DRAINAGE REPORT

For

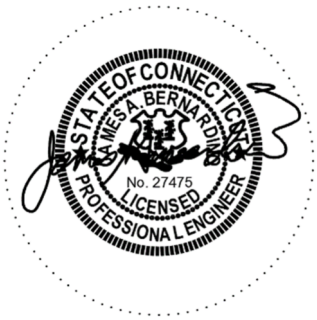
PROPOSED

Gasoline Refueling Station and Convenience Store

306 Boston Post Road (Route 1)
Darien, Connecticut
Fairfield County

Prepared by:

BOHLER ENGINEERING
352 Turnpike Road
Southborough, MA 01772
(508) 480-9900 TEL.



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Connecticut P.E. Lic. #27475

June 24, 2020
#W191393

BOHLER

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I. EXECUTIVE SUMMARY

This report examines the changes in drainage that can be expected as the result of the development of a proposed convenience store and fueling facility located on the southeasterly side of Boston Post Road (Route 1) near the Interstate 95 on ramp in the Town of Darien, Connecticut. The site, which contains approximately 1.04 acres of land, contains an existing "Duchess" restaurant and drive-through with associated paved parking areas and landscaping.

The proposed project includes the construction of a new 4,050 sf freestanding "7-Eleven" convenience store and self-service gasoline station along with new paved parking areas, landscaping, storm water management components and associated utilities. This report addresses a comparative analysis of the pre- and post-development site runoff conditions. For the purposes of this report, the predevelopment calculations assume existing conditions (grass cover) prior to the construction of the Duchess restaurant, which currently occupies the site. Additionally, this report provides calculations documenting the design of the proposed stormwater conveyance/management system as illustrated within the accompanying Site Development Plans prepared by Bohler. The project will also provide erosion and sedimentation controls during the demolition and construction periods, as well as long term stabilization of the site.

For the purposes of this analysis the pre- and post-development drainage conditions were analyzed at two (2) "design points" where stormwater runoff currently drains to under existing conditions. These design points are described in further detail in **Section II** below. A summary of the existing and proposed conditions peak runoff rates for the 2-, 10-, 25-, 50- and 100-year storms can be found in **Table 1.1** below. In addition, the project has been designed to meet or exceed the Stormwater Management Standards as detailed herein.

Table 1.1: Design Point Peak Runoff Rate Summary

	Peak Flow Discharge in cubic feet per second (cfs)														
	2-year			10-year			25-year			50-year			100-year		
	Exist	Prop.	Delta	Exist	Prop.	Delta	Exist	Prop.	Delta	Exist	Prop.	Delta	Exist	Prop.	Delta
DP1	0.38	0.35	-0.03	1.50	1.49	-0.01	2.06	1.94	-0.12	2.65	2.37	-0.28	3.36	3.26	-0.10
DP2	0.03	0.06	0.03	0.13	0.14	0.01	0.17	0.18	0.01	0.22	0.23	0.01	0.28	0.28	0.00

II. EXISTING SITE CONDITIONS

On-Site Soil Information

The majority of the soils at the site are mapped as Udorthents—Urban land complex, which are classified by the Natural Resource Conservation Service (NRCS) as Hydrologic Soil Group (HSG) "B". Refer to **Appendix C** for additional information.

Existing Collection and Conveyance

Stormwater flows across the site from east to west. Runoff is captured by multiple catch basins within the parking area and is then conveyed via drainage piping to a wooded area between the property and the on ramp for Interstate 95. There is a small portion of stormwater that flows down the driveway and enters the Route 1 drainage system via catch basins at the bottom of the driveway. Slopes on the site range from 1%-13% with on-site elevations ranging from 92 in the southern corner of the property to 79 at the northern corner of the property.

Existing Watersheds and Design Point Information

The site was subdivided into two (2) separate sub catchments for the existing conditions as described below to analyze existing and proposed flow rates at each design point. The minimum time of concentration for all proposed areas is calculated as 6 minutes (0.1 hr).

Subcatchment E1 in total is 1.05 acres with pavement, landscaping, and existing woods to remain. However, in the pre-development conditions analysis the site was modeled as existing woods and grass, per the "Fresh Meadow" approach to stormwater management as explained in section 883(a) in the Darien Zoning Regulations. The "Fresh Meadow" approach states that where an existing commercial building is proposed to be razed and replaced with a new structure, the basis of existing conditions analysis shall be the site's undeveloped condition if there is no engineered detention system on the existing site. Subcatchment E1 flows overland from southwest to northeast across the site, and runoff is collected by existing catch basins in the parking lot. The stormwater runoff from this Subcatchment is not treated or attenuated. Runoff is conveyed via drainage piping to a wooded area between the property and the on ramp to Interstate 95, defined as Design Point #1 (DP1). Using the "Fresh Meadow" approach, this area has a calculated curve number of 61 and a calculated time of concentration of 6.3 minutes.

Subcatchment E2 in total is 0.087 acres with pavement and landscaping. Similar to Subcatchment E1, E2 was modeled as grass, per the "Fresh Meadow" approach to stormwater management noted above. This area flows overland from southwest to northeast onto Route 1, where runoff is collected by existing catch basins. The stormwater runoff from this Subcatchment is not treated or attenuated. The municipal drainage system in Route 1 is defined as Design Point #2 (DP2). Using the Fresh Meadow approach, this area has a calculated curve number of 61 and a calculated time of concentration of 6.0 minutes.

Refer to **Table 1.1 and 5.1** for the calculated existing conditions peak rates of runoff. For additional hydrologic information, refer to **Appendix D** and the Drainage Area Maps in the appendices of this report for a graphical representation of the existing drainage areas.

III. PROPOSED SITE CONDITIONS

Proposed Development Description

The proposed project consists of the construction of a new 4,050 sf freestanding "7-Eleven" convenience store and self-service gasoline station including paved parking areas, landscaping, associated utilities, and a new stormwater management system. The site, including the proposed parking areas, has been designed to drain to deep-sump, hooded catch basins. The catch basins will capture and convey stormwater runoff, via an underground pipe system, to a CDS2015-4-C hydrodynamic separator or "water quality unit" (WQU-1). Runoff is then conveyed to a proposed Stormtech MC-3500 underground detention chamber system (UGS-1) with a Stormtech Isolator Row. Pretreatment of stormwater runoff will be provided by a combination of the deep-sump, hooded catch basins and the proprietary treatment unit (WQU-1) prior to discharge into the proposed underground detention basin (UGS-1). The Isolator Row then provides primary treatment. Rooftop runoff has been designed to flow to the basin as well. Runoff is finally conveyed from UGS-1 to an existing drainage structure and outlets into DP1 through existing drainage piping.

Proposed Development Collection and Conveyance

Deep sump hooded catch basins are proposed to collect and route runoff from the paved parking areas to the existing subsurface basins. Pipes have been designed for the 10-year storm per the 2004 CT Stormwater Quality Manual using the Rational Method. Pipe sizing calculations are included in **Appendix F**.

The best management practices (BMPs) incorporated into the proposed stormwater management system have been designed to meet the total suspended solid (TSS) removal requirements as set forth in the 2004 CT Stormwater Quality Manual standards. Refer to **Appendix F** for calculations. In addition, a Stormwater Operation and Maintenance (O&M) Plan, attached in **Appendix G**, has been developed which includes scheduled maintenance and periodic inspections of stormwater management structures [i.e catch basins and detention basins].

Proposed Watersheds and Design Point Information

The project has been designed to maintain existing drainage watersheds to the greatest extent possible, with the same design points described in **Section II** above. The site was subdivided into two (2) separate sub catchments for the proposed conditions as described below. The minimum time of concentration for all proposed areas is calculated as 6 minutes (0.1 hr).

Subcatchment P1 consists of 1.062 acres consisting of pavement, roofs, woods, and landscaping with a calculated curve number of 85. This area drains to proposed catch basins and is routed through a Contech CDS unit for pretreatment prior to discharge into the Stormtech MC-3500 underground detention chamber system. Runoff is finally conveyed from UGS-1 to an existing drainage structure and outlets into DP1 through existing drainage piping. The minimum time of concentration of 6 minutes was used.

Subcatchment P2 consists of 0.078 acres consisting of pavement and landscaping with a calculated curve number of 65. This area flows overland from southwest to northeast onto Route 1, where runoff is collected by existing catch basins. The stormwater runoff from this Subcatchment is not treated or attenuated. The minimum time of concentration was of 6 minutes was used.

Refer to **Table 1.1 and 5.1** for the calculated proposed conditions peak rates of runoff. For additional hydrologic information, refer to **Appendix D** and the Drainage Area Maps in the appendices of this report for a graphical representation of the proposed drainage areas.

IV. METHODOLOGY

Peak Flow Calculations

Methodology utilized to design the proposed stormwater management system includes compliance with the guidelines set forth in the latest edition of both the CT Stormwater Quality Manual and the Town of Darien Stormwater Management and Drainage Manual. The pre- and post-development runoff rates being discharged from the site were computed using the HydroCAD computer program. The drainage area and outlet information were entered into the program, which routes storm flows based on NRCS TR-20 and TR-55 methods. The other components of the model were determined following standard NRCS procedures for Curve Numbers (CNs) and times of concentrations documented in the appendices of this report. The rainfall data utilized and listed

below in table 4.1 below for stormwater calculations is based on Technical Paper-40. Refer to **Appendix F** for more information.

Table 4.1: Fairfield County Rainfall Intensities

Frequency	2 year	10 year	25 year	50 year	100 year
Rainfall* (inches)	3.30	5.00	5.70	6.40	7.20

*Values derived from CT Stormwater Manual (TP-40)

The proposed stormwater management as designed will provide a decrease in peak rates of runoff from the proposed facility for the 2-, 10-, 25-, 50-, and 100-year design storm events. Additionally, the proposed project meets, or exceeds, the Darien Stormwater Management standards. Compliance with these standards is described further below.

V. STORMWATER MANAGEMENT STANDARDS

The following standards are those outlined in the Zoning Regulations of the Town of Darien and the 2003 Town of Darien Stormwater Management and Drainage Manual. The proposed stormwater best management practices (BMPs) outlined in this document and illustrated on the drawings prepared by Bohler were designed using the both the Darien zoning regulations and stormwater manual as a guide. Per discussions with Darren J. Oustafine, Assistant Director of Public Works in Darien, the requirements outlined in the zoning regulations supersede those in the stormwater manual.

Standard #1: Untreated Stormwater

The project has been designed so that proposed impervious areas (including the building roof and paved parking/driveway areas) shall be collected and passed through the proposed drainage system for treatment prior to discharge. In addition, this project has been designed so that there are no new stormwater discharges. The stormwater collected in the proposed condition will be routed to an existing stormwater structure that currently conveys stormwater runoff to the existing wooded area between the subject property and the on ramp to Interstate 95. This outlet will remain in its current condition.

Standard #2: Post Development Peak Discharge Rates

As outlined in **Table 1.1** and **Table 5.1**, the development of the site and the proposed stormwater management system, have been designed so that post-development peak rates of runoff are equal to or below pre-development conditions for the 2-, 10-, 25-, 50-, and 100-year storm events at all design points.

Standard #3: Recharge to Groundwater

Per section 885 of the Zoning Regulations of the Town of Darien, runoff from areas with high pollutant loadings, such as gasoline stations, shall not be infiltrated. Therefore, infiltration and groundwater recharge on site are not applicable.

Standard #4: 80% TSS Removal

Water quality treatment is provided via deep sump catch basins, a CDS2015-4-C hydrodynamic separator (WQU-1), and a Stormtech Isolator Row as part of the MC-3500 underground detention chamber system (UGS-1). TSS removal calculations are included in **Appendix F** of this report. Overall proposed TSS removal is 85%. Documentation from the New Jersey Department of Environmental Protection certifying the TSS removal capabilities of the proposed BMPs are included in **Appendix F.**

The calculated required water quality flow rate, defined as the peak flow rate associated with the water quality design storm, is 0.66 cfs (see calculation spreadsheet included in **Appendix F**). The hydrodynamic separator, WQU-1, provides pretreatment to the stormwater runoff. Per the 2004 CT Stormwater Quality Manual, 100% of the water quality flow for sites with potential for higher pollutant loads must receive pretreatment. Gas stations are considered sites with potential for higher pollutant loads, so WQU-1 has been designed to accommodate 100% of the required water quality flow rate. The CDS2015-4-C unit chosen has a treatment capacity of up to 1.4 cfs, as shown in the CDS brochure attached in **Appendix F**.

The Stormtech Isolator Row acts as the primary treatment for the stormwater runoff. This BMP must also be designed to accommodate the required water quality flow rate of 0.66 cfs. Per manufacturer specifications also included in **Appendix F**, the isolator row treats flows up to 1.44 cfs.

Refer to **Appendix F** of this report for calculations documenting required and provided water quality volumes and flows.

Standard #5: Stormwater hotspots

The proposed project involves potential for higher pollutant loads due to the proposed gas station and is therefore classified as a hot spot per the Darien Stormwater Manual.

Standard #6: Critical area protection

Not Applicable for this project.

Standard #7: Redevelopment projects

This project is considered a redevelopment and meets the Stormwater Management Standards to the maximum extent practicable. Post development conditions reduce the amount of impervious coverage on site compared to pre development conditions, and water quality/stormwater peak rates of runoff are improved. Groundwater recharge is not proposed; however, this is not applicable due to the site's classification as a hot spot. Gas stations and hot spots are not allowed infiltration/recharge per the Darien Zoning Regulations.

Standard #8: Erosion/sediment control

The proposed project will provide construction period erosion and sedimentation controls as indicated within the site plan set provided for this project. This includes a proposed construction exit, protection for stormwater inlets, protection around temporary material stock piles and various other techniques as outlined on the erosion and sediment control sheets.

Standard #9: Operation and maintenance plan (O&M plans)

An Operation and Maintenance (O&M) Plan for this site has been prepared and is included in **Appendix G** of this report. The O&M Plan outlines procedures and time tables for the long term operation and maintenance of the proposed site stormwater management system, including initial inspections upon completion of construction, and periodic monitoring of the system components, in accordance with established practices and the manufacturer's recommendations. The O&M Plan includes a list of responsible parties and an estimated budget for inspections and maintenance.

VI. SUMMARY

In summary, the proposed stormwater management system illustrated on the drawings prepared by Bohler results in equal to or a reduction in peak rates of runoff from the subject site when compared to pre-development conditions for the 2-, 10-, 25-, 50- and 100-year storm frequencies. In addition, the proposed best management practices will result in an effective removal of total suspended solids from the post-development runoff. The pre-development versus post-development stormwater discharge comparisons are contained in **Table 5.1** below:

Table 5.1: Design Point Peak Runoff Rate Summary

	Peak Flow Discharge in cubic feet per second (cfs)														
	2-year			10-year			25-year			50-year			100-year		
	Exist	Prop.	Delta	Exist	Prop.	Delta	Exist	Prop.	Delta	Exist	Prop.	Delta	Exist	Prop.	Delta
DP1	0.38	0.35	-0.03	1.50	1.49	-0.01	2.06	1.94	-0.12	2.65	2.37	-0.28	3.36	3.26	-0.10
DP2	0.03	0.06	0.03	0.13	0.14	0.01	0.17	0.18	0.01	0.22	0.23	0.01	0.28	0.28	0.00

As outlined in the table above, the proposed stormwater management system as designed will provide a decrease in peak rates of runoff from the proposed facility for the 2-, 10-, 25-, 50- and 100-year storm events. Additionally, the project meets, or exceeds the Darien Stormwater Management Standards as described further herein.

APPENDIX A: DARIEN STORMWATER MANAGEMENT CHECKLIST

Town of Darien
Department of Public Works

Stormwater Management Checklist

This checklist is to help an applicant ensure that a proposed development meets the Stormwater Management Standards set forth in the Town of Darien Drainage Manual. Applicants are strongly encouraged to include this checklist as part of their application in order to facilitate review.

Project: 7-Eleven
Address: 306 Boston Post Road

The Water Quality Volume for this project is based upon the following depth of runoff over the post-development site impervious area:

☐ **1 inch of runoff.** (Critical areas as defined in Section 6 of the manual.)
☑ **0.5 inches of runoff.** (All other areas) *Note: The equivalent water quality flow was used for analysis

Standard 1: Untreated stormwater.

☑ The project has been designed so that new stormwater discharges do not discharge untreated stormwater into watercourses and wetlands and these new stormwater discharges do not contribute to erosion of watercourses or wetlands. *If not, please attach a sheet to explain.*

Standard 2: Post-development peak discharge rates.

☑ The post-development peak discharge from the site does not exceed the existing conditions discharge from the site.
☑ The post-development stormwater discharge will not exacerbate offsite flooding impacts for storms up to a 100-year recurrence interval.

Standard 3: Recharge to groundwater.

☐ Groundwater recharge for the post-development site approximates the annual recharge from existing conditions.
☐ On-site soil hydrologic groups have been identified. Recharge volume calculations are based upon a soil hydrologic group of _____ and a total impervious area of _____ acres.

*Note: Not applicable, as recharge is not allowed at gas stations per Darien Zoning Regulations

Standard 4: 80% TSS Removal.

☑ The proposed stormwater management systems will remove 80% of the post-development site's average annual load of total suspended solids. (TSS)

Standard 5: Stormwater hotspots.

☐ This project does not involve land uses consistent with stormwater hotspots.
☑ This project involves land uses that are consistent with stormwater hotspots.

Standard 6: Critical area protection.

☑ This project does not discharge to critical areas.
☐ This project does discharge to critical areas. Critical area: _____

Standard 7: Redevelopment projects.

☐ This project is not a redevelopment project.
☑ This project is a redevelopment project. If checked, please address the following on a separate sheet of paper:

1. Identify the Stormwater Management Standards that have been met.
2. Identify the Stormwater Management Standards that have not been met.
3. Briefly explain how the project will improve stormwater quality over existing conditions.

Standard 8: Erosion/sediment control.

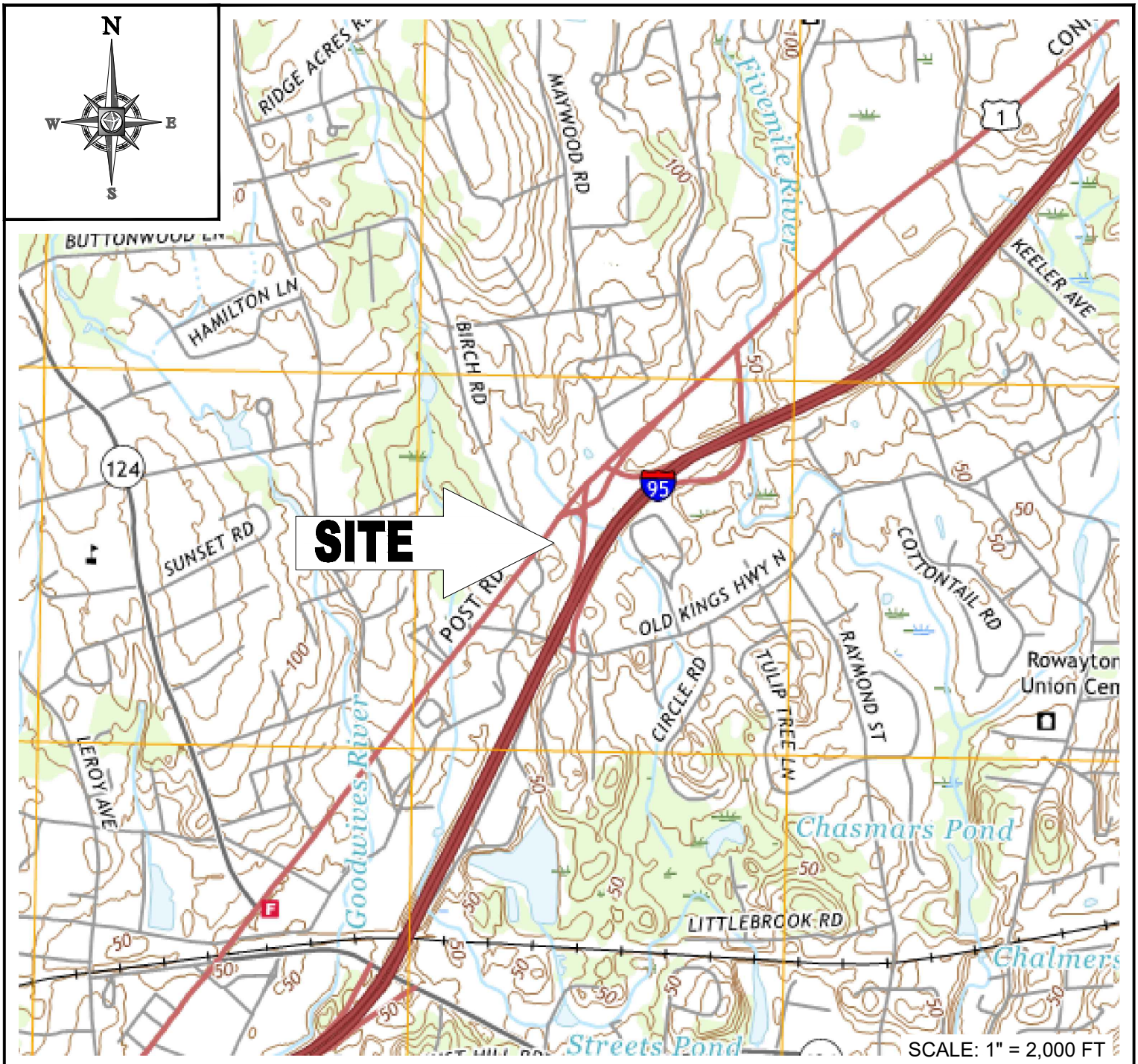
☑ Erosion and sediment controls have been incorporated into the design as prescribed by state and local regulations.

Standard 9: Operation and maintenance plans

☑ An operation and maintenance plan has been developed, and includes contact information for the BMP owner, parties responsible for maintenance, and inspection and maintenance schedules.

APPENDIX B: PROJECT LOCATION MAPS

- *USGS MAP*
- *FEMA FIRMETTE*



USGS MAP

FOR

ELEVEN

LOCATION OF SITE
MAP #32, LOT #9
306 BOSTON POST ROAD (ROUTE 1)
TOWN OF DARIEN
FAIRFIELD COUNTY,
CONNECTICUT

BOHLER™

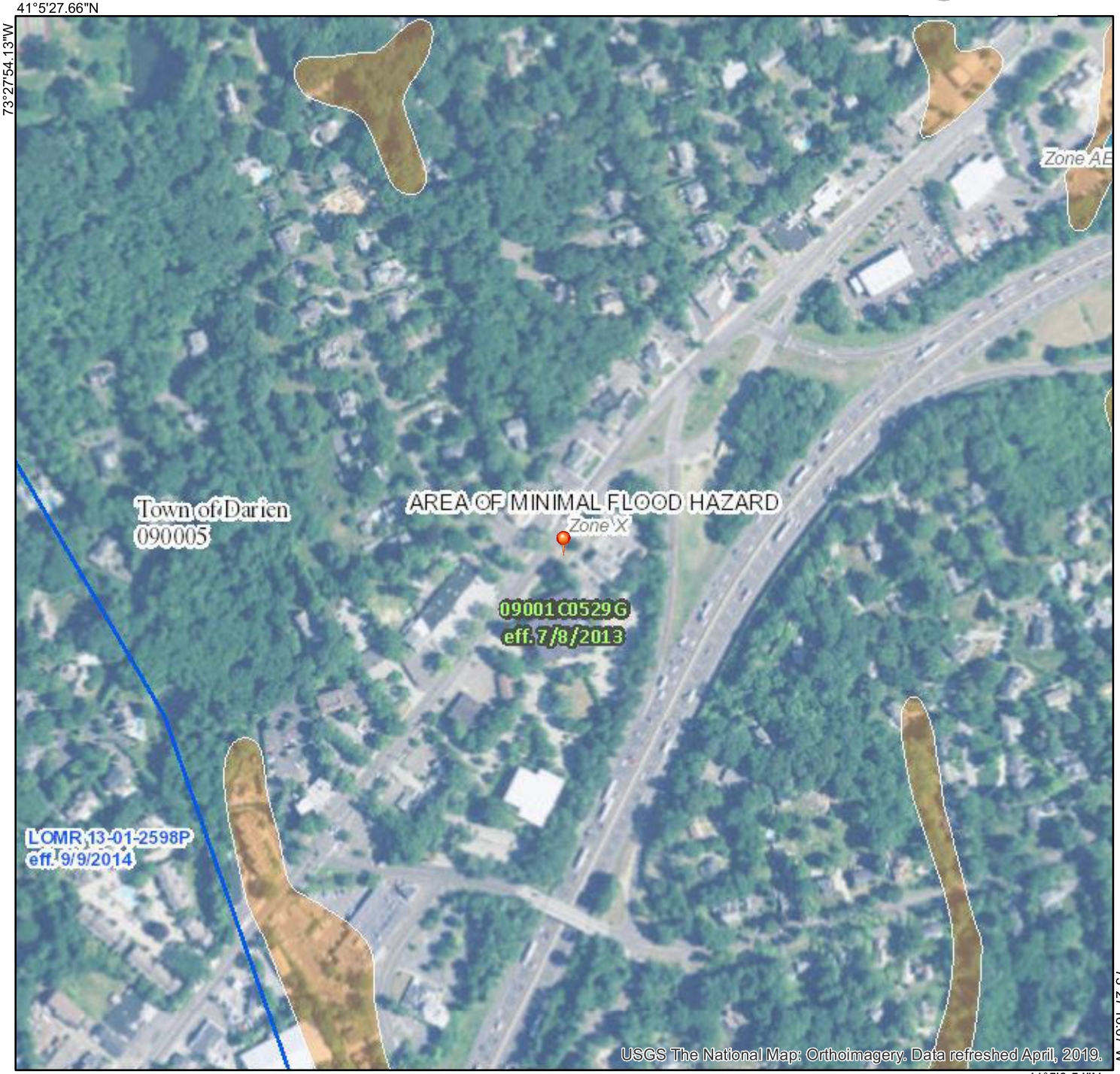
SITE CIVIL AND CONSULTING ENGINEERING
LAND SURVEYING
PROGRAM MANAGEMENT
LANDSCAPE ARCHITECTURE
SUSTAINABLE DESIGN
PERMITTING SERVICES
TRANSPORTATION SERVICES

National Flood Hazard Layer FIRMette

FEMA

41°5'27.66"N

73°27'54.13"W



73°27'16.67"W

41°5'0.54"N

0 250 500 1,000 1,500 2,000 Feet

1:6,000

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 / 17.5 Cross Sections with 1% Annual Chance / Water Surface Elevation
- Coastal Transect
- 513 Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

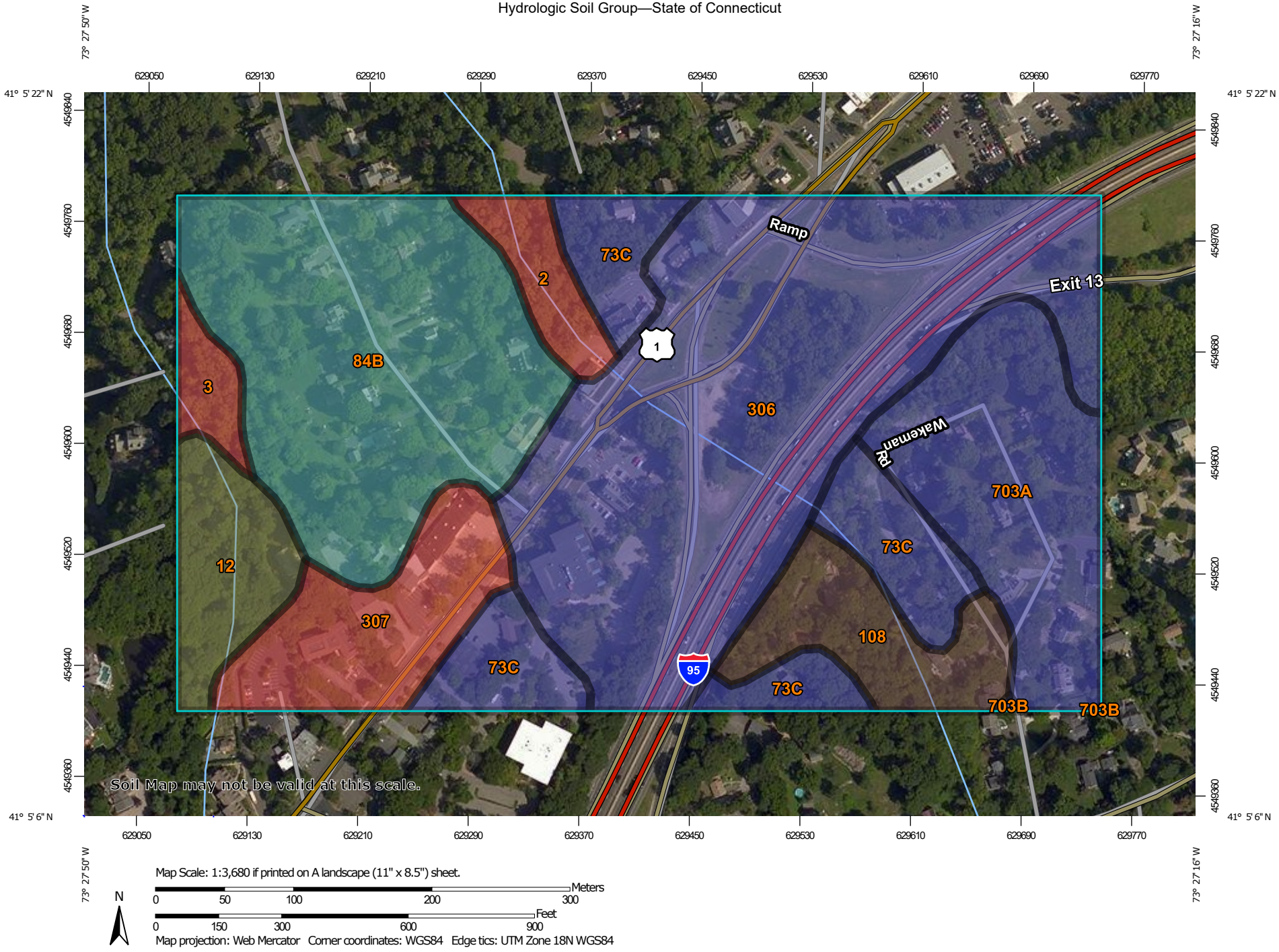
This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 6/10/2020 at 6:44:15 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

APPENDIX C: SOIL AND WETLAND INFORMATION

- *NCRS CUSTOM SOIL RESOURCE REPORT*



Map Scale: 1:3,680 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 50 100 200 300

Feet: 0 150 300 600 900

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 18N WGS84

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

Soil Rating Polygons

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Water Features

- Streams and Canals

Transportation

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

Background

- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:12,000.

