

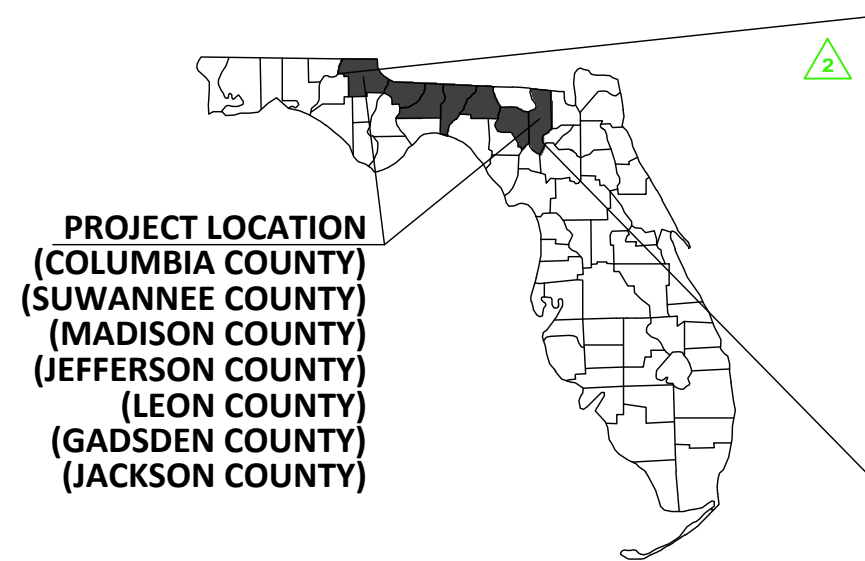
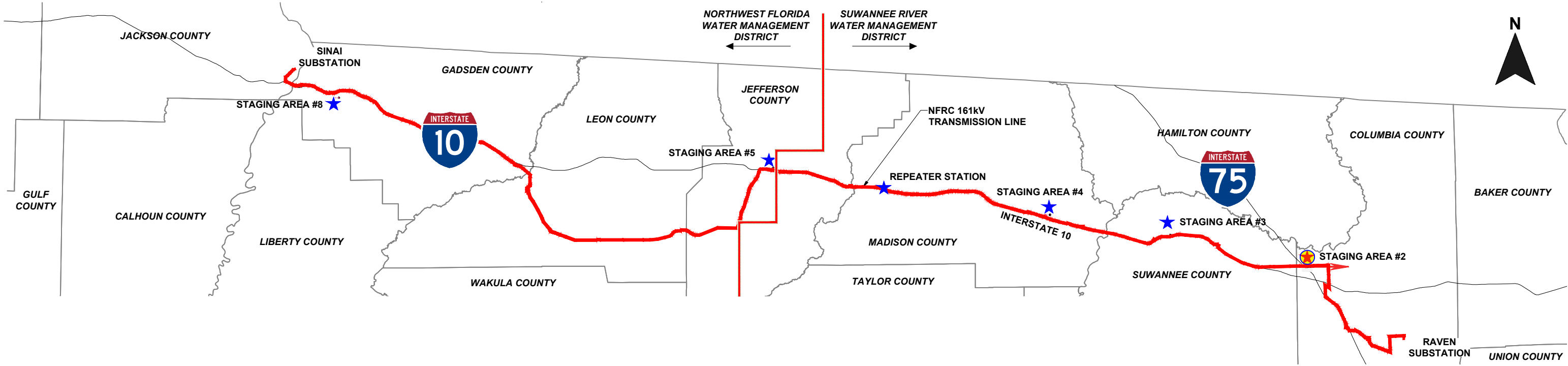
GULF POWER COMPANY

NFRC TRANSMISSION LINE PROJECT △2

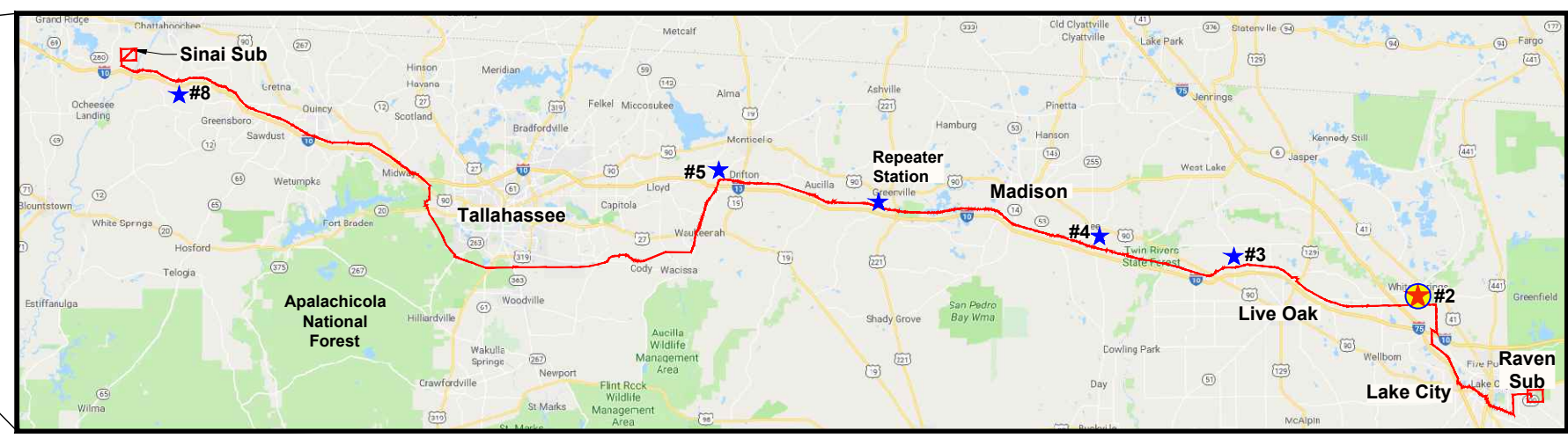
TEMPORARY STAGING AREA NO. 2

SITE PLAN EXHIBIT

CAD FILE: S:\Projects\108_Gulf Power\19-108-1002_Raven-Sinai Line Detailed Engineering\Drawings\Staging Areas Exhibit\NFRC_Exh_SA02_R02.dwg PLOT DATE/TIME: 3/17/2020 - 3:19pm By: Josh Baker



PROJECT LOCATION
 (COLUMBIA COUNTY)
 (SUWANNEE COUNTY)
 (MADISON COUNTY)
 (JEFFERSON COUNTY)
 (LEON COUNTY)
 (GADSDEN COUNTY)
 (JACKSON COUNTY)



LEGEND

- ★ PROPOSED STAGING AREAS & REPEATER STATION



**Know what's below.
before you dig.**

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TYPICAL CONSTRUCTION DETAILS	SHEET 5
FENCE AND BMP DETAILS	SHEET 6

NOTICE:
 CONTRACTOR SHALL VERIFY ALL CONDITIONS ON JOB SITE & NOTIFY PROJECT MANAGER AND ENGINEER OF ANY VARIATIONS FROM DIMENSIONS SHOWN ON THESE DRAWINGS BEFORE PROCEEDING WITH ANY CONSTRUCTION.

PICKETT SURVEYING • ENGINEERING

PICKETT AND ASSOCIATES, INC
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 CA #31323 LB #364

PROFESSIONAL SURVEYOR
 MICHAEL K. LEAHY
 No. 45287
 FLORIDA LICENSED PROFESSIONAL ENGINEER No. 45287
 PROFESSIONAL SURVEYOR & MAPPER No. 5658

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1	11/22/19	REVISIONS, CLARIFICATIONS FOR RAI RESPONSE 11-22-19	GCC JJB MKL
			BY: CHK APP

TRANSMISSION ENGINEERING DEPARTMENT

SCALE: N.T.S. ENGINEER: MKL SECTION: 25-2S-15E
 DRAFTER: GCC CHECKED: JJB COUNTY: COLUMBIA
 SHEET: 1 OF 6 FILE NAME: NFRC_EXH_SA02_R02.dwg

NORTH FLORIDA RESILIENCY CONNECTION (NFRC)
 STAGING AREA NO. 2 SITE PLAN EXHIBIT
 FOR TEMPORARY USE AS LAYDOWN YARDS

Gulf Power

**STAGING AREA NO. 2
SITE PLAN EXHIBIT**

GULF POWER COMPANY

NFRC TRANSMISSION LINE PROJECT

TEMPORARY STAGING AREA NO. 2

SITE PLAN EXHIBIT

SURVEYOR'S NOTES:

1. NORTH, THE BEARINGS AND THE COORDINATES SHOWN HEREON ARE REFERENCE TO THE WEST ZONE OF THE FLORIDA STATE PLANE COORDINATE SYSTEM, NORTH AMERICAN DATUM OF 1983 (NAD 83/ FLW-83) CORS 2011..
2. ELEVATIONS ARE TO NORTH AMERICAN VERTICAL DATUM OF 1988 AND ARE FOR REFERENCE AND GRAPHICAL DISPLAY PURPOSES ONLY. TEMPORARY BENCHMARKS WILL BE SET AT EACH CROSSING SITE LOCATION AS REQUIRED.
3. SURVEY INFORMATION SHOWN HEREON PERTAINING TO RIGHT-OF-WAY AND EASEMENTS IS BASED ON A SURVEYS PROVIDED BY GULF POWER.
4. NO UNDERGROUND UTILITIES AND/OR IMPROVEMENTS SHOWN HEREON A SUBSURFACE INVESTIGATION WAS NOT PERFORMED AS PART OF THIS SURVEY.
5. THE AERIAL IMAGERY SHOWN HEREIN ARE A COMBINATION OF 2015/2016/2017 ORTHOGRAPHIC IMAGES OBTAINED FROM THE FLORIDA DEPARTMENT OF TRANSPORTATION A+PLUS WEBSITE.
6. PROPERTY THE PROPOSED STAGING AREA IS LOCATED ON IS THERE BY GRANTED EASEMENT TO GULF POWER.

SITE DATA:

STAGING AREA #2 - COLUMBIA COUNTY - SRWMD
SUWANNEE VALLEY ROAD, LAKE CITY, FL
PID 25-2S-15-00093-000

PROJECT NARRATIVE:

TEMPORARY STAGING AREA NO. 2 IS REQUIRED TO STAGE AND STORE CONSTRUCTION MATERIALS (POLES, CONDUCTOR, INSULATORS, ETC.) AND EQUIPMENT (DRILL RIGS, LINE TRUCKS, CRANES, ETC.) FOR THE NORTH FLORIDA RESILIENCY CONNECTION (NFRC) PROJECT. THE NFRC PROJECT IS A 176 MILE LENGTH CORRIDOR THAT IS BROKEN UP INTO APPROXIMATELY 20 MILE SEGMENTS RESULTING IN THE NEED FOR FIVE (5) TOTAL TEMPORARY STAGING AREAS. EACH STAGING AREA IS SIZED TO BE ABLE TO STORE ITS PRO-RATA SHARE OF THE MATERIAL. THE AVERAGE SITE SELECTION CRITERIA IS FOR EACH STAGING AREA TO BE APPROXIMATELY 16.0 ACRES TOTAL WITH APPROXIMATELY 12.6 ACRES OF DEVELOPED AREA. THE DEVELOPED AREA WILL CONSIST OF AN AT GRADE #57 CRUSHED LIMEROCK SURFACE ON UNCOMPACTED SUBBASE TO FACILITATE THE STORAGE OF POLES AND EQUIPMENT ALONG WITH A GEOWEB SEDIMENT CONTAINMENT CELL PERIMETER ROAD OF #57 CRUSHED LIMEROCK FILL TO FACILITATE ACCESS.

TEMPORARY STAGING AREA NO. 2 SITE PLAN STORMWATER DESIGN HAS BEEN REVIEWED TO ENSURE THAT EXISTING SURFACE WATER FLOW WILL FLOW SIMILAR TO IT'S PREDEVELOPED CONDITIION. THE DIFFERENCE BETWEEN PRE AND POST-DEVELOPED RUNOFF WILL BE STORED ON SITE WITH DRY RETENTION PONDS AND/OR THE ROCK VOIDS. DISCHARGE WILL NOT EXCEED THE PRE-DEVELOPED CONDITION FOR WATER TREATMENT AND RECOVERY. THIS SITE WILL USE A COMBINATION OF THE VOID SPACE BETWEEN THE #57 CRUSHED LIMEROCK AND A SERIES OF CHECK DAMN SYSTEMS MADE WITH WATER AND ROOT BARRIER SYSTEMS FOR STORAGE FOR THE FIRST 1" OR THE FIRST 1/2" OF RUNOFF, WHICH EVER IS GREATER, AS DIRECTED BY THE GOVERNING SUWANNEE RIVER WATER MANAGEMENT DISTRICT STORMWATER DESIGN MANUAL REQUIREMENTS. GULF POWER HAS DONE EXTENSIVE TESTING ON THIS VOID RATIO AND HAS DETERMINED THAT A 35% VOID RATIO PROVIDES A GOOD CONSERVATIVE VALUE. ANY TREATMENT VOLUMES NOT ABLE TO RECOVER IN THE ROCK VOIDS WILL UTILIZE DRY RETENTION PONDS FOR THE REMAINING VOLUME. THE TREATMENT VOLUMES ARE DESIGNED TO RECOVER WITHIN THE 72 HOUR REQUIREMENT. SOIL BORINGS AND DOUBLE RING INFILTRMETER TESTING WAS PERFORMED AT EACH SITE TO FACILITATE THE DESIGN OF EACH DRY POND AND ROCK VOID STORAGE AREA. REFER TO GEOGRAPHICAL REPORT FOR DETAILS.

TEMPORARY STAGING ARE NO. 2 WILL REMAIN IN PLACE FOR THE DURATION OF THE PROJECT. AT THE CONCLUSION OF THE PROJECT, THIS SITE WILL BE RETURNED TO ITS PRE-CONSTRUCTION STATE BY THE CONTRACTOR. THE ANTICIPATED DURATION IS APPROXIMATELY 12 - 18 MONTHS.

GENERAL SITE NOTES:

1. CONSTRUCTION AND MAINTENANCE ACCESS TO TEMPORARY STAGING AREA NO. 2 WILL BE GAINED VIA EXISTING ROAD RIGHT-OF-WAY OF SUWANNEE VALLEY ROAD. CONNECTOR APRONS WILL BE CONSTRUCTED IN ACCORDANCE WITH COUNTY / STATE REQUIREMENTS.
2. TEMPORARY STAGING AREA NO. 2 EXISTS ON EASEMENTS MADE THRU LAND NEGOTIATIONS WITH CURRENT LANDOWNERS. THIS SITE HAS UNDERGONE A FULL EVALUATION / VETTING RELATIVE TO AVOIDANCE OF ENVIRONMENTAL, CULTURAL, AND WILDLIFE HABITAT IMPACT. NO TREE REMOVAL WILL BE NECESSARY TO FACILITATE CONSTRUCTION OF THIS SITE.
3. TEMPORARY STAGING AREA NO. 2 WILL CONFORM WITH ALL FEDERAL, STATE, AND LOCAL ORDINANCES AND REGULATIONS FOR LONG TERM STORAGE MATERIALS.
4. DELIVERIES AND ACTIVE USE OF THIS SITE WILL BE CONSISTENT WITH CONSTRUCTION HOURS.
5. ALL PROPOSED SEMI-PERVIOUS MATERIAL WILL BE INSTALLED AT THE EXISTING NATURAL GROUND ELEVATION THROUGHOUT THE SITE TO MINIMIZE IMPEDANCE OF THE EXISTING WATERSHED.
6. WHEN THE PROPOSED ACTIVITIES OCCUR ADJACENT TO WETLANDS, APPROPRIATE SEDIMENT CONTROL METHODS WILL BE USED, AS REQUIRED. SEDIMENT CONTROLS INCLUDE THE INSTALLATION OF STAKED SILT FENCES ALONG PROPOSED FILL ADJACENT WETLANDS. NO FILL OR GRADING WORK WILL OCCUR IN WETLAND AREAS.

CONSTRUCTION NOTES:

1. CONTRACTOR SHALL INSTALL AND MAINTAIN BMP'S PER THE APPROVED SWPPP (STORM WATER POLLUTION PREVENTION PLAN, I.E. SILT FENCE, TURBIDITY BARRIER) AND WWACCM MANUAL AROUND THE PERIMETER TO THE WORK ZONES DURING CONSTRUCTION. BMP'S SHALL ONLY BE REMOVED AFTER ALL CONSTRUCTION HAS BEEN COMPLETED AND ESTABLISHED.
2. CONTRACTOR SHALL CONSTRUCT PONDS AND/OR SWALES AS SHOWN IN THE DRAWINGS. CONTRACTOR SHALL SOD THE SIDE SLOPES AFTER GRADING TO STABILIZE THE DISTURBED SOIL AND EMBANKMENTS AND TO CONTROL EROSION. SEEDING AND SODDING SHALL BE PERFORMED IN ACCORDANCE WITH THE LATEST FDOT STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION. THE SIDES OF POND/SWALE AREAS SHALL BE SODDED AND THE BOTTOMS SHALL BE SEEDED AND MULCHED.CONTRACTOR SHALL DISC THE AREAS TO EMBED THE SEED AND MULCH AND SHALL THEN RE-COMPACT THE SURFACE.CONTRACTOR SHALL MAINTAIN THE SOD AND SEED UNTIL FINAL ACCEPTANCE OF THE WORK.
3. CONTRACTOR SHALL INSTALL CHECK DAMS ALONG THE EXISTING (1) ONE FOOT CONTOUR ELEVATIONS AS SHOWN ON THE PLANS AND ALONG THE INTERIOR OF THE ROADWAYS BETWEEN THE ROCK LAYDOWN AREAS AND THE EDGE OF GEOWEB ROAD. SEE DETAIL 3 ON SHEET 5.
4. CONTRACTOR SHALL REMOVE THE TOP LAYER OF VEGETATION ON THE SITE BEFORE BEGINNING ANY GRADING OR SITE WORK. SITE SHALL MAINTAIN EXISTING SLOPES AND GENERAL GRADING CHARACTERISTICS.
5. IF ANY OBSTRUCTIONS OR VARIANCES EXIST, CONTRACTOR MUST NOTIFY THE ENGINEER OF RECORD.

FLOOD ZONE NOTES:

1. FLOOD ZONE INFORMATION BASED ON THE COLUMBIA COUNTY, FLORIDA FLOOD INSURANCE RATE MAPS:

MAP NUMBER 12023C0167D (DATED 11-02-18)

2. APPLICABLE FLOOD ZONE DELINEATIONS PER THE ABOVE REFERENCED FLOOD INSURANCE RATE MAP ARE AS FOLLOWS:

ZONE X AREA OUTSIDE THE 100-YEAR FLOOD PLAIN

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 CA #31323 LB #364




THESEY VERIFY THAT THIS DRAWING WAS PREPARED UNDER THE DIRECTION OF THE DATE SHOWN BASED ON THE INFORMATION FURNISHED TO ME AS NOTED AND BEGINS TO ACCEPTED ENGINEERING PRACTICES IN THE STATE OF FLORIDA PURSUANT TO SECTION 471, FLORIDA STATUTE IN ACCORDANCE WITH THE BEST OF THIS ENGINEER'S KNOWLEDGE, THE PLANS AND SPECIFICATIONS COMPLY WITH THE APPLICABLE BUILDING CODES.

MICHAEL K. LEAHY
 FLORIDA LICENSED PROFESSIONAL ENGINEER No. 45287
 PROFESSIONAL SURVEYOR & MAPPER No. 5658

TRANSMISSION ENGINEERING DEPARTMENT

SCALE: N.T.S.	ENGINEER: MKL	SECTION: 25-2S-15E
DRAFTER: GCC	CHECKED: JJB	COUNTY: COLUMBIA
SHEET: 2 OF 6		FILE NAME: NFRC_EXH_SA02_R02.dwg

NORTH FLORIDA RESILIENCY CONNECTION (NFRC)
 STAGING AREA NO. 2 SITE PLAN EXHIBIT
 FOR TEMPORARY LAYDOWN YARDS



STAGING AREA NO. 2
SITE PLAN EXHIBIT

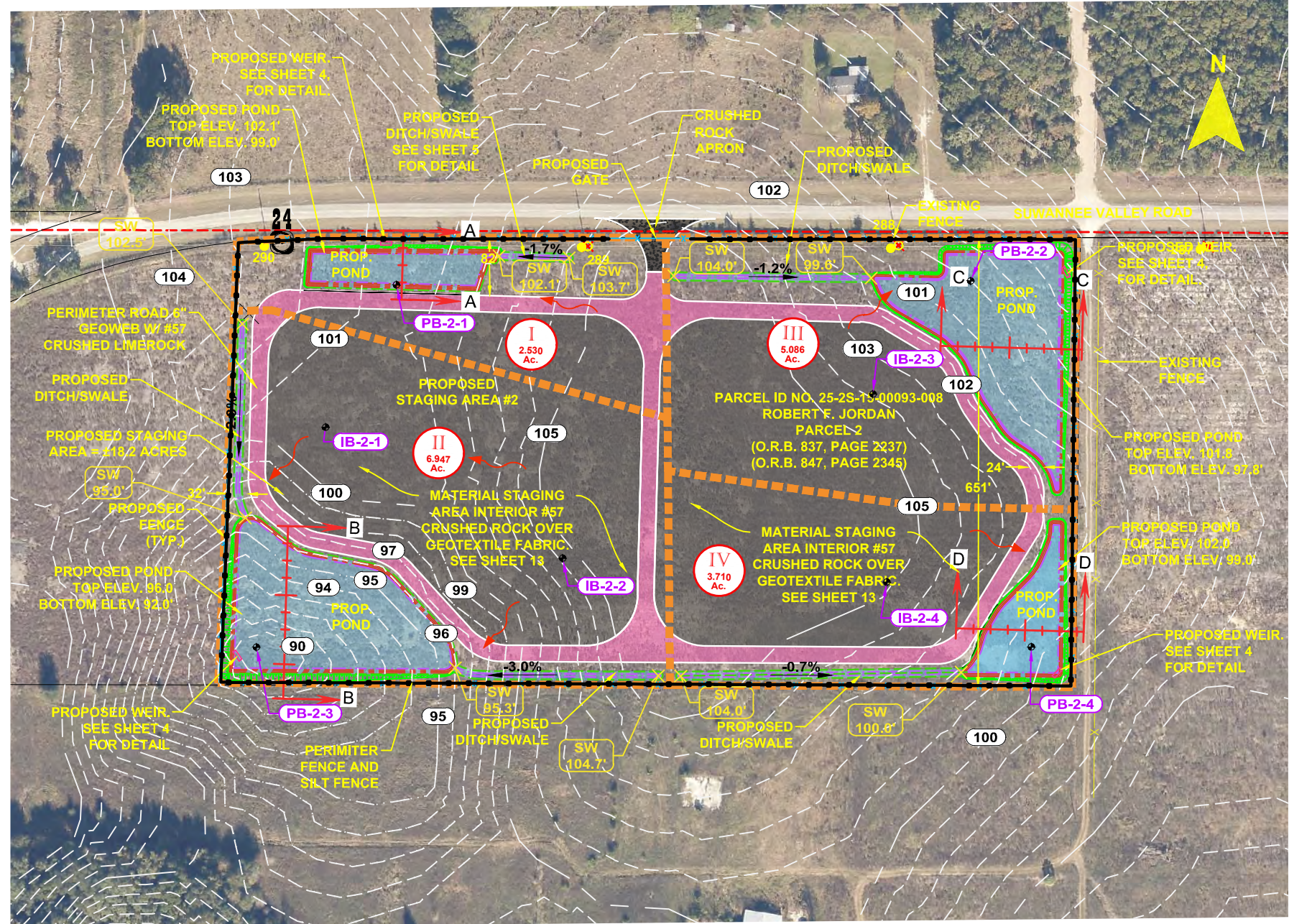
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Table 3: Pond Storage Data

Basin No.	Elevation (ft, NAVD 88)	Area (ac)	Provided Volume (acft)	Required Volume (acft)	Provided Discharge at Weir (cfs)
I	Top of Pond	102.1	1.07	1.04	24.33
	Peak Water Elev.	101.1			
	Weir Elev.	100.5			
	Bottom of Pond	97.5			
II	Top of Pond	96.0	4.10	3.54	13.40
	Peak Water Elev.	94.9			
	Weir Elev.	94.5			
	Bottom of Pond	92.0			
III	Top of Pond	101.8	3.89	3.33	1.92
	Peak Water Elev.	100.8			
	Weir Elev.	100.7			
	Bottom of Pond	97.8			
IV	Top of Pond	102.0	1.28	1.26	19.86
	Peak Water Elev.	101.0			
	Weir Elev.	100.3			
	Bottom of Pond	98.0			

Table 4: Summary of Treatment Volume and Recovery

Basin No.	Treatment Volume Required (acft)	Treatment Volume Provided (acft)		Recovery Time (hrs)
		Rock Voids	Water Quality Basins	
I	0.11	0.15	Not Required for Treatment	6
II	0.33	0.73	Not Required for Treatment	60
III	0.24	0.43	Not Required for Treatment	12
IV	0.17	0.42	Not Required for Treatment	12



GENERAL NOTES:

- CHECK DAMS WILL BE INSTALLED ALONG EXISTING (1) ONE FOOT CONTOUR ELEVATIONS AS SHOWN, AND AS A BARRIER BETWEEN THE INTERIOR ROAD EDGE AND GRAVEL LAYDOWN AREA. SEE NOTES ON SHEET 2 AND DETAILS ON SHEET 5.
- INFORMATION OF WATER TABLE DEPTHS FOR SEASONAL HIGH WATER (SHW) ELEVATIONS IS BASED ON GEOTECHNICAL REPORTS PROVIDED BY B.J. ROCK.
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- INTERIOR CRUSHED ROCK SHALL NOT BE COMPACTED (TYP.).
- FILL SHALL NOT BE PLACED IN WETLAND AREAS (TYP.).

LEGEND

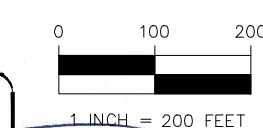
PROPOSED TEMPORARY STAGING AREA MATERIALS	WETLAND AREAS	EXISTING BOUNDARIES
L AT-GRADE ROCK LAYDOWN	WETLAND AREA	FEMA 100-YEAR FLOOD PLAIN LINE
R AT-GRADE GEOWEB ROAD	SURFACE WATER AREA	EASEMENT
C CRUSHED ROCK APRON	EXISTING GRADE	PROPERTY LINE
PROPOSED GRADE	DRAINAGE BASIN AREA BOUNDARY	SECTION LINE
PROPOSED PONDS & DITCHES	PROPOSED FENCE & GATES	RIGHT-OF-WAY LINE
TOP OF BANK	PROPOSED GATE	EXISTING FENCE
GRADE BREAK	PROPOSED FENCE	PROPOSED SILT FENCE
TOE OF SLOPE		
P/D PROPOSED POND/DITCH		

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PROFESSIONAL ENGINEER
 MICHAEL LEAHY
 STATE OF FLORIDA
 LICENSE NO. 45226
 EXPIRES 08-18-20

FLORIDA LICENSED PROFESSIONAL ENGINEER No. 45226
 PROFESSIONAL SURVEYOR & MAPPER No. 5658



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SCALE: 1" = 200'
 ENGINEER: MKL
 DRAFTER: GCC
 SHEET: 3 OF 6

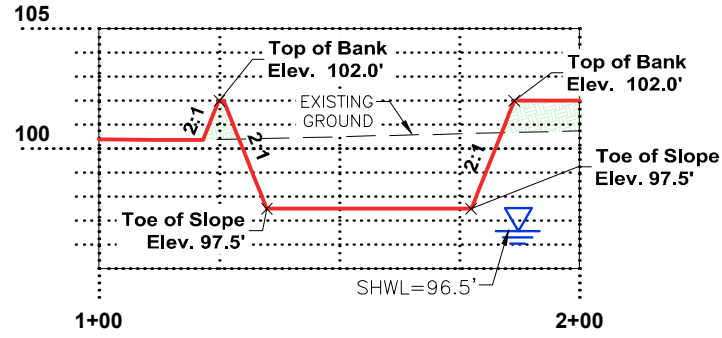
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NORTH FLORIDA RESILIENCY CONNECTION (NFRC)
 STAGING AREA NO. 2 SITE PLAN EXHIBIT
 FOR TEMPORARY LAYDOWN YARDS

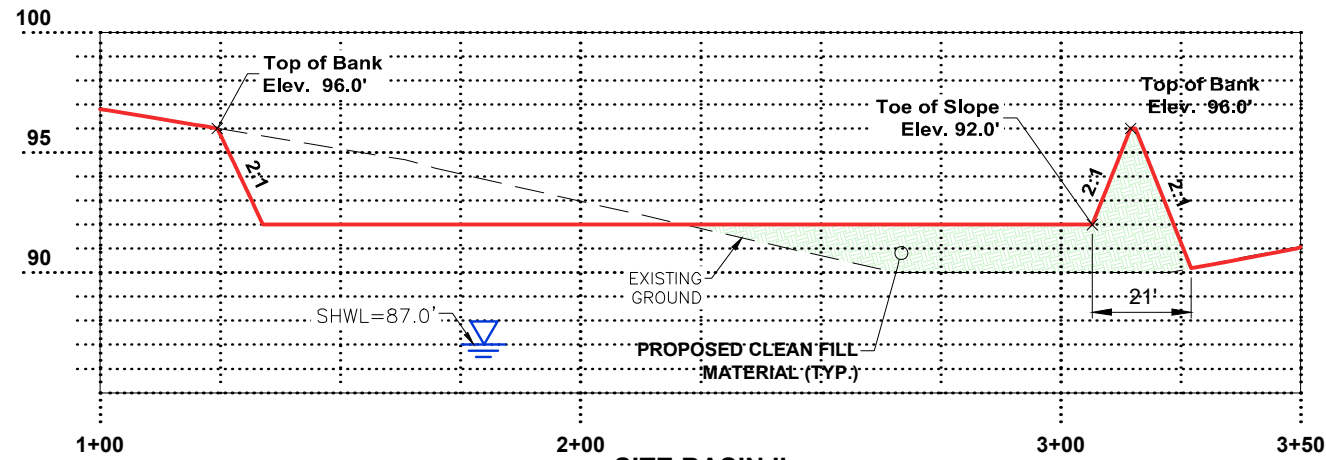
Gulf Power

STAGING AREA NO. 2 SITE PLAN EXHIBIT

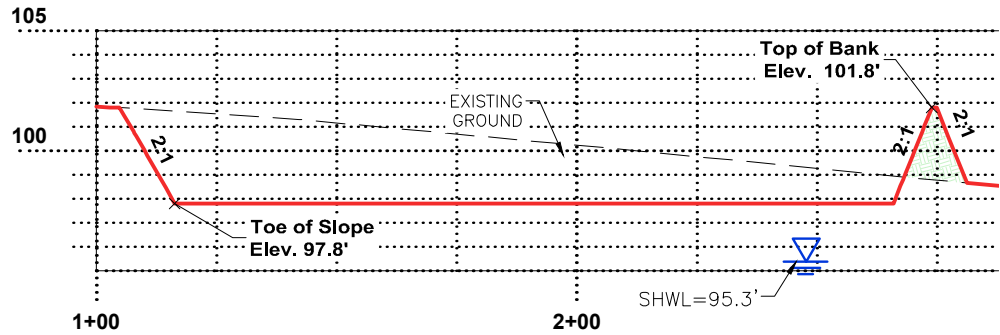
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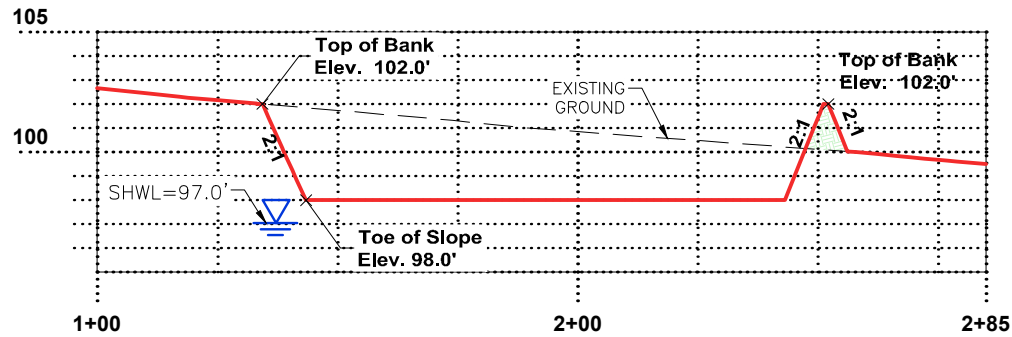
SITE BASIN I
CROSS SECTION VIEW A-A
 LOOKING EAST
 HORZ. SCALE = 1" = 40'
 VERT. SCALE = 1" = 8'



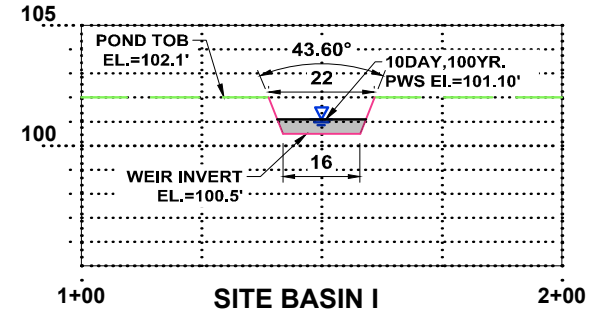
SITE BASIN II
CROSS SECTION VIEW B-B
 LOOKING EAST
 HORZ. SCALE = 1" = 40'
 VERT. SCALE = 1" = 8'



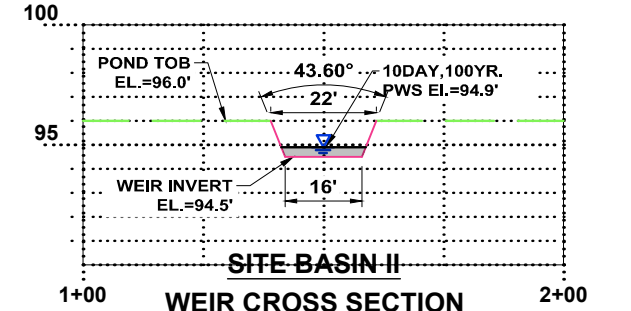
SITE BASIN III
CROSS SECTION VIEW C-C
 LOOKING NORTH
 HORZ. SCALE = 1" = 40'
 VERT. SCALE = 1" = 8'



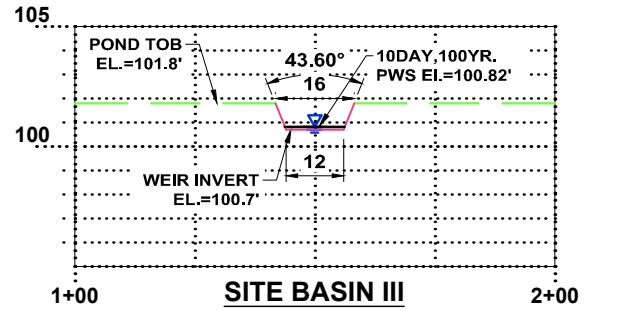
SITE BASIN IV
CROSS SECTION VIEW D-D
 LOOKING NORTH
 HORZ. SCALE = 1" = 40'
 VERT. SCALE = 1" = 8'



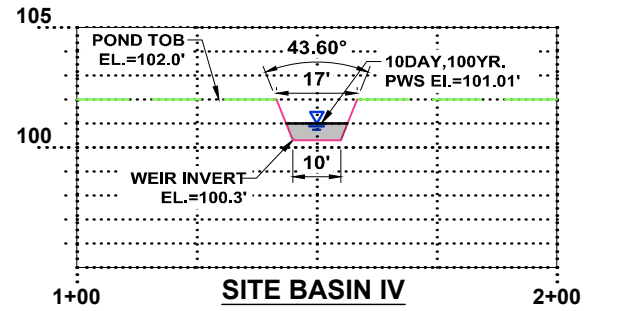
SITE BASIN I
WEIR CROSS SECTION
 HORZ. SCALE = 1" = 40'
 VERT. SCALE = 1" = 8'



SITE BASIN II
WEIR CROSS SECTION
 HORZ. SCALE = 1" = 40'
 VERT. SCALE = 1" = 8'



SITE BASIN III
WEIR CROSS SECTION
 HORZ. SCALE = 1" = 40'
 VERT. SCALE = 1" = 8'



SITE BASIN IV
WEIR CROSS SECTION
 HORZ. SCALE = 1" = 40'
 VERT. SCALE = 1" = 8'

GENERAL NOTES:

1. INFORMATION OF WATER TABLE DEPTHS FOR SEASONAL HIGH WATER (SHW) ELEVATIONS IS BASED ON GEOTECHNICAL REPORTS PROVIDED BY B.J. ROCK.

LEGEND
 - - - EXISTING GROUND
 ——— PROPOSED GROUND

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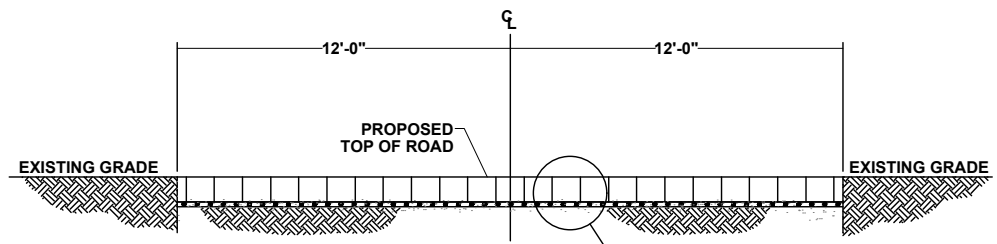
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STAGING AREA NO. 2
SITE PLAN EXHIBIT

Gulf Power

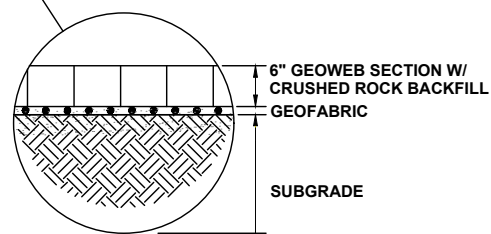
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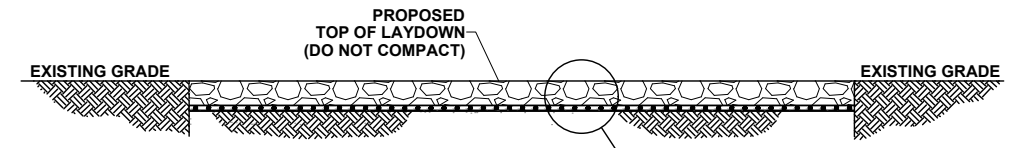
TEMPORARY ROADWAY IMPROVEMENTS - AT GRADE GEOWEB STABILIZATION

1. REMOVE THE TOP 6" OF EXISTING VEGETATED SURFACE MATERIAL BEFORE INSTALLING THE TEMPORARY ROADWAY IMPROVEMENTS.
2. SMOOTH SUBGRADE TO LEVEL ELEVATION ACROSS WIDTH OF 24' WIDE TEMPORARY ROAD.
3. PLACE ROAD BEDLINER, MIRAFI RS580i HIGH STRENGTH WOVEN GEOTEXTILE FABRIC, OR APPROVED EQUIVALENT. INSTALL GEOTEXTILE FABRIC PROVIDING MINIMUM LAP AS PER MANUFACTURER INSTALLATION INSTRUCTIONS AT THE LAP JOINT.
4. INSTALL 6" PERFORATED GEOWEB AND FILL WITH 4. NO 57 CRUSHED LIMEROCK.



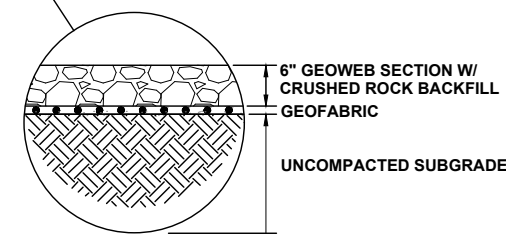
DETAIL 1

**TEMPORARY ROADWAY IMPROVEMENT
AT-GRADE GEOWEB STABILIZATION
WITH CRUSHED ROCK BACKFILL**



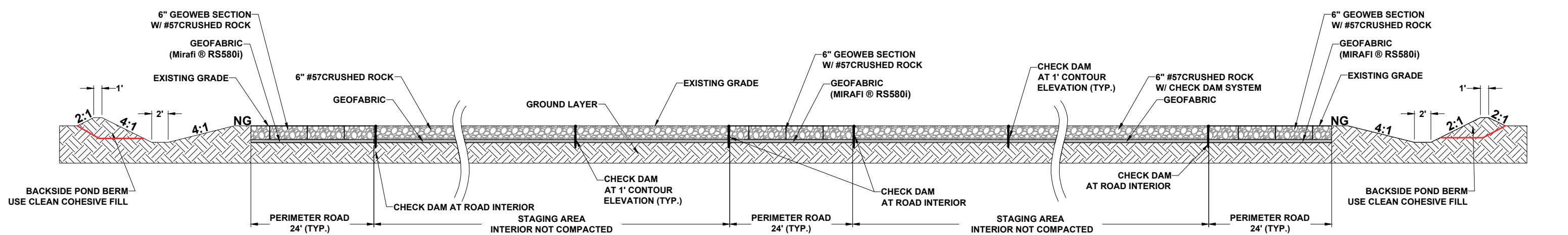
TEMPORARY - AT GRADE LAYDOWN STABILIZATION

1. REMOVE THE TOP 6" LAYER OF EXISTING VEGETATED SURFACE MATERIAL BEFORE INSTALLING THE TEMPORARY LAYDOWN STABILIZATION. DO NOT COMPACT SUBGRADE.
2. INSTALL CHECK DAM SYSTEM AT EXISTING 1 FOOT CONTOURS, USING 12" CR-PE MULTI PURPOSE ROOT & WATER BARRIER, OR EQUIVILANT (SEE TYPICAL PROFILE OF CHECK DAM SYSTEM). BURY 6" DEEP AND LEAVE TOP 6" EXPOSED AND PLUM.
3. PLACE ROAD BEDLINER, MIRAFI RS580i HIGH STRENGTH WOVEN GEOTEXTILE FABRIC, OR APPROVED EQUIVALENT. INSTALL GEOTEXTILE FABRIC PROVIDING MINIMUM LAP AS PER MANUFACTURER INSTALLATION INSTRUCTIONS AT THE LAP JOINT.
4. INSTALL 6" WASHED NO 57 CRUSHED ROCK BACKFILL.



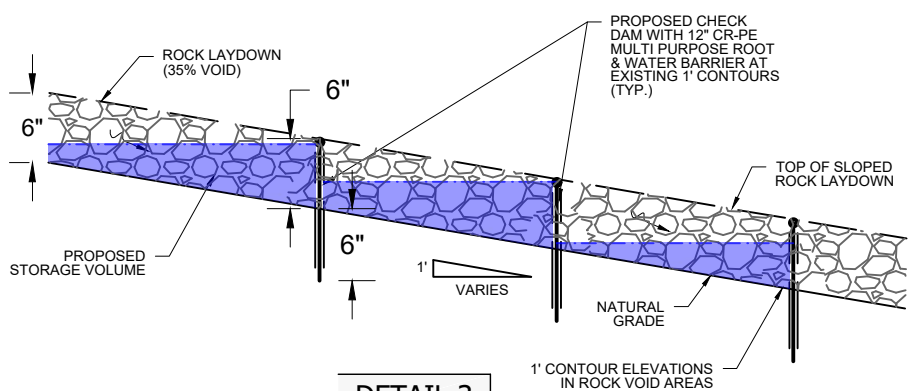
DETAIL 2

**TEMPORARY LAYDOWN AREA IMPROVEMENT
AT-GRADE WASHED CRUSHED ROCK BACKFILL**



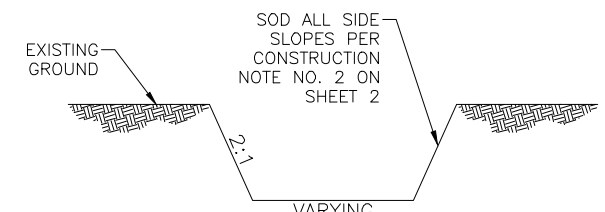
DETAIL 4

**TYPICAL CROSS SECTION PLAN
FOR TEMPORARY ROCK LAYDOWN YARDS**



DETAIL 3

**TYPICAL PROFILE OF CHECK DAM SYSTEM
FOR TEMPORARY ROCK LAYDOWN YARDS**



DETAIL 5

**STANDARD SWALE CROSS SECTION
N.T.S.**

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2. Printed copies of this document are not considered signed and sealed and the signature must be verified on any electronic copies.

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 CA #31323 LB #364

PROFESSIONAL SURVEYOR
 STATE OF FLORIDA
 No. 45287
 MICHAEL LEAHY
 03-18-20
 FLORIDA LICENSED PROFESSIONAL ENGINEER No. 45287
 PROFESSIONAL SURVEYOR MAPPER No. 5658

NO	DATE	REVISIONS AND RECORD OF ISSUE	BY
2	3/18/20	REVISIONS, CLARIFICATIONS FOR RAI#2 RESPONSE 12-20-19	GCC JJB MKL
1	11/22/19	REVISIONS, CLARIFICATIONS FOR RAI RESPONSE 11-22-19	GCC JJB MKL
			BY: CHK APP

TRANSMISSION ENGINEERING DEPARTMENT

SCALE: N.T.S. ENGINEER: MKL SECTION: AS SHOWN
 DRAFTER: GCC CHECKED: JJB COUNTY: AS SHOWN
 SHEET: 5 OF 6 FILE NAME: NFRC_EXH_SA02_R02.dwg

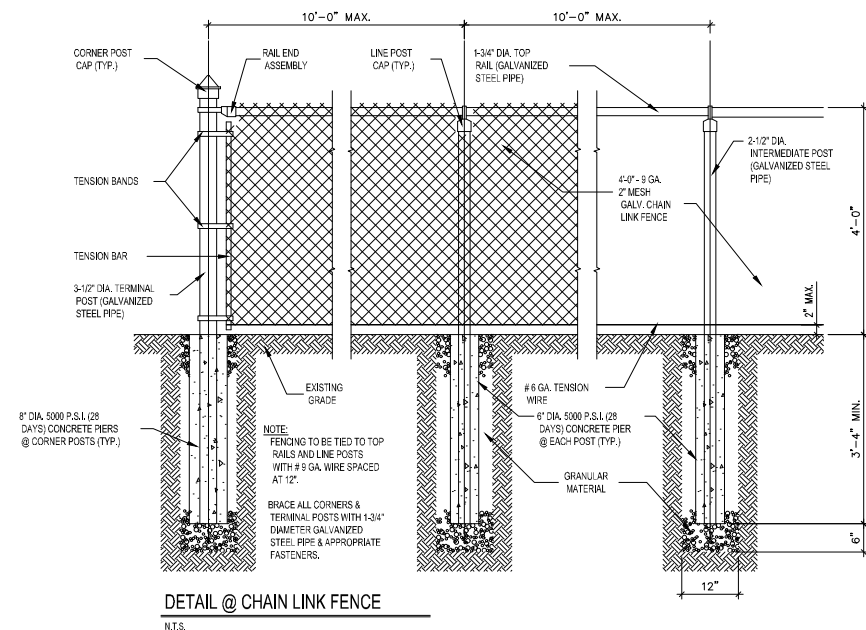
NORTH FLORIDA RESILIENCY CONNECTION (NFRC)
 STAGING AREAS SITE PLANS EXHIBIT
 FOR TEMPORARY LAYDOWN YARDS

**STAGING AREA NO. 2
SITE PLAN EXHIBIT**

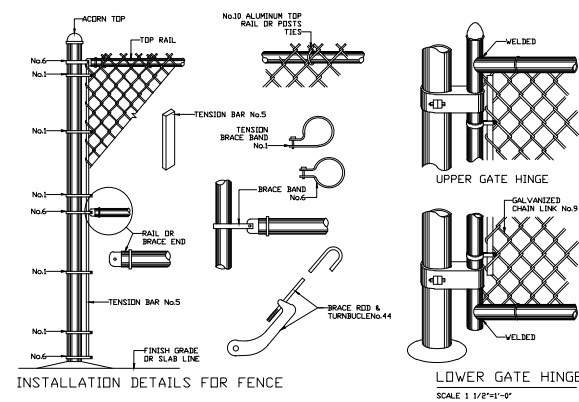
Gulf Power

CAD FILE: S:\Projects\108_Gulf Power\19-108-1002_Raven-Sinal_161K Line Detailed Engineering\Drawings\Staging Areas Exhibit\NFRC_Exh_SA02_R02.dwg PLOT DATE/TIME: 3/17/2020 3:33pm By: Josh Baker

PERIMETER FENCE DETAILS

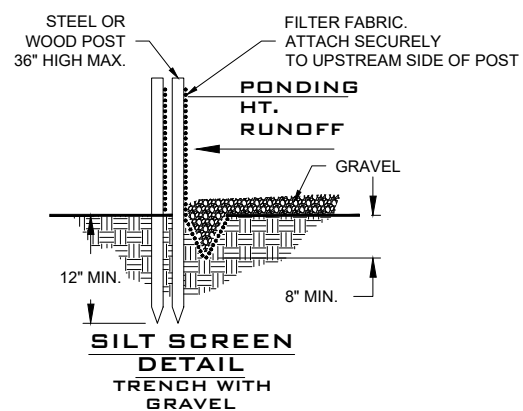


DETAIL @ CHAIN LINK FENCE
N.T.S.

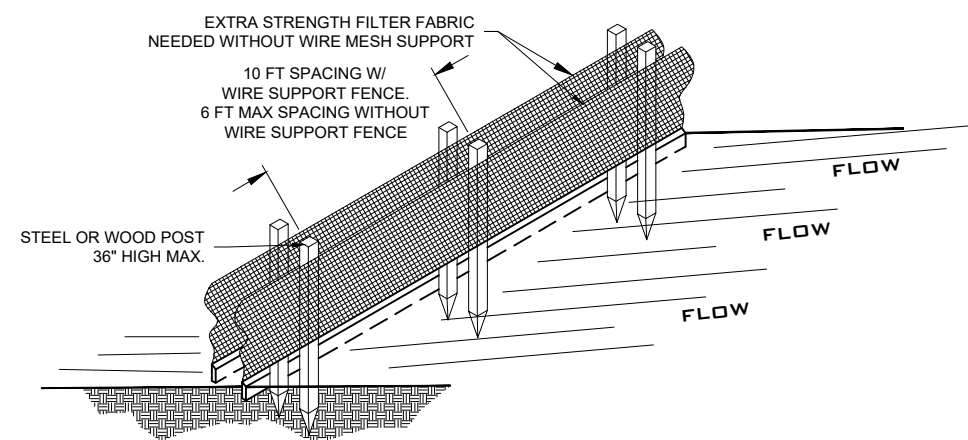


CHAIN LINK FENCE TYPICAL HARDWARE DETAILS

EROSION CONTROL DETAILS



SILT SCREEN
DETAIL
TRENCH WITH GRAVEL



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PROFESSIONAL ENGINEER
STATE OF FLORIDA
MICHAEL LEAHY, P.E., P.S.M.
No. 45287
03-18-20
FLORIDA LICENSED PROFESSIONAL ENGINEER No. 45287
PROFESSIONAL SURVEYOR & MAPPER No. 5658

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DRAFTER: GCC CHECKED: JJB COUNTY: AS SHOWN
SHEET: 6 OF 6 FILE NAME: NFRC_EXH_SA02_R02.dwg

NORTH FLORIDA RESILIENCY CONNECTION (NFRC)
STAGING AREAS SITE PLANS EXHIBIT
FOR TEMPORARY LAYDOWN YARDS

Gulf Power

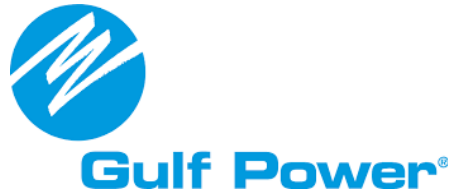
**STAGING AREA NO. 2
SITE PLAN EXHIBIT**

Temporary Staging Area #2

Stormwater Calculations

for the

North Florida Resiliency Connection Project



Gulf Power
15430 Endeavor Drive
Jupiter, FL 33478

Prepared by:



Pickett and Associates, Inc.
5025 W. Grace Street
Tampa, FL 33607

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Appendix D – SRWMD Rainfall Distribution Data	
Appendix E – SRWMD Boundary Map	

1.0 Site Data

Columbia County – SRWMD

Suwannee Valley Road, Lake City, FL

PID 25-2S-15-00093-000

Basin Area = 18.27 acres

Developed Area = 10.34 acres

Flood Zone X per FRIM Map 12023C0167D effective 11-02-18

Design Storm, Non Ag: 100 year, SCS Type II Distribution. 1-, 2-, 4-, 8-, 24-hour and 3-, 7-, and 10-day duration.

Recovery (Attenuation)

1. Provide treatment volumes within 72 hours following the end of the design storm event.

2.0 Project Narrative

Temporary Staging Area #2 will stage and store construction materials (poles, conductor, insulators, etc.) and equipment (drill rigs, line trucks, cranes, etc.). The developed area will consist of an at grade #57 crushed limerock surface to facilitate the storage of poles and equipment along with a perimeter road to facilitate access. The site has been reviewed to ensure that existing surface water flow will not be impeded and existing water quality will not be adversely impacted. All proposed semi-pervious material will be installed at the existing natural ground elevation throughout the site to prevent impedance of the existing watershed.

The staging area will use the void space between the #57 crushed limerock for storage for the first 1" of runoff. Gulf Power has done extensive testing on this void ratio and has determined that a 35% void ratio provides a good conservative value. In addition to utilizing the voids for storage, each site will have a swale / berm constructed on the low side(s) of each to ensure no stormwater runoff escapes to adjacent properties. Each site will also have a dry retention pond to account for attenuation. The ponds will be designed to recover within 72 hours. Soil Borings and Double Ring Infiltrometer Testing have been performed at each site to facilitate the design of each dry pond. The site will use the interior uncompacted gravel as additional area for recovery by incorporating the use of a check dam system. Since the site has a slight grade change, an impervious, flexible water barrier (CR-PE12-20) will be installed along each contour line to slow the progression of water over the site to allow recovery within 72 hours. This is detailed in the construction drawings.

The staging area will remain in place for the duration of the project. At the conclusion of the project, each staging area will be returned to its pre-construction state. The anticipated duration is approximately 12 – 18 months.

Construction and maintenance access to each staging area will be gained via existing road right-of-way. Connector aprons will be constructed in accordance with county / state requirements.

Deliveries and active use of staging areas will be consistent with construction hours.

No tree removal will be necessary to facilitate construction of staging area #2.

3.0 Stormwater Calculations

Staging Area No.2 Design Criteria

The SCS TR-20 method was used to calculate the pre and post-development peak runoff. The time of concentration was generated from the sheet, shallow concentrated flow and Lag/CN method. A complete summary of the procedure follows.

Assumptions and Methodology

The SRWMD requires that the difference between the 100-year pre-developed and post-developed storm volume be stored on-site with the maximum release rate not exceed the pre developed flow, Q. Per the SRWMD Handbook, the 100-year storm shall be evaluated for the greatest of the 1, 2, 4, 8, and 24 hour, 3, 7, and 10 days storms.

- Storm Frequency – Type II 100 Year, 1, 2, 4, 8, and 24 hour, 3, 7, and 10 day storms
- Runoff Curve Number – Weighted Curve Numbers were calculated for each area
 - Existing Conditions Curve Number Range: 58
 - Post-Developed Condition Curve Number Range: 58-85
- Calculation of Time of Concentrations
 - Lag/CN Method – Which is used for areas of 2000 acres or less. The formula is provided below:
 - $T_c = 0.00526 \times L^{0.8}(1000/CN-9)^{0.7} \times S^{-0.5}$
- Peak Flow Rate Calculations – HydroCAD Version 10.0
- Pond Recovery Calculations – PONDS Version 3.3

Pre-Development Summary

Staging Area 2 has mild slopes of up to 3% and generally consists of grasses and small shrubs. Table 1 below includes the results of the pre-development drainage area runoff calculations for the peak flow. These were developed using the topography which can be seen on the plan set and HydroCAD (Appendix B). Table 1 summarizes the peak flows for the various 100-year design storm in the pre-developed condition. The storm with the greatest runoff volume was used in the calculations. In this case, the 100-year, 10-day storm generated the greatest runoff and thus was used as the design storm.

Table 1: Pre-Developed Peak Discharge											
Sub-Basin	Area (Acre)	Weighted CN	Time of Concentration (Min.)	Type II, 100-Year Storm, Q ₁₀₀ (CFS)							
				1 HR	2 HR	4 HR	8 HR	24 HR	3 DAY	7 DAY	10 DAY
I	2.53	58	17.1	0.00	0.00	0.00	1.30	13.66	20.09	24.24	29.78
II	6.95	58	24.7	0.00	0.00	0.02	4.43	30.26	44.70	54.05	66.54
III	5.09	58	40.9	0.00	0.00	0.01	3.25	22.15	32.72	39.57	48.71
IV	3.71	58	44.5	0.00	0.00	0.15	4.39	10.85	16.14	19.56	24.15

Post-Development Summary

Upon completion of construction, Staging Area 2 will consist of uncompacted gravel laydown yard with compacted gravel drives. Water quality basins will be generally located at low points in each sub-basin within the site. Table 2 below includes the results of the post- development calculations for the 100-

year, 1, 2, 4, 8, and 24 hour, 3, 7, and 10 day peak flows. These were developed using the topography which can be seen on the plan set and HydroCAD (Appendix B). The difference between the pre-development and post-development storm will be contained within the pond, and anything greater will be conveyed through the outflow weir per the Suwannee River Management District Design Requirement. The storm with the greatest runoff volume was used in the calculations. Again, in this case, the 100-year, 10-day storm generated the greatest runoff and thus was used as the design storm.

Sub-Basin	Area (Acre)	Weighted CN	Time of Concentration (Min.)	Type II, 100-Year Storm, Q ₁₀₀ (CFS)							
				1 HR	2 HR	4 HR	8 HR	24 HR	3 DAY	7 DAY	10 DAY
				I	2.53	58	17.1	0.00	0.00	0.00	1.33
II	6.95	58	24.7	0.00	0.00	0.00	3.67	64.22	89.65	105.73	125.56
III	5.09	58	40.9	0.00	0.00	0.00	2.64	45.73	64.19	75.88	91.31
IV	3.71	58	44.5	0.00	0.00	0.11	4.64	14.60	20.70	24.58	29.72

Table 3 below summarizes the stormwater quality basin design and key pond elevations with required and provided volumes. It shows that each basin provides the required amount of freeboard (1-foot) and storage required to retain the peak runoff. Peak water surface elevation calculations for detention ponds were developed using HydroCAD (Appendix B).

Basin No.	Elevation (ft, NAVD 88)		Area (ac)	Provided Volume (acft)	Required Volume (acft)	Provided Discharge at Weir (cfs)
I	Top of Pond	102.1	0.37	1.07	1.04	24.33
	Peak Water Elev.	101.1				
	Weir Elev.	100.5				
	Bottom of Pond	97.5	0.24			
II	Top of Pond	96.0	1.20	4.10	3.54	13.40
	Peak Water Elev.	94.9				
	Weir Elev.	94.5				
	Bottom of Pond	92.0	1.03			
III	Top of Pond	101.8	1.17	3.89	3.33	1.92
	Peak Water Elev.	100.8				
	Weir Elev.	100.7				
	Bottom of Pond	97.8	0.97			
IV	Top of Pond	102.0	0.44	1.28	1.26	19.86
	Peak Water Elev.	101.0				
	Weir Elev.	100.3				
	Bottom of Pond	98.0	0.32			

Water Quality/Treatment Methodology

The SRWMD Handbook requires that all stormwater management systems provide the minimum state water quality treatment requirements. The method utilized for this project consists of one or a combination of percolation in the existing soils within the rock voids of the laydown storage and/or percolation within the stormwater quality basin. To determine the treatment runoff volume, the first 1.0-inch of rainfall was used along with the composite runoff coefficient for each sub-basin. This was compared with the volume from the first 0.5-inch rainfall without the coefficient. The greater volume was used for treatment evaluation and recovery. The calculations can be found starting on Page 7.

Recovery was calculated utilizing the PONDS software, as approved by the district. The rate of recovery was calculated within both the rock voids and if needed, the water quality basins. To model the rock voids, we calculated the available void space within the laydown area using a 35% uncompacted void ratio. An adjusted stage-storage table was input into the PONDS model utilizing a one-half foot increment stage, which corresponds to the height of the check dam. All treatment volumes must recover within 72-hours. See Table 4 for a summary of treatment volumes and recovery times for each sub-basin within the staging area.

Basin No.	Treatment Volume Required (acft)	Treatment Volume Provided (acft)		Recovery Time (hrs)
		Rock Voids	Water Quality Basins	
I	0.11	0.15	Not Required for Treatment	6
II	0.33	0.73	Not Required for Treatment	60
III	0.24	0.43	Not Required for Treatment	12
IV	0.17	0.42	Not Required for Treatment	12

Water Quality Recovery Volume Calculations

BASIN I:

Areas:

$$\text{Total Area} = (110,209 \text{ S.F.}) \times \left(\frac{1 \text{ Ac.}}{43,560 \text{ S.F.}} \right) = 2.53 \text{ Ac.}$$

$$\text{Crushed Rock for Laydown Area} = (37,146 \text{ S.F.}) \times \left(\frac{1 \text{ Ac.}}{43,560 \text{ S.F.}} \right) = 0.85 \text{ Ac.}$$

$$\text{Crushed Rock Road Area} = (20,773 \text{ S.F.}) \times \left(\frac{1 \text{ Ac.}}{43,560 \text{ S.F.}} \right) = 0.48 \text{ Ac.}$$

$$\text{Pond Area} = (16,076 \text{ S.F.}) \times \left(\frac{1 \text{ Ac.}}{43,560 \text{ S.F.}} \right) = 0.37 \text{ Ac.}$$

$$\text{Grass Area} = 2.53 \text{ Ac.} - 0.88 \text{ Ac.} - 0.48 \text{ Ac.} - 0.43 \text{ Ac.} = 0.74 \text{ Ac.}$$

Composite Runoff Coefficient:

$$C = \frac{[(C_{\text{rock laydown area}} \times \text{Area}) + (C_{\text{rock road area}} \times \text{Area}) + (C_{\text{pond area}} \times \text{Area}) + (C_{\text{grass area}} \times \text{Area})]}{\text{Total Project Area}}$$

$$C = \frac{[(0.5 \times 0.85 \text{ Ac.}) + (0.7 \times 0.48 \text{ Ac.}) + (1.0 \times 0.37 \text{ Ac.}) + (0.17 \times 0.74)]}{2.53} = 0.50$$

Total Treatment Volume from 1 inch of Rainfall:

$$\text{Treatment Volume} = (C) \times (1 \text{ inch}) \times (\text{Project Contributing area})$$

$$\text{Treatment Volume} = (.50) \times (1 \text{ in.}) \times (2.53 \text{ Ac.}) \times \left(\frac{1 \text{ Ft.}}{12 \text{ in.}} \right) = 0.11 \text{ Ac.-Ft.}$$

Total Treatment Volume from ½ inch of Rainfall:

$$\text{Treatment Volume} = (0.5 \text{ inch}) \times (\text{Project Contributing area})$$

$$\text{Treatment Volume} = (0.5 \text{ in.}) \times (2.53 \text{ Ac.}) \times \left(\frac{1 \text{ Ft.}}{12 \text{ in.}} \right) = 0.11 \text{ Ac.-Ft.}$$

The treatment volume for the project is the larger value, **0.11 Ac.-Ft.**

BASIN II:

Areas:

$$\text{Total Area} = (302,602 \text{ S. F.}) \times \left(\frac{1 \text{ Ac.}}{43,560 \text{ S. F.}} \right) = 6.95 \text{ Ac.}$$

$$\text{Crushed Rock for Laydown Area} = (181,050 \text{ S. F.}) \times \left(\frac{1 \text{ Ac.}}{43,560 \text{ S. F.}} \right) = 4.16 \text{ Ac.}$$

$$\text{Crushed Rock Road Area} = (33,790 \text{ S. F.}) \times \left(\frac{1 \text{ Ac.}}{43,560 \text{ S. F.}} \right) = 0.78 \text{ Ac.}$$

$$\text{Pond Area} = (52,265 \text{ S. F.}) \times \left(\frac{1 \text{ Ac.}}{43,560 \text{ S. F.}} \right) = 1.20 \text{ Ac.}$$

$$\text{Grass Area} = 6.95 \text{ Ac.} - 4.16 \text{ Ac.} - 0.78 \text{ Ac.} - 1.20 \text{ Ac.} = 0.81 \text{ Ac.}$$

Composite Runoff Coefficient:

$$C = \frac{[(C_{\text{rock laydown area}} \times \text{Area}) + (C_{\text{rock road area}} \times \text{Area}) + (C_{\text{pond area}} \times \text{Area}) + (C_{\text{grass area}} \times \text{Area})]}{\text{Total Project Area}}$$

$$C = \frac{[(0.5 \times 4.16 \text{ Ac.}) + (0.7 \times 0.78 \text{ Ac.}) + (1.0 \times 1.20 \text{ Ac.}) + (0.17 \times 0.81)]}{6.95} = 0.57$$

Total Treatment Volume from 1 inch of Rainfall:

$$\text{Treatment Volume} = (C) \times (1 \text{ inch}) \times (\text{Project Contributing area})$$

$$\text{Treatment Volume} = (.57) \times (1 \text{ in.}) \times (6.95 \text{ Ac.}) \times \left(\frac{1 \text{ Ft.}}{12 \text{ in.}} \right) = 0.33 \text{ Ac.}-\text{Ft.}$$

Total Treatment Volume from ½ inch of Rainfall:

$$\text{Treatment Volume} = (0.5 \text{ inch}) \times (\text{Project Contributing area})$$

$$\text{Treatment Volume} = (0.5 \text{ in.}) \times (6.95 \text{ Ac.}) \times \left(\frac{1 \text{ Ft.}}{12 \text{ in.}} \right) = 0.29 \text{ Ac.}-\text{Ft.}$$

The treatment volume for the project is the larger value, **0.33 Ac.-Ft.**

BASIN III:

Areas:

$$\text{Total Area} = (221,533 \text{ S. F.}) \times \left(\frac{1\text{Ac.}}{43,560 \text{ S. F.}}\right) = 5.09 \text{ Ac.}$$

$$\text{Crushed Rock for Laydown Area} = (106,708 \text{ S. F.}) \times \left(\frac{1\text{Ac.}}{43,560 \text{ S. F.}}\right) = 2.45\text{Ac.}$$

$$\text{Crushed Rock Road Area} = (17,518 \text{ S. F.}) \times \left(\frac{1\text{Ac.}}{43,560 \text{ S. F.}}\right) = 0.40 \text{ Ac.}$$

$$\text{Pond Area} = (50,909 \text{ S. F.}) \times \left(\frac{1\text{Ac.}}{43,560 \text{ S. F.}}\right) = 1.17 \text{ Ac.}$$

$$\text{Grass Area} = 5.09\text{Ac.} - 2.45\text{Ac.} - 0.40\text{Ac.} - 1.17 \text{ Ac.} = 1.07\text{Ac.}$$

Composite Runoff Coefficient:

$$C = \frac{[(C_{\text{rock laydown area}} \times \text{Area}) + (C_{\text{rock road area}} \times \text{Area}) + (C_{\text{pond area}} \times \text{Area}) + (C_{\text{grass area}} \times \text{Area})]}{\text{Total Project Area}}$$

$$C = \frac{[(0.5 \times 2.45 \text{ Ac.}) + (0.7 \times 0.40 \text{ Ac.}) + (1.0 \times 1.17 \text{ Ac.}) + (0.17 \times 1.07)]}{5.09} = 0.56$$

Total Treatment Volume from 1 inch of Rainfall:

$$\text{Treatment Volume} = (C) \times (1 \text{ inch}) \times (\text{Project Contributing area})$$

$$\text{Treatment Volume} = (.56) \times (1 \text{ in.}) \times (5.09\text{Ac.}) \times \left(\frac{1\text{Ft.}}{12 \text{ in.}}\right) = 0.24 \text{ Ac.}-\text{Ft.}$$

Total Treatment Volume from ½ inch of Rainfall:

$$\text{Treatment Volume} = (0.5 \text{ inch}) \times (\text{Project Contributing area})$$

$$\text{Treatment Volume} = (0.5\text{in.}) \times (5.09\text{Ac.}) \times \left(\frac{1\text{Ft.}}{12 \text{ in.}}\right) = 0.21 \text{ Ac.}-\text{Ft.}$$

The treatment volume for the project is the larger value, **0.24 Ac.-Ft.**

BASIN IV:

Areas:

$$\text{Total Area} = (161,589 \text{ S.F.}) \times \left(\frac{1 \text{ Ac.}}{43,560 \text{ S.F.}} \right) = 3.71 \text{ Ac.}$$

$$\text{Crushed Rock for Laydown Area} = (103,895 \text{ S.F.}) \times \left(\frac{1 \text{ Ac.}}{43,560 \text{ S.F.}} \right) = 2.39 \text{ Ac.}$$

$$\text{Crushed Rock Road Area} = (16,289 \text{ S.F.}) \times \left(\frac{1 \text{ Ac.}}{43,560 \text{ S.F.}} \right) = 0.37 \text{ Ac.}$$

$$\text{Pond Area} = (19,008 \text{ S.F.}) \times \left(\frac{1 \text{ Ac.}}{43,560 \text{ S.F.}} \right) = 0.44 \text{ Ac.}$$

$$\text{Grass Area} = 3.71 \text{ Ac.} - 2.39 \text{ Ac.} - 0.37 \text{ Ac.} - 0.44 \text{ Ac.} = 0.51 \text{ Ac.}$$

Composite Runoff Coefficient:

$$C = \frac{[(C_{\text{rock laydown area}} \times \text{Area}) + (C_{\text{rock road area}} \times \text{Area}) + (C_{\text{pond area}} \times \text{Area}) + (C_{\text{grass area}} \times \text{Area})]}{\text{Total Project Area}}$$

$$C = \frac{[(0.5 \times 2.39 \text{ Ac.}) + (0.7 \times 0.37 \text{ Ac.}) + (1.0 \times 0.44 \text{ Ac.}) + (0.17 \times 0.51)]}{3.71} = 0.54$$

Total Treatment Volume from 1 inch of Rainfall:

$$\text{Treatment Volume} = (C) \times (1 \text{ inch}) \times (\text{Project Contributing area})$$

$$\text{Treatment Volume} = (.54) \times (1 \text{ in.}) \times (3.71 \text{ Ac.}) \times \left(\frac{1 \text{ Ft.}}{12 \text{ in.}} \right) = 0.17 \text{ Ac.-Ft.}$$

Total Treatment Volume from ½ inch of Rainfall:

$$\text{Treatment Volume} = (0.5 \text{ inch}) \times (\text{Project Contributing area})$$

$$\text{Treatment Volume} = (0.5 \text{ in.}) \times (3.71 \text{ Ac.}) \times \left(\frac{1 \text{ Ft.}}{12 \text{ in.}} \right) = 0.15 \text{ Ac.-Ft.}$$

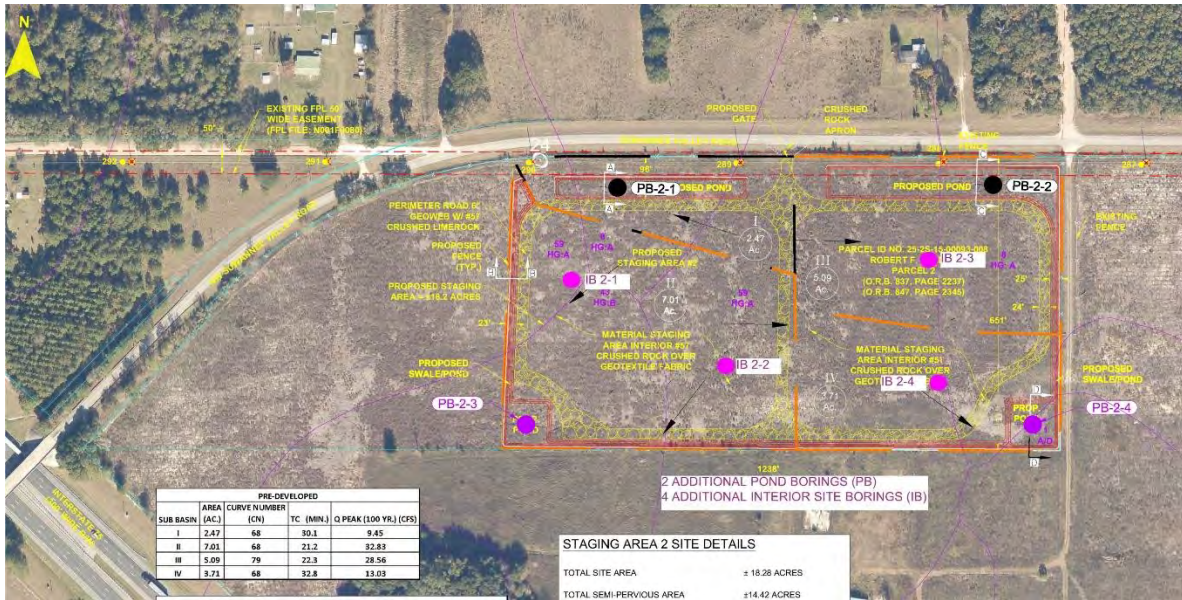
The treatment volume for the project is the larger value, **0.17 Ac.-Ft.**

Appendix A – Geotechnical Investigation

GEOTECHNICAL REPORT



NFRC STAGING AREA NO. 2



COLUMBIA COUNTY, FLORIDA

MARCH 2020

BJR 19-198B





March 13, 2020

Mike Leahy, P.E.
Pickett & Associates
5025 W. Grace Street
Tampa, FL 33607

**Geotechnical Exploration Report
NFRC Staging Area No. 2
Columbia County, Florida
BJR No. 19-198B**

Dear Mr. Leahy:

BJ Rock, LLC (BJR) has completed the geotechnical exploration for the referenced project as authorized by Pickett & Associates for Gulf Power. The purposes of this study were to explore general subsurface conditions for the proposed staging areas and to use the data obtained to develop engineering recommendations to guide the design of the planned ponds/swales. This report describes our exploration procedure, presents the data obtained, and presents our conclusions and recommendations regarding the geotechnical engineering aspects of the design.

BJR appreciates the opportunity to participate in this project and we trust that the information included in this report is sufficient for your design. If you have any questions or comments concerning the contents of this report, please contact us.

Sincerely,

BJ Rock, LLC

BJR FL Certificate of Authorization No. 29100



John C. Peak, P.E.
Sr. Geotechnical Engineer
FL P.E. License No. 57018

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ATTACHMENTS

Field Test Location Plan (Figure 1)
Soil Boring Logs (Figure 2)
Stormwater Pond Recovery Analysis Results
NRCS Soil Survey Data
Field Testing Standards and Procedures



PROJECT INFORMATION

Existing Site

Based on the information provided for our review from Pickett & Associates, we understand a staging area is planned off Suwannee Valley Road in Columbia County, Florida (Figure 1).

Project Approach

The objective of the geotechnical investigation for the proposed project was to obtain information concerning the subsurface conditions in order to make geotechnical engineering estimates and recommendations in each of the following areas:

- Soil stratigraphy at the boring locations and the development of the approximate soil profile.
- General location and description of potentially deleterious materials which may interfere with construction or new structure performance, including buried or surficial existing fills, organics, construction debris, etc.
- Identification of some critical design or construction details, including present groundwater levels, estimated wet season levels, and seasonal fluctuations in the specified areas.

Scope of Work

In order to address the above objectives, our scope of work for this project included the following:

- Reviewed available published information on the site, including the United States Department of Agriculture (USDA) National Resources Conservation Service (NRCS) soil survey data for Columbia County.
- Conducted a subsurface exploration program consisting of the advancement of auger borings with DRI / field permeability testing for the pond/swales, subsurface sampling, and field testing.
- Measured the stabilized groundwater levels at the boring locations.
- Reviewed and visually classified the recovered soils in the laboratory using the Unified Soil Classification System (ASTM D 2487). Developed the general soil stratigraphy at the boring locations.
- Performed geotechnical engineering studies and analyses in order to develop geotechnical engineering recommendations for each of the objectives previously discussed for the proposed project.
- Performed stormwater pond recovery analysis per referenced staging area. Analysis performed by our subconsultant, Native GeoSciences, Inc.
- Prepared a geotechnical report that summarizes the course of our study, the field and laboratory data generated, the subsurface conditions encountered, stormwater pond recovery analysis results and our geotechnical engineering recommendations for the proposed project.



Soil Survey Review

According to the USDA NRCS “Soil Survey of Columbia County”, the soil types generally present on the site are attached in the appendix and are generalized as follows: *Albany fine sand, Blanton fine sand, Bonneau fine sand, Ocilla fine sand, Troup fine sand and Orangeburg loamy fine sand.*

SUBSURFACE EXPLORATION

Field Exploration Procedures

The procedures used by BJ Rock, LLC for field sampling and testing are in general accordance with industry standards of care and established geotechnical engineering practice. BJR performed 8 borings to an approximate depths of 10 feet each with 8 field permeability tests at the proposed locations.

Our staff located the staked borings in the field per the plans and field information provided by Pickett & Associates. The approximate testing locations are noted on the provided Field Test Location Plan (Figure 1) in the Appendix. The standards and procedures for the Standard Penetration Test (SPT) Boring and soil sample handling and classification are described in our Field Testing Standards and Procedures in the Appendix.

Field Exploration Results

Subsurface Conditions

The auger borings generally encountered fine to slightly silty fine sands, clayey fine sands and sandy clays to an approximate depth of 10 feet below existing grade. The soil testing results are shown on the attached Soil Boring Logs (Figure 2) in the Appendix.

Field Permeability Test

The field permeability falling head tests were performed at the specified location on the site as shown on Figure 2 in the Appendix. The tests were performed at approximate depths of 2-3^{+/-} feet below existing grade. The tests were performed utilizing slotted casing seated in a uniform soil condition. The results of the tests are as follows:

Recommended Existing Groundwater Parameters for Pond Design				
STAGING AREA 2 - NFRC TRANSMISSION LINE FPL				
PB Test	Test Depth (ft)	Vertical Infiltration (ft/day)	Estimated Horizontal Infiltration (ft/day)*	Recommended SHGWL Depth (ft)
IB-2-1	2	0.15	0.3	3
IB-2-2	2	0.08	0.16	2
IB-2-3	2	0.8	1.6	3
IB-2-4	2	1.2	2.4	6
PB 2-1	3	1.5	3	4.5
PB 2-2	3	0.6	1.2	5
PB-2-3	2	0.25	0.5	3
PB-2-4	2	0.1	0.2	3
*	Estimated horizontal permeability rate is 2x the vertical permeability test result.			
Note:	Horizontal and vertical permeability rates do not include a factor of safety.			



Groundwater

Groundwater was not encountered to an approximate depth of 10 feet below existing ground surface in the soil test borings performed in November 2019 and February 2020. Based on our past site experience, the results of our investigation, and our review of the NRCS soil survey, it is our opinion that the seasonal high groundwater table will be encountered at an approximate depth of 2 to 6^{+/-} feet below existing ground surface in the areas of the borings. Significant fluctuations in the groundwater levels should be expected due to seasonal variations in rainfall, runoff, and other site-specific factors across the site such as shallow perched conditions due to encountered clayey soils.

Stormwater Pond Recovery Analysis

Native GeoSciences (NGS) completed the stormwater pond recovery analysis for the staging area(s). NGS utilized the commercially available software PONDS (version 3.3) to perform the stormwater pond recovery analysis. The analysis included recovery of the treatment volume within 30 days. The description of the input parameters and a Copy of the PONDS software outputs are included in the Attachments in the Appendix.

SITE PREPARATION RECOMMENDATIONS

Site Stripping

Prior to any construction, the site must be properly prepared. To prepare the site for construction, all existing topsoil, muck, debris, vegetation, and large roots down to finger-size should be removed, including a 5-foot margin in a horizontal direction away from the footprints of the structures. The resulting excavations should be backfilled with soils as discussed in the structural fill section of this report.

Proofrolling

Following site stripping and any related excavation activity, and prior to any fill placement, proofrolling of the on-site soils should be performed. We recommend using a vibratory roller having a static weight of at least ten tons. Placement of fill materials may then proceed. Compaction of the fill materials should continue until the roller has made at least ten passes over all areas of the site and the soils appear to be relatively firm and unyielding. Half of the roller passes should be perpendicular to the direction of travel of the other passes. Proofrolling should be closely monitored by our engineering technician to look for unusual deflection of the soils beneath the compacting equipment. If unusual or excessive deflection is observed, the areas should be undercut to firm soils and backfilled with structural fill placed in maximum one-foot thick lifts. Backfill soils should be of the same composition and should be compacted to the same criteria as structural fill soils.

Structural Fill

Definition

Soil used for structural fill can be defined as clean fine sand containing less than twelve percent material by weight that is finer than a number 200 sieve (fines) (material conforming to SP to SP-SM in the Unified Soil Classification System) and less than 5 percent organics by weight. However, materials containing up to 25 percent fines (materials conforming to SC or SM in the Unified Soil Classification System) may be utilized as structural fill, if their plasticity index is less than 20 and the working subgrade is at least 2 feet above water or groundwater level.



If fill material with higher fines content is used (< 25 percent fines), the material will require the use of compaction equipment designed for clayey soils. This includes a sheeps foot or vibratory pad foot roller. In addition, a disk could be required to assist with drying the clayey soils in order to place them at or near their optimum moisture content. These materials must be placed in 6-inch thick maximum lifts so that they can be effectively compacted with a vibratory pad foot roller.

Soil Suitability Recommendations

Based on the results of the auger borings in Figure 3, the soil materials encountered in the borings appear to be acceptable general and/or structural fill from ground surface to 1 to 6+ feet below existing grade excluding any organic material, clays and unsuitable rock/shell/limestone, etc. Stratum 1 (SP/SP-SM) can be utilized as structural fill material. Stratum 2 (SM/SC) can be utilized as general fill material.

Placement

Fill should be placed in lifts not to exceed one foot thick. The fill material should be compacted to at least 95 percent of its modified Proctor maximum dry density (ASTM D 1557). Confined areas, such as utility trenches, should be compacted with manually operated vibratory compaction equipment.

TESTING AND MONITORING

Construction monitoring and testing are essential to proper site construction and performance. Compliance with the recommended foundation specification must be verified by our engineering technician familiar with the project construction. Observation of site preparation work is an integral part of the engineering recommendations contained in this report.

Safe working conditions are necessary. Temporary excavations should be sloped and/or braced as required by applicable local, state, and federal safety regulations, as well as the current Occupational Safety and Health Organization (OSHA) Excavation and Trench Safety Standards. Generally, the grading contractor is responsible for constructing stable, temporary excavations that are dewatered, shored, sloped and/or benched to maintain stability of the sides and bottom of the trench.

LIMITATIONS

This report has been prepared for the exclusive use of **Pickett & Associates and Gulf Power** for the specific application to the project previously discussed. Our conclusions and recommendations have been rendered using generally accepted standards of geotechnical engineering geology practice in the state of Florida. No other warranty is expressed or implied.

Our conclusions and recommendations are based on the design information furnished to us, the data obtained from the previously described subsurface exploration, and our experience. They do not reflect variations in the subsurface conditions that are likely to exist in the region of our boring and in unexplored areas of the site. These variations are due to the inherent variability of the subsurface conditions in this geologic region. Should variations become apparent during construction, it will be necessary to re-evaluate our conclusions and recommendations based upon our on-site observations of the conditions.

The site is underlain by limestone bedrock that is susceptible to dissolution and the subsequent development of karst features such as voids and sinkholes in the natural soil overburden. Construction in a sinkhole prone area is therefore accompanied by some risk that internal soil

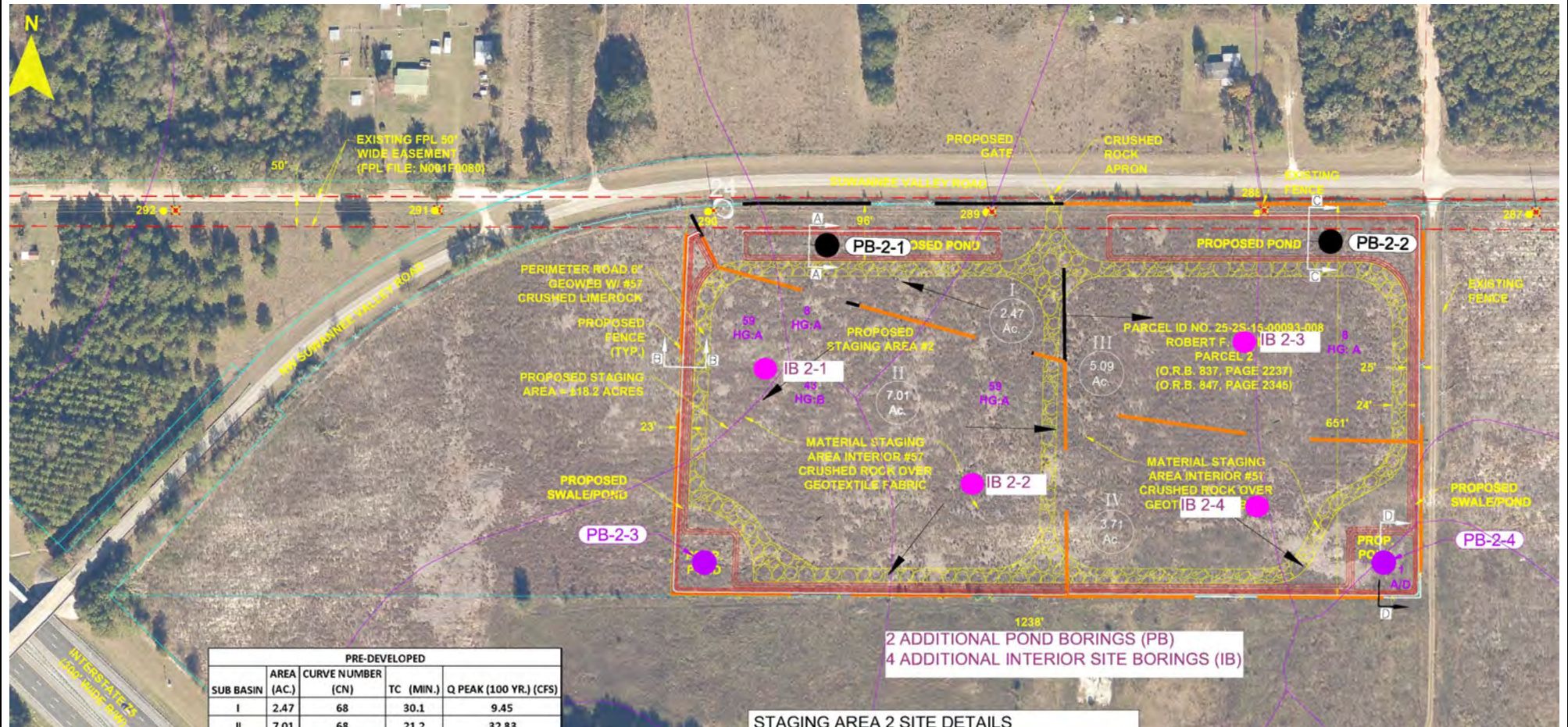


erosion and ground subsidence could affect new structures in the future. It is not possible to investigate or design to completely eliminate the possibility of future sinkhole-related problems. In any event, the Owner must understand and accept this risk.

The scope of our services does not include any environmental assessments or investigations for the possible presence of hazardous or toxic substances in the soil, groundwater, or surface water within or in the general vicinity of the site studied. Any statements made in this report or shown on the test boring log regarding unusual subsurface conditions and/or composition, odor, staining, origin, or other characteristics of the surface and/or subsurface materials are strictly for the information of our client and may or may not be indicative of an environmental problem.

If changes are made in the overall design or the location of the proposed structure(s), the recommendations presented in this report must not be considered valid unless the changes are reviewed by our firm and recommendations modified or verified in writing. We should be given the opportunity to review the foundation plan and the applicable portions of the project specifications when the design is finalized. This review will allow us to check whether these documents are consistent with the intent of our recommendations.

APPENDIX



PRE-DEVELOPED				
SUB BASIN	AREA (AC.)	CURVE NUMBER (CN)	TC (MIN.)	Q PEAK (100 YR.) (CFS)
I	2.47	68	30.1	9.45
II	7.01	68	21.2	37.83

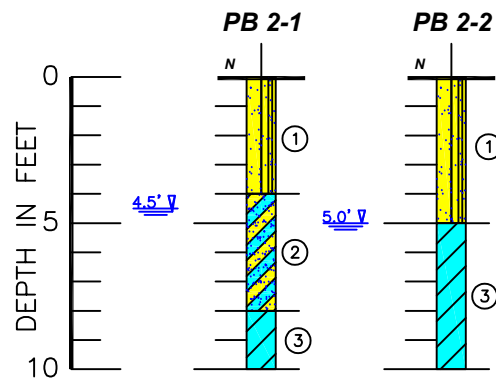
2 ADDITIONAL POND BORINGS (PB)
4 ADDITIONAL INTERIOR SITE BORINGS (IB)

STAGING AREA 2 SITE DETAILS



**NFRC STAGING AREA NO. 2
FIELD TEST LOCATION PLAN
COLUMBIA COUNTY, FLORIDA**

DATE: 03/10/20	SCALE: NOT TO SCALE	JOB NO. 19-198B
DRAWN BY: J. PEAK		FIGURE 1
CK'D BY: B. JORY		



LEGEND

① = GRAY, WHITE, TAN, BROWN FINE TO SLIGHTLY SILTY FINE SANDS (SP)/(SP-SM)

② = GRAY, ORANGE, BROWN CLAYEY FINE SAND (SC)

③ = GRAY, TAN, BROWN, ORANGE SANDY CLAY (CL)

(SP) = UNIFIED SOIL CLASSIFICATION GROUP SYMBOL

N = STANDARD PENETRATION RESISTANCE IN BLOWS PER FOOT

0.0' V = ESTIMATED SEASONAL HIGH GROUNDWATER LEVEL

NOTES: HAND AUGER BORINGS PERFORMED NOVEMBER 14, 2019.

EXISTING GROUNDWATER LEVEL NOT ENCOUNTERED TO 10 FEET.

LEGEND

 ① = GRAY, TAN, BROWN, ORANGE, DARK GRAY/BROWN FINE TO SLIGHTLY SILTY FINE SANDS (SP)/(SP-SM)

 ② = ORANGE, BROWN, DARK ORANGE/BROWN SANDY CLAY (CL)

(SP) = UNIFIED SOIL CLASSIFICATION GROUP SYMBOL

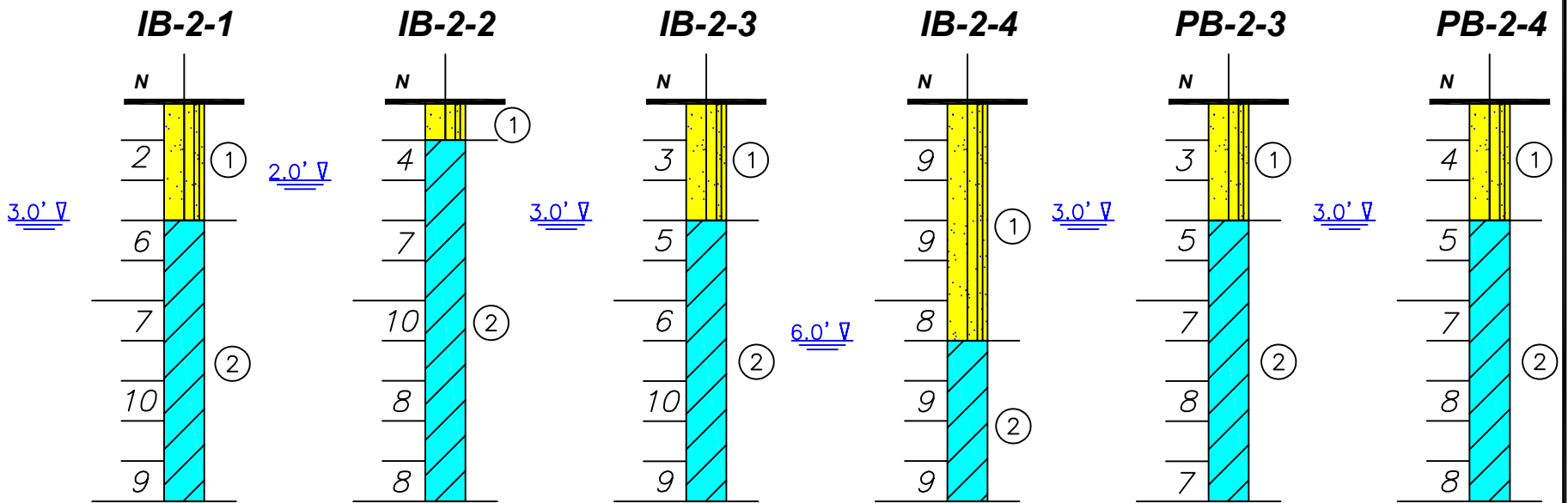
N = STANDARD PENETRATION RESISTANCE IN BLOWS PER FOOT CORRELATED FROM CPT READINGS

0.0' ▼ = EXISTING GROUNDWATER LEVEL (IF ENCOUNTERED)

0.0' ▽ = ESTIMATED SEASONAL HIGH GROUNDWATER LEVEL

NOTE: TESTING PERFORMED FEBRUARY 18, 2020.

DEPTH IN FEET



March 13, 2020

Re: Stormwater Pond Recovery Analysis
NFRC Staging Areas
Staging Area No. 2 – Basins I through IV
Columbia County, Florida
BJR Job No: 19-198(B)

As authorized, BJ Rock, LLC (BJR) has completed the stormwater pond recovery analysis for the above-referenced staging area. The project site is located on Suwanee Valley Road in Columbia County, Florida.

We understand that two crushed rock material laydown areas will be constructed along with four dry stormwater management ponds within the proposed project. The ponds will be constructed along the outer boundary of the project. The Staging Area is broken into 4 drainage basins (I through IV).

We used soil and groundwater information collected during the geotechnical exploration on the site and provided in the BJR Geotechnical data. In addition, we used site survey data, crushed rock laydown area design, and stormwater pond design information provided by Pickett Surveying and Engineering. We utilized the commercially available software PONDS (version 3.3) to perform the stormwater pond recovery analysis. Copies of the PONDS software outputs are included in the Attachments.

The PONDS software is generally limited to analyzing flat bottom stormwater ponds. Since the rock laydown areas are planned to be constructed at existing grade and will be sloping, it was necessary to analyze each area as flat basins using average soil and groundwater parameters. We understand that you plan to utilize CR-PE Multi-Purpose Root & Water Barrier Molded Rolls by Century Products (or similar) to retain water within the laydown areas for recharge before discharging excess water to the ponds. Based on this plan, it is our opinion that using average soil and groundwater parameters for this analysis is appropriate. Please note that the treatment volume was recovered within each of the four rock laydown basin areas within 72 hours. Therefore, discharge and recovery within the stormwater ponds was not needed.

Below are Average Soil and Groundwater Calculations and Model Input Parameters for each basin. We assumed a Base of Aquifer depth below the Seasonal High Water Table (SHWT) of 2 feet or less. This depth is generally conservative based on our experience with similar projects in soils with relatively high silt/clay content. The actual Base of Aquifer is likely deeper.

Lastly, we assumed a porosity of 35% for the crushed rock for void space storage.

Stormwater Recovery Analysis – Staging Area No. 2 – Basin I

Average Soil and Groundwater Calculations

Below are the average soil and groundwater calculations for the stormwater pond recovery analysis.

Staging Area No. 2		
Basin I		
Rock Laydown Elevation		
Low El. (ft)	High El. (ft)	Average El. (ft.)
100	105	102.5
Boring	Horizontal Saturated Hydraulic Conductivity (ft/day)*	Depth to SHWT (ft)
PB-2-1	1.5	4.5
AVG.	1.50	4.5
Average SHWT Elevation (ft)		98
* Hydraulic conductivity values include a factor of safety of 2 based on the field test results.		

Model Input Parameters

Below are the input parameters used for the stormwater pond recovery analysis.

Aquifer and Geometry Data

Input Parameter	STAGING AREA NO.2/BASIN I
Base of Aquifer Elevation (feet)	97
Water Table Elevation (feet)	98
Horizontal Saturated Hydraulic Conductivity (ft/day)*	1.5
Fillable Porosity (%)	25
Unsaturated Vertical Infiltration Rate (ft/day)*,**	0.75
Maximum Area for Unsaturated Infiltration (ft²)	13001.1
Equivalent Pond Length (ft)	350
Equivalent Pond Width (ft)	100
* Hydraulic conductivity values include a factor of safety of 2 based on the field test results.	
** Unsaturated vertical Infiltration rate is 1/2 the field tested Horizontal Saturated Hydraulic Conductivity rate.	

Stage vs Area Data for STAGING AREA 2 – BASIN I

Stage (ft)	Area (ft²)
102.5	13001.1
103	13001.1

Stormwater Input Data

STAGING AREA NO. 2 BASIN I	Hydrograph Type	slug load
	Treatment Volume (ft³)	4791.6

Stormwater Recovery Analysis – Staging Area No. 2 – Basin II

Average Soil and Groundwater Calculations

Below are the average soil and groundwater calculations for the stormwater pond recovery analysis.

Staging Area No. 2		
Basin II		
Rock Laydown Elevation		
Low El. (ft)	High El. (ft)	Average El. (ft.)
97	105	101
Boring	Horizontal Saturated Hydraulic Conductivity (ft/day)*	Depth to SHWT (ft)
PB-2-3	0.25	3
IB-2-1	0.15	2
IB-2-2	0.08	3
AVG.	0.16	2.67
Average SHWT Elevation (ft)		98.33
* Hydraulic conductivity values include a factor of safety of 2 based on the field test results.		

Model Input Parameters

Below are the input parameters used for the stormwater pond recovery analysis.

Aquifer and Geometry Data

Input Parameter	STAGING AREA NO.2/BASIN II
Base of Aquifer Elevation (feet)	96.5
Water Table Elevation (feet)	98.33
Horizontal Saturated Hydraulic Conductivity (ft/day)*	0.16
Fillable Porosity (%)	25
Unsaturated Vertical Infiltration Rate (ft/day)*,**	0.08
Maximum Area for Unsaturated Infiltration (ft²)	63367.5
Equivalent Pond Length (ft)	480
Equivalent Pond Width (ft)	380
* Hydraulic conductivity values include a factor of safety of 2 based on the field test results.	
** Unsaturated vertical Infiltration rate is 1/2 the field tested Horizontal Saturated Hydraulic Conductivity rate.	

Stage vs Area Data for STAGING AREA 2 – BASIN II

Stage (ft)	Area (ft ²)
101	63367.5
101.5	63367.5

Stormwater Input Data

STAGING AREA NO. 2	Hydrograph Type	slug load
BASIN II	Treatment Volume (ft ³)	14374.8

Stormwater Recovery Analysis – Staging Area No. 2 – Basin III

Average Soil and Groundwater Calculations

Below are the average soil and groundwater calculations for the stormwater pond recovery analysis.

Staging Area No. 2		
Basin III		
Rock Laydown Elevation		
Low El. (ft)	High El. (ft)	Average El. (ft.)
102	105	103.5
Boring	Horizontal Saturated Hydraulic Conductivity (ft/day)*	Depth to SHWT (ft)
PB-2-2	0.8	3
IB-2-3	0.6	5
AVG.	0.70	4.00
Average SHWT Elevation (ft)		99.50
* Hydraulic conductivity values include a factor of safety of 2 based on the field test results.		

Model Input Parameters

Below are the input parameters used for the stormwater pond recovery analysis.

Aquifer and Geometry Data

Input Parameter	STAGING AREA NO.2/BASIN III
Base of Aquifer Elevation (feet)	98.5
Water Table Elevation (feet)	99.5
Horizontal Saturated Hydraulic Conductivity (ft/day)*	0.7
Fillable Porosity (%)	25
Unsaturated Vertical Infiltration Rate (ft/day)*, **	0.35
Maximum Area for Unsaturated Infiltration (ft ²)	37347.8
Equivalent Pond Length (ft)	490
Equivalent Pond Width (ft)	220
* Hydraulic conductivity values include a factor of safety of 2 based on the field test results.	
** Unsaturated vertical Infiltration rate is 1/2 the field tested Horizontal Saturated Hydraulic Conductivity rate.	

Stage vs Area Data for STAGING AREA 2 – BASIN III

Stage (ft)	Area (ft ²)
103.5	37347.8
104	37347.8

Stormwater Input Data

STAGING AREA NO. 2 BASIN III	Hydrograph Type	slug load
	Treatment Volume (ft ³)	10454.4

Stormwater Recovery Analysis – Staging Area No. 2 – Basin IV

Average Soil and Groundwater Calculations

Below are the average soil and groundwater calculations for the stormwater pond recovery analysis.

Staging Area No. 2		
Basin IV		
Rock Laydown Elevation		
Low El. (ft)	High El. (ft)	Average El. (ft.)
103	105	104
Boring	Horizontal Saturated Hydraulic Conductivity (ft/day)*	Depth to SHWT (ft)
PB-2-4	0.1	3
IB-2-4	1.2	6
AVG.	0.65	4.50
Average SHWT Elevation (ft)		99.50
* Hydraulic conductivity values include a factor of safety of 2 based on the field test results.		

Model Input Parameters

Below are the input parameters used for the stormwater pond recovery analysis.

Aquifer and Geometry Data

Input Parameter	STAGING AREA NO.2/ BASIN IV
Base of Aquifer Elevation (feet)	98.5
Water Table Elevation (feet)	99.5
Horizontal Saturated Hydraulic Conductivity (ft/day)*	0.65
Fillable Porosity (%)	25
Unsaturated Vertical Infiltration Rate (ft/day)*, **	0.325
Maximum Area for Unsaturated Infiltration (ft ²)	36363.3
Equivalent Pond Length (ft)	490
Equivalent Pond Width (ft)	210
* Hydraulic conductivity values include a factor of safety of 2 based on the field test results.	
** Unsaturated vertical Infiltration rate is 1/2 the field tested Horizontal Saturated Hydraulic Conductivity rate.	

Stage vs Area Data for STAGING AREA 2 – BASIN IV

Stage (ft)	Area (ft ²)
104	36363.3
104.5	36363.3

Stormwater Input Data

STAGING AREA NO. 2 BASIN IV	Hydrograph Type	slug load
	Treatment Volume (ft ³)	7405.2

Results

Based on the results of this analysis, the proposed crushed rock laydown areas recover their associated treatment volumes within 72 hours. Therefore, the treatment areas appear to meet the requirements of the Suwanee River Water Management District.

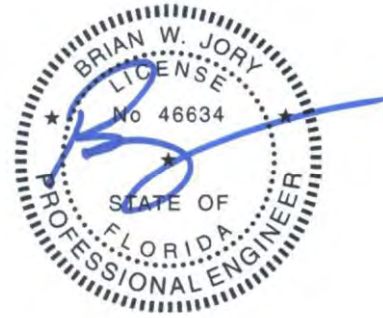
Closing

We appreciate the opportunity to be of service to you on this project and look forward to a continued relationship. Should you have any questions or concerns regarding this report, please feel free to call us at (407) 342-1443.

Sincerely,
Native Geoscience, Inc.
Certificate of Authorization No. 30474



John C. Diehl, P.G.
Principal Geologist
P.G. 2460



Brian W. Jory, P.E.
Principal Engineer
P.E. 46634
3/13/20

Attachments:

- PONDS Output – Staging Area No. 2 – Basin I – Rock Voids (7 pages)
- PONDS Output – Staging Area No. 2 – Basin II – Rock Voids (7 pages)
- PONDS Output – Staging Area No. 2 – Basin III – Rock Voids (7 pages)
- PONDS Output – Staging Area No. 2 – Basin IV – Rock Voids (7 pages)

PONDS Version 3.3.0278
Retention Pond Recovery - Refined Method
Copyright 2012
Devo Seereeram, Ph.D., P.E.

Project Data

Project Name: NFRC Staging Areas
Simulation Description: Staging Area No. 2 - Basin I - Rock Voids
Project Number: BJR 19-198A
Engineer : CW
Supervising Engineer: JCD
Date: 03-11-2020

Aquifer Data

Base Of Aquifer Elevation, [B] (ft datum): 97.00
Water Table Elevation, [WT] (ft datum): 98.00
Horizontal Saturated Hydraulic Conductivity, [Kh] (ft/day): 1.50
Fillable Porosity, [n] (%): 25.00
Unsaturated Vertical Infiltration Rate, [Iv] (ft/day): 0.75
Maximum Area For Unsaturated Infiltration, [Av] (ft²): 13001.1

Geometry Data

Equivalent Pond Length, [L] (ft): 350.0
Equivalent Pond Width, [W] (ft): 100.0
Ground water mound is expected to intersect the pond bottom

Stage vs Area Data

Stage (ft datum)	Area (ft ²)
102.50	13001.1
103.00	13001.1

Ditch Data

Ditch (or interceptor trench) parallel to length axis is inactive
Ditch (or interceptor trench) parallel to width axis is inactive

Discharge Structures

Discharge Structure #1 is inactive
Discharge Structure #2 is inactive

Discharge Structures (cont'd.)

Discharge Structure #3 is inactive

PONDS Version 3.3.0278
Retention Pond Recovery - Refined Method
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Scenario Input Data

Scenario 1 :: 4791.6 ft³ slug load

Hydrograph Type: Slug Load
 Modflow Routing: Routed with infiltration

Treatment Volume (ft³) 4791.6

Initial ground water level (ft datum) 98.00 (default)

<u>Time After Storm Event (days)</u>	<u>Time After Storm Event (days)</u>	<u>Time After Storm Event (days)</u>	<u>Time After Storm Event (days)</u>	<u>Time After Storm Event (days)</u>
0.100	3.500	11.000	19.000	27.000
0.250	4.000	12.000	20.000	28.000
0.500	5.000	13.000	21.000	29.000
1.000	6.000	14.000	22.000	30.000
1.500	7.000	15.000	23.000	
2.000	8.000	16.000	24.000	
2.500	9.000	17.000	25.000	
3.000	10.000	18.000	26.000	

PONDS Version 3.3.0278
Retention Pond Recovery - Refined Method
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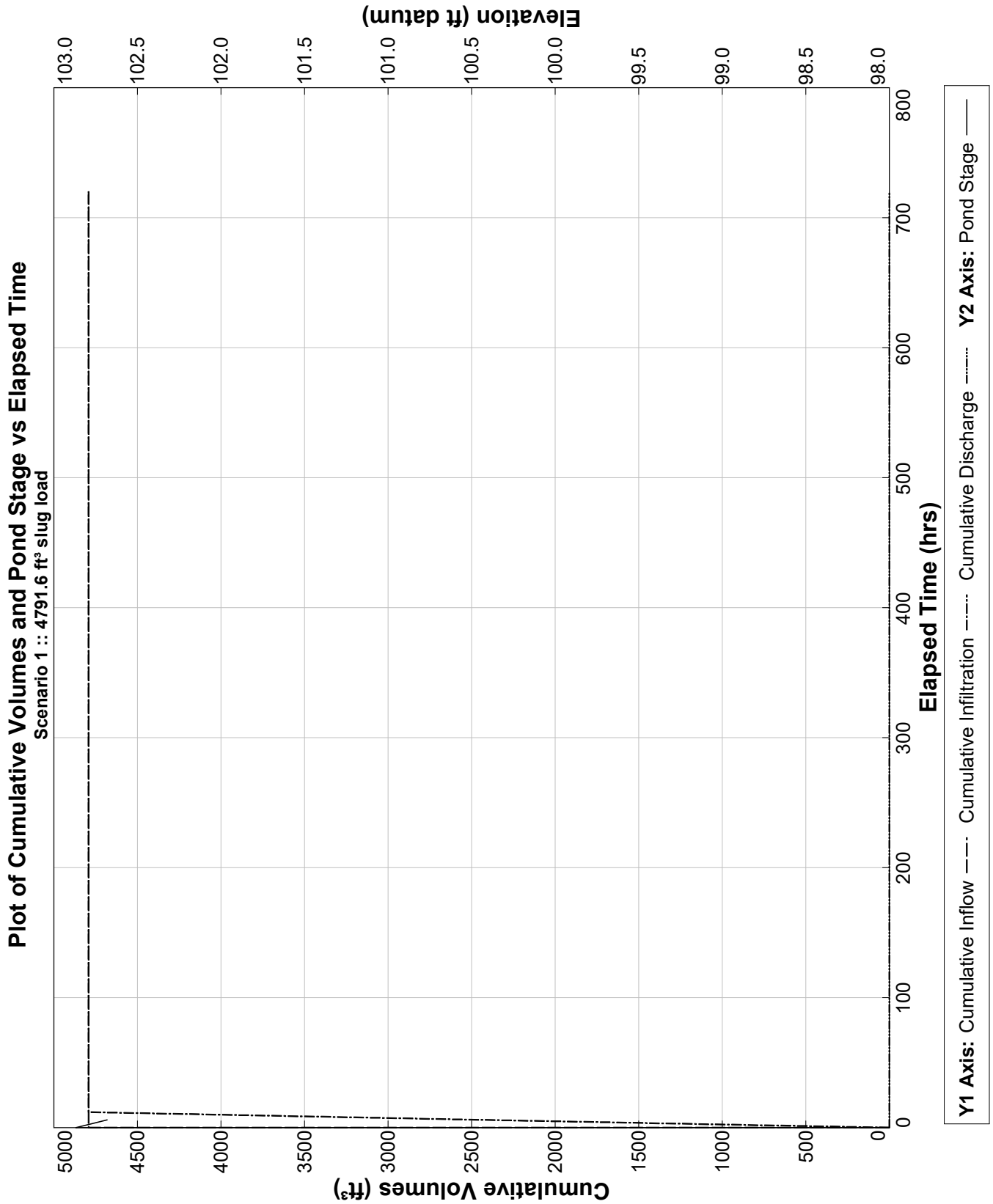
Detailed Results :: Scenario 1 :: 4791.6 ft³ slug load

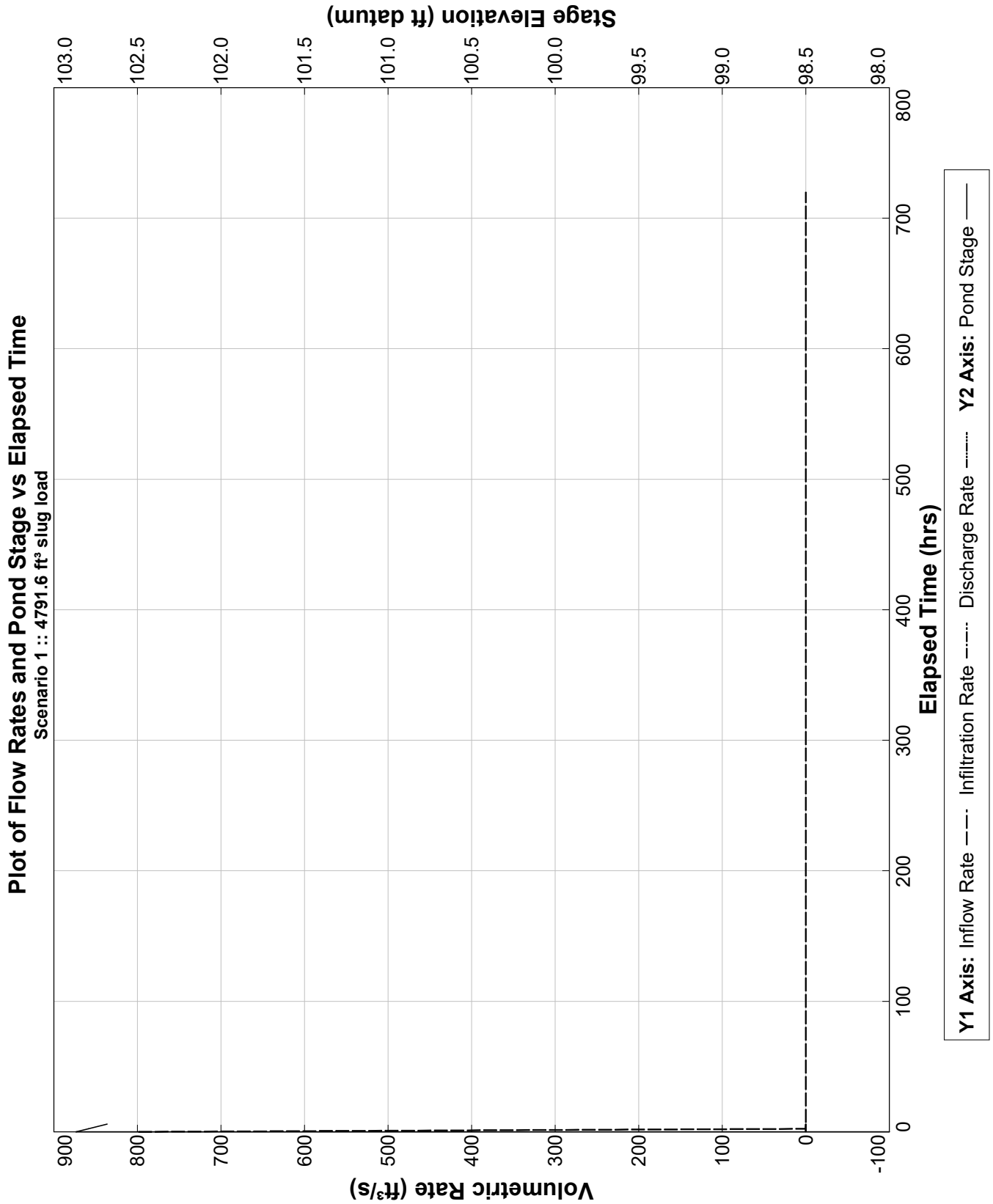
Elapsed Time (hours)	Instantaneous Inflow Rate (ft ³ /s)	Outside Recharge (ft/day)	Stage Elevation (ft datum)	Infiltration Rate (ft ³ /s)	Combined Instantaneous Discharge Rate (ft ³ /s)	Cumulative Inflow Volume (ft ³)	Cumulative Infiltration Volume (ft ³)	Combined Cumulative Discharge (ft ³)	Flow Type
0.000	798.6000	0.00000	98.00000	0.00000	0	0.000	0.0	0	N.A.
0.002	798.6000	0.00000	102.86850	0.11286	0	4791.600	0.7	0	U/P
2.400	0.0000	0.00000	102.79360	0.11286	0	4791.600	975.1	0	U/P
6.000	0.0000	0.00000	102.68110	0.07054	0	4791.600	2437.7	0	U/P
12.000	0.0000	0.00000	----	----	----	4791.600	4791.6	0	dry
24.000	0.0000	0.00000	----	----	----	4791.600	4791.6	0	dry
36.000	0.0000	0.00000	----	----	----	4791.600	4791.6	0	dry
48.000	0.0000	0.00000	----	----	----	4791.600	4791.6	0	dry
60.000	0.0000	0.00000	----	----	----	4791.600	4791.6	0	dry
72.000	0.0000	0.00000	----	----	----	4791.600	4791.6	0	dry
84.000	0.0000	0.00000	----	----	----	4791.600	4791.6	0	dry
96.000	0.0000	0.00000	----	----	----	4791.600	4791.6	0	dry
120.000	0.0000	0.00000	----	----	----	4791.600	4791.6	0	dry
144.000	0.0000	0.00000	----	----	----	4791.600	4791.6	0	dry
168.000	0.0000	0.00000	----	----	----	4791.600	4791.6	0	dry
192.000	0.0000	0.00000	----	----	----	4791.600	4791.6	0	dry
216.000	0.0000	0.00000	----	----	----	4791.600	4791.6	0	dry
240.000	0.0000	0.00000	----	----	----	4791.600	4791.6	0	dry
264.000	0.0000	0.00000	----	----	----	4791.600	4791.6	0	dry
288.000	0.0000	0.00000	----	----	----	4791.600	4791.6	0	dry
312.000	0.0000	0.00000	----	----	----	4791.600	4791.6	0	dry
336.000	0.0000	0.00000	----	----	----	4791.600	4791.6	0	dry
360.000	0.0000	0.00000	----	----	----	4791.600	4791.6	0	dry
384.000	0.0000	0.00000	----	----	----	4791.600	4791.6	0	dry
408.000	0.0000	0.00000	----	----	----	4791.600	4791.6	0	dry
432.000	0.0000	0.00000	----	----	----	4791.600	4791.6	0	dry
456.000	0.0000	0.00000	----	----	----	4791.600	4791.6	0	dry
480.000	0.0000	0.00000	----	----	----	4791.600	4791.6	0	dry
504.000	0.0000	0.00000	----	----	----	4791.600	4791.6	0	dry
528.000	0.0000	0.00000	----	----	----	4791.600	4791.6	0	dry
552.000	0.0000	0.00000	----	----	----	4791.600	4791.6	0	dry
576.000	0.0000	0.00000	----	----	----	4791.600	4791.6	0	dry
600.000	0.0000	0.00000	----	----	----	4791.600	4791.6	0	dry
624.000	0.0000	0.00000	----	----	----	4791.600	4791.6	0	dry
648.000	0.0000	0.00000	----	----	----	4791.600	4791.6	0	dry
672.000	0.0000	0.00000	----	----	----	4791.600	4791.6	0	dry
696.000	0.0000	0.00000	----	----	----	4791.600	4791.6	0	dry
720.000	0.0000	0.00000	----	----	----	4791.600	4791.6	0	dry

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Summary of Results :: Scenario 1 :: 4791.6 ft³ slug load

	Time (hours)	Stage (ft datum)	Rate (ft ³ /s)	Volume (ft ³)
Stage				
Minimum	0.000	98.00		
Maximum	0.002	102.87		
Inflow				
Rate - Maximum - Positive	0.002		798.6000	
Rate - Maximum - Negative	None		None	
Cumulative Volume - Maximum Positive	0.002			4791.6
Cumulative Volume - Maximum Negative	None			None
Cumulative Volume - End of Simulation	720.000			4791.6
Infiltration				
Rate - Maximum - Positive	0.002		0.1129	
Rate - Maximum - Negative	None		None	
Cumulative Volume - Maximum Positive	6.000			2437.7
Cumulative Volume - Maximum Negative	None			None
Cumulative Volume - End of Simulation	720.000			4791.6
Combined Discharge				
Rate - Maximum - Positive	None		None	
Rate - Maximum - Negative	None		None	
Cumulative Volume - Maximum Positive	None			None
Cumulative Volume - Maximum Negative	None			None
Cumulative Volume - End of Simulation	720.000			0.0
Discharge Structure 1 - inactive				
Rate - Maximum - Positive	disabled		disabled	
Rate - Maximum - Negative	disabled		disabled	
Cumulative Volume - Maximum Positive	disabled			disabled
Cumulative Volume - Maximum Negative	disabled			disabled
Cumulative Volume - End of Simulation	disabled			disabled
Discharge Structure 2 - inactive				
Rate - Maximum - Positive	disabled		disabled	
Rate - Maximum - Negative	disabled		disabled	
Cumulative Volume - Maximum Positive	disabled			disabled
Cumulative Volume - Maximum Negative	disabled			disabled
Cumulative Volume - End of Simulation	disabled			disabled
Discharge Structure 3 - inactive				
Rate - Maximum - Positive	disabled		disabled	
Rate - Maximum - Negative	disabled		disabled	
Cumulative Volume - Maximum Positive	disabled			disabled
Cumulative Volume - Maximum Negative	disabled			disabled
Cumulative Volume - End of Simulation	disabled			disabled
Pollution Abatement:				
36 Hour Stage and Infiltration Volume	36.000	Dry		4791.6
72 Hour Stage and Infiltration Volume	72.000	Dry		4791.6





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Project Data

Project Name: NFRC Staging Areas
Simulation Description: Staging Area No. 2 - Basin II - Rock Voids
Project Number: BJR 19-198A
Engineer : CW
Supervising Engineer: JCD
Date: 03-11-2020

Aquifer Data

Base Of Aquifer Elevation, [B] (ft datum): 96.50
Water Table Elevation, [WT] (ft datum): 98.33
Horizontal Saturated Hydraulic Conductivity, [Kh] (ft/day): 0.16
Fillable Porosity, [n] (%): 25.00
Unsaturated Vertical Infiltration Rate, [Iv] (ft/day): 0.08
Maximum Area For Unsaturated Infiltration, [Av] (ft²): 63367.5

Geometry Data

Equivalent Pond Length, [L] (ft): 480.0
Equivalent Pond Width, [W] (ft): 380.0
Ground water mound is expected to intersect the pond bottom

Stage vs Area Data

<u>Stage</u> (ft datum)	<u>Area</u> (ft ²)
101.00	63367.5
101.50	63367.5

Ditch Data

Ditch (or interceptor trench) parallel to length axis is inactive
Ditch (or interceptor trench) parallel to width axis is inactive

Discharge Structures

Discharge Structure #1 is inactive
Discharge Structure #2 is inactive

Discharge Structures (cont'd.)

Discharge Structure #3 is inactive

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Scenario Input Data

Scenario 1 :: 14374.8 ft³ slug load

Hydrograph Type: Slug Load
 Modflow Routing: Routed with infiltration

Treatment Volume (ft³) 14374.8

Initial ground water level (ft datum) 98.33 (default)

<u>Time After Storm Event (days)</u>	<u>Time After Storm Event (days)</u>	<u>Time After Storm Event (days)</u>	<u>Time After Storm Event (days)</u>	<u>Time After Storm Event (days)</u>
0.100	3.500	11.000	19.000	27.000
0.250	4.000	12.000	20.000	28.000
0.500	5.000	13.000	21.000	29.000
1.000	6.000	14.000	22.000	30.000
1.500	7.000	15.000	23.000	
2.000	8.000	16.000	24.000	
2.500	9.000	17.000	25.000	
3.000	10.000	18.000	26.000	

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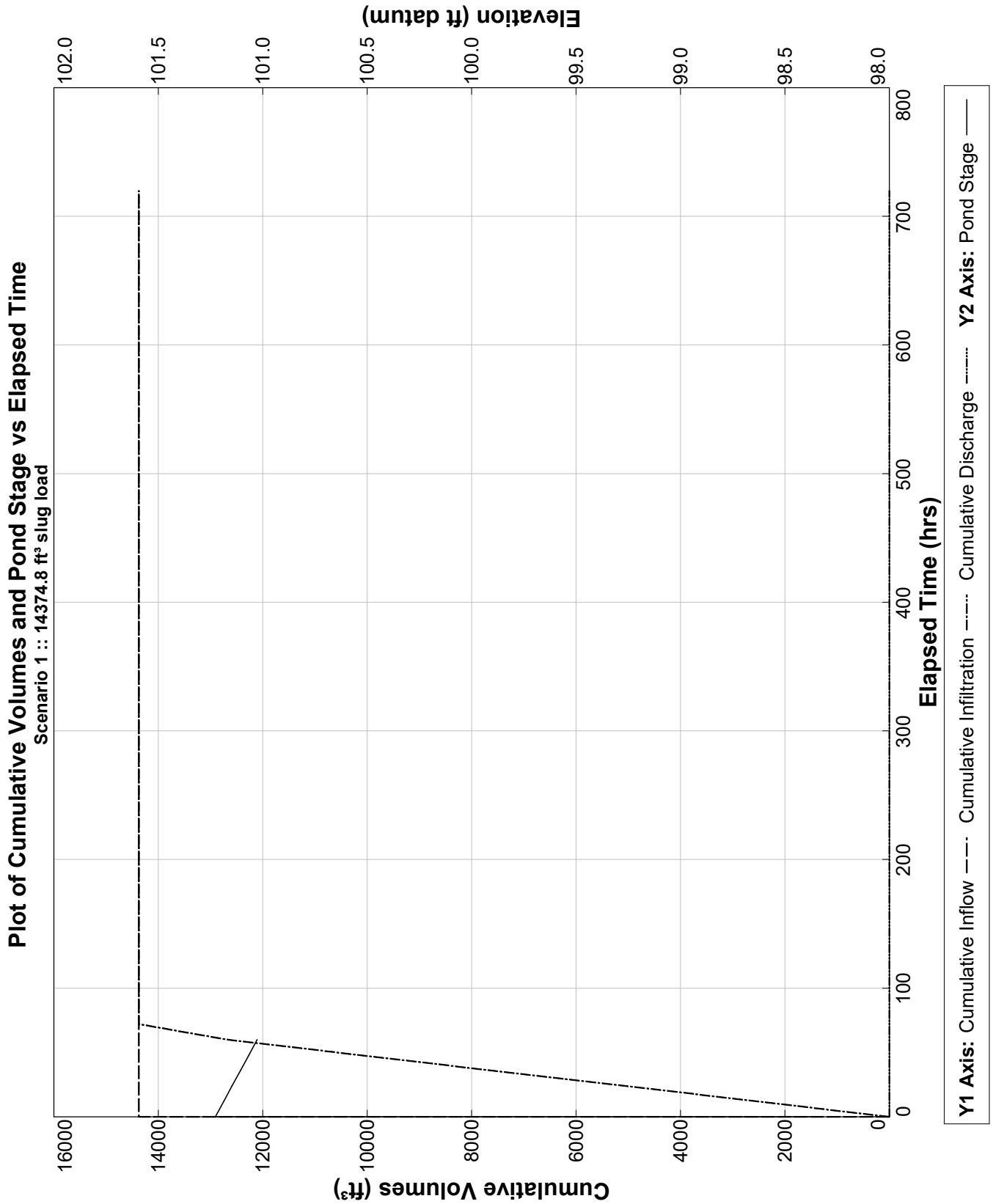
Detailed Results :: Scenario 1 :: 14374.8 ft³ slug load

Elapsed Time (hours)	Instantaneous Inflow Rate (ft ³ /s)	Outside Recharge (ft/day)	Stage Elevation (ft datum)	Infiltration Rate (ft ³ /s)	Combined Instantaneous Discharge Rate (ft ³ /s)	Cumulative Inflow Volume (ft ³)	Cumulative Infiltration Volume (ft ³)	Combined Cumulative Discharge (ft ³)	Flow Type
0.000	2395.8000	0.00000	98.33000	0.00000	0	0.000	0.0	0	N.A.
0.002	2395.8000	0.00000	101.22680	0.05867	0	14374.800	0.4	0	U/P
2.400	0.0000	0.00000	101.21880	0.05867	0	14374.800	506.9	0	U/P
6.000	0.0000	0.00000	101.20680	0.05867	0	14374.800	1267.4	0	U/P
12.000	0.0000	0.00000	101.18690	0.05867	0	14374.800	2534.7	0	U/P
24.000	0.0000	0.00000	101.14690	0.05867	0	14374.800	5069.4	0	U/P
36.000	0.0000	0.00000	101.10680	0.05867	0	14374.800	7604.1	0	U/P
48.000	0.0000	0.00000	101.06680	0.05867	0	14374.800	10138.8	0	U/P
60.000	0.0000	0.00000	101.02680	0.02934	0	14374.800	12673.5	0	U/P
72.000	0.0000	0.00000	----	----	----	14374.800	14374.8	0	dry
84.000	0.0000	0.00000	----	----	----	14374.800	14374.8	0	dry
96.000	0.0000	0.00000	----	----	----	14374.800	14374.8	0	dry
120.000	0.0000	0.00000	----	----	----	14374.800	14374.8	0	dry
144.000	0.0000	0.00000	----	----	----	14374.800	14374.8	0	dry
168.000	0.0000	0.00000	----	----	----	14374.800	14374.8	0	dry
192.000	0.0000	0.00000	----	----	----	14374.800	14374.8	0	dry
216.000	0.0000	0.00000	----	----	----	14374.800	14374.8	0	dry
240.000	0.0000	0.00000	----	----	----	14374.800	14374.8	0	dry
264.000	0.0000	0.00000	----	----	----	14374.800	14374.8	0	dry
288.000	0.0000	0.00000	----	----	----	14374.800	14374.8	0	dry
312.000	0.0000	0.00000	----	----	----	14374.800	14374.8	0	dry
336.000	0.0000	0.00000	----	----	----	14374.800	14374.8	0	dry
360.000	0.0000	0.00000	----	----	----	14374.800	14374.8	0	dry
384.000	0.0000	0.00000	----	----	----	14374.800	14374.8	0	dry
408.000	0.0000	0.00000	----	----	----	14374.800	14374.8	0	dry
432.000	0.0000	0.00000	----	----	----	14374.800	14374.8	0	dry
456.000	0.0000	0.00000	----	----	----	14374.800	14374.8	0	dry
480.000	0.0000	0.00000	----	----	----	14374.800	14374.8	0	dry
504.000	0.0000	0.00000	----	----	----	14374.800	14374.8	0	dry
528.000	0.0000	0.00000	----	----	----	14374.800	14374.8	0	dry
552.000	0.0000	0.00000	----	----	----	14374.800	14374.8	0	dry
576.000	0.0000	0.00000	----	----	----	14374.800	14374.8	0	dry
600.000	0.0000	0.00000	----	----	----	14374.800	14374.8	0	dry
624.000	0.0000	0.00000	----	----	----	14374.800	14374.8	0	dry
648.000	0.0000	0.00000	----	----	----	14374.800	14374.8	0	dry
672.000	0.0000	0.00000	----	----	----	14374.800	14374.8	0	dry
696.000	0.0000	0.00000	----	----	----	14374.800	14374.8	0	dry
720.000	0.0000	0.00000	----	----	----	14374.800	14374.8	0	dry

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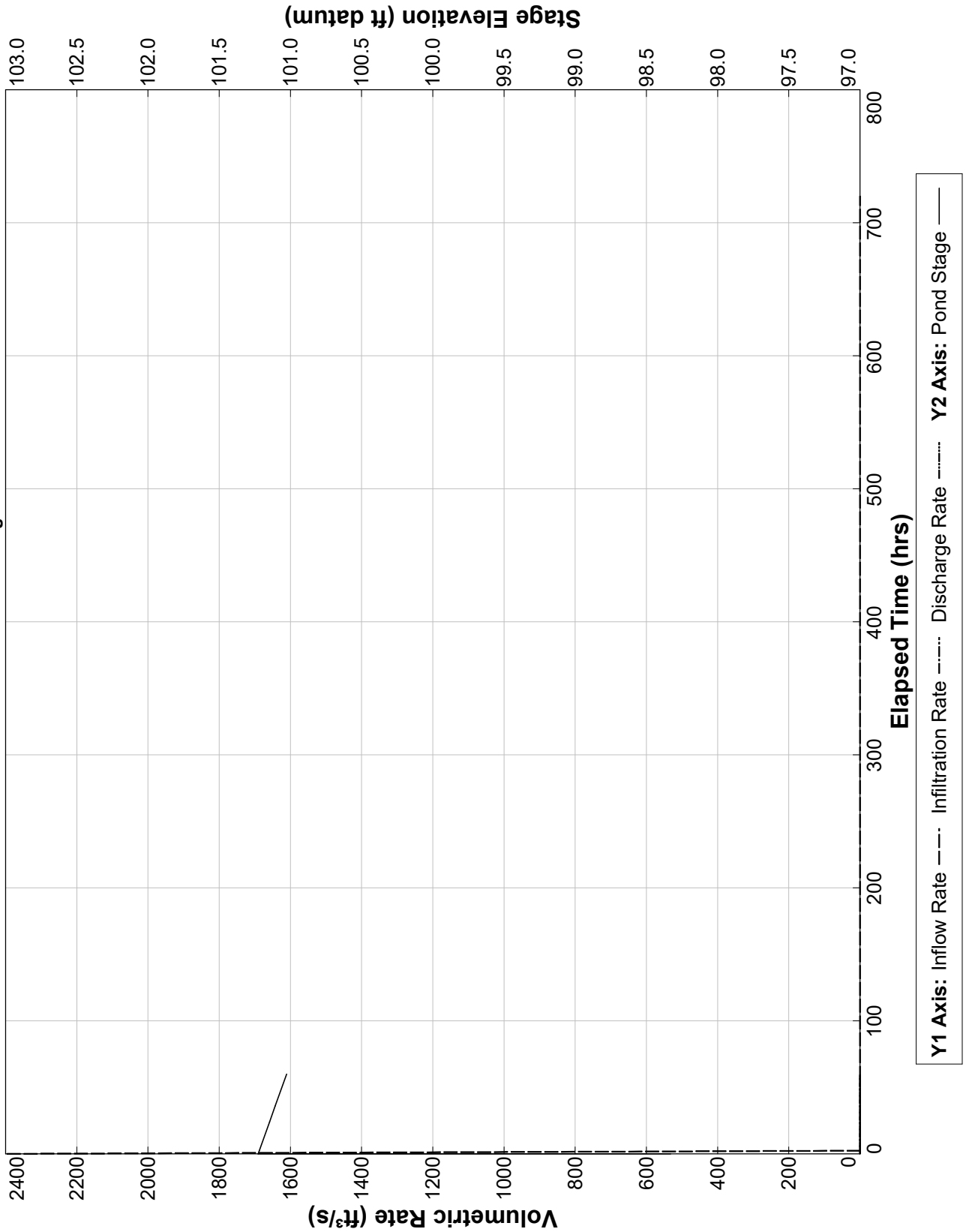
Summary of Results :: Scenario 1 :: 14374.8 ft³ slug load

	Time (hours)	Stage (ft datum)	Rate (ft ³ /s)	Volume (ft ³)
Stage				
Minimum	0.000	98.33		
Maximum	0.002	101.23		
Inflow				
Rate - Maximum - Positive	0.002		2395.8000	
Rate - Maximum - Negative	None		None	
Cumulative Volume - Maximum Positive	0.002			14374.8
Cumulative Volume - Maximum Negative	None			None
Cumulative Volume - End of Simulation	720.000			14374.8
Infiltration				
Rate - Maximum - Positive	0.002		0.0587	
Rate - Maximum - Negative	None		None	
Cumulative Volume - Maximum Positive	60.000			12673.5
Cumulative Volume - Maximum Negative	None			None
Cumulative Volume - End of Simulation	720.000			14374.8
Combined Discharge				
Rate - Maximum - Positive	None		None	
Rate - Maximum - Negative	None		None	
Cumulative Volume - Maximum Positive	None			None
Cumulative Volume - Maximum Negative	None			None
Cumulative Volume - End of Simulation	720.000			0.0
Discharge Structure 1 - inactive				
Rate - Maximum - Positive	disabled		disabled	
Rate - Maximum - Negative	disabled		disabled	
Cumulative Volume - Maximum Positive	disabled			disabled
Cumulative Volume - Maximum Negative	disabled			disabled
Cumulative Volume - End of Simulation	disabled			disabled
Discharge Structure 2 - inactive				
Rate - Maximum - Positive	disabled		disabled	
Rate - Maximum - Negative	disabled		disabled	
Cumulative Volume - Maximum Positive	disabled			disabled
Cumulative Volume - Maximum Negative	disabled			disabled
Cumulative Volume - End of Simulation	disabled			disabled
Discharge Structure 3 - inactive				
Rate - Maximum - Positive	disabled		disabled	
Rate - Maximum - Negative	disabled		disabled	
Cumulative Volume - Maximum Positive	disabled			disabled
Cumulative Volume - Maximum Negative	disabled			disabled
Cumulative Volume - End of Simulation	disabled			disabled
Pollution Abatement:				
36 Hour Stage and Infiltration Volume	36.000	101.11		7604.1
72 Hour Stage and Infiltration Volume	72.000	Dry		14374.8



Plot of Flow Rates and Pond Stage vs Elapsed Time

Scenario 1 :: 14374.8 ft³ slug load



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Project Data

Project Name: NFRC Staging Areas
Simulation Description: Staging Area No. 2 - Basin III - Rock Voids
Project Number: BJR 19-198A
Engineer : CW
Supervising Engineer: JCD
Date: 03-11-2020

Aquifer Data

Base Of Aquifer Elevation, [B] (ft datum): 98.50
Water Table Elevation, [WT] (ft datum): 99.50
Horizontal Saturated Hydraulic Conductivity, [Kh] (ft/day): 0.70
Fillable Porosity, [n] (%): 25.00
Unsaturated Vertical Infiltration Rate, [Iv] (ft/day): 0.35
Maximum Area For Unsaturated Infiltration, [Av] (ft²): 37347.8

Geometry Data

Equivalent Pond Length, [L] (ft): 490.0
Equivalent Pond Width, [W] (ft): 220.0
Ground water mound is expected to intersect the pond bottom

Stage vs Area Data

Stage (ft datum)	Area (ft ²)
103.50	37347.8
104.00	37347.8

Ditch Data

Ditch (or interceptor trench) parallel to length axis is inactive
Ditch (or interceptor trench) parallel to width axis is inactive

Discharge Structures

Discharge Structure #1 is inactive
Discharge Structure #2 is inactive

Discharge Structures (cont'd.)

Discharge Structure #3 is inactive

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Scenario Input Data

Scenario 1 :: 10454.4 ft³ slug load

Hydrograph Type: Slug Load
 Modflow Routing: Routed with infiltration

Treatment Volume (ft³) 10454.4

Initial ground water level (ft datum) 99.50 (default)

<u>Time After Storm Event (days)</u>	<u>Time After Storm Event (days)</u>	<u>Time After Storm Event (days)</u>	<u>Time After Storm Event (days)</u>	<u>Time After Storm Event (days)</u>
0.100	3.500	11.000	19.000	27.000
0.250	4.000	12.000	20.000	28.000
0.500	5.000	13.000	21.000	29.000
1.000	6.000	14.000	22.000	30.000
1.500	7.000	15.000	23.000	
2.000	8.000	16.000	24.000	
2.500	9.000	17.000	25.000	
3.000	10.000	18.000	26.000	

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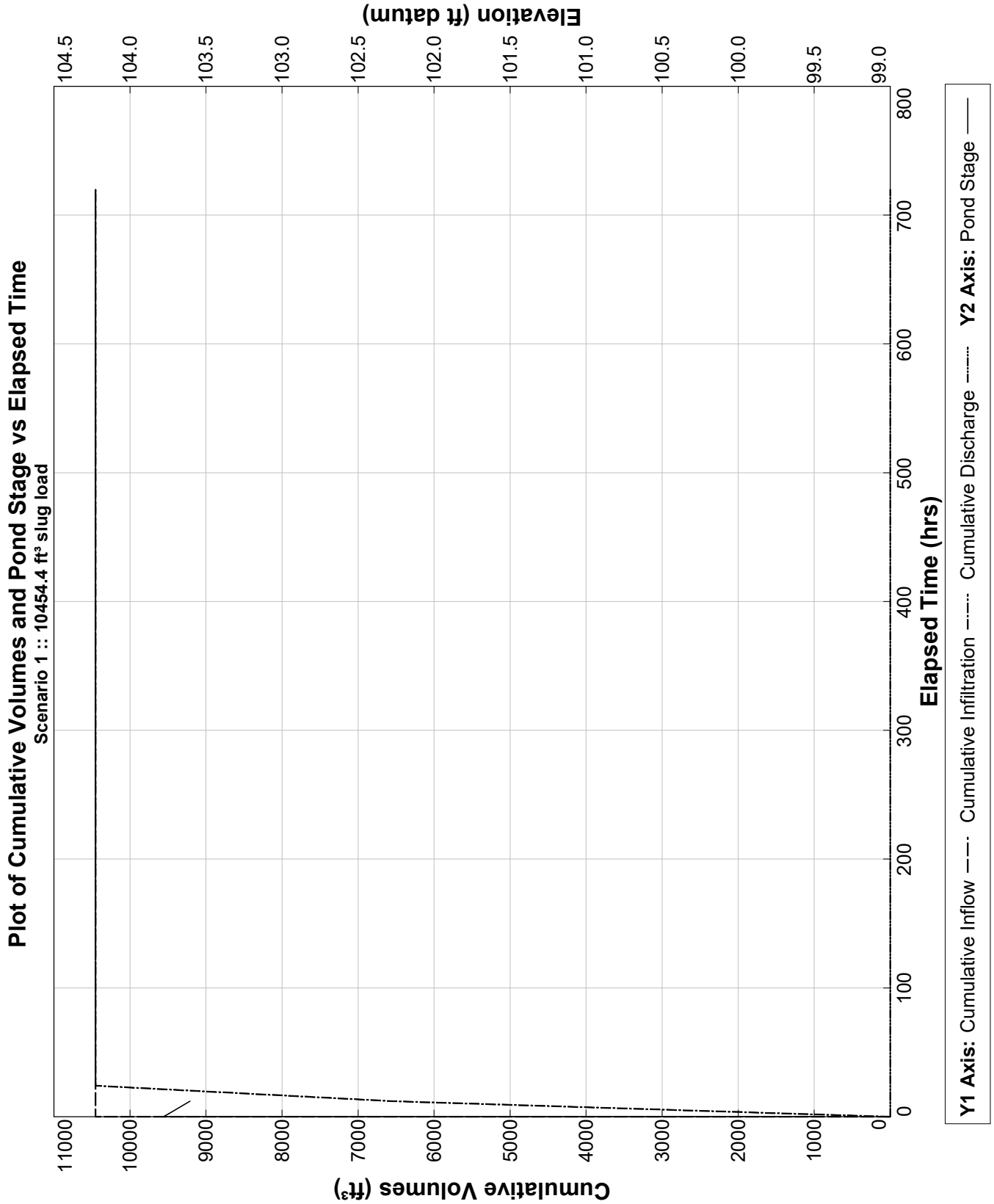
Detailed Results :: Scenario 1 :: 10454.4 ft³ slug load

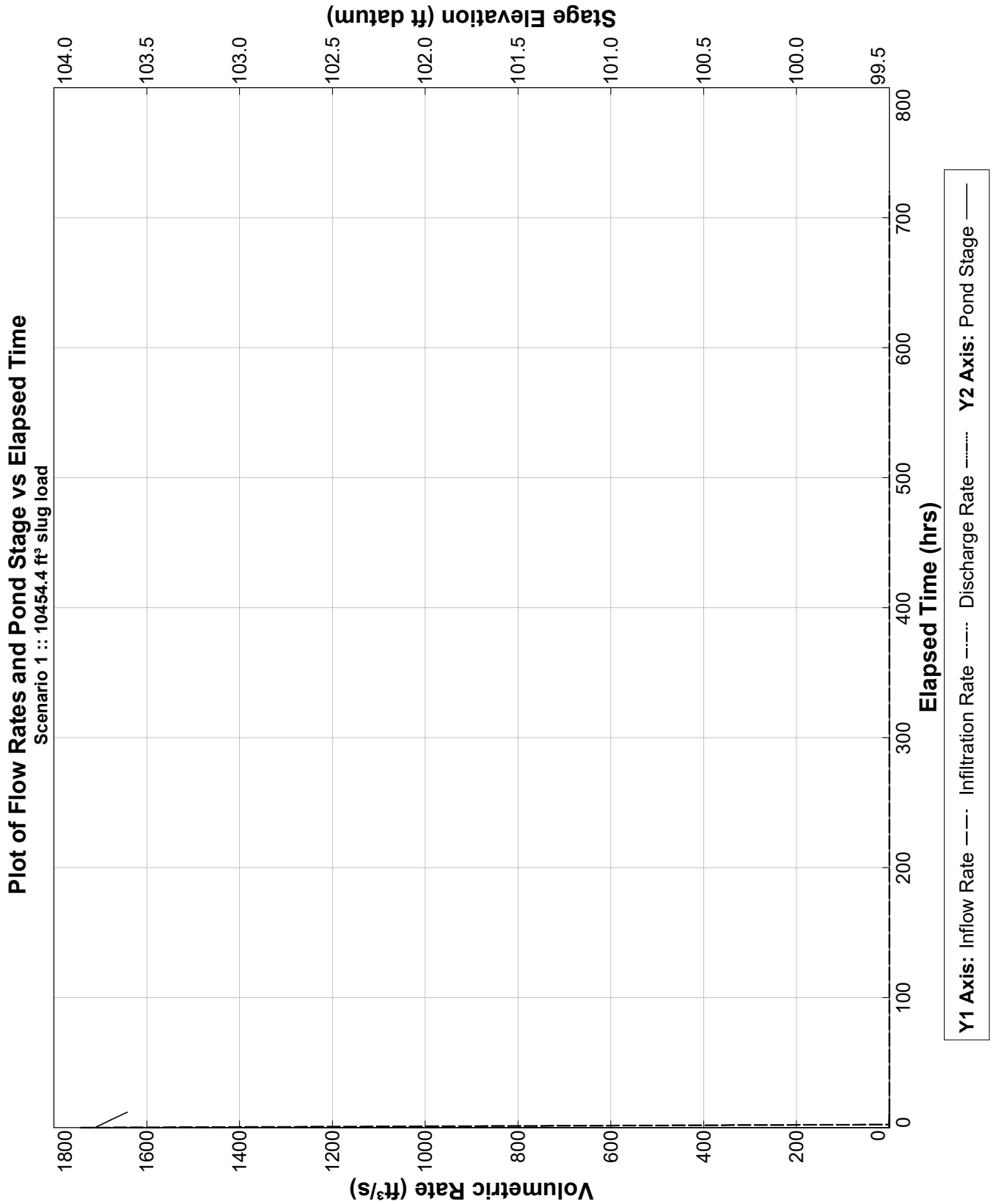
Elapsed Time (hours)	Instantaneous Inflow Rate (ft ³ /s)	Outside Recharge (ft/day)	Stage Elevation (ft datum)	Infiltration Rate (ft ³ /s)	Combined Instantaneous Discharge Rate (ft ³ /s)	Cumulative Inflow Volume (ft ³)	Cumulative Infiltration Volume (ft ³)	Combined Cumulative Discharge (ft ³)	Flow Type
0.000	1742.4000	0.00000	99.50000	0.00000	0	0.000	0.0	0	N.A.
0.002	1742.4000	0.00000	103.77990	0.15129	0	10454.400	0.9	0	U/P
2.400	0.0000	0.00000	103.74490	0.15129	0	10454.400	1307.2	0	U/P
6.000	0.0000	0.00000	103.69240	0.15129	0	10454.400	3267.9	0	U/P
12.000	0.0000	0.00000	103.60490	0.10086	0	10454.400	6535.9	0	U/P
24.000	0.0000	0.00000	----	----	----	10454.400	10454.4	0	dry
36.000	0.0000	0.00000	----	----	----	10454.400	10454.4	0	dry
48.000	0.0000	0.00000	----	----	----	10454.400	10454.4	0	dry
60.000	0.0000	0.00000	----	----	----	10454.400	10454.4	0	dry
72.000	0.0000	0.00000	----	----	----	10454.400	10454.4	0	dry
84.000	0.0000	0.00000	----	----	----	10454.400	10454.4	0	dry
96.000	0.0000	0.00000	----	----	----	10454.400	10454.4	0	dry
120.000	0.0000	0.00000	----	----	----	10454.400	10454.4	0	dry
144.000	0.0000	0.00000	----	----	----	10454.400	10454.4	0	dry
168.000	0.0000	0.00000	----	----	----	10454.400	10454.4	0	dry
192.000	0.0000	0.00000	----	----	----	10454.400	10454.4	0	dry
216.000	0.0000	0.00000	----	----	----	10454.400	10454.4	0	dry
240.000	0.0000	0.00000	----	----	----	10454.400	10454.4	0	dry
264.000	0.0000	0.00000	----	----	----	10454.400	10454.4	0	dry
288.000	0.0000	0.00000	----	----	----	10454.400	10454.4	0	dry
312.000	0.0000	0.00000	----	----	----	10454.400	10454.4	0	dry
336.000	0.0000	0.00000	----	----	----	10454.400	10454.4	0	dry
360.000	0.0000	0.00000	----	----	----	10454.400	10454.4	0	dry
384.000	0.0000	0.00000	----	----	----	10454.400	10454.4	0	dry
408.000	0.0000	0.00000	----	----	----	10454.400	10454.4	0	dry
432.000	0.0000	0.00000	----	----	----	10454.400	10454.4	0	dry
456.000	0.0000	0.00000	----	----	----	10454.400	10454.4	0	dry
480.000	0.0000	0.00000	----	----	----	10454.400	10454.4	0	dry
504.000	0.0000	0.00000	----	----	----	10454.400	10454.4	0	dry
528.000	0.0000	0.00000	----	----	----	10454.400	10454.4	0	dry
552.000	0.0000	0.00000	----	----	----	10454.400	10454.4	0	dry
576.000	0.0000	0.00000	----	----	----	10454.400	10454.4	0	dry
600.000	0.0000	0.00000	----	----	----	10454.400	10454.4	0	dry
624.000	0.0000	0.00000	----	----	----	10454.400	10454.4	0	dry
648.000	0.0000	0.00000	----	----	----	10454.400	10454.4	0	dry
672.000	0.0000	0.00000	----	----	----	10454.400	10454.4	0	dry
696.000	0.0000	0.00000	----	----	----	10454.400	10454.4	0	dry
720.000	0.0000	0.00000	----	----	----	10454.400	10454.4	0	dry

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Summary of Results :: Scenario 1 :: 10454.4 ft³ slug load

	Time (hours)	Stage (ft datum)	Rate (ft ³ /s)	Volume (ft ³)
Stage				
Minimum	0.000	99.50		
Maximum	0.002	103.78		
Inflow				
Rate - Maximum - Positive	0.002		1742.4000	
Rate - Maximum - Negative	None		None	
Cumulative Volume - Maximum Positive	0.002			10454.4
Cumulative Volume - Maximum Negative	None			None
Cumulative Volume - End of Simulation	720.000			10454.4
Infiltration				
Rate - Maximum - Positive	0.002		0.1513	
Rate - Maximum - Negative	None		None	
Cumulative Volume - Maximum Positive	12.000			6535.9
Cumulative Volume - Maximum Negative	None			None
Cumulative Volume - End of Simulation	720.000			10454.4
Combined Discharge				
Rate - Maximum - Positive	None		None	
Rate - Maximum - Negative	None		None	
Cumulative Volume - Maximum Positive	None			None
Cumulative Volume - Maximum Negative	None			None
Cumulative Volume - End of Simulation	720.000			0.0
Discharge Structure 1 - inactive				
Rate - Maximum - Positive	disabled		disabled	
Rate - Maximum - Negative	disabled		disabled	
Cumulative Volume - Maximum Positive	disabled			disabled
Cumulative Volume - Maximum Negative	disabled			disabled
Cumulative Volume - End of Simulation	disabled			disabled
Discharge Structure 2 - inactive				
Rate - Maximum - Positive	disabled		disabled	
Rate - Maximum - Negative	disabled		disabled	
Cumulative Volume - Maximum Positive	disabled			disabled
Cumulative Volume - Maximum Negative	disabled			disabled
Cumulative Volume - End of Simulation	disabled			disabled
Discharge Structure 3 - inactive				
Rate - Maximum - Positive	disabled		disabled	
Rate - Maximum - Negative	disabled		disabled	
Cumulative Volume - Maximum Positive	disabled			disabled
Cumulative Volume - Maximum Negative	disabled			disabled
Cumulative Volume - End of Simulation	disabled			disabled
Pollution Abatement:				
36 Hour Stage and Infiltration Volume	36.000	Dry		10454.4
72 Hour Stage and Infiltration Volume	72.000	Dry		10454.4





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Project Data

Project Name: NFRC Staging Areas
Simulation Description: Staging Area No. 2 - Basin IV - Rock Voids
Project Number: BJR 19-198A
Engineer : CW
Supervising Engineer: JCD
Date: 03-11-2020

Aquifer Data

Base Of Aquifer Elevation, [B] (ft datum): 98.50
Water Table Elevation, [WT] (ft datum): 99.50
Horizontal Saturated Hydraulic Conductivity, [Kh] (ft/day): 0.65
Fillable Porosity, [n] (%): 25.00
Unsaturated Vertical Infiltration Rate, [Iv] (ft/day): 0.325
Maximum Area For Unsaturated Infiltration, [Av] (ft²): 36363.3

Geometry Data

Equivalent Pond Length, [L] (ft): 490.0
Equivalent Pond Width, [W] (ft): 210.0
Ground water mound is expected to intersect the pond bottom

Stage vs Area Data

<u>Stage</u> (ft datum)	<u>Area</u> (ft ²)
104.00	36363.3
104.50	36363.3

Ditch Data

Ditch (or interceptor trench) parallel to length axis is inactive
Ditch (or interceptor trench) parallel to width axis is inactive

Discharge Structures

Discharge Structure #1 is inactive
Discharge Structure #2 is inactive

Discharge Structures (cont'd.)

