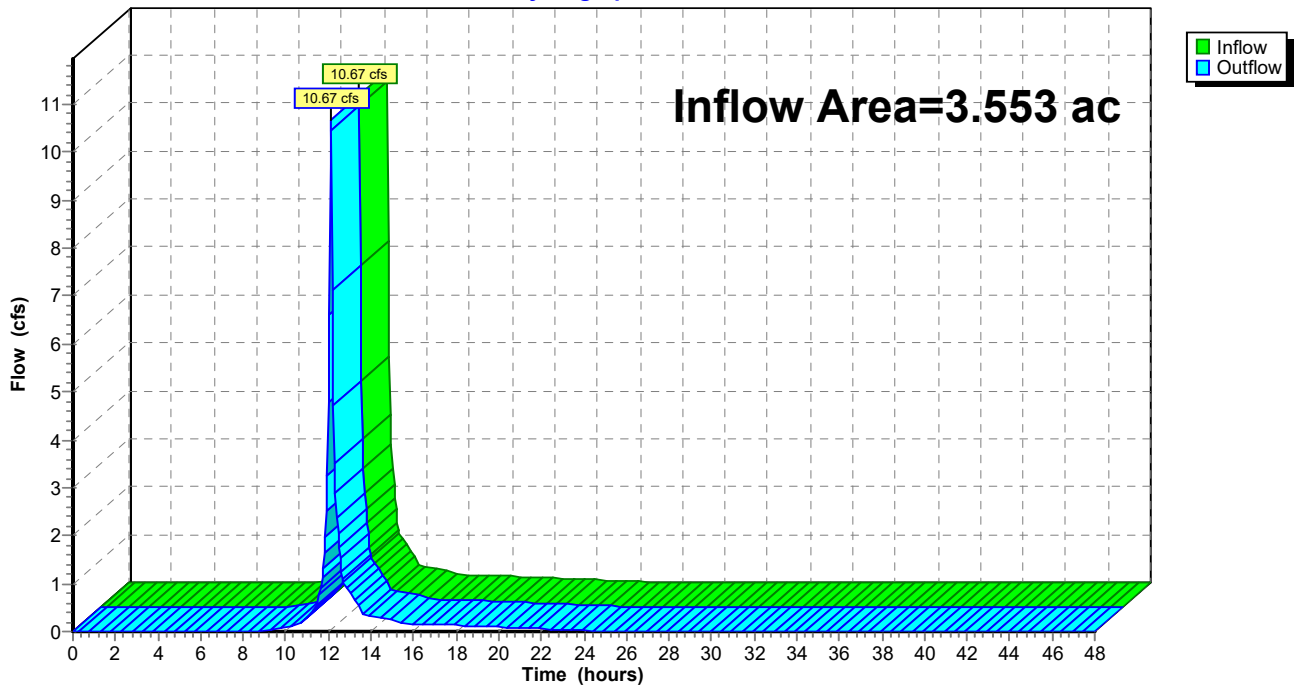
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 3.553 ac, 0.00% Impervious, Inflow Depth = 1.72" for 2-yr event
Inflow = 10.67 cfs @ 12.13 hrs, Volume= 0.511 af
Outflow = 10.67 cfs @ 12.13 hrs, Volume= 0.511 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Reach 8R: Exiting Conditions

Hydrograph



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Existing Conditions
MSE 24-hr 3 10-yr Rainfall=3.81"

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Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment6S: E-1

Runoff Area=25,779 sf 0.00% Impervious Runoff Depth=2.84"
Tc=6.0 min CN=91 Runoff=2.85 cfs 0.140 af

Subcatchment7S: E-2

Runoff Area=128,976 sf 0.00% Impervious Runoff Depth=2.74"
Flow Length=585' Tc=6.3 min CN=90 Runoff=13.79 cfs 0.676 af

Reach 8R: Exiting Conditions

Inflow=16.64 cfs 0.816 af
Outflow=16.64 cfs 0.816 af

Total Runoff Area = 3.553 ac Runoff Volume = 0.816 af Average Runoff Depth = 2.76"
100.00% Pervious = 3.553 ac 0.00% Impervious = 0.000 ac

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Existing Conditions
MSE 24-hr 3 10-yr Rainfall=3.81"

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Summary for Subcatchment 6S: E-1

Runoff = 2.85 cfs @ 12.13 hrs, Volume= 0.140 af, Depth= 2.84"
Routed to Reach 8R : Exiting Conditions

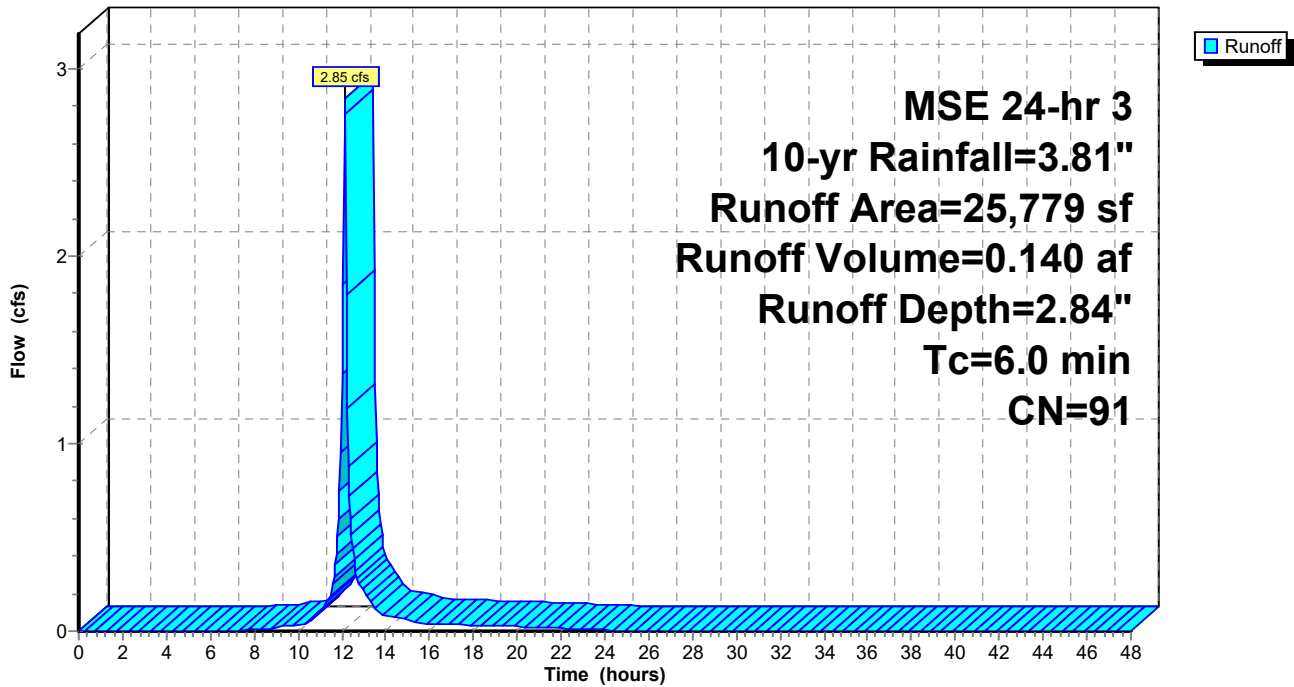
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 10-yr Rainfall=3.81"

Area (sf)	CN	Description
* 25,779	91	Gravel
25,779		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 6S: E-1

Hydrograph



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Existing Conditions
MSE 24-hr 3 10-yr Rainfall=3.81"

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Summary for Subcatchment 7S: E-2

Runoff = 13.79 cfs @ 12.13 hrs, Volume= 0.676 af, Depth= 2.74"
Routed to Reach 8R : Exiting Conditions

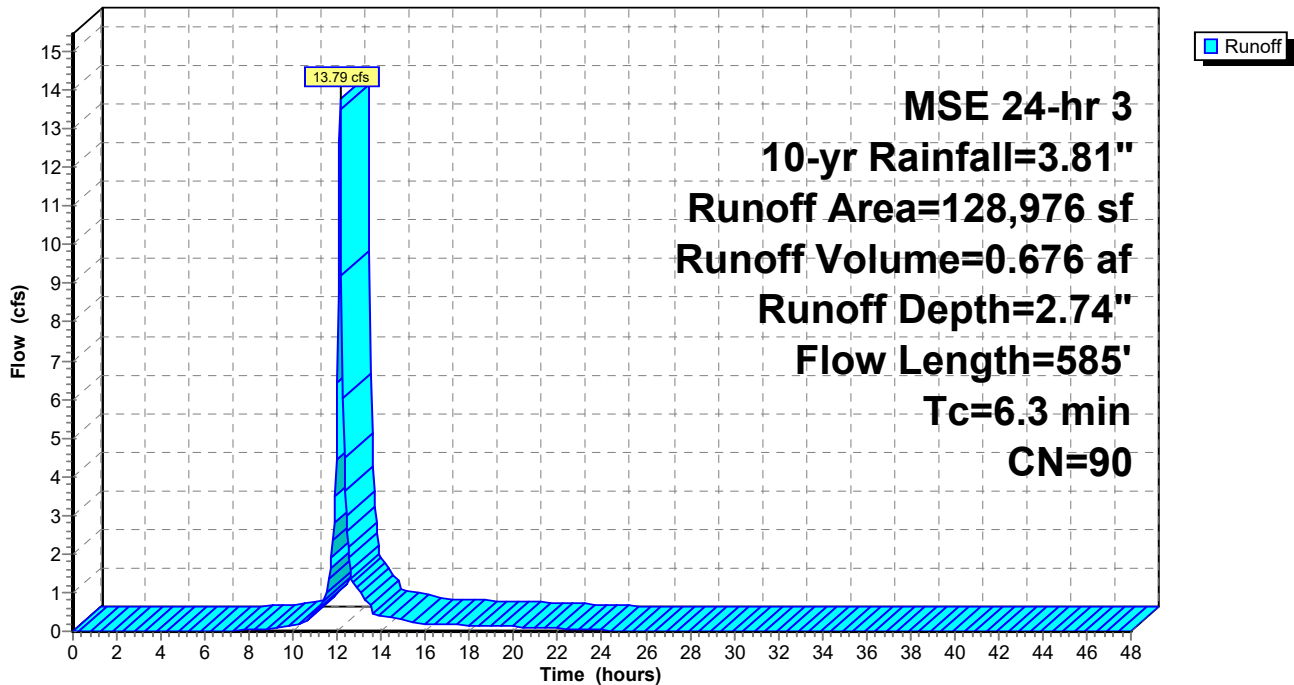
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 10-yr Rainfall=3.81"

	Area (sf)	CN	Description
*	113,003	91	Gravel
	15,973	80	>75% Grass cover, Good, HSG D
	128,976	90	Weighted Average
	128,976		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.4	100	0.0198	0.70		Sheet Flow, Surface -Gravel n= 0.023 P2= 2.70"
3.9	485	0.0168	2.09		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
6.3	585	Total			

Subcatchment 7S: E-2

Hydrograph



Summary for Reach 8R: Exiting Conditions

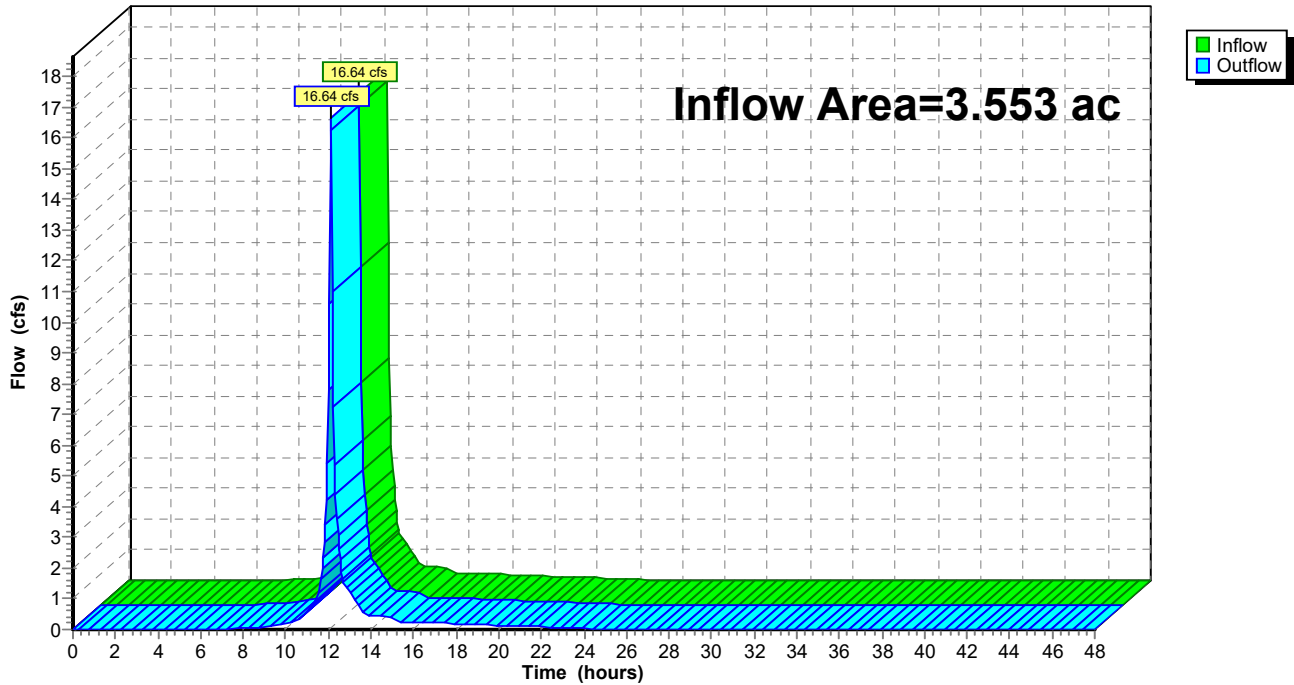
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 3.553 ac, 0.00% Impervious, Inflow Depth = 2.76" for 10-yr event
Inflow = 16.64 cfs @ 12.13 hrs, Volume= 0.816 af
Outflow = 16.64 cfs @ 12.13 hrs, Volume= 0.816 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Reach 8R: Exiting Conditions

Hydrograph



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Existing Conditions
MSE 24-hr 3 50-yr Rainfall=5.38"

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Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment6S: E-1

Runoff Area=25,779 sf 0.00% Impervious Runoff Depth=4.35"
Tc=6.0 min CN=91 Runoff=4.25 cfs 0.215 af

Subcatchment7S: E-2

Runoff Area=128,976 sf 0.00% Impervious Runoff Depth=4.24"
Flow Length=585' Tc=6.3 min CN=90 Runoff=20.80 cfs 1.047 af

Reach 8R: Exiting Conditions

Inflow=25.04 cfs 1.262 af
Outflow=25.04 cfs 1.262 af

Total Runoff Area = 3.553 ac Runoff Volume = 1.262 af Average Runoff Depth = 4.26"
100.00% Pervious = 3.553 ac 0.00% Impervious = 0.000 ac

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Existing Conditions
MSE 24-hr 3 50-yr Rainfall=5.38"

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Summary for Subcatchment 6S: E-1

Runoff = 4.25 cfs @ 12.13 hrs, Volume= 0.215 af, Depth= 4.35"
Routed to Reach 8R : Exiting Conditions

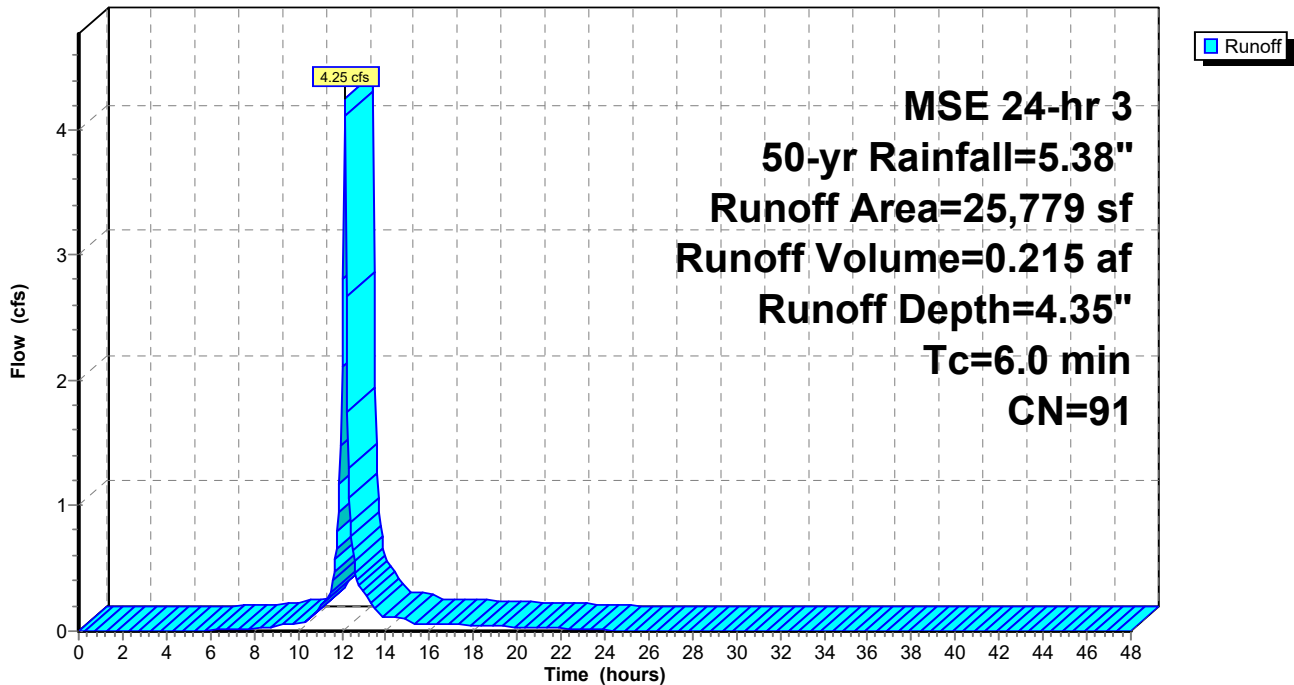
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 50-yr Rainfall=5.38"

Area (sf)	CN	Description
* 25,779	91	Gravel
25,779		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 6S: E-1

Hydrograph



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Existing Conditions
MSE 24-hr 3 50-yr Rainfall=5.38"

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Summary for Subcatchment 7S: E-2

Runoff = 20.80 cfs @ 12.13 hrs, Volume= 1.047 af, Depth= 4.24"
Routed to Reach 8R : Exiting Conditions

