

22 September 2025

Abdul Quadir
City Engineer
Public Works
355 Main Street
West Haven, CT 06516

**RE: Stormwater Management Analysis
MacDermid Alpha New Process Building
350 Frontage Rd
West Haven, CT 06516
Langan Project No.: 140324701**

Dear Mr. Quadir:

This letter provides an analysis of the existing and proposed peak runoff discharges and the engineering design for the proposed stormwater conveyance system associated with the addition at 350 Frontage Road.

PROJECT DESCRIPTION

Existing Site Conditions

The project site is located within the parcel of 350 frontage Rd. West Haven, Connecticut; see Figure 1. The approximately 5.93-acre site comprises driveways, parking areas, and wetlands to the south west and east of the existing building.

Based upon a topographic survey prepared by Langan Engineering and Environmental Services, dated July 9, 2021, a plan titled "ALTA/ACSM Land Title Survey" prepared by American Surveying & Mapping Inc., dated April 13, 2016, and a plan titled "Improvement Location Plan, 350 Frontage Road, Property of Enthone, Inc., West Haven, Conn." Prepared by Aeschliman Land Surveying Inc., last revised June 16, 2015 site grades (NAVD88) range from approximately 103 around the existing building to approximately 92 feet towards the southwestern corner of the property.

Based upon FEMA's Flood Insurance Rate Map (FIRM) Map number 09009C0438H with an effective date of December 17, 2010 for New Haven County, the entire parcel is within Zone X, an area determined to be outside the 0.2% annual chance flood (Figure 2).

Based upon the Soil Survey of New Haven County, the site's soil type is predominantly Urban Land with a section of Udorthents-Urban Land Complex (see Figure 3). These soil types have hydrological ratings of D and B, respectively. There is an approximately 2.7 acre wetland in the southwestern portion of the property, a 0.16 acre wetland in the southeast corner of the

property, and a wetland on the adjacent property to the east. Wetlands on-site and on the adjacent parcel were flagged by All-Points Technology in June 2025.

Proposed Project

The proposed project consists of the construction of a 22,500 square-foot stand-alone outbuilding with updated driveways and parking areas. Additional improvements include new stormwater and utility infrastructure. A summary of the change in impervious is shown below.

Project Site Impervious Cover [SF]		
Existing Conditions	Proposed Conditions	Net Increase
±75,750	±122,275	±46,525

The proposed stormwater system has been designed to maintain existing site hydrology to the maximum extent practicable. The majority of runoff from the new development will be conveyed to various stormwater management systems before discharging to either of the two wetlands outside the project limits. Water quality improvements include catch basins with sumps, hydrodynamic separators, and two underground detention systems. These water quality improvements have been designed to retain 50% of the proposed project's water quality volume onsite. This achieves the average annual pollutant load reduction requirements as per the recommendations of the 2024 CT Stormwater Quality Manual.

Details of the size and location of the stormwater network can be found on the Grading & Drainage Plans, detail sheets and supporting calculations in the appendices of this report.

PEAK RUNOFF ANALYSIS (See Appendices A & B)

The stormwater management system is designed to control the rate of runoff from the site's watersheds to be equal or less than existing conditions up to, and including, a 100-year design storm event. The 2-year post development peak discharge is controlled to be less than 50% of pre-development 2-year peak discharge.

The peak runoff discharges for the existing and proposed conditions were analyzed using Soil Conservation Service (SCS) methodology which outlines procedures for calculating peak rates of runoff resulting from precipitation events as well as procedures for developing runoff hydrographs. Only the impacted portion of the site was included in the analysis; see Figures EXWS and PRWS. Values for area, curve number (CN), and a time of concentration were calculated for the existing and proposed conditions.

The curve number is a land sensitive coefficient that dictates the relationship between total rainfall depth and direct storm runoff. The soils within the watershed are divided into hydrologic soil groups (A, B, C, and D). The SCS classification system evaluates the runoff potential of a soil according to its infiltration and transmission rates. "A" soils have the lowest runoff potential, while "D" soils have the greatest runoff potential.

The time of concentration (Tc) is defined as the time for runoff to travel from the hydraulically most distant point in the watershed to a point of interest. Values of time of concentration were

determined for existing and proposed conditions based on land cover and slope of the flow path using methods outlined in TR-55.

For this study, a 24-hour NOAA Type D standard rainfall distribution was used to determine the peak flow rate and volume to all points of discharge from the site. Precipitation data used for the various storm events is based on the "NOAA Atlas 14 Point Precipitation Frequency Estimates: CT" for New Haven Tweed AP Station. Tweed Airport Station was chosen for rainfall data because it is the station located within the closest proximity of the project location as shown in Graphic 1. A summary of all rainfall data utilized in the analysis for this site is provided below and a complete compilation of data provided by NOAA for this location is included in Appendix C.

Graphic 1. NOAA Rainfall Data Location Map



NOAA Precipitation Depth per Average Recurrence Interval [in]					
Duration	2-Year	10-Year	25-Year	50-Year	100-Year
24-hour	3.42	5.22	6.34	7.17	8.07

Existing Condition (See Appendix A)

The existing project site is partially developed and includes an undeveloped wetland area. Impervious areas include building roof, surface parking areas, concrete patios, and sidewalks. Existing Watershed A collects water from the southern portion of the site and flows overland on-site through either onsite wetland and discharges to an storm drainage system at the southern corner of the site (based on information obtained from West Haven GIS on August 8, 2025). Watershed A is subdivided into Watersheds A1 and A2. Watershed A1 flows overland

through wetlands and depressed areas along the southeast boundary of the site. Watershed A2 discharges to the large wetland to the west of the site. Watershed B discharges overland offsite to the northeast into wetlands located on the adjacent property. Watershed B includes a portion of roof area that is routed separately than the rest of the building roof. The remaining existing building drainage and north side of the site is to remain as-is in the proposed condition and, therefore, is excluded from the watershed analysis for this project.

Proposed Condition (See Appendix B)

Overall proposed site hydrology will mimic the existing condition and stormwater runoff will continue to discharge from the site in a manner similar to today. Watershed A1 will continue to drain along the southeast site boundary in the same manner, with a substantially reduced drainage area. Subwatershed-A2 has been further subdivided; the disturbed portion called Subwatershed-A2, and the portion to remain as existing called Subwatershed-A3. Watershed A2 will flow via a proposed on-site storm drainage system and be controlled via an underground retention system. Watershed B is subdivided into two proposed watersheds; the undisturbed portion called Subwatershed-B1, and the disturbed portion called Subwatershed-B2. Watershed B has increased in size in the proposed condition. To control flows to match the existing conditions, Subwatershed-B2 drains via a stormwater system and is controlled by and underground stormwater retention system.

Per the 2024 Connecticut Stormwater Quality Manual, the underground retention systems are sized to retain the runoff reduction volume for the site through a combination of infiltration and dead storage. The existing site area is 153,000 sq. ft. of which 75,750 sq.ft, or 49%, is impervious. This is above the 40% impervious cover threshold to consider this a redevelopment project, requiring the site to retain 50% of the water quality volume. The water quality volume for the site is 12,780 cu.ft., therefore the runoff reduction volume is 6,390 cu.ft. for this project, see Appendix E for supporting calculations. The reduction volume is provided as 5,080 cu ft in Detention – A and 1,310 cu ft in Detention – B (see WQV storm in Appendix B.)

In addition, the retention system is sized to hold 1" of rainfall over the proposed increase in impervious area on site per City of West Haven requirements. 1" of rainfall across the proposed 46,525 square feet of additional impervious area equals a required storage volume of 3,900 cubic feet, less than the required retention volume required by the 2024 Stormwater Quality Manual.

Each detention system will have a hydrodynamic separator pre-treatment device to capture and retain floatables while removing sediment from stormwater runoff. Infiltration in the retention basins further reduces pollutants and encourages groundwater recharge.

Percolation testing was completed in the vicinity of Retention System A. An infiltration rate of 1.7 in/hr was observed. Therefore, the detention systems were modeled assuming a conservative 0.85 in/hr infiltration rate for fine sand.

A summary of the existing and proposed peak flows for the design storm events are provided in the following tables:

	Current	Proposed	Delta	% Reduction
2-Year	4.58	2.14	-2.44	53%
10-Year	8.24	8.07	-0.17	2%
25-Year	10.57	10.59	0.02	0%
50-Year	12.31	12.17	-0.14	1%
100-Year	14.20	14.04	-0.16	1%

Site Discharge Peak Flow Comparison for WS-B (CFS)

	Current	Proposed	Delta	% Reduction
2-Year	1.04	0.44	-0.60	58%
10-Year	1.62	1.51	-0.11	7%
25-Year	1.98	1.89	-0.09	5%
50-Year	2.25	2.11	-0.14	6%
100-Year	2.53	2.32	-0.21	8%

Site Discharge Peak Flow Comparison for TOTAL SITE (CFS)

	Current	Proposed	Delta	% Reduction
2-Year	5.59	2.57	-3.02	54%
10-Year	9.82	9.58	-0.24	2%
25-Year	12.49	12.47	-0.02	0%
50-Year	14.48	14.26	-0.22	2%
100-Year	16.65	16.34	-0.31	2%

CONCLUSION

The stormwater management system has been designed in accordance with the City of West Haven zoning regulations, the 2024 Connecticut Stormwater Quality Manual. The system incorporates low impact stormwater quality measures to promote groundwater recharge and minimize passage of pollutants to downstream receiving waters. The management system has been designed to provide additional on-site stormwater storage capacity and peak flow runoff rate attenuation to improve the existing site hydrology, as well as to minimize sediment transport offsite. This Langan report confirms that the proposed stormwater system, as designed, will effectively manage quality and quantity of stormwater runoff for the proposed development. Please refer to the Drawings for additional drainage information.

Sincerely,
Langan CT, Inc.



Brian Phillips, P.E.
Senior Project Manager



Christopher P. Cardany, P.E., LEED AP
Principal/Vice President

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LIST OF FIGURES

Fig. 1	USGS Map
Fig. 2	FEMA Flood Map
Fig. 3	Soil Survey Map

LIST OF DRAWINGS

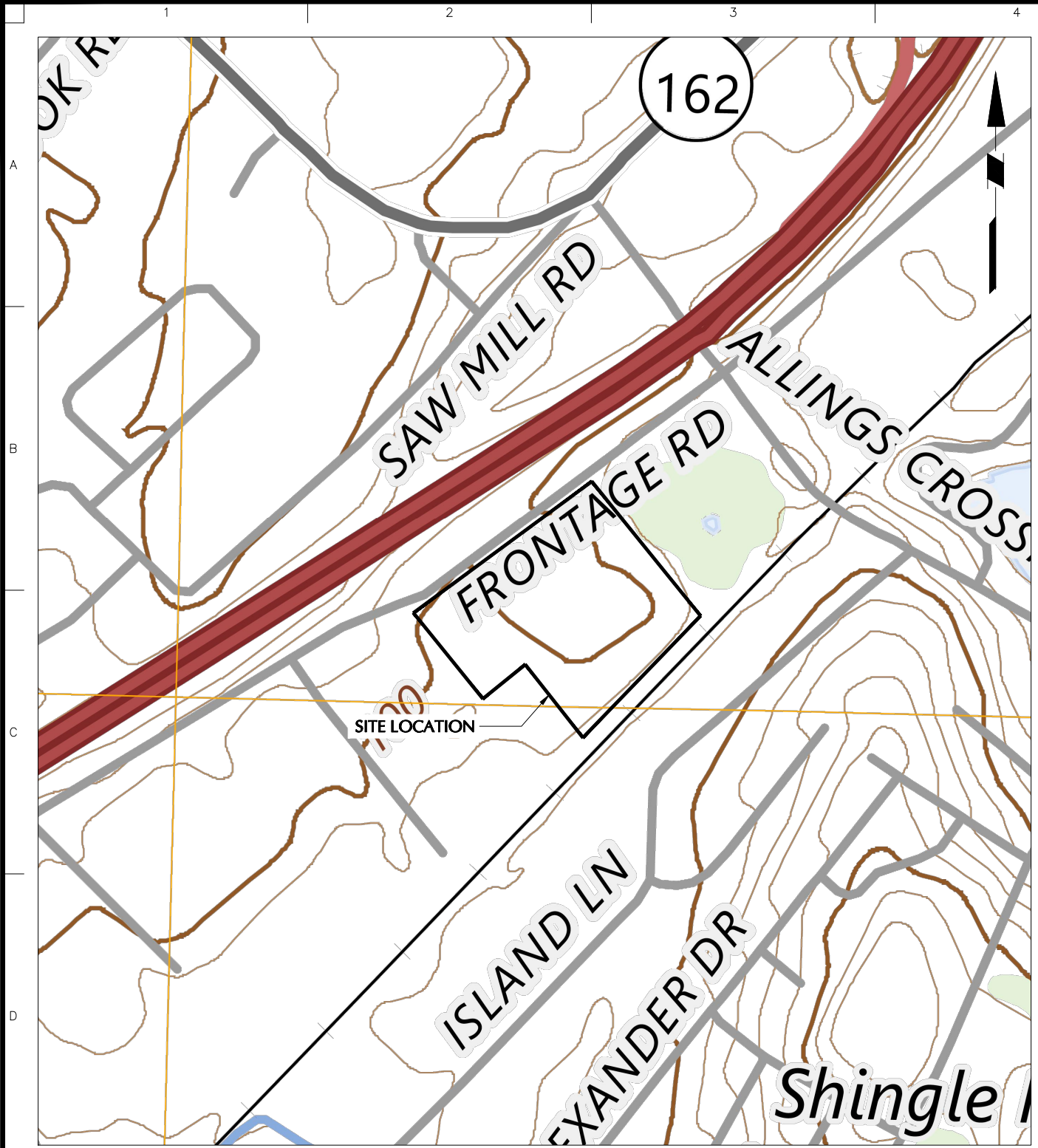
EXWS	Existing Watershed Map
PRWS	Proposed Watershed Map
DACB	Catch Basin Drainage Area Map

REFERENCE DRAWINGS

CG101	Grading & Drainage Plan
CG501	Grading & Drainage Details I
CG502	Grading & Drainage Details II
CE101	Soil Erosion & Sediment Control Plan
CE501	Soil Erosion & Sediment Control Details

LIST OF APPENDICES

Appendix A	Existing Stormwater Discharge Calculations
Appendix B	Proposed Stormwater Discharge Calculations
Appendix C	Storm Sewer Network Calculations
Appendix D	NOAA Rainfall Data
Appendix E	Supporting Calculations
Appendix F	Stormwater Operations & Maintenance Plan



REFERENCE: USGS 7.5-MINUTE MAP FOR NEW HAVEN,
CONNECTICUT, U.S. GEOLOGICAL SURVEY DATED 2024



LANGAN Langan CT, Inc. 555 Long Wharf Drive, 9th Floor New Haven, CT 06511 T: 203.562.5771 F: 203.789.6142 www.langan.com	Project MACDERMID ALPHA NEW PROCESS BUILDING WEST HAVEN CONNECTICUT	Drawing Title USGS Location Map	Project No. 140324701 Date 09/09/2025 Drawn By JAD Checked By BP	Drawing No. FIG. 1 Sheet 1 of 1
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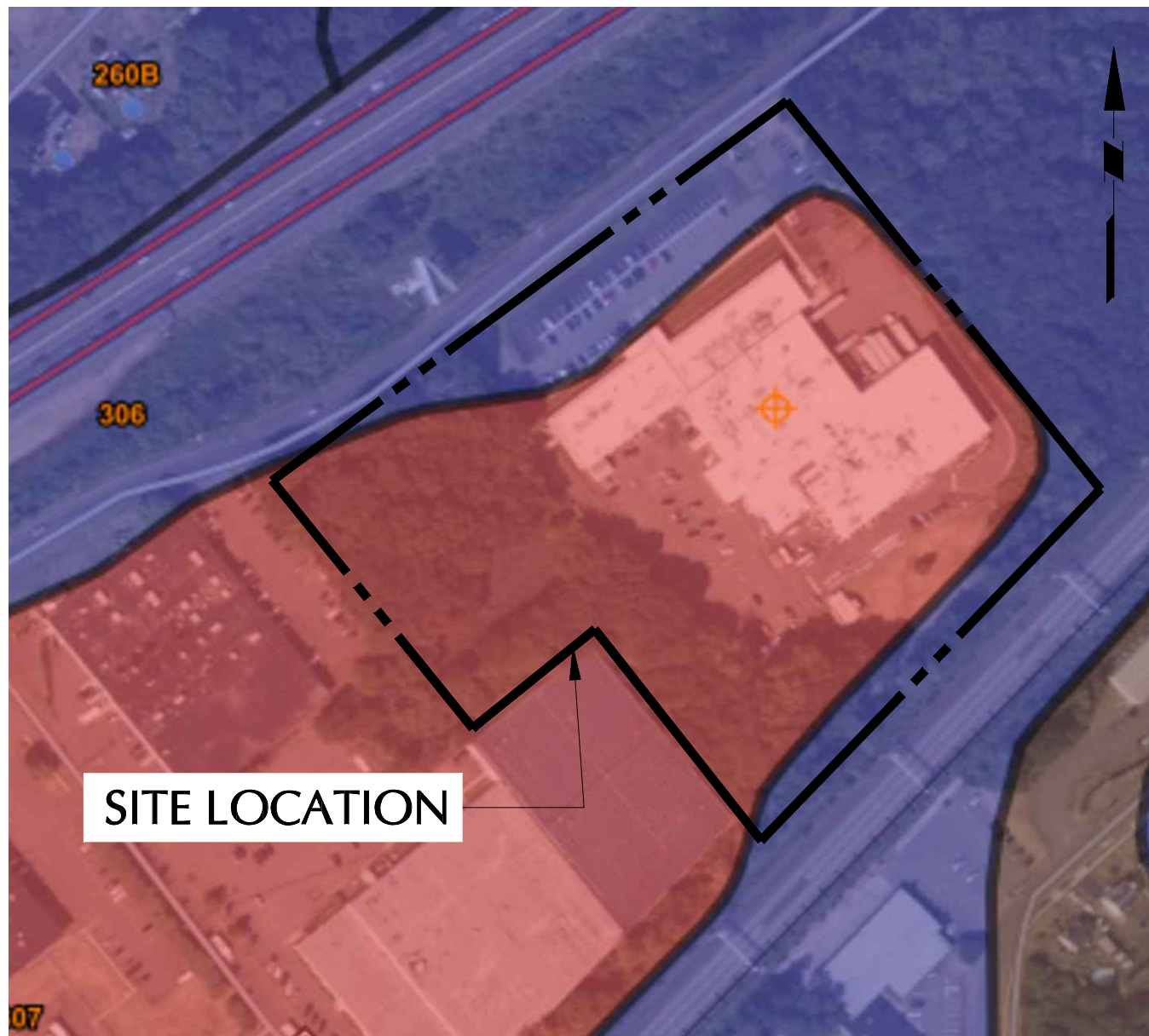


LEGEND	ZONE	DESCRIPTION
	AE FLOODWAY	THE FLOODWAY IS THE CHANNEL OF A STREAM PLUS ANY ADJACENT FLOODPLAIN AREAS THAT MUST BE KEPT FREE OF ENCROACHMENT SO THAT THE 1% ANNUAL CHANCE FLOOD CAN BE CARRIED WITHOUT SUBSTANTIAL INCREASE IN FLOOD HEIGHT
	AE	BASE FLOOD ELEVATIONS DETERMINED
	X SHADED	AREAS OF 0.2% ANNUAL CHANCE FLOOD; ANNUAL CHANCE FLOOD WITH AVERAGE DEPTHS OF LESS THAN 1 FOOT OR WITH DRAINAGE AREAS LESS THAN 1 SQUARE MILE; AND AREAS PROTECTED BY LEVEES FROM 1% ANNUAL CHANCE FLOOD
	X UNSHADED	AREAS DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOODPLAIN

REFERENCE: "FLOOD INSURANCE RATE MAP" NEW HAVEN COUNTY, CONNECTICUT
MAP NUMBER 09009C0439J, EFFECTIVE DATE JUNE 18, 2010



LANGAN Langan CT, Inc. 555 Long Wharf Drive, 9th Floor New Haven, CT 06511 T: 203.562.5771 F: 203.789.6142 www.langan.com	Project MACDERMID ALPHA NEW PROCESS BUILDING WEST HAVEN CONNECTICUT	Drawing Title FEMA MAP	Project No. 140324701	Drawing No. FIG. 2 Sheet 2 of 1
			Date 09/09/2025	
			Drawn By JAD	
			Checked By BP	



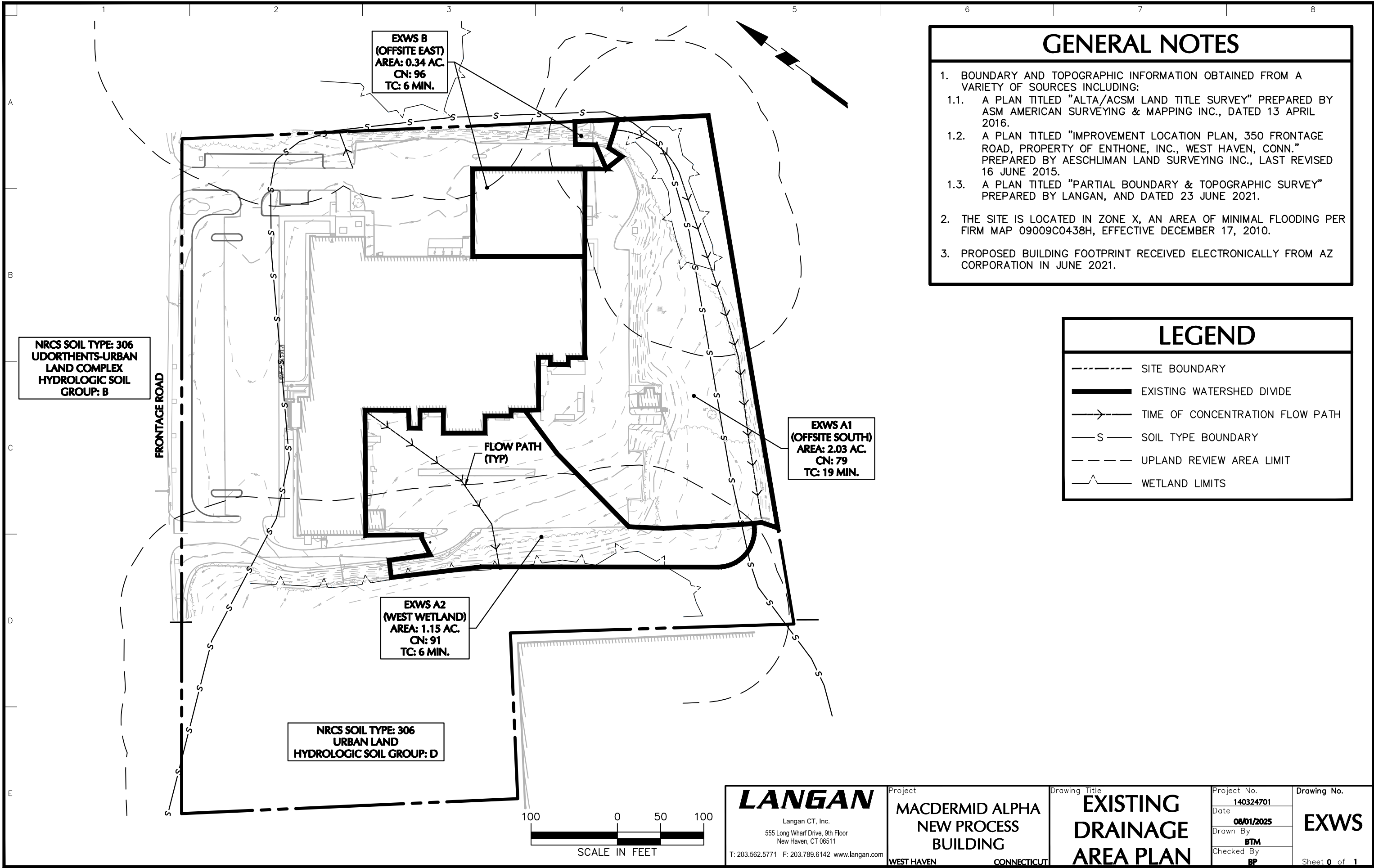
SOIL TYPE LEGEND

SYMBOL	NAME	GROUP
12	RAYPOL SILT LOAM, 0 TO 3 PERCENT SLOPES	B/D
260C	CHARLTON-URBAN LAND COMPLEX, 15 TO 25 PERCENT SLOPES	B
306	UDORTHENTS-URBAN LAND COMPLEX	B
307	URBAN LAND	D

REFERENCE: WEB SOIL SURVEY BY THE UNITED STATES DEPARTMENT OF AGRICULTURAL AND NATURAL RESOURCES CONSERVATION SERVICE.



LANGAN Langan CT, Inc. 555 Long Wharf Drive, 9th Floor New Haven, CT 06511 T: 203.562.5771 F: 203.789.6142 www.langan.com	Project	Drawing Title	Project No.	Drawing No. FIG. 3 Sheet 3 of 1
	MACDERMID ALPHA NEW PROCESS BUILDING	NRCS SOIL MAP	140324701	
	WEST HAVEN	CONNECTICUT	Date 09/09/2025	
			Drawn By JAD Checked By BP	



GENERAL NOTES

- BOUNDARY AND TOPOGRAPHIC INFORMATION OBTAINED FROM A VARIETY OF SOURCES INCLUDING:
 - A PLAN TITLED "ALTA/ACSM LAND TITLE SURVEY" PREPARED BY ASM AMERICAN SURVEYING & MAPPING INC., DATED 13 APRIL 2016.
 - A PLAN TITLED "IMPROVEMENT LOCATION PLAN, 350 FRONTAGE ROAD, PROPERTY OF ENTHONE, INC., WEST HAVEN, CONN." PREPARED BY AESCHLIMAN LAND SURVEYING INC., LAST REVISED 16 JUNE 2015.
 - A PLAN TITLED "PARTIAL BOUNDARY & TOPOGRAPHIC SURVEY" PREPARED BY LANGAN, AND DATED 23 JUNE 2021.
- THE SITE IS LOCATED IN ZONE X, AN AREA OF MINIMAL FLOODING PER FIRM MAP 09009C0438H, EFFECTIVE DECEMBER 17, 2010.
- PROPOSED BUILDING FOOTPRINT RECEIVED ELECTRONICALLY FROM AZ CORPORATION IN JUNE 2021.

LEGEND

- SITE BOUNDARY
- EXISTING WATERSHED DIVIDE
- > TIME OF CONCENTRATION FLOW PATH
- S--- SOIL TYPE BOUNDARY
- UPLAND REVIEW AREA LIMIT
- WETLAND LIMITS

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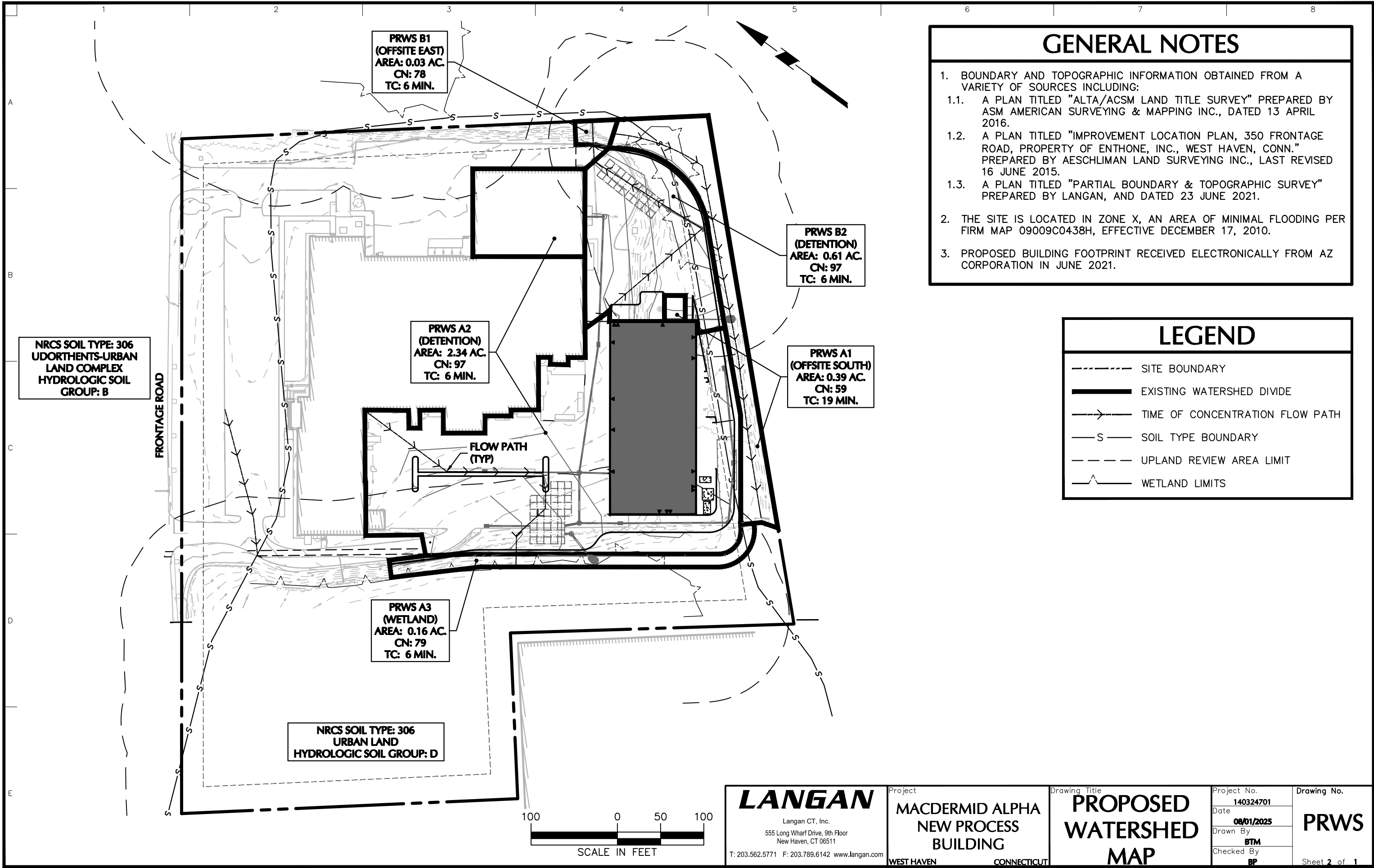
Project
**MACDERMID ALPHA
NEW PROCESS
BUILDING**

WEST HAVEN CONNECTICUT

Drawing Title
**EXISTING
DRAINAGE
AREA PLAN**

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Date
08/01/2025
Drawn By
BTM
Checked By
BP

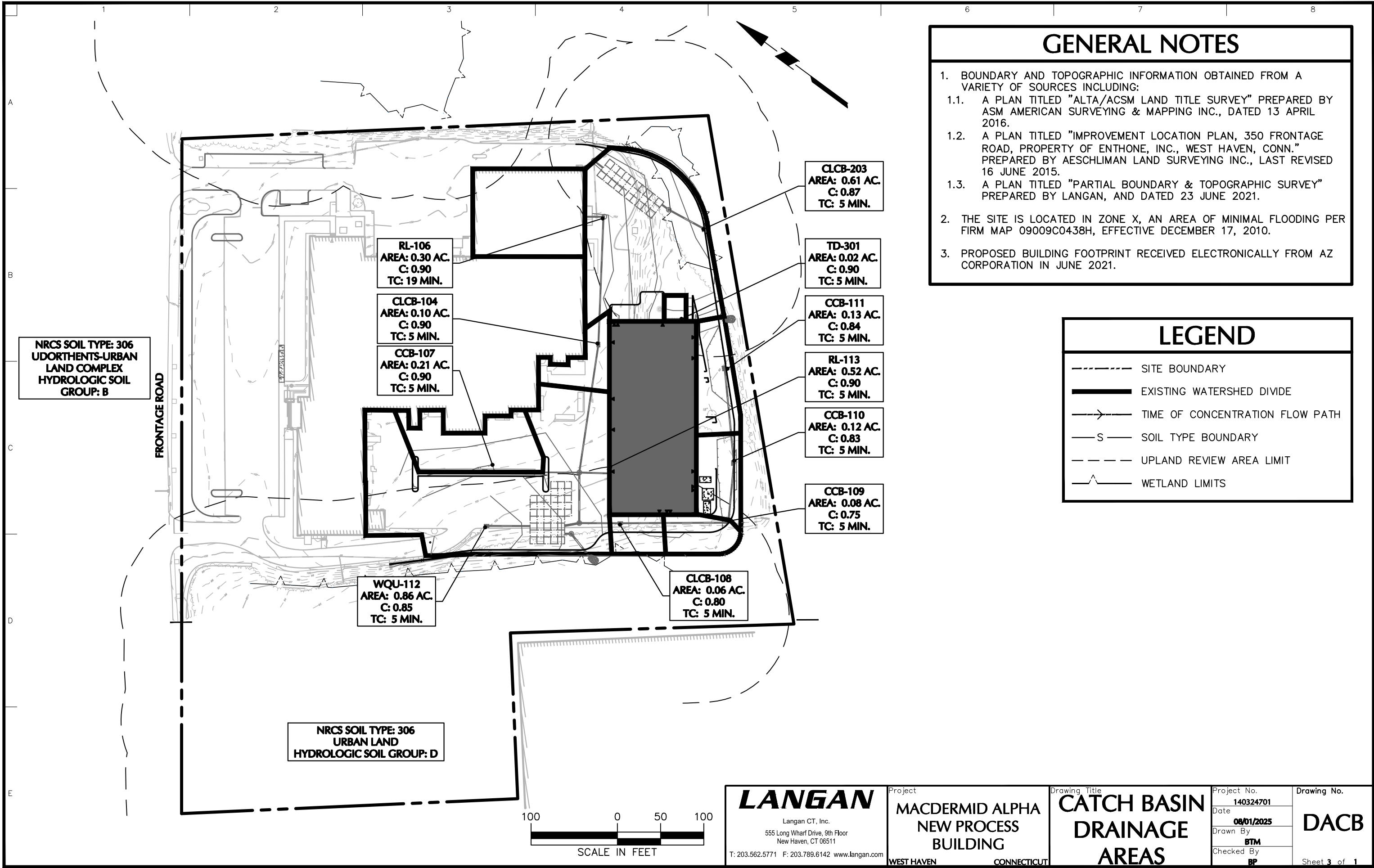
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EXWS
Sheet **0** of **1**



- ### GENERAL NOTES
- BOUNDARY AND TOPOGRAPHIC INFORMATION OBTAINED FROM A VARIETY OF SOURCES INCLUDING:
 - A PLAN TITLED "ALTA/ACSM LAND TITLE SURVEY" PREPARED BY ASM AMERICAN SURVEYING & MAPPING INC., DATED 13 APRIL 2016.
 - A PLAN TITLED "IMPROVEMENT LOCATION PLAN, 350 FRONTAGE ROAD, PROPERTY OF ENTHONE, INC., WEST HAVEN, CONN." PREPARED BY AESCHLIMAN LAND SURVEYING INC., LAST REVISED 16 JUNE 2015.
 - A PLAN TITLED "PARTIAL BOUNDARY & TOPOGRAPHIC SURVEY" PREPARED BY LANGAN, AND DATED 23 JUNE 2021.
 - THE SITE IS LOCATED IN ZONE X, AN AREA OF MINIMAL FLOODING PER FIRM MAP 09009C0438H, EFFECTIVE DECEMBER 17, 2010.
 - PROPOSED BUILDING FOOTPRINT RECEIVED ELECTRONICALLY FROM AZ CORPORATION IN JUNE 2021.

LEGEND	
	SITE BOUNDARY
	EXISTING WATERSHED DIVIDE
	TIME OF CONCENTRATION FLOW PATH
	SOIL TYPE BOUNDARY
	UPLAND REVIEW AREA LIMIT
	WETLAND LIMITS

LANGAN Langan CT, Inc. 555 Long Wharf Drive, 9th Floor New Haven, CT 06511 T: 203.562.5771 F: 203.789.6142 www.langan.com	Project MACDERMID ALPHA NEW PROCESS BUILDING WEST HAVEN CONNECTICUT	Drawing Title PROPOSED WATERSHED MAP	Project No. 140324701	Drawing No. PRWS
			Date 08/01/2025	
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			Checked By BP	Sheet 2 of 1



- ### GENERAL NOTES
- BOUNDARY AND TOPOGRAPHIC INFORMATION OBTAINED FROM A VARIETY OF SOURCES INCLUDING:
 - A PLAN TITLED "ALTA/ACSM LAND TITLE SURVEY" PREPARED BY ASM AMERICAN SURVEYING & MAPPING INC., DATED 13 APRIL 2016.
 - A PLAN TITLED "IMPROVEMENT LOCATION PLAN, 350 FRONTAGE ROAD, PROPERTY OF ENTHONE, INC., WEST HAVEN, CONN." PREPARED BY AESCHLIMAN LAND SURVEYING INC., LAST REVISED 16 JUNE 2015.
 - A PLAN TITLED "PARTIAL BOUNDARY & TOPOGRAPHIC SURVEY" PREPARED BY LANGAN, AND DATED 23 JUNE 2021.
 - THE SITE IS LOCATED IN ZONE X, AN AREA OF MINIMAL FLOODING PER FIRM MAP 09009C0438H, EFFECTIVE DECEMBER 17, 2010.
 - PROPOSED BUILDING FOOTPRINT RECEIVED ELECTRONICALLY FROM AZ CORPORATION IN JUNE 2021.

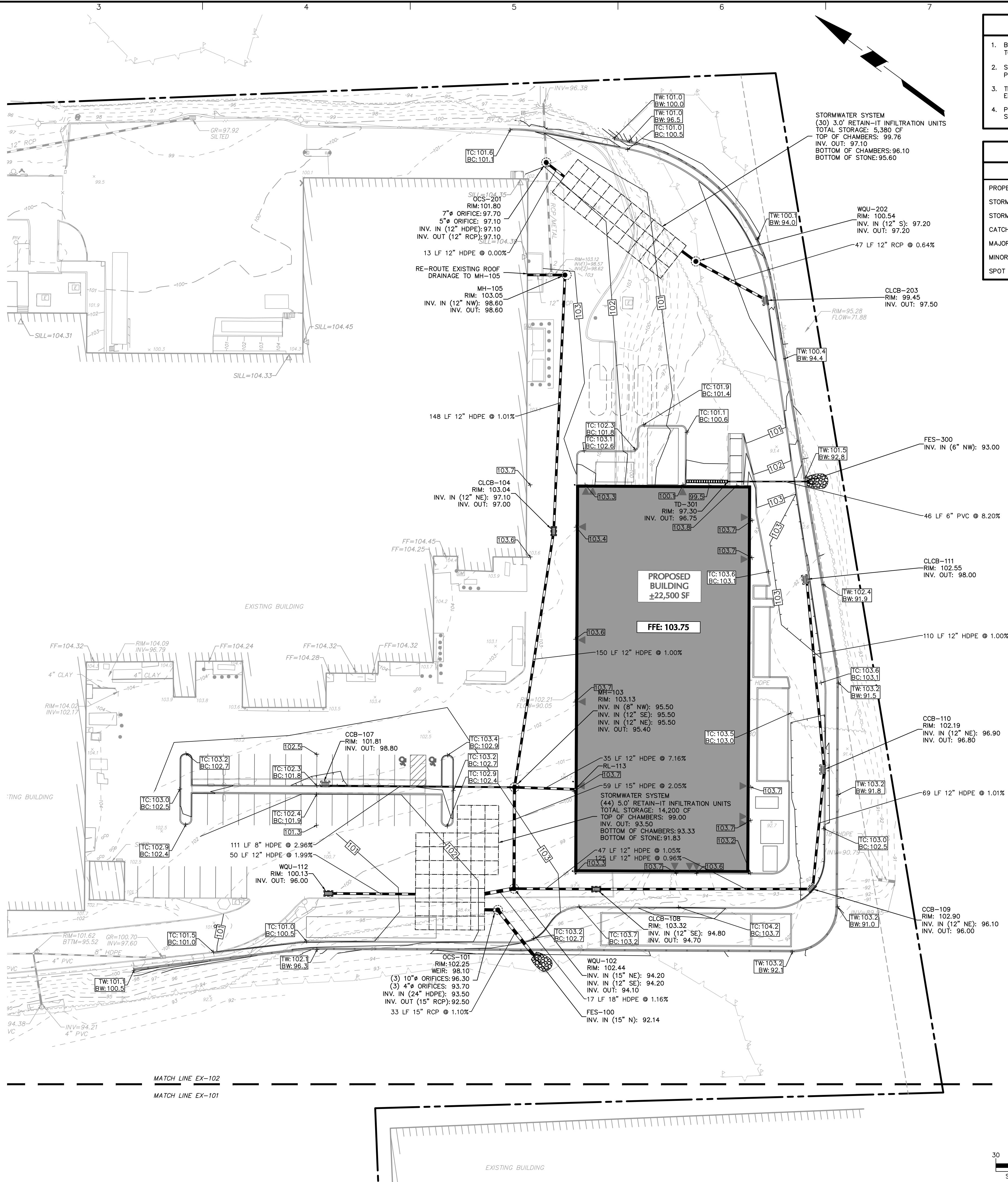
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---	SITE BOUNDARY
---	EXISTING WATERSHED DIVIDE
---	TIME OF CONCENTRATION FLOW PATH
---	SOIL TYPE BOUNDARY
---	UPLAND REVIEW AREA LIMIT
---	WETLAND LIMITS

LANGAN Langan CT, Inc. 555 Long Wharf Drive, 9th Floor New Haven, CT 06511 T: 203.562.5771 F: 203.789.6142 www.langan.com	Project	Drawing Title	Project No.	Drawing No.
	MACDERMID ALPHA NEW PROCESS BUILDING	CATCH BASIN DRAINAGE AREAS	140324701	DACB
	WEST HAVEN	CONNECTICUT	Date 08/01/2025	Sheet 3 of 1
			Drawn By BTM	

GRADING & DRAINAGE NOTES

- ALL PROPOSED STORM DRAINAGE PIPING TO UTILIZE WATER-TIGHT JOINTS.
- LOCATIONS AND ELEVATIONS OF ROOF LEADERS SHOULD BE COORDINATED WITH ARCHITECTURAL DRAWINGS PRIOR TO CONSTRUCTION. ALL ROOF LEADERS ARE TO BE TIE INTO PROPOSED UNDERGROUND DRAINAGE NETWORK.
- CLEANOUTS SHALL BE PROVIDED FLUSH TO GRADE AT ALL LOCATIONS OF ROOF DRAIN INTERSECTIONS, BENDS AND UPSTREAM ENDS.
- ALL REQUIRED STORM LATERALS SERVING THE BUILDING SHALL BE COORDINATED AND CONSTRUCTED TO WITHIN FIVE FEET OF EACH BUILDING LATERAL ENTRANCE LOCATION AT THE INVERTS NOTED. ANY NECESSARY EXTENSIONS, RELOCATIONS, OR CORRECTIONS WITHIN FIVE FEET OF THE BUILDING NECESSARY TO COMPLETE CONNECTION OF LATERALS TO THE BUILDINGS SHALL BE MADE BY THE BUILDING CONTRACTOR.
- CONTRACTOR IS RESPONSIBLE FOR DETERMINING THE APPROPRIATE SIZES OF THE DRAINAGE CATCH BASINS AND MANHOLES TO RECEIVE PIPING SHOWN.
- STORM DRAINAGE PIPING INSTALLATION SHALL COMMENCE AT THE FURTHEST DOWNSTREAM POINT AND PROCEED UPSTREAM "IN THE DRY".
- ABBREVIATIONS: RCP=REINFORCED CONCRETE PIPE
HOPE=HIGH DENSITY POLYETHYLENE PIPE
CCB=CURBED CATCH BASIN
CLCB=CURBLESS CATCH BASIN
MH=MANHOLE
YD=YARD DRAIN
WQU=WATER QUALITY UNIT
OCS=OUTLET CONTROL STRUCTURE
FES=FLARED END SECTION
SS=STAINLESS STEEL
- EXISTING GRADES SHOWN ARE APPROXIMATE AND SHOULD BE VERIFIED BY THE SITE CONTRACTOR PRIOR TO EARTHWORK.
- CONTRACTOR TO PERFORM VIDEO INSPECTION TO VERIFY CONDITION OF ALL EXISTING DRAINAGE PIPES AND STRUCTURES TO REMAIN (INCLUDING PIPES RUNNING INTO AND OUT OF BUILDING). CONTRACTOR TO REPAIR OR REPLACE PIPE OR STRUCTURES AS DIRECTED IF DEEMED TO BE IN POOR CONDITION BY OWNER OR ENGINEER (TYP)
- STABILITY FOR RETAINING WALLS, INCLUDING GLOBAL STABILITY CALCULATIONS, MUST BE ANALYZED BY THE RETAINING WALL DESIGN ENGINEER OF RECORD AND SIGNED AND SEALED BY AN ACTIVE CTPROFESSIONAL ENGINEER
- STABILITY FOR ALL SLOPES GREATER THAN 3:1 MUST BE ANALYZED BY THE GEOTECHNICAL DESIGN ENGINEER OF RECORD, INCLUDING CALCULATIONS SIGNED AND SEALED BY AN ACTIVE CTPROFESSIONAL ENGINEER
- ALL SIDEWALKS TO HAVE A MAXIMUM 2% CROSS SLOPE



GENERAL NOTES

- BOUNDARY AND TOPOGRAPHIC INFORMATION OBTAINED FROM A PLAN TITLED "BOUNDARY & TOPOGRAPHIC SURVEY" PREPARED BY LANGAN, AND DATED 9 JULY 2021.
- SITE IMPROVEMENTS INCORPORATED INTO THE SURVEY TAKEN FROM A PLAN ENTITLED "SITE PLAN" PREPARED BY LANGAN, DATED 15 OCTOBER 2021.
- THE SITE IS LOCATED IN ZONE X, AN AREA OF MINIMAL FLOODING PER FIRM MAP 09008C0438H, EFFECTIVE DECEMBER 17, 2010.
- PROPOSED BUILDING FOOTPRINT RECEIVED ELECTRONICALLY FROM ITAC CORPORATION DATED SEPTEMBER 2025.

LEGEND

	EXISTING	PROPOSED
PROPERTY LINE		
STORM LINE		
STORM MANHOLE		
CATCH BASIN		
MAJOR CONTOUR		
MINOR CONTOUR		
SPOT ELEVATION		

Date	Description	No.
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Revisions

LANGAN

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Project

**MACDERMID ALPHA
NEW PROCESS
BUILDING**

WEST HAVEN CONNECTICUT

Drawing Title

GRADING & DRAINAGE PLAN

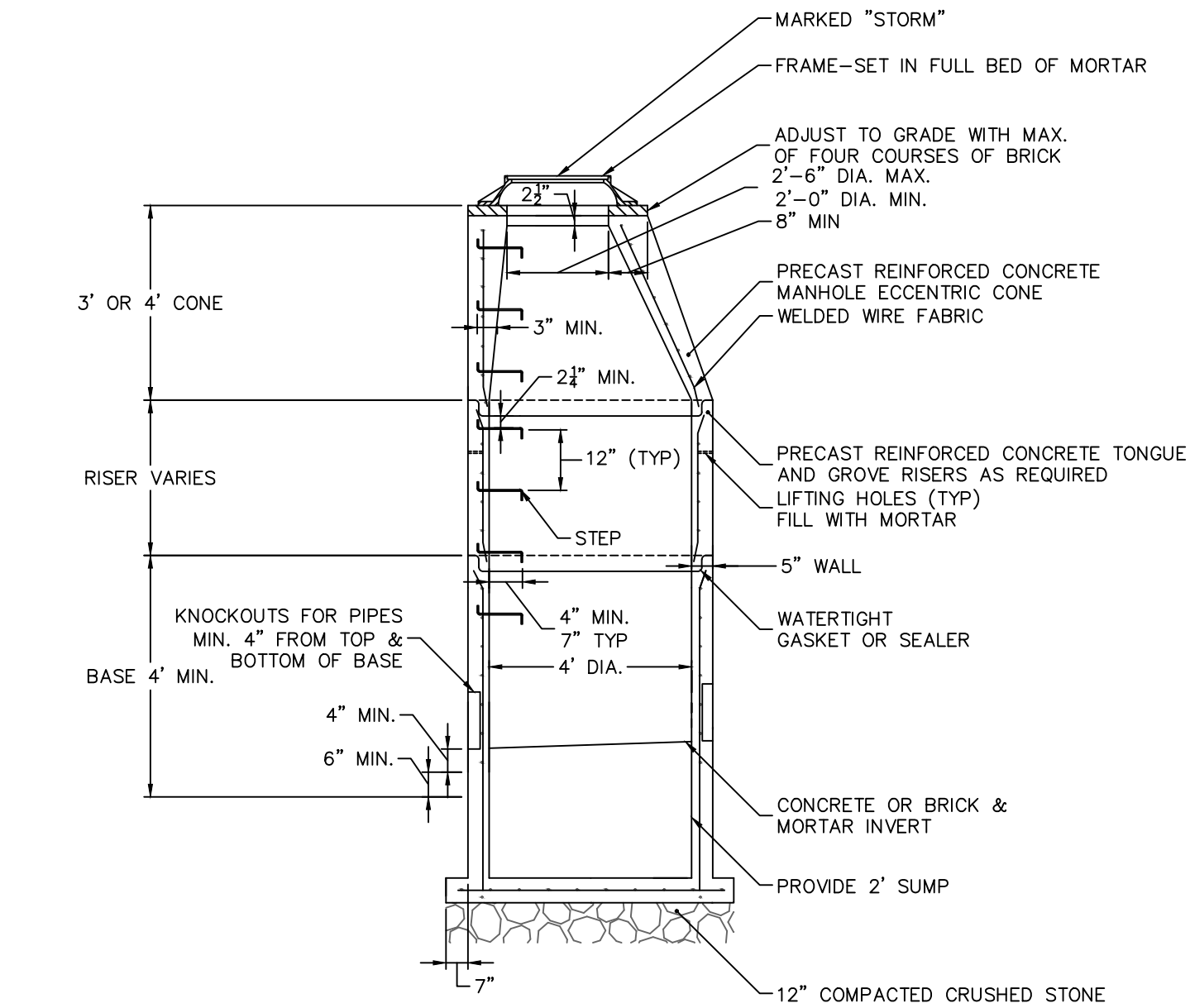
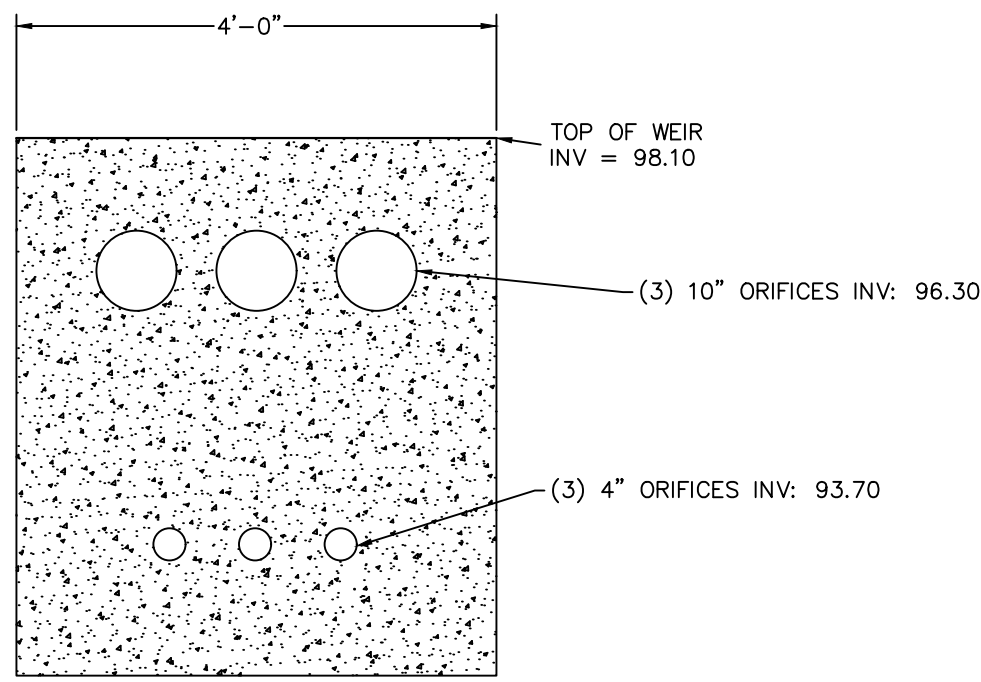
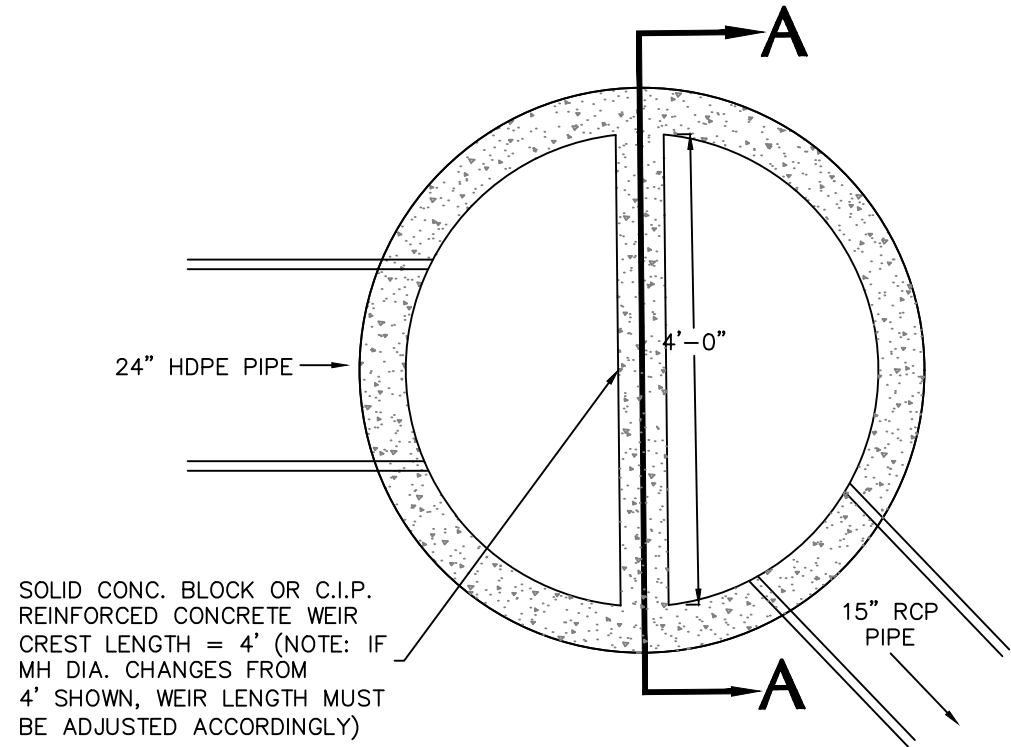
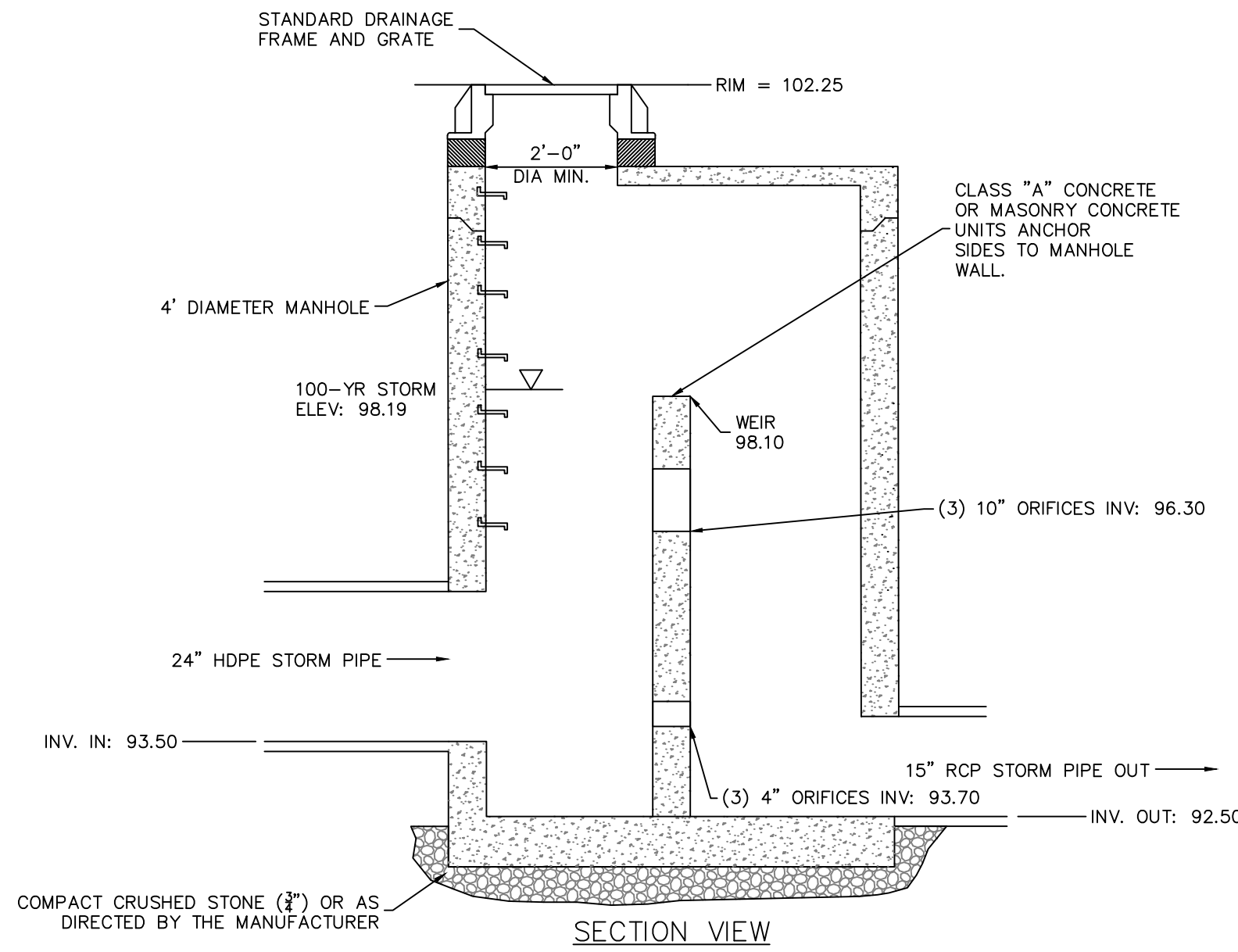
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Sheet 6 of 16

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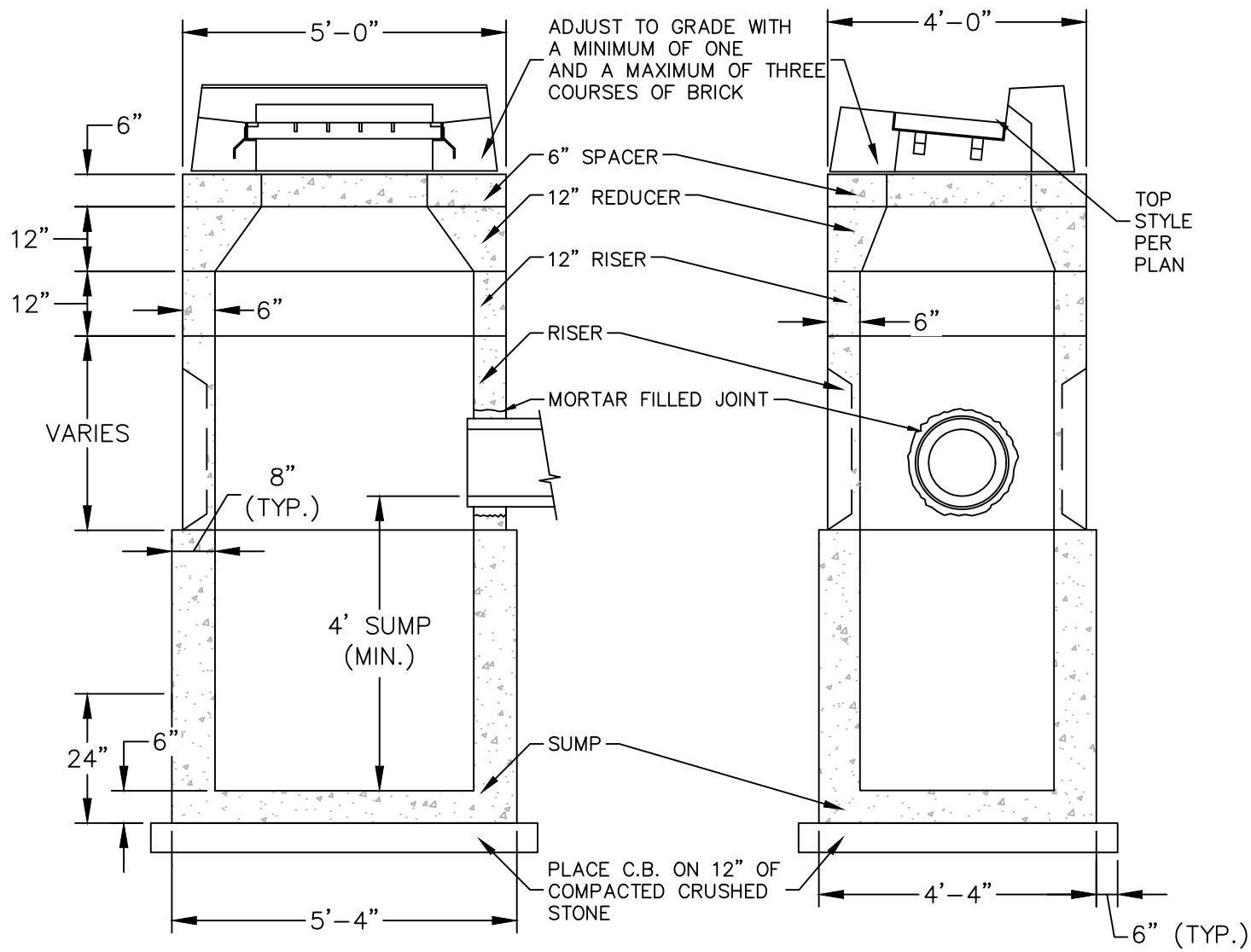
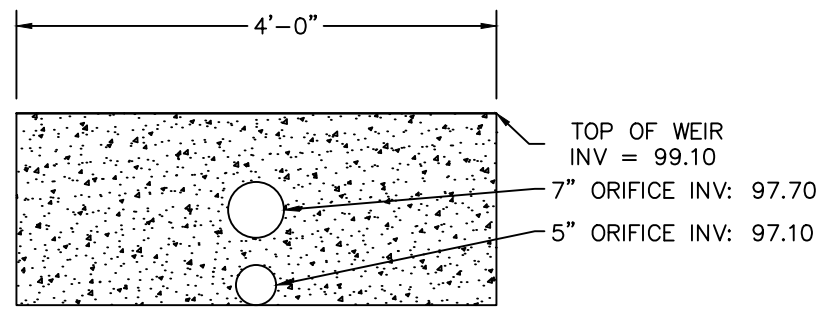
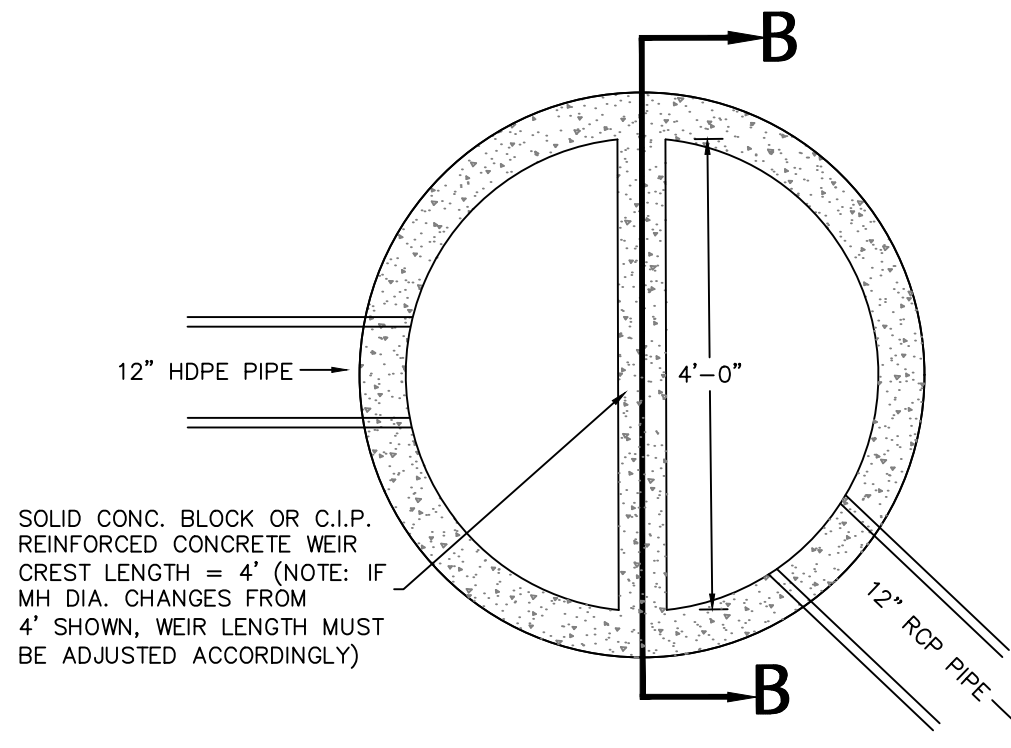
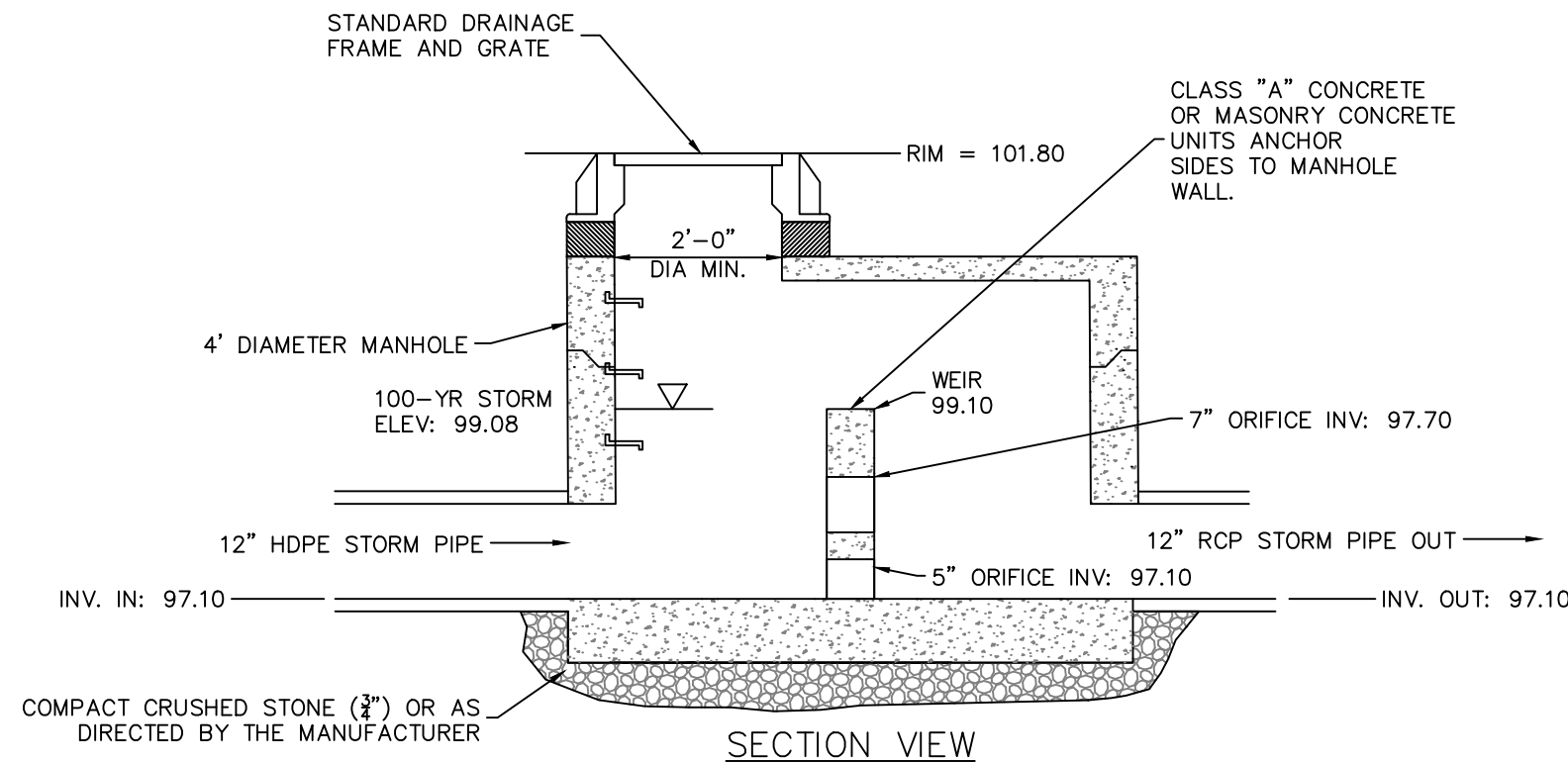
- NOTES:
- 5' OR 6' DIA. PRECAST BASES MAY BE USED WHEN REQUIRED DUE TO SIZE OR NUMBER OF PIPES AT THE MANHOLE. PRECAST REDUCERS WILL BE PLACED ABOVE THE 5' OR 6' BASES AS DIRECTED BY THE ENGINEER. WALL THICKNESS TO INCREASE 1" FOR EACH 1' OF INSIDE DIAMETER INCREASE. MINIMUM 6" WALL DIMENSION SHOULD BE PROVIDED BETWEEN ALL PIPES.
 - FRAME DIAMETER OF 3'-3" WITH 4" FLANGE MUST BE USED WHEN THE TOP DIA. OF THE PRECAST CONE IS LESS THAN 3'-6". ALL OTHER FRAME DIMENSIONS ARE TO REMAIN THE SAME.
 - MINIMUM CONCRETE COMPRESSIVE STRENGTH OF F'c = 4000 PSI SHALL BE OBTAINED PRIOR TO SHIPPING.
 - MANHOLE, FRAME, AND COVER SHALL BE RATED FOR HS-20 LOADING (STANDARD TRUCK LOAD)

STORM MANHOLE

N.T.S.