Discharge Structure #3 is inactive

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Scenario Input Data

Scenario 1 :: 7405.2 ft³ slug load

Hydrograph Type: Slug Load
Modflow Routing: Routed with infiltration

Treatment Volume (ft³) 7405.2

Initial ground water level (ft datum) 99.50 (default)

<u>Time After Storm Event (days)</u>	<u>Time After Storm Event (days)</u>	<u>Time After Storm Event (days)</u>	<u>Time After Storm Event (days)</u>	<u>Time After Storm Event (days)</u>
0.100	3.500	11.000	19.000	27.000
0.250	4.000	12.000	20.000	28.000
0.500	5.000	13.000	21.000	29.000
1.000	6.000	14.000	22.000	30.000
1.500	7.000	15.000	23.000	
2.000	8.000	16.000	24.000	
2.500	9.000	17.000	25.000	
3.000	10.000	18.000	26.000	

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Detailed Results :: Scenario 1 :: 7405.2 ft³ slug load

Elapsed Time (hours)	Instantaneous Inflow Rate (ft ³ /s)	Outside Recharge (ft/day)	Stage Elevation (ft datum)	Infiltration Rate (ft ³ /s)	Combined Instantaneous Discharge Rate (ft ³ /s)	Cumulative Inflow Volume (ft ³)	Cumulative Infiltration Volume (ft ³)	Combined Cumulative Discharge (ft ³)	Flow Type
0.000	1234.2000	0.00000	99.50000	0.00000	0	0.000	0.0	0	N.A.
0.002	1234.2000	0.00000	104.20360	0.13678	0	7405.200	0.8	0	U/P
2.400	0.0000	0.00000	104.17110	0.13678	0	7405.200	1181.8	0	U/P
6.000	0.0000	0.00000	104.12240	0.13678	0	7405.200	2954.5	0	U/P
12.000	0.0000	0.00000	104.04110	0.09119	0	7405.200	5909.0	0	U/P
24.000	0.0000	0.00000	----	----	----	7405.200	7405.2	0	dry
36.000	0.0000	0.00000	----	----	----	7405.200	7405.2	0	dry
48.000	0.0000	0.00000	----	----	----	7405.200	7405.2	0	dry
60.000	0.0000	0.00000	----	----	----	7405.200	7405.2	0	dry
72.000	0.0000	0.00000	----	----	----	7405.200	7405.2	0	dry
84.000	0.0000	0.00000	----	----	----	7405.200	7405.2	0	dry
96.000	0.0000	0.00000	----	----	----	7405.200	7405.2	0	dry
120.000	0.0000	0.00000	----	----	----	7405.200	7405.2	0	dry
144.000	0.0000	0.00000	----	----	----	7405.200	7405.2	0	dry
168.000	0.0000	0.00000	----	----	----	7405.200	7405.2	0	dry
192.000	0.0000	0.00000	----	----	----	7405.200	7405.2	0	dry
216.000	0.0000	0.00000	----	----	----	7405.200	7405.2	0	dry
240.000	0.0000	0.00000	----	----	----	7405.200	7405.2	0	dry
264.000	0.0000	0.00000	----	----	----	7405.200	7405.2	0	dry
288.000	0.0000	0.00000	----	----	----	7405.200	7405.2	0	dry
312.000	0.0000	0.00000	----	----	----	7405.200	7405.2	0	dry
336.000	0.0000	0.00000	----	----	----	7405.200	7405.2	0	dry
360.000	0.0000	0.00000	----	----	----	7405.200	7405.2	0	dry
384.000	0.0000	0.00000	----	----	----	7405.200	7405.2	0	dry
408.000	0.0000	0.00000	----	----	----	7405.200	7405.2	0	dry
432.000	0.0000	0.00000	----	----	----	7405.200	7405.2	0	dry
456.000	0.0000	0.00000	----	----	----	7405.200	7405.2	0	dry
480.000	0.0000	0.00000	----	----	----	7405.200	7405.2	0	dry
504.000	0.0000	0.00000	----	----	----	7405.200	7405.2	0	dry
528.000	0.0000	0.00000	----	----	----	7405.200	7405.2	0	dry
552.000	0.0000	0.00000	----	----	----	7405.200	7405.2	0	dry
576.000	0.0000	0.00000	----	----	----	7405.200	7405.2	0	dry
600.000	0.0000	0.00000	----	----	----	7405.200	7405.2	0	dry
624.000	0.0000	0.00000	----	----	----	7405.200	7405.2	0	dry
648.000	0.0000	0.00000	----	----	----	7405.200	7405.2	0	dry
672.000	0.0000	0.00000	----	----	----	7405.200	7405.2	0	dry
696.000	0.0000	0.00000	----	----	----	7405.200	7405.2	0	dry
720.000	0.0000	0.00000	----	----	----	7405.200	7405.2	0	dry

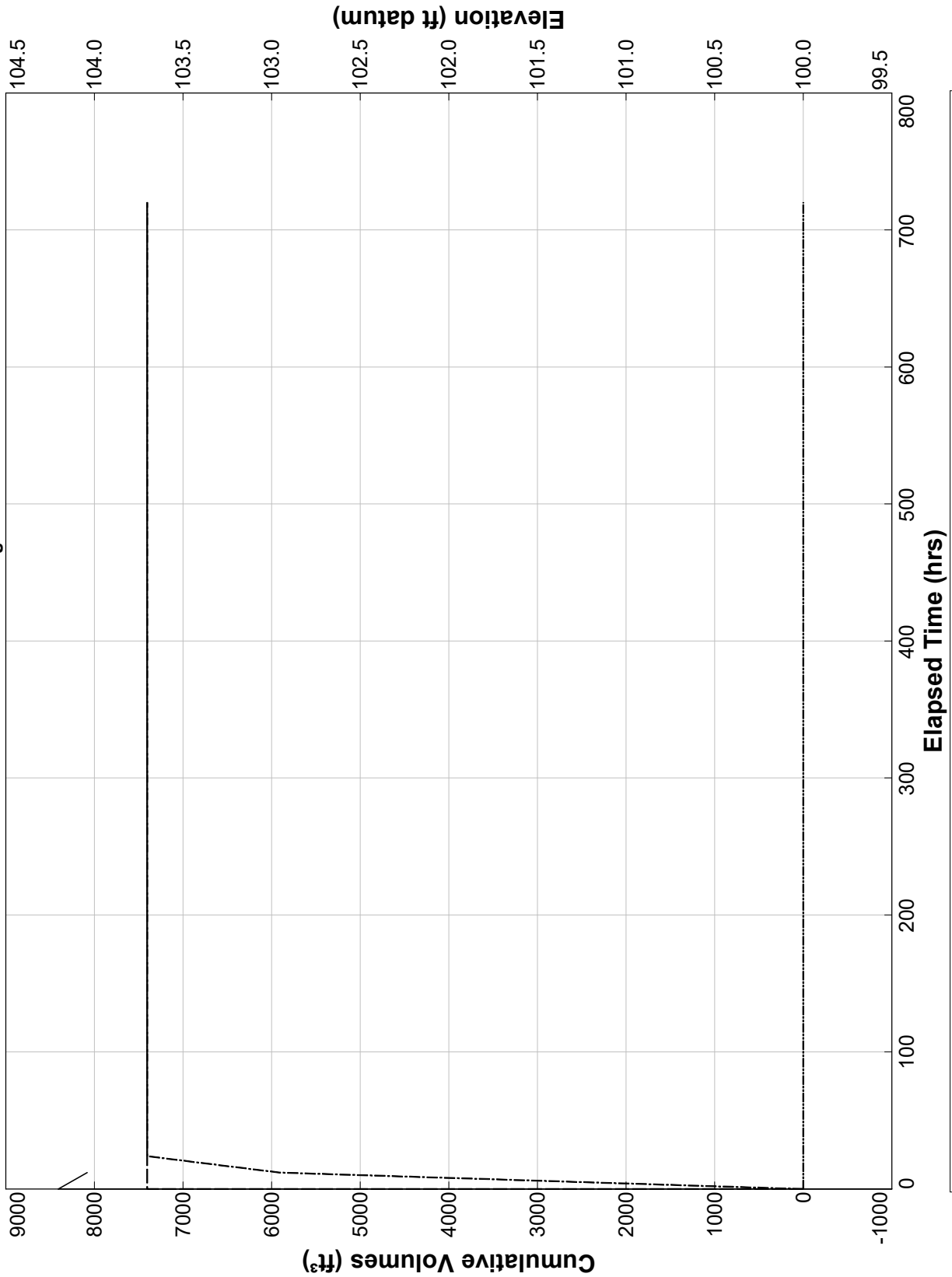
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Summary of Results :: Scenario 1 :: 7405.2 ft³ slug load

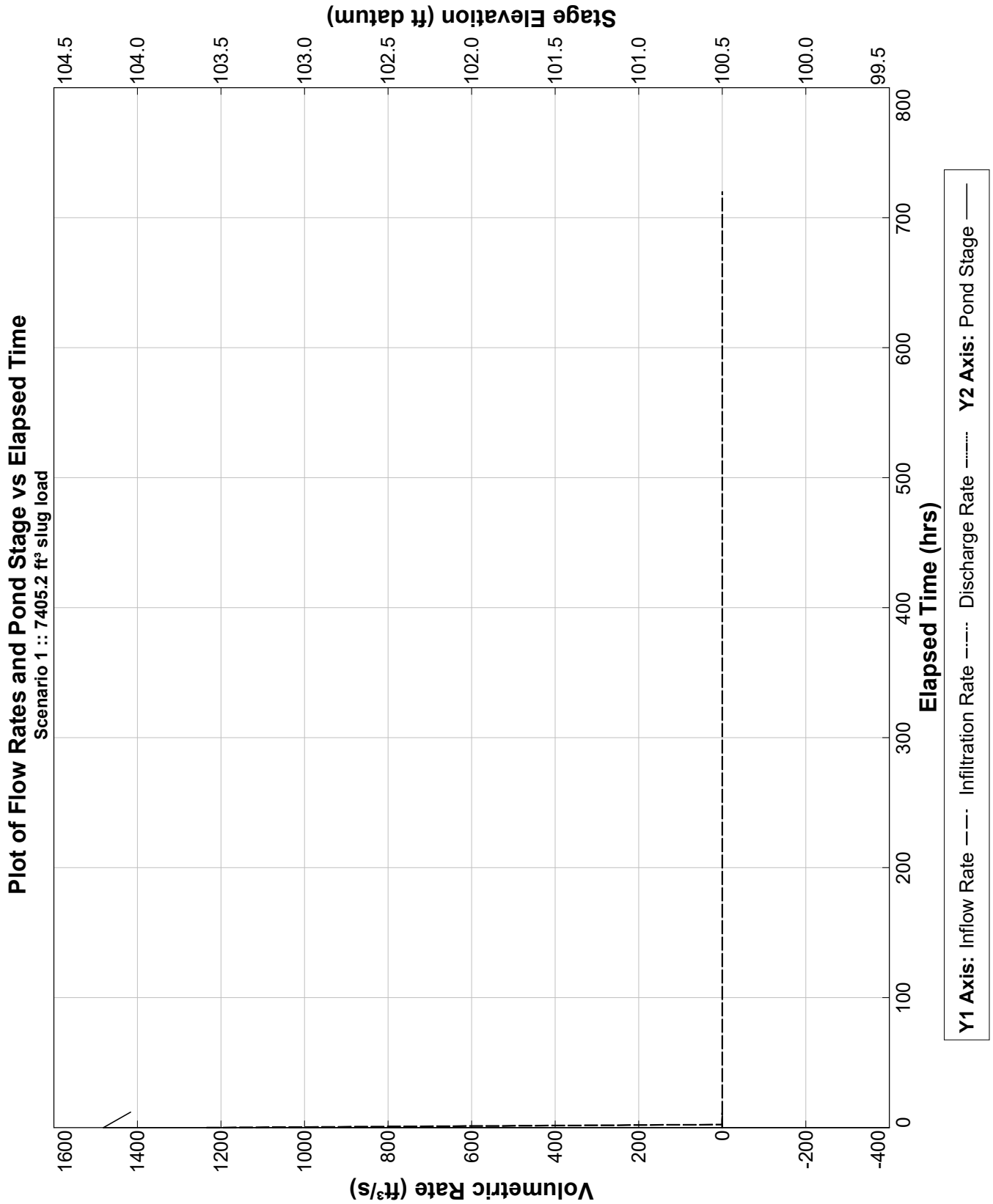
	Time (hours)	Stage (ft datum)	Rate (ft ³ /s)	Volume (ft ³)
Stage				
Minimum	0.000	99.50		
Maximum	0.002	104.20		
Inflow				
Rate - Maximum - Positive	0.002		1234.2000	
Rate - Maximum - Negative	None		None	
Cumulative Volume - Maximum Positive	0.002			7405.2
Cumulative Volume - Maximum Negative	None			None
Cumulative Volume - End of Simulation	720.000			7405.2
Infiltration				
Rate - Maximum - Positive	0.002		0.1368	
Rate - Maximum - Negative	None		None	
Cumulative Volume - Maximum Positive	12.000			5909.0
Cumulative Volume - Maximum Negative	None			None
Cumulative Volume - End of Simulation	720.000			7405.2
Combined Discharge				
Rate - Maximum - Positive	None		None	
Rate - Maximum - Negative	None		None	
Cumulative Volume - Maximum Positive	None			None
Cumulative Volume - Maximum Negative	None			None
Cumulative Volume - End of Simulation	720.000			0.0
Discharge Structure 1 - inactive				
Rate - Maximum - Positive	disabled		disabled	
Rate - Maximum - Negative	disabled		disabled	
Cumulative Volume - Maximum Positive	disabled			disabled
Cumulative Volume - Maximum Negative	disabled			disabled
Cumulative Volume - End of Simulation	disabled			disabled
Discharge Structure 2 - inactive				
Rate - Maximum - Positive	disabled		disabled	
Rate - Maximum - Negative	disabled		disabled	
Cumulative Volume - Maximum Positive	disabled			disabled
Cumulative Volume - Maximum Negative	disabled			disabled
Cumulative Volume - End of Simulation	disabled			disabled
Discharge Structure 3 - inactive				
Rate - Maximum - Positive	disabled		disabled	
Rate - Maximum - Negative	disabled		disabled	
Cumulative Volume - Maximum Positive	disabled			disabled
Cumulative Volume - Maximum Negative	disabled			disabled
Cumulative Volume - End of Simulation	disabled			disabled
Pollution Abatement:				
36 Hour Stage and Infiltration Volume	36.000	Dry		7405.2
72 Hour Stage and Infiltration Volume	72.000	Dry		7405.2

Plot of Cumulative Volumes and Pond Stage vs Elapsed Time

Scenario 1 :: 7405.2 ft³ slug load



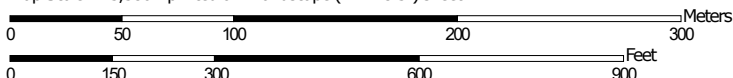
Y1 Axis: Cumulative Inflow --- Cumulative Infiltration - - - - Cumulative Discharge - - - - - Y2 Axis: Pond Stage —



Soil Map—Columbia County, Florida



Map Scale: 1:3,380 if printed on A landscape (11" x 8.5") sheet.



Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 17N 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 1:24,000.

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: Columbia County, Florida

Survey Area Data: Version 15, Sep 16, 2019

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

Date(s) aerial images were photographed: Nov 26, 2014—Dec 9, 2017

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background 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
1	Albany fine sand, 0 to 5 percent slopes	3.9	7.2%
8	Blanton fine sand, 0 to 5 percent slopes	11.2	20.7%
13	Bonneau fine sand, 2 to 5 percent slopes	0.9	1.7%
40	Ocilla fine sand, 0 to 5 percent slopes	1.9	3.5%
43	Orangeburg loamy fine sand, 2 to 5 percent slopes	9.5	17.5%
59	Troup fine sand, 2 to 5 percent slopes	26.8	49.3%
Totals for Area of Interest		54.3	100.0%

Columbia County, Florida

1—Albany fine sand, 0 to 5 percent slopes

Map Unit Setting

National map unit symbol: 2v178

Elevation: 10 to 190 feet

Mean annual precipitation: 51 to 59 inches

Mean annual air temperature: 66 to 70 degrees F

Frost-free period: 280 to 310 days

Farmland classification: Not prime farmland

Map Unit Composition

Albany and similar soils: 90 percent

Minor components: 10 percent

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

Description of Albany

Setting

Landform: Ridges on marine terraces

Landform position (two-dimensional): Shoulder

Landform position (three-dimensional): Interfluve, talf

Down-slope shape: Convex

Across-slope shape: Linear

Parent material: Sandy and loamy marine deposits

Typical profile

A - 0 to 9 inches: fine sand

E - 9 to 57 inches: fine sand

Bt - 57 to 63 inches: fine sandy loam

Btg - 63 to 80 inches: sandy clay loam

Properties and qualities

Slope: 0 to 5 percent

Depth to restrictive feature: More than 80 inches

Natural drainage class: Somewhat poorly drained

Runoff class: Negligible

Capacity of the most limiting layer to transmit water (Ksat):

Moderately high to high (0.20 to 2.00 in/hr)

Depth to water table: About 12 to 30 inches

Frequency of flooding: None

Frequency of ponding: None

Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)

Sodium adsorption ratio, maximum in profile: 4.0

Available water storage in profile: Moderate (about 6.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 3e

Hydrologic Soil Group: A/D
Forage suitability group: Sandy soils on rises and knolls of mesic uplands (G138XA131FL)
Other vegetative classification: North Florida Flatwoods (R138XY004FL)
Hydric soil rating: No

Minor Components

Blanton

Percent of map unit: 5 percent
Landform: Ridges on marine terraces, knolls on marine terraces
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Side slope, interfluve
Down-slope shape: Convex
Across-slope shape: Linear
Other vegetative classification: Upland Hardwood Hammock (R152AY008FL)
Hydric soil rating: No

Hurricane

Percent of map unit: 3 percent
Landform: Flats on marine terraces, rises on marine terraces
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Interfluve, side slope
Down-slope shape: Convex
Across-slope shape: Linear
Other vegetative classification: North Florida Flatwoods (R152AY004FL)
Hydric soil rating: No

Chipley

Percent of map unit: 2 percent
Landform: Knolls on marine terraces, flats on marine terraces, rises on marine terraces
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Interfluve, side slope
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

Data Source Information

Soil Survey Area: Columbia County, Florida
Survey Area Data: Version 15, Sep 16, 2019

Columbia County, Florida

8—Blanton fine sand, 0 to 5 percent slopes

Map Unit Setting

National map unit symbol: 2w0q2

Elevation: 30 to 200 feet

Mean annual precipitation: 51 to 59 inches

Mean annual air temperature: 64 to 72 degrees F

Frost-free period: 258 to 310 days

Farmland classification: Not prime farmland

Map Unit Composition

Blanton and similar soils: 85 percent

Minor components: 15 percent

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

Description of Blanton

Setting

Landform: Knolls on marine terraces, ridges on marine terraces

Landform position (two-dimensional): Backslope

Landform position (three-dimensional): Side slope, interfluve, riser

Down-slope shape: Convex

Across-slope shape: Linear

Parent material: Sandy and loamy marine deposits

Typical profile

A - 0 to 7 inches: fine sand

E - 7 to 52 inches: fine sand

Bt - 52 to 80 inches: fine sandy loam

Properties and qualities

Slope: 0 to 5 percent

Depth to restrictive feature: More than 80 inches

Natural drainage class: Moderately well drained

Runoff class: Negligible

Capacity of the most limiting layer to transmit water (Ksat):

Moderately high to high (0.20 to 6.00 in/hr)

Depth to water table: About 42 to 72 inches

Frequency of flooding: None

Frequency of ponding: None

Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)

Sodium adsorption ratio, maximum in profile: 4.0

Available water storage in profile: Low (about 3.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 3s

Hydrologic Soil Group: A

Forage suitability group: Sandy soils on rises, knolls, and ridges of mesic uplands (G138XA121FL)

Hydric soil rating: No

Minor Components

Albany

Percent of map unit: 6 percent

Landform: Ridges on marine terraces

Landform position (two-dimensional): Shoulder

Landform position (three-dimensional): Interfluve, talf

Down-slope shape: Convex

Across-slope shape: Linear

Other vegetative classification: North Florida Flatwoods (R138XY004FL)

Hydric soil rating: No

Troup

Percent of map unit: 4 percent

Landform: Ridges, knolls

Landform position (two-dimensional): Summit

Landform position (three-dimensional): Interfluve

Down-slope shape: Convex

Across-slope shape: Linear

Ecological site: Longleaf Pine-Turkey Oak Hills (R133AY002FL)

Hydric soil rating: No

Chibley

Percent of map unit: 3 percent

Landform: Knolls on marine terraces, flats on marine terraces, rises on marine terraces

Landform position (two-dimensional): Shoulder, footslope

Landform position (three-dimensional): Interfluve

Down-slope shape: Convex

Across-slope shape: Linear

Hydric soil rating: No

Alpin

Percent of map unit: 2 percent

Landform: Ridges on marine terraces, knolls on marine terraces, flatwoods on marine terraces

Landform position (two-dimensional): Shoulder, backslope

Landform position (three-dimensional): Interfluve

Down-slope shape: Convex

Across-slope shape: Linear

Other vegetative classification: Sand Pine Scrub (R153AY001FL)

Hydric soil rating: No

Data Source Information

Soil Survey Area: Columbia County, Florida

Survey Area Data: Version 15, Sep 16, 2019

Columbia County, Florida

13—Bonneau fine sand, 2 to 5 percent slopes

Map Unit Setting

National map unit symbol: 2w0q7

Elevation: 30 to 200 feet

Mean annual precipitation: 50 to 59 inches

Mean annual air temperature: 64 to 72 degrees F

Frost-free period: 258 to 310 days

Farmland classification: Not prime farmland

Map Unit Composition

Bonneau and similar soils: 88 percent

Minor components: 12 percent

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

Description of Bonneau

Setting

Landform: Knolls on marine terraces, ridges on marine terraces

Landform position (two-dimensional): Backslope

Landform position (three-dimensional): Interfluve, riser

Down-slope shape: Convex, linear

Across-slope shape: Convex

Parent material: Sandy and loamy marine deposits

Typical profile

A - 0 to 7 inches: fine sand

E - 7 to 27 inches: fine sand

Bt - 27 to 80 inches: sandy clay loam

Properties and qualities

Slope: 2 to 5 percent

Depth to restrictive feature: More than 80 inches

Natural drainage class: Moderately well drained

Runoff class: Very low

Capacity of the most limiting layer to transmit water (Ksat):

Moderately high to high (0.60 to 2.00 in/hr)

Depth to water table: About 42 to 60 inches

Frequency of flooding: None

Frequency of ponding: None

Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)

Sodium adsorption ratio, maximum in profile: 4.0

Available water storage in profile: Low (about 5.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 2s

Hydrologic Soil Group: B

Forage suitability group: Sandy over loamy soils on rises, knolls, and ridges of mesic uplands (G138XA221FL)

Hydric soil rating: No

Minor Components

Ichetucknee

Percent of map unit: 4 percent

Landform: Knolls on marine terraces, hills on marine terraces

Landform position (three-dimensional): Interfluve

Down-slope shape: Linear, convex

Across-slope shape: Convex, linear

Hydric soil rating: No

Lucy

Percent of map unit: 4 percent

Landform: Ridges on marine terraces

Landform position (three-dimensional): Interfluve

Down-slope shape: Linear, convex

Across-slope shape: Convex, linear

Hydric soil rating: No

Goldsboro

Percent of map unit: 4 percent

Landform: Knolls on marine terraces, ridges on marine terraces

Landform position (three-dimensional): Interfluve

Down-slope shape: Convex, linear

Across-slope shape: Convex, linear

Hydric soil rating: No

Data Source Information

Soil Survey Area: Columbia County, Florida

Survey Area Data: Version 15, Sep 16, 2019

Columbia County, Florida

40—Ocilla fine sand, 0 to 5 percent slopes

Map Unit Setting

National map unit symbol: vrtl
Elevation: 130 to 660 feet
Mean annual precipitation: 50 to 58 inches
Mean annual air temperature: 64 to 72 degrees F
Frost-free period: 258 to 288 days
Farmland classification: Not prime farmland

Map Unit Composition

Ocilla and similar soils: 75 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Ocilla

Setting

Landform: Rises on marine terraces
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Sandy and loamy marine deposits

Typical profile

A - 0 to 9 inches: fine sand
E - 9 to 32 inches: fine sand
Btg - 32 to 68 inches: fine sandy loam
2Cg - 68 to 80 inches: clay

Properties and qualities

Slope: 0 to 5 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat poorly drained
Runoff class: Negligible
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: About 12 to 30 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 4.0
Available water storage in profile: Low (about 5.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: B/D

Forage suitability group: Sandy over loamy soils on rises and knolls of mesic uplands (G138XA231FL)

Hydric soil rating: No

Minor Components

Pelham, hydric

Percent of map unit: 5 percent

Landform: Flats on marine terraces

Landform position (three-dimensional): Talf

Down-slope shape: Linear

Across-slope shape: Linear

Hydric soil rating: Yes

Albany

Percent of map unit: 5 percent

Landform: Ridges on marine terraces, knolls on marine terraces

Landform position (three-dimensional): Interfluve, talf

Down-slope shape: Convex

Across-slope shape: Linear

Hydric soil rating: No

Plummer, non-hydric

Percent of map unit: 5 percent

Landform: Flats on marine terraces

Landform position (three-dimensional): Talf

Down-slope shape: Convex

Across-slope shape: Linear

Hydric soil rating: No

Blanton

Percent of map unit: 5 percent

Landform: Ridges on marine terraces, knolls on marine terraces

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

Down-slope shape: Convex

Across-slope shape: Linear

Hydric soil rating: No

Bonneau

Percent of map unit: 5 percent

Landform: Knolls on marine terraces, ridges on marine terraces

Landform position (three-dimensional): Interfluve

Down-slope shape: Convex

Across-slope shape: Convex

Hydric soil rating: No

Data Source Information

Soil Survey Area: Columbia County, Florida

Survey Area Data: Version 15, Sep 16, 2019

Columbia County, Florida

43—Orangeburg loamy fine sand, 2 to 5 percent slopes

Map Unit Setting

National map unit symbol: vrtp
Elevation: 330 to 660 feet
Mean annual precipitation: 50 to 58 inches
Mean annual air temperature: 64 to 72 degrees F
Frost-free period: 258 to 288 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Orangeburg and similar soils: 75 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Orangeburg

Setting

Landform: Ridges on marine terraces
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Loamy and clayey marine deposits

Typical profile

A - 0 to 8 inches: loamy fine sand
B1 - 8 to 13 inches: sandy loam
Bt1 - 13 to 51 inches: sandy clay loam
Bt2 - 51 to 80 inches: sandy clay loam

Properties and qualities

Slope: 2 to 5 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat):
Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 4.0
Available water storage in profile: Moderate (about 7.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: B

Forage suitability group: Loamy and clayey soils on knolls and ridges of mesic uplands (G138XA311FL)

Hydric soil rating: No

Minor Components

Bonneau

Percent of map unit: 7 percent

Landform: Ridges on marine terraces, knolls on marine terraces

Landform position (three-dimensional): Interfluve

Down-slope shape: Convex

Across-slope shape: Convex

Hydric soil rating: No

Troup

Percent of map unit: 6 percent

Landform: Knolls on marine terraces, ridges on marine terraces

Landform position (three-dimensional): Interfluve

Down-slope shape: Convex

Across-slope shape: Linear

Hydric soil rating: No

Goldsboro

Percent of map unit: 6 percent

Landform: Ridges on marine terraces, knolls on marine terraces

Landform position (three-dimensional): Interfluve

Down-slope shape: Convex

Across-slope shape: Linear

Hydric soil rating: No

Ocilla

Percent of map unit: 6 percent

Landform: Rises on marine terraces

Landform position (three-dimensional): Interfluve

Down-slope shape: Convex

Across-slope shape: Linear

Hydric soil rating: No

Data Source Information

Soil Survey Area: Columbia County, Florida

Survey Area Data: Version 15, Sep 16, 2019

Columbia County, Florida

59—Troup fine sand, 2 to 5 percent slopes

Map Unit Setting

National map unit symbol: vrv7
Elevation: 330 to 660 feet
Mean annual precipitation: 50 to 58 inches
Mean annual air temperature: 64 to 72 degrees F
Frost-free period: 258 to 288 days
Farmland classification: Not prime farmland

Map Unit Composition

Troup and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Troup

Setting

Landform: Ridges on marine terraces, knolls on marine terraces
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Sandy and loamy marine deposits

Typical profile

A - 0 to 8 inches: fine sand
E - 8 to 52 inches: loamy sand
Bt - 52 to 80 inches: sandy clay loam

Properties and qualities

Slope: 2 to 5 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat):
Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 4.0
Available water storage in profile: Low (about 5.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3s
Hydrologic Soil Group: A

Forage suitability group: Sandy soils on ridges and dunes of xeric uplands (G138XA111FL)

Hydric soil rating: No

Minor Components

Fort meade

Percent of map unit: 3 percent

Landform: Ridges on marine terraces

Landform position (three-dimensional): Interfluve

Down-slope shape: Convex

Across-slope shape: Linear

Hydric soil rating: No

Chiefland

Percent of map unit: 3 percent

Landform: Knolls on karstic marine terraces, rises on karstic marine terraces

Landform position (three-dimensional): Interfluve

Down-slope shape: Convex

Across-slope shape: Linear

Hydric soil rating: No

Blanton

Percent of map unit: 3 percent

Landform: Ridges on marine terraces, knolls on marine terraces

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

Down-slope shape: Convex

Across-slope shape: Linear

Hydric soil rating: No

Orangeburg

Percent of map unit: 2 percent

Landform: Ridges on marine terraces

Landform position (three-dimensional): Interfluve

Down-slope shape: Convex

Across-slope shape: Linear

Hydric soil rating: No

Ocilla

Percent of map unit: 2 percent

Landform: Rises on marine terraces

Landform position (three-dimensional): Interfluve

Down-slope shape: Convex

Across-slope shape: Linear

Hydric soil rating: No

Lucy

Percent of map unit: 2 percent

Landform: Ridges on marine terraces

Landform position (three-dimensional): Interfluve

Down-slope shape: Convex

Across-slope shape: Linear

Hydric soil rating: No

Data Source Information

Soil Survey Area: Columbia County, Florida
Survey Area Data: Version 15, Sep 16, 2019



FIELD TESTING STANDARDS AND PROCEDURES

Standard Penetration Test (SPT) Boring

The SPT borings were advanced by means of a truck or track mounted drill rig employing wet rotary drilling techniques. The SPT testing was performed continuously in the upper ten feet and at five-foot intervals thereafter. The soil samples were obtained at the depths where the SPT testing was performed. The soil samples were then classified in the field, placed in sealed containers, and returned to our laboratory for further evaluation by a geotechnical engineer.

The SPT borings were performed in general compliance with standard field penetration test procedures (ASTM D 1586-99). After drilling to the sampling depth and flushing the borehole, the standard two-inch O.D. split-barrel sampler was seated by driving it six inches into the undisturbed soil at the bottom of the borehole. The sampler was then driven an additional 12 inches by a 140-pound hammer falling 30 inches. The number of blows required to produce the 12 inches of penetration is recorded as the standard penetration test value (N). These values are plotted on the left side of the boring log Figure 3.

In the upper ten feet sampling was performed by driving the split-barrel sampler 24 inches and the blows required to drive the sampler the middle two 6-inch increments were recorded as the “N” value. Through this technique, the upper ten feet of the soil was sampled continuously. Detailed descriptions of the soils encountered during the advancement of the SPT boring are presented in the Boring Logs.

Soil Sample Handling and Classification

The soil samples obtained from the SPT borings were placed in sealed containers to retain moisture and returned to our laboratory. The samples were then reviewed by a geotechnical engineer to confirm classifications, visually estimate the relative percentages of the soil’s constituents (sand, clay, etc.), and identify pertinent structural features. We visually classified the soils according to the Unified Soil Classification System (ASTM D 2487). The stratification lines shown on the boring logs in Figure 3 represent our interpretation of approximate boundaries between soil types. The transition between strata may be gradual. Our classifications are based on a visual estimation of the soil properties and our engineering experience with the soils found in this geologic area.

The SPT “N” values are presented adjacent along the left side of the boring logs. The correlation of the SPT “N” values with relative density, unconfined compressive strength, and consistency are provided in the following table:

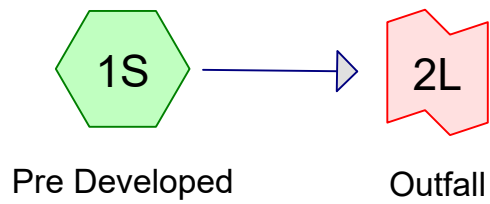
Coarse-Grained Soils		Fine Grained Soils		
Penetration Resistance N (blows/ft)	Relative Density of Sand	Penetration Resistance N (blows/ft)	Unconfined Compressive Strength of Clay (tons/ft ²)	Consistency of Clay
0-4	Very Loose	<2	<0.25	Very Soft
4-10	Loose	2-4	0.25-0.50	Soft
10-30	Medium-Dense	4-8	0.50-1.00	Medium
30-50	Dense	8-15	1.00-2.00	Stiff
>50	Very Dense	15-30	2.00-4.00	Very Stiff
		>30	>4.00	Hard

Hand Auger Borings

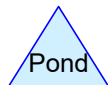
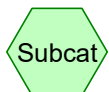
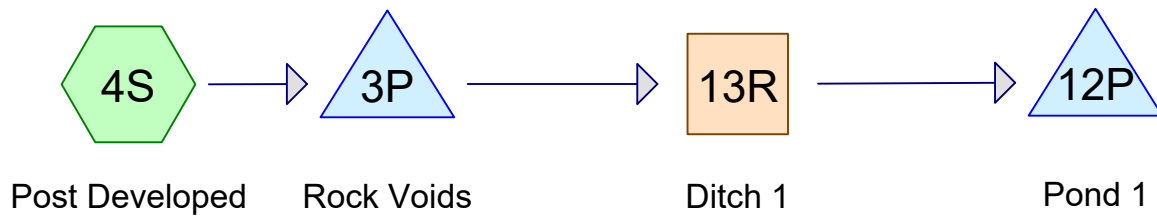
The auger borings were performed with a manually advanced hand auger. The auger was advanced by rotating it into the ground in approximate 6-inch increments. After each incremental penetration, the auger was retracted, and the soils collected in the auger bucket were placed in sealed containers. The samples were then reviewed by a geotechnical engineer and classified as described above. Detailed descriptions of the soils encountered in the auger borings are presented in the Auger Boring Logs.

Appendix B – HydroCAD Report

PRE-DEVELOPED SITE



POST DEVELOPED SITE



Staging Area 2 Basin 1 HydroCAD Report

Type II 24-hr 3 DAY-100YR. Rainfall=12.40"

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

Subcatchment 1S: Pre Developed Runoff Area=2.530 ac 0.00% Impervious Runoff Depth>6.06"
Flow Length=245' Slope=0.0120 '/' Tc=17.1 min CN=58 Runoff=20.09 cfs 1.278 af

Subcatchment 4S: Post Developed Runoff Area=2.530 ac 0.00% Impervious Runoff Depth>7.13"
Flow Length=607' Slope=0.2470 '/' Tc=6.5 min CN=65 Runoff=32.65 cfs 1.504 af

Reach 13R: Ditch 1 Avg. Flow Depth=0.90' Max Vel=4.72 fps Inflow=32.64 cfs 1.503 af
n=0.030 L=110.0' S=0.0182 '/' Capacity=40.23 cfs Outflow=32.11 cfs 1.502 af

Pond 3P: Rock Voids Peak Elev=104.50' Storage=25 cf Inflow=32.65 cfs 1.504 af
Discarded=0.01 cfs 0.001 af Primary=32.64 cfs 1.503 af Outflow=32.65 cfs 1.504 af

Pond 12P: Pond 1 Peak Elev=100.66' Storage=38,899 cf Inflow=32.11 cfs 1.502 af
Discarded=0.08 cfs 0.074 af Primary=3.34 cfs 0.578 af Outflow=3.42 cfs 0.652 af

Link 2L: Outfall Inflow=20.09 cfs 1.278 af
Primary=20.09 cfs 1.278 af

Staging Area 2 Basin 1 HydroCAD Report

Type II 24-hr 3 DAY-100YR. Rainfall=12.40"

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Summary for Subcatchment 1S: Pre Developed

Runoff = 20.09 cfs @ 12.10 hrs, Volume= 1.278 af, Depth> 6.06"

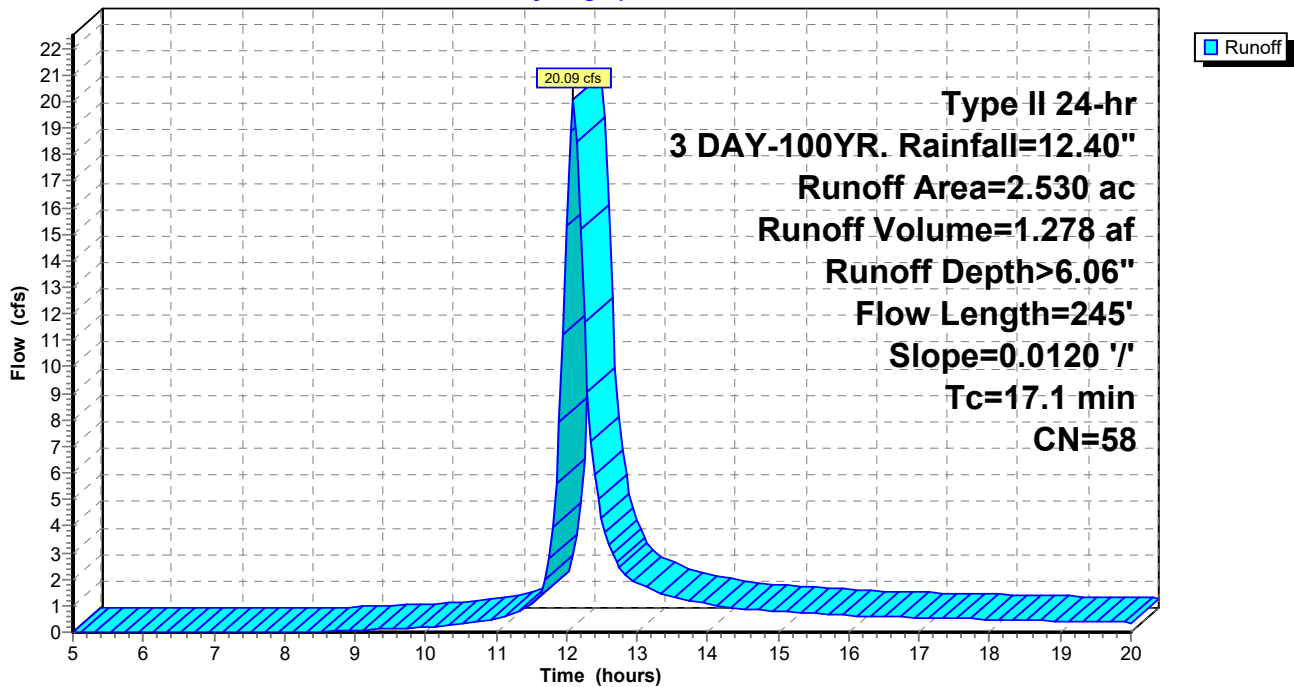
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 3 DAY-100YR. Rainfall=12.40"

Area (ac)	CN	Description
2.530	58	Meadow, non-grazed, HSG B
2.530		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.1	245	0.0120	0.24		Lag/CN Method,

Subcatchment 1S: Pre Developed

Hydrograph



Staging Area 2 Basin 1 HydroCAD Report

Type II 24-hr 3 DAY-100YR. Rainfall=12.40"

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Summary for Subcatchment 4S: Post Developed

Runoff = 32.65 cfs @ 11.98 hrs, Volume= 1.504 af, Depth> 7.13"

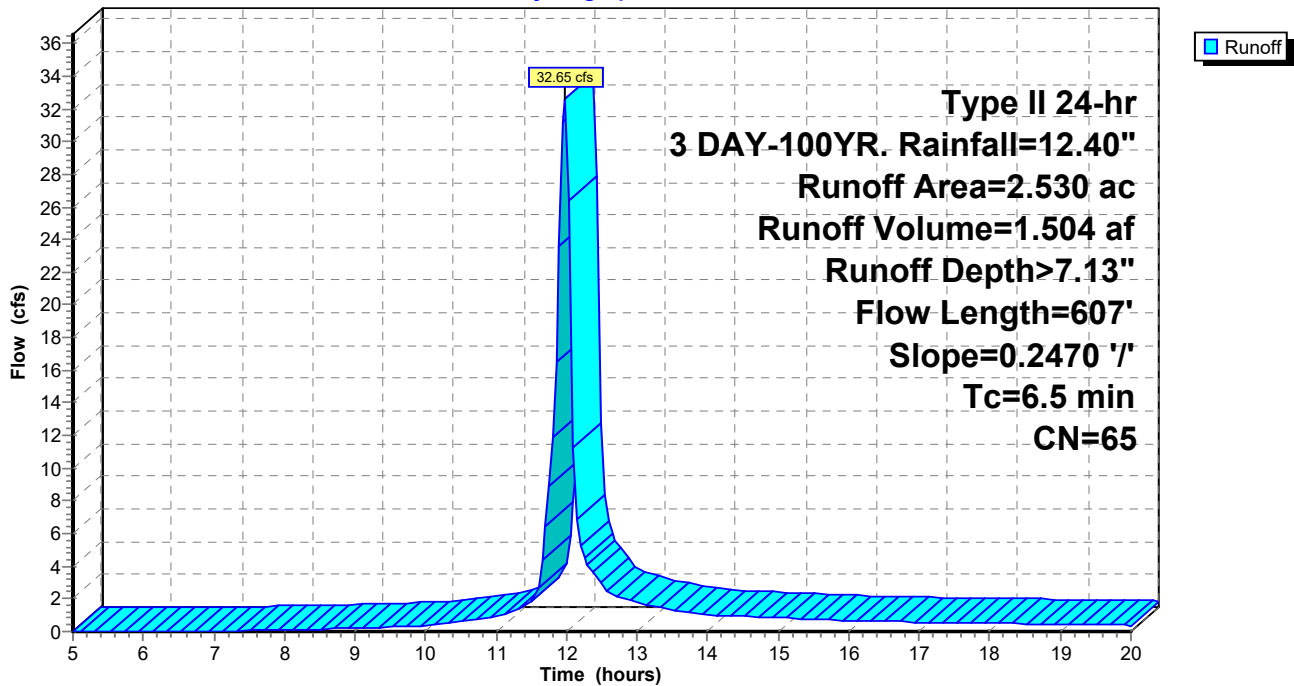
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 3 DAY-100YR. Rainfall=12.40"

Area (ac)	CN	Description
1.200	58	Meadow, non-grazed, HSG B
* 0.853	65	Uncompacted Gravel (35% Void)
0.477	85	Gravel roads, HSG B
2.530	65	Weighted Average
2.530		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.5	607	0.2470	1.55		Lag/CN Method,

Subcatchment 4S: Post Developed

Hydrograph



Staging Area 2 Basin 1 HydroCAD Report

Type II 24-hr 3 DAY-100YR. Rainfall=12.40"

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Summary for Reach 13R: Ditch 1

Inflow Area = 2.530 ac, 0.00% Impervious, Inflow Depth > 7.13" for 3 DAY-100YR. event
Inflow = 32.64 cfs @ 11.98 hrs, Volume= 1.503 af
Outflow = 32.11 cfs @ 11.99 hrs, Volume= 1.502 af, Atten= 2%, Lag= 0.6 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.72 fps, Min. Travel Time= 0.4 min
Avg. Velocity = 1.40 fps, Avg. Travel Time= 1.3 min

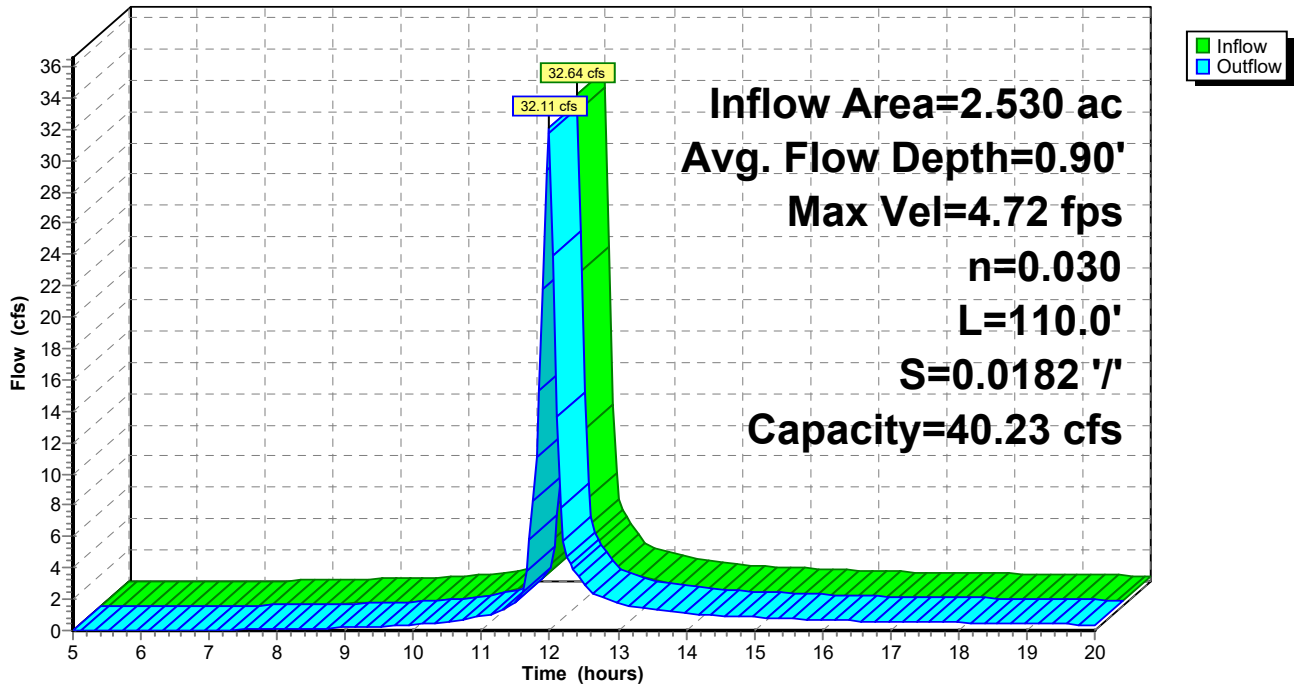
Peak Storage= 756 cf @ 11.98 hrs
Average Depth at Peak Storage= 0.90'
Bank-Full Depth= 1.00' Flow Area= 8.0 sf, Capacity= 40.23 cfs

4.00' x 1.00' deep channel, n= 0.030 Short grass
Side Slope Z-value= 4.0 '/' Top Width= 12.00'
Length= 110.0' Slope= 0.0182 '/'
Inlet Invert= 103.00', Outlet Invert= 101.00'



Reach 13R: Ditch 1

Hydrograph



Staging Area 2 Basin 1 HydroCAD Report

Type II 24-hr 3 DAY-100YR. Rainfall=12.40"

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Summary for Pond 3P: Rock Voids

Inflow Area = 2.530 ac, 0.00% Impervious, Inflow Depth > 7.13" for 3 DAY-100YR. event
 Inflow = 32.65 cfs @ 11.98 hrs, Volume= 1.504 af
 Outflow = 32.65 cfs @ 11.98 hrs, Volume= 1.504 af, Atten= 0%, Lag= 0.0 min
 Discarded = 0.01 cfs @ 11.98 hrs, Volume= 0.001 af
 Primary = 32.64 cfs @ 11.98 hrs, Volume= 1.503 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Peak Elev= 104.50' @ 11.98 hrs Surf.Area= 38,573 sf Storage= 25 cf

Plug-Flow detention time= 0.0 min calculated for 1.504 af (100% of inflow)
 Center-of-Mass det. time= 0.0 min (774.7 - 774.7)

Volume	Invert	Avail.Storage	Storage Description
#1	104.50'	7,715 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
104.50	38,573	0	0
104.70	38,573	7,715	7,715

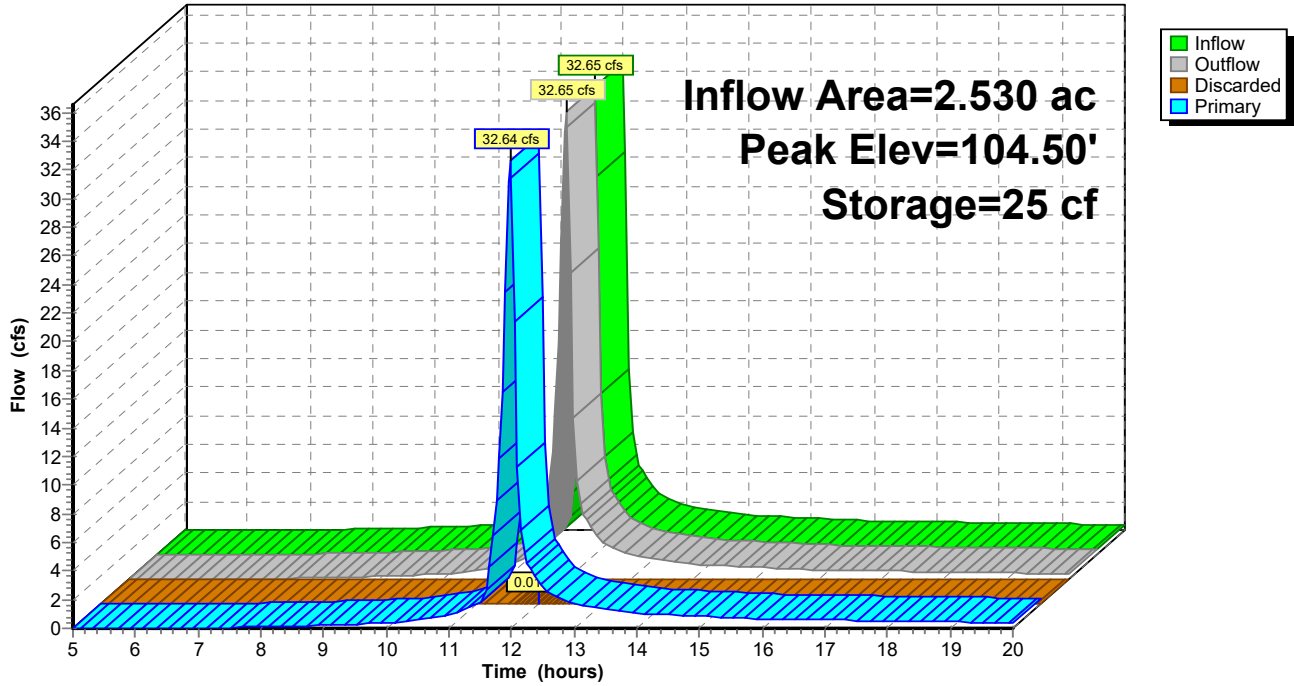
Device	Routing	Invert	Outlet Devices
#1	Primary	102.70'	16.0' long x 5.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88
#2	Discarded	104.50'	0.250 in/hr Exfiltration over Surface area Phase-In= 0.01'

Discarded OutFlow Max=0.01 cfs @ 11.98 hrs HW=104.50' (Free Discharge)
 ↑**2=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=102.45 cfs @ 11.98 hrs HW=104.50' (Free Discharge)
 ↑**1=Broad-Crested Rectangular Weir**(Weir Controls 102.45 cfs @ 3.56 fps)

Pond 3P: Rock Voids

Hydrograph



Staging Area 2 Basin 1 HydroCAD Report

Type II 24-hr 3 DAY-100YR. Rainfall=12.40"

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Summary for Pond 12P: Pond 1

Inflow Area = 2.530 ac, 0.00% Impervious, Inflow Depth > 7.12" for 3 DAY-100YR. event
Inflow = 32.11 cfs @ 11.99 hrs, Volume= 1.502 af
Outflow = 3.42 cfs @ 12.43 hrs, Volume= 0.652 af, Atten= 89%, Lag= 26.6 min
Discarded = 0.08 cfs @ 12.43 hrs, Volume= 0.074 af
Primary = 3.34 cfs @ 12.43 hrs, Volume= 0.578 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 100.66' @ 12.43 hrs Surf.Area= 14,297 sf Storage= 38,899 cf

Plug-Flow detention time= 183.3 min calculated for 0.650 af (43% of inflow)
Center-of-Mass det. time= 101.9 min (877.5 - 775.6)

Volume	Invert	Avail.Storage	Storage Description
#1	97.50'	59,205 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
97.50	10,365	0	0
98.00	10,965	5,333	5,333
99.00	12,190	11,578	16,910
100.00	13,448	12,819	29,729
101.00	14,732	14,090	43,819
102.00	16,040	15,386	59,205

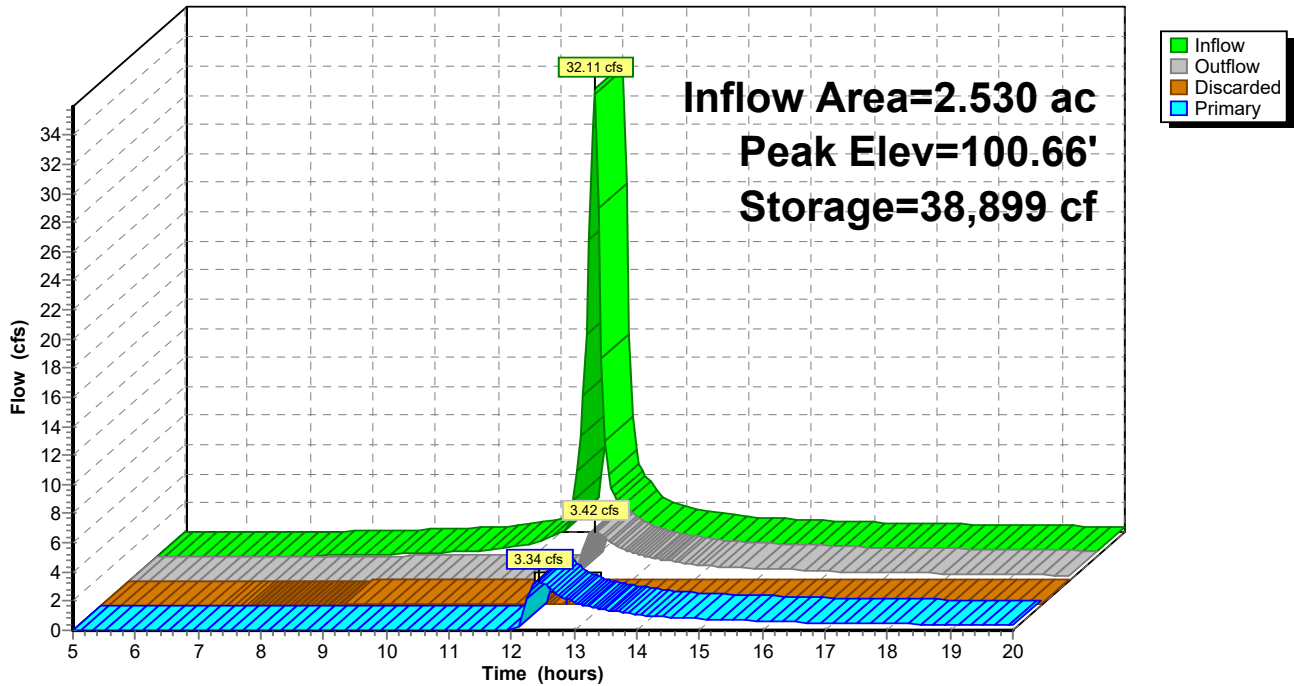
Device	Routing	Invert	Outlet Devices
#1	Discarded	97.50'	0.250 in/hr Exfiltration over Surface area
#2	Primary	100.50'	43.6 deg x 16.0' long x 1.50' rise Sharp-Crested Vee/Trap Weir Cv= 2.56 (C= 3.20)

Discarded OutFlow Max=0.08 cfs @ 12.43 hrs HW=100.66' (Free Discharge)
↑1=Exfiltration (Exfiltration Controls 0.08 cfs)

Primary OutFlow Max=3.31 cfs @ 12.43 hrs HW=100.66' (Free Discharge)
↑2=Sharp-Crested Vee/Trap Weir (Weir Controls 3.31 cfs @ 1.28 fps)

Pond 12P: Pond 1

Hydrograph



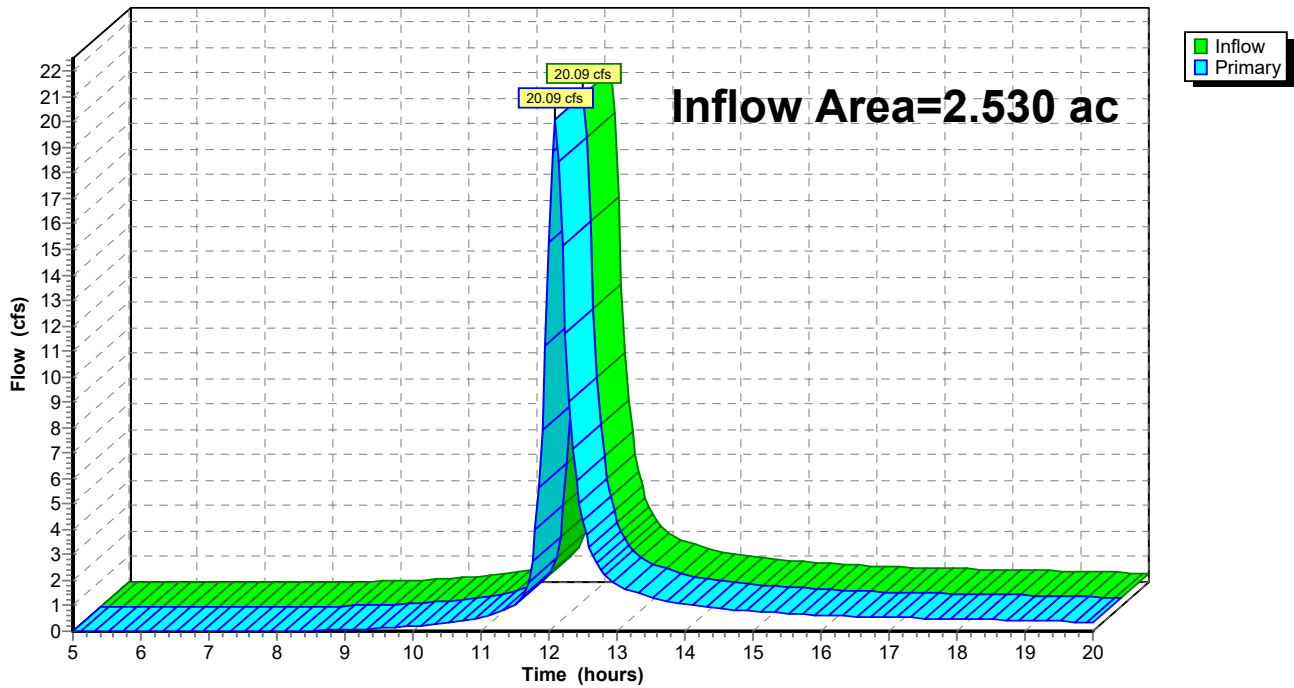
Summary for Link 2L: Outfall

Inflow Area = 2.530 ac, 0.00% Impervious, Inflow Depth > 6.06" for 3 DAY-100YR. event
Inflow = 20.09 cfs @ 12.10 hrs, Volume= 1.278 af
Primary = 20.09 cfs @ 12.10 hrs, Volume= 1.278 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link 2L: Outfall

Hydrograph



Staging Area 2 Basin 1 HydroCAD Report

Type II 24-hr 7 DAY-100YR Rainfall=14.00"

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Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 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: Pre Developed Runoff Area=2.530 ac 0.00% Impervious Runoff Depth>7.34"
Flow Length=245' Slope=0.0120 '/' Tc=17.1 min CN=58 Runoff=24.24 cfs 1.548 af

Subcatchment4S: Post Developed Runoff Area=2.530 ac 0.00% Impervious Runoff Depth>8.50"
Flow Length=607' Slope=0.2470 '/' Tc=6.5 min CN=65 Runoff=38.51 cfs 1.792 af

Reach 13R: Ditch 1 Avg. Flow Depth=0.98' Max Vel=4.94 fps Inflow=38.49 cfs 1.791 af
n=0.030 L=110.0' S=0.0182 '/' Capacity=40.23 cfs Outflow=37.91 cfs 1.790 af

Pond 3P: Rock Voids Peak Elev=104.50' Storage=29 cf Inflow=38.51 cfs 1.792 af
Discarded=0.02 cfs 0.001 af Primary=38.49 cfs 1.791 af Outflow=38.51 cfs 1.792 af

Pond 12P: Pond 1 Peak Elev=100.85' Storage=41,578 cf Inflow=37.91 cfs 1.790 af
Discarded=0.08 cfs 0.078 af Primary=10.55 cfs 0.861 af Outflow=10.63 cfs 0.938 af

Link 2L: Outfall Inflow=24.24 cfs 1.548 af
Primary=24.24 cfs 1.548 af

Staging Area 2 Basin 1 HydroCAD Report

Type II 24-hr 7 DAY-100YR Rainfall=14.00"

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Summary for Subcatchment 1S: Pre Developed

Runoff = 24.24 cfs @ 12.09 hrs, Volume= 1.548 af, Depth> 7.34"

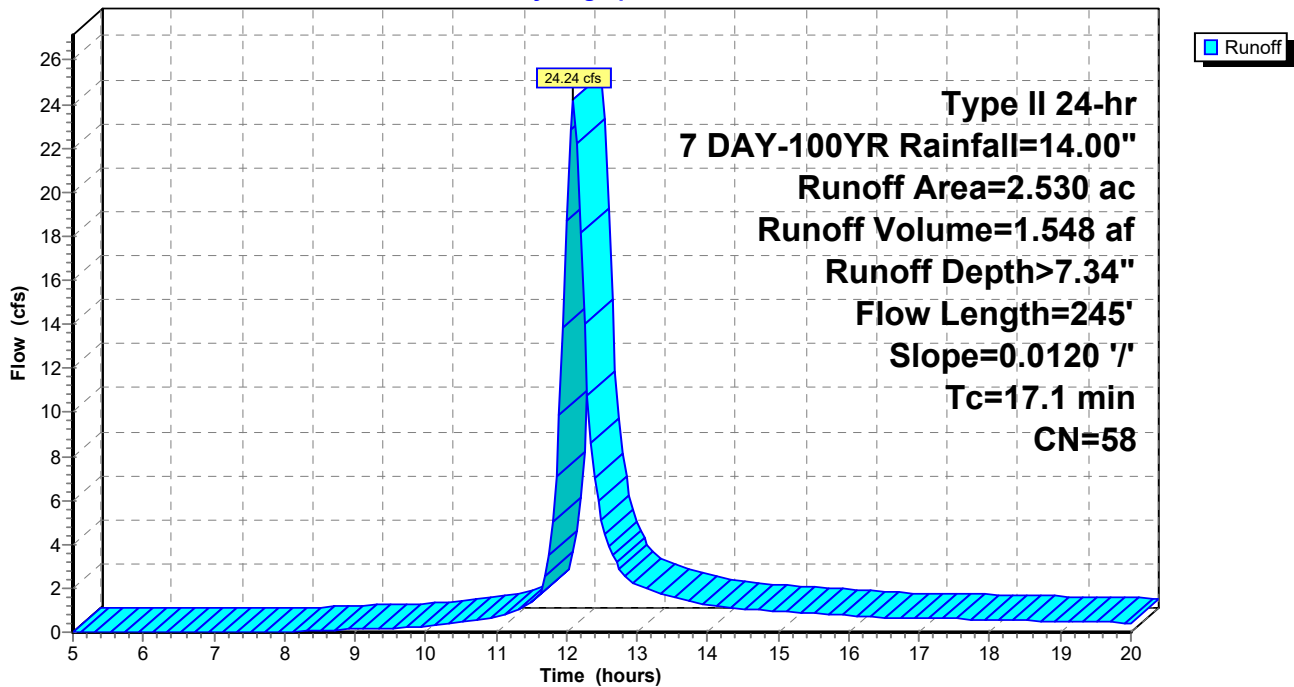
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 7 DAY-100YR Rainfall=14.00"

Area (ac)	CN	Description
2.530	58	Meadow, non-grazed, HSG B
2.530		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.1	245	0.0120	0.24		Lag/CN Method,

Subcatchment 1S: Pre Developed

Hydrograph



Staging Area 2 Basin 1 HydroCAD Report

Type II 24-hr 7 DAY-100YR Rainfall=14.00"

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Summary for Subcatchment 4S: Post Developed

Runoff = 38.51 cfs @ 11.98 hrs, Volume= 1.792 af, Depth> 8.50"

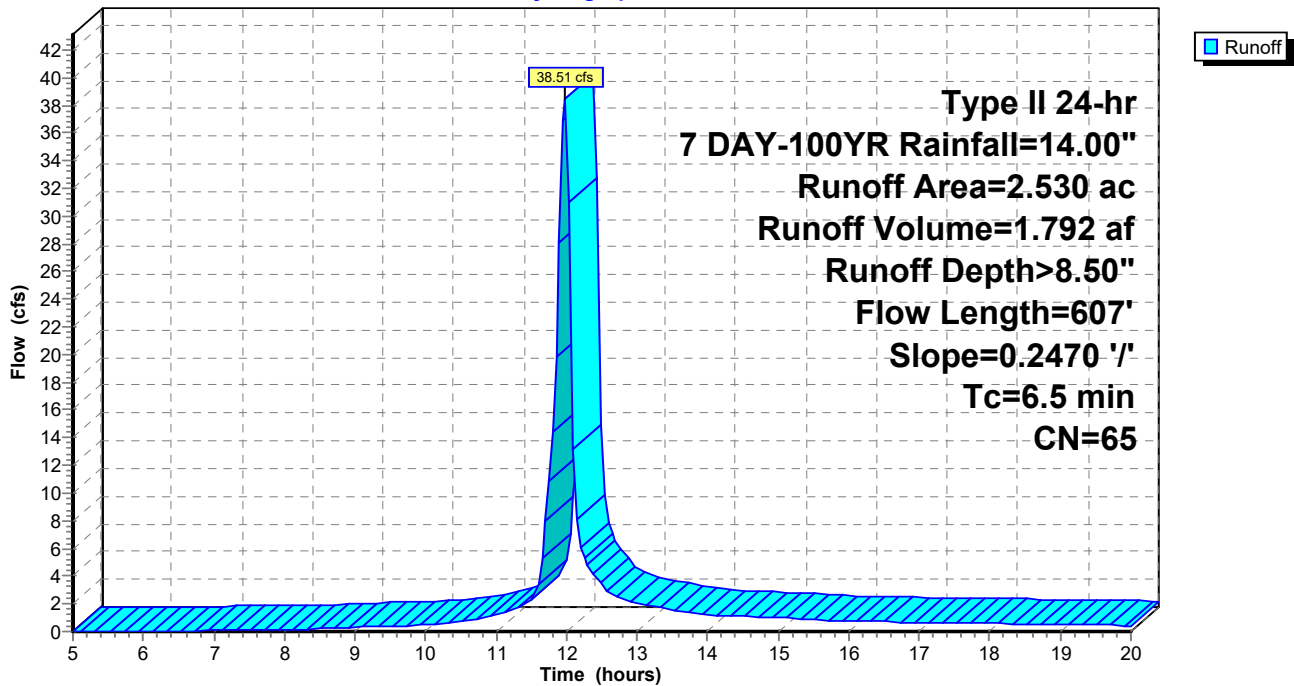
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 7 DAY-100YR Rainfall=14.00"

Area (ac)	CN	Description
1.200	58	Meadow, non-grazed, HSG B
* 0.853	65	Uncompacted Gravel (35% Void)
0.477	85	Gravel roads, HSG B
2.530	65	Weighted Average
2.530		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.5	607	0.2470	1.55		Lag/CN Method,

Subcatchment 4S: Post Developed

Hydrograph



Staging Area 2 Basin 1 HydroCAD Report

Type II 24-hr 7 DAY-100YR Rainfall=14.00"

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Summary for Reach 13R: Ditch 1

Inflow Area = 2.530 ac, 0.00% Impervious, Inflow Depth > 8.49" for 7 DAY-100YR event
Inflow = 38.49 cfs @ 11.98 hrs, Volume= 1.791 af
Outflow = 37.91 cfs @ 11.99 hrs, Volume= 1.790 af, Atten= 2%, Lag= 0.6 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.94 fps, Min. Travel Time= 0.4 min
Avg. Velocity = 1.46 fps, Avg. Travel Time= 1.3 min

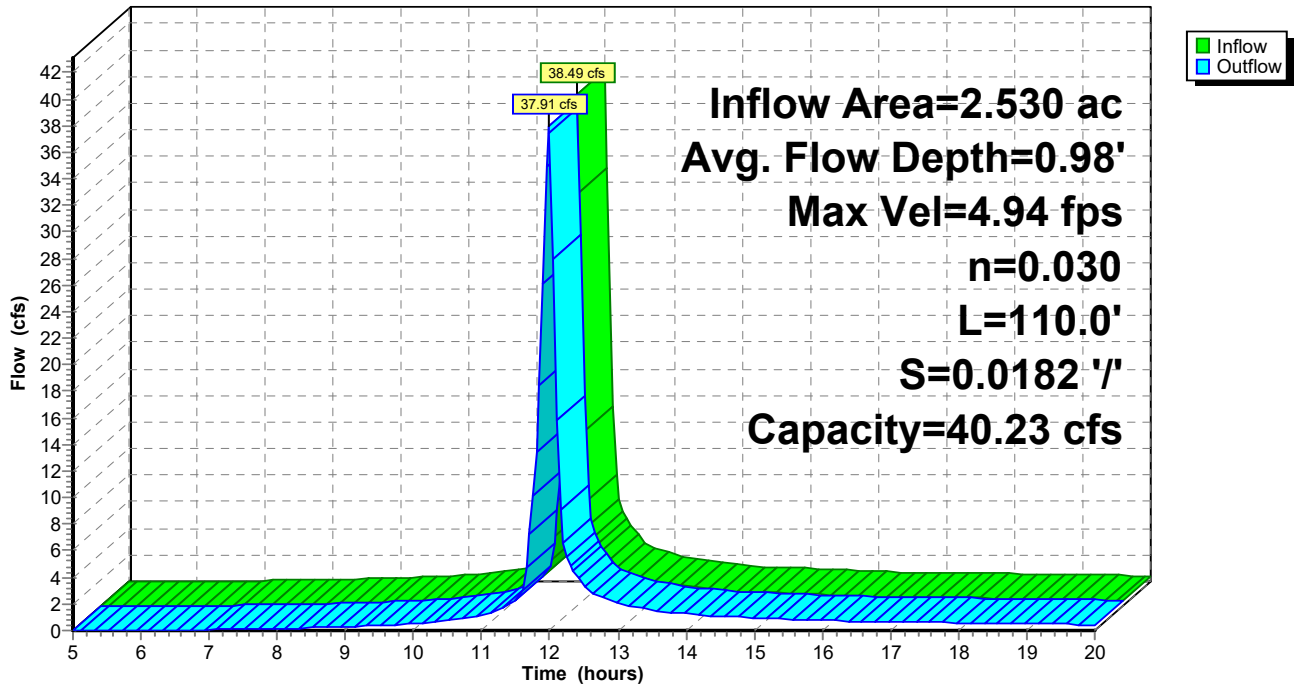
Peak Storage= 853 cf @ 11.98 hrs
Average Depth at Peak Storage= 0.98'
Bank-Full Depth= 1.00' Flow Area= 8.0 sf, Capacity= 40.23 cfs

4.00' x 1.00' deep channel, n= 0.030 Short grass
Side Slope Z-value= 4.0 '/' Top Width= 12.00'
Length= 110.0' Slope= 0.0182 '/'
Inlet Invert= 103.00', Outlet Invert= 101.00'



Reach 13R: Ditch 1

Hydrograph



Staging Area 2 Basin 1 HydroCAD Report

Type II 24-hr 7 DAY-100YR Rainfall=14.00"

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Summary for Pond 3P: Rock Voids

Inflow Area = 2.530 ac, 0.00% Impervious, Inflow Depth > 8.50" for 7 DAY-100YR event
 Inflow = 38.51 cfs @ 11.98 hrs, Volume= 1.792 af
 Outflow = 38.51 cfs @ 11.98 hrs, Volume= 1.792 af, Atten= 0%, Lag= 0.0 min
 Discarded = 0.02 cfs @ 11.98 hrs, Volume= 0.001 af
 Primary = 38.49 cfs @ 11.98 hrs, Volume= 1.791 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Peak Elev= 104.50' @ 11.98 hrs Surf.Area= 38,573 sf Storage= 29 cf

Plug-Flow detention time= 0.0 min calculated for 1.792 af (100% of inflow)
 Center-of-Mass det. time= 0.0 min (770.7 - 770.7)

Volume	Invert	Avail.Storage	Storage Description
#1	104.50'	7,715 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
104.50	38,573	0	0
104.70	38,573	7,715	7,715

Device	Routing	Invert	Outlet Devices
#1	Primary	102.70'	16.0' long x 5.0' 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) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88
#2	Discarded	104.50'	0.250 in/hr Exfiltration over Surface area Phase-In= 0.01'

Discarded OutFlow Max=0.02 cfs @ 11.98 hrs HW=104.50' (Free Discharge)
 ↑**2=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=102.46 cfs @ 11.98 hrs HW=104.50' (Free Discharge)
 ↑**1=Broad-Crested Rectangular Weir**(Weir Controls 102.46 cfs @ 3.56 fps)

Staging Area 2 Basin 1 HydroCAD Report

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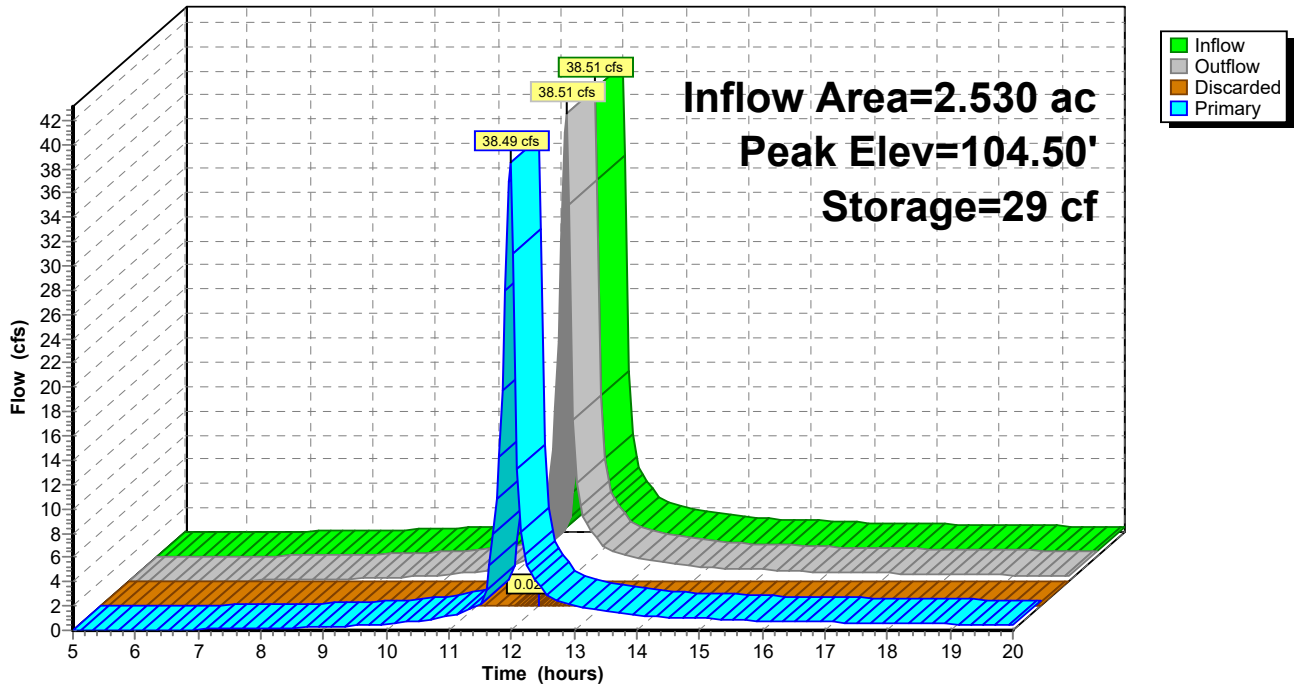
Type II 24-hr 7 DAY-100YR Rainfall=14.00"

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Pond 3P: Rock Voids

Hydrograph



Staging Area 2 Basin 1 HydroCAD Report

Type II 24-hr 7 DAY-100YR Rainfall=14.00"

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Summary for Pond 12P: Pond 1

Inflow Area = 2.530 ac, 0.00% Impervious, Inflow Depth > 8.49" for 7 DAY-100YR event
 Inflow = 37.91 cfs @ 11.99 hrs, Volume= 1.790 af
 Outflow = 10.63 cfs @ 12.15 hrs, Volume= 0.938 af, Atten= 72%, Lag= 10.0 min
 Discarded = 0.08 cfs @ 12.15 hrs, Volume= 0.078 af
 Primary = 10.55 cfs @ 12.15 hrs, Volume= 0.861 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Peak Elev= 100.85' @ 12.15 hrs Surf.Area= 14,535 sf Storage= 41,578 cf

Plug-Flow detention time= 153.7 min calculated for 0.938 af (52% of inflow)
 Center-of-Mass det. time= 76.5 min (848.1 - 771.6)

Volume	Invert	Avail.Storage	Storage Description
#1	97.50'	59,205 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
97.50	10,365	0	0
98.00	10,965	5,333	5,333
99.00	12,190	11,578	16,910
100.00	13,448	12,819	29,729
101.00	14,732	14,090	43,819
102.00	16,040	15,386	59,205

Device	Routing	Invert	Outlet Devices
#1	Discarded	97.50'	0.250 in/hr Exfiltration over Surface area
#2	Primary	100.50'	43.6 deg x 16.0' long x 1.50' rise Sharp-Crested Vee/Trap Weir Cv= 2.56 (C= 3.20)

Discarded OutFlow Max=0.08 cfs @ 12.15 hrs HW=100.85' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.08 cfs)

Primary OutFlow Max=10.48 cfs @ 12.15 hrs HW=100.85' (Free Discharge)
 ↑2=Sharp-Crested Vee/Trap Weir (Weir Controls 10.48 cfs @ 1.88 fps)

Staging Area 2 Basin 1 HydroCAD Report

Type II 24-hr 7 DAY-100YR Rainfall=14.00"

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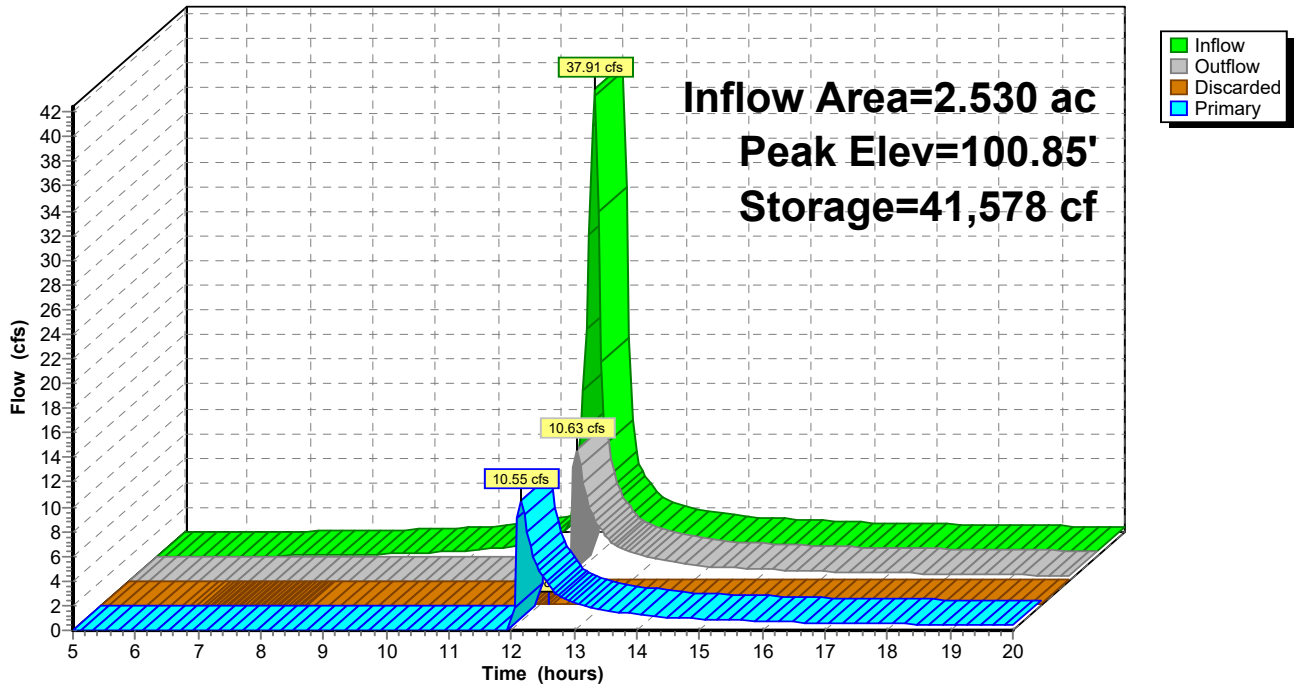
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Pond 12P: Pond 1

Hydrograph



Staging Area 2 Basin 1 HydroCAD Report

Type II 24-hr 7 DAY-100YR Rainfall=14.00"

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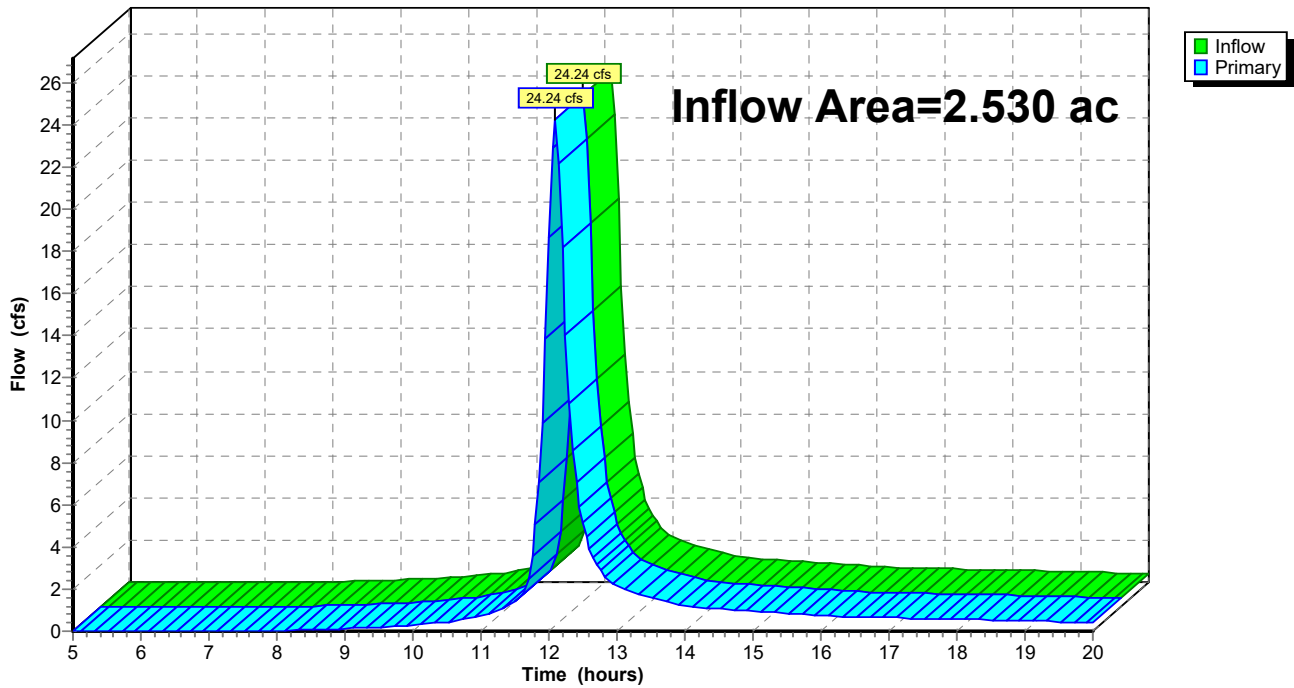
Summary for Link 2L: Outfall

Inflow Area = 2.530 ac, 0.00% Impervious, Inflow Depth > 7.34" for 7 DAY-100YR event
Inflow = 24.24 cfs @ 12.09 hrs, Volume= 1.548 af
Primary = 24.24 cfs @ 12.09 hrs, Volume= 1.548 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link 2L: Outfall

Hydrograph



Staging Area 2 Basin 1 HydroCAD Report

Type II 24-hr 10 DAY-100YR Rainfall=16.10"

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Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 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: Pre Developed Runoff Area=2.530 ac 0.00% Impervious Runoff Depth>9.07"
Flow Length=245' Slope=0.0120 '/' Tc=17.1 min CN=58 Runoff=29.78 cfs 1.913 af

Subcatchment4S: Post Developed Runoff Area=2.530 ac 0.00% Impervious Runoff Depth>10.33"
Flow Length=607' Slope=0.2470 '/' Tc=6.5 min CN=65 Runoff=45.73 cfs 2.177 af

Reach 13R: Ditch 1 Avg. Flow Depth=1.07' Max Vel=5.17 fps Inflow=45.70 cfs 2.176 af
n=0.030 L=110.0' S=0.0182 '/' Capacity=40.23 cfs Outflow=45.54 cfs 2.175 af

Pond 3P: Rock Voids Peak Elev=104.50' Storage=34 cf Inflow=45.73 cfs 2.177 af
Discarded=0.02 cfs 0.001 af Primary=45.70 cfs 2.176 af Outflow=45.72 cfs 2.177 af

Pond 12P: Pond 1 Peak Elev=101.10' Storage=45,340 cf Inflow=45.54 cfs 2.175 af
Discarded=0.09 cfs 0.082 af Primary=24.24 cfs 1.240 af Outflow=24.33 cfs 1.322 af

Link 2L: Outfall Inflow=29.78 cfs 1.913 af
Primary=29.78 cfs 1.913 af

Staging Area 2 Basin 1 HydroCAD Report

Type II 24-hr 10 DAY-100YR Rainfall=16.10"

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Summary for Subcatchment 1S: Pre Developed

Runoff = 29.78 cfs @ 12.09 hrs, Volume= 1.913 af, Depth> 9.07"

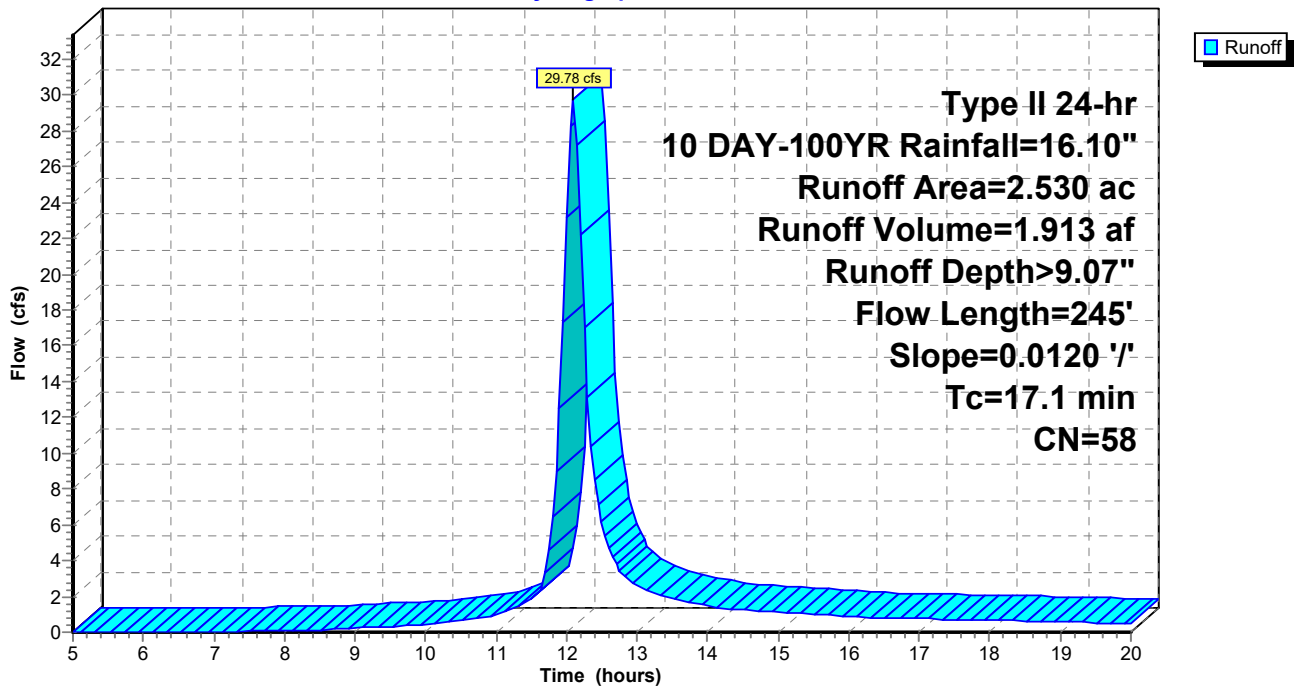
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10 DAY-100YR Rainfall=16.10"

Area (ac)	CN	Description
2.530	58	Meadow, non-grazed, HSG B
2.530		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.1	245	0.0120	0.24		Lag/CN Method,

Subcatchment 1S: Pre Developed

Hydrograph



Staging Area 2 Basin 1 HydroCAD Report

Type II 24-hr 10 DAY-100YR Rainfall=16.10"

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Summary for Subcatchment 4S: Post Developed

Runoff = 45.73 cfs @ 11.97 hrs, Volume= 2.177 af, Depth>10.33"

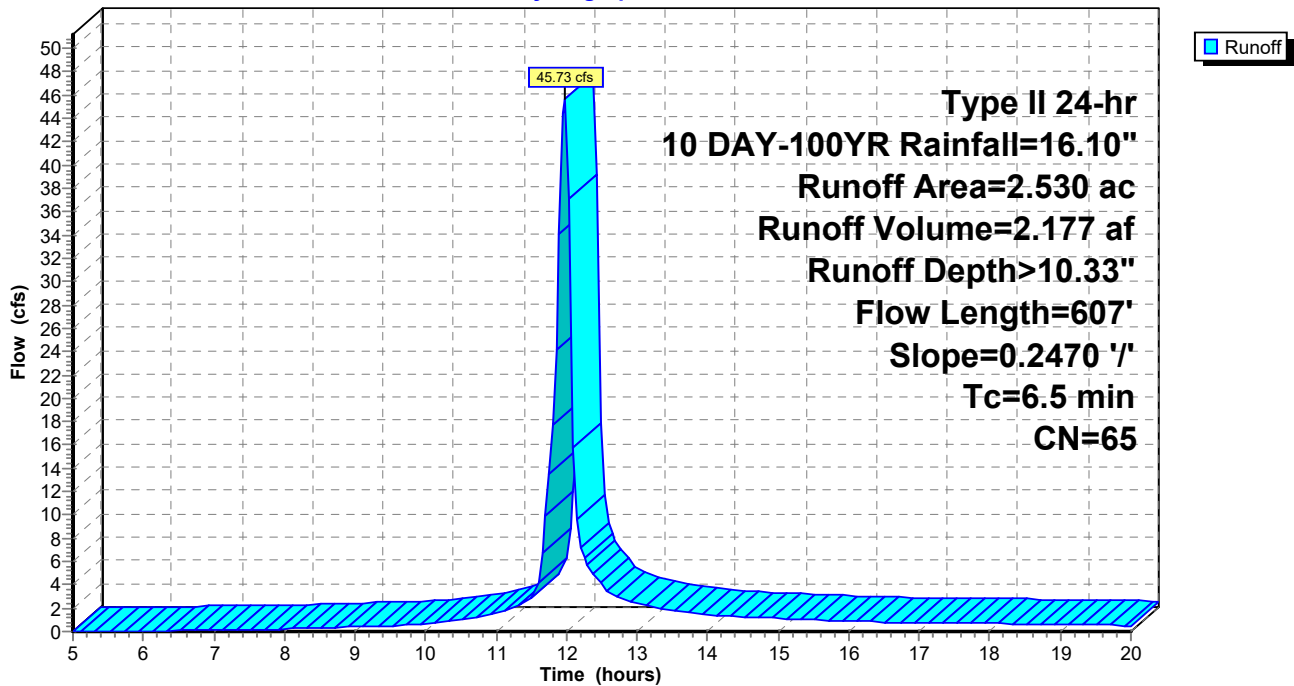
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10 DAY-100YR Rainfall=16.10"

Area (ac)	CN	Description
1.200	58	Meadow, non-grazed, HSG B
* 0.853	65	Uncompacted Gravel (35% Void)
0.477	85	Gravel roads, HSG B
2.530	65	Weighted Average
2.530		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.5	607	0.2470	1.55		Lag/CN Method,

Subcatchment 4S: Post Developed

Hydrograph



Staging Area 2 Basin 1 HydroCAD Report

Type II 24-hr 10 DAY-100YR Rainfall=16.10"

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Summary for Reach 13R: Ditch 1

Inflow Area = 2.530 ac, 0.00% Impervious, Inflow Depth > 10.32" for 10 DAY-100YR event
Inflow = 45.70 cfs @ 11.97 hrs, Volume= 2.176 af
Outflow = 45.54 cfs @ 11.98 hrs, Volume= 2.175 af, Atten= 0%, Lag= 0.5 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 5.17 fps, Min. Travel Time= 0.4 min
Avg. Velocity = 1.53 fps, Avg. Travel Time= 1.2 min

Peak Storage= 976 cf @ 11.98 hrs
Average Depth at Peak Storage= 1.07'
Bank-Full Depth= 1.00' Flow Area= 8.0 sf, Capacity= 40.23 cfs

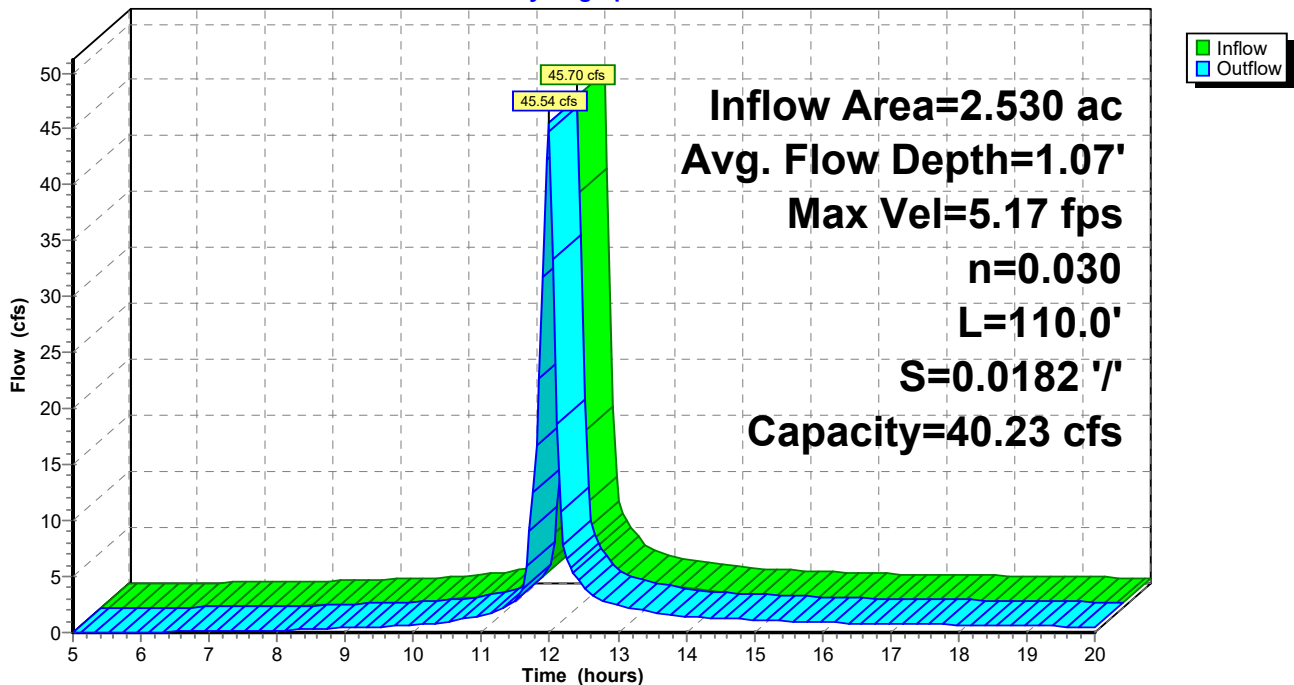
4.00' x 1.00' deep channel, n= 0.030 Short grass
Side Slope Z-value= 4.0 '/' Top Width= 12.00'
Length= 110.0' Slope= 0.0182 '/'
Inlet Invert= 103.00', Outlet Invert= 101.00'



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Reach 13R: Ditch 1

Hydrograph



Staging Area 2 Basin 1 HydroCAD Report

Type II 24-hr 10 DAY-100YR Rainfall=16.10"

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Summary for Pond 3P: Rock Voids

Inflow Area = 2.530 ac, 0.00% Impervious, Inflow Depth > 10.33" for 10 DAY-100YR event
 Inflow = 45.73 cfs @ 11.97 hrs, Volume= 2.177 af
 Outflow = 45.72 cfs @ 11.97 hrs, Volume= 2.177 af, Atten= 0%, Lag= 0.0 min
 Discarded = 0.02 cfs @ 11.97 hrs, Volume= 0.001 af
 Primary = 45.70 cfs @ 11.97 hrs, Volume= 2.176 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Peak Elev= 104.50' @ 11.97 hrs Surf.Area= 38,573 sf Storage= 34 cf

Plug-Flow detention time= 0.0 min calculated for 2.170 af (100% of inflow)
 Center-of-Mass det. time= 0.0 min (766.2 - 766.2)

Volume	Invert	Avail.Storage	Storage Description
#1	104.50'	7,715 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
104.50	38,573	0	0
104.70	38,573	7,715	7,715

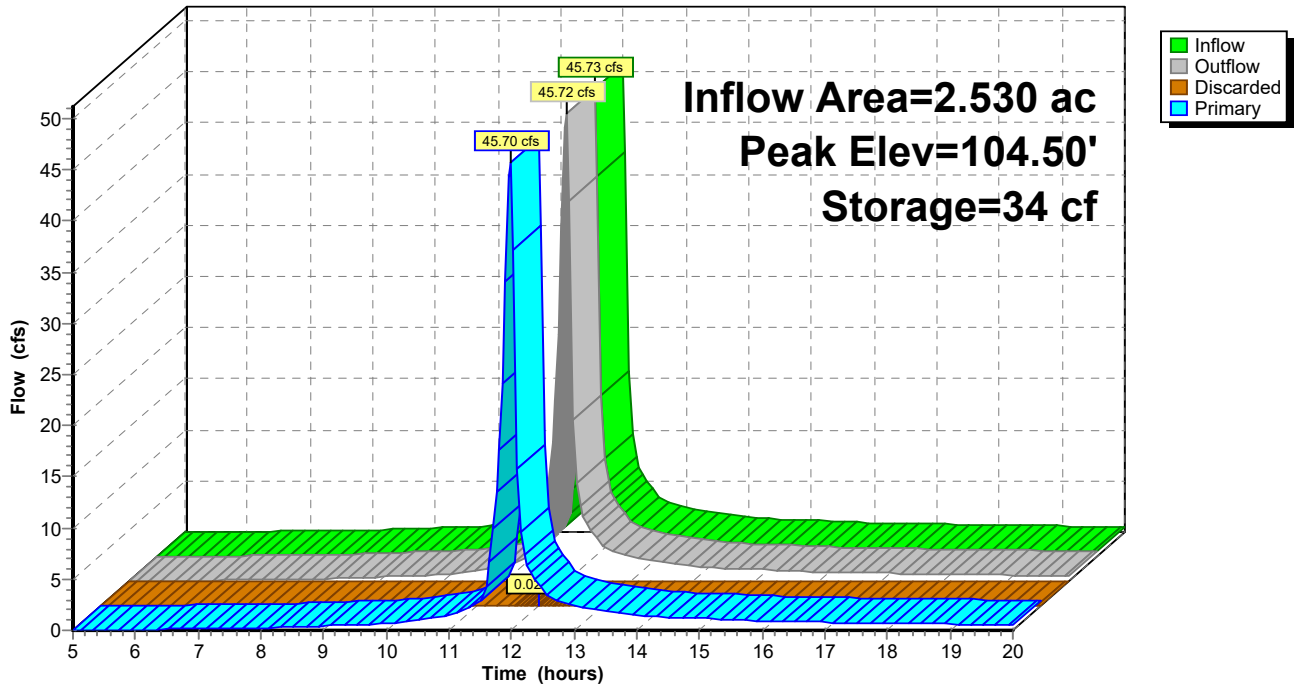
Device	Routing	Invert	Outlet Devices
#1	Primary	102.70'	16.0' long x 5.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88
#2	Discarded	104.50'	0.250 in/hr Exfiltration over Surface area Phase-In= 0.01'

Discarded OutFlow Max=0.02 cfs @ 11.97 hrs HW=104.50' (Free Discharge)
 ↑**2=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=102.47 cfs @ 11.97 hrs HW=104.50' (Free Discharge)
 ↑**1=Broad-Crested Rectangular Weir**(Weir Controls 102.47 cfs @ 3.56 fps)

Pond 3P: Rock Voids

Hydrograph



Staging Area 2 Basin 1 HydroCAD Report

Type II 24-hr 10 DAY-100YR Rainfall=16.10"

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Summary for Pond 12P: Pond 1

Inflow Area = 2.530 ac, 0.00% Impervious, Inflow Depth > 10.32" for 10 DAY-100YR event
 Inflow = 45.54 cfs @ 11.98 hrs, Volume= 2.175 af
 Outflow = 24.33 cfs @ 12.09 hrs, Volume= 1.322 af, Atten= 47%, Lag= 6.3 min
 Discarded = 0.09 cfs @ 12.09 hrs, Volume= 0.082 af
 Primary = 24.24 cfs @ 12.09 hrs, Volume= 1.240 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Peak Elev= 101.10' @ 12.09 hrs Surf.Area= 14,866 sf Storage= 45,340 cf

Plug-Flow detention time= 132.4 min calculated for 1.322 af (61% of inflow)
 Center-of-Mass det. time= 60.1 min (827.1 - 767.0)

Volume	Invert	Avail.Storage	Storage Description
#1	97.50'	59,205 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
97.50	10,365	0	0
98.00	10,965	5,333	5,333
99.00	12,190	11,578	16,910
100.00	13,448	12,819	29,729
101.00	14,732	14,090	43,819
102.00	16,040	15,386	59,205

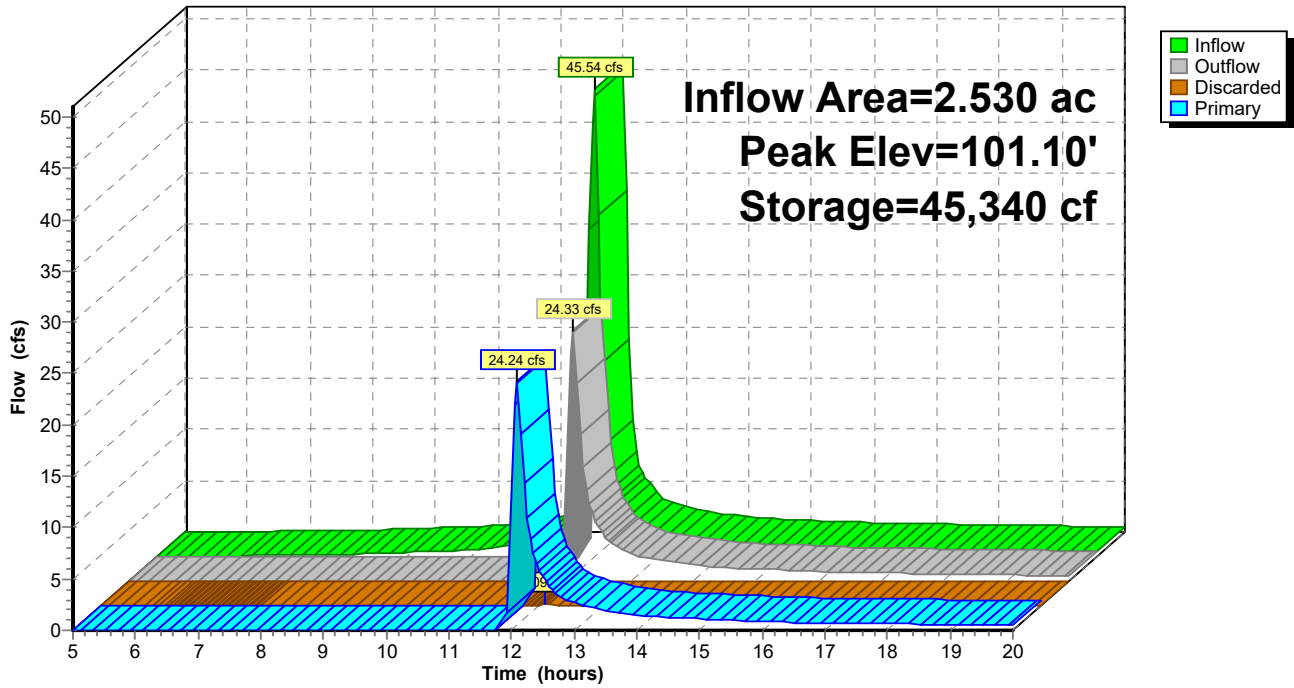
Device	Routing	Invert	Outlet Devices
#1	Discarded	97.50'	0.250 in/hr Exfiltration over Surface area
#2	Primary	100.50'	43.6 deg x 16.0' long x 1.50' rise Sharp-Crested Vee/Trap Weir Cv= 2.56 (C= 3.20)

Discarded OutFlow Max=0.09 cfs @ 12.09 hrs HW=101.09' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.09 cfs)

Primary OutFlow Max=23.66 cfs @ 12.09 hrs HW=101.09' (Free Discharge)
 ↑2=Sharp-Crested Vee/Trap Weir (Weir Controls 23.66 cfs @ 2.46 fps)

Pond 12P: Pond 1

Hydrograph



Staging Area 2 Basin 1 HydroCAD Report

Type II 24-hr 10 DAY-100YR Rainfall=16.10"

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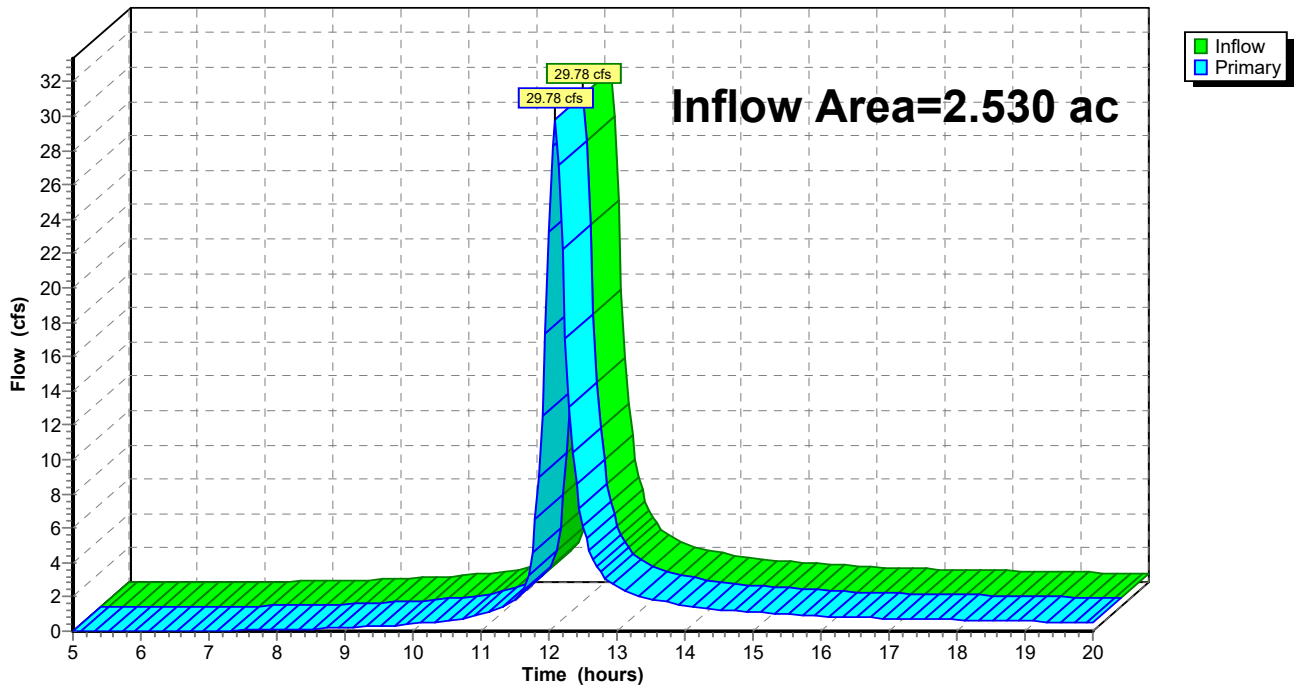
Summary for Link 2L: Outfall

Inflow Area = 2.530 ac, 0.00% Impervious, Inflow Depth > 9.07" for 10 DAY-100YR event
Inflow = 29.78 cfs @ 12.09 hrs, Volume= 1.913 af
Primary = 29.78 cfs @ 12.09 hrs, Volume= 1.913 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link 2L: Outfall

Hydrograph



Staging Area 2 Basin 1 HydroCAD Report

Type II 24-hr 10-YR - 24HR. Rainfall=6.72"

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

Subcatchment 1S: Pre Developed Runoff Area=2.530 ac 0.00% Impervious Runoff Depth>2.00"
Flow Length=245' Slope=0.0120 '/' Tc=17.1 min CN=58 Runoff=6.49 cfs 0.421 af

Subcatchment 4S: Post Developed Runoff Area=2.530 ac 0.00% Impervious Runoff Depth>2.64"
Flow Length=607' Slope=0.2470 '/' Tc=6.5 min CN=65 Runoff=12.56 cfs 0.556 af

Reach 13R: Ditch 1 Avg. Flow Depth=0.55' Max Vel=3.63 fps Inflow=12.56 cfs 0.556 af
n=0.030 L=110.0' S=0.0182 '/' Capacity=40.23 cfs Outflow=12.24 cfs 0.556 af

Pond 3P: Rock Voids Peak Elev=104.50' Storage=9 cf Inflow=12.56 cfs 0.556 af
Discarded=0.01 cfs 0.000 af Primary=12.56 cfs 0.556 af Outflow=12.56 cfs 0.556 af

Pond 12P: Pond 1 Peak Elev=99.40' Storage=21,874 cf Inflow=12.24 cfs 0.556 af
Discarded=0.07 cfs 0.053 af Primary=0.00 cfs 0.000 af Outflow=0.07 cfs 0.053 af

Link 2L: Outfall Inflow=6.49 cfs 0.421 af
Primary=6.49 cfs 0.421 af

Staging Area 2 Basin 1 HydroCAD Report

Type II 24-hr 10-YR - 24HR. Rainfall=6.72"

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Summary for Subcatchment 1S: Pre Developed

Runoff = 6.49 cfs @ 12.11 hrs, Volume= 0.421 af, Depth> 2.00"

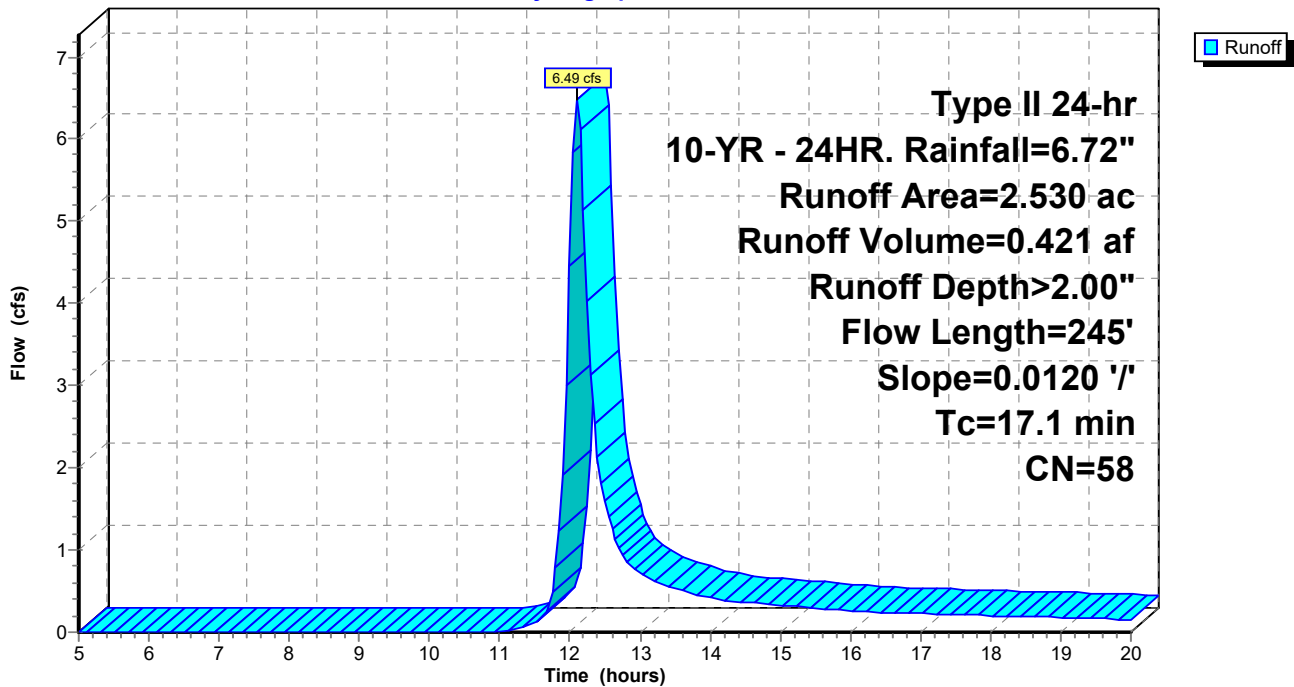
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-YR - 24HR. Rainfall=6.72"

Area (ac)	CN	Description
2.530	58	Meadow, non-grazed, HSG B
2.530		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.1	245	0.0120	0.24		Lag/CN Method,

Subcatchment 1S: Pre Developed

Hydrograph



Staging Area 2 Basin 1 HydroCAD Report

Type II 24-hr 10-YR - 24HR. Rainfall=6.72"

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Summary for Subcatchment 4S: Post Developed

Runoff = 12.56 cfs @ 11.98 hrs, Volume= 0.556 af, Depth> 2.64"

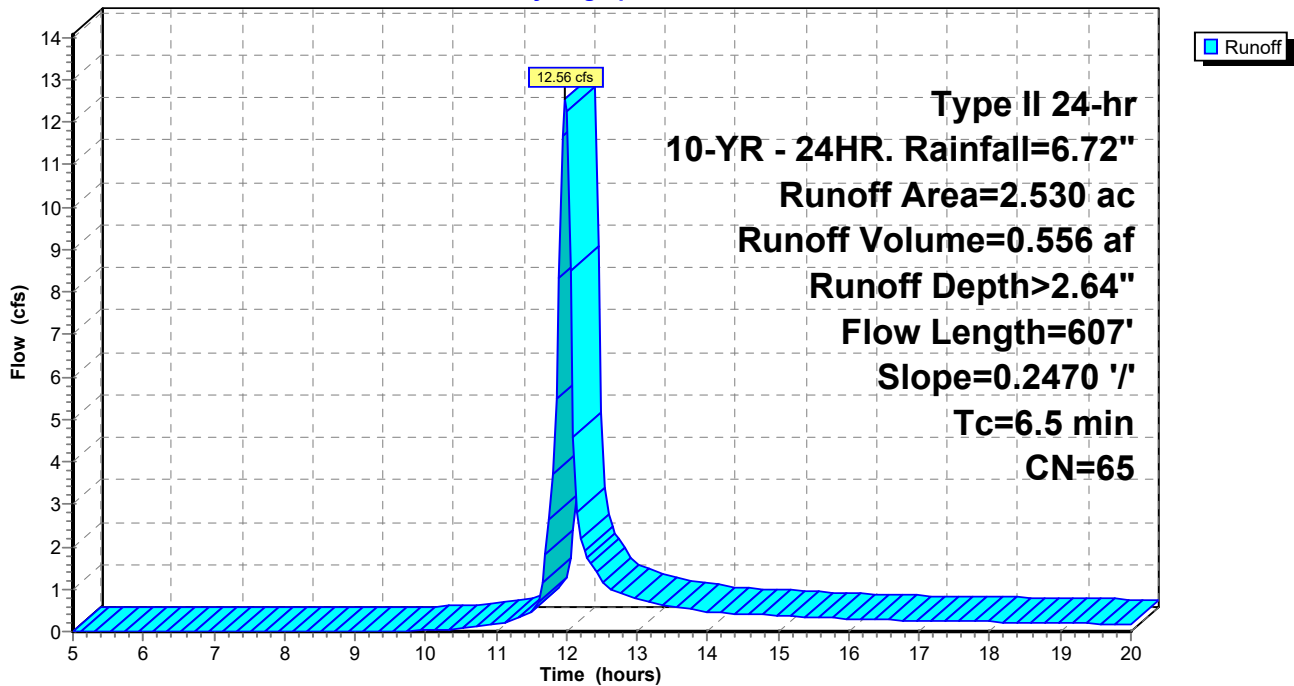
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-YR - 24HR. Rainfall=6.72"

Area (ac)	CN	Description
1.200	58	Meadow, non-grazed, HSG B
* 0.853	65	Uncompacted Gravel (35% Void)
0.477	85	Gravel roads, HSG B
2.530	65	Weighted Average
2.530		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.5	607	0.2470	1.55		Lag/CN Method,

Subcatchment 4S: Post Developed

Hydrograph



Staging Area 2 Basin 1 HydroCAD Report

Type II 24-hr 10-YR - 24HR. Rainfall=6.72"

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Summary for Reach 13R: Ditch 1

Inflow Area = 2.530 ac, 0.00% Impervious, Inflow Depth > 2.64" for 10-YR - 24HR. event
Inflow = 12.56 cfs @ 11.98 hrs, Volume= 0.556 af
Outflow = 12.24 cfs @ 11.99 hrs, Volume= 0.556 af, Atten= 3%, Lag= 0.7 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.63 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 1.12 fps, Avg. Travel Time= 1.6 min

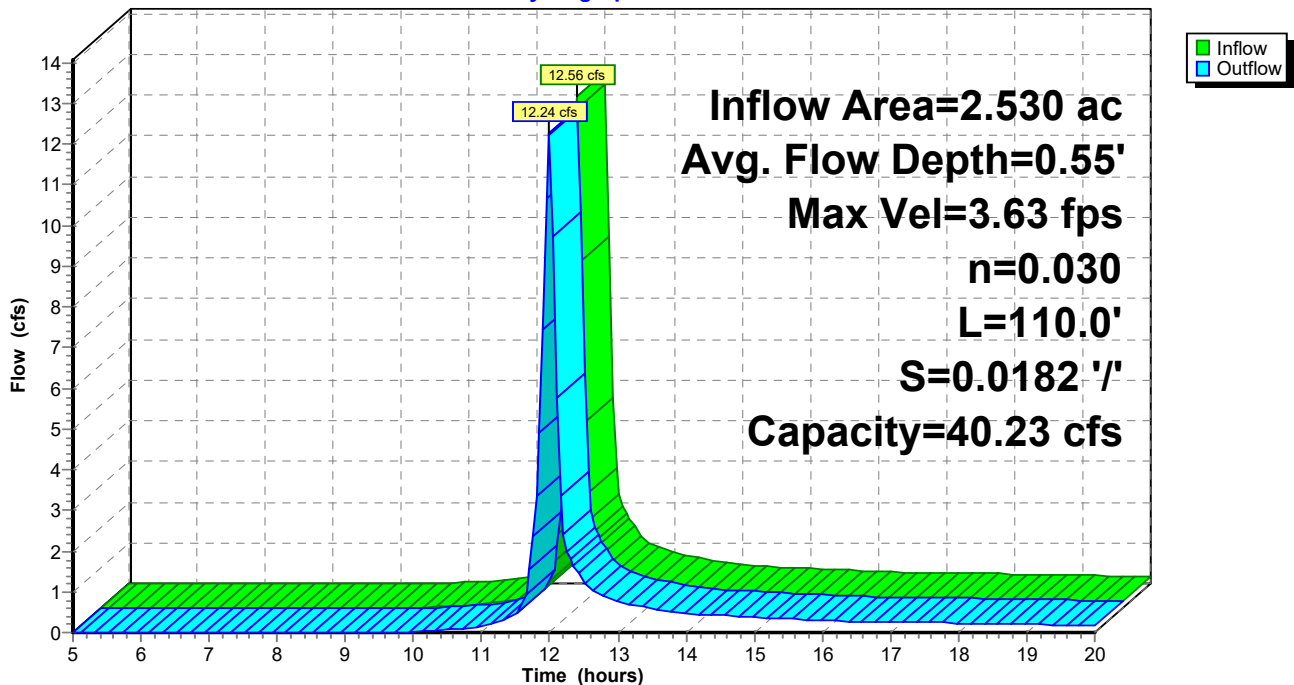
Peak Storage= 379 cf @ 11.99 hrs
Average Depth at Peak Storage= 0.55'
Bank-Full Depth= 1.00' Flow Area= 8.0 sf, Capacity= 40.23 cfs

4.00' x 1.00' deep channel, n= 0.030 Short grass
Side Slope Z-value= 4.0 '/' Top Width= 12.00'
Length= 110.0' Slope= 0.0182 '/'
Inlet Invert= 103.00', Outlet Invert= 101.00'



Reach 13R: Ditch 1

Hydrograph



Staging Area 2 Basin 1 HydroCAD Report

Type II 24-hr 10-YR - 24HR. Rainfall=6.72"

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Summary for Pond 3P: Rock Voids

Inflow Area = 2.530 ac, 0.00% Impervious, Inflow Depth > 2.64" for 10-YR - 24HR. event
 Inflow = 12.56 cfs @ 11.98 hrs, Volume= 0.556 af
 Outflow = 12.56 cfs @ 11.98 hrs, Volume= 0.556 af, Atten= 0%, Lag= 0.0 min
 Discarded = 0.01 cfs @ 11.98 hrs, Volume= 0.000 af
 Primary = 12.56 cfs @ 11.98 hrs, Volume= 0.556 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Peak Elev= 104.50' @ 11.98 hrs Surf.Area= 38,573 sf Storage= 9 cf

Plug-Flow detention time= 0.0 min calculated for 0.556 af (100% of inflow)
 Center-of-Mass det. time= 0.0 min (796.1 - 796.1)

Volume	Invert	Avail.Storage	Storage Description
#1	104.50'	7,715 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
104.50	38,573	0	0
104.70	38,573	7,715	7,715

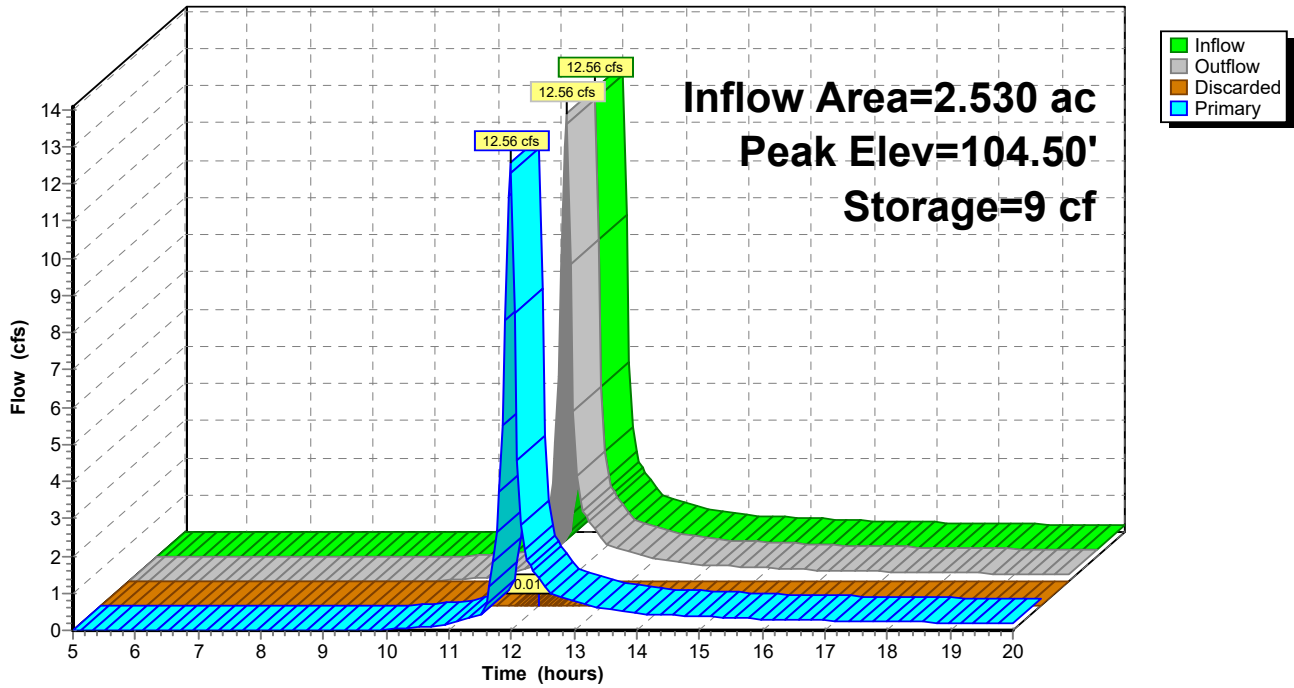
Device	Routing	Invert	Outlet Devices
#1	Primary	102.70'	16.0' long x 5.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88
#2	Discarded	104.50'	0.250 in/hr Exfiltration over Surface area Phase-In= 0.01'

Discarded OutFlow Max=0.01 cfs @ 11.98 hrs HW=104.50' (Free Discharge)
 ↑**2=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=102.41 cfs @ 11.98 hrs HW=104.50' (Free Discharge)
 ↑**1=Broad-Crested Rectangular Weir**(Weir Controls 102.41 cfs @ 3.56 fps)

Pond 3P: Rock Voids

Hydrograph



Staging Area 2 Basin 1 HydroCAD Report

Type II 24-hr 10-YR - 24HR. Rainfall=6.72"

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Summary for Pond 12P: Pond 1

Inflow Area = 2.530 ac, 0.00% Impervious, Inflow Depth > 2.64" for 10-YR - 24HR. event
 Inflow = 12.24 cfs @ 11.99 hrs, Volume= 0.556 af
 Outflow = 0.07 cfs @ 20.00 hrs, Volume= 0.053 af, Atten= 99%, Lag= 480.4 min
 Discarded = 0.07 cfs @ 20.00 hrs, Volume= 0.053 af
 Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Peak Elev= 99.40' @ 20.00 hrs Surf.Area= 12,692 sf Storage= 21,874 cf

Plug-Flow detention time= 243.7 min calculated for 0.053 af (10% of inflow)
 Center-of-Mass det. time= 136.2 min (933.5 - 797.3)

Volume	Invert	Avail.Storage	Storage Description
#1	97.50'	59,205 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
97.50	10,365	0	0
98.00	10,965	5,333	5,333
99.00	12,190	11,578	16,910
100.00	13,448	12,819	29,729
101.00	14,732	14,090	43,819
102.00	16,040	15,386	59,205

Device	Routing	Invert	Outlet Devices
#1	Discarded	97.50'	0.250 in/hr Exfiltration over Surface area
#2	Primary	100.50'	43.6 deg x 16.0' long x 1.50' rise Sharp-Crested Vee/Trap Weir Cv= 2.56 (C= 3.20)

Discarded OutFlow Max=0.07 cfs @ 20.00 hrs HW=99.40' (Free Discharge)
 ↑1=**Exfiltration** (Exfiltration Controls 0.07 cfs)

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=97.50' (Free Discharge)
 ↑2=**Sharp-Crested Vee/Trap Weir**(Controls 0.00 cfs)

Staging Area 2 Basin 1 HydroCAD Report

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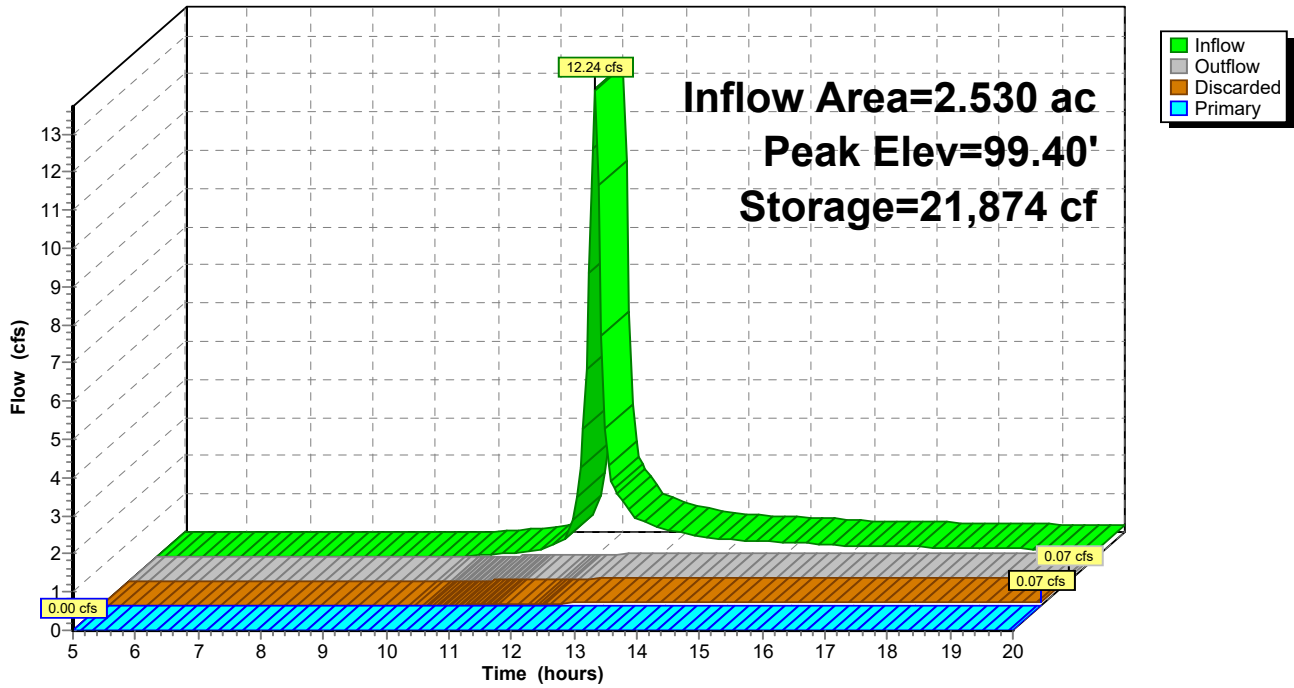
Type II 24-hr 10-YR - 24HR. Rainfall=6.72"

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Pond 12P: Pond 1

Hydrograph



Staging Area 2 Basin 1 HydroCAD Report

Type II 24-hr 10-YR - 24HR. Rainfall=6.72"

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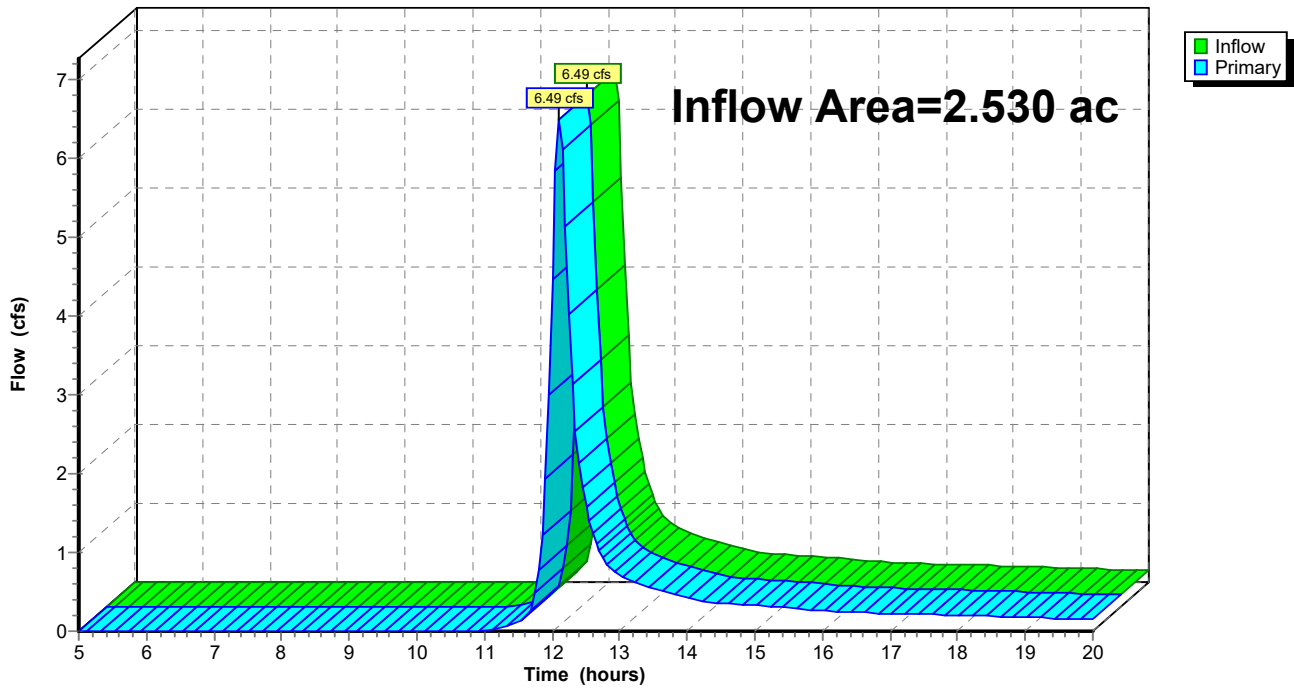
Summary for Link 2L: Outfall

Inflow Area = 2.530 ac, 0.00% Impervious, Inflow Depth > 2.00" for 10-YR - 24HR. event
Inflow = 6.49 cfs @ 12.11 hrs, Volume= 0.421 af
Primary = 6.49 cfs @ 12.11 hrs, Volume= 0.421 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link 2L: Outfall

Hydrograph



Staging Area 2 Basin 1 HydroCAD Report

Type II 24-hr 25-YR - 24HR. Rainfall=7.92"

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

Subcatchment 1S: Pre Developed Runoff Area=2.530 ac 0.00% Impervious Runoff Depth>2.77"
Flow Length=245' Slope=0.0120 '/' Tc=17.1 min CN=58 Runoff=9.12 cfs 0.583 af

Subcatchment 4S: Post Developed Runoff Area=2.530 ac 0.00% Impervious Runoff Depth>3.52"
Flow Length=607' Slope=0.2470 '/' Tc=6.5 min CN=65 Runoff=16.63 cfs 0.742 af

Reach 13R: Ditch 1 Avg. Flow Depth=0.64' Max Vel=3.93 fps Inflow=16.62 cfs 0.742 af
n=0.030 L=110.0' S=0.0182 '/' Capacity=40.23 cfs Outflow=16.26 cfs 0.741 af

Pond 3P: Rock Voids Peak Elev=104.50' Storage=13 cf Inflow=16.63 cfs 0.742 af
Discarded=0.01 cfs 0.000 af Primary=16.62 cfs 0.742 af Outflow=16.63 cfs 0.742 af

Pond 12P: Pond 1 Peak Elev=100.00' Storage=29,694 cf Inflow=16.26 cfs 0.741 af
Discarded=0.08 cfs 0.059 af Primary=0.00 cfs 0.000 af Outflow=0.08 cfs 0.059 af

Link 2L: Outfall Inflow=9.12 cfs 0.583 af
Primary=9.12 cfs 0.583 af

Staging Area 2 Basin 1 HydroCAD Report

Type II 24-hr 25-YR - 24HR. Rainfall=7.92"

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Summary for Subcatchment 1S: Pre Developed

Runoff = 9.12 cfs @ 12.10 hrs, Volume= 0.583 af, Depth> 2.77"

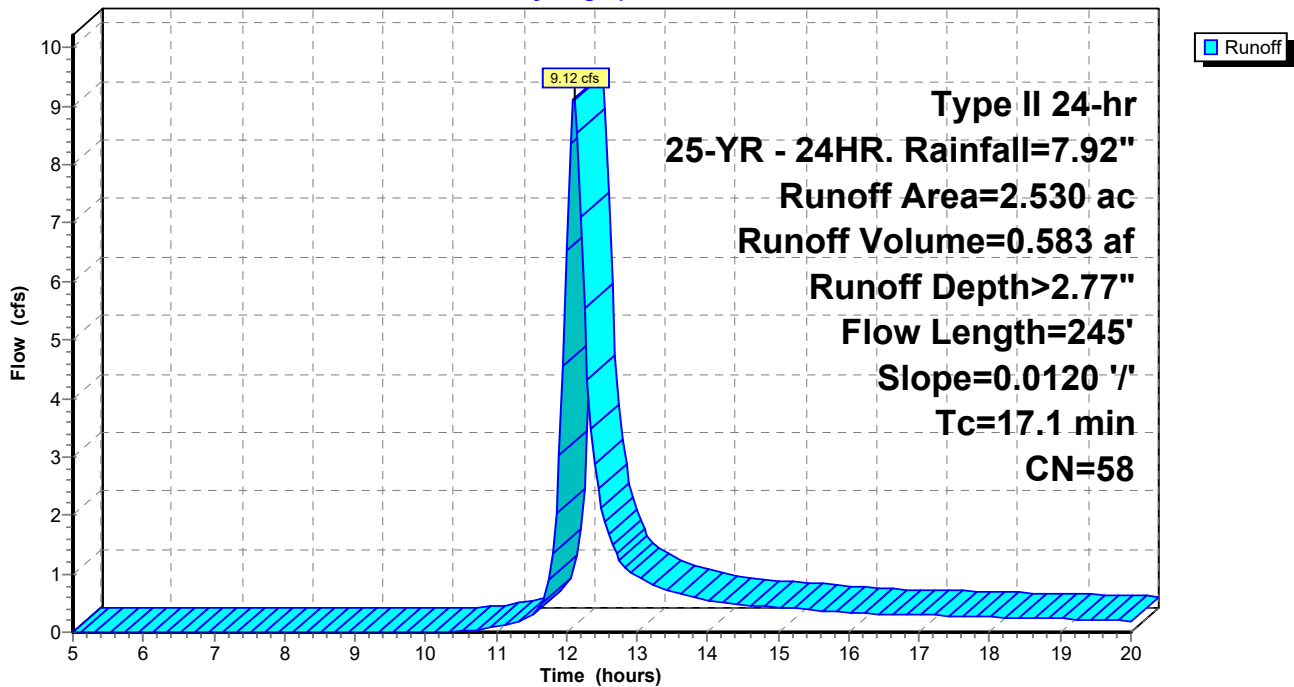
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-YR - 24HR. Rainfall=7.92"

Area (ac)	CN	Description
2.530	58	Meadow, non-grazed, HSG B
2.530		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.1	245	0.0120	0.24		Lag/CN Method,

Subcatchment 1S: Pre Developed

Hydrograph



Staging Area 2 Basin 1 HydroCAD Report

Type II 24-hr 25-YR - 24HR. Rainfall=7.92"

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Summary for Subcatchment 4S: Post Developed

Runoff = 16.63 cfs @ 11.98 hrs, Volume= 0.742 af, Depth> 3.52"

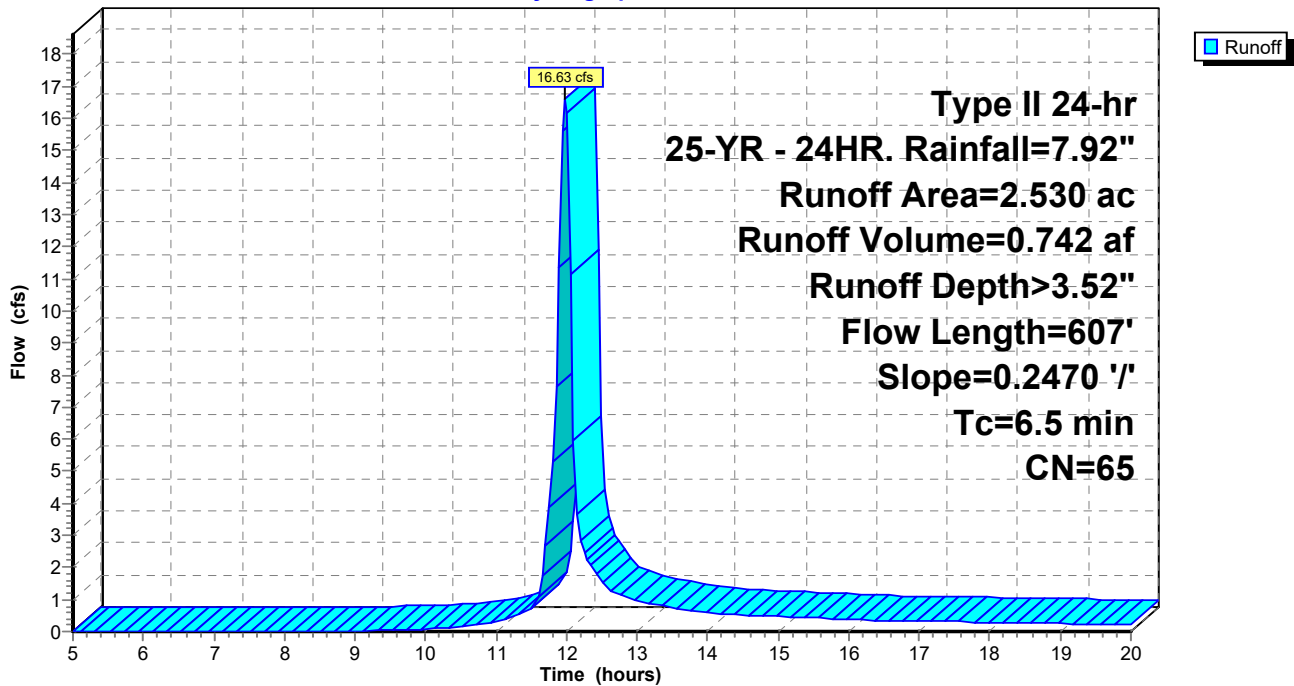
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-YR - 24HR. Rainfall=7.92"

Area (ac)	CN	Description
1.200	58	Meadow, non-grazed, HSG B
* 0.853	65	Uncompacted Gravel (35% Void)
0.477	85	Gravel roads, HSG B
2.530	65	Weighted Average
2.530		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.5	607	0.2470	1.55		Lag/CN Method,

Subcatchment 4S: Post Developed

Hydrograph



Staging Area 2 Basin 1 HydroCAD Report

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Type II 24-hr 25-YR - 24HR. Rainfall=7.92"

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Summary for Reach 13R: Ditch 1

Inflow Area = 2.530 ac, 0.00% Impervious, Inflow Depth > 3.52" for 25-YR - 24HR. event
Inflow = 16.62 cfs @ 11.98 hrs, Volume= 0.742 af
Outflow = 16.26 cfs @ 11.99 hrs, Volume= 0.741 af, Atten= 2%, Lag= 0.7 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.93 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 1.20 fps, Avg. Travel Time= 1.5 min

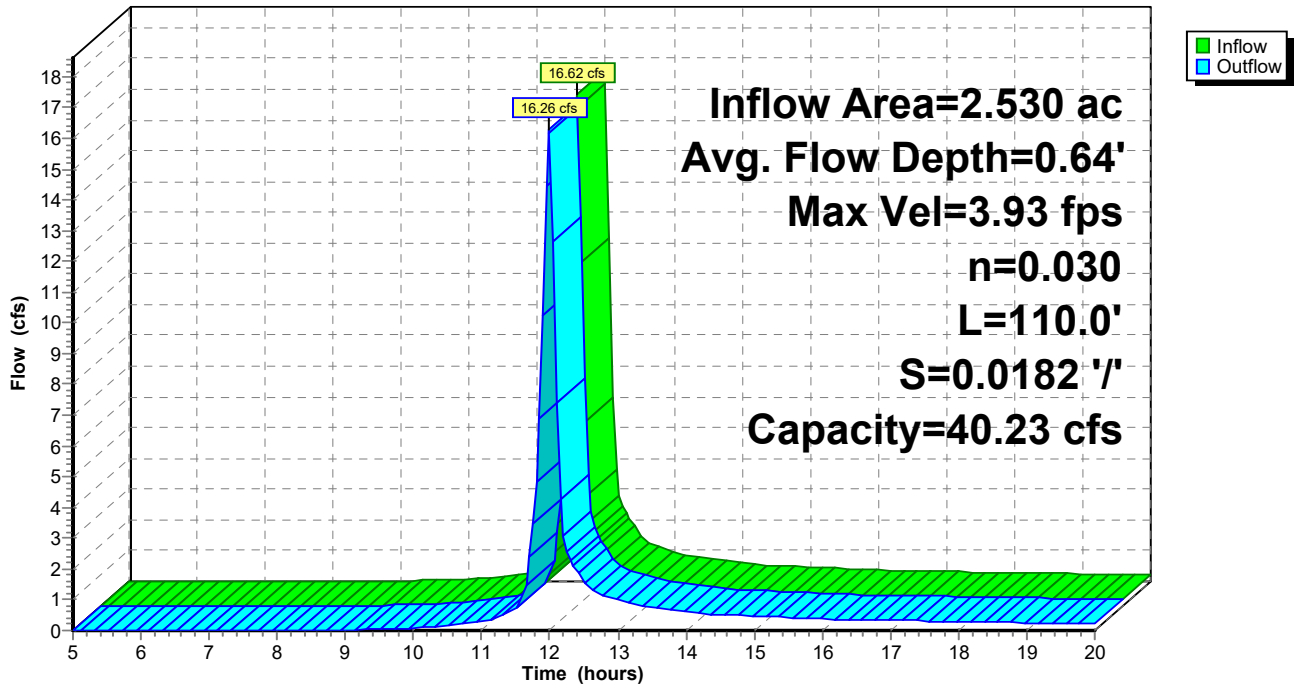
Peak Storage= 464 cf @ 11.99 hrs
Average Depth at Peak Storage= 0.64'
Bank-Full Depth= 1.00' Flow Area= 8.0 sf, Capacity= 40.23 cfs

4.00' x 1.00' deep channel, n= 0.030 Short grass
Side Slope Z-value= 4.0 '/' Top Width= 12.00'
Length= 110.0' Slope= 0.0182 '/'
Inlet Invert= 103.00', Outlet Invert= 101.00'



Reach 13R: Ditch 1

Hydrograph



Staging Area 2 Basin 1 HydroCAD Report

Type II 24-hr 25-YR - 24HR. Rainfall=7.92"

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Summary for Pond 3P: Rock Voids

Inflow Area = 2.530 ac, 0.00% Impervious, Inflow Depth > 3.52" for 25-YR - 24HR. event
 Inflow = 16.63 cfs @ 11.98 hrs, Volume= 0.742 af
 Outflow = 16.63 cfs @ 11.98 hrs, Volume= 0.742 af, Atten= 0%, Lag= 0.0 min
 Discarded = 0.01 cfs @ 11.98 hrs, Volume= 0.000 af
 Primary = 16.62 cfs @ 11.98 hrs, Volume= 0.742 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Peak Elev= 104.50' @ 11.98 hrs Surf.Area= 38,573 sf Storage= 13 cf

Plug-Flow detention time= 0.0 min calculated for 0.742 af (100% of inflow)
 Center-of-Mass det. time= 0.0 min (790.1 - 790.1)

Volume	Invert	Avail.Storage	Storage Description
#1	104.50'	7,715 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
104.50	38,573	0	0
104.70	38,573	7,715	7,715

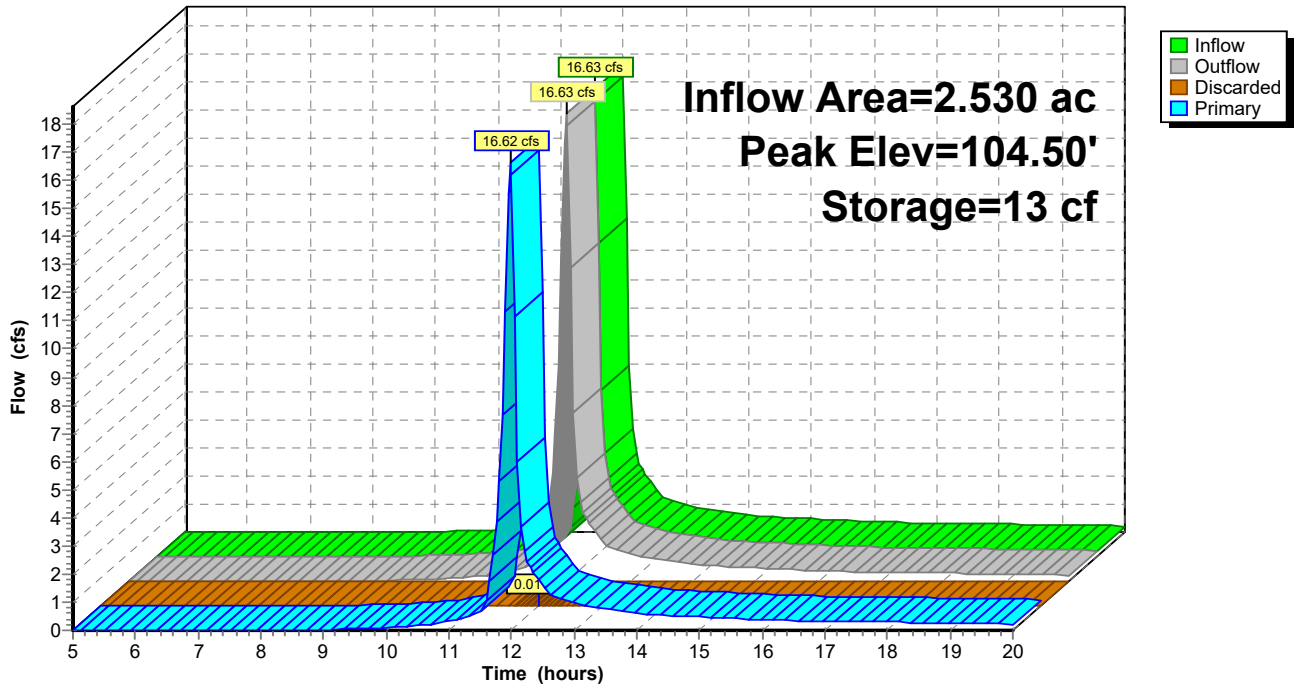
Device	Routing	Invert	Outlet Devices
#1	Primary	102.70'	16.0' long x 5.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88
#2	Discarded	104.50'	0.250 in/hr Exfiltration over Surface area Phase-In= 0.01'

Discarded OutFlow Max=0.01 cfs @ 11.98 hrs HW=104.50' (Free Discharge)
 ↑**2=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=102.42 cfs @ 11.98 hrs HW=104.50' (Free Discharge)
 ↑**1=Broad-Crested Rectangular Weir**(Weir Controls 102.42 cfs @ 3.56 fps)

Pond 3P: Rock Voids

Hydrograph



Staging Area 2 Basin 1 HydroCAD Report

Type II 24-hr 25-YR - 24HR. Rainfall=7.92"

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Summary for Pond 12P: Pond 1

Inflow Area = 2.530 ac, 0.00% Impervious, Inflow Depth > 3.51" for 25-YR - 24HR. event
 Inflow = 16.26 cfs @ 11.99 hrs, Volume= 0.741 af
 Outflow = 0.08 cfs @ 20.00 hrs, Volume= 0.059 af, Atten= 100%, Lag= 480.5 min
 Discarded = 0.08 cfs @ 20.00 hrs, Volume= 0.059 af
 Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Peak Elev= 100.00' @ 20.00 hrs Surf.Area= 13,445 sf Storage= 29,694 cf

Plug-Flow detention time= 248.4 min calculated for 0.059 af (8% of inflow)
 Center-of-Mass det. time= 127.8 min (919.0 - 791.2)

Volume	Invert	Avail.Storage	Storage Description
#1	97.50'	59,205 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
97.50	10,365	0	0
98.00	10,965	5,333	5,333
99.00	12,190	11,578	16,910
100.00	13,448	12,819	29,729
101.00	14,732	14,090	43,819
102.00	16,040	15,386	59,205

Device	Routing	Invert	Outlet Devices
#1	Discarded	97.50'	0.250 in/hr Exfiltration over Surface area
#2	Primary	100.50'	43.6 deg x 16.0' long x 1.50' rise Sharp-Crested Vee/Trap Weir Cv= 2.56 (C= 3.20)

Discarded OutFlow Max=0.08 cfs @ 20.00 hrs HW=100.00' (Free Discharge)
 ↑1=**Exfiltration** (Exfiltration Controls 0.08 cfs)

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=97.50' (Free Discharge)
 ↑2=**Sharp-Crested Vee/Trap Weir** (Controls 0.00 cfs)

Staging Area 2 Basin 1 HydroCAD Report

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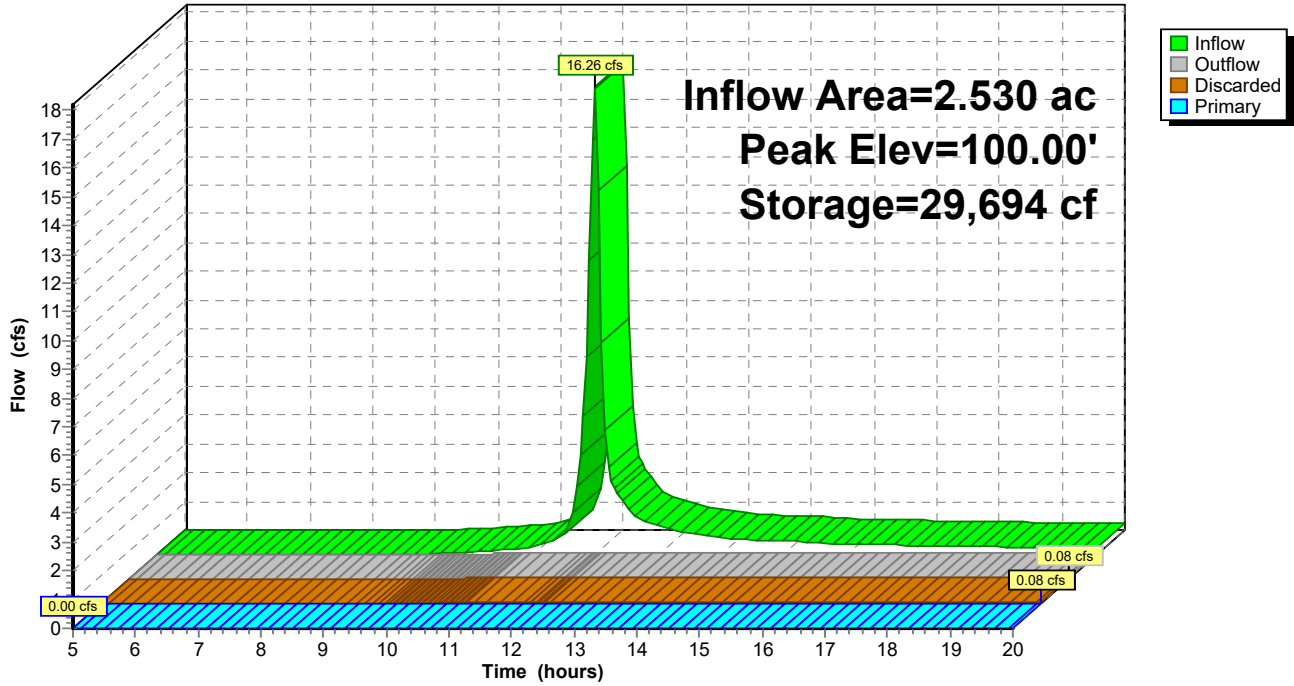
Type II 24-hr 25-YR - 24HR. Rainfall=7.92"

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Pond 12P: Pond 1

Hydrograph



Staging Area 2 Basin 1 HydroCAD Report

Type II 24-hr 25-YR - 24HR. Rainfall=7.92"