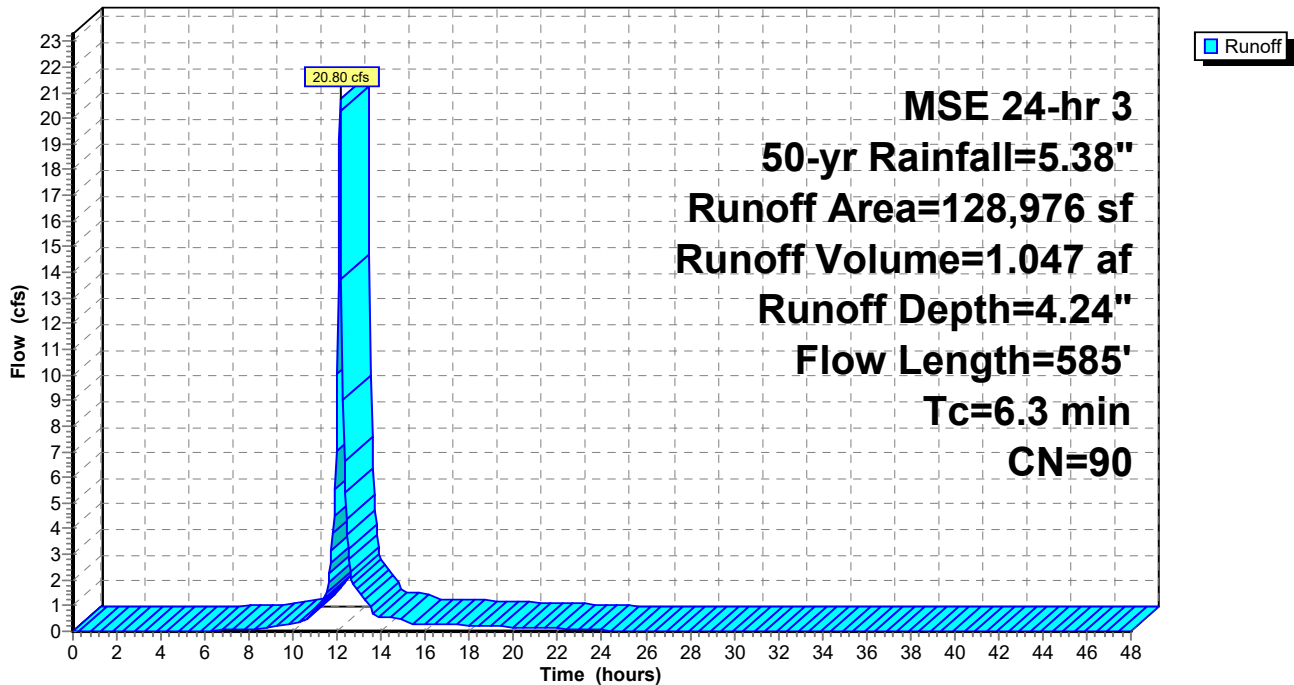
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 50-yr Rainfall=5.38"

	Area (sf)	CN	Description
*	113,003	91	Gravel
	15,973	80	>75% Grass cover, Good, HSG D
	128,976	90	Weighted Average
	128,976		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.4	100	0.0198	0.70		Sheet Flow, Surface -Gravel n= 0.023 P2= 2.70"
3.9	485	0.0168	2.09		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
6.3	585	Total			

Subcatchment 7S: E-2

Hydrograph



Summary for Reach 8R: Exiting Conditions

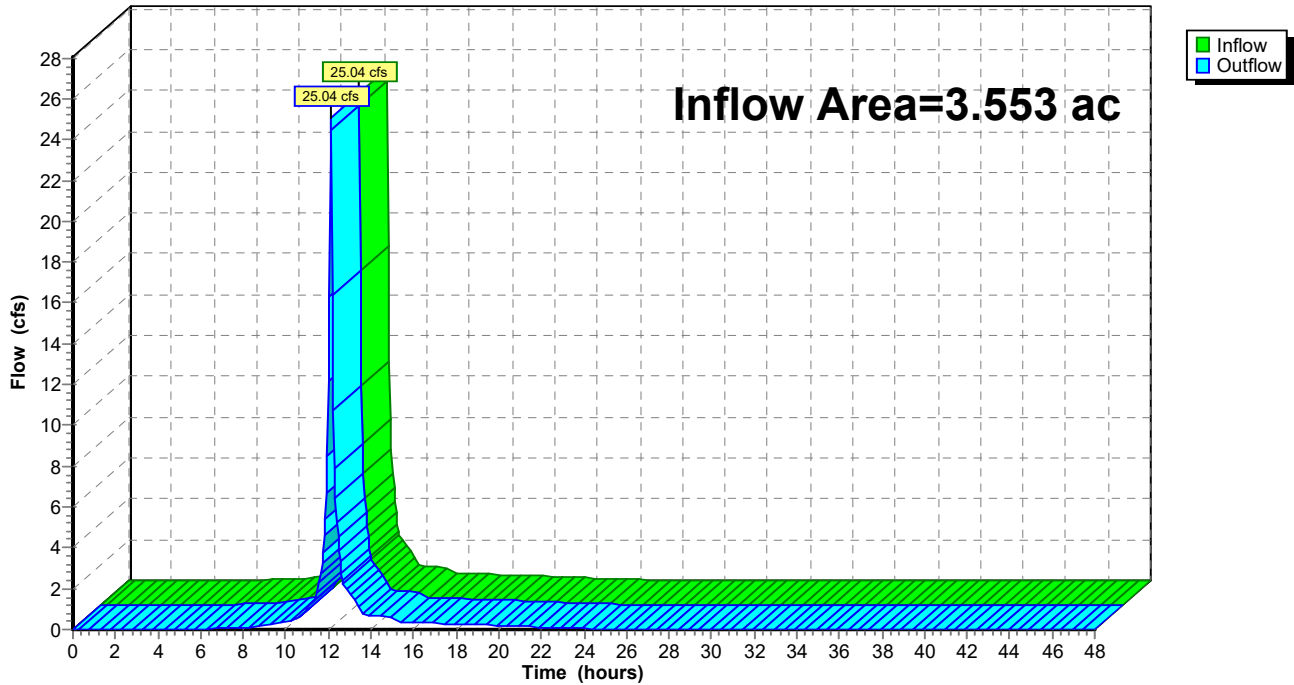
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 3.553 ac, 0.00% Impervious, Inflow Depth = 4.26" for 50-yr event
Inflow = 25.04 cfs @ 12.13 hrs, Volume= 1.262 af
Outflow = 25.04 cfs @ 12.13 hrs, Volume= 1.262 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Reach 8R: Exiting Conditions

Hydrograph



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Existing Conditions

MSE 24-hr 3 100-yr Rainfall=6.18"

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Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment6S: E-1

Runoff Area=25,779 sf 0.00% Impervious Runoff Depth=5.13"
Tc=6.0 min CN=91 Runoff=4.96 cfs 0.253 af

Subcatchment7S: E-2

Runoff Area=128,976 sf 0.00% Impervious Runoff Depth=5.02"
Flow Length=585' Tc=6.3 min CN=90 Runoff=24.34 cfs 1.239 af

Reach 8R: Exiting Conditions

Inflow=29.29 cfs 1.492 af
Outflow=29.29 cfs 1.492 af

Total Runoff Area = 3.553 ac Runoff Volume = 1.492 af Average Runoff Depth = 5.04"
100.00% Pervious = 3.553 ac 0.00% Impervious = 0.000 ac

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Existing Conditions
MSE 24-hr 3 100-yr Rainfall=6.18"

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Summary for Subcatchment 6S: E-1

Runoff = 4.96 cfs @ 12.13 hrs, Volume= 0.253 af, Depth= 5.13"
Routed to Reach 8R : Exiting Conditions

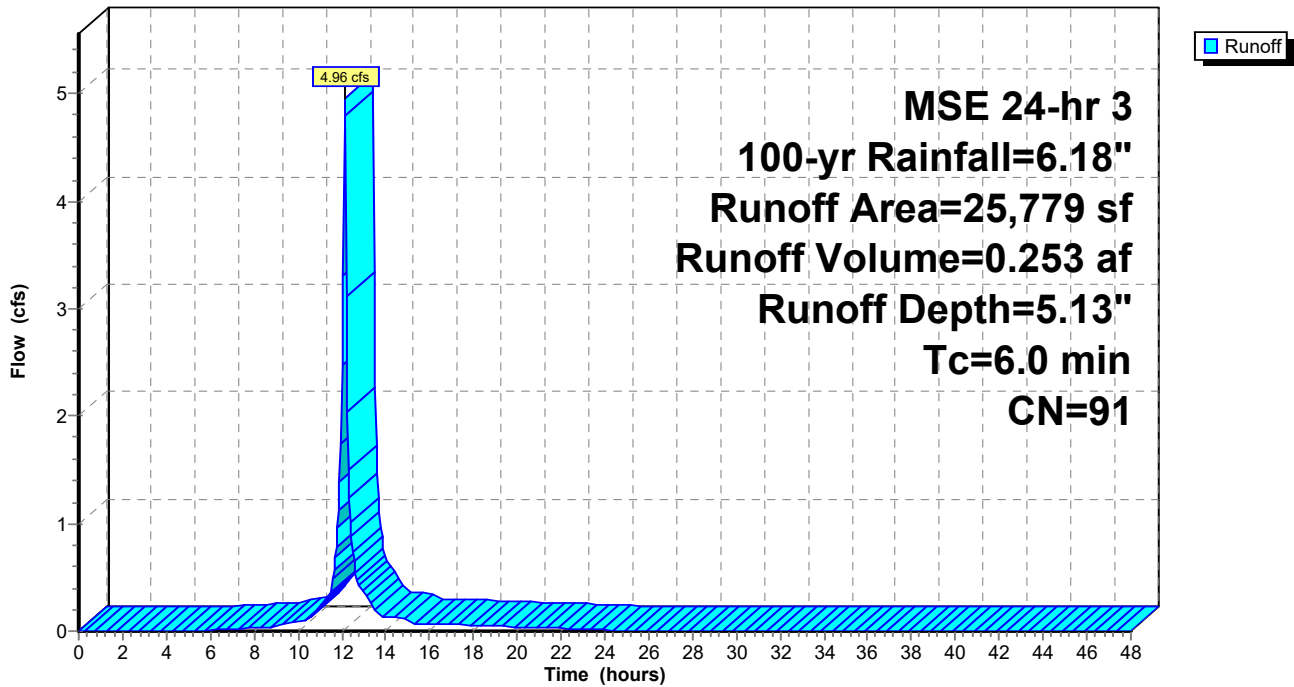
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-yr Rainfall=6.18"

Area (sf)	CN	Description
* 25,779	91	Gravel
25,779		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 6S: E-1

Hydrograph



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Existing Conditions
MSE 24-hr 3 100-yr Rainfall=6.18"

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Summary for Subcatchment 7S: E-2

Runoff = 24.34 cfs @ 12.13 hrs, Volume= 1.239 af, Depth= 5.02"
Routed to Reach 8R : Exiting Conditions

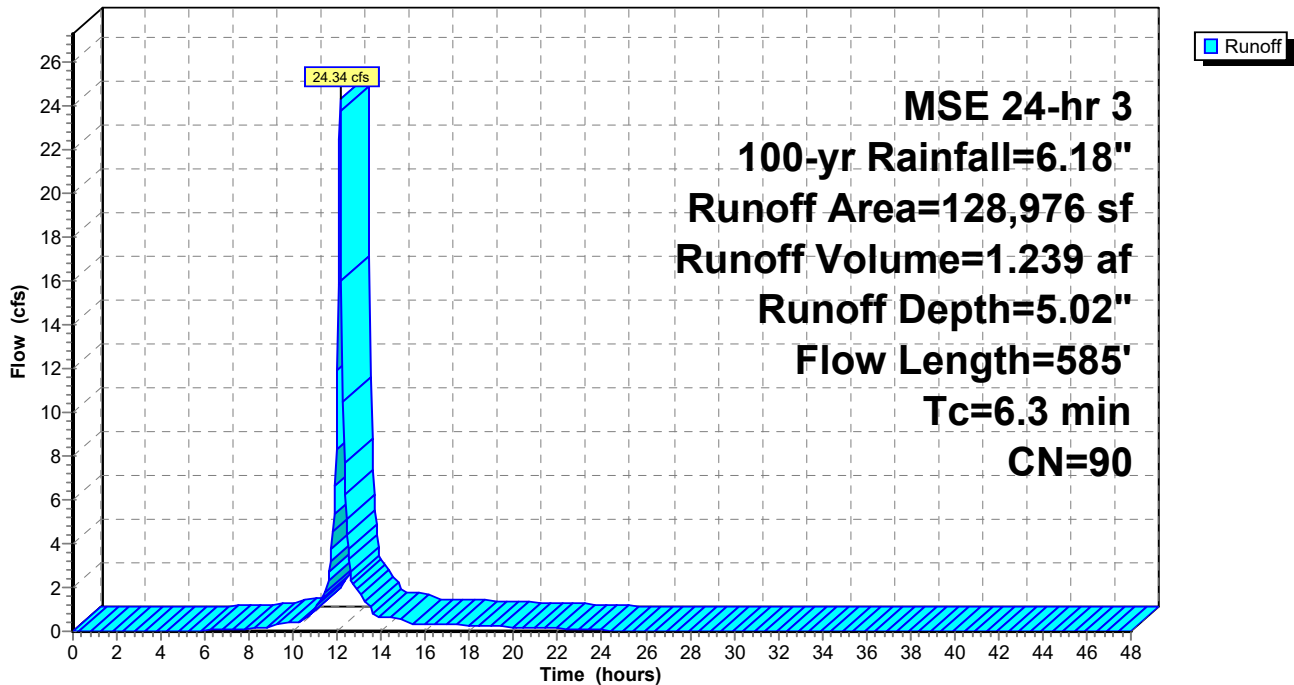
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-yr Rainfall=6.18"

	Area (sf)	CN	Description
*	113,003	91	Gravel
	15,973	80	>75% Grass cover, Good, HSG D
	128,976	90	Weighted Average
	128,976		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.4	100	0.0198	0.70		Sheet Flow, Surface -Gravel n= 0.023 P2= 2.70"
3.9	485	0.0168	2.09		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
6.3	585	Total			

Subcatchment 7S: E-2

Hydrograph



Summary for Reach 8R: Exiting Conditions

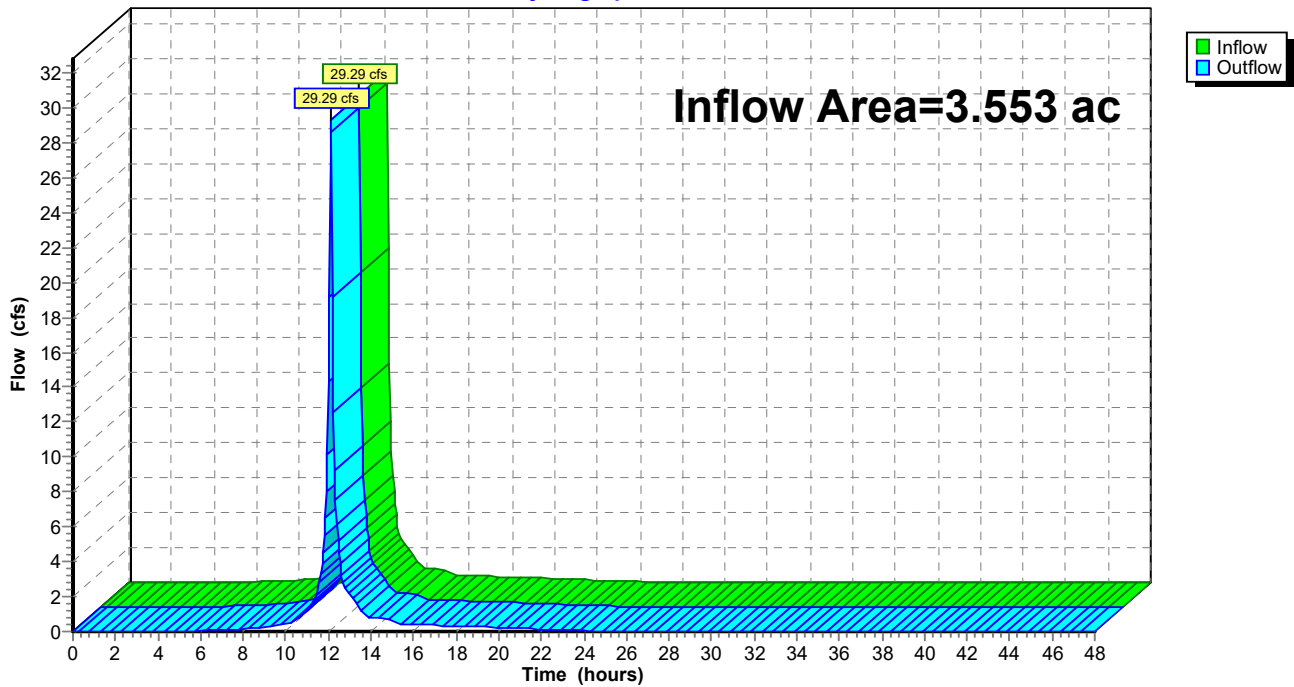
[40] Hint: Not Described (Outflow=Inflow)

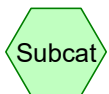
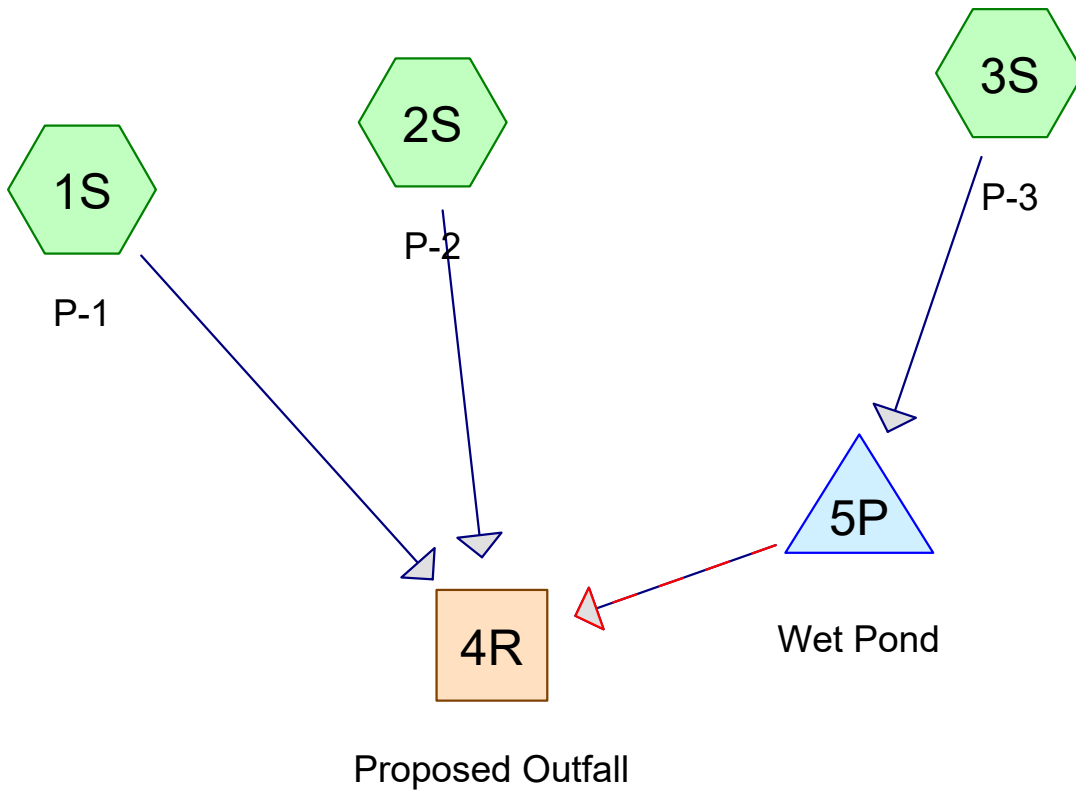
Inflow Area = 3.553 ac, 0.00% Impervious, Inflow Depth = 5.04" for 100-yr event
Inflow = 29.29 cfs @ 12.13 hrs, Volume= 1.492 af
Outflow = 29.29 cfs @ 12.13 hrs, Volume= 1.492 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Reach 8R: Exiting Conditions

Hydrograph

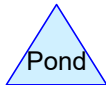




Subcat



Reach



Pond



Link

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Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	1-yr	MSE 24-hr	3	Default	24.00	1	2.40	2
2	2-yr	MSE 24-hr	3	Default	24.00	1	2.70	2
3	10-yr	MSE 24-hr	3	Default	24.00	1	3.81	2
4	50-yr	MSE 24-hr	3	Default	24.00	1	5.38	2
5	100-yr	MSE 24-hr	3	Default	24.00	1	6.18	2

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Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.480	80	>75% Grass cover, Good, HSG D (2S, 3S)
1.434	91	Gravel D (1S, 2S, 3S)
1.533	98	Paved parking, HSG D (1S, 2S, 3S)
0.106	98	Water Surface, HSG D (3S)
3.553	93	TOTAL AREA

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Soil Listing (selected nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
0.000	HSG C	
2.119	HSG D	1S, 2S, 3S
1.434	Other	1S, 2S, 3S
3.553		TOTAL AREA