3

2



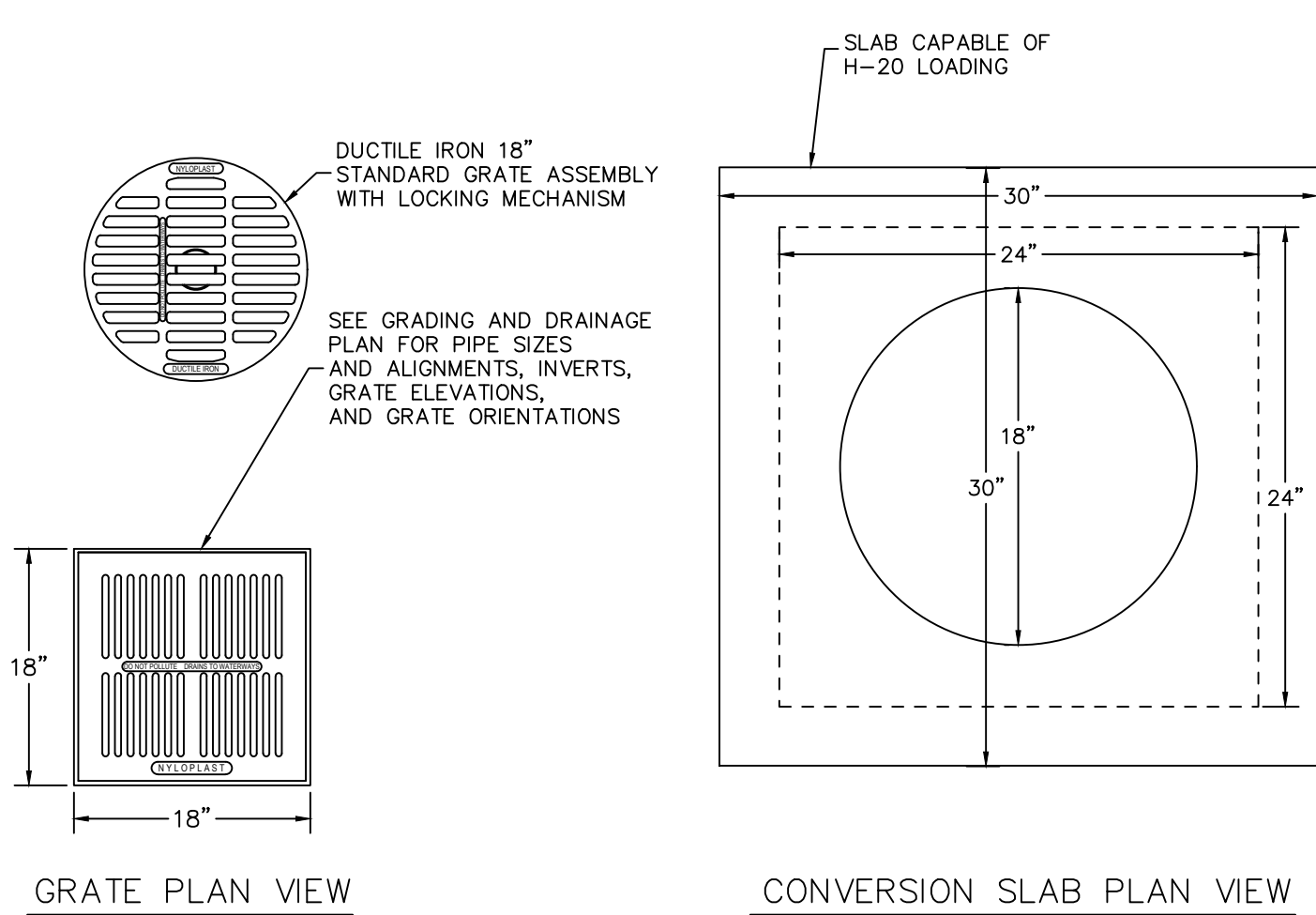
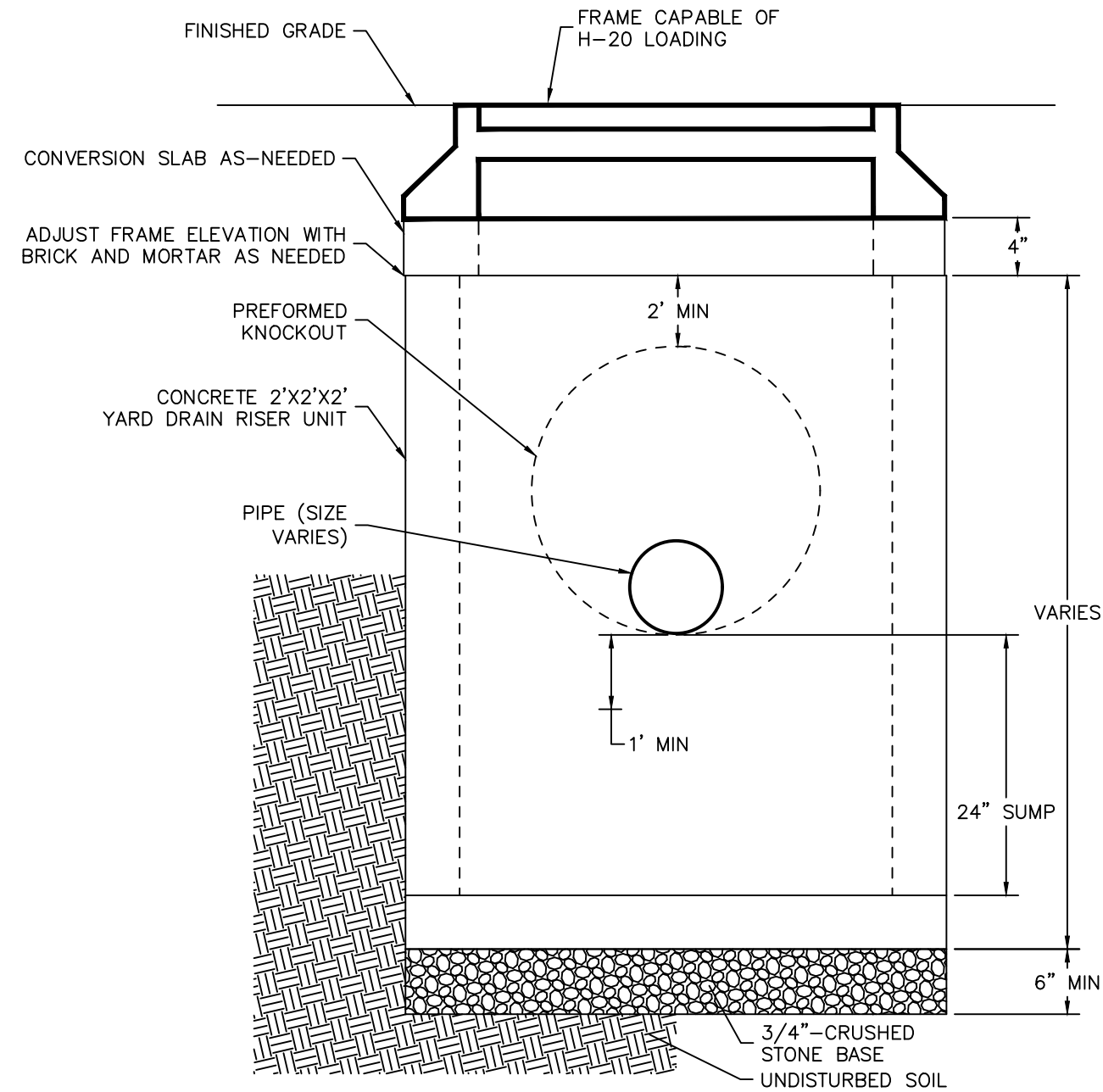
- NOTES:
- ALL CATCH BASIN COMPONENTS TO BE PRE-CAST REINFORCED CONCRETE, ABLE TO WITHSTAND THE APPLIED EARTH LOADS WITH AN HS-20 TRUCK LOAD.
 - ALL JOINTS TO BE MORTARED.
 - CATCH BASIN SHALL CONFORM TO ASTM C478.
 - PROVIDE FLOODPROOF GRATES

CATCH BASIN

N.T.S.

5

4



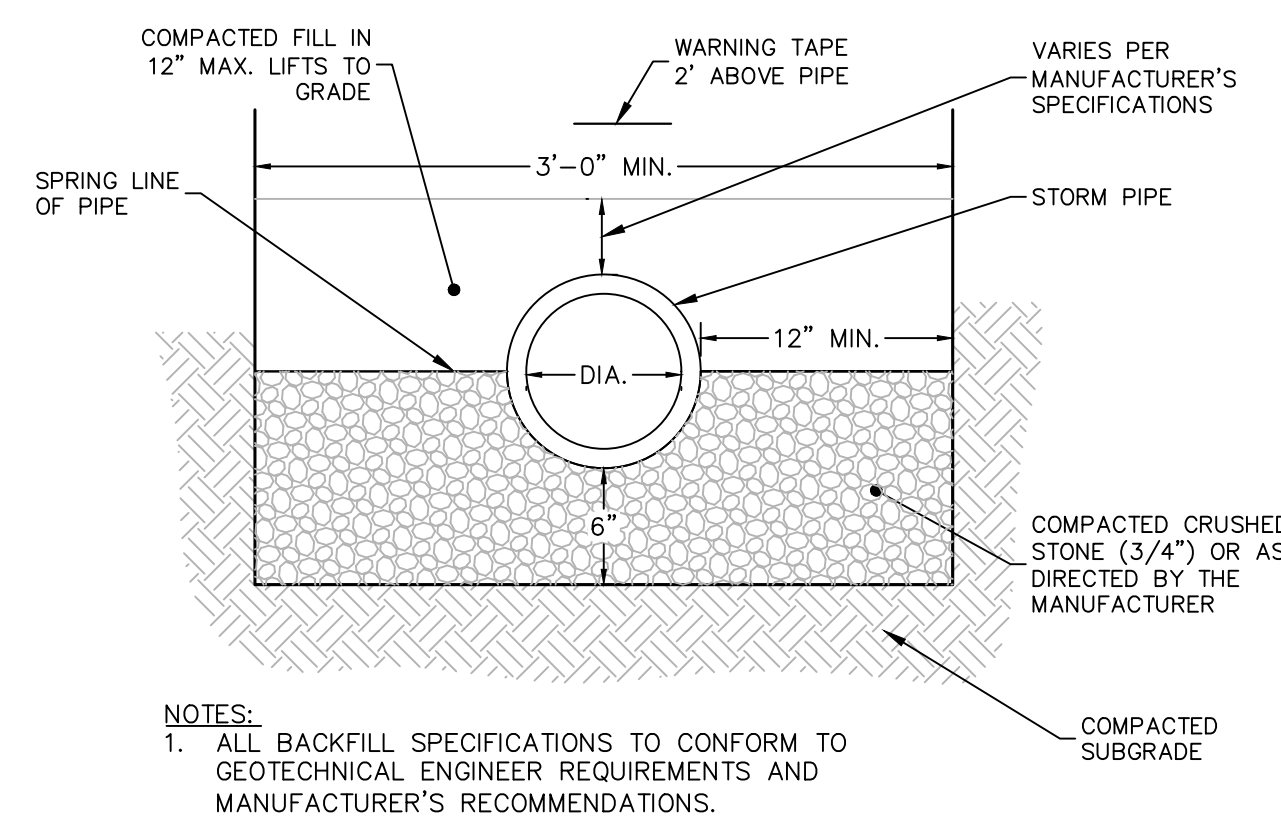
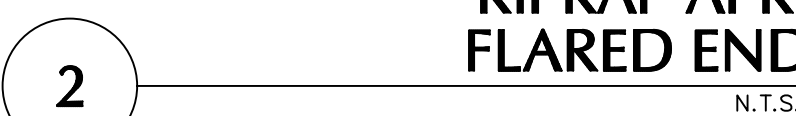
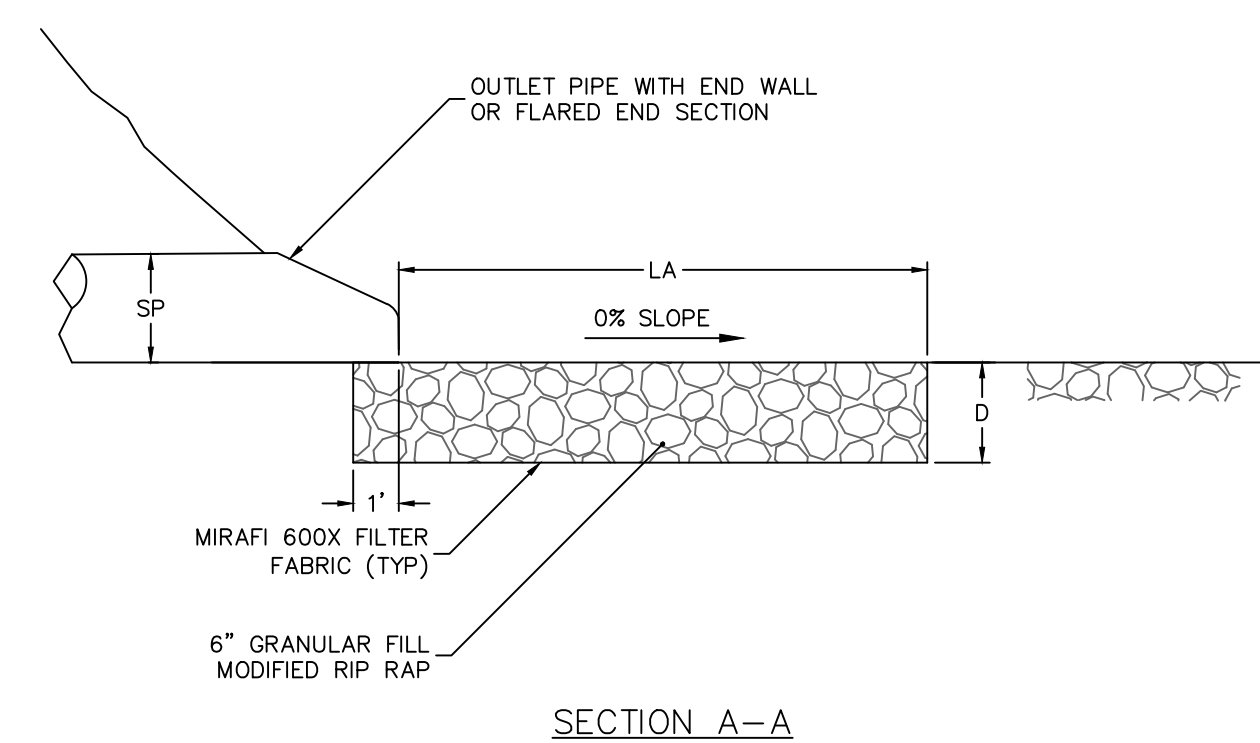
- NOTES:
- GRATES SHALL BE ROUND IN LAWN/FIELD AREAS AND SQUARE IN HARDSCAPE AREAS.
 - NEEDHAM ADA COMPLIANT TYPE '12' GRATES OR APPROVED EQUAL (MAXIMUM SLOT OPENING 1/2\"/>

YARD DRAIN

N.T.S.

Date	Description	No.
Revisions		
Signature		Date
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Project		
MACDERMID ALPHA NEW PROCESS BUILDING WEST HAVENCONNECTICUT		
Drawing Title		
GRADING & DRAINAGE DETAILS I		
Project No.		Drawing No.
140324701		
Date		
09/22/2025		
Drawn By		CG501
JAD		
Checked By		
BP		Sheet 7 of 16

LANEAW
Project No. 140324701
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Date: 9/19/2025 Time: 14:38 User: bmichaelis Style Table: Langan.stb Layout: Layout1 Document Code: 140324701-0501-CG501-0102

SOIL EROSION-SEDIMENT CONTROL NOTES

PROPOSED DEVELOPMENT

- CONSTRUCTION WILL INCLUDE EARTHWORK, CURBING, PAVING, UTILITY INSTALLATION, LANDSCAPING AND BUILDING CONSTRUCTION. ALL DEMOLITION DEBRIS AND SOIL REMOVAL RELATED TO CONSTRUCTION SHALL BE REMOVED AND DISPOSED OF IN ACCORDANCE WITH APPLICABLE STATE AND LOCAL LAWS GOVERNING SUCH ACTIVITIES.
- THE DETAILED EROSION AND SEDIMENT CONTROL MEASURES ARE SHOWN ON DRAWING CG101. THE PROPOSED MEASURES HAVE BEEN DESIGNED TO PREVENT THE MIGRATION OF SOIL SEDIMENT FROM THE SITE.

SOIL EROSION AND SEDIMENT CONTROL NOTES

- THE SOIL AND SEDIMENT CONTROL PRACTICES MUST BE INSTALLED IN ACCORDANCE WITH THE LOCAL GOVERNING AUTHORITY, THE CONNECTICUT EROSION AND SEDIMENT CONTROL GUIDELINES AND THE CONNECTICUT STORMWATER STANDARDS.
- EROSION AND SEDIMENT CONTROL DEVICES MUST BE INSTALLED PRIOR TO START OF DEMOLITION AND CONSTRUCTION AND DISTURBANCE OF SITE CONTRIBUTORY DRAINAGE AREAS. THE OWNER OR ITS CONTRACTOR SHALL INSPECT, REPAIR AND REMOVE ALL SEDIMENT AND EROSION CONTROL DEVICES, AS INDICATED HEREIN. ALL EARTH CHANGES SHALL BE DESIGNED, CONSTRUCTED, AND COMPLETED IN SUCH A MANNER SO THAT THE EXPOSED AREA OF ANY DISTURBED LAND SHALL BE LIMITED TO THE SHORTEST POSSIBLE PERIOD OF TIME.
- DISPOSAL OF COLLECTED SEDIMENT SHALL BE MADE TO AREA DESIGNATED BY THE OWNER'S SOIL ENGINEER.
- FILTER FABRIC/SILT FENCE WILL BE INSTALLED ALONG THE TOE OF ALL CRITICAL CUT AND FILL SLOPES.
- ALL TOPSOIL NOT TO BE USED FOR FINAL GRADING/LANDSCAPED AREAS SHALL BE REMOVED FROM THE SITE IMMEDIATELY, IN ACCORDANCE WITH APPLICABLE STATE AND LOCAL LAW. ALL TOPSOIL TO BE USED IN LANDSCAPED AREAS SHALL BE STORED/STOCKPILED IN ACCORDANCE WITH APPLICABLE STATE AND LOCAL LAW STANDARDS.
- ALL AREAS WITHIN 500 FEET OF AN INHABITED DWELLING SHALL BE WETTED AS NECESSARY TO PROVIDE DUST CONTROL.
- PAVEMENT BASE COURSE MUST BE PLACED IN ALL NEW ROADWAY AREAS UPON COMPLETION OF FINE GRADING.
- THE CONTRACTOR IS RESPONSIBLE FOR ALL PAVED ROADWAYS, ON AND OFF-SITE, WHICH MUST BE KEPT FREE OF SITE GENERATED SEDIMENT AT ALL TIMES. DUST SHALL BE CONTROLLED BY SPRINKLING OR OTHER APPROVED METHOD.
- ALL STORM DRAINAGE OUTLETS MUST BE STABILIZED, AS REQUIRED, BEFORE THE DISCHARGE POINTS BECOME OPERATIONAL.
- SILT FENCES AND BARRIERS MUST BE CLEANED OR REPLACED PERIODICALLY TO REMOVE BUILT-UP SILT.
- SEDIMENT TRAPS MUST BE CLEANED WHEN CAPACITY HAS BEEN REDUCED BY AN AVERAGE OF 2'-0" OVER ITS TOTAL AREA OR TO 70% OF ITS DESIGN VOLUMES, WHICHEVER OCCURS FIRST.
- ALL EROSION AND SEDIMENT CONTROL DEVICES MUST BE INSPECTED ON A DAILY BASIS AND CLEANED IMMEDIATELY AFTER EACH STORM.
- ANY TEMPORARY OR PERMANENT FACILITY DESIGNED FOR THE CONVEYANCE OF WATER AROUND, THROUGH, OR FROM THE EARTH CHANGE AREA SHALL BE DESIGNED TO LIMIT THE WATER FLOW TO A NON-EROSIVE VELOCITY.
- THE CONTRACTOR SHALL CORRECT ANY OMISSIONS, ERRORS, OR FIELD OPERATIONS IMMEDIATELY AND IN ACCORDANCE WITH THE GUIDELINES FOR SOIL EROSION AND SEDIMENT CONTROL.
- ANY CONVEYANCE OF THIS PROJECT PRIOR TO ITS COMPLETION WILL TRANSFER FULL RESPONSIBILITY FOR COMPLIANCE WITH THE CERTIFIED PLAN TO ANY SUBSEQUENT OWNERS.
- SOIL EROSION AND SEDIMENT CONTROLS MUST BE INSPECTED BY THE ZONING ENFORCEMENT OFFICER BEFORE WORK MAY COMMENCE.
- THE PROPERTY OWNER AND/OR HIS/HER AGENTS MUST MAINTAIN (REPAIR/REPLACE), WHEN NECESSARY, THE SILTATION CONTROL UNTIL ALL DEVELOPMENT ACTIVITY IS COMPLETED AND ALL DISTURBED AREAS ARE PERMANENTLY STABILIZED.

TEMPORARY STABILIZATION

SEDIMENT DISPOSAL AREAS AND TOPSOIL STOCKPILES NOT SCHEDULED FOR CONSTRUCTION ACTIVITIES WITHIN THIRTY (30) DAYS OF DISTURBANCE SHALL BE STABILIZED AS FOLLOWS:

- SOIL AMENDMENTS AS NECESSARY.
- ANNUAL RYE GRASS SEEDING APPLIED AT A RATE OF NOT LESS THAN 1 LB. PER 1,000 SF.
- MULCH ALL NEWLY SEEDED AREAS WITHIN 80 LBS. OF SALT HAY OR SMALL GRAIN STRAW PER 1,000 SF.
- WHEN DISTURBED AREAS ARE SCHEDULED FOR IMMEDIATE LANDSCAPING THEY MAY BE MULCHED AND SEEDED PER ITEM C ABOVE.

PERMANENT STABILIZATION

REFER TO PLANTING PLANS & DETAILS FOR PERMANENT STABILIZATION METHODS + PROPOSED SEED MIXES.

- PERMANENT VEGETATION IS TO BE SEEDED OR SODDED ON ALL DISTURBED LAND AREAS WITHIN SEVEN (7) DAYS AFTER FINAL GRADING. MULCH AS NECESSARY FOR SEED PROTECTION AND ESTABLISHMENT. AMEND SOIL AS NEEDED PRIOR TO PERMANENT SEEDING. WHEN IT IS NOT POSSIBLE TO PERMANENTLY STABILIZE A DISTURBED AREA AFTER COMPLETION OF AN EARTH CHANGE OR WHEN SIGNIFICANT EARTH CHANGE ACTIVITY CEASES, TEMPORARY SOIL EROSION CONTROL MEASURES SHALL BE IMPLEMENTED. ALL TEMPORARY SOIL EROSION CONTROL MEASURES SHALL BE MAINTAINED UNTIL PERMANENT SOIL EROSION CONTROL MEASURES SHALL BE IMPLEMENTED. ALL DISTURBED AREAS, STOCKPILES OF FILL OR EXCAVATED MATERIAL SHALL BE STABILIZED IN SUCH A MANNER AS NOT TO CAUSE UNREASONABLE HAZARD TO PERSONS OR PROPERTY.
- MATERIALS SPECIFICATION: LAWN + MEADOW AREAS
 - ANY SOIL HAVING A pH OF FOUR OR LESS CONTAINING IRON SULFIDES SHALL BE COVERED WITH A MINIMUM OF TWELVE INCHES OF SOIL HAVING A pH OF FIVE OR MORE PRIOR TO SEED BED PREPARATION.
- MULCHING SHALL BE DONE AT THE RATE OF SEVENTY TO NINETY POUNDS (70-90 LBS) PER 1,000 SQUARE FEET WITH UNROTTED SALT HAY.
- LIQUID MULCH BINDERS MUST BE USED TO ANCHOR SALT HAY, HAY OR STRAY MULCHES.
 - APPLICATIONS SHOULD BE HEAVIER AT EDGES WHERE WIND CATCHES THE MULCH IN VALLEYS AND AT CREATED BANKS. REMAINDER OF AREA SHOULD BE UNIFORM IN APPEARANCE.
 - USE ONE OF THE FOLLOWING: SYNTHETIC OR ORGANIC BINDERS. BINDERS SUCH AS CURASOL DCA-70, PETRO SET, TERRA TACH, HYDRO MULCH AND AEROSPRAY MAY BE USED AT RATES RECOMMENDED BY THE MANUFACTURER OF ANCHOR MULCH MATERIALS. BINDERS CONTAINING PETROLEUM PRODUCTS SHALL NOT BE USED.NOTE: ALL NAMES GIVEN ABOVE ARE REGISTERED TRADE NAMES. THIS DOES NOT CONSTITUTE A RECOMMENDATION OF THESE TO THE EXCLUSION OF OTHER PRODUCTS.
- FILL MATERIAL SHALL BE FREE FROM DEBRIS, PERISHABLE OR COMBUSTIBLE MATERIAL AND FROZEN OR WET EARTH OR STONES LARGER THAN THREE INCHES IN MAXIMUM DIMENSION.
- CONSTRUCTION AREAS SHALL BE PERIODICALLY SPRAYED WITH WATER UNTIL THE SURFACE IS WET TO CONTROL THE GENERATION OF DUST.
- ALL REVISIONS AFTER APPROVAL HAS BEEN GRANTED SHALL BE FORWARDED TO THE APPROPRIATE DISTRICT FOR REVIEW.
- THE LOCAL GOVERNING AUTHORITY SHALL RECEIVE WRITTEN NOTIFICATION SEVENTY TWO HOURS BEFORE THE START OF ANY CONSTRUCTION.
- SEEDBED PREPARATION:
 - TOPSOIL SHOULD BE A MINIMUM OF SIX INCHES DEEP (LIGHTLY COMPACTED) BEFORE SEEDING.
 - TOPSOIL SHALL BE TESTED PRIOR TO SEEDING.
 - WORK SOIL AMENDMENTS INTO SOIL AS NECESSARY AS NEARLY AS PRACTICAL TO A DEPTH OF FOUR INCHES WITH A DISC, SPRINGTOOTH HARROW OR OTHER SUITABLE EQUIPMENT. THE FINAL HARROWING OR DISCING OPERATION SHOULD BE ON THE GENERAL CONTOUR. CONTINUE ALL CLAY OR SILTY SOIL AND COARSE SANDS SHOULD BE ROLLED TO FIRM THE SEED BED WHEREVER FEASIBLE.
 - REMOVE FROM THE SURFACE ALL STONES ONE INCH OR LARGER IN ANY DIMENSION. REMOVE ALL OTHER DEBRIS, SUCH AS WIRE, CABLE, TREE ROOTS, PIECES OF CONCRETE, CLOUDS, LUMPS, OR OTHER UNSUITABLE MATERIAL.
 - INSPECT SEED BED JUST BEFORE SEEDING. IF TRAFFIC HAS LEFT SOIL COMPACT, THE AREA MUST BE RETILLED AND FIRMED AS ABOVE.

CONTINGENCY SOIL EROSION AND SEDIMENT CONTROL NARRATIVE

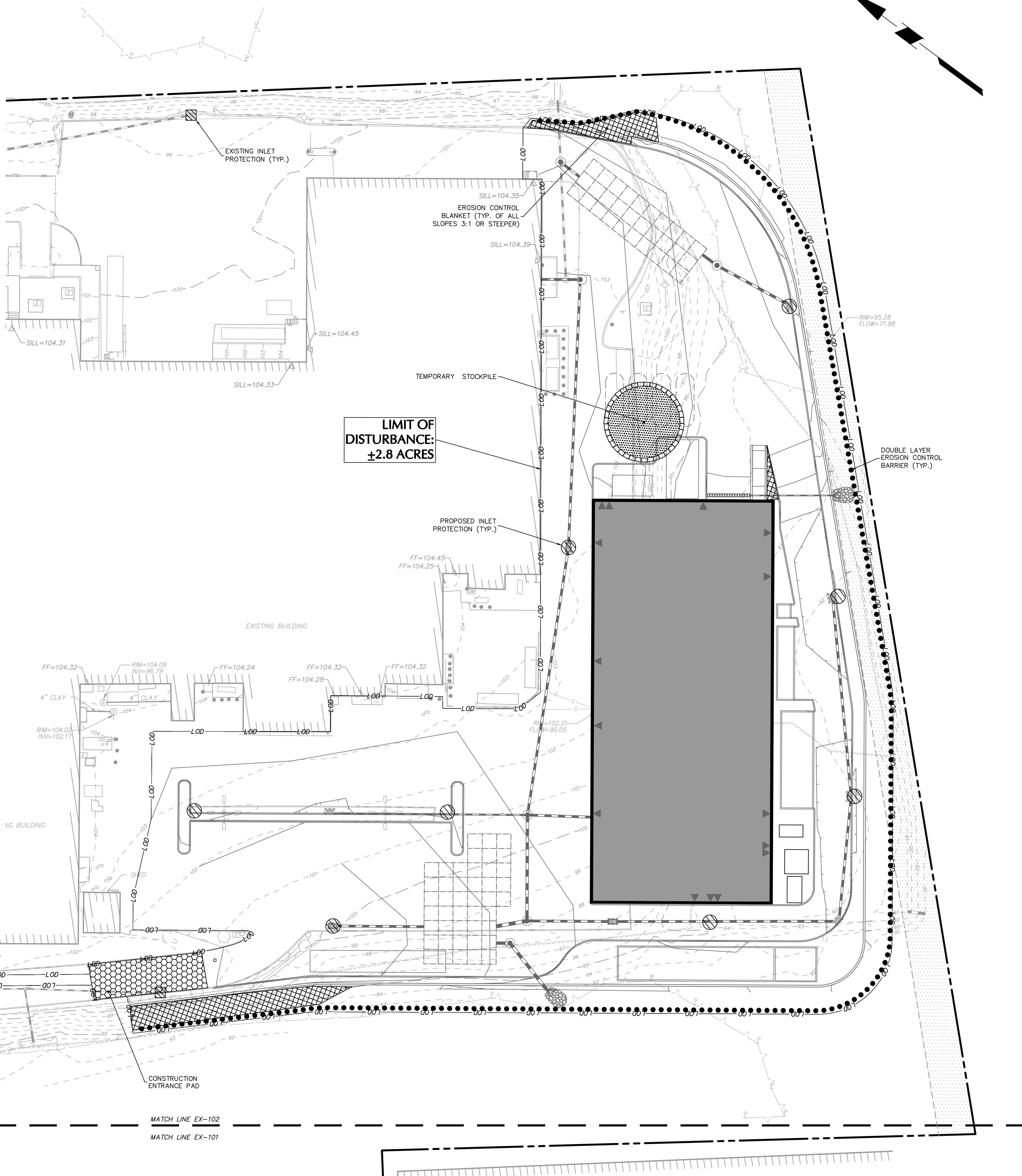
- THE GENERAL CONTRACTOR WILL DESIGNATE PERSONNEL FOR 24 HOUR EMERGENCY RESPONSE IN THE EVENT OF SEVERE WEATHER AND INCREASED POTENTIAL FOR SEVERE EROSION.
- THE GENERAL CONTRACTOR IS REQUIRED TO MAINTAIN ON SITE OR HAVE THE ABILITY TO RETRIEVE WITHIN 12 HOURS THE FOLLOWING MATERIALS IN THE EVENT THAT THERE ARE DEFICIENCIES IN THE SESC MEASURES:
 - 25% OF THE INSTALLED LENGTH OF SILT FENCE
 - EQUIVALENT TONNAGE OF STONE FOR STABILIZATION OF 2 STABILIZATION ENTRANCES. STONE COULD BE USED FOR SLOPE REPAIRS, ENERGY DISSIPATER ENHANCEMENTS, ETC.
 - HEAVY EQUIPMENT CAPABLE OF TRENCHING/EXCAVATING LARGE AREAS TO DIVERT AND CONTROL RUNOFF IN A CONTROLLED MANNER.
- HAVE DESIGNATED A HYDRO-SEED CONTRACTOR CAPABLE OF RESPONDING TO THE SITE WITHIN 12 HOURS
- ANY STUMP GRINDINGS OR WOOD CHIPS GENERATED ON-SITE SHOULD BE RETAINED FOR USE TO BACK UP SILT FENCES.

GENERAL NOTES

- BOUNDARY AND TOPOGRAPHIC INFORMATION OBTAINED FROM A PLAN TITLED "BOUNDARY & TOPOGRAPHIC SURVEY" PREPARED BY LANGAN, AND DATED 9 JULY 2021.
- SITE IMPROVEMENTS INCORPORATED INTO THE SURVEY TAKEN FROM A PLAN ENTITLED "SITE PLAN" PREPARED BY LANGAN, DATED 15 OCTOBER 2021.
- THE SITE IS LOCATED IN ZONE X, AN AREA OF MINIMAL FLOODING PER FIRM MAP 09009C0438H, EFFECTIVE DECEMBER 17, 2010.
- PROPOSED BUILDING FOOTPRINT RECEIVED ELECTRONICALLY FROM ITAC CORPORATION DATED SEPTEMBER 2025.

LEGEND

	EXISTING	PROPOSED
PROPERTY LINE		
LIMIT OF DISTURBANCE LINE		
EXISTING INLET PROTECTION		
PROPOSED INLET PROTECTION		
CONSTRUCTION ENTRANCE		
SILT FENCE		



LIMIT OF
DISTURBANCE:
±2.8 ACRES

Date	Description	No.
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Revisions

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Project

**MACDERMID ALPHA
NEW PROCESS
BUILDING**

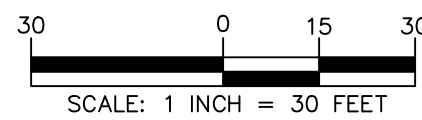
WEST HAVEN CONNECTICUT

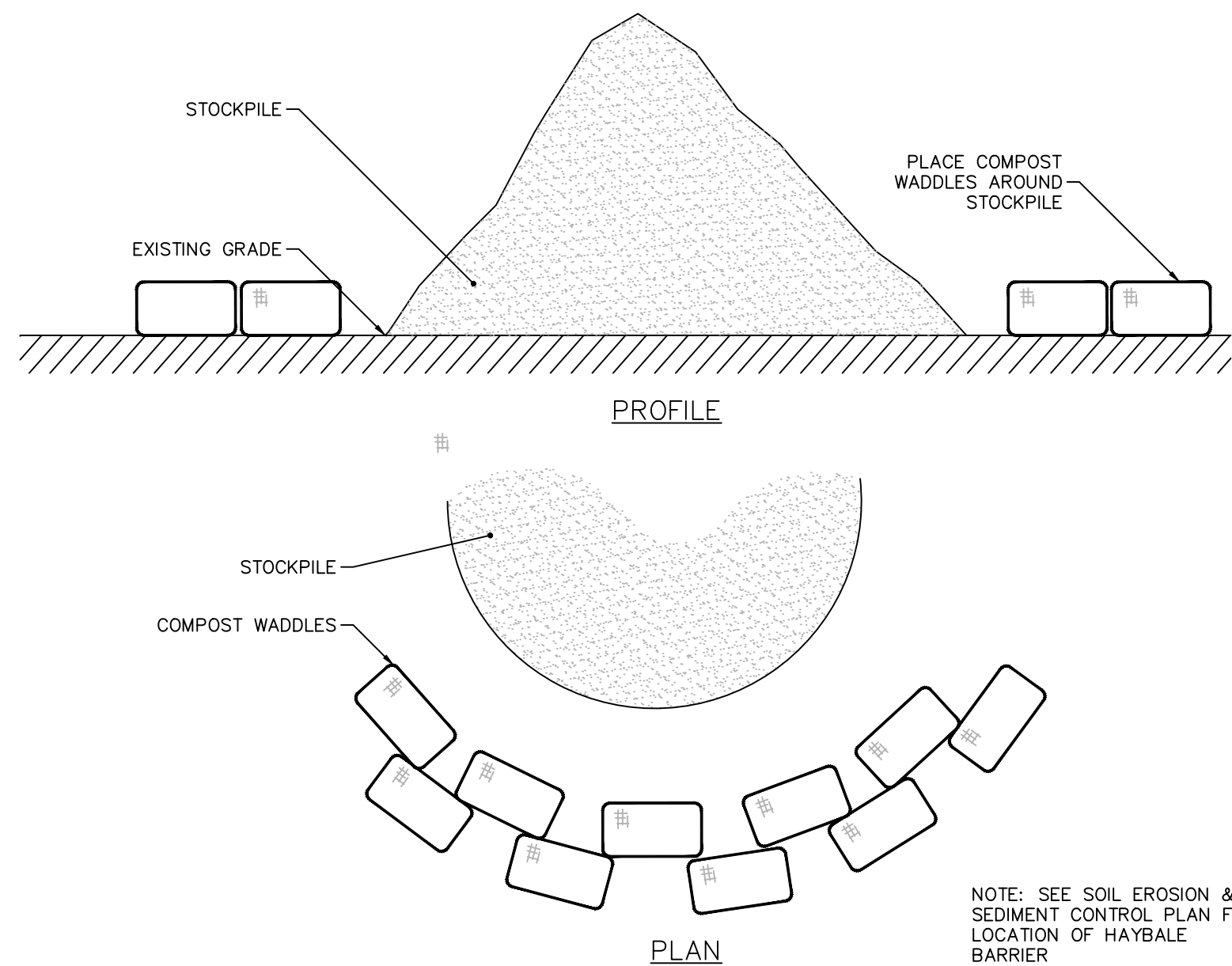
Drawing Title

**SOIL EROSION &
SEDIMENT
CONTROL PLAN**

Project No. 140324701	Drawing No. CE101
Date 09/22/2025	
Drawn By JAD	
Checked By BP	

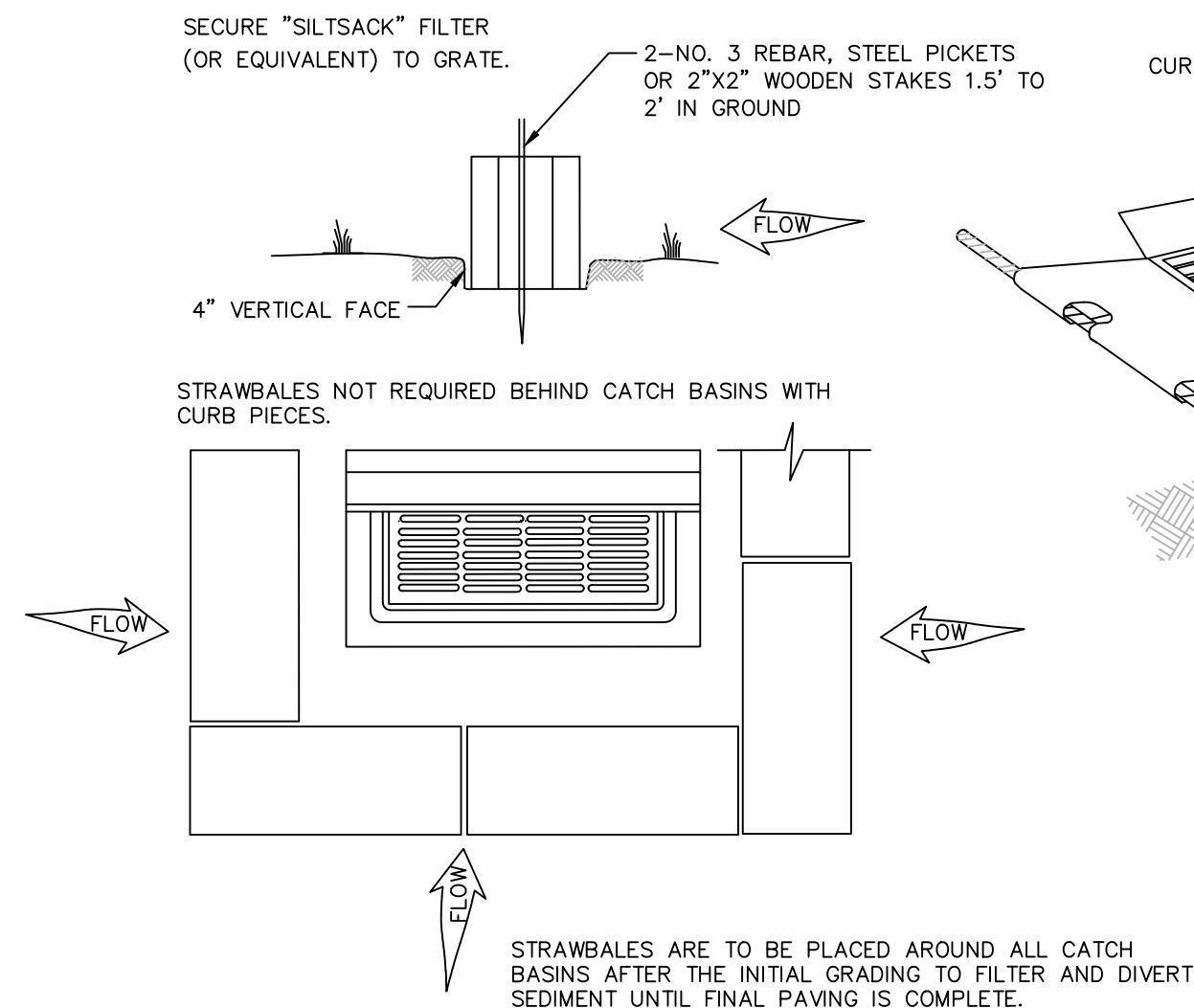
Sheet 11 of 16





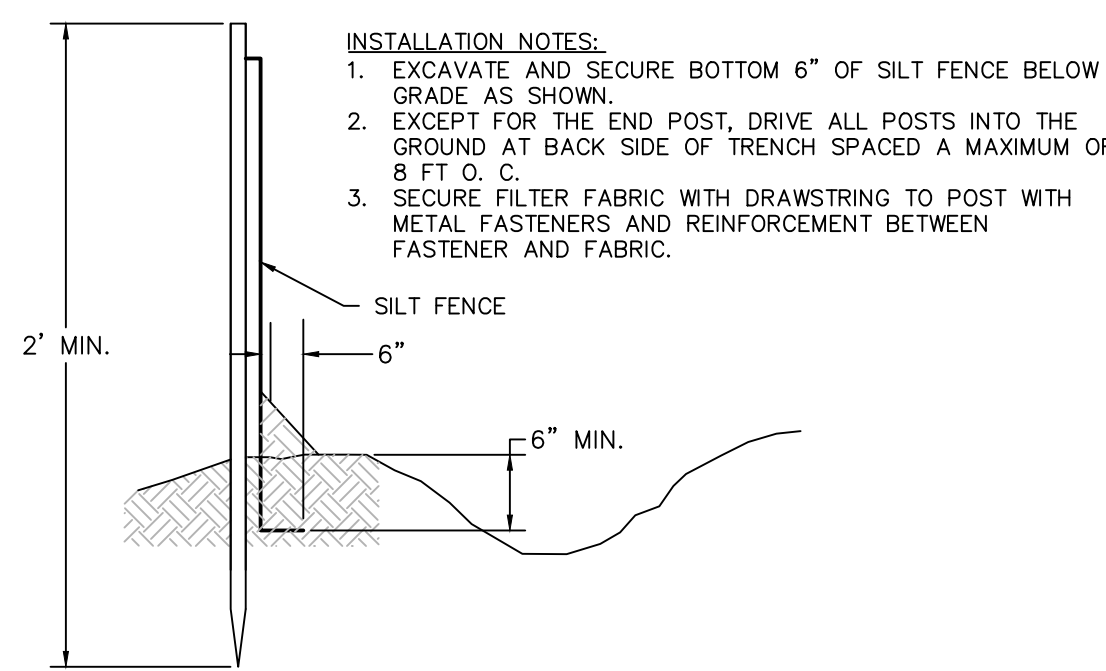
TEMPORARY STOCKPILE

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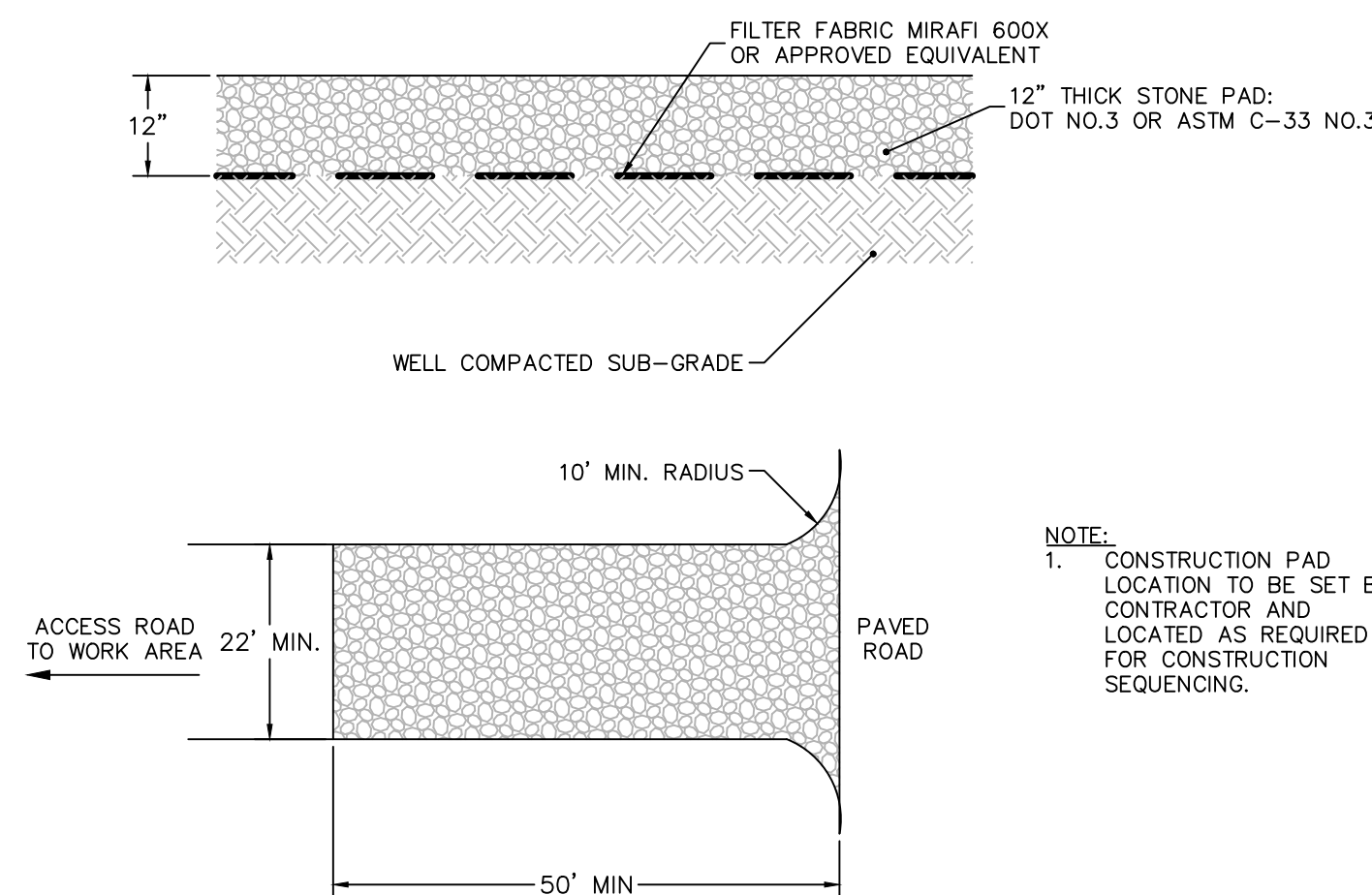
INLET PROTECTION

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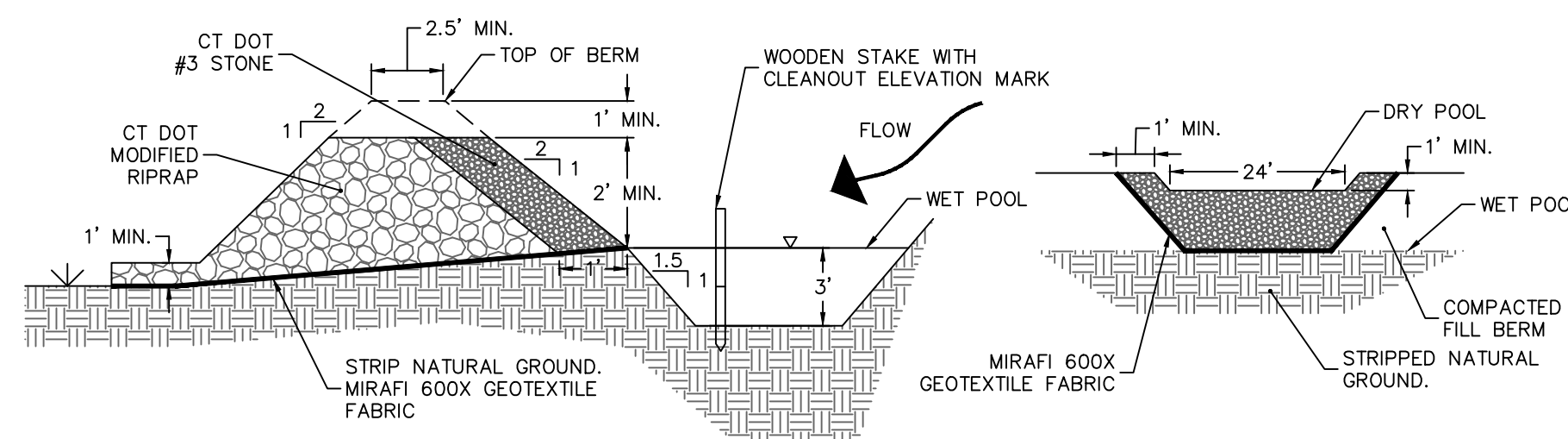
SILT FENCE

N.T.S.



CONSTRUCTION ENTRANCE

N.T.S.



PROFILE

CROSS SECTION

- NOTES:
1. TEMPORARY SEDIMENT TRAPS SHALL BE INSTALLED IN DISTURBED AREAS WITH DRAINAGE AREAS LESS THAN 5 ACRES.
 2. TEMPORARY SEDIMENT TRAPS AND OVERFLOW WEIRS SHALL BE SIZED ACCORDING TO THE 2024 CONNECTICUT GUIDELINES FOR SOIL EROSION AND SEDIMENT CONTROL TO PROVIDE A MINIMUM OF 134 CUBIC YARDS OF STORAGE PER ACRE OF DRAINAGE AREA.
 3. OVERFLOW WEIR LENGTH TO BE A MINIMUM OF 24' LONG. CONTINUE RIPRAP AND GEOTEXTILE FABRIC UP SIDE OF OVERFLOW WEIR TO TOP OF BERM TO PREVENT BERM EROSION.
 4. SEDIMENT TRAPS SHALL BE MAINTAINED UNTIL FINAL STABILIZATION OF THE CONTRIBUTING AREA OR SECONDARY CONTROLS ARE INSTALLED.
 5. SEDIMENT TRAPS TO BE INSPECTED WEEKLY AND WITHIN 24 HOURS OF A STORM. CLEANED OUT WHEN SEDIMENT ACCUMULATES TO HALF OF THE WET POOL DEPTH, AS MARKED WITH A WOODEN STAKE.

TEMPORARY SEDIMENTATION TRAP

N.T.S.

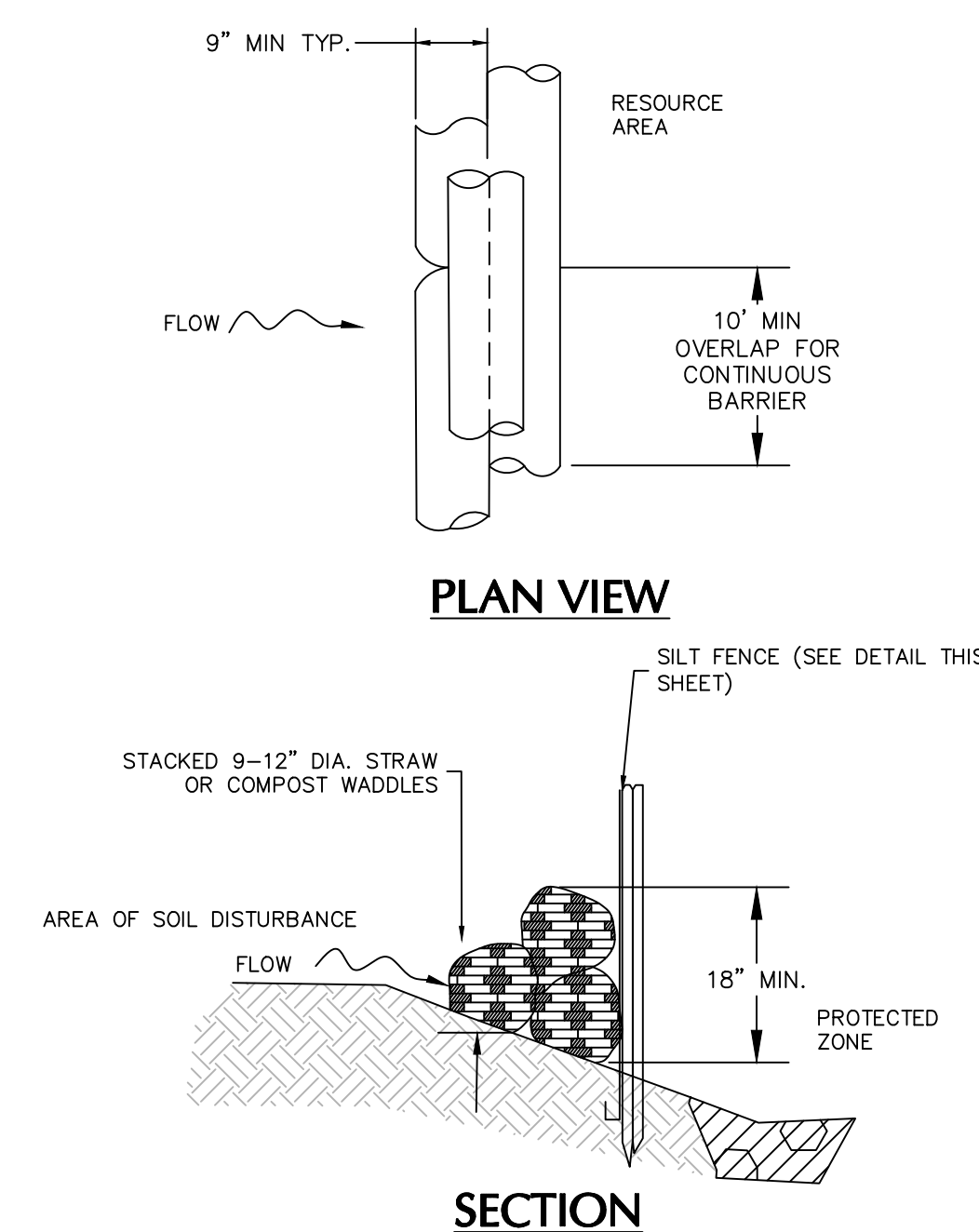


BIONET SC150BN DOUBLE NET STRAW BLANKET – BIODEGRADABLE (OR APPROVED EQUAL)
SLOPE INSTALLATION

1. PREPARE SOIL BEFORE INSTALLING ROLLED EROSION CONTROL PRODUCTS (RECP's), INCLUDING ANY NECESSARY APPLICATION OF LIME, FERTILIZER, AND SEED.
NOTE: WHEN USING CELL-O-SEED DO NOT SEED PREPARED AREA. CELL-O-SEED MUST BE INSTALLED WITH PAPER SIDE DOWN.
 2. BEGIN AT THE TOP OF THE SLOPE BY ANCHORING THE RECP's IN A 6" (15 CM) DEEP X 6" (15 CM) WIDE TRENCH WITH APPROXIMATELY 12" (30cm) OF RECP's EXTENDED BEYOND THE UP-SLOPE PORTION OF THE TRENCH. ANCHOR THE RECP's WITH A ROW OF STAPLES/STAKES APPROXIMATELY 12" (30 CM) APART IN THE BOTTOM OF THE TRENCH. BACKFILL AND COMPACT THE TRENCH AFTER STAPLING. APPLY SEED TO COMPACTED SOIL AND FOLD REMAINING 12" (30 CM) PORTION OF RECP'S BACK OVER SEED AND COMPACTED SOIL. SECURE RECP'S OVER COMPACTED SOIL WITH A ROW OF STAPLES/STAKES SPACED APPROXIMATELY 12" (30 CM) APART ACROSS THE WIDTH OF THE RECP's.
 3. ROLL THE RECP's (A) DOWN OR (B) HORIZONTALLY ACROSS THE SLOPE. RECP's WILL UNROLL WITH APPROPRIATE SIDE AGAINST THE SOIL SURFACE. ALL RECP's MUST BE SECURELY FASTENED TO SOIL SURFACE BY PLACING STAPLES/STAKES IN APPROPRIATE LOCATIONS AS SHOWN IN THE STAPLE PATTERN GUIDE. WHEN USING THE DOT SYSTEM, STAPLES/STAKES SHOULD BE PLACED THROUGH EACH OF THE COLORED DOTS CORRESPONDING TO THE APPROPRIATE STAPLE PATTERN.
 4. THE EDGES OF PARALLEL RECP's MUST BE STAPLED WITH APPROXIMATELY 2" - 5" (5 CM - 12.5 CM) OVERLAP DEPENDING ON RECP's TYPE.
 5. CONSECUTIVE RECP's SPICED DOWN THE SLOPE MUST BE PLACED END OVER END (SHINGLE STYLE) WITH AN APPROXIMATE 3" (7.5 CM) OVERLAP. STAPLE THROUGH OVERLAPPED AREA, APPROXIMATELY 12" (30 CM) APART ACROSS ENTIRE RECP's WIDTH.
- NOTE:
*IN LOOSE SOIL CONDITIONS, THE USE OF STAPLE OR STAKE LENGTHS GREATER THAN 6" (15 CM) MAY BE NECESSARY TO PROPERLY SECURE THE RECP's.
- NOTE:
CONTRACTOR TO PROVIDE EROSION CONTROL BLANKET ON ALL SLOPES 3:1 OR STEEPER.

SLOPE STABILIZATION (3:1 SLOPES AND STEEPER)

N.T.S.



PLAN VIEW

SECTION

- NOTES:
1. STAKE A MIN. OF EVERY 5 FEET TO SECURE TUBE OR PER MANUFACTURERS INSTRUCTION
 2. WADDLES TO BE WRAPPED IN BURLAP COVERING

DOUBLE LAYER EROSION CONTROL BARRIER

N.T.S.

Date	Description	No.
Revisions		
Signature		
Date		
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Project		
MACDERMID ALPHA NEW PROCESS BUILDING		
WEST HAVEN CONNECTICUT		
Drawing Title		
SOIL EROSION & SEDIMENT CONTROL DETAILS		
Project No.	Drawing No.	
140324701	CE501	
Date	09/22/2025	
Drawn By	JAD	
Checked By	BP	
Sheet 12 of 16		

APPENDIX A

Existing Stormwater Discharge Calculations

MDA Ex.

Prepared by Langan Engineering

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Table of Contents

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TABLE OF CONTENTS

Project Reports

- 1 Routing Diagram
- 2 Rainfall Events Listing
- 3 Area Listing (all nodes)

2-yr Event

- 4 Subcat 3S: EXWS-A1
- 5 Subcat 4S: EXWS-A2
- 7 Link 5L: WS-A
- 8 Subcat 6S: EXWS-B
- 9 Link 7L: Site

10-yr Event

- 10 Subcat 3S: EXWS-A1
- 11 Subcat 4S: EXWS-A2
- 13 Link 5L: WS-A
- 14 Subcat 6S: EXWS-B
- 15 Link 7L: Site

25-yr Event

- 16 Subcat 3S: EXWS-A1
- 17 Subcat 4S: EXWS-A2
- 19 Link 5L: WS-A
- 20 Subcat 6S: EXWS-B
- 21 Link 7L: Site

50-yr Event

- 22 Subcat 3S: EXWS-A1
- 23 Subcat 4S: EXWS-A2
- 25 Link 5L: WS-A
- 26 Subcat 6S: EXWS-B
- 27 Link 7L: Site

100-yr Event

- 28 Subcat 3S: EXWS-A1
- 29 Subcat 4S: EXWS-A2
- 31 Link 5L: WS-A
- 32 Subcat 6S: EXWS-B
- 33 Link 7L: Site

WQV Event

- 34 Subcat 3S: EXWS-A1
- 35 Subcat 4S: EXWS-A2
- 37 Link 5L: WS-A
- 38 Subcat 6S: EXWS-B
- 39 Link 7L: Site

Multi-Event Tables

- 40 Subcat 3S: EXWS-A1
- 41 Subcat 4S: EXWS-A2

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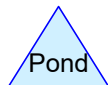
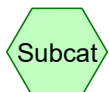
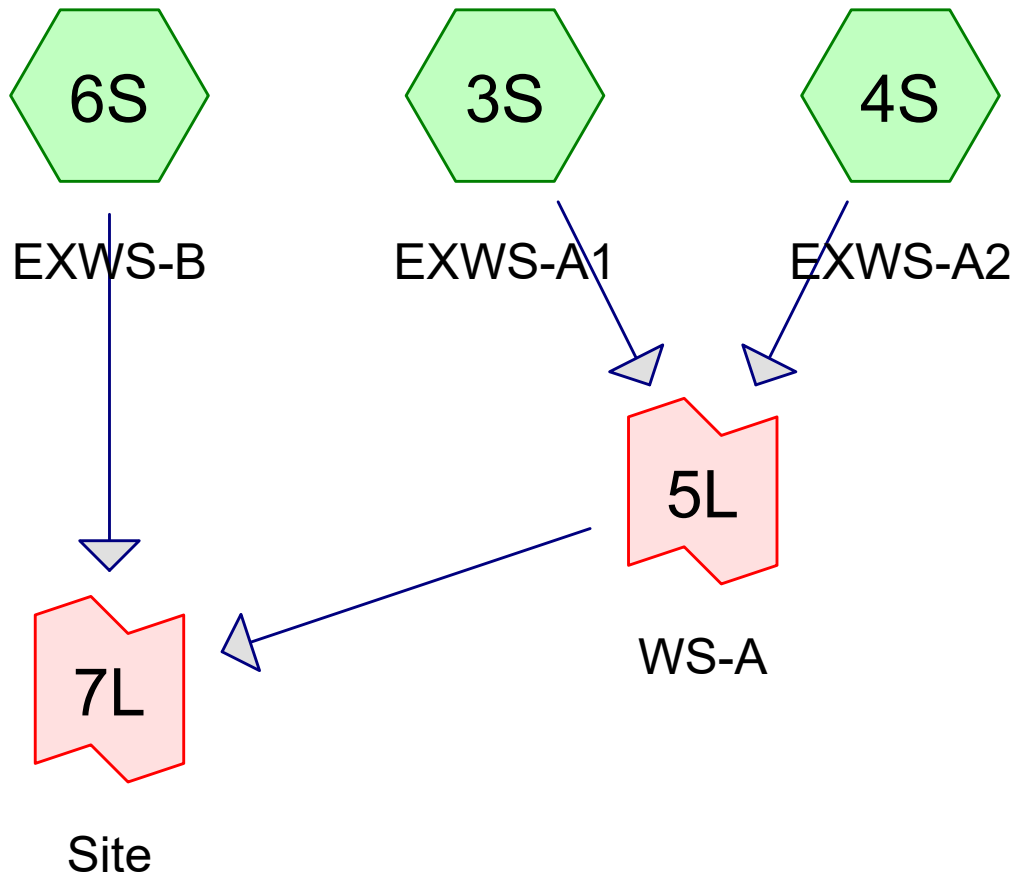
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Table of Contents

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- 42 Link 5L: WS-A
- 43 Subcat 6S: EXWS-B
- 44 Link 7L: Site



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Page 2

Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2-yr	WinTR55 NOAA	D	Default	24.00	1	3.42	2
2	10-yr	WinTR55 NOAA	D	Default	24.00	1	5.22	2
3	25-yr	WinTR55 NOAA	D	Default	24.00	1	6.34	2
4	50-yr	WinTR55 NOAA	D	Default	24.00	1	7.17	2
5	100-yr	WinTR55 NOAA	D	Default	24.00	1	8.07	2
6	WQV	WinTR55 NOAA	D	Default	24.00	1	1.35	2

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Page 3

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.127	61	>75% Grass cover, Good, HSG B (3S)
0.606	80	>75% Grass cover, Good, HSG D (3S, 4S, 6S)
1.739	98	Paved parking, HSG D (3S, 4S, 6S)
0.399	55	Woods, Good, HSG B (3S, 4S)
0.647	77	Woods, Good, HSG D (3S, 4S, 6S)
3.518	85	TOTAL AREA

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WinTR55 NOAA D 2-yr Rainfall=3.42"

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Page 4

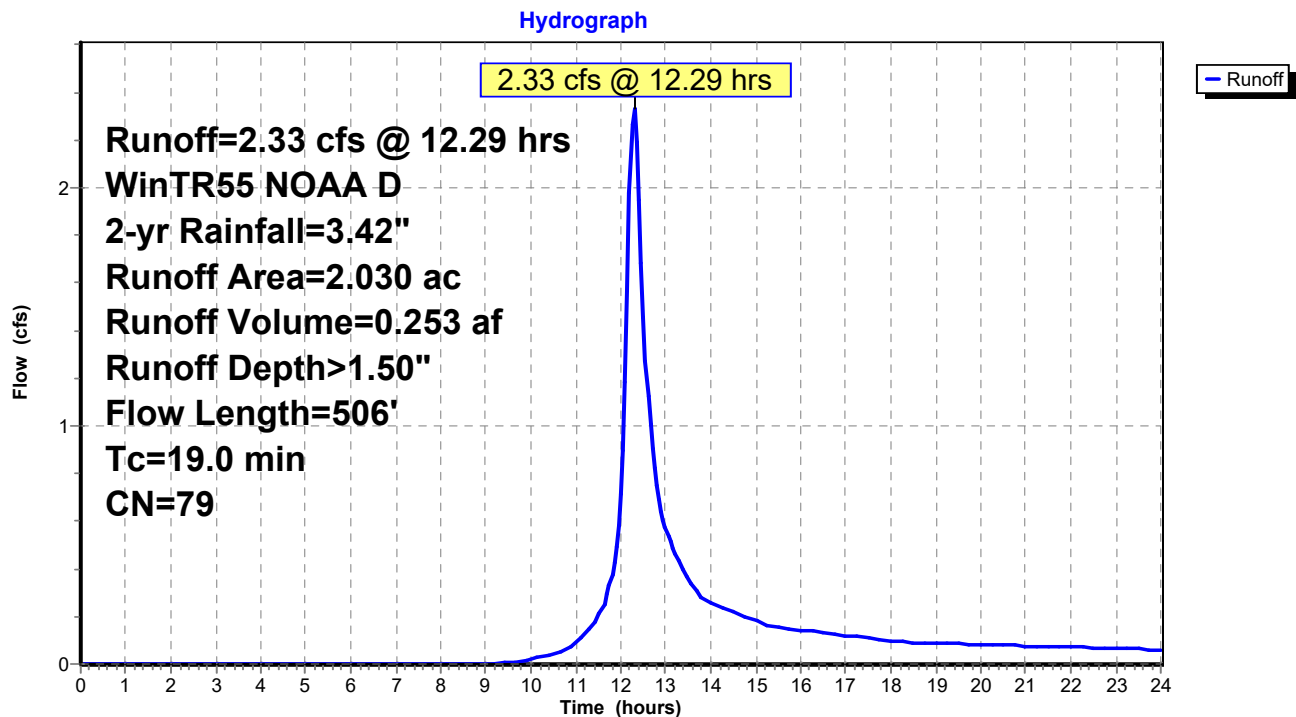
Summary for Subcatchment 3S: EXWS-A1

Runoff = 2.33 cfs @ 12.29 hrs, Volume= 0.253 af, Depth> 1.50"
Routed to Link 5L : WS-A

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
WinTR55 NOAA D 2-yr Rainfall=3.42"

Area (ac)	CN	Description
0.392	55	Woods, Good, HSG B
0.342	77	Woods, Good, HSG D
0.127	61	>75% Grass cover, Good, HSG B
0.501	80	>75% Grass cover, Good, HSG D
0.000	98	Paved parking, HSG B
0.668	98	Paved parking, HSG D
2.030	79	Weighted Average
1.362		67.09% Pervious Area
0.668		32.91% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.0	100	0.0160	0.11		Sheet Flow, Parking Lot
					Grass: Dense n= 0.240 P2= 3.47"
4.0	406	0.0109	1.68		Shallow Concentrated Flow, Natural Channel
					Unpaved Kv= 16.1 fps
19.0	506	Total			

Subcatchment 3S: EXWS-A1

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WinTR55 NOAA D 2-yr Rainfall=3.42"

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Page 5

Summary for Subcatchment 4S: EXWS-A2

Runoff = 3.10 cfs @ 12.13 hrs, Volume= 0.235 af, Depth> 2.46"
 Routed to Link 5L : WS-A

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 WinTR55 NOAA D 2-yr Rainfall=3.42"

Area (ac)	CN	Description
0.007	55	Woods, Good, HSG B
0.285	77	Woods, Good, HSG D
0.000	61	>75% Grass cover, Good, HSG B
0.096	80	>75% Grass cover, Good, HSG D
0.000	98	Paved parking, HSG B
0.759	98	Paved parking, HSG D
1.147	91	Weighted Average
0.388		33.83% Pervious Area
0.759		66.17% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.6	150	0.0200	1.55		Sheet Flow, Parking Lot Smooth surfaces n= 0.011 P2= 3.47"
0.3	50	0.0200	2.87		Shallow Concentrated Flow, Paved Slope Paved Kv= 20.3 fps
0.1	50	0.2500	8.05		Shallow Concentrated Flow, Grassed Slope Unpaved Kv= 16.1 fps
2.0	250	Total, Increased to minimum Tc = 6.0 min			

MDA Ex.