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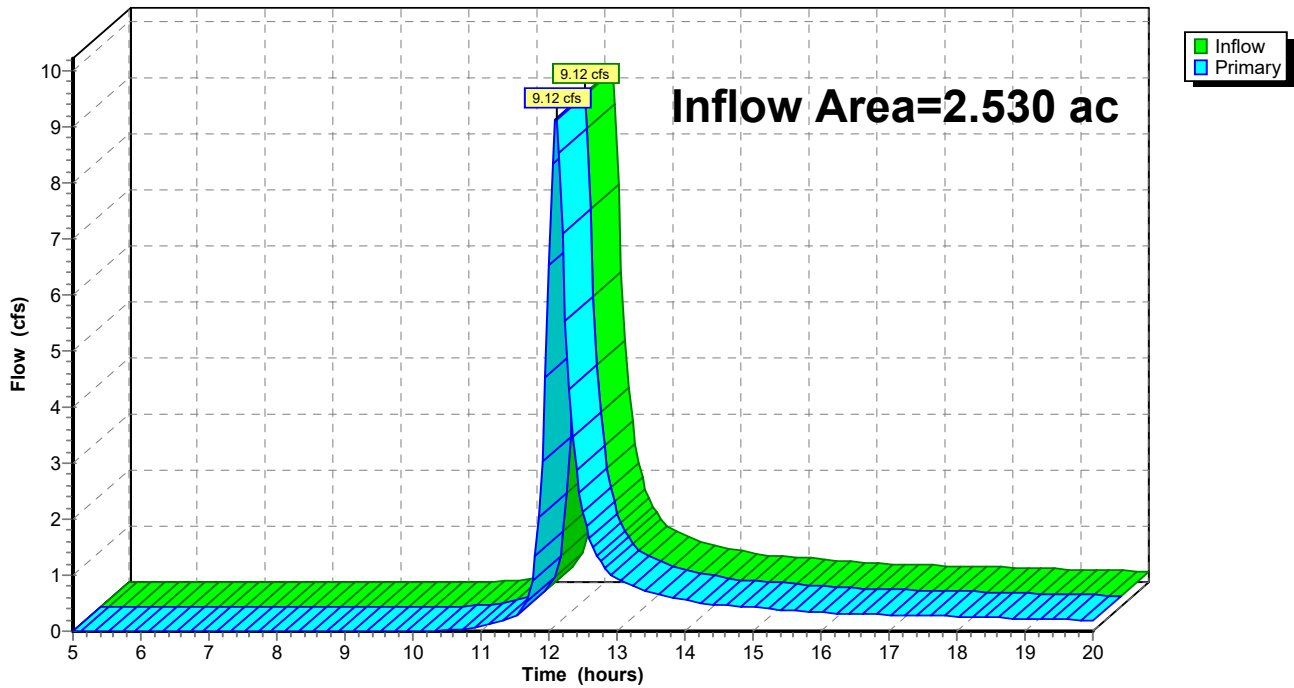
Summary for Link 2L: Outfall

Inflow Area = 2.530 ac, 0.00% Impervious, Inflow Depth > 2.77" for 25-YR - 24HR. event
Inflow = 9.12 cfs @ 12.10 hrs, Volume= 0.583 af
Primary = 9.12 cfs @ 12.10 hrs, Volume= 0.583 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link 2L: Outfall

Hydrograph



Staging Area 2 Basin 1 HydroCAD Report Type II 24-hr 1.00 hrs 100-YR - 1HR. Rainfall=4.20"

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

Subcatchment 1S: Pre Developed Runoff Area=2.530 ac 0.00% Impervious Runoff Depth=0.00"
Flow Length=245' Slope=0.0120 '/' Tc=17.1 min CN=58 Runoff=0.00 cfs 0.000 af

Subcatchment 4S: Post Developed Runoff Area=2.530 ac 0.00% Impervious Runoff Depth=0.00"
Flow Length=607' Slope=0.2470 '/' Tc=6.5 min CN=65 Runoff=0.00 cfs 0.000 af

Reach 13R: Ditch 1 Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af
n=0.030 L=110.0' S=0.0182 '/' Capacity=40.23 cfs Outflow=0.00 cfs 0.000 af

Pond 3P: Rock Voids Peak Elev=104.50' Storage=0 cf Inflow=0.00 cfs 0.000 af
Discarded=0.00 cfs 0.000 af Primary=0.00 cfs 0.000 af Outflow=0.00 cfs 0.000 af

Pond 12P: Pond 1 Peak Elev=97.50' Storage=0 cf Inflow=0.00 cfs 0.000 af
Discarded=0.00 cfs 0.000 af Primary=0.00 cfs 0.000 af Outflow=0.00 cfs 0.000 af

Link 2L: Outfall Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

Summary for Subcatchment 1S: Pre Developed

Runoff = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Depth= 0.00"

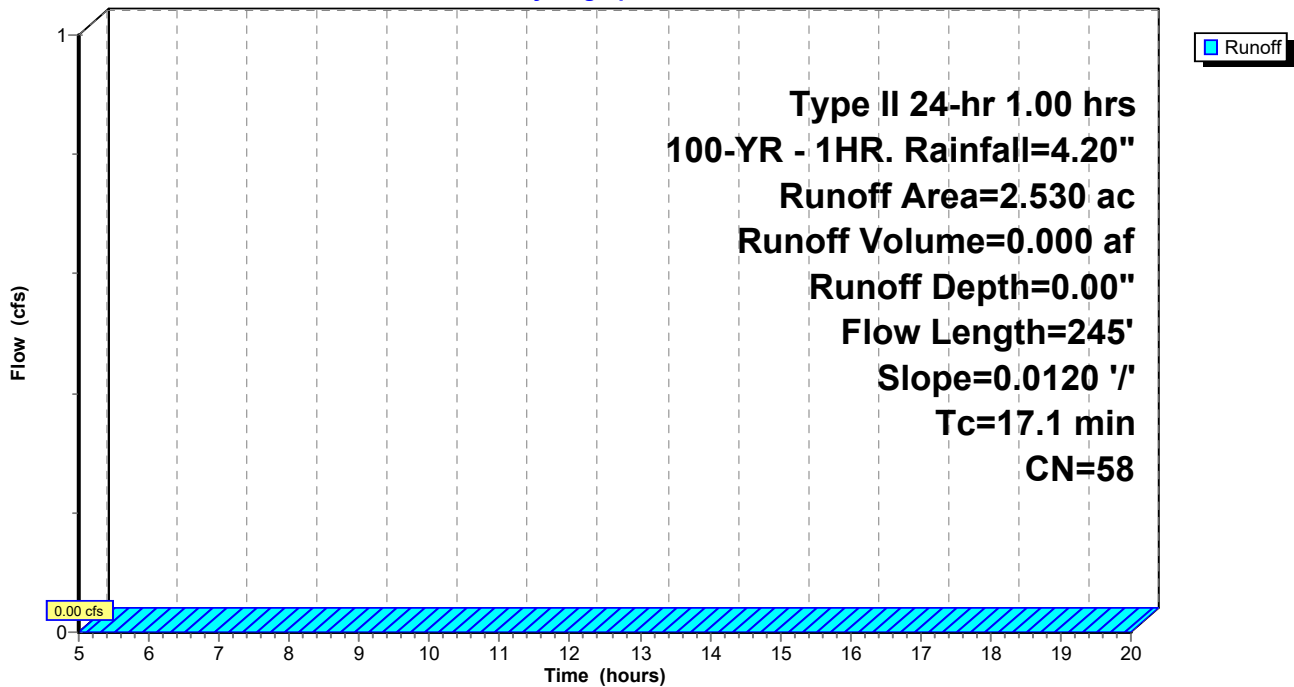
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Type II 24-hr 1.00 hrs 100-YR - 1HR. Rainfall=4.20"

Area (ac)	CN	Description
2.530	58	Meadow, non-grazed, HSG B
2.530		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.1	245	0.0120	0.24		Lag/CN Method,

Subcatchment 1S: Pre Developed

Hydrograph



Summary for Subcatchment 4S: Post Developed

Runoff = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Depth= 0.00"

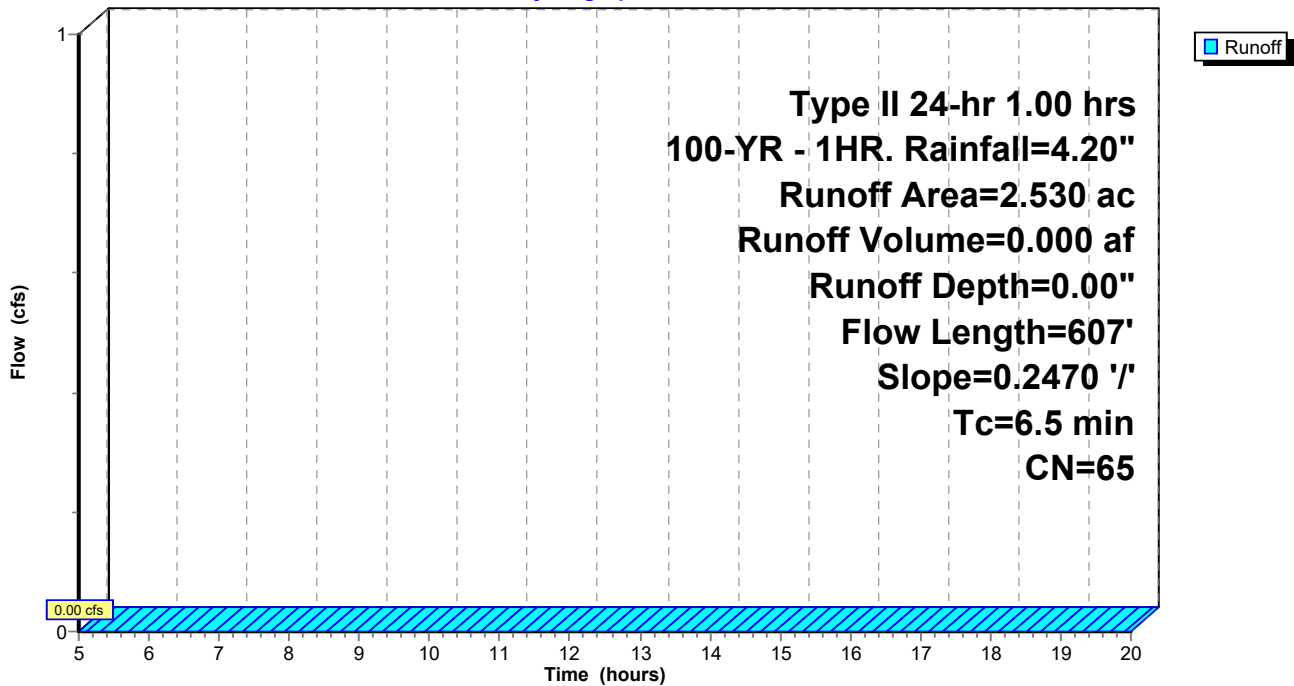
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Type II 24-hr 1.00 hrs 100-YR - 1HR. Rainfall=4.20"

Area (ac)	CN	Description
1.200	58	Meadow, non-grazed, HSG B
* 0.853	65	Uncompacted Gravel (35% Void)
0.477	85	Gravel roads, HSG B
2.530	65	Weighted Average
2.530		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.5	607	0.2470	1.55		Lag/CN Method,

Subcatchment 4S: Post Developed

Hydrograph



Summary for Reach 13R: Ditch 1

Inflow Area = 2.530 ac, 0.00% Impervious, Inflow Depth = 0.00" for 100-YR - 1HR. event
 Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
 Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Max. Velocity= 0.00 fps, Min. Travel Time= 0.0 min
 Avg. Velocity = 0.00 fps, Avg. Travel Time= 0.0 min

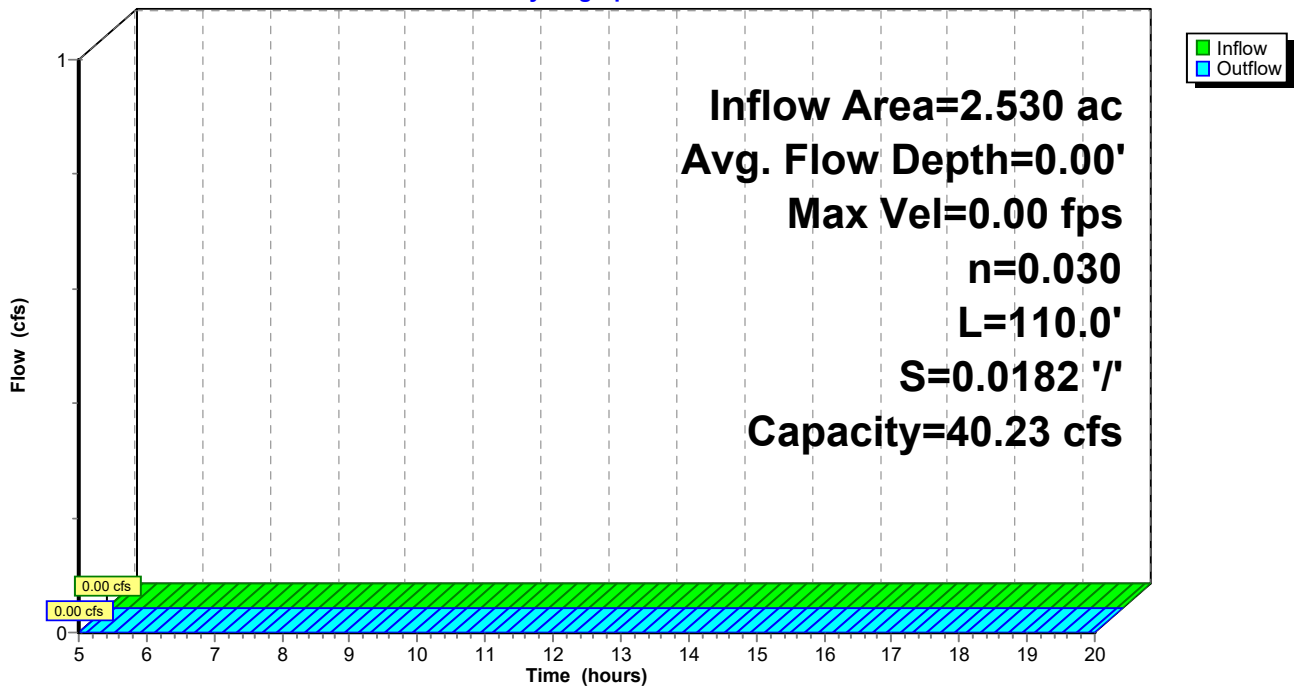
Peak Storage= 0 cf @ 5.00 hrs
 Average Depth at Peak Storage= 0.00'
 Bank-Full Depth= 1.00' Flow Area= 8.0 sf, Capacity= 40.23 cfs

4.00' x 1.00' deep channel, n= 0.030 Short grass
 Side Slope Z-value= 4.0 '/' Top Width= 12.00'
 Length= 110.0' Slope= 0.0182 '/'
 Inlet Invert= 103.00', Outlet Invert= 101.00'



Reach 13R: Ditch 1

Hydrograph



Summary for Pond 3P: Rock Voids

Inflow Area = 2.530 ac, 0.00% Impervious, Inflow Depth = 0.00" for 100-YR - 1HR. event
 Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
 Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min
 Discarded = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
 Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Peak Elev= 104.50' @ 5.00 hrs Surf.Area= 38,573 sf Storage= 0 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
 Center-of-Mass det. time= (not calculated: no inflow)

Volume	Invert	Avail.Storage	Storage Description
#1	104.50'	7,715 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
104.50	38,573	0	0
104.70	38,573	7,715	7,715

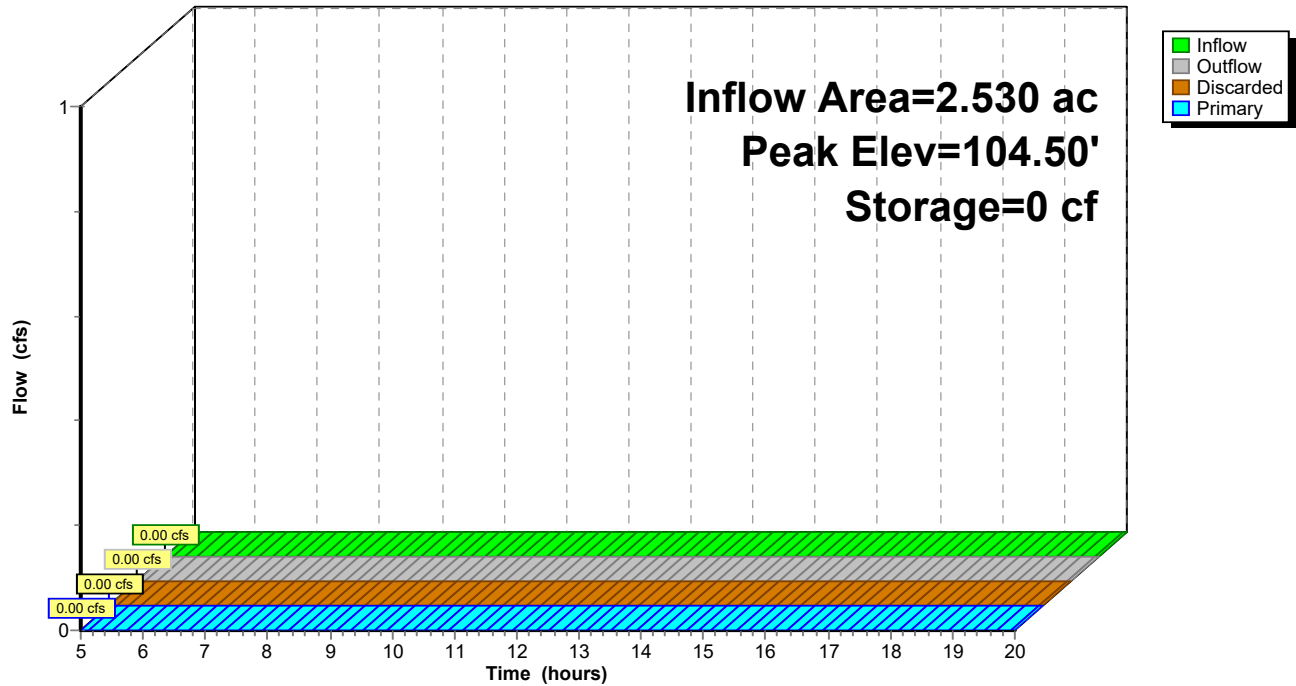
Device	Routing	Invert	Outlet Devices
#1	Primary	102.70'	16.0' long x 5.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88
#2	Discarded	104.50'	0.250 in/hr Exfiltration over Surface area Phase-In= 0.01'

Discarded OutFlow Max=0.00 cfs @ 5.00 hrs HW=104.50' (Free Discharge)
 ↑**2=Exfiltration** (Controls 0.00 cfs)

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=104.50' (Free Discharge)
 ↑**1=Broad-Crested Rectangular Weir**(Passes 0.00 cfs of 102.39 cfs potential flow)

Pond 3P: Rock Voids

Hydrograph



Summary for Pond 12P: Pond 1

Inflow Area = 2.530 ac, 0.00% Impervious, Inflow Depth = 0.00" for 100-YR - 1HR. event
 Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
 Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min
 Discarded = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
 Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Peak Elev= 97.50' @ 5.00 hrs Surf.Area= 10,365 sf Storage= 0 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
 Center-of-Mass det. time= (not calculated: no inflow)

Volume	Invert	Avail.Storage	Storage Description
#1	97.50'	59,205 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
97.50	10,365	0	0
98.00	10,965	5,333	5,333
99.00	12,190	11,578	16,910
100.00	13,448	12,819	29,729
101.00	14,732	14,090	43,819
102.00	16,040	15,386	59,205

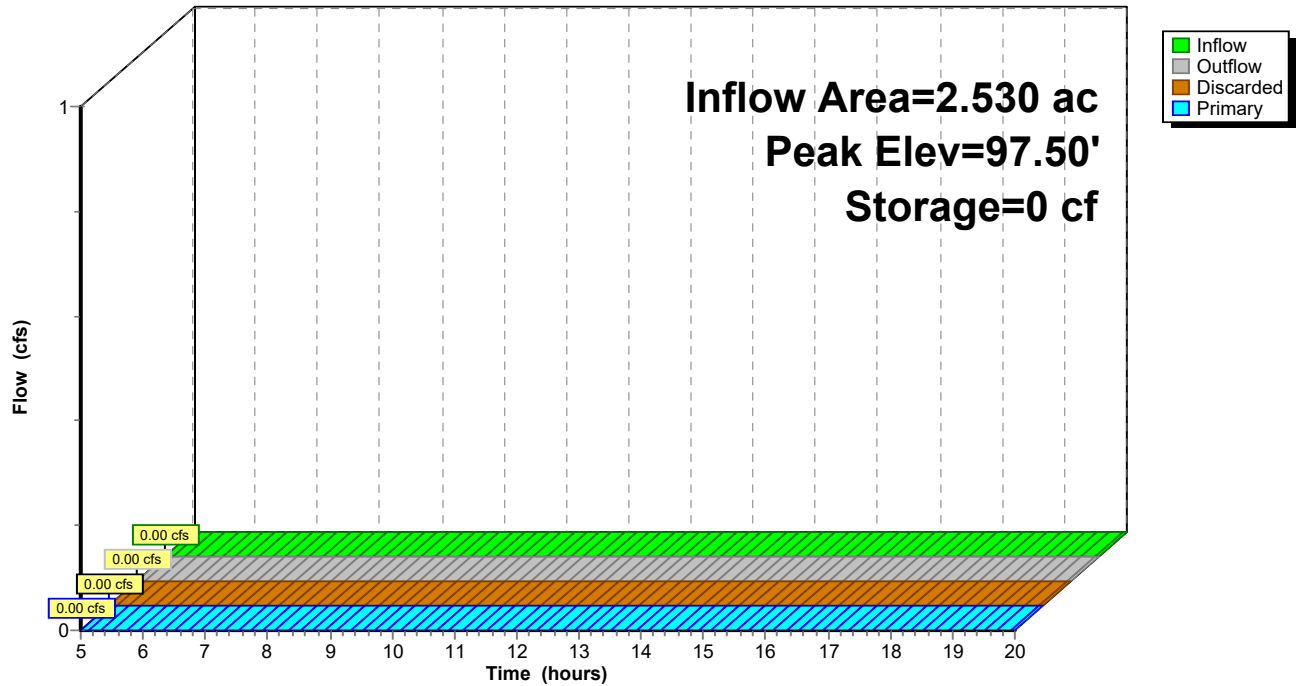
Device	Routing	Invert	Outlet Devices
#1	Discarded	97.50'	0.250 in/hr Exfiltration over Surface area
#2	Primary	100.50'	43.6 deg x 16.0' long x 1.50' rise Sharp-Crested Vee/Trap Weir Cv= 2.56 (C= 3.20)

Discarded OutFlow Max=0.00 cfs @ 5.00 hrs HW=97.50' (Free Discharge)
 ↑1=Exfiltration (Passes 0.00 cfs of 0.06 cfs potential flow)

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=97.50' (Free Discharge)
 ↑2=Sharp-Crested Vee/Trap Weir (Controls 0.00 cfs)

Pond 12P: Pond 1

Hydrograph



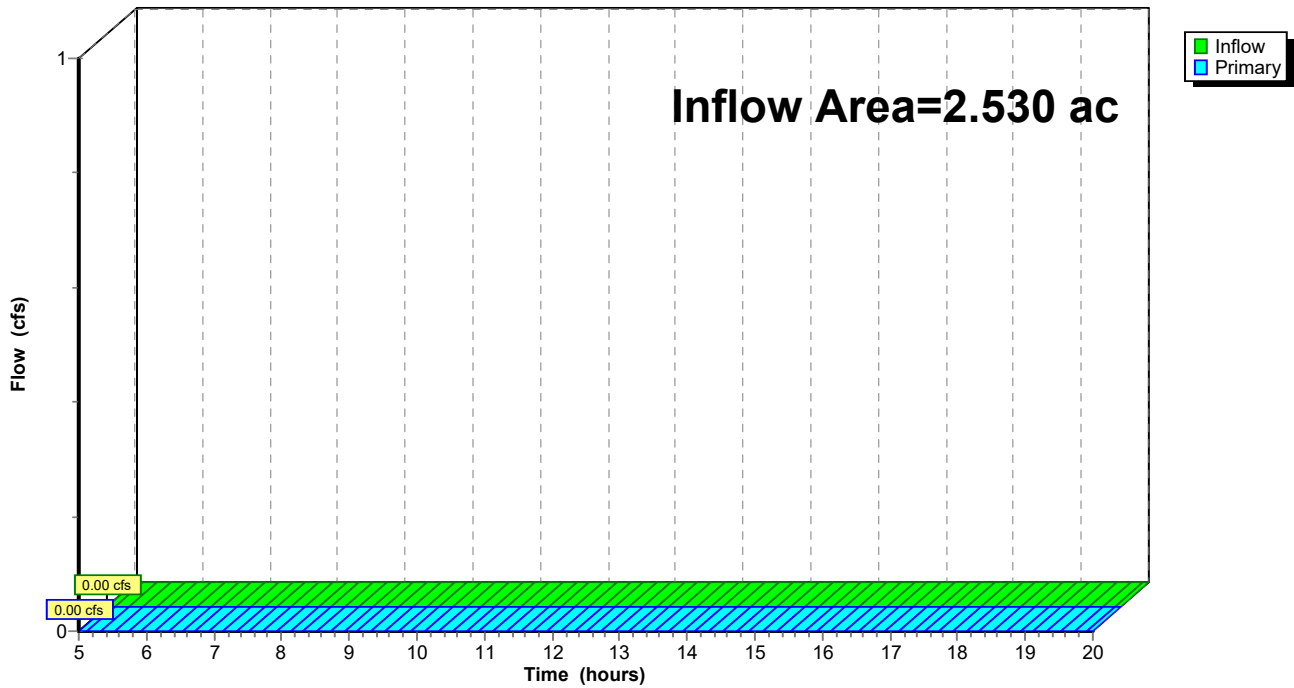
Summary for Link 2L: Outfall

Inflow Area = 2.530 ac, 0.00% Impervious, Inflow Depth = 0.00" for 100-YR - 1HR. event
Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link 2L: Outfall

Hydrograph



Staging Area 2 Basin 1 HydroCAD Report*Type II 24-hr 100-YR - 24HR. Rainfall=9.84"*

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

Subcatchment 1S: Pre Developed

Runoff Area=2.530 ac 0.00% Impervious Runoff Depth>4.11"
Flow Length=245' Slope=0.0120 '/' Tc=17.1 min CN=58 Runoff=13.66 cfs 0.867 af

Subcatchment 4S: Post Developed

Runoff Area=2.530 ac 0.00% Impervious Runoff Depth>5.02"
Flow Length=607' Slope=0.2470 '/' Tc=6.5 min CN=65 Runoff=23.39 cfs 1.058 af

Reach 13R: Ditch 1

Avg. Flow Depth=0.76' Max Vel=4.32 fps Inflow=23.38 cfs 1.058 af
n=0.030 L=110.0' S=0.0182 '/' Capacity=40.23 cfs Outflow=22.94 cfs 1.057 af

Pond 3P: Rock Voids

Peak Elev=104.50' Storage=18 cf Inflow=23.39 cfs 1.058 af
Discarded=0.01 cfs 0.000 af Primary=23.38 cfs 1.058 af Outflow=23.39 cfs 1.058 af

Pond 12P: Pond 1

Peak Elev=100.54' Storage=37,182 cf Inflow=22.94 cfs 1.057 af
Discarded=0.08 cfs 0.068 af Primary=0.46 cfs 0.141 af Outflow=0.55 cfs 0.209 af

Link 2L: Outfall

Inflow=13.66 cfs 0.867 af
Primary=13.66 cfs 0.867 af

Staging Area 2 Basin 1 HydroCAD Report

Type II 24-hr 100-YR - 24HR. Rainfall=9.84"

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Summary for Subcatchment 1S: Pre Developed

Runoff = 13.66 cfs @ 12.10 hrs, Volume= 0.867 af, Depth> 4.11"

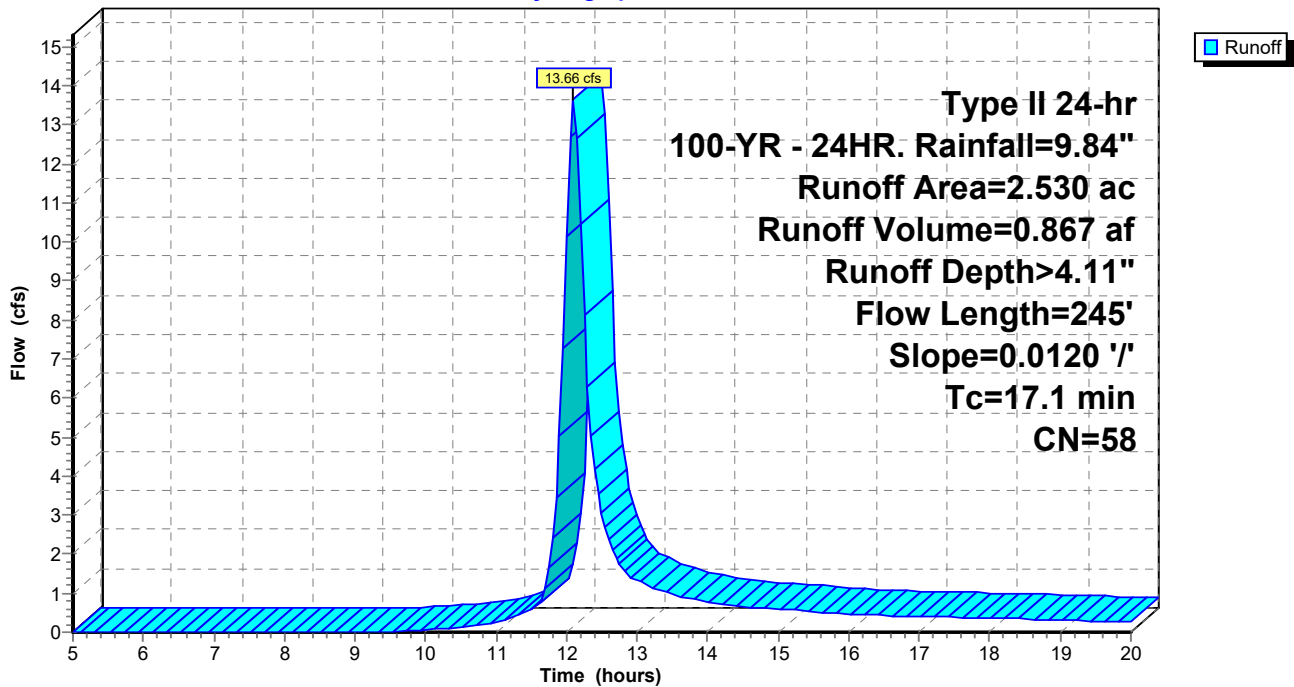
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Type II 24-hr 100-YR - 24HR. Rainfall=9.84"

Area (ac)	CN	Description
2.530	58	Meadow, non-grazed, HSG B
2.530		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.1	245	0.0120	0.24		Lag/CN Method,

Subcatchment 1S: Pre Developed

Hydrograph



Staging Area 2 Basin 1 HydroCAD Report

Type II 24-hr 100-YR - 24HR. Rainfall=9.84"

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Summary for Subcatchment 4S: Post Developed

Runoff = 23.39 cfs @ 11.98 hrs, Volume= 1.058 af, Depth> 5.02"

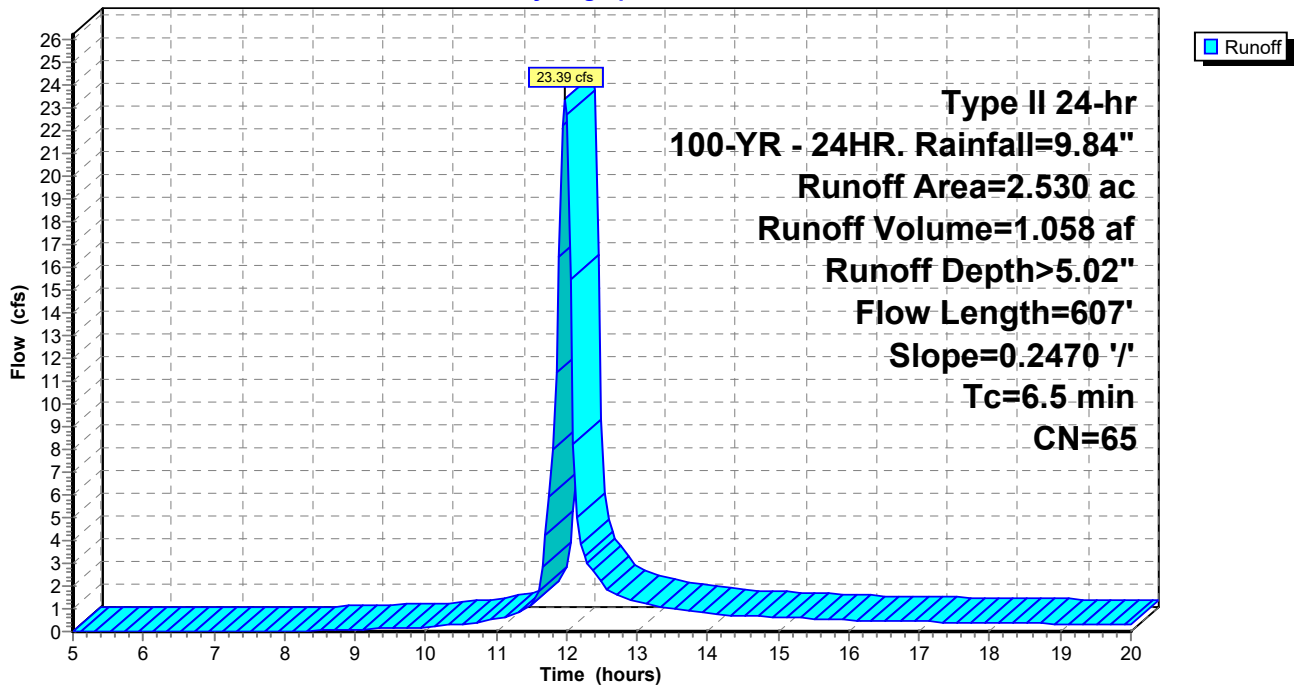
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Type II 24-hr 100-YR - 24HR. Rainfall=9.84"

Area (ac)	CN	Description
1.200	58	Meadow, non-grazed, HSG B
* 0.853	65	Uncompacted Gravel (35% Void)
0.477	85	Gravel roads, HSG B
2.530	65	Weighted Average
2.530		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.5	607	0.2470	1.55		Lag/CN Method,

Subcatchment 4S: Post Developed

Hydrograph



Staging Area 2 Basin 1 HydroCAD Report

Type II 24-hr 100-YR - 24HR. Rainfall=9.84"

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Summary for Reach 13R: Ditch 1

Inflow Area = 2.530 ac, 0.00% Impervious, Inflow Depth > 5.02" for 100-YR - 24HR. event
Inflow = 23.38 cfs @ 11.98 hrs, Volume= 1.058 af
Outflow = 22.94 cfs @ 11.99 hrs, Volume= 1.057 af, Atten= 2%, Lag= 0.6 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.32 fps, Min. Travel Time= 0.4 min
Avg. Velocity = 1.29 fps, Avg. Travel Time= 1.4 min

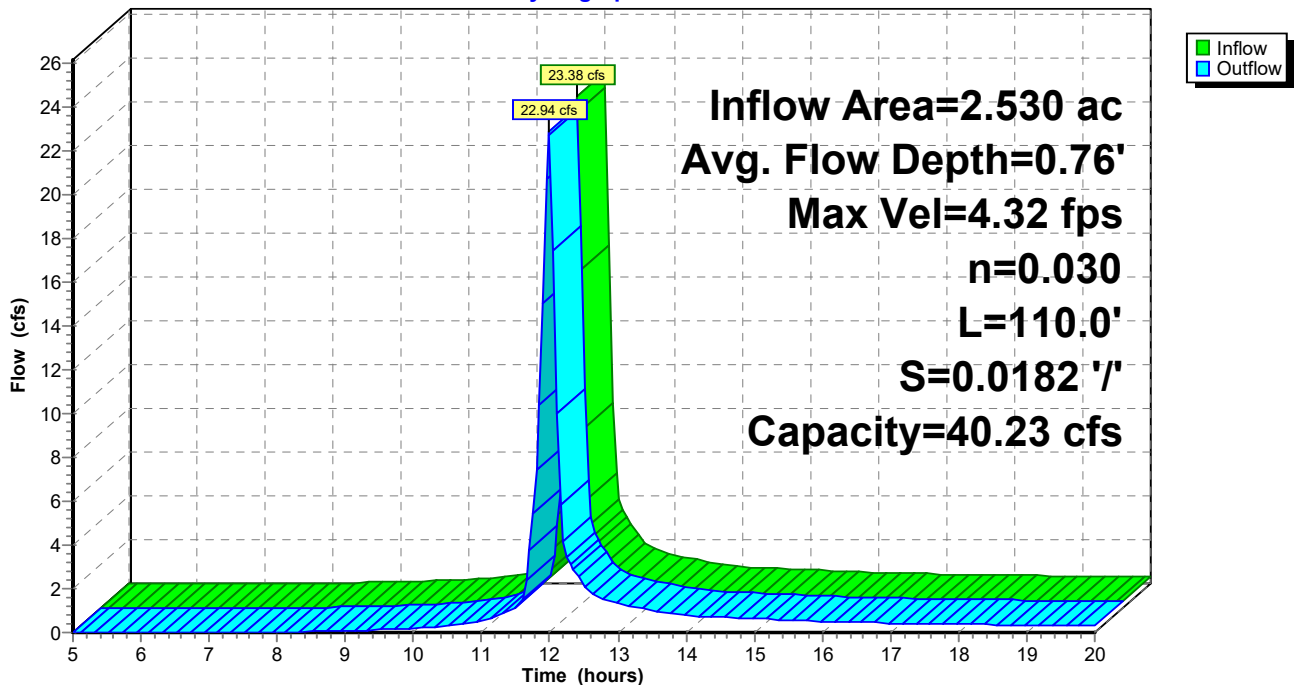
Peak Storage= 593 cf @ 11.98 hrs
Average Depth at Peak Storage= 0.76'
Bank-Full Depth= 1.00' Flow Area= 8.0 sf, Capacity= 40.23 cfs

4.00' x 1.00' deep channel, n= 0.030 Short grass
Side Slope Z-value= 4.0 '/' Top Width= 12.00'
Length= 110.0' Slope= 0.0182 '/'
Inlet Invert= 103.00', Outlet Invert= 101.00'



Reach 13R: Ditch 1

Hydrograph



Staging Area 2 Basin 1 HydroCAD Report

Type II 24-hr 100-YR - 24HR. Rainfall=9.84"

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Summary for Pond 3P: Rock Voids

Inflow Area = 2.530 ac, 0.00% Impervious, Inflow Depth > 5.02" for 100-YR - 24HR. event
 Inflow = 23.39 cfs @ 11.98 hrs, Volume= 1.058 af
 Outflow = 23.39 cfs @ 11.98 hrs, Volume= 1.058 af, Atten= 0%, Lag= 0.0 min
 Discarded = 0.01 cfs @ 11.98 hrs, Volume= 0.000 af
 Primary = 23.38 cfs @ 11.98 hrs, Volume= 1.058 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Peak Elev= 104.50' @ 11.98 hrs Surf.Area= 38,573 sf Storage= 18 cf

Plug-Flow detention time= 0.0 min calculated for 1.058 af (100% of inflow)
 Center-of-Mass det. time= 0.0 min (782.5 - 782.5)

Volume	Invert	Avail.Storage	Storage Description
#1	104.50'	7,715 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
104.50	38,573	0	0
104.70	38,573	7,715	7,715

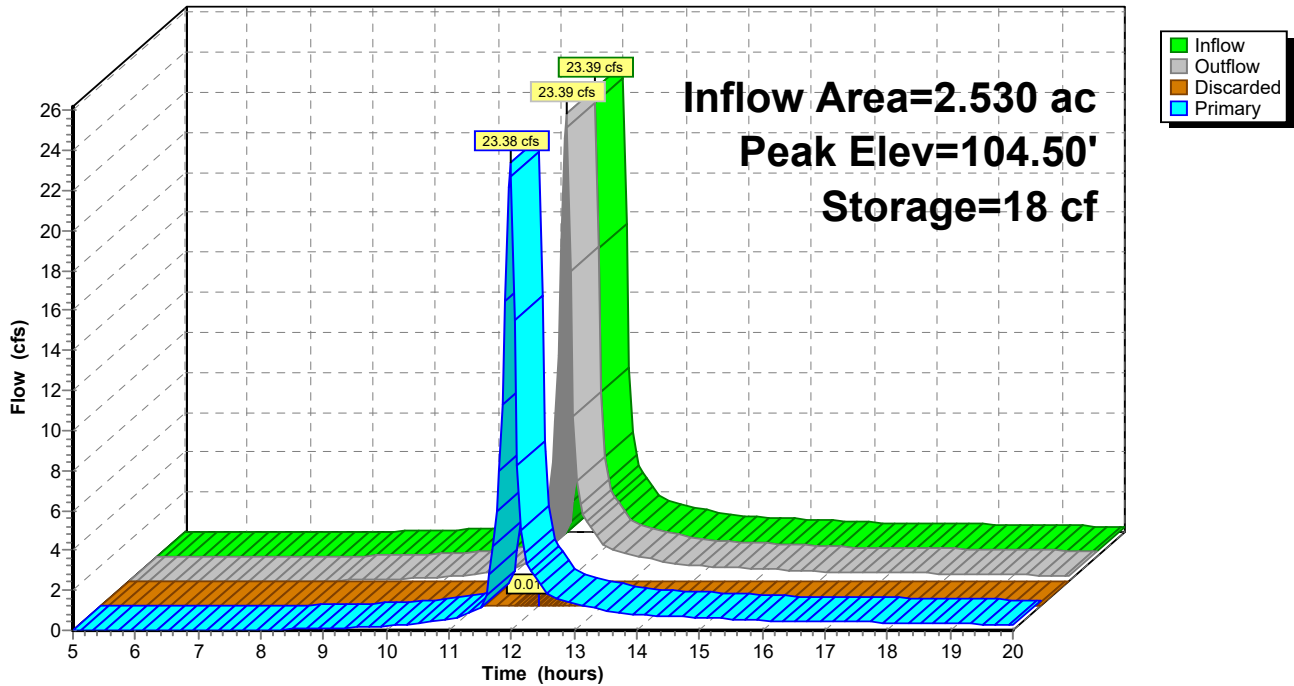
Device	Routing	Invert	Outlet Devices
#1	Primary	102.70'	16.0' long x 5.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88
#2	Discarded	104.50'	0.250 in/hr Exfiltration over Surface area Phase-In= 0.01'

Discarded OutFlow Max=0.01 cfs @ 11.98 hrs HW=104.50' (Free Discharge)
 ↑**2=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=102.43 cfs @ 11.98 hrs HW=104.50' (Free Discharge)
 ↑**1=Broad-Crested Rectangular Weir**(Weir Controls 102.43 cfs @ 3.56 fps)

Pond 3P: Rock Voids

Hydrograph



Staging Area 2 Basin 1 HydroCAD Report

Type II 24-hr 100-YR - 24HR. Rainfall=9.84"

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Summary for Pond 12P: Pond 1

Inflow Area = 2.530 ac, 0.00% Impervious, Inflow Depth > 5.01" for 100-YR - 24HR. event
 Inflow = 22.94 cfs @ 11.99 hrs, Volume= 1.057 af
 Outflow = 0.55 cfs @ 15.64 hrs, Volume= 0.209 af, Atten= 98%, Lag= 218.8 min
 Discarded = 0.08 cfs @ 15.64 hrs, Volume= 0.068 af
 Primary = 0.46 cfs @ 15.64 hrs, Volume= 0.141 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Peak Elev= 100.54' @ 15.64 hrs Surf.Area= 14,142 sf Storage= 37,182 cf

Plug-Flow detention time= 306.9 min calculated for 0.209 af (20% of inflow)
 Center-of-Mass det. time= 204.9 min (988.4 - 783.5)

Volume	Invert	Avail.Storage	Storage Description
#1	97.50'	59,205 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
97.50	10,365	0	0
98.00	10,965	5,333	5,333
99.00	12,190	11,578	16,910
100.00	13,448	12,819	29,729
101.00	14,732	14,090	43,819
102.00	16,040	15,386	59,205

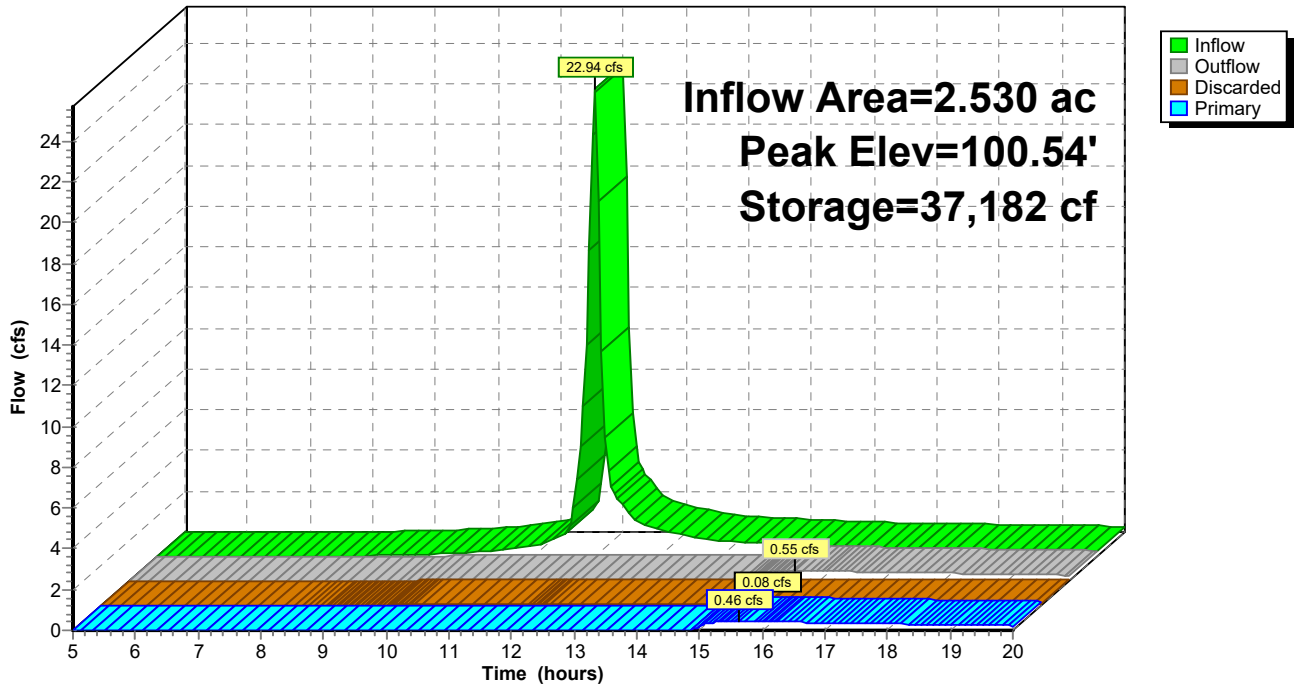
Device	Routing	Invert	Outlet Devices
#1	Discarded	97.50'	0.250 in/hr Exfiltration over Surface area
#2	Primary	100.50'	43.6 deg x 16.0' long x 1.50' rise Sharp-Crested Vee/Trap Weir Cv= 2.56 (C= 3.20)

Discarded OutFlow Max=0.08 cfs @ 15.64 hrs HW=100.54' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.08 cfs)

Primary OutFlow Max=0.41 cfs @ 15.64 hrs HW=100.54' (Free Discharge)
 ↑2=Sharp-Crested Vee/Trap Weir (Weir Controls 0.41 cfs @ 0.64 fps)

Pond 12P: Pond 1

Hydrograph



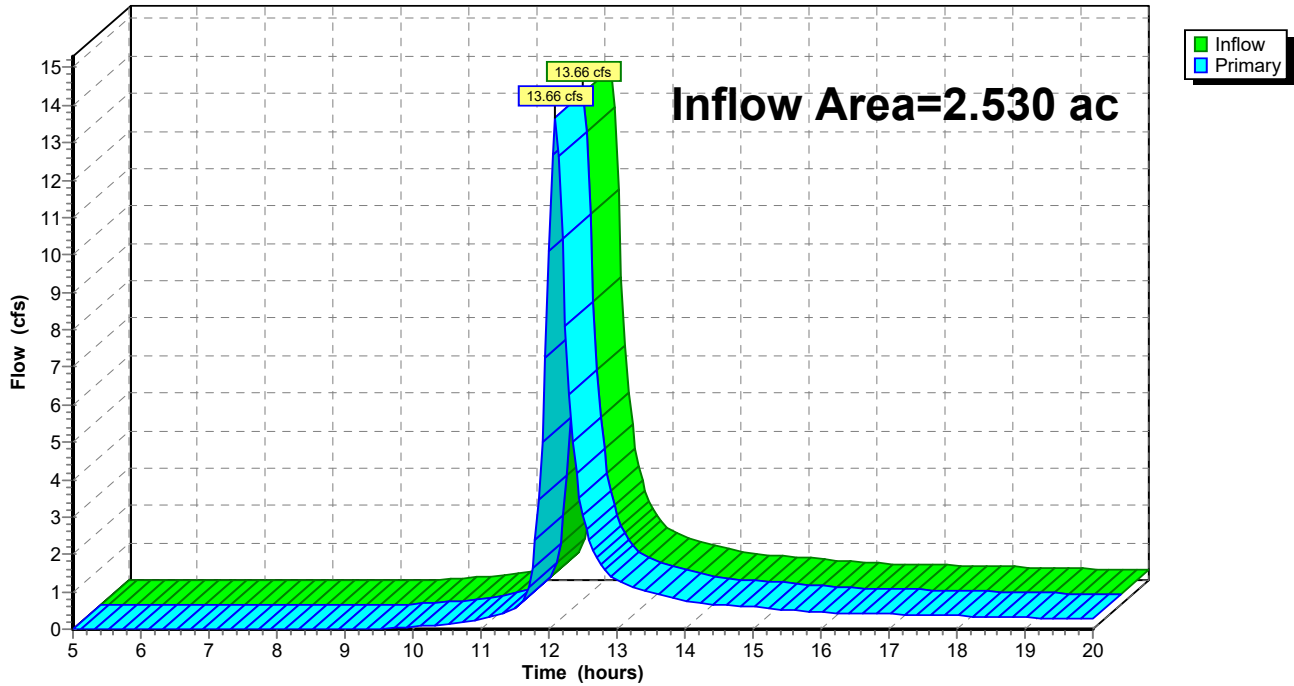
Summary for Link 2L: Outfall

Inflow Area = 2.530 ac, 0.00% Impervious, Inflow Depth > 4.11" for 100-YR - 24HR. event
Inflow = 13.66 cfs @ 12.10 hrs, Volume= 0.867 af
Primary = 13.66 cfs @ 12.10 hrs, Volume= 0.867 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link 2L: Outfall

Hydrograph



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

Subcatchment 1S: Pre Developed Runoff Area=2.530 ac 0.00% Impervious Runoff Depth=0.00"
Flow Length=245' Slope=0.0120 '/' Tc=17.1 min CN=58 Runoff=0.00 cfs 0.000 af

Subcatchment 4S: Post Developed Runoff Area=2.530 ac 0.00% Impervious Runoff Depth=0.00"
Flow Length=607' Slope=0.2470 '/' Tc=6.5 min CN=65 Runoff=0.00 cfs 0.000 af

Reach 13R: Ditch 1 Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af
n=0.030 L=110.0' S=0.0182 '/' Capacity=40.23 cfs Outflow=0.00 cfs 0.000 af

Pond 3P: Rock Voids Peak Elev=104.50' Storage=0 cf Inflow=0.00 cfs 0.000 af
Discarded=0.00 cfs 0.000 af Primary=0.00 cfs 0.000 af Outflow=0.00 cfs 0.000 af

Pond 12P: Pond 1 Peak Elev=97.50' Storage=0 cf Inflow=0.00 cfs 0.000 af
Discarded=0.00 cfs 0.000 af Primary=0.00 cfs 0.000 af Outflow=0.00 cfs 0.000 af

Link 2L: Outfall Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

Summary for Subcatchment 1S: Pre Developed

Runoff = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Depth= 0.00"

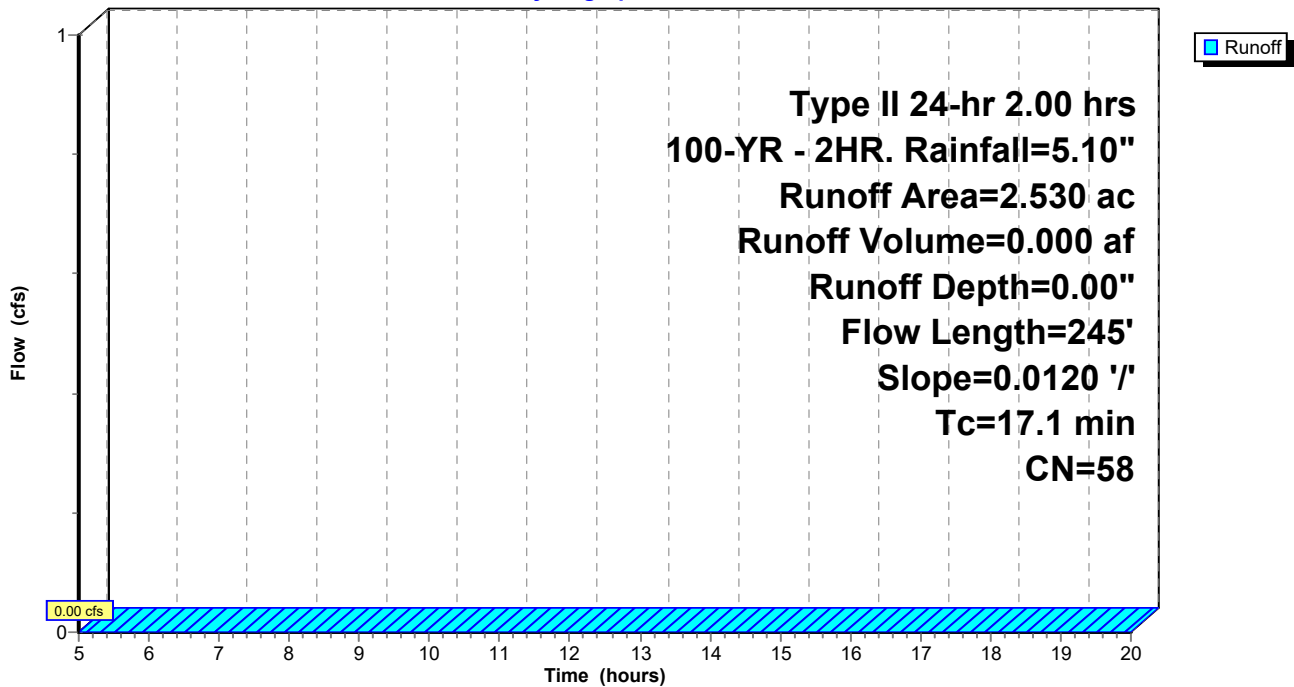
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Type II 24-hr 2.00 hrs 100-YR - 2HR. Rainfall=5.10"

Area (ac)	CN	Description
2.530	58	Meadow, non-grazed, HSG B
2.530		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.1	245	0.0120	0.24		Lag/CN Method,

Subcatchment 1S: Pre Developed

Hydrograph



Summary for Subcatchment 4S: Post Developed

Runoff = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Depth= 0.00"

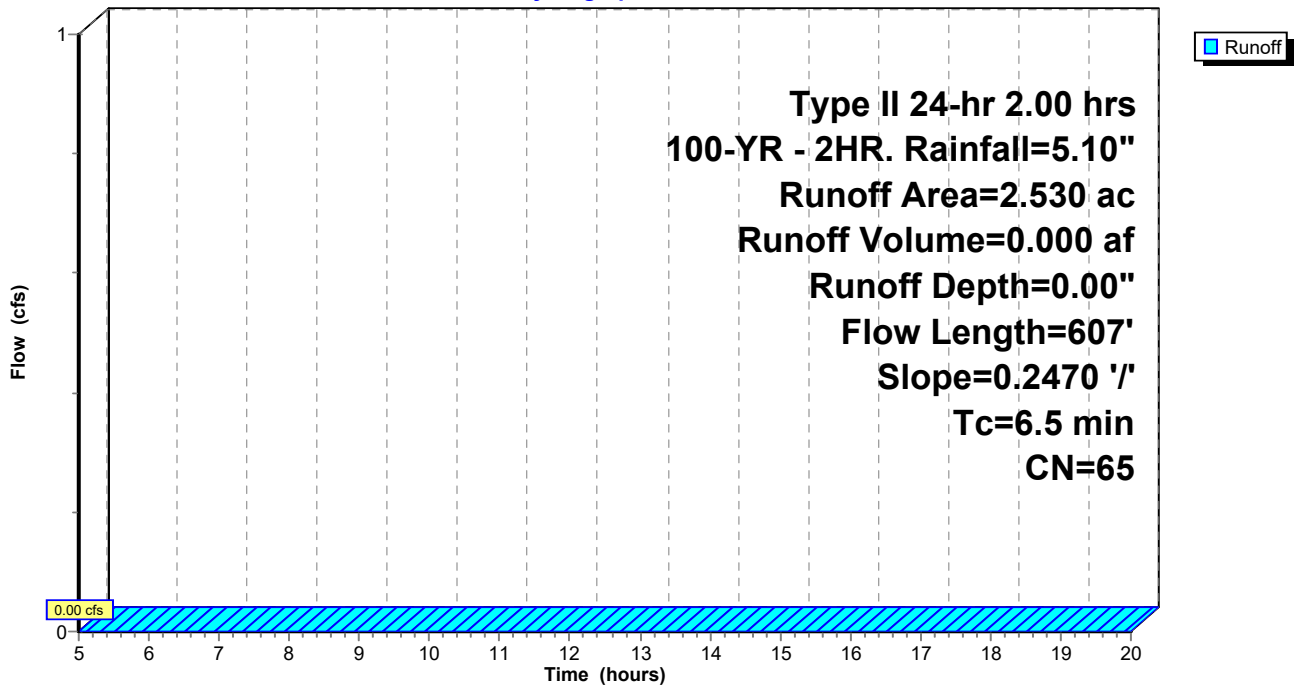
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Type II 24-hr 2.00 hrs 100-YR - 2HR. Rainfall=5.10"

Area (ac)	CN	Description
1.200	58	Meadow, non-grazed, HSG B
* 0.853	65	Uncompacted Gravel (35% Void)
0.477	85	Gravel roads, HSG B
2.530	65	Weighted Average
2.530		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.5	607	0.2470	1.55		Lag/CN Method,

Subcatchment 4S: Post Developed

Hydrograph



Summary for Reach 13R: Ditch 1

Inflow Area = 2.530 ac, 0.00% Impervious, Inflow Depth = 0.00" for 100-YR - 2HR. event
 Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
 Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Max. Velocity= 0.00 fps, Min. Travel Time= 0.0 min
 Avg. Velocity = 0.00 fps, Avg. Travel Time= 0.0 min

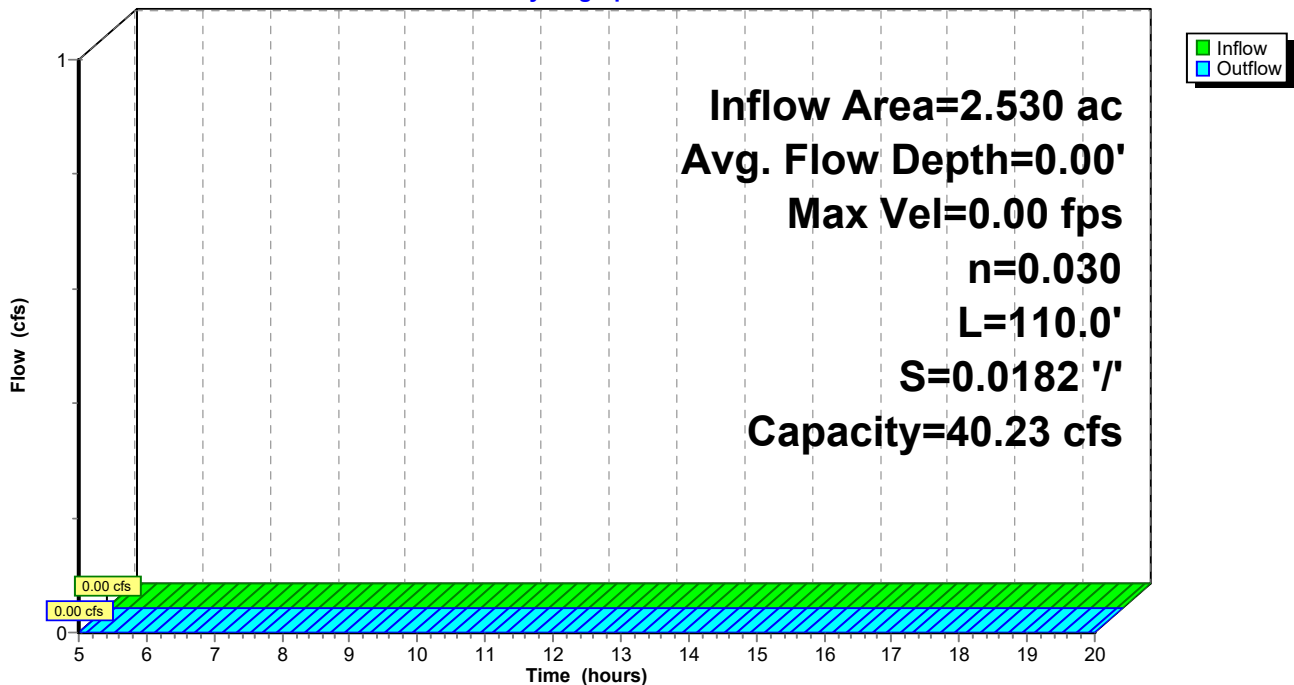
Peak Storage= 0 cf @ 5.00 hrs
 Average Depth at Peak Storage= 0.00'
 Bank-Full Depth= 1.00' Flow Area= 8.0 sf, Capacity= 40.23 cfs

4.00' x 1.00' deep channel, n= 0.030 Short grass
 Side Slope Z-value= 4.0 '/' Top Width= 12.00'
 Length= 110.0' Slope= 0.0182 '/'
 Inlet Invert= 103.00', Outlet Invert= 101.00'



Reach 13R: Ditch 1

Hydrograph



Summary for Pond 3P: Rock Voids

Inflow Area = 2.530 ac, 0.00% Impervious, Inflow Depth = 0.00" for 100-YR - 2HR. event
 Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
 Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min
 Discarded = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
 Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Peak Elev= 104.50' @ 5.00 hrs Surf.Area= 38,573 sf Storage= 0 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
 Center-of-Mass det. time= (not calculated: no inflow)

Volume	Invert	Avail.Storage	Storage Description
#1	104.50'	7,715 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
104.50	38,573	0	0
104.70	38,573	7,715	7,715

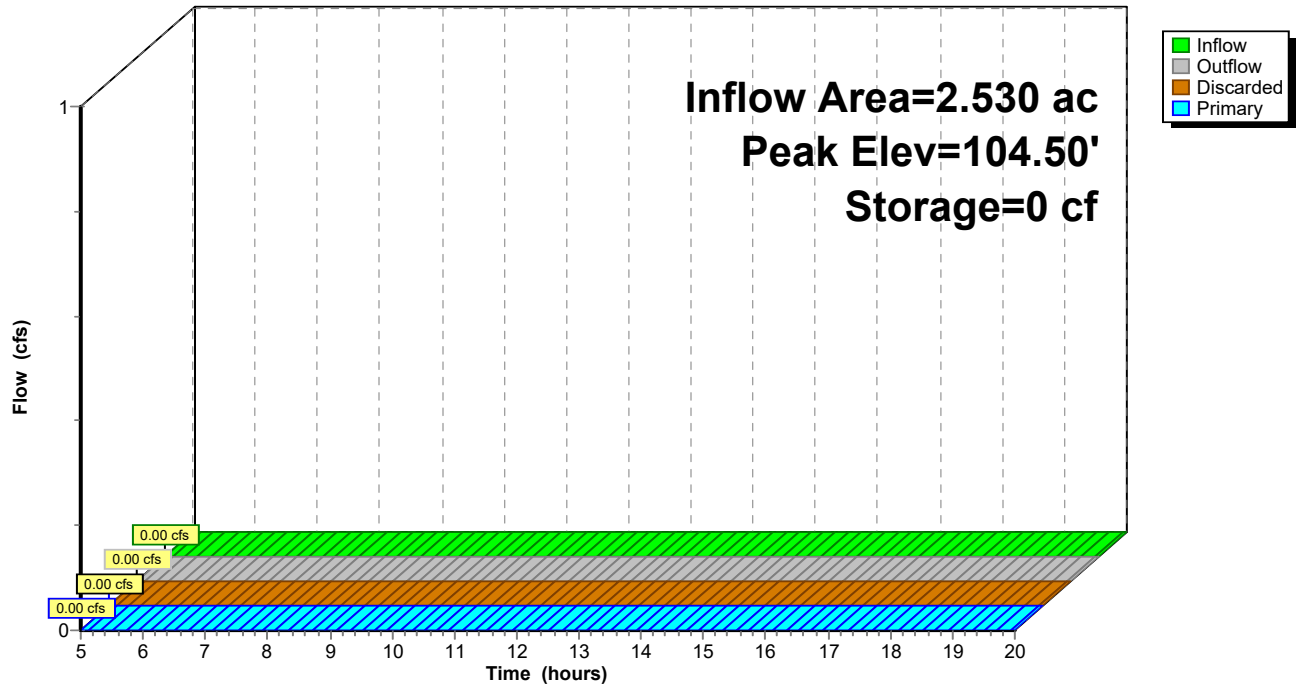
Device	Routing	Invert	Outlet Devices
#1	Primary	102.70'	16.0' long x 5.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88
#2	Discarded	104.50'	0.250 in/hr Exfiltration over Surface area Phase-In= 0.01'

Discarded OutFlow Max=0.00 cfs @ 5.00 hrs HW=104.50' (Free Discharge)
 ↑**2=Exfiltration** (Controls 0.00 cfs)

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=104.50' (Free Discharge)
 ↑**1=Broad-Crested Rectangular Weir**(Passes 0.00 cfs of 102.39 cfs potential flow)

Pond 3P: Rock Voids

Hydrograph



Summary for Pond 12P: Pond 1

Inflow Area = 2.530 ac, 0.00% Impervious, Inflow Depth = 0.00" for 100-YR - 2HR. event
 Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
 Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min
 Discarded = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
 Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Peak Elev= 97.50' @ 5.00 hrs Surf.Area= 10,365 sf Storage= 0 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
 Center-of-Mass det. time= (not calculated: no inflow)

Volume	Invert	Avail.Storage	Storage Description
#1	97.50'	59,205 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
97.50	10,365	0	0
98.00	10,965	5,333	5,333
99.00	12,190	11,578	16,910
100.00	13,448	12,819	29,729
101.00	14,732	14,090	43,819
102.00	16,040	15,386	59,205

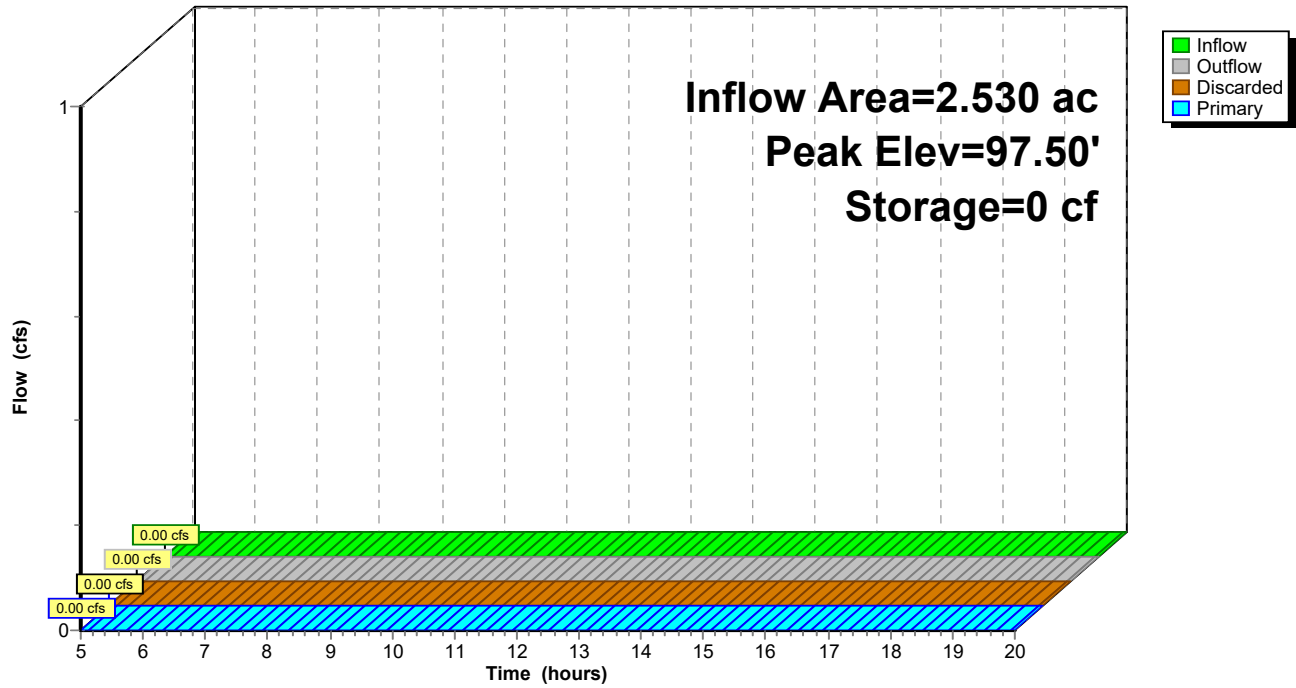
Device	Routing	Invert	Outlet Devices
#1	Discarded	97.50'	0.250 in/hr Exfiltration over Surface area
#2	Primary	100.50'	43.6 deg x 16.0' long x 1.50' rise Sharp-Crested Vee/Trap Weir Cv= 2.56 (C= 3.20)

Discarded OutFlow Max=0.00 cfs @ 5.00 hrs HW=97.50' (Free Discharge)
 ↑1=Exfiltration (Passes 0.00 cfs of 0.06 cfs potential flow)

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=97.50' (Free Discharge)
 ↑2=Sharp-Crested Vee/Trap Weir (Controls 0.00 cfs)

Pond 12P: Pond 1

Hydrograph



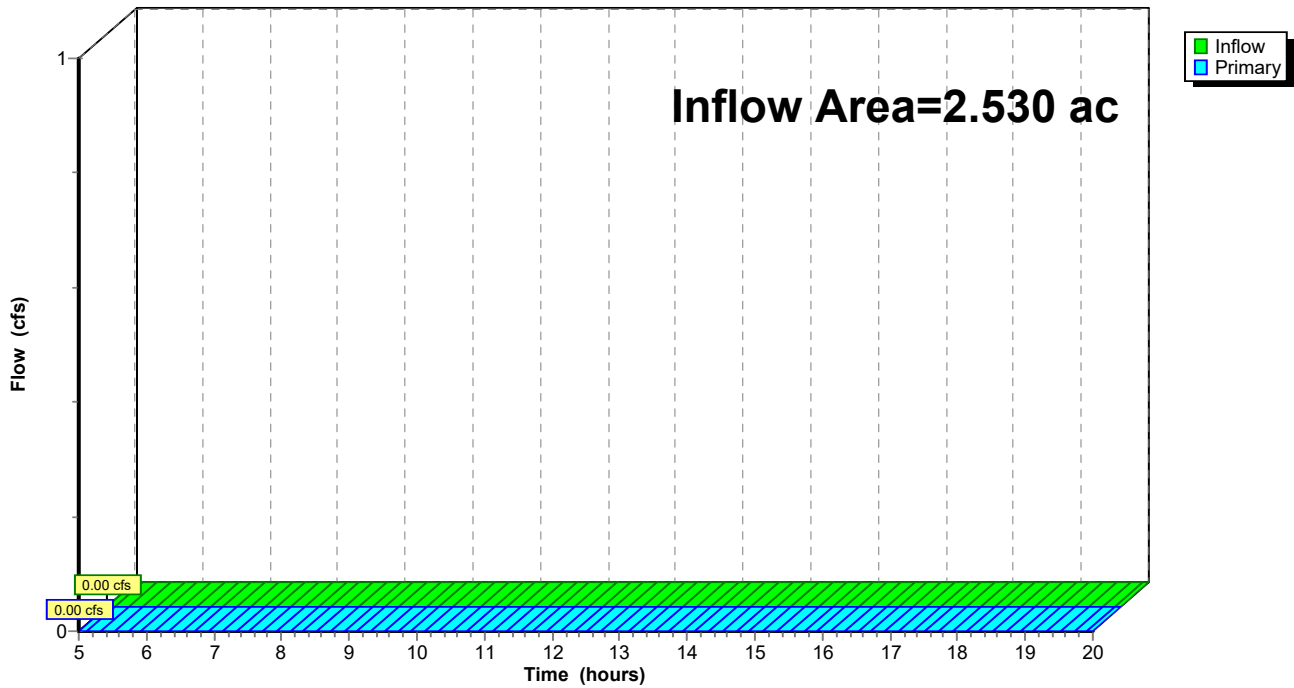
Summary for Link 2L: Outfall

Inflow Area = 2.530 ac, 0.00% Impervious, Inflow Depth = 0.00" for 100-YR - 2HR. event
Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link 2L: Outfall

Hydrograph



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

Subcatchment 1S: Pre Developed Runoff Area=2.530 ac 0.00% Impervious Runoff Depth>0.00"
Flow Length=245' Slope=0.0120 '/' Tc=17.1 min CN=58 Runoff=0.00 cfs 0.000 af

Subcatchment 4S: Post Developed Runoff Area=2.530 ac 0.00% Impervious Runoff Depth=0.00"
Flow Length=607' Slope=0.2470 '/' Tc=6.5 min CN=65 Runoff=0.00 cfs 0.000 af

Reach 13R: Ditch 1 Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af
n=0.030 L=110.0' S=0.0182 '/' Capacity=40.23 cfs Outflow=0.00 cfs 0.000 af

Pond 3P: Rock Voids Peak Elev=104.50' Storage=0 cf Inflow=0.00 cfs 0.000 af
Discarded=0.00 cfs 0.000 af Primary=0.00 cfs 0.000 af Outflow=0.00 cfs 0.000 af

Pond 12P: Pond 1 Peak Elev=97.50' Storage=0 cf Inflow=0.00 cfs 0.000 af
Discarded=0.00 cfs 0.000 af Primary=0.00 cfs 0.000 af Outflow=0.00 cfs 0.000 af

Link 2L: Outfall Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

Summary for Subcatchment 1S: Pre Developed

Runoff = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Depth> 0.00"

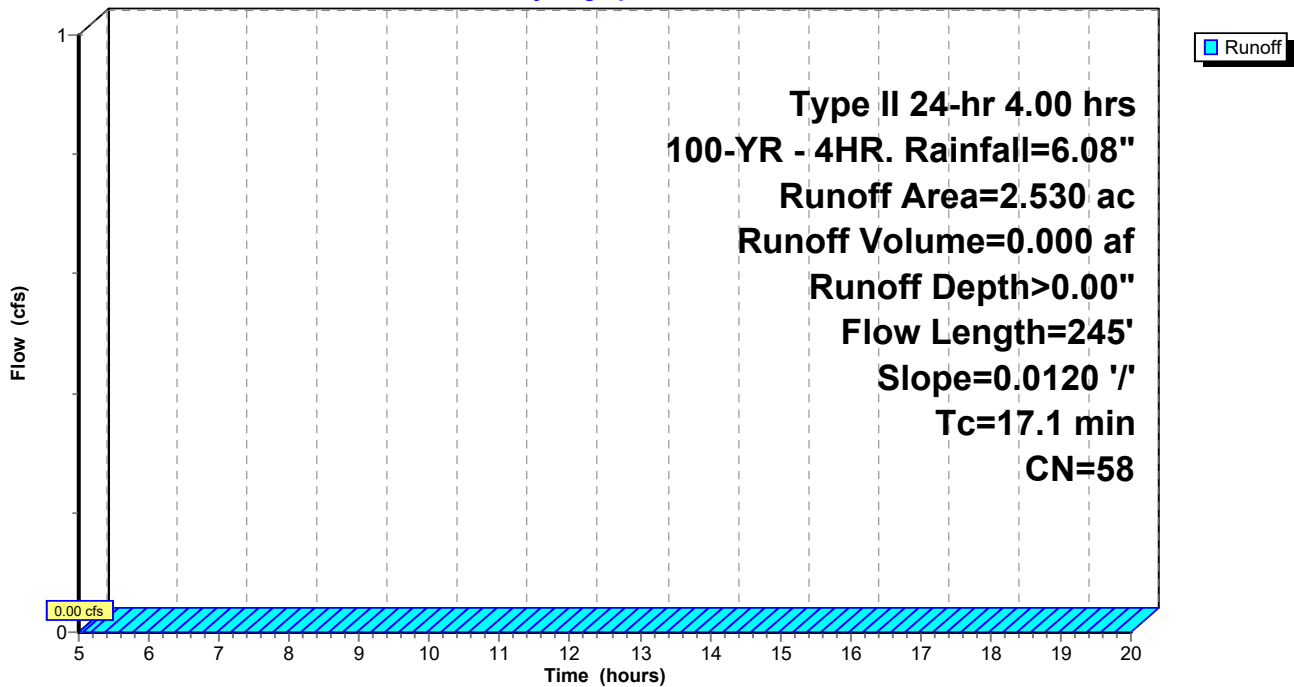
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Type II 24-hr 4.00 hrs 100-YR - 4HR. Rainfall=6.08"

Area (ac)	CN	Description
2.530	58	Meadow, non-grazed, HSG B
2.530		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.1	245	0.0120	0.24		Lag/CN Method,

Subcatchment 1S: Pre Developed

Hydrograph



Summary for Subcatchment 4S: Post Developed

Runoff = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Depth= 0.00"

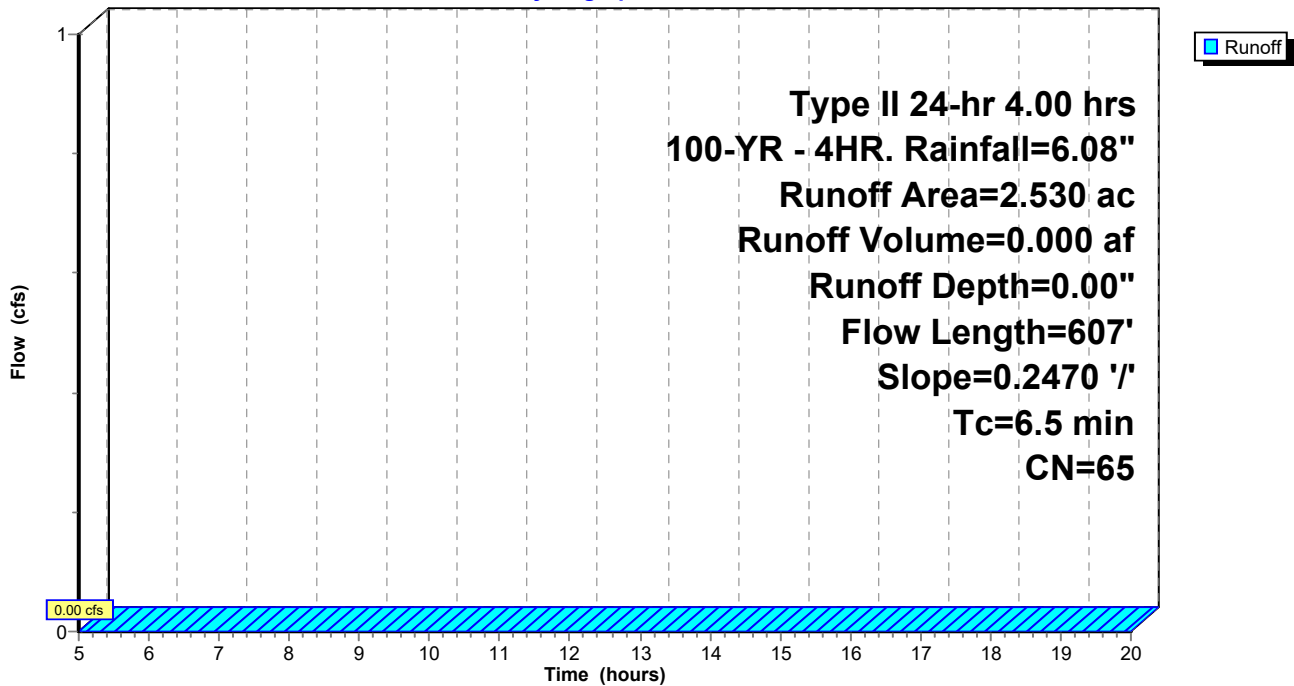
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Type II 24-hr 4.00 hrs 100-YR - 4HR. Rainfall=6.08"

Area (ac)	CN	Description
1.200	58	Meadow, non-grazed, HSG B
* 0.853	65	Uncompacted Gravel (35% Void)
0.477	85	Gravel roads, HSG B
2.530	65	Weighted Average
2.530		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.5	607	0.2470	1.55		Lag/CN Method,

Subcatchment 4S: Post Developed

Hydrograph



Summary for Reach 13R: Ditch 1

Inflow Area = 2.530 ac, 0.00% Impervious, Inflow Depth = 0.00" for 100-YR - 4HR. event
 Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
 Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Max. Velocity= 0.00 fps, Min. Travel Time= 0.0 min
 Avg. Velocity = 0.00 fps, Avg. Travel Time= 0.0 min

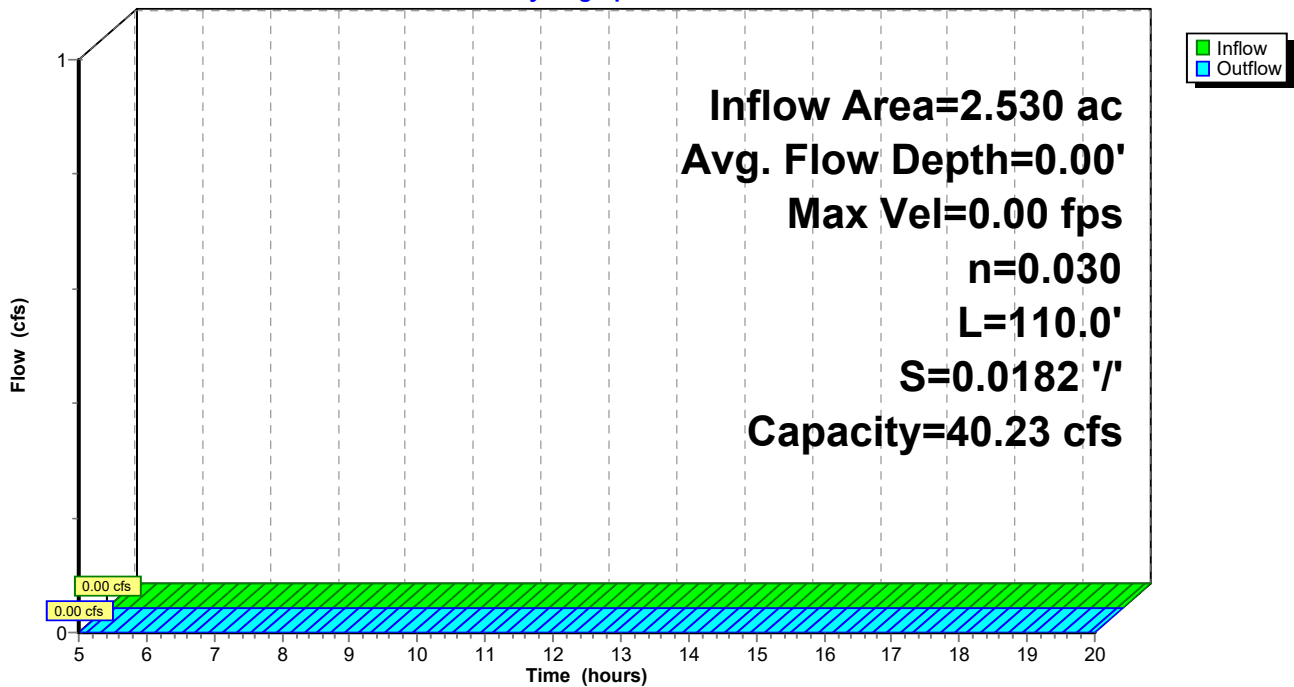
Peak Storage= 0 cf @ 5.00 hrs
 Average Depth at Peak Storage= 0.00'
 Bank-Full Depth= 1.00' Flow Area= 8.0 sf, Capacity= 40.23 cfs

4.00' x 1.00' deep channel, n= 0.030 Short grass
 Side Slope Z-value= 4.0 '/' Top Width= 12.00'
 Length= 110.0' Slope= 0.0182 '/'
 Inlet Invert= 103.00', Outlet Invert= 101.00'



Reach 13R: Ditch 1

Hydrograph



Summary for Pond 3P: Rock Voids

Inflow Area = 2.530 ac, 0.00% Impervious, Inflow Depth = 0.00" for 100-YR - 4HR. event
 Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
 Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min
 Discarded = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
 Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Peak Elev= 104.50' @ 5.00 hrs Surf.Area= 38,573 sf Storage= 0 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
 Center-of-Mass det. time= (not calculated: no inflow)

Volume	Invert	Avail.Storage	Storage Description
#1	104.50'	7,715 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
104.50	38,573	0	0
104.70	38,573	7,715	7,715

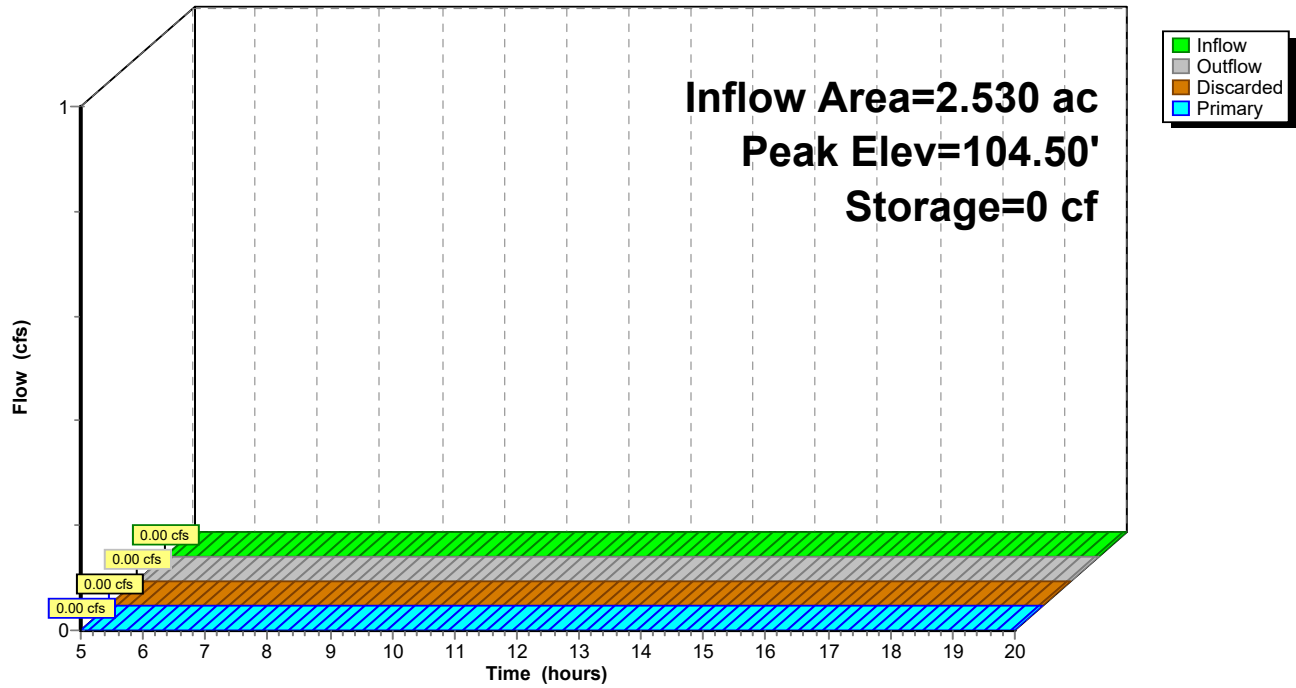
Device	Routing	Invert	Outlet Devices
#1	Primary	102.70'	16.0' long x 5.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88
#2	Discarded	104.50'	0.250 in/hr Exfiltration over Surface area Phase-In= 0.01'

Discarded OutFlow Max=0.00 cfs @ 5.00 hrs HW=104.50' (Free Discharge)
 ↑**2=Exfiltration** (Controls 0.00 cfs)

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=104.50' (Free Discharge)
 ↑**1=Broad-Crested Rectangular Weir**(Passes 0.00 cfs of 102.39 cfs potential flow)

Pond 3P: Rock Voids

Hydrograph



Summary for Pond 12P: Pond 1

Inflow Area = 2.530 ac, 0.00% Impervious, Inflow Depth = 0.00" for 100-YR - 4HR. event
 Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
 Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min
 Discarded = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
 Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Peak Elev= 97.50' @ 5.00 hrs Surf.Area= 10,365 sf Storage= 0 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
 Center-of-Mass det. time= (not calculated: no inflow)

Volume	Invert	Avail.Storage	Storage Description
#1	97.50'	59,205 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
97.50	10,365	0	0
98.00	10,965	5,333	5,333
99.00	12,190	11,578	16,910
100.00	13,448	12,819	29,729
101.00	14,732	14,090	43,819
102.00	16,040	15,386	59,205

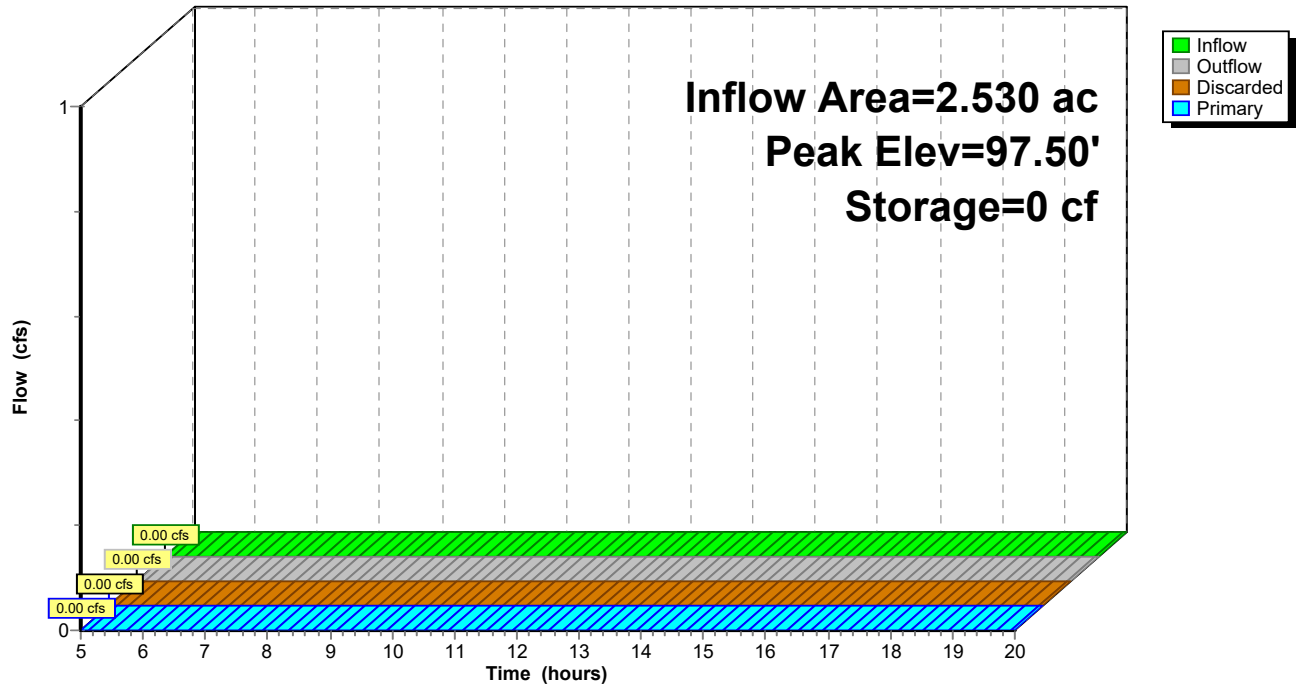
Device	Routing	Invert	Outlet Devices
#1	Discarded	97.50'	0.250 in/hr Exfiltration over Surface area
#2	Primary	100.50'	43.6 deg x 16.0' long x 1.50' rise Sharp-Crested Vee/Trap Weir Cv= 2.56 (C= 3.20)

Discarded OutFlow Max=0.00 cfs @ 5.00 hrs HW=97.50' (Free Discharge)
 ↑1=Exfiltration (Passes 0.00 cfs of 0.06 cfs potential flow)

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=97.50' (Free Discharge)
 ↑2=Sharp-Crested Vee/Trap Weir (Controls 0.00 cfs)

Pond 12P: Pond 1

Hydrograph



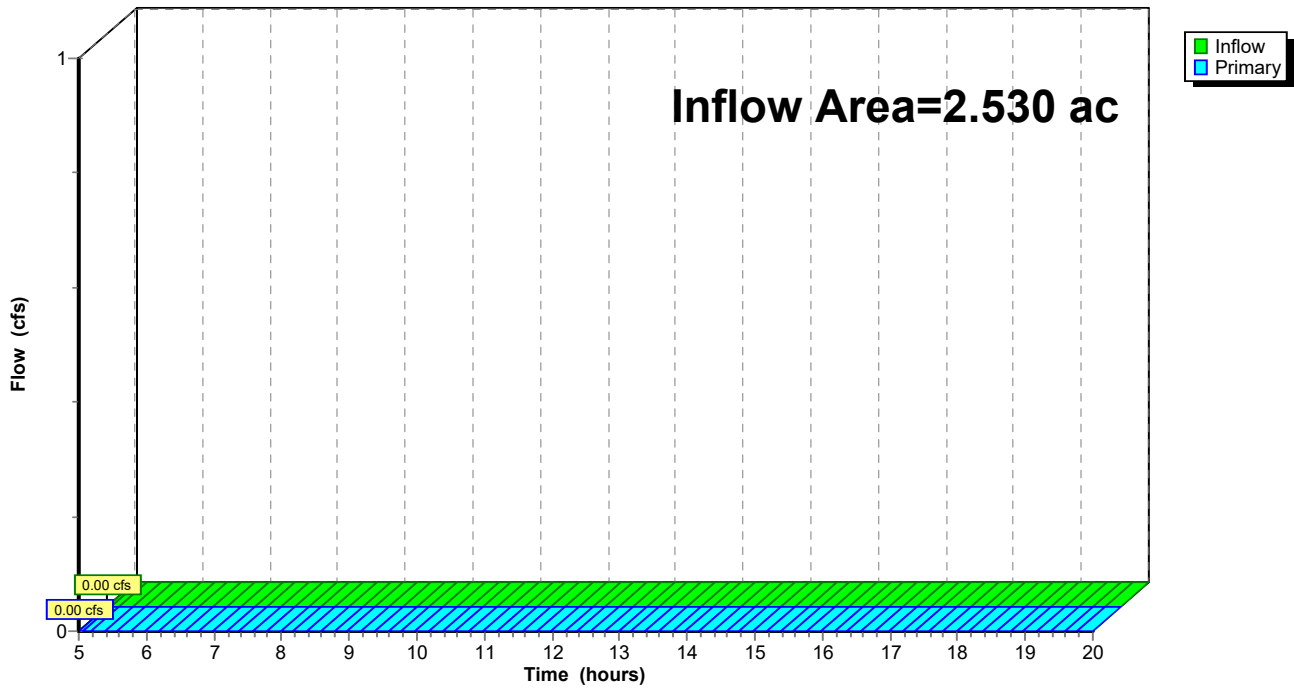
Summary for Link 2L: Outfall

Inflow Area = 2.530 ac, 0.00% Impervious, Inflow Depth > 0.00" for 100-YR - 4HR. event
Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link 2L: Outfall

Hydrograph



Staging Area 2 Basin 1 HydroCAD Report Type II 24-hr 8.00 hrs 100-YR - 8HR. Rainfall=7.36"

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

Subcatchment 1S: Pre Developed Runoff Area=2.530 ac 0.00% Impervious Runoff Depth>0.86"
Flow Length=245' Slope=0.0120 '/' Tc=17.1 min CN=58 Runoff=1.30 cfs 0.181 af

Subcatchment 4S: Post Developed Runoff Area=2.530 ac 0.00% Impervious Runoff Depth>0.89"
Flow Length=607' Slope=0.2470 '/' Tc=6.5 min CN=65 Runoff=1.33 cfs 0.188 af

Reach 13R: Ditch 1 Avg. Flow Depth=0.18' Max Vel=1.91 fps Inflow=1.32 cfs 0.188 af
n=0.030 L=110.0' S=0.0182 '/' Capacity=40.23 cfs Outflow=1.30 cfs 0.185 af

Pond 3P: Rock Voids Peak Elev=104.50' Storage=1 cf Inflow=1.33 cfs 0.188 af
Discarded=0.00 cfs 0.000 af Primary=1.32 cfs 0.188 af Outflow=1.32 cfs 0.188 af

Pond 12P: Pond 1 Peak Elev=98.18' Storage=7,324 cf Inflow=1.30 cfs 0.185 af
Discarded=0.06 cfs 0.079 af Primary=0.00 cfs 0.000 af Outflow=0.06 cfs 0.079 af

Link 2L: Outfall Inflow=1.30 cfs 0.181 af
Primary=1.30 cfs 0.181 af

Summary for Subcatchment 1S: Pre Developed

Runoff = 1.30 cfs @ 5.00 hrs, Volume= 0.181 af, Depth> 0.86"

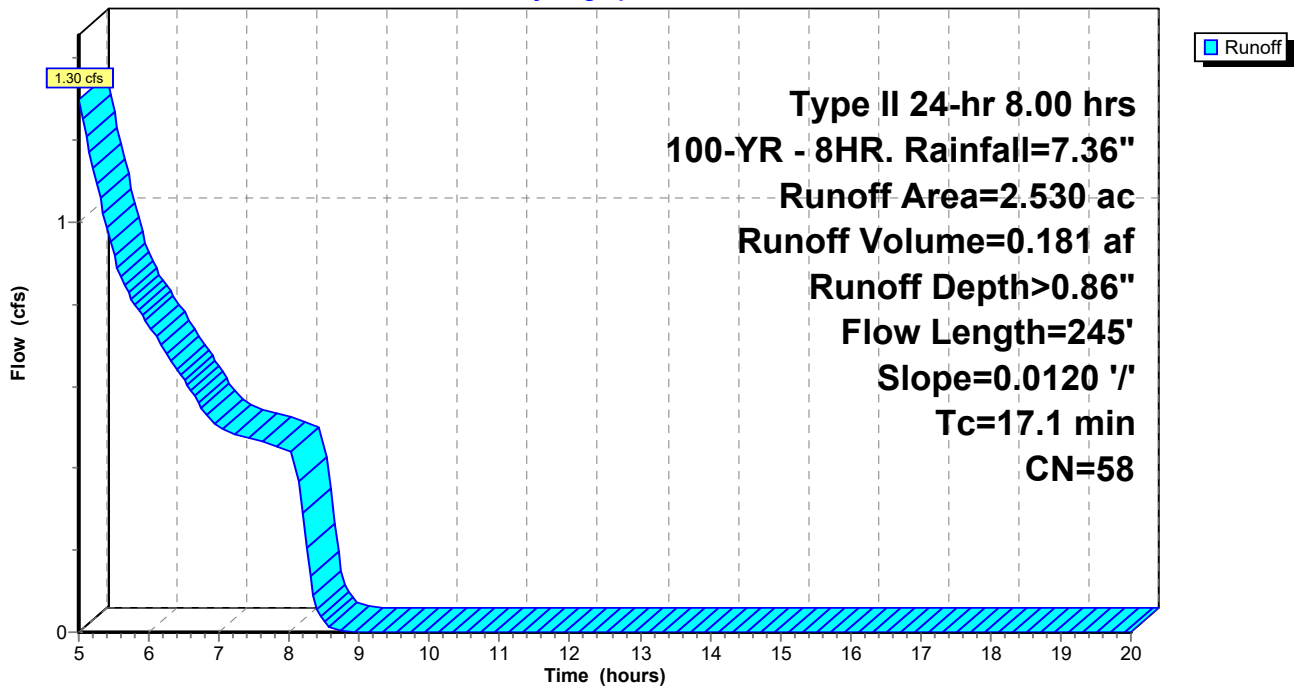
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Type II 24-hr 8.00 hrs 100-YR - 8HR. Rainfall=7.36"

Area (ac)	CN	Description
2.530	58	Meadow, non-grazed, HSG B
2.530		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.1	245	0.0120	0.24		Lag/CN Method,

Subcatchment 1S: Pre Developed

Hydrograph



Summary for Subcatchment 4S: Post Developed

Runoff = 1.33 cfs @ 5.00 hrs, Volume= 0.188 af, Depth> 0.89"

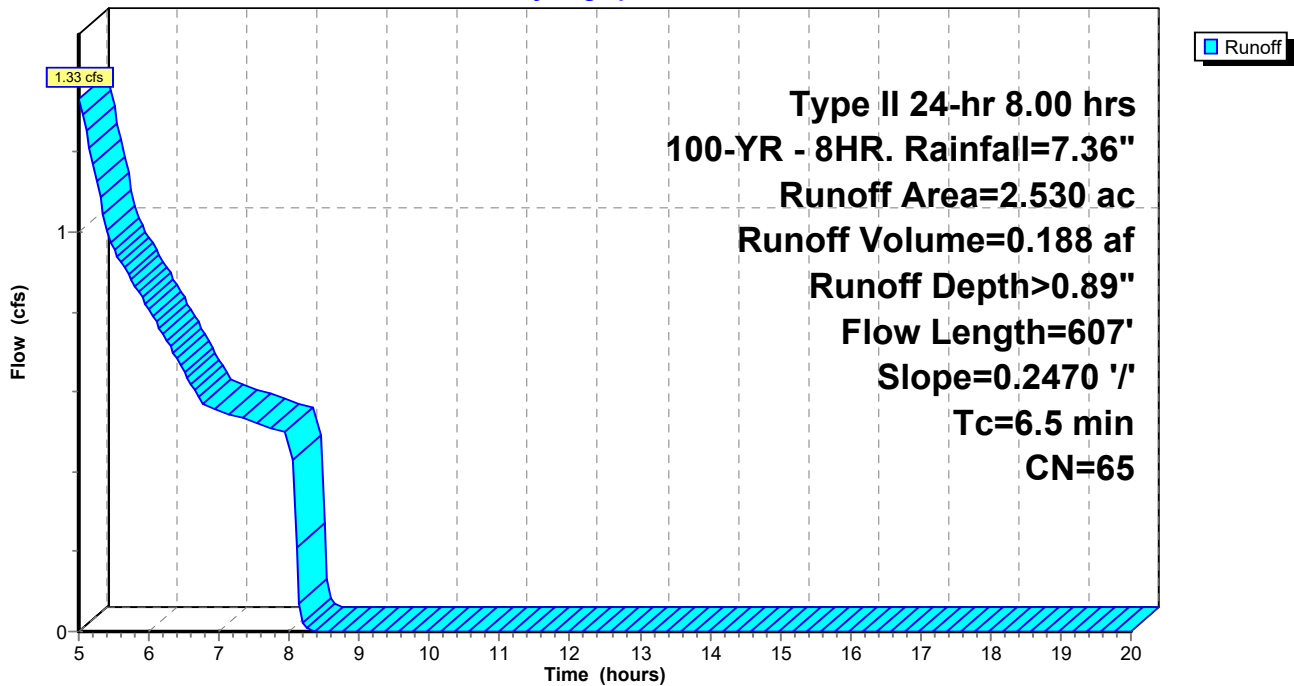
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Type II 24-hr 8.00 hrs 100-YR - 8HR. Rainfall=7.36"

Area (ac)	CN	Description
1.200	58	Meadow, non-grazed, HSG B
* 0.853	65	Uncompacted Gravel (35% Void)
0.477	85	Gravel roads, HSG B
2.530	65	Weighted Average
2.530		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.5	607	0.2470	1.55		Lag/CN Method,

Subcatchment 4S: Post Developed

Hydrograph



Summary for Reach 13R: Ditch 1

Inflow Area = 2.530 ac, 0.00% Impervious, Inflow Depth > 0.89" for 100-YR - 8HR. event
 Inflow = 1.32 cfs @ 5.00 hrs, Volume= 0.188 af
 Outflow = 1.30 cfs @ 5.11 hrs, Volume= 0.185 af, Atten= 2%, Lag= 6.8 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Max. Velocity= 1.91 fps, Min. Travel Time= 1.0 min
 Avg. Velocity = 1.22 fps, Avg. Travel Time= 1.5 min

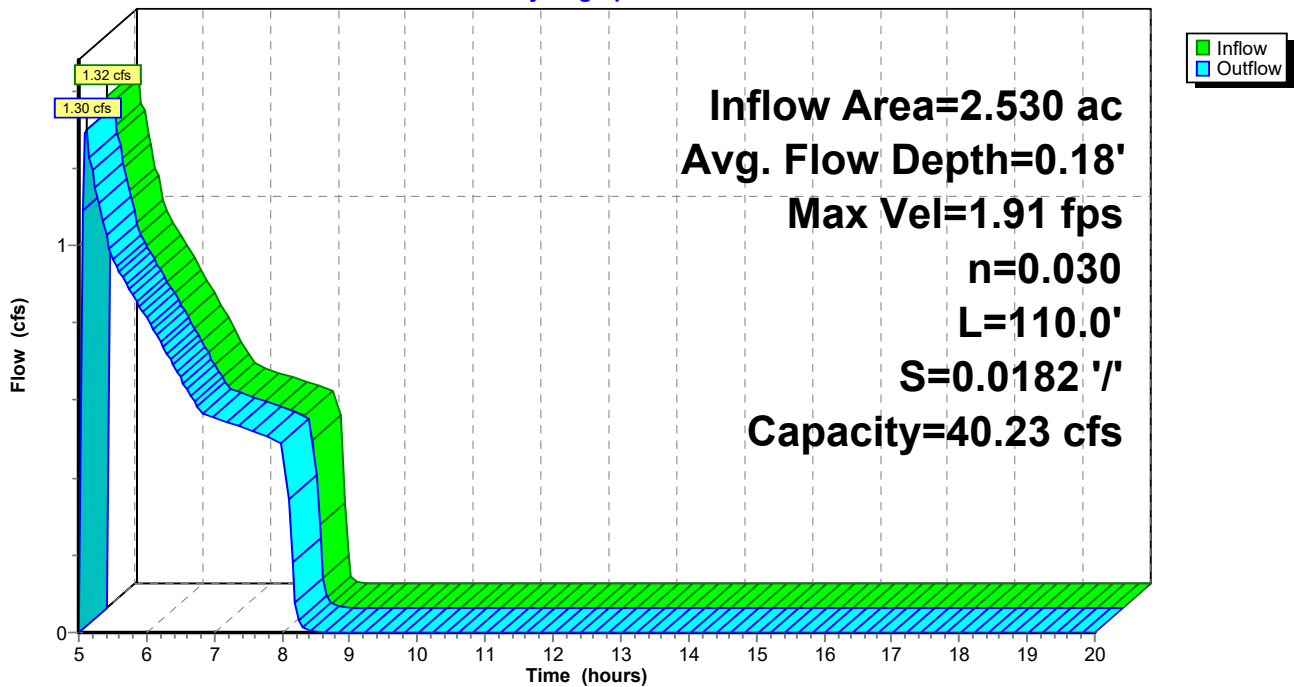
Peak Storage= 92 cf @ 5.05 hrs
 Average Depth at Peak Storage= 0.18'
 Bank-Full Depth= 1.00' Flow Area= 8.0 sf, Capacity= 40.23 cfs

4.00' x 1.00' deep channel, n= 0.030 Short grass
 Side Slope Z-value= 4.0 '/' Top Width= 12.00'
 Length= 110.0' Slope= 0.0182 '/'
 Inlet Invert= 103.00', Outlet Invert= 101.00'



Reach 13R: Ditch 1

Hydrograph



Summary for Pond 3P: Rock Voids

Inflow Area = 2.530 ac, 0.00% Impervious, Inflow Depth > 0.89" for 100-YR - 8HR. event
 Inflow = 1.33 cfs @ 5.00 hrs, Volume= 0.188 af
 Outflow = 1.32 cfs @ 5.00 hrs, Volume= 0.188 af, Atten= 1%, Lag= 0.0 min
 Discarded = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
 Primary = 1.32 cfs @ 5.00 hrs, Volume= 0.188 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Peak Elev= 104.50' @ 5.00 hrs Surf.Area= 38,573 sf Storage= 1 cf

Plug-Flow detention time= 0.0 min calculated for 0.187 af (100% of inflow)
 Center-of-Mass det. time= 0.0 min (376.1 - 376.1)

Volume	Invert	Avail.Storage	Storage Description
#1	104.50'	7,715 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
104.50	38,573	0	0
104.70	38,573	7,715	7,715

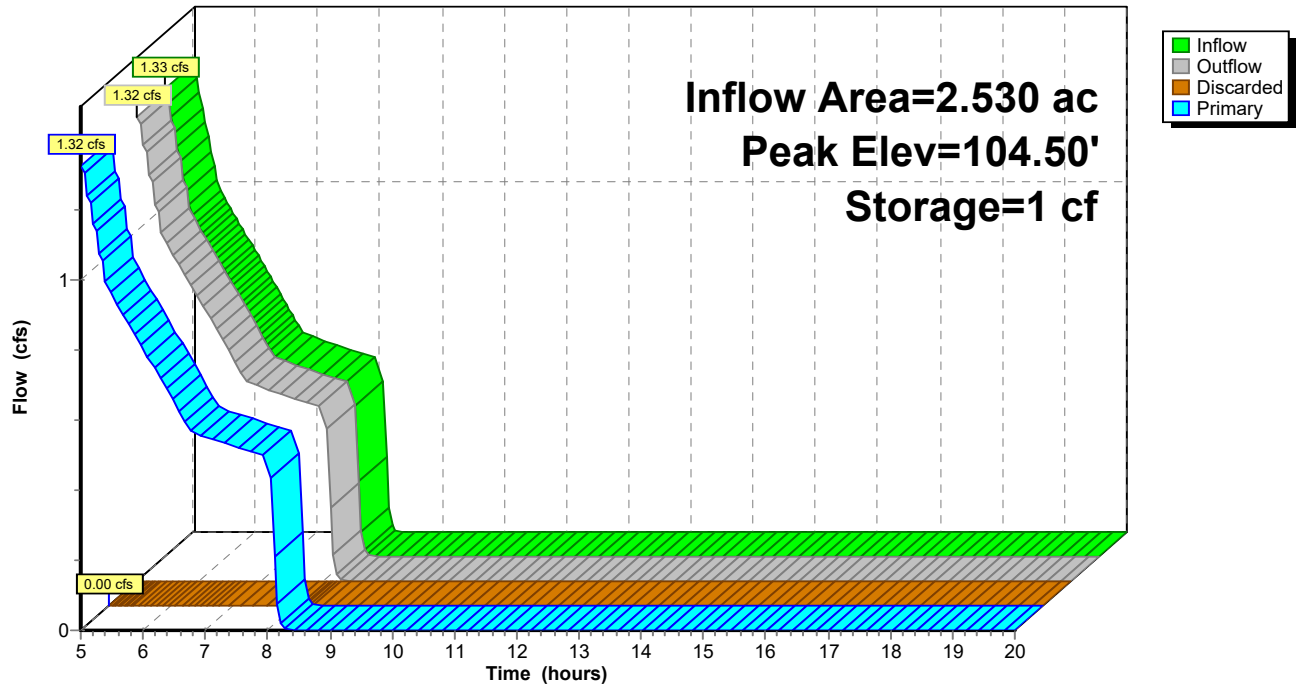
Device	Routing	Invert	Outlet Devices
#1	Primary	102.70'	16.0' long x 5.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88
#2	Discarded	104.50'	0.250 in/hr Exfiltration over Surface area Phase-In= 0.01'

Discarded OutFlow Max=0.00 cfs @ 5.00 hrs HW=104.50' (Free Discharge)
 ↑**2=Exfiltration** (Exfiltration Controls 0.00 cfs)

Primary OutFlow Max=102.40 cfs @ 5.00 hrs HW=104.50' (Free Discharge)
 ↑**1=Broad-Crested Rectangular Weir**(Weir Controls 102.40 cfs @ 3.56 fps)

Pond 3P: Rock Voids

Hydrograph



Summary for Pond 12P: Pond 1

Inflow Area = 2.530 ac, 0.00% Impervious, Inflow Depth > 0.88" for 100-YR - 8HR. event
 Inflow = 1.30 cfs @ 5.11 hrs, Volume= 0.185 af
 Outflow = 0.06 cfs @ 8.22 hrs, Volume= 0.079 af, Atten= 95%, Lag= 186.3 min
 Discarded = 0.06 cfs @ 8.22 hrs, Volume= 0.079 af
 Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Peak Elev= 98.18' @ 8.22 hrs Surf.Area= 11,185 sf Storage= 7,324 cf

Plug-Flow detention time= 425.5 min calculated for 0.079 af (43% of inflow)
 Center-of-Mass det. time= 373.8 min (753.3 - 379.5)

Volume	Invert	Avail.Storage	Storage Description
#1	97.50'	59,205 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
97.50	10,365	0	0
98.00	10,965	5,333	5,333
99.00	12,190	11,578	16,910
100.00	13,448	12,819	29,729
101.00	14,732	14,090	43,819
102.00	16,040	15,386	59,205

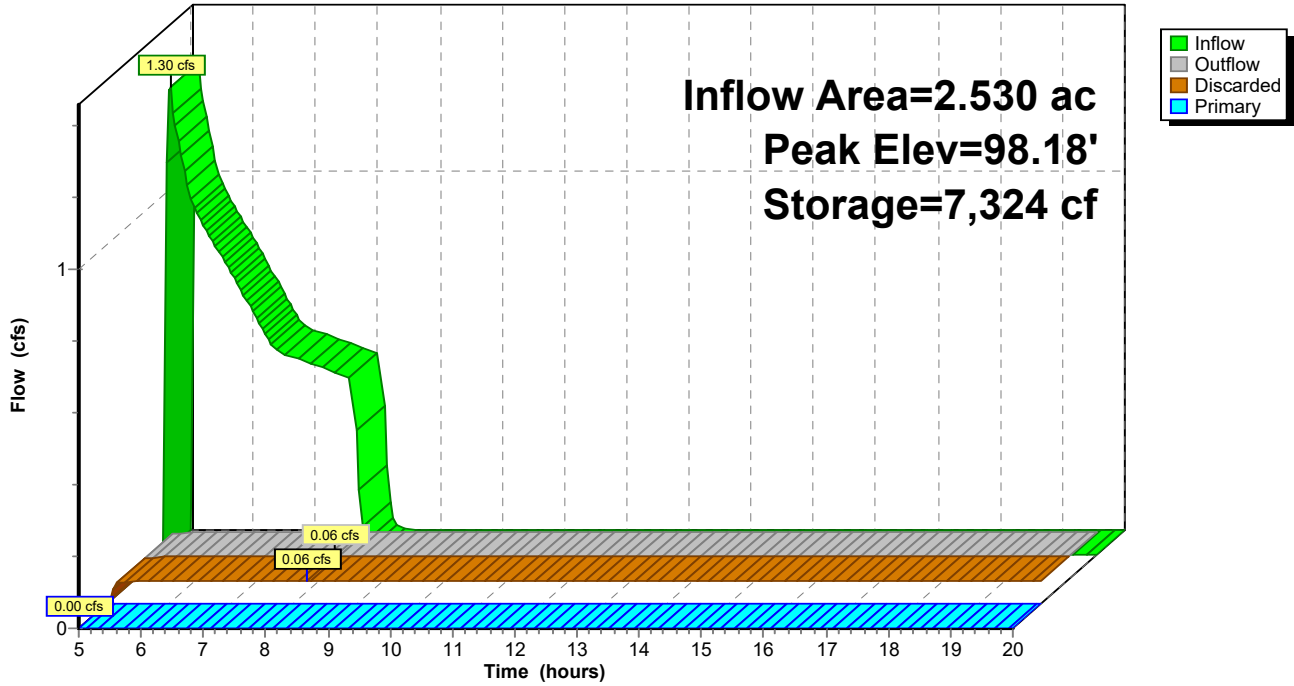
Device	Routing	Invert	Outlet Devices
#1	Discarded	97.50'	0.250 in/hr Exfiltration over Surface area
#2	Primary	100.50'	43.6 deg x 16.0' long x 1.50' rise Sharp-Crested Vee/Trap Weir Cv= 2.56 (C= 3.20)

Discarded OutFlow Max=0.06 cfs @ 8.22 hrs HW=98.18' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.06 cfs)

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=97.50' (Free Discharge)
 ↑2=Sharp-Crested Vee/Trap Weir (Controls 0.00 cfs)

Pond 12P: Pond 1

Hydrograph



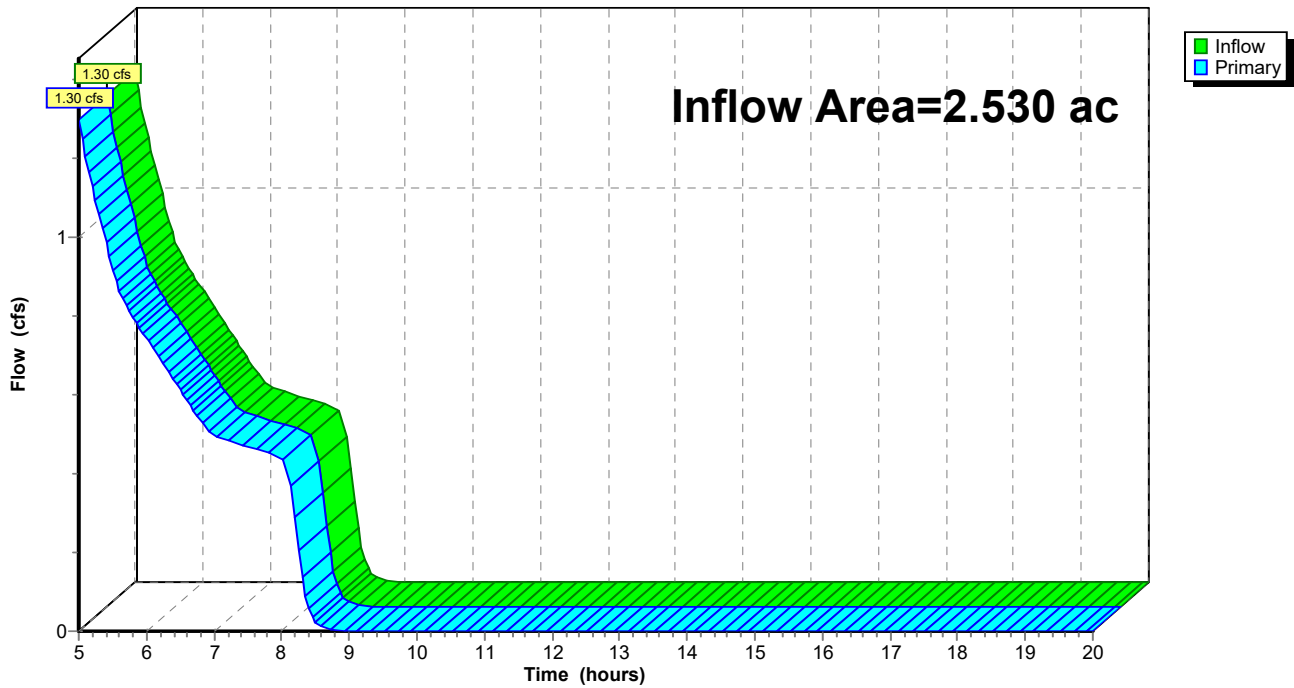
Summary for Link 2L: Outfall

Inflow Area = 2.530 ac, 0.00% Impervious, Inflow Depth > 0.86" for 100-YR - 8HR. event
Inflow = 1.30 cfs @ 5.00 hrs, Volume= 0.181 af
Primary = 1.30 cfs @ 5.00 hrs, Volume= 0.181 af, Atten= 0%, Lag= 0.0 min

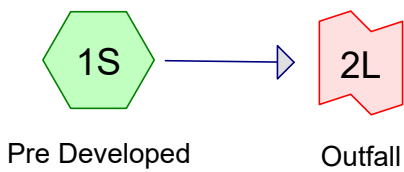
Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link 2L: Outfall

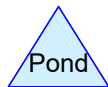
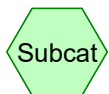
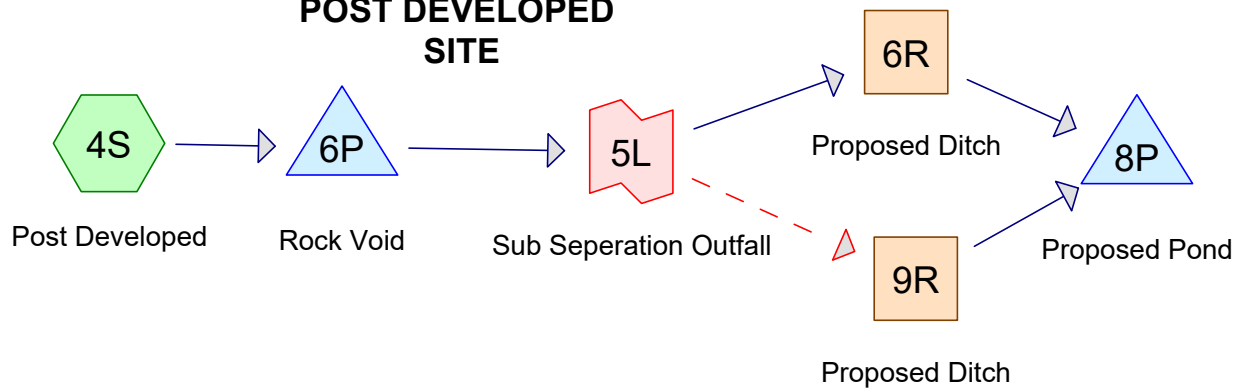
Hydrograph



PRE-DEVELOPED SITE



POST DEVELOPED SITE



Staging Area 2 Basin 2 HydroCAD Report

Type II 24-hr 3 DAY-100YR. Rainfall=12.40"

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

Subcatchment 1S: Pre Developed Runoff Area=6.947 ac 0.00% Impervious Runoff Depth>6.05"
Flow Length=607' Slope=0.0247 '/' Tc=24.7 min CN=58 Runoff=44.70 cfs 3.500 af

Subcatchment 4S: Post Developed Runoff Area=6.947 ac 0.00% Impervious Runoff Depth>7.13"
Flow Length=607' Slope=0.2470 '/' Tc=6.5 min CN=65 Runoff=89.65 cfs 4.129 af

Reach 6R: Proposed Ditch Avg. Flow Depth=1.25' Max Vel=5.16 fps Inflow=44.83 cfs 1.733 af
n=0.035 L=392.0' S=0.0250 '/' Capacity=28.19 cfs Outflow=41.82 cfs 1.729 af

Reach 9R: Proposed Ditch Avg. Flow Depth=1.19' Max Vel=5.53 fps Inflow=44.83 cfs 1.733 af
n=0.035 L=438.0' S=0.0297 '/' Capacity=30.72 cfs Outflow=41.73 cfs 1.729 af

Pond 6P: Rock Void Peak Elev=103.27' Storage=12,674 cf Inflow=89.65 cfs 4.129 af
Discarded=0.37 cfs 0.374 af Primary=89.66 cfs 3.465 af Outflow=90.03 cfs 3.839 af

Pond 8P: Proposed Pond Peak Elev=94.60' Storage=122,305 cf Inflow=83.55 cfs 3.458 af
Discarded=0.29 cfs 0.198 af Primary=1.53 cfs 0.510 af Outflow=1.82 cfs 0.707 af

Link 2L: Outfall Inflow=44.70 cfs 3.500 af
Primary=44.70 cfs 3.500 af

Link 5L: Sub Separation Outfall x 0.50 Inflow=89.66 cfs 3.465 af
Primary=44.83 cfs 1.733 af Secondary=44.83 cfs 1.733 af

Staging Area 2 Basin 2 HydroCAD Report

Type II 24-hr 3 DAY-100YR. Rainfall=12.40"

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Summary for Subcatchment 1S: Pre Developed

Runoff = 44.70 cfs @ 12.18 hrs, Volume= 3.500 af, Depth> 6.05"

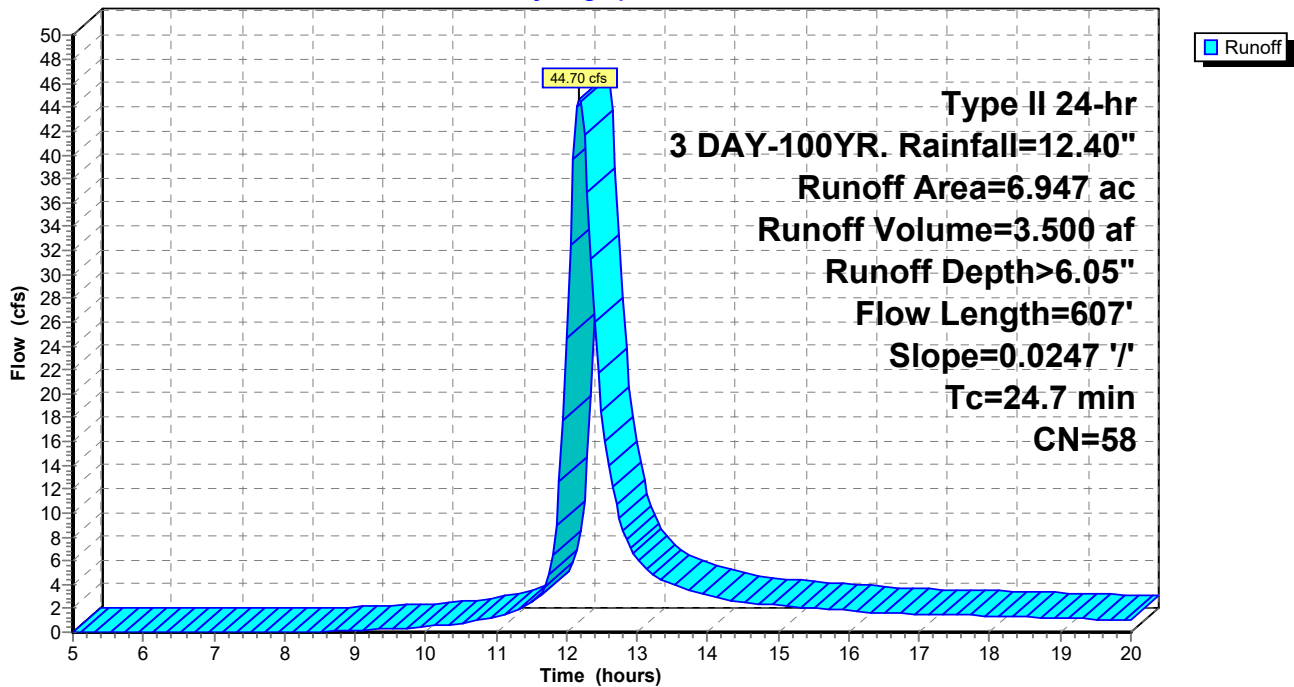
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 3 DAY-100YR. Rainfall=12.40"

Area (ac)	CN	Description
6.947	58	Meadow, non-grazed, HSG B
6.947		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.7	607	0.0247	0.41		Lag/CN Method,

Subcatchment 1S: Pre Developed

Hydrograph



Staging Area 2 Basin 2 HydroCAD Report

Type II 24-hr 3 DAY-100YR. Rainfall=12.40"

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Summary for Subcatchment 4S: Post Developed

Runoff = 89.65 cfs @ 11.98 hrs, Volume= 4.129 af, Depth> 7.13"

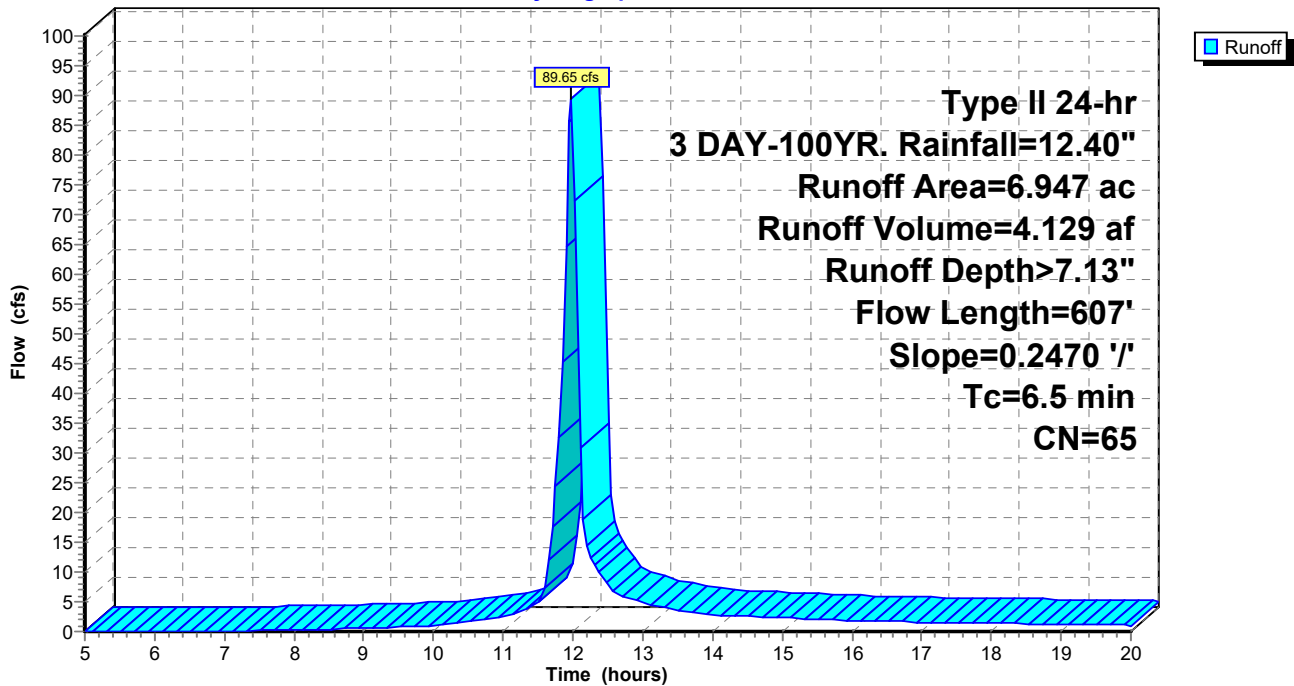
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 3 DAY-100YR. Rainfall=12.40"

Area (ac)	CN	Description
2.015	58	Meadow, non-grazed, HSG B
* 4.156	65	Uncompacted Gravel (35% Void)
0.776	85	Gravel roads, HSG B
6.947	65	Weighted Average
6.947		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.5	607	0.2470	1.55		Lag/CN Method,

Subcatchment 4S: Post Developed

Hydrograph



Staging Area 2 Basin 2 HydroCAD Report

Type II 24-hr 3 DAY-100YR. Rainfall=12.40"

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Summary for Reach 6R: Proposed Ditch

Inflow Area = 6.947 ac, 0.00% Impervious, Inflow Depth > 2.99" for 3 DAY-100YR. event
Inflow = 44.83 cfs @ 11.98 hrs, Volume= 1.733 af
Outflow = 41.82 cfs @ 12.01 hrs, Volume= 1.729 af, Atten= 7%, Lag= 1.9 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 5.16 fps, Min. Travel Time= 1.3 min
Avg. Velocity = 1.98 fps, Avg. Travel Time= 3.3 min

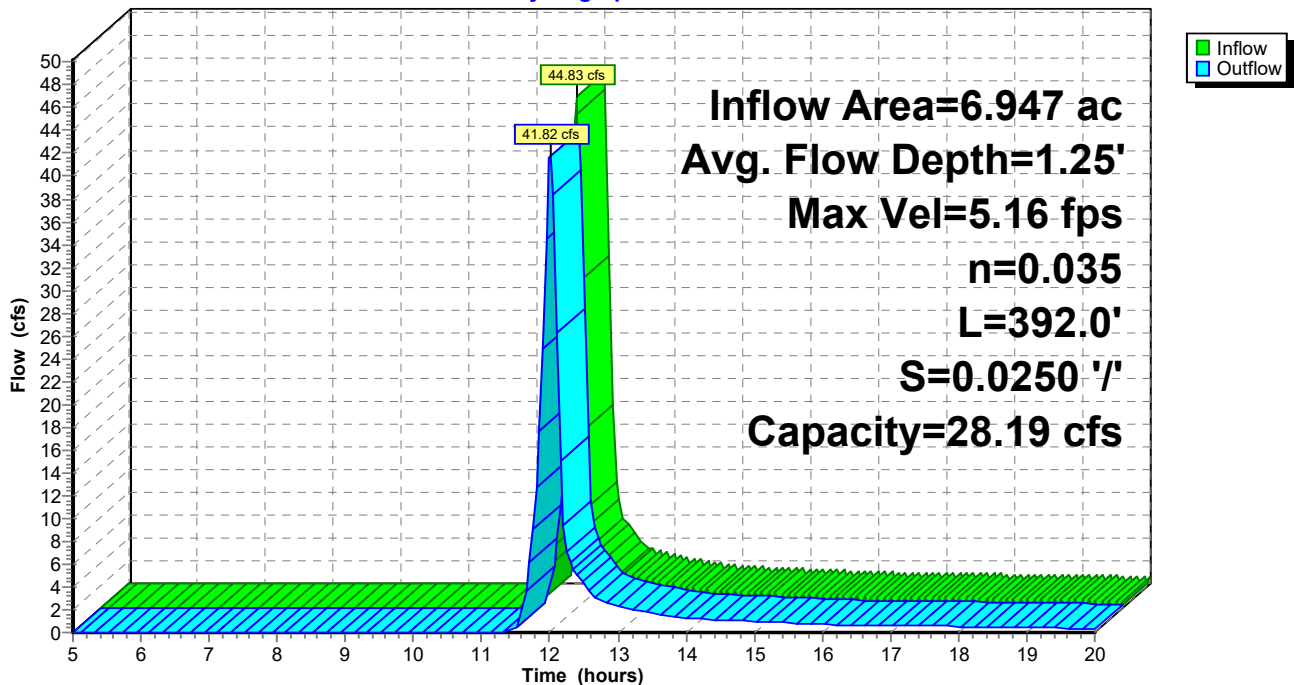
Peak Storage= 3,318 cf @ 11.99 hrs
Average Depth at Peak Storage= 1.25'
Bank-Full Depth= 1.00' Flow Area= 6.0 sf, Capacity= 28.19 cfs

2.00' x 1.00' deep channel, n= 0.035 High grass
Side Slope Z-value= 4.0 '/' Top Width= 10.00'
Length= 392.0' Slope= 0.0250 '/'
Inlet Invert= 101.80', Outlet Invert= 92.00'



Reach 6R: Proposed Ditch

Hydrograph



Staging Area 2 Basin 2 HydroCAD Report

Type II 24-hr 3 DAY-100YR. Rainfall=12.40"

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Summary for Reach 9R: Proposed Ditch

Inflow = 44.83 cfs @ 11.98 hrs, Volume= 1.733 af
Outflow = 41.73 cfs @ 12.01 hrs, Volume= 1.729 af, Atten= 7%, Lag= 1.9 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 5.53 fps, Min. Travel Time= 1.3 min
Avg. Velocity = 2.11 fps, Avg. Travel Time= 3.5 min

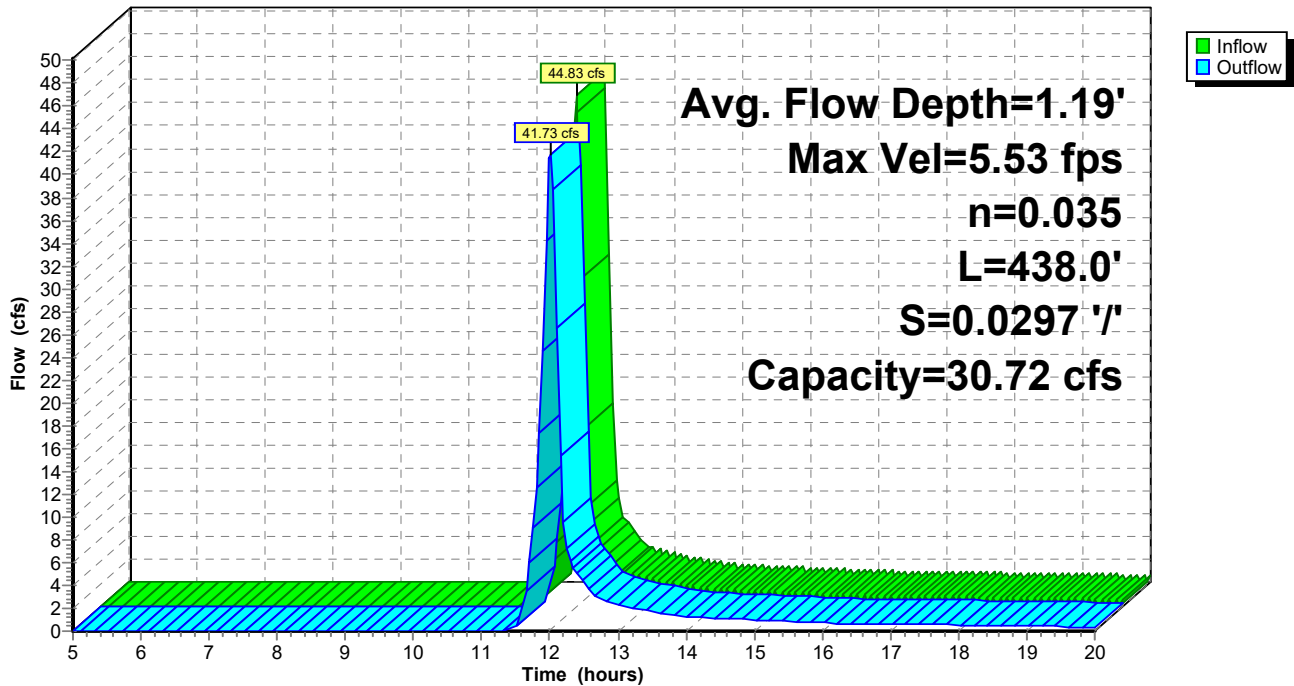
Peak Storage= 3,455 cf @ 11.99 hrs
Average Depth at Peak Storage= 1.19'
Bank-Full Depth= 1.00' Flow Area= 6.0 sf, Capacity= 30.72 cfs

2.00' x 1.00' deep channel, n= 0.035 High grass
Side Slope Z-value= 4.0 '/' Top Width= 10.00'
Length= 438.0' Slope= 0.0297 '/'
Inlet Invert= 105.00', Outlet Invert= 92.00'



Reach 9R: Proposed Ditch

Hydrograph



Staging Area 2 Basin 2 HydroCAD Report

Type II 24-hr 3 DAY-100YR. Rainfall=12.40"

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Summary for Pond 6P: Rock Void

Inflow Area = 6.947 ac, 0.00% Impervious, Inflow Depth > 7.13" for 3 DAY-100YR. event
 Inflow = 89.65 cfs @ 11.98 hrs, Volume= 4.129 af
 Outflow = 90.03 cfs @ 11.98 hrs, Volume= 3.839 af, Atten= 0%, Lag= 0.1 min
 Discarded = 0.37 cfs @ 8.55 hrs, Volume= 0.374 af
 Primary = 89.66 cfs @ 11.98 hrs, Volume= 3.465 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Peak Elev= 103.27' @ 11.98 hrs Surf.Area= 63,368 sf Storage= 12,674 cf

Plug-Flow detention time= 35.5 min calculated for 3.839 af (93% of inflow)
 Center-of-Mass det. time= 9.9 min (784.6 - 774.7)

Volume	Invert	Avail.Storage	Storage Description
#1	103.00'	12,674 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
103.00	63,368	0	0
103.20	63,368	12,674	12,674

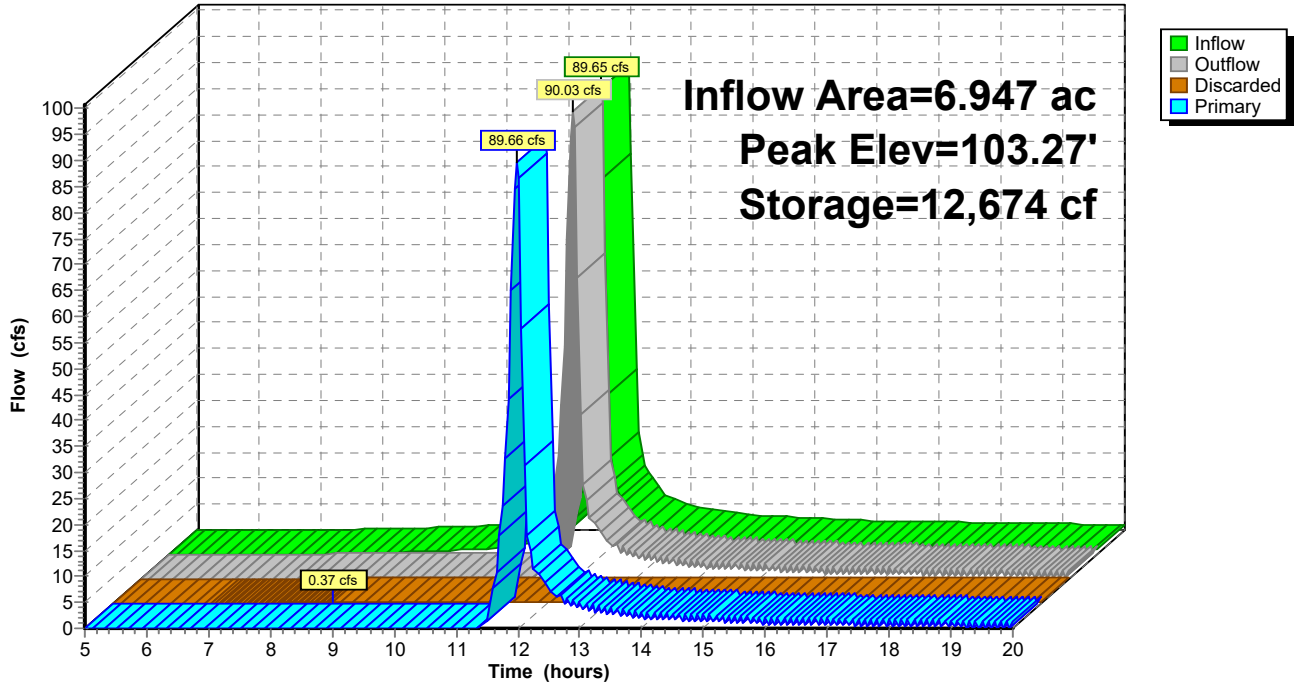
Device	Routing	Invert	Outlet Devices
#1	Discarded	103.00'	0.250 in/hr Exfiltration over Surface area
#2	Primary	103.20'	1,717.0' long x 1.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Discarded OutFlow Max=0.37 cfs @ 8.55 hrs HW=103.00' (Free Discharge)
 ↑1=**Exfiltration** (Exfiltration Controls 0.37 cfs)

Primary OutFlow Max=85.82 cfs @ 11.98 hrs HW=103.27' (Free Discharge)
 ↑2=**Broad-Crested Rectangular Weir**(Weir Controls 85.82 cfs @ 0.71 fps)

Pond 6P: Rock Void

Hydrograph



Staging Area 2 Basin 2 HydroCAD Report

Type II 24-hr 3 DAY-100YR. Rainfall=12.40"

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Summary for Pond 8P: Proposed Pond

Inflow Area = 6.947 ac, 0.00% Impervious, Inflow Depth > 5.97" for 3 DAY-100YR. event
 Inflow = 83.55 cfs @ 12.01 hrs, Volume= 3.458 af
 Outflow = 1.82 cfs @ 15.32 hrs, Volume= 0.707 af, Atten= 98%, Lag= 198.4 min
 Discarded = 0.29 cfs @ 15.32 hrs, Volume= 0.198 af
 Primary = 1.53 cfs @ 15.32 hrs, Volume= 0.510 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Peak Elev= 94.60' @ 15.32 hrs Surf.Area= 49,562 sf Storage= 122,305 cf

Plug-Flow detention time= 275.3 min calculated for 0.705 af (20% of inflow)
 Center-of-Mass det. time= 203.6 min (985.9 - 782.3)

Volume	Invert	Avail.Storage	Storage Description
#1	92.00'	193,786 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
92.00	44,696	0	0
93.00	46,547	45,622	45,622
94.00	48,426	47,487	93,108
95.00	50,332	49,379	142,487
96.00	52,265	51,299	193,786

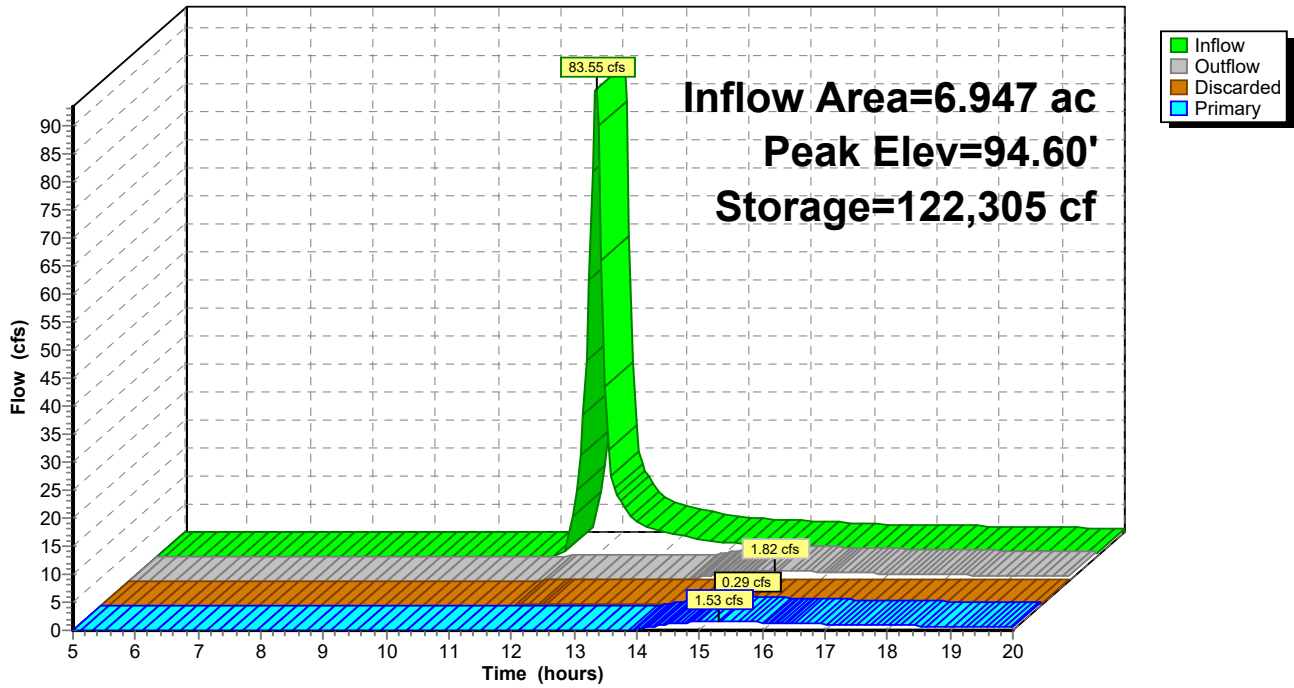
Device	Routing	Invert	Outlet Devices
#1	Discarded	92.00'	0.250 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Primary	94.50'	43.6 deg x 16.0' long x 1.00' rise Sharp-Crested Vee/Trap Weir Cv= 2.56 (C= 3.20)

Discarded OutFlow Max=0.29 cfs @ 15.32 hrs HW=94.60' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.29 cfs)

Primary OutFlow Max=1.52 cfs @ 15.32 hrs HW=94.60' (Free Discharge)
 ↑2=Sharp-Crested Vee/Trap Weir (Weir Controls 1.52 cfs @ 0.99 fps)

Pond 8P: Proposed Pond

Hydrograph



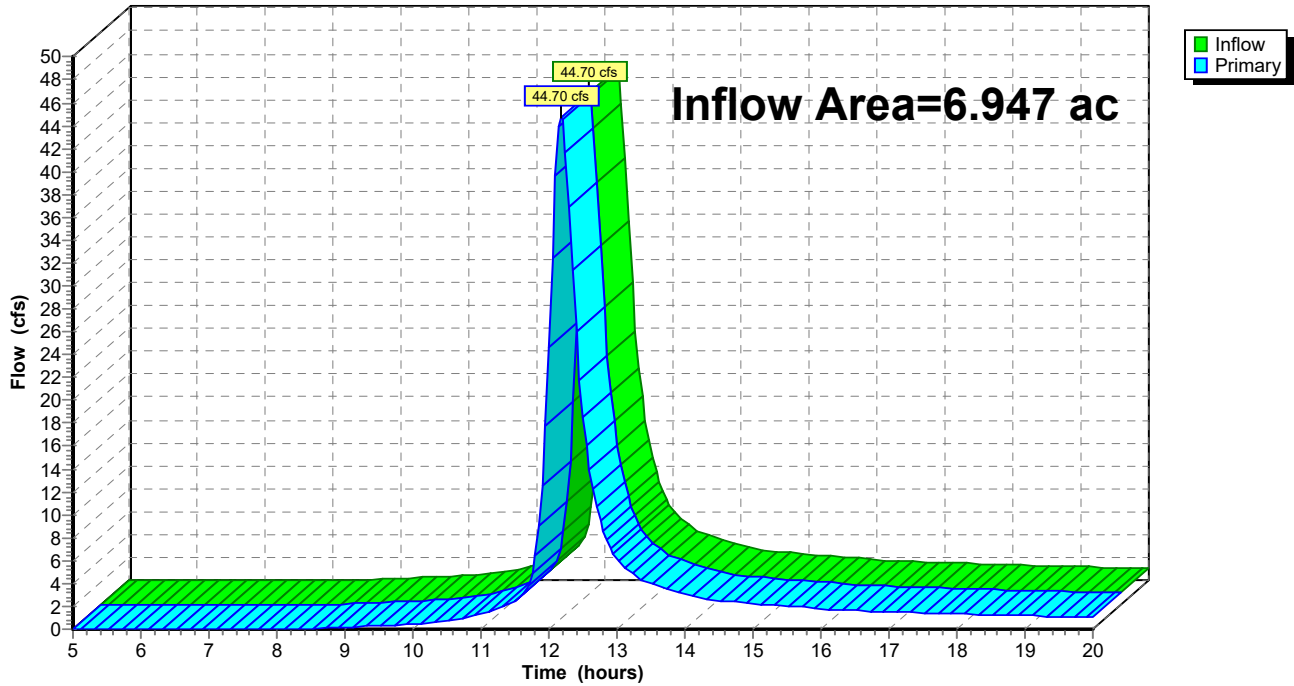
Summary for Link 2L: Outfall

Inflow Area = 6.947 ac, 0.00% Impervious, Inflow Depth > 6.05" for 3 DAY-100YR. event
Inflow = 44.70 cfs @ 12.18 hrs, Volume= 3.500 af
Primary = 44.70 cfs @ 12.18 hrs, Volume= 3.500 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link 2L: Outfall

Hydrograph

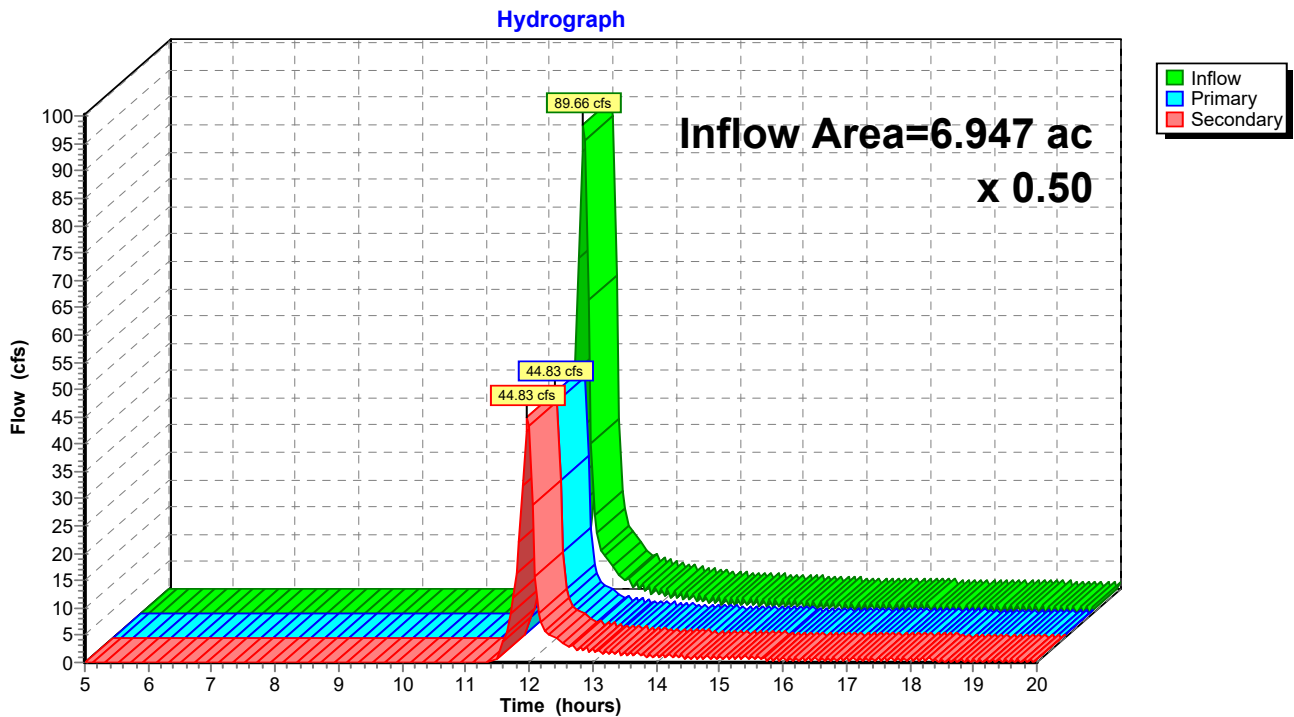


Summary for Link 5L: Sub Separation Outfall

Inflow Area = 6.947 ac, 0.00% Impervious, Inflow Depth > 5.99" for 3 DAY-100YR. event
Inflow = 89.66 cfs @ 11.98 hrs, Volume= 3.465 af
Primary = 44.83 cfs @ 11.98 hrs, Volume= 1.733 af, Atten= 50%, Lag= 0.0 min
Secondary = 44.83 cfs @ 11.98 hrs, Volume= 1.733 af

Primary outflow = Inflow x 0.50, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link 5L: Sub Separation Outfall



Staging Area 2 Basin 2 HydroCAD Report

Type II 24-hr 7 DAY-100YR Rainfall=14.00"

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

Subcatchment 1S: Pre Developed Runoff Area=6.947 ac 0.00% Impervious Runoff Depth>7.32"
Flow Length=607' Slope=0.0247 '/' Tc=24.7 min CN=58 Runoff=54.05 cfs 4.239 af

Subcatchment 4S: Post Developed Runoff Area=6.947 ac 0.00% Impervious Runoff Depth>8.50"
Flow Length=607' Slope=0.0247 '/' Tc=6.5 min CN=65 Runoff=105.73 cfs 4.920 af