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Ground Covers (selected nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	0.000	0.480	0.000	0.480	>75% Grass cover, Good	2S, 3S
0.000	0.000	0.000	0.000	1.434	1.434	Gravel D	1S, 2S, 3S
0.000	0.000	0.000	1.533	0.000	1.533	Paved parking	1S, 2S, 3S
0.000	0.000	0.000	0.106	0.000	0.106	Water Surface	3S
0.000	0.000	0.000	2.119	1.434	3.553	TOTAL AREA	

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Pipe Listing (selected nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Width (inches)	Diam/Height (inches)	Inside-Fill (inches)
1	5P	856.50	856.00	32.7	0.0153	0.015	0.0	18.0	0.0

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MSE 24-hr 3 1-yr Rainfall=2.40"

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Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: P-1 Runoff Area=26,258 sf 59.41% Impervious Runoff Depth=1.87"
Tc=6.0 min CN=95 Runoff=1.88 cfs 0.094 af

Subcatchment2S: P-2 Runoff Area=43,753 sf 37.57% Impervious Runoff Depth=1.52"
Tc=6.0 min CN=91 Runoff=2.68 cfs 0.127 af

Subcatchment3S: P-3 Runoff Area=84,744 sf 46.42% Impervious Runoff Depth=1.69"
Tc=6.0 min CN=93 Runoff=5.65 cfs 0.273 af

Reach 4R: Proposed Outfall Inflow=4.71 cfs 0.490 af
Outflow=4.71 cfs 0.490 af

Pond 5P: Wet Pond Peak Elev=858.00' Storage=8,159 cf Inflow=5.65 cfs 0.273 af
Primary=0.20 cfs 0.269 af Secondary=0.00 cfs 0.000 af Outflow=0.20 cfs 0.269 af

Total Runoff Area = 3.553 ac Runoff Volume = 0.494 af Average Runoff Depth = 1.67"
53.88% Pervious = 1.914 ac 46.12% Impervious = 1.638 ac

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Proposed Condition
MSE 24-hr 3 1-yr Rainfall=2.40"

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Summary for Subcatchment 1S: P-1

Runoff = 1.88 cfs @ 12.13 hrs, Volume= 0.094 af, Depth= 1.87"
Routed to Reach 4R : Proposed Outfall

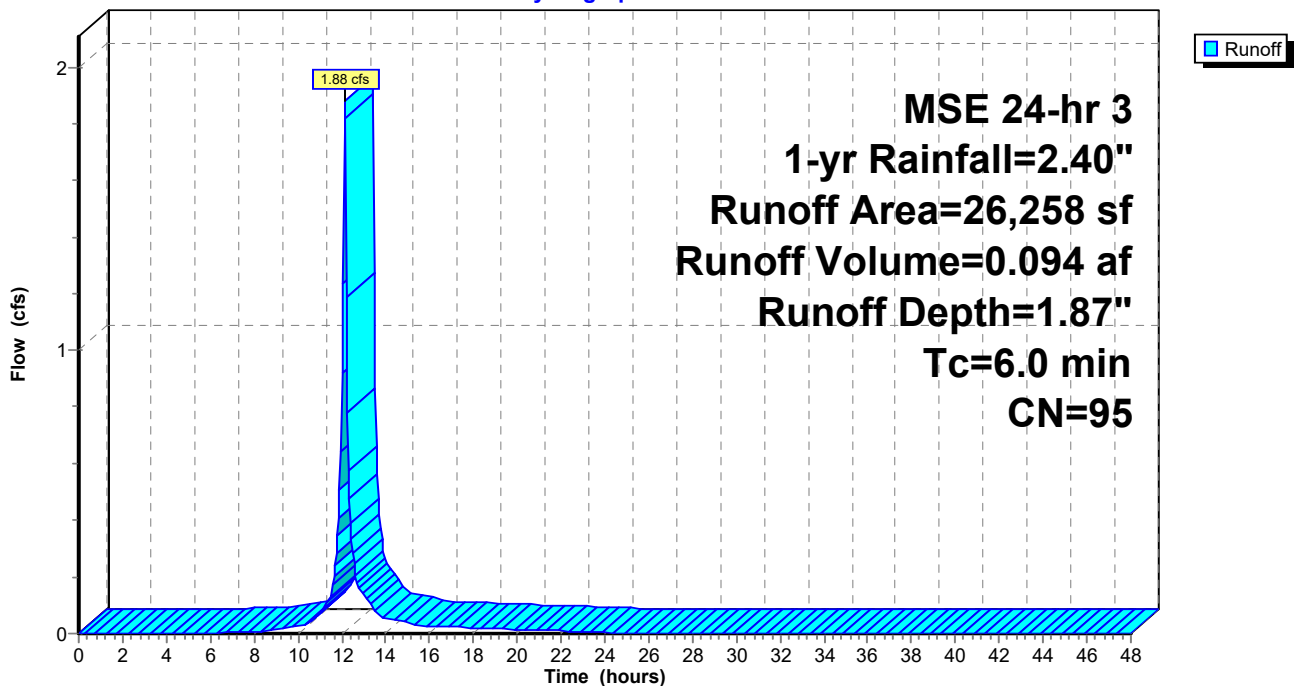
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 1-yr Rainfall=2.40"

Area (sf)	CN	Description
15,600	98	Paved parking, HSG D
* 10,658	91	Gravel D
26,258	95	Weighted Average
10,658		40.59% Pervious Area
15,600		59.41% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 1S: P-1

Hydrograph



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MSE 24-hr 3 1-yr Rainfall=2.40"

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Summary for Subcatchment 2S: P-2

Runoff = 2.68 cfs @ 12.13 hrs, Volume= 0.127 af, Depth= 1.52"
Routed to Reach 4R : Proposed Outfall

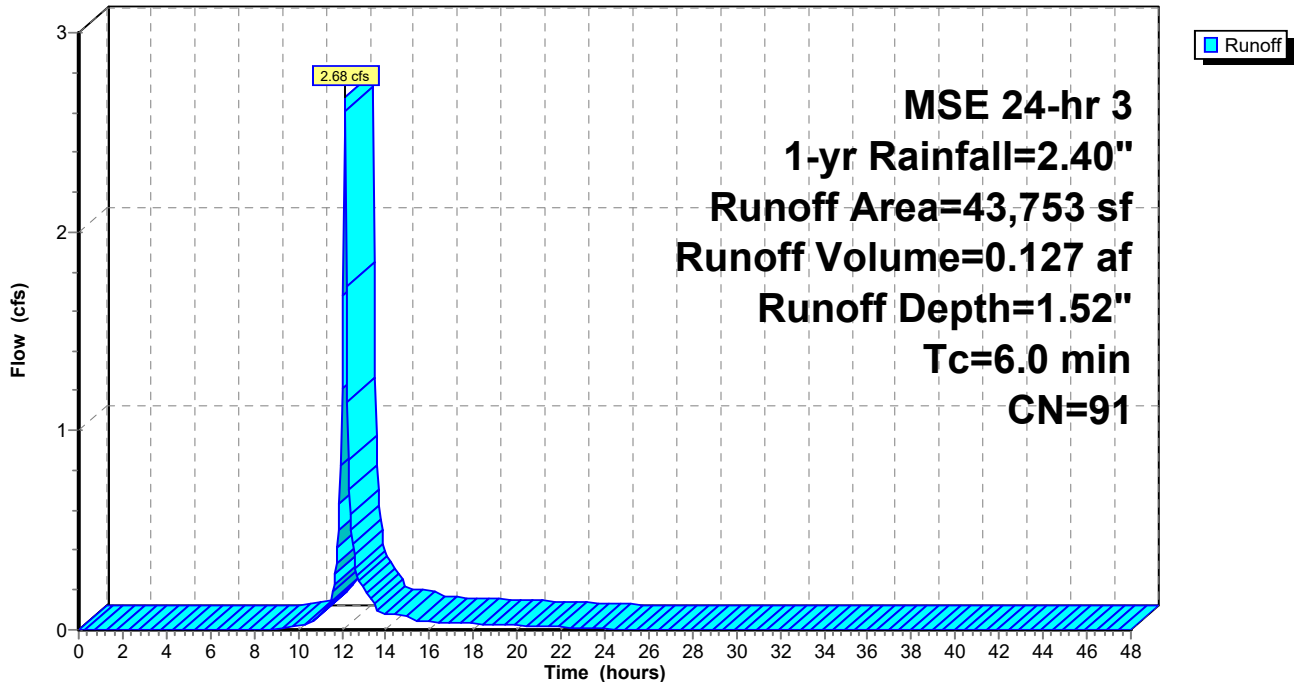
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 1-yr Rainfall=2.40"

Area (sf)	CN	Description
16,438	98	Paved parking, HSG D
* 17,854	91	Gravel D
9,461	80	>75% Grass cover, Good, HSG D
43,753	91	Weighted Average
27,315		62.43% Pervious Area
16,438		37.57% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 2S: P-2

Hydrograph



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Proposed Condition

MSE 24-hr 3 1-yr Rainfall=2.40"

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Summary for Subcatchment 3S: P-3

Runoff = 5.65 cfs @ 12.13 hrs, Volume= 0.273 af, Depth= 1.69"
Routed to Pond 5P : Wet Pond

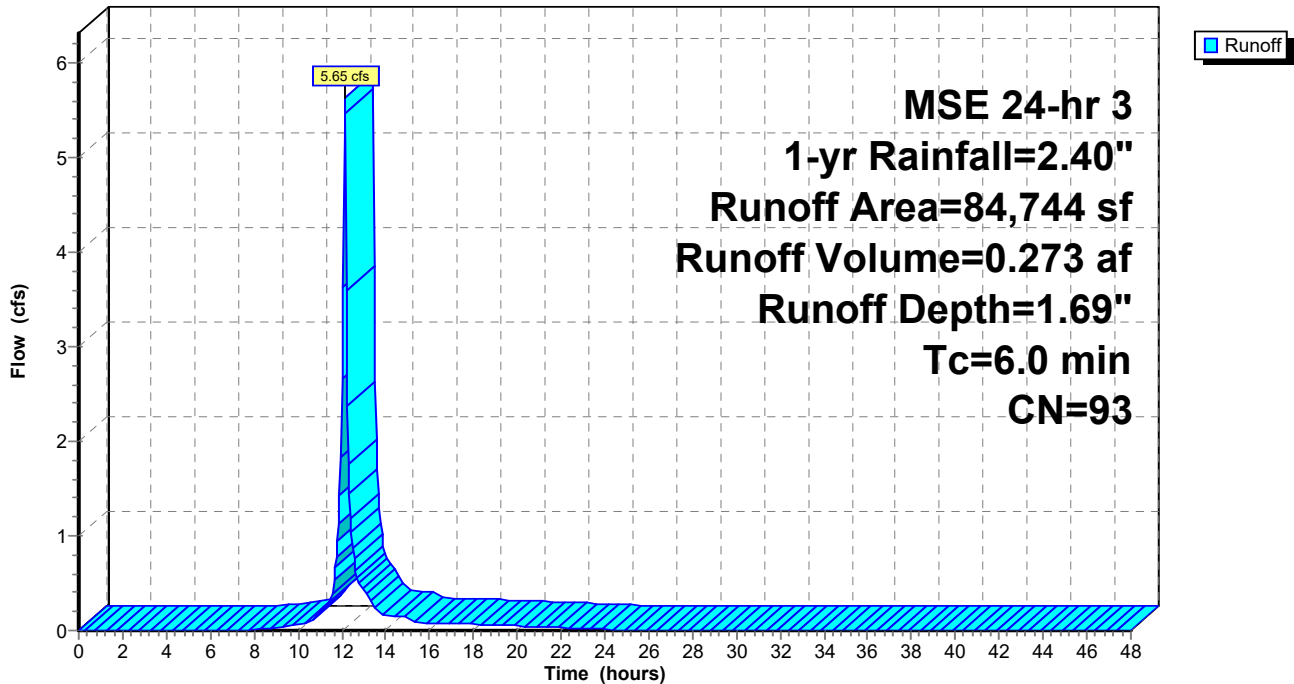
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 1-yr Rainfall=2.40"

Area (sf)	CN	Description
34,718	98	Paved parking, HSG D
* 33,953	91	Gravel D
11,456	80	>75% Grass cover, Good, HSG D
4,617	98	Water Surface, HSG D
84,744	93	Weighted Average
45,409		53.58% Pervious Area
39,335		46.42% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 3S: P-3

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MSE 24-hr 3 1-yr Rainfall=2.40"

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Summary for Reach 4R: Proposed Outfall

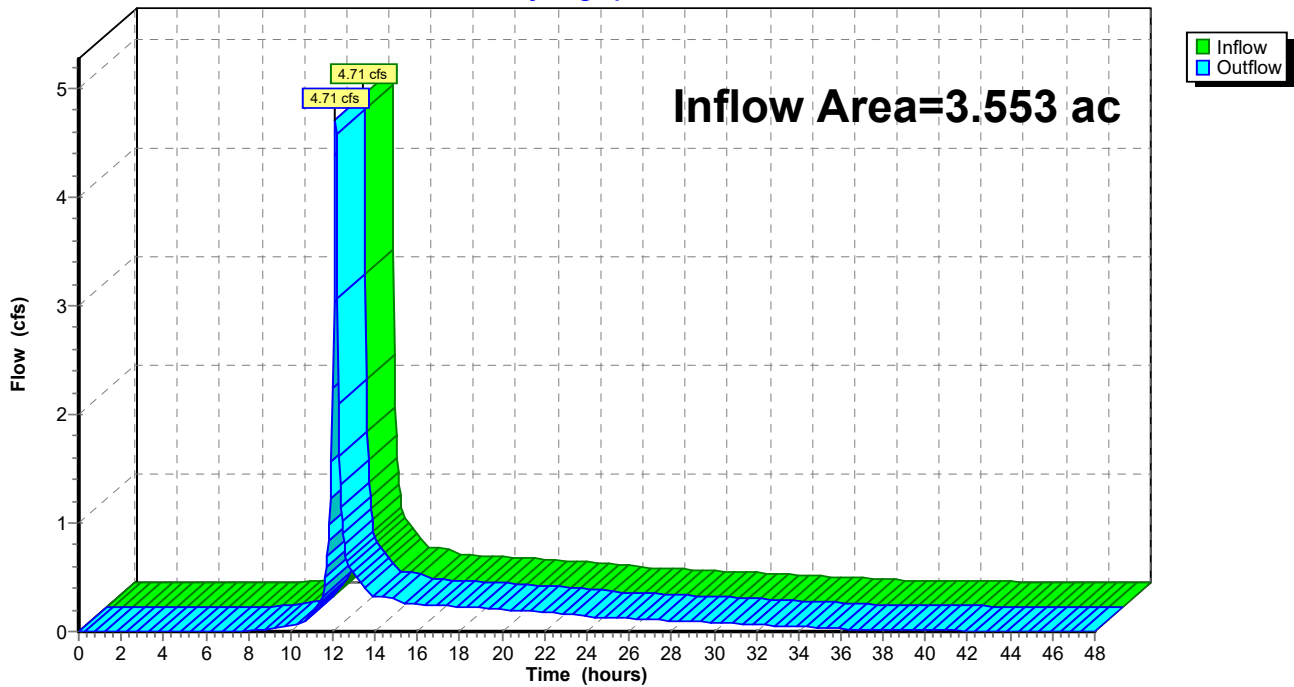
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 3.553 ac, 46.12% Impervious, Inflow Depth > 1.66" for 1-yr event
Inflow = 4.71 cfs @ 12.13 hrs, Volume= 0.490 af
Outflow = 4.71 cfs @ 12.13 hrs, Volume= 0.490 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Reach 4R: Proposed Outfall

Hydrograph



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Proposed Condition
MSE 24-hr 3 1-yr Rainfall=2.40"

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Summary for Pond 5P: Wet Pond

Inflow Area = 1.945 ac, 46.42% Impervious, Inflow Depth = 1.69" for 1-yr event
 Inflow = 5.65 cfs @ 12.13 hrs, Volume= 0.273 af
 Outflow = 0.20 cfs @ 13.61 hrs, Volume= 0.269 af, Atten= 96%, Lag= 88.5 min
 Primary = 0.20 cfs @ 13.61 hrs, Volume= 0.269 af
 Routed to Reach 4R : Proposed Outfall
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
 Routed to Reach 4R : Proposed Outfall

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
 Peak Elev= 858.00' @ 13.61 hrs Surf.Area= 6,148 sf Storage= 8,159 cf

Plug-Flow detention time= 524.2 min calculated for 0.269 af (98% of inflow)
 Center-of-Mass det. time= 516.5 min (1,302.8 - 786.3)

Volume	Invert	Avail.Storage	Storage Description
#1	856.50'	22,433 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
856.50	4,617	0	0
857.00	5,209	2,457	2,457
858.00	6,144	5,677	8,133
859.00	7,136	6,640	14,773
860.00	8,184	7,660	22,433

Device	Routing	Invert	Outlet Devices
#1	Primary	856.50'	18.0" Round Culvert L= 32.7' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 856.50' / 856.00' S= 0.0153 '/' Cc= 0.900 n= 0.015 Concrete sewer w/manholes & inlets, Flow Area= 1.77 sf
#2	Device 1	856.50'	2.5" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device 1	858.00'	6.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)
#4	Secondary	859.00'	20.0' long x 4.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.38 2.54 2.69 2.68 2.67 2.67 2.65 2.66 2.66 2.68 2.72 2.73 2.76 2.79 2.88 3.07 3.32

Primary OutFlow Max=0.20 cfs @ 13.61 hrs HW=858.00' (Free Discharge)

- ↑1=Culvert (Passes 0.20 cfs of 7.36 cfs potential flow)
- ↑2=Orifice/Grate (Orifice Controls 0.19 cfs @ 5.70 fps)
- ↑3=Sharp-Crested Rectangular Weir(Weir Controls 0.01 cfs @ 0.21 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=856.50' (Free Discharge)

- ↑4=Broad-Crested Rectangular Weir(Controls 0.00 cfs)

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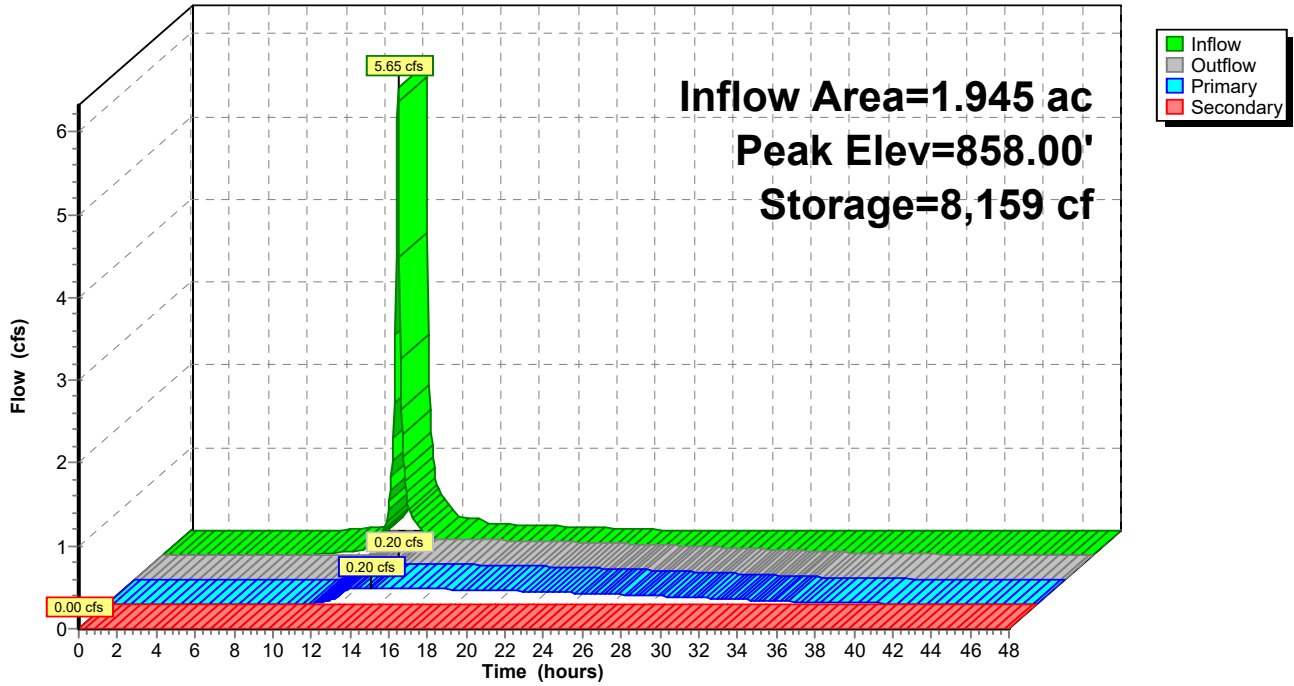
MSE 24-hr 3 1-yr Rainfall=2.40"