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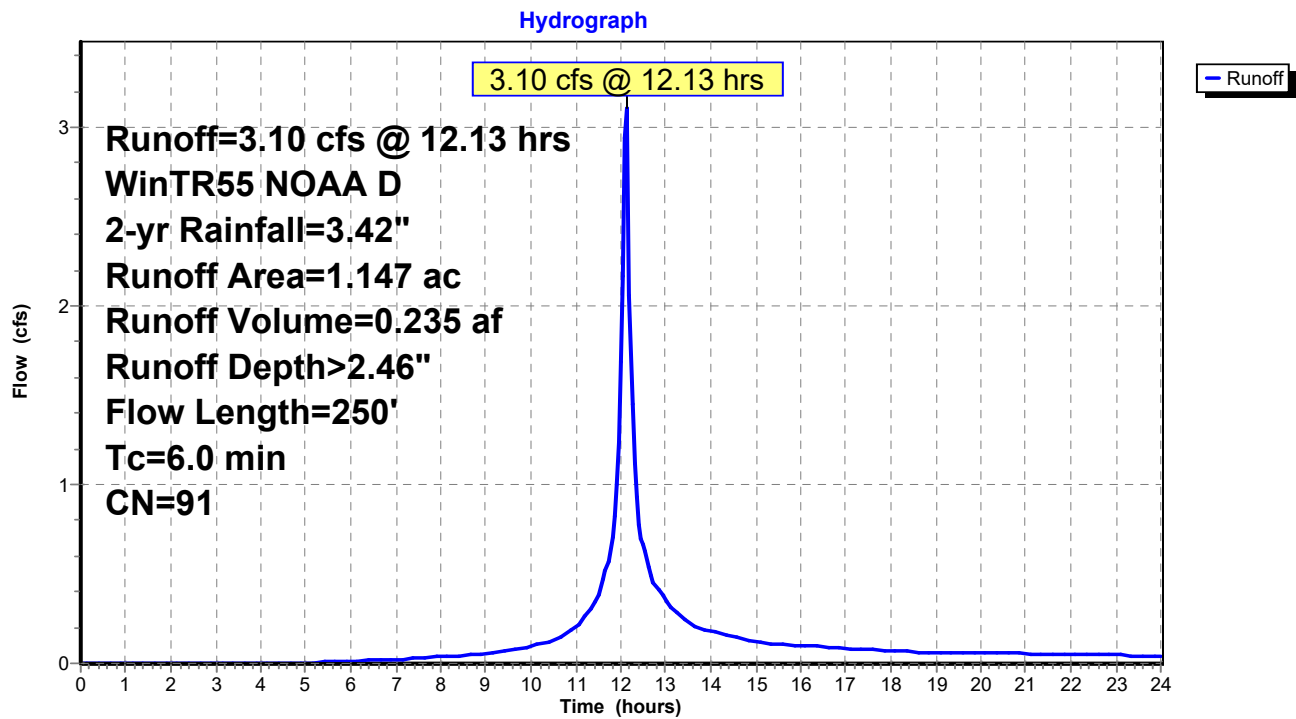
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WinTR55 NOAA D 2-yr Rainfall=3.42"

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Page 6

Subcatchment 4S: EXWS-A2



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WinTR55 NOAA D 2-yr Rainfall=3.42"

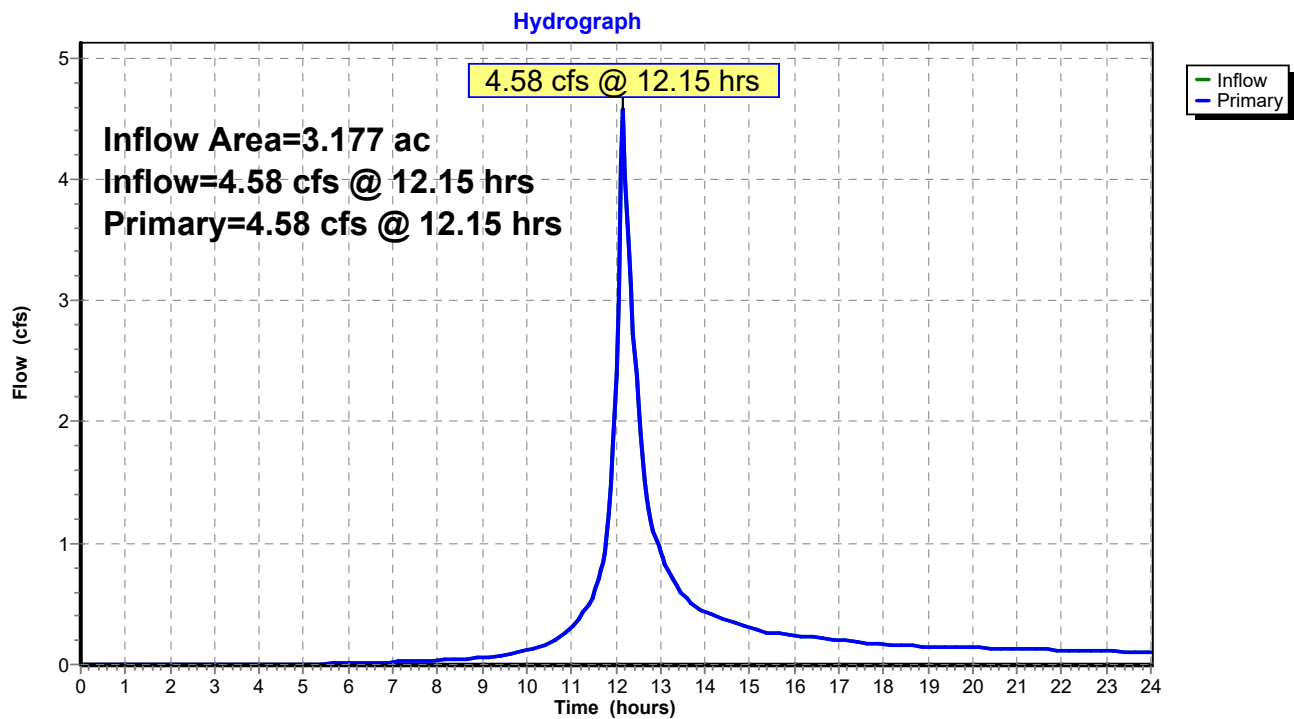
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Page 7

Summary for Link 5L: WS-A

Inflow Area = 3.177 ac, 44.92% Impervious, Inflow Depth > 1.85" for 2-yr event
Inflow = 4.58 cfs @ 12.15 hrs, Volume= 0.489 af
Primary = 4.58 cfs @ 12.15 hrs, Volume= 0.489 af, Atten= 0%, Lag= 0.0 min
Routed to Link 7L : Site

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link 5L: WS-A

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WinTR55 NOAA D 2-yr Rainfall=3.42"

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Page 8

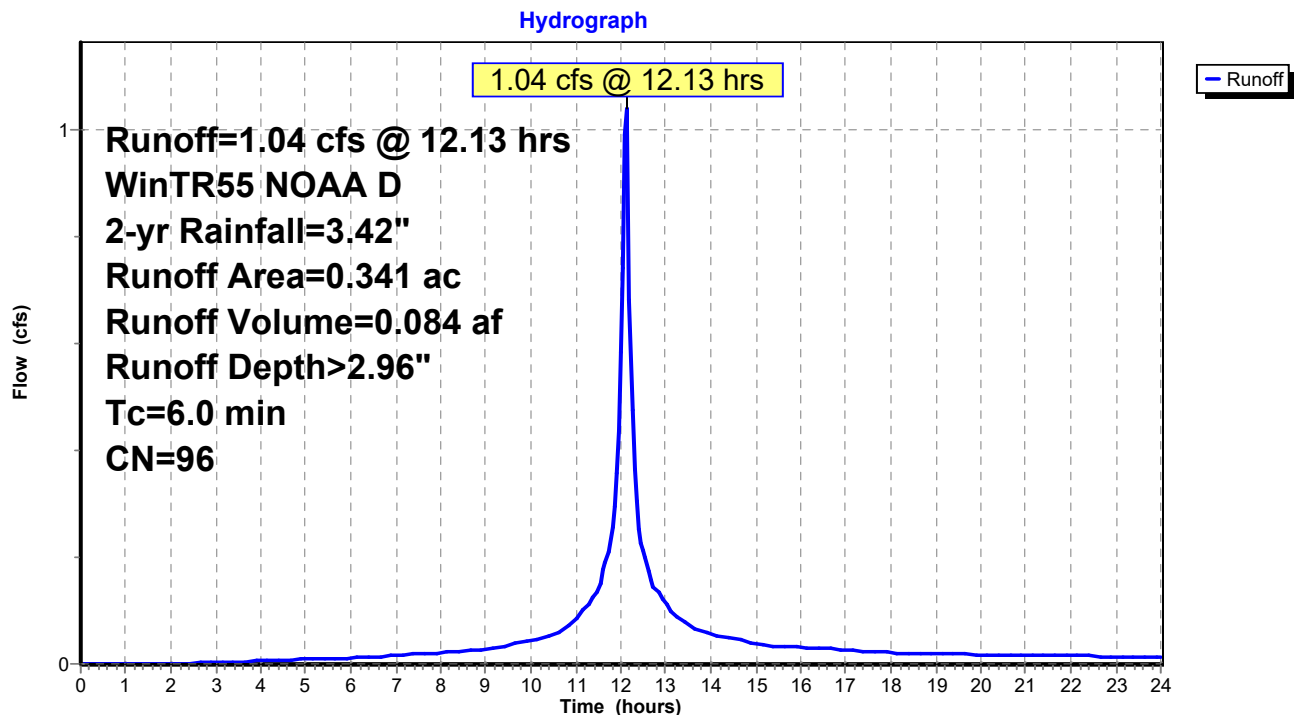
Summary for Subcatchment 6S: EXWS-B

Runoff = 1.04 cfs @ 12.13 hrs, Volume= 0.084 af, Depth> 2.96"
Routed to Link 7L : Site

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
WinTR55 NOAA D 2-yr Rainfall=3.42"

Area (ac)	CN	Description
0.000	55	Woods, Good, HSG B
0.020	77	Woods, Good, HSG D
0.000	61	>75% Grass cover, Good, HSG B
0.009	80	>75% Grass cover, Good, HSG D
0.000	98	Paved parking, HSG B
0.312	98	Paved parking, HSG D
0.341	96	Weighted Average
0.029		8.50% Pervious Area
0.312		91.50% Impervious Area

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

Subcatchment 6S: EXWS-B

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WinTR55 NOAA D 2-yr Rainfall=3.42"

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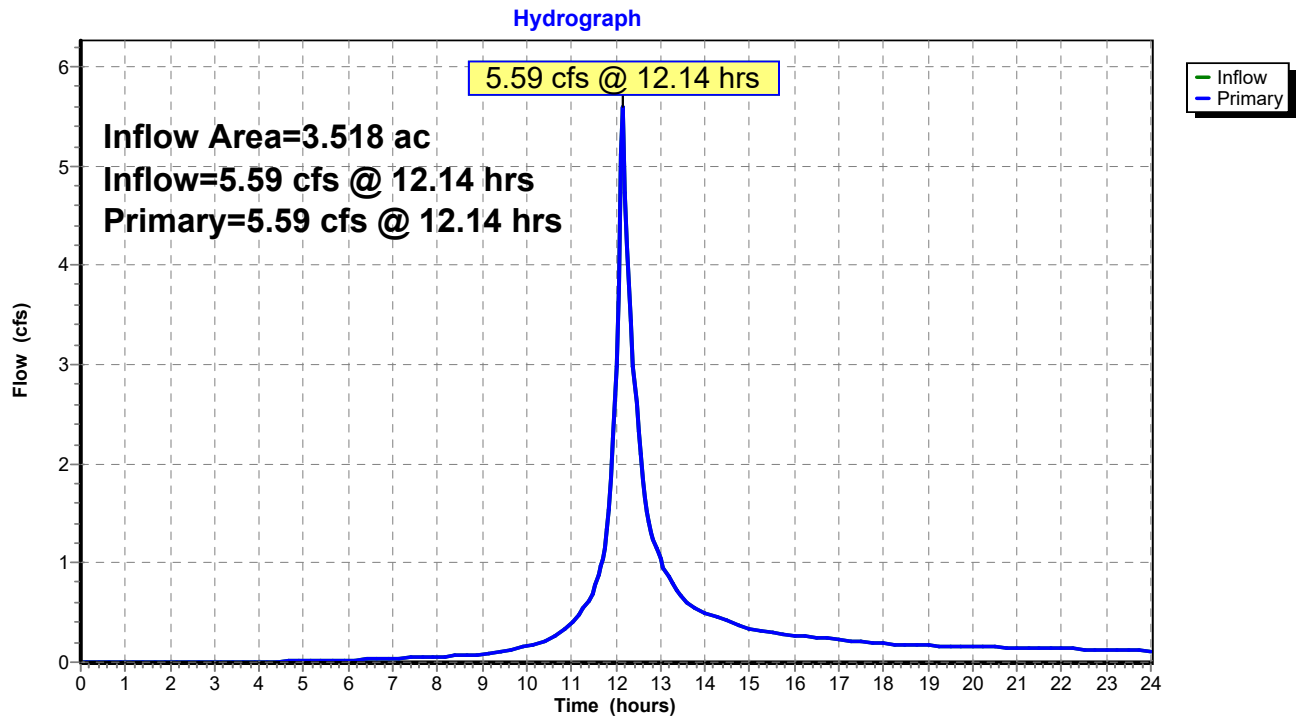
Page 9

Summary for Link 7L: Site

Inflow Area = 3.518 ac, 49.43% Impervious, Inflow Depth > 1.95" for 2-yr event
Inflow = 5.59 cfs @ 12.14 hrs, Volume= 0.573 af
Primary = 5.59 cfs @ 12.14 hrs, Volume= 0.573 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link 7L: Site



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WinTR55 NOAA D 10-yr Rainfall=5.22"

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Page 10

Summary for Subcatchment 3S: EXWS-A1

Runoff = 4.68 cfs @ 12.28 hrs, Volume= 0.504 af, Depth> 2.98"
Routed to Link 5L : WS-A

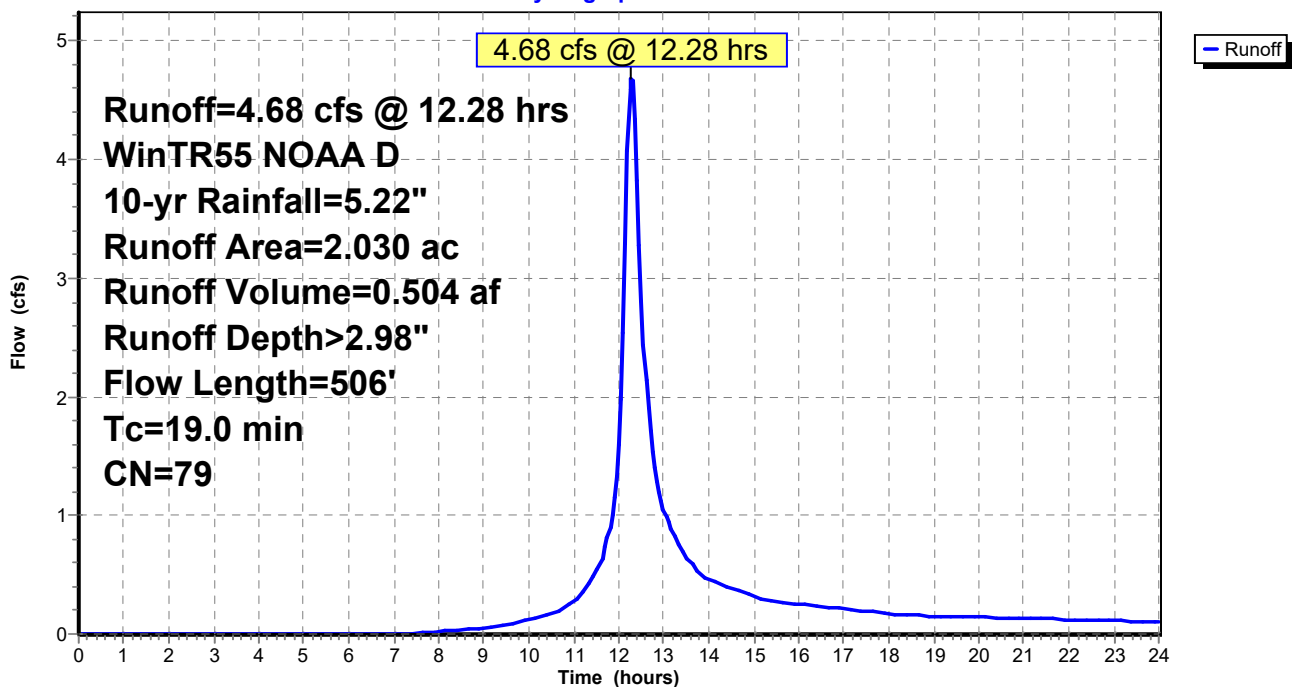
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
WinTR55 NOAA D 10-yr Rainfall=5.22"

Area (ac)	CN	Description
0.392	55	Woods, Good, HSG B
0.342	77	Woods, Good, HSG D
0.127	61	>75% Grass cover, Good, HSG B
0.501	80	>75% Grass cover, Good, HSG D
0.000	98	Paved parking, HSG B
0.668	98	Paved parking, HSG D
2.030	79	Weighted Average
1.362		67.09% Pervious Area
0.668		32.91% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.0	100	0.0160	0.11		Sheet Flow, Parking Lot
					Grass: Dense n= 0.240 P2= 3.47"
4.0	406	0.0109	1.68		Shallow Concentrated Flow, Natural Channel
					Unpaved Kv= 16.1 fps
19.0	506	Total			

Subcatchment 3S: EXWS-A1

Hydrograph



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WinTR55 NOAA D 10-yr Rainfall=5.22"

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Page 11

Summary for Subcatchment 4S: EXWS-A2

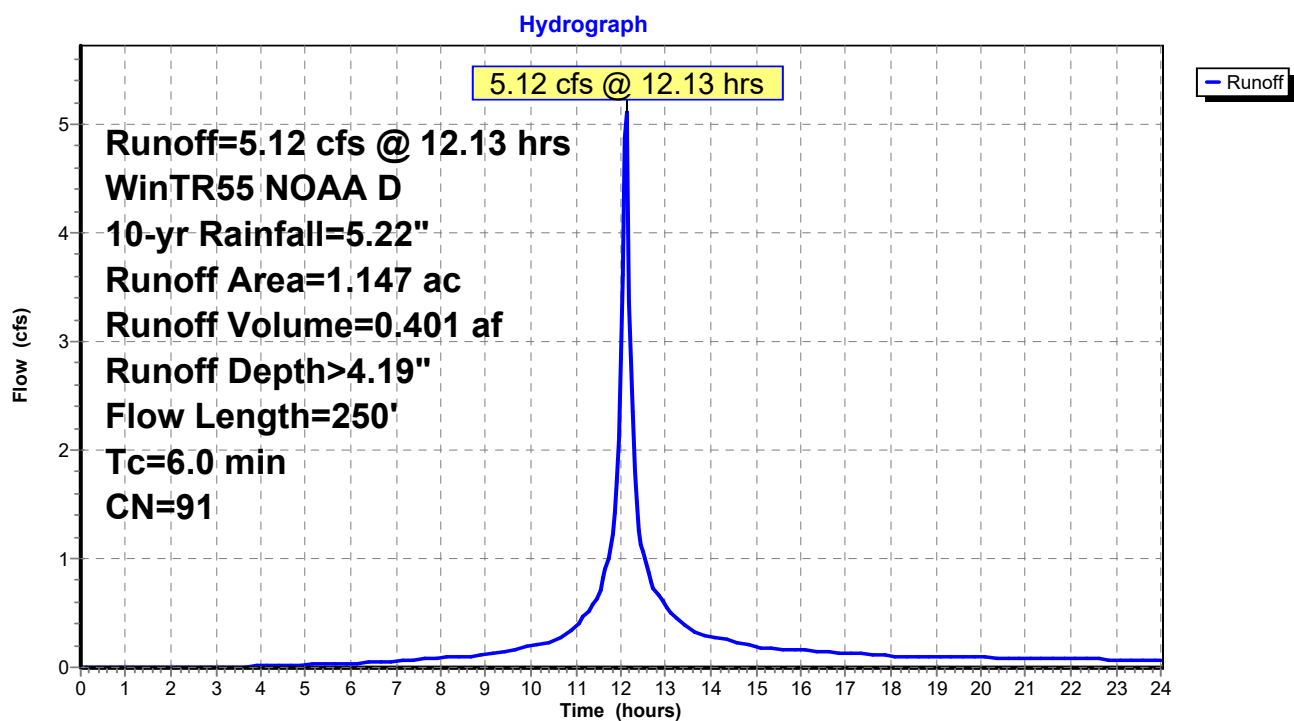
Runoff = 5.12 cfs @ 12.13 hrs, Volume= 0.401 af, Depth> 4.19"
 Routed to Link 5L : WS-A

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 WinTR55 NOAA D 10-yr Rainfall=5.22"

Area (ac)	CN	Description
0.007	55	Woods, Good, HSG B
0.285	77	Woods, Good, HSG D
0.000	61	>75% Grass cover, Good, HSG B
0.096	80	>75% Grass cover, Good, HSG D
0.000	98	Paved parking, HSG B
0.759	98	Paved parking, HSG D
1.147	91	Weighted Average
0.388		33.83% Pervious Area
0.759		66.17% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.6	150	0.0200	1.55		Sheet Flow, Parking Lot Smooth surfaces n= 0.011 P2= 3.47"
0.3	50	0.0200	2.87		Shallow Concentrated Flow, Paved Slope Paved Kv= 20.3 fps
0.1	50	0.2500	8.05		Shallow Concentrated Flow, Grassed Slope Unpaved Kv= 16.1 fps
2.0	250	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 4S: EXWS-A2



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WinTR55 NOAA D 10-yr Rainfall=5.22"

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Page 13

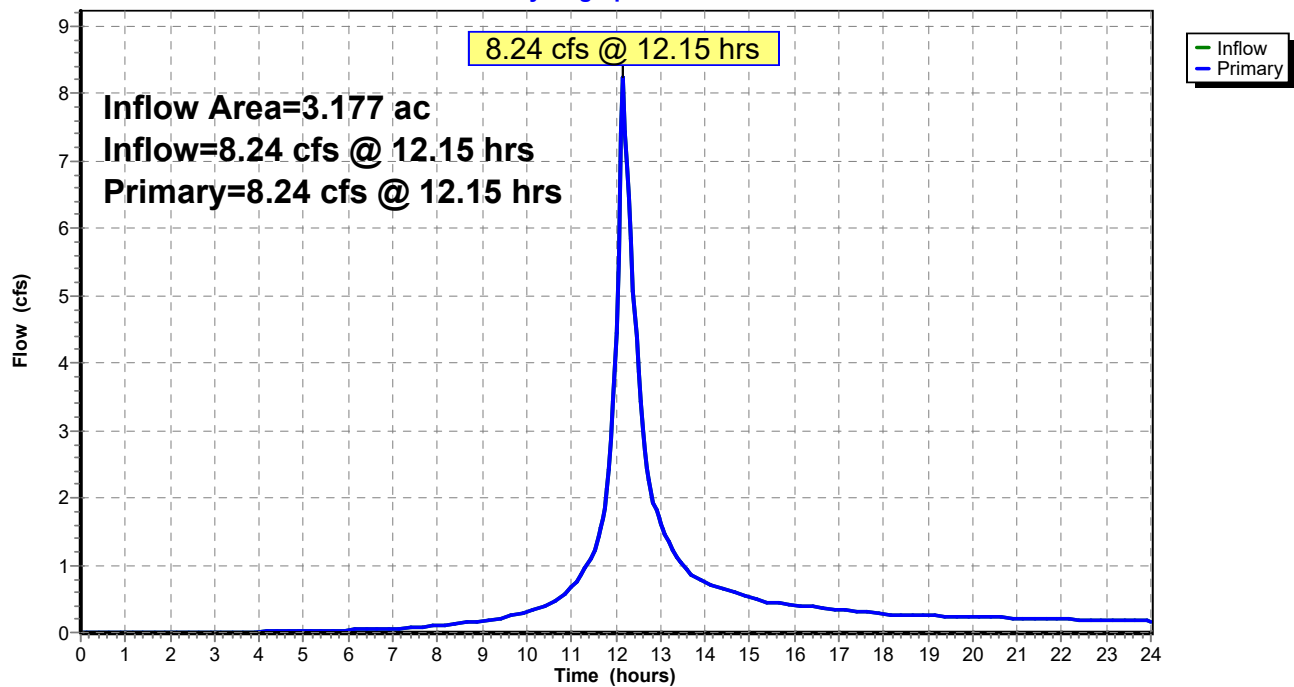
Summary for Link 5L: WS-A

Inflow Area = 3.177 ac, 44.92% Impervious, Inflow Depth > 3.42" for 10-yr event
Inflow = 8.24 cfs @ 12.15 hrs, Volume= 0.905 af
Primary = 8.24 cfs @ 12.15 hrs, Volume= 0.905 af, Atten= 0%, Lag= 0.0 min
Routed to Link 7L : Site

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link 5L: WS-A

Hydrograph



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WinTR55 NOAA D 10-yr Rainfall=5.22"

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Page 14

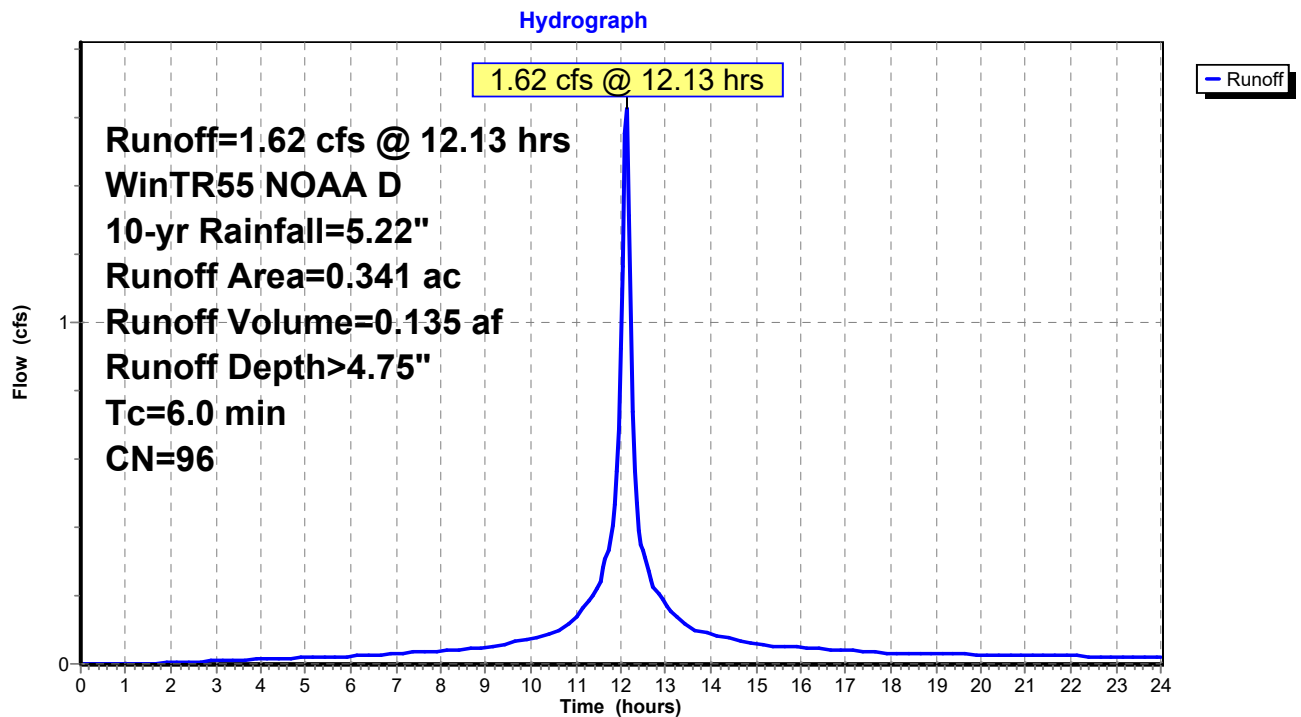
Summary for Subcatchment 6S: EXWS-B

Runoff = 1.62 cfs @ 12.13 hrs, Volume= 0.135 af, Depth> 4.75"
Routed to Link 7L : Site

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
WinTR55 NOAA D 10-yr Rainfall=5.22"

Area (ac)	CN	Description
0.000	55	Woods, Good, HSG B
0.020	77	Woods, Good, HSG D
0.000	61	>75% Grass cover, Good, HSG B
0.009	80	>75% Grass cover, Good, HSG D
0.000	98	Paved parking, HSG B
0.312	98	Paved parking, HSG D
0.341	96	Weighted Average
0.029		8.50% Pervious Area
0.312		91.50% Impervious Area

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

Subcatchment 6S: EXWS-B

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WinTR55 NOAA D 10-yr Rainfall=5.22"

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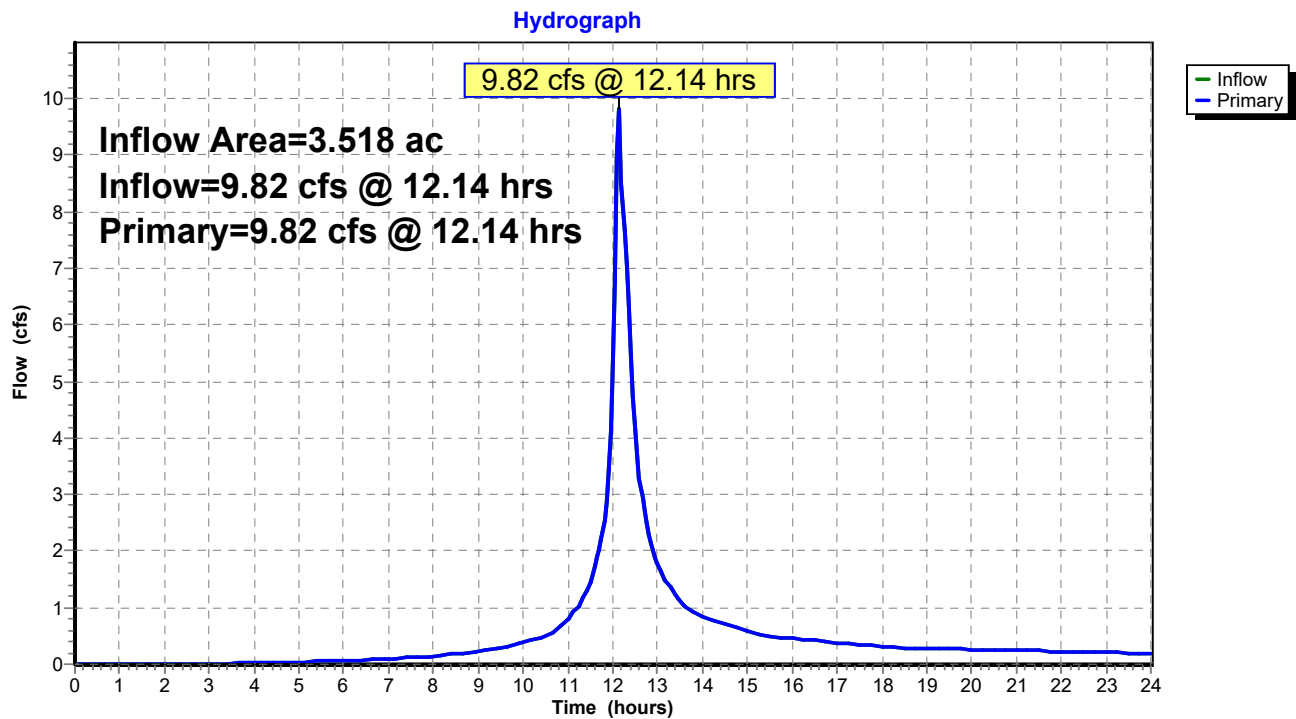
Page 15

Summary for Link 7L: Site

Inflow Area = 3.518 ac, 49.43% Impervious, Inflow Depth > 3.55" for 10-yr event
Inflow = 9.82 cfs @ 12.14 hrs, Volume= 1.039 af
Primary = 9.82 cfs @ 12.14 hrs, Volume= 1.039 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link 7L: Site



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WinTR55 NOAA D 25-yr Rainfall=6.34"

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Page 16

Summary for Subcatchment 3S: EXWS-A1

Runoff = 6.21 cfs @ 12.28 hrs, Volume= 0.671 af, Depth> 3.97"
Routed to Link 5L : WS-A

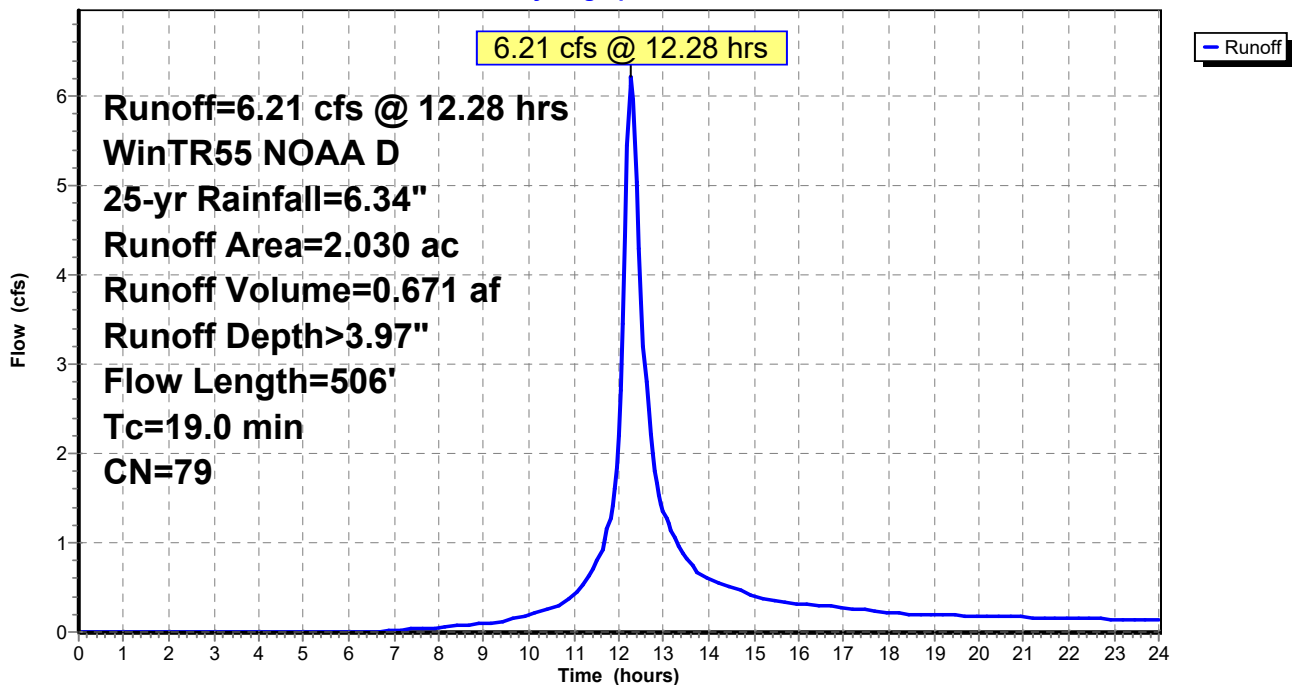
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
WinTR55 NOAA D 25-yr Rainfall=6.34"

Area (ac)	CN	Description
0.392	55	Woods, Good, HSG B
0.342	77	Woods, Good, HSG D
0.127	61	>75% Grass cover, Good, HSG B
0.501	80	>75% Grass cover, Good, HSG D
0.000	98	Paved parking, HSG B
0.668	98	Paved parking, HSG D
2.030	79	Weighted Average
1.362		67.09% Pervious Area
0.668		32.91% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.0	100	0.0160	0.11		Sheet Flow, Parking Lot
					Grass: Dense n= 0.240 P2= 3.47"
4.0	406	0.0109	1.68		Shallow Concentrated Flow, Natural Channel
					Unpaved Kv= 16.1 fps
19.0	506	Total			

Subcatchment 3S: EXWS-A1

Hydrograph



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WinTR55 NOAA D 25-yr Rainfall=6.34"

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Page 17

Summary for Subcatchment 4S: EXWS-A2

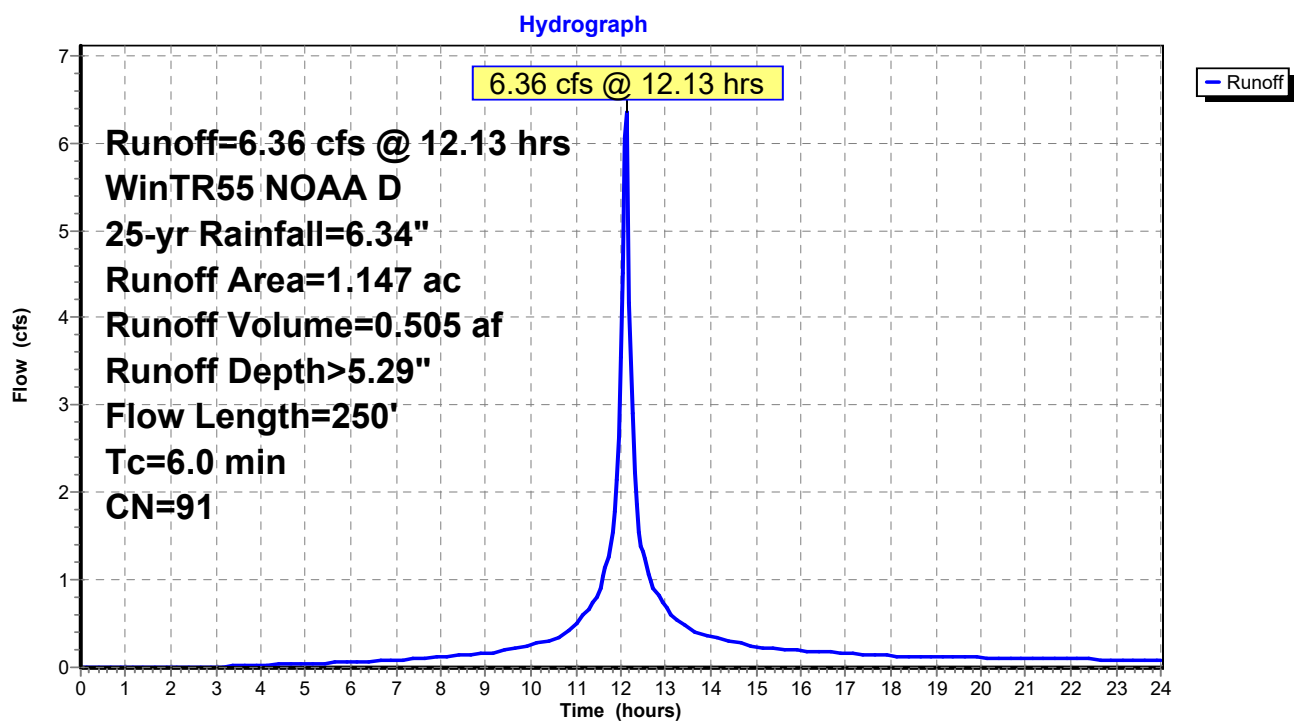
Runoff = 6.36 cfs @ 12.13 hrs, Volume= 0.505 af, Depth> 5.29"
 Routed to Link 5L : WS-A

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 WinTR55 NOAA D 25-yr Rainfall=6.34"

Area (ac)	CN	Description
0.007	55	Woods, Good, HSG B
0.285	77	Woods, Good, HSG D
0.000	61	>75% Grass cover, Good, HSG B
0.096	80	>75% Grass cover, Good, HSG D
0.000	98	Paved parking, HSG B
0.759	98	Paved parking, HSG D
1.147	91	Weighted Average
0.388		33.83% Pervious Area
0.759		66.17% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.6	150	0.0200	1.55		Sheet Flow, Parking Lot Smooth surfaces n= 0.011 P2= 3.47"
0.3	50	0.0200	2.87		Shallow Concentrated Flow, Paved Slope Paved Kv= 20.3 fps
0.1	50	0.2500	8.05		Shallow Concentrated Flow, Grassed Slope Unpaved Kv= 16.1 fps
2.0	250	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 4S: EXWS-A2



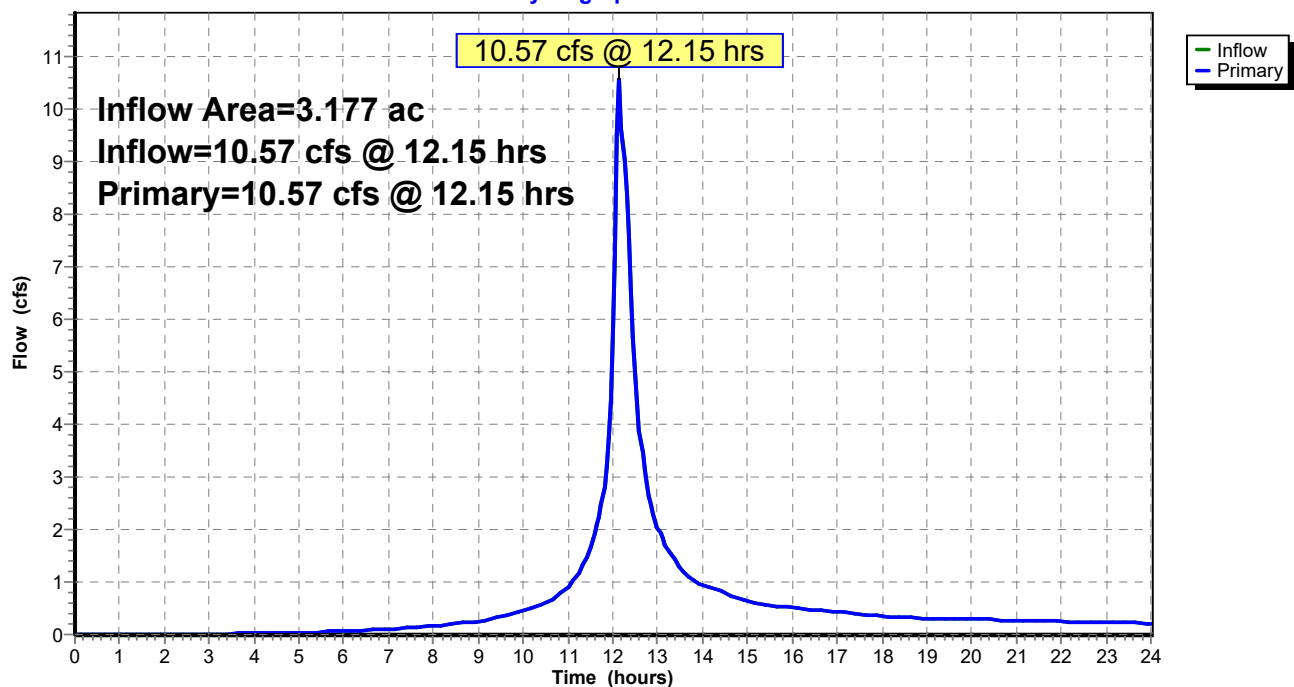
Summary for Link 5L: WS-A

Inflow Area = 3.177 ac, 44.92% Impervious, Inflow Depth > 4.44" for 25-yr event
Inflow = 10.57 cfs @ 12.15 hrs, Volume= 1.176 af
Primary = 10.57 cfs @ 12.15 hrs, Volume= 1.176 af, Atten= 0%, Lag= 0.0 min
Routed to Link 7L : Site

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link 5L: WS-A

Hydrograph



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WinTR55 NOAA D 25-yr Rainfall=6.34"

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Page 20

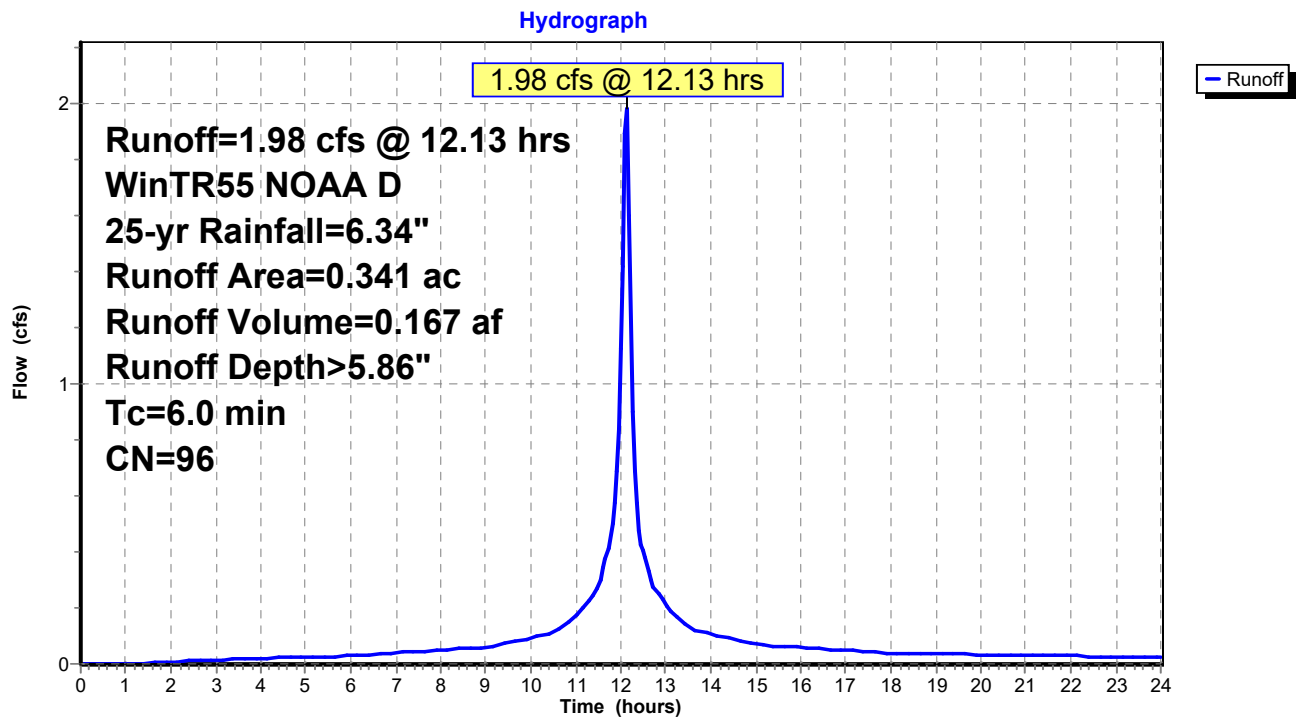
Summary for Subcatchment 6S: EXWS-B

Runoff = 1.98 cfs @ 12.13 hrs, Volume= 0.167 af, Depth> 5.86"
Routed to Link 7L : Site

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
WinTR55 NOAA D 25-yr Rainfall=6.34"

Area (ac)	CN	Description
0.000	55	Woods, Good, HSG B
0.020	77	Woods, Good, HSG D
0.000	61	>75% Grass cover, Good, HSG B
0.009	80	>75% Grass cover, Good, HSG D
0.000	98	Paved parking, HSG B
0.312	98	Paved parking, HSG D
0.341	96	Weighted Average
0.029		8.50% Pervious Area
0.312		91.50% Impervious Area

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

Subcatchment 6S: EXWS-B

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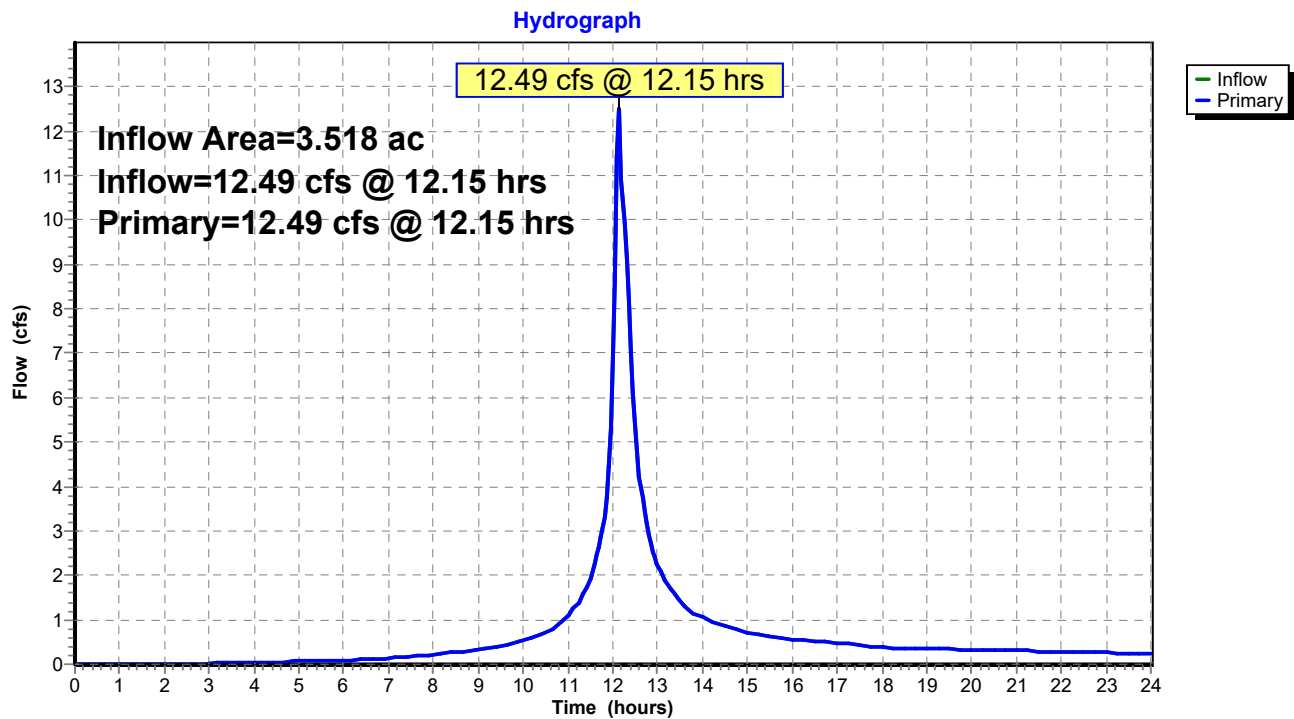
Page 21

Summary for Link 7L: Site

Inflow Area = 3.518 ac, 49.43% Impervious, Inflow Depth > 4.58" for 25-yr event
Inflow = 12.49 cfs @ 12.15 hrs, Volume= 1.343 af
Primary = 12.49 cfs @ 12.15 hrs, Volume= 1.343 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link 7L: Site



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WinTR55 NOAA D 50-yr Rainfall=7.17"

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Page 22

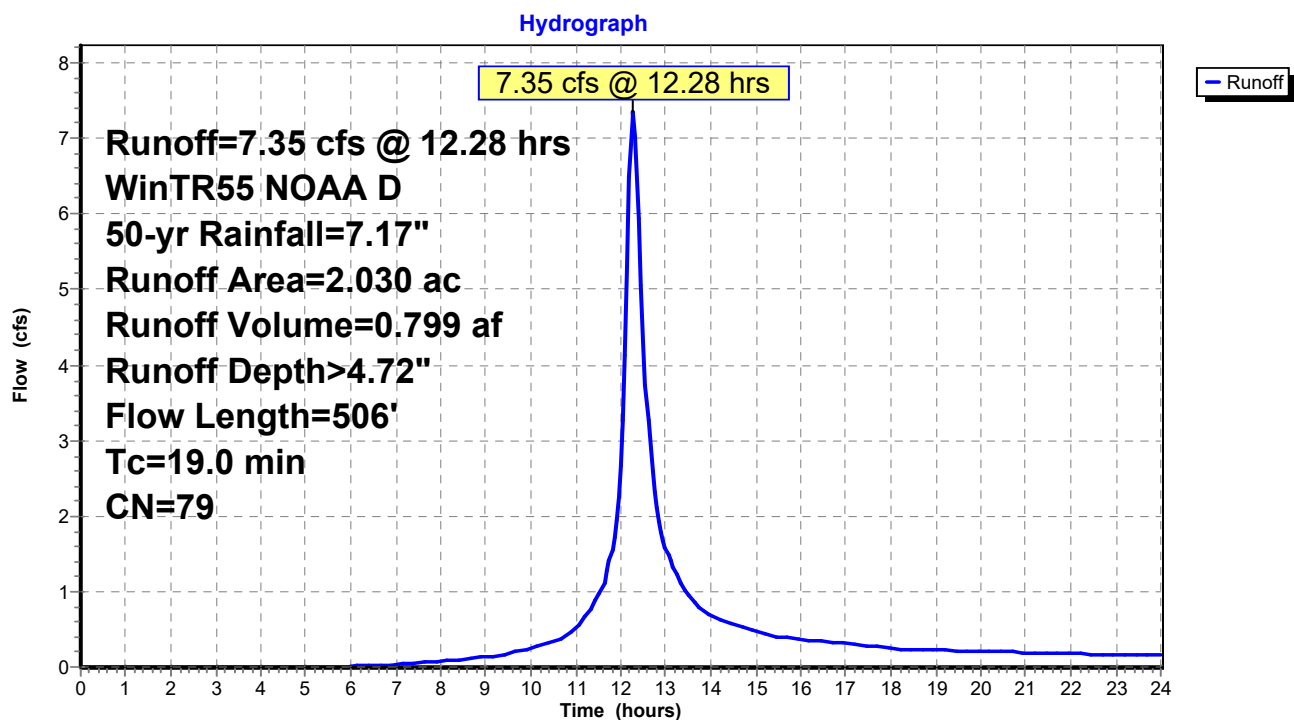
Summary for Subcatchment 3S: EXWS-A1

Runoff = 7.35 cfs @ 12.28 hrs, Volume= 0.799 af, Depth> 4.72"
Routed to Link 5L : WS-A

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
WinTR55 NOAA D 50-yr Rainfall=7.17"

Area (ac)	CN	Description
0.392	55	Woods, Good, HSG B
0.342	77	Woods, Good, HSG D
0.127	61	>75% Grass cover, Good, HSG B
0.501	80	>75% Grass cover, Good, HSG D
0.000	98	Paved parking, HSG B
0.668	98	Paved parking, HSG D
2.030	79	Weighted Average
1.362		67.09% Pervious Area
0.668		32.91% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.0	100	0.0160	0.11		Sheet Flow, Parking Lot
					Grass: Dense n= 0.240 P2= 3.47"
4.0	406	0.0109	1.68		Shallow Concentrated Flow, Natural Channel
					Unpaved Kv= 16.1 fps
19.0	506	Total			

Subcatchment 3S: EXWS-A1

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WinTR55 NOAA D 50-yr Rainfall=7.17"

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Page 23

Summary for Subcatchment 4S: EXWS-A2

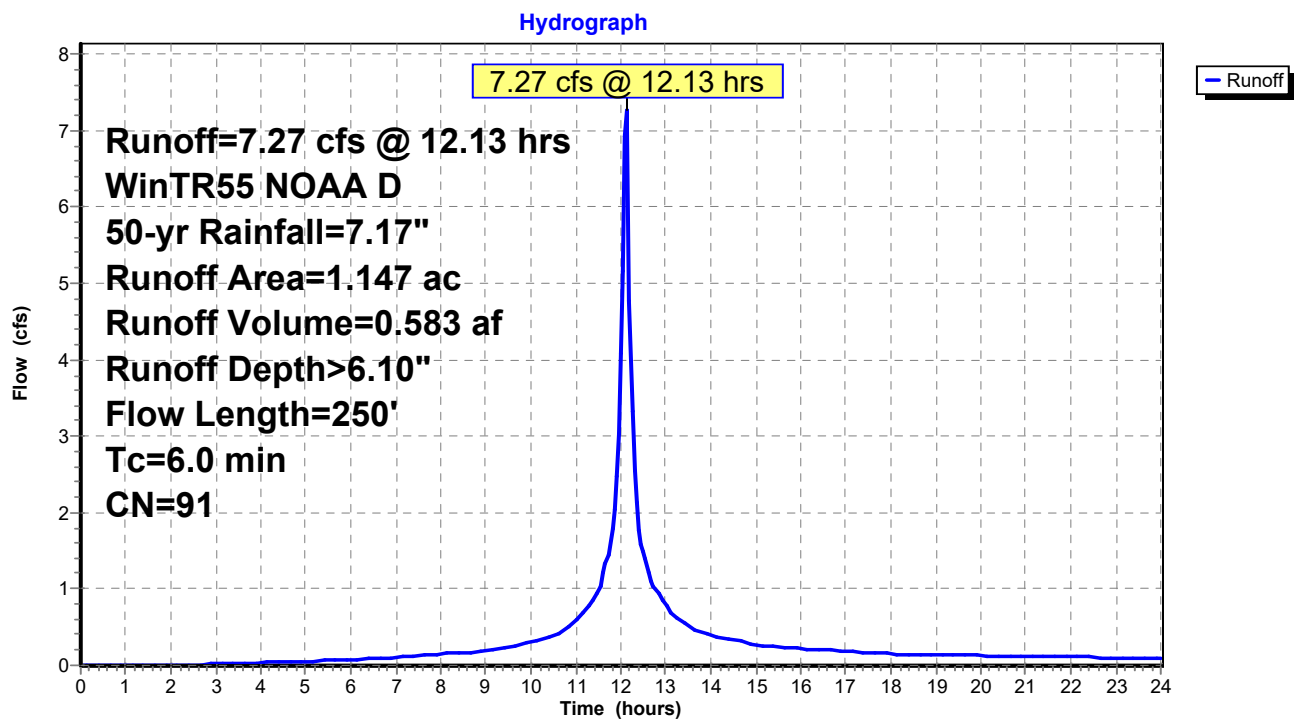
Runoff = 7.27 cfs @ 12.13 hrs, Volume= 0.583 af, Depth> 6.10"
 Routed to Link 5L : WS-A

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 WinTR55 NOAA D 50-yr Rainfall=7.17"

Area (ac)	CN	Description
0.007	55	Woods, Good, HSG B
0.285	77	Woods, Good, HSG D
0.000	61	>75% Grass cover, Good, HSG B
0.096	80	>75% Grass cover, Good, HSG D
0.000	98	Paved parking, HSG B
0.759	98	Paved parking, HSG D
1.147	91	Weighted Average
0.388		33.83% Pervious Area
0.759		66.17% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.6	150	0.0200	1.55		Sheet Flow, Parking Lot Smooth surfaces n= 0.011 P2= 3.47"
0.3	50	0.0200	2.87		Shallow Concentrated Flow, Paved Slope Paved Kv= 20.3 fps
0.1	50	0.2500	8.05		Shallow Concentrated Flow, Grassed Slope Unpaved Kv= 16.1 fps
2.0	250	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 4S: EXWS-A2



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WinTR55 NOAA D 50-yr Rainfall=7.17"

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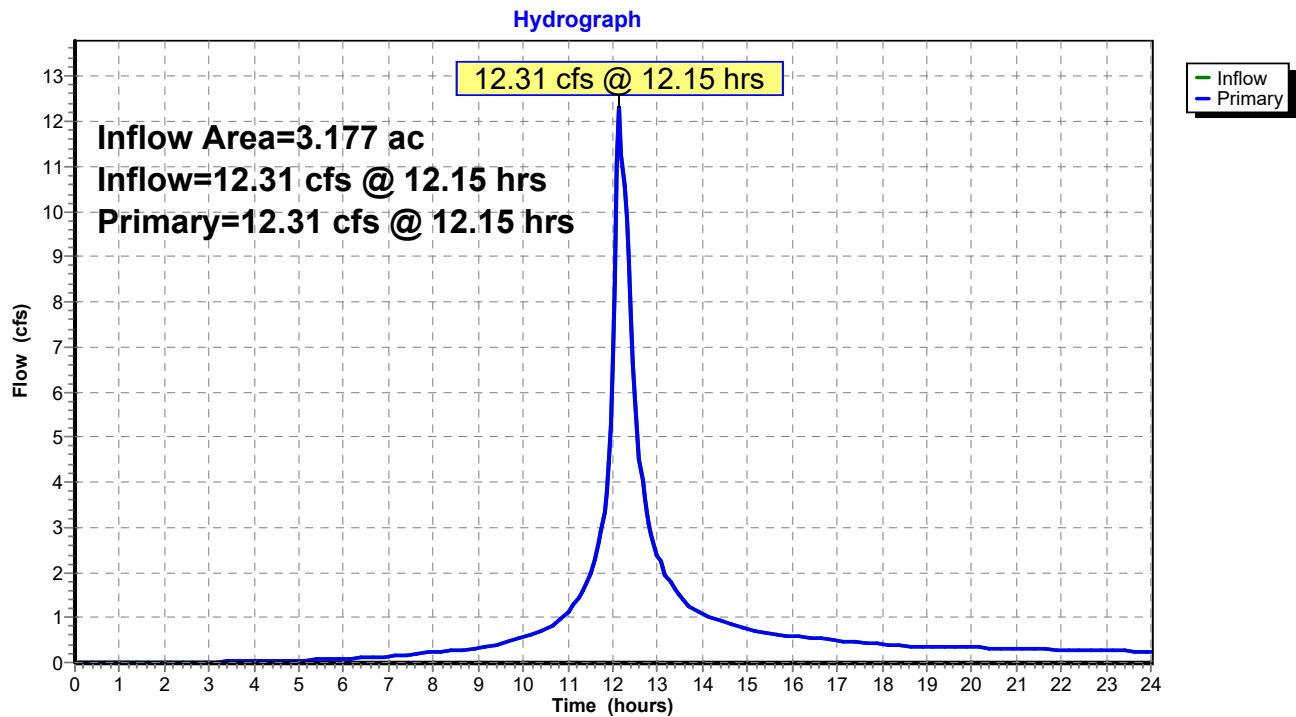
Page 25

Summary for Link 5L: WS-A

Inflow Area = 3.177 ac, 44.92% Impervious, Inflow Depth > 5.22" for 50-yr event
Inflow = 12.31 cfs @ 12.15 hrs, Volume= 1.382 af
Primary = 12.31 cfs @ 12.15 hrs, Volume= 1.382 af, Atten= 0%, Lag= 0.0 min
Routed to Link 7L : Site

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link 5L: WS-A



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WinTR55 NOAA D 50-yr Rainfall=7.17"

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Page 26

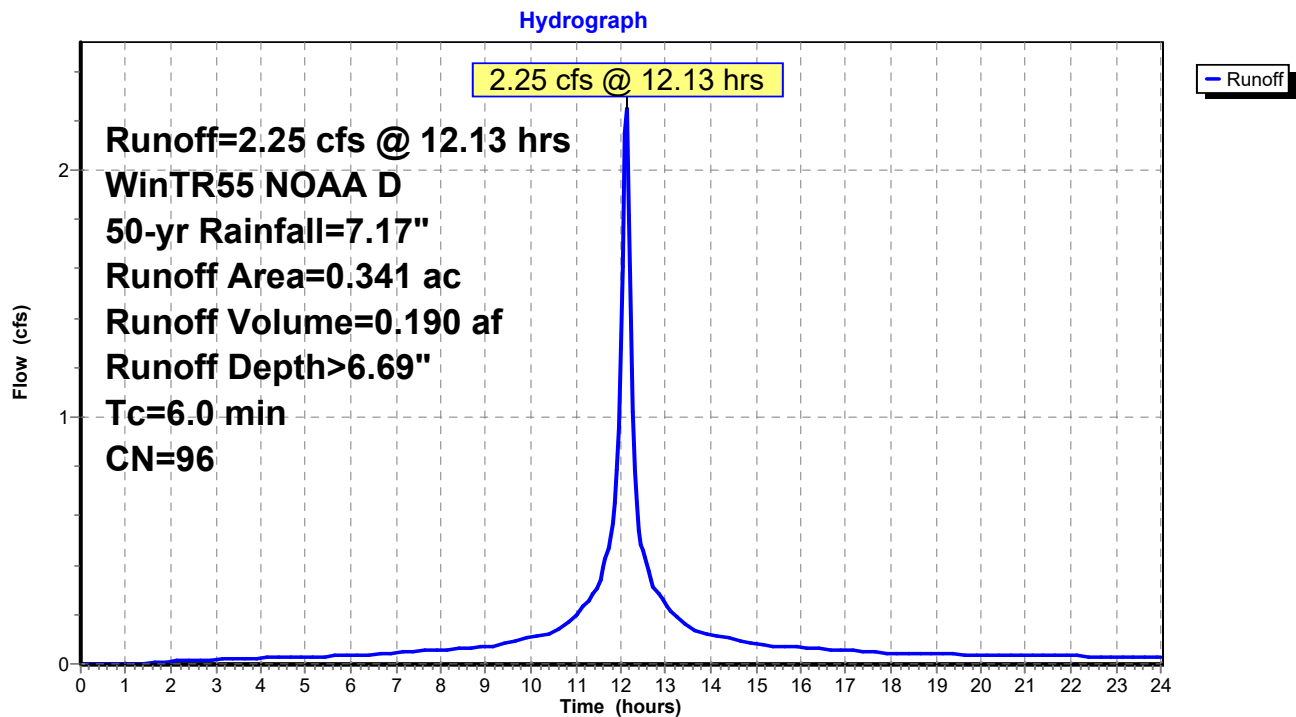
Summary for Subcatchment 6S: EXWS-B

Runoff = 2.25 cfs @ 12.13 hrs, Volume= 0.190 af, Depth> 6.69"
Routed to Link 7L : Site

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
WinTR55 NOAA D 50-yr Rainfall=7.17"

Area (ac)	CN	Description
0.000	55	Woods, Good, HSG B
0.020	77	Woods, Good, HSG D
0.000	61	>75% Grass cover, Good, HSG B
0.009	80	>75% Grass cover, Good, HSG D
0.000	98	Paved parking, HSG B
0.312	98	Paved parking, HSG D
0.341	96	Weighted Average
0.029		8.50% Pervious Area
0.312		91.50% Impervious Area

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

Subcatchment 6S: EXWS-B

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WinTR55 NOAA D 50-yr Rainfall=7.17"

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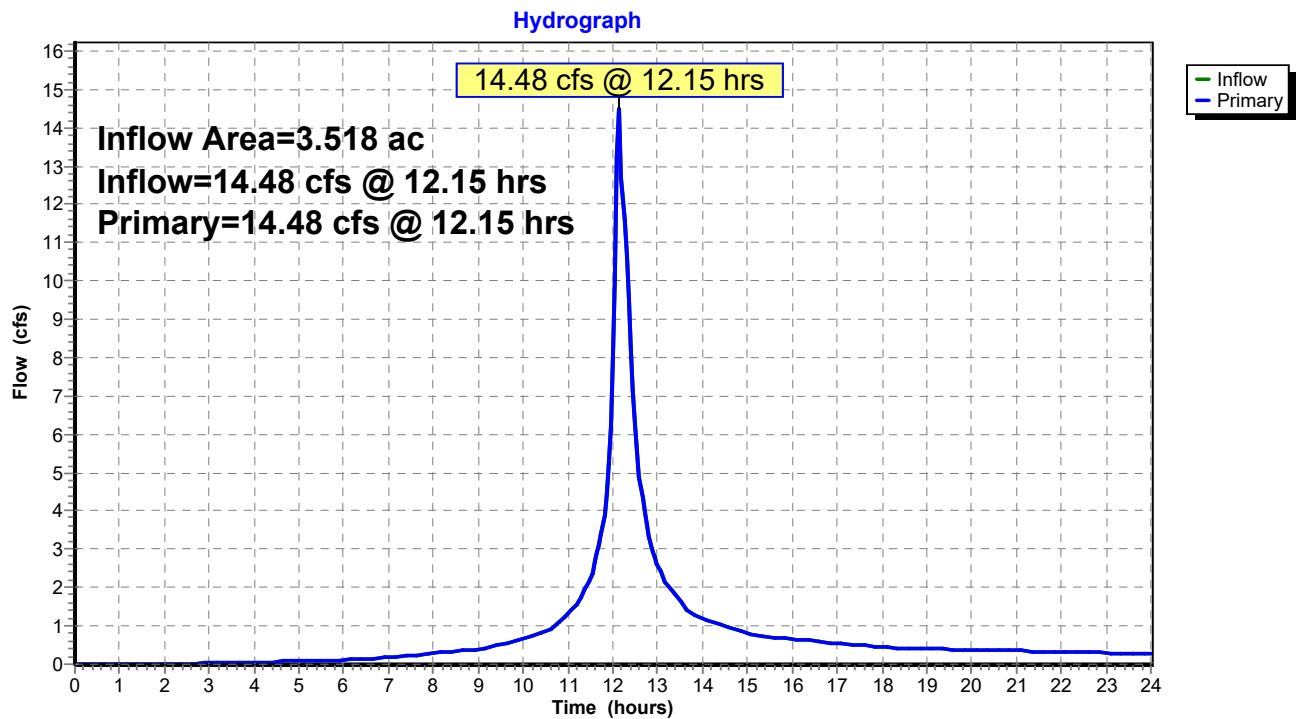
Page 27

Summary for Link 7L: Site

Inflow Area = 3.518 ac, 49.43% Impervious, Inflow Depth > 5.36" for 50-yr event
Inflow = 14.48 cfs @ 12.15 hrs, Volume= 1.572 af
Primary = 14.48 cfs @ 12.15 hrs, Volume= 1.572 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link 7L: Site



MDA Ex.

