STORMWATER MANAGEMENT, GROUNDWATER RECHARGE AND WATER QUALITY ANALYSIS

For

RPM Development, LLC

Proposed Residential Development

2495 Brunswick Pike (AKA Alt. Route 1)
Block 2001, Lot 2.02
Township of Lawrence
Mercer County, New Jersey

Prepared by:

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

Thomas J. Muller, PE, PP
NJ Professional Engineer License #52179

April 2020
Last Revised October 2024
DEC# 1279-99-010

TABLE OF CONTENTS

Page No.

I. Site Description 1

II. Design Overview 1

III. Existing Drainage Conditions 2

IV. Proposed Drainage Conditions 3

V. Design Methodology 4

VI. Runoff Rate Reduction Performance 5

VII. Pervious Pavement System Design 7

VIII. Water Quality 8

IX. Groundwater Recharge 9

X. Conclusion 9

APPENDIX

- Runoff Coefficient (CN) Calculations – Existing
- Runoff Coefficient (CN) Calculations – Proposed
- Time of Concentration (Tc) Calculations
- McCuen Speiss Sheet Flow Calculations
- Hydrograph Summary Reports – Existing and Proposed Conditions 2 yr. 10 yr. 25 yr. & 100 yr.
- Hydrograph Summary Reports – Water Quality Storm
- Comparative Hydrographs – POA Texas Avenue 2 yr. 10 yr. 25 yr. & 100 yr.
- Pervious Pavement System Details and Specifications
- Contech Filterra Sizing Summary and NJDEP Certification
- Stormwater Collection System Calculations (Pipe Sizing)
- Capacity of Circular Pipe Flowing Full
- Conduit Outlet Protection Calculations
- Groundwater Recharge Calculations
- Drainage Ditch Stability Analysis
- Stormwater Basin Area Investigation Report, prepared by Dynamic Earth, LLC
- Drainage Area Maps

I. SITE DESCRIPTION

The project area consists of Block 2001, Lots 2.02 in the Township of Lawrence, Mercer County, New Jersey. The property is located at 2495 Brunswick Pike (AKA Alt. Route 1) and has frontage along Texas Avenue. The proposed development consists mostly of open space area to the northern portion of the Lawrence Shopping Center in order to construct a residential development consisting of two (2) multi-family three-story buildings and six (6) two-story duplexes for a total gross floor area of 70,863 SF with 110 parking spaces and associated driveways, landscaped areas, stormwater management facilities, and accompanying site amenities.

The property was historically developed with a parking area and a man-made drainage ditch, and currently consists mostly of open space areas. There are wetlands along the northwestern property line, adjacent to Foch Avenue. Furthermore, the site is also located within a Flood Hazard Area and within the Delaware and Raritan Canal Review Zone B.

The property is bordered to the north by Texas Avenue with residential uses beyond, to the east and south by commercial uses with Brunswick Pike beyond, and to the west by freshwater wetlands with residential uses beyond.

The existing conditions of the tract have been verified by the Boundary and Topographic Survey as prepared by Dynamic Survey, LLC, dated 05/16/2023, last revised 08/31/2023.

II. DESIGN OVERVIEW

This report has been prepared to define and analyze the stormwater drainage conditions that would occur as a result of the development of Block 2001, 2.02 in the Township of Lawrence, Mercer County, New Jersey.

The proposed development consists of redeveloping the northern portion of the site which is currently mostly open space in order to construct a residential development consisting of two (2) multi-family three-story buildings and six (6) two-story duplexes for a total floor area of 70,863 SF with 110 parking spaces with associated driveways, landscaped areas, stormwater management facilities, and accompanying site amenities.

Based upon the scope of the project, the development is classified as a major development as it disturbs more than one (1) acre of land and increases the amount of impervious coverage onsite by more than ¼ acre; therefore, the project has been designed to meet the groundwater recharge, stormwater runoff quantity and quality standards set forth under N.J.A.C. 7:8. Accordingly, the following items are addressed within this report:

- Green infrastructure standards (7:8-5.3)
- Groundwater recharge standards (7:8-5.4)
- Stormwater runoff quality standards (7:8-5.5)

- Stormwater runoff quantity standards (7:8-5.6)
- Calculation of stormwater runoff and groundwater recharge (7:8-5.7)

The proposed development is exempt from the groundwater recharge requirements set forth by N.J.A.C. 7:8 due to the fact that the project is located within an "urban redevelopment area" as it is a previously developed portion of the Metropolitan Planning Area as delineated on the State Plan Policy Map (SPPM).

A hydrological evaluation is provided for the NJDEP Water Quality, 2-, 10-, and 100-year storm events utilizing the Urban Hydrology for Small Watershed TR55 method.

The Township of Lawrence and NJDEP peak flow reduction requirements are as follows:

2-year:	50% reduction
10-year:	25% reduction
25-year	Not to exceed predevelopment peak flow
100-year:	20% reduction

It is the intention of the design of this facility to comply with the Stormwater Management Best Management Practices.

III. EXISTING DRAINAGE CONDITIONS

The tract has been evaluated with the following existing drainage sub-watershed areas as depicted on the Existing Drainage Area Map:

Existing Drainage Area West: This area of the tract consists of open space, wooded and gravel areas located on the western portion of the overall development area. Stormwater runoff from these areas generally flows south via overland flow, is tributary to the existing stormwater conveyance system located within the Lawrence Shopping Center property and is ultimately tributary to the Shabakunk Creek.

Existing Drainage Area East: This area of the tract consists of open space and wooded areas located on the eastern portion of the overall development area. Stormwater runoff from these areas generally flows southeast via overland flow towards the existing ditch and trench drain and is ultimately tributary to the Tributary to Shabakunk Creek located to the east of the property.

Existing Drainage Area Texas Avenue: This area of the tract consists of the northern portion of the development area adjacent to Texas Avenue, which includes an existing sidewalk. Runoff from the open space area and sidewalk areas flow via overland flow and is ultimately tributary to Texas Avenue.

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

MERCER COUNTY SOIL SURVEY INFORMATION		
SOIL TYPE (SYMBOL)	**SOIL TYPE (NAME)**	**HYDROLOGIC SOIL GROUP (HSG)**
UdstB	Udorthents, stratified substratum, 0 to 8 percent slopes	D

IV. PROPOSED DRAINAGE CONDITIONS

The tract has been evaluated with the following drainage sub-watershed areas as depicted on the Proposed Drainage Area Map:

Proposed Drainage Area East (Pervious Pavement East): This area of the tract consists of a majority of the proposed landscape and parking areas in the middle of the site, the proposed multifamily buildings and the three (3) easternmost duplex buildings. Stormwater runoff from the parking areas flows overland towards and is collected by the pervious pavement system with underdrains. Stormwater runoff from the multifamily buildings and duplex buildings is routed directly to the stone storage beneath the pervious pavement. Stormwater runoff from the pervious pavement system is routed through an outlet control structure and is tributary to the proposed headwall and rip rap located on the eastern portion of the property and is ultimately tributary to the existing man-made drainage ditch on-site, which flows off-site towards the adjacent existing development on the southern side of the proposed development and is ultimately tributary to the Shabakunk Creek to the south of the property.

Proposed Drainage Area East (Pervious Pavement West): This area of the tract consists of a portion of the parking areas on the western portion of the site and the three (3) westernmost duplex buildings. Stormwater runoff from the parking areas flows overland towards and is collected by the pervious pavement system with underdrains. Stormwater runoff from the duplex buildings is routed directly to the stone storage beneath the pervious pavement. Stormwater runoff from the pervious pavement system is routed through an outlet control structure and is tributary to the proposed headwall and rip rap located on the eastern portion of the property and is ultimately tributary to the existing man-made drainage ditch on-site, which flows off-site towards the adjacent existing development on the southern side of the proposed development and is ultimately tributary to the Shabakunk Creek to the south of the property.

Proposed Drainage Area East (Undetained): This area of the tract consists of the open space area located on the eastern portion of the subject property and along Texas Avenue. The study area also consists of the proposed driveway along Texas Avenue. Stormwater runoff from the open space area along Texas Avenue and the

proposed driveway flows via overland flow to the proposed stormwater conveyance system located onsite and is routed to the proposed ditch located on the eastern portion of the property, which is ultimately is tributary to the Tributary to Shabakunk Creek. The remainder of the stormwater runoff from the open space areas located on the eastern portion of the property flow directly to the ditch via overland flow.

Proposed Drainage Area West (Undetained): This area of the tract consists of proposed parking area and drive aisles located to the south and east of the proposed multifamily buildings. Stormwater runoff from the proposed motor vehicle surfaces is routed to four (4) Contech Filterra Green Infrastructure Manufactured Treatment Devices located along the southerly curb line adjacent to the Lawrence Shopping Center property and is ultimately routed to the existing stormwater conveyance system located within the Lawrence Shopping Center property, similar to existing conditions. Stormwater runoff from the remaining portion of the study area flows overland and is ultimately tributary to the adjacent existing development to the southwest of the proposed development, similar to existing conditions.

Proposed Drainage Area Texas Avenue: This area of the tract consists of open space and asphalt areas on the northern portion of the site. Runoff from this area is not collected by the onsite stormwater conveyance system and will sheet flow directly to the existing stormwater conveyance system located on Texas Avenue, similar to existing conditions.

V. DESIGN METHODOLOGY

The intention of the proposed stormwater design is to provide measures as required to address applicable aspects of the Township of Lawrence Land Use Ordinance and N.J.A.C. 7:8. In order to prepare the stormwater calculations for the subject project, extensive initial investigation of the property and topography was performed. On-site review of the tract was performed by Dynamic Engineering Consultants, PC to verify existing site conditions and land cover characteristics. Dynamic Survey, LLC, was contracted to prepare the Boundary and Topographic Survey for the existing site. Furthermore, Dynamic Earth, LLC performed test pits within the site to establish the seasonal high water table.

Based on our review of the existing site conditions and the Boundary and 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 the existing drainage patterns in mind. The plan was designed to ensure runoff from the proposed development could be directed to stormwater management facilities in order to address the applicable sections of the Township of Lawrence Land Use Ordinance and N.J.A.C. 7:8.

Stormwater runoff from the majority of the proposed development is collected by the on-site stormwater collection system or conveyed by overland flow to the pervious pavement systems. All stormwater tributary to the proposed pervious pavement systems will be routed through outlet control structures, which discharge runoff at a controlled rate in order to satisfy the stormwater quantity requirements set forth by the Township Lawrence Land Use Ordinance and N.J.A.C. 7:8.

In proposed Study Area Texas Avenue, the development has been designed so the post-construction runoff hydrographs for the 2, 10, 25 and 100-year design storm do not exceed, at any point in time, the pre-construction runoff hydrographs for the same design storms in compliance with N.J.A.C. 7:8-5.6(b)1. Due to the decrease of stormwater runoff in the post-construction hydrographs for the 2, 10, 25 and 100-year design storm, the proposed development in Study Area Texas Avenue will not adversely impact Texas Avenue or the surrounding area.

In addition, the design of the pervious pavement systems in Study Area East complies with the standards set forth by the NJ Stormwater Best Management Practices Manual, thereby providing a TSS Removal Rate of 80%. Moreover, the Contech Filterra Green Infrastructure Manufactured Treatment Devices in Study Area West have been provided to collect stormwater runoff from the remainder of the proposed motor vehicle surfaces in order to provide a TSS Removal Rate of 80%. As a result of the proposed water quality BMPs, the proposed development satisfies the water quality aspect of N.J.A.C. 7:8.

The proposed development is exempt from the groundwater recharge requirements set forth by N.J.A.C. 7:8 due to the fact that the project is located within and "urban redevelopment area" as it is a previously developed portion of the Metropolitan Planning Area as delineated on the State Plan Policy Map (SPPM). Additionally, the groundwater recharge calculations provided in the Appendix of this report depict that the existing soils onsite do not promote groundwater recharge and there is no pre-developed annual recharge to preserve. Therefore, the groundwater recharge requirements set forth at N.J.A.C. 7:8 have been met.

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

VI. RUNOFF RATE REDUCTION PERFORMANCE

Proposed Drainage Area East (Pervious Pavement East): In order to meet the stormwater runoff quantity and quality requirements for the developed site, this area of the site incorporates a pervious pavement system with underdrains. Stormwater runoff from the pervious pavement system is routed through an outlet control structure and tributary to the proposed headwall and rip rap located on the eastern portion of the property and is ultimately tributary to the existing man-made drainage ditch on-site, which flows off-site towards the adjacent existing

development on the southern side of the proposed development and is ultimately tributary to the Shabakunk Creek to the south of the property.

Proposed Drainage Area East (Pervious Pavement West): In order to meet the stormwater runoff quantity and quality requirements for the developed site, this area of the site incorporates a pervious pavement system with underdrains. Stormwater runoff from the pervious pavement system is routed through an outlet control structure and tributary to the proposed headwall and rip rap located on the eastern portion of the property and is ultimately tributary to the existing man-made drainage ditch on-site, which flows off-site towards the adjacent existing development on the southern side of the proposed development and is ultimately tributary to the Shabakunk Creek to the south of the property.

Proposed Drainage Area West (Undetained): In order to meet the stormwater runoff quantity and quality requirements for the developed site, this area of the site incorporates four (4) Contech Filterra Green Infrastructure Manufactured Treatment Devices. Stormwater runoff from the MTDs is ultimately routed to the existing stormwater conveyance system located within the Lawrence Shopping Center property, similar to existing conditions. Based on the hydrologic and hydraulic analysis of the stormwater runoff rates in pre and post construction, the stormwater runoff hydrographs for the 2, 10, 25 and 100-year design storms in post construction at no time exceed the stormwater runoff hydrographs produced for the same design storms in the pre-construction state for the point of analysis, thereby meeting the runoff quantity reduction requirements per N.J.A.C. 7:8-5.4(a)3.i.

Proposed Drainage Area Texas Avenue: Based on the hydrologic and hydraulic analysis of the stormwater runoff rates in pre and post construction, the stormwater runoff hydrographs for the 2, 10, 25 and 100-year design storms in post construction at no time exceed the stormwater runoff hydrographs produced for the same design storms in the pre-construction state for the point of analysis, thereby meeting the runoff quantity reduction requirements per N.J.A.C. 7:8-5.4(a)3.i. Below are the results for the enclosed hydrographs:

Pre-Development and Post-Development Peak Runoff Results
Summary for Point Of Analysis East

	EXISTING RUNOFF RATE (CFS)	REDUCTION REQUIREMENT	ALLOWABLE RUNOFF RATE (CFS)	PROPOSED RUNOFF RATE (CFS)
2 Year	4.753	50%	2.377	2.321
10 Year	8.005	25%	6.004	4.284
100 Year	14.28	20%	11.42	10.33

Pre-Development and Post-Development Peak Runoff Results
Summary for Point Of Analysis West

	EXISTING RUNOFF RATE (CFS)	REDUCTION REQUIREMENT	ALLOWABLE RUNOFF RATE (CFS)	PROPOSED RUNOFF RATE (CFS)	EXISTING RUNOFF VOLUME (CF)	PROPOSED RUNOFF VOLUME (CF)
2 Year	4.713	50%	2.356	2.223	13,777	7,304
10 Year	7.931	25%	5.948	3.608	23,621	11,864
100 Year	14.17	20%	11.33	6.362	43,498	21,059

Pre-Development and Post-Development Peak Runoff Results
Summary for Point Of Analysis Texas Avenue

	EXISTING RUNOFF RATE (CFS)	PROPOSED RUNOFF RATE (CFS)	PROPOSED RUNOFF RATE REDUCTION (CFS)	EXISTING RUNOFF VOLUME (CF)	PROPOSED RUNOFF VOLUME (CF)
2 Year	0.760	0.521	-0.239	2,193	1,480
10 Year	1.227	0.918	-0.309	3,618	2,620
100 Year	2.134	1.717	-0.417	6,460	4,994

*Please see comparative hydrographs within the appendix for compliance with N.J.A.C. 7:8-5.4(a)3.i

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

	EXISTING RUNOFF RATE (CFS)	REDUCTION REQUIREMENT	ALLOWABLE RUNOFF RATE (CFS)	PROPOSED RUNOFF RATE (CFS)
2 Year	10.18	50%	5.09	4.923
10 Year	17.08	25%	12.81	8.591
25 Year	21.85	Not to Exceed Existing	21.85	11.22
100 Year	30.43	20%	24.344	16.23

VII. PERVIOUS PAVEMENT SYSTEM DESIGN

As previously stated within this report, the stormwater management design utilizes a pervious pavement system and green infrastructure manufactured treatment devices to satisfy the stormwater quantity and quality regulations set forth by the Township of Lawrence Land Use Ordinance and N.J.A.C. 7:8.

Pervious Pavement System West

Stormwater runoff tributary to the pervious pavement will infiltrate through void space in the pavement to the stone storage section where the stormwater runoff will be detained. The bottom of the stone storage bed is located at least one foot above the seasonal high-water table in each location. The underdrain is proposed at elevation 64.00 FT, to discharge storms larger than the water quality storm and to provide at least 3 inches of stone

underneath the underdrain as outline in Chapter 9.5 of the New Jersey Stormwater Best Management Practices Manual. The 100-year stormwater runoff tributary to the pervious pavement system with calculation for the stone section (0.40 void ratio) is located in the Hydrograph Summary reports: Proposed Conditions section within the Appendix of this Report. Overflow of stormwater runoff from the paver system in the event of larger storms will be discharged through an outlet control structure which discharges to the proposed stormwater conveyance system located on site, which is ultimately tributary to the existing ditch on the eastern portion of the site.

Pervious Pavement System East

Stormwater runoff tributary to the pervious pavement will infiltrate through void space in the pavement to the stone storage section where the stormwater runoff will be detained. The bottom of the stone storage bed is located at least one foot above the seasonal high-water table in each location. The underdrain is proposed at elevation 60.25 FT, to discharge storms larger than the water quality storm and to provide at least 3 inches of stone underneath the underdrain as outline in Chapter 9.5 of the New Jersey Stormwater Best Management Practices Manual. The 100-year stormwater runoff tributary to the pervious pavement system with calculation for the stone section (0.40 void ratio) is located in the Hydrograph Summary reports: Proposed Conditions section within the Appendix of this Report. Overflow of stormwater runoff from the paver system in the event of larger storms will be discharged through an outlet control structure which discharges to the proposed stormwater conveyance system located on site, which is ultimately tributary to the existing ditch on the eastern portion of the site.

In accordance with the New Jersey Stormwater Best Management Practices Manual, the following design considerations have been satisfied:

- Filter fabric is required along the sides and the bottom of the system to prevent migration of fines from the surrounding soil.
- The seasonal high water table (SHWT) or bedrock must be at least 1 foot below the bottom of the storage bed.
- The capacity of the underdrain must be sufficient to allow the system to drain within 72 hours.
- At least one inspection port, with a removable cap, must be provided in the storage bed with its location denoted in the maintenance plan. The inspection port must be placed at least 3 feet from any edge.

VIII. WATER QUALITY

The TSS removal rate requirement set forth by the Township of Lawrence Ordinance and N.J.A.C. 7:8 is 80% for the newly proposed impervious coverage. The stormwater management design for the project satisfies this requirement by utilizing two (2) pervious pavement systems and four (4) Contech Filterra Green Infrastructure

Manufactured Treatment Device certified by the NJDEP to provide a TSS removal rate of 80%. Therefore, the stormwater management facilities provide a TSS removal rate of 80% for the subject project, thereby, satisfying the water quality aspect of the Township of Lawrence Land Use Ordinance and N.J.A.C. 7:8.

IX. GROUNDWATER RECHARGE

As was mentioned previously, the proposed development is exempt from the groundwater recharge requirements set forth by N.J.A.C. 7:8 due to the fact that the project is located within and "urban redevelopment area" as it is a previously developed portion of the Metropolitan Planning Area as delineated on the State Plan Policy Map (SPPM). Additionally, the groundwater recharge calculations provided in the Appendix of this report depict that the existing soils onsite do not promote groundwater recharge and there is no pre-developed annual recharge to preserve. Therefore, the groundwater recharge requirements set forth at N.J.A.C. 7:8 have been met.

X. CONCLUSION

The proposed 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.

The proposed stormwater management design incorporates a StormFilter Manufactured Treatment Device capable of 80% total suspended solid (TSS) removal as stated within the New Jersey Stormwater Best Management Practices Manual thereby satisfying N.J.A.C. 7:8 Water Quality Standards.

The proposed development is exempt from the groundwater recharge requirements set forth by N.J.A.C. 7:8 due to the fact that the project is located within and "urban redevelopment area" as it is a previously developed portion of the Metropolitan Planning Area as delineated on the State Plan Policy Map (SPPM). Additionally, according to the Stormwater Basin Area Investigation Report, prepared by Dynamic Earth, enclosed within the appendix of this report, the on-site soils do not exhibit adequate permeability to allow for proper infiltration. Therefore, the proposed development is requesting a waiver from the groundwater recharge standards set forth by the Township of Lawrence Land Use Ordinance.

Furthermore, the stormwater management design shall reduce peak flow rates for Study Areas East and West and the entirety of the proposed development area and meets the minimum peak flow reduction for the 2, 10 and 100-year storm as dictated by N.J.A.C. 7:8. Additionally, for proposed Study Area Texas Avenue the amount of stormwater runoff volume has been reduced. The stormwater runoff hydrographs produced for the 2-, 10-, 25-, and 100-year design storms in post construction at no time exceed the stormwater runoff hydrographs produced for the same design storm for the same design in the pre-construction state, thereby meeting the runoff

reduction requirements per N.J.A.C. 7:8-5.6(b)1. With this stated, it is evident that the proposed development will not have a negative impact on the existing stormwater management system, water quality or groundwater recharge on site or within the vicinity of the subject parcel.

APPENDIX

RUNOFF COEFFICIENT (CN) CALCULATIONS – EXISTING

DYNAMIC ENGINEERING

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

Project:	Proposed Residential Development	Computed By:	JMH
Job #:	1279-99-010	Checked By:	TAZ
Location:	Lawrence, NJ	Date:	10/11/2023
		Last Revised	

Drainage Area	Impervious Area (acre)	Impervious Area (sf)	Curve Number (CN) Used	HSG D - Gravel Area (acre)	HSG D - Gravel Area (sf)	Curve Number (CN) Used	HSG D - Open Space Area (acre)	HSG D - Open Space Area (sf)	Curve Number (CN) Used	HSG D - Wooded Area (acre)	HSG D - Wooded Area (sf)	Curve Number (CN) Used	Avg. Perv. Curve Number	Total Pervious Area (acres)	Total Area (acres)	Total Area (sf)
Ex. DA West	0.25	10,728	98	0.05	2,298	91	1.49	65,051	89	0.08	3,662	77	88	1.63	1.88	81,739
Ex. DA East	0.05	2,196	98	0.00		91	1.81	79,045	89	0.03	1,129	77	89	1.84	1.89	82,370
Ex. DA Texas Avenue	0.09	3,784	98	0.00		91	0.15	6,581	89	0.00		77	89	0.15	0.24	10,365
Total	**0.38**	**16,708**		**0.05**	**2,298**		**3.46**	**150,677**		**0.11**	**4,791**			**3.62**	**4.01**	**174,473**

Per County Soil Survey - Mercer	UdstB	HSG	D	Soil	Udorthents, stratified substratum 0 to 8 percent slopes
Per County Soil Survey - Mercer	OthA	HSG	C/D	Soil	Othello silt loams, 0 to 2 percent slopes, northern coastal plain

Description	Runoff Curve Number (CN)	Runoff Curve Number (CN)	Runoff Curve Number (CN)	Runoff Curve Number (CN)
Impervious Surface	98	98	98	98
Open Space (lawn) (poor)	68	79	86	89
Woods (good)	30	55	70	77

RUNOFF COEFFICIENT (CN) CALCULATIONS – PROPOSED

DYNAMIC ENGINEERING

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

Project:	Proposed Residential Development	Computed By:	JMH
Job #:	1279-99-010	Checked By:	TAZ
Location:	Lawrence, NJ	Date:	3/11/2024
		Last Revised	

Drainage Area	Impervious Area (acre)	Impervious Area (sf)	Curve Number (CN) Used	HSG D - Open Space Area (acre)	HSG D - Open Space Area (sf)	Curve Number (CN) Used	HSG D - Wooded Area (acre)	HSG D - Wooded Area (sf)	Curve Number (CN) Used	Avg. Perv. Curve Number	Total Pervious Area (acres)	Total Area (acres)	Total Area (sf)
Prop. DA West (Undetained)	0.57	24,754	98	0.07	3,077	80	0.21	9,064	77	78	0.28	0.85	36,895
Prop. DA East (Undetained)	0.15	6,527	99	0.16	7,116	80	0.90	39,210	77	77	1.06	1.21	52,853
Prop. DA East (Pervious Pavement West)	0.28	12,309	98	0.03	1,523	80	0.00		77	80	0.03	0.32	13,832
Prop. DA East (Pervious Pavement East)	1.22	53,246	98	0.19	8,359	80	0.00		77	80	0.19	1.41	61,605
Prop. DA Texas Avenue	0.06	2,789	98	0.15	6,499	80	0.00		77	80	0.15	0.21	9,288
Total	**2.29**	**99,625**		**0.61**	**26,574**		**1.11**	**48274.00**			**1.72**	**4.01**	**174,473**

Per County Soil Survey - Mercer	UdstB	HSG	D	Soil	Udorthents, stratified substratum 0 to 8 percent slopes
Per County Soil Survey - Mercer	OthA	HSG	C/D	Soil	Othello silt loams, 0 to 2 percent slopes, northern coastal plain

Description	Runoff Curve Number (CN) (HSG A)	Runoff Curve Number (CN) (HSG B)	Runoff Curve Number (CN) (HSG C)	Runoff Curve Number (CN) (HSG D)
Impervious Surface	98	98	98	98
Open Space (lawn) (good)	39	61	74	80
Woods (good)	30	55	70	77

TIME OF CONCENTRATION (TC) CALCULATIONS

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

Date: 10/11/2023
Project: Prop Residential Development
Project No: 1279-99-010

Calculated By: JMH
Checked By: TAZ

Worksheet 3: Time of Concentration (T_c) Calculations

Land Condition: Existing
Drainage Area: West

• Sheet Flow:

		AB				
1.	Surface Description	Short Grass, Prairie				
2.	Manning's Roughness Coefficient, n	0.15				
3.	Flow Length, L { total $L \le 100$ ft }	100.0 ft				
4.	Two-Year 24-hour Rainfall, p_2 for . . . Mercer County	3.31 in	3.31 in	3.31 in		
5.	Land Slope, s (ft/ft)	0.059 ft/ft				
6.	Travel Time, $T_t = \frac{0.007\,(n\,L)^{0.8}}{p_2^{0.5}\,s^{0.4}}$	0.104 hr	+ 0.000 hr	+ 0.000 hr	=	0.104 hr

• Shallow Concentrated Flow:

		BC	CD			
7.	Surface Description	Unpaved	Paved			
8.	Flow Length, L	286.0 ft	30.0 ft			
9.	Watercourse Slope, s	0.025 ft/ft	0.011 ft/ft			
10.	Average velocity, V { see Figure 3.1)	2.55 ft/s	2.17 ft/s			
11.	Travel Time, $T_t = \frac{L}{3600\,V}$	0.031 hr	+ 0.004 hr	+ 0.000 hr	=	0.035 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 }					0.139 hr
						8.3 min

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

Date: 10/11/2023
Project: Prop Residential Development
Project No: 1279-99-010

Calculated By: JMH
Checked By: TAZ

Worksheet 3: Time of Concentration (T_c) Calculations

Land Condition: Existing
Drainage Area: East

• Sheet Flow:

		AB				
1.	Surface Description	Short Grass, Prairie				
2.	Manning's Roughness Coefficient, n	0.15				
3.	Flow Length, L { total $L \le 100$ ft }	100.0 ft				
4.	Two-Year 24-hour Rainfall, p_2 for . . . Mercer County	3.31 in				
5.	Land Slope, s (ft/ft)	0.095 ft/ft				
6.	Travel Time, $T_t = \frac{0.007\,(n\,L)^{0.8}}{p_2^{0.5}\,s^{0.4}}$	0.086 hr	+ 0.000 hr	+ 0.000 hr	=	0.086 hr

• Shallow Concentrated Flow:

		BC				
7.	Surface Description	Unpaved				
8.	Flow Length, L	319.0 ft				
9.	Watercourse Slope, s	0.015 ft/ft				
10.	Average velocity, V { see Figure 3.1)	1.98 ft/s				
11.	Travel Time, $T_t = \frac{L}{3600\,V}$	0.045 hr	+ 0.000 hr	+ 0.000 hr	=	0.045 hr

• Channel Flow:

		CD				
12.	Pipe Diameter, D	15 in				
13.	Cross-Sectional Flow Area, A	1.227 sf				
14.	Wetted Perimeter, p_w	3.9 ft				
15.	Hydraulic Radius, $r = A / p_w$	0.3 ft				
16.	Channel Slope, s	0.005 ft/ft				
17.	Pipe Material	RCP				
18.	Manning's Roughness Coefficient, n	0.013				
19.	Velocity, $V = \frac{1.49\,r^{2/3}\,s^{1/2}}{n}$	3.73 ft/s				
20.	Flow Length, L	41.0				
21.	Travel Time, $T_t = \frac{L}{3600\,V}$	0.003 hr	+ 0.000 hr	+ 0.000 hr	=	0.003 hr
22.	Watershed or subarea Time of Concentration, T_c { add T_t in steps 6, 11 and 21 }					0.134 hr
						8.0 min

DYNAMIC ENGINEERING

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

Date: 10/11/2023
Project: Prop Residential Development
Project No: 1279-99-010

Calculated By: JMH
Checked By: TAZ

Worksheet 3: Time of Concentration (T_c) Calculations

Land Condition: Existing
Drainage Area: Texas Ave

- ***Sheet Flow*:**

		EF	FG					
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 }	36.0 ft	7.0 ft					
4.	Two-Year 24-hour Rainfall, p_2 for . . . Mercer County	3.31 in	3.31 in	3.31 in				
5.	Land Slope, s (ft/ft)	0.027 ft/ft	0.027 ft/ft					
6.	Travel Time, $T_t = \frac{0.007\,(n\,L)^{0.8}}{p_2^{0.5}\,s^{0.4}}$	0.063 hr	+ 0.002 hr	+ 0.000 hr	=	0.065 hr		

- ***Shallow Concentrated Flow*:**

7.	Surface Description							
8.	Flow Length, L							
9.	Watercourse Slope, s							
10.	Average velocity, V { see Figure 3.1)							
11.	Travel Time, $T_t = \frac{L}{3600\,V}$	0.000 hr	+ 0.000 hr	+ 0.000 hr	=	0.000 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 }					0.065 hr		
						3.9 min		

DYNAMIC ENGINEERING

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

Date: 3/11/2024
Project: Prop Residential Development
Project No: 1279-99-010

Calculated By: JMH
Checked By: TAZ

Worksheet 3: Time of Concentration (T_c) Calculations

Land Condition: Proposed
Drainage Area: Texas Avenue

		AB	BC			
• *Sheet Flow*:						
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* }	40.0 ft	10.0 ft			
4.	Two-Year 24-hour Rainfall, p_2 for . . Mercer County	3.31 in	3.31 in	3.31 in		
5.	Land Slope, s *(ft/ft)*	0.020 ft/ft	0.015 ft/ft			
6.	Travel Time, $T_t = \frac{0.007\,(n\,L)^{0.8}}{p_2^{0.5}\,s^{0.4}}$	0.077 hr	+ 0.004 hr	+ 0.000 hr	=	0.081 hr
• *Shallow Concentrated Flow*:						
7.	Surface Description					
8.	Flow Length, L					
9.	Watercourse Slope, s					
10.	Average velocity, V { *see Figure 3.1)*					
11.	Travel Time, $T_t = \frac{L}{3600\,V}$	0.000 hr	+ 0.000 hr	+ 0.000 hr	=	0.000 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* }					0.081 hr
						4.8 min

DYNAMIC ENGINEERING

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

Date: 10/11/2023
Project: Prop Residential Development
Project No: 1279-99-010

Calculated By: JMH
Checked By: TAZ

Worksheet 3: Time of Concentration (T_c) Calculations

Land Condition: Proposed
Drainage Area: East (Undetained, Pervious)

• Sheet Flow:

	AB	BC	CD	DE	EF		
1. Surface Description	Short Grass, Prairie	Smooth Surfaces	Short Grass, Prairie	Smooth Surfaces	Short Grass, Prairie		
2. Manning's Roughness Coefficient, n	0.15	0.011	0.15	0.011	0.15		
3. Flow Length, L { total $L \le 100$ ft }	20.0 ft	4.0 ft	52.0 ft	4.0 ft	20.0 ft		
4. Two-Year 24-hour Rainfall, p_2 for . . . Mercer County	3.31 in	3.31 in	3.31 in	3.31 in	3.31 in		
5. Land Slope, s (ft/ft)	0.025 ft/ft	0.015 ft/ft	0.025 ft/ft	0.015 ft/ft	0.025 ft/ft		
6. Travel Time, $T_t = \frac{0.007\,(n\,L)^{0.8}}{p_2^{0.5}\,s^{0.4}}$	0.041 hr	+ 0.002 hr	+ 0.087 hr	+ 0.002 hr	+ 0.041 hr	=	0.129 hr

• Shallow Concentrated Flow:

	FG	IJ					
7. Surface Description	Unpaved	Unpaved					
8. Flow Length, L	36.0 ft	115.0 ft					
9. Watercourse Slope, s	0.014 ft/ft	0.017 ft/ft					
10. Average velocity, V { see Figure 3.1)	1.94 ft/s	2.10 ft/s					
11. Travel Time, $T_t = \frac{L}{3600\,V}$	0.005 hr	+ 0.015 hr	+ 0.000 hr	+ 0.000 hr	+ 0.000 hr	=	0.020 hr

• Channel Flow:

	GH	HI	JK				
12. Pipe Diameter, D	12 in	30 in	15 in				
13. Cross-Sectional Flow Area, A	0.785 sf	4.909 sf	1.227 sf				
14. Wetted Perimeter, p_w	3.1 ft	7.9 ft	3.9 ft				
15. Hydraulic Radius, $r = A / p_w$	0.3 ft	0.6 ft	0.3 ft				
16. Channel Slope, s	0.005 ft/ft	0.005 ft/ft	0.005 ft/ft				
17. Pipe Material	HDPE	RCP	RCP				
18. Manning's Roughness Coefficient, n	0.010	0.013	0.013				
19. Velocity, $V = \frac{1.49\,r^{2/3}\,s^{1/2}}{n}$	4.18 ft/s	5.92 ft/s	3.73 ft/s				
20. Flow Length, L	10.0	155.0	37.0				
21. Travel Time, $T_t = \frac{L}{3600\,V}$	0.001 hr	+ 0.007 hr	+ 0.003 hr	+ 0.000 hr	+ 0.000 hr	=	0.011 hr

22. Watershed or subarea Time of Concentration, T_c { add T_t in steps 6, 11 and 21 } . . . . . 0.160 hr

9.6 min

DYNAMIC ENGINEERING

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

Date: 10/11/2023
Project: Prop Residential Development
Project No: 1279-99-010

Calculated By: JMH
Checked By: TAZ

Worksheet 3: Time of Concentration (T_c) Calculations

Land Condition: Proposed
Drainage Area: West (Undetained, Impervious)

- ***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* }	61.0 ft	39.0 ft					
4.	Two-Year 24-hour Rainfall, p_2 for . . . Mercer County	3.31 in	3.31 in	3.31 in				
5.	Land Slope, s *(ft/ft)*	0.029 ft/ft	0.035 ft/ft					
6.	Travel Time, $T_t = \frac{0.007\,(n\,L)^{0.8}}{p_2^{0.5}\,s^{0.4}}$	0.093 hr	+ 0.007 hr	+ 0.000 hr	=	0.101 hr		

- ***Shallow Concentrated Flow*** **:**

		CD						
7.	Surface Description	Paved						
8.	Flow Length, L	20.0 ft						
9.	Watercourse Slope, s	0.035 ft/ft						
10.	Average velocity, V { *see Figure 3.1)*	3.80 ft/s						
11.	Travel Time, $T_t = \frac{L}{3600\,V}$	0.001 hr	+ 0.000 hr	+ 0.000 hr	=	0.001 hr		

- ***Channel Flow*** **:**

		DE						
12.	Pipe Diameter, D	15 in						
13.	Cross-Sectional Flow Area, A	1.227 sf						
14.	Wetted Perimeter, p_w	3.9 ft						
15.	Hydraulic Radius, $r = A / p_w$	0.3 ft						
16.	Channel Slope, s	0.005 ft/ft						
17.	Pipe Material	RCP						
18.	Manning's Roughness Coefficient, n	0.013						
19.	Velocity, $V = \frac{1.49\,r^{2/3}\,s^{1/2}}{n}$	3.73 ft/s						
20.	Flow Length, L	262.0						
21.	Travel Time, $T_t = \frac{L}{3600\,V}$	0.020 hr	+ 0.000 hr	+ 0.000 hr	=	0.020 hr		
22.	Watershed or subarea Time of Concentration, T_c { *add* T_t *in steps 6, 11 and 21* }					0.122 hr		
						7.3 min		

DYNAMIC ENGINEERING

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

Date: 10/11/2023
Project: Prop Residential Development
Project No: 1279-99-010

Calculated By: JMH
Checked By: TAZ

Worksheet 3: Time of Concentration (T_c) Calculations

Land Condition: Proposed
Drainage Area: East (Pervious East, Pervious)

• Sheet Flow:

		AB			
1.	Surface Description	Short Grass, Prairie			
2.	Manning's Roughness Coefficient, n	0.15			
3.	Flow Length, L { total $L \le 100$ ft }	73.0 ft			
4.	Two-Year 24-hour Rainfall, p_2 for Mercer County	3.31 in	3.31 in	3.31 in	
5.	Land Slope, s (ft/ft)	0.012 ft/ft			
6.	Travel Time, $T_t = \frac{0.007\,(n\,L)^{0.8}}{p_2^{0.5}\,s^{0.4}}$	0.153 hr	+ 0.000 hr	+ 0.000 hr	= 0.153 hr

• Shallow Concentrated Flow:

		BC			
7.	Surface Description	Paved			
8.	Flow Length, L	6.0 ft			
9.	Watercourse Slope, s	0.015 ft/ft			
10.	Average velocity, V { see Figure 3.1)	2.49 ft/s			
11.	Travel Time, $T_t = \frac{L}{3600\,V}$	0.001 hr	+ 0.000 hr	+ 0.000 hr	= 0.001 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 }				0.154 hr
					9.2 min

DYNAMIC ENGINEERING

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

Date: 10/11/2023
Project: Prop Residential Development
Project No: 1279-99-010

Calculated By: JMH
Checked By: TAZ

Worksheet 3: Time of Concentration (T_c) Calculations

Land Condition: Proposed
Drainage Area: East (Pervious West, Pervious)

- ***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 ≤ 100 ft* }	46.0 ft	6.0 ft					
4. Two-Year 24-hour Rainfall, p_2 for . . . Mercer County	3.31 in	3.31 in	3.31 in				
5. Land Slope, *s (ft/ft)*	0.037 ft/ft	0.015 ft/ft					
6. Travel Time, $T_t = \frac{0.007\,(n\,L)^{0.8}}{p_2^{0.5}\,s^{0.4}}$	0.067 hr	+ 0.002 hr	+ 0.000 hr	=	0.070 hr		

- ***Shallow Concentrated Flow*:**

7. Surface Description							
8. Flow Length, *L*							
9. Watercourse Slope, *s*							
10. Average velocity, *V* { *see Figure 3.1* }							
11. Travel Time, $T_t = \frac{L}{3600\,V}$	0.000 hr	+ 0.000 hr	+ 0.000 hr	=	0.000 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* }					0.070 hr		
					4.2 min		

MCCUEN SPIESS SHEET FLOW CALCULATIONS

DYNAMIC ENGINEERING

McCuen-Spiess Sheet Flow Equation
Proposed Residential Development
2495 Brunswick Pike (AKA Alt Route 1)
DEC #1279-99-010
10/17/2023

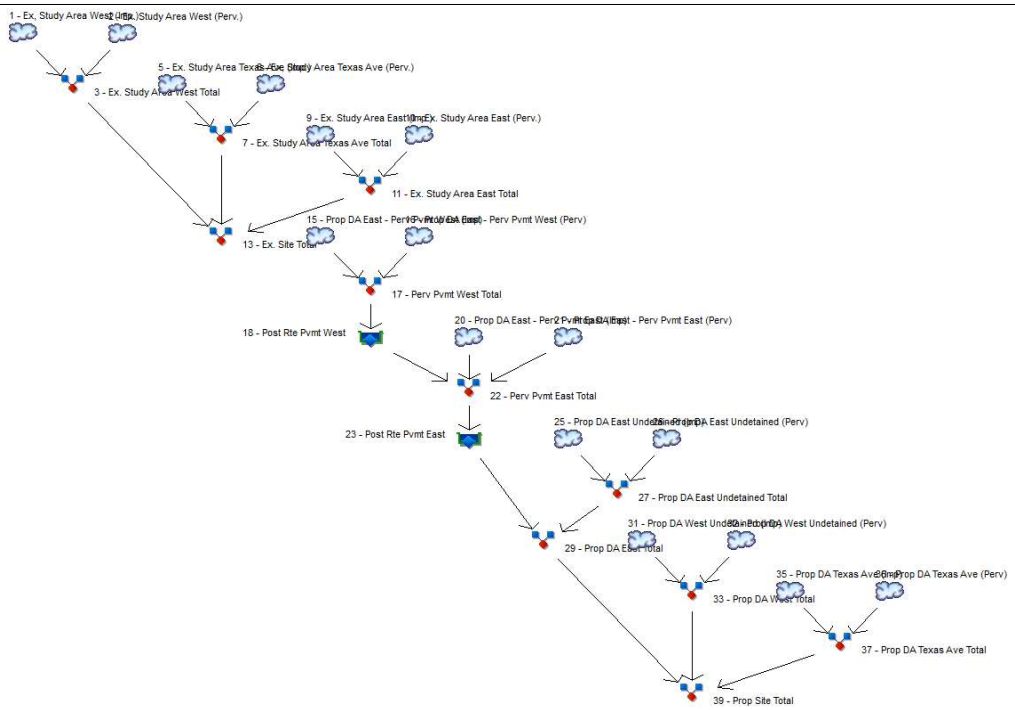
McCuen-Spiess Equation: $$L = \frac{100\sqrt{S}}{n}$$

	Slope	Manning's Number	McCuen-Spiess Equation Sheet Flow	Inputted Sheet Flow
Prop DA Texas Avenue (Pervious)	0.020	0.150	94.28	40**
Prop DA Texas Avenue (Impervious)	0.015	0.011	1113.40	16**
Prop DA East (Undetained)	0.025	0.150	105.41	100*
Prop DA West (Undetained)	0.029	0.150	113.53	100*
Prop DA East (Pvmt East)	0.012	0.150	73.03	73
Prop DA East (Pvmt West)	0.037	0.150	128.24	52**

* Maximum length permitted
**Sheet Flow length terminated due to shallow concentrated flow or end of path

HYDROGRAPH SUMMARY REPORTS – EXISTING AND PROPOSED CONDITIONS
2 YR. 10 YR. 25 YR. & 100 YR.

Watershed Model Schematic



Legend

Hyd.	Origin	Description
1	SCS Runoff	Ex, Study Area West (Imp.)
2	SCS Runoff	Ex. Study Area West (Perv.)
3	Combine	Ex. Study Area West Total
5	SCS Runoff	Ex. Study Area Texas Ave (Imp.)
6	SCS Runoff	Ex, Study Area Texas Ave (Perv.)
7	Combine	Ex. Study Area Texas Ave Total
9	SCS Runoff	Ex. Study Area East (Imp.)
10	SCS Runoff	Ex. Study Area East (Perv.)
11	Combine	Ex. Study Area East Total
13	Combine	Ex. Site Total
15	SCS Runoff	Prop DA East - Perv Pvmt West (Imp)
16	SCS Runoff	Prop DA East - Perv Pvmt West (Perv)
17	Combine	Perv Pvmt West Total
18	Reservoir	Post Rte Pvmt West
20	SCS Runoff	Prop DA East - Perv Pvmt East (Imp)
21	SCS Runoff	Prop DA East - Perv Pvmt East (Perv)
22	Combine	Perv Pvmt East Total
23	Reservoir	Post Rte Pvmt East
25	SCS Runoff	Prop DA East Undetained (Imp)
26	SCS Runoff	Prop DA East Undetained (Perv)
27	Combine	Prop DA East Undetained Total
29	Combine	Prop DA East Total
31	SCS Runoff	Prop DA West Undetained (Imp)
32	SCS Runoff	Prop DA West Undetained (Perv)
33	Combine	Prop DA West Total
35	SCS Runoff	Prop DA Texas Ave (Imp)
36	SCS Runoff	Prop DA Texas Ave (Perv)
37	Combine	Prop DA Texas Ave Total
39	Combine	Prop Site Total

Hydraflow Table of Contents

2024-05 2.10.100yr.gpw

Hydraflow Hydrographs by Intelisolve v9.1

Tuesday, May 21, 2024

Watershed Model Schematic 1

Hydrograph Return Period Recap 2

2 - Year

Summary Report 3

Hydrograph Reports 4

Hydrograph No. 1, SCS Runoff, Ex, Study Area West (Imp.) 4

Precipitation Report 5

Hydrograph No. 2, SCS Runoff, Ex. Study Area West (Perv.) 6

Precipitation Report 7

Hydrograph No. 3, Combine, Ex. Study Area West Total 8

Hydrograph No. 5, SCS Runoff, Ex. Study Area Texas Ave (Imp.) 9

Precipitation Report 10

Hydrograph No. 6, SCS Runoff, Ex, Study Area Texas Ave (Perv.) 11

Precipitation Report 12

Hydrograph No. 7, Combine, Ex. Study Area Texas Ave Total 13

Hydrograph No. 9, SCS Runoff, Ex. Study Area East (Imp.) 14

Precipitation Report 15

Hydrograph No. 10, SCS Runoff, Ex. Study Area East (Perv.) 16

Precipitation Report 17

Hydrograph No. 11, Combine, Ex. Study Area East Total 18

Hydrograph No. 13, Combine, Ex. Site Total 19

Hydrograph No. 15, SCS Runoff, Prop DA East - Perv Pvmt West (Imp) 20

Precipitation Report 21

Hydrograph No. 16, SCS Runoff, Prop DA East - Perv Pvmt West (Perv) 22

Precipitation Report 23

Hydrograph No. 17, Combine, Perv Pvmt West Total 24

Hydrograph No. 18, Reservoir, Post Rte Pvmt West 25

Pond Report - Porous Pavement West 26

Hydrograph No. 20, SCS Runoff, Prop DA East - Perv Pvmt East (Imp) 28

Precipitation Report 29

Hydrograph No. 21, SCS Runoff, Prop DA East - Perv Pvmt East (Perv) 30

Precipitation Report 31

Hydrograph No. 22, Combine, Perv Pvmt East Total 32

Hydrograph No. 23, Reservoir, Post Rte Pvmt East 33

Pond Report - Porous Pavement East 34

Hydrograph No. 25, SCS Runoff, Prop DA East Undetained (Imp) 36

Precipitation Report 37

Hydrograph No. 26, SCS Runoff, Prop DA East Undetained (Perv) 38

Precipitation Report 39

Hydrograph No. 27, Combine, Prop DA East Undetained Total 40

Hydrograph No. 29, Combine, Prop DA East Total 41

Hydrograph No. 31, SCS Runoff, Prop DA West Undetained (Imp) 42

Precipitation Report 43

Hydrograph No. 32, SCS Runoff, Prop DA West Undetained (Perv) 44

Precipitation Report 45

Hydrograph No. 33, Combine, Prop DA West Total 46

Hydrograph No. 35, SCS Runoff, Prop DA Texas Ave (Imp) 47

Precipitation Report 48
Hydrograph No. 36, SCS Runoff, Prop DA Texas Ave (Perv) 49
Precipitation Report 50
Hydrograph No. 37, Combine, Prop DA Texas Ave Total 51
Hydrograph No. 39, Combine, Prop Site Total 52

10 - Year

Summary Report 53
Hydrograph Reports 54
Hydrograph No. 1, SCS Runoff, Ex, Study Area West (Imp.) 54
Precipitation Report 55
Hydrograph No. 2, SCS Runoff, Ex. Study Area West (Perv.) 56
Precipitation Report 57
Hydrograph No. 3, Combine, Ex. Study Area West Total 58
Hydrograph No. 5, SCS Runoff, Ex. Study Area Texas Ave (Imp.) 59
Precipitation Report 60
Hydrograph No. 6, SCS Runoff, Ex, Study Area Texas Ave (Perv.) 61
Precipitation Report 62
Hydrograph No. 7, Combine, Ex. Study Area Texas Ave Total 63
Hydrograph No. 9, SCS Runoff, Ex. Study Area East (Imp.) 64
Precipitation Report 65
Hydrograph No. 10, SCS Runoff, Ex. Study Area East (Perv.) 66
Precipitation Report 67
Hydrograph No. 11, Combine, Ex. Study Area East Total 68
Hydrograph No. 13, Combine, Ex. Site Total 69
Hydrograph No. 15, SCS Runoff, Prop DA East - Perv Pvmt West (Imp) 70
Precipitation Report 71
Hydrograph No. 16, SCS Runoff, Prop DA East - Perv Pvmt West (Perv) 72
Precipitation Report 73
Hydrograph No. 17, Combine, Perv Pvmt West Total 74
Hydrograph No. 18, Reservoir, Post Rte Pvmt West 75
Hydrograph No. 20, SCS Runoff, Prop DA East - Perv Pvmt East (Imp) 76
Precipitation Report 77
Hydrograph No. 21, SCS Runoff, Prop DA East - Perv Pvmt East (Perv) 78
Precipitation Report 79
Hydrograph No. 22, Combine, Perv Pvmt East Total 80
Hydrograph No. 23, Reservoir, Post Rte Pvmt East 81
Hydrograph No. 25, SCS Runoff, Prop DA East Undetained (Imp) 82
Precipitation Report 83
Hydrograph No. 26, SCS Runoff, Prop DA East Undetained (Perv) 84
Precipitation Report 85
Hydrograph No. 27, Combine, Prop DA East Undetained Total 86
Hydrograph No. 29, Combine, Prop DA East Total 87
Hydrograph No. 31, SCS Runoff, Prop DA West Undetained (Imp) 88
Precipitation Report 89
Hydrograph No. 32, SCS Runoff, Prop DA West Undetained (Perv) 90
Precipitation Report 91
Hydrograph No. 33, Combine, Prop DA West Total 92
Hydrograph No. 35, SCS Runoff, Prop DA Texas Ave (Imp) 93
Precipitation Report 94
Hydrograph No. 36, SCS Runoff, Prop DA Texas Ave (Perv) 95
Precipitation Report 96

Hydrograph No. 37, Combine, Prop DA Texas Ave Total 97
Hydrograph No. 39, Combine, Prop Site Total 98

25 - Year

Summary Report 99
Hydrograph Reports 100
Hydrograph No. 1, SCS Runoff, Ex, Study Area West (Imp.) 100
Precipitation Report 101
Hydrograph No. 2, SCS Runoff, Ex. Study Area West (Perv.) 102
Precipitation Report 103
Hydrograph No. 3, Combine, Ex. Study Area West Total 104
Hydrograph No. 5, SCS Runoff, Ex. Study Area Texas Ave (Imp.) 105
Precipitation Report 106
Hydrograph No. 6, SCS Runoff, Ex, Study Area Texas Ave (Perv.) 107
Precipitation Report 108
Hydrograph No. 7, Combine, Ex. Study Area Texas Ave Total 109
Hydrograph No. 9, SCS Runoff, Ex. Study Area East (Imp.) 110
Precipitation Report 111
Hydrograph No. 10, SCS Runoff, Ex. Study Area East (Perv.) 112
Precipitation Report 113
Hydrograph No. 11, Combine, Ex. Study Area East Total 114
Hydrograph No. 13, Combine, Ex. Site Total 115
Hydrograph No. 15, SCS Runoff, Prop DA East - Perv Pvmt West (Imp) 116
Precipitation Report 117
Hydrograph No. 16, SCS Runoff, Prop DA East - Perv Pvmt West (Perv) 118
Precipitation Report 119
Hydrograph No. 17, Combine, Perv Pvmt West Total 120
Hydrograph No. 18, Reservoir, Post Rte Pvmt West 121
Hydrograph No. 20, SCS Runoff, Prop DA East - Perv Pvmt East (Imp) 122
Precipitation Report 123
Hydrograph No. 21, SCS Runoff, Prop DA East - Perv Pvmt East (Perv) 124
Precipitation Report 125
Hydrograph No. 22, Combine, Perv Pvmt East Total 126
Hydrograph No. 23, Reservoir, Post Rte Pvmt East 127
Hydrograph No. 25, SCS Runoff, Prop DA East Undetained (Imp) 128
Precipitation Report 129
Hydrograph No. 26, SCS Runoff, Prop DA East Undetained (Perv) 130
Precipitation Report 131
Hydrograph No. 27, Combine, Prop DA East Undetained Total 132
Hydrograph No. 29, Combine, Prop DA East Total 133
Hydrograph No. 31, SCS Runoff, Prop DA West Undetained (Imp) 134
Precipitation Report 135
Hydrograph No. 32, SCS Runoff, Prop DA West Undetained (Perv) 136
Precipitation Report 137
Hydrograph No. 33, Combine, Prop DA West Total 138
Hydrograph No. 35, SCS Runoff, Prop DA Texas Ave (Imp) 139
Precipitation Report 140
Hydrograph No. 36, SCS Runoff, Prop DA Texas Ave (Perv) 141
Precipitation Report 142
Hydrograph No. 37, Combine, Prop DA Texas Ave Total 143
Hydrograph No. 39, Combine, Prop Site Total 144

100 - Year

Summary Report **145**
Hydrograph Reports **146**
Hydrograph No. 1, SCS Runoff, Ex, Study Area West (Imp.) 146
Precipitation Report 147
Hydrograph No. 2, SCS Runoff, Ex. Study Area West (Perv.) 148
Precipitation Report 149
Hydrograph No. 3, Combine, Ex. Study Area West Total 150
Hydrograph No. 5, SCS Runoff, Ex. Study Area Texas Ave (Imp.) 151
Precipitation Report 152
Hydrograph No. 6, SCS Runoff, Ex, Study Area Texas Ave (Perv.) 153
Precipitation Report 154
Hydrograph No. 7, Combine, Ex. Study Area Texas Ave Total 155
Hydrograph No. 9, SCS Runoff, Ex. Study Area East (Imp.) 156
Precipitation Report 157
Hydrograph No. 10, SCS Runoff, Ex. Study Area East (Perv.) 158
Precipitation Report 159
Hydrograph No. 11, Combine, Ex. Study Area East Total 160
Hydrograph No. 13, Combine, Ex. Site Total 161
Hydrograph No. 15, SCS Runoff, Prop DA East - Perv Pvmt West (Imp) 162
Precipitation Report 163
Hydrograph No. 16, SCS Runoff, Prop DA East - Perv Pvmt West (Perv) 164
Precipitation Report 165
Hydrograph No. 17, Combine, Perv Pvmt West Total 166
Hydrograph No. 18, Reservoir, Post Rte Pvmt West 167
Hydrograph No. 20, SCS Runoff, Prop DA East - Perv Pvmt East (Imp) 168
Precipitation Report 169
Hydrograph No. 21, SCS Runoff, Prop DA East - Perv Pvmt East (Perv) 170
Precipitation Report 171
Hydrograph No. 22, Combine, Perv Pvmt East Total 172
Hydrograph No. 23, Reservoir, Post Rte Pvmt East 173
Hydrograph No. 25, SCS Runoff, Prop DA East Undetained (Imp) 174
Precipitation Report 175
Hydrograph No. 26, SCS Runoff, Prop DA East Undetained (Perv) 176
Precipitation Report 177
Hydrograph No. 27, Combine, Prop DA East Undetained Total 178
Hydrograph No. 29, Combine, Prop DA East Total 179
Hydrograph No. 31, SCS Runoff, Prop DA West Undetained (Imp) 180
Precipitation Report 181
Hydrograph No. 32, SCS Runoff, Prop DA West Undetained (Perv) 182
Precipitation Report 183
Hydrograph No. 33, Combine, Prop DA West Total 184
Hydrograph No. 35, SCS Runoff, Prop DA Texas Ave (Imp) 185
Precipitation Report 186
Hydrograph No. 36, SCS Runoff, Prop DA Texas Ave (Perv) 187
Precipitation Report 188
Hydrograph No. 37, Combine, Prop DA Texas Ave Total 189
Hydrograph No. 39, Combine, Prop Site Total 190

IDF Report **191**

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	-------	-------	0.784	-------	-------	1.195	1.479	-------	1.994	Ex, Study Area West (Imp.)
2	SCS Runoff	-------	-------	3.929	-------	-------	6.737	8.680	-------	12.17	Ex. Study Area West (Perv.)
3	Combine	1, 2	-------	4.713	-------	-------	7.931	10.16	-------	14.17	Ex. Study Area West Total
5	SCS Runoff	-------	-------	0.326	-------	-------	0.496	0.614	-------	0.828	Ex. Study Area Texas Ave (Imp.)
6	SCS Runoff	-------	-------	0.436	-------	-------	0.733	0.937	-------	1.306	Ex, Study Area Texas Ave (Perv.)
7	Combine	5, 6	-------	0.760	-------	-------	1.227	1.551	-------	2.134	Ex. Study Area Texas Ave Total
9	SCS Runoff	-------	-------	0.157	-------	-------	0.239	0.296	-------	0.399	Ex. Study Area East (Imp.)
10	SCS Runoff	-------	-------	4.596	-------	-------	7.766	9.953	-------	13.88	Ex. Study Area East (Perv.)
11	Combine	9, 10	-------	4.753	-------	-------	8.005	10.25	-------	14.28	Ex. Study Area East Total
13	Combine	3, 7, 11,	-------	10.18	-------	-------	17.08	21.85	-------	30.43	Ex. Site Total
15	SCS Runoff	-------	-------	1.013	-------	-------	1.543	1.910	-------	2.575	Prop DA East - Perv Pvmt West (Imp)
16	SCS Runoff	-------	-------	0.061	-------	-------	0.118	0.159	-------	0.233	Prop DA East - Perv Pvmt West (Per
17	Combine	15, 16	-------	1.073	-------	-------	1.660	2.068	-------	2.807	Perv Pvmt West Total
18	Reservoir	17	-------	0.498	-------	-------	0.679	0.984	-------	2.148	Post Rte Pvmt West
20	SCS Runoff	-------	-------	3.692	-------	-------	5.626	6.965	-------	9.389	Prop DA East - Perv Pvmt East (Imp)
21	SCS Runoff	-------	-------	0.317	-------	-------	0.617	0.833	-------	1.229	Prop DA East - Perv Pvmt East (Perv
22	Combine	18, 20, 21	-------	4.483	-------	-------	6.885	8.629	-------	12.76	Perv Pvmt East Total
23	Reservoir	22	-------	0.459	-------	-------	0.604	1.735	-------	5.606	Post Rte Pvmt East
25	SCS Runoff	-------	-------	0.454	-------	-------	0.692	0.856	-------	1.154	Prop DA East Undetained (Imp)
26	SCS Runoff	-------	-------	1.520	-------	-------	3.134	4.320	-------	6.516	Prop DA East Undetained (Perv)
27	Combine	25, 26	-------	1.972	-------	-------	3.823	5.172	-------	7.666	Prop DA East Undetained Total
29	Combine	23, 27,	-------	2.321	-------	-------	4.284	5.700	-------	10.33	Prop DA East Total
31	SCS Runoff	-------	-------	1.788	-------	-------	2.724	3.372	-------	4.546	Prop DA West Undetained (Imp)
32	SCS Runoff	-------	-------	0.439	-------	-------	0.884	1.211	-------	1.816	Prop DA West Undetained (Perv)
33	Combine	31, 32	-------	2.223	-------	-------	3.608	4.584	-------	6.362	Prop DA West Total
35	SCS Runoff	-------	-------	0.217	-------	-------	0.331	0.409	-------	0.552	Prop DA Texas Ave (Imp)
36	SCS Runoff	-------	-------	0.304	-------	-------	0.589	0.793	-------	1.167	Prop DA Texas Ave (Perv)
37	Combine	35, 36	-------	0.521	-------	-------	0.918	1.201	-------	1.717	Prop DA Texas Ave Total
39	Combine	29, 33, 37,	-------	4.923	-------	-------	8.591	11.22	-------	16.23	Prop Site Total

Hydrograph Summary Report

Hydraflow Hydrographs by Intelisolve v9.1

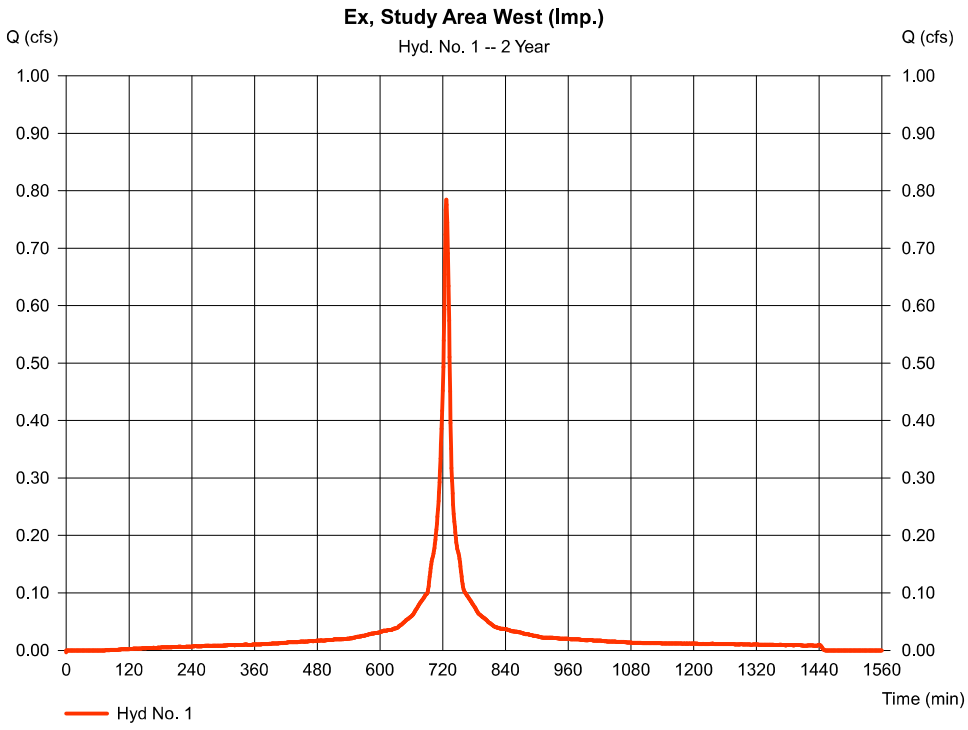
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph description
1	SCS Runoff	0.784	1	727	2,723	----	------	------	Ex, Study Area West (Imp.)
2	SCS Runoff	3.929	1	727	12,093	----	------	------	Ex. Study Area West (Perv.)
3	Combine	4.713	1	727	14,815	1, 2	------	------	Ex. Study Area West Total
5	SCS Runoff	0.326	1	725	1,005	----	------	------	Ex. Study Area Texas Ave (Imp.)
6	SCS Runoff	0.436	1	726	1,188	----	------	------	Ex, Study Area Texas Ave (Perv.)
7	Combine	0.760	1	726	2,193	5, 6	------	------	Ex. Study Area Texas Ave Total
9	SCS Runoff	0.157	1	727	545	----	------	------	Ex. Study Area East (Imp.)
10	SCS Runoff	4.596	1	727	14,211	----	------	------	Ex. Study Area East (Perv.)
11	Combine	4.753	1	727	14,756	9, 10	------	------	Ex. Study Area East Total
13	Combine	10.18	1	727	31,764	3, 7, 11,	------	------	Ex. Site Total
15	SCS Runoff	1.013	1	725	3,128	----	------	------	Prop DA East - Perv Pvmt West (Imp)
16	SCS Runoff	0.061	1	726	162	----	------	------	Prop DA East - Perv Pvmt West (Per
17	Combine	1.073	1	725	3,289	15, 16	------	------	Perv Pvmt West Total
18	Reservoir	0.498	1	732	3,276	17	64.33	808	Post Rte Pvmt West
20	SCS Runoff	3.692	1	728	13,627	----	------	------	Prop DA East - Perv Pvmt East (Imp)
21	SCS Runoff	0.317	1	729	1,026	----	------	------	Prop DA East - Perv Pvmt East (Perv
22	Combine	4.483	1	728	17,929	18, 20, 21	------	------	Perv Pvmt East Total
23	Reservoir	0.459	1	795	17,715	22	61.48	9,444	Post Rte Pvmt East
25	SCS Runoff	0.454	1	728	1,675	----	------	------	Prop DA East Undetained (Imp)
26	SCS Runoff	1.520	1	729	4,967	----	------	------	Prop DA East Undetained (Perv)
27	Combine	1.972	1	729	6,643	25, 26	------	------	Prop DA East Undetained Total
29	Combine	2.321	1	729	24,358	23, 27,	------	------	Prop DA East Total
31	SCS Runoff	1.788	1	727	6,208	----	------	------	Prop DA West Undetained (Imp)
32	SCS Runoff	0.439	1	728	1,342	----	------	------	Prop DA West Undetained (Perv)
33	Combine	2.223	1	727	7,550	31, 32	------	------	Prop DA West Total
35	SCS Runoff	0.217	1	725	670	----	------	------	Prop DA Texas Ave (Imp)
36	SCS Runoff	0.304	1	726	810	----	------	------	Prop DA Texas Ave (Perv)
37	Combine	0.521	1	726	1,480	35, 36	------	------	Prop DA Texas Ave Total
39	Combine	4.923	1	727	33,388	29, 33, 37,	------	------	Prop Site Total

Hydrograph Report

Hyd. No. 1

Ex, Study Area West (Imp.)

Hydrograph type	= SCS Runoff	Peak discharge	= 0.784 cfs
Storm frequency	= 2 yrs	Time to peak	= 727 min
Time interval	= 1 min	Hyd. volume	= 2,723 cuft
Drainage area	= 0.250 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 8.30 min
Total precip.	= 3.31 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds	Shape factor	= 484

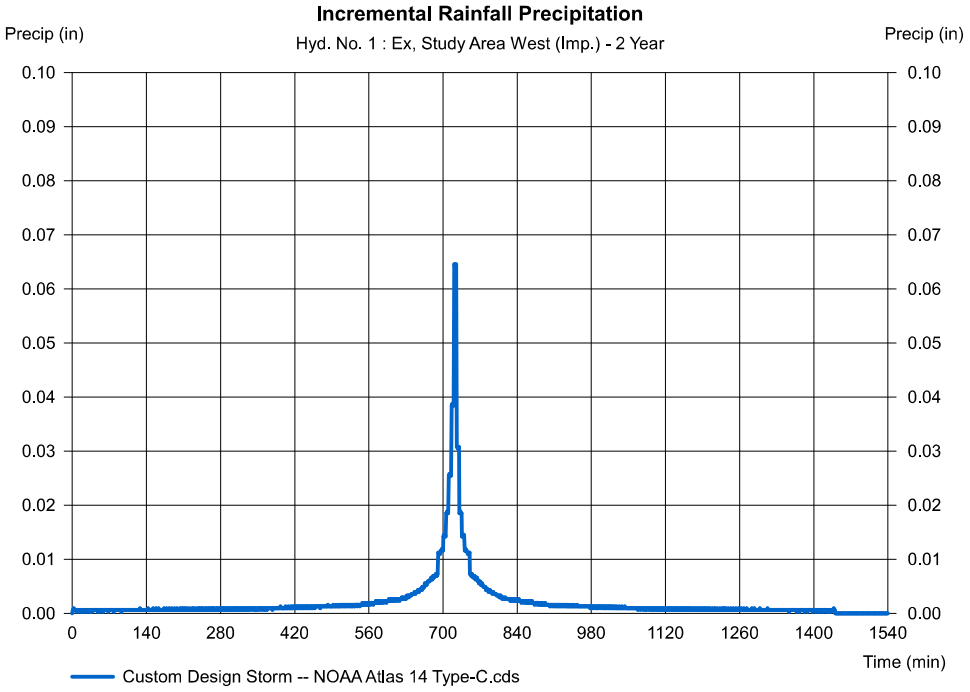


Precipitation Report

Hyd. No. 1

Ex, Study Area West (Imp.)

Storm Frequency	= 2 yrs	Time interval	= 1 min
Total precip.	= 3.3100 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds		

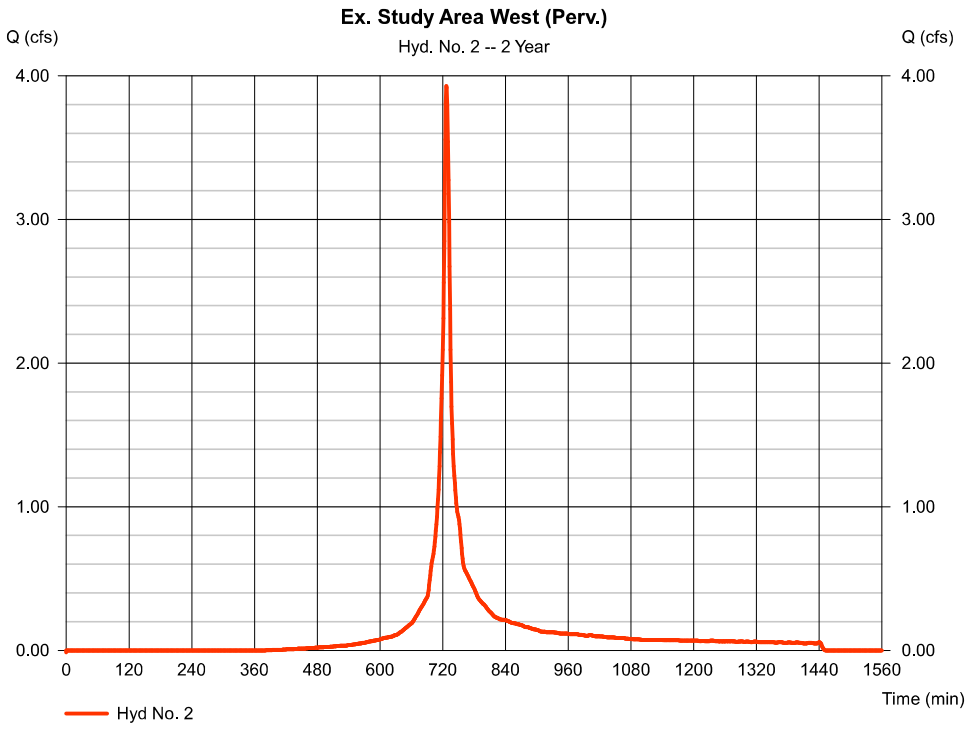


Hydrograph Report

Hyd. No. 2

Ex. Study Area West (Perv.)

Hydrograph type	= SCS Runoff	Peak discharge	= 3.929 cfs
Storm frequency	= 2 yrs	Time to peak	= 727 min
Time interval	= 1 min	Hyd. volume	= 12,093 cuft
Drainage area	= 1.630 ac	Curve number	= 88
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 8.30 min
Total precip.	= 3.31 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds	Shape factor	= 484

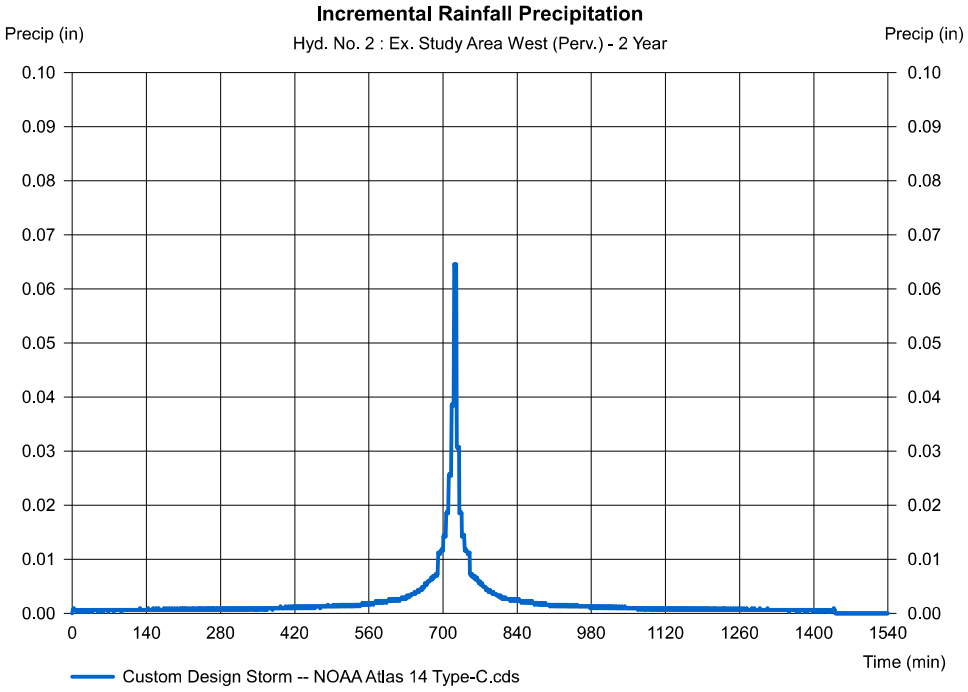


Precipitation Report

Hyd. No. 2

Ex. Study Area West (Perv.)

Storm Frequency	= 2 yrs	Time interval	= 1 min
Total precip.	= 3.3100 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds		

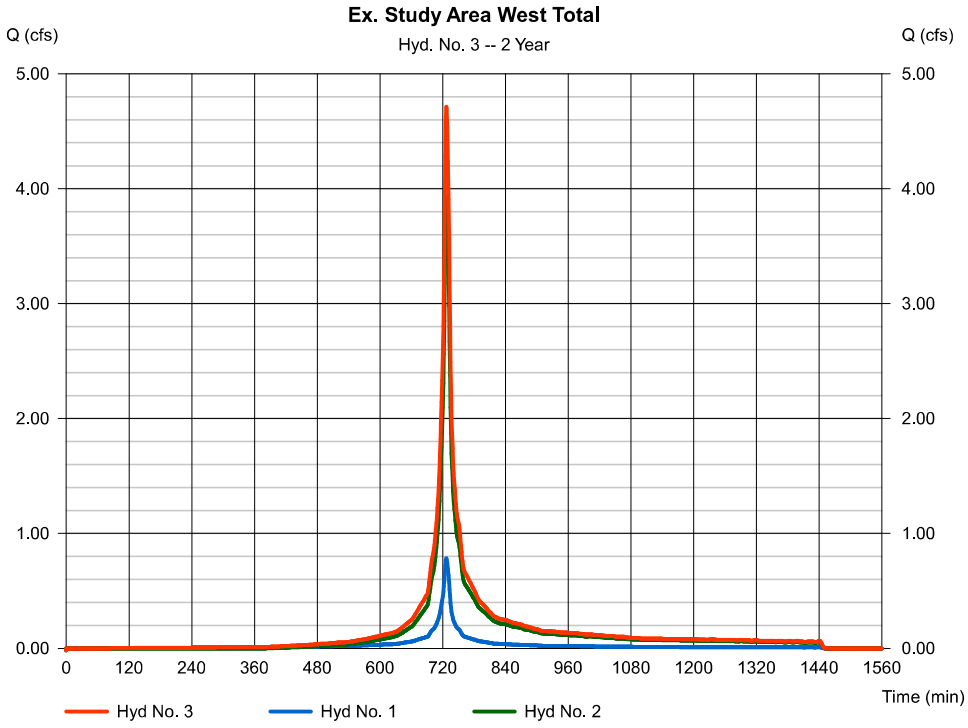


Hydrograph Report

Hyd. No. 3

Ex. Study Area West Total

Hydrograph type	= Combine	Peak discharge	= 4.713 cfs
Storm frequency	= 2 yrs	Time to peak	= 727 min
Time interval	= 1 min	Hyd. volume	= 14,815 cuft
Inflow hyds.	= 1, 2	Contrib. drain. area	= 1.880 ac

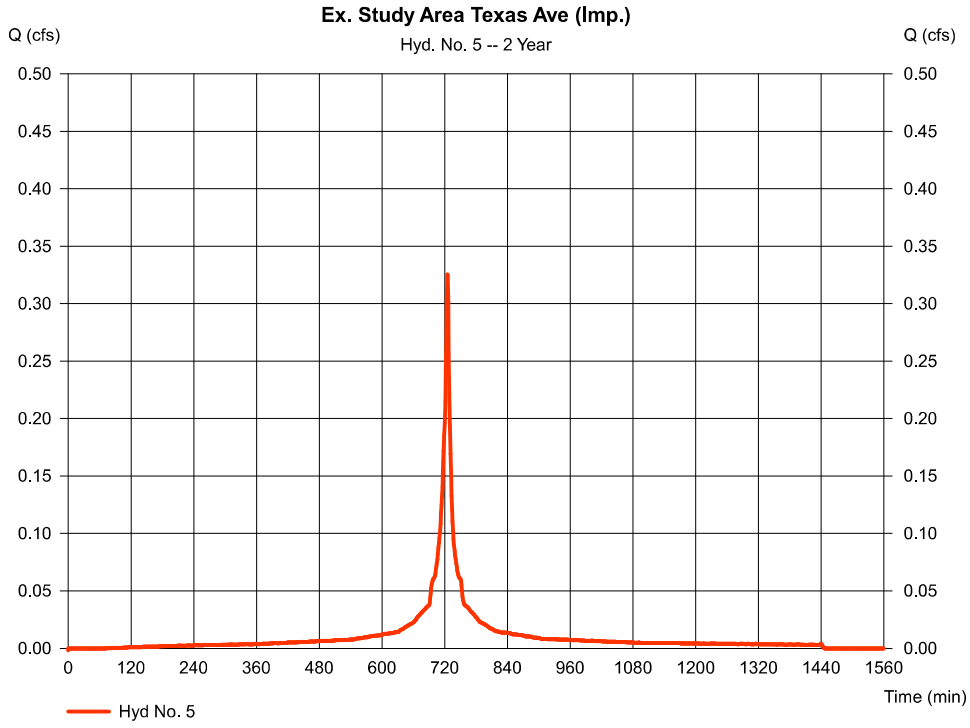


Hydrograph Report

Hyd. No. 5

Ex. Study Area Texas Ave (Imp.)

Hydrograph type	= SCS Runoff	Peak discharge	= 0.326 cfs
Storm frequency	= 2 yrs	Time to peak	= 725 min
Time interval	= 1 min	Hyd. volume	= 1,005 cuft
Drainage area	= 0.090 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 3.90 min
Total precip.	= 3.31 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds	Shape factor	= 484

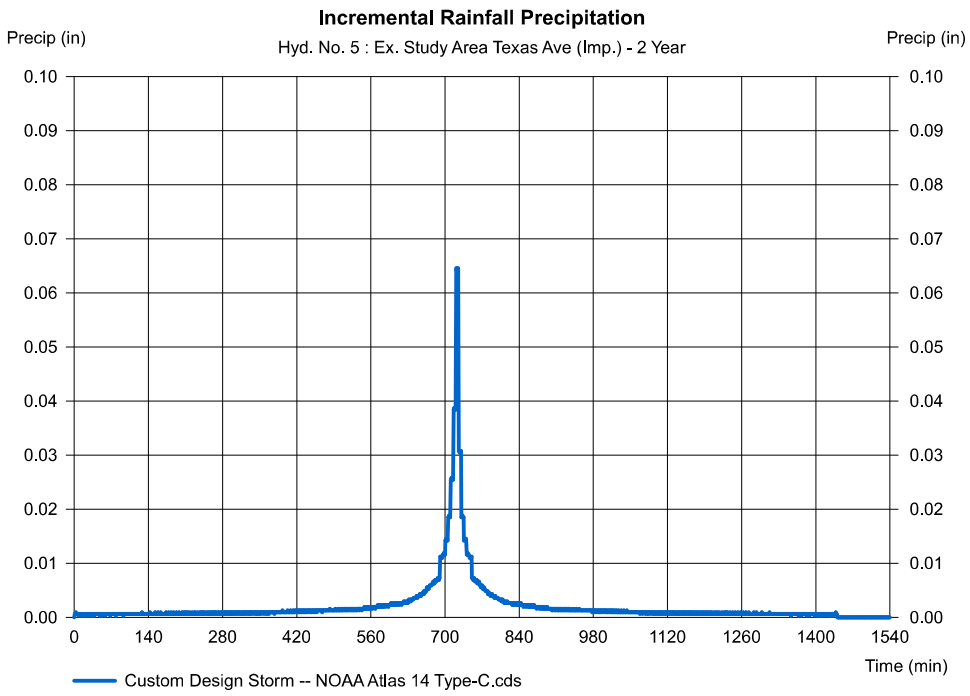


Precipitation Report

Hyd. No. 5

Ex. Study Area Texas Ave (Imp.)

Storm Frequency	= 2 yrs	Time interval	= 1 min
Total precip.	= 3.3100 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds		

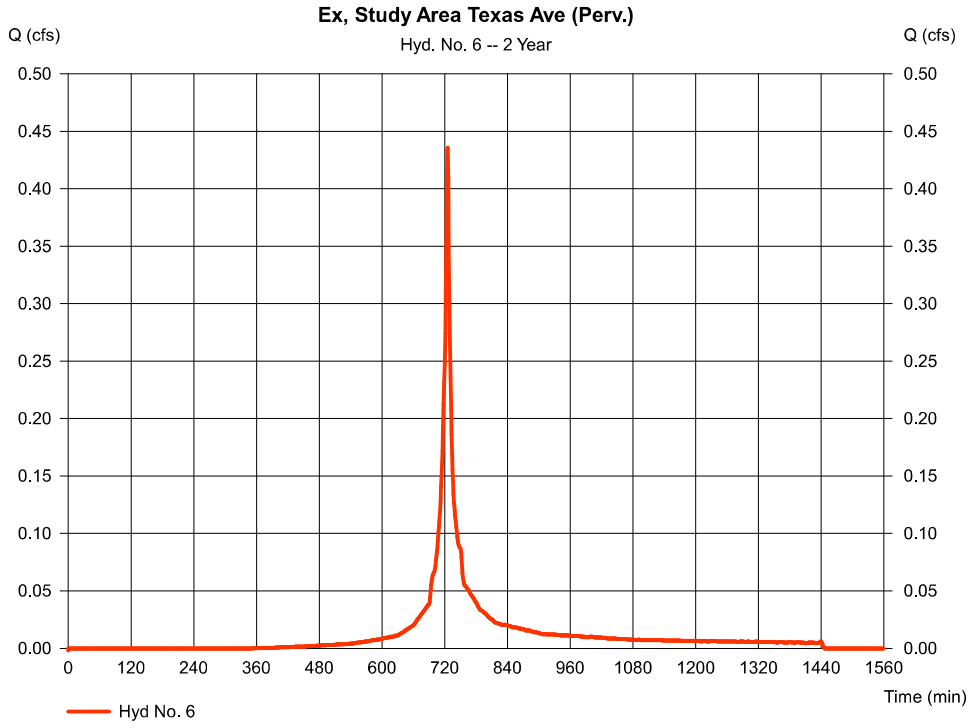


Hydrograph Report

Hyd. No. 6

Ex, Study Area Texas Ave (Perv.)

Hydrograph type	= SCS Runoff	Peak discharge	= 0.436 cfs
Storm frequency	= 2 yrs	Time to peak	= 726 min
Time interval	= 1 min	Hyd. volume	= 1,188 cuft
Drainage area	= 0.150 ac	Curve number	= 89
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 3.90 min
Total precip.	= 3.31 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds	Shape factor	= 484

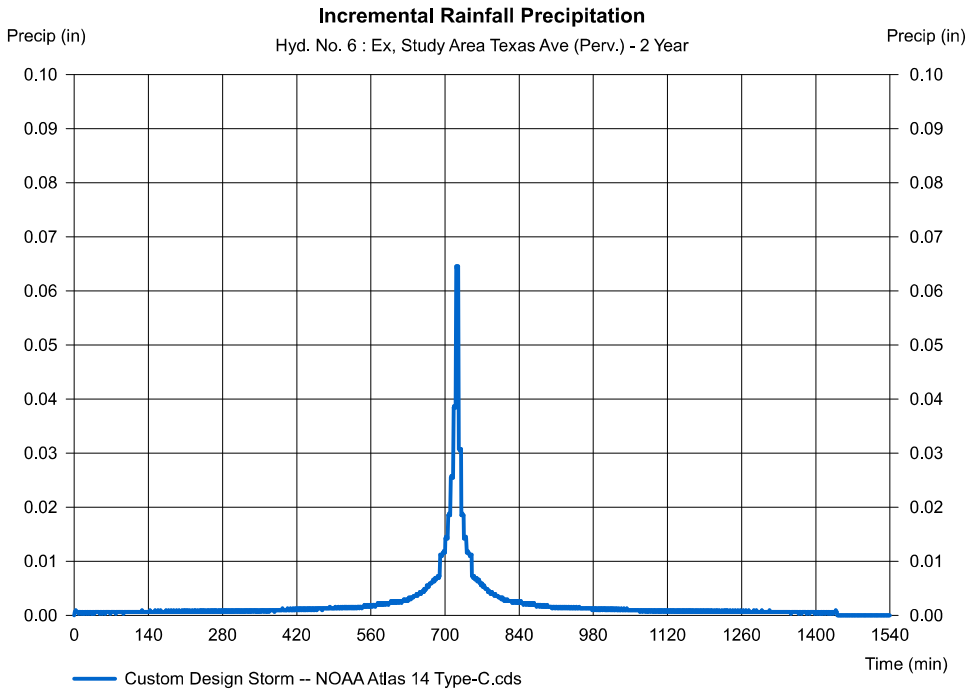


Precipitation Report

Hyd. No. 6

Ex, Study Area Texas Ave (Perv.)

Storm Frequency	= 2 yrs	Time interval	= 1 min
Total precip.	= 3.3100 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds		

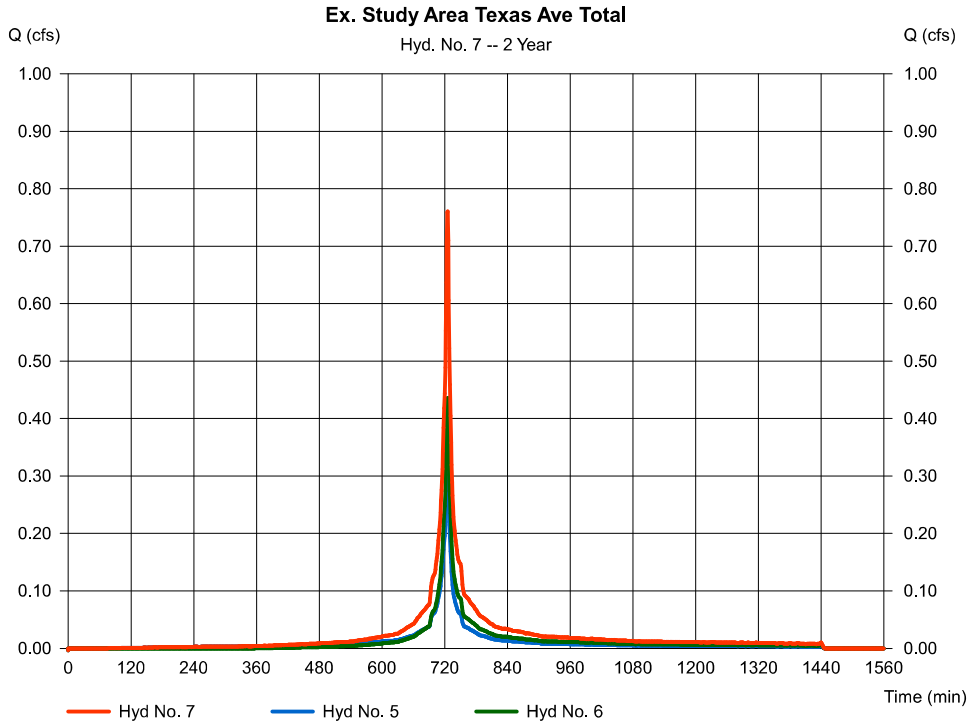


Hydrograph Report

Hyd. No. 7

Ex. Study Area Texas Ave Total

Hydrograph type	= Combine	Peak discharge	= 0.760 cfs
Storm frequency	= 2 yrs	Time to peak	= 726 min
Time interval	= 1 min	Hyd. volume	= 2,193 cuft
Inflow hyds.	= 5, 6	Contrib. drain. area	= 0.240 ac

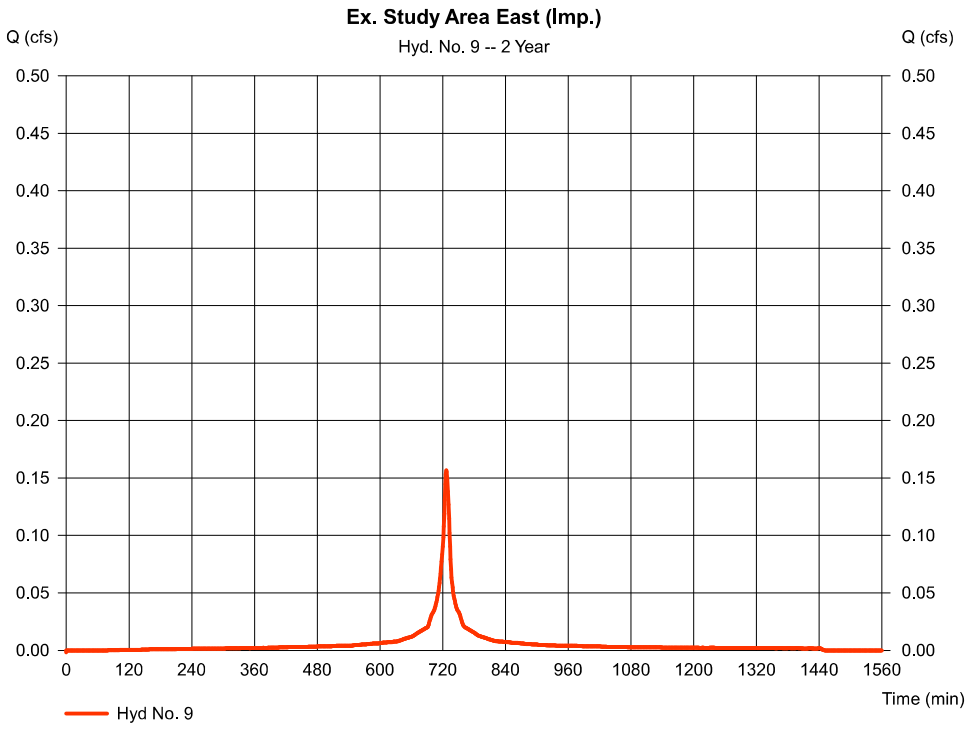


Hydrograph Report

Hyd. No. 9

Ex. Study Area East (Imp.)

Hydrograph type	= SCS Runoff	Peak discharge	= 0.157 cfs
Storm frequency	= 2 yrs	Time to peak	= 727 min
Time interval	= 1 min	Hyd. volume	= 545 cuft
Drainage area	= 0.050 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 8.00 min
Total precip.	= 3.31 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds	Shape factor	= 484

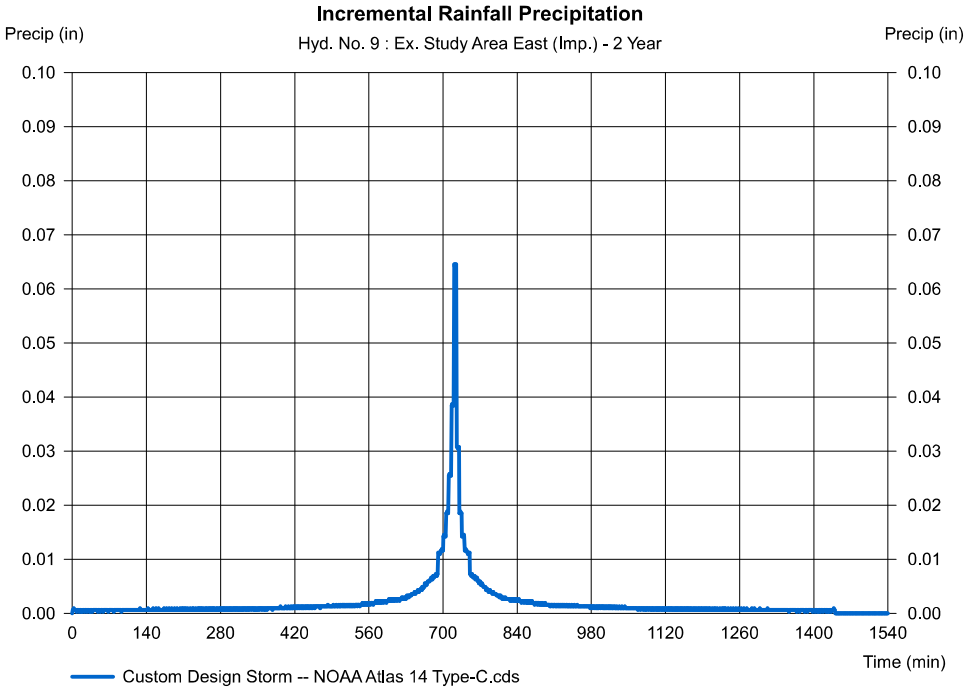


Precipitation Report

Hyd. No. 9

Ex. Study Area East (Imp.)