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Pond 5P: Wet Pond

Hydrograph



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MSE 24-hr 3 2-yr Rainfall=2.70"

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Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: P-1 Runoff Area=26,258 sf 59.41% Impervious Runoff Depth=2.16"
Tc=6.0 min CN=95 Runoff=2.16 cfs 0.108 af

Subcatchment2S: P-2 Runoff Area=43,753 sf 37.57% Impervious Runoff Depth=1.79"
Tc=6.0 min CN=91 Runoff=3.14 cfs 0.150 af

Subcatchment3S: P-3 Runoff Area=84,744 sf 46.42% Impervious Runoff Depth=1.97"
Tc=6.0 min CN=93 Runoff=6.54 cfs 0.319 af

Reach 4R: Proposed Outfall Inflow=5.45 cfs 0.573 af
Outflow=5.45 cfs 0.573 af

Pond 5P: Wet Pond Peak Elev=858.08' Storage=8,611 cf Inflow=6.54 cfs 0.319 af
Primary=0.62 cfs 0.315 af Secondary=0.00 cfs 0.000 af Outflow=0.62 cfs 0.315 af

Total Runoff Area = 3.553 ac Runoff Volume = 0.578 af Average Runoff Depth = 1.95"
53.88% Pervious = 1.914 ac 46.12% Impervious = 1.638 ac

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Proposed Condition
MSE 24-hr 3 2-yr Rainfall=2.70"

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Summary for Subcatchment 1S: P-1

Runoff = 2.16 cfs @ 12.13 hrs, Volume= 0.108 af, Depth= 2.16"
Routed to Reach 4R : Proposed Outfall

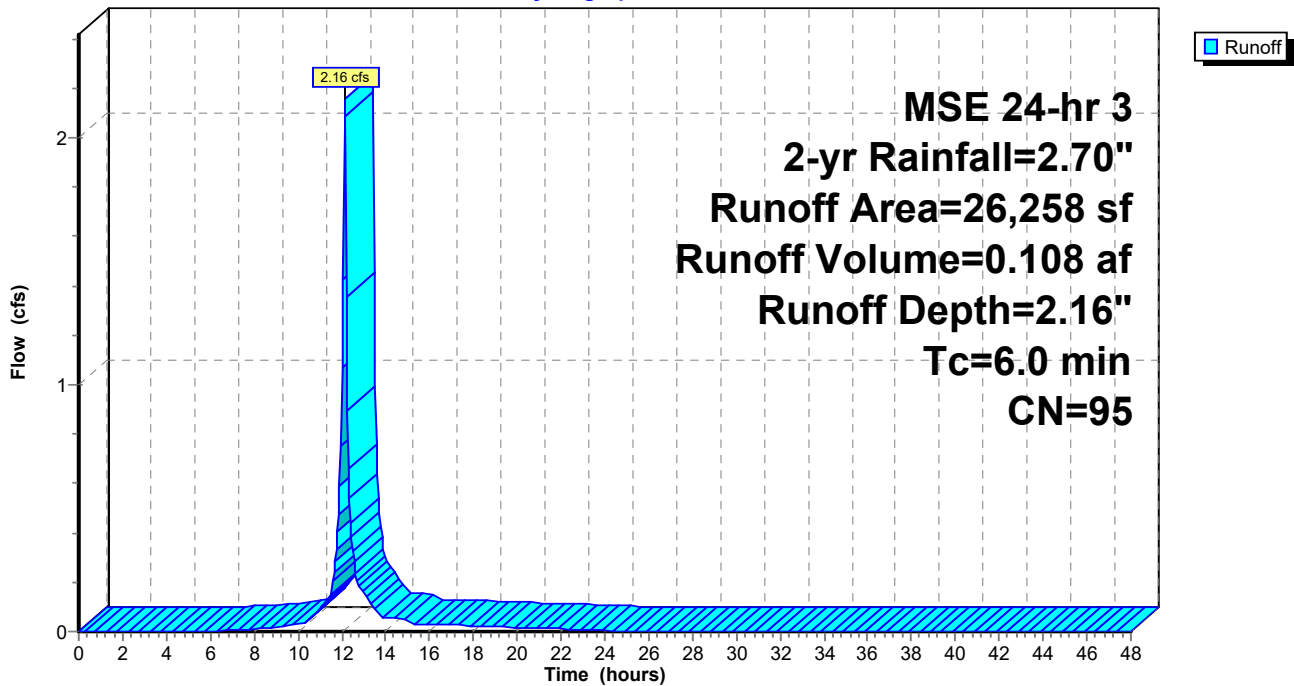
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 2-yr Rainfall=2.70"

Area (sf)	CN	Description
15,600	98	Paved parking, HSG D
* 10,658	91	Gravel D
26,258	95	Weighted Average
10,658		40.59% Pervious Area
15,600		59.41% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 1S: P-1

Hydrograph



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Proposed Condition
MSE 24-hr 3 2-yr Rainfall=2.70"

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Summary for Subcatchment 2S: P-2

Runoff = 3.14 cfs @ 12.13 hrs, Volume= 0.150 af, Depth= 1.79"
Routed to Reach 4R : Proposed Outfall

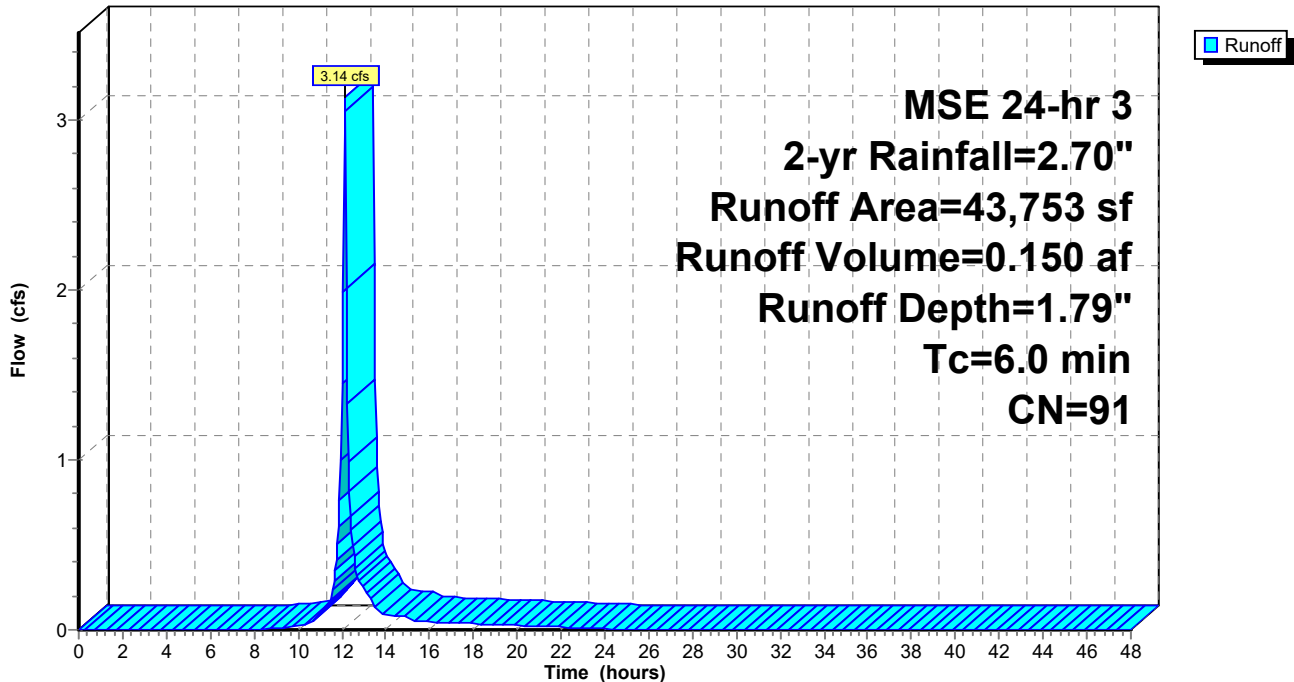
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 2-yr Rainfall=2.70"

Area (sf)	CN	Description
16,438	98	Paved parking, HSG D
* 17,854	91	Gravel D
9,461	80	>75% Grass cover, Good, HSG D
43,753	91	Weighted Average
27,315		62.43% Pervious Area
16,438		37.57% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 2S: P-2

Hydrograph



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MSE 24-hr 3 2-yr Rainfall=2.70"

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Summary for Subcatchment 3S: P-3

Runoff = 6.54 cfs @ 12.13 hrs, Volume= 0.319 af, Depth= 1.97"
Routed to Pond 5P : Wet Pond

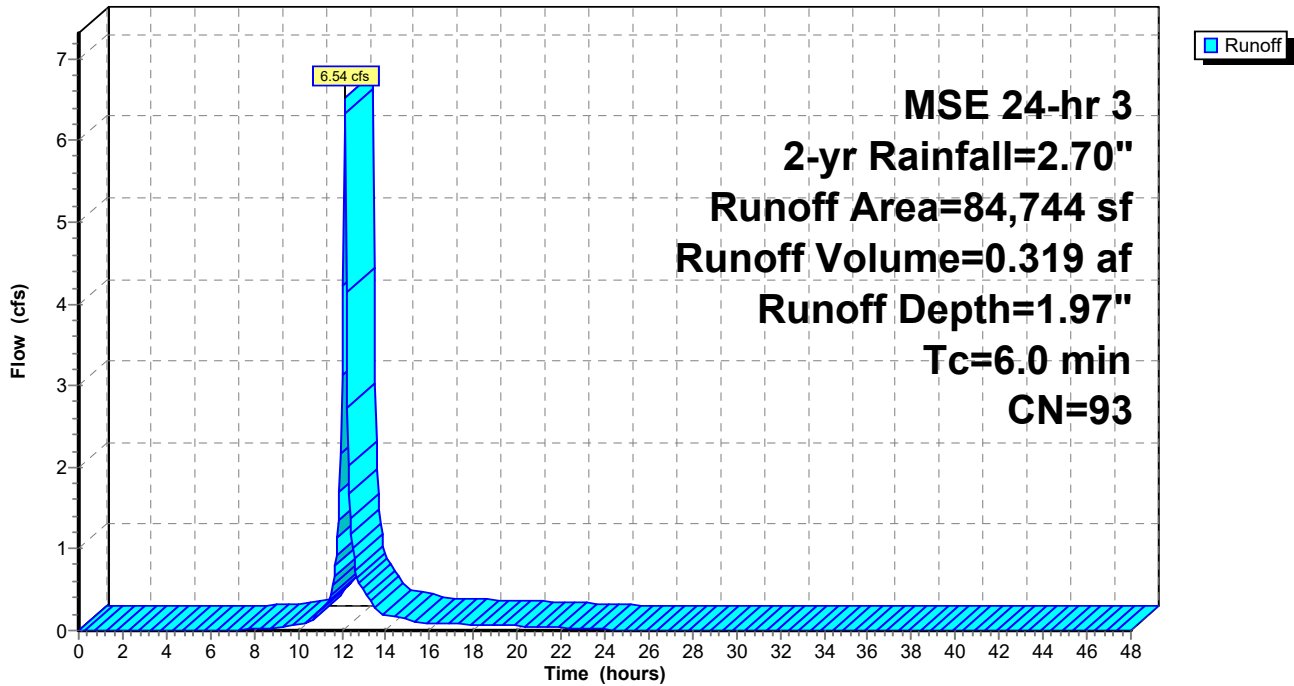
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 2-yr Rainfall=2.70"

Area (sf)	CN	Description
34,718	98	Paved parking, HSG D
* 33,953	91	Gravel D
11,456	80	>75% Grass cover, Good, HSG D
4,617	98	Water Surface, HSG D
84,744	93	Weighted Average
45,409		53.58% Pervious Area
39,335		46.42% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 3S: P-3

Hydrograph



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MSE 24-hr 3 2-yr Rainfall=2.70"

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Summary for Reach 4R: Proposed Outfall

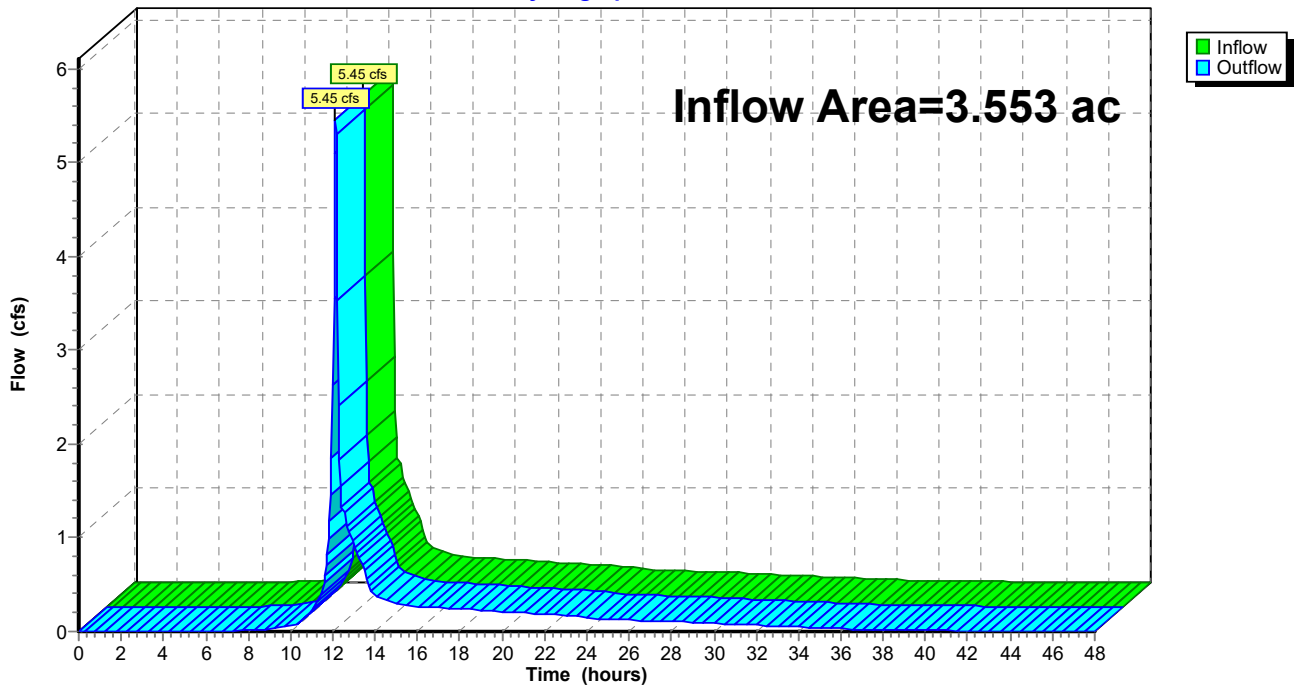
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 3.553 ac, 46.12% Impervious, Inflow Depth > 1.94" for 2-yr event
Inflow = 5.45 cfs @ 12.13 hrs, Volume= 0.573 af
Outflow = 5.45 cfs @ 12.13 hrs, Volume= 0.573 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Reach 4R: Proposed Outfall

Hydrograph



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Proposed Condition
MSE 24-hr 3 2-yr Rainfall=2.70"

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Summary for Pond 5P: Wet Pond

Inflow Area = 1.945 ac, 46.42% Impervious, Inflow Depth = 1.97" for 2-yr event
 Inflow = 6.54 cfs @ 12.13 hrs, Volume= 0.319 af
 Outflow = 0.62 cfs @ 12.67 hrs, Volume= 0.315 af, Atten= 90%, Lag= 32.7 min
 Primary = 0.62 cfs @ 12.67 hrs, Volume= 0.315 af
 Routed to Reach 4R : Proposed Outfall
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
 Routed to Reach 4R : Proposed Outfall

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
 Peak Elev= 858.08' @ 12.67 hrs Surf.Area= 6,221 sf Storage= 8,611 cf

Plug-Flow detention time= 474.6 min calculated for 0.315 af (99% of inflow)
 Center-of-Mass det. time= 467.8 min (1,251.1 - 783.2)

Volume	Invert	Avail.Storage	Storage Description
#1	856.50'	22,433 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
856.50	4,617	0	0
857.00	5,209	2,457	2,457
858.00	6,144	5,677	8,133
859.00	7,136	6,640	14,773
860.00	8,184	7,660	22,433

Device	Routing	Invert	Outlet Devices
#1	Primary	856.50'	18.0" Round Culvert L= 32.7' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 856.50' / 856.00' S= 0.0153 '/' Cc= 0.900 n= 0.015 Concrete sewer w/manholes & inlets, Flow Area= 1.77 sf
#2	Device 1	856.50'	2.5" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device 1	858.00'	6.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)
#4	Secondary	859.00'	20.0' long x 4.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.38 2.54 2.69 2.68 2.67 2.67 2.65 2.66 2.66 2.68 2.72 2.73 2.76 2.79 2.88 3.07 3.32

Primary OutFlow Max=0.62 cfs @ 12.67 hrs HW=858.08' (Free Discharge)

- ↑1=Culvert (Passes 0.62 cfs of 7.74 cfs potential flow)
- ↑2=Orifice/Grate (Orifice Controls 0.20 cfs @ 5.84 fps)
- ↑3=Sharp-Crested Rectangular Weir(Weir Controls 0.42 cfs @ 0.91 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=856.50' (Free Discharge)

- ↑4=Broad-Crested Rectangular Weir(Controls 0.00 cfs)

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Proposed Condition

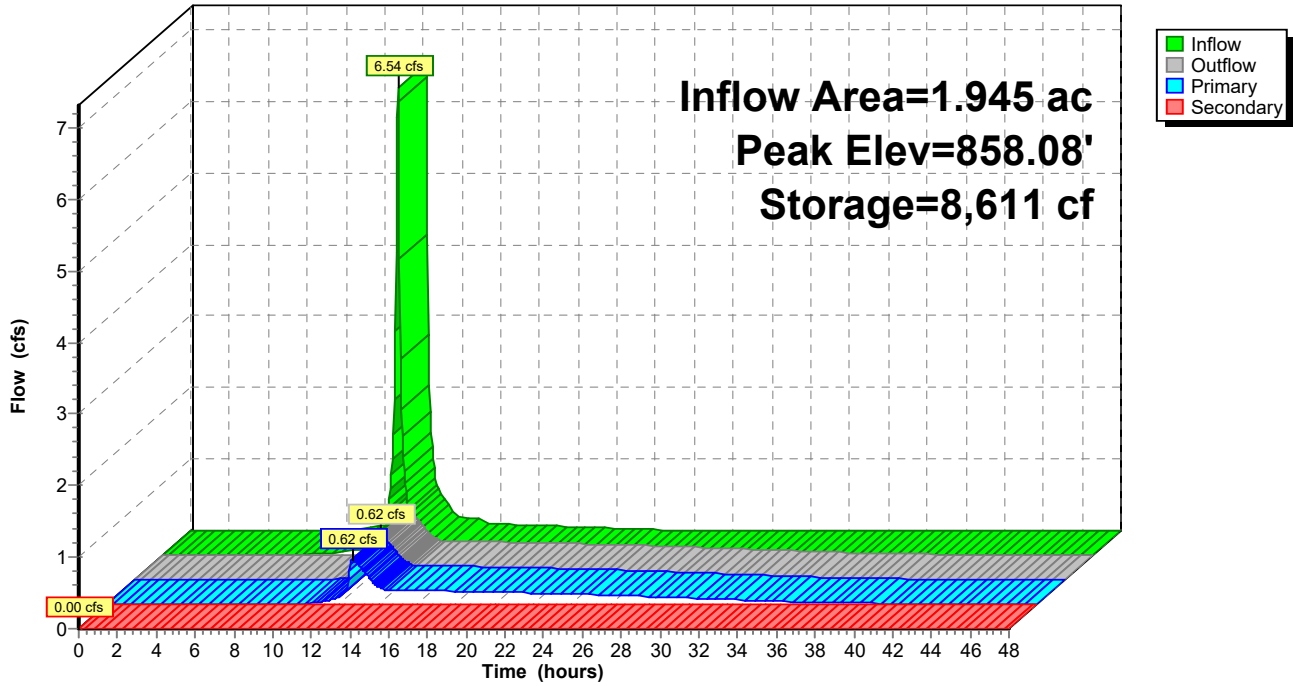
MSE 24-hr 3 2-yr Rainfall=2.70"