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WinTR55 NOAA D 100-yr Rainfall=8.07"

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Page 28

Summary for Subcatchment 3S: EXWS-A1

Runoff = 8.60 cfs @ 12.28 hrs, Volume= 0.939 af, Depth> 5.55"
Routed to Link 5L : WS-A

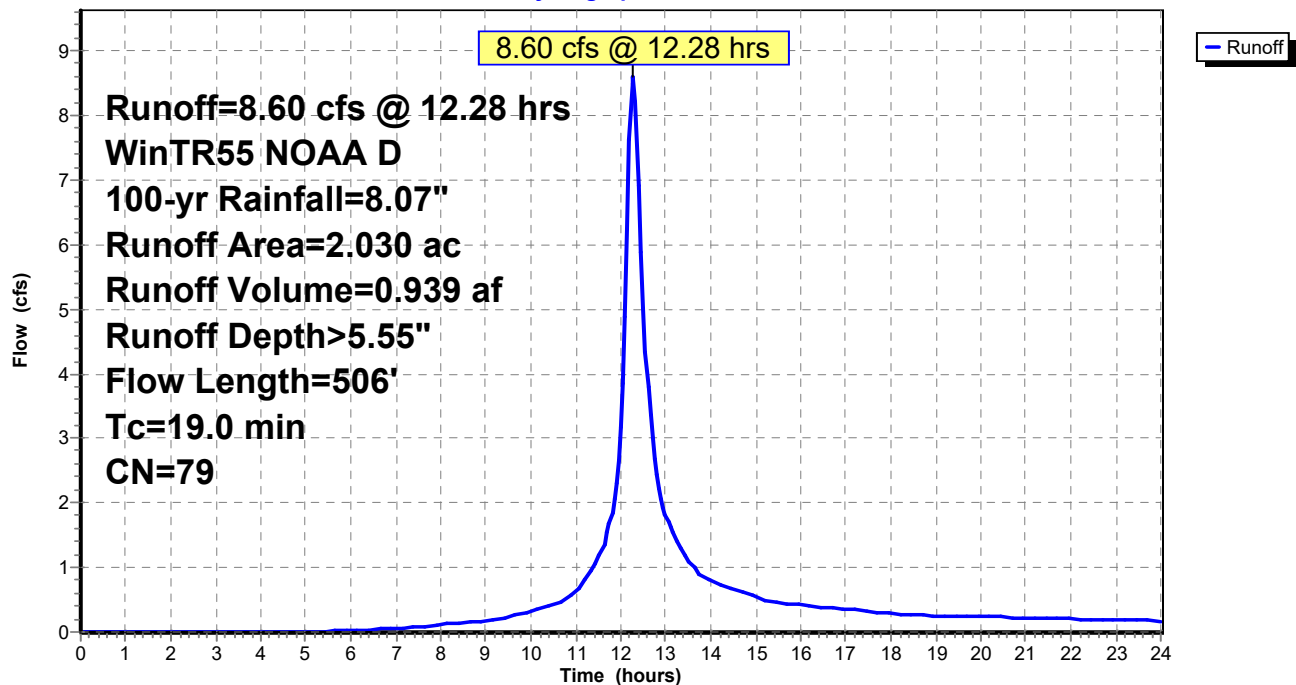
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
WinTR55 NOAA D 100-yr Rainfall=8.07"

Area (ac)	CN	Description
0.392	55	Woods, Good, HSG B
0.342	77	Woods, Good, HSG D
0.127	61	>75% Grass cover, Good, HSG B
0.501	80	>75% Grass cover, Good, HSG D
0.000	98	Paved parking, HSG B
0.668	98	Paved parking, HSG D
2.030	79	Weighted Average
1.362		67.09% Pervious Area
0.668		32.91% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.0	100	0.0160	0.11		Sheet Flow, Parking Lot
					Grass: Dense n= 0.240 P2= 3.47"
4.0	406	0.0109	1.68		Shallow Concentrated Flow, Natural Channel
					Unpaved Kv= 16.1 fps
19.0	506	Total			

Subcatchment 3S: EXWS-A1

Hydrograph



MDA Ex.

WinTR55 NOAA D 100-yr Rainfall=8.07"

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Page 29

Summary for Subcatchment 4S: EXWS-A2

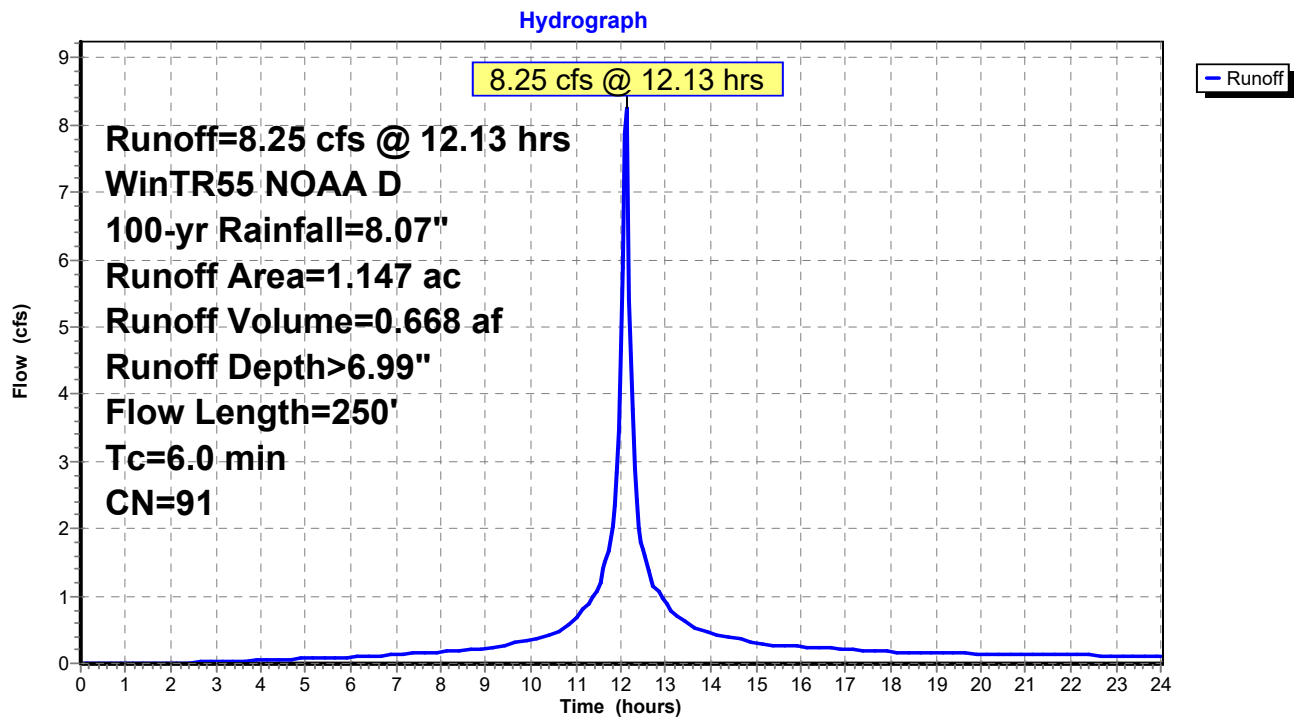
Runoff = 8.25 cfs @ 12.13 hrs, Volume= 0.668 af, Depth> 6.99"
 Routed to Link 5L : WS-A

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 WinTR55 NOAA D 100-yr Rainfall=8.07"

Area (ac)	CN	Description
0.007	55	Woods, Good, HSG B
0.285	77	Woods, Good, HSG D
0.000	61	>75% Grass cover, Good, HSG B
0.096	80	>75% Grass cover, Good, HSG D
0.000	98	Paved parking, HSG B
0.759	98	Paved parking, HSG D
1.147	91	Weighted Average
0.388		33.83% Pervious Area
0.759		66.17% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.6	150	0.0200	1.55		Sheet Flow, Parking Lot Smooth surfaces n= 0.011 P2= 3.47"
0.3	50	0.0200	2.87		Shallow Concentrated Flow, Paved Slope Paved Kv= 20.3 fps
0.1	50	0.2500	8.05		Shallow Concentrated Flow, Grassed Slope Unpaved Kv= 16.1 fps
2.0	250	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 4S: EXWS-A2



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WinTR55 NOAA D 100-yr Rainfall=8.07"

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Page 31

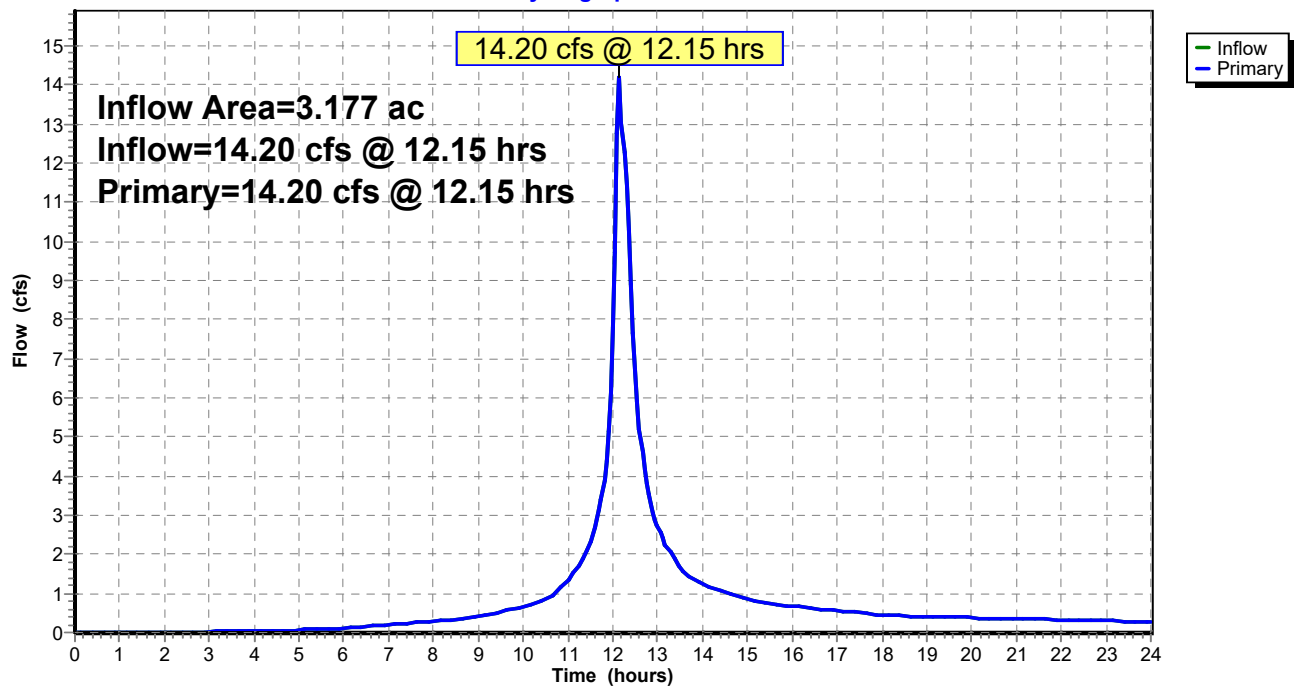
Summary for Link 5L: WS-A

Inflow Area = 3.177 ac, 44.92% Impervious, Inflow Depth > 6.07" for 100-yr event
Inflow = 14.20 cfs @ 12.15 hrs, Volume= 1.607 af
Primary = 14.20 cfs @ 12.15 hrs, Volume= 1.607 af, Atten= 0%, Lag= 0.0 min
Routed to Link 7L : Site

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link 5L: WS-A

Hydrograph



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WinTR55 NOAA D 100-yr Rainfall=8.07"

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Page 32

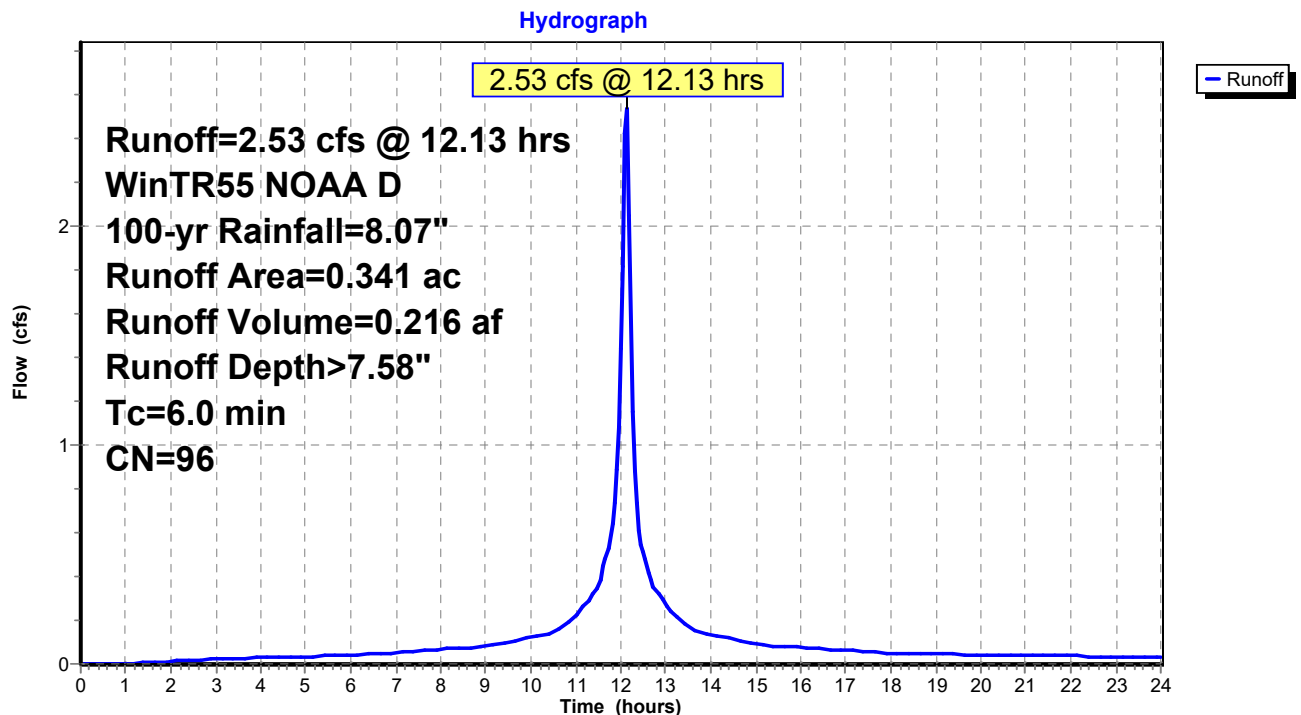
Summary for Subcatchment 6S: EXWS-B

Runoff = 2.53 cfs @ 12.13 hrs, Volume= 0.216 af, Depth> 7.58"
Routed to Link 7L : Site

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
WinTR55 NOAA D 100-yr Rainfall=8.07"

Area (ac)	CN	Description
0.000	55	Woods, Good, HSG B
0.020	77	Woods, Good, HSG D
0.000	61	>75% Grass cover, Good, HSG B
0.009	80	>75% Grass cover, Good, HSG D
0.000	98	Paved parking, HSG B
0.312	98	Paved parking, HSG D
0.341	96	Weighted Average
0.029		8.50% Pervious Area
0.312		91.50% Impervious Area

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

Subcatchment 6S: EXWS-B

MDA Ex.

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WinTR55 NOAA D 100-yr Rainfall=8.07"

Printed 9/16/2025

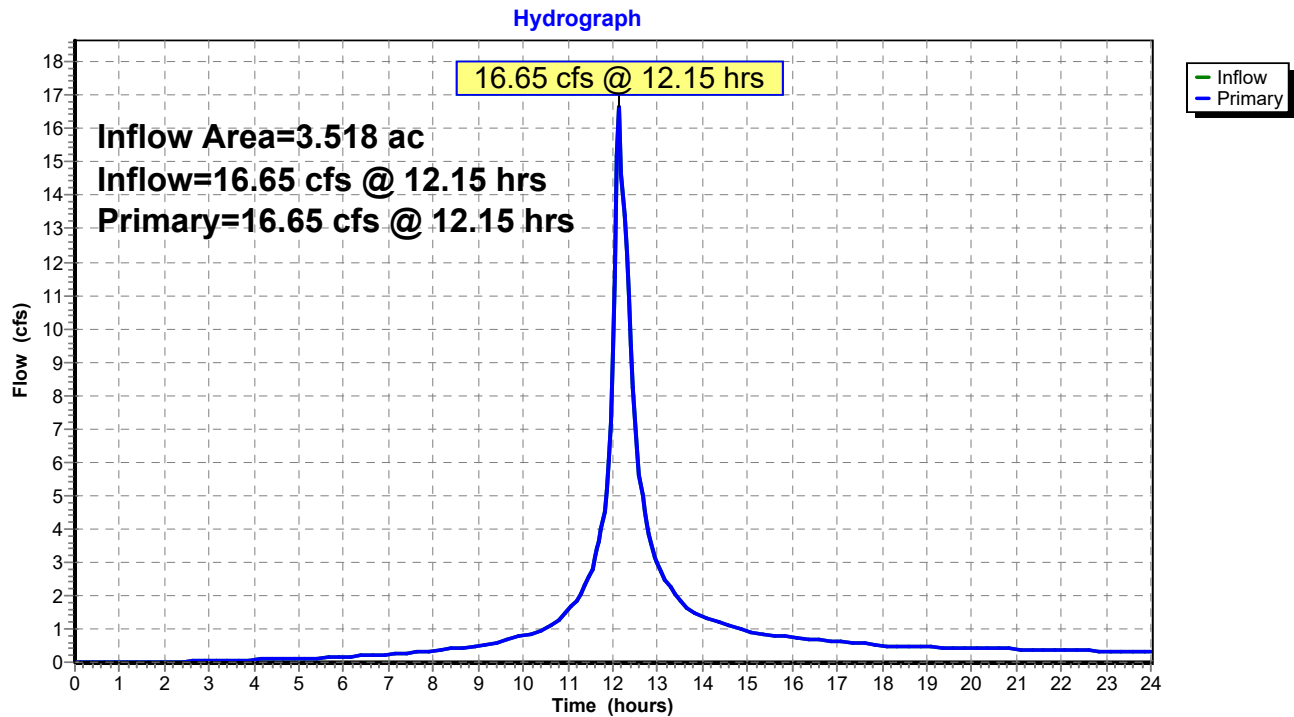
Page 33

Summary for Link 7L: Site

Inflow Area = 3.518 ac, 49.43% Impervious, Inflow Depth > 6.22" for 100-yr event
Inflow = 16.65 cfs @ 12.15 hrs, Volume= 1.822 af
Primary = 16.65 cfs @ 12.15 hrs, Volume= 1.822 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link 7L: Site



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WinTR55 NOAA D WQV Rainfall=1.35"

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Page 34

Summary for Subcatchment 3S: EXWS-A1

Runoff = 0.20 cfs @ 12.35 hrs, Volume= 0.032 af, Depth> 0.19"
Routed to Link 5L : WS-A

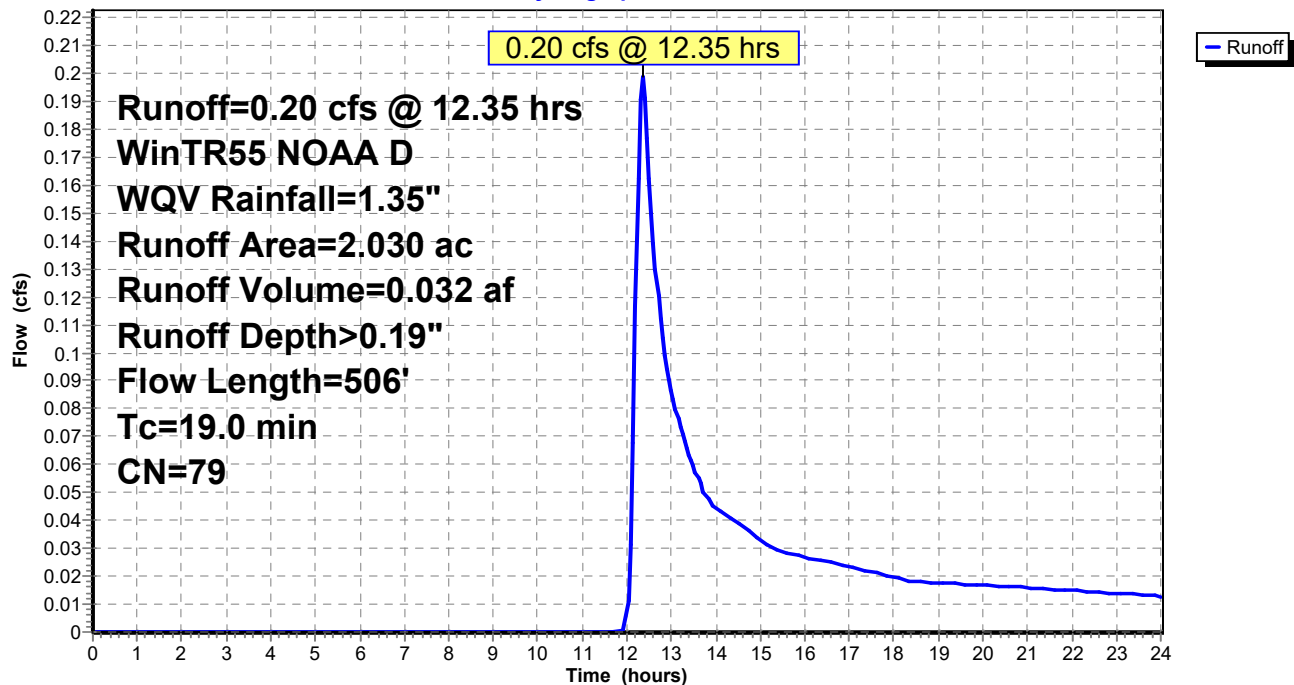
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
WinTR55 NOAA D WQV Rainfall=1.35"

Area (ac)	CN	Description
0.392	55	Woods, Good, HSG B
0.342	77	Woods, Good, HSG D
0.127	61	>75% Grass cover, Good, HSG B
0.501	80	>75% Grass cover, Good, HSG D
0.000	98	Paved parking, HSG B
0.668	98	Paved parking, HSG D
2.030	79	Weighted Average
1.362		67.09% Pervious Area
0.668		32.91% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.0	100	0.0160	0.11		Sheet Flow, Parking Lot
					Grass: Dense n= 0.240 P2= 3.47"
4.0	406	0.0109	1.68		Shallow Concentrated Flow, Natural Channel
					Unpaved Kv= 16.1 fps
19.0	506	Total			

Subcatchment 3S: EXWS-A1

Hydrograph



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WinTR55 NOAA D WQV Rainfall=1.35"

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Page 35

Summary for Subcatchment 4S: EXWS-A2

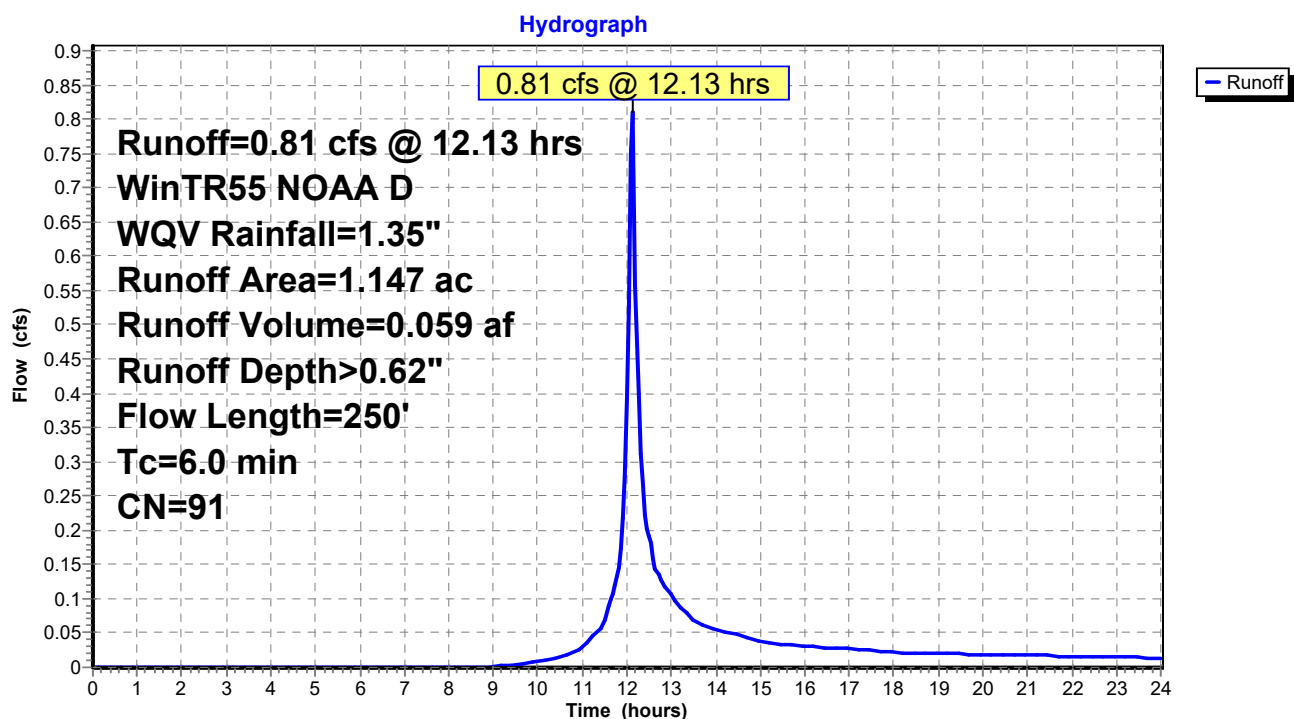
Runoff = 0.81 cfs @ 12.13 hrs, Volume= 0.059 af, Depth> 0.62"
 Routed to Link 5L : WS-A

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 WinTR55 NOAA D WQV Rainfall=1.35"

Area (ac)	CN	Description
0.007	55	Woods, Good, HSG B
0.285	77	Woods, Good, HSG D
0.000	61	>75% Grass cover, Good, HSG B
0.096	80	>75% Grass cover, Good, HSG D
0.000	98	Paved parking, HSG B
0.759	98	Paved parking, HSG D
1.147	91	Weighted Average
0.388		33.83% Pervious Area
0.759		66.17% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.6	150	0.0200	1.55		Sheet Flow, Parking Lot Smooth surfaces n= 0.011 P2= 3.47"
0.3	50	0.0200	2.87		Shallow Concentrated Flow, Paved Slope Paved Kv= 20.3 fps
0.1	50	0.2500	8.05		Shallow Concentrated Flow, Grassed Slope Unpaved Kv= 16.1 fps
2.0	250	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 4S: EXWS-A2



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WinTR55 NOAA D WQV Rainfall=1.35"

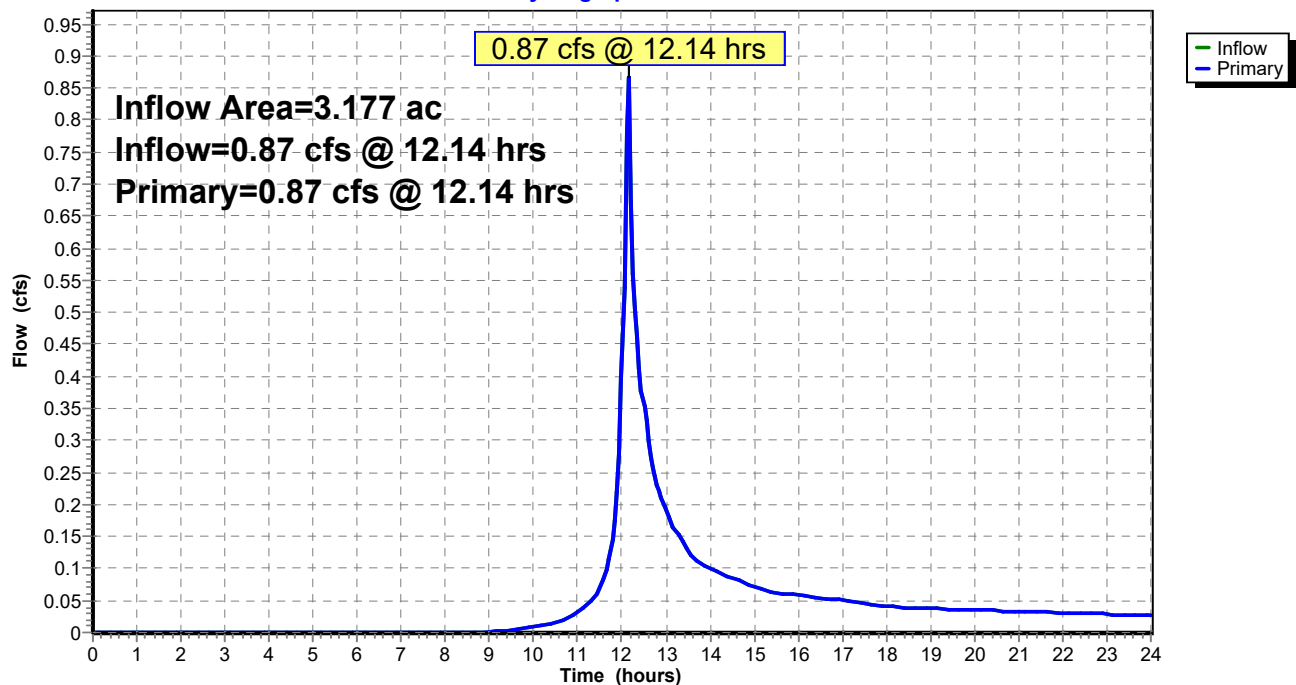
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Page 37

Summary for Link 5L: WS-A

Inflow Area = 3.177 ac, 44.92% Impervious, Inflow Depth > 0.35" for WQV event
Inflow = 0.87 cfs @ 12.14 hrs, Volume= 0.091 af
Primary = 0.87 cfs @ 12.14 hrs, Volume= 0.091 af, Atten= 0%, Lag= 0.0 min
Routed to Link 7L : Site

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link 5L: WS-A**Hydrograph**

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WinTR55 NOAA D WQV Rainfall=1.35"

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Page 38

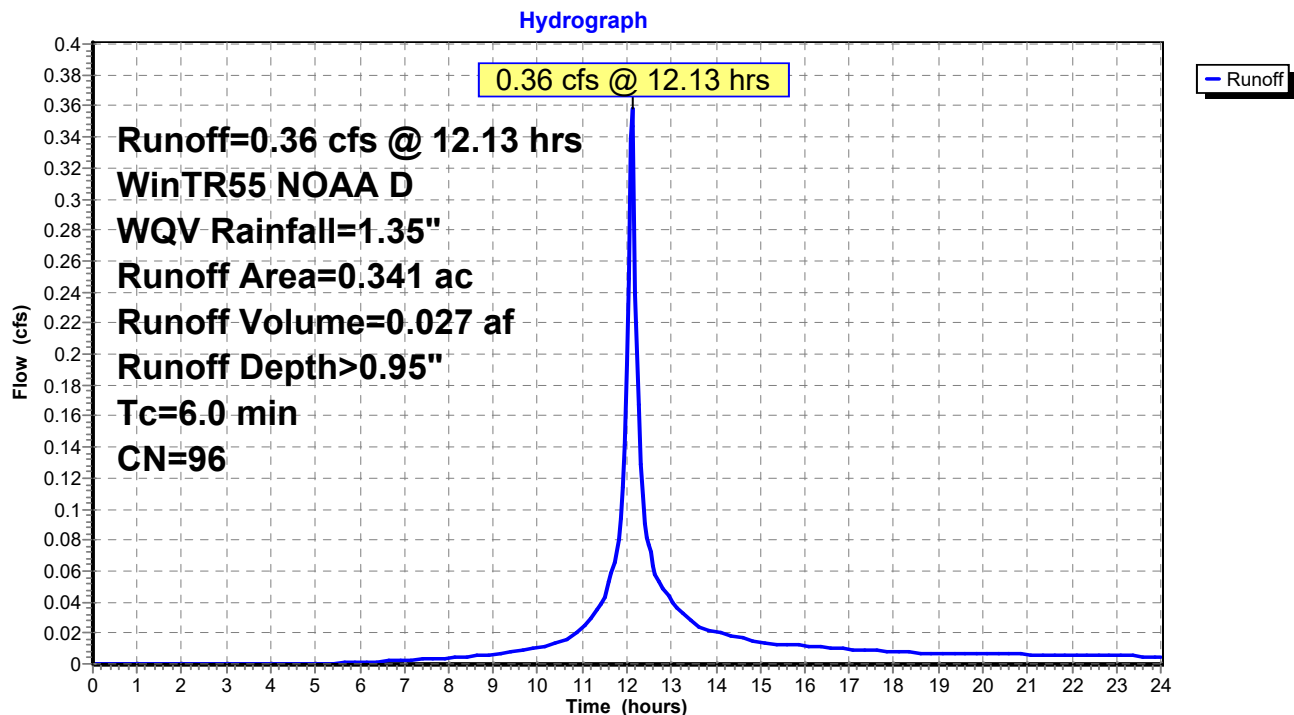
Summary for Subcatchment 6S: EXWS-B

Runoff = 0.36 cfs @ 12.13 hrs, Volume= 0.027 af, Depth> 0.95"
Routed to Link 7L : Site

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
WinTR55 NOAA D WQV Rainfall=1.35"

Area (ac)	CN	Description
0.000	55	Woods, Good, HSG B
0.020	77	Woods, Good, HSG D
0.000	61	>75% Grass cover, Good, HSG B
0.009	80	>75% Grass cover, Good, HSG D
0.000	98	Paved parking, HSG B
0.312	98	Paved parking, HSG D
0.341	96	Weighted Average
0.029		8.50% Pervious Area
0.312		91.50% Impervious Area

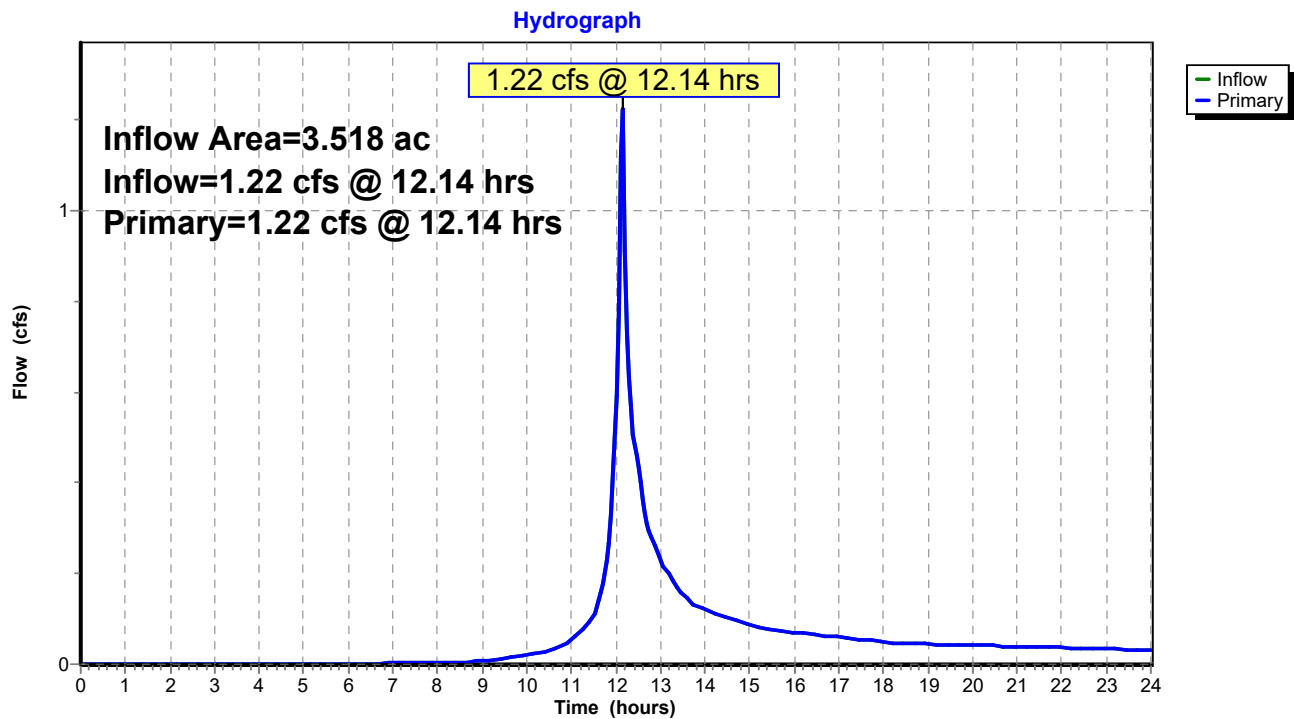
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, Min TC

Subcatchment 6S: EXWS-B

Summary for Link 7L: Site

Inflow Area = 3.518 ac, 49.43% Impervious, Inflow Depth > 0.40" for WQV event
Inflow = 1.22 cfs @ 12.14 hrs, Volume= 0.119 af
Primary = 1.22 cfs @ 12.14 hrs, Volume= 0.119 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link 7L: Site

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Multi-Event Tables

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Page 40

Events for Subcatchment 3S: EXWS-A1

Event	Rainfall (inches)	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
2-yr	3.42	2.33	0.253	1.50
10-yr	5.22	4.68	0.504	2.98
25-yr	6.34	6.21	0.671	3.97
50-yr	7.17	7.35	0.799	4.72
100-yr	8.07	8.60	0.939	5.55
WQV	1.35	0.20	0.032	0.19

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Multi-Event Tables

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Page 41

Events for Subcatchment 4S: EXWS-A2

Event	Rainfall (inches)	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
2-yr	3.42	3.10	0.235	2.46
10-yr	5.22	5.12	0.401	4.19
25-yr	6.34	6.36	0.505	5.29
50-yr	7.17	7.27	0.583	6.10
100-yr	8.07	8.25	0.668	6.99
WQV	1.35	0.81	0.059	0.62

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Multi-Event Tables

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Page 42

Events for Link 5L: WS-A

Event	Inflow (cfs)	Primary (cfs)	Elevation (feet)
2-yr	4.58	4.58	0.00
10-yr	8.24	8.24	0.00
25-yr	10.57	10.57	0.00
50-yr	12.31	12.31	0.00
100-yr	14.20	14.20	0.00
WQV	0.87	0.87	0.00

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Multi-Event Tables

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Page 43

Events for Subcatchment 6S: EXWS-B

Event	Rainfall (inches)	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
2-yr	3.42	1.04	0.084	2.96
10-yr	5.22	1.62	0.135	4.75
25-yr	6.34	1.98	0.167	5.86
50-yr	7.17	2.25	0.190	6.69
100-yr	8.07	2.53	0.216	7.58
WQV	1.35	0.36	0.027	0.95

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Multi-Event Tables

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Page 44

Events for Link 7L: Site

Event	Inflow (cfs)	Primary (cfs)	Elevation (feet)
2-yr	5.59	5.59	0.00
10-yr	9.82	9.82	0.00
25-yr	12.49	12.49	0.00
50-yr	14.48	14.48	0.00
100-yr	16.65	16.65	0.00
WQV	1.22	1.22	0.00

APPENDIX B

Proposed Stormwater Discharge Calculations

TABLE OF CONTENTS

Project Reports

- 1 Routing Diagram
- 2 Rainfall Events Listing
- 3 Area Listing (all nodes)

2-yr Event

- 4 Subcat 1S: PRWS-A1
- 5 Subcat 2S: PRWS-A2
- 7 Pond 3P: Detention A
- 9 Subcat 4S: PRWS-A3
- 11 Link 5L: PRWS-A
- 12 Subcat 6S: PRWS-B1
- 13 Subcat 7S: PRWS-B2
- 14 Pond 8P: Detention B
- 16 Link 9L: PRWS-B
- 17 Link 10L: Site

10-yr Event

- 18 Subcat 1S: PRWS-A1
- 19 Subcat 2S: PRWS-A2
- 21 Pond 3P: Detention A
- 23 Subcat 4S: PRWS-A3
- 25 Link 5L: PRWS-A
- 26 Subcat 6S: PRWS-B1
- 27 Subcat 7S: PRWS-B2
- 28 Pond 8P: Detention B
- 30 Link 9L: PRWS-B
- 31 Link 10L: Site

25-yr Event

- 32 Subcat 1S: PRWS-A1
- 33 Subcat 2S: PRWS-A2
- 35 Pond 3P: Detention A
- 37 Subcat 4S: PRWS-A3
- 39 Link 5L: PRWS-A
- 40 Subcat 6S: PRWS-B1
- 41 Subcat 7S: PRWS-B2
- 42 Pond 8P: Detention B
- 44 Link 9L: PRWS-B
- 45 Link 10L: Site

50-yr Event

- 46 Subcat 1S: PRWS-A1
- 47 Subcat 2S: PRWS-A2
- 49 Pond 3P: Detention A
- 51 Subcat 4S: PRWS-A3
- 53 Link 5L: PRWS-A
- 54 Subcat 6S: PRWS-B1
- 55 Subcat 7S: PRWS-B2
- 56 Pond 8P: Detention B

MDA PR.

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Table of Contents

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58 Link 9L: PRWS-B

59 Link 10L: Site

100-yr Event

60 Subcat 1S: PRWS-A1

61 Subcat 2S: PRWS-A2

63 Pond 3P: Detention A

65 Subcat 4S: PRWS-A3

67 Link 5L: PRWS-A

68 Subcat 6S: PRWS-B1

69 Subcat 7S: PRWS-B2

70 Pond 8P: Detention B

72 Link 9L: PRWS-B

73 Link 10L: Site

WQV Event

74 Subcat 1S: PRWS-A1

75 Subcat 2S: PRWS-A2

77 Pond 3P: Detention A

79 Subcat 4S: PRWS-A3

81 Link 5L: PRWS-A

82 Subcat 6S: PRWS-B1

83 Subcat 7S: PRWS-B2

84 Pond 8P: Detention B

86 Link 9L: PRWS-B

87 Link 10L: Site

Multi-Event Tables

88 Subcat 1S: PRWS-A1

89 Subcat 2S: PRWS-A2

90 Pond 3P: Detention A

91 Subcat 4S: PRWS-A3

92 Link 5L: PRWS-A

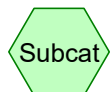
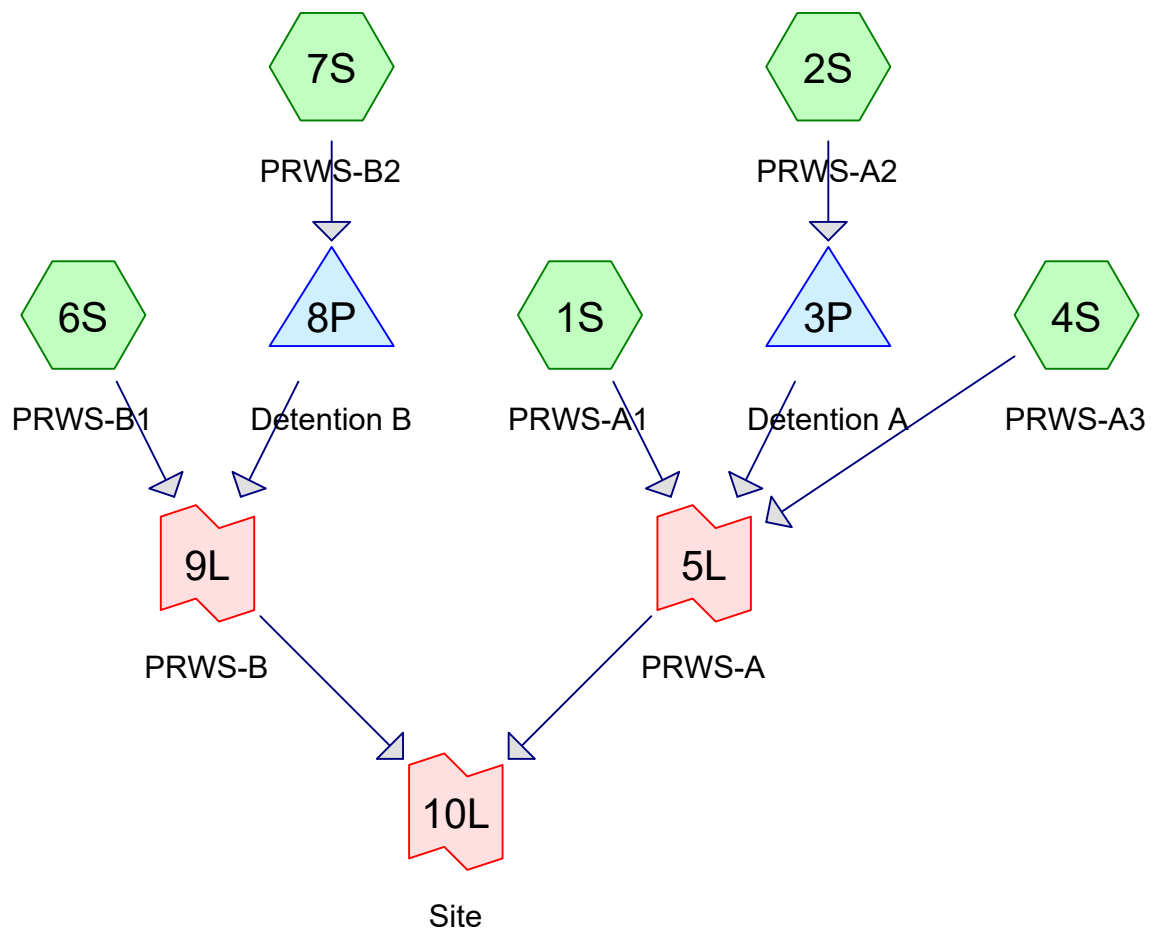
93 Subcat 6S: PRWS-B1

94 Subcat 7S: PRWS-B2

95 Pond 8P: Detention B

96 Link 9L: PRWS-B

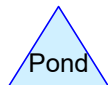
97 Link 10L: Site



Subcat



Reach



Pond



Link

Routing Diagram for MDA PR.

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MDA PR.

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Page 2

Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2-yr	WinTR55 NOAA	D	Default	24.00	1	3.42	2
2	10-yr	WinTR55 NOAA	D	Default	24.00	1	5.22	2
3	25-yr	WinTR55 NOAA	D	Default	24.00	1	6.34	2
4	50-yr	WinTR55 NOAA	D	Default	24.00	1	7.17	2
5	100-yr	WinTR55 NOAA	D	Default	24.00	1	8.07	2
6	WQV	WinTR55 NOAA	D	Default	24.00	1	0.89	2

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Page 3

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.047	61	>75% Grass cover, Good, HSG B (2S, 4S, 7S)
0.281	80	>75% Grass cover, Good, HSG D (2S, 4S, 6S, 7S)
2.812	98	Paved parking, HSG D (1S, 2S, 7S)
0.340	55	Woods, Good, HSG B (1S)
0.056	77	Woods, Good, HSG D (1S, 6S)
3.536	92	TOTAL AREA

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WinTR55 NOAA D 2-yr Rainfall=3.42"

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Page 4

Summary for Subcatchment 1S: PRWS-A1

Runoff = 0.09 cfs @ 12.36 hrs, Volume= 0.015 af, Depth> 0.45"
Routed to Link 5L : PRWS-A

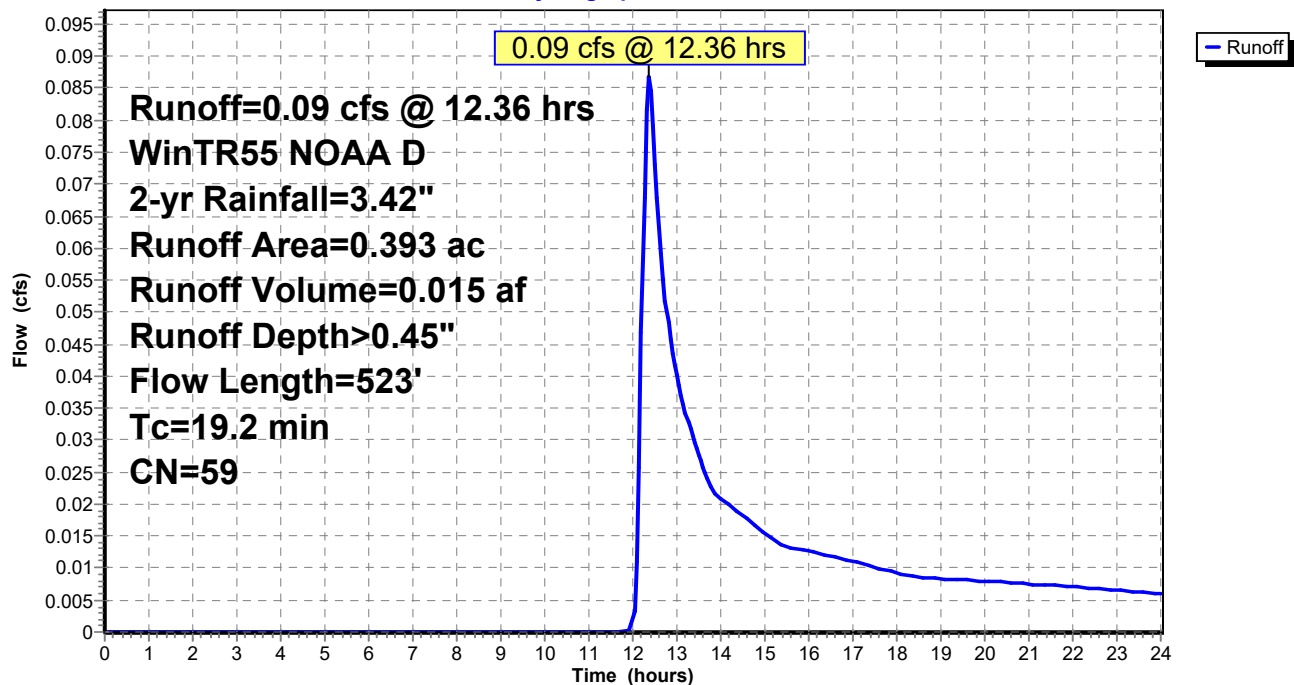
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
WinTR55 NOAA D 2-yr Rainfall=3.42"

Area (ac)	CN	Description
0.340	55	Woods, Good, HSG B
0.036	77	Woods, Good, HSG D
0.000	61	>75% Grass cover, Good, HSG B
0.000	80	>75% Grass cover, Good, HSG D
0.000	98	Paved parking, HSG B
0.017	98	Paved parking, HSG D
0.393	59	Weighted Average
0.376		95.67% Pervious Area
0.017		4.33% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.0	100	0.0160	0.11		Sheet Flow, Wetland
					Grass: Dense n= 0.240 P2= 3.47"
4.2	423	0.0109	1.68		Shallow Concentrated Flow, Grass Slope
					Unpaved Kv= 16.1 fps
19.2	523	Total			

Subcatchment 1S: PRWS-A1

Hydrograph



MDA PR.

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WinTR55 NOAA D 2-yr Rainfall=3.42"

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Page 5

Summary for Subcatchment 2S: PRWS-A2

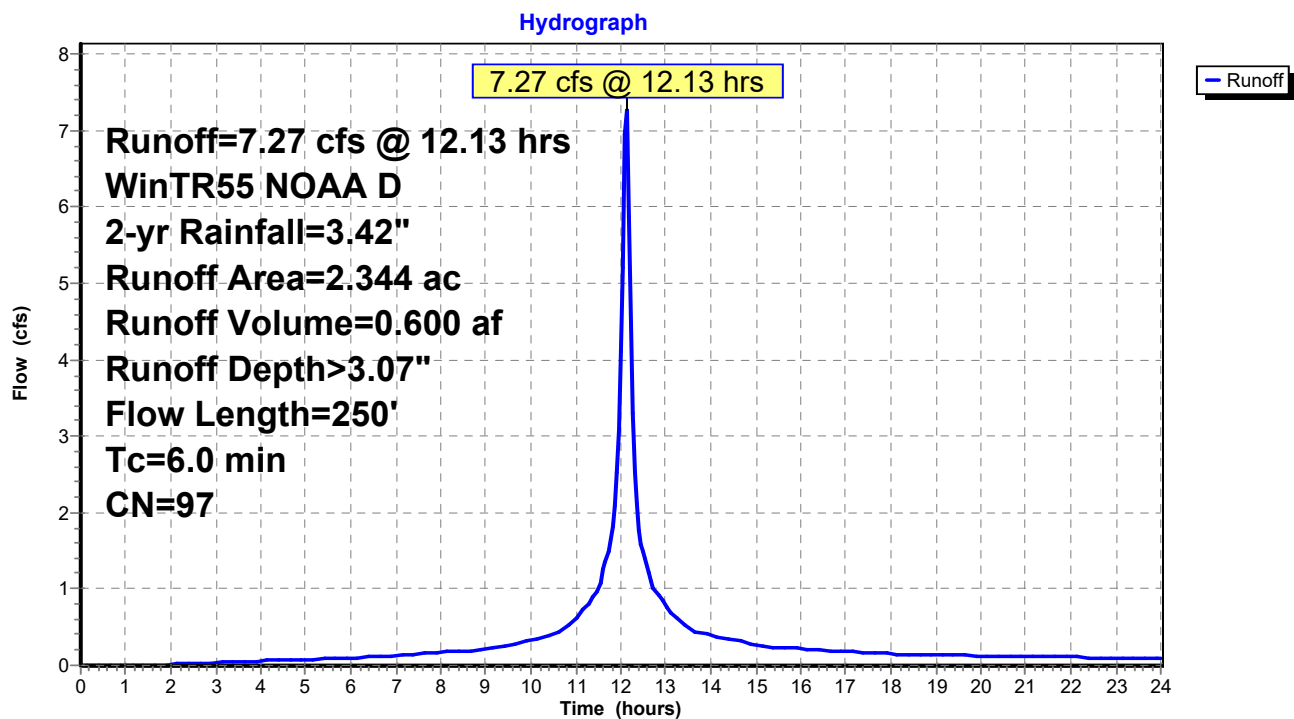
Runoff = 7.27 cfs @ 12.13 hrs, Volume= 0.600 af, Depth> 3.07"
 Routed to Pond 3P : Detention A

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 WinTR55 NOAA D 2-yr Rainfall=3.42"

Area (ac)	CN	Description
0.000	55	Woods, Good, HSG B
0.000	77	Woods, Good, HSG D
0.020	61	>75% Grass cover, Good, HSG B
0.110	80	>75% Grass cover, Good, HSG D
0.000	98	Paved parking, HSG B
2.214	98	Paved parking, HSG D
2.344	97	Weighted Average
0.130		5.55% Pervious Area
2.214		94.45% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.6	150	0.0200	1.55		Sheet Flow, Parking Lot Smooth surfaces n= 0.011 P2= 3.47"
0.3	50	0.0200	2.87		Shallow Concentrated Flow, Paved Slope Paved Kv= 20.3 fps
0.1	50	0.2500	8.05		Shallow Concentrated Flow, Grassed Slope Unpaved Kv= 16.1 fps
2.0	250	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 2S: PRWS-A2



Summary for Pond 3P: Detention A

Inflow Area = 2.344 ac, 94.45% Impervious, Inflow Depth > 3.07" for 2-yr event
 Inflow = 7.27 cfs @ 12.13 hrs, Volume= 0.600 af
 Outflow = 2.01 cfs @ 12.37 hrs, Volume= 0.536 af, Atten= 72%, Lag= 14.3 min
 Discarded = 0.06 cfs @ 4.60 hrs, Volume= 0.095 af
 Primary = 1.96 cfs @ 12.37 hrs, Volume= 0.441 af
 Routed to Link 5L : PRWS-A

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 Peak Elev= 96.28' @ 12.37 hrs Surf.Area= 0.065 ac Storage= 0.208 af

Plug-Flow detention time= 113.7 min calculated for 0.536 af (89% of inflow)
 Center-of-Mass det. time= 58.8 min (825.4 - 766.5)

Volume	Invert	Avail.Storage	Storage Description
#1A	91.83'	0.039 af	32.00'W x 88.00'L x 7.17'H Field A 0.463 af Overall - 0.366 af Embedded = 0.097 af x 40.0% Voids
#2A	93.33'	0.287 af	retain_it retain_it 5.0' x 44 Inside #1 Inside= 84.0"W x 60.0"H => 36.41 sf x 8.00'L = 291.3 cf Outside= 96.0"W x 68.0"H => 45.33 sf x 8.00'L = 362.7 cf 4 Rows adjusted for 311.7 cf perimeter wall
#3	98.33'	0.001 af	4.00'D x 5.00'H Vertical Cone/Cylinder
		0.327 af	Total Available Storage

Storage Group A created with Chamber Wizard

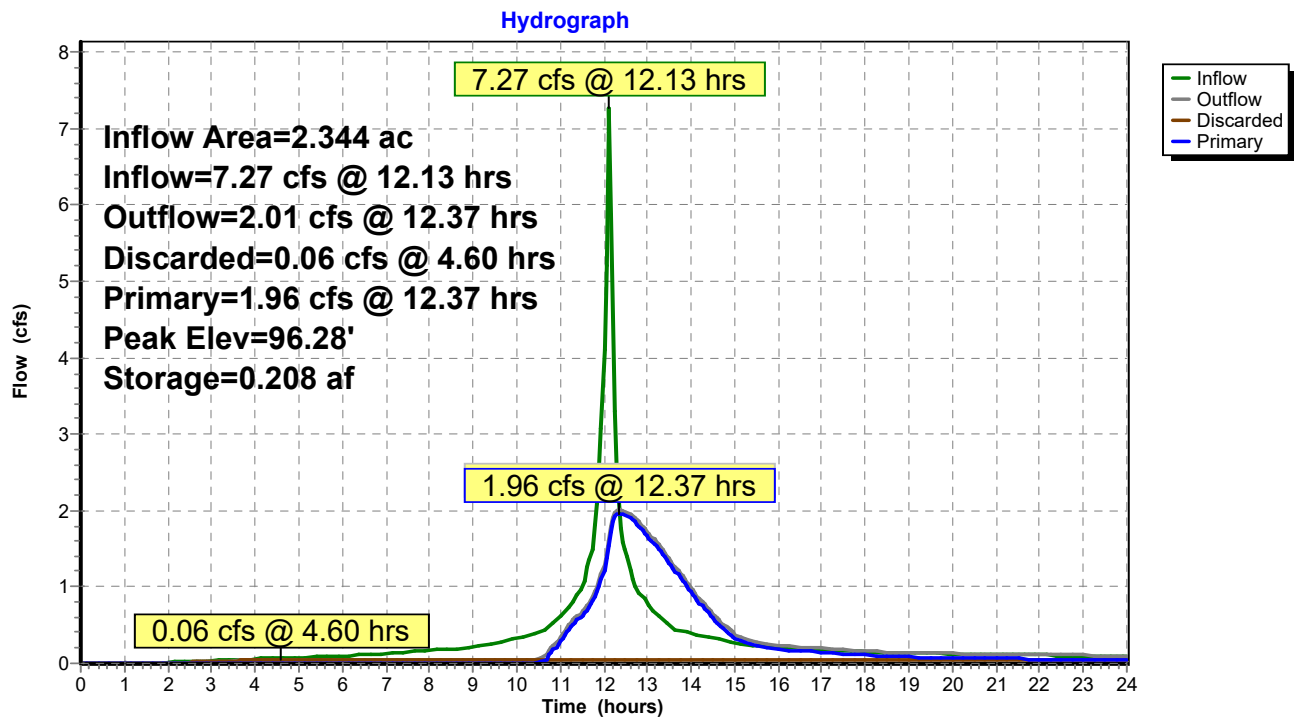
Device	Routing	Invert	Outlet Devices
#1	Primary	92.50'	15.0" Round Culvert L= 38.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 92.50' / 92.14' S= 0.0095 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf
#2	Discarded	91.83'	0.850 in/hr Exfiltration over Horizontal area
#3	Device 1	93.70'	4.0" Vert. Orifice/Grate X 3.00 C= 0.600 Limited to weir flow at low heads
#4	Device 1	96.30'	10.0" Vert. Orifice/Grate X 3.00 C= 0.600 Limited to weir flow at low heads
#5	Device 1	98.10'	4.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)

Discarded OutFlow Max=0.06 cfs @ 4.60 hrs HW=91.95' (Free Discharge)

↑ **2=Exfiltration** (Exfiltration Controls 0.06 cfs)

Primary OutFlow Max=1.96 cfs @ 12.37 hrs HW=96.28' (Free Discharge)

↑ **1=Culvert** (Passes 1.96 cfs of 10.49 cfs potential flow)
 ↑ **3=Orifice/Grate** (Orifice Controls 1.96 cfs @ 7.48 fps)
 ↑ **4=Orifice/Grate** (Controls 0.00 cfs)
 ↑ **5=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 3P: Detention A

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WinTR55 NOAA D 2-yr Rainfall=3.42"

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Page 9

Summary for Subcatchment 4S: PRWS-A3

Runoff = 0.28 cfs @ 12.13 hrs, Volume= 0.020 af, Depth> 1.50"
 Routed to Link 5L : PRWS-A

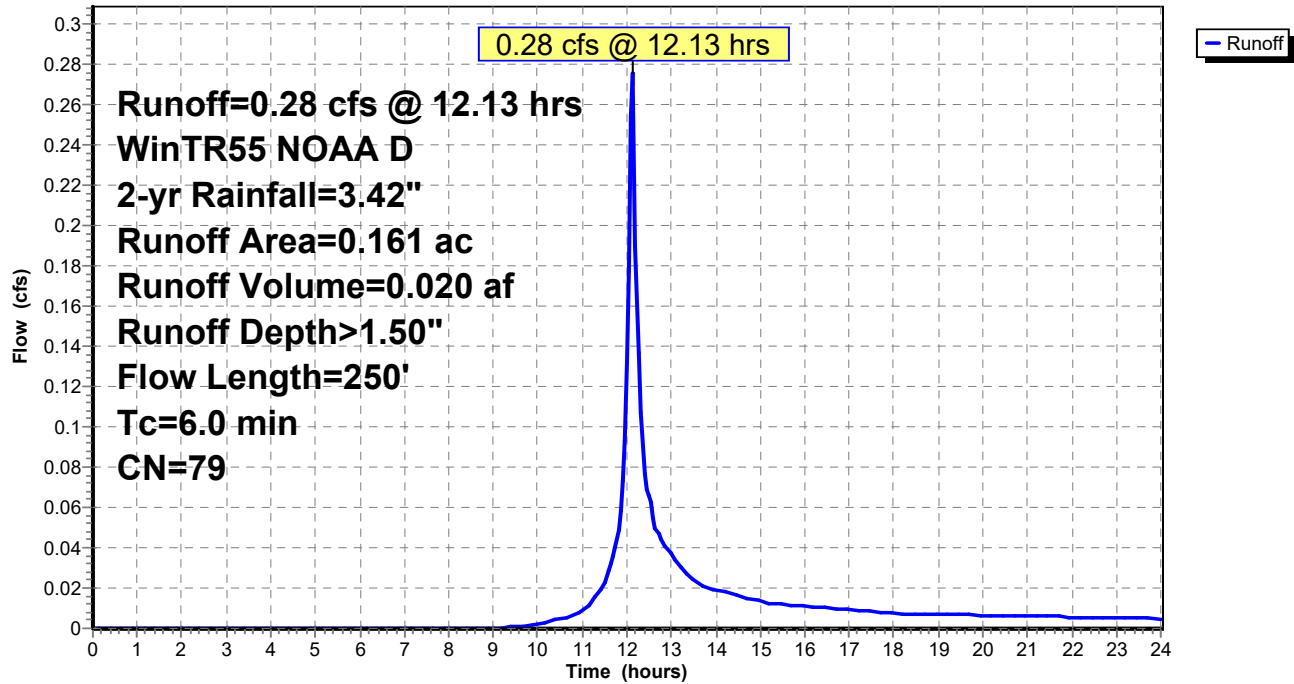
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 WinTR55 NOAA D 2-yr Rainfall=3.42"

Area (ac)	CN	Description
0.000	55	Woods, Good, HSG B
0.000	77	Woods, Good, HSG D
0.007	61	>75% Grass cover, Good, HSG B
0.154	80	>75% Grass cover, Good, HSG D
0.000	98	Paved parking, HSG B
0.000	98	Paved parking, HSG D
0.161	79	Weighted Average
0.161		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.6	150	0.0200	1.55		Sheet Flow, Parking Lot Smooth surfaces n= 0.011 P2= 3.47"
0.3	50	0.0200	2.87		Shallow Concentrated Flow, Paved Slope Paved Kv= 20.3 fps
0.1	50	0.2500	8.05		Shallow Concentrated Flow, Grassed Slope Unpaved Kv= 16.1 fps
2.0	250	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 4S: PRWS-A3