Storm Frequency	= 2 yrs	Time interval	= 1 min
Total precip.	= 3.3100 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds		

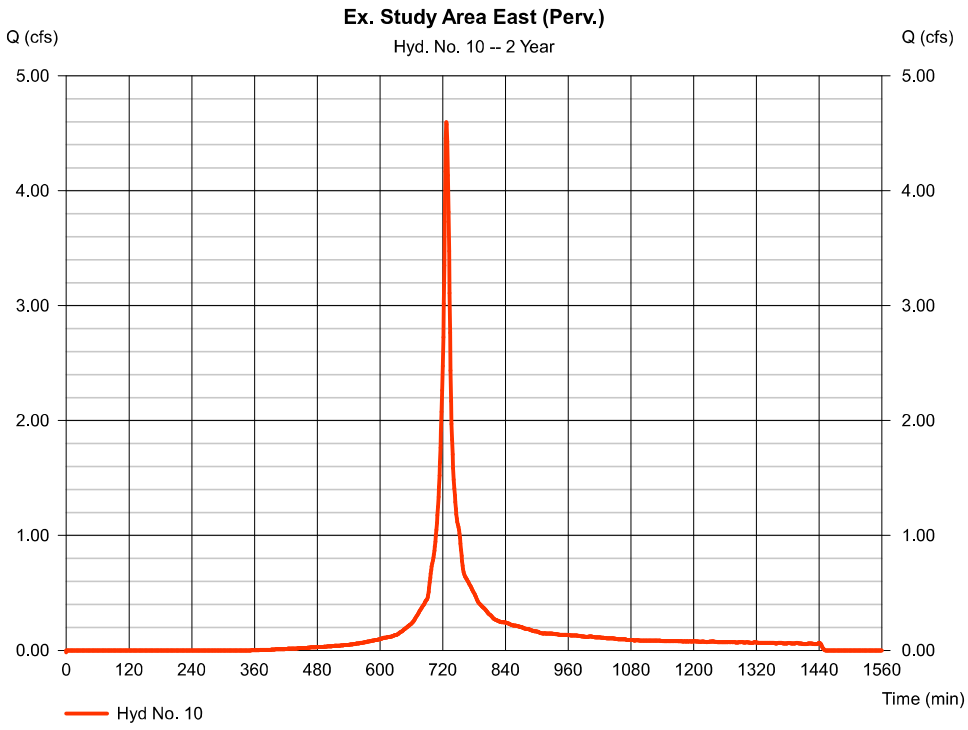


Hydrograph Report

Hyd. No. 10

Ex. Study Area East (Perv.)

Hydrograph type	= SCS Runoff	Peak discharge	= 4.596 cfs
Storm frequency	= 2 yrs	Time to peak	= 727 min
Time interval	= 1 min	Hyd. volume	= 14,211 cuft
Drainage area	= 1.840 ac	Curve number	= 89
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 8.00 min
Total precip.	= 3.31 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds	Shape factor	= 484

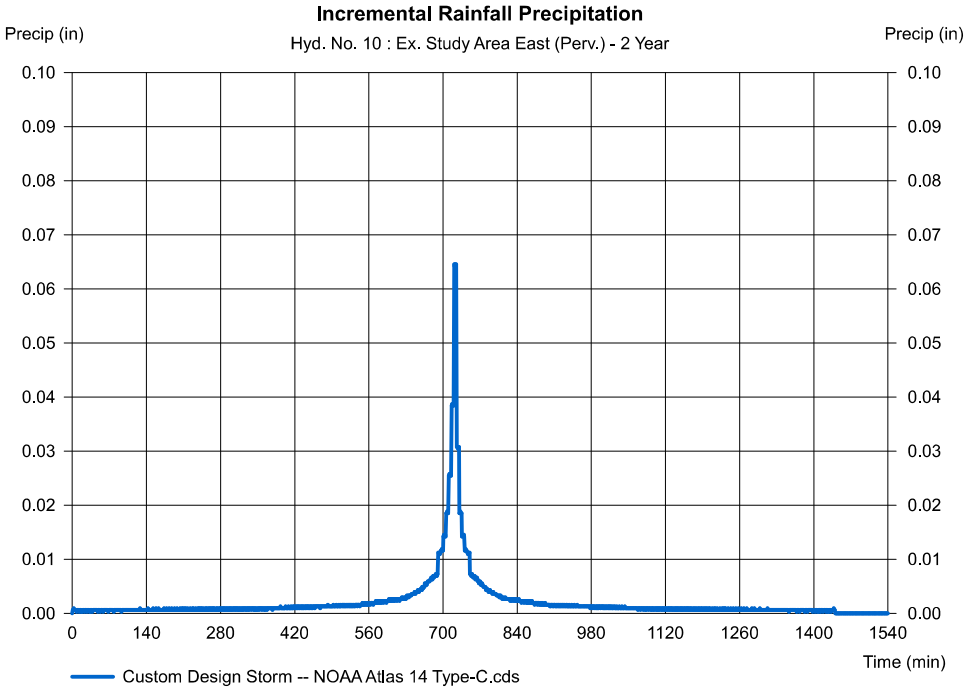


Precipitation Report

Hyd. No. 10

Ex. Study Area East (Perv.)

Storm Frequency	= 2 yrs	Time interval	= 1 min
Total precip.	= 3.3100 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds		

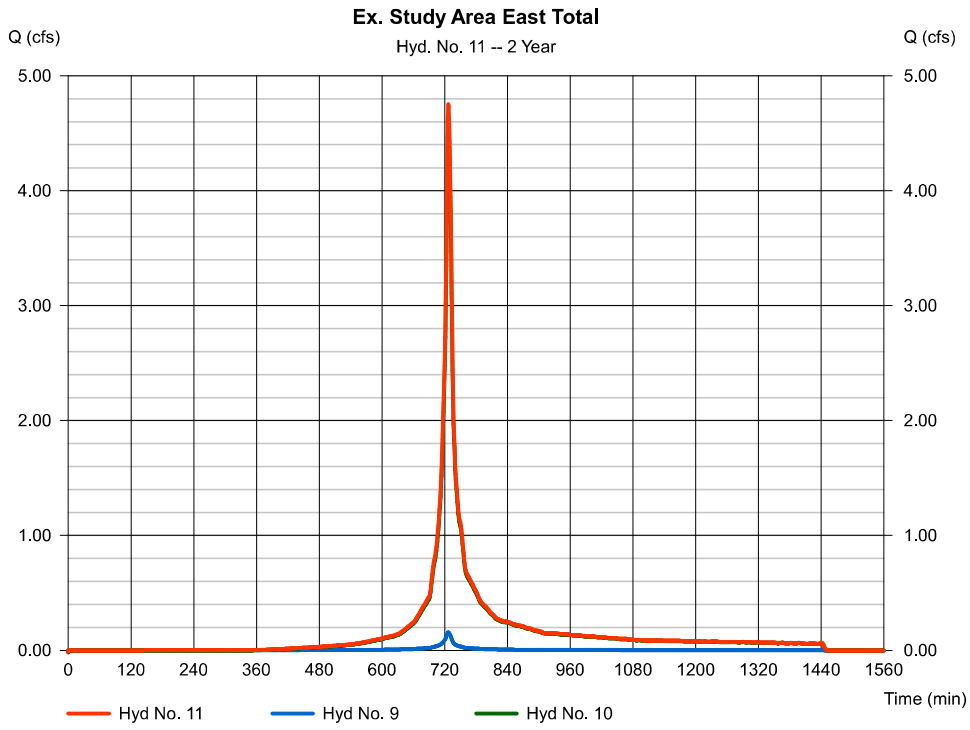


Hydrograph Report

Hyd. No. 11

Ex. Study Area East Total

Hydrograph type	= Combine	Peak discharge	= 4.753 cfs
Storm frequency	= 2 yrs	Time to peak	= 727 min
Time interval	= 1 min	Hyd. volume	= 14,756 cuft
Inflow hyds.	= 9, 10	Contrib. drain. area	= 1.890 ac

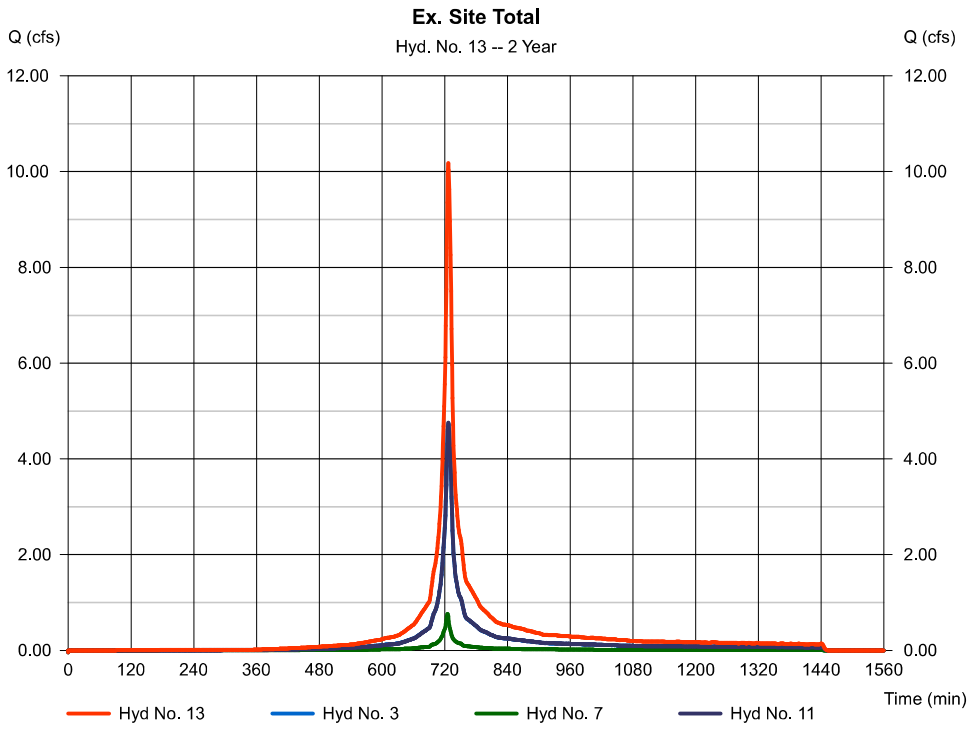


Hydrograph Report

Hyd. No. 13

Ex. Site Total

Hydrograph type	= Combine	Peak discharge	= 10.18 cfs
Storm frequency	= 2 yrs	Time to peak	= 727 min
Time interval	= 1 min	Hyd. volume	= 31,764 cuft
Inflow hyds.	= 3, 7, 11	Contrib. drain. area	= 0.000 ac

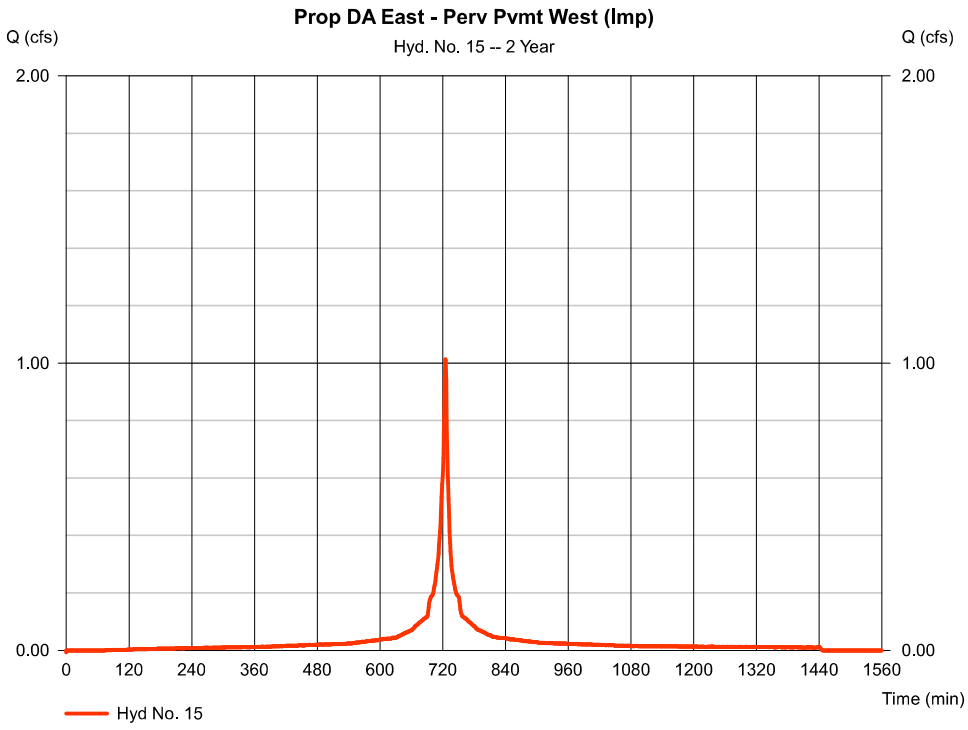


Hydrograph Report

Hyd. No. 15

Prop DA East - Perv Pvmt West (Imp)

Hydrograph type	= SCS Runoff	Peak discharge	= 1.013 cfs
Storm frequency	= 2 yrs	Time to peak	= 725 min
Time interval	= 1 min	Hyd. volume	= 3,128 cuft
Drainage area	= 0.280 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 4.20 min
Total precip.	= 3.31 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds	Shape factor	= 484

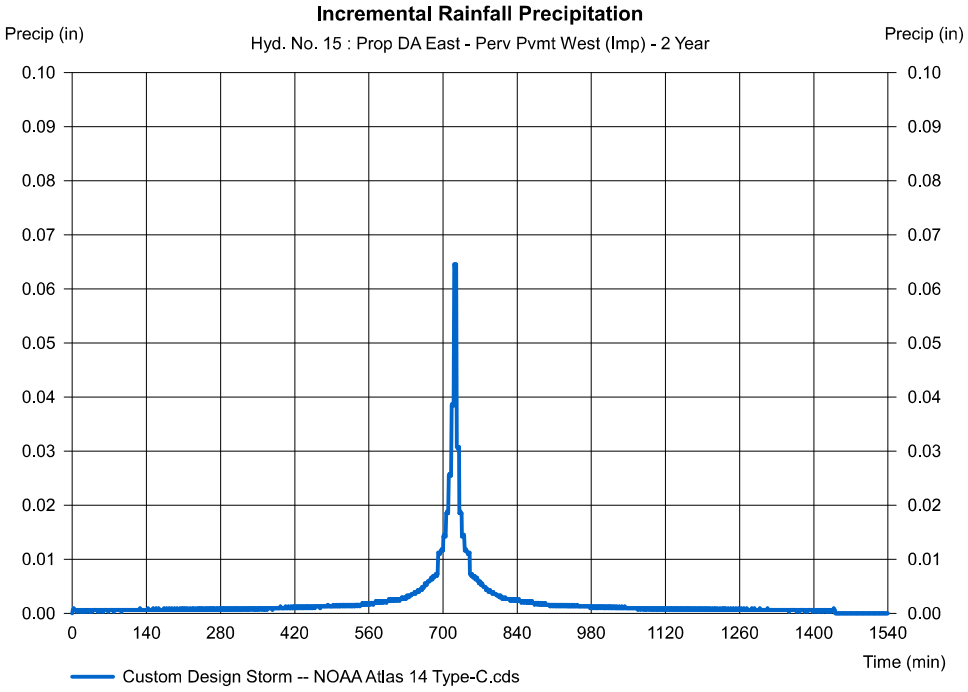


Precipitation Report

Hyd. No. 15

Prop DA East - Perv Pvmt West (Imp)

Storm Frequency	= 2 yrs	Time interval	= 1 min
Total precip.	= 3.3100 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds		

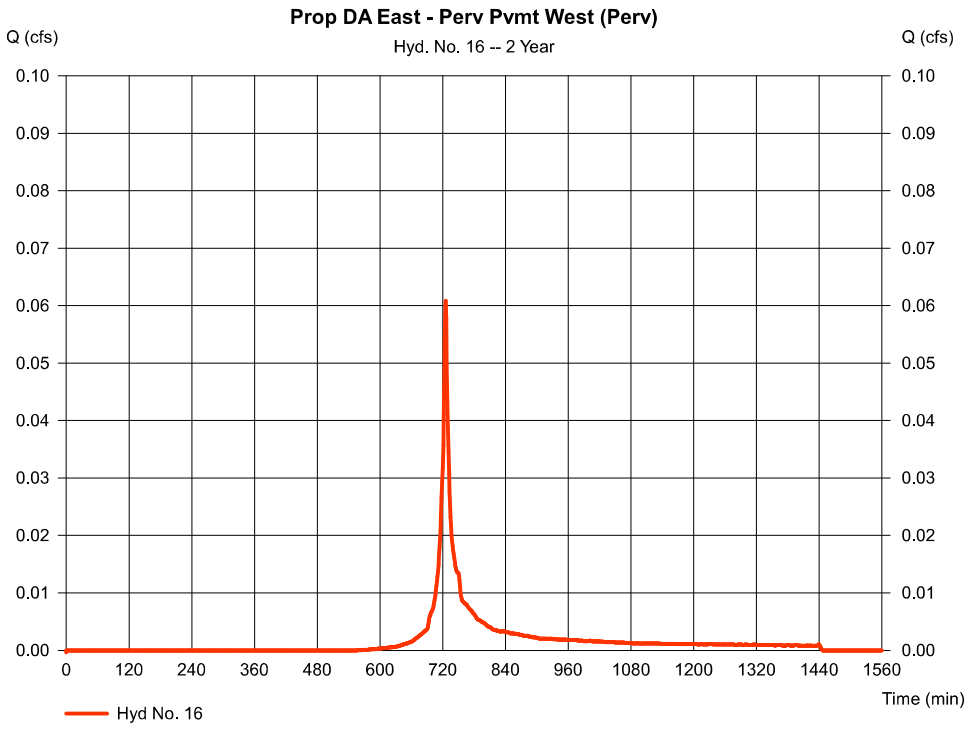


Hydrograph Report

Hyd. No. 16

Prop DA East - Perv Pvmt West (Perv)

Hydrograph type	= SCS Runoff	Peak discharge	= 0.061 cfs
Storm frequency	= 2 yrs	Time to peak	= 726 min
Time interval	= 1 min	Hyd. volume	= 162 cuft
Drainage area	= 0.030 ac	Curve number	= 80
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 4.20 min
Total precip.	= 3.31 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds	Shape factor	= 484

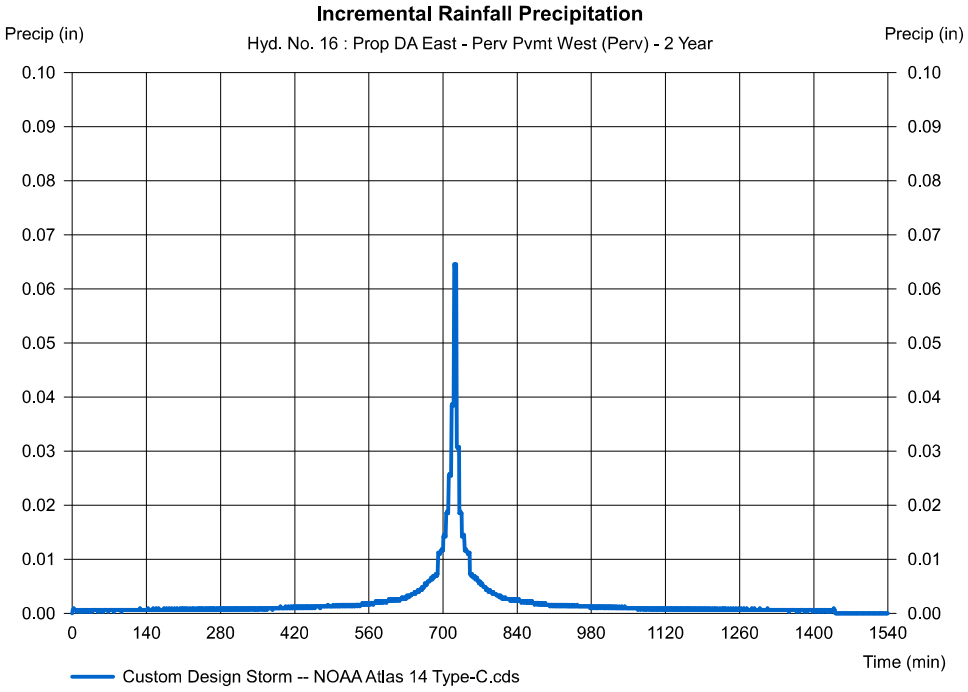


Precipitation Report

Hyd. No. 16

Prop DA East - Perv Pvmt West (Perv)

Storm Frequency	= 2 yrs	Time interval	= 1 min
Total precip.	= 3.3100 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds		

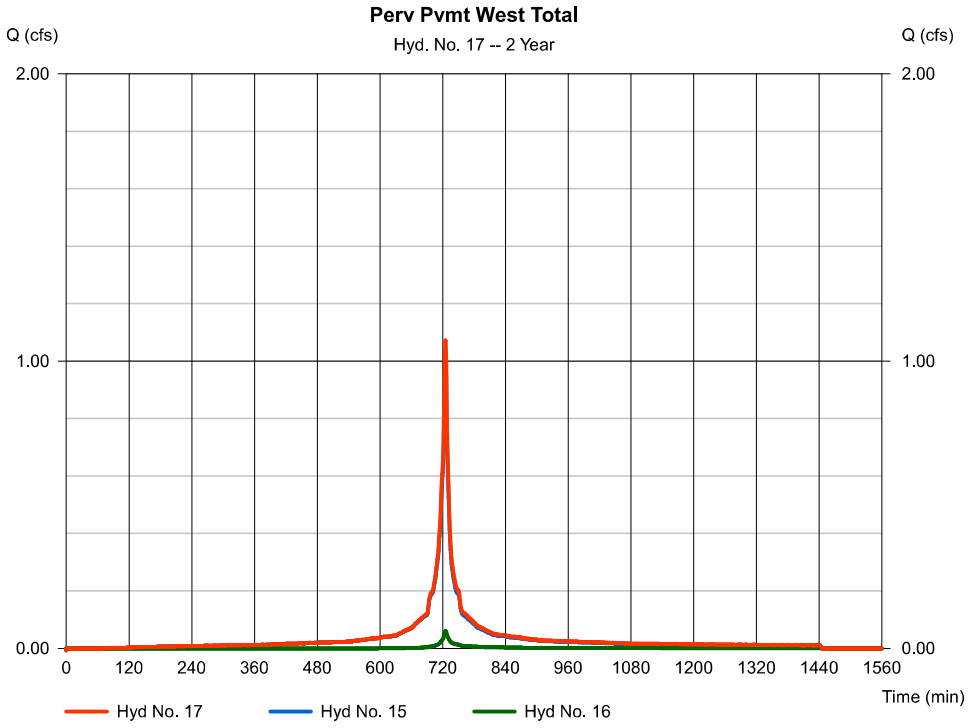


Hydrograph Report

Hyd. No. 17

Perv Pvmt West Total

Hydrograph type	= Combine	Peak discharge	= 1.073 cfs
Storm frequency	= 2 yrs	Time to peak	= 725 min
Time interval	= 1 min	Hyd. volume	= 3,289 cuft
Inflow hyds.	= 15, 16	Contrib. drain. area	= 0.310 ac



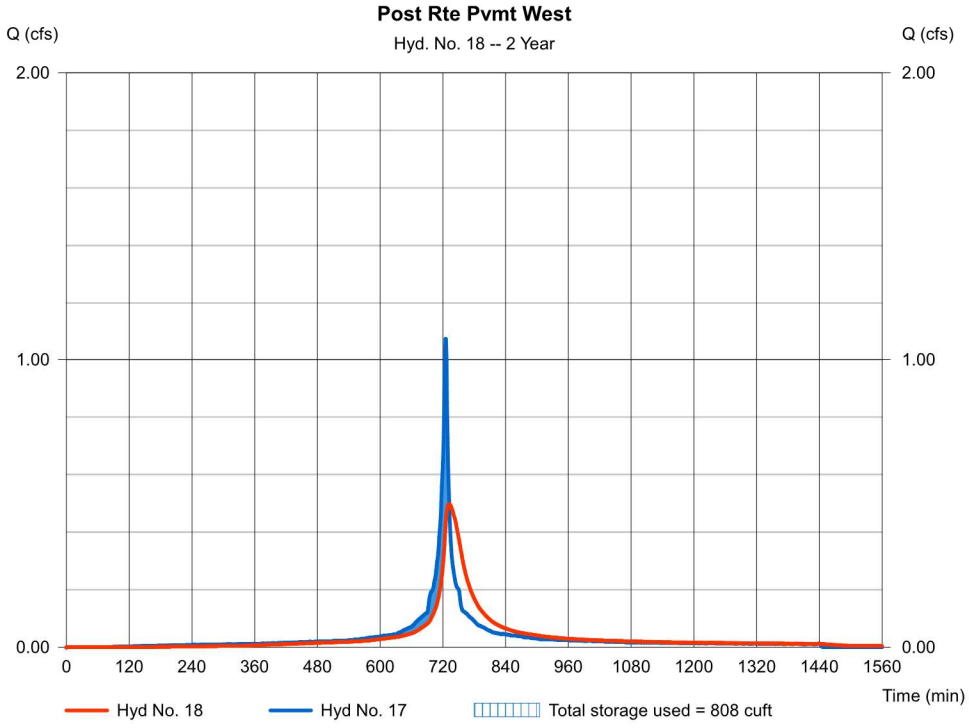
Hydrograph Report

Hyd. No. 18

Post Rte Pvmt West

Hydrograph type	= Reservoir	Peak discharge	= 0.498 cfs
Storm frequency	= 2 yrs	Time to peak	= 732 min
Time interval	= 1 min	Hyd. volume	= 3,276 cuft
Inflow hyd. No.	= 17 - Perv Pvmt West Total	Max. Elevation	= 64.33 ft
Reservoir name	= Porous Pavement West	Max. Storage	= 808 cuft

Storage Indication method used.



Pond Report

Hydraflow Hydrographs by Intelisolve v9.1 — Tuesday, May 21, 2024

Pond No. 3 - Porous Pavement West

Pond Data

Contours - User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 63.75 ft. Voids = 40.00%

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	63.75	3,460	0	0
0.50	64.25	3,461	692	692
1.00	64.75	3,462	692	1,384
1.50	65.25	3,463	692	2,077
1.75	65.50	3,464	346	2,423

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 18.00	6.00	0.00	0.00
Span (in)	= 18.00	6.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 63.75	63.76	0.00	0.00
Length (ft)	= 50.00	0.00	0.00	0.00
Slope (%)	= 0.50	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	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 4.00	0.00	0.00	0.00
Crest El. (ft)	= 64.75	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= Rect	---	---	---
Multi-Stage	= Yes	No	No	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 cuft	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	63.75	0.00	0.00	---	---	0.00	---	---	---	---	---	0.00
0.05	69	63.80	0.01 ic	0.01 ic	---	---	0.00	---	---	---	---	---	0.01
0.10	138	63.85	0.02 ic	0.02 ic	---	---	0.00	---	---	---	---	---	0.02
0.15	208	63.90	0.05 ic	0.05 ic	---	---	0.00	---	---	---	---	---	0.05
0.20	277	63.95	0.09 ic	0.09 ic	---	---	0.00	---	---	---	---	---	0.09
0.25	346	64.00	0.14 ic	0.14 ic	---	---	0.00	---	---	---	---	---	0.14
0.30	415	64.05	0.20 ic	0.19 ic	---	---	0.00	---	---	---	---	---	0.19
0.35	484	64.10	0.25 ic	0.25 ic	---	---	0.00	---	---	---	---	---	0.25
0.40	554	64.15	0.32 ic	0.32 ic	---	---	0.00	---	---	---	---	---	0.32
0.45	623	64.20	0.38 ic	0.38 ic	---	---	0.00	---	---	---	---	---	0.38
0.50	692	64.25	0.44 ic	0.44 ic	---	---	0.00	---	---	---	---	---	0.44
0.55	761	64.30	0.49 ic	0.47 ic	---	---	0.00	---	---	---	---	---	0.47
0.60	830	64.35	0.52 ic	0.51 ic	---	---	0.00	---	---	---	---	---	0.51
0.65	900	64.40	0.55 ic	0.54 ic	---	---	0.00	---	---	---	---	---	0.54
0.70	969	64.45	0.58 ic	0.58 ic	---	---	0.00	---	---	---	---	---	0.58
0.75	1,038	64.50	0.62 ic	0.61 ic	---	---	0.00	---	---	---	---	---	0.61
0.80	1,107	64.55	0.65 ic	0.64 ic	---	---	0.00	---	---	---	---	---	0.64
0.85	1,177	64.60	0.69 ic	0.66 ic	---	---	0.00	---	---	---	---	---	0.66
0.90	1,246	64.65	0.69 ic	0.69 ic	---	---	0.00	---	---	---	---	---	0.69
0.95	1,315	64.70	0.72 ic	0.72 ic	---	---	0.00	---	---	---	---	---	0.72
1.00	1,384	64.75	0.76 ic	0.75 ic	---	---	0.00	---	---	---	---	---	0.75
1.05	1,454	64.80	0.93 ic	0.75 ic	---	---	0.15	---	---	---	---	---	0.90
1.10	1,523	64.85	1.17 ic	0.74 ic	---	---	0.42	---	---	---	---	---	1.17
1.15	1,592	64.90	1.53 oc	0.72 ic	---	---	0.77	---	---	---	---	---	1.50
1.20	1,661	64.95	1.93 oc	0.70 ic	---	---	1.19	---	---	---	---	---	1.89
1.25	1,730	65.00	2.34 oc	0.67 ic	---	---	1.67	---	---	---	---	---	2.33
1.30	1,800	65.05	2.85 oc	0.62 ic	---	---	2.19	---	---	---	---	---	2.81
1.35	1,869	65.10	3.33 oc	0.57 ic	---	---	2.76	---	---	---	---	---	3.33
1.40	1,938	65.15	3.75 oc	0.53 ic	---	---	3.23 s	---	---	---	---	---	3.75
1.45	2,007	65.20	4.07 oc	0.49 ic	---	---	3.58 s	---	---	---	---	---	4.07
1.50	2,077	65.25	4.32 oc	0.45 ic	---	---	3.87 s	---	---	---	---	---	4.32
1.53	2,111	65.28	4.45 oc	0.44 ic	---	---	4.00 s	---	---	---	---	---	4.43
1.55	2,146	65.30	4.53 oc	0.42 ic	---	---	4.11 s	---	---	---	---	---	4.53
1.58	2,181	65.33	4.60 oc	0.40 ic	---	---	4.20 s	---	---	---	---	---	4.60
1.60	2,215	65.35	4.65 oc	0.38 ic	---	---	4.26 s	---	---	---	---	---	4.65
1.63	2,250	65.38	4.64 oc	0.36 ic	---	---	4.28 s	---	---	---	---	---	4.64
1.65	2,284	65.40	4.71 oc	0.35 ic	---	---	4.36 s	---	---	---	---	---	4.71
1.68	2,319	65.43	4.92 oc	0.35 ic	---	---	4.57 s	---	---	---	---	---	4.92
1.70	2,354	65.45	5.12 oc	0.35 ic	---	---	4.77 s	---	---	---	---	---	5.12

Continues on next page...

Porous Pavement West

Stage / Storage / Discharge Table

Stage ft	Storage cuft	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
1.73	2,388	65.48	5.32 oc	0.35 ic	---	---	4.97 s	---	---	---	---	---	5.32
1.75	2,423	65.50	5.51 oc	0.35 ic	---	---	5.16 s	---	---	---	---	---	5.51

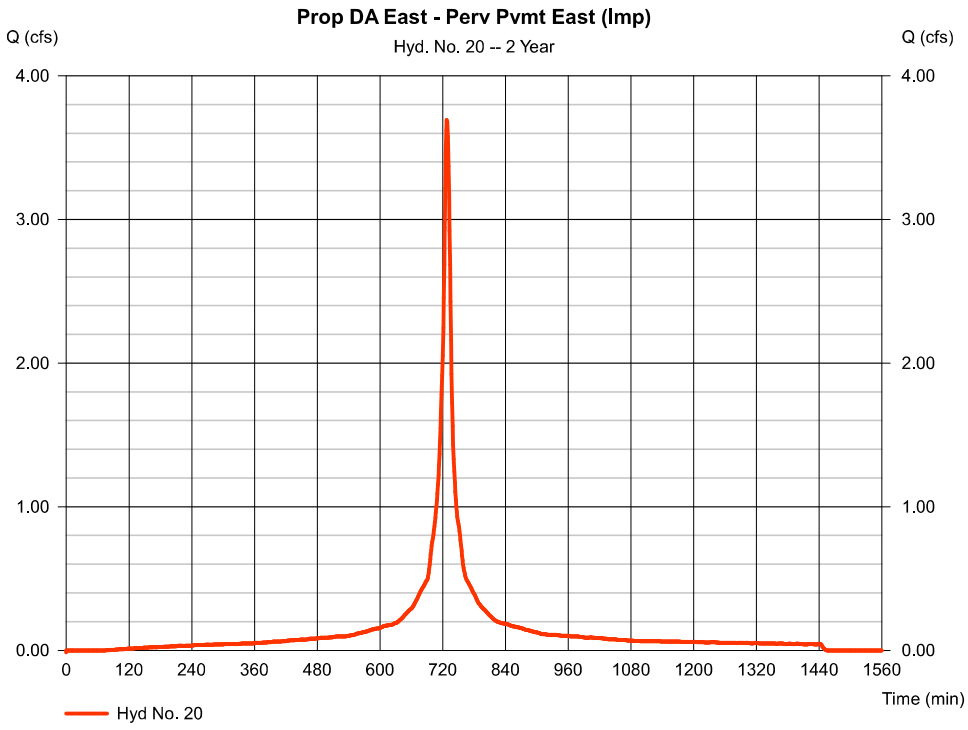
...End

Hydrograph Report

Hyd. No. 20

Prop DA East - Perv Pvmt East (Imp)

Hydrograph type	= SCS Runoff	Peak discharge	= 3.692 cfs
Storm frequency	= 2 yrs	Time to peak	= 728 min
Time interval	= 1 min	Hyd. volume	= 13,627 cuft
Drainage area	= 1.220 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 9.20 min
Total precip.	= 3.31 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds	Shape factor	= 484

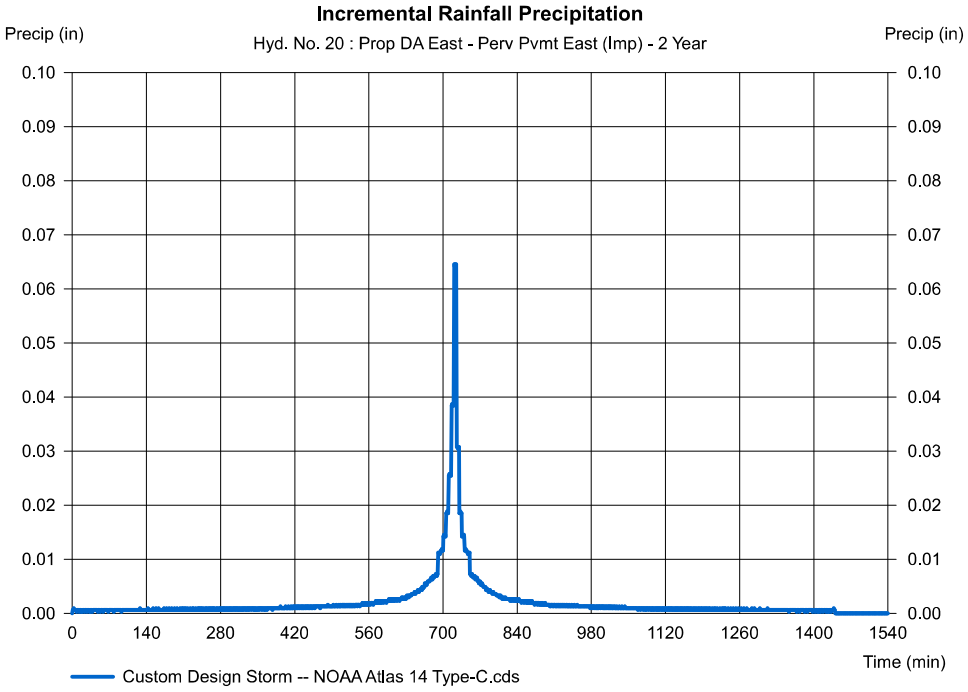


Precipitation Report

Hyd. No. 20

Prop DA East - Perv Pvmt East (Imp)

Storm Frequency	= 2 yrs	Time interval	= 1 min
Total precip.	= 3.3100 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds		

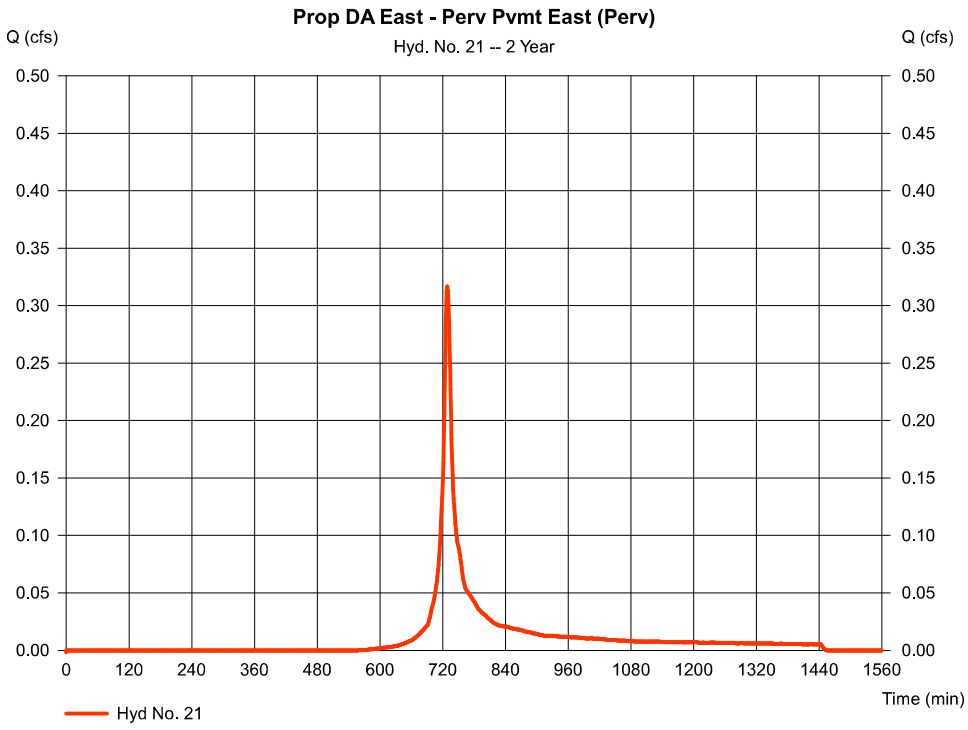


Hydrograph Report

Hyd. No. 21

Prop DA East - Perv Pvmt East (Perv)

Hydrograph type	= SCS Runoff	Peak discharge	= 0.317 cfs
Storm frequency	= 2 yrs	Time to peak	= 729 min
Time interval	= 1 min	Hyd. volume	= 1,026 cuft
Drainage area	= 0.190 ac	Curve number	= 80
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 9.20 min
Total precip.	= 3.31 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds	Shape factor	= 484

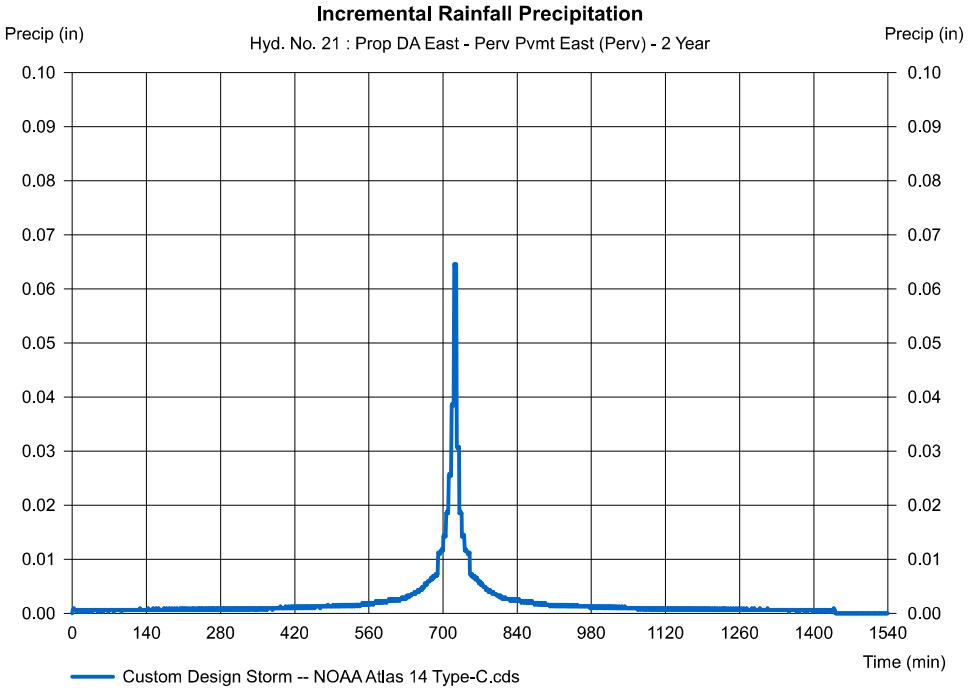


Precipitation Report

Hyd. No. 21

Prop DA East - Perv Pvmt East (Perv)

Storm Frequency	= 2 yrs	Time interval	= 1 min
Total precip.	= 3.3100 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds		

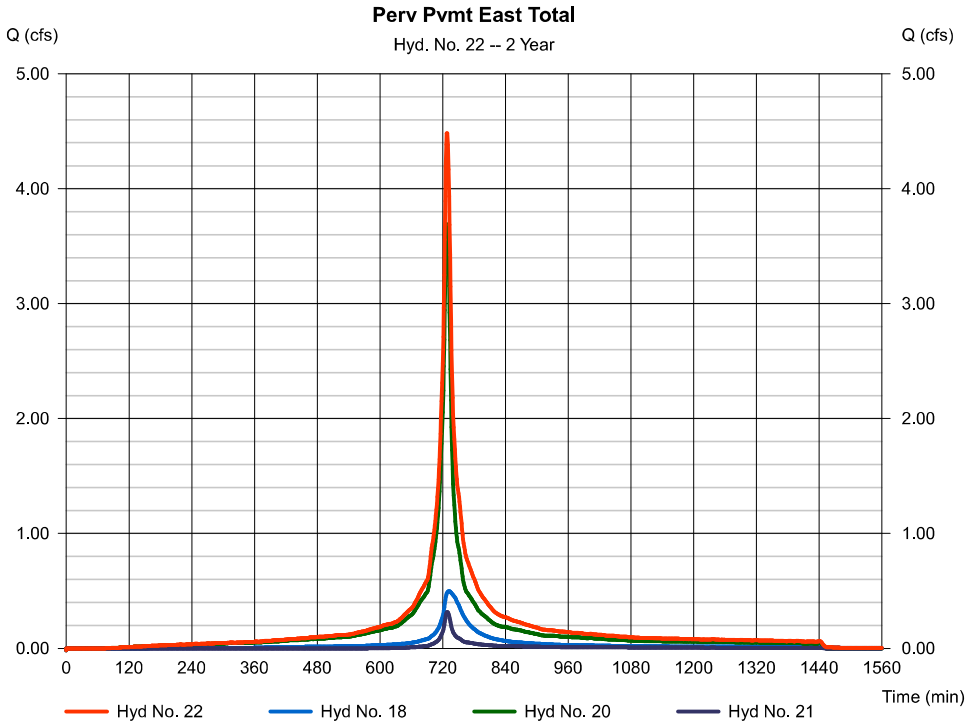


Hydrograph Report

Hyd. No. 22

Perv Pvmt East Total

Hydrograph type	= Combine	Peak discharge	= 4.483 cfs
Storm frequency	= 2 yrs	Time to peak	= 728 min
Time interval	= 1 min	Hyd. volume	= 17,929 cuft
Inflow hyds.	= 18, 20, 21	Contrib. drain. area	= 1.410 ac



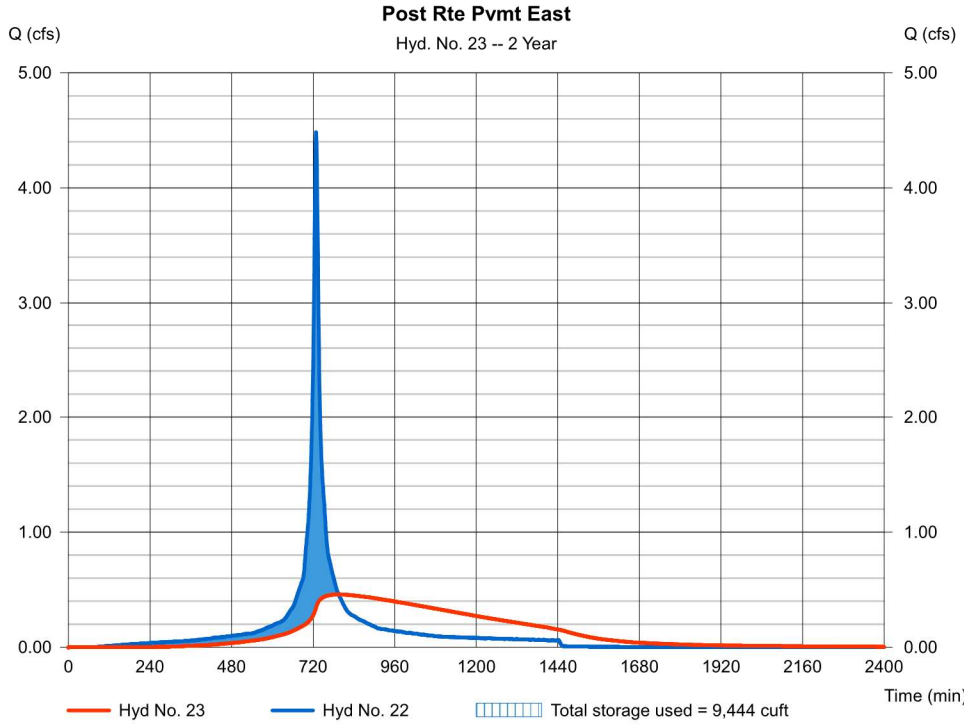
Hydrograph Report

Hyd. No. 23

Post Rte Pvmt East

Hydrograph type	= Reservoir	Peak discharge	= 0.459 cfs
Storm frequency	= 2 yrs	Time to peak	= 795 min
Time interval	= 1 min	Hyd. volume	= 17,715 cuft
Inflow hyd. No.	= 22 - Perv Pvmt East Total	Max. Elevation	= 61.48 ft
Reservoir name	= Porous Pavement East	Max. Storage	= 9,444 cuft

Storage Indication method used.



Pond Report

Hydraflow Hydrographs by Intelisolve v9.1 — Tuesday, May 21, 2024

Pond No. 1 - Porous Pavement East

Pond Data

Contours - User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 60.00 ft. Voids = 40.00%

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	60.00	15,917	0	0
0.50	60.50	15,917	3,183	3,183
1.00	61.00	15,917	3,183	6,366
1.50	61.50	15,917	3,183	9,549
2.00	62.00	15,917	3,183	12,732
2.50	62.50	15,917	3,183	15,915
3.00	63.00	15,917	3,183	19,098
3.50	63.50	15,917	3,183	22,282

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 18.00	4.00	0.00	0.00
Span (in)	= 18.00	4.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 60.00	60.01	0.00	0.00
Length (ft)	= 50.00	0.00	0.00	0.00
Slope (%)	= 0.50	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	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 3.00	0.00	0.00	0.00
Crest El. (ft)	= 62.50	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= Rect	---	---	---
Multi-Stage	= Yes	No	No	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 cuft	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	60.00	0.00	0.00	---	---	0.00	---	---	---	---	---	0.00
0.05	318	60.05	0.00 ic	0.00 ic	---	---	0.00	---	---	---	---	---	0.00
0.10	637	60.10	0.02 ic	0.02 ic	---	---	0.00	---	---	---	---	---	0.02
0.15	955	60.15	0.05 ic	0.04 ic	---	---	0.00	---	---	---	---	---	0.04
0.20	1,273	60.20	0.07 ic	0.07 ic	---	---	0.00	---	---	---	---	---	0.07
0.25	1,592	60.25	0.11 ic	0.11 ic	---	---	0.00	---	---	---	---	---	0.11
0.30	1,910	60.30	0.14 ic	0.14 ic	---	---	0.00	---	---	---	---	---	0.14
0.35	2,228	60.35	0.18 ic	0.17 ic	---	---	0.00	---	---	---	---	---	0.17
0.40	2,546	60.40	0.20 ic	0.19 ic	---	---	0.00	---	---	---	---	---	0.19
0.45	2,865	60.45	0.22 ic	0.21 ic	---	---	0.00	---	---	---	---	---	0.21
0.50	3,183	60.50	0.23 ic	0.23 ic	---	---	0.00	---	---	---	---	---	0.23
0.55	3,501	60.55	0.25 ic	0.24 ic	---	---	0.00	---	---	---	---	---	0.24
0.60	3,820	60.60	0.27 ic	0.26 ic	---	---	0.00	---	---	---	---	---	0.26
0.65	4,138	60.65	0.27 ic	0.27 ic	---	---	0.00	---	---	---	---	---	0.27
0.70	4,456	60.70	0.29 ic	0.29 ic	---	---	0.00	---	---	---	---	---	0.29
0.75	4,775	60.75	0.31 ic	0.30 ic	---	---	0.00	---	---	---	---	---	0.30
0.80	5,093	60.80	0.31 ic	0.31 ic	---	---	0.00	---	---	---	---	---	0.31
0.85	5,411	60.85	0.33 ic	0.33 ic	---	---	0.00	---	---	---	---	---	0.33
0.90	5,730	60.90	0.34 ic	0.34 ic	---	---	0.00	---	---	---	---	---	0.34
0.95	6,048	60.95	0.36 ic	0.35 ic	---	---	0.00	---	---	---	---	---	0.35
1.00	6,366	61.00	0.36 ic	0.36 ic	---	---	0.00	---	---	---	---	---	0.36
1.05	6,684	61.05	0.38 ic	0.37 ic	---	---	0.00	---	---	---	---	---	0.37
1.10	7,003	61.10	0.38 ic	0.38 ic	---	---	0.00	---	---	---	---	---	0.38
1.15	7,321	61.15	0.41 ic	0.39 ic	---	---	0.00	---	---	---	---	---	0.39
1.20	7,639	61.20	0.41 ic	0.40 ic	---	---	0.00	---	---	---	---	---	0.40
1.25	7,958	61.25	0.41 ic	0.41 ic	---	---	0.00	---	---	---	---	---	0.41
1.30	8,276	61.30	0.43 ic	0.42 ic	---	---	0.00	---	---	---	---	---	0.42
1.35	8,594	61.35	0.43 ic	0.43 ic	---	---	0.00	---	---	---	---	---	0.43
1.40	8,913	61.40	0.46 ic	0.44 ic	---	---	0.00	---	---	---	---	---	0.44
1.45	9,231	61.45	0.46 ic	0.45 ic	---	---	0.00	---	---	---	---	---	0.45
1.50	9,549	61.50	0.46 ic	0.46 ic	---	---	0.00	---	---	---	---	---	0.46
1.55	9,868	61.55	0.49 ic	0.47 ic	---	---	0.00	---	---	---	---	---	0.47
1.60	10,186	61.60	0.49 ic	0.48 ic	---	---	0.00	---	---	---	---	---	0.48
1.65	10,504	61.65	0.49 ic	0.49 ic	---	---	0.00	---	---	---	---	---	0.49
1.70	10,822	61.70	0.50 ic	0.50 ic	---	---	0.00	---	---	---	---	---	0.50
1.75	11,141	61.75	0.52 ic	0.50 ic	---	---	0.00	---	---	---	---	---	0.50

Continues on next page...

Porous Pavement East

Stage / Storage / Discharge Table

Stage ft	Storage cuft	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
1.80	11,459	61.80	0.52 ic	0.51 ic	---	---	0.00	---	---	---	---	---	0.51
1.85	11,777	61.85	0.52 ic	0.52 ic	---	---	0.00	---	---	---	---	---	0.52
1.90	12,096	61.90	0.55 ic	0.53 ic	---	---	0.00	---	---	---	---	---	0.53
1.95	12,414	61.95	0.55 ic	0.54 ic	---	---	0.00	---	---	---	---	---	0.54
2.00	12,732	62.00	0.55 ic	0.54 ic	---	---	0.00	---	---	---	---	---	0.54
2.05	13,051	62.05	0.55 ic	0.55 ic	---	---	0.00	---	---	---	---	---	0.55
2.10	13,369	62.10	0.58 ic	0.56 ic	---	---	0.00	---	---	---	---	---	0.56
2.15	13,687	62.15	0.58 ic	0.57 ic	---	---	0.00	---	---	---	---	---	0.57
2.20	14,006	62.20	0.58 ic	0.57 ic	---	---	0.00	---	---	---	---	---	0.57
2.25	14,324	62.25	0.58 ic	0.58 ic	---	---	0.00	---	---	---	---	---	0.58
2.30	14,642	62.30	0.59 ic	0.59 ic	---	---	0.00	---	---	---	---	---	0.59
2.35	14,960	62.35	0.62 ic	0.60 ic	---	---	0.00	---	---	---	---	---	0.60
2.40	15,279	62.40	0.62 ic	0.60 ic	---	---	0.00	---	---	---	---	---	0.60
2.45	15,597	62.45	0.62 ic	0.61 ic	---	---	0.00	---	---	---	---	---	0.61
2.50	15,915	62.50	0.62 ic	0.62 ic	---	---	0.00	---	---	---	---	---	0.62
2.55	16,234	62.55	0.73 ic	0.62 ic	---	---	0.11	---	---	---	---	---	0.73
2.60	16,552	62.60	0.94 ic	0.62 ic	---	---	0.32	---	---	---	---	---	0.93
2.65	16,870	62.65	1.21 ic	0.62 ic	---	---	0.58	---	---	---	---	---	1.20
2.70	17,189	62.70	1.53 oc	0.61 ic	---	---	0.89	---	---	---	---	---	1.51
2.75	17,507	62.75	1.88 oc	0.61 ic	---	---	1.25	---	---	---	---	---	1.86
2.80	17,825	62.80	2.29 oc	0.60 ic	---	---	1.64	---	---	---	---	---	2.24
2.85	18,144	62.85	2.70 oc	0.60 ic	---	---	2.07	---	---	---	---	---	2.67
2.90	18,462	62.90	3.14 oc	0.59 ic	---	---	2.53	---	---	---	---	---	3.12
2.95	18,780	62.95	3.63 oc	0.58 ic	---	---	3.02	---	---	---	---	---	3.59
3.00	19,098	63.00	4.10 oc	0.57 ic	---	---	3.53	---	---	---	---	---	4.10
3.05	19,417	63.05	4.61 oc	0.54 ic	---	---	4.07	---	---	---	---	---	4.61
3.10	19,735	63.10	5.16 oc	0.52 ic	---	---	4.64	---	---	---	---	---	5.16
3.15	20,053	63.15	5.75 oc	0.52 ic	---	---	5.24	---	---	---	---	---	5.75
3.20	20,372	63.20	6.36 oc	0.51 ic	---	---	5.85	---	---	---	---	---	6.36
3.25	20,690	63.25	6.99 oc	0.50 ic	---	---	6.49	---	---	---	---	---	6.99
3.30	21,008	63.30	7.64 oc	0.49 ic	---	---	7.15	---	---	---	---	---	7.64
3.35	21,327	63.35	8.30 oc	0.47 ic	---	---	7.83	---	---	---	---	---	8.30
3.40	21,645	63.40	8.99 oc	0.46 ic	---	---	8.53	---	---	---	---	---	8.99
3.45	21,963	63.45	9.69 oc	0.44 ic	---	---	9.25	---	---	---	---	---	9.69
3.50	22,282	63.50	10.38 oc	0.41 ic	---	---	9.96 s	---	---	---	---	---	10.38

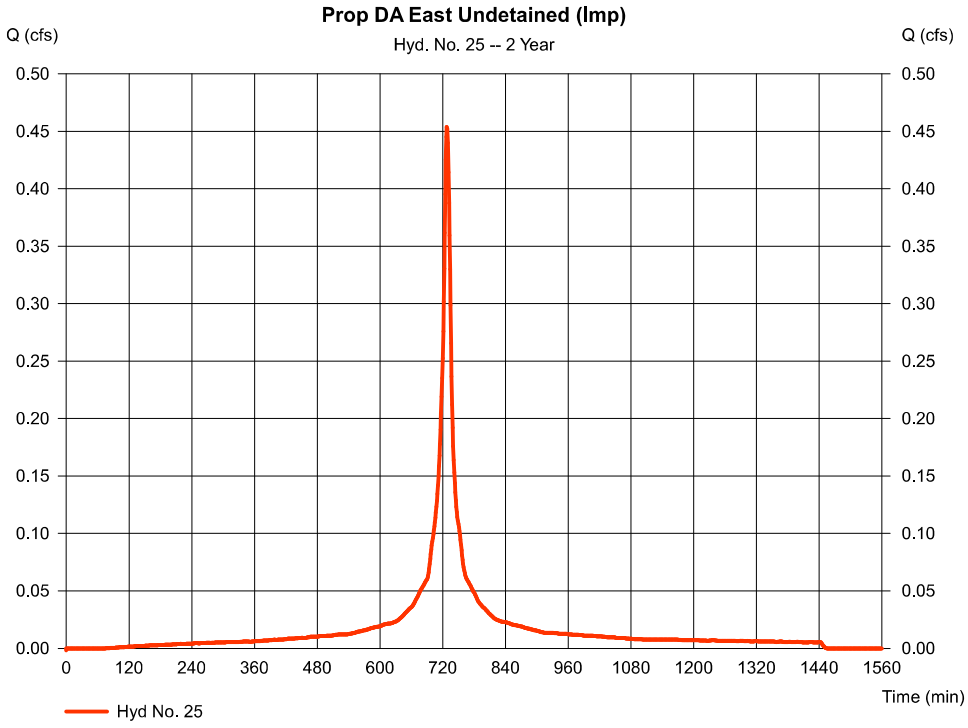
...End

Hydrograph Report

Hyd. No. 25

Prop DA East Undetained (Imp)

Hydrograph type	= SCS Runoff	Peak discharge	= 0.454 cfs
Storm frequency	= 2 yrs	Time to peak	= 728 min
Time interval	= 1 min	Hyd. volume	= 1,675 cuft
Drainage area	= 0.150 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 9.60 min
Total precip.	= 3.31 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds	Shape factor	= 484

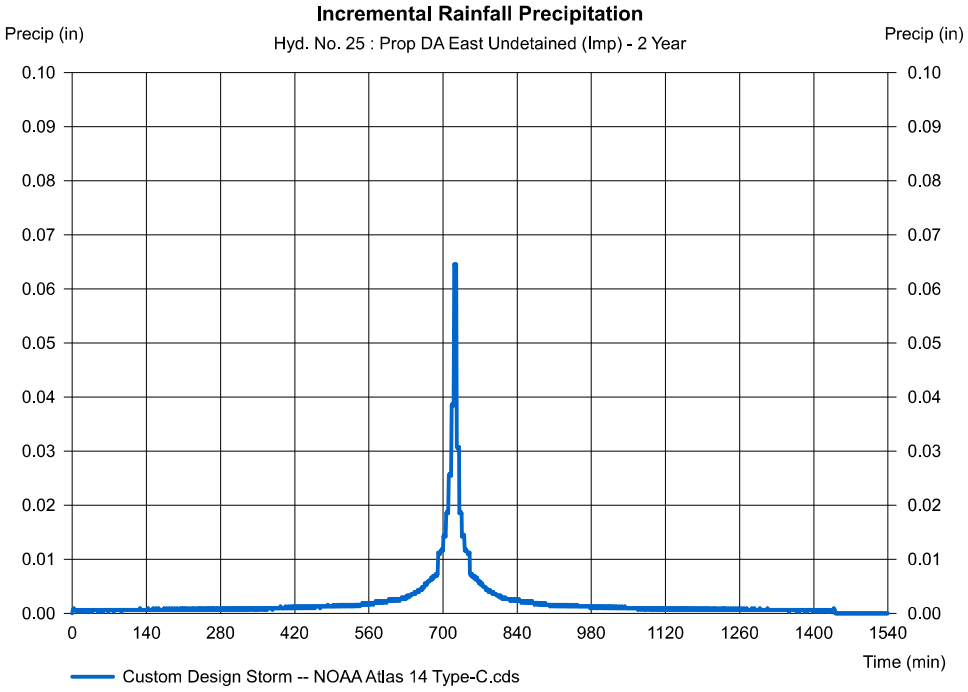


Precipitation Report

Hyd. No. 25

Prop DA East Undetained (Imp)

Storm Frequency	= 2 yrs	Time interval	= 1 min
Total precip.	= 3.3100 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds		

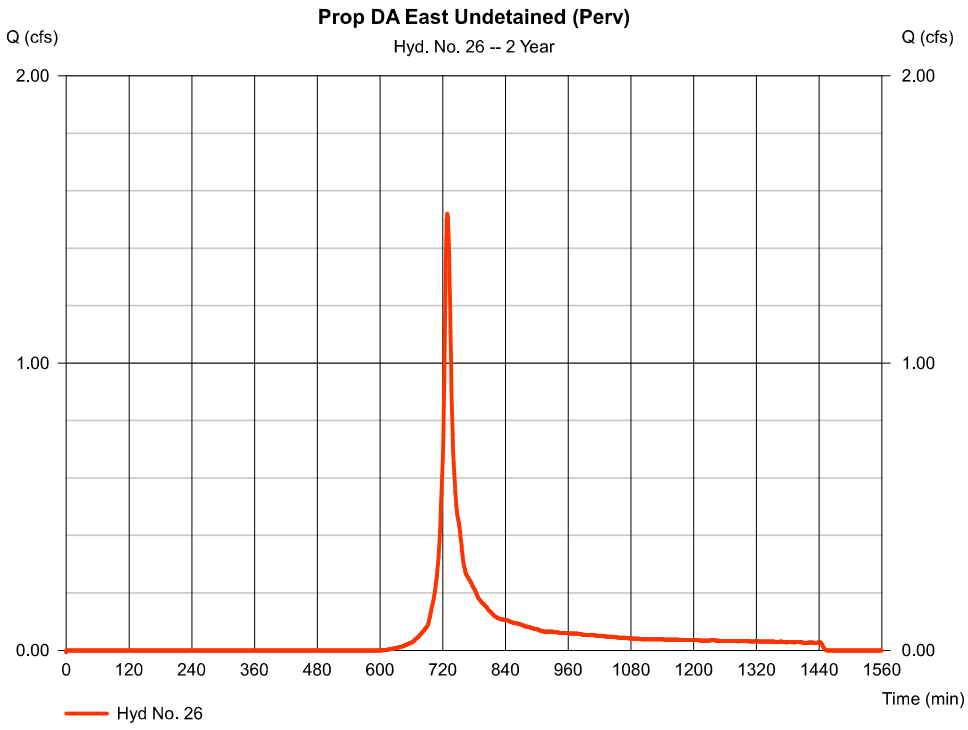


Hydrograph Report

Hyd. No. 26

Prop DA East Undetained (Perv)

Hydrograph type	= SCS Runoff	Peak discharge	= 1.520 cfs
Storm frequency	= 2 yrs	Time to peak	= 729 min
Time interval	= 1 min	Hyd. volume	= 4,967 cuft
Drainage area	= 1.060 ac	Curve number	= 77
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 9.60 min
Total precip.	= 3.31 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds	Shape factor	= 484

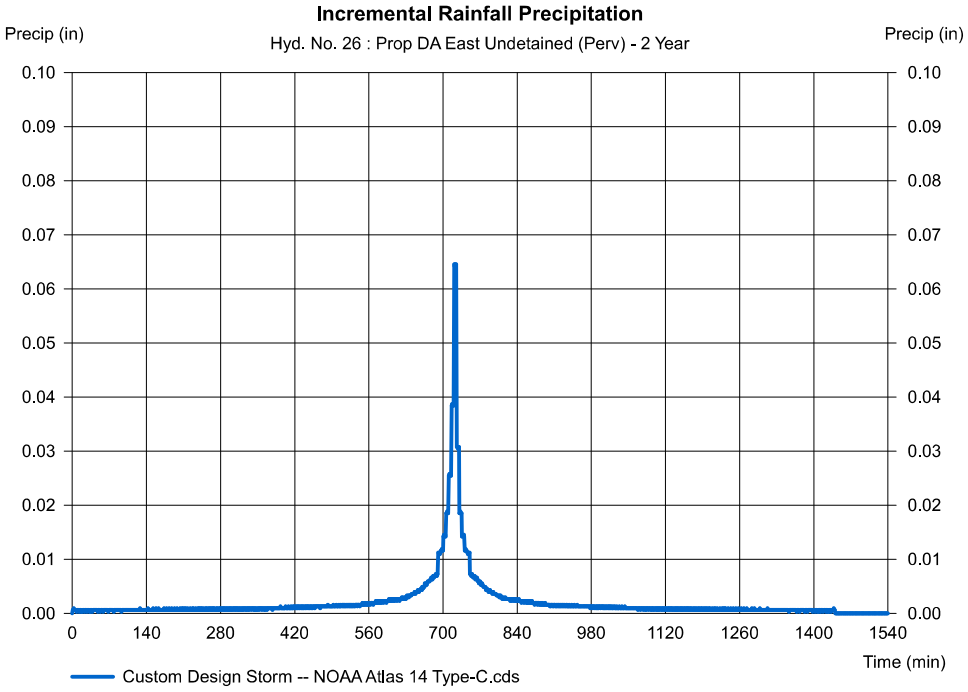


Precipitation Report

Hyd. No. 26

Prop DA East Undetained (Perv)

Storm Frequency	= 2 yrs	Time interval	= 1 min
Total precip.	= 3.3100 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds		

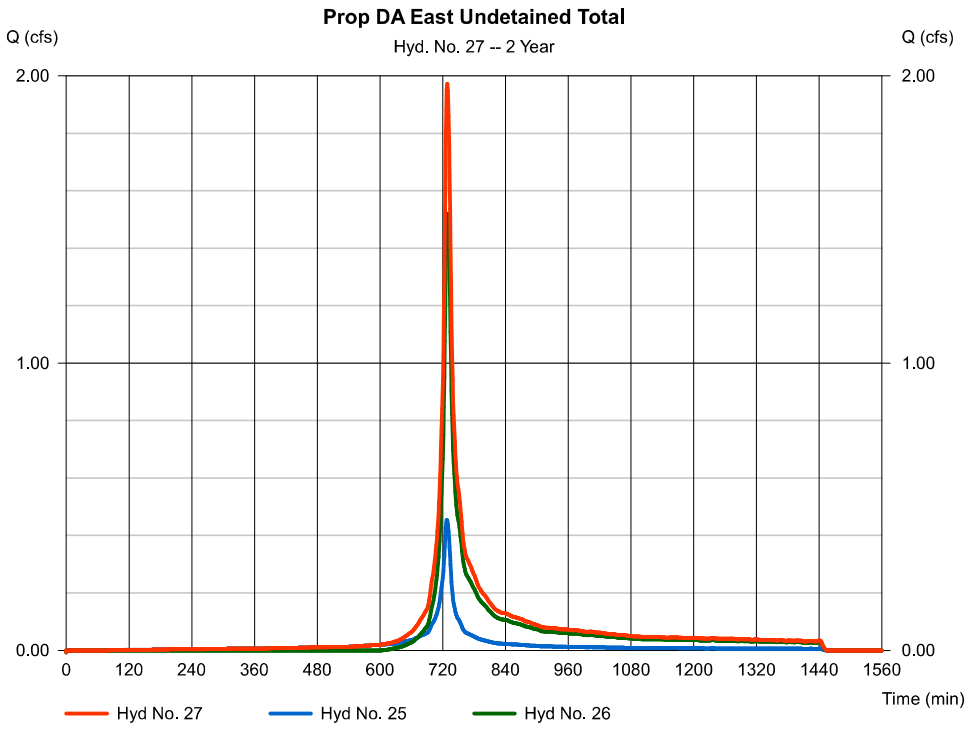


Hydrograph Report

Hyd. No. 27

Prop DA East Undetained Total

Hydrograph type	= Combine	Peak discharge	= 1.972 cfs
Storm frequency	= 2 yrs	Time to peak	= 729 min
Time interval	= 1 min	Hyd. volume	= 6,643 cuft
Inflow hyds.	= 25, 26	Contrib. drain. area	= 1.210 ac

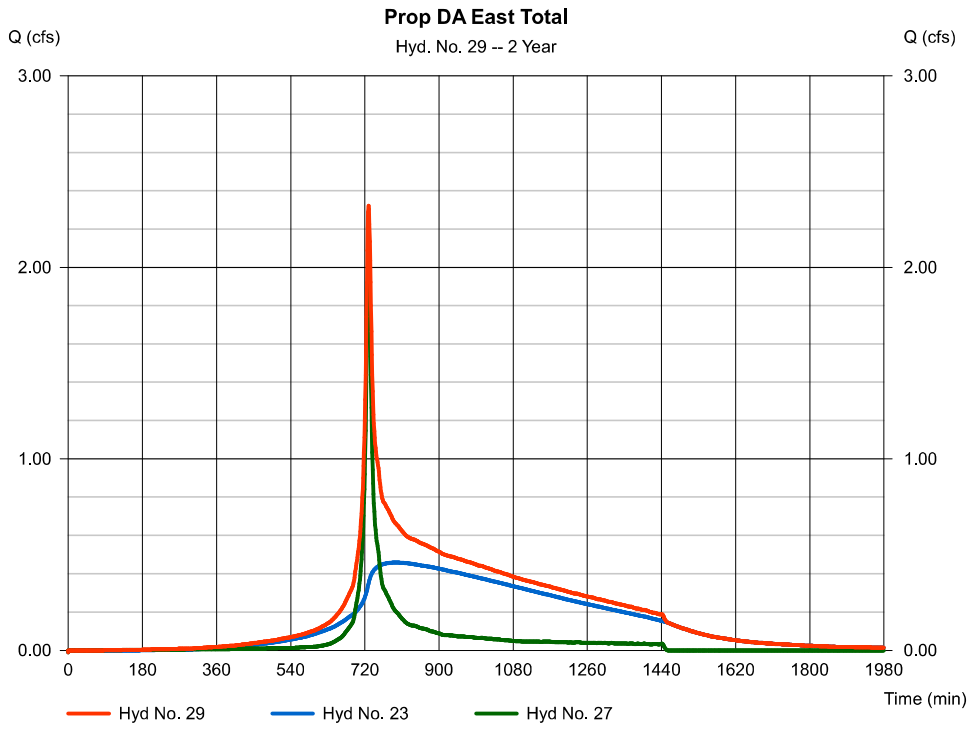


Hydrograph Report

Hyd. No. 29

Prop DA East Total

Hydrograph type	= Combine	Peak discharge	= 2.321 cfs
Storm frequency	= 2 yrs	Time to peak	= 729 min
Time interval	= 1 min	Hyd. volume	= 24,358 cuft
Inflow hyds.	= 23, 27	Contrib. drain. area	= 0.000 ac

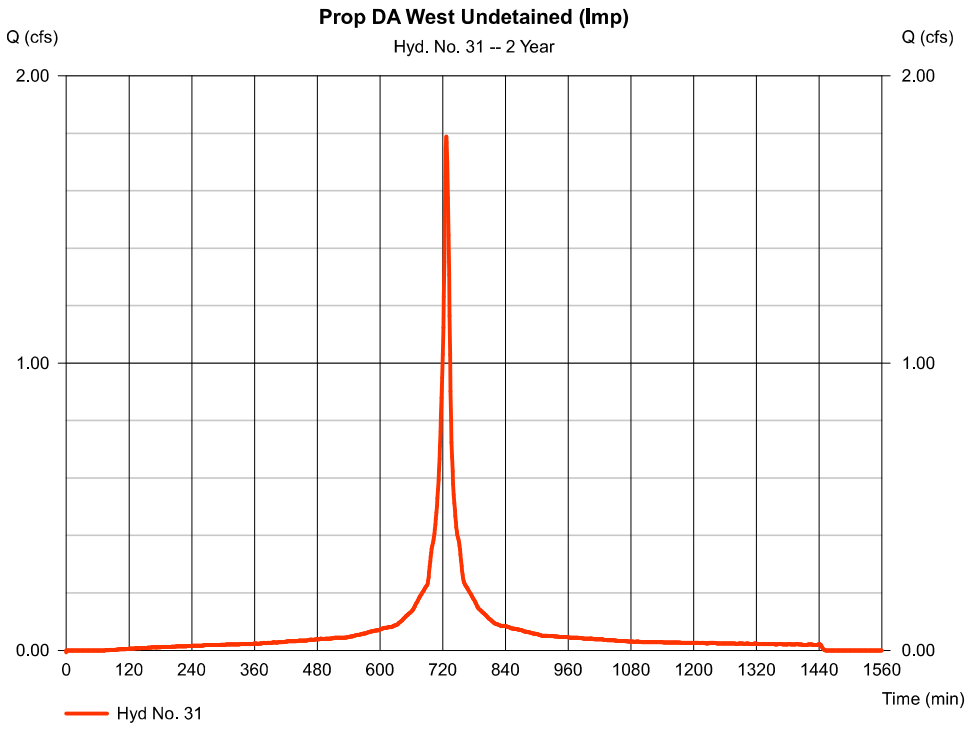


Hydrograph Report

Hyd. No. 31

Prop DA West Undetained (Imp)

Hydrograph type	= SCS Runoff	Peak discharge	= 1.788 cfs
Storm frequency	= 2 yrs	Time to peak	= 727 min
Time interval	= 1 min	Hyd. volume	= 6,208 cuft
Drainage area	= 0.570 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 7.30 min
Total precip.	= 3.31 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds	Shape factor	= 484

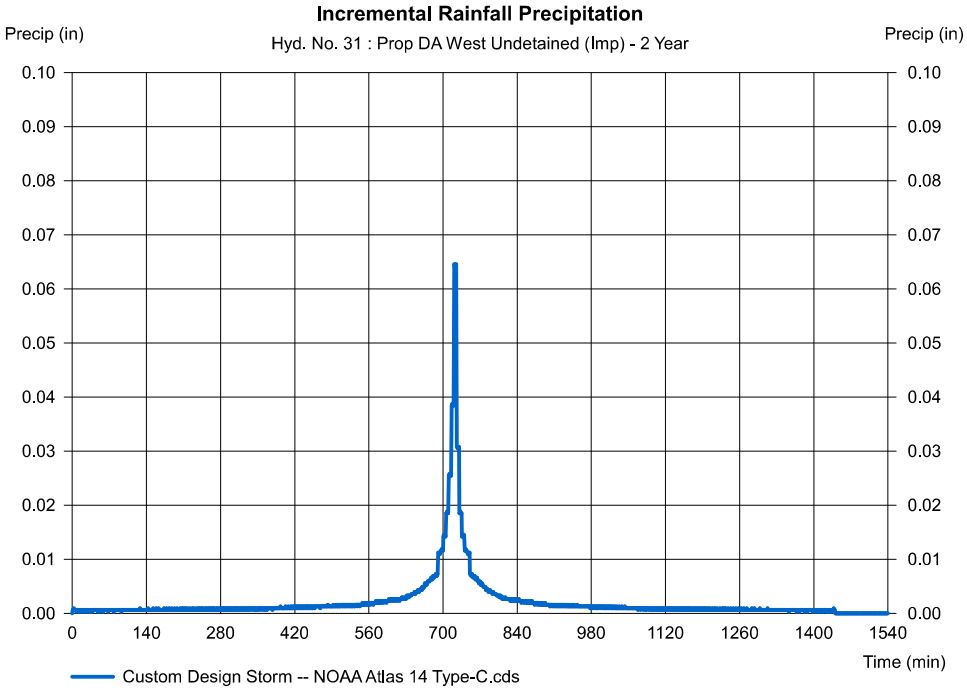


Precipitation Report

Hyd. No. 31

Prop DA West Undetained (Imp)

Storm Frequency	= 2 yrs	Time interval	= 1 min
Total precip.	= 3.3100 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds		

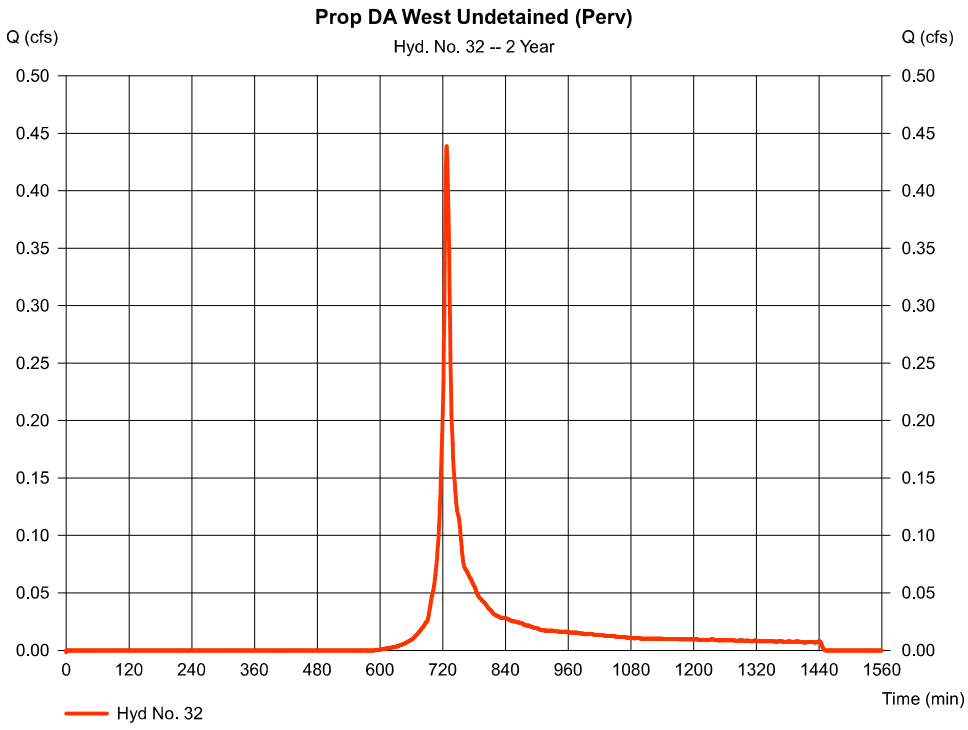


Hydrograph Report

Hyd. No. 32

Prop DA West Undetained (Perv)

Hydrograph type	= SCS Runoff	Peak discharge	= 0.439 cfs
Storm frequency	= 2 yrs	Time to peak	= 728 min
Time interval	= 1 min	Hyd. volume	= 1,342 cuft
Drainage area	= 0.280 ac	Curve number	= 78
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 7.30 min
Total precip.	= 3.31 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds	Shape factor	= 484

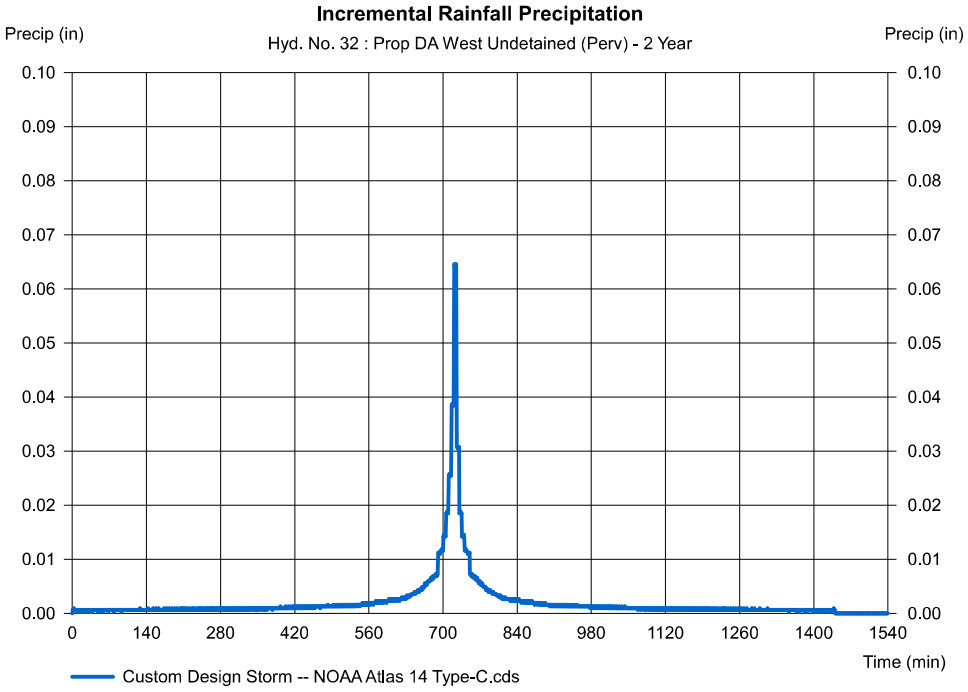


Precipitation Report

Hyd. No. 32

Prop DA West Undetained (Perv)

Storm Frequency	= 2 yrs	Time interval	= 1 min
Total precip.	= 3.3100 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds		

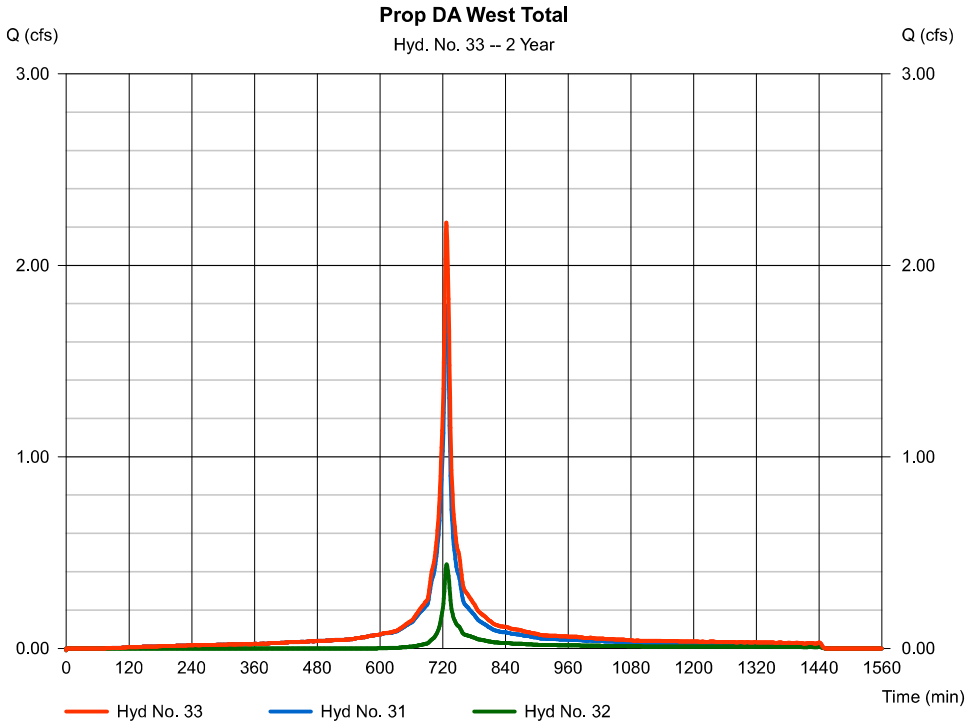


Hydrograph Report

Hyd. No. 33

Prop DA West Total

Hydrograph type	= Combine	Peak discharge	= 2.223 cfs
Storm frequency	= 2 yrs	Time to peak	= 727 min
Time interval	= 1 min	Hyd. volume	= 7,550 cuft
Inflow hyds.	= 31, 32	Contrib. drain. area	= 0.850 ac

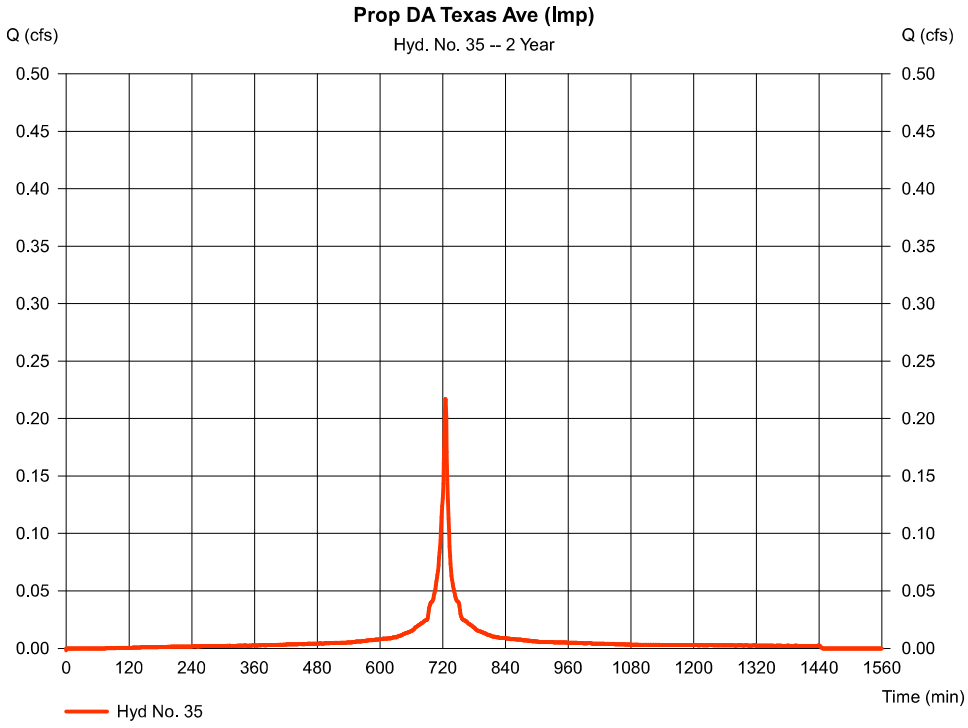


Hydrograph Report

Hyd. No. 35

Prop DA Texas Ave (Imp)

Hydrograph type	= SCS Runoff	Peak discharge	= 0.217 cfs
Storm frequency	= 2 yrs	Time to peak	= 725 min
Time interval	= 1 min	Hyd. volume	= 670 cuft
Drainage area	= 0.060 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 4.80 min
Total precip.	= 3.31 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds	Shape factor	= 484

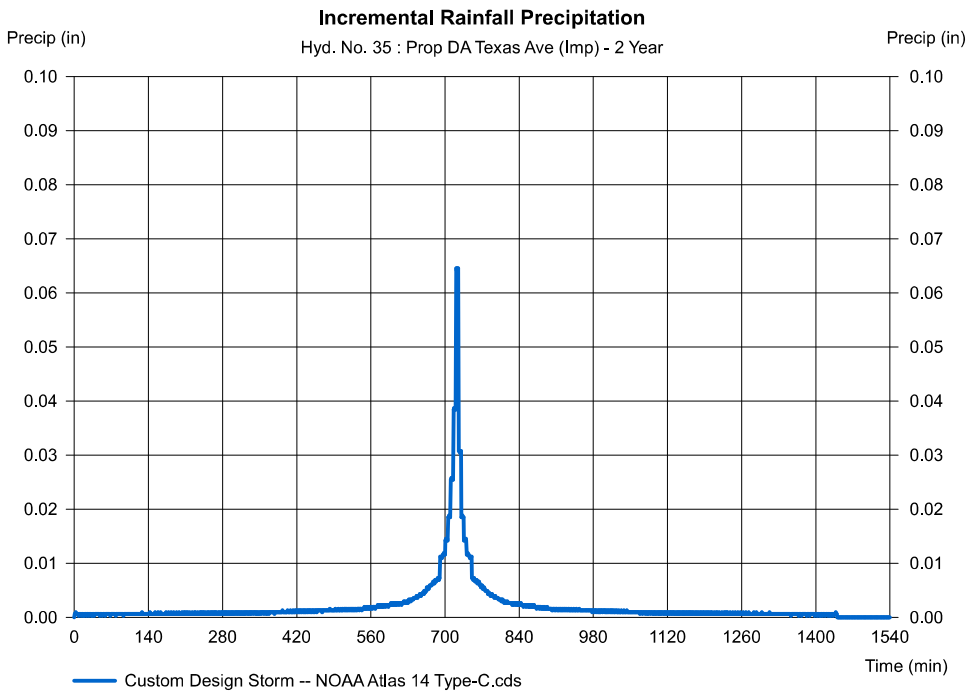


Precipitation Report

Hyd. No. 35

Prop DA Texas Ave (Imp)

Storm Frequency	= 2 yrs	Time interval	= 1 min
Total precip.	= 3.3100 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds		

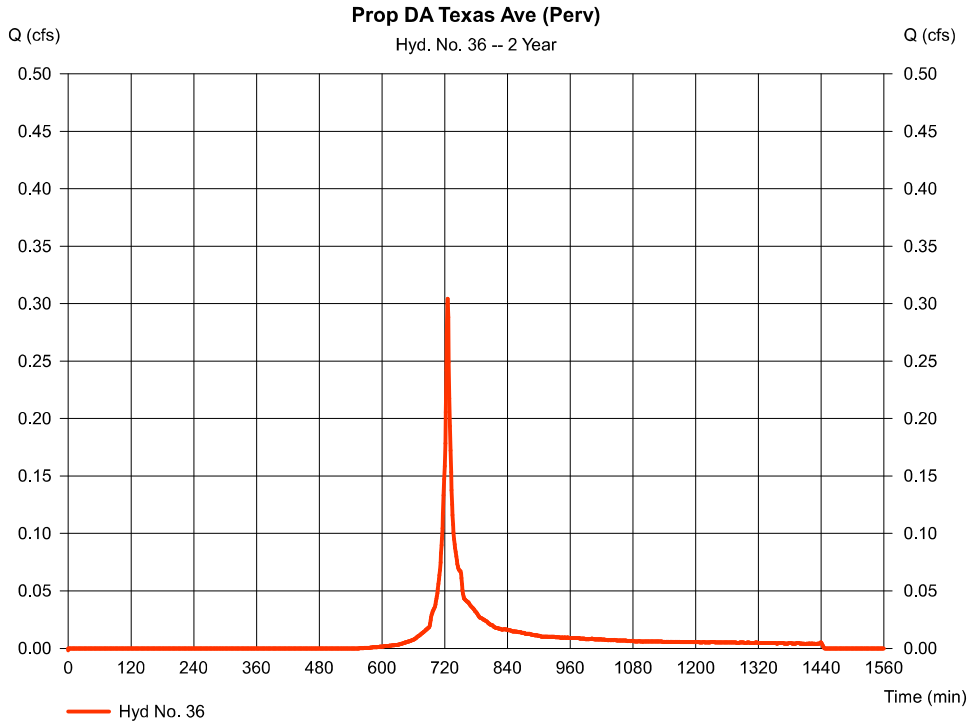


Hydrograph Report

Hyd. No. 36

Prop DA Texas Ave (Perv)

Hydrograph type	= SCS Runoff	Peak discharge	= 0.304 cfs
Storm frequency	= 2 yrs	Time to peak	= 726 min
Time interval	= 1 min	Hyd. volume	= 810 cuft
Drainage area	= 0.150 ac	Curve number	= 80
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 4.80 min
Total precip.	= 3.31 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds	Shape factor	= 484

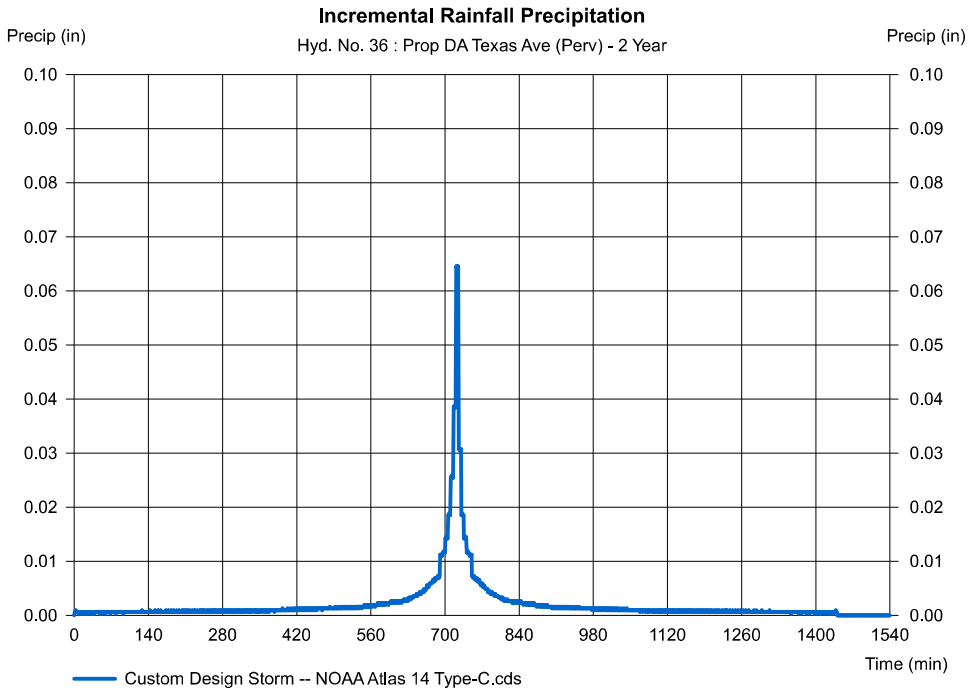


Precipitation Report

Hyd. No. 36

Prop DA Texas Ave (Perv)

Storm Frequency	= 2 yrs	Time interval	= 1 min
Total precip.	= 3.3100 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds		

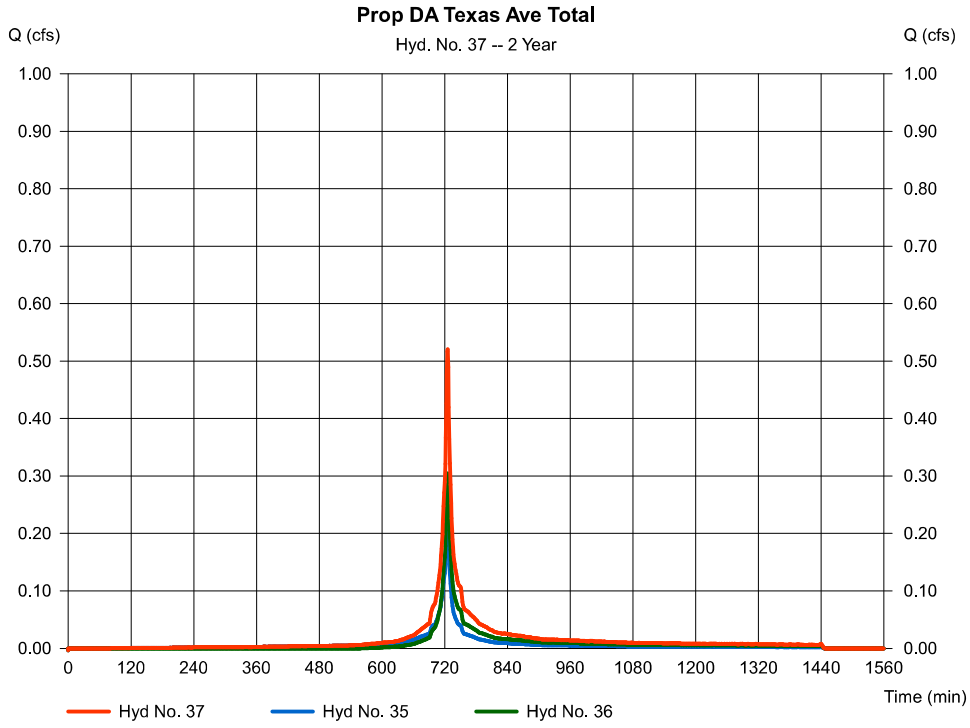


Hydrograph Report

Hyd. No. 37

Prop DA Texas Ave Total

Hydrograph type	= Combine	Peak discharge	= 0.521 cfs
Storm frequency	= 2 yrs	Time to peak	= 726 min
Time interval	= 1 min	Hyd. volume	= 1,480 cuft
Inflow hyds.	= 35, 36	Contrib. drain. area	= 0.210 ac



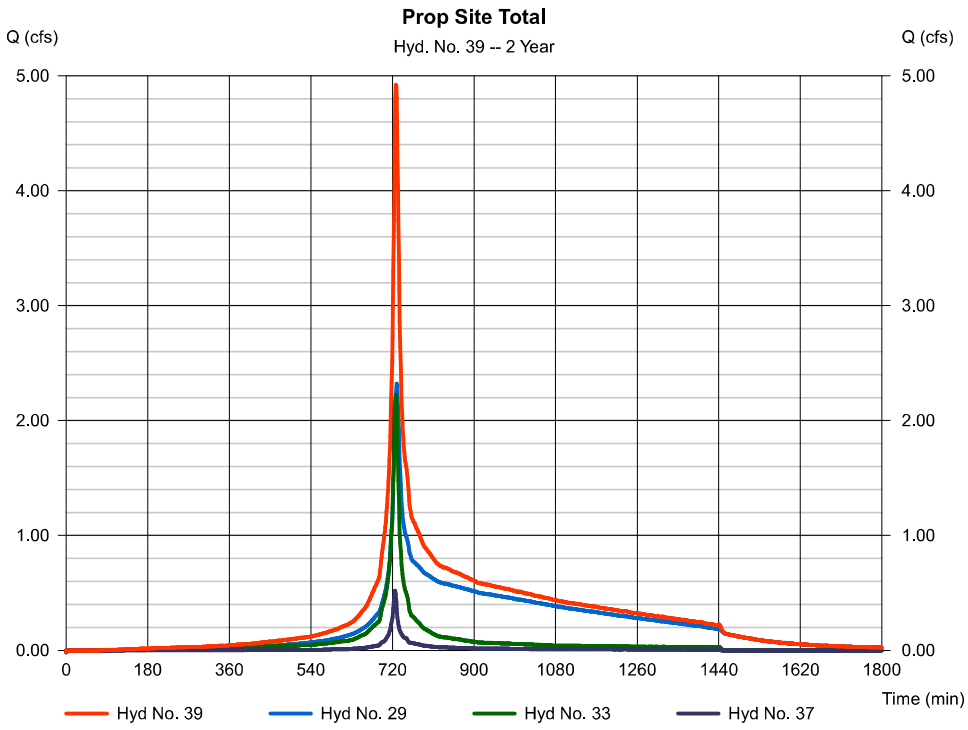
Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.1 — Tuesday, May 21, 2024

Hyd. No. 39

Prop Site Total

Hydrograph type	= Combine	Peak discharge	= 4.923 cfs
Storm frequency	= 2 yrs	Time to peak	= 727 min
Time interval	= 1 min	Hyd. volume	= 33,388 cuft
Inflow hyds.	= 29, 33, 37	Contrib. drain. area	= 0.000 ac



Hydrograph Summary Report

Hydraflow Hydrographs by Intelisolve v9.1

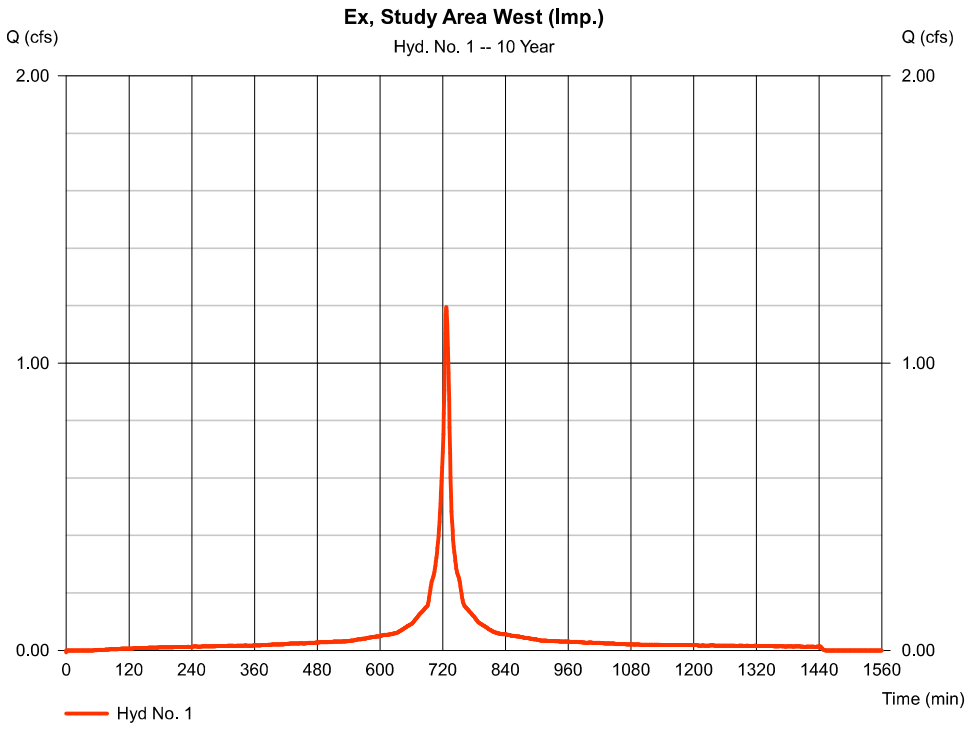
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph description
1	SCS Runoff	1.195	1	727	4,223	----	------	------	Ex, Study Area West (Imp.)
2	SCS Runoff	6.737	1	727	21,221	----	------	------	Ex. Study Area West (Perv.)
3	Combine	7.931	1	727	25,444	1, 2	------	------	Ex. Study Area West Total
5	SCS Runoff	0.496	1	725	1,559	----	------	------	Ex. Study Area Texas Ave (Imp.)
6	SCS Runoff	0.733	1	726	2,059	----	------	------	Ex, Study Area Texas Ave (Perv.)
7	Combine	1.227	1	725	3,618	5, 6	------	------	Ex. Study Area Texas Ave Total
9	SCS Runoff	0.239	1	727	845	----	------	------	Ex. Study Area East (Imp.)
10	SCS Runoff	7.766	1	727	24,626	----	------	------	Ex. Study Area East (Perv.)
11	Combine	8.005	1	727	25,471	9, 10	------	------	Ex. Study Area East Total
13	Combine	17.08	1	727	54,533	3, 7, 11,	------	------	Ex. Site Total
15	SCS Runoff	1.543	1	725	4,851	----	------	------	Prop DA East - Perv Pvmt West (Imp)
16	SCS Runoff	0.118	1	726	316	----	------	------	Prop DA East - Perv Pvmt West (Per
17	Combine	1.660	1	725	5,167	15, 16	------	------	Perv Pvmt West Total
18	Reservoir	0.679	1	733	5,154	17	64.63	1,214	Post Rte Pvmt West
20	SCS Runoff	5.626	1	728	21,138	----	------	------	Prop DA East - Perv Pvmt East (Imp)
21	SCS Runoff	0.617	1	729	2,001	----	------	------	Prop DA East - Perv Pvmt East (Perv
22	Combine	6.885	1	728	28,294	18, 20, 21	------	------	Perv Pvmt East Total
23	Reservoir	0.604	1	806	28,047	22	62.40	15,310	Post Rte Pvmt East
25	SCS Runoff	0.692	1	728	2,599	----	------	------	Prop DA East Undetained (Imp)
26	SCS Runoff	3.134	1	729	10,125	----	------	------	Prop DA East Undetained (Perv)
27	Combine	3.823	1	729	12,724	25, 26	------	------	Prop DA East Undetained Total
29	Combine	4.284	1	729	40,771	23, 27,	------	------	Prop DA East Total
31	SCS Runoff	2.724	1	727	9,629	----	------	------	Prop DA West Undetained (Imp)
32	SCS Runoff	0.884	1	728	2,696	----	------	------	Prop DA West Undetained (Perv)
33	Combine	3.608	1	727	12,325	31, 32	------	------	Prop DA West Total
35	SCS Runoff	0.331	1	725	1,040	----	------	------	Prop DA Texas Ave (Imp)
36	SCS Runoff	0.589	1	726	1,580	----	------	------	Prop DA Texas Ave (Perv)
37	Combine	0.918	1	726	2,620	35, 36	------	------	Prop DA Texas Ave Total
39	Combine	8.591	1	727	55,715	29, 33, 37,	------	------	Prop Site Total

Hydrograph Report

Hyd. No. 1

Ex, Study Area West (Imp.)

