STORMWATER MANAGEMENT ANALYSIS

For

B9 Cottontail Owner, LLC

Proposed Warehouses

Block 517.06, Lot 15.10
200 Cottontail Lane
Township of Franklin
Somerset County, NJ

Prepared by:

DYNAMIC ENGINEERING

40 Main Street, 3rd Floor
Toms River, NJ 08753
(732) 678-0000

Kyle C. Kavinski, PE
NJ Professional Engineer License #52985

February 2022
DEC# 3566-99-004

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APPENDIX

I. SITE DESCRIPTION

The project area is comprised of Lot 15.10, Block 517.06 in the Township of Franklin, Somerset County, New Jersey. The property is located at 200 Cottontail Lane. The subject parcel primarily consists of an existing office building with associated driveways, parking areas and open space areas. The site presently contains approximately 452,446 SF (10.39 AC.) of impervious coverage. Stormwater runoff from the existing development ultimately drains to the existing stormwater conveyance system within Cottontail Lane.

The proposed development includes the construction of two warehouse facilities (116,530 SF and 119,325 SF) with driveways, parking areas, utilities, lighting, and accommodating site improvements as shown on the Preliminary & Final Major Site Plan drawings, prepared by Dynamic Engineering Consultants, PC. The proposed development will result in a total amount of impervious coverage of approximately 445,152 SF (10.22 Acres). The total disturbance area is approximately 534,817 SF (12.28 Acres). The project will utilize and maintain the existing stormwater management facilities to address applicable aspects of NJAC 7:8.

The existing conditions of the tract have been verified by the Topographic Survey, as prepared by Dynamic Survey, LLC dated 07/23/2021.

II. DESIGN OVERVIEW

This report has been prepared to define and analyze the stormwater drainage conditions that would occur as a result of the redevelopment of the above referenced site in the Township of Franklin, Somerset County, New Jersey.

The proposed development includes the construction of two (2) warehouse facilities (116,530 SF and 119,325 SF) and the associated site improvements as shown on the accompanying Site Plans.

The proposed redevelopment within the limit of disturbance proposed a net decrease in impervious coverage and therefore, reduces and does not exceed at any time the stormwater runoff volume and peak rate of runoff from the development for the 2, 10 and 100-year storm events. Runoff peak flows and peak volumes will be reduced to the existing stormwater conveyance systems. No structural stormwater management measures are provided as the net proposed impervious area is decreased in the proposed condition. The water quantity rates and volumes are demonstrated to meet the requirements of NJAC 7:8.

A hydrological evaluation is provided for the 2, 10, and 100-year storm events utilizing the Urban Hydrology for Small Watershed TR55 method. It is the intention of the design of this site to comply with the Stormwater Management Best Management Practices.

II. EXISTING SITE CONDITIONS

The existing conditions of the tract have been verified by the Topographic Survey, as prepared by Dynamic Survey, LLC dated 07/23/2021. This information has been utilized to establish the Existing Conditions Drainage Area Map which is included within the Appendix of this Report.

The tract has been evaluated with the following existing drainage sub-watershed areas:

Study Area Cottontail Lane: This area consists of a portion of impervious and open space that will be disturbed as part of the proposed site improvements. Stormwater runoff generated by this area is tributary to the existing stormwater conveyance system located within Cottontail Lane.

Study Area Existing Basin: This area consists of the existing office building, along with impervious and open space areas that will be disturbed as part of the proposed site improvements. Stormwater runoff generated by this area is tributary to the existing basin located along Cottontail Lane and ultimately drains to the existing stormwater conveyance system located within Cottontail Lane.

Based on Somerset County soils survey information, the soil types native to the site include:

SOMERSET COUNTY SOIL SURVEY INFORMATION		
SOIL TYPE (SYMBOL)	**SOIL TYPE (NAME)**	**HYDROLOGIC SOIL GROUP**
PenB	Penn silt loam, 2 to 6 percent slopes	C
RorAt	Rowland Silt Loam, 0 to 2 percent slopes, frequently flooded	C

III. PROPOSED SITE CONDITIONS

The proposed development includes the construction of two warehouse facilities (116,530 SF and 119,325 SF). Additional site improvements include constructing driveways, parking areas, landscaping, lighting and other associated site improvements. The proposed development will maintain and utilize the existing aboveground detention basins.

The tract has been evaluated with the following drainage sub-watershed areas as depicted on the Proposed Drainage Area Map included within the Appendix of this report.

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Study Area Existing Basin: This area consists of both of the proposed warehouses, the existing detention basins, impervious areas and open space areas. The stormwater runoff from this study area is tributary to the proposed conveyance system and discharges to the existing detention basins, which is ultimately tributary to the Cottontail Lane stormwater conveyance system.

IV. DESIGN METHODOLOGY

The intention of the design of the proposed stormwater management facilities for this project is to provide measures as required to address applicable aspects of the Township of Franklin Land Use Ordinance and NJAC 7:8. In order to prepare the stormwater calculations for the subject project, initial investigation of the property and topography was performed. On-site review of the tract was initially performed by Dynamic Engineering Consultants, PC to verify existing site conditions and land cover characteristics. Dynamic Survey, LLC was contracted to prepare a Topographic Survey depicting the boundary, location and topography for the existing site and surrounding watershed areas.

Based on our review of the existing site conditions and the Topographic Survey, the Drainage Area Maps for the existing and proposed site conditions as defined within this report were established. A grading plan was developed for the proposed site improvements with considerations to the existing drainage patterns.

The overall stormwater management report for the subject tract has been evaluated by Dynamic Engineering Consultants to ensure that the overall development satisfies the applicable stormwater criteria set forth in the Township of Franklin Land Use Ordinance and NJAC 7:8.

V. RUNOFF RATE REDUCTION PERFORMANCE

The following is a comparison of the existing and proposed runoff rates:

Pre-Development and Post-Development Peak Runoff Results
Summary for Existing Basin Total

	EXISTING RUNOFF RATE (CFS)	PROPOSED RUNOFF RATE (CFS)	TOTAL REDUCTION (CFS)
2 Year	32.45	32.29	0.16
10 Year	51.37	51.20	0.17
100 Year	88.51	88.37	0.14

Pre-Development and Post-Development Peak Runoff Results
Summary for Cottontail Lane Total

	EXISTING RUNOFF RATE (CFS)	PROPOSED RUNOFF RATE (CFS)	TOTAL REDUCTION (CFS)
2 Year	0.712	0.505	0.207
10 Year	1.314	1.048	0.266
100 Year	2.546	2.202	0.344

Pre-Development and Post-Development Peak Runoff Results
Summary for Total Site

	EXISTING RUNOFF RATE (CFS)	PROPOSED RUNOFF RATE (CFS)	TOTAL REDUCTION (CFS)
2 Year	33.15	32.77	0.38
10 Year	52.67	52.20	0.47
100 Year	91.05	90.48	0.57

The proposed redevelopment will reduce the overall impervious coverage and therefore, reduces the stormwater runoff volume and peak rate of runoff from the development for the 2, 10, and 100-year storm events. As shown in the Hydrograph Summary Reports within the appendix of this report, the post development runoff hydrographs for all drainage areas do not exceed at any point in time, the pre-development runoff hydrographs for the 2, 10, and 100-year storms. Therefore, the overall development satisfies the applicable stormwater criteria set forth in the Township of Franklin Land Use Ordinance and NJAC 7:8.

VI. WATER QUALITY

The subject development does not result in a ¼ acre or more of new regulated motor vehicle surfaces; therefore, the State's Stormwater Runoff Water Quality Standards, set forth by NJAC 7:8, would not be applicable to this project. However, as discussed with the DRCC, three (3) manufactured treatment devices have been proposed in series prior to the existing detention basins discharging into the conveyance system within Cottontail Lane for additional water quality.

VII. GROUNDWATER RECHARGE

As previously stated within this report, under proposed conditions, overall impervious coverage will be reduced; therefore, the proposed project meets groundwater recharge requirements.

VIII. CONCLUSION

The proposed overall development has been designed with provisions for the safe and efficient control of stormwater runoff in a manner that will not adversely impact the existing drainage patterns, adjacent roadways, or adjacent parcels.

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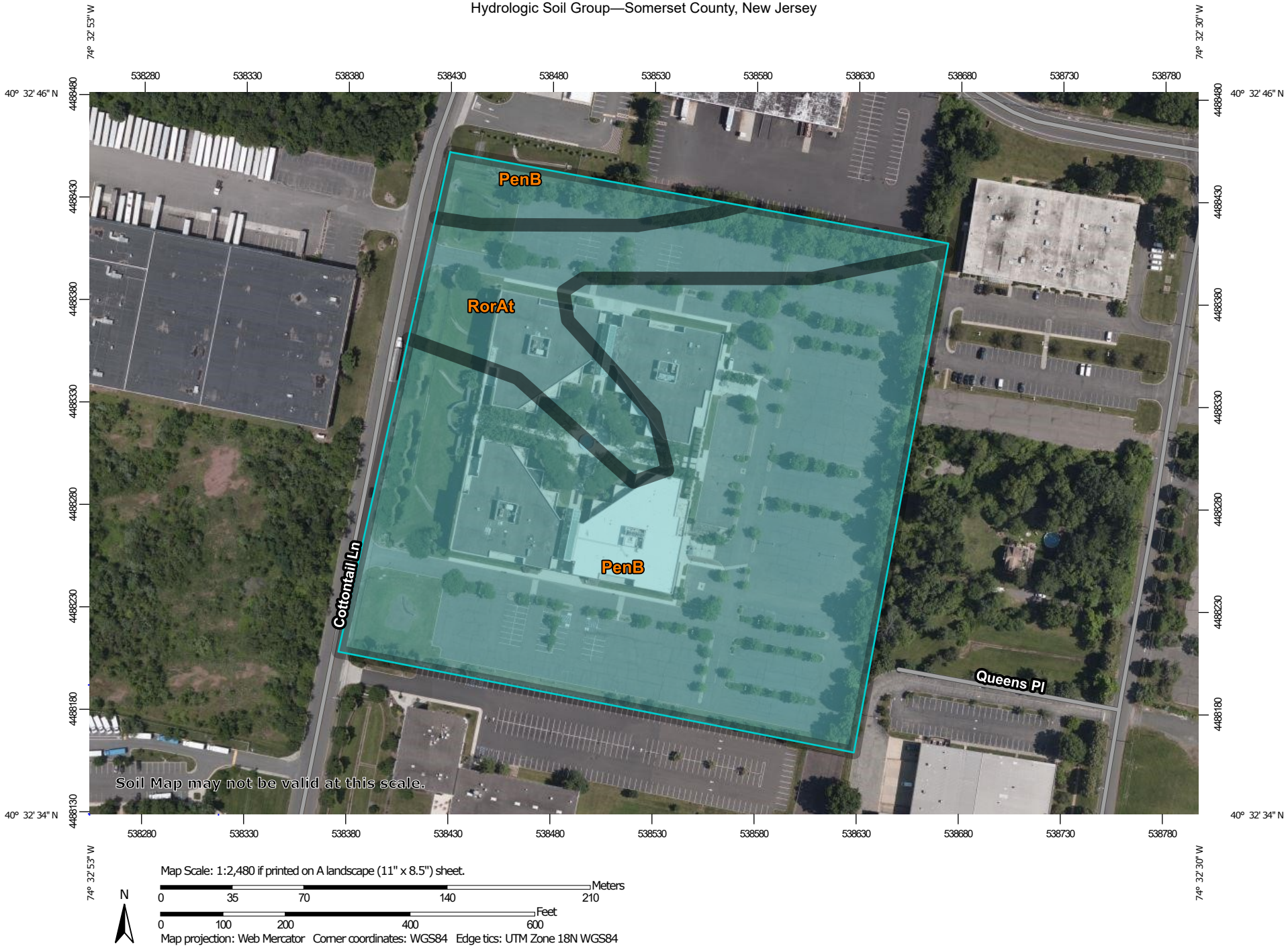
NRCS WEB SOIL SURVEY


74° 32' 53" W
74° 32' 30" W
538280
538330
538380
538430
538480
538530
538580
538630
538680
538730
538780
40° 32' 46" N
40° 32' 34" N
4488480
4488430
4488380
4488330
4488280
4488230
4488180
4488130
PenB
RorAt
PenB
Cottontail Ln
Queens Pl
Soil Map may not be valid at this scale.
Map Scale: 1:2,480 if printed on A landscape (11" x 8.5") sheet.
N
Meters
0 35 70 140 210
Feet
0 100 200 400 600
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 1:24,000.

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

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

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

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

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

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

Soil Survey Area: Somerset County, New Jersey
Survey Area Data: Version 18, Jun 1, 2020

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

Date(s) aerial images were photographed: Jun 22, 2019—Jul 13, 2019

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
PenB	Penn silt loam, 2 to 6 percent slopes	C	12.8	81.2%
RorAt	Rowland silt loam, 0 to 2 percent slopes, frequently flooded	C	3.0	18.8%
Totals for Area of Interest			**15.8**	**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

RUNOFF CURVE NUMBER (CN) CALCULATIONS
EXISTING

Existing Drainage Area Summary and Average Curve Number(CN) Calculations

Project:	Proposed Warehouses	Computed By:	AG
Job #:	3566-99-004	Checked By:	DT
Location:	Franklin, NJ	Date:	1/11/2022

Drainage Area	Impervious Area (acre)	Impervious Area (sf)	Curve Number (CN) Used	HSG C - Open Space Area (acre)	HSG C - Open Space Area (sf)	Curve Number (CN) Used	Avg. Perv. Curve Number	Total Pervious Area (acres)	Total Area (acres)	TC (Min.)
SA Existing Basin	10.25	446,506	98	3.72	162,157	74	74	3.72	13.97	6.1
SA Cottontail Lane	0.14	5,940	98	0.37	16,238	74	74	0.37	0.51	6.0
Total	**10.39**	**452,446.0**		**4.09**	**178,395.0**			**4.09**	**14.48**	

Per County Soil Survey - Somerset	PenB	HSG	C	Soil	Penn Silt Loam, 2 to 6 percent slopes
Per County Soil Survey - Somerset	RorAt	HSG	C	Soil	Rowland silt loam, 0 to 2 percent slopes, frequently flooded

Description	Runoff Curve Number (CN)
Impervious Surface	98
Open Space (lawn) (good)	74

RUNOFF CURVE NUMBER (CN) CALCULATIONS
PROPOSED

DYNAMIC ENGINEERING

PROPOSED DRAINAGE AREA SUMMARY AND AVERAGE CURVE NUMBER(CN) CALCULATIONS

Project:	Proposed Warehouses	Computed By:	AG
Job #:	3566-99-004	Checked By:	DT
Location:	Franklin, NJ	Date:	1/25/2022

Drainage Area	Impervious Area (acre)	Impervious Area (sf)	Curve Number (CN) Used	HSG C - Open Space Area (acre)	HSG C - Open Space Area (sf)	Curve Number (CN) Used	Avg. Perv. Curve Number	Total Pervious Area (acres)	Total Area (acres)	TC (Min.)
SA Existing Basin	10.16	442,477	98	3.84	167,320	74	74	3.84	14.00	6.0
SA Cottontail Lane	0.04	1,768	98	0.44	19,245	74	74	0.44	0.48	6.0
Total	**10.20**	**444,245.0**		**4.28**	**186,565.0**			**4.28**	**14.48**	

Per County Soil Survey - Somerset	PenB	HSG	C	Soil	Penn Silt Loam, 2 to 6 percent slopes
Per County Soil Survey - Somerset	RorAt	HSG	C	Soil	Rowland silt loam, 0 to 2 percent slopes, frequently flooded

Description	Runoff Curve Number (CN)
Impervious Surface	98
Open Space (lawn) (good)	74

TIME OF CONCENTRATION (Tc) CALCULATIONS

DYNAMIC ENGINEERING
1904 Main Street, Lake Como, NJ 07719
(732) 974-0198

Date: 1/10/2022
Project: Link - Franklin
Project No: 3566-99-004

Calculated By: AG
Checked By:

Worksheet 3: Time of Concentration (T_c) Calculations

Land Condition: Existing
Drainage Area: SA Cottontail Lane

• Sheet Flow:

		AB							
1.	Surface Description	Smooth Surfaces							
2.	Manning's Roughness Coefficient, n	0.011							
3.	Flow Length, L { *total* $L \le 100$ *ft* }	100.0 ft							
4.	Two-Year 24-hour Rainfall, p_2 for . . . Somerset County	3.34 in							
5.	Land Slope, s *(ft/ft)*	0.023 ft/ft							
6.	Travel Time, $T_t = \frac{0.007\,(n\,L)^{0.8}}{p_2^{0.5}\,s^{0.4}}$	0.019 hr	+	0.000 hr	+	0.000 hr	=	0.019 hr	

• Shallow Concentrated Flow:

		BC							
7.	Surface Description	Unpaved							
8.	Flow Length, L	100.0 ft							
9.	Watercourse Slope, s	0.052 ft/ft							
10.	Average velocity, V { *see Figure 3.1)*	4.50 ft/s							
11.	Travel Time, $T_t = \frac{L}{3600\,V}$	0.006 hr	+	0.000 hr	+	0.000 hr	=	0.006 hr	

• Channel Flow:

12.	Pipe Diameter, D								
13.	Cross-Sectional Flow Area, A								
14.	Wetted Perimeter, p_w								
15.	Hydraulic Radius, $r = A / p_w$								
16.	Channel Slope, s								
17.	Pipe Material								
18.	Manning's Roughness Coefficient, n								
19.	Velocity, $V = \frac{1.49\,r^{2/3}\,s^{1/2}}{n}$								
20.	Flow Length, L								
21.	Travel Time, $T_t = \frac{L}{3600\,V}$	0.000 hr	+	0.000 hr	+	0.000 hr	=	0.000 hr	
22.	Watershed or subarea Time of Concentration, T_c { *add* T_t *in steps 6, 11 and 21* }							0.025 hr	
								1.5 min	

Use 6 min.

DYNAMIC ENGINEERING

1904 Main Street, Lake Como, NJ 07719
(732) 974-0198

Date: 1/10/2022
Project: Link - Franklin
Project No: 3566-99-004

Calculated By: AG
Checked By:

Worksheet 3: Time of Concentration (T_c) Calculations

Land Condition: Existing
Drainage Area: SA Existing Basin

• Sheet Flow:

		AB	BC			
1.	Surface Description	Short Grass, Prairie	Smooth Surfaces			
2.	Manning's Roughness Coefficient, n	0.15	0.011			
3.	Flow Length, L { *total* $L \le 100$ *ft* }	45.0 ft	55.0 ft			
4.	Two-Year 24-hour Rainfall, p_2 for . . . Somerset County	3.34 in	3.34 in			
5.	Land Slope, s *(ft/ft)*	0.051 ft/ft	0.049 ft/ft			
6.	Travel Time, $T_t = \frac{0.007\,(n\,L)^{0.8}}{p_2^{0.5}\,s^{0.4}}$	0.058 hr	+ 0.009 hr	+ 0.000 hr	=	0.067 hr

• Shallow Concentrated Flow:

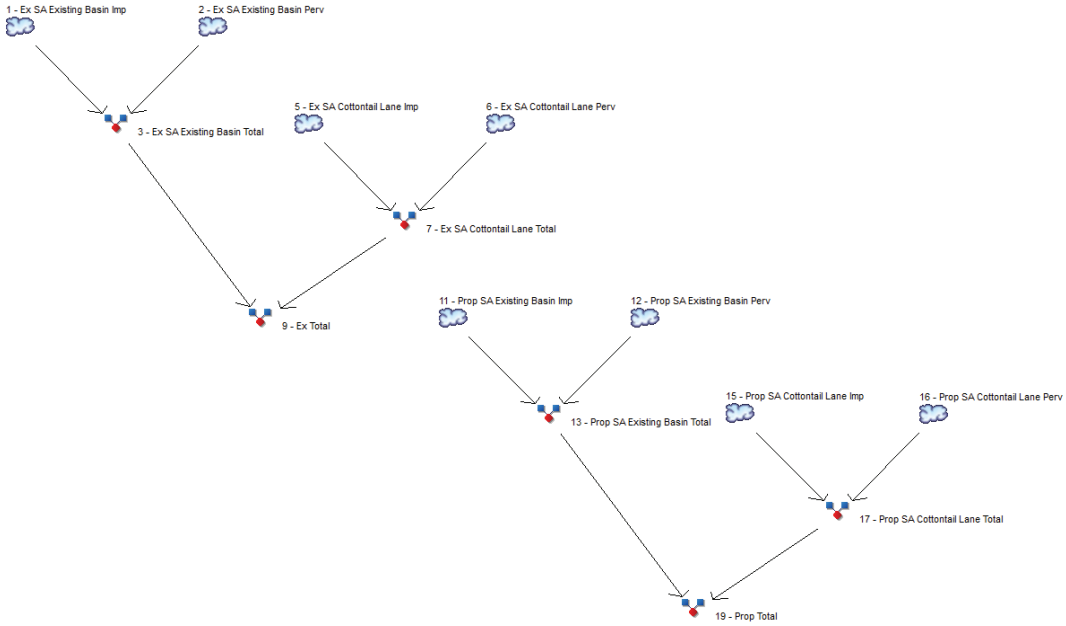
		CD				
7.	Surface Description	Paved				
8.	Flow Length, L	260.0 ft				
9.	Watercourse Slope, s	0.036 ft/ft				
10.	Average velocity, V { *see Figure 3.1)*	3.70 ft/s				
11.	Travel Time, $T_t = \frac{L}{3600\,V}$	0.020 hr	+ 0.000 hr	+ 0.000 hr	=	0.020 hr

• Channel Flow:

		DE				
12.	Pipe Diameter, D	30 in				
13.	Cross-Sectional Flow Area, A	4.909 sf				
14.	Wetted Perimeter, p_w	7.9 ft				
15.	Hydraulic Radius, $r = A / p_w$	0.6 ft				
16.	Channel Slope, s	0.012 ft/ft				
17.	Pipe Material	RCP				
18.	Manning's Roughness Coefficient, n	0.013				
19.	Velocity, $V = \frac{1.49\,r^{2/3}\,s^{1/2}}{n}$	9.10 ft/s				
20.	Flow Length, L	490.0				
21.	Travel Time, $T_t = \frac{L}{3600\,V}$	0.015 hr	+ 0.000 hr	+ 0.000 hr	=	0.015 hr
22.	Watershed or subarea Time of Concentration, T_c { *add* T_t *in steps 6, 11 and 21* }					0.101 hr
						6.1 min

HYDROGRAPH SUMMARY REPORTS
EXISTING AND PROPOSED CONDITIONS
2YR, 10YR & 100YR STORMS

Watershed Model Schematic



Legend

Hyd.	Origin	Description
1	SCS Runoff	Ex SA Existing Basin Imp
2	SCS Runoff	Ex SA Existing Basin Perv
3	Combine	Ex SA Existing Basin Total
5	SCS Runoff	Ex SA Cottontail Lane Imp
6	SCS Runoff	Ex SA Cottontail Lane Perv
7	Combine	Ex SA Cottontail Lane Total
9	Combine	Ex Total
11	SCS Runoff	Prop SA Existing Basin Imp
12	SCS Runoff	Prop SA Existing Basin Perv
13	Combine	Prop SA Existing Basin Total
15	SCS Runoff	Prop SA Cottontail Lane Imp
16	SCS Runoff	Prop SA Cottontail Lane Perv
17	Combine	Prop SA Cottontail Lane Total
19	Combine	Prop Total

Hydrograph Return Period Recap

Hydraflow Hydrographs by Intelisolve v9.1

Hyd. No.	Hydrograph type (origin)	Inflow Hyd(s)	Peak Outflow (cfs)								Hydrograph description
			1-Yr	2-Yr	3-Yr	5-Yr	10-Yr	25-Yr	50-Yr	100-Yr	
1	SCS Runoff	-------	-------	29.40	-------	-------	44.40	-------	-------	73.03	Ex SA Existing Basin Imp
2	SCS Runoff	-------	-------	3.432	-------	-------	7.517	-------	-------	16.35	Ex SA Existing Basin Perv
3	Combine	1, 2	-------	32.45	-------	-------	51.37	-------	-------	88.51	Ex SA Existing Basin Total
5	SCS Runoff	-------	-------	0.402	-------	-------	0.606	-------	-------	0.998	Ex SA Cottontail Lane Imp
6	SCS Runoff	-------	-------	0.341	-------	-------	0.748	-------	-------	1.627	Ex SA Cottontail Lane Perv
7	Combine	5, 6	-------	0.712	-------	-------	1.314	-------	-------	2.564	Ex SA Cottontail Lane Total
9	Combine	3, 7,	-------	33.15	-------	-------	52.67	-------	-------	91.05	Ex Total
11	SCS Runoff	-------	-------	29.14	-------	-------	44.01	-------	-------	72.39	Prop SA Existing Basin Imp
12	SCS Runoff	-------	-------	3.543	-------	-------	7.760	-------	-------	16.88	Prop SA Existing Basin Perv
13	Combine	11, 12	-------	32.29	-------	-------	51.20	-------	-------	88.37	Prop SA Existing Basin Total
15	SCS Runoff	-------	-------	0.115	-------	-------	0.173	-------	-------	0.285	Prop SA Cottontail Lane Imp
16	SCS Runoff	-------	-------	0.406	-------	-------	0.889	-------	-------	1.934	Prop SA Cottontail Lane Perv
17	Combine	15, 16	-------	0.505	-------	-------	1.048	-------	-------	2.202	Prop SA Cottontail Lane Total
19	Combine	13, 17,	-------	32.77	-------	-------	52.20	-------	-------	90.48	Prop Total

Hydrograph Summary Report

Hydraflow Hydrographs by Intelisolve v9.1

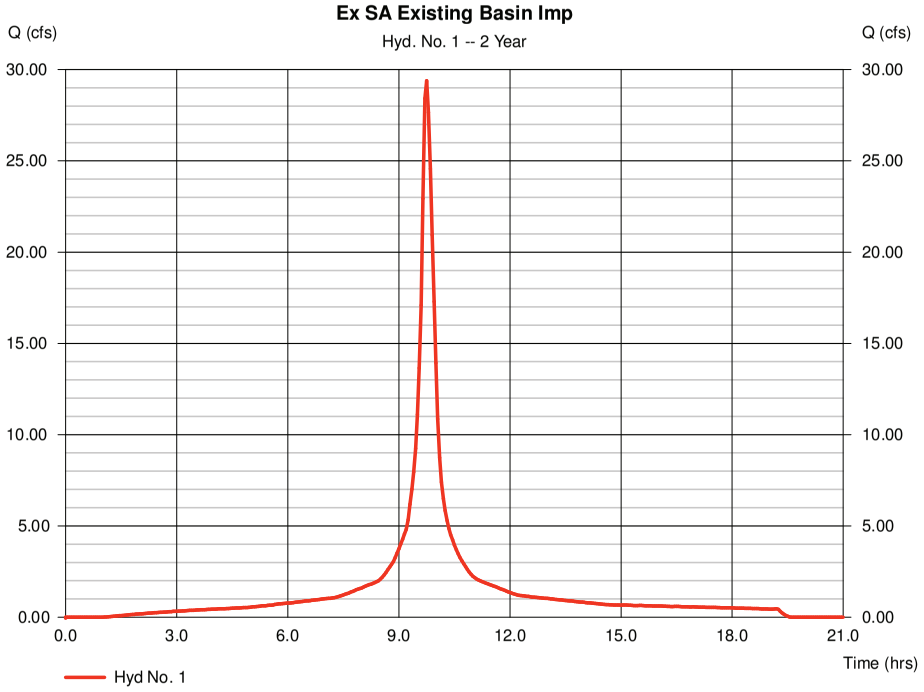
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Hyd. volume (acft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (acft)	Hydrograph description
1	SCS Runoff	29.40	3	585	2.637	----	------	------	Ex SA Existing Basin Imp
2	SCS Runoff	3.432	3	591	0.361	----	------	------	Ex SA Existing Basin Perv
3	Combine	32.45	3	585	2.998	1, 2	------	------	Ex SA Existing Basin Total
5	SCS Runoff	0.402	3	585	0.036	----	------	------	Ex SA Cottontail Lane Imp
6	SCS Runoff	0.341	3	591	0.036	----	------	------	Ex SA Cottontail Lane Perv
7	Combine	0.712	3	588	0.072	5, 6	------	------	Ex SA Cottontail Lane Total
9	Combine	33.15	3	585	3.070	3, 7,	------	------	Ex Total
11	SCS Runoff	29.14	3	585	2.614	----	------	------	Prop SA Existing Basin Imp
12	SCS Runoff	3.543	3	591	0.373	----	------	------	Prop SA Existing Basin Perv
13	Combine	32.29	3	585	2.987	11, 12	------	------	Prop SA Existing Basin Total
15	SCS Runoff	0.115	3	585	0.010	----	------	------	Prop SA Cottontail Lane Imp
16	SCS Runoff	0.406	3	591	0.043	----	------	------	Prop SA Cottontail Lane Perv
17	Combine	0.505	3	588	0.053	15, 16	------	------	Prop SA Cottontail Lane Total
19	Combine	32.77	3	585	3.040	13, 17,	------	------	Prop Total

Hydrograph Report

Hyd. No. 1

Ex SA Existing Basin Imp

Hydrograph type	=	SCS Runoff	Peak discharge	=	29.40 cfs
Storm frequency	=	2 yrs	Time to peak	=	9.75 hrs
Time interval	=	3 min	Hyd. volume	=	2.637 acft
Drainage area	=	10.250 ac	Curve number	=	98
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	6.00 min
Total precip.	=	3.34 in	Distribution	=	Custom
Storm duration	=	NOAA Atlas 14 Type-C.cds	Shape factor	=	285

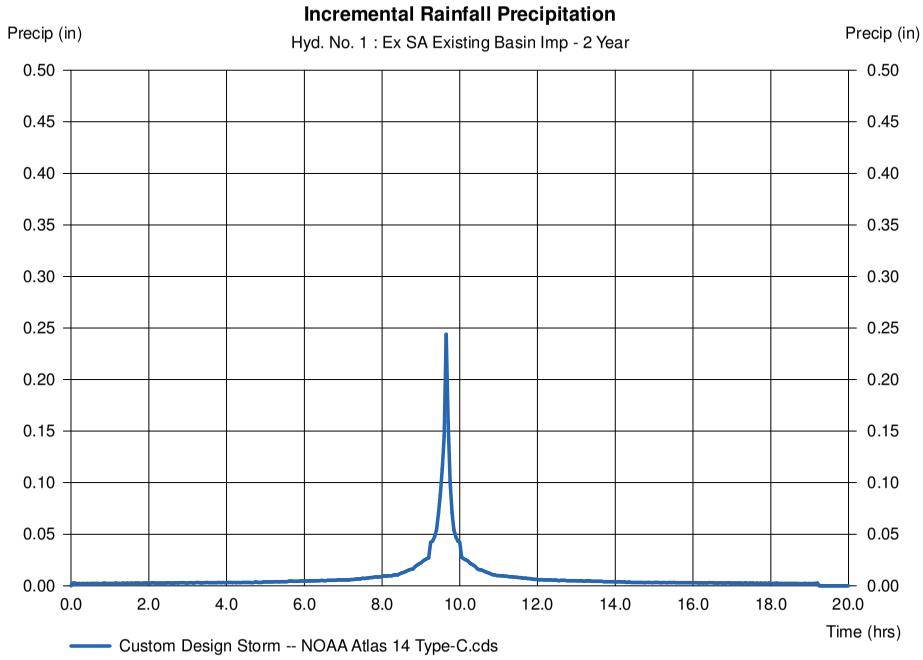


Precipitation Report

Hyd. No. 1

Ex SA Existing Basin Imp

Storm Frequency	=	2 yrs	Time interval	=	3 min
Total precip.	=	3.3400 in	Distribution	=	Custom
Storm duration	=	NOAA Atlas 14 Type-C.cds			

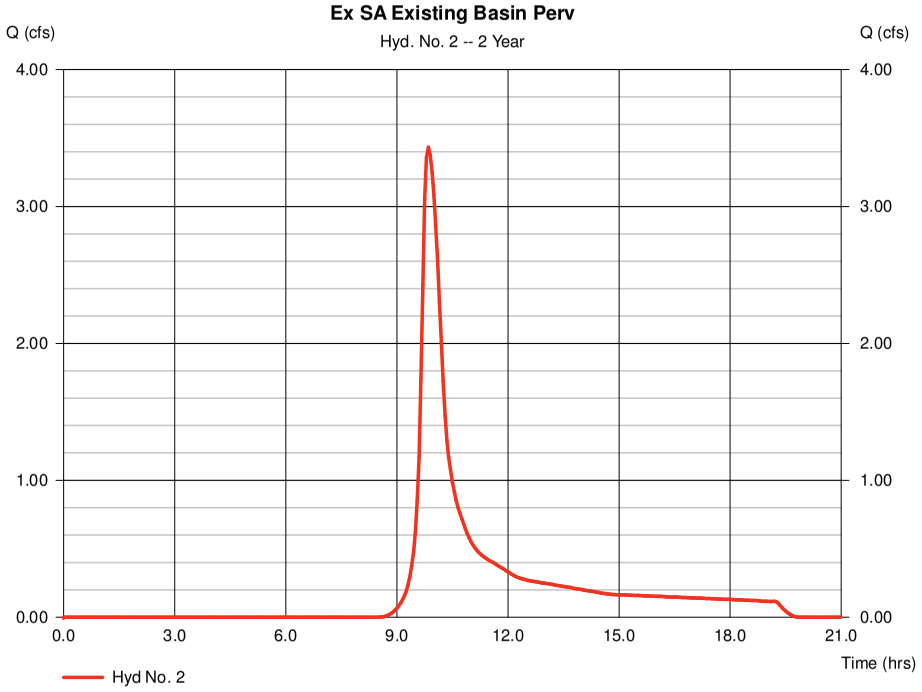


Hydrograph Report

Hyd. No. 2

Ex SA Existing Basin Perv

Hydrograph type	= SCS Runoff	Peak discharge	= 3.432 cfs
Storm frequency	= 2 yrs	Time to peak	= 9.85 hrs
Time interval	= 3 min	Hyd. volume	= 0.361 acft
Drainage area	= 3.720 ac	Curve number	= 74
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 10.00 min
Total precip.	= 3.34 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds	Shape factor	= 285

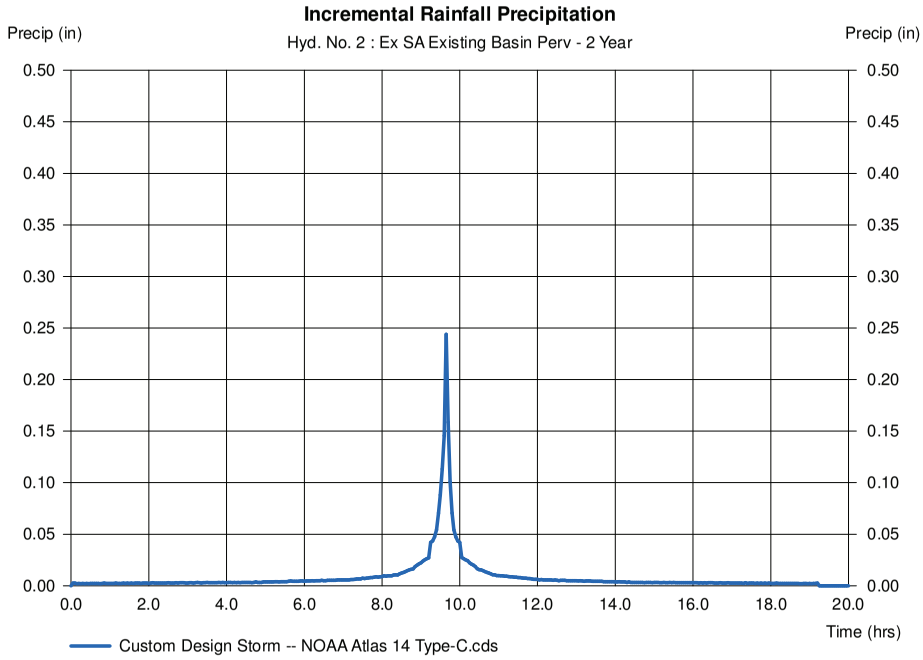


Precipitation Report

Hyd. No. 2

Ex SA Existing Basin Perv

Storm Frequency	= 2 yrs	Time interval	= 3 min
Total precip.	= 3.3400 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds		

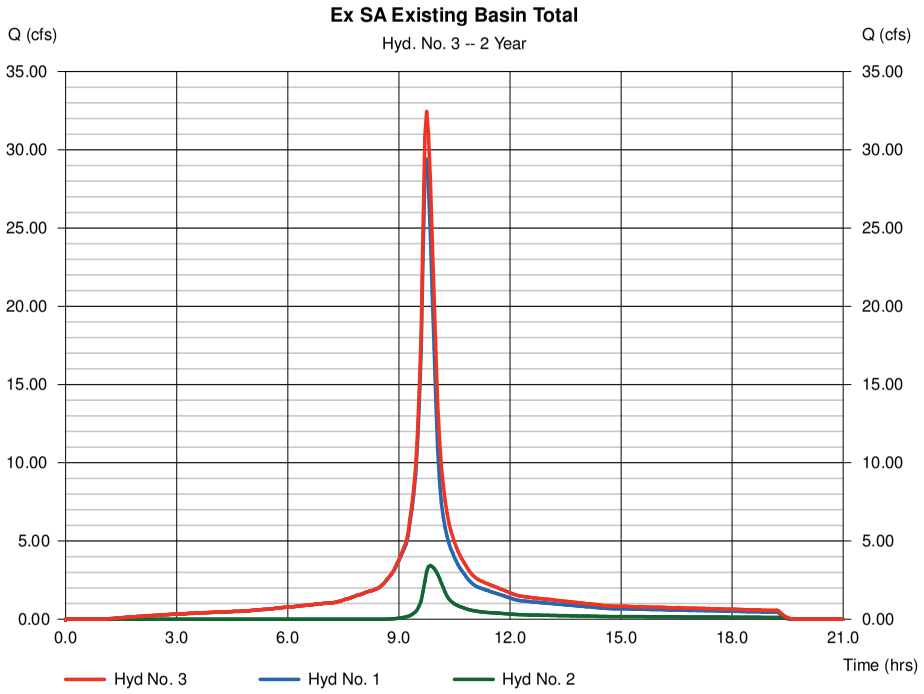


Hydrograph Report

Hyd. No. 3

Ex SA Existing Basin Total

Hydrograph type	= Combine	Peak discharge	= 32.45 cfs
Storm frequency	= 2 yrs	Time to peak	= 9.75 hrs
Time interval	= 3 min	Hyd. volume	= 2.998 acft
Inflow hyds.	= 1, 2	Contrib. drain. area	= 13.970 ac