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

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

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

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

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

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

Soil Survey Area: State of Connecticut
Survey Area Data: Version 19, Sep 13, 2019

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

Date(s) aerial images were photographed: Jul 21, 2014—Aug 27, 2014

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
2	Ridgebury fine sandy loam, 0 to 3 percent slopes	D	1.6	2.6%
3	Ridgebury, Leicester, and Whitman soils, 0 to 8 percent slopes, extremely stony	D	1.0	1.6%
12	Raypol silt loam	C/D	3.0	4.8%
73C	Charlton-Chatfield complex, 0 to 15 percent slopes, very rocky	B	6.4	10.3%
84B	Paxton and Montauk fine sandy loams, 3 to 8 percent slopes	C	13.3	21.5%
108	Saco silt loam	B/D	3.6	5.8%
306	Udorthents-Urban land complex	B	20.8	33.7%
307	Urban land	D	4.6	7.4%
703A	Haven silt loam, 0 to 3 percent slopes	B	7.5	12.2%
703B	Haven silt loam, 3 to 8 percent slopes	B	0.0	0.0%
Totals for Area of Interest			**61.7**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

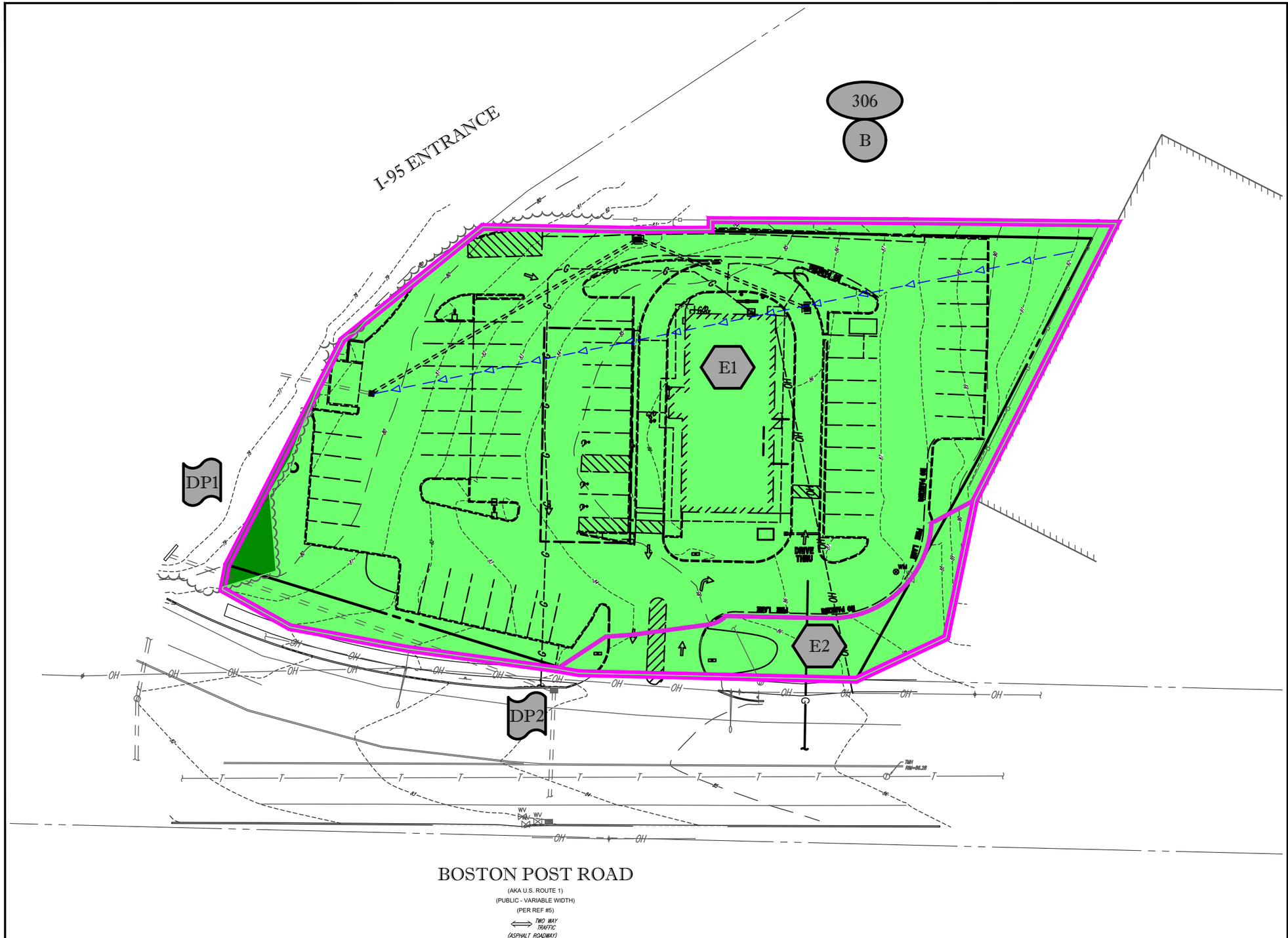
Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

APPENDIX D: EXISTING CONDITIONS HYDROLOGIC ANALYSIS

- *EXISTING CONDITIONS DRAINAGE MAP*
- *EXISTING CONDITIONS HYDROCAD COMPUTATIONS*



LEGEND

- OVERALL BOUNDARY
- SUBCATCHMENT BOUNDARY
- TIME OF CONCENTRATION
- HYDROLOGIC SOIL GROUP BOUNDARY
- CONCRETE/ PAVEMENT
- ROOF
- GRAVEL SURFACE
- LANDSCAPE/ LAWN
- LIGHT UNDERBRUSH/ SHRUBS
- DENSE WOODS
- WATER/ PONDING
- DP# — DESIGN POINT
- X#.# — SUBCATCHMENT
- X#.# — OUTLET CONTROL STRUCTURE OR POND
- X — HYDROLOGIC SOIL GROUP RATING
- XxX — NCRS SOIL MAP UNIT
- R#.# — REACH

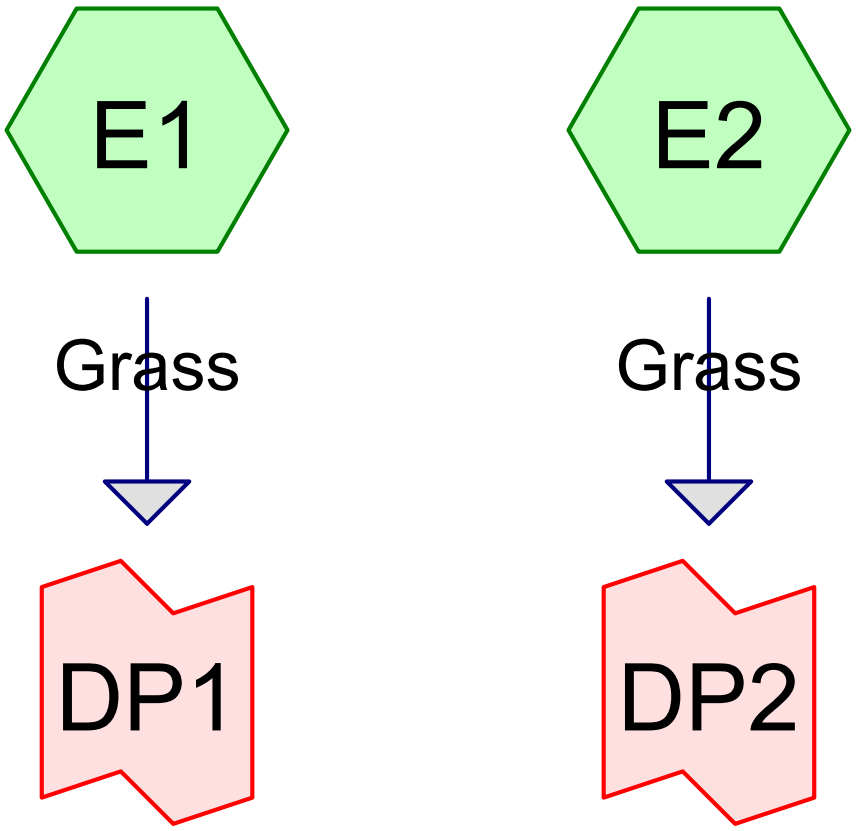
EXISTING DRAINAGE WATERSHED MAP

306 BOSTON POST ROAD
TOWN OF DARIEN
FAIRFIELD COUNTY, CONNECTICUT

PREPARED BY

BOHLER

SCALE: 1"=40'
DATE: JUNE 11, 2020



Subcat Reach Pond Link

Routing Diagram for W191393_EXIST
Prepared by {enter your company name here}, Printed 6/10/2020

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
1.129	61	>75% Grass cover, Good, HSG B (E1, E2)
0.012	55	Woods, Good, HSG B (E1)
1.141	**61**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
1.141	HSG B	E1, E2
0.000	HSG C	
0.000	HSG D	
0.000	Other	
1.141		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	1.129	0.000	0.000	0.000	1.129	>75% Grass cover, Good	E1, E2
0.000	0.012	0.000	0.000	0.000	0.012	Woods, Good	E1
0.000	**1.141**	**0.000**	**0.000**	**0.000**	**1.141**	**TOTAL AREA**	

Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 points
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv.
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

SubcatchmentE1: Grass Runoff Area=1.054 ac 0.00% Impervious Runoff Depth=0.49"
Flow Length=287' Tc=6.3 min CN=61/0 Runoff=0.38 cfs 0.043 af

SubcatchmentE2: Grass Runoff Area=0.087 ac 0.00% Impervious Runoff Depth=0.49"
Tc=6.0 min CN=61/0 Runoff=0.03 cfs 0.004 af

Link DP1: Inflow=0.38 cfs 0.043 af
Primary=0.38 cfs 0.043 af

Link DP2: Inflow=0.03 cfs 0.004 af
Primary=0.03 cfs 0.004 af

Total Runoff Area = 1.141 ac Runoff Volume = 0.046 af Average Runoff Depth = 0.49"
100.00% Pervious = 1.141 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment E1: Grass

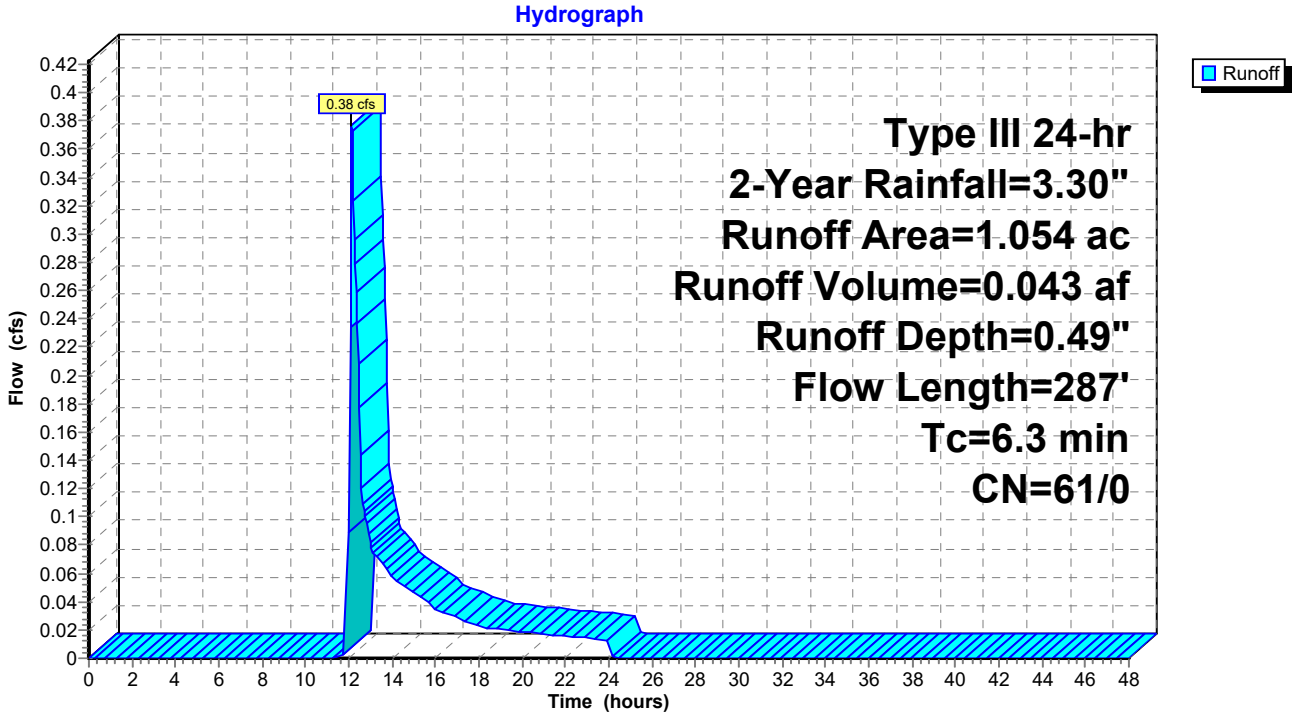
Runoff = 0.38 cfs @ 12.13 hrs, Volume= 0.043 af, Depth= 0.49"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.30"

Area (ac)	CN	Description
1.042	61	>75% Grass cover, Good, HSG B
0.012	55	Woods, Good, HSG B
1.054	61	Weighted Average
1.054	61	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.5	50	0.0600	0.24		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.40"
2.8	237	0.0420	1.43		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
6.3	287	Total			

Subcatchment E1: Grass



Summary for Subcatchment E2: Grass

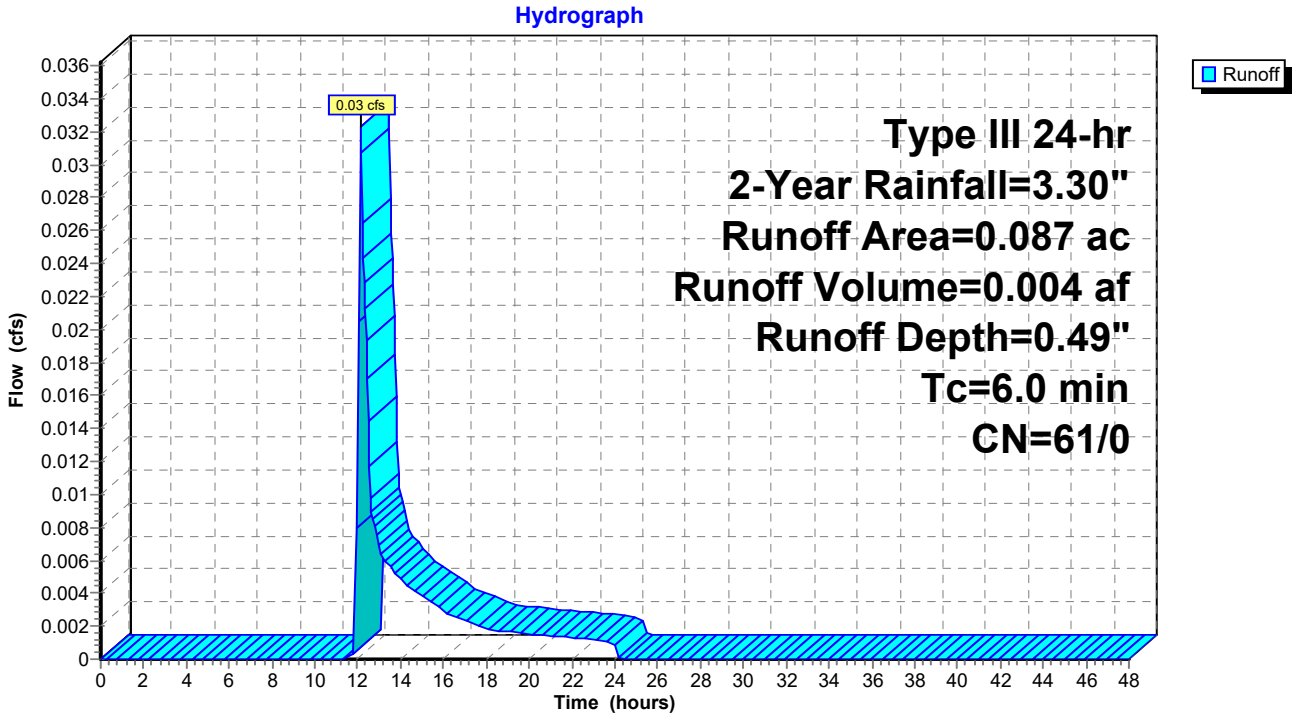
Runoff = 0.03 cfs @ 12.12 hrs, Volume= 0.004 af, Depth= 0.49"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.30"

Area (ac)	CN	Description
0.087	61	>75% Grass cover, Good, HSG B
0.087	61	100.00% Pervious Area

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

Subcatchment E2: Grass

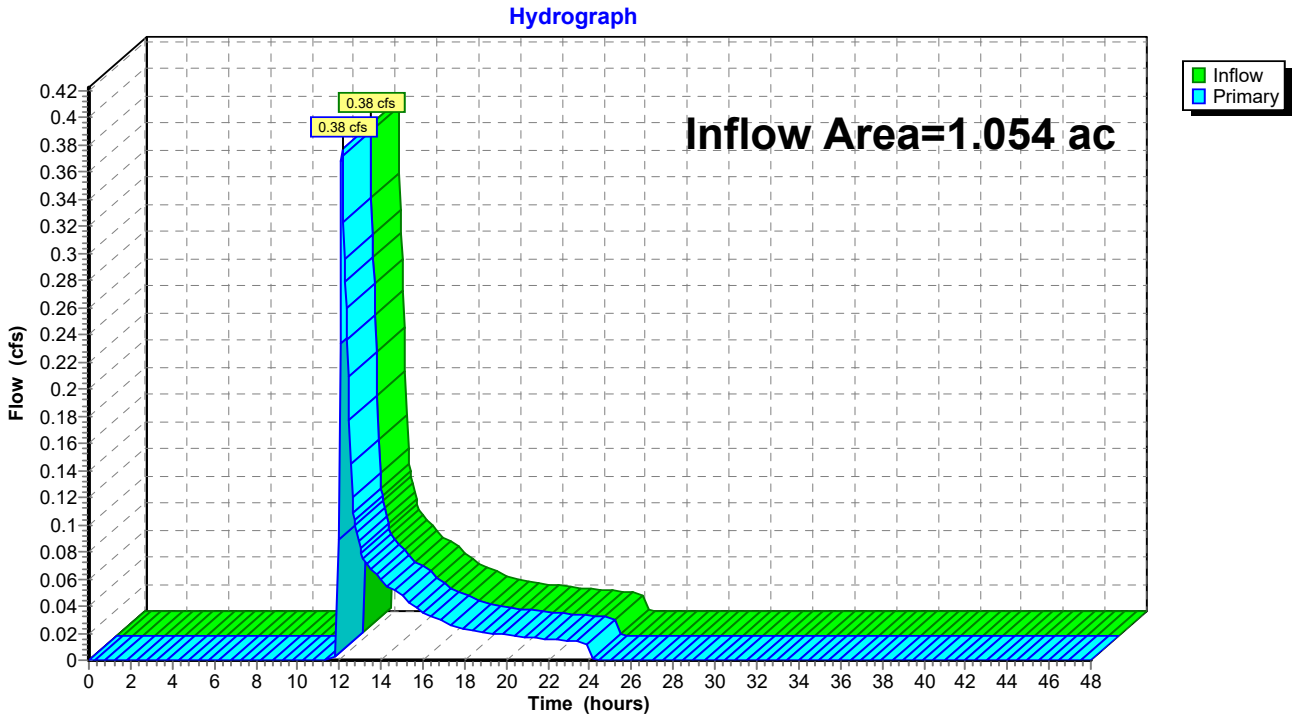


Summary for Link DP1:

Inflow Area = 1.054 ac, 0.00% Impervious, Inflow Depth = 0.49" for 2-Year event
Inflow = 0.38 cfs @ 12.13 hrs, Volume= 0.043 af
Primary = 0.38 cfs @ 12.13 hrs, Volume= 0.043 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Link DP1:

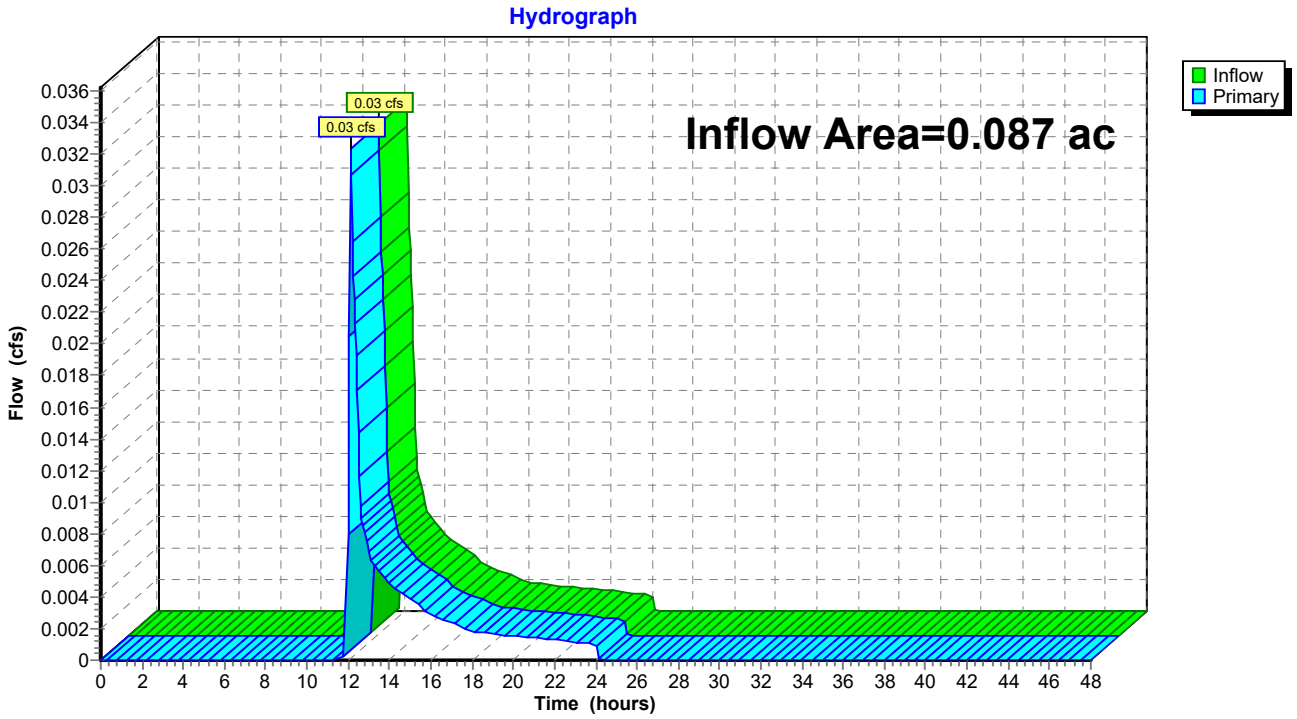


Summary for Link DP2:

Inflow Area = 0.087 ac, 0.00% Impervious, Inflow Depth = 0.49" for 2-Year event
Inflow = 0.03 cfs @ 12.12 hrs, Volume= 0.004 af
Primary = 0.03 cfs @ 12.12 hrs, Volume= 0.004 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Link DP2:



Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 points
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv.
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

SubcatchmentE1: Grass Runoff Area=1.054 ac 0.00% Impervious Runoff Depth=1.37"
Flow Length=287' Tc=6.3 min CN=61/0 Runoff=1.50 cfs 0.120 af

SubcatchmentE2: Grass Runoff Area=0.087 ac 0.00% Impervious Runoff Depth=1.37"
Tc=6.0 min CN=61/0 Runoff=0.13 cfs 0.010 af

Link DP1: Inflow=1.50 cfs 0.120 af
Primary=1.50 cfs 0.120 af

Link DP2: Inflow=0.13 cfs 0.010 af
Primary=0.13 cfs 0.010 af

Total Runoff Area = 1.141 ac Runoff Volume = 0.130 af Average Runoff Depth = 1.37"
100.00% Pervious = 1.141 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment E1: Grass

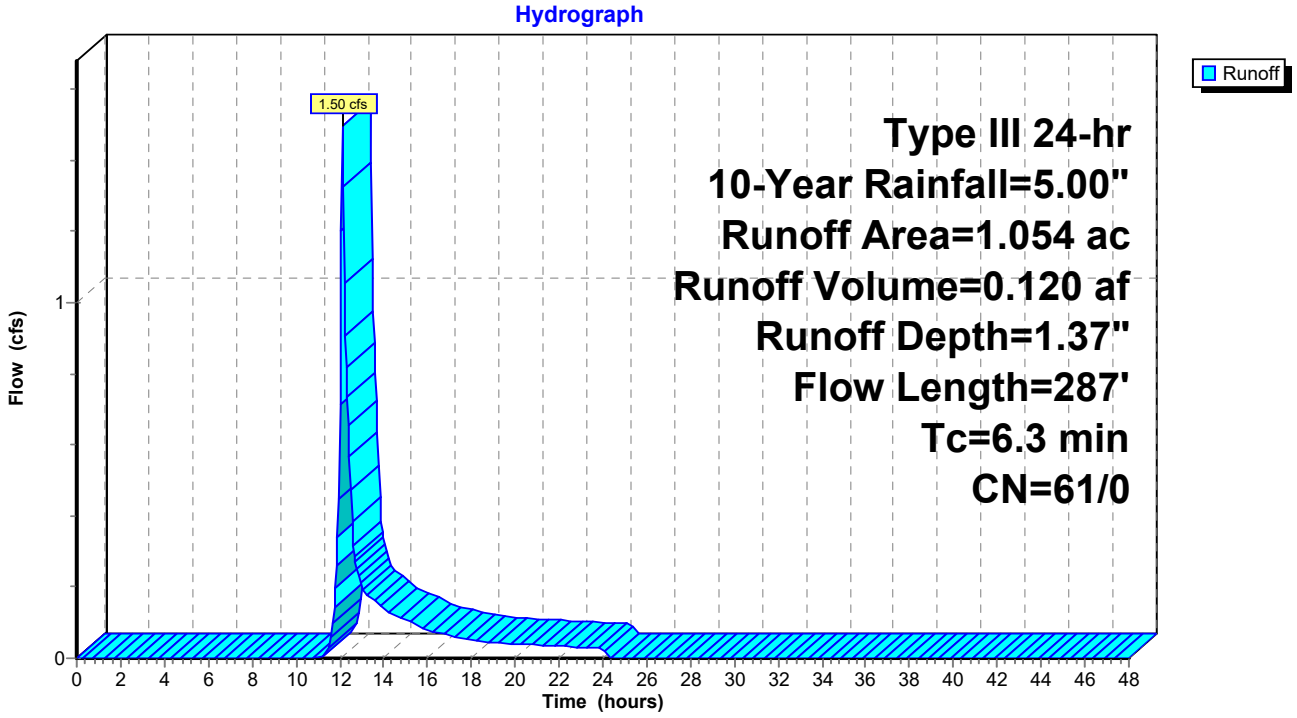
Runoff = 1.50 cfs @ 12.11 hrs, Volume= 0.120 af, Depth= 1.37"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=5.00"

Area (ac)	CN	Description
1.042	61	>75% Grass cover, Good, HSG B
0.012	55	Woods, Good, HSG B
1.054	61	Weighted Average
1.054	61	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.5	50	0.0600	0.24		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.40"
2.8	237	0.0420	1.43		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
6.3	287	Total			

Subcatchment E1: Grass



Summary for Subcatchment E2: Grass

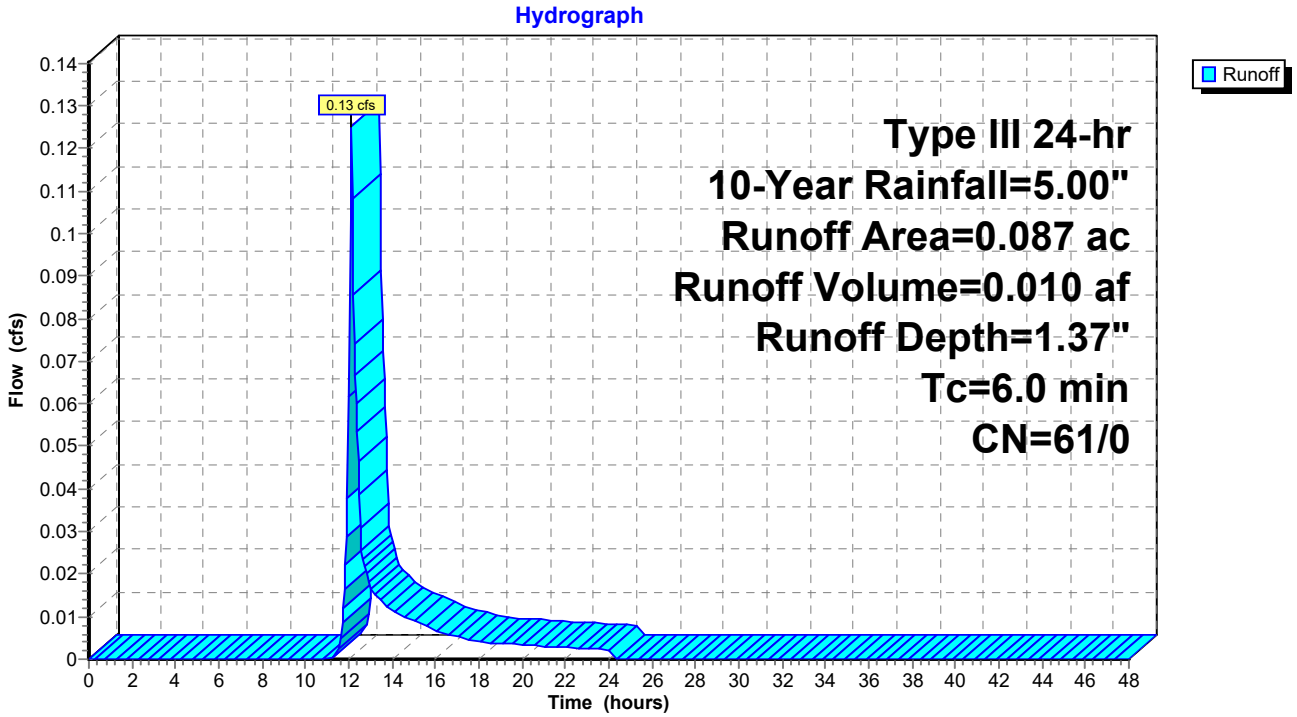
Runoff = 0.13 cfs @ 12.10 hrs, Volume= 0.010 af, Depth= 1.37"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=5.00"

Area (ac)	CN	Description
0.087	61	>75% Grass cover, Good, HSG B
0.087	61	100.00% Pervious Area

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

Subcatchment E2: Grass

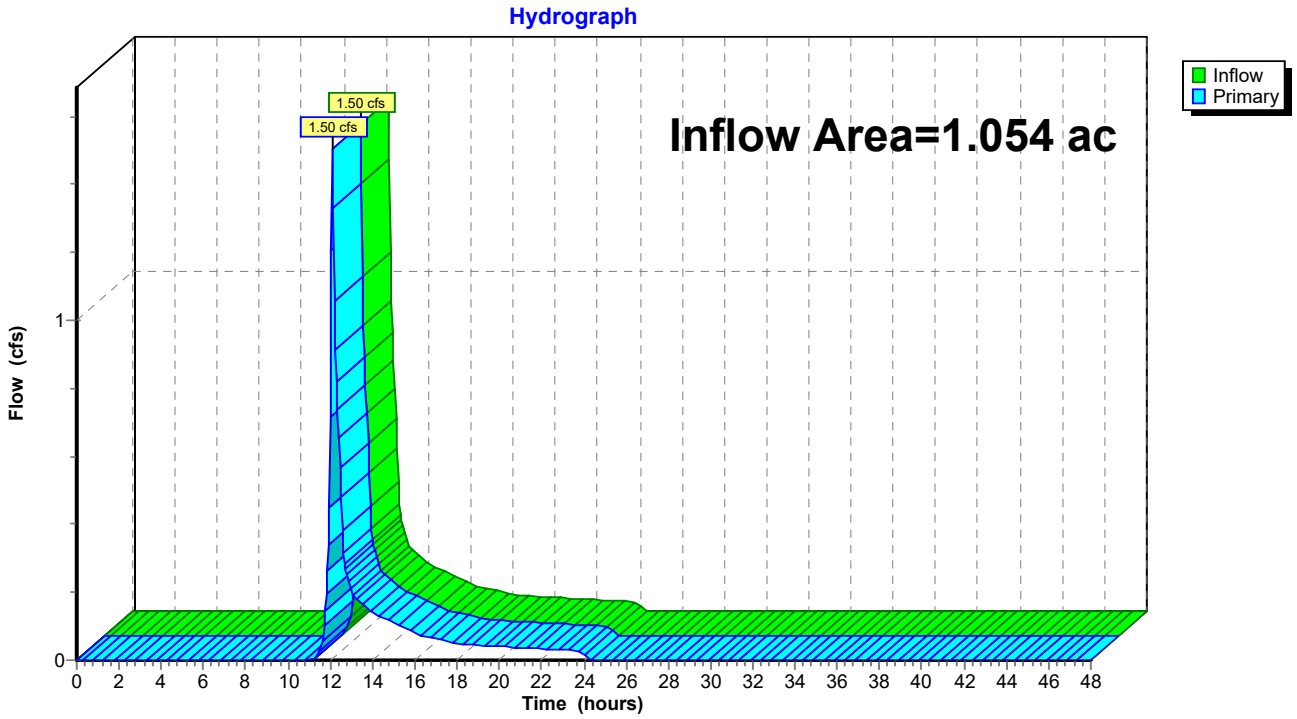


Summary for Link DP1:

Inflow Area = 1.054 ac, 0.00% Impervious, Inflow Depth = 1.37" for 10-Year event
Inflow = 1.50 cfs @ 12.11 hrs, Volume= 0.120 af
Primary = 1.50 cfs @ 12.11 hrs, Volume= 0.120 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Link DP1:

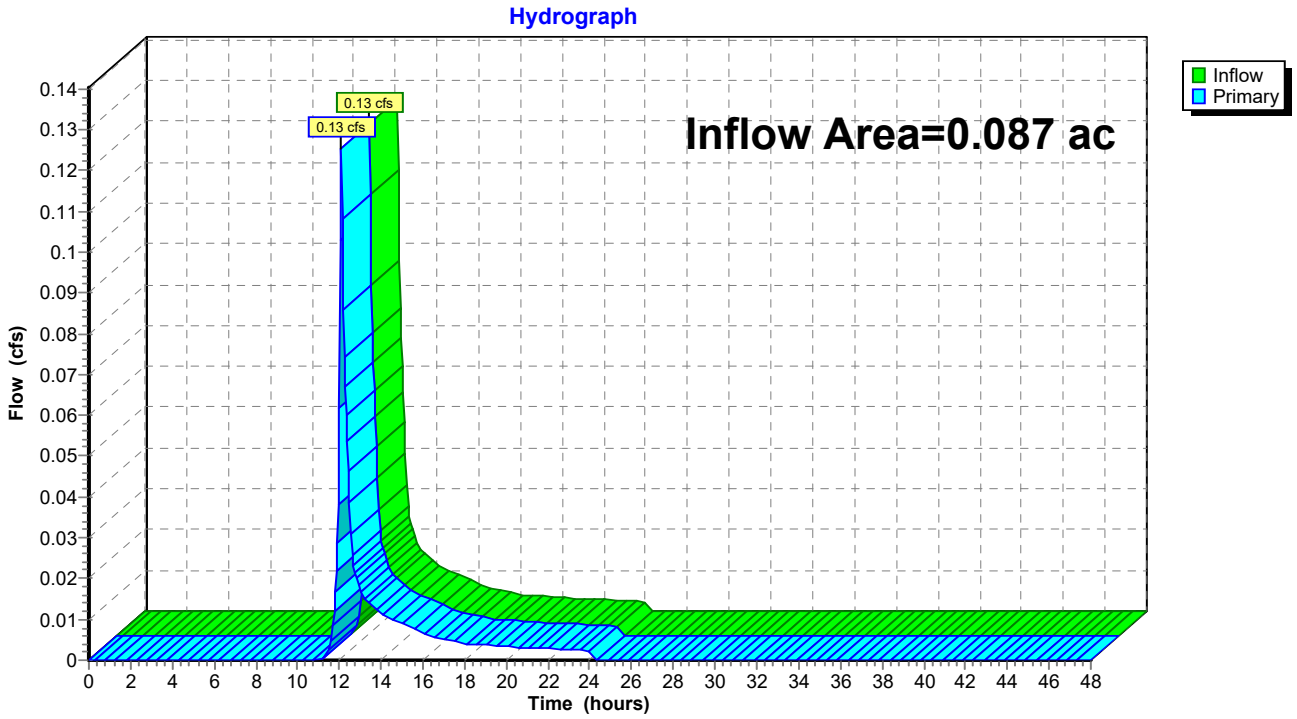


Summary for Link DP2:

Inflow Area = 0.087 ac, 0.00% Impervious, Inflow Depth = 1.37" for 10-Year event
Inflow = 0.13 cfs @ 12.10 hrs, Volume= 0.010 af
Primary = 0.13 cfs @ 12.10 hrs, Volume= 0.010 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Link DP2:



Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 points
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv.
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

SubcatchmentE1: Grass Runoff Area=1.054 ac 0.00% Impervious Runoff Depth=1.81"
Flow Length=287' Tc=6.3 min CN=61/0 Runoff=2.06 cfs 0.159 af

SubcatchmentE2: Grass Runoff Area=0.087 ac 0.00% Impervious Runoff Depth=1.81"
Tc=6.0 min CN=61/0 Runoff=0.17 cfs 0.013 af

Link DP1: Inflow=2.06 cfs 0.159 af
Primary=2.06 cfs 0.159 af

Link DP2: Inflow=0.17 cfs 0.013 af
Primary=0.17 cfs 0.013 af

Total Runoff Area = 1.141 ac Runoff Volume = 0.172 af Average Runoff Depth = 1.81"
100.00% Pervious = 1.141 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment E1: Grass

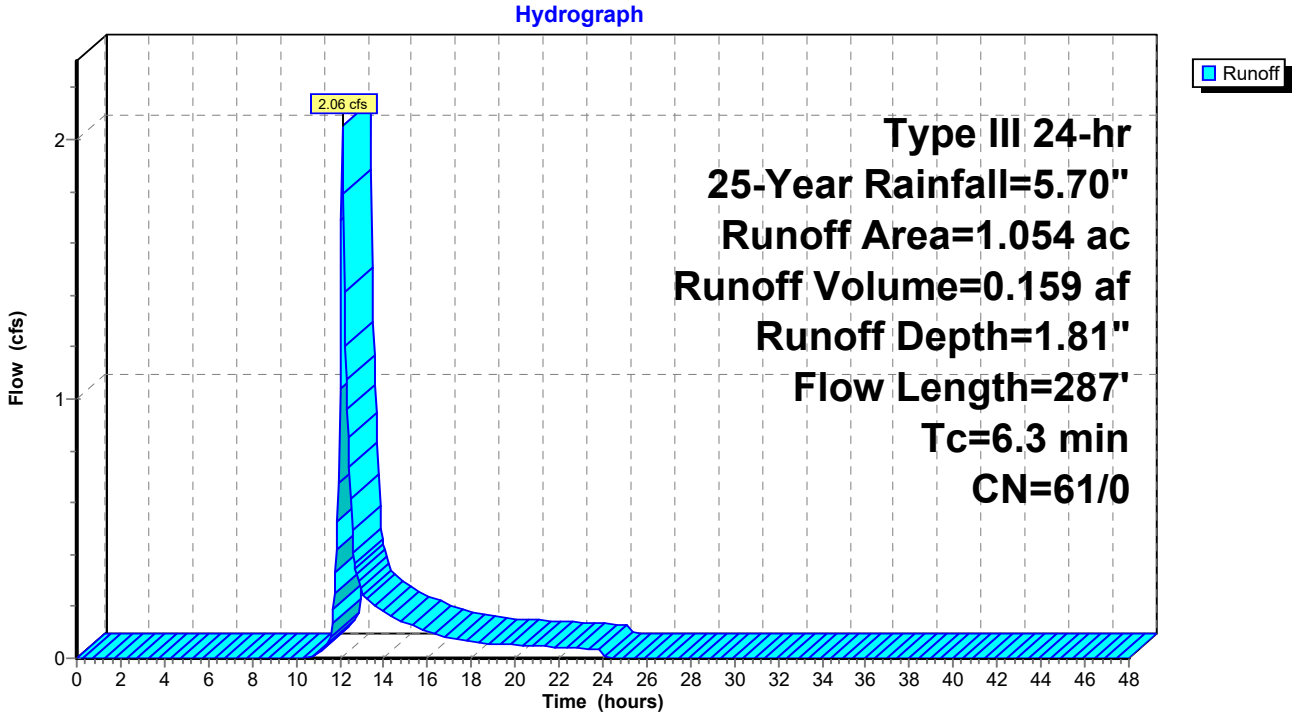
Runoff = 2.06 cfs @ 12.10 hrs, Volume= 0.159 af, Depth= 1.81"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=5.70"

Area (ac)	CN	Description
1.042	61	>75% Grass cover, Good, HSG B
0.012	55	Woods, Good, HSG B
1.054	61	Weighted Average
1.054	61	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.5	50	0.0600	0.24		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.40"
2.8	237	0.0420	1.43		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
6.3	287	Total			

Subcatchment E1: Grass



Summary for Subcatchment E2: Grass

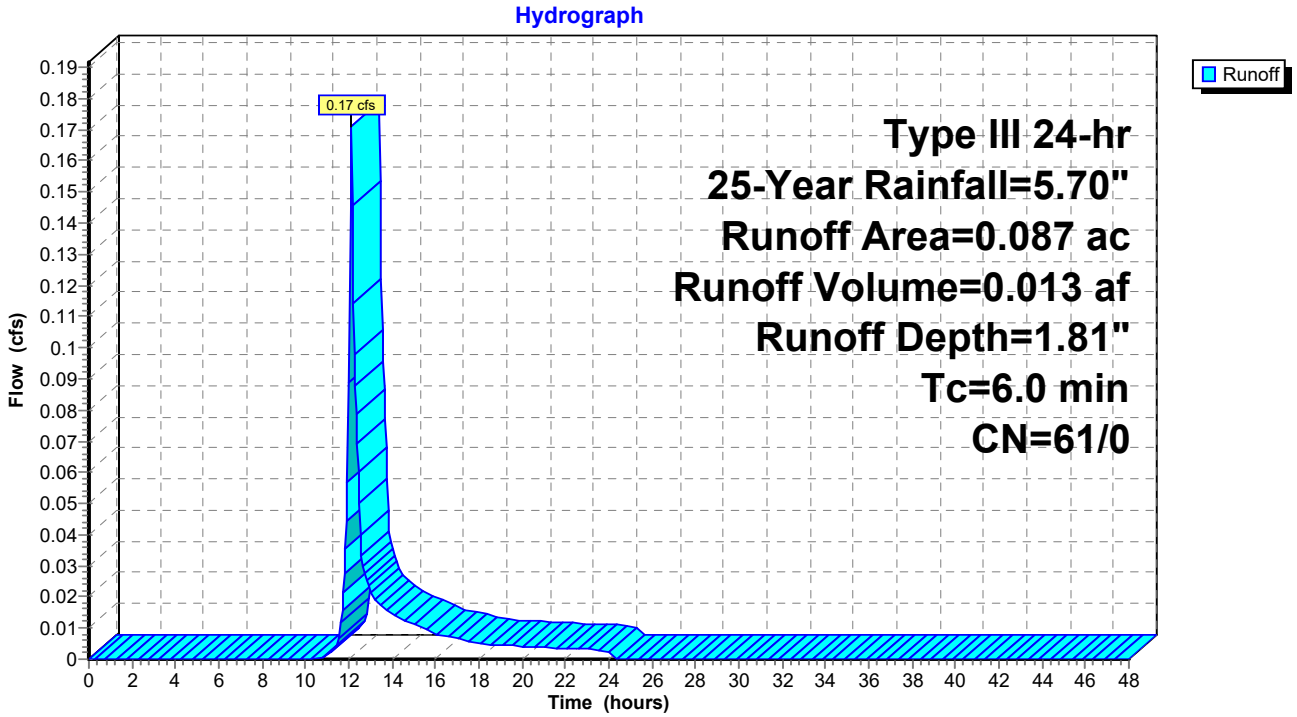
Runoff = 0.17 cfs @ 12.10 hrs, Volume= 0.013 af, Depth= 1.81"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=5.70"

Area (ac)	CN	Description
0.087	61	>75% Grass cover, Good, HSG B
0.087	61	100.00% Pervious Area

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

Subcatchment E2: Grass

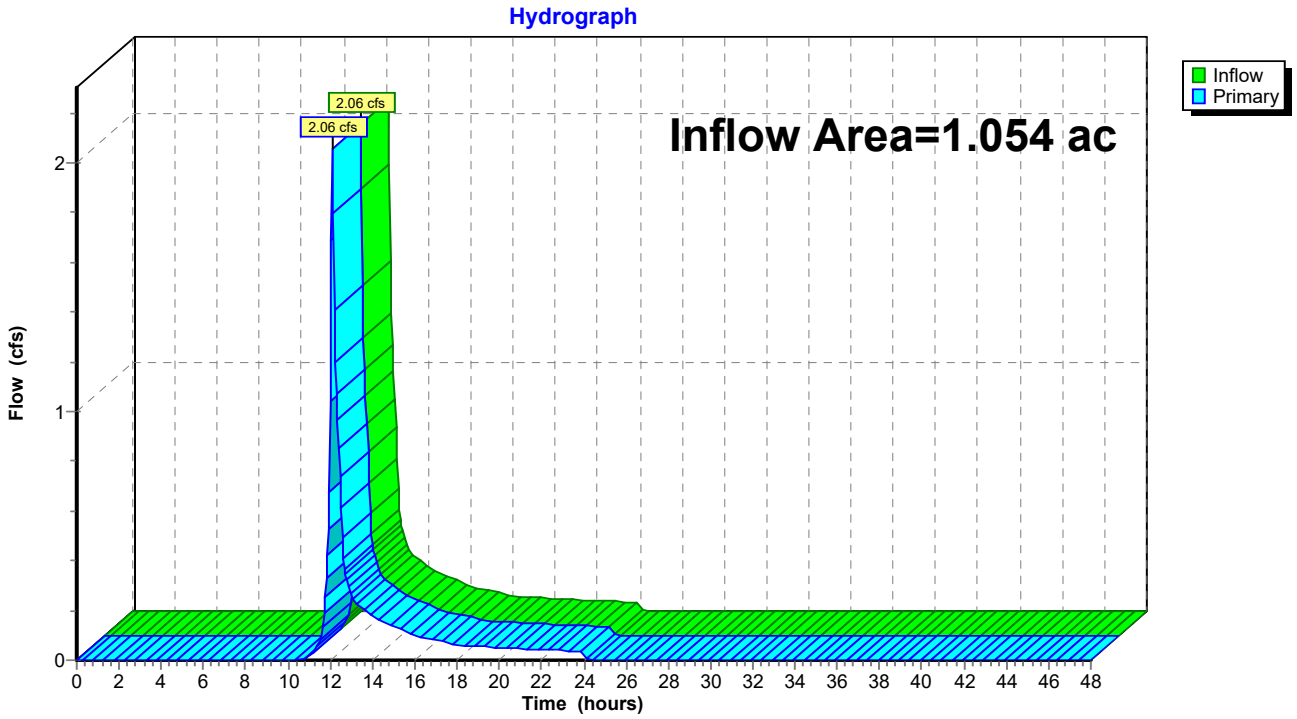


Summary for Link DP1:

Inflow Area = 1.054 ac, 0.00% Impervious, Inflow Depth = 1.81" for 25-Year event
Inflow = 2.06 cfs @ 12.10 hrs, Volume= 0.159 af
Primary = 2.06 cfs @ 12.10 hrs, Volume= 0.159 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Link DP1:

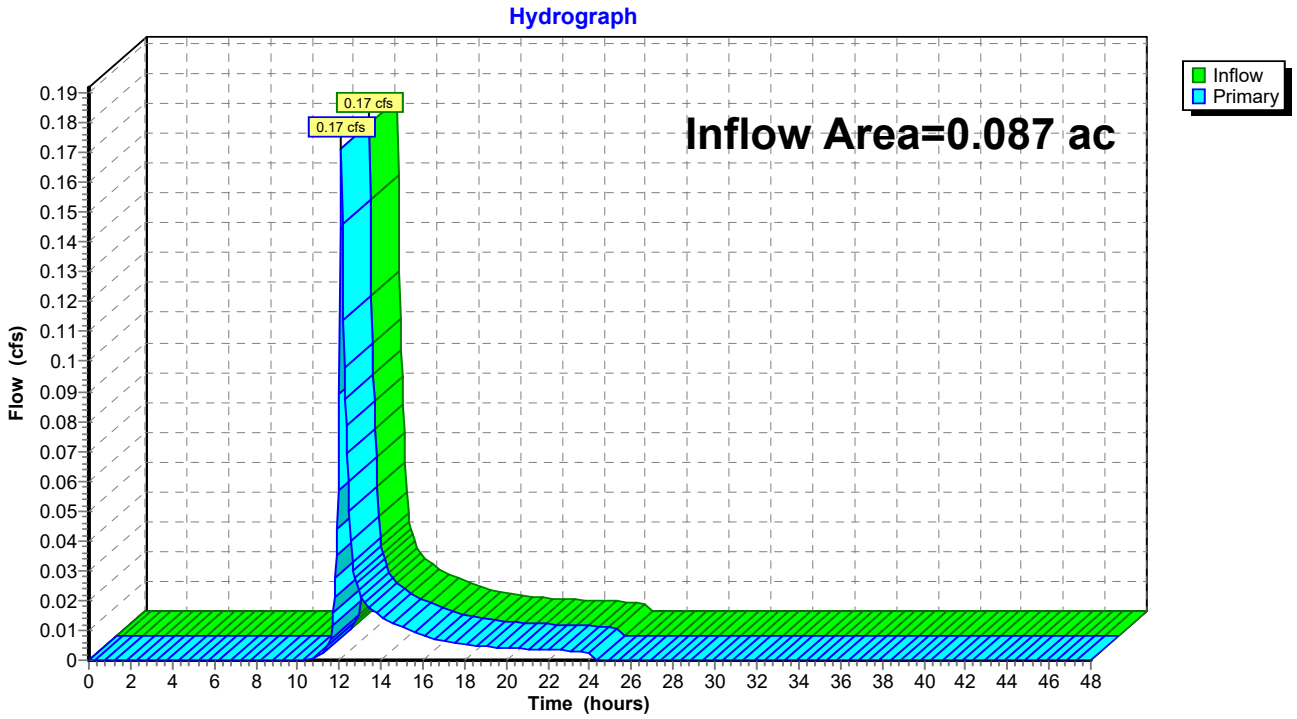


Summary for Link DP2:

Inflow Area = 0.087 ac, 0.00% Impervious, Inflow Depth = 1.81" for 25-Year event
Inflow = 0.17 cfs @ 12.10 hrs, Volume= 0.013 af
Primary = 0.17 cfs @ 12.10 hrs, Volume= 0.013 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Link DP2:



Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 points
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv.
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

SubcatchmentE1: Grass Runoff Area=1.054 ac 0.00% Impervious Runoff Depth=2.28"
Flow Length=287' Tc=6.3 min CN=61/0 Runoff=2.65 cfs 0.200 af

SubcatchmentE2: Grass Runoff Area=0.087 ac 0.00% Impervious Runoff Depth=2.28"
Tc=6.0 min CN=61/0 Runoff=0.22 cfs 0.017 af

Link DP1: Inflow=2.65 cfs 0.200 af
Primary=2.65 cfs 0.200 af

Link DP2: Inflow=0.22 cfs 0.017 af
Primary=0.22 cfs 0.017 af

Total Runoff Area = 1.141 ac Runoff Volume = 0.217 af Average Runoff Depth = 2.28"
100.00% Pervious = 1.141 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment E1: Grass

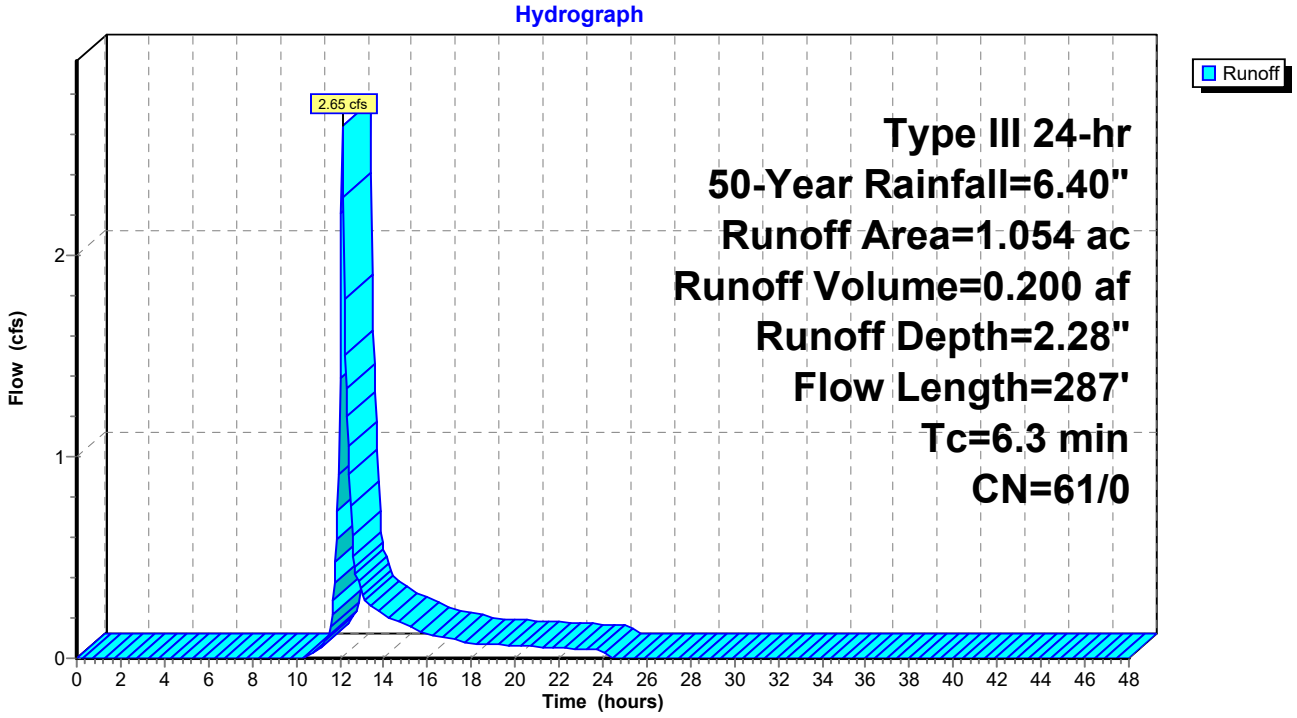
Runoff = 2.65 cfs @ 12.10 hrs, Volume= 0.200 af, Depth= 2.28"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-Year Rainfall=6.40"

Area (ac)	CN	Description
1.042	61	>75% Grass cover, Good, HSG B
0.012	55	Woods, Good, HSG B
1.054	61	Weighted Average
1.054	61	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.5	50	0.0600	0.24		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.40"
2.8	237	0.0420	1.43		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
6.3	287	Total			

Subcatchment E1: Grass



Summary for Subcatchment E2: Grass

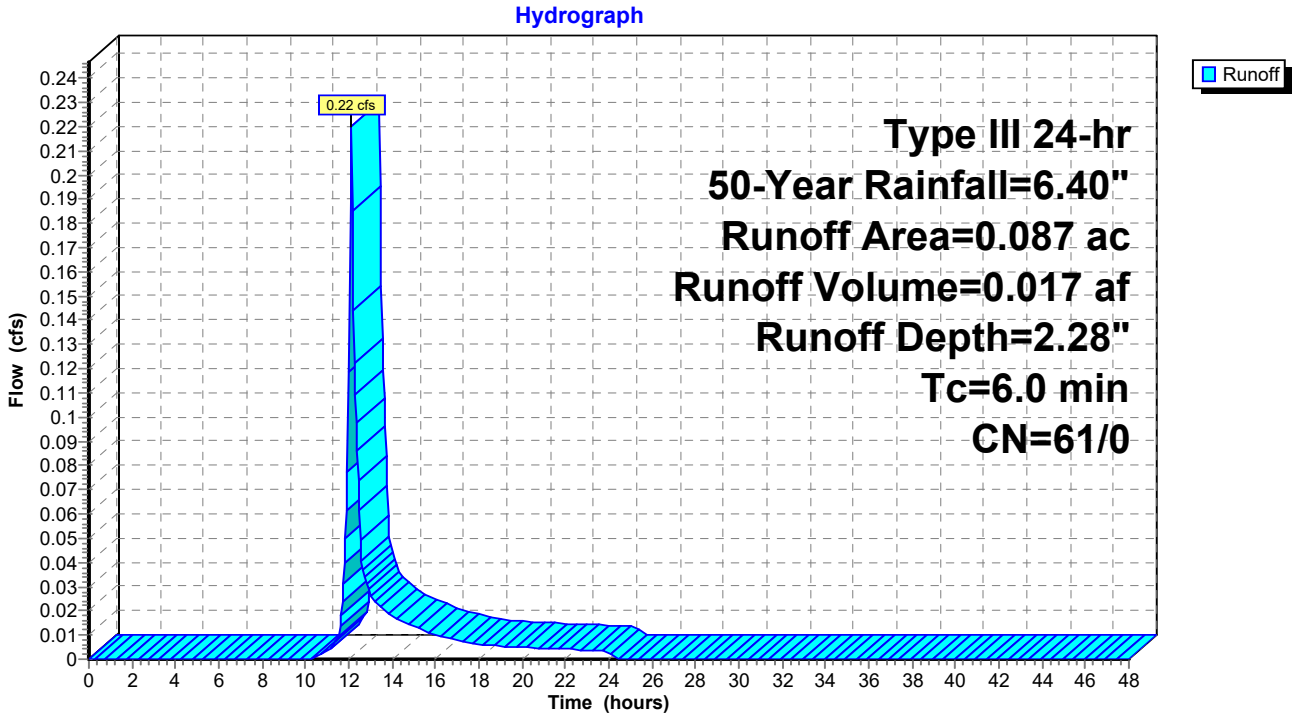
Runoff = 0.22 cfs @ 12.10 hrs, Volume= 0.017 af, Depth= 2.28"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-Year Rainfall=6.40"

Area (ac)	CN	Description
0.087	61	>75% Grass cover, Good, HSG B
0.087	61	100.00% Pervious Area

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

Subcatchment E2: Grass

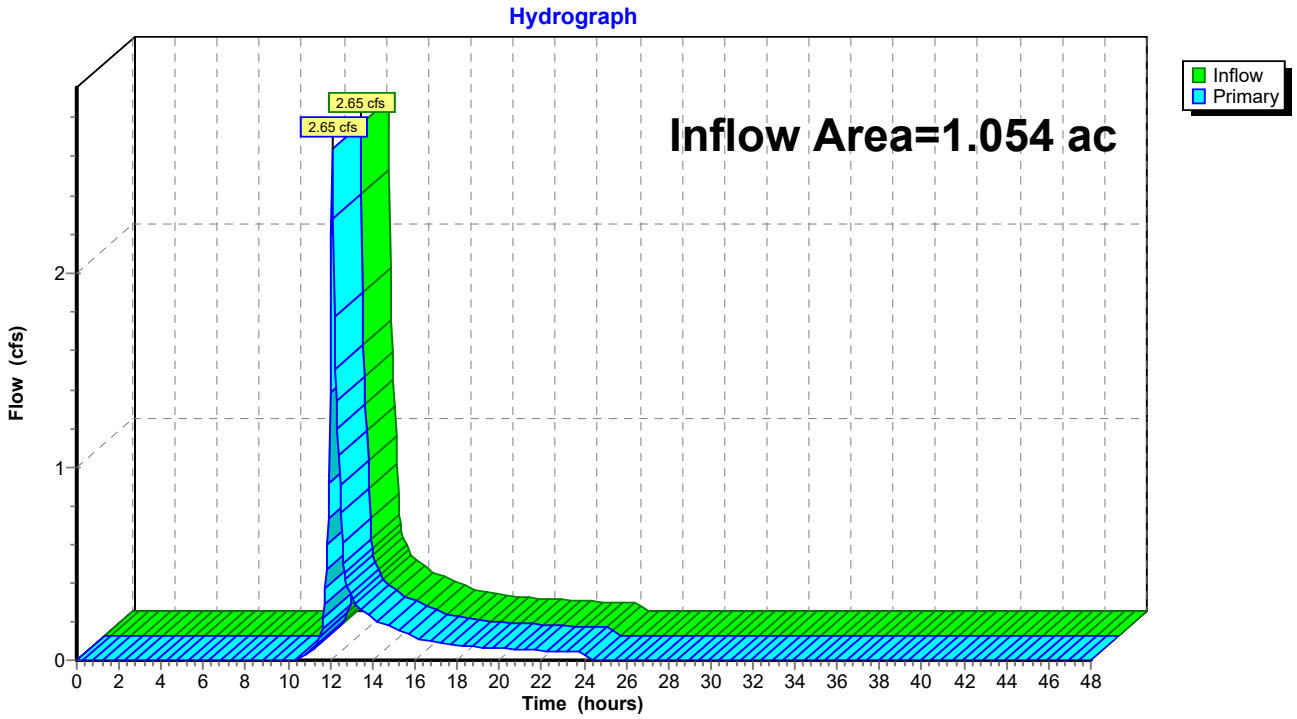


Summary for Link DP1:

Inflow Area = 1.054 ac, 0.00% Impervious, Inflow Depth = 2.28" for 50-Year event
Inflow = 2.65 cfs @ 12.10 hrs, Volume= 0.200 af
Primary = 2.65 cfs @ 12.10 hrs, Volume= 0.200 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Link DP1:

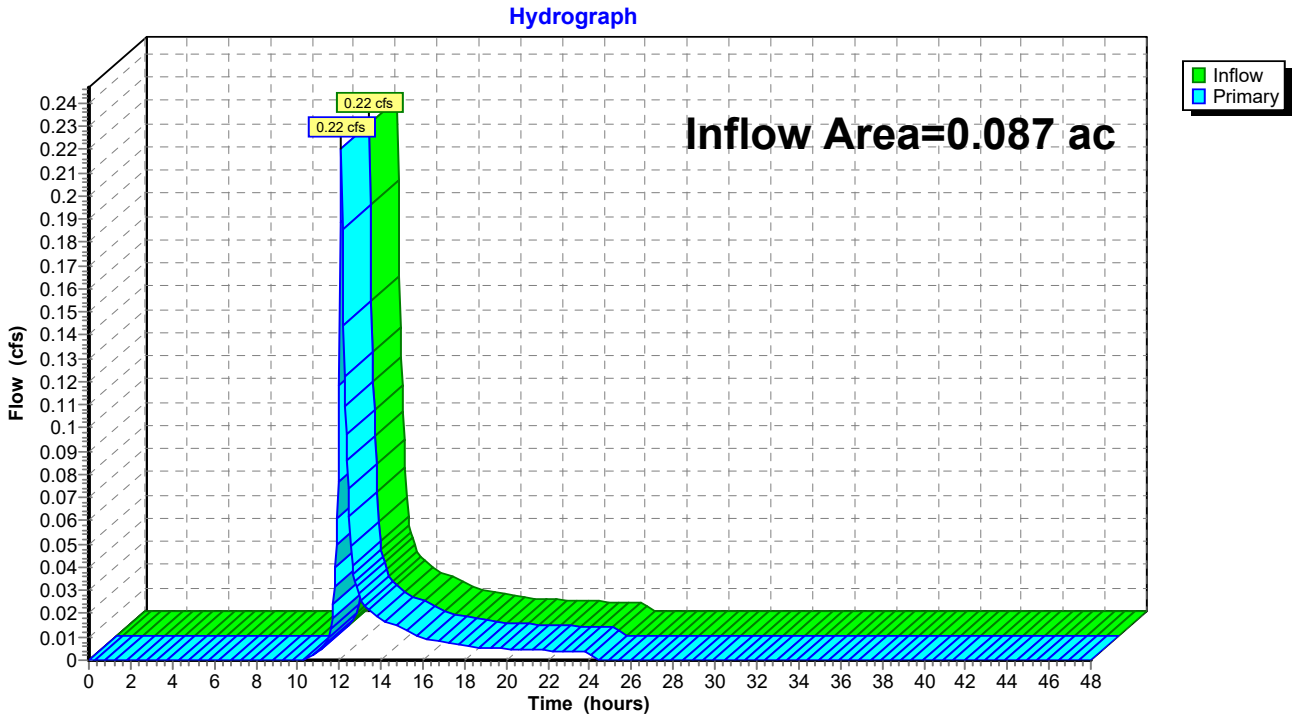


Summary for Link DP2:

Inflow Area = 0.087 ac, 0.00% Impervious, Inflow Depth = 2.28" for 50-Year event
Inflow = 0.22 cfs @ 12.10 hrs, Volume= 0.017 af
Primary = 0.22 cfs @ 12.10 hrs, Volume= 0.017 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Link DP2:



Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 points
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv.
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

SubcatchmentE1: Grass Runoff Area=1.054 ac 0.00% Impervious Runoff Depth=2.85"
Flow Length=287' Tc=6.3 min CN=61/0 Runoff=3.36 cfs 0.250 af

SubcatchmentE2: Grass Runoff Area=0.087 ac 0.00% Impervious Runoff Depth=2.85"
Tc=6.0 min CN=61/0 Runoff=0.28 cfs 0.021 af

Link DP1: Inflow=3.36 cfs 0.250 af
Primary=3.36 cfs 0.250 af

Link DP2: Inflow=0.28 cfs 0.021 af
Primary=0.28 cfs 0.021 af

Total Runoff Area = 1.141 ac Runoff Volume = 0.271 af Average Runoff Depth = 2.85"
100.00% Pervious = 1.141 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment E1: Grass

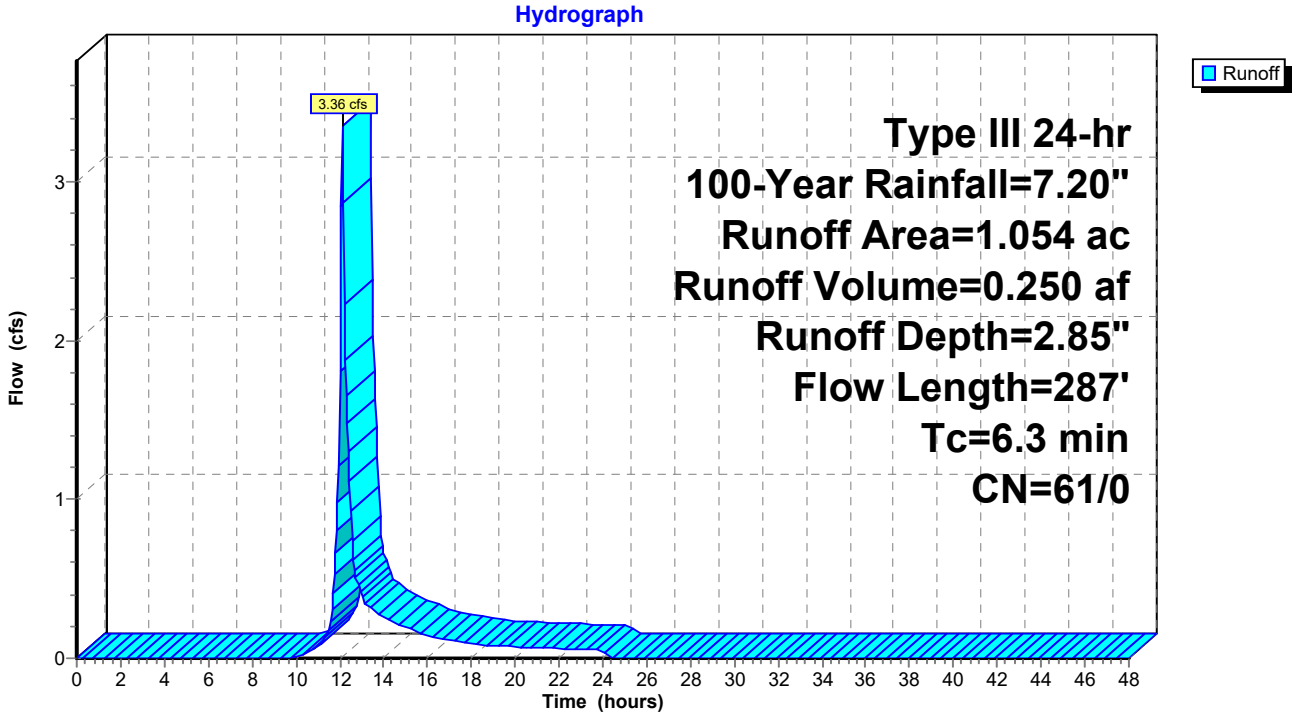
Runoff = 3.36 cfs @ 12.10 hrs, Volume= 0.250 af, Depth= 2.85"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=7.20"