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Pond 5P: Wet Pond

Hydrograph



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MSE 24-hr 3 10-yr Rainfall=3.81"

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Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: P-1 Runoff Area=26,258 sf 59.41% Impervious Runoff Depth=3.24"
Tc=6.0 min CN=95 Runoff=3.16 cfs 0.163 af

Subcatchment2S: P-2 Runoff Area=43,753 sf 37.57% Impervious Runoff Depth=2.84"
Tc=6.0 min CN=91 Runoff=4.83 cfs 0.237 af

Subcatchment3S: P-3 Runoff Area=84,744 sf 46.42% Impervious Runoff Depth=3.04"
Tc=6.0 min CN=93 Runoff=9.80 cfs 0.492 af

Reach 4R: Proposed Outfall Inflow=9.35 cfs 0.888 af
Outflow=9.35 cfs 0.888 af

Pond 5P: Wet Pond Peak Elev=858.35' Storage=10,338 cf Inflow=9.80 cfs 0.492 af
Primary=4.22 cfs 0.487 af Secondary=0.00 cfs 0.000 af Outflow=4.22 cfs 0.487 af

Total Runoff Area = 3.553 ac Runoff Volume = 0.892 af Average Runoff Depth = 3.01"
53.88% Pervious = 1.914 ac 46.12% Impervious = 1.638 ac

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MSE 24-hr 3 10-yr Rainfall=3.81"

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Summary for Subcatchment 1S: P-1

Runoff = 3.16 cfs @ 12.13 hrs, Volume= 0.163 af, Depth= 3.24"
 Routed to Reach 4R : Proposed Outfall

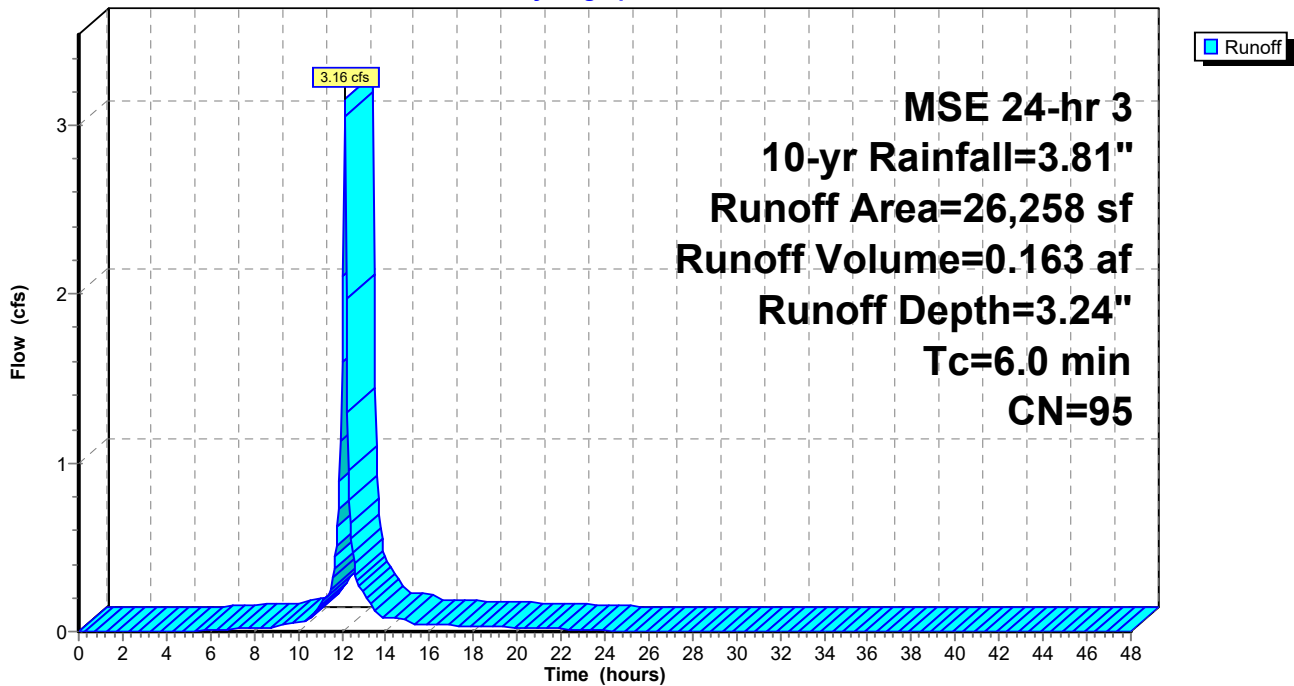
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
 MSE 24-hr 3 10-yr Rainfall=3.81"

Area (sf)	CN	Description
15,600	98	Paved parking, HSG D
* 10,658	91	Gravel D
26,258	95	Weighted Average
10,658		40.59% Pervious Area
15,600		59.41% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 1S: P-1

Hydrograph



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Proposed Condition
MSE 24-hr 3 10-yr Rainfall=3.81"

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Summary for Subcatchment 2S: P-2

Runoff = 4.83 cfs @ 12.13 hrs, Volume= 0.237 af, Depth= 2.84"
Routed to Reach 4R : Proposed Outfall

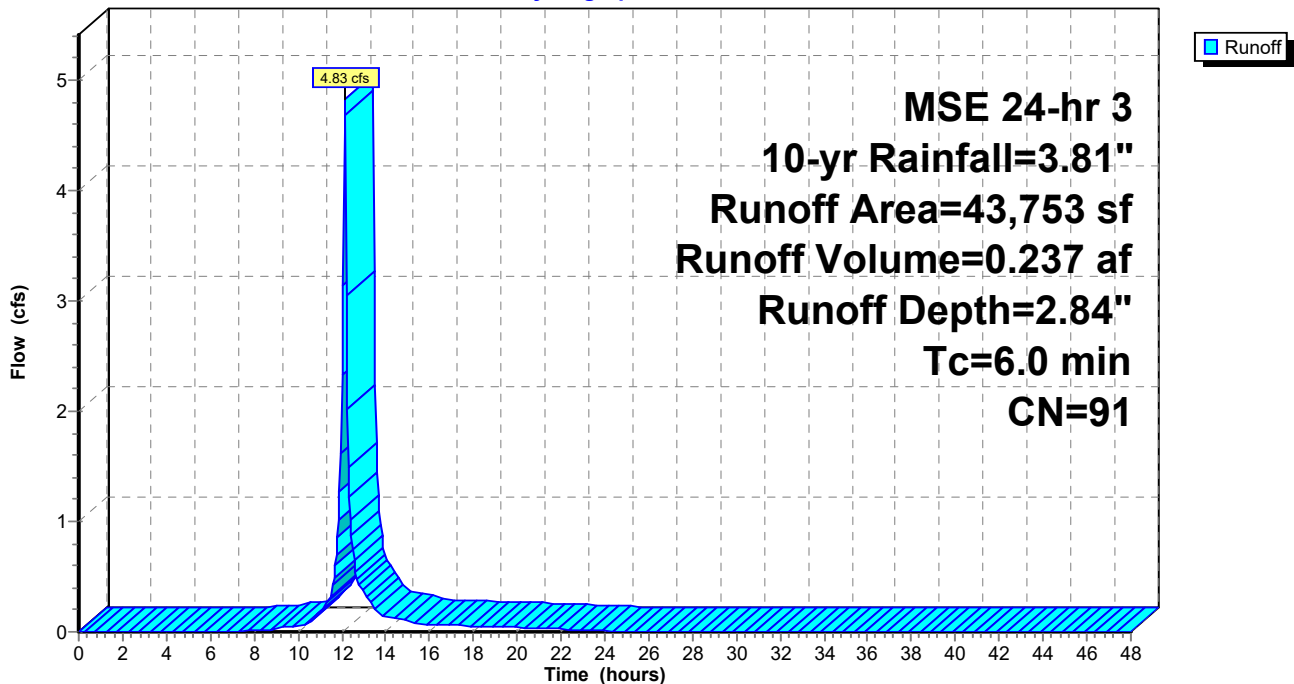
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 10-yr Rainfall=3.81"

Area (sf)	CN	Description
16,438	98	Paved parking, HSG D
* 17,854	91	Gravel D
9,461	80	>75% Grass cover, Good, HSG D
43,753	91	Weighted Average
27,315		62.43% Pervious Area
16,438		37.57% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 2S: P-2

Hydrograph



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MSE 24-hr 3 10-yr Rainfall=3.81"

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Summary for Subcatchment 3S: P-3

Runoff = 9.80 cfs @ 12.13 hrs, Volume= 0.492 af, Depth= 3.04"
Routed to Pond 5P : Wet Pond

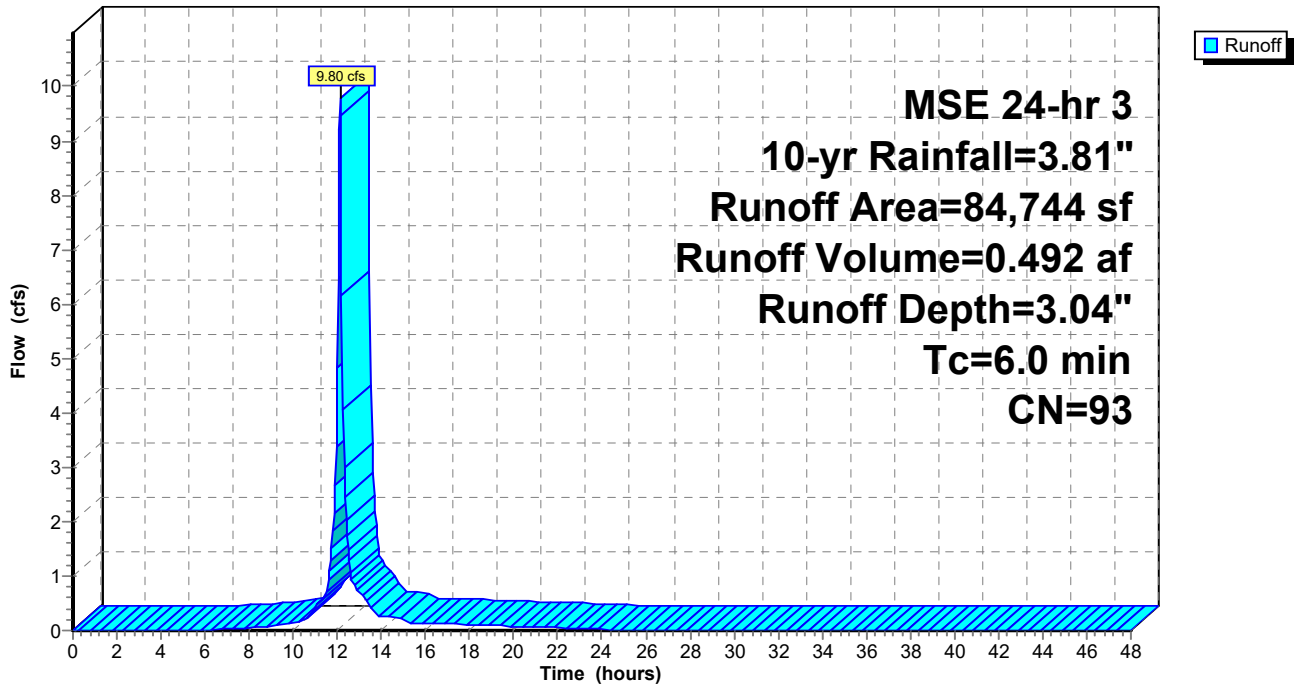
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 10-yr Rainfall=3.81"

Area (sf)	CN	Description
34,718	98	Paved parking, HSG D
* 33,953	91	Gravel D
11,456	80	>75% Grass cover, Good, HSG D
4,617	98	Water Surface, HSG D
84,744	93	Weighted Average
45,409		53.58% Pervious Area
39,335		46.42% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 3S: P-3

Hydrograph



Summary for Reach 4R: Proposed Outfall

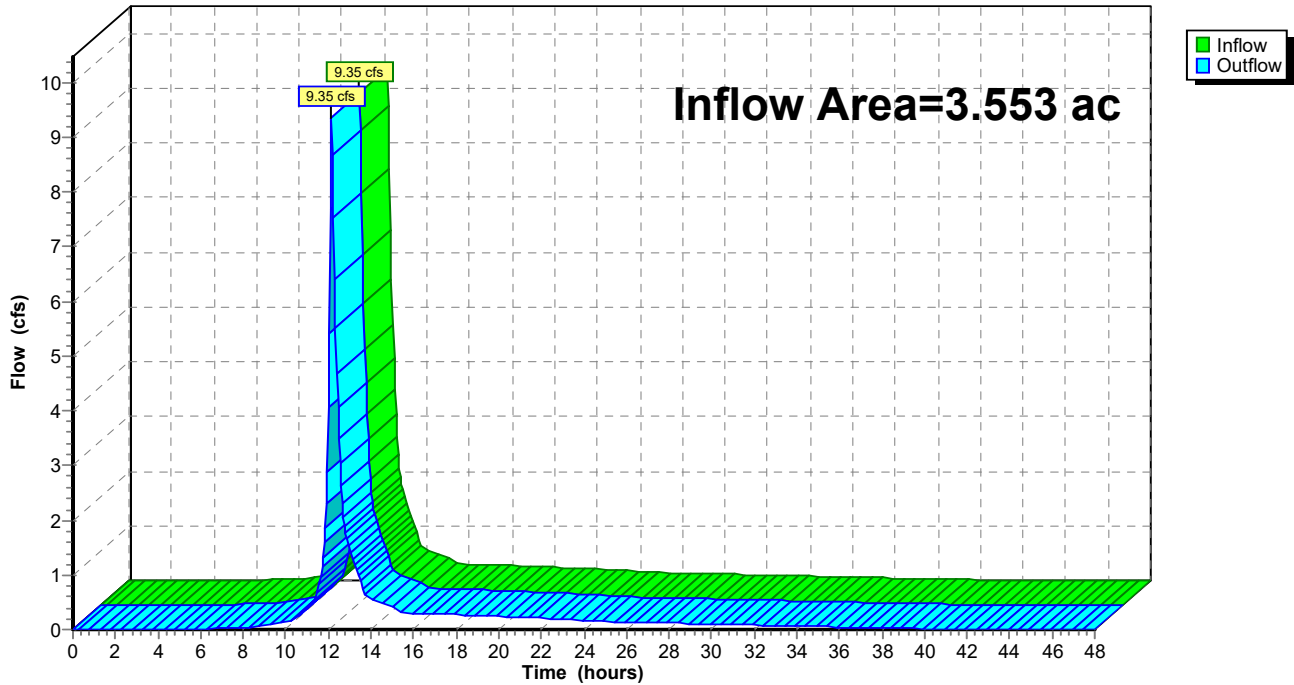
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 3.553 ac, 46.12% Impervious, Inflow Depth > 3.00" for 10-yr event
Inflow = 9.35 cfs @ 12.16 hrs, Volume= 0.888 af
Outflow = 9.35 cfs @ 12.16 hrs, Volume= 0.888 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Reach 4R: Proposed Outfall

Hydrograph



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MSE 24-hr 3 10-yr Rainfall=3.81"

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Summary for Pond 5P: Wet Pond

Inflow Area = 1.945 ac, 46.42% Impervious, Inflow Depth = 3.04" for 10-yr event
 Inflow = 9.80 cfs @ 12.13 hrs, Volume= 0.492 af
 Outflow = 4.22 cfs @ 12.26 hrs, Volume= 0.487 af, Atten= 57%, Lag= 7.8 min
 Primary = 4.22 cfs @ 12.26 hrs, Volume= 0.487 af
 Routed to Reach 4R : Proposed Outfall
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
 Routed to Reach 4R : Proposed Outfall

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
 Peak Elev= 858.35' @ 12.26 hrs Surf.Area= 6,490 sf Storage= 10,338 cf

Plug-Flow detention time= 347.1 min calculated for 0.487 af (99% of inflow)
 Center-of-Mass det. time= 342.6 min (1,117.3 - 774.7)

Volume	Invert	Avail.Storage	Storage Description
#1	856.50'	22,433 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
856.50	4,617	0	0
857.00	5,209	2,457	2,457
858.00	6,144	5,677	8,133
859.00	7,136	6,640	14,773
860.00	8,184	7,660	22,433

Device	Routing	Invert	Outlet Devices
#1	Primary	856.50'	18.0" Round Culvert L= 32.7' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 856.50' / 856.00' S= 0.0153 '/' Cc= 0.900 n= 0.015 Concrete sewer w/manholes & inlets, Flow Area= 1.77 sf
#2	Device 1	856.50'	2.5" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device 1	858.00'	6.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)
#4	Secondary	859.00'	20.0' long x 4.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.38 2.54 2.69 2.68 2.67 2.67 2.65 2.66 2.66 2.68 2.72 2.73 2.76 2.79 2.88 3.07 3.32

Primary OutFlow Max=4.16 cfs @ 12.26 hrs HW=858.35' (Free Discharge)

- ↑1=Culvert (Passes 4.16 cfs of 8.91 cfs potential flow)
- ↑2=Orifice/Grate (Orifice Controls 0.22 cfs @ 6.35 fps)
- ↑3=Sharp-Crested Rectangular Weir(Weir Controls 3.94 cfs @ 1.92 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=856.50' (Free Discharge)

- ↑4=Broad-Crested Rectangular Weir(Controls 0.00 cfs)