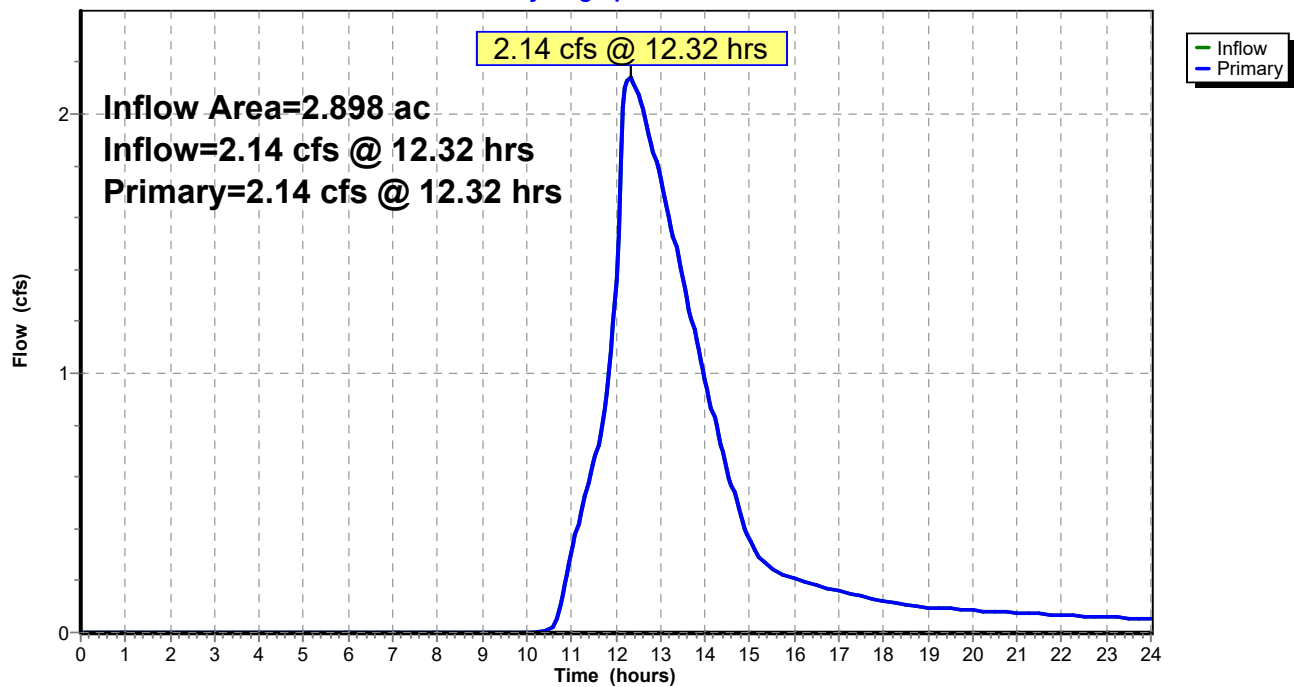
Hydrograph



Summary for Link 5L: PRWS-A

Inflow Area = 2.898 ac, 76.98% Impervious, Inflow Depth > 1.97" for 2-yr event
Inflow = 2.14 cfs @ 12.32 hrs, Volume= 0.476 af
Primary = 2.14 cfs @ 12.32 hrs, Volume= 0.476 af, Atten= 0%, Lag= 0.0 min
Routed to Link 10L : Site

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link 5L: PRWS-A**Hydrograph**

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WinTR55 NOAA D 2-yr Rainfall=3.42"

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Page 12

Summary for Subcatchment 6S: PRWS-B1

Runoff = 0.05 cfs @ 12.13 hrs, Volume= 0.003 af, Depth> 1.43"
Routed to Link 9L : PRWS-B

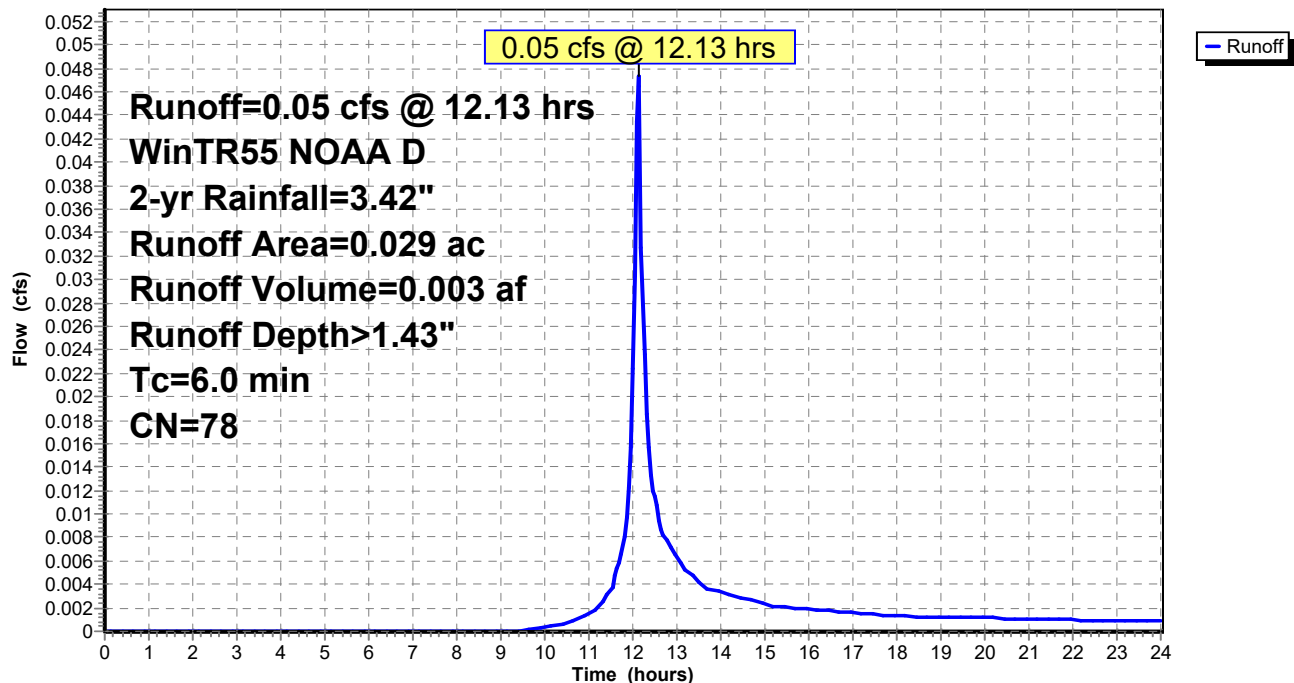
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
WinTR55 NOAA D 2-yr Rainfall=3.42"

Area (ac)	CN	Description
0.000	55	Woods, Good, HSG B
0.020	77	Woods, Good, HSG D
0.000	61	>75% Grass cover, Good, HSG B
0.009	80	>75% Grass cover, Good, HSG D
0.000	98	Paved parking, HSG B
0.000	98	Paved parking, HSG D
0.029	78	Weighted Average
0.029		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry, Min TC
5.0	0				Total, Increased to minimum Tc = 6.0 min

Subcatchment 6S: PRWS-B1

Hydrograph



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WinTR55 NOAA D 2-yr Rainfall=3.42"

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Page 13

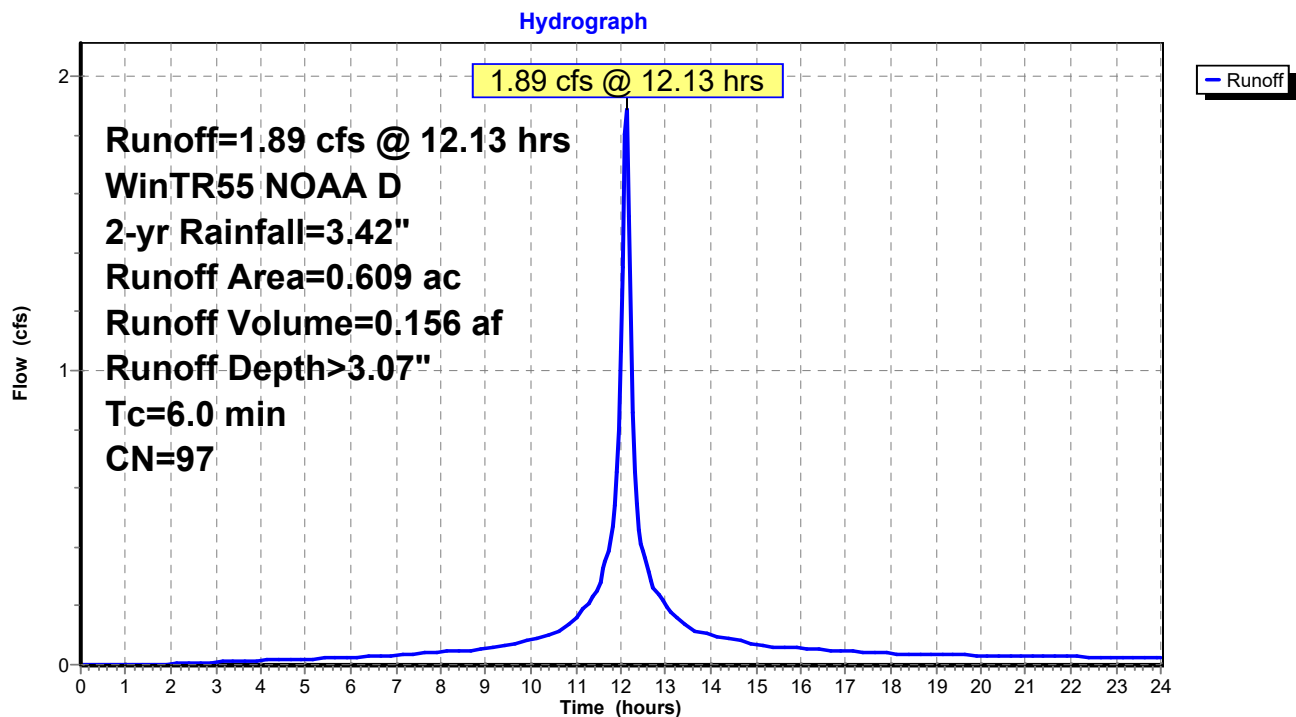
Summary for Subcatchment 7S: PRWS-B2

Runoff = 1.89 cfs @ 12.13 hrs, Volume= 0.156 af, Depth> 3.07"
Routed to Pond 8P : Detention B

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
WinTR55 NOAA D 2-yr Rainfall=3.42"

Area (ac)	CN	Description
0.000	55	Woods, Good, HSG B
0.000	77	Woods, Good, HSG D
0.020	61	>75% Grass cover, Good, HSG B
0.008	80	>75% Grass cover, Good, HSG D
0.000	98	Paved parking, HSG B
0.581	98	Paved parking, HSG D
0.609	97	Weighted Average
0.028		4.60% Pervious Area
0.581		95.40% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry, Min TC
5.0	0				Total, Increased to minimum Tc = 6.0 min

Subcatchment 7S: PRWS-B2

Summary for Pond 8P: Detention B

Inflow Area = 0.609 ac, 95.40% Impervious, Inflow Depth > 3.07" for 2-yr event
 Inflow = 1.89 cfs @ 12.13 hrs, Volume= 0.156 af
 Outflow = 0.45 cfs @ 12.41 hrs, Volume= 0.107 af, Atten= 76%, Lag= 17.3 min
 Discarded = 0.02 cfs @ 6.10 hrs, Volume= 0.037 af
 Primary = 0.43 cfs @ 12.41 hrs, Volume= 0.071 af
 Routed to Link 9L : PRWS-B

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 Peak Elev= 97.72' @ 12.41 hrs Surf.Area= 0.044 ac Storage= 0.071 af

Plug-Flow detention time= 181.8 min calculated for 0.107 af (69% of inflow)
 Center-of-Mass det. time= 78.6 min (845.1 - 766.5)

Volume	Invert	Avail.Storage	Storage Description
#1A	95.60'	0.009 af	24.00'W x 80.00'L x 4.17'H Field A 0.184 af Overall - 0.162 af Embedded = 0.022 af x 40.0% Voids
#2A	96.10'	0.115 af	retain_it retain_it 3.0' x 30 Inside #1 Inside= 84.0"W x 36.0"H => 21.33 sf x 8.00'L = 170.6 cf Outside= 96.0"W x 44.0"H => 29.33 sf x 8.00'L = 234.7 cf 3 Rows adjusted for 122.7 cf perimeter wall
#3	99.10'	0.001 af	4.00'D x 2.00'H Vertical Cone/Cylinder
		0.124 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	97.10'	12.0" Round Culvert L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 97.10' / 97.00' S= 0.0100 ' S= 0.0100 ' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2	Discarded	95.60'	0.500 in/hr Exfiltration over Horizontal area
#3	Device 1	97.10'	5.0" Vert. 2-yr Orifice C= 0.600 Limited to weir flow at low heads
#4	Device 1	97.70'	7.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.02 cfs @ 6.10 hrs HW=95.66' (Free Discharge)

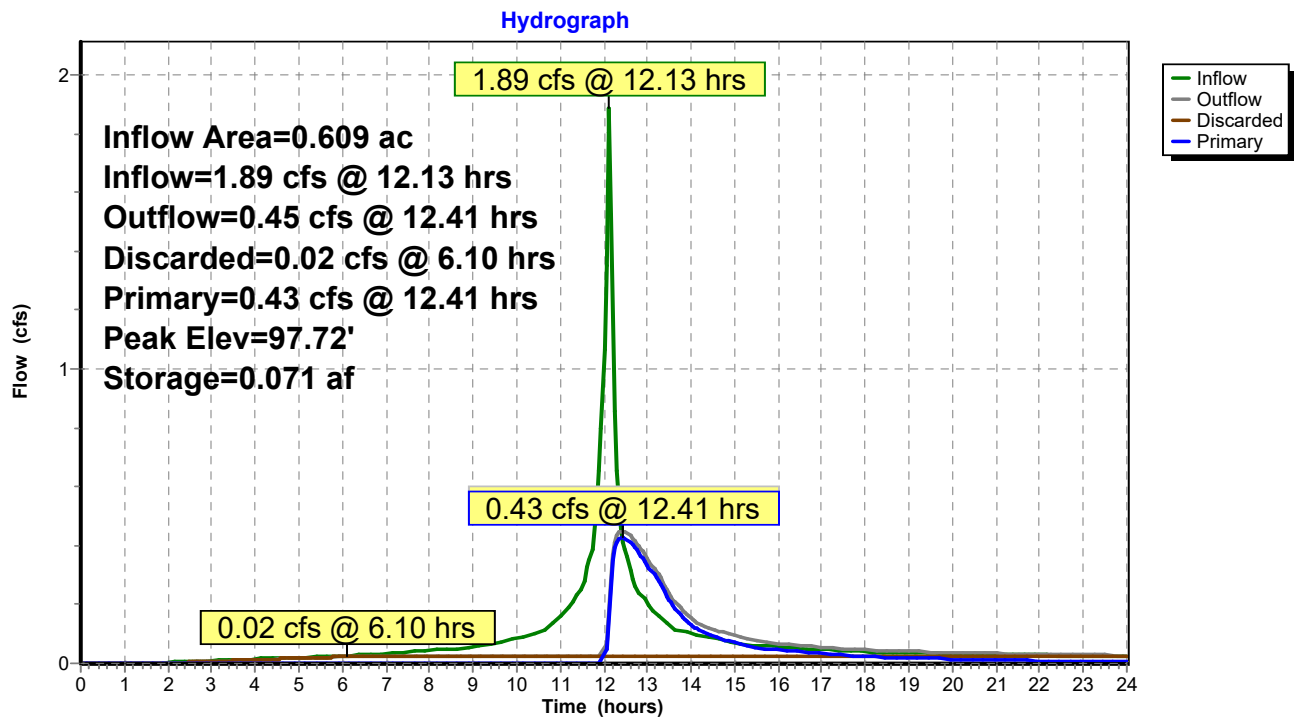
↑ **2=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=0.42 cfs @ 12.41 hrs HW=97.72' (Free Discharge)

↑ **1=Culvert** (Passes 0.42 cfs of 1.08 cfs potential flow)

↑ **3=2-yr Orifice** (Orifice Controls 0.42 cfs @ 3.10 fps)

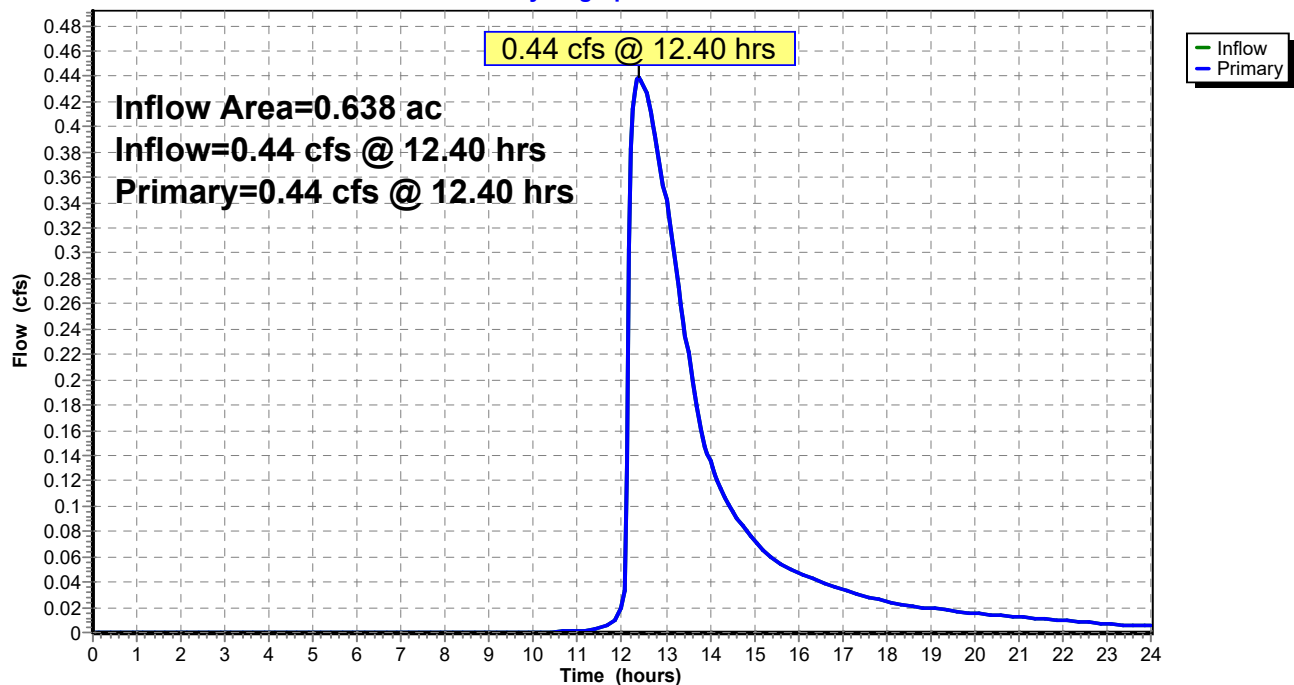
↑ **4=Orifice/Grate** (Orifice Controls 0.00 cfs @ 0.51 fps)

Pond 8P: Detention B

Summary for Link 9L: PRWS-B

Inflow Area = 0.638 ac, 91.07% Impervious, Inflow Depth > 1.39" for 2-yr event
Inflow = 0.44 cfs @ 12.40 hrs, Volume= 0.074 af
Primary = 0.44 cfs @ 12.40 hrs, Volume= 0.074 af, Atten= 0%, Lag= 0.0 min
Routed to Link 10L : Site

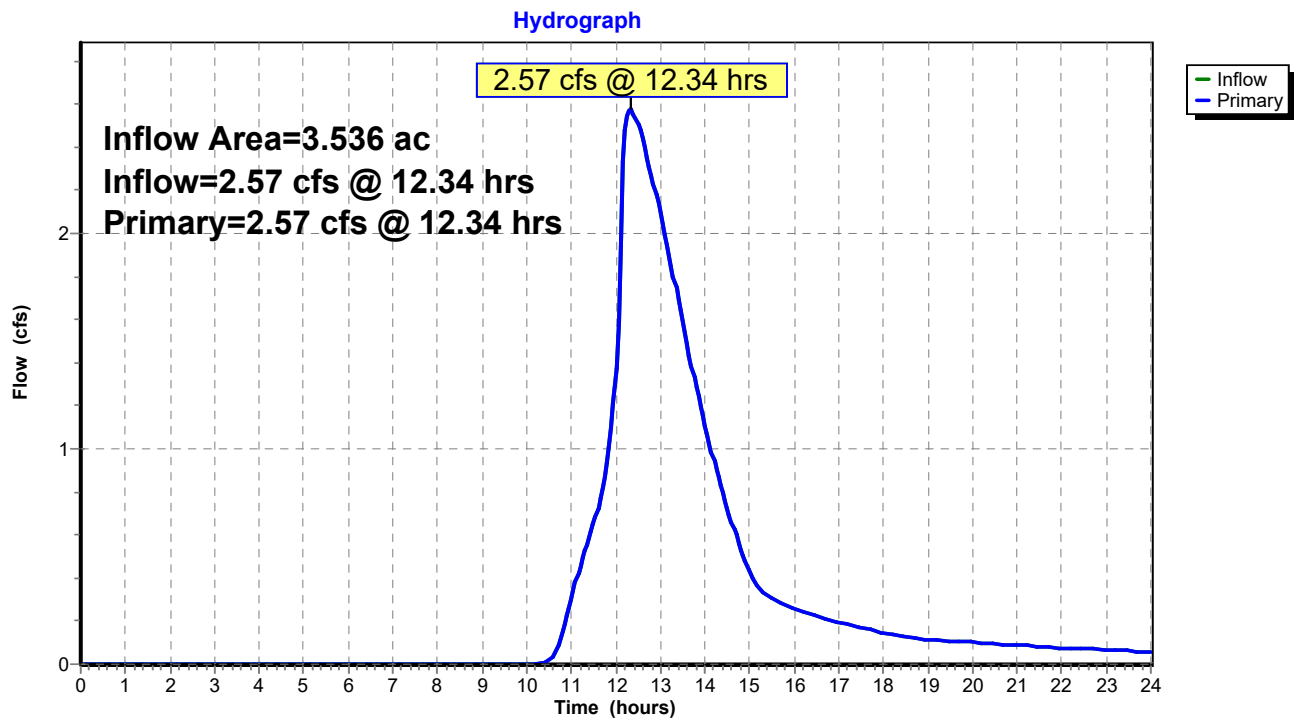
Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link 9L: PRWS-B**Hydrograph**

Summary for Link 10L: Site

Inflow Area = 3.536 ac, 79.52% Impervious, Inflow Depth > 1.87" for 2-yr event
Inflow = 2.57 cfs @ 12.34 hrs, Volume= 0.550 af
Primary = 2.57 cfs @ 12.34 hrs, Volume= 0.550 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link 10L: Site

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WinTR55 NOAA D 10-yr Rainfall=5.22"

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Page 18

Summary for Subcatchment 1S: PRWS-A1

Runoff = 0.37 cfs @ 12.31 hrs, Volume= 0.044 af, Depth> 1.35"
Routed to Link 5L : PRWS-A

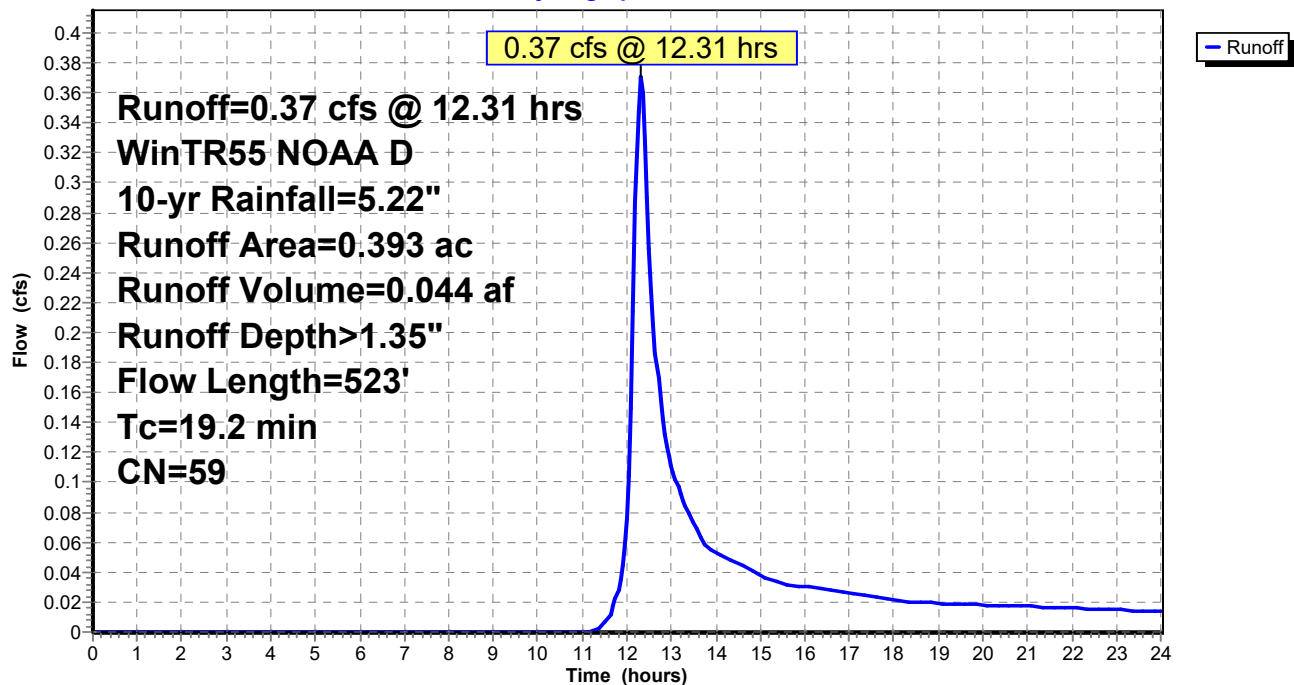
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
WinTR55 NOAA D 10-yr Rainfall=5.22"

Area (ac)	CN	Description
0.340	55	Woods, Good, HSG B
0.036	77	Woods, Good, HSG D
0.000	61	>75% Grass cover, Good, HSG B
0.000	80	>75% Grass cover, Good, HSG D
0.000	98	Paved parking, HSG B
0.017	98	Paved parking, HSG D
0.393	59	Weighted Average
0.376		95.67% Pervious Area
0.017		4.33% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.0	100	0.0160	0.11		Sheet Flow, Wetland
					Grass: Dense n= 0.240 P2= 3.47"
4.2	423	0.0109	1.68		Shallow Concentrated Flow, Grass Slope
					Unpaved Kv= 16.1 fps
19.2	523	Total			

Subcatchment 1S: PRWS-A1

Hydrograph



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WinTR55 NOAA D 10-yr Rainfall=5.22"

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Page 19

Summary for Subcatchment 2S: PRWS-A2

Runoff = 11.23 cfs @ 12.13 hrs, Volume= 0.950 af, Depth> 4.86"
 Routed to Pond 3P : Detention A

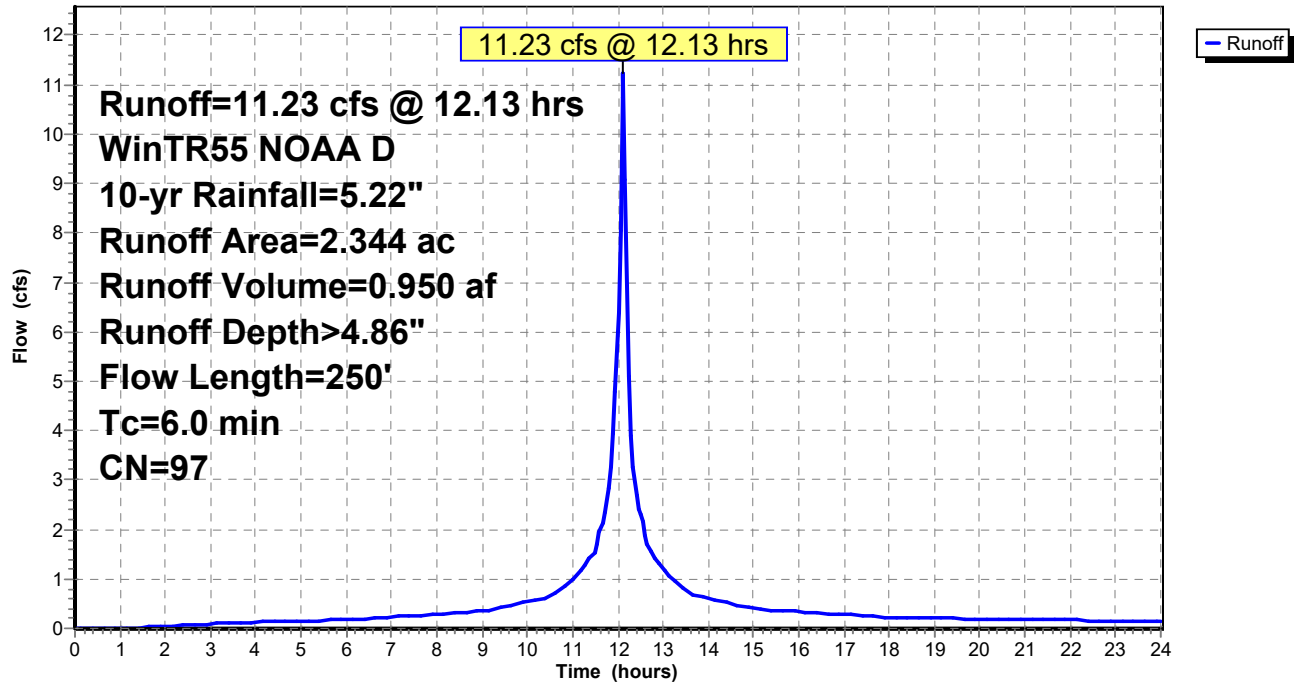
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 WinTR55 NOAA D 10-yr Rainfall=5.22"

Area (ac)	CN	Description
0.000	55	Woods, Good, HSG B
0.000	77	Woods, Good, HSG D
0.020	61	>75% Grass cover, Good, HSG B
0.110	80	>75% Grass cover, Good, HSG D
0.000	98	Paved parking, HSG B
2.214	98	Paved parking, HSG D
2.344	97	Weighted Average
0.130		5.55% Pervious Area
2.214		94.45% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.6	150	0.0200	1.55		Sheet Flow, Parking Lot Smooth surfaces n= 0.011 P2= 3.47"
0.3	50	0.0200	2.87		Shallow Concentrated Flow, Paved Slope Paved Kv= 20.3 fps
0.1	50	0.2500	8.05		Shallow Concentrated Flow, Grassed Slope Unpaved Kv= 16.1 fps
2.0	250	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 2S: PRWS-A2

Hydrograph



Summary for Pond 3P: Detention A

Inflow Area = 2.344 ac, 94.45% Impervious, Inflow Depth > 4.86" for 10-yr event
 Inflow = 11.23 cfs @ 12.13 hrs, Volume= 0.950 af
 Outflow = 7.48 cfs @ 12.21 hrs, Volume= 0.884 af, Atten= 33%, Lag= 5.1 min
 Discarded = 0.06 cfs @ 2.85 hrs, Volume= 0.100 af
 Primary = 7.43 cfs @ 12.21 hrs, Volume= 0.784 af
 Routed to Link 5L : PRWS-A

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 Peak Elev= 97.14' @ 12.21 hrs Surf.Area= 0.065 ac Storage= 0.257 af

Plug-Flow detention time= 93.1 min calculated for 0.882 af (93% of inflow)
 Center-of-Mass det. time= 53.7 min (809.8 - 756.2)

Volume	Invert	Avail.Storage	Storage Description
#1A	91.83'	0.039 af	32.00'W x 88.00'L x 7.17'H Field A 0.463 af Overall - 0.366 af Embedded = 0.097 af x 40.0% Voids
#2A	93.33'	0.287 af	retain_it retain_it 5.0' x 44 Inside #1 Inside= 84.0"W x 60.0"H => 36.41 sf x 8.00'L = 291.3 cf Outside= 96.0"W x 68.0"H => 45.33 sf x 8.00'L = 362.7 cf 4 Rows adjusted for 311.7 cf perimeter wall
#3	98.33'	0.001 af	4.00'D x 5.00'H Vertical Cone/Cylinder
		0.327 af	Total Available Storage

Storage Group A created with Chamber Wizard

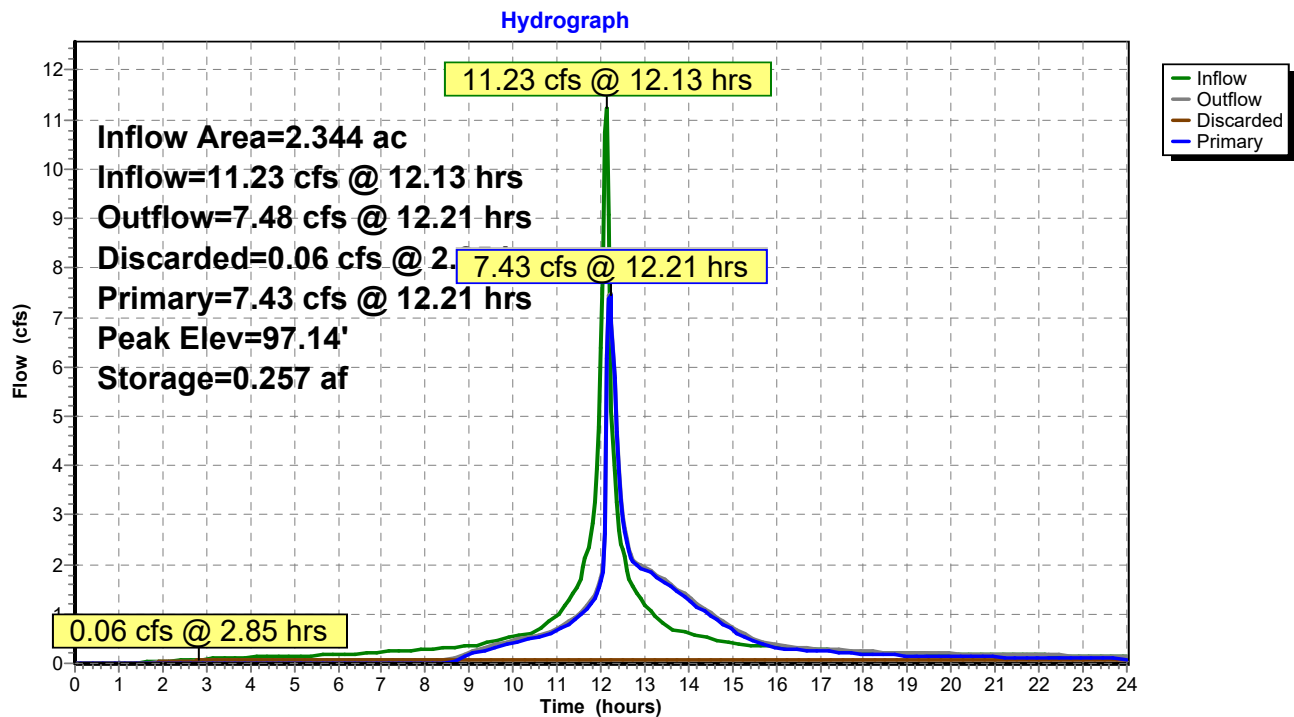
Device	Routing	Invert	Outlet Devices
#1	Primary	92.50'	15.0" Round Culvert L= 38.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 92.50' / 92.14' S= 0.0095 ' S= 0.0095 ' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf
#2	Discarded	91.83'	0.850 in/hr Exfiltration over Horizontal area
#3	Device 1	93.70'	4.0" Vert. Orifice/Grate X 3.00 C= 0.600 Limited to weir flow at low heads
#4	Device 1	96.30'	10.0" Vert. Orifice/Grate X 3.00 C= 0.600 Limited to weir flow at low heads
#5	Device 1	98.10'	4.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)

Discarded OutFlow Max=0.06 cfs @ 2.85 hrs HW=91.95' (Free Discharge)

↑ **2=Exfiltration** (Exfiltration Controls 0.06 cfs)

Primary OutFlow Max=7.30 cfs @ 12.21 hrs HW=97.12' (Free Discharge)

↑ **1=Culvert** (Passes 7.30 cfs of 11.81 cfs potential flow)
 ↑ **3=Orifice/Grate** (Orifice Controls 2.27 cfs @ 8.68 fps)
 ↑ **4=Orifice/Grate** (Orifice Controls 5.03 cfs @ 3.08 fps)
 ↑ **5=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 3P: Detention A

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WinTR55 NOAA D 10-yr Rainfall=5.22"

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Page 23

Summary for Subcatchment 4S: PRWS-A3

Runoff = 0.55 cfs @ 12.13 hrs, Volume= 0.040 af, Depth> 2.99"
 Routed to Link 5L : PRWS-A

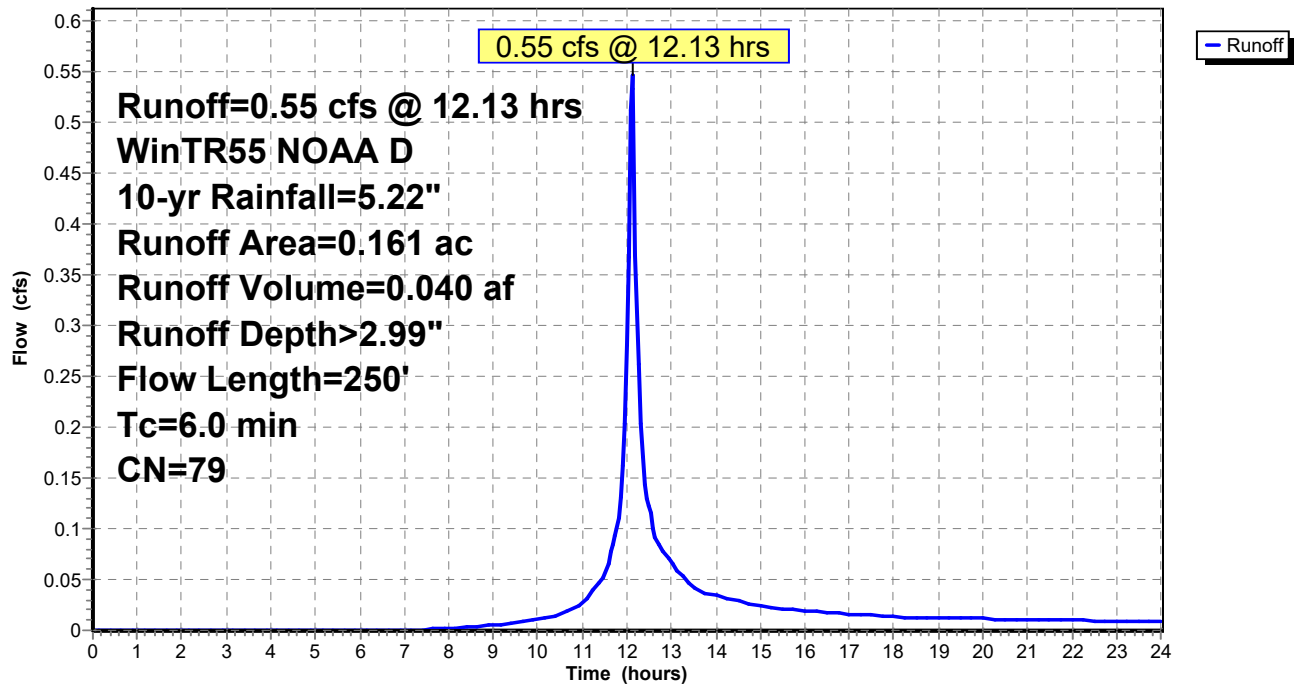
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 WinTR55 NOAA D 10-yr Rainfall=5.22"

Area (ac)	CN	Description
0.000	55	Woods, Good, HSG B
0.000	77	Woods, Good, HSG D
0.007	61	>75% Grass cover, Good, HSG B
0.154	80	>75% Grass cover, Good, HSG D
0.000	98	Paved parking, HSG B
0.000	98	Paved parking, HSG D
0.161	79	Weighted Average
0.161		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.6	150	0.0200	1.55		Sheet Flow, Parking Lot Smooth surfaces n= 0.011 P2= 3.47"
0.3	50	0.0200	2.87		Shallow Concentrated Flow, Paved Slope Paved Kv= 20.3 fps
0.1	50	0.2500	8.05		Shallow Concentrated Flow, Grassed Slope Unpaved Kv= 16.1 fps
2.0	250	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 4S: PRWS-A3

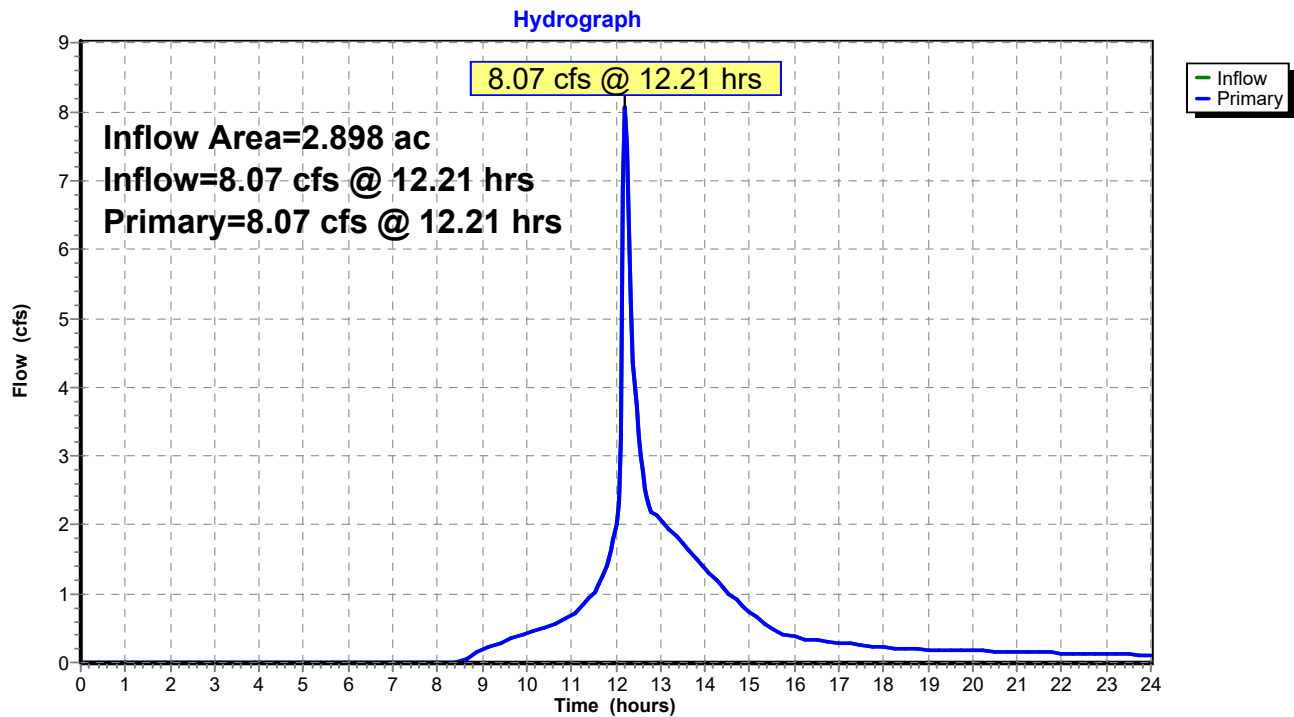
Hydrograph



Summary for Link 5L: PRWS-A

Inflow Area = 2.898 ac, 76.98% Impervious, Inflow Depth > 3.59" for 10-yr event
Inflow = 8.07 cfs @ 12.21 hrs, Volume= 0.868 af
Primary = 8.07 cfs @ 12.21 hrs, Volume= 0.868 af, Atten= 0%, Lag= 0.0 min
Routed to Link 10L : Site

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link 5L: PRWS-A

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WinTR55 NOAA D 10-yr Rainfall=5.22"

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Page 26

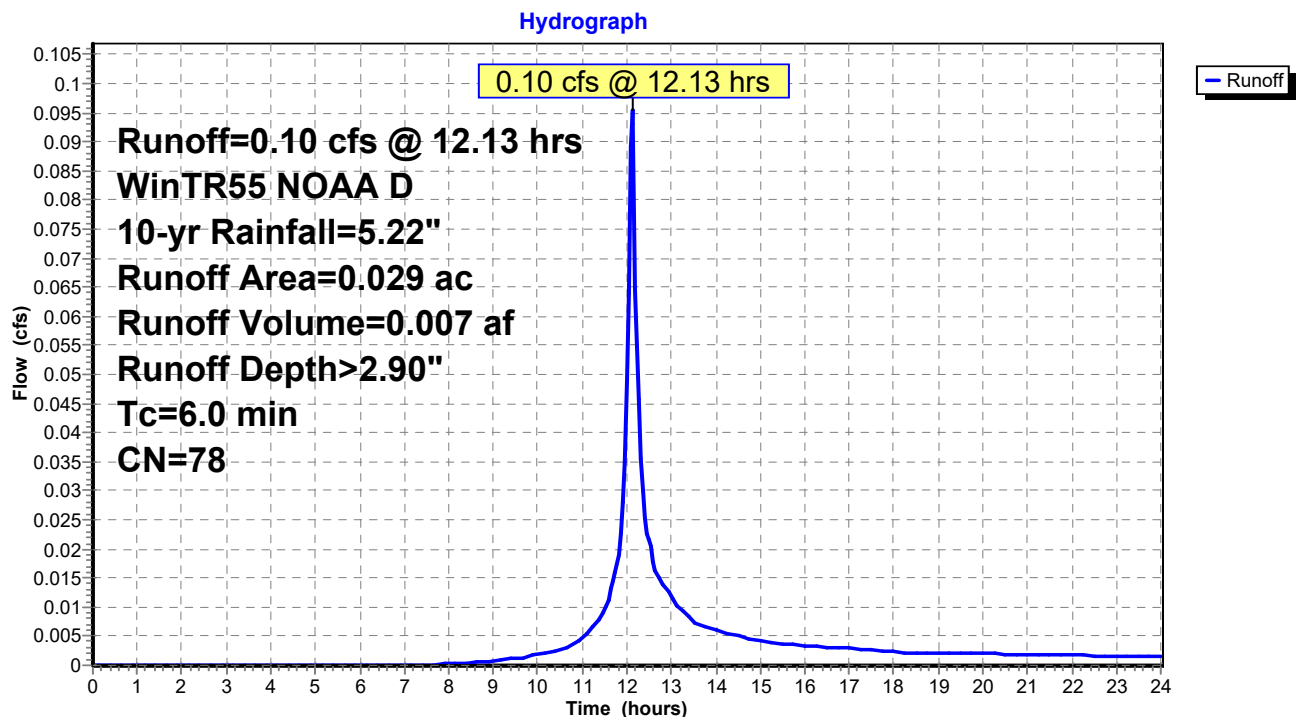
Summary for Subcatchment 6S: PRWS-B1

Runoff = 0.10 cfs @ 12.13 hrs, Volume= 0.007 af, Depth> 2.90"
Routed to Link 9L : PRWS-B

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
WinTR55 NOAA D 10-yr Rainfall=5.22"

Area (ac)	CN	Description
0.000	55	Woods, Good, HSG B
0.020	77	Woods, Good, HSG D
0.000	61	>75% Grass cover, Good, HSG B
0.009	80	>75% Grass cover, Good, HSG D
0.000	98	Paved parking, HSG B
0.000	98	Paved parking, HSG D
0.029	78	Weighted Average
0.029		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry, Min TC
5.0	0				Total, Increased to minimum Tc = 6.0 min

Subcatchment 6S: PRWS-B1

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WinTR55 NOAA D 10-yr Rainfall=5.22"

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Page 27

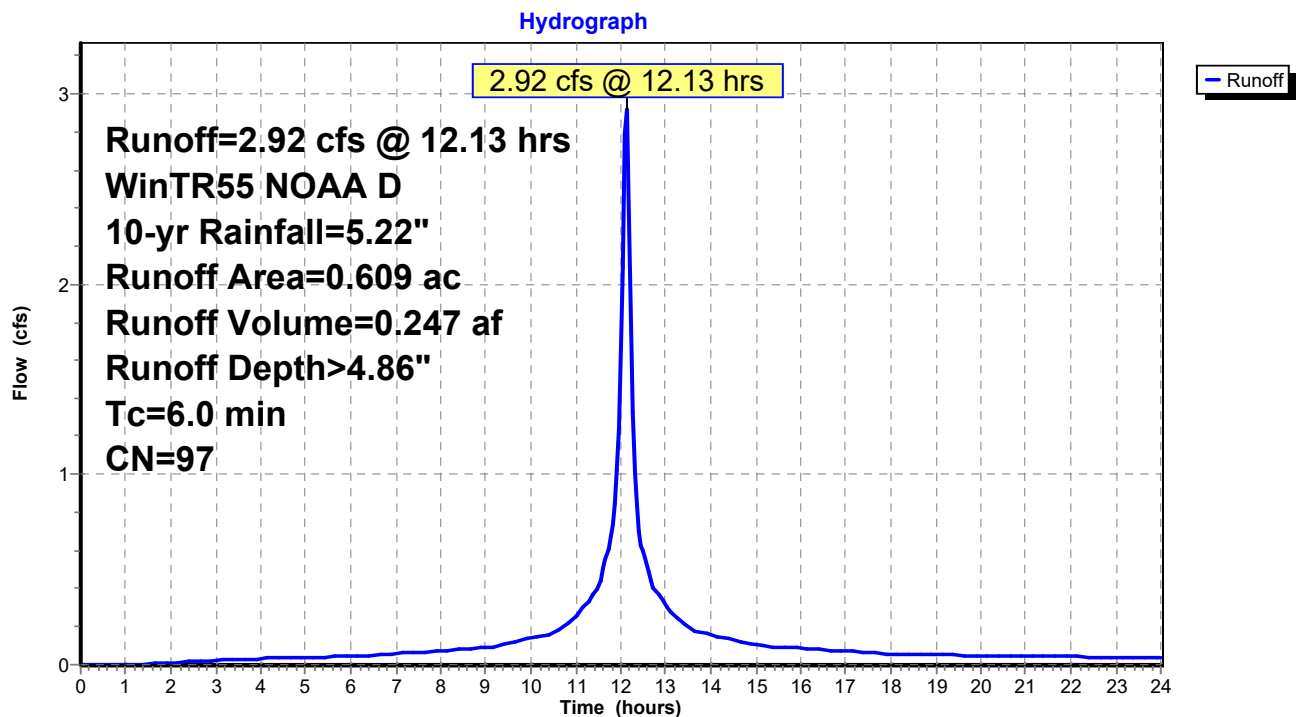
Summary for Subcatchment 7S: PRWS-B2

Runoff = 2.92 cfs @ 12.13 hrs, Volume= 0.247 af, Depth> 4.86"
Routed to Pond 8P : Detention B

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
WinTR55 NOAA D 10-yr Rainfall=5.22"

Area (ac)	CN	Description
0.000	55	Woods, Good, HSG B
0.000	77	Woods, Good, HSG D
0.020	61	>75% Grass cover, Good, HSG B
0.008	80	>75% Grass cover, Good, HSG D
0.000	98	Paved parking, HSG B
0.581	98	Paved parking, HSG D
0.609	97	Weighted Average
0.028		4.60% Pervious Area
0.581		95.40% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry, Min TC
5.0	0				Total, Increased to minimum Tc = 6.0 min

Subcatchment 7S: PRWS-B2

Summary for Pond 8P: Detention B

Inflow Area = 0.609 ac, 95.40% Impervious, Inflow Depth > 4.86" for 10-yr event
 Inflow = 2.92 cfs @ 12.13 hrs, Volume= 0.247 af
 Outflow = 1.48 cfs @ 12.24 hrs, Volume= 0.197 af, Atten= 49%, Lag= 7.0 min
 Discarded = 0.02 cfs @ 3.55 hrs, Volume= 0.040 af
 Primary = 1.45 cfs @ 12.24 hrs, Volume= 0.157 af
 Routed to Link 9L : PRWS-B

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 Peak Elev= 98.36' @ 12.24 hrs Surf.Area= 0.044 ac Storage= 0.095 af

Plug-Flow detention time= 153.3 min calculated for 0.196 af (80% of inflow)
 Center-of-Mass det. time= 70.4 min (826.5 - 756.2)

Volume	Invert	Avail.Storage	Storage Description
#1A	95.60'	0.009 af	24.00'W x 80.00'L x 4.17'H Field A 0.184 af Overall - 0.162 af Embedded = 0.022 af x 40.0% Voids
#2A	96.10'	0.115 af	retain_it retain_it 3.0' x 30 Inside #1 Inside= 84.0"W x 36.0"H => 21.33 sf x 8.00'L = 170.6 cf Outside= 96.0"W x 44.0"H => 29.33 sf x 8.00'L = 234.7 cf 3 Rows adjusted for 122.7 cf perimeter wall
#3	99.10'	0.001 af	4.00'D x 2.00'H Vertical Cone/Cylinder
		0.124 af	Total Available Storage

Storage Group A created with Chamber Wizard

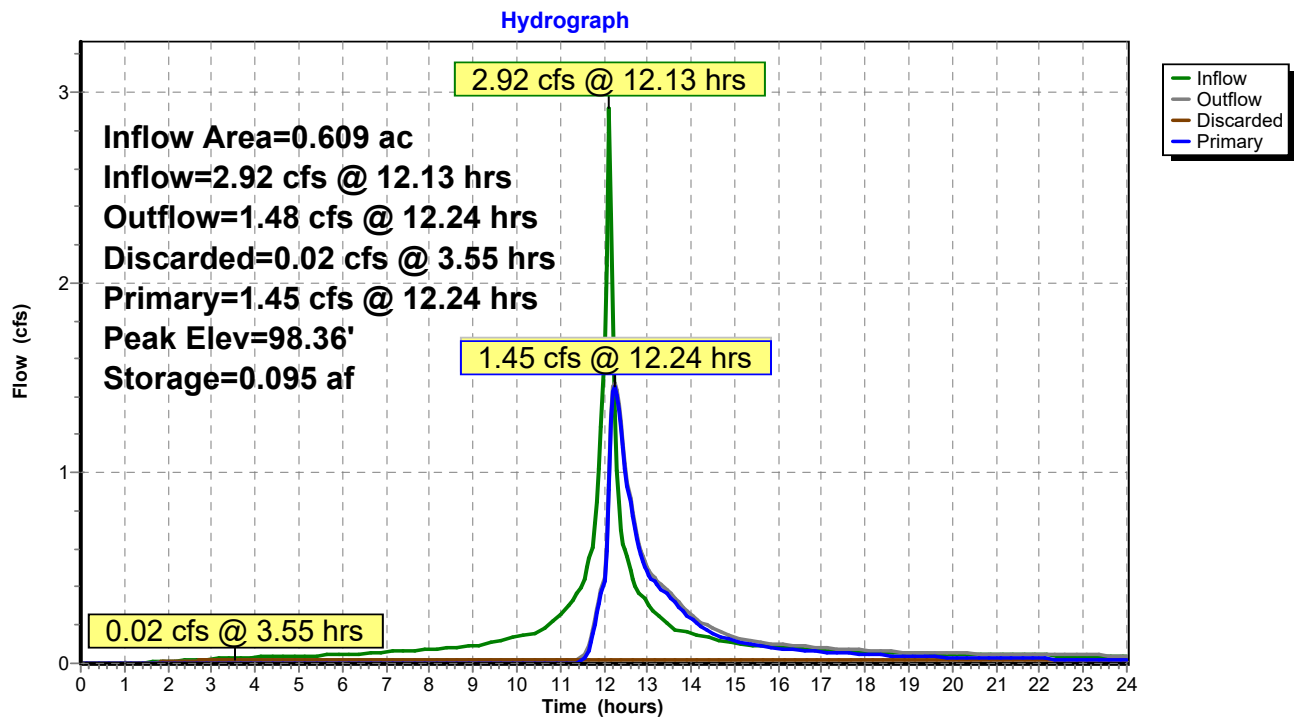
Device	Routing	Invert	Outlet Devices
#1	Primary	97.10'	12.0" Round Culvert L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 97.10' / 97.00' S= 0.0100 ' S= 0.0100 ' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2	Discarded	95.60'	0.500 in/hr Exfiltration over Horizontal area
#3	Device 1	97.10'	5.0" Vert. 2-yr Orifice C= 0.600 Limited to weir flow at low heads
#4	Device 1	97.70'	7.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.02 cfs @ 3.55 hrs HW=95.66' (Free Discharge)

↑ **2=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=1.45 cfs @ 12.24 hrs HW=98.36' (Free Discharge)

↑ **1=Culvert** (Passes 1.45 cfs of 2.99 cfs potential flow)
 ↑ **3=2-yr Orifice** (Orifice Controls 0.67 cfs @ 4.93 fps)
 ↑ **4=Orifice/Grate** (Orifice Controls 0.78 cfs @ 2.91 fps)

Pond 8P: Detention B

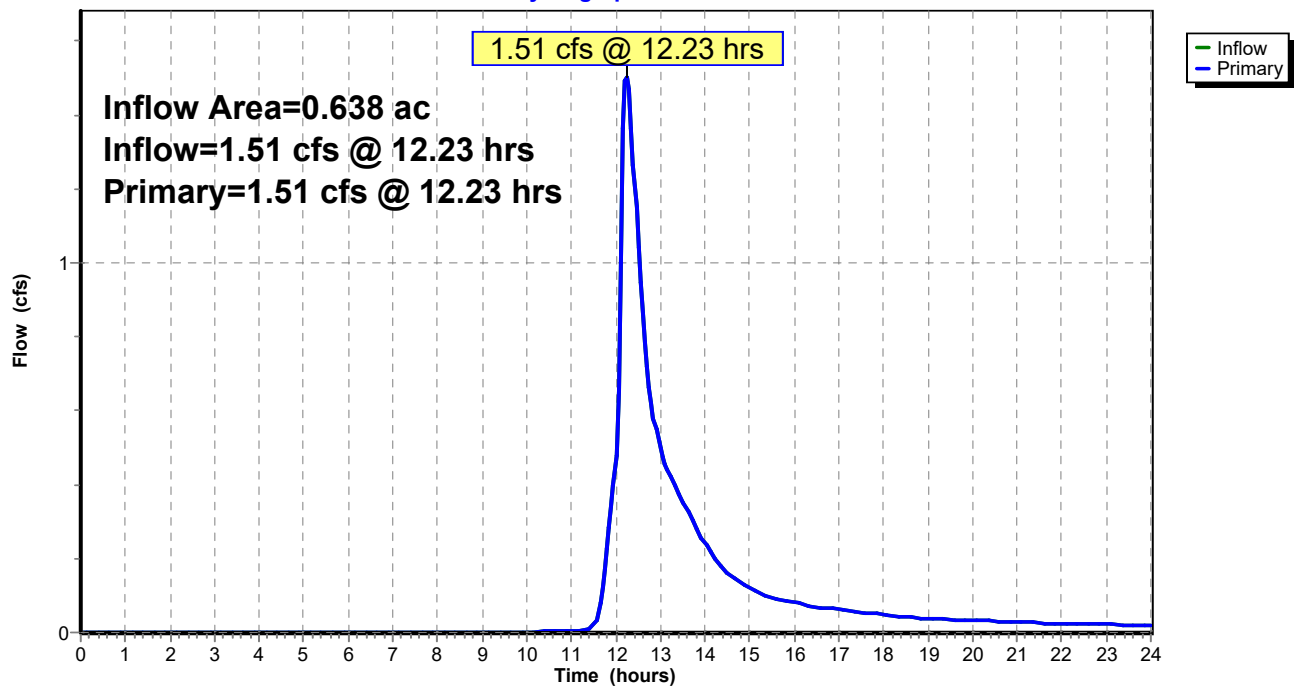
Summary for Link 9L: PRWS-B

Inflow Area = 0.638 ac, 91.07% Impervious, Inflow Depth > 3.09" for 10-yr event
Inflow = 1.51 cfs @ 12.23 hrs, Volume= 0.164 af
Primary = 1.51 cfs @ 12.23 hrs, Volume= 0.164 af, Atten= 0%, Lag= 0.0 min
Routed to Link 10L : Site

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link 9L: PRWS-B

Hydrograph

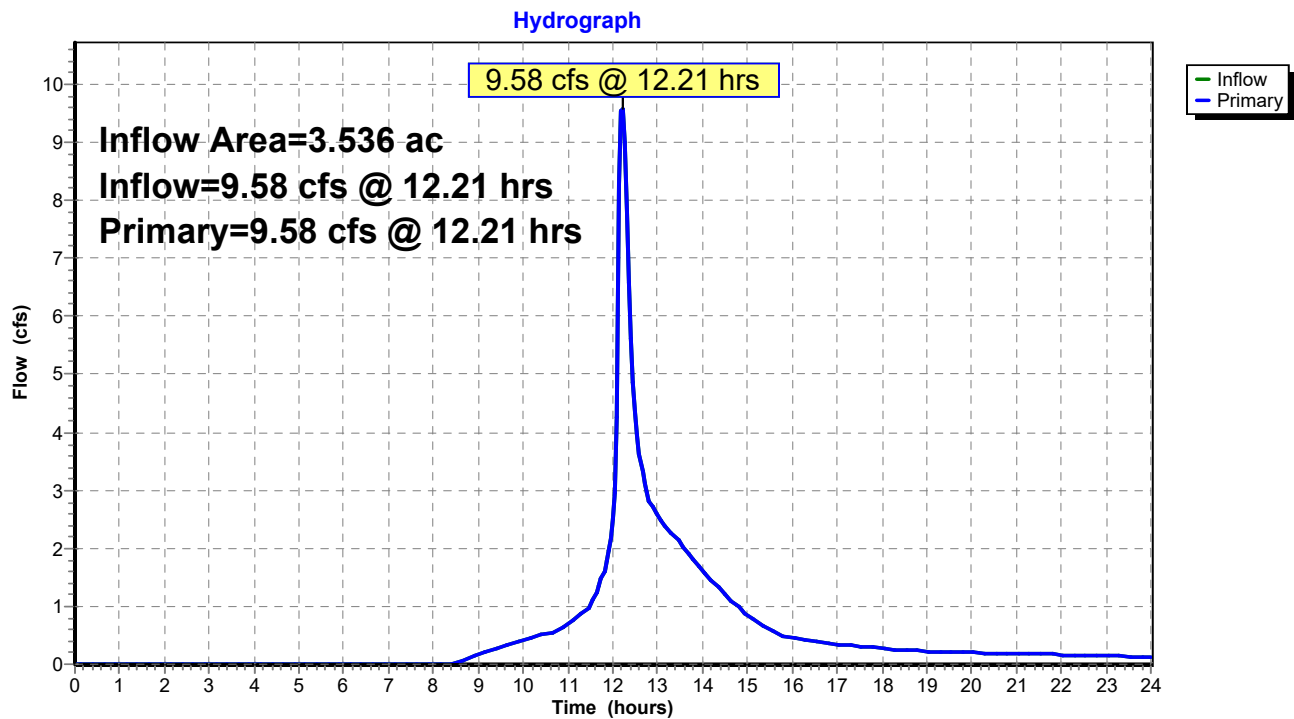


Summary for Link 10L: Site

Inflow Area = 3.536 ac, 79.52% Impervious, Inflow Depth > 3.50" for 10-yr event
Inflow = 9.58 cfs @ 12.21 hrs, Volume= 1.032 af
Primary = 9.58 cfs @ 12.21 hrs, Volume= 1.032 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link 10L: Site



Summary for Subcatchment 1S: PRWS-A1

Runoff = 0.59 cfs @ 12.30 hrs, Volume= 0.067 af, Depth> 2.05"
 Routed to Link 5L : PRWS-A

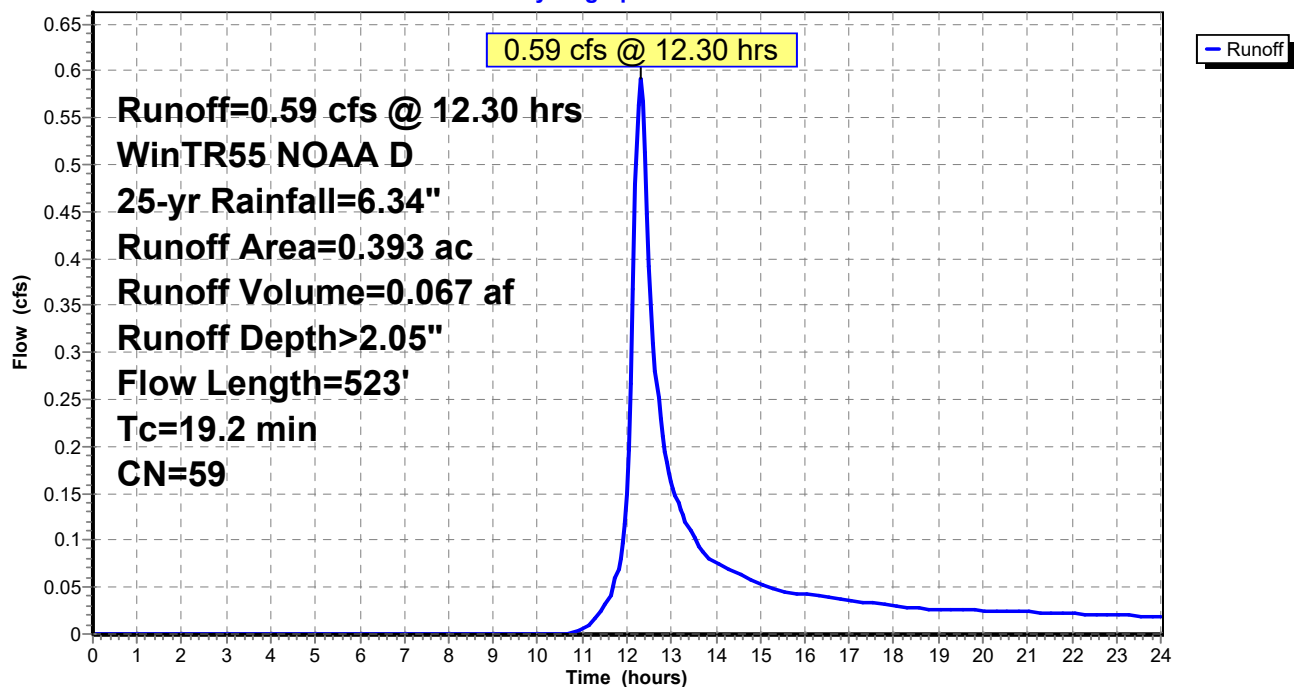
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 WinTR55 NOAA D 25-yr Rainfall=6.34"

Area (ac)	CN	Description
0.340	55	Woods, Good, HSG B
0.036	77	Woods, Good, HSG D
0.000	61	>75% Grass cover, Good, HSG B
0.000	80	>75% Grass cover, Good, HSG D
0.000	98	Paved parking, HSG B
0.017	98	Paved parking, HSG D
0.393	59	Weighted Average
0.376		95.67% Pervious Area
0.017		4.33% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.0	100	0.0160	0.11		Sheet Flow, Wetland
					Grass: Dense n= 0.240 P2= 3.47"
4.2	423	0.0109	1.68		Shallow Concentrated Flow, Grass Slope
					Unpaved Kv= 16.1 fps
19.2	523	Total			

Subcatchment 1S: PRWS-A1

Hydrograph



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WinTR55 NOAA D 25-yr Rainfall=6.34"

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Page 33

Summary for Subcatchment 2S: PRWS-A2

Runoff = 13.69 cfs @ 12.13 hrs, Volume= 1.168 af, Depth> 5.98"
 Routed to Pond 3P : Detention A

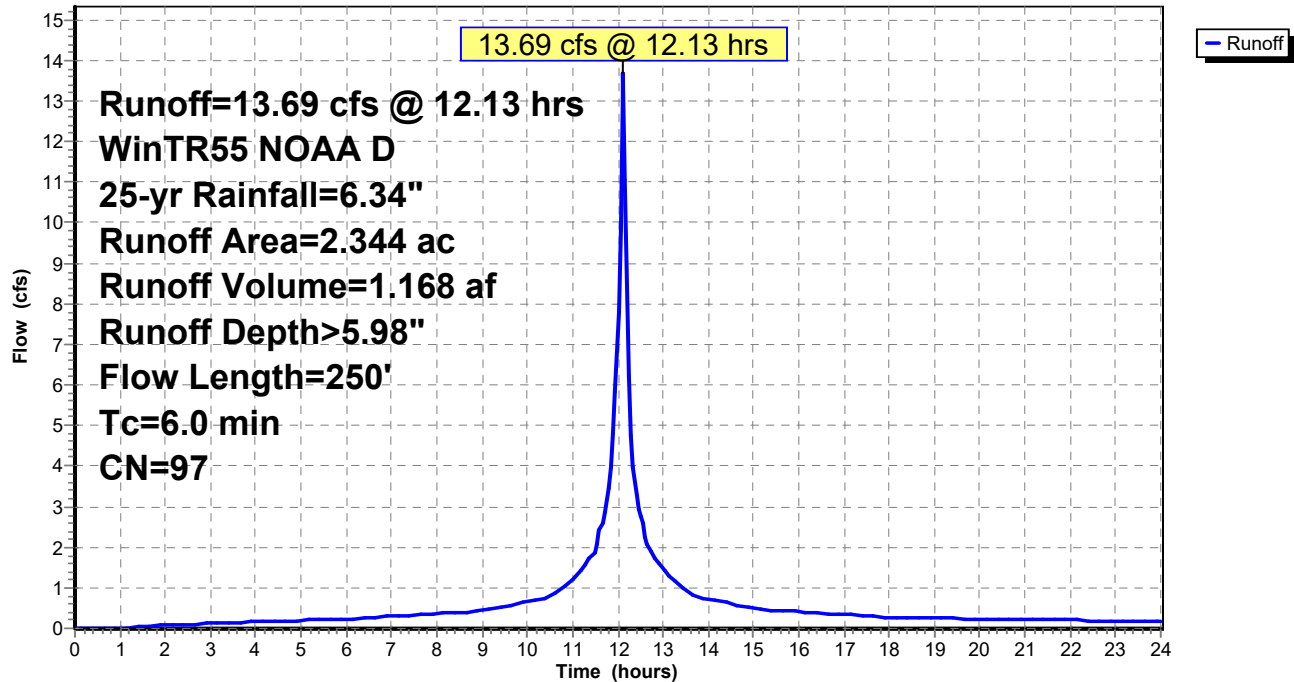
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 WinTR55 NOAA D 25-yr Rainfall=6.34"