Hydrograph type	= SCS Runoff	Peak discharge	= 1.195 cfs
Storm frequency	= 10 yrs	Time to peak	= 727 min
Time interval	= 1 min	Hyd. volume	= 4,223 cuft
Drainage area	= 0.250 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 8.30 min
Total precip.	= 5.01 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds	Shape factor	= 484

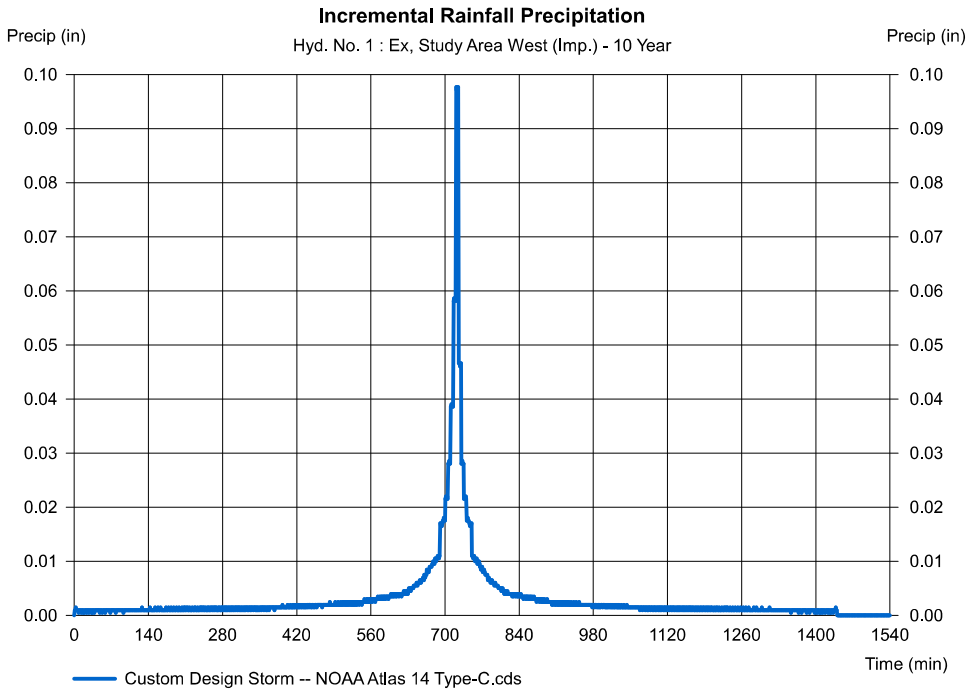


Precipitation Report

Hyd. No. 1

Ex, Study Area West (Imp.)

Storm Frequency	= 10 yrs	Time interval	= 1 min
Total precip.	= 5.0100 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds		

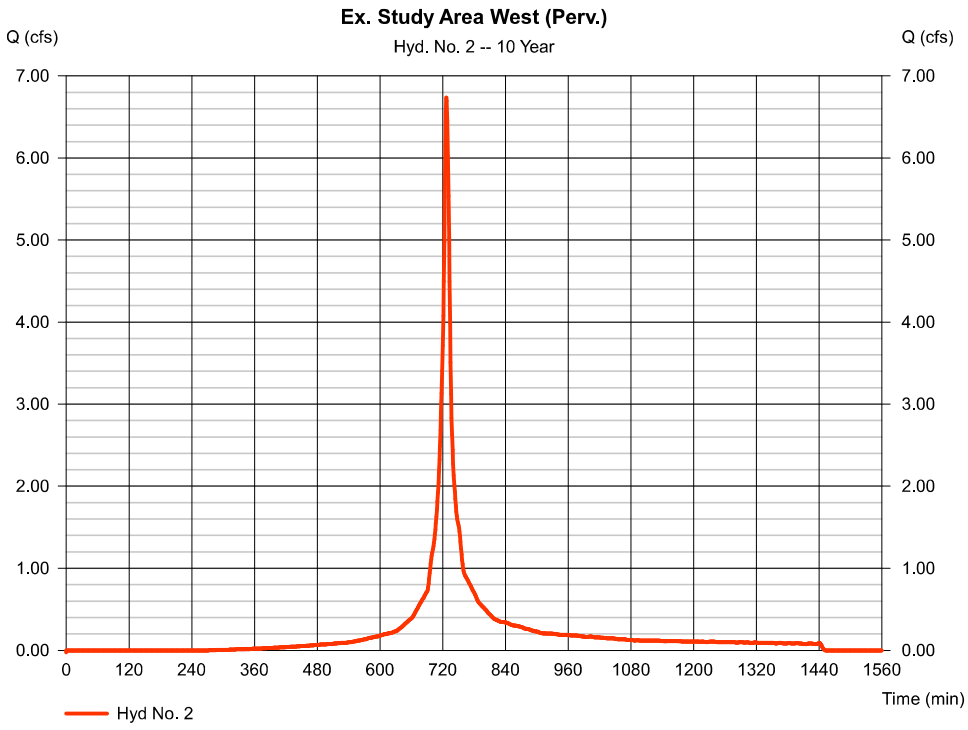


Hydrograph Report

Hyd. No. 2

Ex. Study Area West (Perv.)

Hydrograph type	= SCS Runoff	Peak discharge	= 6.737 cfs
Storm frequency	= 10 yrs	Time to peak	= 727 min
Time interval	= 1 min	Hyd. volume	= 21,221 cuft
Drainage area	= 1.630 ac	Curve number	= 88
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 8.30 min
Total precip.	= 5.01 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds	Shape factor	= 484

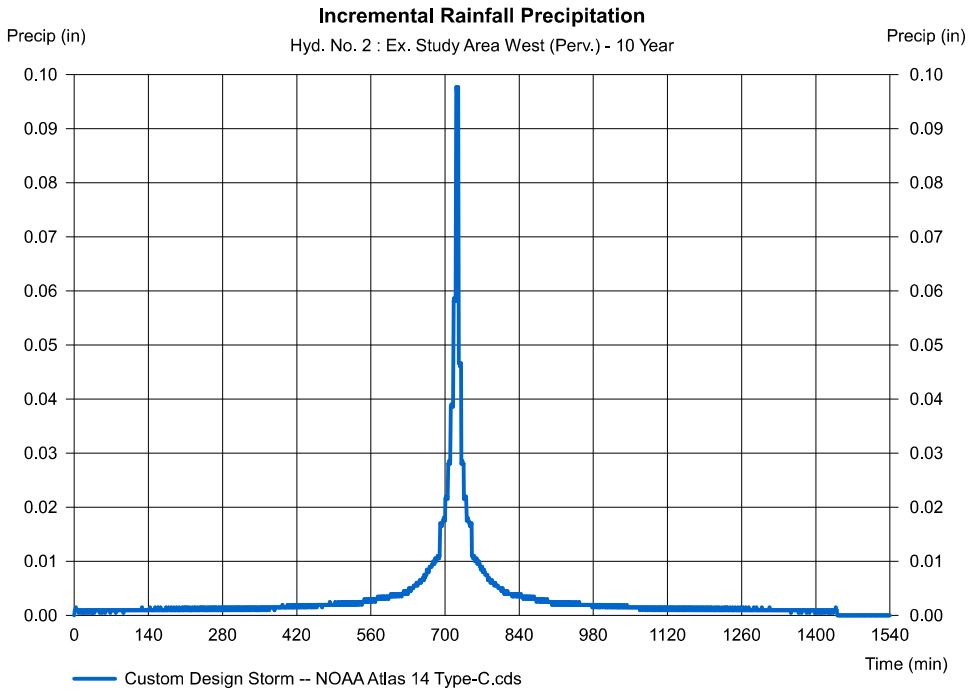


Precipitation Report

Hyd. No. 2

Ex. Study Area West (Perv.)

Storm Frequency	= 10 yrs	Time interval	= 1 min
Total precip.	= 5.0100 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds		

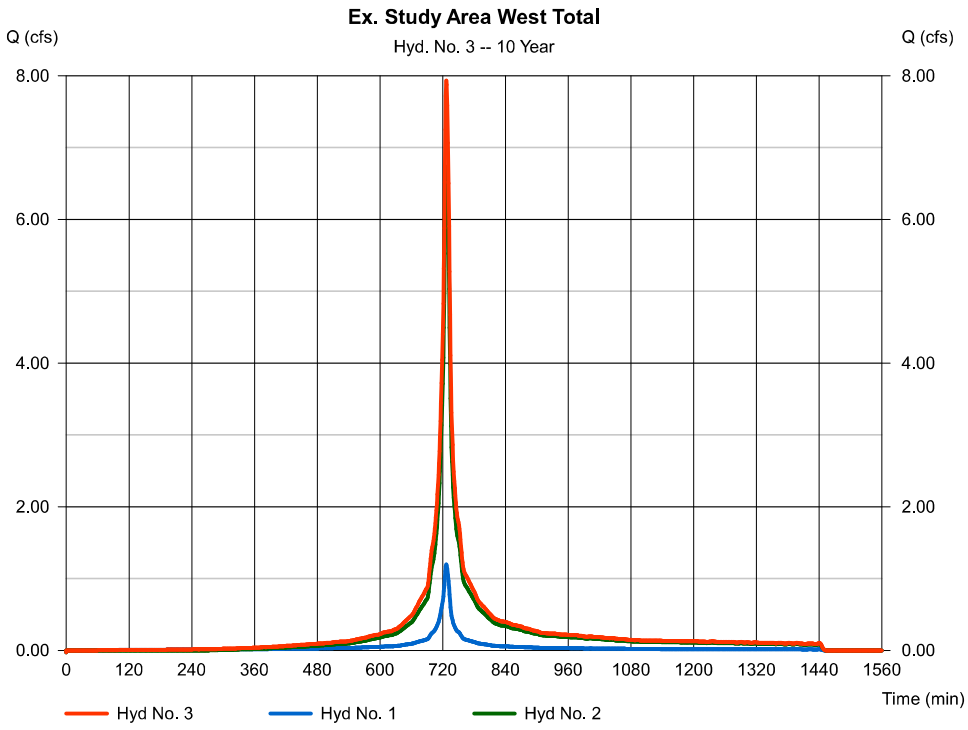


Hydrograph Report

Hyd. No. 3

Ex. Study Area West Total

Hydrograph type	= Combine	Peak discharge	= 7.931 cfs
Storm frequency	= 10 yrs	Time to peak	= 727 min
Time interval	= 1 min	Hyd. volume	= 25,444 cuft
Inflow hyds.	= 1, 2	Contrib. drain. area	= 1.880 ac

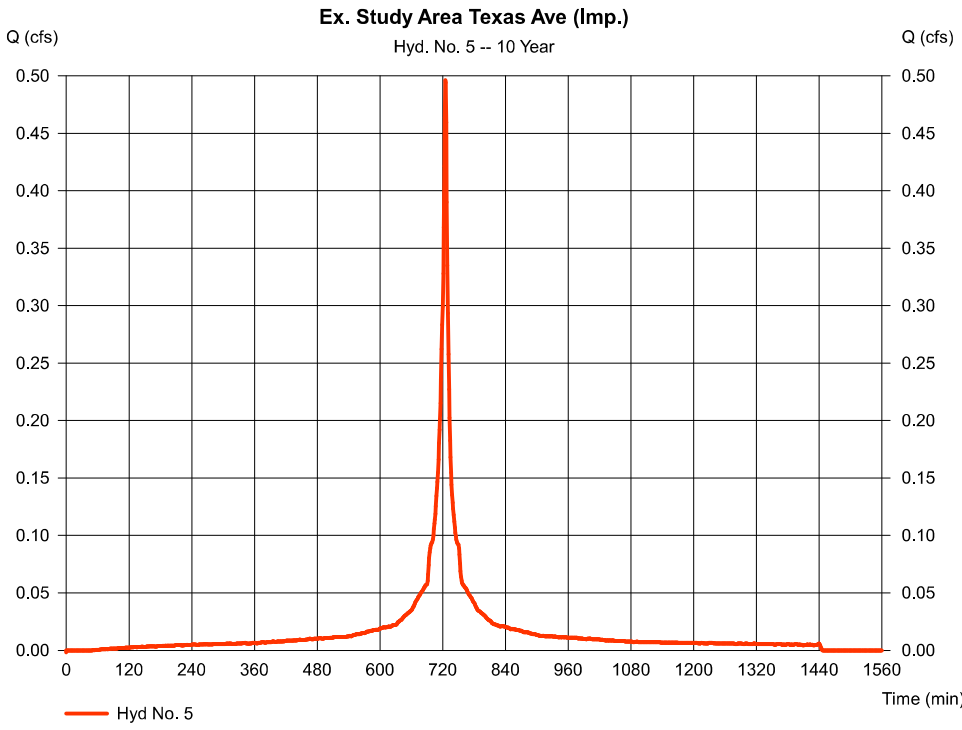


Hydrograph Report

Hyd. No. 5

Ex. Study Area Texas Ave (Imp.)

Hydrograph type	= SCS Runoff	Peak discharge	= 0.496 cfs
Storm frequency	= 10 yrs	Time to peak	= 725 min
Time interval	= 1 min	Hyd. volume	= 1,559 cuft
Drainage area	= 0.090 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 3.90 min
Total precip.	= 5.01 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds	Shape factor	= 484

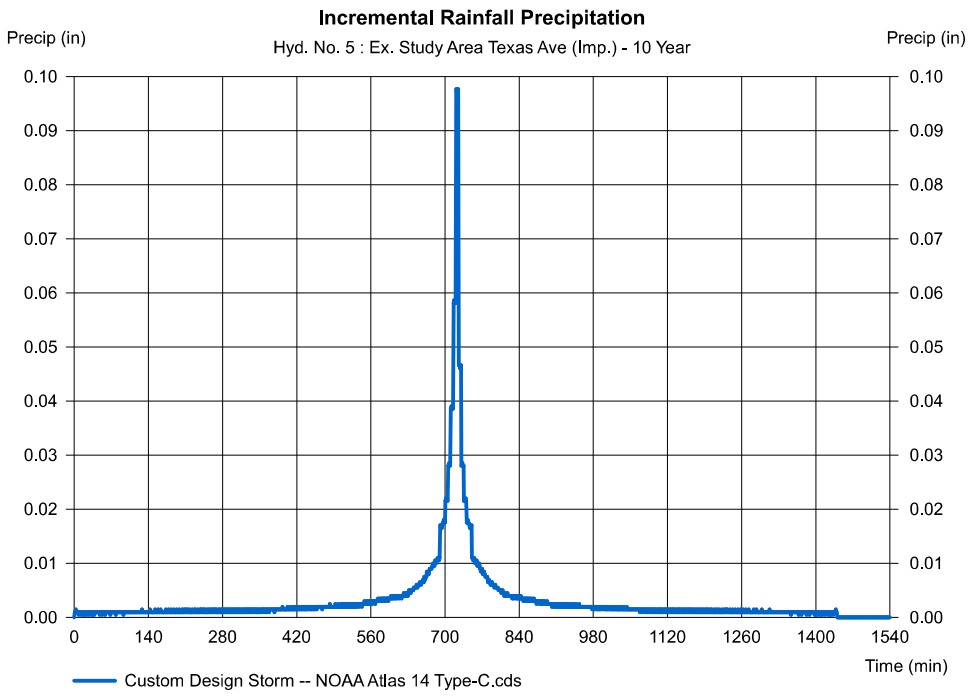


Precipitation Report

Hyd. No. 5

Ex. Study Area Texas Ave (Imp.)

Storm Frequency	= 10 yrs	Time interval	= 1 min
Total precip.	= 5.0100 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds		

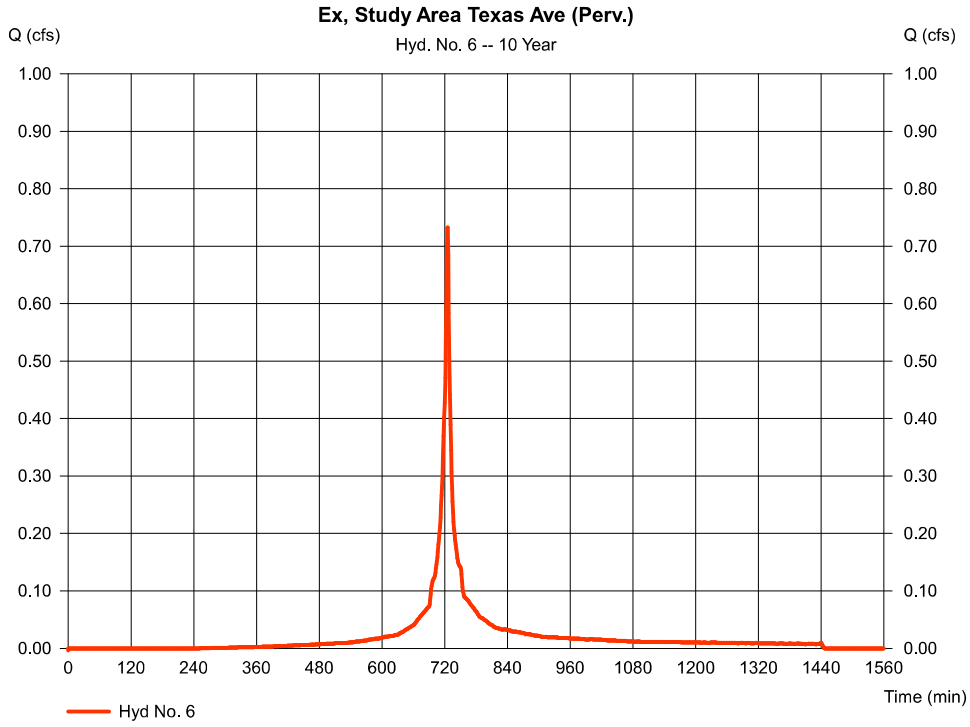


Hydrograph Report

Hyd. No. 6

Ex, Study Area Texas Ave (Perv.)

Hydrograph type	= SCS Runoff	Peak discharge	= 0.733 cfs
Storm frequency	= 10 yrs	Time to peak	= 726 min
Time interval	= 1 min	Hyd. volume	= 2,059 cuft
Drainage area	= 0.150 ac	Curve number	= 89
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 3.90 min
Total precip.	= 5.01 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds	Shape factor	= 484

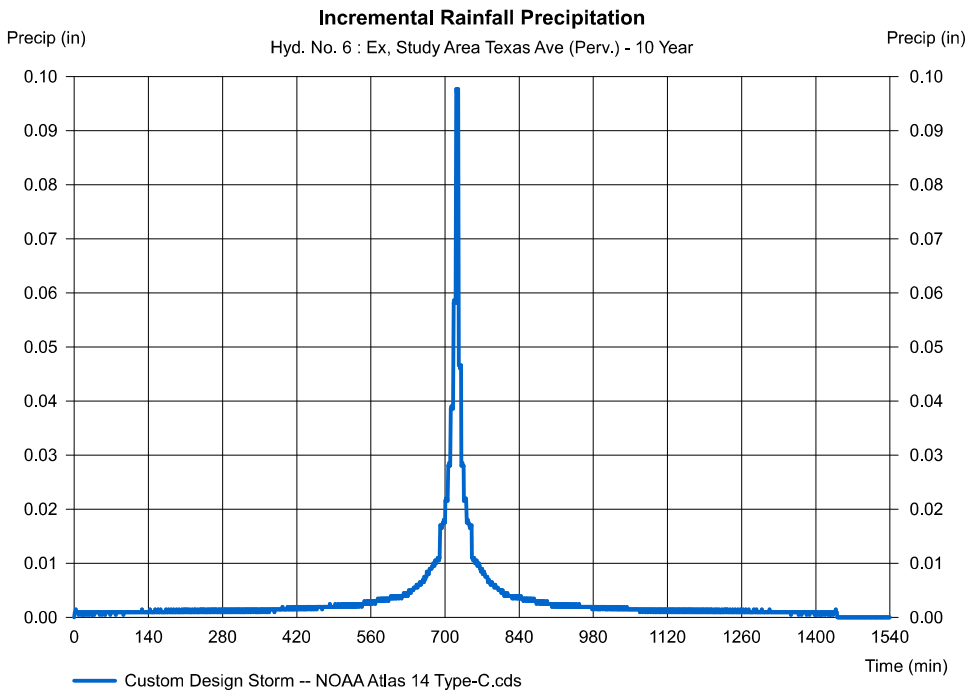


Precipitation Report

Hyd. No. 6

Ex, Study Area Texas Ave (Perv.)

Storm Frequency	= 10 yrs	Time interval	= 1 min
Total precip.	= 5.0100 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds		

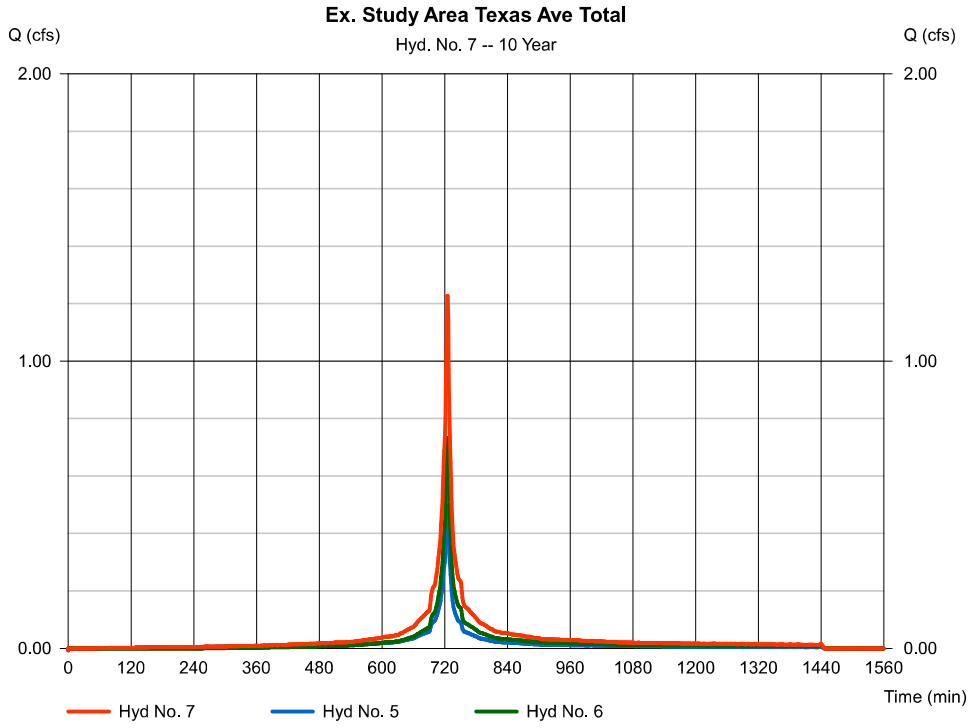


Hydrograph Report

Hyd. No. 7

Ex. Study Area Texas Ave Total

Hydrograph type	= Combine	Peak discharge	= 1.227 cfs
Storm frequency	= 10 yrs	Time to peak	= 725 min
Time interval	= 1 min	Hyd. volume	= 3,618 cuft
Inflow hyds.	= 5, 6	Contrib. drain. area	= 0.240 ac

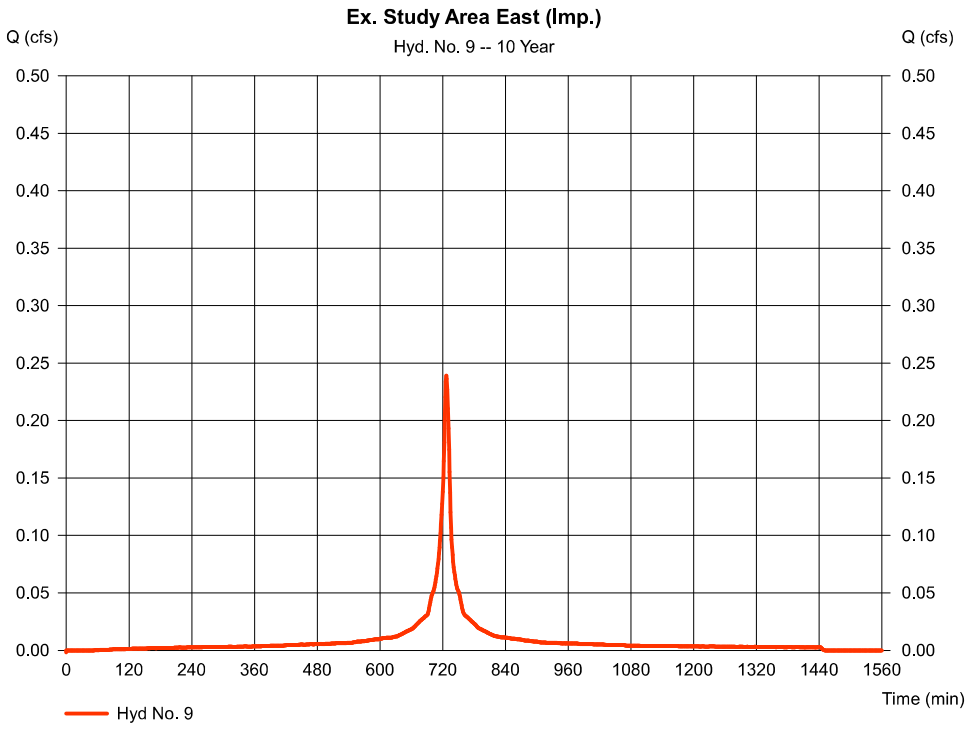


Hydrograph Report

Hyd. No. 9

Ex. Study Area East (Imp.)

Hydrograph type	= SCS Runoff	Peak discharge	= 0.239 cfs
Storm frequency	= 10 yrs	Time to peak	= 727 min
Time interval	= 1 min	Hyd. volume	= 845 cuft
Drainage area	= 0.050 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 8.00 min
Total precip.	= 5.01 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds	Shape factor	= 484

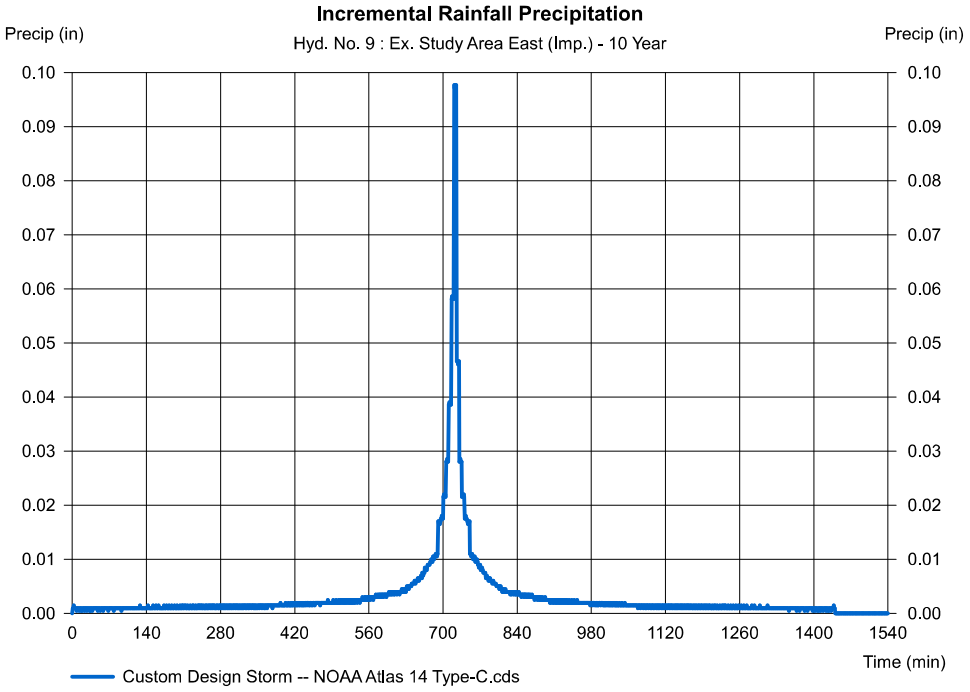


Precipitation Report

Hyd. No. 9

Ex. Study Area East (Imp.)

Storm Frequency	= 10 yrs	Time interval	= 1 min
Total precip.	= 5.0100 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds		

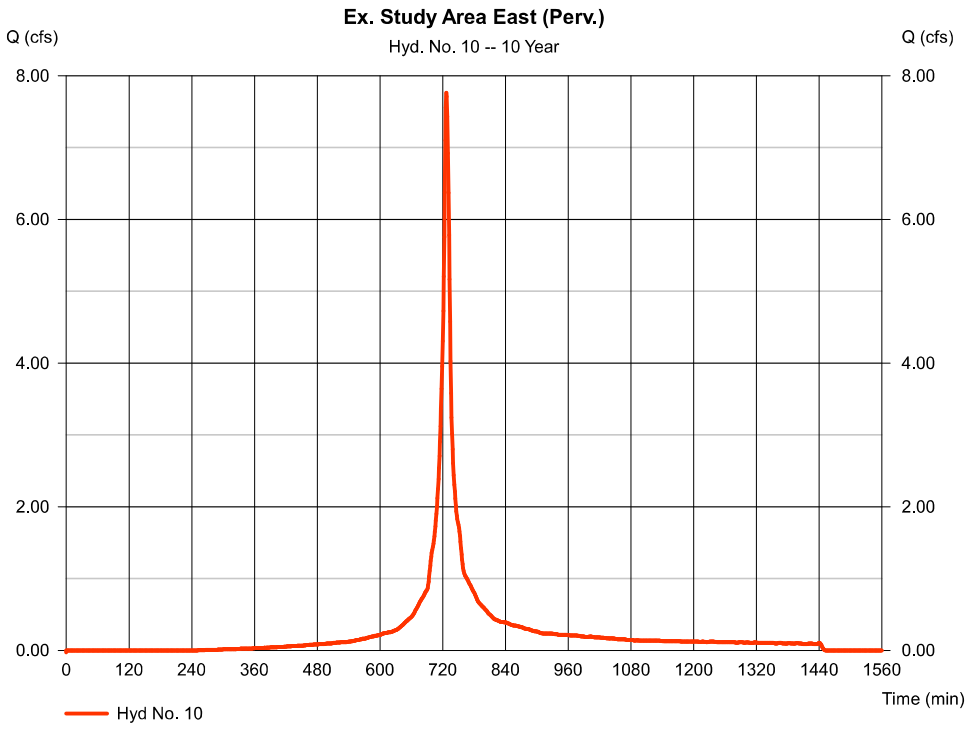


Hydrograph Report

Hyd. No. 10

Ex. Study Area East (Perv.)

Hydrograph type	= SCS Runoff	Peak discharge	= 7.766 cfs
Storm frequency	= 10 yrs	Time to peak	= 727 min
Time interval	= 1 min	Hyd. volume	= 24,626 cuft
Drainage area	= 1.840 ac	Curve number	= 89
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 8.00 min
Total precip.	= 5.01 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds	Shape factor	= 484

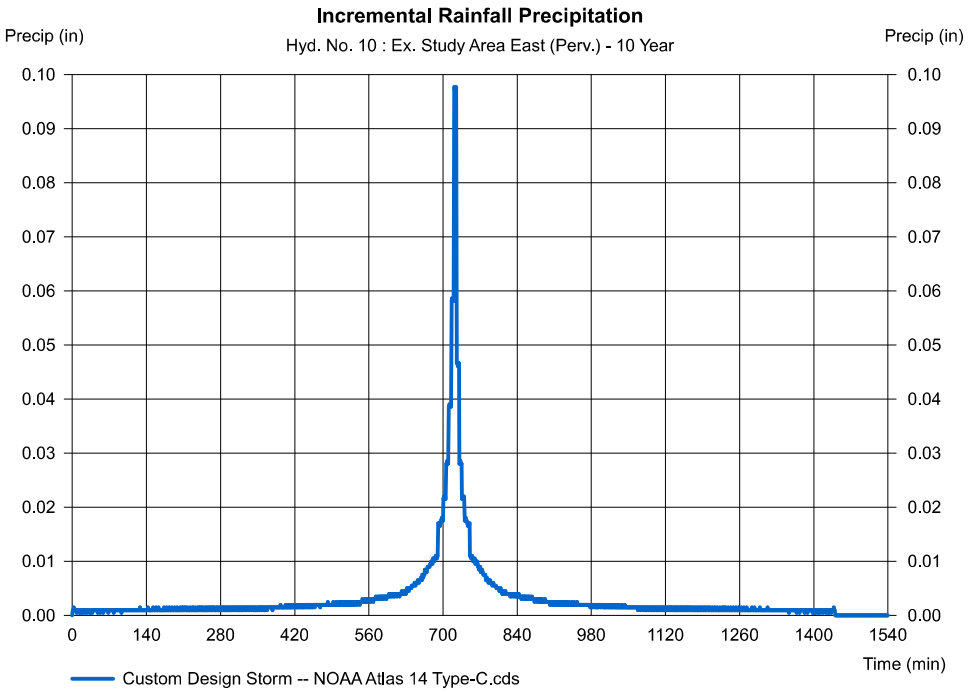


Precipitation Report

Hyd. No. 10

Ex. Study Area East (Perv.)

Storm Frequency	= 10 yrs	Time interval	= 1 min
Total precip.	= 5.0100 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds		

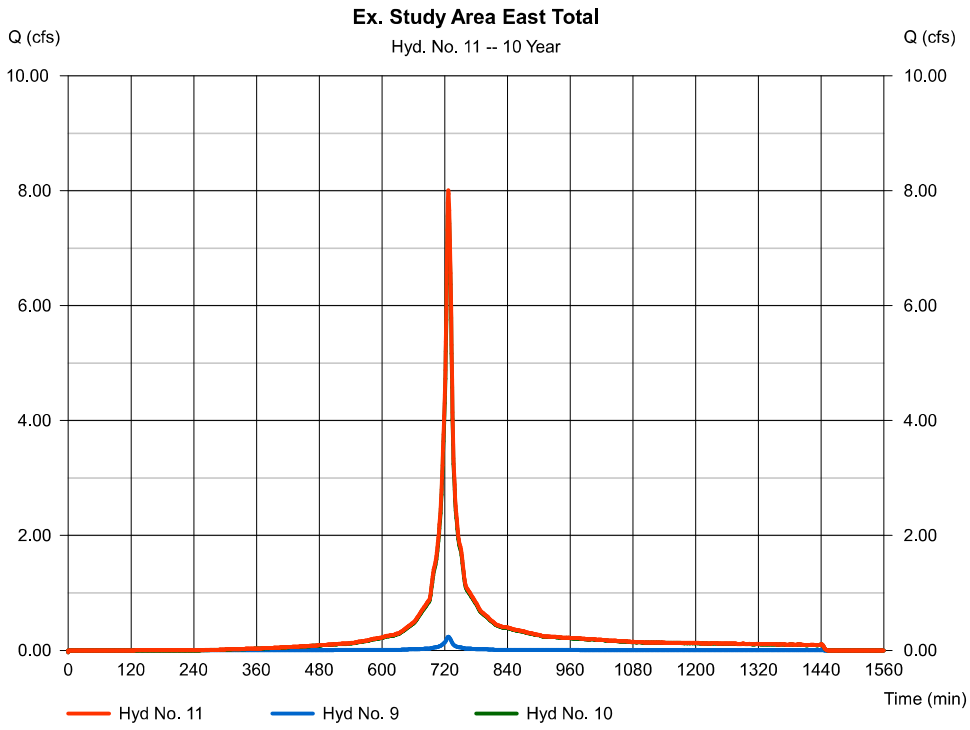


Hydrograph Report

Hyd. No. 11

Ex. Study Area East Total

Hydrograph type	= Combine	Peak discharge	= 8.005 cfs
Storm frequency	= 10 yrs	Time to peak	= 727 min
Time interval	= 1 min	Hyd. volume	= 25,471 cuft
Inflow hyds.	= 9, 10	Contrib. drain. area	= 1.890 ac

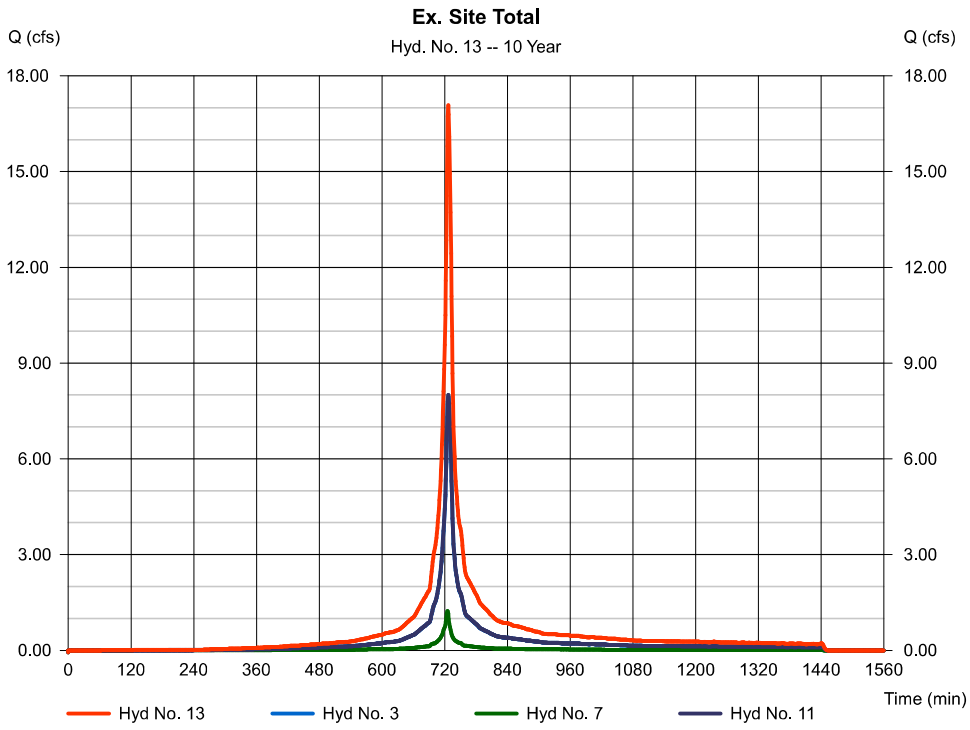


Hydrograph Report

Hyd. No. 13

Ex. Site Total

Hydrograph type	= Combine	Peak discharge	= 17.08 cfs
Storm frequency	= 10 yrs	Time to peak	= 727 min
Time interval	= 1 min	Hyd. volume	= 54,533 cuft
Inflow hyds.	= 3, 7, 11	Contrib. drain. area	= 0.000 ac

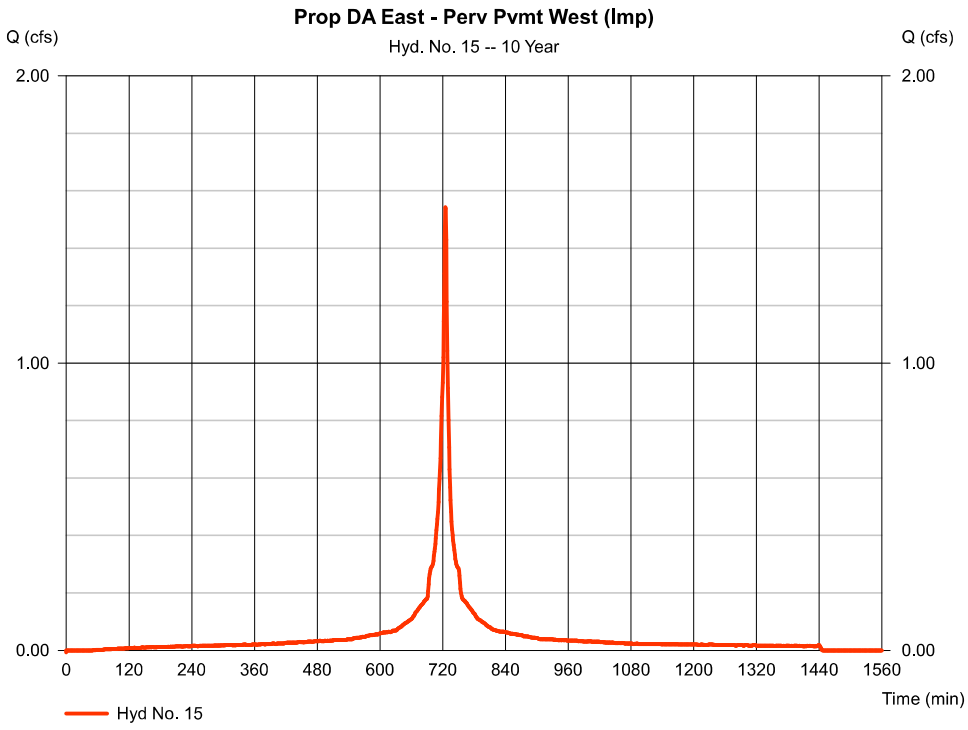


Hydrograph Report

Hyd. No. 15

Prop DA East - Perv Pvmt West (Imp)

Hydrograph type	= SCS Runoff	Peak discharge	= 1.543 cfs
Storm frequency	= 10 yrs	Time to peak	= 725 min
Time interval	= 1 min	Hyd. volume	= 4,851 cuft
Drainage area	= 0.280 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 4.20 min
Total precip.	= 5.01 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds	Shape factor	= 484

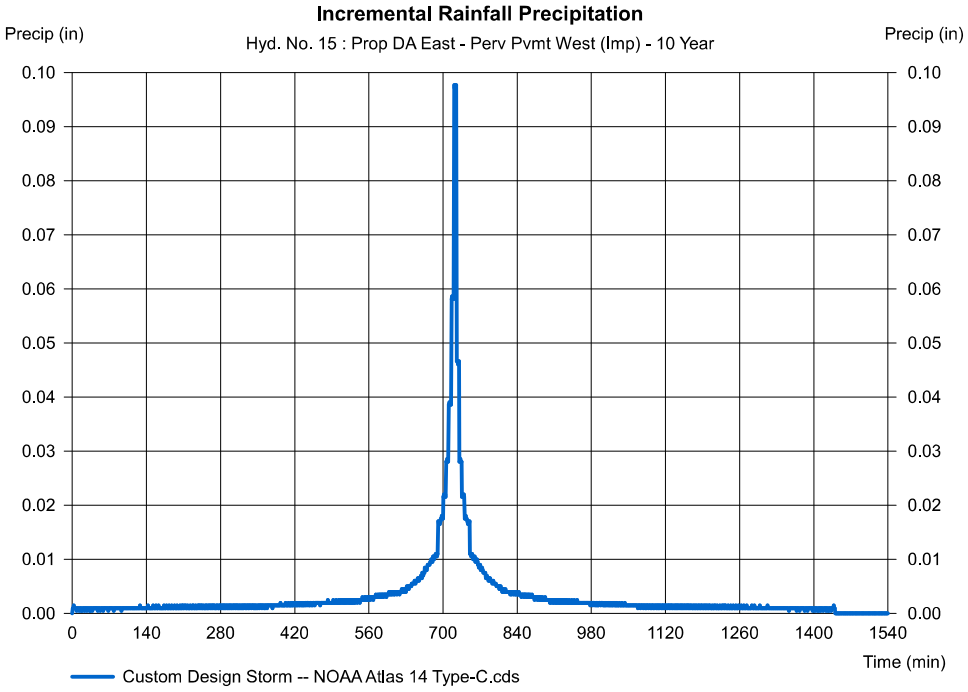


Precipitation Report

Hyd. No. 15

Prop DA East - Perv Pvmt West (Imp)

Storm Frequency	= 10 yrs	Time interval	= 1 min
Total precip.	= 5.0100 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds		

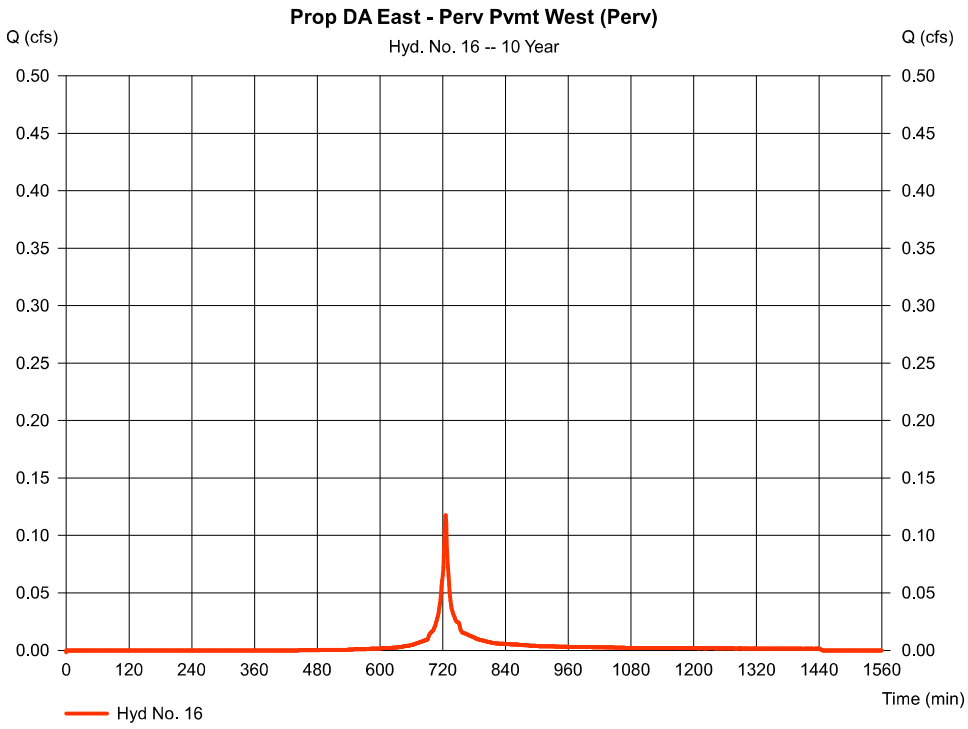


Hydrograph Report

Hyd. No. 16

Prop DA East - Perv Pvmt West (Perv)

Hydrograph type	= SCS Runoff	Peak discharge	= 0.118 cfs
Storm frequency	= 10 yrs	Time to peak	= 726 min
Time interval	= 1 min	Hyd. volume	= 316 cuft
Drainage area	= 0.030 ac	Curve number	= 80
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 4.20 min
Total precip.	= 5.01 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds	Shape factor	= 484

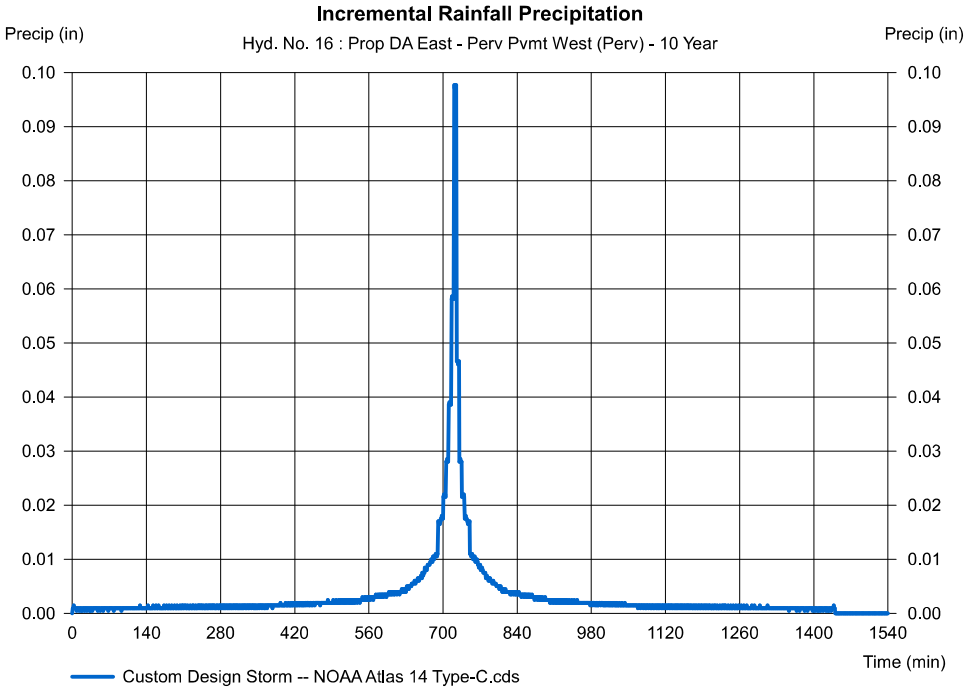


Precipitation Report

Hyd. No. 16

Prop DA East - Perv Pvmt West (Perv)

Storm Frequency	= 10 yrs	Time interval	= 1 min
Total precip.	= 5.0100 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds		

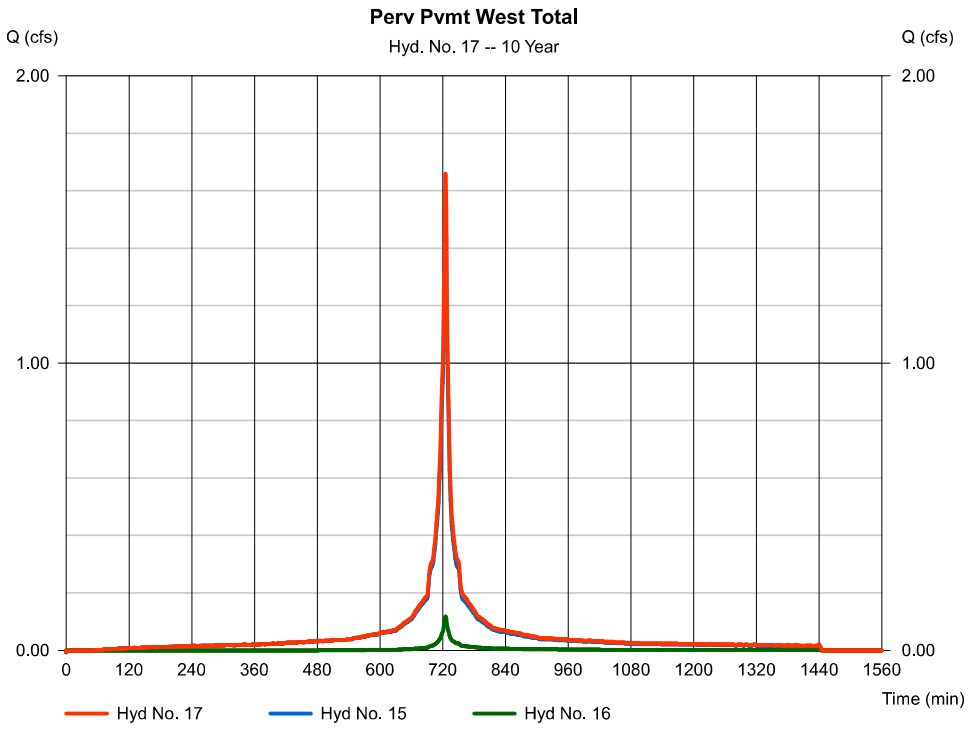


Hydrograph Report

Hyd. No. 17

Perv Pvmt West Total

Hydrograph type	= Combine	Peak discharge	= 1.660 cfs
Storm frequency	= 10 yrs	Time to peak	= 725 min
Time interval	= 1 min	Hyd. volume	= 5,167 cuft
Inflow hyds.	= 15, 16	Contrib. drain. area	= 0.310 ac



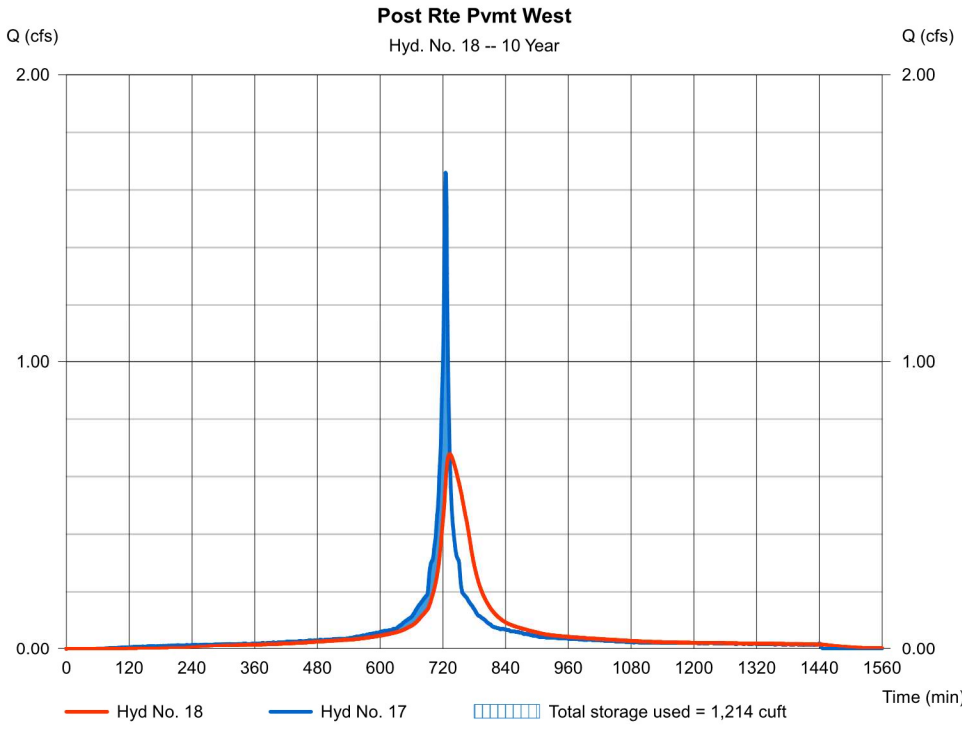
Hydrograph Report

Hyd. No. 18

Post Rte Pvmt West

Hydrograph type	= Reservoir	Peak discharge	= 0.679 cfs
Storm frequency	= 10 yrs	Time to peak	= 733 min
Time interval	= 1 min	Hyd. volume	= 5,154 cuft
Inflow hyd. No.	= 17 - Perv Pvmt West Total	Max. Elevation	= 64.63 ft
Reservoir name	= Porous Pavement West	Max. Storage	= 1,214 cuft

Storage Indication method used.

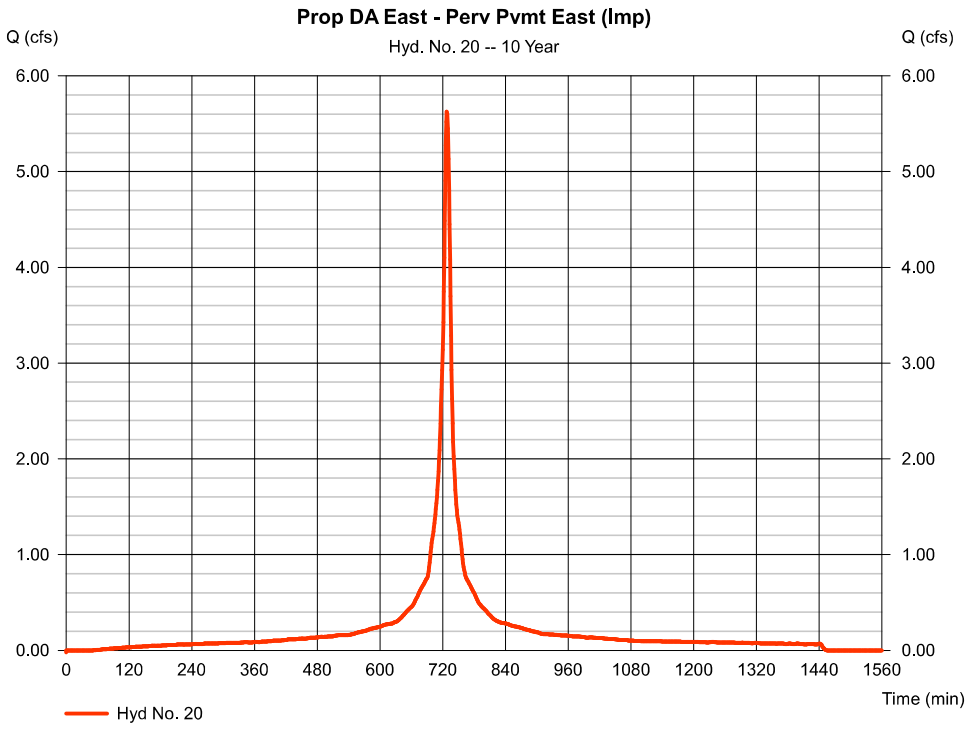


Hydrograph Report

Hyd. No. 20

Prop DA East - Perv Pvmt East (Imp)

Hydrograph type	= SCS Runoff	Peak discharge	= 5.626 cfs
Storm frequency	= 10 yrs	Time to peak	= 728 min
Time interval	= 1 min	Hyd. volume	= 21,138 cuft
Drainage area	= 1.220 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 9.20 min
Total precip.	= 5.01 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds	Shape factor	= 484

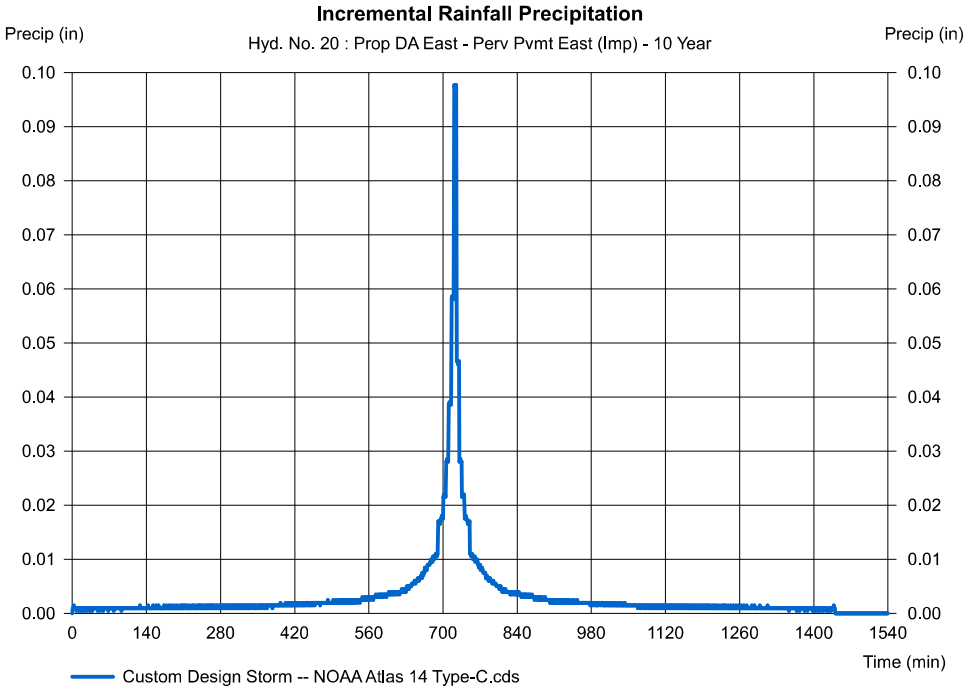


Precipitation Report

Hyd. No. 20

Prop DA East - Perv Pvmt East (Imp)

Storm Frequency	= 10 yrs	Time interval	= 1 min
Total precip.	= 5.0100 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds		

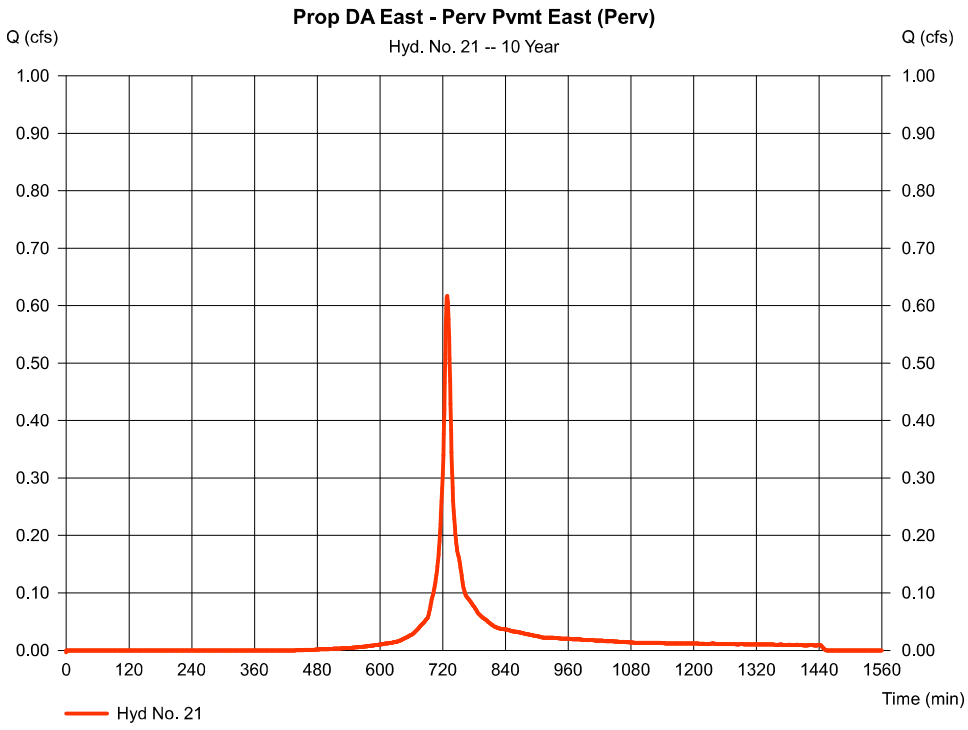


Hydrograph Report

Hyd. No. 21

Prop DA East - Perv Pvmt East (Perv)

Hydrograph type	= SCS Runoff	Peak discharge	= 0.617 cfs
Storm frequency	= 10 yrs	Time to peak	= 729 min
Time interval	= 1 min	Hyd. volume	= 2,001 cuft
Drainage area	= 0.190 ac	Curve number	= 80
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 9.20 min
Total precip.	= 5.01 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds	Shape factor	= 484

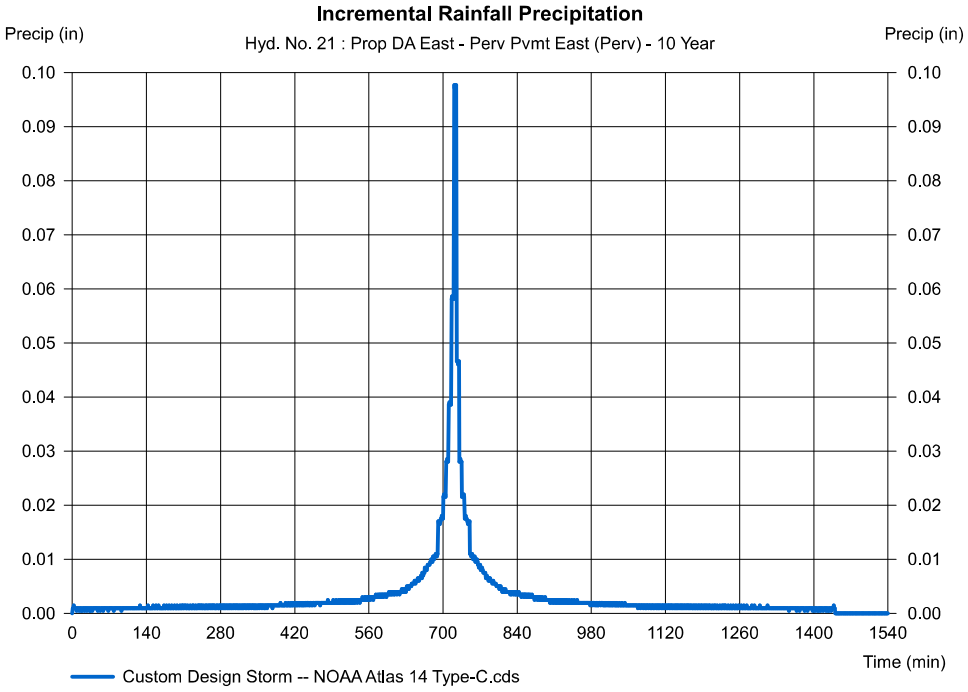


Precipitation Report

Hyd. No. 21

Prop DA East - Perv Pvmt East (Perv)

Storm Frequency	= 10 yrs	Time interval	= 1 min
Total precip.	= 5.0100 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds		

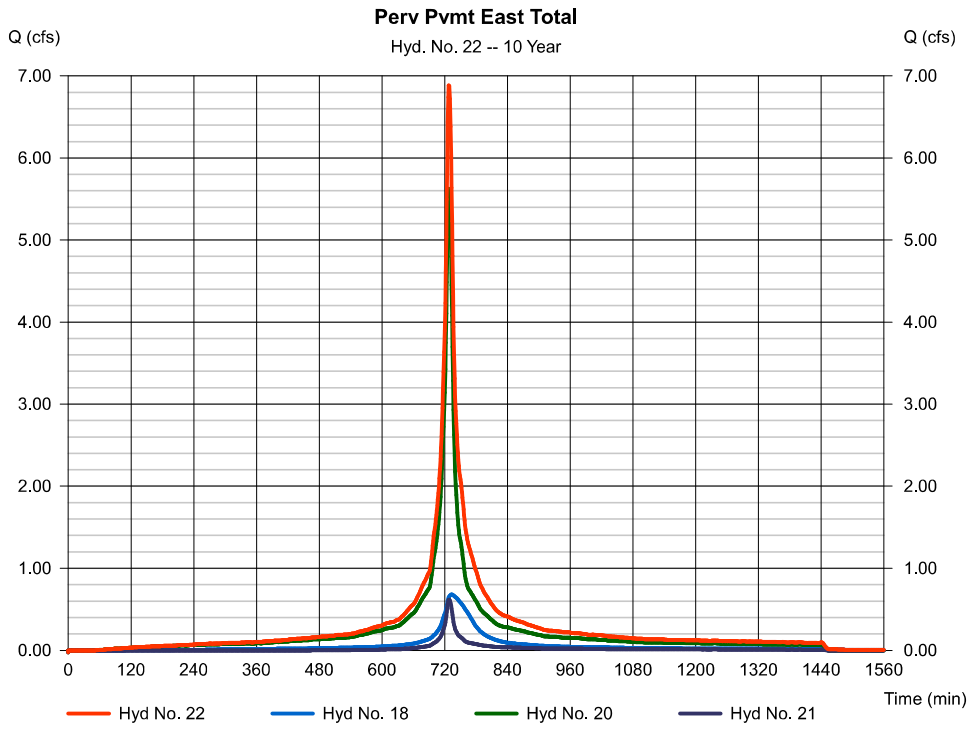


Hydrograph Report

Hyd. No. 22

Perv Pvmt East Total

Hydrograph type	= Combine	Peak discharge	= 6.885 cfs
Storm frequency	= 10 yrs	Time to peak	= 728 min
Time interval	= 1 min	Hyd. volume	= 28,294 cuft
Inflow hyds.	= 18, 20, 21	Contrib. drain. area	= 1.410 ac



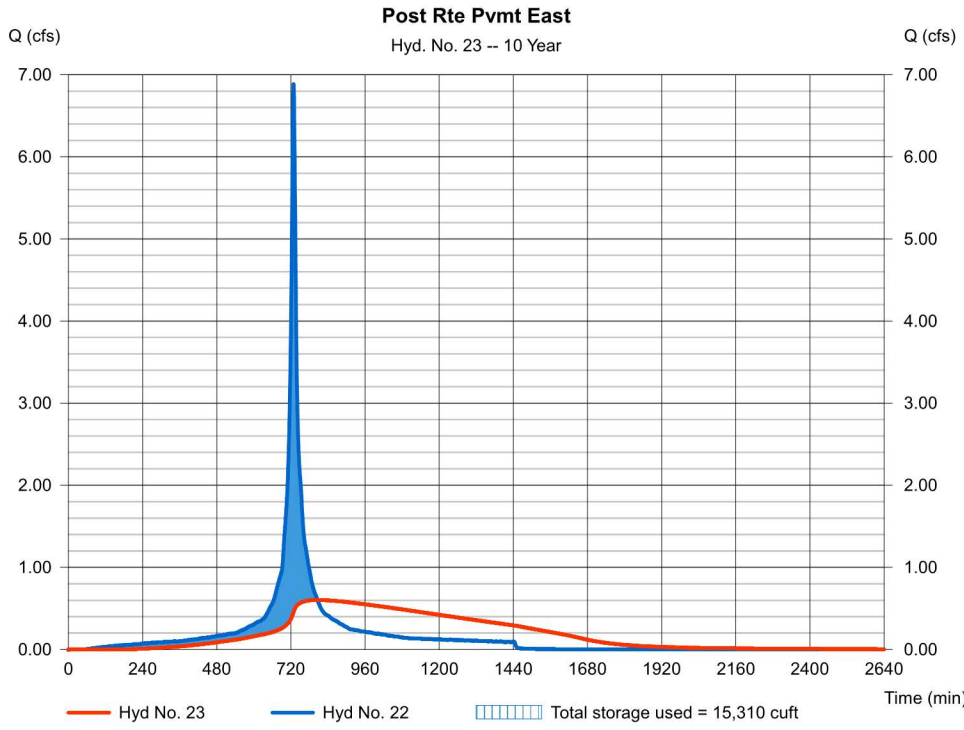
Hydrograph Report

Hyd. No. 23

Post Rte Pvmt East

Hydrograph type	= Reservoir	Peak discharge	= 0.604 cfs
Storm frequency	= 10 yrs	Time to peak	= 806 min
Time interval	= 1 min	Hyd. volume	= 28,047 cuft
Inflow hyd. No.	= 22 - Perv Pvmt East Total	Max. Elevation	= 62.40 ft
Reservoir name	= Porous Pavement East	Max. Storage	= 15,310 cuft

Storage Indication method used.