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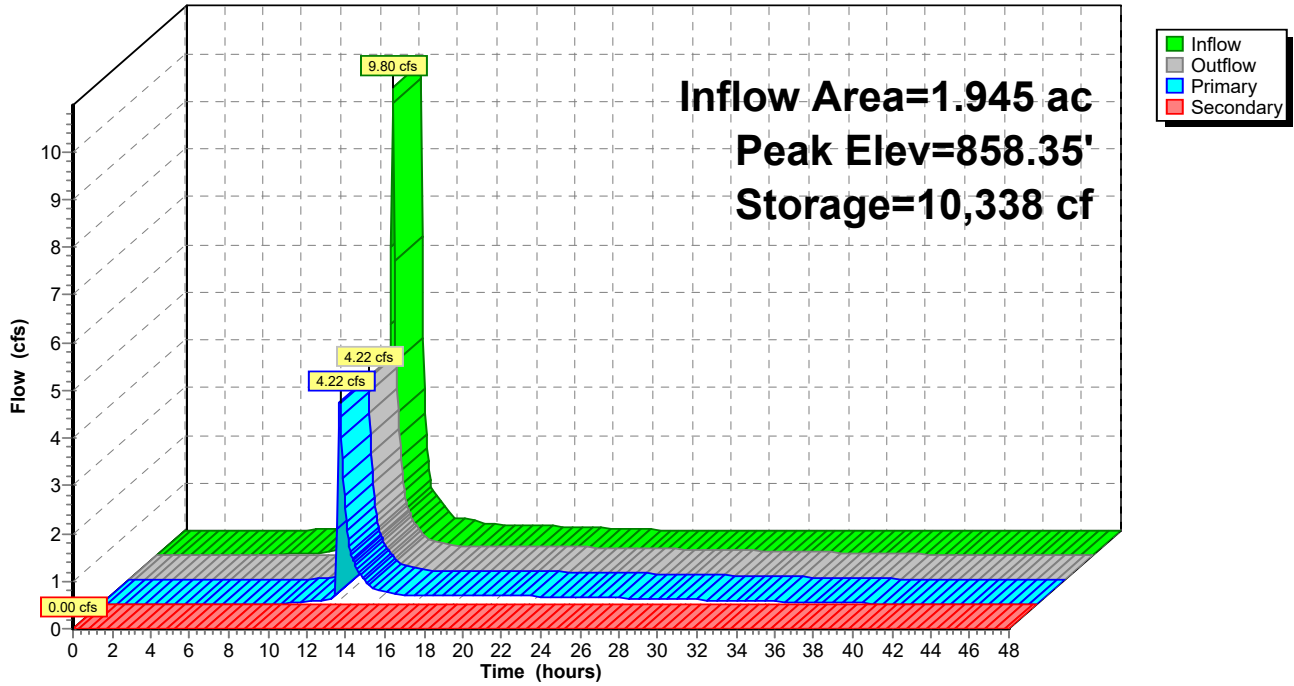
Proposed Condition
MSE 24-hr 3 10-yr Rainfall=3.81"

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Pond 5P: Wet Pond

Hydrograph



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MSE 24-hr 3 50-yr Rainfall=5.38"

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Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: P-1	Runoff Area=26,258 sf 59.41% Impervious Runoff Depth=4.80" Tc=6.0 min CN=95 Runoff=4.56 cfs 0.241 af
Subcatchment2S: P-2	Runoff Area=43,753 sf 37.57% Impervious Runoff Depth=4.35" Tc=6.0 min CN=91 Runoff=7.22 cfs 0.364 af
Subcatchment3S: P-3	Runoff Area=84,744 sf 46.42% Impervious Runoff Depth=4.57" Tc=6.0 min CN=93 Runoff=14.38 cfs 0.741 af
Reach 4R: Proposed Outfall	Inflow=20.90 cfs 1.341 af Outflow=20.90 cfs 1.341 af
Pond 5P: Wet Pond	Peak Elev=858.66' Storage=12,403 cf Inflow=14.38 cfs 0.741 af Primary=10.08 cfs 0.736 af Secondary=0.00 cfs 0.000 af Outflow=10.08 cfs 0.736 af
Total Runoff Area = 3.553 ac Runoff Volume = 1.346 af Average Runoff Depth = 4.55" 53.88% Pervious = 1.914 ac 46.12% Impervious = 1.638 ac	

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MSE 24-hr 3 50-yr Rainfall=5.38"

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Summary for Subcatchment 1S: P-1

Runoff = 4.56 cfs @ 12.13 hrs, Volume= 0.241 af, Depth= 4.80"
Routed to Reach 4R : Proposed Outfall

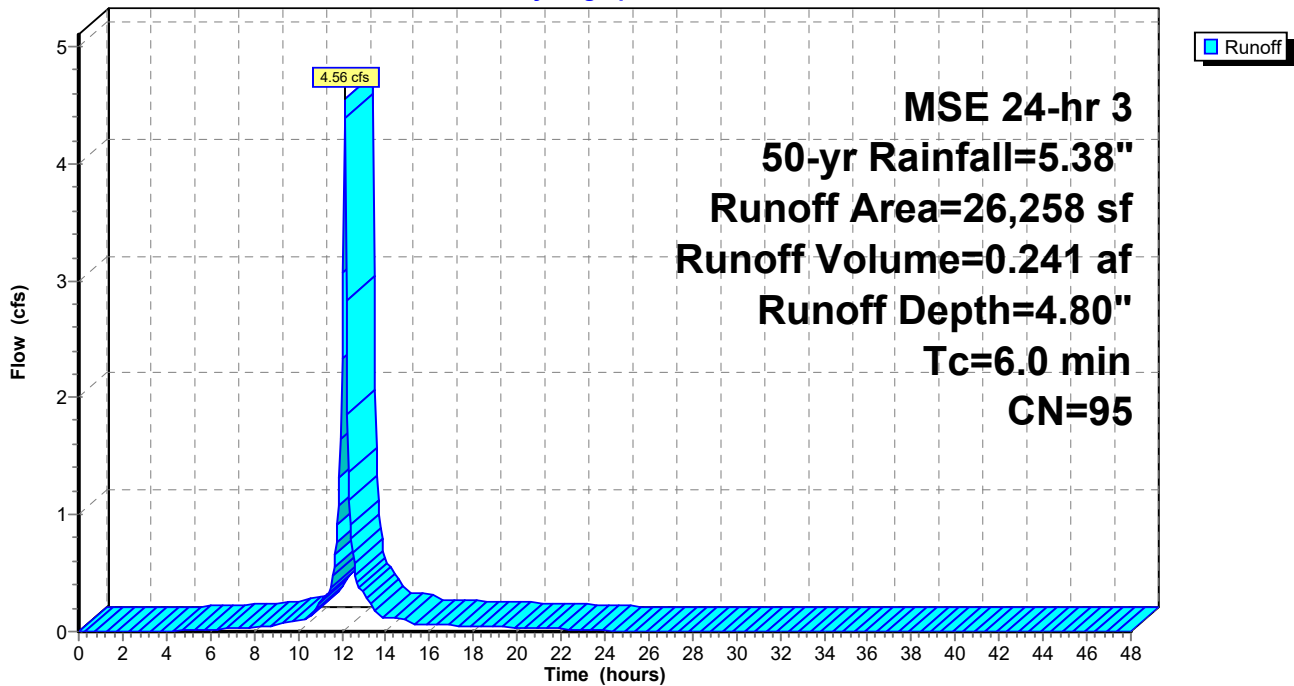
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 50-yr Rainfall=5.38"

Area (sf)	CN	Description
15,600	98	Paved parking, HSG D
* 10,658	91	Gravel D
26,258	95	Weighted Average
10,658		40.59% Pervious Area
15,600		59.41% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 1S: P-1

Hydrograph



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Proposed Condition
MSE 24-hr 3 50-yr Rainfall=5.38"

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Summary for Subcatchment 2S: P-2

Runoff = 7.22 cfs @ 12.13 hrs, Volume= 0.364 af, Depth= 4.35"
Routed to Reach 4R : Proposed Outfall

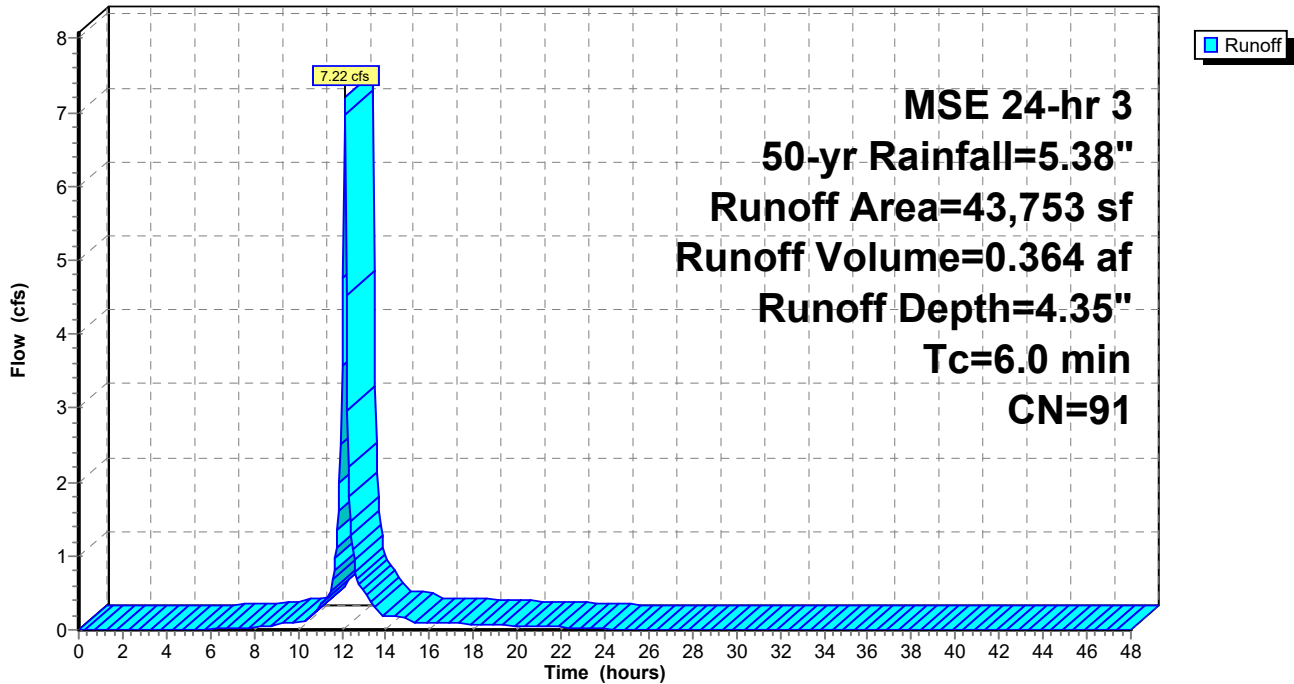
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 50-yr Rainfall=5.38"

Area (sf)	CN	Description
16,438	98	Paved parking, HSG D
* 17,854	91	Gravel D
9,461	80	>75% Grass cover, Good, HSG D
43,753	91	Weighted Average
27,315		62.43% Pervious Area
16,438		37.57% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 2S: P-2

Hydrograph



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Proposed Condition
MSE 24-hr 3 50-yr Rainfall=5.38"

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Summary for Subcatchment 3S: P-3

Runoff = 14.38 cfs @ 12.13 hrs, Volume= 0.741 af, Depth= 4.57"
Routed to Pond 5P : Wet Pond

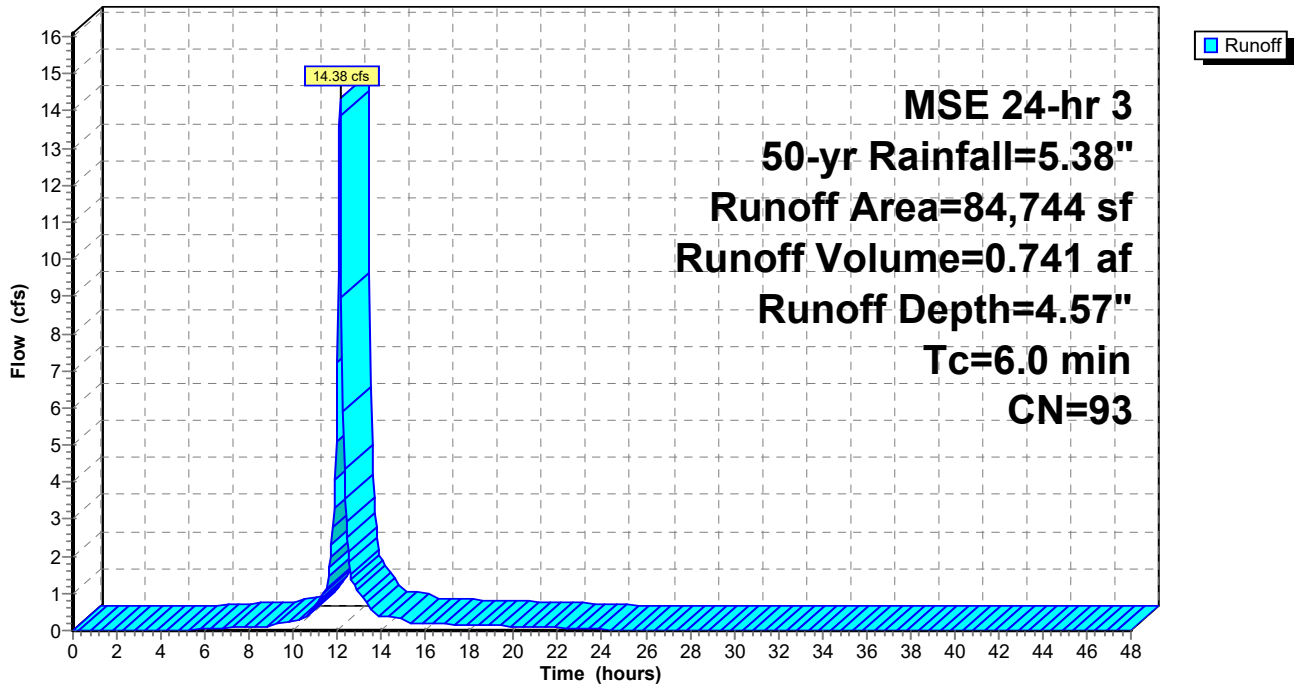
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 50-yr Rainfall=5.38"

Area (sf)	CN	Description
34,718	98	Paved parking, HSG D
* 33,953	91	Gravel D
11,456	80	>75% Grass cover, Good, HSG D
4,617	98	Water Surface, HSG D
84,744	93	Weighted Average
45,409		53.58% Pervious Area
39,335		46.42% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 3S: P-3

Hydrograph



Summary for Reach 4R: Proposed Outfall

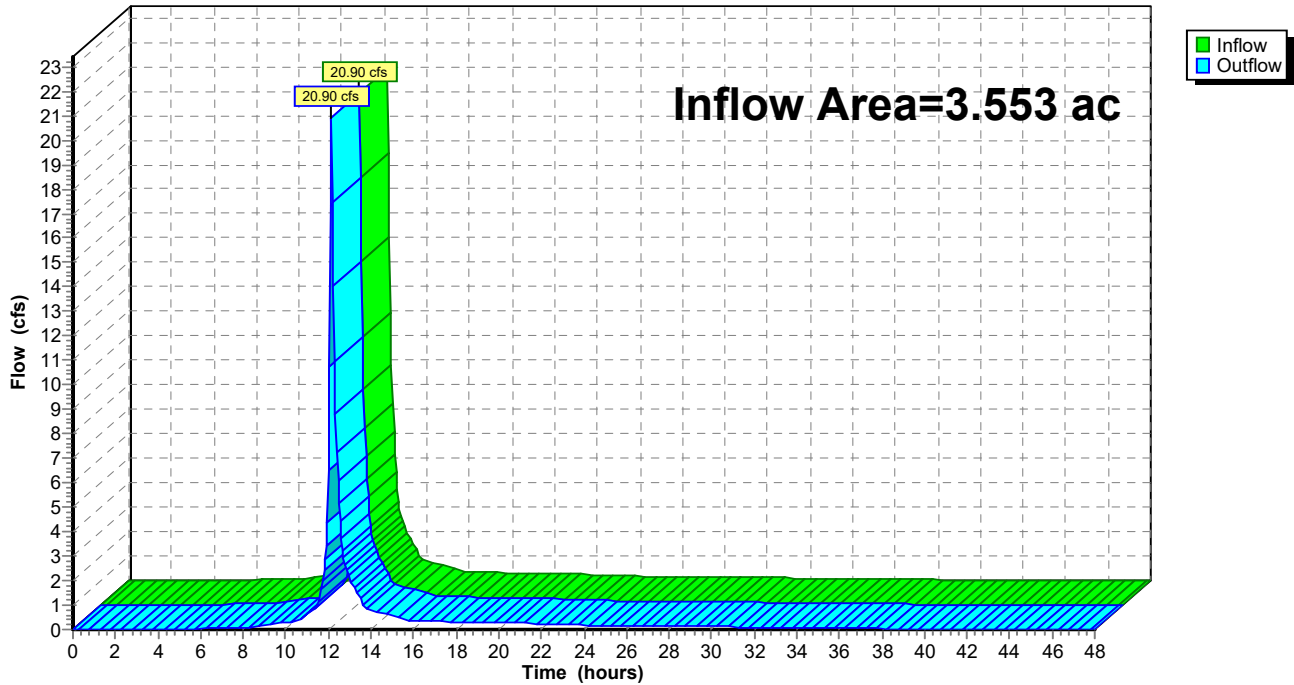
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 3.553 ac, 46.12% Impervious, Inflow Depth > 4.53" for 50-yr event
Inflow = 20.90 cfs @ 12.15 hrs, Volume= 1.341 af
Outflow = 20.90 cfs @ 12.15 hrs, Volume= 1.341 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Reach 4R: Proposed Outfall

Hydrograph



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Proposed Condition
MSE 24-hr 3 50-yr Rainfall=5.38"

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Summary for Pond 5P: Wet Pond

Inflow Area = 1.945 ac, 46.42% Impervious, Inflow Depth = 4.57" for 50-yr event
 Inflow = 14.38 cfs @ 12.13 hrs, Volume= 0.741 af
 Outflow = 10.08 cfs @ 12.19 hrs, Volume= 0.736 af, Atten= 30%, Lag= 4.0 min
 Primary = 10.08 cfs @ 12.19 hrs, Volume= 0.736 af
 Routed to Reach 4R : Proposed Outfall
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
 Routed to Reach 4R : Proposed Outfall

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
 Peak Elev= 858.66' @ 12.20 hrs Surf.Area= 6,799 sf Storage= 12,403 cf

Plug-Flow detention time= 263.2 min calculated for 0.735 af (99% of inflow)
 Center-of-Mass det. time= 260.0 min (1,026.9 - 766.9)

Volume	Invert	Avail.Storage	Storage Description
#1	856.50'	22,433 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
856.50	4,617	0	0
857.00	5,209	2,457	2,457
858.00	6,144	5,677	8,133
859.00	7,136	6,640	14,773
860.00	8,184	7,660	22,433

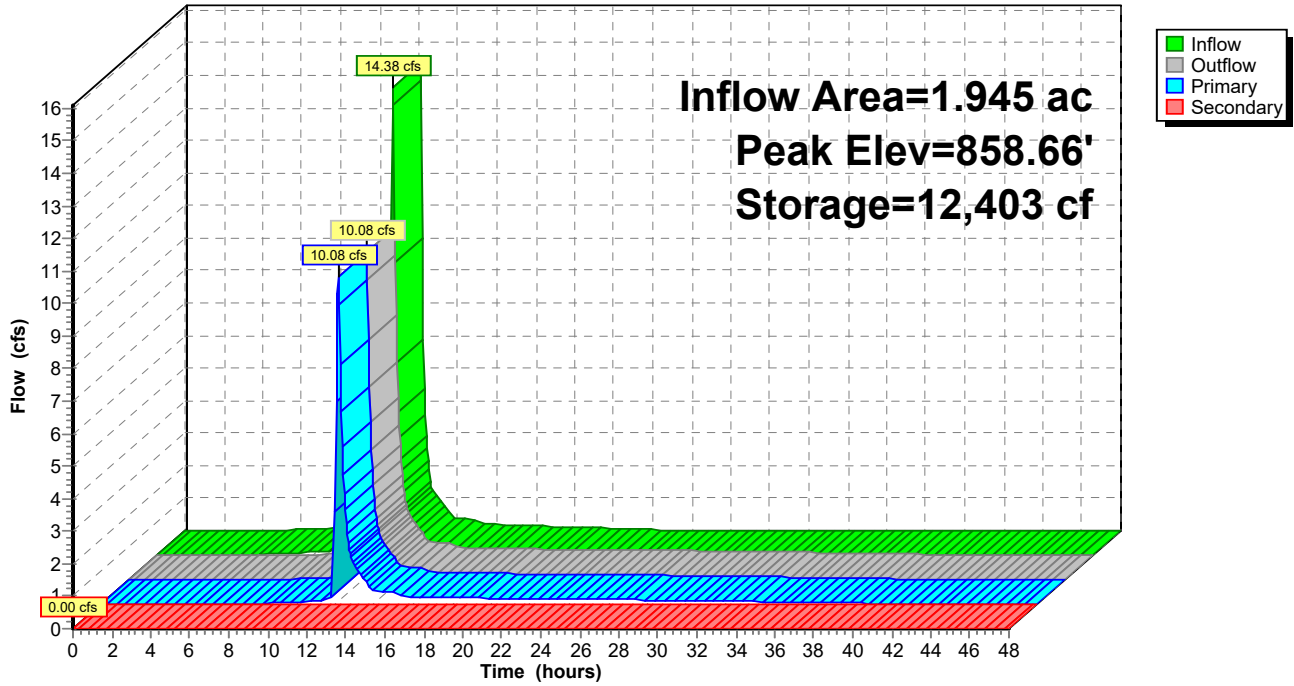
Device	Routing	Invert	Outlet Devices
#1	Primary	856.50'	18.0" Round Culvert L= 32.7' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 856.50' / 856.00' S= 0.0153 '/' Cc= 0.900 n= 0.015 Concrete sewer w/manholes & inlets, Flow Area= 1.77 sf
#2	Device 1	856.50'	2.5" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device 1	858.00'	6.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)
#4	Secondary	859.00'	20.0' long x 4.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.38 2.54 2.69 2.68 2.67 2.67 2.65 2.66 2.66 2.68 2.72 2.73 2.76 2.79 2.88 3.07 3.32