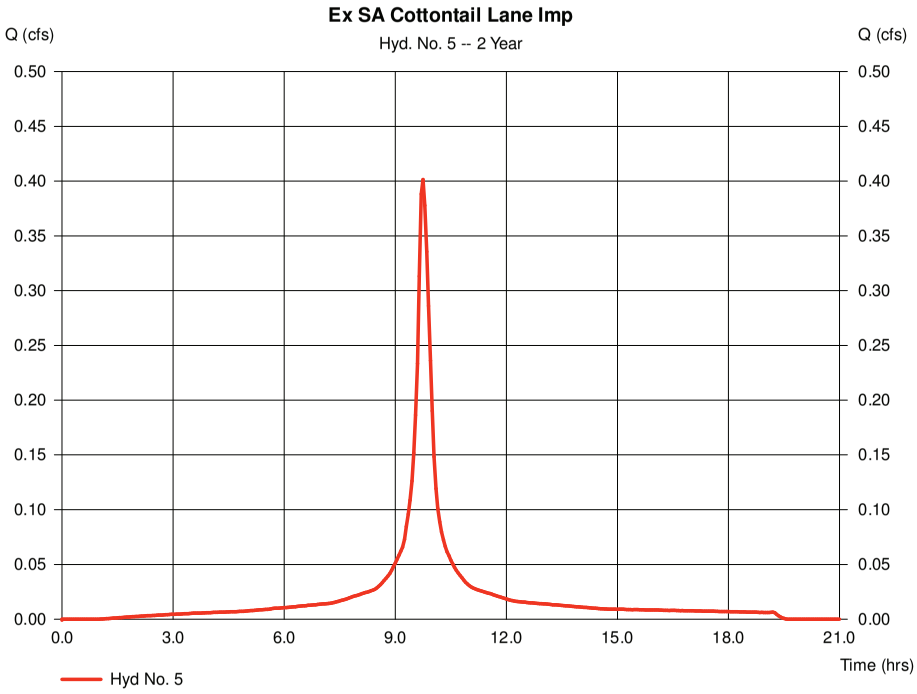


Hydrograph Report

Hyd. No. 5

Ex SA Cottontail Lane Imp

Hydrograph type	= SCS Runoff	Peak discharge	= 0.402 cfs
Storm frequency	= 2 yrs	Time to peak	= 9.75 hrs
Time interval	= 3 min	Hyd. volume	= 0.036 acft
Drainage area	= 0.140 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 6.00 min
Total precip.	= 3.34 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds	Shape factor	= 285

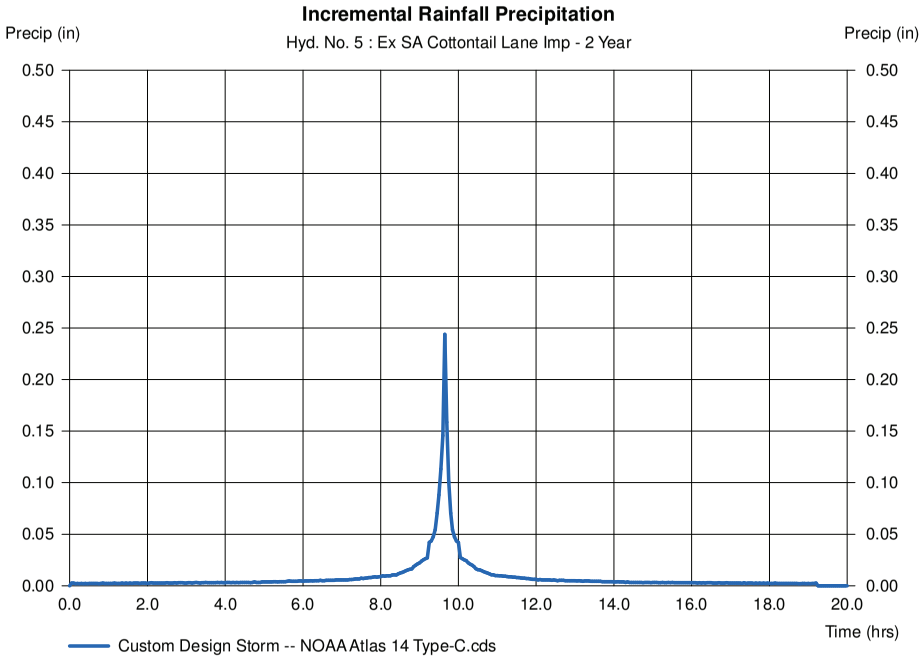


Precipitation Report

Hyd. No. 5

Ex SA Cottontail Lane Imp

Storm Frequency	= 2 yrs	Time interval	= 3 min
Total precip.	= 3.3400 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds		

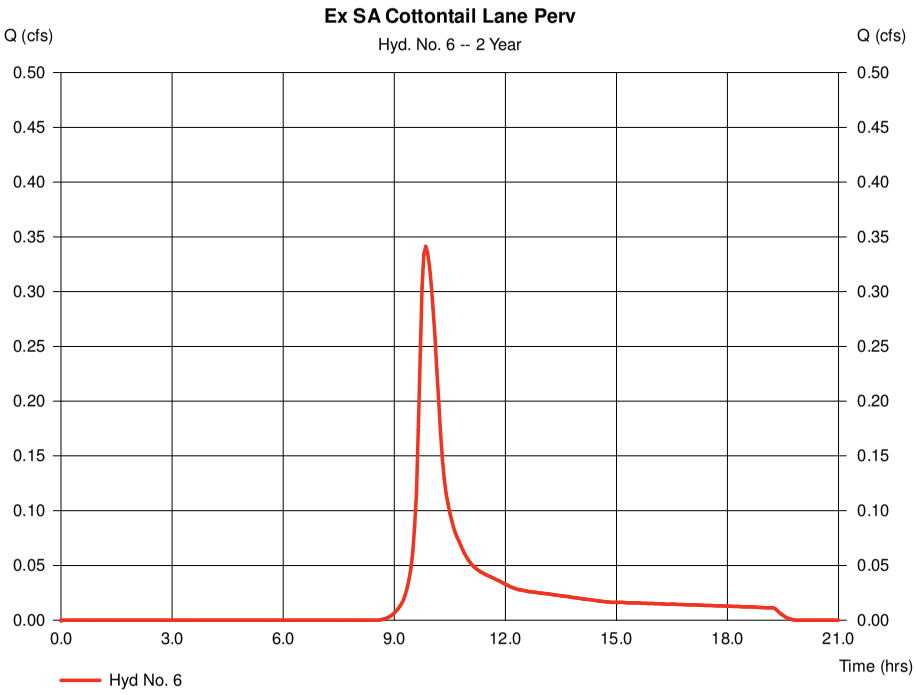


Hydrograph Report

Hyd. No. 6

Ex SA Cottontail Lane Perv

Hydrograph type	= SCS Runoff	Peak discharge	= 0.341 cfs
Storm frequency	= 2 yrs	Time to peak	= 9.85 hrs
Time interval	= 3 min	Hyd. volume	= 0.036 acft
Drainage area	= 0.370 ac	Curve number	= 74
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 10.00 min
Total precip.	= 3.34 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds	Shape factor	= 285

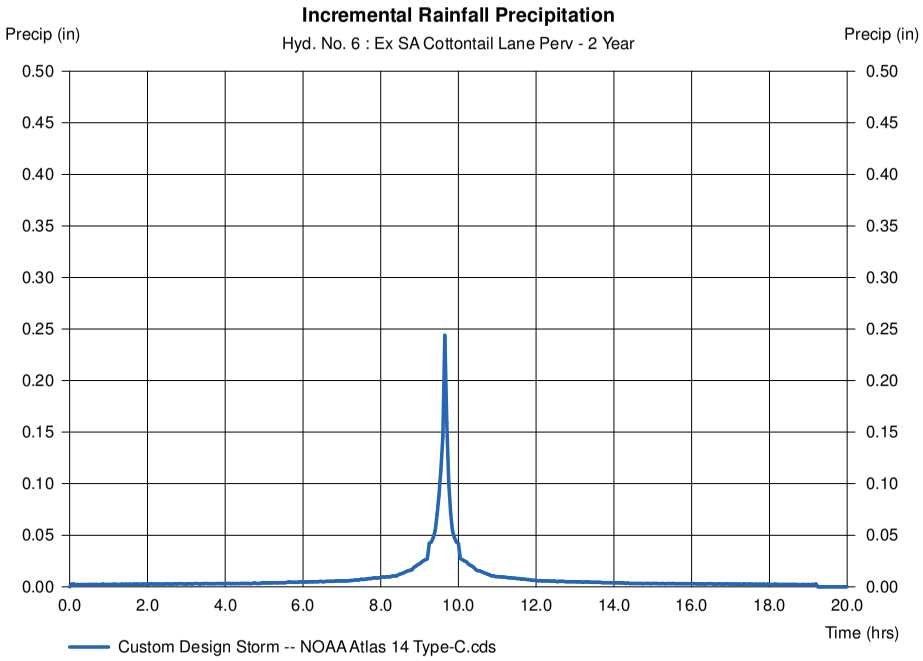


Precipitation Report

Hyd. No. 6

Ex SA Cottontail Lane Perv

Storm Frequency	= 2 yrs	Time interval	= 3 min
Total precip.	= 3.3400 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds		

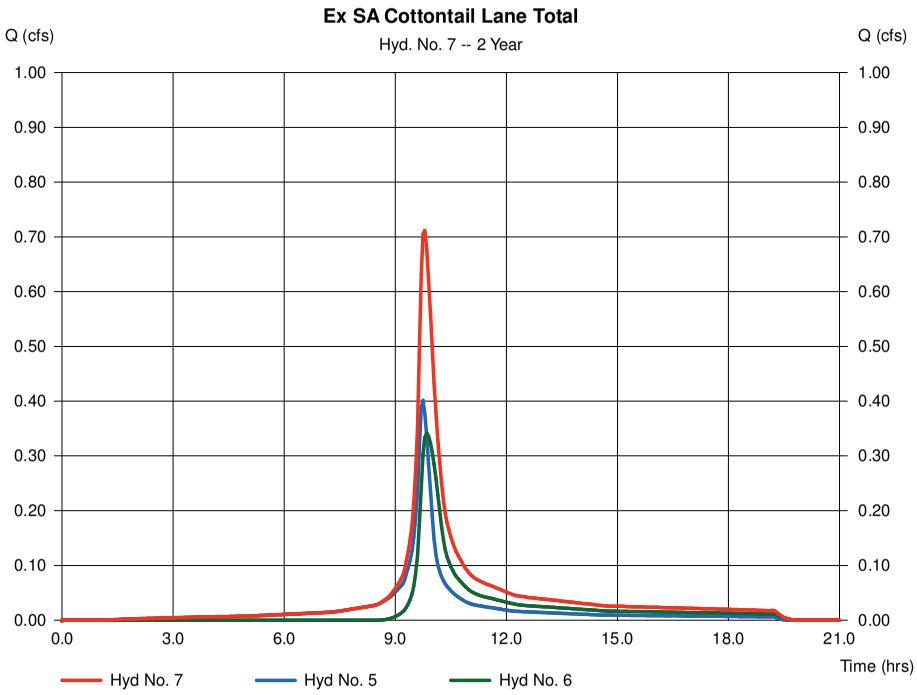


Hydrograph Report

Hyd. No. 7

Ex SA Cottontail Lane Total

Hydrograph type	= Combine	Peak discharge	= 0.712 cfs
Storm frequency	= 2 yrs	Time to peak	= 9.80 hrs
Time interval	= 3 min	Hyd. volume	= 0.072 acft
Inflow hyds.	= 5, 6	Contrib. drain. area	= 0.510 ac

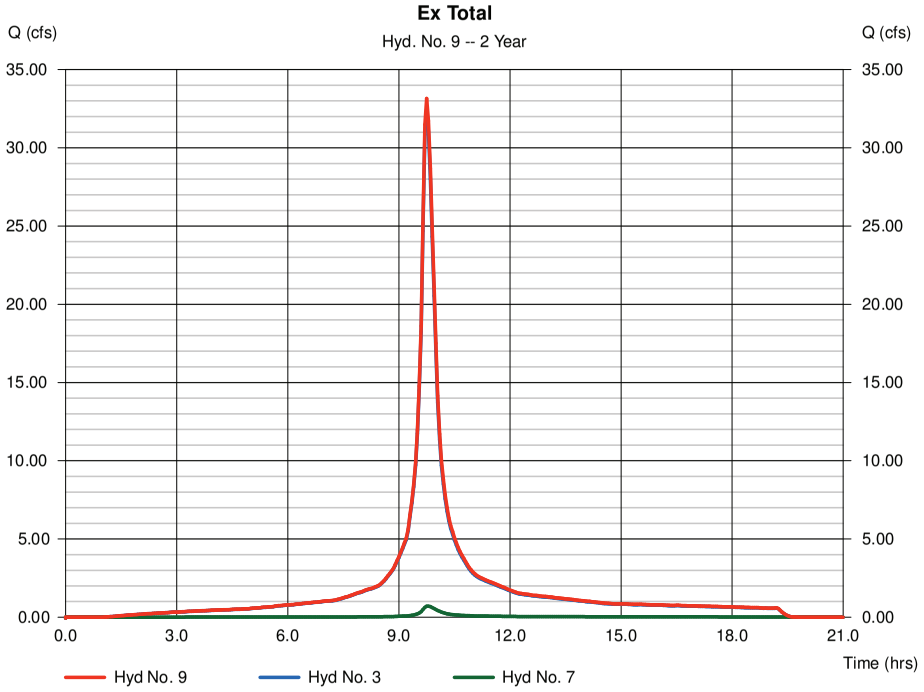


Hydrograph Report

Hyd. No. 9

Ex Total

Hydrograph type	= Combine	Peak discharge	= 33.15 cfs
Storm frequency	= 2 yrs	Time to peak	= 9.75 hrs
Time interval	= 3 min	Hyd. volume	= 3.070 acft
Inflow hyds.	= 3, 7	Contrib. drain. area	= 0.000 ac

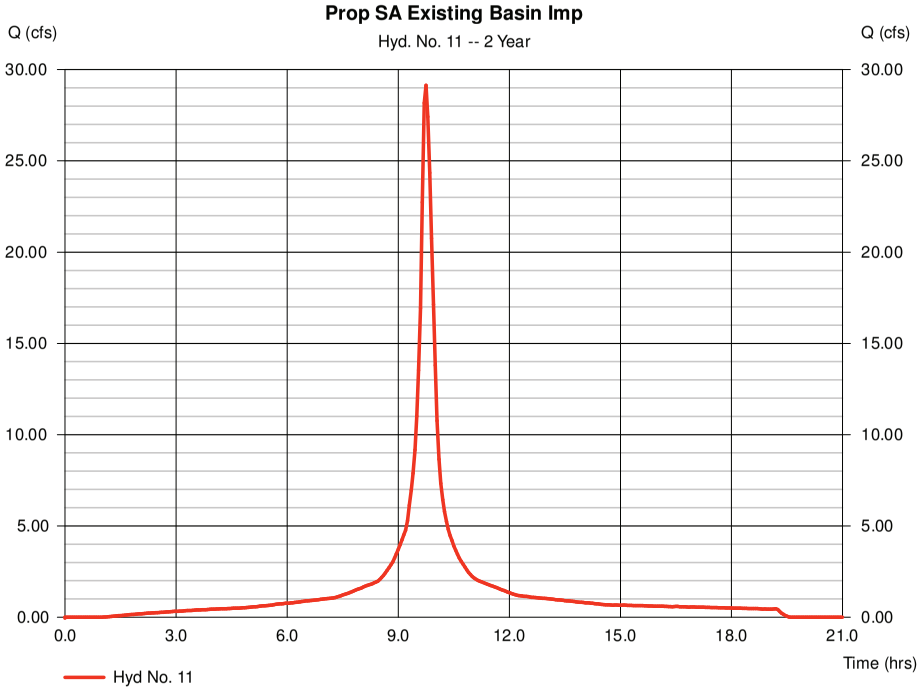


Hydrograph Report

Hyd. No. 11

Prop SA Existing Basin Imp

Hydrograph type	= SCS Runoff	Peak discharge	= 29.14 cfs
Storm frequency	= 2 yrs	Time to peak	= 9.75 hrs
Time interval	= 3 min	Hyd. volume	= 2.614 acft
Drainage area	= 10.160 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 6.00 min
Total precip.	= 3.34 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds	Shape factor	= 285

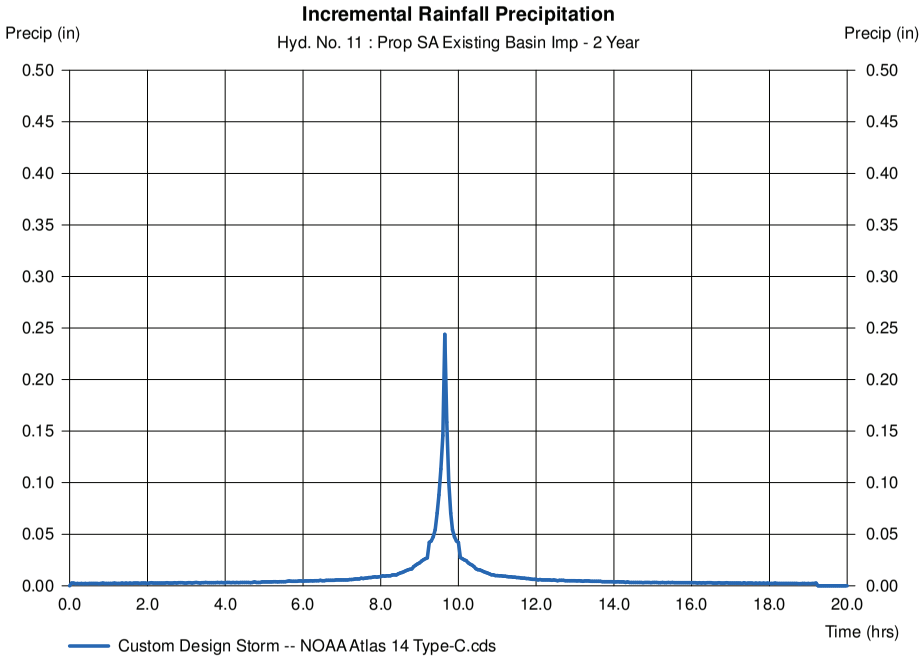


Precipitation Report

Hyd. No. 11

Prop SA Existing Basin Imp

Storm Frequency	= 2 yrs	Time interval	= 3 min
Total precip.	= 3.3400 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds		

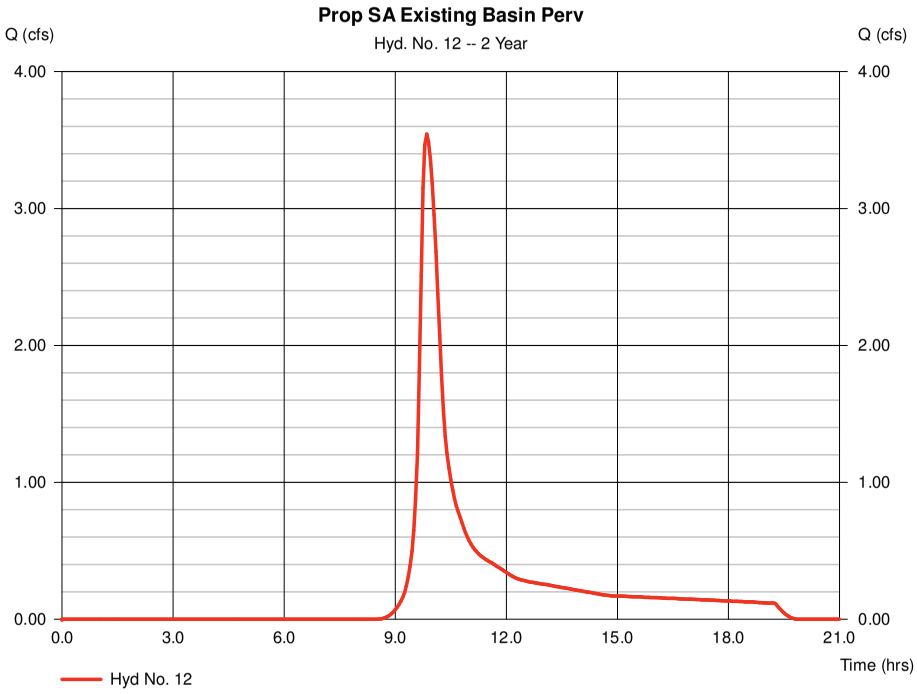


Hydrograph Report

Hyd. No. 12

Prop SA Existing Basin Perv

Hydrograph type	= SCS Runoff	Peak discharge	= 3.543 cfs
Storm frequency	= 2 yrs	Time to peak	= 9.85 hrs
Time interval	= 3 min	Hyd. volume	= 0.373 acft
Drainage area	= 3.840 ac	Curve number	= 74
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 10.00 min
Total precip.	= 3.34 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds	Shape factor	= 285

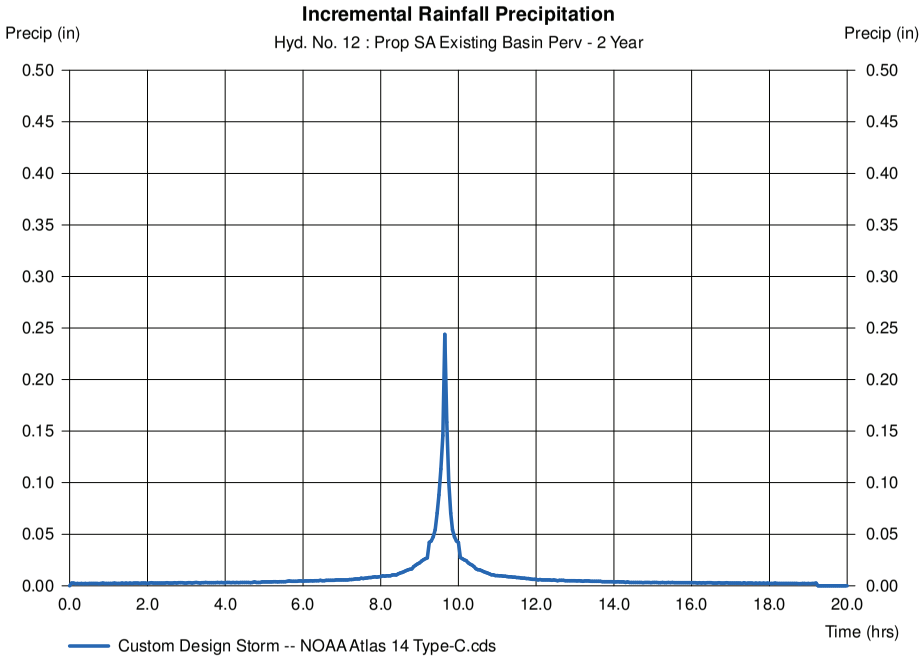


Precipitation Report

Hyd. No. 12

Prop SA Existing Basin Perv

Storm Frequency	= 2 yrs	Time interval	= 3 min
Total precip.	= 3.3400 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds		

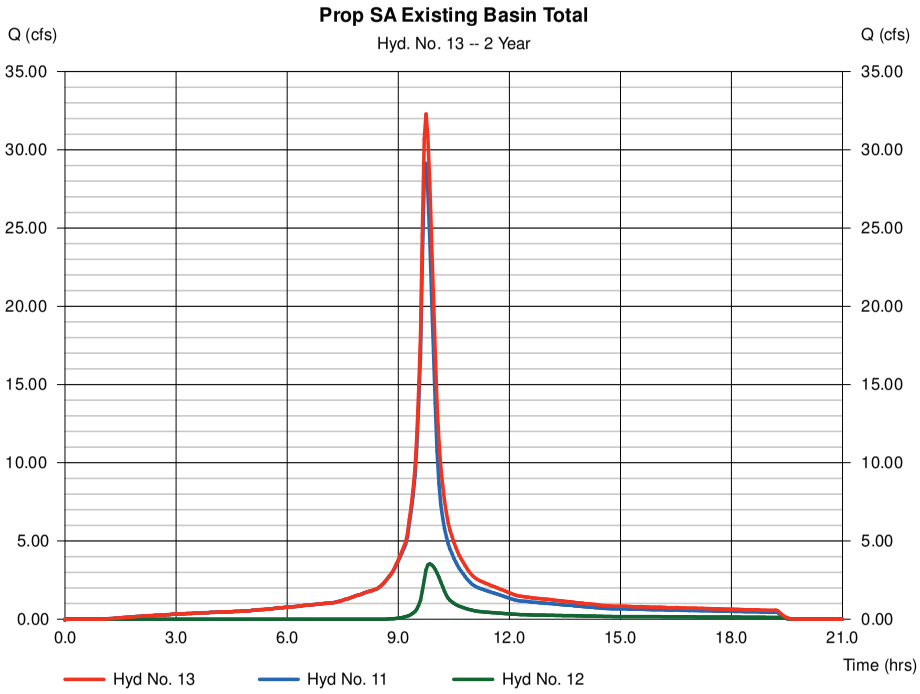


Hydrograph Report

Hyd. No. 13

Prop SA Existing Basin Total

Hydrograph type	= Combine	Peak discharge	= 32.29 cfs
Storm frequency	= 2 yrs	Time to peak	= 9.75 hrs
Time interval	= 3 min	Hyd. volume	= 2.987 acft
Inflow hyds.	= 11, 12	Contrib. drain. area	= 14.000 ac

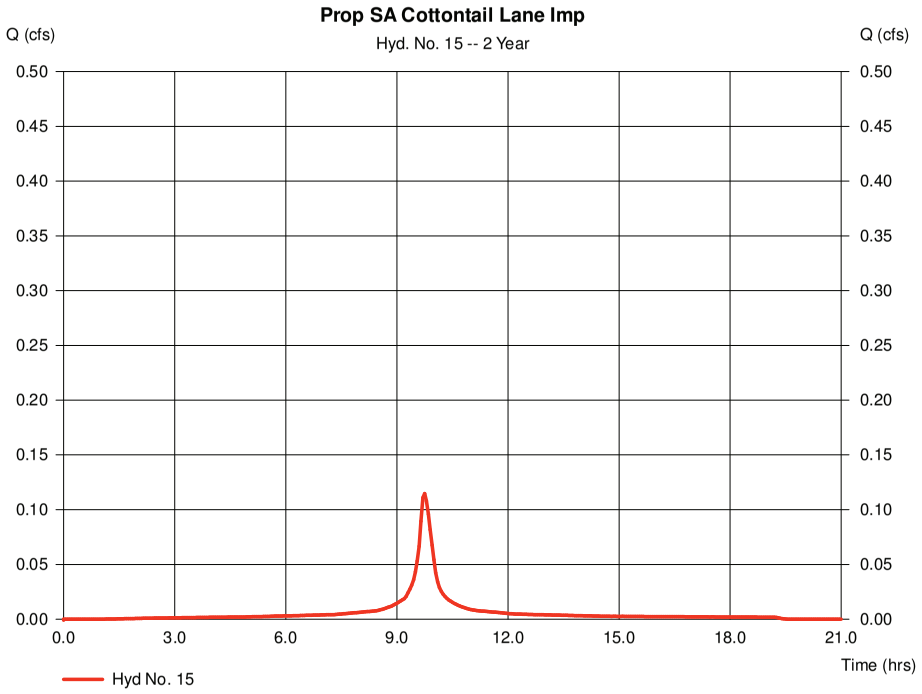


Hydrograph Report

Hyd. No. 15

Prop SA Cottontail Lane Imp

Hydrograph type	= SCS Runoff	Peak discharge	= 0.115 cfs
Storm frequency	= 2 yrs	Time to peak	= 9.75 hrs
Time interval	= 3 min	Hyd. volume	= 0.010 acft
Drainage area	= 0.040 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 6.00 min
Total precip.	= 3.34 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds	Shape factor	= 285

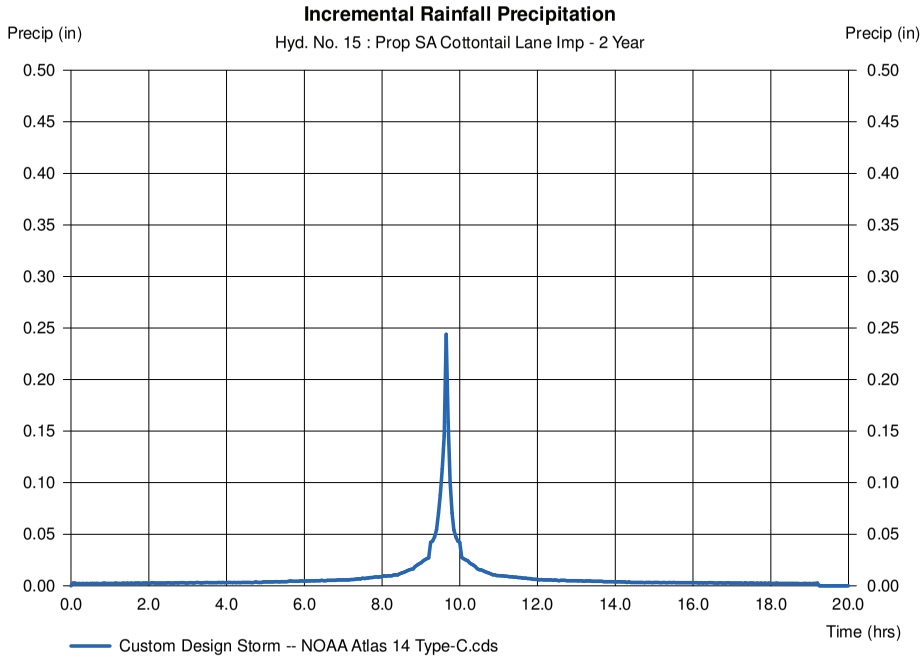


Precipitation Report

Hyd. No. 15

Prop SA Cottontail Lane Imp

Storm Frequency	= 2 yrs	Time interval	= 3 min
Total precip.	= 3.3400 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds		

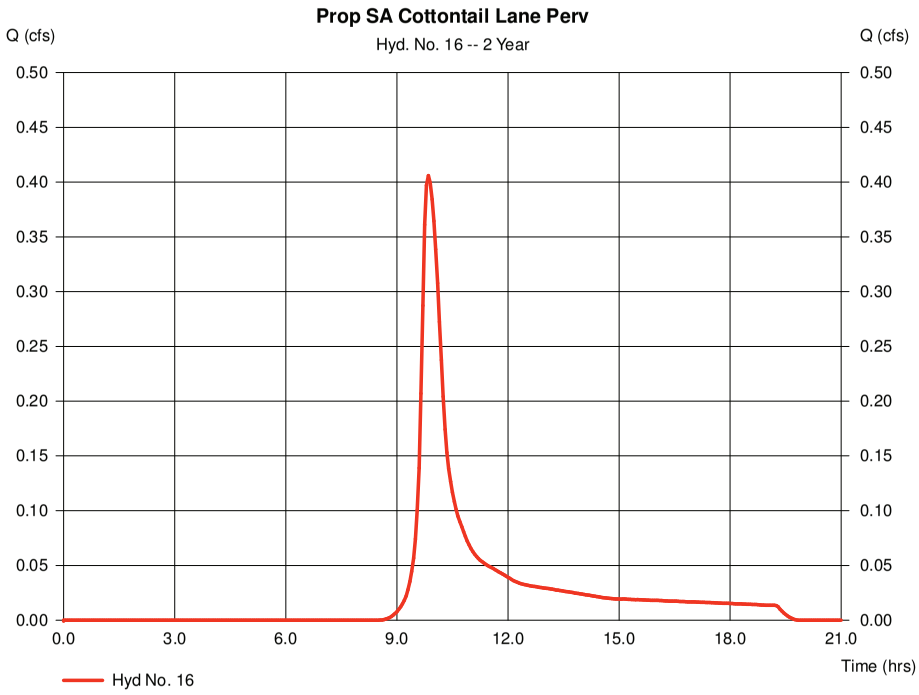


Hydrograph Report

Hyd. No. 16

Prop SA Cottontail Lane Perv

Hydrograph type	= SCS Runoff	Peak discharge	= 0.406 cfs
Storm frequency	= 2 yrs	Time to peak	= 9.85 hrs
Time interval	= 3 min	Hyd. volume	= 0.043 acft
Drainage area	= 0.440 ac	Curve number	= 74
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 10.00 min
Total precip.	= 3.34 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds	Shape factor	= 285

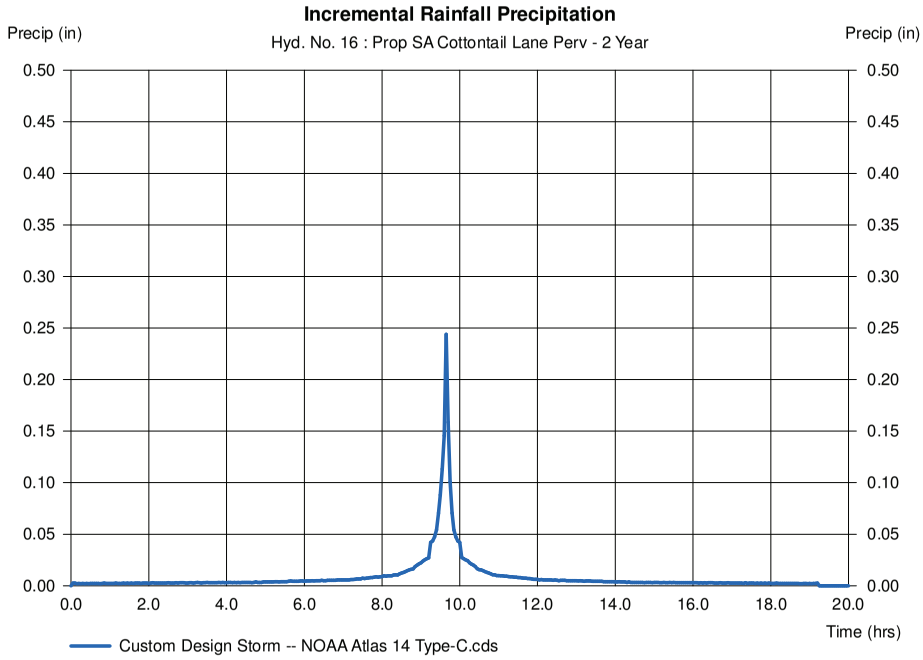


Precipitation Report

Hyd. No. 16

Prop SA Cottontail Lane Perv

Storm Frequency	= 2 yrs	Time interval	= 3 min
Total precip.	= 3.3400 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds		

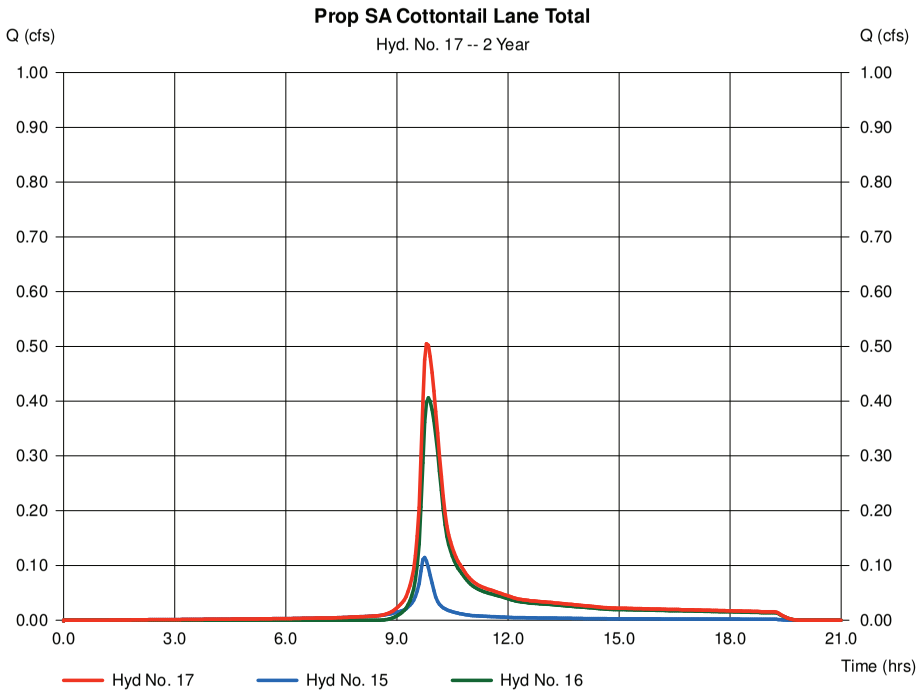


Hydrograph Report

Hyd. No. 17

Prop SA Cottontail Lane Total

Hydrograph type	= Combine	Peak discharge	= 0.505 cfs
Storm frequency	= 2 yrs	Time to peak	= 9.80 hrs
Time interval	= 3 min	Hyd. volume	= 0.053 acft
Inflow hyds.	= 15, 16	Contrib. drain. area	= 0.480 ac

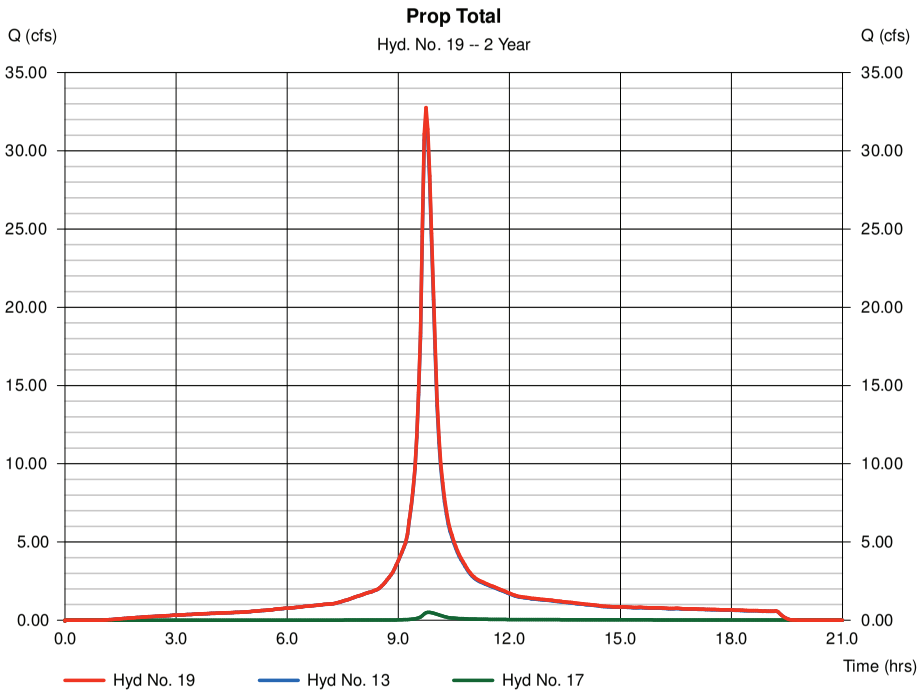


Hydrograph Report

Hyd. No. 19

Prop Total

Hydrograph type	= Combine	Peak discharge	= 32.77 cfs
Storm frequency	= 2 yrs	Time to peak	= 9.75 hrs
Time interval	= 3 min	Hyd. volume	= 3.040 acft
Inflow hyds.	= 13, 17	Contrib. drain. area	= 0.000 ac