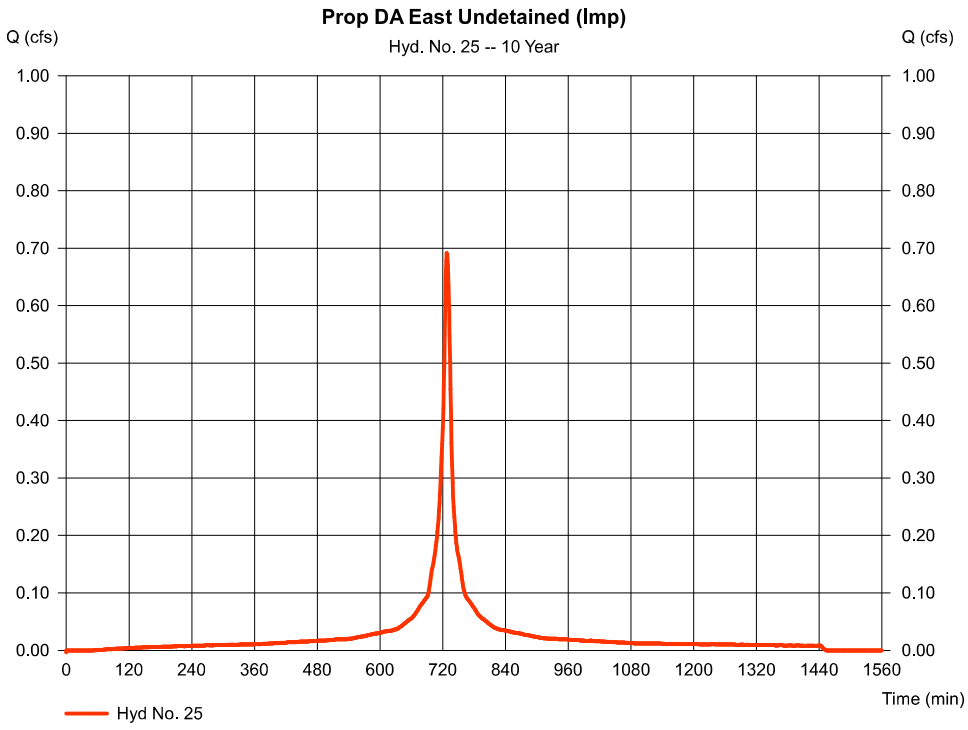


Hydrograph Report

Hyd. No. 25

Prop DA East Undetained (Imp)

Hydrograph type	= SCS Runoff	Peak discharge	= 0.692 cfs
Storm frequency	= 10 yrs	Time to peak	= 728 min
Time interval	= 1 min	Hyd. volume	= 2,599 cuft
Drainage area	= 0.150 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 9.60 min
Total precip.	= 5.01 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds	Shape factor	= 484

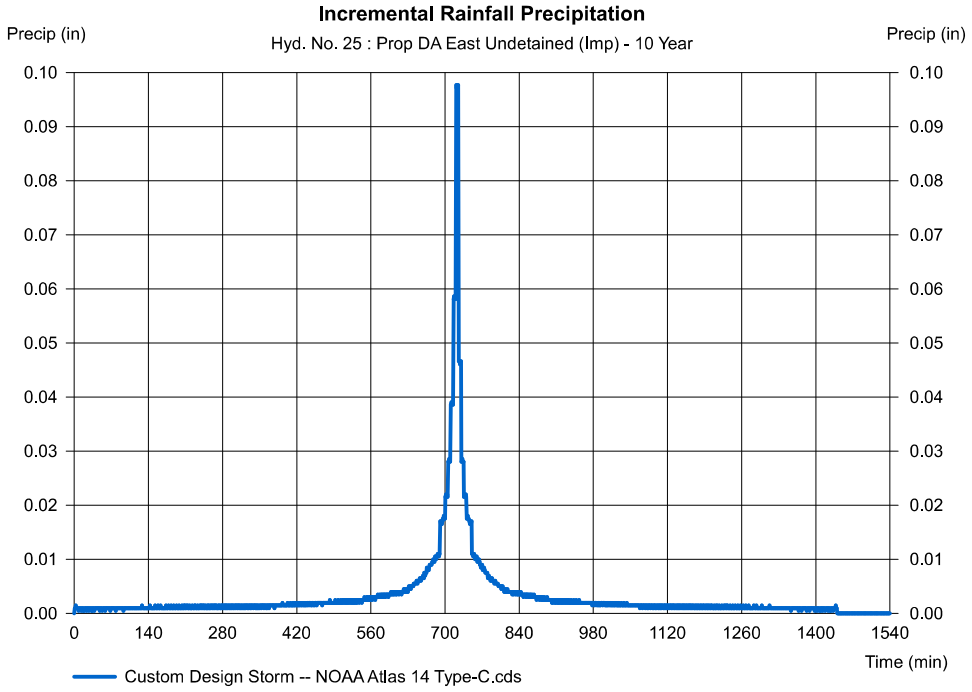


Precipitation Report

Hyd. No. 25

Prop DA East Undetained (Imp)

Storm Frequency	= 10 yrs	Time interval	= 1 min
Total precip.	= 5.0100 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds		

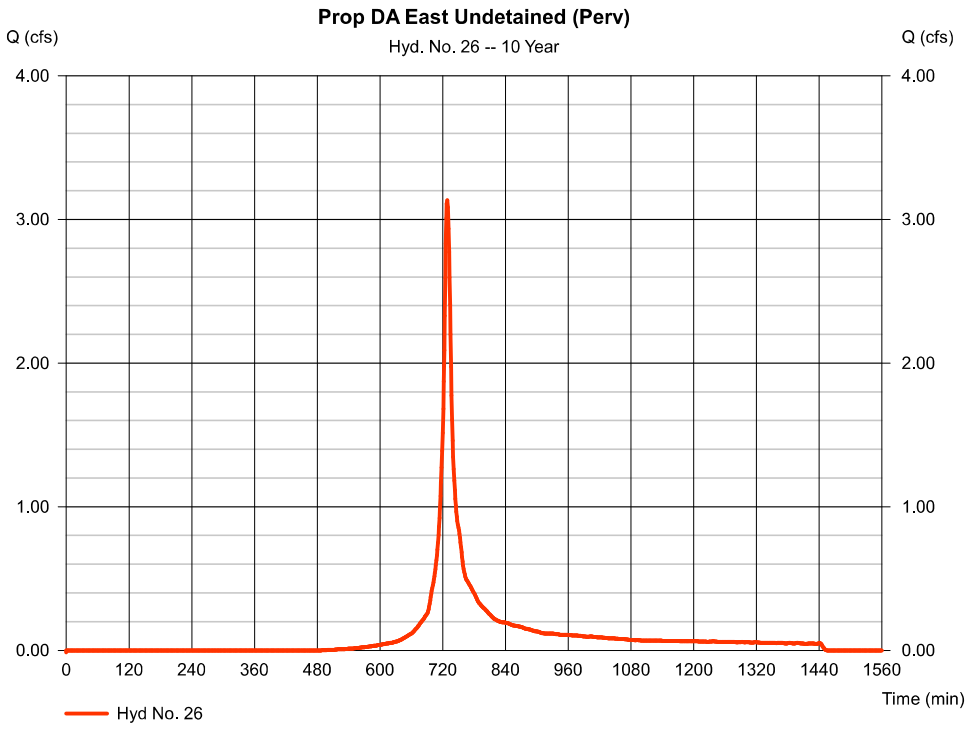


Hydrograph Report

Hyd. No. 26

Prop DA East Undetained (Perv)

Hydrograph type	= SCS Runoff	Peak discharge	= 3.134 cfs
Storm frequency	= 10 yrs	Time to peak	= 729 min
Time interval	= 1 min	Hyd. volume	= 10,125 cuft
Drainage area	= 1.060 ac	Curve number	= 77
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 9.60 min
Total precip.	= 5.01 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds	Shape factor	= 484

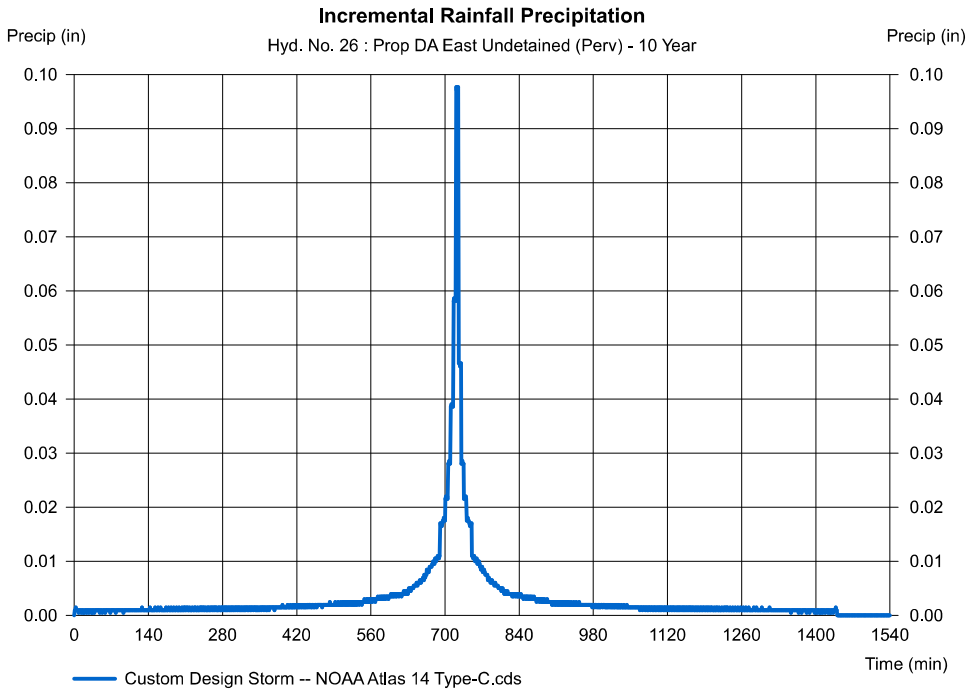


Precipitation Report

Hyd. No. 26

Prop DA East Undetained (Perv)

Storm Frequency	= 10 yrs	Time interval	= 1 min
Total precip.	= 5.0100 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds		

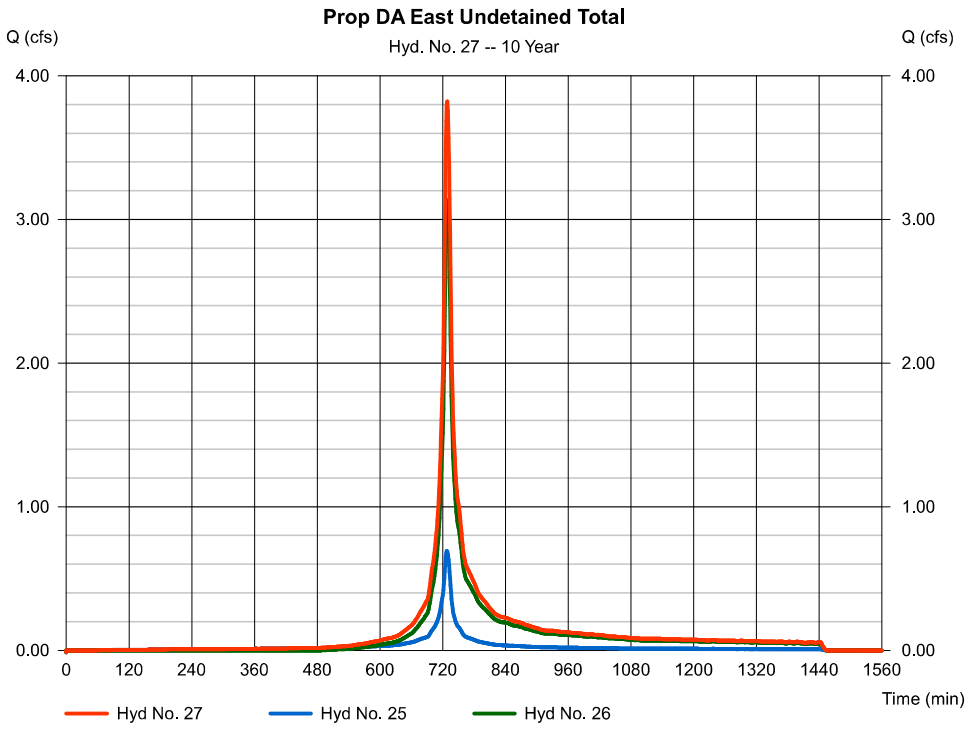


Hydrograph Report

Hyd. No. 27

Prop DA East Undetained Total

Hydrograph type	= Combine	Peak discharge	= 3.823 cfs
Storm frequency	= 10 yrs	Time to peak	= 729 min
Time interval	= 1 min	Hyd. volume	= 12,724 cuft
Inflow hyds.	= 25, 26	Contrib. drain. area	= 1.210 ac

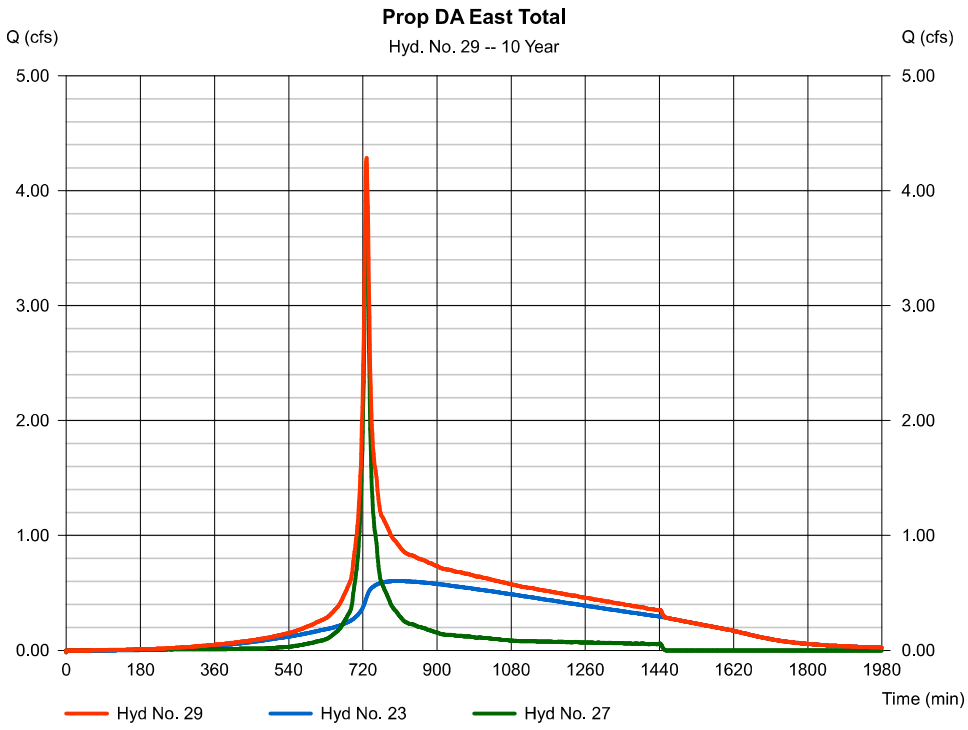


Hydrograph Report

Hyd. No. 29

Prop DA East Total

Hydrograph type	= Combine	Peak discharge	= 4.284 cfs
Storm frequency	= 10 yrs	Time to peak	= 729 min
Time interval	= 1 min	Hyd. volume	= 40,771 cuft
Inflow hyds.	= 23, 27	Contrib. drain. area	= 0.000 ac

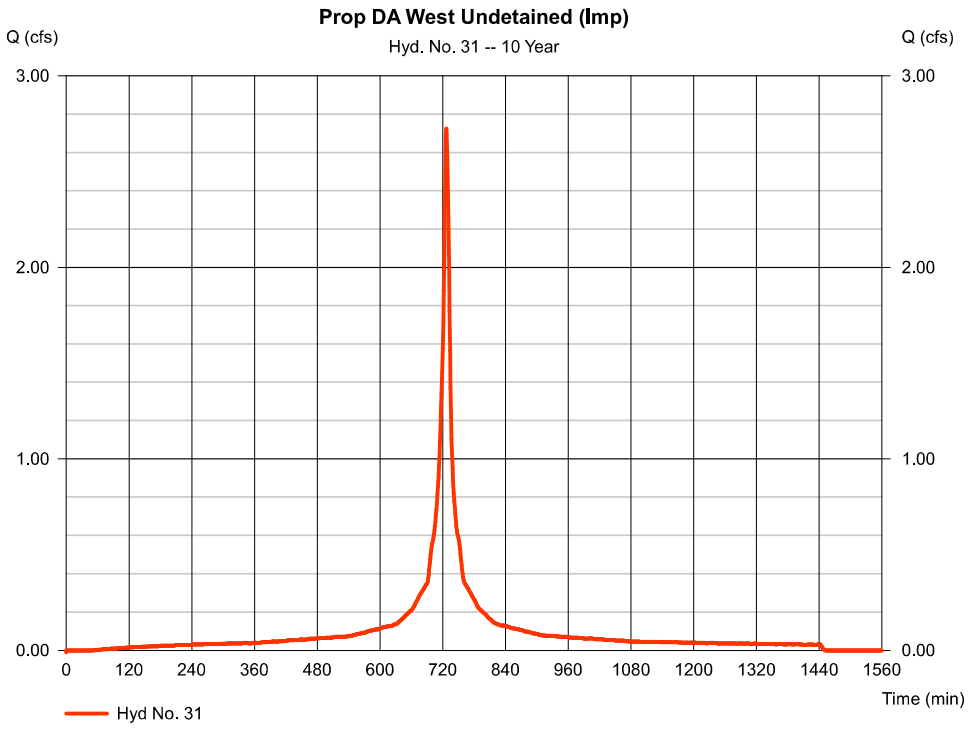


Hydrograph Report

Hyd. No. 31

Prop DA West Undetained (Imp)

Hydrograph type	= SCS Runoff	Peak discharge	= 2.724 cfs
Storm frequency	= 10 yrs	Time to peak	= 727 min
Time interval	= 1 min	Hyd. volume	= 9,629 cuft
Drainage area	= 0.570 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 7.30 min
Total precip.	= 5.01 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds	Shape factor	= 484

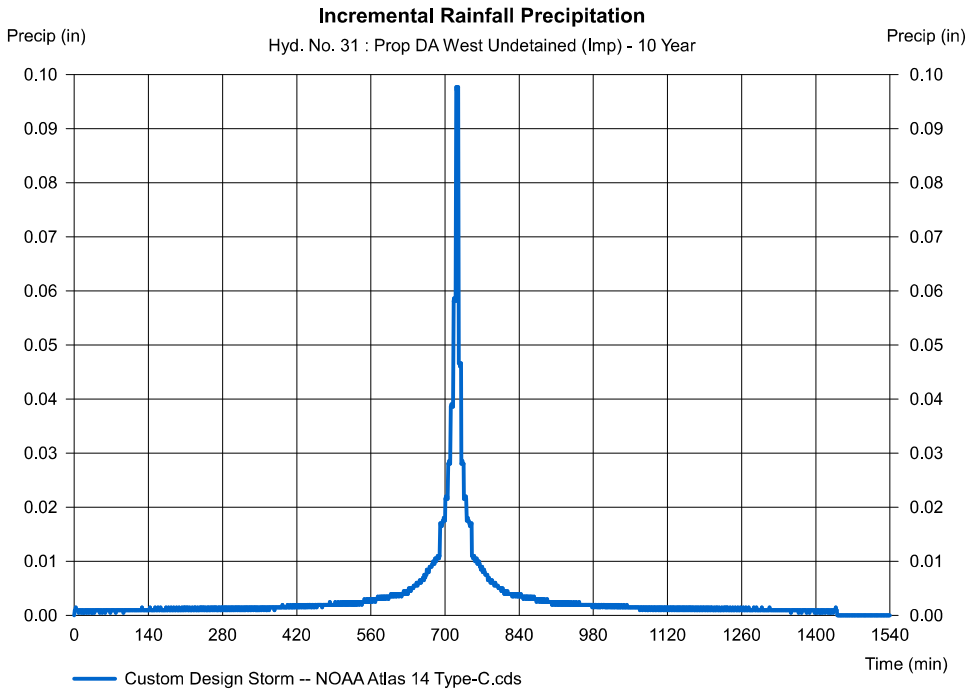


Precipitation Report

Hyd. No. 31

Prop DA West Undetained (Imp)

Storm Frequency	= 10 yrs	Time interval	= 1 min
Total precip.	= 5.0100 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds		

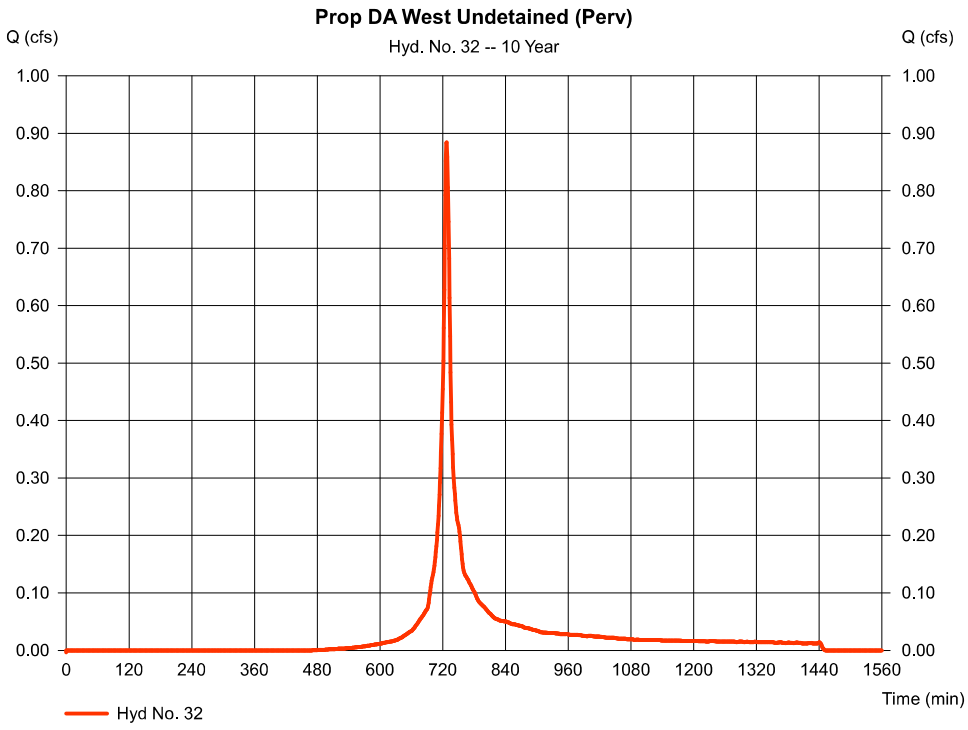


Hydrograph Report

Hyd. No. 32

Prop DA West Undetained (Perv)

Hydrograph type	= SCS Runoff	Peak discharge	= 0.884 cfs
Storm frequency	= 10 yrs	Time to peak	= 728 min
Time interval	= 1 min	Hyd. volume	= 2,696 cuft
Drainage area	= 0.280 ac	Curve number	= 78
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 7.30 min
Total precip.	= 5.01 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds	Shape factor	= 484

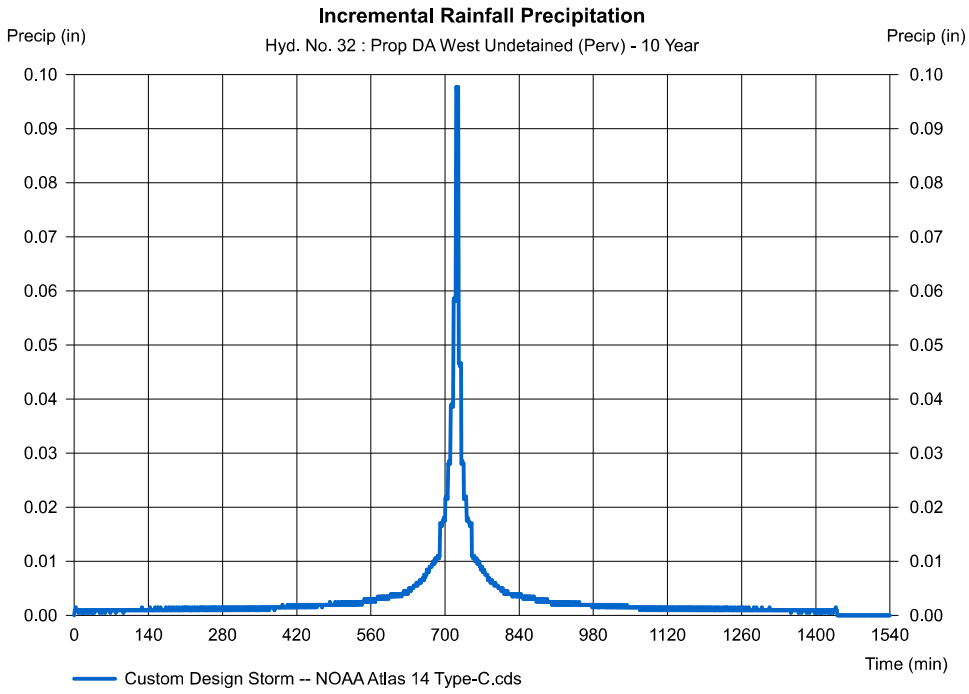


Precipitation Report

Hyd. No. 32

Prop DA West Undetained (Perv)

Storm Frequency	= 10 yrs	Time interval	= 1 min
Total precip.	= 5.0100 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds		

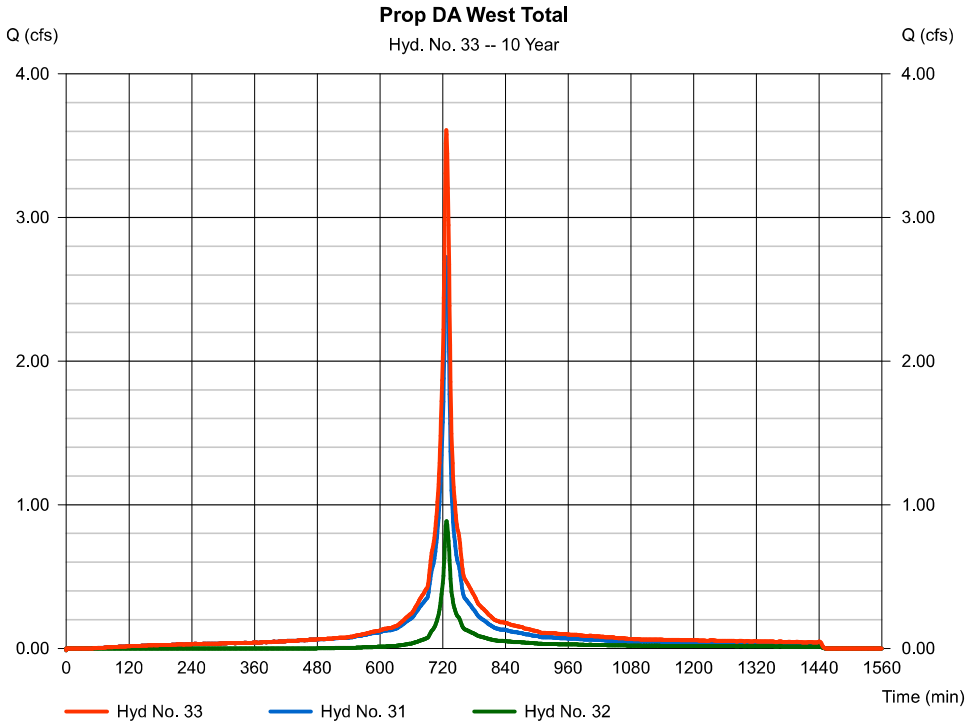


Hydrograph Report

Hyd. No. 33

Prop DA West Total

Hydrograph type	= Combine	Peak discharge	= 3.608 cfs
Storm frequency	= 10 yrs	Time to peak	= 727 min
Time interval	= 1 min	Hyd. volume	= 12,325 cuft
Inflow hyds.	= 31, 32	Contrib. drain. area	= 0.850 ac

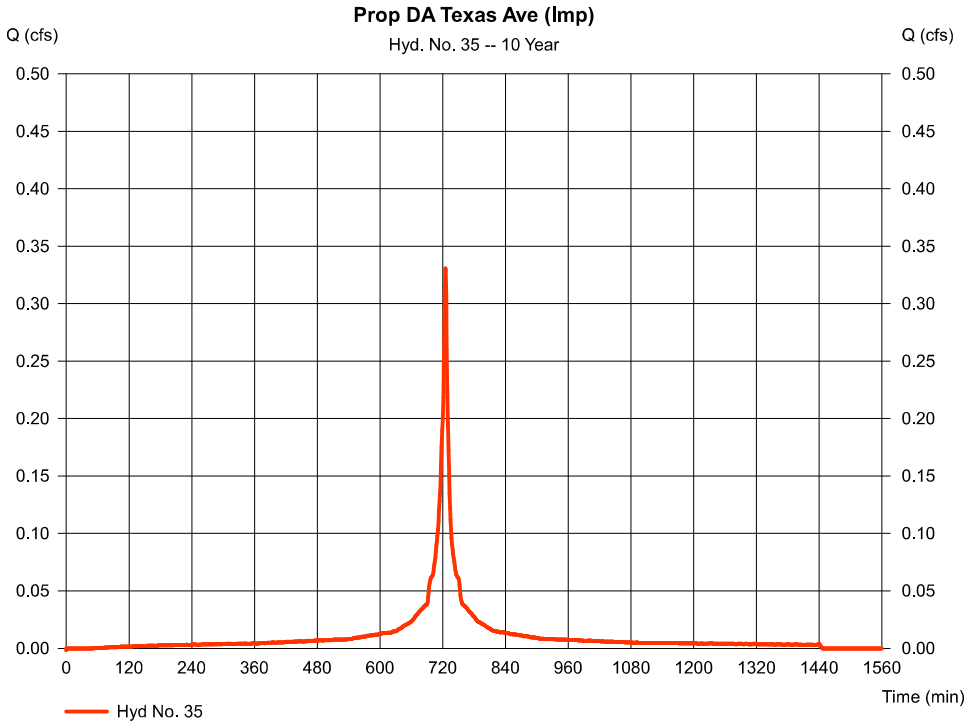


Hydrograph Report

Hyd. No. 35

Prop DA Texas Ave (Imp)

Hydrograph type	= SCS Runoff	Peak discharge	= 0.331 cfs
Storm frequency	= 10 yrs	Time to peak	= 725 min
Time interval	= 1 min	Hyd. volume	= 1,040 cuft
Drainage area	= 0.060 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 4.80 min
Total precip.	= 5.01 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds	Shape factor	= 484

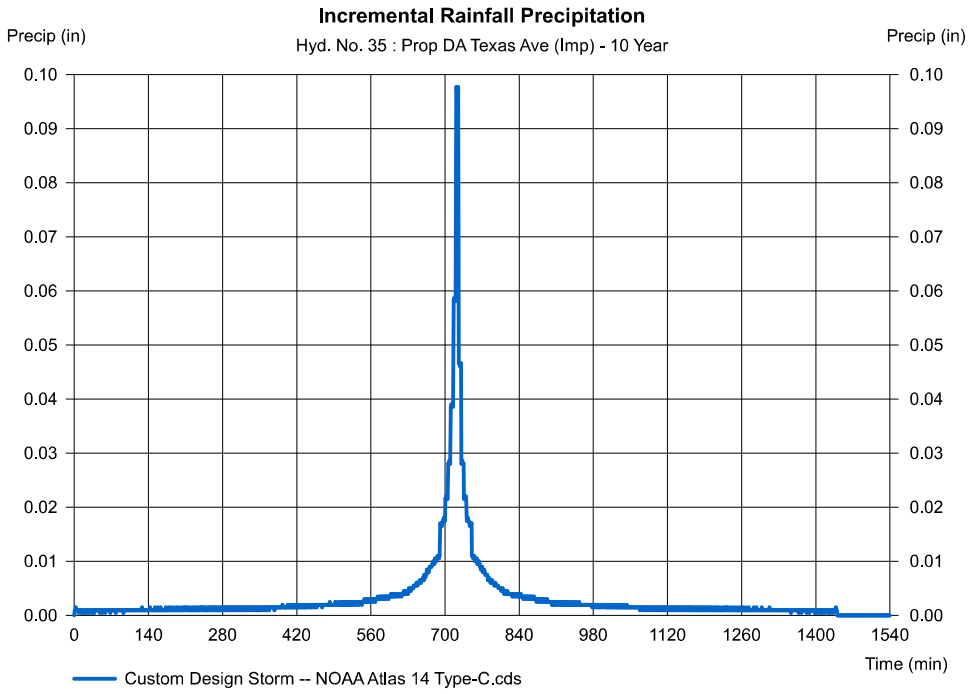


Precipitation Report

Hyd. No. 35

Prop DA Texas Ave (Imp)

Storm Frequency	= 10 yrs	Time interval	= 1 min
Total precip.	= 5.0100 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds		

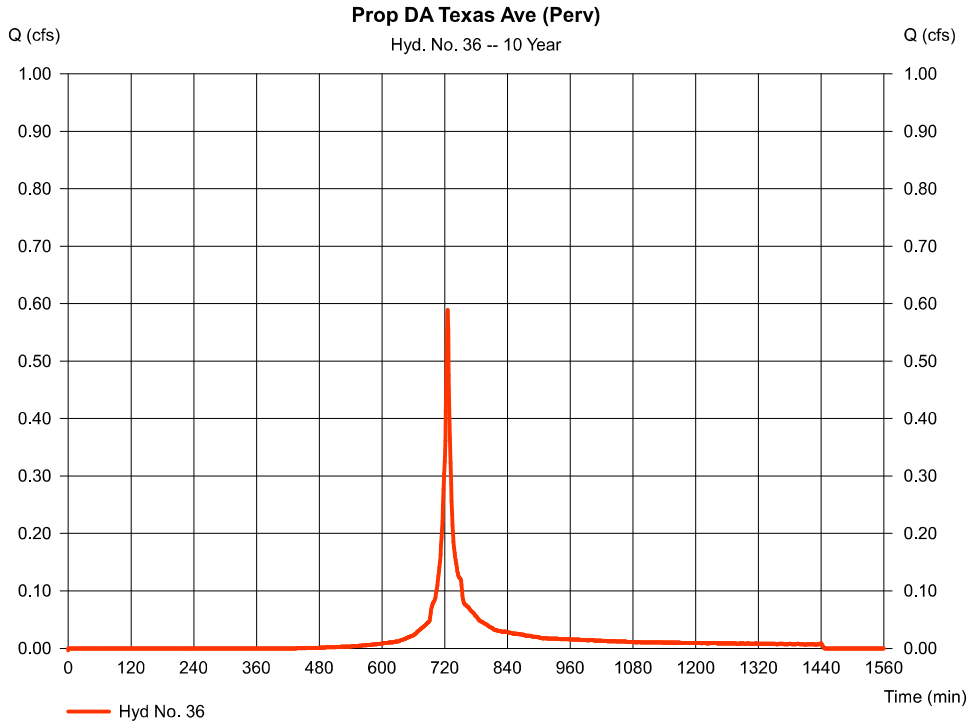


Hydrograph Report

Hyd. No. 36

Prop DA Texas Ave (Perv)

Hydrograph type	= SCS Runoff	Peak discharge	= 0.589 cfs
Storm frequency	= 10 yrs	Time to peak	= 726 min
Time interval	= 1 min	Hyd. volume	= 1,580 cuft
Drainage area	= 0.150 ac	Curve number	= 80
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 4.80 min
Total precip.	= 5.01 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds	Shape factor	= 484

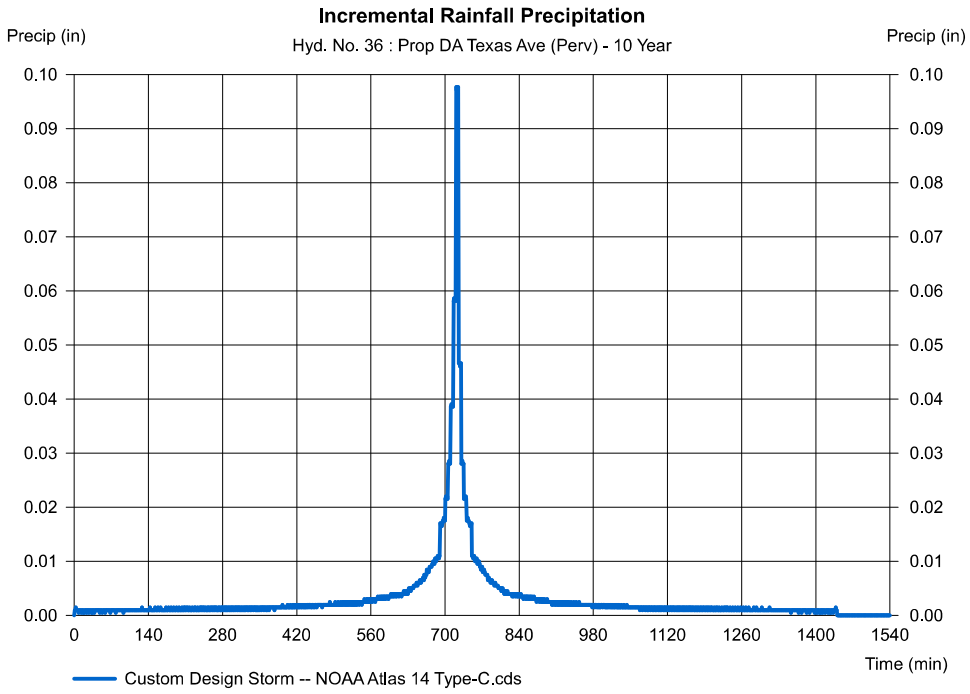


Precipitation Report

Hyd. No. 36

Prop DA Texas Ave (Perv)

Storm Frequency	= 10 yrs	Time interval	= 1 min
Total precip.	= 5.0100 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds		

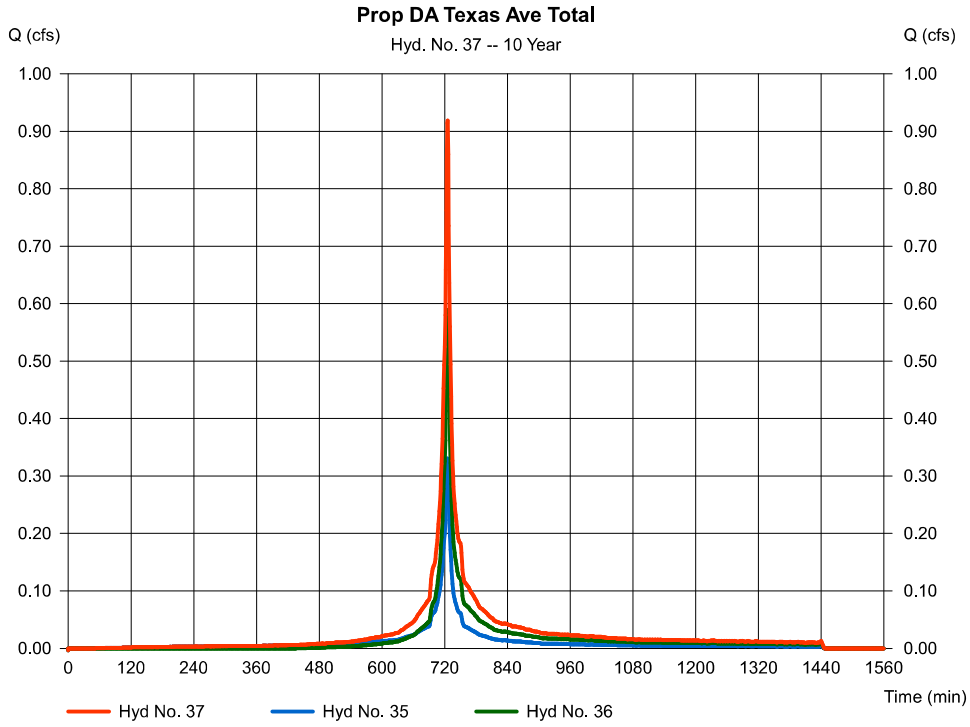


Hydrograph Report

Hyd. No. 37

Prop DA Texas Ave Total

Hydrograph type	= Combine	Peak discharge	= 0.918 cfs
Storm frequency	= 10 yrs	Time to peak	= 726 min
Time interval	= 1 min	Hyd. volume	= 2,620 cuft
Inflow hyds.	= 35, 36	Contrib. drain. area	= 0.210 ac



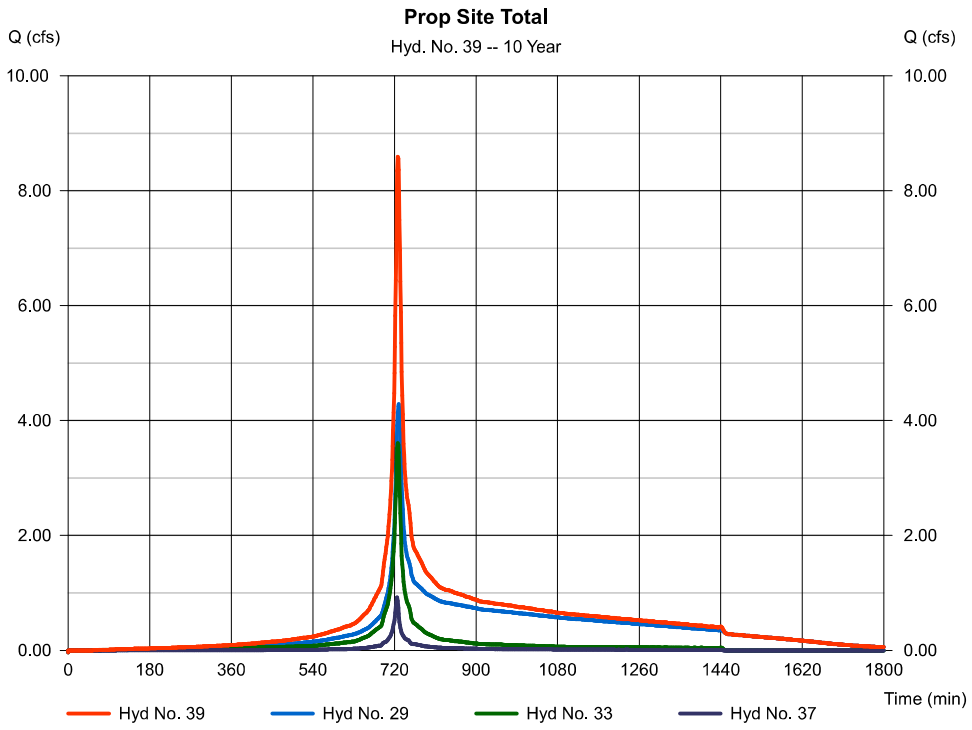
Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.1 — Tuesday, May 21, 2024

Hyd. No. 39

Prop Site Total

Hydrograph type	= Combine	Peak discharge	= 8,591 cfs
Storm frequency	= 10 yrs	Time to peak	= 727 min
Time interval	= 1 min	Hyd. volume	= 55,715 cuft
Inflow hyds.	= 29, 33, 37	Contrib. drain. area	= 0.000 ac



Hydrograph Summary Report

Hydraflow Hydrographs by Intelisolve v9.1

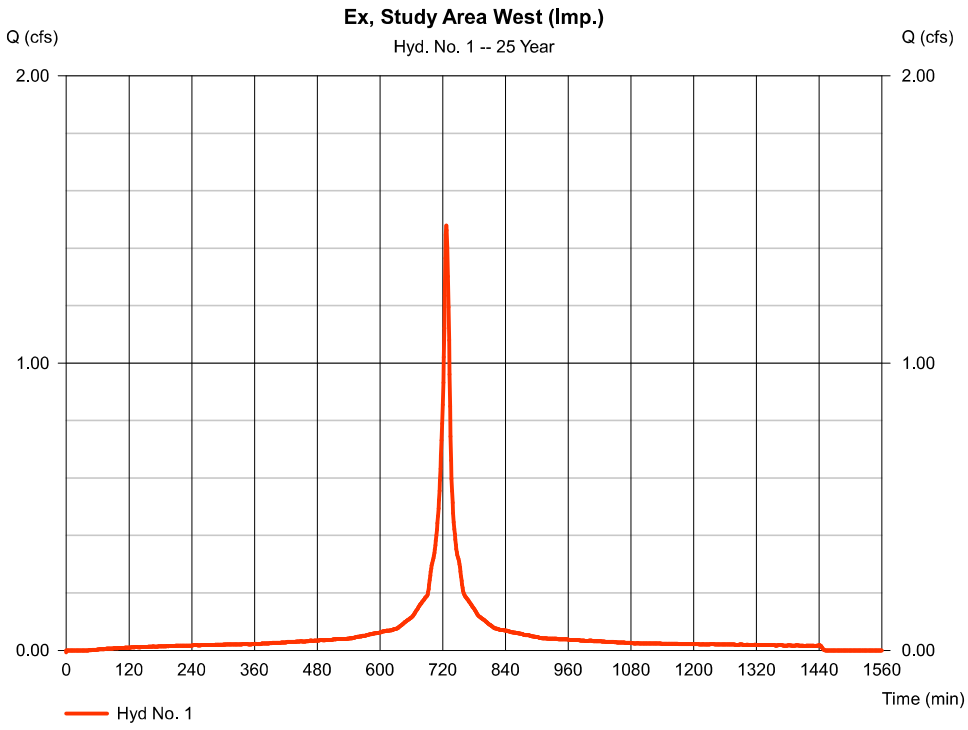
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph description
1	SCS Runoff	1.479	1	727	5,266	----	------	------	Ex, Study Area West (Imp.)
2	SCS Runoff	8.680	1	727	27,743	----	------	------	Ex. Study Area West (Perv.)
3	Combine	10.16	1	727	33,009	1, 2	------	------	Ex. Study Area West Total
5	SCS Runoff	0.614	1	725	1,944	----	------	------	Ex. Study Area Texas Ave (Imp.)
6	SCS Runoff	0.937	1	726	2,679	----	------	------	Ex, Study Area Texas Ave (Perv.)
7	Combine	1.551	1	725	4,623	5, 6	------	------	Ex. Study Area Texas Ave Total
9	SCS Runoff	0.296	1	727	1,053	----	------	------	Ex. Study Area East (Imp.)
10	SCS Runoff	9.953	1	727	32,038	----	------	------	Ex. Study Area East (Perv.)
11	Combine	10.25	1	727	33,091	9, 10	------	------	Ex. Study Area East Total
13	Combine	21.85	1	727	70,723	3, 7, 11,	------	------	Ex. Site Total
15	SCS Runoff	1.910	1	725	6,049	----	------	------	Prop DA East - Perv Pvmt West (Imp)
16	SCS Runoff	0.159	1	726	430	----	------	------	Prop DA East - Perv Pvmt West (Per
17	Combine	2.068	1	725	6,480	15, 16	------	------	Perv Pvmt West Total
18	Reservoir	0.984	1	732	6,466	17	64.82	1,475	Post Rte Pvmt West
20	SCS Runoff	6.965	1	728	26,358	----	------	------	Prop DA East - Perv Pvmt East (Imp)
21	SCS Runoff	0.833	1	729	2,726	----	------	------	Prop DA East - Perv Pvmt East (Perv
22	Combine	8.629	1	729	35,550	18, 20, 21	------	------	Perv Pvmt East Total
23	Reservoir	1.735	1	761	35,292	22	62.73	17,395	Post Rte Pvmt East
25	SCS Runoff	0.856	1	728	3,241	----	------	------	Prop DA East Undetained (Imp)
26	SCS Runoff	4.320	1	729	14,027	----	------	------	Prop DA East Undetained (Perv)
27	Combine	5.172	1	729	17,268	25, 26	------	------	Prop DA East Undetained Total
29	Combine	5.700	1	729	52,560	23, 27,	------	------	Prop DA East Total
31	SCS Runoff	3.372	1	727	12,007	----	------	------	Prop DA West Undetained (Imp)
32	SCS Runoff	1.211	1	727	3,713	----	------	------	Prop DA West Undetained (Perv)
33	Combine	4.584	1	727	15,720	31, 32	------	------	Prop DA West Total
35	SCS Runoff	0.409	1	725	1,296	----	------	------	Prop DA Texas Ave (Imp)
36	SCS Runoff	0.793	1	726	2,152	----	------	------	Prop DA Texas Ave (Perv)
37	Combine	1.201	1	726	3,449	35, 36	------	------	Prop DA Texas Ave Total
39	Combine	11.22	1	727	71,729	29, 33, 37,	------	------	Prop Site Total

Hydrograph Report

Hyd. No. 1

Ex, Study Area West (Imp.)

Hydrograph type	= SCS Runoff	Peak discharge	= 1.479 cfs
Storm frequency	= 25 yrs	Time to peak	= 727 min
Time interval	= 1 min	Hyd. volume	= 5,266 cuft
Drainage area	= 0.250 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 8.30 min
Total precip.	= 6.19 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds	Shape factor	= 484

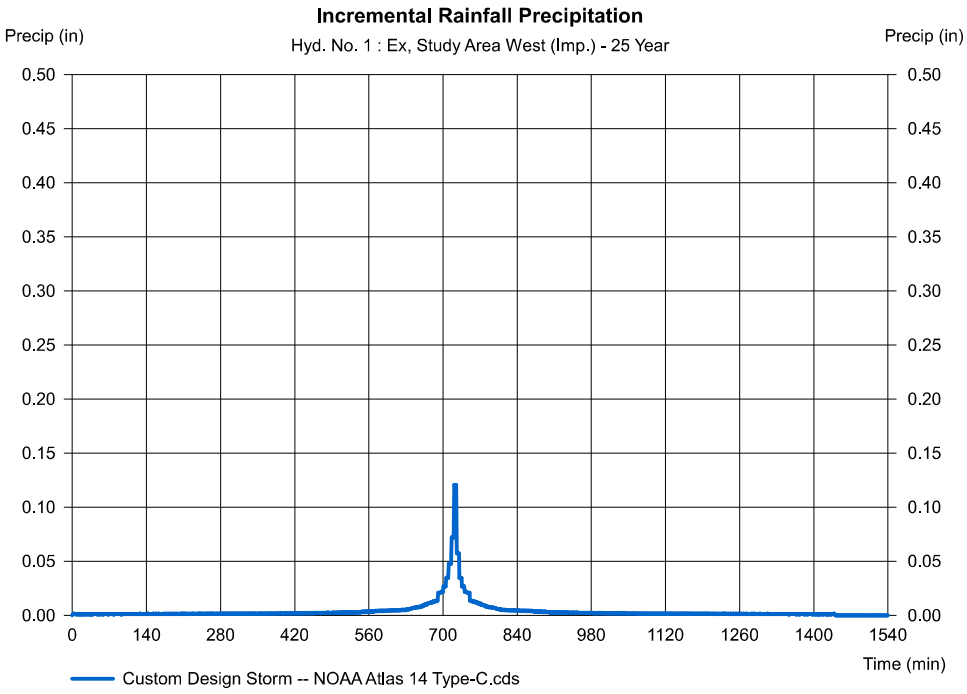


Precipitation Report

Hyd. No. 1

Ex, Study Area West (Imp.)

Storm Frequency	= 25 yrs	Time interval	= 1 min
Total precip.	= 6.1900 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds		

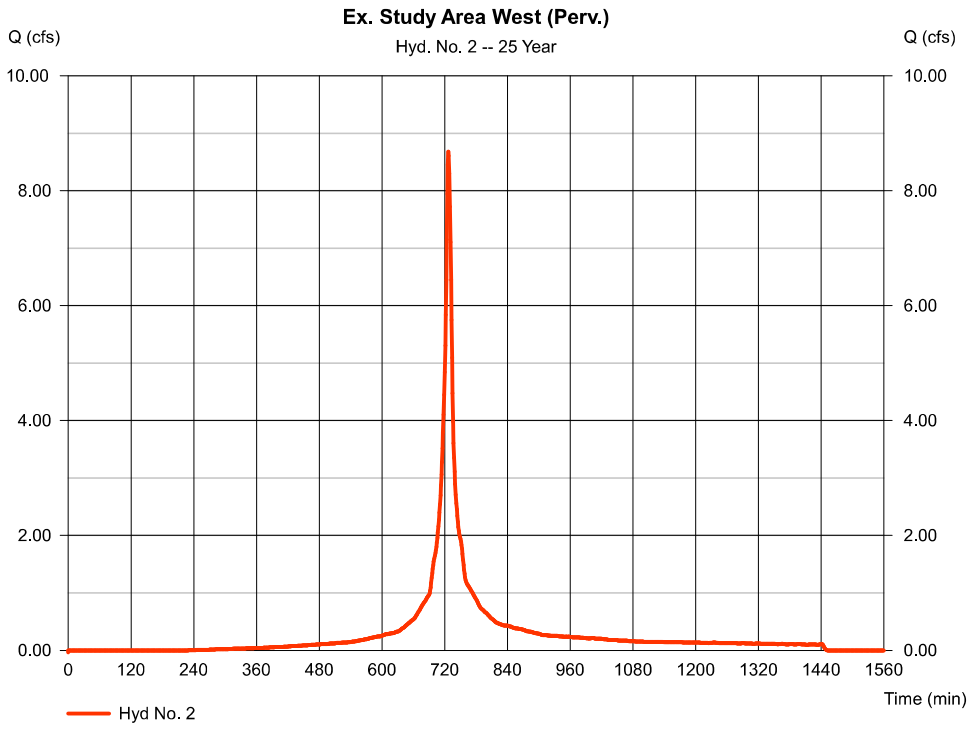


Hydrograph Report

Hyd. No. 2

Ex. Study Area West (Perv.)

Hydrograph type	= SCS Runoff	Peak discharge	= 8.680 cfs
Storm frequency	= 25 yrs	Time to peak	= 727 min
Time interval	= 1 min	Hyd. volume	= 27,743 cuft
Drainage area	= 1.630 ac	Curve number	= 88
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 8.30 min
Total precip.	= 6.19 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds	Shape factor	= 484

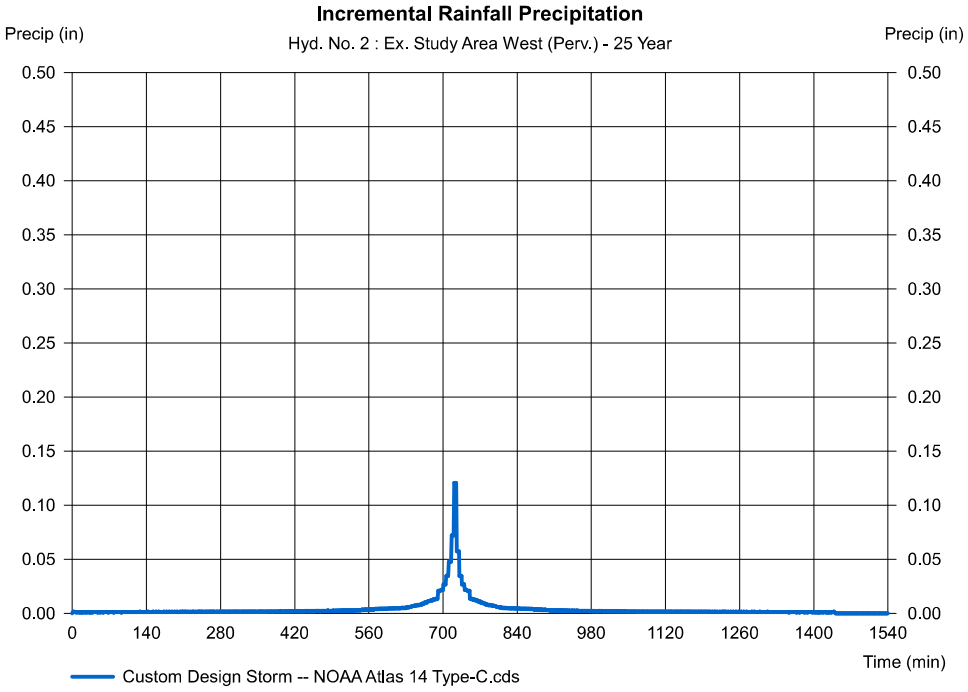


Precipitation Report

Hyd. No. 2

Ex. Study Area West (Perv.)

Storm Frequency	= 25 yrs	Time interval	= 1 min
Total precip.	= 6.1900 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds		

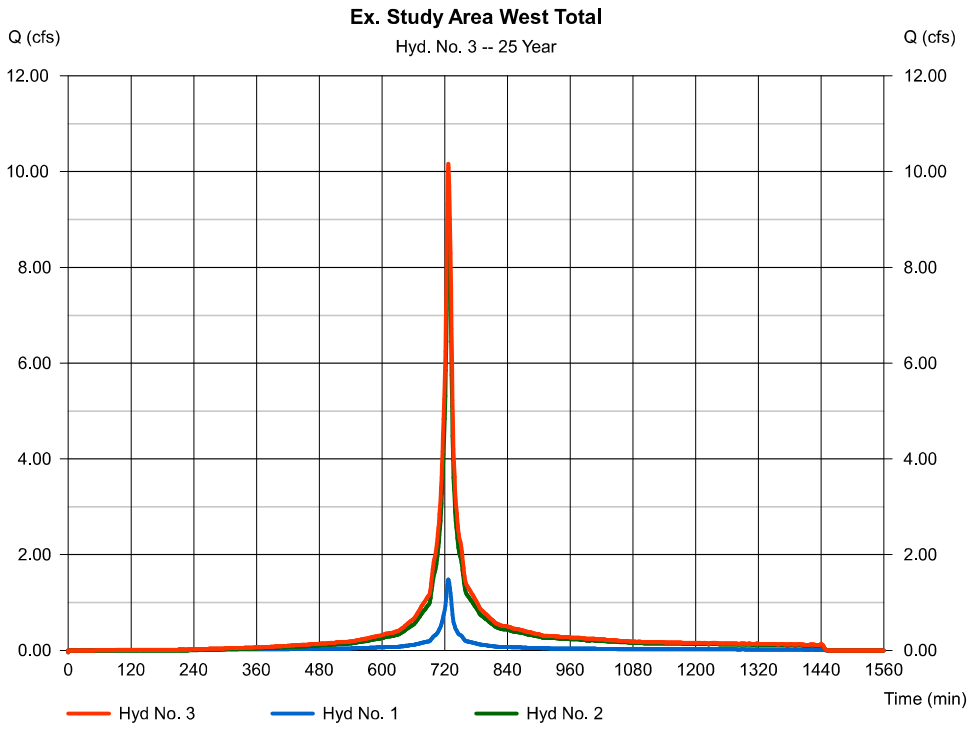


Hydrograph Report

Hyd. No. 3

Ex. Study Area West Total

Hydrograph type	= Combine	Peak discharge	= 10.16 cfs
Storm frequency	= 25 yrs	Time to peak	= 727 min
Time interval	= 1 min	Hyd. volume	= 33,009 cuft
Inflow hyds.	= 1, 2	Contrib. drain. area	= 1.880 ac

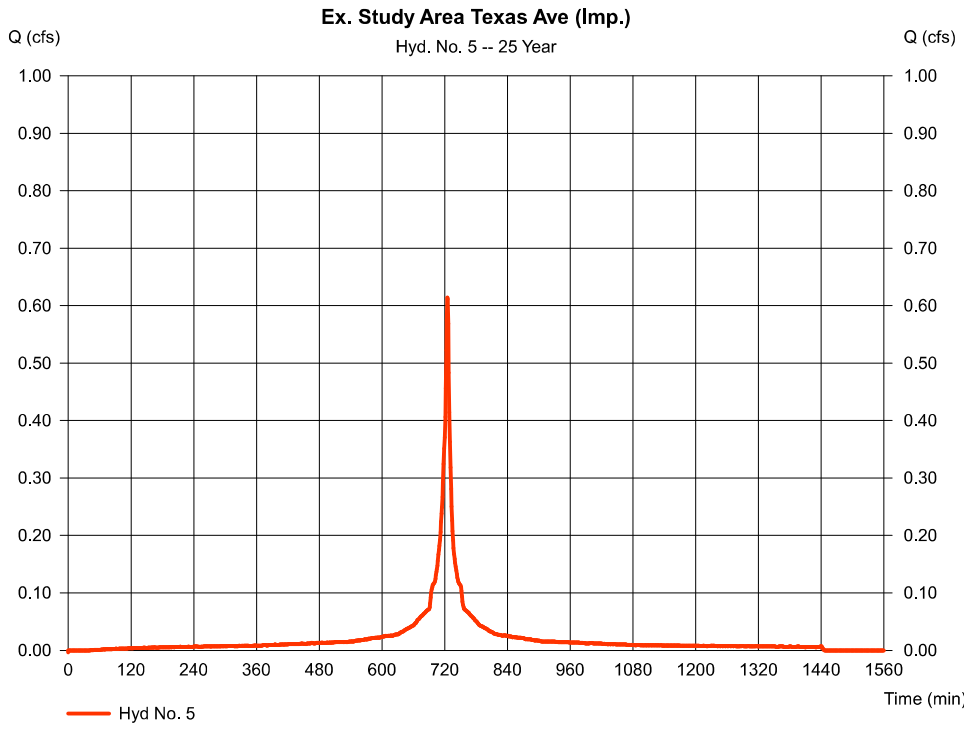


Hydrograph Report

Hyd. No. 5

Ex. Study Area Texas Ave (Imp.)

Hydrograph type	= SCS Runoff	Peak discharge	= 0.614 cfs
Storm frequency	= 25 yrs	Time to peak	= 725 min
Time interval	= 1 min	Hyd. volume	= 1,944 cuft
Drainage area	= 0.090 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 3.90 min
Total precip.	= 6.19 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds	Shape factor	= 484

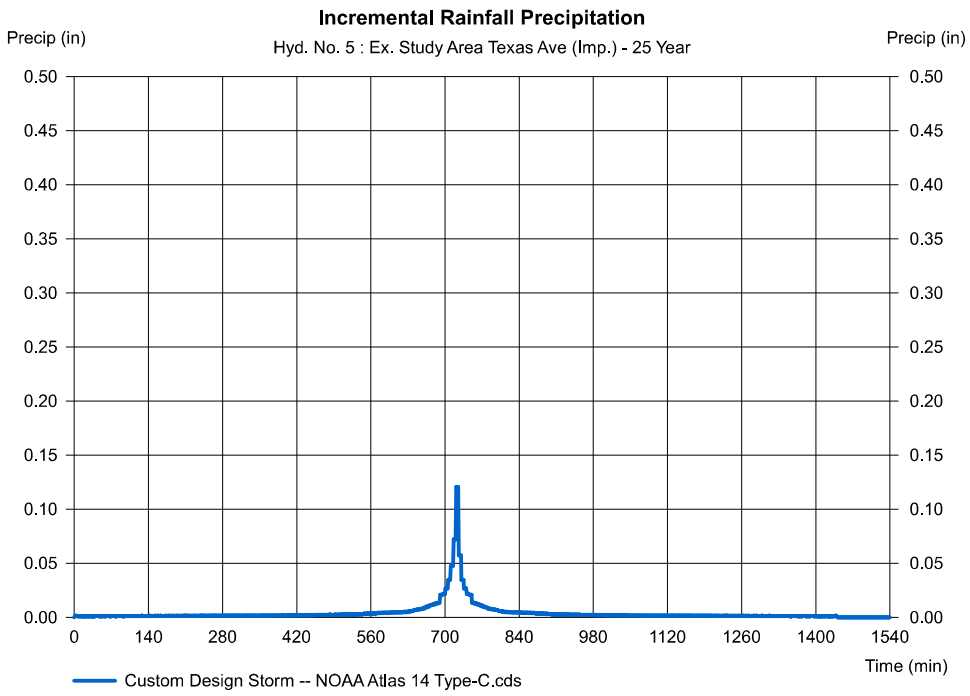


Precipitation Report

Hyd. No. 5

Ex. Study Area Texas Ave (Imp.)

Storm Frequency	= 25 yrs	Time interval	= 1 min
Total precip.	= 6.1900 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds		

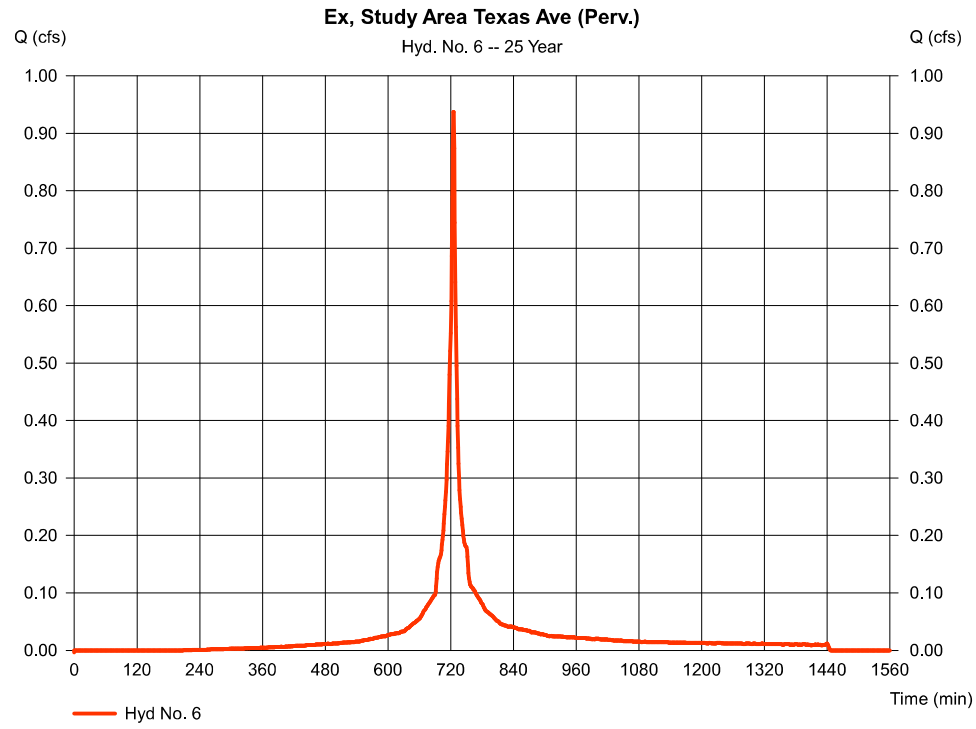


Hydrograph Report

Hyd. No. 6

Ex, Study Area Texas Ave (Perv.)

Hydrograph type	= SCS Runoff	Peak discharge	= 0.937 cfs
Storm frequency	= 25 yrs	Time to peak	= 726 min
Time interval	= 1 min	Hyd. volume	= 2,679 cuft
Drainage area	= 0.150 ac	Curve number	= 89
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 3.90 min
Total precip.	= 6.19 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds	Shape factor	= 484

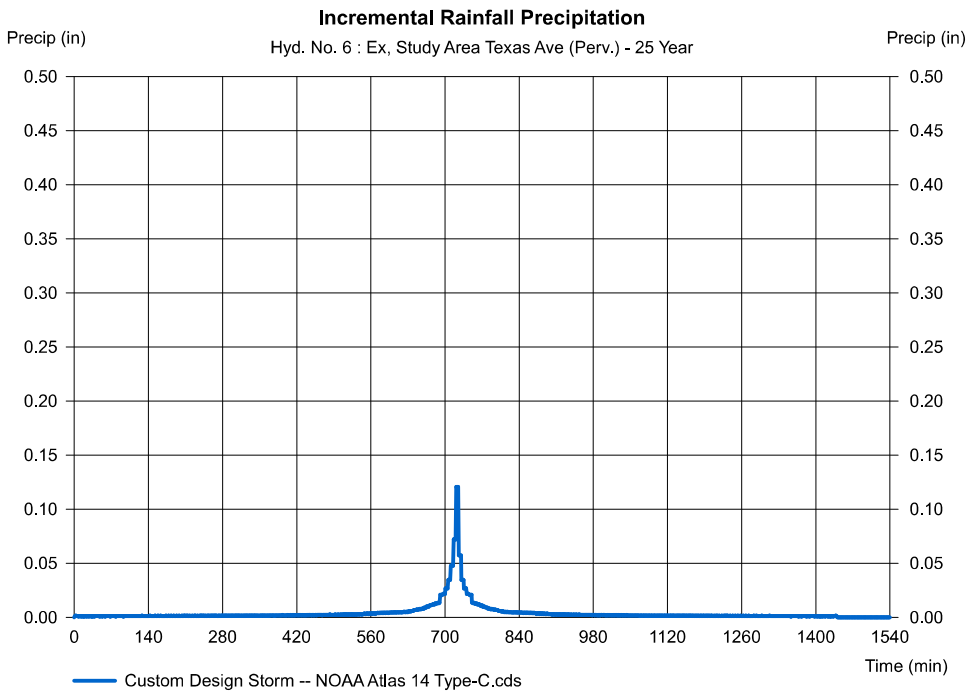


Precipitation Report

Hyd. No. 6

Ex, Study Area Texas Ave (Perv.)

Storm Frequency	= 25 yrs	Time interval	= 1 min
Total precip.	= 6.1900 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds		

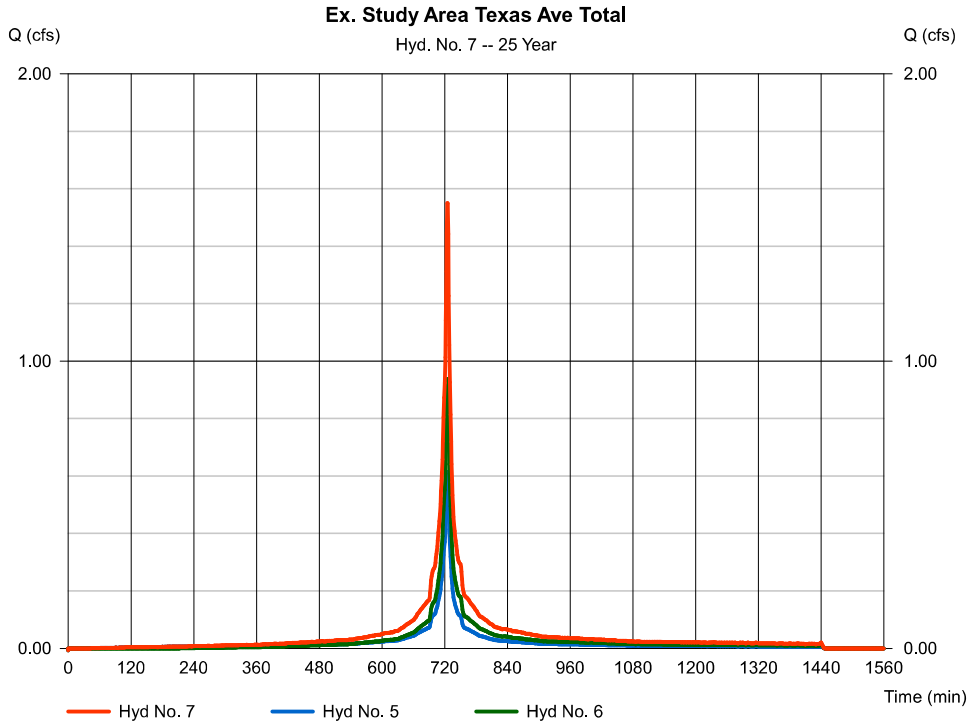


Hydrograph Report

Hyd. No. 7

Ex. Study Area Texas Ave Total

Hydrograph type	= Combine	Peak discharge	= 1.551 cfs
Storm frequency	= 25 yrs	Time to peak	= 725 min
Time interval	= 1 min	Hyd. volume	= 4,623 cuft
Inflow hyds.	= 5, 6	Contrib. drain. area	= 0.240 ac

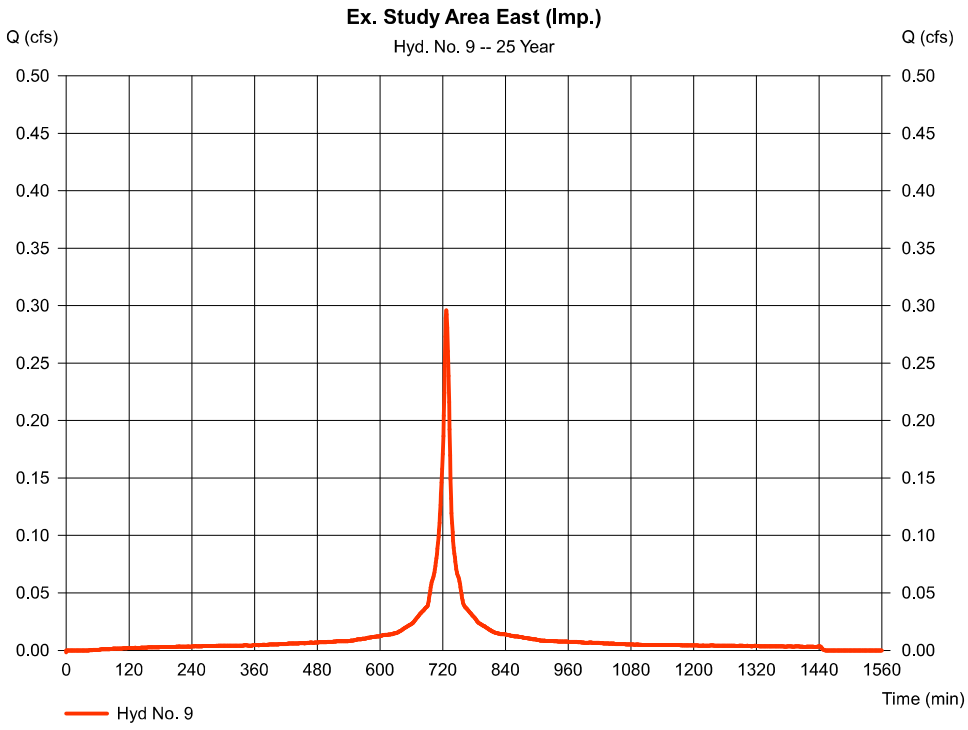


Hydrograph Report

Hyd. No. 9

Ex. Study Area East (Imp.)

Hydrograph type	= SCS Runoff	Peak discharge	= 0.296 cfs
Storm frequency	= 25 yrs	Time to peak	= 727 min
Time interval	= 1 min	Hyd. volume	= 1,053 cuft
Drainage area	= 0.050 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 8.00 min
Total precip.	= 6.19 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds	Shape factor	= 484

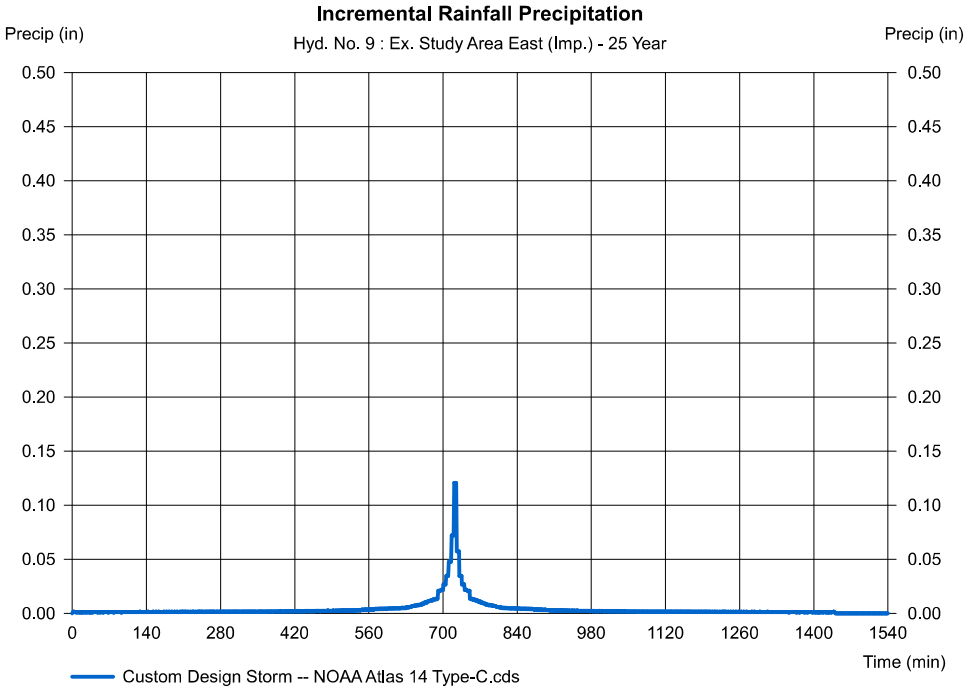


Precipitation Report

Hyd. No. 9

Ex. Study Area East (Imp.)

Storm Frequency	= 25 yrs	Time interval	= 1 min
Total precip.	= 6.1900 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds		

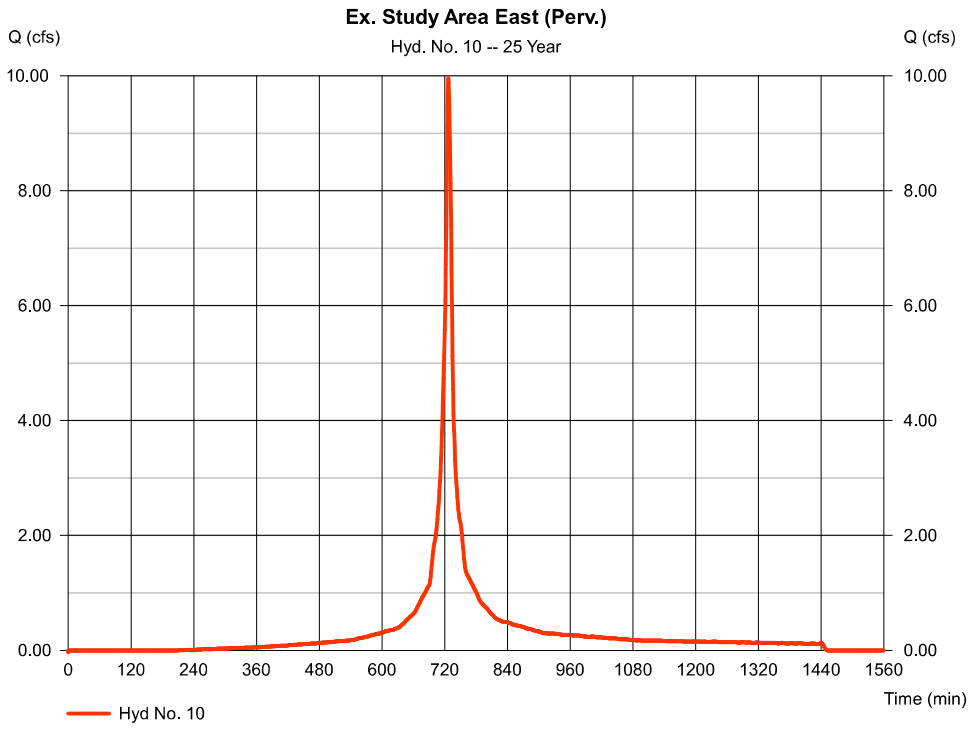


Hydrograph Report

Hyd. No. 10

Ex. Study Area East (Perv.)

Hydrograph type	= SCS Runoff	Peak discharge	= 9.953 cfs
Storm frequency	= 25 yrs	Time to peak	= 727 min
Time interval	= 1 min	Hyd. volume	= 32,038 cuft
Drainage area	= 1.840 ac	Curve number	= 89
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 8.00 min
Total precip.	= 6.19 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds	Shape factor	= 484

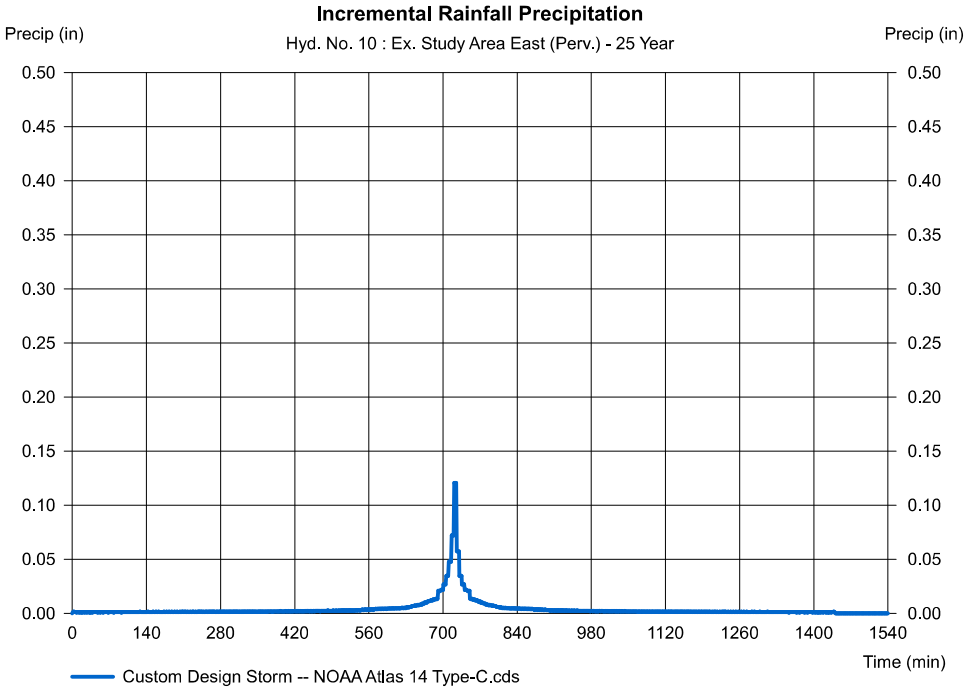


Precipitation Report

Hyd. No. 10

Ex. Study Area East (Perv.)

Storm Frequency	= 25 yrs	Time interval	= 1 min
Total precip.	= 6.1900 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds		

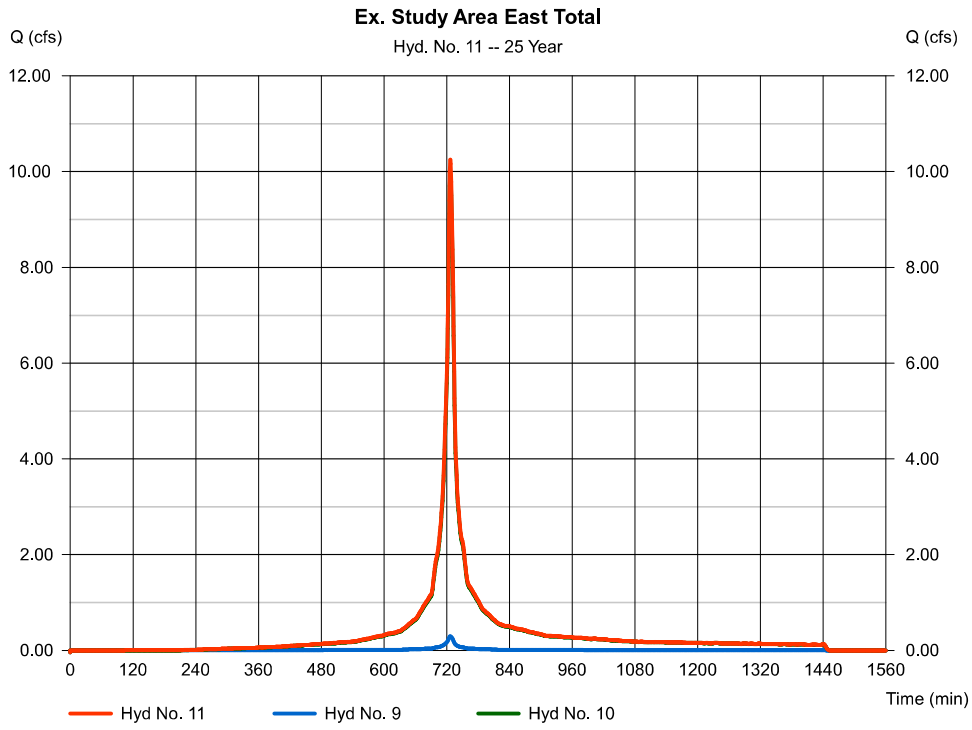


Hydrograph Report

Hyd. No. 11

Ex. Study Area East Total

Hydrograph type	= Combine	Peak discharge	= 10.25 cfs
Storm frequency	= 25 yrs	Time to peak	= 727 min
Time interval	= 1 min	Hyd. volume	= 33,091 cuft
Inflow hyds.	= 9, 10	Contrib. drain. area	= 1.890 ac

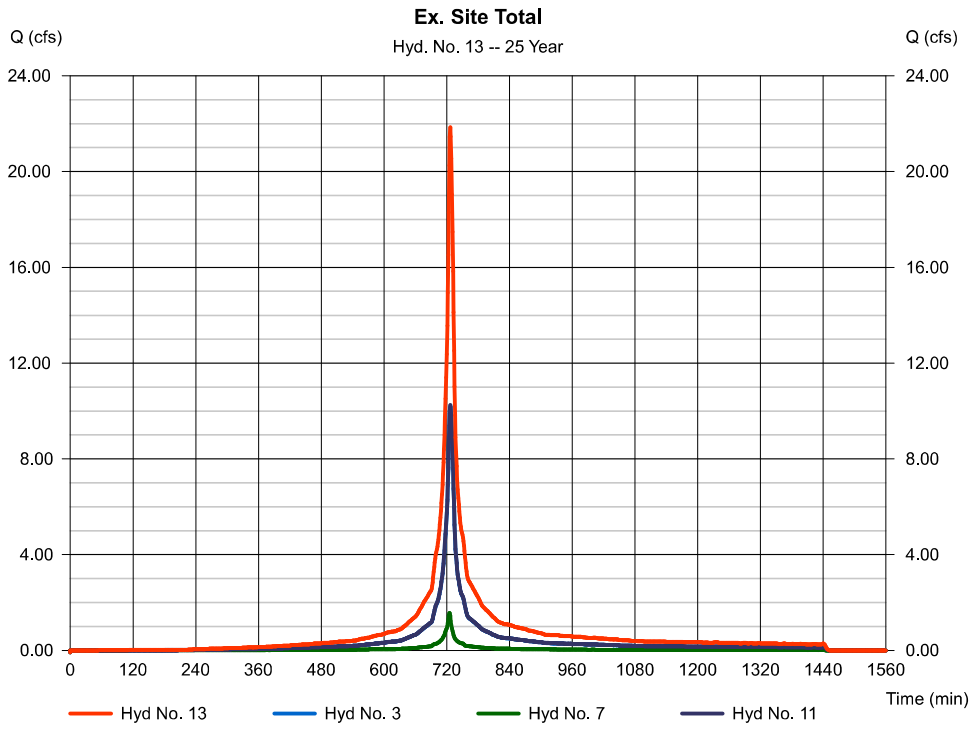


Hydrograph Report

Hyd. No. 13

Ex. Site Total

Hydrograph type	= Combine	Peak discharge	= 21.85 cfs
Storm frequency	= 25 yrs	Time to peak	= 727 min
Time interval	= 1 min	Hyd. volume	= 70,723 cuft
Inflow hyds.	= 3, 7, 11	Contrib. drain. area	= 0.000 ac

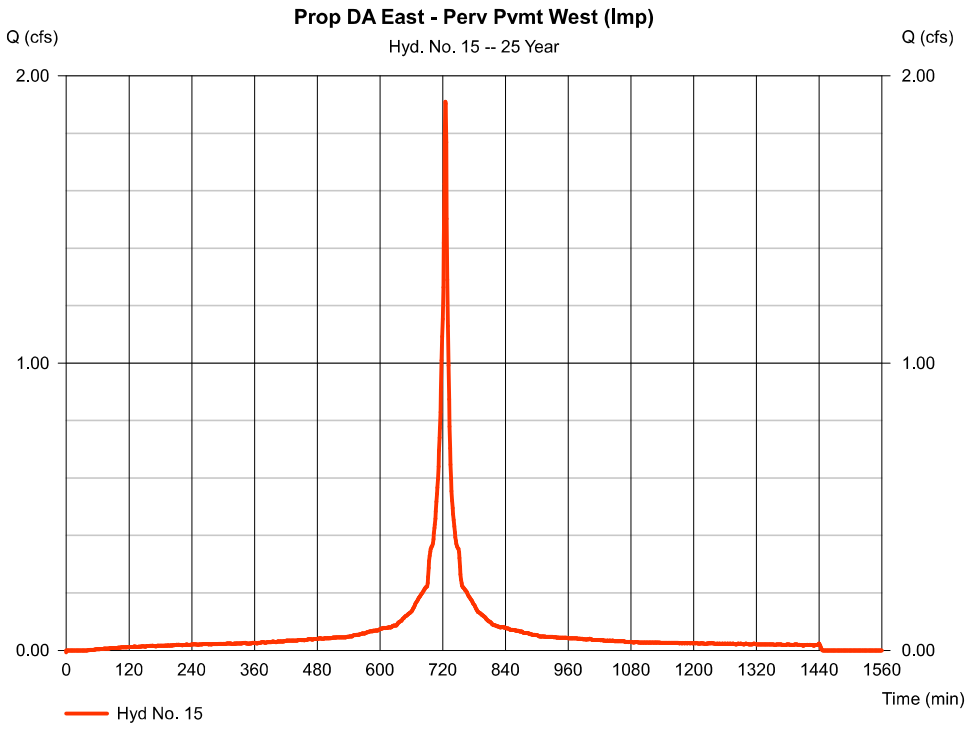


Hydrograph Report

Hyd. No. 15

Prop DA East - Perv Pvmt West (Imp)

Hydrograph type	= SCS Runoff	Peak discharge	= 1.910 cfs
Storm frequency	= 25 yrs	Time to peak	= 725 min
Time interval	= 1 min	Hyd. volume	= 6,049 cuft
Drainage area	= 0.280 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 4.20 min
Total precip.	= 6.19 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds	Shape factor	= 484

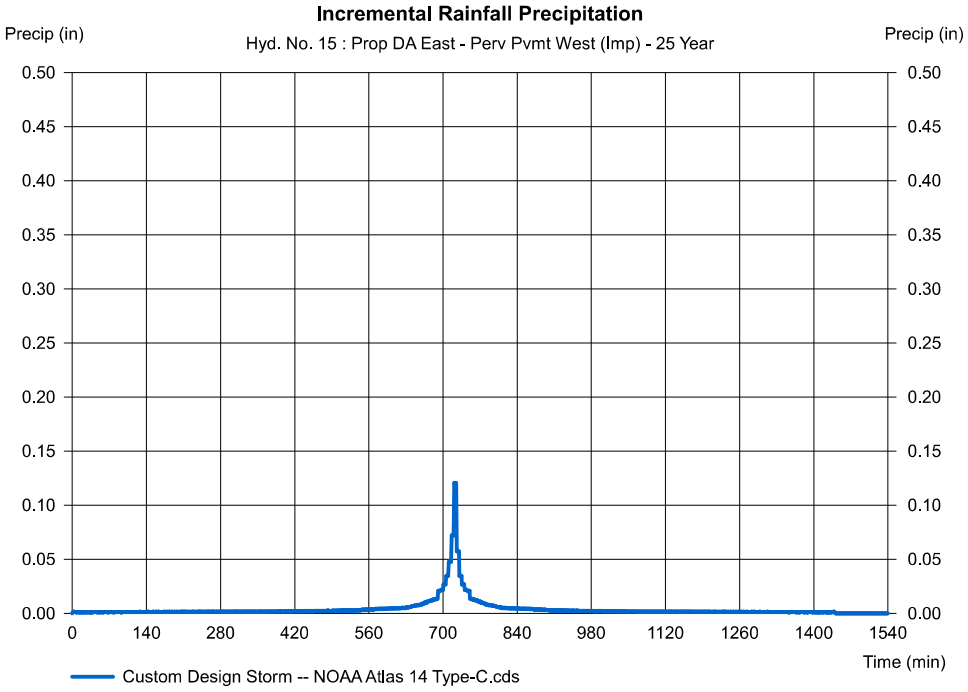


Precipitation Report

Hyd. No. 15

Prop DA East - Perv Pvmt West (Imp)

Storm Frequency	= 25 yrs	Time interval	= 1 min
Total precip.	= 6.1900 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds		

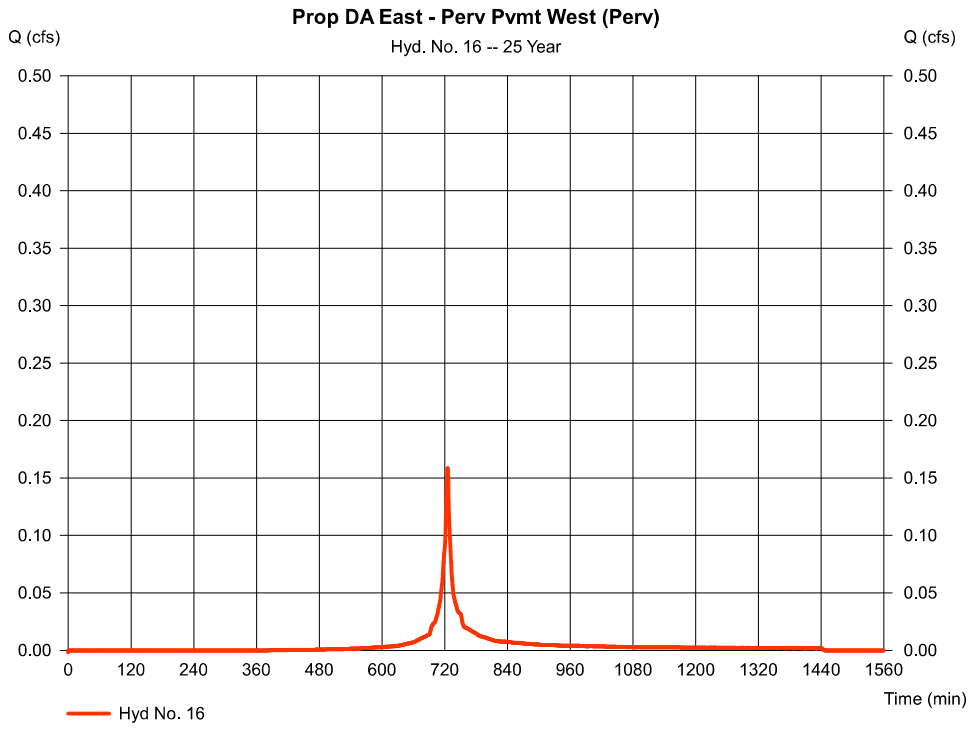


Hydrograph Report

Hyd. No. 16

Prop DA East - Perv Pvmt West (Perv)

Hydrograph type	= SCS Runoff	Peak discharge	= 0.159 cfs
Storm frequency	= 25 yrs	Time to peak	= 726 min
Time interval	= 1 min	Hyd. volume	= 430 cuft
Drainage area	= 0.030 ac	Curve number	= 80
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 4.20 min
Total precip.	= 6.19 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds	Shape factor	= 484

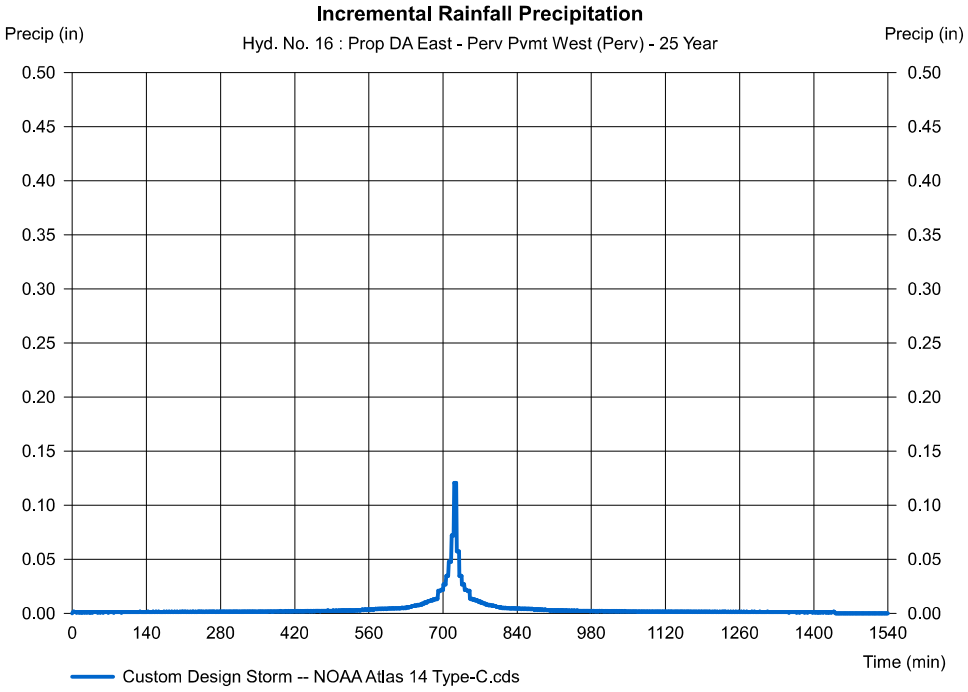


Precipitation Report

Hyd. No. 16

Prop DA East - Perv Pvmt West (Perv)

Storm Frequency	= 25 yrs	Time interval	= 1 min
Total precip.	= 6.1900 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds		

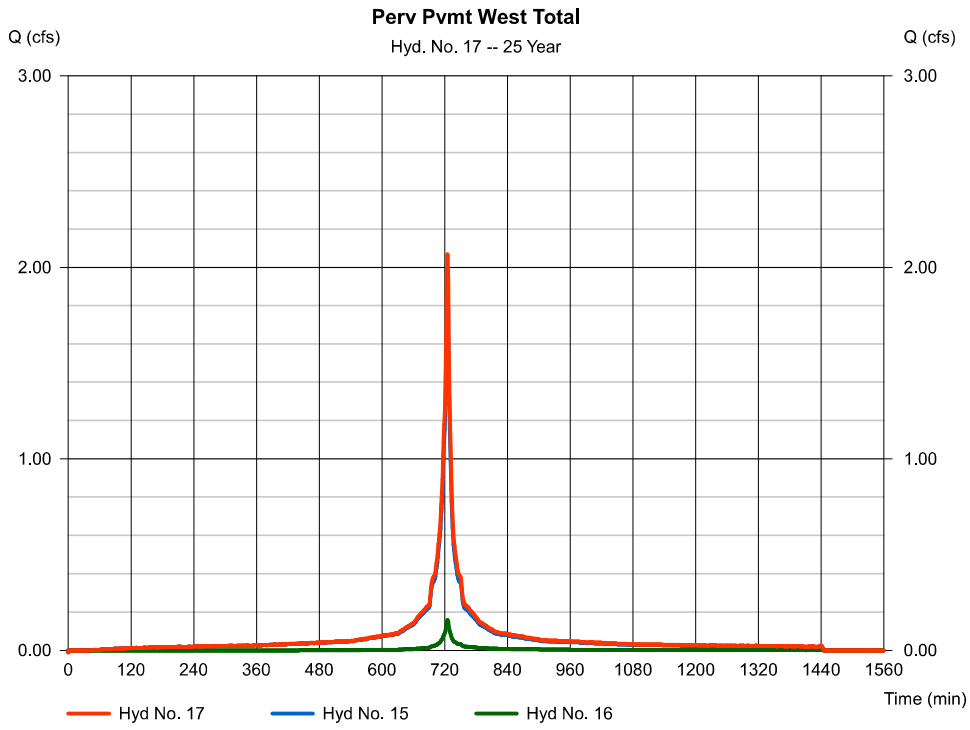


Hydrograph Report

Hyd. No. 17

Perv Pvmt West Total

Hydrograph type	= Combine	Peak discharge	= 2.068 cfs
Storm frequency	= 25 yrs	Time to peak	= 725 min
Time interval	= 1 min	Hyd. volume	= 6,480 cuft
Inflow hyds.	= 15, 16	Contrib. drain. area	= 0.310 ac



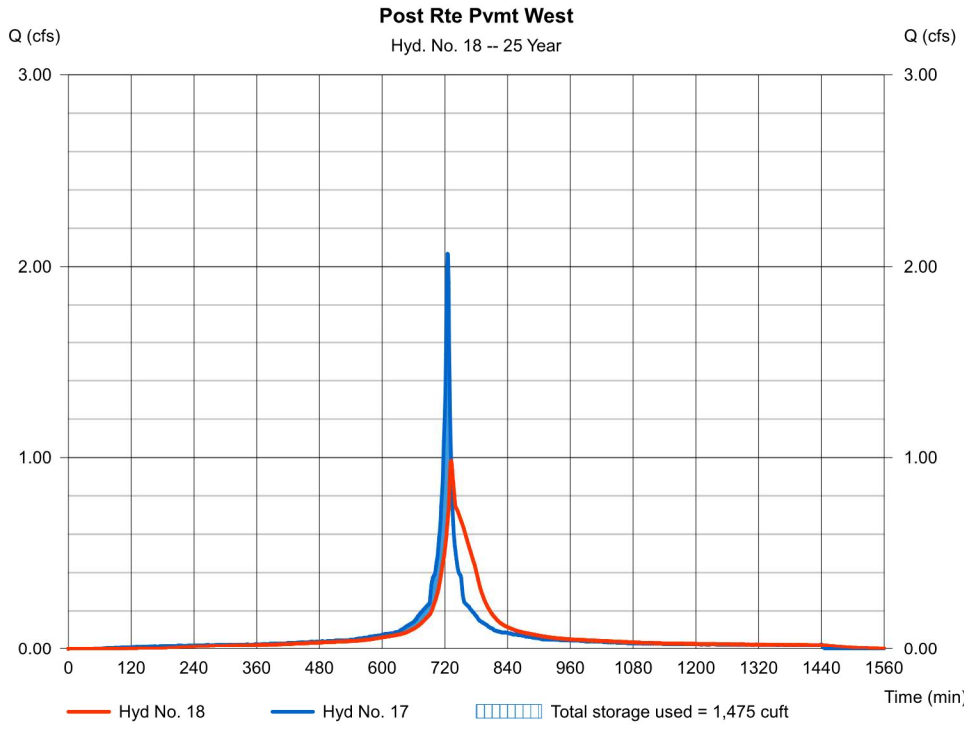
Hydrograph Report

Hyd. No. 18

Post Rte Pvmt West

Hydrograph type	= Reservoir	Peak discharge	= 0.984 cfs
Storm frequency	= 25 yrs	Time to peak	= 732 min
Time interval	= 1 min	Hyd. volume	= 6,466 cuft
Inflow hyd. No.	= 17 - Perv Pvmt West Total	Max. Elevation	= 64.82 ft
Reservoir name	= Porous Pavement West	Max. Storage	= 1,475 cuft

Storage Indication method used.