Area (ac)	CN	Description
1.042	61	>75% Grass cover, Good, HSG B
0.012	55	Woods, Good, HSG B
1.054	61	Weighted Average
1.054	61	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.5	50	0.0600	0.24		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.40"
2.8	237	0.0420	1.43		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
6.3	287	Total			

Subcatchment E1: Grass



Summary for Subcatchment E2: Grass

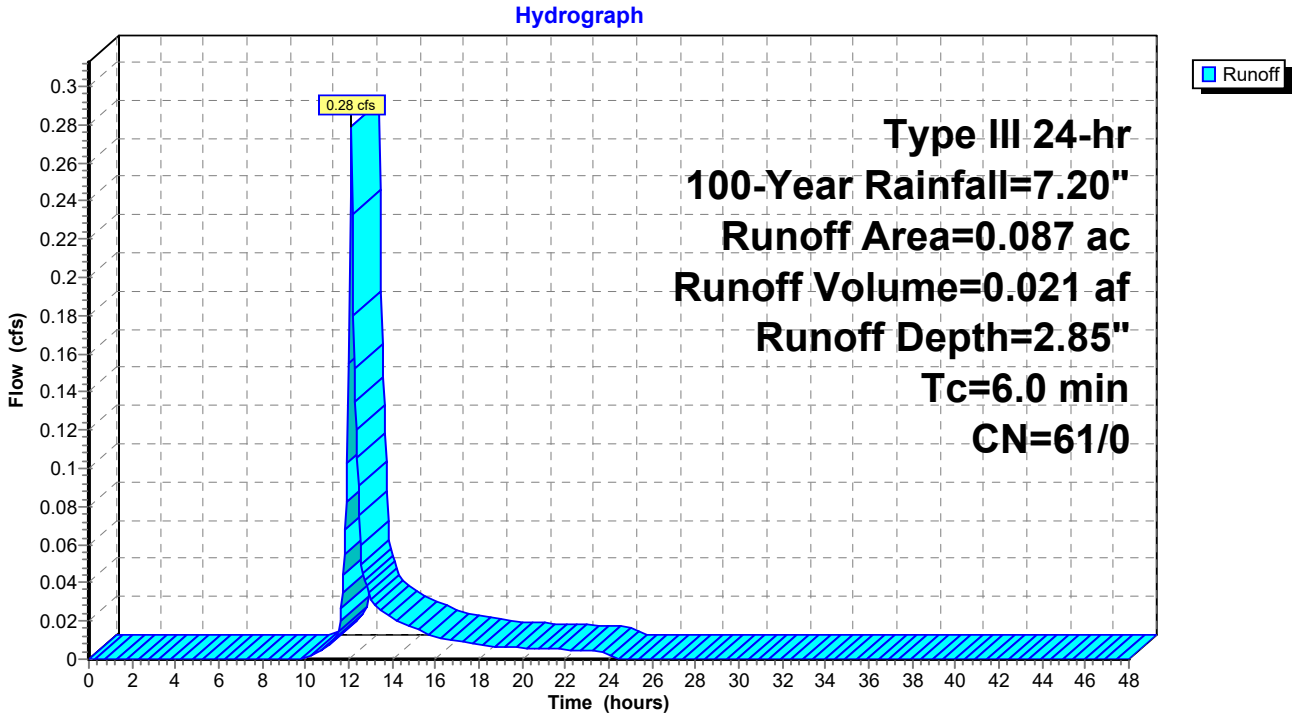
Runoff = 0.28 cfs @ 12.10 hrs, Volume= 0.021 af, Depth= 2.85"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=7.20"

Area (ac)	CN	Description
0.087	61	>75% Grass cover, Good, HSG B
0.087	61	100.00% Pervious Area

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

Subcatchment E2: Grass

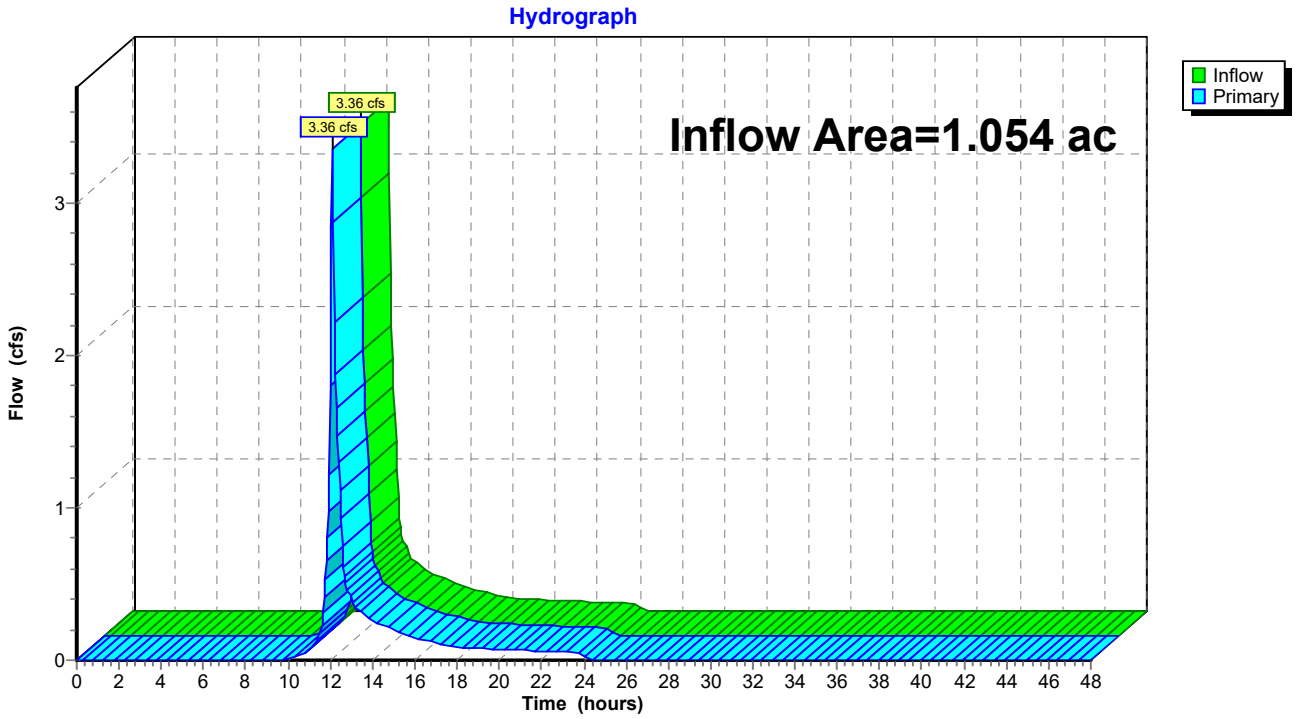


Summary for Link DP1:

Inflow Area = 1.054 ac, 0.00% Impervious, Inflow Depth = 2.85" for 100-Year event
Inflow = 3.36 cfs @ 12.10 hrs, Volume= 0.250 af
Primary = 3.36 cfs @ 12.10 hrs, Volume= 0.250 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Link DP1:

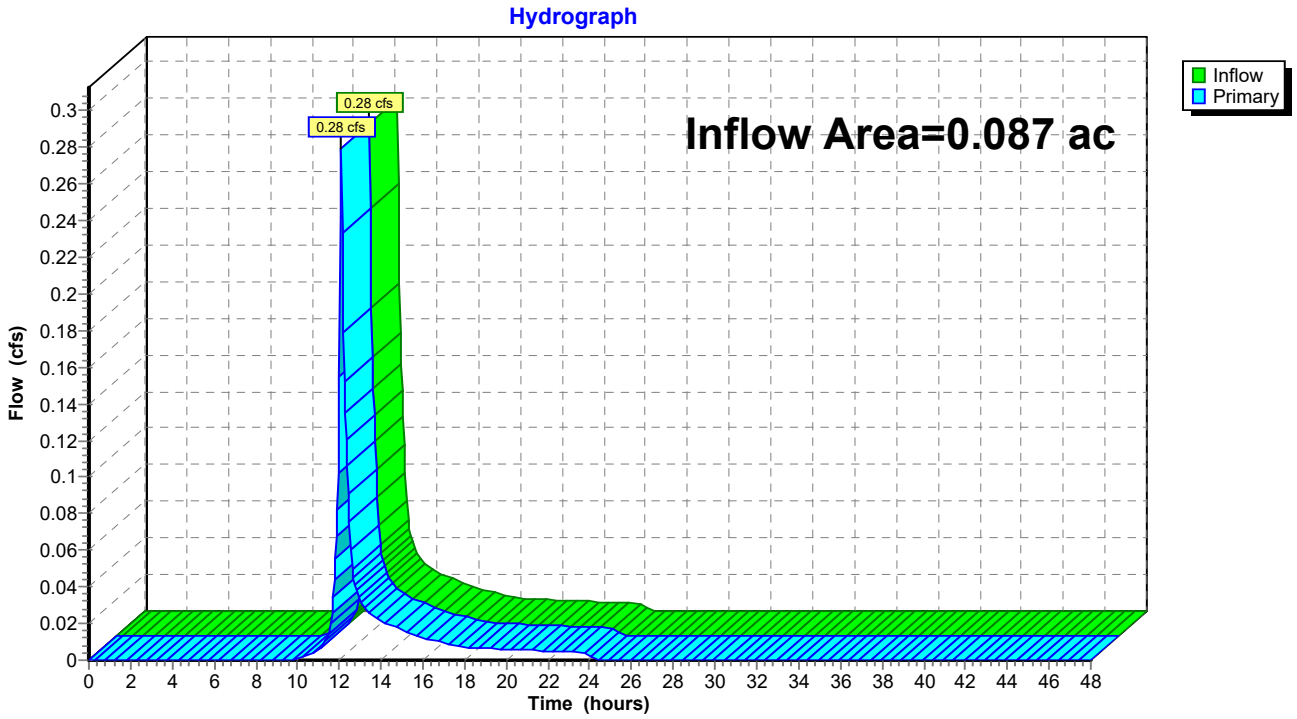


Summary for Link DP2:

Inflow Area = 0.087 ac, 0.00% Impervious, Inflow Depth = 2.85" for 100-Year event
Inflow = 0.28 cfs @ 12.10 hrs, Volume= 0.021 af
Primary = 0.28 cfs @ 12.10 hrs, Volume= 0.021 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Link DP2:



APPENDIX E: PROPOSED CONDITIONS HYDROLOGIC ANALYSIS

- *PROPOSED CONDITIONS DRAINAGE MAP*
- *PROPOSED CONDITIONS HYDROCAD CALCULATIONS*

LEGEND

- OVERALL BOUNDARY
- SUBCATCHMENT BOUNDARY
- TIME OF CONCENTRATION
- HYDROLOGIC SOIL GROUP BOUNDARY
- CONCRETE/ PAVEMENT
- ROOF
- GRAVEL SURFACE
- LANDSCAPE/ LAWN
- LIGHT UNDERBRUSH/ SHRUBS
- DENSE WOODS
- WATER/ PONDING
- DP# — DESIGN POINT
- X#.# — SUBCATCHMENT
- X#.# — OUTLET CONTROL STRUCTURE OR POND
- X — HYDROLOGIC SOIL GROUP RATING
- XxX — NCRS SOIL MAP UNIT
- R#.# — REACH

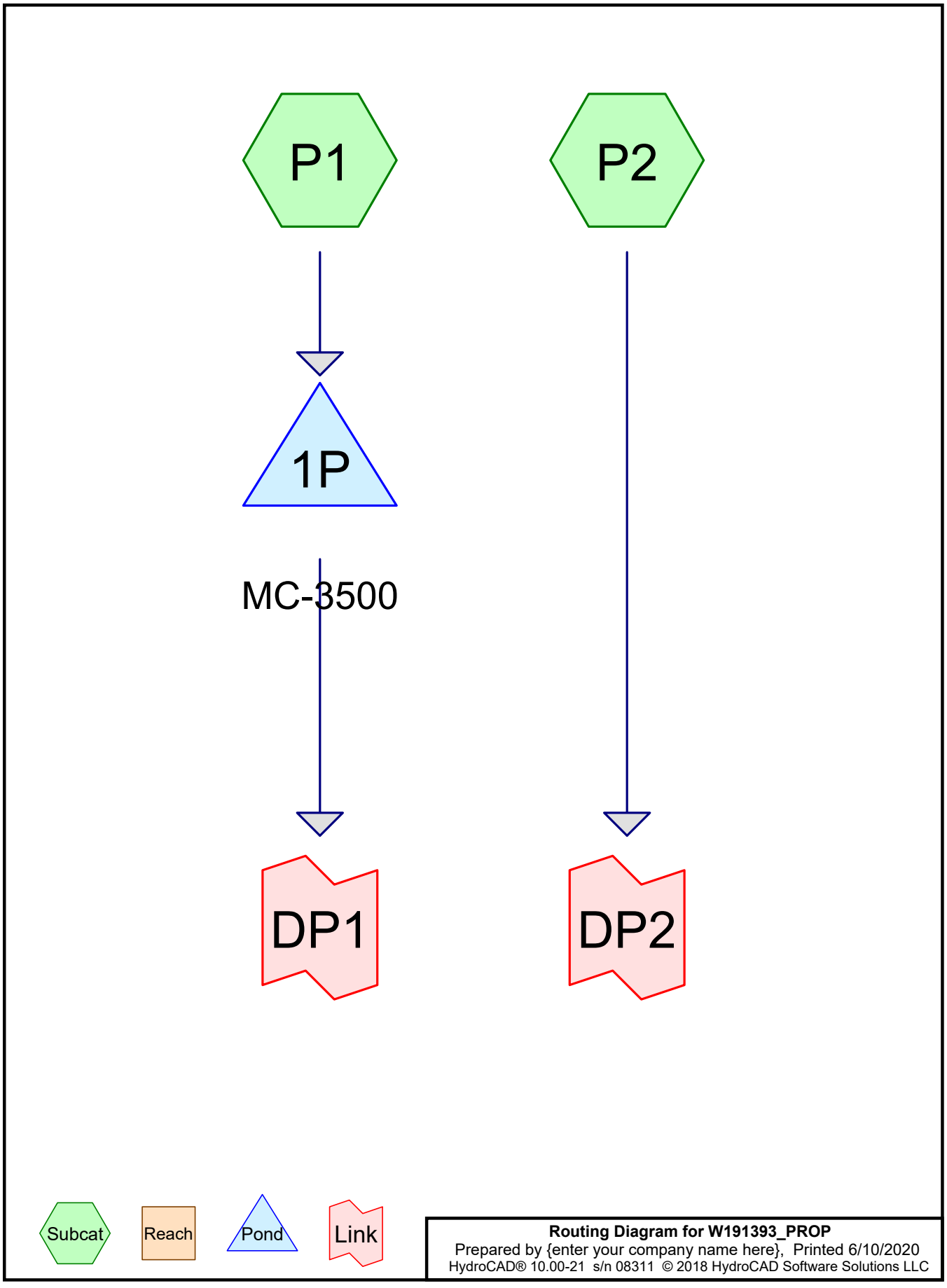
PROPOSED DRAINAGE WATERSHED MAP

306 BOSTON POST ROAD
TOWN OF DARIEN
FAIRFIELD COUNTY, CONNECTICUT

PREPARED BY

BOHLER

SCALE: 1"=40'
DATE: JUNE 11, 2020



Routing Diagram for W191393_PROP
Prepared by {enter your company name here}, Printed 6/10/2020

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.387	61	>75% Grass cover, Good, HSG B (P1)
0.064	58	Meadow, non-grazed, HSG B (P2)
0.660	98	Paved parking, HSG B (P1, P2)
0.017	98	Roofs, HSG B (P1)
0.012	55	Woods, Good, HSG B (P1)
1.140	**83**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
1.140	HSG B	P1, P2
0.000	HSG C	
0.000	HSG D	
0.000	Other	
1.140		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.387	0.000	0.000	0.000	0.387	>75% Grass cover, Good	P1
0.000	0.064	0.000	0.000	0.000	0.064	Meadow, non-grazed	P2
0.000	0.660	0.000	0.000	0.000	0.660	Paved parking	P1, P2
0.000	0.017	0.000	0.000	0.000	0.017	Roofs	P1
0.000	0.012	0.000	0.000	0.000	0.012	Woods, Good	P1
0.000	**1.140**	**0.000**	**0.000**	**0.000**	**1.140**	**TOTAL AREA**	

Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 points
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv.
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

SubcatchmentP1: Runoff Area=1.062 ac 62.43% Impervious Runoff Depth=2.10"
Tc=6.0 min CN=61/98 Runoff=2.21 cfs 0.186 af

SubcatchmentP2: Runoff Area=0.078 ac 17.95% Impervious Runoff Depth=0.86"
Tc=6.0 min CN=58/98 Runoff=0.06 cfs 0.006 af

Pond 1P: MC-3500 Peak Elev=77.60' Storage=0.064 af Inflow=2.21 cfs 0.186 af
Outflow=0.35 cfs 0.185 af

Link DP1: Inflow=0.35 cfs 0.185 af
Primary=0.35 cfs 0.185 af

Link DP2: Inflow=0.06 cfs 0.006 af
Primary=0.06 cfs 0.006 af

Total Runoff Area = 1.140 ac Runoff Volume = 0.191 af Average Runoff Depth = 2.01"
40.61% Pervious = 0.463 ac 59.39% Impervious = 0.677 ac

Summary for Subcatchment P1:

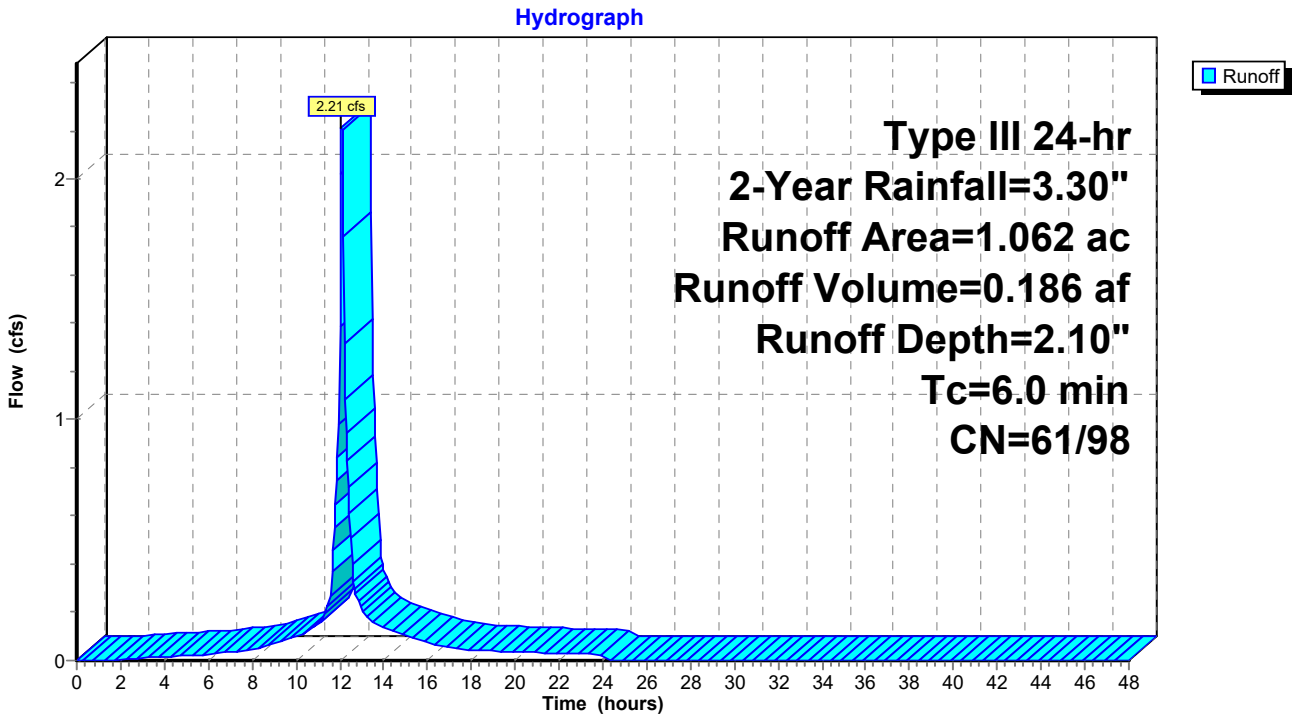
Runoff = 2.21 cfs @ 12.09 hrs, Volume= 0.186 af, Depth= 2.10"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.30"

Area (ac)	CN	Description
0.387	61	>75% Grass cover, Good, HSG B
0.012	55	Woods, Good, HSG B
0.646	98	Paved parking, HSG B
0.017	98	Roofs, HSG B
1.062	84	Weighted Average
0.399	61	37.57% Pervious Area
0.663	98	62.43% Impervious Area

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

Subcatchment P1:



Summary for Subcatchment P2:

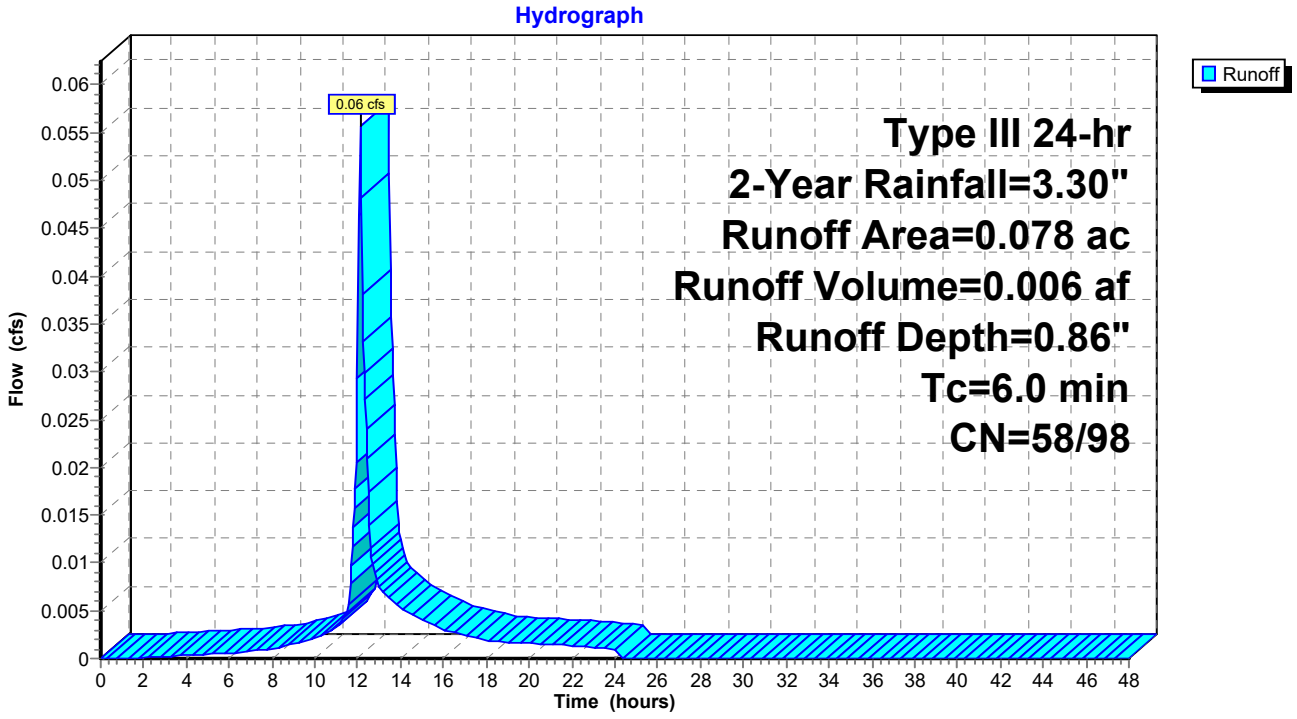
Runoff = 0.06 cfs @ 12.10 hrs, Volume= 0.006 af, Depth= 0.86"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.30"

Area (ac)	CN	Description
0.064	58	Meadow, non-grazed, HSG B
0.014	98	Paved parking, HSG B
0.078	65	Weighted Average
0.064	58	82.05% Pervious Area
0.014	98	17.95% Impervious Area

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

Subcatchment P2:



Summary for Pond 1P: MC-3500

Inflow Area = 1.062 ac, 62.43% Impervious, Inflow Depth = 2.10" for 2-Year event
Inflow = 2.21 cfs @ 12.09 hrs, Volume= 0.186 af
Outflow = 0.35 cfs @ 12.59 hrs, Volume= 0.185 af, Atten= 84%, Lag= 30.1 min
Primary = 0.35 cfs @ 12.59 hrs, Volume= 0.185 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 77.60' @ 12.59 hrs Surf.Area= 0.041 ac Storage= 0.064 af

Plug-Flow detention time= 83.1 min calculated for 0.185 af (100% of inflow)
Center-of-Mass det. time= 82.2 min (851.5 - 769.3)

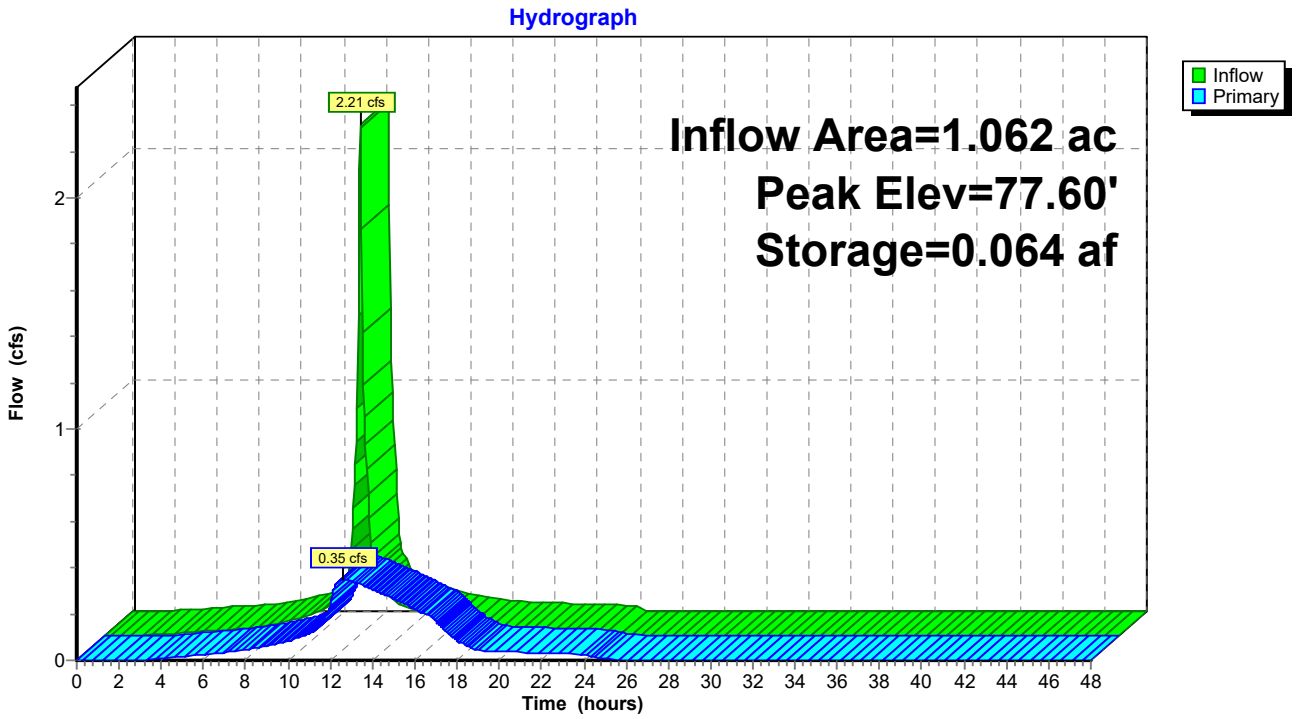
Volume	Invert	Avail.Storage	Storage Description
#1A	75.30'	0.060 af	**37.08'W x 48.72'L x 5.50'H Field A** 0.228 af Overall - 0.079 af Embedded = 0.149 af x 40.0% Voids
#2A	76.05'	0.079 af	**ADS_StormTech MC-3500 d +Cap**x 30 Inside #1 Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap 5 Rows of 6 Chambers Cap Storage= +14.9 cf x 2 x 5 rows = 149.0 cf
		0.139 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	75.30'	**12.0" Round Culvert** L= 20.0' Ke= 0.500 Inlet / Outlet Invert= 75.30' / 75.30' S= 0.0000 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#2	Device 1	79.90'	**5.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#3	Device 1	75.30'	**3.0" Vert. Orifice/Grate** C= 0.600
#4	Device 1	77.73'	**8.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.35 cfs @ 12.59 hrs HW=77.60' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.35 cfs of 5.03 cfs potential flow)
  ├─**2=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)
  ├─**3=Orifice/Grate** (Orifice Controls 0.35 cfs @ 7.09 fps)
  └─**4=Orifice/Grate** (Controls 0.00 cfs)

Pond 1P: MC-3500

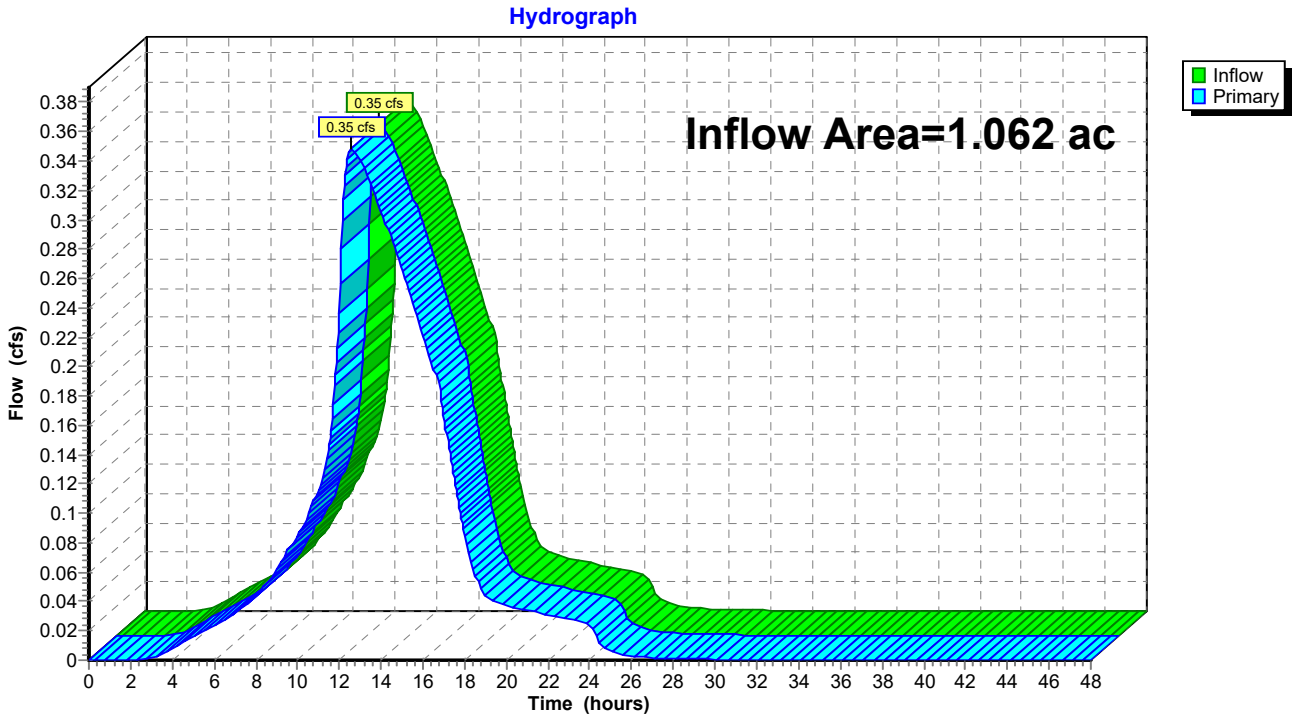


Summary for Link DP1:

Inflow Area = 1.062 ac, 62.43% Impervious, Inflow Depth > 2.09" for 2-Year event
Inflow = 0.35 cfs @ 12.59 hrs, Volume= 0.185 af
Primary = 0.35 cfs @ 12.59 hrs, Volume= 0.185 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Link DP1:

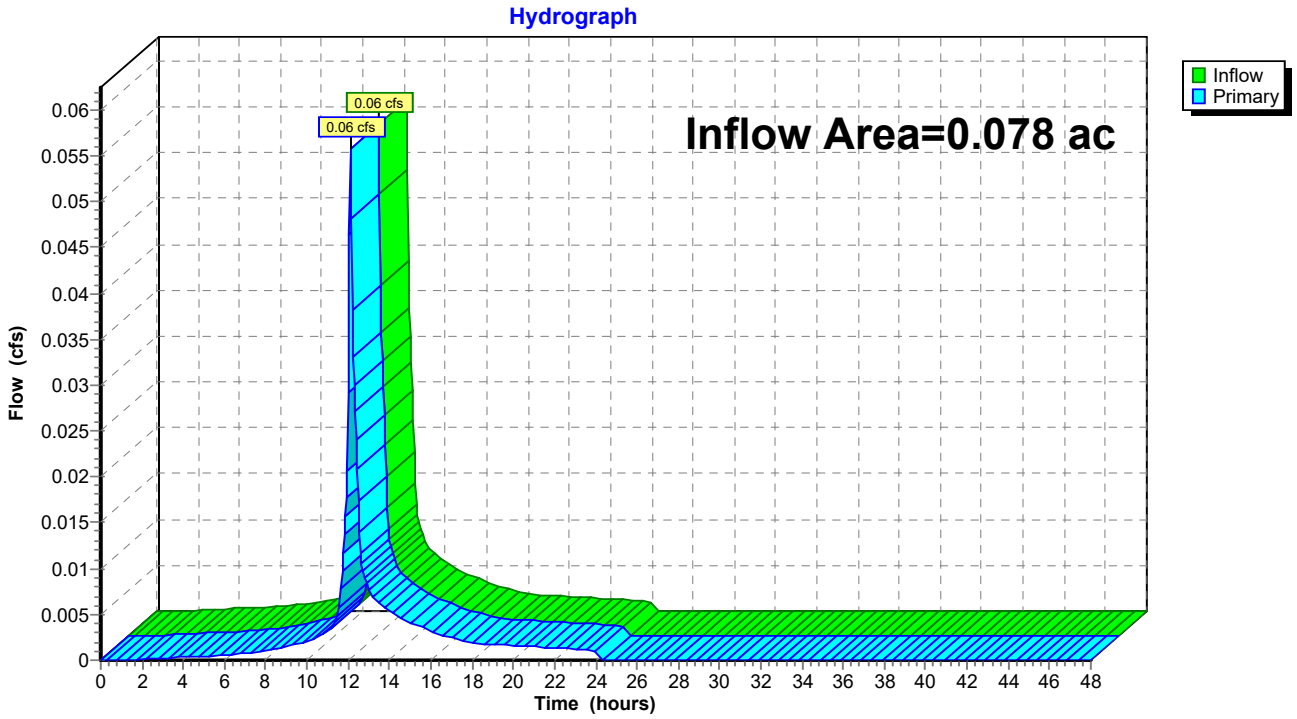


Summary for Link DP2:

Inflow Area = 0.078 ac, 17.95% Impervious, Inflow Depth = 0.86" for 2-Year event
Inflow = 0.06 cfs @ 12.10 hrs, Volume= 0.006 af
Primary = 0.06 cfs @ 12.10 hrs, Volume= 0.006 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Link DP2:



Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 points
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv.
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

SubcatchmentP1: Runoff Area=1.062 ac 62.43% Impervious Runoff Depth=3.49"
Tc=6.0 min CN=61/98 Runoff=3.73 cfs 0.309 af

SubcatchmentP2: Runoff Area=0.078 ac 17.95% Impervious Runoff Depth=1.81"
Tc=6.0 min CN=58/98 Runoff=0.14 cfs 0.012 af

Pond 1P: MC-3500 Peak Elev=78.47' Storage=0.091 af Inflow=3.73 cfs 0.309 af
Outflow=1.49 cfs 0.308 af

Link DP1: Inflow=1.49 cfs 0.308 af
Primary=1.49 cfs 0.308 af

Link DP2: Inflow=0.14 cfs 0.012 af
Primary=0.14 cfs 0.012 af

Total Runoff Area = 1.140 ac Runoff Volume = 0.320 af Average Runoff Depth = 3.37"
40.61% Pervious = 0.463 ac 59.39% Impervious = 0.677 ac

Summary for Subcatchment P1:

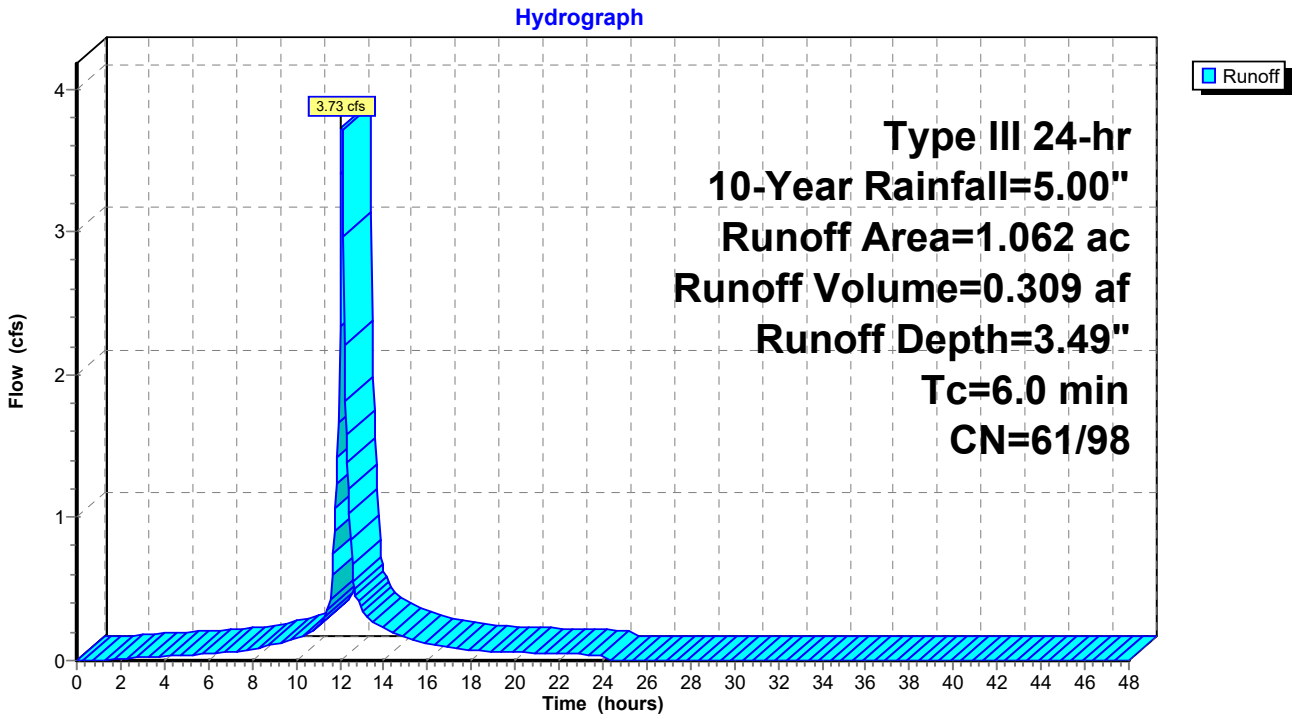
Runoff = 3.73 cfs @ 12.09 hrs, Volume= 0.309 af, Depth= 3.49"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=5.00"

Area (ac)	CN	Description
0.387	61	>75% Grass cover, Good, HSG B
0.012	55	Woods, Good, HSG B
0.646	98	Paved parking, HSG B
0.017	98	Roofs, HSG B
1.062	84	Weighted Average
0.399	61	37.57% Pervious Area
0.663	98	62.43% Impervious Area

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

Subcatchment P1:



Summary for Subcatchment P2:

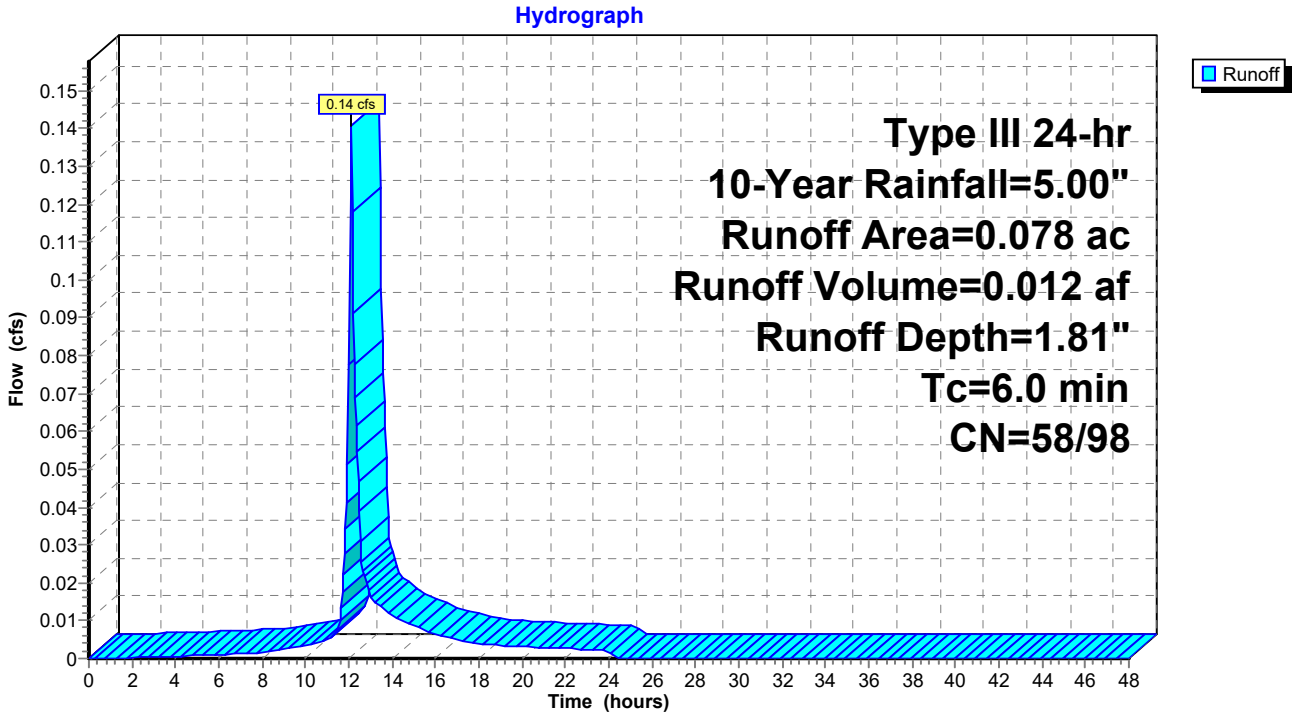
Runoff = 0.14 cfs @ 12.10 hrs, Volume= 0.012 af, Depth= 1.81"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=5.00"

Area (ac)	CN	Description
0.064	58	Meadow, non-grazed, HSG B
0.014	98	Paved parking, HSG B
0.078	65	Weighted Average
0.064	58	82.05% Pervious Area
0.014	98	17.95% Impervious Area

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

Subcatchment P2:



Summary for Pond 1P: MC-3500

Inflow Area = 1.062 ac, 62.43% Impervious, Inflow Depth = 3.49" for 10-Year event
Inflow = 3.73 cfs @ 12.09 hrs, Volume= 0.309 af
Outflow = 1.49 cfs @ 12.33 hrs, Volume= 0.308 af, Atten= 60%, Lag= 14.1 min
Primary = 1.49 cfs @ 12.33 hrs, Volume= 0.308 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 78.47' @ 12.33 hrs Surf.Area= 0.041 ac Storage= 0.091 af

Plug-Flow detention time= 77.1 min calculated for 0.308 af (100% of inflow)
Center-of-Mass det. time= 77.2 min (843.6 - 766.3)

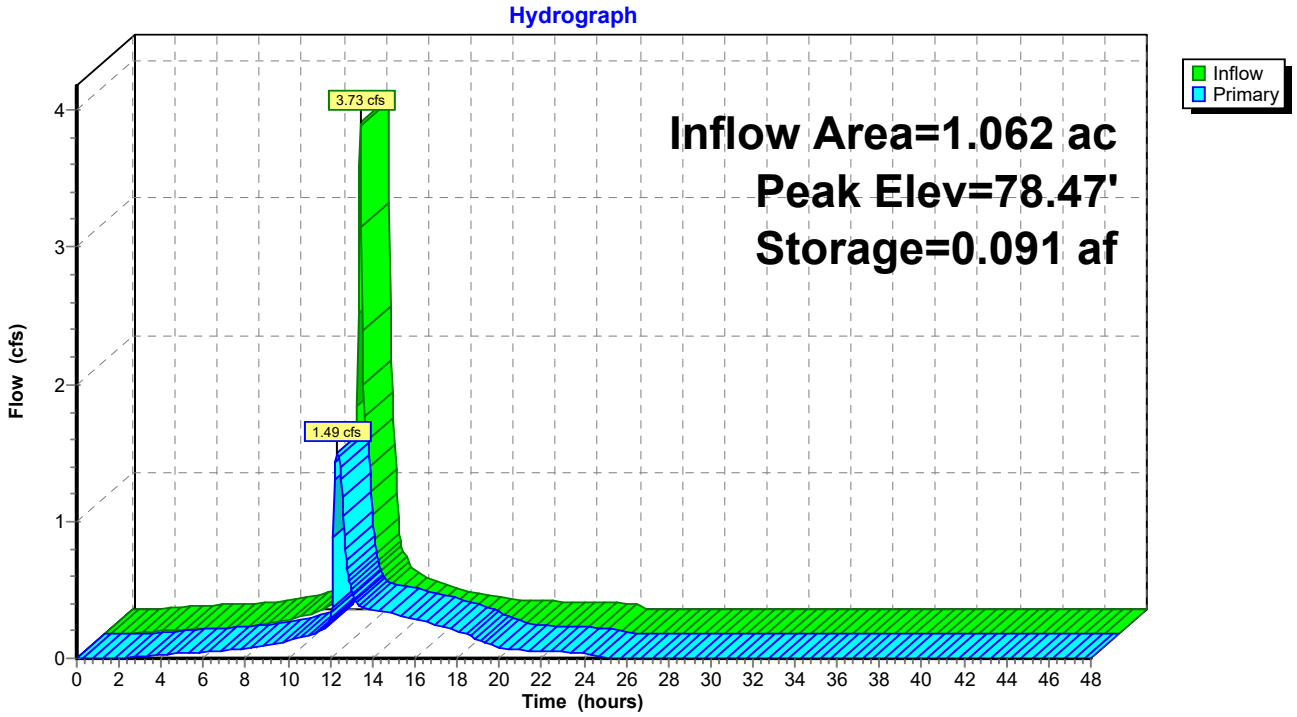
Volume	Invert	Avail.Storage	Storage Description
#1A	75.30'	0.060 af	**37.08'W x 48.72'L x 5.50'H Field A** 0.228 af Overall - 0.079 af Embedded = 0.149 af x 40.0% Voids
#2A	76.05'	0.079 af	**ADS_StormTech MC-3500 d +Cap**x 30 Inside #1 Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap 5 Rows of 6 Chambers Cap Storage= +14.9 cf x 2 x 5 rows = 149.0 cf
		0.139 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	75.30'	**12.0" Round Culvert** L= 20.0' Ke= 0.500 Inlet / Outlet Invert= 75.30' / 75.30' S= 0.0000 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#2	Device 1	79.90'	**5.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#3	Device 1	75.30'	**3.0" Vert. Orifice/Grate** C= 0.600
#4	Device 1	77.73'	**8.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=1.49 cfs @ 12.33 hrs HW=78.47' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Passes 1.49 cfs of 6.18 cfs potential flow)
  ├─**2=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)
  ├─**3=Orifice/Grate** (Orifice Controls 0.41 cfs @ 8.40 fps)
  └─**4=Orifice/Grate** (Orifice Controls 1.07 cfs @ 3.08 fps)

Pond 1P: MC-3500

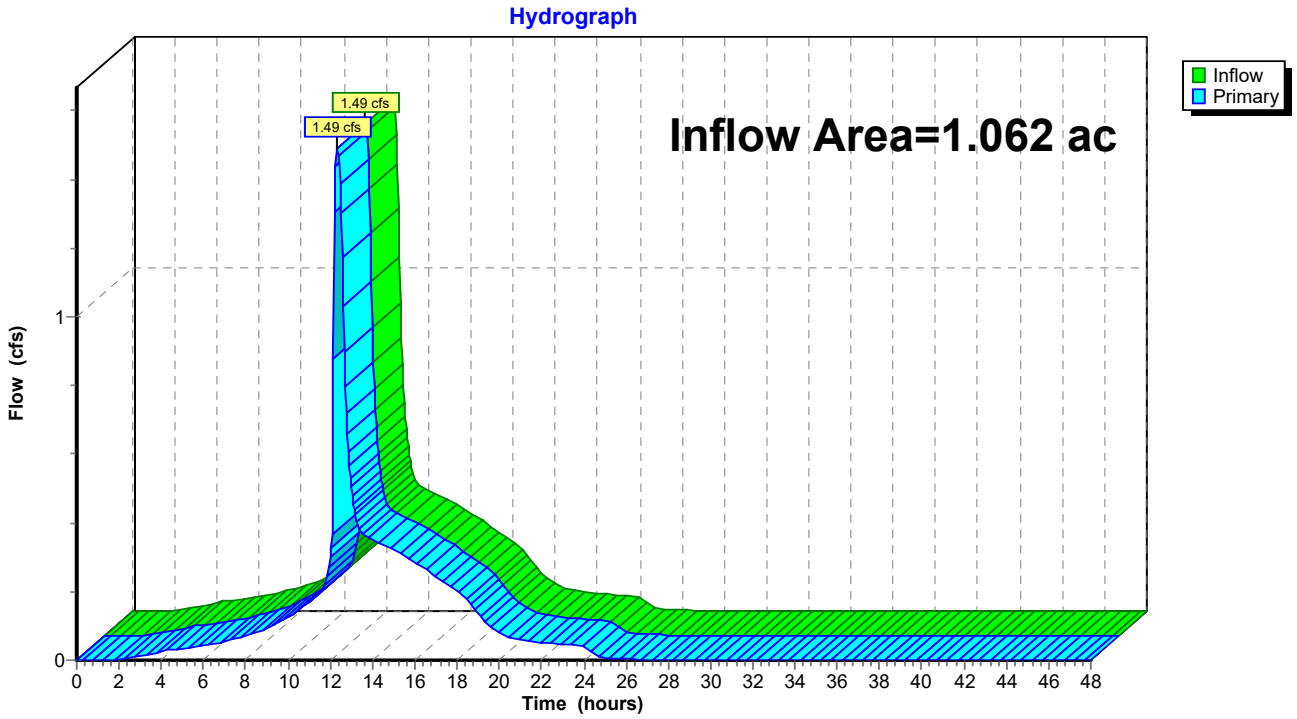


Summary for Link DP1:

Inflow Area = 1.062 ac, 62.43% Impervious, Inflow Depth = 3.49" for 10-Year event
Inflow = 1.49 cfs @ 12.33 hrs, Volume= 0.308 af
Primary = 1.49 cfs @ 12.33 hrs, Volume= 0.308 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Link DP1:

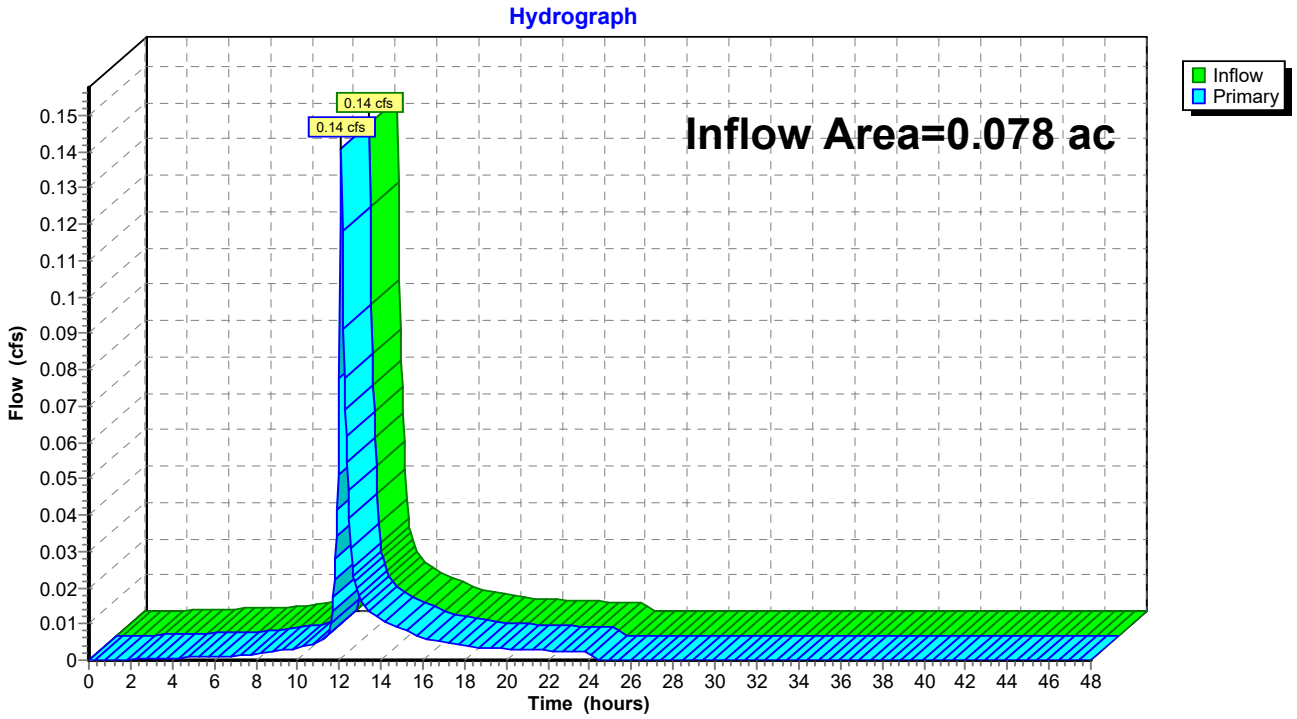


Summary for Link DP2:

Inflow Area = 0.078 ac, 17.95% Impervious, Inflow Depth = 1.81" for 10-Year event
Inflow = 0.14 cfs @ 12.10 hrs, Volume= 0.012 af
Primary = 0.14 cfs @ 12.10 hrs, Volume= 0.012 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Link DP2:



Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 points
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv.
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

SubcatchmentP1: Runoff Area=1.062 ac 62.43% Impervious Runoff Depth=4.09"
Tc=6.0 min CN=61/98 Runoff=4.39 cfs 0.362 af

SubcatchmentP2: Runoff Area=0.078 ac 17.95% Impervious Runoff Depth=2.27"
Tc=6.0 min CN=58/98 Runoff=0.18 cfs 0.015 af

Pond 1P: MC-3500 Peak Elev=78.86' Storage=0.102 af Inflow=4.39 cfs 0.362 af
Outflow=1.94 cfs 0.362 af

Link DP1: Inflow=1.94 cfs 0.362 af
Primary=1.94 cfs 0.362 af

Link DP2: Inflow=0.18 cfs 0.015 af
Primary=0.18 cfs 0.015 af

Total Runoff Area = 1.140 ac Runoff Volume = 0.377 af Average Runoff Depth = 3.96"
40.61% Pervious = 0.463 ac 59.39% Impervious = 0.677 ac

Summary for Subcatchment P1:

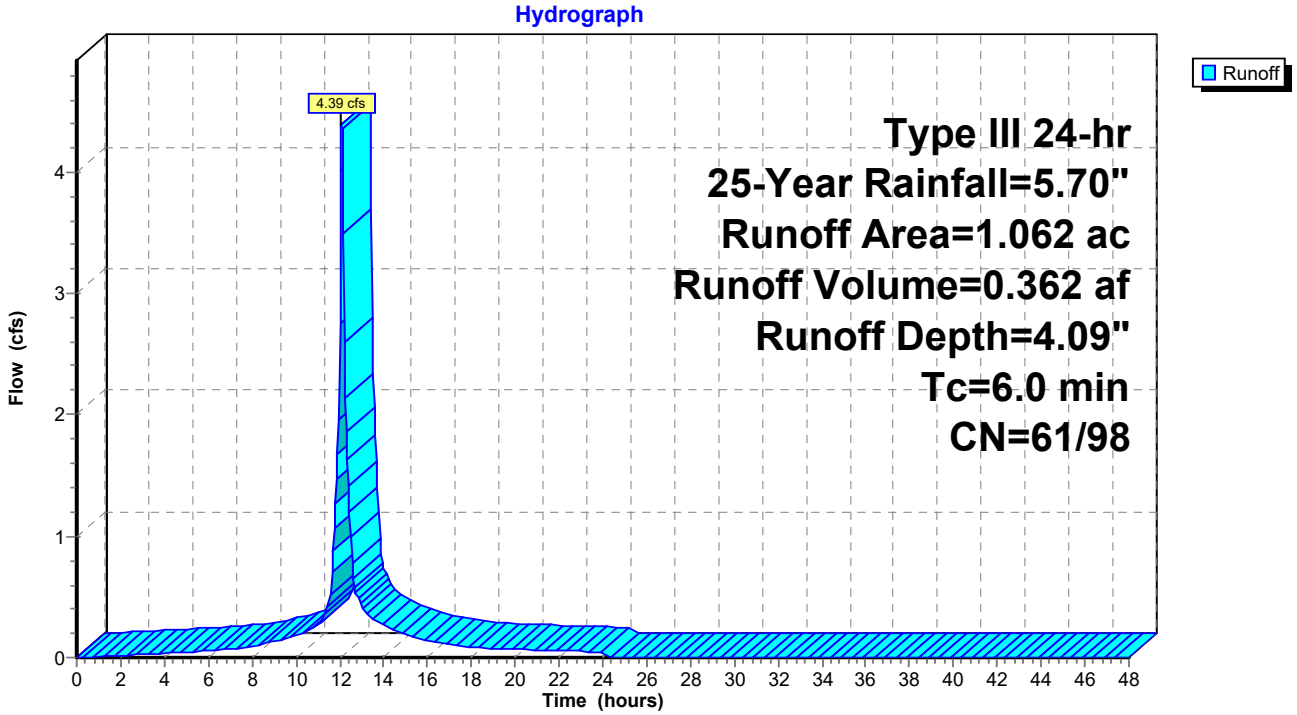
Runoff = 4.39 cfs @ 12.09 hrs, Volume= 0.362 af, Depth= 4.09"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=5.70"

Area (ac)	CN	Description
0.387	61	>75% Grass cover, Good, HSG B
0.012	55	Woods, Good, HSG B
0.646	98	Paved parking, HSG B
0.017	98	Roofs, HSG B
1.062	84	Weighted Average
0.399	61	37.57% Pervious Area
0.663	98	62.43% Impervious Area

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

Subcatchment P1:



Summary for Subcatchment P2:

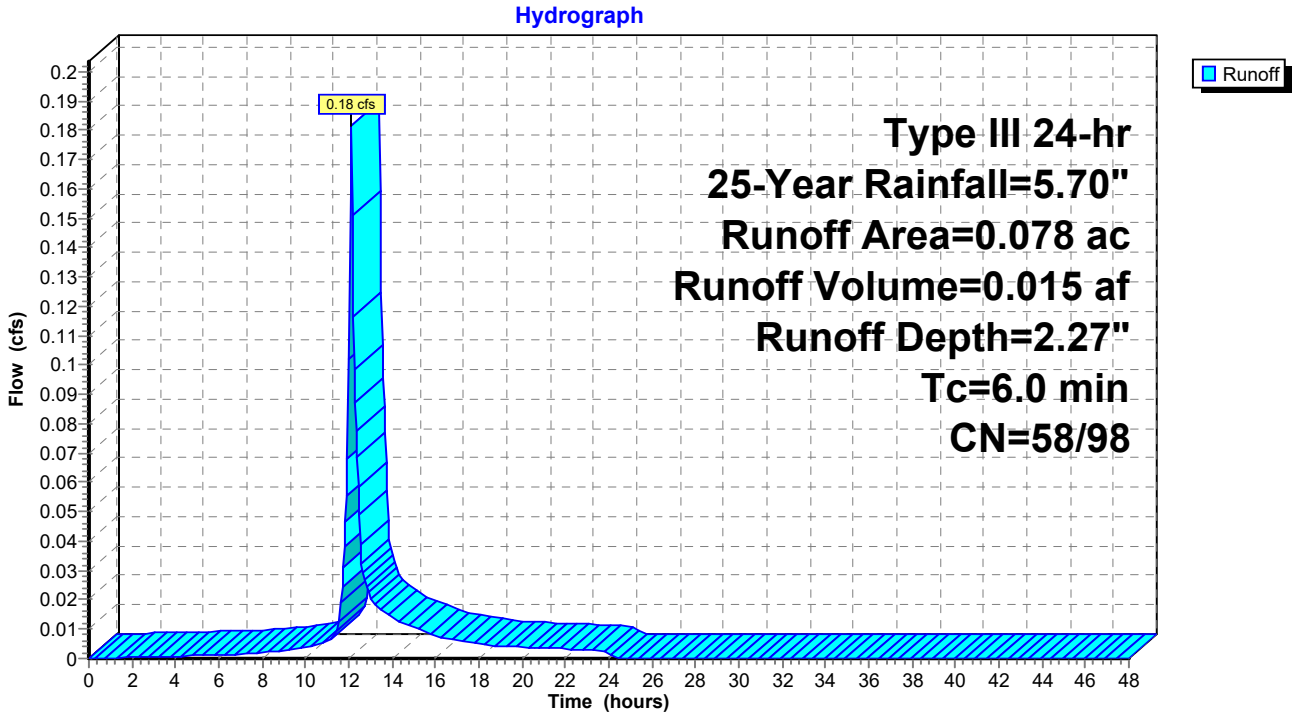
Runoff = 0.18 cfs @ 12.10 hrs, Volume= 0.015 af, Depth= 2.27"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=5.70"

Area (ac)	CN	Description
0.064	58	Meadow, non-grazed, HSG B
0.014	98	Paved parking, HSG B
0.078	65	Weighted Average
0.064	58	82.05% Pervious Area
0.014	98	17.95% Impervious Area

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

Subcatchment P2:



Summary for Pond 1P: MC-3500

Inflow Area = 1.062 ac, 62.43% Impervious, Inflow Depth = 4.09" for 25-Year event
Inflow = 4.39 cfs @ 12.09 hrs, Volume= 0.362 af
Outflow = 1.94 cfs @ 12.29 hrs, Volume= 0.362 af, Atten= 56%, Lag= 12.0 min
Primary = 1.94 cfs @ 12.29 hrs, Volume= 0.362 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 78.86' @ 12.29 hrs Surf.Area= 0.041 ac Storage= 0.102 af

Plug-Flow detention time= 74.5 min calculated for 0.362 af (100% of inflow)
Center-of-Mass det. time= 73.9 min (839.3 - 765.4)