Area (ac)	CN	Description
0.000	55	Woods, Good, HSG B
0.000	77	Woods, Good, HSG D
0.020	61	>75% Grass cover, Good, HSG B
0.110	80	>75% Grass cover, Good, HSG D
0.000	98	Paved parking, HSG B
2.214	98	Paved parking, HSG D
2.344	97	Weighted Average
0.130		5.55% Pervious Area
2.214		94.45% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.6	150	0.0200	1.55		Sheet Flow, Parking Lot Smooth surfaces n= 0.011 P2= 3.47"
0.3	50	0.0200	2.87		Shallow Concentrated Flow, Paved Slope Paved Kv= 20.3 fps
0.1	50	0.2500	8.05		Shallow Concentrated Flow, Grassed Slope Unpaved Kv= 16.1 fps
2.0	250	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 2S: PRWS-A2

Hydrograph



Summary for Pond 3P: Detention A

Inflow Area = 2.344 ac, 94.45% Impervious, Inflow Depth > 5.98" for 25-yr event
 Inflow = 13.69 cfs @ 12.13 hrs, Volume= 1.168 af
 Outflow = 9.68 cfs @ 12.20 hrs, Volume= 1.101 af, Atten= 29%, Lag= 4.4 min
 Discarded = 0.06 cfs @ 2.35 hrs, Volume= 0.102 af
 Primary = 9.63 cfs @ 12.20 hrs, Volume= 0.999 af
 Routed to Link 5L : PRWS-A

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 Peak Elev= 97.55' @ 12.20 hrs Surf.Area= 0.065 ac Storage= 0.281 af

Plug-Flow detention time= 84.1 min calculated for 1.099 af (94% of inflow)
 Center-of-Mass det. time= 50.4 min (802.5 - 752.1)

Volume	Invert	Avail.Storage	Storage Description
#1A	91.83'	0.039 af	32.00'W x 88.00'L x 7.17'H Field A 0.463 af Overall - 0.366 af Embedded = 0.097 af x 40.0% Voids
#2A	93.33'	0.287 af	retain_it retain_it 5.0' x 44 Inside #1 Inside= 84.0"W x 60.0"H => 36.41 sf x 8.00'L = 291.3 cf Outside= 96.0"W x 68.0"H => 45.33 sf x 8.00'L = 362.7 cf 4 Rows adjusted for 311.7 cf perimeter wall
#3	98.33'	0.001 af	4.00'D x 5.00'H Vertical Cone/Cylinder
		0.327 af	Total Available Storage

Storage Group A created with Chamber Wizard

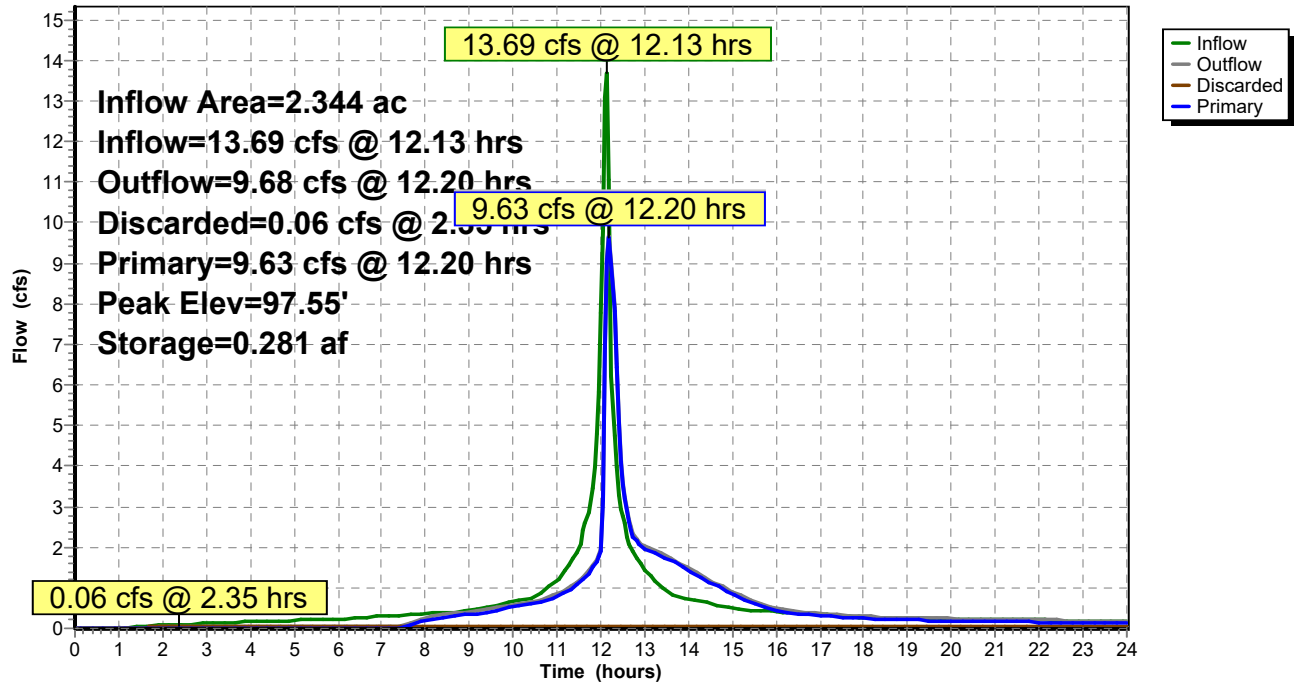
Device	Routing	Invert	Outlet Devices
#1	Primary	92.50'	15.0" Round Culvert L= 38.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 92.50' / 92.14' S= 0.0095 ' S= 0.0095 ' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf
#2	Discarded	91.83'	0.850 in/hr Exfiltration over Horizontal area
#3	Device 1	93.70'	4.0" Vert. Orifice/Grate X 3.00 C= 0.600 Limited to weir flow at low heads
#4	Device 1	96.30'	10.0" Vert. Orifice/Grate X 3.00 C= 0.600 Limited to weir flow at low heads
#5	Device 1	98.10'	4.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)

Discarded OutFlow Max=0.06 cfs @ 2.35 hrs HW=91.95' (Free Discharge)

↑ **2=Exfiltration** (Exfiltration Controls 0.06 cfs)

Primary OutFlow Max=9.62 cfs @ 12.20 hrs HW=97.55' (Free Discharge)

↑ **1=Culvert** (Passes 9.62 cfs of 12.43 cfs potential flow)
 ↑ **3=Orifice/Grate** (Orifice Controls 2.42 cfs @ 9.24 fps)
 ↑ **4=Orifice/Grate** (Orifice Controls 7.20 cfs @ 4.40 fps)
 ↑ **5=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 3P: Detention A**Hydrograph**

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WinTR55 NOAA D 25-yr Rainfall=6.34"

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Page 37

Summary for Subcatchment 4S: PRWS-A3

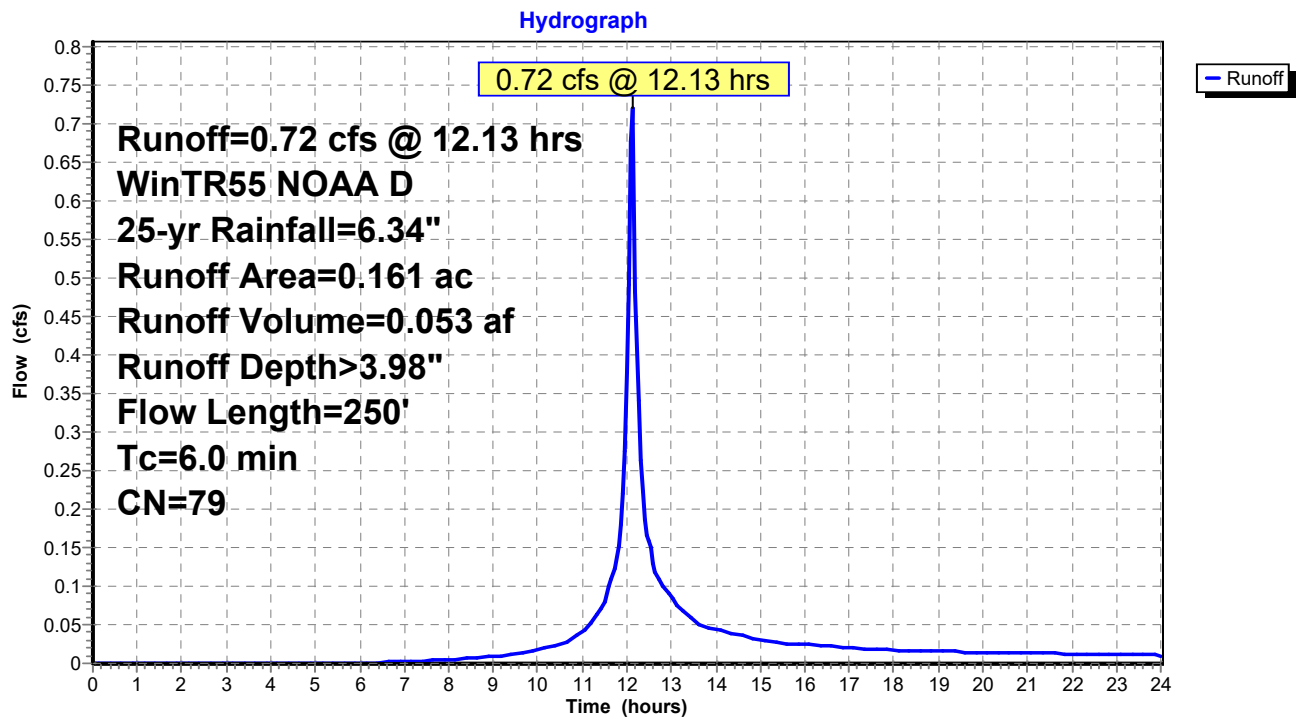
Runoff = 0.72 cfs @ 12.13 hrs, Volume= 0.053 af, Depth> 3.98"
 Routed to Link 5L : PRWS-A

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 WinTR55 NOAA D 25-yr Rainfall=6.34"

Area (ac)	CN	Description
0.000	55	Woods, Good, HSG B
0.000	77	Woods, Good, HSG D
0.007	61	>75% Grass cover, Good, HSG B
0.154	80	>75% Grass cover, Good, HSG D
0.000	98	Paved parking, HSG B
0.000	98	Paved parking, HSG D
0.161	79	Weighted Average
0.161		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.6	150	0.0200	1.55		Sheet Flow, Parking Lot Smooth surfaces n= 0.011 P2= 3.47"
0.3	50	0.0200	2.87		Shallow Concentrated Flow, Paved Slope Paved Kv= 20.3 fps
0.1	50	0.2500	8.05		Shallow Concentrated Flow, Grassed Slope Unpaved Kv= 16.1 fps
2.0	250	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 4S: PRWS-A3



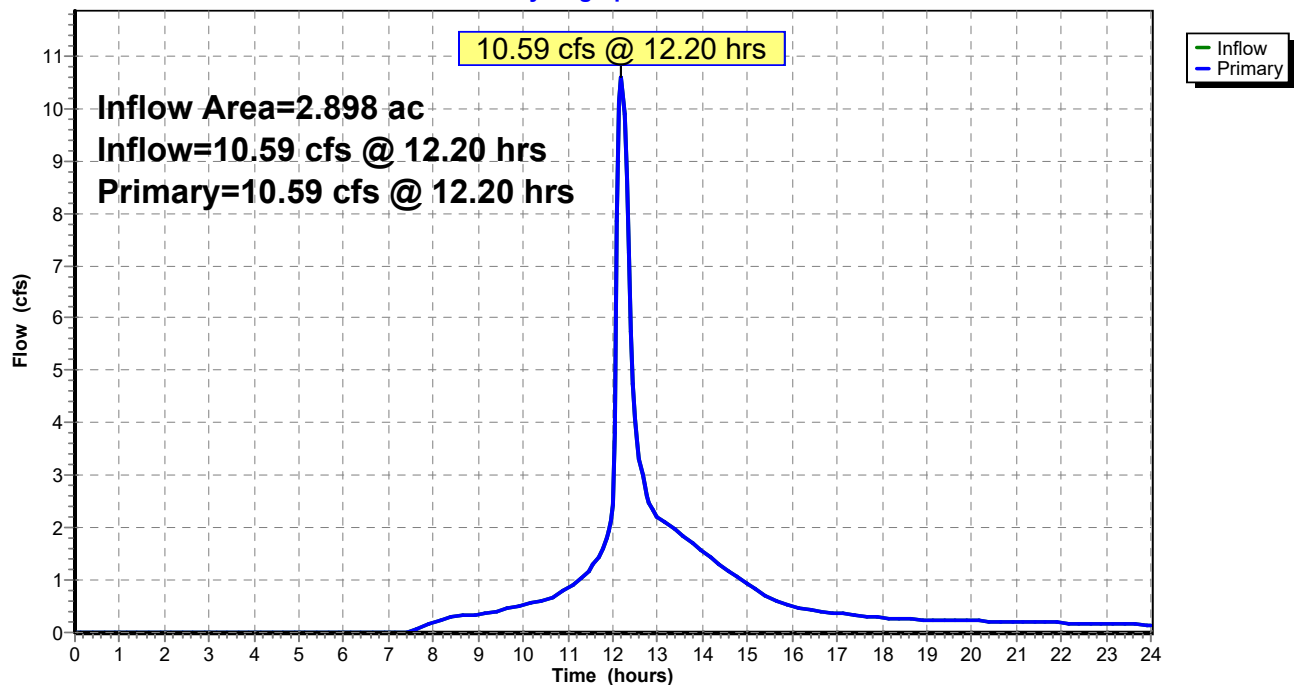
Summary for Link 5L: PRWS-A

Inflow Area = 2.898 ac, 76.98% Impervious, Inflow Depth > 4.63" for 25-yr event
Inflow = 10.59 cfs @ 12.20 hrs, Volume= 1.119 af
Primary = 10.59 cfs @ 12.20 hrs, Volume= 1.119 af, Atten= 0%, Lag= 0.0 min
Routed to Link 10L : Site

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link 5L: PRWS-A

Hydrograph



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WinTR55 NOAA D 25-yr Rainfall=6.34"

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Page 40

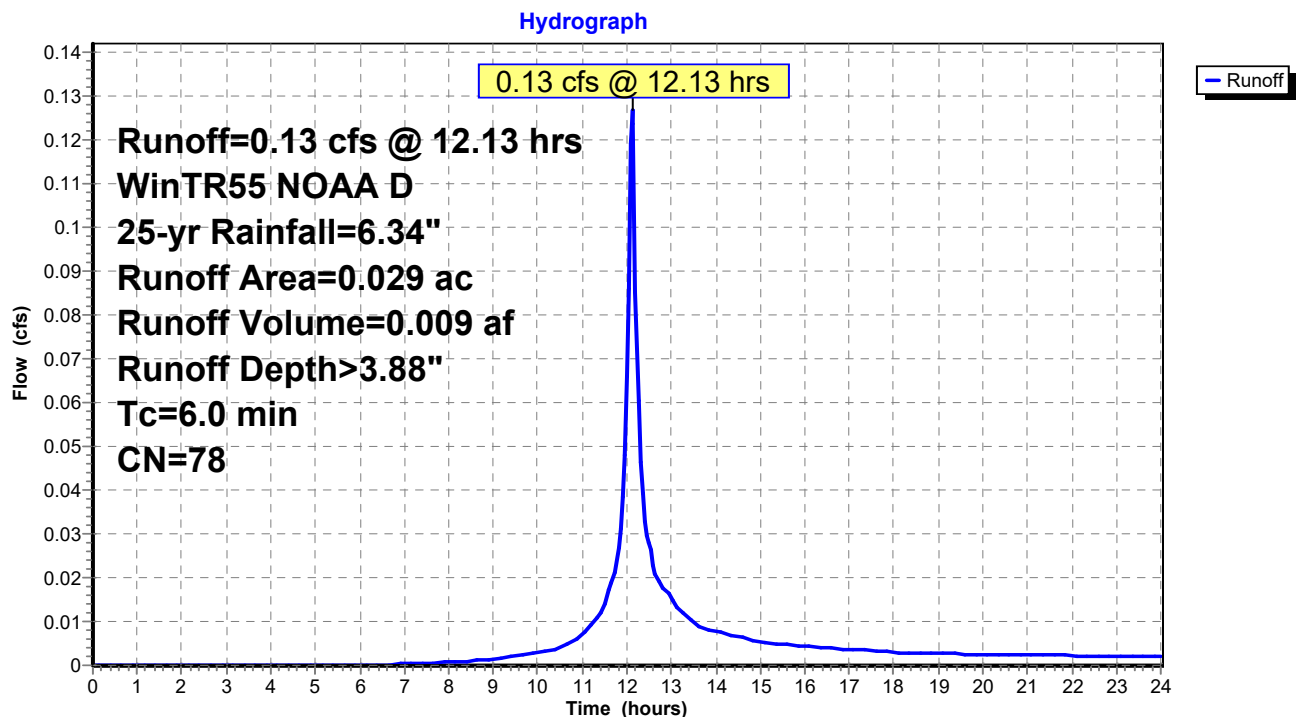
Summary for Subcatchment 6S: PRWS-B1

Runoff = 0.13 cfs @ 12.13 hrs, Volume= 0.009 af, Depth> 3.88"
Routed to Link 9L : PRWS-B

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
WinTR55 NOAA D 25-yr Rainfall=6.34"

Area (ac)	CN	Description
0.000	55	Woods, Good, HSG B
0.020	77	Woods, Good, HSG D
0.000	61	>75% Grass cover, Good, HSG B
0.009	80	>75% Grass cover, Good, HSG D
0.000	98	Paved parking, HSG B
0.000	98	Paved parking, HSG D
0.029	78	Weighted Average
0.029		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry, Min TC
5.0	0				Total, Increased to minimum Tc = 6.0 min

Subcatchment 6S: PRWS-B1

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WinTR55 NOAA D 25-yr Rainfall=6.34"

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Page 41

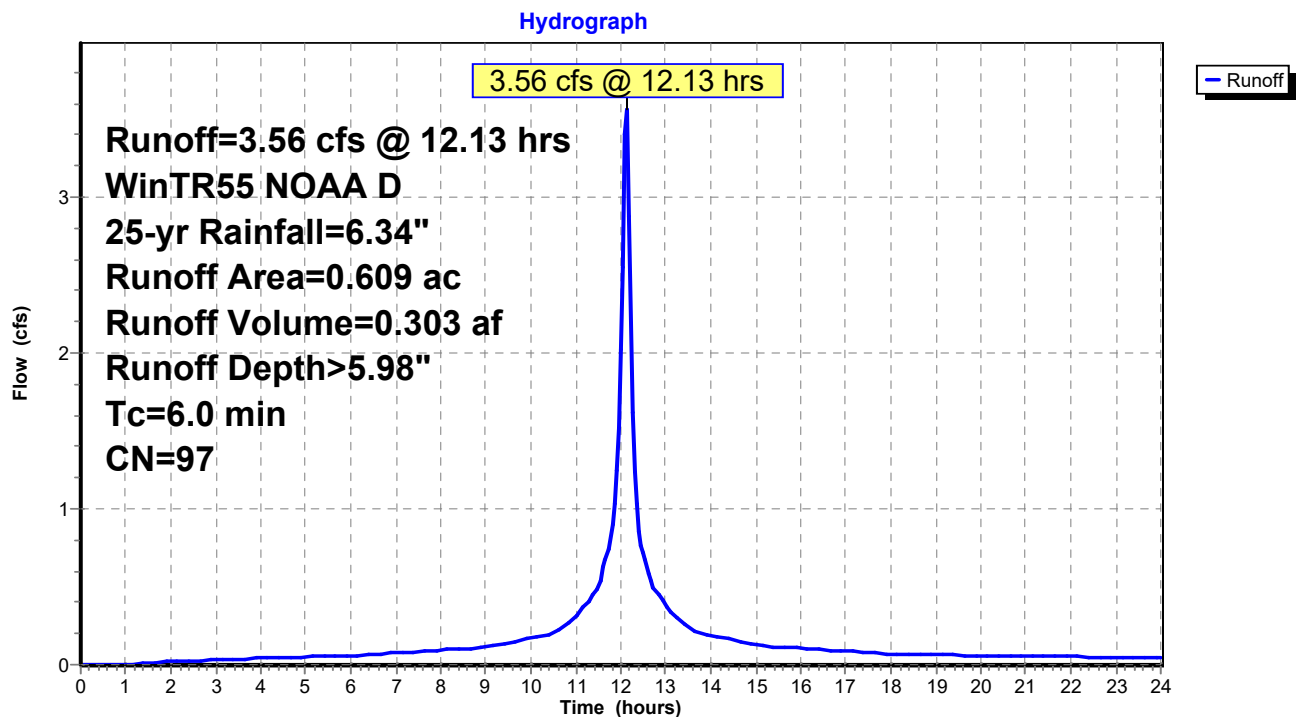
Summary for Subcatchment 7S: PRWS-B2

Runoff = 3.56 cfs @ 12.13 hrs, Volume= 0.303 af, Depth> 5.98"
Routed to Pond 8P : Detention B

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
WinTR55 NOAA D 25-yr Rainfall=6.34"

Area (ac)	CN	Description
0.000	55	Woods, Good, HSG B
0.000	77	Woods, Good, HSG D
0.020	61	>75% Grass cover, Good, HSG B
0.008	80	>75% Grass cover, Good, HSG D
0.000	98	Paved parking, HSG B
0.581	98	Paved parking, HSG D
0.609	97	Weighted Average
0.028		4.60% Pervious Area
0.581		95.40% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry, Min TC
5.0	0				Total, Increased to minimum Tc = 6.0 min

Subcatchment 7S: PRWS-B2

Summary for Pond 8P: Detention B

Inflow Area = 0.609 ac, 95.40% Impervious, Inflow Depth > 5.98" for 25-yr event
 Inflow = 3.56 cfs @ 12.13 hrs, Volume= 0.303 af
 Outflow = 1.84 cfs @ 12.24 hrs, Volume= 0.253 af, Atten= 48%, Lag= 6.7 min
 Discarded = 0.02 cfs @ 2.80 hrs, Volume= 0.041 af
 Primary = 1.81 cfs @ 12.24 hrs, Volume= 0.212 af
 Routed to Link 9L : PRWS-B

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 Peak Elev= 98.66' @ 12.24 hrs Surf.Area= 0.044 ac Storage= 0.107 af

Plug-Flow detention time= 143.1 min calculated for 0.252 af (83% of inflow)
 Center-of-Mass det. time= 68.6 min (820.7 - 752.1)

Volume	Invert	Avail.Storage	Storage Description
#1A	95.60'	0.009 af	24.00'W x 80.00'L x 4.17'H Field A 0.184 af Overall - 0.162 af Embedded = 0.022 af x 40.0% Voids
#2A	96.10'	0.115 af	retain_it retain_it 3.0' x 30 Inside #1 Inside= 84.0"W x 36.0"H => 21.33 sf x 8.00'L = 170.6 cf Outside= 96.0"W x 44.0"H => 29.33 sf x 8.00'L = 234.7 cf 3 Rows adjusted for 122.7 cf perimeter wall
#3	99.10'	0.001 af	4.00'D x 2.00'H Vertical Cone/Cylinder
		0.124 af	Total Available Storage

Storage Group A created with Chamber Wizard

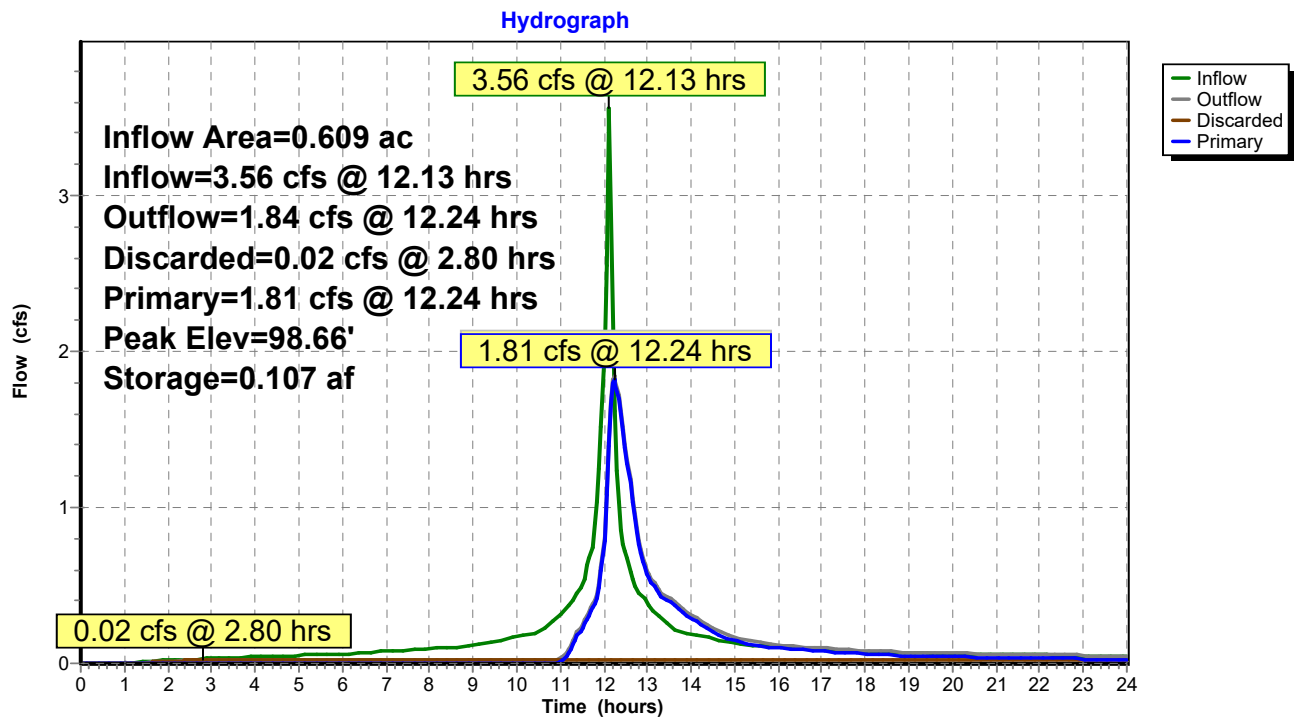
Device	Routing	Invert	Outlet Devices
#1	Primary	97.10'	12.0" Round Culvert L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 97.10' / 97.00' S= 0.0100 ' S= 0.0100 ' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2	Discarded	95.60'	0.500 in/hr Exfiltration over Horizontal area
#3	Device 1	97.10'	5.0" Vert. 2-yr Orifice C= 0.600 Limited to weir flow at low heads
#4	Device 1	97.70'	7.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.02 cfs @ 2.80 hrs HW=95.66' (Free Discharge)

↑ **2=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=1.81 cfs @ 12.24 hrs HW=98.65' (Free Discharge)

↑ **1=Culvert** (Passes 1.81 cfs of 3.78 cfs potential flow)
 ↑ **3=2-yr Orifice** (Orifice Controls 0.76 cfs @ 5.59 fps)
 ↑ **4=Orifice/Grate** (Orifice Controls 1.05 cfs @ 3.92 fps)

Pond 8P: Detention B

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WinTR55 NOAA D 25-yr Rainfall=6.34"

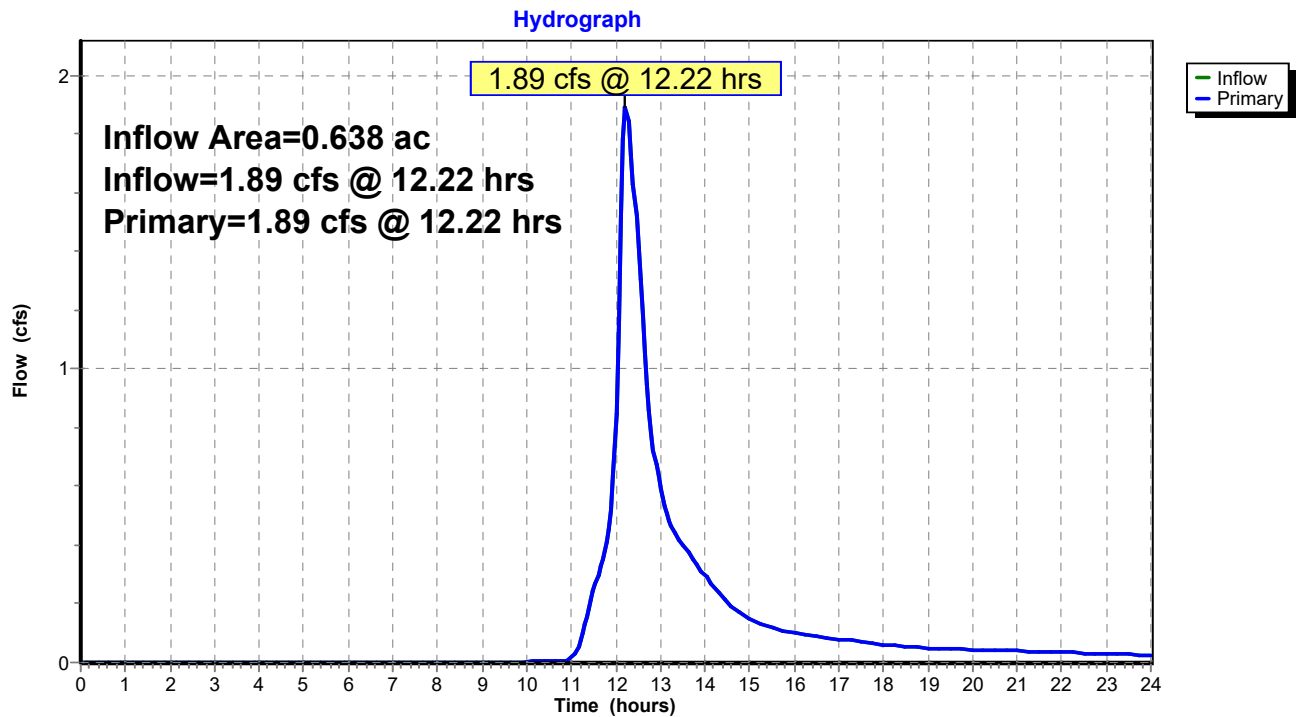
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Page 44

Summary for Link 9L: PRWS-B

Inflow Area = 0.638 ac, 91.07% Impervious, Inflow Depth > 4.17" for 25-yr event
Inflow = 1.89 cfs @ 12.22 hrs, Volume= 0.222 af
Primary = 1.89 cfs @ 12.22 hrs, Volume= 0.222 af, Atten= 0%, Lag= 0.0 min
Routed to Link 10L : Site

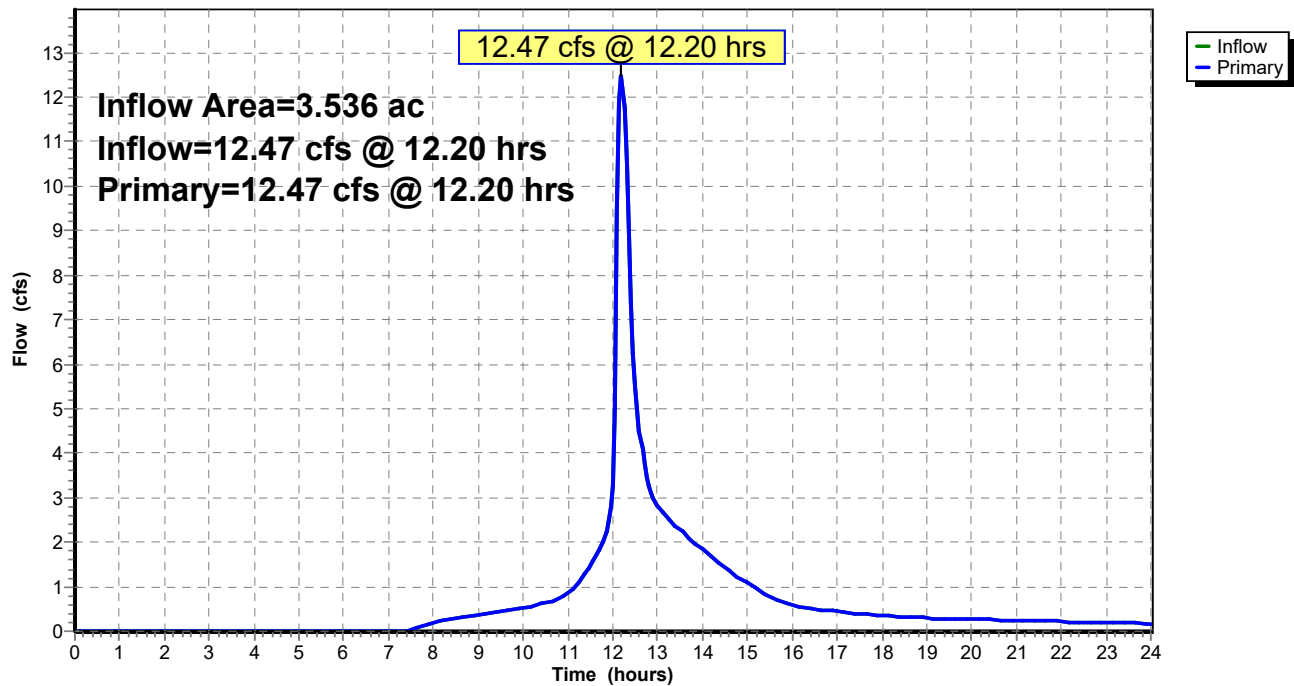
Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link 9L: PRWS-B

Summary for Link 10L: Site

Inflow Area = 3.536 ac, 79.52% Impervious, Inflow Depth > 4.55" for 25-yr event
Inflow = 12.47 cfs @ 12.20 hrs, Volume= 1.341 af
Primary = 12.47 cfs @ 12.20 hrs, Volume= 1.341 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link 10L: Site**Hydrograph**

Summary for Subcatchment 1S: PRWS-A1

Runoff = 0.77 cfs @ 12.30 hrs, Volume= 0.085 af, Depth> 2.61"
 Routed to Link 5L : PRWS-A

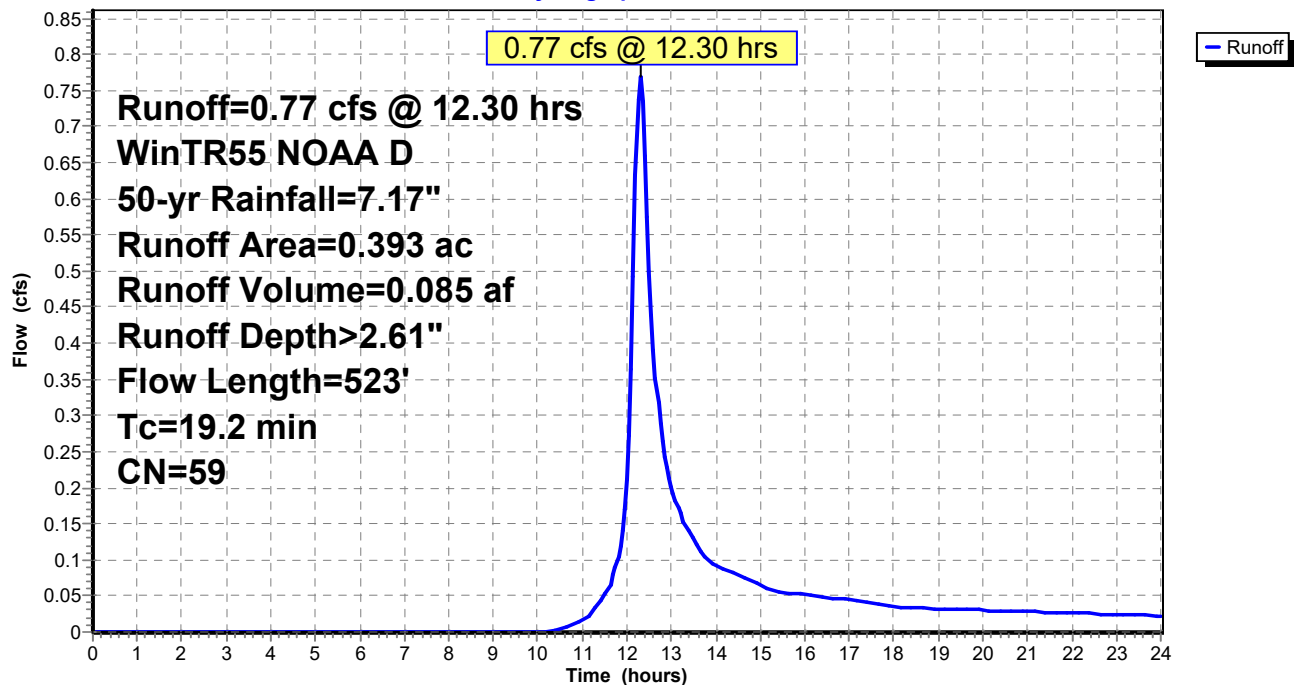
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 WinTR55 NOAA D 50-yr Rainfall=7.17"

Area (ac)	CN	Description
0.340	55	Woods, Good, HSG B
0.036	77	Woods, Good, HSG D
0.000	61	>75% Grass cover, Good, HSG B
0.000	80	>75% Grass cover, Good, HSG D
0.000	98	Paved parking, HSG B
0.017	98	Paved parking, HSG D
0.393	59	Weighted Average
0.376		95.67% Pervious Area
0.017		4.33% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.0	100	0.0160	0.11		Sheet Flow, Wetland
					Grass: Dense n= 0.240 P2= 3.47"
4.2	423	0.0109	1.68		Shallow Concentrated Flow, Grass Slope
					Unpaved Kv= 16.1 fps
19.2	523	Total			

Subcatchment 1S: PRWS-A1

Hydrograph



MDA PR.

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WinTR55 NOAA D 50-yr Rainfall=7.17"

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Page 47

Summary for Subcatchment 2S: PRWS-A2

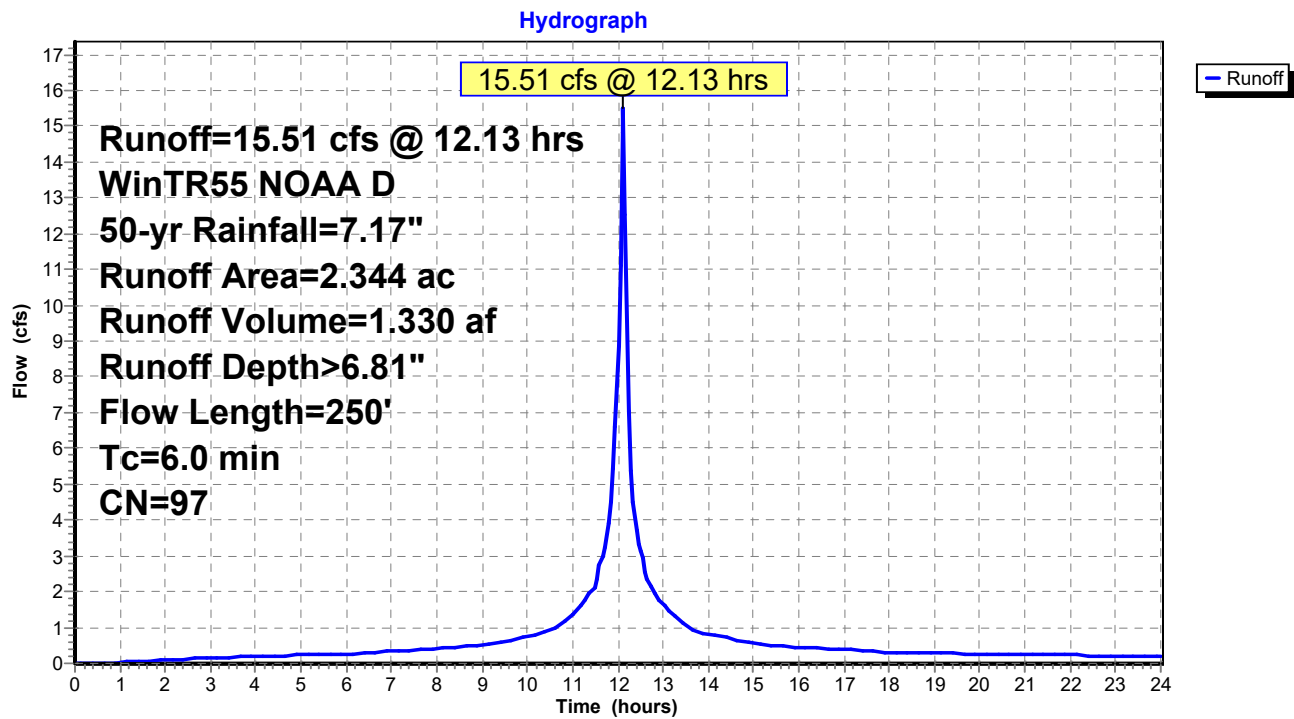
Runoff = 15.51 cfs @ 12.13 hrs, Volume= 1.330 af, Depth> 6.81"
 Routed to Pond 3P : Detention A

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 WinTR55 NOAA D 50-yr Rainfall=7.17"

Area (ac)	CN	Description
0.000	55	Woods, Good, HSG B
0.000	77	Woods, Good, HSG D
0.020	61	>75% Grass cover, Good, HSG B
0.110	80	>75% Grass cover, Good, HSG D
0.000	98	Paved parking, HSG B
2.214	98	Paved parking, HSG D
2.344	97	Weighted Average
0.130		5.55% Pervious Area
2.214		94.45% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.6	150	0.0200	1.55		Sheet Flow, Parking Lot Smooth surfaces n= 0.011 P2= 3.47"
0.3	50	0.0200	2.87		Shallow Concentrated Flow, Paved Slope Paved Kv= 20.3 fps
0.1	50	0.2500	8.05		Shallow Concentrated Flow, Grassed Slope Unpaved Kv= 16.1 fps
2.0	250	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 2S: PRWS-A2



Summary for Pond 3P: Detention A

Inflow Area = 2.344 ac, 94.45% Impervious, Inflow Depth > 6.81" for 50-yr event
 Inflow = 15.51 cfs @ 12.13 hrs, Volume= 1.330 af
 Outflow = 11.01 cfs @ 12.20 hrs, Volume= 1.262 af, Atten= 29%, Lag= 4.3 min
 Discarded = 0.06 cfs @ 2.05 hrs, Volume= 0.103 af
 Primary = 10.96 cfs @ 12.20 hrs, Volume= 1.159 af
 Routed to Link 5L : PRWS-A

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 Peak Elev= 97.86' @ 12.20 hrs Surf.Area= 0.065 ac Storage= 0.299 af

Plug-Flow detention time= 78.9 min calculated for 1.259 af (95% of inflow)
 Center-of-Mass det. time= 48.3 min (798.1 - 749.7)

Volume	Invert	Avail.Storage	Storage Description
#1A	91.83'	0.039 af	32.00'W x 88.00'L x 7.17'H Field A 0.463 af Overall - 0.366 af Embedded = 0.097 af x 40.0% Voids
#2A	93.33'	0.287 af	retain_it retain_it 5.0' x 44 Inside #1 Inside= 84.0"W x 60.0"H => 36.41 sf x 8.00'L = 291.3 cf Outside= 96.0"W x 68.0"H => 45.33 sf x 8.00'L = 362.7 cf 4 Rows adjusted for 311.7 cf perimeter wall
#3	98.33'	0.001 af	4.00'D x 5.00'H Vertical Cone/Cylinder
		0.327 af	Total Available Storage

Storage Group A created with Chamber Wizard

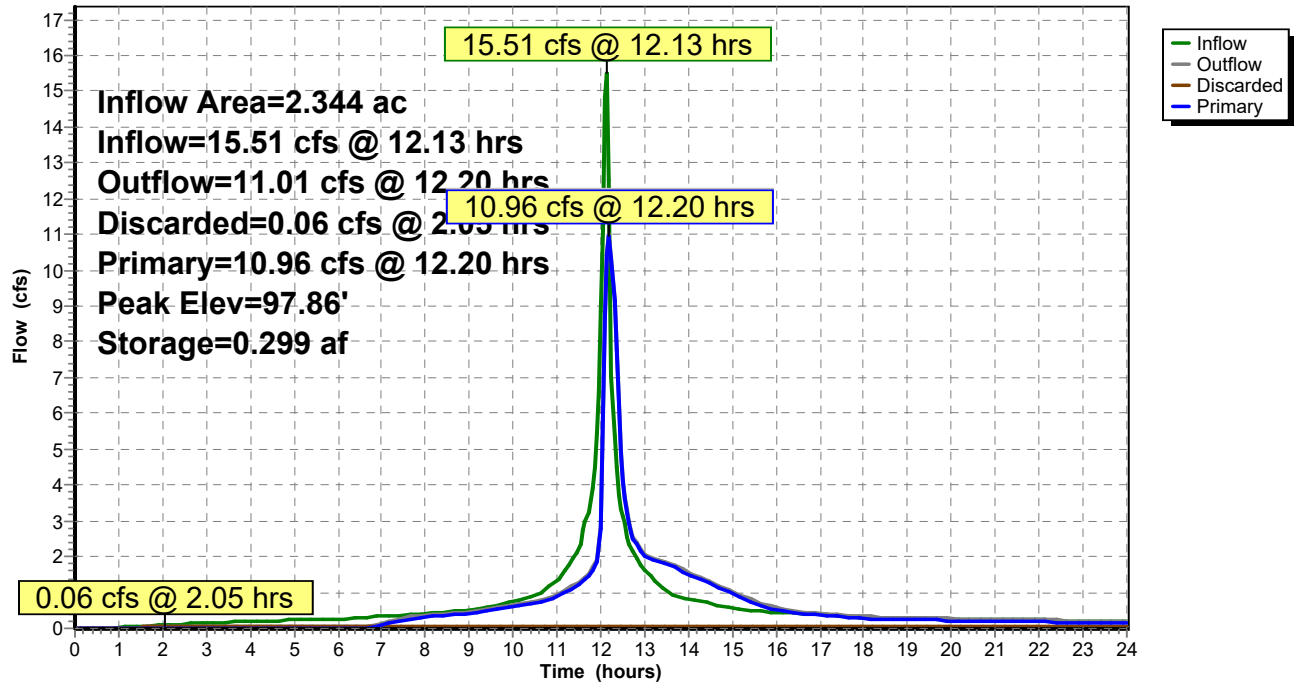
Device	Routing	Invert	Outlet Devices
#1	Primary	92.50'	15.0" Round Culvert L= 38.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 92.50' / 92.14' S= 0.0095 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf
#2	Discarded	91.83'	0.850 in/hr Exfiltration over Horizontal area
#3	Device 1	93.70'	4.0" Vert. Orifice/Grate X 3.00 C= 0.600 Limited to weir flow at low heads
#4	Device 1	96.30'	10.0" Vert. Orifice/Grate X 3.00 C= 0.600 Limited to weir flow at low heads
#5	Device 1	98.10'	4.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)

Discarded OutFlow Max=0.06 cfs @ 2.05 hrs HW=91.95' (Free Discharge)

↑ **2=Exfiltration** (Exfiltration Controls 0.06 cfs)

Primary OutFlow Max=10.94 cfs @ 12.20 hrs HW=97.86' (Free Discharge)

↑ **1=Culvert** (Passes 10.94 cfs of 12.86 cfs potential flow)
 ↑ **3=Orifice/Grate** (Orifice Controls 2.52 cfs @ 9.62 fps)
 ↑ **4=Orifice/Grate** (Orifice Controls 8.42 cfs @ 5.15 fps)
 ↑ **5=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 3P: Detention A**Hydrograph**

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WinTR55 NOAA D 50-yr Rainfall=7.17"

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Page 51

Summary for Subcatchment 4S: PRWS-A3

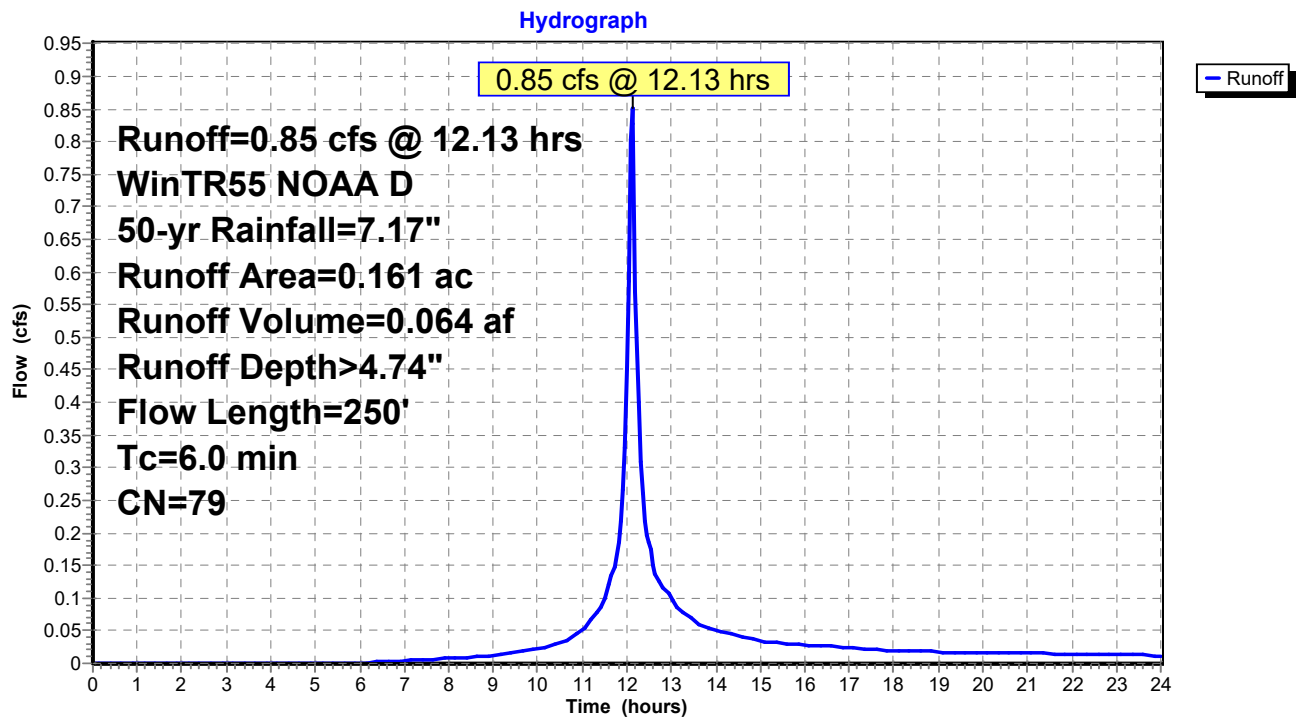
Runoff = 0.85 cfs @ 12.13 hrs, Volume= 0.064 af, Depth> 4.74"
 Routed to Link 5L : PRWS-A

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 WinTR55 NOAA D 50-yr Rainfall=7.17"

Area (ac)	CN	Description
0.000	55	Woods, Good, HSG B
0.000	77	Woods, Good, HSG D
0.007	61	>75% Grass cover, Good, HSG B
0.154	80	>75% Grass cover, Good, HSG D
0.000	98	Paved parking, HSG B
0.000	98	Paved parking, HSG D
0.161	79	Weighted Average
0.161		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.6	150	0.0200	1.55		Sheet Flow, Parking Lot Smooth surfaces n= 0.011 P2= 3.47"
0.3	50	0.0200	2.87		Shallow Concentrated Flow, Paved Slope Paved Kv= 20.3 fps
0.1	50	0.2500	8.05		Shallow Concentrated Flow, Grassed Slope Unpaved Kv= 16.1 fps
2.0	250	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 4S: PRWS-A3



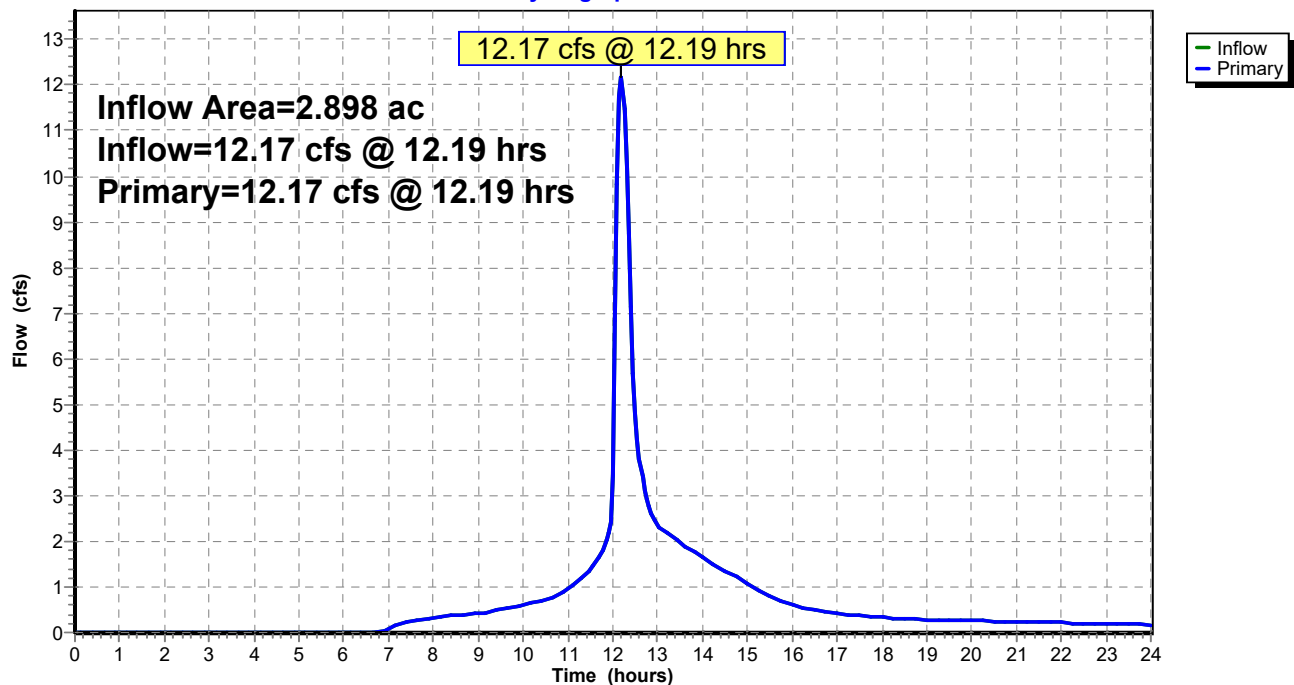
Summary for Link 5L: PRWS-A

Inflow Area = 2.898 ac, 76.98% Impervious, Inflow Depth > 5.42" for 50-yr event
Inflow = 12.17 cfs @ 12.19 hrs, Volume= 1.308 af
Primary = 12.17 cfs @ 12.19 hrs, Volume= 1.308 af, Atten= 0%, Lag= 0.0 min
Routed to Link 10L : Site

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link 5L: PRWS-A

Hydrograph



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WinTR55 NOAA D 50-yr Rainfall=7.17"

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Page 54

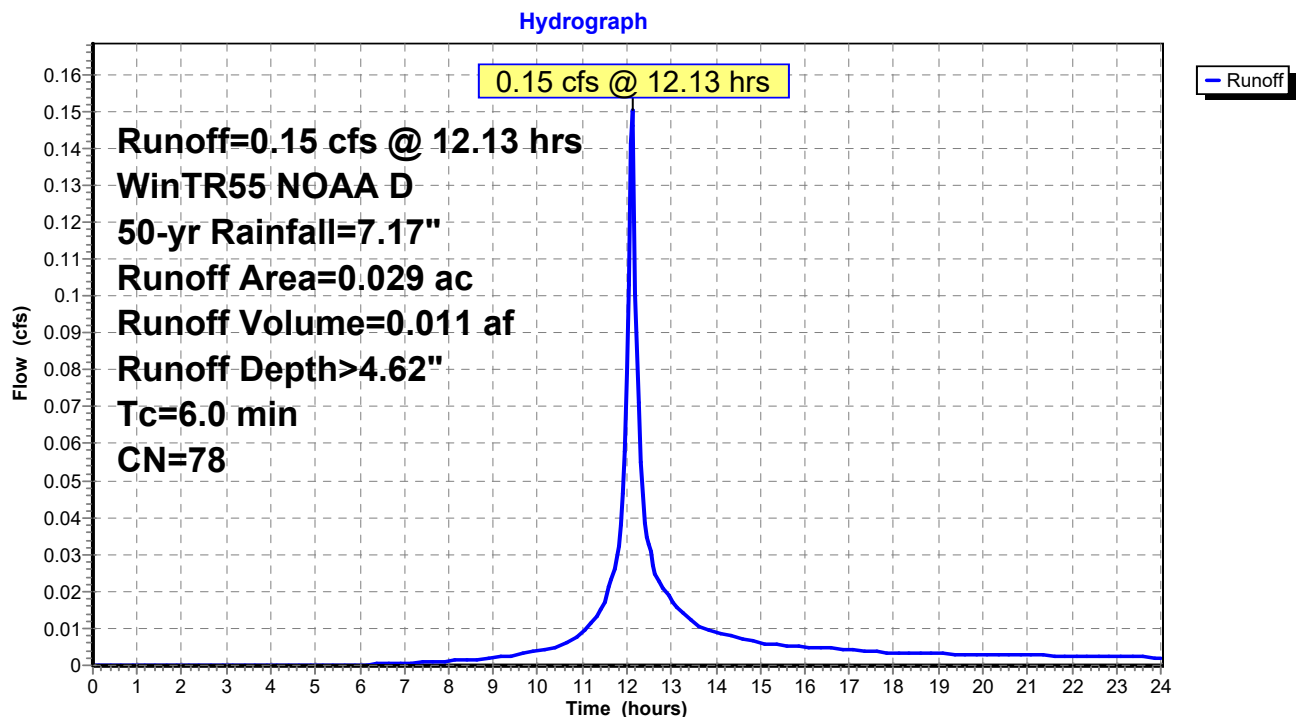
Summary for Subcatchment 6S: PRWS-B1

Runoff = 0.15 cfs @ 12.13 hrs, Volume= 0.011 af, Depth> 4.62"
Routed to Link 9L : PRWS-B

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
WinTR55 NOAA D 50-yr Rainfall=7.17"

Area (ac)	CN	Description
0.000	55	Woods, Good, HSG B
0.020	77	Woods, Good, HSG D
0.000	61	>75% Grass cover, Good, HSG B
0.009	80	>75% Grass cover, Good, HSG D
0.000	98	Paved parking, HSG B
0.000	98	Paved parking, HSG D
0.029	78	Weighted Average
0.029		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry, Min TC
5.0	0				Total, Increased to minimum Tc = 6.0 min

Subcatchment 6S: PRWS-B1

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WinTR55 NOAA D 50-yr Rainfall=7.17"

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Page 55

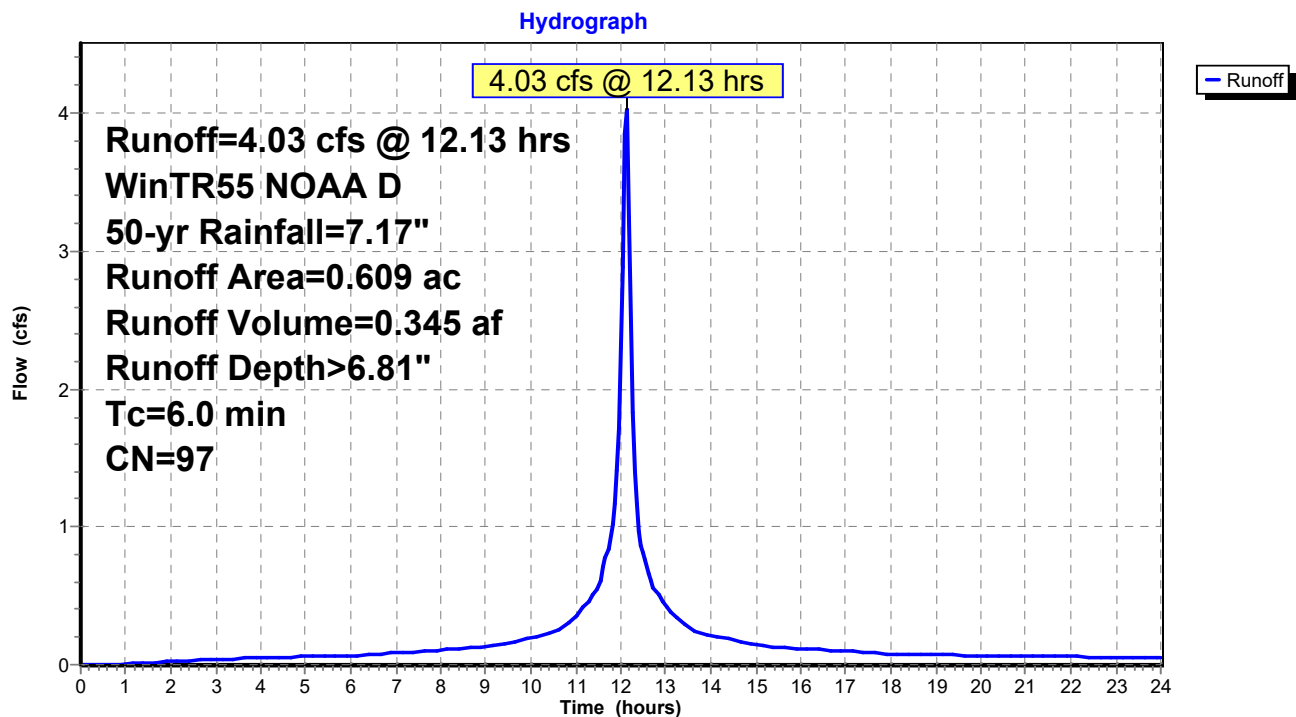
Summary for Subcatchment 7S: PRWS-B2

Runoff = 4.03 cfs @ 12.13 hrs, Volume= 0.345 af, Depth> 6.81"
Routed to Pond 8P : Detention B

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
WinTR55 NOAA D 50-yr Rainfall=7.17"

Area (ac)	CN	Description
0.000	55	Woods, Good, HSG B
0.000	77	Woods, Good, HSG D
0.020	61	>75% Grass cover, Good, HSG B
0.008	80	>75% Grass cover, Good, HSG D
0.000	98	Paved parking, HSG B
0.581	98	Paved parking, HSG D
0.609	97	Weighted Average
0.028		4.60% Pervious Area
0.581		95.40% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry, Min TC
5.0	0				Total, Increased to minimum Tc = 6.0 min

Subcatchment 7S: PRWS-B2

Summary for Pond 8P: Detention B

Inflow Area = 0.609 ac, 95.40% Impervious, Inflow Depth > 6.81" for 50-yr event
 Inflow = 4.03 cfs @ 12.13 hrs, Volume= 0.345 af
 Outflow = 2.04 cfs @ 12.24 hrs, Volume= 0.294 af, Atten= 49%, Lag= 6.9 min
 Discarded = 0.02 cfs @ 2.40 hrs, Volume= 0.041 af
 Primary = 2.02 cfs @ 12.24 hrs, Volume= 0.253 af
 Routed to Link 9L : PRWS-B

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 Peak Elev= 98.86' @ 12.24 hrs Surf.Area= 0.044 ac Storage= 0.114 af

Plug-Flow detention time= 137.7 min calculated for 0.294 af (85% of inflow)
 Center-of-Mass det. time= 67.8 min (817.5 - 749.7)

Volume	Invert	Avail.Storage	Storage Description
#1A	95.60'	0.009 af	24.00'W x 80.00'L x 4.17'H Field A 0.184 af Overall - 0.162 af Embedded = 0.022 af x 40.0% Voids
#2A	96.10'	0.115 af	retain_it retain_it 3.0' x 30 Inside #1 Inside= 84.0"W x 36.0"H => 21.33 sf x 8.00'L = 170.6 cf Outside= 96.0"W x 44.0"H => 29.33 sf x 8.00'L = 234.7 cf 3 Rows adjusted for 122.7 cf perimeter wall
#3	99.10'	0.001 af	4.00'D x 2.00'H Vertical Cone/Cylinder
		0.124 af	Total Available Storage

Storage Group A created with Chamber Wizard

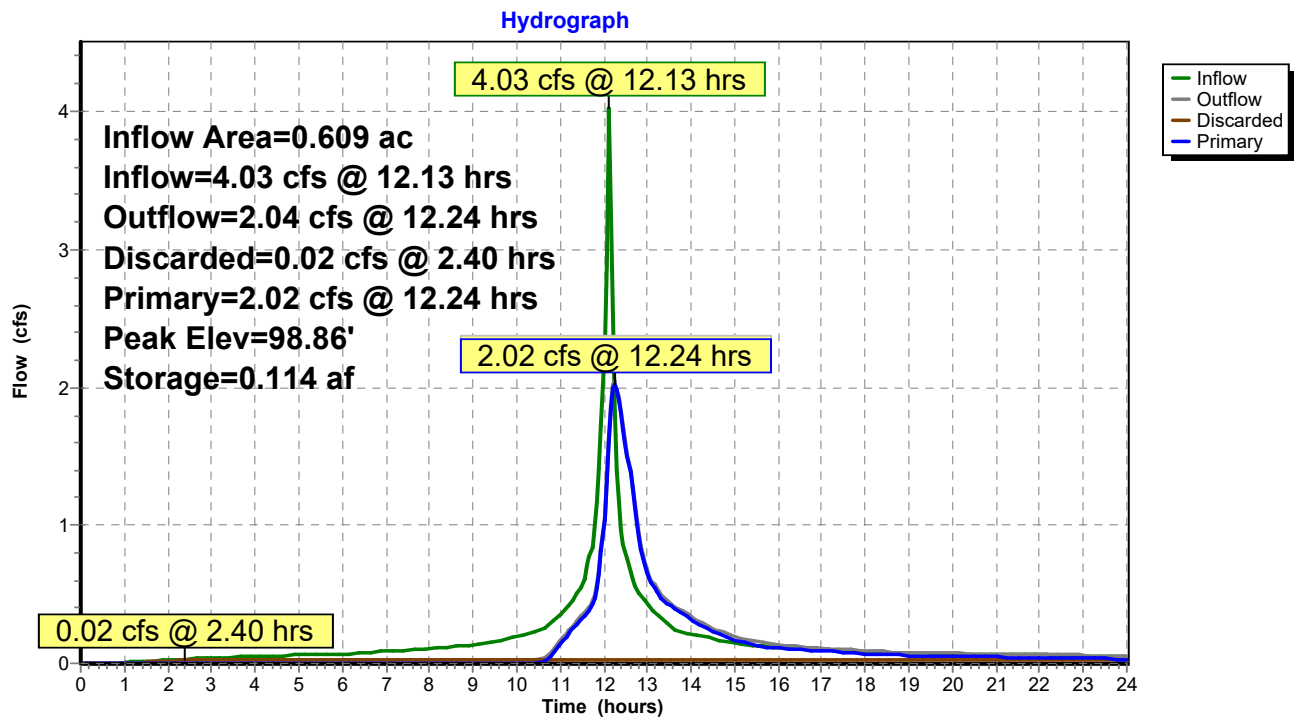
Device	Routing	Invert	Outlet Devices
#1	Primary	97.10'	12.0" Round Culvert L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 97.10' / 97.00' S= 0.0100 ' S= 0.0100 ' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2	Discarded	95.60'	0.500 in/hr Exfiltration over Horizontal area
#3	Device 1	97.10'	5.0" Vert. 2-yr Orifice C= 0.600 Limited to weir flow at low heads
#4	Device 1	97.70'	7.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.02 cfs @ 2.40 hrs HW=95.66' (Free Discharge)

↑ **2=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=2.02 cfs @ 12.24 hrs HW=98.86' (Free Discharge)