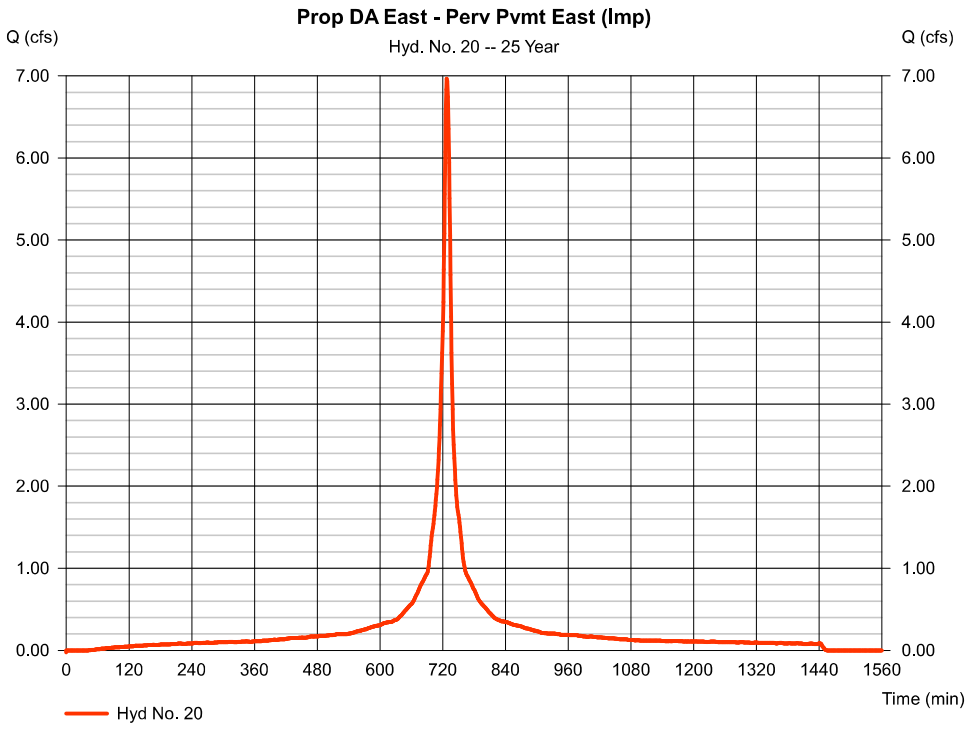


Hydrograph Report

Hyd. No. 20

Prop DA East - Perv Pvmt East (Imp)

Hydrograph type	= SCS Runoff	Peak discharge	= 6.965 cfs
Storm frequency	= 25 yrs	Time to peak	= 728 min
Time interval	= 1 min	Hyd. volume	= 26,358 cuft
Drainage area	= 1.220 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 9.20 min
Total precip.	= 6.19 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds	Shape factor	= 484

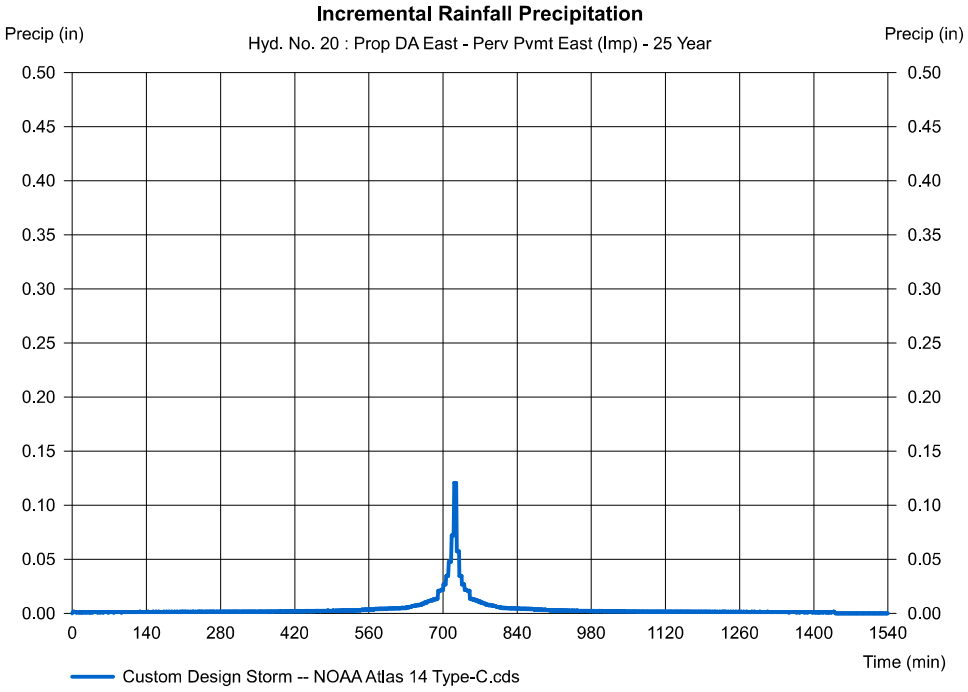


Precipitation Report

Hyd. No. 20

Prop DA East - Perv Pvmt East (Imp)

Storm Frequency	= 25 yrs	Time interval	= 1 min
Total precip.	= 6.1900 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds		

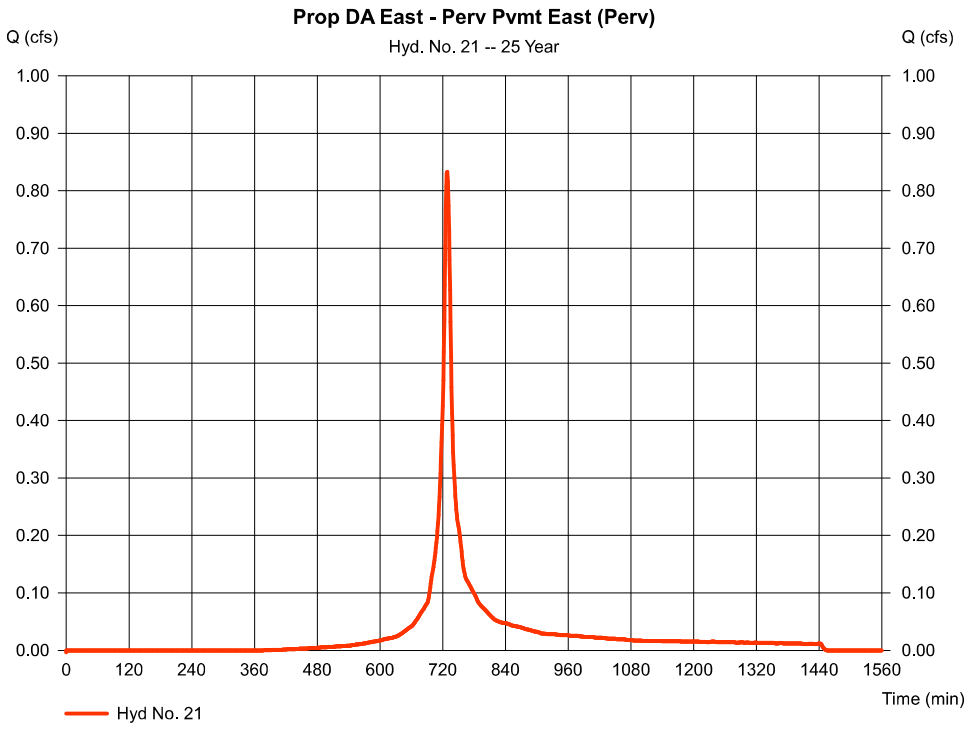


Hydrograph Report

Hyd. No. 21

Prop DA East - Perv Pvmt East (Perv)

Hydrograph type	= SCS Runoff	Peak discharge	= 0.833 cfs
Storm frequency	= 25 yrs	Time to peak	= 729 min
Time interval	= 1 min	Hyd. volume	= 2,726 cuft
Drainage area	= 0.190 ac	Curve number	= 80
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 9.20 min
Total precip.	= 6.19 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds	Shape factor	= 484

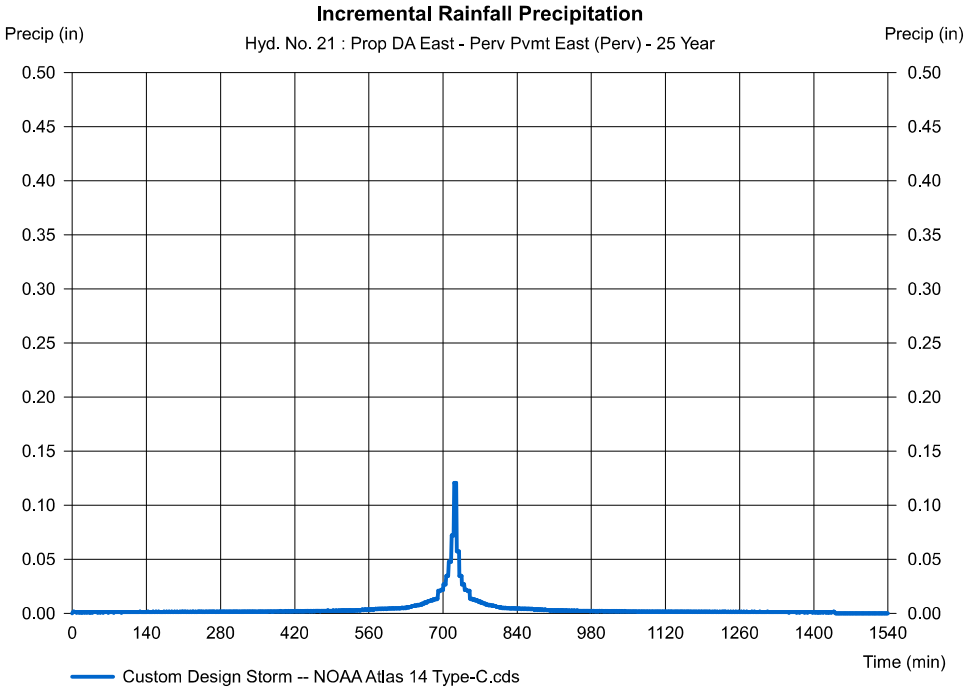


Precipitation Report

Hyd. No. 21

Prop DA East - Perv Pvmt East (Perv)

Storm Frequency	= 25 yrs	Time interval	= 1 min
Total precip.	= 6.1900 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds		

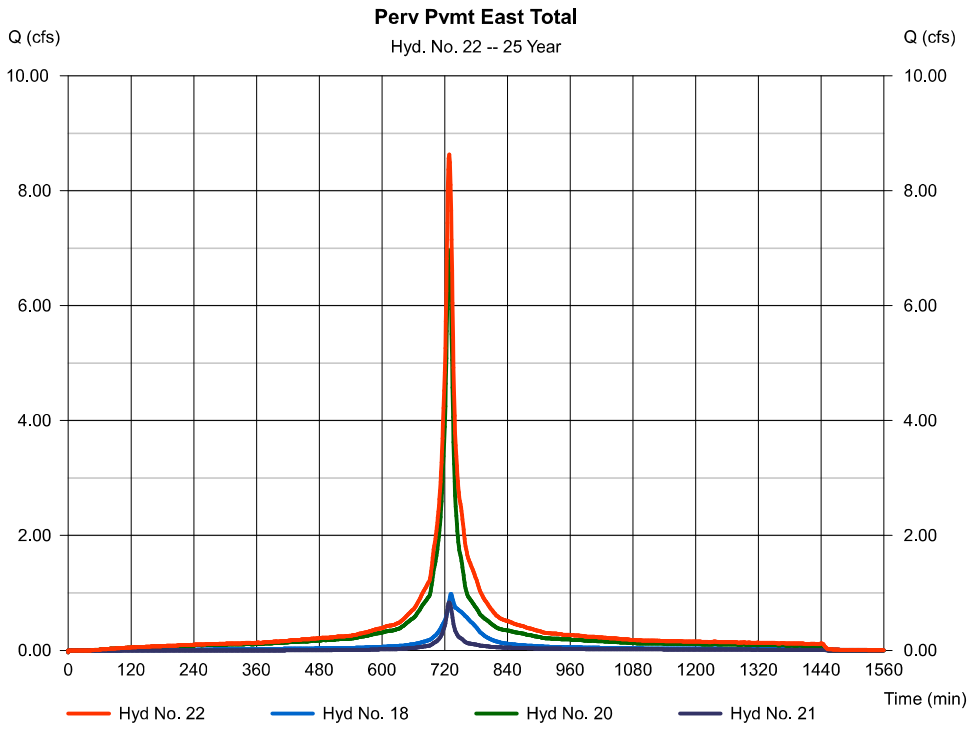


Hydrograph Report

Hyd. No. 22

Perv Pvmt East Total

Hydrograph type	= Combine	Peak discharge	= 8.629 cfs
Storm frequency	= 25 yrs	Time to peak	= 729 min
Time interval	= 1 min	Hyd. volume	= 35,550 cuft
Inflow hyds.	= 18, 20, 21	Contrib. drain. area	= 1.410 ac



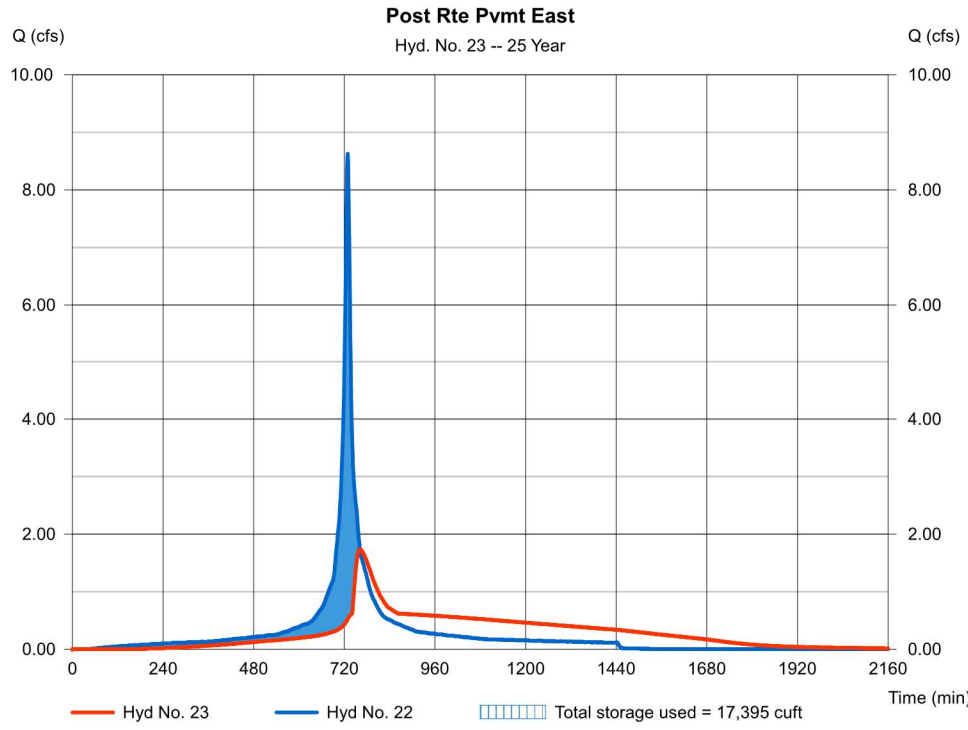
Hydrograph Report

Hyd. No. 23

Post Rte Pvmt East

Hydrograph type	= Reservoir	Peak discharge	= 1.735 cfs
Storm frequency	= 25 yrs	Time to peak	= 761 min
Time interval	= 1 min	Hyd. volume	= 35,292 cuft
Inflow hyd. No.	= 22 - Perv Pvmt East Total	Max. Elevation	= 62.73 ft
Reservoir name	= Porous Pavement East	Max. Storage	= 17,395 cuft

Storage Indication method used.

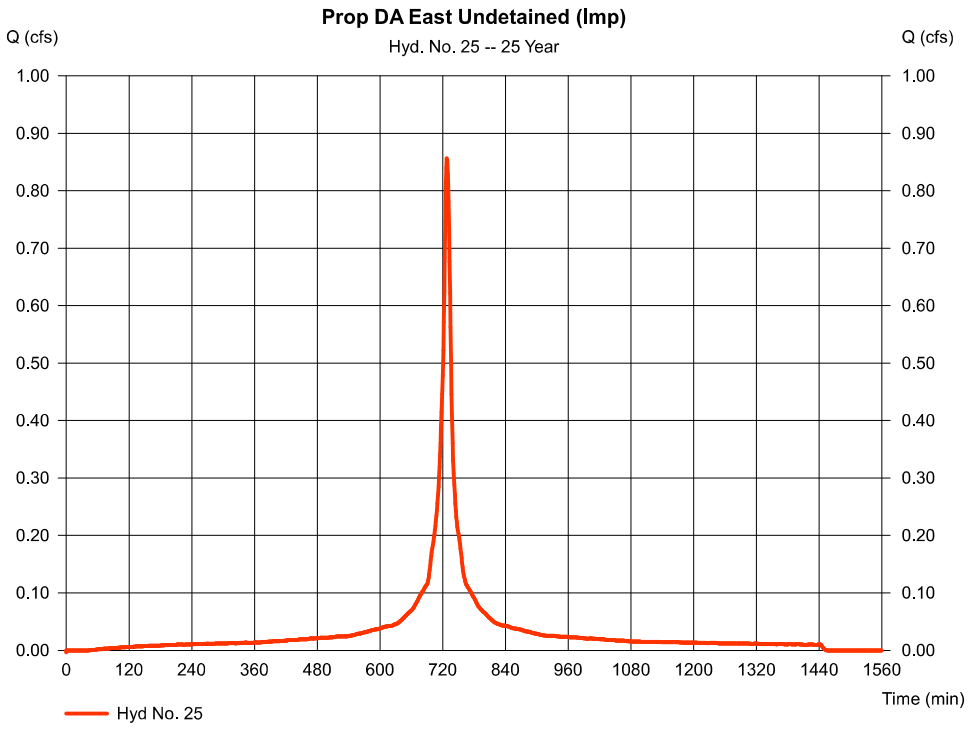


Hydrograph Report

Hyd. No. 25

Prop DA East Undetained (Imp)

Hydrograph type	= SCS Runoff	Peak discharge	= 0.856 cfs
Storm frequency	= 25 yrs	Time to peak	= 728 min
Time interval	= 1 min	Hyd. volume	= 3,241 cuft
Drainage area	= 0.150 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 9.60 min
Total precip.	= 6.19 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds	Shape factor	= 484

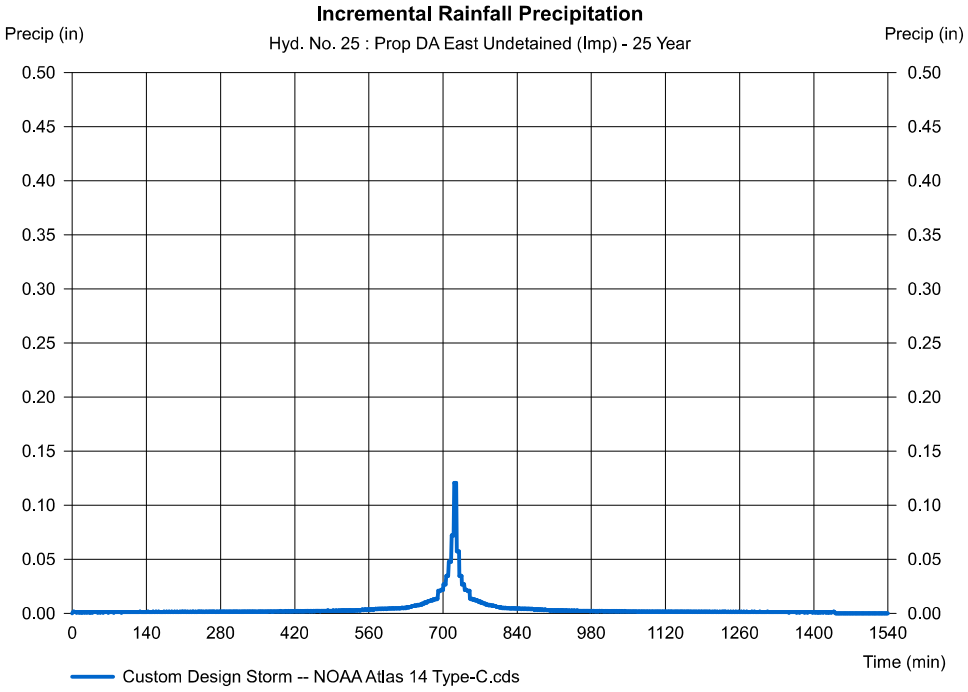


Precipitation Report

Hyd. No. 25

Prop DA East Undetained (Imp)

Storm Frequency	= 25 yrs	Time interval	= 1 min
Total precip.	= 6.1900 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds		

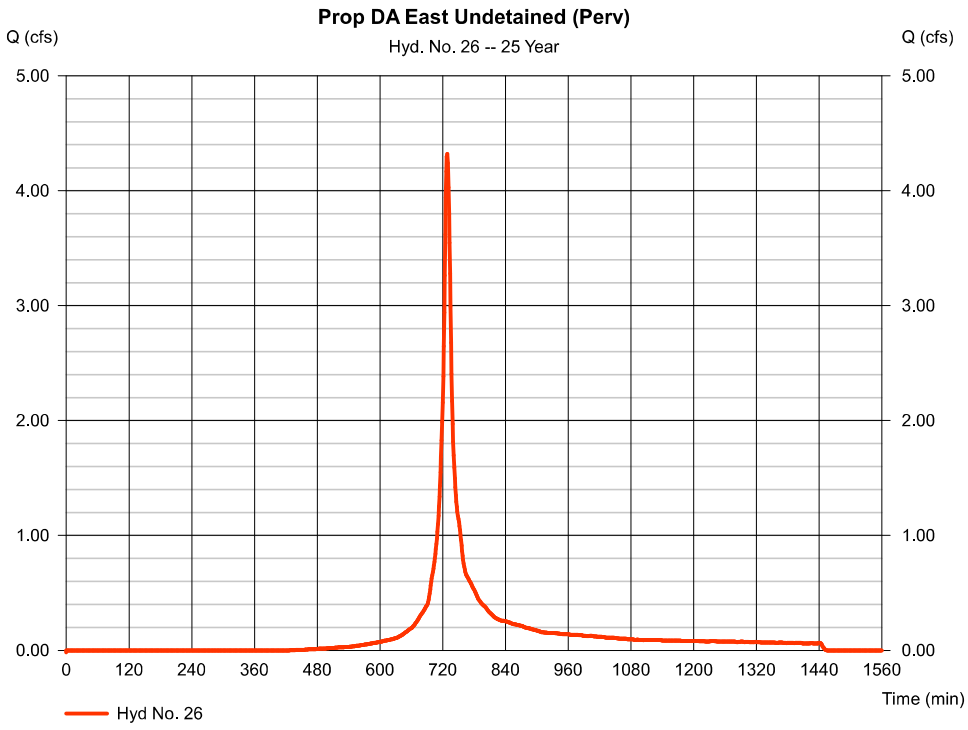


Hydrograph Report

Hyd. No. 26

Prop DA East Undetained (Perv)

Hydrograph type	= SCS Runoff	Peak discharge	= 4.320 cfs
Storm frequency	= 25 yrs	Time to peak	= 729 min
Time interval	= 1 min	Hyd. volume	= 14,027 cuft
Drainage area	= 1.060 ac	Curve number	= 77
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 9.60 min
Total precip.	= 6.19 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds	Shape factor	= 484

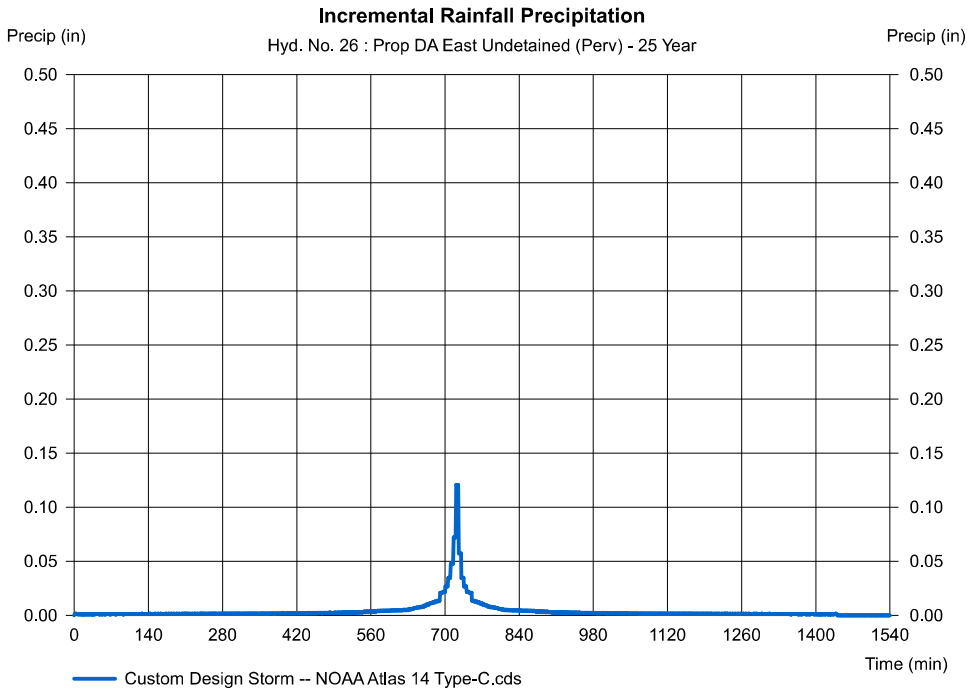


Precipitation Report

Hyd. No. 26

Prop DA East Undetained (Perv)

Storm Frequency	= 25 yrs	Time interval	= 1 min
Total precip.	= 6.1900 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds		

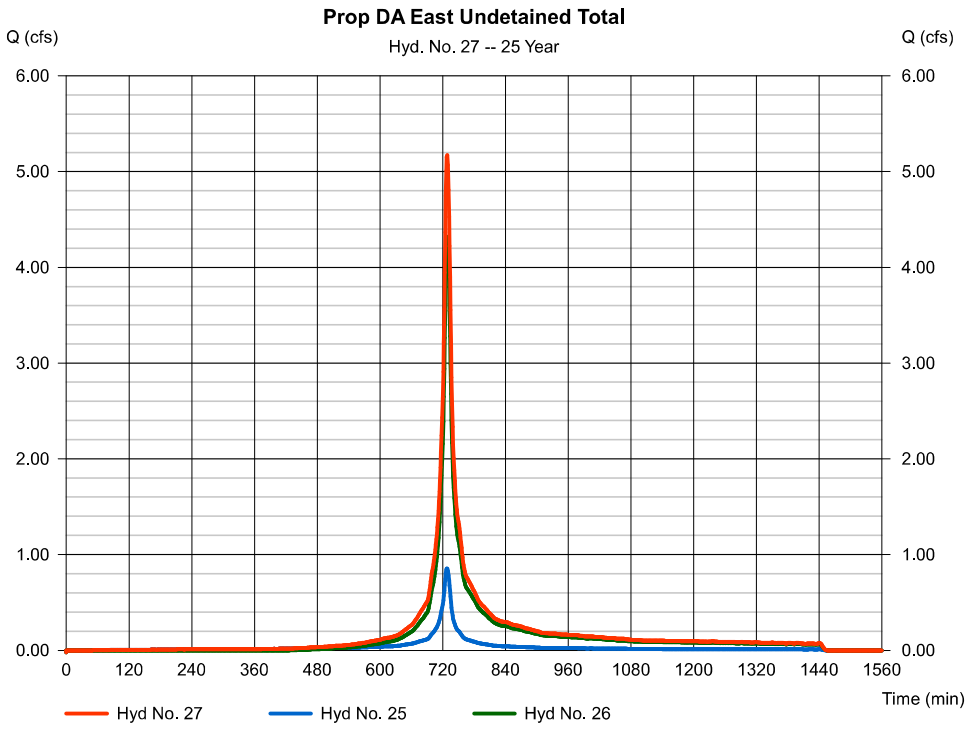


Hydrograph Report

Hyd. No. 27

Prop DA East Undetained Total

Hydrograph type	= Combine	Peak discharge	= 5.172 cfs
Storm frequency	= 25 yrs	Time to peak	= 729 min
Time interval	= 1 min	Hyd. volume	= 17,268 cuft
Inflow hyds.	= 25, 26	Contrib. drain. area	= 1.210 ac

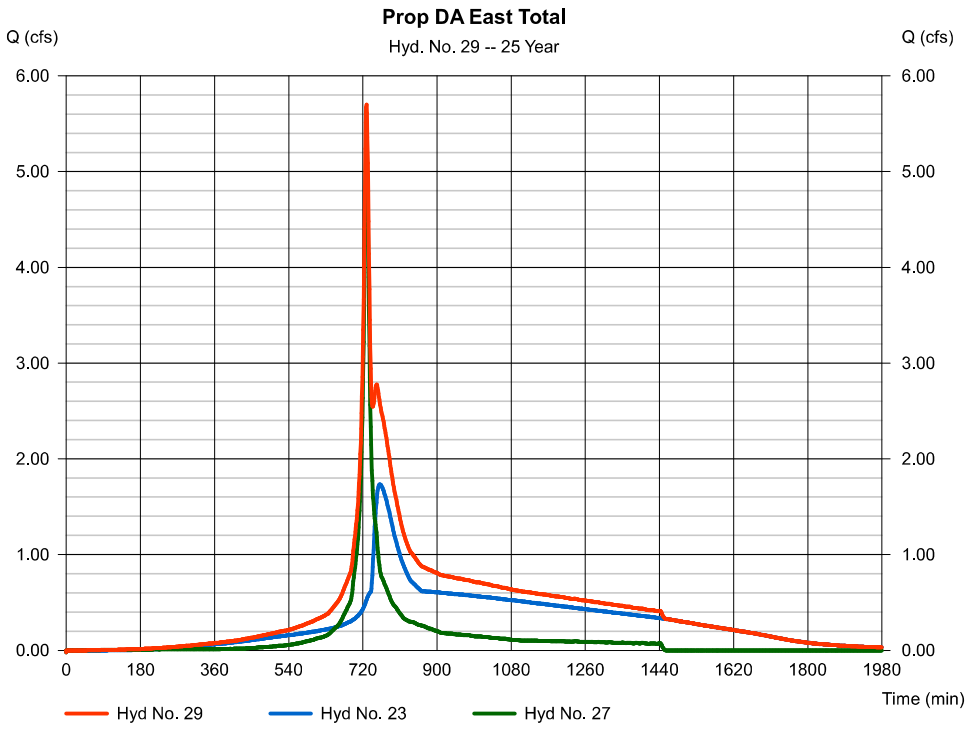


Hydrograph Report

Hyd. No. 29

Prop DA East Total

Hydrograph type	= Combine	Peak discharge	= 5.700 cfs
Storm frequency	= 25 yrs	Time to peak	= 729 min
Time interval	= 1 min	Hyd. volume	= 52,560 cuft
Inflow hyds.	= 23, 27	Contrib. drain. area	= 0.000 ac

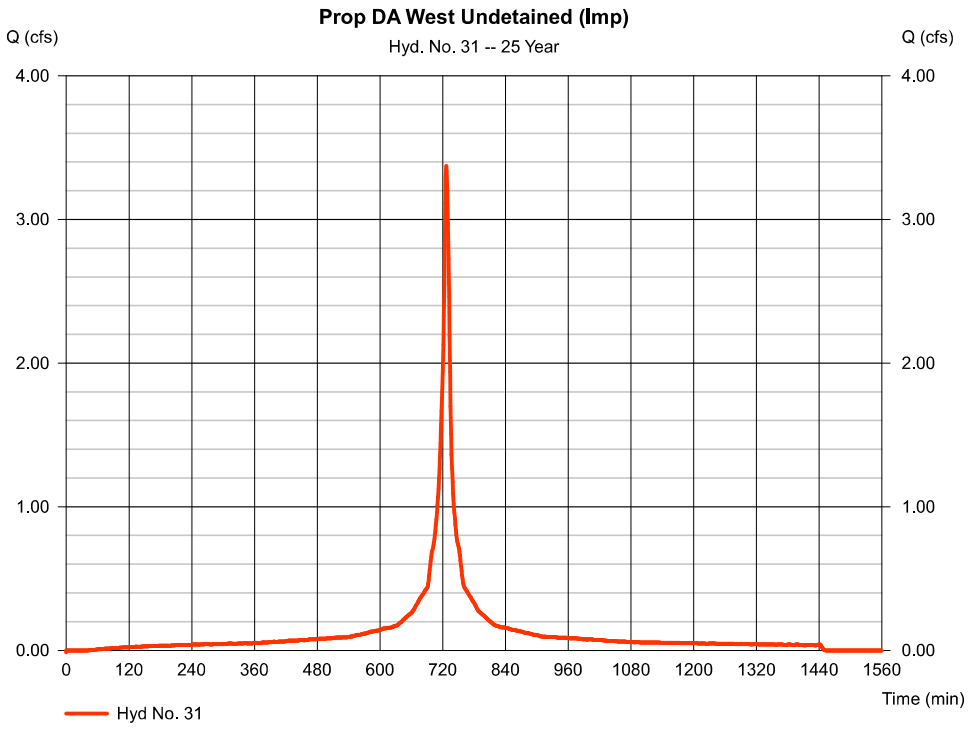


Hydrograph Report

Hyd. No. 31

Prop DA West Undetained (Imp)

Hydrograph type	= SCS Runoff	Peak discharge	= 3.372 cfs
Storm frequency	= 25 yrs	Time to peak	= 727 min
Time interval	= 1 min	Hyd. volume	= 12,007 cuft
Drainage area	= 0.570 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 7.30 min
Total precip.	= 6.19 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds	Shape factor	= 484

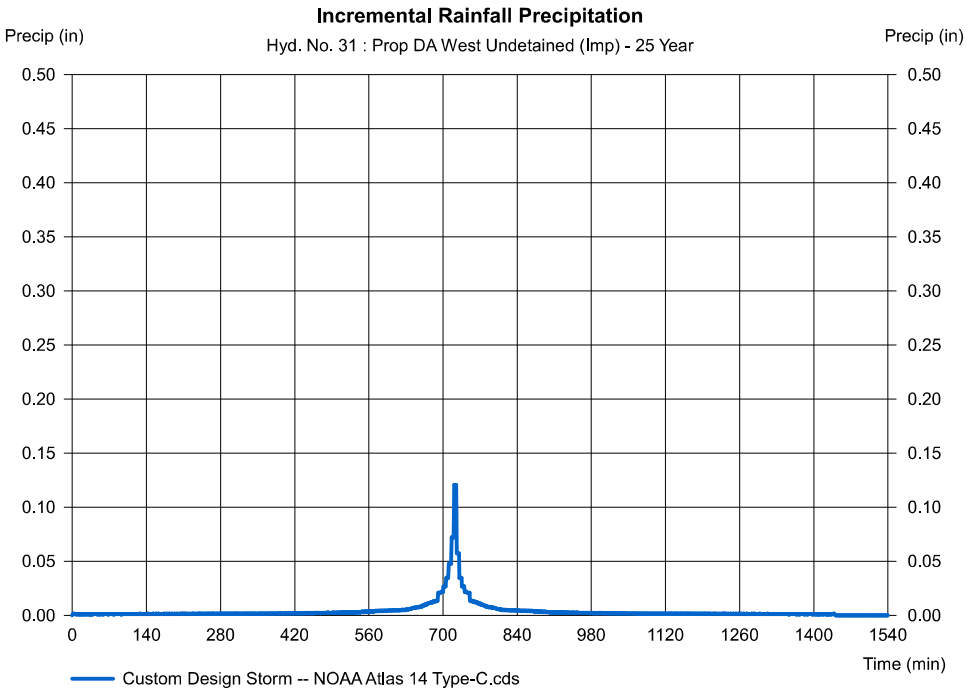


Precipitation Report

Hyd. No. 31

Prop DA West Undetained (Imp)

Storm Frequency	= 25 yrs	Time interval	= 1 min
Total precip.	= 6.1900 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds		

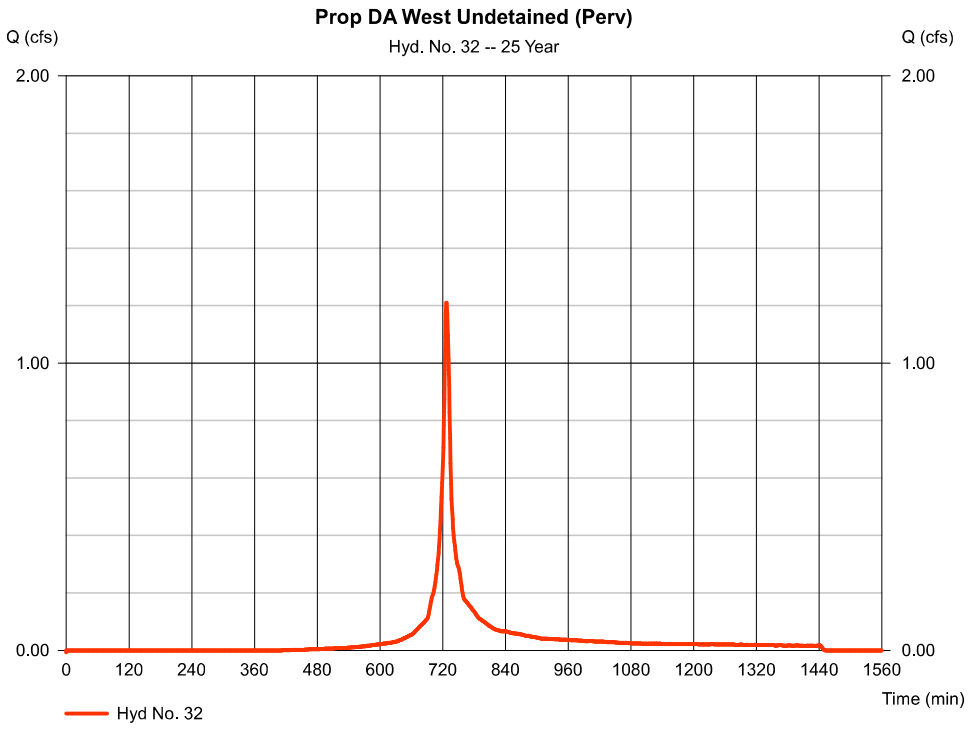


Hydrograph Report

Hyd. No. 32

Prop DA West Undetained (Perv)

Hydrograph type	= SCS Runoff	Peak discharge	= 1.211 cfs
Storm frequency	= 25 yrs	Time to peak	= 727 min
Time interval	= 1 min	Hyd. volume	= 3,713 cuft
Drainage area	= 0.280 ac	Curve number	= 78
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 7.30 min
Total precip.	= 6.19 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds	Shape factor	= 484

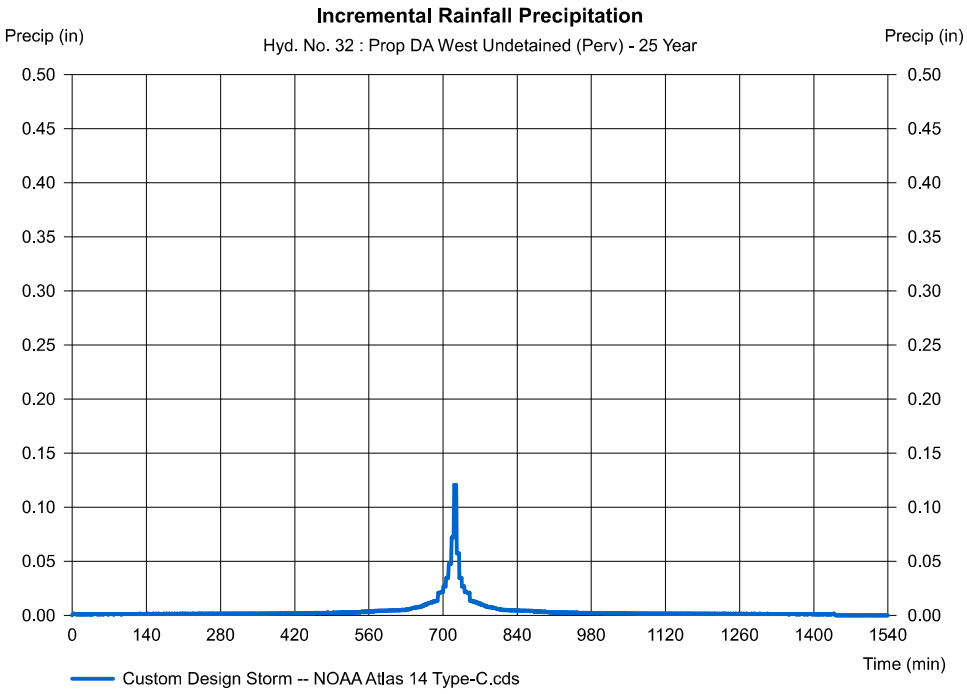


Precipitation Report

Hyd. No. 32

Prop DA West Undetained (Perv)

Storm Frequency	= 25 yrs	Time interval	= 1 min
Total precip.	= 6.1900 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds		

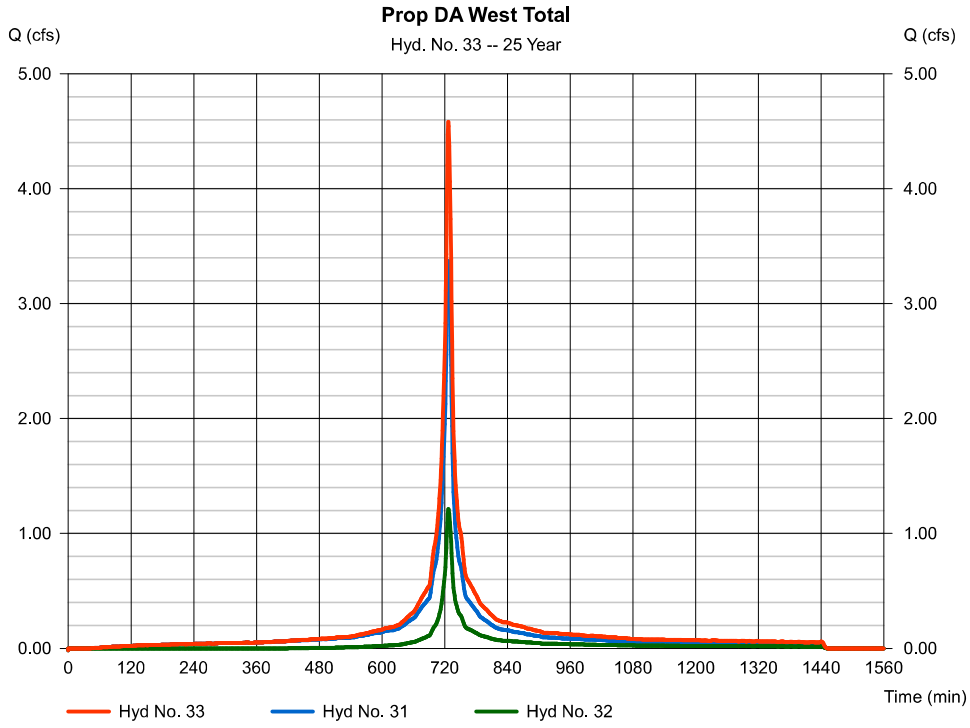


Hydrograph Report

Hyd. No. 33

Prop DA West Total

Hydrograph type	= Combine	Peak discharge	= 4.584 cfs
Storm frequency	= 25 yrs	Time to peak	= 727 min
Time interval	= 1 min	Hyd. volume	= 15,720 cuft
Inflow hyds.	= 31, 32	Contrib. drain. area	= 0.850 ac

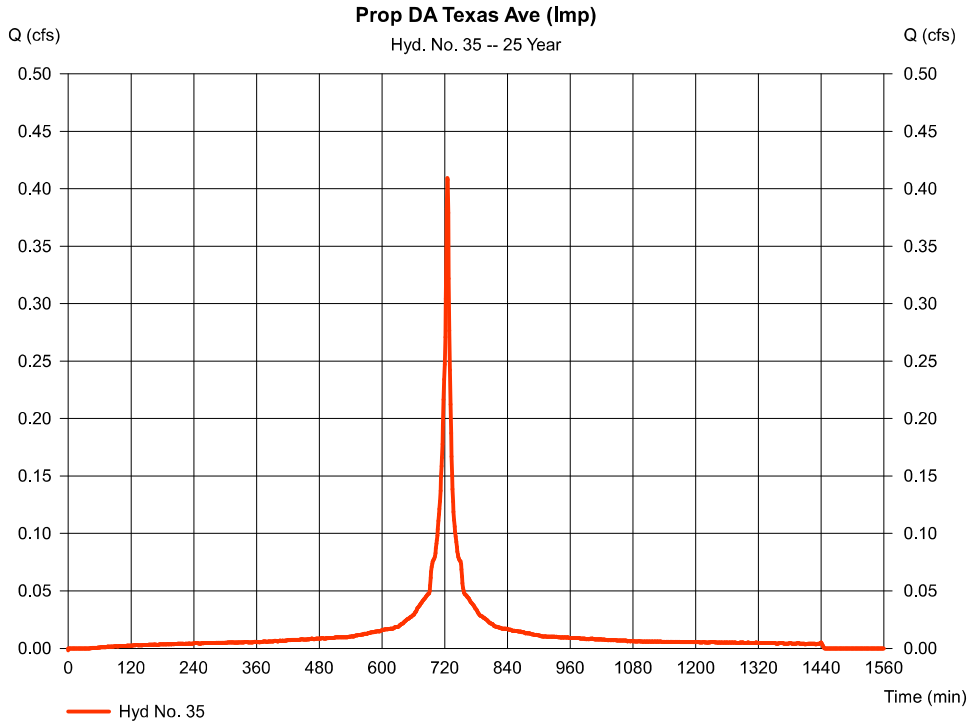


Hydrograph Report

Hyd. No. 35

Prop DA Texas Ave (Imp)

Hydrograph type	= SCS Runoff	Peak discharge	= 0.409 cfs
Storm frequency	= 25 yrs	Time to peak	= 725 min
Time interval	= 1 min	Hyd. volume	= 1,296 cuft
Drainage area	= 0.060 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 4.80 min
Total precip.	= 6.19 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds	Shape factor	= 484

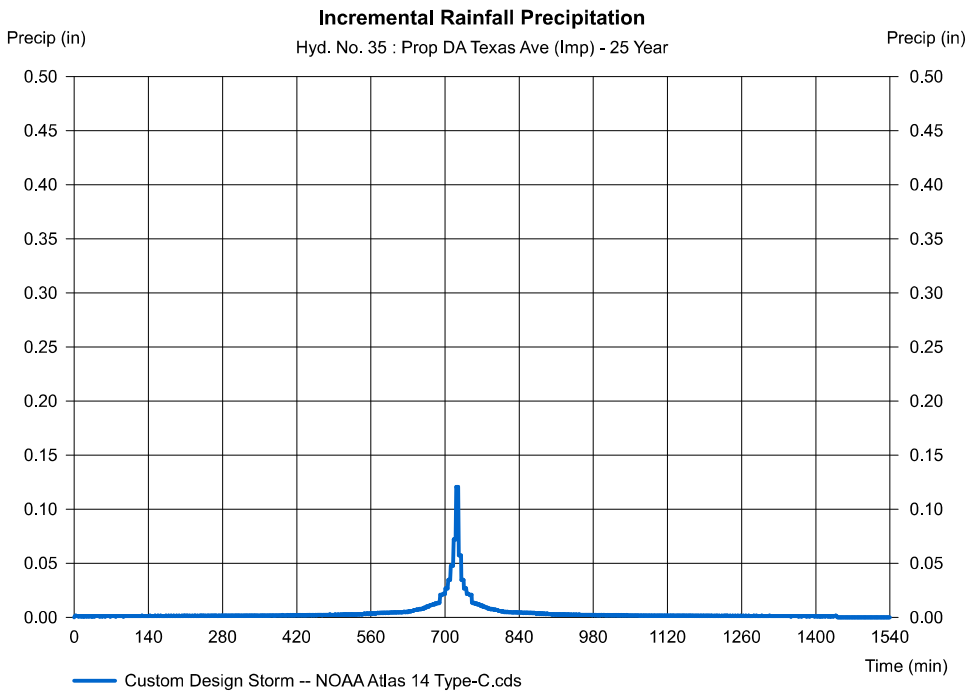


Precipitation Report

Hyd. No. 35

Prop DA Texas Ave (Imp)

Storm Frequency	= 25 yrs	Time interval	= 1 min
Total precip.	= 6.1900 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds		

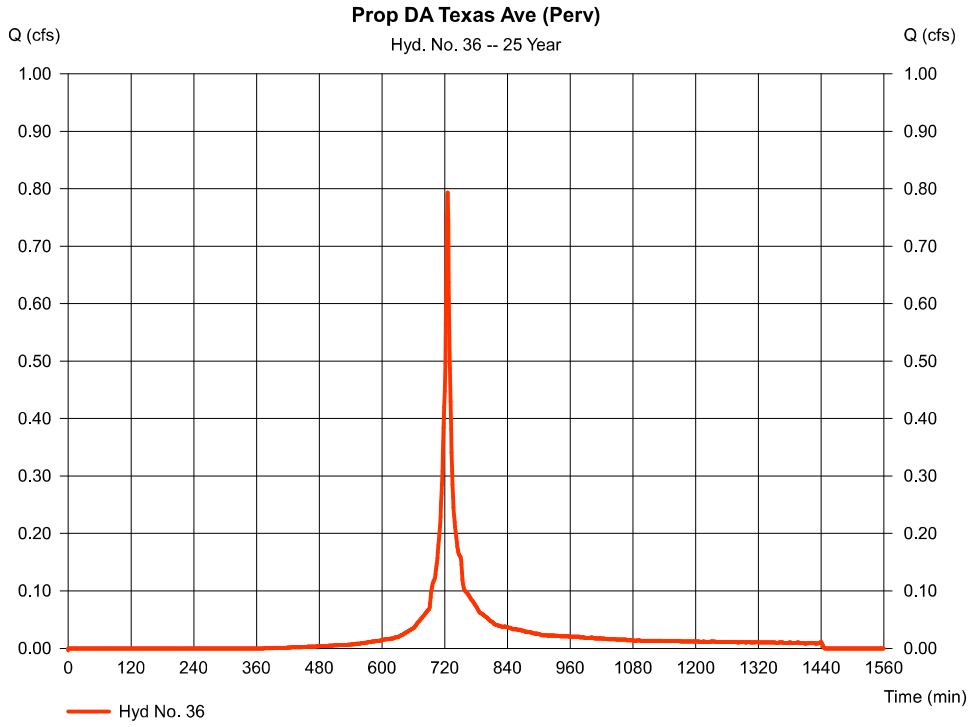


Hydrograph Report

Hyd. No. 36

Prop DA Texas Ave (Perv)

Hydrograph type	= SCS Runoff	Peak discharge	= 0.793 cfs
Storm frequency	= 25 yrs	Time to peak	= 726 min
Time interval	= 1 min	Hyd. volume	= 2,152 cuft
Drainage area	= 0.150 ac	Curve number	= 80
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 4.80 min
Total precip.	= 6.19 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds	Shape factor	= 484

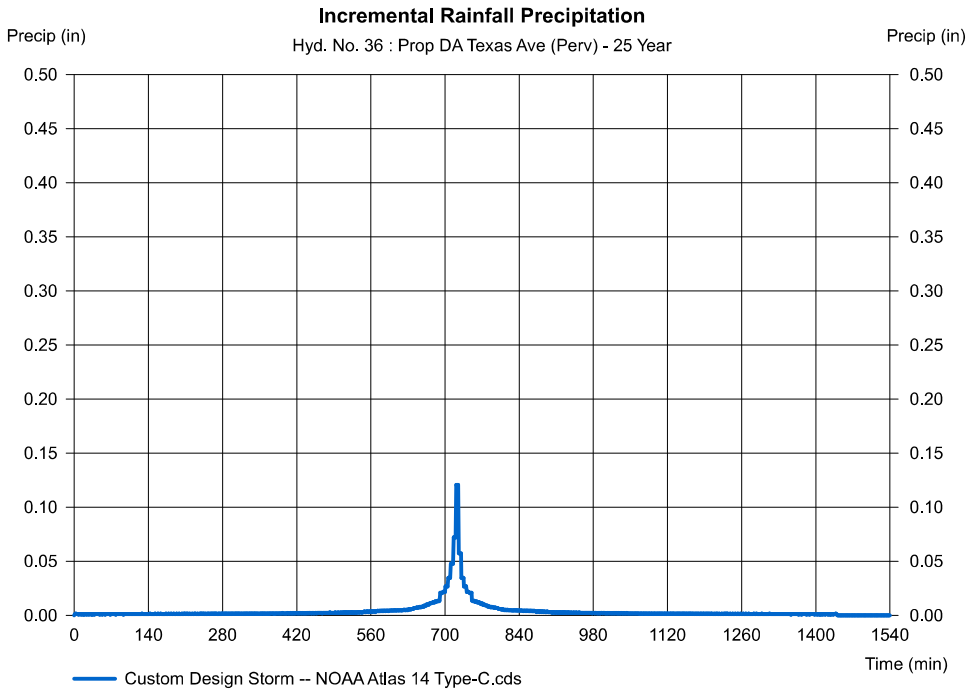


Precipitation Report

Hyd. No. 36

Prop DA Texas Ave (Perv)

Storm Frequency	= 25 yrs	Time interval	= 1 min
Total precip.	= 6.1900 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds		

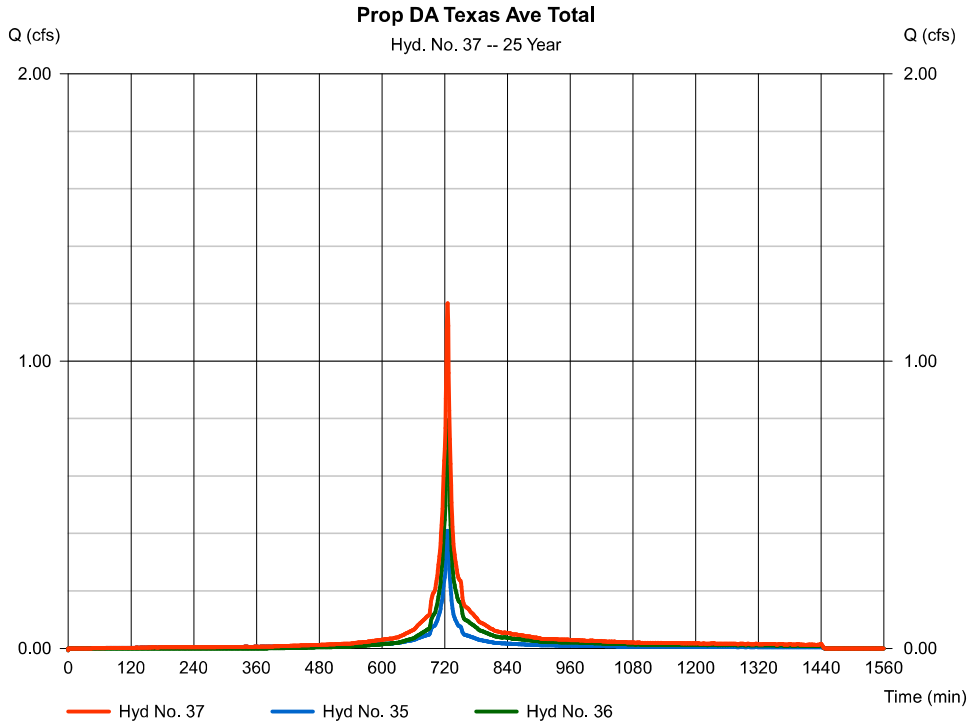


Hydrograph Report

Hyd. No. 37

Prop DA Texas Ave Total

Hydrograph type	= Combine	Peak discharge	= 1.201 cfs
Storm frequency	= 25 yrs	Time to peak	= 726 min
Time interval	= 1 min	Hyd. volume	= 3,449 cuft
Inflow hyds.	= 35, 36	Contrib. drain. area	= 0.210 ac



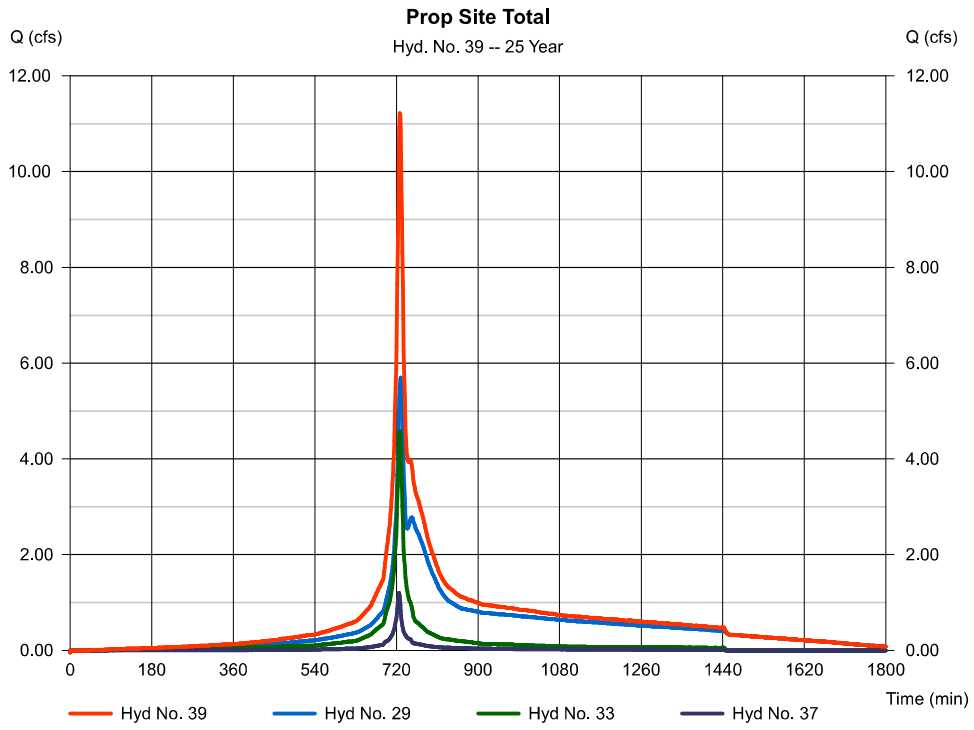
Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.1 — Tuesday, May 21, 2024

Hyd. No. 39

Prop Site Total

Hydrograph type	= Combine	Peak discharge	= 11.22 cfs
Storm frequency	= 25 yrs	Time to peak	= 727 min
Time interval	= 1 min	Hyd. volume	= 71,729 cuft
Inflow hyds.	= 29, 33, 37	Contrib. drain. area	= 0.000 ac



Hydrograph Summary Report

Hydraflow Hydrographs by Intelisolve v9.1

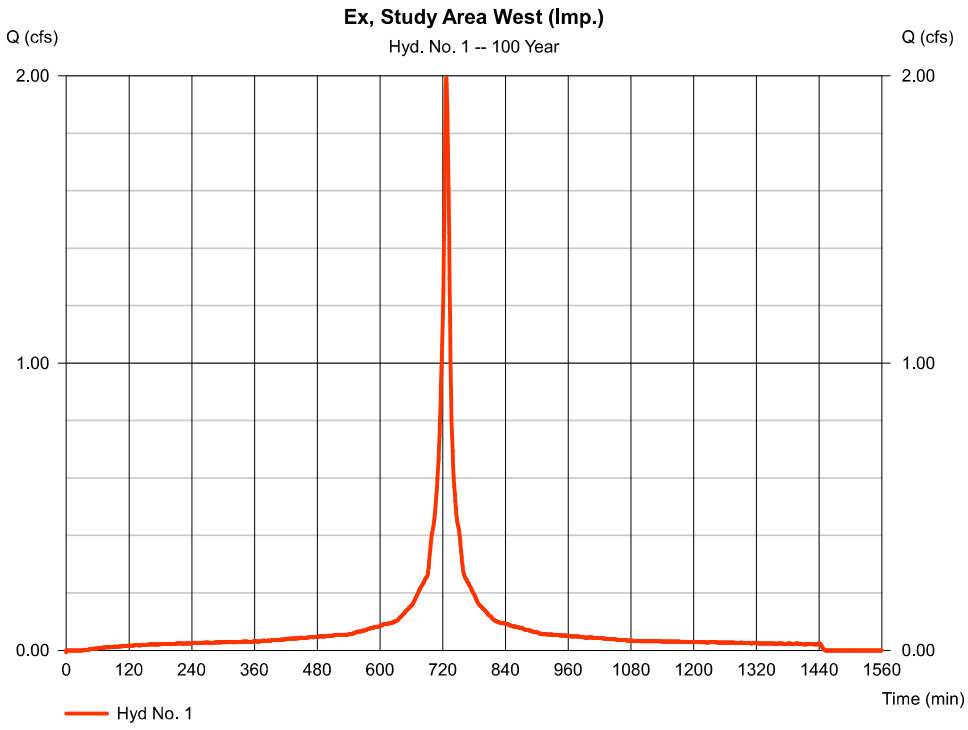
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph description
1	SCS Runoff	1.994	1	727	7,158	----	------	------	Ex, Study Area West (Imp.)
2	SCS Runoff	12.17	1	727	39,754	----	------	------	Ex. Study Area West (Perv.)
3	Combine	14.17	1	727	46,912	1, 2	------	------	Ex. Study Area West Total
5	SCS Runoff	0.828	1	725	2,643	----	------	------	Ex. Study Area Texas Ave (Imp.)
6	SCS Runoff	1.306	1	725	3,817	----	------	------	Ex, Study Area Texas Ave (Perv.)
7	Combine	2.134	1	725	6,460	5, 6	------	------	Ex. Study Area Texas Ave Total
9	SCS Runoff	0.399	1	727	1,432	----	------	------	Ex. Study Area East (Imp.)
10	SCS Runoff	13.88	1	727	45,656	----	------	------	Ex. Study Area East (Perv.)
11	Combine	14.28	1	727	47,087	9, 10	------	------	Ex. Study Area East Total
13	Combine	30.43	1	727	100,460	3, 7, 11,	------	------	Ex. Site Total
15	SCS Runoff	2.575	1	725	8,223	----	------	------	Prop DA East - Perv Pvmt West (Imp)
16	SCS Runoff	0.233	1	726	646	----	------	------	Prop DA East - Perv Pvmt West (Per
17	Combine	2.807	1	725	8,869	15, 16	------	------	Perv Pvmt West Total
18	Reservoir	2.148	1	728	8,856	17	64.98	1,702	Post Rte Pvmt West
20	SCS Runoff	9.389	1	728	35,827	----	------	------	Prop DA East - Perv Pvmt East (Imp)
21	SCS Runoff	1.229	1	729	4,093	----	------	------	Prop DA East - Perv Pvmt East (Perv
22	Combine	12.76	1	728	48,776	18, 20, 21	------	------	Perv Pvmt East Total
23	Reservoir	5.606	1	739	48,504	22	63.14	19,975	Post Rte Pvmt East
25	SCS Runoff	1.154	1	728	4,405	----	------	------	Prop DA East Undetained (Imp)
26	SCS Runoff	6.516	1	729	21,463	----	------	------	Prop DA East Undetained (Perv)
27	Combine	7.666	1	729	25,868	25, 26	------	------	Prop DA East Undetained Total
29	Combine	10.33	1	734	74,372	23, 27,	------	------	Prop DA East Total
31	SCS Runoff	4.546	1	727	16,321	----	------	------	Prop DA West Undetained (Imp)
32	SCS Runoff	1.816	1	727	5,646	----	------	------	Prop DA West Undetained (Perv)
33	Combine	6.362	1	727	21,966	31, 32	------	------	Prop DA West Total
35	SCS Runoff	0.552	1	725	1,762	----	------	------	Prop DA Texas Ave (Imp)
36	SCS Runoff	1.167	1	726	3,232	----	------	------	Prop DA Texas Ave (Perv)
37	Combine	1.717	1	726	4,994	35, 36	------	------	Prop DA Texas Ave Total
39	Combine	16.23	1	729	101,331	29, 33, 37,	------	------	Prop Site Total

Hydrograph Report

Hyd. No. 1

Ex, Study Area West (Imp.)

Hydrograph type	= SCS Runoff	Peak discharge	= 1.994 cfs
Storm frequency	= 100 yrs	Time to peak	= 727 min
Time interval	= 1 min	Hyd. volume	= 7,158 cuft
Drainage area	= 0.250 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 8.30 min
Total precip.	= 8.33 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds	Shape factor	= 484

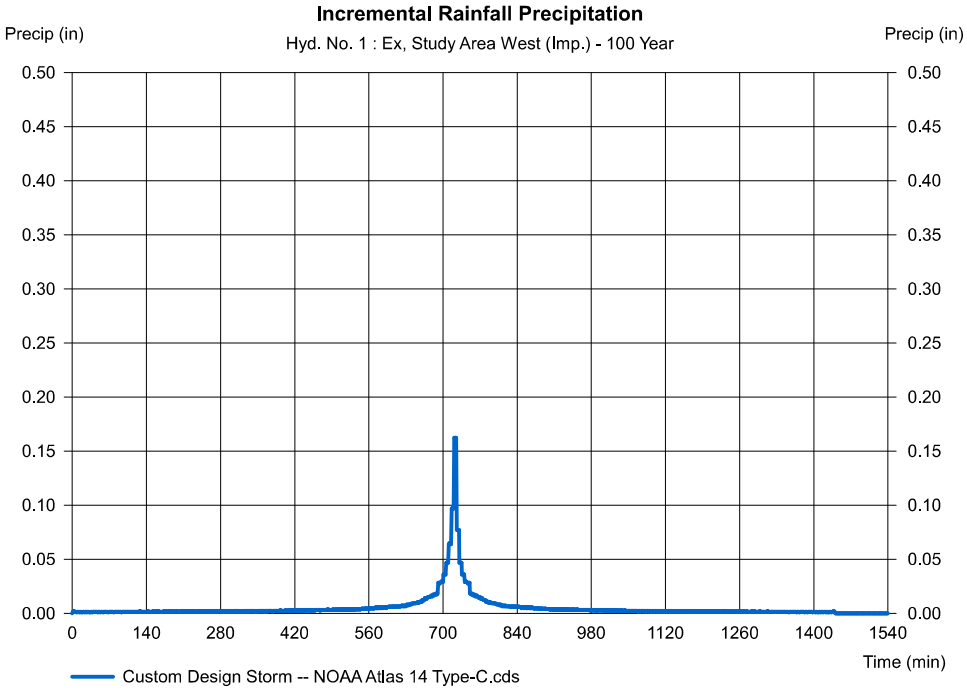


Precipitation Report

Hyd. No. 1

Ex, Study Area West (Imp.)

Storm Frequency	= 100 yrs	Time interval	= 1 min
Total precip.	= 8.3300 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds		

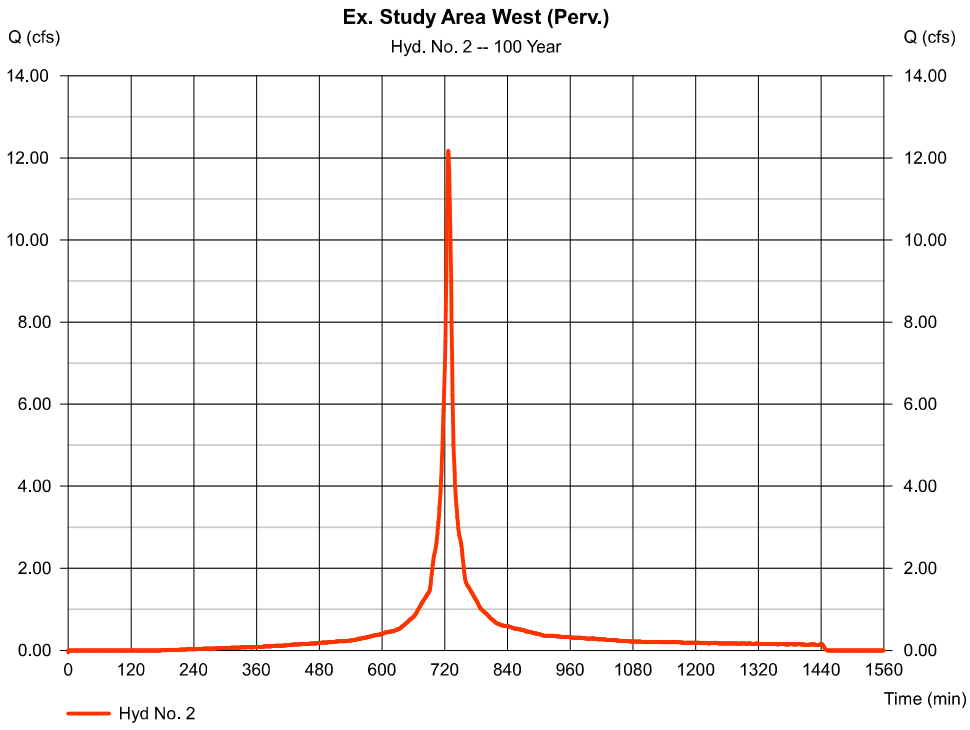


Hydrograph Report

Hyd. No. 2

Ex. Study Area West (Perv.)

Hydrograph type	= SCS Runoff	Peak discharge	= 12.17 cfs
Storm frequency	= 100 yrs	Time to peak	= 727 min
Time interval	= 1 min	Hyd. volume	= 39,754 cuft
Drainage area	= 1.630 ac	Curve number	= 88
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 8.30 min
Total precip.	= 8.33 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds	Shape factor	= 484

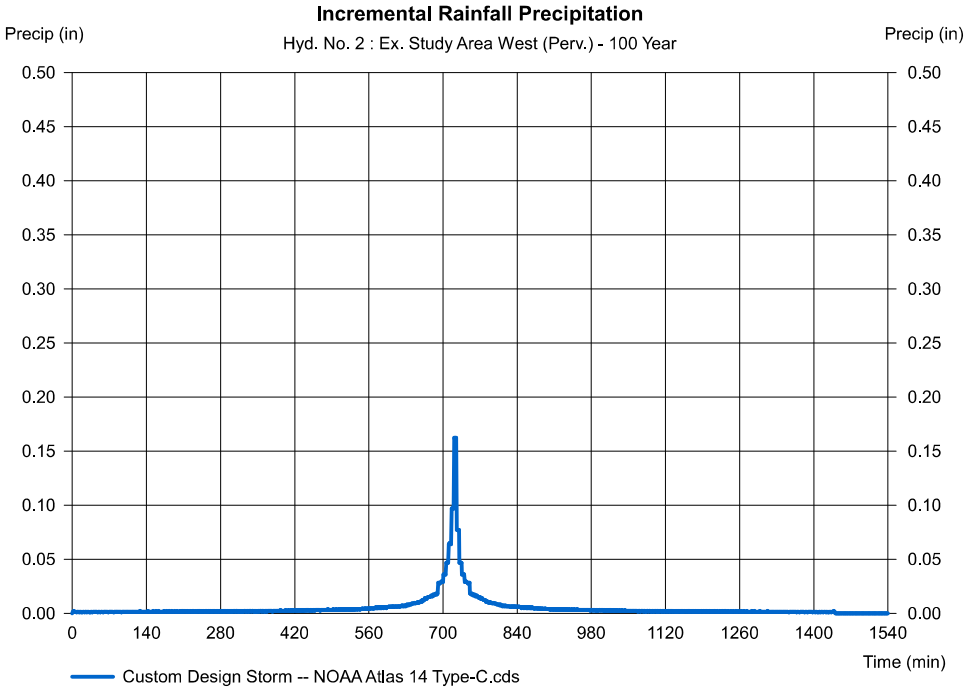


Precipitation Report

Hyd. No. 2

Ex. Study Area West (Perv.)

Storm Frequency	= 100 yrs	Time interval	= 1 min
Total precip.	= 8.3300 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds		

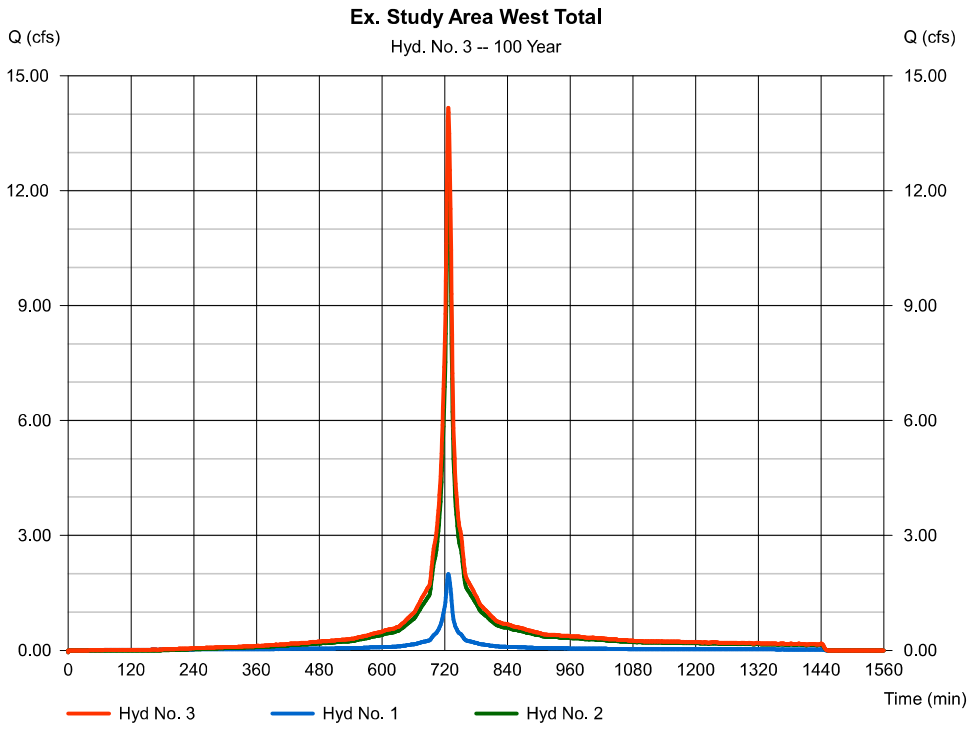


Hydrograph Report

Hyd. No. 3

Ex. Study Area West Total

Hydrograph type	= Combine	Peak discharge	= 14.17 cfs
Storm frequency	= 100 yrs	Time to peak	= 727 min
Time interval	= 1 min	Hyd. volume	= 46,912 cuft
Inflow hyds.	= 1, 2	Contrib. drain. area	= 1.880 ac

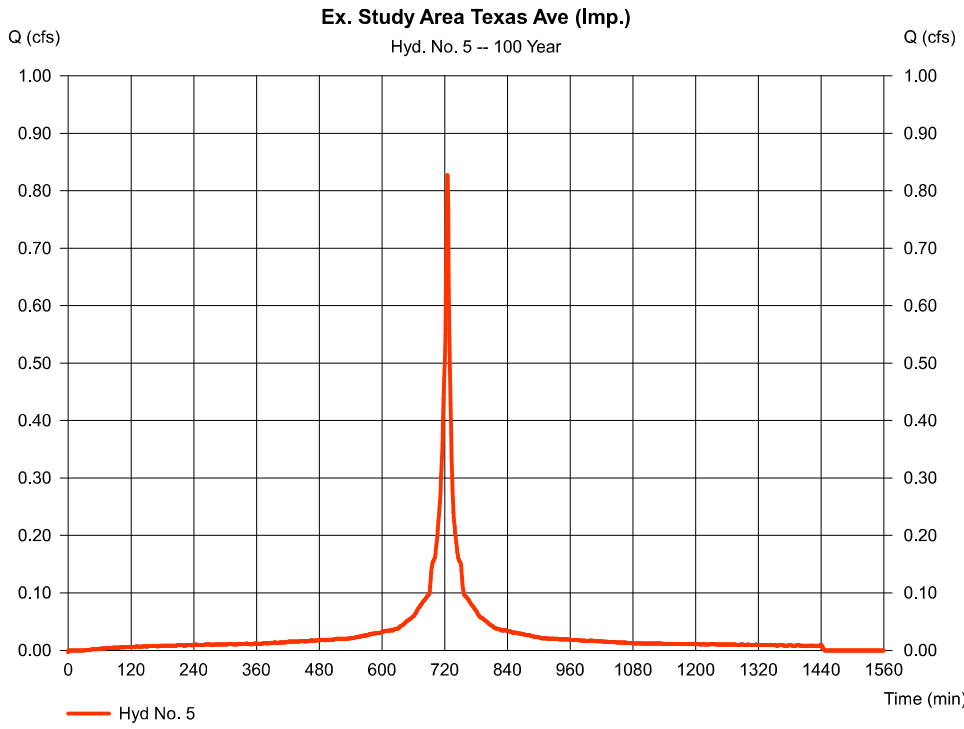


Hydrograph Report

Hyd. No. 5

Ex. Study Area Texas Ave (Imp.)

Hydrograph type	= SCS Runoff	Peak discharge	= 0.828 cfs
Storm frequency	= 100 yrs	Time to peak	= 725 min
Time interval	= 1 min	Hyd. volume	= 2,643 cuft
Drainage area	= 0.090 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 3.90 min
Total precip.	= 8.33 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds	Shape factor	= 484

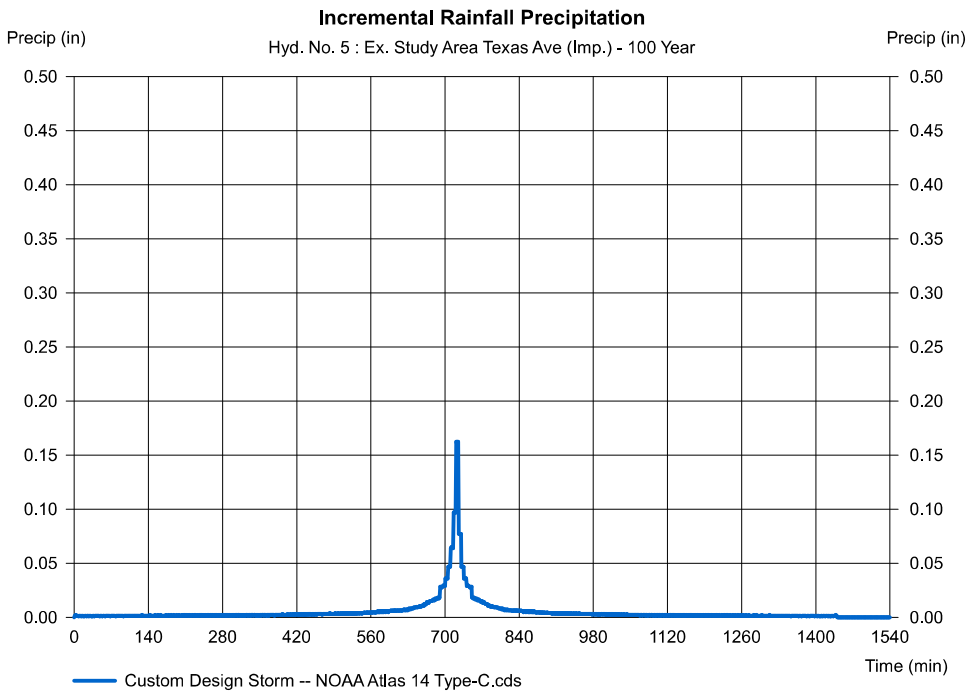


Precipitation Report

Hyd. No. 5

Ex. Study Area Texas Ave (Imp.)

Storm Frequency	= 100 yrs	Time interval	= 1 min
Total precip.	= 8.3300 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds		

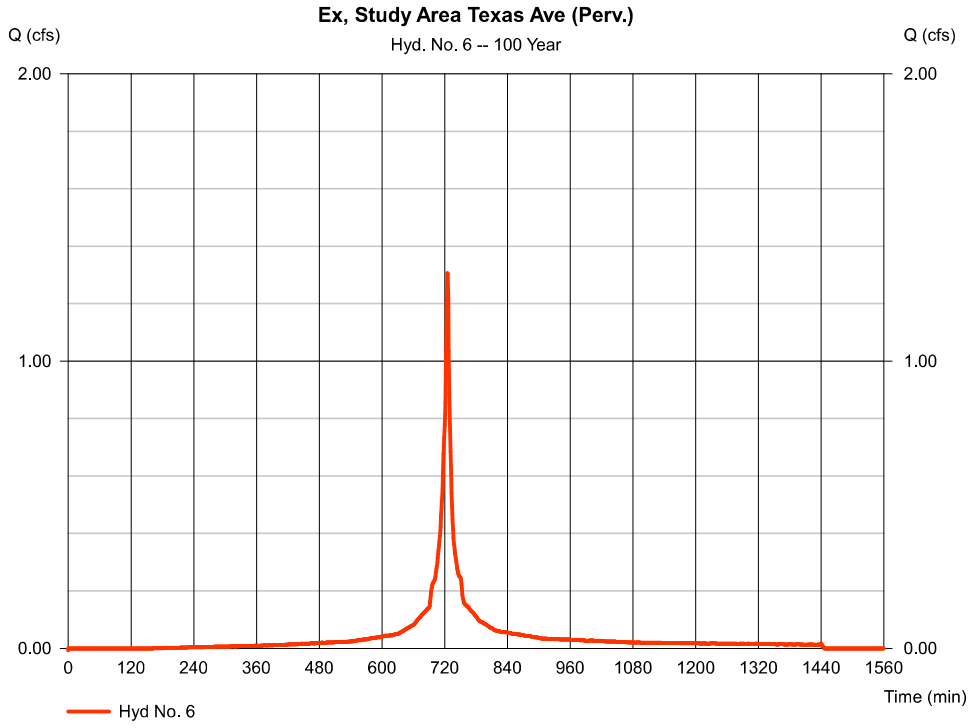


Hydrograph Report

Hyd. No. 6

Ex, Study Area Texas Ave (Perv.)

Hydrograph type	= SCS Runoff	Peak discharge	= 1.306 cfs
Storm frequency	= 100 yrs	Time to peak	= 725 min
Time interval	= 1 min	Hyd. volume	= 3,817 cuft
Drainage area	= 0.150 ac	Curve number	= 89
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 3.90 min
Total precip.	= 8.33 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds	Shape factor	= 484

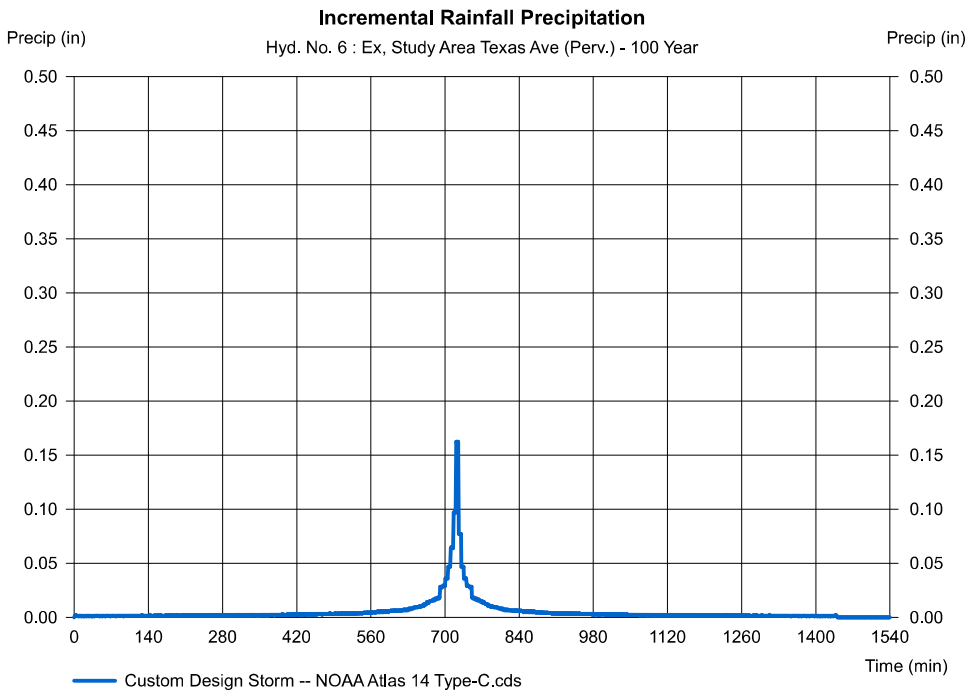


Precipitation Report

Hyd. No. 6

Ex, Study Area Texas Ave (Perv.)

Storm Frequency	= 100 yrs	Time interval	= 1 min
Total precip.	= 8.3300 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds		

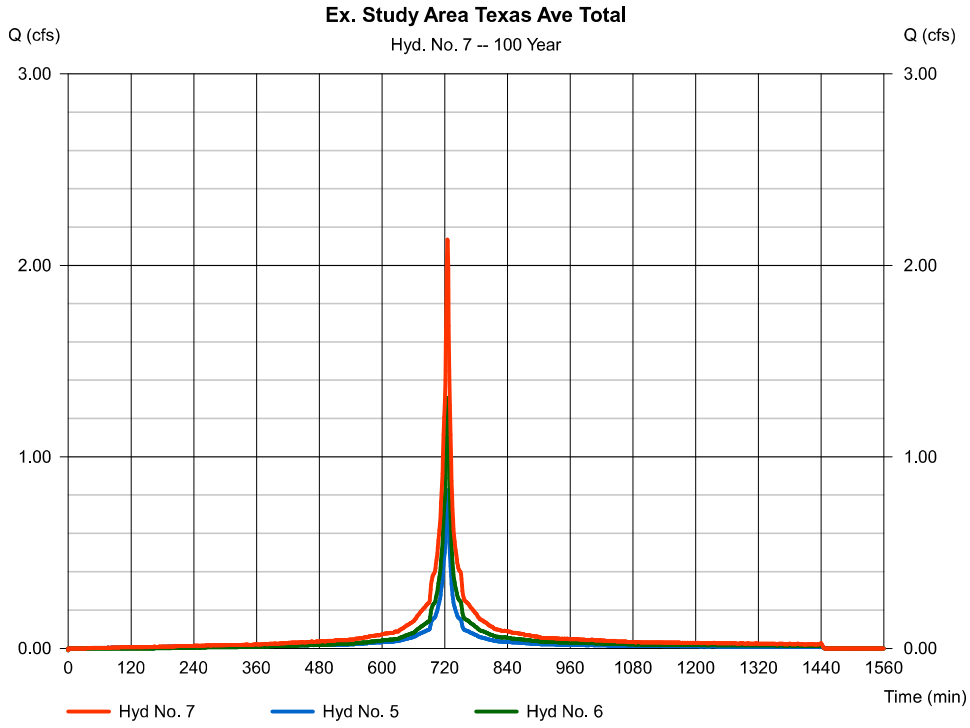


Hydrograph Report

Hyd. No. 7

Ex. Study Area Texas Ave Total

Hydrograph type	= Combine	Peak discharge	= 2.134 cfs
Storm frequency	= 100 yrs	Time to peak	= 725 min
Time interval	= 1 min	Hyd. volume	= 6,460 cuft
Inflow hyds.	= 5, 6	Contrib. drain. area	= 0.240 ac

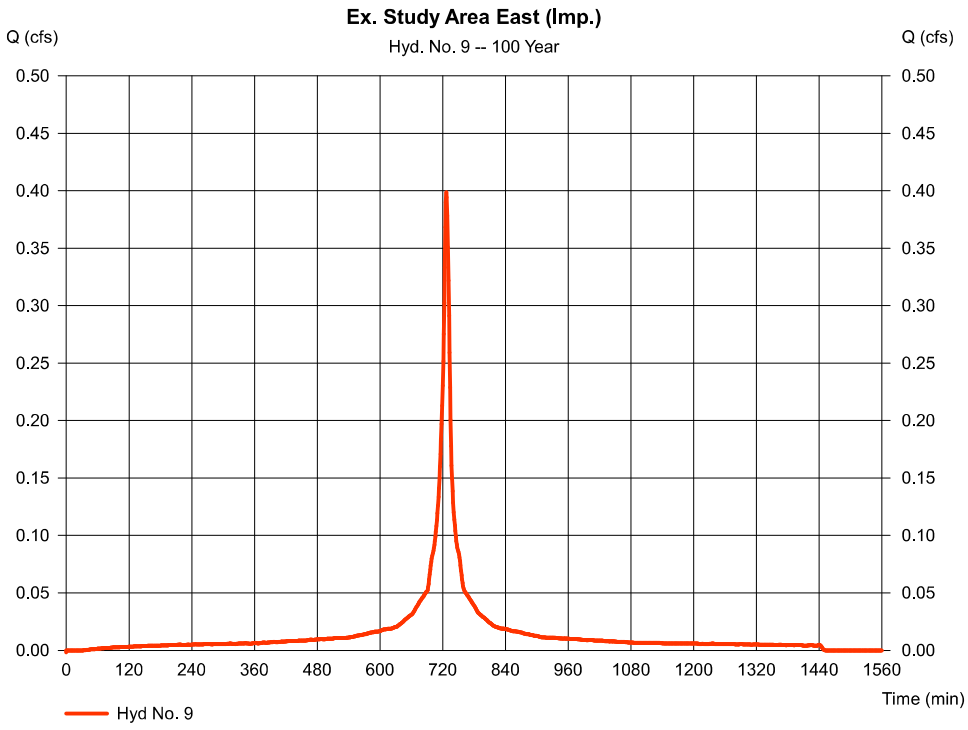


Hydrograph Report

Hyd. No. 9

Ex. Study Area East (Imp.)

Hydrograph type	= SCS Runoff	Peak discharge	= 0.399 cfs
Storm frequency	= 100 yrs	Time to peak	= 727 min
Time interval	= 1 min	Hyd. volume	= 1,432 cuft
Drainage area	= 0.050 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 8.00 min
Total precip.	= 8.33 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds	Shape factor	= 484

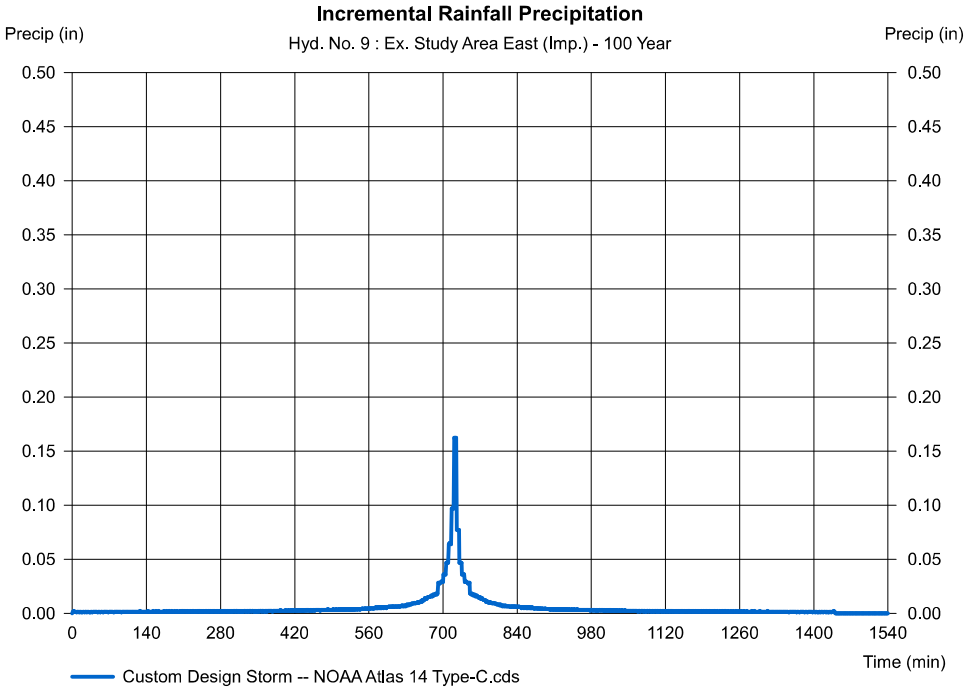


Precipitation Report

Hyd. No. 9

Ex. Study Area East (Imp.)

Storm Frequency	= 100 yrs	Time interval	= 1 min
Total precip.	= 8.3300 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds		

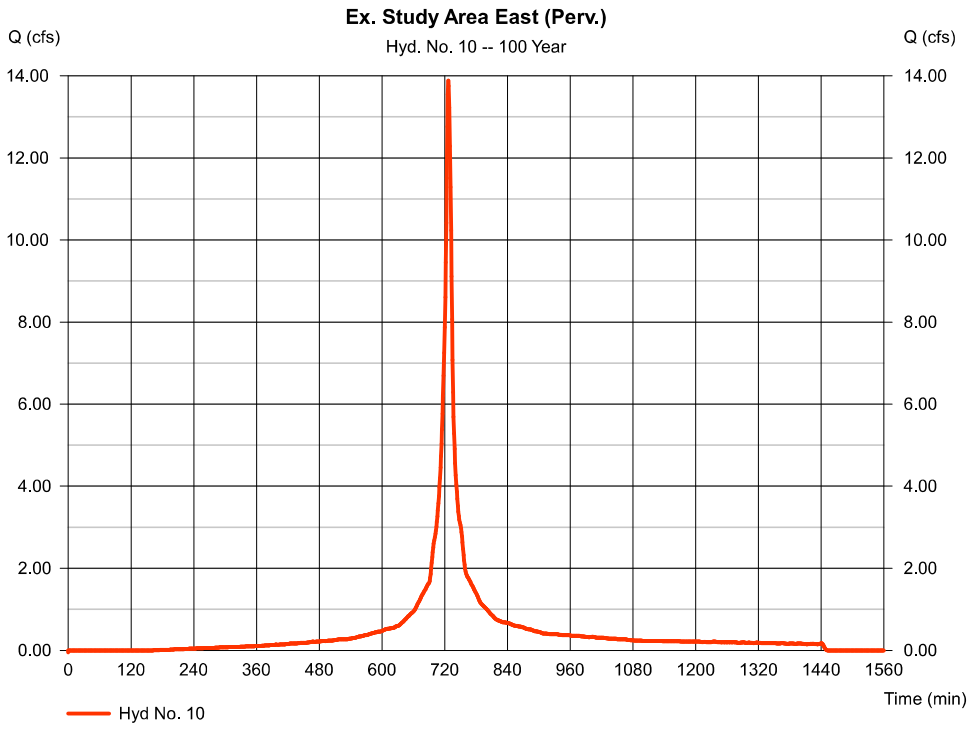


Hydrograph Report

Hyd. No. 10

Ex. Study Area East (Perv.)