Reach 6R: Proposed Ditch Avg. Flow Depth=1.37' Max Vel=5.31 fps Inflow=53.27 cfs 2.118 af
n=0.035 L=392.0' S=0.0250 '/' Capacity=28.19 cfs Outflow=49.44 cfs 2.114 af

Reach 9R: Proposed Ditch Avg. Flow Depth=1.30' Max Vel=5.70 fps Inflow=53.27 cfs 2.118 af
n=0.035 L=438.0' S=0.0297 '/' Capacity=30.72 cfs Outflow=49.34 cfs 2.114 af

Pond 6P: Rock Void Peak Elev=103.28' Storage=12,674 cf Inflow=105.73 cfs 4.920 af
Discarded=0.37 cfs 0.393 af Primary=106.54 cfs 4.237 af Outflow=106.90 cfs 4.630 af

Pond 8P: Proposed Pond Peak Elev=94.70' Storage=127,336 cf Inflow=98.78 cfs 4.229 af
Discarded=0.29 cfs 0.204 af Primary=4.52 cfs 1.262 af Outflow=4.81 cfs 1.466 af

Link 2L: Outfall Inflow=54.05 cfs 4.239 af
Primary=54.05 cfs 4.239 af

Link 5L: Sub Separation Outfall x 0.50 Inflow=106.54 cfs 4.237 af
Primary=53.27 cfs 2.118 af Secondary=53.27 cfs 2.118 af

Staging Area 2 Basin 2 HydroCAD Report

Type II 24-hr 7 DAY-100YR Rainfall=14.00"

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Summary for Subcatchment 1S: Pre Developed

Runoff = 54.05 cfs @ 12.18 hrs, Volume= 4.239 af, Depth> 7.32"

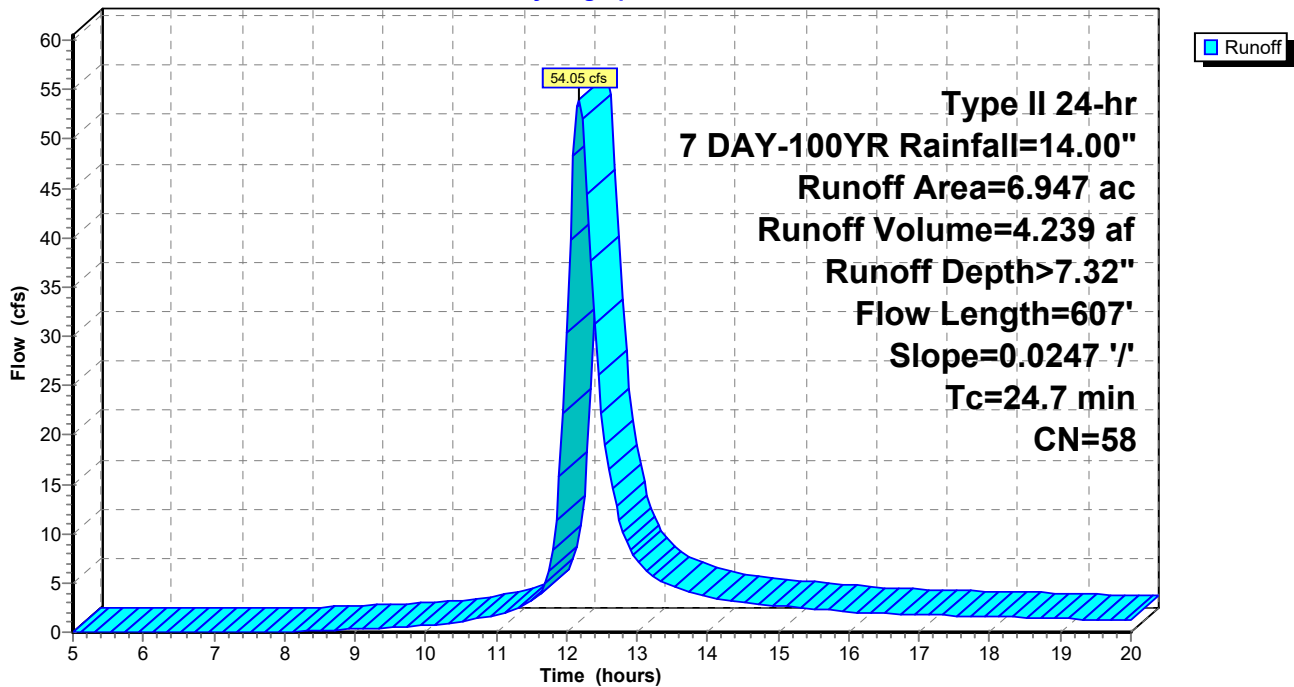
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 7 DAY-100YR Rainfall=14.00"

Area (ac)	CN	Description
6.947	58	Meadow, non-grazed, HSG B
6.947		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.7	607	0.0247	0.41		Lag/CN Method,

Subcatchment 1S: Pre Developed

Hydrograph



Staging Area 2 Basin 2 HydroCAD Report

Type II 24-hr 7 DAY-100YR Rainfall=14.00"

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Summary for Subcatchment 4S: Post Developed

Runoff = 105.73 cfs @ 11.98 hrs, Volume= 4.920 af, Depth> 8.50"

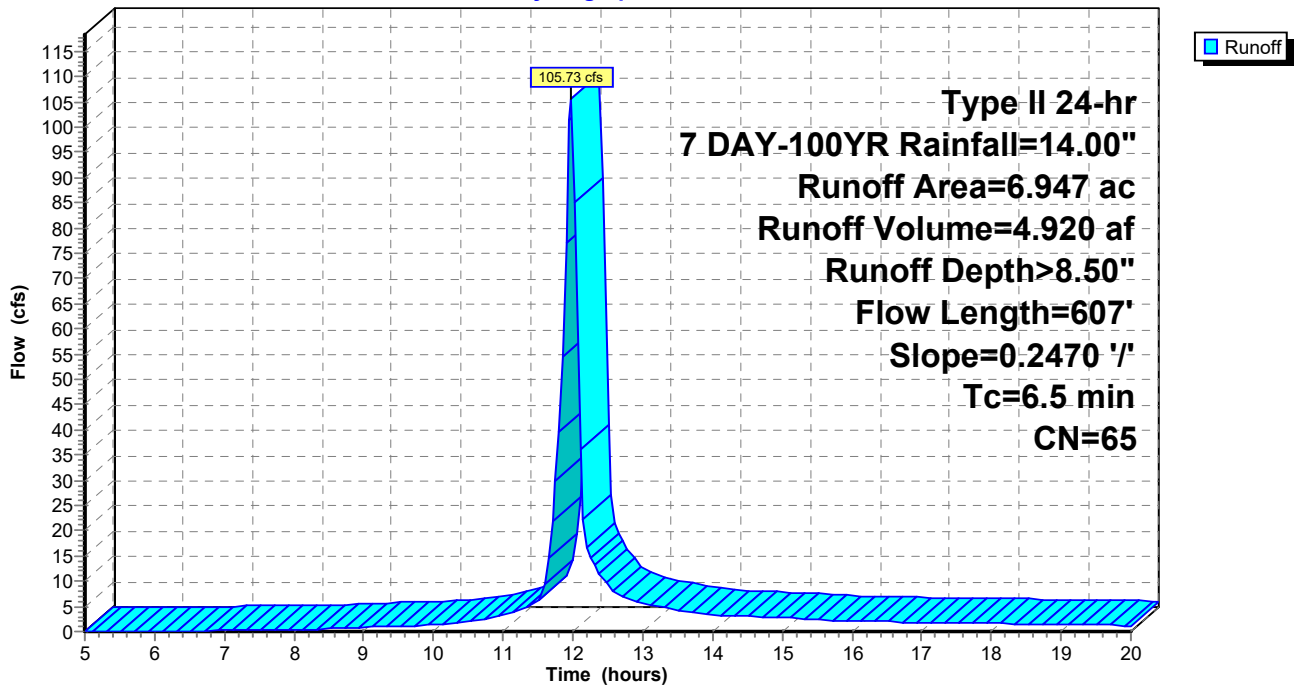
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 7 DAY-100YR Rainfall=14.00"

Area (ac)	CN	Description
2.015	58	Meadow, non-grazed, HSG B
* 4.156	65	Uncompacted Gravel (35% Void)
0.776	85	Gravel roads, HSG B
6.947	65	Weighted Average
6.947		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.5	607	0.2470	1.55		Lag/CN Method,

Subcatchment 4S: Post Developed

Hydrograph



Staging Area 2 Basin 2 HydroCAD Report

Type II 24-hr 7 DAY-100YR Rainfall=14.00"

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Summary for Reach 6R: Proposed Ditch

Inflow Area = 6.947 ac, 0.00% Impervious, Inflow Depth > 3.66" for 7 DAY-100YR event
Inflow = 53.27 cfs @ 11.98 hrs, Volume= 2.118 af
Outflow = 49.44 cfs @ 12.01 hrs, Volume= 2.114 af, Atten= 7%, Lag= 1.7 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 5.31 fps, Min. Travel Time= 1.2 min
Avg. Velocity = 2.10 fps, Avg. Travel Time= 3.1 min

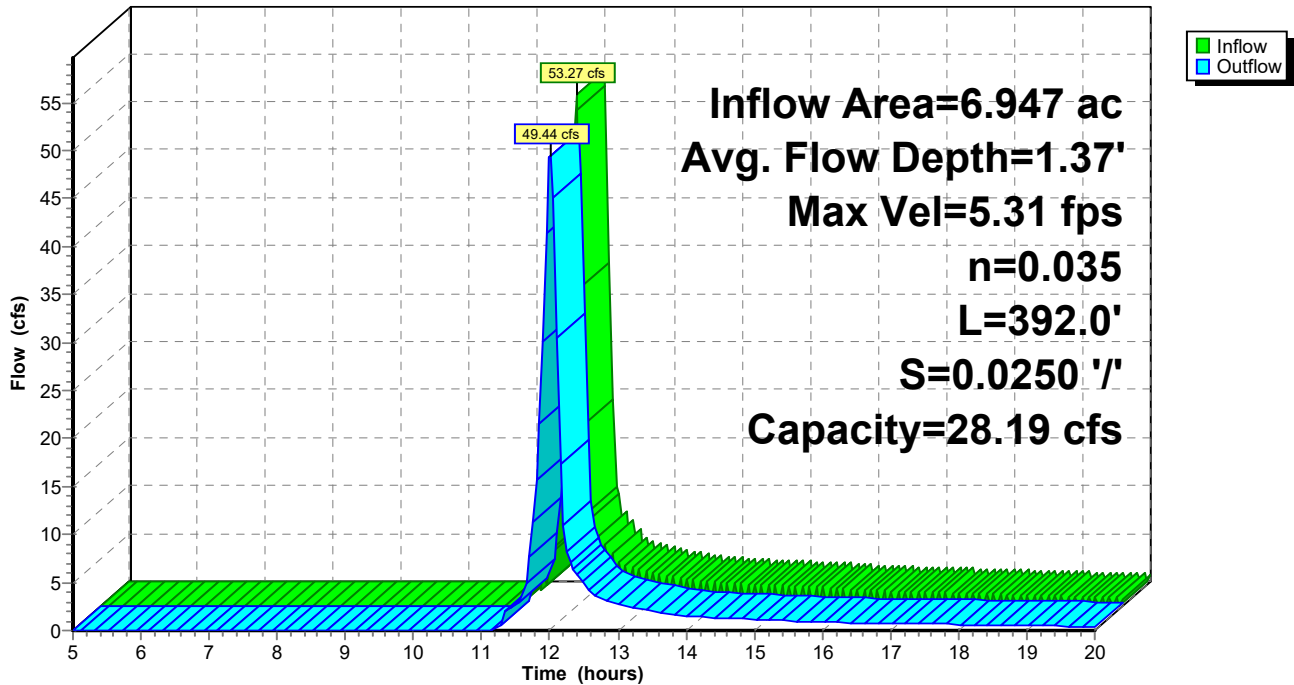
Peak Storage= 3,809 cf @ 11.99 hrs
Average Depth at Peak Storage= 1.37'
Bank-Full Depth= 1.00' Flow Area= 6.0 sf, Capacity= 28.19 cfs

2.00' x 1.00' deep channel, n= 0.035 High grass
Side Slope Z-value= 4.0 '/' Top Width= 10.00'
Length= 392.0' Slope= 0.0250 '/'
Inlet Invert= 101.80', Outlet Invert= 92.00'



Reach 6R: Proposed Ditch

Hydrograph



Staging Area 2 Basin 2 HydroCAD Report

Type II 24-hr 7 DAY-100YR Rainfall=14.00"

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Summary for Reach 9R: Proposed Ditch

Inflow = 53.27 cfs @ 11.98 hrs, Volume= 2.118 af
Outflow = 49.34 cfs @ 12.01 hrs, Volume= 2.114 af, Atten= 7%, Lag= 1.7 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 5.70 fps, Min. Travel Time= 1.3 min
Avg. Velocity = 2.23 fps, Avg. Travel Time= 3.3 min

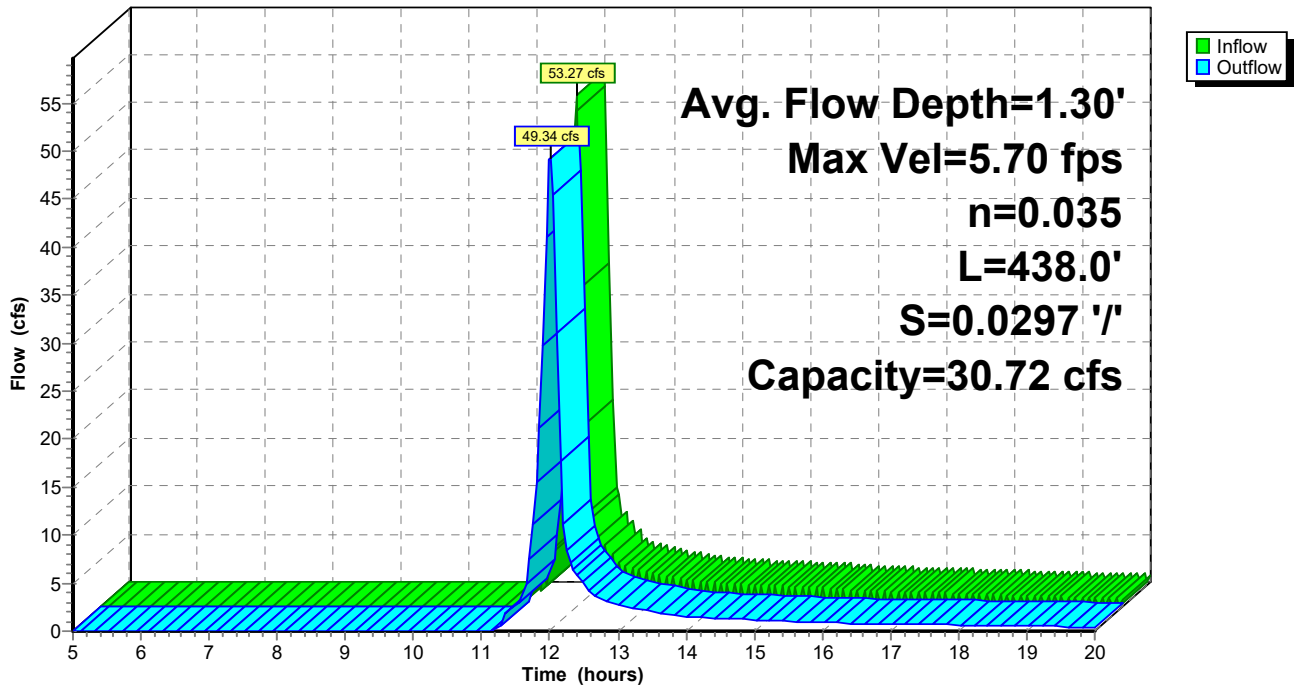
Peak Storage= 3,958 cf @ 11.99 hrs
Average Depth at Peak Storage= 1.30'
Bank-Full Depth= 1.00' Flow Area= 6.0 sf, Capacity= 30.72 cfs

2.00' x 1.00' deep channel, n= 0.035 High grass
Side Slope Z-value= 4.0 '/' Top Width= 10.00'
Length= 438.0' Slope= 0.0297 '/'
Inlet Invert= 105.00', Outlet Invert= 92.00'



Reach 9R: Proposed Ditch

Hydrograph



Staging Area 2 Basin 2 HydroCAD Report

Type II 24-hr 7 DAY-100YR Rainfall=14.00"

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Summary for Pond 6P: Rock Void

Inflow Area = 6.947 ac, 0.00% Impervious, Inflow Depth > 8.50" for 7 DAY-100YR event
 Inflow = 105.73 cfs @ 11.98 hrs, Volume= 4.920 af
 Outflow = 106.90 cfs @ 11.98 hrs, Volume= 4.630 af, Atten= 0%, Lag= 0.3 min
 Discarded = 0.37 cfs @ 8.00 hrs, Volume= 0.393 af
 Primary = 106.54 cfs @ 11.98 hrs, Volume= 4.237 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Peak Elev= 103.28' @ 11.98 hrs Surf.Area= 63,368 sf Storage= 12,674 cf

Plug-Flow detention time= 31.3 min calculated for 4.615 af (94% of inflow)
 Center-of-Mass det. time= 9.6 min (780.2 - 770.7)

Volume	Invert	Avail.Storage	Storage Description
#1	103.00'	12,674 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
103.00	63,368	0	0
103.20	63,368	12,674	12,674

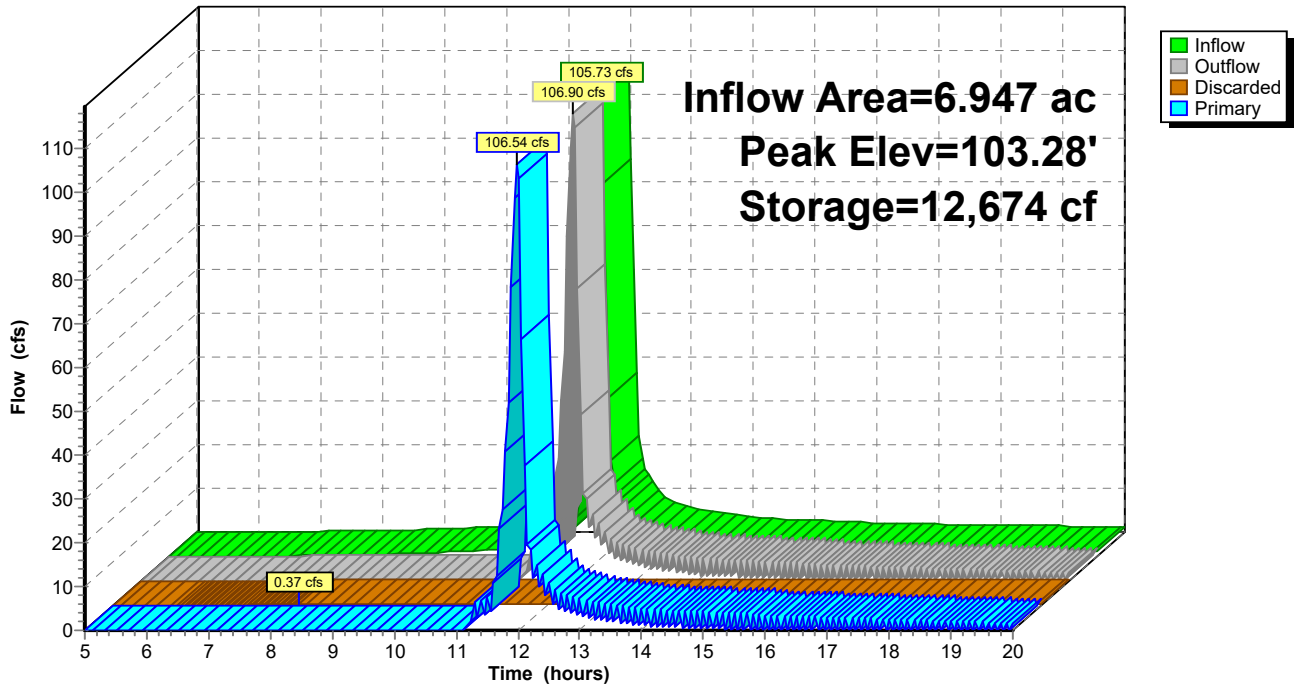
Device	Routing	Invert	Outlet Devices
#1	Discarded	103.00'	0.250 in/hr Exfiltration over Surface area
#2	Primary	103.20'	1,717.0' long x 1.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Discarded OutFlow Max=0.37 cfs @ 8.00 hrs HW=103.00' (Free Discharge)
 ↑1=**Exfiltration** (Exfiltration Controls 0.37 cfs)

Primary OutFlow Max=101.60 cfs @ 11.98 hrs HW=103.28' (Free Discharge)
 ↑2=**Broad-Crested Rectangular Weir**(Weir Controls 101.60 cfs @ 0.75 fps)

Pond 6P: Rock Void

Hydrograph



Staging Area 2 Basin 2 HydroCAD Report

Type II 24-hr 7 DAY-100YR Rainfall=14.00"

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Summary for Pond 8P: Proposed Pond

Inflow Area = 6.947 ac, 0.00% Impervious, Inflow Depth > 7.30" for 7 DAY-100YR event
 Inflow = 98.78 cfs @ 12.01 hrs, Volume= 4.229 af
 Outflow = 4.81 cfs @ 13.19 hrs, Volume= 1.466 af, Atten= 95%, Lag= 70.9 min
 Discarded = 0.29 cfs @ 13.19 hrs, Volume= 0.204 af
 Primary = 4.52 cfs @ 13.19 hrs, Volume= 1.262 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Peak Elev= 94.70' @ 13.19 hrs Surf.Area= 49,755 sf Storage= 127,336 cf

Plug-Flow detention time= 202.9 min calculated for 1.466 af (35% of inflow)
 Center-of-Mass det. time= 133.7 min (913.7 - 779.9)

Volume	Invert	Avail.Storage	Storage Description
#1	92.00'	193,786 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
92.00	44,696	0	0
93.00	46,547	45,622	45,622
94.00	48,426	47,487	93,108
95.00	50,332	49,379	142,487
96.00	52,265	51,299	193,786

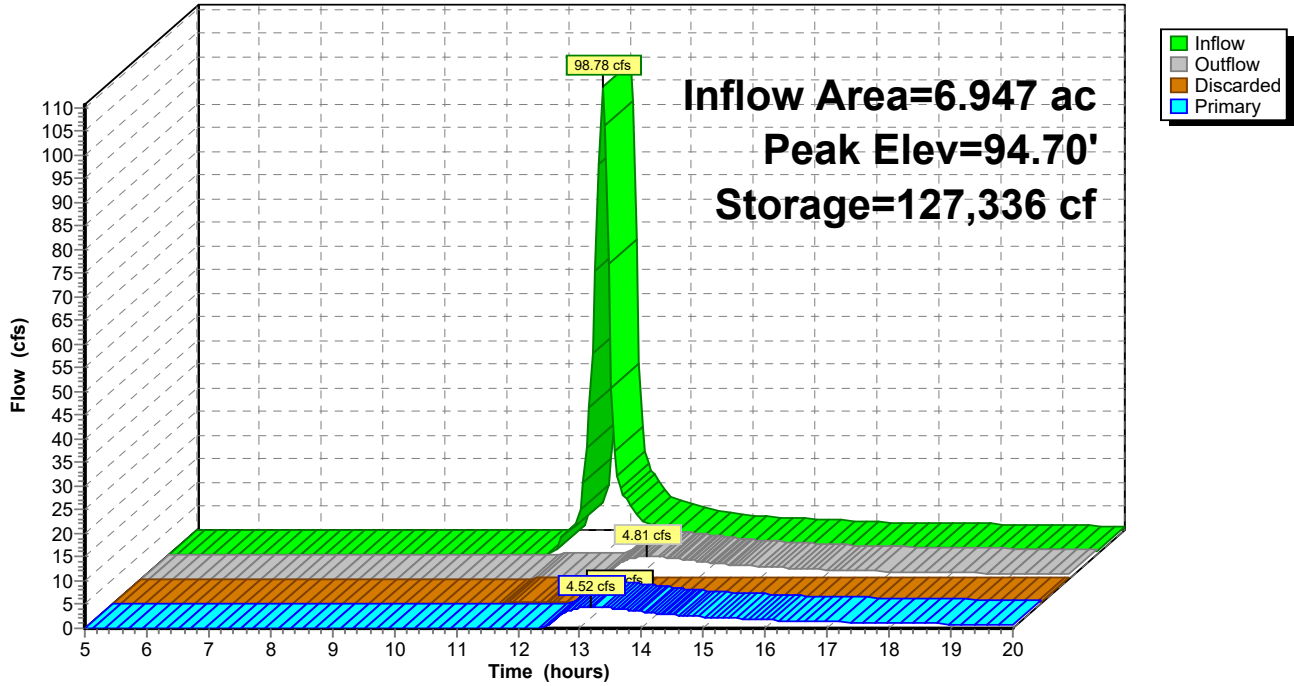
Device	Routing	Invert	Outlet Devices
#1	Discarded	92.00'	0.250 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Primary	94.50'	43.6 deg x 16.0' long x 1.00' rise Sharp-Crested Vee/Trap Weir Cv= 2.56 (C= 3.20)

Discarded OutFlow Max=0.29 cfs @ 13.19 hrs HW=94.70' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.29 cfs)

Primary OutFlow Max=4.50 cfs @ 13.19 hrs HW=94.70' (Free Discharge)
 ↑2=Sharp-Crested Vee/Trap Weir (Weir Controls 4.50 cfs @ 1.42 fps)

Pond 8P: Proposed Pond

Hydrograph



Staging Area 2 Basin 2 HydroCAD Report

Type II 24-hr 7 DAY-100YR Rainfall=14.00"

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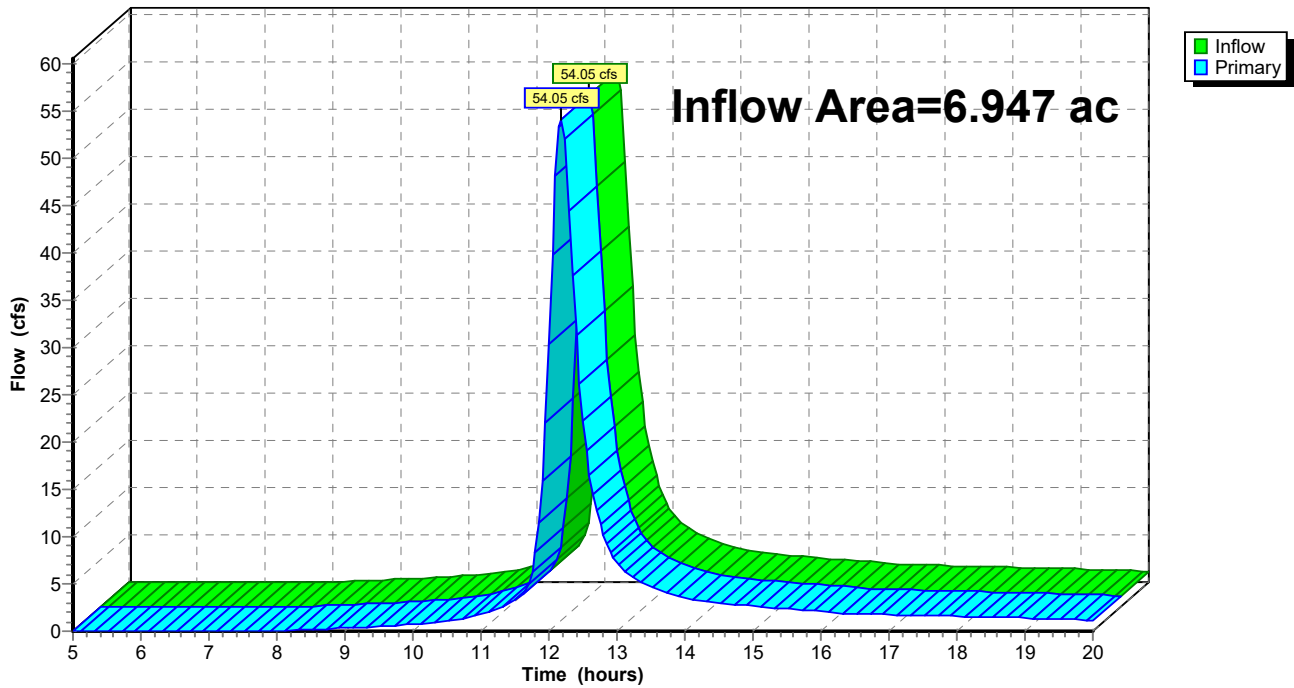
Summary for Link 2L: Outfall

Inflow Area = 6.947 ac, 0.00% Impervious, Inflow Depth > 7.32" for 7 DAY-100YR event
Inflow = 54.05 cfs @ 12.18 hrs, Volume= 4.239 af
Primary = 54.05 cfs @ 12.18 hrs, Volume= 4.239 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link 2L: Outfall

Hydrograph



Staging Area 2 Basin 2 HydroCAD Report

Type II 24-hr 7 DAY-100YR Rainfall=14.00"

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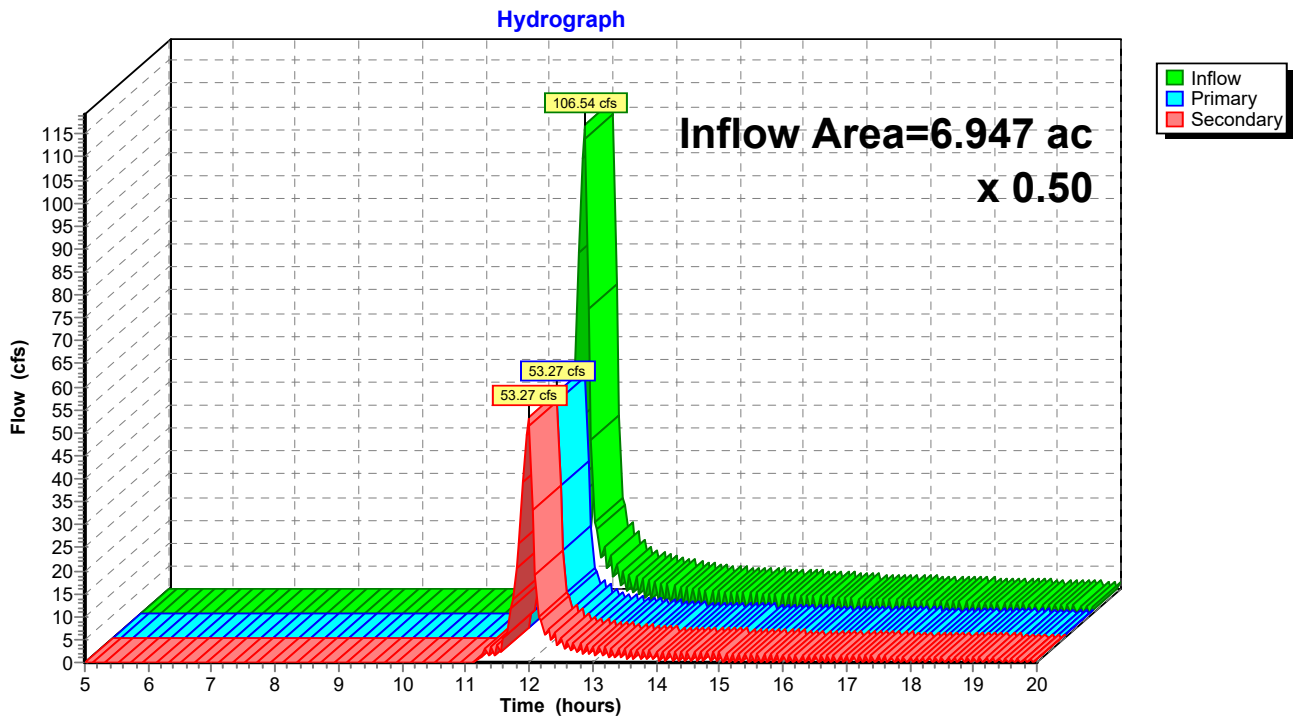
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Summary for Link 5L: Sub Separation Outfall

Inflow Area = 6.947 ac, 0.00% Impervious, Inflow Depth > 7.32" for 7 DAY-100YR event
Inflow = 106.54 cfs @ 11.98 hrs, Volume= 4.237 af
Primary = 53.27 cfs @ 11.98 hrs, Volume= 2.118 af, Atten= 50%, Lag= 0.0 min
Secondary = 53.27 cfs @ 11.98 hrs, Volume= 2.118 af

Primary outflow = Inflow x 0.50, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link 5L: Sub Separation Outfall



Staging Area 2 Basin 2 HydroCAD Report

Type II 24-hr 10 DAY-100YR Rainfall=16.10"

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

Subcatchment 1S: Pre Developed Runoff Area=6.947 ac 0.00% Impervious Runoff Depth>9.05"
Flow Length=607' Slope=0.0247 '/' Tc=24.7 min CN=58 Runoff=66.54 cfs 5.240 af

Subcatchment 4S: Post Developed Runoff Area=6.947 ac 0.00% Impervious Runoff Depth>10.33"
Flow Length=607' Slope=0.2470 '/' Tc=6.5 min CN=65 Runoff=125.56 cfs 5.979 af

Reach 6R: Proposed Ditch Avg. Flow Depth=1.54' Max Vel=5.45 fps Inflow=63.36 cfs 2.635 af
n=0.035 L=392.0' S=0.0250 '/' Capacity=28.19 cfs Outflow=59.50 cfs 2.633 af

Reach 9R: Proposed Ditch Avg. Flow Depth=1.46' Max Vel=5.87 fps Inflow=63.36 cfs 2.635 af
n=0.035 L=438.0' S=0.0297 '/' Capacity=30.72 cfs Outflow=59.38 cfs 2.632 af

Pond 6P: Rock Void Peak Elev=103.29' Storage=12,674 cf Inflow=125.56 cfs 5.979 af
Discarded=0.37 cfs 0.415 af Primary=126.72 cfs 5.271 af Outflow=127.09 cfs 5.686 af

Pond 8P: Proposed Pond Peak Elev=94.90' Storage=137,504 cf Inflow=118.88 cfs 5.265 af
Discarded=0.29 cfs 0.213 af Primary=13.11 cfs 2.277 af Outflow=13.40 cfs 2.490 af

Link 2L: Outfall Inflow=66.54 cfs 5.240 af
Primary=66.54 cfs 5.240 af

Link 5L: Sub Separation Outfall x 0.50 Inflow=126.72 cfs 5.271 af
Primary=63.36 cfs 2.635 af Secondary=63.36 cfs 2.635 af

Staging Area 2 Basin 2 HydroCAD Report

Type II 24-hr 10 DAY-100YR Rainfall=16.10"

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Summary for Subcatchment 1S: Pre Developed

Runoff = 66.54 cfs @ 12.18 hrs, Volume= 5.240 af, Depth> 9.05"

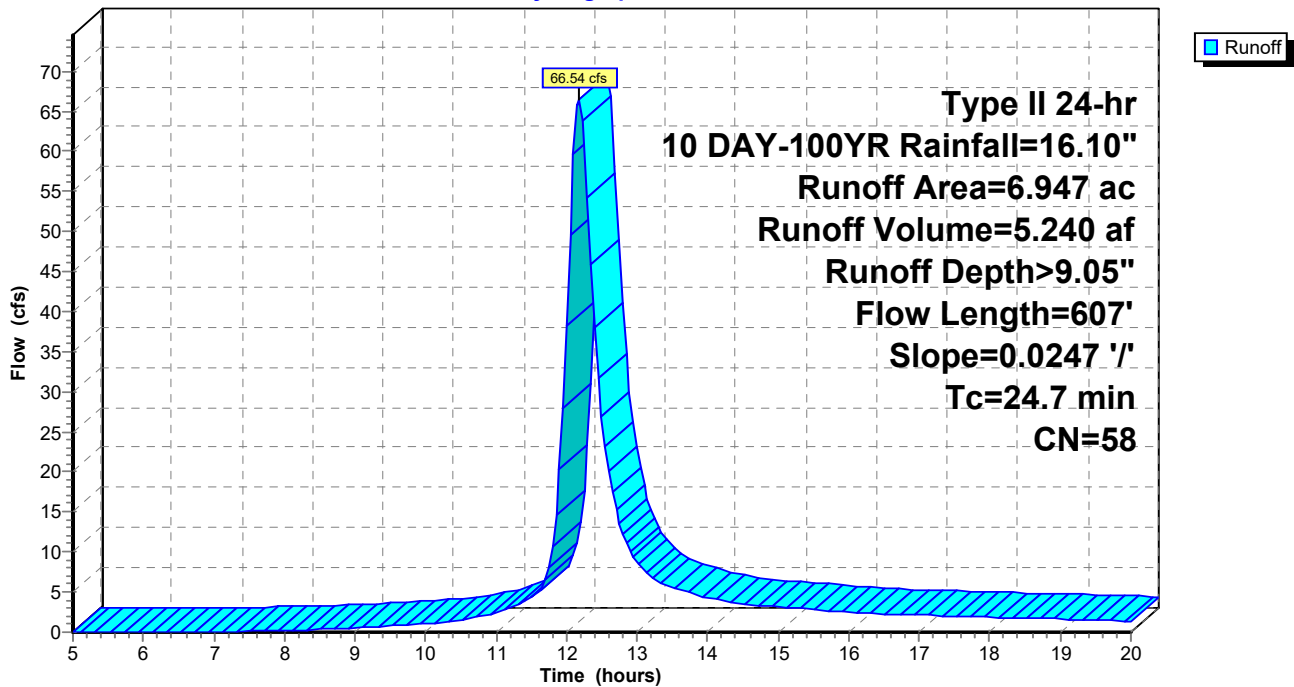
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10 DAY-100YR Rainfall=16.10"

Area (ac)	CN	Description
6.947	58	Meadow, non-grazed, HSG B
6.947		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.7	607	0.0247	0.41		Lag/CN Method,

Subcatchment 1S: Pre Developed

Hydrograph



Staging Area 2 Basin 2 HydroCAD Report

Type II 24-hr 10 DAY-100YR Rainfall=16.10"

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Summary for Subcatchment 4S: Post Developed

Runoff = 125.56 cfs @ 11.97 hrs, Volume= 5.979 af, Depth>10.33"

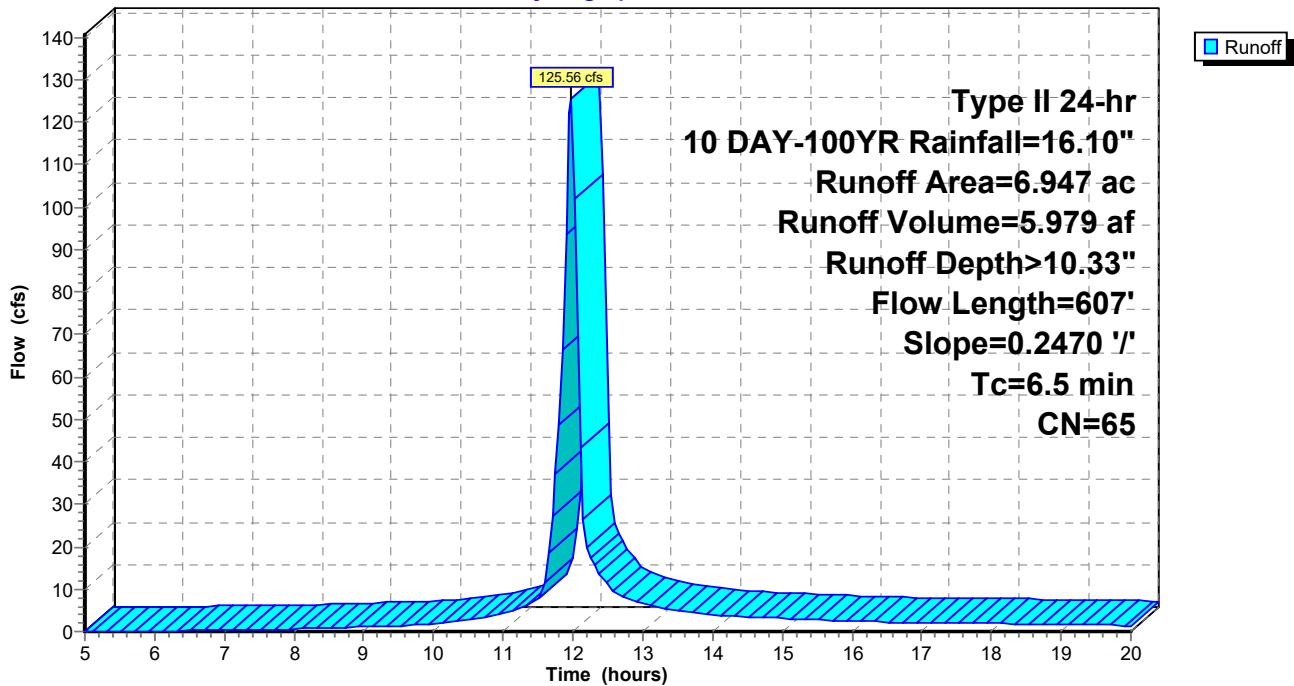
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10 DAY-100YR Rainfall=16.10"

Area (ac)	CN	Description
2.015	58	Meadow, non-grazed, HSG B
* 4.156	65	Uncompacted Gravel (35% Void)
0.776	85	Gravel roads, HSG B
6.947	65	Weighted Average
6.947		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.5	607	0.2470	1.55		Lag/CN Method,

Subcatchment 4S: Post Developed

Hydrograph



Staging Area 2 Basin 2 HydroCAD Report

Type II 24-hr 10 DAY-100YR Rainfall=16.10"

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Summary for Reach 6R: Proposed Ditch

Inflow Area = 6.947 ac, 0.00% Impervious, Inflow Depth > 4.55" for 10 DAY-100YR event
Inflow = 63.36 cfs @ 11.97 hrs, Volume= 2.635 af
Outflow = 59.50 cfs @ 12.01 hrs, Volume= 2.633 af, Atten= 6%, Lag= 2.3 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 5.45 fps, Min. Travel Time= 1.2 min
Avg. Velocity = 2.23 fps, Avg. Travel Time= 2.9 min

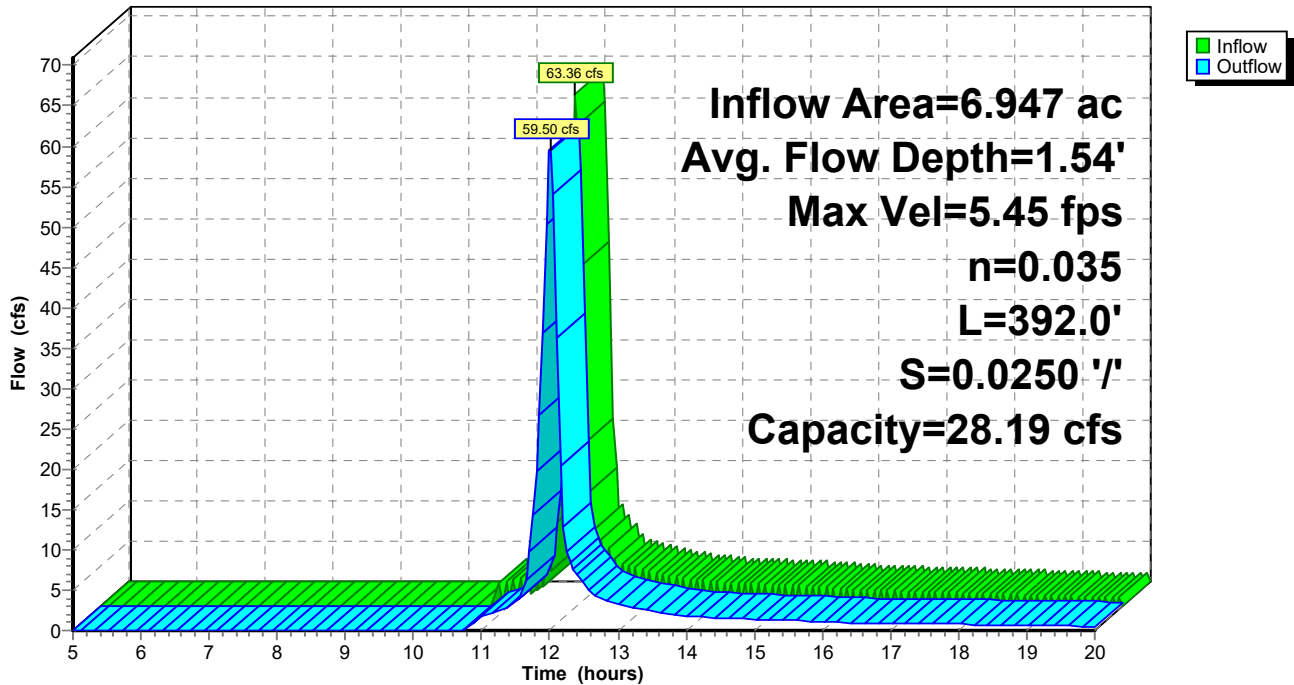
Peak Storage= 4,457 cf @ 11.99 hrs
Average Depth at Peak Storage= 1.54'
Bank-Full Depth= 1.00' Flow Area= 6.0 sf, Capacity= 28.19 cfs

2.00' x 1.00' deep channel, n= 0.035 High grass
Side Slope Z-value= 4.0 '/' Top Width= 10.00'
Length= 392.0' Slope= 0.0250 '/'
Inlet Invert= 101.80', Outlet Invert= 92.00'



Reach 6R: Proposed Ditch

Hydrograph



Staging Area 2 Basin 2 HydroCAD Report

Type II 24-hr 10 DAY-100YR Rainfall=16.10"

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Summary for Reach 9R: Proposed Ditch

Inflow = 63.36 cfs @ 11.97 hrs, Volume= 2.635 af
Outflow = 59.38 cfs @ 12.01 hrs, Volume= 2.632 af, Atten= 6%, Lag= 2.3 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 5.87 fps, Min. Travel Time= 1.2 min
Avg. Velocity = 2.37 fps, Avg. Travel Time= 3.1 min

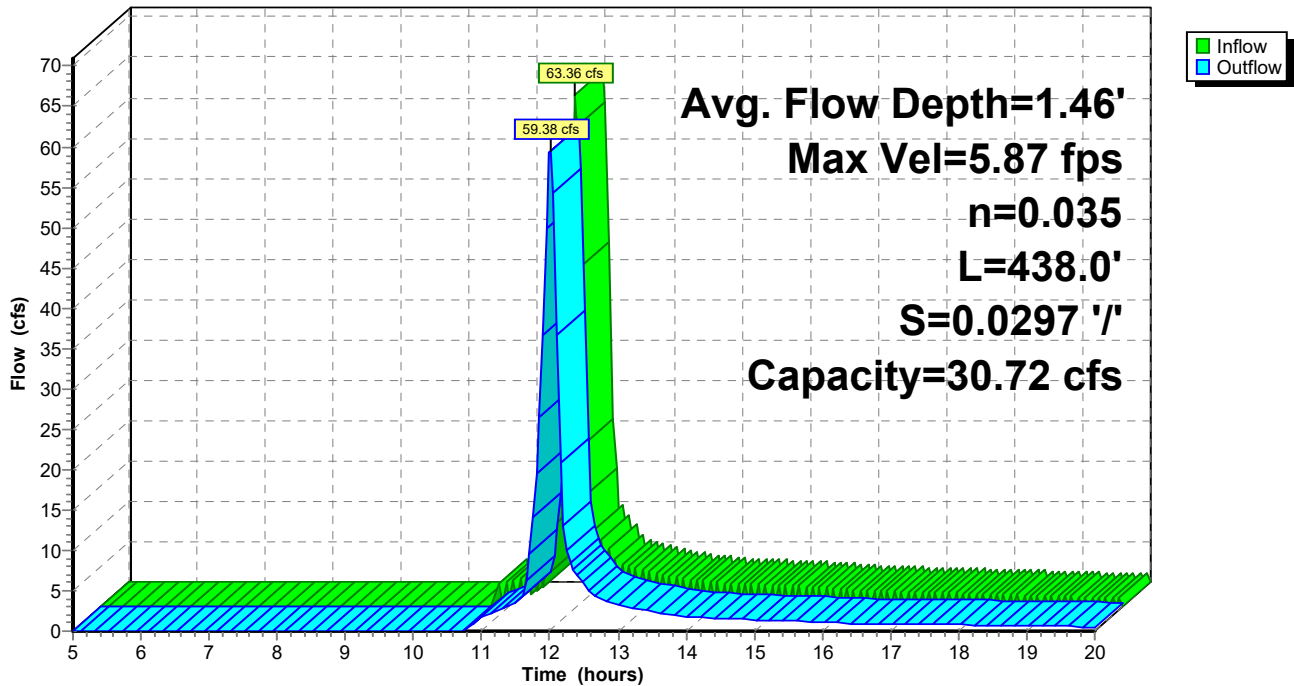
Peak Storage= 4,622 cf @ 11.99 hrs
Average Depth at Peak Storage= 1.46'
Bank-Full Depth= 1.00' Flow Area= 6.0 sf, Capacity= 30.72 cfs

2.00' x 1.00' deep channel, n= 0.035 High grass
Side Slope Z-value= 4.0 '/' Top Width= 10.00'
Length= 438.0' Slope= 0.0297 '/'
Inlet Invert= 105.00', Outlet Invert= 92.00'



Reach 9R: Proposed Ditch

Hydrograph



Staging Area 2 Basin 2 HydroCAD Report

Type II 24-hr 10 DAY-100YR Rainfall=16.10"

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Summary for Pond 6P: Rock Void

Inflow Area = 6.947 ac, 0.00% Impervious, Inflow Depth > 10.33" for 10 DAY-100YR event
 Inflow = 125.56 cfs @ 11.97 hrs, Volume= 5.979 af
 Outflow = 127.09 cfs @ 11.97 hrs, Volume= 5.686 af, Atten= 0%, Lag= 0.0 min
 Discarded = 0.37 cfs @ 7.15 hrs, Volume= 0.415 af
 Primary = 126.72 cfs @ 11.97 hrs, Volume= 5.271 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Peak Elev= 103.29' @ 11.97 hrs Surf.Area= 63,368 sf Storage= 12,674 cf

Plug-Flow detention time= 27.6 min calculated for 5.667 af (95% of inflow)
 Center-of-Mass det. time= 9.0 min (775.2 - 766.2)

Volume	Invert	Avail.Storage	Storage Description
#1	103.00'	12,674 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
103.00	63,368	0	0
103.20	63,368	12,674	12,674

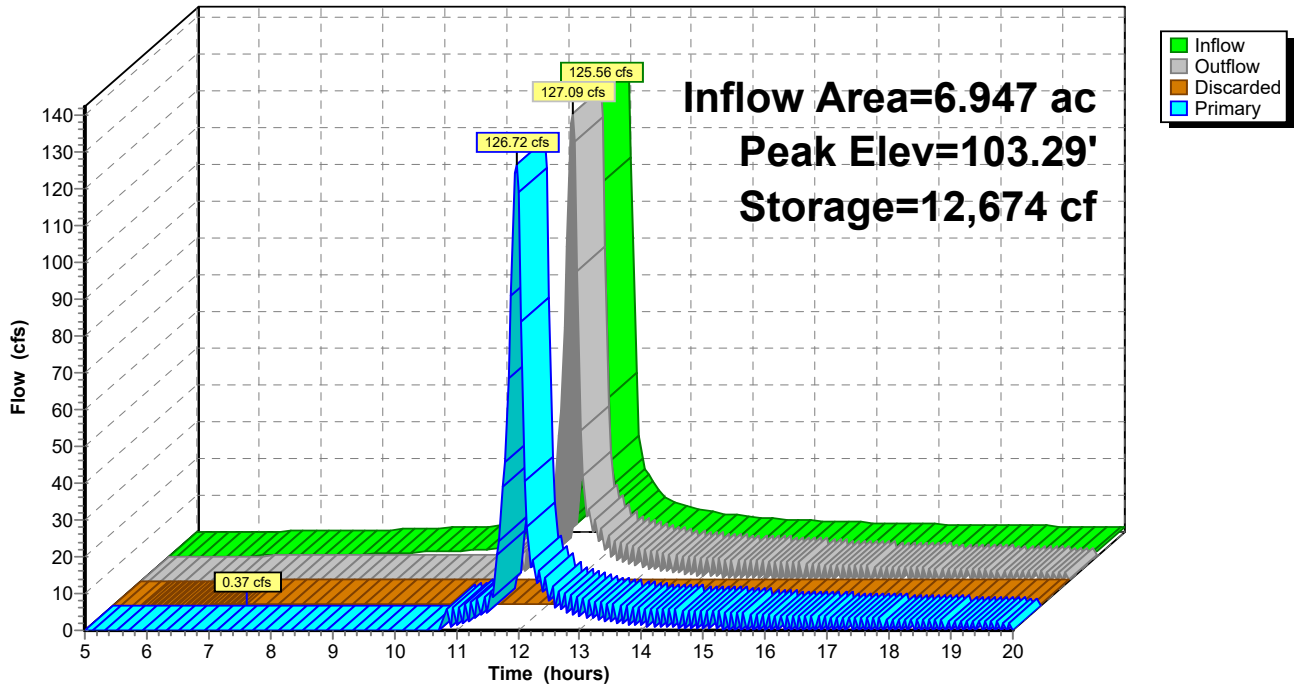
Device	Routing	Invert	Outlet Devices
#1	Discarded	103.00'	0.250 in/hr Exfiltration over Surface area
#2	Primary	103.20'	1,717.0' long x 1.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Discarded OutFlow Max=0.37 cfs @ 7.15 hrs HW=103.00' (Free Discharge)
 ↑1=**Exfiltration** (Exfiltration Controls 0.37 cfs)

Primary OutFlow Max=122.25 cfs @ 11.97 hrs HW=103.29' (Free Discharge)
 ↑2=**Broad-Crested Rectangular Weir**(Weir Controls 122.25 cfs @ 0.80 fps)

Pond 6P: Rock Void

Hydrograph



Staging Area 2 Basin 2 HydroCAD Report

Type II 24-hr 10 DAY-100YR Rainfall=16.10"

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Summary for Pond 8P: Proposed Pond

Inflow Area = 6.947 ac, 0.00% Impervious, Inflow Depth > 9.09" for 10 DAY-100YR event
 Inflow = 118.88 cfs @ 12.01 hrs, Volume= 5.265 af
 Outflow = 13.40 cfs @ 12.42 hrs, Volume= 2.490 af, Atten= 89%, Lag= 25.0 min
 Discarded = 0.29 cfs @ 12.42 hrs, Volume= 0.213 af
 Primary = 13.11 cfs @ 12.42 hrs, Volume= 2.277 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Peak Elev= 94.90' @ 12.42 hrs Surf.Area= 50,143 sf Storage= 137,504 cf

Plug-Flow detention time= 156.2 min calculated for 2.482 af (47% of inflow)
 Center-of-Mass det. time= 90.9 min (867.7 - 776.8)

Volume	Invert	Avail.Storage	Storage Description
#1	92.00'	193,786 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
92.00	44,696	0	0
93.00	46,547	45,622	45,622
94.00	48,426	47,487	93,108
95.00	50,332	49,379	142,487
96.00	52,265	51,299	193,786

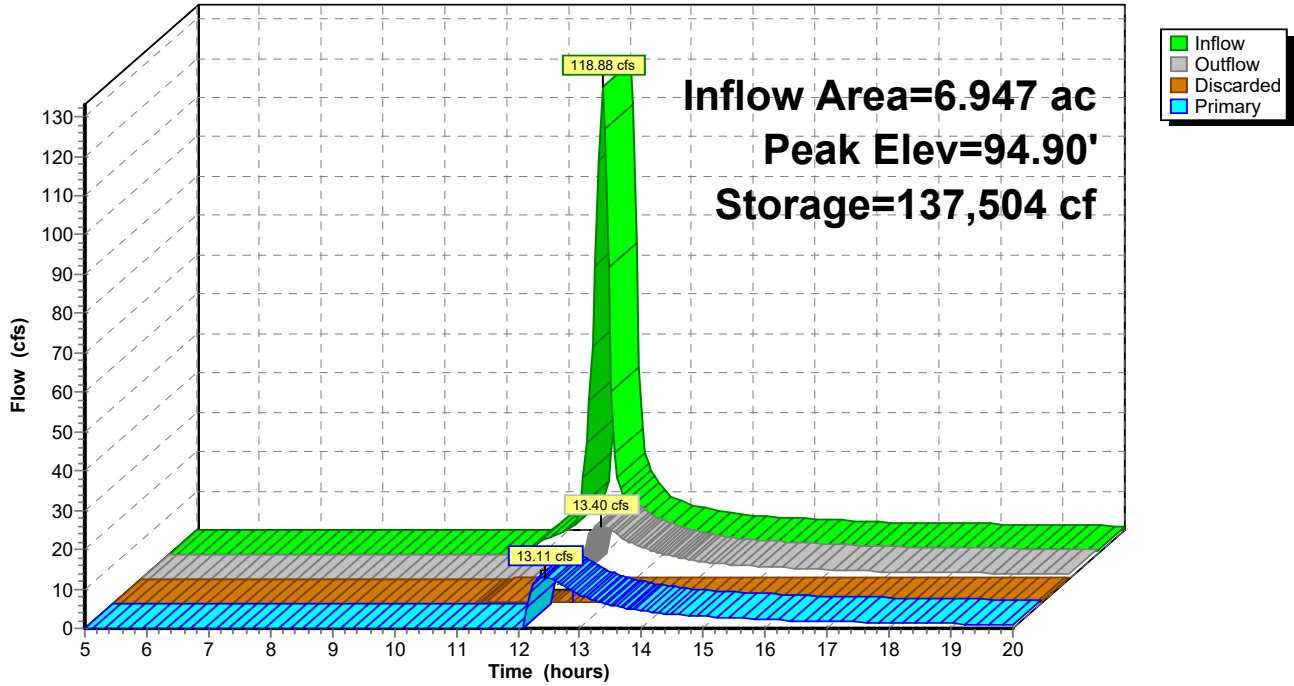
Device	Routing	Invert	Outlet Devices
#1	Discarded	92.00'	0.250 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Primary	94.50'	43.6 deg x 16.0' long x 1.00' rise Sharp-Crested Vee/Trap Weir Cv= 2.56 (C= 3.20)

Discarded OutFlow Max=0.29 cfs @ 12.42 hrs HW=94.90' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.29 cfs)

Primary OutFlow Max=13.07 cfs @ 12.42 hrs HW=94.90' (Free Discharge)
 ↑2=Sharp-Crested Vee/Trap Weir (Weir Controls 13.07 cfs @ 2.02 fps)

Pond 8P: Proposed Pond

Hydrograph



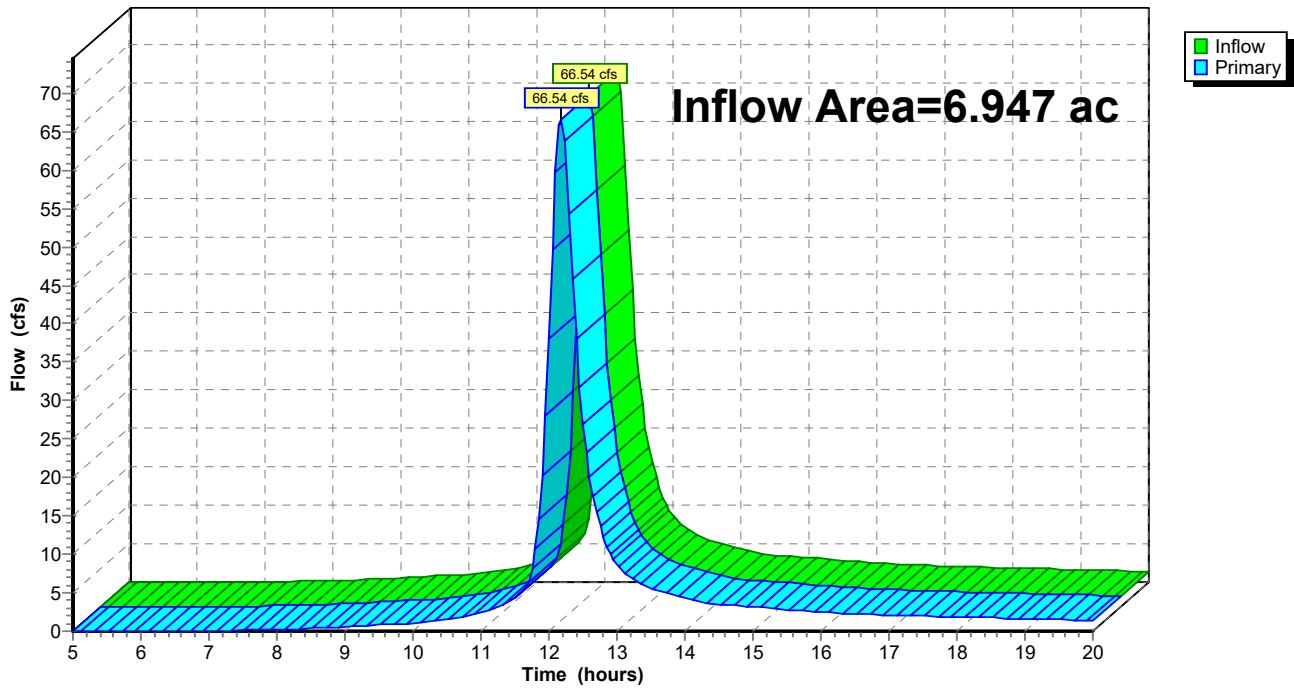
Summary for Link 2L: Outfall

Inflow Area = 6.947 ac, 0.00% Impervious, Inflow Depth > 9.05" for 10 DAY-100YR event
Inflow = 66.54 cfs @ 12.18 hrs, Volume= 5.240 af
Primary = 66.54 cfs @ 12.18 hrs, Volume= 5.240 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link 2L: Outfall

Hydrograph

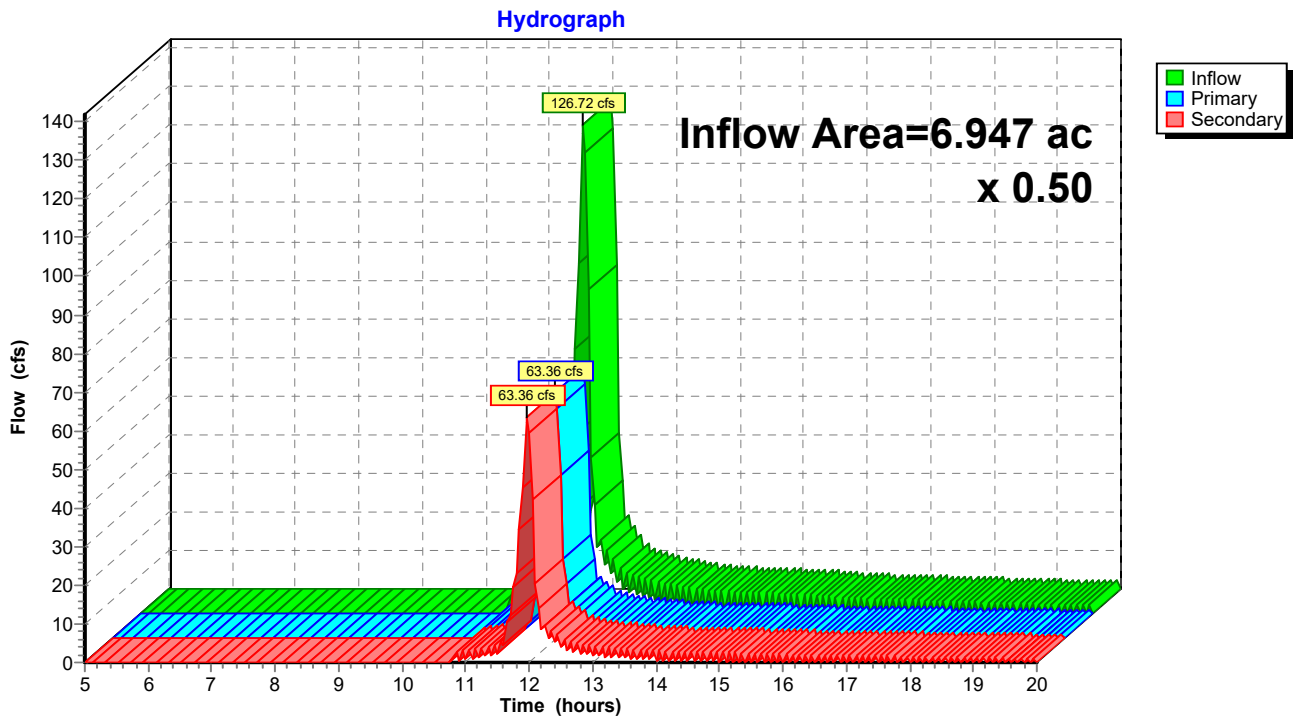


Summary for Link 5L: Sub Separation Outfall

Inflow Area = 6.947 ac, 0.00% Impervious, Inflow Depth > 9.10" for 10 DAY-100YR event
Inflow = 126.72 cfs @ 11.97 hrs, Volume= 5.271 af
Primary = 63.36 cfs @ 11.97 hrs, Volume= 2.635 af, Atten= 50%, Lag= 0.0 min
Secondary = 63.36 cfs @ 11.97 hrs, Volume= 2.635 af

Primary outflow = Inflow x 0.50, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link 5L: Sub Separation Outfall



Staging Area 2 Basin 2 HydroCAD Report

Type II 24-hr 10-YR - 24HR. Rainfall=6.72"

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

Subcatchment 1S: Pre Developed Runoff Area=6.947 ac 0.00% Impervious Runoff Depth>1.99"
Flow Length=607' Slope=0.0247 '/' Tc=24.7 min CN=58 Runoff=14.22 cfs 1.151 af

Subcatchment 4S: Post Developed Runoff Area=6.947 ac 0.00% Impervious Runoff Depth>2.64"
Flow Length=607' Slope=0.2470 '/' Tc=6.5 min CN=65 Runoff=34.50 cfs 1.528 af

Reach 6R: Proposed Ditch Avg. Flow Depth=0.81' Max Vel=4.12 fps Inflow=17.80 cfs 0.473 af
n=0.035 L=392.0' S=0.0250 '/' Capacity=28.19 cfs Outflow=15.45 cfs 0.472 af

Reach 9R: Proposed Ditch Avg. Flow Depth=0.78' Max Vel=4.37 fps Inflow=17.80 cfs 0.473 af
n=0.035 L=438.0' S=0.0297 '/' Capacity=30.72 cfs Outflow=15.45 cfs 0.472 af

Pond 6P: Rock Void Peak Elev=103.24' Storage=12,674 cf Inflow=34.50 cfs 1.528 af
Discarded=0.37 cfs 0.291 af Primary=35.60 cfs 0.947 af Outflow=35.96 cfs 1.237 af

Pond 8P: Proposed Pond Peak Elev=92.75' Storage=33,983 cf Inflow=30.89 cfs 0.945 af
Discarded=0.27 cfs 0.177 af Primary=0.00 cfs 0.000 af Outflow=0.27 cfs 0.177 af

Link 2L: Outfall Inflow=14.22 cfs 1.151 af
Primary=14.22 cfs 1.151 af

Link 5L: Sub Separation Outfall x 0.50 Inflow=35.60 cfs 0.947 af
Primary=17.80 cfs 0.473 af Secondary=17.80 cfs 0.473 af

Staging Area 2 Basin 2 HydroCAD Report

Type II 24-hr 10-YR - 24HR. Rainfall=6.72"

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Summary for Subcatchment 1S: Pre Developed

Runoff = 14.22 cfs @ 12.20 hrs, Volume= 1.151 af, Depth> 1.99"

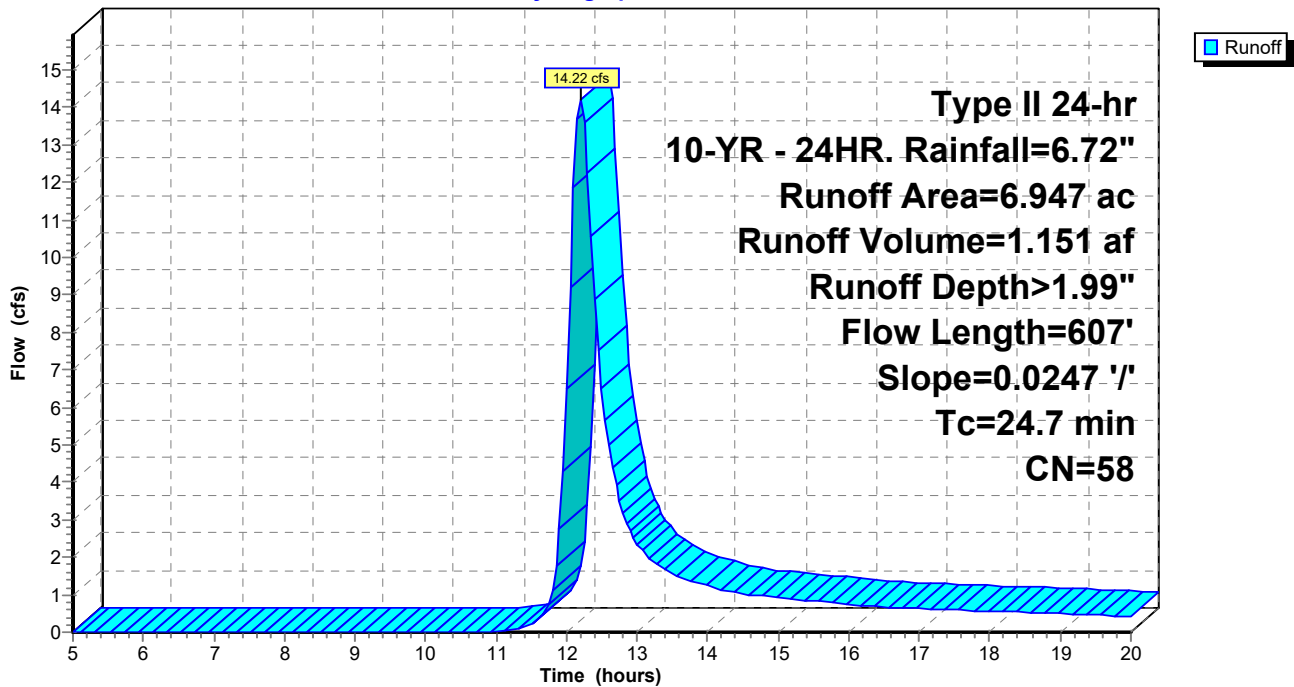
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-YR - 24HR. Rainfall=6.72"

Area (ac)	CN	Description
6.947	58	Meadow, non-grazed, HSG B
6.947		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.7	607	0.0247	0.41		Lag/CN Method,

Subcatchment 1S: Pre Developed

Hydrograph



Staging Area 2 Basin 2 HydroCAD Report

Type II 24-hr 10-YR - 24HR. Rainfall=6.72"

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Summary for Subcatchment 4S: Post Developed

Runoff = 34.50 cfs @ 11.98 hrs, Volume= 1.528 af, Depth> 2.64"

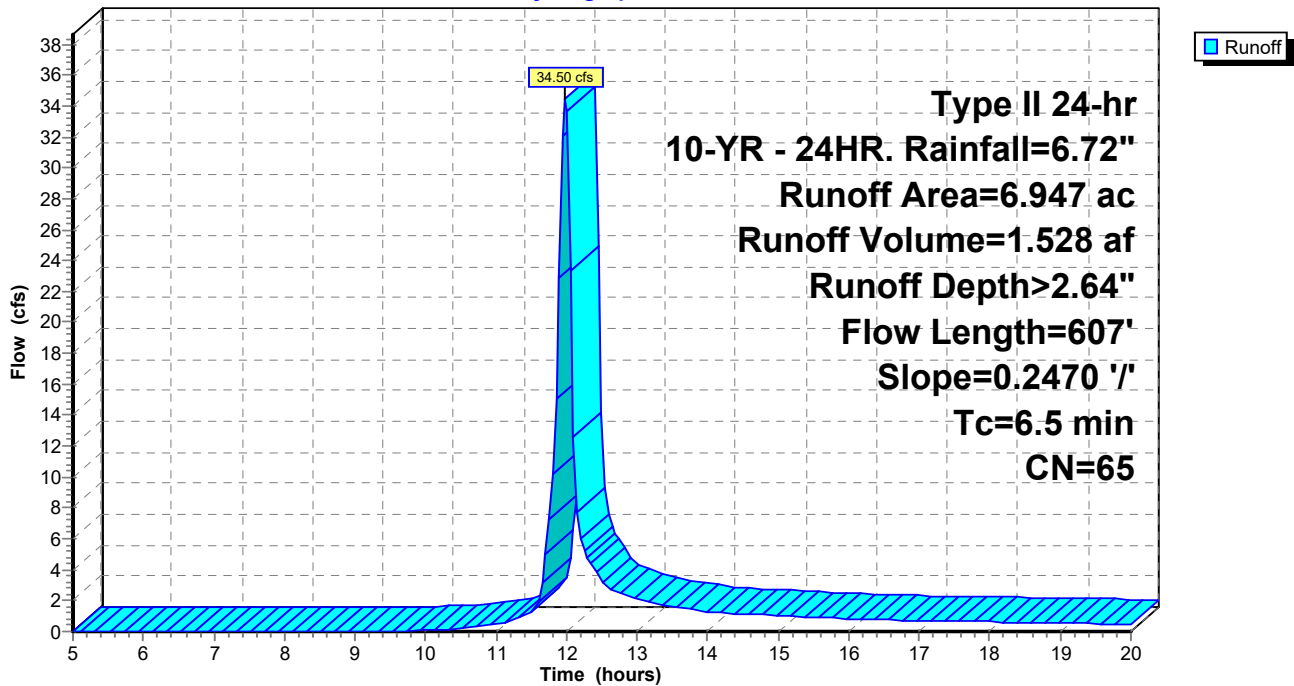
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-YR - 24HR. Rainfall=6.72"

Area (ac)	CN	Description
2.015	58	Meadow, non-grazed, HSG B
* 4.156	65	Uncompacted Gravel (35% Void)
0.776	85	Gravel roads, HSG B
6.947	65	Weighted Average
6.947		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.5	607	0.2470	1.55		Lag/CN Method,

Subcatchment 4S: Post Developed

Hydrograph



Staging Area 2 Basin 2 HydroCAD Report

Type II 24-hr 10-YR - 24HR. Rainfall=6.72"

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Summary for Reach 6R: Proposed Ditch

Inflow Area = 6.947 ac, 0.00% Impervious, Inflow Depth > 0.82" for 10-YR - 24HR. event
Inflow = 17.80 cfs @ 11.99 hrs, Volume= 0.473 af
Outflow = 15.45 cfs @ 12.05 hrs, Volume= 0.472 af, Atten= 13%, Lag= 3.7 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.12 fps, Min. Travel Time= 1.6 min
Avg. Velocity = 1.33 fps, Avg. Travel Time= 4.9 min

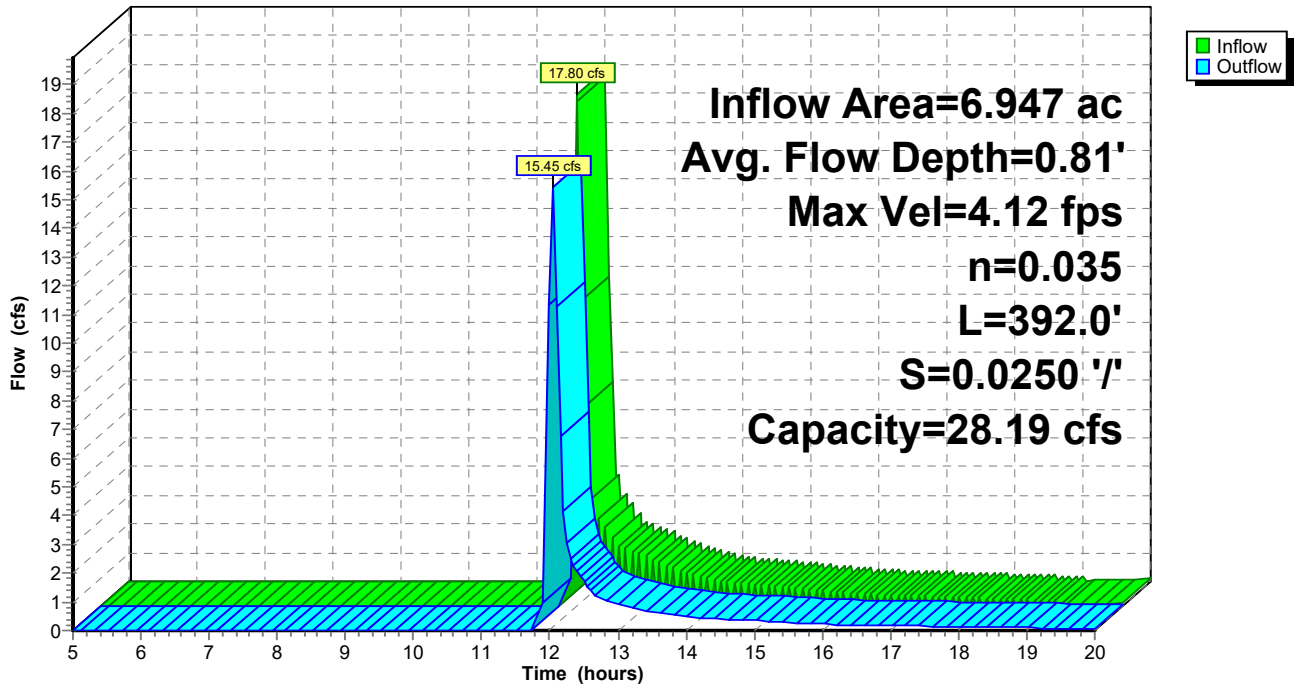
Peak Storage= 1,655 cf @ 12.01 hrs
Average Depth at Peak Storage= 0.81'
Bank-Full Depth= 1.00' Flow Area= 6.0 sf, Capacity= 28.19 cfs

2.00' x 1.00' deep channel, n= 0.035 High grass
Side Slope Z-value= 4.0 '/' Top Width= 10.00'
Length= 392.0' Slope= 0.0250 '/'
Inlet Invert= 101.80', Outlet Invert= 92.00'



Reach 6R: Proposed Ditch

Hydrograph



Staging Area 2 Basin 2 HydroCAD Report

Type II 24-hr 10-YR - 24HR. Rainfall=6.72"

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Summary for Reach 9R: Proposed Ditch

Inflow = 17.80 cfs @ 11.99 hrs, Volume= 0.473 af
Outflow = 15.45 cfs @ 12.05 hrs, Volume= 0.472 af, Atten= 13%, Lag= 3.8 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.37 fps, Min. Travel Time= 1.7 min
Avg. Velocity = 1.41 fps, Avg. Travel Time= 5.2 min

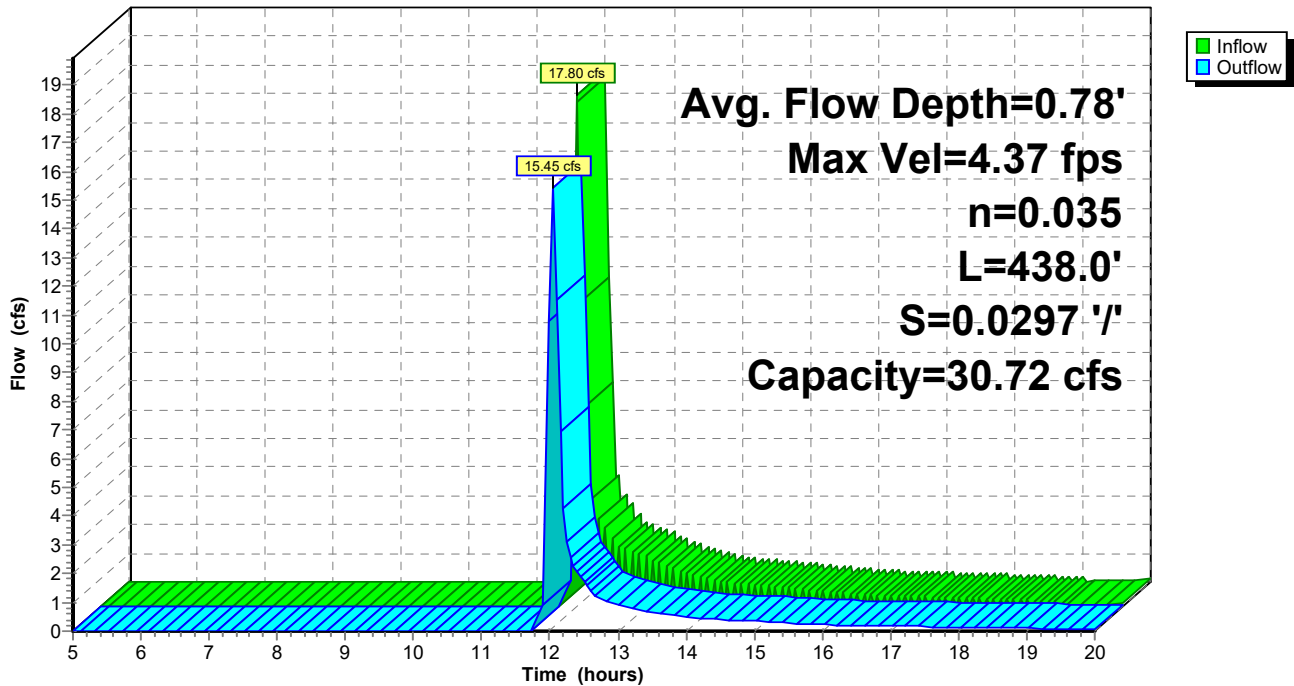
Peak Storage= 1,722 cf @ 12.02 hrs
Average Depth at Peak Storage= 0.78'
Bank-Full Depth= 1.00' Flow Area= 6.0 sf, Capacity= 30.72 cfs

2.00' x 1.00' deep channel, n= 0.035 High grass
Side Slope Z-value= 4.0 '/' Top Width= 10.00'
Length= 438.0' Slope= 0.0297 '/'
Inlet Invert= 105.00', Outlet Invert= 92.00'



Reach 9R: Proposed Ditch

Hydrograph



Staging Area 2 Basin 2 HydroCAD Report

Type II 24-hr 10-YR - 24HR. Rainfall=6.72"

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Summary for Pond 6P: Rock Void

Inflow Area = 6.947 ac, 0.00% Impervious, Inflow Depth > 2.64" for 10-YR - 24HR. event
 Inflow = 34.50 cfs @ 11.98 hrs, Volume= 1.528 af
 Outflow = 35.96 cfs @ 11.99 hrs, Volume= 1.237 af, Atten= 0%, Lag= 0.4 min
 Discarded = 0.37 cfs @ 10.95 hrs, Volume= 0.291 af
 Primary = 35.60 cfs @ 11.99 hrs, Volume= 0.947 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Peak Elev= 103.24' @ 11.99 hrs Surf.Area= 63,368 sf Storage= 12,674 cf

Plug-Flow detention time= 76.2 min calculated for 1.237 af (81% of inflow)
 Center-of-Mass det. time= 21.2 min (817.3 - 796.1)

Volume	Invert	Avail.Storage	Storage Description
#1	103.00'	12,674 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
103.00	63,368	0	0
103.20	63,368	12,674	12,674

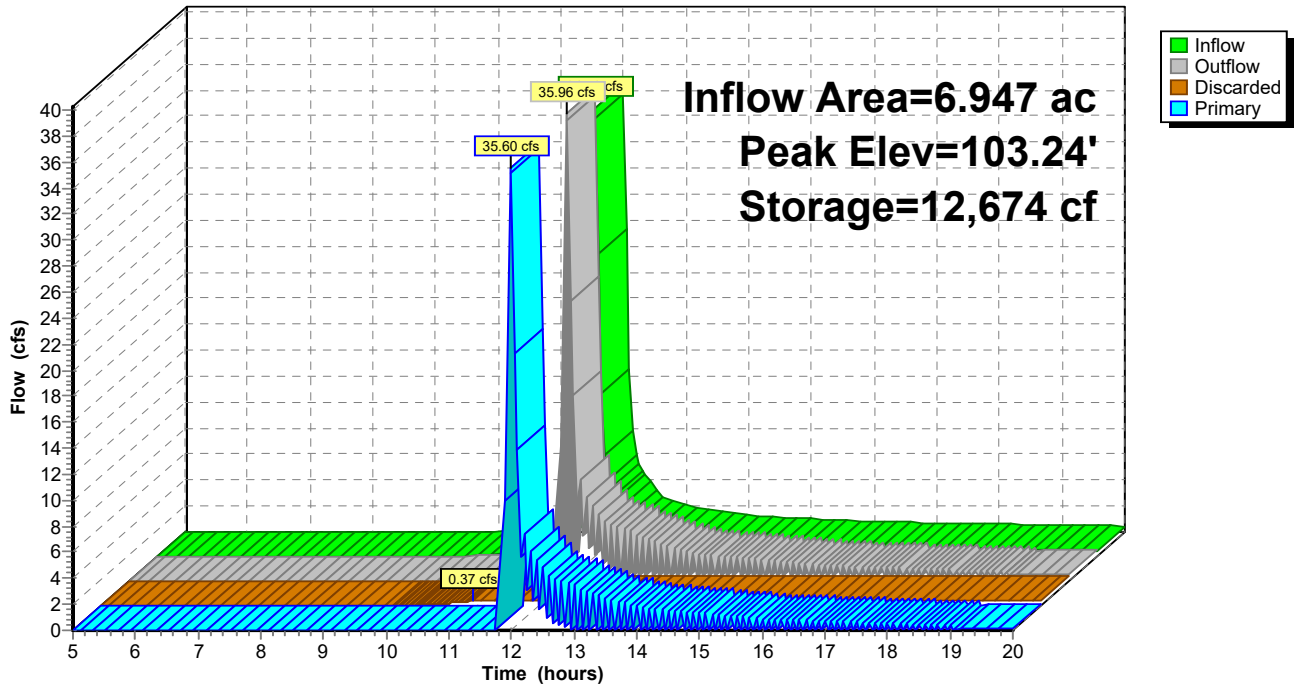
Device	Routing	Invert	Outlet Devices
#1	Discarded	103.00'	0.250 in/hr Exfiltration over Surface area
#2	Primary	103.20'	1,717.0' long x 1.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Discarded OutFlow Max=0.37 cfs @ 10.95 hrs HW=103.00' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.37 cfs)

Primary OutFlow Max=33.89 cfs @ 11.99 hrs HW=103.24' (Free Discharge)
 ↑2=Broad-Crested Rectangular Weir (Weir Controls 33.89 cfs @ 0.52 fps)

Pond 6P: Rock Void

Hydrograph



Staging Area 2 Basin 2 HydroCAD Report

Type II 24-hr 10-YR - 24HR. Rainfall=6.72"

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Summary for Pond 8P: Proposed Pond

Inflow Area = 6.947 ac, 0.00% Impervious, Inflow Depth > 1.63" for 10-YR - 24HR. event
Inflow = 30.89 cfs @ 12.05 hrs, Volume= 0.945 af
Outflow = 0.27 cfs @ 18.09 hrs, Volume= 0.177 af, Atten= 99%, Lag= 362.1 min
Discarded = 0.27 cfs @ 18.09 hrs, Volume= 0.177 af
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 92.75' @ 18.09 hrs Surf.Area= 46,082 sf Storage= 33,983 cf

Plug-Flow detention time= 239.6 min calculated for 0.177 af (19% of inflow)
Center-of-Mass det. time= 168.2 min (960.0 - 791.8)

Volume	Invert	Avail.Storage	Storage Description
#1	92.00'	193,786 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
92.00	44,696	0	0
93.00	46,547	45,622	45,622
94.00	48,426	47,487	93,108
95.00	50,332	49,379	142,487
96.00	52,265	51,299	193,786

Device	Routing	Invert	Outlet Devices
#1	Discarded	92.00'	0.250 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Primary	94.50'	43.6 deg x 16.0' long x 1.00' rise Sharp-Crested Vee/Trap Weir Cv= 2.56 (C= 3.20)

Discarded OutFlow Max=0.27 cfs @ 18.09 hrs HW=92.75' (Free Discharge)

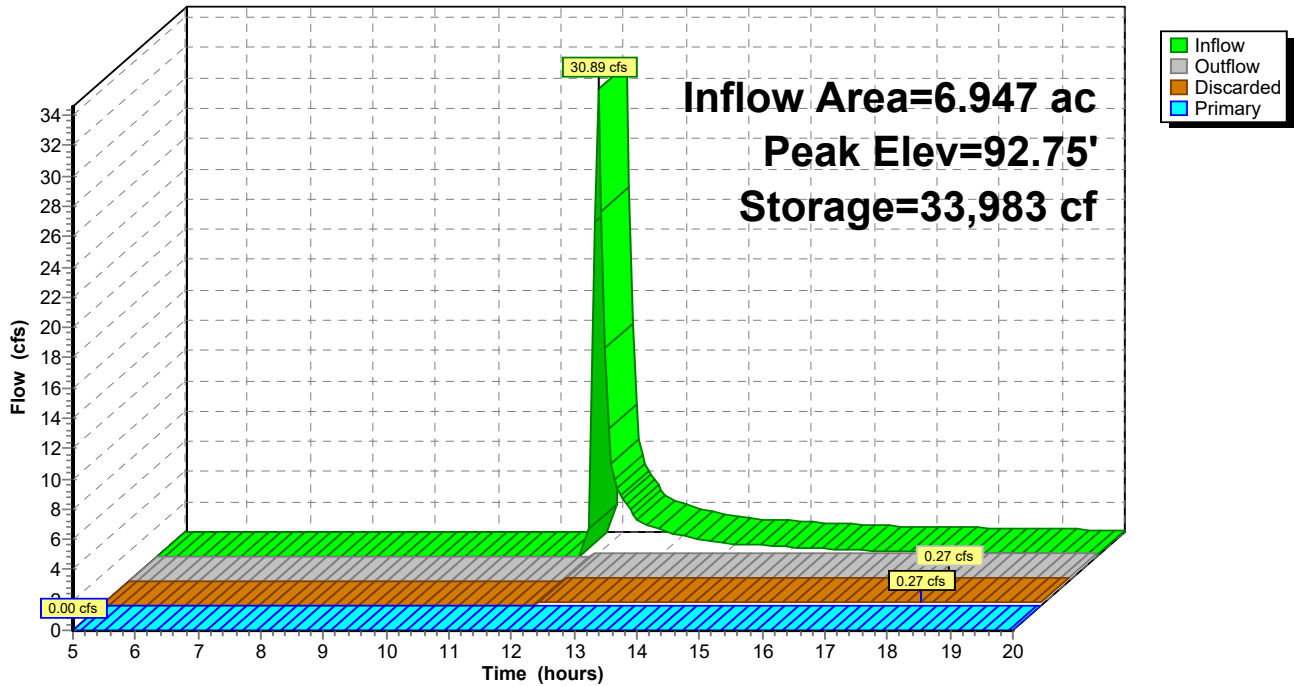
↑1=**Exfiltration** (Exfiltration Controls 0.27 cfs)

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=92.00' (Free Discharge)

↑2=**Sharp-Crested Vee/Trap Weir** (Controls 0.00 cfs)

Pond 8P: Proposed Pond

Hydrograph



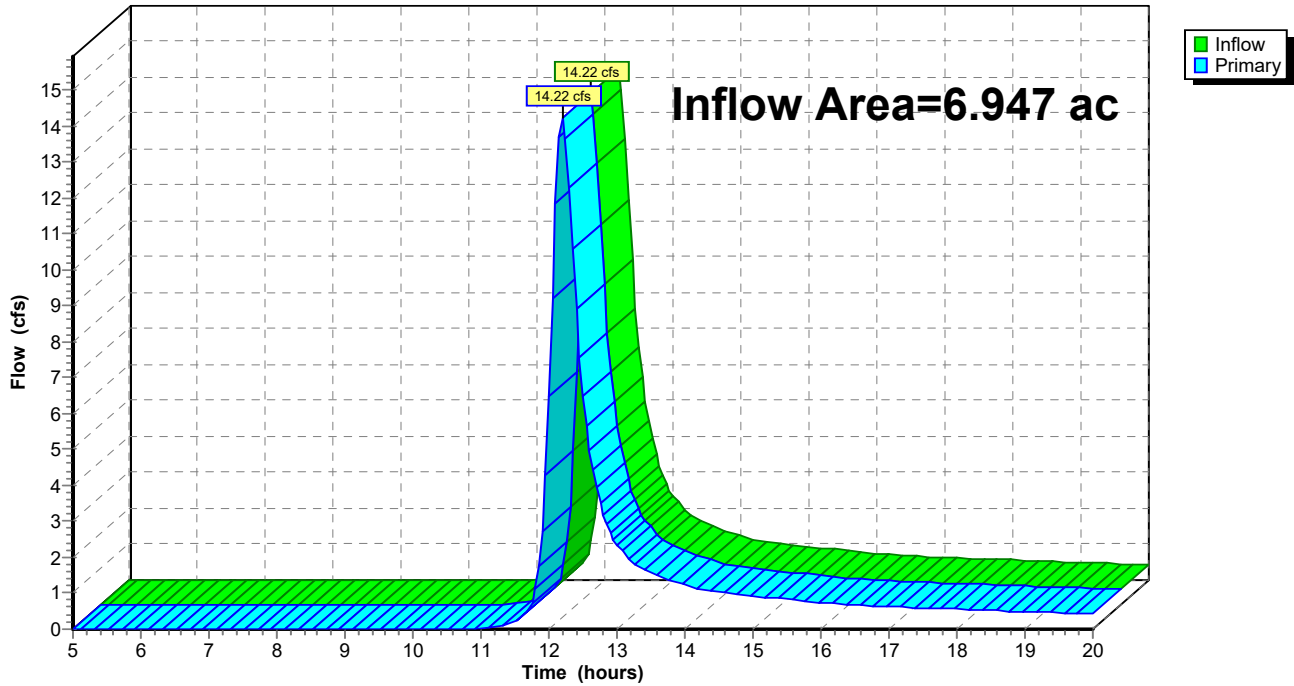
Summary for Link 2L: Outfall

Inflow Area = 6.947 ac, 0.00% Impervious, Inflow Depth > 1.99" for 10-YR - 24HR. event
Inflow = 14.22 cfs @ 12.20 hrs, Volume= 1.151 af
Primary = 14.22 cfs @ 12.20 hrs, Volume= 1.151 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link 2L: Outfall

Hydrograph



Staging Area 2 Basin 2 HydroCAD Report

Type II 24-hr 10-YR - 24HR. Rainfall=6.72"

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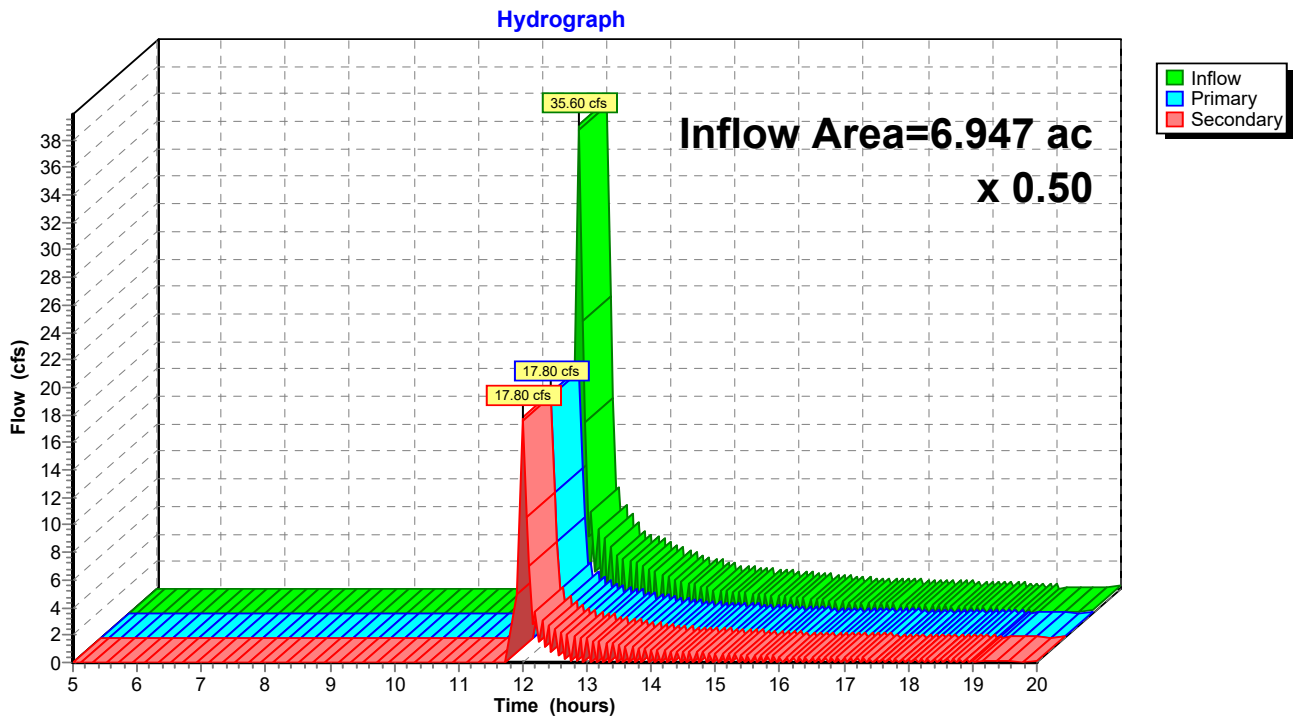
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Summary for Link 5L: Sub Separation Outfall

Inflow Area = 6.947 ac, 0.00% Impervious, Inflow Depth > 1.64" for 10-YR - 24HR. event
Inflow = 35.60 cfs @ 11.99 hrs, Volume= 0.947 af
Primary = 17.80 cfs @ 11.99 hrs, Volume= 0.473 af, Atten= 50%, Lag= 0.0 min
Secondary = 17.80 cfs @ 11.99 hrs, Volume= 0.473 af

Primary outflow = Inflow x 0.50, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link 5L: Sub Separation Outfall



Staging Area 2 Basin 2 HydroCAD Report

Type II 24-hr 25-YR - 24HR. Rainfall=7.92"

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

Subcatchment 1S: Pre Developed Runoff Area=6.947 ac 0.00% Impervious Runoff Depth>2.76"
Flow Length=607' Slope=0.0247 '/' Tc=24.7 min CN=58 Runoff=20.10 cfs 1.596 af

Subcatchment 4S: Post Developed Runoff Area=6.947 ac 0.00% Impervious Runoff Depth>3.52"
Flow Length=607' Slope=0.2470 '/' Tc=6.5 min CN=65 Runoff=45.66 cfs 2.037 af

Reach 6R: Proposed Ditch Avg. Flow Depth=0.89' Max Vel=4.41 fps Inflow=26.08 cfs 0.719 af
n=0.035 L=392.0' S=0.0250 '/' Capacity=28.19 cfs Outflow=21.27 cfs 0.717 af

Reach 9R: Proposed Ditch Avg. Flow Depth=0.86' Max Vel=4.70 fps Inflow=26.08 cfs 0.719 af
n=0.035 L=438.0' S=0.0297 '/' Capacity=30.72 cfs Outflow=21.20 cfs 0.717 af

Pond 6P: Rock Void Peak Elev=103.25' Storage=12,674 cf Inflow=45.66 cfs 2.037 af
Discarded=0.37 cfs 0.310 af Primary=52.16 cfs 1.437 af Outflow=52.52 cfs 1.747 af

Pond 8P: Proposed Pond Peak Elev=93.19' Storage=54,598 cf Inflow=42.47 cfs 1.434 af
Discarded=0.27 cfs 0.181 af Primary=0.00 cfs 0.000 af Outflow=0.27 cfs 0.181 af

Link 2L: Outfall Inflow=20.10 cfs 1.596 af
Primary=20.10 cfs 1.596 af

Link 5L: Sub Separation Outfall x 0.50 Inflow=52.16 cfs 1.437 af
Primary=26.08 cfs 0.719 af Secondary=26.08 cfs 0.719 af

Staging Area 2 Basin 2 HydroCAD Report

Type II 24-hr 25-YR - 24HR. Rainfall=7.92"

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Summary for Subcatchment 1S: Pre Developed

Runoff = 20.10 cfs @ 12.19 hrs, Volume= 1.596 af, Depth> 2.76"

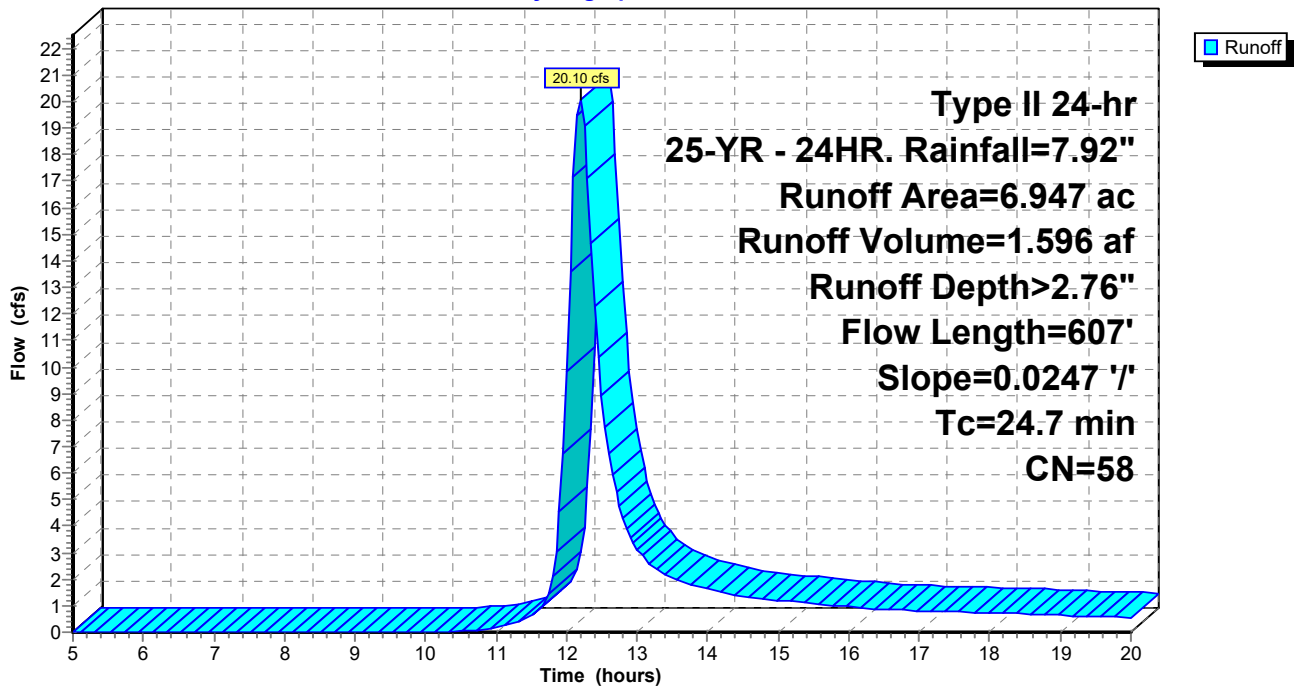
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-YR - 24HR. Rainfall=7.92"

Area (ac)	CN	Description
6.947	58	Meadow, non-grazed, HSG B
6.947		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.7	607	0.0247	0.41		Lag/CN Method,

Subcatchment 1S: Pre Developed

Hydrograph



Staging Area 2 Basin 2 HydroCAD Report

Type II 24-hr 25-YR - 24HR. Rainfall=7.92"

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Summary for Subcatchment 4S: Post Developed

Runoff = 45.66 cfs @ 11.98 hrs, Volume= 2.037 af, Depth> 3.52"

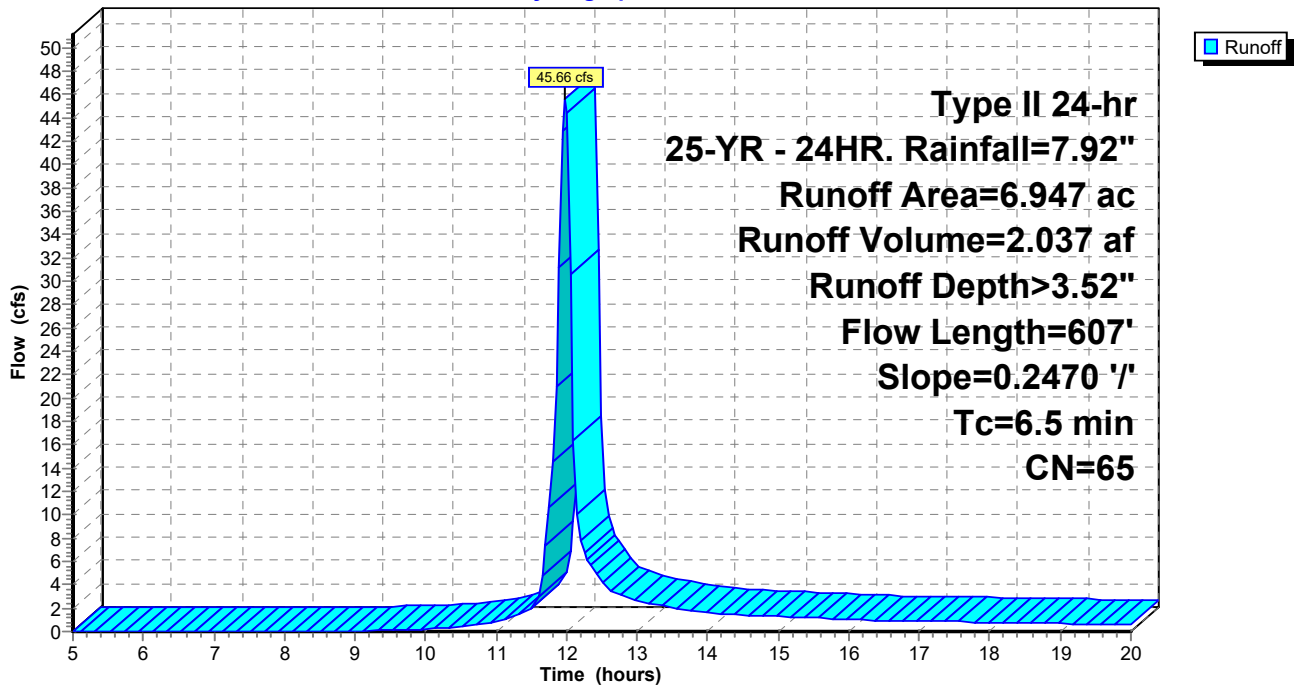
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-YR - 24HR. Rainfall=7.92"

Area (ac)	CN	Description
2.015	58	Meadow, non-grazed, HSG B
* 4.156	65	Uncompacted Gravel (35% Void)
0.776	85	Gravel roads, HSG B
6.947	65	Weighted Average
6.947		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.5	607	0.2470	1.55		Lag/CN Method,

Subcatchment 4S: Post Developed

Hydrograph



Staging Area 2 Basin 2 HydroCAD Report

Type II 24-hr 25-YR - 24HR. Rainfall=7.92"

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Summary for Reach 6R: Proposed Ditch

Inflow Area = 6.947 ac, 0.00% Impervious, Inflow Depth > 1.24" for 25-YR - 24HR. event
Inflow = 26.08 cfs @ 11.99 hrs, Volume= 0.719 af
Outflow = 21.27 cfs @ 12.02 hrs, Volume= 0.717 af, Atten= 18%, Lag= 1.6 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.41 fps, Min. Travel Time= 1.5 min
Avg. Velocity = 1.52 fps, Avg. Travel Time= 4.3 min

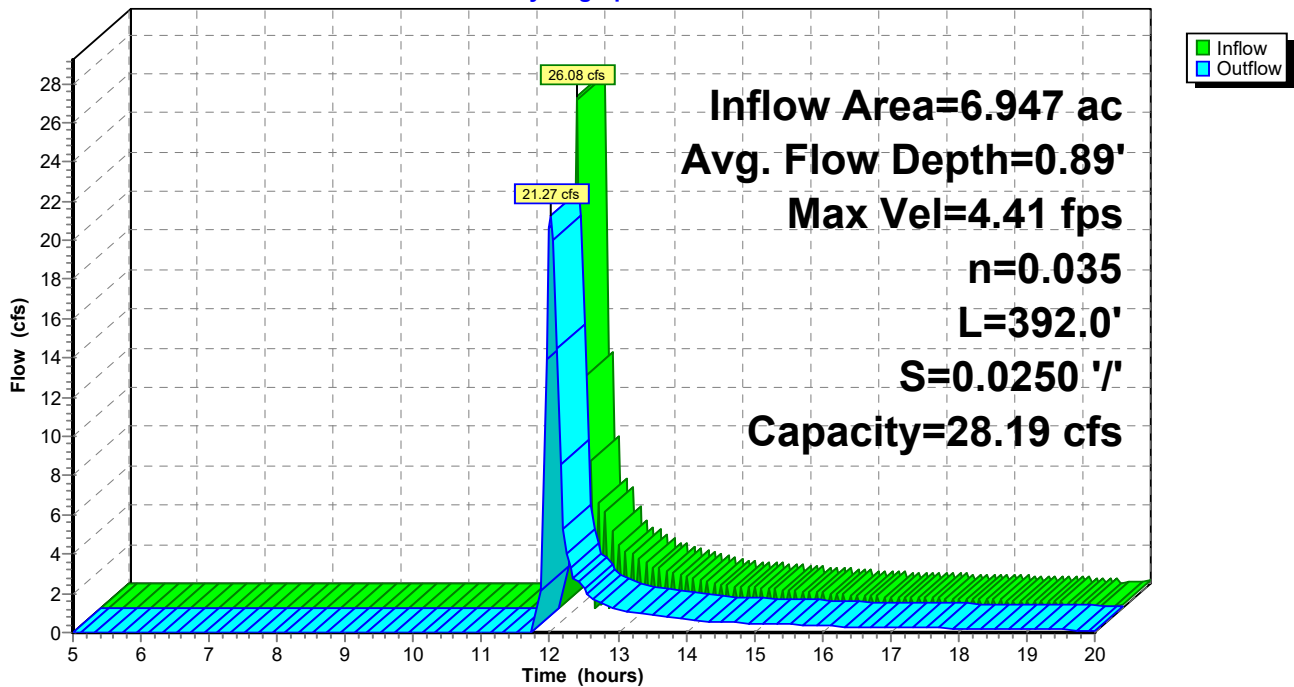
Peak Storage= 1,957 cf @ 12.00 hrs
Average Depth at Peak Storage= 0.89'
Bank-Full Depth= 1.00' Flow Area= 6.0 sf, Capacity= 28.19 cfs

2.00' x 1.00' deep channel, n= 0.035 High grass
Side Slope Z-value= 4.0 '/' Top Width= 10.00'
Length= 392.0' Slope= 0.0250 '/'
Inlet Invert= 101.80', Outlet Invert= 92.00'



Reach 6R: Proposed Ditch

Hydrograph



Staging Area 2 Basin 2 HydroCAD Report

Type II 24-hr 25-YR - 24HR. Rainfall=7.92"

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Summary for Reach 9R: Proposed Ditch

Inflow = 26.08 cfs @ 11.99 hrs, Volume= 0.719 af
Outflow = 21.20 cfs @ 12.02 hrs, Volume= 0.717 af, Atten= 19%, Lag= 1.8 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.70 fps, Min. Travel Time= 1.6 min
Avg. Velocity = 1.61 fps, Avg. Travel Time= 4.5 min

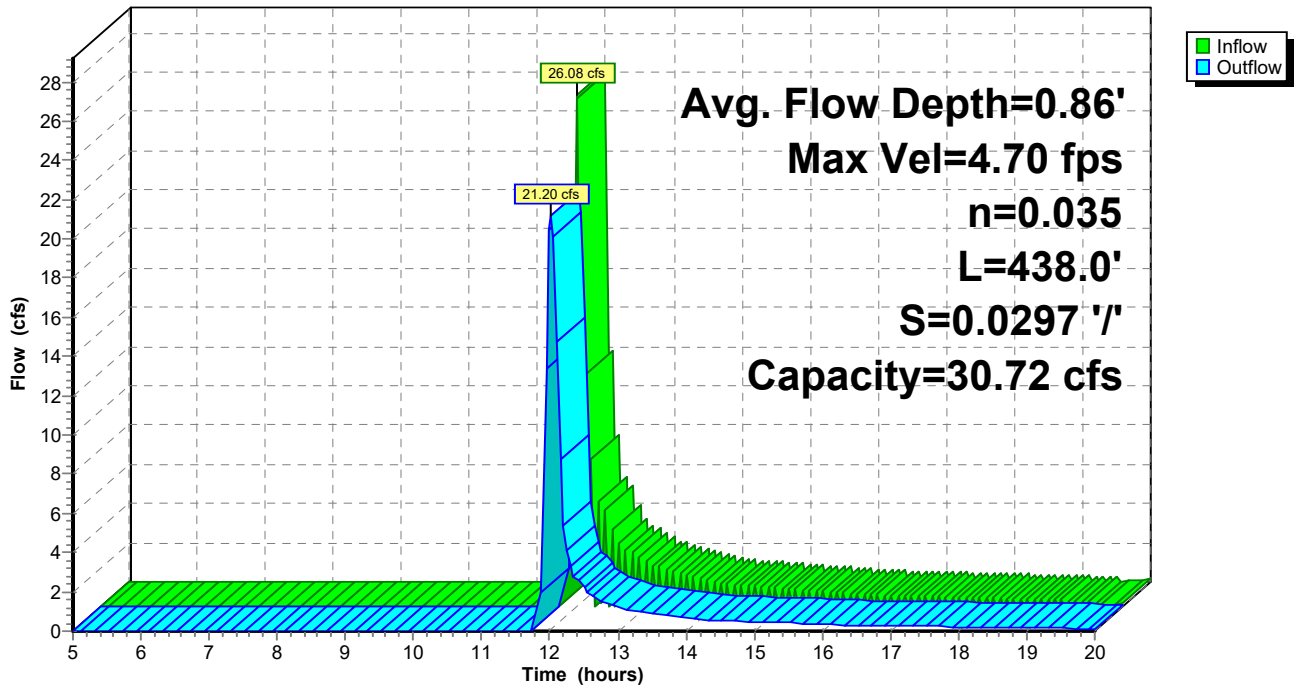
Peak Storage= 2,049 cf @ 12.00 hrs
Average Depth at Peak Storage= 0.86'
Bank-Full Depth= 1.00' Flow Area= 6.0 sf, Capacity= 30.72 cfs

2.00' x 1.00' deep channel, n= 0.035 High grass
Side Slope Z-value= 4.0 '/' Top Width= 10.00'
Length= 438.0' Slope= 0.0297 '/'
Inlet Invert= 105.00', Outlet Invert= 92.00'



Reach 9R: Proposed Ditch

Hydrograph



Staging Area 2 Basin 2 HydroCAD Report

Type II 24-hr 25-YR - 24HR. Rainfall=7.92"

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Summary for Pond 6P: Rock Void

Inflow Area = 6.947 ac, 0.00% Impervious, Inflow Depth > 3.52" for 25-YR - 24HR. event
 Inflow = 45.66 cfs @ 11.98 hrs, Volume= 2.037 af
 Outflow = 52.52 cfs @ 11.99 hrs, Volume= 1.747 af, Atten= 0%, Lag= 0.8 min
 Discarded = 0.37 cfs @ 10.45 hrs, Volume= 0.310 af
 Primary = 52.16 cfs @ 11.99 hrs, Volume= 1.437 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Peak Elev= 103.25' @ 11.99 hrs Surf.Area= 63,368 sf Storage= 12,674 cf

Plug-Flow detention time= 60.0 min calculated for 1.747 af (86% of inflow)
 Center-of-Mass det. time= 15.3 min (805.4 - 790.1)

Volume	Invert	Avail.Storage	Storage Description
#1	103.00'	12,674 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
103.00	63,368	0	0
103.20	63,368	12,674	12,674

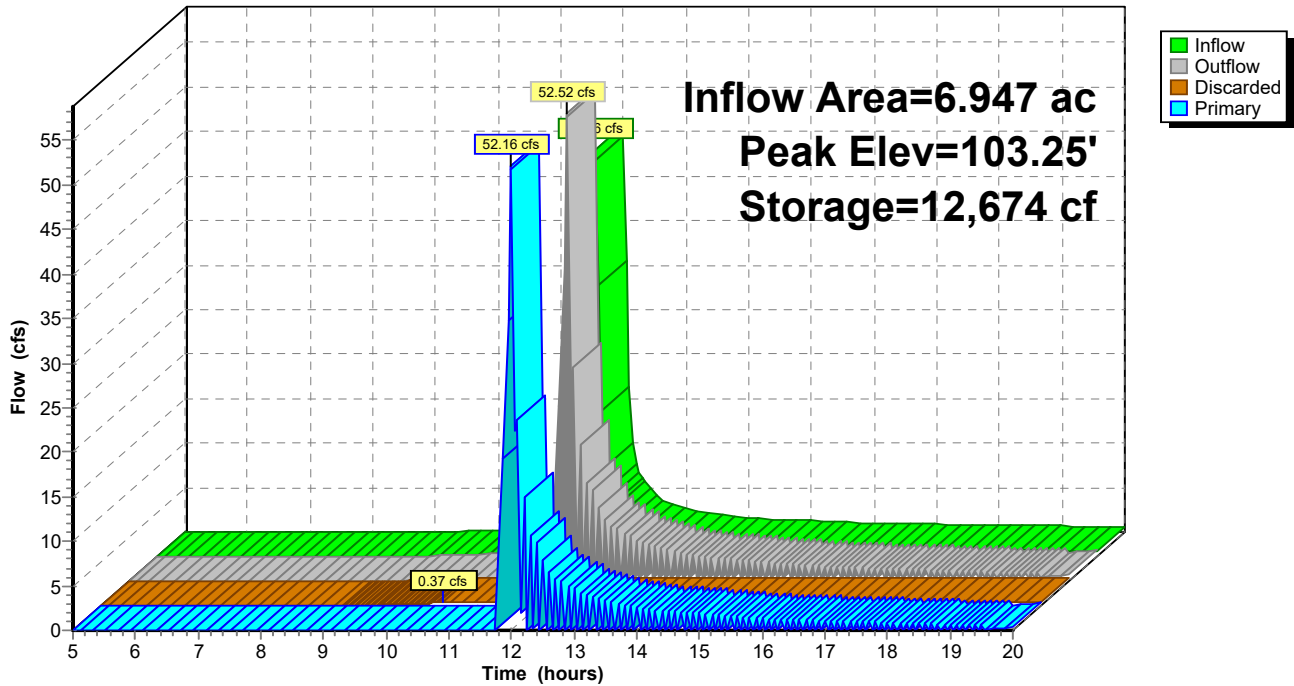
Device	Routing	Invert	Outlet Devices
#1	Discarded	103.00'	0.250 in/hr Exfiltration over Surface area
#2	Primary	103.20'	1,717.0' long x 1.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Discarded OutFlow Max=0.37 cfs @ 10.45 hrs HW=103.00' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.37 cfs)

Primary OutFlow Max=49.36 cfs @ 11.99 hrs HW=103.25' (Free Discharge)
 ↑2=Broad-Crested Rectangular Weir (Weir Controls 49.36 cfs @ 0.59 fps)

Pond 6P: Rock Void

Hydrograph



Staging Area 2 Basin 2 HydroCAD Report

Type II 24-hr 25-YR - 24HR. Rainfall=7.92"

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Summary for Pond 8P: Proposed Pond

Inflow Area = 6.947 ac, 0.00% Impervious, Inflow Depth > 2.48" for 25-YR - 24HR. event
Inflow = 42.47 cfs @ 12.02 hrs, Volume= 1.434 af
Outflow = 0.27 cfs @ 19.58 hrs, Volume= 0.181 af, Atten= 99%, Lag= 453.7 min
Discarded = 0.27 cfs @ 19.58 hrs, Volume= 0.181 af
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 93.19' @ 19.58 hrs Surf.Area= 46,908 sf Storage= 54,598 cf

Plug-Flow detention time= 241.1 min calculated for 0.181 af (13% of inflow)
Center-of-Mass det. time= 169.0 min (958.7 - 789.7)

Volume	Invert	Avail.Storage	Storage Description
#1	92.00'	193,786 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
92.00	44,696	0	0
93.00	46,547	45,622	45,622
94.00	48,426	47,487	93,108
95.00	50,332	49,379	142,487
96.00	52,265	51,299	193,786

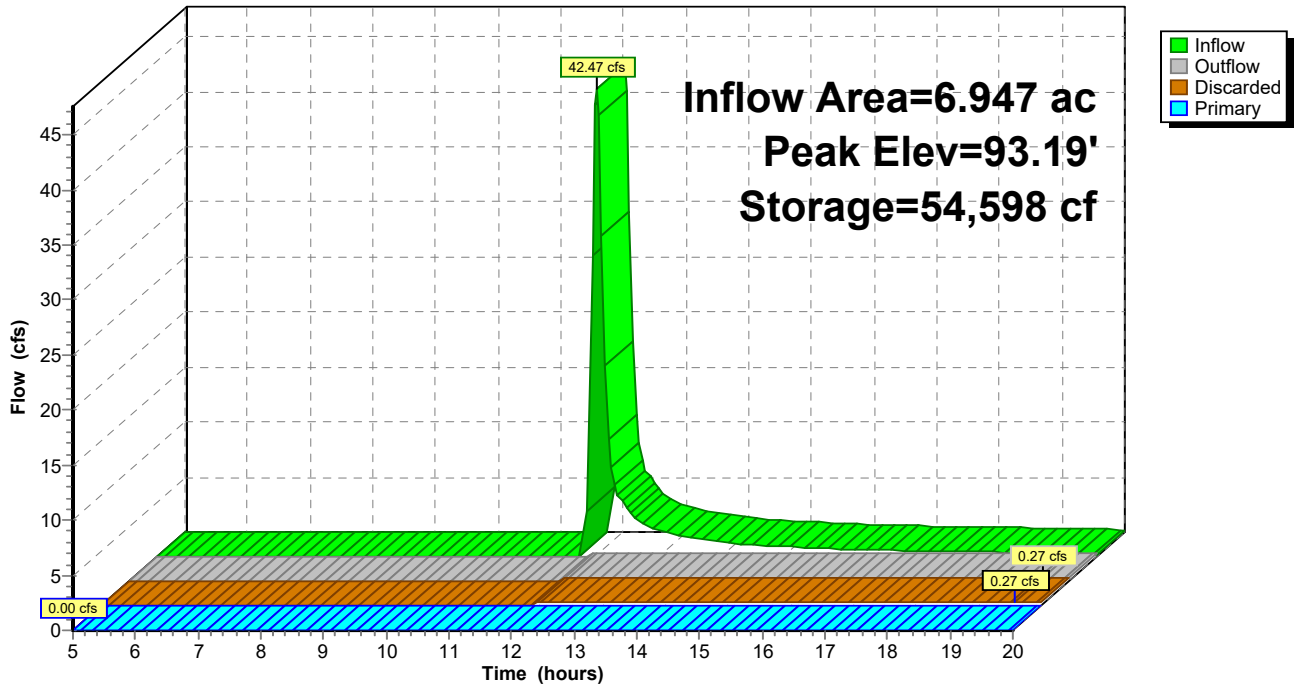
Device	Routing	Invert	Outlet Devices
#1	Discarded	92.00'	0.250 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Primary	94.50'	43.6 deg x 16.0' long x 1.00' rise Sharp-Crested Vee/Trap Weir Cv= 2.56 (C= 3.20)

Discarded OutFlow Max=0.27 cfs @ 19.58 hrs HW=93.19' (Free Discharge)
↑1=Exfiltration (Exfiltration Controls 0.27 cfs)

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=92.00' (Free Discharge)
↑2=Sharp-Crested Vee/Trap Weir (Controls 0.00 cfs)

Pond 8P: Proposed Pond

Hydrograph



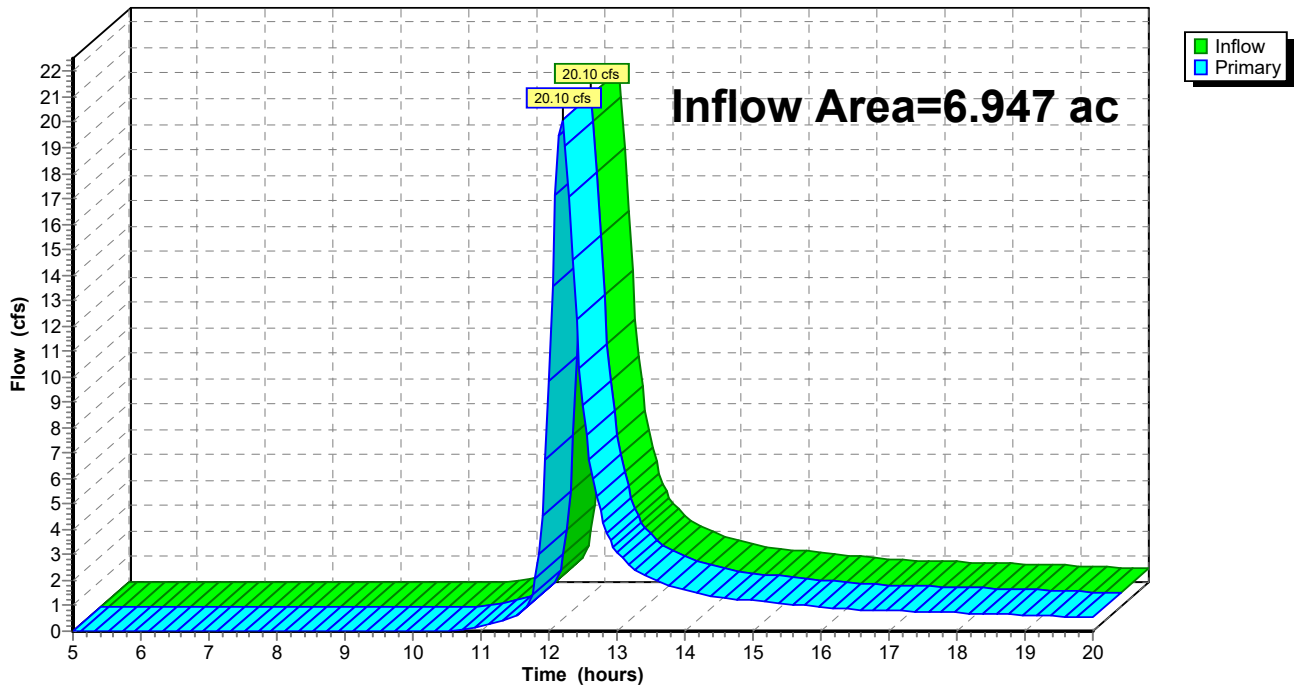
Summary for Link 2L: Outfall

Inflow Area = 6.947 ac, 0.00% Impervious, Inflow Depth > 2.76" for 25-YR - 24HR. event
Inflow = 20.10 cfs @ 12.19 hrs, Volume= 1.596 af
Primary = 20.10 cfs @ 12.19 hrs, Volume= 1.596 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link 2L: Outfall

Hydrograph



Staging Area 2 Basin 2 HydroCAD Report

Type II 24-hr 25-YR - 24HR. Rainfall=7.92"

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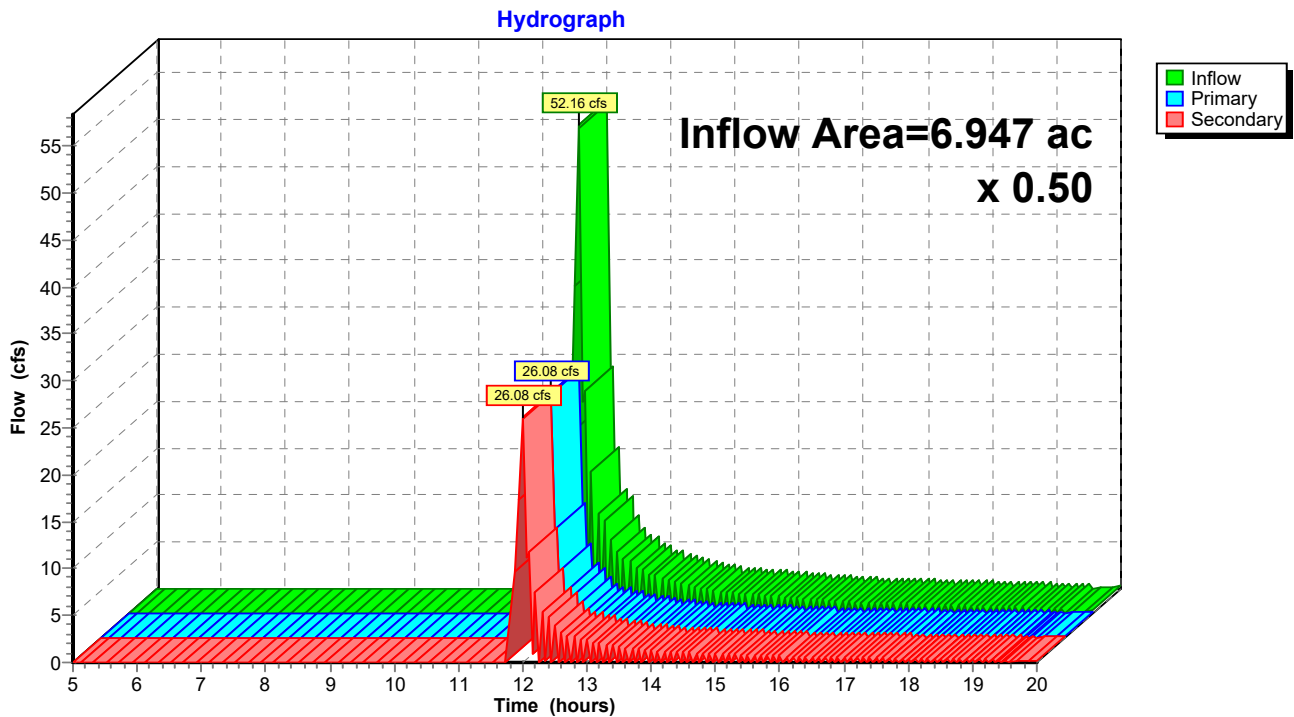
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Summary for Link 5L: Sub Separation Outfall

Inflow Area = 6.947 ac, 0.00% Impervious, Inflow Depth > 2.48" for 25-YR - 24HR. event
Inflow = 52.16 cfs @ 11.99 hrs, Volume= 1.437 af
Primary = 26.08 cfs @ 11.99 hrs, Volume= 0.719 af, Atten= 50%, Lag= 0.0 min
Secondary = 26.08 cfs @ 11.99 hrs, Volume= 0.719 af

Primary outflow = Inflow x 0.50, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link 5L: Sub Separation Outfall



Staging Area 2 Basin 2 HydroCAD Report Type II 24-hr 1.00 hrs 100-YR - 1HR. Rainfall=4.20"

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

Subcatchment 1S: Pre Developed Runoff Area=6.947 ac 0.00% Impervious Runoff Depth=0.00"
Flow Length=607' Slope=0.0247 '/' Tc=24.7 min CN=58 Runoff=0.00 cfs 0.000 af

Subcatchment 4S: Post Developed Runoff Area=6.947 ac 0.00% Impervious Runoff Depth=0.00"
Flow Length=607' Slope=0.2470 '/' Tc=6.5 min CN=65 Runoff=0.00 cfs 0.000 af

Reach 6R: Proposed Ditch Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af
n=0.035 L=392.0' S=0.0250 '/' Capacity=28.19 cfs Outflow=0.00 cfs 0.000 af

Reach 9R: Proposed Ditch Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af
n=0.035 L=438.0' S=0.0297 '/' Capacity=30.72 cfs Outflow=0.00 cfs 0.000 af

Pond 6P: Rock Void Peak Elev=103.00' Storage=0 cf Inflow=0.00 cfs 0.000 af
Discarded=0.00 cfs 0.000 af Primary=0.00 cfs 0.000 af Outflow=0.00 cfs 0.000 af

Pond 8P: Proposed Pond Peak Elev=92.00' Storage=0 cf Inflow=0.00 cfs 0.000 af
Discarded=0.00 cfs 0.000 af Primary=0.00 cfs 0.000 af Outflow=0.00 cfs 0.000 af

Link 2L: Outfall Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

Link 5L: Sub Separation Outfall x 0.50 Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af Secondary=0.00 cfs 0.000 af

Summary for Subcatchment 1S: Pre Developed

Runoff = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Depth= 0.00"

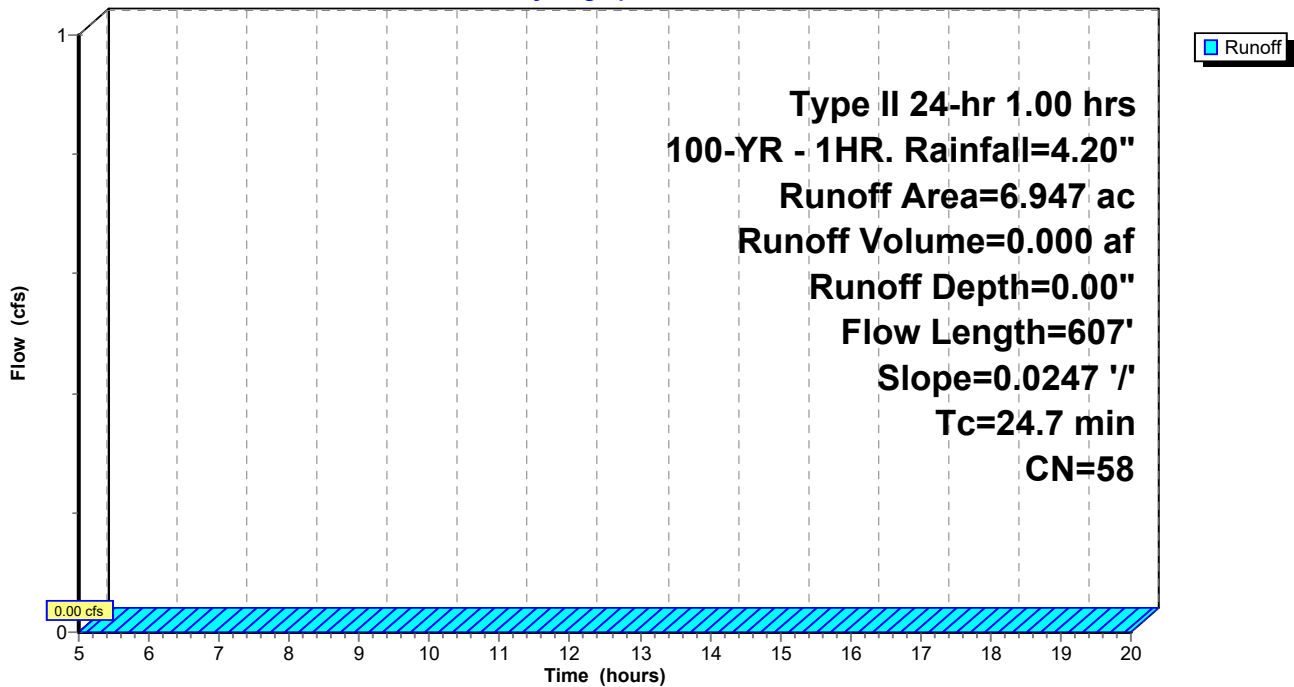
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Type II 24-hr 1.00 hrs 100-YR - 1HR. Rainfall=4.20"

Area (ac)	CN	Description
6.947	58	Meadow, non-grazed, HSG B
6.947		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.7	607	0.0247	0.41		Lag/CN Method,

Subcatchment 1S: Pre Developed

Hydrograph



Summary for Subcatchment 4S: Post Developed

Runoff = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Depth= 0.00"

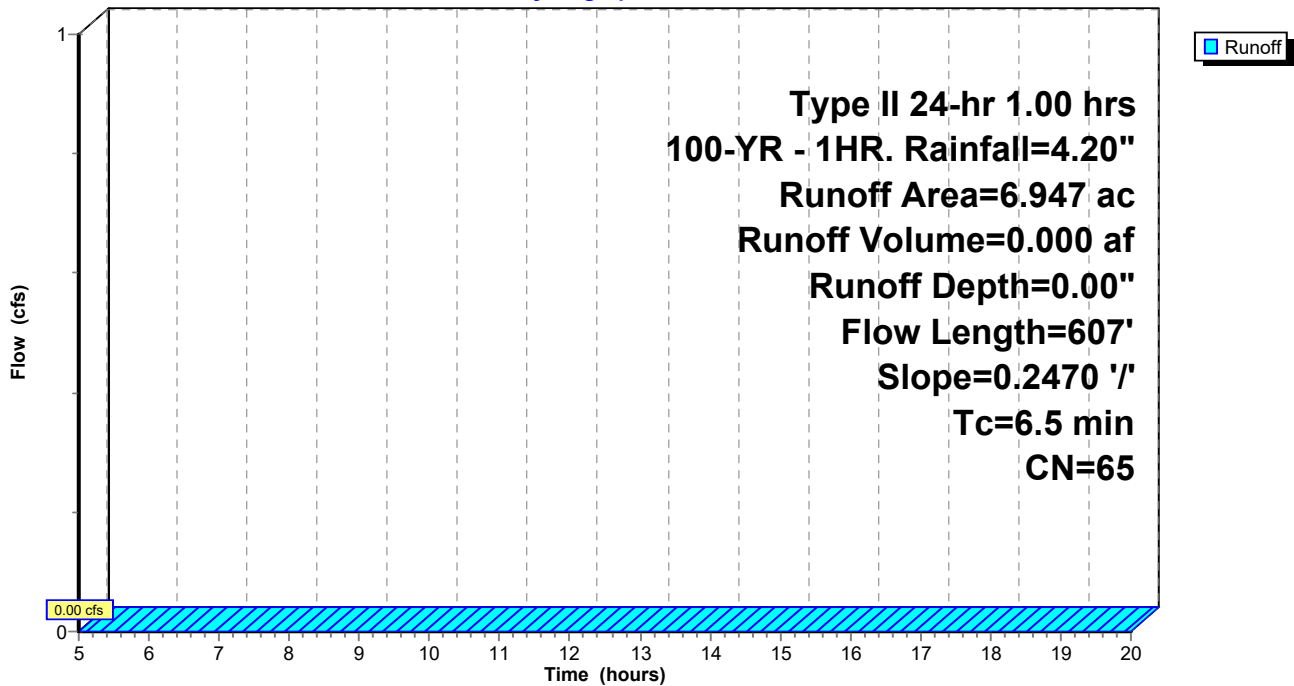
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Type II 24-hr 1.00 hrs 100-YR - 1HR. Rainfall=4.20"

Area (ac)	CN	Description
2.015	58	Meadow, non-grazed, HSG B
* 4.156	65	Uncompacted Gravel (35% Void)
0.776	85	Gravel roads, HSG B
6.947	65	Weighted Average
6.947		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.5	607	0.2470	1.55		Lag/CN Method,

Subcatchment 4S: Post Developed

Hydrograph



Summary for Reach 6R: Proposed Ditch

Inflow Area = 6.947 ac, 0.00% Impervious, Inflow Depth = 0.00" for 100-YR - 1HR. event
 Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
 Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Max. Velocity= 0.00 fps, Min. Travel Time= 0.0 min
 Avg. Velocity = 0.00 fps, Avg. Travel Time= 0.0 min

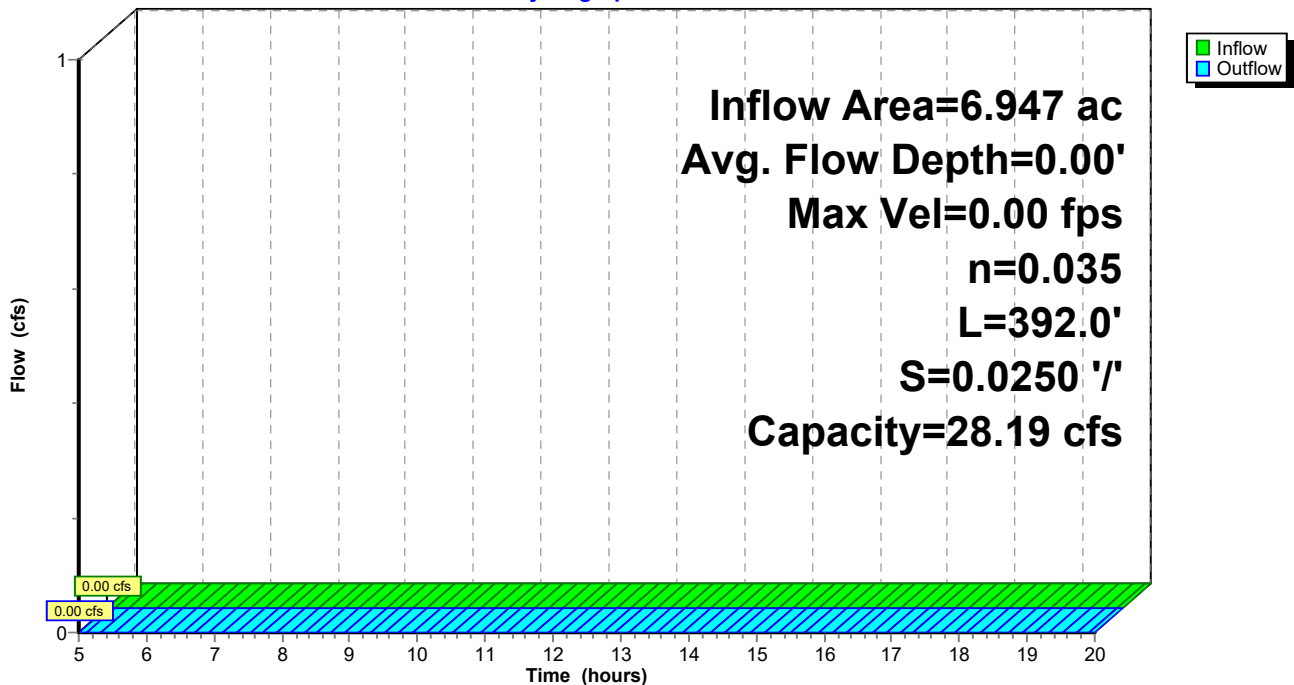
Peak Storage= 0 cf @ 5.00 hrs
 Average Depth at Peak Storage= 0.00'
 Bank-Full Depth= 1.00' Flow Area= 6.0 sf, Capacity= 28.19 cfs

2.00' x 1.00' deep channel, n= 0.035 High grass
 Side Slope Z-value= 4.0 '/' Top Width= 10.00'
 Length= 392.0' Slope= 0.0250 '/'
 Inlet Invert= 101.80', Outlet Invert= 92.00'



Reach 6R: Proposed Ditch

Hydrograph



Summary for Reach 9R: Proposed Ditch

Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
 Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Max. Velocity= 0.00 fps, Min. Travel Time= 0.0 min
 Avg. Velocity = 0.00 fps, Avg. Travel Time= 0.0 min

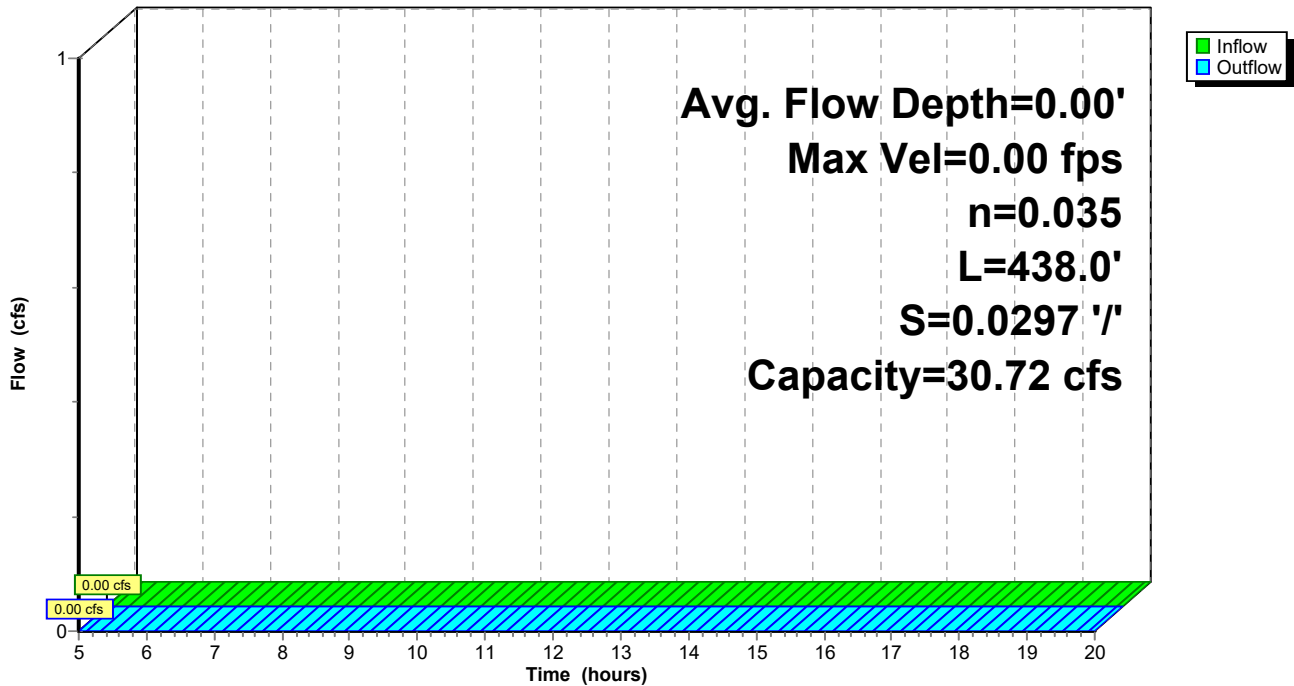
Peak Storage= 0 cf @ 5.00 hrs
 Average Depth at Peak Storage= 0.00'
 Bank-Full Depth= 1.00' Flow Area= 6.0 sf, Capacity= 30.72 cfs

2.00' x 1.00' deep channel, n= 0.035 High grass
 Side Slope Z-value= 4.0 '/' Top Width= 10.00'
 Length= 438.0' Slope= 0.0297 '/'
 Inlet Invert= 105.00', Outlet Invert= 92.00'



Reach 9R: Proposed Ditch

Hydrograph



Summary for Pond 6P: Rock Void

Inflow Area = 6.947 ac, 0.00% Impervious, Inflow Depth = 0.00" for 100-YR - 1HR. event
 Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
 Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min
 Discarded = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
 Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Peak Elev= 103.00' @ 5.00 hrs Surf.Area= 63,368 sf Storage= 0 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
 Center-of-Mass det. time= (not calculated: no inflow)

Volume	Invert	Avail.Storage	Storage Description
#1	103.00'	12,674 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
103.00	63,368	0	0
103.20	63,368	12,674	12,674

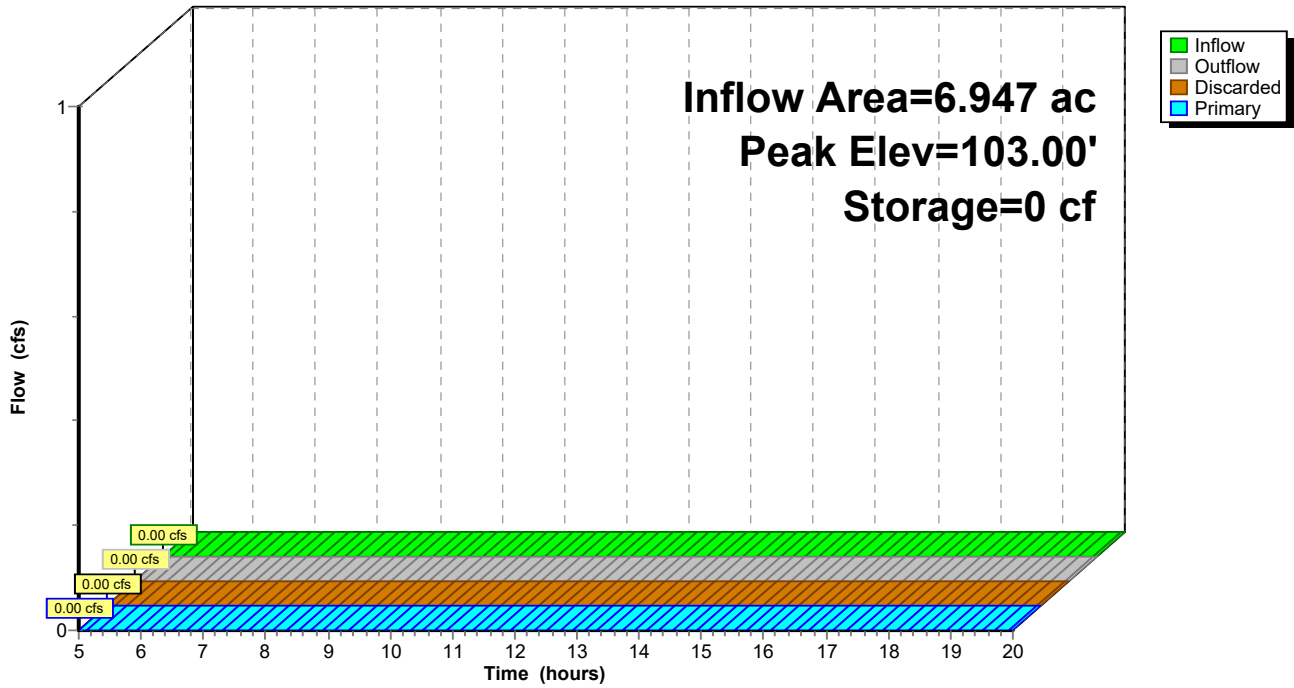
Device	Routing	Invert	Outlet Devices
#1	Discarded	103.00'	0.250 in/hr Exfiltration over Surface area
#2	Primary	103.20'	1,717.0' long x 1.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Discarded OutFlow Max=0.00 cfs @ 5.00 hrs HW=103.00' (Free Discharge)
 ↑1=Exfiltration (Passes 0.00 cfs of 0.37 cfs potential flow)

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=103.00' (Free Discharge)
 ↑2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond 6P: Rock Void

Hydrograph



Summary for Pond 8P: Proposed Pond

Inflow Area = 6.947 ac, 0.00% Impervious, Inflow Depth = 0.00" for 100-YR - 1HR. event
 Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
 Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min
 Discarded = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
 Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Peak Elev= 92.00' @ 5.00 hrs Surf.Area= 44,696 sf Storage= 0 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
 Center-of-Mass det. time= (not calculated: no inflow)

Volume	Invert	Avail.Storage	Storage Description
#1	92.00'	193,786 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

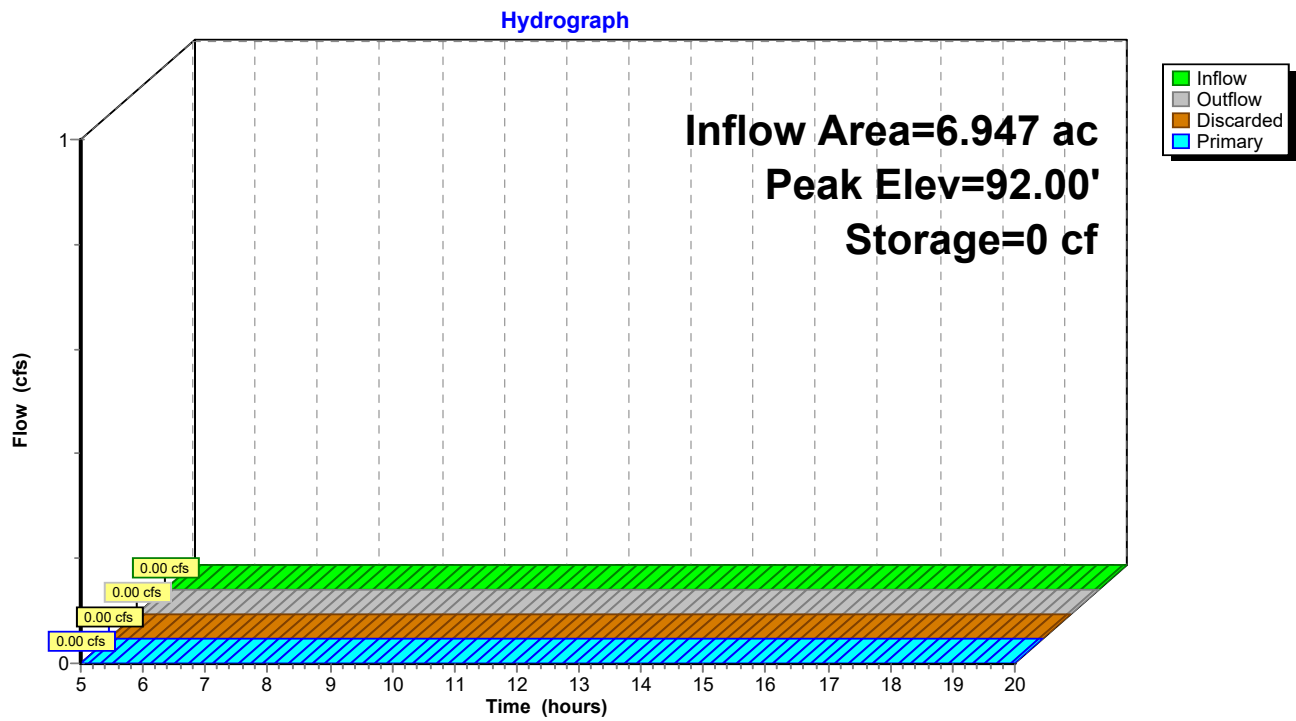
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
92.00	44,696	0	0
93.00	46,547	45,622	45,622
94.00	48,426	47,487	93,108
95.00	50,332	49,379	142,487
96.00	52,265	51,299	193,786

Device	Routing	Invert	Outlet Devices
#1	Discarded	92.00'	0.250 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Primary	94.50'	43.6 deg x 16.0' long x 1.00' rise Sharp-Crested Vee/Trap Weir Cv= 2.56 (C= 3.20)

Discarded OutFlow Max=0.00 cfs @ 5.00 hrs HW=92.00' (Free Discharge)
 ↑1=Exfiltration (Controls 0.00 cfs)

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=92.00' (Free Discharge)
 ↑2=Sharp-Crested Vee/Trap Weir (Controls 0.00 cfs)