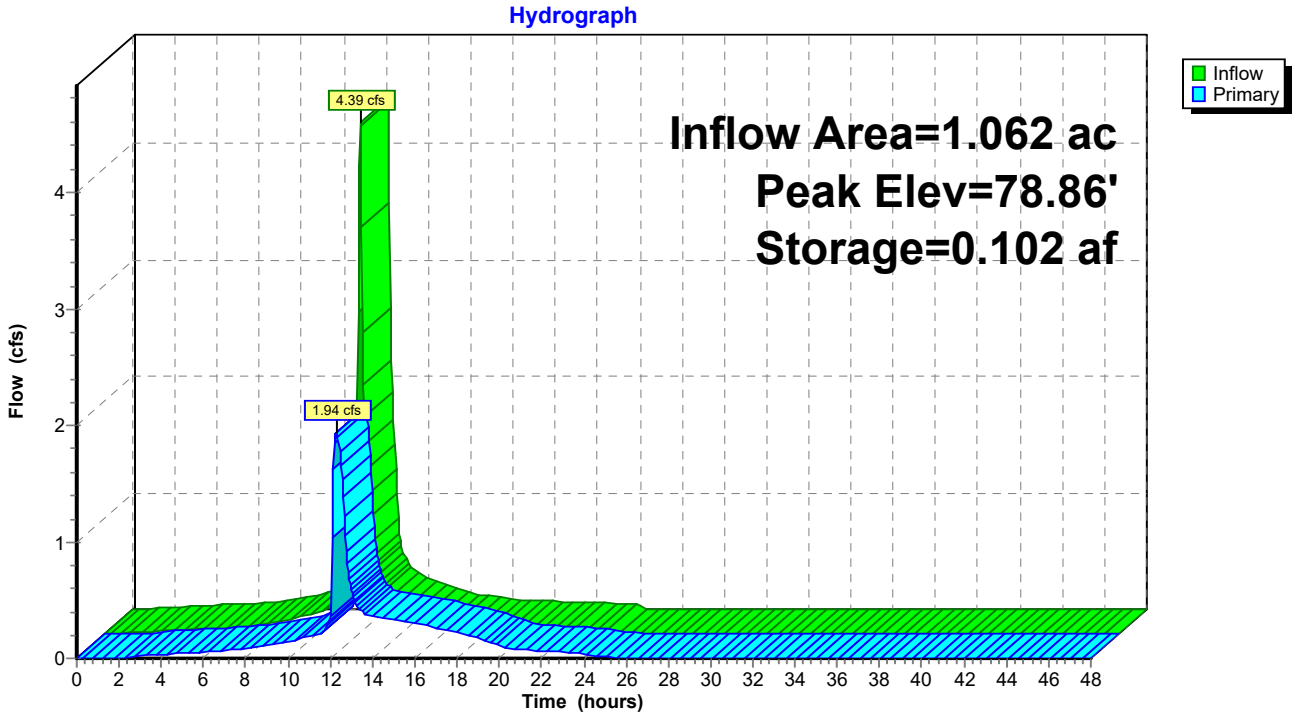
Volume	Invert	Avail.Storage	Storage Description
#1A	75.30'	0.060 af	**37.08'W x 48.72'L x 5.50'H Field A** 0.228 af Overall - 0.079 af Embedded = 0.149 af x 40.0% Voids
#2A	76.05'	0.079 af	**ADS_StormTech MC-3500 d +Cap**x 30 Inside #1 Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap 5 Rows of 6 Chambers Cap Storage= +14.9 cf x 2 x 5 rows = 149.0 cf
		0.139 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	75.30'	**12.0" Round Culvert** L= 20.0' Ke= 0.500 Inlet / Outlet Invert= 75.30' / 75.30' S= 0.0000 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#2	Device 1	79.90'	**5.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#3	Device 1	75.30'	**3.0" Vert. Orifice/Grate** C= 0.600
#4	Device 1	77.73'	**8.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=1.93 cfs @ 12.29 hrs HW=78.86' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Passes 1.93 cfs of 6.61 cfs potential flow)
  ├─**2=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)
  ├─**3=Orifice/Grate** (Orifice Controls 0.44 cfs @ 8.92 fps)
  └─**4=Orifice/Grate** (Orifice Controls 1.50 cfs @ 4.29 fps)

Pond 1P: MC-3500

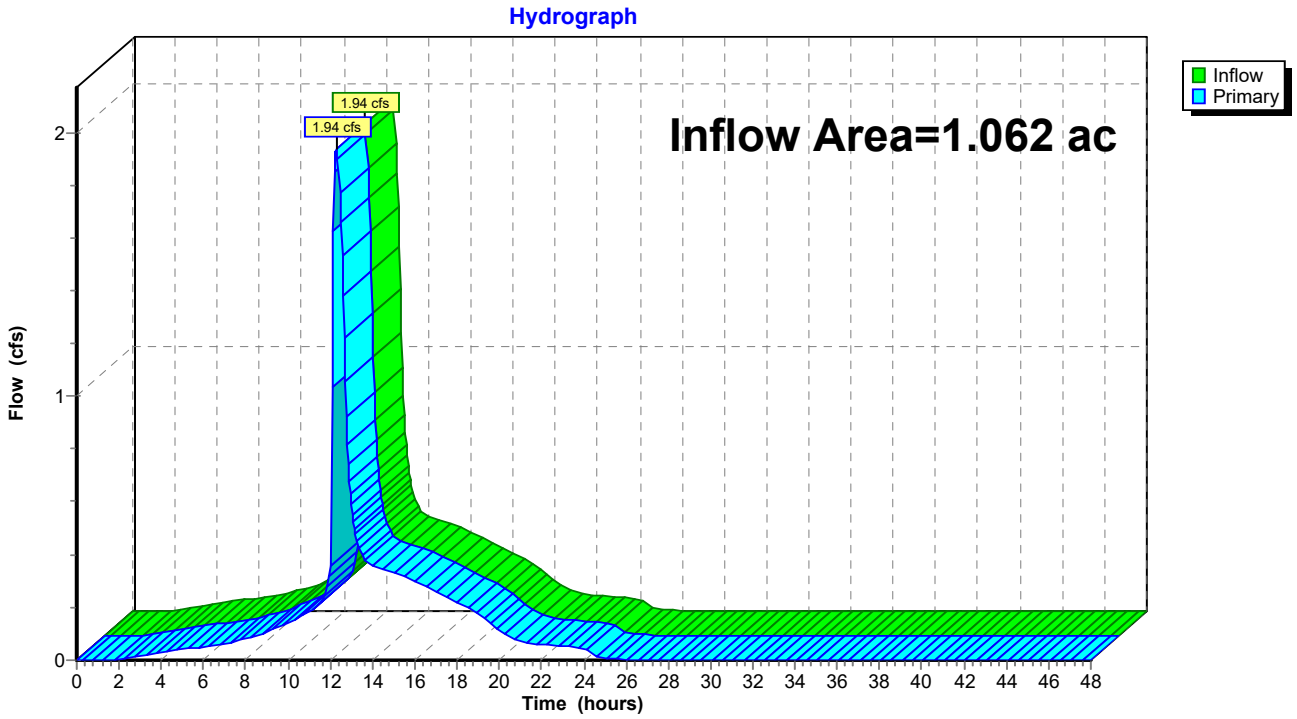


Summary for Link DP1:

Inflow Area = 1.062 ac, 62.43% Impervious, Inflow Depth = 4.09" for 25-Year event
Inflow = 1.94 cfs @ 12.29 hrs, Volume= 0.362 af
Primary = 1.94 cfs @ 12.29 hrs, Volume= 0.362 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Link DP1:

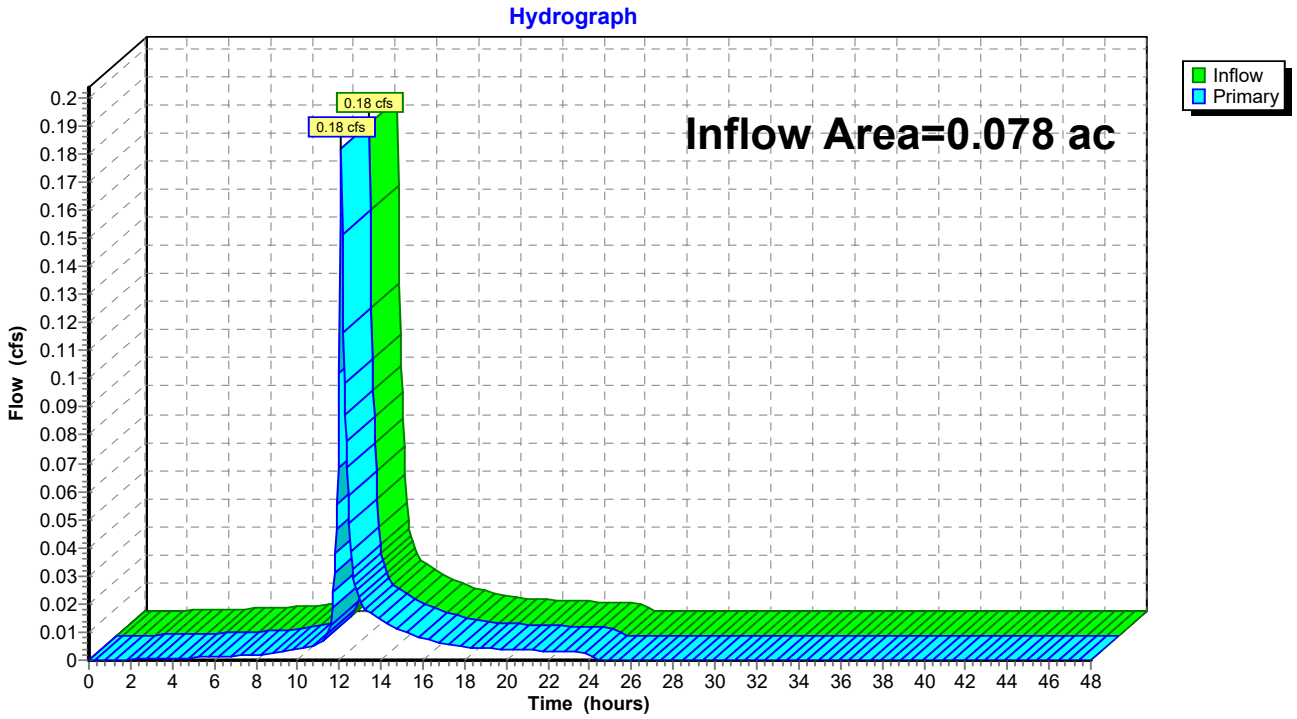


Summary for Link DP2:

Inflow Area = 0.078 ac, 17.95% Impervious, Inflow Depth = 2.27" for 25-Year event
Inflow = 0.18 cfs @ 12.10 hrs, Volume= 0.015 af
Primary = 0.18 cfs @ 12.10 hrs, Volume= 0.015 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Link DP2:



Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 points
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv.
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

SubcatchmentP1: Runoff Area=1.062 ac 62.43% Impervious Runoff Depth=4.70"
Tc=6.0 min CN=61/98 Runoff=5.07 cfs 0.416 af

SubcatchmentP2: Runoff Area=0.078 ac 17.95% Impervious Runoff Depth=2.76"
Tc=6.0 min CN=58/98 Runoff=0.23 cfs 0.018 af

Pond 1P: MC-3500 Peak Elev=79.34' Storage=0.114 af Inflow=5.07 cfs 0.416 af
Outflow=2.37 cfs 0.416 af

Link DP1: Inflow=2.37 cfs 0.416 af
Primary=2.37 cfs 0.416 af

Link DP2: Inflow=0.23 cfs 0.018 af
Primary=0.23 cfs 0.018 af

Total Runoff Area = 1.140 ac Runoff Volume = 0.434 af Average Runoff Depth = 4.57"
40.61% Pervious = 0.463 ac 59.39% Impervious = 0.677 ac

Summary for Subcatchment P1:

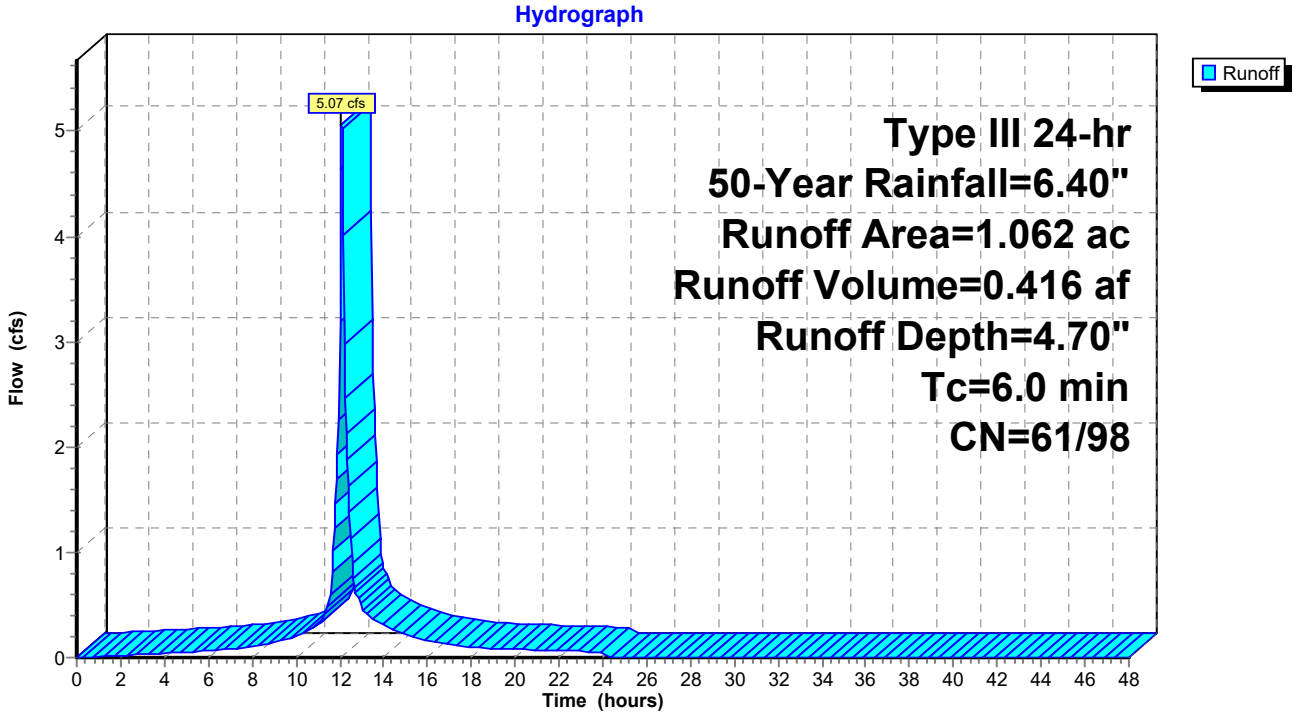
Runoff = 5.07 cfs @ 12.09 hrs, Volume= 0.416 af, Depth= 4.70"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-Year Rainfall=6.40"

Area (ac)	CN	Description
0.387	61	>75% Grass cover, Good, HSG B
0.012	55	Woods, Good, HSG B
0.646	98	Paved parking, HSG B
0.017	98	Roofs, HSG B
1.062	84	Weighted Average
0.399	61	37.57% Pervious Area
0.663	98	62.43% Impervious Area

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

Subcatchment P1:



Summary for Subcatchment P2:

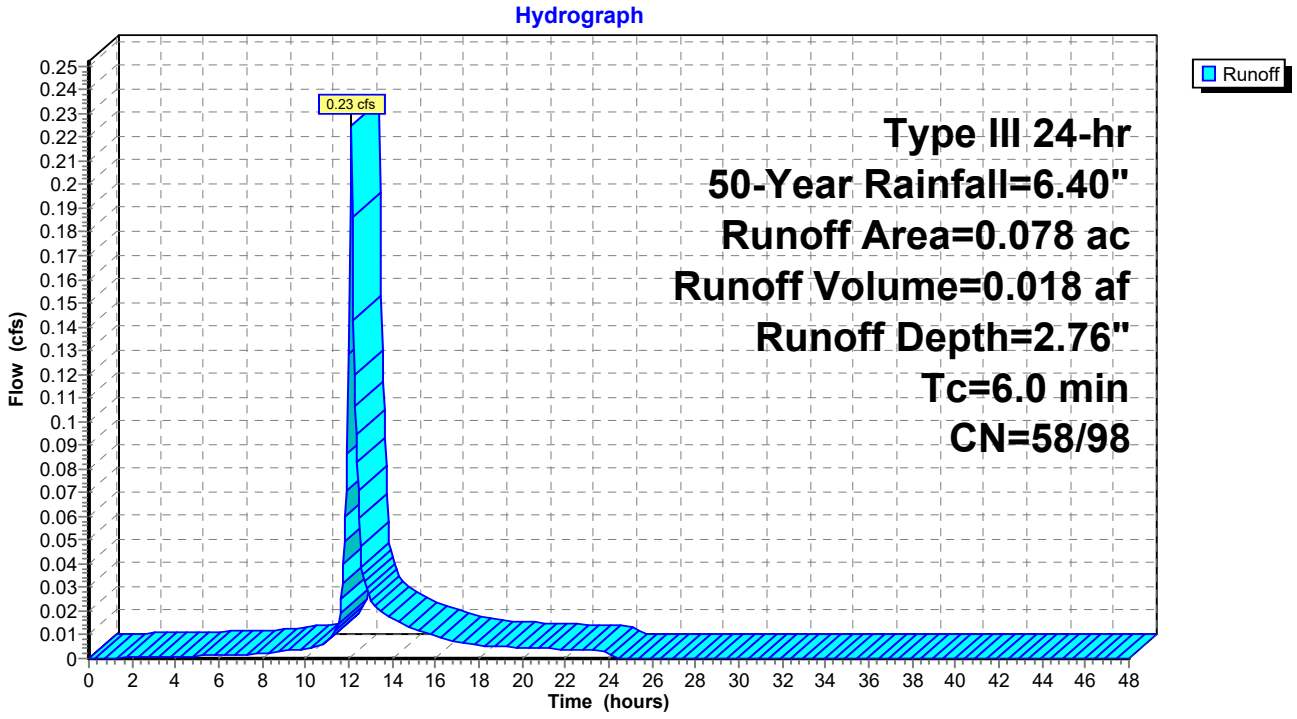
Runoff = 0.23 cfs @ 12.10 hrs, Volume= 0.018 af, Depth= 2.76"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-Year Rainfall=6.40"

Area (ac)	CN	Description
0.064	58	Meadow, non-grazed, HSG B
0.014	98	Paved parking, HSG B
0.078	65	Weighted Average
0.064	58	82.05% Pervious Area
0.014	98	17.95% Impervious Area

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

Subcatchment P2:



Summary for Pond 1P: MC-3500

Inflow Area = 1.062 ac, 62.43% Impervious, Inflow Depth = 4.70" for 50-Year event
Inflow = 5.07 cfs @ 12.09 hrs, Volume= 0.416 af
Outflow = 2.37 cfs @ 12.27 hrs, Volume= 0.416 af, Atten= 53%, Lag= 10.7 min
Primary = 2.37 cfs @ 12.27 hrs, Volume= 0.416 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 79.34' @ 12.27 hrs Surf.Area= 0.041 ac Storage= 0.114 af

Plug-Flow detention time= 72.0 min calculated for 0.416 af (100% of inflow)
Center-of-Mass det. time= 71.4 min (836.0 - 764.6)

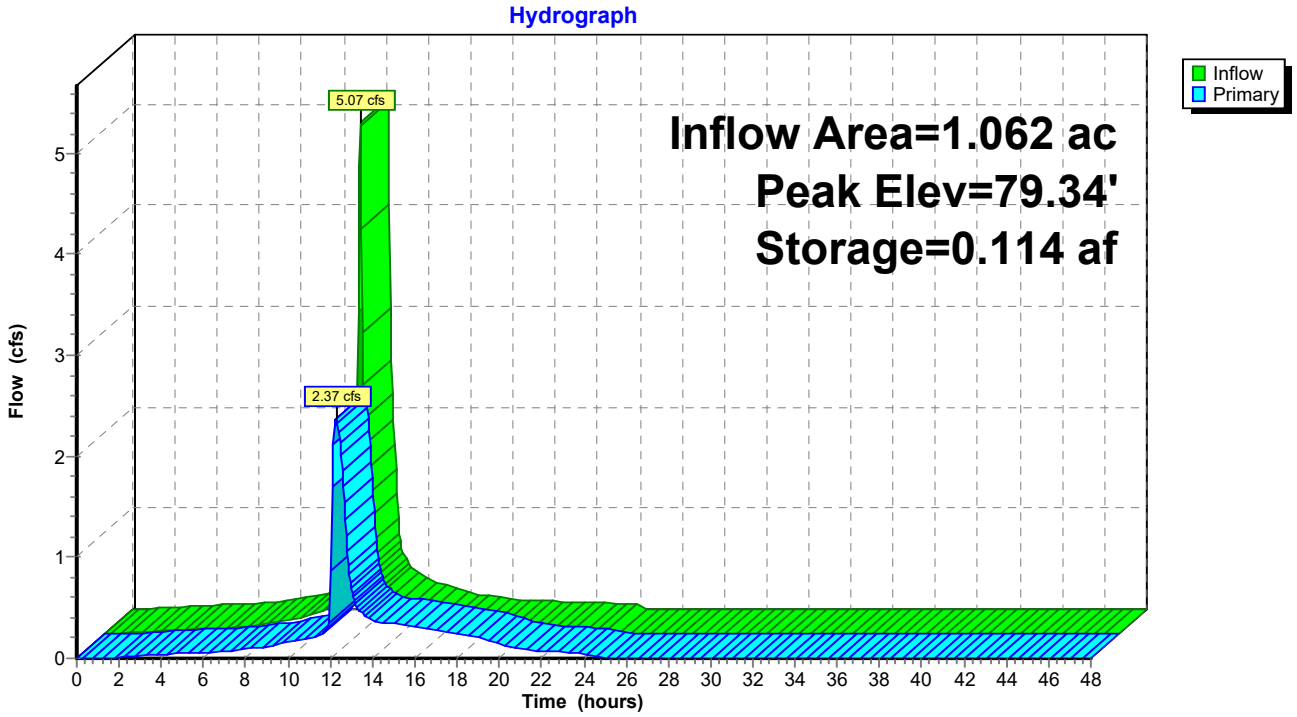
Volume	Invert	Avail.Storage	Storage Description
#1A	75.30'	0.060 af	**37.08'W x 48.72'L x 5.50'H Field A** 0.228 af Overall - 0.079 af Embedded = 0.149 af x 40.0% Voids
#2A	76.05'	0.079 af	**ADS_StormTech MC-3500 d +Cap**x 30 Inside #1 Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap 5 Rows of 6 Chambers Cap Storage= +14.9 cf x 2 x 5 rows = 149.0 cf
		0.139 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	75.30'	**12.0" Round Culvert** L= 20.0' Ke= 0.500 Inlet / Outlet Invert= 75.30' / 75.30' S= 0.0000 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#2	Device 1	79.90'	**5.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#3	Device 1	75.30'	**3.0" Vert. Orifice/Grate** C= 0.600
#4	Device 1	77.73'	**8.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=2.36 cfs @ 12.27 hrs HW=79.33' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Passes 2.36 cfs of 7.11 cfs potential flow)
  ├─**2=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)
  ├─**3=Orifice/Grate** (Orifice Controls 0.47 cfs @ 9.52 fps)
  └─**4=Orifice/Grate** (Orifice Controls 1.89 cfs @ 5.43 fps)

Pond 1P: MC-3500

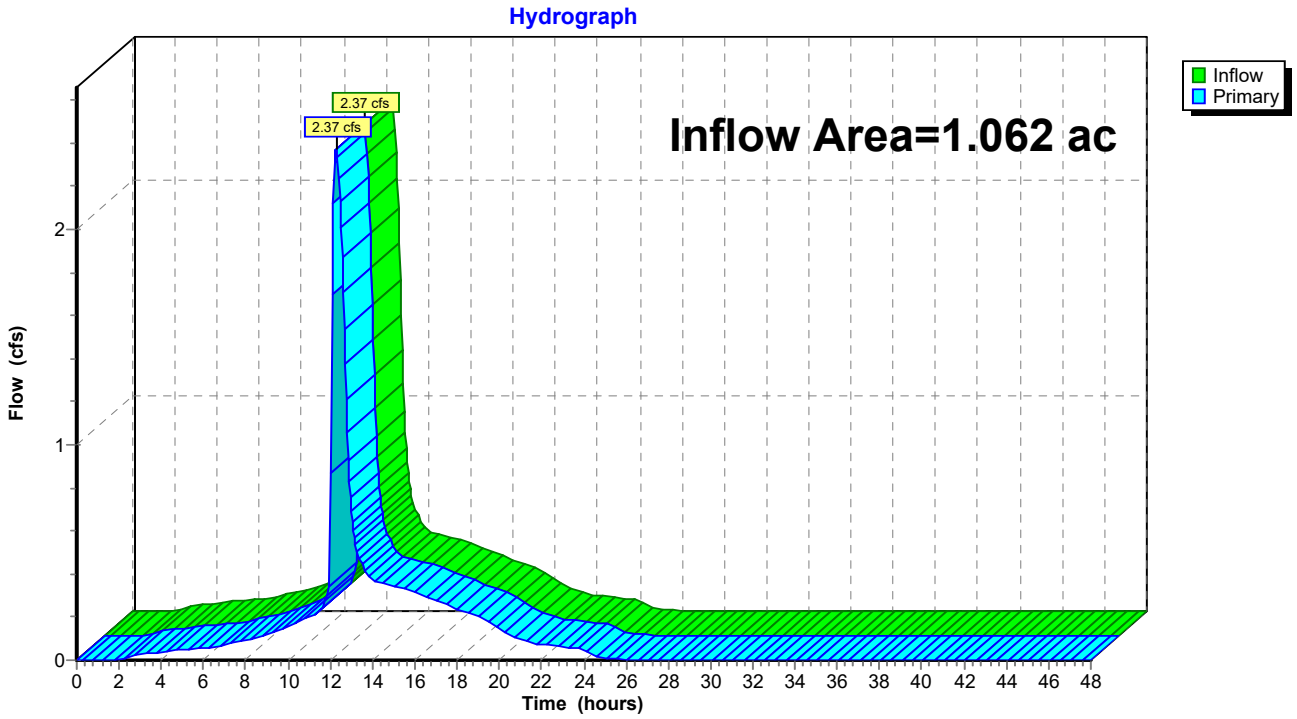


Summary for Link DP1:

Inflow Area = 1.062 ac, 62.43% Impervious, Inflow Depth = 4.70" for 50-Year event
Inflow = 2.37 cfs @ 12.27 hrs, Volume= 0.416 af
Primary = 2.37 cfs @ 12.27 hrs, Volume= 0.416 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Link DP1:

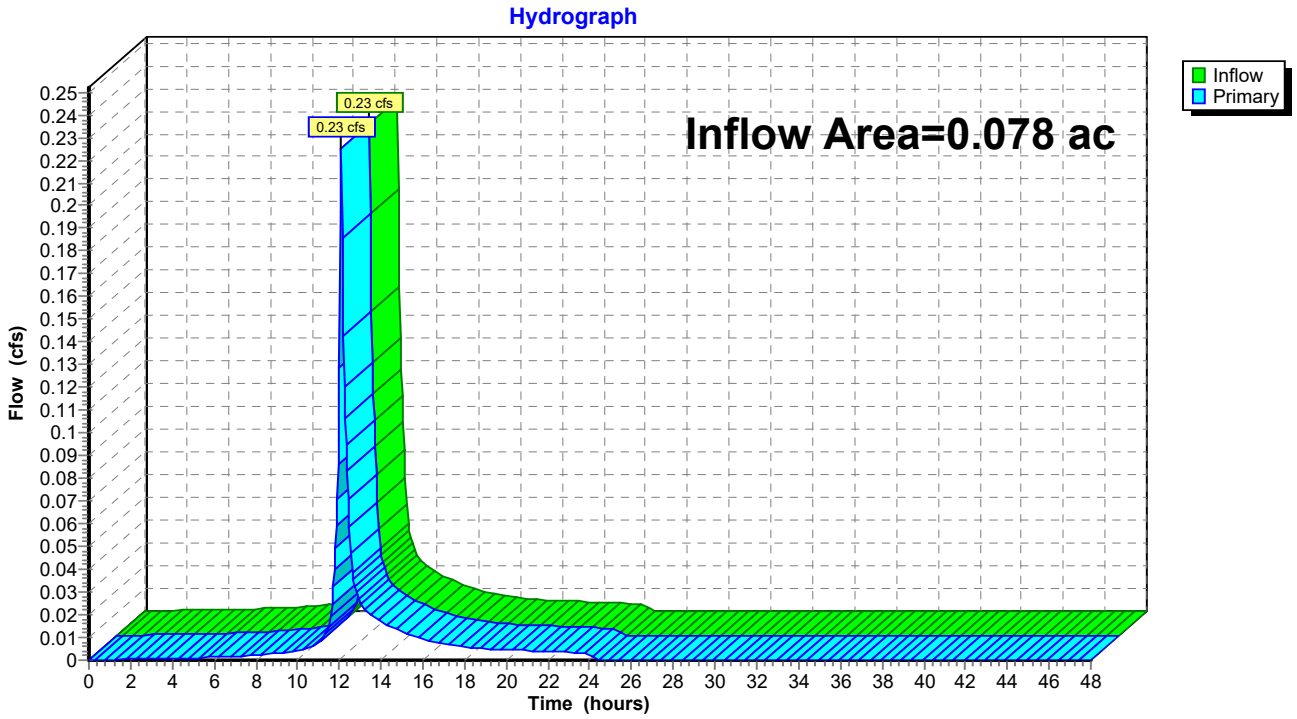


Summary for Link DP2:

Inflow Area = 0.078 ac, 17.95% Impervious, Inflow Depth = 2.76" for 50-Year event
Inflow = 0.23 cfs @ 12.10 hrs, Volume= 0.018 af
Primary = 0.23 cfs @ 12.10 hrs, Volume= 0.018 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Link DP2:



Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 points
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv.
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

SubcatchmentP1: Runoff Area=1.062 ac 62.43% Impervious Runoff Depth=5.42"
Tc=6.0 min CN=61/98 Runoff=5.85 cfs 0.479 af

SubcatchmentP2: Runoff Area=0.078 ac 17.95% Impervious Runoff Depth=3.34"
Tc=6.0 min CN=58/98 Runoff=0.28 cfs 0.022 af

Pond 1P: MC-3500 Peak Elev=80.01' Storage=0.126 af Inflow=5.85 cfs 0.479 af
Outflow=3.26 cfs 0.479 af

Link DP1: Inflow=3.26 cfs 0.479 af
Primary=3.26 cfs 0.479 af

Link DP2: Inflow=0.28 cfs 0.022 af
Primary=0.28 cfs 0.022 af

Total Runoff Area = 1.140 ac Runoff Volume = 0.501 af Average Runoff Depth = 5.27"
40.61% Pervious = 0.463 ac 59.39% Impervious = 0.677 ac

Summary for Subcatchment P1:

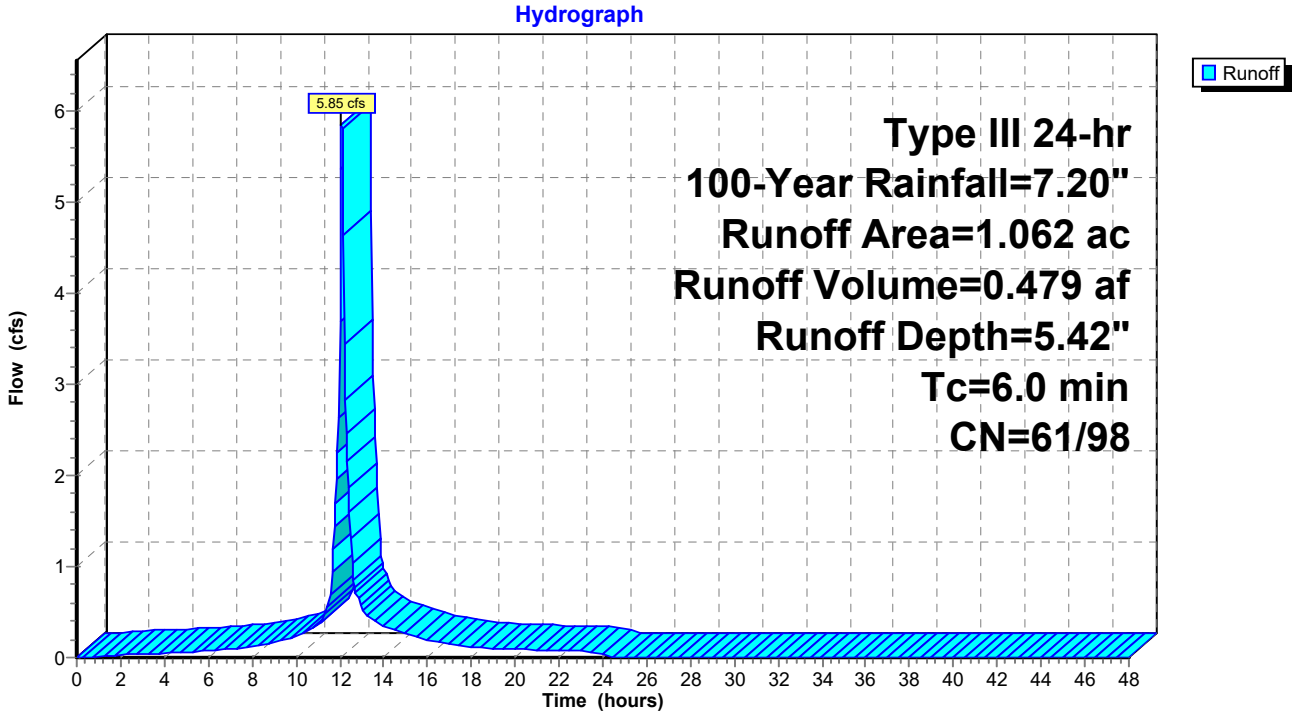
Runoff = 5.85 cfs @ 12.09 hrs, Volume= 0.479 af, Depth= 5.42"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=7.20"