Hydrograph type	= SCS Runoff	Peak discharge	= 13.88 cfs
Storm frequency	= 100 yrs	Time to peak	= 727 min
Time interval	= 1 min	Hyd. volume	= 45,656 cuft
Drainage area	= 1.840 ac	Curve number	= 89
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 8.00 min
Total precip.	= 8.33 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds	Shape factor	= 484

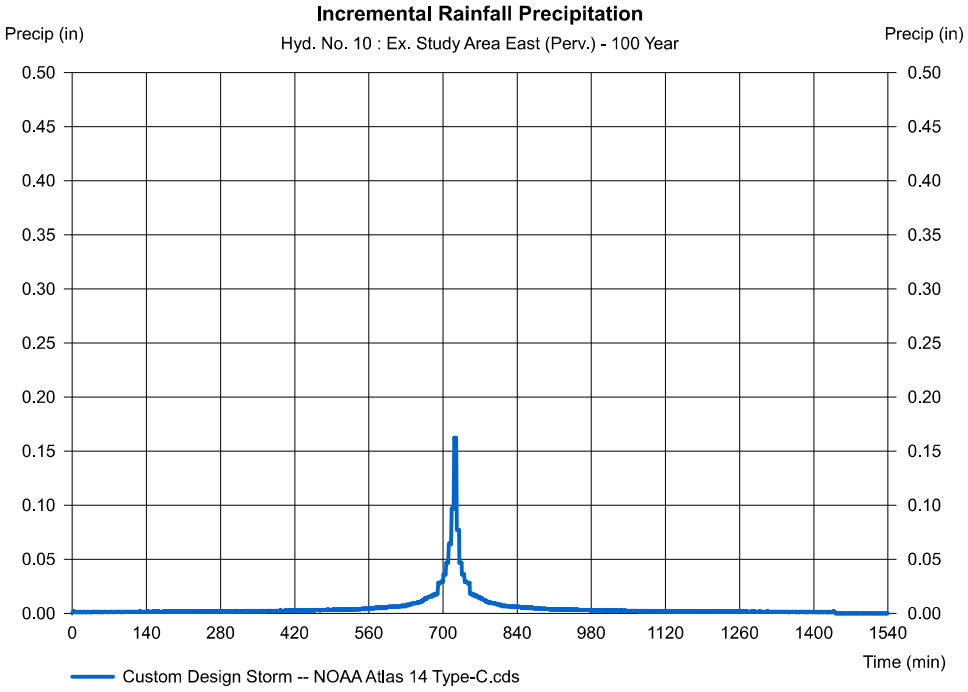


Precipitation Report

Hyd. No. 10

Ex. Study Area East (Perv.)

Storm Frequency	= 100 yrs	Time interval	= 1 min
Total precip.	= 8.3300 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds		

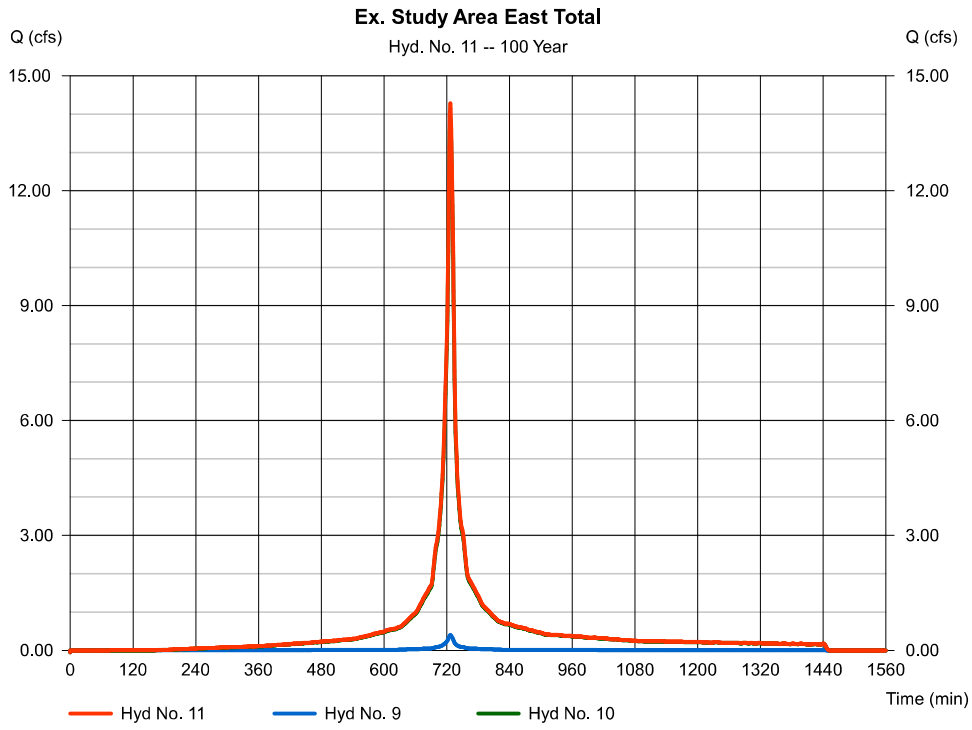


Hydrograph Report

Hyd. No. 11

Ex. Study Area East Total

Hydrograph type	= Combine	Peak discharge	= 14.28 cfs
Storm frequency	= 100 yrs	Time to peak	= 727 min
Time interval	= 1 min	Hyd. volume	= 47,087 cuft
Inflow hyds.	= 9, 10	Contrib. drain. area	= 1.890 ac

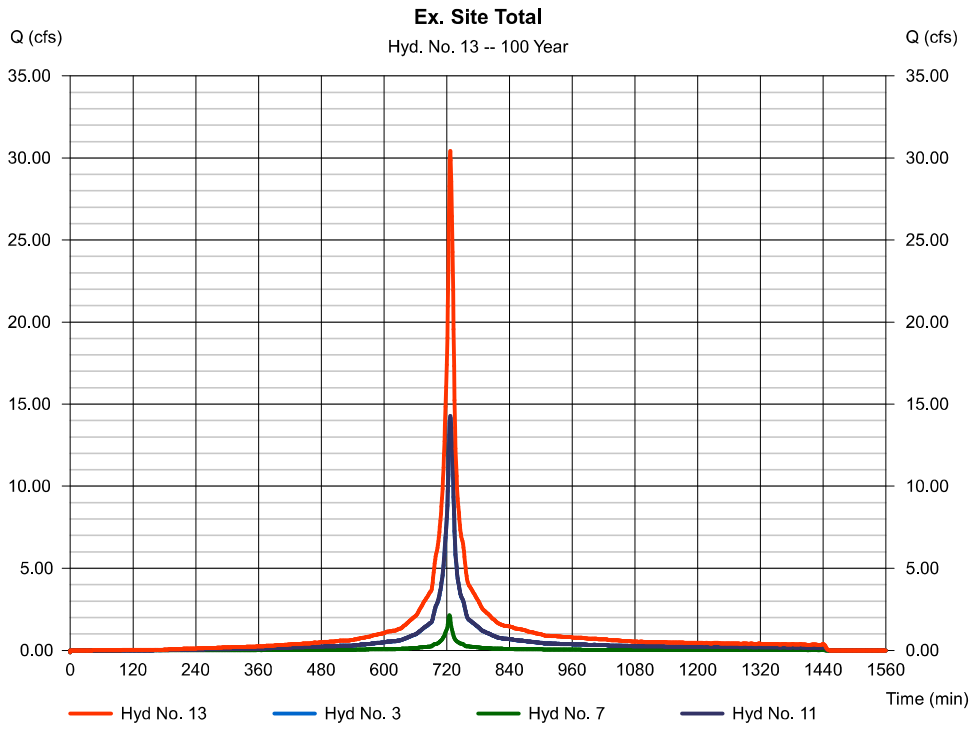


Hydrograph Report

Hyd. No. 13

Ex. Site Total

Hydrograph type	= Combine	Peak discharge	= 30.43 cfs
Storm frequency	= 100 yrs	Time to peak	= 727 min
Time interval	= 1 min	Hyd. volume	= 100,460 cuft
Inflow hyds.	= 3, 7, 11	Contrib. drain. area	= 0.000 ac

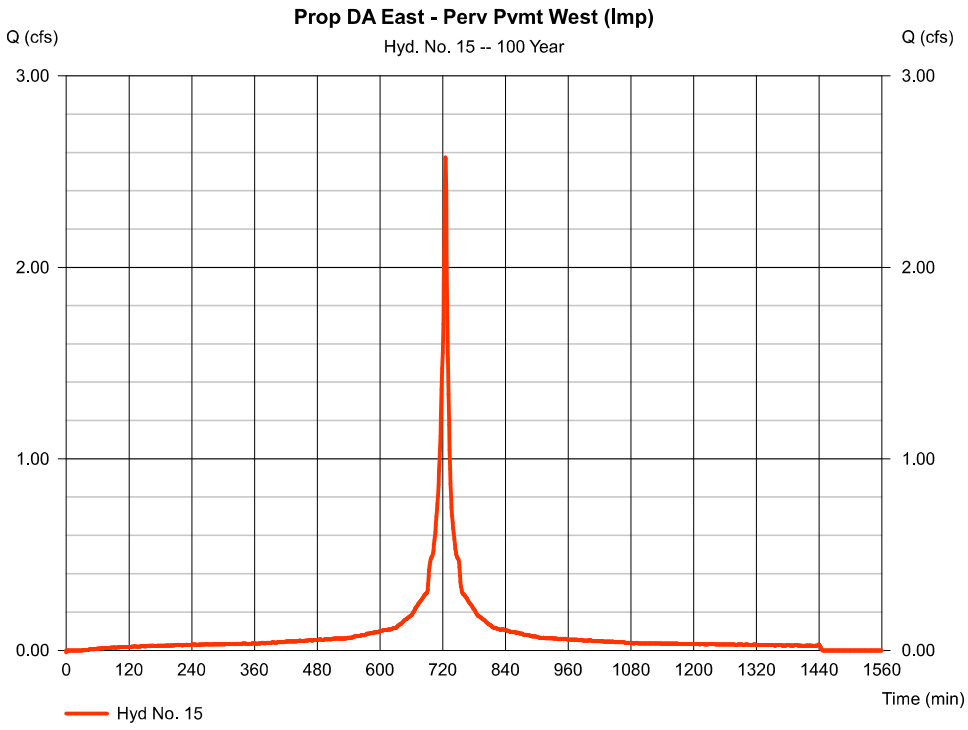


Hydrograph Report

Hyd. No. 15

Prop DA East - Perv Pvmt West (Imp)

Hydrograph type	= SCS Runoff	Peak discharge	= 2.575 cfs
Storm frequency	= 100 yrs	Time to peak	= 725 min
Time interval	= 1 min	Hyd. volume	= 8,223 cuft
Drainage area	= 0.280 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 4.20 min
Total precip.	= 8.33 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds	Shape factor	= 484

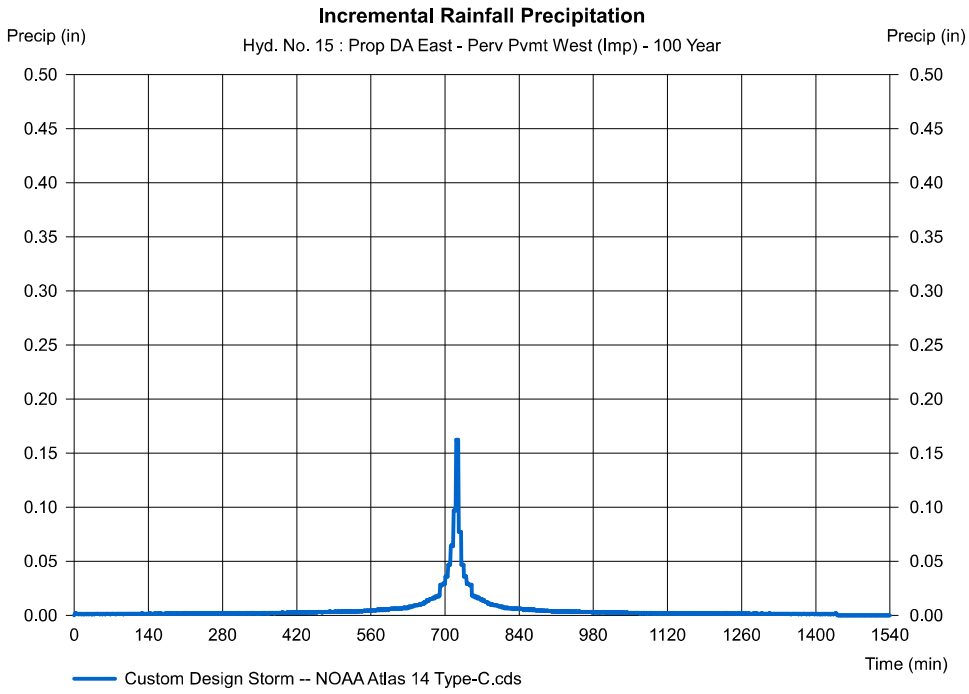


Precipitation Report

Hyd. No. 15

Prop DA East - Perv Pvmt West (Imp)

Storm Frequency	= 100 yrs	Time interval	= 1 min
Total precip.	= 8.3300 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds		

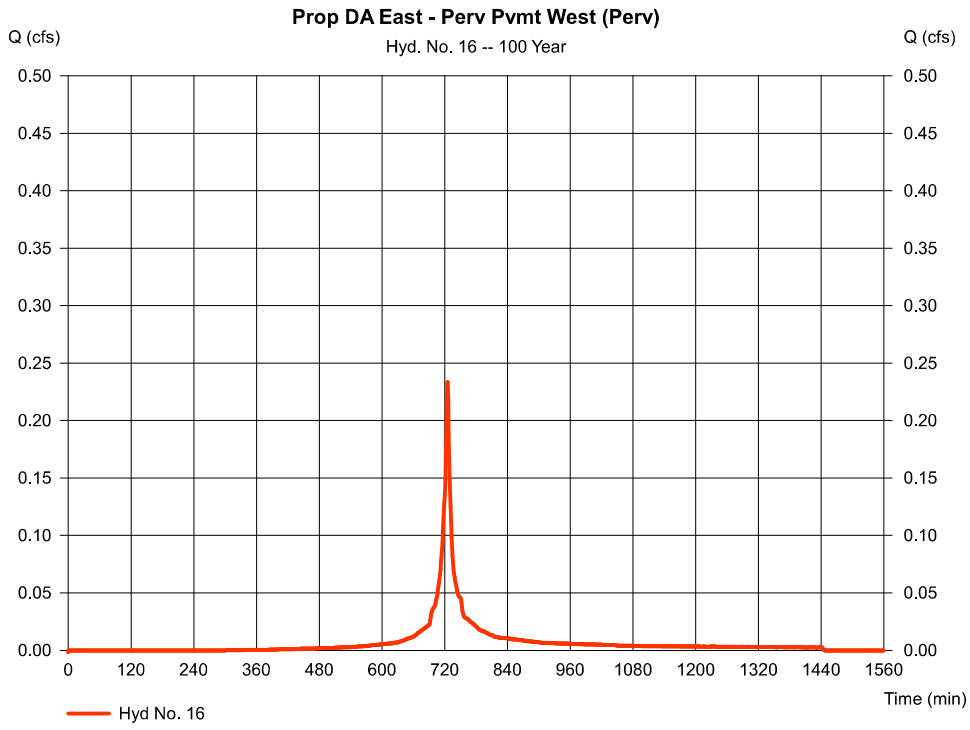


Hydrograph Report

Hyd. No. 16

Prop DA East - Perv Pvmt West (Perv)

Hydrograph type	= SCS Runoff	Peak discharge	= 0.233 cfs
Storm frequency	= 100 yrs	Time to peak	= 726 min
Time interval	= 1 min	Hyd. volume	= 646 cuft
Drainage area	= 0.030 ac	Curve number	= 80
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 4.20 min
Total precip.	= 8.33 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds	Shape factor	= 484

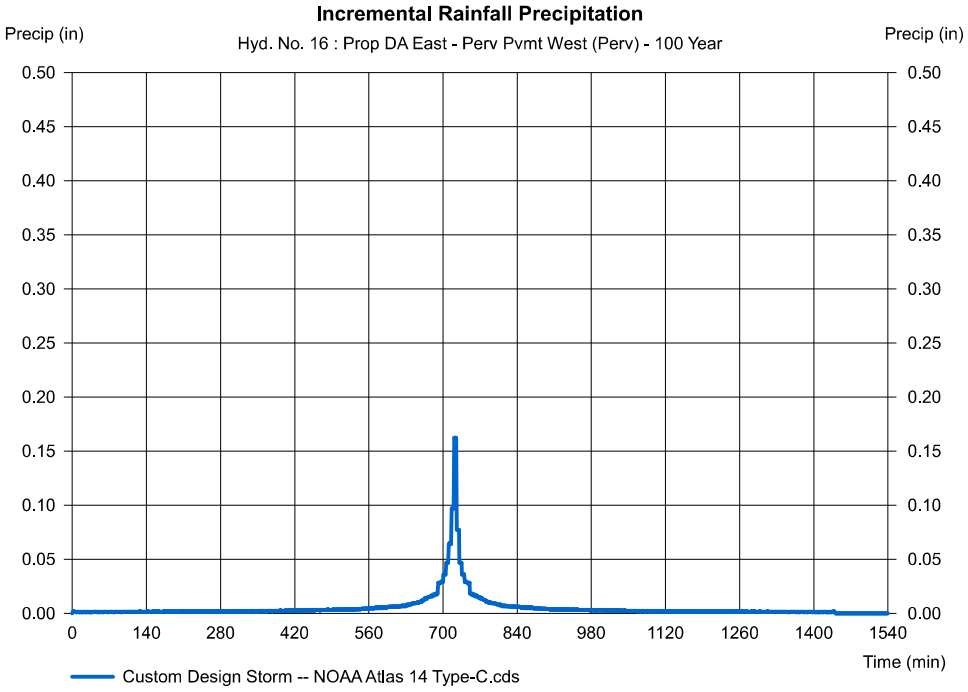


Precipitation Report

Hyd. No. 16

Prop DA East - Perv Pvmt West (Perv)

Storm Frequency	= 100 yrs	Time interval	= 1 min
Total precip.	= 8.3300 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds		

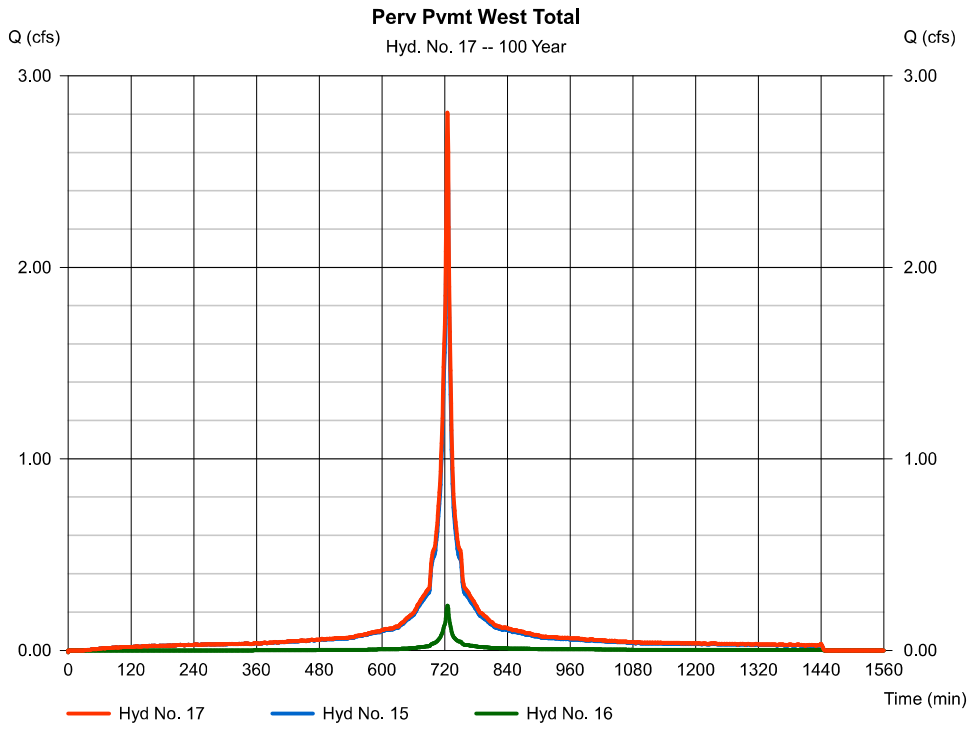


Hydrograph Report

Hyd. No. 17

Perv Pvmt West Total

Hydrograph type	= Combine	Peak discharge	= 2.807 cfs
Storm frequency	= 100 yrs	Time to peak	= 725 min
Time interval	= 1 min	Hyd. volume	= 8,869 cuft
Inflow hyds.	= 15, 16	Contrib. drain. area	= 0.310 ac



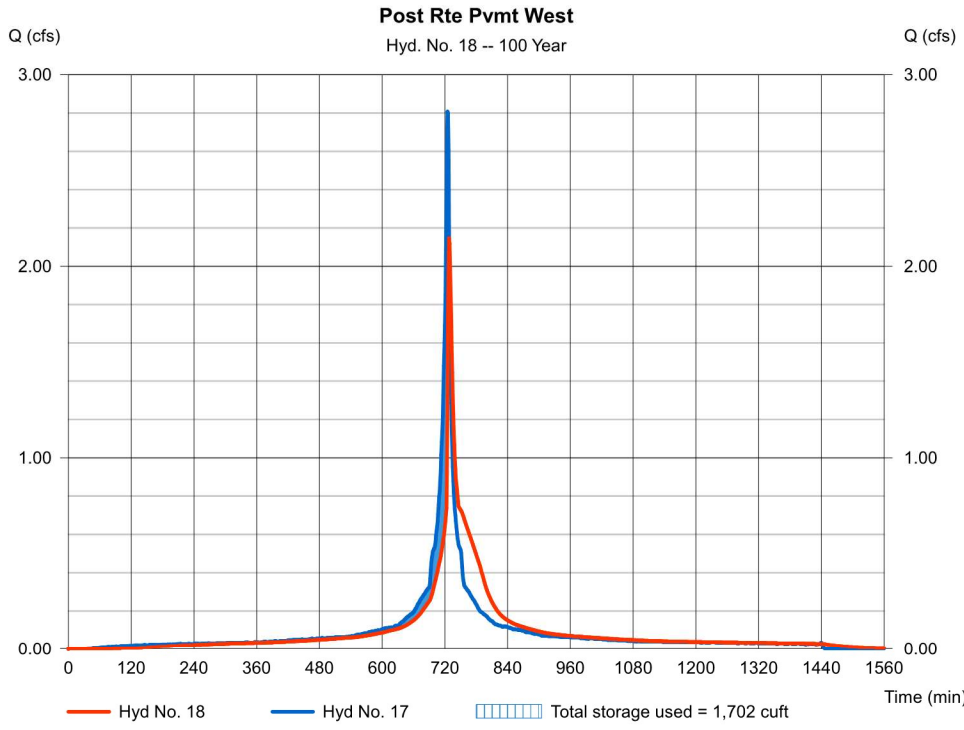
Hydrograph Report

Hyd. No. 18

Post Rte Pvmt West

Hydrograph type	= Reservoir	Peak discharge	= 2.148 cfs
Storm frequency	= 100 yrs	Time to peak	= 728 min
Time interval	= 1 min	Hyd. volume	= 8,856 cuft
Inflow hyd. No.	= 17 - Perv Pvmt West Total	Max. Elevation	= 64.98 ft
Reservoir name	= Porous Pavement West	Max. Storage	= 1,702 cuft

Storage Indication method used.

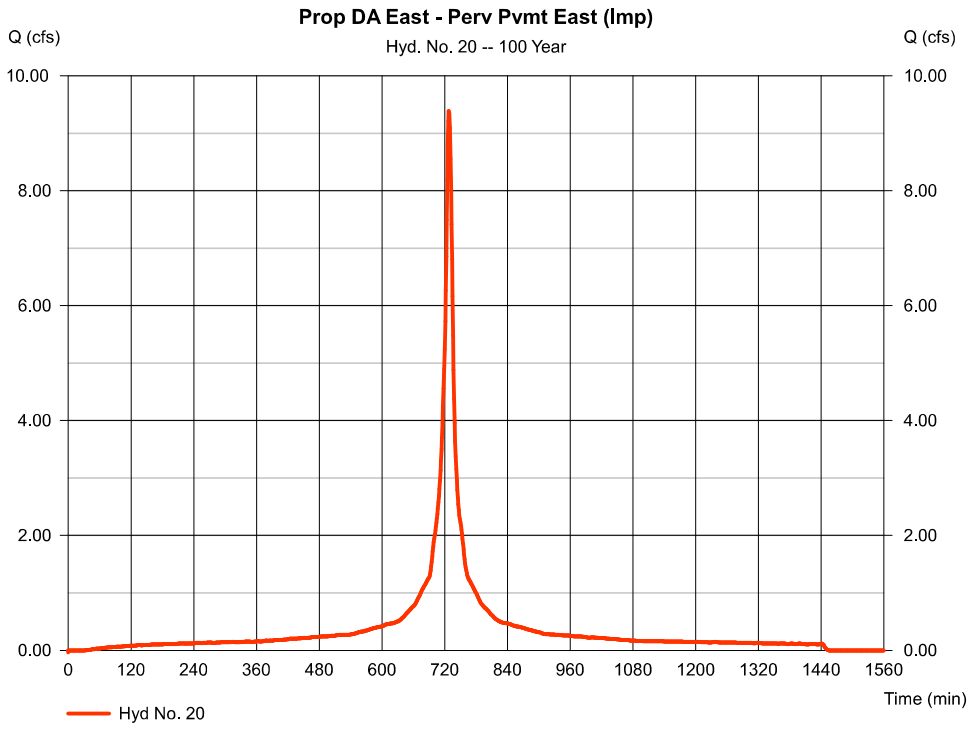


Hydrograph Report

Hyd. No. 20

Prop DA East - Perv Pvmt East (Imp)

Hydrograph type	= SCS Runoff	Peak discharge	= 9.389 cfs
Storm frequency	= 100 yrs	Time to peak	= 728 min
Time interval	= 1 min	Hyd. volume	= 35,827 cuft
Drainage area	= 1.220 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 9.20 min
Total precip.	= 8.33 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds	Shape factor	= 484

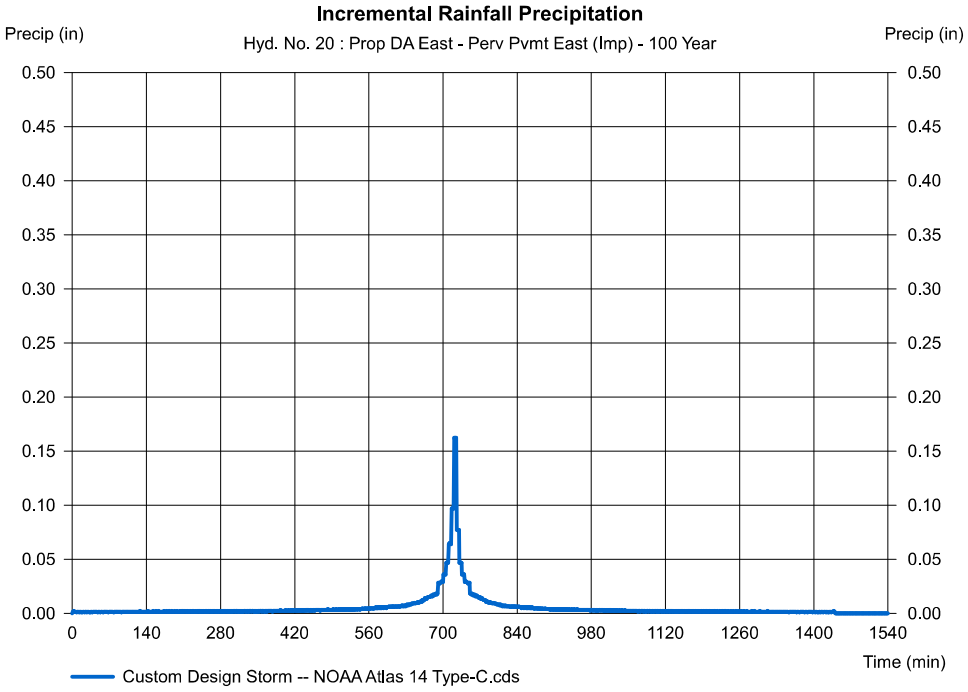


Precipitation Report

Hyd. No. 20

Prop DA East - Perv Pvmt East (Imp)

Storm Frequency	= 100 yrs	Time interval	= 1 min
Total precip.	= 8.3300 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds		

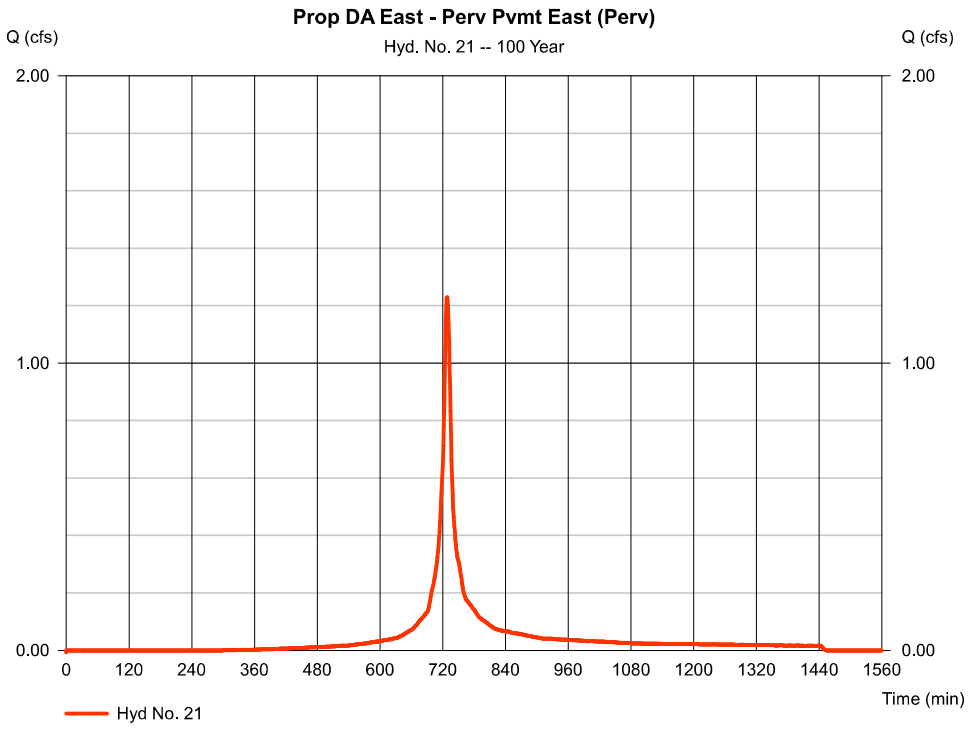


Hydrograph Report

Hyd. No. 21

Prop DA East - Perv Pvmt East (Perv)

Hydrograph type	= SCS Runoff	Peak discharge	= 1.229 cfs
Storm frequency	= 100 yrs	Time to peak	= 729 min
Time interval	= 1 min	Hyd. volume	= 4,093 cuft
Drainage area	= 0.190 ac	Curve number	= 80
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 9.20 min
Total precip.	= 8.33 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds	Shape factor	= 484

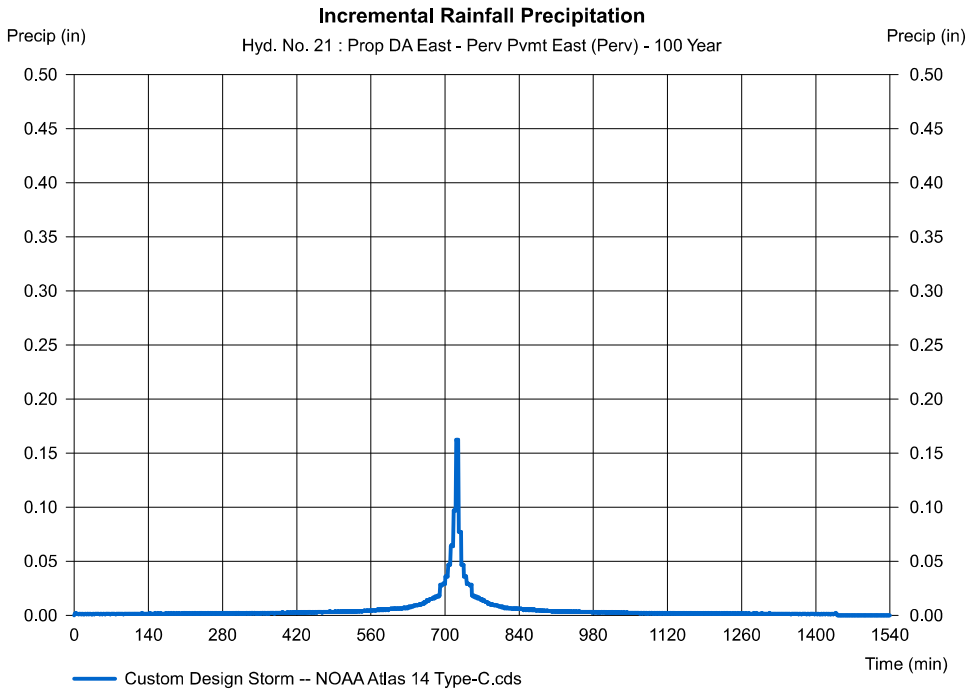


Precipitation Report

Hyd. No. 21

Prop DA East - Perv Pvmt East (Perv)

Storm Frequency	= 100 yrs	Time interval	= 1 min
Total precip.	= 8.3300 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds		

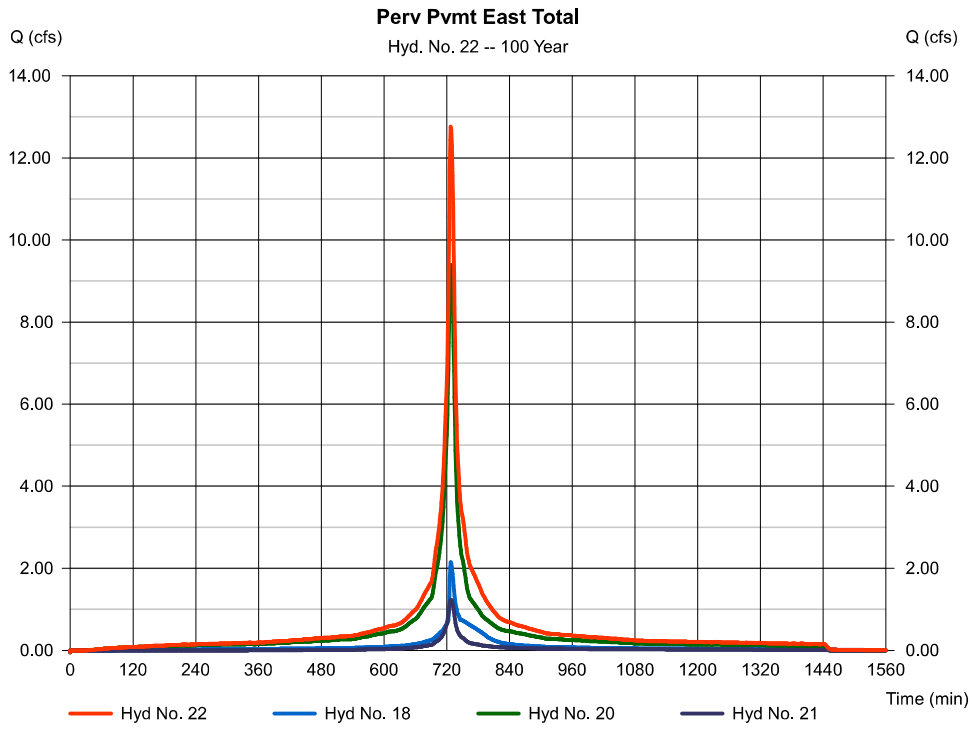


Hydrograph Report

Hyd. No. 22

Perv Pvmt East Total

Hydrograph type	= Combine	Peak discharge	= 12.76 cfs
Storm frequency	= 100 yrs	Time to peak	= 728 min
Time interval	= 1 min	Hyd. volume	= 48,776 cuft
Inflow hyds.	= 18, 20, 21	Contrib. drain. area	= 1.410 ac



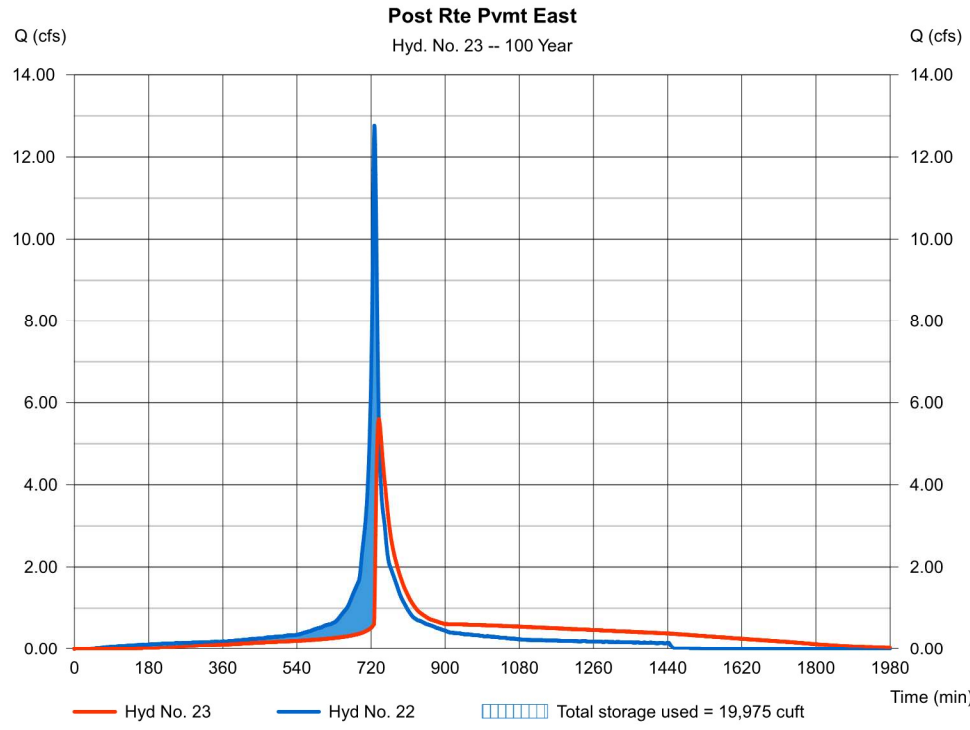
Hydrograph Report

Hyd. No. 23

Post Rte Pvmt East

Hydrograph type	= Reservoir	Peak discharge	= 5.606 cfs
Storm frequency	= 100 yrs	Time to peak	= 739 min
Time interval	= 1 min	Hyd. volume	= 48,504 cuft
Inflow hyd. No.	= 22 - Perv Pvmt East Total	Max. Elevation	= 63.14 ft
Reservoir name	= Porous Pavement East	Max. Storage	= 19,975 cuft

Storage Indication method used.

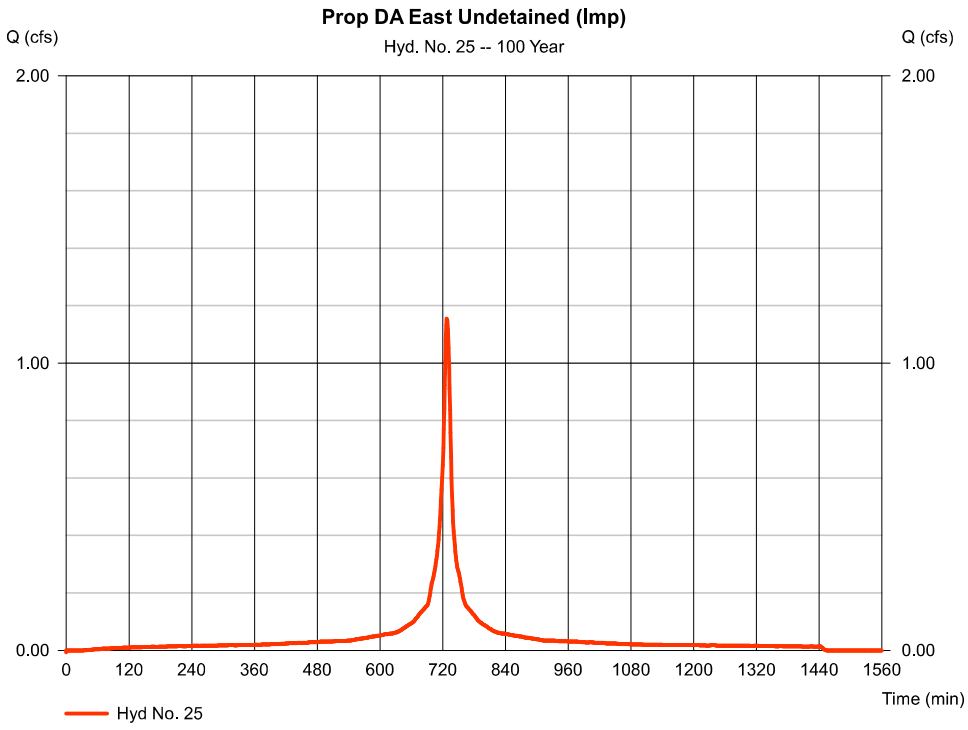


Hydrograph Report

Hyd. No. 25

Prop DA East Undetained (Imp)

Hydrograph type	= SCS Runoff	Peak discharge	= 1.154 cfs
Storm frequency	= 100 yrs	Time to peak	= 728 min
Time interval	= 1 min	Hyd. volume	= 4,405 cuft
Drainage area	= 0.150 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 9.60 min
Total precip.	= 8.33 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds	Shape factor	= 484

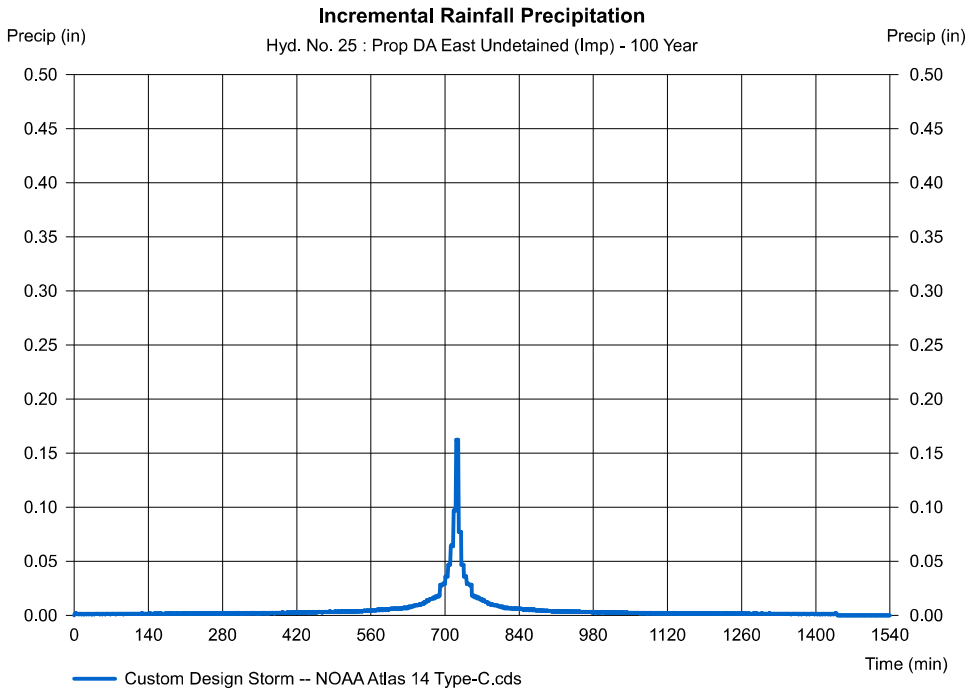


Precipitation Report

Hyd. No. 25

Prop DA East Undetained (Imp)

Storm Frequency	= 100 yrs	Time interval	= 1 min
Total precip.	= 8.3300 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds		

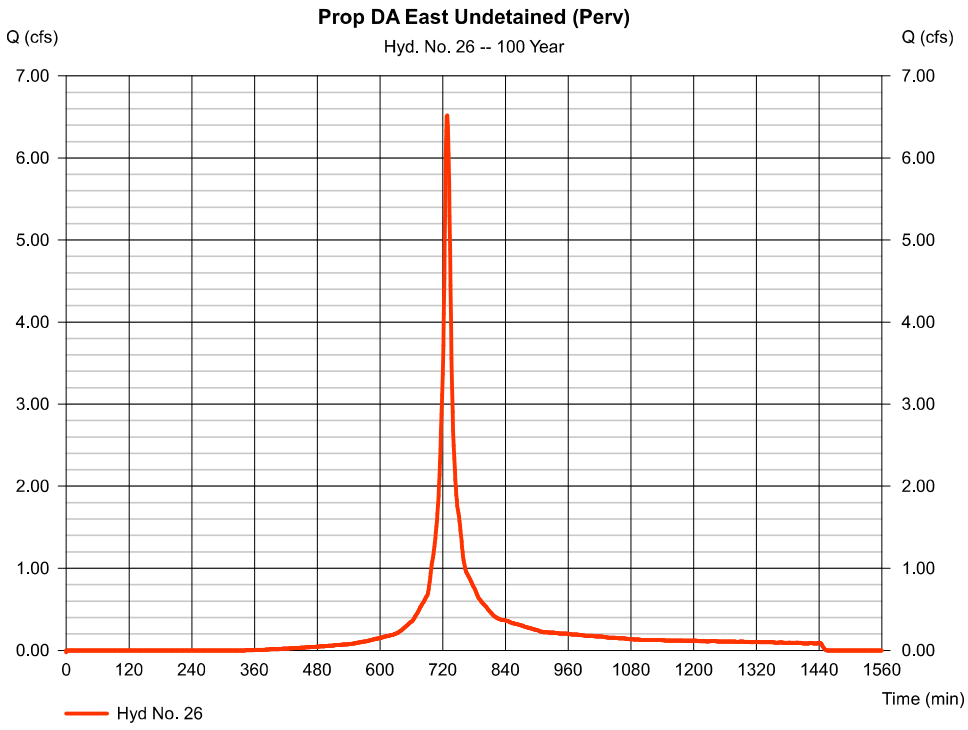


Hydrograph Report

Hyd. No. 26

Prop DA East Undetained (Perv)

Hydrograph type	= SCS Runoff	Peak discharge	= 6.516 cfs
Storm frequency	= 100 yrs	Time to peak	= 729 min
Time interval	= 1 min	Hyd. volume	= 21,463 cuft
Drainage area	= 1.060 ac	Curve number	= 77
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 9.60 min
Total precip.	= 8.33 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds	Shape factor	= 484

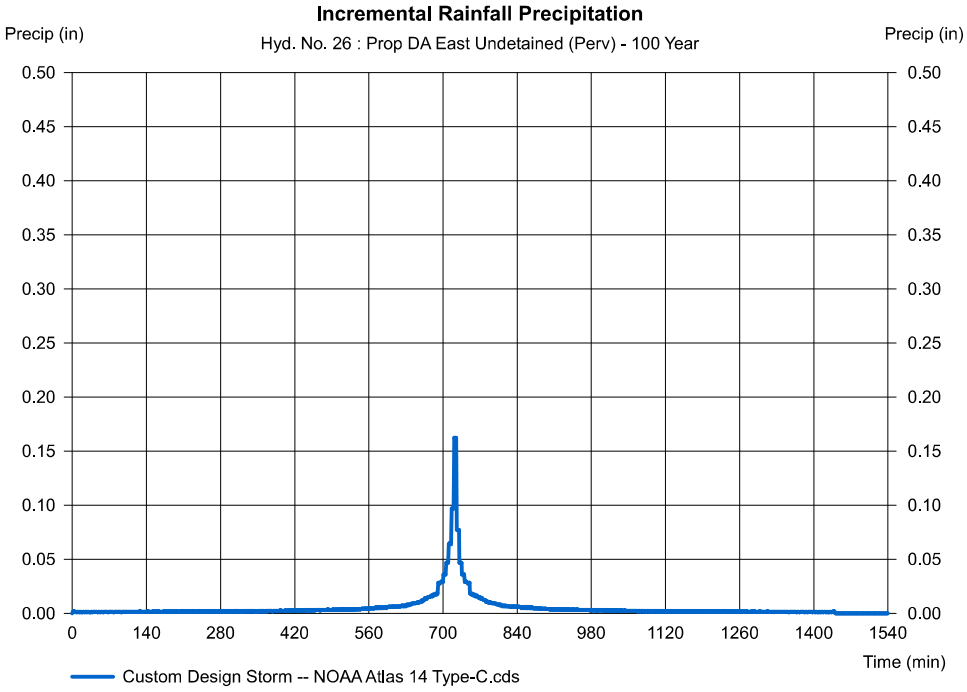


Precipitation Report

Hyd. No. 26

Prop DA East Undetained (Perv)

Storm Frequency	= 100 yrs	Time interval	= 1 min
Total precip.	= 8.3300 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds		

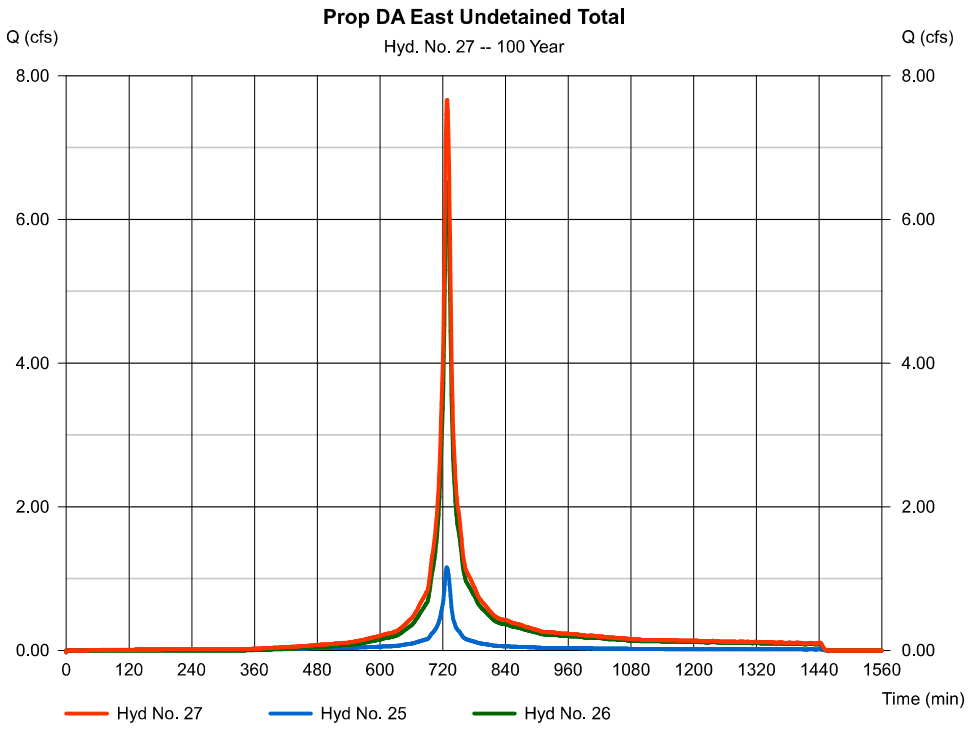


Hydrograph Report

Hyd. No. 27

Prop DA East Undetained Total

Hydrograph type	= Combine	Peak discharge	= 7.666 cfs
Storm frequency	= 100 yrs	Time to peak	= 729 min
Time interval	= 1 min	Hyd. volume	= 25,868 cuft
Inflow hyds.	= 25, 26	Contrib. drain. area	= 1.210 ac

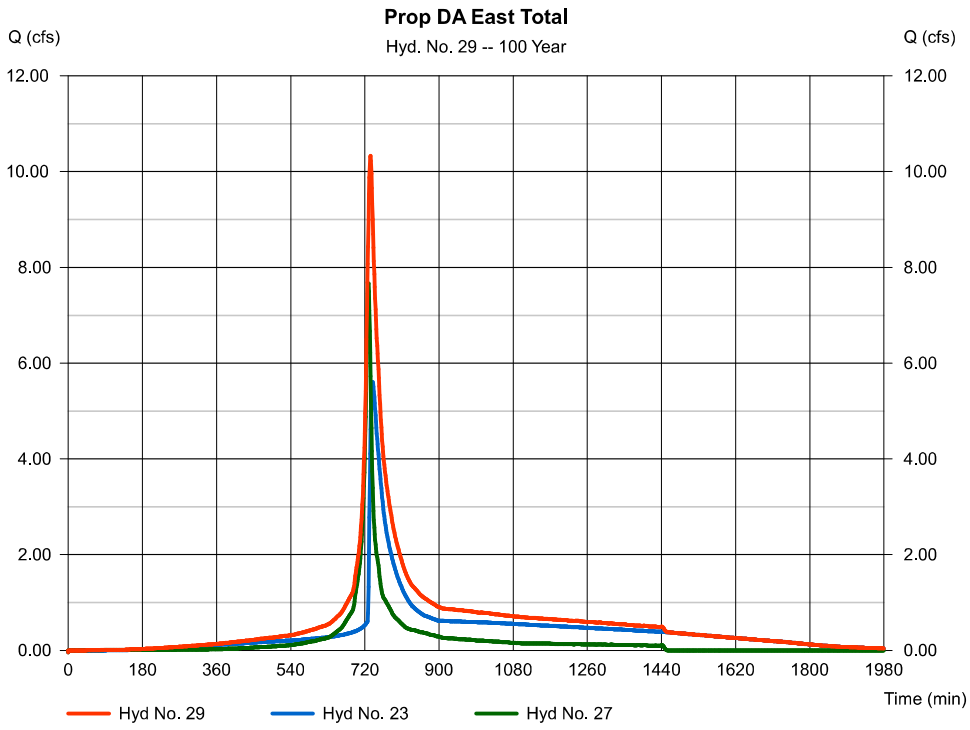


Hydrograph Report

Hyd. No. 29

Prop DA East Total

Hydrograph type	= Combine	Peak discharge	= 10.33 cfs
Storm frequency	= 100 yrs	Time to peak	= 734 min
Time interval	= 1 min	Hyd. volume	= 74,372 cuft
Inflow hyds.	= 23, 27	Contrib. drain. area	= 0.000 ac

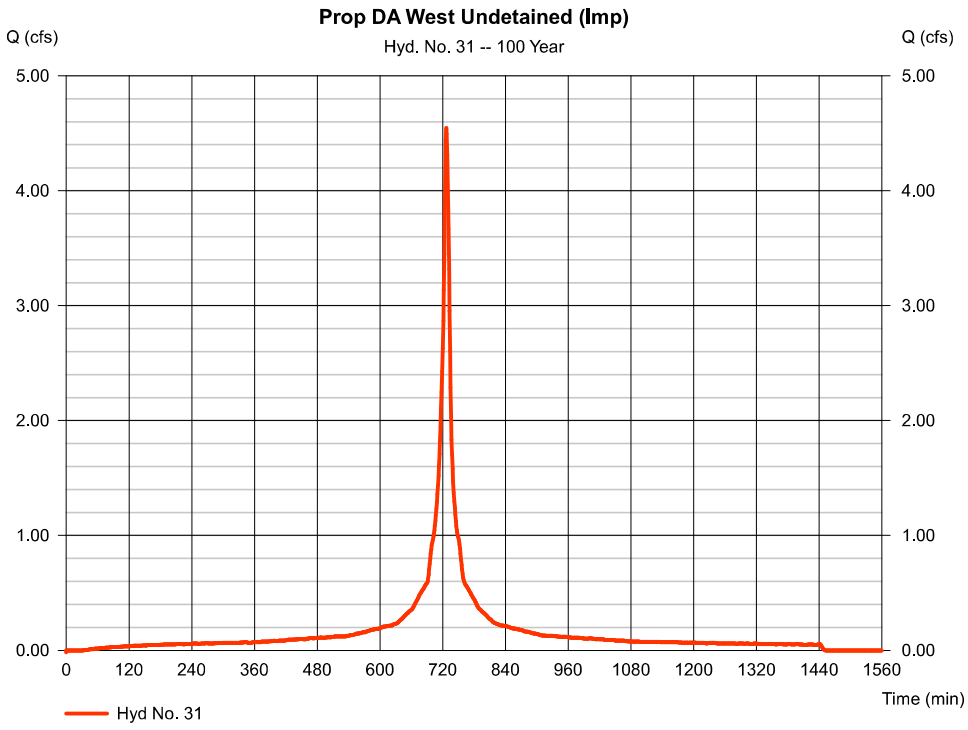


Hydrograph Report

Hyd. No. 31

Prop DA West Undetained (Imp)

Hydrograph type	= SCS Runoff	Peak discharge	= 4.546 cfs
Storm frequency	= 100 yrs	Time to peak	= 727 min
Time interval	= 1 min	Hyd. volume	= 16,321 cuft
Drainage area	= 0.570 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 7.30 min
Total precip.	= 8.33 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds	Shape factor	= 484

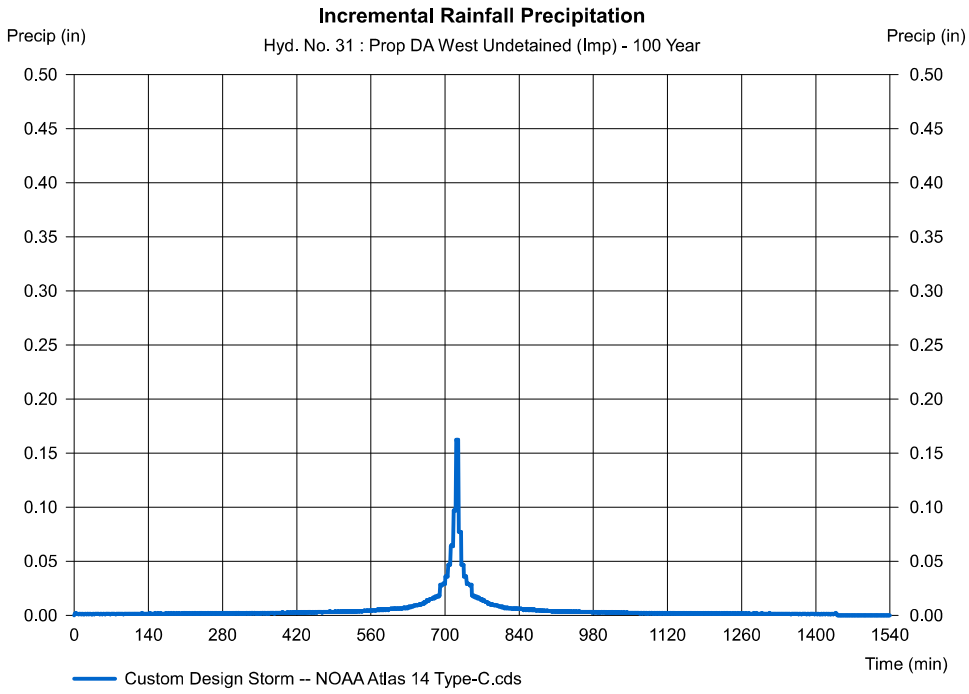


Precipitation Report

Hyd. No. 31

Prop DA West Undetained (Imp)

Storm Frequency	= 100 yrs	Time interval	= 1 min
Total precip.	= 8.3300 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds		

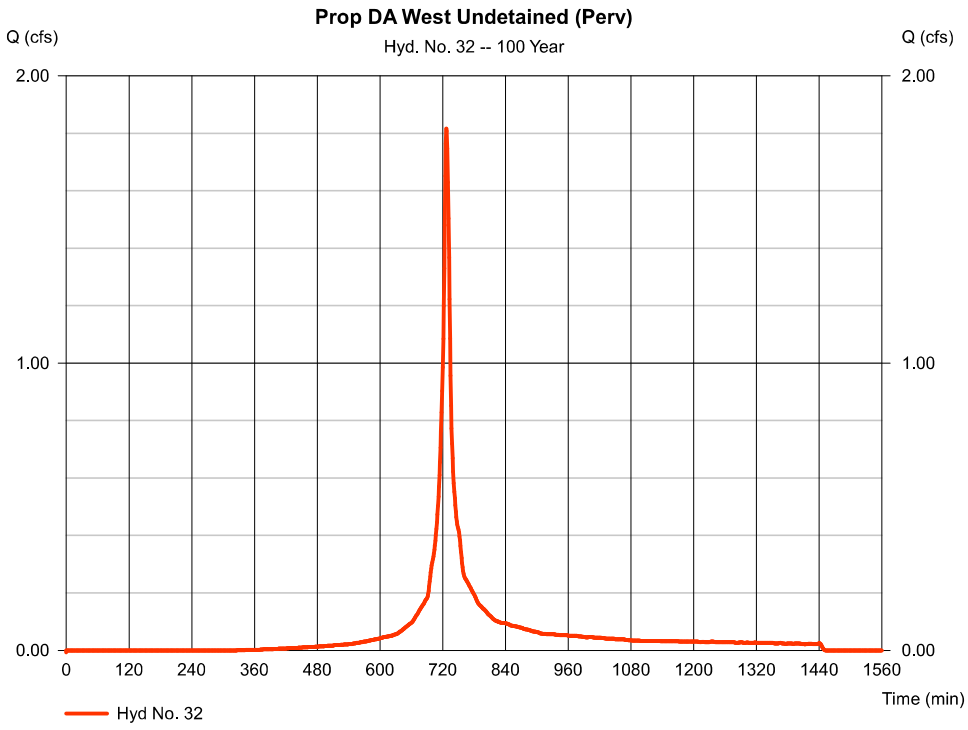


Hydrograph Report

Hyd. No. 32

Prop DA West Undetained (Perv)

Hydrograph type	= SCS Runoff	Peak discharge	= 1.816 cfs
Storm frequency	= 100 yrs	Time to peak	= 727 min
Time interval	= 1 min	Hyd. volume	= 5,646 cuft
Drainage area	= 0.280 ac	Curve number	= 78
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 7.30 min
Total precip.	= 8.33 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds	Shape factor	= 484

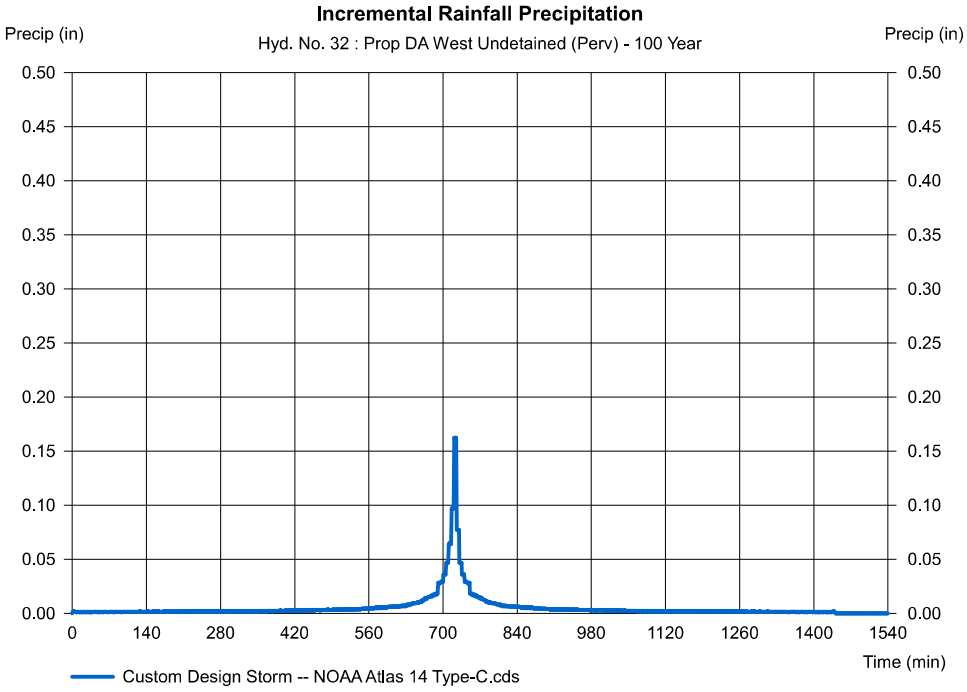


Precipitation Report

Hyd. No. 32

Prop DA West Undetained (Perv)

Storm Frequency	= 100 yrs	Time interval	= 1 min
Total precip.	= 8.3300 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds		

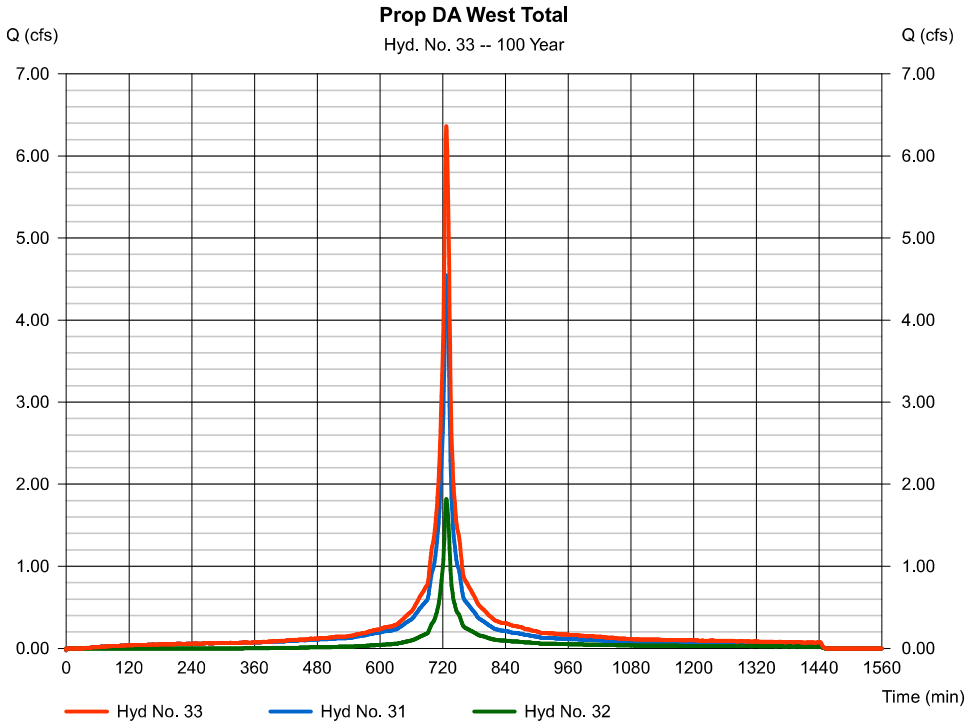


Hydrograph Report

Hyd. No. 33

Prop DA West Total

Hydrograph type	= Combine	Peak discharge	= 6.362 cfs
Storm frequency	= 100 yrs	Time to peak	= 727 min
Time interval	= 1 min	Hyd. volume	= 21,966 cuft
Inflow hyds.	= 31, 32	Contrib. drain. area	= 0.850 ac

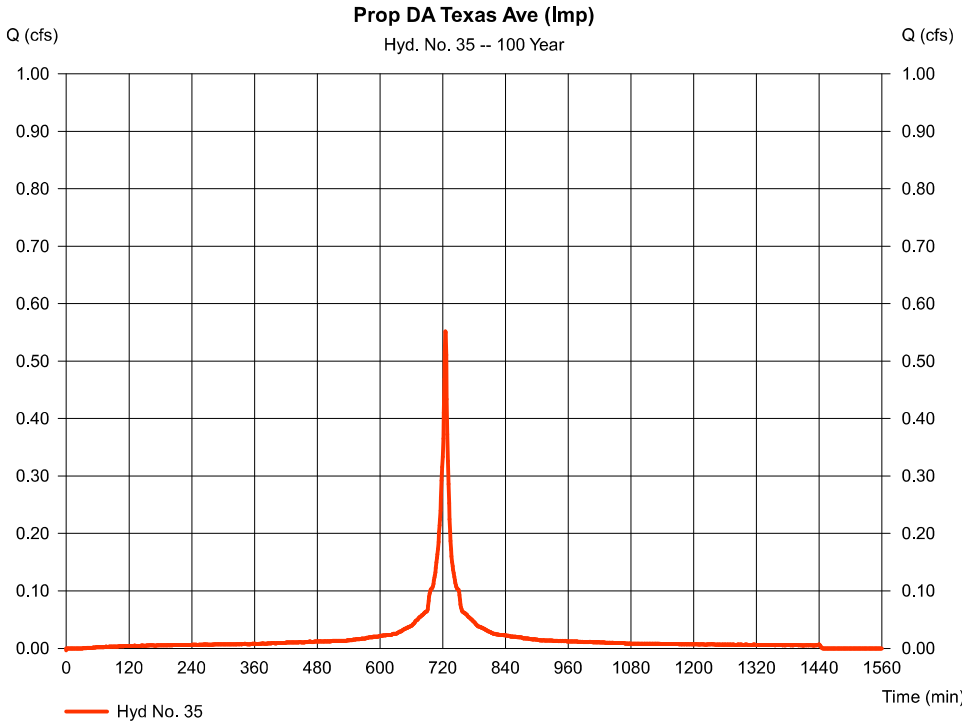


Hydrograph Report

Hyd. No. 35

Prop DA Texas Ave (Imp)

Hydrograph type	= SCS Runoff	Peak discharge	= 0.552 cfs
Storm frequency	= 100 yrs	Time to peak	= 725 min
Time interval	= 1 min	Hyd. volume	= 1,762 cuft
Drainage area	= 0.060 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 4.80 min
Total precip.	= 8.33 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds	Shape factor	= 484

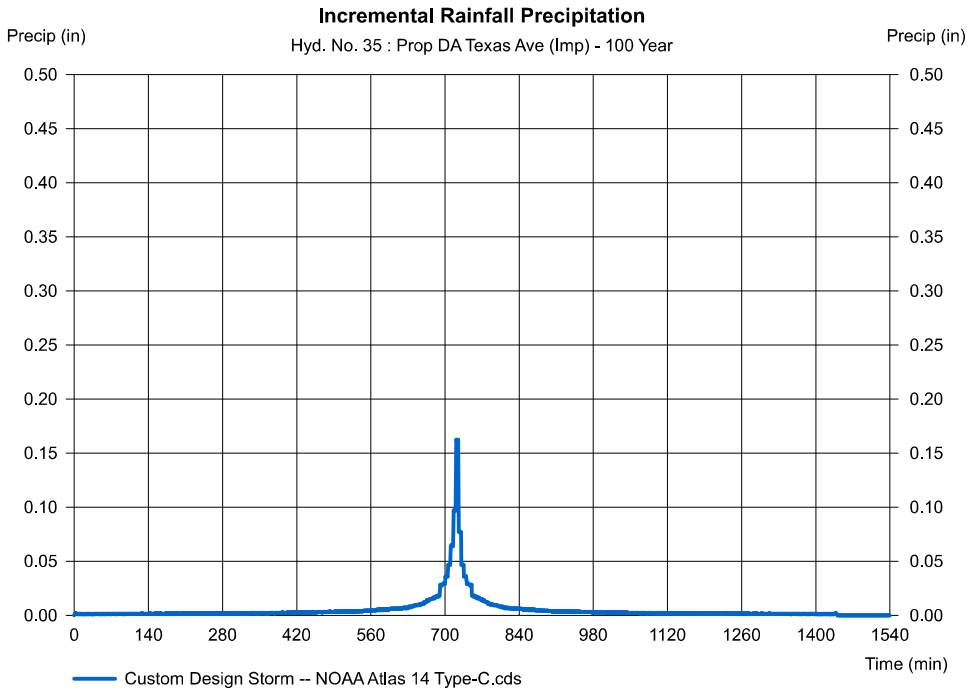


Precipitation Report

Hyd. No. 35

Prop DA Texas Ave (Imp)

Storm Frequency	= 100 yrs	Time interval	= 1 min
Total precip.	= 8.3300 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds		

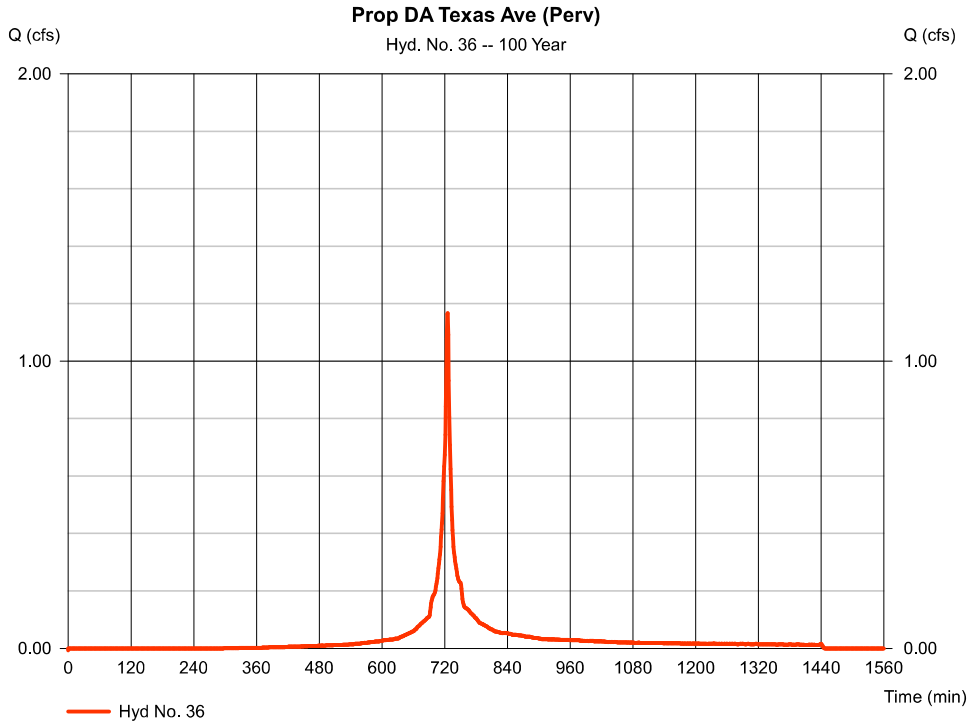


Hydrograph Report

Hyd. No. 36

Prop DA Texas Ave (Perv)

Hydrograph type	= SCS Runoff	Peak discharge	= 1.167 cfs
Storm frequency	= 100 yrs	Time to peak	= 726 min
Time interval	= 1 min	Hyd. volume	= 3,232 cuft
Drainage area	= 0.150 ac	Curve number	= 80
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 4.80 min
Total precip.	= 8.33 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds	Shape factor	= 484

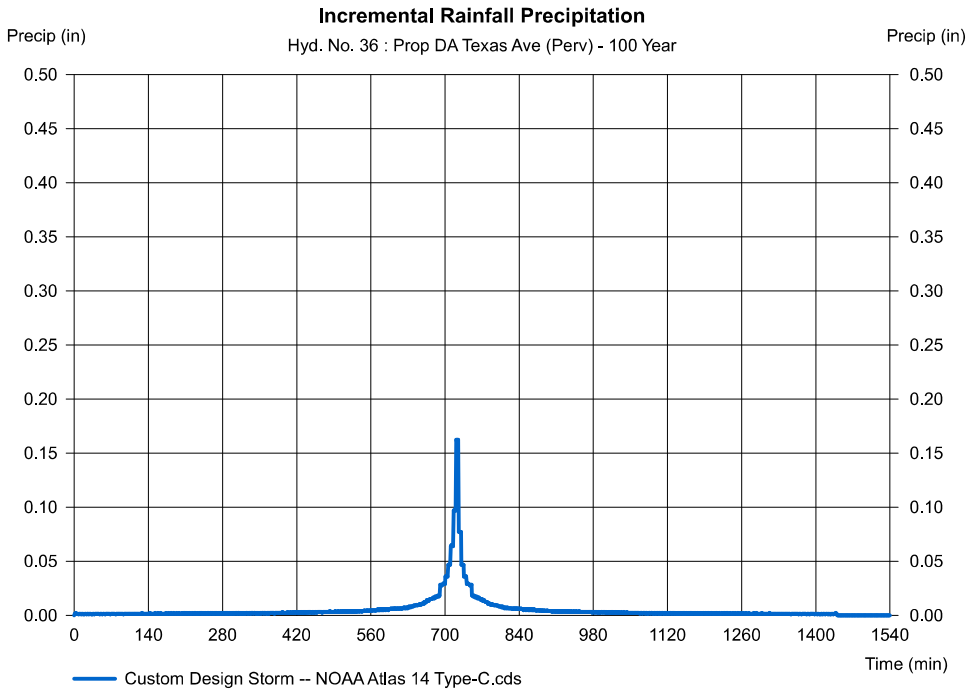


Precipitation Report

Hyd. No. 36

Prop DA Texas Ave (Perv)

Storm Frequency	= 100 yrs	Time interval	= 1 min
Total precip.	= 8.3300 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds		

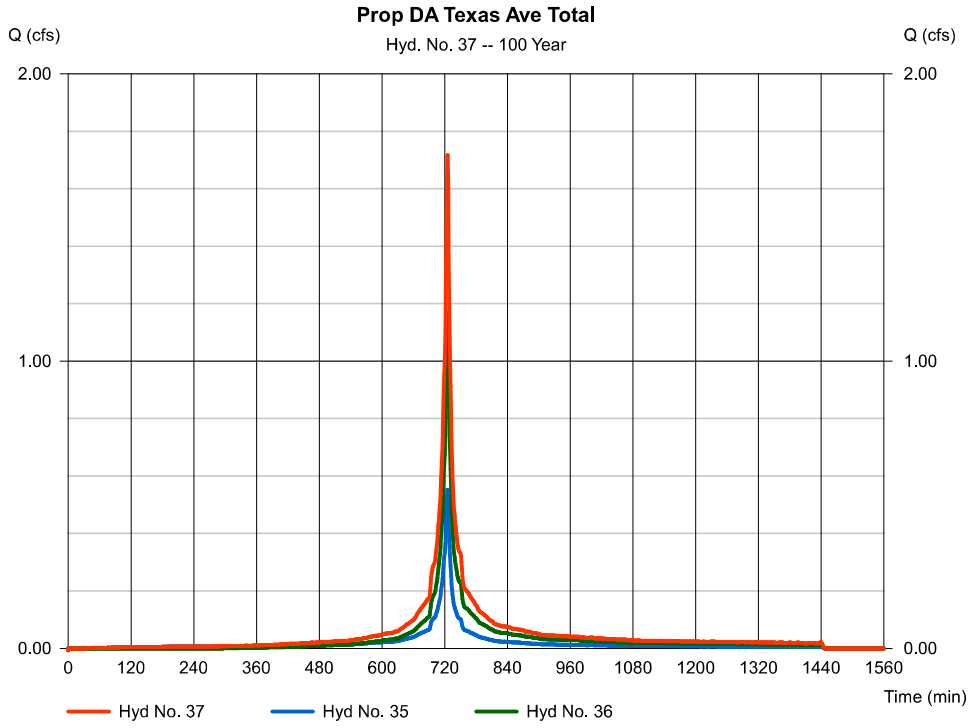


Hydrograph Report

Hyd. No. 37

Prop DA Texas Ave Total

Hydrograph type	= Combine	Peak discharge	= 1.717 cfs
Storm frequency	= 100 yrs	Time to peak	= 726 min
Time interval	= 1 min	Hyd. volume	= 4,994 cuft
Inflow hyds.	= 35, 36	Contrib. drain. area	= 0.210 ac

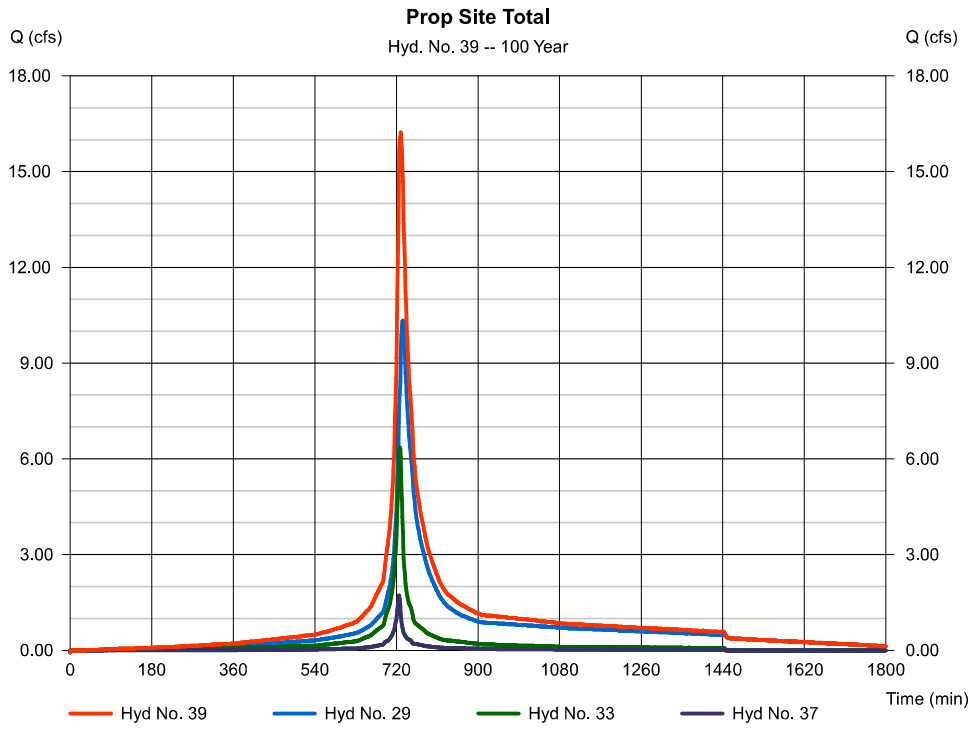


Hydrograph Report

Hyd. No. 39

Prop Site Total

Hydrograph type	= Combine	Peak discharge	= 16.23 cfs
Storm frequency	= 100 yrs	Time to peak	= 729 min
Time interval	= 1 min	Hyd. volume	= 101,331 cuft
Inflow hyds.	= 29, 33, 37	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

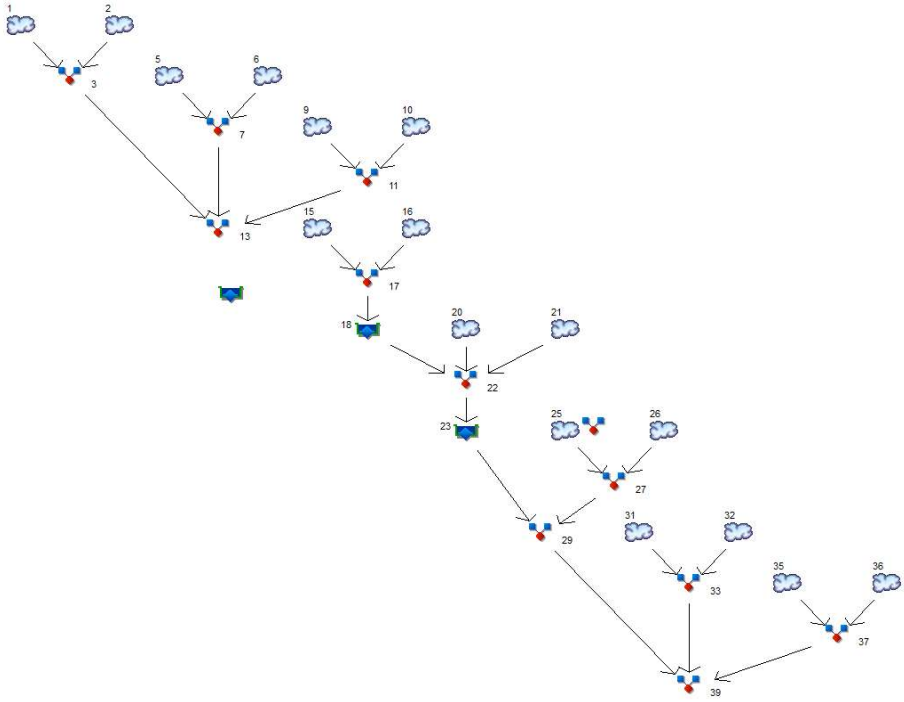
Tc = time in minutes. Values may exceed 60.

Precip. file name: Mercer 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	3.31	0.00	0.00	5.01	6.19	0.00	8.33
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	3.31	0.00	0.00	5.01	6.19	0.00	8.33

HYDROGRAPH SUMMARY REPORTS – WATER QUALITY STORM

Watershed Model Schematic



Legend

Hyd.	Origin	Description
1	SCS Runoff	Prop DA East - Perv Pvmt West (Imp)
2	SCS Runoff	Prop DA East - Perv Pvmt West (Perv)
3	Combine	Perv Pvmt West Total
4	Reservoir	Post Rte Pvmt West
6	SCS Runoff	Prop DA East - Perv Pvmt East (Imp)
7	SCS Runoff	Prop DA East - Perv Pvmt East (Perv)
8	Combine	Perv Pvmt East Total
9	Reservoir	Post Rte Pvmt East

Hydraflow Table of Contents

2024-03 WQ.gpw

Hydraflow Hydrographs by Intelisolve v9.1

Thursday, Apr 11, 2024

Watershed Model Schematic 1

Hydrograph Return Period Recap 2

1 - Year

Summary Report 3

Hydrograph Reports 4

Hydrograph No. 1, SCS Runoff, Prop DA East - Perv Pvmt West (Imp) 4

Precipitation Report 5

Hydrograph No. 2, SCS Runoff, Prop DA East - Perv Pvmt West (Perv) 6

Precipitation Report 7

Hydrograph No. 3, Combine, Perv Pvmt West Total 8

Hydrograph No. 4, Reservoir, Post Rte Pvmt West 9

Pond Report - Porous Pavement West 10

Hydrograph No. 6, SCS Runoff, Prop DA East - Perv Pvmt East (Imp) 12

Precipitation Report 13

Hydrograph No. 7, SCS Runoff, Prop DA East - Perv Pvmt East (Perv) 14

Precipitation Report 15

Hydrograph No. 8, Combine, Perv Pvmt East Total 16

Hydrograph No. 9, Reservoir, Post Rte Pvmt East 17

Pond Report - Porous Pavement East 18

IDF Report 20

Hydrograph Return Period Recap

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	-----	0.362	---	---	-----	-----	----	---	---	Prop DA East - Perv Pvmt West (Imp)
2	SCS Runoff	-----	0.005	---	---	-----	-----	----	---	---	Prop DA East - Perv Pvmt West (Per
3	Combine	1, 2	0.367	---	---	-----	-----	----	---	---	Perv Pvmt West Total
4	Reservoir	3	0.147	---	---	-----	-----	----	---	---	Post Rte Pvmt West
6	SCS Runoff	-----	1.319	---	---	-----	-----	----	---	---	Prop DA East - Perv Pvmt East (Imp)
7	SCS Runoff	-----	0.025	---	---	-----	-----	----	---	---	Prop DA East - Perv Pvmt East (Perv
8	Combine	4, 6, 7	1.476	---	---	-----	-----	----	---	---	Perv Pvmt East Total
9	Reservoir	8	0.215	---	---	-----	-----	----	---	---	Post Rte Pvmt East

Hydrograph Summary Report

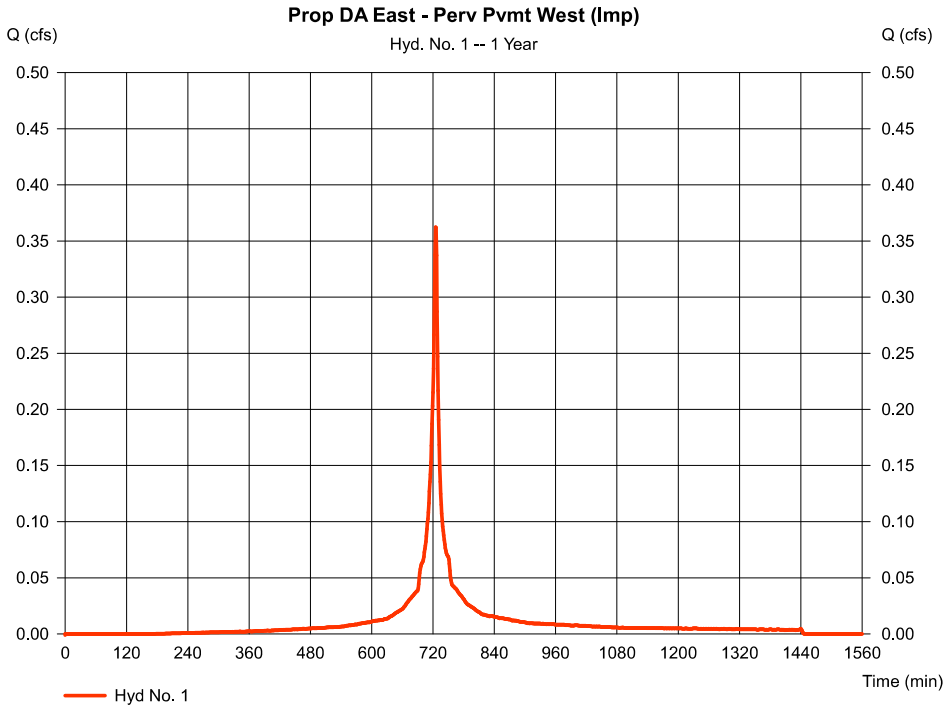
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Hyd. volume (acft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (acft)	Hydrograph description
1	SCS Runoff	0.362	1	725	0.024	---	-----	----	Prop DA East - Perv Pvmt West (Imp)
2	SCS Runoff	0.005	1	727	0.000	---	-----	----	Prop DA East - Perv Pvmt West (Per
3	Combine	0.367	1	726	0.025	1, 2	-----	----	Perv Pvmt West Total
4	Reservoir	0.147	1	733	0.024	3	64.01	0.008	Post Rte Pvmt West
6	SCS Runoff	1.319	1	728	0.105	---	-----	----	Prop DA East - Perv Pvmt East (Imp)
7	SCS Runoff	0.025	1	731	0.003	---	-----	----	Prop DA East - Perv Pvmt East (Perv
8	Combine	1.476	1	729	0.132	4, 6, 7	-----	----	Perv Pvmt East Total
9	Reservoir	0.215	1	781	0.128	8	60.46	0.067	Post Rte Pvmt East

Hydrograph Report

Hyd. No. 1

Prop DA East - Perv Pvmt West (Imp)

Hydrograph type	= SCS Runoff	Peak discharge	= 0.362 cfs
Storm frequency	= 1 yrs	Time to peak	= 725 min
Time interval	= 1 min	Hyd. volume	= 0.024 acft
Drainage area	= 0.280 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 4.20 min
Total precip.	= 1.25 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds	Shape factor	= 484

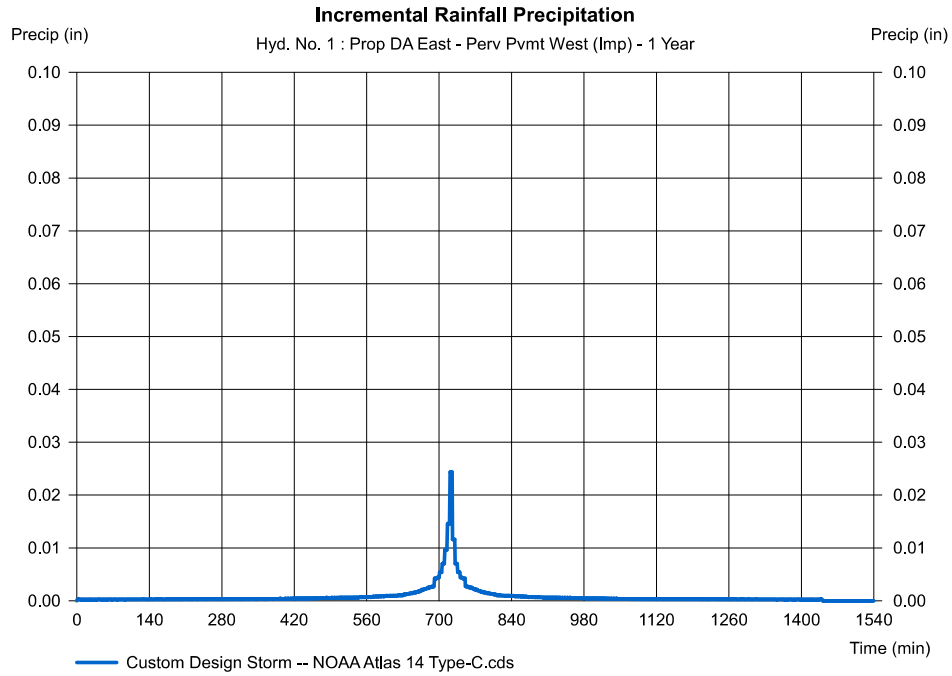


Precipitation Report

Hyd. No. 1

Prop DA East - Perv Pvmt West (Imp)

Storm Frequency	= 1 yrs	Time interval	= 1 min
Total precip.	= 1.2500 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds		

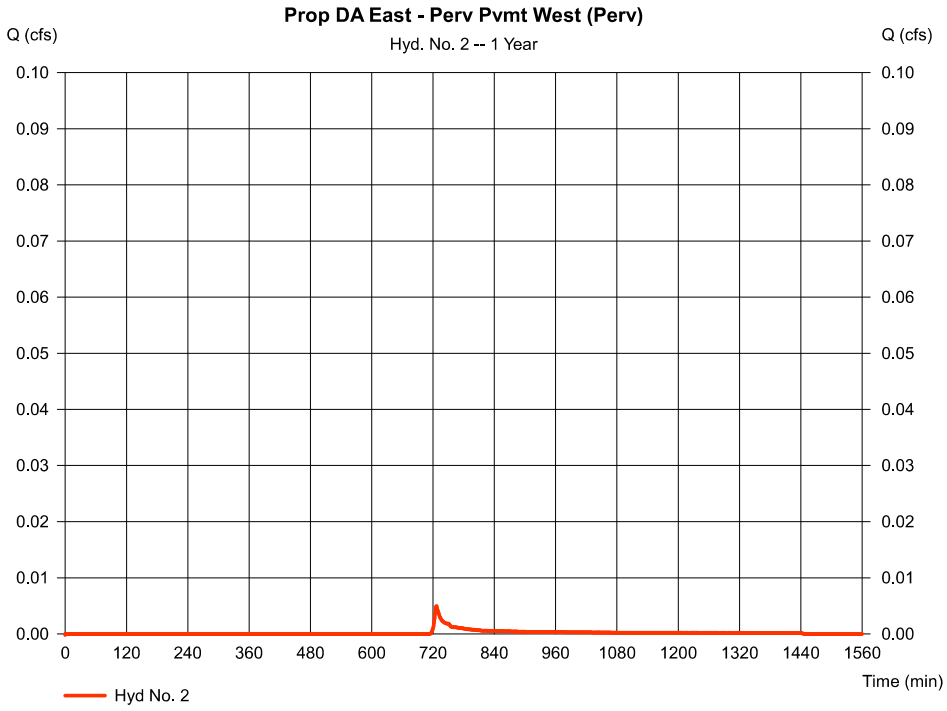


Hydrograph Report

Hyd. No. 2

Prop DA East - Perv Pvmt West (Perv)

Hydrograph type	= SCS Runoff	Peak discharge	= 0.005 cfs
Storm frequency	= 1 yrs	Time to peak	= 727 min
Time interval	= 1 min	Hyd. volume	= 0.000 acft
Drainage area	= 0.030 ac	Curve number	= 80
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 4.20 min
Total precip.	= 1.25 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds	Shape factor	= 484

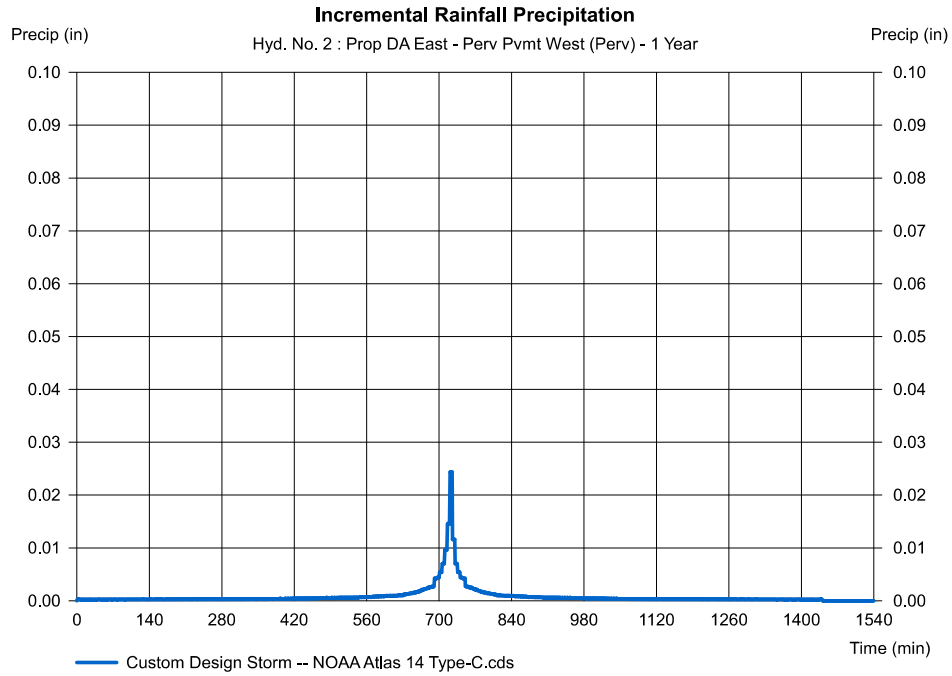


Precipitation Report

Hyd. No. 2

Prop DA East - Perv Pvmt West (Perv)

Storm Frequency	= 1 yrs	Time interval	= 1 min
Total precip.	= 1.2500 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds		

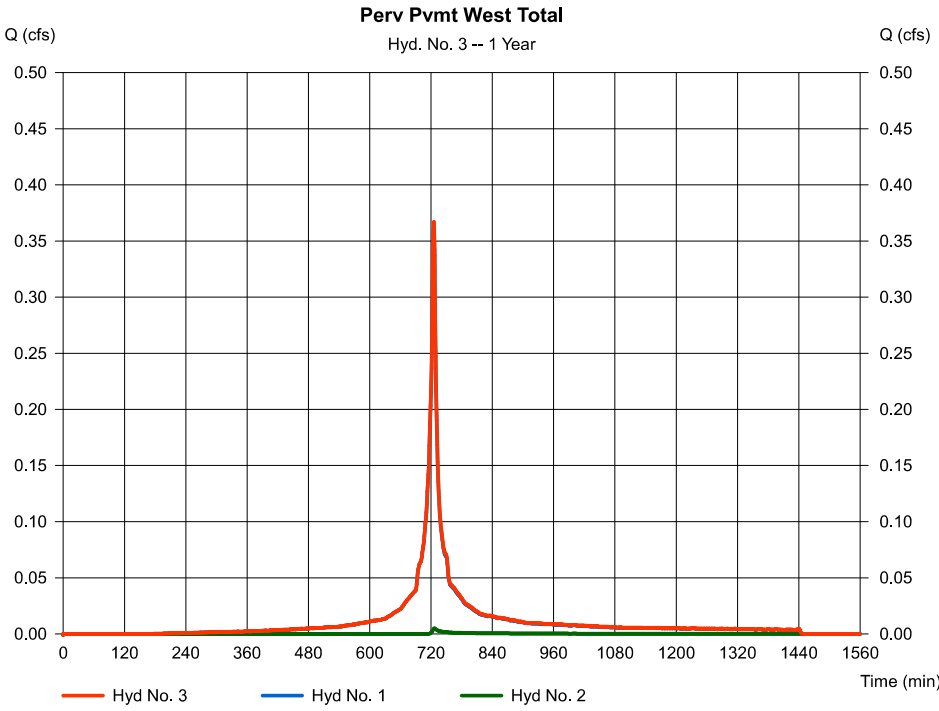


Hydrograph Report

Hyd. No. 3

Perv Pvmt West Total

Hydrograph type	= Combine	Peak discharge	= 0.367 cfs
Storm frequency	= 1 yrs	Time to peak	= 726 min
Time interval	= 1 min	Hyd. volume	= 0.025 acft
Inflow hyds.	= 1, 2	Contrib. drain. area	= 0.310 ac



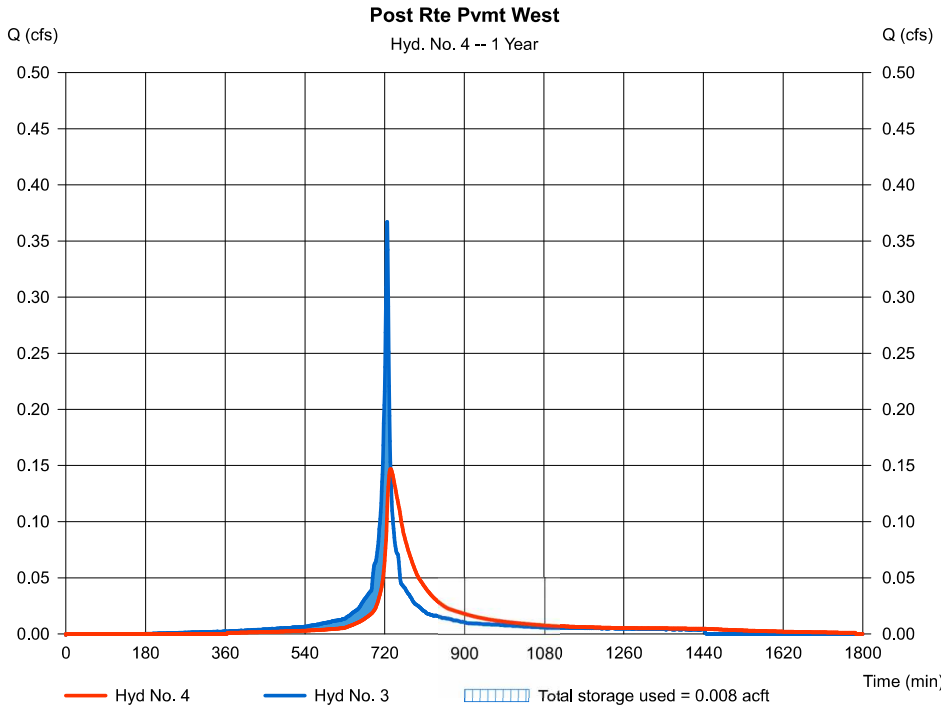
Hydrograph Report

Hyd. No. 4

Post Rte Pvmt West

Hydrograph type	= Reservoir	Peak discharge	= 0.147 cfs
Storm frequency	= 1 yrs	Time to peak	= 733 min
Time interval	= 1 min	Hyd. volume	= 0.024 acft
Inflow hyd. No.	= 3 - Perv Pvmt West Total	Max. Elevation	= 64.01 ft
Reservoir name	= Porous Pavement West	Max. Storage	= 0.008 acft

Storage Indication method used.