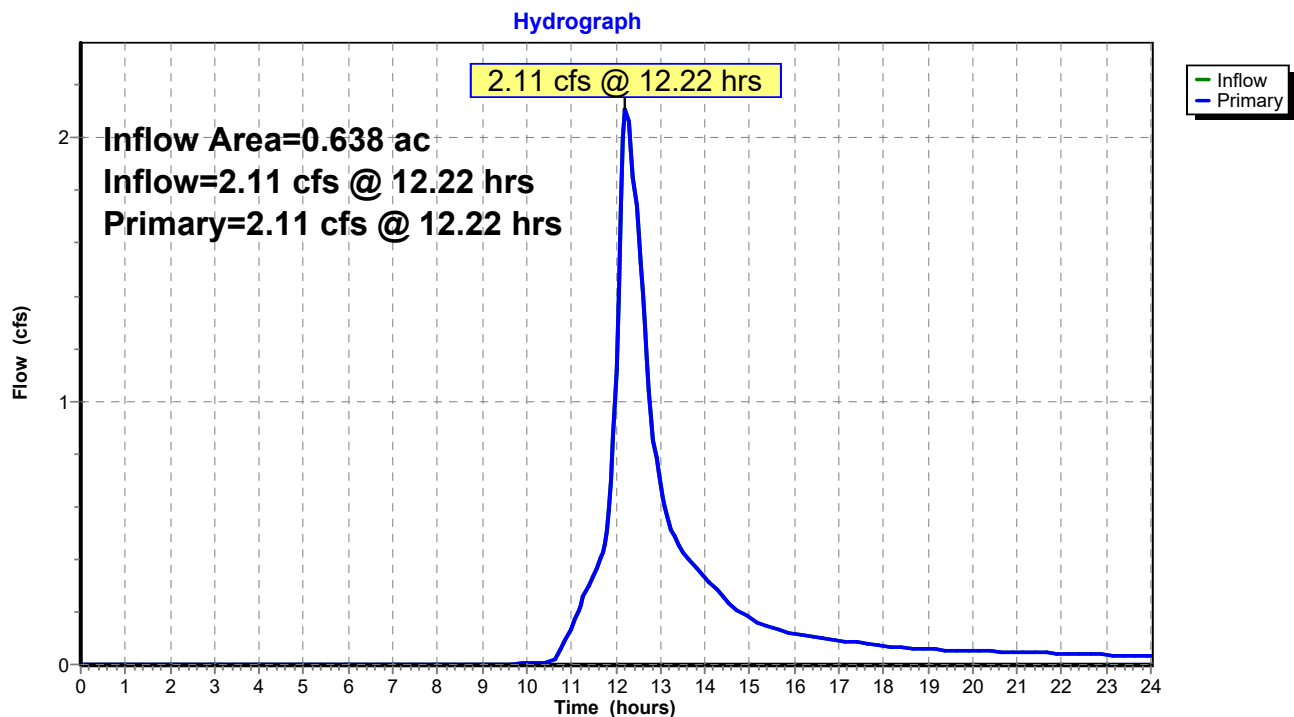
↑ **1=Culvert** (Passes 2.02 cfs of 4.24 cfs potential flow)
 ↑ **3=2-yr Orifice** (Orifice Controls 0.82 cfs @ 6.00 fps)
 ↑ **4=Orifice/Grate** (Orifice Controls 1.20 cfs @ 4.48 fps)

Pond 8P: Detention B

Summary for Link 9L: PRWS-B

Inflow Area = 0.638 ac, 91.07% Impervious, Inflow Depth > 4.98" for 50-yr event
Inflow = 2.11 cfs @ 12.22 hrs, Volume= 0.265 af
Primary = 2.11 cfs @ 12.22 hrs, Volume= 0.265 af, Atten= 0%, Lag= 0.0 min
Routed to Link 10L : Site

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link 9L: PRWS-B

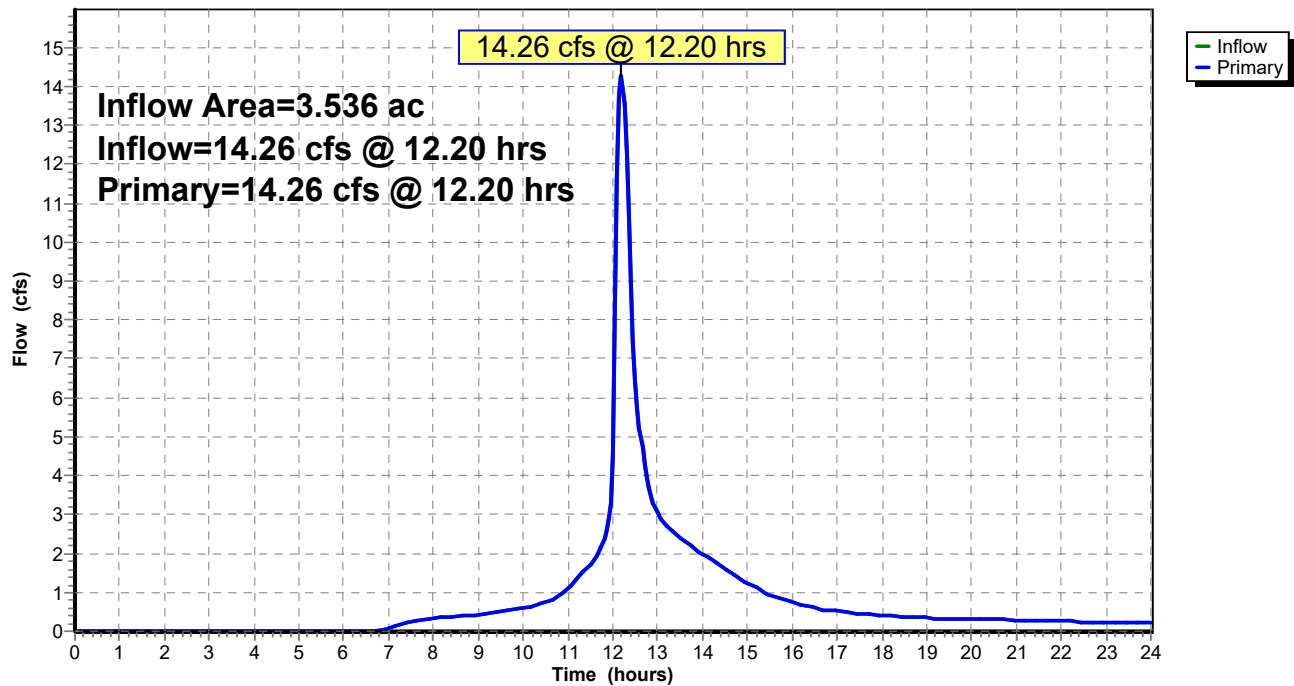
Summary for Link 10L: Site

Inflow Area = 3.536 ac, 79.52% Impervious, Inflow Depth > 5.34" for 50-yr event
Inflow = 14.26 cfs @ 12.20 hrs, Volume= 1.573 af
Primary = 14.26 cfs @ 12.20 hrs, Volume= 1.573 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link 10L: Site

Hydrograph



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WinTR55 NOAA D 100-yr Rainfall=8.07"

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Page 60

Summary for Subcatchment 1S: PRWS-A1

Runoff = 0.97 cfs @ 12.30 hrs, Volume= 0.107 af, Depth> 3.26"
Routed to Link 5L : PRWS-A

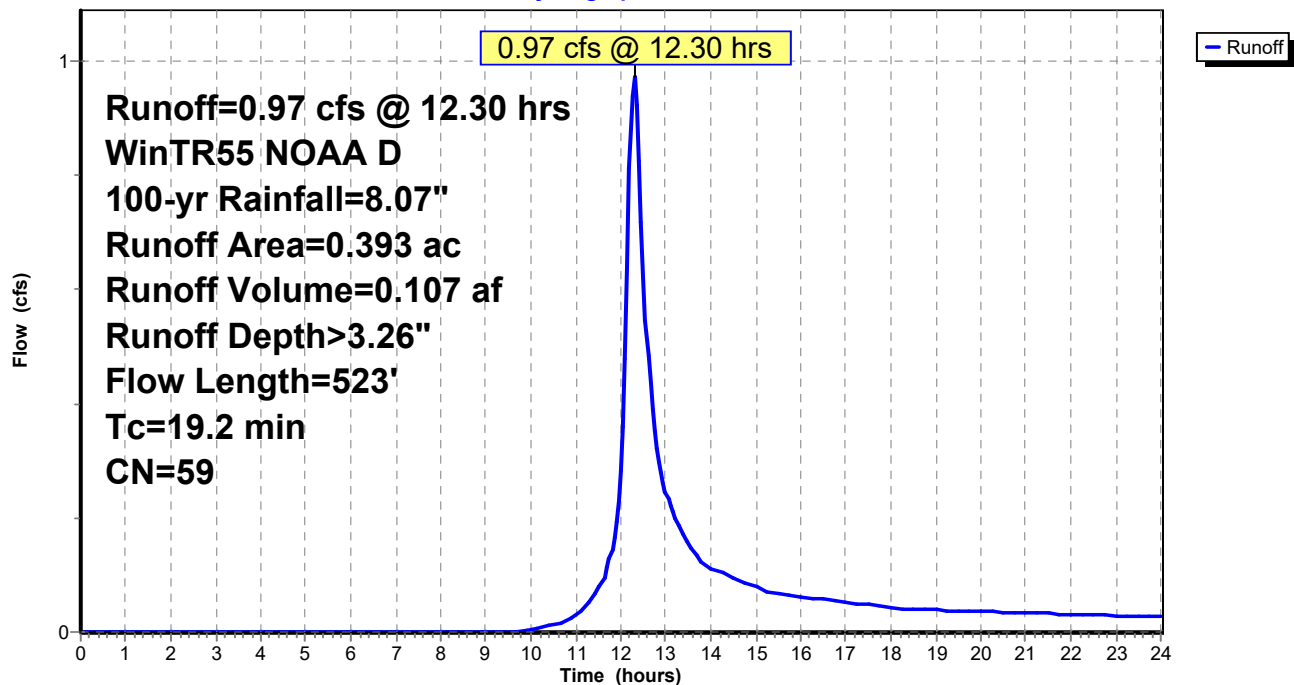
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
WinTR55 NOAA D 100-yr Rainfall=8.07"

Area (ac)	CN	Description
0.340	55	Woods, Good, HSG B
0.036	77	Woods, Good, HSG D
0.000	61	>75% Grass cover, Good, HSG B
0.000	80	>75% Grass cover, Good, HSG D
0.000	98	Paved parking, HSG B
0.017	98	Paved parking, HSG D
0.393	59	Weighted Average
0.376		95.67% Pervious Area
0.017		4.33% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.0	100	0.0160	0.11		Sheet Flow, Wetland
					Grass: Dense n= 0.240 P2= 3.47"
4.2	423	0.0109	1.68		Shallow Concentrated Flow, Grass Slope
					Unpaved Kv= 16.1 fps
19.2	523	Total			

Subcatchment 1S: PRWS-A1

Hydrograph



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WinTR55 NOAA D 100-yr Rainfall=8.07"

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Page 61

Summary for Subcatchment 2S: PRWS-A2

Runoff = 17.47 cfs @ 12.13 hrs, Volume= 1.505 af, Depth> 7.70"
 Routed to Pond 3P : Detention A

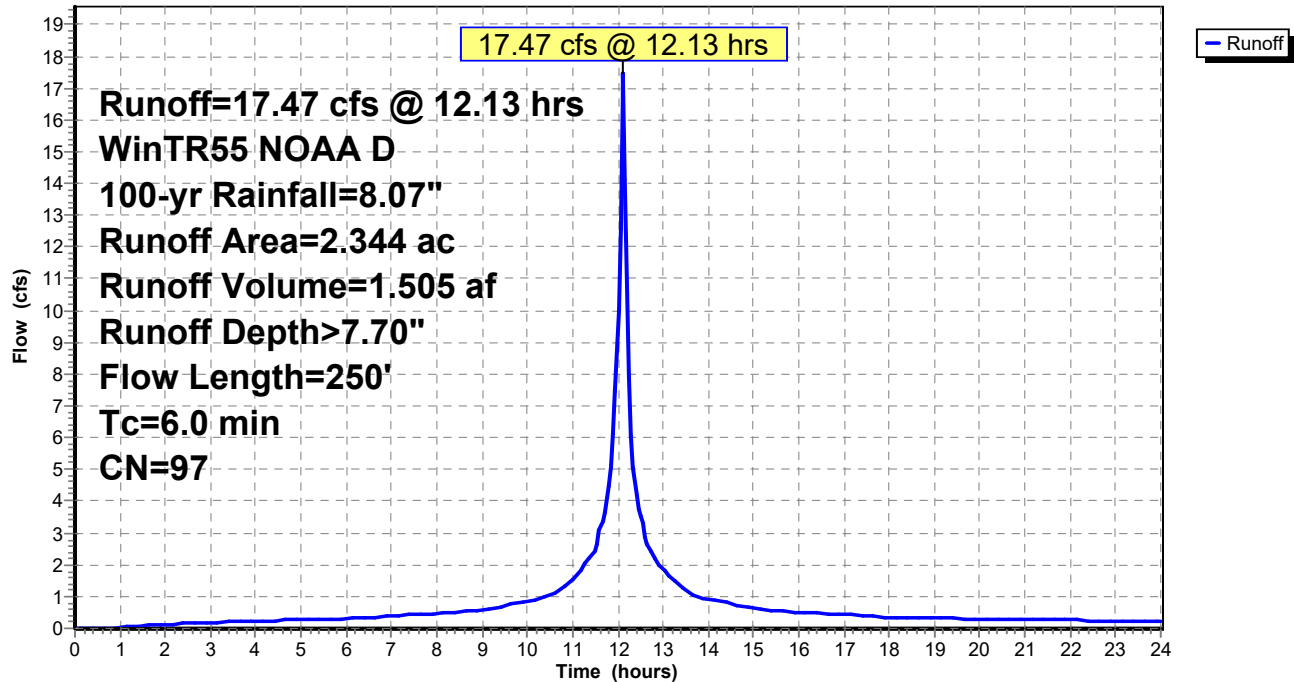
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 WinTR55 NOAA D 100-yr Rainfall=8.07"

Area (ac)	CN	Description
0.000	55	Woods, Good, HSG B
0.000	77	Woods, Good, HSG D
0.020	61	>75% Grass cover, Good, HSG B
0.110	80	>75% Grass cover, Good, HSG D
0.000	98	Paved parking, HSG B
2.214	98	Paved parking, HSG D
2.344	97	Weighted Average
0.130		5.55% Pervious Area
2.214		94.45% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.6	150	0.0200	1.55		Sheet Flow, Parking Lot Smooth surfaces n= 0.011 P2= 3.47"
0.3	50	0.0200	2.87		Shallow Concentrated Flow, Paved Slope Paved Kv= 20.3 fps
0.1	50	0.2500	8.05		Shallow Concentrated Flow, Grassed Slope Unpaved Kv= 16.1 fps
2.0	250	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 2S: PRWS-A2

Hydrograph



Summary for Pond 3P: Detention A

Inflow Area = 2.344 ac, 94.45% Impervious, Inflow Depth > 7.70" for 100-yr event
 Inflow = 17.47 cfs @ 12.13 hrs, Volume= 1.505 af
 Outflow = 12.62 cfs @ 12.20 hrs, Volume= 1.436 af, Atten= 28%, Lag= 4.3 min
 Discarded = 0.06 cfs @ 1.80 hrs, Volume= 0.104 af
 Primary = 12.56 cfs @ 12.20 hrs, Volume= 1.333 af
 Routed to Link 5L : PRWS-A

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 Peak Elev= 98.19' @ 12.20 hrs Surf.Area= 0.065 ac Storage= 0.318 af

Plug-Flow detention time= 74.0 min calculated for 1.433 af (95% of inflow)
 Center-of-Mass det. time= 46.3 min (793.9 - 747.6)

Volume	Invert	Avail.Storage	Storage Description
#1A	91.83'	0.039 af	32.00'W x 88.00'L x 7.17'H Field A 0.463 af Overall - 0.366 af Embedded = 0.097 af x 40.0% Voids
#2A	93.33'	0.287 af	retain_it retain_it 5.0' x 44 Inside #1 Inside= 84.0"W x 60.0"H => 36.41 sf x 8.00'L = 291.3 cf Outside= 96.0"W x 68.0"H => 45.33 sf x 8.00'L = 362.7 cf 4 Rows adjusted for 311.7 cf perimeter wall
#3	98.33'	0.001 af	4.00'D x 5.00'H Vertical Cone/Cylinder
		0.327 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	92.50'	15.0" Round Culvert L= 38.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 92.50' / 92.14' S= 0.0095 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf
#2	Discarded	91.83'	0.850 in/hr Exfiltration over Horizontal area
#3	Device 1	93.70'	4.0" Vert. Orifice/Grate X 3.00 C= 0.600 Limited to weir flow at low heads
#4	Device 1	96.30'	10.0" Vert. Orifice/Grate X 3.00 C= 0.600 Limited to weir flow at low heads
#5	Device 1	98.10'	4.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)

Discarded OutFlow Max=0.06 cfs @ 1.80 hrs HW=91.95' (Free Discharge)

↑ **2=Exfiltration** (Exfiltration Controls 0.06 cfs)

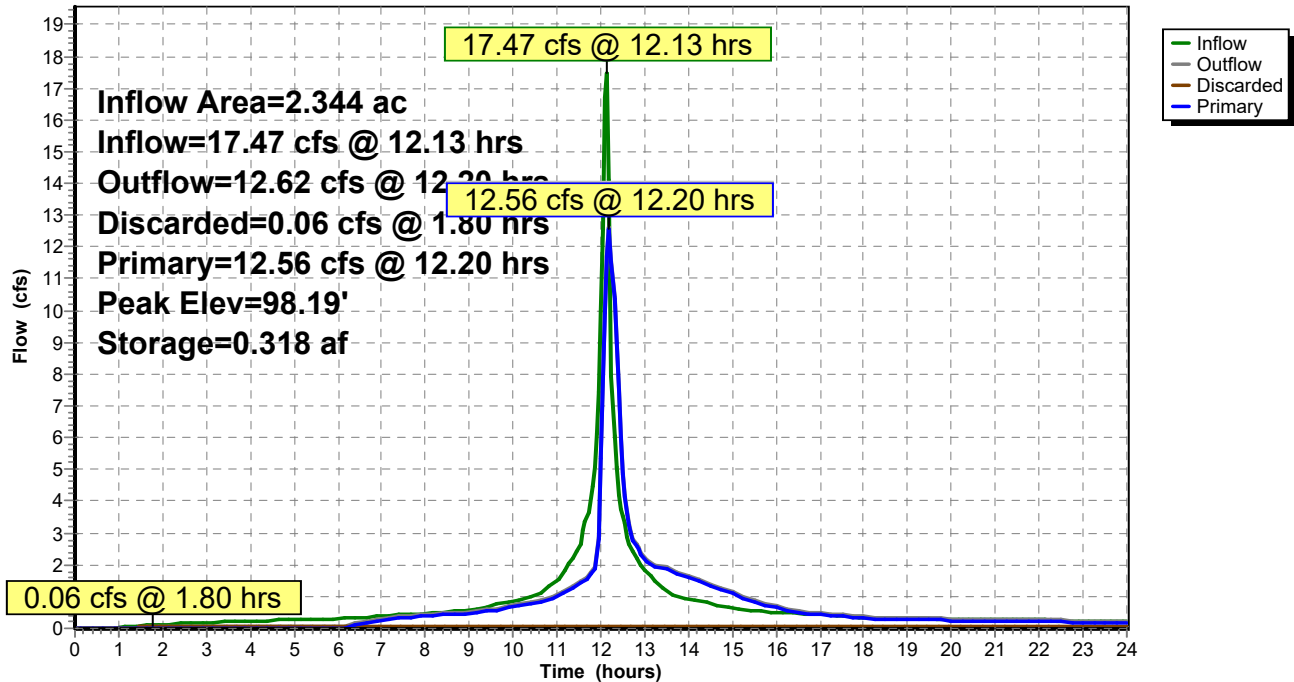
Primary OutFlow Max=12.48 cfs @ 12.20 hrs HW=98.18' (Free Discharge)

↑ **1=Culvert** (Passes 12.48 cfs of 13.29 cfs potential flow)

↑ **3=Orifice/Grate** (Orifice Controls 2.62 cfs @ 10.00 fps)

↑ **4=Orifice/Grate** (Orifice Controls 9.54 cfs @ 5.83 fps)

↑ **5=Sharp-Crested Rectangular Weir** (Weir Controls 0.31 cfs @ 0.95 fps)

Pond 3P: Detention A**Hydrograph**

MDA PR.

WinTR55 NOAA D 100-yr Rainfall=8.07"

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Page 65

Summary for Subcatchment 4S: PRWS-A3

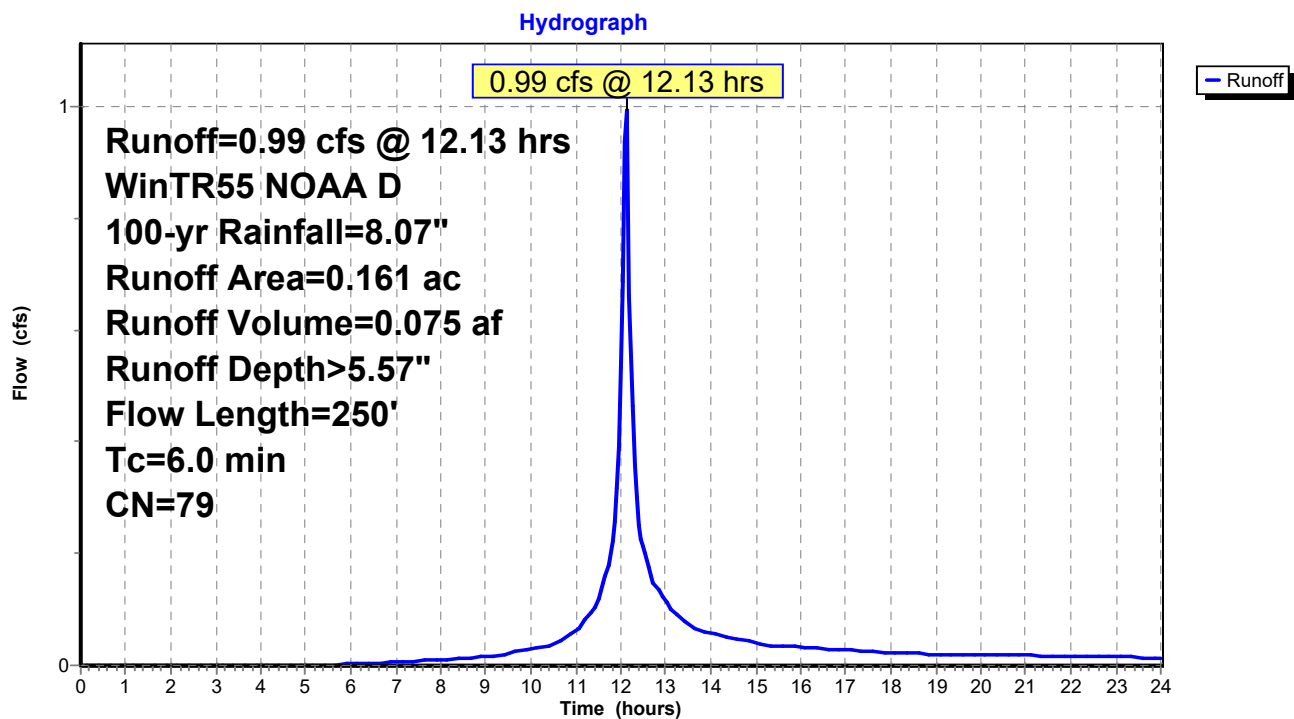
Runoff = 0.99 cfs @ 12.13 hrs, Volume= 0.075 af, Depth> 5.57"
 Routed to Link 5L : PRWS-A

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 WinTR55 NOAA D 100-yr Rainfall=8.07"

Area (ac)	CN	Description
0.000	55	Woods, Good, HSG B
0.000	77	Woods, Good, HSG D
0.007	61	>75% Grass cover, Good, HSG B
0.154	80	>75% Grass cover, Good, HSG D
0.000	98	Paved parking, HSG B
0.000	98	Paved parking, HSG D
0.161	79	Weighted Average
0.161		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.6	150	0.0200	1.55		Sheet Flow, Parking Lot Smooth surfaces n= 0.011 P2= 3.47"
0.3	50	0.0200	2.87		Shallow Concentrated Flow, Paved Slope Paved Kv= 20.3 fps
0.1	50	0.2500	8.05		Shallow Concentrated Flow, Grassed Slope Unpaved Kv= 16.1 fps
2.0	250	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 4S: PRWS-A3



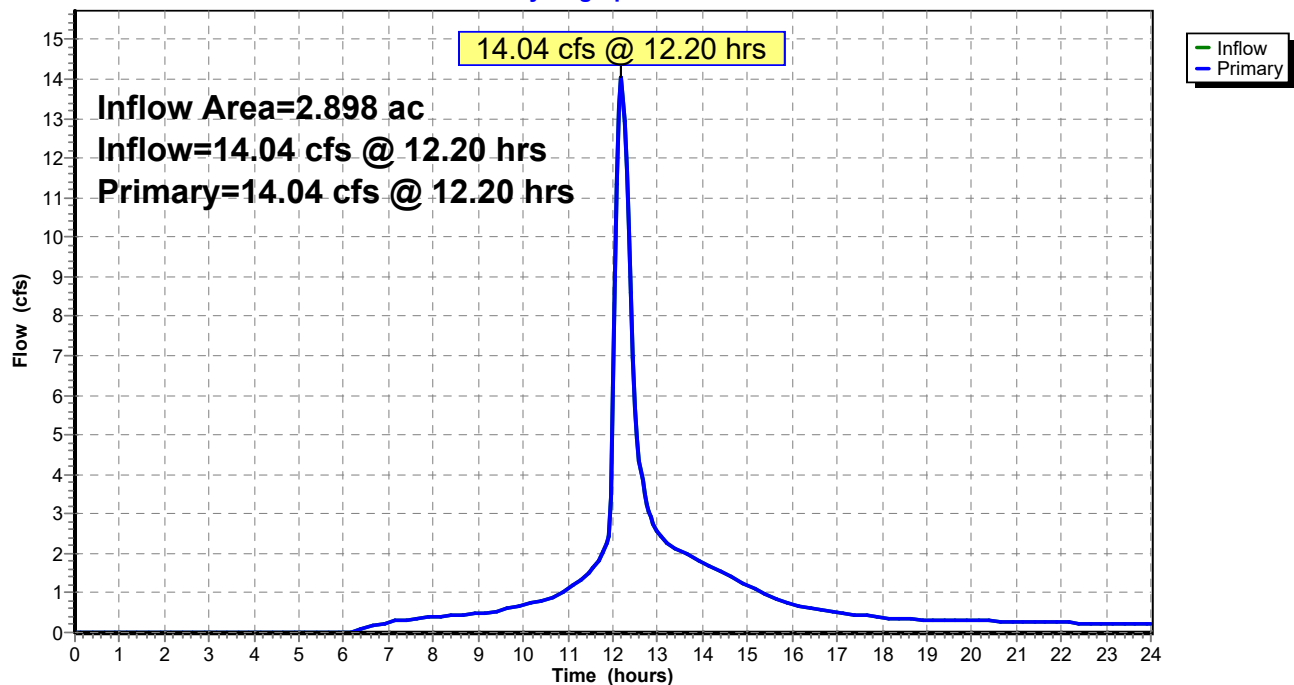
Summary for Link 5L: PRWS-A

Inflow Area = 2.898 ac, 76.98% Impervious, Inflow Depth > 6.27" for 100-yr event
Inflow = 14.04 cfs @ 12.20 hrs, Volume= 1.514 af
Primary = 14.04 cfs @ 12.20 hrs, Volume= 1.514 af, Atten= 0%, Lag= 0.0 min
Routed to Link 10L : Site

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link 5L: PRWS-A

Hydrograph



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WinTR55 NOAA D 100-yr Rainfall=8.07"

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Page 68

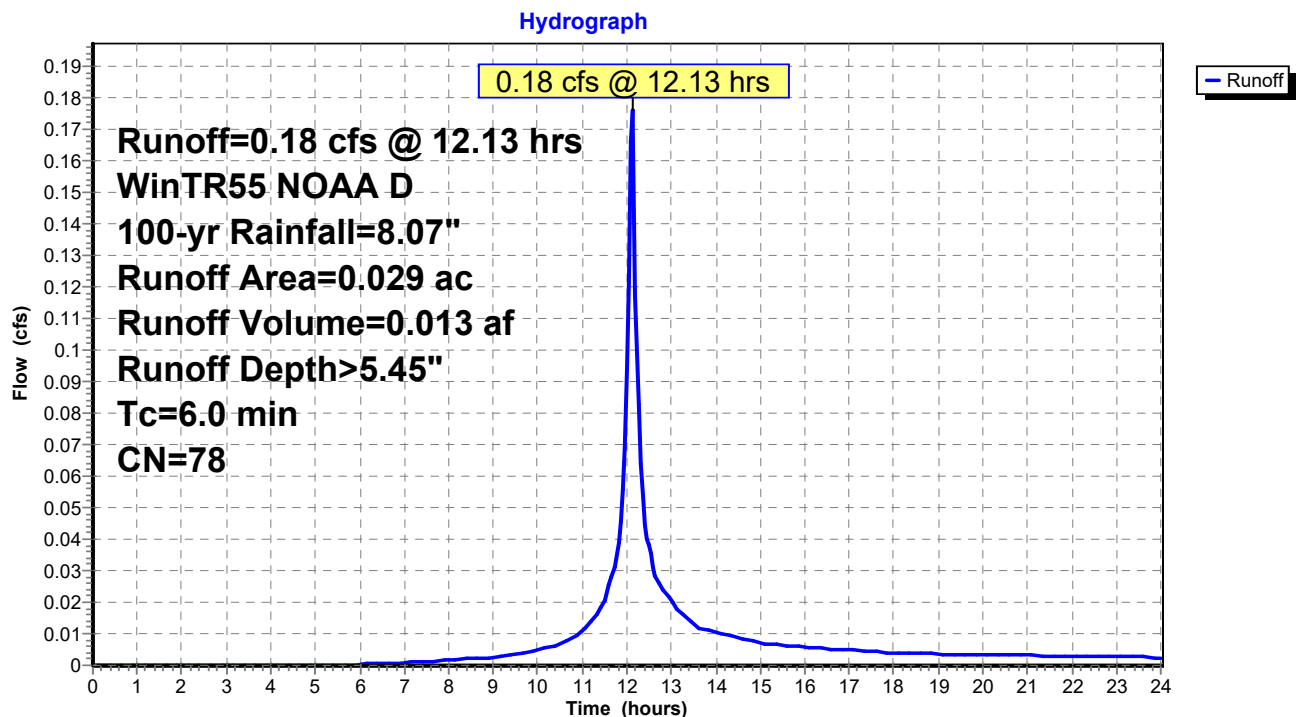
Summary for Subcatchment 6S: PRWS-B1

Runoff = 0.18 cfs @ 12.13 hrs, Volume= 0.013 af, Depth> 5.45"
Routed to Link 9L : PRWS-B

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
WinTR55 NOAA D 100-yr Rainfall=8.07"

Area (ac)	CN	Description
0.000	55	Woods, Good, HSG B
0.020	77	Woods, Good, HSG D
0.000	61	>75% Grass cover, Good, HSG B
0.009	80	>75% Grass cover, Good, HSG D
0.000	98	Paved parking, HSG B
0.000	98	Paved parking, HSG D
0.029	78	Weighted Average
0.029		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry, Min TC
5.0	0				Total, Increased to minimum Tc = 6.0 min

Subcatchment 6S: PRWS-B1

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WinTR55 NOAA D 100-yr Rainfall=8.07"

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Page 69

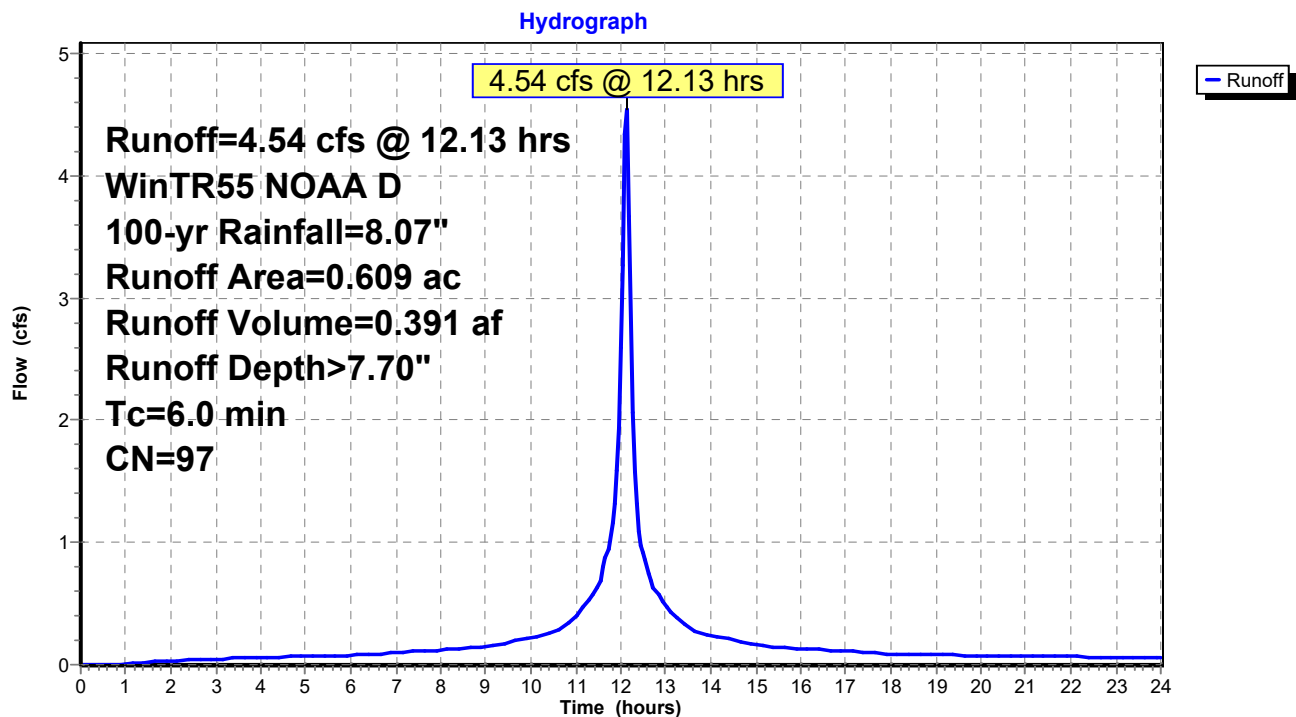
Summary for Subcatchment 7S: PRWS-B2

Runoff = 4.54 cfs @ 12.13 hrs, Volume= 0.391 af, Depth> 7.70"
Routed to Pond 8P : Detention B

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
WinTR55 NOAA D 100-yr Rainfall=8.07"

Area (ac)	CN	Description
0.000	55	Woods, Good, HSG B
0.000	77	Woods, Good, HSG D
0.020	61	>75% Grass cover, Good, HSG B
0.008	80	>75% Grass cover, Good, HSG D
0.000	98	Paved parking, HSG B
0.581	98	Paved parking, HSG D
0.609	97	Weighted Average
0.028		4.60% Pervious Area
0.581		95.40% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry, Min TC
5.0	0				Total, Increased to minimum Tc = 6.0 min

Subcatchment 7S: PRWS-B2

Summary for Pond 8P: Detention B

Inflow Area = 0.609 ac, 95.40% Impervious, Inflow Depth > 7.70" for 100-yr event
 Inflow = 4.54 cfs @ 12.13 hrs, Volume= 0.391 af
 Outflow = 2.24 cfs @ 12.25 hrs, Volume= 0.340 af, Atten= 51%, Lag= 7.2 min
 Discarded = 0.02 cfs @ 12.25 hrs, Volume= 0.041 af
 Primary = 2.22 cfs @ 12.25 hrs, Volume= 0.298 af
 Routed to Link 9L : PRWS-B

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 Peak Elev= 99.08' @ 12.25 hrs Surf.Area= 0.044 ac Storage= 0.123 af

Plug-Flow detention time= 131.6 min calculated for 0.340 af (87% of inflow)
 Center-of-Mass det. time= 66.7 min (814.4 - 747.6)

Volume	Invert	Avail.Storage	Storage Description
#1A	95.60'	0.009 af	24.00'W x 80.00'L x 4.17'H Field A 0.184 af Overall - 0.162 af Embedded = 0.022 af x 40.0% Voids
#2A	96.10'	0.115 af	retain_it retain_it 3.0' x 30 Inside #1 Inside= 84.0"W x 36.0"H => 21.33 sf x 8.00'L = 170.6 cf Outside= 96.0"W x 44.0"H => 29.33 sf x 8.00'L = 234.7 cf 3 Rows adjusted for 122.7 cf perimeter wall
#3	99.10'	0.001 af	4.00'D x 2.00'H Vertical Cone/Cylinder
		0.124 af	Total Available Storage

Storage Group A created with Chamber Wizard

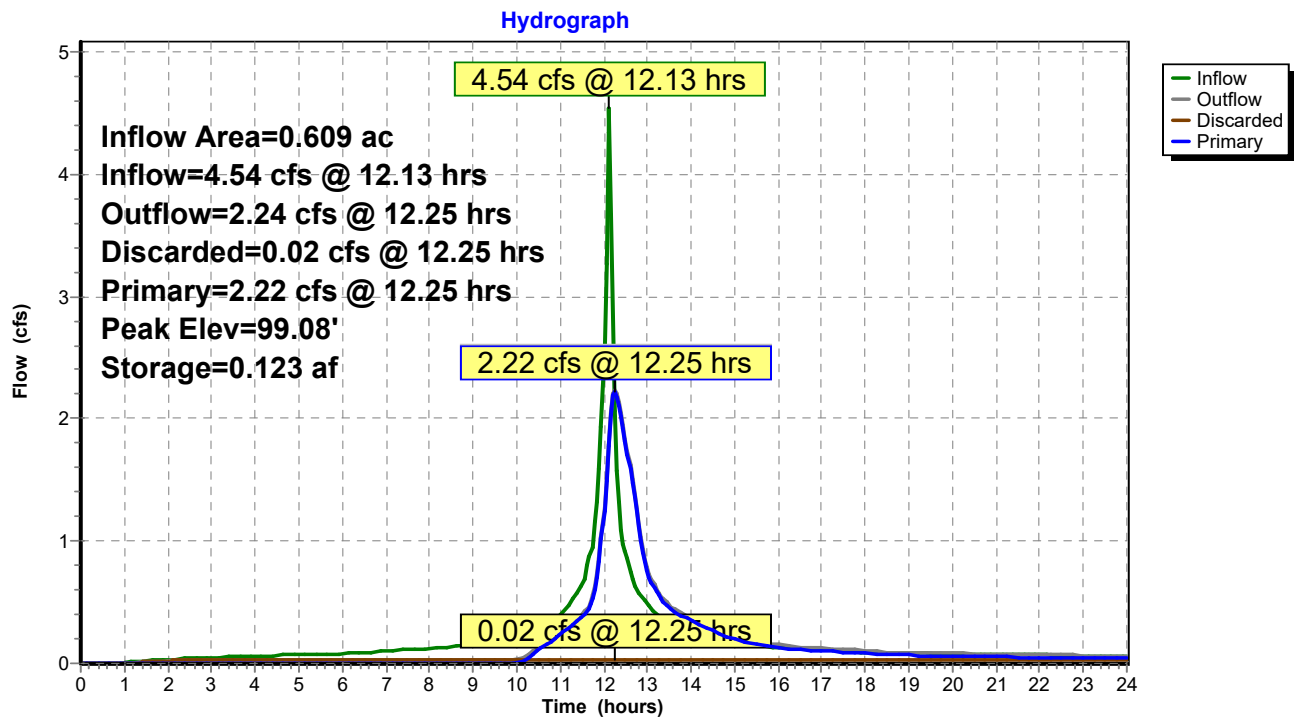
Device	Routing	Invert	Outlet Devices
#1	Primary	97.10'	12.0" Round Culvert L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 97.10' / 97.00' S= 0.0100 ' S= 0.0100 ' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2	Discarded	95.60'	0.500 in/hr Exfiltration over Horizontal area
#3	Device 1	97.10'	5.0" Vert. 2-yr Orifice C= 0.600 Limited to weir flow at low heads
#4	Device 1	97.70'	7.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.02 cfs @ 12.25 hrs HW=99.08' (Free Discharge)

↑ **2=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=2.21 cfs @ 12.25 hrs HW=99.08' (Free Discharge)

↑ **1=Culvert** (Passes 2.21 cfs of 4.60 cfs potential flow)
 ↑ **3=2-yr Orifice** (Orifice Controls 0.87 cfs @ 6.41 fps)
 ↑ **4=Orifice/Grate** (Orifice Controls 1.34 cfs @ 5.02 fps)

Pond 8P: Detention B

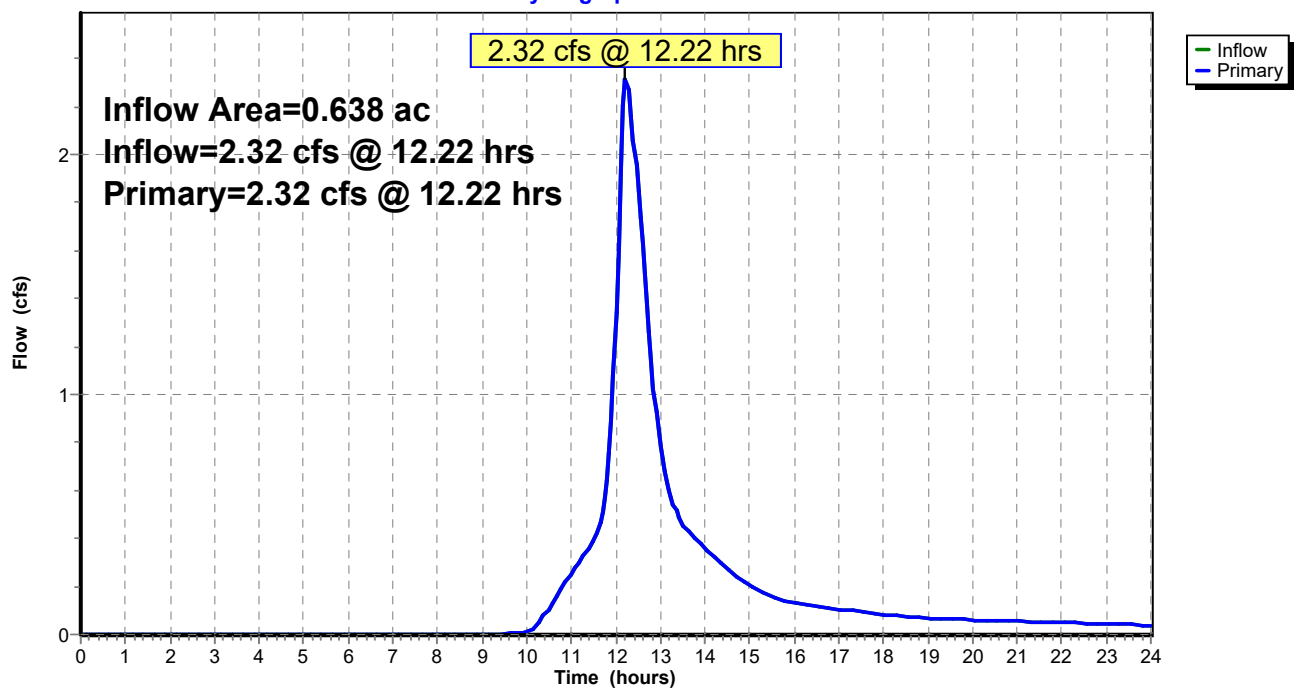
Summary for Link 9L: PRWS-B

Inflow Area = 0.638 ac, 91.07% Impervious, Inflow Depth > 5.86" for 100-yr event
Inflow = 2.32 cfs @ 12.22 hrs, Volume= 0.311 af
Primary = 2.32 cfs @ 12.22 hrs, Volume= 0.311 af, Atten= 0%, Lag= 0.0 min
Routed to Link 10L : Site

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link 9L: PRWS-B

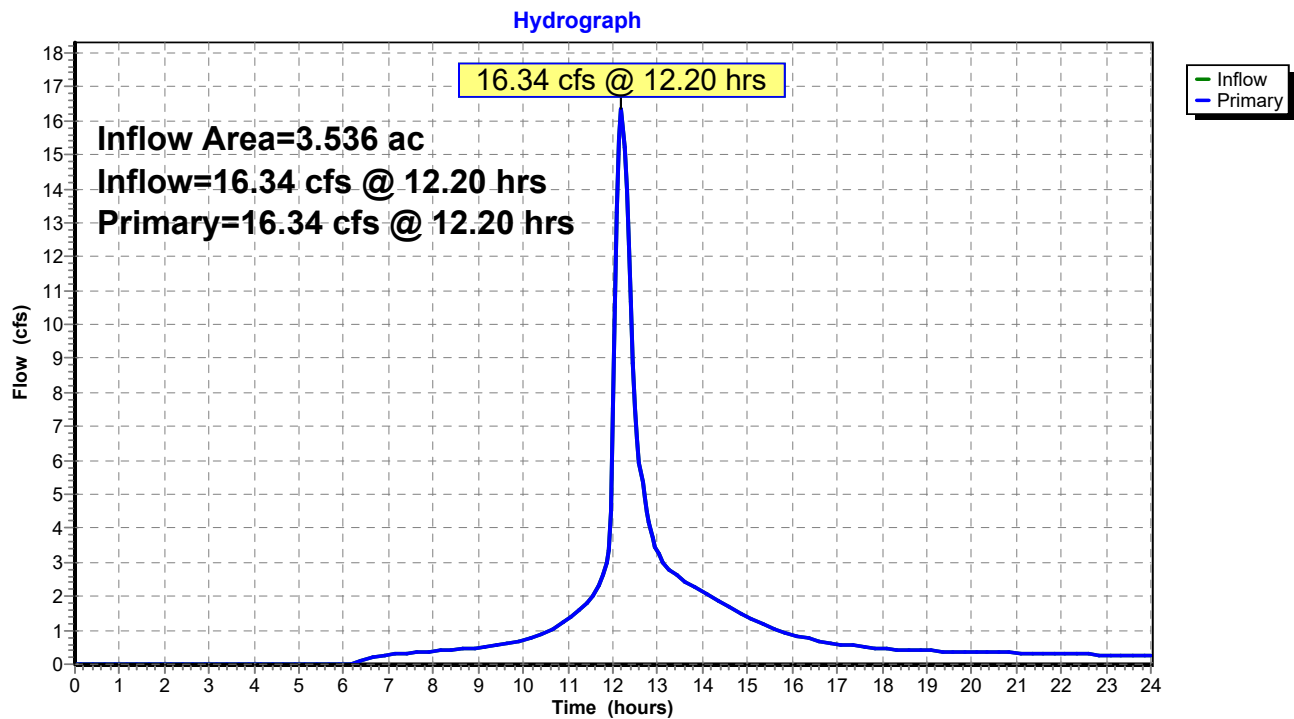
Hydrograph



Summary for Link 10L: Site

Inflow Area = 3.536 ac, 79.52% Impervious, Inflow Depth > 6.20" for 100-yr event
Inflow = 16.34 cfs @ 12.20 hrs, Volume= 1.825 af
Primary = 16.34 cfs @ 12.20 hrs, Volume= 1.825 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link 10L: Site

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WinTR55 NOAA D WQV Rainfall=0.89"

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Page 74

Summary for Subcatchment 1S: PRWS-A1

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"
 Routed to Link 5L : PRWS-A

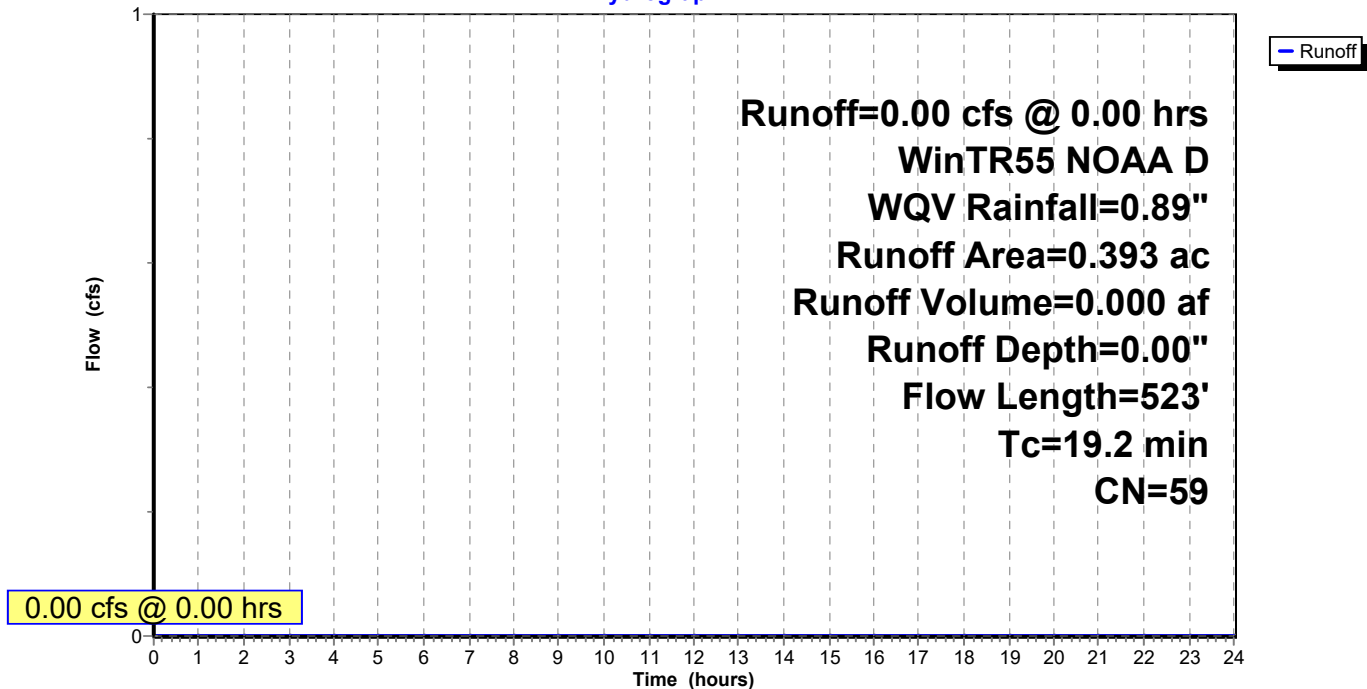
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 WinTR55 NOAA D WQV Rainfall=0.89"

Area (ac)	CN	Description
0.340	55	Woods, Good, HSG B
0.036	77	Woods, Good, HSG D
0.000	61	>75% Grass cover, Good, HSG B
0.000	80	>75% Grass cover, Good, HSG D
0.000	98	Paved parking, HSG B
0.017	98	Paved parking, HSG D
0.393	59	Weighted Average
0.376		95.67% Pervious Area
0.017		4.33% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.0	100	0.0160	0.11		Sheet Flow, Wetland
					Grass: Dense n= 0.240 P2= 3.47"
4.2	423	0.0109	1.68		Shallow Concentrated Flow, Grass Slope
					Unpaved Kv= 16.1 fps
19.2	523	Total			

Subcatchment 1S: PRWS-A1

Hydrograph



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Page 75

Summary for Subcatchment 2S: PRWS-A2

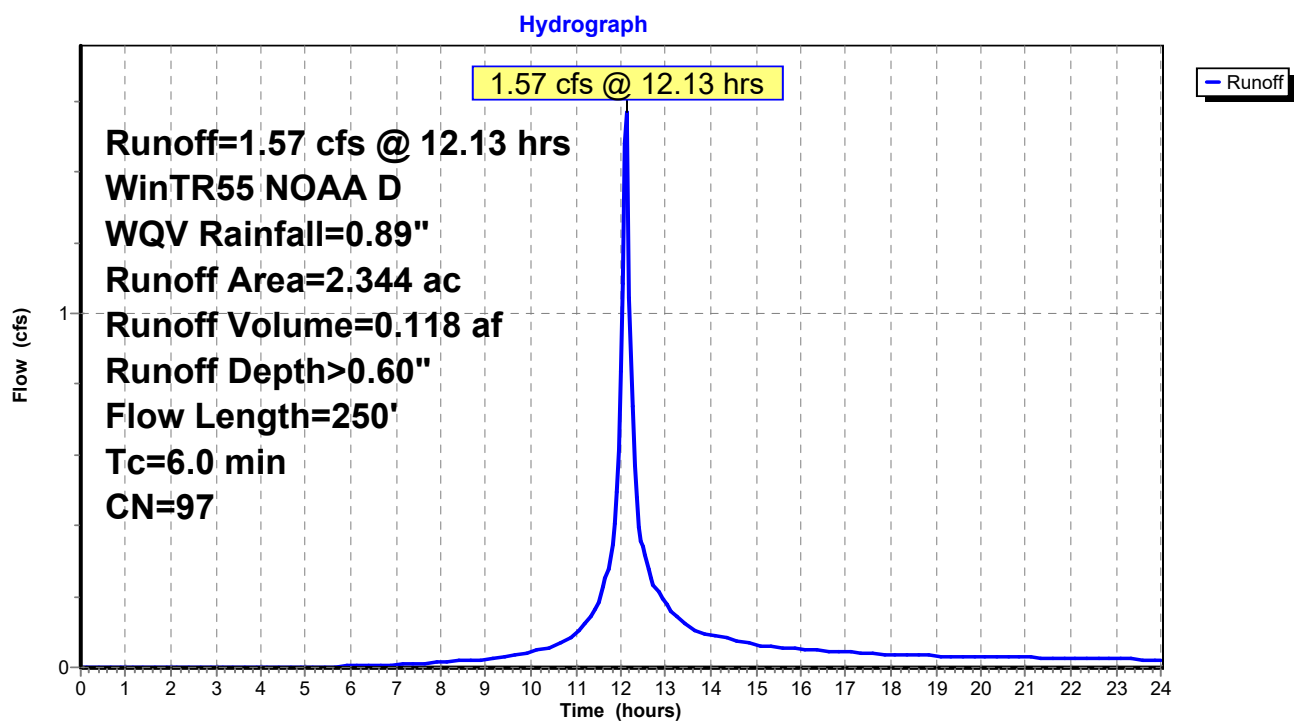
Runoff = 1.57 cfs @ 12.13 hrs, Volume= 0.118 af, Depth> 0.60"
 Routed to Pond 3P : Detention A

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 WinTR55 NOAA D WQV Rainfall=0.89"

Area (ac)	CN	Description
0.000	55	Woods, Good, HSG B
0.000	77	Woods, Good, HSG D
0.020	61	>75% Grass cover, Good, HSG B
0.110	80	>75% Grass cover, Good, HSG D
0.000	98	Paved parking, HSG B
2.214	98	Paved parking, HSG D
2.344	97	Weighted Average
0.130		5.55% Pervious Area
2.214		94.45% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.6	150	0.0200	1.55		Sheet Flow, Parking Lot Smooth surfaces n= 0.011 P2= 3.47"
0.3	50	0.0200	2.87		Shallow Concentrated Flow, Paved Slope Paved Kv= 20.3 fps
0.1	50	0.2500	8.05		Shallow Concentrated Flow, Grassed Slope Unpaved Kv= 16.1 fps
2.0	250	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 2S: PRWS-A2



Summary for Pond 3P: Detention A

Inflow Area = 2.344 ac, 94.45% Impervious, Inflow Depth > 0.60" for WQV event
 Inflow = 1.57 cfs @ 12.13 hrs, Volume= 0.118 af
 Outflow = 0.09 cfs @ 14.22 hrs, Volume= 0.073 af, Atten= 95%, Lag= 125.3 min
 Discarded = 0.06 cfs @ 10.90 hrs, Volume= 0.067 af
 Primary = 0.03 cfs @ 14.22 hrs, Volume= 0.006 af
 Routed to Link 5L : PRWS-A

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 Peak Elev= 93.75' @ 14.22 hrs Surf.Area= 0.065 ac Storage= 0.063 af

Plug-Flow detention time= 286.1 min calculated for 0.073 af (62% of inflow)
 Center-of-Mass det. time= 174.3 min (987.9 - 813.7)

Volume	Invert	Avail.Storage	Storage Description
#1A	91.83'	0.039 af	32.00'W x 88.00'L x 7.17'H Field A 0.463 af Overall - 0.366 af Embedded = 0.097 af x 40.0% Voids
#2A	93.33'	0.287 af	retain_it retain_it 5.0' x 44 Inside #1 Inside= 84.0"W x 60.0"H => 36.41 sf x 8.00'L = 291.3 cf Outside= 96.0"W x 68.0"H => 45.33 sf x 8.00'L = 362.7 cf 4 Rows adjusted for 311.7 cf perimeter wall
#3	98.33'	0.001 af	4.00'D x 5.00'H Vertical Cone/Cylinder
		0.327 af	Total Available Storage

Storage Group A created with Chamber Wizard

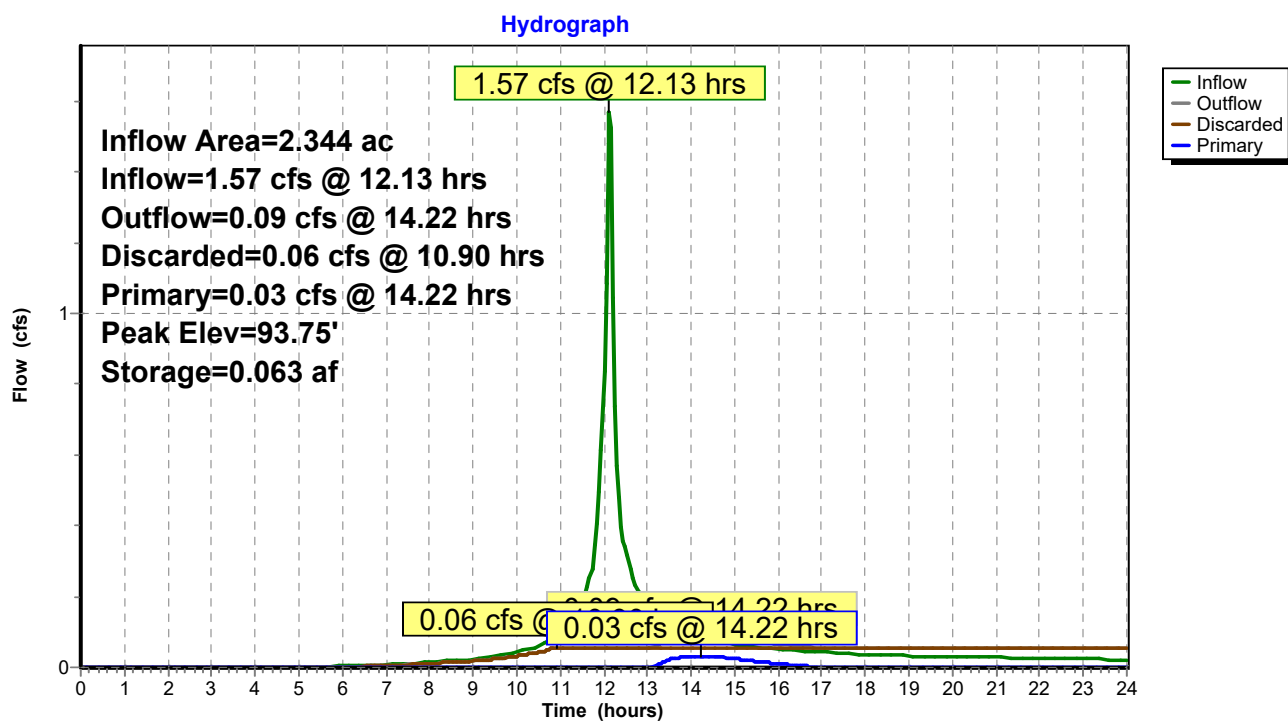
Device	Routing	Invert	Outlet Devices
#1	Primary	92.50'	15.0" Round Culvert L= 38.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 92.50' / 92.14' S= 0.0095 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf
#2	Discarded	91.83'	0.850 in/hr Exfiltration over Horizontal area
#3	Device 1	93.70'	4.0" Vert. Orifice/Grate X 3.00 C= 0.600 Limited to weir flow at low heads
#4	Device 1	96.30'	10.0" Vert. Orifice/Grate X 3.00 C= 0.600 Limited to weir flow at low heads
#5	Device 1	98.10'	4.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)

Discarded OutFlow Max=0.06 cfs @ 10.90 hrs HW=91.95' (Free Discharge)

↑ **2=Exfiltration** (Exfiltration Controls 0.06 cfs)

Primary OutFlow Max=0.02 cfs @ 14.22 hrs HW=93.75' (Free Discharge)

↑ **1=Culvert** (Passes 0.02 cfs of 4.39 cfs potential flow)
 ↑ **3=Orifice/Grate** (Orifice Controls 0.02 cfs @ 0.76 fps)
 ↑ **4=Orifice/Grate** (Controls 0.00 cfs)
 ↑ **5=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 3P: Detention A

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WinTR55 NOAA D WQV Rainfall=0.89"

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Page 79

Summary for Subcatchment 4S: PRWS-A3

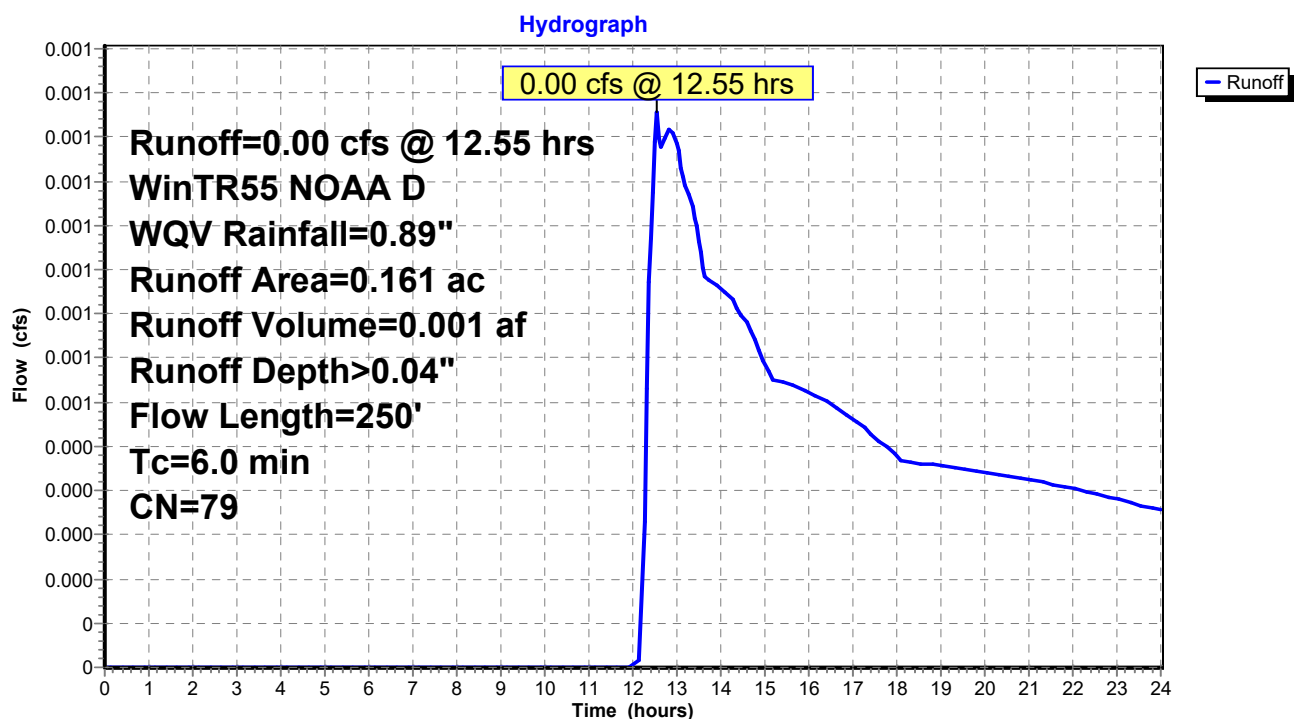
Runoff = 0.00 cfs @ 12.55 hrs, Volume= 0.001 af, Depth> 0.04"
 Routed to Link 5L : PRWS-A

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 WinTR55 NOAA D WQV Rainfall=0.89"

Area (ac)	CN	Description
0.000	55	Woods, Good, HSG B
0.000	77	Woods, Good, HSG D
0.007	61	>75% Grass cover, Good, HSG B
0.154	80	>75% Grass cover, Good, HSG D
0.000	98	Paved parking, HSG B
0.000	98	Paved parking, HSG D
0.161	79	Weighted Average
0.161		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.6	150	0.0200	1.55		Sheet Flow, Parking Lot Smooth surfaces n= 0.011 P2= 3.47"
0.3	50	0.0200	2.87		Shallow Concentrated Flow, Paved Slope Paved Kv= 20.3 fps
0.1	50	0.2500	8.05		Shallow Concentrated Flow, Grassed Slope Unpaved Kv= 16.1 fps
2.0	250	Total, Increased to minimum Tc = 6.0 min			

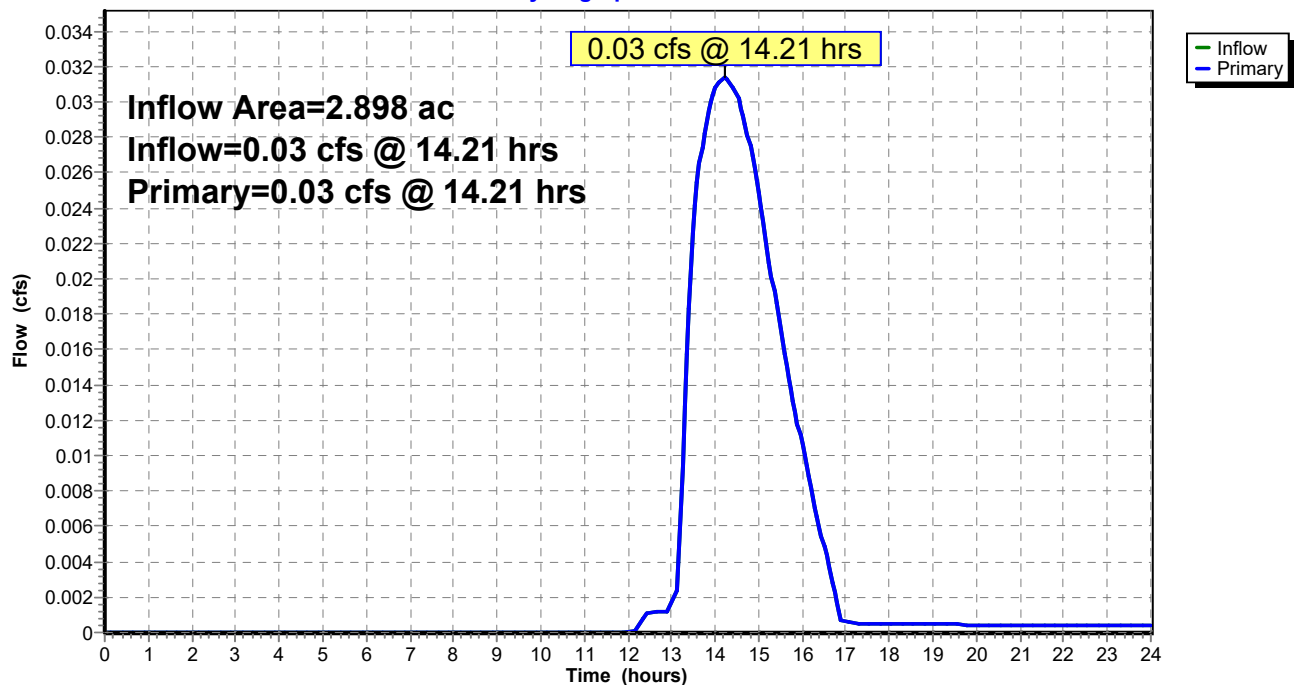
Subcatchment 4S: PRWS-A3



Summary for Link 5L: PRWS-A

Inflow Area = 2.898 ac, 76.98% Impervious, Inflow Depth > 0.03" for WQV event
Inflow = 0.03 cfs @ 14.21 hrs, Volume= 0.006 af
Primary = 0.03 cfs @ 14.21 hrs, Volume= 0.006 af, Atten= 0%, Lag= 0.0 min
Routed to Link 10L : Site

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link 5L: PRWS-A**Hydrograph**

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WinTR55 NOAA D WQV Rainfall=0.89"

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Page 82

Summary for Subcatchment 6S: PRWS-B1

Runoff = 0.00 cfs @ 12.96 hrs, Volume= 0.000 af, Depth> 0.03"
Routed to Link 9L : PRWS-B