Hydrograph Summary Report

Hydraflow Hydrographs by Intelisolve v9.1

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Hyd. volume (acft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (acft)	Hydrograph description
1	SCS Runoff	44.40	3	585	4.051	---	------	------	Ex SA Existing Basin Imp
2	SCS Runoff	7.517	3	591	0.758	---	------	------	Ex SA Existing Basin Perv
3	Combine	51.37	3	585	4.809	1, 2	------	------	Ex SA Existing Basin Total
5	SCS Runoff	0.606	3	585	0.055	---	------	------	Ex SA Cottontail Lane Imp
6	SCS Runoff	0.748	3	591	0.075	---	------	------	Ex SA Cottontail Lane Perv
7	Combine	1.314	3	588	0.131	5, 6	------	------	Ex SA Cottontail Lane Total
9	Combine	52.67	3	585	4.940	3, 7,	------	------	Ex Total
11	SCS Runoff	44.01	3	585	4.016	---	------	------	Prop SA Existing Basin Imp
12	SCS Runoff	7.760	3	591	0.782	---	------	------	Prop SA Existing Basin Perv
13	Combine	51.20	3	585	4.798	11, 12	------	------	Prop SA Existing Basin Total
15	SCS Runoff	0.173	3	585	0.016	---	------	------	Prop SA Cottontail Lane Imp
16	SCS Runoff	0.889	3	591	0.090	---	------	------	Prop SA Cottontail Lane Perv
17	Combine	1.048	3	588	0.105	15, 16	------	------	Prop SA Cottontail Lane Total
19	Combine	52.20	3	585	4.903	13, 17,	------	------	Prop Total

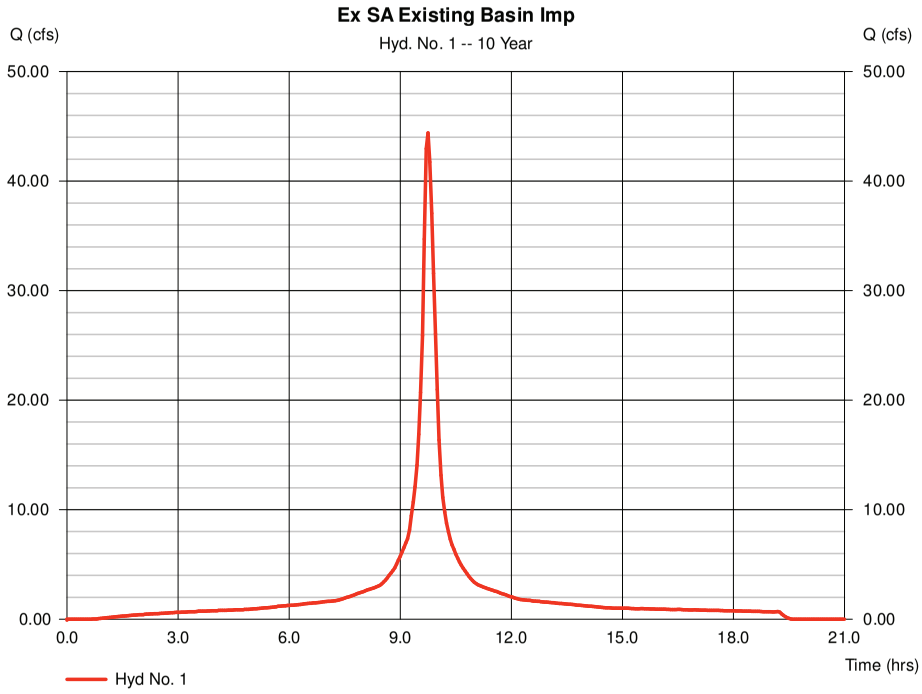
Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.1 — Monday, Feb 14, 2022

Hyd. No. 1

Ex SA Existing Basin Imp

Hydrograph type	= SCS Runoff	Peak discharge	= 44.40 cfs
Storm frequency	= 10 yrs	Time to peak	= 9.75 hrs
Time interval	= 3 min	Hyd. volume	= 4.051 acft
Drainage area	= 10.250 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 6.00 min
Total precip.	= 5.01 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds	Shape factor	= 285

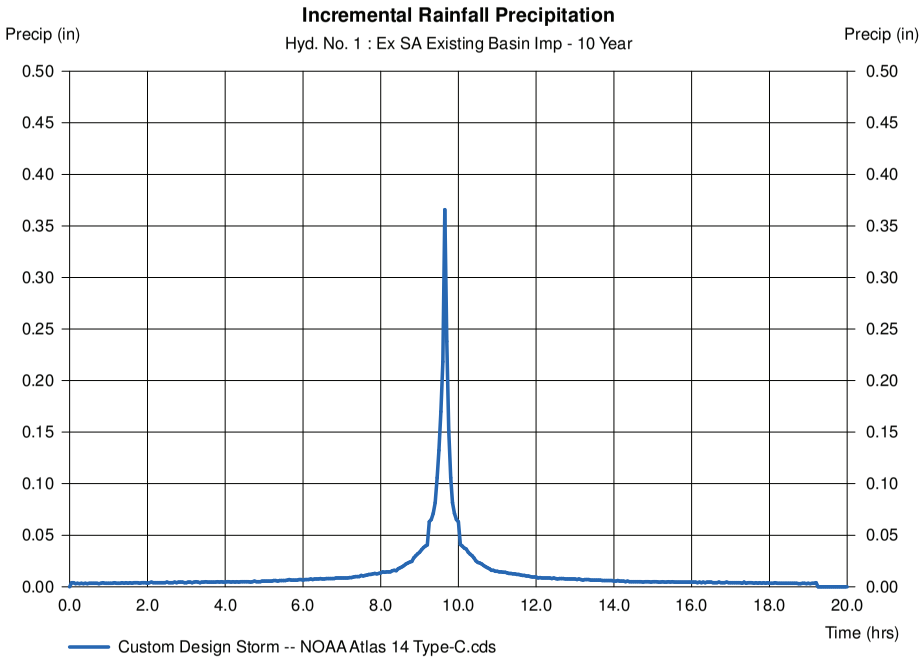


Precipitation Report

Hyd. No. 1

Ex SA Existing Basin Imp

Storm Frequency	= 10 yrs	Time interval	= 3 min
Total precip.	= 5.0100 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds		

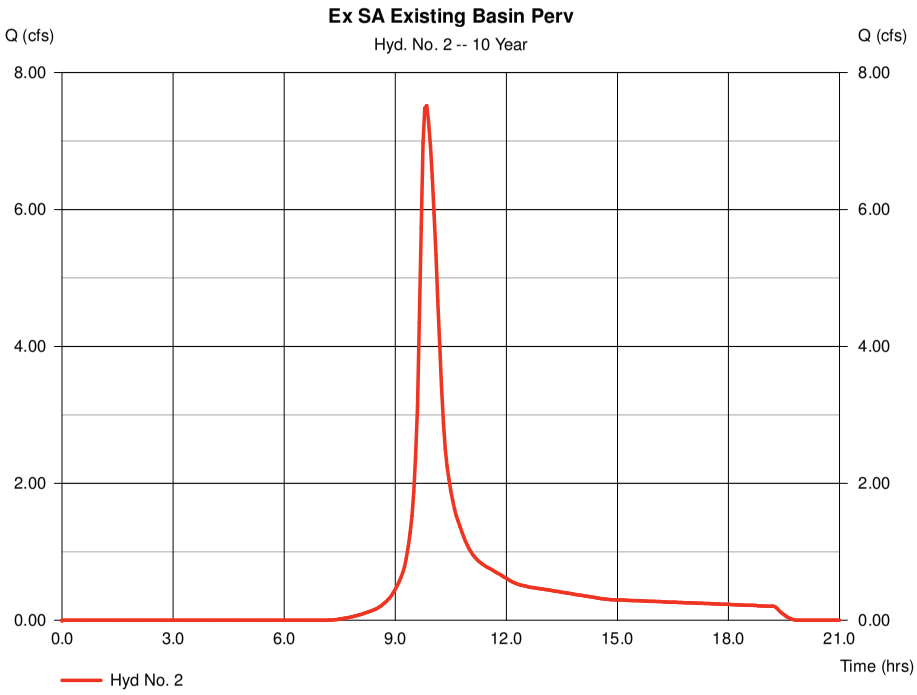


Hydrograph Report

Hyd. No. 2

Ex SA Existing Basin Perv

Hydrograph type	= SCS Runoff	Peak discharge	= 7.517 cfs
Storm frequency	= 10 yrs	Time to peak	= 9.85 hrs
Time interval	= 3 min	Hyd. volume	= 0.758 acft
Drainage area	= 3.720 ac	Curve number	= 74
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 10.00 min
Total precip.	= 5.01 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds	Shape factor	= 285

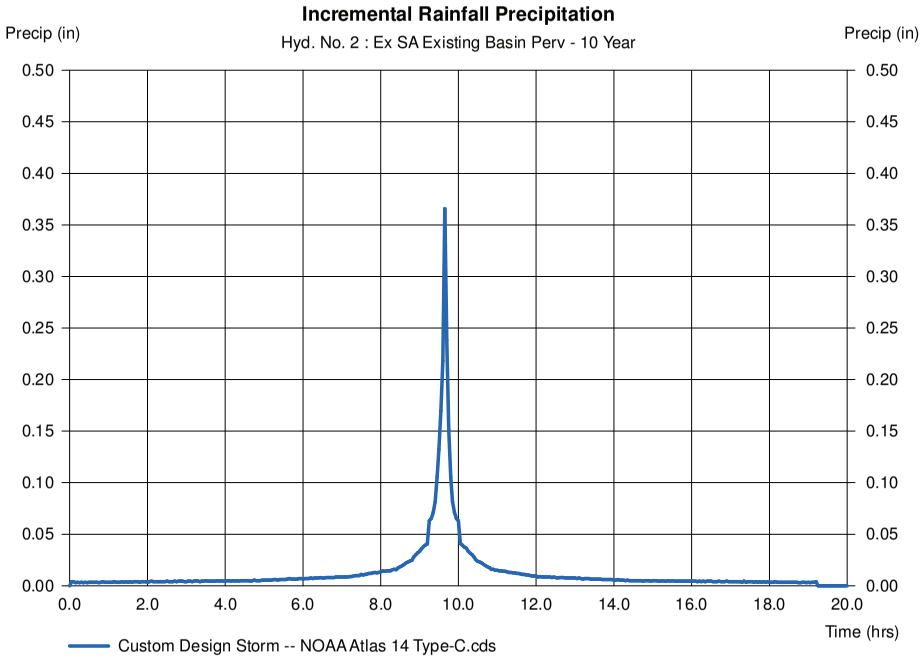


Precipitation Report

Hyd. No. 2

Ex SA Existing Basin Perv

Storm Frequency	= 10 yrs	Time interval	= 3 min
Total precip.	= 5.0100 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds		

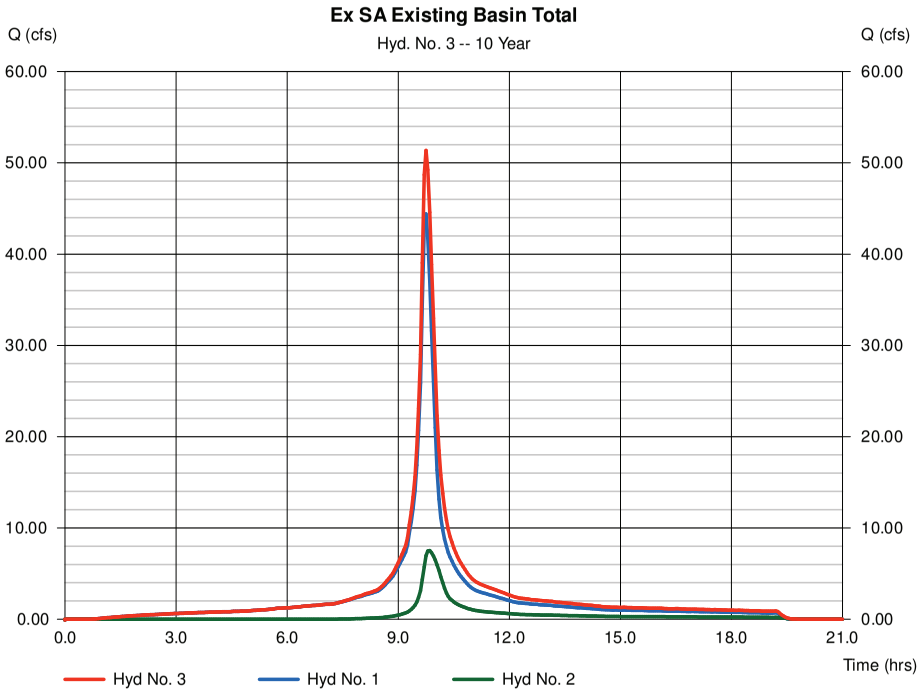


Hydrograph Report

Hyd. No. 3

Ex SA Existing Basin Total

Hydrograph type	= Combine	Peak discharge	= 51.37 cfs
Storm frequency	= 10 yrs	Time to peak	= 9.75 hrs
Time interval	= 3 min	Hyd. volume	= 4.809 acft
Inflow hyds.	= 1, 2	Contrib. drain. area	= 13.970 ac

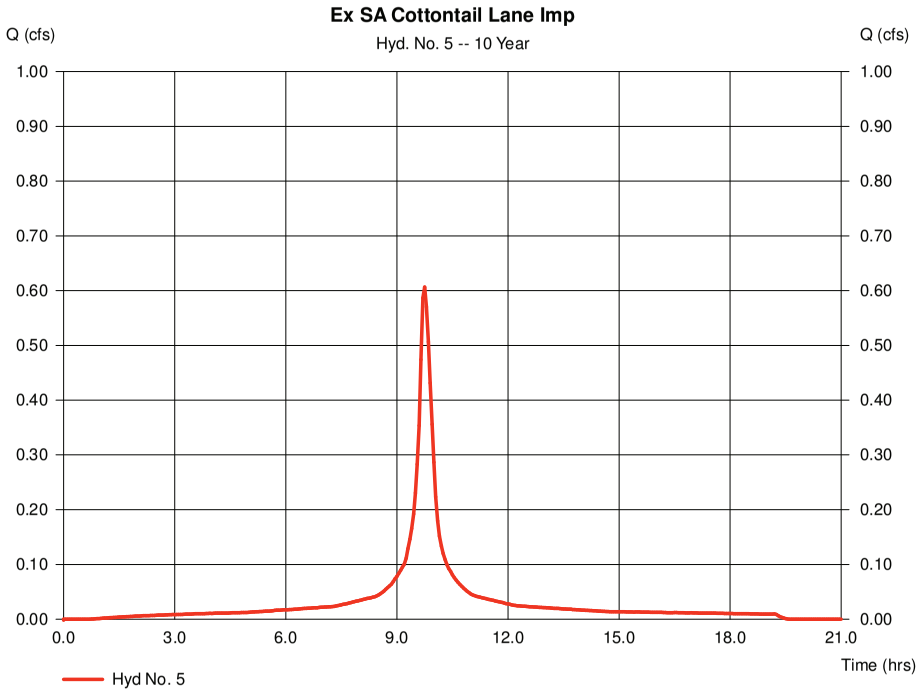


Hydrograph Report

Hyd. No. 5

Ex SA Cottontail Lane Imp

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.606 cfs
Storm frequency	=	10 yrs	Time to peak	=	9.75 hrs
Time interval	=	3 min	Hyd. volume	=	0.055 acft
Drainage area	=	0.140 ac	Curve number	=	98
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	6.00 min
Total precip.	=	5.01 in	Distribution	=	Custom
Storm duration	=	NOAA Atlas 14 Type-C.cds	Shape factor	=	285

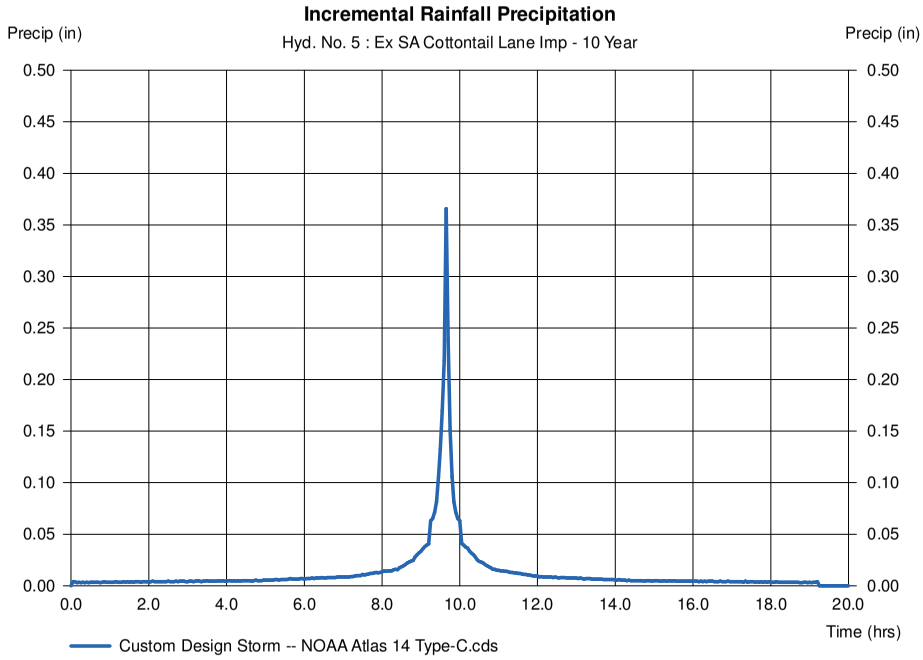


Precipitation Report

Hyd. No. 5

Ex SA Cottontail Lane Imp

Storm Frequency	=	10 yrs	Time interval	=	3 min
Total precip.	=	5.0100 in	Distribution	=	Custom
Storm duration	=	NOAA Atlas 14 Type-C.cds			

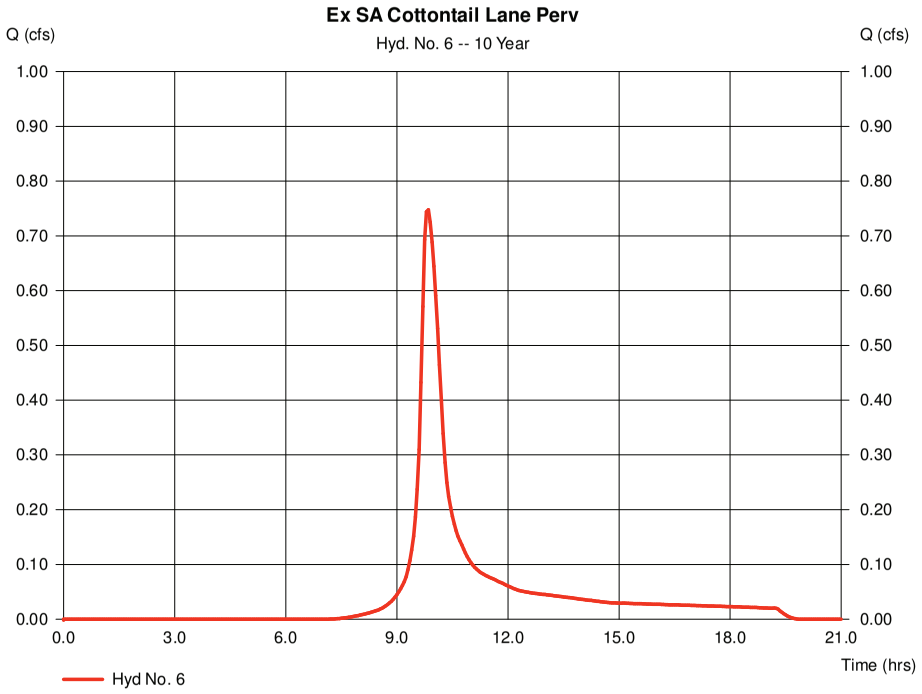


Hydrograph Report

Hyd. No. 6

Ex SA Cottontail Lane Perv

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.748 cfs
Storm frequency	=	10 yrs	Time to peak	=	9.85 hrs
Time interval	=	3 min	Hyd. volume	=	0.075 acft
Drainage area	=	0.370 ac	Curve number	=	74
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	10.00 min
Total precip.	=	5.01 in	Distribution	=	Custom
Storm duration	=	NOAA Atlas 14 Type-C.cds	Shape factor	=	285

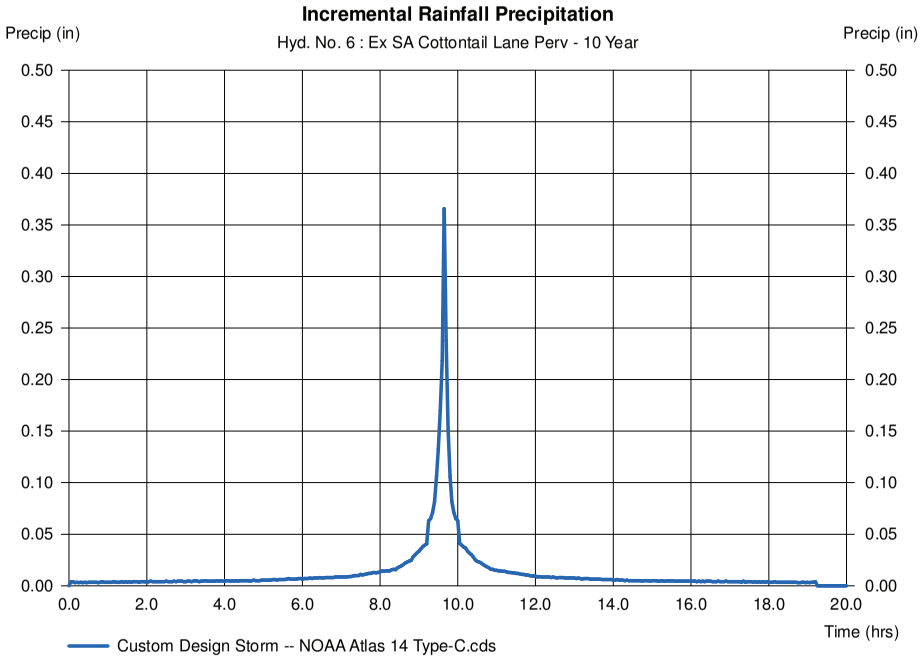


Precipitation Report

Hyd. No. 6

Ex SA Cottontail Lane Perv

Storm Frequency	=	10 yrs	Time interval	=	3 min
Total precip.	=	5.0100 in	Distribution	=	Custom
Storm duration	=	NOAA Atlas 14 Type-C.cds			

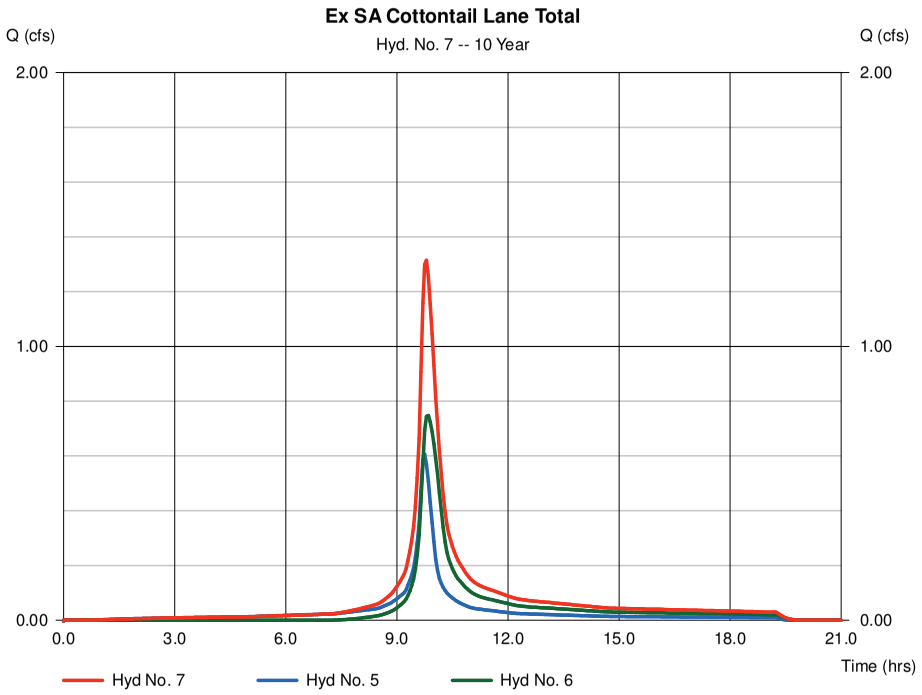


Hydrograph Report

Hyd. No. 7

Ex SA Cottontail Lane Total

Hydrograph type	= Combine	Peak discharge	= 1.314 cfs
Storm frequency	= 10 yrs	Time to peak	= 9.80 hrs
Time interval	= 3 min	Hyd. volume	= 0.131 acft
Inflow hyds.	= 5, 6	Contrib. drain. area	= 0.510 ac

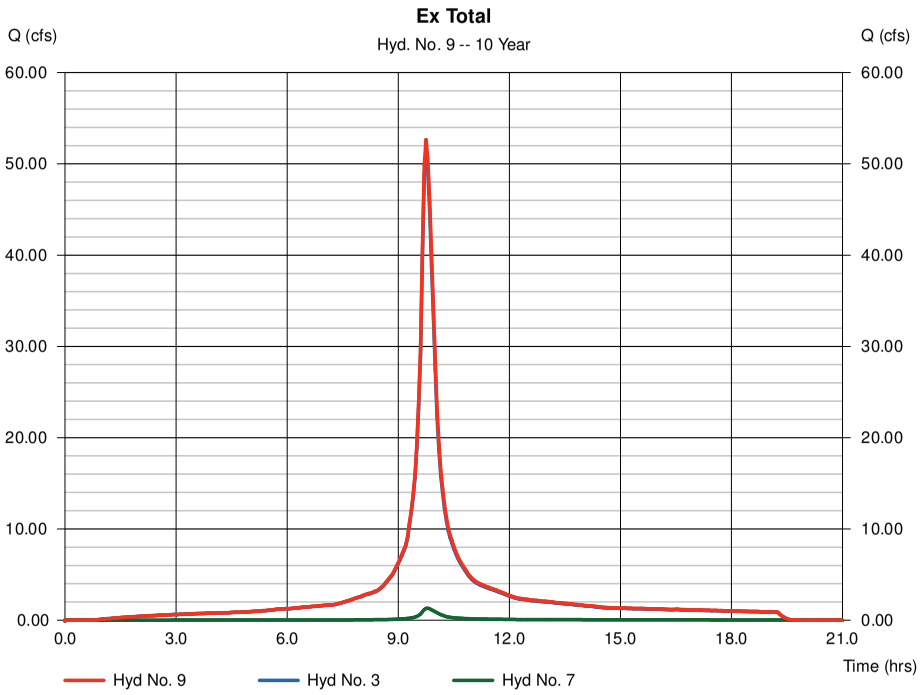


Hydrograph Report

Hyd. No. 9

Ex Total

Hydrograph type	= Combine	Peak discharge	= 52.67 cfs
Storm frequency	= 10 yrs	Time to peak	= 9.75 hrs
Time interval	= 3 min	Hyd. volume	= 4.940 acft
Inflow hyds.	= 3, 7	Contrib. drain. area	= 0.000 ac

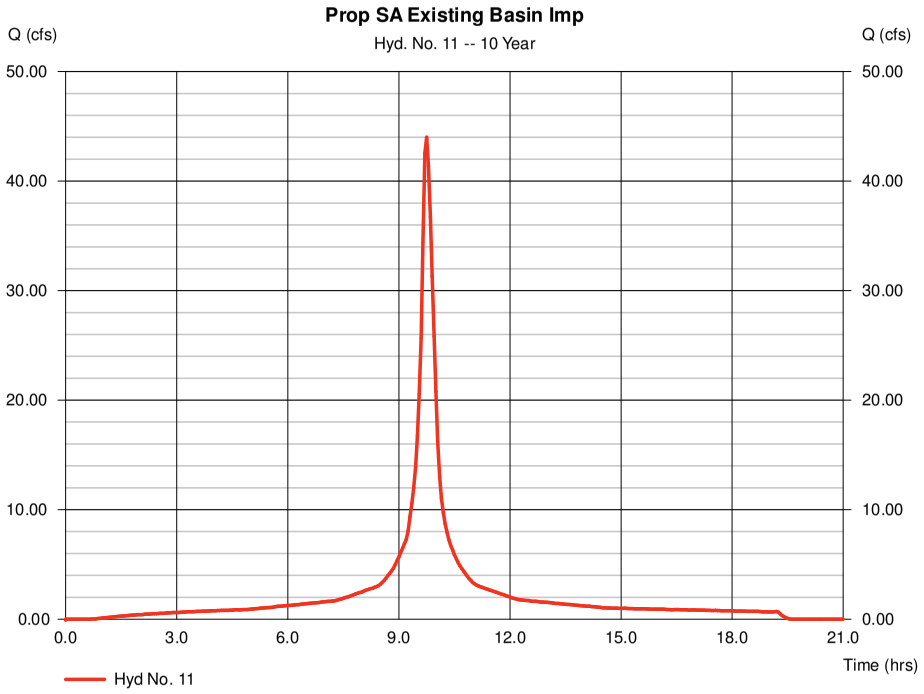


Hydrograph Report

Hyd. No. 11

Prop SA Existing Basin Imp

Hydrograph type	=	SCS Runoff	Peak discharge	=	44.01 cfs
Storm frequency	=	10 yrs	Time to peak	=	9.75 hrs
Time interval	=	3 min	Hyd. volume	=	4.016 acft
Drainage area	=	10.160 ac	Curve number	=	98
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	6.00 min
Total precip.	=	5.01 in	Distribution	=	Custom
Storm duration	=	NOAA Atlas 14 Type-C.cds	Shape factor	=	285

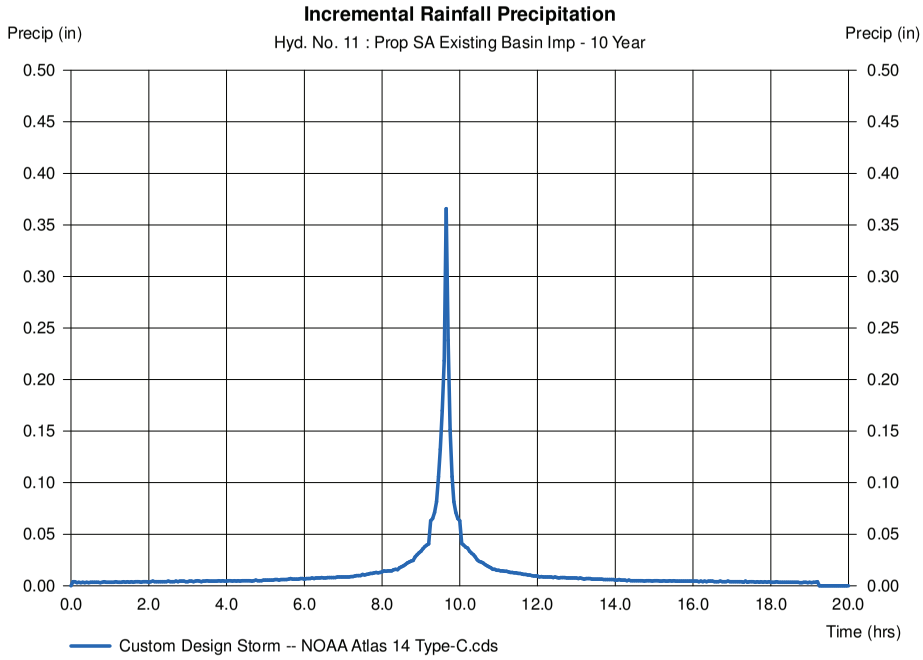


Precipitation Report

Hyd. No. 11

Prop SA Existing Basin Imp

Storm Frequency	=	10 yrs	Time interval	=	3 min
Total precip.	=	5.0100 in	Distribution	=	Custom
Storm duration	=	NOAA Atlas 14 Type-C.cds			

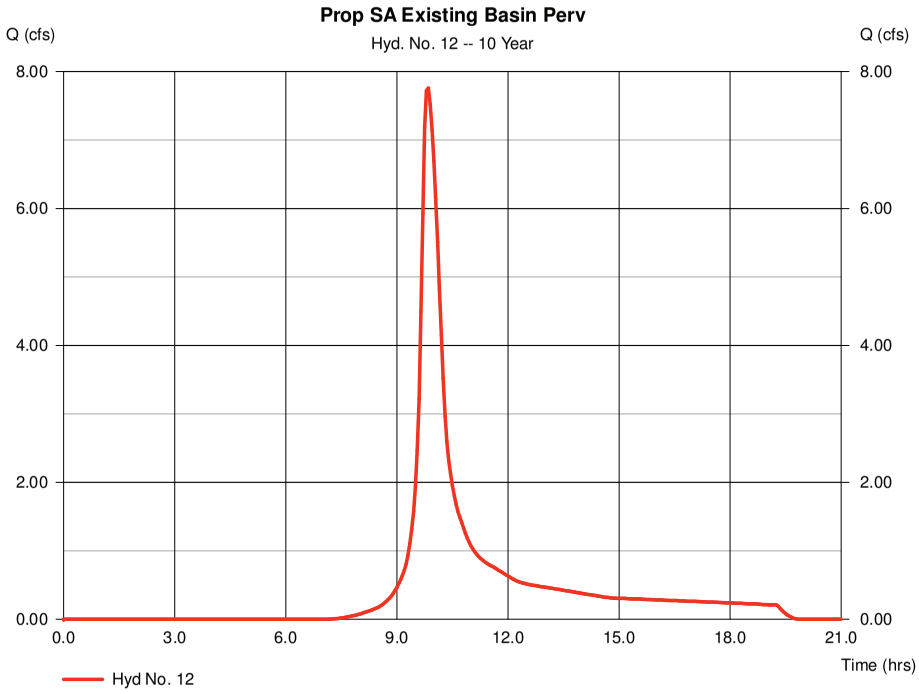


Hydrograph Report

Hyd. No. 12

Prop SA Existing Basin Perv

Hydrograph type	=	SCS Runoff	Peak discharge	=	7.760 cfs
Storm frequency	=	10 yrs	Time to peak	=	9.85 hrs
Time interval	=	3 min	Hyd. volume	=	0.782 acft
Drainage area	=	3.840 ac	Curve number	=	74
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	10.00 min
Total precip.	=	5.01 in	Distribution	=	Custom
Storm duration	=	NOAA Atlas 14 Type-C.cds	Shape factor	=	285

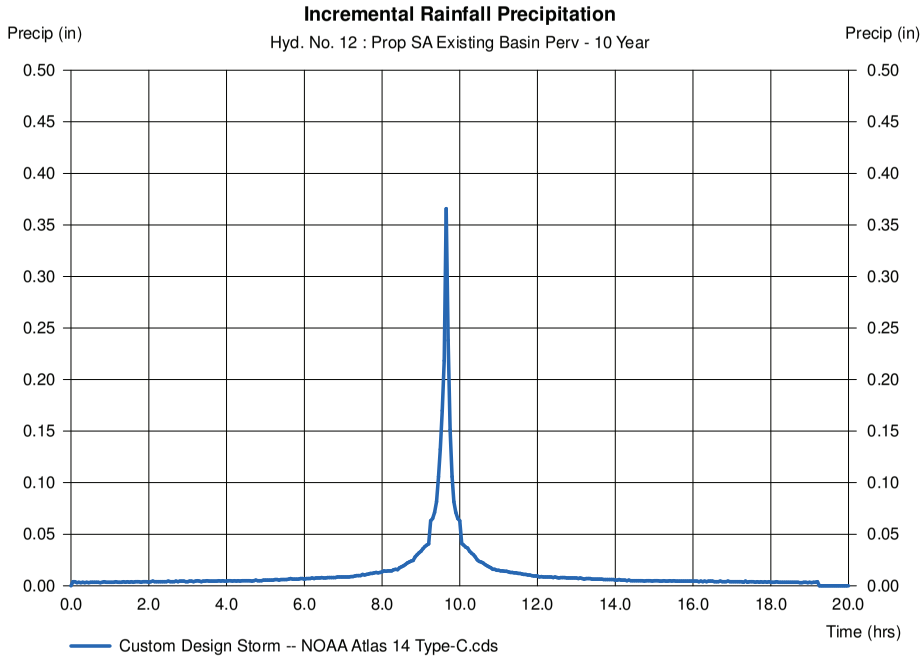


Precipitation Report

Hyd. No. 12

Prop SA Existing Basin Perv

Storm Frequency	=	10 yrs	Time interval	=	3 min
Total precip.	=	5.0100 in	Distribution	=	Custom
Storm duration	=	NOAA Atlas 14 Type-C.cds			

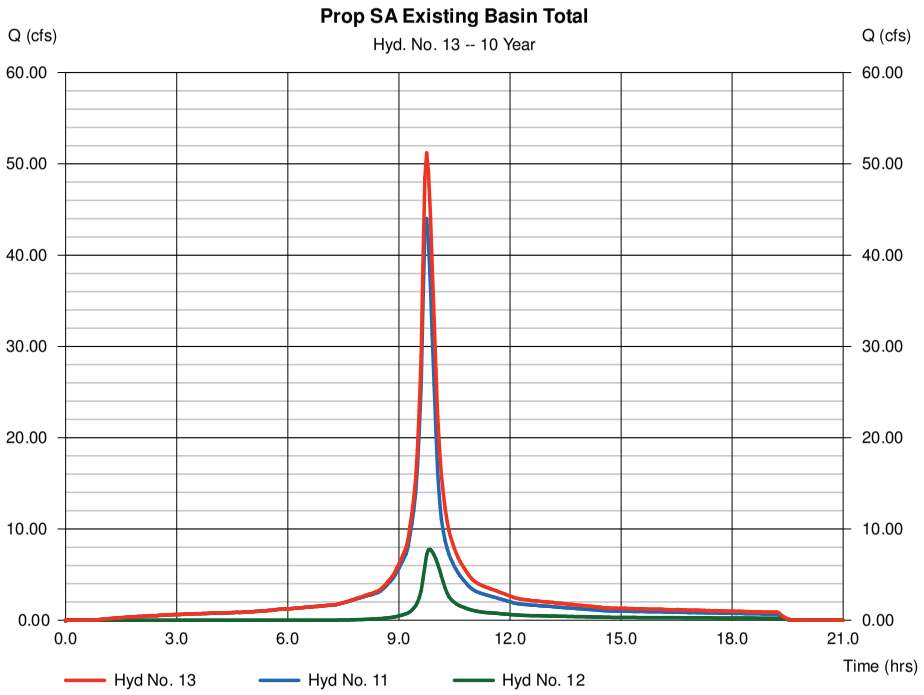


Hydrograph Report

Hyd. No. 13

Prop SA Existing Basin Total

Hydrograph type	= Combine	Peak discharge	= 51.20 cfs
Storm frequency	= 10 yrs	Time to peak	= 9.75 hrs
Time interval	= 3 min	Hyd. volume	= 4.798 acft
Inflow hyds.	= 11, 12	Contrib. drain. area	= 14.000 ac