Primary OutFlow Max=10.05 cfs @ 12.19 hrs HW=858.65' (Free Discharge)
 ↑1=Culvert (Barrel Controls 10.05 cfs @ 5.69 fps)
 ↑2=Orifice/Grate (Passes < 0.24 cfs potential flow)
 ↑3=Sharp-Crested Rectangular Weir(Passes < 10.16 cfs potential flow)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=856.50' (Free Discharge)
 ↑4=Broad-Crested Rectangular Weir(Controls 0.00 cfs)

Pond 5P: Wet Pond

Hydrograph



CDI Waukesha_HydroCAD

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Proposed Condition

MSE 24-hr 3 100-yr Rainfall=6.18"

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Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: P-1 Runoff Area=26,258 sf 59.41% Impervious Runoff Depth=5.59"
Tc=6.0 min CN=95 Runoff=5.26 cfs 0.281 af

Subcatchment2S: P-2 Runoff Area=43,753 sf 37.57% Impervious Runoff Depth=5.13"
Tc=6.0 min CN=91 Runoff=8.42 cfs 0.430 af

Subcatchment3S: P-3 Runoff Area=84,744 sf 46.42% Impervious Runoff Depth=5.36"
Tc=6.0 min CN=93 Runoff=16.68 cfs 0.869 af

Reach 4R: Proposed Outfall Inflow=23.81 cfs 1.574 af
Outflow=23.81 cfs 1.574 af

Pond 5P: Wet Pond Peak Elev=858.83' Storage=13,570 cf Inflow=16.68 cfs 0.869 af
Primary=10.69 cfs 0.864 af Secondary=0.00 cfs 0.000 af Outflow=10.69 cfs 0.864 af

Total Runoff Area = 3.553 ac Runoff Volume = 1.580 af Average Runoff Depth = 5.34"
53.88% Pervious = 1.914 ac 46.12% Impervious = 1.638 ac

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Proposed Condition
MSE 24-hr 3 100-yr Rainfall=6.18"

Printed 2/24/2024

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Summary for Subcatchment 1S: P-1

Runoff = 5.26 cfs @ 12.13 hrs, Volume= 0.281 af, Depth= 5.59"
Routed to Reach 4R : Proposed Outfall

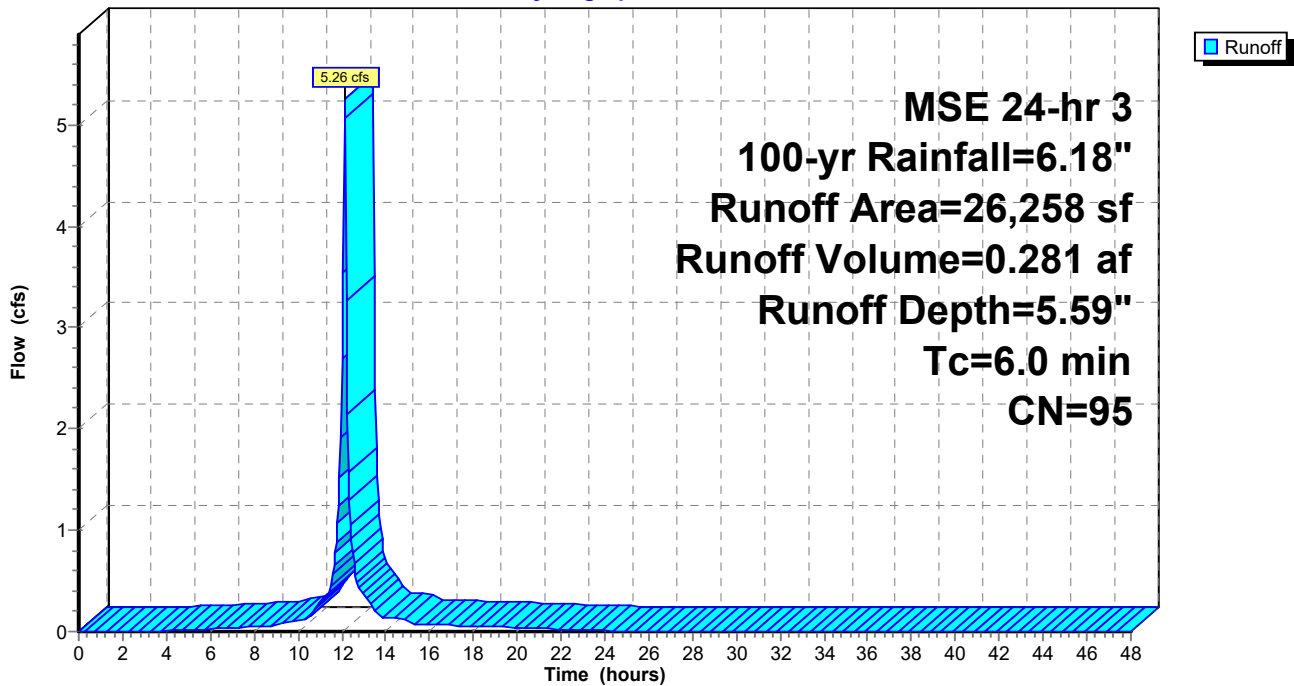
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-yr Rainfall=6.18"

Area (sf)	CN	Description
15,600	98	Paved parking, HSG D
* 10,658	91	Gravel D
26,258	95	Weighted Average
10,658		40.59% Pervious Area
15,600		59.41% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 1S: P-1

Hydrograph



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Proposed Condition
MSE 24-hr 3 100-yr Rainfall=6.18"

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Summary for Subcatchment 2S: P-2

Runoff = 8.42 cfs @ 12.13 hrs, Volume= 0.430 af, Depth= 5.13"
Routed to Reach 4R : Proposed Outfall

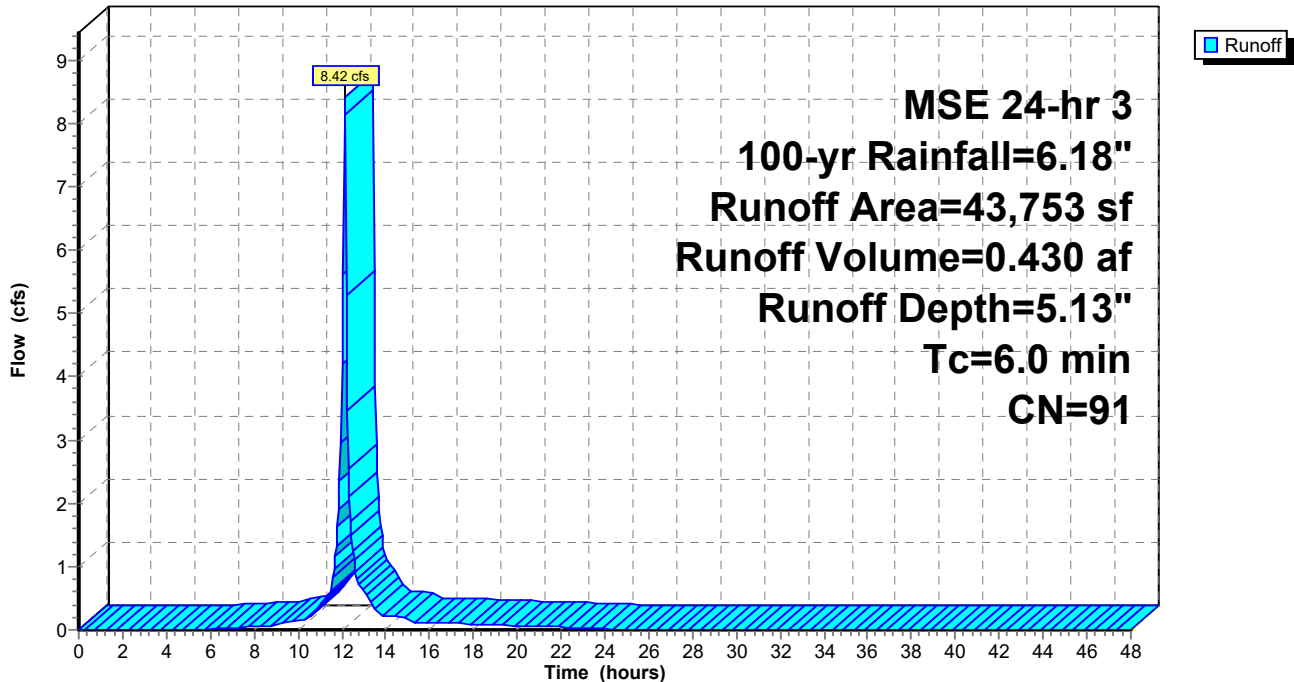
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-yr Rainfall=6.18"

Area (sf)	CN	Description
16,438	98	Paved parking, HSG D
* 17,854	91	Gravel D
9,461	80	>75% Grass cover, Good, HSG D
43,753	91	Weighted Average
27,315		62.43% Pervious Area
16,438		37.57% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 2S: P-2

Hydrograph



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Proposed Condition
MSE 24-hr 3 100-yr Rainfall=6.18"

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Summary for Subcatchment 3S: P-3

Runoff = 16.68 cfs @ 12.13 hrs, Volume= 0.869 af, Depth= 5.36"
Routed to Pond 5P : Wet Pond

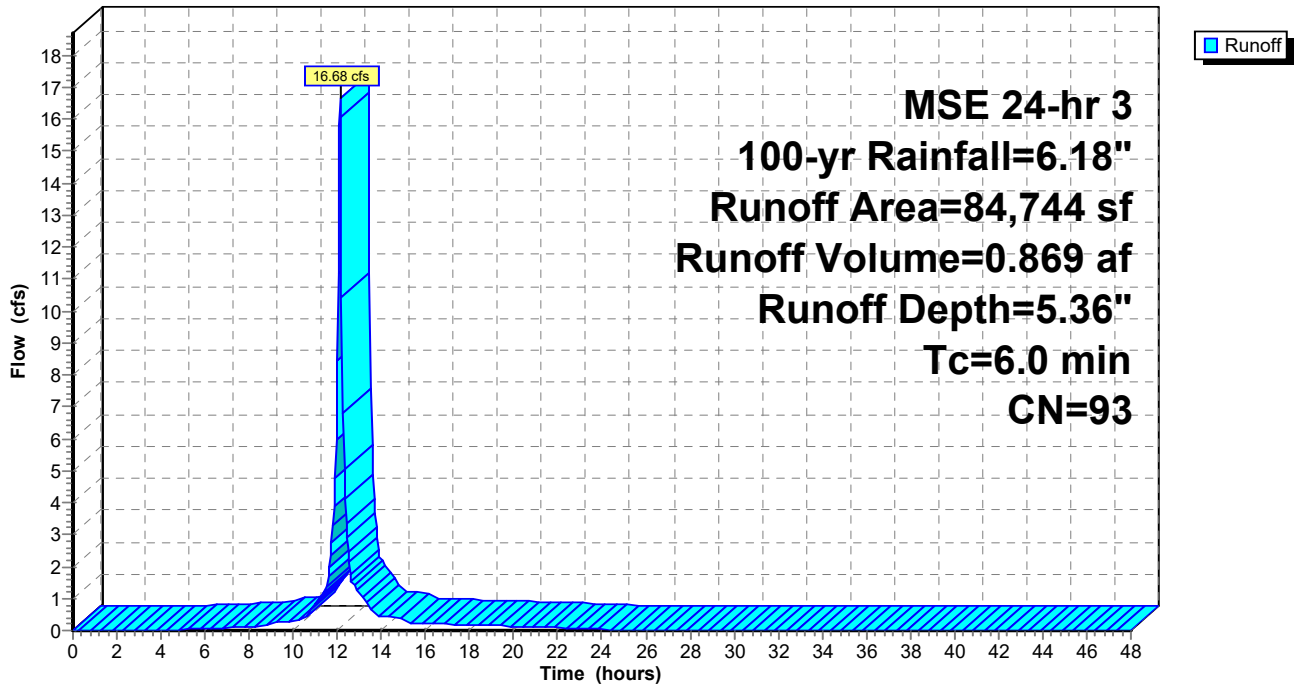
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-yr Rainfall=6.18"

Area (sf)	CN	Description
34,718	98	Paved parking, HSG D
* 33,953	91	Gravel D
11,456	80	>75% Grass cover, Good, HSG D
4,617	98	Water Surface, HSG D
84,744	93	Weighted Average
45,409		53.58% Pervious Area
39,335		46.42% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 3S: P-3

Hydrograph



Summary for Reach 4R: Proposed Outfall

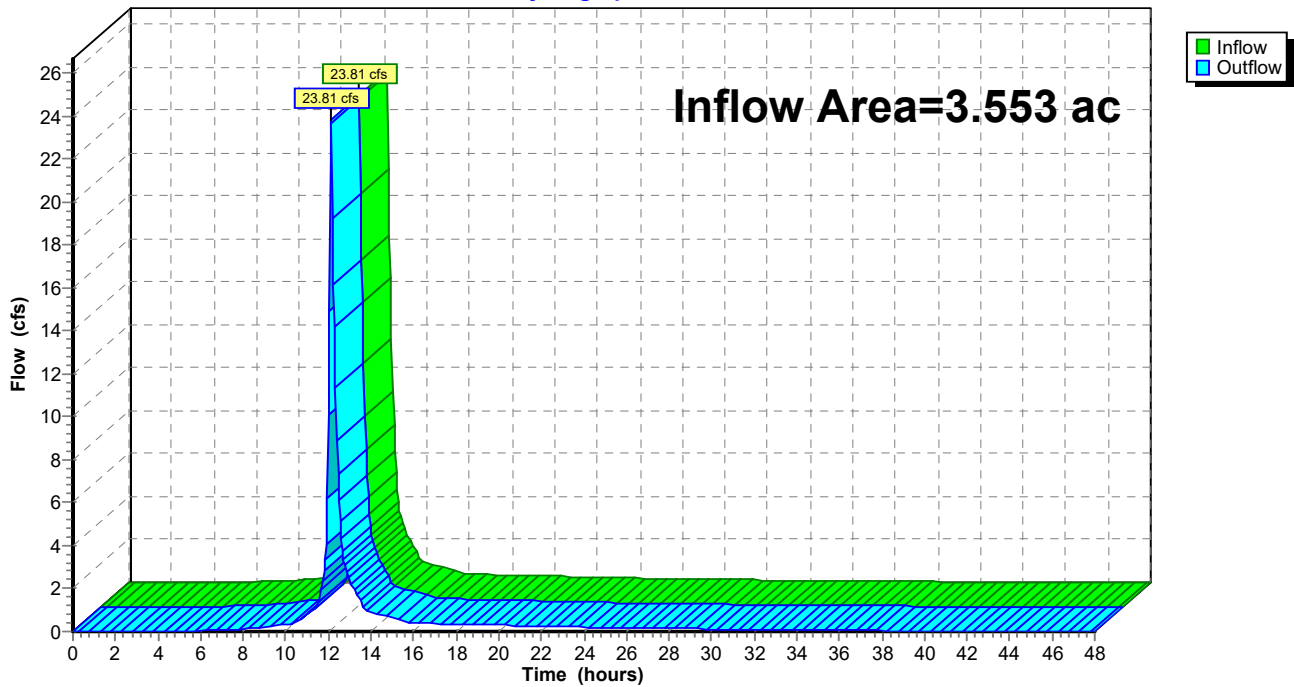
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 3.553 ac, 46.12% Impervious, Inflow Depth > 5.32" for 100-yr event
Inflow = 23.81 cfs @ 12.14 hrs, Volume= 1.574 af
Outflow = 23.81 cfs @ 12.14 hrs, Volume= 1.574 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Reach 4R: Proposed Outfall

Hydrograph



CDI Waukesha_HydroCAD

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Proposed Condition
MSE 24-hr 3 100-yr Rainfall=6.18"

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Summary for Pond 5P: Wet Pond

Inflow Area = 1.945 ac, 46.42% Impervious, Inflow Depth = 5.36" for 100-yr event
 Inflow = 16.68 cfs @ 12.13 hrs, Volume= 0.869 af
 Outflow = 10.69 cfs @ 12.20 hrs, Volume= 0.864 af, Atten= 36%, Lag= 4.6 min
 Primary = 10.69 cfs @ 12.20 hrs, Volume= 0.864 af
 Routed to Reach 4R : Proposed Outfall
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
 Routed to Reach 4R : Proposed Outfall

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
 Peak Elev= 858.83' @ 12.20 hrs Surf.Area= 6,967 sf Storage= 13,570 cf

Plug-Flow detention time= 237.9 min calculated for 0.864 af (99% of inflow)
 Center-of-Mass det. time= 233.9 min (997.9 - 763.9)

Volume	Invert	Avail.Storage	Storage Description
#1	856.50'	22,433 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
856.50	4,617	0	0
857.00	5,209	2,457	2,457
858.00	6,144	5,677	8,133
859.00	7,136	6,640	14,773
860.00	8,184	7,660	22,433

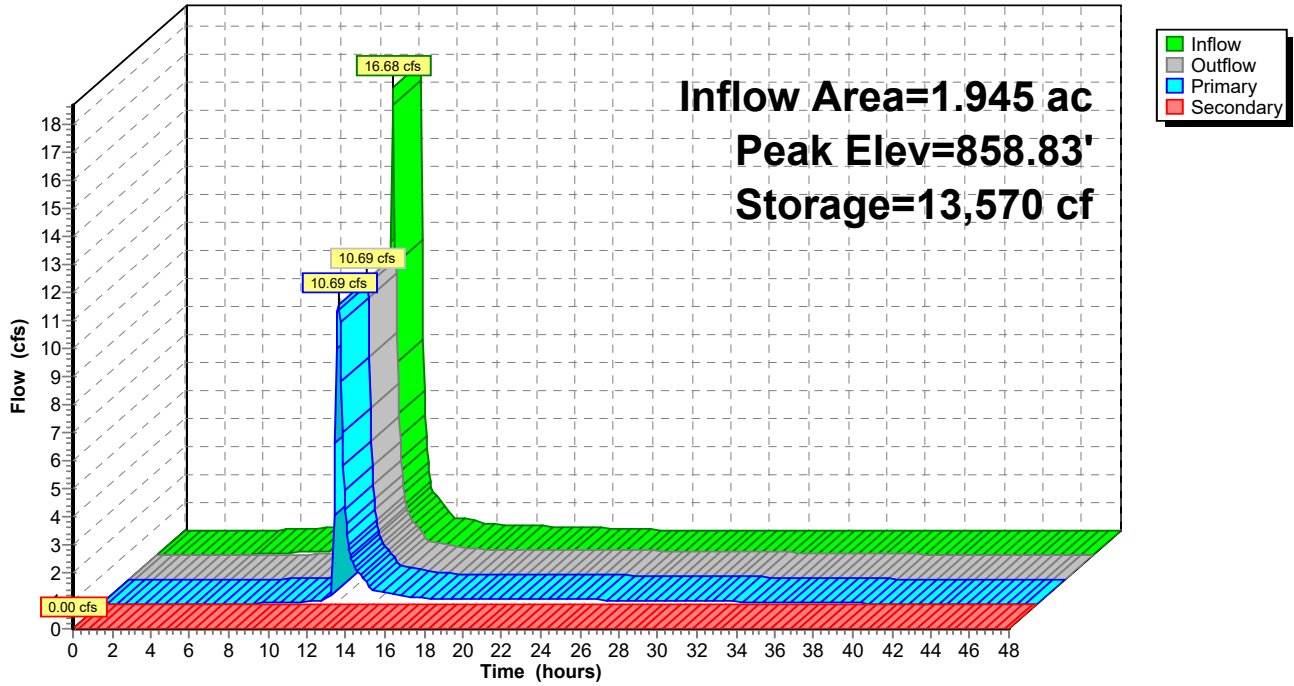
Device	Routing	Invert	Outlet Devices
#1	Primary	856.50'	18.0" Round Culvert L= 32.7' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 856.50' / 856.00' S= 0.0153 '/' Cc= 0.900 n= 0.015 Concrete sewer w/manholes & inlets, Flow Area= 1.77 sf
#2	Device 1	856.50'	2.5" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device 1	858.00'	6.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)
#4	Secondary	859.00'	20.0' long x 4.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.38 2.54 2.69 2.68 2.67 2.67 2.65 2.66 2.66 2.68 2.72 2.73 2.76 2.79 2.88 3.07 3.32