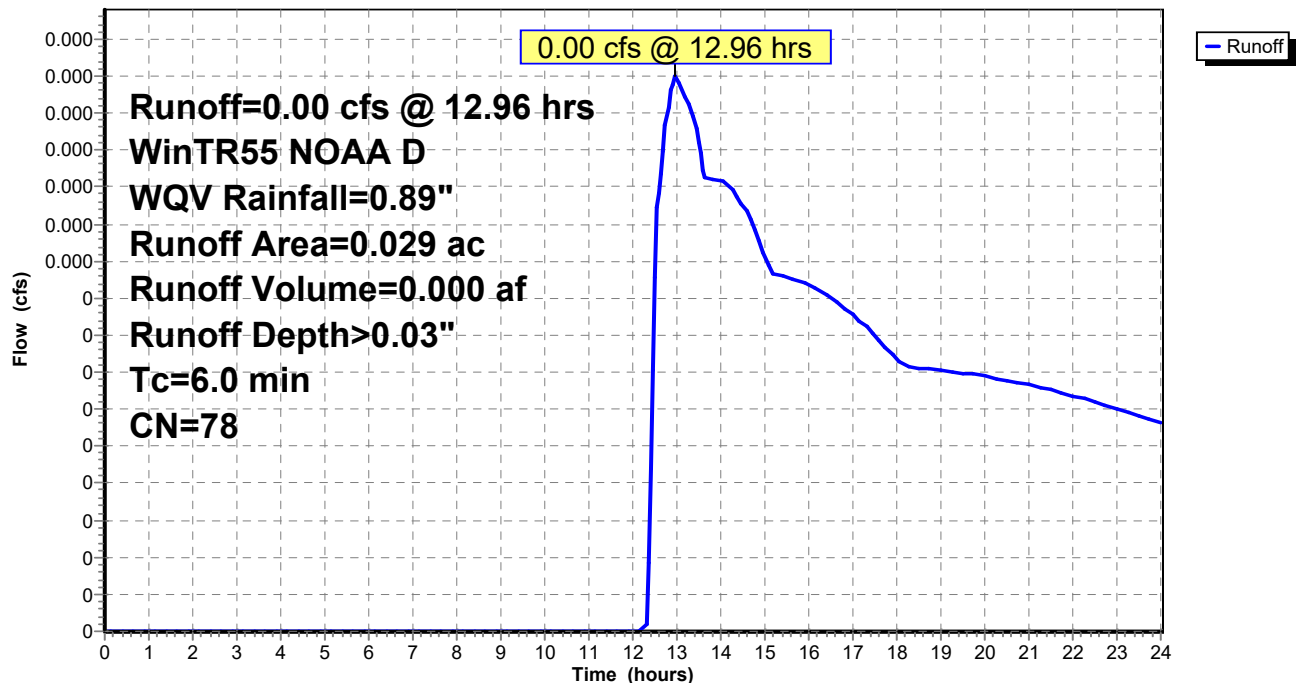
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
WinTR55 NOAA D WQV Rainfall=0.89"

Area (ac)	CN	Description
0.000	55	Woods, Good, HSG B
0.020	77	Woods, Good, HSG D
0.000	61	>75% Grass cover, Good, HSG B
0.009	80	>75% Grass cover, Good, HSG D
0.000	98	Paved parking, HSG B
0.000	98	Paved parking, HSG D
0.029	78	Weighted Average
0.029		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry, Min TC
5.0	0				Total, Increased to minimum Tc = 6.0 min

Subcatchment 6S: PRWS-B1

Hydrograph



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WinTR55 NOAA D WQV Rainfall=0.89"

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Page 83

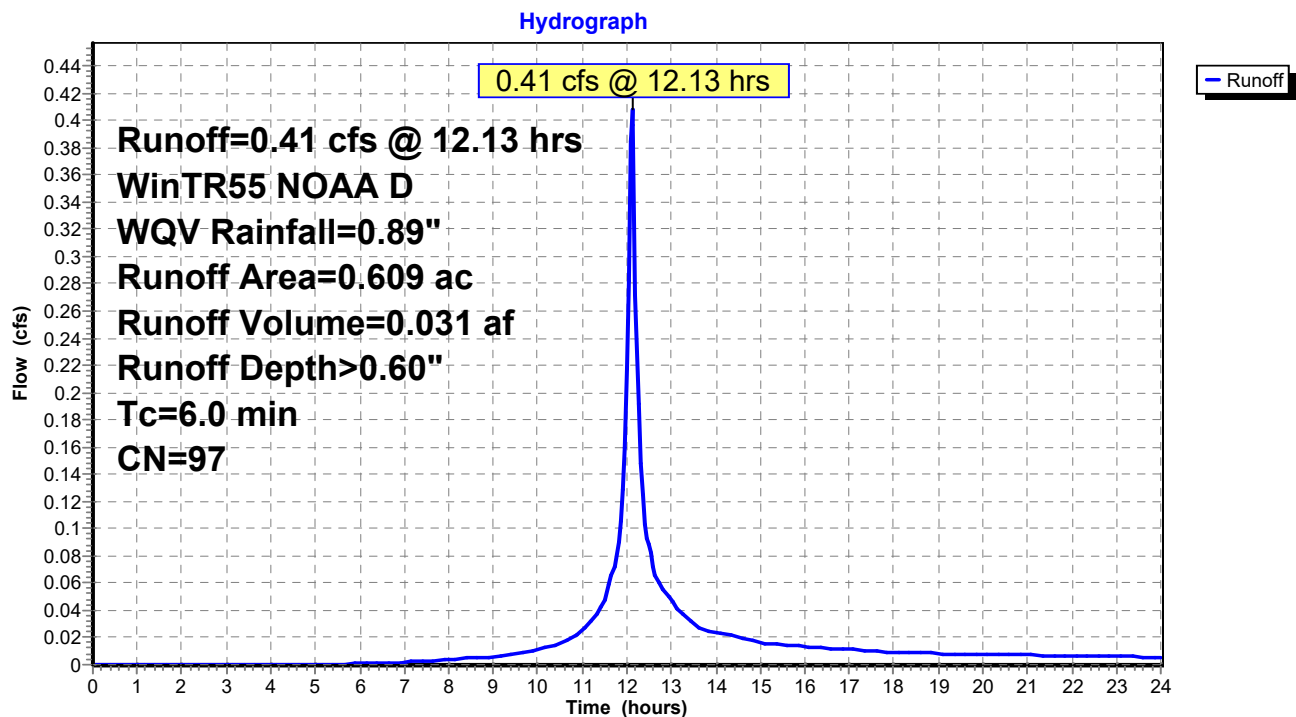
Summary for Subcatchment 7S: PRWS-B2

Runoff = 0.41 cfs @ 12.13 hrs, Volume= 0.031 af, Depth> 0.60"
Routed to Pond 8P : Detention B

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
WinTR55 NOAA D WQV Rainfall=0.89"

Area (ac)	CN	Description
0.000	55	Woods, Good, HSG B
0.000	77	Woods, Good, HSG D
0.020	61	>75% Grass cover, Good, HSG B
0.008	80	>75% Grass cover, Good, HSG D
0.000	98	Paved parking, HSG B
0.581	98	Paved parking, HSG D
0.609	97	Weighted Average
0.028		4.60% Pervious Area
0.581		95.40% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry, Min TC
5.0	0				Total, Increased to minimum Tc = 6.0 min

Subcatchment 7S: PRWS-B2

Summary for Pond 8P: Detention B

Inflow Area = 0.609 ac, 95.40% Impervious, Inflow Depth > 0.60" for WQV event
 Inflow = 0.41 cfs @ 12.13 hrs, Volume= 0.031 af
 Outflow = 0.02 cfs @ 11.30 hrs, Volume= 0.026 af, Atten= 95%, Lag= 0.0 min
 Discarded = 0.02 cfs @ 11.30 hrs, Volume= 0.026 af
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
 Routed to Link 9L : PRWS-B

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 Peak Elev= 96.25' @ 14.23 hrs Surf.Area= 0.044 ac Storage= 0.015 af

Plug-Flow detention time= 268.4 min calculated for 0.026 af (85% of inflow)
 Center-of-Mass det. time= 199.6 min (1,013.2 - 813.7)

Volume	Invert	Avail.Storage	Storage Description
#1A	95.60'	0.009 af	24.00'W x 80.00'L x 4.17'H Field A 0.184 af Overall - 0.162 af Embedded = 0.022 af x 40.0% Voids
#2A	96.10'	0.115 af	retain_it retain_it 3.0' x 30 Inside #1 Inside= 84.0"W x 36.0"H => 21.33 sf x 8.00'L = 170.6 cf Outside= 96.0"W x 44.0"H => 29.33 sf x 8.00'L = 234.7 cf 3 Rows adjusted for 122.7 cf perimeter wall
#3	99.10'	0.001 af	4.00'D x 2.00'H Vertical Cone/Cylinder
		0.124 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	97.10'	12.0" Round Culvert L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 97.10' / 97.00' S= 0.0100 ' S= 0.0100 ' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2	Discarded	95.60'	0.500 in/hr Exfiltration over Horizontal area
#3	Device 1	97.10'	5.0" Vert. 2-yr Orifice C= 0.600 Limited to weir flow at low heads
#4	Device 1	97.70'	7.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.02 cfs @ 11.30 hrs HW=95.66' (Free Discharge)

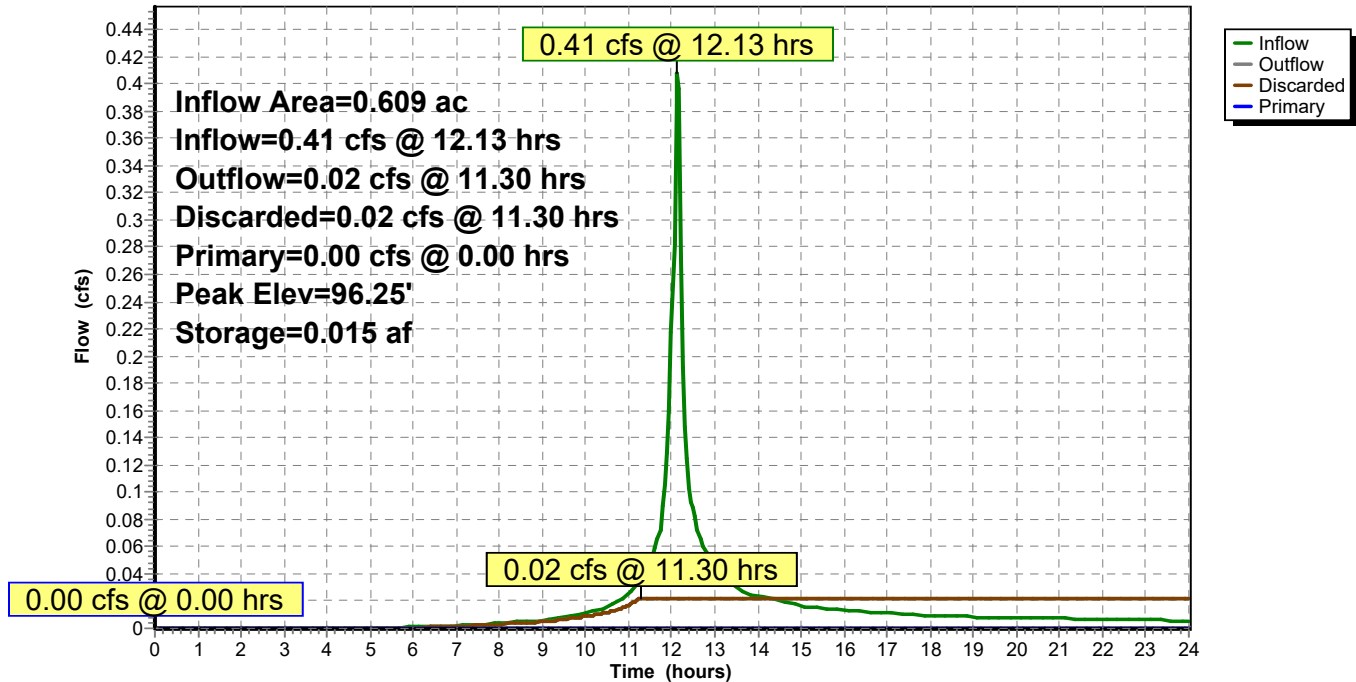
↑ **2=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=95.60' (Free Discharge)

↑ **1=Culvert** (Controls 0.00 cfs)

↑ **3=2-yr Orifice** (Controls 0.00 cfs)

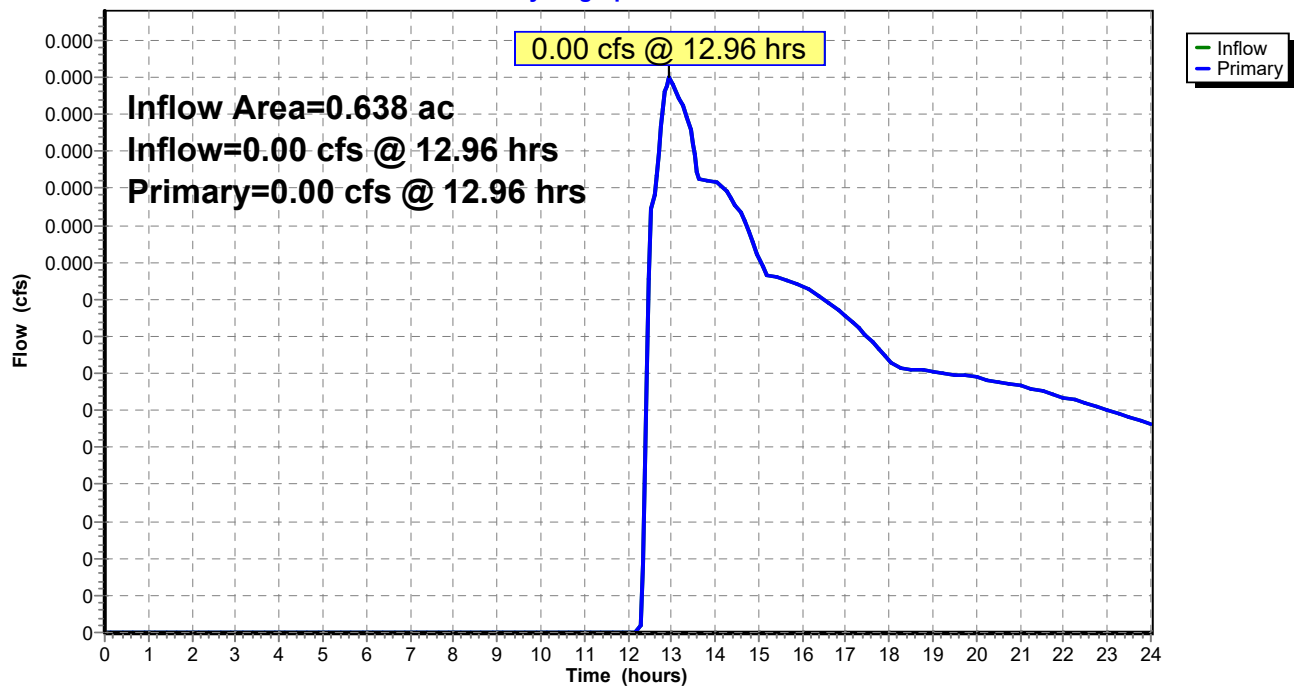
↑ **4=Orifice/Grate** (Controls 0.00 cfs)

Pond 8P: Detention B**Hydrograph**

Summary for Link 9L: PRWS-B

Inflow Area = 0.638 ac, 91.07% Impervious, Inflow Depth > 0.00" for WQV event
Inflow = 0.00 cfs @ 12.96 hrs, Volume= 0.000 af
Primary = 0.00 cfs @ 12.96 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min
Routed to Link 10L : Site

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link 9L: PRWS-B**Hydrograph**

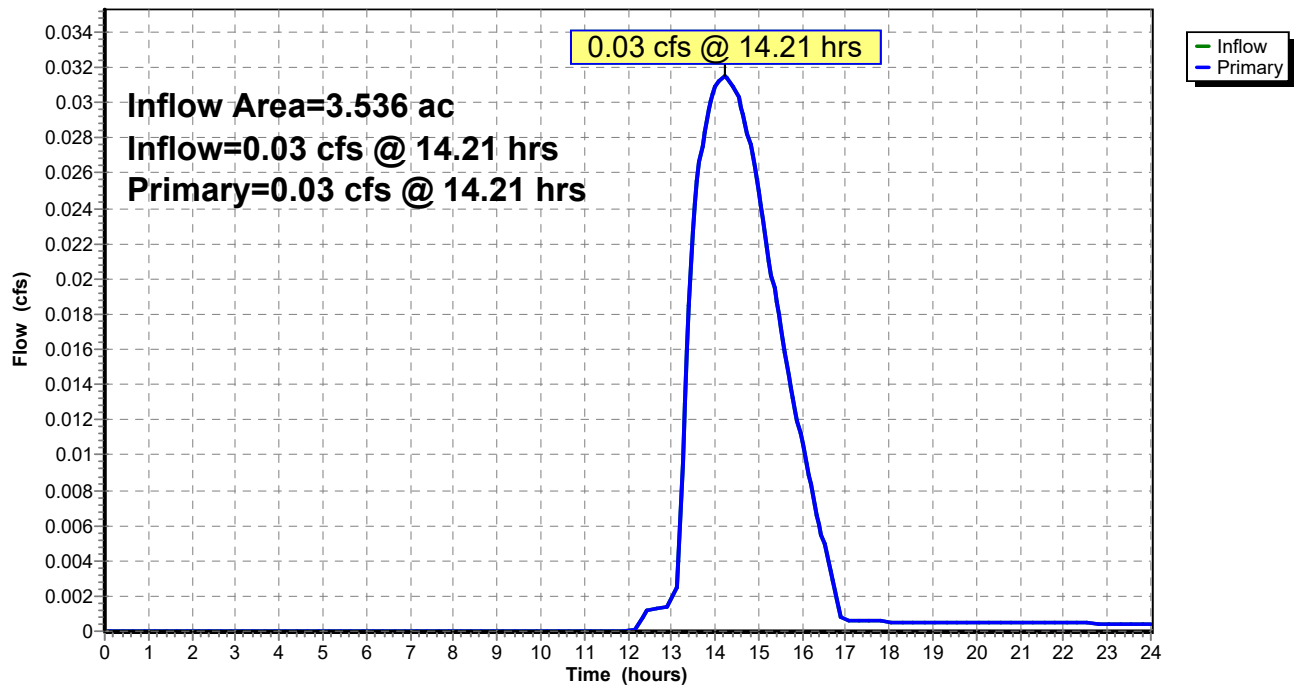
Summary for Link 10L: Site

Inflow Area = 3.536 ac, 79.52% Impervious, Inflow Depth > 0.02" for WQV event
Inflow = 0.03 cfs @ 14.21 hrs, Volume= 0.006 af
Primary = 0.03 cfs @ 14.21 hrs, Volume= 0.006 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link 10L: Site

Hydrograph



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Multi-Event Tables

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Page 88

Events for Subcatchment 1S: PRWS-A1

Event	Rainfall (inches)	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
2-yr	3.42	0.09	0.015	0.45
10-yr	5.22	0.37	0.044	1.35
25-yr	6.34	0.59	0.067	2.05
50-yr	7.17	0.77	0.085	2.61
100-yr	8.07	0.97	0.107	3.26
WQV	0.89	0.00	0.000	0.00

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Multi-Event Tables

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Page 89

Events for Subcatchment 2S: PRWS-A2

Event	Rainfall (inches)	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
2-yr	3.42	7.27	0.600	3.07
10-yr	5.22	11.23	0.950	4.86
25-yr	6.34	13.69	1.168	5.98
50-yr	7.17	15.51	1.330	6.81
100-yr	8.07	17.47	1.505	7.70
WQV	0.89	1.57	0.118	0.60

MDA PR.

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Multi-Event Tables

Printed 9/16/2025

Page 90

Events for Pond 3P: Detention A

Event	Inflow (cfs)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)	Elevation (feet)	Storage (acre-feet)
2-yr	7.27	2.01	0.06	1.96	96.28	0.208
10-yr	11.23	7.48	0.06	7.43	97.14	0.257
25-yr	13.69	9.68	0.06	9.63	97.55	0.281
50-yr	15.51	11.01	0.06	10.96	97.86	0.299
100-yr	17.47	12.62	0.06	12.56	98.19	0.318
WQV	1.57	0.09	0.06	0.03	93.75	0.063

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Multi-Event Tables

Printed 9/16/2025

Page 91

Events for Subcatchment 4S: PRWS-A3

Event	Rainfall (inches)	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
2-yr	3.42	0.28	0.020	1.50
10-yr	5.22	0.55	0.040	2.99
25-yr	6.34	0.72	0.053	3.98
50-yr	7.17	0.85	0.064	4.74
100-yr	8.07	0.99	0.075	5.57
WQV	0.89	0.00	0.001	0.04

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Page 92

Events for Link 5L: PRWS-A

Event	Inflow (cfs)	Primary (cfs)	Elevation (feet)
2-yr	2.14	2.14	0.00
10-yr	8.07	8.07	0.00
25-yr	10.59	10.59	0.00
50-yr	12.17	12.17	0.00
100-yr	14.04	14.04	0.00
WQV	0.03	0.03	0.00

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Multi-Event Tables

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Page 93

Events for Subcatchment 6S: PRWS-B1

Event	Rainfall (inches)	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
2-yr	3.42	0.05	0.003	1.43
10-yr	5.22	0.10	0.007	2.90
25-yr	6.34	0.13	0.009	3.88
50-yr	7.17	0.15	0.011	4.62
100-yr	8.07	0.18	0.013	5.45
WQV	0.89	0.00	0.000	0.03

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Multi-Event Tables

Printed 9/16/2025

Page 94

Events for Subcatchment 7S: PRWS-B2

Event	Rainfall (inches)	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
2-yr	3.42	1.89	0.156	3.07
10-yr	5.22	2.92	0.247	4.86
25-yr	6.34	3.56	0.303	5.98
50-yr	7.17	4.03	0.345	6.81
100-yr	8.07	4.54	0.391	7.70
WQV	0.89	0.41	0.031	0.60

Events for Pond 8P: Detention B

Event	Inflow (cfs)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)	Elevation (feet)	Storage (acre-feet)
2-yr	1.89	0.45	0.02	0.43	97.72	0.071
10-yr	2.92	1.48	0.02	1.45	98.36	0.095
25-yr	3.56	1.84	0.02	1.81	98.66	0.107
50-yr	4.03	2.04	0.02	2.02	98.86	0.114
100-yr	4.54	2.24	0.02	2.22	99.08	0.123
WQV	0.41	0.02	0.02	0.00	96.25	0.015

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Multi-Event Tables

Printed 9/16/2025

Page 96

Events for Link 9L: PRWS-B

Event	Inflow (cfs)	Primary (cfs)	Elevation (feet)
2-yr	0.44	0.44	0.00
10-yr	1.51	1.51	0.00
25-yr	1.89	1.89	0.00
50-yr	2.11	2.11	0.00
100-yr	2.32	2.32	0.00
WQV	0.00	0.00	0.00

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Multi-Event Tables

Printed 9/16/2025

Page 97

Events for Link 10L: Site

Event	Inflow (cfs)	Primary (cfs)	Elevation (feet)
2-yr	2.57	2.57	0.00
10-yr	9.58	9.58	0.00
25-yr	12.47	12.47	0.00
50-yr	14.26	14.26	0.00
100-yr	16.34	16.34	0.00
WQV	0.03	0.03	0.00

APPENDIX C

NOAA Rainfall Data

Storm Sewer Tabulation

Station		Len (ft)	Drng Area		Rnoff coeff (C)	Area x C		Tc		Rain (I) (in/hr)	Total flow (cfs)	Cap full (cfs)	Vel (ft/s)	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID	
Line	To Line		Incr (ac)	Total (ac)		Incr (min)	Total (min)	Inlet (min)	Syst (min)					Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)		
1	End	17.288	0.00	1.52	0.00	0.00	1.33	6.0	7.8	6.2	8.32	12.24	5.89	18	1.16	93.90	94.10	95.02	95.22	95.06	102.44	A2-102	
2	1	58.544	0.52	1.13	0.90	0.47	1.02	6.0	7.4	6.4	6.53	10.02	6.07	15	2.05	94.20	95.40	95.22	96.43	102.44	103.13	102-103	
3	2	149.675	0.10	0.40	0.90	0.09	0.36	6.0	6.7	6.7	2.41	3.86	3.77	12	1.00	95.50	97.00	96.43	97.66	103.13	103.04	103-104	
4	3	148.114	0.00	0.30	0.00	0.00	0.27	6.0	6.1	7.0	1.89	3.88	4.05	12	1.01	97.10	98.60	97.66	99.19	103.04	102.64	104-105	
5	4	21.681	0.30	0.30	0.90	0.27	0.27	6.0	6.0	7.1	1.90	3.89	3.98	12	1.01	98.60	98.82	99.19	99.41	102.64	103.00	105-106	
6	1	47.469	0.06	0.39	0.80	0.05	0.32	6.0	7.6	6.3	2.01	3.96	3.29	12	1.05	94.20	94.70	95.22	95.31	102.44	103.31	102-108	
7	6	127.431	0.08	0.33	0.75	0.06	0.27	6.0	7.0	6.6	1.77	3.74	3.62	12	0.94	94.80	96.00	95.43	96.57	103.31	103.00	108-109	
8	7	69.274	0.12	0.25	0.83	0.10	0.21	6.0	6.7	6.7	1.40	3.88	3.74	12	1.01	96.10	96.80	96.57	97.30	103.00	102.19	109-110	
9	8	111.096	0.13	0.13	0.84	0.11	0.11	6.0	6.0	7.1	0.77	3.84	2.79	12	0.99	96.90	98.00	97.30	98.37	102.19	102.07	110-111	
10	2	111.307	0.21	0.21	0.90	0.19	0.19	6.0	6.0	7.1	1.33	2.25	4.09	8	2.96	95.50	98.80	96.43	99.34	103.13	101.81	103-107	
11	End	10.000	0.00	0.61	0.00	0.00	0.53	6.0	6.2	7.0	3.70	3.86	5.37	12	1.00	97.10	97.20	97.92	98.02	97.18	100.31	B2-202	
12	11	46.746	0.61	0.61	0.87	0.53	0.53	6.0	6.0	7.1	3.74	3.09	4.77	12	0.64	97.20	97.50	98.20	98.64	100.31	99.38	202-203	
13	End	31.500	0.00	0.00	0.00	0.00	0.00	6.0	6.0	0.0	1.68	5.83	3.79	12	2.29	96.38	97.10	96.93	97.65	0.00	101.50	200-201	
14	13	23.423	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	1.68	0.00	3.21	12	0.00	97.10	97.10	97.65	97.86	101.50	101.00	201-B1	
15	End	50.262	0.86	0.86	0.85	0.73	0.73	6.0	6.0	7.1	5.16	5.44	6.57	12	1.99	95.00	96.00	96.42	97.32	95.16	100.13	A3-112	
16	End	32.665	0.00	0.00	0.00	0.00	0.00	6.0	15.0	0.0	7.03	7.34	6.50	15	1.10	92.14	92.50	93.14	93.56	100.11	102.22	100-101	
17	16	7.727	0.00	0.00	0.00	0.00	0.00	15.0	15.0	0.0	7.03	0.00	6.03	15	0.00	93.60	93.60	94.66	94.85	102.22	102.25	101-A1	
18	End	42.875	0.02	0.02	0.90	0.02	0.02	6.0	6.0	7.1	0.13	1.99	2.02	6	8.75	93.00	96.75	93.18	96.93	97.23	97.80	300-301	
Project File: MDA.stm																Number of lines: 18				Run Date: 9/12/2025			
NOTES:Intensity = 33.73 / (Inlet time + 3.40) ^ 0.70; Return period =Yrs. 10 ; c = cir e = ellip b = box																							

APPENDIX D

Storm Sewer Network Calculations



POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sandra Pavlovic, Michael St. Laurent, Carl Trypaluk, Dale Unruh, Orlan Wilhite

NOAA, National Weather Service, Silver Spring, Maryland

[PF tabular](#) | [PF graphical](#) | [Maps & aeriels](#)

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches/hour) ¹										
Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	4.12 (3.37-5.00)	4.97 (4.07-6.05)	6.36 (5.18-7.76)	7.51 (6.08-9.23)	9.11 (7.07-11.7)	10.3 (7.80-13.5)	11.6 (8.44-15.7)	13.0 (8.87-18.0)	15.0 (9.79-21.6)	16.7 (10.6-24.4)
10-min	2.92 (2.39-3.54)	3.52 (2.88-4.28)	4.50 (3.67-5.50)	5.32 (4.30-6.53)	6.45 (5.01-8.27)	7.30 (5.52-9.56)	8.19 (5.97-11.1)	9.20 (6.28-12.8)	10.6 (6.94-15.3)	11.8 (7.49-17.3)
15-min	2.28 (1.87-2.78)	2.76 (2.26-3.36)	3.54 (2.88-4.32)	4.18 (3.38-5.13)	5.06 (3.93-6.49)	5.72 (4.33-7.50)	6.42 (4.68-8.72)	7.21 (4.93-10.0)	8.35 (5.44-12.0)	9.28 (5.88-13.6)
30-min	1.57 (1.29-1.91)	1.90 (1.55-2.31)	2.43 (1.98-2.97)	2.87 (2.32-3.52)	3.48 (2.70-4.46)	3.94 (2.98-5.15)	4.42 (3.22-6.00)	4.96 (3.39-6.87)	5.74 (3.74-8.23)	6.38 (4.04-9.33)
60-min	1.00 (0.819-1.22)	1.21 (0.988-1.47)	1.55 (1.26-1.89)	1.83 (1.48-2.24)	2.21 (1.72-2.84)	2.51 (1.90-3.28)	2.81 (2.05-3.82)	3.16 (2.15-4.37)	3.65 (2.38-5.24)	4.06 (2.57-5.93)
2-hr	0.650 (0.536-0.785)	0.788 (0.649-0.953)	1.01 (0.832-1.23)	1.20 (0.978-1.47)	1.46 (1.14-1.86)	1.65 (1.26-2.15)	1.86 (1.36-2.51)	2.09 (1.44-2.88)	2.44 (1.60-3.48)	2.73 (1.74-3.97)
3-hr	0.502 (0.415-0.604)	0.609 (0.503-0.733)	0.784 (0.645-0.947)	0.929 (0.759-1.13)	1.13 (0.885-1.44)	1.28 (0.978-1.66)	1.44 (1.06-1.94)	1.62 (1.12-2.23)	1.90 (1.24-2.70)	2.13 (1.36-3.08)
6-hr	0.321 (0.267-0.383)	0.388 (0.323-0.464)	0.498 (0.413-0.598)	0.590 (0.485-0.712)	0.715 (0.565-0.904)	0.809 (0.622-1.05)	0.909 (0.675-1.22)	1.03 (0.708-1.40)	1.20 (0.791-1.70)	1.35 (0.863-1.94)
12-hr	0.199 (0.167-0.236)	0.240 (0.201-0.285)	0.306 (0.255-0.365)	0.362 (0.299-0.433)	0.438 (0.347-0.549)	0.494 (0.382-0.634)	0.555 (0.414-0.740)	0.627 (0.434-0.848)	0.733 (0.483-1.03)	0.823 (0.527-1.18)
24-hr	0.117 (0.099-0.138)	0.142 (0.120-0.168)	0.183 (0.154-0.217)	0.217 (0.181-0.259)	0.264 (0.211-0.330)	0.299 (0.233-0.381)	0.336 (0.252-0.447)	0.381 (0.265-0.513)	0.449 (0.297-0.625)	0.508 (0.326-0.720)
2-day	0.066 (0.056-0.077)	0.081 (0.069-0.095)	0.106 (0.090-0.125)	0.127 (0.106-0.150)	0.155 (0.125-0.193)	0.177 (0.139-0.225)	0.200 (0.151-0.266)	0.228 (0.159-0.305)	0.273 (0.181-0.378)	0.312 (0.201-0.440)
3-day	0.047 (0.040-0.055)	0.059 (0.050-0.068)	0.077 (0.065-0.090)	0.092 (0.078-0.109)	0.113 (0.091-0.140)	0.129 (0.101-0.163)	0.146 (0.111-0.193)	0.167 (0.117-0.222)	0.200 (0.133-0.276)	0.229 (0.148-0.321)
4-day	0.038 (0.033-0.044)	0.047 (0.040-0.055)	0.062 (0.052-0.072)	0.074 (0.062-0.086)	0.090 (0.073-0.111)	0.102 (0.081-0.130)	0.116 (0.088-0.153)	0.133 (0.093-0.176)	0.159 (0.106-0.218)	0.181 (0.117-0.254)
7-day	0.026 (0.022-0.030)	0.031 (0.027-0.036)	0.040 (0.034-0.047)	0.048 (0.041-0.056)	0.058 (0.047-0.071)	0.066 (0.052-0.082)	0.074 (0.056-0.097)	0.084 (0.059-0.111)	0.099 (0.066-0.135)	0.112 (0.073-0.156)
10-day	0.021 (0.018-0.024)	0.025 (0.021-0.029)	0.031 (0.027-0.036)	0.037 (0.031-0.043)	0.044 (0.036-0.054)	0.050 (0.040-0.062)	0.056 (0.043-0.073)	0.063 (0.044-0.083)	0.074 (0.049-0.100)	0.083 (0.054-0.114)
20-day	0.015 (0.013-0.017)	0.017 (0.015-0.019)	0.020 (0.018-0.023)	0.023 (0.020-0.027)	0.027 (0.022-0.033)	0.031 (0.024-0.037)	0.034 (0.026-0.043)	0.037 (0.026-0.048)	0.042 (0.028-0.057)	0.046 (0.030-0.064)
30-day	0.012 (0.011-0.014)	0.014 (0.012-0.016)	0.016 (0.014-0.019)	0.018 (0.016-0.021)	0.021 (0.017-0.025)	0.023 (0.018-0.028)	0.025 (0.019-0.032)	0.028 (0.020-0.036)	0.031 (0.021-0.041)	0.033 (0.022-0.046)
45-day	0.010 (0.009-0.012)	0.011 (0.010-0.013)	0.013 (0.011-0.015)	0.014 (0.012-0.016)	0.016 (0.013-0.019)	0.018 (0.014-0.021)	0.019 (0.015-0.024)	0.021 (0.015-0.027)	0.023 (0.015-0.030)	0.024 (0.016-0.033)
60-day	0.009 (0.008-0.010)	0.010 (0.008-0.011)	0.011 (0.010-0.012)	0.012 (0.010-0.014)	0.014 (0.011-0.016)	0.015 (0.012-0.018)	0.016 (0.012-0.020)	0.017 (0.012-0.022)	0.018 (0.012-0.024)	0.019 (0.013-0.026)
¹ Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS). Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values. Please refer to NOAA Atlas 14 document for more information.										

[Back to Top](#)

PF graphical



POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sandra Pavlovic, Michael St. Laurent, Carl Trypaluk, Dale Unruh, Orlan Wilhite

NOAA, National Weather Service, Silver Spring, Maryland

[PF_tabular](#) | [PF_graphical](#) | [Maps & aeriels](#)

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches) ¹										
Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.343 (0.281-0.417)	0.414 (0.339-0.504)	0.530 (0.432-0.647)	0.626 (0.507-0.769)	0.759 (0.589-0.973)	0.859 (0.650-1.13)	0.964 (0.703-1.31)	1.08 (0.739-1.50)	1.25 (0.816-1.80)	1.39 (0.881-2.04)
10-min	0.486 (0.398-0.590)	0.586 (0.480-0.713)	0.750 (0.611-0.916)	0.887 (0.717-1.09)	1.08 (0.835-1.38)	1.22 (0.920-1.59)	1.37 (0.995-1.85)	1.53 (1.05-2.13)	1.77 (1.16-2.55)	1.97 (1.25-2.89)
15-min	0.571 (0.468-0.695)	0.690 (0.564-0.839)	0.884 (0.721-1.08)	1.04 (0.844-1.28)	1.26 (0.982-1.62)	1.43 (1.08-1.87)	1.61 (1.17-2.18)	1.80 (1.23-2.50)	2.09 (1.36-2.99)	2.32 (1.47-3.40)
30-min	0.786 (0.644-0.955)	0.949 (0.776-1.15)	1.22 (0.990-1.48)	1.44 (1.16-1.76)	1.74 (1.35-2.23)	1.97 (1.49-2.58)	2.21 (1.61-3.00)	2.48 (1.69-3.44)	2.87 (1.87-4.11)	3.19 (2.02-4.67)
60-min	1.00 (0.819-1.22)	1.21 (0.988-1.47)	1.55 (1.26-1.89)	1.83 (1.48-2.24)	2.21 (1.72-2.84)	2.51 (1.90-3.28)	2.81 (2.05-3.82)	3.16 (2.15-4.37)	3.65 (2.38-5.24)	4.06 (2.57-5.93)
2-hr	1.30 (1.07-1.57)	1.58 (1.30-1.91)	2.03 (1.66-2.46)	2.40 (1.96-2.93)	2.92 (2.28-3.72)	3.30 (2.52-4.31)	3.71 (2.73-5.03)	4.19 (2.87-5.77)	4.89 (3.19-6.96)	5.47 (3.47-7.95)
3-hr	1.51 (1.25-1.81)	1.83 (1.51-2.20)	2.35 (1.94-2.84)	2.79 (2.28-3.39)	3.39 (2.66-4.31)	3.84 (2.94-4.99)	4.32 (3.18-5.83)	4.87 (3.35-6.69)	5.70 (3.73-8.10)	6.40 (4.07-9.26)
6-hr	1.92 (1.60-2.30)	2.33 (1.93-2.78)	2.99 (2.47-3.58)	3.53 (2.90-4.26)	4.28 (3.38-5.41)	4.85 (3.73-6.26)	5.45 (4.04-7.32)	6.15 (4.24-8.39)	7.21 (4.74-10.2)	8.10 (5.17-11.6)
12-hr	2.40 (2.01-2.84)	2.89 (2.42-3.43)	3.69 (3.07-4.40)	4.36 (3.60-5.22)	5.27 (4.18-6.62)	5.96 (4.61-7.64)	6.69 (4.98-8.92)	7.55 (5.23-10.2)	8.83 (5.82-12.4)	9.92 (6.35-14.2)
24-hr	2.82 (2.38-3.32)	3.42 (2.88-4.04)	4.40 (3.69-5.21)	5.22 (4.34-6.21)	6.34 (5.06-7.91)	7.17 (5.58-9.15)	8.07 (6.06-10.7)	9.15 (6.36-12.3)	10.8 (7.13-15.0)	12.2 (7.82-17.3)
2-day	3.15 (2.68-3.69)	3.89 (3.30-4.56)	5.09 (4.30-5.99)	6.09 (5.10-7.20)	7.46 (6.01-9.28)	8.47 (6.65-10.8)	9.58 (7.27-12.7)	11.0 (7.64-14.7)	13.1 (8.70-18.1)	15.0 (9.65-21.1)
3-day	3.41 (2.91-3.98)	4.22 (3.60-4.93)	5.55 (4.70-6.50)	6.64 (5.59-7.82)	8.15 (6.59-10.1)	9.26 (7.30-11.8)	10.5 (7.98-13.9)	12.0 (8.39-16.0)	14.4 (9.57-19.8)	16.5 (10.6-23.1)
4-day	3.66 (3.13-4.25)	4.51 (3.85-5.25)	5.91 (5.02-6.90)	7.07 (5.96-8.30)	8.66 (7.01-10.7)	9.83 (7.76-12.4)	11.1 (8.47-14.7)	12.7 (8.90-16.9)	15.2 (10.1-20.9)	17.4 (11.2-24.3)
7-day	4.34 (3.73-5.02)	5.26 (4.52-6.09)	6.78 (5.79-7.87)	8.03 (6.81-9.38)	9.76 (7.93-12.0)	11.0 (8.73-13.8)	12.4 (9.47-16.2)	14.1 (9.91-18.6)	16.7 (11.1-22.8)	18.9 (12.2-26.2)
10-day	5.01 (4.32-5.77)	5.97 (5.14-6.89)	7.55 (6.48-8.74)	8.86 (7.54-10.3)	10.7 (8.68-13.0)	12.0 (9.51-14.9)	13.4 (10.2-17.4)	15.1 (10.7-19.9)	17.7 (11.8-24.0)	19.8 (12.8-27.5)
20-day	7.07 (6.14-8.08)	8.11 (7.03-9.29)	9.81 (8.47-11.3)	11.2 (9.61-13.0)	13.2 (10.8-15.8)	14.6 (11.6-18.0)	16.2 (12.3-20.6)	17.9 (12.7-23.3)	20.3 (13.6-27.3)	22.2 (14.4-30.6)
30-day	8.80 (7.67-10.0)	9.88 (8.61-11.3)	11.7 (10.1-13.3)	13.1 (11.3-15.1)	15.2 (12.4-18.1)	16.7 (13.3-20.3)	18.3 (13.9-23.0)	19.9 (14.2-25.9)	22.2 (15.0-29.8)	24.0 (15.6-32.8)
45-day	11.0 (9.59-12.4)	12.1 (10.6-13.7)	13.9 (12.1-15.9)	15.5 (13.3-17.7)	17.6 (14.4-20.8)	19.2 (15.3-23.2)	20.8 (15.8-25.9)	22.4 (16.0-28.9)	24.5 (16.6-32.7)	26.0 (17.0-35.5)
60-day	12.8 (11.2-14.4)	13.9 (12.2-15.8)	15.8 (13.8-18.0)	17.4 (15.0-19.9)	19.5 (16.1-23.1)	21.2 (16.9-25.5)	22.9 (17.3-28.2)	24.4 (17.5-31.4)	26.3 (17.8-35.0)	27.6 (18.0-37.6)

¹ Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS). Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values. Please refer to NOAA Atlas 14 document for more information.

[Back to Top](#)

PF graphical

APPENDIX E

Supporting Calculations

Project West Haven Macdermid Alpha

By JAD Date 9/12/2025

Location West Haven, CT

Checked BP Date 9/17/2025

Circle one: Present Developed

Job No. 140324701

1. Rational 'C' Runoff Coefficient & Area Calculations

Catchment Area	Total Area		Impervious (C=.9)		Gravel (C=0.6)		Pervious (C=0.3)		Percent Impervious	C
	SF	AC	SF	AC	SF	AC	SF	AC		
WQU-112	37,556	0.86	34,453	0.79	0	0.00	3,103	0.07	92%	0.85
CLCB-108	2,831	0.06	2,359	0.05	0	0.00	472	0.01	83%	0.80
CCB-109	3,591	0.08	2,708	0.06	0	0.00	883	0.02	75%	0.75
CCB-110	5,032	0.12	4,466	0.10	0	0.00	566	0.01	89%	0.83
CCB-111	5,663	0.13	5,111	0.12	0	0.00	552	0.01	90%	0.84
CCB-107	8,991	0.21	8,938	0.21	0	0.00	53	0.00	99%	0.90
CLCB-104	4,191	0.10	4,191	0.10	0	0.00	0	0.00	100%	0.90
RL-102	22,503	0.52	22,503	0.52	0	0.00	0	0.00	100%	0.90
RL-106	13,193	0.30	13,193	0.30	0	0.00	0	0.00	100%	0.90
CLCB-203	26,545	0.61	25,236	0.58	0	0.00	1,309	0.03	95%	0.87

$$WQV = \frac{(P)(R)(A)}{12}$$

where:

WQV = water quality volume (cubic feet)

P = 1.3 inches (90th percentile rainfall event)

R = volumetric runoff coefficient = $0.05 + 0.009(I)$

I = post- development impervious area (percent) after application of non-structural LID site planning and design strategies and before application of structural stormwater BMPs

A = post-development total drainage area of site or design point (square feet)

Project	140324701 MacDermind Alpha New Process Building	Date	9/16/2025
Location	West Haven, CT	By	BTM

PRWS-A

Area (SF) 126,255

Impervious (SF) 97,222

I 0.77

R 0.7430

WQV (CF) 10,163

RRV (CF) 5,082

PRWS-B

Area (SF) 26,621

Impervious (SF) 25,351

I 0.95

R 0.9071

WQV (CF) 2,616

RRV (CF) 1,308

APPENDIX F

Stormwater Operations & Maintenance Plan

Stormwater Management System Operation and Maintenance Plan

MacDermind Alpha New Process Building, 350 Frontage Rd.

Regular inspection and maintenance of the stormwater management system and uphill areas is necessary to ensure proper operation. Inspections of the stormwater management system and pavement areas should be conducted monthly and should follow the schedule outlined in the sections below:

SITE AREAS:

Inspection and Maintenance

<i>Check for:</i>	<i>Corrective Measure:</i>
Erosion	Install erosion control measures and provide stabilization measures.
Spillage	Contain spill as close to source as possible with a dike of absorbent materials installed to protect drainage inlets, stormwater areas, or downstream wetlands and streams. All hazardous waste material, including absorbent materials must be disposed of by a licensed hazardous waste transporter and disposed of in an environmentally acceptable manner.
Sediment Accumulation	Stabilize any disturbed areas uphill of where the sedimentation is occurring. Use temporary erosion control measures (i.e. silt fence, straw bales) to filter stormwater runoff.
Trash	Pick up and dispose of trash and litter in an environmentally acceptable manner.

At a minimum the following maintenance measures shall be provided at the frequency listed in the following table:

Routine Maintenance

<i>Maintenance Measure:</i>	<i>Frequency:</i>
Pavement Sweeping	Minimum two times per year: during spring cleanup (after last snow event) and during fall cleanup (to remove fallen leaves).
Pavement De-icing	Apply anti-icing treatment prior to storms. Apply deicing treatments as needed during and after snow storms and mixed precipitation events to control ice and compact snow not removed during plowing

CATCH BASINS, YARD DRAINS, AND PIPES:

All catch basins shall be inspected annually.

Inspection and Maintenance

<i>Check for:</i>	<i>Corrective Measure:</i>
Trash, Sediment, and Debris at CB Grate	Remove trash, sediment, and debris and dispose of in an environmentally acceptable manner.
Sediment & Trash Accumulation in Sump	Remove sediment from sumps if depth of deposits is greater than one-half the depth from the bottom of the catch basin to the invert of the lowest pipe in the catch basin.
Pipe blockages	Flush pipes to remove blockages. TV inspect as required.

Stormwater Management System Operation and Maintenance Plan MacDermind Alpha New Process Building, 350 Frontage Rd.

At a minimum the following maintenance measures shall be provided at the frequency listed in the following table:

Routine Maintenance

<i>Maintenance Measure:</i>	<i>Frequency:</i>
Sediment Removal	Minimum one time per year. Remove accumulated sediment and trash from catch basin sumps, grates and pipe inverts. Dispose of sediment and trash in an environmentally acceptable manner.

WATER QUALITY UNITS

Water Quality Units shall be inspected monthly.

Inspection and Maintenance

<i>Check for:</i>	<i>Corrective Measure:</i>
Sediment Accumulation	Remove sediment when accumulation exceeds 75% of capacity in the isolated sump or when an appreciable level of hydrocarbons and trash has accumulated per manufacturer's specifications.
Trash and Debris	Remove trash and debris and dispose of in an environmentally acceptable manner.
Hydrocarbons	Clean out water quality unit sump immediately following any recorded petroleum spill. May be performed using vacuum pump or absorbent pads.

At a minimum the following maintenance measures shall be provided at the frequency listed in the following table:

Routine Maintenance

<i>Maintenance Measure:</i>	<i>Frequency:</i>
Sediment Removal	Inspected at a minimum immediately after completion of the site's construction and twice a year afterwards. Remove sediment accumulation as required. Dispose of sediment in an environmentally acceptable manner.
Trash and Debris	Inspected at a minimum immediately after completion of the site's construction and twice a year afterwards. Dispose trash in an environmentally acceptable manner.

In addition to the above measures, water quality units are to be inspected and maintained per manufacturer's specifications. Product information is attached.

Stormwater Management System Operation and Maintenance Plan MacDermind Alpha New Process Building, 350 Frontage Rd.

DETENTION PONDS

Detention Ponds shall be inspected monthly. Inspect after every major storm during the first three months of operation and monthly thereafter.

Inspection and Maintenance

<i>Check for:</i>	<i>Corrective Measure:</i>
Sediment Accumulation	Remove sediment from the detention pond as necessary. Wait until floor of the pond is thoroughly dry before removing sediment.
Erosion and cracking	Install erosion control measures and provide stabilization measures. Undercut or eroded areas shall be repaired within 30 days of documentation.
Trash and Debris	Remove trash, dead branches, and debris from pond and dispose of in an environmentally acceptable manner.
Invasive and Excess Vegetation	Remove excess vegetation, weeds and invasive species from the rain pond. Revegetate as needed.
Condition of stone inlets	Area should be cleared of all sediment deposits and invasive plant species. Damage and deterioration of the area shall be repaired immediately.

At a minimum the following maintenance measures shall be provided at the frequency listed in the following table:

Routine Maintenance

<i>Maintenance Measure:</i>	<i>Frequency:</i>
Weeding & Mowing	Mow grass within infiltration basin to a height of 3 to 6 inches. Maintain healthy grass cover; re-seed as necessary. Remove trash and debris, grass clippings and accumulated organic matter.

UNDERGROUND INFILTRATION SYSTEMS

Underground infiltration systems shall be inspected twice per year at a minimum. Inspect after every major storm during the first three months of operation and monthly thereafter.

Inspection and Maintenance

<i>Check for:</i>	<i>Corrective Measure:</i>
Sediment Accumulation	Remove sediment from the isolator row as necessary. Inspect the remainder of the system annually. Remove debris, sediment and floatables using a high-pressure water nozzle and vacuum truck

Stormwater Management System Operation and Maintenance Plan MacDermind Alpha New Process Building, 350 Frontage Rd.

VEGETATED SWALES

The grass drainage channel shall be inspected monthly. Inspect after every major storm during the first three months of operation and monthly thereafter.

Inspection and Maintenance

<i>Check for:</i>	<i>Corrective Measure:</i>
Sediment Accumulation	Remove sediment from the channel as necessary. Wait until floor of the channel is thoroughly dry before removing sediment.
Erosion and cracking	Install erosion control measures and provide stabilization measures. Undercut or eroded areas shall be repaired within 30 days of documentation.
Trash and Debris	Remove trash, dead branches, and debris from channel and dispose of in an environmentally acceptable manner.
Invasive and Excess Vegetation	Remove excess vegetation and invasive species from the rain garden. Revegetate as needed.
Condition of stone inlets	Area should be cleared of all sediment deposits and invasive plant species. Damage and deterioration of the area shall be repaired immediately.

At a minimum the following maintenance measures shall be provided at the frequency listed in the following table:

Routine Maintenance

<i>Maintenance Measure:</i>	<i>Frequency:</i>
Mowing	Twice a year: mow the buffer area and side slopes. Remove trash and debris, grass clippings and accumulated organic matter.

Stormwater Management System Operation and Maintenance Plan
MacDermind Alpha New Process Building, 350 Frontage Rd.

STORMWATER MANAGEMENT SYSTEM INSPECTION AND MAINTENANCE CHECKLIST

350 Frontage Road		Inspector:	
Date:		Time:	
Date Since Last Precipitation Event:		Site Conditions:	
Inspection Item	Satisfactory? Yes (Y) or No (N)		Comments or Corrective Measures Taken
Site Areas			
Erosion	Y	N	
Spillage	Y	N	
Sediment Accumulation	Y	N	
Trash	Y	N	
Catch Basins and Pipe			
Trash, Sediment, and Debris at Inlet Grates	Y	N	
Sediment & Trash Accumulation in Sump	Y	N	
Pipe blockages	Y	N	
Water Quality Unit			
Sediment Accumulation	Y	N	
Trash and Debris	Y	N	
Hydrocarbons	Y	N	
Rain Gardens			
Sediment Accumulation	Y	N	
Erosion and Cracking	Y	N	
Trash and Debris	Y	N	
Invasive and Excess Vegetation	Y	N	
Condition of Stone Inlets	Y	N	
Underground Infiltration Systems			
Sediment Accumulation	Y	N	
Vegetated Swale			
Sediment Accumulation	Y	N	
Erosion and Cracking	Y	N	
Trash and Debris	Y	N	
Invasive and Excess Vegetation	Y	N	
Condition of Stone Inlets	Y	N	



OWNERS MAINTENANCE MANUAL

retain-it, LLC
560 Salmon Brook Street
Granby, CT 06035
(860) 413-3050

retain-it ®

Owners Maintenance Manual

Table of Contents

Description

Engineering Design Specifications

Daily Operation and Long Term Maintenance

 System Operation

 Periodic Inspection

 Visual Inspection Guide

 Internal Flow Evaluation

 Low, Medium and High Flow

 Pollution Storage Capacities

 Oil and Grease

 Sediments

 Trash and Debris

 Standard Maintenance

 Emergency Spill Conditions

Sample Maintenance Log

Description

retain-it[®] is a subsurface Storm Water Management system constructed of precast concrete structures. They are installed in a side by side configuration creating a continuous internal flow channel integrated throughout the system. Systems are constructed with designated inlet and outlet modules, some with multiple inlets and outlets depending on the site storm water system layout. Infiltration systems typically have an inlet and sidewalls/ base constructed on a stone infiltration blanket with geofabric installed at the native soil interface. Other systems incorporate outlet flow control devices. Detention systems are typically lined with a watertight membrane and have inlet and outlet control devices.

The retain-it[®] system can consist of multiple varying layouts, with no two the same. Given this, it should be noted that the operation and maintenance requirements are very similar regardless of the intended layout. It is important that the end user know the specific elements of each system so as to understand how best to optimize it's operation.

Installation per Design: Operation is simple to follow where the installation was performed in accordance with the design specifications, drawings and calculations. Specifics shall be identified in the design drawings. As-built drawings will benefit the locating of specific design modules where the system has been buried below a parking lot area. Optional access manholes or removable grates may be installed above every inlet/outlet pipe and at critical design elements designated by the design.

Daily Operation and Long Term Maintenance: In general, daily usage of the system is self sufficient and will operate without requiring any outside assistance, except for periodic inspection to verify optimal performance and maintenance for removal of collected pollutants. A longer term maintenance program should incorporate a more thorough inspection of the all elements of the system to verify proper operating condition. This is more important with the infiltration type of systems where the soil infiltration surface may become restricted due to fine particle build up. Long term maintenance should include provisions for cleaning and removal of collected solids, oils and debris from the system.

System Operation: The system operational function is initiated according to rainfall runoff flows entering the structure. Internally, the runoff flows in a set pattern or sequence throughout the module layout in accordance with the hydraulic design conditions. The flows primarily operate on system head derived from the changes in

elevation from the internal water surface and the outlet invert elevation. Some designs incorporate internal flow controls to satisfy hydraulic conditions that enhance water quality treatment or other intended purposes. Modified systems may incorporate a pump, but in general there are no mechanical apparatus required.

End user operations primarily consist of inspection and maintenance of the system over time.

Periodic Inspection: Important note - All storm water management systems react differently depending on the conditions that are characteristic to the contributing water shed. Variables such as storm intensity, runoff flow rates, site geology, surface stabilization and pollution load will affect the system operation. As does the inspection and maintenance frequency to ensure optimum effectiveness.

Inspections should be done periodically, with a greater number scheduled during the system start up and less frequently as the operator becomes familiar with the system performance characteristics. It is recommended that the end user keep records of the performance using the inspection log record sheet found in the back of this manual. These records shall identify the cycle of maintenance “system calibration” required for the specific applications based on the contributing water shed variables operating under “normal” conditions.

Please note that immediate maintenance may be required during “non-normal” events such as during adverse weather conditions or emergency fuel spills. See information on emergency spills in this manual.

Visual inspection of all assessable components shall be performed throughout the lifetime of the system. Access has been supplied at critical points to monitor hydraulic performance and removed pollutants buildup.

Standard Maintenance:

After construction has been completed and all disturbed surfaces have been stabilized by means of vegetation, asphalt or concrete surfaces, and all drainage system components have been constructed and are free of construction debris and sediments; then the storm water management system can be considered in an operational status.

Periodic visual inspections will help to identify issues of concern. The usual indicators are signs of slow flows, backed up water, visible oil, trash and debris or an excessive amount of sediment in the storage area.

Normal operational flows can be observed to flow freely at the predicted design elevations, from the inlet to the outlet module, following a serpentine path thru the storage and attenuation modules. Note that some modules are designed to permanently

retain water where others may hold water and slowly release it over a typical 24 hour period. During a storm water event, the flows and water surface elevations will fluctuate from a low flow to a high flow/ storage status. The storage modules should fill during the event and drain down within a 24 hour period after the event has stopped. All pipes, orifices, weirs and standpipes should pass flows freely and at optimum capacity.

Standard maintenance is performed using a vacuum truck to suction the accumulated sediments, oils and greases and trash and debris from the system. Whereas an on-site maintenance staff can remove these items by hand, it is preferred that the vacuum truck be used as dictated by specific system conditions. When a specialized module designed to have a permanent water level is used, the vacuum truck should pump the liquid level down to inspect the below water elevation structures and sump storage areas.

Oils and greases can be handled by on-site staff by utilizing absorbent products that soak up the oils (and not) converting the oils from a liquid into a manageable solid form. These oil soaked absorbent materials should be disposed of in an approved manner.

Sediments, trash and debris shall be removed and disposed of in an approved manner.

Any indications of hazardous material, determined by visual inspection, testing, smell or abnormality, should be reported and handled per appropriate regulations.

Flow Conditions

System operators should familiarize themselves with proper hydraulic flow condition indicators, acceptable depths of sedimentation, debris and trash build up, and concentrations of oils and greases.

Hydraulic flow conditions are those that are established by the design as either a flow/storage or as a water quality treatment function. Both have performance characteristics that can be visually identified so as to determine the effective and efficient operation of the system.

The engineering design drawings should note the various expected water surface level elevations that are achieved during different design storms within the various modules. Since it is difficult for a visual inspection to coincide with the exact time given water elevations are predicted, the following guidelines are given for evaluation.

Visual Inspection Guide:

Internal Flow Evaluation

Low flow: water should flow freely from the inlet to the outlet, travelling the intended attenuation path thru the system with the water surface elevation below the structure

beam height (12" deep), the system should drain completely 24 hours after a storm event,

Medium flow: the system should hold and maintain a water level during the 24 hour storm event and yet continually fill as the storm increases or drain downward as the event recedes. Flow within the system should occur freely from inlet to outlet only being restricted when a flow control structure has been integrally designed in place. Flow control devices may result in a water level backing up either temporarily or permanently; noting devices such as water quality modules may require a permanent water level to operate properly (see water quality treatment). Other system applications should drain completely 24 hours after a storm event.

High flow: the system should fill to the maximum design storm water level elevation (hydraulic grade line) per design. In most cases, that is the highest storage elevation available in the system, at the underside of the module top slab, or the invert of the overflow pipe. As the storm event recedes, the water level should begin to drain down via flow thru the system and discharge. The system should drain completely within 24 hours after a storm event.

Pollutant Storage Capacities

Oil and Grease

Oil and Grease Collection (with optional Oil water separator module specified) - Oil and grease accumulation is generally a function related to vehicle parking lot and drive areas, oil generating land uses or emergency spill conditions. It is important to maintain the system from accumulating excessive volumes of oils in that they may wash over into other sections of the system potentially clogging and reducing the infiltration capacity, blocking control devices and contaminating the overall system. The following standards apply.

Oil should not accumulate more than a visible sheen on the water surface in the oil water separation module only. A sheen is described as a fine, thin oil layer on the water surface identified by the glossy rainbow colors. A dipstick (dry wooden stick) can be used as a probe to determine the thickness of oil on the surface.

Accumulated oils could be associated with insufficient maintenance or a potential large volume oil resource. Any accumulation of oil should be promptly maintained by an experienced waste handler. Emergency spills such as those generated by an accidental spill shall be contained and removed immediately before the next storm event. Spills shall be handled in accordance with local environmental regulations. See spill and accumulated oil maintenance procedures.

Sediments

Sediments (with optional primary grit module or sedimentation modules specified) - Sediments shall be periodically removed from the system as they accumulate within the designated storage modules. The inlet modules are generally equipped with a sediment storage sump located in the base of the inlet structure. Inspection should be performed after major storm events or a minimum of annually, unless a different inspection cycle has been determined to be sufficient. Inspection shall consist of using a probe to determine the presence of and depth of the accumulated solids. Access is via the 24" manhole.

Note that excessive volumes of sediments will reduce the performance and efficiency of the system. Regional accumulations of solids such as those associated with ice and snow, may result in large springtime volumes of sand and gravels used for traction and ice control.

Trash and Debris

Trash and Debris (with optional trash and debris module specified) - Trash and debris accumulates in the inlet module in three forms; floating debris, neutrally buoyant, and heavy material. The floating debris is visible from the access manhole floating on the water surface in the form of but not limited to wood, paper, plastic, foam, bottles and cans. The neutrally buoyant material resides below the surface and combines with the natural flow regime of the system. It is hard to detect and can only be recognized when at a high concentration appears as a thickening of the water viscosity. Heavier material will simply settle to the sump base and combine with the sediments.

Note that trash and debris typically cause the most problems when they become lodged in a flow control device such as an outlet elbow, riser pipe, and orifice or weir structure. This can be detected visibly when the system is pumped down during maintenance. It can also be evaluated as a condition when flow is impeded and the water level backs up higher than the design elevations.

Emergency Spill Conditions (with optional emergency spill control module specified):

Emergency spill conditions are defined as an excessive accumulation of hydrocarbons such as oil, gasoline, diesel fuel, transmission oil or antifreeze usually resulting from an accidental discharge. Excessive accumulation is described as any amount larger than a thin "sheen" visible on the water surface.

Care should be given in handling these types of fluids. The incident should be reported to the appropriate authorities and should be mitigated by a hazardous waste consultant approved for such matters.

retain-it ®

Maintenance Log

Storm Water Management System

Location:

ID #:

Date

Inspection Notes

Inspector

Note the following conditions:

Inlet Module

Outlet Module

Water Quality Module

Oil Elbow

Oil Accumulation

Sedimentation Accumulation

Trash and Debris Quantity

Flow Conditions

Flow Control Outlet Structure

Overflow Pipe

Cascade Separator[®] Inspection and Maintenance Guide



Maintenance

The Cascade Separator® system should be inspected at regular intervals and maintained when necessary to ensure optimum performance. The rate at which the system collects sediment and debris will depend upon on-site activities and site pollutant characteristics. For example, unstable soils or heavy winter sanding will cause the sediment storage sump to fill more quickly but regular sweeping of paved surfaces will slow accumulation.

Inspection

Inspection is the key to effective maintenance and is easily performed. Pollutant transport and deposition may vary from year to year and regular inspections will help ensure that the system is cleaned out at the appropriate time. At a minimum, inspections should be performed twice per year (i.e. spring and fall). However, more frequent inspections may be necessary in climates where winter sanding operations may lead to rapid accumulations, or in equipment wash-down areas. Installations should also be inspected more frequently where excessive amounts of trash are expected.

A visual inspection should ascertain that the system components are in working order and that there are no blockages or obstructions in the inlet chamber, flumes or outlet channel. The inspection should also quantify the accumulation of hydrocarbons, trash and sediment in the system. Measuring pollutant accumulation can be done with a calibrated dipstick, tape measure or other measuring instrument. If absorbent material is used for enhanced removal of hydrocarbons, the level of discoloration of the sorbent material should also be identified during inspection. It is useful and often required as part of an operating permit to keep a record of each inspection. A simple form for doing so is provided in this Inspection and Maintenance Guide.

Access to the Cascade Separator unit is typically achieved through one manhole access cover. The opening allows for inspection and cleanout of the center chamber (cylinder) and sediment storage sump, as well as inspection of the inlet chamber and slanted skirt. For large units, multiple manhole covers allow access to the chambers and sump.

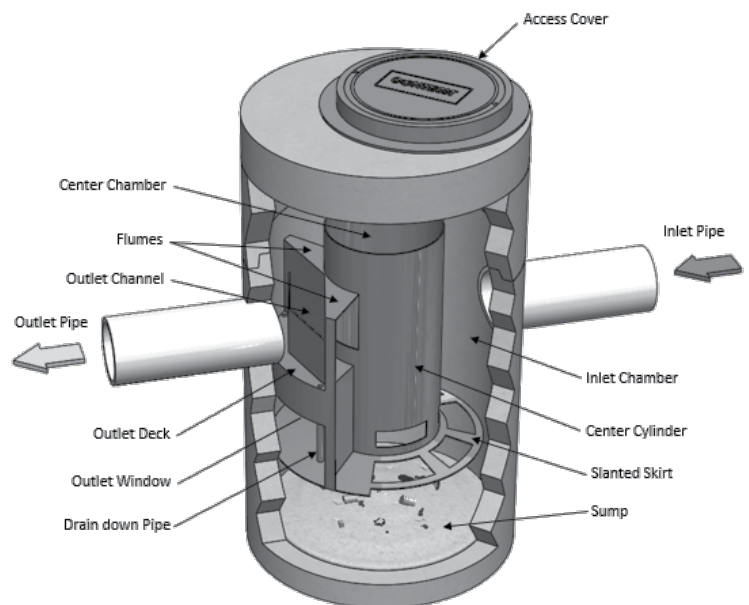
The Cascade Separator system should be cleaned before the level of sediment in the sump reaches the maximum sediment depth and/or when an appreciable level of hydrocarbons and trash has accumulated. If sorbent material is used, it must be replaced when significant discoloration has occurred. Performance may be impacted when maximum sediment storage capacity is exceeded. Contech recommends maintaining the system when sediment level reaches 50% of maximum storage volume. The level of sediment is easily determined by measuring the distance from the system outlet invert (standing water level) to the top of the sediment pile. To avoid underestimating the level of sediment in the chamber, the measuring device must be lowered to the top of the sediment pile carefully. Finer, silty particles at the top of the pile typically offer less resistance to the end of the rod than larger particles toward the bottom of the pile. Once this measurement is recorded, it should be compared to the chart in this document to determine if the height of the sediment pile off the bottom of the sump floor exceeds 50% of the maximum sediment storage.

Cleaning

Cleaning of a Cascade Separator system should be done during dry weather conditions when no flow is entering the system. The use of a vacuum truck is generally the most effective and convenient method of removing pollutants from the system. Simply remove the manhole cover and insert the vacuum tube down through the center chamber and into the sump. The system should be completely drained down and the sump fully evacuated of sediment. The areas outside the center chamber and the slanted skirt should also be washed off if pollutant build-up exists in these areas.

In installations where the risk of petroleum spills is small, liquid contaminants may not accumulate as quickly as sediment. However, the system should be cleaned out immediately in the event of an oil or gasoline spill. Motor oil and other hydrocarbons that accumulate on a more routine basis should be removed when an appreciable layer has been captured. To remove these pollutants, it may be preferable to use absorbent pads since they are usually less expensive to dispose than the oil/water emulsion that may be created by vacuuming the oily layer. Trash and debris can be netted out to separate it from the other pollutants. Then the system should be power washed to ensure it is free of trash and debris.

Manhole covers should be securely seated following cleaning activities to prevent leakage of runoff into the system from above and to ensure proper safety precautions. Confined space entry procedures need to be followed if physical access is required. Disposal of all material removed from the Cascade Separator system must be done in accordance with local regulations. In many locations, disposal of evacuated sediments may be handled in the same manner as disposal of sediments removed from catch basins or deep sump manholes. Check your local regulations for specific requirements on disposal. If any components are damaged, replacement parts can be ordered from the manufacturer.



Cascade Separator® Maintenance Indicators and Sediment Storage Capacities

Model Number	Diameter		Distance from Water Surface to Top of Sediment Pile		Sediment Storage Capacity	
	ft	m	ft	m	y ³	m ³
CS-3	3	0.9	1.5	0.5	0.4	0.3
CS-4	4	1.2	2.5	0.8	0.7	0.5
CS-5	5	1.3	3	0.9	1.1	0.8
CS-6	6	1.8	3.5	1	1.6	1.2
CS-8	8	2.4	4.8	1.4	2.8	2.1
CS-10	10	3.0	6.2	1.9	4.4	3.3
CS-12	12	3.6	7.5	2.3	6.3	4.8

Note: The information in the chart is for standard units. Units may have been designed with non-standard sediment storage depth.



A Cascade Separator unit can be easily cleaned in less than 30 minutes.



A vacuum truck excavates pollutants from the systems.

Cascade Separator® Inspection & Maintenance Log

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1. The depth to sediment is determined by taking a measurement from the manhole outlet invert (standing water level) to the top of the sediment pile. Once this measurement is recorded, it should be compared to the chart in the maintenance guide to determine if the height of the sediment pile off the bottom of the sump floor exceeds 50% of the maximum sediment storage. Note: to avoid underestimating the volume of sediment in the chamber, the measuring device must be carefully lowered to the top of the sediment pile.
2. For optimum performance, the system should be cleaned out when the floating hydrocarbon layer accumulates to an appreciable thickness. In the event of an oil spill, the system should be cleaned immediately.

SUPPORT

- Drawings and specifications are available at www.ContechES.com.
- Site-specific design support is available from our engineers.

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