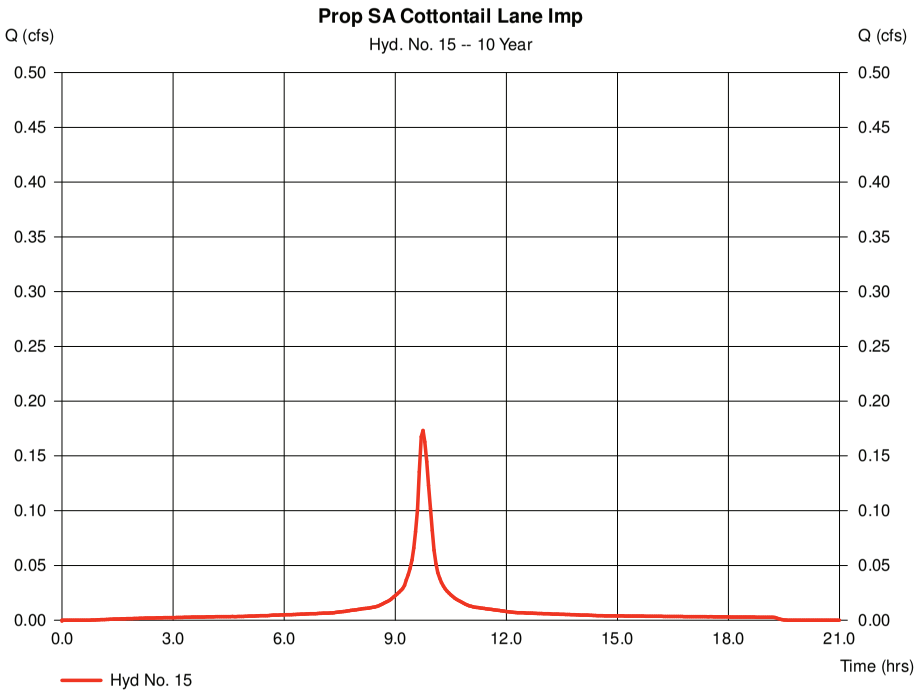


Hydrograph Report

Hyd. No. 15

Prop SA Cottontail Lane Imp

Hydrograph type	= SCS Runoff	Peak discharge	= 0.173 cfs
Storm frequency	= 10 yrs	Time to peak	= 9.75 hrs
Time interval	= 3 min	Hyd. volume	= 0.016 acft
Drainage area	= 0.040 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 6.00 min
Total precip.	= 5.01 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds	Shape factor	= 285

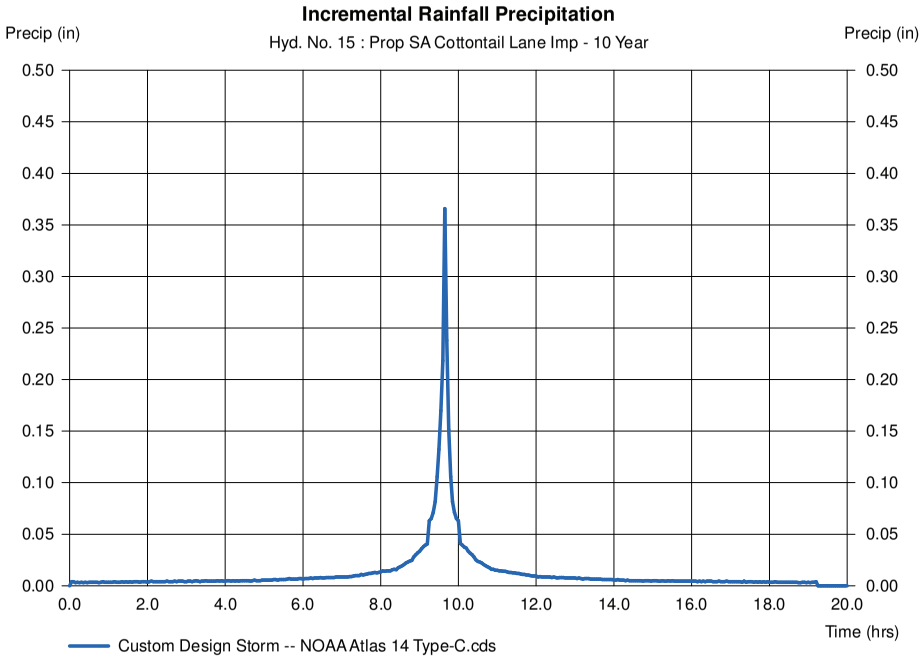


Precipitation Report

Hyd. No. 15

Prop SA Cottontail Lane Imp

Storm Frequency	= 10 yrs	Time interval	= 3 min
Total precip.	= 5.0100 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds		

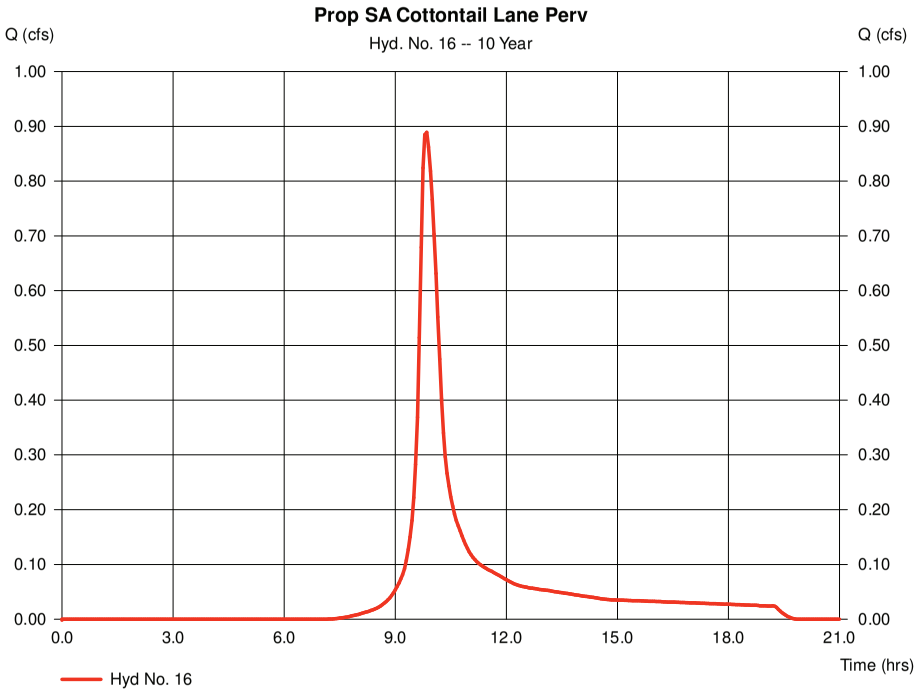


Hydrograph Report

Hyd. No. 16

Prop SA Cottontail Lane Perv

Hydrograph type	= SCS Runoff	Peak discharge	= 0.889 cfs
Storm frequency	= 10 yrs	Time to peak	= 9.85 hrs
Time interval	= 3 min	Hyd. volume	= 0.090 acft
Drainage area	= 0.440 ac	Curve number	= 74
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 10.00 min
Total precip.	= 5.01 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds	Shape factor	= 285

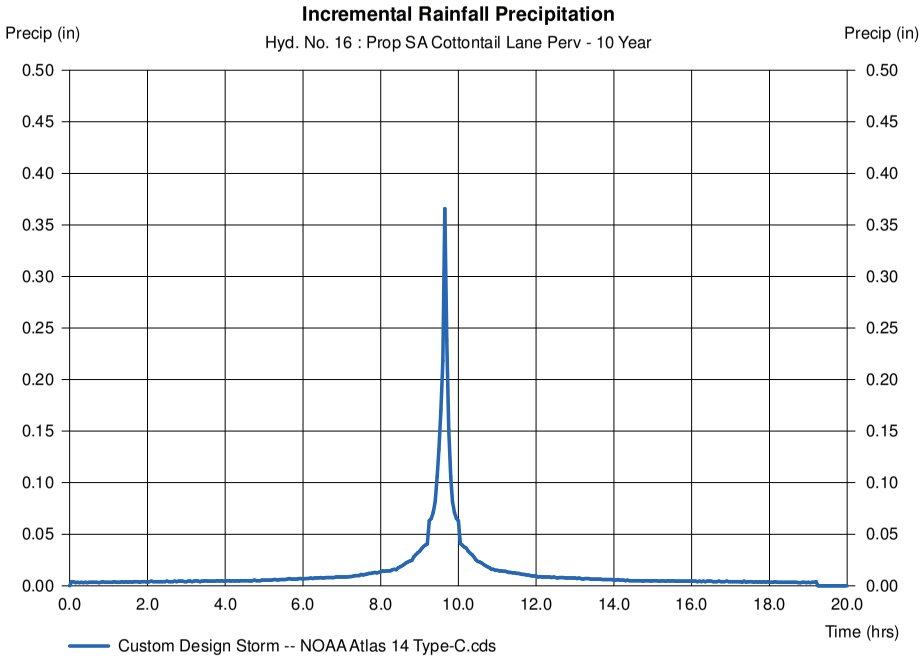


Precipitation Report

Hyd. No. 16

Prop SA Cottontail Lane Perv

Storm Frequency	= 10 yrs	Time interval	= 3 min
Total precip.	= 5.0100 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds		

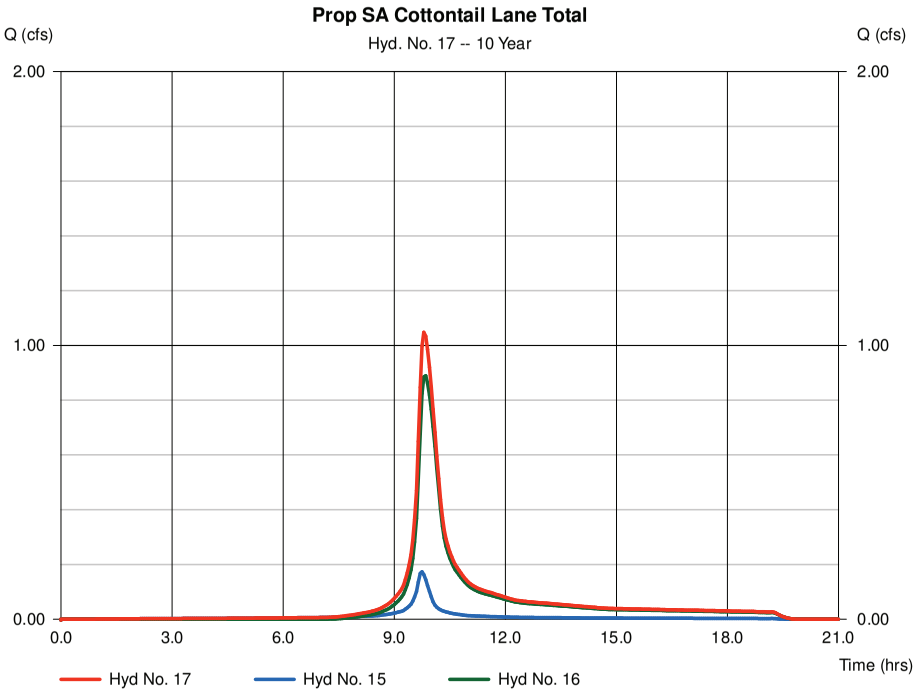


Hydrograph Report

Hyd. No. 17

Prop SA Cottontail Lane Total

Hydrograph type	= Combine	Peak discharge	= 1.048 cfs
Storm frequency	= 10 yrs	Time to peak	= 9.80 hrs
Time interval	= 3 min	Hyd. volume	= 0.105 acft
Inflow hyds.	= 15, 16	Contrib. drain. area	= 0.480 ac

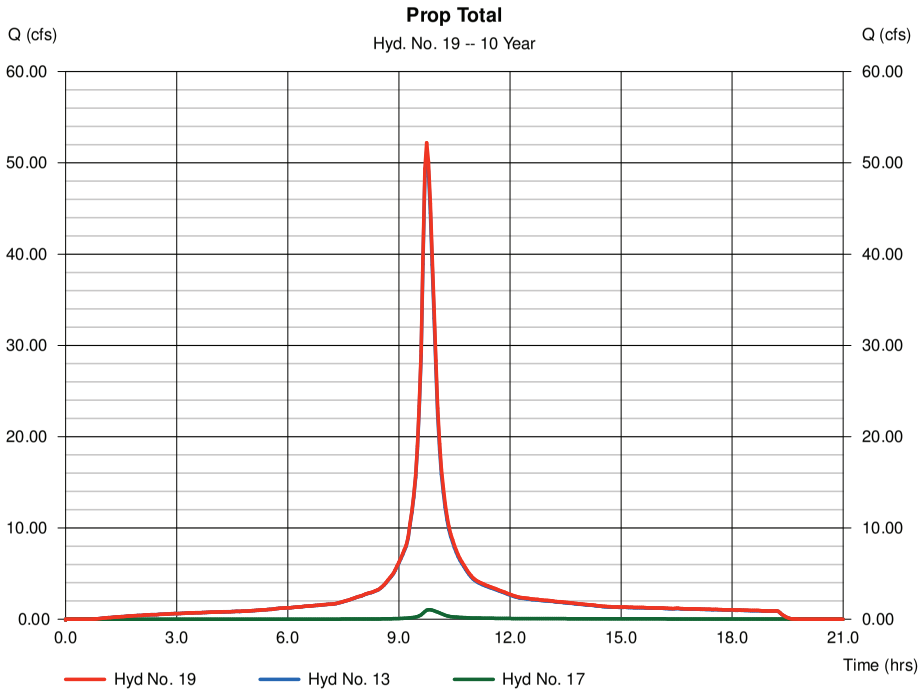


Hydrograph Report

Hyd. No. 19

Prop Total

Hydrograph type	= Combine	Peak discharge	= 52.20 cfs
Storm frequency	= 10 yrs	Time to peak	= 9.75 hrs
Time interval	= 3 min	Hyd. volume	= 4.903 acft
Inflow hyds.	= 13, 17	Contrib. drain. area	= 0.000 ac



Hydrograph Summary Report

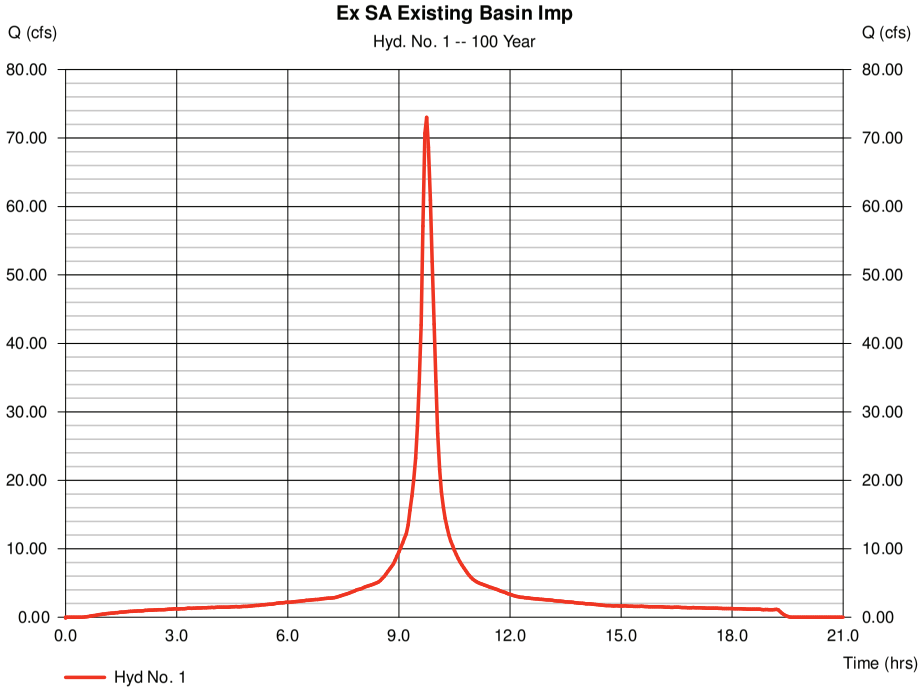
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Hyd. volume (acft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (acft)	Hydrograph description
1	SCS Runoff	73.03	3	585	6.765	----	------	------	Ex SA Existing Basin Imp
2	SCS Runoff	16.35	3	588	1.634	----	------	------	Ex SA Existing Basin Perv
3	Combine	88.51	3	585	8.398	1, 2	------	------	Ex SA Existing Basin Total
5	SCS Runoff	0.998	3	585	0.092	----	------	------	Ex SA Cottontail Lane Imp
6	SCS Runoff	1.627	3	588	0.162	----	------	------	Ex SA Cottontail Lane Perv
7	Combine	2.564	3	588	0.255	5, 6	------	------	Ex SA Cottontail Lane Total
9	Combine	91.05	3	585	8.653	3, 7,	------	------	Ex Total
11	SCS Runoff	72.39	3	585	6.705	----	------	------	Prop SA Existing Basin Imp
12	SCS Runoff	16.88	3	588	1.686	----	------	------	Prop SA Existing Basin Perv
13	Combine	88.37	3	585	8.392	11, 12	------	------	Prop SA Existing Basin Total
15	SCS Runoff	0.285	3	585	0.026	----	------	------	Prop SA Cottontail Lane Imp
16	SCS Runoff	1.934	3	588	0.193	----	------	------	Prop SA Cottontail Lane Perv
17	Combine	2.202	3	588	0.220	15, 16	------	------	Prop SA Cottontail Lane Total
19	Combine	90.48	3	585	8.611	13, 17,	------	------	Prop Total

Hydrograph Report

Hyd. No. 1

Ex SA Existing Basin Imp

Hydrograph type	=	SCS Runoff	Peak discharge	=	73.03 cfs
Storm frequency	=	100 yrs	Time to peak	=	9.75 hrs
Time interval	=	3 min	Hyd. volume	=	6.765 acft
Drainage area	=	10.250 ac	Curve number	=	98
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	6.00 min
Total precip.	=	8.21 in	Distribution	=	Custom
Storm duration	=	NOAA Atlas 14 Type-C.cds	Shape factor	=	285

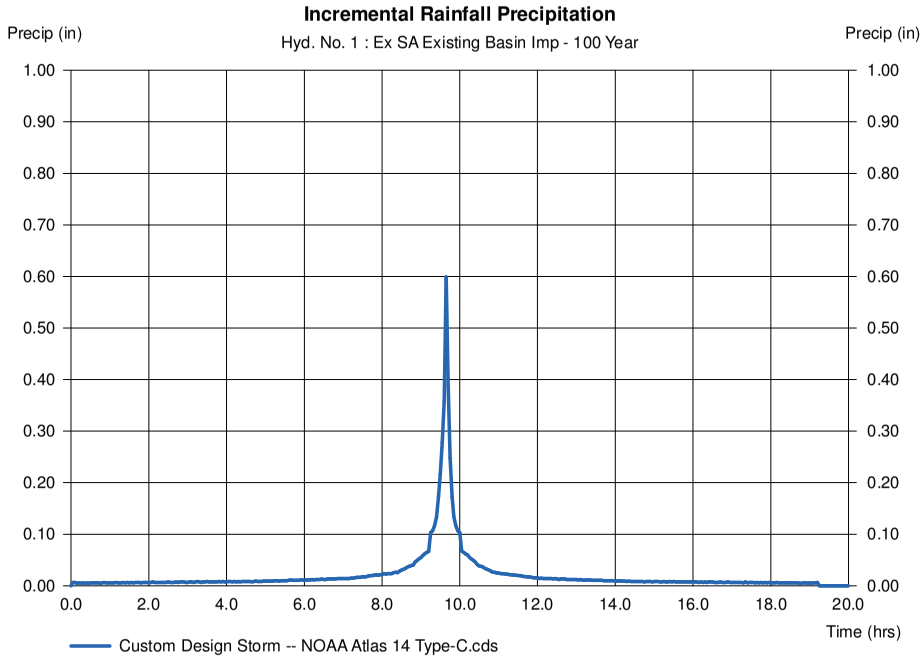


Precipitation Report

Hyd. No. 1

Ex SA Existing Basin Imp

Storm Frequency	=	100 yrs	Time interval	=	3 min
Total precip.	=	8.2100 in	Distribution	=	Custom
Storm duration	=	NOAA Atlas 14 Type-C.cds			

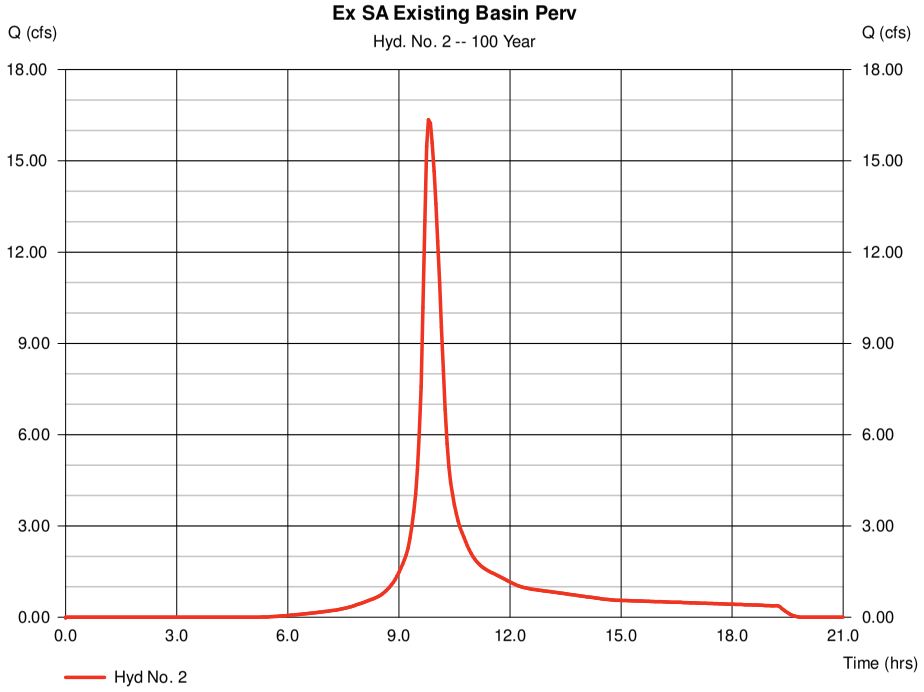


Hydrograph Report

Hyd. No. 2

Ex SA Existing Basin Perv

Hydrograph type	= SCS Runoff	Peak discharge	= 16.35 cfs
Storm frequency	= 100 yrs	Time to peak	= 9.80 hrs
Time interval	= 3 min	Hyd. volume	= 1.634 acft
Drainage area	= 3.720 ac	Curve number	= 74
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 10.00 min
Total precip.	= 8.21 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds	Shape factor	= 285

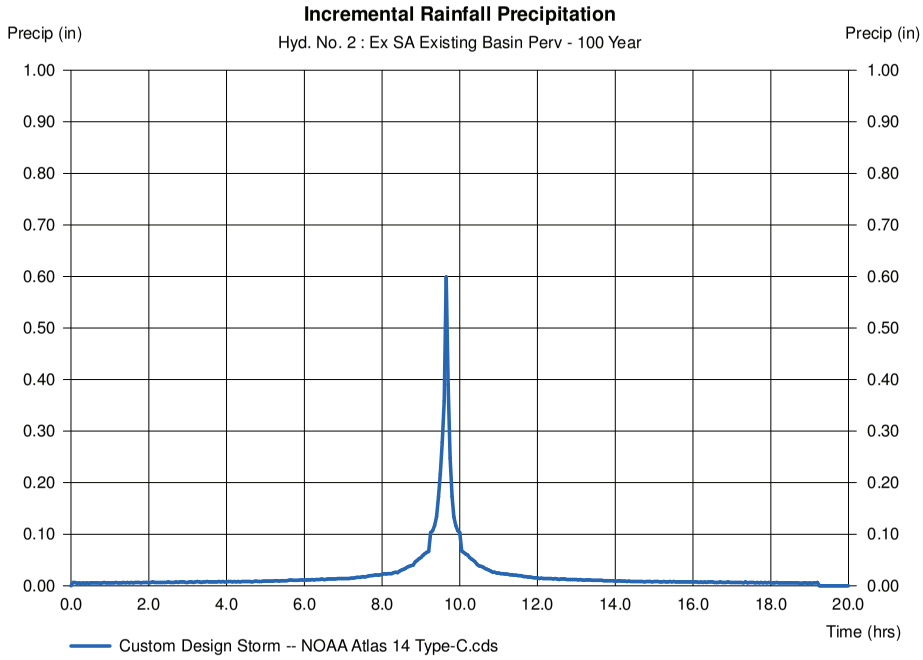


Precipitation Report

Hyd. No. 2

Ex SA Existing Basin Perv

Storm Frequency	= 100 yrs	Time interval	= 3 min
Total precip.	= 8.2100 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds		

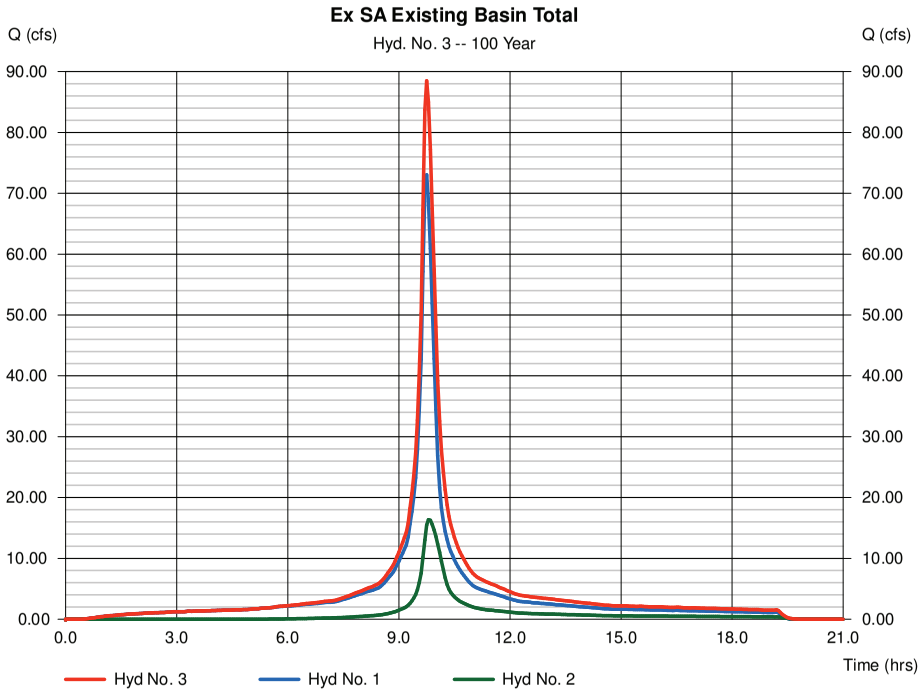


Hydrograph Report

Hyd. No. 3

Ex SA Existing Basin Total

Hydrograph type	= Combine	Peak discharge	= 88.51 cfs
Storm frequency	= 100 yrs	Time to peak	= 9.75 hrs
Time interval	= 3 min	Hyd. volume	= 8.398 acft
Inflow hyds.	= 1, 2	Contrib. drain. area	= 13.970 ac

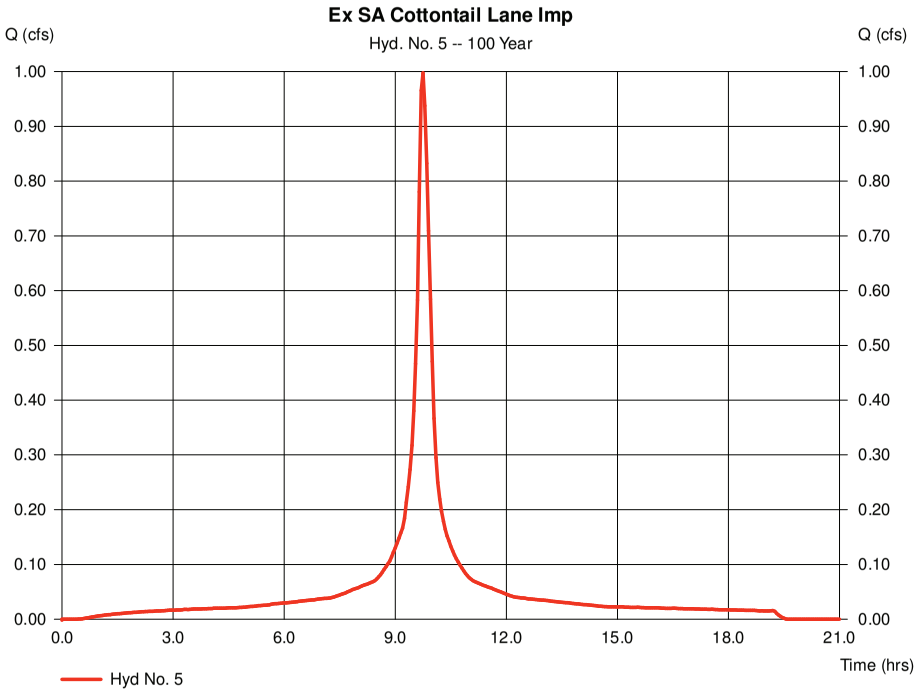


Hydrograph Report

Hyd. No. 5

Ex SA Cottontail Lane Imp

Hydrograph type	= SCS Runoff	Peak discharge	= 0.998 cfs
Storm frequency	= 100 yrs	Time to peak	= 9.75 hrs
Time interval	= 3 min	Hyd. volume	= 0.092 acft
Drainage area	= 0.140 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 6.00 min
Total precip.	= 8.21 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds	Shape factor	= 285

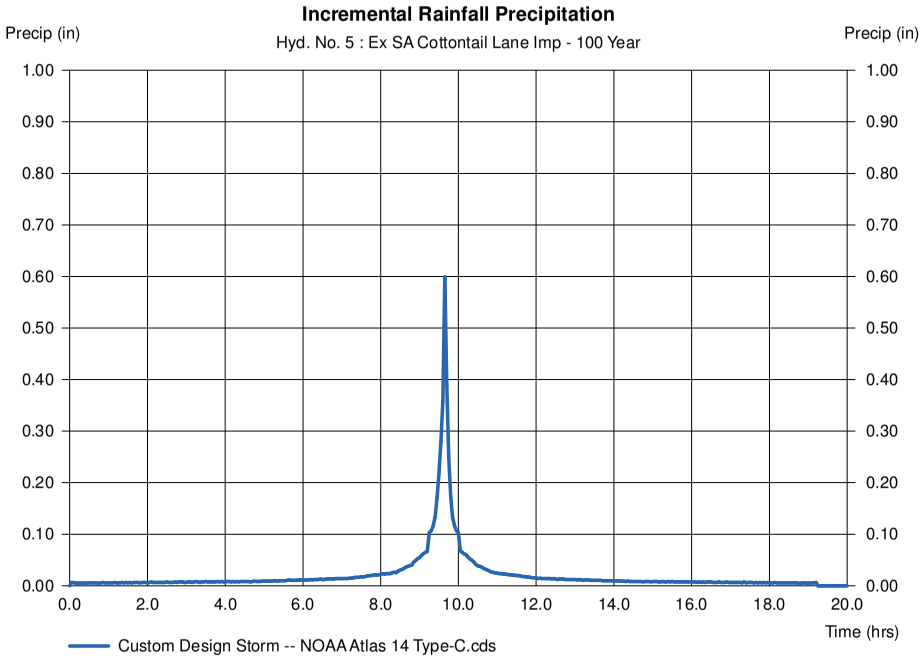


Precipitation Report

Hyd. No. 5

Ex SA Cottontail Lane Imp

Storm Frequency	= 100 yrs	Time interval	= 3 min
Total precip.	= 8.2100 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds		

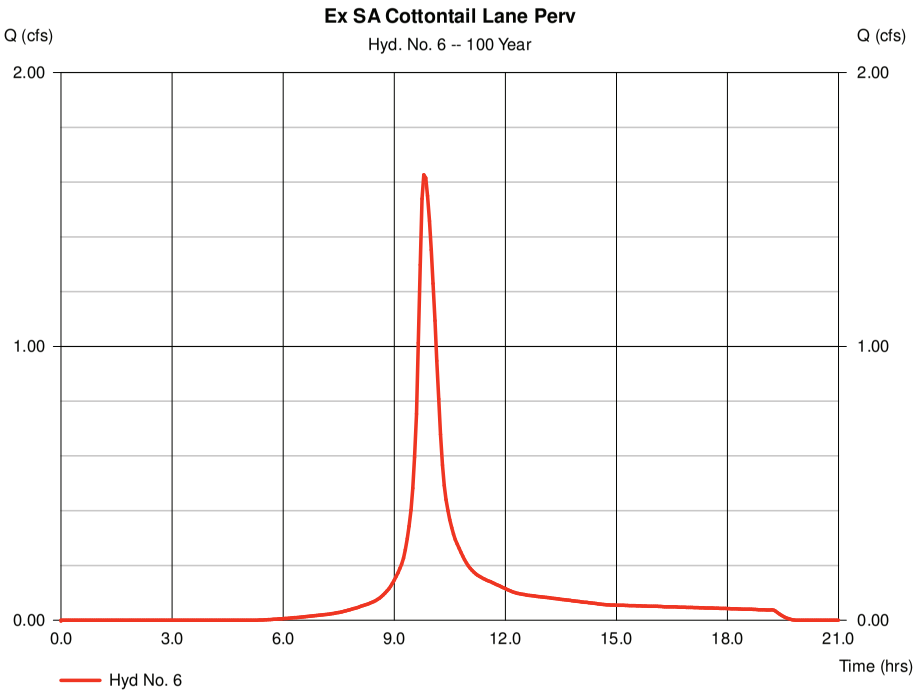


Hydrograph Report

Hyd. No. 6

Ex SA Cottontail Lane Perv

Hydrograph type	= SCS Runoff	Peak discharge	= 1.627 cfs
Storm frequency	= 100 yrs	Time to peak	= 9.80 hrs
Time interval	= 3 min	Hyd. volume	= 0.162 acft
Drainage area	= 0.370 ac	Curve number	= 74
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 10.00 min
Total precip.	= 8.21 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds	Shape factor	= 285

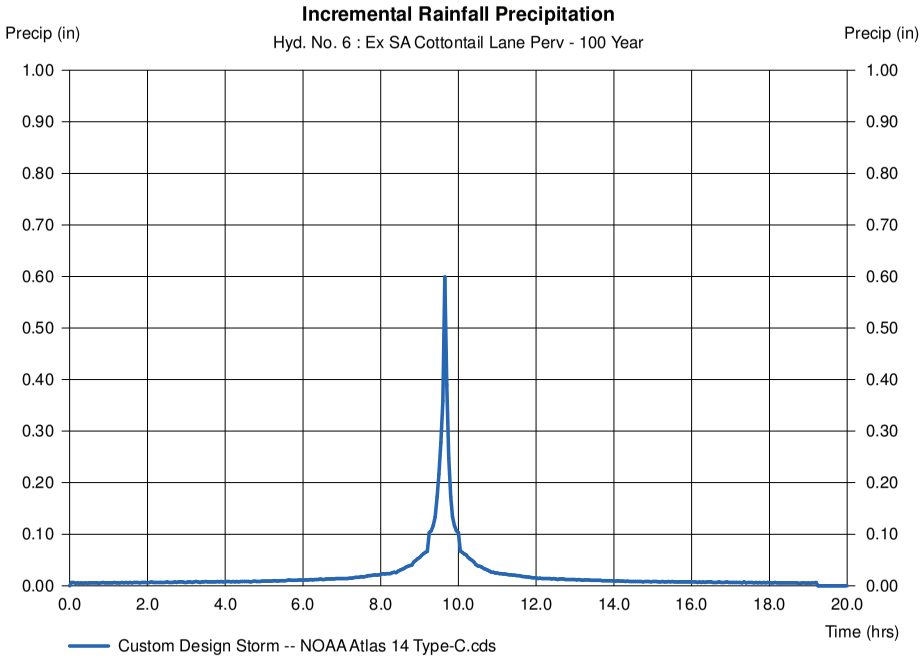


Precipitation Report

Hyd. No. 6

Ex SA Cottontail Lane Perv

Storm Frequency	= 100 yrs	Time interval	= 3 min
Total precip.	= 8.2100 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds		

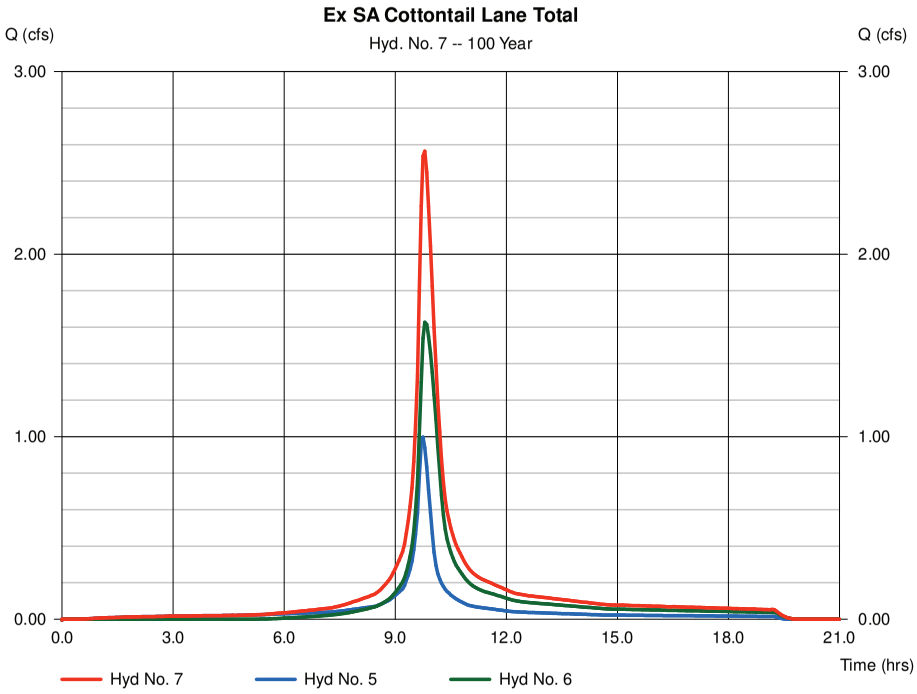


Hydrograph Report

Hyd. No. 7

Ex SA Cottontail Lane Total

Hydrograph type	= Combine	Peak discharge	= 2.564 cfs
Storm frequency	= 100 yrs	Time to peak	= 9.80 hrs
Time interval	= 3 min	Hyd. volume	= 0.255 acft
Inflow hyds.	= 5, 6	Contrib. drain. area	= 0.510 ac