Primary OutFlow Max=10.68 cfs @ 12.20 hrs HW=858.83' (Free Discharge)
 ↑1=Culvert (Inlet Controls 10.68 cfs @ 6.04 fps)
 ↑2=Orifice/Grate (Passes < 0.24 cfs potential flow)
 ↑3=Sharp-Crested Rectangular Weir(Passes < 14.31 cfs potential flow)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=856.50' (Free Discharge)
 ↑4=Broad-Crested Rectangular Weir(Controls 0.00 cfs)

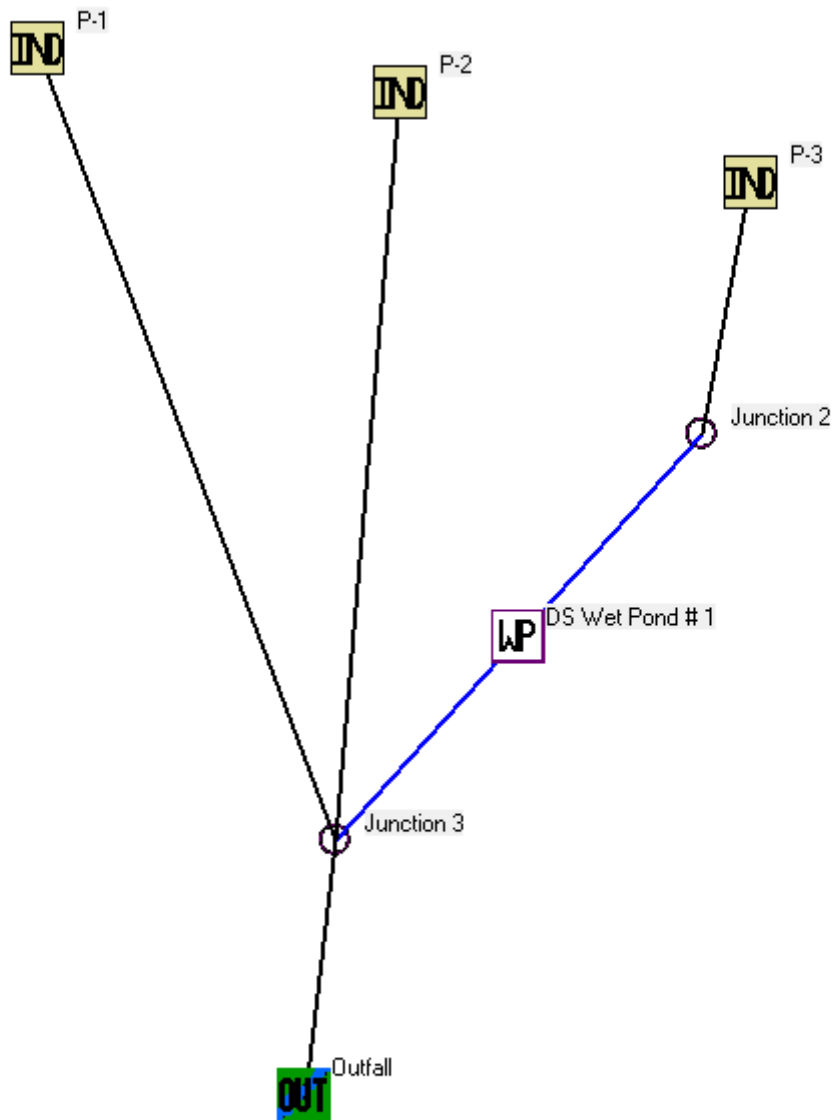
Pond 5P: Wet Pond

Hydrograph



Appendix D – Water Quality Calculations

WinSLAMM Model



Data file name: P:\3230241\Eng Data\Hydrology\CDI Waukesha_SLAMM.mdb
 WinSLAMM Version 10.5.0
 Rain file name: C:\WinSLAMM Files\Rain Files\WisReg - Milwaukee WI 1969.RAN
 Particulate Solids Concentration file name: C:\WinSLAMM Files\v10.1 WI_AVG01.pscx
 Runoff Coefficient file name: C:\WinSLAMM Files\WI_SL06 Dec06.rsvx
 Residential Street Delivery file name: C:\WinSLAMM Files\WI_Res and Other Urban Dec06.std
 Institutional Street Delivery file name: C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std
 Commercial Street Delivery file name: C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std
 Industrial Street Delivery file name: C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std
 Other Urban Street Delivery file name: C:\WinSLAMM Files\WI_Res and Other Urban Dec06.std
 Freeway Street Delivery file name: C:\WinSLAMM Files\Freeway Dec06.std
 Apply Street Delivery Files to Adjust the After Event Load Street Dirt Mass Balance: False
 Pollutant Relative Concentration file name: C:\WinSLAMM Files\WI_GEO03.ppd
 Source Area PSD and Peak to Average Flow Ratio File: C:\WinSLAMM Files\NURP Source Area PSD Files.csv
 Cost Data file name:
 Seed for random number generator: -42
 Study period starting date: 01/05/69 Study period ending date: 12/31/69
 Start of Winter Season: 12/06 End of Winter Season: 03/28
 Date: 02-24-2024 Time: 07:35:47
 Site information:

LU# 1 - Industrial: P-1 Total area (ac): 0.603
 13 - Paved Parking 1: 0.358 ac. Connected PSD File: C:\WinSLAMM Files\NURP.cpz Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
 14 - Paved Parking 2: 0.245 ac. Connected PSD File: C:\WinSLAMM Files\NURP.cpz Source Area PSD File: C:\WinSLAMM Files\NURP.cpz

LU# 2 - Industrial: P-2 Total area (ac): 1.004
 1 - Roofs 1: 0.033 ac. Flat Connected PSD File: C:\WinSLAMM Files\NURP.cpz Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
 13 - Paved Parking 1: 0.344 ac. Connected PSD File: C:\WinSLAMM Files\NURP.cpz Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
 14 - Paved Parking 2: 0.410 ac. Connected PSD File: C:\WinSLAMM Files\NURP.cpz Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
 45 - Large Landscaped Areas 1: 0.217 ac. Normal Clayey Low Density PSD File: C:\WinSLAMM Files\NURP.cpz Source Area PSD File: C:\WinSLAMM Files\NURP.cpz

LU# 3 - Industrial: P-3 Total area (ac): 1.945
 1 - Roofs 1: 0.347 ac. Pitched Connected PSD File: C:\WinSLAMM Files\NURP.cpz Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
 13 - Paved Parking 1: 0.450 ac. Connected PSD File: C:\WinSLAMM Files\NURP.cpz Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
 14 - Paved Parking 2: 0.779 ac. Connected PSD File: C:\WinSLAMM Files\NURP.cpz Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
 45 - Large Landscaped Areas 1: 0.263 ac. Normal Clayey Low Density PSD File: C:\WinSLAMM Files\NURP.cpz Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
 70 - Water Body Areas: 0.106 ac. PSD File: Source Area PSD File:

Control Practice 1: Wet Detention Pond CP# 1 (DS) - DS Wet Pond # 1
 Particle Size Distribution file name: Not needed - calculated by program
 Initial stage elevation (ft): 5
 Peak to Average Flow Ratio: 3.8
 Maximum flow allowed into pond (cfs): No maximum value entered
 Outlet Characteristics:

Outlet type: Sharp Crested Weir
 1. Sharp crested weir length (ft): 6
 2. Sharp crested weir height from invert: 2
 3. Sharp crested weir invert elevation above datum (ft): 6.5

Outlet type: Orifice 1
 1. Orifice diameter (ft): 0.21
 2. Number of orifices: 1
 3. Invert elevation above datum (ft): 5

Outlet type: Broad Crested Weir
 1. Weir crest length (ft): 20
 2. Weir crest width (ft): 4
 3. Height from datum to bottom of weir opening: 7.5

Pond stage and surface area

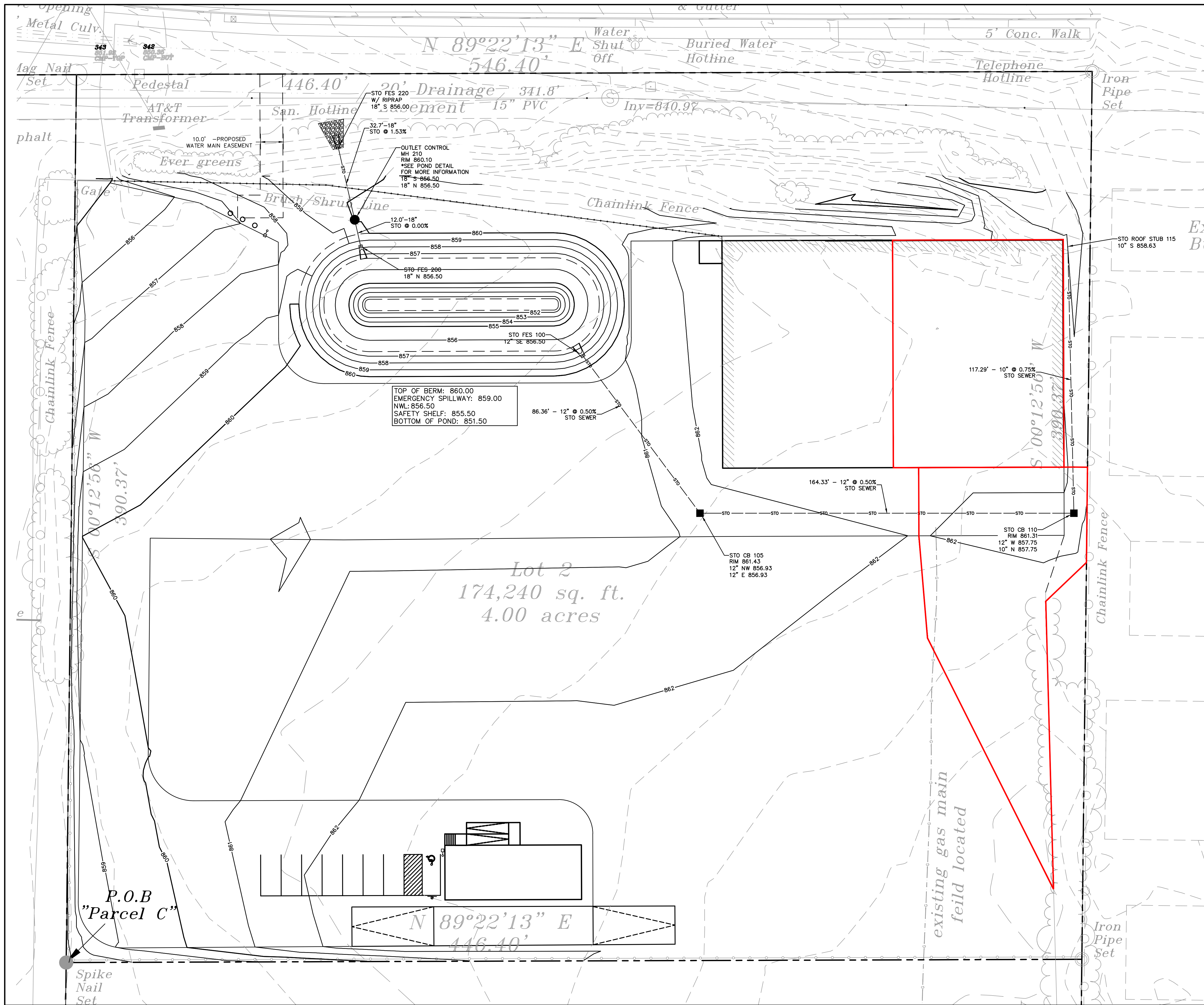
Entry Number	Stage (ft)	Pond Area (acres)	Natural Seepage (in/hr)	Other Outflow (cfs)
0	0.00	0.0000	0.00	0.00
1	0.01	0.0097	0.00	0.00
2	1.00	0.0181	0.00	0.00
3	2.00	0.0270	0.00	0.00
4	3.00	0.0366	0.00	0.00
5	4.00	0.0467	0.00	0.00
6	5.00	0.1060	0.00	0.00
7	5.50	0.1196	0.00	0.00
8	6.50	0.1410	0.00	0.00
9	7.50	0.1638	0.00	0.00
10	8.50	0.1879	0.00	0.00

Data file name: P:\3230241\Eng Data\Hydrology\CDI Waukesha_SLAMM.mdb
WinSLAMM Version 10.5.0
Rain file name: C:\WinSLAMM Files\Rain Files\WisReg - Milwaukee WI 1969.RAN
Particulate Solids Concentration file name: C:\WinSLAMM Files\v10.1 WI_AVG01.pscx
Runoff Coefficient file name: C:\WinSLAMM Files\WI_SL06 Dec06.rsvx
Pollutant Relative Concentration file name: C:\WinSLAMM Files\WI_GEO03.ppdx
Residential Street Delivery file name: C:\WinSLAMM Files\WI_Res and Other Urban Dec06.std
Institutional Street Delivery file name: C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std
Commercial Street Delivery file name: C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std
Industrial Street Delivery file name: C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std
Other Urban Street Delivery file name: C:\WinSLAMM Files\WI_Res and Other Urban Dec06.std
Freeway Street Delivery file name: C:\WinSLAMM Files\Freeway Dec06.std
Apply Street Delivery Files to Adjust the After Event Load Street Dirt Mass Balance: False
Source Area PSD and Peak to Average Flow Ratio File: C:\WinSLAMM Files\NURP Source Area PSD Files.csv
Cost Data file name:
Seed for random number generator: -42
Study period starting date: 01/05/69 Study period ending date: 12/31/69
Start of Winter Season: 12/06 End of Winter Season: 03/28
Model Run Start Date: 01/05/69 Model Run End Date: 12/31/69
Date of run: 02-24-2024 Time of run: 07:35:22
Total Area Modeled (acres): 3.552
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
Total of all Land Uses without Controls:	249753	-	206.5	3220	-
Outfall Total with Controls:	249889	-0.05%	123.4	1925	40.22%
Annualized Total After Outfall Controls:	253360			1952	

Appendix E – Hydrology Exhibit

Appendix F – Storm Sewer Design



LEGEND

---	PROPERTY LINE
---	PROPOSED WATERSHED
---	PROPOSED SWALE
---	PROPOSED 1-FOOT GRADE CONTOUR
---	PROPOSED 5-FOOT GRADE CONTOUR
---	EXISTING CONTOUR ELEVATION
X	PROPOSED SPOT GRADE
(X)	PROPOSED TOP OF CURB
X	EXISTING SPOT ELEVATION

DATE	DESCRIPTION

16745 W. Bluemound Road
Brookfield, WI 53005-5938
(262) 781-1000
rasmith.com

raSmith
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Cedarburg, WI | Naperville, IL | Irvine, CA

**CENTRAL DISPOSAL
CITY OF WAUKESHA, WI**

PROPOSED HYDROLOGY EXHIBIT

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DATE: 02/26/2024
SCALE: 1" = 20'
JOB NO. 3230241
PROJECT MANAGER: ROBERT J. HARLEY, P.E.
DESIGNED BY: CBW
CHECKED BY: RJH
SHEET NUMBER
HX02



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Storm Sewer Inventory Report

Line No.	Alignment				Flow Data				Physical Data								Line ID
	Dnstr Line No.	Line Length (ft)	Defl angle (deg)	Junc Type	Known Q (cfs)	Drng Area (ac)	Runoff Coeff (C)	Inlet Time (min)	Invert El Dn (ft)	Line Slope (%)	Invert El Up (ft)	Line Size (in)	Line Shape	N Value (n)	J-Loss Coeff (K)	Inlet/ Rim El (ft)	
1	End	86.359	53.353	DrGrt	0.00	0.00	0.00	6.0	856.50	0.50	856.93	12	Cir	0.012	1.25	861.43	105-100
2	1	164.334	-53.353	DrGrt	0.00	0.18	0.86	6.0	856.93	0.50	857.75	12	Cir	0.012	1.50	861.31	110-105
3	2	117.291	-91.303	MH	0.00	0.17	0.90	6.0	857.75	0.75	858.63	10	Cir	0.012	1.00	860.99	115-110
Project File: New.stm											Number of lines: 3				Date: 2/24/2024		

Storm Sewer Tabulation

Station		Len (ft)	Drng Area		Rnoff coeff (C)	Area x C		Tc		Rain (l) (in/hr)	Total flow (cfs)	Cap full (cfs)	Vel (ft/s)	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line		Incr (ac)	Total (ac)		Incr	Total	Inlet (min)	Syst (min)					Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
1	End	86.359	0.00	0.35	0.00	0.00	0.31	6.0	8.0	6.5	1.99	2.73	3.79	12	0.50	856.50	856.93	857.13	857.56	857.36	861.43	105-100
2	1	164.334	0.18	0.35	0.86	0.15	0.31	6.0	7.0	6.7	2.06	2.73	3.37	12	0.50	856.93	857.75	857.84	858.38	861.43	861.31	110-105
3	2	117.291	0.17	0.17	0.90	0.15	0.15	6.0	6.0	7.0	1.06	2.05	2.70	10	0.75	857.75	858.63	858.75	859.09	861.31	860.99	115-110

Project File: New.stm

Number of lines: 3

Run Date: 2/24/2024

NOTES: Intensity = $88.24 / (\text{Inlet time} + 15.50)^{0.83}$; Return period = Yrs. 10 ; c = cir e = ellip b = box

Storm Sewer Tabulation

Station		Len (ft)	Drng Area		Rnoff coeff (C)	Area x C		Tc		Rain (l) (in/hr)	Total flow (cfs)	Cap full (cfs)	Vel (ft/s)	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line		Incr (ac)	Total (ac)		Incr	Total	Inlet (min)	Syst (min)					Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
1	End	86.359	0.00	0.35	0.00	0.00	0.31	6.0	7.5	9.0	2.78	2.73	4.18	12	0.50	856.50	856.93	857.21	857.83	857.36	861.43	105-100
2	1	164.334	0.18	0.35	0.86	0.15	0.31	6.0	6.7	9.3	2.85	2.73	3.63	12	0.50	856.93	857.75	858.10	859.00	861.43	861.31	110-105
3	2	117.291	0.17	0.17	0.90	0.15	0.15	6.0	6.0	9.5	1.45	2.05	2.66	10	0.75	857.75	858.63	859.31	859.75	861.31	860.99	115-110

Project File: New.stm

Number of lines: 3

Run Date: 2/24/2024

NOTES: Intensity = $127.16 / (\text{Inlet time} + 17.80)^{0.82}$; Return period = Yrs. 100 ; c = cir e = ellip b = box