Pond 8P: Proposed Pond



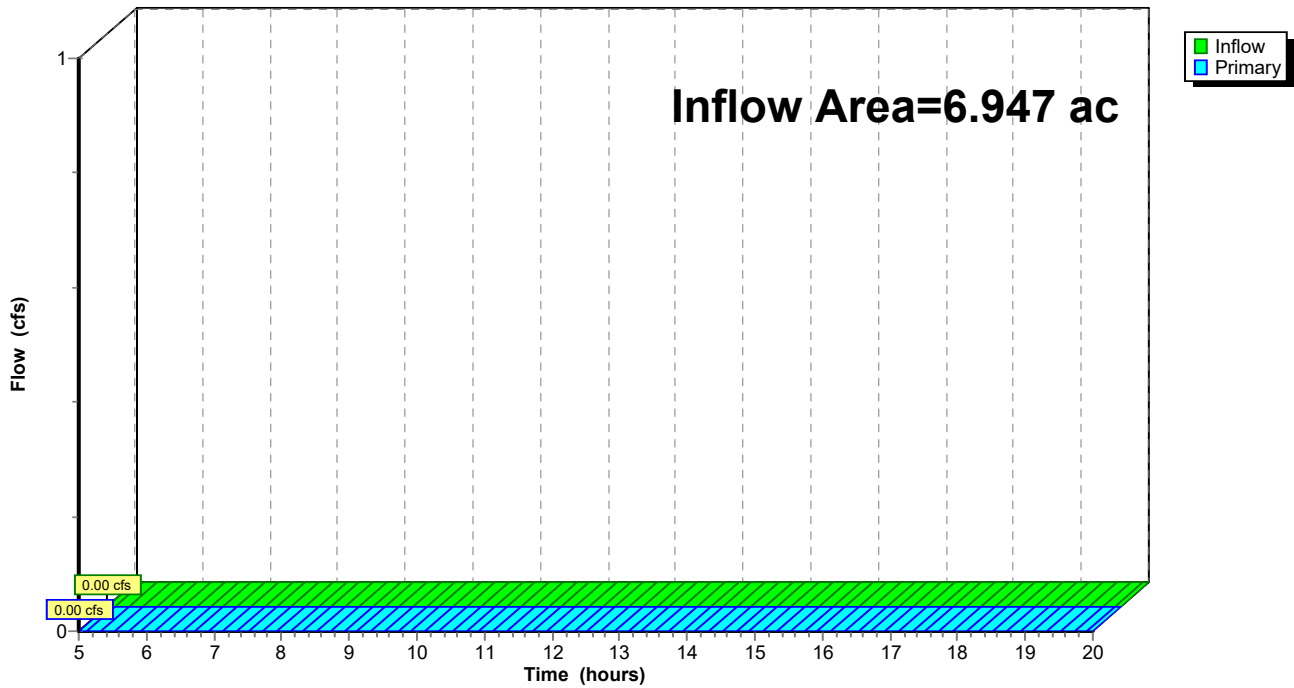
Summary for Link 2L: Outfall

Inflow Area = 6.947 ac, 0.00% Impervious, Inflow Depth = 0.00" for 100-YR - 1HR. event
Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link 2L: Outfall

Hydrograph

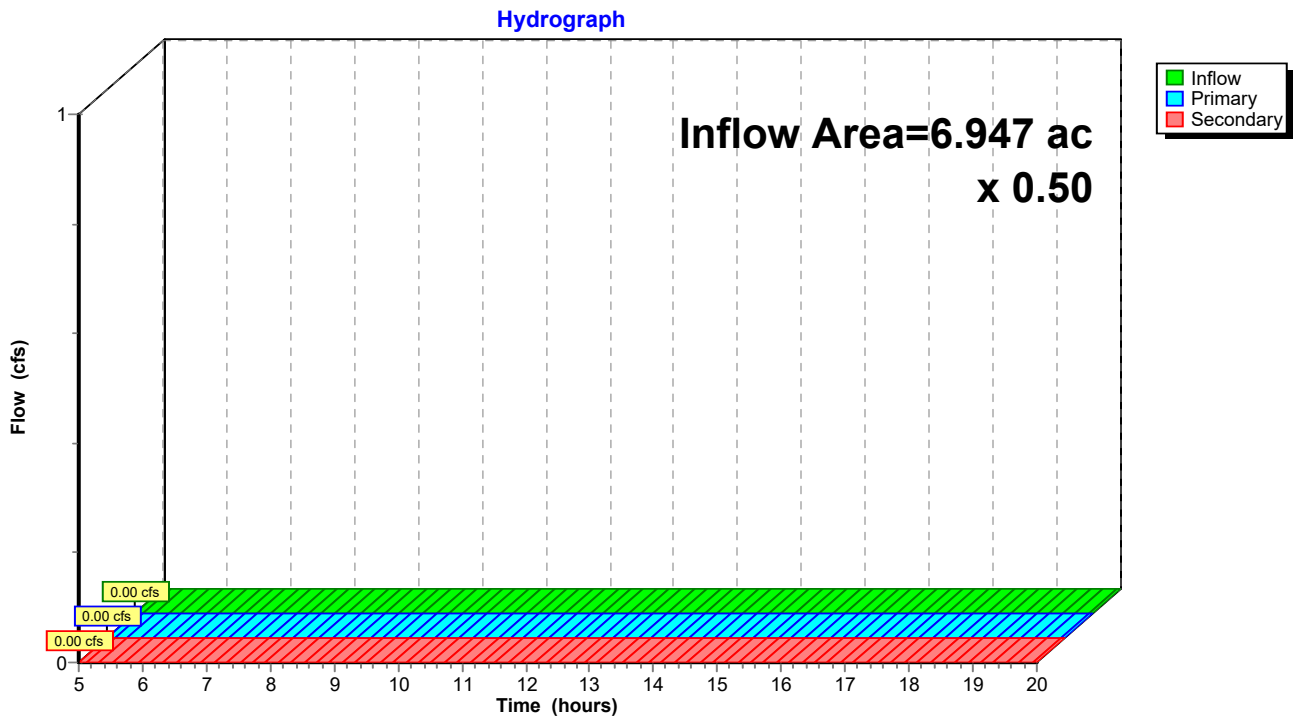


Summary for Link 5L: Sub Seperation Outfall

Inflow Area = 6.947 ac, 0.00% Impervious, Inflow Depth = 0.00" for 100-YR - 1HR. event
 Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
 Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min
 Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Primary outflow = Inflow x 0.50, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link 5L: Sub Seperation Outfall



Staging Area 2 Basin 2 HydroCAD Report

Type II 24-hr 100-YR - 24HR. Rainfall=9.84"

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

Subcatchment 1S: Pre Developed Runoff Area=6.947 ac 0.00% Impervious Runoff Depth>4.10"
Flow Length=607' Slope=0.0247 '/' Tc=24.7 min CN=58 Runoff=30.26 cfs 2.374 af

Subcatchment 4S: Post Developed Runoff Area=6.947 ac 0.00% Impervious Runoff Depth>5.02"
Flow Length=607' Slope=0.2470 '/' Tc=6.5 min CN=65 Runoff=64.22 cfs 2.905 af

Reach 6R: Proposed Ditch Avg. Flow Depth=1.05' Max Vel=4.82 fps Inflow=35.63 cfs 1.137 af
n=0.035 L=392.0' S=0.0250 '/' Capacity=28.19 cfs Outflow=29.75 cfs 1.135 af

Reach 9R: Proposed Ditch Avg. Flow Depth=1.01' Max Vel=5.14 fps Inflow=35.63 cfs 1.137 af
n=0.035 L=438.0' S=0.0297 '/' Capacity=30.72 cfs Outflow=29.66 cfs 1.135 af

Pond 6P: Rock Void Peak Elev=103.26' Storage=12,674 cf Inflow=64.22 cfs 2.905 af
Discarded=0.37 cfs 0.340 af Primary=71.26 cfs 2.275 af Outflow=71.63 cfs 2.615 af

Pond 8P: Proposed Pond Peak Elev=93.95' Storage=90,657 cf Inflow=59.40 cfs 2.270 af
Discarded=0.28 cfs 0.188 af Primary=0.00 cfs 0.000 af Outflow=0.28 cfs 0.188 af

Link 2L: Outfall Inflow=30.26 cfs 2.374 af
Primary=30.26 cfs 2.374 af

Link 5L: Sub Separation Outfall x 0.50 Inflow=71.26 cfs 2.275 af
Primary=35.63 cfs 1.137 af Secondary=35.63 cfs 1.137 af

Staging Area 2 Basin 2 HydroCAD Report

Type II 24-hr 100-YR - 24HR. Rainfall=9.84"

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Summary for Subcatchment 1S: Pre Developed

Runoff = 30.26 cfs @ 12.19 hrs, Volume= 2.374 af, Depth> 4.10"

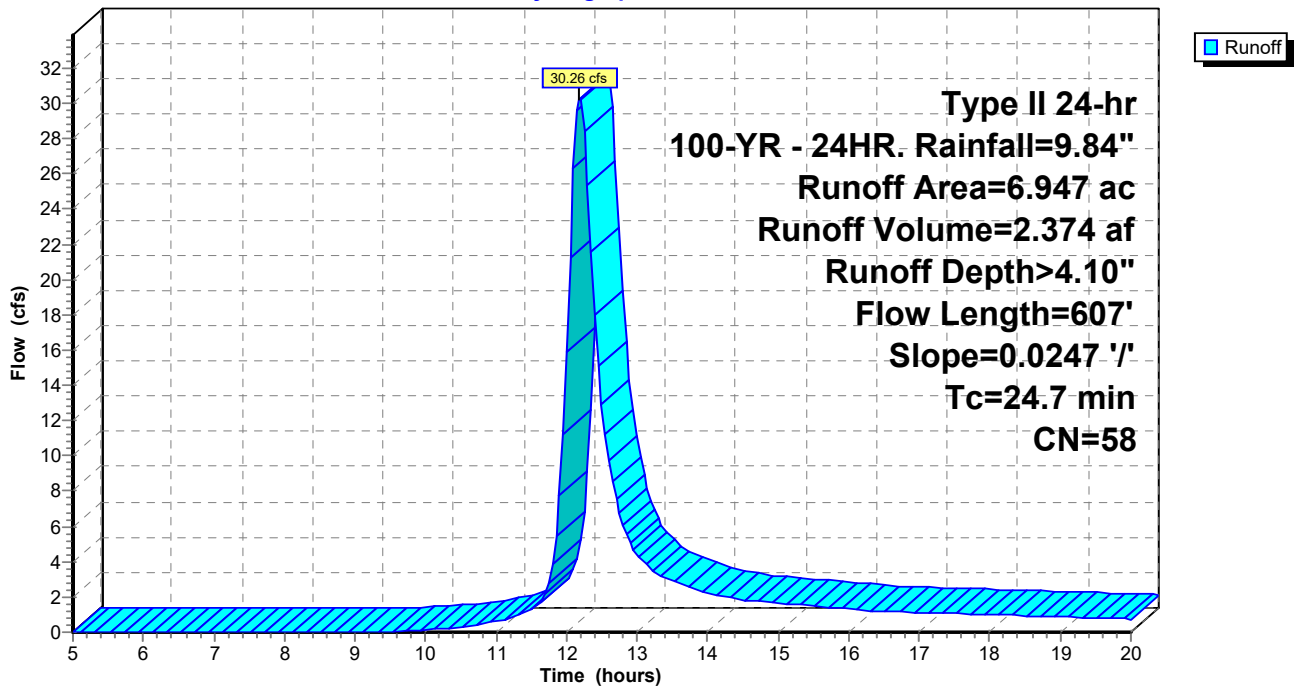
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-YR - 24HR. Rainfall=9.84"

Area (ac)	CN	Description
6.947	58	Meadow, non-grazed, HSG B
6.947		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.7	607	0.0247	0.41		Lag/CN Method,

Subcatchment 1S: Pre Developed

Hydrograph



Staging Area 2 Basin 2 HydroCAD Report

Type II 24-hr 100-YR - 24HR. Rainfall=9.84"

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Summary for Subcatchment 4S: Post Developed

Runoff = 64.22 cfs @ 11.98 hrs, Volume= 2.905 af, Depth> 5.02"

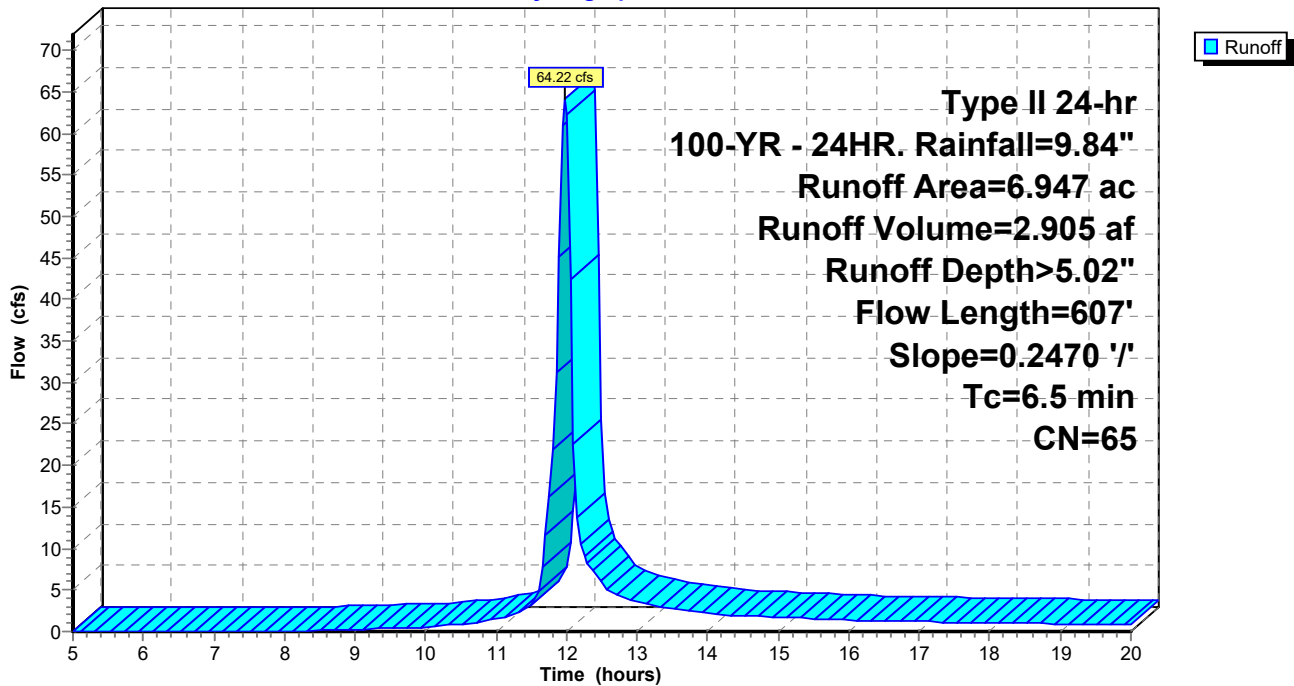
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Type II 24-hr 100-YR - 24HR. Rainfall=9.84"

Area (ac)	CN	Description
2.015	58	Meadow, non-grazed, HSG B
* 4.156	65	Uncompacted Gravel (35% Void)
0.776	85	Gravel roads, HSG B
6.947	65	Weighted Average
6.947		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.5	607	0.2470	1.55		Lag/CN Method,

Subcatchment 4S: Post Developed

Hydrograph



Staging Area 2 Basin 2 HydroCAD Report

Type II 24-hr 100-YR - 24HR. Rainfall=9.84"

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Summary for Reach 6R: Proposed Ditch

Inflow Area = 6.947 ac, 0.00% Impervious, Inflow Depth > 1.96" for 100-YR - 24HR. event
Inflow = 35.63 cfs @ 11.99 hrs, Volume= 1.137 af
Outflow = 29.75 cfs @ 12.01 hrs, Volume= 1.135 af, Atten= 17%, Lag= 1.3 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.82 fps, Min. Travel Time= 1.4 min
Avg. Velocity = 1.75 fps, Avg. Travel Time= 3.7 min

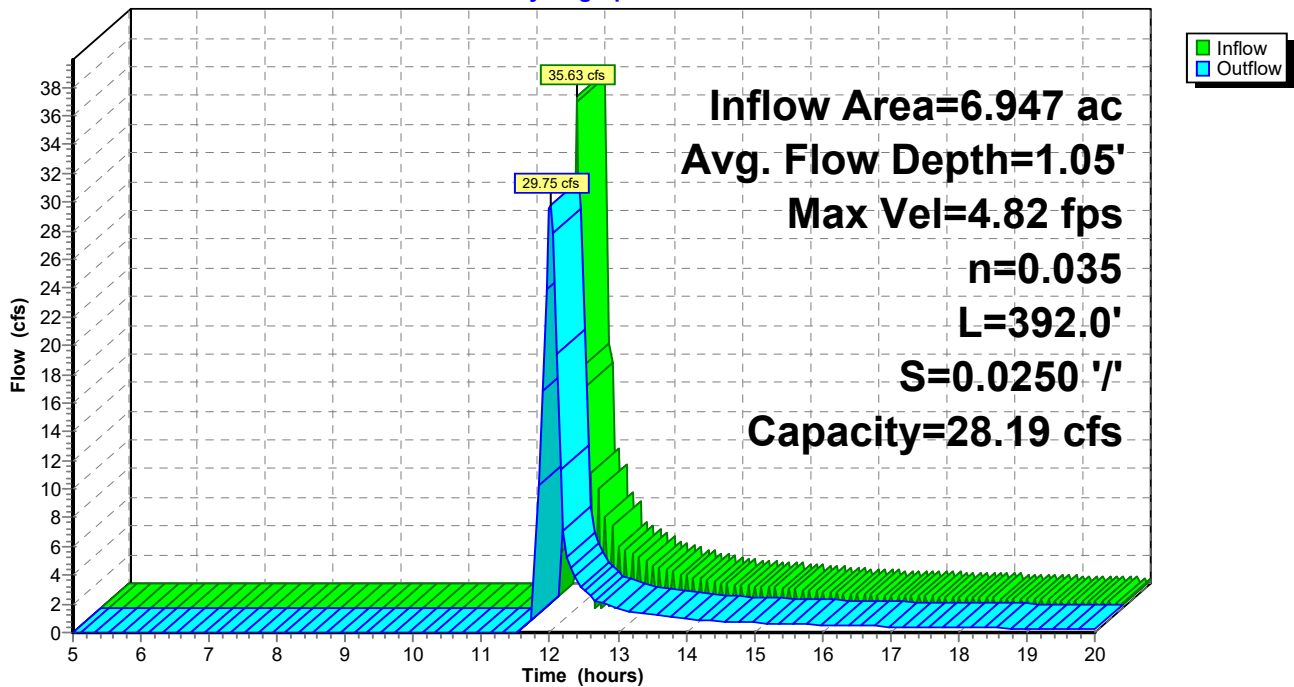
Peak Storage= 2,541 cf @ 11.99 hrs
Average Depth at Peak Storage= 1.05'
Bank-Full Depth= 1.00' Flow Area= 6.0 sf, Capacity= 28.19 cfs

2.00' x 1.00' deep channel, n= 0.035 High grass
Side Slope Z-value= 4.0 '/' Top Width= 10.00'
Length= 392.0' Slope= 0.0250 '/'
Inlet Invert= 101.80', Outlet Invert= 92.00'



Reach 6R: Proposed Ditch

Hydrograph



Staging Area 2 Basin 2 HydroCAD Report

Type II 24-hr 100-YR - 24HR. Rainfall=9.84"

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Summary for Reach 9R: Proposed Ditch

Inflow = 35.63 cfs @ 11.99 hrs, Volume= 1.137 af
Outflow = 29.66 cfs @ 12.02 hrs, Volume= 1.135 af, Atten= 17%, Lag= 1.4 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 5.14 fps, Min. Travel Time= 1.4 min
Avg. Velocity = 1.86 fps, Avg. Travel Time= 3.9 min

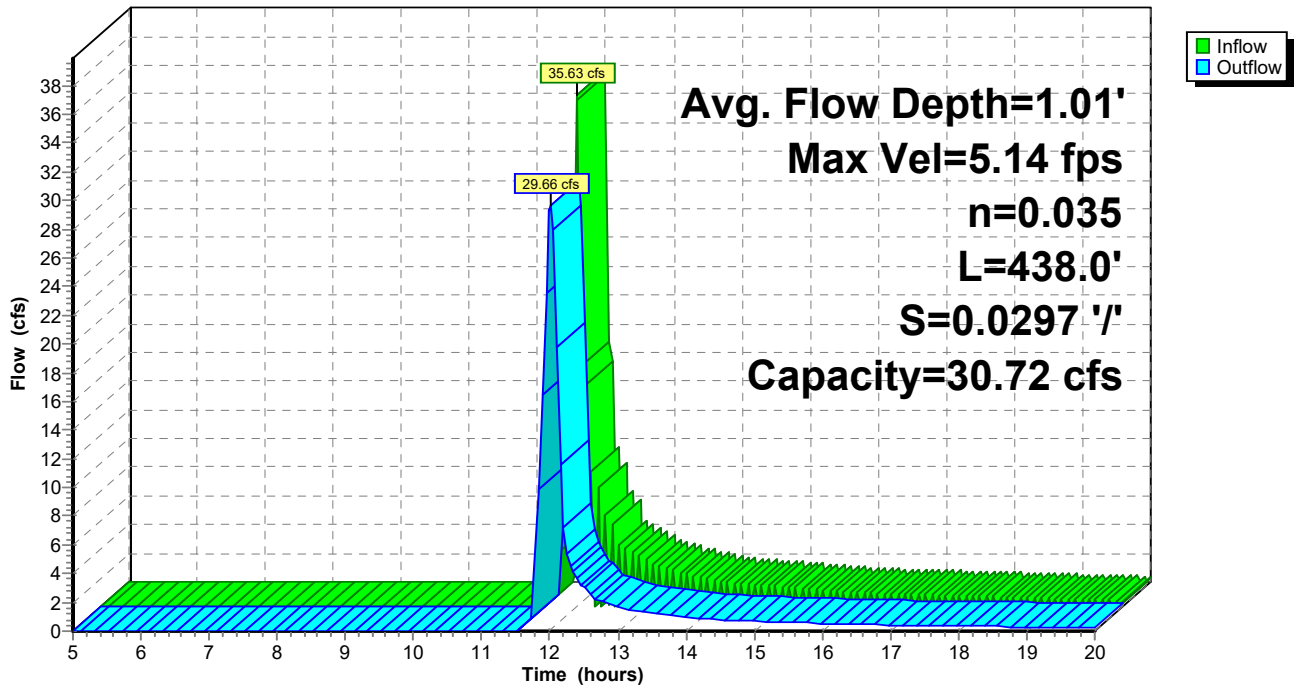
Peak Storage= 2,658 cf @ 11.99 hrs
Average Depth at Peak Storage= 1.01'
Bank-Full Depth= 1.00' Flow Area= 6.0 sf, Capacity= 30.72 cfs

2.00' x 1.00' deep channel, n= 0.035 High grass
Side Slope Z-value= 4.0 '/' Top Width= 10.00'
Length= 438.0' Slope= 0.0297 '/'
Inlet Invert= 105.00', Outlet Invert= 92.00'



Reach 9R: Proposed Ditch

Hydrograph



Staging Area 2 Basin 2 HydroCAD Report

Type II 24-hr 100-YR - 24HR. Rainfall=9.84"

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Summary for Pond 6P: Rock Void

Inflow Area = 6.947 ac, 0.00% Impervious, Inflow Depth > 5.02" for 100-YR - 24HR. event
 Inflow = 64.22 cfs @ 11.98 hrs, Volume= 2.905 af
 Outflow = 71.63 cfs @ 11.99 hrs, Volume= 2.615 af, Atten= 0%, Lag= 0.8 min
 Discarded = 0.37 cfs @ 9.65 hrs, Volume= 0.340 af
 Primary = 71.26 cfs @ 11.99 hrs, Volume= 2.275 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Peak Elev= 103.26' @ 11.99 hrs Surf.Area= 63,368 sf Storage= 12,674 cf

Plug-Flow detention time= 45.4 min calculated for 2.615 af (90% of inflow)
 Center-of-Mass det. time= 11.4 min (793.8 - 782.5)

Volume	Invert	Avail.Storage	Storage Description
#1	103.00'	12,674 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
103.00	63,368	0	0
103.20	63,368	12,674	12,674

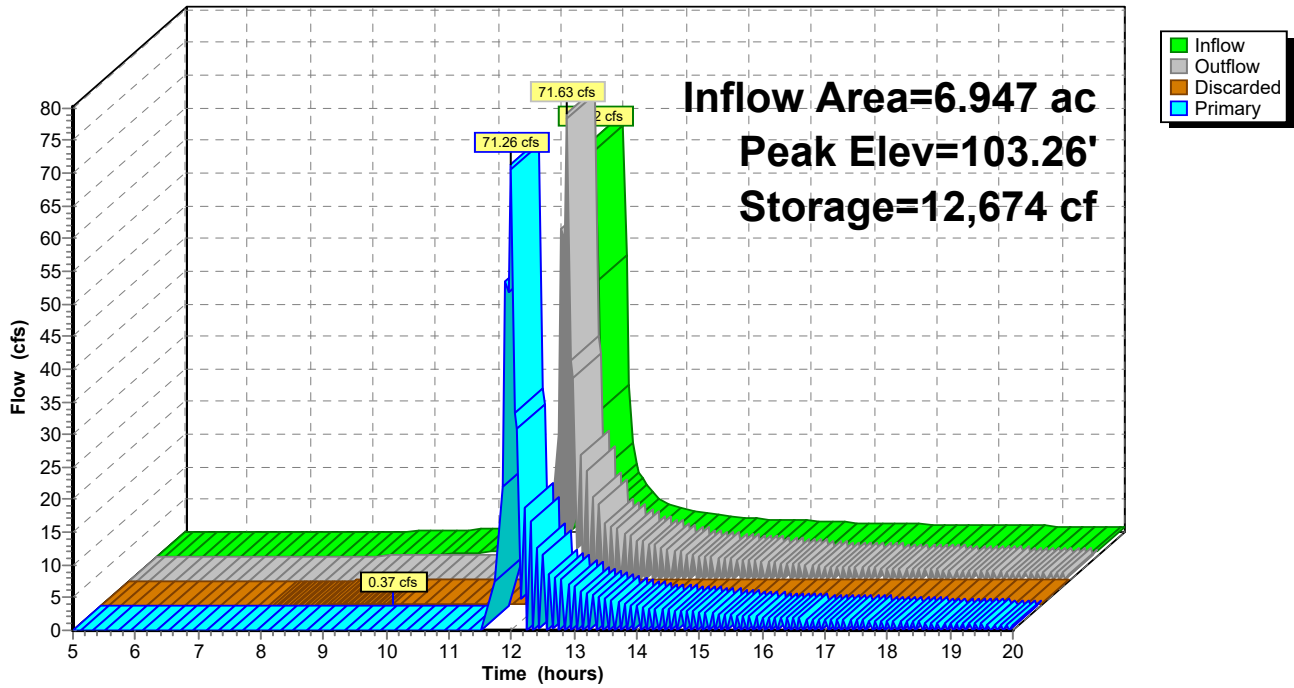
Device	Routing	Invert	Outlet Devices
#1	Discarded	103.00'	0.250 in/hr Exfiltration over Surface area
#2	Primary	103.20'	1,717.0' long x 1.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Discarded OutFlow Max=0.37 cfs @ 9.65 hrs HW=103.00' (Free Discharge)
 ↑1=**Exfiltration** (Exfiltration Controls 0.37 cfs)

Primary OutFlow Max=67.27 cfs @ 11.99 hrs HW=103.26' (Free Discharge)
 ↑2=**Broad-Crested Rectangular Weir**(Weir Controls 67.27 cfs @ 0.66 fps)

Pond 6P: Rock Void

Hydrograph



Staging Area 2 Basin 2 HydroCAD Report

Type II 24-hr 100-YR - 24HR. Rainfall=9.84"

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Summary for Pond 8P: Proposed Pond

Inflow Area = 6.947 ac, 0.00% Impervious, Inflow Depth > 3.92" for 100-YR - 24HR. event
 Inflow = 59.40 cfs @ 12.01 hrs, Volume= 2.270 af
 Outflow = 0.28 cfs @ 20.00 hrs, Volume= 0.188 af, Atten= 100%, Lag= 479.1 min
 Discarded = 0.28 cfs @ 20.00 hrs, Volume= 0.188 af
 Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Peak Elev= 93.95' @ 20.00 hrs Surf.Area= 48,331 sf Storage= 90,657 cf

Plug-Flow detention time= 244.9 min calculated for 0.188 af (8% of inflow)
 Center-of-Mass det. time= 170.0 min (956.4 - 786.3)

Volume	Invert	Avail.Storage	Storage Description
#1	92.00'	193,786 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
92.00	44,696	0	0
93.00	46,547	45,622	45,622
94.00	48,426	47,487	93,108
95.00	50,332	49,379	142,487
96.00	52,265	51,299	193,786

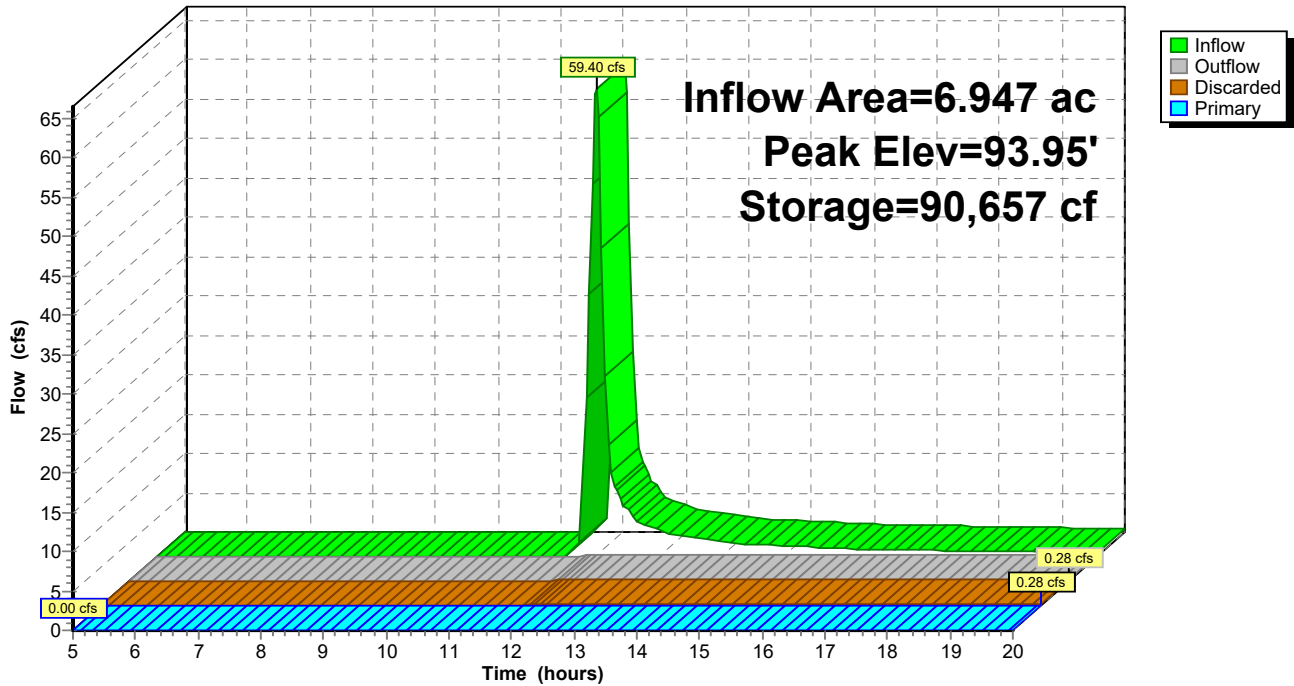
Device	Routing	Invert	Outlet Devices
#1	Discarded	92.00'	0.250 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Primary	94.50'	43.6 deg x 16.0' long x 1.00' rise Sharp-Crested Vee/Trap Weir Cv= 2.56 (C= 3.20)

Discarded OutFlow Max=0.28 cfs @ 20.00 hrs HW=93.95' (Free Discharge)
 ↑1=**Exfiltration** (Exfiltration Controls 0.28 cfs)

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=92.00' (Free Discharge)
 ↑2=**Sharp-Crested Vee/Trap Weir** (Controls 0.00 cfs)

Pond 8P: Proposed Pond

Hydrograph



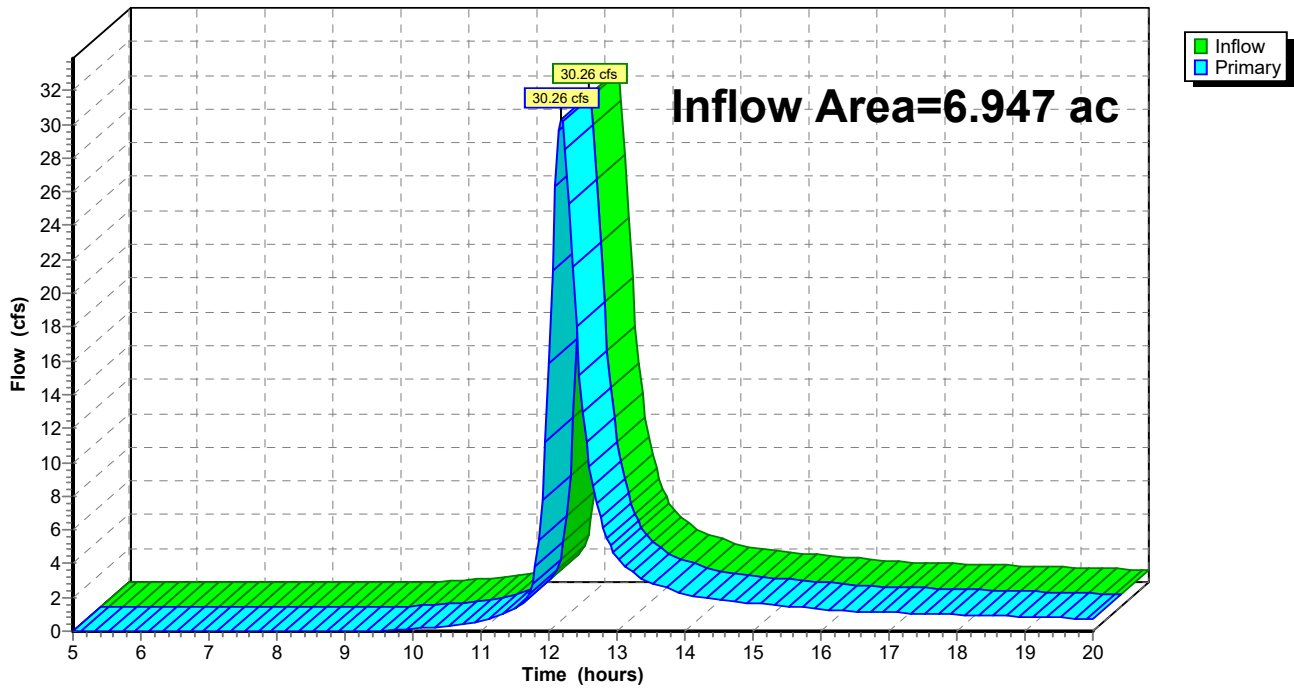
Summary for Link 2L: Outfall

Inflow Area = 6.947 ac, 0.00% Impervious, Inflow Depth > 4.10" for 100-YR - 24HR. event
Inflow = 30.26 cfs @ 12.19 hrs, Volume= 2.374 af
Primary = 30.26 cfs @ 12.19 hrs, Volume= 2.374 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link 2L: Outfall

Hydrograph

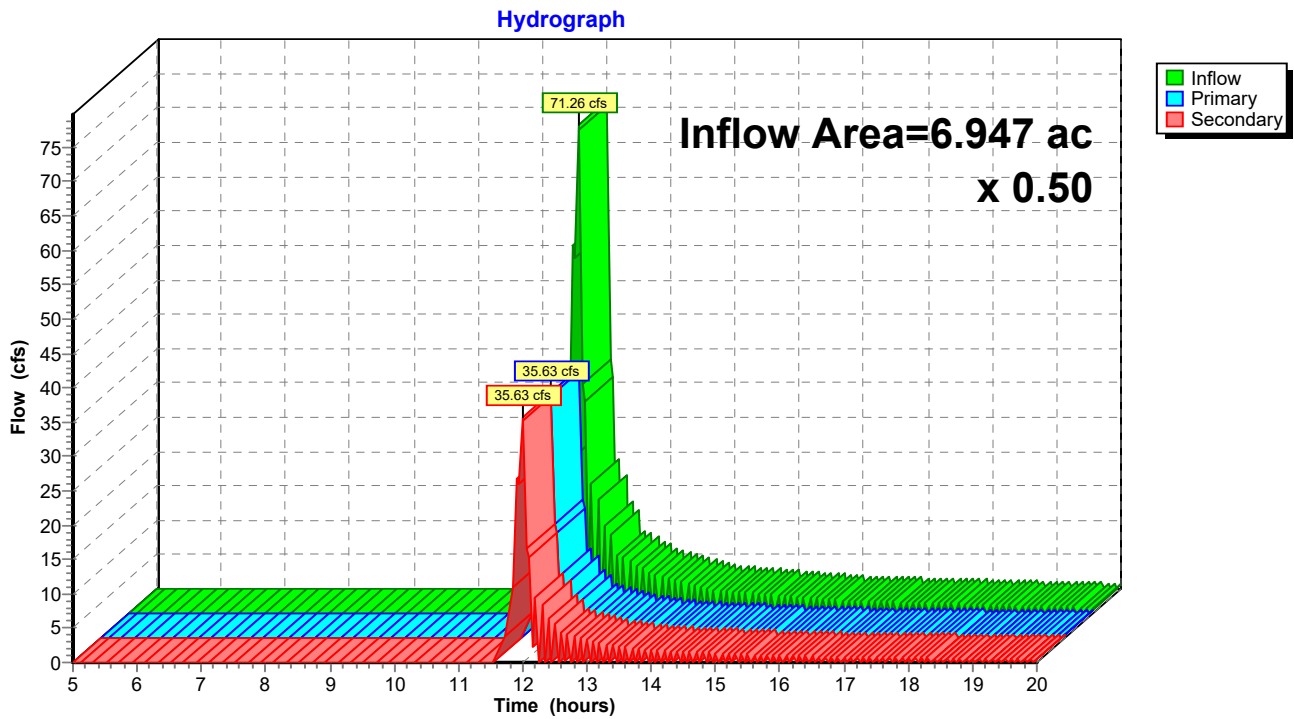


Summary for Link 5L: Sub Separation Outfall

Inflow Area = 6.947 ac, 0.00% Impervious, Inflow Depth > 3.93" for 100-YR - 24HR. event
Inflow = 71.26 cfs @ 11.99 hrs, Volume= 2.275 af
Primary = 35.63 cfs @ 11.99 hrs, Volume= 1.137 af, Atten= 50%, Lag= 0.0 min
Secondary = 35.63 cfs @ 11.99 hrs, Volume= 1.137 af

Primary outflow = Inflow x 0.50, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link 5L: Sub Separation Outfall



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

Subcatchment 1S: Pre Developed Runoff Area=6.947 ac 0.00% Impervious Runoff Depth=0.00"
 Flow Length=607' Slope=0.0247 '/' Tc=24.7 min CN=58 Runoff=0.00 cfs 0.000 af

Subcatchment 4S: Post Developed Runoff Area=6.947 ac 0.00% Impervious Runoff Depth=0.00"
 Flow Length=607' Slope=0.2470 '/' Tc=6.5 min CN=65 Runoff=0.00 cfs 0.000 af

Reach 6R: Proposed Ditch Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af
 n=0.035 L=392.0' S=0.0250 '/' Capacity=28.19 cfs Outflow=0.00 cfs 0.000 af

Reach 9R: Proposed Ditch Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af
 n=0.035 L=438.0' S=0.0297 '/' Capacity=30.72 cfs Outflow=0.00 cfs 0.000 af

Pond 6P: Rock Void Peak Elev=103.00' Storage=0 cf Inflow=0.00 cfs 0.000 af
 Discarded=0.00 cfs 0.000 af Primary=0.00 cfs 0.000 af Outflow=0.00 cfs 0.000 af

Pond 8P: Proposed Pond Peak Elev=92.00' Storage=0 cf Inflow=0.00 cfs 0.000 af
 Discarded=0.00 cfs 0.000 af Primary=0.00 cfs 0.000 af Outflow=0.00 cfs 0.000 af

Link 2L: Outfall Inflow=0.00 cfs 0.000 af
 Primary=0.00 cfs 0.000 af

Link 5L: Sub Separation Outfall x 0.50 Inflow=0.00 cfs 0.000 af
 Primary=0.00 cfs 0.000 af Secondary=0.00 cfs 0.000 af

Summary for Subcatchment 1S: Pre Developed

Runoff = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Depth= 0.00"

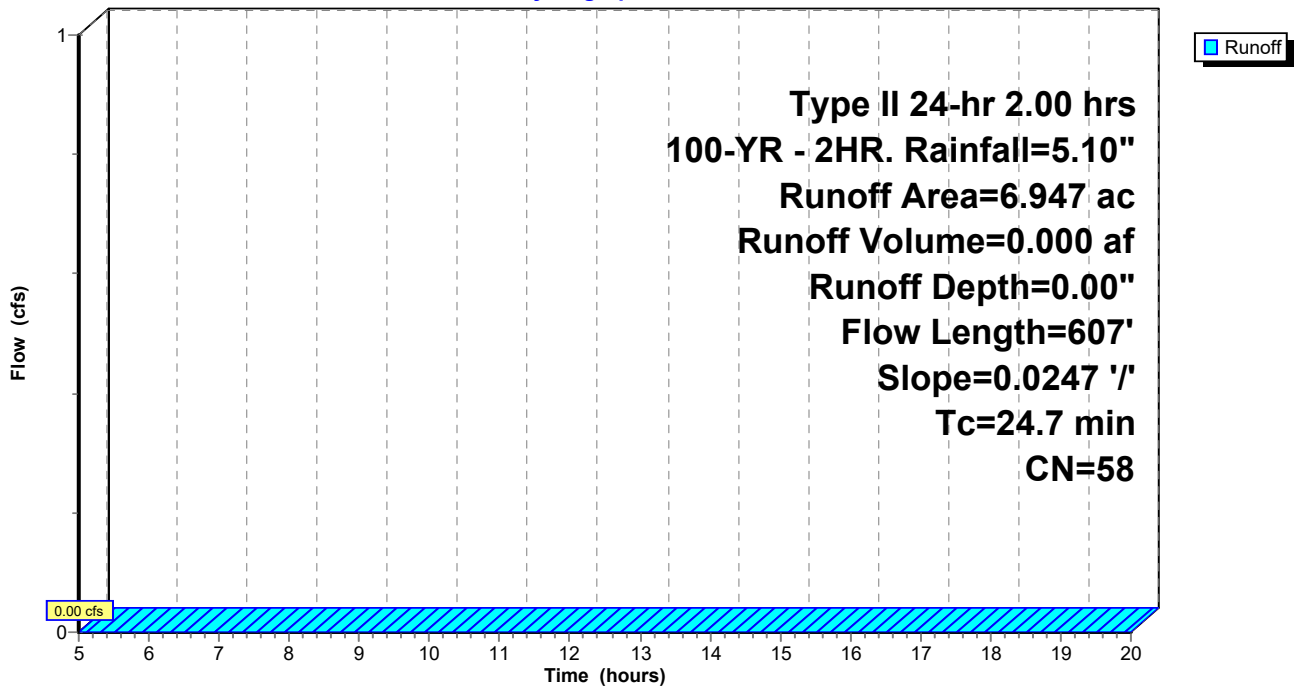
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Type II 24-hr 2.00 hrs 100-YR - 2HR. Rainfall=5.10"

Area (ac)	CN	Description
6.947	58	Meadow, non-grazed, HSG B
6.947		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.7	607	0.0247	0.41		Lag/CN Method,

Subcatchment 1S: Pre Developed

Hydrograph



Summary for Subcatchment 4S: Post Developed

Runoff = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Depth= 0.00"

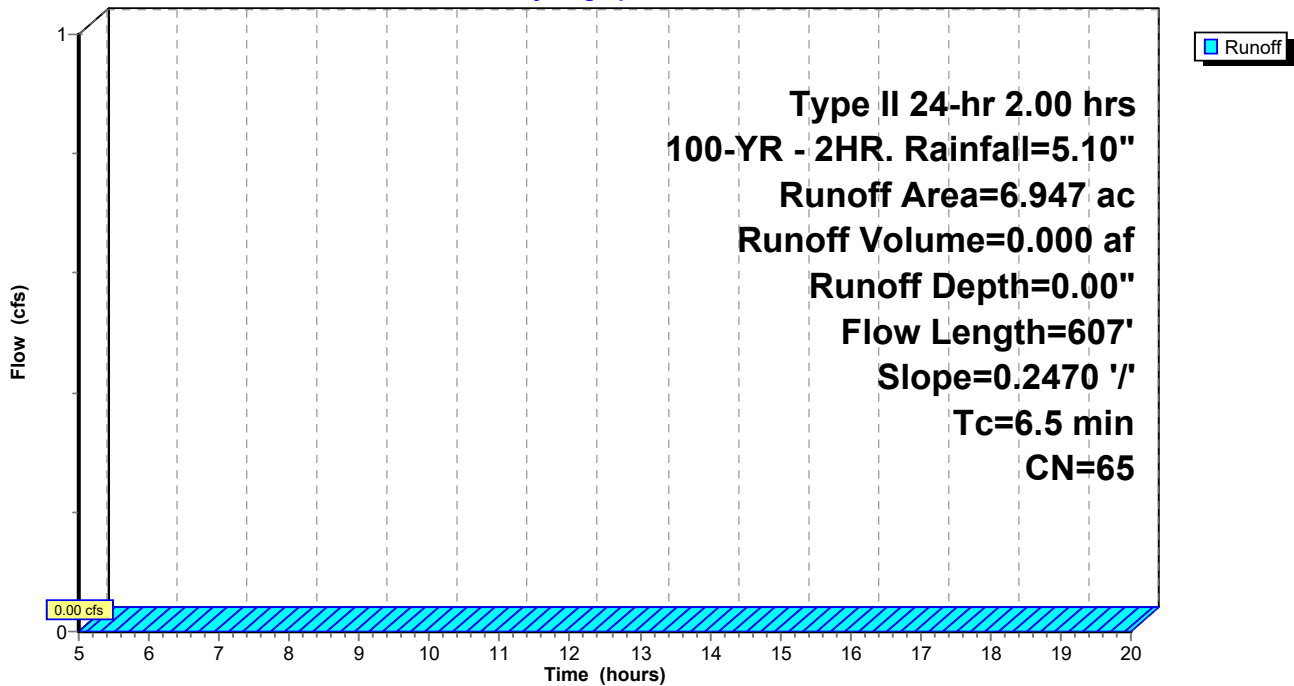
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Type II 24-hr 2.00 hrs 100-YR - 2HR. Rainfall=5.10"

Area (ac)	CN	Description
2.015	58	Meadow, non-grazed, HSG B
* 4.156	65	Uncompacted Gravel (35% Void)
0.776	85	Gravel roads, HSG B
6.947	65	Weighted Average
6.947		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.5	607	0.2470	1.55		Lag/CN Method,

Subcatchment 4S: Post Developed

Hydrograph



Summary for Reach 6R: Proposed Ditch

Inflow Area = 6.947 ac, 0.00% Impervious, Inflow Depth = 0.00" for 100-YR - 2HR. event
 Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
 Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Max. Velocity= 0.00 fps, Min. Travel Time= 0.0 min
 Avg. Velocity = 0.00 fps, Avg. Travel Time= 0.0 min

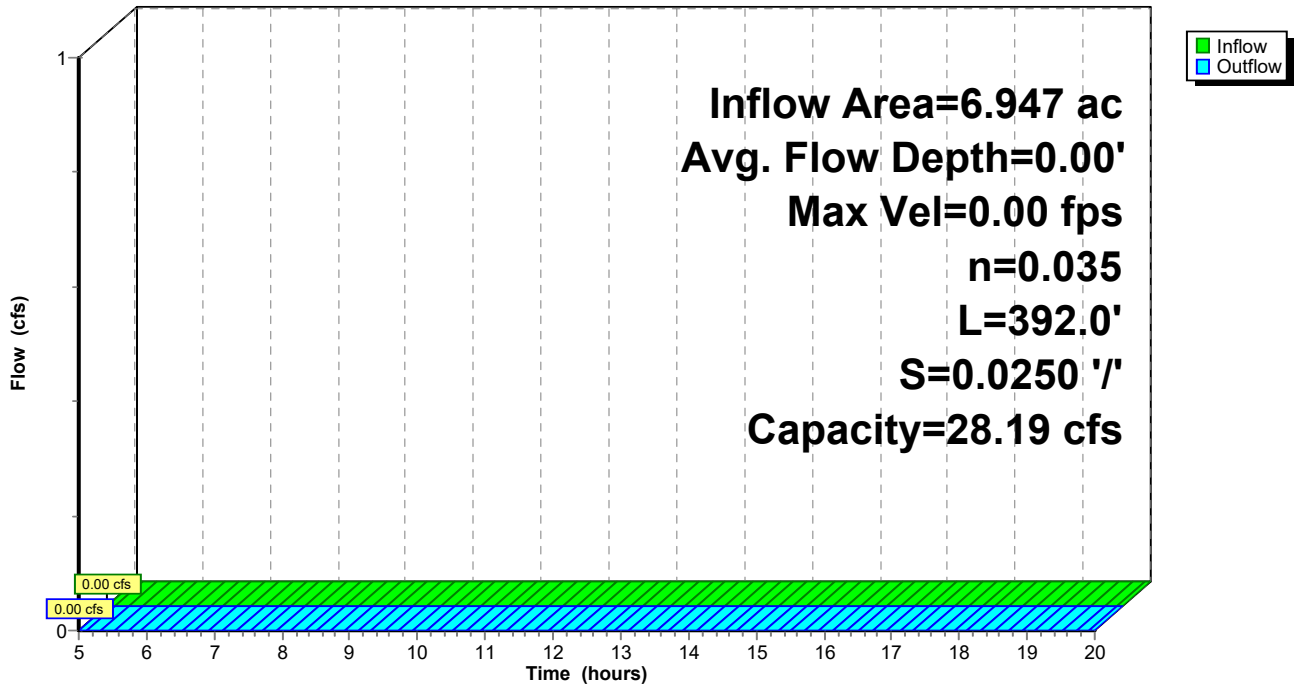
Peak Storage= 0 cf @ 5.00 hrs
 Average Depth at Peak Storage= 0.00'
 Bank-Full Depth= 1.00' Flow Area= 6.0 sf, Capacity= 28.19 cfs

2.00' x 1.00' deep channel, n= 0.035 High grass
 Side Slope Z-value= 4.0 '/' Top Width= 10.00'
 Length= 392.0' Slope= 0.0250 '/'
 Inlet Invert= 101.80', Outlet Invert= 92.00'



Reach 6R: Proposed Ditch

Hydrograph



Summary for Reach 9R: Proposed Ditch

Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
 Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Max. Velocity= 0.00 fps, Min. Travel Time= 0.0 min
 Avg. Velocity = 0.00 fps, Avg. Travel Time= 0.0 min

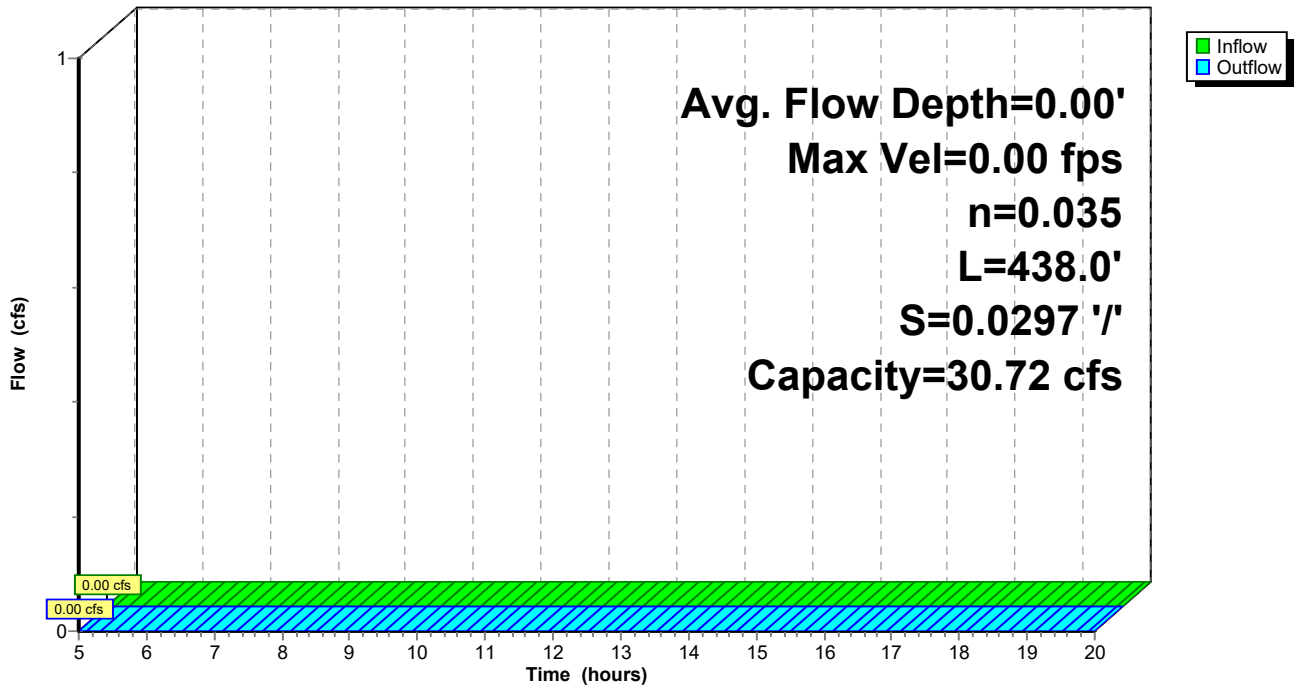
Peak Storage= 0 cf @ 5.00 hrs
 Average Depth at Peak Storage= 0.00'
 Bank-Full Depth= 1.00' Flow Area= 6.0 sf, Capacity= 30.72 cfs

2.00' x 1.00' deep channel, n= 0.035 High grass
 Side Slope Z-value= 4.0 '/' Top Width= 10.00'
 Length= 438.0' Slope= 0.0297 '/'
 Inlet Invert= 105.00', Outlet Invert= 92.00'



Reach 9R: Proposed Ditch

Hydrograph



Summary for Pond 6P: Rock Void

Inflow Area = 6.947 ac, 0.00% Impervious, Inflow Depth = 0.00" for 100-YR - 2HR. event
 Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
 Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min
 Discarded = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
 Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Peak Elev= 103.00' @ 5.00 hrs Surf.Area= 63,368 sf Storage= 0 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
 Center-of-Mass det. time= (not calculated: no inflow)

Volume	Invert	Avail.Storage	Storage Description
#1	103.00'	12,674 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
103.00	63,368	0	0
103.20	63,368	12,674	12,674

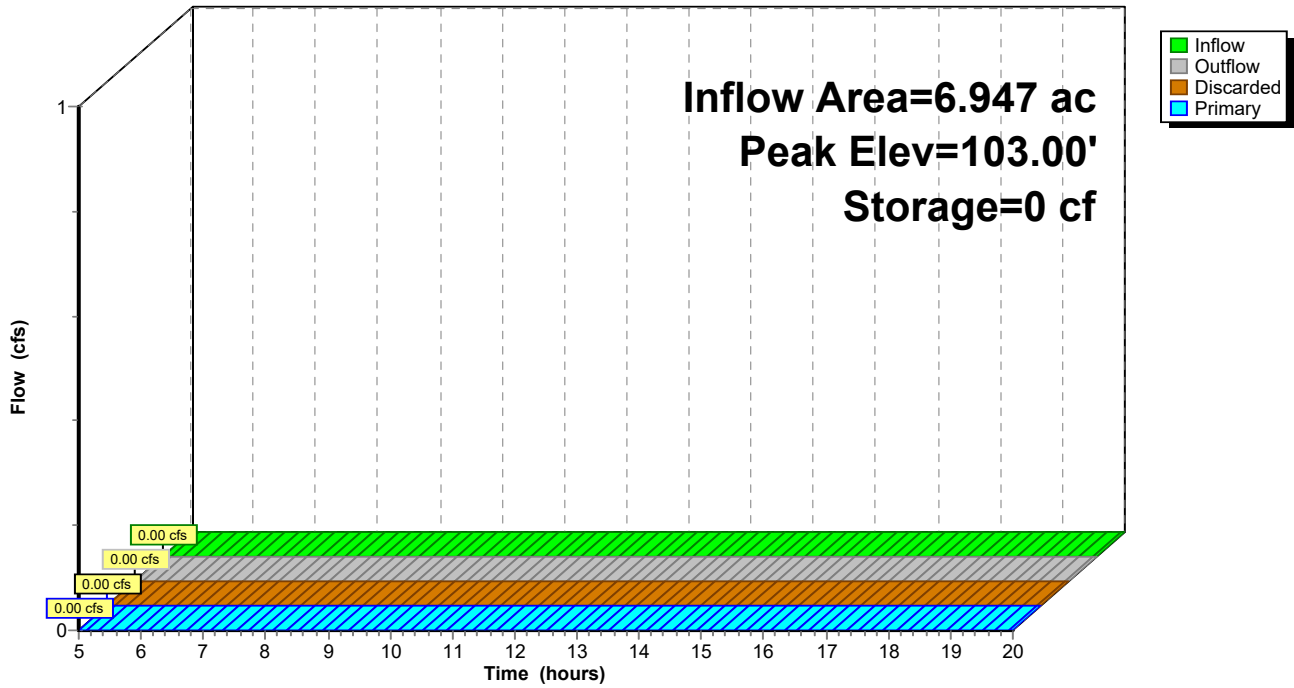
Device	Routing	Invert	Outlet Devices
#1	Discarded	103.00'	0.250 in/hr Exfiltration over Surface area
#2	Primary	103.20'	1,717.0' long x 1.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Discarded OutFlow Max=0.00 cfs @ 5.00 hrs HW=103.00' (Free Discharge)
 ↑1=Exfiltration (Passes 0.00 cfs of 0.37 cfs potential flow)

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=103.00' (Free Discharge)
 ↑2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond 6P: Rock Void

Hydrograph



Summary for Pond 8P: Proposed Pond

Inflow Area = 6.947 ac, 0.00% Impervious, Inflow Depth = 0.00" for 100-YR - 2HR. event
 Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
 Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min
 Discarded = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
 Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Peak Elev= 92.00' @ 5.00 hrs Surf.Area= 44,696 sf Storage= 0 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
 Center-of-Mass det. time= (not calculated: no inflow)

Volume	Invert	Avail.Storage	Storage Description
#1	92.00'	193,786 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

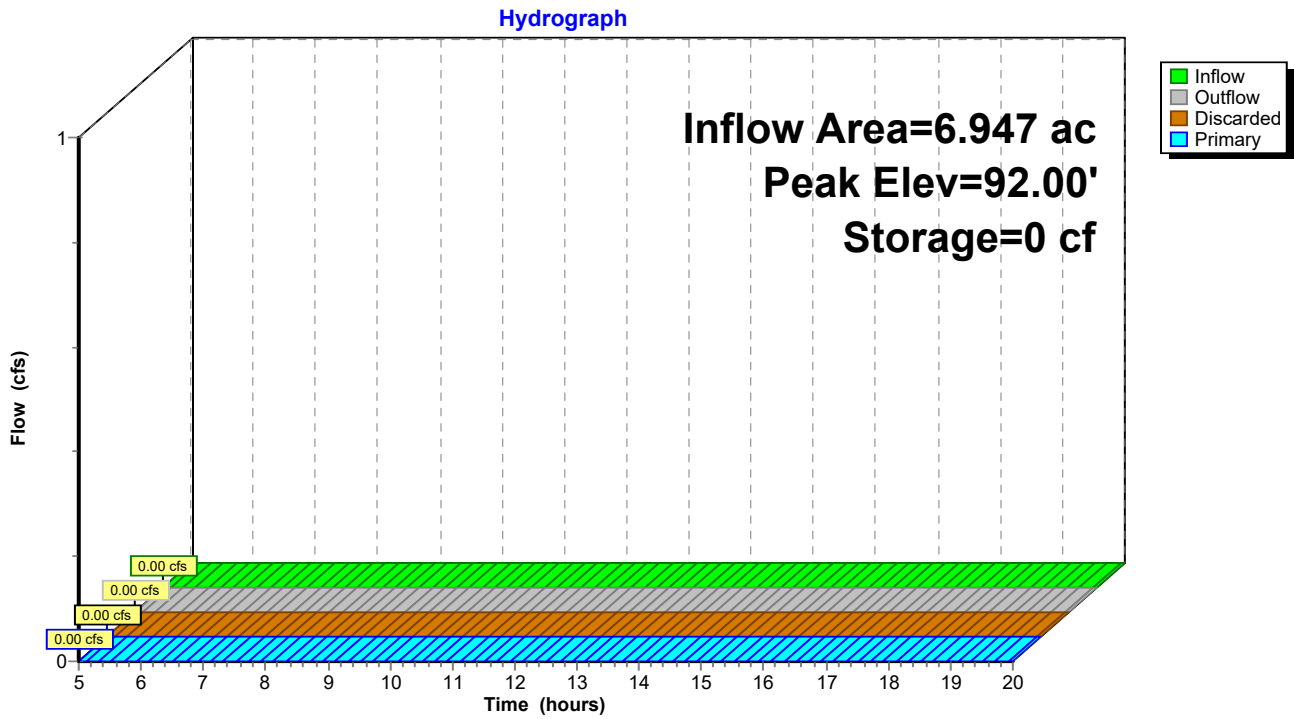
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
92.00	44,696	0	0
93.00	46,547	45,622	45,622
94.00	48,426	47,487	93,108
95.00	50,332	49,379	142,487
96.00	52,265	51,299	193,786

Device	Routing	Invert	Outlet Devices
#1	Discarded	92.00'	0.250 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Primary	94.50'	43.6 deg x 16.0' long x 1.00' rise Sharp-Crested Vee/Trap Weir Cv= 2.56 (C= 3.20)

Discarded OutFlow Max=0.00 cfs @ 5.00 hrs HW=92.00' (Free Discharge)
 ↑1=Exfiltration (Controls 0.00 cfs)

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=92.00' (Free Discharge)
 ↑2=Sharp-Crested Vee/Trap Weir (Controls 0.00 cfs)

Pond 8P: Proposed Pond



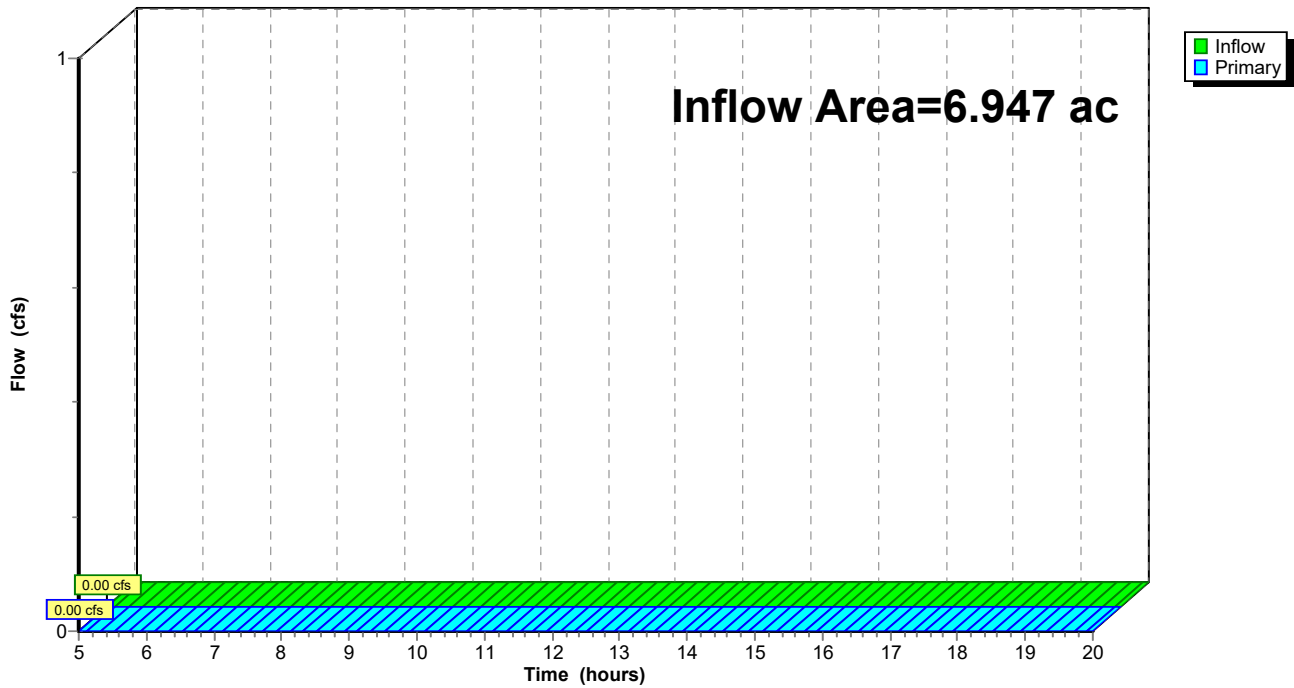
Summary for Link 2L: Outfall

Inflow Area = 6.947 ac, 0.00% Impervious, Inflow Depth = 0.00" for 100-YR - 2HR. event
Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link 2L: Outfall

Hydrograph

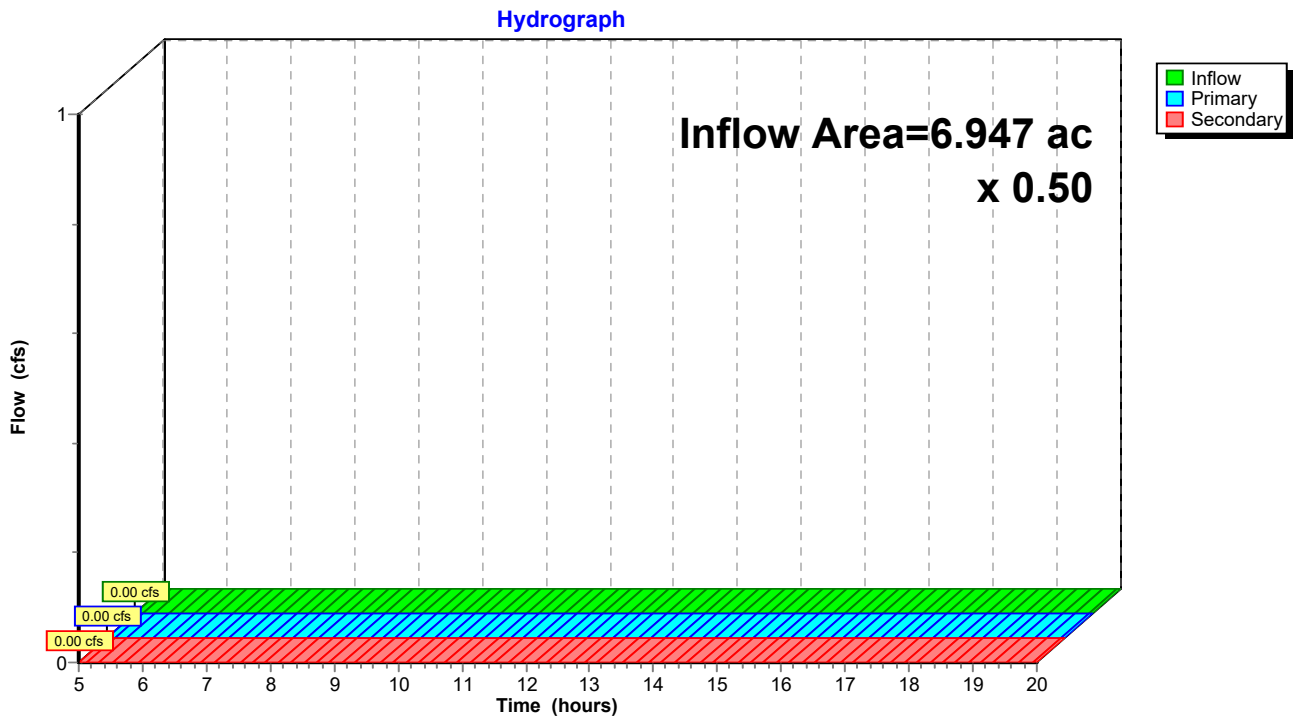


Summary for Link 5L: Sub Separation Outfall

Inflow Area = 6.947 ac, 0.00% Impervious, Inflow Depth = 0.00" for 100-YR - 2HR. event
 Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
 Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min
 Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Primary outflow = Inflow x 0.50, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link 5L: Sub Separation Outfall



Staging Area 2 Basin 2 HydroCAD Report Type II 24-hr 4.00 hrs 100-YR - 4HR. Rainfall=6.08"

Prepared by HP Inc.

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

Subcatchment 1S: Pre Developed Runoff Area=6.947 ac 0.00% Impervious Runoff Depth>0.00"
Flow Length=607' Slope=0.0247 '/' Tc=24.7 min CN=58 Runoff=0.02 cfs 0.000 af

Subcatchment 4S: Post Developed Runoff Area=6.947 ac 0.00% Impervious Runoff Depth=0.00"
Flow Length=607' Slope=0.2470 '/' Tc=6.5 min CN=65 Runoff=0.00 cfs 0.000 af

Reach 6R: Proposed Ditch Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af
n=0.035 L=392.0' S=0.0250 '/' Capacity=28.19 cfs Outflow=0.00 cfs 0.000 af

Reach 9R: Proposed Ditch Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af
n=0.035 L=438.0' S=0.0297 '/' Capacity=30.72 cfs Outflow=0.00 cfs 0.000 af

Pond 6P: Rock Void Peak Elev=103.00' Storage=0 cf Inflow=0.00 cfs 0.000 af
Discarded=0.00 cfs 0.000 af Primary=0.00 cfs 0.000 af Outflow=0.00 cfs 0.000 af

Pond 8P: Proposed Pond Peak Elev=92.00' Storage=0 cf Inflow=0.00 cfs 0.000 af
Discarded=0.00 cfs 0.000 af Primary=0.00 cfs 0.000 af Outflow=0.00 cfs 0.000 af

Link 2L: Outfall Inflow=0.02 cfs 0.000 af
Primary=0.02 cfs 0.000 af

Link 5L: Sub Separation Outfall x 0.50 Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af Secondary=0.00 cfs 0.000 af

Summary for Subcatchment 1S: Pre Developed

Runoff = 0.02 cfs @ 5.00 hrs, Volume= 0.000 af, Depth> 0.00"

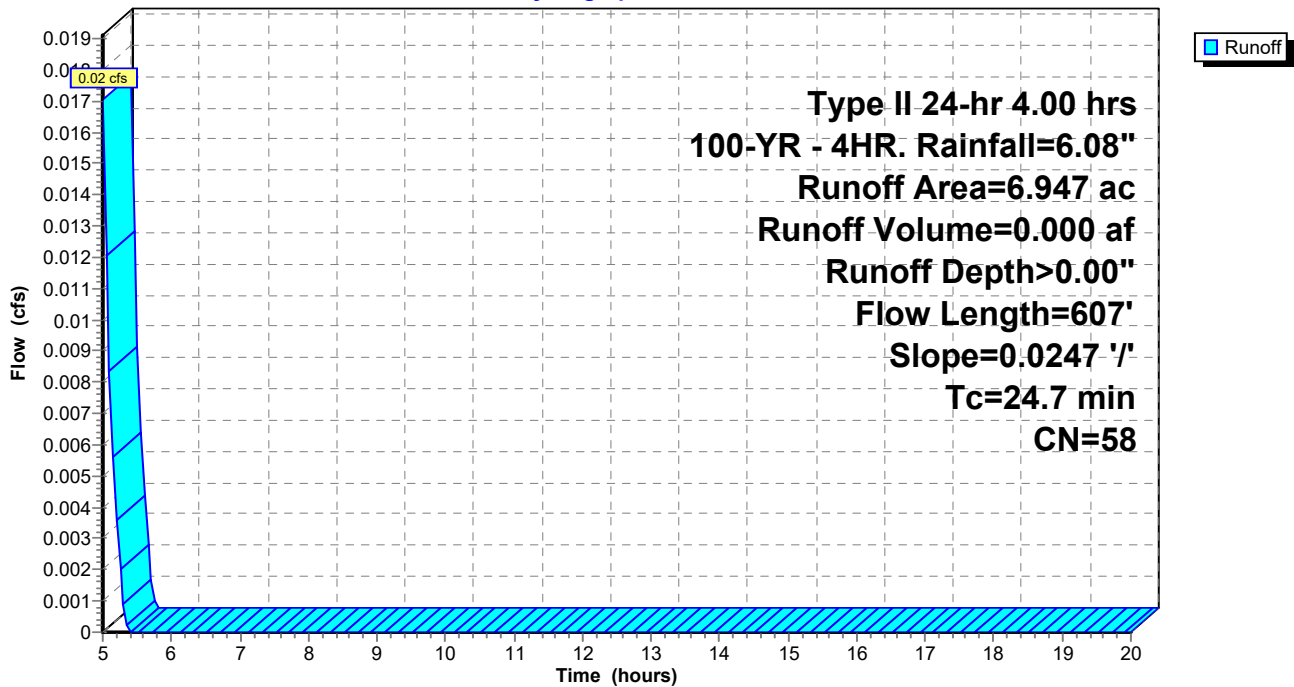
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Type II 24-hr 4.00 hrs 100-YR - 4HR. Rainfall=6.08"

Area (ac)	CN	Description
6.947	58	Meadow, non-grazed, HSG B
6.947		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.7	607	0.0247	0.41		Lag/CN Method,

Subcatchment 1S: Pre Developed

Hydrograph



Summary for Subcatchment 4S: Post Developed

Runoff = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Depth= 0.00"

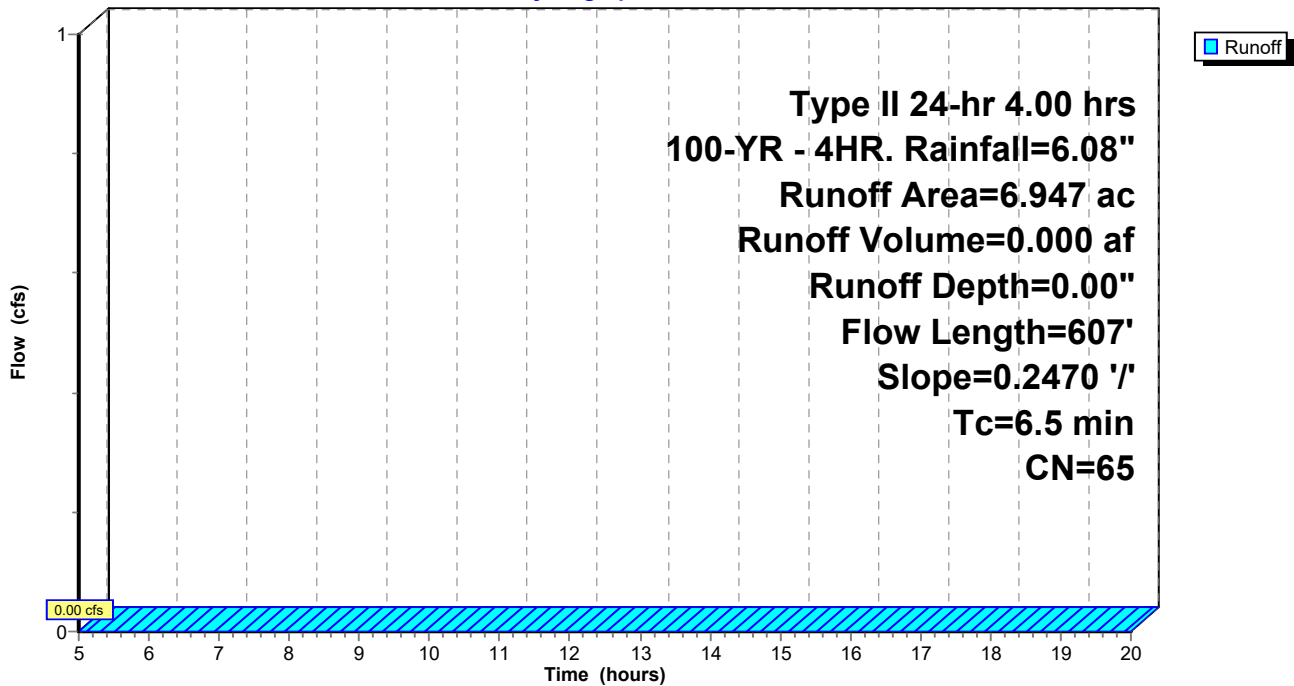
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Type II 24-hr 4.00 hrs 100-YR - 4HR. Rainfall=6.08"

Area (ac)	CN	Description
2.015	58	Meadow, non-grazed, HSG B
* 4.156	65	Uncompacted Gravel (35% Void)
0.776	85	Gravel roads, HSG B
6.947	65	Weighted Average
6.947		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.5	607	0.2470	1.55		Lag/CN Method,

Subcatchment 4S: Post Developed

Hydrograph



Summary for Reach 6R: Proposed Ditch

Inflow Area = 6.947 ac, 0.00% Impervious, Inflow Depth = 0.00" for 100-YR - 4HR. event
 Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
 Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Max. Velocity= 0.00 fps, Min. Travel Time= 0.0 min
 Avg. Velocity = 0.00 fps, Avg. Travel Time= 0.0 min

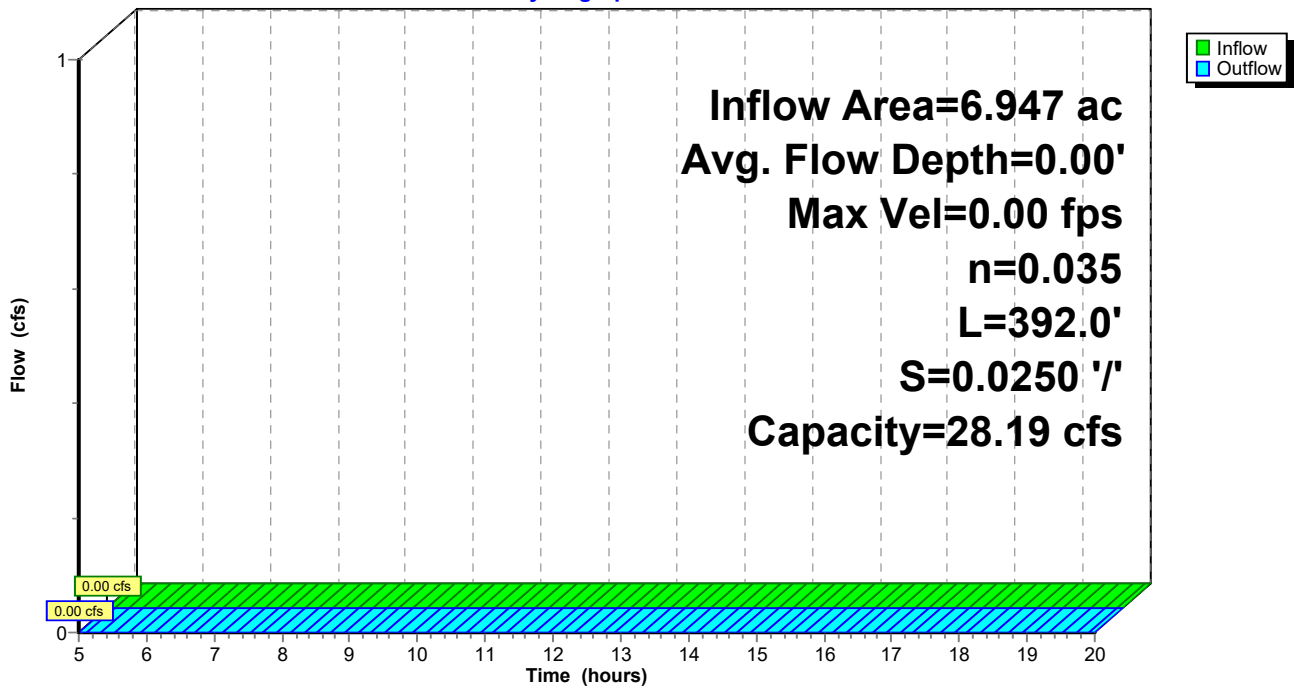
Peak Storage= 0 cf @ 5.00 hrs
 Average Depth at Peak Storage= 0.00'
 Bank-Full Depth= 1.00' Flow Area= 6.0 sf, Capacity= 28.19 cfs

2.00' x 1.00' deep channel, n= 0.035 High grass
 Side Slope Z-value= 4.0 '/' Top Width= 10.00'
 Length= 392.0' Slope= 0.0250 '/'
 Inlet Invert= 101.80', Outlet Invert= 92.00'



Reach 6R: Proposed Ditch

Hydrograph



Summary for Reach 9R: Proposed Ditch

Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
 Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Max. Velocity= 0.00 fps, Min. Travel Time= 0.0 min
 Avg. Velocity = 0.00 fps, Avg. Travel Time= 0.0 min

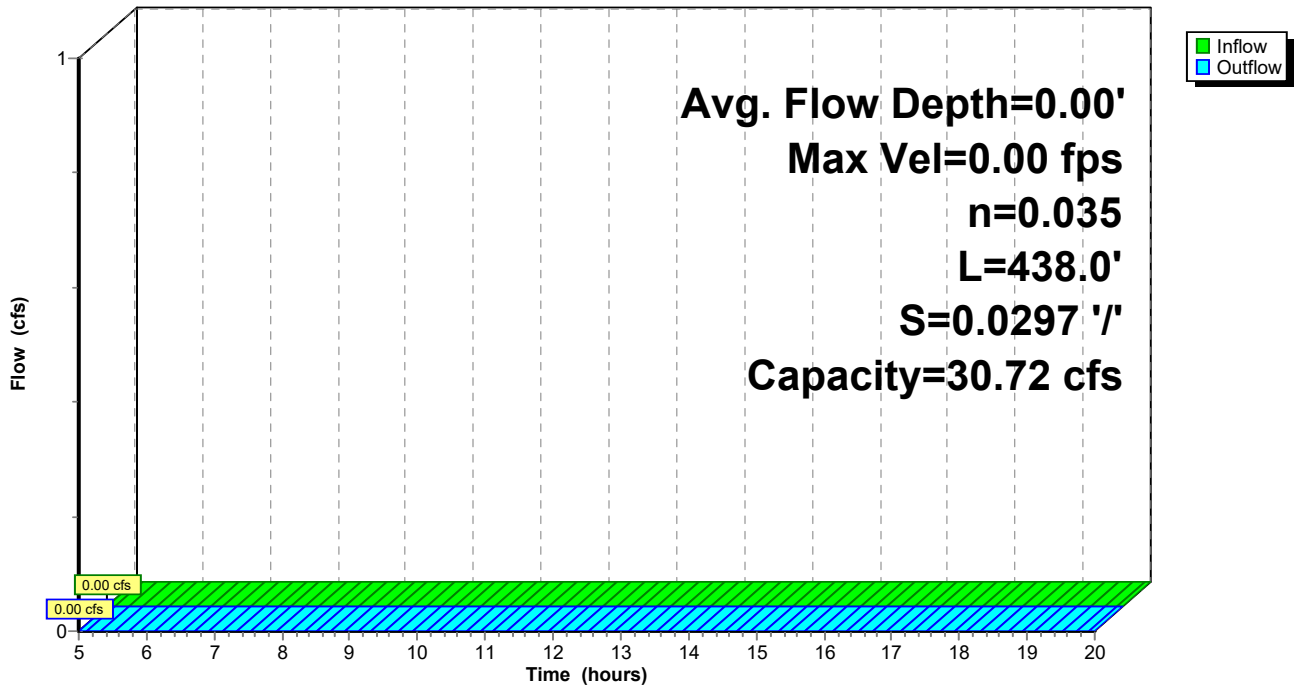
Peak Storage= 0 cf @ 5.00 hrs
 Average Depth at Peak Storage= 0.00'
 Bank-Full Depth= 1.00' Flow Area= 6.0 sf, Capacity= 30.72 cfs

2.00' x 1.00' deep channel, n= 0.035 High grass
 Side Slope Z-value= 4.0 '/' Top Width= 10.00'
 Length= 438.0' Slope= 0.0297 '/'
 Inlet Invert= 105.00', Outlet Invert= 92.00'



Reach 9R: Proposed Ditch

Hydrograph



Summary for Pond 6P: Rock Void

Inflow Area = 6.947 ac, 0.00% Impervious, Inflow Depth = 0.00" for 100-YR - 4HR. event
 Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
 Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min
 Discarded = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
 Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Peak Elev= 103.00' @ 5.00 hrs Surf.Area= 63,368 sf Storage= 0 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
 Center-of-Mass det. time= (not calculated: no inflow)

Volume	Invert	Avail.Storage	Storage Description
#1	103.00'	12,674 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
103.00	63,368	0	0
103.20	63,368	12,674	12,674

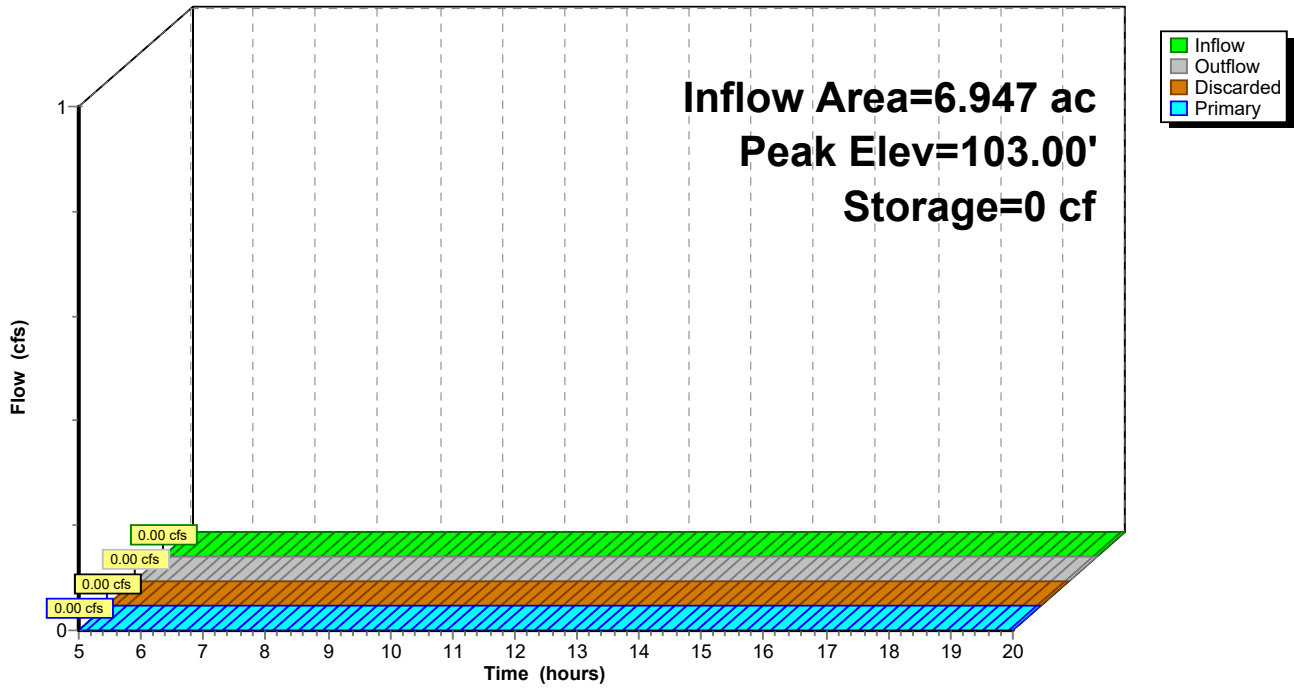
Device	Routing	Invert	Outlet Devices
#1	Discarded	103.00'	0.250 in/hr Exfiltration over Surface area
#2	Primary	103.20'	1,717.0' long x 1.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Discarded OutFlow Max=0.00 cfs @ 5.00 hrs HW=103.00' (Free Discharge)
 ↑1=Exfiltration (Passes 0.00 cfs of 0.37 cfs potential flow)

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=103.00' (Free Discharge)
 ↑2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond 6P: Rock Void

Hydrograph



Summary for Pond 8P: Proposed Pond

Inflow Area = 6.947 ac, 0.00% Impervious, Inflow Depth = 0.00" for 100-YR - 4HR. event
 Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
 Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min
 Discarded = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
 Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Peak Elev= 92.00' @ 5.00 hrs Surf.Area= 44,696 sf Storage= 0 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
 Center-of-Mass det. time= (not calculated: no inflow)

Volume	Invert	Avail.Storage	Storage Description
#1	92.00'	193,786 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

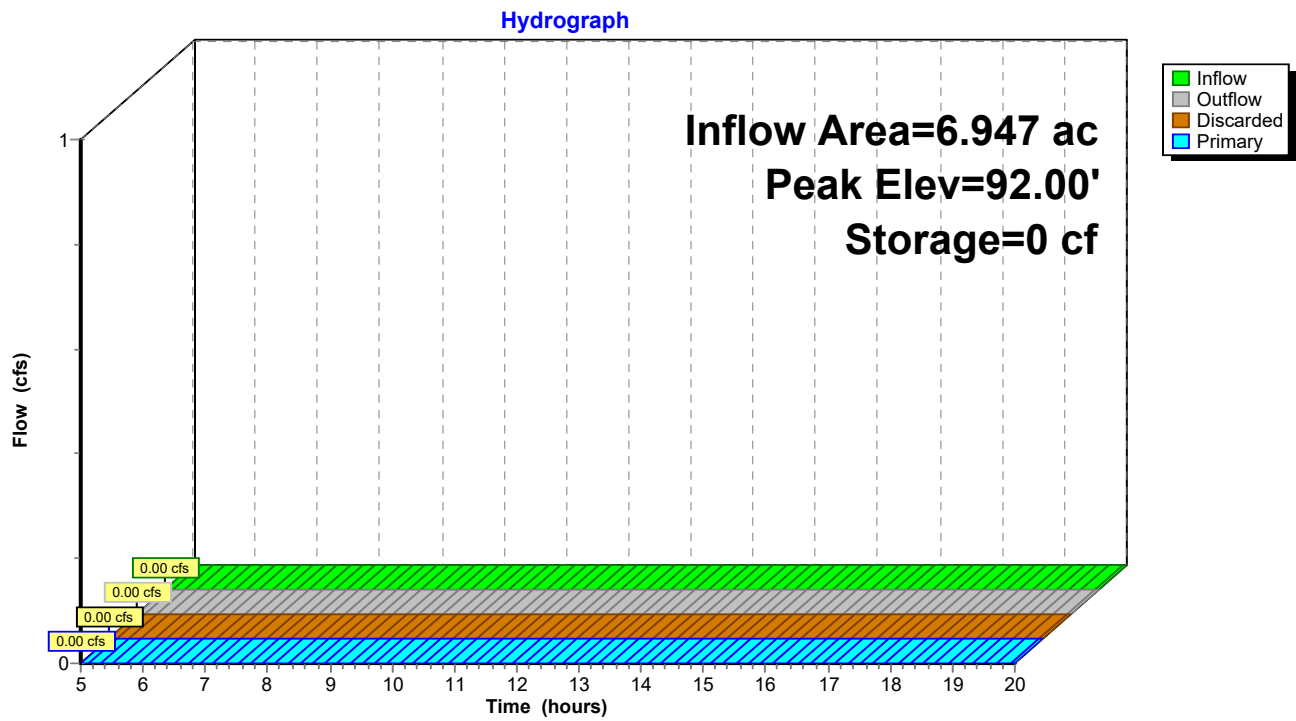
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
92.00	44,696	0	0
93.00	46,547	45,622	45,622
94.00	48,426	47,487	93,108
95.00	50,332	49,379	142,487
96.00	52,265	51,299	193,786

Device	Routing	Invert	Outlet Devices
#1	Discarded	92.00'	0.250 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Primary	94.50'	43.6 deg x 16.0' long x 1.00' rise Sharp-Crested Vee/Trap Weir Cv= 2.56 (C= 3.20)

Discarded OutFlow Max=0.00 cfs @ 5.00 hrs HW=92.00' (Free Discharge)
 ↑1=Exfiltration (Controls 0.00 cfs)

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=92.00' (Free Discharge)
 ↑2=Sharp-Crested Vee/Trap Weir (Controls 0.00 cfs)

Pond 8P: Proposed Pond



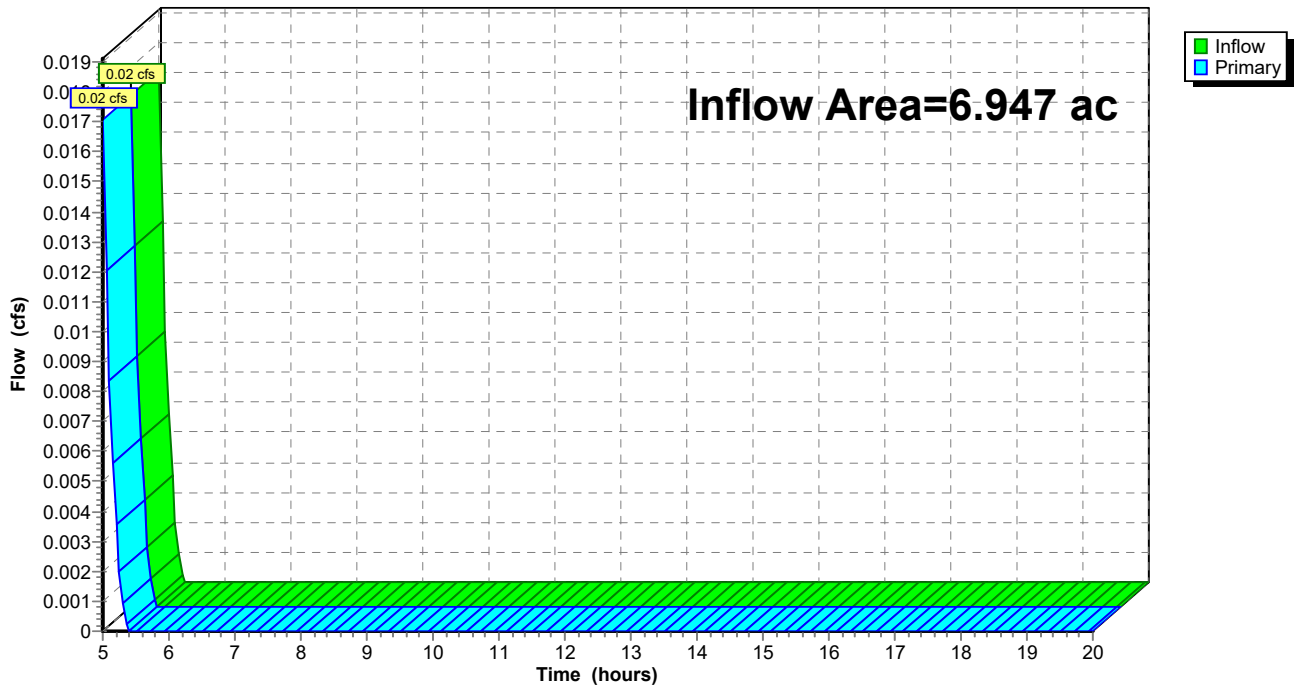
Summary for Link 2L: Outfall

Inflow Area = 6.947 ac, 0.00% Impervious, Inflow Depth > 0.00" for 100-YR - 4HR. event
Inflow = 0.02 cfs @ 5.00 hrs, Volume= 0.000 af
Primary = 0.02 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link 2L: Outfall

Hydrograph

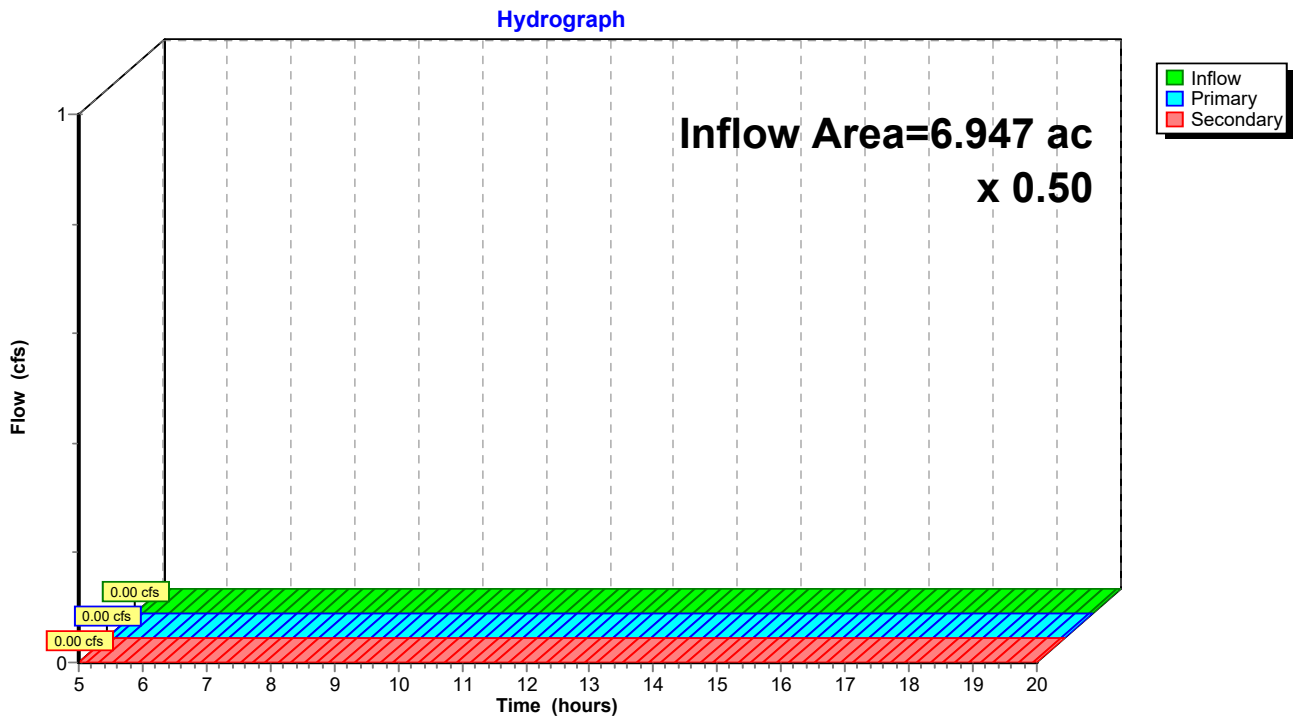


Summary for Link 5L: Sub Seperation Outfall

Inflow Area = 6.947 ac, 0.00% Impervious, Inflow Depth = 0.00" for 100-YR - 4HR. event
 Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
 Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min
 Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Primary outflow = Inflow x 0.50, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link 5L: Sub Seperation Outfall



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

Subcatchment 1S: Pre Developed Runoff Area=6.947 ac 0.00% Impervious Runoff Depth>0.94"
Flow Length=607' Slope=0.0247 '/' Tc=24.7 min CN=58 Runoff=4.43 cfs 0.545 af

Subcatchment 4S: Post Developed Runoff Area=6.947 ac 0.00% Impervious Runoff Depth>0.89"
Flow Length=607' Slope=0.2470 '/' Tc=6.5 min CN=65 Runoff=3.67 cfs 0.515 af

Reach 6R: Proposed Ditch Avg. Flow Depth=0.14' Max Vel=1.59 fps Inflow=0.81 cfs 0.064 af
n=0.035 L=392.0' S=0.0250 '/' Capacity=28.19 cfs Outflow=0.58 cfs 0.064 af

Reach 9R: Proposed Ditch Avg. Flow Depth=0.14' Max Vel=1.69 fps Inflow=0.81 cfs 0.064 af
n=0.035 L=438.0' S=0.0297 '/' Capacity=30.72 cfs Outflow=0.58 cfs 0.064 af

Pond 6P: Rock Void Peak Elev=103.20' Storage=12,674 cf Inflow=3.67 cfs 0.515 af
Discarded=0.37 cfs 0.387 af Primary=1.62 cfs 0.128 af Outflow=1.99 cfs 0.515 af

Pond 8P: Proposed Pond Peak Elev=92.10' Storage=4,331 cf Inflow=1.17 cfs 0.128 af
Discarded=0.26 cfs 0.128 af Primary=0.00 cfs 0.000 af Outflow=0.26 cfs 0.128 af

Link 2L: Outfall Inflow=4.43 cfs 0.545 af
Primary=4.43 cfs 0.545 af

Link 5L: Sub Separation Outfall x 0.50 Inflow=1.62 cfs 0.128 af
Primary=0.81 cfs 0.064 af Secondary=0.81 cfs 0.064 af

Summary for Subcatchment 1S: Pre Developed

Runoff = 4.43 cfs @ 5.00 hrs, Volume= 0.545 af, Depth> 0.94"

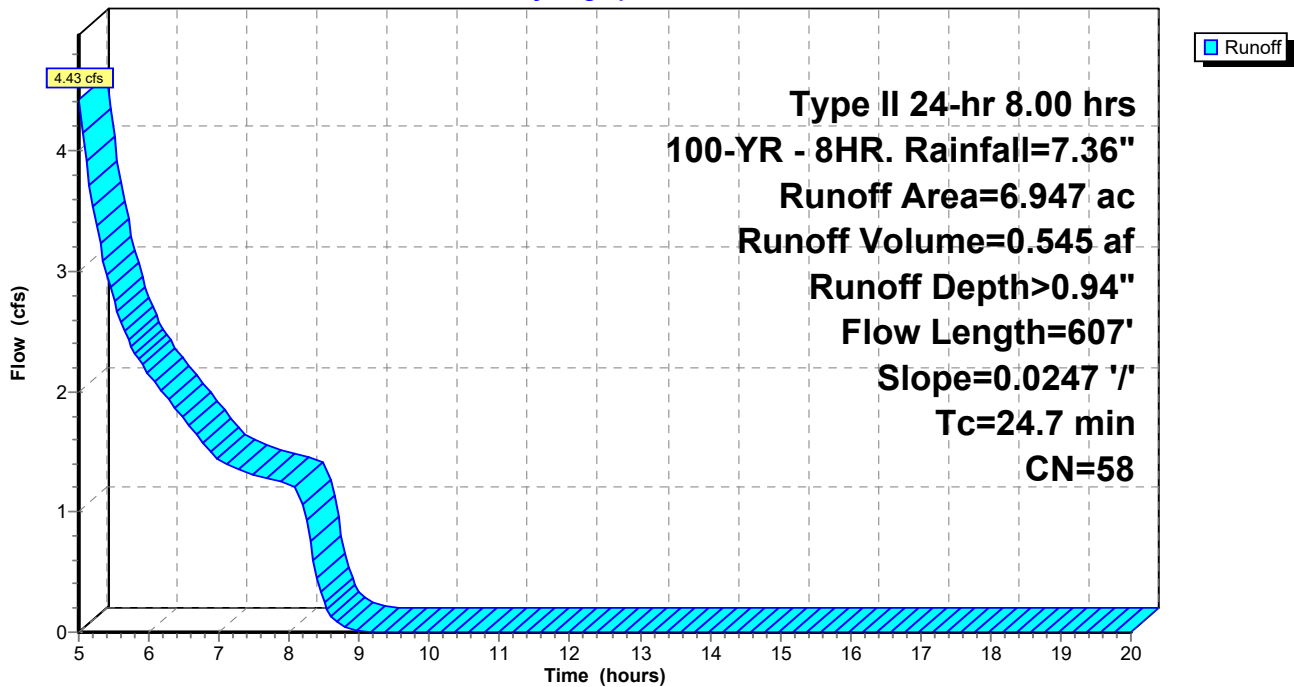
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Type II 24-hr 8.00 hrs 100-YR - 8HR. Rainfall=7.36"

Area (ac)	CN	Description
6.947	58	Meadow, non-grazed, HSG B
6.947		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.7	607	0.0247	0.41		Lag/CN Method,

Subcatchment 1S: Pre Developed

Hydrograph



Summary for Subcatchment 4S: Post Developed

Runoff = 3.67 cfs @ 5.00 hrs, Volume= 0.515 af, Depth> 0.89"

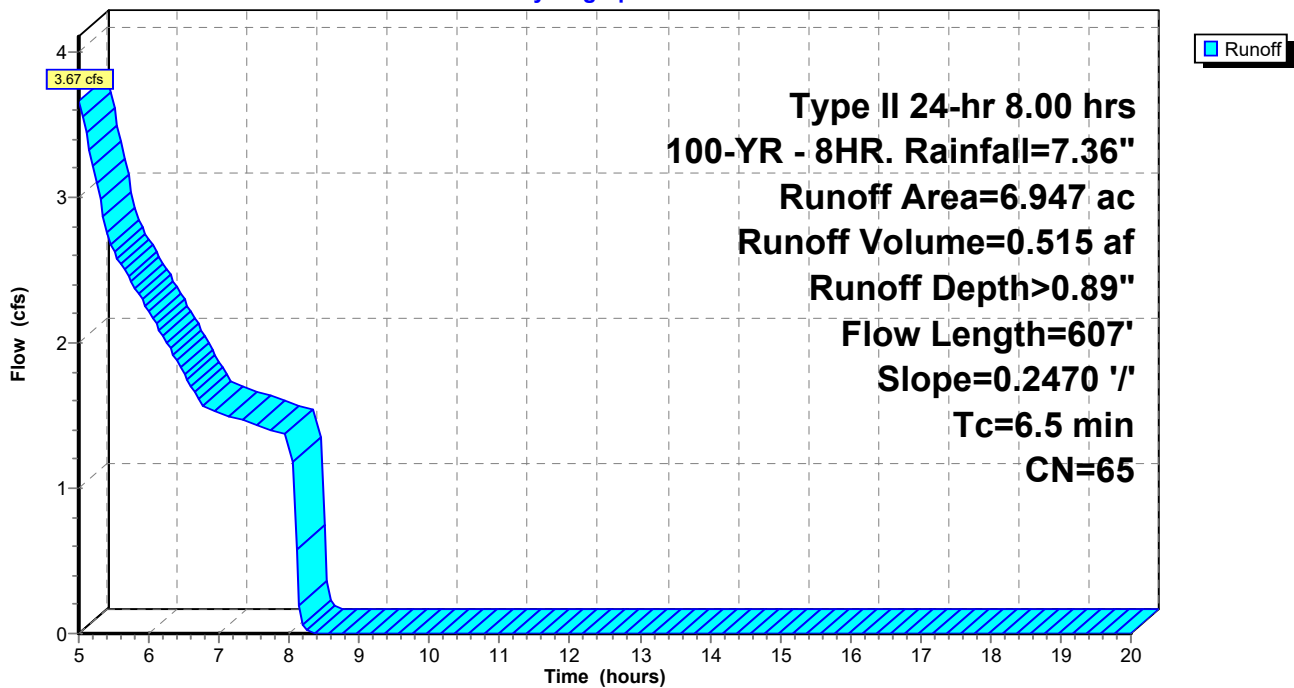
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Type II 24-hr 8.00 hrs 100-YR - 8HR. Rainfall=7.36"

Area (ac)	CN	Description
2.015	58	Meadow, non-grazed, HSG B
* 4.156	65	Uncompacted Gravel (35% Void)
0.776	85	Gravel roads, HSG B
6.947	65	Weighted Average
6.947		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.5	607	0.2470	1.55		Lag/CN Method,

Subcatchment 4S: Post Developed

Hydrograph



Summary for Reach 6R: Proposed Ditch

Inflow Area = 6.947 ac, 0.00% Impervious, Inflow Depth = 0.11" for 100-YR - 8HR. event
 Inflow = 0.81 cfs @ 6.70 hrs, Volume= 0.064 af
 Outflow = 0.58 cfs @ 6.99 hrs, Volume= 0.064 af, Atten= 28%, Lag= 17.7 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Max. Velocity= 1.59 fps, Min. Travel Time= 4.1 min
 Avg. Velocity = 0.81 fps, Avg. Travel Time= 8.0 min

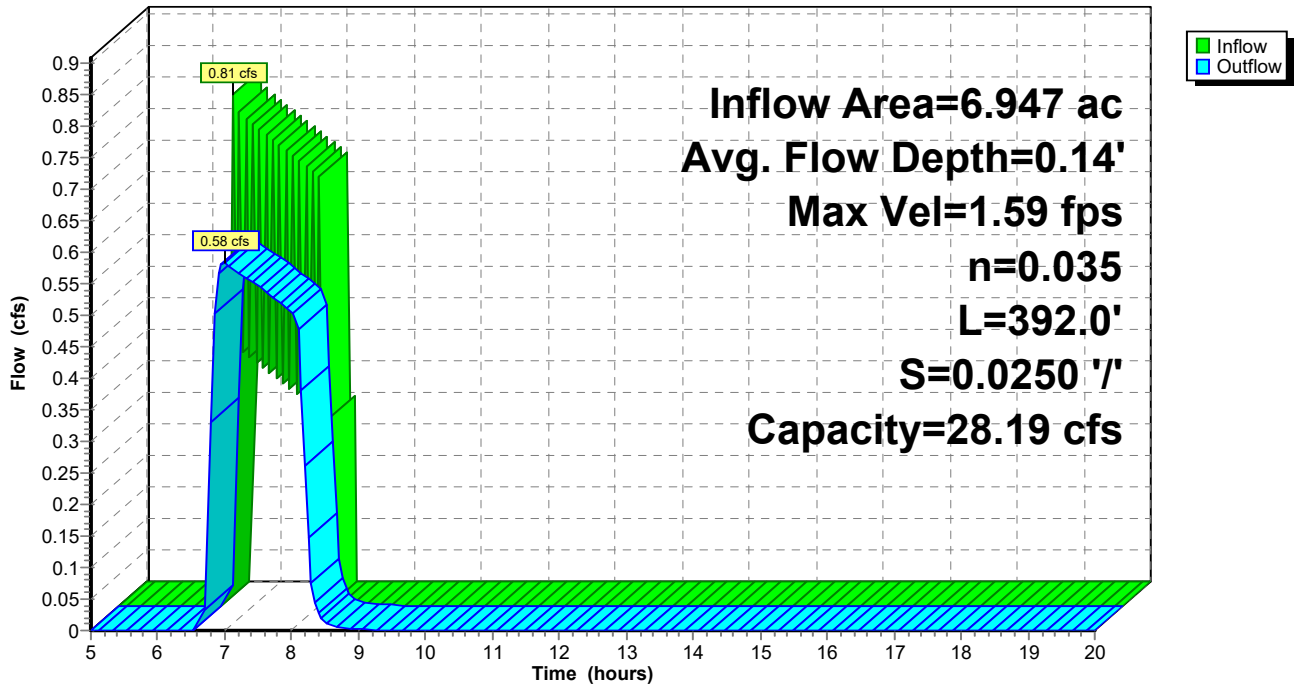
Peak Storage= 144 cf @ 6.92 hrs
 Average Depth at Peak Storage= 0.14'
 Bank-Full Depth= 1.00' Flow Area= 6.0 sf, Capacity= 28.19 cfs

2.00' x 1.00' deep channel, n= 0.035 High grass
 Side Slope Z-value= 4.0 ' / ' Top Width= 10.00'
 Length= 392.0' Slope= 0.0250 ' / '
 Inlet Invert= 101.80', Outlet Invert= 92.00'



Reach 6R: Proposed Ditch

Hydrograph



Summary for Reach 9R: Proposed Ditch

Inflow = 0.81 cfs @ 6.70 hrs, Volume= 0.064 af
 Outflow = 0.58 cfs @ 7.01 hrs, Volume= 0.064 af, Atten= 28%, Lag= 18.6 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Max. Velocity= 1.69 fps, Min. Travel Time= 4.3 min
 Avg. Velocity = 0.86 fps, Avg. Travel Time= 8.5 min

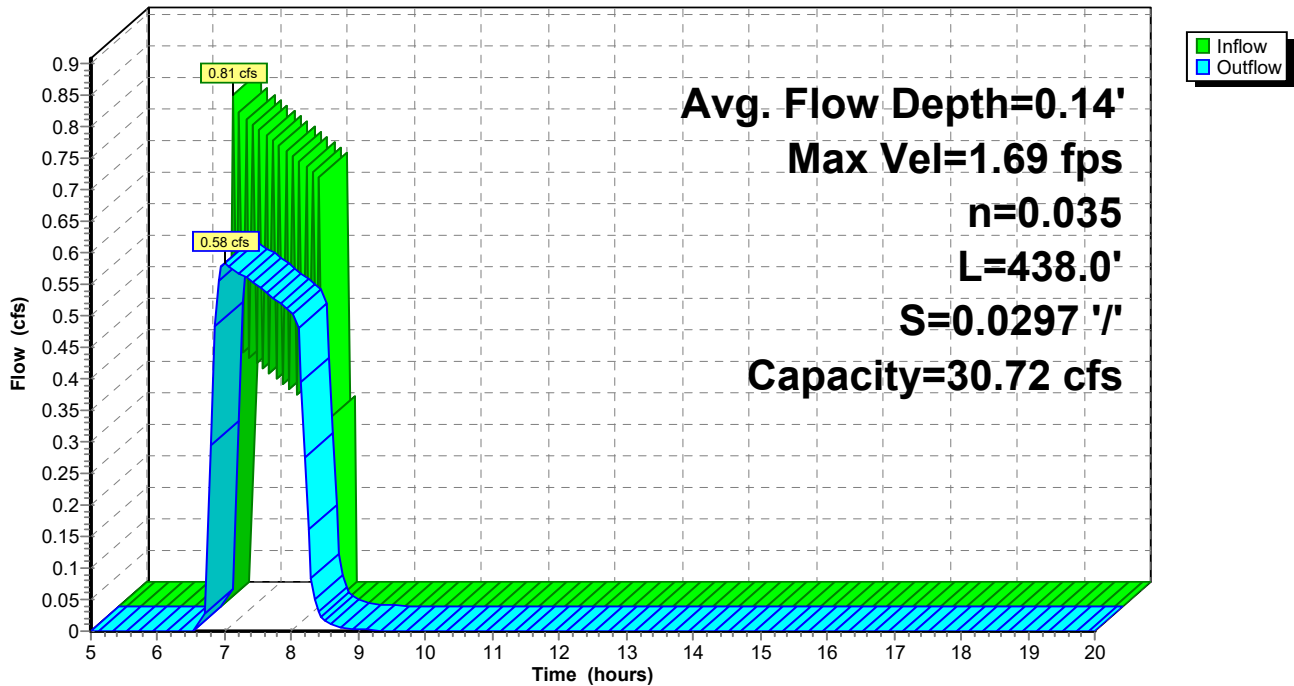
Peak Storage= 151 cf @ 6.92 hrs
 Average Depth at Peak Storage= 0.14'
 Bank-Full Depth= 1.00' Flow Area= 6.0 sf, Capacity= 30.72 cfs

2.00' x 1.00' deep channel, n= 0.035 High grass
 Side Slope Z-value= 4.0 '/' Top Width= 10.00'
 Length= 438.0' Slope= 0.0297 '/'
 Inlet Invert= 105.00', Outlet Invert= 92.00'



Reach 9R: Proposed Ditch

Hydrograph



Summary for Pond 6P: Rock Void

Inflow Area = 6.947 ac, 0.00% Impervious, Inflow Depth > 0.89" for 100-YR - 8HR. event
 Inflow = 3.67 cfs @ 5.00 hrs, Volume= 0.515 af
 Outflow = 1.99 cfs @ 6.70 hrs, Volume= 0.515 af, Atten= 46%, Lag= 102.0 min
 Discarded = 0.37 cfs @ 5.00 hrs, Volume= 0.387 af
 Primary = 1.62 cfs @ 6.70 hrs, Volume= 0.128 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Peak Elev= 103.20' @ 6.70 hrs Surf.Area= 63,368 sf Storage= 12,674 cf

Plug-Flow detention time= 250.0 min calculated for 0.507 af (98% of inflow)
 Center-of-Mass det. time= 245.4 min (621.5 - 376.1)

Volume	Invert	Avail.Storage	Storage Description
#1	103.00'	12,674 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
103.00	63,368	0	0
103.20	63,368	12,674	12,674

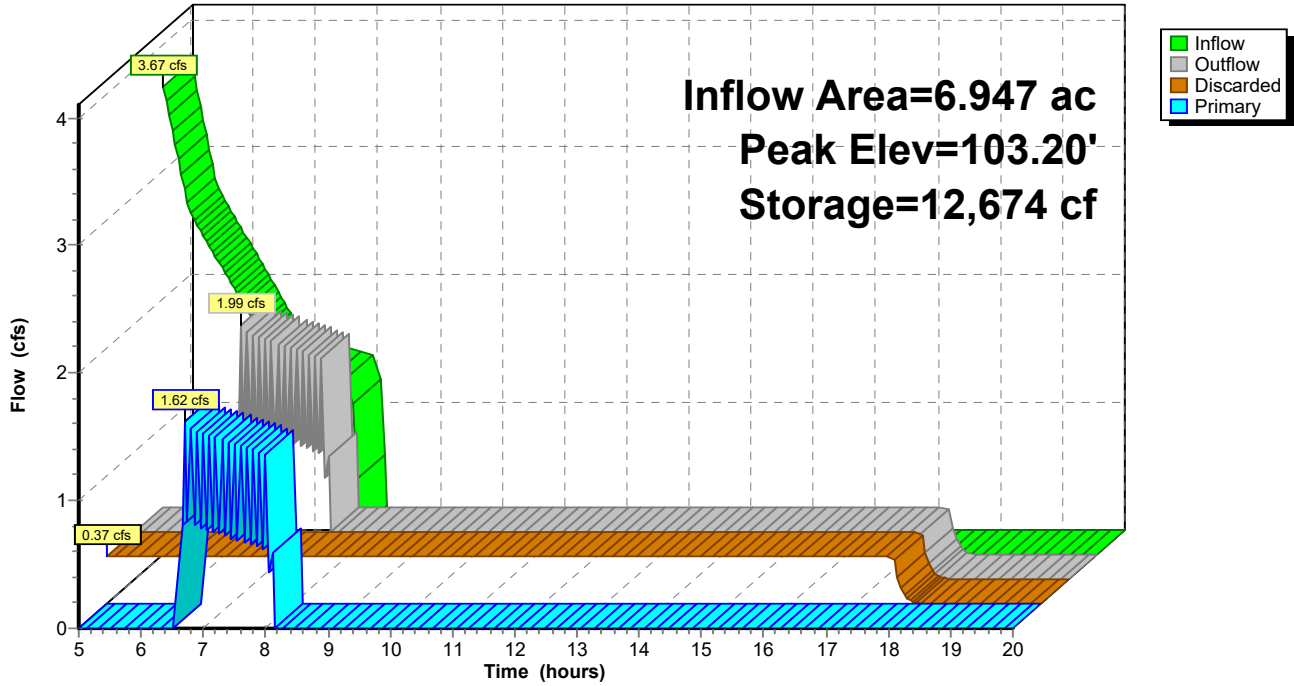
Device	Routing	Invert	Outlet Devices
#1	Discarded	103.00'	0.250 in/hr Exfiltration over Surface area
#2	Primary	103.20'	1,717.0' long x 1.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Discarded OutFlow Max=0.37 cfs @ 5.00 hrs HW=103.00' (Free Discharge)
 ↑1=**Exfiltration** (Exfiltration Controls 0.37 cfs)

Primary OutFlow Max=1.60 cfs @ 6.70 hrs HW=103.20' (Free Discharge)
 ↑2=**Broad-Crested Rectangular Weir**(Weir Controls 1.60 cfs @ 0.19 fps)

Pond 6P: Rock Void

Hydrograph



Summary for Pond 8P: Proposed Pond

Inflow Area = 6.947 ac, 0.00% Impervious, Inflow Depth = 0.22" for 100-YR - 8HR. event
 Inflow = 1.17 cfs @ 7.00 hrs, Volume= 0.128 af
 Outflow = 0.26 cfs @ 8.27 hrs, Volume= 0.128 af, Atten= 78%, Lag= 75.8 min
 Discarded = 0.26 cfs @ 8.27 hrs, Volume= 0.128 af
 Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Peak Elev= 92.10' @ 8.27 hrs Surf.Area= 44,875 sf Storage= 4,331 cf

Plug-Flow detention time= 168.0 min calculated for 0.128 af (100% of inflow)
 Center-of-Mass det. time= 167.7 min (617.5 - 449.8)

Volume	Invert	Avail.Storage	Storage Description
#1	92.00'	193,786 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
92.00	44,696	0	0
93.00	46,547	45,622	45,622
94.00	48,426	47,487	93,108
95.00	50,332	49,379	142,487
96.00	52,265	51,299	193,786

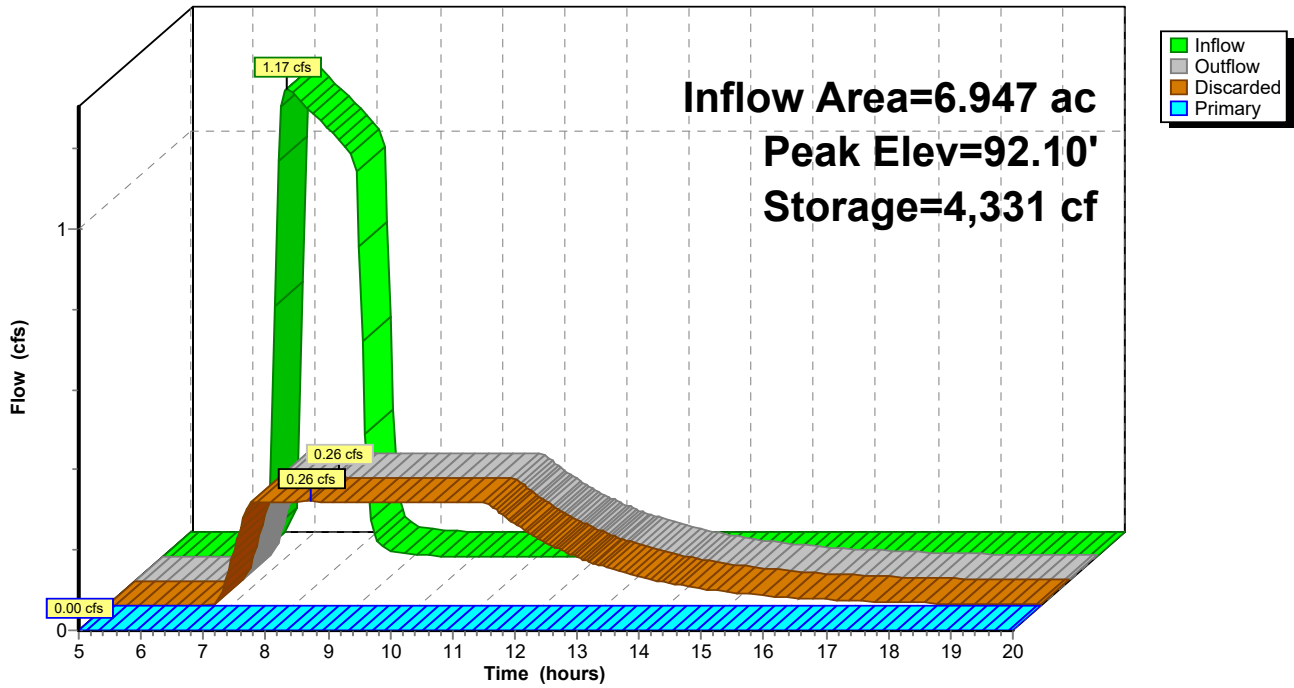
Device	Routing	Invert	Outlet Devices
#1	Discarded	92.00'	0.250 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Primary	94.50'	43.6 deg x 16.0' long x 1.00' rise Sharp-Crested Vee/Trap Weir Cv= 2.56 (C= 3.20)

Discarded OutFlow Max=0.26 cfs @ 8.27 hrs HW=92.10' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.26 cfs)

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=92.00' (Free Discharge)
 ↑2=Sharp-Crested Vee/Trap Weir (Controls 0.00 cfs)

Pond 8P: Proposed Pond

Hydrograph



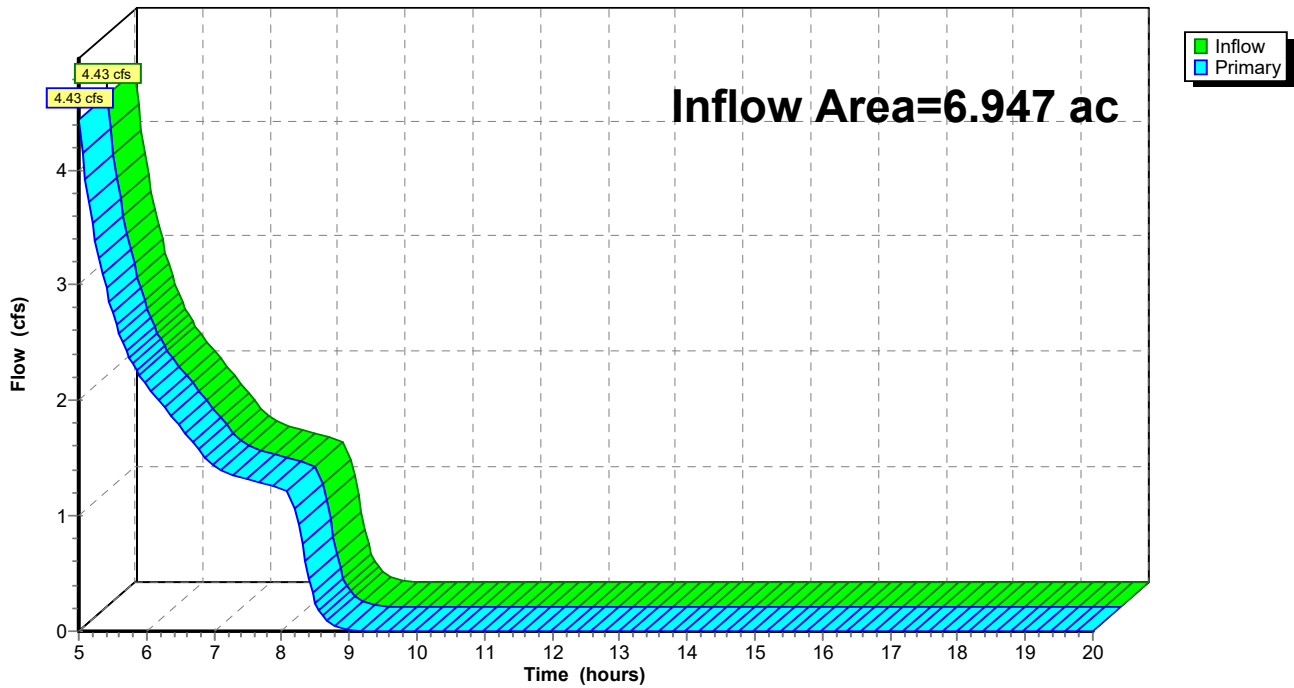
Summary for Link 2L: Outfall

Inflow Area = 6.947 ac, 0.00% Impervious, Inflow Depth > 0.94" for 100-YR - 8HR. event
Inflow = 4.43 cfs @ 5.00 hrs, Volume= 0.545 af
Primary = 4.43 cfs @ 5.00 hrs, Volume= 0.545 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link 2L: Outfall

Hydrograph

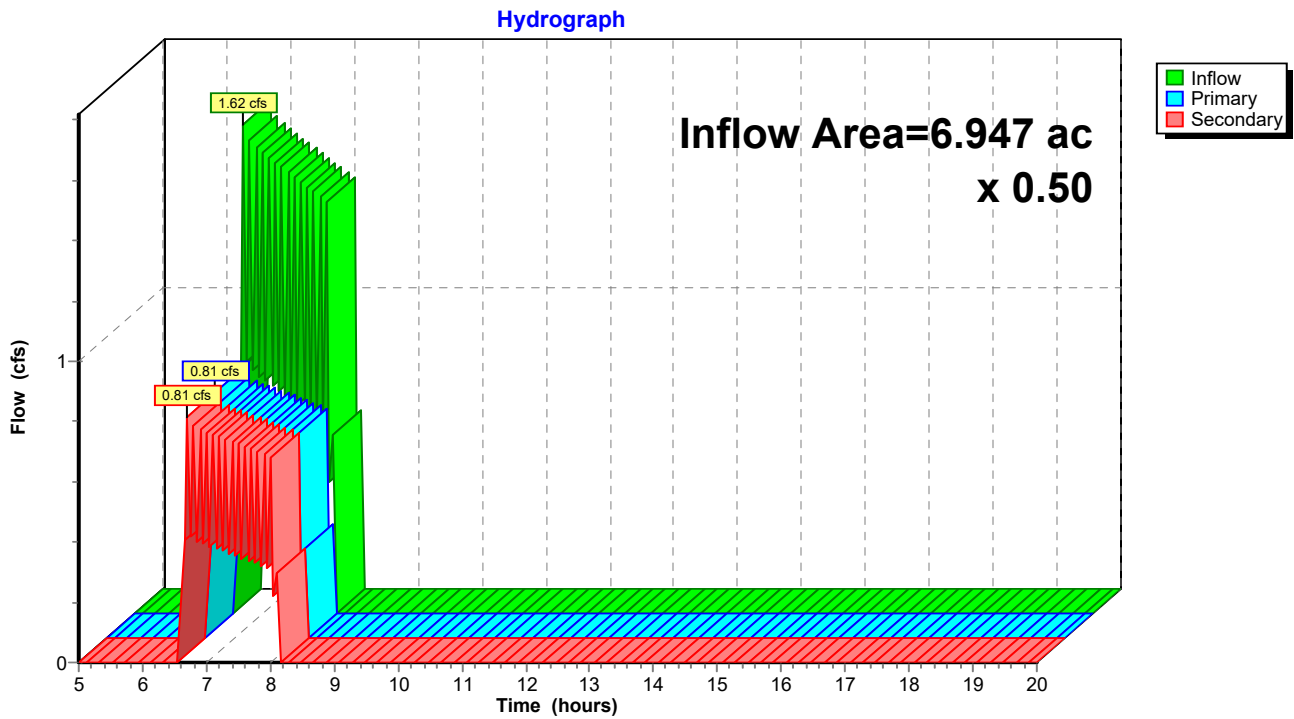


Summary for Link 5L: Sub Seperation Outfall

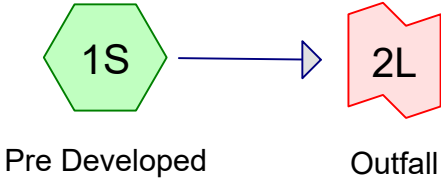
Inflow Area = 6.947 ac, 0.00% Impervious, Inflow Depth = 0.22" for 100-YR - 8HR. event
 Inflow = 1.62 cfs @ 6.70 hrs, Volume= 0.128 af
 Primary = 0.81 cfs @ 6.70 hrs, Volume= 0.064 af, Atten= 50%, Lag= 0.0 min
 Secondary = 0.81 cfs @ 6.70 hrs, Volume= 0.064 af

Primary outflow = Inflow x 0.50, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

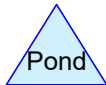
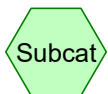
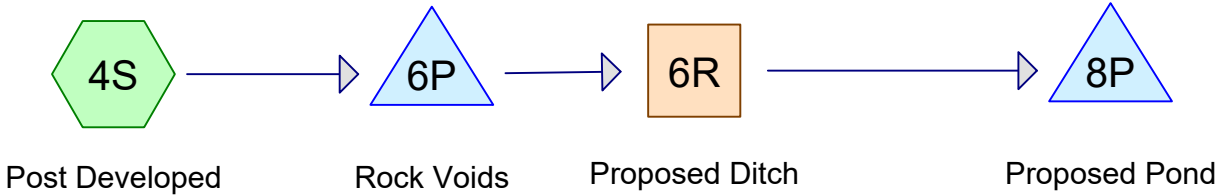
Link 5L: Sub Seperation Outfall



**STAGING AREA 2
BASIN 3
PRE-DEVELOPED
SITE**



**POST DEVELOPED
SITE**



Staging Area 2 Basin 3 HydroCAD Report

Type II 24-hr 3 DAY-100YR. Rainfall=12.40"

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

Subcatchment 1S: Pre Developed Runoff Area=221,533 sf 0.00% Impervious Runoff Depth>6.05"
Flow Length=607' Slope=0.0247 '/' Tc=24.7 min CN=58 Runoff=32.72 cfs 2.562 af

Subcatchment 4S: Post Developed Runoff Area=221,533 sf 0.00% Impervious Runoff Depth>6.98"
Flow Length=607' Slope=0.2470 '/' Tc=6.7 min CN=64 Runoff=64.19 cfs 2.960 af

Reach 6R: Proposed Ditch Avg. Flow Depth=1.60' Max Vel=4.15 fps Inflow=65.55 cfs 2.575 af
n=0.035 L=261.0' S=0.0123 '/' Capacity=28.32 cfs Outflow=60.42 cfs 2.571 af

Pond 6P: Rock Voids Peak Elev=104.04' Storage=7,470 cf Inflow=64.19 cfs 2.960 af
Discarded=0.22 cfs 0.214 af Primary=65.55 cfs 2.575 af Outflow=65.76 cfs 2.790 af

Pond 8P: Proposed Pond Peak Elev=100.11' Storage=103,674 cf Inflow=60.42 cfs 2.571 af
Discarded=0.27 cfs 0.190 af Primary=0.00 cfs 0.000 af Outflow=0.27 cfs 0.190 af

Link 2L: Outfall Inflow=32.72 cfs 2.562 af
Primary=32.72 cfs 2.562 af

Staging Area 2 Basin 3 HydroCAD Report

Type II 24-hr 3 DAY-100YR. Rainfall=12.40"

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Summary for Subcatchment 1S: Pre Developed

Runoff = 32.72 cfs @ 12.18 hrs, Volume= 2.562 af, Depth> 6.05"

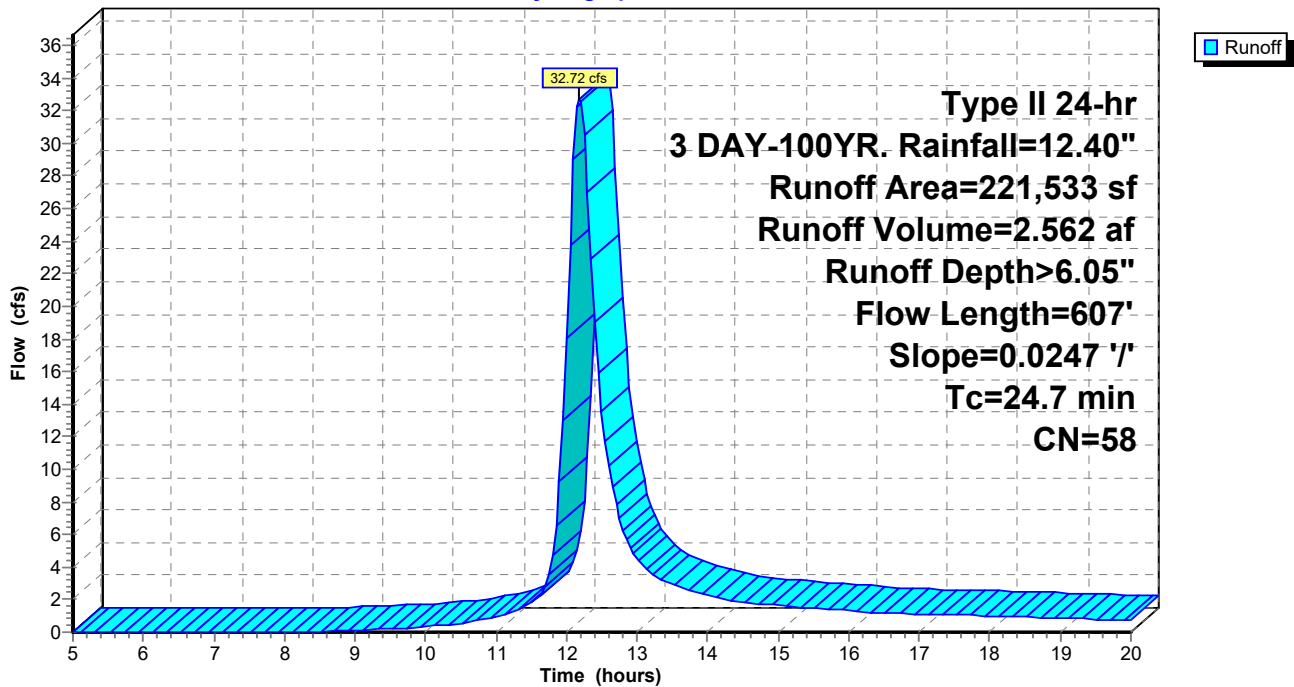
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 3 DAY-100YR. Rainfall=12.40"

Area (sf)	CN	Description
221,533	58	Meadow, non-grazed, HSG B
221,533		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.7	607	0.0247	0.41		Lag/CN Method,

Subcatchment 1S: Pre Developed

Hydrograph



Staging Area 2 Basin 3 HydroCAD Report

Type II 24-hr 3 DAY-100YR. Rainfall=12.40"

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Summary for Subcatchment 4S: Post Developed

Runoff = 64.19 cfs @ 11.98 hrs, Volume= 2.960 af, Depth> 6.98"

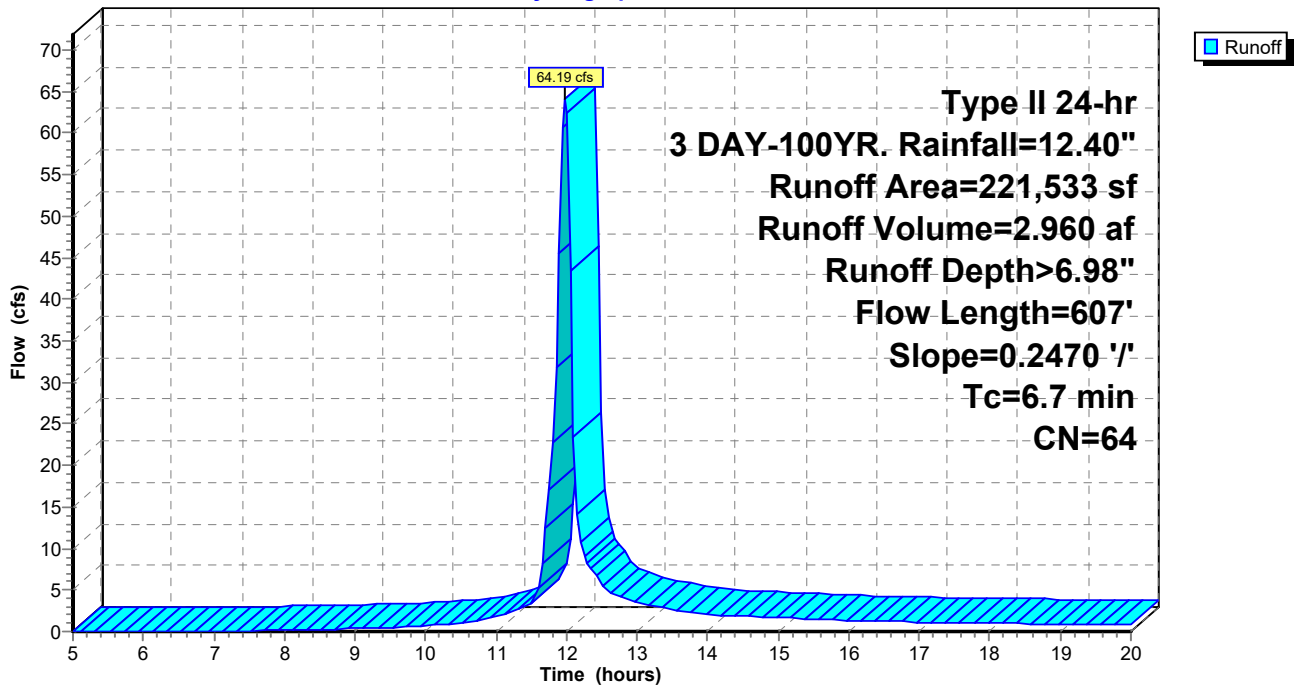
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 3 DAY-100YR. Rainfall=12.40"

Area (sf)	CN	Description
97,307	58	Meadow, non-grazed, HSG B
* 106,708	65	Uncompacted Gravel (35% Void)
17,518	85	Gravel roads, HSG B
221,533	64	Weighted Average
221,533		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.7	607	0.2470	1.51		Lag/CN Method,

Subcatchment 4S: Post Developed

Hydrograph



Staging Area 2 Basin 3 HydroCAD Report

Type II 24-hr 3 DAY-100YR. Rainfall=12.40"

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Summary for Reach 6R: Proposed Ditch

Inflow Area = 5.086 ac, 0.00% Impervious, Inflow Depth > 6.08" for 3 DAY-100YR. event
Inflow = 65.55 cfs @ 11.99 hrs, Volume= 2.575 af
Outflow = 60.42 cfs @ 12.01 hrs, Volume= 2.571 af, Atten= 8%, Lag= 1.3 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.15 fps, Min. Travel Time= 1.0 min
Avg. Velocity = 1.57 fps, Avg. Travel Time= 2.8 min

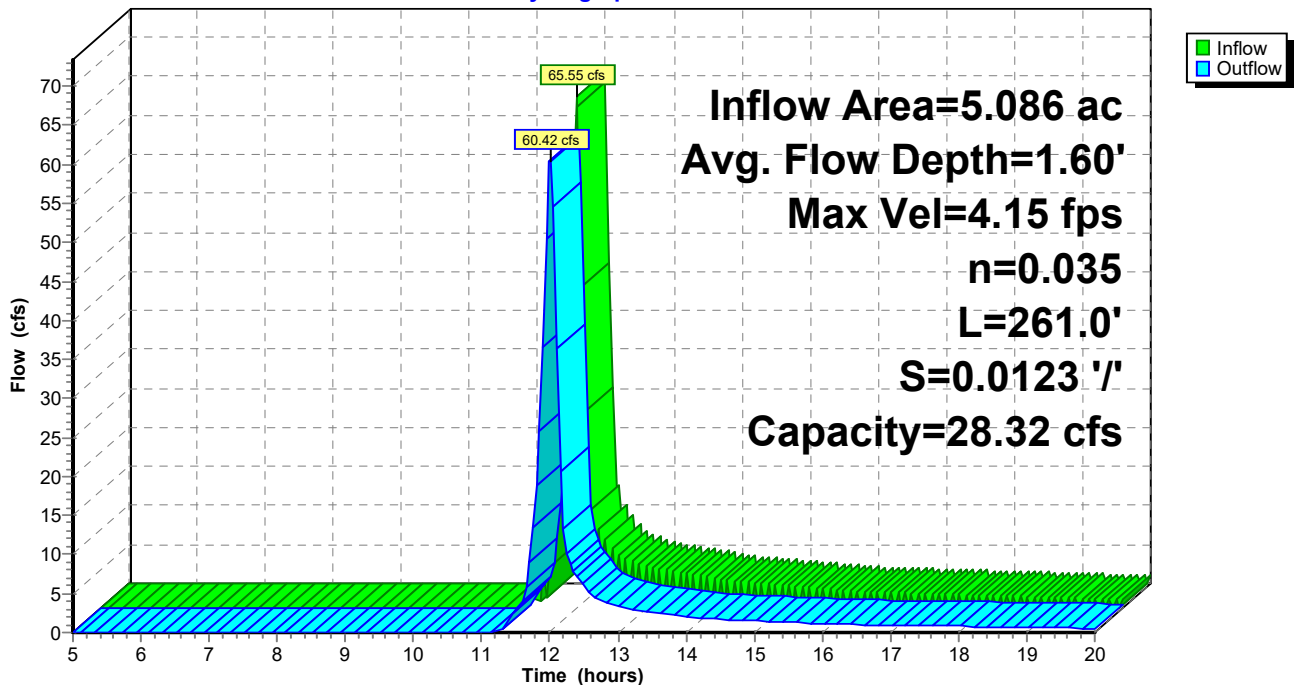
Peak Storage= 3,957 cf @ 11.99 hrs
Average Depth at Peak Storage= 1.60'
Bank-Full Depth= 1.00' Flow Area= 8.0 sf, Capacity= 28.32 cfs

4.00' x 1.00' deep channel, n= 0.035 High grass
Side Slope Z-value= 4.0 '/' Top Width= 12.00'
Length= 261.0' Slope= 0.0123 '/'
Inlet Invert= 104.00', Outlet Invert= 100.80'



Reach 6R: Proposed Ditch

Hydrograph



Staging Area 2 Basin 3 HydroCAD Report

Type II 24-hr 3 DAY-100YR. Rainfall=12.40"

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Summary for Pond 6P: Rock Voids

Inflow Area = 5.086 ac, 0.00% Impervious, Inflow Depth > 6.98" for 3 DAY-100YR. event
 Inflow = 64.19 cfs @ 11.98 hrs, Volume= 2.960 af
 Outflow = 65.76 cfs @ 11.99 hrs, Volume= 2.790 af, Atten= 0%, Lag= 0.4 min
 Discarded = 0.22 cfs @ 9.15 hrs, Volume= 0.214 af
 Primary = 65.55 cfs @ 11.99 hrs, Volume= 2.575 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Peak Elev= 104.04' @ 11.98 hrs Surf.Area= 37,348 sf Storage= 7,470 cf

Plug-Flow detention time= 30.4 min calculated for 2.780 af (94% of inflow)
 Center-of-Mass det. time= 9.2 min (785.5 - 776.3)

Volume	Invert	Avail.Storage	Storage Description
#1	102.50'	7,470 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
102.50	37,348	0	0
102.70	37,348	7,470	7,470

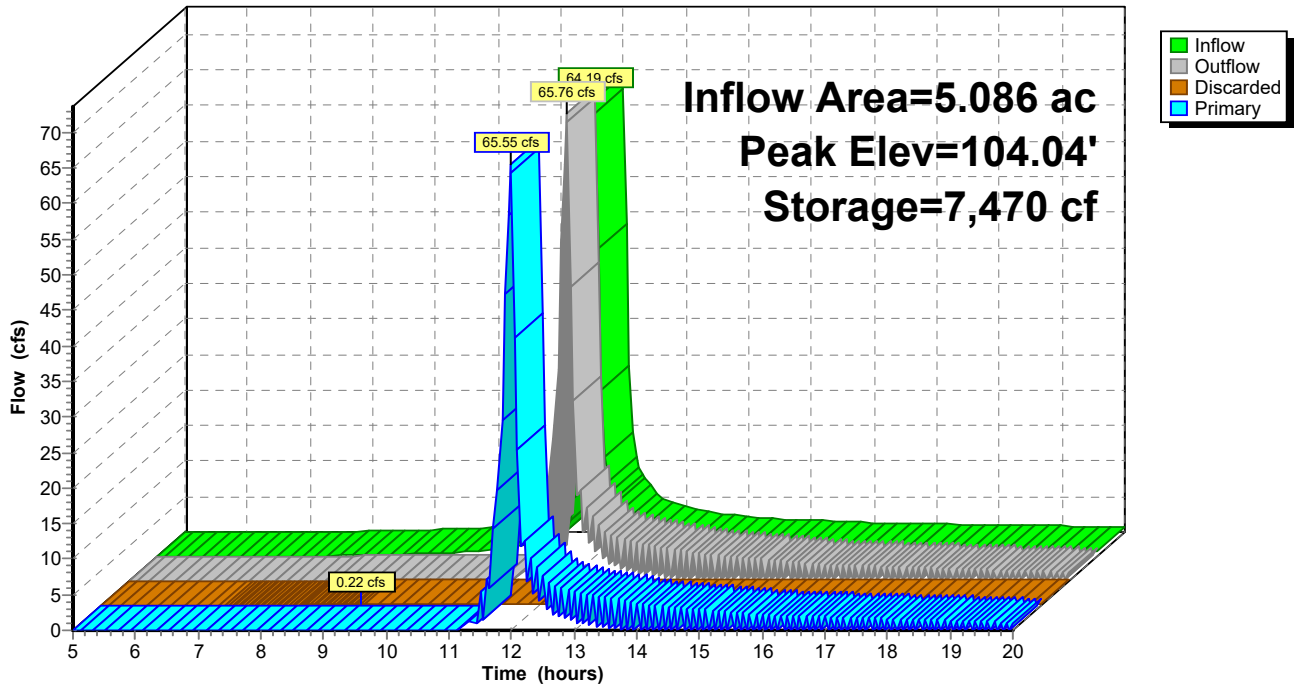
Device	Routing	Invert	Outlet Devices
#1	Discarded	102.50'	0.250 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Primary	102.70'	16.0' long x 5.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Discarded OutFlow Max=0.22 cfs @ 9.15 hrs HW=102.52' (Free Discharge)
 ↑1=**Exfiltration** (Exfiltration Controls 0.22 cfs)

Primary OutFlow Max=62.49 cfs @ 11.99 hrs HW=103.99' (Free Discharge)
 ↑2=**Broad-Crested Rectangular Weir** (Weir Controls 62.49 cfs @ 3.02 fps)

Pond 6P: Rock Voids

Hydrograph



Staging Area 2 Basin 3 HydroCAD Report

Type II 24-hr 3 DAY-100YR. Rainfall=12.40"

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Summary for Pond 8P: Proposed Pond

Inflow Area = 5.086 ac, 0.00% Impervious, Inflow Depth > 6.07" for 3 DAY-100YR. event
 Inflow = 60.42 cfs @ 12.01 hrs, Volume= 2.571 af
 Outflow = 0.27 cfs @ 20.00 hrs, Volume= 0.190 af, Atten= 100%, Lag= 479.6 min
 Discarded = 0.27 cfs @ 20.00 hrs, Volume= 0.190 af
 Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Peak Elev= 100.11' @ 20.00 hrs Surf.Area= 47,274 sf Storage= 103,674 cf

Plug-Flow detention time= 248.3 min calculated for 0.190 af (7% of inflow)
 Center-of-Mass det. time= 164.8 min (947.8 - 783.0)

Volume	Invert	Avail.Storage	Storage Description
#1	97.80'	186,469 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
97.80	42,365	0	0
98.80	44,469	43,417	43,417
99.80	46,598	45,534	88,951
100.80	48,753	47,676	136,626
101.80	50,933	49,843	186,469

Device	Routing	Invert	Outlet Devices
#1	Discarded	97.80'	0.250 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Primary	100.70'	43.6 deg x 12.0' long x 1.00' rise Sharp-Crested Vee/Trap Weir Cv= 2.56 (C= 3.20)

Discarded OutFlow Max=0.27 cfs @ 20.00 hrs HW=100.11' (Free Discharge)

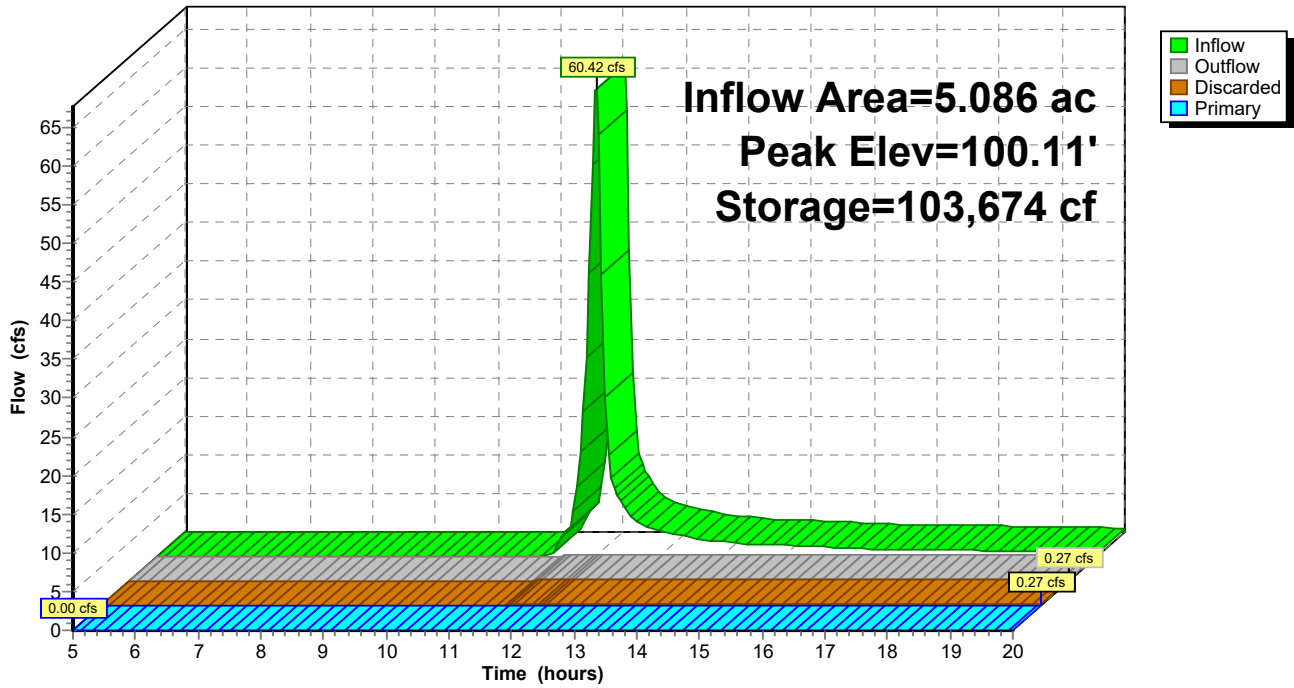
↑**1=Exfiltration** (Exfiltration Controls 0.27 cfs)

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=97.80' (Free Discharge)

↑**2=Sharp-Crested Vee/Trap Weir** (Controls 0.00 cfs)

Pond 8P: Proposed Pond

Hydrograph



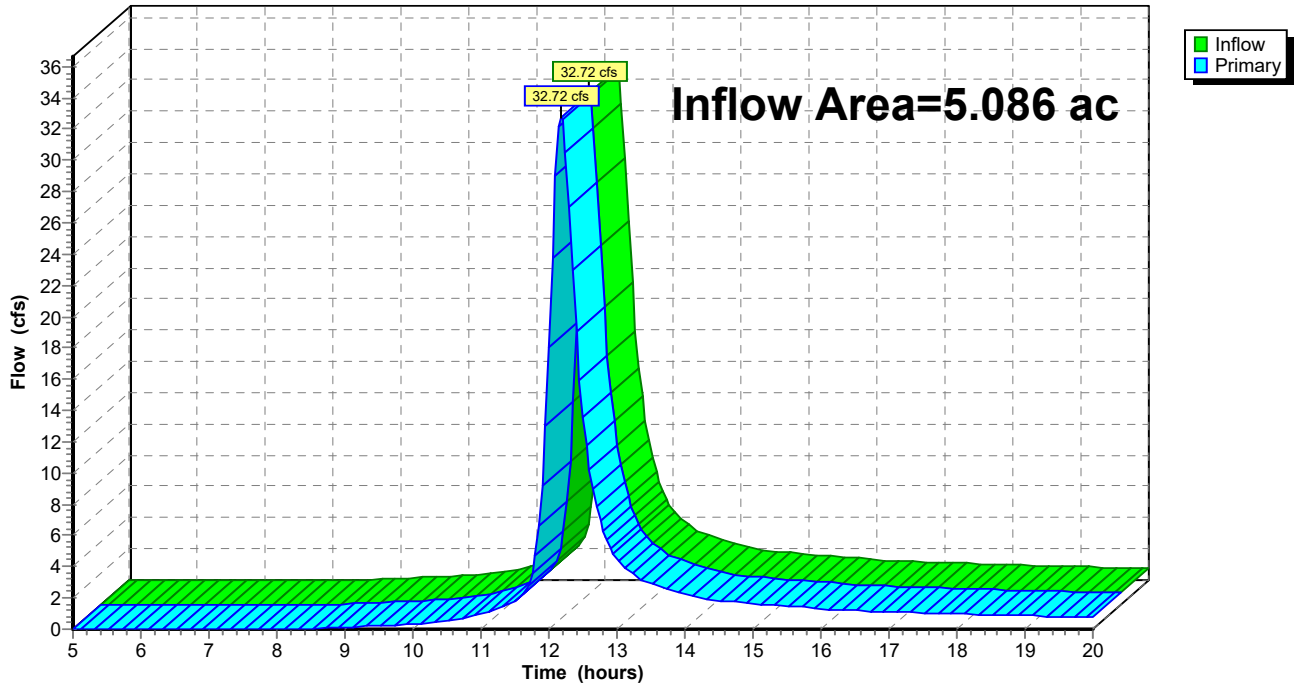
Summary for Link 2L: Outfall

Inflow Area = 5.086 ac, 0.00% Impervious, Inflow Depth > 6.05" for 3 DAY-100YR. event
Inflow = 32.72 cfs @ 12.18 hrs, Volume= 2.562 af
Primary = 32.72 cfs @ 12.18 hrs, Volume= 2.562 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link 2L: Outfall