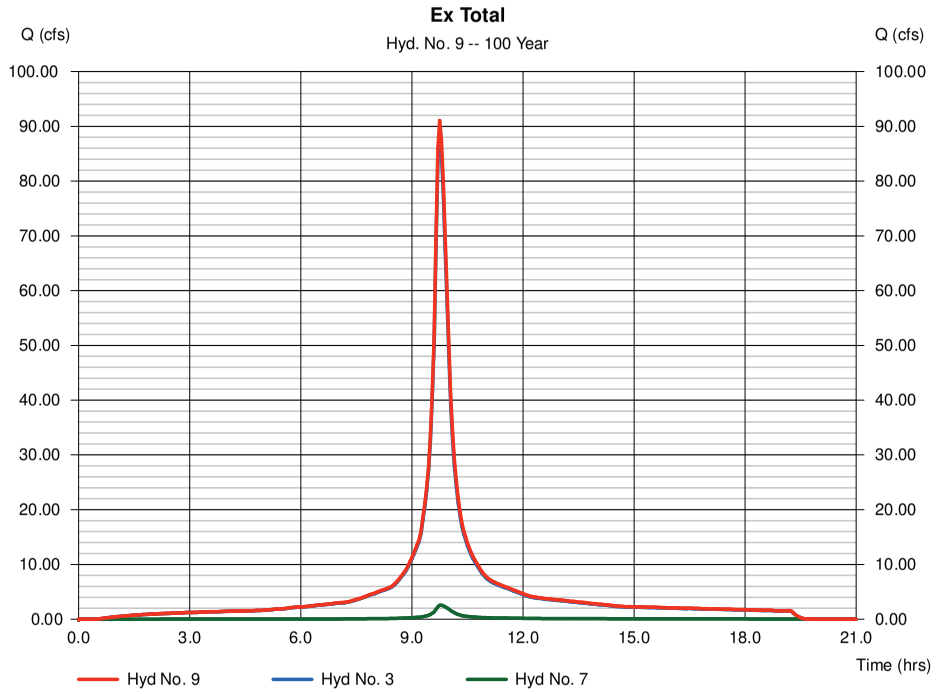


Hydrograph Report

Hyd. No. 9

Ex Total

Hydrograph type	= Combine	Peak discharge	= 91.05 cfs
Storm frequency	= 100 yrs	Time to peak	= 9.75 hrs
Time interval	= 3 min	Hyd. volume	= 8.653 acft
Inflow hyds.	= 3, 7	Contrib. drain. area	= 0.000 ac

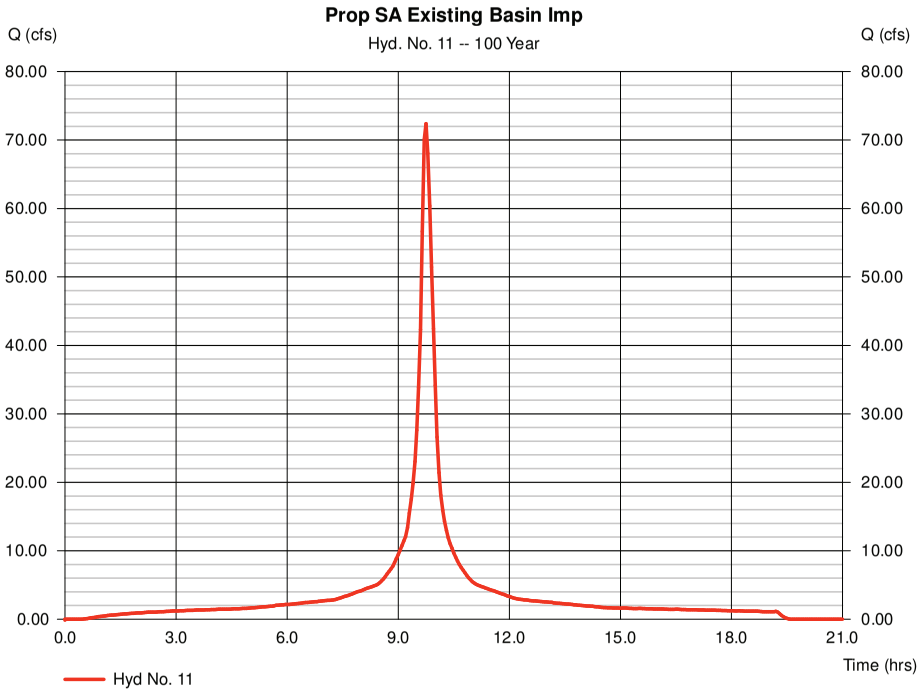


Hydrograph Report

Hyd. No. 11

Prop SA Existing Basin Imp

Hydrograph type	= SCS Runoff	Peak discharge	= 72.39 cfs
Storm frequency	= 100 yrs	Time to peak	= 9.75 hrs
Time interval	= 3 min	Hyd. volume	= 6.705 acft
Drainage area	= 10.160 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 6.00 min
Total precip.	= 8.21 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds	Shape factor	= 285

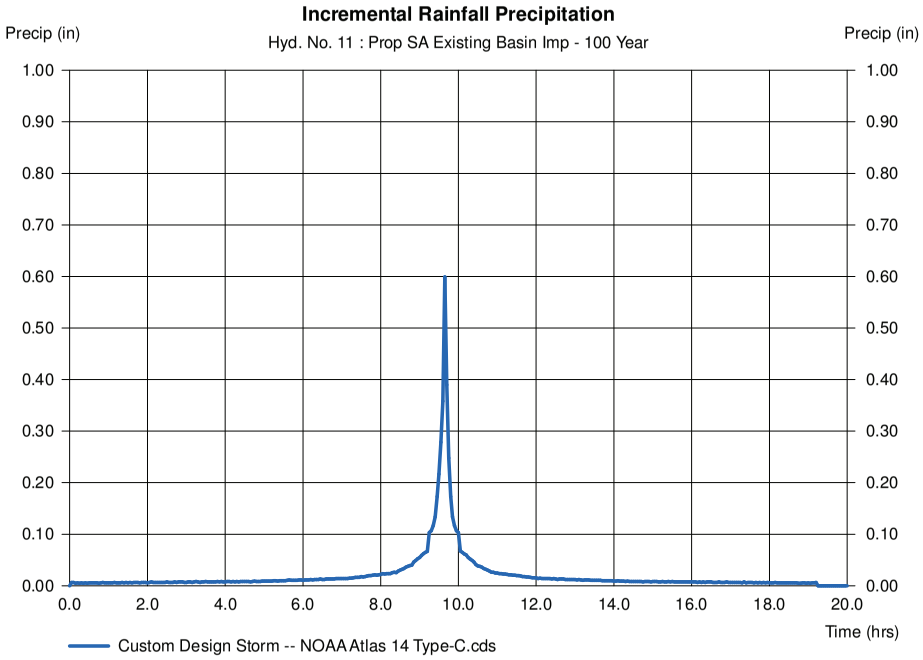


Precipitation Report

Hyd. No. 11

Prop SA Existing Basin Imp

Storm Frequency	= 100 yrs	Time interval	= 3 min
Total precip.	= 8.2100 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds		

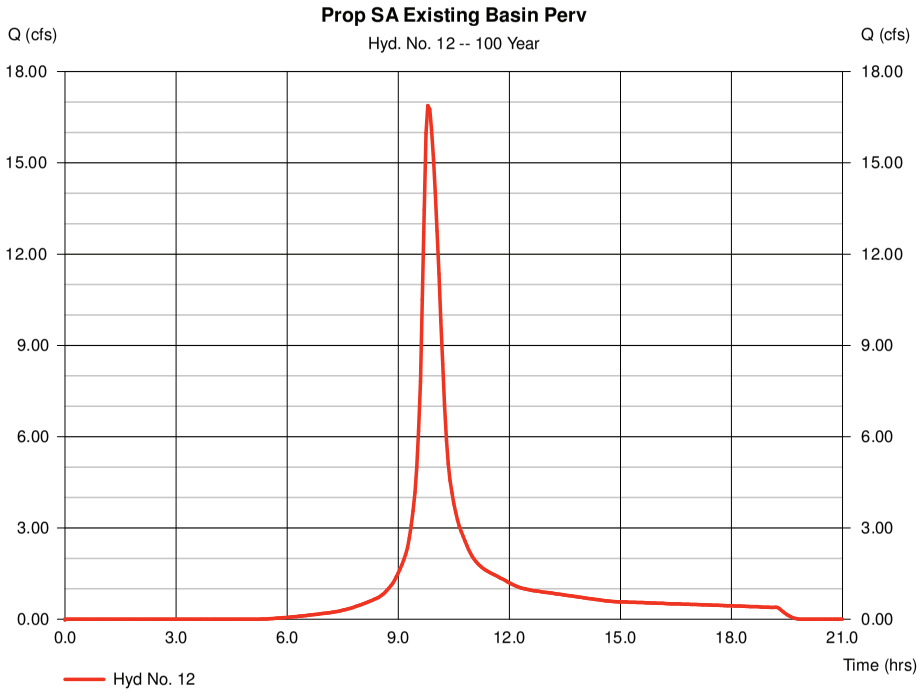


Hydrograph Report

Hyd. No. 12

Prop SA Existing Basin Perv

Hydrograph type	= SCS Runoff	Peak discharge	= 16.88 cfs
Storm frequency	= 100 yrs	Time to peak	= 9.80 hrs
Time interval	= 3 min	Hyd. volume	= 1.686 acft
Drainage area	= 3.840 ac	Curve number	= 74
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 10.00 min
Total precip.	= 8.21 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds	Shape factor	= 285

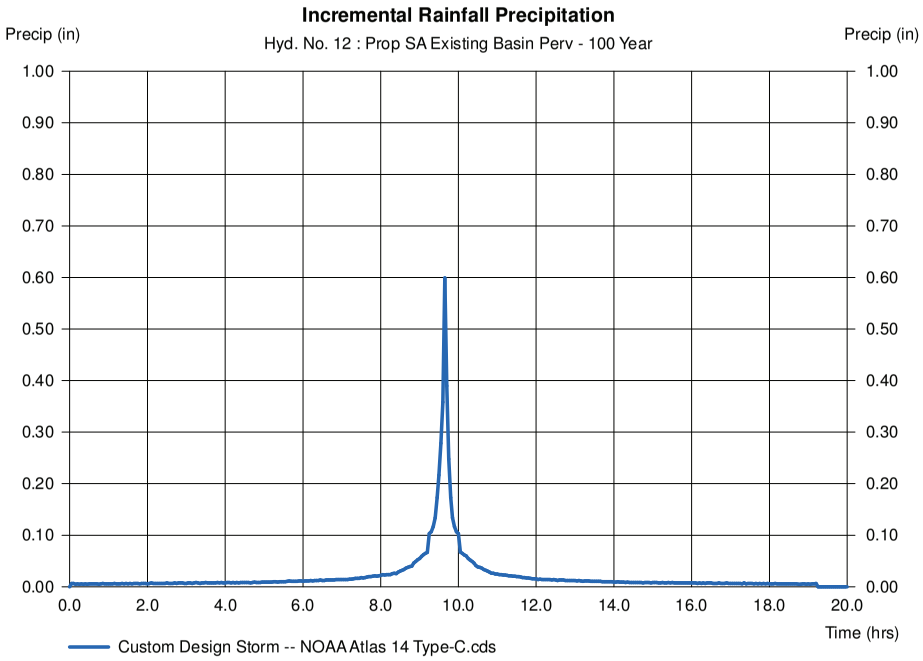


Precipitation Report

Hyd. No. 12

Prop SA Existing Basin Perv

Storm Frequency	= 100 yrs	Time interval	= 3 min
Total precip.	= 8.2100 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds		

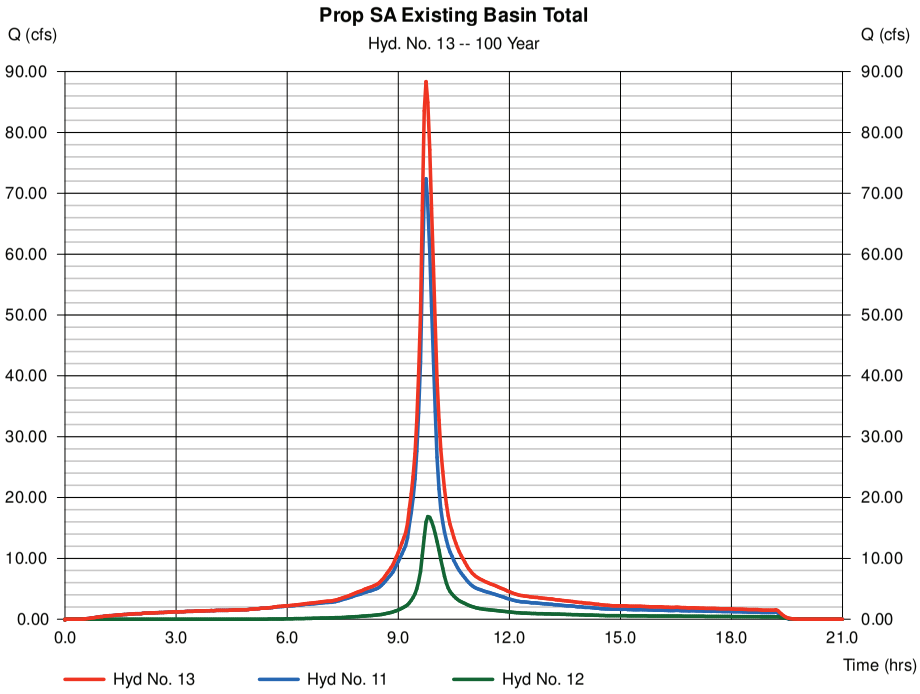


Hydrograph Report

Hyd. No. 13

Prop SA Existing Basin Total

Hydrograph type	= Combine	Peak discharge	= 88.37 cfs
Storm frequency	= 100 yrs	Time to peak	= 9.75 hrs
Time interval	= 3 min	Hyd. volume	= 8.392 acft
Inflow hyds.	= 11, 12	Contrib. drain. area	= 14.000 ac

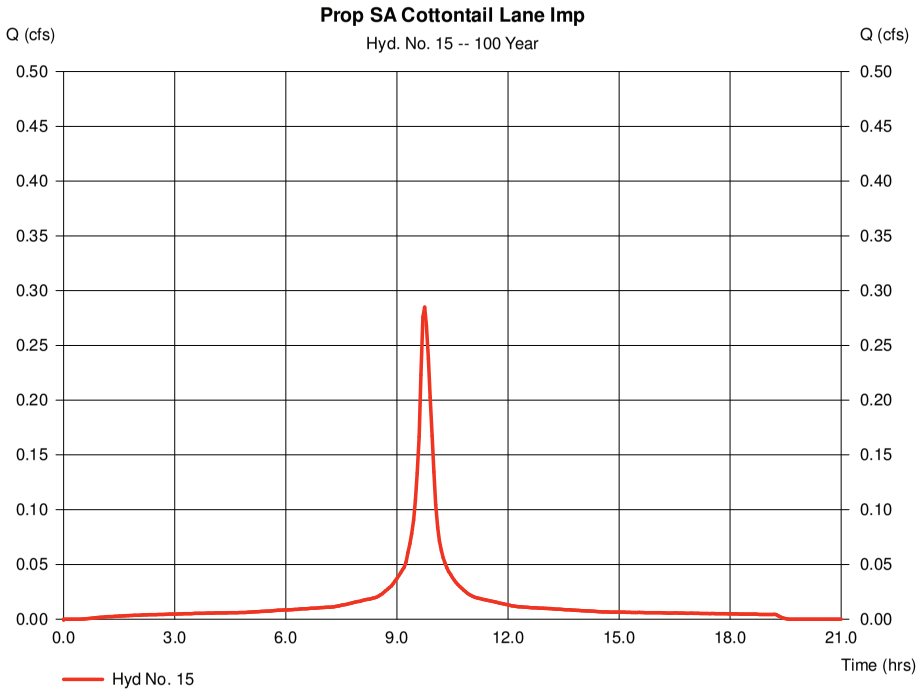


Hydrograph Report

Hyd. No. 15

Prop SA Cottontail Lane Imp

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.285 cfs
Storm frequency	=	100 yrs	Time to peak	=	9.75 hrs
Time interval	=	3 min	Hyd. volume	=	0.026 acft
Drainage area	=	0.040 ac	Curve number	=	98
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	6.00 min
Total precip.	=	8.21 in	Distribution	=	Custom
Storm duration	=	NOAA Atlas 14 Type-C.cds	Shape factor	=	285

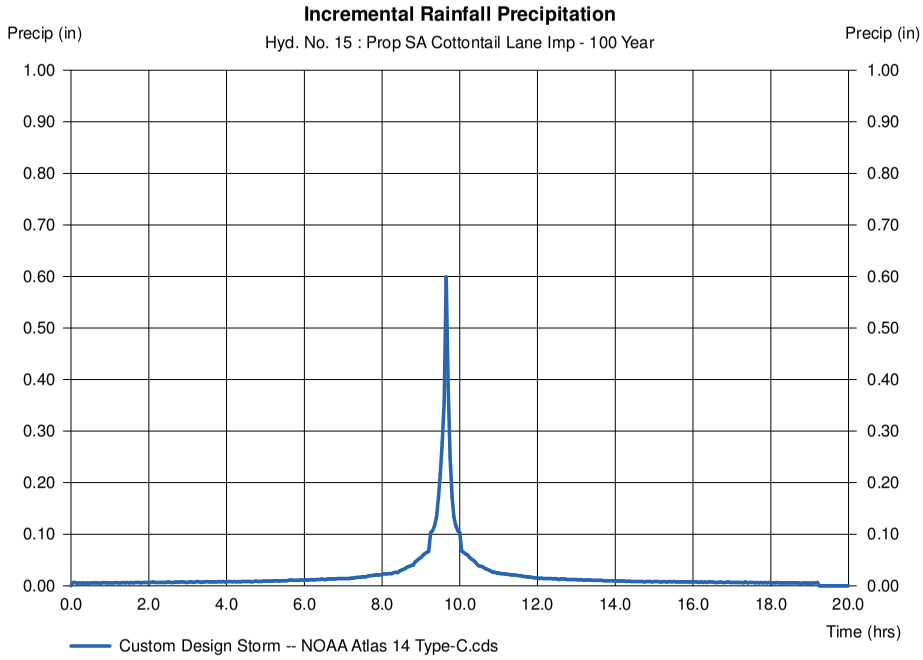


Precipitation Report

Hyd. No. 15

Prop SA Cottontail Lane Imp

Storm Frequency	=	100 yrs	Time interval	=	3 min
Total precip.	=	8.2100 in	Distribution	=	Custom
Storm duration	=	NOAA Atlas 14 Type-C.cds			

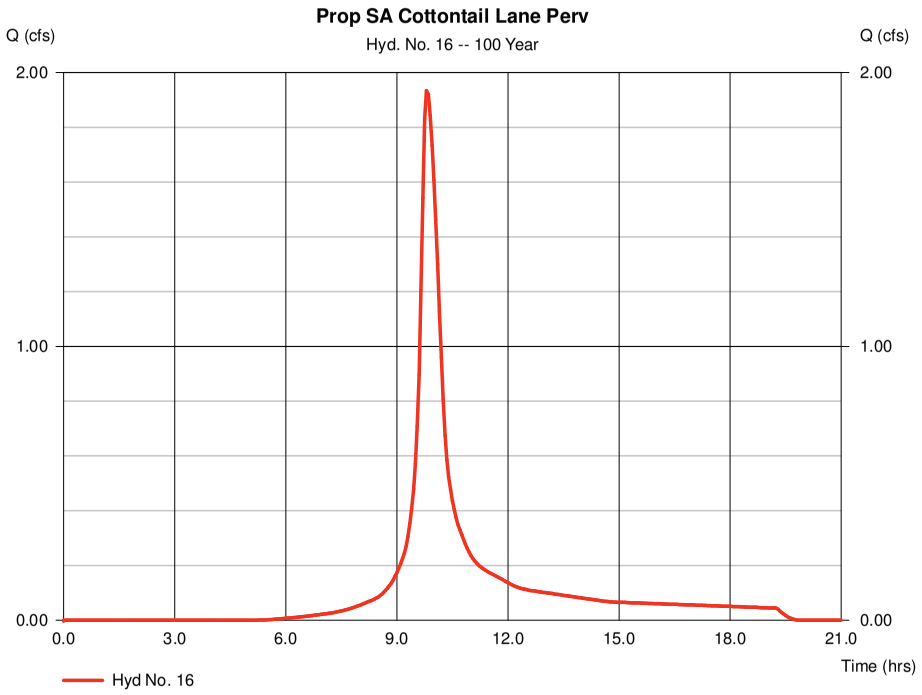


Hydrograph Report

Hyd. No. 16

Prop SA Cottontail Lane Perv

Hydrograph type	=	SCS Runoff	Peak discharge	=	1.934 cfs
Storm frequency	=	100 yrs	Time to peak	=	9.80 hrs
Time interval	=	3 min	Hyd. volume	=	0.193 acft
Drainage area	=	0.440 ac	Curve number	=	74
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	10.00 min
Total precip.	=	8.21 in	Distribution	=	Custom
Storm duration	=	NOAA Atlas 14 Type-C.cds	Shape factor	=	285

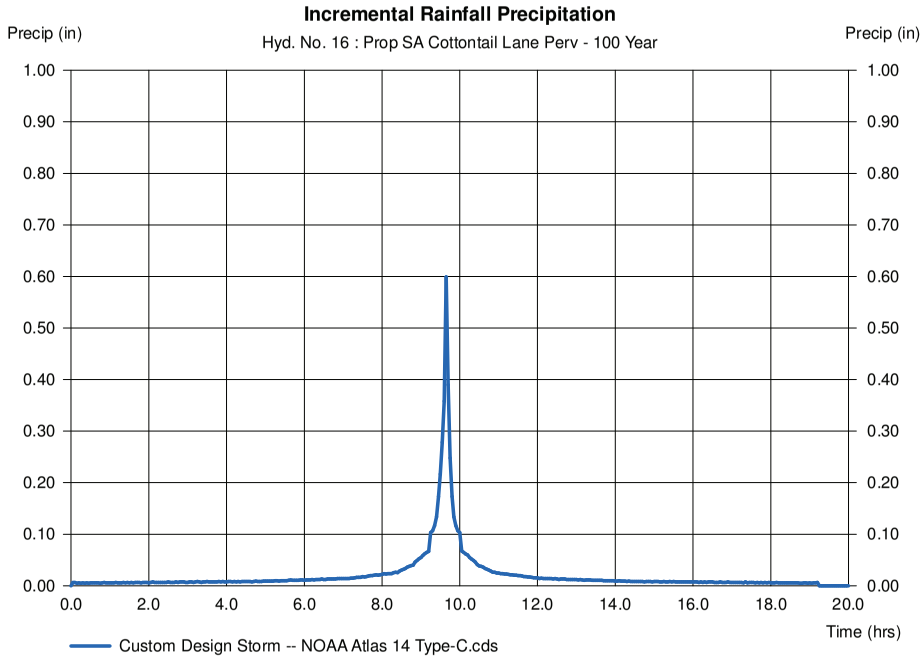


Precipitation Report

Hyd. No. 16

Prop SA Cottontail Lane Perv

Storm Frequency	=	100 yrs	Time interval	=	3 min
Total precip.	=	8.2100 in	Distribution	=	Custom
Storm duration	=	NOAA Atlas 14 Type-C.cds			

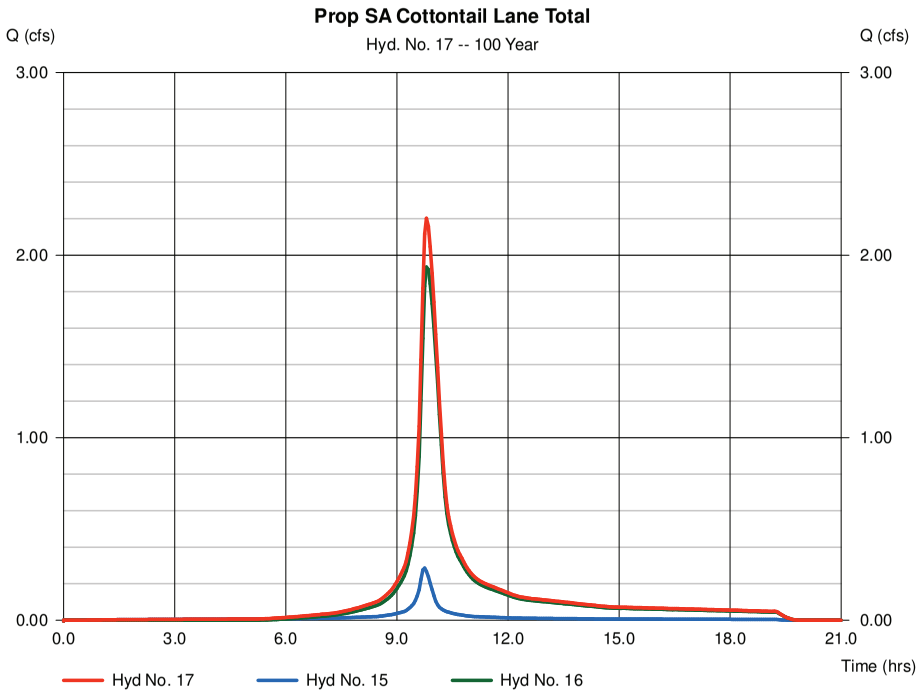


Hydrograph Report

Hyd. No. 17

Prop SA Cottontail Lane Total

Hydrograph type	= Combine	Peak discharge	= 2.202 cfs
Storm frequency	= 100 yrs	Time to peak	= 9.80 hrs
Time interval	= 3 min	Hyd. volume	= 0.220 acft
Inflow hyds.	= 15, 16	Contrib. drain. area	= 0.480 ac

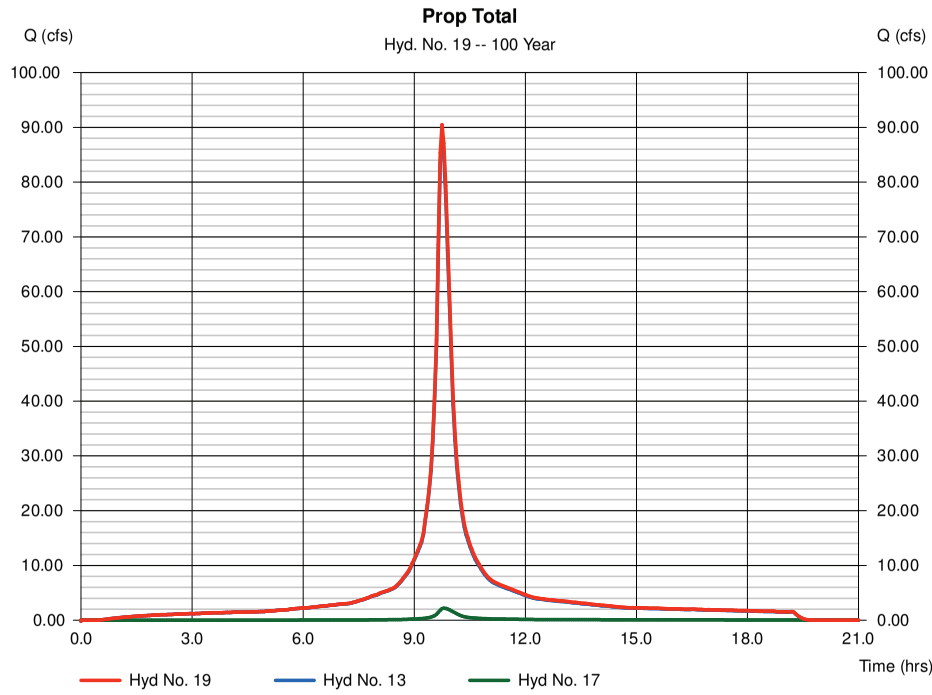


Hydrograph Report

Hyd. No. 19

Prop Total

Hydrograph type	= Combine	Peak discharge	= 90.48 cfs
Storm frequency	= 100 yrs	Time to peak	= 9.75 hrs
Time interval	= 3 min	Hyd. volume	= 8.611 acft
Inflow hyds.	= 13, 17	Contrib. drain. area	= 0.000 ac



Hydraflow Rainfall Report

Return Period (Yrs)	Intensity-Duration-Frequency Equation Coefficients (FHA)			
	B	D	E	(N/A)
1	39.0824	9.5000	0.8528	-------
2	45.6943	10.7000	0.8185	-------
3	0.0000	0.0000	0.0000	-------
5	99.7061	14.8000	0.9304	-------
10	249.7597	21.8001	1.0961	-------
25	115.7547	14.9000	0.8980	-------
50	7.3699	0.1000	0.2544	-------
100	403.8513	25.1001	1.1108	-------

File name: TRENTON.idf

Intensity = B / (Tc + D)^E

Return Period (Yrs)	Intensity Values (in/hr)											
	5 min	10	15	20	25	30	35	40	45	50	55	60
1	4.00	3.10	2.55	2.18	1.91	1.70	1.54	1.40	1.29	1.20	1.12	1.05
2	4.80	3.83	3.21	2.77	2.45	2.20	2.00	1.84	1.70	1.59	1.49	1.40
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	6.20	5.03	4.24	3.67	3.24	2.90	2.63	2.40	2.22	2.06	1.92	1.80
10	6.80	5.63	4.80	4.17	3.69	3.30	2.98	2.72	2.50	2.31	2.14	2.00
25	7.89	6.45	5.47	4.76	4.23	3.80	3.46	3.17	2.93	2.73	2.55	2.40
50	4.87	4.09	3.69	3.44	3.25	3.10	2.98	2.88	2.80	2.72	2.66	2.60
100	9.20	7.76	6.69	5.87	5.22	4.70	4.27	3.91	3.60	3.33	3.10	2.90

Tc = time in minutes. Values may exceed 60.

Precip. file name: Somerset County.pcp

Storm Distribution	Rainfall Precipitation Table (in)							
	1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr
SCS 24-hour	0.00	3.34	0.00	0.00	5.01	6.15	0.00	8.21
SCS 6-Hr	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-1st	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-2nd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-3rd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-4th	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-Indy	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Custom	1.25	3.34	0.00	0.00	5.01	6.15	0.00	8.21

Hydraflow Table of Contents

HYDROGRAPH SUMMARY REPORTS
PRE VS POST CONDITIONS
2YR, 10YR & 100YR STORMS

Multi-Hydrograph Plot

Hyd. No. 7

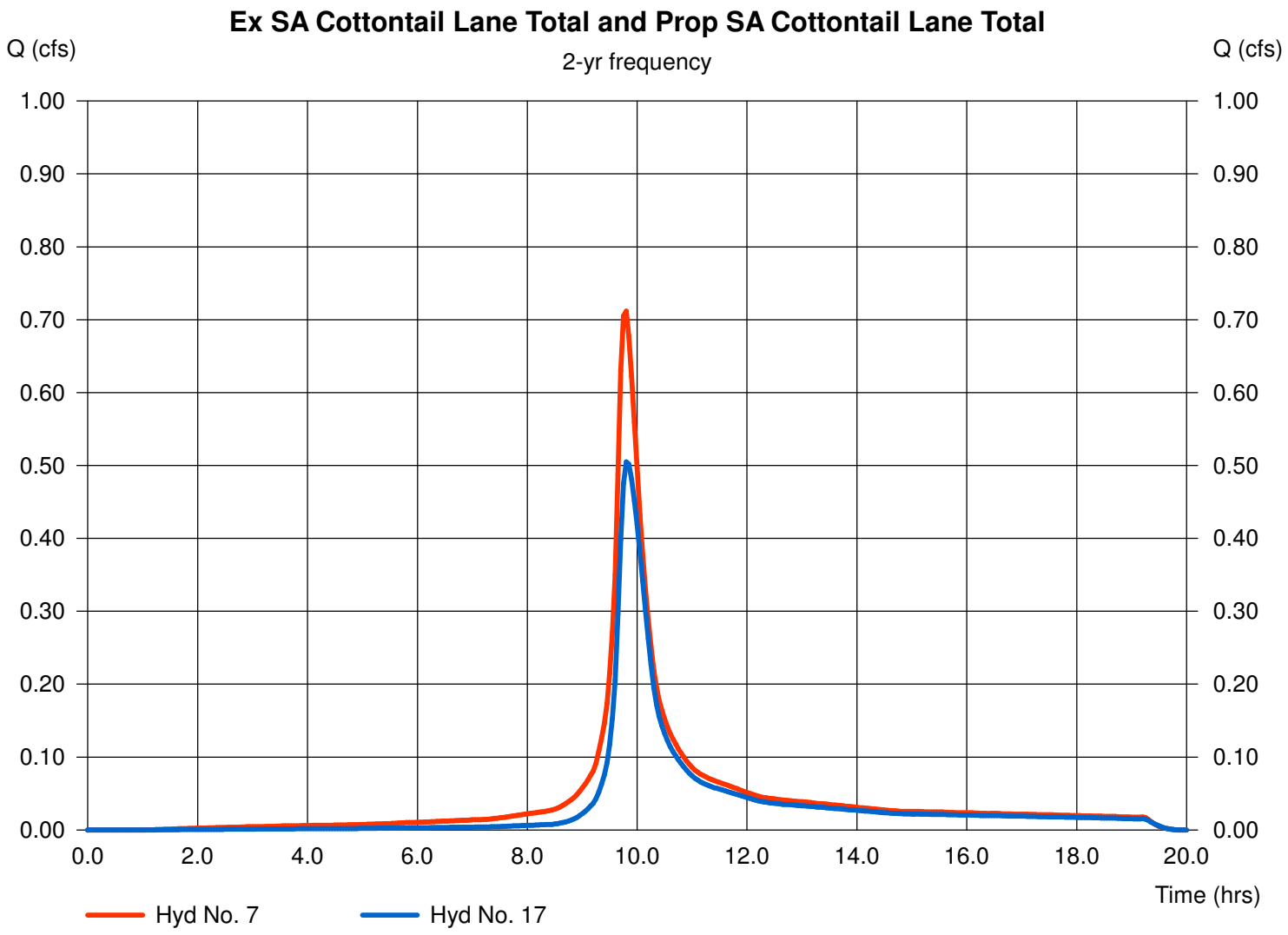
Ex SA Cottontail Lane Total

Hydrograph type	=	Combine
Peak discharge	=	0.712 cfs
Time to peak	=	9.80 hrs
Hyd. Volume	=	3,134 cuft

Hyd. No. 17

Prop SA Cottontail Lane Total

Hydrograph type	=	Combine
Peak discharge	=	0.50 cfs
Time to peak	=	9.80 hrs
Hyd. Volume	=	2,309 cuft



Multi-Hydrograph Plot

Hyd. No. 7

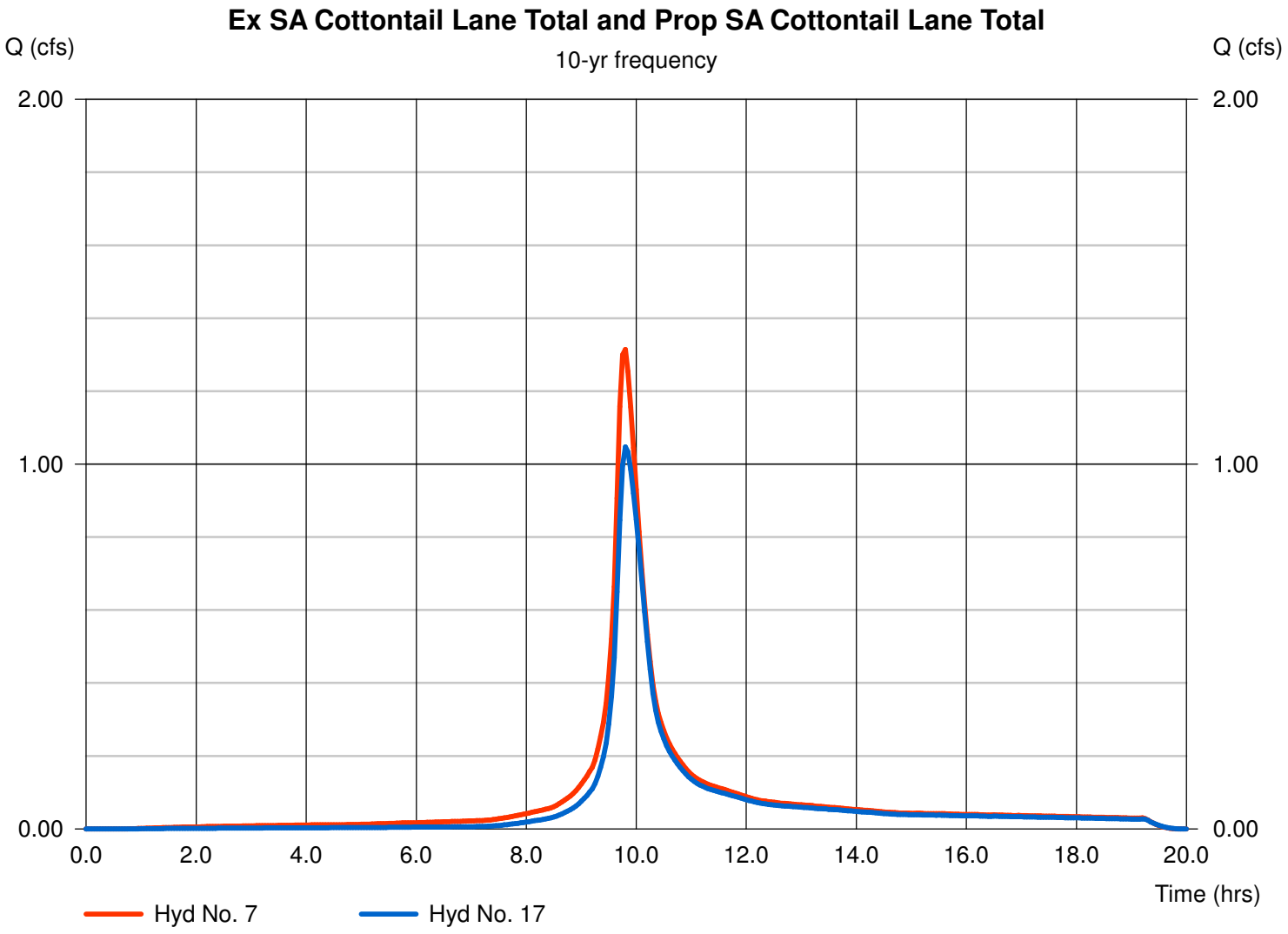
Ex SA Cottontail Lane Total

Hydrograph type	=	Combine
Peak discharge	=	1.314 cfs
Time to peak	=	9.80 hrs
Hyd. Volume	=	5,694 cuft

Hyd. No. 17

Prop SA Cottontail Lane Total

Hydrograph type	=	Combine
Peak discharge	=	1.05 cfs
Time to peak	=	9.80 hrs
Hyd. Volume	=	4,593 cuft