Area (ac)	CN	Description
0.387	61	>75% Grass cover, Good, HSG B
0.012	55	Woods, Good, HSG B
0.646	98	Paved parking, HSG B
0.017	98	Roofs, HSG B
1.062	84	Weighted Average
0.399	61	37.57% Pervious Area
0.663	98	62.43% Impervious Area

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

Subcatchment P1:



Summary for Subcatchment P2:

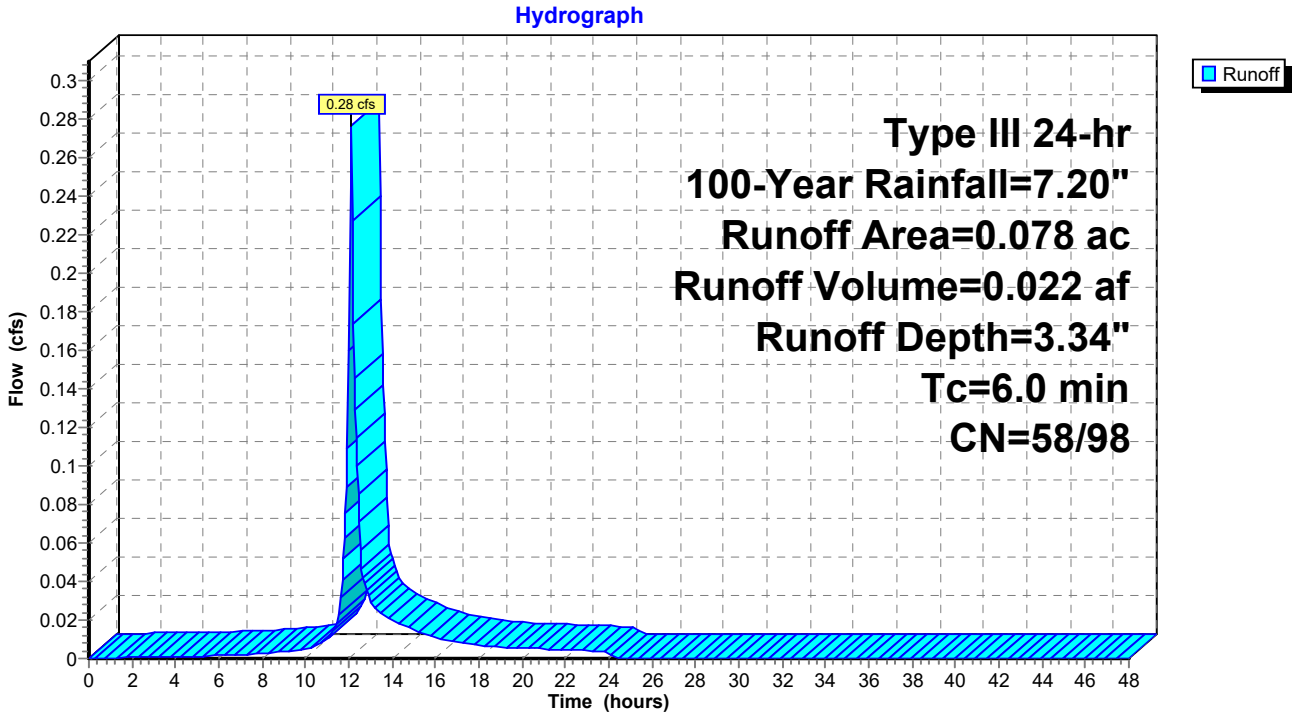
Runoff = 0.28 cfs @ 12.09 hrs, Volume= 0.022 af, Depth= 3.34"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=7.20"

Area (ac)	CN	Description
0.064	58	Meadow, non-grazed, HSG B
0.014	98	Paved parking, HSG B
0.078	65	Weighted Average
0.064	58	82.05% Pervious Area
0.014	98	17.95% Impervious Area

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

Subcatchment P2:



Summary for Pond 1P: MC-3500

Inflow Area = 1.062 ac, 62.43% Impervious, Inflow Depth = 5.42" for 100-Year event
Inflow = 5.85 cfs @ 12.09 hrs, Volume= 0.479 af
Outflow = 3.26 cfs @ 12.22 hrs, Volume= 0.479 af, Atten= 44%, Lag= 7.8 min
Primary = 3.26 cfs @ 12.22 hrs, Volume= 0.479 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 80.01' @ 12.22 hrs Surf.Area= 0.041 ac Storage= 0.126 af

Plug-Flow detention time= 69.6 min calculated for 0.479 af (100% of inflow)
Center-of-Mass det. time= 69.0 min (832.7 - 763.7)

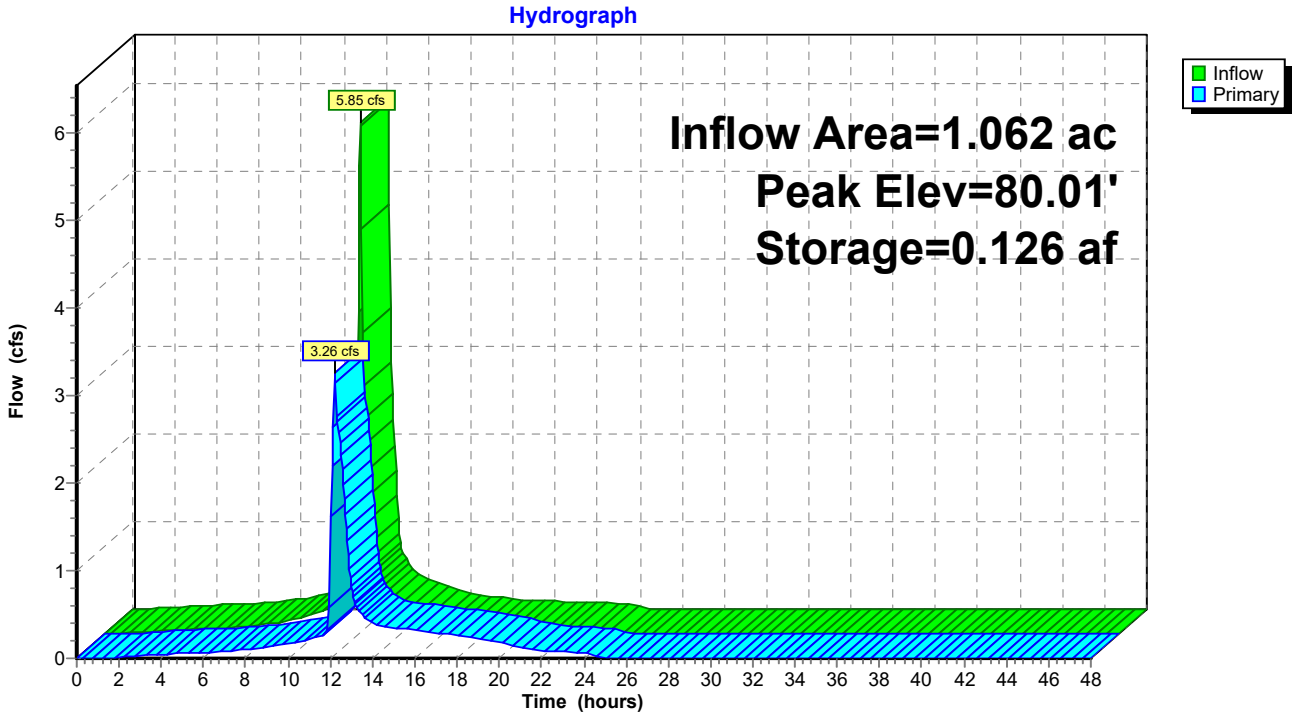
Volume	Invert	Avail.Storage	Storage Description
#1A	75.30'	0.060 af	**37.08'W x 48.72'L x 5.50'H Field A** 0.228 af Overall - 0.079 af Embedded = 0.149 af x 40.0% Voids
#2A	76.05'	0.079 af	**ADS_StormTech MC-3500 d +Cap**x 30 Inside #1 Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap 5 Rows of 6 Chambers Cap Storage= +14.9 cf x 2 x 5 rows = 149.0 cf
		0.139 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	75.30'	**12.0" Round Culvert** L= 20.0' Ke= 0.500 Inlet / Outlet Invert= 75.30' / 75.30' S= 0.0000 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#2	Device 1	79.90'	**5.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#3	Device 1	75.30'	**3.0" Vert. Orifice/Grate** C= 0.600
#4	Device 1	77.73'	**8.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=3.18 cfs @ 12.22 hrs HW=79.98' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Passes 3.18 cfs of 7.73 cfs potential flow)
  ├─**2=Sharp-Crested Rectangular Weir** (Weir Controls 0.35 cfs @ 0.91 fps)
  ├─**3=Orifice/Grate** (Orifice Controls 0.50 cfs @ 10.27 fps)
  └─**4=Orifice/Grate** (Orifice Controls 2.33 cfs @ 6.66 fps)

Pond 1P: MC-3500

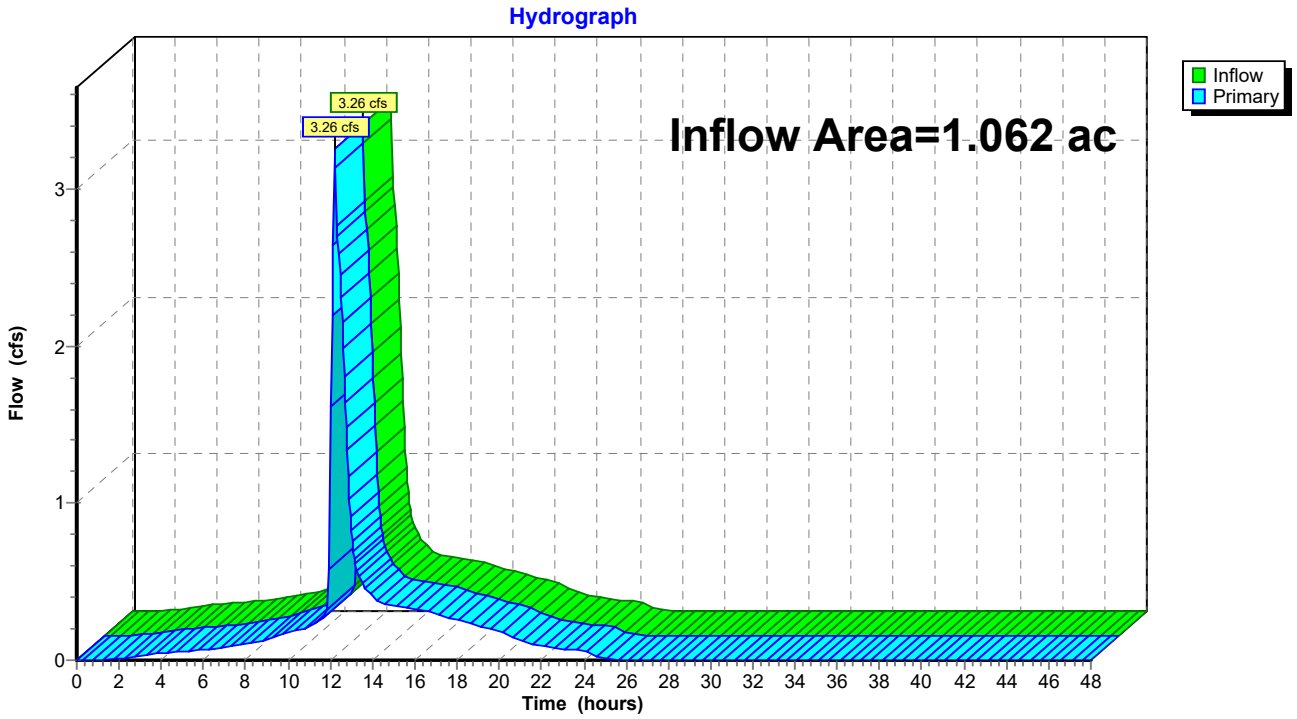


Summary for Link DP1:

Inflow Area = 1.062 ac, 62.43% Impervious, Inflow Depth = 5.41" for 100-Year event
Inflow = 3.26 cfs @ 12.22 hrs, Volume= 0.479 af
Primary = 3.26 cfs @ 12.22 hrs, Volume= 0.479 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Link DP1:

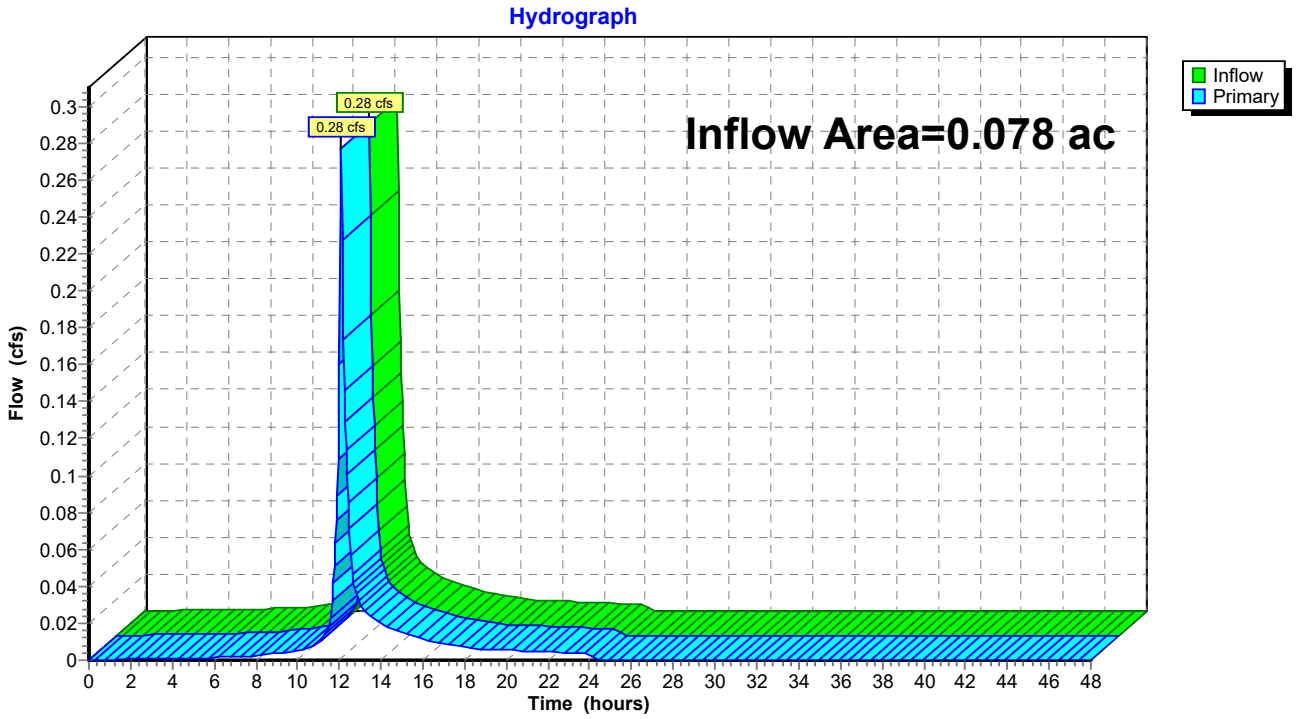


Summary for Link DP2:

Inflow Area = 0.078 ac, 17.95% Impervious, Inflow Depth = 3.34" for 100-Year event
Inflow = 0.28 cfs @ 12.09 hrs, Volume= 0.022 af
Primary = 0.28 cfs @ 12.09 hrs, Volume= 0.022 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Link DP2:



APPENDIX F: STORMWATER CALCULATIONS

- *REQUIRED WATER QUALITY FLOW*
- *CDS HYDRODYNAMIC SEPARATOR BROCHURE*
- *ISOLATOR ROW SIZING CHART*
- *TSS REMOVAL*
- *STATE OF NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PREOTECTION CDS HYDRODYNAMIC SEPARATOR TSS REMOVAL RATE*
- *STATE OF NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PREOTECTION STORMTECH ISOLATOR ROW TSS REMOVAL RATE*
- *RAINFALL INTENSITY-DURATION CURVE FOR DARIEN*
- *PIPE SIZING*

Water Quality Calculations

Determine Water Quality Flow

From CT 2004 Stormwater Quality Manual:

$$CN = \frac{1000}{\left[10 + 5P + 10Q - 10\left(Q^2 + 1.25QP\right)^{\frac{1}{2}}\right]}$$

$$Q = \frac{[WQV\,(acre-feet)\times[12(inches/foot)]]}{DrainageArea(acres)}$$

$$WQF = (q_u)(A)(Q)$$

CN = Runoff Curve Number
P = design preciptation, inches, (1" for water quality storm)
Q = runoff depth (in watershed inches)
T_c = time of concentration
I_a = Initial abstraction, inches, from Table 4-1, Chapter 4, TR-55
q_u = unit peak discharge,
WQF = water quality flow (cfs)

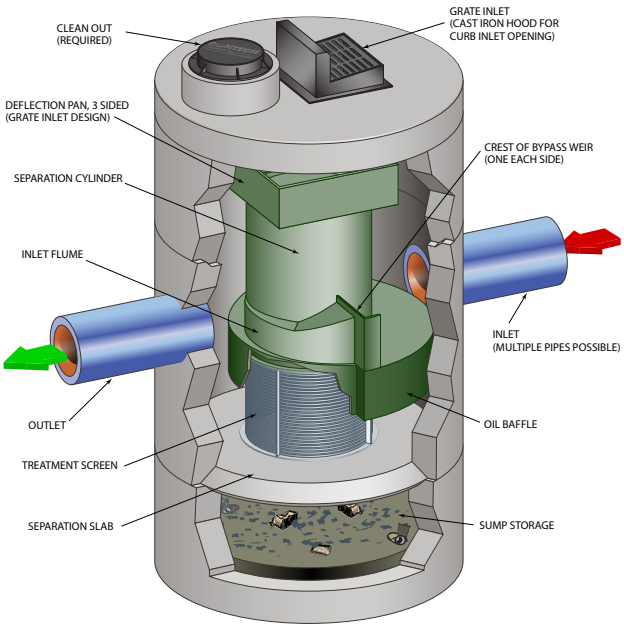
Area	Hydrodynamic Separator	Facility ID	Total Area			Imp Area		Imp Cover	R	WQV	Q	P	CN	T_c		I_a	I_a/P	q_u [1]	WQF
			ft^2	ac	mi^2	ft^2	ac	%	-	acre-feet	in	in	-	mins	hours	in	-	$cfs/mi^2/in$	cfs
Proposed	CDS2015-4-C		46,262	1.062	0.0017	28,881	0.663	62.43	0.612	0.054	0.61	1.00	96	6.0	0.1	0.083	0.083	650	0.66

[1]From Exhibit 4-III: Unit peak discharge (q) for SCS type III rainfall distribution, Urban Hydrology for Small Watersheds (TR-55), USDS< SCS, June 1986.

water quality design flow = 0.66 cfs

Patented continuous deflection separation (CDS) technology

Using continuous deflective separation technology, the CDS system screens, separates and traps sediment, debris, and oil and grease from stormwater runoff. The indirect screening capability of the system allows for 100% removal of floatables and neutrally buoyant material without blinding. Flow and screening controls physically separate captured solids, and minimize the re-suspension and release of previously trapped pollutants. Available in precast or cast-in-place. Offline units can treat flows from 30 to 8500 L/s (1 to 300 cfs). Inline units can treat up to 170 L/s (7.5 cfs), and internally bypass larger flows in excess of 1420 L/s (50 cfs). The pollutant removal capability of the CDS system has been proven in the lab and field.



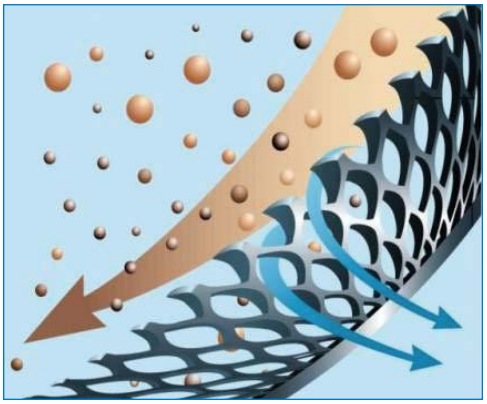
How does it work?

Stormwater enters the CDS unit's diversion chamber where the diversion weir guides the flow into the unit's separation chamber and pollutants are removed. All flows up to the system's treatment design capacity enter the separation chamber.

Swirl concentration and screen deflection forces floatables and solids to the center of the separation chamber where 100% of floatables and neutrally buoyant debris larger than the screen apertures are trapped.

Stormwater then moves through the separation screen, under the oil baffle and exits the system. The separation screen remains clog free due to continuous deflection.

During flow events exceeding the design capacity, the diversion weir bypasses excessive flows around the separation chamber, so captured pollutants will not wash out.



CDS

- Removes sediment, trash and free oil and grease
- Patented screening technology captures and retains 100% of floatables, including neutrally buoyant and all other material larger than the screen aperture
- Operation independent of flow
- Performance verified through lab and field testing
- Unobstructed maintenance access
- Customizable/flexible design and multiple configurations available
- Separates and confines pollutants from outlet flow
- Inline, offline, grate inlet and drop inlet configurations available
- Multiple screen aperture sizes available
- Allows for multiple inlet pipes

Available Models

CDS Model	Treatment Capacity[3] (cfs)	Maximum Sediment Storage Capacity (CF)
1515	1.0	26
w/ 1' added sump	1.0	33
w/ 2' added sump	1.0	40
w/ 3' added sump	1.0	47
2015_4	1.4	50
w/ 1' added sump	1.4	63
w/ 2' added sump	1.4	75
w/ 3' added sump	1.4	88
2015	1.4	79
w/ 1' added sump	1.4	98
w/ 2' added sump	1.4	118
2020	2.2	90
w/ 1' added sump	2.2	110
w/ 2' added sump	2.2	129
2025	3.2	97
w/ 1' added sump	3.2	117
w/ 2' added sump	3.2	136
3020	3.9	134
w/ 1' added sump	3.9	163
w/ 2' added sump	3.9	191
3030	6.1	157
w/ 1' added sump	6.1	185
w/ 2' added sump	6.1	213
4030	7.9	329
w/ 1' added sump	7.9	379
w/ 2' added sump	7.9	429
4040	12.4	381
w/ 1' added sump	12.4	431
w/ 2' added sump	12.4	482

1. Structure diameter represents the typical inside dimension of the concrete structure. Offline systems will require additional concrete diversion components
2. Depth below pipe can vary to accommodate site specific design. Depth below pipe invert represents the depth from the pipe invert to the inside bottom of concrete structure.
3. Treatment Capacity is based on laboratory testing using OK-110 (average d50 particle size of approximately 100 microns) and a 2400 micron screen.

Sediment Depths Indicating Required Servicing*			
CDS Model	Standard Sediment Depth (in.)	w/ 1' added Sump Sediment Depth (in.)	w/ 2' added Sump Sediment Depth (in.)
1515	18	27	36
2015_4	18	30	42
2015	18	30	42
2020	18	30	42
2025	18	30	42
3020	18	30	42
3030	18	39	42
4030	27	39	51
4040	27	39	51

* Based on 75% capacity of isolated sump.

StormTech®

Detention • Retention • Water Quality

Division of ADS

STORMTECH ISOLATOR ROW SIZING CHART						
	SC-160LP	SC-310	SC-740	DC-780	MC-3500	MC-4500
Chamber Area (Sq.Ft.)		20	27.8	27.8	43.2	30.1
Treated Flow Rate per chamber (CFS)	0.055	0.11	0.15	0.15	0.24	0.17

0.24 cfs per chamber * 6 chambers = 1.44 cfs provided treated flow rate

NOTE: *Testing of the Isolator Row completed by Tennesse Tech has been verified by NJCAT and it has shown to have a TSS removal efficiency of 84% for SIL-CO-SIL 250*

NJCAT verified Treated Flow Rate (GPM / Sq.Ft.) 2.5

TSS Removal Calculation Worksheet

Location: Darien, CT

A BMP[1]	B TSS Removal Rate[1]	C Starting TSS Load*	D Amount Removed (B*C)	E Remaining Load (C-D)
Deep Sump Hooded Catch Basin	0.25	1.00	0.25	0.75
CDS2015-4-C Water Quality Unit	0.50	0.75	0.38	0.38
Stormtech Isolator Row	0.60	0.38	0.23	0.15

Total TSS Removal = 85%

Project: 7-Eleven
Prepared By: Bohler
Date: 6/11/2020

*Equals remaining load from previous BMP (E) which enters the BMP

Prepared By:
Bohler Engineering
352 Turnpike Road
Southborough, MA 01772
(508) 480-9900

State of New Jersey
DEPARTMENT OF ENVIRONMENTAL PROTECTION
Bureau of Nonpoint Pollution Control
Division of Water Quality
401-02B
Post Office Box 420
Trenton, New Jersey 08625-0420
609-633-7021 Fax: 609-777-0432
http://www.state.nj.us/dep/dwq/bnpc_home.htm

CHRIS CHRISTIE
Governor

KIM GUADAGNO
Lt. Governor

BOB MARTIN
Commissioner

January 9, 2015

Derek M. Berg
CONTECH Engineered Solutions, LLC
71 US Route 1, Suite F
Scarborough, ME 04074

Re: MTD Lab Certification for the
Continuous Deflective Separator (CDS®) Stormwater Treatment Device
By Contech Engineered Solutions LLC

TSS Removal Rate 50%

Dear Mr. Berg:

The Stormwater Management rules under N.J.A.C. 7:8-5.5(b) and 5.7 (c) allow the use of manufactured treatment devices (MTDs) for compliance with the design and performance standards at N.J.A.C. 7:8-5 if the pollutant removal rates have been verified by the New Jersey Corporation for Advanced Technology (NJCAT) and have been certified by the New Jersey Department of Environmental Protection (NJDEP). Contech Engineered Solutions, LLC has requested a Laboratory Certification for the CDS® Stormwater Treatment Device.

The projects falls under the "Procedure for Obtaining Verification of a Stormwater Manufactured Treatment Device from New Jersey Corporation for Advance Technology" dated January 25, 2013. The applicable protocol is the "New Jersey Laboratory Testing Protocol to Assess Total Suspended Solids Removal by a Hydrodynamic Sedimentation Manufactured Treatment Device" dated January 25, 2013.

NJCAT verification documents submitted to the NJDEP indicate that the requirements of the aforementioned protocol have been met or exceeded. The NJCAT letter also included a recommended certification TSS removal rate and the required maintenance plan. The NJCAT Verification Report with the Verification Appendix for this device is published online at http://www.njcat.org/verification-process/technology-verification-database.html.

The NJDEP certifies the use of the Continuous Deflective Separator (CDS®) Stormwater Treatment Device by Contech Engineered Solutions LLC at a TSS removal rate of 50% when designed, operated and maintained in accordance with the information provided in the Verification Appendix.

Be advised a detailed maintenance plan is mandatory for any project with a Stormwater BMP subject to the Stormwater Management Rules, N.J.A.C. 7:8. The plan must include all of the items identified in the Stormwater Management Rules, N.J.A.C. 7:8-5.8. Such items include, but are not limited to, the list of inspection and maintenance equipment and tools, specific corrective and preventative maintenance tasks, indication of problems in the system, and training of maintenance personnel. Additional information can be found in Chapter 8: Maintenance of the New Jersey Stormwater Best Management Practices Manual.

If you have any questions regarding the above information, please contact Mr. Titus Magnanao of my office at (609) 633-7021.

Sincerely,

James J. Murphy, Chief
Bureau of Nonpoint Pollution Control

C: Chron File
Richard Magee, NJCAT
Madhu Guru, DLUR
Ravi Patraju, NJDEP
Elizabeth Dragon, BNPC
Titus Magnanao, BNPC

EXECUTIVE SUMMARY:

This report details the experimental set up, testing protocols, results and findings of a full scale laboratory study conducted at Tennessee Tech University to determine the sediment removal efficiency of the StormTech® Isolator™ Row for two different silica-water slurry influent streams; one influent stream consisting of SIL-CO-SIL 106, with a median particle size of approximately 22 microns, and the other consisting of SIL-CO-SIL 250, with a median particle size of 45 microns. Both silica materials are used as surrogates in laboratory testing and verification protocols as a representation of very fine sediments contained in storm water runoff. Both influent streams were tested at a hydraulic loading rate of 3.2 gpm/sqft of filter area (179.6 gpm divided by 55.6 sqft of filter area). The SIL-CO-SIL 250 influent stream was also tested at 1.7 gpm/sqft.

Over the period of several test runs, it was observed that extremely fine particles accumulated in the flow stream tending to skew the average particle size of the distributions downward. This resulted in a particle size distribution with an approximate average particle size of 10 microns. The ability of a stormwater treatment system to remove such very fine particles is noteworthy. This report includes a limited analysis of the impact on TSS removal efficiency due to the fine particle accumulation.

Following is a brief synopsis of the results:

60% TSS Removal at 3.2 gpm/sqft for SIL-CO-SIL 106 with accumulated fines (D_{50} = 10 microns)
66% TSS Removal at 3.2 gpm/sqft for SIL-CO-SIL 106 (D_{50} = 22 microns)
71% TSS Removal at 3.2 gpm/sqft for SIL-CO-SIL 250 with accumulated fines (D_{50} < 45 microns)
88% TSS Removal at 1.7 gpm/sqft for SIL-CO-SIL 250 with accumulated fines (D_{50} < 45 microns)

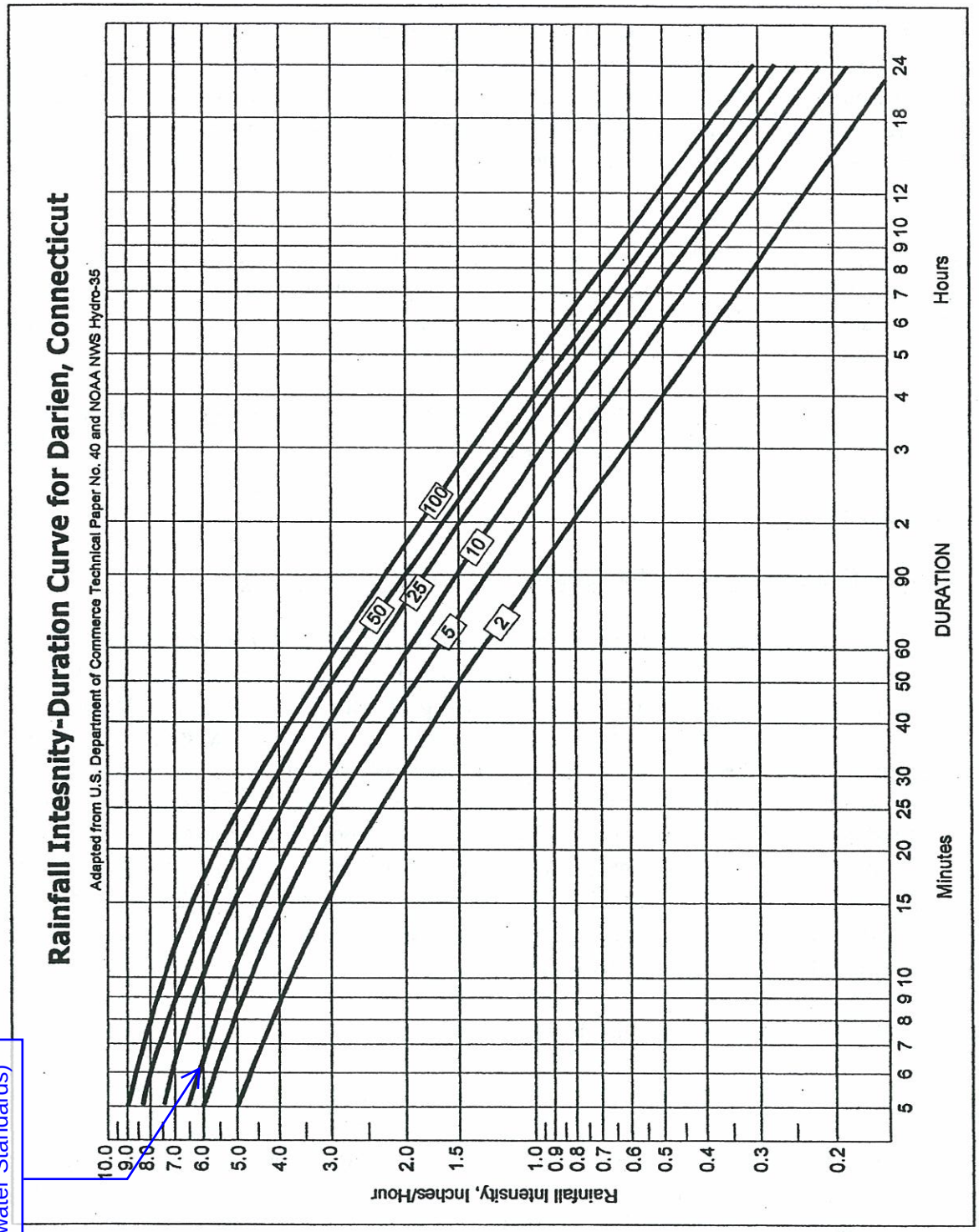
METHODS AND MATERIALS:

The main components of the laboratory set-up are shown in the design drawings (Figure 1). Two (2) SC-740 chambers are secured to a wooden frame and lay over a 12-in. bed of No. 3 angular stone (AASHTO M43 #3) contained in a wooden flume with interior W x L x H dimensions, 6.25-ft x 16.22-ft x 3-ft. The physical properties of the No. 3 stone are given in *Appendix 1.*

The chambers are covered with GEOTEX® 601 non-woven geotextile fabric with specifications given in *Appendix 2.* Two layers of GEOTEX® 315 ST woven geotextile fabric, with specifications given in *Appendix 3*, are placed at the bottom of the chamber to stabilize the stone foundation and to prevent scouring of the stone base. Both the nonwoven fabric covering the chamber and the woven fabric placed at the bottom provide filtration media for the Isolator Row.