Hydrograph



Staging Area 2 Basin 3 HydroCAD Report

Type II 24-hr 7 DAY-100YR Rainfall=14.00"

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

Subcatchment 1S: Pre Developed Runoff Area=221,533 sf 0.00% Impervious Runoff Depth>7.32"
Flow Length=607' Slope=0.0247 '/' Tc=24.7 min CN=58 Runoff=39.57 cfs 3.103 af

Subcatchment 4S: Post Developed Runoff Area=221,533 sf 0.00% Impervious Runoff Depth>8.34"
Flow Length=607' Slope=0.2470 '/' Tc=6.7 min CN=64 Runoff=75.88 cfs 3.534 af

Reach 6R: Proposed Ditch Avg. Flow Depth=1.80' Max Vel=4.24 fps Inflow=75.15 cfs 3.139 af
n=0.035 L=261.0' S=0.0123 '/' Capacity=28.32 cfs Outflow=71.60 cfs 3.136 af

Pond 6P: Rock Voids Peak Elev=104.17' Storage=7,470 cf Inflow=75.88 cfs 3.534 af
Discarded=0.22 cfs 0.223 af Primary=75.15 cfs 3.139 af Outflow=75.37 cfs 3.362 af

Pond 8P: Proposed Pond Peak Elev=100.62' Storage=127,829 cf Inflow=71.60 cfs 3.136 af
Discarded=0.28 cfs 0.200 af Primary=0.00 cfs 0.000 af Outflow=0.28 cfs 0.200 af

Link 2L: Outfall Inflow=39.57 cfs 3.103 af
Primary=39.57 cfs 3.103 af

Staging Area 2 Basin 3 HydroCAD Report

Type II 24-hr 7 DAY-100YR Rainfall=14.00"

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Summary for Subcatchment 1S: Pre Developed

Runoff = 39.57 cfs @ 12.18 hrs, Volume= 3.103 af, Depth> 7.32"

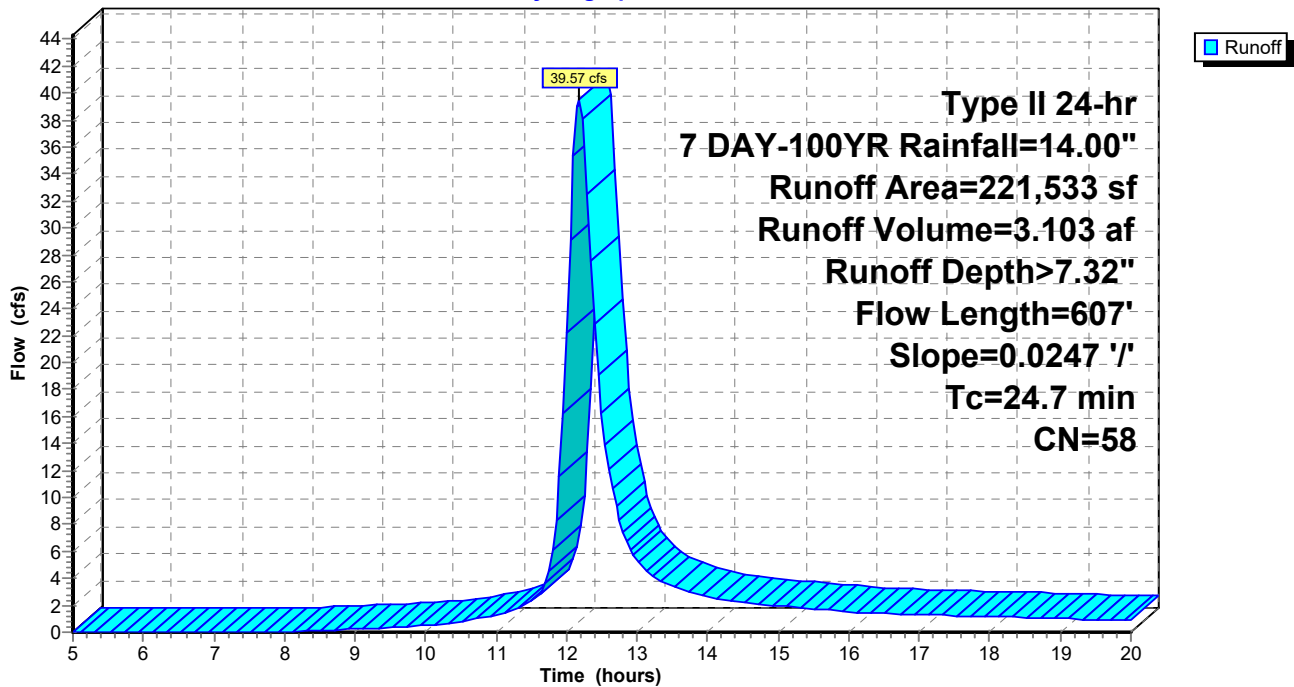
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 7 DAY-100YR Rainfall=14.00"

Area (sf)	CN	Description
221,533	58	Meadow, non-grazed, HSG B
221,533		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.7	607	0.0247	0.41		Lag/CN Method,

Subcatchment 1S: Pre Developed

Hydrograph



Staging Area 2 Basin 3 HydroCAD Report

Type II 24-hr 7 DAY-100YR Rainfall=14.00"

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Summary for Subcatchment 4S: Post Developed

Runoff = 75.88 cfs @ 11.98 hrs, Volume= 3.534 af, Depth> 8.34"

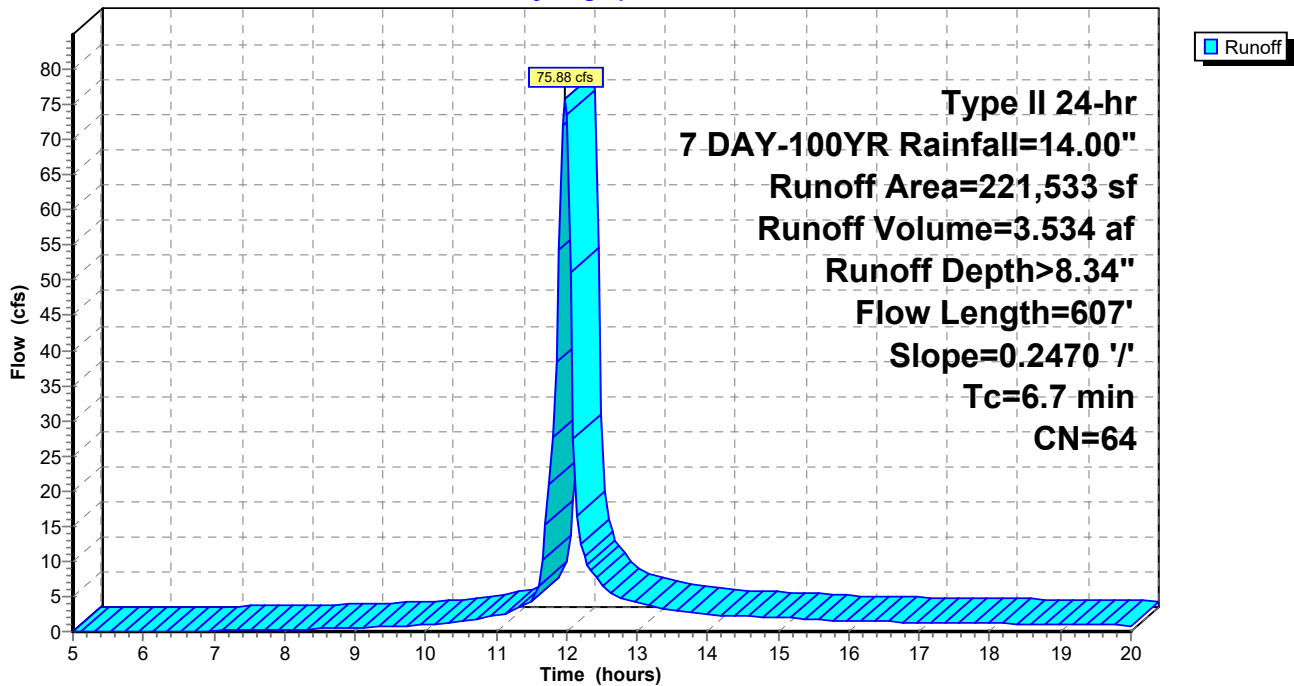
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 7 DAY-100YR Rainfall=14.00"

Area (sf)	CN	Description
97,307	58	Meadow, non-grazed, HSG B
* 106,708	65	Uncompacted Gravel (35% Void)
17,518	85	Gravel roads, HSG B
221,533	64	Weighted Average
221,533		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.7	607	0.2470	1.51		Lag/CN Method,

Subcatchment 4S: Post Developed

Hydrograph



Staging Area 2 Basin 3 HydroCAD Report

Type II 24-hr 7 DAY-100YR Rainfall=14.00"

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Summary for Reach 6R: Proposed Ditch

Inflow Area = 5.086 ac, 0.00% Impervious, Inflow Depth > 7.41" for 7 DAY-100YR event
Inflow = 75.15 cfs @ 11.97 hrs, Volume= 3.139 af
Outflow = 71.60 cfs @ 12.01 hrs, Volume= 3.136 af, Atten= 5%, Lag= 1.9 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.24 fps, Min. Travel Time= 1.0 min
Avg. Velocity = 1.67 fps, Avg. Travel Time= 2.6 min

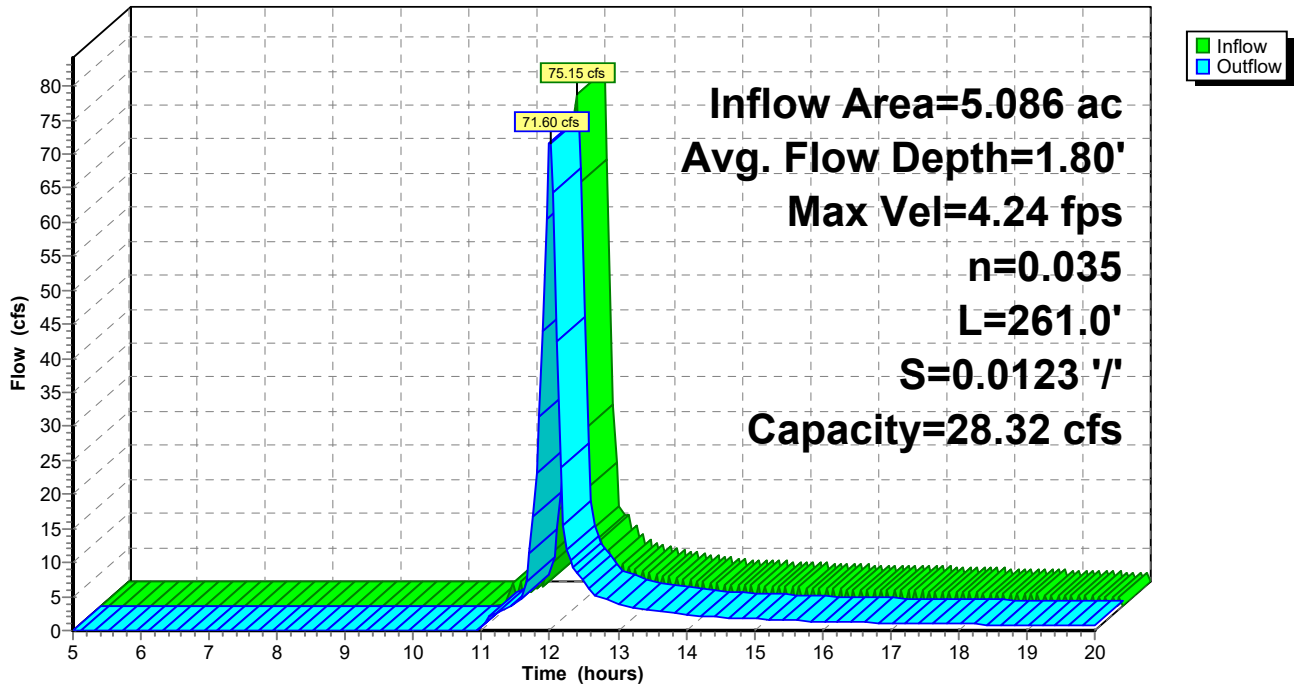
Peak Storage= 4,581 cf @ 11.99 hrs
Average Depth at Peak Storage= 1.80'
Bank-Full Depth= 1.00' Flow Area= 8.0 sf, Capacity= 28.32 cfs

4.00' x 1.00' deep channel, n= 0.035 High grass
Side Slope Z-value= 4.0 '/' Top Width= 12.00'
Length= 261.0' Slope= 0.0123 '/'
Inlet Invert= 104.00', Outlet Invert= 100.80'



Reach 6R: Proposed Ditch

Hydrograph



Staging Area 2 Basin 3 HydroCAD Report

Type II 24-hr 7 DAY-100YR Rainfall=14.00"

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Summary for Pond 6P: Rock Voids

Inflow Area = 5.086 ac, 0.00% Impervious, Inflow Depth > 8.34" for 7 DAY-100YR event
 Inflow = 75.88 cfs @ 11.98 hrs, Volume= 3.534 af
 Outflow = 75.37 cfs @ 11.97 hrs, Volume= 3.362 af, Atten= 1%, Lag= 0.0 min
 Discarded = 0.22 cfs @ 8.45 hrs, Volume= 0.223 af
 Primary = 75.15 cfs @ 11.97 hrs, Volume= 3.139 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Peak Elev= 104.17' @ 11.97 hrs Surf.Area= 37,348 sf Storage= 7,470 cf

Plug-Flow detention time= 27.4 min calculated for 3.362 af (95% of inflow)
 Center-of-Mass det. time= 8.7 min (781.0 - 772.3)

Volume	Invert	Avail.Storage	Storage Description
#1	102.50'	7,470 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
102.50	37,348	0	0
102.70	37,348	7,470	7,470

Device	Routing	Invert	Outlet Devices
#1	Discarded	102.50'	0.250 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Primary	102.70'	16.0' long x 5.0' 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) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Discarded OutFlow Max=0.22 cfs @ 8.45 hrs HW=102.52' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.22 cfs)

Primary OutFlow Max=72.61 cfs @ 11.97 hrs HW=104.13' (Free Discharge)
 ↑2=Broad-Crested Rectangular Weir (Weir Controls 72.61 cfs @ 3.17 fps)

Staging Area 2 Basin 3 HydroCAD Report

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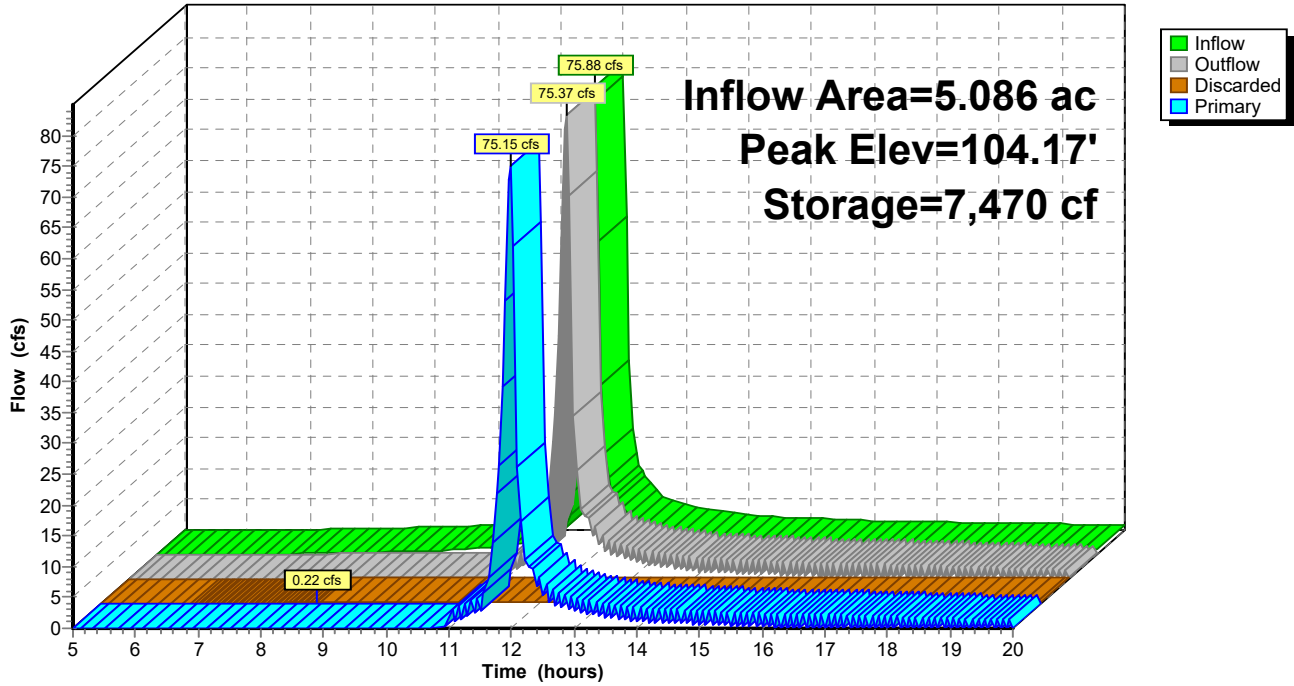
Type II 24-hr 7 DAY-100YR Rainfall=14.00"

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Pond 6P: Rock Voids

Hydrograph



Staging Area 2 Basin 3 HydroCAD Report

Type II 24-hr 7 DAY-100YR Rainfall=14.00"

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Summary for Pond 8P: Proposed Pond

Inflow Area = 5.086 ac, 0.00% Impervious, Inflow Depth > 7.40" for 7 DAY-100YR event
Inflow = 71.60 cfs @ 12.01 hrs, Volume= 3.136 af
Outflow = 0.28 cfs @ 20.00 hrs, Volume= 0.200 af, Atten= 100%, Lag= 479.7 min
Discarded = 0.28 cfs @ 20.00 hrs, Volume= 0.200 af
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 100.62' @ 20.00 hrs Surf.Area= 48,363 sf Storage= 127,829 cf

Plug-Flow detention time= 252.3 min calculated for 0.200 af (6% of inflow)
Center-of-Mass det. time= 159.1 min (939.2 - 780.2)

Volume	Invert	Avail.Storage	Storage Description
#1	97.80'	186,469 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
97.80	42,365	0	0
98.80	44,469	43,417	43,417
99.80	46,598	45,534	88,951
100.80	48,753	47,676	136,626
101.80	50,933	49,843	186,469

Device	Routing	Invert	Outlet Devices
#1	Discarded	97.80'	0.250 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Primary	100.70'	43.6 deg x 12.0' long x 1.00' rise Sharp-Crested Vee/Trap Weir Cv= 2.56 (C= 3.20)

Discarded OutFlow Max=0.28 cfs @ 20.00 hrs HW=100.62' (Free Discharge)

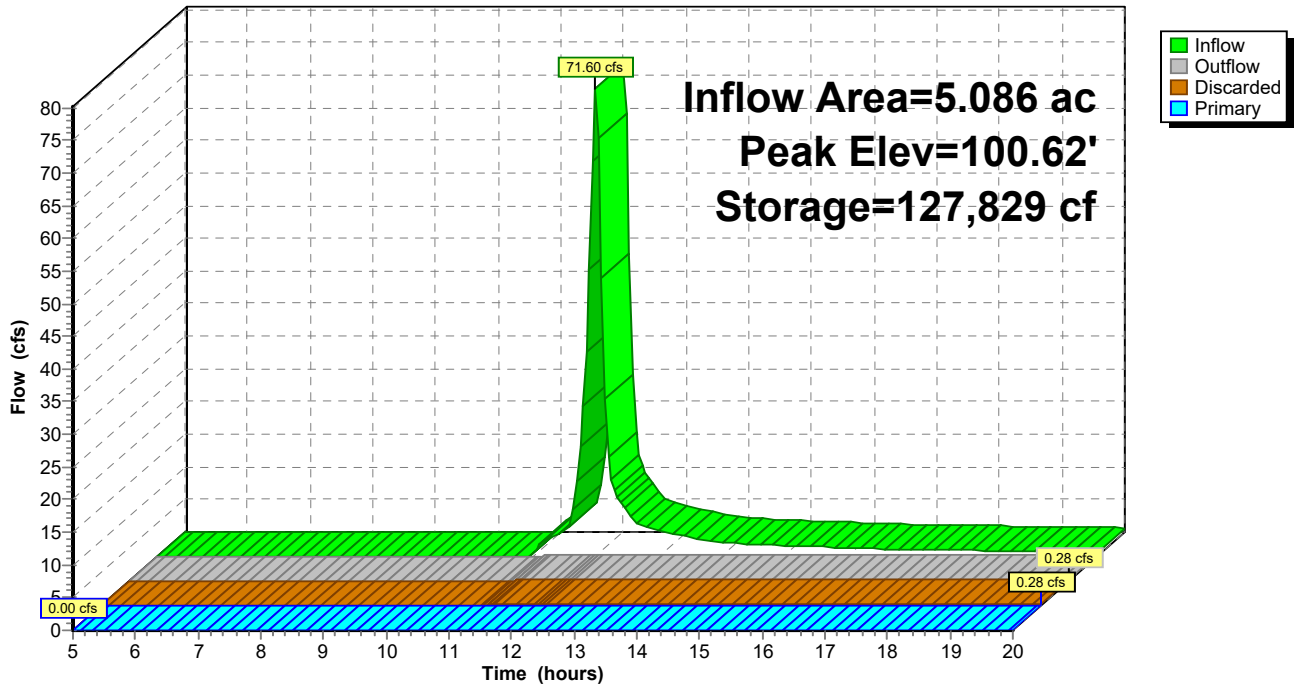
↑1=**Exfiltration** (Exfiltration Controls 0.28 cfs)

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=97.80' (Free Discharge)

↑2=**Sharp-Crested Vee/Trap Weir** (Controls 0.00 cfs)

Pond 8P: Proposed Pond

Hydrograph



Staging Area 2 Basin 3 HydroCAD Report

Type II 24-hr 7 DAY-100YR Rainfall=14.00"

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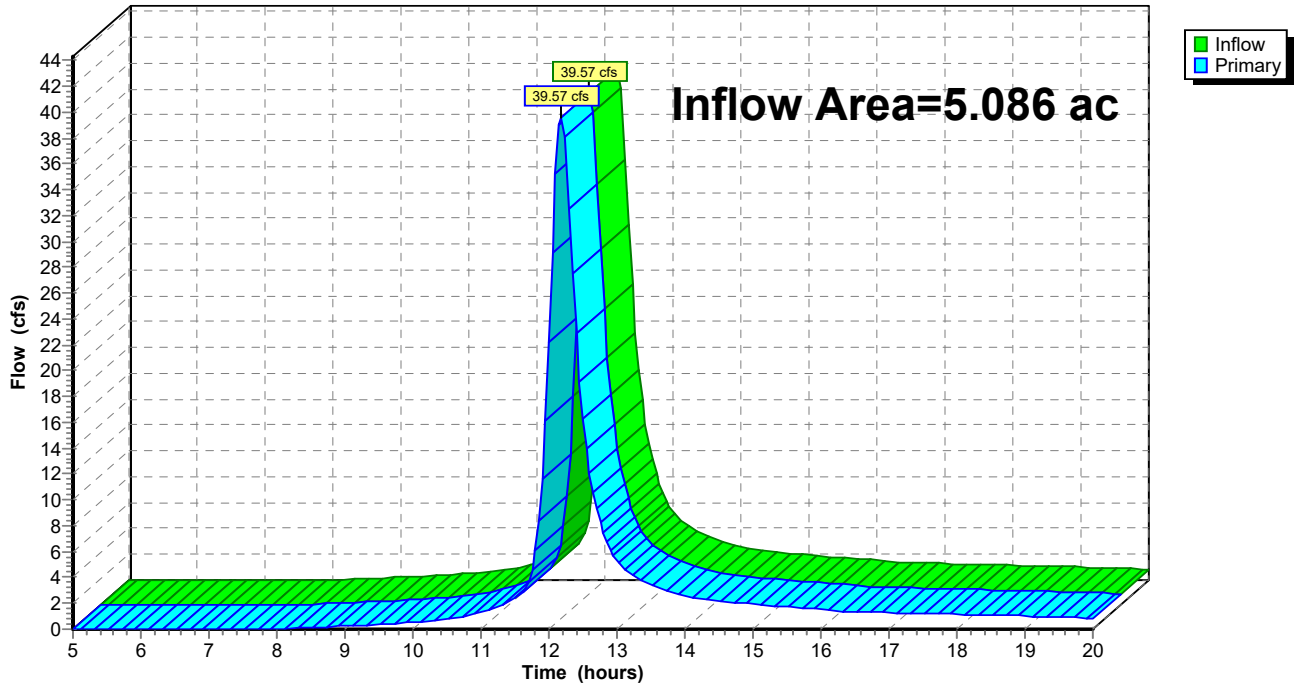
Summary for Link 2L: Outfall

Inflow Area = 5.086 ac, 0.00% Impervious, Inflow Depth > 7.32" for 7 DAY-100YR event
Inflow = 39.57 cfs @ 12.18 hrs, Volume= 3.103 af
Primary = 39.57 cfs @ 12.18 hrs, Volume= 3.103 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link 2L: Outfall

Hydrograph



Staging Area 2 Basin 3 HydroCAD Report

Type II 24-hr 10 DAY-100YR Rainfall=16.10"

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

Subcatchment 1S: Pre Developed Runoff Area=221,533 sf 0.00% Impervious Runoff Depth>9.05"
Flow Length=607' Slope=0.0247 '/' Tc=24.7 min CN=58 Runoff=48.71 cfs 3.836 af

Subcatchment 4S: Post Developed Runoff Area=221,533 sf 0.00% Impervious Runoff Depth>10.16"
Flow Length=607' Slope=0.2470 '/' Tc=6.7 min CN=64 Runoff=91.31 cfs 4.305 af

Reach 6R: Proposed Ditch Avg. Flow Depth=2.06' Max Vel=4.33 fps Inflow=90.76 cfs 3.896 af
n=0.035 L=261.0' S=0.0123 '/' Capacity=28.32 cfs Outflow=86.35 cfs 3.893 af

Pond 6P: Rock Voids Peak Elev=104.36' Storage=7,470 cf Inflow=91.31 cfs 4.305 af
Discarded=0.22 cfs 0.236 af Primary=90.76 cfs 3.896 af Outflow=90.98 cfs 4.132 af

Pond 8P: Proposed Pond Peak Elev=100.82' Storage=137,647 cf Inflow=86.35 cfs 3.893 af
Discarded=0.28 cfs 0.213 af Primary=1.64 cfs 0.581 af Outflow=1.92 cfs 0.794 af

Link 2L: Outfall Inflow=48.71 cfs 3.836 af
Primary=48.71 cfs 3.836 af

Staging Area 2 Basin 3 HydroCAD Report

Type II 24-hr 10 DAY-100YR Rainfall=16.10"

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Summary for Subcatchment 1S: Pre Developed

Runoff = 48.71 cfs @ 12.18 hrs, Volume= 3.836 af, Depth> 9.05"

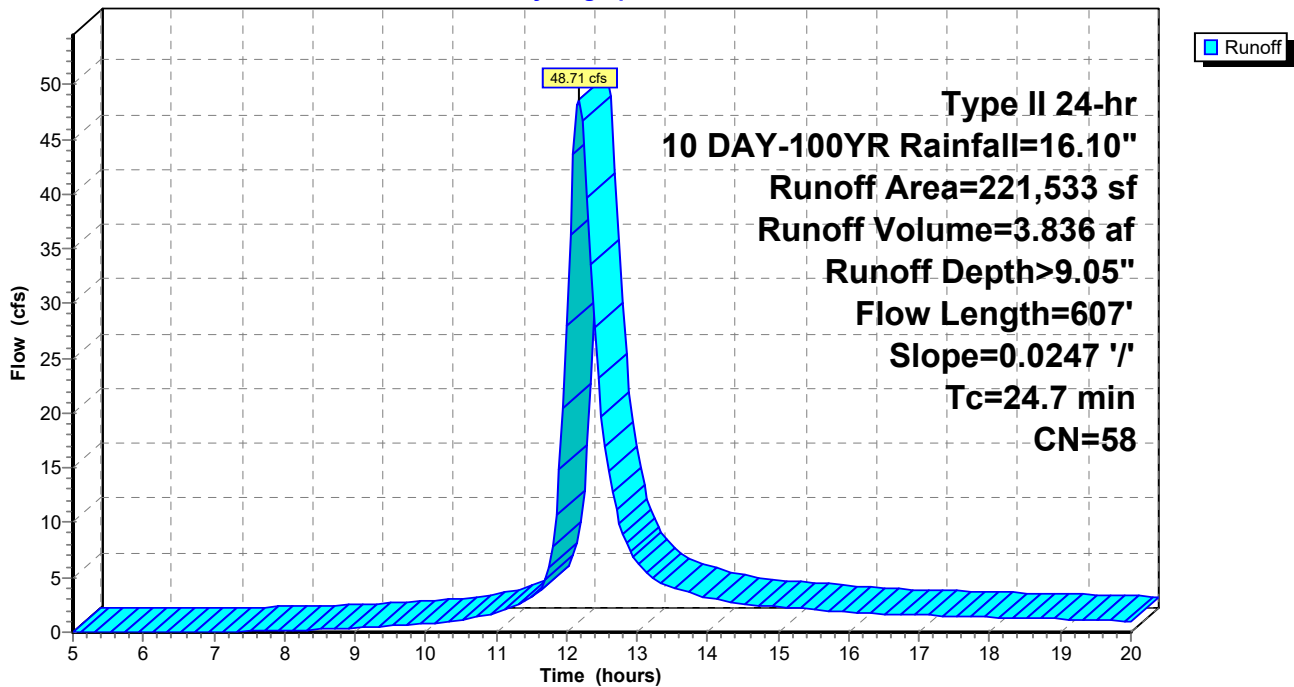
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10 DAY-100YR Rainfall=16.10"

Area (sf)	CN	Description
221,533	58	Meadow, non-grazed, HSG B
221,533		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.7	607	0.0247	0.41		Lag/CN Method,

Subcatchment 1S: Pre Developed

Hydrograph



Staging Area 2 Basin 3 HydroCAD Report

Type II 24-hr 10 DAY-100YR Rainfall=16.10"

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Summary for Subcatchment 4S: Post Developed

Runoff = 91.31 cfs @ 11.98 hrs, Volume= 4.305 af, Depth>10.16"

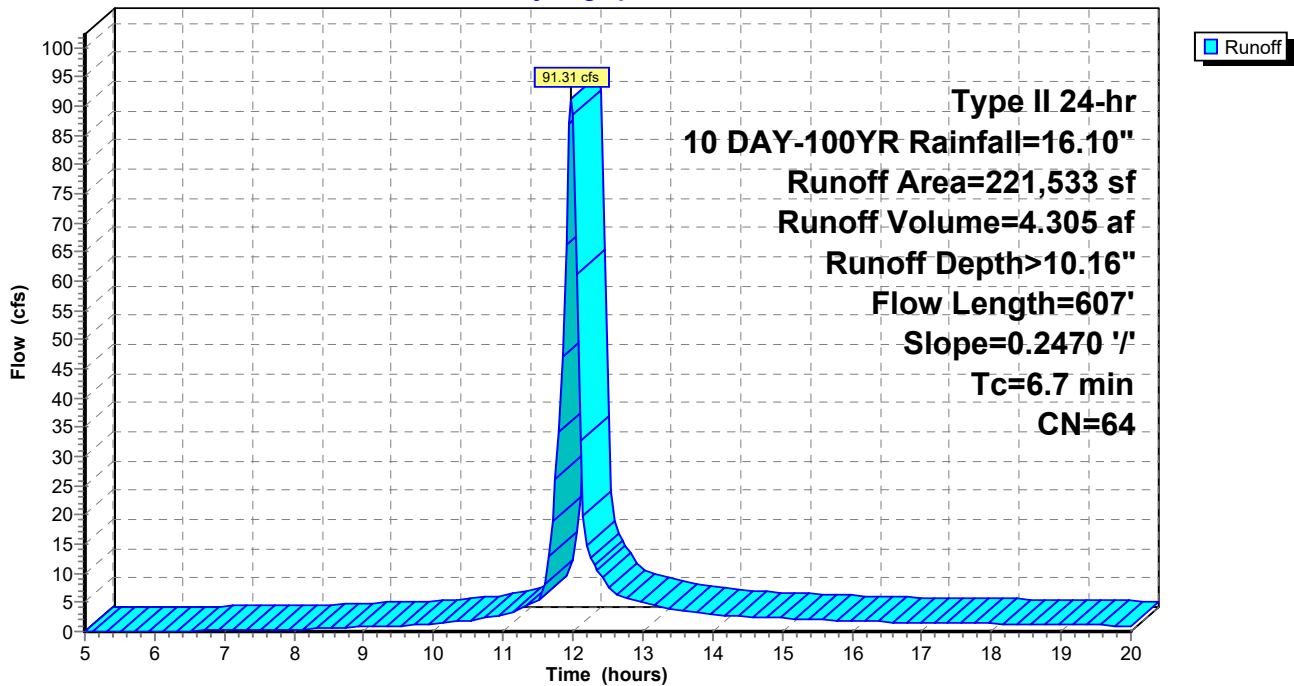
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10 DAY-100YR Rainfall=16.10"

Area (sf)	CN	Description
97,307	58	Meadow, non-grazed, HSG B
* 106,708	65	Uncompacted Gravel (35% Void)
17,518	85	Gravel roads, HSG B
221,533	64	Weighted Average
221,533		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.7	607	0.2470	1.51		Lag/CN Method,

Subcatchment 4S: Post Developed

Hydrograph



Staging Area 2 Basin 3 HydroCAD Report

Type II 24-hr 10 DAY-100YR Rainfall=16.10"

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Summary for Reach 6R: Proposed Ditch

Inflow Area = 5.086 ac, 0.00% Impervious, Inflow Depth > 9.19" for 10 DAY-100YR event
Inflow = 90.76 cfs @ 11.97 hrs, Volume= 3.896 af
Outflow = 86.35 cfs @ 12.00 hrs, Volume= 3.893 af, Atten= 5%, Lag= 1.9 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.33 fps, Min. Travel Time= 1.0 min
Avg. Velocity = 1.76 fps, Avg. Travel Time= 2.5 min

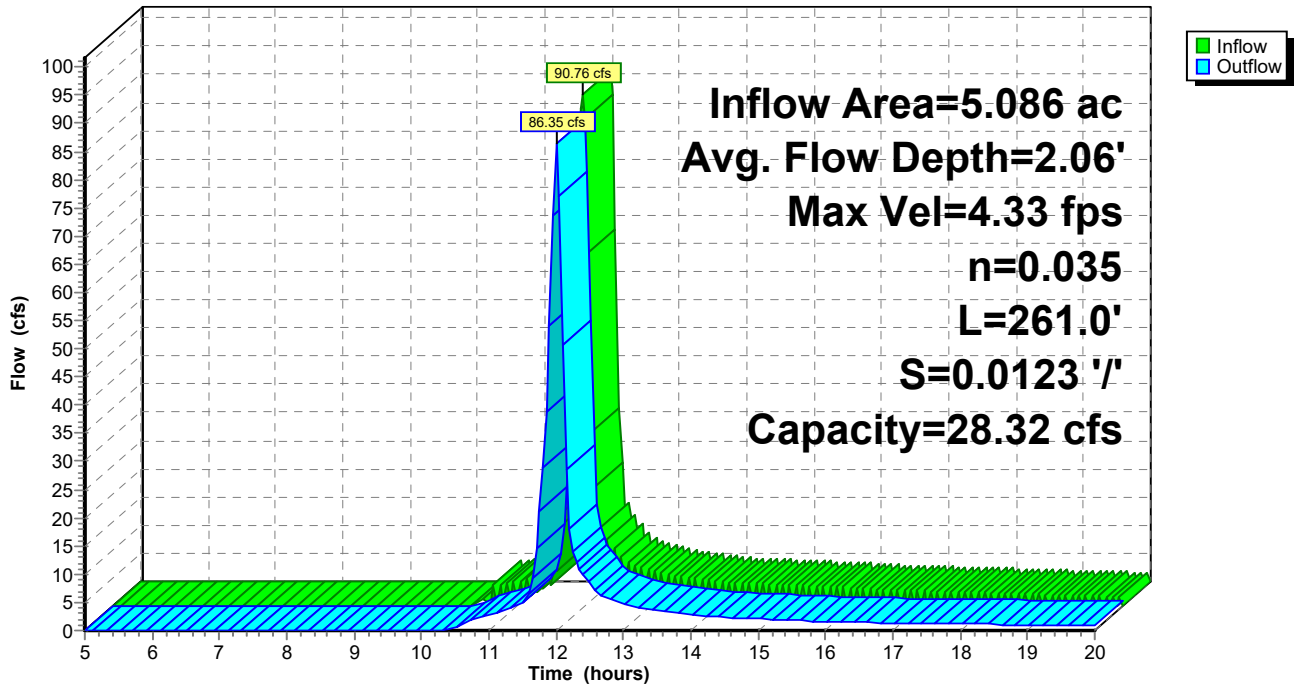
Peak Storage= 5,403 cf @ 11.99 hrs
Average Depth at Peak Storage= 2.06'
Bank-Full Depth= 1.00' Flow Area= 8.0 sf, Capacity= 28.32 cfs

4.00' x 1.00' deep channel, n= 0.035 High grass
Side Slope Z-value= 4.0 '/' Top Width= 12.00'
Length= 261.0' Slope= 0.0123 '/'
Inlet Invert= 104.00', Outlet Invert= 100.80'



Reach 6R: Proposed Ditch

Hydrograph



Staging Area 2 Basin 3 HydroCAD Report

Type II 24-hr 10 DAY-100YR Rainfall=16.10"

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Summary for Pond 6P: Rock Voids

Inflow Area = 5.086 ac, 0.00% Impervious, Inflow Depth > 10.16" for 10 DAY-100YR event
 Inflow = 91.31 cfs @ 11.98 hrs, Volume= 4.305 af
 Outflow = 90.98 cfs @ 11.97 hrs, Volume= 4.132 af, Atten= 0%, Lag= 0.0 min
 Discarded = 0.22 cfs @ 7.65 hrs, Volume= 0.236 af
 Primary = 90.76 cfs @ 11.97 hrs, Volume= 3.896 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Peak Elev= 104.36' @ 11.97 hrs Surf.Area= 37,348 sf Storage= 7,470 cf

Plug-Flow detention time= 23.9 min calculated for 4.118 af (96% of inflow)
 Center-of-Mass det. time= 8.4 min (776.1 - 767.7)

Volume	Invert	Avail.Storage	Storage Description
#1	102.50'	7,470 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
102.50	37,348	0	0
102.70	37,348	7,470	7,470

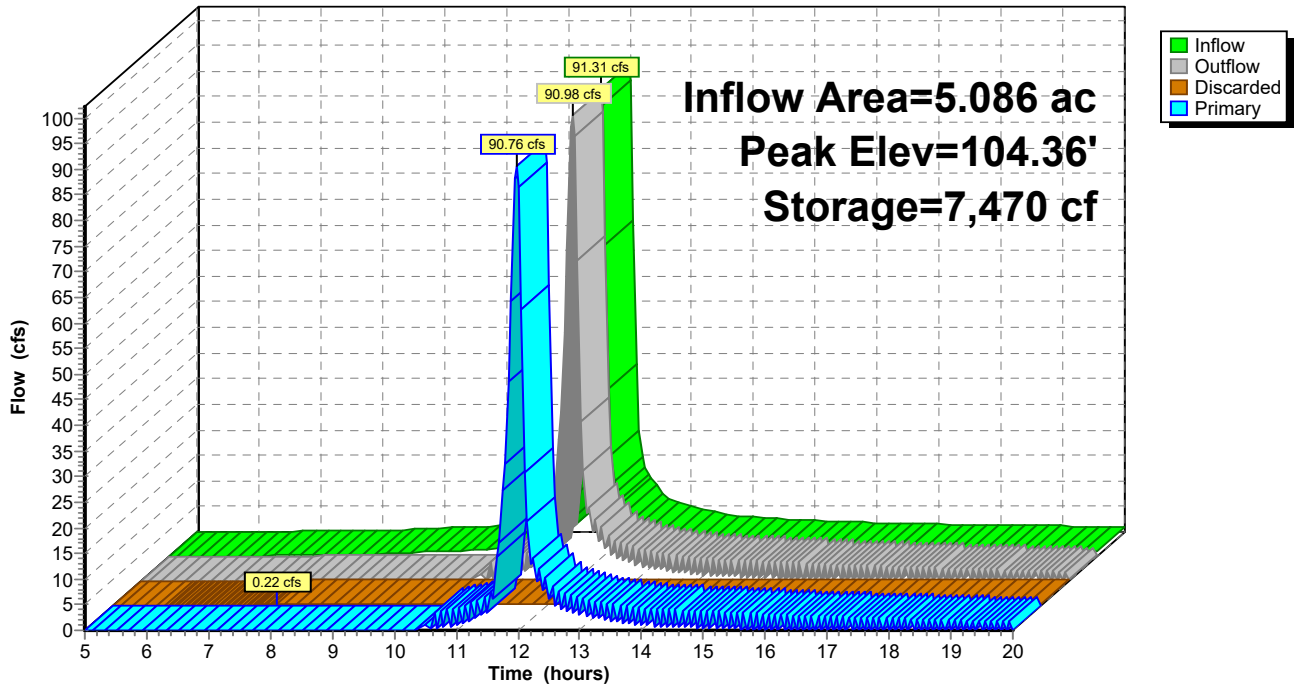
Device	Routing	Invert	Outlet Devices
#1	Discarded	102.50'	0.250 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Primary	102.70'	16.0' long x 5.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Discarded OutFlow Max=0.22 cfs @ 7.65 hrs HW=102.52' (Free Discharge)
 ↑1=**Exfiltration** (Exfiltration Controls 0.22 cfs)

Primary OutFlow Max=87.59 cfs @ 11.97 hrs HW=104.32' (Free Discharge)
 ↑2=**Broad-Crested Rectangular Weir**(Weir Controls 87.59 cfs @ 3.38 fps)

Pond 6P: Rock Voids

Hydrograph



Staging Area 2 Basin 3 HydroCAD Report

Type II 24-hr 10 DAY-100YR Rainfall=16.10"

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Summary for Pond 8P: Proposed Pond

Inflow Area = 5.086 ac, 0.00% Impervious, Inflow Depth > 9.19" for 10 DAY-100YR event
Inflow = 86.35 cfs @ 12.00 hrs, Volume= 3.893 af
Outflow = 1.92 cfs @ 15.36 hrs, Volume= 0.794 af, Atten= 98%, Lag= 201.3 min
Discarded = 0.28 cfs @ 15.36 hrs, Volume= 0.213 af
Primary = 1.64 cfs @ 15.36 hrs, Volume= 0.581 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 100.82' @ 15.36 hrs Surf.Area= 48,799 sf Storage= 137,647 cf

Plug-Flow detention time= 286.9 min calculated for 0.794 af (20% of inflow)
Center-of-Mass det. time= 205.0 min (981.7 - 776.7)

Volume	Invert	Avail.Storage	Storage Description
#1	97.80'	186,469 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
97.80	42,365	0	0
98.80	44,469	43,417	43,417
99.80	46,598	45,534	88,951
100.80	48,753	47,676	136,626
101.80	50,933	49,843	186,469

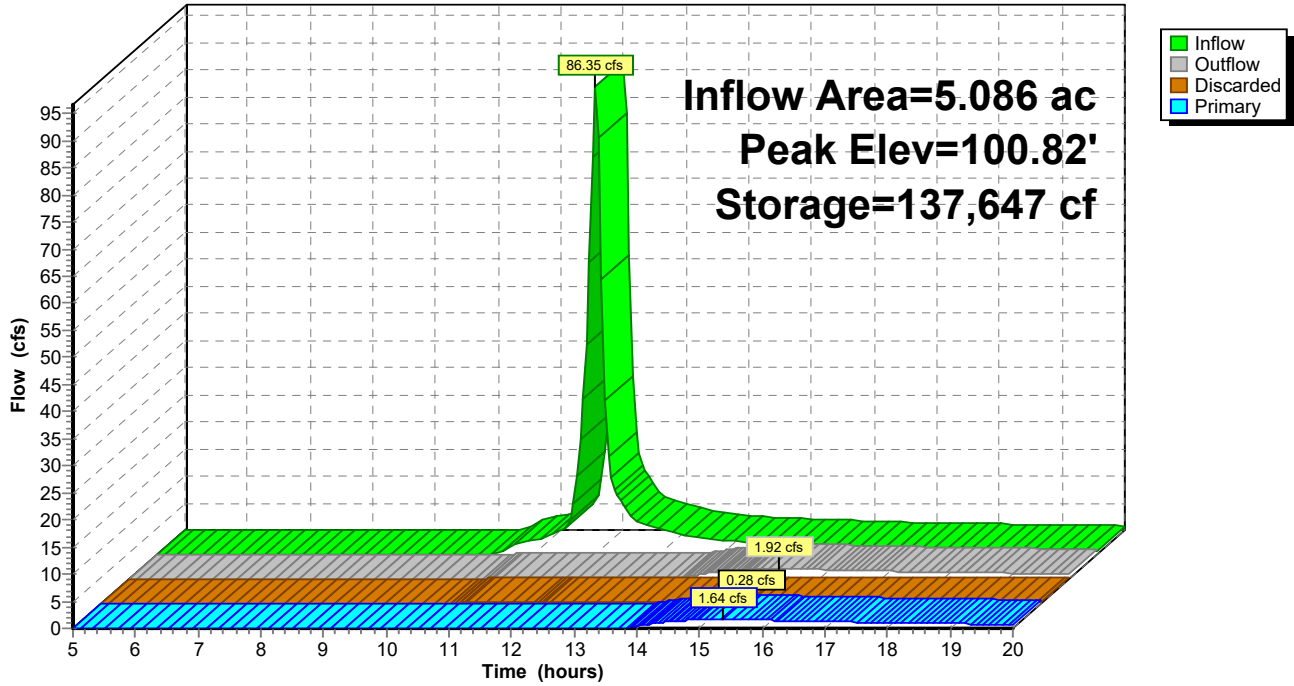
Device	Routing	Invert	Outlet Devices
#1	Discarded	97.80'	0.250 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Primary	100.70'	43.6 deg x 12.0' long x 1.00' rise Sharp-Crested Vee/Trap Weir Cv= 2.56 (C= 3.20)

Discarded OutFlow Max=0.28 cfs @ 15.36 hrs HW=100.82' (Free Discharge)
↑1=Exfiltration (Exfiltration Controls 0.28 cfs)

Primary OutFlow Max=1.62 cfs @ 15.36 hrs HW=100.82' (Free Discharge)
↑2=Sharp-Crested Vee/Trap Weir (Weir Controls 1.62 cfs @ 1.11 fps)

Pond 8P: Proposed Pond

Hydrograph



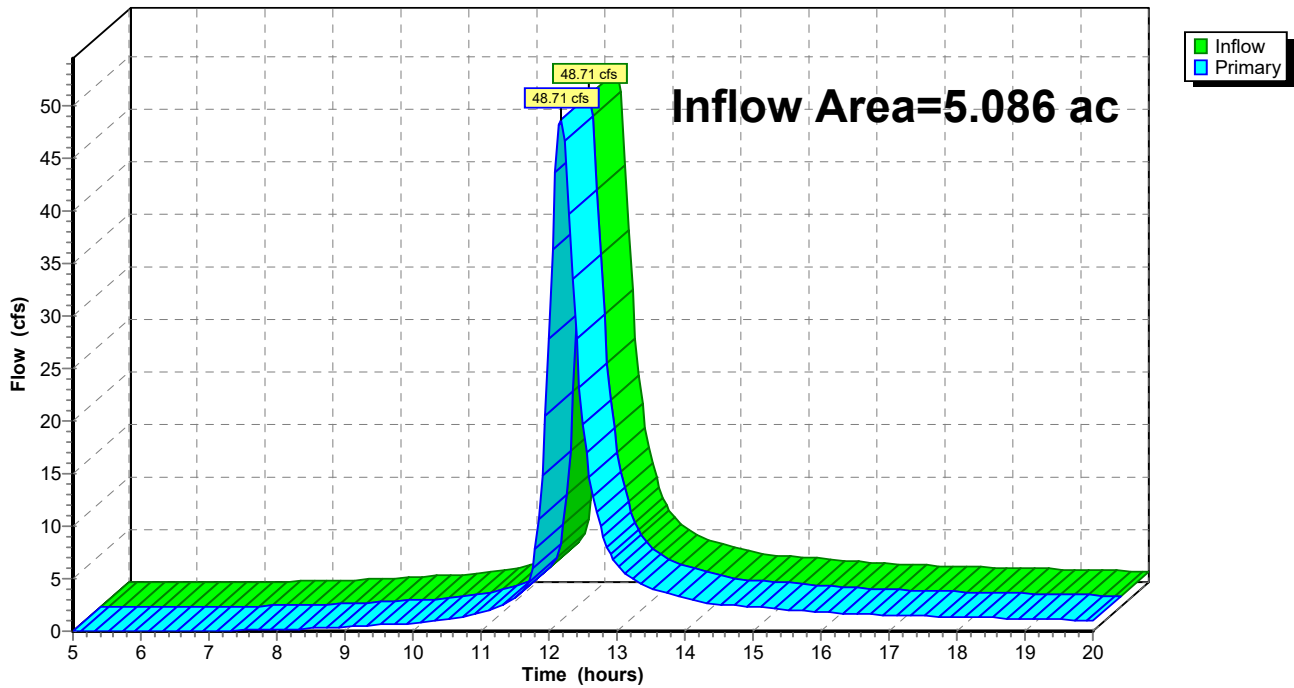
Summary for Link 2L: Outfall

Inflow Area = 5.086 ac, 0.00% Impervious, Inflow Depth > 9.05" for 10 DAY-100YR event
Inflow = 48.71 cfs @ 12.18 hrs, Volume= 3.836 af
Primary = 48.71 cfs @ 12.18 hrs, Volume= 3.836 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link 2L: Outfall

Hydrograph



Staging Area 2 Basin 3 HydroCAD Report

Type II 24-hr 10-YR - 24HR. Rainfall=6.72"

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

Subcatchment 1S: Pre Developed Runoff Area=221,533 sf 0.00% Impervious Runoff Depth>1.99"
Flow Length=607' Slope=0.0247 '/' Tc=24.7 min CN=58 Runoff=10.41 cfs 0.843 af

Subcatchment 4S: Post Developed Runoff Area=221,533 sf 0.00% Impervious Runoff Depth>2.55"
Flow Length=607' Slope=0.2470 '/' Tc=6.7 min CN=64 Runoff=24.26 cfs 1.079 af

Reach 6R: Proposed Ditch Avg. Flow Depth=0.92' Max Vel=3.37 fps Inflow=36.66 cfs 0.742 af
n=0.035 L=261.0' S=0.0123 '/' Capacity=28.32 cfs Outflow=22.88 cfs 0.740 af

Pond 6P: Rock Voids Peak Elev=103.61' Storage=7,470 cf Inflow=24.26 cfs 1.079 af
Discarded=0.22 cfs 0.166 af Primary=36.66 cfs 0.742 af Outflow=36.88 cfs 0.907 af

Pond 8P: Proposed Pond Peak Elev=98.39' Storage=25,433 cf Inflow=22.88 cfs 0.740 af
Discarded=0.25 cfs 0.168 af Primary=0.00 cfs 0.000 af Outflow=0.25 cfs 0.168 af

Link 2L: Outfall Inflow=10.41 cfs 0.843 af
Primary=10.41 cfs 0.843 af

Staging Area 2 Basin 3 HydroCAD Report

Type II 24-hr 10-YR - 24HR. Rainfall=6.72"

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Summary for Subcatchment 1S: Pre Developed

Runoff = 10.41 cfs @ 12.20 hrs, Volume= 0.843 af, Depth> 1.99"

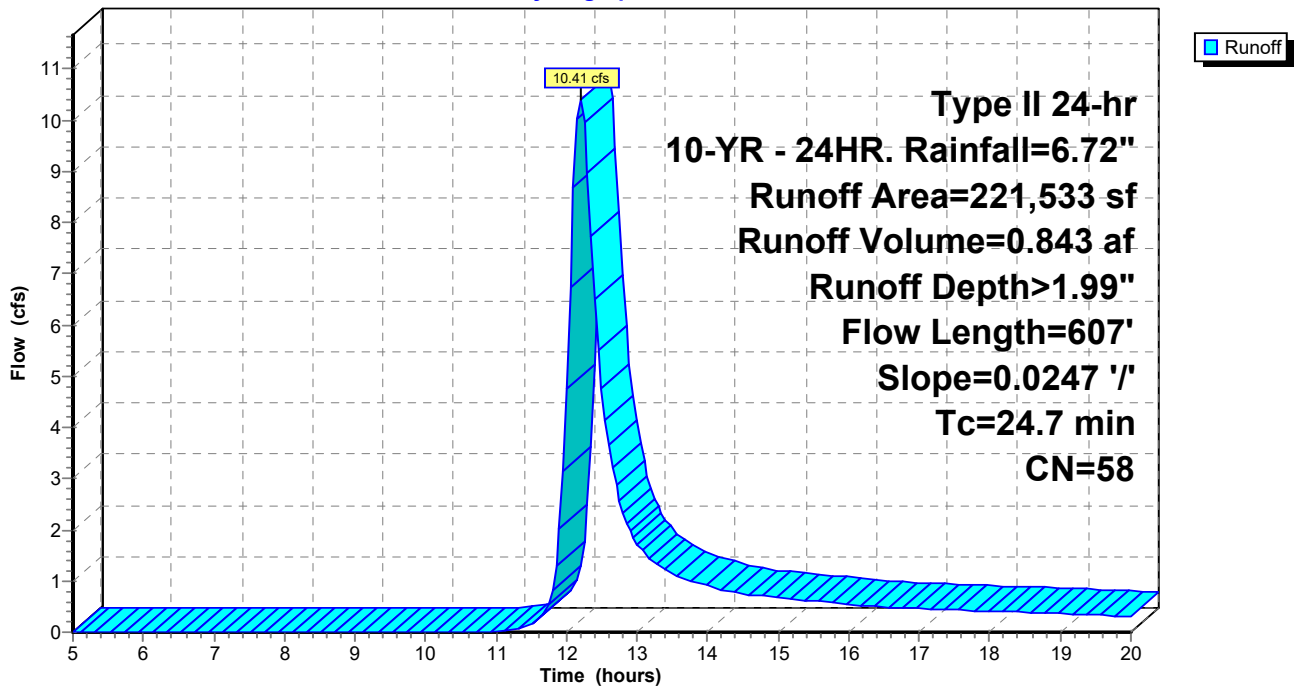
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-YR - 24HR. Rainfall=6.72"

Area (sf)	CN	Description
221,533	58	Meadow, non-grazed, HSG B
221,533		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.7	607	0.0247	0.41		Lag/CN Method,

Subcatchment 1S: Pre Developed

Hydrograph



Staging Area 2 Basin 3 HydroCAD Report

Type II 24-hr 10-YR - 24HR. Rainfall=6.72"

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Summary for Subcatchment 4S: Post Developed

Runoff = 24.26 cfs @ 11.98 hrs, Volume= 1.079 af, Depth> 2.55"

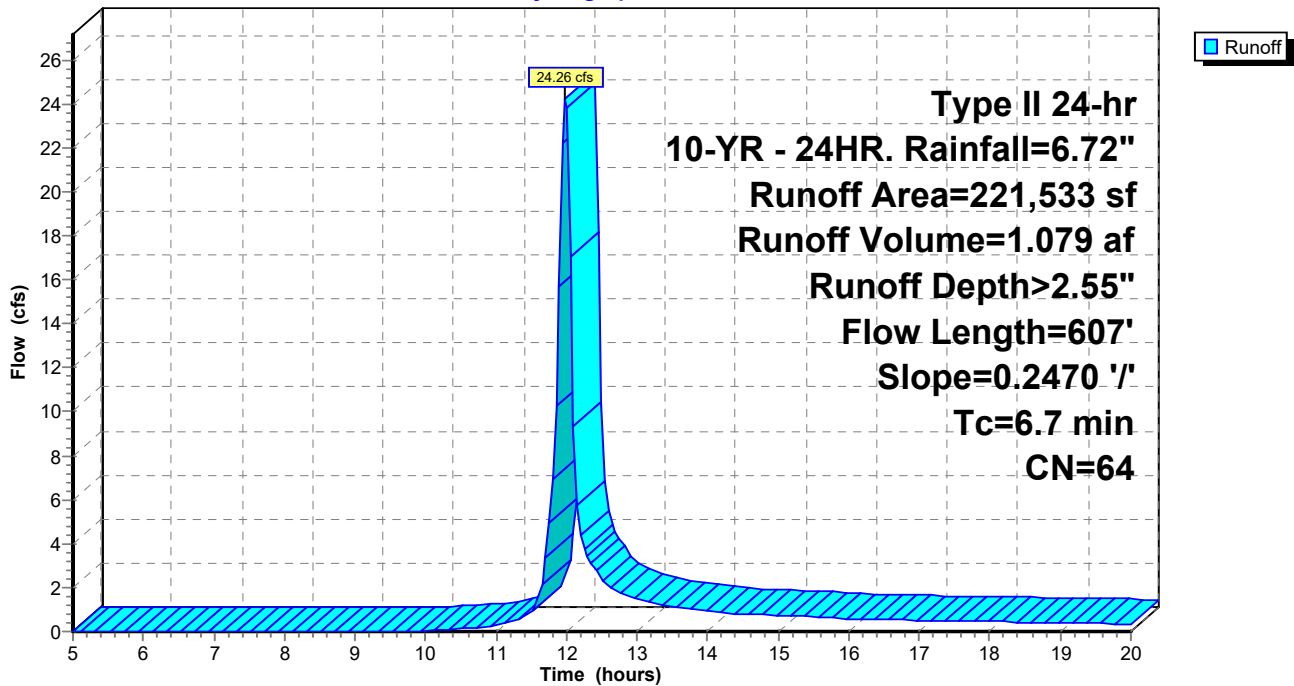
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-YR - 24HR. Rainfall=6.72"

Area (sf)	CN	Description
97,307	58	Meadow, non-grazed, HSG B
* 106,708	65	Uncompacted Gravel (35% Void)
17,518	85	Gravel roads, HSG B
221,533	64	Weighted Average
221,533		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.7	607	0.2470	1.51		Lag/CN Method,

Subcatchment 4S: Post Developed

Hydrograph



Staging Area 2 Basin 3 HydroCAD Report

Type II 24-hr 10-YR - 24HR. Rainfall=6.72"

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Summary for Reach 6R: Proposed Ditch

Inflow Area = 5.086 ac, 0.00% Impervious, Inflow Depth > 1.75" for 10-YR - 24HR. event
Inflow = 36.66 cfs @ 11.95 hrs, Volume= 0.742 af
Outflow = 22.88 cfs @ 12.02 hrs, Volume= 0.740 af, Atten= 38%, Lag= 4.2 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.37 fps, Min. Travel Time= 1.3 min
Avg. Velocity = 1.06 fps, Avg. Travel Time= 4.1 min

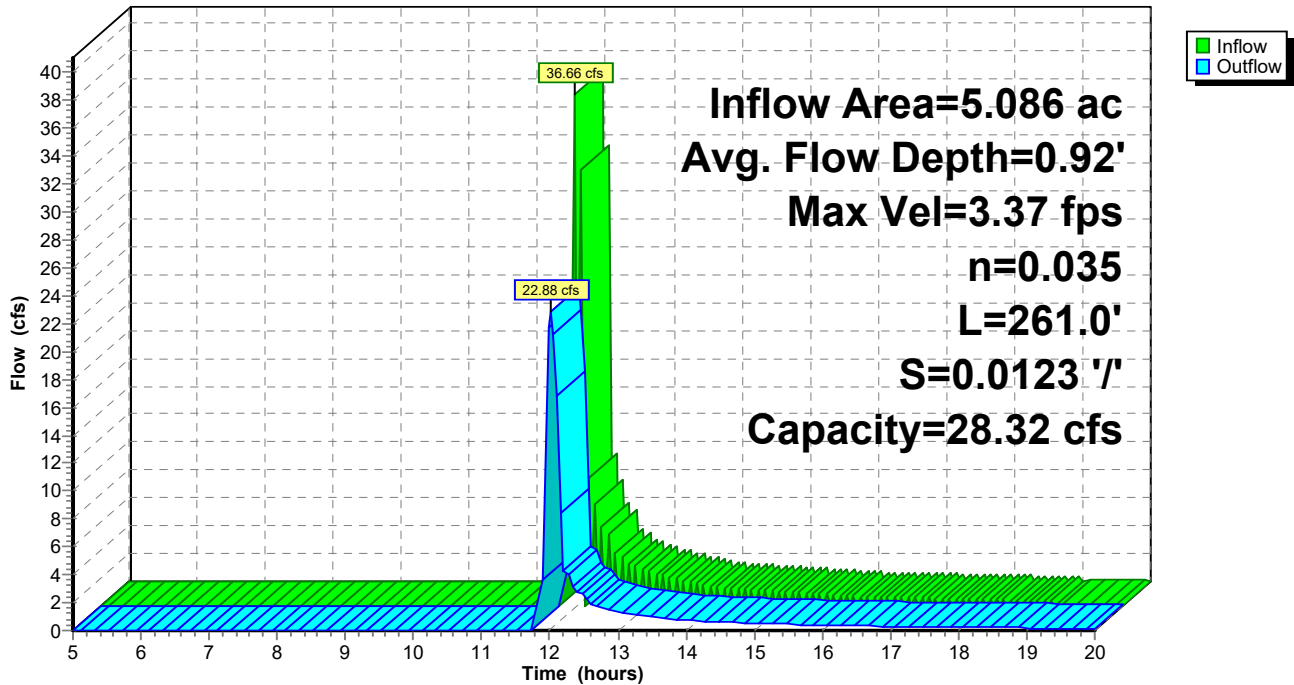
Peak Storage= 1,830 cf @ 12.00 hrs
Average Depth at Peak Storage= 0.92'
Bank-Full Depth= 1.00' Flow Area= 8.0 sf, Capacity= 28.32 cfs

4.00' x 1.00' deep channel, n= 0.035 High grass
Side Slope Z-value= 4.0 ' / ' Top Width= 12.00'
Length= 261.0' Slope= 0.0123 ' / '
Inlet Invert= 104.00', Outlet Invert= 100.80'



Reach 6R: Proposed Ditch

Hydrograph



Staging Area 2 Basin 3 HydroCAD Report

Type II 24-hr 10-YR - 24HR. Rainfall=6.72"

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Summary for Pond 6P: Rock Voids

Inflow Area = 5.086 ac, 0.00% Impervious, Inflow Depth > 2.55" for 10-YR - 24HR. event
 Inflow = 24.26 cfs @ 11.98 hrs, Volume= 1.079 af
 Outflow = 36.88 cfs @ 11.95 hrs, Volume= 0.907 af, Atten= 0%, Lag= 0.0 min
 Discarded = 0.22 cfs @ 11.40 hrs, Volume= 0.166 af
 Primary = 36.66 cfs @ 11.95 hrs, Volume= 0.742 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Peak Elev= 103.61' @ 11.96 hrs Surf.Area= 37,348 sf Storage= 7,470 cf

Plug-Flow detention time= 66.5 min calculated for 0.907 af (84% of inflow)
 Center-of-Mass det. time= 17.8 min (815.8 - 798.0)

Volume	Invert	Avail.Storage	Storage Description
#1	102.50'	7,470 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
102.50	37,348	0	0
102.70	37,348	7,470	7,470

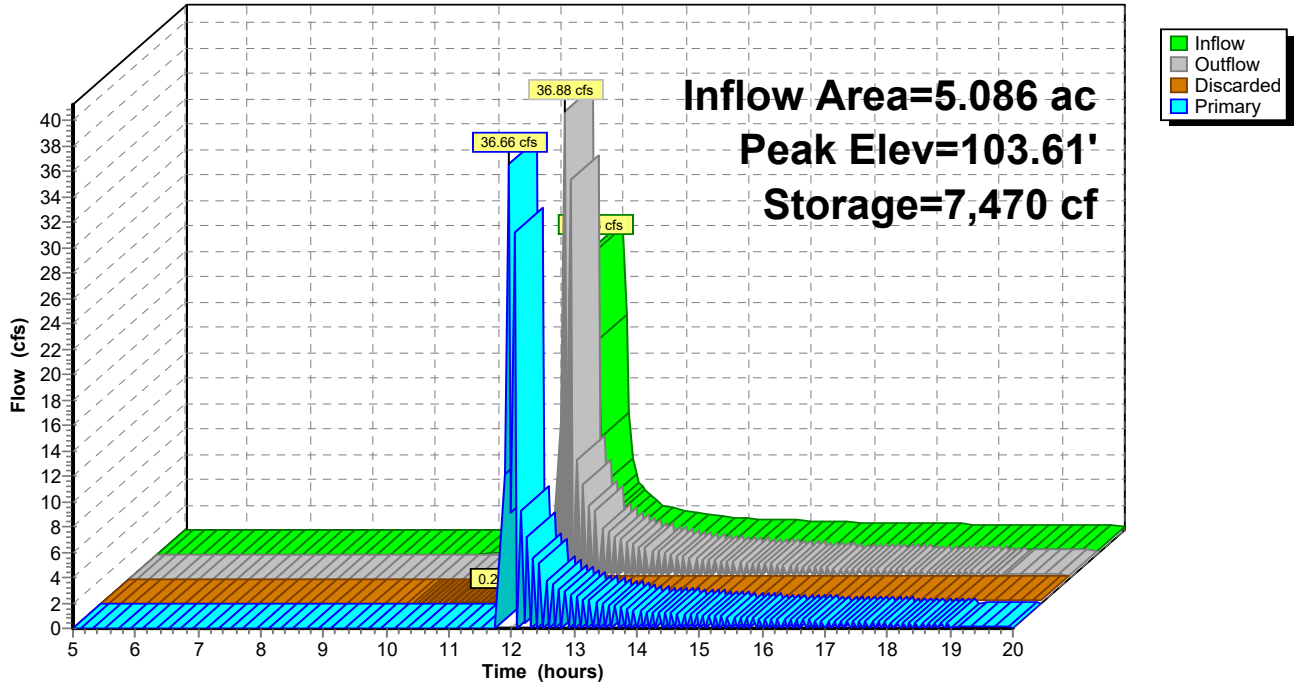
Device	Routing	Invert	Outlet Devices
#1	Discarded	102.50'	0.250 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Primary	102.70'	16.0' long x 5.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Discarded OutFlow Max=0.22 cfs @ 11.40 hrs HW=102.52' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.22 cfs)

Primary OutFlow Max=34.24 cfs @ 11.95 hrs HW=103.56' (Free Discharge)
 ↑2=Broad-Crested Rectangular Weir (Weir Controls 34.24 cfs @ 2.49 fps)

Pond 6P: Rock Voids

Hydrograph



Staging Area 2 Basin 3 HydroCAD Report

Type II 24-hr 10-YR - 24HR. Rainfall=6.72"

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Summary for Pond 8P: Proposed Pond

Inflow Area = 5.086 ac, 0.00% Impervious, Inflow Depth > 1.75" for 10-YR - 24HR. event
 Inflow = 22.88 cfs @ 12.02 hrs, Volume= 0.740 af
 Outflow = 0.25 cfs @ 17.84 hrs, Volume= 0.168 af, Atten= 99%, Lag= 349.1 min
 Discarded = 0.25 cfs @ 17.84 hrs, Volume= 0.168 af
 Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Peak Elev= 98.39' @ 17.84 hrs Surf.Area= 43,610 sf Storage= 25,433 cf

Plug-Flow detention time= 239.9 min calculated for 0.168 af (23% of inflow)
 Center-of-Mass det. time= 164.4 min (959.5 - 795.1)

Volume	Invert	Avail.Storage	Storage Description
#1	97.80'	186,469 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
97.80	42,365	0	0
98.80	44,469	43,417	43,417
99.80	46,598	45,534	88,951
100.80	48,753	47,676	136,626
101.80	50,933	49,843	186,469

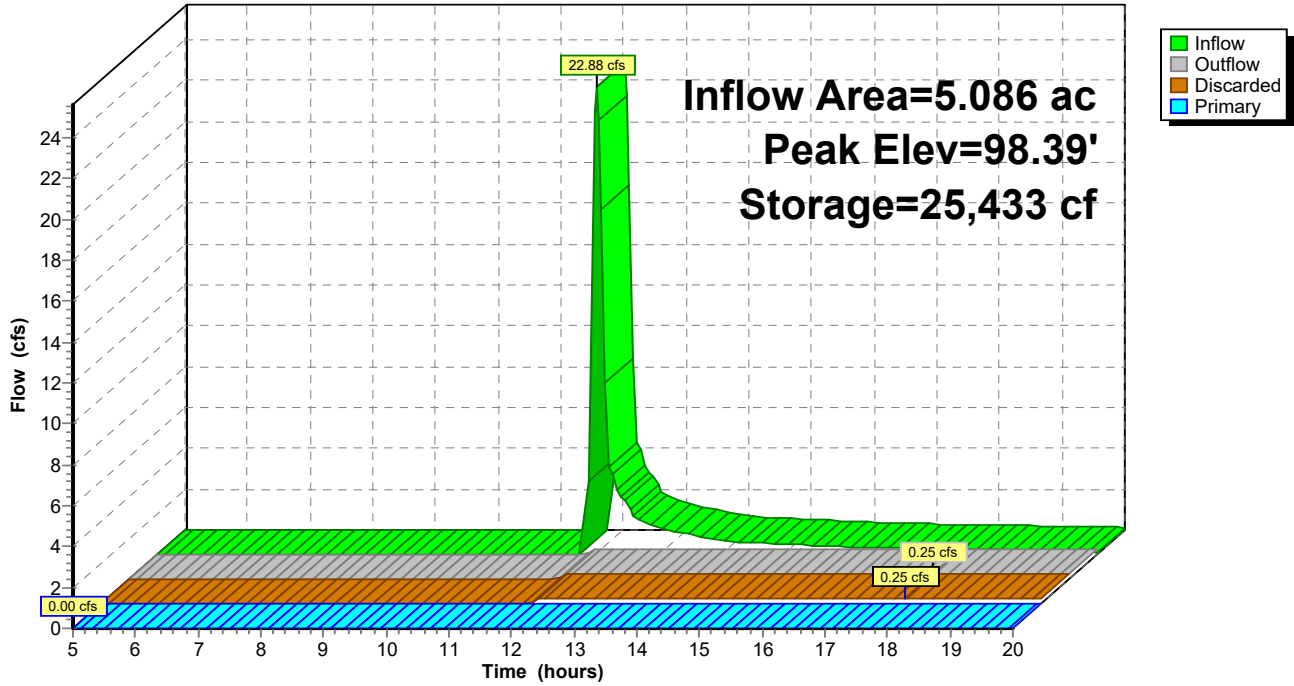
Device	Routing	Invert	Outlet Devices
#1	Discarded	97.80'	0.250 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Primary	100.70'	43.6 deg x 12.0' long x 1.00' rise Sharp-Crested Vee/Trap Weir Cv= 2.56 (C= 3.20)

Discarded OutFlow Max=0.25 cfs @ 17.84 hrs HW=98.39' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.25 cfs)

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=97.80' (Free Discharge)
 ↑2=Sharp-Crested Vee/Trap Weir (Controls 0.00 cfs)

Pond 8P: Proposed Pond

Hydrograph



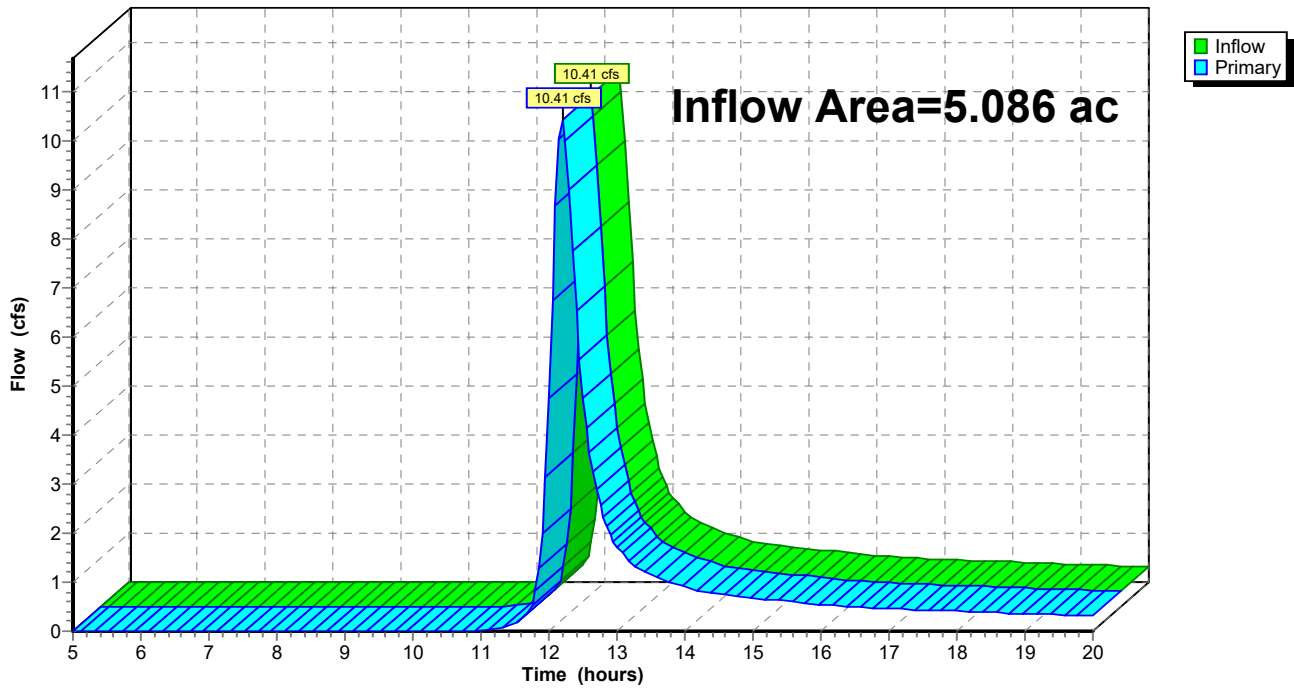
Summary for Link 2L: Outfall

Inflow Area = 5.086 ac, 0.00% Impervious, Inflow Depth > 1.99" for 10-YR - 24HR. event
Inflow = 10.41 cfs @ 12.20 hrs, Volume= 0.843 af
Primary = 10.41 cfs @ 12.20 hrs, Volume= 0.843 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link 2L: Outfall

Hydrograph



Staging Area 2 Basin 3 HydroCAD Report

Type II 24-hr 25-YR - 24HR. Rainfall=7.92"

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

Subcatchment 1S: Pre Developed Runoff Area=221,533 sf 0.00% Impervious Runoff Depth>2.76"
Flow Length=607' Slope=0.0247 '/' Tc=24.7 min CN=58 Runoff=14.71 cfs 1.168 af

Subcatchment 4S: Post Developed Runoff Area=221,533 sf 0.00% Impervious Runoff Depth>3.41"
Flow Length=607' Slope=0.2470 '/' Tc=6.7 min CN=64 Runoff=32.30 cfs 1.446 af

Reach 6R: Proposed Ditch Avg. Flow Depth=1.06' Max Vel=3.64 fps Inflow=37.74 cfs 1.098 af
n=0.035 L=261.0' S=0.0123 '/' Capacity=28.32 cfs Outflow=29.93 cfs 1.096 af

Pond 6P: Rock Voids Peak Elev=103.62' Storage=7,470 cf Inflow=32.30 cfs 1.446 af
Discarded=0.22 cfs 0.177 af Primary=37.74 cfs 1.098 af Outflow=37.96 cfs 1.275 af

Pond 8P: Proposed Pond Peak Elev=98.73' Storage=40,289 cf Inflow=29.93 cfs 1.096 af
Discarded=0.26 cfs 0.172 af Primary=0.00 cfs 0.000 af Outflow=0.26 cfs 0.172 af

Link 2L: Outfall Inflow=14.71 cfs 1.168 af
Primary=14.71 cfs 1.168 af

Staging Area 2 Basin 3 HydroCAD Report

Type II 24-hr 25-YR - 24HR. Rainfall=7.92"

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Summary for Subcatchment 1S: Pre Developed

Runoff = 14.71 cfs @ 12.19 hrs, Volume= 1.168 af, Depth> 2.76"

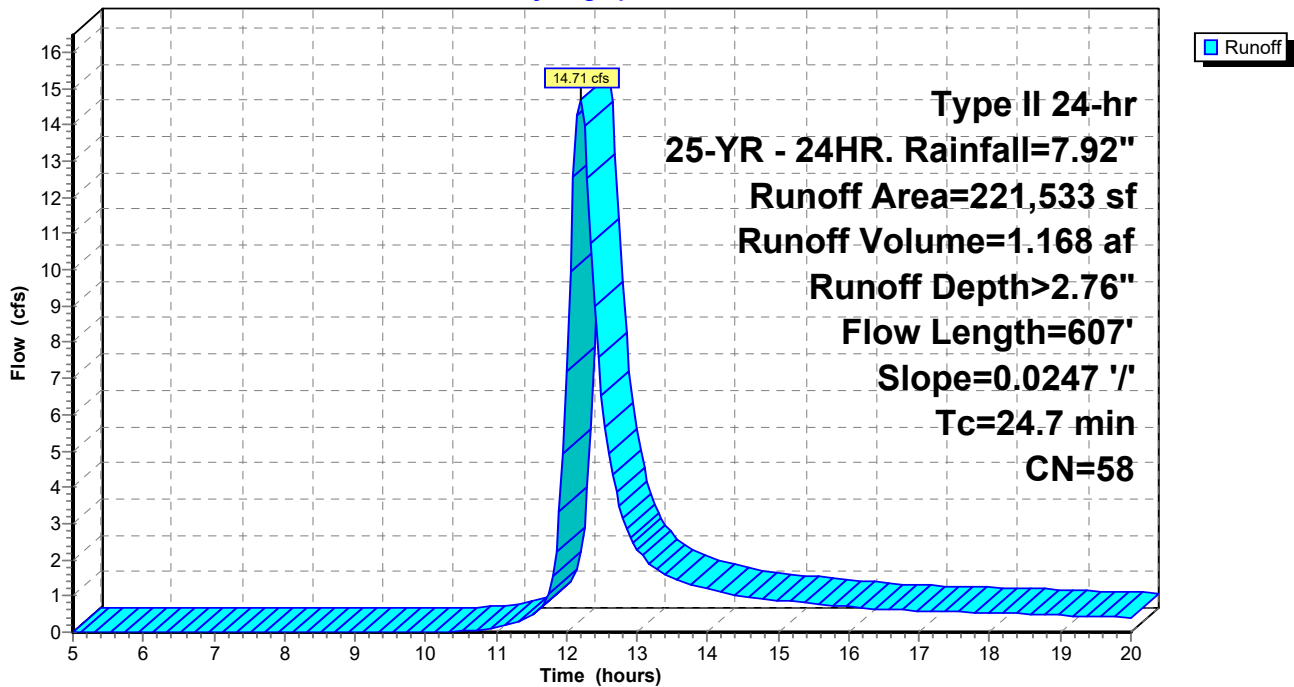
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-YR - 24HR. Rainfall=7.92"

Area (sf)	CN	Description
221,533	58	Meadow, non-grazed, HSG B
221,533		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.7	607	0.0247	0.41		Lag/CN Method,

Subcatchment 1S: Pre Developed

Hydrograph



Staging Area 2 Basin 3 HydroCAD Report

Type II 24-hr 25-YR - 24HR. Rainfall=7.92"

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Summary for Subcatchment 4S: Post Developed

Runoff = 32.30 cfs @ 11.98 hrs, Volume= 1.446 af, Depth> 3.41"

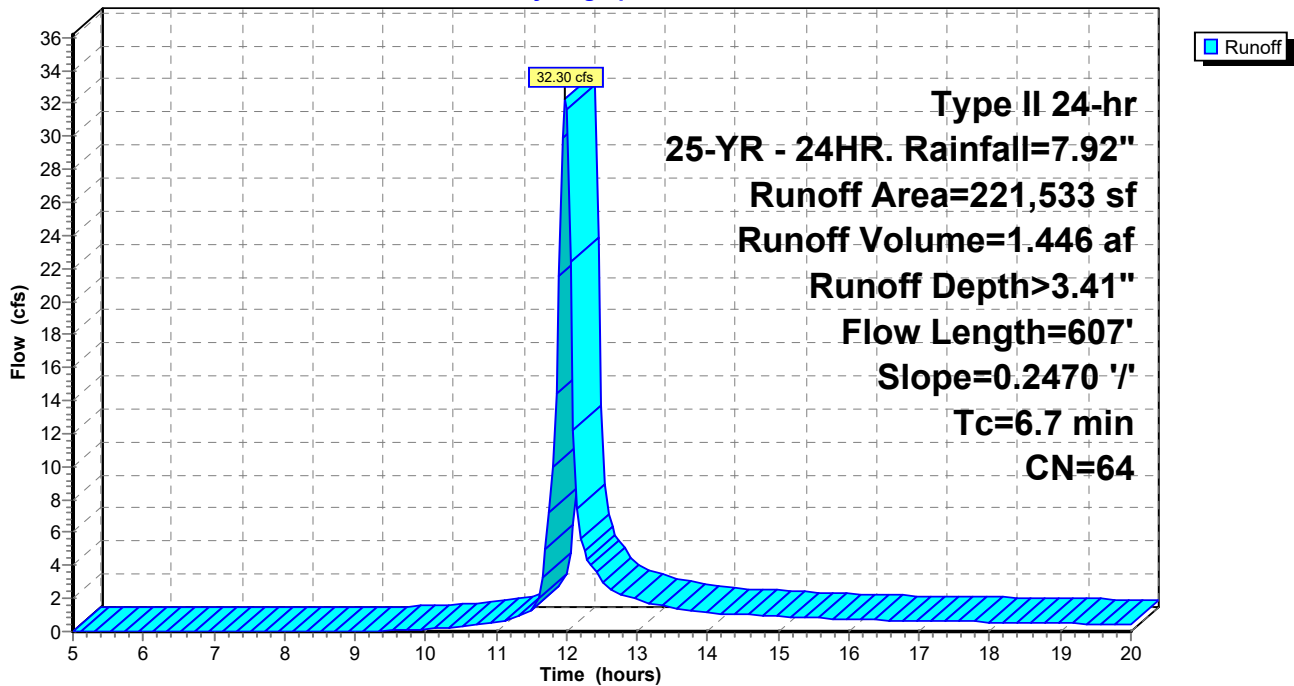
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-YR - 24HR. Rainfall=7.92"

Area (sf)	CN	Description
97,307	58	Meadow, non-grazed, HSG B
* 106,708	65	Uncompacted Gravel (35% Void)
17,518	85	Gravel roads, HSG B
221,533	64	Weighted Average
221,533		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.7	607	0.2470	1.51		Lag/CN Method,

Subcatchment 4S: Post Developed

Hydrograph



Staging Area 2 Basin 3 HydroCAD Report

Type II 24-hr 25-YR - 24HR. Rainfall=7.92"

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Summary for Reach 6R: Proposed Ditch

Inflow Area = 5.086 ac, 0.00% Impervious, Inflow Depth > 2.59" for 25-YR - 24HR. event
Inflow = 37.74 cfs @ 11.99 hrs, Volume= 1.098 af
Outflow = 29.93 cfs @ 12.01 hrs, Volume= 1.096 af, Atten= 21%, Lag= 1.1 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.64 fps, Min. Travel Time= 1.2 min
Avg. Velocity = 1.21 fps, Avg. Travel Time= 3.6 min

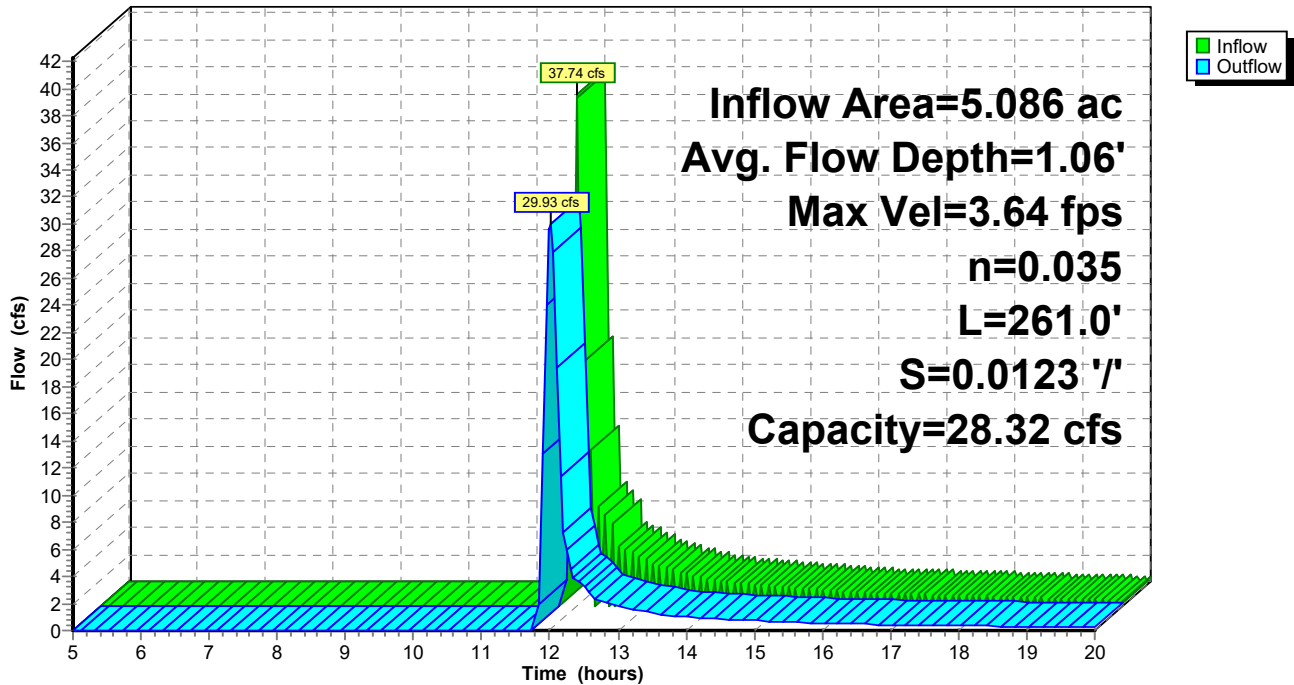
Peak Storage= 2,261 cf @ 12.00 hrs
Average Depth at Peak Storage= 1.06'
Bank-Full Depth= 1.00' Flow Area= 8.0 sf, Capacity= 28.32 cfs

4.00' x 1.00' deep channel, n= 0.035 High grass
Side Slope Z-value= 4.0 ' / ' Top Width= 12.00'
Length= 261.0' Slope= 0.0123 ' / '
Inlet Invert= 104.00', Outlet Invert= 100.80'



Reach 6R: Proposed Ditch

Hydrograph



Staging Area 2 Basin 3 HydroCAD Report

Type II 24-hr 25-YR - 24HR. Rainfall=7.92"

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Summary for Pond 6P: Rock Voids

Inflow Area = 5.086 ac, 0.00% Impervious, Inflow Depth > 3.41" for 25-YR - 24HR. event
 Inflow = 32.30 cfs @ 11.98 hrs, Volume= 1.446 af
 Outflow = 37.96 cfs @ 11.99 hrs, Volume= 1.275 af, Atten= 0%, Lag= 0.7 min
 Discarded = 0.22 cfs @ 10.95 hrs, Volume= 0.177 af
 Primary = 37.74 cfs @ 11.99 hrs, Volume= 1.098 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Peak Elev= 103.62' @ 11.99 hrs Surf.Area= 37,348 sf Storage= 7,470 cf

Plug-Flow detention time= 51.6 min calculated for 1.271 af (88% of inflow)
 Center-of-Mass det. time= 13.4 min (805.2 - 791.8)

Volume	Invert	Avail.Storage	Storage Description
#1	102.50'	7,470 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
102.50	37,348	0	0
102.70	37,348	7,470	7,470

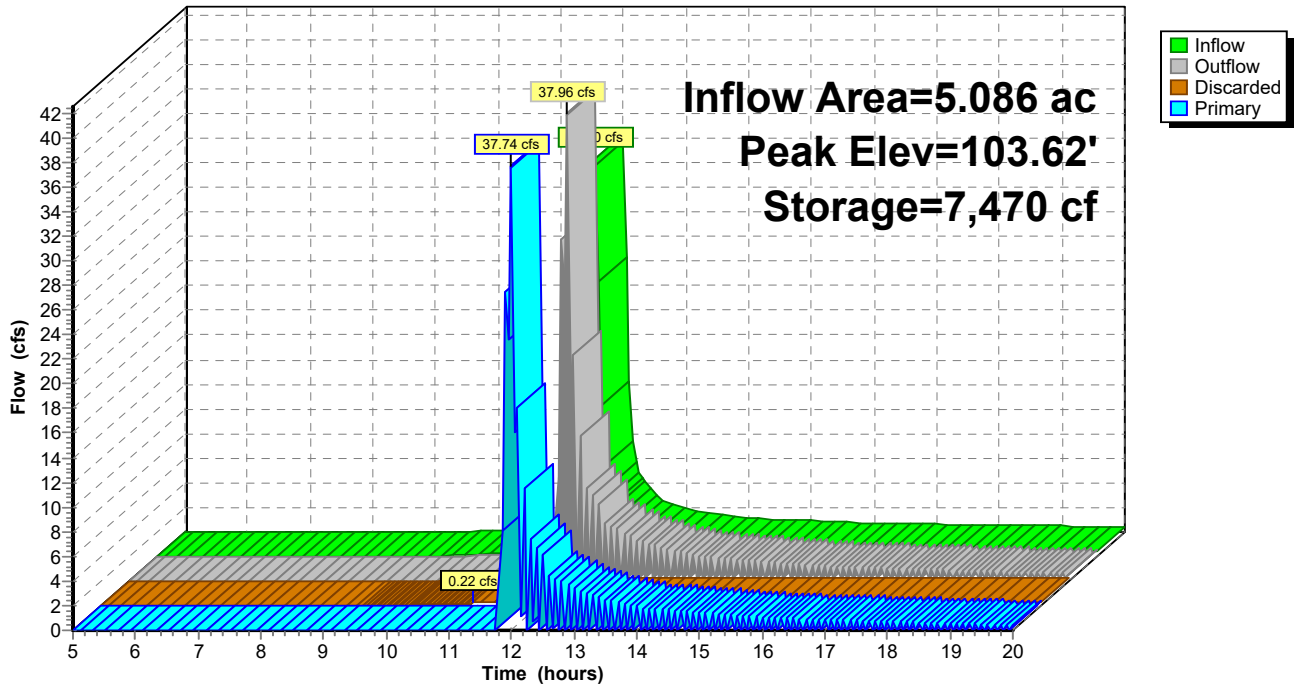
Device	Routing	Invert	Outlet Devices
#1	Discarded	102.50'	0.250 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Primary	102.70'	16.0' long x 5.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Discarded OutFlow Max=0.22 cfs @ 10.95 hrs HW=102.52' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.22 cfs)

Primary OutFlow Max=35.94 cfs @ 11.99 hrs HW=103.59' (Free Discharge)
 ↑2=Broad-Crested Rectangular Weir (Weir Controls 35.94 cfs @ 2.53 fps)

Pond 6P: Rock Voids

Hydrograph



Staging Area 2 Basin 3 HydroCAD Report

Type II 24-hr 25-YR - 24HR. Rainfall=7.92"

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Summary for Pond 8P: Proposed Pond

Inflow Area = 5.086 ac, 0.00% Impervious, Inflow Depth > 2.59" for 25-YR - 24HR. event
Inflow = 29.93 cfs @ 12.01 hrs, Volume= 1.096 af
Outflow = 0.26 cfs @ 19.40 hrs, Volume= 0.172 af, Atten= 99%, Lag= 443.3 min
Discarded = 0.26 cfs @ 19.40 hrs, Volume= 0.172 af
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 98.73' @ 19.40 hrs Surf.Area= 44,321 sf Storage= 40,289 cf

Plug-Flow detention time= 241.0 min calculated for 0.171 af (16% of inflow)
Center-of-Mass det. time= 165.8 min (957.7 - 791.9)

Volume	Invert	Avail.Storage	Storage Description
#1	97.80'	186,469 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
97.80	42,365	0	0
98.80	44,469	43,417	43,417
99.80	46,598	45,534	88,951
100.80	48,753	47,676	136,626
101.80	50,933	49,843	186,469

Device	Routing	Invert	Outlet Devices
#1	Discarded	97.80'	0.250 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Primary	100.70'	43.6 deg x 12.0' long x 1.00' rise Sharp-Crested Vee/Trap Weir Cv= 2.56 (C= 3.20)

Discarded OutFlow Max=0.26 cfs @ 19.40 hrs HW=98.73' (Free Discharge)

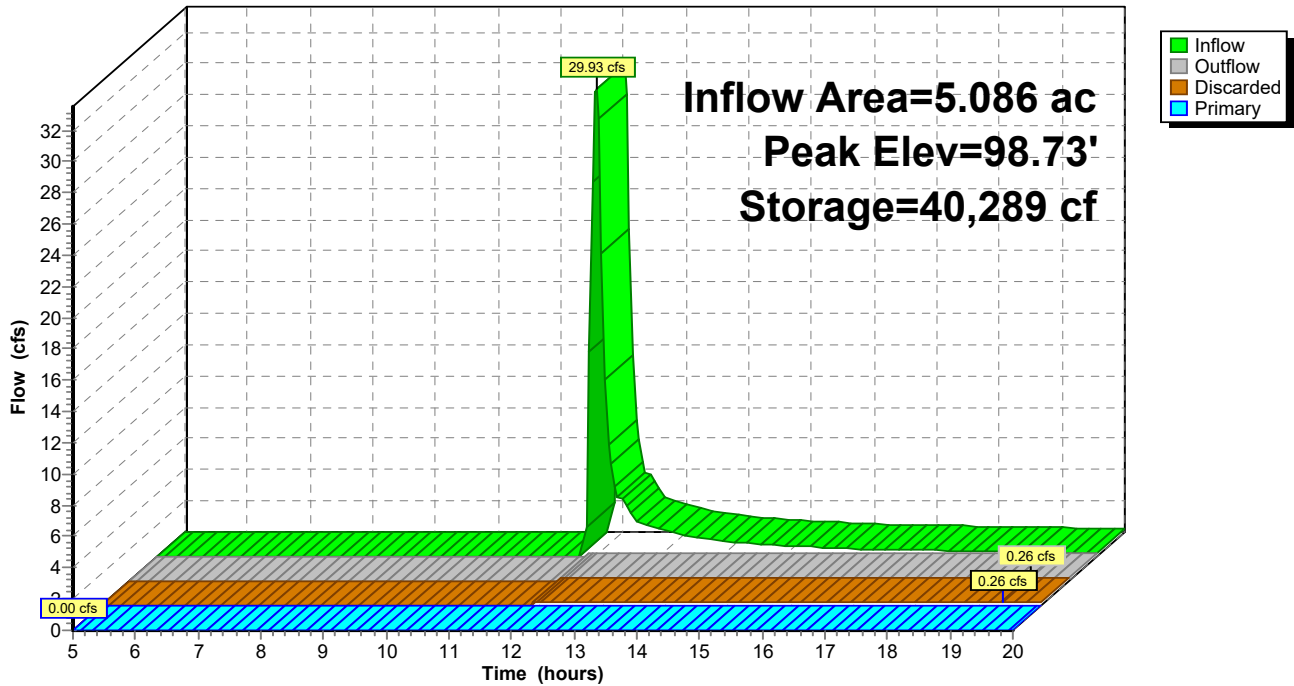
↑1=**Exfiltration** (Exfiltration Controls 0.26 cfs)

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=97.80' (Free Discharge)

↑2=**Sharp-Crested Vee/Trap Weir** (Controls 0.00 cfs)

Pond 8P: Proposed Pond

Hydrograph



Staging Area 2 Basin 3 HydroCAD Report

Type II 24-hr 25-YR - 24HR. Rainfall=7.92"

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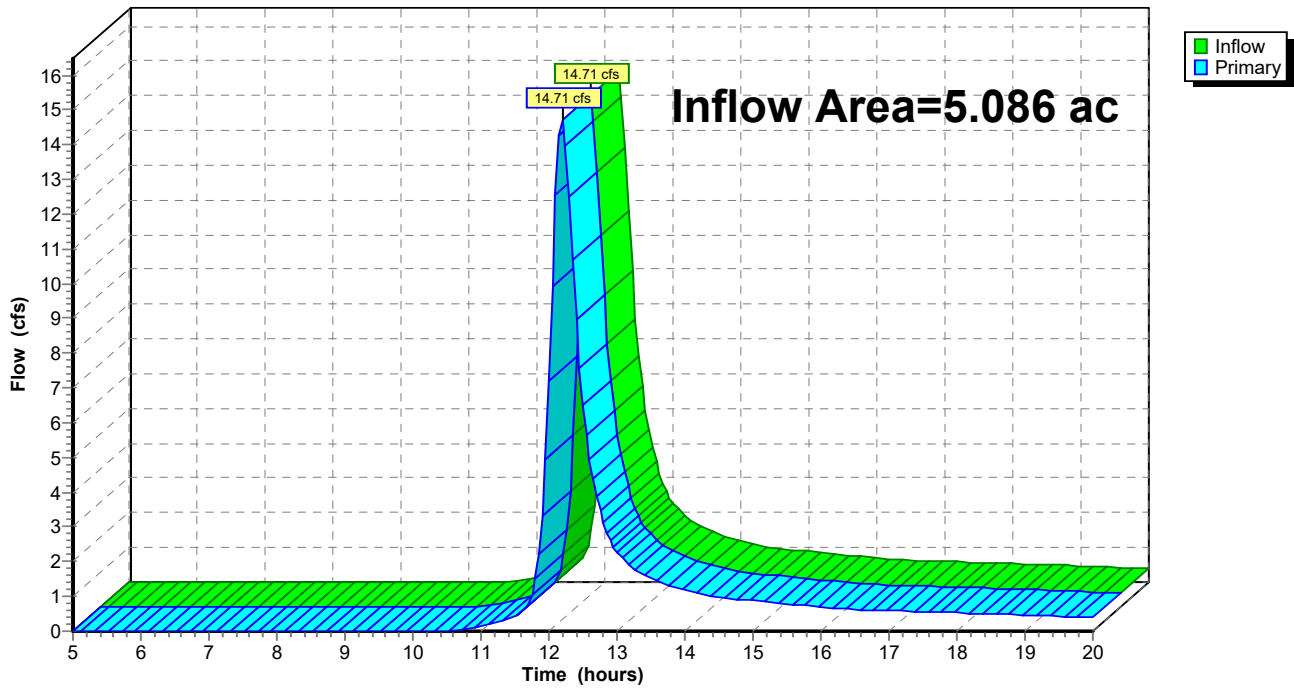
Summary for Link 2L: Outfall

Inflow Area = 5.086 ac, 0.00% Impervious, Inflow Depth > 2.76" for 25-YR - 24HR. event
Inflow = 14.71 cfs @ 12.19 hrs, Volume= 1.168 af
Primary = 14.71 cfs @ 12.19 hrs, Volume= 1.168 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link 2L: Outfall

Hydrograph



Staging Area 2 Basin 3 HydroCAD Report Type II 24-hr 1.00 hrs 100-YR - 1HR. Rainfall=4.20"

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

Subcatchment 1S: Pre Developed Runoff Area=221,533 sf 0.00% Impervious Runoff Depth=0.00"
Flow Length=607' Slope=0.0247 '/' Tc=24.7 min CN=58 Runoff=0.00 cfs 0.000 af

Subcatchment 4S: Post Developed Runoff Area=221,533 sf 0.00% Impervious Runoff Depth=0.00"
Flow Length=607' Slope=0.2470 '/' Tc=6.7 min CN=64 Runoff=0.00 cfs 0.000 af

Reach 6R: Proposed Ditch Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af
n=0.035 L=261.0' S=0.0123 '/' Capacity=28.32 cfs Outflow=0.00 cfs 0.000 af

Pond 6P: Rock Voids Peak Elev=102.50' Storage=0 cf Inflow=0.00 cfs 0.000 af
Discarded=0.00 cfs 0.000 af Primary=0.00 cfs 0.000 af Outflow=0.00 cfs 0.000 af

Pond 8P: Proposed Pond Peak Elev=97.80' Storage=0 cf Inflow=0.00 cfs 0.000 af
Discarded=0.00 cfs 0.000 af Primary=0.00 cfs 0.000 af Outflow=0.00 cfs 0.000 af

Link 2L: Outfall Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

Summary for Subcatchment 1S: Pre Developed

Runoff = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Depth= 0.00"

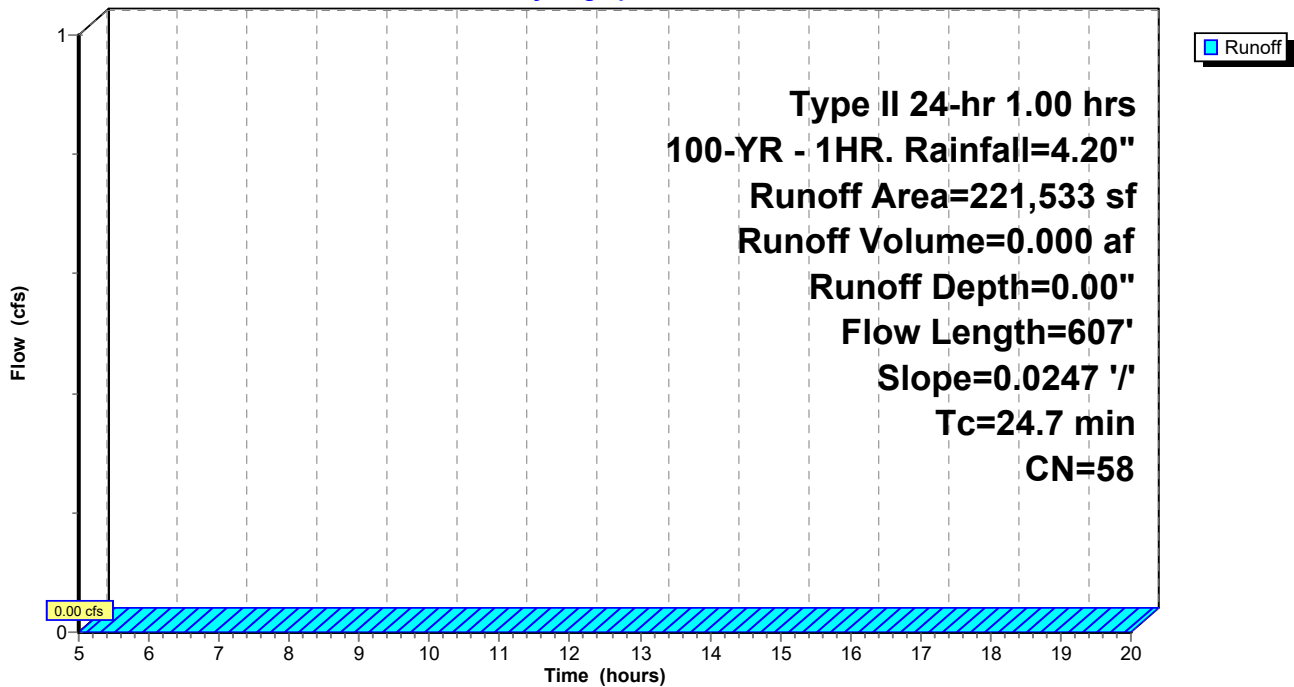
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Type II 24-hr 1.00 hrs 100-YR - 1HR. Rainfall=4.20"

Area (sf)	CN	Description
221,533	58	Meadow, non-grazed, HSG B
221,533		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.7	607	0.0247	0.41		Lag/CN Method,

Subcatchment 1S: Pre Developed

Hydrograph



Summary for Subcatchment 4S: Post Developed

Runoff = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Depth= 0.00"

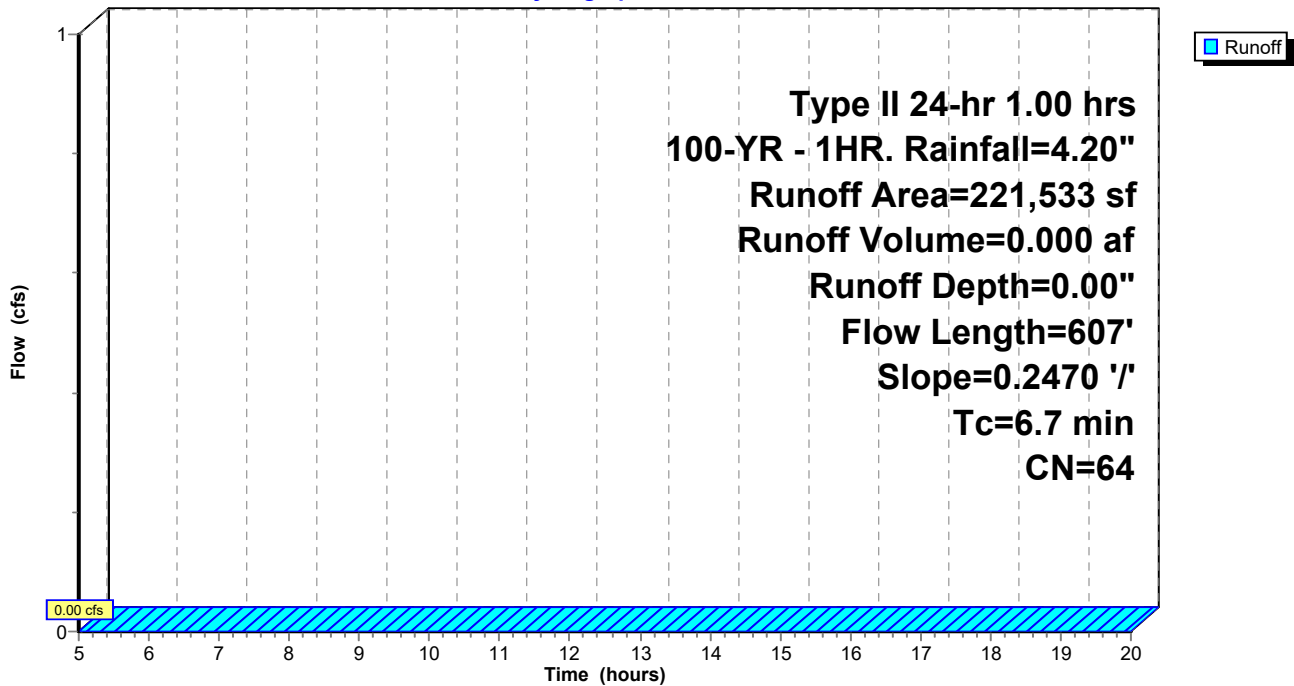
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Type II 24-hr 1.00 hrs 100-YR - 1HR. Rainfall=4.20"

Area (sf)	CN	Description
97,307	58	Meadow, non-grazed, HSG B
* 106,708	65	Uncompacted Gravel (35% Void)
17,518	85	Gravel roads, HSG B
221,533	64	Weighted Average
221,533		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.7	607	0.2470	1.51		Lag/CN Method,

Subcatchment 4S: Post Developed

Hydrograph



Summary for Reach 6R: Proposed Ditch

Inflow Area = 5.086 ac, 0.00% Impervious, Inflow Depth = 0.00" for 100-YR - 1HR. event
 Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
 Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Max. Velocity= 0.00 fps, Min. Travel Time= 0.0 min
 Avg. Velocity = 0.00 fps, Avg. Travel Time= 0.0 min

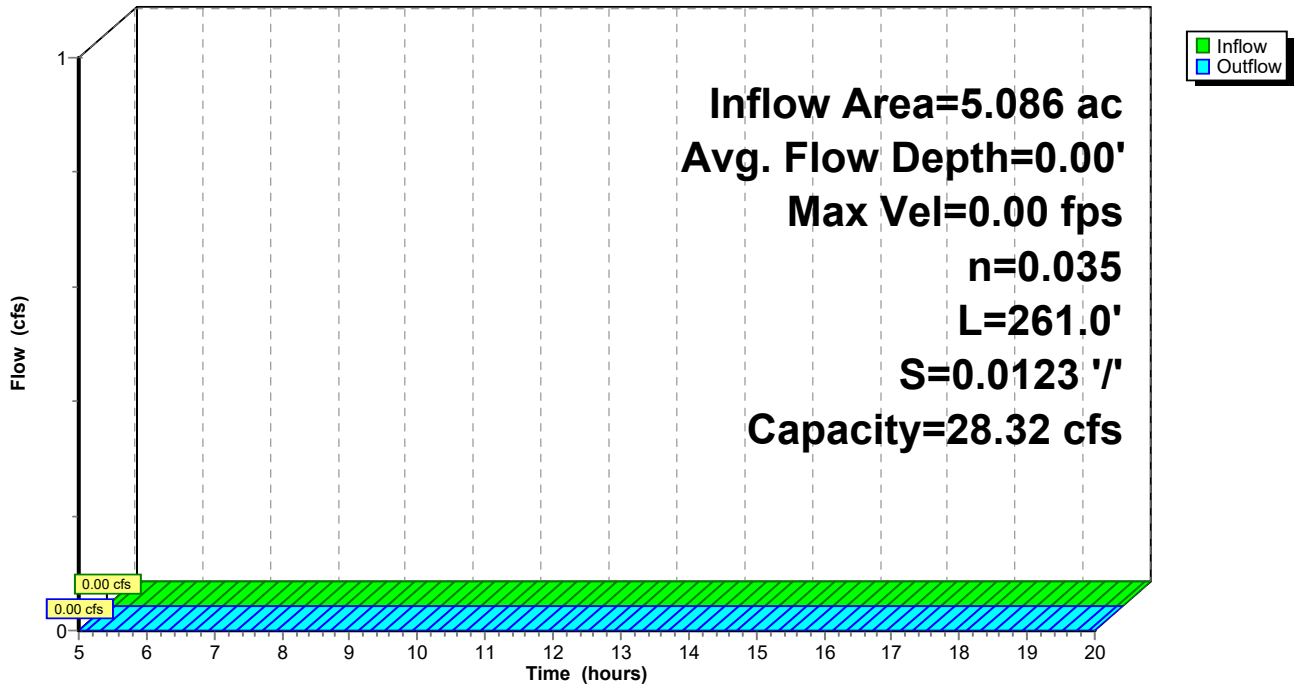
Peak Storage= 0 cf @ 5.00 hrs
 Average Depth at Peak Storage= 0.00'
 Bank-Full Depth= 1.00' Flow Area= 8.0 sf, Capacity= 28.32 cfs

4.00' x 1.00' deep channel, n= 0.035 High grass
 Side Slope Z-value= 4.0 '/' Top Width= 12.00'
 Length= 261.0' Slope= 0.0123 '/'
 Inlet Invert= 104.00', Outlet Invert= 100.80'



Reach 6R: Proposed Ditch

Hydrograph



Summary for Pond 6P: Rock Voids

Inflow Area = 5.086 ac, 0.00% Impervious, Inflow Depth = 0.00" for 100-YR - 1HR. event
 Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
 Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min
 Discarded = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
 Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Peak Elev= 102.50' @ 5.00 hrs Surf.Area= 37,348 sf Storage= 0 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
 Center-of-Mass det. time= (not calculated: no inflow)

Volume	Invert	Avail.Storage	Storage Description
#1	102.50'	7,470 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
102.50	37,348	0	0
102.70	37,348	7,470	7,470

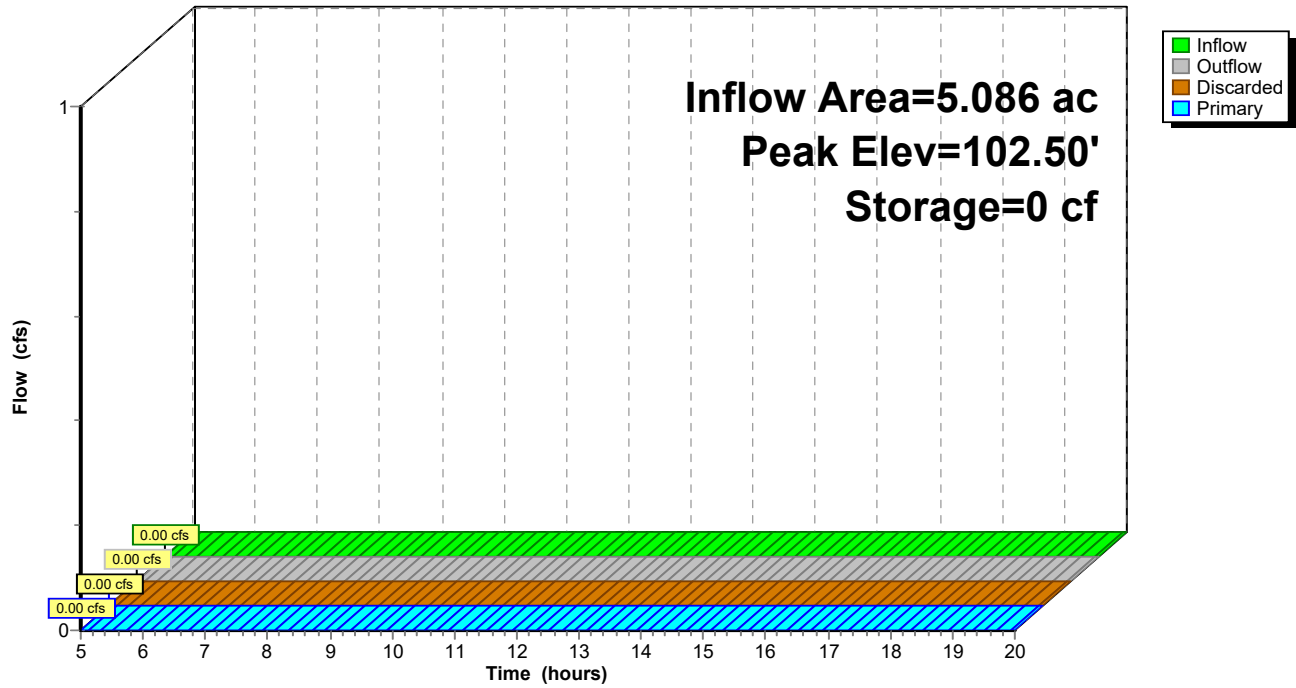
Device	Routing	Invert	Outlet Devices
#1	Discarded	102.50'	0.250 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Primary	102.70'	16.0' long x 5.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Discarded OutFlow Max=0.00 cfs @ 5.00 hrs HW=102.50' (Free Discharge)
 ↑1=**Exfiltration** (Controls 0.00 cfs)

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=102.50' (Free Discharge)
 ↑2=**Broad-Crested Rectangular Weir**(Controls 0.00 cfs)

Pond 6P: Rock Voids

Hydrograph



Summary for Pond 8P: Proposed Pond

Inflow Area = 5.086 ac, 0.00% Impervious, Inflow Depth = 0.00" for 100-YR - 1HR. event
 Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
 Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min
 Discarded = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
 Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Peak Elev= 97.80' @ 5.00 hrs Surf.Area= 42,365 sf Storage= 0 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
 Center-of-Mass det. time= (not calculated: no inflow)

Volume	Invert	Avail.Storage	Storage Description
#1	97.80'	186,469 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

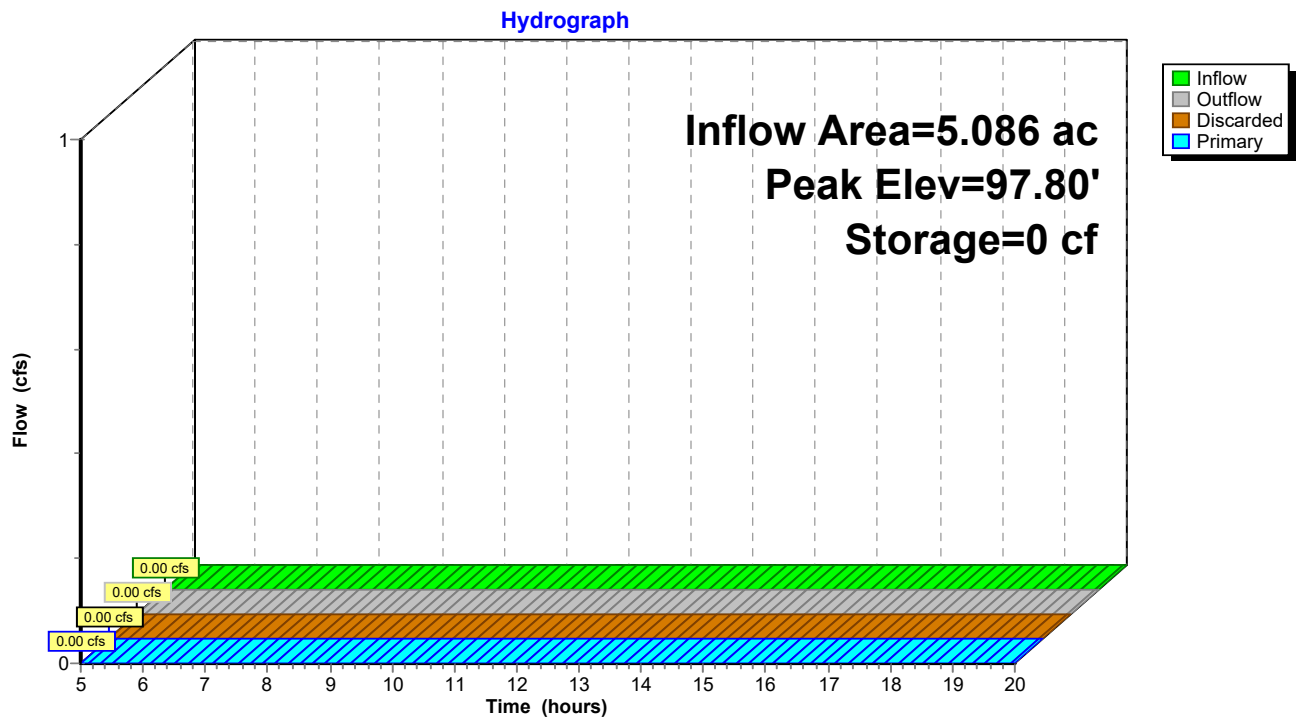
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
97.80	42,365	0	0
98.80	44,469	43,417	43,417
99.80	46,598	45,534	88,951
100.80	48,753	47,676	136,626
101.80	50,933	49,843	186,469

Device	Routing	Invert	Outlet Devices
#1	Discarded	97.80'	0.250 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Primary	100.70'	43.6 deg x 12.0' long x 1.00' rise Sharp-Crested Vee/Trap Weir Cv= 2.56 (C= 3.20)

Discarded OutFlow Max=0.00 cfs @ 5.00 hrs HW=97.80' (Free Discharge)
 ↑1=Exfiltration (Controls 0.00 cfs)

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=97.80' (Free Discharge)
 ↑2=Sharp-Crested Vee/Trap Weir (Controls 0.00 cfs)

Pond 8P: Proposed Pond



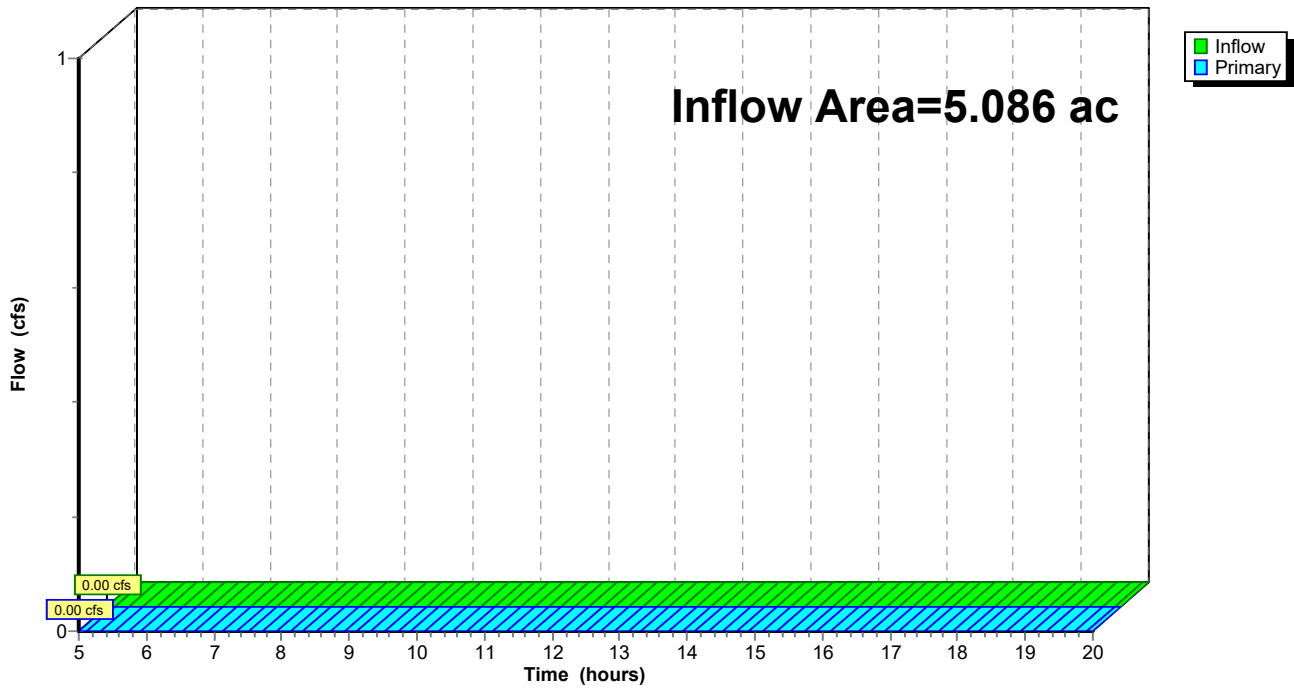
Summary for Link 2L: Outfall

Inflow Area = 5.086 ac, 0.00% Impervious, Inflow Depth = 0.00" for 100-YR - 1HR. event
Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link 2L: Outfall

Hydrograph



Staging Area 2 Basin 3 HydroCAD Report

Type II 24-hr 100-YR - 24HR. Rainfall=9.84"

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

Subcatchment 1S: Pre Developed Runoff Area=221,533 sf 0.00% Impervious Runoff Depth>4.10"
Flow Length=607' Slope=0.0247 '/' Tc=24.7 min CN=58 Runoff=22.15 cfs 1.738 af

Subcatchment 4S: Post Developed Runoff Area=221,533 sf 0.00% Impervious Runoff Depth>4.89"
Flow Length=607' Slope=0.2470 '/' Tc=6.7 min CN=64 Runoff=45.73 cfs 2.073 af

Reach 6R: Proposed Ditch Avg. Flow Depth=1.28' Max Vel=3.92 fps Inflow=46.75 cfs 1.707 af
n=0.035 L=261.0' S=0.0123 '/' Capacity=28.32 cfs Outflow=42.79 cfs 1.704 af

Pond 6P: Rock Voids Peak Elev=103.76' Storage=7,470 cf Inflow=45.73 cfs 2.073 af
Discarded=0.22 cfs 0.194 af Primary=46.75 cfs 1.707 af Outflow=46.97 cfs 1.901 af

Pond 8P: Proposed Pond Peak Elev=99.31' Storage=66,464 cf Inflow=42.79 cfs 1.704 af
Discarded=0.26 cfs 0.178 af Primary=0.00 cfs 0.000 af Outflow=0.26 cfs 0.178 af

Link 2L: Outfall Inflow=22.15 cfs 1.738 af
Primary=22.15 cfs 1.738 af

Staging Area 2 Basin 3 HydroCAD Report

Type II 24-hr 100-YR - 24HR. Rainfall=9.84"

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Summary for Subcatchment 1S: Pre Developed

Runoff = 22.15 cfs @ 12.19 hrs, Volume= 1.738 af, Depth> 4.10"

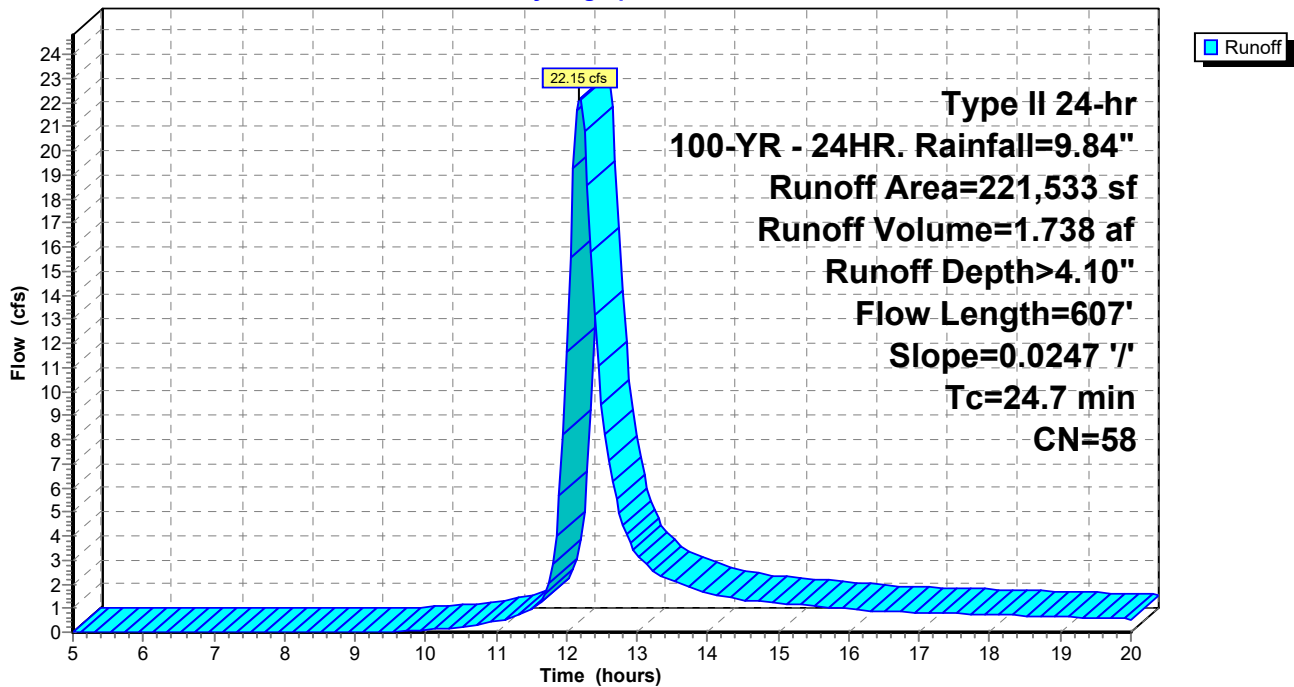
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Type II 24-hr 100-YR - 24HR. Rainfall=9.84"

Area (sf)	CN	Description
221,533	58	Meadow, non-grazed, HSG B
221,533		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.7	607	0.0247	0.41		Lag/CN Method,

Subcatchment 1S: Pre Developed

Hydrograph



Staging Area 2 Basin 3 HydroCAD Report

Type II 24-hr 100-YR - 24HR. Rainfall=9.84"

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Summary for Subcatchment 4S: Post Developed

Runoff = 45.73 cfs @ 11.98 hrs, Volume= 2.073 af, Depth> 4.89"

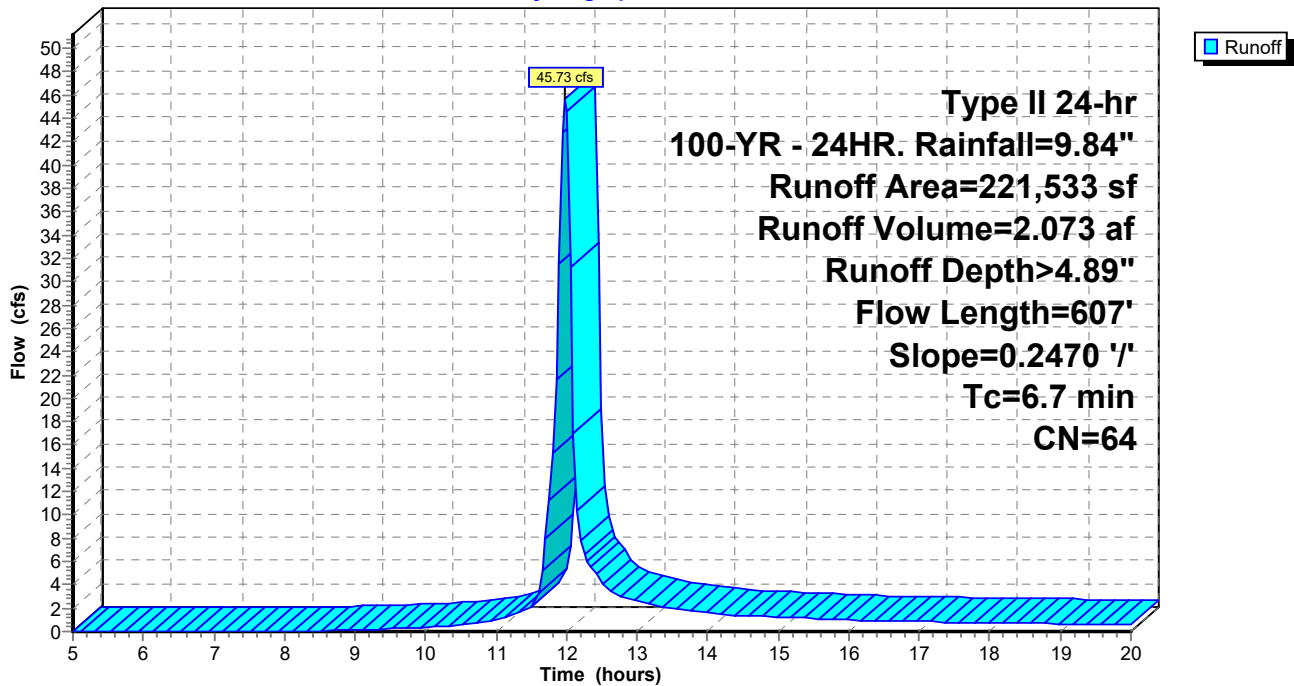
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-YR - 24HR. Rainfall=9.84"

Area (sf)	CN	Description
97,307	58	Meadow, non-grazed, HSG B
* 106,708	65	Uncompacted Gravel (35% Void)
17,518	85	Gravel roads, HSG B
221,533	64	Weighted Average
221,533		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.7	607	0.2470	1.51		Lag/CN Method,

Subcatchment 4S: Post Developed

Hydrograph



Staging Area 2 Basin 3 HydroCAD Report

Type II 24-hr 100-YR - 24HR. Rainfall=9.84"

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Summary for Reach 6R: Proposed Ditch

Inflow Area = 5.086 ac, 0.00% Impervious, Inflow Depth > 4.03" for 100-YR - 24HR. event
Inflow = 46.75 cfs @ 11.96 hrs, Volume= 1.707 af
Outflow = 42.79 cfs @ 12.01 hrs, Volume= 1.704 af, Atten= 8%, Lag= 2.7 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.92 fps, Min. Travel Time= 1.1 min
Avg. Velocity = 1.39 fps, Avg. Travel Time= 3.1 min

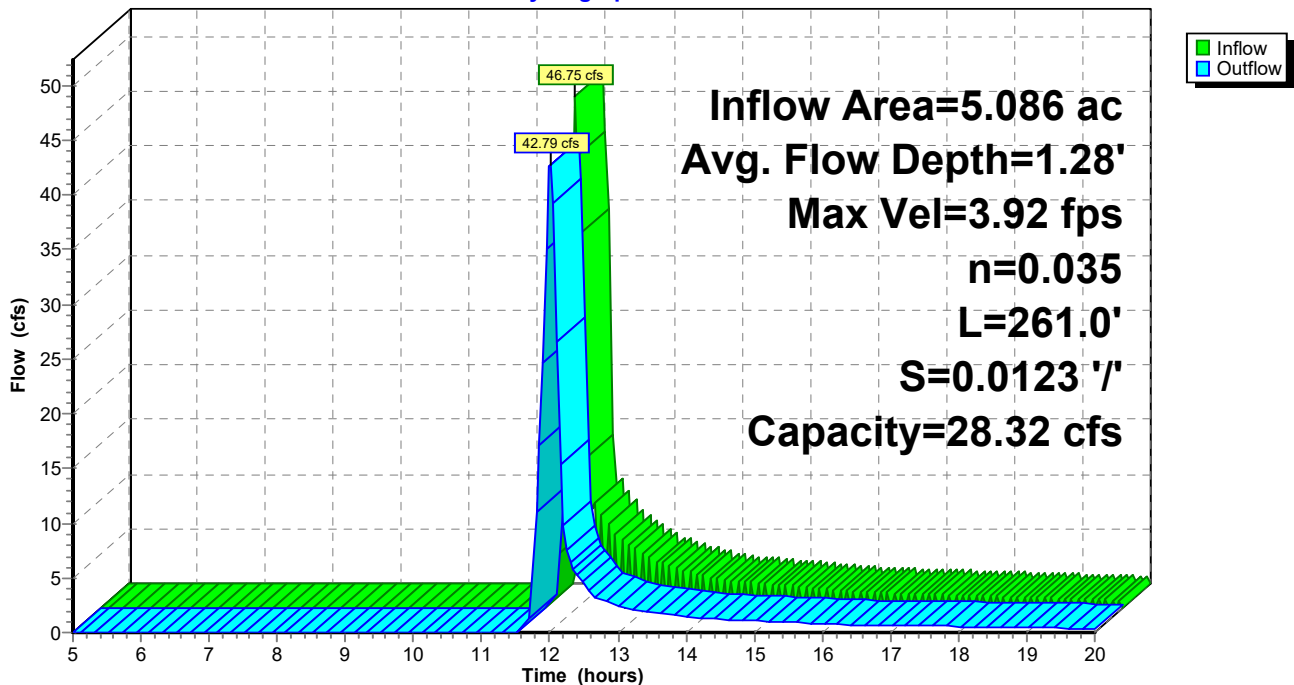
Peak Storage= 2,973 cf @ 11.99 hrs
Average Depth at Peak Storage= 1.28'
Bank-Full Depth= 1.00' Flow Area= 8.0 sf, Capacity= 28.32 cfs

4.00' x 1.00' deep channel, n= 0.035 High grass
Side Slope Z-value= 4.0 '/' Top Width= 12.00'
Length= 261.0' Slope= 0.0123 '/'
Inlet Invert= 104.00', Outlet Invert= 100.80'



Reach 6R: Proposed Ditch

Hydrograph



Staging Area 2 Basin 3 HydroCAD Report

Type II 24-hr 100-YR - 24HR. Rainfall=9.84"

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Summary for Pond 6P: Rock Voids

Inflow Area = 5.086 ac, 0.00% Impervious, Inflow Depth > 4.89" for 100-YR - 24HR. event
 Inflow = 45.73 cfs @ 11.98 hrs, Volume= 2.073 af
 Outflow = 46.97 cfs @ 11.96 hrs, Volume= 1.901 af, Atten= 0%, Lag= 0.0 min
 Discarded = 0.22 cfs @ 10.20 hrs, Volume= 0.194 af
 Primary = 46.75 cfs @ 11.96 hrs, Volume= 1.707 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Peak Elev= 103.76' @ 11.97 hrs Surf.Area= 37,348 sf Storage= 7,470 cf

Plug-Flow detention time= 38.8 min calculated for 1.894 af (91% of inflow)
 Center-of-Mass det. time= 10.1 min (794.2 - 784.1)

Volume	Invert	Avail.Storage	Storage Description
#1	102.50'	7,470 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
102.50	37,348	0	0
102.70	37,348	7,470	7,470

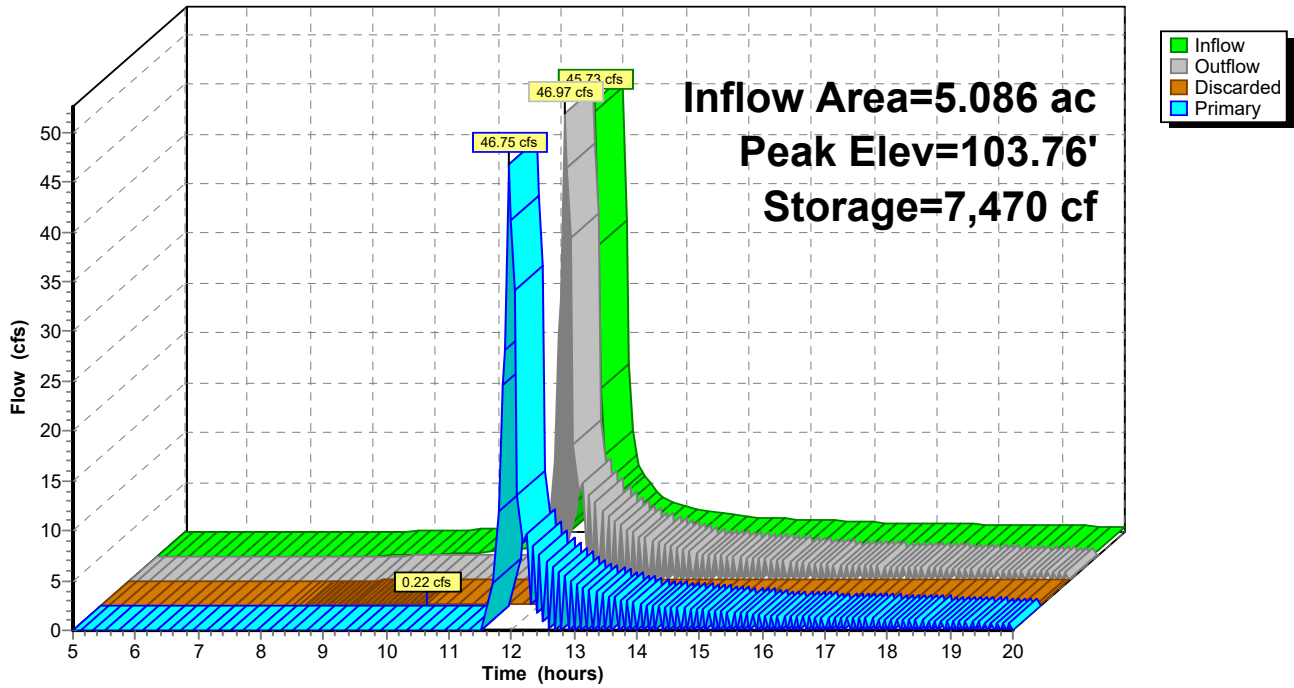
Device	Routing	Invert	Outlet Devices
#1	Discarded	102.50'	0.250 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Primary	102.70'	16.0' long x 5.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Discarded OutFlow Max=0.22 cfs @ 10.20 hrs HW=102.52' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.22 cfs)

Primary OutFlow Max=44.45 cfs @ 11.96 hrs HW=103.72' (Free Discharge)
 ↑2=Broad-Crested Rectangular Weir (Weir Controls 44.45 cfs @ 2.71 fps)

Pond 6P: Rock Voids

Hydrograph



Staging Area 2 Basin 3 HydroCAD Report

Type II 24-hr 100-YR - 24HR. Rainfall=9.84"

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Summary for Pond 8P: Proposed Pond

Inflow Area = 5.086 ac, 0.00% Impervious, Inflow Depth > 4.02" for 100-YR - 24HR. event
 Inflow = 42.79 cfs @ 12.01 hrs, Volume= 1.704 af
 Outflow = 0.26 cfs @ 20.00 hrs, Volume= 0.178 af, Atten= 99%, Lag= 479.4 min
 Discarded = 0.26 cfs @ 20.00 hrs, Volume= 0.178 af
 Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Peak Elev= 99.31' @ 20.00 hrs Surf.Area= 45,559 sf Storage= 66,464 cf

Plug-Flow detention time= 244.0 min calculated for 0.178 af (10% of inflow)
 Center-of-Mass det. time= 167.3 min (955.0 - 787.7)

Volume	Invert	Avail.Storage	Storage Description
#1	97.80'	186,469 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
97.80	42,365	0	0
98.80	44,469	43,417	43,417
99.80	46,598	45,534	88,951
100.80	48,753	47,676	136,626
101.80	50,933	49,843	186,469

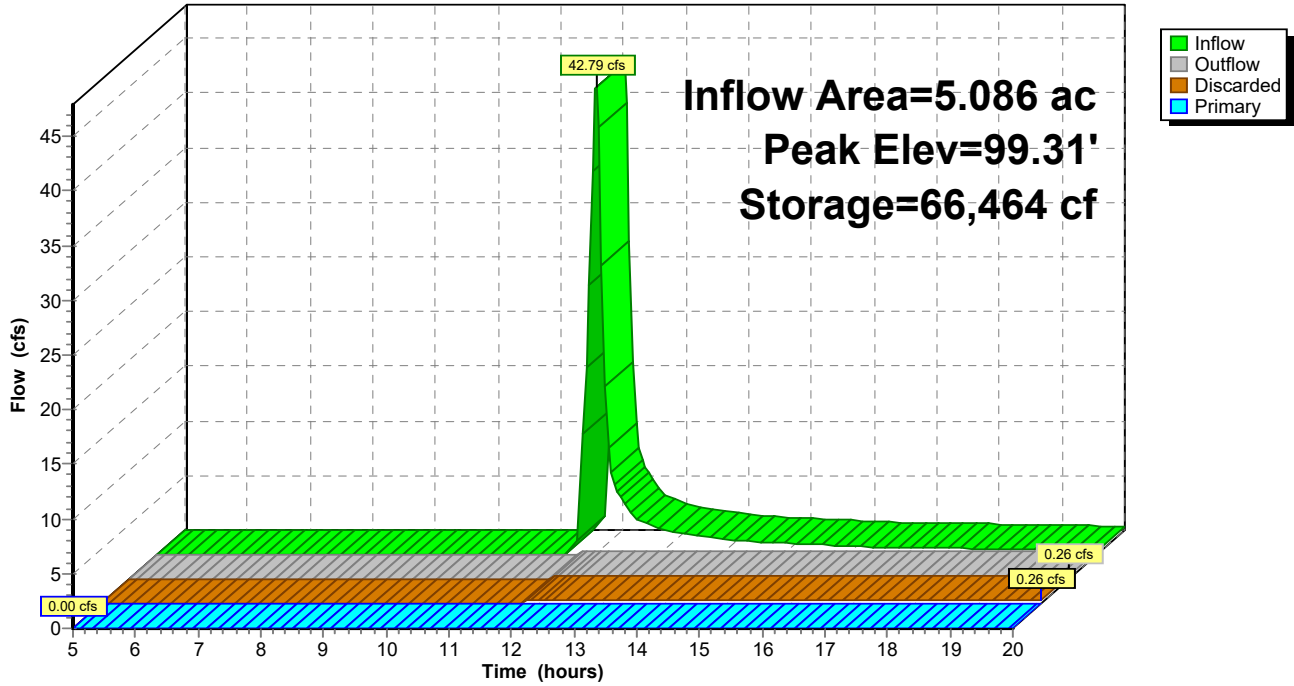
Device	Routing	Invert	Outlet Devices
#1	Discarded	97.80'	0.250 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Primary	100.70'	43.6 deg x 12.0' long x 1.00' rise Sharp-Crested Vee/Trap Weir Cv= 2.56 (C= 3.20)

Discarded OutFlow Max=0.26 cfs @ 20.00 hrs HW=99.31' (Free Discharge)
 ↑1=**Exfiltration** (Exfiltration Controls 0.26 cfs)

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=97.80' (Free Discharge)
 ↑2=**Sharp-Crested Vee/Trap Weir** (Controls 0.00 cfs)

Pond 8P: Proposed Pond

Hydrograph



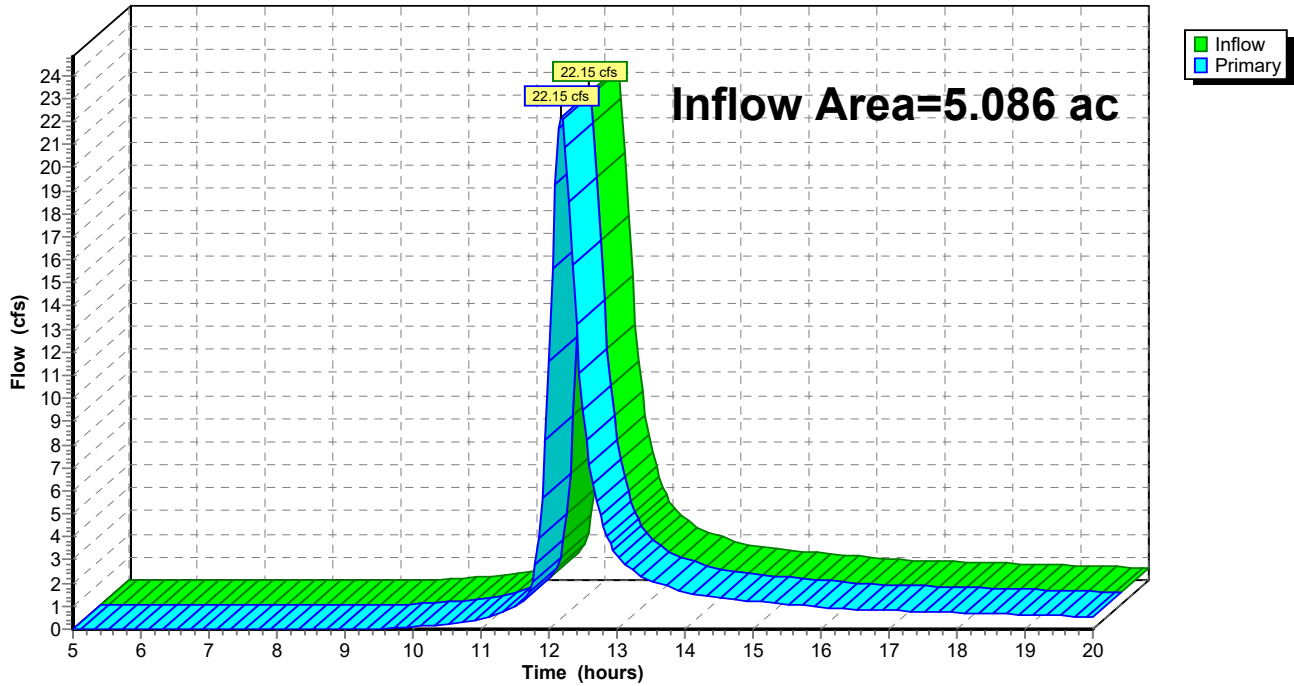
Summary for Link 2L: Outfall

Inflow Area = 5.086 ac, 0.00% Impervious, Inflow Depth > 4.10" for 100-YR - 24HR. event
Inflow = 22.15 cfs @ 12.19 hrs, Volume= 1.738 af
Primary = 22.15 cfs @ 12.19 hrs, Volume= 1.738 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link 2L: Outfall

Hydrograph



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

Subcatchment 1S: Pre Developed Runoff Area=221,533 sf 0.00% Impervious Runoff Depth=0.00"
Flow Length=607' Slope=0.0247 '/' Tc=24.7 min CN=58 Runoff=0.00 cfs 0.000 af

Subcatchment 4S: Post Developed Runoff Area=221,533 sf 0.00% Impervious Runoff Depth=0.00"
Flow Length=607' Slope=0.2470 '/' Tc=6.7 min CN=64 Runoff=0.00 cfs 0.000 af

Reach 6R: Proposed Ditch Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af
n=0.035 L=261.0' S=0.0123 '/' Capacity=28.32 cfs Outflow=0.00 cfs 0.000 af

Pond 6P: Rock Voids Peak Elev=102.50' Storage=0 cf Inflow=0.00 cfs 0.000 af
Discarded=0.00 cfs 0.000 af Primary=0.00 cfs 0.000 af Outflow=0.00 cfs 0.000 af

Pond 8P: Proposed Pond Peak Elev=97.80' Storage=0 cf Inflow=0.00 cfs 0.000 af
Discarded=0.00 cfs 0.000 af Primary=0.00 cfs 0.000 af Outflow=0.00 cfs 0.000 af

Link 2L: Outfall Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

Summary for Subcatchment 1S: Pre Developed

Runoff = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Depth= 0.00"

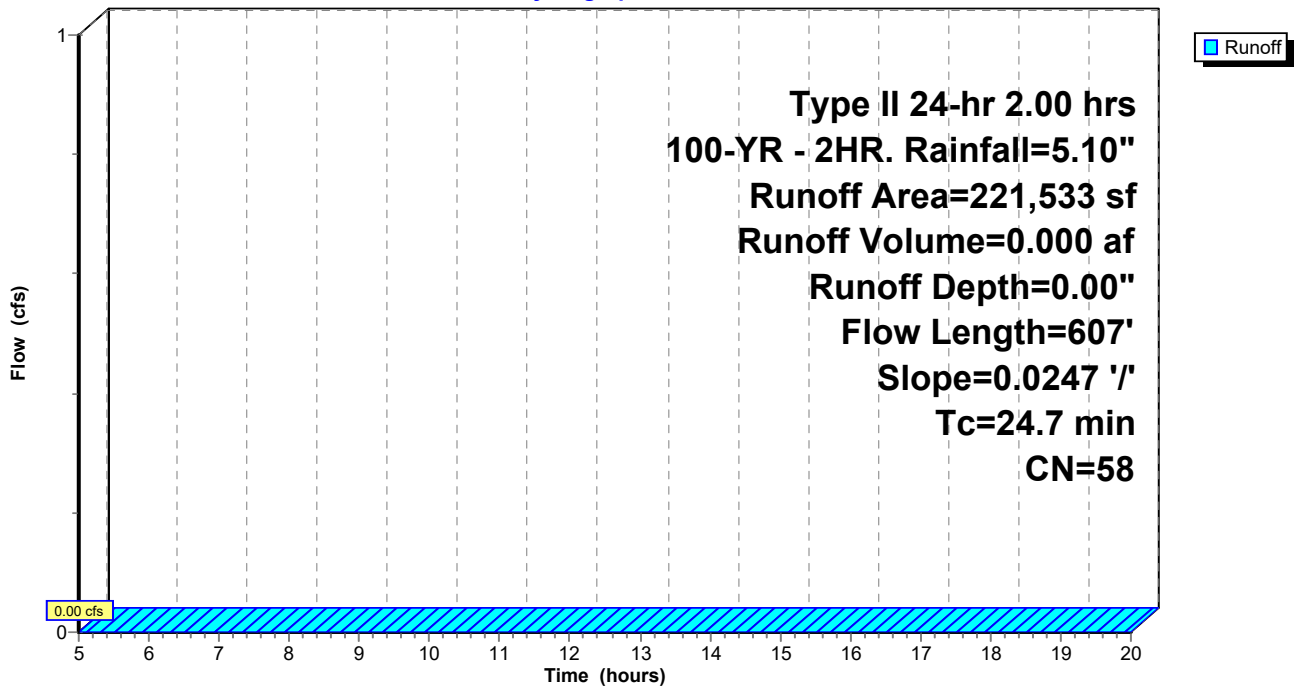
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Type II 24-hr 2.00 hrs 100-YR - 2HR. Rainfall=5.10"

Area (sf)	CN	Description
221,533	58	Meadow, non-grazed, HSG B
221,533		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.7	607	0.0247	0.41		Lag/CN Method,

Subcatchment 1S: Pre Developed

Hydrograph



Summary for Subcatchment 4S: Post Developed

Runoff = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Depth= 0.00"

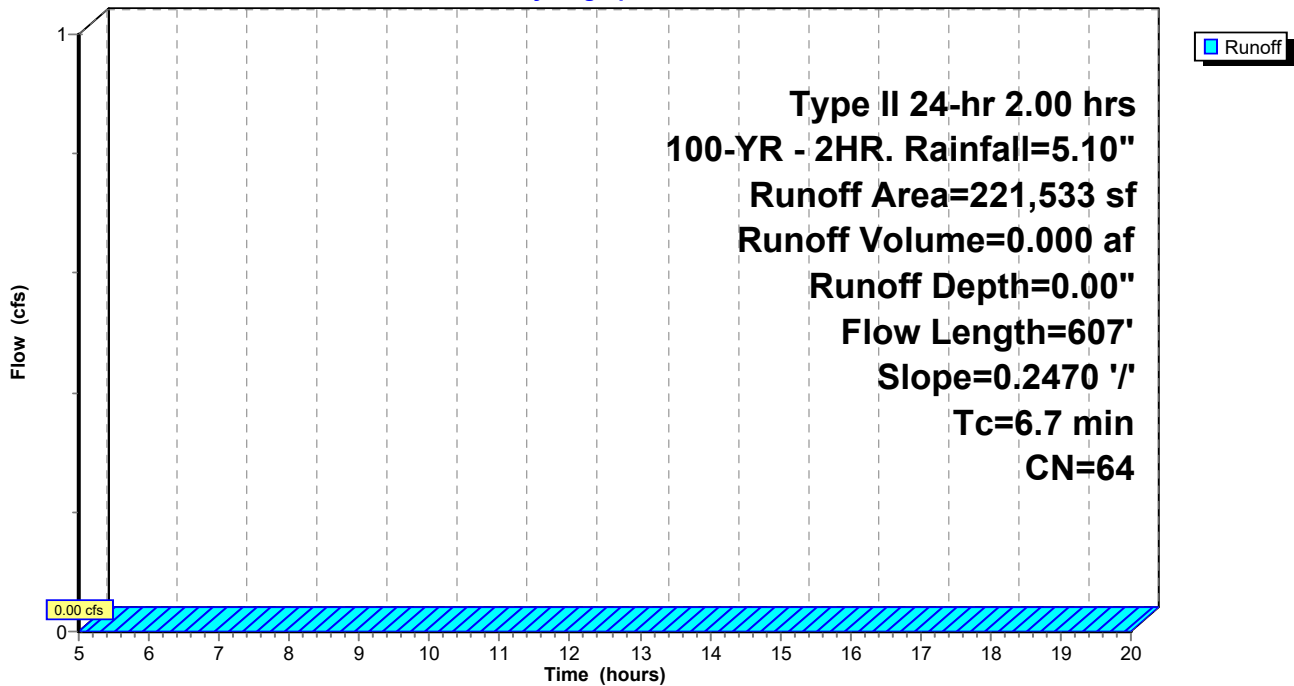
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Type II 24-hr 2.00 hrs 100-YR - 2HR. Rainfall=5.10"