Multi-Hydrograph Plot

Hyd. No. 7

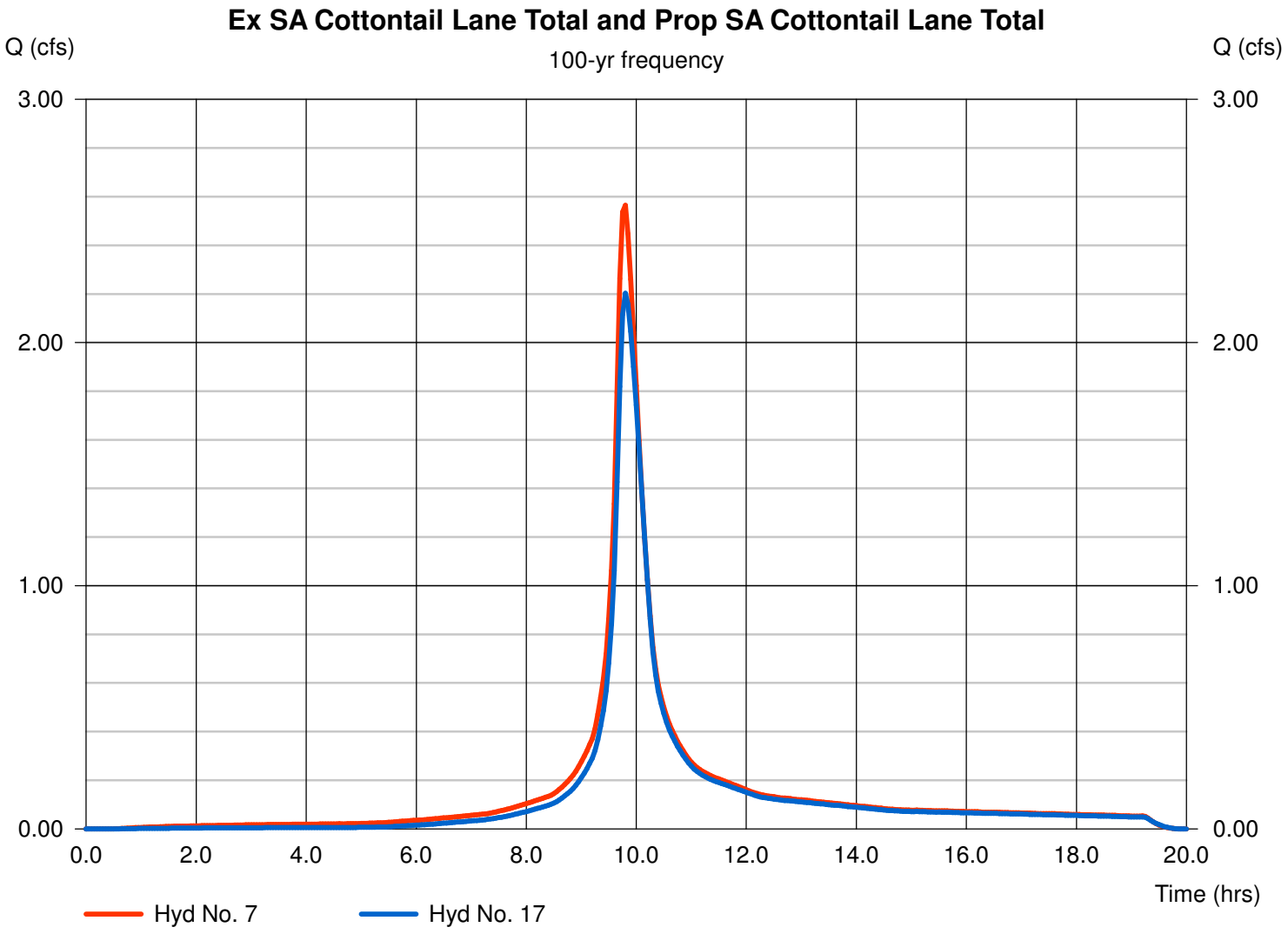
Ex SA Cottontail Lane Total

Hydrograph type	=	Combine
Peak discharge	=	2.564 cfs
Time to peak	=	9.80 hrs
Hyd. Volume	=	11,103 cuft

Hyd. No. 17

Prop SA Cottontail Lane Total

Hydrograph type	=	Combine
Peak discharge	=	2.20 cfs
Time to peak	=	9.80 hrs
Hyd. Volume	=	9,567 cuft



Multi-Hydrograph Plot

Hyd. No. 3

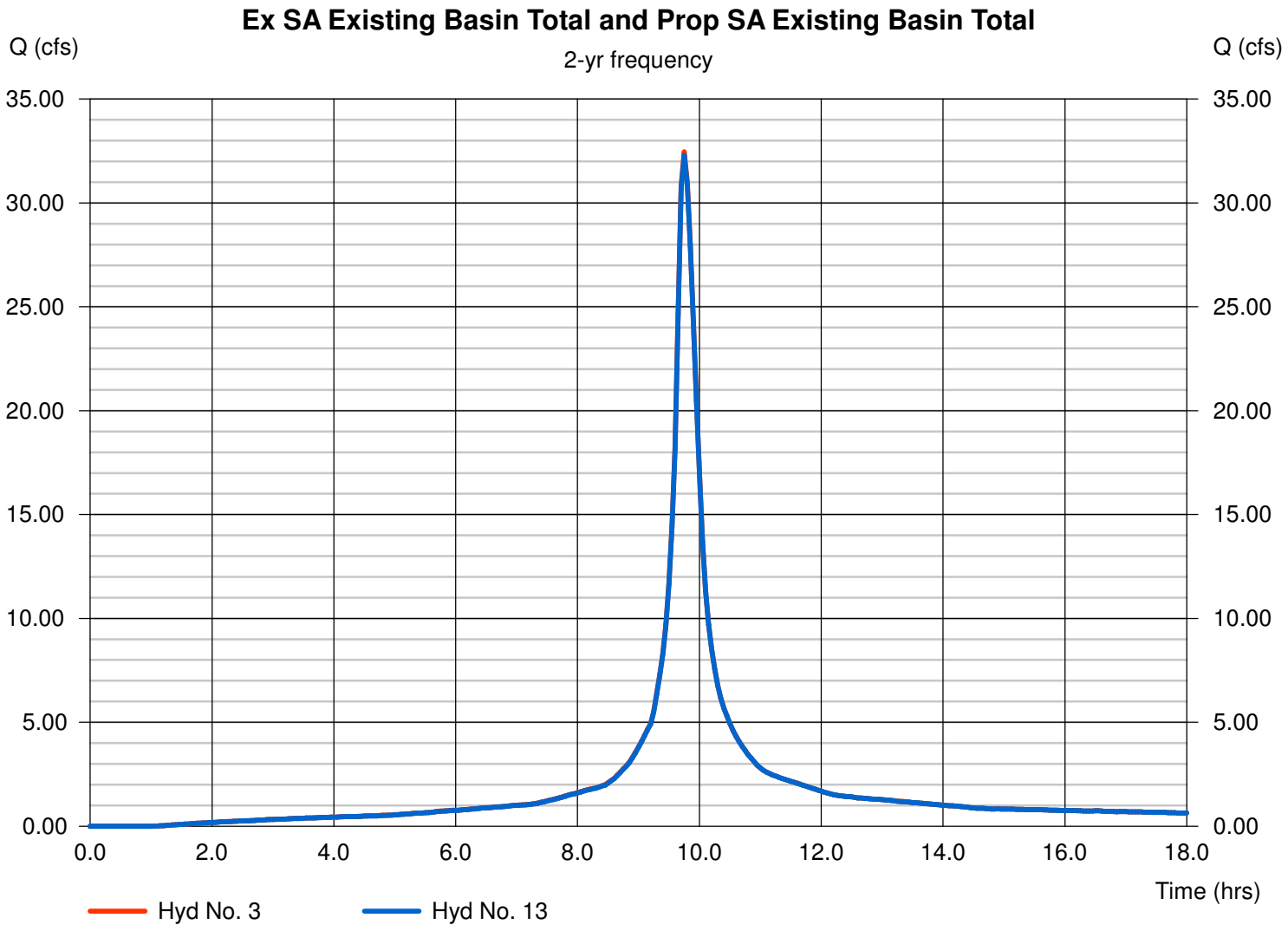
Ex SA Existing Basin Total

Hydrograph type	=	Combine
Peak discharge	=	32.45 cfs
Time to peak	=	9.75 hrs
Hyd. Volume	=	130,607 cuft

Hyd. No. 13

Prop SA Existing Basin Total

Hydrograph type	=	Combine
Peak discharge	=	32.29 cfs
Time to peak	=	9.75 hrs
Hyd. Volume	=	130,106 cuft



Multi-Hydrograph Plot

Hyd. No. 3

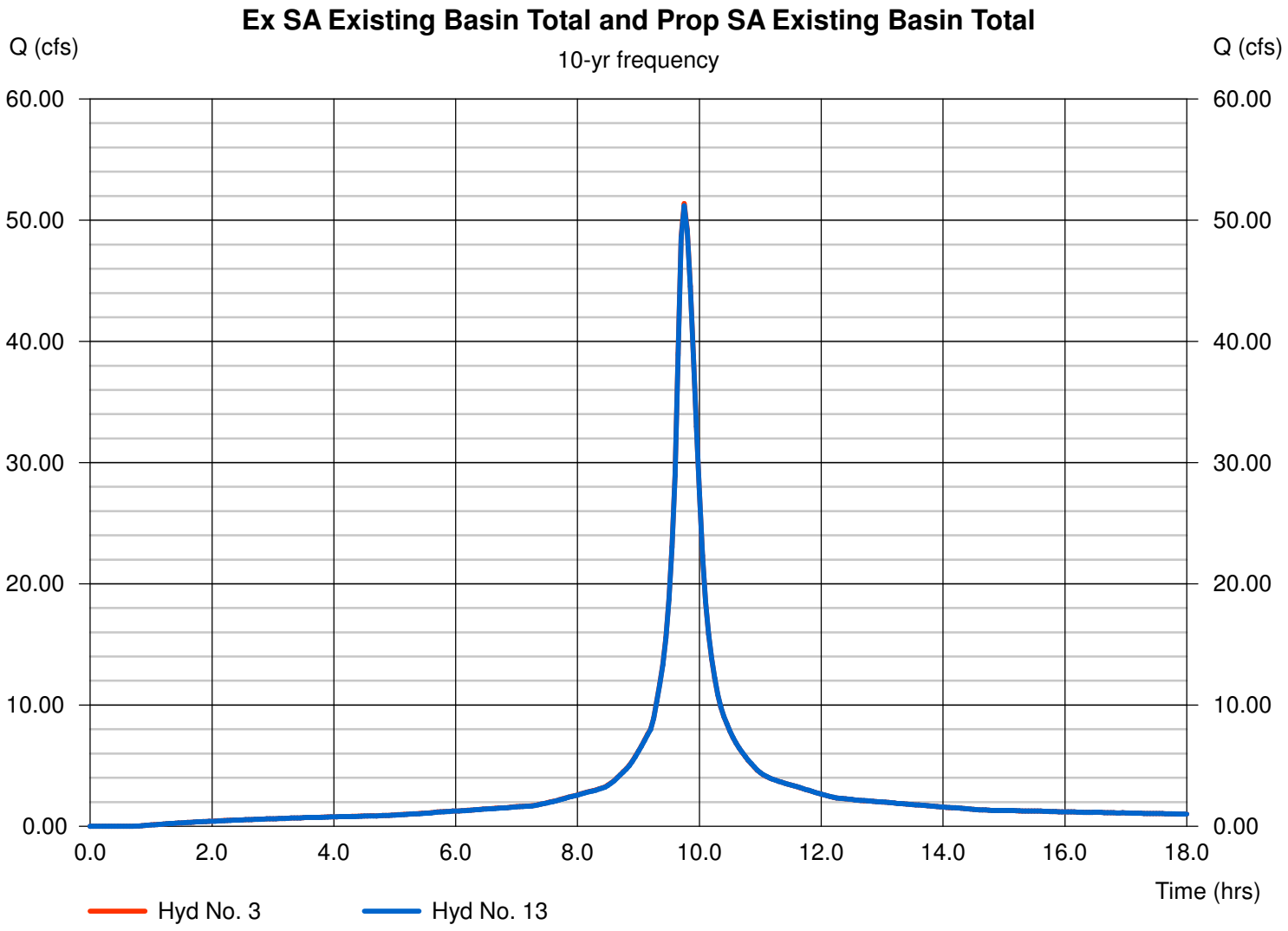
Ex SA Existing Basin Total

Hydrograph type	=	Combine
Peak discharge	=	51.37 cfs
Time to peak	=	9.75 hrs
Hyd. Volume	=	209,483 cuft

Hyd. No. 13

Prop SA Existing Basin Total

Hydrograph type	=	Combine
Peak discharge	=	51.20 cfs
Time to peak	=	9.75 hrs
Hyd. Volume	=	208,999 cuft



Multi-Hydrograph Plot

Hyd. No. 3

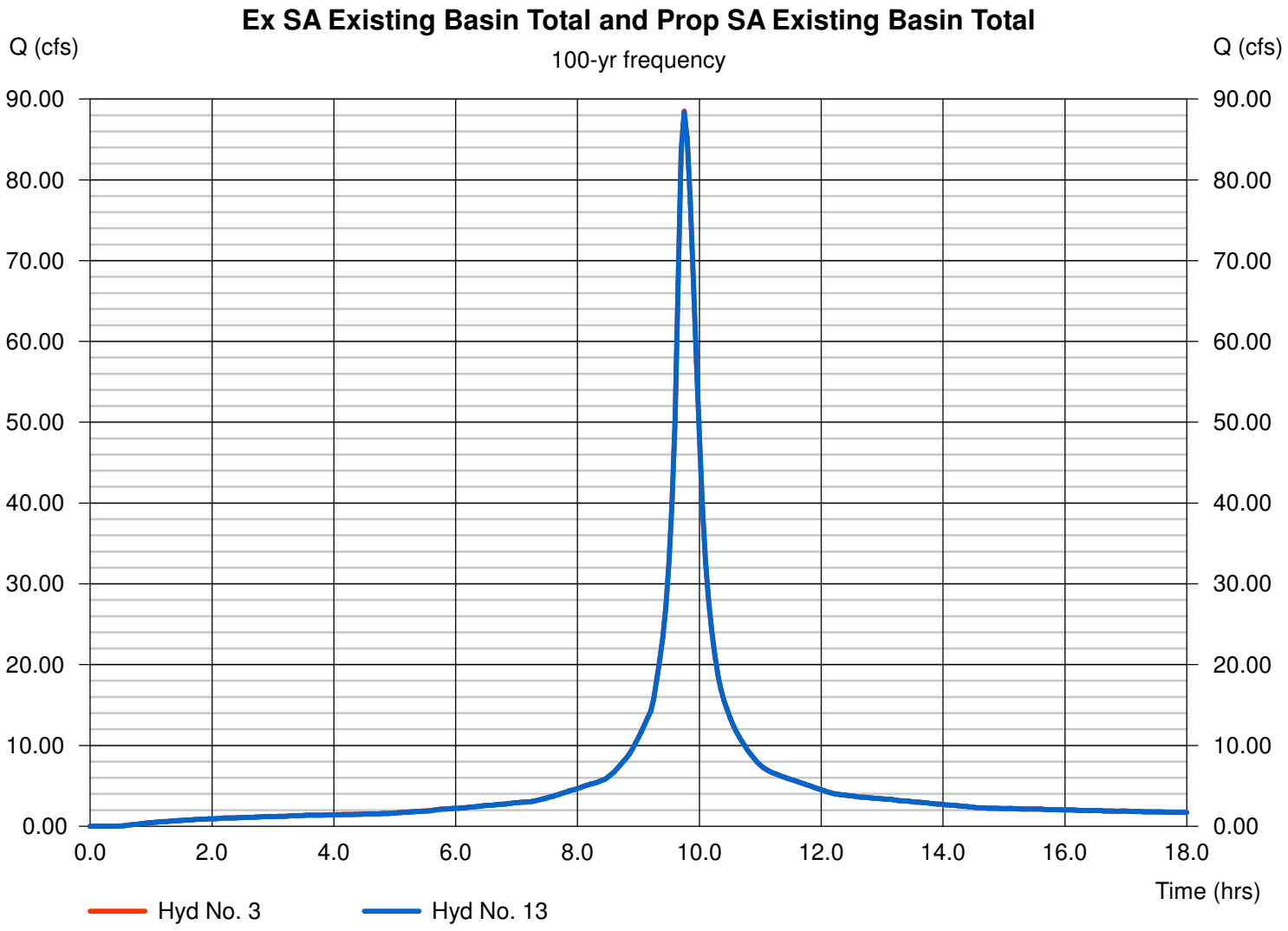
Ex SA Existing Basin Total

Hydrograph type	=	Combine
Peak discharge	=	88.51 cfs
Time to peak	=	9.75 hrs
Hyd. Volume	=	365,831 cuft

Hyd. No. 13

Prop SA Existing Basin Total

Hydrograph type	=	Combine
Peak discharge	=	88.37 cfs
Time to peak	=	9.75 hrs
Hyd. Volume	=	365,539 cuft



Multi-Hydrograph Plot

Hyd. No. 9

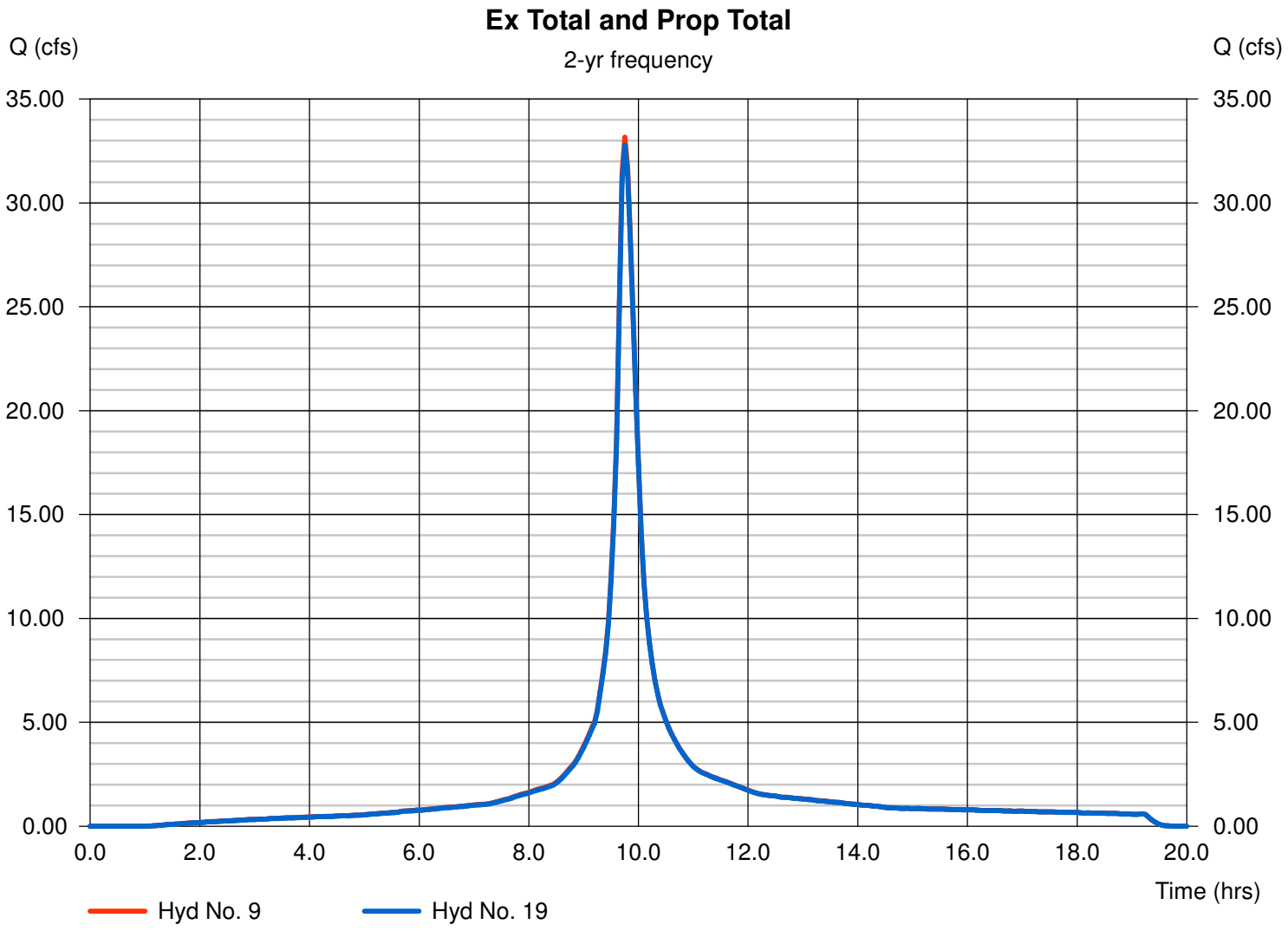
Ex Total

Hydrograph type	=	Combine
Peak discharge	=	33.15 cfs
Time to peak	=	9.75 hrs
Hyd. Volume	=	133,741 cuft

Hyd. No. 19

Prop Total

Hydrograph type	=	Combine
Peak discharge	=	32.77 cfs
Time to peak	=	9.75 hrs
Hyd. Volume	=	132,415 cuft



Multi-Hydrograph Plot

Hyd. No. 9

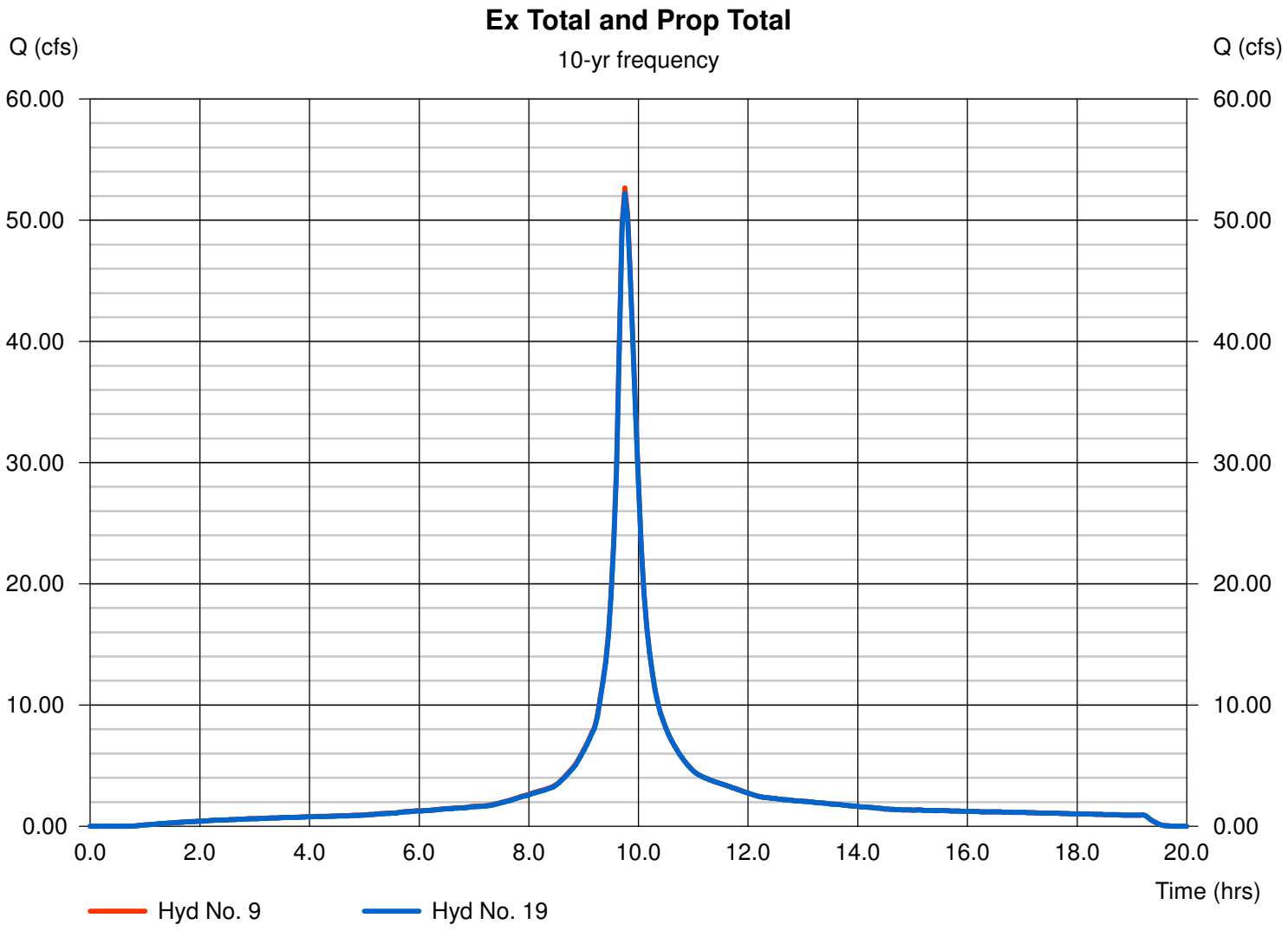
Ex Total

Hydrograph type	=	Combine
Peak discharge	=	52.67 cfs
Time to peak	=	9.75 hrs
Hyd. Volume	=	215,177 cuft

Hyd. No. 19

Prop Total

Hydrograph type	=	Combine
Peak discharge	=	52.20 cfs
Time to peak	=	9.75 hrs
Hyd. Volume	=	213,592 cuft



Multi-Hydrograph Plot

Hyd. No. 9

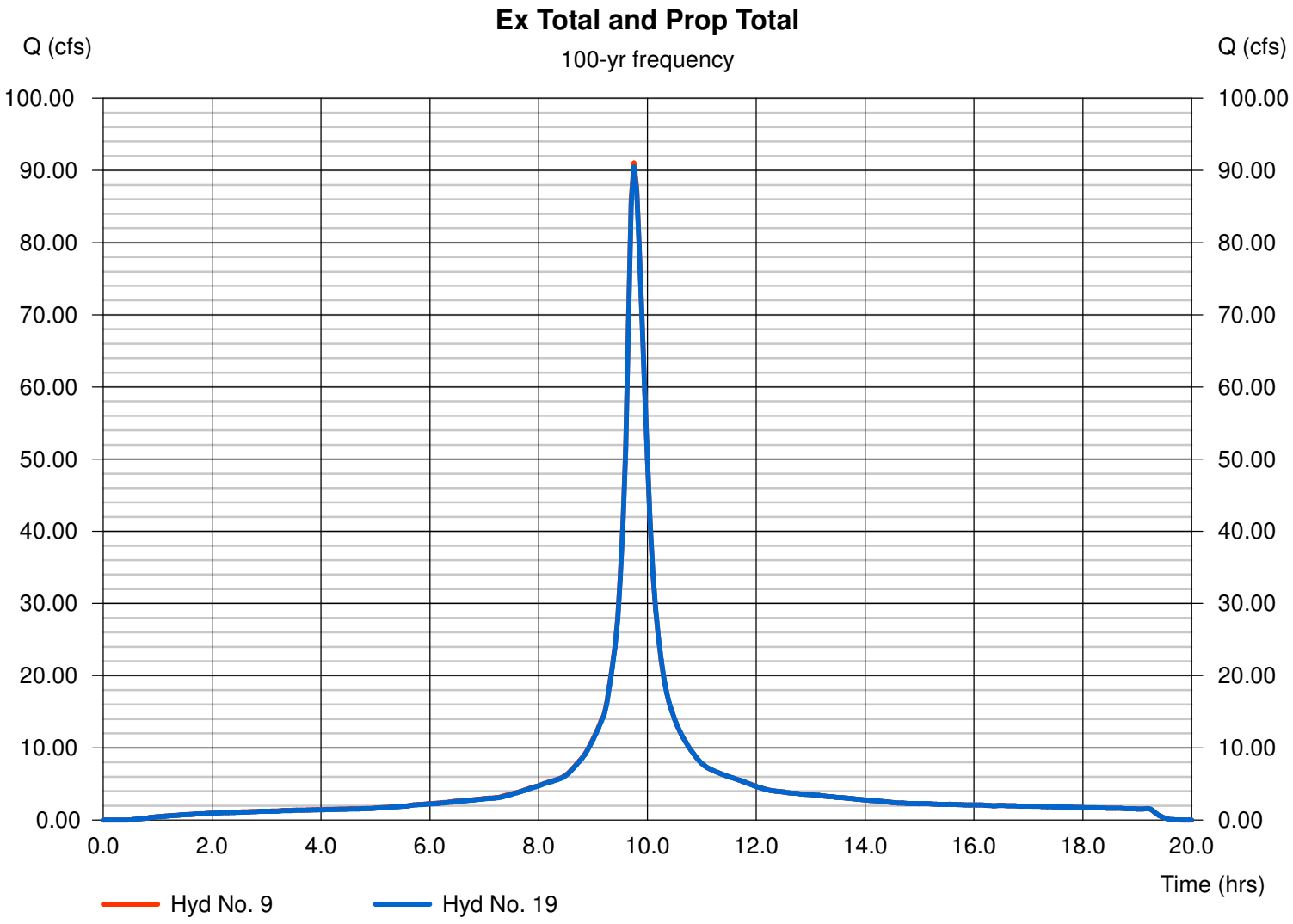
Ex Total

Hydrograph type	=	Combine
Peak discharge	=	91.05 cfs
Time to peak	=	9.75 hrs
Hyd. Volume	=	376,933 cuft

Hyd. No. 19

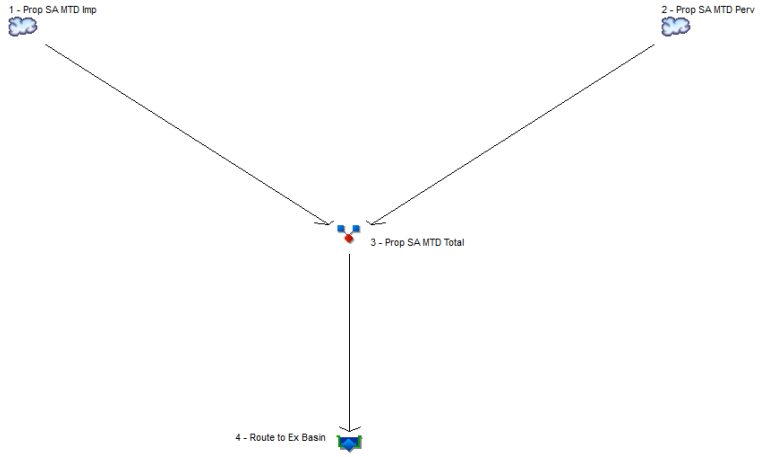
Prop Total

Hydrograph type	=	Combine
Peak discharge	=	90.48 cfs
Time to peak	=	9.75 hrs
Hyd. Volume	=	375,106 cuft



HYDROGRAPH SUMMARY REPORTS
WATER QUALITY

Watershed Model Schematic



Legend

Hyd.	Origin	Description
1	SCS Runoff	Prop SA MTD Imp
2	SCS Runoff	Prop SA MTD Perv
3	Combine	Prop SA MTD Total
4	Reservoir	Route to Ex Basin

Hydrograph Return Period Recap

Hydraflow Hydrographs by Intelisolve v9.1

Hyd. No.	Hydrograph type (origin)	Inflow Hyd(s)	Peak Outflow (cfs)								Hydrograph description
			1-Yr	2-Yr	3-Yr	5-Yr	10-Yr	25-Yr	50-Yr	100-Yr	
1	SCS Runoff	-------	26.27	------	------	------	------	------	------	------	Prop SA MTD Imp
2	SCS Runoff	-------	0.451	------	------	------	------	------	------	------	Prop SA MTD Perv
3	Combine	1, 2	26.34	------	------	------	------	------	------	------	Prop SA MTD Total
4	Reservoir	3	5.895	------	------	------	------	------	------	------	Route to Ex Basin

Hydrograph Summary Report

Hydraflow Hydrographs by Intelisolve v9.1

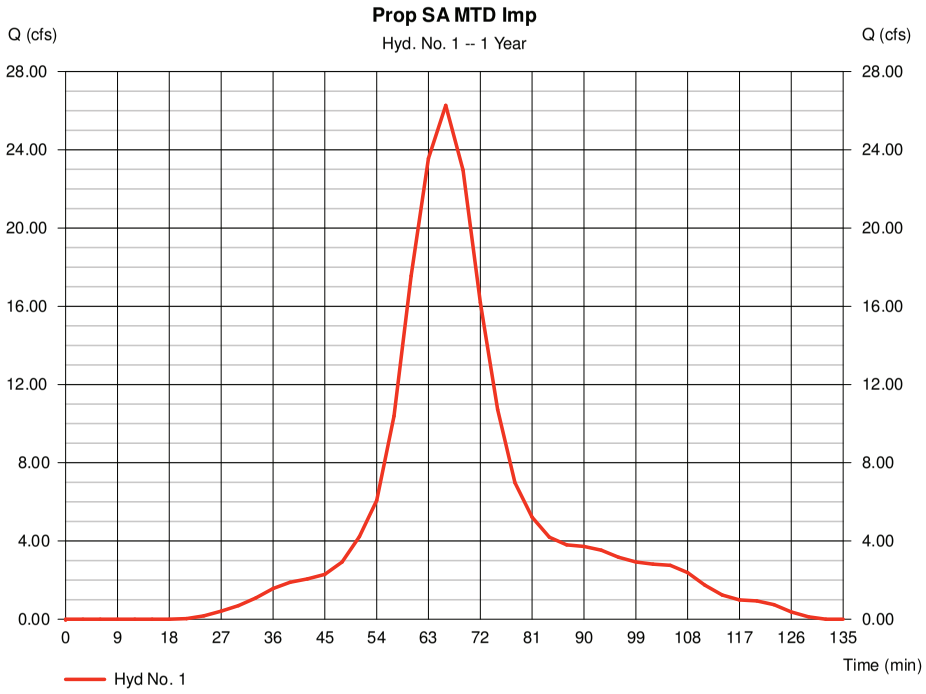
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Hyd. volume (acft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (acft)	Hydrograph description
1	SCS Runoff	26.27	3	66	0.821	---	------	------	Prop SA MTD Imp
2	SCS Runoff	0.451	3	78	0.023	---	------	------	Prop SA MTD Perv
3	Combine	26.34	3	66	0.844	1, 2	------	------	Prop SA MTD Total
4	Reservoir	5.895	3	81	0.844	3	54.98	0.521	Route to Ex Basin

Hydrograph Report

Hyd. No. 1

Prop SA MTD Imp

Hydrograph type	=	SCS Runoff	Peak discharge	=	26.27 cfs
Storm frequency	=	1 yrs	Time to peak	=	66 min
Time interval	=	3 min	Hyd. volume	=	0.821 acft
Drainage area	=	10.160 ac	Curve number	=	98
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	6.00 min
Total precip.	=	1.25 in	Distribution	=	Custom
Storm duration	=	Water Quality Storm.cds	Shape factor	=	484

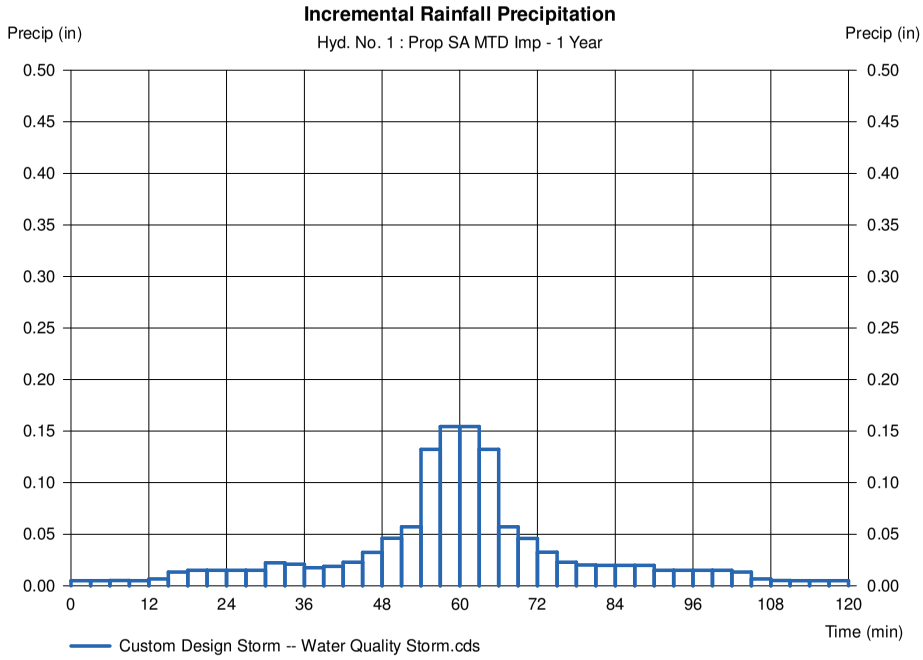


Precipitation Report

Hyd. No. 1

Prop SA MTD Imp

Storm Frequency	=	1 yrs	Time interval	=	3 min
Total precip.	=	1.2500 in	Distribution	=	Custom
Storm duration	=	Water Quality Storm.cds			

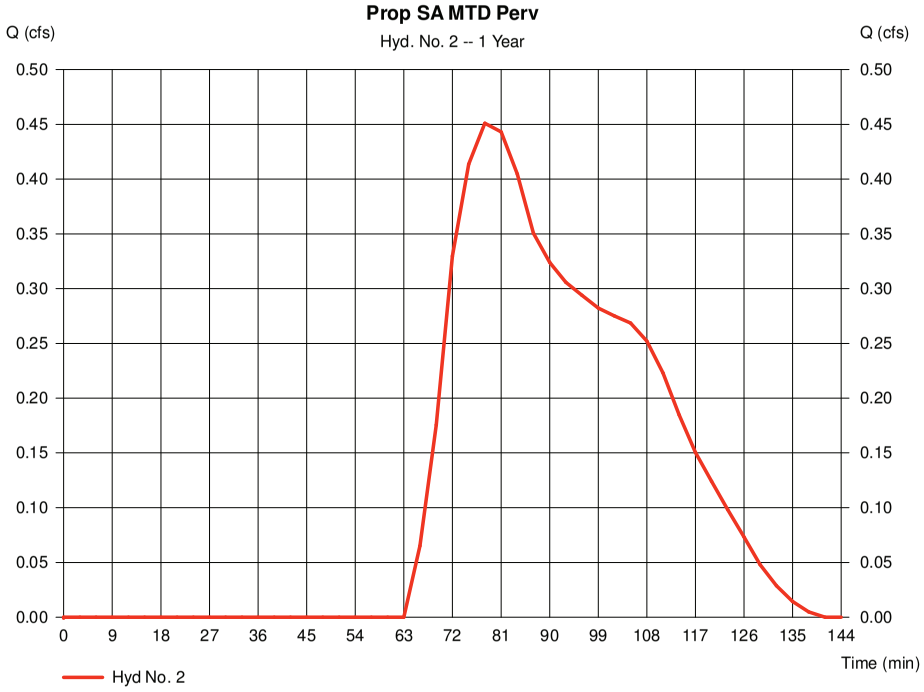


Hydrograph Report

Hyd. No. 2

Prop SA MTD Perv

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.451 cfs
Storm frequency	=	1 yrs	Time to peak	=	78 min
Time interval	=	3 min	Hyd. volume	=	0.023 acft
Drainage area	=	3.840 ac	Curve number	=	74
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	10.00 min
Total precip.	=	1.25 in	Distribution	=	Custom
Storm duration	=	Water Quality Storm.cds	Shape factor	=	484