Pond Report

Hydraflow Hydrographs by Intelisolve v9.1 — Thursday, Apr 11, 2024

Pond No. 3 - Porous Pavement West

Pond Data

Contours - User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 63.75 ft. Voids = 40.00%

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (acft)	Total storage (acft)
0.00	63.75	3,460	0.000	0.000
0.50	64.25	3,461	0.016	0.016
1.00	64.75	3,462	0.016	0.032
1.50	65.25	3,463	0.016	0.048
1.75	65.50	3,464	0.008	0.056

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 18.00	6.00	0.00	0.00
Span (in)	= 18.00	6.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 63.75	63.76	0.00	0.00
Length (ft)	= 50.00	0.00	0.00	0.00
Slope (%)	= 0.50	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	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 4.00	0.00	0.00	0.00
Crest El. (ft)	= 64.75	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= Rect	---	---	---
Multi-Stage	= Yes	No	No	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	63.75	0.00	0.00	---	---	0.00	---	---	---	---	---	0.00
0.05	0.002	63.80	0.01 ic	0.01 ic	---	---	0.00	---	---	---	---	---	0.01
0.10	0.003	63.85	0.02 ic	0.02 ic	---	---	0.00	---	---	---	---	---	0.02
0.15	0.005	63.90	0.05 ic	0.05 ic	---	---	0.00	---	---	---	---	---	0.05
0.20	0.006	63.95	0.09 ic	0.09 ic	---	---	0.00	---	---	---	---	---	0.09
0.25	0.008	64.00	0.14 ic	0.14 ic	---	---	0.00	---	---	---	---	---	0.14
0.30	0.010	64.05	0.20 ic	0.19 ic	---	---	0.00	---	---	---	---	---	0.19
0.35	0.011	64.10	0.25 ic	0.25 ic	---	---	0.00	---	---	---	---	---	0.25
0.40	0.013	64.15	0.32 ic	0.32 ic	---	---	0.00	---	---	---	---	---	0.32
0.45	0.014	64.20	0.38 ic	0.38 ic	---	---	0.00	---	---	---	---	---	0.38
0.50	0.016	64.25	0.44 ic	0.44 ic	---	---	0.00	---	---	---	---	---	0.44
0.55	0.017	64.30	0.49 ic	0.47 ic	---	---	0.00	---	---	---	---	---	0.47
0.60	0.019	64.35	0.52 ic	0.51 ic	---	---	0.00	---	---	---	---	---	0.51
0.65	0.021	64.40	0.55 ic	0.54 ic	---	---	0.00	---	---	---	---	---	0.54
0.70	0.022	64.45	0.58 ic	0.58 ic	---	---	0.00	---	---	---	---	---	0.58
0.75	0.024	64.50	0.62 ic	0.61 ic	---	---	0.00	---	---	---	---	---	0.61
0.80	0.025	64.55	0.65 ic	0.64 ic	---	---	0.00	---	---	---	---	---	0.64
0.85	0.027	64.60	0.69 ic	0.66 ic	---	---	0.00	---	---	---	---	---	0.66
0.90	0.029	64.65	0.69 ic	0.69 ic	---	---	0.00	---	---	---	---	---	0.69
0.95	0.030	64.70	0.72 ic	0.72 ic	---	---	0.00	---	---	---	---	---	0.72
1.00	0.032	64.75	0.76 ic	0.75 ic	---	---	0.00	---	---	---	---	---	0.75
1.05	0.033	64.80	0.93 ic	0.75 ic	---	---	0.15	---	---	---	---	---	0.90
1.10	0.035	64.85	1.17 ic	0.74 ic	---	---	0.42	---	---	---	---	---	1.17
1.15	0.037	64.90	1.53 oc	0.72 ic	---	---	0.77	---	---	---	---	---	1.50
1.20	0.038	64.95	1.93 oc	0.70 ic	---	---	1.19	---	---	---	---	---	1.89
1.25	0.040	65.00	2.34 oc	0.67 ic	---	---	1.67	---	---	---	---	---	2.33
1.30	0.041	65.05	2.85 oc	0.62 ic	---	---	2.19	---	---	---	---	---	2.81
1.35	0.043	65.10	3.33 oc	0.57 ic	---	---	2.76	---	---	---	---	---	3.33
1.40	0.044	65.15	3.75 oc	0.53 ic	---	---	3.23 s	---	---	---	---	---	3.75
1.45	0.046	65.20	4.07 oc	0.49 ic	---	---	3.58 s	---	---	---	---	---	4.07
1.50	0.048	65.25	4.32 oc	0.45 ic	---	---	3.87 s	---	---	---	---	---	4.32
1.53	0.048	65.28	4.45 oc	0.44 ic	---	---	4.00 s	---	---	---	---	---	4.43
1.55	0.049	65.30	4.53 oc	0.42 ic	---	---	4.11 s	---	---	---	---	---	4.53
1.58	0.050	65.33	4.60 oc	0.40 ic	---	---	4.20 s	---	---	---	---	---	4.60
1.60	0.051	65.35	4.65 oc	0.38 ic	---	---	4.26 s	---	---	---	---	---	4.65
1.63	0.052	65.38	4.64 oc	0.36 ic	---	---	4.28 s	---	---	---	---	---	4.64
1.65	0.052	65.40	4.71 oc	0.35 ic	---	---	4.36 s	---	---	---	---	---	4.71
1.68	0.053	65.43	4.92 oc	0.35 ic	---	---	4.57 s	---	---	---	---	---	4.92
1.70	0.054	65.45	5.12 oc	0.35 ic	---	---	4.77 s	---	---	---	---	---	5.12

Continues on next page...

Porous Pavement West

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
1.73	0.055	65.48	5.32 oc	0.35 ic	---	---	4.97 s	---	---	---	---	---	5.32
1.75	0.056	65.50	5.51 oc	0.35 ic	---	---	5.16 s	---	---	---	---	---	5.51

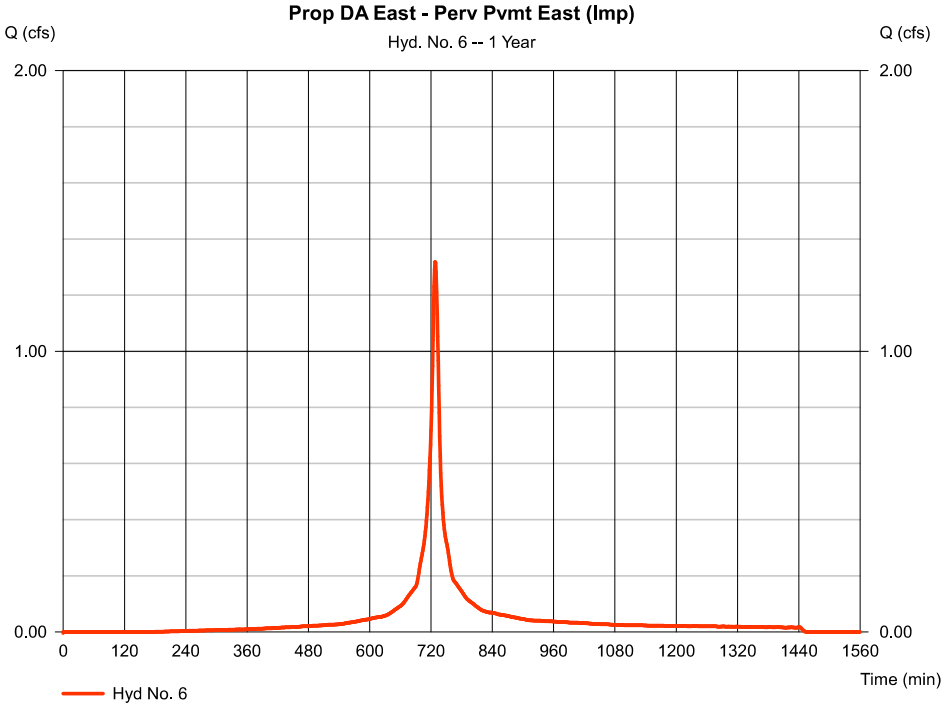
...End

Hydrograph Report

Hyd. No. 6

Prop DA East - Perv Pvmt East (Imp)

Hydrograph type	= SCS Runoff	Peak discharge	= 1.319 cfs
Storm frequency	= 1 yrs	Time to peak	= 728 min
Time interval	= 1 min	Hyd. volume	= 0.105 acft
Drainage area	= 1.220 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 9.20 min
Total precip.	= 1.25 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds	Shape factor	= 484

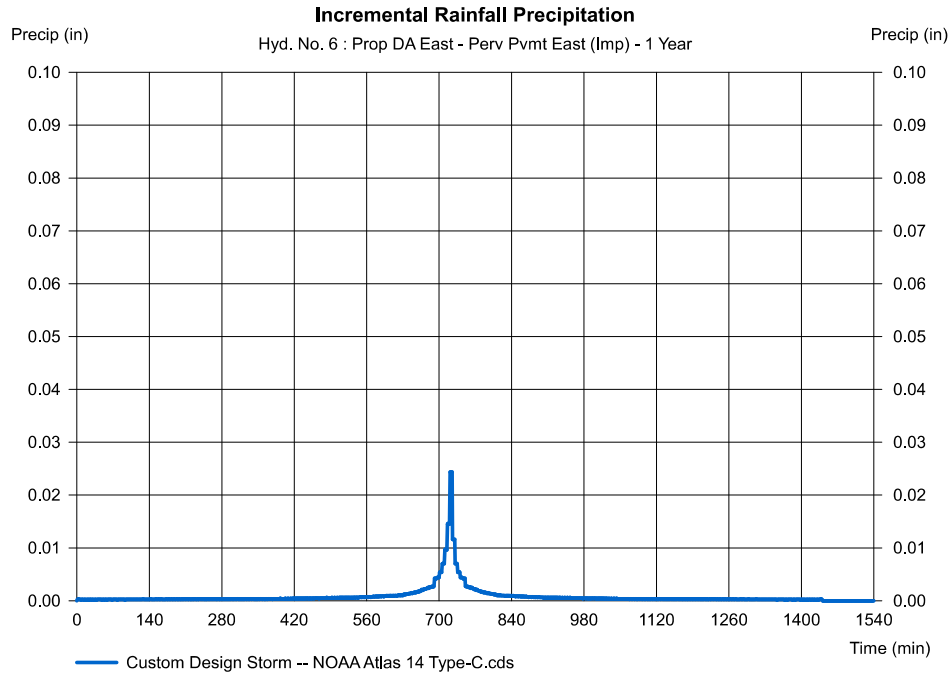


Precipitation Report

Hyd. No. 6

Prop DA East - Perv Pvmt East (Imp)

Storm Frequency	= 1 yrs	Time interval	= 1 min
Total precip.	= 1.2500 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds		

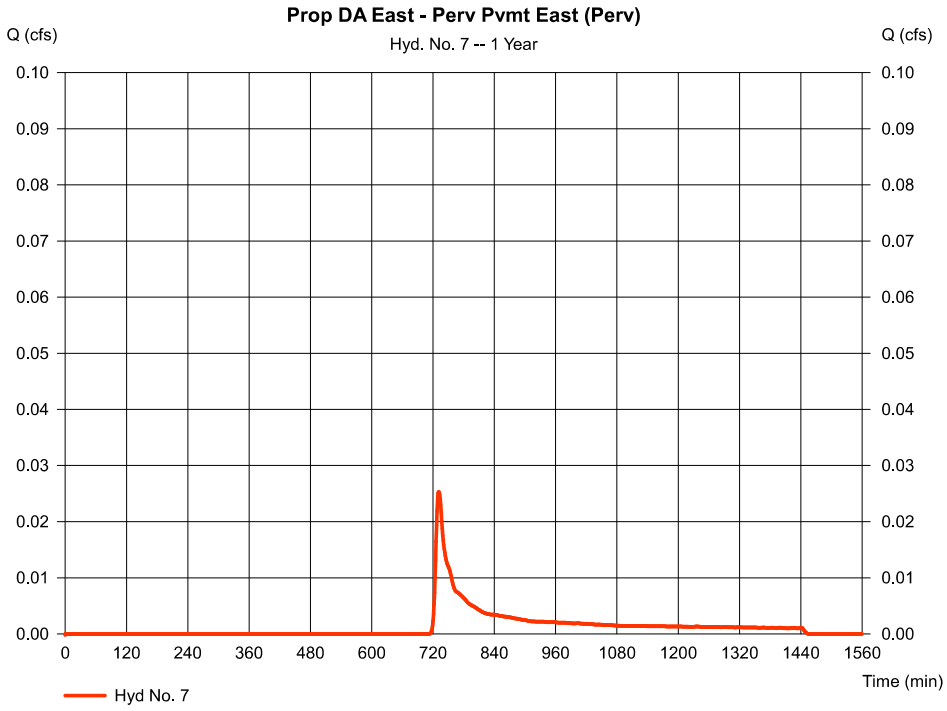


Hydrograph Report

Hyd. No. 7

Prop DA East - Perv Pvmt East (Perv)

Hydrograph type	= SCS Runoff	Peak discharge	= 0.025 cfs
Storm frequency	= 1 yrs	Time to peak	= 731 min
Time interval	= 1 min	Hyd. volume	= 0.003 acft
Drainage area	= 0.190 ac	Curve number	= 80
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 9.20 min
Total precip.	= 1.25 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds	Shape factor	= 484

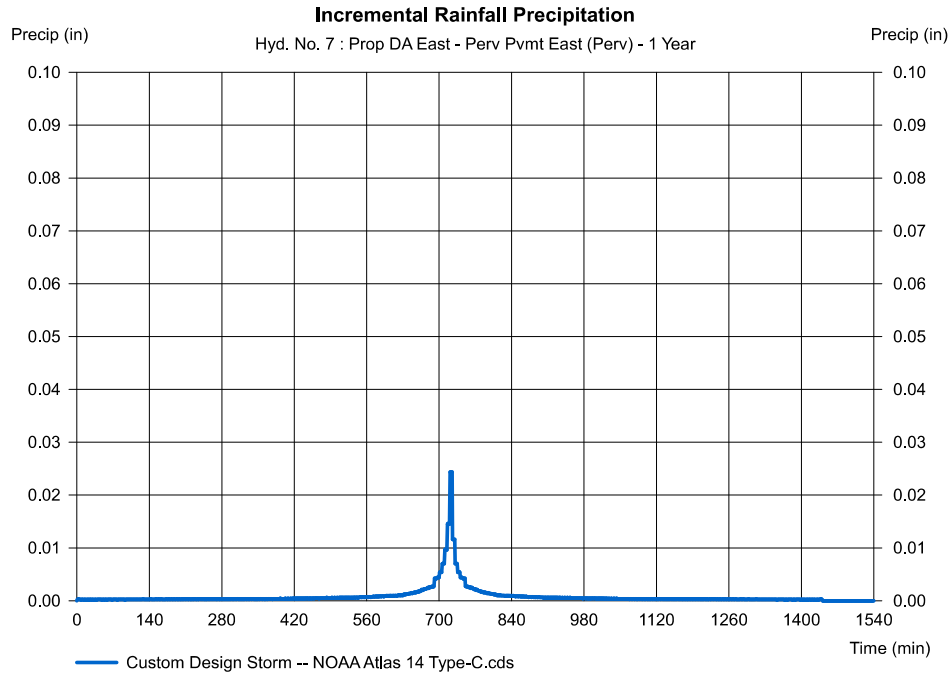


Precipitation Report

Hyd. No. 7

Prop DA East - Perv Pvmt East (Perv)

Storm Frequency	= 1 yrs	Time interval	= 1 min
Total precip.	= 1.2500 in	Distribution	= Custom
Storm duration	= NOAA Atlas 14 Type-C.cds		

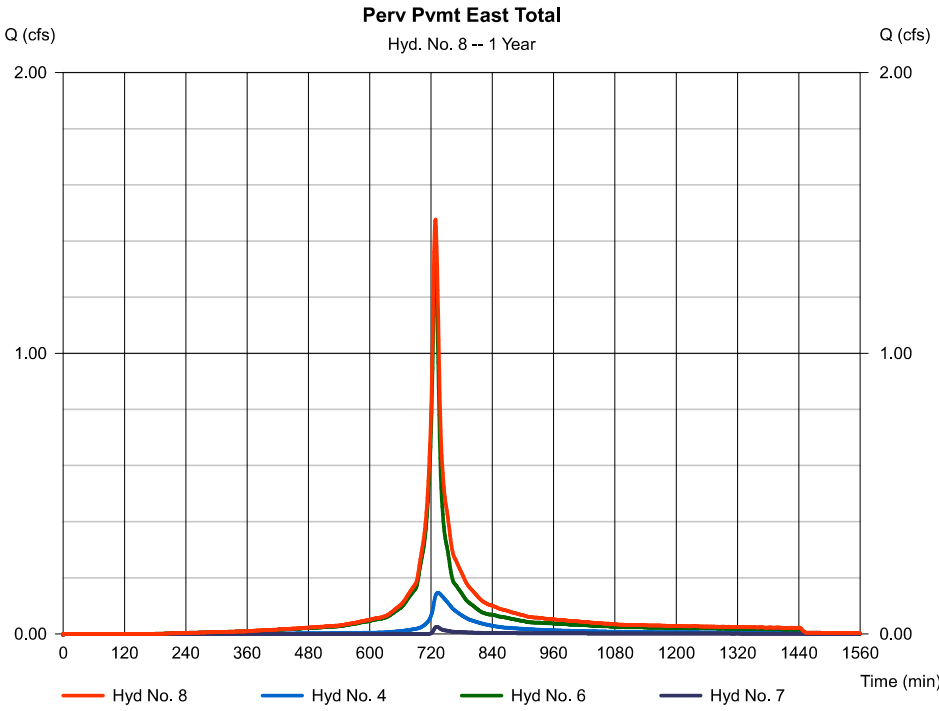


Hydrograph Report

Hyd. No. 8

Perv Pvmt East Total

Hydrograph type	= Combine	Peak discharge	= 1.476 cfs
Storm frequency	= 1 yrs	Time to peak	= 729 min
Time interval	= 1 min	Hyd. volume	= 0.132 acft
Inflow hyds.	= 4, 6, 7	Contrib. drain. area	= 1.410 ac



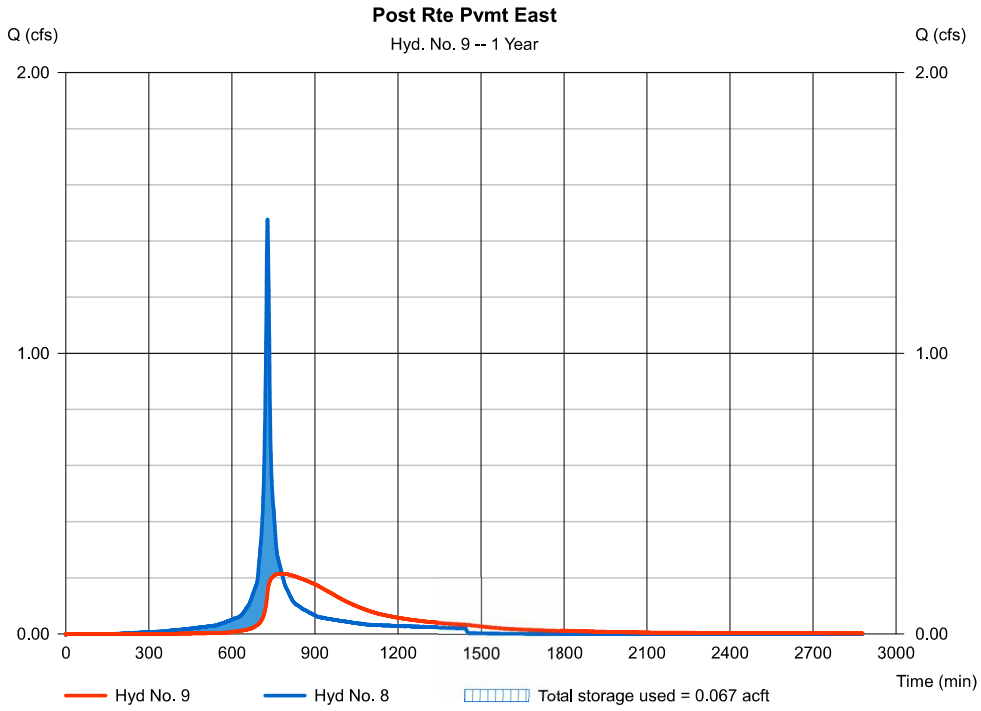
Hydrograph Report

Hyd. No. 9

Post Rte Pvmt East

Hydrograph type	= Reservoir	Peak discharge	= 0.215 cfs
Storm frequency	= 1 yrs	Time to peak	= 781 min
Time interval	= 1 min	Hyd. volume	= 0.128 acft
Inflow hyd. No.	= 8 - Perv Pvmt East Total	Max. Elevation	= 60.46 ft
Reservoir name	= Porous Pavement East	Max. Storage	= 0.067 acft

Storage Indication method used.



Pond Report

Pond No. 1 - Porous Pavement East

Pond Data

Contours - User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 60.00 ft. Voids = 40.00%

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (acft)	Total storage (acft)
0.00	60.00	15,917	0.000	0.000
0.50	60.50	15,917	0.073	0.073
1.00	61.00	15,917	0.073	0.146
1.50	61.50	15,917	0.073	0.219
2.00	62.00	15,917	0.073	0.292
2.50	62.50	15,917	0.073	0.365
3.00	63.00	15,917	0.073	0.438
3.50	63.50	15,917	0.073	0.512

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 18.00	4.00	0.00	0.00
Span (in)	= 18.00	4.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 60.00	60.01	0.00	0.00
Length (ft)	= 50.00	0.00	0.00	0.00
Slope (%)	= 0.50	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	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 3.00	0.00	0.00	0.00
Crest El. (ft)	= 62.50	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= Rect	---	---	---
Multi-Stage	= Yes	No	No	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	60.00	0.00	0.00	---	---	0.00	---	---	---	---	---	0.00
0.05	0.007	60.05	0.00 ic	0.00 ic	---	---	0.00	---	---	---	---	---	0.00
0.10	0.015	60.10	0.02 ic	0.02 ic	---	---	0.00	---	---	---	---	---	0.02
0.15	0.022	60.15	0.05 ic	0.04 ic	---	---	0.00	---	---	---	---	---	0.04
0.20	0.029	60.20	0.07 ic	0.07 ic	---	---	0.00	---	---	---	---	---	0.07
0.25	0.037	60.25	0.11 ic	0.11 ic	---	---	0.00	---	---	---	---	---	0.11
0.30	0.044	60.30	0.14 ic	0.14 ic	---	---	0.00	---	---	---	---	---	0.14
0.35	0.051	60.35	0.18 ic	0.17 ic	---	---	0.00	---	---	---	---	---	0.17
0.40	0.058	60.40	0.20 ic	0.19 ic	---	---	0.00	---	---	---	---	---	0.19
0.45	0.066	60.45	0.22 ic	0.21 ic	---	---	0.00	---	---	---	---	---	0.21
0.50	0.073	60.50	0.23 ic	0.23 ic	---	---	0.00	---	---	---	---	---	0.23
0.55	0.080	60.55	0.25 ic	0.24 ic	---	---	0.00	---	---	---	---	---	0.24
0.60	0.088	60.60	0.27 ic	0.26 ic	---	---	0.00	---	---	---	---	---	0.26
0.65	0.095	60.65	0.27 ic	0.27 ic	---	---	0.00	---	---	---	---	---	0.27
0.70	0.102	60.70	0.29 ic	0.29 ic	---	---	0.00	---	---	---	---	---	0.29
0.75	0.110	60.75	0.31 ic	0.30 ic	---	---	0.00	---	---	---	---	---	0.30
0.80	0.117	60.80	0.31 ic	0.31 ic	---	---	0.00	---	---	---	---	---	0.31
0.85	0.124	60.85	0.33 ic	0.33 ic	---	---	0.00	---	---	---	---	---	0.33
0.90	0.132	60.90	0.34 ic	0.34 ic	---	---	0.00	---	---	---	---	---	0.34
0.95	0.139	60.95	0.36 ic	0.35 ic	---	---	0.00	---	---	---	---	---	0.35
1.00	0.146	61.00	0.36 ic	0.36 ic	---	---	0.00	---	---	---	---	---	0.36
1.05	0.153	61.05	0.38 ic	0.37 ic	---	---	0.00	---	---	---	---	---	0.37
1.10	0.161	61.10	0.38 ic	0.38 ic	---	---	0.00	---	---	---	---	---	0.38
1.15	0.168	61.15	0.41 ic	0.39 ic	---	---	0.00	---	---	---	---	---	0.39
1.20	0.175	61.20	0.41 ic	0.40 ic	---	---	0.00	---	---	---	---	---	0.40
1.25	0.183	61.25	0.41 ic	0.41 ic	---	---	0.00	---	---	---	---	---	0.41
1.30	0.190	61.30	0.43 ic	0.42 ic	---	---	0.00	---	---	---	---	---	0.42
1.35	0.197	61.35	0.43 ic	0.43 ic	---	---	0.00	---	---	---	---	---	0.43
1.40	0.205	61.40	0.46 ic	0.44 ic	---	---	0.00	---	---	---	---	---	0.44
1.45	0.212	61.45	0.46 ic	0.45 ic	---	---	0.00	---	---	---	---	---	0.45
1.50	0.219	61.50	0.46 ic	0.46 ic	---	---	0.00	---	---	---	---	---	0.46
1.55	0.227	61.55	0.49 ic	0.47 ic	---	---	0.00	---	---	---	---	---	0.47
1.60	0.234	61.60	0.49 ic	0.48 ic	---	---	0.00	---	---	---	---	---	0.48
1.65	0.241	61.65	0.49 ic	0.49 ic	---	---	0.00	---	---	---	---	---	0.49
1.70	0.248	61.70	0.50 ic	0.50 ic	---	---	0.00	---	---	---	---	---	0.50
1.75	0.256	61.75	0.52 ic	0.50 ic	---	---	0.00	---	---	---	---	---	0.50

Continues on next page...

Porous Pavement East

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
1.80	0.263	61.80	0.52 ic	0.51 ic	---	---	0.00	---	---	---	---	---	0.51
1.85	0.270	61.85	0.52 ic	0.52 ic	---	---	0.00	---	---	---	---	---	0.52
1.90	0.278	61.90	0.55 ic	0.53 ic	---	---	0.00	---	---	---	---	---	0.53
1.95	0.285	61.95	0.55 ic	0.54 ic	---	---	0.00	---	---	---	---	---	0.54
2.00	0.292	62.00	0.55 ic	0.54 ic	---	---	0.00	---	---	---	---	---	0.54
2.05	0.300	62.05	0.55 ic	0.55 ic	---	---	0.00	---	---	---	---	---	0.55
2.10	0.307	62.10	0.58 ic	0.56 ic	---	---	0.00	---	---	---	---	---	0.56
2.15	0.314	62.15	0.58 ic	0.57 ic	---	---	0.00	---	---	---	---	---	0.57
2.20	0.322	62.20	0.58 ic	0.57 ic	---	---	0.00	---	---	---	---	---	0.57
2.25	0.329	62.25	0.58 ic	0.58 ic	---	---	0.00	---	---	---	---	---	0.58
2.30	0.336	62.30	0.59 ic	0.59 ic	---	---	0.00	---	---	---	---	---	0.59
2.35	0.343	62.35	0.62 ic	0.60 ic	---	---	0.00	---	---	---	---	---	0.60
2.40	0.351	62.40	0.62 ic	0.60 ic	---	---	0.00	---	---	---	---	---	0.60
2.45	0.358	62.45	0.62 ic	0.61 ic	---	---	0.00	---	---	---	---	---	0.61
2.50	0.365	62.50	0.62 ic	0.62 ic	---	---	0.00	---	---	---	---	---	0.62
2.55	0.373	62.55	0.73 ic	0.62 ic	---	---	0.11	---	---	---	---	---	0.73
2.60	0.380	62.60	0.94 ic	0.62 ic	---	---	0.32	---	---	---	---	---	0.93
2.65	0.387	62.65	1.21 ic	0.62 ic	---	---	0.58	---	---	---	---	---	1.20
2.70	0.395	62.70	1.53 oc	0.61 ic	---	---	0.89	---	---	---	---	---	1.51
2.75	0.402	62.75	1.88 oc	0.61 ic	---	---	1.25	---	---	---	---	---	1.86
2.80	0.409	62.80	2.29 oc	0.60 ic	---	---	1.64	---	---	---	---	---	2.24
2.85	0.417	62.85	2.70 oc	0.60 ic	---	---	2.07	---	---	---	---	---	2.67
2.90	0.424	62.90	3.14 oc	0.59 ic	---	---	2.53	---	---	---	---	---	3.12
2.95	0.431	62.95	3.63 oc	0.58 ic	---	---	3.02	---	---	---	---	---	3.59
3.00	0.438	63.00	4.10 oc	0.57 ic	---	---	3.53	---	---	---	---	---	4.10
3.05	0.446	63.05	4.61 oc	0.54 ic	---	---	4.07	---	---	---	---	---	4.61
3.10	0.453	63.10	5.16 oc	0.52 ic	---	---	4.64	---	---	---	---	---	5.16
3.15	0.460	63.15	5.75 oc	0.52 ic	---	---	5.24	---	---	---	---	---	5.75
3.20	0.468	63.20	6.36 oc	0.51 ic	---	---	5.85	---	---	---	---	---	6.36
3.25	0.475	63.25	6.99 oc	0.50 ic	---	---	6.49	---	---	---	---	---	6.99
3.30	0.482	63.30	7.64 oc	0.49 ic	---	---	7.15	---	---	---	---	---	7.64
3.35	0.490	63.35	8.30 oc	0.47 ic	---	---	7.83	---	---	---	---	---	8.30
3.40	0.497	63.40	8.99 oc	0.46 ic	---	---	8.53	---	---	---	---	---	8.99
3.45	0.504	63.45	9.69 oc	0.44 ic	---	---	9.25	---	---	---	---	---	9.69
3.50	0.512	63.50	10.38 oc	0.41 ic	---	---	9.96 s	---	---	---	---	---	10.38

...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: Mercer 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	3.31	0.00	0.00	5.01	6.19	0.00	8.33
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	3.31	0.00	0.00	5.01	6.19	0.00	8.33

HYDROGRAPH SUMMARY REPORTS – POA WEST
2 YR. 10 YR. 25 YR. & 100 YR.

Multi-Hydrograph Plot

Hyd. No. 3

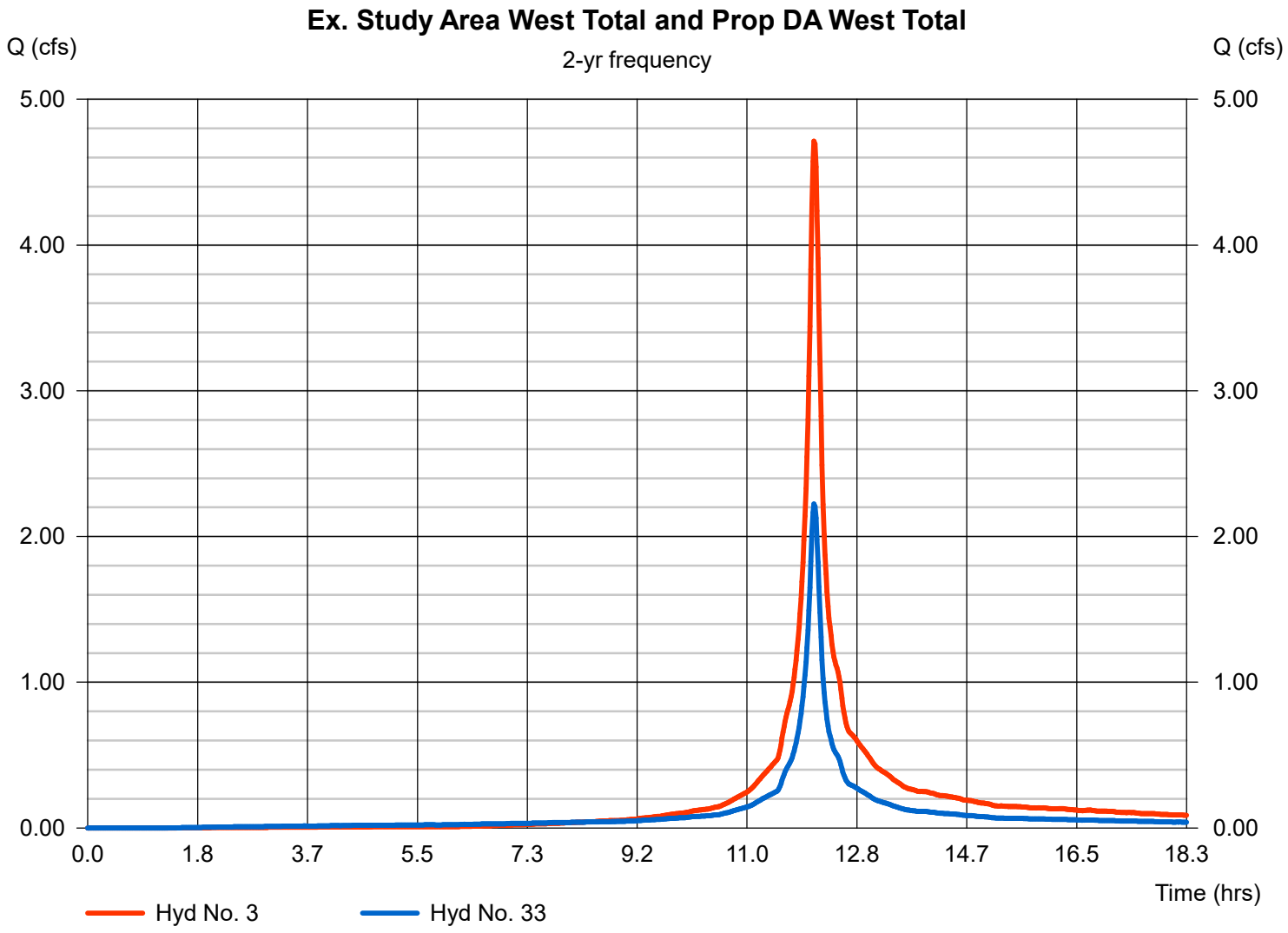
Ex. Study Area West Total

Hydrograph type	=	Combine
Peak discharge	=	4.713 cfs
Time to peak	=	12.12 hrs
Hyd. Volume	=	14,815 cuft

Hyd. No. 33

Prop DA West Total

Hydrograph type	=	Combine
Peak discharge	=	2.22 cfs
Time to peak	=	12.12 hrs
Hyd. Volume	=	7,550 cuft



Multi-Hydrograph Plot

Hyd. No. 3

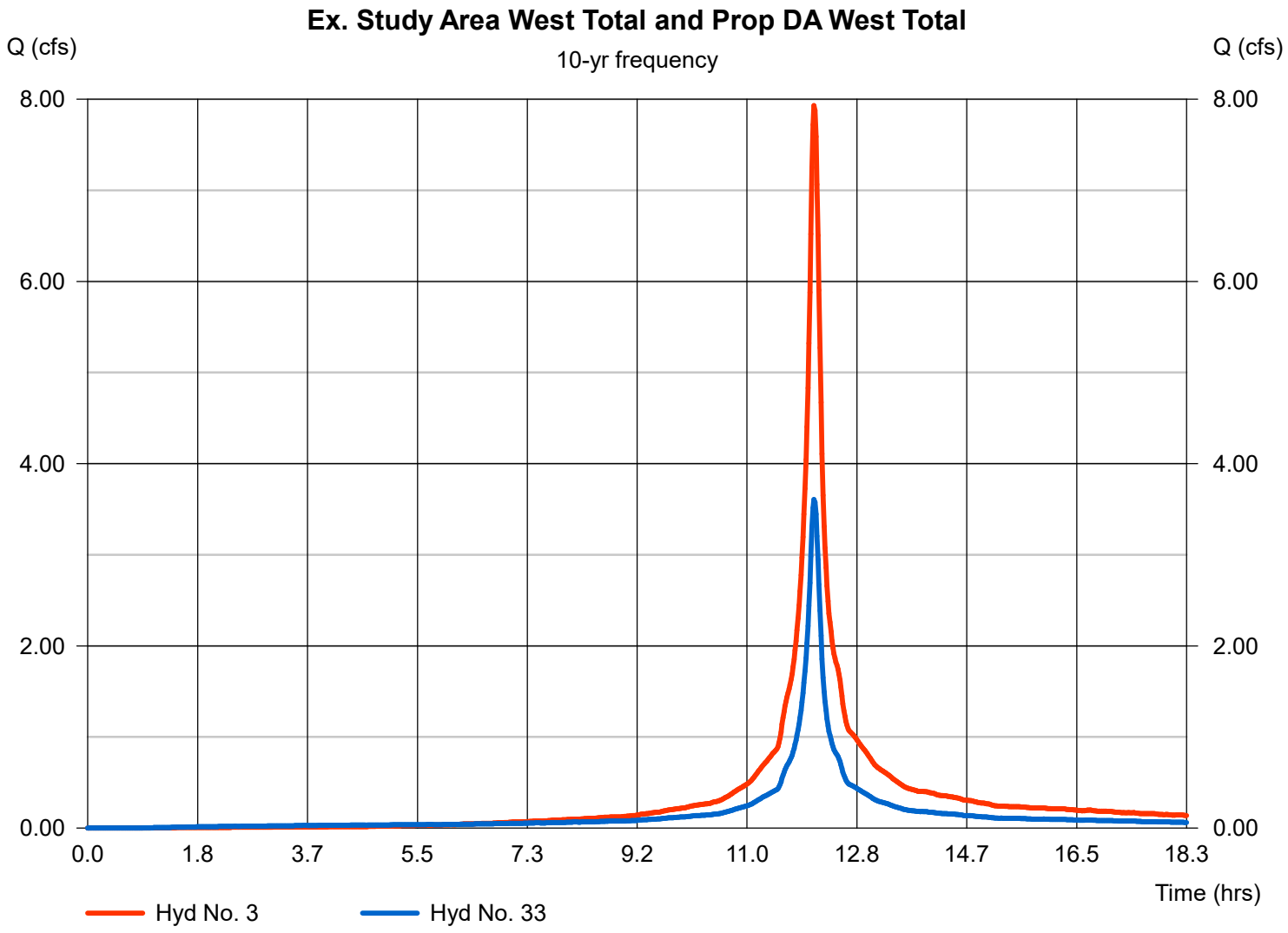
Ex. Study Area West Total

Hydrograph type	=	Combine
Peak discharge	=	7.931 cfs
Time to peak	=	12.12 hrs
Hyd. Volume	=	25,444 cuft

Hyd. No. 33

Prop DA West Total

Hydrograph type	=	Combine
Peak discharge	=	3.61 cfs
Time to peak	=	12.12 hrs
Hyd. Volume	=	12,325 cuft



Multi-Hydrograph Plot

Hyd. No. 3

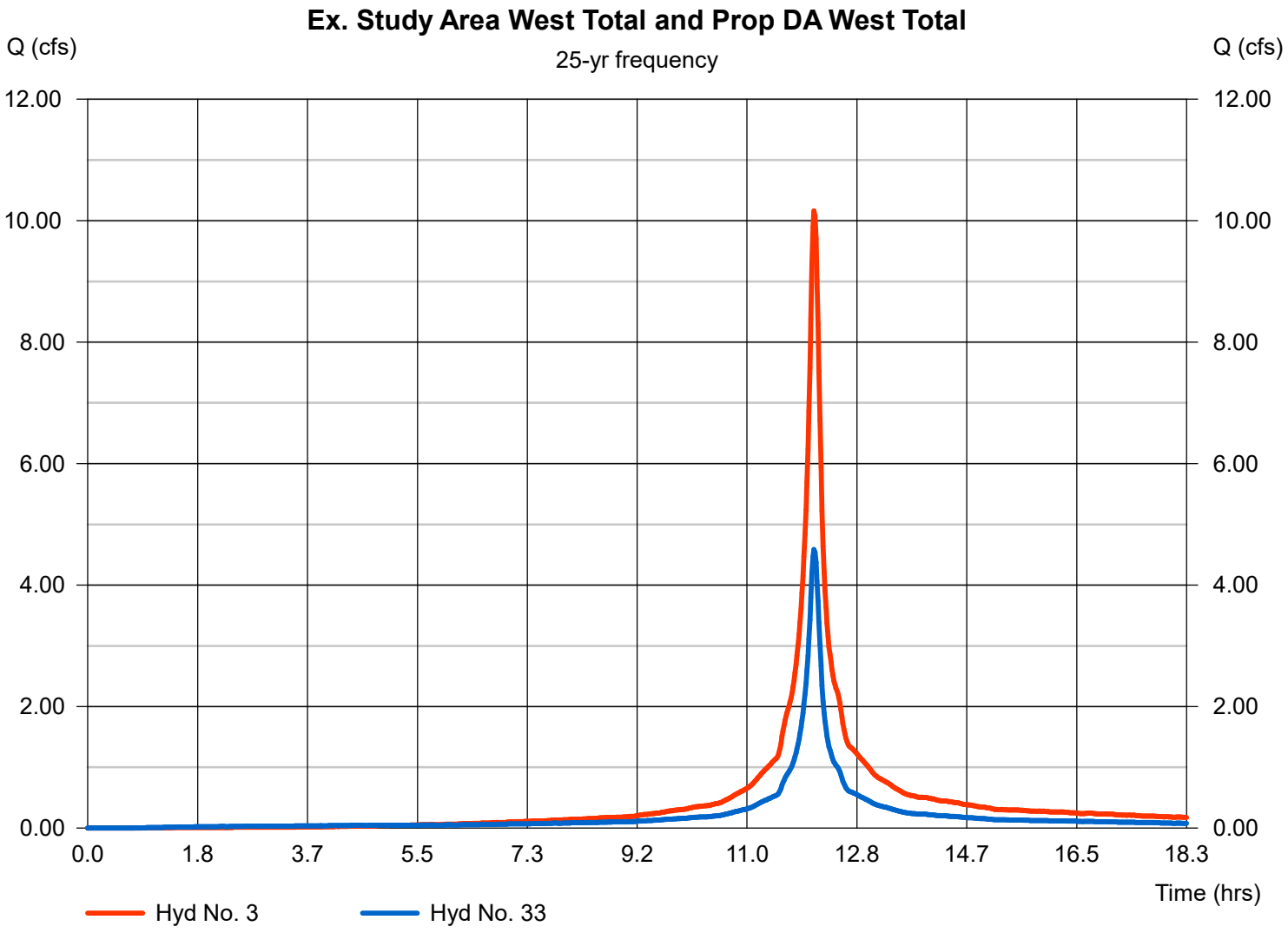
Ex. Study Area West Total

Hydrograph type	=	Combine
Peak discharge	=	10.16 cfs
Time to peak	=	12.12 hrs
Hyd. Volume	=	33,009 cuft

Hyd. No. 33

Prop DA West Total

Hydrograph type	=	Combine
Peak discharge	=	4.58 cfs
Time to peak	=	12.12 hrs
Hyd. Volume	=	15,720 cuft



Multi-Hydrograph Plot

Hyd. No. 3

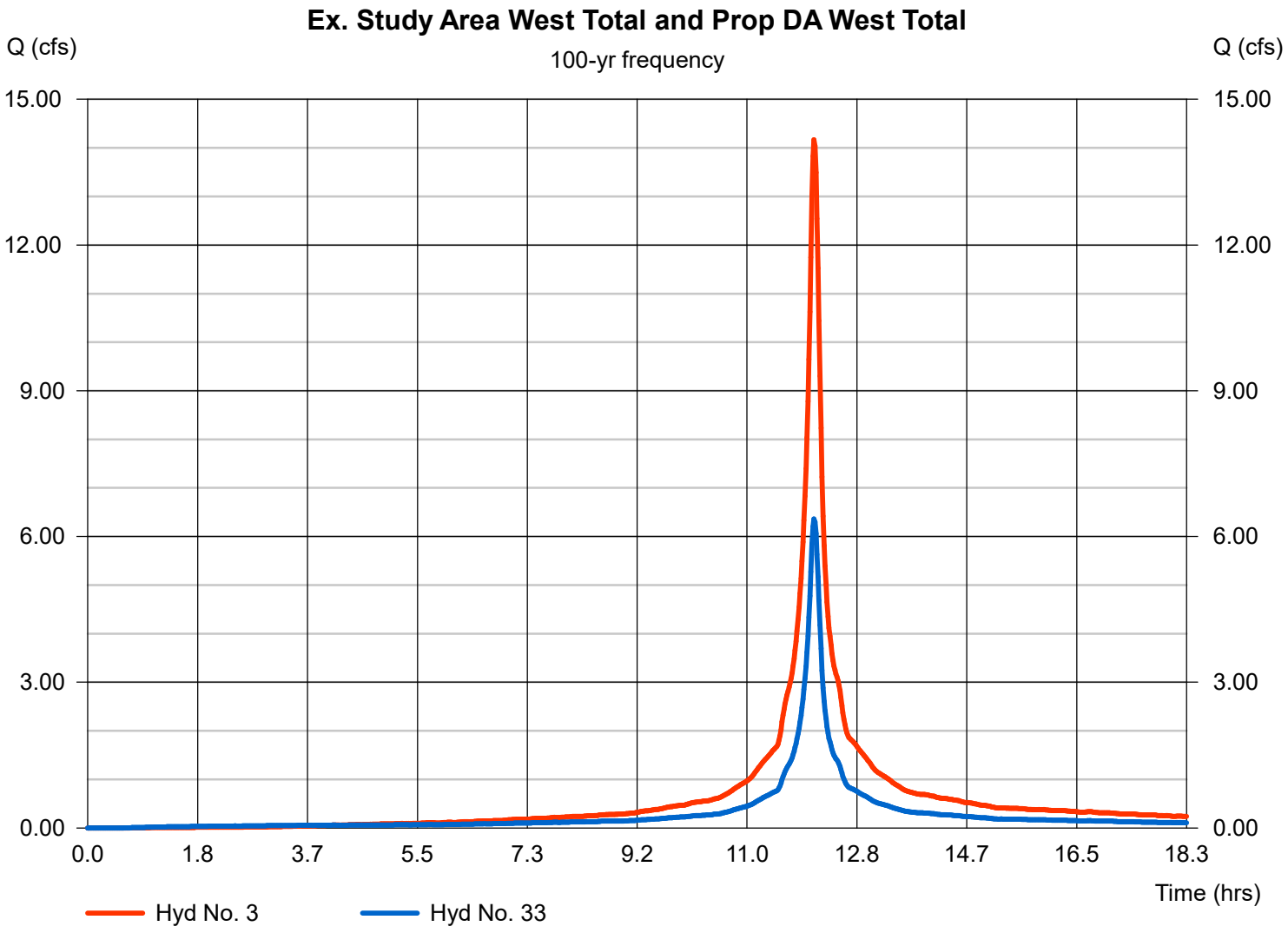
Ex. Study Area West Total

Hydrograph type	=	Combine
Peak discharge	=	14.17 cfs
Time to peak	=	12.12 hrs
Hyd. Volume	=	46,912 cuft

Hyd. No. 33

Prop DA West Total

Hydrograph type	=	Combine
Peak discharge	=	6.36 cfs
Time to peak	=	12.12 hrs
Hyd. Volume	=	21,966 cuft



HYDROGRAPH SUMMARY REPORTS – POA TEXAS AVENUE 2 YR. 10 YR. 25 YR. & 100 YR.

Multi-Hydrograph Plot

Hyd. No. 7

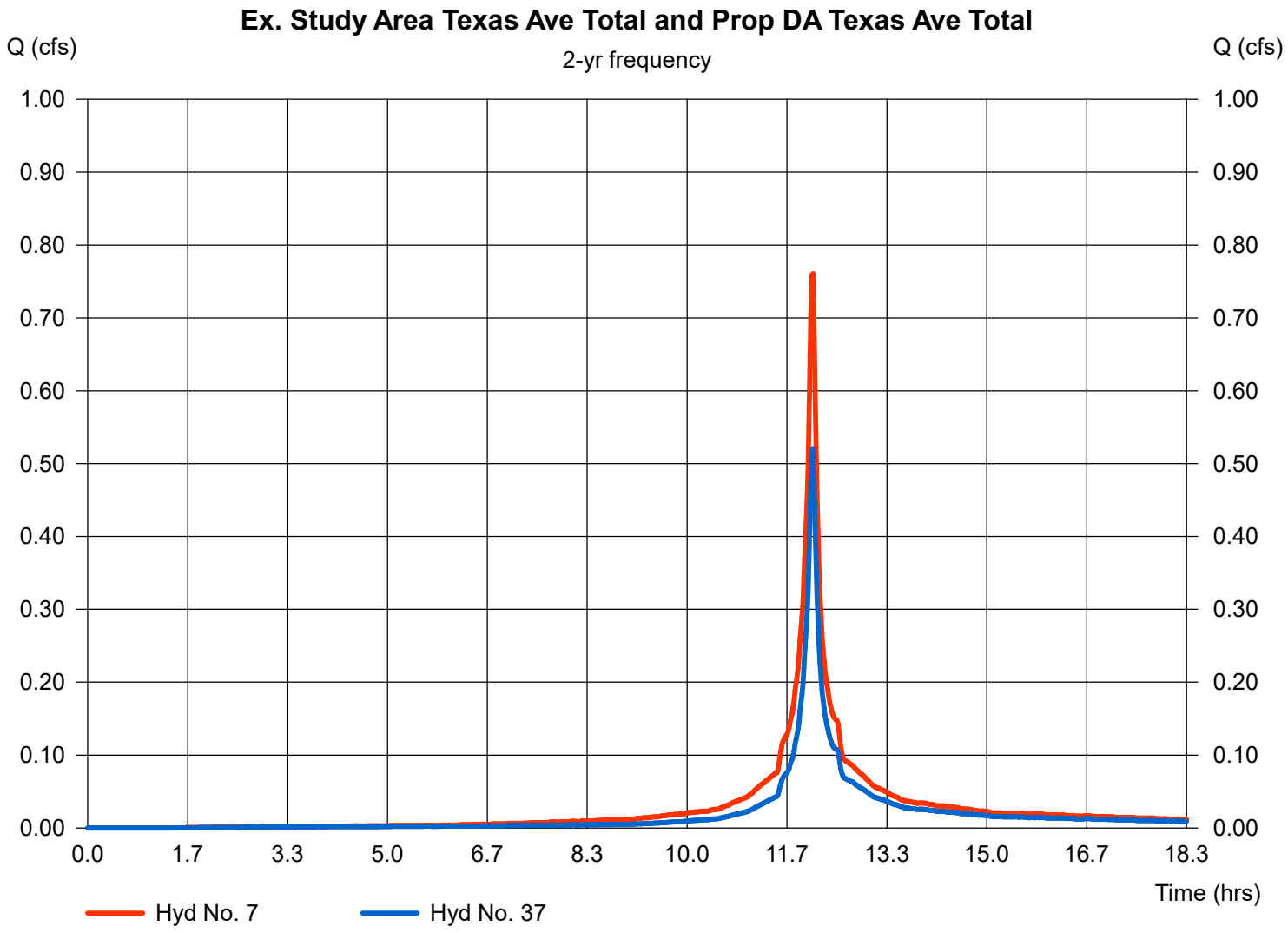
Ex. Study Area Texas Ave Total

Hydrograph type	=	Combine
Peak discharge	=	0.760 cfs
Time to peak	=	12.10 hrs
Hyd. Volume	=	2,193 cuft

Hyd. No. 37

Prop DA Texas Ave Total

Hydrograph type	=	Combine
Peak discharge	=	0.52 cfs
Time to peak	=	12.10 hrs
Hyd. Volume	=	1,480 cuft



Multi-Hydrograph Plot

Hyd. No. 7

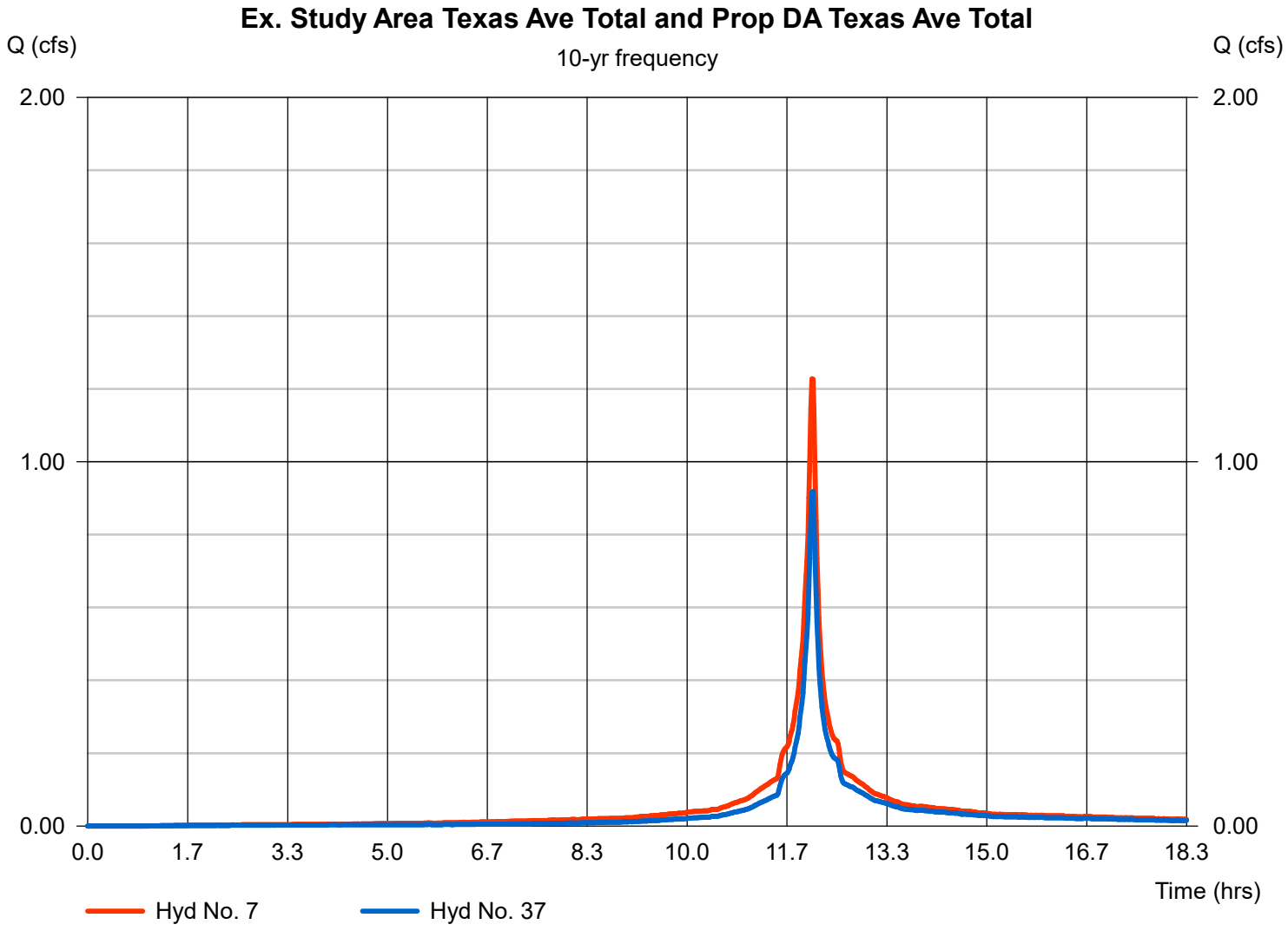
Ex. Study Area Texas Ave Total

Hydrograph type	=	Combine
Peak discharge	=	1.227 cfs
Time to peak	=	12.08 hrs
Hyd. Volume	=	3,618 cuft

Hyd. No. 37

Prop DA Texas Ave Total

Hydrograph type	=	Combine
Peak discharge	=	0.92 cfs
Time to peak	=	12.10 hrs
Hyd. Volume	=	2,620 cuft



Multi-Hydrograph Plot

Hyd. No. 7

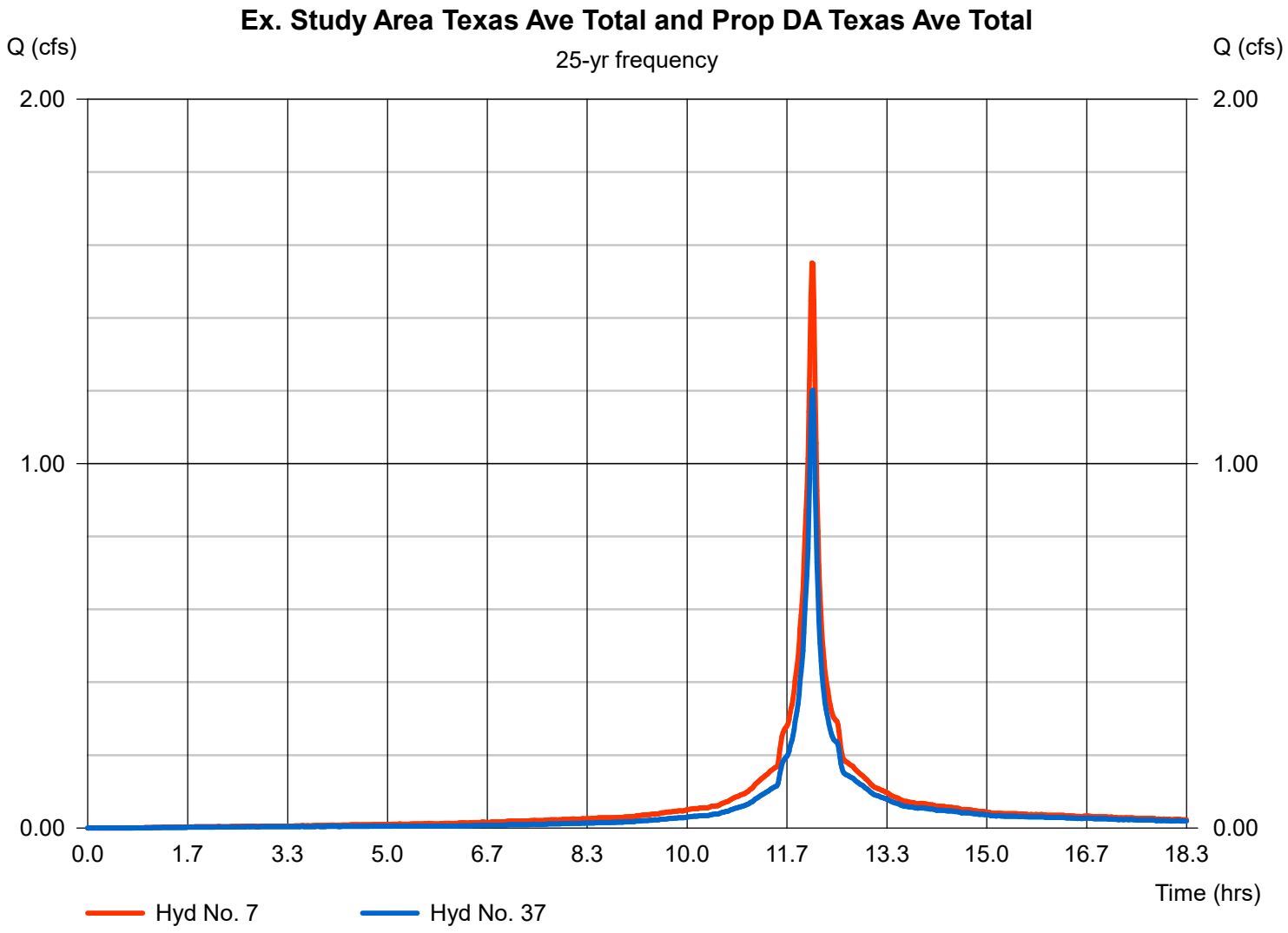
Ex. Study Area Texas Ave Total

Hydrograph type	=	Combine
Peak discharge	=	1.551 cfs
Time to peak	=	12.08 hrs
Hyd. Volume	=	4,623 cuft

Hyd. No. 37

Prop DA Texas Ave Total

Hydrograph type	=	Combine
Peak discharge	=	1.20 cfs
Time to peak	=	12.10 hrs
Hyd. Volume	=	3,449 cuft



Multi-Hydrograph Plot

Hyd. No. 7

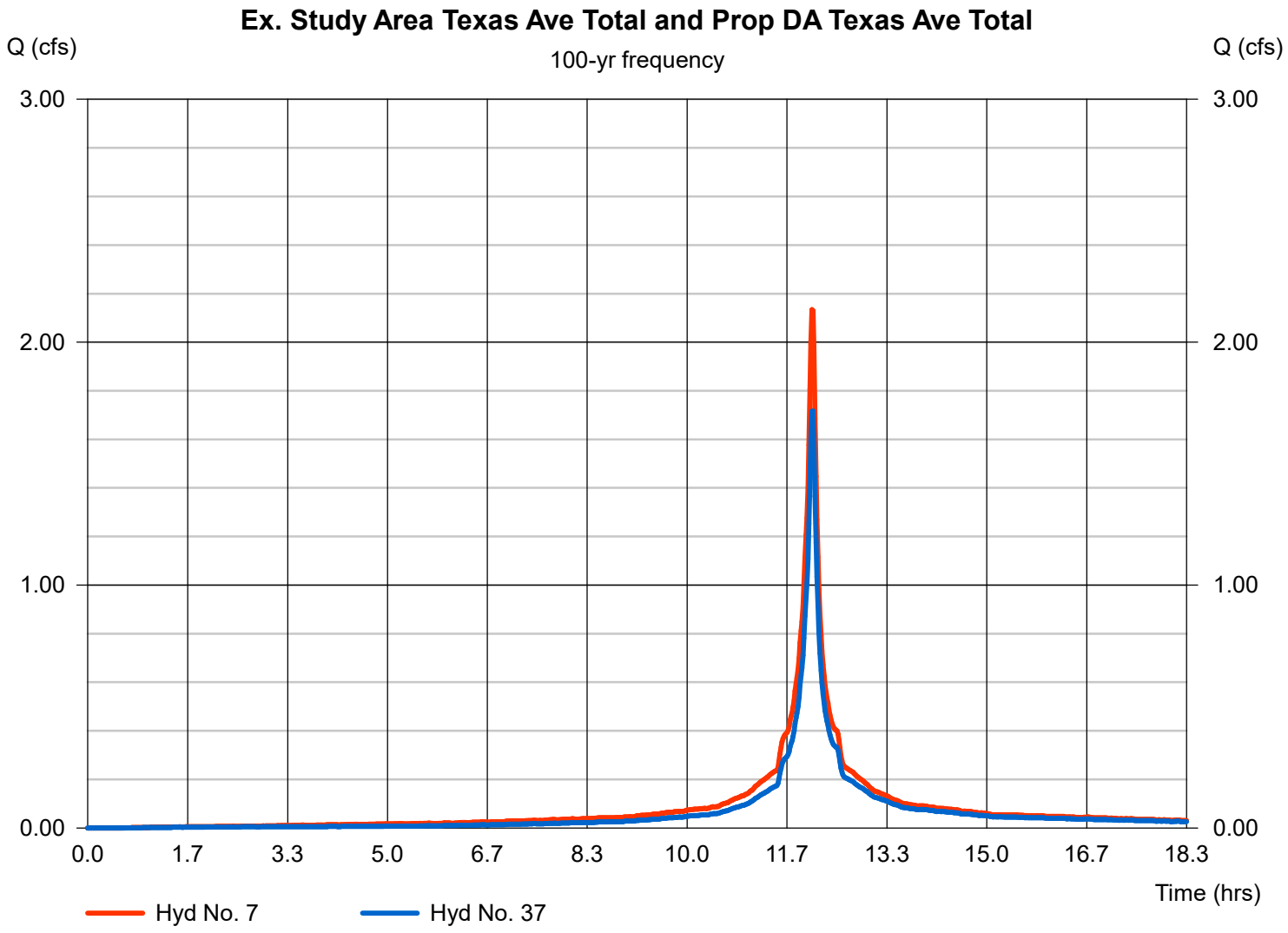
Ex. Study Area Texas Ave Total

Hydrograph type	=	Combine
Peak discharge	=	2.134 cfs
Time to peak	=	12.08 hrs
Hyd. Volume	=	6,460 cuft

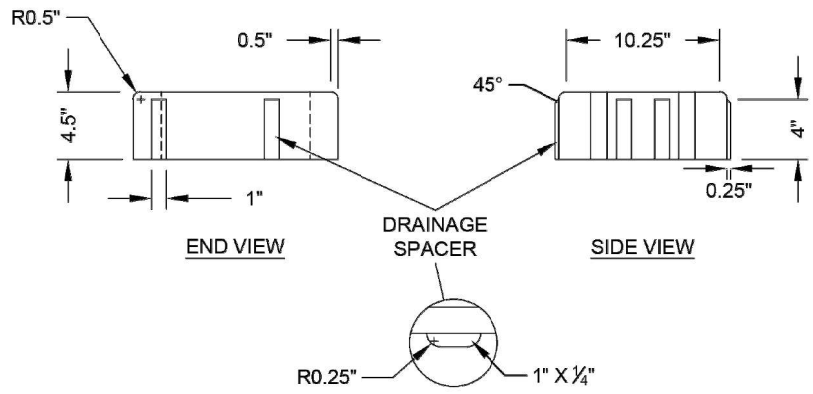
Hyd. No. 37

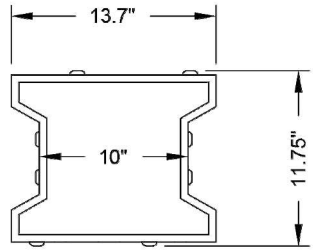
Prop DA Texas Ave Total

Hydrograph type	=	Combine
Peak discharge	=	1.72 cfs
Time to peak	=	12.10 hrs
Hyd. Volume	=	4,994 cuft

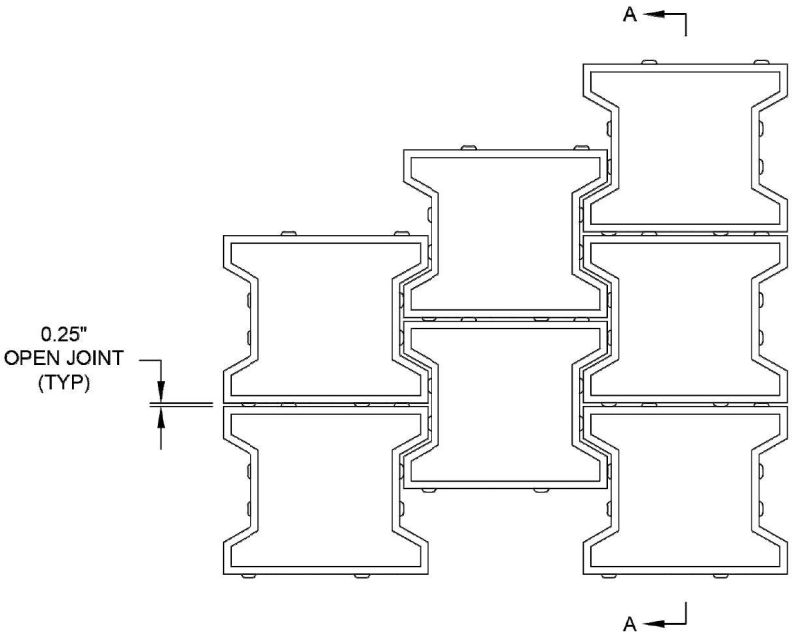


PERVIOUS PAVEMENT SYSTEM DETAILS





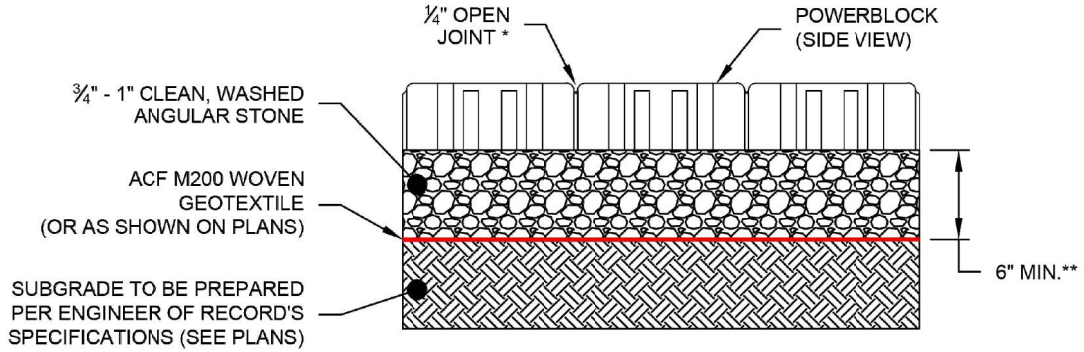
TOP VIEW



TOP VIEW
INTERCONNECTED BLOCKS

* ¼" OPEN JOINTS SHALL BE UNFILLED AND FREE OF STONE/SAND BACKFILL.

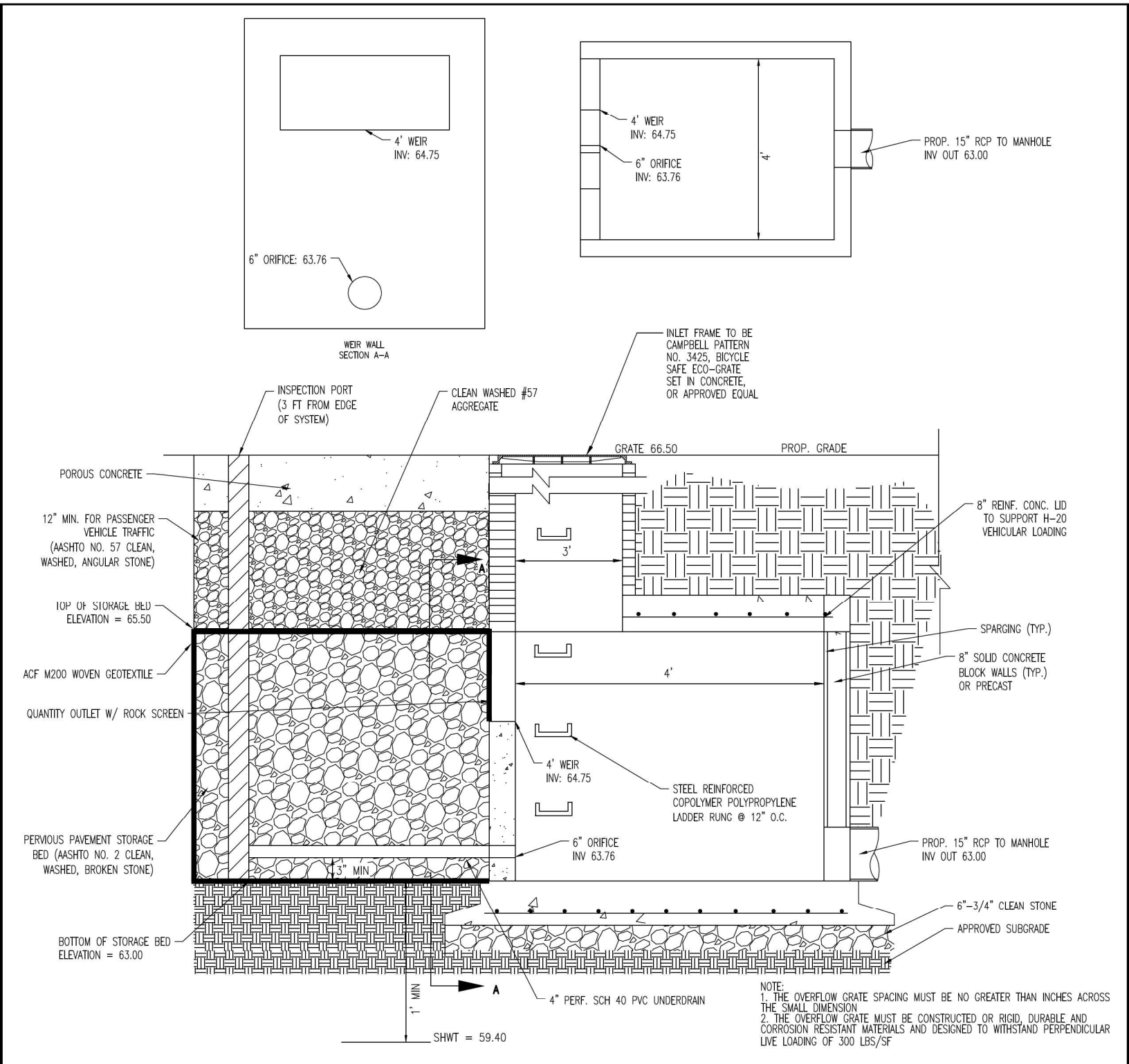
** RECOMMENDED STONE BASE DEPTHS	
DEPTHS LISTED BELOW ARE SUBJECT TO CBR TESTS AND THE DESIGN ENGINEER'S SUBGRADE SUPPORT CALCULATIONS.	
PEDESTRIAN TRAFFIC	6"-8" MIN.
PASSENGER VEHICLE TRAFFIC	12" MIN.
INDUSTRIAL TRAFFIC	18" MIN.



SECTION A-A VIEW

PAVEDRAIN DETAIL

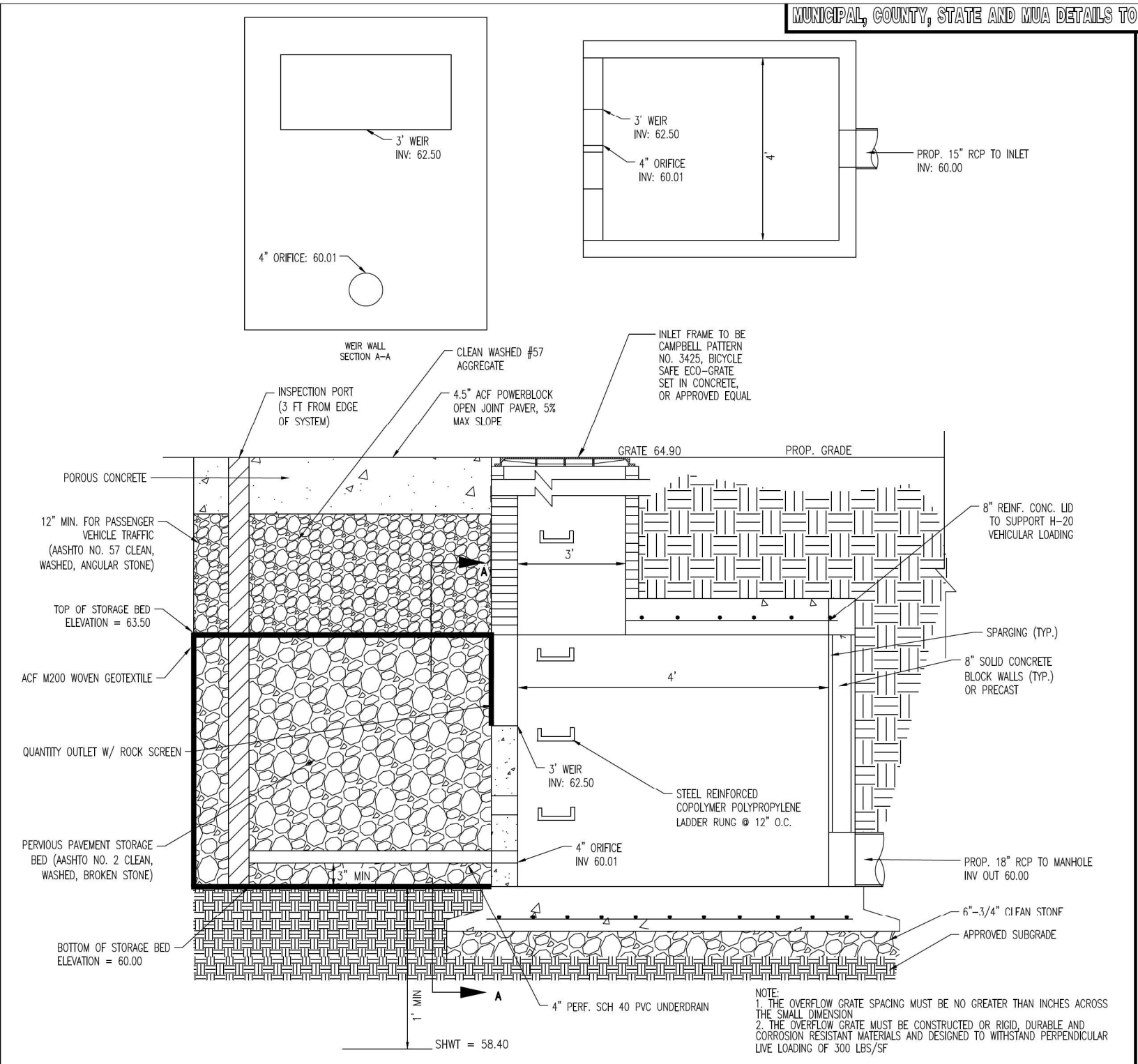
NOT TO SCALE



NOTE:
1. THE OVERFLOW GRATE SPACING MUST BE NO GREATER THAN INCHES ACROSS THE SMALL DIMENSION
2. THE OVERFLOW GRATE MUST BE CONSTRUCTED OR RIGID, DURABLE AND CORROSION RESISTANT MATERIALS AND DESIGNED TO WITHSTAND PERPENDICULAR LIVE LOADING OF 300 LBS/SF

PERVIOUS PAVEMENT SYSTEM 'WEST' & OUTLET CONTROL STRUCTURE

NOT TO SCALE



PERVIOUS PAVEMENT SYSTEM 'EAST' & OUTLET CONTROL STRUCTURE

NOT TO SCALE

SPECIFICATION

PART 1 GENERAL

1. Related Documents

A. Drawings, technical specifications, and general provisions of the Contract as modified herein apply to this section.

2. Description of the Work Included

A. Provide excavation and base preparation per geotechnical engineer's recommendations and/or as shown on the design drawings.
B. Provide and install PowerBlock® and all related products including base materials, geotextiles, and geogrids per the manufacturer's installation guidelines provided in this section.
C. Perform post-installation testing.
D. Protect PowerBlock® system from contamination due to construction traffic and construction sedimentation after installation until the site is completely stabilized.

3. Quality Assurance

A. Installation Contractor shall demonstrate the following experience:
    1. A minimum of three permeable pavement projects completed within the last 2 years of a similar or larger size and complexity.
    2. A minimum of 25,000 square feet of permeable pavement installed within the last 2 years.
    3. Installation Contractor experience requirement may be waived if the manufacturer's representative provides on-site training and review during construction.
B. Installation Personnel: Performed only by skilled workers with a satisfactory record of performance on permeable pavement construction projects of comparable size and complexity.
C. Contractor must have the manufacturer's representative available for site review if requested by the Owner.

4. Submittals

A. Submit proposed PowerBlock® layout drawings.
B. Submit manufacturer's product data, including all requirements detailed in this specification.
C. Submit material specifications for all geotextiles and geogrids.
D. Submit material specification for base stone and aggregates.
E. Any proposed equal alternative product substitution to this specification must be submitted for review and approved prior to the bid opening. The review package should include third party performance data that meets or exceeds the criteria in Table 2.1A.

5. Storage and Handling

A. Protect concrete pavers during shipment, storage, and installation against staining, chipping, cracking, and other damage.

B. Coordinate delivery and paving schedule with other construction activities.

6. Preinstallation Conference

A. Prior to the start of the installation, a preinstallation conference shall occur with Owner representatives, the general contractor, the installation contractor, and the manufacturer's representative.

B. Coordinate installation for the PowerBlock® system with other on-site activities to minimize sedimentation and contamination of the permeable pavement during construction. All non-installation related construction traffic, particularly equipment used for earthwork, should be routed around the permeable pavement. Stabilize denuded soils contributing runoff to the permeable pavement prior to commissioning the system.

PART 2: PRODUCTS

1. Permeable Paver

A. Permeable pavement shall be constructed from pre-manufactured, interlocking concrete blocks that do not require stone or sand filler between the blocks, leaving the joints open to allow rapid infiltration of runoff through the joints. The blocks and completed permeable pavement shall meet the following properties:

Table 2.1A

PROPERTY	DESCRIPTION	VALUE
Dimensions	Length x Width x Height	11.75" x 13.70" x 4.5" (+/- 1/8")
Block Weight	Pounds	44 lbs. Minimum
Loading Capability	Traffic Rating	HS-20 / HS-25
Open Joint Width	Inches	0.25" (+/- 0.02")
Joint Filler Between Blocks	Material Used	NONE ALLOWED[1]
Post-Installation, Field-Verified Surface Infiltration Rate[3]	ASTM C-1701 / C-1701-M09 / ASTM C-1781 / C-140	1,000 inches / hour average (Minimum 3 tests)
Compressive Strength	ASTM D-6684 / C-140	4,000 psi (average) 3,500 psi (minimum)
Freeze / Thaw Resistance[2]	ASTM C-67 / C-1645 / C-936	COMPLIANT
Abrasion Resistance[2]	C-418[2]	COMPLIANT

NOTE 1: No filler material is allowed to be used between the blocks. Use ONLY blocks that do not require stabilizing stone/sand between the units.

NOTE 2: Testing by the National Concrete Masonry Association (NCMA) will be made available for freeze/thaw and abrasion resistance upon request.

NOTE 3: The completed permeable pavement system must be tested in-situ after installation and will only be accepted when required performance value shown in Table 2.1A has been documented by a third party. Final test report must be submitted to the Owner prior to acceptance.

B. Visual Inspection
    1. All blocks shall be sound and free of defects that would interfere with the proper placing of the units or impair the strength or performance of the permeable pavement system.
    2. Surface cracks incidental to the usual methods of manufacture, or surface chipping resulting from customary methods of handling in shipment and delivery, shall not be deemed grounds for rejection.
    3. Cracks exceeding 0.25 inches in width and/or 1.0 inches in depth or larger shall be deemed grounds for rejection.
    4. Ensure the PowerBlock delivered to the site matches the color requirements on plans.

C. The permeable paver shall be PowerBlock® or pre-approved equal (as noted in Part 1, Section 4.E), as represented and distributed by:
    Ferguson Waterworks
    12500 Jefferson Avenue, Newport News, VA
    Branch Locator: https://www.ferguson.com/searchBranch

D. When PowerBlock® installation may be exposed to de-icing salts or salt air in coastal climates, blocks should be sealed after installation with optional Prossoco Saltguard WB or equivalent. If specified, the coating shall be applied per manufacturer's recommendations.

2. Stone Base

A. Permeable pavements require site specific design based on both structural and hydrologic requirements of the pavement. Depths shown on typical drawings must be evaluated and modified as necessary by the engineer of record.

B. All aggregate shall be clean and angular on all sides, with no less than 90% fractured faces. Do not use rounded river gravel or fractured river gravel for any application.

C. If more than 6" of base stone is required, use AASHTO #2 Stone or similar for the lower layers.

ASTM No. 2 Subbase
Grading Requirements

Sieve Size	Percent Passing
75 mm (3 in.)	100
63 mm (2 1/2 in.)	90 to 100
50 mm (2 in.)	35 to 70
37.5 mm (1 1/2 in.)	0 to 15
19 mm (3/4 in.)	0 to 5

D. AASHTO #57 Stone shall be used as a leveling course for the upper 4" to 6" of the base layer.

ASTM No. 57 Base
Grading Requirements

Sieve Size	Percent Passing
37.5 mm (1 1/2 in.)	100
25 mm (1 in.)	95 to 100
12.5 mm (1/2 in.)	25 to 60
4.75 mm (No. 4)	0 to 10
2.36 mm (No. 8)	0 to 5

3. **Geotextiles**
   A. Use a woven monofilament geotextile, such as ACF (Ferguson) M200, or as specified in the contract documents.

4. **Edge Restraint**
   A. Edges of the PowerBlock area shall be finished with an edge restraint. Acceptable forms of edge restraint include, but are not limited to, concrete flush curb, concrete vertical curb, concrete gutter curb, asphalt, or as shown on plans.
   B. Topsoil, landscaping, or other soils are not acceptable forms of edge restraint in traffic applications.