Area (sf)	CN	Description
97,307	58	Meadow, non-grazed, HSG B
* 106,708	65	Uncompacted Gravel (35% Void)
17,518	85	Gravel roads, HSG B
221,533	64	Weighted Average
221,533		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.7	607	0.2470	1.51		Lag/CN Method,

Subcatchment 4S: Post Developed

Hydrograph



Summary for Reach 6R: Proposed Ditch

Inflow Area = 5.086 ac, 0.00% Impervious, Inflow Depth = 0.00" for 100-YR - 2HR. event
 Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
 Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Max. Velocity= 0.00 fps, Min. Travel Time= 0.0 min
 Avg. Velocity = 0.00 fps, Avg. Travel Time= 0.0 min

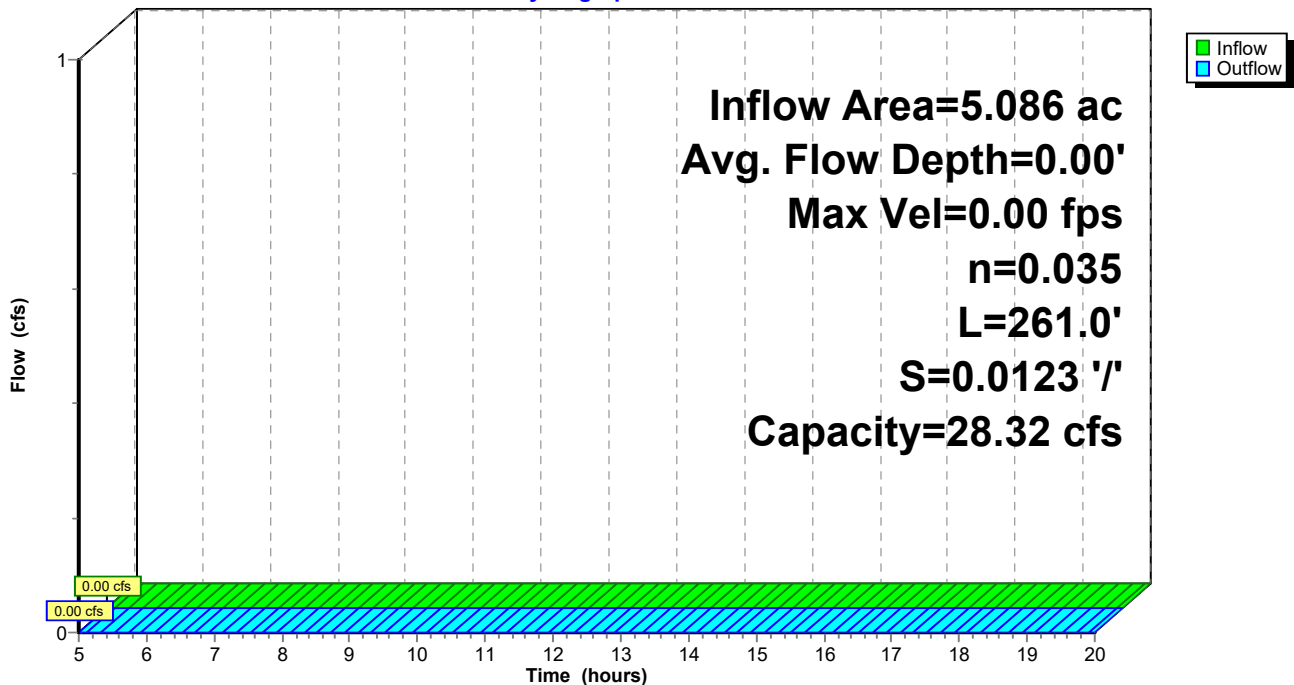
Peak Storage= 0 cf @ 5.00 hrs
 Average Depth at Peak Storage= 0.00'
 Bank-Full Depth= 1.00' Flow Area= 8.0 sf, Capacity= 28.32 cfs

4.00' x 1.00' deep channel, n= 0.035 High grass
 Side Slope Z-value= 4.0 '/' Top Width= 12.00'
 Length= 261.0' Slope= 0.0123 '/'
 Inlet Invert= 104.00', Outlet Invert= 100.80'



Reach 6R: Proposed Ditch

Hydrograph



Summary for Pond 6P: Rock Voids

Inflow Area = 5.086 ac, 0.00% Impervious, Inflow Depth = 0.00" for 100-YR - 2HR. event
 Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
 Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min
 Discarded = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
 Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Peak Elev= 102.50' @ 5.00 hrs Surf.Area= 37,348 sf Storage= 0 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
 Center-of-Mass det. time= (not calculated: no inflow)

Volume	Invert	Avail.Storage	Storage Description
#1	102.50'	7,470 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
102.50	37,348	0	0
102.70	37,348	7,470	7,470

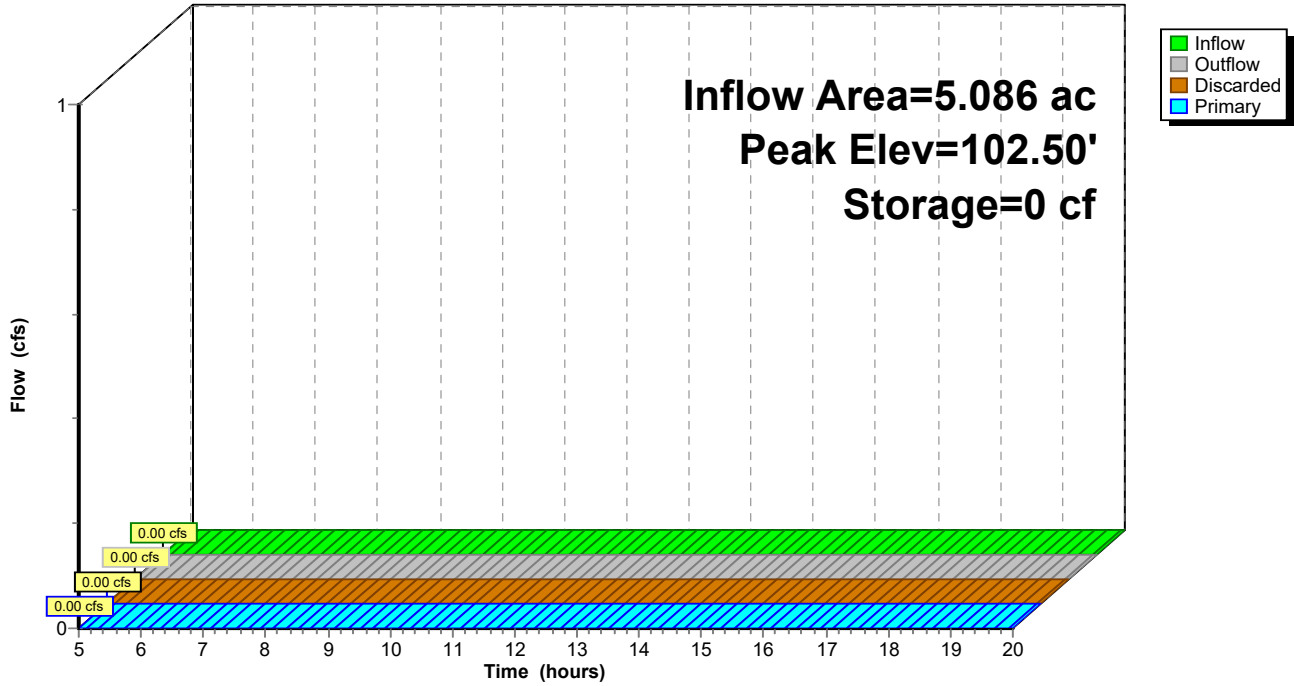
Device	Routing	Invert	Outlet Devices
#1	Discarded	102.50'	0.250 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Primary	102.70'	16.0' long x 5.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Discarded OutFlow Max=0.00 cfs @ 5.00 hrs HW=102.50' (Free Discharge)
 ↑1=Exfiltration (Controls 0.00 cfs)

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=102.50' (Free Discharge)
 ↑2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond 6P: Rock Voids

Hydrograph



Summary for Pond 8P: Proposed Pond

Inflow Area = 5.086 ac, 0.00% Impervious, Inflow Depth = 0.00" for 100-YR - 2HR. event
 Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
 Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min
 Discarded = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
 Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Peak Elev= 97.80' @ 5.00 hrs Surf.Area= 42,365 sf Storage= 0 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
 Center-of-Mass det. time= (not calculated: no inflow)

Volume	Invert	Avail.Storage	Storage Description
#1	97.80'	186,469 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

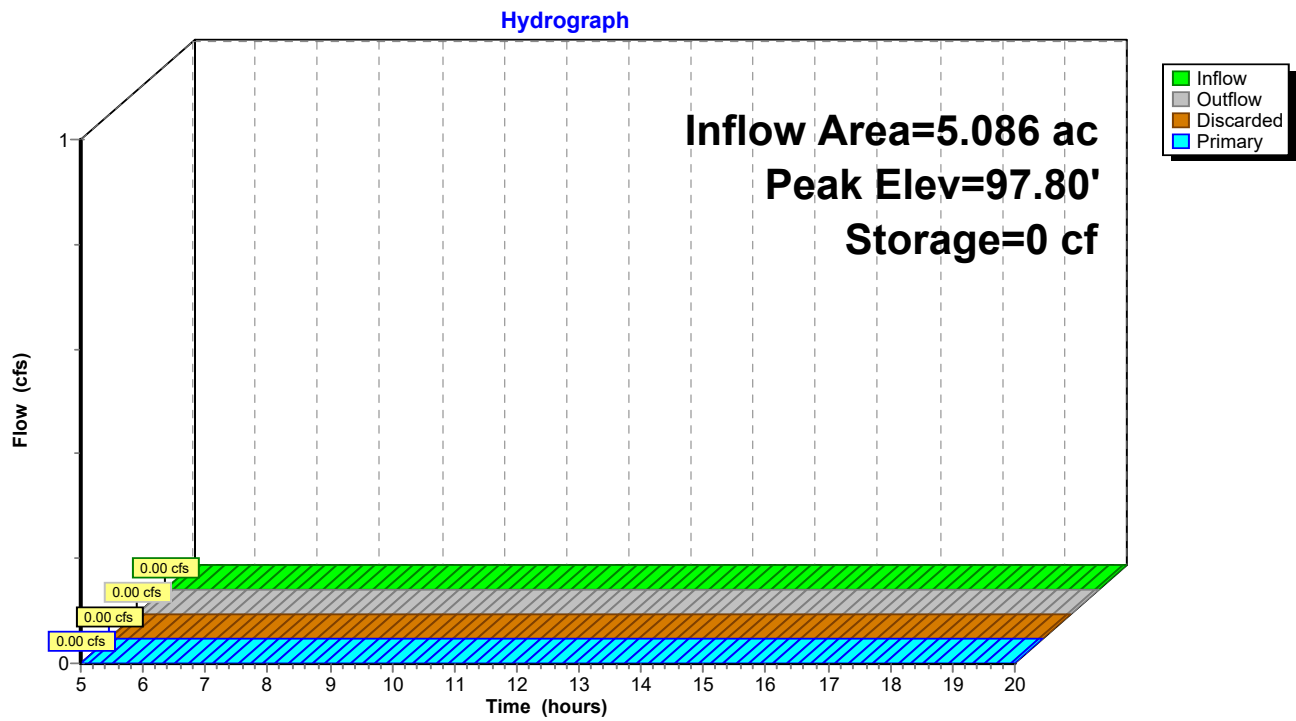
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
97.80	42,365	0	0
98.80	44,469	43,417	43,417
99.80	46,598	45,534	88,951
100.80	48,753	47,676	136,626
101.80	50,933	49,843	186,469

Device	Routing	Invert	Outlet Devices
#1	Discarded	97.80'	0.250 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Primary	100.70'	43.6 deg x 12.0' long x 1.00' rise Sharp-Crested Vee/Trap Weir Cv= 2.56 (C= 3.20)

Discarded OutFlow Max=0.00 cfs @ 5.00 hrs HW=97.80' (Free Discharge)
 ↑1=Exfiltration (Controls 0.00 cfs)

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=97.80' (Free Discharge)
 ↑2=Sharp-Crested Vee/Trap Weir (Controls 0.00 cfs)

Pond 8P: Proposed Pond



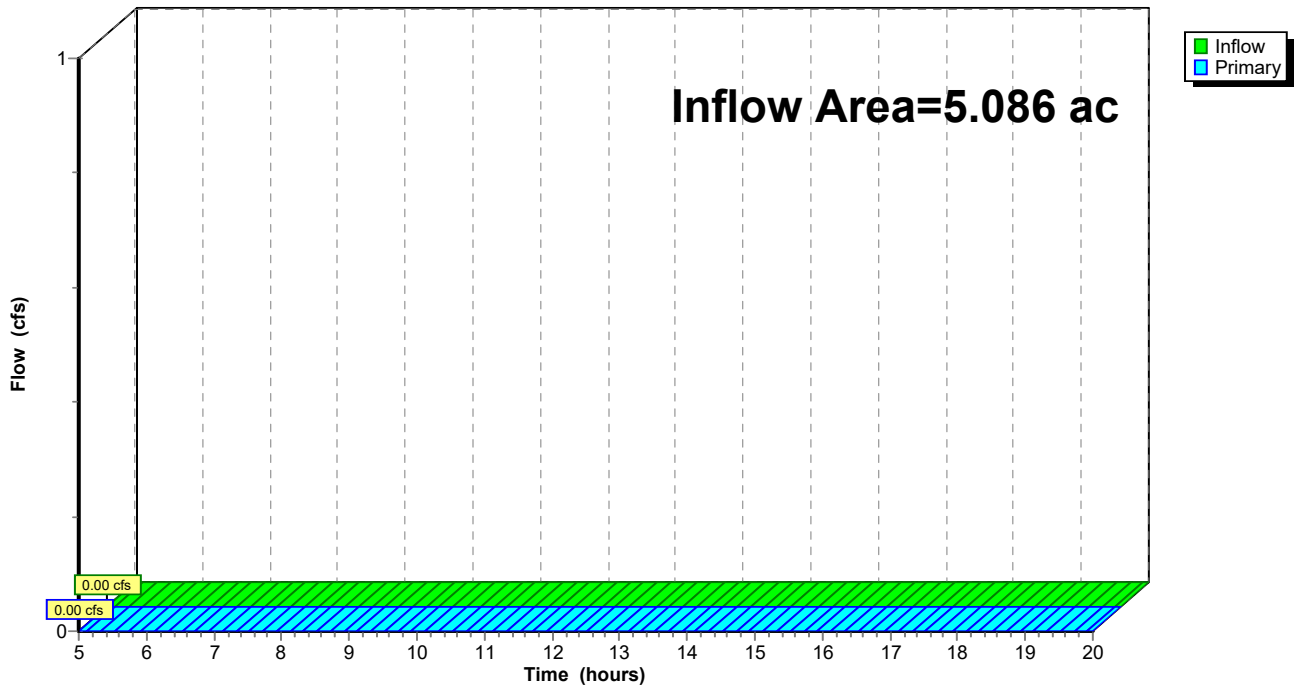
Summary for Link 2L: Outfall

Inflow Area = 5.086 ac, 0.00% Impervious, Inflow Depth = 0.00" for 100-YR - 2HR. event
Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link 2L: Outfall

Hydrograph



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

Subcatchment 1S: Pre Developed Runoff Area=221,533 sf 0.00% Impervious Runoff Depth>0.00"
Flow Length=607' Slope=0.0247 '/' Tc=24.7 min CN=58 Runoff=0.01 cfs 0.000 af

Subcatchment 4S: Post Developed Runoff Area=221,533 sf 0.00% Impervious Runoff Depth=0.00"
Flow Length=607' Slope=0.2470 '/' Tc=6.7 min CN=64 Runoff=0.00 cfs 0.000 af

Reach 6R: Proposed Ditch Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af
n=0.035 L=261.0' S=0.0123 '/' Capacity=28.32 cfs Outflow=0.00 cfs 0.000 af

Pond 6P: Rock Voids Peak Elev=102.50' Storage=0 cf Inflow=0.00 cfs 0.000 af
Discarded=0.00 cfs 0.000 af Primary=0.00 cfs 0.000 af Outflow=0.00 cfs 0.000 af

Pond 8P: Proposed Pond Peak Elev=97.80' Storage=0 cf Inflow=0.00 cfs 0.000 af
Discarded=0.00 cfs 0.000 af Primary=0.00 cfs 0.000 af Outflow=0.00 cfs 0.000 af

Link 2L: Outfall Inflow=0.01 cfs 0.000 af
Primary=0.01 cfs 0.000 af

Summary for Subcatchment 1S: Pre Developed

Runoff = 0.01 cfs @ 5.00 hrs, Volume= 0.000 af, Depth> 0.00"

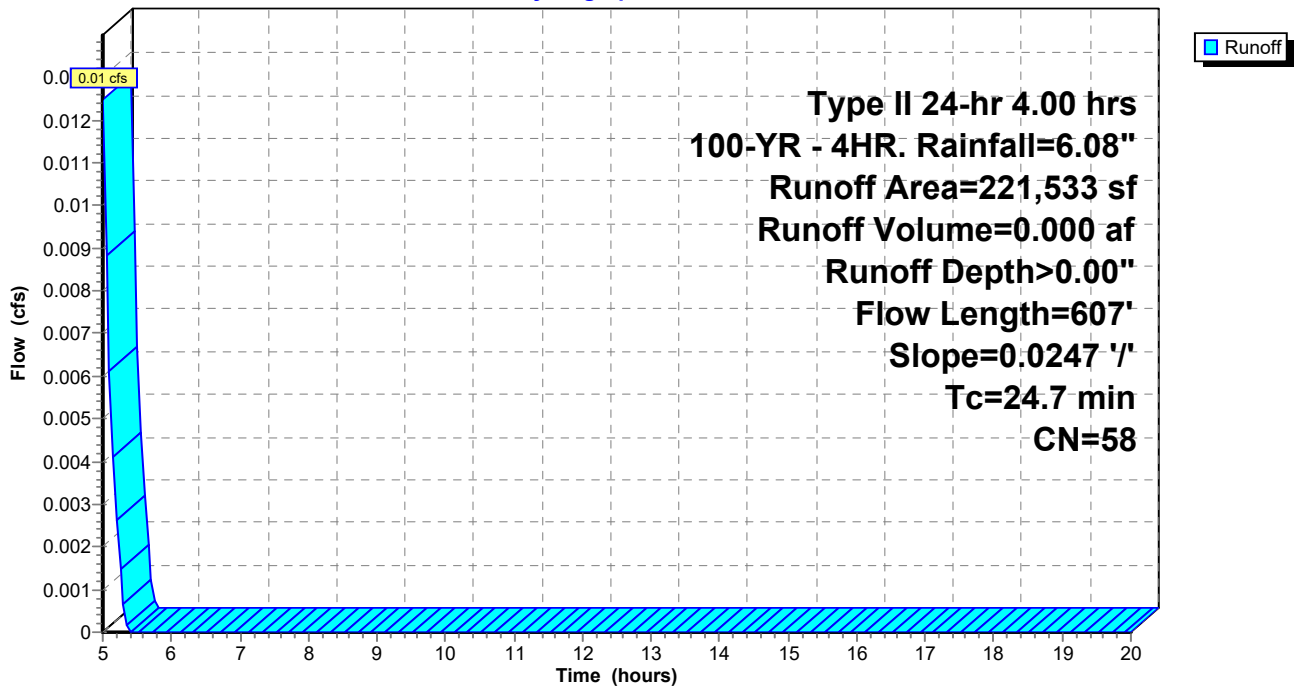
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Type II 24-hr 4.00 hrs 100-YR - 4HR. Rainfall=6.08"

Area (sf)	CN	Description
221,533	58	Meadow, non-grazed, HSG B
221,533		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.7	607	0.0247	0.41		Lag/CN Method,

Subcatchment 1S: Pre Developed

Hydrograph



Summary for Subcatchment 4S: Post Developed

Runoff = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Depth= 0.00"

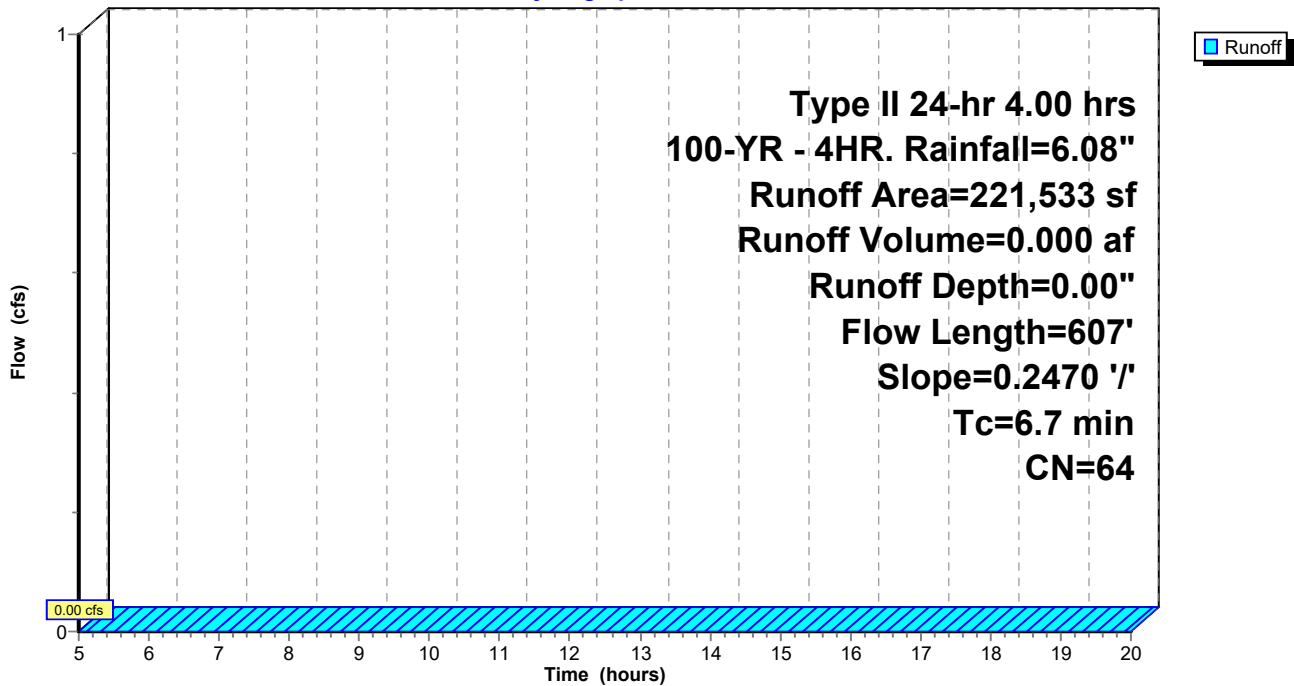
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Type II 24-hr 4.00 hrs 100-YR - 4HR. Rainfall=6.08"

Area (sf)	CN	Description
97,307	58	Meadow, non-grazed, HSG B
* 106,708	65	Uncompacted Gravel (35% Void)
17,518	85	Gravel roads, HSG B
221,533	64	Weighted Average
221,533		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.7	607	0.2470	1.51		Lag/CN Method,

Subcatchment 4S: Post Developed

Hydrograph



Summary for Reach 6R: Proposed Ditch

Inflow Area = 5.086 ac, 0.00% Impervious, Inflow Depth = 0.00" for 100-YR - 4HR. event
 Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
 Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Max. Velocity= 0.00 fps, Min. Travel Time= 0.0 min
 Avg. Velocity = 0.00 fps, Avg. Travel Time= 0.0 min

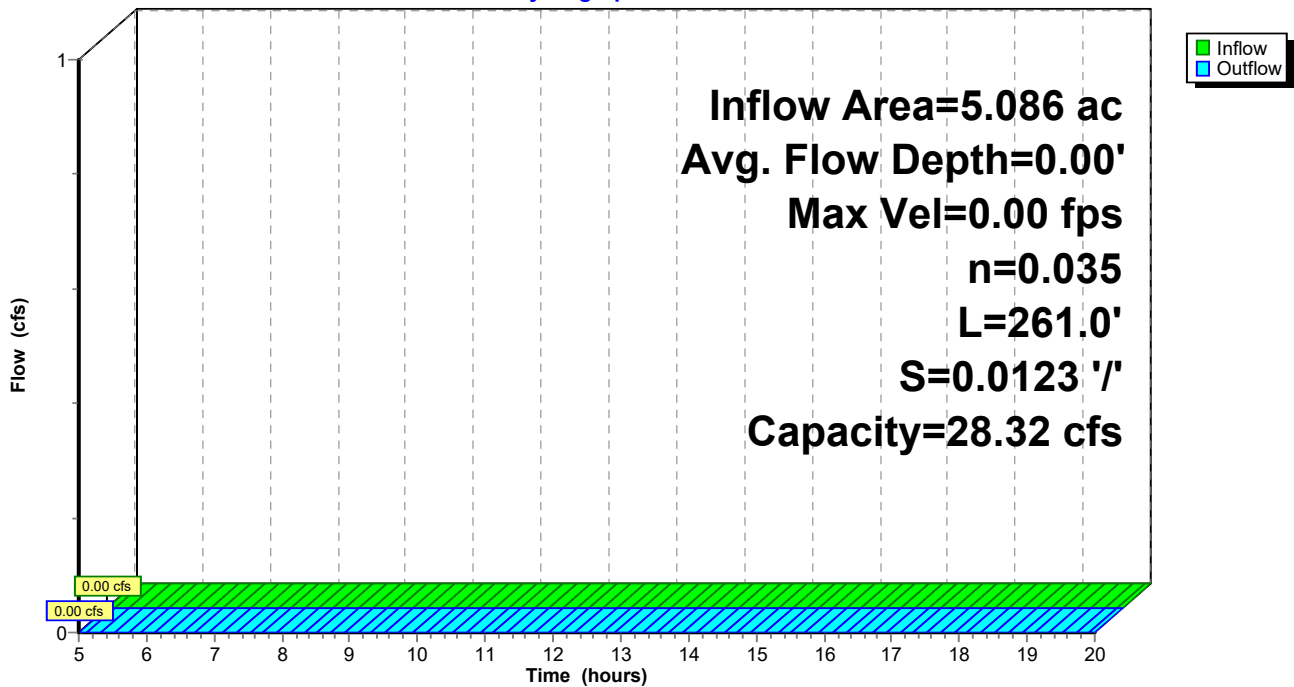
Peak Storage= 0 cf @ 5.00 hrs
 Average Depth at Peak Storage= 0.00'
 Bank-Full Depth= 1.00' Flow Area= 8.0 sf, Capacity= 28.32 cfs

4.00' x 1.00' deep channel, n= 0.035 High grass
 Side Slope Z-value= 4.0 '/' Top Width= 12.00'
 Length= 261.0' Slope= 0.0123 '/'
 Inlet Invert= 104.00', Outlet Invert= 100.80'



Reach 6R: Proposed Ditch

Hydrograph



Summary for Pond 6P: Rock Voids

Inflow Area = 5.086 ac, 0.00% Impervious, Inflow Depth = 0.00" for 100-YR - 4HR. event
 Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
 Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min
 Discarded = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
 Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Peak Elev= 102.50' @ 5.00 hrs Surf.Area= 37,348 sf Storage= 0 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
 Center-of-Mass det. time= (not calculated: no inflow)

Volume	Invert	Avail.Storage	Storage Description
#1	102.50'	7,470 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
102.50	37,348	0	0
102.70	37,348	7,470	7,470

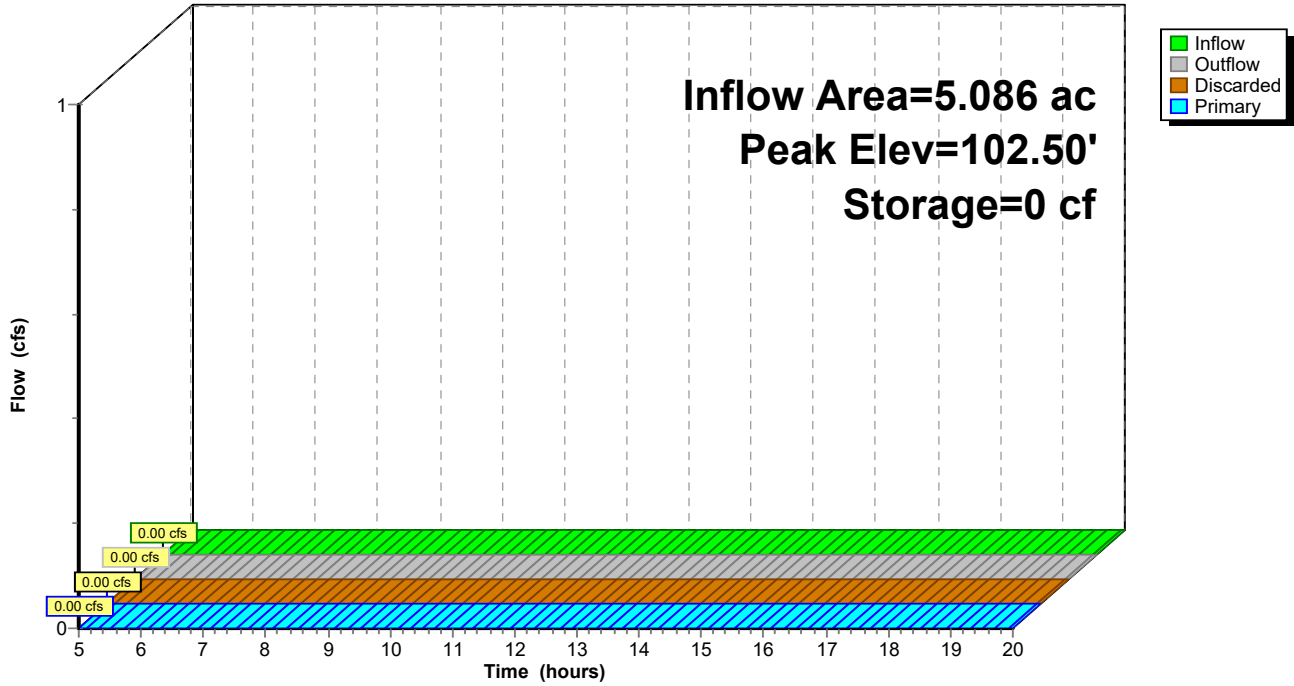
Device	Routing	Invert	Outlet Devices
#1	Discarded	102.50'	0.250 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Primary	102.70'	16.0' long x 5.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Discarded OutFlow Max=0.00 cfs @ 5.00 hrs HW=102.50' (Free Discharge)
 ↑1=Exfiltration (Controls 0.00 cfs)

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=102.50' (Free Discharge)
 ↑2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond 6P: Rock Voids

Hydrograph



Summary for Pond 8P: Proposed Pond

Inflow Area = 5.086 ac, 0.00% Impervious, Inflow Depth = 0.00" for 100-YR - 4HR. event
 Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
 Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min
 Discarded = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
 Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Peak Elev= 97.80' @ 5.00 hrs Surf.Area= 42,365 sf Storage= 0 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
 Center-of-Mass det. time= (not calculated: no inflow)

Volume	Invert	Avail.Storage	Storage Description
#1	97.80'	186,469 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

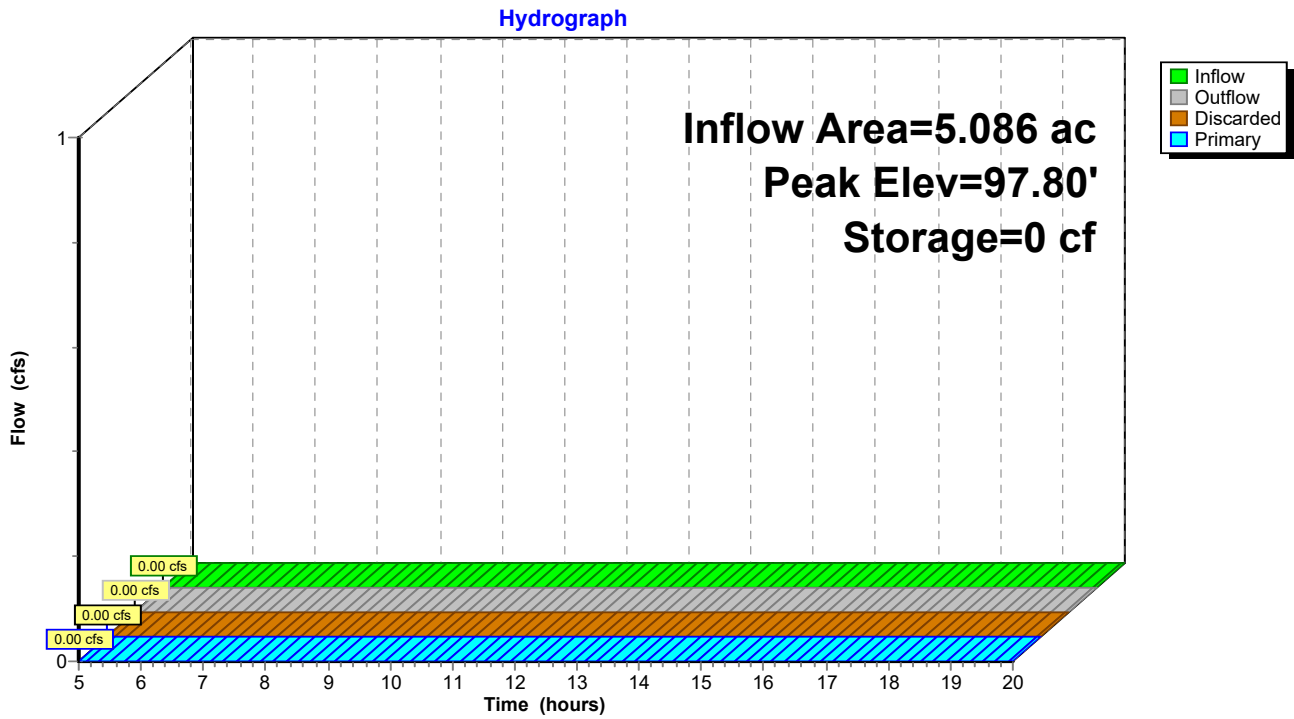
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
97.80	42,365	0	0
98.80	44,469	43,417	43,417
99.80	46,598	45,534	88,951
100.80	48,753	47,676	136,626
101.80	50,933	49,843	186,469

Device	Routing	Invert	Outlet Devices
#1	Discarded	97.80'	0.250 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Primary	100.70'	43.6 deg x 12.0' long x 1.00' rise Sharp-Crested Vee/Trap Weir Cv= 2.56 (C= 3.20)

Discarded OutFlow Max=0.00 cfs @ 5.00 hrs HW=97.80' (Free Discharge)
 ↑1=Exfiltration (Controls 0.00 cfs)

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=97.80' (Free Discharge)
 ↑2=Sharp-Crested Vee/Trap Weir (Controls 0.00 cfs)

Pond 8P: Proposed Pond



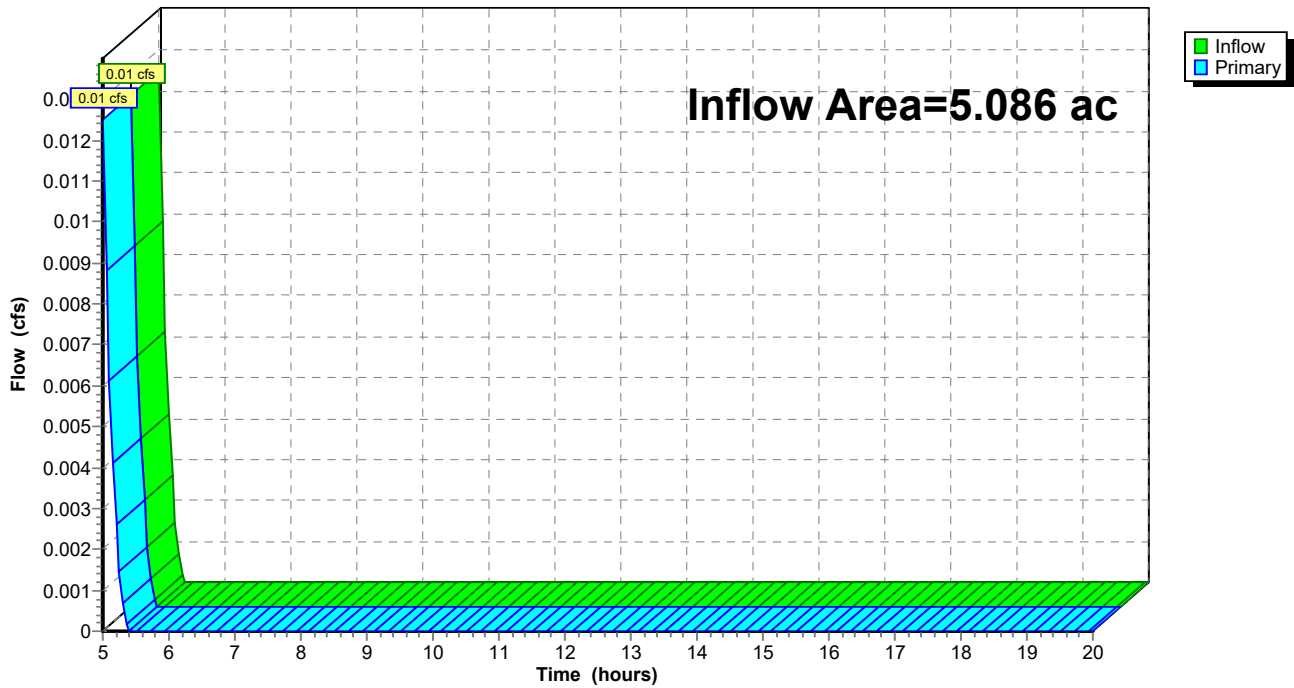
Summary for Link 2L: Outfall

Inflow Area = 5.086 ac, 0.00% Impervious, Inflow Depth > 0.00" for 100-YR - 4HR. event
Inflow = 0.01 cfs @ 5.00 hrs, Volume= 0.000 af
Primary = 0.01 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link 2L: Outfall

Hydrograph



Staging Area 2 Basin 3 HydroCAD Report Type II 24-hr 8.00 hrs 100-YR - 8HR. Rainfall=7.36"

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

Subcatchment 1S: Pre Developed Runoff Area=221,533 sf 0.00% Impervious Runoff Depth>0.94"
Flow Length=607' Slope=0.0247 '/' Tc=24.7 min CN=58 Runoff=3.25 cfs 0.399 af

Subcatchment 4S: Post Developed Runoff Area=221,533 sf 0.00% Impervious Runoff Depth>0.88"
Flow Length=607' Slope=0.2470 '/' Tc=6.7 min CN=64 Runoff=2.64 cfs 0.371 af

Reach 6R: Proposed Ditch Avg. Flow Depth=0.18' Max Vel=1.37 fps Inflow=1.43 cfs 0.143 af
n=0.035 L=261.0' S=0.0123 '/' Capacity=28.32 cfs Outflow=1.18 cfs 0.143 af

Pond 6P: Rock Voids Peak Elev=102.81' Storage=7,470 cf Inflow=2.64 cfs 0.371 af
Discarded=0.22 cfs 0.228 af Primary=1.43 cfs 0.143 af Outflow=1.65 cfs 0.371 af

Pond 8P: Proposed Pond Peak Elev=97.91' Storage=4,641 cf Inflow=1.18 cfs 0.143 af
Discarded=0.25 cfs 0.143 af Primary=0.00 cfs 0.000 af Outflow=0.25 cfs 0.143 af

Link 2L: Outfall Inflow=3.25 cfs 0.399 af
Primary=3.25 cfs 0.399 af

Summary for Subcatchment 1S: Pre Developed

Runoff = 3.25 cfs @ 5.00 hrs, Volume= 0.399 af, Depth> 0.94"

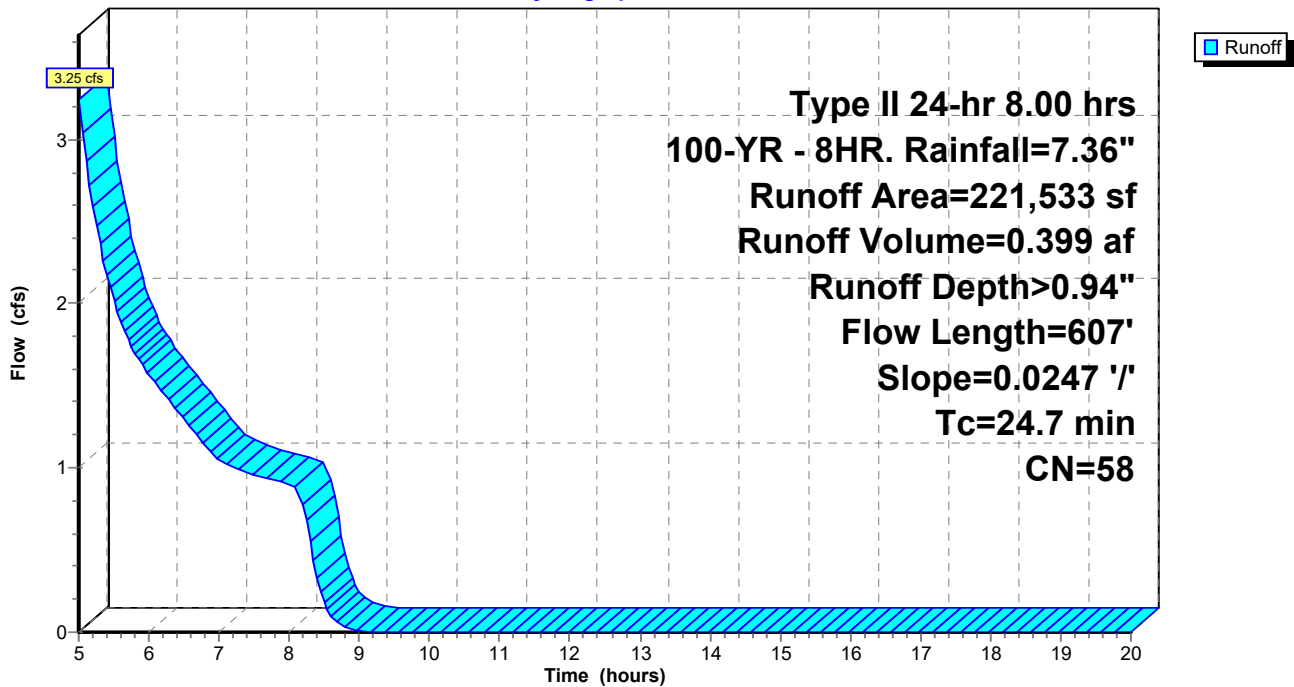
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Type II 24-hr 8.00 hrs 100-YR - 8HR. Rainfall=7.36"

Area (sf)	CN	Description
221,533	58	Meadow, non-grazed, HSG B
221,533		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.7	607	0.0247	0.41		Lag/CN Method,

Subcatchment 1S: Pre Developed

Hydrograph



Summary for Subcatchment 4S: Post Developed

Runoff = 2.64 cfs @ 5.00 hrs, Volume= 0.371 af, Depth> 0.88"

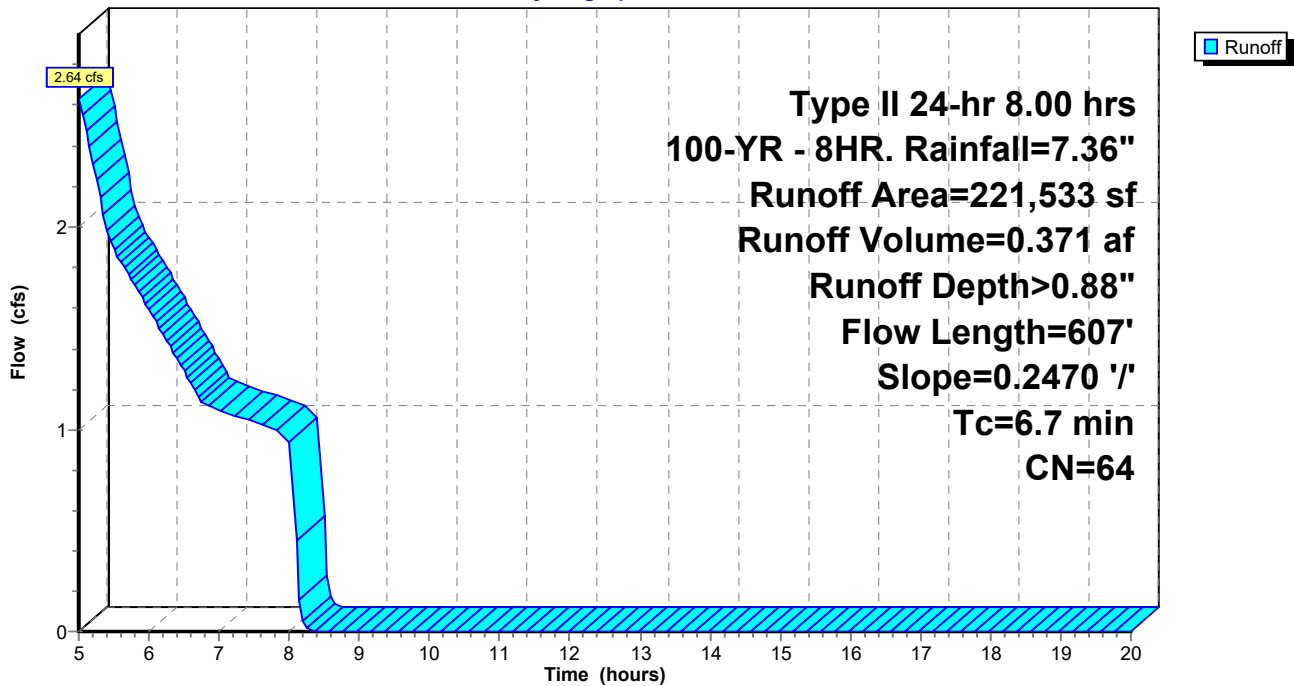
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Type II 24-hr 8.00 hrs 100-YR - 8HR. Rainfall=7.36"

Area (sf)	CN	Description
97,307	58	Meadow, non-grazed, HSG B
* 106,708	65	Uncompacted Gravel (35% Void)
17,518	85	Gravel roads, HSG B
221,533	64	Weighted Average
221,533		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.7	607	0.2470	1.51		Lag/CN Method,

Subcatchment 4S: Post Developed

Hydrograph



Summary for Reach 6R: Proposed Ditch

Inflow Area = 5.086 ac, 0.00% Impervious, Inflow Depth = 0.34" for 100-YR - 8HR. event
 Inflow = 1.43 cfs @ 6.25 hrs, Volume= 0.143 af
 Outflow = 1.18 cfs @ 6.40 hrs, Volume= 0.143 af, Atten= 18%, Lag= 9.2 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Max. Velocity= 1.37 fps, Min. Travel Time= 3.2 min
 Avg. Velocity = 0.69 fps, Avg. Travel Time= 6.3 min

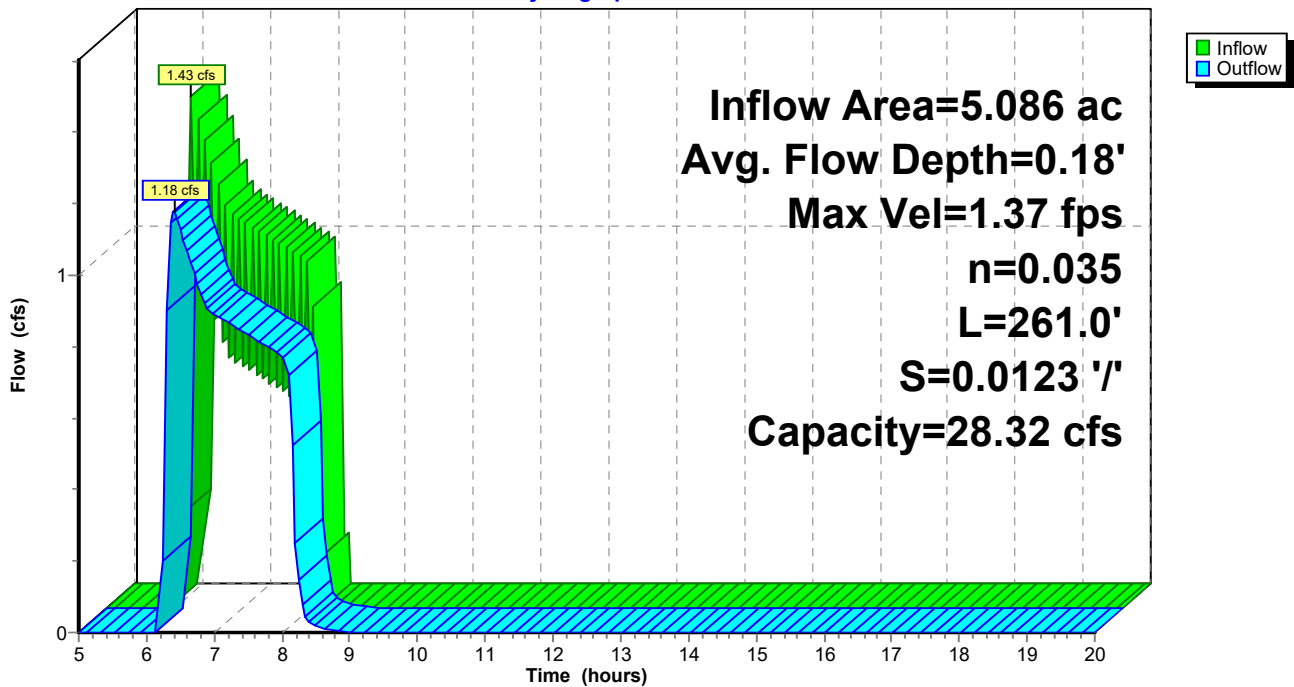
Peak Storage= 225 cf @ 6.35 hrs
 Average Depth at Peak Storage= 0.18'
 Bank-Full Depth= 1.00' Flow Area= 8.0 sf, Capacity= 28.32 cfs

4.00' x 1.00' deep channel, n= 0.035 High grass
 Side Slope Z-value= 4.0 '/' Top Width= 12.00'
 Length= 261.0' Slope= 0.0123 '/'
 Inlet Invert= 104.00', Outlet Invert= 100.80'



Reach 6R: Proposed Ditch

Hydrograph



Summary for Pond 6P: Rock Voids

Inflow Area = 5.086 ac, 0.00% Impervious, Inflow Depth > 0.88" for 100-YR - 8HR. event
 Inflow = 2.64 cfs @ 5.00 hrs, Volume= 0.371 af
 Outflow = 1.65 cfs @ 6.25 hrs, Volume= 0.371 af, Atten= 38%, Lag= 75.0 min
 Discarded = 0.22 cfs @ 5.05 hrs, Volume= 0.228 af
 Primary = 1.43 cfs @ 6.25 hrs, Volume= 0.143 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Peak Elev= 102.81' @ 6.25 hrs Surf.Area= 37,348 sf Storage= 7,470 cf

Plug-Flow detention time= 210.9 min calculated for 0.365 af (98% of inflow)
 Center-of-Mass det. time= 206.9 min (583.1 - 376.2)

Volume	Invert	Avail.Storage	Storage Description
#1	102.50'	7,470 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
102.50	37,348	0	0
102.70	37,348	7,470	7,470

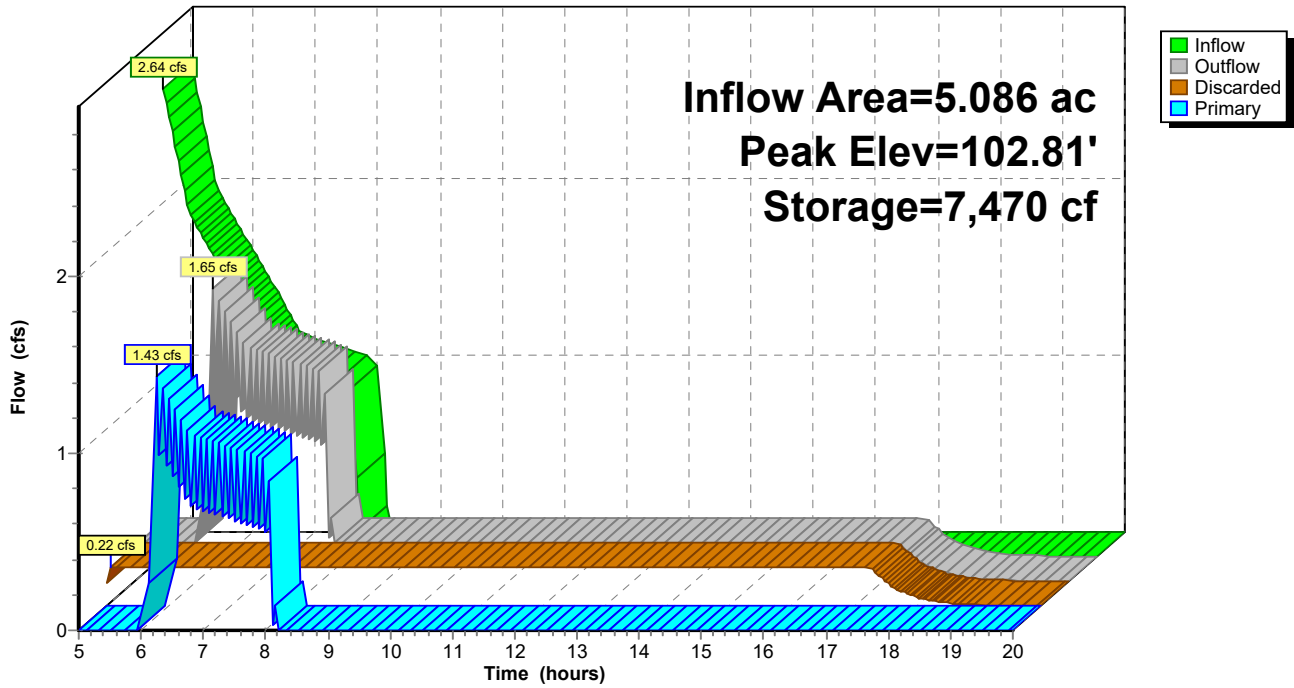
Device	Routing	Invert	Outlet Devices
#1	Discarded	102.50'	0.250 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Primary	102.70'	16.0' long x 5.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Discarded OutFlow Max=0.22 cfs @ 5.05 hrs HW=102.52' (Free Discharge)
 ↑1=**Exfiltration** (Exfiltration Controls 0.22 cfs)

Primary OutFlow Max=1.43 cfs @ 6.25 hrs HW=102.81' (Free Discharge)
 ↑2=**Broad-Crested Rectangular Weir**(Weir Controls 1.43 cfs @ 0.79 fps)

Pond 6P: Rock Voids

Hydrograph



Summary for Pond 8P: Proposed Pond

Inflow Area = 5.086 ac, 0.00% Impervious, Inflow Depth = 0.34" for 100-YR - 8HR. event
 Inflow = 1.18 cfs @ 6.40 hrs, Volume= 0.143 af
 Outflow = 0.25 cfs @ 8.21 hrs, Volume= 0.143 af, Atten= 79%, Lag= 108.5 min
 Discarded = 0.25 cfs @ 8.21 hrs, Volume= 0.143 af
 Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Peak Elev= 97.91' @ 8.21 hrs Surf.Area= 42,595 sf Storage= 4,641 cf

Plug-Flow detention time= 184.8 min calculated for 0.143 af (100% of inflow)
 Center-of-Mass det. time= 184.5 min (614.6 - 430.1)

Volume	Invert	Avail.Storage	Storage Description
#1	97.80'	186,469 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

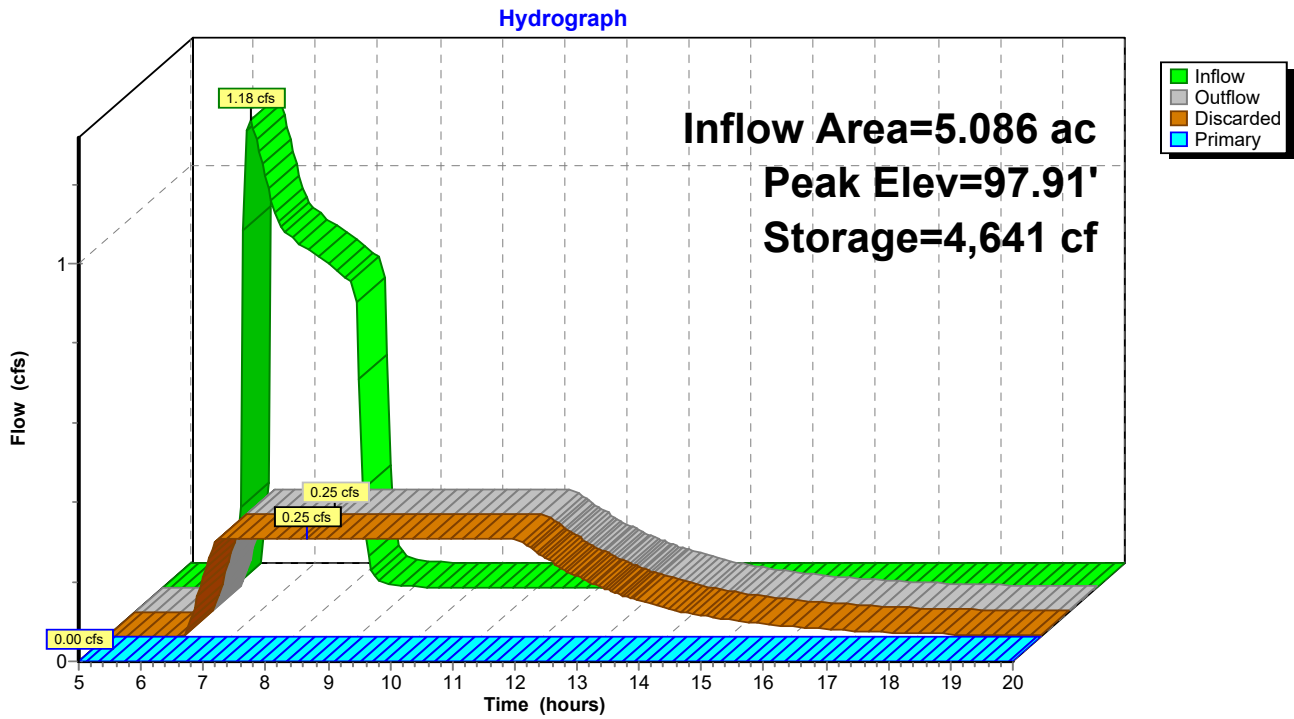
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
97.80	42,365	0	0
98.80	44,469	43,417	43,417
99.80	46,598	45,534	88,951
100.80	48,753	47,676	136,626
101.80	50,933	49,843	186,469

Device	Routing	Invert	Outlet Devices
#1	Discarded	97.80'	0.250 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Primary	100.70'	43.6 deg x 12.0' long x 1.00' rise Sharp-Crested Vee/Trap Weir Cv= 2.56 (C= 3.20)

Discarded OutFlow Max=0.25 cfs @ 8.21 hrs HW=97.91' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.25 cfs)

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=97.80' (Free Discharge)
 ↑2=Sharp-Crested Vee/Trap Weir (Controls 0.00 cfs)

Pond 8P: Proposed Pond



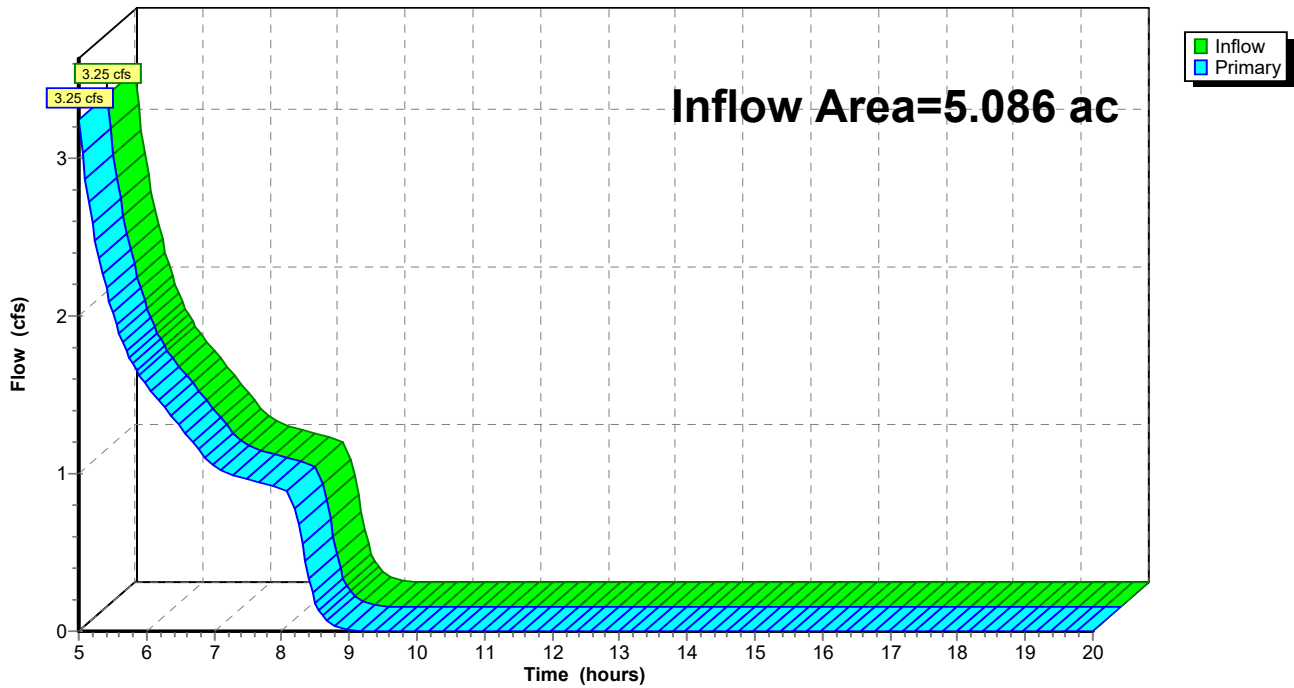
Summary for Link 2L: Outfall

Inflow Area = 5.086 ac, 0.00% Impervious, Inflow Depth > 0.94" for 100-YR - 8HR. event
Inflow = 3.25 cfs @ 5.00 hrs, Volume= 0.399 af
Primary = 3.25 cfs @ 5.00 hrs, Volume= 0.399 af, Atten= 0%, Lag= 0.0 min

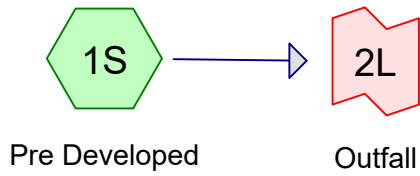
Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link 2L: Outfall

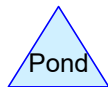
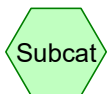
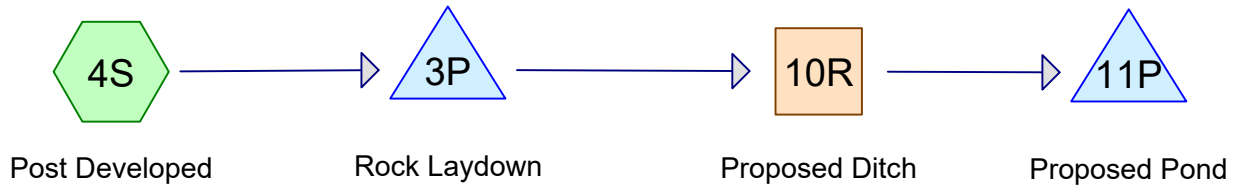
Hydrograph



STAGING AREA 2
BASIN IV
**PRE-DEVELOPED
SITE**



**POST DEVELOPED
SITE**



Staging Area 2 Basin 4 HydroCAD Report

Type II 24-hr 3 DAY-100YR. Rainfall=12.40"

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Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 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: Pre Developed Runoff Area=161,589 sf 0.00% Impervious Runoff Depth>6.00"
Flow Length=674' Slope=0.0090 '/' Tc=44.5 min CN=58 Runoff=16.14 cfs 1.855 af

Subcatchment4S: Post Developed Runoff Area=161,589 sf 0.00% Impervious Runoff Depth>7.05"
Flow Length=532' Slope=0.0056 '/' Tc=39.0 min CN=65 Runoff=20.70 cfs 2.181 af

Reach 10R: Proposed Ditch Avg. Flow Depth=0.90' Max Vel=2.99 fps Inflow=23.83 cfs 1.815 af
n=0.030 L=415.0' S=0.0072 '/' Capacity=25.37 cfs Outflow=20.30 cfs 1.808 af

Pond 3P: Rock Laydown Peak Elev=102.23' Storage=7,273 cf Inflow=20.70 cfs 2.181 af
Discarded=0.21 cfs 0.200 af Primary=23.83 cfs 1.815 af Outflow=24.04 cfs 2.015 af

Pond 11P: Proposed Pond Peak Elev=100.67' Storage=41,584 cf Inflow=20.30 cfs 1.808 af
Discarded=0.16 cfs 0.103 af Primary=7.18 cfs 0.878 af Outflow=7.34 cfs 0.981 af

Link 2L: Outfall Inflow=16.14 cfs 1.855 af
Primary=16.14 cfs 1.855 af

Staging Area 2 Basin 4 HydroCAD Report

Type II 24-hr 3 DAY-100YR. Rainfall=12.40"

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Summary for Subcatchment 1S: Pre Developed

Runoff = 16.14 cfs @ 12.42 hrs, Volume= 1.855 af, Depth> 6.00"

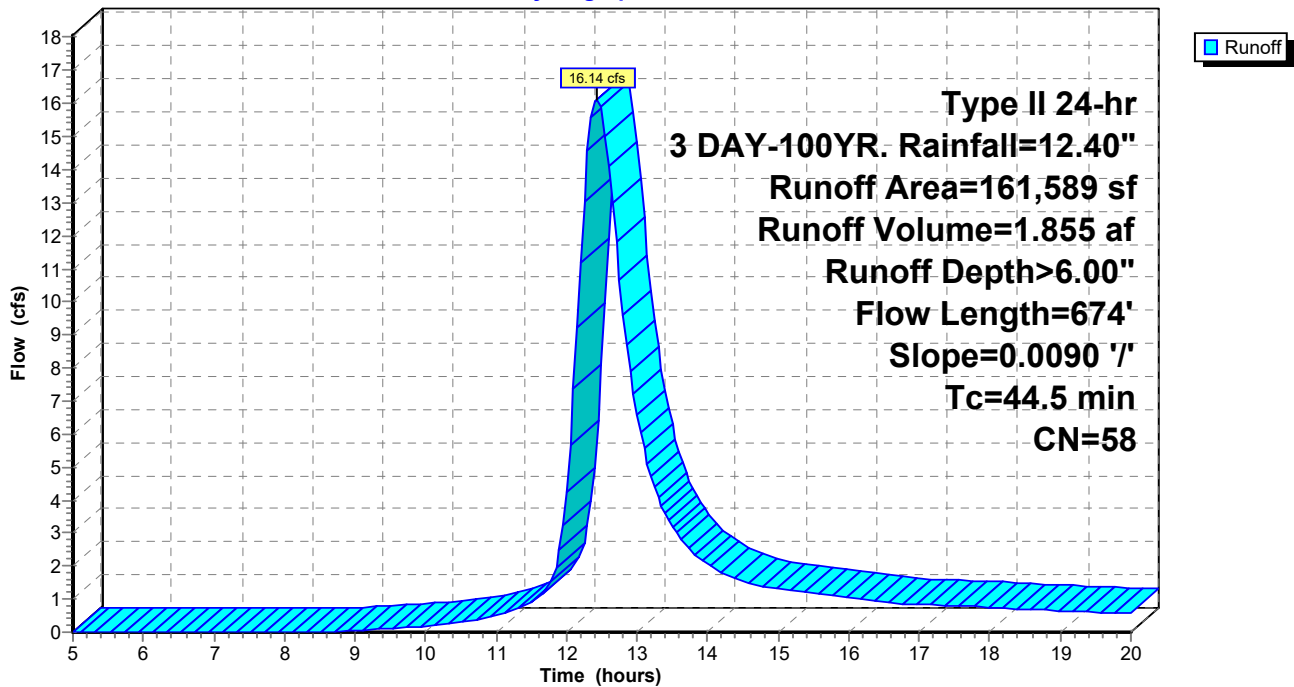
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 3 DAY-100YR. Rainfall=12.40"

Area (sf)	CN	Description
161,589	58	Meadow, non-grazed, HSG B
161,589		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
44.5	674	0.0090	0.25		Lag/CN Method,

Subcatchment 1S: Pre Developed

Hydrograph



Staging Area 2 Basin 4 HydroCAD Report

Type II 24-hr 3 DAY-100YR. Rainfall=12.40"

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Summary for Subcatchment 4S: Post Developed

Runoff = 20.70 cfs @ 12.35 hrs, Volume= 2.181 af, Depth> 7.05"

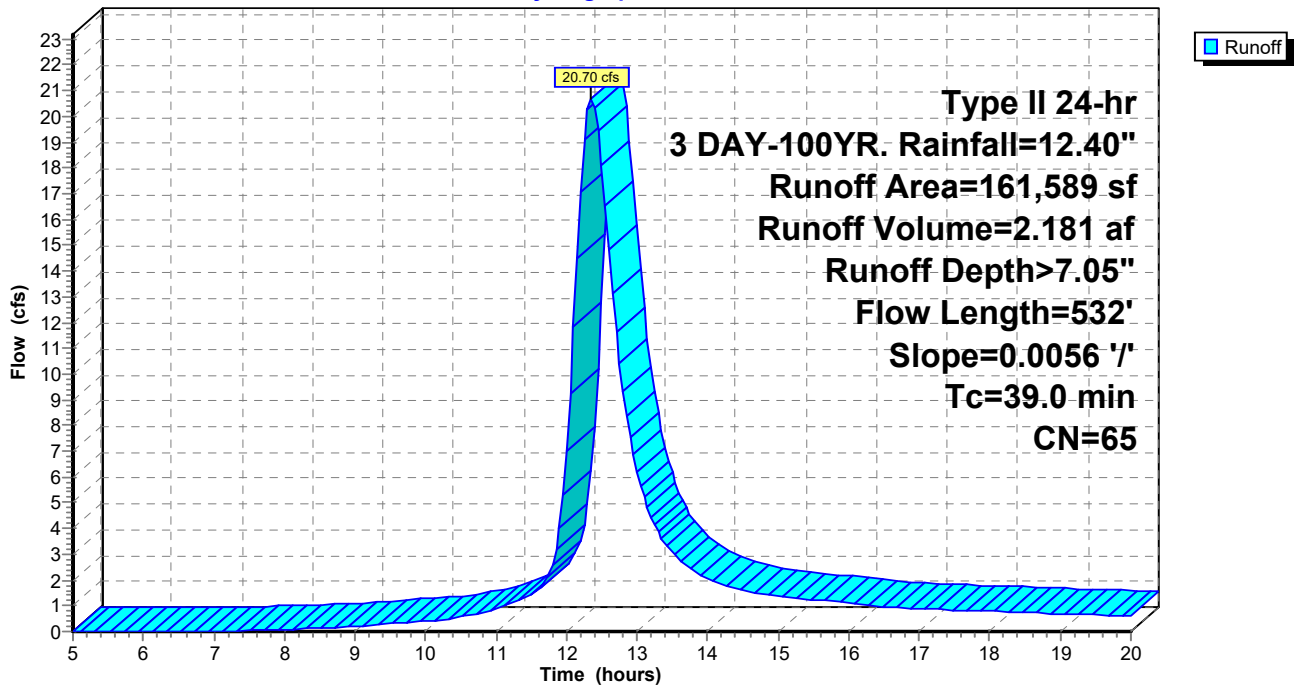
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 3 DAY-100YR. Rainfall=12.40"

Area (sf)	CN	Description
41,405	58	Meadow, non-grazed, HSG B
* 103,895	65	Uncompacted Gravel (35% Void)
16,289	85	Gravel roads, HSG B
161,589	65	Weighted Average
161,589		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
39.0	532	0.0056	0.23		Lag/CN Method,

Subcatchment 4S: Post Developed

Hydrograph



Summary for Reach 10R: Proposed Ditch

Inflow Area = 3.710 ac, 0.00% Impervious, Inflow Depth > 5.87" for 3 DAY-100YR. event
 Inflow = 23.83 cfs @ 12.40 hrs, Volume= 1.815 af
 Outflow = 20.30 cfs @ 12.42 hrs, Volume= 1.808 af, Atten= 15%, Lag= 1.2 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Max. Velocity= 2.99 fps, Min. Travel Time= 2.3 min
 Avg. Velocity = 1.37 fps, Avg. Travel Time= 5.1 min

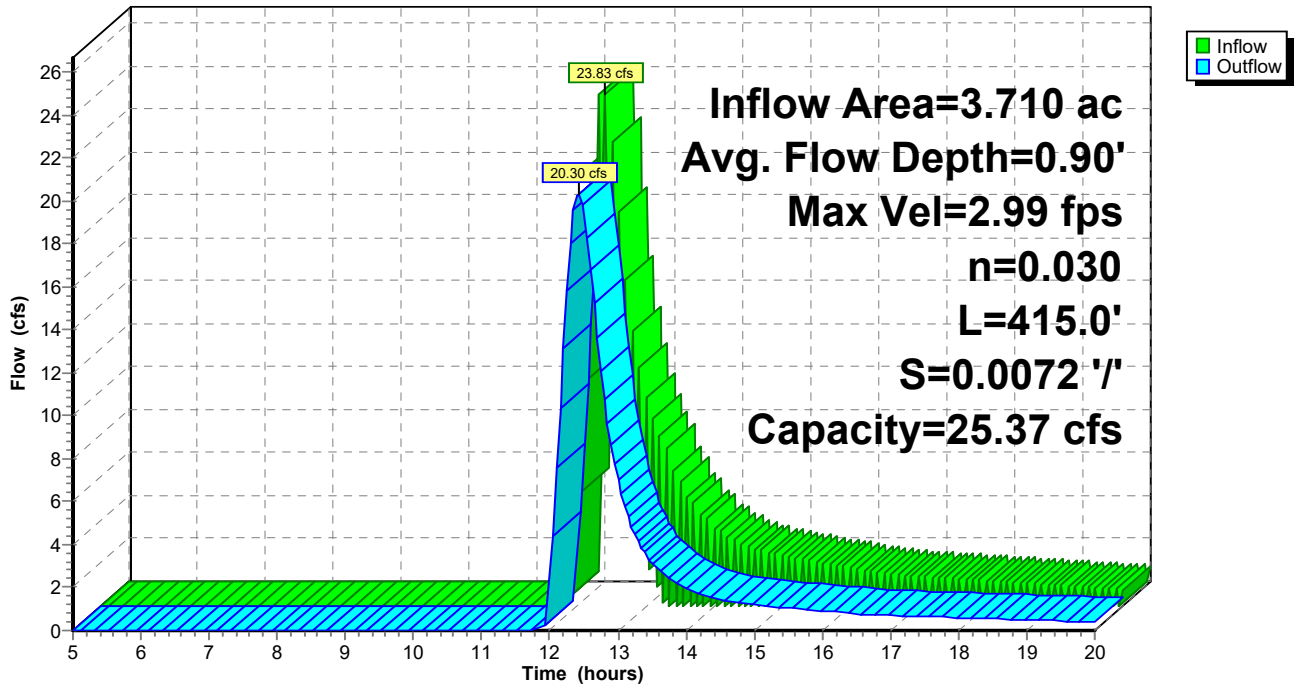
Peak Storage= 2,826 cf @ 12.38 hrs
 Average Depth at Peak Storage= 0.90'
 Bank-Full Depth= 1.00' Flow Area= 8.0 sf, Capacity= 25.37 cfs

4.00' x 1.00' deep channel, n= 0.030 Earth, grassed & winding
 Side Slope Z-value= 4.0 ' / ' Top Width= 12.00'
 Length= 415.0' Slope= 0.0072 ' / '
 Inlet Invert= 104.00', Outlet Invert= 101.00'



Reach 10R: Proposed Ditch

Hydrograph



Staging Area 2 Basin 4 HydroCAD Report

Type II 24-hr 3 DAY-100YR. Rainfall=12.40"

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Summary for Pond 3P: Rock Laydown

Inflow Area = 3.710 ac, 0.00% Impervious, Inflow Depth > 7.05" for 3 DAY-100YR. event
 Inflow = 20.70 cfs @ 12.35 hrs, Volume= 2.181 af
 Outflow = 24.04 cfs @ 12.40 hrs, Volume= 2.015 af, Atten= 0%, Lag= 2.9 min
 Discarded = 0.21 cfs @ 9.60 hrs, Volume= 0.200 af
 Primary = 23.83 cfs @ 12.40 hrs, Volume= 1.815 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Peak Elev= 102.23' @ 12.40 hrs Surf.Area= 36,363 sf Storage= 7,273 cf

Plug-Flow detention time= 36.7 min calculated for 2.015 af (92% of inflow)
 Center-of-Mass det. time= 10.9 min (811.1 - 800.2)

Volume	Invert	Avail.Storage	Storage Description
#1	101.80'	7,273 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
101.80	36,363	0	0
102.00	36,363	7,273	7,273

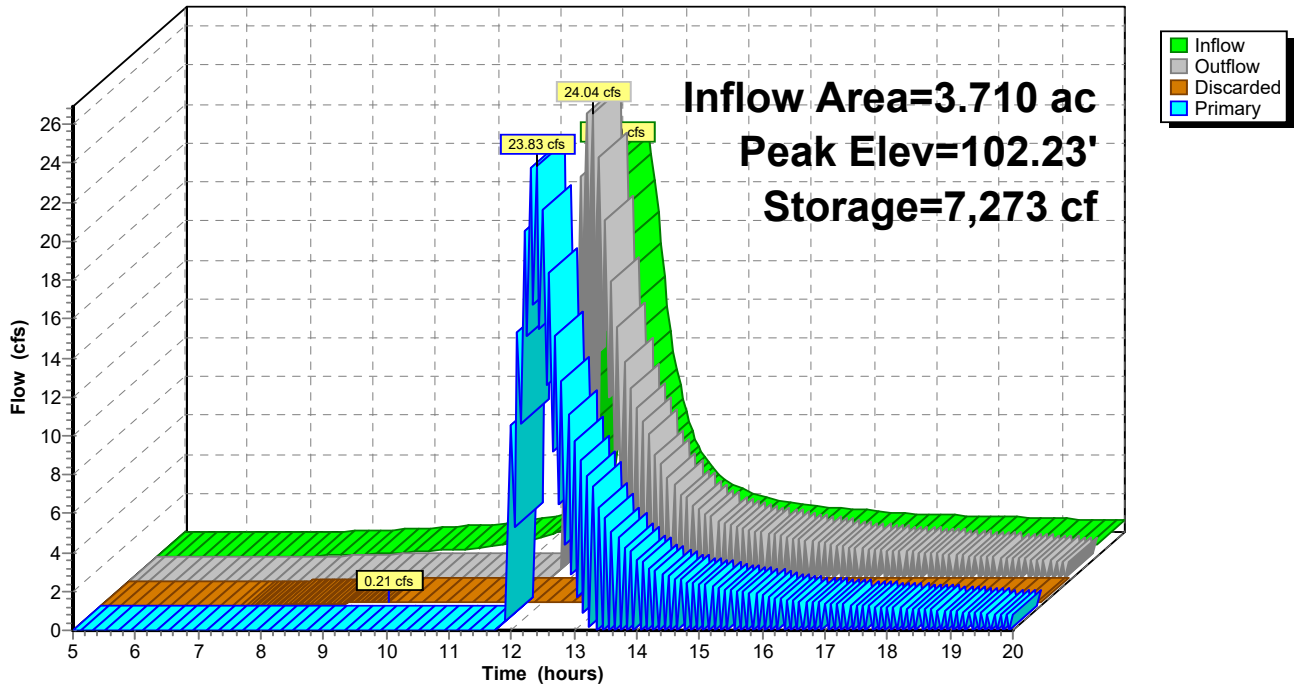
Device	Routing	Invert	Outlet Devices
#1	Discarded	101.80'	0.250 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Primary	102.20'	1,392.0' long x 1.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Discarded OutFlow Max=0.21 cfs @ 9.60 hrs HW=101.81' (Free Discharge)
 ↑1=**Exfiltration** (Exfiltration Controls 0.21 cfs)

Primary OutFlow Max=23.80 cfs @ 12.40 hrs HW=102.23' (Free Discharge)
 ↑2=**Broad-Crested Rectangular Weir**(Weir Controls 23.80 cfs @ 0.50 fps)

Pond 3P: Rock Laydown

Hydrograph



Staging Area 2 Basin 4 HydroCAD Report

Type II 24-hr 3 DAY-100YR. Rainfall=12.40"

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Summary for Pond 11P: Proposed Pond

Inflow Area = 3.710 ac, 0.00% Impervious, Inflow Depth > 5.85" for 3 DAY-100YR. event
Inflow = 20.30 cfs @ 12.42 hrs, Volume= 1.808 af
Outflow = 7.34 cfs @ 12.98 hrs, Volume= 0.981 af, Atten= 64%, Lag= 33.7 min
Discarded = 0.16 cfs @ 12.98 hrs, Volume= 0.103 af
Primary = 7.18 cfs @ 12.98 hrs, Volume= 0.878 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 100.67' @ 12.98 hrs Surf.Area= 17,278 sf Storage= 41,584 cf

Plug-Flow detention time= 132.9 min calculated for 0.981 af (54% of inflow)
Center-of-Mass det. time= 69.1 min (879.8 - 810.7)

Volume	Invert	Avail.Storage	Storage Description
#1	98.00'	65,783 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
98.00	13,946	0	0
99.00	15,174	14,560	14,560
100.00	16,427	15,801	30,361
101.00	17,705	17,066	47,427
102.00	19,008	18,357	65,783

Device	Routing	Invert	Outlet Devices
#1	Discarded	98.00'	0.250 in/hr Exfiltration X 1.60 over Surface area Phase-In= 0.01'
#2	Primary	100.30'	43.6 deg x 10.0' long x 1.50' rise Sharp-Crested Vee/Trap Weir Cv= 2.56 (C= 3.20)

Discarded OutFlow Max=0.16 cfs @ 12.98 hrs HW=100.67' (Free Discharge)

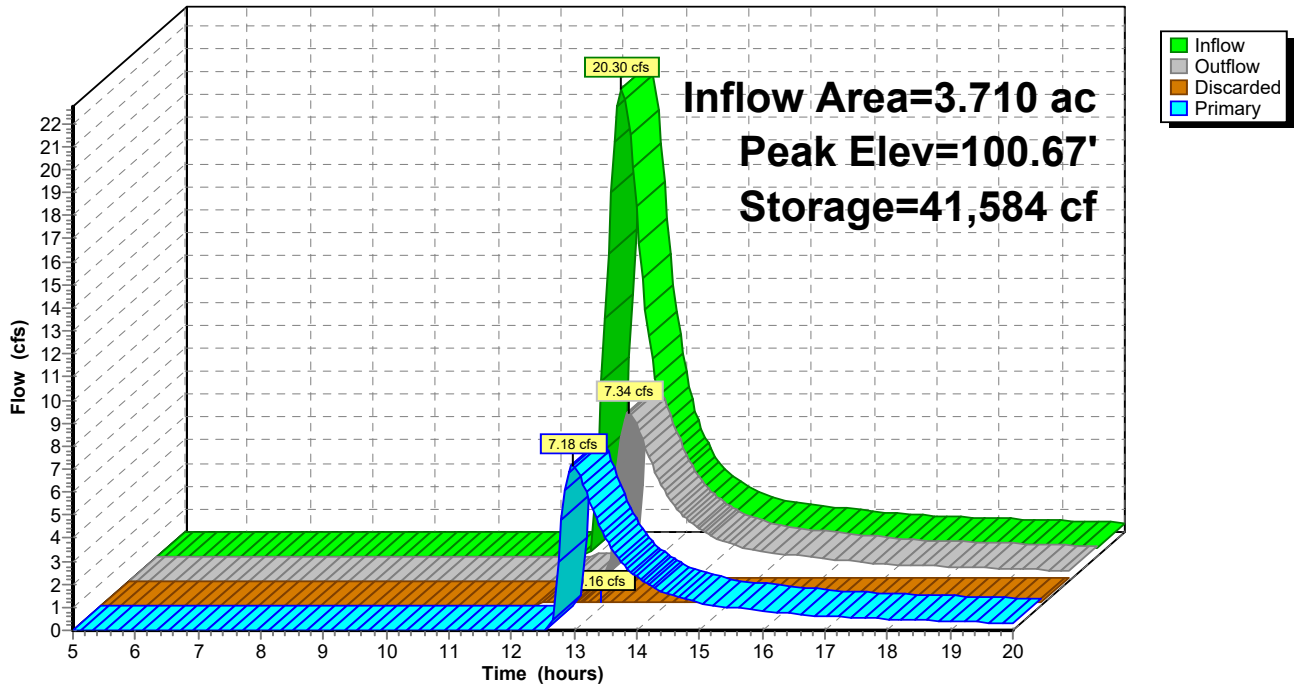
↑1=Exfiltration (Exfiltration Controls 0.16 cfs)

Primary OutFlow Max=7.14 cfs @ 12.98 hrs HW=100.67' (Free Discharge)

↑2=Sharp-Crested Vee/Trap Weir (Weir Controls 7.14 cfs @ 1.93 fps)

Pond 11P: Proposed Pond

Hydrograph



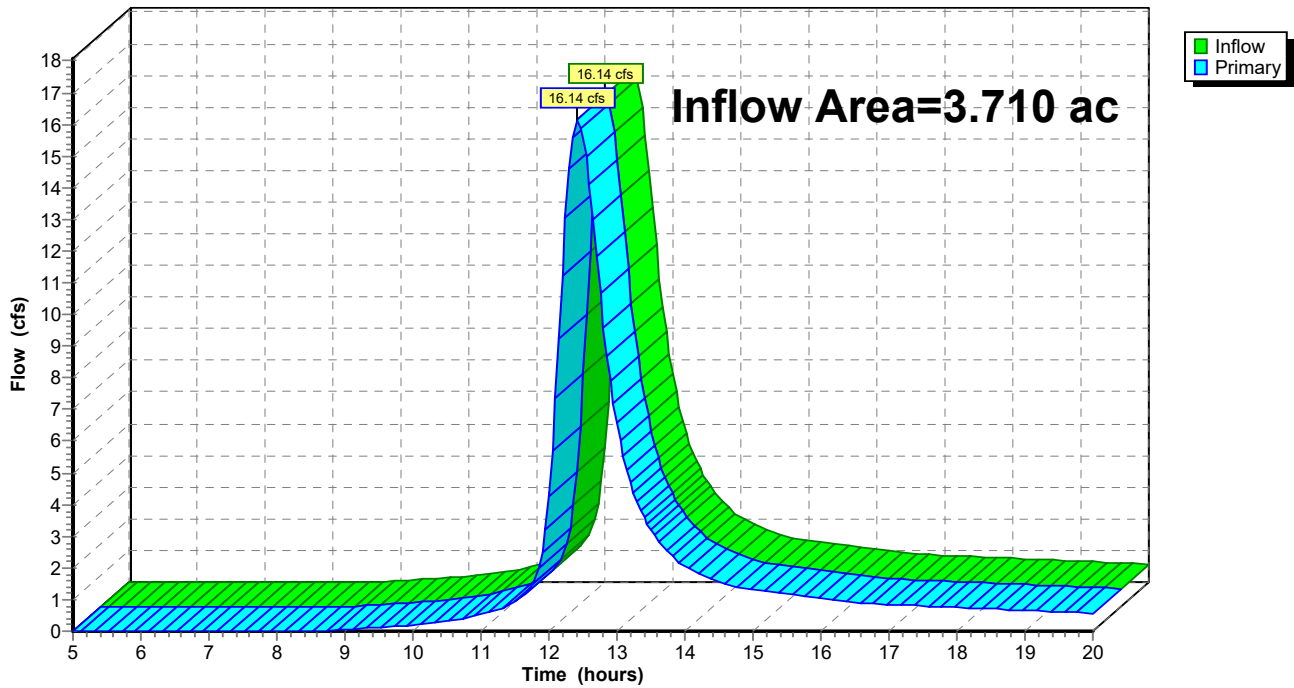
Summary for Link 2L: Outfall

Inflow Area = 3.710 ac, 0.00% Impervious, Inflow Depth > 6.00" for 3 DAY-100YR. event
Inflow = 16.14 cfs @ 12.42 hrs, Volume= 1.855 af
Primary = 16.14 cfs @ 12.42 hrs, Volume= 1.855 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link 2L: Outfall

Hydrograph



Staging Area 2 Basin 4 HydroCAD Report

Type II 24-hr 7 DAY-100YR Rainfall=14.00"

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Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 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: Pre Developed Runoff Area=161,589 sf 0.00% Impervious Runoff Depth>7.27"
Flow Length=674' Slope=0.0090 '/' Tc=44.5 min CN=58 Runoff=19.56 cfs 2.247 af

Subcatchment4S: Post Developed Runoff Area=161,589 sf 0.00% Impervious Runoff Depth>8.41"
Flow Length=532' Slope=0.0056 '/' Tc=39.0 min CN=65 Runoff=24.58 cfs 2.599 af

Reach 10R: Proposed Ditch Avg. Flow Depth=0.98' Max Vel=3.13 fps Inflow=25.65 cfs 2.223 af
n=0.030 L=415.0' S=0.0072 '/' Capacity=25.37 cfs Outflow=24.15 cfs 2.216 af

Pond 3P: Rock Laydown Peak Elev=102.24' Storage=7,273 cf Inflow=24.58 cfs 2.599 af
Discarded=0.21 cfs 0.210 af Primary=25.65 cfs 2.223 af Outflow=25.86 cfs 2.433 af

Pond 11P: Proposed Pond Peak Elev=100.83' Storage=44,357 cf Inflow=24.15 cfs 2.216 af
Discarded=0.16 cfs 0.105 af Primary=12.40 cfs 1.279 af Outflow=12.56 cfs 1.385 af

Link 2L: Outfall Inflow=19.56 cfs 2.247 af
Primary=19.56 cfs 2.247 af

Staging Area 2 Basin 4 HydroCAD Report

Type II 24-hr 7 DAY-100YR Rainfall=14.00"

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Summary for Subcatchment 1S: Pre Developed

Runoff = 19.56 cfs @ 12.42 hrs, Volume= 2.247 af, Depth> 7.27"

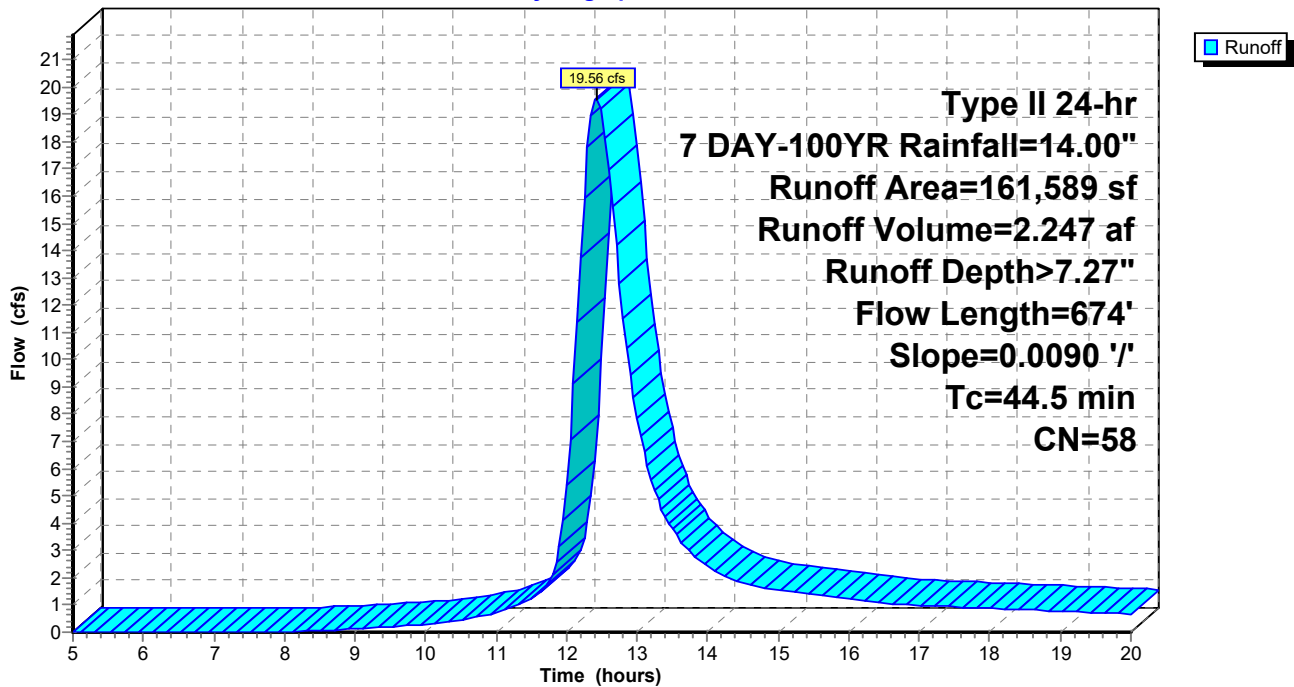
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 7 DAY-100YR Rainfall=14.00"

Area (sf)	CN	Description
161,589	58	Meadow, non-grazed, HSG B
161,589		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
44.5	674	0.0090	0.25		Lag/CN Method,

Subcatchment 1S: Pre Developed

Hydrograph



Staging Area 2 Basin 4 HydroCAD Report

Type II 24-hr 7 DAY-100YR Rainfall=14.00"

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Summary for Subcatchment 4S: Post Developed

Runoff = 24.58 cfs @ 12.35 hrs, Volume= 2.599 af, Depth> 8.41"

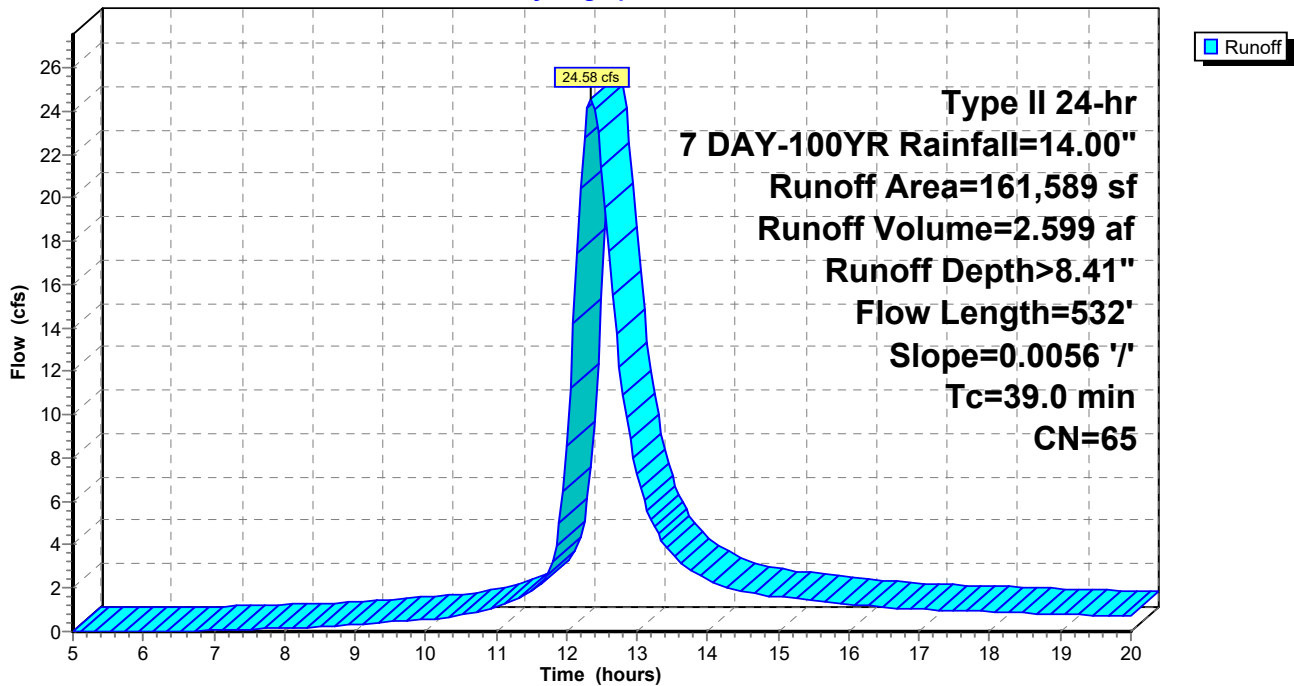
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Type II 24-hr 7 DAY-100YR Rainfall=14.00"

Area (sf)	CN	Description
41,405	58	Meadow, non-grazed, HSG B
* 103,895	65	Uncompacted Gravel (35% Void)
16,289	85	Gravel roads, HSG B
161,589	65	Weighted Average
161,589		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
39.0	532	0.0056	0.23		Lag/CN Method,

Subcatchment 4S: Post Developed

Hydrograph



Staging Area 2 Basin 4 HydroCAD Report

Type II 24-hr 7 DAY-100YR Rainfall=14.00"

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Summary for Reach 10R: Proposed Ditch

Inflow Area = 3.710 ac, 0.00% Impervious, Inflow Depth > 7.19" for 7 DAY-100YR event
Inflow = 25.65 cfs @ 12.30 hrs, Volume= 2.223 af
Outflow = 24.15 cfs @ 12.41 hrs, Volume= 2.216 af, Atten= 6%, Lag= 6.9 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.13 fps, Min. Travel Time= 2.2 min
Avg. Velocity = 1.46 fps, Avg. Travel Time= 4.8 min

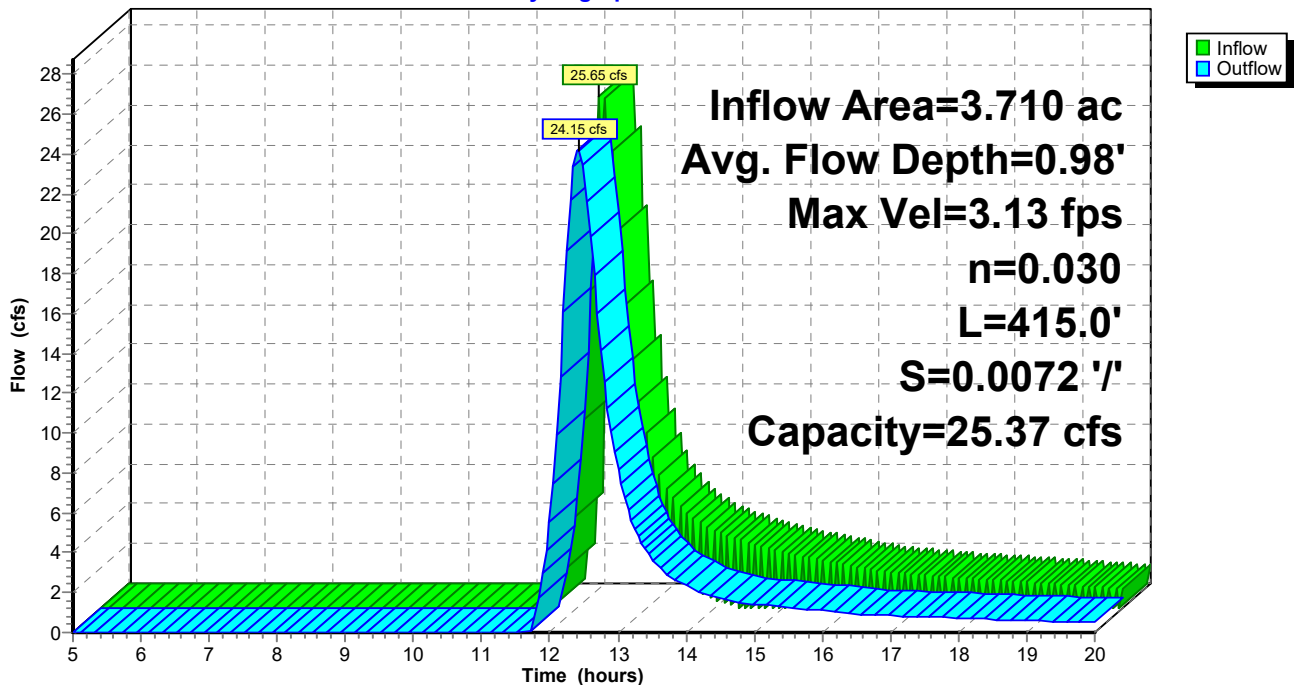
Peak Storage= 3,209 cf @ 12.38 hrs
Average Depth at Peak Storage= 0.98'
Bank-Full Depth= 1.00' Flow Area= 8.0 sf, Capacity= 25.37 cfs

4.00' x 1.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 4.0 '/' Top Width= 12.00'
Length= 415.0' Slope= 0.0072 '/'
Inlet Invert= 104.00', Outlet Invert= 101.00'



Reach 10R: Proposed Ditch

Hydrograph



Staging Area 2 Basin 4 HydroCAD Report

Type II 24-hr 7 DAY-100YR Rainfall=14.00"

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Summary for Pond 3P: Rock Laydown

Inflow Area = 3.710 ac, 0.00% Impervious, Inflow Depth > 8.41" for 7 DAY-100YR event
 Inflow = 24.58 cfs @ 12.35 hrs, Volume= 2.599 af
 Outflow = 25.86 cfs @ 12.30 hrs, Volume= 2.433 af, Atten= 0%, Lag= 0.0 min
 Discarded = 0.21 cfs @ 9.05 hrs, Volume= 0.210 af
 Primary = 25.65 cfs @ 12.30 hrs, Volume= 2.223 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Peak Elev= 102.24' @ 12.30 hrs Surf.Area= 36,363 sf Storage= 7,273 cf

Plug-Flow detention time= 32.8 min calculated for 2.433 af (94% of inflow)
 Center-of-Mass det. time= 10.4 min (806.8 - 796.4)

Volume	Invert	Avail.Storage	Storage Description
#1	101.80'	7,273 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
101.80	36,363	0	0
102.00	36,363	7,273	7,273

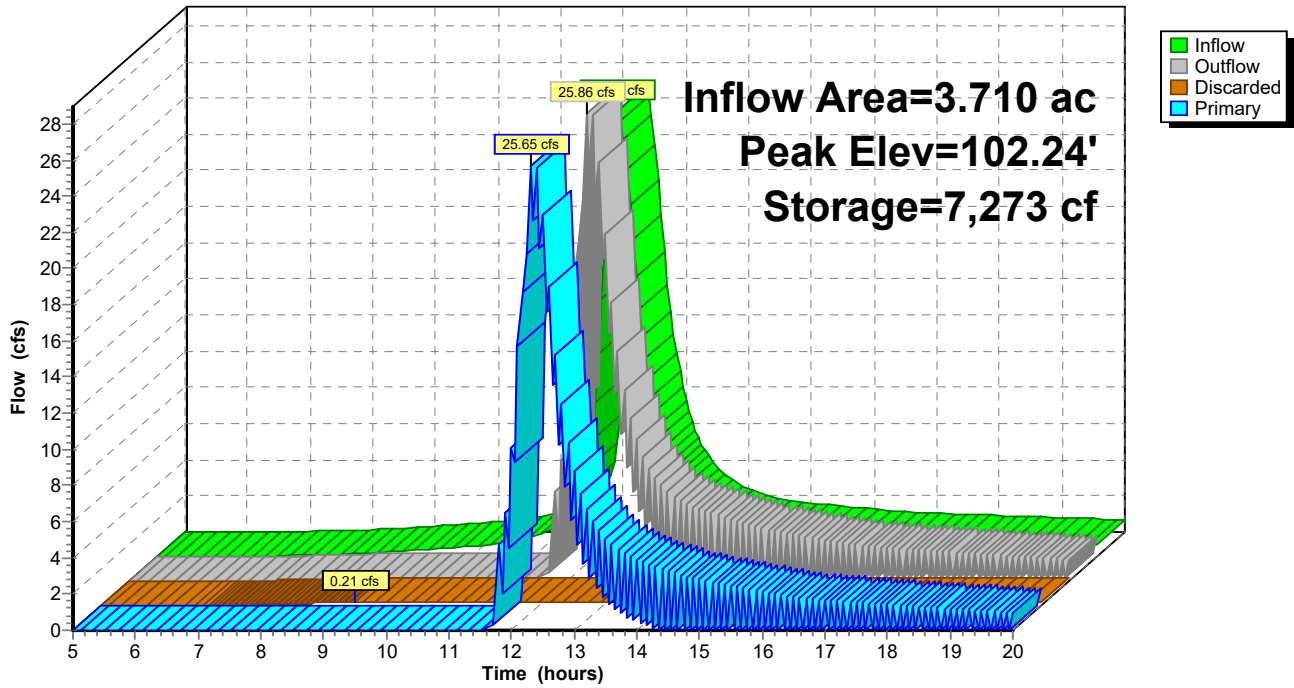
Device	Routing	Invert	Outlet Devices
#1	Discarded	101.80'	0.250 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Primary	102.20'	1,392.0' long x 1.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Discarded OutFlow Max=0.21 cfs @ 9.05 hrs HW=101.81' (Free Discharge)
 ↑1=**Exfiltration** (Exfiltration Controls 0.21 cfs)

Primary OutFlow Max=25.64 cfs @ 12.30 hrs HW=102.24' (Free Discharge)
 ↑2=**Broad-Crested Rectangular Weir**(Weir Controls 25.64 cfs @ 0.51 fps)

Pond 3P: Rock Laydown

Hydrograph



Staging Area 2 Basin 4 HydroCAD Report

Type II 24-hr 7 DAY-100YR Rainfall=14.00"

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Summary for Pond 11P: Proposed Pond

Inflow Area = 3.710 ac, 0.00% Impervious, Inflow Depth > 7.17" for 7 DAY-100YR event
 Inflow = 24.15 cfs @ 12.41 hrs, Volume= 2.216 af
 Outflow = 12.56 cfs @ 12.81 hrs, Volume= 1.385 af, Atten= 48%, Lag= 23.5 min
 Discarded = 0.16 cfs @ 12.81 hrs, Volume= 0.105 af
 Primary = 12.40 cfs @ 12.81 hrs, Volume= 1.279 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Peak Elev= 100.83' @ 12.81 hrs Surf.Area= 17,482 sf Storage= 44,357 cf

Plug-Flow detention time= 112.3 min calculated for 1.380 af (62% of inflow)
 Center-of-Mass det. time= 53.4 min (861.6 - 808.1)

Volume	Invert	Avail.Storage	Storage Description
#1	98.00'	65,783 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
98.00	13,946	0	0
99.00	15,174	14,560	14,560
100.00	16,427	15,801	30,361
101.00	17,705	17,066	47,427
102.00	19,008	18,357	65,783

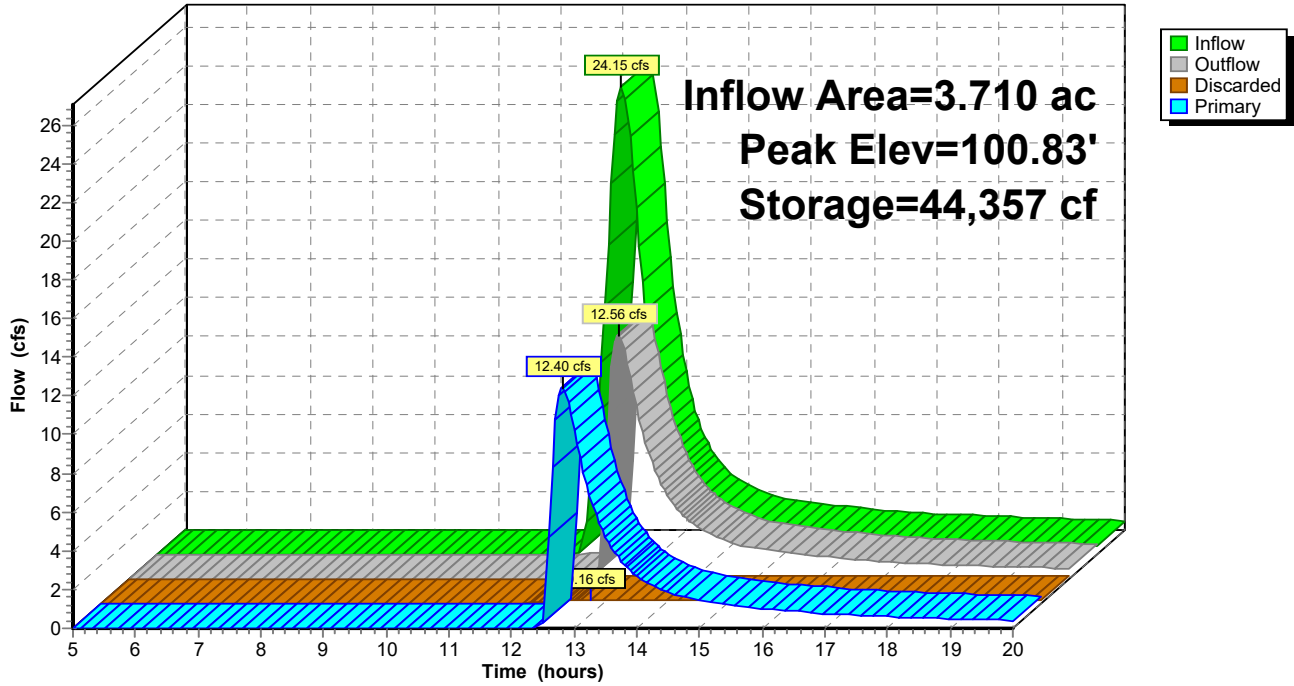
Device	Routing	Invert	Outlet Devices
#1	Discarded	98.00'	0.250 in/hr Exfiltration X 1.60 over Surface area Phase-In= 0.01'
#2	Primary	100.30'	43.6 deg x 10.0' long x 1.50' rise Sharp-Crested Vee/Trap Weir Cv= 2.56 (C= 3.20)

Discarded OutFlow Max=0.16 cfs @ 12.81 hrs HW=100.82' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.16 cfs)

Primary OutFlow Max=12.36 cfs @ 12.81 hrs HW=100.82' (Free Discharge)
 ↑2=Sharp-Crested Vee/Trap Weir (Weir Controls 12.36 cfs @ 2.31 fps)

Pond 11P: Proposed Pond

Hydrograph



Staging Area 2 Basin 4 HydroCAD Report

Type II 24-hr 7 DAY-100YR Rainfall=14.00"

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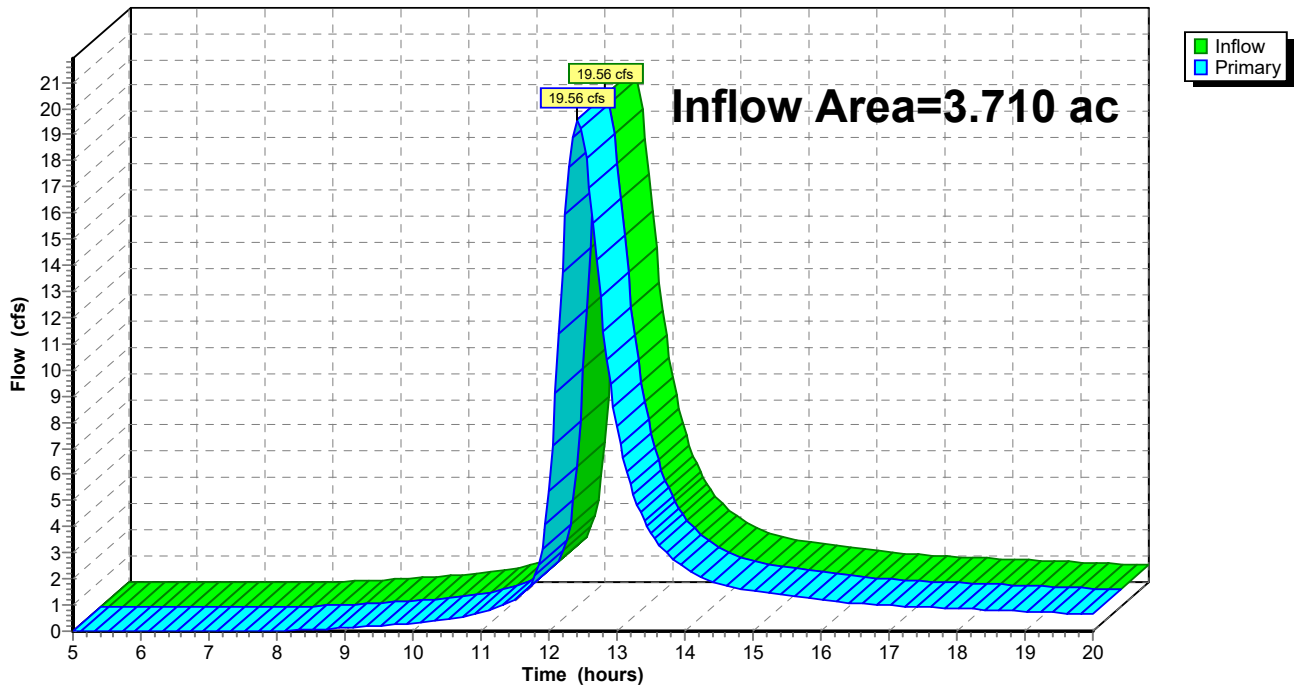
Summary for Link 2L: Outfall

Inflow Area = 3.710 ac, 0.00% Impervious, Inflow Depth > 7.27" for 7 DAY-100YR event
Inflow = 19.56 cfs @ 12.42 hrs, Volume= 2.247 af
Primary = 19.56 cfs @ 12.42 hrs, Volume= 2.247 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link 2L: Outfall

Hydrograph



Staging Area 2 Basin 4 HydroCAD Report

Type II 24-hr 10 DAY-100YR Rainfall=16.10"

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Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 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: Pre Developed Runoff Area=161,589 sf 0.00% Impervious Runoff Depth>8.99"
Flow Length=674' Slope=0.0090 '/' Tc=44.5 min CN=58 Runoff=24.15 cfs 2.779 af

Subcatchment4S: Post Developed Runoff Area=161,589 sf 0.00% Impervious Runoff Depth>10.22"
Flow Length=532' Slope=0.0056 '/' Tc=39.0 min CN=65 Runoff=29.72 cfs 3.160 af

Reach 10R: Proposed Ditch Avg. Flow Depth=1.08' Max Vel=3.29 fps Inflow=30.47 cfs 2.772 af
n=0.030 L=415.0' S=0.0072 '/' Capacity=25.37 cfs Outflow=29.24 cfs 2.763 af

Pond 3P: Rock Laydown Peak Elev=102.24' Storage=7,273 cf Inflow=29.72 cfs 3.160 af
Discarded=0.21 cfs 0.223 af Primary=30.47 cfs 2.772 af Outflow=30.68 cfs 2.994 af

Pond 11P: Proposed Pond Peak Elev=101.01' Storage=47,651 cf Inflow=29.24 cfs 2.763 af
Discarded=0.16 cfs 0.110 af Primary=19.70 cfs 1.818 af Outflow=19.86 cfs 1.927 af

Link 2L: Outfall Inflow=24.15 cfs 2.779 af
Primary=24.15 cfs 2.779 af

Staging Area 2 Basin 4 HydroCAD Report

Type II 24-hr 10 DAY-100YR Rainfall=16.10"

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Summary for Subcatchment 1S: Pre Developed

Runoff = 24.15 cfs @ 12.42 hrs, Volume= 2.779 af, Depth> 8.99"

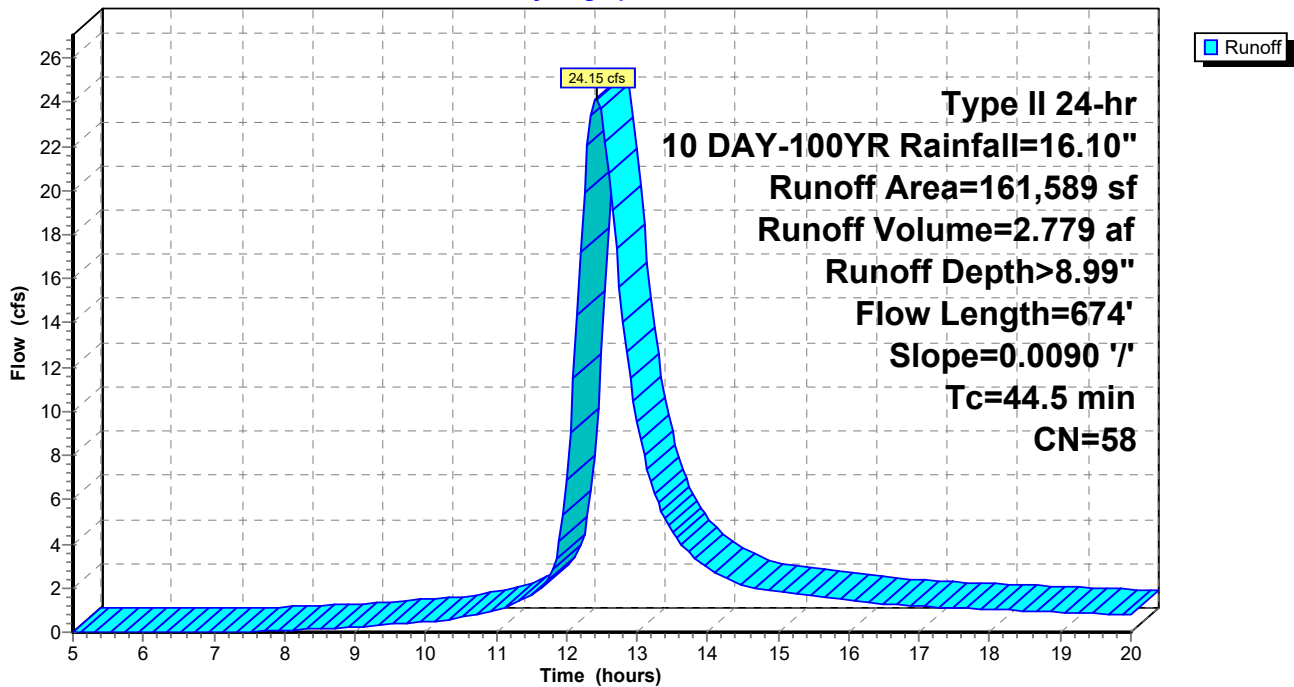
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10 DAY-100YR Rainfall=16.10"

Area (sf)	CN	Description
161,589	58	Meadow, non-grazed, HSG B
161,589		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
44.5	674	0.0090	0.25		Lag/CN Method,

Subcatchment 1S: Pre Developed

Hydrograph



Staging Area 2 Basin 4 HydroCAD Report

Type II 24-hr 10 DAY-100YR Rainfall=16.10"

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Summary for Subcatchment 4S: Post Developed

Runoff = 29.72 cfs @ 12.35 hrs, Volume= 3.160 af, Depth>10.22"

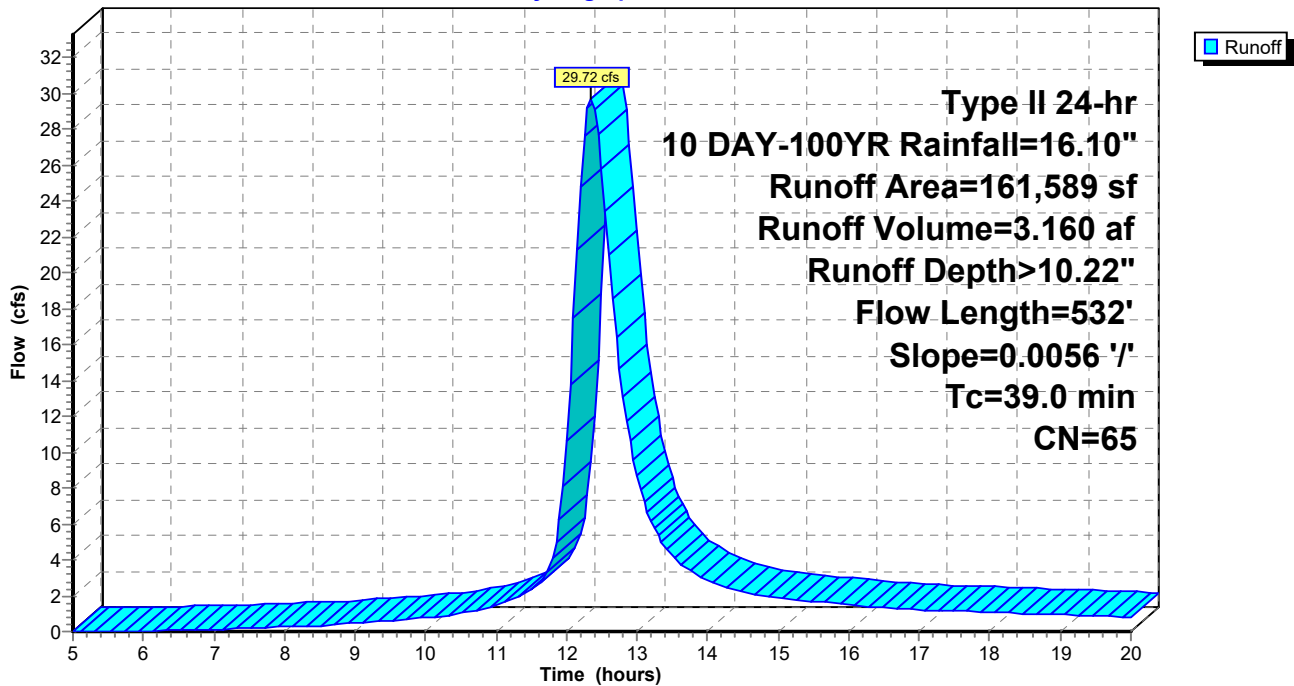
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10 DAY-100YR Rainfall=16.10"

Area (sf)	CN	Description
41,405	58	Meadow, non-grazed, HSG B
* 103,895	65	Uncompacted Gravel (35% Void)
16,289	85	Gravel roads, HSG B
161,589	65	Weighted Average
161,589		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
39.0	532	0.0056	0.23		Lag/CN Method,

Subcatchment 4S: Post Developed

Hydrograph



Staging Area 2 Basin 4 HydroCAD Report

Type II 24-hr 10 DAY-100YR Rainfall=16.10"

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Summary for Reach 10R: Proposed Ditch

Inflow Area = 3.710 ac, 0.00% Impervious, Inflow Depth > 8.97" for 10 DAY-100YR event
Inflow = 30.47 cfs @ 12.30 hrs, Volume= 2.772 af
Outflow = 29.24 cfs @ 12.41 hrs, Volume= 2.763 af, Atten= 4%, Lag= 6.6 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.29 fps, Min. Travel Time= 2.1 min
Avg. Velocity = 1.55 fps, Avg. Travel Time= 4.5 min

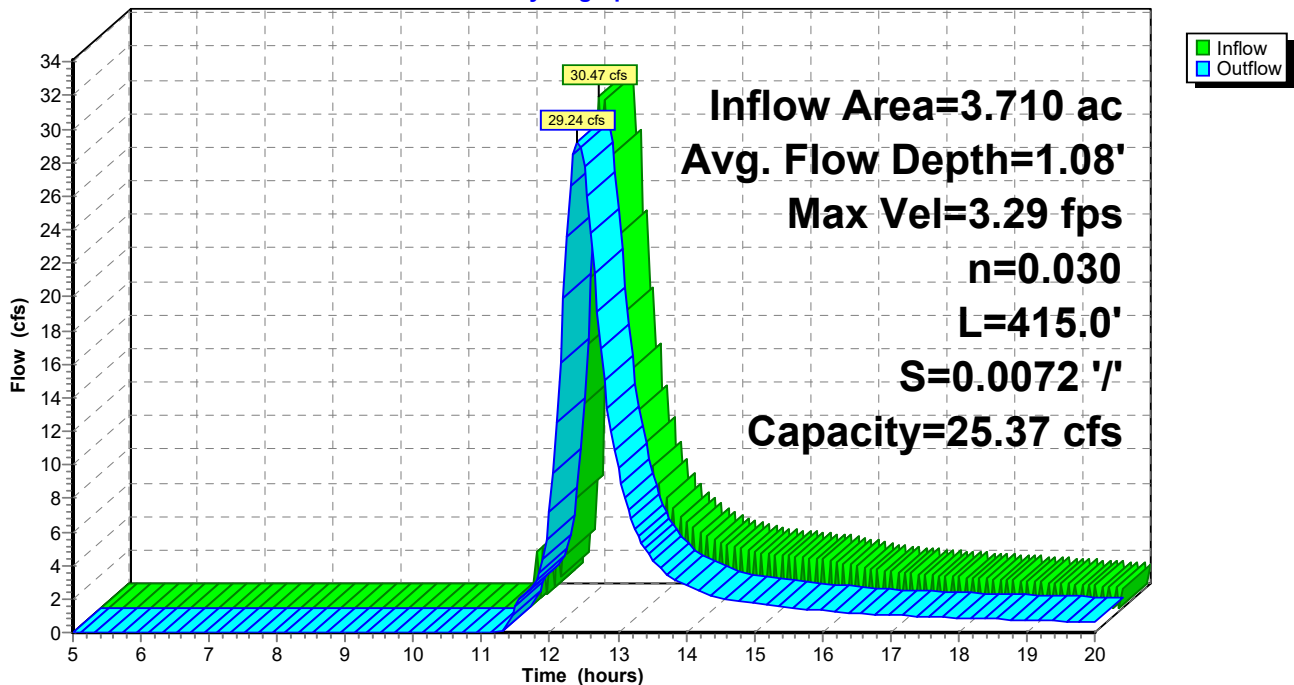
Peak Storage= 3,702 cf @ 12.37 hrs
Average Depth at Peak Storage= 1.08'
Bank-Full Depth= 1.00' Flow Area= 8.0 sf, Capacity= 25.37 cfs

4.00' x 1.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 4.0 ' / ' Top Width= 12.00'
Length= 415.0' Slope= 0.0072 ' / '
Inlet Invert= 104.00', Outlet Invert= 101.00'



Reach 10R: Proposed Ditch

Hydrograph



Staging Area 2 Basin 4 HydroCAD Report

Type II 24-hr 10 DAY-100YR Rainfall=16.10"

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Summary for Pond 3P: Rock Laydown

Inflow Area = 3.710 ac, 0.00% Impervious, Inflow Depth > 10.22" for 10 DAY-100YR event
 Inflow = 29.72 cfs @ 12.35 hrs, Volume= 3.160 af
 Outflow = 30.68 cfs @ 12.30 hrs, Volume= 2.994 af, Atten= 0%, Lag= 0.0 min
 Discarded = 0.21 cfs @ 8.35 hrs, Volume= 0.223 af
 Primary = 30.47 cfs @ 12.30 hrs, Volume= 2.772 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Peak Elev= 102.24' @ 12.30 hrs Surf.Area= 36,363 sf Storage= 7,273 cf

Plug-Flow detention time= 28.7 min calculated for 2.985 af (94% of inflow)
 Center-of-Mass det. time= 10.1 min (802.0 - 792.0)

Volume	Invert	Avail.Storage	Storage Description
#1	101.80'	7,273 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
101.80	36,363	0	0
102.00	36,363	7,273	7,273

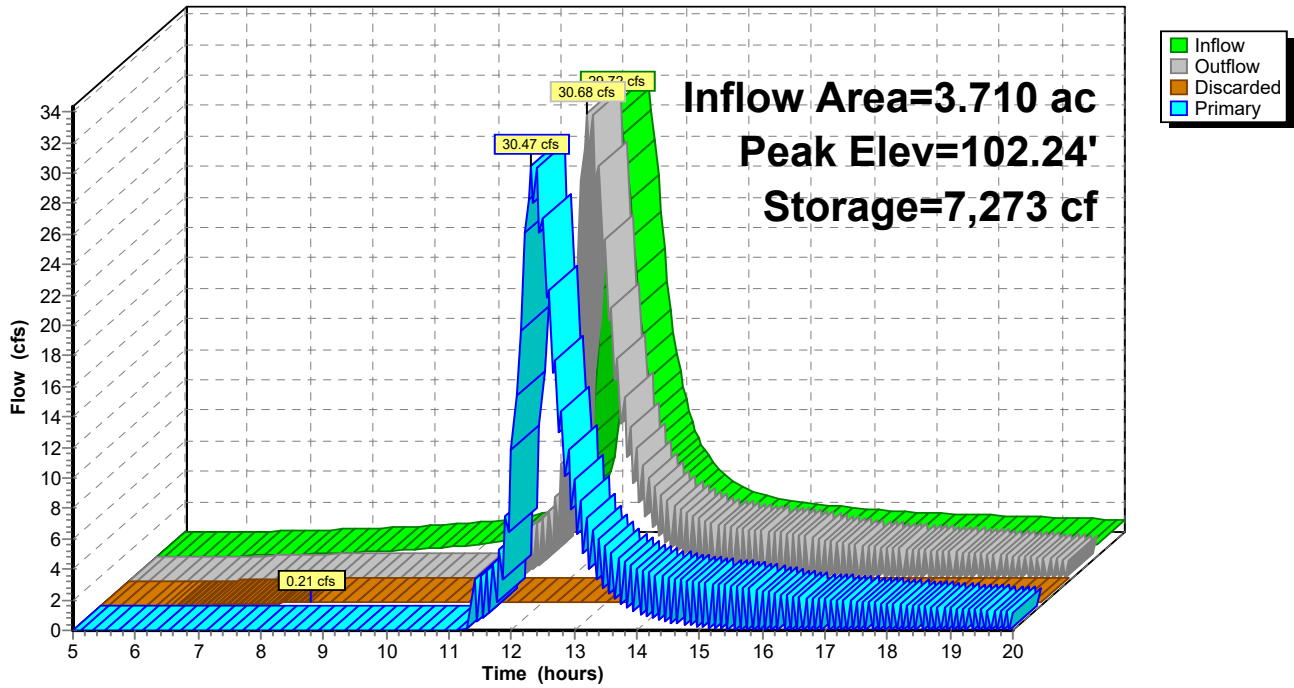
Device	Routing	Invert	Outlet Devices
#1	Discarded	101.80'	0.250 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Primary	102.20'	1,392.0' long x 1.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Discarded OutFlow Max=0.21 cfs @ 8.35 hrs HW=101.81' (Free Discharge)
 ↑1=**Exfiltration** (Exfiltration Controls 0.21 cfs)

Primary OutFlow Max=30.46 cfs @ 12.30 hrs HW=102.24' (Free Discharge)
 ↑2=**Broad-Crested Rectangular Weir**(Weir Controls 30.46 cfs @ 0.54 fps)

Pond 3P: Rock Laydown

Hydrograph



Staging Area 2 Basin 4 HydroCAD Report

Type II 24-hr 10 DAY-100YR Rainfall=16.10"

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Summary for Pond 11P: Proposed Pond

Inflow Area = 3.710 ac, 0.00% Impervious, Inflow Depth > 8.94" for 10 DAY-100YR event
 Inflow = 29.24 cfs @ 12.41 hrs, Volume= 2.763 af
 Outflow = 19.86 cfs @ 12.69 hrs, Volume= 1.927 af, Atten= 32%, Lag= 16.6 min
 Discarded = 0.16 cfs @ 12.69 hrs, Volume= 0.110 af
 Primary = 19.70 cfs @ 12.69 hrs, Volume= 1.818 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Peak Elev= 101.01' @ 12.69 hrs Surf.Area= 17,721 sf Storage= 47,651 cf

Plug-Flow detention time= 97.9 min calculated for 1.927 af (70% of inflow)
 Center-of-Mass det. time= 42.3 min (847.3 - 805.0)

Volume	Invert	Avail.Storage	Storage Description
#1	98.00'	65,783 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
98.00	13,946	0	0
99.00	15,174	14,560	14,560
100.00	16,427	15,801	30,361
101.00	17,705	17,066	47,427
102.00	19,008	18,357	65,783

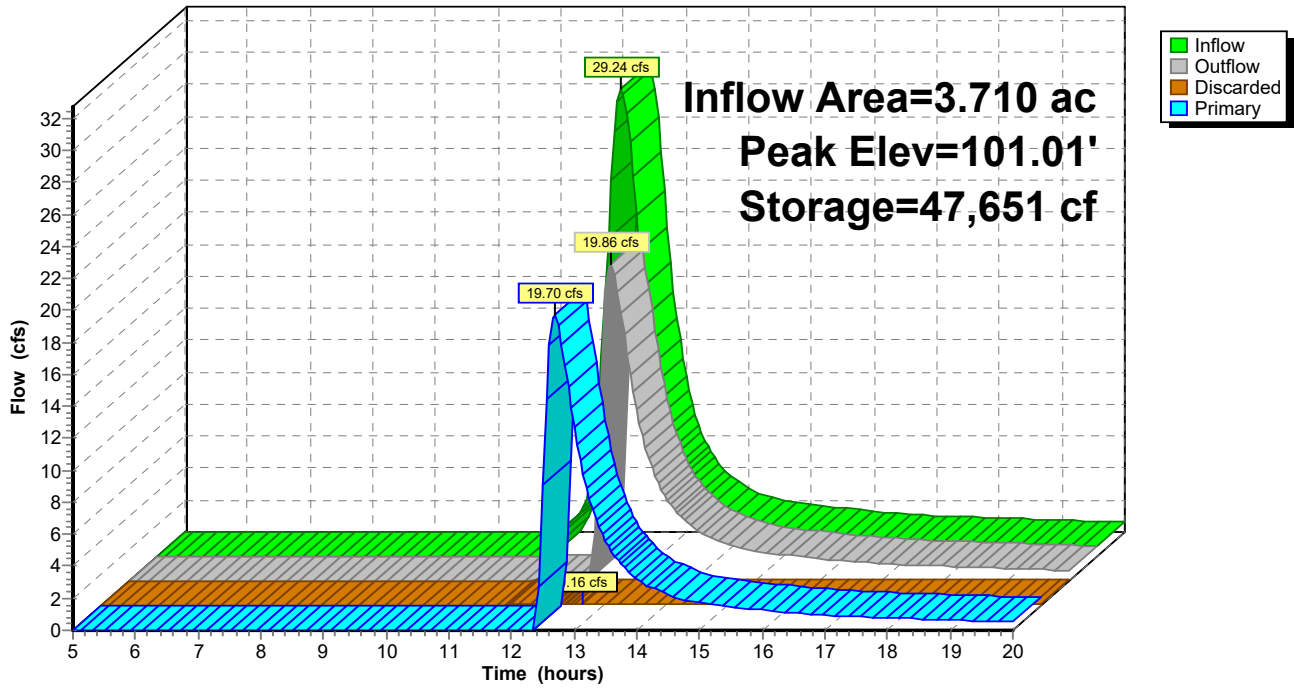
Device	Routing	Invert	Outlet Devices
#1	Discarded	98.00'	0.250 in/hr Exfiltration X 1.60 over Surface area Phase-In= 0.01'
#2	Primary	100.30'	43.6 deg x 10.0' long x 1.50' rise Sharp-Crested Vee/Trap Weir Cv= 2.56 (C= 3.20)

Discarded OutFlow Max=0.16 cfs @ 12.69 hrs HW=101.01' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.16 cfs)

Primary OutFlow Max=19.61 cfs @ 12.69 hrs HW=101.01' (Free Discharge)
 ↑2=Sharp-Crested Vee/Trap Weir (Weir Controls 19.61 cfs @ 2.68 fps)

Pond 11P: Proposed Pond

Hydrograph



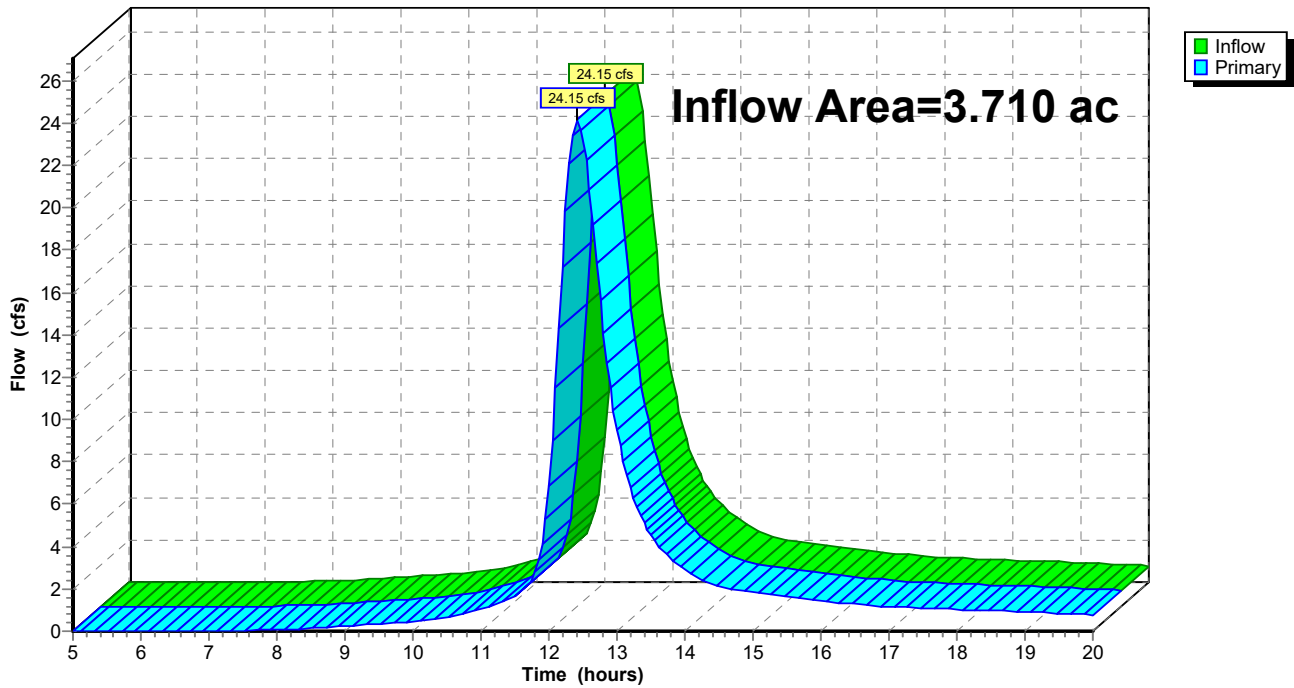
Summary for Link 2L: Outfall

Inflow Area = 3.710 ac, 0.00% Impervious, Inflow Depth > 8.99" for 10 DAY-100YR event
Inflow = 24.15 cfs @ 12.42 hrs, Volume= 2.779 af
Primary = 24.15 cfs @ 12.42 hrs, Volume= 2.779 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link 2L: Outfall

Hydrograph



Staging Area 2 Basin 4 HydroCAD Report

Type II 24-hr 10-YR - 24HR. Rainfall=6.72"

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Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 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: Pre Developed Runoff Area=161,589 sf 0.00% Impervious Runoff Depth>1.97"
Flow Length=674' Slope=0.0090 '/' Tc=44.5 min CN=58 Runoff=5.04 cfs 0.609 af

Subcatchment4S: Post Developed Runoff Area=161,589 sf 0.00% Impervious Runoff Depth>2.60"
Flow Length=532' Slope=0.0056 '/' Tc=39.0 min CN=65 Runoff=7.59 cfs 0.805 af

Reach 10R: Proposed Ditch Avg. Flow Depth=0.51' Max Vel=2.20 fps Inflow=11.83 cfs 0.484 af
n=0.030 L=415.0' S=0.0072 '/' Capacity=25.37 cfs Outflow=6.82 cfs 0.483 af

Pond 3P: Rock Laydown Peak Elev=102.22' Storage=7,273 cf Inflow=7.59 cfs 0.805 af
Discarded=0.21 cfs 0.154 af Primary=11.83 cfs 0.484 af Outflow=12.04 cfs 0.638 af

Pond 11P: Proposed Pond Peak Elev=99.18' Storage=17,384 cf Inflow=6.82 cfs 0.483 af
Discarded=0.14 cfs 0.089 af Primary=0.00 cfs 0.000 af Outflow=0.14 cfs 0.089 af

Link 2L: Outfall Inflow=5.04 cfs 0.609 af
Primary=5.04 cfs 0.609 af

Staging Area 2 Basin 4 HydroCAD Report

Type II 24-hr 10-YR - 24HR. Rainfall=6.72"

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Summary for Subcatchment 1S: Pre Developed

Runoff = 5.04 cfs @ 12.46 hrs, Volume= 0.609 af, Depth> 1.97"

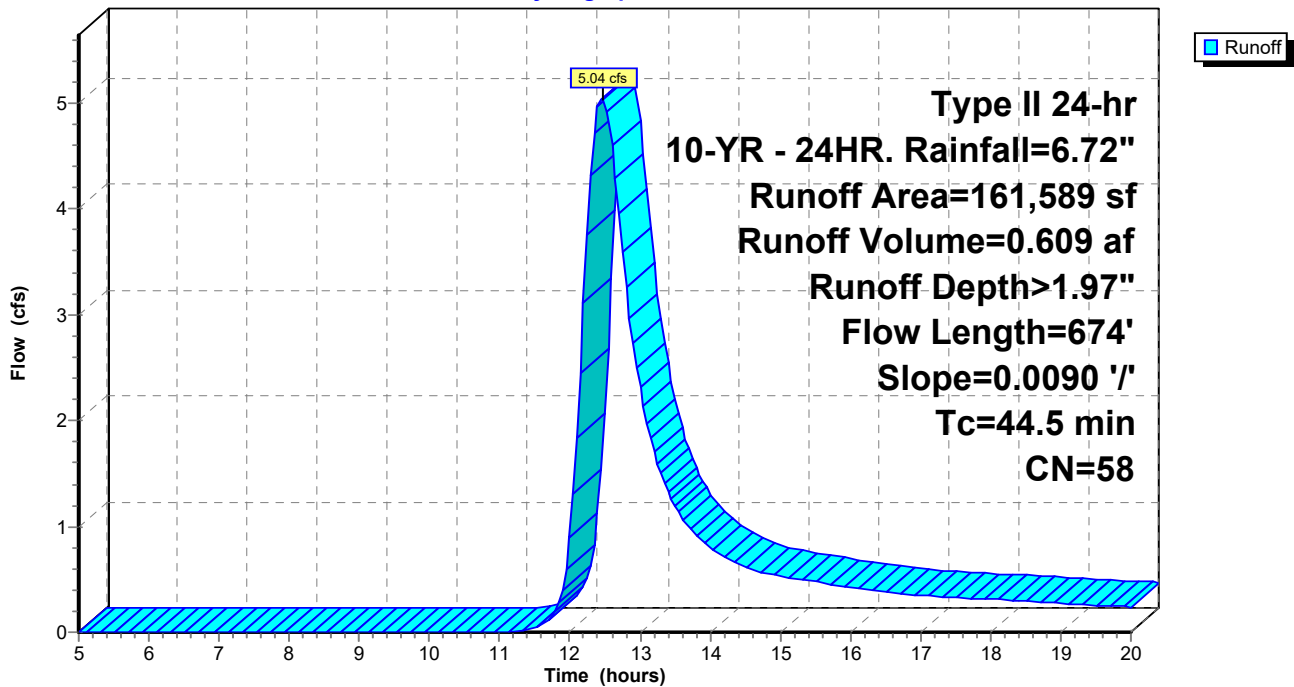
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-YR - 24HR. Rainfall=6.72"

Area (sf)	CN	Description
161,589	58	Meadow, non-grazed, HSG B
161,589		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
44.5	674	0.0090	0.25		Lag/CN Method,

Subcatchment 1S: Pre Developed

Hydrograph



Staging Area 2 Basin 4 HydroCAD Report

Type II 24-hr 10-YR - 24HR. Rainfall=6.72"

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Summary for Subcatchment 4S: Post Developed

Runoff = 7.59 cfs @ 12.37 hrs, Volume= 0.805 af, Depth> 2.60"

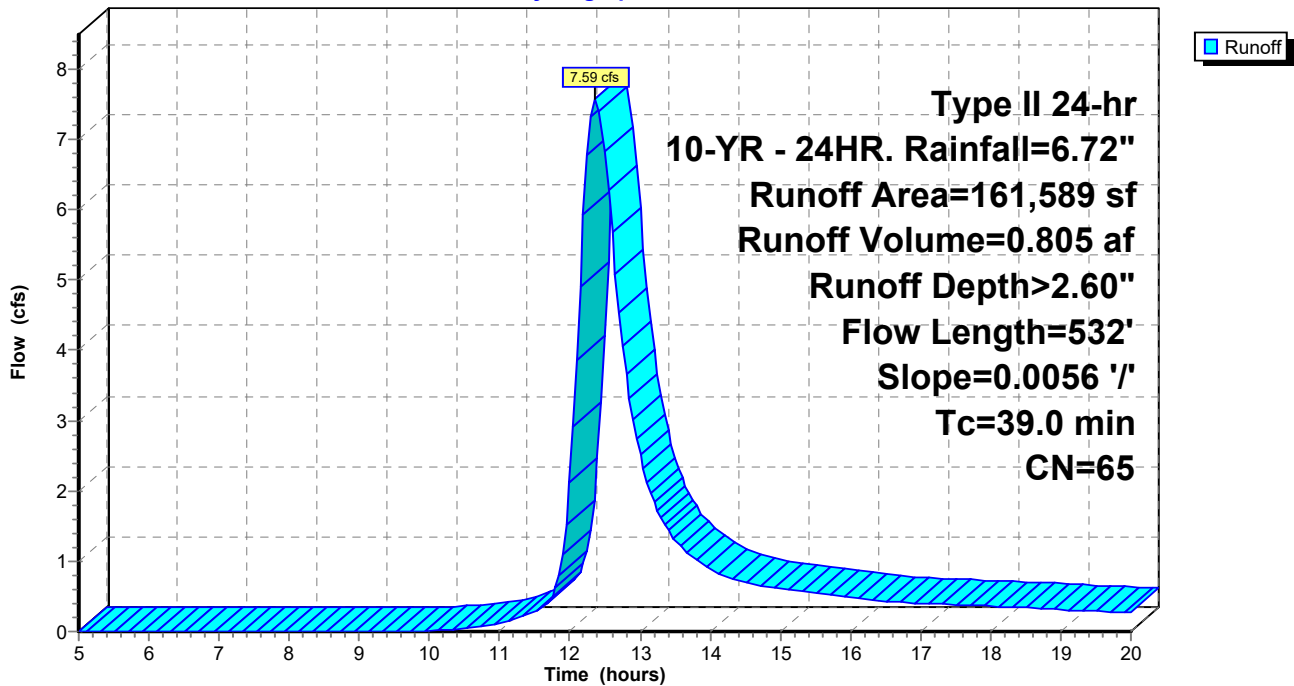
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-YR - 24HR. Rainfall=6.72"

Area (sf)	CN	Description
41,405	58	Meadow, non-grazed, HSG B
* 103,895	65	Uncompacted Gravel (35% Void)
16,289	85	Gravel roads, HSG B
161,589	65	Weighted Average
161,589		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
39.0	532	0.0056	0.23		Lag/CN Method,

Subcatchment 4S: Post Developed

Hydrograph



Staging Area 2 Basin 4 HydroCAD Report

Type II 24-hr 10-YR - 24HR. Rainfall=6.72"

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Summary for Reach 10R: Proposed Ditch

Inflow Area = 3.710 ac, 0.00% Impervious, Inflow Depth > 1.57" for 10-YR - 24HR. event
Inflow = 11.83 cfs @ 12.40 hrs, Volume= 0.484 af
Outflow = 6.82 cfs @ 12.54 hrs, Volume= 0.483 af, Atten= 42%, Lag= 8.5 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.20 fps, Min. Travel Time= 3.1 min
Avg. Velocity = 0.89 fps, Avg. Travel Time= 7.8 min

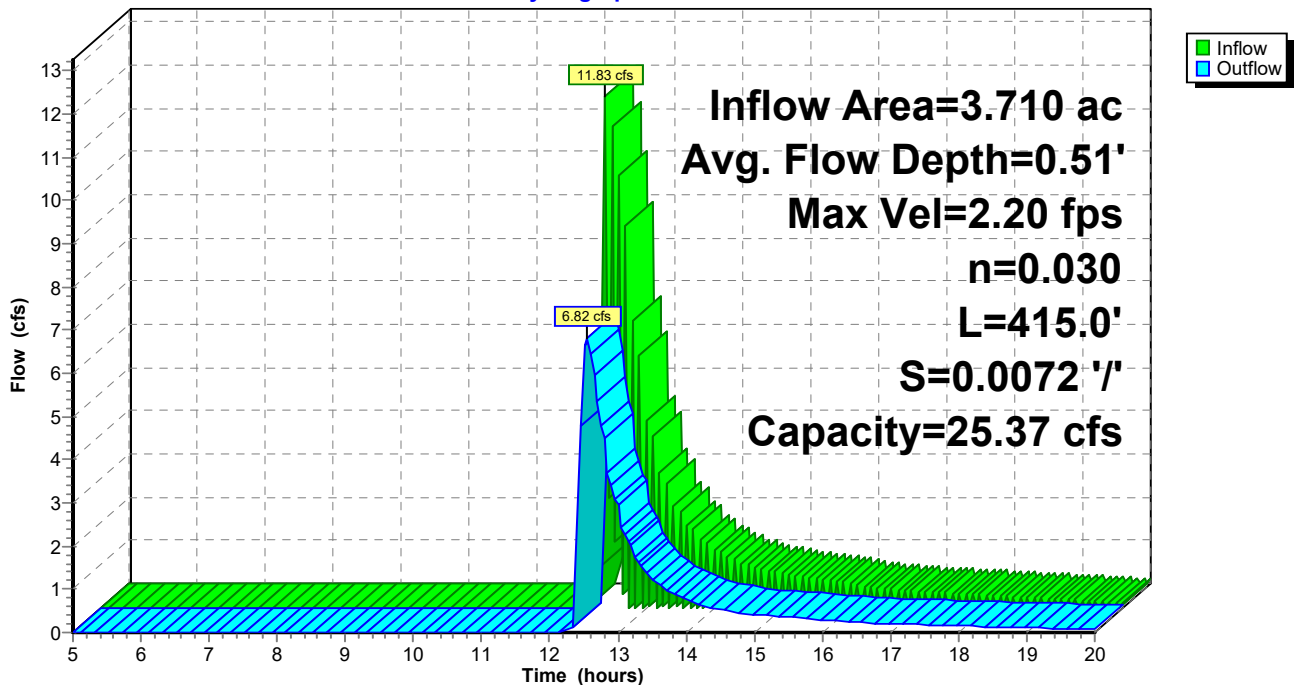
Peak Storage= 1,289 cf @ 12.49 hrs
Average Depth at Peak Storage= 0.51'
Bank-Full Depth= 1.00' Flow Area= 8.0 sf, Capacity= 25.37 cfs

4.00' x 1.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 4.0 ' ' Top Width= 12.00'
Length= 415.0' Slope= 0.0072 ' '
Inlet Invert= 104.00', Outlet Invert= 101.00'



Reach 10R: Proposed Ditch

Hydrograph



Staging Area 2 Basin 4 HydroCAD Report

Type II 24-hr 10-YR - 24HR. Rainfall=6.72"

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Summary for Pond 3P: Rock Laydown

Inflow Area = 3.710 ac, 0.00% Impervious, Inflow Depth > 2.60" for 10-YR - 24HR. event
 Inflow = 7.59 cfs @ 12.37 hrs, Volume= 0.805 af
 Outflow = 12.04 cfs @ 12.40 hrs, Volume= 0.638 af, Atten= 0%, Lag= 2.0 min
 Discarded = 0.21 cfs @ 11.75 hrs, Volume= 0.154 af
 Primary = 11.83 cfs @ 12.40 hrs, Volume= 0.484 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Peak Elev= 102.22' @ 12.40 hrs Surf.Area= 36,363 sf Storage= 7,273 cf

Plug-Flow detention time= 78.7 min calculated for 0.636 af (79% of inflow)
 Center-of-Mass det. time= 24.6 min (845.6 - 820.9)

Volume	Invert	Avail.Storage	Storage Description
#1	101.80'	7,273 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
101.80	36,363	0	0
102.00	36,363	7,273	7,273

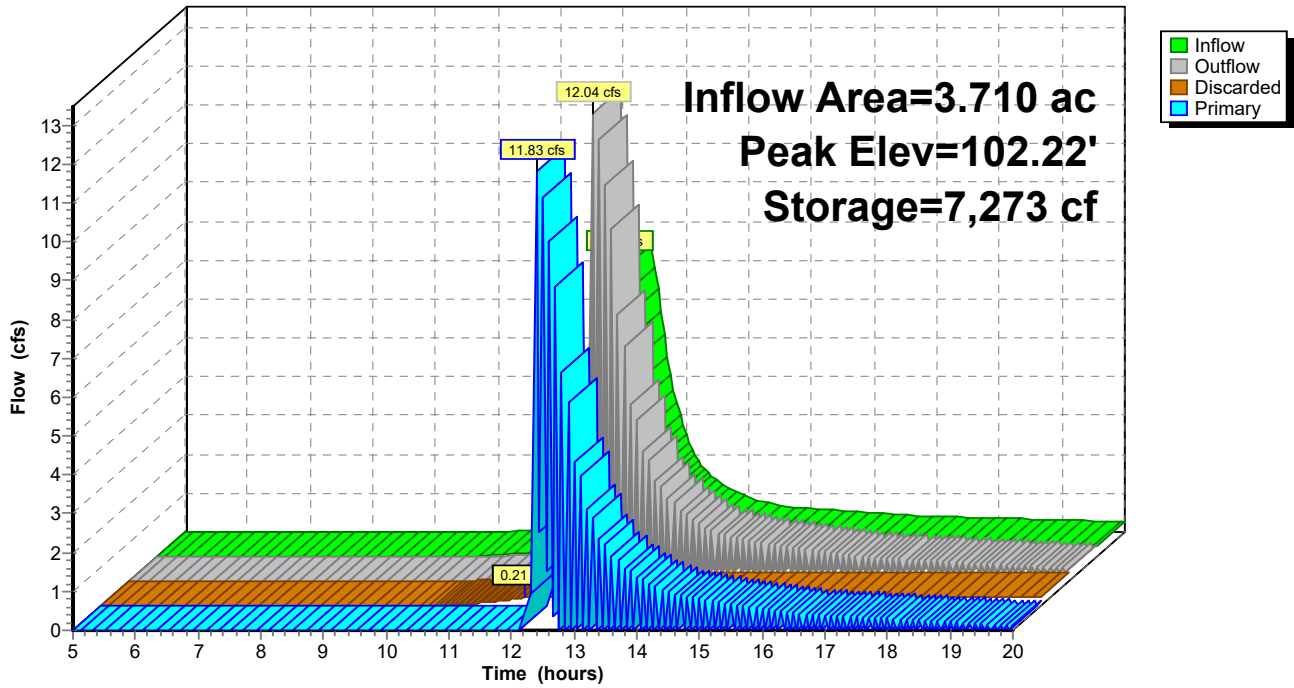
Device	Routing	Invert	Outlet Devices
#1	Discarded	101.80'	0.250 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Primary	102.20'	1,392.0' long x 1.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Discarded OutFlow Max=0.21 cfs @ 11.75 hrs HW=101.81' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.21 cfs)

Primary OutFlow Max=11.70 cfs @ 12.40 hrs HW=102.22' (Free Discharge)
 ↑2=Broad-Crested Rectangular Weir (Weir Controls 11.70 cfs @ 0.39 fps)