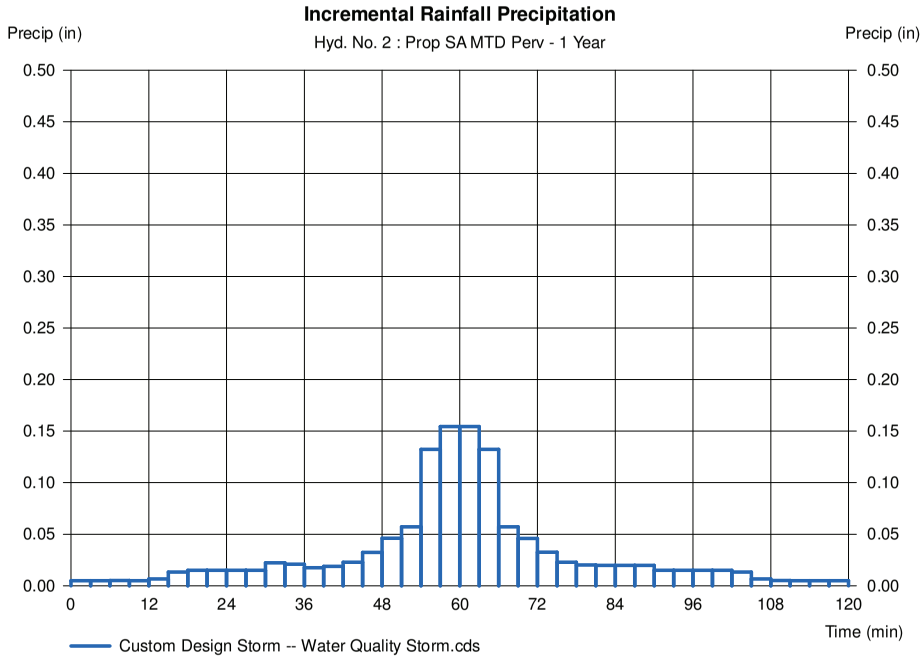


Precipitation Report

Hyd. No. 2

Prop SA MTD Perv

Storm Frequency	=	1 yrs	Time interval	=	3 min
Total precip.	=	1.2500 in	Distribution	=	Custom
Storm duration	=	Water Quality Storm.cds			

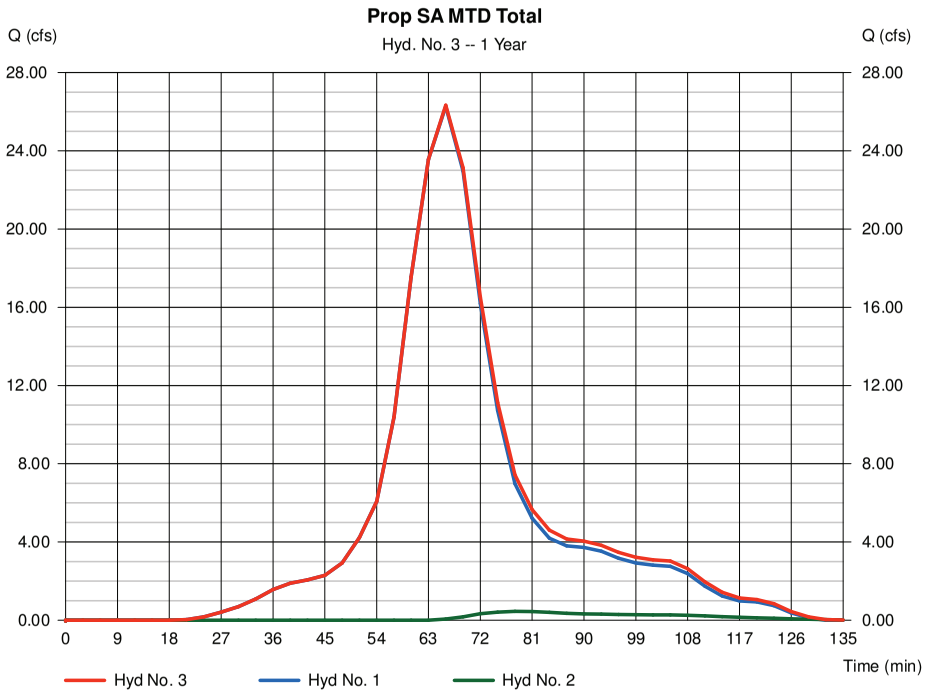


Hydrograph Report

Hyd. No. 3

Prop SA MTD Total

Hydrograph type	= Combine	Peak discharge	= 26.34 cfs
Storm frequency	= 1 yrs	Time to peak	= 66 min
Time interval	= 3 min	Hyd. volume	= 0.844 acft
Inflow hyds.	= 1, 2	Contrib. drain. area	= 14.000 ac



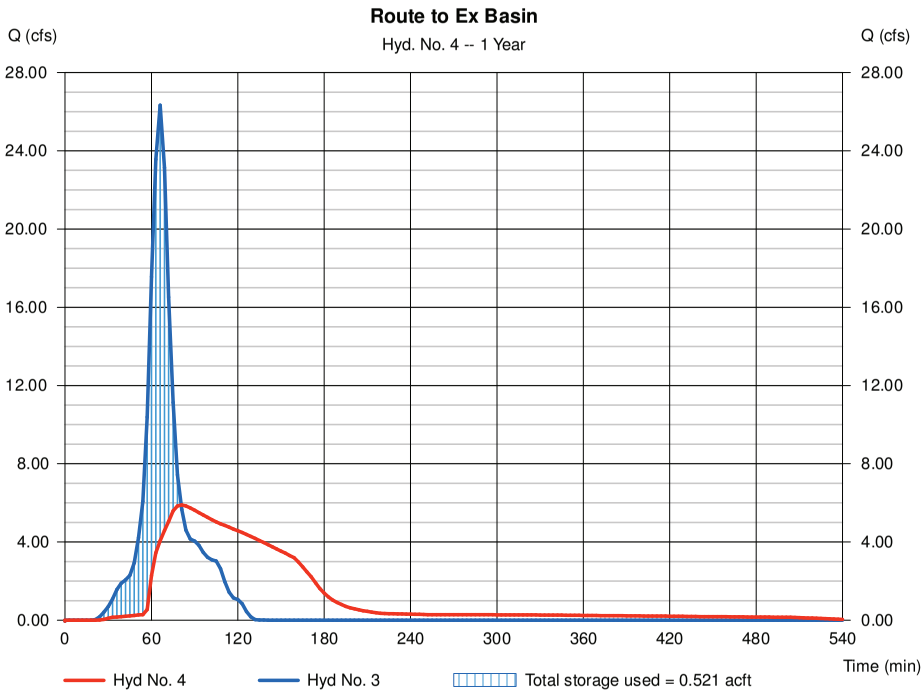
Hydrograph Report

Hyd. No. 4

Route to Ex Basin

Hydrograph type	= Reservoir	Peak discharge	= 5.895 cfs
Storm frequency	= 1 yrs	Time to peak	= 81 min
Time interval	= 3 min	Hyd. volume	= 0.844 acft
Inflow hyd. No.	= 3 - Prop SA MTD Total	Max. Elevation	= 54.98 ft
Reservoir name	= Existing Basin	Max. Storage	= 0.521 acft

Storage Indication method used.



Pond Report

Pond No. 1 - Existing Basin

Pond Data

Contours - User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 51.46 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (acft)	Total storage (acft)
0.00	51.46	00	0.000	0.000
0.54	52.00	1,500	0.006	0.006
1.54	53.00	3,000	0.051	0.057
2.54	54.00	10,326	0.145	0.201
3.54	55.00	18,448	0.326	0.527
4.54	56.00	26,189	0.510	1.037
5.54	57.00	33,823	0.687	1.724

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 24.00	3.00	5.00	0.00
Span (in)	= 24.00	3.00	24.00	0.00
No. Barrels	= 1	1	1	0
Invert El. (ft)	= 51.44	51.46	53.26	0.00
Length (ft)	= 25.00	0.00	0.00	0.00
Slope (%)	= 0.20	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	Yes	Yes	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 0.00	2.00	16.00	0.00
Crest El. (ft)	= 0.00	54.76	56.74	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= ---	Rect	Rect	---
Multi-Stage	= No	Yes	Yes	No

Exfil.(in/hr) = 0.000 (by Contour)

TW Elev. (ft) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).

Stage / Storage / Discharge Table

Stage ft	Storage acft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0.000	51.46	0.00	0.00	0.00	---	---	0.00	0.00	---	---	---	0.00
0.05	0.001	51.51	0.01 oc	0.01 ic	0.00	---	---	0.00	0.00	---	---	---	0.01
0.11	0.001	51.57	0.02 oc	0.02 ic	0.00	---	---	0.00	0.00	---	---	---	0.02
0.16	0.002	51.62	0.05 oc	0.05 ic	0.00	---	---	0.00	0.00	---	---	---	0.05
0.22	0.002	51.68	0.07 oc	0.07 ic	0.00	---	---	0.00	0.00	---	---	---	0.07
0.27	0.003	51.73	0.09 oc	0.09 ic	0.00	---	---	0.00	0.00	---	---	---	0.09
0.32	0.004	51.78	0.11 oc	0.10 ic	0.00	---	---	0.00	0.00	---	---	---	0.10
0.38	0.004	51.84	0.12 oc	0.11 ic	0.00	---	---	0.00	0.00	---	---	---	0.11
0.43	0.005	51.89	0.13 oc	0.12 ic	0.00	---	---	0.00	0.00	---	---	---	0.12
0.49	0.006	51.95	0.15 oc	0.13 ic	0.00	---	---	0.00	0.00	---	---	---	0.13
0.54	0.006	52.00	0.15 oc	0.15 ic	0.00	---	---	0.00	0.00	---	---	---	0.15
0.64	0.011	52.10	0.17 oc	0.16 ic	0.00	---	---	0.00	0.00	---	---	---	0.16
0.74	0.016	52.20	0.19 oc	0.18 ic	0.00	---	---	0.00	0.00	---	---	---	0.18
0.84	0.021	52.30	0.20 oc	0.19 ic	0.00	---	---	0.00	0.00	---	---	---	0.19
0.94	0.027	52.40	0.20 oc	0.20 ic	0.00	---	---	0.00	0.00	---	---	---	0.20
1.04	0.032	52.50	0.22 oc	0.22 ic	0.00	---	---	0.00	0.00	---	---	---	0.22
1.14	0.037	52.60	0.24 oc	0.23 ic	0.00	---	---	0.00	0.00	---	---	---	0.23
1.24	0.042	52.70	0.25 oc	0.24 ic	0.00	---	---	0.00	0.00	---	---	---	0.24
1.34	0.047	52.80	0.25 oc	0.25 ic	0.00	---	---	0.00	0.00	---	---	---	0.25
1.44	0.052	52.90	0.27 oc	0.26 ic	0.00	---	---	0.00	0.00	---	---	---	0.26
1.54	0.057	53.00	0.27 oc	0.27 ic	0.00	---	---	0.00	0.00	---	---	---	0.27
1.64	0.071	53.10	0.29 oc	0.28 ic	0.00	---	---	0.00	0.00	---	---	---	0.28
1.74	0.086	53.20	0.29 oc	0.29 ic	0.00	---	---	0.00	0.00	---	---	---	0.29
1.84	0.100	53.30	0.35 oc	0.29 ic	0.05 ic	---	---	0.00	0.00	---	---	---	0.35
1.94	0.115	53.40	0.67 oc	0.29 ic	0.36 ic	---	---	0.00	0.00	---	---	---	0.65
2.04	0.129	53.50	1.09 oc	0.28 ic	0.80 ic	---	---	0.00	0.00	---	---	---	1.08
2.14	0.144	53.60	1.66 oc	0.27 ic	1.35 ic	---	---	0.00	0.00	---	---	---	1.62
2.24	0.158	53.70	2.23 oc	0.26 ic	1.93 ic	---	---	0.00	0.00	---	---	---	2.19
2.34	0.173	53.80	2.58 oc	0.26 ic	2.31 ic	---	---	0.00	0.00	---	---	---	2.57
2.44	0.187	53.90	2.91 oc	0.26 ic	2.64 ic	---	---	0.00	0.00	---	---	---	2.89
2.54	0.201	54.00	3.18 oc	0.26 ic	2.93 ic	---	---	0.00	0.00	---	---	---	3.18
2.64	0.234	54.10	3.46 oc	0.26 ic	3.19 ic	---	---	0.00	0.00	---	---	---	3.44
2.74	0.267	54.20	3.70 oc	0.25 ic	3.43 ic	---	---	0.00	0.00	---	---	---	3.69
2.84	0.299	54.30	3.93 oc	0.25 ic	3.66 ic	---	---	0.00	0.00	---	---	---	3.91
2.94	0.332	54.40	4.13 oc	0.25 ic	3.87 ic	---	---	0.00	0.00	---	---	---	4.12
3.04	0.364	54.50	4.32 oc	0.24 ic	4.08 ic	---	---	0.00	0.00	---	---	---	4.32
3.14	0.397	54.60	4.53 oc	0.25 ic	4.27 ic	---	---	0.00	0.00	---	---	---	4.52

Continues on next page...

Existing Basin

Stage / Storage / Discharge Table

Stage ft	Storage acft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
3.24	0.430	54.70	4.72 oc	0.26 ic	4.45 ic	---	---	0.00	0.00	---	---	---	4.72
3.34	0.462	54.80	4.96 oc	0.27 ic	4.63 ic	---	---	0.05	0.00	---	---	---	4.96
3.44	0.495	54.90	5.43 oc	0.28 ic	4.79 ic	---	---	0.35	0.00	---	---	---	5.42
3.54	0.527	55.00	6.00 oc	0.29 ic	4.93 ic	---	---	0.78	0.00	---	---	---	6.00
3.64	0.578	55.10	6.67 oc	0.30 ic	5.05 ic	---	---	1.32	0.00	---	---	---	6.67
3.74	0.629	55.20	7.41 oc	0.30 ic	5.16 ic	---	---	1.94	0.00	---	---	---	7.41
3.84	0.680	55.30	8.21 oc	0.31 ic	5.26 ic	---	---	2.64	0.00	---	---	---	8.21
3.94	0.731	55.40	9.07 oc	0.31 ic	5.35 ic	---	---	3.41	0.00	---	---	---	9.07
4.04	0.782	55.50	9.98 oc	0.32 ic	5.42 ic	---	---	4.24	0.00	---	---	---	9.98
4.14	0.833	55.60	10.94 oc	0.32 ic	5.49 ic	---	---	5.13	0.00	---	---	---	10.94
4.24	0.884	55.70	11.93 oc	0.33 ic	5.54 ic	---	---	6.07	0.00	---	---	---	11.93
4.34	0.935	55.80	12.97 oc	0.33 ic	5.58 ic	---	---	7.06	0.00	---	---	---	12.97
4.44	0.986	55.90	14.04 oc	0.33 ic	5.60 ic	---	---	8.11	0.00	---	---	---	14.04
4.54	1.037	56.00	15.14 oc	0.33 ic	5.61 ic	---	---	9.20	0.00	---	---	---	15.14
4.64	1.106	56.10	16.27 oc	0.33 ic	5.61 ic	---	---	10.33	0.00	---	---	---	16.27
4.74	1.174	56.20	17.43 oc	0.33 ic	5.60 ic	---	---	11.51	0.00	---	---	---	17.43
4.84	1.243	56.30	18.62 oc	0.33 ic	5.56 ic	---	---	12.73	0.00	---	---	---	18.62
4.94	1.312	56.40	19.83 oc	0.32 ic	5.52 ic	---	---	13.99	0.00	---	---	---	19.83
5.04	1.380	56.50	21.06 oc	0.32 ic	5.45 ic	---	---	15.29	0.00	---	---	---	21.06
5.14	1.449	56.60	22.29 oc	0.32 ic	5.38 ic	---	---	16.60 s	0.00	---	---	---	22.29
5.24	1.518	56.70	23.41 oc	0.31 ic	5.31 ic	---	---	17.78 s	0.00	---	---	---	23.41
5.34	1.586	56.80	24.95 ic	0.30 ic	5.14 ic	---	---	18.73 s	0.78	---	---	---	24.95
5.44	1.655	56.90	26.92 ic	0.27 ic	4.56 ic	---	---	18.67 s	3.41	---	---	---	26.92
5.54	1.724	57.00	28.85 ic	0.23 ic	3.85 ic	---	---	17.71 s	7.06	---	---	---	28.85

...End

Hydraflow Rainfall Report

Return Period (Yrs)	Intensity-Duration-Frequency Equation Coefficients (FHA)			
	B	D	E	(N/A)
1	39.0824	9.5000	0.8528	-------
2	45.6943	10.7000	0.8185	-------
3	0.0000	0.0000	0.0000	-------
5	99.7061	14.8000	0.9304	-------
10	249.7597	21.8001	1.0961	-------
25	115.7547	14.9000	0.8980	-------
50	7.3699	0.1000	0.2544	-------
100	403.8513	25.1001	1.1108	-------

File name: TRENTON.idf

Intensity = B / (Tc + D)^E

Return Period (Yrs)	Intensity Values (in/hr)											
	5 min	10	15	20	25	30	35	40	45	50	55	60
1	4.00	3.10	2.55	2.18	1.91	1.70	1.54	1.40	1.29	1.20	1.12	1.05
2	4.80	3.83	3.21	2.77	2.45	2.20	2.00	1.84	1.70	1.59	1.49	1.40
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	6.20	5.03	4.24	3.67	3.24	2.90	2.63	2.40	2.22	2.06	1.92	1.80
10	6.80	5.63	4.80	4.17	3.69	3.30	2.98	2.72	2.50	2.31	2.14	2.00
25	7.89	6.45	5.47	4.76	4.23	3.80	3.46	3.17	2.93	2.73	2.55	2.40
50	4.87	4.09	3.69	3.44	3.25	3.10	2.98	2.88	2.80	2.72	2.66	2.60
100	9.20	7.76	6.69	5.87	5.22	4.70	4.27	3.91	3.60	3.33	3.10	2.90

Tc = time in minutes. Values may exceed 60.

Precip. file name: Somerset County.pcp

Storm Distribution	Rainfall Precipitation Table (in)							
	1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr
SCS 24-hour	0.00	3.34	0.00	0.00	5.01	6.15	0.00	8.21
SCS 6-Hr	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-1st	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-2nd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-3rd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-4th	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-Indy	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Custom	1.25	3.34	0.00	0.00	5.01	6.15	0.00	8.21

Hydraflow Table of Contents

WQS - MTD.gpw

STORMWATER COLLECTION SYSTEM CALCULATIONS (PIPE SIZING)

DYNAMIC ENGINEERING

Inlet Area Summary and Average Coefficient (C) Calculations

Project: B9 Cottontail Owner, LLC
Job #: 3566-99-004
Location: Franklin, NJ

Computed By: MP
Checked By: KK
Date: 2/14/2022

Drainage Area	Impervious Area (sf)	Coefficient (C) Used	Open Space (SF)	Coefficient (C) Used	Average Coefficient (C) Used	Total Area (SF)	Total Area (acres)
IA 1	2866	0.95	7173	0.35	0.52	10039	0.23
IA 2	2504	0.95	6320	0.35	0.52	8824	0.20
IA 3	4766	0.95	1893	0.35	0.78	6659	0.15
IA 4	7225	0.95	0	0.35	0.95	7225	0.17
IA 5	7228	0.95	0	0.35	0.95	7228	0.17
IA 6	7957	0.95	0	0.35	0.95	7957	0.18
IA 8	1431	0.95	395	0.35	0.82	1826	0.04
IA 9	1354	0.95	0	0.35	0.95	1354	0.03
IA 10	4543	0.95	461	0.35	0.89	5004	0.11
IA 25	14790	0.95		0.35	0.95	14790	0.34
IA 27	21677	0.95	19676	0.35	0.66	41353	0.95
IA 28	17655	0.95	0	0.35	0.95	17655	0.41
IA 29	18396	0.95	0	0.35	0.95	18396	0.42
IA 30	17371	0.95	0	0.35	0.95	17371	0.40
IA 31	18546	0.95	0	0.35	0.95	18546	0.43
IA 32	14514	0.95	5068	0.35	0.79	19582	0.45
IA 45	5123	0.95	5672	0.35	0.63	10795	0.25
IA 46	2731	0.95	6140	0.35	0.53	8871	0.20
IA 47	4614	0.95	4777	0.35	0.64	9391	0.22
IA 48	7378	0.95	3607	0.35	0.75	10985	0.25
IA 49	7271	0.95	3544	0.35	0.75	10815	0.25
IA 50	10453	0.95	6774	0.35	0.71	17227	0.40
IA 56	5064	0.95	1570	0.35	0.81	6634	0.15
IA 57	3701	0.95	730	0.35	0.85	4431	0.10
RA 1	12947	0.95	0	0.35	0.95	12947	0.30
RA 2	12947	0.95	0	0.35	0.95	12947	0.30
RA 3	12947	0.95	0	0.35	0.95	12947	0.30
RA 4	12947	0.95	0	0.35	0.95	12947	0.30
RA 5	12947	0.95	0	0.35	0.95	12947	0.30
RA 6	12947	0.95	0	0.35	0.95	12947	0.30
RA 7	12947	0.95	0	0.35	0.95	12947	0.30
RA 8	12947	0.95	0	0.35	0.95	12947	0.30
RA 9	12947	0.95	0	0.35	0.95	12947	0.30
RA 10	11933	0.95	0	0.35	0.95	11933	0.27
RA 11	11933	0.95	0	0.35	0.95	11933	0.27
RA 12	11933	0.95	0	0.35	0.95	11933	0.27
RA 13	11933	0.95	0	0.35	0.95	11933	0.27
RA 14	11933	0.95	0	0.35	0.95	11933	0.27
RA 15	11933	0.95	0	0.35	0.95	11933	0.27
RA 16	11933	0.95	0	0.35	0.95	11933	0.27
RA 17	11933	0.95	0	0.35	0.95	11933	0.27
RA 18	11933	0.95	0	0.35	0.95	11933	0.27
RA 19	11933	0.95	0	0.35	0.95	11933	0.27

DYNAMIC ENGINEERING

Stormwater Collection System Calculations

Project: B9 Cottontail Owner, LLC
Job #: 3566-99-004
Location: Franklin, NJ
Design Storm: 25-year

Computed By: MP
Checked By: KK
Date: 2/14/2022

NOTES:
1) Design method used is Rational Method, unless otherwise noted.
2) Refer to Weighted Runoff Coefficient table
for calculation of incremental areas and C values

PIPE SECTION		SUBCATCHMENT AREA	INCREMENTAL		CUMULATIVE	TIME OF CONCENTRATION			I	PEAK RUNOFF		PIPING INPUT			PIPING DATA		
FROM	TO	Area (Acres)	"C"	A x C Ac	A x C (acres)	Tc to Inlet (min)	Tc in Pipe (min.)	Final Tc (min)	(In/Hr)	Q to Inlet (CFS)	Q cum. for Pipe (CFS)	Dia. (In)	Length (Ft)	Man. "n"	Slope (ft/ft)	Pipe Capacity (cfs)	Pipe Velocity (fps)
IA 1	IA 2	0.23	0.52	0.12	0.12	10.00	0.34	10.00	6.80	0.82	0.82	15	100.0	0.010	0.0050	5.94	4.84
IA 2	IA 3	0.20	0.52	0.10	0.22	10.00	0.28	10.34	6.80	0.68	1.50	15	82.0	0.010	0.0050	5.94	4.84
IA 3	IA 4	0.15	0.78	0.12	0.34	10.00	0.48	10.62	6.68	0.80	2.27	15	140.0	0.010	0.0050	5.94	4.84
IA 4	IA 5	0.17	0.95	0.16	0.50	10.00	0.48	11.10	6.56	1.05	3.28	15	140.0	0.010	0.0050	5.94	4.84
IA 5	IA 6	0.17	0.95	0.16	0.66	10.00	0.48	11.58	6.44	1.03	4.25	15	140.0	0.010	0.0050	5.94	4.84
IA 6	EX MH	0.18	0.95	0.17	0.83	10.00	0.24	12.06	6.32	1.07	5.25	15	148.0	0.010	0.0222	12.51	10.20
IA 8	IA 9	0.04	0.82	0.03	0.03	10.00	0.07	10.00	6.80	0.20	0.20	15	30.0	0.010	0.0100	8.39	6.84
IA 9	IA 10	0.03	0.95	0.03	0.06	10.00	0.19	10.07	6.80	0.20	0.41	15	77.0	0.010	0.0100	8.39	6.84
IA 10	EX MH	0.11	0.89	0.10	0.16	10.00	0.18	10.26	6.80	0.68	1.09	15	75.0	0.010	0.0100	8.39	6.84
EX MH	EX FES	0.00	0.95	0.00	0.99	10.00	0.05	12.30	6.32	0.00	6.26	30	35.0	0.013	0.0186	55.93	11.40
RA 1	MH 15	0.30	0.95	0.29	0.29	10.00	0.13	10.00	6.80	1.97	1.97	12	32.0	0.010	0.0050	3.27	4.17
RA 2	ITC 16	0.30	0.95	0.29	0.29	10.00	0.08	10.00	6.80	1.97	1.97	12	20.0	0.010	0.0050	3.27	4.17
RA 3	ITC 17	0.30	0.95	0.29	0.29	10.00	0.08	10.00	6.80	1.97	1.97	12	20.0	0.010	0.0050	3.27	4.17
RA 4	MH 18	0.30	0.95	0.29	0.29	10.00	0.10	10.00	6.80	1.97	1.97	12	25.0	0.010	0.0050	3.27	4.17
RA 5	ITC 19	0.30	0.95	0.29	0.29	10.00	0.08	10.00	6.80	1.97	1.97	12	20.0	0.010	0.0050	3.27	4.17
RA 6	ITC 20	0.30	0.95	0.29	0.29	10.00	0.08	10.00	6.80	1.97	1.97	12	20.0	0.010	0.0050	3.27	4.17
RA 7	MH 21	0.30	0.95	0.29	0.29	10.00	0.10	10.00	6.80	1.97	1.97	12	25.0	0.010	0.0050	3.27	4.17
RA 8	ITC 22	0.30	0.95	0.29	0.29	10.00	0.08	10.00	6.80	1.97	1.97	12	20.0	0.010	0.0050	3.27	4.17
RA 9	ITC 23	0.30	0.95	0.29	0.29	10.00	0.08	10.00	6.80	1.97	1.97	12	20.0	0.010	0.0050	3.27	4.17
MH 15	ITC 16	0.00	0.95	0.00	0.29	10.00	0.11	10.13	6.80	0.00	1.97	15	32.0	0.010	0.0050	5.94	4.84
ITC 16	ITC 17	0.00	0.95	0.00	0.58	10.00	0.19	10.24	6.80	0.00	3.94	15	54.0	0.010	0.0050	5.94	4.84
ITC 17	MH 18	0.00	0.95	0.00	0.87	10.00	0.21	10.43	6.80	0.00	5.92	18	69.0	0.010	0.0050	9.65	5.46
MH 18	ITC 19	0.00	0.95	0.00	1.16	10.00	0.09	10.64	6.68	0.00	7.75	24	37.0	0.010	0.0050	20.79	6.62
ITC 19	ITC 20	0.00	0.95	0.00	1.45	10.00	0.14	10.73	6.68	0.00	9.69	24	56.0	0.010	0.0050	20.79	6.62
ITC 20	MH 21	0.00	0.95	0.00	1.74	10.00	0.17	10.87	6.68	0.00	11.62	24	69.0	0.010	0.0050	20.79	6.62
MH 21	ITC 22	0.00	0.95	0.00	2.03	10.00	0.14	11.04	6.56	0.00	13.32	24	54.0	0.010	0.0050	20.79	6.62
ITC 22	ITC 23	0.00	0.95	0.00	2.32	10.00	0.14	11.18	6.56	0.00	15.22	24	54.0	0.010	0.0050	20.79	6.62
ITC 23	MH 24	0.00	0.95	0.00	2.61	10.00	0.15	11.32	6.56	0.00	17.12	30	70.0	0.010	0.0050	37.70	7.68
MH 24	IA 25	0.00	0.95	0.00	2.61	10.00	0.15	11.47	6.56	0.00	17.12	30	68.0	0.010	0.0050	37.70	7.68
IA 25	FES 22	0.34	0.95	0.32	2.93	10.00	0.08	11.62	6.44	2.06	18.87	30	30.0	0.013	0.0050	29.00	5.91
IA 27	IA 28	0.95	0.66	0.63	0.63	10.00	0.33	10.00	6.80	4.28	4.28	15	95.0	0.010	0.0050	5.94	4.84
IA 28	IA 29	0.41	0.95	0.39	1.02	10.00	0.29	10.33	6.80	2.65	6.94	18	95.0	0.010	0.0050	9.65	5.46
IA 29	IA 30	0.42	0.95	0.40	1.42	10.00	0.24	10.62	6.68	2.67	9.49	24	95.0	0.010	0.0050	20.79	6.62
IA 30	IA 31	0.40	0.95	0.38	1.80	10.00	0.24	10.86	6.68	2.54	12.02	24	95.0	0.010	0.0050	20.79	6.62
IA 31	IA 32	0.43	0.95	0.41	2.21	10.00	0.24	11.10	6.56	2.69	14.50	24	95.0	0.010	0.0050	20.79	6.62
IA 32	FES 33	0.45	0.79	0.36	2.57	10.00	0.25	11.34	6.56	2.36	16.86	30	115.0	0.010	0.0050	37.70	7.68
RA 10	MH 35	0.27	0.95	0.26	0.26	10.00	0.10	10.00	6.80	1.77	1.77	12	25.0	0.010	0.0050	3.27	4.17
RA 11	ITC 36	0.27	0.95	0.26	0.26	10.00	0.08	10.00	6.80	1.77	1.77	12	20.0	0.010	0.0050	3.27	4.17
RA 12	ITC 37	0.27	0.95	0.26	0.26	10.00	0.08	10.00	6.80	1.77	1.77	12	20.0	0.010	0.0050	3.27	4.17
RA 13	MH 38	0.27	0.95	0.26	0.26	10.00	0.08	10.00	6.80	1.77	1.77	12	20.0	0.010	0.0050	3.27	4.17
RA 14	ITC 39	0.27	0.95	0.26	0.26	10.00	0.08	10.00	6.80	1.77	1.77	12	20.0	0.010	0.0050	3.27	4.17
RA 15	ITC 40	0.27	0.95	0.26	0.26	10.00	0.08	10.00	6.80	1.77	1.77	12	20.0	0.010	0.0050	3.27	4.17
RA 16	MH 54	0.27	0.95	0.26	0.26	10.00	0.08	10.00	6.80	1.77	1.77	12	20.0	0.010	0.0050	3.27	4.17
RA 17	ITC 55	0.27	0.95	0.26	0.26	10.00	0.08	10.00	6.80	1.77	1.77	12	20.0	0.010	0.0050	3.27	4.17
RA 18	ITC 56	0.27	0.95	0.26	0.26	10.00	0.08	10.00	6.80	1.77	1.77	12	20.0	0.010	0.0050	3.27	4.17
RA 19	ITC 57	0.27	0.95	0.26	0.26	10.00	0.08	10.00	6.80	1.77	1.77	12	20.0	0.010	0.0050	3.27	4.17
MH 35	ITC 36	0.00	0.95	0.00	0.26	10.00	0.14	10.10	6.80	0.00	1.77	15	40.0	0.010	0.0050	5.94	4.84
ITC 36	ITC 37	0.00	0.95	0.00	0.52	10.00	0.19	10.24	6.80	0.00	3.54	15	54.0	0.010	0.0050	5.94	4.84
ITC 37	MH 38	0.00	0.95	0.00	0.78	10.00	0.21	10.43	6.80	0.00	5.30	18	54.0	0.013	0.0050	7.43	4.21
MH 38	ITC 39	0.00	0.95	0.00	1.04	10.00	0.21	10.64	6.68	0.00	6.95	18	54.0	0.010	0.0050	7.43	4.21
ITC 39	ITC 40	0.00	0.95	0.00	1.30	10.00	0.18	10.85	6.68	0.00	8.68	24	54.0	0.013	0.0050	15.99	5.09
ITC 40	MH 54	0.00	0.95	0.00	1.56	10.00	0.14	11.03	6.56	0.00	10.23	24	54.0	0.010	0.0050	20.79	6.62
MH 54	ITC 55	0.00	0.95	0.00	1.82	10.00	0.14	11.17	6.56	0.00	11.94	24	54.0	0.010	0.0050	20.79	6.62
ITC 55	ITC 56	0.00	0.95	0.00	2.08	10.00	0.14	11.31	6.56	0.00	13.64	24	54.0	0.010	0.0050	20.79	6.62
ITC 56	ITC 57	0.00	0.95	0.00	2.34	10.00	0.09	11.45	6.56	0.00	15.35	24	36.0	0.010	0.0050	20.79	6.62
ITC 57	MH 52	0.00	0.95	0.00	2.60	10.00	0.11	11.54	6.44	0.00	16.74	30	51.0	0.010	0.0050	37.70	7.68
MH 52	MH 53	0.00	0.95	0.00	2.60	10.00	0.21	11.65	6.44	0.00	16.74	30	97.0	0.010	0.0050	37.70	7.68
IA 56	IA 57	0.15	0.81	0.12	0.12	10.00	0.10	10.00	6.80	0.82	0.82	15	30.0	0.010	0.0050	5.94	4.84
IA 57	MH 62	0.10	0.85	0.09	0.21	10.00	0.14	10.10	6.80	0.61	1.43	15	40.0	0.010	0.0050	5.94	4.84
MH 62	MH 53	0.00	0.95	0.00	0.21	10.00	0.22	10.24	6.80	0.00	1.43	15	65.0	0.010	0.0050	5.94	4.84
MH 53	FES 41	0.00	0.95	0.00	2.81	10.00	0.06	11.86	6.44	0.00	18.10	30	20.0	0.013	0.0050	29.00	5.91
IA 45	IA 46	0.25	0.63	0.16	0.16	10.00	0.40	10.00	6.80	1.09	1.09	15	115.0	0.010	0.0050	5.94	4.84
IA 46	IA 47	0.20	0.53	0.11	0.27	10.00	0.27	10.40	6.80	0.75	1.84	15	77.0	0.010	0.0050	5.94	4.84
IA 47	IA 48	0.22	0.64	0.14	0.41	10.00	0.48	10.67	6.68	0.94	2.74	15	140.0	0.010	0.0050	5.94	4.84
IA 48	IA 49	0.25	0.75	0.19	0.60	10.00	0.48	11.15	6.56	1.25	3.94	15	140.0	0.010	0.0050	5.94	4.84
IA 49	IA 50	0.25	0.75	0.19	0.79	10.00	0.48	11.63	6.44	1.22	5.09	15	140.0	0.010	0.0050	5.94	4.84
IA 50	FES 51	0.40	0.71	0.28	1.07	10.00	0.34	12.11	6.32	1.77	6.76	15	200.0	0.010	0.0207	12.08	9.85

FIRST DEFENSE MTD CERTIFICATION (HYDRO INTERNATIONAL)

State of New Jersey
DEPARTMENT OF ENVIRONMENTAL PROTECTION
PHILIP D. MURPHY
Governor
SHEILA Y. OLIVER
Lt. Governor
DIVISION OF WATERSHED PROTECTION AND RESTORATION
BUREAU OF NJPDES STORMWATER PERMITTING & WATER QUALITY MANAGEMENT
P.O. Box 420 Mail Code 401-02B
Trenton, New Jersey 08625-0420
609-633-7021 / Fax: 609-777-0432
www.njstormwater.org
SHAWN M. LATOURETTE
Commissioner

July 19, 2021

Mr. Jeremy Fink
Pr. Product Development Engineer
Hydro International
94 Hutchins Drive
Portland, ME 04102

Re: MTD Lab Certification
First Defense® Optimum Vortex Separator by Hydro International
Online Installation

TSS Removal Rate 50%

Dear Mr. Fink:

The Stormwater Management rules under N.J.A.C. 7:8-5.2(f) and 5.2(j) 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). Bio Clean Environmental, Inc. has requested an MTD Laboratory Certification for the First Defense® Optimum Vortex Separator (FD Optimum).

The project 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 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 dated June 2021 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 First Defense® Optimum Vortex Separator by Hydro International at a TSS removal rate of 50% when designed, operated and maintained in accordance with the information provided in the Verification Appendix and the following conditions:

1. The maximum treatment flow rate (MTFR) for the manufactured treatment device (MTD) is calculated using the New Jersey Water Quality Design Storm (1.25 inches in 2 hrs) in N.J.A.C. 7:8-5.5.

2. The FD Optimum shall be installed using the same configuration reviewed by NJCAT and shall be sized in accordance with the criteria specified in in item 6 below.

3. This FD Optimum cannot be used in series with another MTD or a media filter (such as a sand filter), to achieve an enhanced removal rate for total suspended solids (TSS) removal under N.J.A.C. 7:8-5.5.

4. Additional design criteria for MTDs can be found in Chapter 11.3 of the New Jersey Stormwater Best Management Practices (NJ Stormwater BMP) Manual which can be found online at www.njstormwater.org.

5. The maintenance plan for a site using this device shall incorporate, at a minimum, the maintenance requirements for the FD Optimum, which is attached to this document. However, it is recommended to review the maintenance manual at https://www.hydro-int.com/en/resources/first-defense-operations-maintenance-manual for any changes to the maintenance requirements.

6. Sizing Requirements:

   The example below demonstrates the sizing procedure for the FD Optimum:

   Example: A 0.25-acre impervious site is to be treated to 50% TSS removal using a FD Optimum. The impervious site runoff (Q) based on the New Jersey Water Quality Design Storm was determined to be 0.79 cfs.

   Maximum Treatment Flow Rate (MTFR) Evaluation:

   The site runoff (Q) was based on the following:
   time of concentration = 10 minutes
   i=3.2 in/hr (page 21, Fig. 5-10 of Chapter 5 of the NJ Stormwater BMP Manual)
   c=0.99 (curve number for impervious)
   Q=ciA=0.99x3.2x0.25=0.79 cfs

   Given the site runoff is 0.79 cfs and based on Table 1 below, the FD Optimum 3-ft model with a MTFR of 1.02 cfs would be the smallest model approved that could be used for this site that could remove 50% of the TSS from the impervious area without exceeding the MTFR.

   The sizing table corresponding to the available system models is noted below. Additional specifications regarding each model can be found in the Verification Appendix under Table A-1 and Table A-2.

Table 1. FD Optimum Model and MTFRs

FD Optimum Model	Manhole Diameter (ft)	MTFR (cfs)
3-ft	3	1.02
4-ft	4	1.81
5-ft	5	2.83
6-ft	6	4.07
7-ft	7	5.53
8-ft	8	7.23
10-ft	10	11.33

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 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 and Retrofit of Stormwater Management Measures.

If you have any questions regarding the above information, please contact Lisa Schaefer of my office at lisa.schaefer@dep.nj.gov.