An 8-inch pipe feeds the silica-water mixture through an expansion into the 12-inch inlet pipe of the isolator row. A 1.5 lb /gal silica-water slurry is introduced to the 8-inch pipe from a 35-gallon mixing tank using a Watson-Marlow323S/RL (220 rpm) pump. The silica–water slurry enters a 3/8" feed tap located 10 inches upstream of a butterfly valve, which introduces turbulence and promotes uniform mixing of the influent stream. The Isolator™ Row resides in the recirculating flume, which collects and drains water discharged by the chamber to the stone substrate through an 8-inch drain that discharges to the laboratory trench and sump. The water is recirculated with a 25

Figure 4.1
Rainfall Intensity-Duration Curve for Darien, Connecticut



6.3 in/hr for pipe sizing (10 year storm and 6 minute time of concentration per CT Stormwater Standards)

Proposed 7-Eleven
306 Boston Post Road (Route 1)
Darien, CT
Bohler Job Number: W191393
June 11, 2020

Rational Pipe Sizing Calculations

Design Period Storm:		10	Year	Design Period Intensity*			6.3	in/hr									
LOCATION		IMPERVIOUS			OTHER			SUM	Tc	I	Q	D	S			Q Full	V Full
FROM	TO	A	C	CA	A	C	CA	CA	(min)	(in/hr)	(cfs)	(in)	(ft/ft)	Material	n	(cfs)	(fps)
CB-1	TEE-1	0.00	0.95	0.00	0.07	0.30	0.02	0.02	6	6.3	0.13	12	0.005	HDPE	0.012	2.73	3.47
ROOF-1	TEE-1	0.05	0.95	0.05	0.00	0.30	0.00	0.05	6	6.3	0.30	6	0.010	HDPE	0.012	0.61	3.10
TEE-1	DMH-2										0.43	12	0.005	HDPE	0.012	2.73	3.47
CB-2	DMH-2	0.19	0.95	0.18	0.09	0.30	0.03	0.21	6	6.3	1.31	12	0.005	HDPE	0.012	2.73	3.47
DMH-2	DMH-3										1.74	12	0.005	HDPE	0.012	2.73	3.47
ROOF-2	DMH-3	0.05	0.95	0.05	0.00	0.30	0.00	0.05	6	6.3	0.30	6	0.010	HDPE	0.012	0.61	3.10
DMH-3	TEE-2										2.04	12	0.005	HDPE	0.012	2.73	3.47
CNPY-1	TEE-2	0.07	0.95	0.07	0.00	0.30	0.00	0.07	6	6.3	0.42	8	0.010	HDPE	0.012	1.31	3.75
TEE-2	WQU-1										2.46	12	0.005	HDPE	0.012	2.73	3.47
CB-3	WQU-1	0.38	0.95	0.36	0.00	0.30	0.00	0.36	6	6.3	2.27	12	0.010	HDPE	0.012	3.86	4.91
WQU-1	ICS-1										4.73	15	0.005	HDPE	0.012	4.95	4.03

*Rainfall intensity provided by Rainfall Intensity-Duration Curve for Darien (attached)

Prepared By:
Bohler Engineering
352 Turnpike Road
Southborough, MA 01772
(508) 480-9900

APPENDIX G: OPERATION AND MAINTENANCE

- *STORMWATER OPERATION AND MAINTENANCE PLAN*
- *INSPECTION REPORT*
- *INSPECTION AND MAINTENANCE LOG FORM*
- *LONG-TERM POLLUTION PREVENTION PLAN*
- *ILLICIT DISCHARGE STATEMENT*
- *SPILL PREVENTION*
- *MANUFACTURER'S INSPECTION AND MAINTENANCE MANUALS*

STORMWATER OPERATION AND MAINTENANCE PLAN

7-Eleven Inc.
306 Boston Post Road (Route 1)
Darien, CT

RESPONSIBLE PARTY DURING CONSTRUCTION:

7-Eleven, Inc.
3200 Hackberry Road
Irving, TX 75063

RESPONSIBLE PARTY POST CONSTRUCTION:

7-Eleven, Inc.
3200 Hackberry Road
Irving, TX 75063

Construction Phase

During the construction phase, all erosion control devices and measures shall be maintained in accordance with the final record plans, local/state approvals and conditions, and the EPA Construction General Permit. Additionally, the maintenance of all erosion / siltation control measures during construction shall be the responsibility of the general contractor. Upon proper notice to the property owner, the Town/City or its authorized designee shall be allowed to enter the property at a reasonable time and in a reasonable manner for the purposes of inspection.

Post Development Controls

Once construction is completed, the post development stormwater controls are to be operated and maintained in compliance with the following permanent procedures (note that the continued implementation of these procedures shall be the responsibility of the Owner or its assignee):

1. Parking lots and on-site driveways: Sweep at least four (4) times per year and on a more frequent basis depending on sanding operations. All resulting sweepings shall be collected and properly disposed of off site in accordance with MADEP and other applicable requirements.

   Approximate Maintenance Budget: $1,000/year

2. Catch basins, manholes and piping: Inspect four (4) times per year and at the end of foliage and snow-removal seasons. These features shall be cleaned four (4) times per year or whenever the depth of deposits is greater than or equal to one half the depth from the bottom of the invert of the lowest pipe in the catch basin or underground system. Accumulated sediment and hydrocarbons present must be removed and properly disposed of off site in accordance with MADEP and other applicable requirements.

   Approximate Maintenance Budget: $500/year per structure.

3. Water Quality Unit (Proprietary Separator): Follow manufacturer's recommendations (attached).

   Approximate Maintenance Budget: $1,000/year per unit.

4. Underground Detention Basins: Preventative maintenance after every major storm event during the first three (3) months of operation and at least twice per year thereafter. Inspect structure and pretreatment BMP to ensure proper operation after every major storm event (generally equal or greater to 3.0 inches in 24 hours) for the first three months. The outlet of the basin, if any, shall be inspected for erosion and sedimentation, and rip-rap shall be promptly repaired in the case of erosion. Sediment collecting in the bottom of the basin shall be inspected twice annually, and removal shall commence any time the sediment reaches a depth of six inches anywhere in the basin. Any sediment removed shall be disposed of in accordance with MADEP and other applicable requirements.

   Approximate Maintenance Budget: Cleaning - $1,000/year, Inspection - $200/year

All components of the stormwater system will be accessible by the owner or their assignee.

STORMWATER MANAGEMENT SYSTEM

POST-CONSTRUCTION INSPECTION REPORT

LOCATION:

7-Eleven Inc.
306 Boston Post Road (Route 1)
Darien, CT

RESPONSIBLE PARTY:

7-Eleven, Inc.
3200 Hackberry Road
Irving, TX 75063

NAME OF INSPECTOR:	INSPECTION DATE:
Note Condition of the Following (sediment depth, debris, standing water, damage, etc.):	
Catch Basins:	
Discharge Points/ Flared End Sections / Rip Rap:	
Detention Basin:	
Water Quality Units:	
Other:	

Note Recommended Actions to be taken on the Following (sediment and/or debris removal, repairs, etc.):
Catch Basins:
Discharge Points / Flared End Sections / Rip Rap:
Detention Basin:
Water Quality Units:
Other:
Comments:

STORMWATER INSPECTION AND MAINTENANCE LOG FORM

7-Eleven
Boston Post Road – Darien, CT

Stormwater Management Practice	Responsible Party	Date	Maintenance Activity Performed

LONG-TERM POLLUTION PREVENTION PLAN

7-Eleven Inc.
306 Boston Post Road (Route 1)
Darien, CT

RESPONSIBLE PARTY DURING CONSTRUCTION:

7-Eleven, Inc.
3200 Hackberry Road
Irving, TX 75063

RESPONSIBLE PARTY POST CONSTRUCTION:

7-Eleven, Inc.
3200 Hackberry Road
Irving, TX 75063

For this site, the Long-Term Pollution Prevention Plan will consist of the following:

- The property owner shall be responsible for "good housekeeping" including proper periodic maintenance of building and pavement areas, curbing, landscaping, etc.
- Proper storage and removal of solid waste (dumpsters).
- Sweeping of driveways a minimum of twice per year with a commercial cleaning unit. Any sediment removed shall be disposed of in accordance with applicable local and state requirements.
- Regular inspections and maintenance of Stormwater Management System as noted in the "O&M Plan".
- Snow removal shall be the responsibility of the property owner. Snow shall not be plowed, dumped and/or placed in forebays, infiltration basins or similar stormwater controls. Salting and/or sanding of pavement / walkway areas during winter conditions shall only be done in accordance with all state/local requirements and approvals.

OPERATON AND MAINTENANCE TRAINING PROGRAM

The Owner will coordinate an annual in-house training session to discuss the Operations and Maintenance Plan, the Long-Term Pollution Prevention Plan, and the Spill Prevention Plan and response procedures. Annual training will include the following:

Discuss the Operations and Maintenance Plan

- Explain the general operations of the stormwater management system and its BMPs
- Identify potential sources of stormwater pollution and measures / methods of reducing or eliminating that pollution
- Emphasize good housekeeping measures

Discuss the Spill Prevention and Response Procedures

- Explain the process in the event of a spill
- Identify potential sources of spills and procedures for cleanup and /or reporting and notification
- Complete a yearly inventory or Materials Safety Data sheets of all tenants and confirm that no potentially harmful chemicals are in use.
- Trash and other debris shall be removed from all areas of the site at least twice yearly.
- Plants shall be pruned as necessary.
- The use of fertilizers will be kept at a level consistent with typical residential use. Fertilizer will be applied a maximum of once to twice per year during the initial planting and stabilization of landscaped areas. Once plants are established and growing well fertilizer will be applied judiciously.
- The use of pesticides will be kept at a level consistent with typical residential use. Where possible mechanical methods (i.e. pest traps) or biological methods (i.e. beneficial insects) of pest control shall be implemented. If pesticides (insecticide, herbicide, and fungicide) are required to be used, a pesticide which poses the lowest risk to public health and the environment shall be used.
- Snow piles shall be located adjacent to or on pervious surfaces in upland areas. This will allow snow melt water to filter in to the soil, leaving behind sand and debris which can be removed in the springtime.
- In no case shall snow be disposed of or stored in resource areas (wetlands, floodplain, streams or other water bodies).

- In no case shall snow be disposed of or stored in the detention basins, infiltration basins or bioretention areas.

- If necessary, stockpiled snow will be removed from the Site and disposed of at an off-site location in accordance with all local, state and federal regulations.

- The amount of sand and deicing chemicals shall be kept at the minimum amount required to provide safe pedestrian and vehicle travel.

- Deicing chemicals are recommended as a pretreatment to storm events to minimize the amount of applied sand.

- Sand and deicing chemicals should be stockpiled under covered storage facilities that prevent precipitation and adjacent runoff from coming in contact with the deicing materials. Stockpile areas shall be located outside resource areas.

- The primary agents used for deicing at parking lots, sidewalks and the access roads shall consist of salt alternatives such as calcium carbonate (CaCO3) or potassium chloride (KCl) or sodium chloride.

- Deliveries shall be monitored by owner or owner's representative to ensure proper delivery and in the event that a spillage occurs it shall be contained and cleaned up immediately in accordance with the spill prevention program for the project.

- Recycle materials whenever possible. Provide separate containers for recycle materials. Recycling products will be removed by a certified waste hauler.

ILLICIT DISCHARGE STATEMENT

Certain types of non-stormwater discharges are allowed under the U.S. Environmental Protection Agency Construction General Permit. These types of discharges will be allowed under the conditions that no pollutants will be allowed to come in contact with the water prior to or after its discharge. The control measures which have been outlined previously in this LTPPP will be strictly followed to ensure that no contamination of these non-storm water discharges takes place. Any existing illicit discharges, if discovered during the course of the work, will be reported to MassDEP and the local DPW, as applicable, to be addressed in accordance with their respective policies. No illicit discharges will be allowed in conjunction with the proposed improvements.

Duly Acknowledged:

_____

Name & Title

SPILL PREVENTION AND RESPONSE PROCEDURES (POST CONSTRUCTION)

In order to prevent or minimize the potential for a spill of Hazardous Substances or Oil or come into contact with stormwater, the following steps will be implemented:

1. All Hazardous Substances or Oil (such as pesticides, petroleum products, fertilizers, detergents, acids, paints, paint solvents, cleaning solvents, etc.) will be stored in a secure location, with their lids on, preferably under cover, when not in use.

2. The minimum practical quantity of all such materials will be kept on site.

3. A spill control and containment kit (containing, for example, absorbent materials, acid neutralizing powder, brooms, dust pans, mops, rags, gloves, goggles, plastic and metal trash containers, etc.) will be provided on site.

4. Manufacturer's recommended methods for spill cleanup will be clearly posted and site personnel will be trained regarding these procedures and the location of the information and cleanup supplies.

5. It is the OWNER's responsibility to ensure that all Hazardous Waste on site is disposed of properly by a licensed hazardous material disposal company. The OWNER is responsible for not exceeding Hazardous Waste storage requirements mandated by the EPA or state and local authorities.

In the event of a spill of Hazardous Substances or Oil, the following procedures should be followed:

1. All measures should be taken to contain and abate the spill and to prevent the discharge of the Hazardous Substance or Oil to stormwater or off-site. (The spill area should be kept well ventilated and personnel should wear appropriate protective clothing to prevent injury from contact with the Hazardous Substances.)

2. For spills of less than five (5) gallons of material, proceed with source control and containment, clean-up with absorbent materials or other applicable means unless an imminent hazard or other circumstances dictate that the spill should be treated by a professional emergency response contractor.

3. For spills greater than five (5) gallons of material immediately contact the MADEP at the toll-free 24-hour statewide emergency number: **1-888-304-1133**, the local fire department (**9-1-1**) and an approved emergency response contractor. Provide information on the type of material spilled, the location of the spill, the quantity spilled, and the time of the spill to the emergency response contractor or coordinator, and proceed with prevention, containment and/or clean-up if so desired. (Use the form provided, or similar).

4. If there is a Reportable Quantity (RQ) release, then the National Response Center should be notified immediately at (800) 424-8802; within 14 days a report should be submitted to the EPA regional office describing the release, the date and circumstances of the release and the steps taken to prevent another release. This Pollution Prevention Plan should be updated to reflect any such steps or actions taken and measures to prevent the same from reoccurring.

SPILL PREVENTION CONTROL AND COUNTERMEASURE FORM

7-Eleven Inc.
306 Boston Post Road (Route 1)
Darien, CT

Where a release containing a hazardous substance occurs, the following steps shall be taken by the facility manager and/or supervisor:

1. Immediately notify The Darien Fire Department (at **9-1-1**)

2. All measures must be taken to contain and abate the spill and to prevent the discharge of the pollutant(s) to off-site locations, receiving waters, wetlands and/or resource areas.

3. Notify the Darien Health Department at (203) 656-7320 and the Darien Environmental Protection Commission at (203) 656-7300.

4. Provide documentation from licensed contractor showing disposal and cleanup procedures were completed as well as details on chemicals that were spilled to the Town of Darien Health Department and Environmental Protection Commission.

Date of spill:_____ Time:_____ Reported By:_____

Weather Conditions:_____

Material Spilled	**Location of Spill**	**Approximate Quantity of Spill (in gallons)**	**Agency(s) Notified**	**Date of Notification**

Cause of Spill:_____

_____

Measures Taken to Clean up Spill:_____

_____

Type of equipment: _____ Make: _____ Size:_____

License or S/N: _____

Location and Method of Disposal_____

_____

Procedures, method, and precautions instituted to prevent a similar occurrence from recurring:_____

_____

Additional Contact Numbers:

- DEPARTMENT OF ENVIRONMENTAL PROTECTION (DEP) EMERGENCY PHONE: (860)-424-3000
- NATIONAL RESPONSE CENTER PHONE: (800) 424-8802
- U.S. ENVIRONMENTAL PROTECTION AGENCYPHONE: (888) 372-7341

CONTECH®
ENGINEERED SOLUTIONS

CDS® Inspection and Maintenance Guide

CDS TECHNOLOGIES

Maintenance

The CDS system should be inspected at regular intervals and maintained when necessary to ensure optimum performance. The rate at which the system collects pollutants will depend more heavily on site activities than the size of the unit. For example, unstable soils or heavy winter sanding will cause the grit chamber 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 (e.g. spring and fall) however more frequent inspections may be necessary in climates where winter sanding operations may lead to rapid accumulations, or in equipment washdown areas. Installations should also be inspected more frequently where excessive amounts of trash are expected.

The visual inspection should ascertain that the system components are in working order and that there are no blockages or obstructions in the inlet and separation screen. 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.

Access to the CDS unit is typically achieved through two manhole access covers. One opening allows for inspection and cleanout of the separation chamber (cylinder and screen) and isolated sump. The other allows for inspection and cleanout of sediment captured and retained outside the screen. For deep units, a single manhole access point would allows both sump cleanout and access outside the screen.

The CDS system should be cleaned when the level of sediment has reached 75% of capacity in the isolated sump or when an appreciable level of hydrocarbons and trash has accumulated. If absorbent material is used, it should be replaced when significant discoloration has occurred. Performance will not be impacted until 100% of the sump capacity is exceeded however it is recommended that the system be cleaned prior to that for easier removal of sediment. The level of sediment is easily determined by measuring from finished grade down 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. Particles at the top of the pile typically offer less resistance to the end of the rod than consolidated particles toward the bottom of the pile. Once this measurement is recorded, it should be compared to the as-built drawing for the unit to determine weather the height of the sediment pile off the bottom of the sump floor exceeds 75% of the total height of isolated sump.

Cleaning

Cleaning of a CDS systems 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 covers and insert the vacuum hose into the sump. The system should be completely drained down and the sump fully evacuated of sediment. The area outside the screen should also be cleaned out if pollutant build-up exists in this area.

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 should be cleaned out immediately. 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. The screen 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 also to ensure that proper safety precautions have been followed. Confined space entry procedures need to be followed if physical access is required. Disposal of all material removed from the CDS system should be done in accordance with local regulations. In many jurisdictions, disposal of the sediments may be handled in the same manner as the disposal of sediments removed from catch basins or deep sump manholes.

CDS Model	Diameter		Distance from Water Surface to Top of Sediment Pile		Sediment Storage Capacity	
	ft	m	ft	m	y^3	m^3
CDS1515	3	0.9	3.0	0.9	0.5	0.4
CDS2015	4	1.2	3.0	0.9	0.9	0.7
CDS2015	5	1.3	3.0	0.9	1.3	1.0
CDS2020	5	1.3	3.5	1.1	1.3	1.0
CDS2025	5	1.3	4.0	1.2	1.3	1.0
CDS3020	6	1.8	4.0	1.2	2.1	1.6
CDS3025	6	1.8	4.0	1.2	2.1	1.6
CDS3030	6	1.8	4.6	1.4	2.1	1.6
CDS3035	6	1.8	5.0	1.5	2.1	1.6
CDS4030	8	2.4	4.6	1.4	5.6	4.3
CDS4040	8	2.4	5.7	1.7	5.6	4.3
CDS4045	8	2.4	6.2	1.9	5.6	4.3
CDS5640	10	3.0	6.3	1.9	8.7	6.7
CDS5653	10	3.0	7.7	2.3	8.7	6.7
CDS5668	10	3.0	9.3	2.8	8.7	6.7
CDS5678	10	3.0	10.3	3.1	8.7	6.7

Table 1: CDS Maintenance Indicators and Sediment Storage Capacities

Support

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

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CDS Inspection & Maintenance Log

CDS Model: _____ Location: _____

Date	Water depth to sediment[1]	Floatable Layer Thickness[2]	Describe Maintenance Performed	Maintenance Personnel	Comments

1. The water depth to sediment is determined by taking two measurements with a stadia rod: one measurement from the manhole opening to the top of the sediment pile and the other from the manhole opening to the water surface. If the difference between these measurements is less than the values listed in table 1 the system should be cleaned out. **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.

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Save Valuable Land and Protect Water Resources

Isolator® Row O&M Manual

StormTech® Chamber System for Stormwater Management

1.0 The Isolator® Row

1.1 INTRODUCTION

An important component of any Stormwater Pollution Prevention Plan is inspection and maintenance. The StormTech Isolator Row is a patented technique to inexpensively enhance Total Suspended Solids (TSS) removal and provide easy access for inspection and maintenance.

Looking down the Isolator Row from the manhole opening, woven geotextile is shown between the chamber and stone base.

1.2 THE ISOLATOR ROW

The Isolator Row is a row of StormTech chambers, either SC-310, SC-310-3, SC-740, DC-780, MC-3500 or MC-4500 models, that is surrounded with filter fabric and connected to a closely located manhole for easy access. The fabric-wrapped chambers provide for settling and filtration of sediment as storm water rises in the Isolator Row and ultimately passes through the filter fabric. The open bottom chambers and perforated sidewalls (SC-310, SC-310-3 and SC-740 models) allow storm water to flow both vertically and horizontally out of the chambers. Sediments are captured in the Isolator Row protecting the storage areas of the adjacent stone and chambers from sediment accumulation.

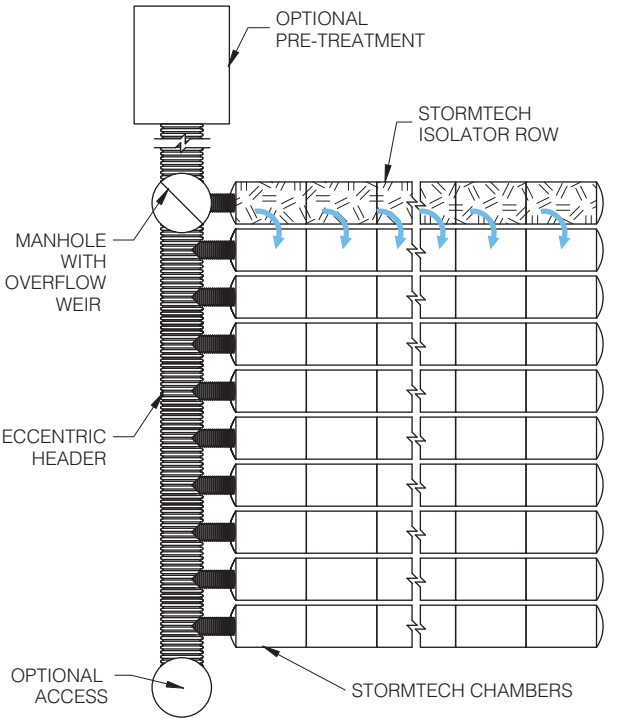
Two different fabrics are used for the Isolator Row. A woven geotextile fabric is placed between the stone and the Isolator Row chambers. The tough geotextile provides a media for storm water filtration and provides a durable surface for maintenance operations. It is also designed to prevent scour of the underlying stone and remain intact during high pressure jetting. A non-woven fabric is placed over the chambers to provide a filter media for flows passing through the perforations in the sidewall of the chamber. The non-woven fabric is not required over the DC-780, MC-3500 or MC-4500 models as these chambers do not have perforated side walls.

The Isolator Row is typically designed to capture the "first flush" and offers the versatility to be sized on a volume basis or flow rate basis. An upstream manhole not only provides access to the Isolator Row but typically includes a high flow weir such that storm water flowrates or volumes that exceed the capacity of the Isolator Row overtop the over flow weir and discharge through a manifold to the other chambers.

The Isolator Row may also be part of a treatment train. By treating storm water prior to entry into the chamber system, the service life can be extended and pollutants such as hydrocarbons can be captured. Pre-treatment best management practices can be as simple as deep sump catch basins, oil-water separators or can be innovative storm water treatment devices. The design of the treatment train and selection of pretreatment devices by the design engineer is often driven by regulatory requirements. Whether pretreatment is used or not, the Isolator Row is recommended by StormTech as an effective means to minimize maintenance requirements and maintenance costs.

Note: See the StormTech Design Manual for detailed information on designing inlets for a StormTech system, including the Isolator Row.

StormTech Isolator Row with Overflow Spillway
(not to scale)



2.0 Isolator Row Inspection/Maintenance

2.1 INSPECTION

The frequency of Inspection and Maintenance varies by location. A routine inspection schedule needs to be established for each individual location based upon site specific variables. The type of land use (i.e. industrial, commercial, residential), anticipated pollutant load, percent imperviousness, climate, etc. all play a critical role in determining the actual frequency of inspection and maintenance practices.

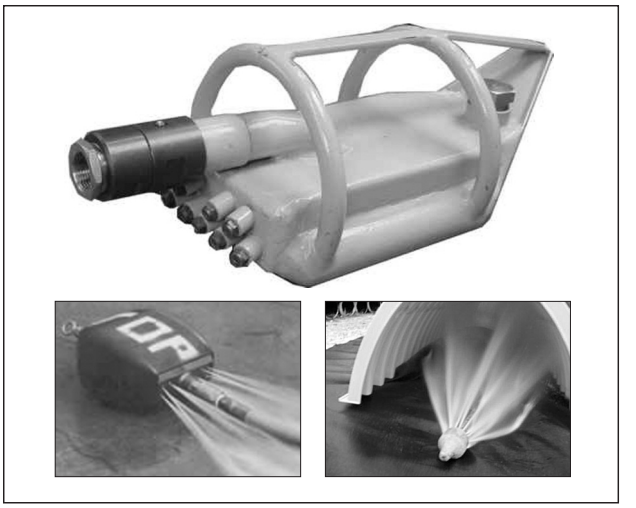
At a minimum, StormTech recommends annual inspections. Initially, the Isolator Row should be inspected every 6 months for the first year of operation. For subsequent years, the inspection should be adjusted based upon previous observation of sediment deposition.

The Isolator Row incorporates a combination of standard manhole(s) and strategically located inspection ports (as needed). The inspection ports allow for easy access to the system from the surface, eliminating the need to perform a confined space entry for inspection purposes.

If upon visual inspection it is found that sediment has accumulated, a stadia rod should be inserted to determine the depth of sediment. When the average depth of sediment exceeds 3 inches throughout the length of the Isolator Row, clean-out should be performed.

2.2 MAINTENANCE

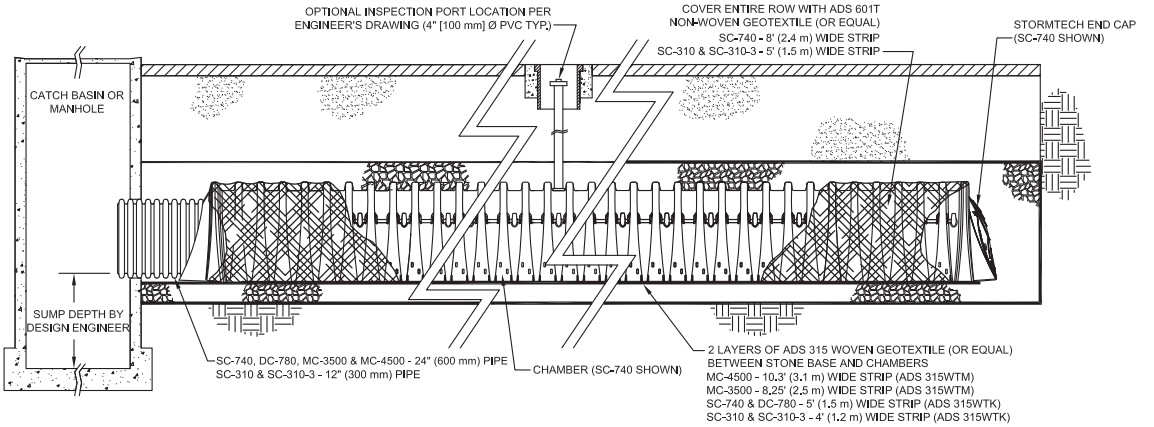
The Isolator Row was designed to reduce the cost of periodic maintenance. By "isolating" sediments to just one row, costs are dramatically reduced by eliminating the need to clean out each row of the entire storage bed. If inspection indicates the potential need for maintenance, access is provided via a manhole(s) located on the end(s) of the row for cleanout. If entry into the manhole is required, please follow local and OSHA rules for a confined space entries.



Examples of culvert cleaning nozzles appropriate for Isolator Row maintenance. (These are not StormTech products.)

Maintenance is accomplished with the JetVac process. The JetVac process utilizes a high pressure water nozzle to propel itself down the Isolator Row while scouring and suspending sediments. As the nozzle is retrieved, the captured pollutants are flushed back into the manhole for vacuuming. Most sewer and pipe maintenance companies have vacuum/JetVac combination vehicles. Selection of an appropriate JetVac nozzle will improve maintenance efficiency. Fixed nozzles designed for culverts or large diameter pipe cleaning are preferable. Rear facing jets with an effective spread of at least 45" are best. Most JetVac reels have 400 feet of hose allowing maintenance of an Isolator Row up to 50 chambers long. **The JetVac process shall only be performed on StormTech Isolator Rows that have AASHTO class 1 woven geotextile (as specified by StormTech) over their angular base stone.**

StormTech Isolator Row (not to scale)



NOTE: NON-WOVEN FABRIC IS ONLY REQUIRED OVER THE INLET PIPE CONNECTION INTO THE END CAP FOR DC-780, MC-3500 AND MC-4500 CHAMBER MODELS AND IS NOT REQUIRED OVER THE ENTIRE ISOLATOR ROW.

3.0 Isolator Row Step By Step Maintenance Procedures

Step 1) Inspect Isolator Row for sediment

A) Inspection ports (if present)

i. Remove lid from floor box frame

ii. Remove cap from inspection riser

iii. Using a flashlight and stadia rod, measure depth of sediment and record results on maintenance log.

iv. If sediment is at, or above, 3 inch depth proceed to Step 2. If not proceed to step 3.

B) All Isolator Rows

i. Remove cover from manhole at upstream end of Isolator Row

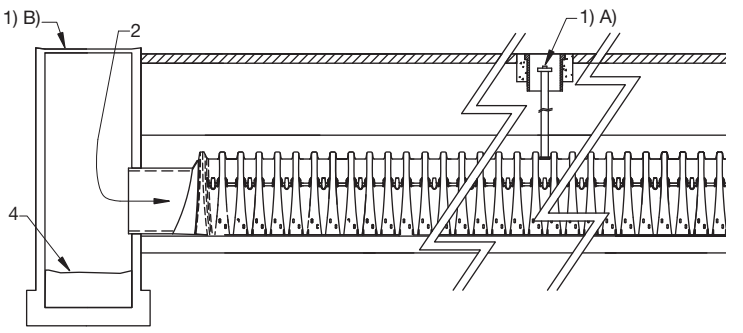
ii. Using a flashlight, inspect down Isolator Row through outlet pipe

1. Mirrors on poles or cameras may be used to avoid a confined space entry

2. Follow OSHA regulations for confined space entry if entering manhole

iii. If sediment is at or above the lower row of sidewall holes (approximately 3 inches) proceed to Step 2. If not proceed to Step 3.

StormTech Isolator Row (not to scale)



Step 2) Clean out Isolator Row using the JetVac process

A) A fixed culvert cleaning nozzle with rear facing nozzle spread of 45 inches or more is preferable

B) Apply multiple passes of JetVac until backflush water is clean

C) Vacuum manhole sump as required

Step 3) Replace all caps, lids and covers, record observations and actions

Step 4) Inspect & clean catch basins and manholes upstream of the StormTech system

Sample Maintenance Log

Date	Stadia Rod Readings		Sediment Depth (1) - (2)	Observations/Actions	Inspector
	Fixed point to chamber bottom (1)	Fixed point to top of sediment (2)			
3/15/01	6.3 ft.	none		New installation. Fixed point is CI frame at grade	djm
9/24/01		6.2	0.1 ft.	Some grit felt	sm
6/20/03		5.8	0.5 ft.	Mucky feel, debris visible in manhole and in Isolator row, maintenance due	rv
7/7/03	6.3 ft.		0	System jetted and vacuumed	djm

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