Pond 3P: Rock Laydown

Hydrograph



Staging Area 2 Basin 4 HydroCAD Report

Type II 24-hr 10-YR - 24HR. Rainfall=6.72"

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Summary for Pond 11P: Proposed Pond

Inflow Area = 3.710 ac, 0.00% Impervious, Inflow Depth > 1.56" for 10-YR - 24HR. event
Inflow = 6.82 cfs @ 12.54 hrs, Volume= 0.483 af
Outflow = 0.14 cfs @ 18.32 hrs, Volume= 0.089 af, Atten= 98%, Lag= 346.5 min
Discarded = 0.14 cfs @ 18.32 hrs, Volume= 0.089 af
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 99.18' @ 18.32 hrs Surf.Area= 15,405 sf Storage= 17,384 cf

Plug-Flow detention time= 223.7 min calculated for 0.088 af (18% of inflow)
Center-of-Mass det. time= 151.3 min (975.2 - 824.0)

Volume	Invert	Avail.Storage	Storage Description
#1	98.00'	65,783 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
98.00	13,946	0	0
99.00	15,174	14,560	14,560
100.00	16,427	15,801	30,361
101.00	17,705	17,066	47,427
102.00	19,008	18,357	65,783

Device	Routing	Invert	Outlet Devices
#1	Discarded	98.00'	0.250 in/hr Exfiltration X 1.60 over Surface area Phase-In= 0.01'
#2	Primary	100.30'	43.6 deg x 10.0' long x 1.50' rise Sharp-Crested Vee/Trap Weir Cv= 2.56 (C= 3.20)

Discarded OutFlow Max=0.14 cfs @ 18.32 hrs HW=99.18' (Free Discharge)

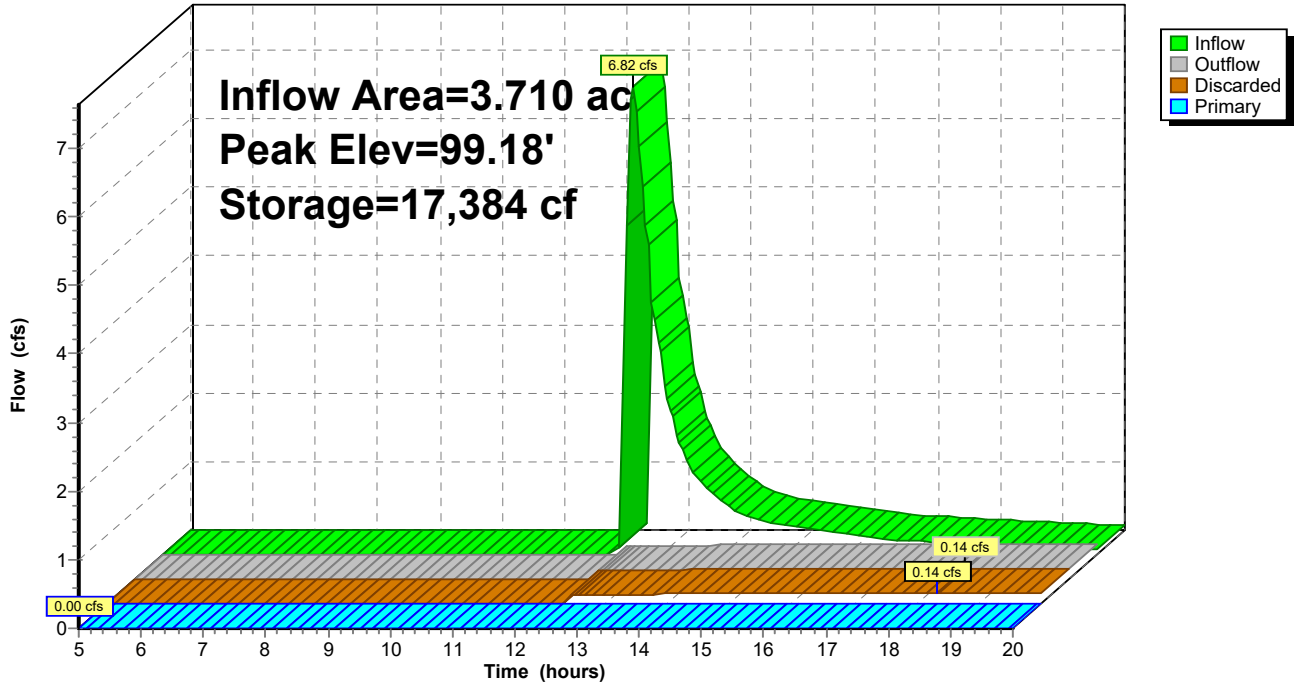
↑1=**Exfiltration** (Exfiltration Controls 0.14 cfs)

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=98.00' (Free Discharge)

↑2=**Sharp-Crested Vee/Trap Weir** (Controls 0.00 cfs)

Pond 11P: Proposed Pond

Hydrograph



Staging Area 2 Basin 4 HydroCAD Report

Type II 24-hr 10-YR - 24HR. Rainfall=6.72"

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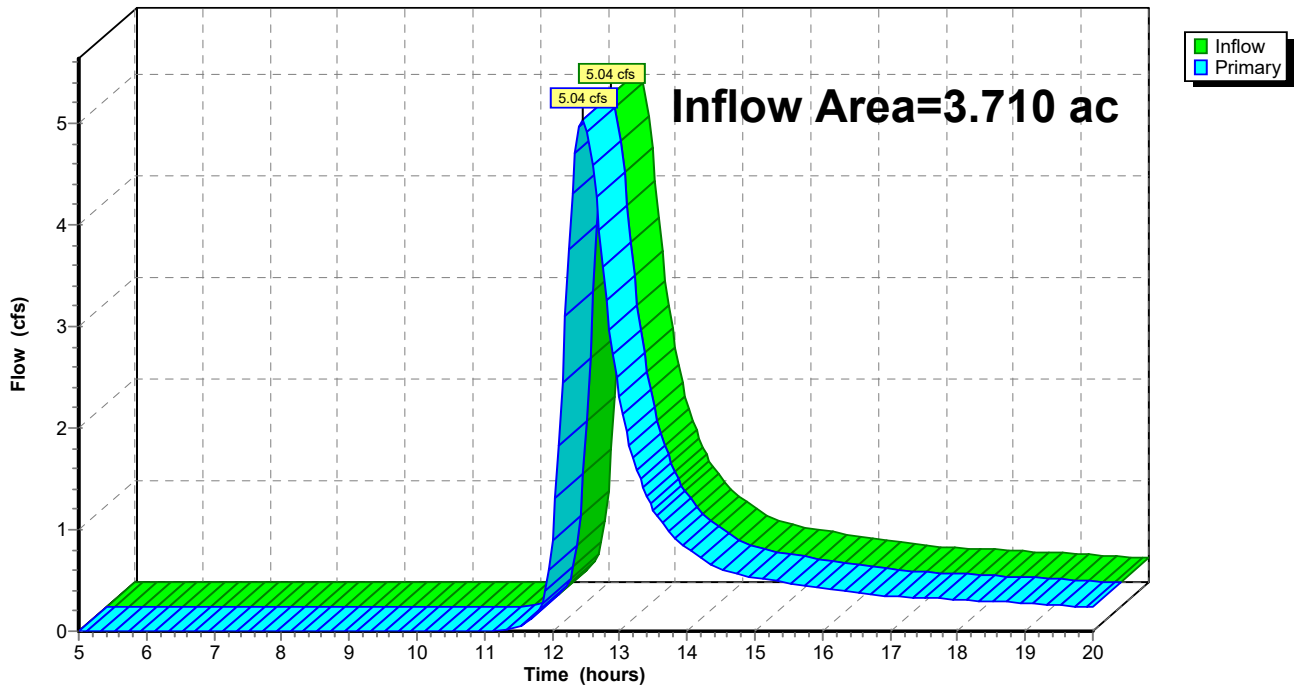
Summary for Link 2L: Outfall

Inflow Area = 3.710 ac, 0.00% Impervious, Inflow Depth > 1.97" for 10-YR - 24HR. event
Inflow = 5.04 cfs @ 12.46 hrs, Volume= 0.609 af
Primary = 5.04 cfs @ 12.46 hrs, Volume= 0.609 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link 2L: Outfall

Hydrograph



Staging Area 2 Basin 4 HydroCAD Report

Type II 24-hr 25-YR - 24HR. Rainfall=7.92"

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Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 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: Pre Developed Runoff Area=161,589 sf 0.00% Impervious Runoff Depth>2.73"
Flow Length=674' Slope=0.0090 '/' Tc=44.5 min CN=58 Runoff=7.16 cfs 0.844 af

Subcatchment4S: Post Developed Runoff Area=161,589 sf 0.00% Impervious Runoff Depth>3.48"
Flow Length=532' Slope=0.0056 '/' Tc=39.0 min CN=65 Runoff=10.20 cfs 1.074 af

Reach 10R: Proposed Ditch Avg. Flow Depth=0.62' Max Vel=2.44 fps Inflow=16.22 cfs 0.744 af
n=0.030 L=415.0' S=0.0072 '/' Capacity=25.37 cfs Outflow=9.85 cfs 0.741 af

Pond 3P: Rock Laydown Peak Elev=102.23' Storage=7,273 cf Inflow=10.20 cfs 1.074 af
Discarded=0.21 cfs 0.164 af Primary=16.22 cfs 0.744 af Outflow=16.43 cfs 0.908 af

Pond 11P: Proposed Pond Peak Elev=99.87' Storage=28,164 cf Inflow=9.85 cfs 0.741 af
Discarded=0.15 cfs 0.094 af Primary=0.00 cfs 0.000 af Outflow=0.15 cfs 0.094 af

Link 2L: Outfall Inflow=7.16 cfs 0.844 af
Primary=7.16 cfs 0.844 af

Staging Area 2 Basin 4 HydroCAD Report

Type II 24-hr 25-YR - 24HR. Rainfall=7.92"

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Summary for Subcatchment 1S: Pre Developed

Runoff = 7.16 cfs @ 12.45 hrs, Volume= 0.844 af, Depth> 2.73"

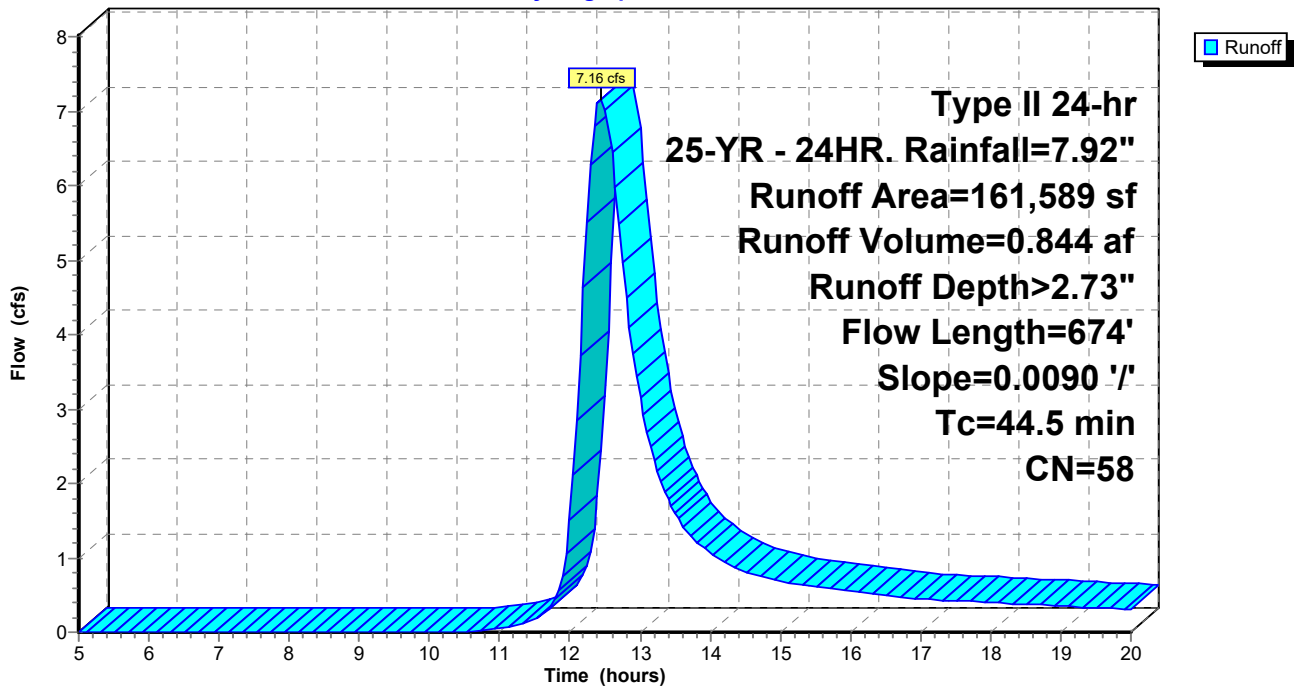
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-YR - 24HR. Rainfall=7.92"

Area (sf)	CN	Description
161,589	58	Meadow, non-grazed, HSG B
161,589		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
44.5	674	0.0090	0.25		Lag/CN Method,

Subcatchment 1S: Pre Developed

Hydrograph



Staging Area 2 Basin 4 HydroCAD Report

Type II 24-hr 25-YR - 24HR. Rainfall=7.92"

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Summary for Subcatchment 4S: Post Developed

Runoff = 10.20 cfs @ 12.36 hrs, Volume= 1.074 af, Depth> 3.48"

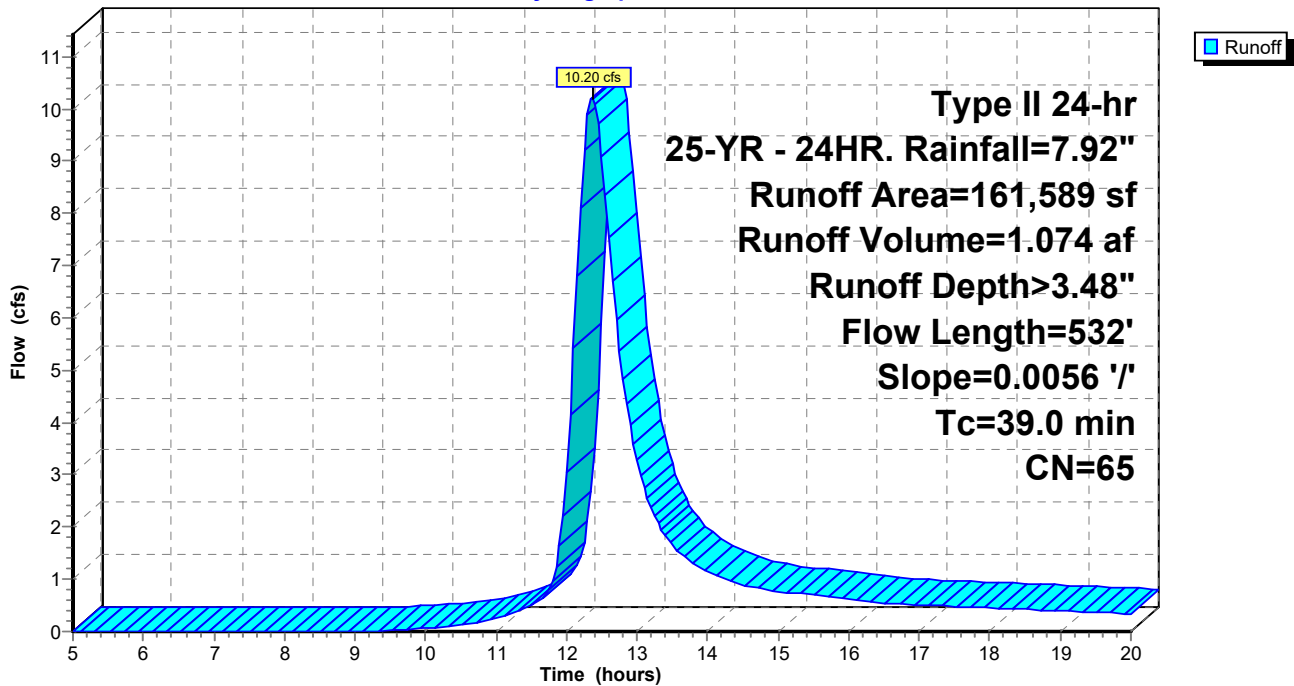
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-YR - 24HR. Rainfall=7.92"

Area (sf)	CN	Description
41,405	58	Meadow, non-grazed, HSG B
* 103,895	65	Uncompacted Gravel (35% Void)
16,289	85	Gravel roads, HSG B
161,589	65	Weighted Average
161,589		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
39.0	532	0.0056	0.23		Lag/CN Method,

Subcatchment 4S: Post Developed

Hydrograph



Staging Area 2 Basin 4 HydroCAD Report

Type II 24-hr 25-YR - 24HR. Rainfall=7.92"

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Summary for Reach 10R: Proposed Ditch

Inflow Area = 3.710 ac, 0.00% Impervious, Inflow Depth > 2.41" for 25-YR - 24HR. event
Inflow = 16.22 cfs @ 12.40 hrs, Volume= 0.744 af
Outflow = 9.85 cfs @ 12.46 hrs, Volume= 0.741 af, Atten= 39%, Lag= 3.9 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.44 fps, Min. Travel Time= 2.8 min
Avg. Velocity = 1.03 fps, Avg. Travel Time= 6.7 min

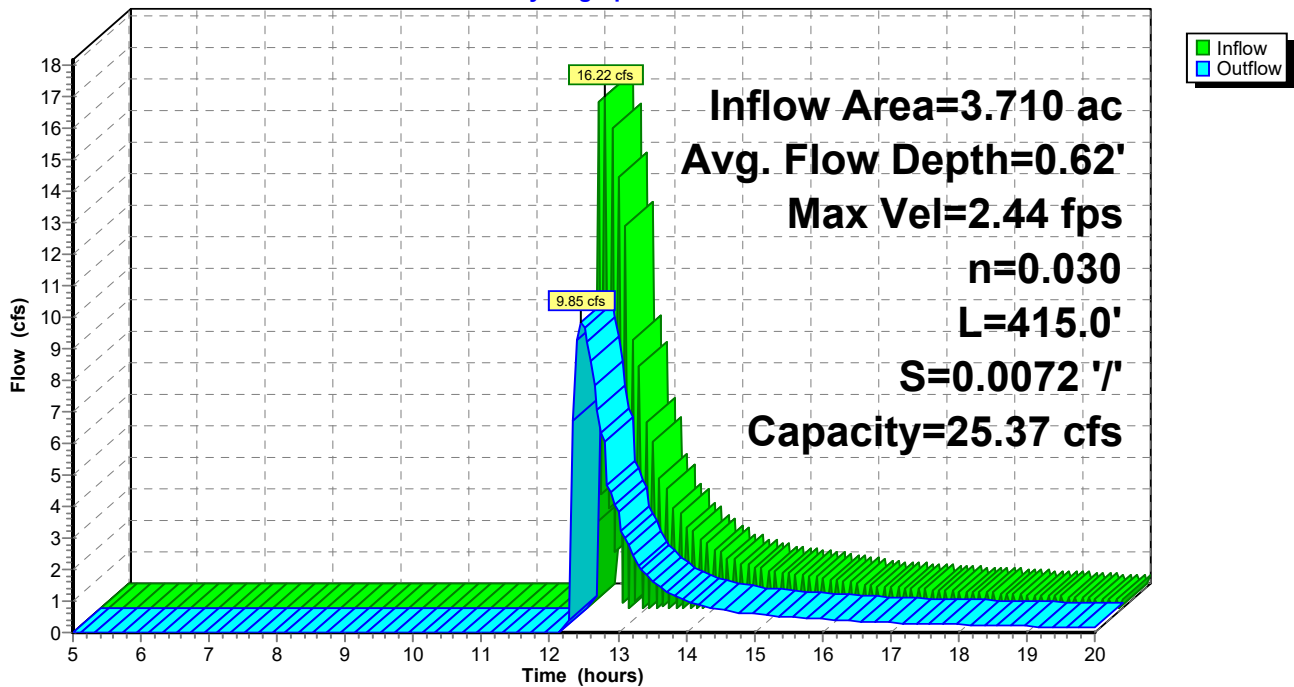
Peak Storage= 1,675 cf @ 12.42 hrs
Average Depth at Peak Storage= 0.62'
Bank-Full Depth= 1.00' Flow Area= 8.0 sf, Capacity= 25.37 cfs

4.00' x 1.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 4.0 ' / ' Top Width= 12.00'
Length= 415.0' Slope= 0.0072 ' / '
Inlet Invert= 104.00', Outlet Invert= 101.00'



Reach 10R: Proposed Ditch

Hydrograph



Staging Area 2 Basin 4 HydroCAD Report

Type II 24-hr 25-YR - 24HR. Rainfall=7.92"

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Summary for Pond 3P: Rock Laydown

Inflow Area = 3.710 ac, 0.00% Impervious, Inflow Depth > 3.48" for 25-YR - 24HR. event
 Inflow = 10.20 cfs @ 12.36 hrs, Volume= 1.074 af
 Outflow = 16.43 cfs @ 12.40 hrs, Volume= 0.908 af, Atten= 0%, Lag= 2.3 min
 Discarded = 0.21 cfs @ 11.35 hrs, Volume= 0.164 af
 Primary = 16.22 cfs @ 12.40 hrs, Volume= 0.744 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Peak Elev= 102.23' @ 12.40 hrs Surf.Area= 36,363 sf Storage= 7,273 cf

Plug-Flow detention time= 62.6 min calculated for 0.908 af (84% of inflow)
 Center-of-Mass det. time= 17.8 min (833.0 - 815.1)

Volume	Invert	Avail.Storage	Storage Description
#1	101.80'	7,273 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
101.80	36,363	0	0
102.00	36,363	7,273	7,273

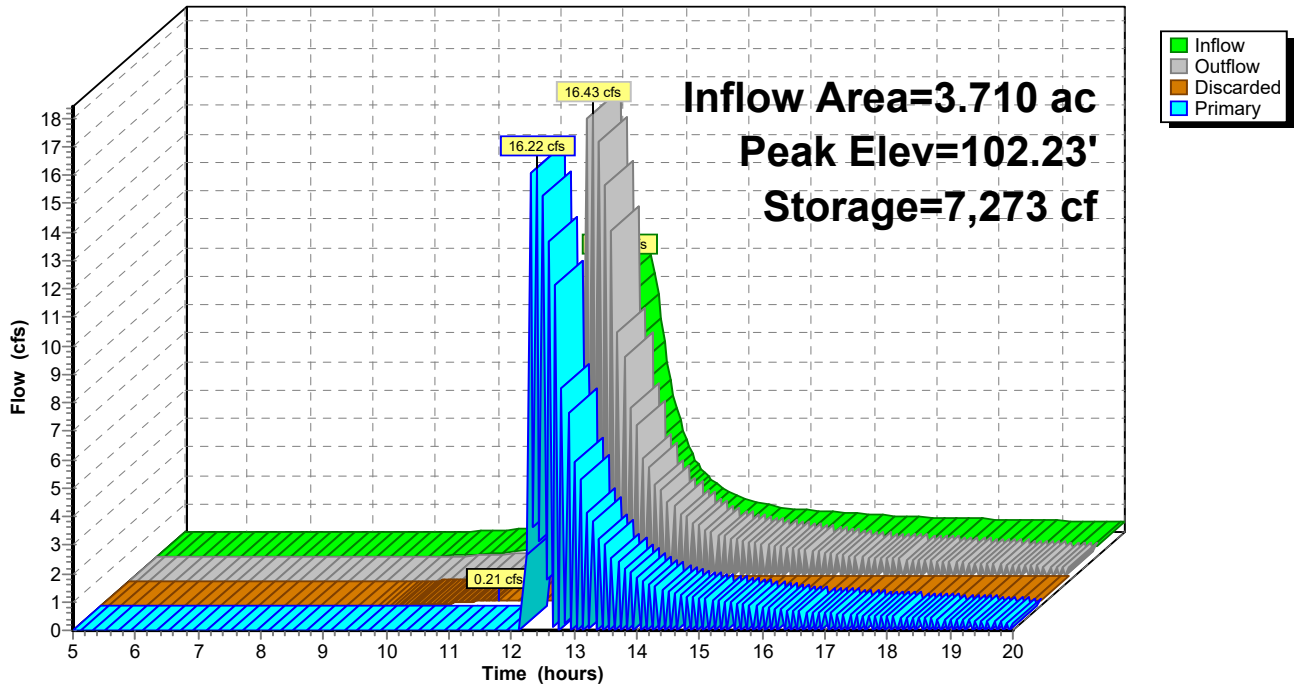
Device	Routing	Invert	Outlet Devices
#1	Discarded	101.80'	0.250 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Primary	102.20'	1,392.0' long x 1.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Discarded OutFlow Max=0.21 cfs @ 11.35 hrs HW=101.81' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.21 cfs)

Primary OutFlow Max=16.05 cfs @ 12.40 hrs HW=102.23' (Free Discharge)
 ↑2=Broad-Crested Rectangular Weir (Weir Controls 16.05 cfs @ 0.44 fps)

Pond 3P: Rock Laydown

Hydrograph



Staging Area 2 Basin 4 HydroCAD Report

Type II 24-hr 25-YR - 24HR. Rainfall=7.92"

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Summary for Pond 11P: Proposed Pond

Inflow Area = 3.710 ac, 0.00% Impervious, Inflow Depth > 2.40" for 25-YR - 24HR. event
 Inflow = 9.85 cfs @ 12.46 hrs, Volume= 0.741 af
 Outflow = 0.15 cfs @ 19.80 hrs, Volume= 0.094 af, Atten= 98%, Lag= 440.0 min
 Discarded = 0.15 cfs @ 19.80 hrs, Volume= 0.094 af
 Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Peak Elev= 99.87' @ 19.80 hrs Surf.Area= 16,259 sf Storage= 28,164 cf

Plug-Flow detention time= 229.5 min calculated for 0.094 af (13% of inflow)
 Center-of-Mass det. time= 152.9 min (973.1 - 820.2)

Volume	Invert	Avail.Storage	Storage Description
#1	98.00'	65,783 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
98.00	13,946	0	0
99.00	15,174	14,560	14,560
100.00	16,427	15,801	30,361
101.00	17,705	17,066	47,427
102.00	19,008	18,357	65,783

Device	Routing	Invert	Outlet Devices
#1	Discarded	98.00'	0.250 in/hr Exfiltration X 1.60 over Surface area Phase-In= 0.01'
#2	Primary	100.30'	43.6 deg x 10.0' long x 1.50' rise Sharp-Crested Vee/Trap Weir Cv= 2.56 (C= 3.20)

Discarded OutFlow Max=0.15 cfs @ 19.80 hrs HW=99.87' (Free Discharge)
 ↑1=**Exfiltration** (Exfiltration Controls 0.15 cfs)

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=98.00' (Free Discharge)
 ↑2=**Sharp-Crested Vee/Trap Weir** (Controls 0.00 cfs)

Staging Area 2 Basin 4 HydroCAD Report

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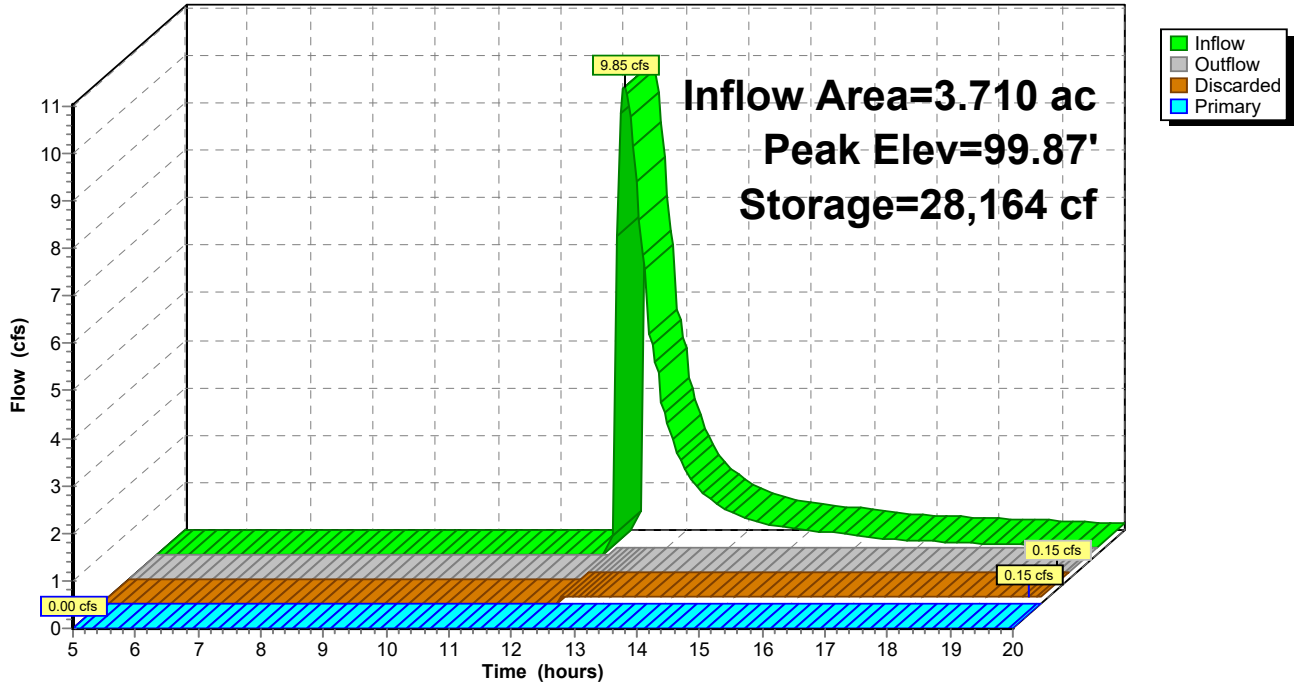
Type II 24-hr 25-YR - 24HR. Rainfall=7.92"

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Pond 11P: Proposed Pond

Hydrograph



Staging Area 2 Basin 4 HydroCAD Report

Type II 24-hr 25-YR - 24HR. Rainfall=7.92"

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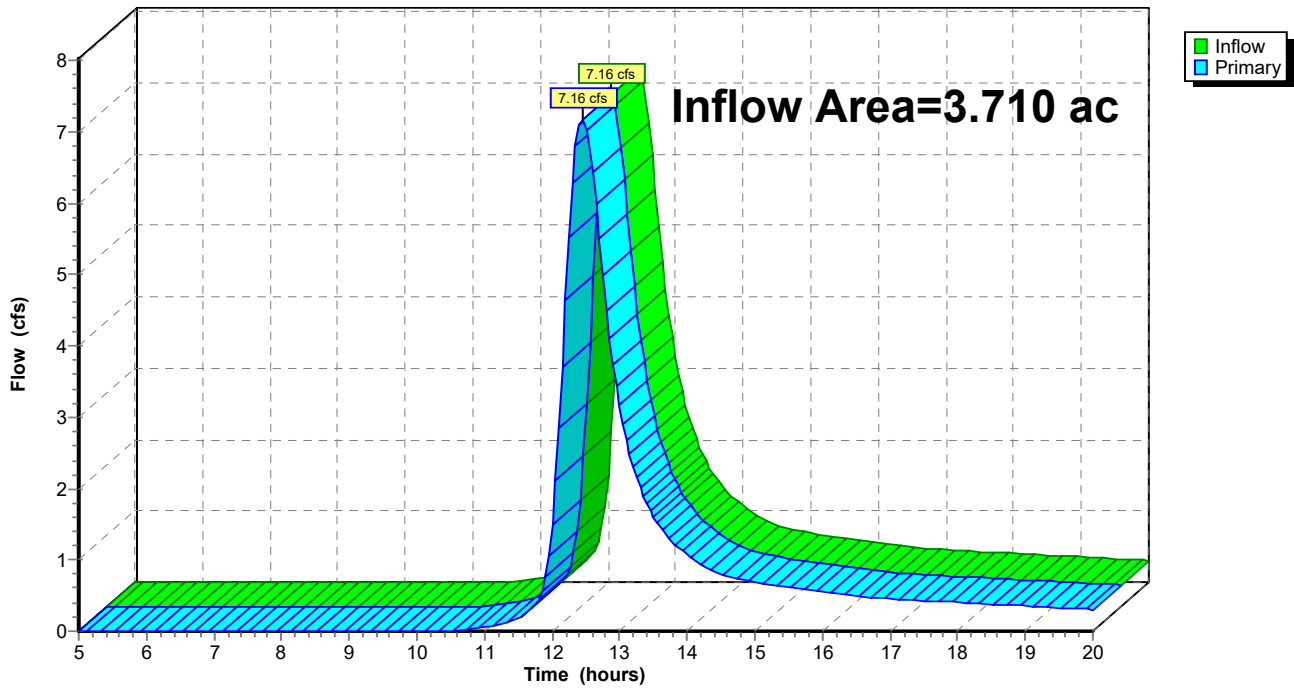
Summary for Link 2L: Outfall

Inflow Area = 3.710 ac, 0.00% Impervious, Inflow Depth > 2.73" for 25-YR - 24HR. event
Inflow = 7.16 cfs @ 12.45 hrs, Volume= 0.844 af
Primary = 7.16 cfs @ 12.45 hrs, Volume= 0.844 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link 2L: Outfall

Hydrograph



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

Subcatchment 1S: Pre Developed Runoff Area=161,589 sf 0.00% Impervious Runoff Depth=0.00"
Flow Length=674' Slope=0.0090 '/' Tc=44.5 min CN=58 Runoff=0.00 cfs 0.000 af

Subcatchment 4S: Post Developed Runoff Area=161,589 sf 0.00% Impervious Runoff Depth=0.00"
Flow Length=532' Slope=0.0056 '/' Tc=39.0 min CN=65 Runoff=0.00 cfs 0.000 af

Reach 10R: Proposed Ditch Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af
n=0.030 L=415.0' S=0.0072 '/' Capacity=25.37 cfs Outflow=0.00 cfs 0.000 af

Pond 3P: Rock Laydown Peak Elev=101.80' Storage=0 cf Inflow=0.00 cfs 0.000 af
Discarded=0.00 cfs 0.000 af Primary=0.00 cfs 0.000 af Outflow=0.00 cfs 0.000 af

Pond 11P: Proposed Pond Peak Elev=98.00' Storage=0 cf Inflow=0.00 cfs 0.000 af
Discarded=0.00 cfs 0.000 af Primary=0.00 cfs 0.000 af Outflow=0.00 cfs 0.000 af

Link 2L: Outfall Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

Summary for Subcatchment 1S: Pre Developed

Runoff = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Depth= 0.00"

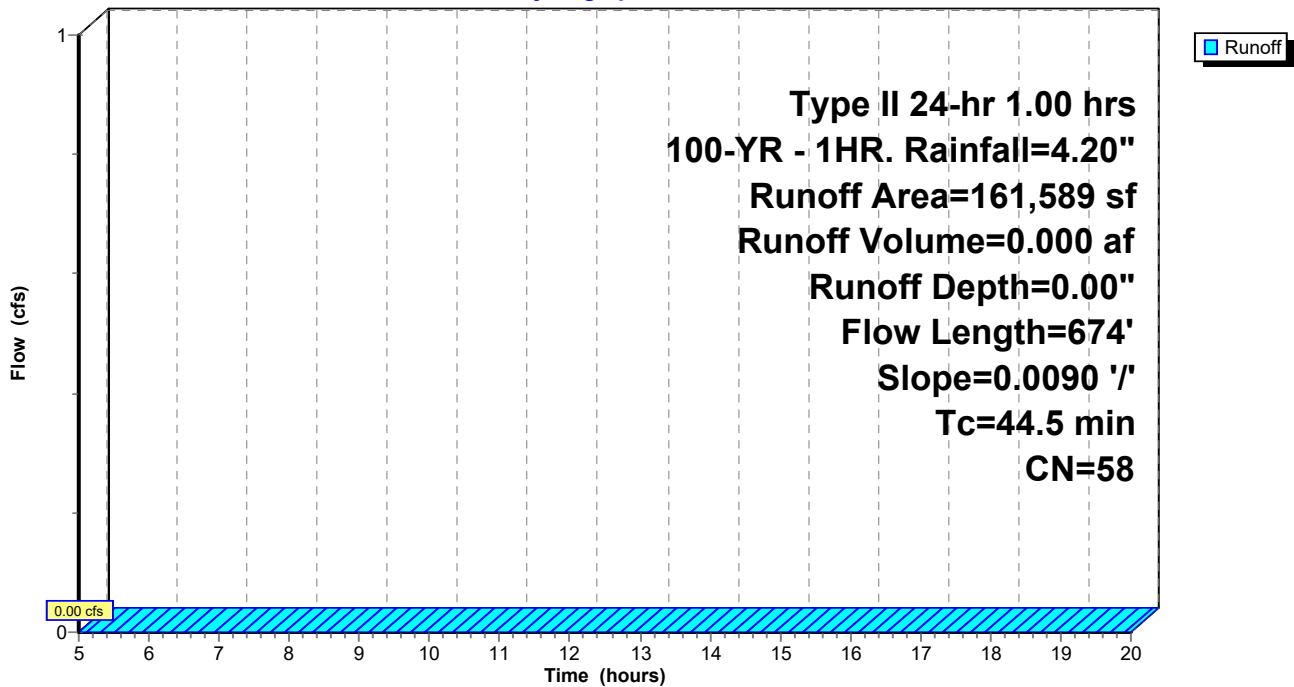
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Type II 24-hr 1.00 hrs 100-YR - 1HR. Rainfall=4.20"

Area (sf)	CN	Description
161,589	58	Meadow, non-grazed, HSG B
161,589		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
44.5	674	0.0090	0.25		Lag/CN Method,

Subcatchment 1S: Pre Developed

Hydrograph



Summary for Subcatchment 4S: Post Developed

Runoff = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Depth= 0.00"

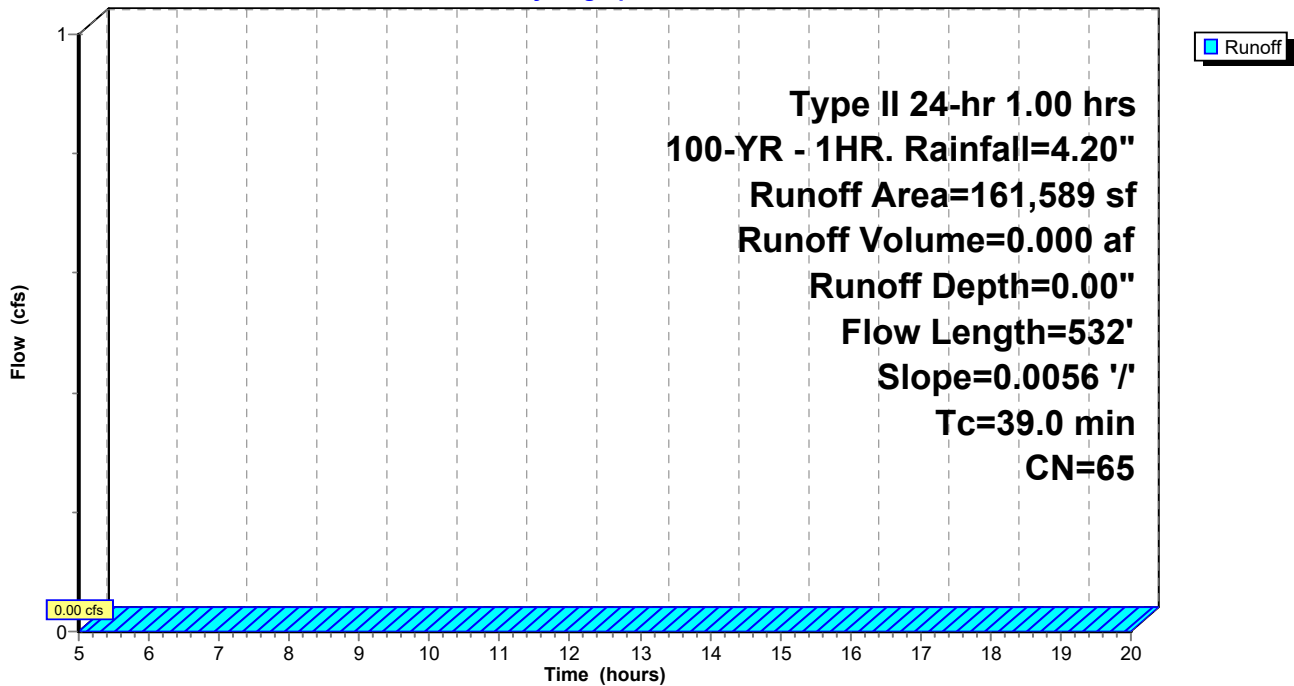
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Type II 24-hr 1.00 hrs 100-YR - 1HR. Rainfall=4.20"

Area (sf)	CN	Description
41,405	58	Meadow, non-grazed, HSG B
* 103,895	65	Uncompacted Gravel (35% Void)
16,289	85	Gravel roads, HSG B
161,589	65	Weighted Average
161,589		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
39.0	532	0.0056	0.23		Lag/CN Method,

Subcatchment 4S: Post Developed

Hydrograph



Summary for Reach 10R: Proposed Ditch

Inflow Area = 3.710 ac, 0.00% Impervious, Inflow Depth = 0.00" for 100-YR - 1HR. event
 Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
 Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Max. Velocity= 0.00 fps, Min. Travel Time= 0.0 min
 Avg. Velocity = 0.00 fps, Avg. Travel Time= 0.0 min

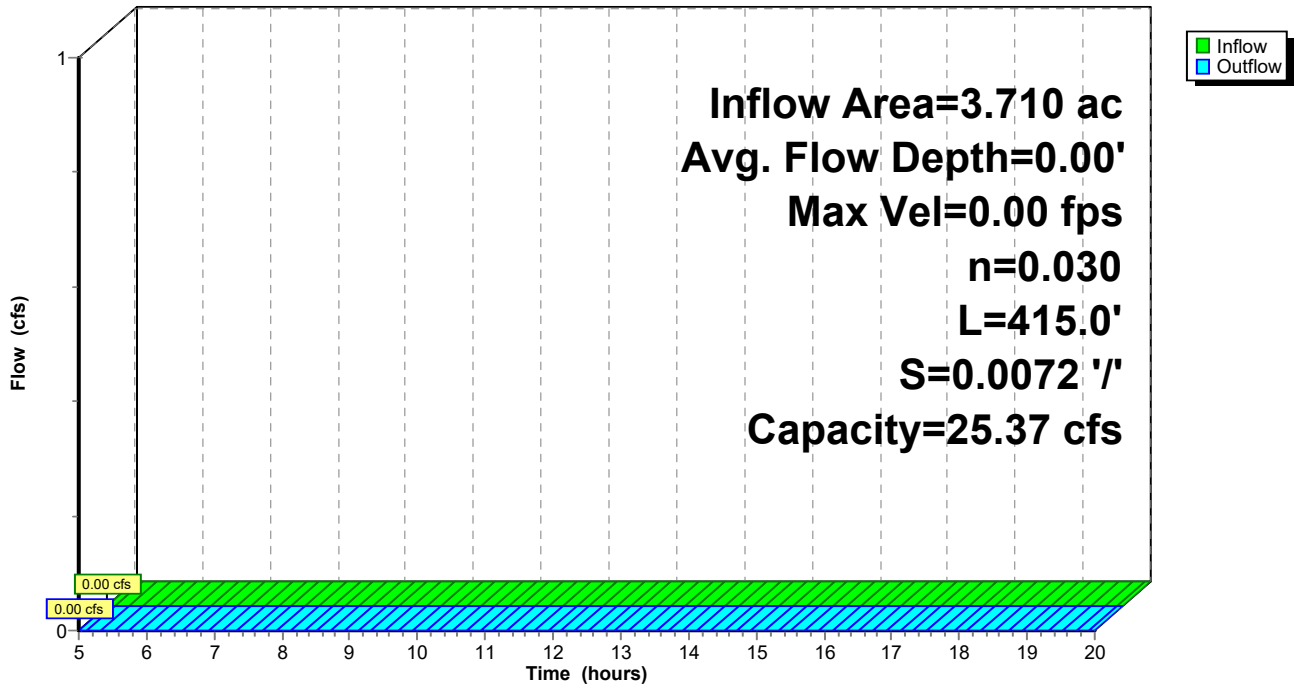
Peak Storage= 0 cf @ 5.00 hrs
 Average Depth at Peak Storage= 0.00'
 Bank-Full Depth= 1.00' Flow Area= 8.0 sf, Capacity= 25.37 cfs

4.00' x 1.00' deep channel, n= 0.030 Earth, grassed & winding
 Side Slope Z-value= 4.0 '/' Top Width= 12.00'
 Length= 415.0' Slope= 0.0072 '/'
 Inlet Invert= 104.00', Outlet Invert= 101.00'



Reach 10R: Proposed Ditch

Hydrograph



Summary for Pond 3P: Rock Laydown

Inflow Area = 3.710 ac, 0.00% Impervious, Inflow Depth = 0.00" for 100-YR - 1HR. event
 Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
 Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min
 Discarded = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
 Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Peak Elev= 101.80' @ 5.00 hrs Surf.Area= 36,363 sf Storage= 0 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
 Center-of-Mass det. time= (not calculated: no inflow)

Volume	Invert	Avail.Storage	Storage Description
#1	101.80'	7,273 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

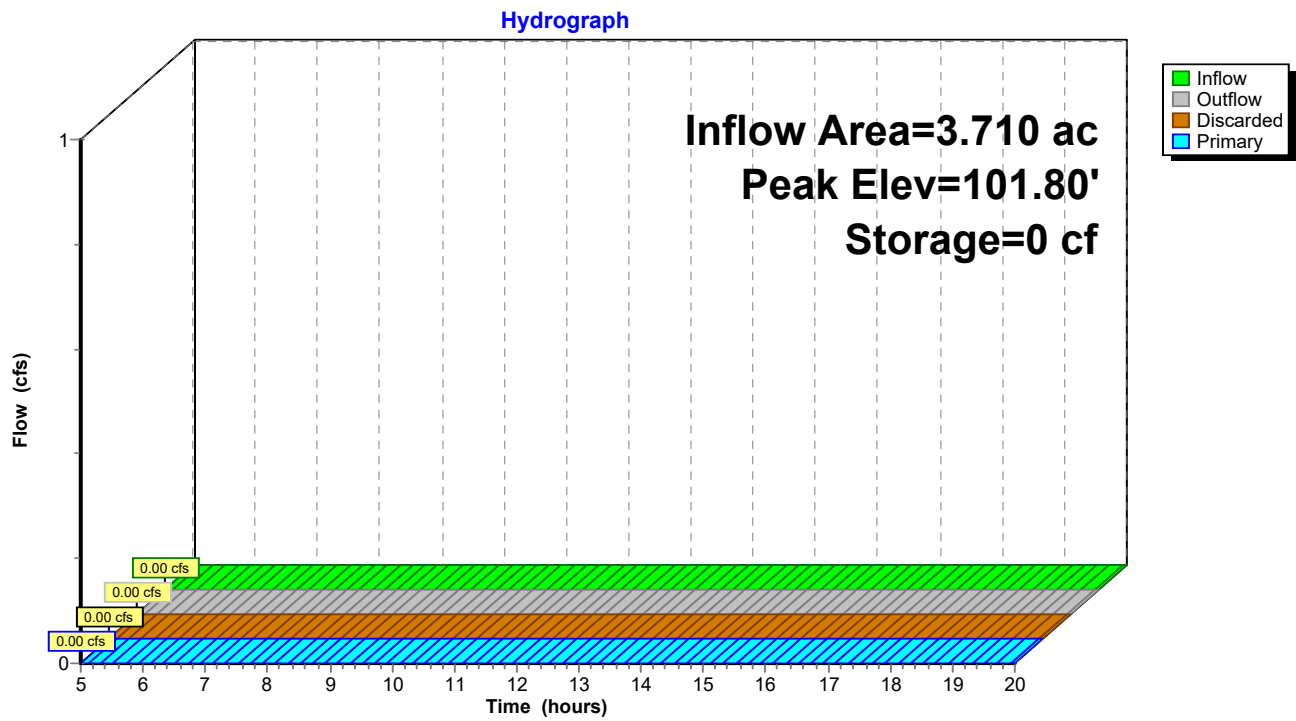
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
101.80	36,363	0	0
102.00	36,363	7,273	7,273

Device	Routing	Invert	Outlet Devices
#1	Discarded	101.80'	0.250 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Primary	102.20'	1,392.0' long x 1.0' 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 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Discarded OutFlow Max=0.00 cfs @ 5.00 hrs HW=101.80' (Free Discharge)
 ↑1=Exfiltration (Controls 0.00 cfs)

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=101.80' (Free Discharge)
 ↑2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond 3P: Rock Laydown



Summary for Pond 11P: Proposed Pond

Inflow Area = 3.710 ac, 0.00% Impervious, Inflow Depth = 0.00" for 100-YR - 1HR. event
 Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
 Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min
 Discarded = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
 Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Peak Elev= 98.00' @ 5.00 hrs Surf.Area= 13,946 sf Storage= 0 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
 Center-of-Mass det. time= (not calculated: no inflow)

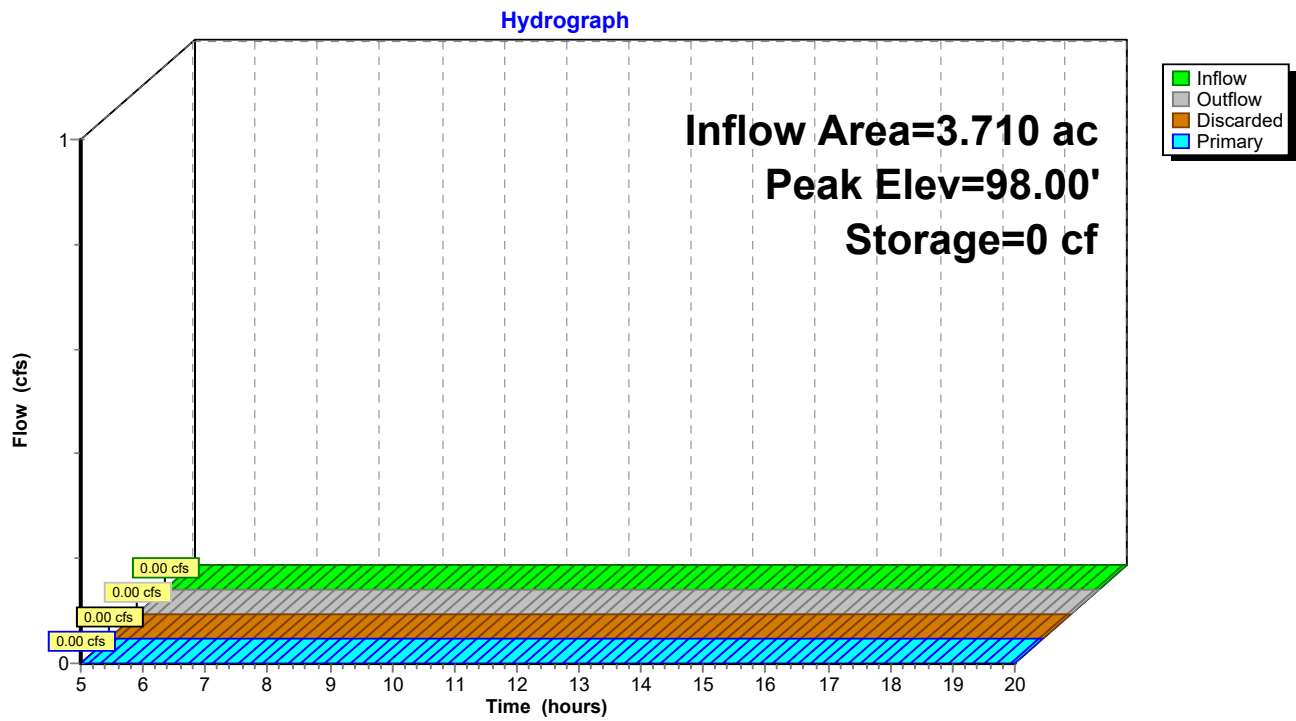
Volume	Invert	Avail.Storage	Storage Description
#1	98.00'	65,783 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
98.00	13,946	0	0
99.00	15,174	14,560	14,560
100.00	16,427	15,801	30,361
101.00	17,705	17,066	47,427
102.00	19,008	18,357	65,783

Device	Routing	Invert	Outlet Devices
#1	Discarded	98.00'	0.250 in/hr Exfiltration X 1.60 over Surface area Phase-In= 0.01'
#2	Primary	100.30'	43.6 deg x 10.0' long x 1.50' rise Sharp-Crested Vee/Trap Weir Cv= 2.56 (C= 3.20)

Discarded OutFlow Max=0.00 cfs @ 5.00 hrs HW=98.00' (Free Discharge)
 ↑1=Exfiltration (Controls 0.00 cfs)

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=98.00' (Free Discharge)
 ↑2=Sharp-Crested Vee/Trap Weir (Controls 0.00 cfs)

Pond 11P: Proposed Pond



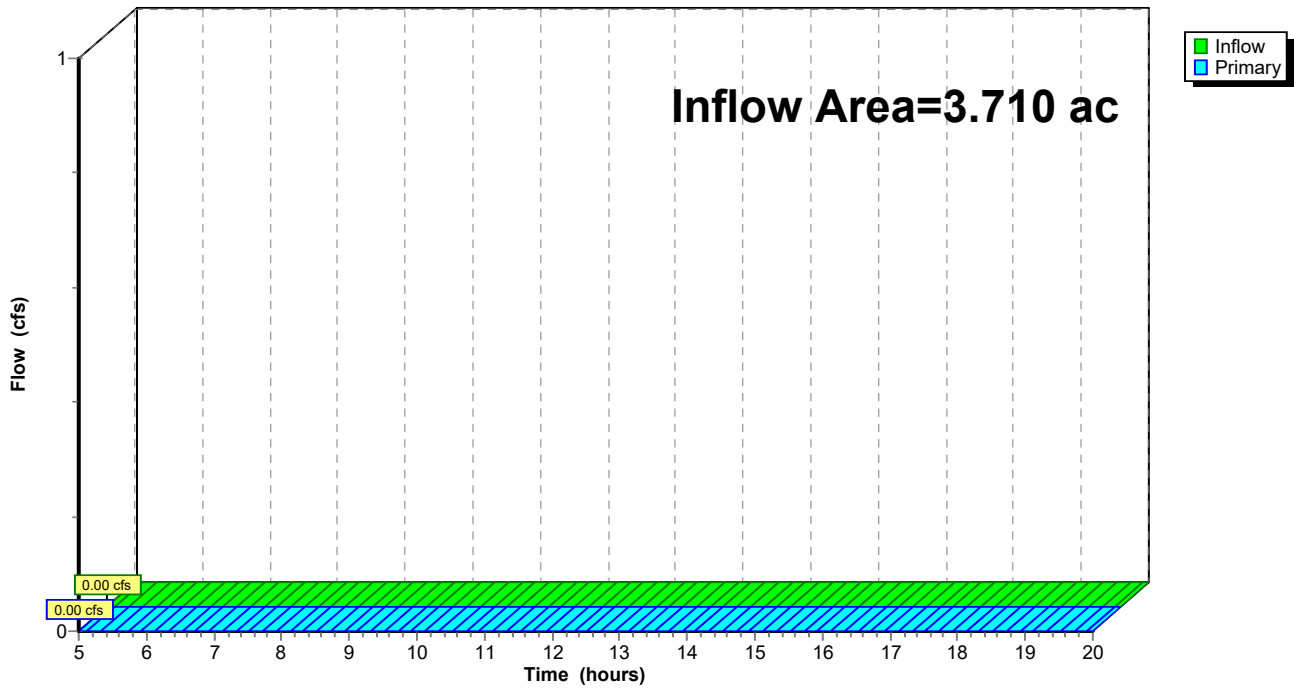
Summary for Link 2L: Outfall

Inflow Area = 3.710 ac, 0.00% Impervious, Inflow Depth = 0.00" for 100-YR - 1HR. event
Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link 2L: Outfall

Hydrograph



Staging Area 2 Basin 4 HydroCAD Report

Type II 24-hr 100-YR - 24HR. Rainfall=9.84"

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Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 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: Pre Developed Runoff Area=161,589 sf 0.00% Impervious Runoff Depth>4.07"
Flow Length=674' Slope=0.0090 '/' Tc=44.5 min CN=58 Runoff=10.85 cfs 1.257 af

Subcatchment4S: Post Developed Runoff Area=161,589 sf 0.00% Impervious Runoff Depth>4.96"
Flow Length=532' Slope=0.0056 '/' Tc=39.0 min CN=65 Runoff=14.60 cfs 1.533 af

Reach 10R: Proposed Ditch Avg. Flow Depth=0.75' Max Vel=2.71 fps Inflow=14.88 cfs 1.185 af
n=0.030 L=415.0' S=0.0072 '/' Capacity=25.37 cfs Outflow=14.24 cfs 1.182 af

Pond 3P: Rock Laydown Peak Elev=102.23' Storage=7,273 cf Inflow=14.60 cfs 1.533 af
Discarded=0.21 cfs 0.180 af Primary=14.88 cfs 1.185 af Outflow=15.09 cfs 1.366 af

Pond 11P: Proposed Pond Peak Elev=100.41' Storage=37,121 cf Inflow=14.24 cfs 1.182 af
Discarded=0.16 cfs 0.100 af Primary=1.10 cfs 0.261 af Outflow=1.26 cfs 0.361 af

Link 2L: Outfall Inflow=10.85 cfs 1.257 af
Primary=10.85 cfs 1.257 af

Staging Area 2 Basin 4 HydroCAD Report

Type II 24-hr 100-YR - 24HR. Rainfall=9.84"

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Summary for Subcatchment 1S: Pre Developed

Runoff = 10.85 cfs @ 12.43 hrs, Volume= 1.257 af, Depth> 4.07"

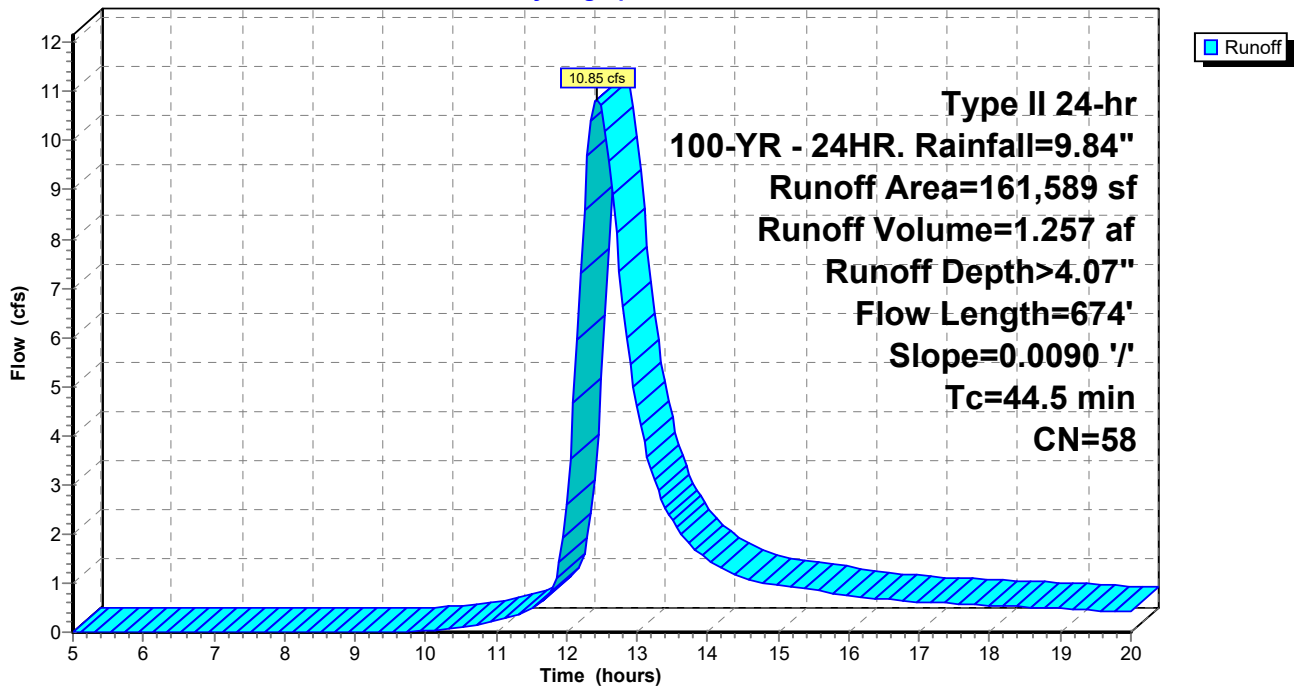
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-YR - 24HR. Rainfall=9.84"

Area (sf)	CN	Description
161,589	58	Meadow, non-grazed, HSG B
161,589		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
44.5	674	0.0090	0.25		Lag/CN Method,

Subcatchment 1S: Pre Developed

Hydrograph



Staging Area 2 Basin 4 HydroCAD Report

Type II 24-hr 100-YR - 24HR. Rainfall=9.84"

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Summary for Subcatchment 4S: Post Developed

Runoff = 14.60 cfs @ 12.36 hrs, Volume= 1.533 af, Depth> 4.96"

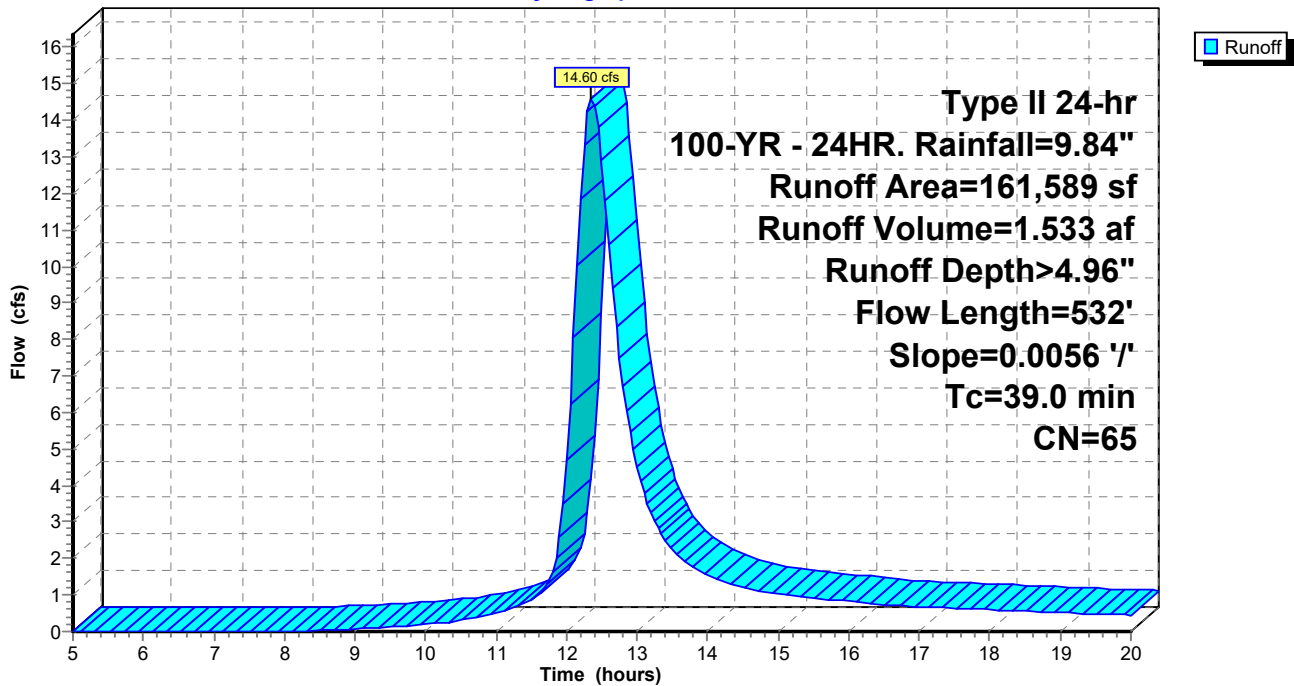
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-YR - 24HR. Rainfall=9.84"

Area (sf)	CN	Description
41,405	58	Meadow, non-grazed, HSG B
* 103,895	65	Uncompacted Gravel (35% Void)
16,289	85	Gravel roads, HSG B
161,589	65	Weighted Average
161,589		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
39.0	532	0.0056	0.23		Lag/CN Method,

Subcatchment 4S: Post Developed

Hydrograph



Staging Area 2 Basin 4 HydroCAD Report

Type II 24-hr 100-YR - 24HR. Rainfall=9.84"

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Summary for Reach 10R: Proposed Ditch

Inflow Area = 3.710 ac, 0.00% Impervious, Inflow Depth > 3.83" for 100-YR - 24HR. event
Inflow = 14.88 cfs @ 12.35 hrs, Volume= 1.185 af
Outflow = 14.24 cfs @ 12.43 hrs, Volume= 1.182 af, Atten= 4%, Lag= 4.8 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.71 fps, Min. Travel Time= 2.6 min
Avg. Velocity = 1.20 fps, Avg. Travel Time= 5.8 min

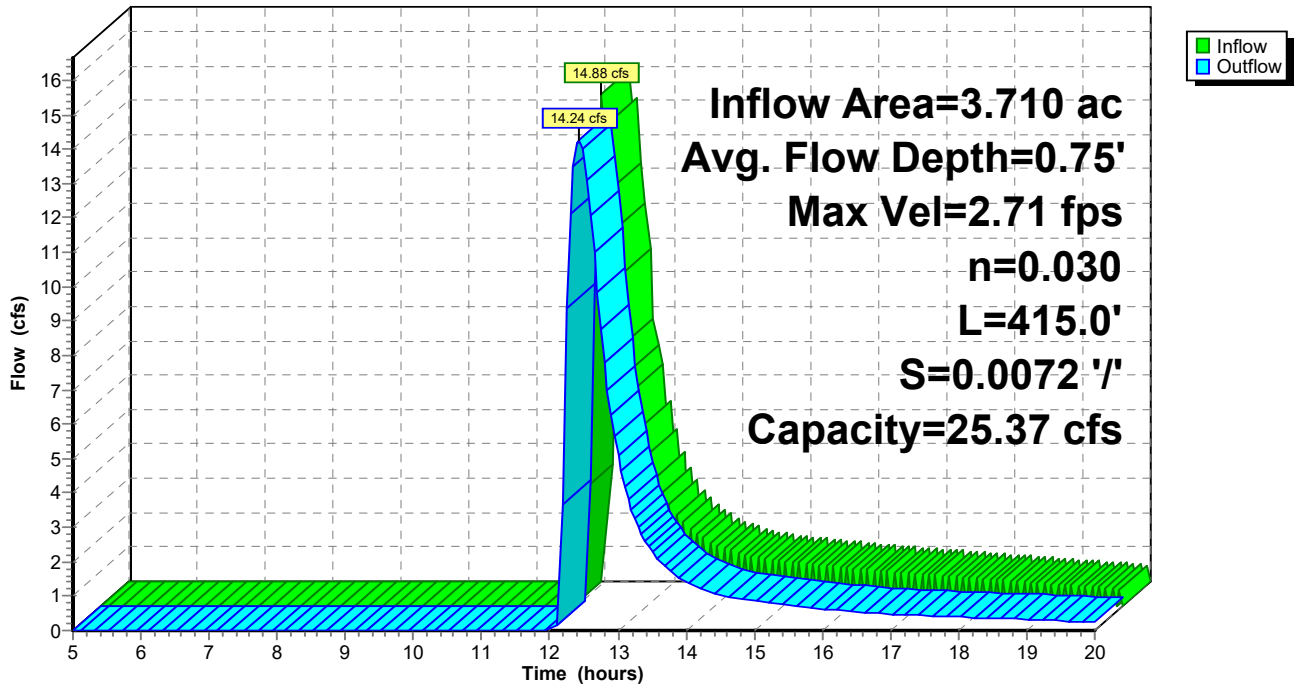
Peak Storage= 2,185 cf @ 12.39 hrs
Average Depth at Peak Storage= 0.75'
Bank-Full Depth= 1.00' Flow Area= 8.0 sf, Capacity= 25.37 cfs

4.00' x 1.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 4.0 '/' Top Width= 12.00'
Length= 415.0' Slope= 0.0072 '/'
Inlet Invert= 104.00', Outlet Invert= 101.00'



Reach 10R: Proposed Ditch

Hydrograph



Staging Area 2 Basin 4 HydroCAD Report

Type II 24-hr 100-YR - 24HR. Rainfall=9.84"

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Summary for Pond 3P: Rock Laydown

Inflow Area = 3.710 ac, 0.00% Impervious, Inflow Depth > 4.96" for 100-YR - 24HR. event
 Inflow = 14.60 cfs @ 12.36 hrs, Volume= 1.533 af
 Outflow = 15.09 cfs @ 12.35 hrs, Volume= 1.366 af, Atten= 0%, Lag= 0.0 min
 Discarded = 0.21 cfs @ 10.65 hrs, Volume= 0.180 af
 Primary = 14.88 cfs @ 12.35 hrs, Volume= 1.185 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Peak Elev= 102.23' @ 12.35 hrs Surf.Area= 36,363 sf Storage= 7,273 cf

Plug-Flow detention time= 47.2 min calculated for 1.366 af (89% of inflow)
 Center-of-Mass det. time= 12.8 min (820.6 - 807.8)

Volume	Invert	Avail.Storage	Storage Description
#1	101.80'	7,273 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
101.80	36,363	0	0
102.00	36,363	7,273	7,273

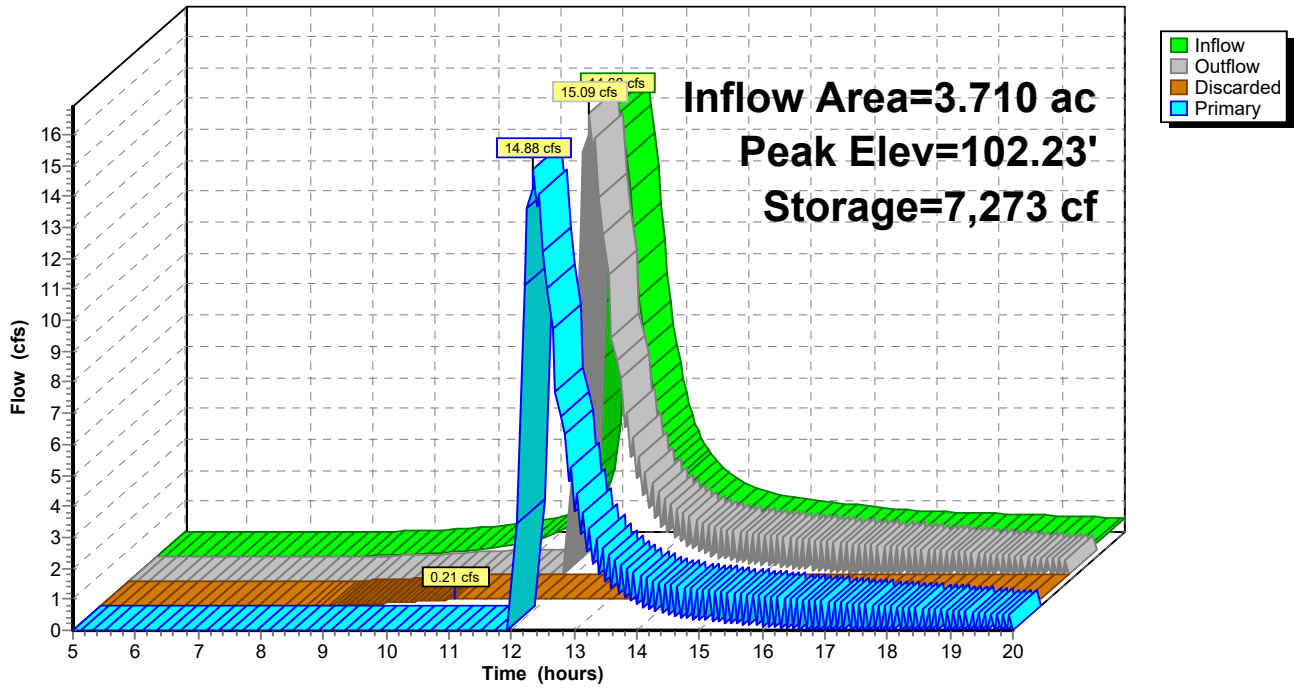
Device	Routing	Invert	Outlet Devices
#1	Discarded	101.80'	0.250 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Primary	102.20'	1,392.0' long x 1.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Discarded OutFlow Max=0.21 cfs @ 10.65 hrs HW=101.81' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.21 cfs)

Primary OutFlow Max=14.82 cfs @ 12.35 hrs HW=102.23' (Free Discharge)
 ↑2=Broad-Crested Rectangular Weir (Weir Controls 14.82 cfs @ 0.43 fps)

Pond 3P: Rock Laydown

Hydrograph



Staging Area 2 Basin 4 HydroCAD Report

Type II 24-hr 100-YR - 24HR. Rainfall=9.84"

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Summary for Pond 11P: Proposed Pond

Inflow Area = 3.710 ac, 0.00% Impervious, Inflow Depth > 3.82" for 100-YR - 24HR. event
 Inflow = 14.24 cfs @ 12.43 hrs, Volume= 1.182 af
 Outflow = 1.26 cfs @ 14.17 hrs, Volume= 0.361 af, Atten= 91%, Lag= 104.4 min
 Discarded = 0.16 cfs @ 14.17 hrs, Volume= 0.100 af
 Primary = 1.10 cfs @ 14.17 hrs, Volume= 0.261 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Peak Elev= 100.41' @ 14.17 hrs Surf.Area= 16,945 sf Storage= 37,121 cf

Plug-Flow detention time= 210.3 min calculated for 0.360 af (30% of inflow)
 Center-of-Mass det. time= 138.8 min (954.3 - 815.5)

Volume	Invert	Avail.Storage	Storage Description
#1	98.00'	65,783 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
98.00	13,946	0	0
99.00	15,174	14,560	14,560
100.00	16,427	15,801	30,361
101.00	17,705	17,066	47,427
102.00	19,008	18,357	65,783

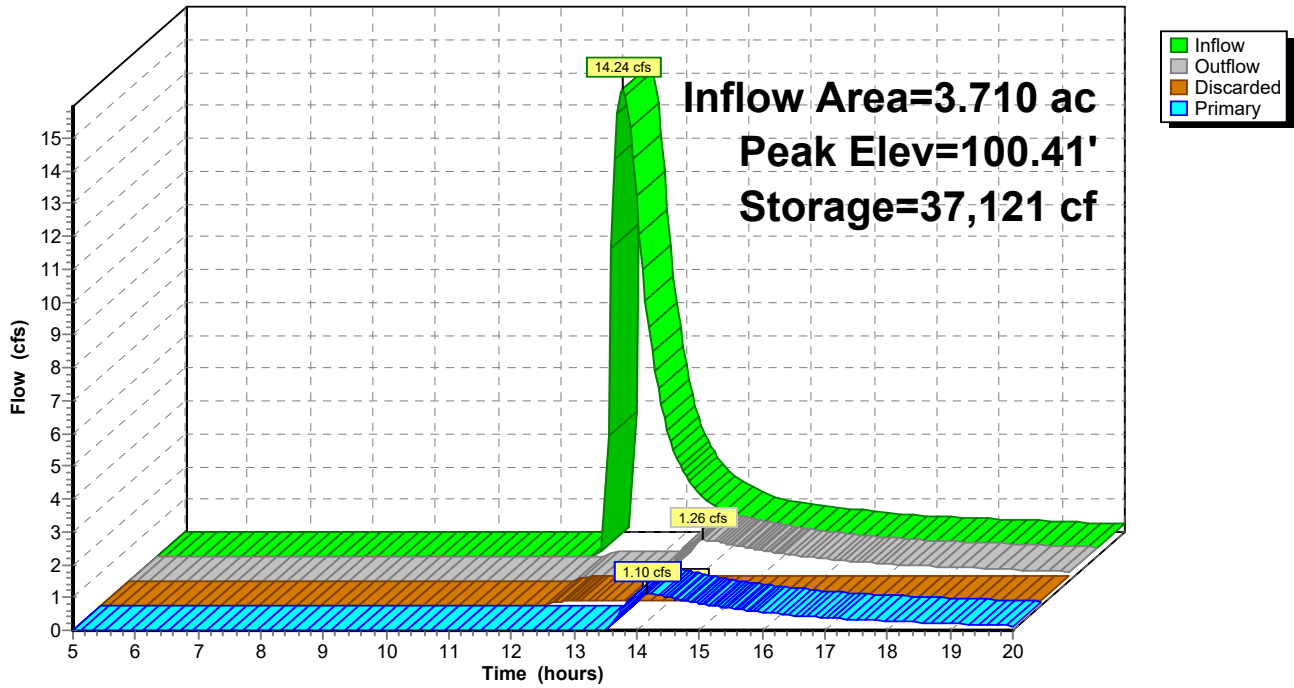
Device	Routing	Invert	Outlet Devices
#1	Discarded	98.00'	0.250 in/hr Exfiltration X 1.60 over Surface area Phase-In= 0.01'
#2	Primary	100.30'	43.6 deg x 10.0' long x 1.50' rise Sharp-Crested Vee/Trap Weir Cv= 2.56 (C= 3.20)

Discarded OutFlow Max=0.16 cfs @ 14.17 hrs HW=100.41' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.16 cfs)

Primary OutFlow Max=1.09 cfs @ 14.17 hrs HW=100.41' (Free Discharge)
 ↑2=Sharp-Crested Vee/Trap Weir (Weir Controls 1.09 cfs @ 1.04 fps)

Pond 11P: Proposed Pond

Hydrograph



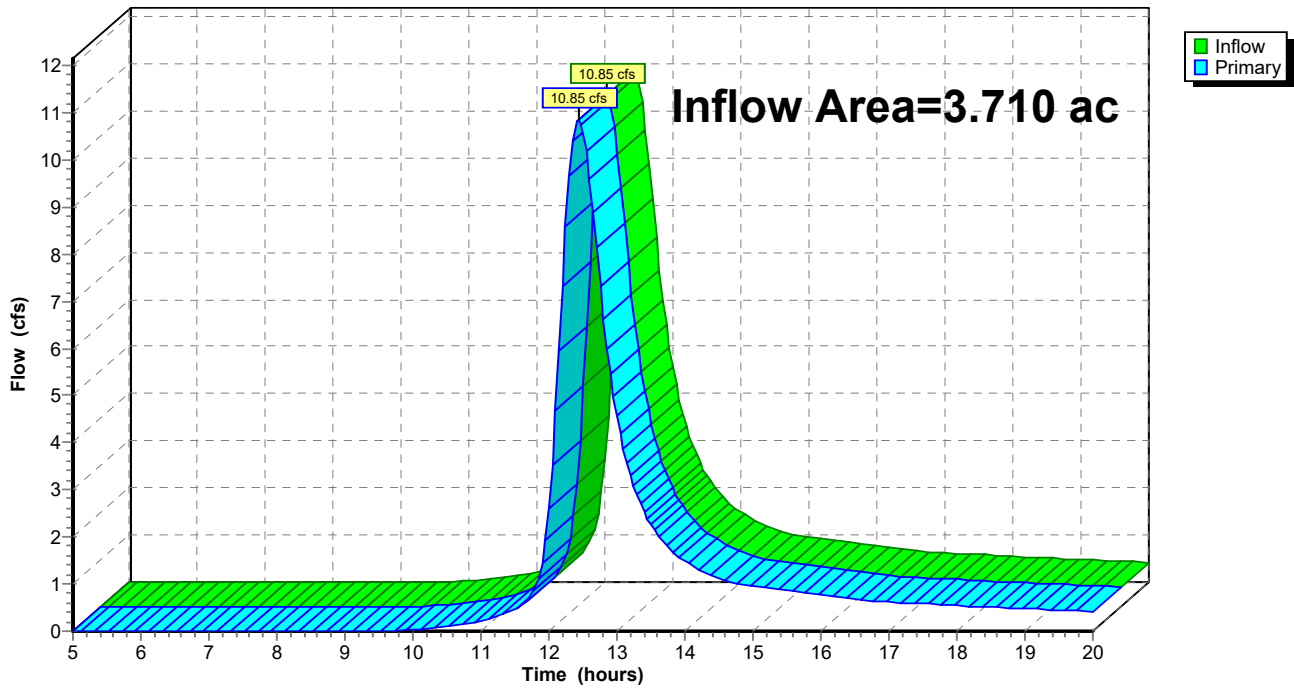
Summary for Link 2L: Outfall

Inflow Area = 3.710 ac, 0.00% Impervious, Inflow Depth > 4.07" for 100-YR - 24HR. event
Inflow = 10.85 cfs @ 12.43 hrs, Volume= 1.257 af
Primary = 10.85 cfs @ 12.43 hrs, Volume= 1.257 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link 2L: Outfall

Hydrograph



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

Subcatchment 1S: Pre Developed Runoff Area=161,589 sf 0.00% Impervious Runoff Depth=0.00"
Flow Length=674' Slope=0.0090 '/' Tc=44.5 min CN=58 Runoff=0.00 cfs 0.000 af

Subcatchment 4S: Post Developed Runoff Area=161,589 sf 0.00% Impervious Runoff Depth=0.00"
Flow Length=532' Slope=0.0056 '/' Tc=39.0 min CN=65 Runoff=0.00 cfs 0.000 af

Reach 10R: Proposed Ditch Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af
n=0.030 L=415.0' S=0.0072 '/' Capacity=25.37 cfs Outflow=0.00 cfs 0.000 af

Pond 3P: Rock Laydown Peak Elev=101.80' Storage=0 cf Inflow=0.00 cfs 0.000 af
Discarded=0.00 cfs 0.000 af Primary=0.00 cfs 0.000 af Outflow=0.00 cfs 0.000 af

Pond 11P: Proposed Pond Peak Elev=98.00' Storage=0 cf Inflow=0.00 cfs 0.000 af
Discarded=0.00 cfs 0.000 af Primary=0.00 cfs 0.000 af Outflow=0.00 cfs 0.000 af

Link 2L: Outfall Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

Summary for Subcatchment 1S: Pre Developed

Runoff = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Depth= 0.00"

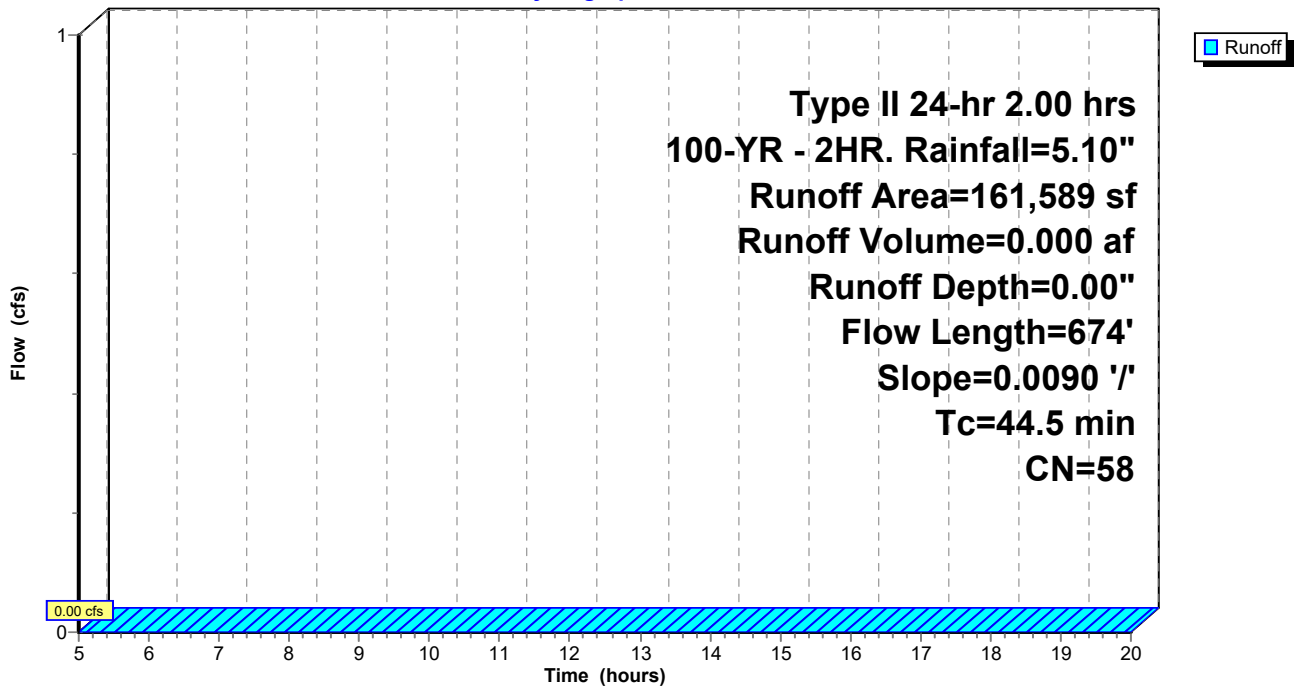
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Type II 24-hr 2.00 hrs 100-YR - 2HR. Rainfall=5.10"

Area (sf)	CN	Description
161,589	58	Meadow, non-grazed, HSG B
161,589		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
44.5	674	0.0090	0.25		Lag/CN Method,

Subcatchment 1S: Pre Developed

Hydrograph



Summary for Subcatchment 4S: Post Developed

Runoff = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Depth= 0.00"

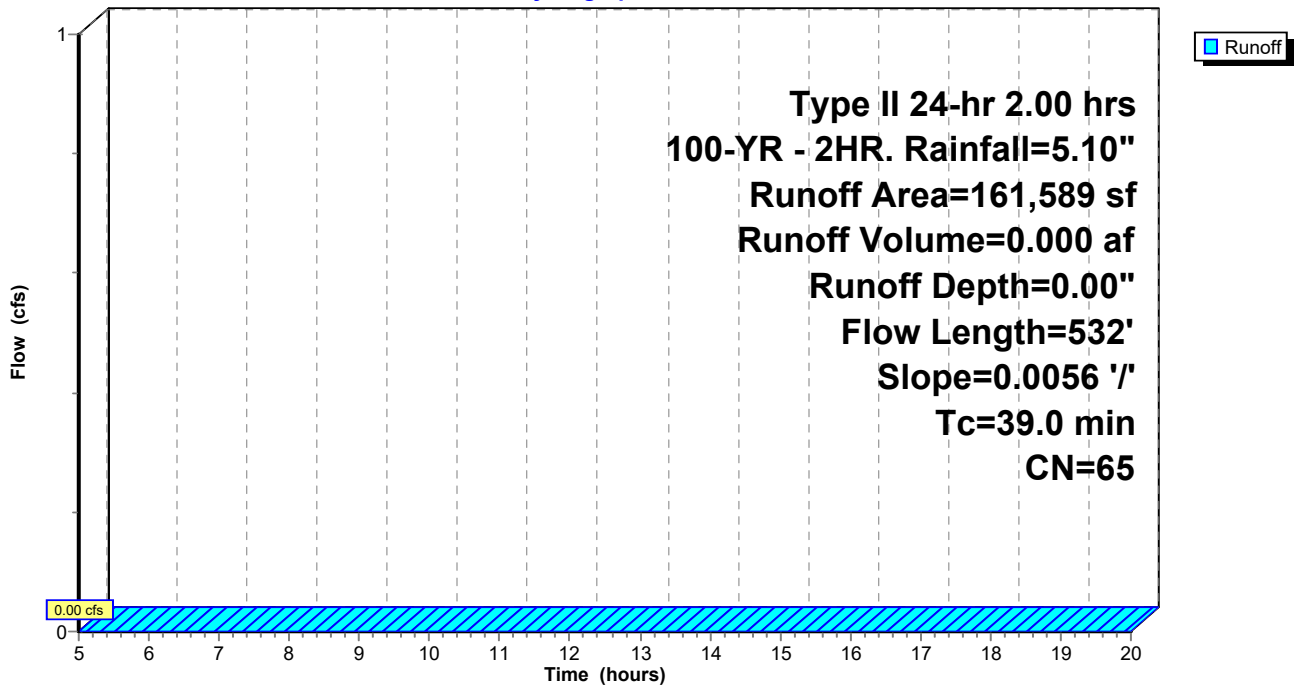
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Type II 24-hr 2.00 hrs 100-YR - 2HR. Rainfall=5.10"

Area (sf)	CN	Description
41,405	58	Meadow, non-grazed, HSG B
* 103,895	65	Uncompacted Gravel (35% Void)
16,289	85	Gravel roads, HSG B
161,589	65	Weighted Average
161,589		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
39.0	532	0.0056	0.23		Lag/CN Method,

Subcatchment 4S: Post Developed

Hydrograph



Summary for Reach 10R: Proposed Ditch

Inflow Area = 3.710 ac, 0.00% Impervious, Inflow Depth = 0.00" for 100-YR - 2HR. event
 Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
 Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Max. Velocity= 0.00 fps, Min. Travel Time= 0.0 min
 Avg. Velocity = 0.00 fps, Avg. Travel Time= 0.0 min

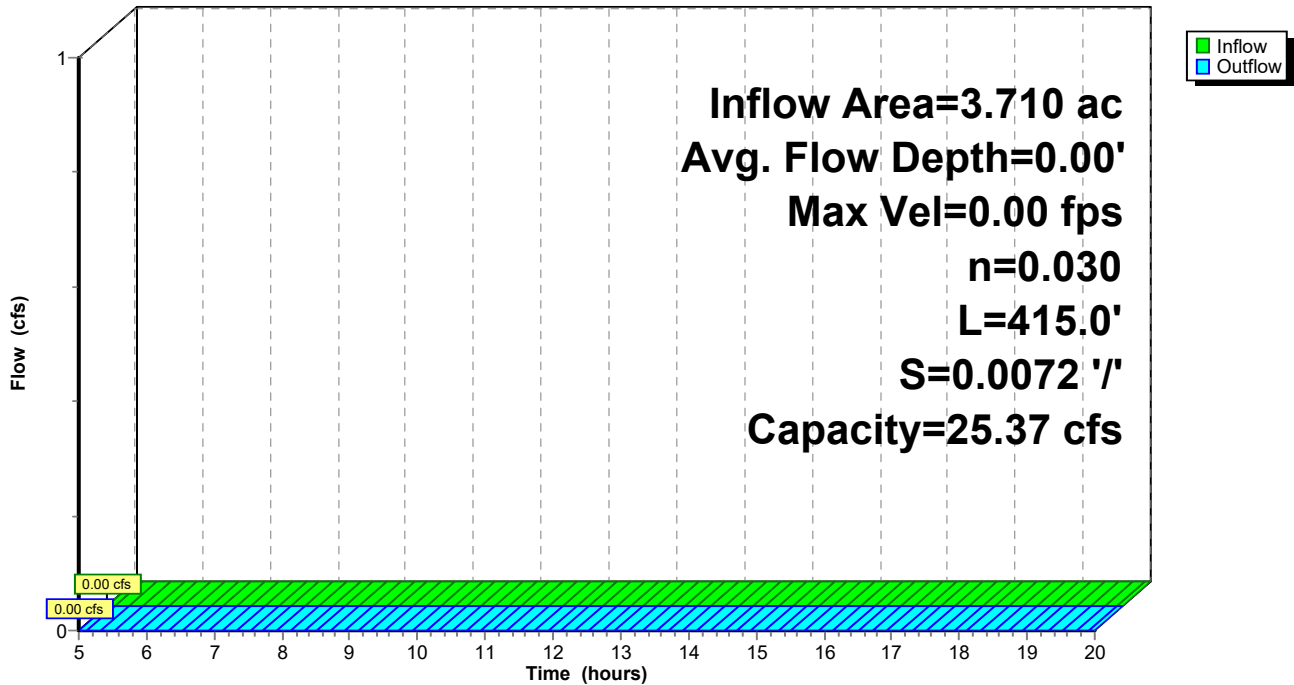
Peak Storage= 0 cf @ 5.00 hrs
 Average Depth at Peak Storage= 0.00'
 Bank-Full Depth= 1.00' Flow Area= 8.0 sf, Capacity= 25.37 cfs

4.00' x 1.00' deep channel, n= 0.030 Earth, grassed & winding
 Side Slope Z-value= 4.0 '/' Top Width= 12.00'
 Length= 415.0' Slope= 0.0072 '/'
 Inlet Invert= 104.00', Outlet Invert= 101.00'



Reach 10R: Proposed Ditch

Hydrograph



Summary for Pond 3P: Rock Laydown

Inflow Area = 3.710 ac, 0.00% Impervious, Inflow Depth = 0.00" for 100-YR - 2HR. event
 Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
 Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min
 Discarded = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
 Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Peak Elev= 101.80' @ 5.00 hrs Surf.Area= 36,363 sf Storage= 0 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
 Center-of-Mass det. time= (not calculated: no inflow)

Volume	Invert	Avail.Storage	Storage Description
#1	101.80'	7,273 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

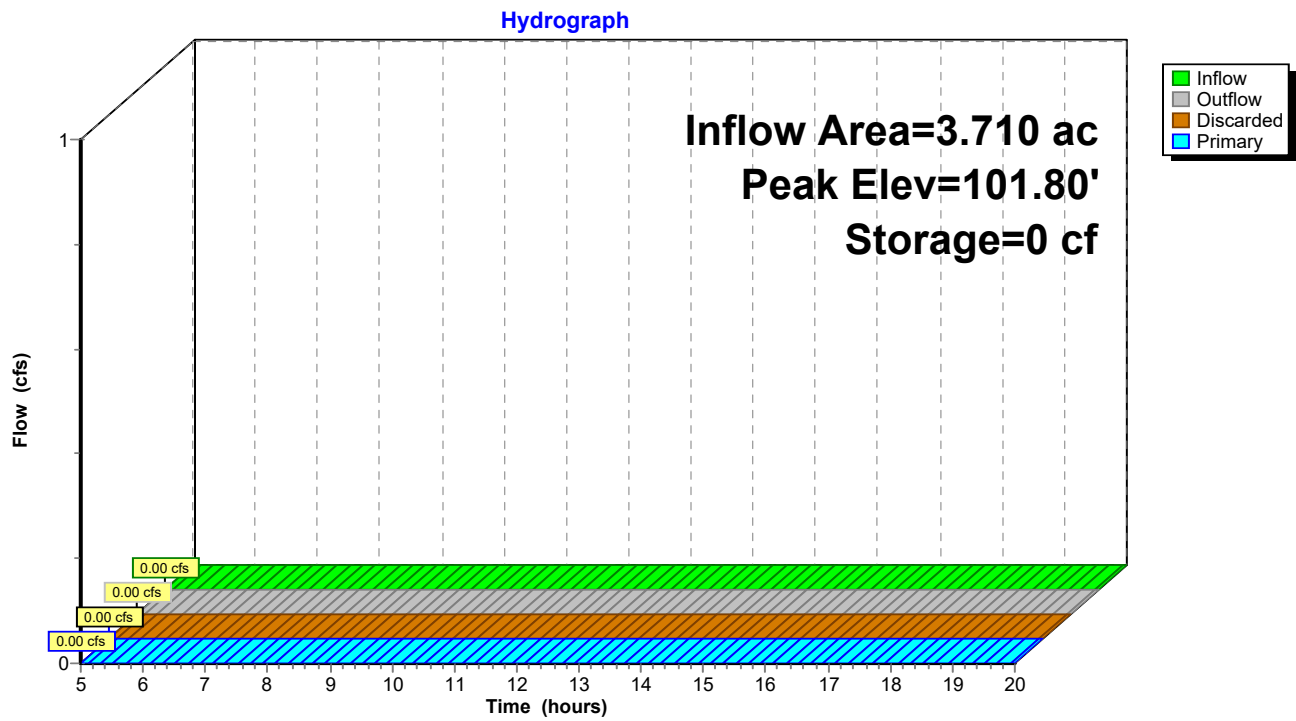
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
101.80	36,363	0	0
102.00	36,363	7,273	7,273

Device	Routing	Invert	Outlet Devices
#1	Discarded	101.80'	0.250 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Primary	102.20'	1,392.0' long x 1.0' 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 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Discarded OutFlow Max=0.00 cfs @ 5.00 hrs HW=101.80' (Free Discharge)
 ↑1=Exfiltration (Controls 0.00 cfs)

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=101.80' (Free Discharge)
 ↑2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond 3P: Rock Laydown



Summary for Pond 11P: Proposed Pond

Inflow Area = 3.710 ac, 0.00% Impervious, Inflow Depth = 0.00" for 100-YR - 2HR. event
 Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
 Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min
 Discarded = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
 Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Peak Elev= 98.00' @ 5.00 hrs Surf.Area= 13,946 sf Storage= 0 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
 Center-of-Mass det. time= (not calculated: no inflow)

Volume	Invert	Avail.Storage	Storage Description
#1	98.00'	65,783 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

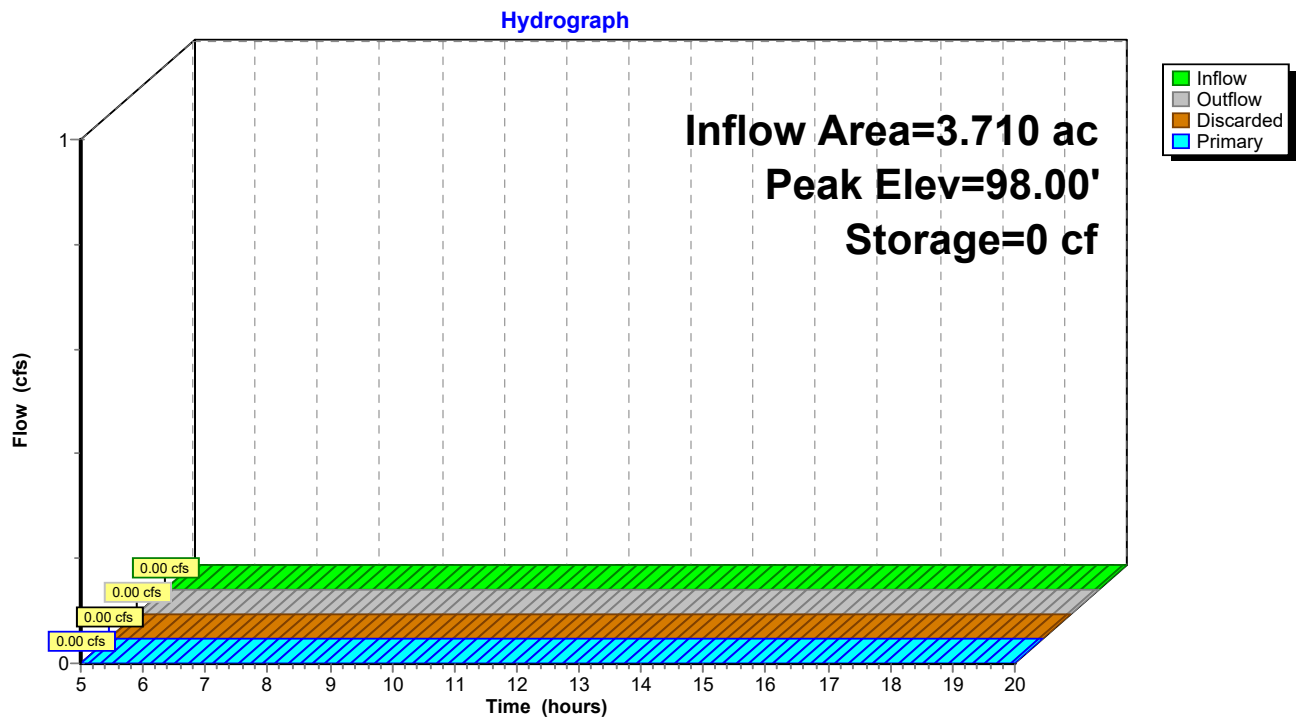
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
98.00	13,946	0	0
99.00	15,174	14,560	14,560
100.00	16,427	15,801	30,361
101.00	17,705	17,066	47,427
102.00	19,008	18,357	65,783

Device	Routing	Invert	Outlet Devices
#1	Discarded	98.00'	0.250 in/hr Exfiltration X 1.60 over Surface area Phase-In= 0.01'
#2	Primary	100.30'	43.6 deg x 10.0' long x 1.50' rise Sharp-Crested Vee/Trap Weir Cv= 2.56 (C= 3.20)

Discarded OutFlow Max=0.00 cfs @ 5.00 hrs HW=98.00' (Free Discharge)
 ↑1=Exfiltration (Controls 0.00 cfs)

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=98.00' (Free Discharge)
 ↑2=Sharp-Crested Vee/Trap Weir (Controls 0.00 cfs)

Pond 11P: Proposed Pond



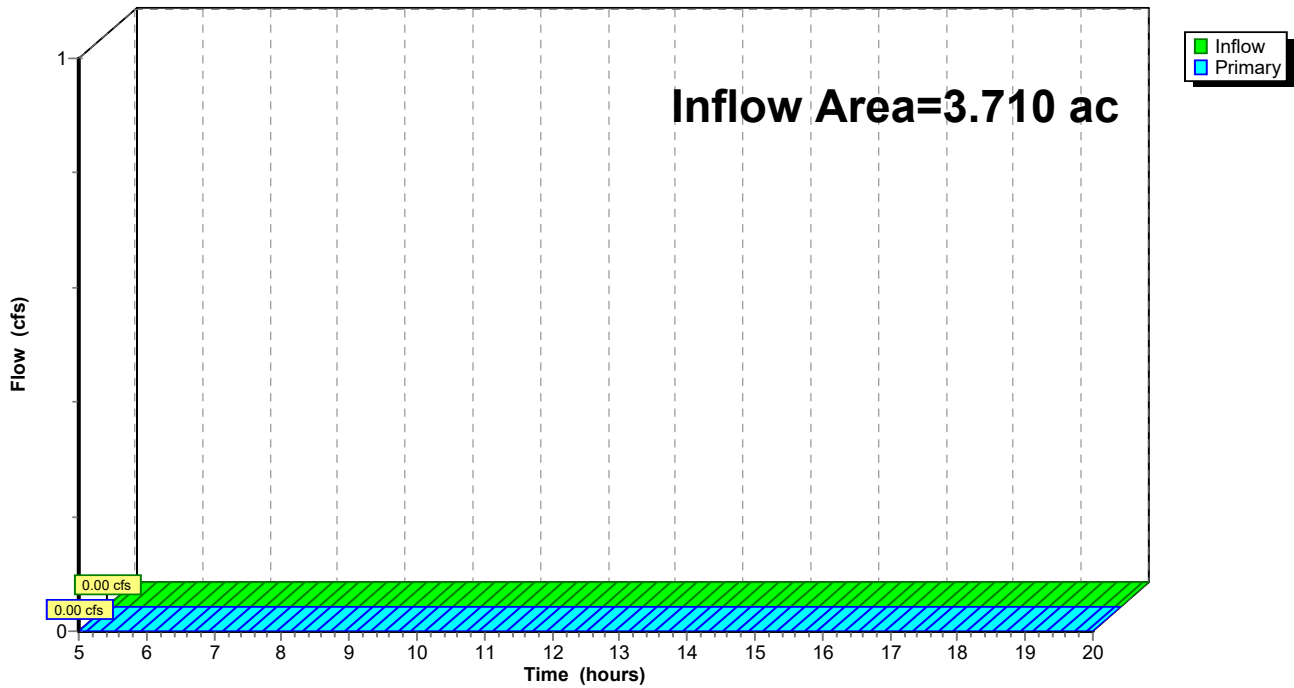
Summary for Link 2L: Outfall

Inflow Area = 3.710 ac, 0.00% Impervious, Inflow Depth = 0.00" for 100-YR - 2HR. event
Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link 2L: Outfall

Hydrograph



Staging Area 2 Basin 4 HydroCAD Report Type II 24-hr 4.00 hrs 100-YR - 4HR. Rainfall=6.08"

Prepared by HP Inc.

Printed 3/12/2020

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

Subcatchment 1S: Pre Developed Runoff Area=161,589 sf 0.00% Impervious Runoff Depth>0.01"
Flow Length=674' Slope=0.0090 '/' Tc=44.5 min CN=58 Runoff=0.15 cfs 0.004 af

Subcatchment 4S: Post Developed Runoff Area=161,589 sf 0.00% Impervious Runoff Depth>0.01"
Flow Length=532' Slope=0.0056 '/' Tc=39.0 min CN=65 Runoff=0.11 cfs 0.002 af

Reach 10R: Proposed Ditch Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af
n=0.030 L=415.0' S=0.0072 '/' Capacity=25.37 cfs Outflow=0.00 cfs 0.000 af

Pond 3P: Rock Laydown Peak Elev=101.80' Storage=54 cf Inflow=0.11 cfs 0.002 af
Discarded=0.03 cfs 0.002 af Primary=0.00 cfs 0.000 af Outflow=0.03 cfs 0.002 af

Pond 11P: Proposed Pond Peak Elev=98.00' Storage=0 cf Inflow=0.00 cfs 0.000 af
Discarded=0.00 cfs 0.000 af Primary=0.00 cfs 0.000 af Outflow=0.00 cfs 0.000 af

Link 2L: Outfall Inflow=0.15 cfs 0.004 af
Primary=0.15 cfs 0.004 af

Summary for Subcatchment 1S: Pre Developed

Runoff = 0.15 cfs @ 5.00 hrs, Volume= 0.004 af, Depth> 0.01"

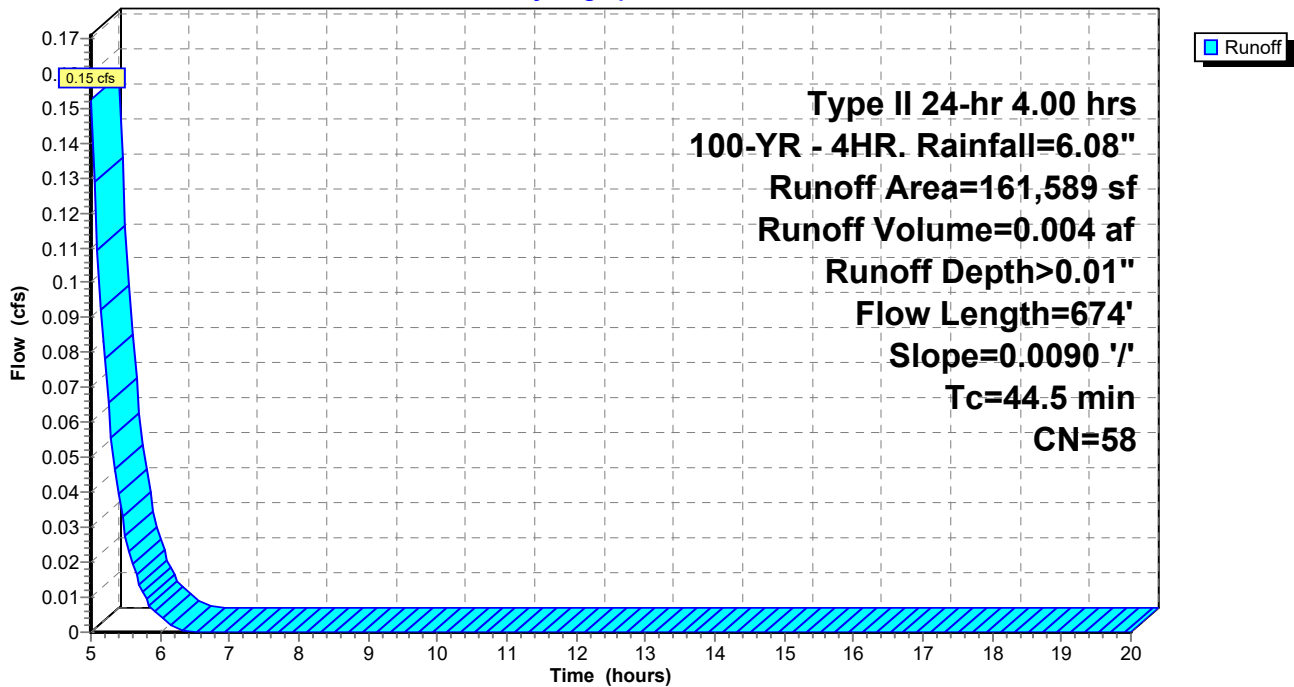
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Type II 24-hr 4.00 hrs 100-YR - 4HR. Rainfall=6.08"

Area (sf)	CN	Description
161,589	58	Meadow, non-grazed, HSG B
161,589		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
44.5	674	0.0090	0.25		Lag/CN Method,

Subcatchment 1S: Pre Developed

Hydrograph



Summary for Subcatchment 4S: Post Developed

Runoff = 0.11 cfs @ 5.00 hrs, Volume= 0.002 af, Depth> 0.01"

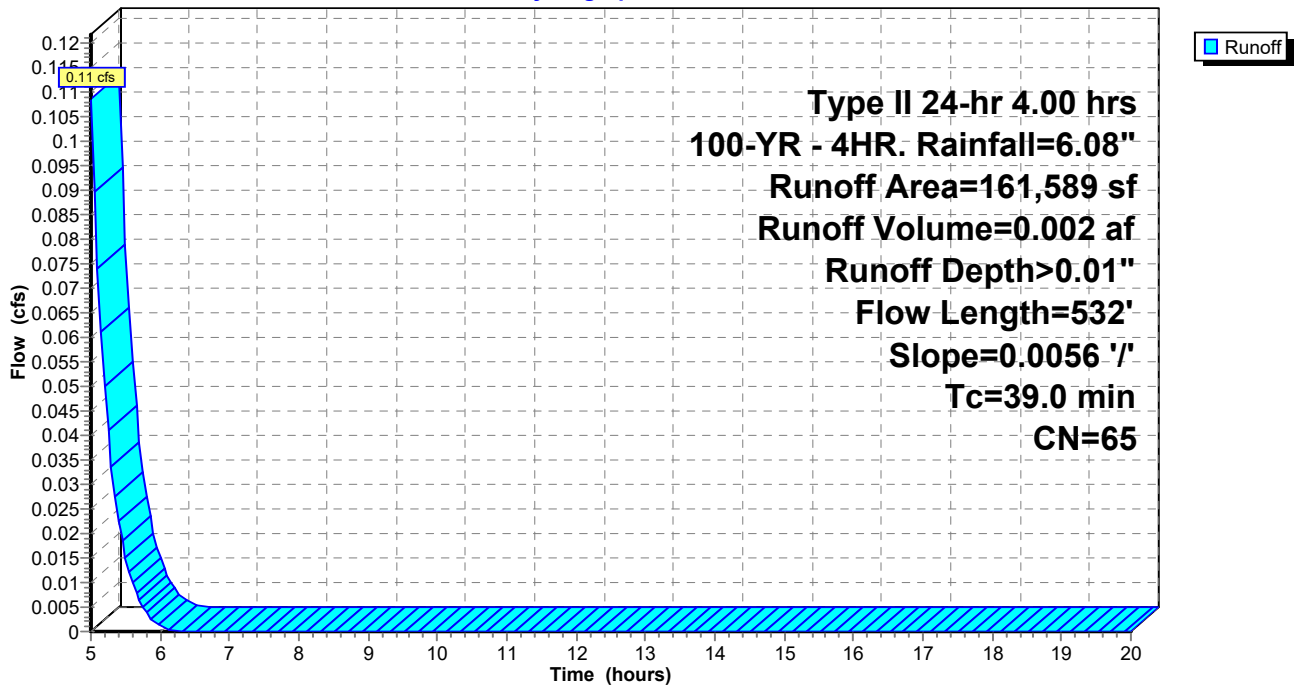
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Type II 24-hr 4.00 hrs 100-YR - 4HR. Rainfall=6.08"

Area (sf)	CN	Description
41,405	58	Meadow, non-grazed, HSG B
* 103,895	65	Uncompacted Gravel (35% Void)
16,289	85	Gravel roads, HSG B
161,589	65	Weighted Average
161,589		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
39.0	532	0.0056	0.23		Lag/CN Method,

Subcatchment 4S: Post Developed

Hydrograph



Summary for Reach 10R: Proposed Ditch

Inflow Area = 3.710 ac, 0.00% Impervious, Inflow Depth = 0.00" for 100-YR - 4HR. event
 Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
 Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Max. Velocity= 0.00 fps, Min. Travel Time= 0.0 min
 Avg. Velocity = 0.00 fps, Avg. Travel Time= 0.0 min

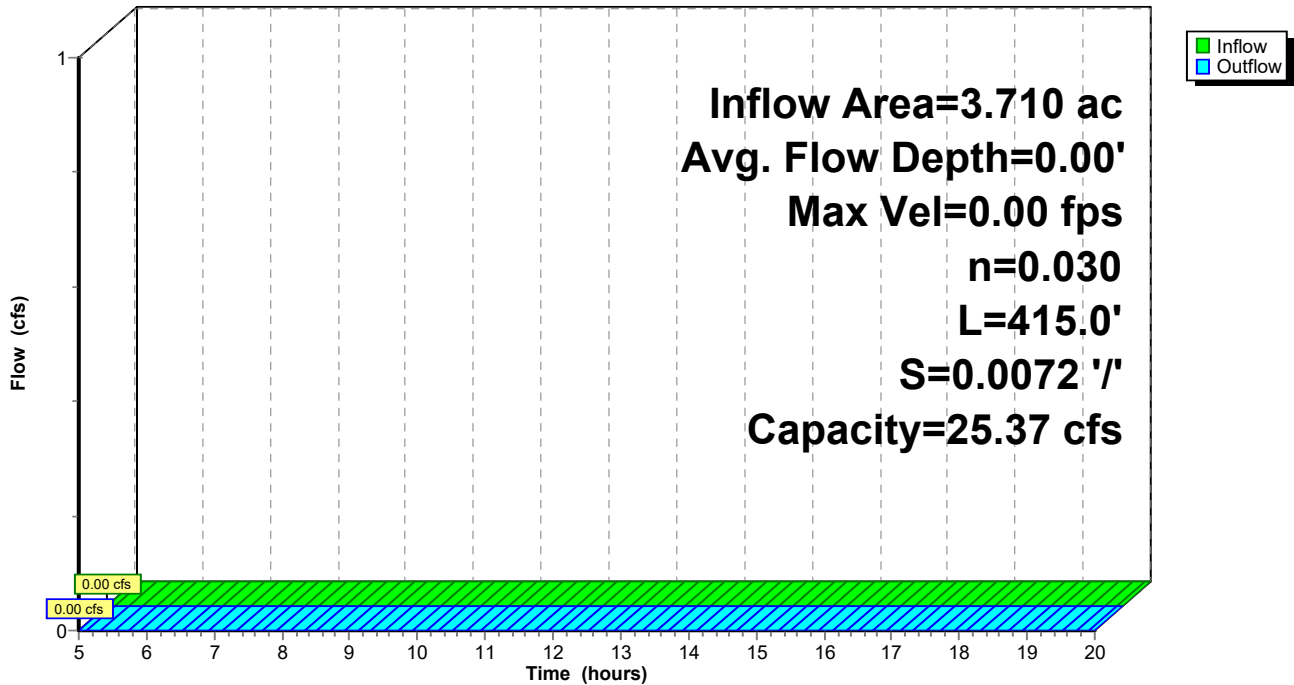
Peak Storage= 0 cf @ 5.00 hrs
 Average Depth at Peak Storage= 0.00'
 Bank-Full Depth= 1.00' Flow Area= 8.0 sf, Capacity= 25.37 cfs

4.00' x 1.00' deep channel, n= 0.030 Earth, grassed & winding
 Side Slope Z-value= 4.0 '/' Top Width= 12.00'
 Length= 415.0' Slope= 0.0072 '/'
 Inlet Invert= 104.00', Outlet Invert= 101.00'



Reach 10R: Proposed Ditch

Hydrograph



Summary for Pond 3P: Rock Laydown

Inflow Area = 3.710 ac, 0.00% Impervious, Inflow Depth > 0.01" for 100-YR - 4HR. event
 Inflow = 0.11 cfs @ 5.00 hrs, Volume= 0.002 af
 Outflow = 0.03 cfs @ 5.32 hrs, Volume= 0.002 af, Atten= 71%, Lag= 19.3 min
 Discarded = 0.03 cfs @ 5.32 hrs, Volume= 0.002 af
 Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Peak Elev= 101.80' @ 5.32 hrs Surf.Area= 36,363 sf Storage= 54 cf

Plug-Flow detention time= 36.1 min calculated for 0.002 af (91% of inflow)
 Center-of-Mass det. time= 28.8 min (341.2 - 312.4)

Volume	Invert	Avail.Storage	Storage Description
#1	101.80'	7,273 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
101.80	36,363	0	0
102.00	36,363	7,273	7,273

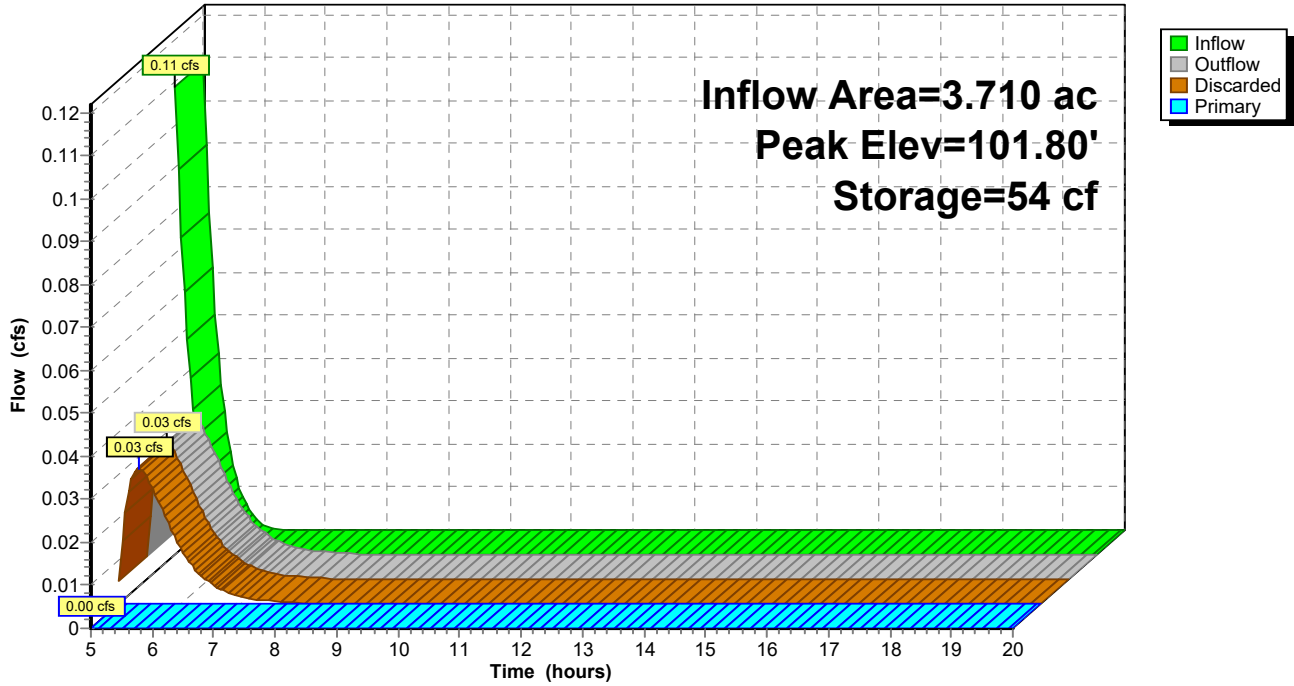
Device	Routing	Invert	Outlet Devices
#1	Discarded	101.80'	0.250 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Primary	102.20'	1,392.0' long x 1.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Discarded OutFlow Max=0.03 cfs @ 5.32 hrs HW=101.80' (Free Discharge)
 ↑1=**Exfiltration** (Exfiltration Controls 0.03 cfs)

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=101.80' (Free Discharge)
 ↑2=**Broad-Crested Rectangular Weir**(Controls 0.00 cfs)

Pond 3P: Rock Laydown

Hydrograph



Summary for Pond 11P: Proposed Pond

Inflow Area = 3.710 ac, 0.00% Impervious, Inflow Depth = 0.00" for 100-YR - 4HR. event
 Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
 Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min
 Discarded = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
 Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Peak Elev= 98.00' @ 5.00 hrs Surf.Area= 13,946 sf Storage= 0 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
 Center-of-Mass det. time= (not calculated: no inflow)

Volume	Invert	Avail.Storage	Storage Description
#1	98.00'	65,783 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

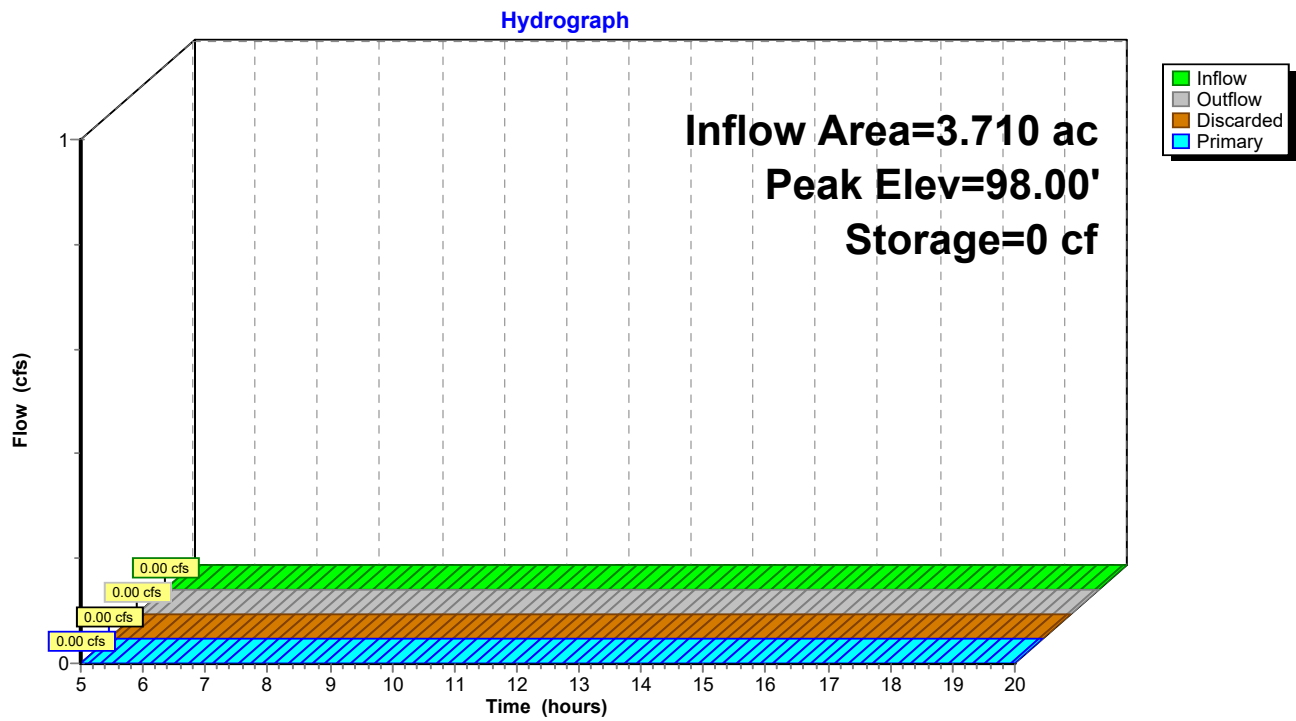
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
98.00	13,946	0	0
99.00	15,174	14,560	14,560
100.00	16,427	15,801	30,361
101.00	17,705	17,066	47,427
102.00	19,008	18,357	65,783

Device	Routing	Invert	Outlet Devices
#1	Discarded	98.00'	0.250 in/hr Exfiltration X 1.60 over Surface area Phase-In= 0.01'
#2	Primary	100.30'	43.6 deg x 10.0' long x 1.50' rise Sharp-Crested Vee/Trap Weir Cv= 2.56 (C= 3.20)

Discarded OutFlow Max=0.00 cfs @ 5.00 hrs HW=98.00' (Free Discharge)
 ↑1=Exfiltration (Controls 0.00 cfs)

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=98.00' (Free Discharge)
 ↑2=Sharp-Crested Vee/Trap Weir (Controls 0.00 cfs)

Pond 11P: Proposed Pond



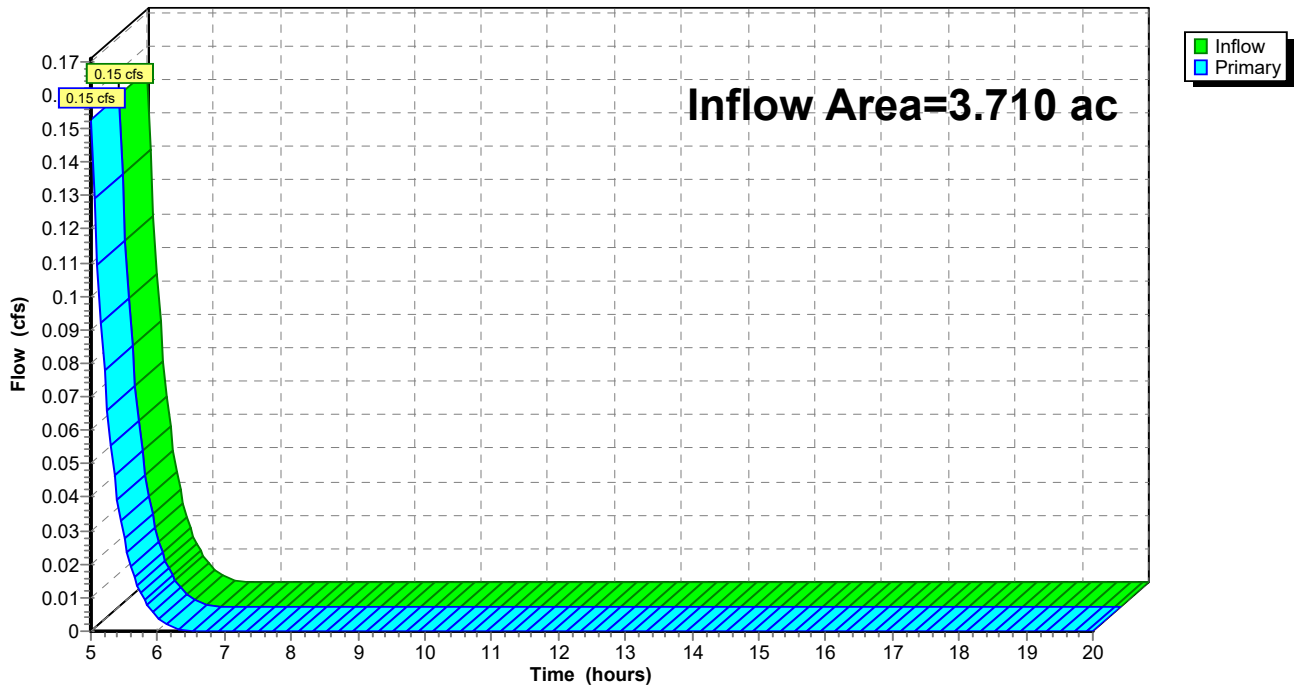
Summary for Link 2L: Outfall

Inflow Area = 3.710 ac, 0.00% Impervious, Inflow Depth > 0.01" for 100-YR - 4HR. event
Inflow = 0.15 cfs @ 5.00 hrs, Volume= 0.004 af
Primary = 0.15 cfs @ 5.00 hrs, Volume= 0.004 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link 2L: Outfall

Hydrograph



Staging Area 2 Basin 4 HydroCAD Report Type II 24-hr 8.00 hrs 100-YR - 8HR. Rainfall=7.36"

Prepared by HP Inc.

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

Subcatchment 1S: Pre Developed Runoff Area=161,589 sf 0.00% Impervious Runoff Depth>1.30"
Flow Length=674' Slope=0.0090 '/' Tc=44.5 min CN=58 Runoff=4.39 cfs 0.401 af

Subcatchment 4S: Post Developed Runoff Area=161,589 sf 0.00% Impervious Runoff Depth>1.37"
Flow Length=532' Slope=0.0056 '/' Tc=39.0 min CN=65 Runoff=4.64 cfs 0.425 af

Reach 10R: Proposed Ditch Avg. Flow Depth=0.21' Max Vel=1.34 fps Inflow=2.03 cfs 0.189 af
n=0.030 L=415.0' S=0.0072 '/' Capacity=25.37 cfs Outflow=1.37 cfs 0.189 af

Pond 3P: Rock Laydown Peak Elev=102.21' Storage=7,273 cf Inflow=4.64 cfs 0.425 af
Discarded=0.21 cfs 0.236 af Primary=2.03 cfs 0.189 af Outflow=2.24 cfs 0.425 af

Pond 11P: Proposed Pond Peak Elev=98.47' Storage=6,752 cf Inflow=1.37 cfs 0.189 af
Discarded=0.13 cfs 0.154 af Primary=0.00 cfs 0.000 af Outflow=0.13 cfs 0.154 af

Link 2L: Outfall Inflow=4.39 cfs 0.401 af
Primary=4.39 cfs 0.401 af

Summary for Subcatchment 1S: Pre Developed

Runoff = 4.39 cfs @ 5.00 hrs, Volume= 0.401 af, Depth> 1.30"

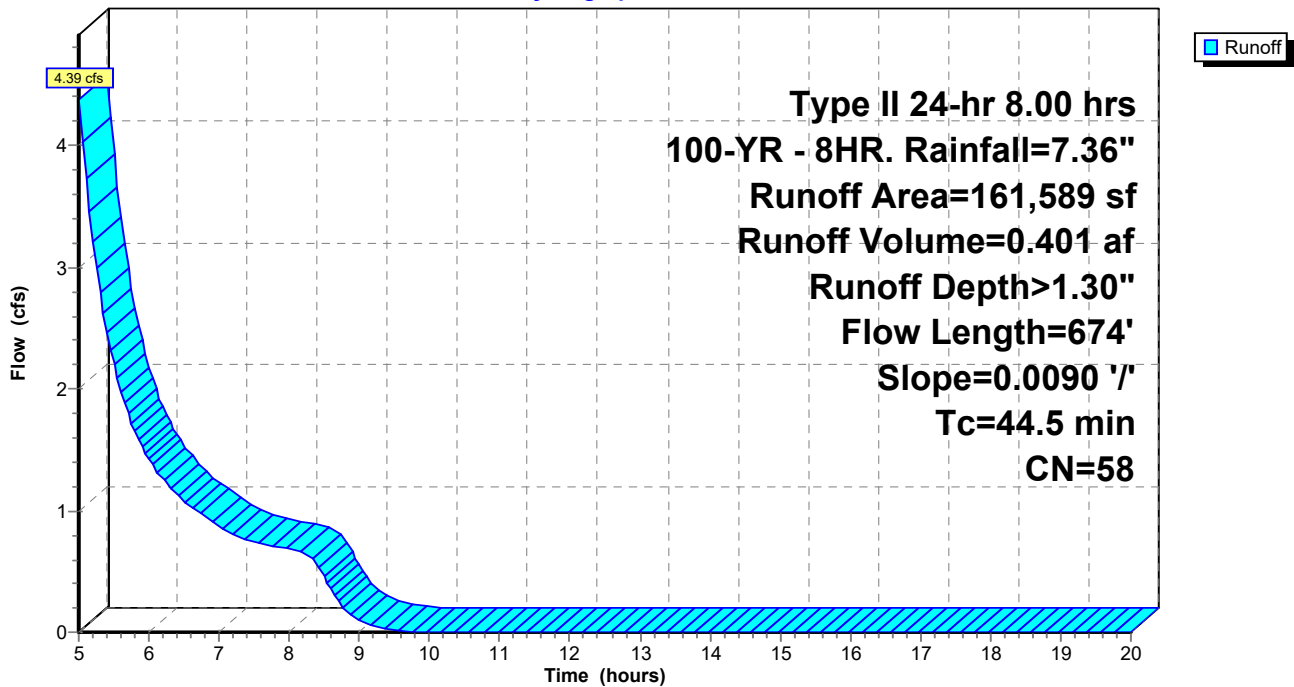
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Type II 24-hr 8.00 hrs 100-YR - 8HR. Rainfall=7.36"

Area (sf)	CN	Description
161,589	58	Meadow, non-grazed, HSG B
161,589		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
44.5	674	0.0090	0.25		Lag/CN Method,

Subcatchment 1S: Pre Developed

Hydrograph



Summary for Subcatchment 4S: Post Developed

Runoff = 4.64 cfs @ 5.00 hrs, Volume= 0.425 af, Depth> 1.37"

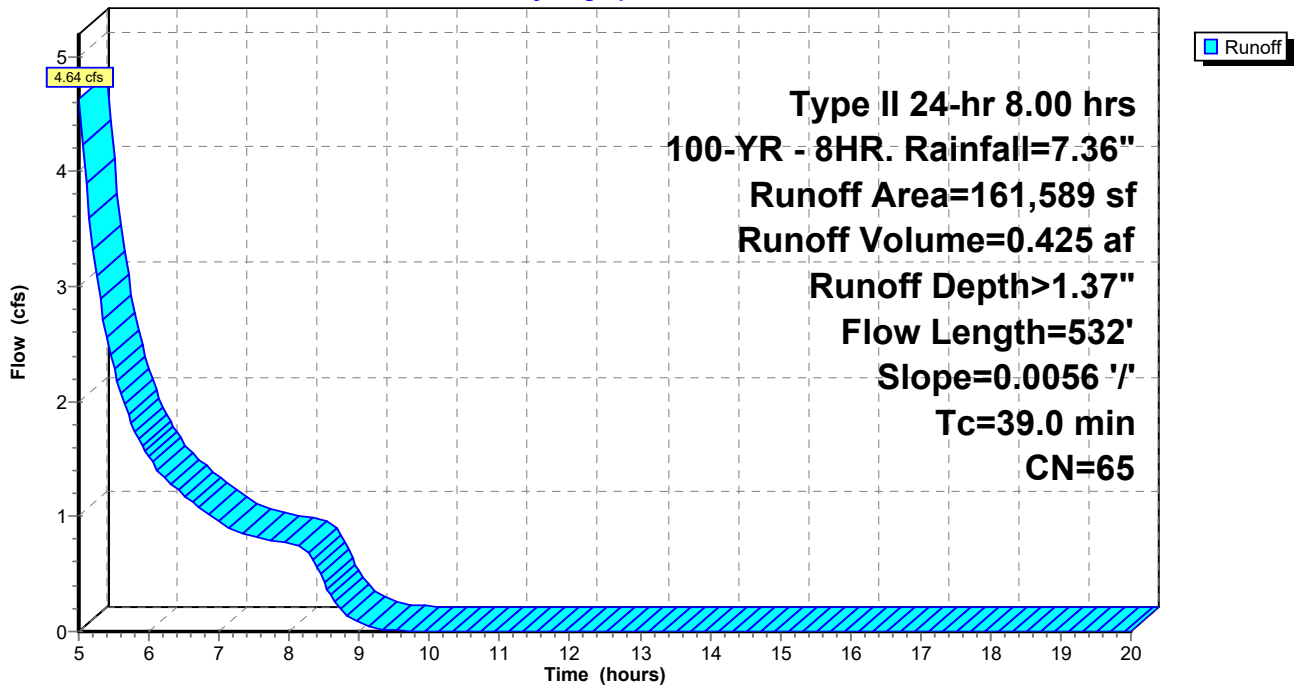
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Type II 24-hr 8.00 hrs 100-YR - 8HR. Rainfall=7.36"

Area (sf)	CN	Description
41,405	58	Meadow, non-grazed, HSG B
* 103,895	65	Uncompacted Gravel (35% Void)
16,289	85	Gravel roads, HSG B
161,589	65	Weighted Average
161,589		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
39.0	532	0.0056	0.23		Lag/CN Method,

Subcatchment 4S: Post Developed

Hydrograph



Summary for Reach 10R: Proposed Ditch

Inflow Area = 3.710 ac, 0.00% Impervious, Inflow Depth = 0.61" for 100-YR - 8HR. event
 Inflow = 2.03 cfs @ 5.76 hrs, Volume= 0.189 af
 Outflow = 1.37 cfs @ 6.03 hrs, Volume= 0.189 af, Atten= 32%, Lag= 16.1 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Max. Velocity= 1.34 fps, Min. Travel Time= 5.2 min
 Avg. Velocity = 0.57 fps, Avg. Travel Time= 12.2 min

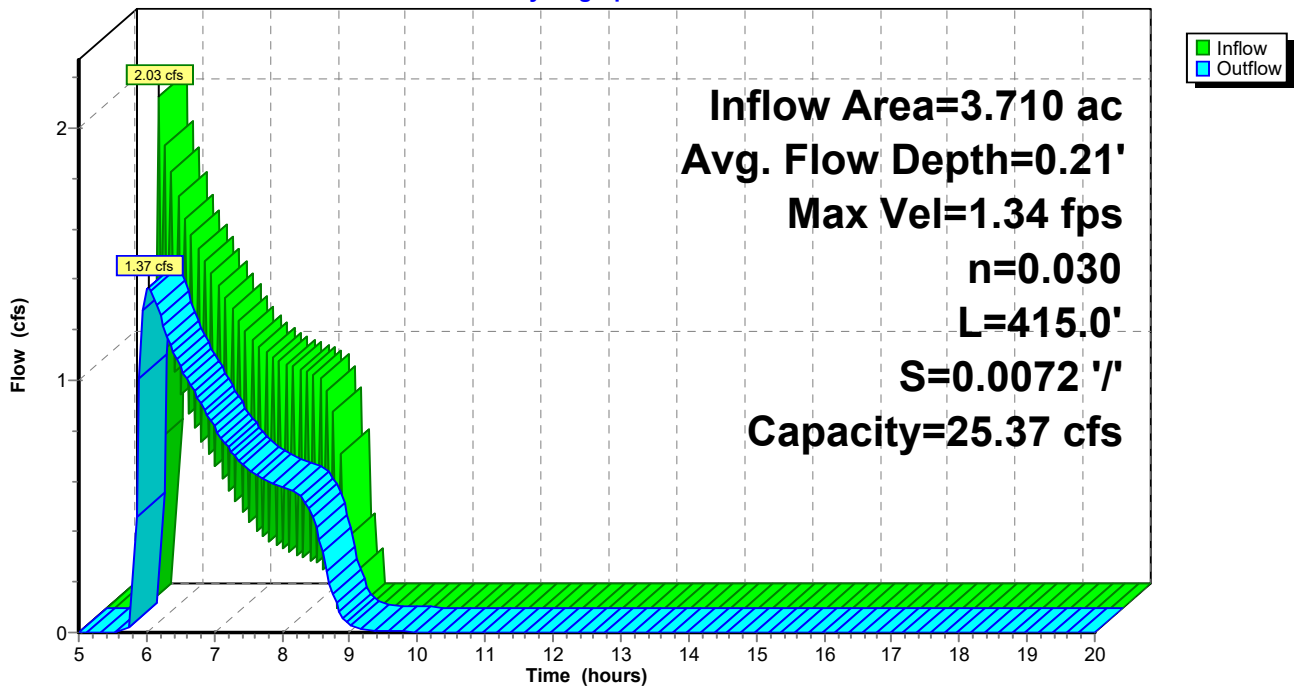
Peak Storage= 427 cf @ 5.94 hrs
 Average Depth at Peak Storage= 0.21'
 Bank-Full Depth= 1.00' Flow Area= 8.0 sf, Capacity= 25.37 cfs

4.00' x 1.00' deep channel, n= 0.030 Earth, grassed & winding
 Side Slope Z-value= 4.0 ' Top Width= 12.00'
 Length= 415.0' Slope= 0.0072 ' / '
 Inlet Invert= 104.00', Outlet Invert= 101.00'



Reach 10R: Proposed Ditch

Hydrograph



Summary for Pond 3P: Rock Laydown

Inflow Area = 3.710 ac, 0.00% Impervious, Inflow Depth > 1.37" for 100-YR - 8HR. event
 Inflow = 4.64 cfs @ 5.00 hrs, Volume= 0.425 af
 Outflow = 2.24 cfs @ 5.76 hrs, Volume= 0.425 af, Atten= 52%, Lag= 45.6 min
 Discarded = 0.21 cfs @ 5.05 hrs, Volume= 0.236 af
 Primary = 2.03 cfs @ 5.76 hrs, Volume= 0.189 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Peak Elev= 102.21' @ 5.75 hrs Surf.Area= 36,363 sf Storage= 7,273 cf

Plug-Flow detention time= 207.5 min calculated for 0.414 af (97% of inflow)
 Center-of-Mass det. time= 199.8 min (574.4 - 374.6)

Volume	Invert	Avail.Storage	Storage Description
#1	101.80'	7,273 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
101.80	36,363	0	0
102.00	36,363	7,273	7,273

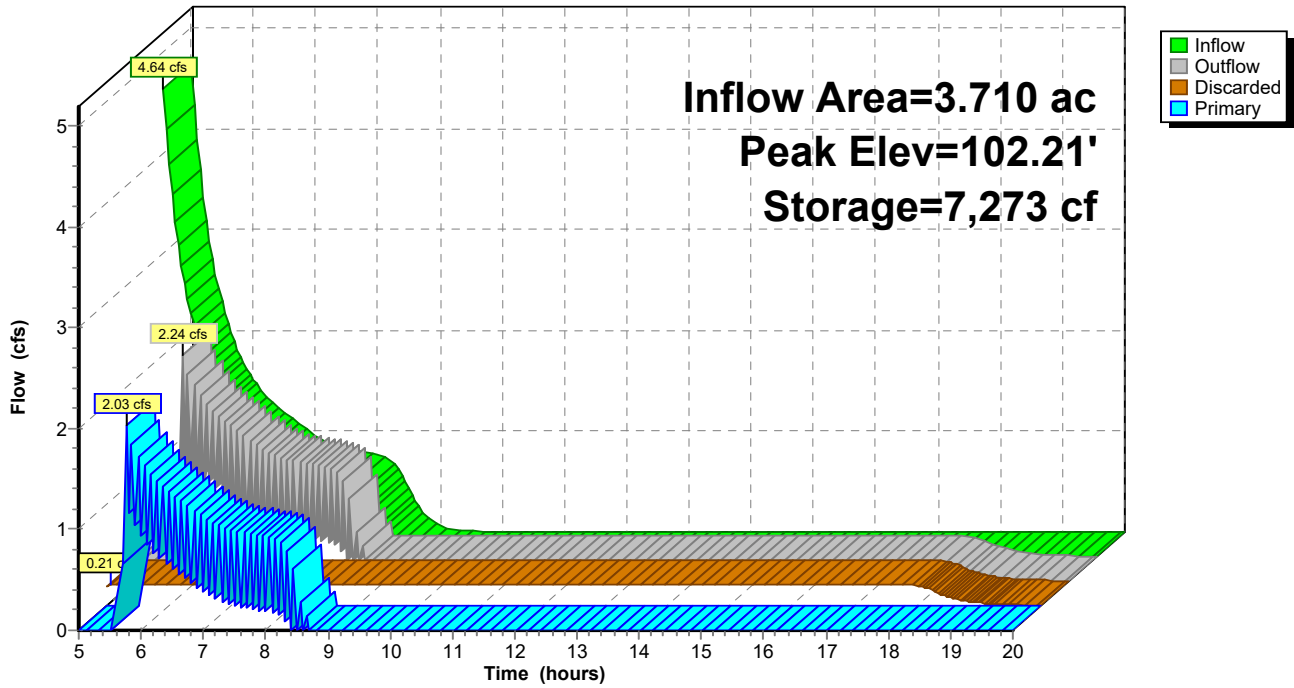
Device	Routing	Invert	Outlet Devices
#1	Discarded	101.80'	0.250 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Primary	102.20'	1,392.0' long x 1.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Discarded OutFlow Max=0.21 cfs @ 5.05 hrs HW=101.83' (Free Discharge)
 ↑1=**Exfiltration** (Exfiltration Controls 0.21 cfs)

Primary OutFlow Max=1.73 cfs @ 5.76 hrs HW=102.21' (Free Discharge)
 ↑2=**Broad-Crested Rectangular Weir**(Weir Controls 1.73 cfs @ 0.21 fps)

Pond 3P: Rock Laydown

Hydrograph



Summary for Pond 11P: Proposed Pond

Inflow Area = 3.710 ac, 0.00% Impervious, Inflow Depth = 0.61" for 100-YR - 8HR. event
 Inflow = 1.37 cfs @ 6.03 hrs, Volume= 0.189 af
 Outflow = 0.13 cfs @ 8.77 hrs, Volume= 0.154 af, Atten= 90%, Lag= 164.7 min
 Discarded = 0.13 cfs @ 8.77 hrs, Volume= 0.154 af
 Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Peak Elev= 98.47' @ 8.77 hrs Surf.Area= 14,528 sf Storage= 6,752 cf

Plug-Flow detention time= 372.0 min calculated for 0.154 af (82% of inflow)
 Center-of-Mass det. time= 355.8 min (776.9 - 421.1)

Volume	Invert	Avail.Storage	Storage Description
#1	98.00'	65,783 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
98.00	13,946	0	0
99.00	15,174	14,560	14,560
100.00	16,427	15,801	30,361
101.00	17,705	17,066	47,427
102.00	19,008	18,357	65,783

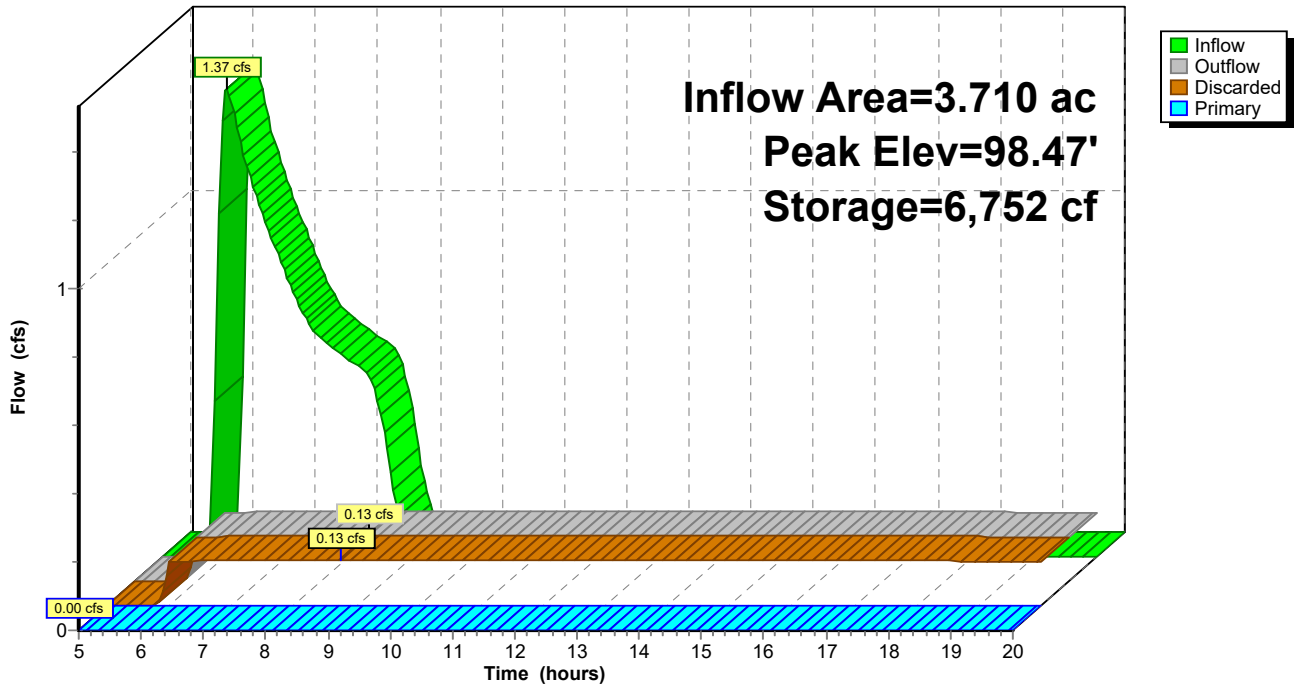
Device	Routing	Invert	Outlet Devices
#1	Discarded	98.00'	0.250 in/hr Exfiltration X 1.60 over Surface area Phase-In= 0.01'
#2	Primary	100.30'	43.6 deg x 10.0' long x 1.50' rise Sharp-Crested Vee/Trap Weir Cv= 2.56 (C= 3.20)

Discarded OutFlow Max=0.13 cfs @ 8.77 hrs HW=98.47' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.13 cfs)

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=98.00' (Free Discharge)
 ↑2=Sharp-Crested Vee/Trap Weir (Controls 0.00 cfs)

Pond 11P: Proposed Pond

Hydrograph



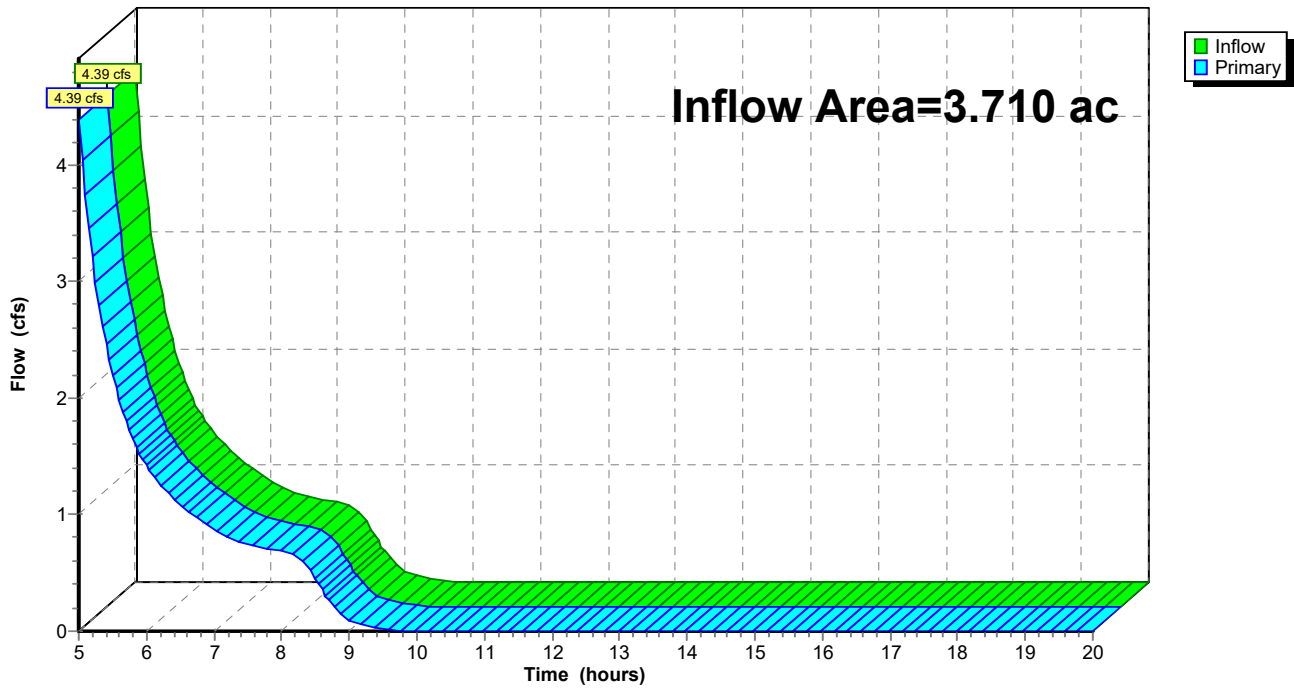
Summary for Link 2L: Outfall

Inflow Area = 3.710 ac, 0.00% Impervious, Inflow Depth > 1.30" for 100-YR - 8HR. event
Inflow = 4.39 cfs @ 5.00 hrs, Volume= 0.401 af
Primary = 4.39 cfs @ 5.00 hrs, Volume= 0.401 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link 2L: Outfall

Hydrograph



Appendix C – FEMA Firm Map

National Flood Hazard Layer FIRMette



Legend

Appendix C

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

- | | | |
|------------------------------------|--|--|
| SPECIAL FLOOD HAZARD AREAS | | Without Base Flood Elevation (BFE)
<i>Zone A, V, A99</i> |
| | | With BFE or Depth <i>Zone AE, AO, AH, VE, AR</i> |
| | | Regulatory Floodway |
| OTHER AREAS OF FLOOD HAZARD | | 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile <i>Zone X</i> |
| | | Future Conditions 1% Annual Chance Flood Hazard <i>Zone X</i> |
| | | Area with Reduced Flood Risk due to Levee. See Notes. <i>Zone X</i> |
| | | Area with Flood Risk due to Levee <i>Zone D</i> |
| OTHER AREAS | | NO SCREEN Area of Minimal Flood Hazard <i>Zone X</i> |
| | | Effective LOMRs |
| | | Area of Undetermined Flood Hazard <i>Zone D</i> |
| GENERAL STRUCTURES | | Channel, Culvert, or Storm Sewer |
| | | Levee, Dike, or Floodwall |
| OTHER FEATURES | | 20.2 Cross Sections with 1% Annual Chance Water Surface Elevation |
| | | 17.5 Coastal Transect |
| | | Base Flood Elevation Line (BFE) |
| | | Limit of Study |
| | | Jurisdiction Boundary |
| | | Coastal Transect Baseline |
| MAP PANELS | | Digital Data Available |
| | | No Digital Data Available |
| | | Unmapped |



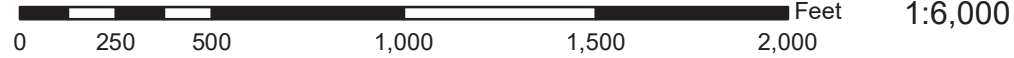
The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on **10/26/2019 at 1:52:54 PM** and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

30°17'46.81"N



30°17'15.75"N

82°46'35.38"W

82°45'57.92"W

Appendix D – Rainfall Distribution Data

Appendix D

District Rainfall Distribution Data

Values for P_{total} (inches)¹

For the counties of Madison, Hamilton, Suwannee, Columbia, Baker and Union.

Frequency (years)	Duration (hours)							
	1	2	4	8	24	72	168	240
3	2.50	2.64	3.08	3.52	4.56	5.80	7.30	8.00
10	3.05	3.70	4.40	5.12	6.72	8.30	10.10	11.80
25	3.45	4.30	5.12	6.00	7.92	10.00	12.30	14.00
100	4.20	5.10	6.08	7.36	9.84	12.40	14.00	16.10

For the counties of Taylor, Lafayette, Dixie, Gilchrist, Levy, Alachua and Bradford.

Frequency (years)	Duration (hours)							
	1	2	4	8	24	72	168	240
3	2.60	3.20	3.80	4.48	6.00	7.60	9.50	10.80
10	3.20	4.00	4.80	5.84	7.92	8.90	11.00	12.50
25	3.60	4.40	5.28	6.56	8.64	11.00	13.00	15.00
100	4.40	5.40	6.72	8.00	11.04	13.80	16.00	18.00

1-HOUR DURATION

T(hrs)	P/ P_{total}	I/ P_{total}
0	0	0
.1	.020	.200
.2	.080	.600
.3	.200	1.200
.4	.410	2.100
.5	.625	2.150
.6	.805	1.800
.7	.915	1.100
.8	.985	0.700
.9	.995	0.100
1.0	1.000	0

¹ Values for durations through 24 hours were taken from Florida Department of Transportation intensity curves. Values for durations greater than 24 hours were taken from National Weather Service Technical Paper No. 49, 1964.

Appendix E – Water Management District Boundary

Appendix E

Part VII APPENDICES Appendix

District Boundary