Sincerely,

Gabriel Mahon

Gabriel Mahon, Chief
Bureau of NJPDES Stormwater Permitting & Water Quality Management
Division of Watershed Protection and Restoration
New Jersey Department of Environmental Protection

Attachment: Maintenance Plan

cc: Richard Magee, NJCAT

NJDEP Sizing Summary
February 9, 2022
Cottontail – Township of Franklin

Prepared for: Kyle Kavinski PE, Dynamic Engineering
Prepared by: Nick Burns, Hydro International
Product: First Defense Optimum
TSS Removal: 50% each and for consideration **87.5% total TSS Removal**

Product Brief

The **First Defense® Optimum** is an enhanced vortex separator that combines an effective stormwater treatment chamber with an integral peak flow bypass. It efficiently removes sediment total suspended solids (TSS), trash and hydrocarbons from Stormwater runoff without washing out previously captured pollutants. It is available in several model configurations to accommodate a wide range of pipe sizes, peak flows and depth constraints.

Certification Letter Product Rating Table

Table 1. FD Optimum Model and MTFRs

FD Optimum Model	Manhole Diameter (ft)	MTFR (cfs)
3-ft	3	1.02
4-ft	4	1.81
5-ft	5	2.83
6-ft	6	4.07
7-ft	7	5.53
8-ft	8	7.23
10-ft	10	11.33

Sizing Input from Engineer

Qwq = 5.895 cfs

Design Sizing

The 8’ diameter First Defense Optimum is selected for this location with a maximum treatment flow rate of 7.23 cfs (due to the limited availability of 7’ diameter precast in New Jersey, the 8’ model is selected). As proposed and for consideration, are three 8’ diameter First Defense Optimums in series for 87.5% (From equation 4-1 with 50% - 50% - 50% TSS removal)

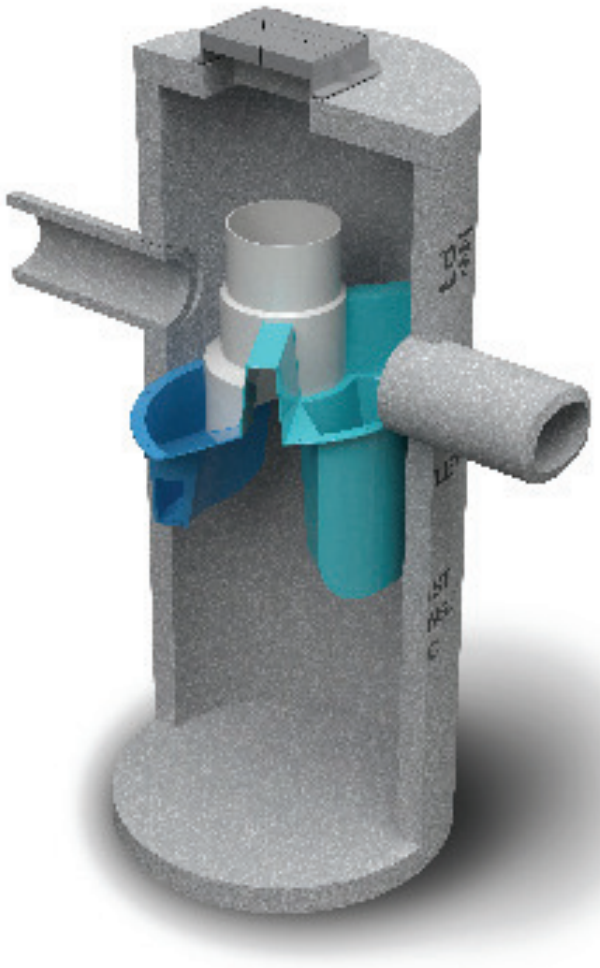
Maintenance

Nobody maintains our systems better than we do. To ensure optimal, ongoing device performance, be sure to recommend Hydro International as a preferred service and maintenance provider to your clients. Call **1 (800) 848-2706** to schedule an inspection and cleanout or learn more at **hydro-int.com/service.**

Hydro International, 94 Hutchins Drive, Portland ME 04102
Tel: (207) 756-6200 Fax: (207) 756-6212 Web: www.hydro-int.com

FIRST DEFENSE MTD OPERATION & MAINTENANCE MANUAL (HYDRO INTERNATIONAL)

Hydro International



Operation and Maintenance Manual

First Defense® High Capacity and First Defense®Optimum

Vortex Separator for Stormwater Treatment

Table of Contents

Hydro International (Stormwater), 94 Hutchins Drive, Portland ME 04102
Tel: (207) 756-6200 Fax: (207) 756-6212 Web: www.hydro-int.com

I. First Defense® by Hydro International

Introduction

The First Defense® is an enhanced vortex separator that combines an effective and economical stormwater treatment chamber with an integral peak flow bypass. It efficiently removes total suspended solids (TSS), trash and hydrocarbons from stormwater runoff without washing out previously captured pollutants. The First Defense® is available in several model configurations to accommodate a wide range of pipe sizes, peak flows and depth constraints.

The two product models described in this guide are the First Defense® High Capacity and the First Defense® Optimum; they are inspected and maintained identically.

Operation

The First Defense® operates on simple fluid hydraulics. It is self-activating, has no moving parts, no external power requirement and is fabricated with durable non-corrosive components. No manual procedures are required to operate the unit and maintenance is limited to monitoring accumulations of stored pollutants and periodic clean-outs. The First Defense® has been designed to allow for easy and safe access for inspection, monitoring and clean-out procedures. Neither entry into the unit nor removal of the internal components is necessary for maintenance, thus safety concerns related to confined-space-entry are avoided.

Pollutant Capture and Retention

The internal components of the First Defense® have been designed to optimize pollutant capture. Sediment is captured and retained in the base of the unit, while oil and floatables are stored on the water surface in the inner volume (Fig.1).

The pollutant storage volumes are isolated from the built-in bypass chamber to prevent washout during high-flow storm events. The sump of the First Defense® retains a standing water level between storm events. This ensures a quiescent flow regime at the onset of a storm, preventing resuspension and washout of pollutants captured during previous events.

Accessories such as oil absorbent pads are available for enhanced oil removal and storage. Due to the separation of the oil and floatable storage volume from the outlet, the potential for washout of stored pollutants between clean-outs is minimized.

Applications

- Stormwater treatment at the point of entry into the drainage line
- Sites constrained by space, topography or drainage profiles with limited slope and depth of cover
- Retrofit installations where stormwater treatment is placed on or tied into an existing storm drain line
- Pretreatment for filters, infiltration and storage

Advantages

- Inlet options include surface grate or multiple inlet pipes
- Integral high capacity bypass conveys large peak flows without the need for “offline” arrangements using separate junction manholes
- Long flow path through the device ensures a long residence time within the treatment chamber, enhancing pollutant settling
- Delivered to site pre-assembled and ready for installation

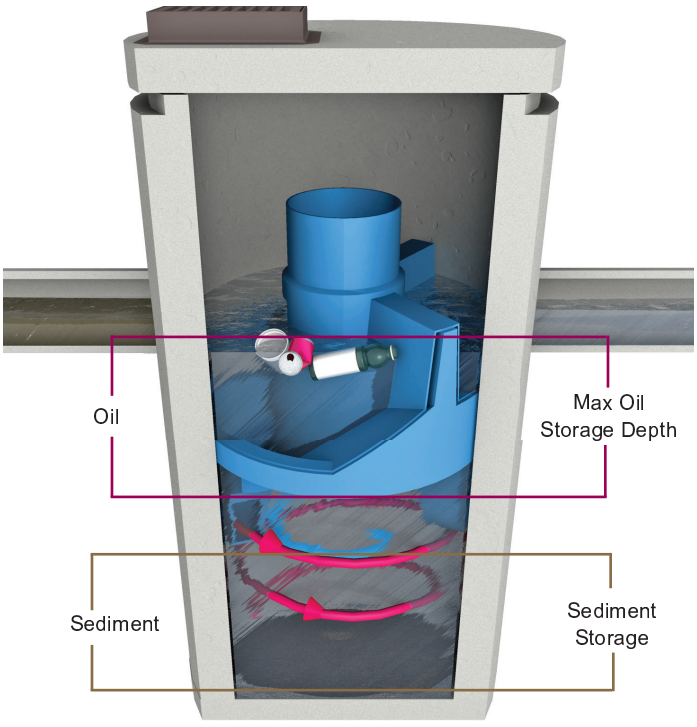


Fig.1 Pollutant storage volumes in the First Defense®.

II. Model Sizes & Configurations

The First Defense® inlet and internal bypass arrangements are available in several model sizes and configurations. The components have modified geometries allowing greater design flexibility to accommodate various site constraints.

All First Defense® models include the internal components that are designed to remove and retain total suspended solids (TSS), gross solids, floatable trash and hydrocarbons (Fig.2). First Defense® model sizes (diameter) are shown in Table 1.

III. Maintenance

First Defense® Components

1. **Built-In Bypass**
2. **Inlet Pipe**
3. **Inlet Chute**
4. **Floatables Draw-off Port**
5. **Outlet Pipe**
6. **Floatables Storage**
7. **Sediment Storage**
8. **Inlet Grate or Cover**

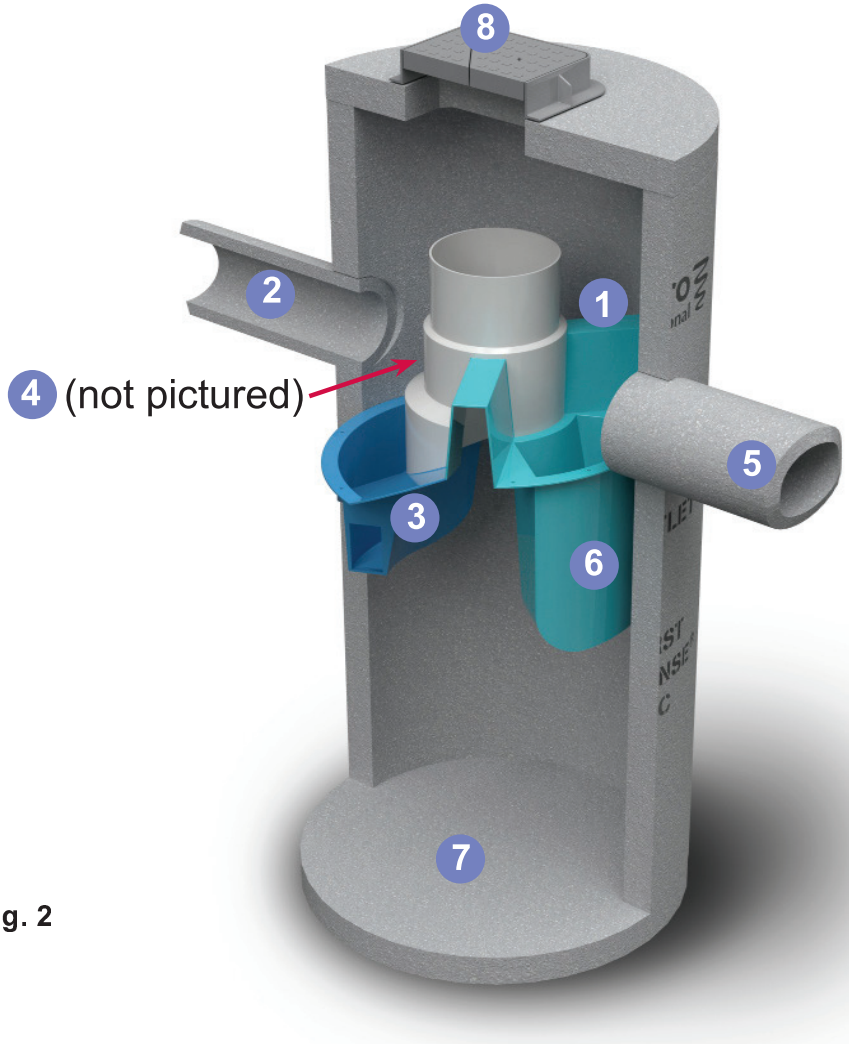


Fig. 2

Table 1

First Defense® Model Sizes
(ft / m) diameter
3 / 0.9
4 / 1.2
5 / 1.5
6 / 1.8
7 / 2.1
8 / 2.4
10 / 3.0

Overview

The First Defense® protects the environment by removing a wide range of pollutants from stormwater runoff. Periodic removal of these captured pollutants is essential to the continuous, long-term functioning of the First Defense®. The First Defense® will capture and retain sediment and oil until the sediment and oil storage volumes are full to capacity. When sediment and oil storage capacities are reached, the First Defense® will no longer be able to store removed sediment and oil.

The First Defense® allows for easy and safe inspection, monitoring and clean-out procedures. A commercially or municipally owned sump-vac is used to remove captured sediment and floatables. Access ports are located in the top of the manhole.

Maintenance events may include Inspection, Oil & Floatables Removal, and Sediment Removal. Maintenance events do not require entry into the First Defense®, nor do they require the internal components of the First Defense® to be removed. In the case of inspection and floatables removal, a vactor truck is not required. However, a vactor truck is required if the maintenance event is to include oil removal and/or sediment removal.

Maintenance Equipment Considerations

The internal components of the First Defense® have a centrally located circular shaft through which the sediment storage sump can be accessed with a sump vac hose. The open diameter of this access shaft is 15 inches in diameter (Fig.3). Therefore, the nozzle fitting of any vactor hose used for maintenance should be less than 15 inches in diameter.

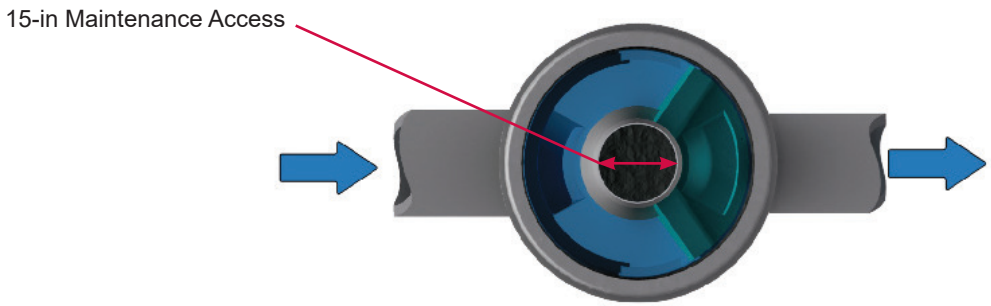


Fig.3 The central opening to the sump of the First Defense®is 15 inches in diameter.

Determining Your Maintenance Schedule

The frequency of clean out is determined in the field after installation. During the first year of operation, the unit should be inspected every six months to determine the rate of sediment and floatables accumulation. A simple probe such as a Sludge-Judge® can be used to determine the level of accumulated solids stored in the sump. This information can be recorded in the maintenance log (see page 9) to establish a routine maintenance schedule.

The vactor procedure, including both sediment and oil / flotables removal, for First Defense® typically takes less than 30 minutes and removes a combined water/oil volume of about 765 gallons.

Inspection Procedures

1. Set up any necessary safety equipment around the access port or grate of the First Defense® as stipulated by local ordinances. Safety equipment should notify passing pedestrian and road traffic that work is being done.

2. Remove the grate or lid to the manhole.

3. Without entering the vessel, look down into the chamber to inspect the inside. Make note of any irregularities. Fig.4 shows the standing water level that should be observed.

4. Without entering the vessel, use the pole with the skimmer net to remove floatables and loose debris from the components and water surface.

5. Using a sediment probe such as a Sludge Judge®, measure the depth of sediment that has collected in the sump of the vessel.

6. On the Maintenance Log (see page 9), record the date, unit location, estimated volume of floatables and gross debris removed, and the depth of sediment measured. Also note any apparent irregularities such as damaged components or blockages.

7. Securely replace the grate or lid.

8. Take down safety equipment.

9. Notify Hydro International of any irregularities noted during inspection.

Floatables and Sediment Clean Out

Floatables clean out is typically done in conjunction with sediment removal. A commercially or municipally owned sump-vac is used to remove captured sediment and floatables (Fig.4).

Floatables and loose debris can also be netted with a skimmer and pole. The access port located at the top of the manhole provides unobstructed access for a vactor hose to be lowered to the base of the sump.

Scheduling

- Floatables and sump clean out are typically conducted once a year during any season.

- Floatables and sump clean out should occur as soon as possible following a spill in the contributing drainage area.

Fig.4 Floatables are removed with a vactor hose

Recommended Equipment

- Safety Equipment (traffic cones, etc)
- Crow bar or other tool to remove grate or lid
- Pole with skimmer or net (if only floatables are being removed)
- Sediment probe (such as a Sludge Judge®)
- Vactor truck (flexible hose recommended)
- First Defense® Maintenance Log

Floatables and Sediment Clean Out Procedures

1. Set up any necessary safety equipment around the access port or grate of the First Defense® as stipulated by local ordinances. Safety equipment should notify passing pedestrian and road traffic that work is being done.

2. Remove the grate or lid to the manhole.

3. Without entering the vessel, look down into the chamber to inspect the inside. Make note of any irregularities.

4. Remove oil and floatables stored on the surface of the water with the vactor hose or with the skimmer or net

5. Using a sediment probe such as a Sludge Judge®, measure the depth of sediment that has collected in the sump of the vessel and record it in the Maintenance Log (page 9).

6. Once all floatables have been removed, drop the vactor hose to the base of the sump. Vactor out the sediment and gross debris off the sump floor

7. Retract the vactor hose from the vessel.

8. On the Maintenance Log provided by Hydro International, record the date, unit location, estimated volume of floatables and gross debris removed, and the depth of sediment measured. Also note any apparent irregularities such as damaged components, blockages, or irregularly high or low water levels.

9. Securely replace the grate or lid.

Maintenance at a Glance

Inspection	- Regularly during first year of installation - Every 6 months after the first year of installation
Oil and Floatables Removal	- Once per year, with sediment removal - Following a spill in the drainage area
Sediment Removal	- Once per year or as needed - Following a spill in the drainage area
NOTE: For most clean outs the entire volume of liquid does not need to be removed from the manhole. Only remove the first few inches of oils and floatables from the water surface to reduce the total volume of liquid removed during a clean out.	

First Defense® Installation Log

HYDRO INTERNATIONAL REFERENCE NUMBER:	
SITE NAME:	
SITE LOCATION:	
OWNER:	CONTRACTOR:
CONTACT NAME:	CONTACT NAME:
COMPANY NAME:	COMPANY NAME:
ADDRESS:	ADDRESS:
TELEPHONE:	TELEPHONE:
FAX:	FAX:

INSTALLATION DATE: / /

MODEL SIZE (CIRCLE ONE): [3-FT] [4-FT] [5-FT] [6-FT] [7-FT] [8-FT] [10-FT]

INLET (CIRCLE ALL THAT APPLY): GRATED INLET (CATCH BASIN) INLET PIPE (FLOW THROUGH)

Hydro International (Stormwater), 94 Hutchins Drive, Portland ME 04102
Tel: (207) 756-6200 Fax: (207) 756-6212 Web: www.hydro-int.com

First Defense® Inspection and Maintenance Log

Date	Initials	Depth of Floatables and Oils	Sediment Depth Measured	Volume of Sediment Removed	Site Activity and Comments

Hydro International (Stormwater), 94 Hutchins Drive, Portland ME 04102
Tel: (207) 756-6200 Fax: (207) 756-6212 Web: www.hydro-int.com

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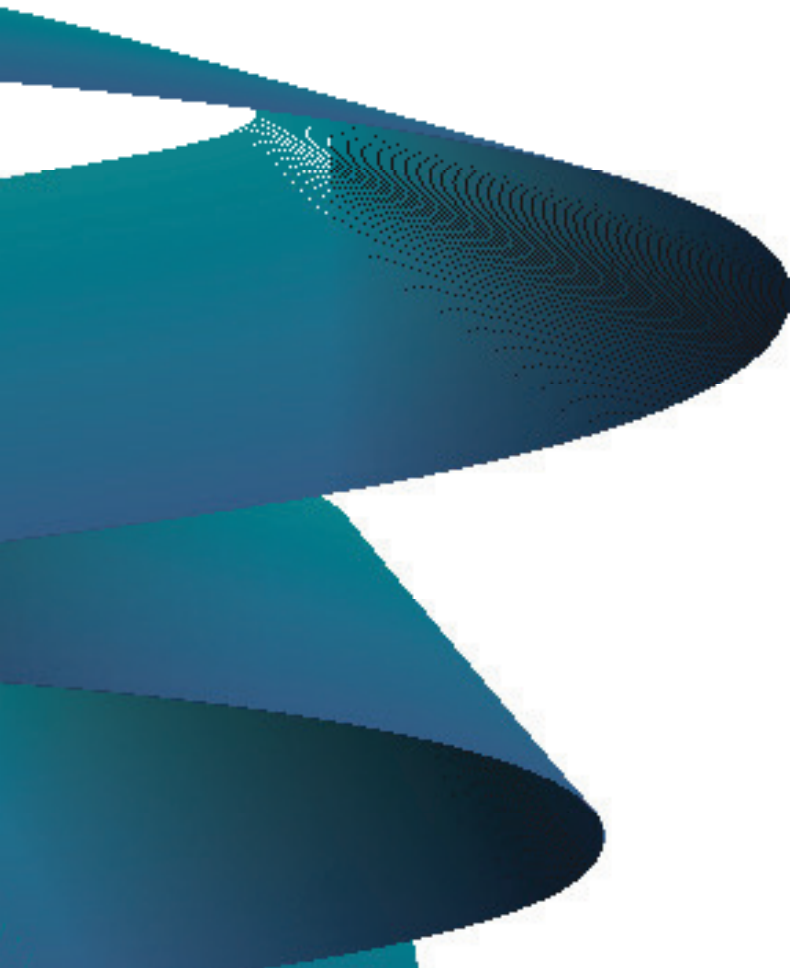
Tel: (207) 756-6200 Fax: (207) 756-6212 Web: www.hydro-int.com

Hydro International



Stormwater Solutions

94 Hutchins Drive
Portland, ME 04102

Tel: (207) 756-6200
Fax: (207) 756-6212
stormwaterinquiry@hydro-int.com

www.hydro-int.com

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NSPS SPREADSHEET

NJDEP Nonstructural Strategies Points System (NSPS)

Version: January 31, 2006

Note: Input Values in Yellow Cells Only

Project:	Proposed Warehouse - Franklin, NJ
Date:	January 18, 2022
User:	AG
Notes:	

Step 1 - Provide Basic Major Development Site Information

A. Specify Total Area in Acres of Development Site Described in Steps 2 and 3 = 14.5 **Acres**

B. Specify by Percent the Various Planning Areas Located within the Development Site:

State Plan Planning Area:	PA-1	PA-2	PA-3	PA-4	PA-4B	PA-5	Total % Area
Percent of Each Planning Area within Site:	100.0%						100.0%

Note: See User's Guide for Equivalent Zones within Designated Centers and the NJ Meadowlands, Pinelands, and Highlands Districts

Step 2 - Describe Existing or Pre-Developed Site Conditions

A. Specify Existing Land Use/Land Cover Descriptions and Areas:

Site Segment	Land Use/Land Cover Description	Specify Land Use/Land Cover in Acres for Each HSG				Use/Cover Subtotals	Points
		HSG A	HSG B	HSG C	HSG D		
1	Wetlands and Undisturbed Stream Buffers					0.0	0
2	Lawn and Open Space			4.2		4.2	67
3	Brush and Shrub					0.0	0
4	Meadow, Pasture, Grassland, or Range					0.0	0
5	Row Crop					0.0	0
6	Small Grain and Legumes					0.0	0
7	Woods - Indigenous					0.0	0
8	Woods - Planted					0.0	0
9	Woods and Grass Combination					0.0	0
10	Ponds, Lakes, and Other Open Water					0.0	0
11	Gravel and Dirt					0.0	0
12	Porous and Permeable Paving					0.0	0
13	Directly Connected Impervious			10.3		10.3	0
14	Unconnected Impervious with Small D/S Pervious					0.0	0
15	Unconnected Impervious with Large D/S Pervious					0.0	0
	HSG Subtotals (Acres):	0.0	0.0	14.5	0.0	**Total Area:**	14.5
	HSG Subtotals (%):	0.0%	0.0%	100.0%	0.0%	**Total % Area:**	100.0%

Points Subtotal: **67**

Total Existing Site Points: **67**

Step 3 - Describe Proposed or Post-Developed Site Conditions

A. Specify Proposed Land Use/Land Cover Descriptions and Areas:

Site Segment	Land Use/Land Cover Description	Specify Land Use/Land Cover in Acres for Each HSG				Use/Cover Subtotals	Points
		HSG A	HSG B	HSG C	HSG D		
1	Wetlands and Undisturbed Stream Buffers					0.0	0
2	Lawn and Open Space			4.3		4.3	68
3	Brush and Shrub					0.0	0
4	Meadow, Pasture, Grassland, or Range					0.0	0
5	Row Crop					0.0	0
6	Small Grain and Legumes					0.0	0
7	Woods - Indigenous					0.0	0
8	Woods - Planted					0.0	0
9	Woods and Grass Combination					0.0	0
10	Ponds, Lakes, and Other Open Water					0.0	0
11	Gravel and Dirt					0.0	0
12	Porous and Permeable Paving					0.0	0
13	Directly Connected Impervious			10.2		10.2	0
14	Unconnected Impervious with Small D/S Pervious					0.0	0
15	Unconnected Impervious with Large D/S Pervious					0.0	0
	HSG Subtotals (Acres):	0.0	0.0	14.5	0.0	**Total Area:**	14.5
	HSG Subtotals (%):	0.0%	0.0%	100.0%	0.0%	**Total % Area:**	100.0%
						Points Subtotal:	**68**

B. Compare Proposed Impervious Coverage with Maximum Allowable Impervious Coverage:

Total Directly Connected Impervious Coverage =	70%	% of Site
Total Unconnected Impervious Coverage with Small D/S Pervious =	0%	% of Site
Total Unconnected Impervious Coverage with Large D/S Pervious =	0%	% of Site
Total Site Impervious Coverage =	70%	% of Site
Effective Site Impervious Coverage =	70%	% of Site
Specify Source of Maximum Allowable Impervious Coverage:	Table	(None or Table)
Allowable Site Impervious Cover from Maximum Impervious Cover Table:	0%	

Note: See Maximum Impervious Cover Table Worksheet for Details

Points Subtotal: 0

C. Compare Proposed Site Disturbance with Maximum Allowable Site Disturbance:

Total Proposed Site Disturbance =	85%	% of Site
Maximum Allowable Site Disturbance by Municipal Ordinance =	100%	% of Site

Points Subtotal: 7

D. Describe Proposed Runoff Conveyance System:

Total Length of Runoff Conveyance System =		Feet
Length of Vegetated Runoff Conveyance System =		Feet
% of Total Runoff Conveyance System That is Vegetated =	0%	

Points Subtotal: 0

E. Residential Lot Clustering:

Percent of Total Site Area that will be Clustered =		% of Site
Minimum Standard Lot Size as Per Zoning (Note: 1/2 Acre or Greater) =		Acres
Maximum Proposed Cluster Lot Size (Note:1/4 Acre or Less) =		Acres
Percent of Clustered Portion of Site to be Preserved as Vegetated Open Space =		% of Clustered Site Portion

Points Subtotal: 0

F. Will the Following be Utilized to Minimize Soil Compaction?

Proposed Lawn Areas will be Graded with Lightweight Construction Equipment:	Yes	(Yes or No)
Percent of Proposed Lawn Areas to be Graded with Such Equipment:	100%	% of Lawn Areas

Points Subtotal: **23**

G. Are Any of the Following Stormwater Management Standards Met Using Only Nonstructural Strategies and Measures?

Groundwater Recharge Standards (NJAC 7:8-5.4-a-2):	No	(Yes or No)
Stormwater Runoff Quality Standards (NJAC 7:8-5.5):	No	(Yes or No)
Stormwater Runoff Quantity Standards (NJAC 7:8-5.4-a-3):	No	(Yes or No)

Points Subtotal: **0**

Note: If the Answers to All Three Questions at G Above are "Yes", Adequate Nonstructural Measures have been Utilized.

Total Proposed Site Points: **98**

Ratio of Proposed to Existing Site Points: **147%**

Required Site Points Ratio: **80%**

Nonstructural Point System Results: **Proposed Nonstructural Measures are Adequate**

DRAINAGE AREA MAPS

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Allen, Texas T: 972.534.2100 | Austin, Texas T:512.646.2646 | Houston, Texas T: 281.789.6400 | Delray Beach, Florida T: 561.921.8570
Newtown, Pennsylvania T: 267.685.0276 | Philadelphia, Pennsylvania T: 215.253.4888 | Bethlehem, Pennsylvania T: 610.598.4400

TITLE:

EXISTING DRAINAGE AREA MAP

PROJECT: **B9 COTTONTAIL OWNER, LLC**
PROPOSED INDUSTRIAL DEVELOPMENT
BLOCK 517.06, LOT 15.10
200 COTTONTAIL LANE
TOWNSHIP OF FRANKLIN, SOMERSET COUNTY, NEW JERSEY

JOB No:	3566-99-004
DATE:	02/09/2022
DRAWN BY:	KJH
DESIGNED BY:	KCK
CHECKED BY:	JMS
CHECKED BY:	–
SCALE:	(H) 1"=50' (V)
SHEET No:	1 OF 3
Rev. #	0

KYLE C. KAVINSKI
PROFESSIONAL ENGINEER
NEW JERSEY LICENSE No. 52985

JOSHUA M. SEWALD
PROFESSIONAL ENGINEER
NEW JERSEY LICENSE No. 52908

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Rev.	Date	Comments	By

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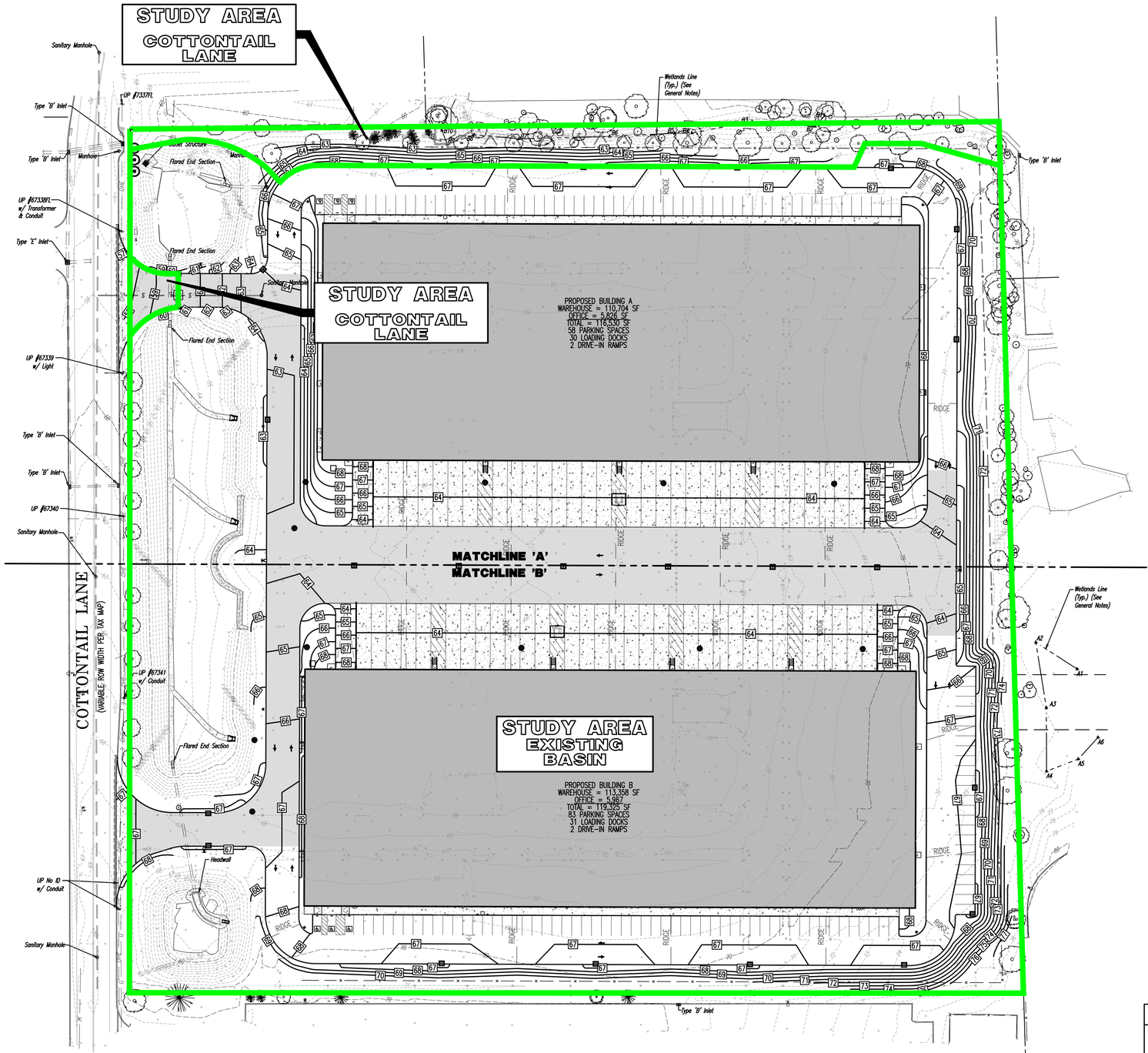

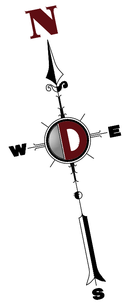

GRAPHIC SCALE

−50 0 25 50 100 200

(IN FEET)

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Newtown, Pennsylvania T: 267.685.0276 | Philadelphia, Pennsylvania T: 215.253.4888 | Bethlehem, Pennsylvania T: 610.598.4400

TITLE:

PROPOSED DRAINAGE AREA MAP

PROJECT: **B9 COTTONTAIL OWNER, LLC**
PROPOSED INDUSTRIAL DEVELOPMENT
BLOCK 517.06, LOT 15.10
200 COTTONTAIL LANE
TOWNSHIP OF FRANKLIN, SOMERSET COUNTY, NEW JERSEY

JOB No:	3566-99-004
DATE:	02/09/2022
DRAWN BY:	KJH
SCALE:(H) 1"=50' (V)	
DESIGNED BY:	KCK
CHECKED BY:	JMS
CHECKED BY:	_
SHEET No:	2 OF 3
Rev. #	0

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JOSHUA M. SEWALD
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Rev.	Date	Comments	By

Plotted: 02/25/22 – 3:41 PM, By: kihnen, – Product Ver: 24.1s (LMS Tech)
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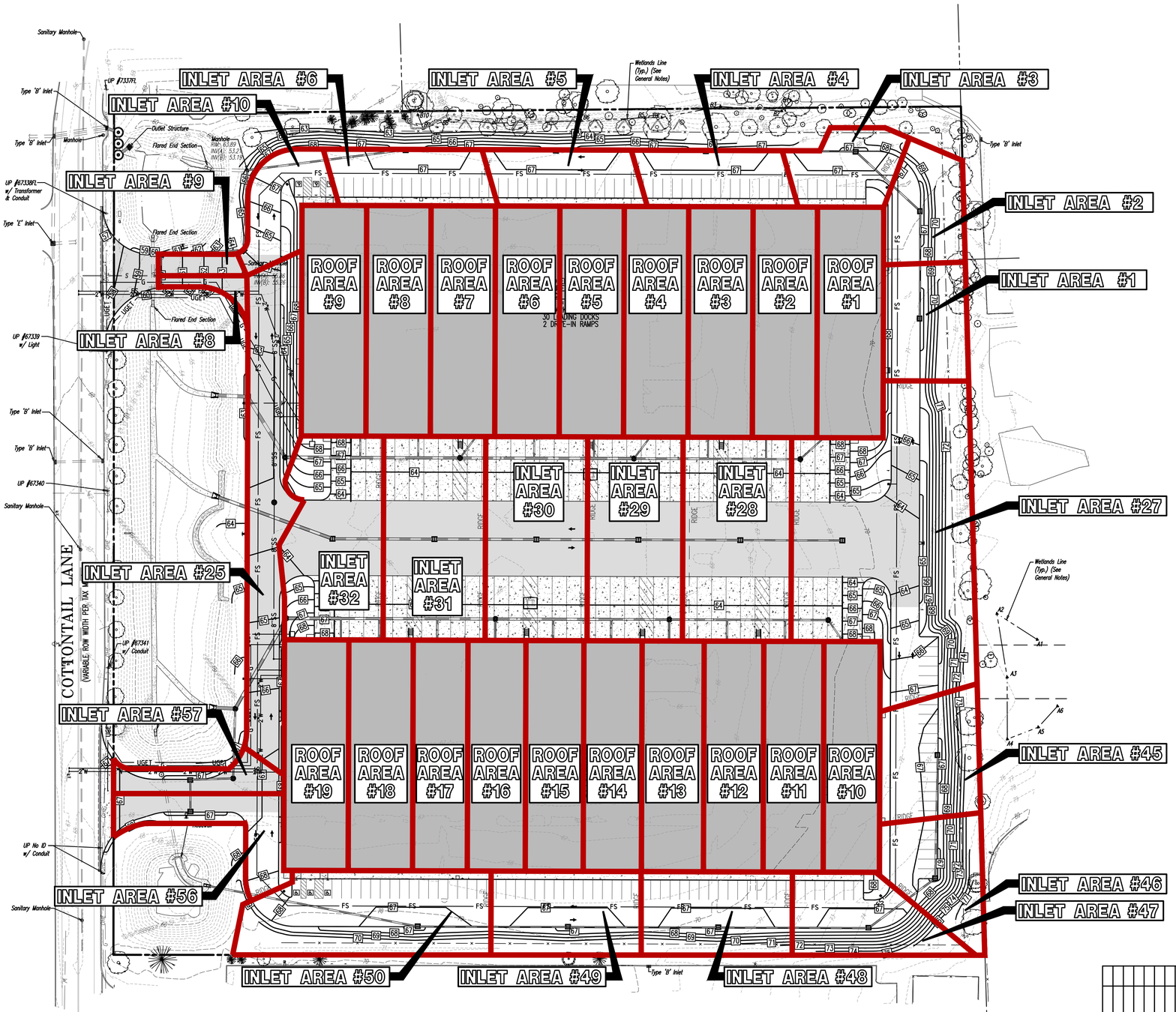

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S

GRAPHIC SCALE

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(IN FEET)

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Newtown, Pennsylvania T: 267.685.0276 | Philadelphia, Pennsylvania T: 215.233.4888 | Bethlehem, Pennsylvania T: 610.598.4400

TITLE:

INLET AREA MAP

PROJECT: **B9 COTTONTAIL OWNER, LLC**
PROPOSED INDUSTRIAL DEVELOPMENT
BLOCK 517.06, LOT 15.10
200 COTTONTAIL LANE
TOWNSHIP OF FRANKLIN, SOMERSET COUNTY, NEW JERSEY

JOB No: 3566-99-004
DATE: 02/09/2022
DRAWN BY: KJH
SCALE: (H) 1"=50' (V)
DESIGNED BY: KCK
CHECKED BY: JMS
CHECKED BY: _
SHEET No: 3 OF 3
Rev. #

Rev. | Date | Comments | By

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