PART 3: FOUNDATION PREPARATION AND BLOCK INSTALLATION

1. **Foundation & Preparation**
   A. Prepare subgrade as noted on plans. Typically, compaction of underlying subgrade soil should be avoided or minimized to encourage infiltration of stormwater. Subgrade should be uniform, level, and free of lumps and debris. All questions about the adequacy of the subgrade should be directed to the owner's engineer, who will approve the subgrade conditions prior to placement of the stone base.
   B. Place a woven monofilament geotextile, such as ACF (Ferguson) M200, on the subgrade base and sides of the excavation to prevent contamination of the clean aggregate base or as specified in the contract documents. Overlap seams a minimum of 12" in all directions, or as shown on plans.
   C. Install base materials in layers uniformly spread and compacted in 6" - 8" lifts or as noted on plans. When final layer of base stone is installed, compact first with a roller and finish with a 10,000-psi plate compactor in both the perpendicular and parallel directions. Compaction is complete when no movement of base materials is observed. Base shall be a smooth, plane surface, firm and non-yielding prior to placement of the PowerBlock®.
   D. Confirm finished elevations of the base match plan requirements.
   E. Completed base shall be proof rolled and inspected and approved by engineer or record. Reconstruct areas where deflection exceeds acceptable limits as determined by engineer.

2. **Pavers**
   A. Ensure PowerBlock® units are free of foreign material before installation.
   B. Set PowerBlock® pavers as shown on plans, within the specified lines and grades shown on plans. Units shall be installed straight and true to the required lines. Ensure joint widths are consistent throughout installation.
      1. Installation shall proceed by adding blocks adjacent to previously installed units.
      2. On sloped areas, work from lower areas toward the higher elevations.
   C. Cut PowerBlock® units as needed to accommodate field conditions and to achieve a consistent pattern.
   D. When a substantial area of PowerBlock® units has been installed, the pavers shall be static rolled to ensure a consistent top elevation.
   E. Replace pavers that are broken, substantially chipped, or stained during construction.
   F. The joints between the blocks shall not be backfilled with smaller aggregates or sand to function properly. The joints shall be always left open, including following maintenance of the permeable pavement.
   G. Within 60 days of completion of the installation, the surface infiltration rate of the pavement shall be field verified to confirm the required infiltration rate of the pavement (per Table 2.1A). If the system fails to perform as required, it shall be removed and replaced at no cost to the Owner.

PART 4: INSPECTION AND MAINTENANCE

1. **Inspection**
   A. Inspect the permeable pavement, noting areas of standing water or significant accumulation of joint debris.
   B. If joints are excessively filled with debris or sediment, a surface infiltration test may be performed per Table 2.1A to determine the capabilities of the system.

2. **Maintenance**
   A. Maintenance shall be performed when either:
      1. The surface infiltration rates of more than 75% of the surface area fall below 10% of the rate required per Table 2.1A.
      2. Surface ponding remains for 24 hours in an area larger than 10 square feet.
      3. Other desired maintenance at the Owner's discretion to optomize performance.
   B. Maintenance shall be performed with a vacuum device, not a mechanical sweeper, to remove accumulated debris from joints. This may be accomplished with smaller hand-held devices or with vacuum trucks such as the Elgin Whirlwind. Adjust device settings to avoid movement or lifting of block, or removal of the base stone underneath the blocks.

CONTECH FILTERRA SIZING SUMMARY AND NJDEP CERTIFICATION

Block 2001, Lot 2.02 - 2495 Brunswick Pike
Lawrence Twp, NJ
5/26/23

Sizing Basis:
Filterra High Capacity biofiltration system has received final certification from the NJDEP for 80% TSS removal. Per the NJDEP, Filterra HC is considered a Green Infrastructure (GI) MTD. The sizing for the Filterra HC system under NJDEP regulations is based on the methodology outlined in Chapter 5 of the NJDEP BMP Manual. The NRCS method is utilized to determine a water quality flow rate for the drainage area in question. To validate the sizing, the parameters below were assumed.

Design Parameters:

Design Storm =	NJDEP Water Quality Design Storm (1.25-inch/2-hour storm event)
Filterra HC Media Flow Rate =	300 inches/hour
Time of Concentration =	10 minutes
Allowable Ponding in Filterra =	9”

Design Summary:
Utilizing NRCS Method and HydroCAD software, a hydrograph can be derived to represent the design storm. As seen in the provided HydroCAD report, the WQ flow is routed to an appropriately sized Filterra unit. Since the Filterra system can provide up to 9” of ponding, some flow attenuation is possible. The Filterra system is able to accommodate a portion of the water quality volume in the head space above the media and release it at the system’s NJDEP certified maximum treatment flow rate.

Site Designation	Impervious Drainage Area (ac)	Filterra HC Model Analyzed
#51	0.220	7’x10’ Peak Diversion Filterra HC
#61	0.094	6’x6’ Peak Diversion Filterra HC
#71	0.103	6’x6’ Peak Diversion Filterra HC
#81	0.084	4.5’x5.83’ Peak Diversion Filterra HC

Thank you for the opportunity to present this to you and your client. Please do not hesitate to contact me should you have any additional questions.

Sincerely,

Taylor Murdock
Stormwater Design Engineer
Contech Engineered Solutions, LLC.

Summary for Subcatchment 1S: #51 DA

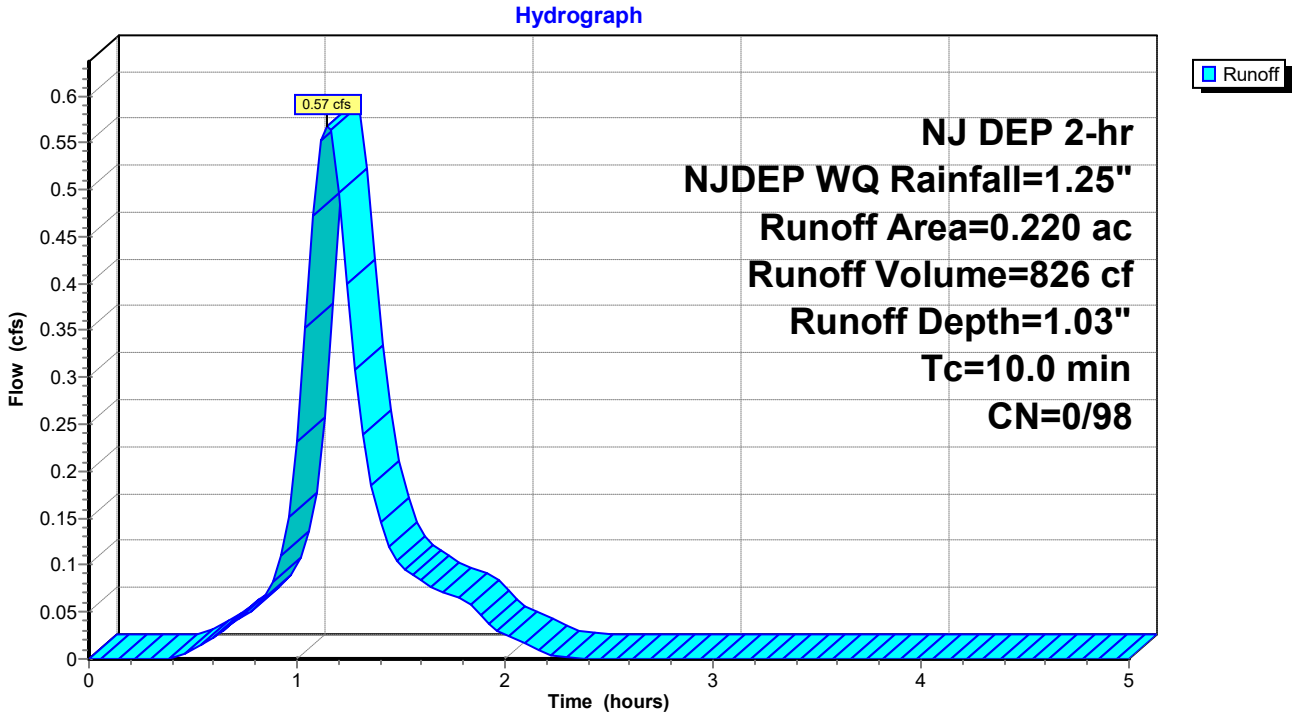
Runoff = 0.57 cfs @ 1.15 hrs, Volume= 826 cf, Depth= 1.03"
Routed to Pond 1P : Filterra 7x10

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-5.00 hrs, dt= 0.04 hrs
NJ DEP 2-hr NJDEP WQ Rainfall=1.25"

	Area (ac)	CN	Description
*	0.220	98	
	0.220	98	100.00% Impervious Area

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

Subcatchment 1S: #51 DA



Summary for Pond 1P: Filterra 7x10

Inflow Area = 9,583 sf,100.00% Impervious, Inflow Depth = 1.03" for NJDEP WQ event
Inflow = 0.57 cfs @ 1.15 hrs, Volume= 826 cf
Outflow = 0.49 cfs @ 1.12 hrs, Volume= 913 cf, Atten= 14%, Lag= 0.0 min
Primary = 0.49 cfs @ 1.12 hrs, Volume= 913 cf

Routing by Stor-Ind method, Time Span= 0.00-5.00 hrs, dt= 0.04 hrs / 2
Peak Elev= 0.31' @ 1.20 hrs Surf.Area= 70 sf Storage= 21 cf

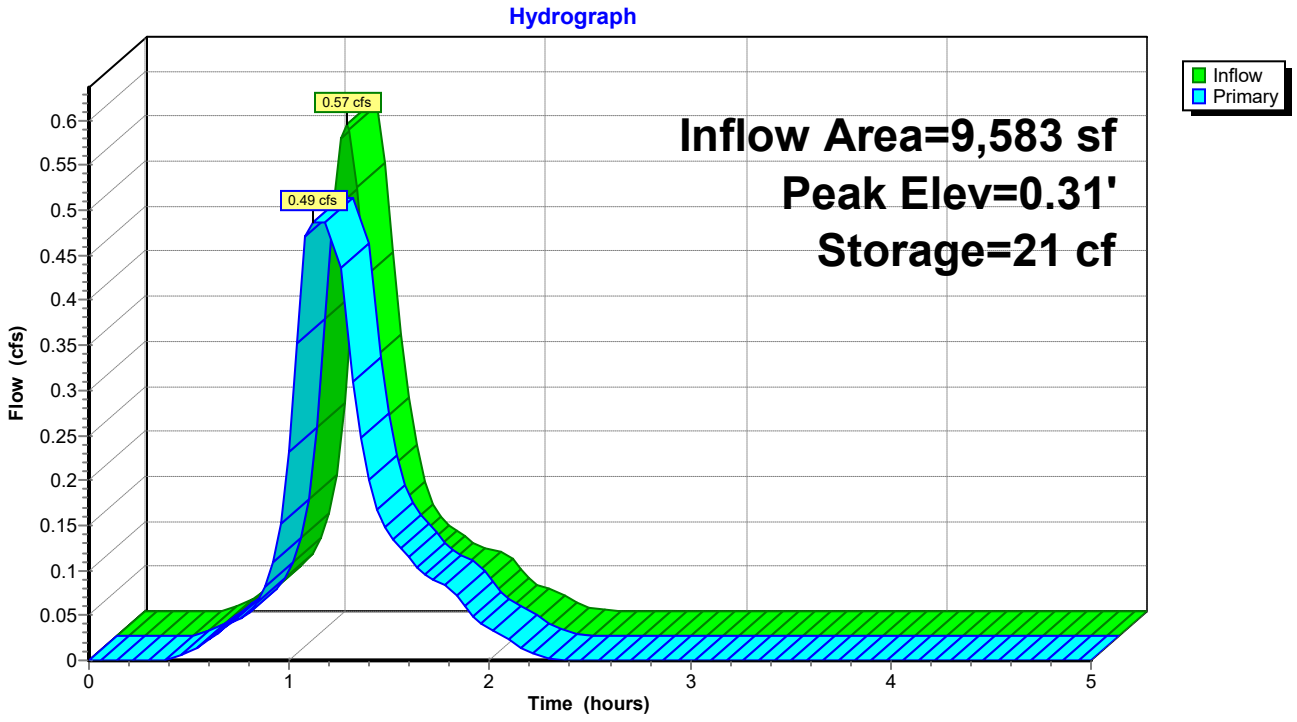
Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 2.1 min (76.1 - 74.0)

Volume	Invert	Avail.Storage	Storage Description
#1	0.00'	53 cf	**7.00'W x 10.00'L x 0.75'H Prismatoid**

Device	Routing	Invert	Outlet Devices
#1	Primary	0.00'	**300.000 in/hr Exfiltration over Surface area**

Primary OutFlow Max=0.49 cfs @ 1.12 hrs HW=0.07' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.49 cfs @ 0.01 fps)

Pond 1P: Filterra 7x10



Summary for Subcatchment 2S: #61 DA

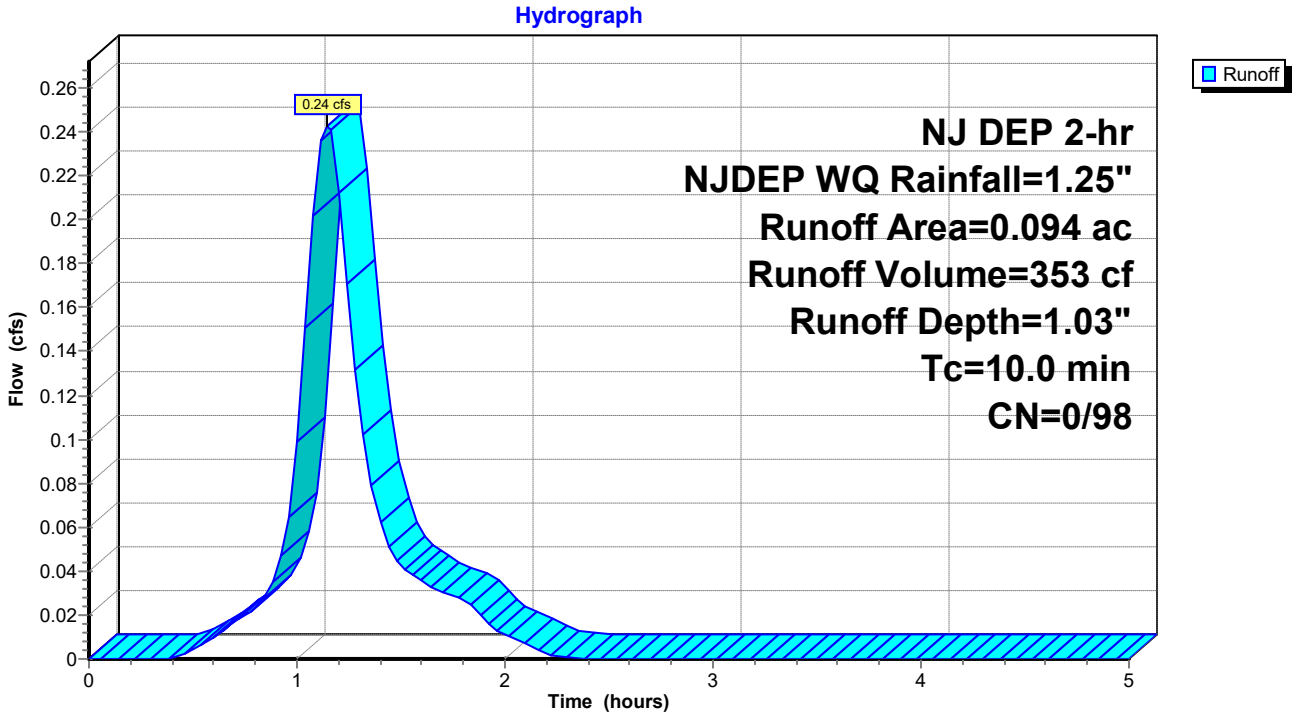
Runoff = 0.24 cfs @ 1.15 hrs, Volume= 353 cf, Depth= 1.03"
Routed to Pond 2P : Filterra 6x6

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-5.00 hrs, dt= 0.04 hrs
NJ DEP 2-hr NJDEP WQ Rainfall=1.25"

	Area (ac)	CN	Description
*	0.094	98	
	0.094	98	100.00% Impervious Area

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

Subcatchment 2S: #61 DA



Summary for Pond 2P: Filterra 6x6

Inflow Area = 4,095 sf,100.00% Impervious, Inflow Depth = 1.03" for NJDEP WQ event
Inflow = 0.24 cfs @ 1.15 hrs, Volume= 353 cf
Outflow = 0.24 cfs @ 1.15 hrs, Volume= 353 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.24 cfs @ 1.15 hrs, Volume= 353 cf

Routing by Stor-Ind method, Time Span= 0.00-5.00 hrs, dt= 0.04 hrs / 2
Peak Elev= 0.01' @ 1.15 hrs Surf.Area= 36 sf Storage= 0 cf

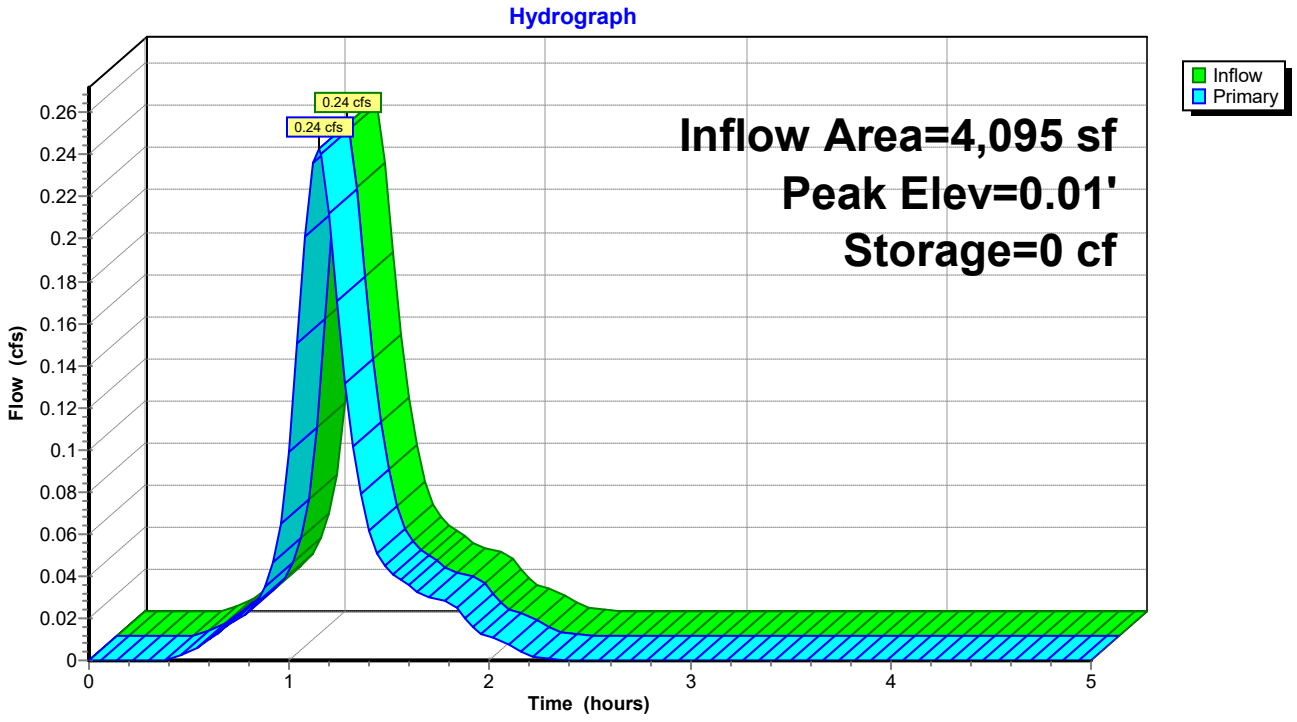
Plug-Flow detention time= 0.1 min calculated for 353 cf (100% of inflow)
Center-of-Mass det. time= 0.0 min (74.0 - 74.0)

Volume	Invert	Avail.Storage	Storage Description
#1	0.00'	27 cf	**6.00'W x 6.00'L x 0.75'H Prismatoid**

Device	Routing	Invert	Outlet Devices
#1	Primary	0.00'	**300.000 in/hr Exfiltration over Surface area**

Primary OutFlow Max=0.25 cfs @ 1.15 hrs HW=0.01' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.25 cfs @ 0.01 fps)

Pond 2P: Filterra 6x6



Summary for Subcatchment 3S: #71 DA

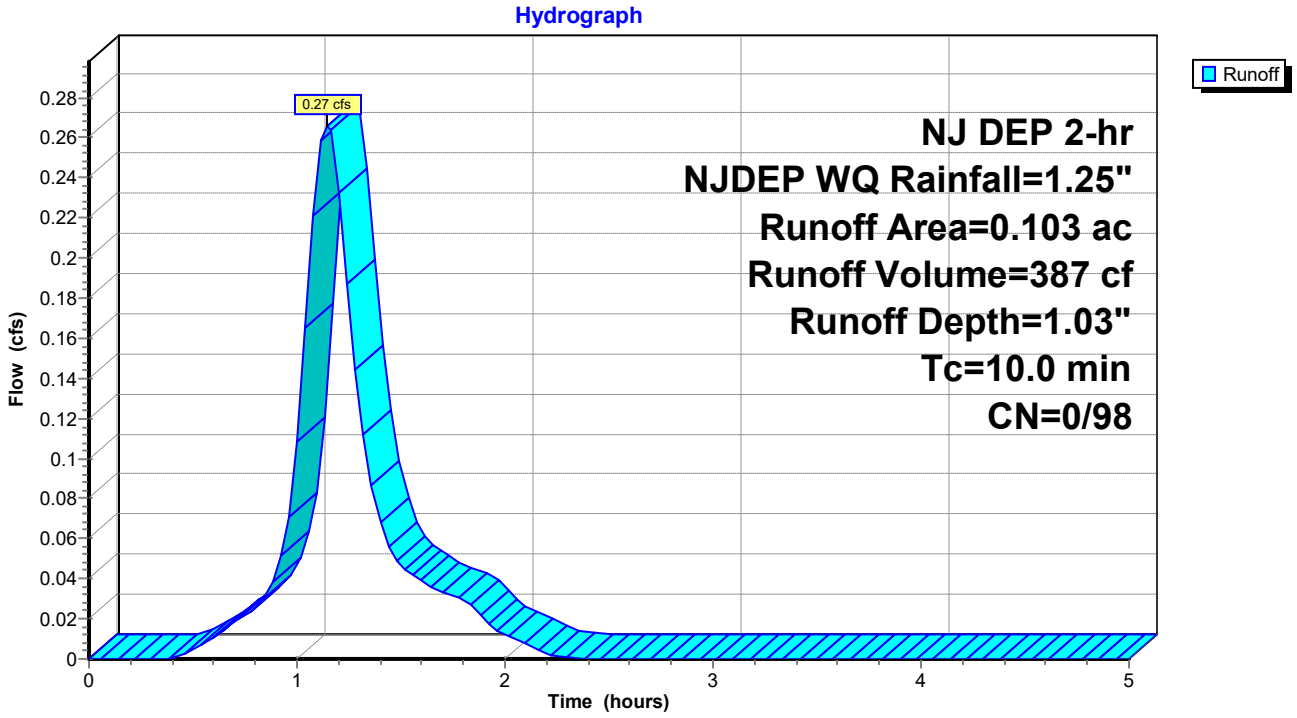
Runoff = 0.27 cfs @ 1.15 hrs, Volume= 387 cf, Depth= 1.03"
Routed to Pond 3P : Filterra 6x6

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-5.00 hrs, dt= 0.04 hrs
NJ DEP 2-hr NJDEP WQ Rainfall=1.25"

	Area (ac)	CN	Description
*	0.103	98	
	0.103	98	100.00% Impervious Area

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

Subcatchment 3S: #71 DA



Summary for Pond 3P: Filterra 6x6

Inflow Area = 4,487 sf,100.00% Impervious, Inflow Depth = 1.03" for NJDEP WQ event
Inflow = 0.27 cfs @ 1.15 hrs, Volume= 387 cf
Outflow = 0.25 cfs @ 1.12 hrs, Volume= 353 cf, Atten= 6%, Lag= 0.0 min
Primary = 0.25 cfs @ 1.12 hrs, Volume= 353 cf

Routing by Stor-Ind method, Time Span= 0.00-5.00 hrs, dt= 0.04 hrs / 2
Peak Elev= 0.06' @ 1.17 hrs Surf.Area= 36 sf Storage= 2 cf

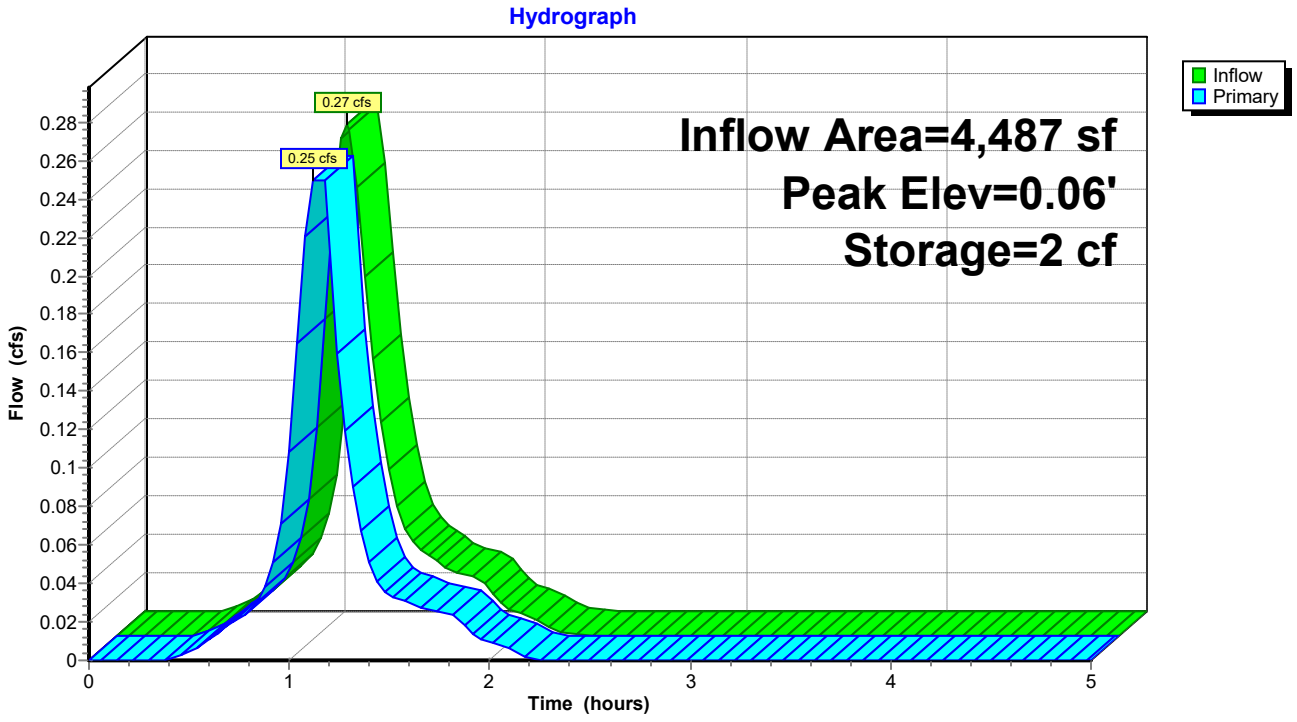
Plug-Flow detention time= 2.2 min calculated for 353 cf (91% of inflow)
Center-of-Mass det. time= (not calculated: outflow precedes inflow)

Volume	Invert	Avail.Storage	Storage Description
#1	0.00'	27 cf	**6.00'W x 6.00'L x 0.75'H Prismatoid**

Device	Routing	Invert	Outlet Devices
#1	Primary	0.00'	**300.000 in/hr Exfiltration over Surface area**

Primary OutFlow Max=0.25 cfs @ 1.12 hrs HW=0.02' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.25 cfs @ 0.01 fps)

Pond 3P: Filterra 6x6



Summary for Subcatchment 4S: #81 DA

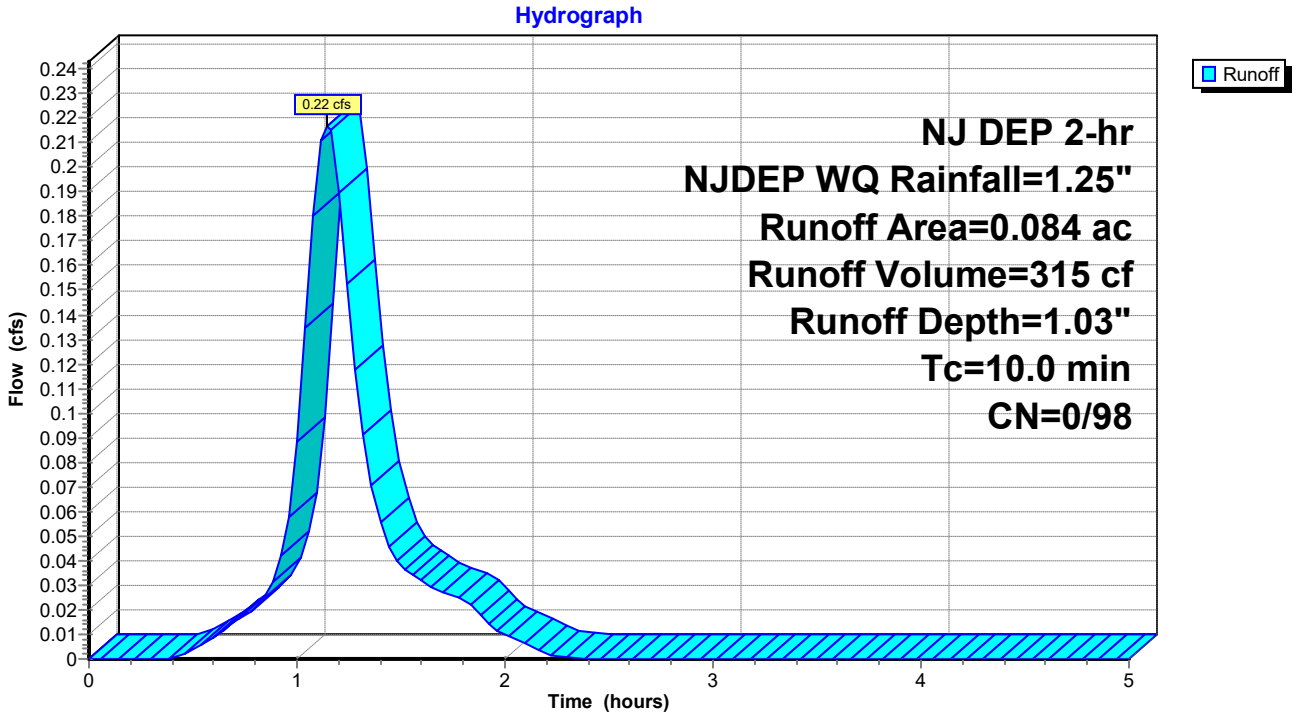
Runoff = 0.22 cfs @ 1.15 hrs, Volume= 315 cf, Depth= 1.03"
Routed to Pond 4P : Filterra 4.5x5.83

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-5.00 hrs, dt= 0.04 hrs
NJ DEP 2-hr NJDEP WQ Rainfall=1.25"

	Area (ac)	CN	Description
*	0.084	98	
	0.084	98	100.00% Impervious Area

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

Subcatchment 4S: #81 DA



Summary for Pond 4P: Filterra 4.5x5.83

Inflow Area = 3,659 sf,100.00% Impervious, Inflow Depth = 1.03" for NJDEP WQ event
Inflow = 0.22 cfs @ 1.15 hrs, Volume= 315 cf
Outflow = 0.18 cfs @ 1.12 hrs, Volume= 360 cf, Atten= 16%, Lag= 0.0 min
Primary = 0.18 cfs @ 1.12 hrs, Volume= 360 cf

Routing by Stor-Ind method, Time Span= 0.00-5.00 hrs, dt= 0.04 hrs / 2
Peak Elev= 0.37' @ 1.21 hrs Surf.Area= 26 sf Storage= 10 cf

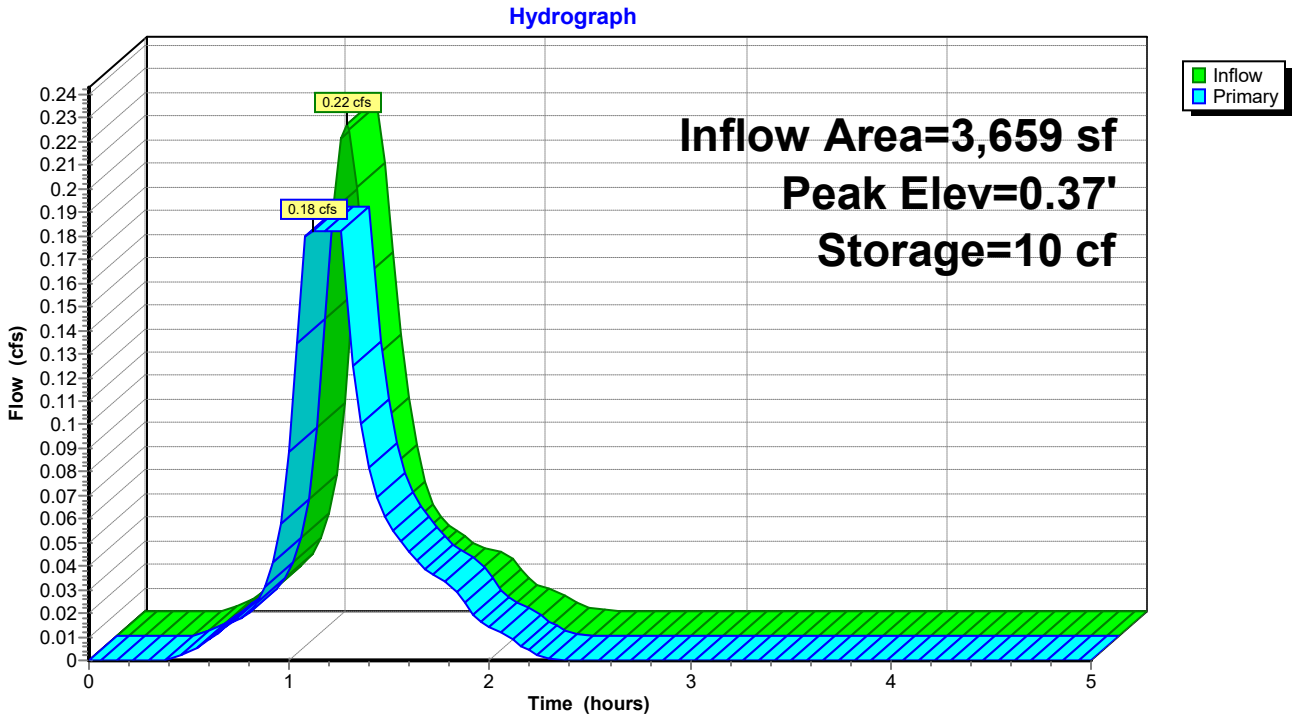
Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 2.6 min (76.6 - 74.0)

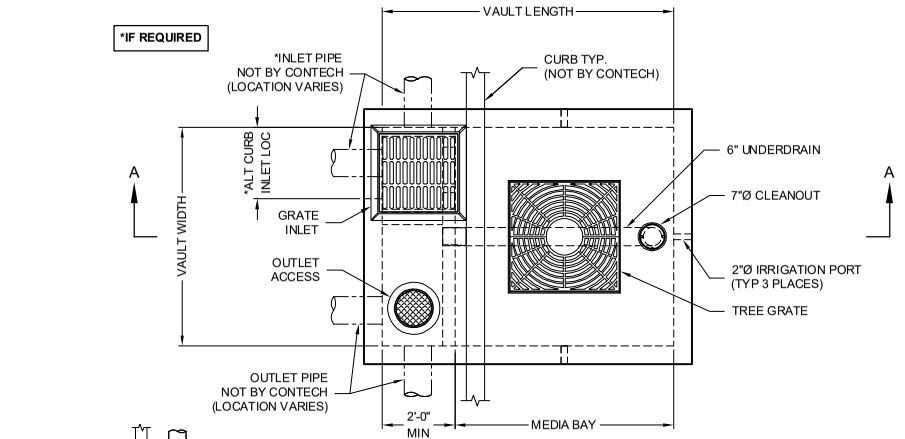
Volume	Invert	Avail.Storage	Storage Description
#1	0.00'	20 cf	**4.50'W x 5.83'L x 0.75'H Prismatoid**

Device	Routing	Invert	Outlet Devices
#1	Primary	0.00'	**300.000 in/hr Exfiltration over Surface area**

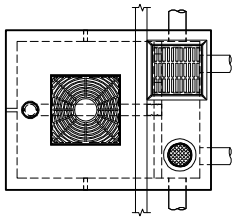
Primary OutFlow Max=0.18 cfs @ 1.12 hrs HW=0.08' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.18 cfs @ 0.01 fps)

Pond 4P: Filterra 4.5x5.83

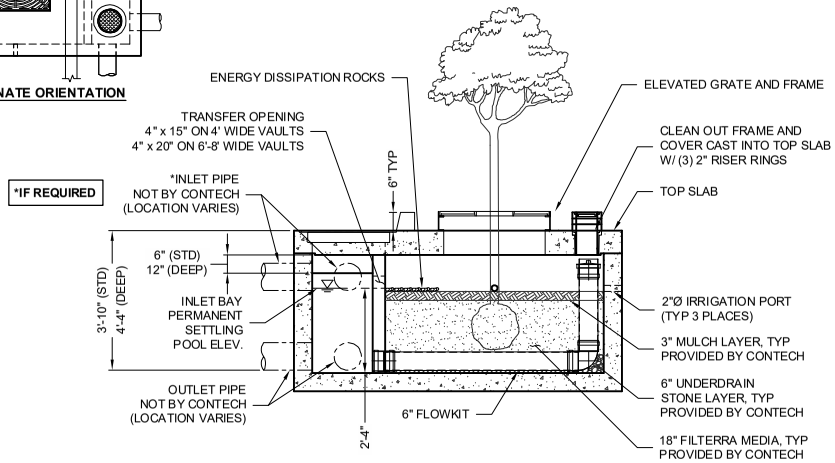




PLAN VIEW



ALTERNATE ORIENTATION



SECTION A-A
(STANDARD DEPTH SHOWN)

INTERNAL PIPE CONFIGURATION MAY VARY
DEPENDING UPON OUTLET LOCATION.

FTPD-G-HC STANDARD HEIGHT CONFIGURATION

DESIGNATION (OPTIONS: -P)	AVAILABILITY	MEDIA BAY SIZE	VAULT SIZE (W x L)	WEIR LENGTH/ MAX CURB OPENING	*MAX BYPASS FLOW (CFS)	GRATE INLET/ OUTLET ACCESS SIZE	TREE GRATE QTY & SIZE
FTPD0404-G-HC	ALL	4 x 4	4 x 6	1'-8"	1.4	12"SQ/12"Ø	(1) 3' x 3'
FTPD0406-G-HC	N/A DE, MD, NJ, PA, VA, WV	4 x 6	4 x 8	1'-8"	1.4	12"SQ/12"Ø	(1) 3' x 3'
FTPD045058-G-HC	DE, MD, NJ, PA, VA, WV ONLY	4.5 x 5.83	4.5 x 7.83	1'-8"	1.4	12"SQ/12"Ø	(1) 3' x 3'
FTPD0604-G-HC	ALL	6 x 4	6 x 6	1'-8"	1.4	24"SQ/12"Ø	(1) 2.5' x 2.5'
FTPD0606-G-HC	ALL	6 x 6	6 x 8	1'-8"	1.4	24"SQ/12"Ø	(1) 3' x 3'
FTPD0608-G-HC	ALL	6 x 8	6 x 10	1'-8"	1.4	24"SQ/12"Ø	(1) 4' x 4'
FTPD0610-G-HC	ALL	6 x 10	6 x 12	1'-8"	1.4	24"SQ/12"Ø	(1) 4' x 4'
FTPD0710-G-HC	ALL	7 x 10	7 x 13	2'-6"	2.1	24"SQ/24"Ø	(1) 4' x 4'
FTPD08105-G-HC	ALL	8 x 10.5	8 x 14	3'-0"	2.5	24"SQ/24"Ø	(1) 4' x 4'
FTPD08125-G-HC	N/A OR, WA	8 x 12.5	8 x 16	3'-0"	2.5	24"SQ/24"Ø	(2) 4' x 4'
FTPD09115-G-HC	OR, WA ONLY	9 x 11.5	9 x 15	3'-0"	2.5	24"SQ/24"Ø	(2) 4' x 4'

N/A = NOT AVAILABLE

FTPD-GD-HC DEEP OPTION CONFIGURATION

DESIGNATION (OPTIONS: -P)	AVAILABILITY	MEDIA BAY SIZE	VAULT SIZE (W x L)	WEIR LENGTH/ MAX CURB OPENING	*MAX BYPASS FLOW (CFS)	GRATE INLET/ OUTLET ACCESS SIZE	TREE GRATE QTY & SIZE
FTPD0404-GD-HC	ALL	4 x 4	4 x 6	1'-8"	4.6	12"SQ/12"Ø	(1) 3' x 3'
FTPD0406-GD-HC	N/A DE, MD, NJ, PA, VA, WV	4 x 6	4 x 8	1'-8"	4.6	12"SQ/12"Ø	(1) 3' x 3'
FTPD045058-GD-HC	DE, MD, NJ, PA, VA, WV ONLY	4.5 x 5.83	4.5 x 7.83	1'-8"	4.6	12"SQ/12"Ø	(1) 3' x 3'
FTPD0604-GD-HC	ALL	6 x 4	6 x 6	1'-8"	4.6	24"SQ/12"Ø	(1) 2.5' x 2.5'
FTPD0606-GD-HC	ALL	6 x 6	6 x 8	1'-8"	4.6	24"SQ/12"Ø	(1) 3' x 3'
FTPD0608-GD-HC	ALL	6 x 8	6 x 10	1'-8"	4.6	24"SQ/12"Ø	(1) 4' x 4'
FTPD0610-GD-HC	ALL	6 x 10	6 x 12	1'-8"	4.6	24"SQ/12"Ø	(1) 4' x 4'
FTPD0710-GD-HC	ALL	7 x 10	7 x 13	2'-6"	6.8	24"SQ/24"Ø	(1) 4' x 4'
FTPD08105-GD-HC	ALL	8 x 10.5	8 x 14	3'-0"	8.2	24"SQ/24"Ø	(1) 4' x 4'
FTPD08125-GD-HC	N/A OR, WA	8 x 12.5	8 x 16	3'-0"	8.2	24"SQ/24"Ø	(2) 4' x 4'
FTPD09115-GD-HC	OR,WA ONLY	9 x 11.5	9 x 15	3'-0"	8.2	24"SQ/24"Ø	(2) 4' x 4'

N/A = NOT AVAILABLE

* MAX BYPASS FLOW IS INTERNAL WEIR FLOW . SITE SPECIFIC ANALYSIS IS REQUIRED TO DETERMINE GRATE INLET FLOW CAPACITY
** 3' x 3' TREE GRATE ON FTPD0404-G UNITS IS INSTALLED OVER A SMALLER 30" x 30" MAX OPENING FOR STRUCTURAL REASONS

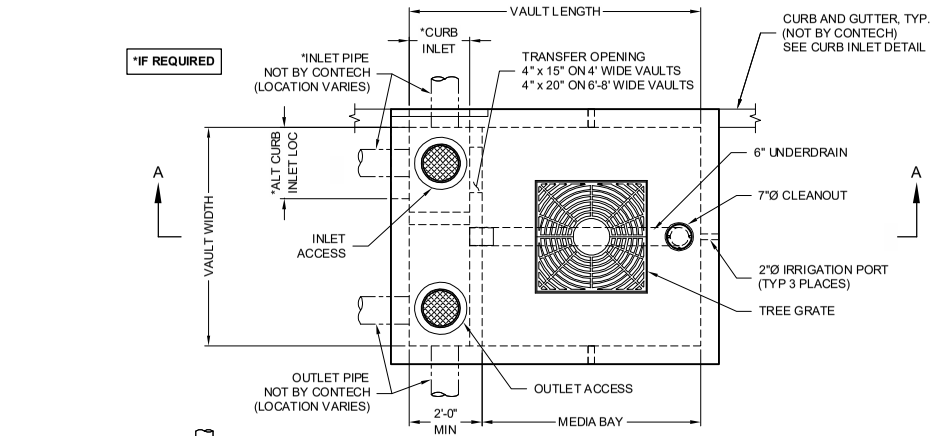
filterra®
THIS PRODUCT MAY BE PROTECTED BY ONE OR MORE OF THE FOLLOWING U.S. PATENTS: 8,277,274; 8,668,821; 7,625,480; 7,425,261; 7,638,412. RELATED FOREIGN PATENTS.

The design and information shown on this drawing is provided as a service to the project owner, engineer and contractor by Contech Engineered Solutions LLC or one of its affiliated companies ("Contech"). Neither this drawing, nor any part thereof, may be used, reproduced or modified in any manner without the prior written consent of Contech. Failure to comply is done at the user's own risk and Contech expressly disclaims any liability or responsibility for such use. If discrepancies between the supplied information upon which the drawing is based and actual field conditions are encountered as site work progresses, these discrepancies must be reported to Contech immediately for re-evaluation of the design. Contech accepts no liability for designs based on missing, incomplete or inaccurate information supplied by others.

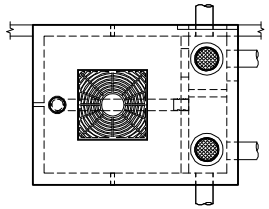
CONTECH ENGINEERED SOLUTIONS LLC
www.ContechES.com
9025 Centre Pointe Dr., Suite 400, West Chester, OH 45069
800-338-1122 513-645-7000 513-645-7993 FAX

FILTERRA HC PEAK DIVERSION - GRATE (FTPD-G-HC) CONFIGURATION DETAIL

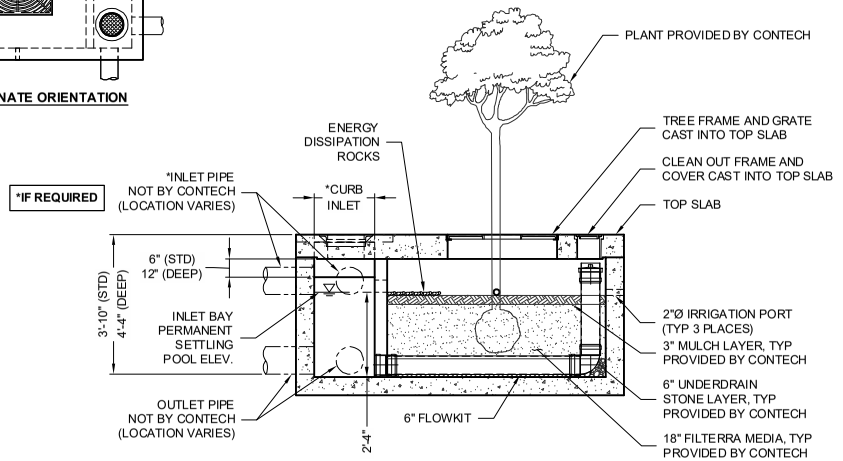
I:\STORMWATER\COMMOPS\54 FILTERRA\40 STANDARD DRAWINGS\FT-HC - FILTERRA HC (NEW JERSEY ONLY)\FTPD-G-HC - FILTERRA PEAK DIVERSION - GRATE CONFIG DTL.DWG 9/8/2022 11:34 AM



PLAN VIEW



ALTERNATE ORIENTATION



SECTION A-A
(STANDARD DEPTH SHOWN)

INTERNAL PIPE CONFIGURATION MAY VARY DEPENDING UPON OUTLET LOCATION.

FTPD-HC STANDARD HEIGHT CONFIGURATION

DESIGNATION (OPTIONS: -P, -T, -PT)	DESIGNATION (OPTIONS: -P, -T, -PT)	MEDIA BAY SIZE	VAULT SIZE (W x L)	WEIR LENGTH/ MAX CURB OPENING	*MAX BYPASS FLOW (CFS)	INLET/ OUTLET ACCESS DIA	TREE GRATE QTY & SIZE
FTPD0404-HC	ALL	4 x 4	4 x 6	1'-8"	1.4	12"/12"	(1) 3' x 3'
FTPD0406-HC	N/A DE, MD, NJ, PA, VA, WV	4 x 6	4 x 8	1'-8"	1.4	12"/12"	(1) 3' x 3'
FTPD045058-HC	DE, MD, NJ, PA, VA, WV ONLY	4.5 x 5.83	4.5 x 7.83	1'-8"	1.4	12"/12"	(1) 3' x 3'
FTPD0604-HC	ALL	6 x 4	6 x 6	1'-8"	1.4	12"/12"	(1) 3' x 3'
FTPD0606-HC	ALL	6 x 6	6 x 8	1'-8"	1.4	12"/12"	(1) 3' x 3'
FTPD0608-HC	ALL	6 x 8	6 x 10	1'-8"	1.4	12"/12"	(1) 4' x 4'
FTPD0610-HC	ALL	6 x 10	6 x 12	1'-8"	1.4	12"/12"	(1) 4' x 4'
FTPD0710-HC	ALL	7 x 10	7 x 13	2'-6"	2.1	24"/24"	(1) 4' x 4'
FTPD08105-HC	ALL	8 x 10.5	8 x 14	3'-0"	2.5	24"/24"	(1) 4' x 4'
FTPD08125-HC	N/A OR, WA	8 x 12.5	8 x 16	3'-0"	2.5	24"/24"	(2) 4' x 4'
FTPD09115-HC	OR, WA ONLY	9 x 11.5	9 x 15	3'-0"	2.5	24"/24"	(2) 4' x 4'

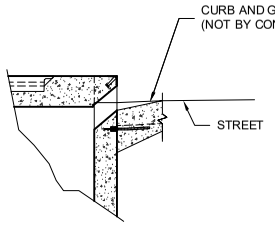
N/A = NOT AVAILABLE

FTPD-D-HC DEEP OPTION CONFIGURATION

DESIGNATION (OPTIONS: -P, -T, -PT)	AVAILABILITY	MEDIA BAY SIZE	VAULT SIZE (W x L)	WEIR LENGTH/ MAX CURB OPENING	*MAX BYPASS FLOW (CFS)	INLET/ OUTLET ACCESS DIA	TREE GRATE QTY & SIZE
FTPD0404-D-HC	ALL	4 x 4	4 x 6	1'-8"	4.6	12"/12"	(1) 3' x 3'
FTPD0406-D-HC	N/A DE, MD, NJ, PA, VA, WV	4 x 6	4 x 8	1'-8"	4.6	12"/12"	(1) 3' x 3'
FTPD045058-D-HC	DE, MD, NJ, PA, VA, WV ONLY	4.5 x 5.83	4.5 x 7.83	1'-8"	4.6	12"/12"	(1) 3' x 3'
FTPD0604-D-HC	ALL	6 x 4	6 x 6	1'-8"	4.6	12"/12"	(1) 3' x 3'
FTPD0606-D-HC	ALL	6 x 6	6 x 8	1'-8"	4.6	12"/12"	(1) 3' x 3'
FTPD0608-D-HC	ALL	6 x 8	6 x 10	1'-8"	4.6	12"/12"	(1) 4' x 4'
FTPD0610-D-HC	ALL	6 x 10	6 x 12	1'-8"	4.6	12"/12"	(1) 4' x 4'
FTPD0710-D-HC	ALL	7 x 10	7 x 13	2'-6"	6.8	24"/24"	(1) 4' x 4'
FTPD08105-D-HC	ALL	8 x 10.5	8 x 14	3'-0"	8.2	24"/24"	(1) 4' x 4'
FTPD08125-D-HC	N/A OR, WA	8 x 12.5	8 x 16	3'-0"	8.2	24"/24"	(2) 4' x 4'
FTPD09115-D-HC	OR, WA ONLY	9 x 11.5	9 x 15	3'-0"	2.5	24"/24"	(2) 4' x 4'

N/A = NOT AVAILABLE

*MAX BYPASS FLOW IS INTERNAL WEIR FLOW. SITE SPECIFIC ANALYSIS IS REQUIRED TO DETERMINE CURB INLET FLOW CAPACITY



CURB INLET DETAIL

filterra

THIS PRODUCT MAY BE PROTECT ED BY ONE OR MORE OF THE FOLLOWING U.S. PATENTS: 6,977,274; 6,649,620; 7,625,480; 7,425,261; 7,638,412. RELATED FOREIGN PATENTS.

The design and information shown on this drawing is provided as a service to the project owner, engineer and contractor by Contech Engineered Solutions LLC or one of its affiliated companies ("Contech"). Neither this drawing, nor any part thereof, may be used, reproduced or modified in any manner without the prior written consent of Contech. Failure to comply is done at the user's own risk and Contech expressly disclaims any liability or responsibility for such use. If discrepancies between the supplied information upon which the drawing is based and actual field conditions are encountered as site work progresses, these discrepancies must be reported to Contech immediately for re-evaluation of the design. Contech accepts no liability for designs based on missing, incomplete or inaccurate information supplied by others.

CONTECH ENGINEERED SOLUTIONS LLC
www.ContechES.com
9025 Centre Pointe Dr., Suite 400, West Chester, OH 45069
800-338-1122 513-645-7000 513-645-7993 FAX

FILTERRA HC PEAK DIVERSION (FTPD-HC) CONFIGURATION DETAIL

I:\STORMWATER\COMMOPS\54 FILTERRA\40 STANDARD DRAWINGS\FT-HC - FILTERRA HC (NEW JERSEY ONLY)\FTPD-HC - FILTERRA PEAK DIVERSION CONFIG DTL.DWG 9/8/2022 11:36 AM

State of New Jersey
DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF WATER QUALITY
Bureau of Stormwater Permitting
401 East State Street
P.O. Box 420 Mail Code 401-02B
Trenton, NJ 08625-0420
Tel. (609) 633-7021 • Fax (609) 777-0432
www.nj.gov/dep/dwq/bnpc_home.htm

PHILIP D. MURPHY
Governor

SHEILA Y. OLIVER
Lt. Governor

SHAWN M. LATOURETTE
Acting Commissioner

February 12, 2021

Derek M. Berg
Director – Stormwater Regulatory Management - East
Contech Engineered Solutions LLC
71 US Route 1, Suite F
Scarborough, ME 04074

Re: MTD Lab Certification
Filterra® HC Bioretention System
Off-line Installation Approved

TSS Removal Rate 80%

Dear Mr. Berg:

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

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 Department of Environmental Protection Laboratory Protocol to Assess Total Suspended Solids Removal by a Filtration Manufactured Treatment Device" dated January 25, 2013.

NJCAT verification documents submitted to the NJDEP indicate that the requirements of the aforementioned protocol have been met or exceeded. The NJCAT letter also included a recommended certification TSS removal rate and the required maintenance plan. The NJCAT Verification Report with the Verification Appendix (dated January 2021) for this device is published online at http://www.njcat.org/uploads/newDocs/NJCATFilterraTechnologyVerificationReportFinal._.pdf.

The NJDEP certifies the use of the Filterra® HC stormwater treatment unit by Contech Engineered Solutions LLC at a TSS removal rate of 80% 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. The MTFR is calculated based on a verified loading rate of 3.12 gpm/ft^2 of effective filtration treatment area.

2. The Filterra® HC stormwater treatment unit shall be installed using the same configuration reviewed by NJCAT, and sized in accordance with the criteria specified in item 7 below.

3. This device 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 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 Filterra® HC. A copy of the maintenance plan is attached to this certification. However, it is recommended to review the maintenance website at https://www.conteches.com/Portals/0/Documents/Maintenance%20Guides/Filterra%20HC%20OM%20Packet.pdf for any changes to the maintenance requirements.

6. For an MTD to be considered "green infrastructure" (GI) in accordance with the March 2, 2020 amendments to the Stormwater Management rules at N.J.A.C. 7:8, the MTD must meet the GI definition noted at amended N.J.A.C. 7:8-1.2. Specifically, the MTD shall (1) treat stormwater runoff through infiltration into subsoil; and/or (2) treat stormwater runoff through filtration by vegetation or soil; or (3) store stormwater runoff for reuse.

   The Filterra® HC filters stormwater runoff through an engineered biofiltration soil media and, thus, meets the definition of GI. Filterra® HC can be configured with or without a precast vault. Installations that will not include a precast vault will additionally need to comply the NJDEP Stormwater BMP Manual conditions regarding separation from the seasonal high water table and, if infiltration is proposed as an outlet, minimum vertical saturated hydraulic conductivity of the subsoil. Installations without a precast vault that do not rely on infiltration are required to maintain at least a one-foot separation from the seasonal high water table measured from the lowest point of the system. Installations without a precast vault that utilize infiltration are required to have the most hydraulically restrictive soil layer below the MTD meet the minimum tested vertical saturated hydraulic conductivity of one inch per hour and have at least two feet of separation from the seasonal high water table measured from the lowest point of the system.

7. Sizing Requirement:

The example below demonstrates the sizing procedure for the Filterra® HC:

Example: A 0.25-acre impervious site is to be treated to 80% TSS removal using the Filterra® HC. The impervious site runoff (Q) based on the New Jersey Water Quality Design Storm was determined to be 0.79 cfs.

The selection of the appropriate model of Filterra® HC is based upon both the maximum inflow drainage area and the MTFR. It is necessary to calculate the required model using both methods and to use the largest model determined by the two methods.

Inflow Drainage Area Evaluation:

The drainage area to the Filterra® HC in this example is 0.25 acres. Included in Table 1 below, all of the Filterra® HC models are designed with a maximum allowable drainage area greater than 0.25 acres. Specifically, the Filterra® HC with a 4'x4' media bay and a maximum allowable drainage area of 0.40 acres would be the smallest model able to treat runoff without exceeding the maximum allowable drainage area.

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 5-8, Fig. 5-3 of the NJ Stormwater BMP Manual)
c = 0.99 (runoff coefficient for impervious)
Q = ciA = 0.99 x 3.2 x 0.25 = 0.79 cfs

Given the site runoff is 0.79 cfs and based on the MTFR's listed in Table 1 below, the Filterra® HC with a 16'x8' media bay and an MTFR of 0.889 cfs would be the smallest model that could be used to treat the impervious area without exceeding the MTFR. If using more than one unit for treating runoff, the units should be configured such that the flowrate to each unit does not exceed the design MTFR for each unit and ensuring the entire 0.25 acre area is treated.

The MTFR evaluation results will be used since that method results in the highest minimum configuration determined by the two methods.

The sizing table corresponding to the available system models is noted below:

Table 1. Filterra® HC MTFRs and Maximum Allowable Drainage Areas

	Available Filterra® Media Bay Sizes (feet)	Effective Filtration Treatment Area (ft^2)	Treatment Flow Rate (cfs)	Maximum Allowable Drainage Area (ac)
Standard Configuration Filterra and Filterra Biosape Vaults	4x4	16	0.111	0.40
	4x6 or 6x4	24	0.167	0.60
	4.5x7.83 or 7.83x4.5 (Nominal 4x8/8x4)	35.24	0.245	0.89
	6x6	36	0.250	0.91
	6x8 or 8x6	48	0.333	1.21
	6x10 or 10x6	60	0.417	1.51
	6x12 or 12x6	72	0.500	1.81
	7x13 or 13x7	91	0.632	2.29
	14x8	112	0.778	2.82
	16x8	128	0.889	3.22
	18x8	144	1.000	3.62
	20x8	160	1.111	4.03
	22x8	176	1.222	4.43
Peak Diversion Filterra Vaults	4x4	16	0.111	0.40
	4.5x5.83 (Nominal 4x6)	26.24	0.182	0.66
	6x4	24	0.167	0.60
	6x6	36	0.250	0.91
	6x8	48	0.333	1.21
	6x10 or 10x6	60	0.417	1.51
	7x10	70	0.486	1.76
	8x10.5	84	0.583	2.11
	8x12.5	100	0.694	2.52
	Custom and/or Filterra Bioscape	Media Area in ft^2	0.00694 * (Media Area in ft^2)	0.0252 * (Media Area in ft^2)

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

If you have any questions regarding the above information, please contact me at (609) 633-7021.

Sincerely,



Gabriel Mahon, Chief
Bureau of Stormwater Permitting

Attachment: Maintenance Plan
cc: Chron File
Richard Magee, NJCAT
Vince Mazzei, NJDEP – Water & Land Management
Nancy Kempel, NJDEP– BSTP
Keith Stampfel, NJDEP – DLRP
Dennis Contois, NJDEP – DLRP

Filterra HC
Owner's Manual

filterra®
Bioretention Systems

CONTECH®
ENGINEERED SOLUTIONS







filterra®
Bioretention Systems

Table of Contents

Introduction 4

Activation Overview 4

Filterra HC Plant Selection Overview 6

Warranty Overview 6

Routine Maintenance Guidelines 6

Maintenance Visit Procedure 9

Appendix 1 – Activation Checklist 12

Appendix 2 – Planting Requirements for Filterra HC Systems 13

CONTECH®
ENGINEERED SOLUTIONS

Introduction

Thank you for your purchase of the Filterra® HC Bioretention System. Filterra HC is a specially engineered stormwater treatment system incorporating high performance biofiltration media to remove pollutants from stormwater runoff. All components of the system work together to provide a sustainable long-term solution for treating stormwater runoff.

The Filterra HC system has been delivered to you with protection in place to resist intrusion of construction related sediment which can contaminate the biofiltration media and result in inadequate system performance. These protection devices are intended as a best practice and cannot fully prevent contamination. It is the purchaser's responsibility to provide adequate measures to prevent construction related runoff from entering the Filterra HC system.

Included with your purchase is Activation of the Filterra HC system by the manufacturer as well as a 1-year warranty from delivery of the system and 1-year of routine maintenance (mulch replacement, debris removal, and pruning of vegetation) up to twice during the first year after activation.

Design and Installation

Each project presents different scopes for the use of Filterra HC systems. Information and help may be provided to the design engineer during the planning process. Correct Filterra HC box sizing (per local regulations) is essential to predict pollutant removal rates for a given area. The engineer shall submit calculations for approval by the local jurisdiction. The contractor is responsible for the correct installation of Filterra HC units as shown in approved plans. A comprehensive installation manual covering all Filterra configurations is available at www.ContechES.com.

Activation Overview

Activation of the Filterra HC system is a procedure completed by the manufacturer to place the system into working condition. This involves the following items:

- Removal of construction runoff protection devices
- Planting of the system's vegetation
- Placement of pretreatment mulch layer using mulch certified for use in Filterra HC systems.

Activation MUST be provided by the manufacturer to ensure proper site conditions are met for Activation, proper installation of the vegetation, and use of pretreatment mulch certified for use in Filterra HC systems.



Minimum Requirements

The minimum requirements for Filterra HC Activation are as follows:

1. The site landscaping must be fully stabilized, i.e. full landscaping installed and some grass cover (not just straw and seed) is required to reduce sediment transport. Construction debris and materials should be removed from surrounding area.



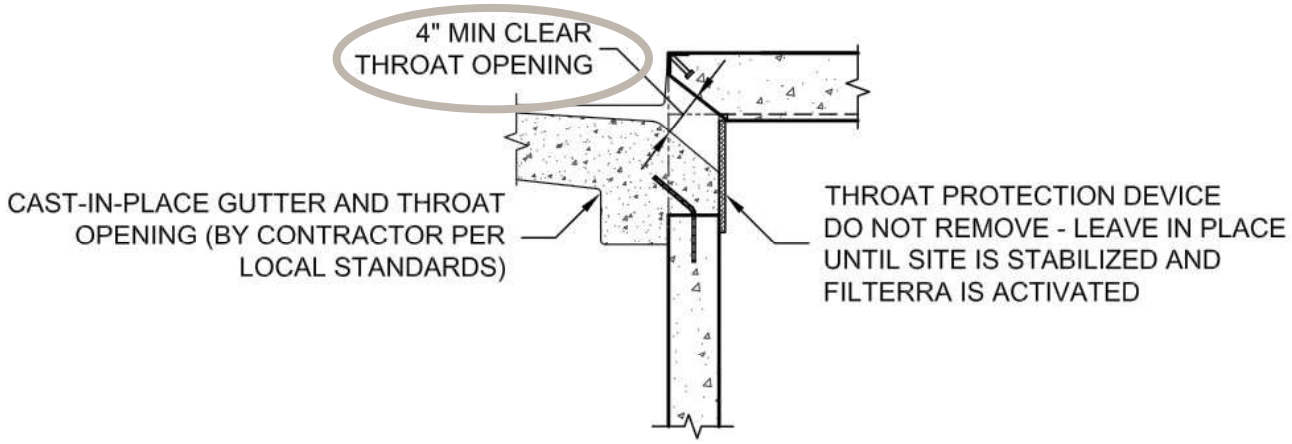


2. Final paving must be completed. Final paving ensures that paving materials will not enter and contaminate the Filterra HC system during the paving process, and that the plant will receive runoff from the drainage area, assisting with plant survival for the Filterra HC system.





3. Filterra HC throat opening (if applicable) should be at least 4" in order to ensure adequate capacity for inflow and debris.



An Activation Checklist is included on page 12 to ensure proper conditions are met for Contech to perform the Activation services. A charge of $500.00 will be invoiced for each Activation visit requested by Customer where Contech determines that the site does not meet the conditions required for Activation.

Filterra HC Plant Selection Overview

Plant Lists are available on the Contech website highlighting recommended plants for Filterra systems in your area. Keep in mind that plants are subject to availability due to seasonality and required minimum size for the Filterra HC system. Plants installed in the Filterra HC system are container plants (max 15 gallon) from nursery stock and will be immature in height and spread at Activation.

It is the responsibility of the owner to provide adequate irrigation when necessary to the plant of the Filterra HC system.

The "Planting Requirements for Filterra HC Systems" document is included as an appendix and discusses proper selection and care of the plants within Filterra HC systems.

Warranty Overview

Refer to the Contech Engineered Solutions LLC Stormwater Treatment System LIMITED WARRANTY for further information. The following conditions may void the Filterra HC system's warranty and waive the manufacturer provided Activation and Maintenance services:

- Unauthorized activation or performance of any of the items listed in the activation overview
- Any tampering, modifications or damage to the Filterra HC system or runoff protection devices
- Removal of any Filterra HC system components
- Failure to prevent construction related runoff from entering the Filterra HC system
- Failure to properly store and protect any Filterra HC components (including media and underdrain stone) that may be shipped separately from the vault

Routine Maintenance Guidelines

Routine maintenance is included by the manufacturer on all Filterra HC systems for the first year after activation. This includes a maximum of 2 visits to remove debris, replace pretreatment mulch, and prune the vegetation. More information is provided in the Operations and Maintenance Guidelines. Some Filterra HC systems also contain diversion bypass or outlet bays. Depending on site pollutant loading, these bays may require periodic removal of debris, however this is not included in the first year of maintenance and would likely not be required within the first year of operation.

These services, as well as routine maintenance outside of the included first year, can be provided by certified maintenance providers listed on the Contech website. Training can also be provided to other stormwater maintenance or landscape providers.



Why Maintain?

All stormwater treatment systems require maintenance for effective operation. This necessity is often incorporated in your property's permitting process as a legally binding BMP maintenance agreement. Other reasons to maintain are:

- Avoiding legal challenges from your jurisdiction's maintenance enforcement program.
- Prolonging the expected lifespan the media in the Filterra HC system.
- Avoiding more costly media replacement.
- Helping reduce pollutant loads leaving your property.

Simple maintenance of the Filterra HC is required to continue effective pollutant removal from stormwater runoff before discharge into downstream waters. This procedure will also extend the longevity of the living biofilter system. The Filterra HC system is also subjected to various materials entering the inlet, including trash, silt, leaves, etc. which will be contained above the mulch layer. Too much silt may inhibit the Filterra HC system flow rate, which is the reason for site stabilization before activation. Regular replacement of the mulch stops accumulation of such sediment.

If the system is not maintained on regular intervals, is subject to a catastrophic spill or other event, or subject to unusual pollutant loading, full media bed replacement could be required. Please contact Contech for further evaluation if you feel this may be necessary.

When to Maintain?

Contech includes a 1-year maintenance plan with each system purchase. Annual included maintenance consists of a maximum of two (2) scheduled visits. Additional maintenance may be necessary depending on sediment and trash loading (by Owner or at additional cost). The start of the maintenance plan begins when the system is activated.

Maintenance visits are scheduled seasonally; the spring visit aims to clean up after winter loads including salts and sands while the fall visit helps the system by removing excessive leaf litter.

It has been found that in regions which receive between 30-50 inches of annual rainfall, (2) two visits are generally required; regions with less rainfall often only require (1) one visit per annum. Varying land uses can affect maintenance frequency;

e.g. some fast food restaurants require more frequent trash removal. Contributing drainage areas which are subject to new development wherein the recommended erosion and sediment control measures have not been implemented may require additional maintenance visits.

Some sites may be subjected to extreme sediment or trash loads, requiring more frequent maintenance visits. This is the reason for detailed notes of maintenance actions per unit, helping the Supplier and Owner predict future maintenance frequencies, reflecting individual site conditions.

Owners must promptly notify the (maintenance) Supplier of any damage to the plant(s), which constitute(s) an integral part of the bioretention technology. Owners should also advise other landscape or maintenance contractors to leave all maintenance to the Supplier (i.e. no pruning or fertilizing) during the first year.



Exclusion of Services

Clean up due to major contamination such as oils, chemicals, toxic spills, etc. will result in additional costs and are not covered under the Supplier maintenance contract. Should a major contamination event occur the Owner must block off the outlet pipe of the Filterra HC (where the cleaned runoff drains to, such as drop inlet) and block off the inlet of the Filterra HC. The Supplier should be informed immediately.

Maintenance Visit Summary

Each maintenance visit consists of the following simple tasks (detailed instructions below).

1. Inspection of Filterra HC and surrounding area
2. Removal of tree grate and erosion control stones
3. Removal of debris, trash and mulch
4. Mulch replacement
5. Plant health evaluation & pruning or replacement as necessary
6. Clean area around Filterra HC
7. Complete paperwork

Maintenance Tools, Safety Equipment and Supplies

Ideal tools include camera, bucket, shovel, broom, pruners, hoe/rake, and tape measure. Appropriate Personal Protective Equipment (PPE) should be used in accordance with local or company procedures. This may include impervious gloves where the type of trash is unknown, high visibility clothing and barricades when working near traffic and also safety hats and shoes. A T-Bar or crowbar should be used for moving the tree grates (up to 170 lbs ea.). Most visits require minor trash removal and a full replacement of mulch. See below for actual number of bagged mulch that is required in each media bay size. Mulch should be a double shredded, hardwood variety. Some visits may require additional Filterra engineered soil media for the Filterra HC system, available from the Supplier.

	Available Filterra® HC Media Bay Sizes (feet)	Filter Surface Area (ft^2)	Mulch Volume at 3" Depth (ft^2)	# of 2 ft^2 Mulch Bags
Standard Configuration Filterra and Filterra Biosape Vaults	4x4	16	4	2
	4x6 or 6x4	24	6	3
	4.5x7.83 or 7.83x4.5 (Nominal 4x8/8x4)	35.24	9	5
	6x6	36	9	5
	6x8 or 8x6	48	12	6
	6x10 or 10x6	60	15	8
	6x12 or 12x6	72	18	9
	7x13 or 13x7	91	23	12
	14x8	112	28	14
	16x8	128	32	16
	18x8	144	36	18
	20x8	160	40	20
	22x8	176	44	22
Peak Diversion Filterra Vaults	4x4	16	4	2
	4.5x5.83 or 5.83x4.5 (Nominal 4x6/6x4)	26.24	7	4
	6x6	36	9	5
	6x8	48	12	6
	6x10 or 10x6	60	15	8
	7x10	70	18	9
	8x10.5	84	21	11
	8x12.5	100	25	13
	Custom and/or Filterra Bioscape	Media Area in ft^2	0.25 x (Media Area in ft^2)	0.125 x (Media Area in ft^2)

Maintenance Visit Procedure

Keep sufficient documentation of maintenance actions to predict location specific maintenance frequencies and needs. An example Maintenance Report is included in this manual.



1. Inspection of Filterra HC and surrounding area

- Record individual unit before maintenance with photograph (numbered). Record on Maintenance Report (see example in this document) the following:

Record on Maintenance Report the following:

Standing Water	yes | no
Damage to Box Structure	yes | no
Damage to Grate	yes | no
Is Bypass Clear	yes | no

If yes answered to any of these observations, record with close-up photograph (numbered).



2. Removal of tree grate and erosion control stones

- Remove cast iron grates for access into Filterra HC box.
- Dig out silt (if any) and mulch and remove trash & foreign items.

3. Removal of debris, trash and mulch

Record on Maintenance Report the following:

Silt/Clay	yes | no
Cups/ Bags	yes | no
Leaves	yes | no
Buckets Removed	_____



- After removal of mulch and debris, measure distance from the top of the Filterra engineered media soil to the top of the top slab. Compare the measured distance to the distance shown on the approved Contract Drawings for the system. Add Filterra media (not top soil or other) to bring media up as needed to distance indicated on drawings.

Record on Maintenance Report the following:

Distance to Top of Top Slab (inches)	_____
Inches of Media Added	_____



4. Mulch replacement

- Add double shredded mulch evenly across the entire unit to a depth of 3″.
- Refer to Filterra Mulch Specifications for information on acceptable sources.
- Ensure correct repositioning of erosion control stones by the Filterra HC inlet to allow for entry of trash during a storm event.
- Replace Filterra HC grates correctly using appropriate lifting or moving tools, taking care not to damage the plant.



5. Plant health evaluation and pruning or replacement as necessary

- Examine the plant's health and replace if necessary.
- Prune as necessary to encourage growth in the correct directions

Record on Maintenance Report the following:

Height above Grate	_____ (ft)
Width at Widest Point	_____ (ft)
Health	healthy | unhealthy
Damage to Plant	yes | no
Plant Replaced	yes | no



6. Clean area around Filterra HC

- Clean area around unit and remove all refuse to be disposed of appropriately.



7. Complete paperwork

- Deliver Maintenance Report and photographs to appropriate location (normally Contech during maintenance contract period).
- Some jurisdictions may require submission of maintenance reports in accordance with approvals. It is the responsibility of the Owner to comply with local regulations.

Maintenance Checklist

Drainage System Failure	Problem	Conditions to Check	Condition that Should Exist	Actions
Inlet	Excessive sediment or trash accumulation.	Accumulated sediments or trash impair free flow of water into Filterra HC.	Inlet should be free of obstructions allowing free distributed flow of water into Filterra HC HC.	Sediments and/or trash should be removed.
Mulch Cover	Trash and floatable debris accumulation.	Excessive trash and/or debris accumulation.	Minimal trash or other debris on mulch cover.	Trash and debris should be removed and mulch cover raked level. Ensure bark nugget mulch is not used.
Mulch Cover	"Ponding" of water on mulch cover.	"Ponding" in unit could be indicative of clogging due to excessive fine sediment accumulation or spill of petroleum oils.	Stormwater should drain freely and evenly through mulch cover.	Recommend contact manufacturer and replace mulch as a minimum.
Vegetation	Plants not growing or in poor condition.	Soil/mulch too wet, evidence of spill. Incorrect plant selection. Pest infestation. Vandalism to plants.	Plants should be healthy and pest free.	Contact manufacturer for advice.
Vegetation	Plant growth excessive.	Plants should be appropriate to the species and location of Filterra HC.		Trim/prune plants in accordance with typical landscaping and safety needs.
Structure	Structure has visible cracks.	Cracks wider than 1/2 inch or evidence of soil particles entering the structure through the cracks.		Vault should be repaired.
Maintenance is ideally to be performed twice annually.				

Filterra HC Inspection & Maintenance Log

Filterra HC System Size/Model: _____ **Location:** _____

Date	Mulch & Debris Removed	Depth of Mulch Added	Mulch Brand	Height of Vegetation Above Grate	Vegetation Species	Issues with System	Comments
1/1/17	*5 – 5 gal Buckets*	*3″*	*Lowe's Premium Brown Mulch*	*4′*	*Galaxy Magnolia*	*- Standing water in downstream structure*	*- Removed blockage in downstream structure*

Appendix 1 – Filterra® Activation Checklist

CONTECH® ENGINEERED SOLUTIONS

Project Name:______________________________Company:______________________________

Site Contact Name: ______________________________ Site Contact Phone/Email: ____________________

Site Owner/End User Name:____________________Site Owner/End User Phone/Email: ____________________

Preferred Activation Date: ______________________________(provide 2 weeks minimum from date this form is submitted)

Site Designation	System Size	Final Pavement / Top Coat Complete	Landscaping Complete / Grass Emerging	Construction materials / Piles / Debris Removed	Throat Opening Measures 4" Min. Height	Plant Species Requested
		☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	
		☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	
		☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	
		☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	
		☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	
		☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	
		☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	
		☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	
		☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	

Attach additional sheets as necessary.

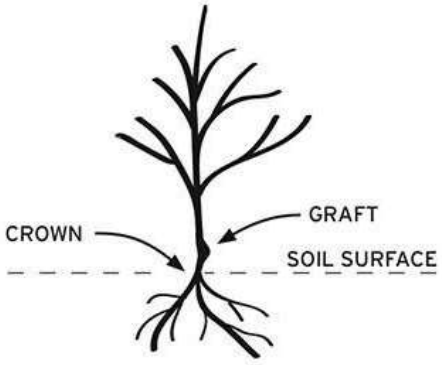
NOTE: A charge of $500.00 will be invoiced for each Activation visit requested by Customer where Contech determines that the site does not meet the conditions required for Activation. ONLY Contech authorized representatives can perform Activation of Filterra HC systems; unauthorized Activations will void the system warranty and waive manufacturer supplied Activation and 1st Year Maintenance.

______________________________ Signature

______________________________ Date

Appendix 2 – Planting Requirements for Filterra® HC Systems

Plant Material Selection



- Select plant(s) as specified in the engineering plans and specifications.
- Select plant(s) with full root development but not to the point where root bound.
- Use local nursery container plants only. Ball and burlapped plants are not permitted.
- For precast Filterra HC systems with a tree grate, plant(s) must not have scaffold limbs at least 14 inches from the crown due to spacing between the top of the mulch and the tree grate. Lower branches can be pruned away provided there are sufficient scaffold branches for tree or shrub development.
- For precast Filterra HC systems with a tree grate, at the time of installation, it is required that plant(s) must be at least 6" above the tree grate opening at installation for all Filterra configurations. This DOES NOT apply to Full Grate Cover designs.
- Plant(s) shall not have a mature height greater than 25-30 feet.
- A 7-15 gallon container size shall be used.
- For precast Filterra HC systems, plant(s) should have a single trunk at installation, and pruning may be necessary at activation and maintenance for some of the faster growing species, or species known to produce basal sprouts

Plant Installation

- During transport protect the plant leaves from wind and excessive jostling.
- Prior to removing the plant(s) from the container, ensure the soil moisture is sufficient to maintain the integrity of the root ball. If needed, pre-wet the container plant.
- Cut away any roots which are growing out of the container drain holes. Plants with excessive root growth from the drain holes should be rejected.
- Plant(s) should be carefully removed from the pot by gently pounding on the sides of the container with the fist to loosen root ball. Then carefully slide out. Do not lift plant(s) by trunk as this can break roots and cause soil to fall off. Extract the root ball in a horizontal position and support it to prevent it from breaking apart. Alternatively, the pot can be cut away to minimize root ball disturbance.
- Remove any excess soil from above the root flare after removing plant(s) from container.
- Excavate a hole with a diameter 4" greater than the root ball, gently place the plant(s).
- If plant(s) have any circling roots from being pot bound, gently tease them loose without breaking them.
- If root ball has a root mat on the bottom, it should be shaved off with a knife just above the mat line.
- Plant the tree/shrub/grass with the top of the root ball 1" above surrounding media to allow for settling.
- All plants should have the main stem centered in the tree grate (where applicable) upon completion of installation.
- With all trees/shrubs, remove dead, diseased, crossed/rubbing, sharply crotched branches or branches growing excessively long or in wrong direction compared to majority of branches.
- To prevent transplant shock (especially if planting takes place in the hot season), it may be necessary to prune some of the foliage to compensate for reduced root uptake capacity. This is accomplished by pruning away some of the smaller secondary branches or a main scaffold branch if there are too many. Too much foliage relative to the root ball can dehydrate and damage the plant.
- Plant staking may be required.

Mulch Installation

- Only mulch that has been meeting Contech Engineered Solutions' mulch specifications can be used in the Filterra HC system.
- Mulch must be applied to a depth of 3" evenly over the surface of the media.

Irrigation Requirements

- Each Filterra HC system must receive adequate irrigation to ensure survival of the living system during periods of drier weather.
- Irrigation sources include rainfall runoff from downspouts and/or gutter flow, applied water through the tree grate or in some cases from an irrigation system with emitters installed during construction.
- At Activation: Apply about one (cool climates) to two (warm climates) gallons of water per inch of trunk diameter over the root ball.
- During Establishment: In common with all plants, each Filterra HC plant will require more frequent watering during the establishment period. One inch of applied water per week for the first three months is recommended for cooler climates (2 to 3 inches for warmer climates). If the system is receiving rainfall runoff from the drainage area, then irrigation may not be needed. Inspection of the soil moisture content can be evaluated by gently brushing aside the mulch layer and feeling the soil. Be sure to replace the mulch when the assessment is complete. Irrigate as needed**.
- Established Plants: Established plants have fully developed root systems and can access the entire water column in the media. Therefore, irrigation is less frequent but requires more applied water when performed. For a mature system assume 3.5 inches of available water within the media matrix. Irrigation demand can be estimated as 1" of irrigation demand per week. Therefore, if dry periods exceed 3 weeks, irrigation may be required. It is also important to recognize that plants which are exposed to windy areas and reflected heat from paved surfaces may need more frequent irrigation. Long term care should develop a history which is more site specific.

** Five gallons per square yard approximates 1 inch of water. Therefore, for a 6' by 6' Filterra HC approximately 20-60 gallons of water is needed. To ensure even distribution of water it needs to be evenly sprinkled over the entire surface of the filter bed, with special attention to make sure the root ball is completely wetted. NOTE: if needed, measure the time it takes to fill a five-gallon bucket to estimate the applied water flow rate then calculate the time needed to irrigate the Filterra HC system. For example, if the flow rate of the sprinkler is 5 gallons/minute then it would take 12 minutes to irrigate a 6' by 6' filter.



Notes

filterra®
Bioretention Systems

CONTECH®
ENGINEERED SOLUTIONS

9025 Centre Pointe Drive, Suite 400
West Chester, OH 45069
info@conteches.com | 800-338-1122
www.ContechES.com

© 2021 Contech Engineered Solutions LLC, a QUIKRETE Company

ALL RIGHTS RESERVED. PRINTED IN THE USA.

NOTHING IN THIS CATALOG SHOULD BE CONSTRUED AS A WARRANTY. APPLICATIONS SUGGESTED HEREIN ARE DESCRIBED ONLY TO HELP READERS MAKE THEIR OWN EVALUATIONS AND DECISIONS, AND ARE NEITHER GUARANTEES NOR WARRANTIES OF SUITABILITY FOR ANY APPLICATION. CONTECH MAKES NO WARRANTY WHATSOEVER, EXPRESS OR IMPLIED, RELATED TO THE APPLICATIONS, MATERIALS, COATINGS, OR PRODUCTS DISCUSSED HEREIN. ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND ALL IMPLIED WARRANTIES OF FITNESS FOR ANY PARTICULAR PURPOSE ARE DISCLAIMED BY CONTECH. SEE CONTECH'S CONDITIONS OF SALE (AVAILABLE AT WWW.CONTECHES.COM/COS) FOR MORE INFORMATION.

PDF 1/21

STORMWATER COLLECTION SYSTEM CALCULATIONS (PIPE SIZING)

DYNAMIC ENGINEERING

Inlet Area Summary and Average Coefficient (C) Calculations

Project: Proposed Residential Development
Job #: 1279-99-010
Location: Township of Lawrence

Computed By: MDC
Checked By: TAZ
Date: 10/25/2022
Last Revised: 11/17/2023

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	5229	0.95	292	0.35	0.92	5521	0.13
IA 3	6872	0.95	3106	0.35	0.76	9978	0.23
IA 4	5418	0.95	1847	0.35	0.80	7265	0.17
IA 6	9823	0.95	2725	0.35	0.82	12548	0.29
IA 10	7200	0.95	1101	0.35	0.87	8301	0.19
IA 40	435	0.95		0.35	0.95	435	0.01
IA 30	1694	0.95		0.35	0.95	1694	0.04
IA 33	896	0.95	4330	0.35	0.45	5226	0.12
IA 51	9383	0.95		0.35	0.95	9383	0.22
IA 61	3795	0.95		0.35	0.95	3795	0.09
IA 71	4337	0.95		0.35	0.95	4337	0.10
IA 81	3655	0.95		0.35	0.95	3655	0.08
Roof 1	2885	0.95		0.35	0.95	2885	0.07
Roof 2	4209	0.95		0.35	0.95	4209	0.10
Roof 3	2926	0.95		0.35	0.95	2926	0.07
Roof 4	3830	0.95		0.35	0.95	3830	0.09
Roof 5	3549	0.95		0.35	0.95	3549	0.08
Roof 6	2365	0.95		0.35	0.95	2365	0.05
Duplex A-F	6042	0.95		0.35	0.95	6042	0.14

DYNAMIC ENGINEERING

Stormwater Collection System Calculations

Project: Proposed Residential Development
Job #: 1279-99-010
Location: Township of Lawrence
Design Storm: 25 Yr

Computed By: JMH
Checked By: TAZ
Date: 10/25/2022
Last Revised: 11/17/2023

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)
ROOF 1	IA1	0.07	0.95	0.07	0.07	10.00	0.04	10.00	6.80	0.48	0.48	15	10.0	0.013	0.0050	4.57	3.73
IA1	MH2	0.13	0.92	0.12	0.19	10.00	0.44	10.04	6.80	0.82	1.29	15	99.0	0.013	0.0050	4.57	3.73
Roof 2	MH2	0.10	0.95	0.10	0.10	10.00	0.05	10.00	6.80	0.68	0.68	15	11.0	0.013	0.0050	4.57	3.73
MH2	IA3	0.00	0.95	0.00	0.29	10.00	0.16	10.48	6.80	0.00	1.97	15	35.0	0.013	0.0050	4.57	3.73
ROOF 3	IA3	0.07	0.86	0.06	0.06	10.00	0.04	10.00	6.80	0.41	0.41	15	10.0	0.013	0.0050	4.57	3.73
IA3	IA4	0.23	0.76	0.17	0.52	10.00	0.48	10.64	6.68	1.14	3.47	15	107.0	0.013	0.0050	4.57	3.73
Roof 4	IA4	0.09	0.95	0.09	0.09	10.00	0.04	10.00	6.80	0.61	0.61	15	8.0	0.013	0.0050	4.57	3.73
IA4	MH5	0.17	0.80	0.14	0.92	10.00	0.28	11.12	6.56	0.92	6.04	18	71.0	0.013	0.0050	7.43	4.21
Roof 5	MH5	0.08	0.95	0.08	0.08	10.00	0.05	10.00	6.80	0.54	0.54	15	11.0	0.013	0.0050	4.57	3.73
MH5	IA6	0.00	0.95	0.00	1.00	10.00	0.14	11.40	6.56	0.00	6.56	18	36.0	0.013	0.0050	7.43	4.21
Roof 6	IA6	0.05	0.95	0.05	0.05	10.00	0.08	10.00	6.80	0.34	0.34	12	16.0	0.012	0.0050	2.73	3.48
IA10	IA6	0.19	0.87	0.17	0.17	10.00	1.03	10.00	6.80	1.16	1.16	15	230.0	0.013	0.0050	4.57	3.73
IA40	IA6	0.01	0.95	0.01	0.01	10.00	0.33	10.00	6.80	0.07	0.07	15	74.0	0.013	0.0050	4.57	3.73
IA6	OCS 7 IN	0.29	0.82	0.24	1.47	10.00	0.00	11.54	6.44	1.55	9.47	18	1.0	0.013	0.0100	10.50	5.94
OCS 7 OUT	MH8	0.32	0.95	0.30	0.30	10.00	0.25	10.00	6.80	2.04	2.04	18	63.0	0.013	0.0050	7.43	4.21
MH27	MH29	4.43	0.95	4.21	4.21	10.00	0.89	10.00	6.80	28.63	28.63	30	317.0	0.013	0.0050	29.00	5.91
IA33	MH29	0.12	0.45	0.05	0.05	10.00	0.07	10.00	6.80	0.34	0.34	15	15.0	0.013	0.0050	4.57	3.73
IA30	MH29	0.04	0.95	0.04	0.04	10.00	0.08	10.00	6.80	0.27	0.27	15	18.0	0.013	0.0050	4.57	3.73
MH29	MH8	0.00	0.95	0.00	4.30	10.00	1.16	10.89	6.68	0.00	28.72	30	413.0	0.013	0.0050	29.00	5.91
MH8	HEADWALL 9	0.00	0.95	0.00	4.60	10.00	0.02	12.05	6.32	0.00	29.07	30	12.0	0.013	0.0100	41.01	8.36
IA51	MH53	0.22	0.95	0.21	0.21	10.00	0.38	10.00	6.80	1.43	1.43	15	84.0	0.013	0.0050	4.57	3.73
IA61	MH53	0.09	0.95	0.09	0.09	10.00	0.02	10.00	6.80	0.61	0.61	15	5.0	0.013	0.0050	4.57	3.73
MH53	MH54	0.00	0.95	0.00	0.30	10.00	0.38	10.38	6.80	0.00	2.04	15	86.0	0.013	0.0050	4.57	3.73
IA71	MH54	0.10	0.95	0.10	0.10	10.00	0.02	10.00	6.80	0.68	0.68	15	5.0	0.013	0.0050	4.57	3.73
MH54	MH55	0.00	0.95	0.00	0.40	10.00	0.58	10.76	6.68	0.00	2.67	15	130.0	0.013	0.0050	4.57	3.73
IA81	MH55	0.08	0.95	0.08	0.08	10.00	0.02	10.00	6.80	0.54	0.54	15	5.0	0.013	0.0050	4.57	3.73
MH55	MH56	0.00	0.95	0.00	0.48	10.00	0.17	11.34	6.56	0.00	3.15	15	38.0	0.013	0.0050	4.57	3.73

CAPACITY OF CIRCULAR PIPE FLOWING FULL

DYNAMIC ENGINEERING

Capacity of Circular Pipe Flowing Full

Project: Proposed Residential Development
Job #: 1279-99-010
Location: Lawrence, Mercer County, NJ

Computed By: LPG
Checked By: TJM
Date: 10/26/2022

PIPE DESCRIPTION	SLOPE (%)	SIZE (IN)	MANNING'S COEFFICIENT (n)	VELOCITY (FT/S)	CAPACITY (CFS)	CAPACITY (GPD)	CAPACITY (MGD)
Existing 30" RCP	0.480%	30	0.013	5.80	28.49	18,416,149	18.42

Variables Defined

Q=Capacity of Pipe (CFS)
V=Velocity in Pipe Section (FT/S)
R=Hydraulic Radius of Pipe Section
S=Slope of Pipe Section (FT/FT)
D=Diameter of Pipe (FT)
d=Depth of Flow in Pipe (FT)
n=Manning's Coefficient
Wp=Wetted Perimeter (FT)

Typical Values for Manning's Coefficient (n)

n(RCP)=	0.013	
n(HDPE-Smooth Interior)=	0.012	*Varies with Manufacturer
n(DIP)=	0.013	
n(PVC)=	0.010	
n(CMP)=	0.024	

Equations used:

Q=VA
V=(1.49/n)*R^(2/3)*S^(1/2)
Q=(1.49/n)*R^(2/3)*S^(1/2)*A

Utilizing Appendix 16.A from the Civil Engineering Reference Manual-Seventh Edition, by Micheal Lindeburg, Copyright 1999
The following equations were utilized to calculate the Hydraulic Radius and Area of a Circular Pipe Section flowing full

A=(π*D^2/4)*0.5=0.7854*D^2
R=A/Wp=0.7854*D^2/(2*π*D/2)=0.25*D

Therefore:

Q=(1.49/n)*(0.25*D)^(2/3)*S^(1/2)*(0.7854*D^2)
V=(1.49/n)*(0.25*D)^(2/3)*S^(1/2)

Unit Conversion Equations

1 Cubic Foot=7.4805 Gallons
1 Day = 86,400 Seconds

Therefore:

$$\frac{\text{Cubic Foot}}{\text{Second}} \times \frac{86{,}400 \text{ Seconds}}{1 \text{ Day}} \times \frac{7.4805 \text{ Gallons}}{1 \text{ Cubic Foot}} = \frac{\text{Gallon}}{\text{Day}}$$

$$\frac{\text{Gallon}}{\text{Day}} \times \frac{1 \text{ Million Gallons}}{1{,}000{,}000 \text{ Gallons}} = \frac{\text{Million Gallons}}{\text{Day}}$$

CONDUIT OUTLET PROTECTION CALCULATIONS

DYNAMIC ENGINEERING

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

Date: 11/9/2023
Project: Residential Dev
Project No: 1279-99-010

Calculated By: JMH
Checked By: TAZ

Conduit Outlet Protection Calculations

Rip Rap Pad # Curb Cut

Design Parameters:

Design Storm Flow for 25 Year, Q	1.05	cfs
Vertical Dimension of Outlet Pipe, D_o	6	in
Horizontal Dimension of Outlet Pipe, W_o	48	in
Tailwater Depth, TW[1]	2.30	ft

Apron Dimension Calculations:

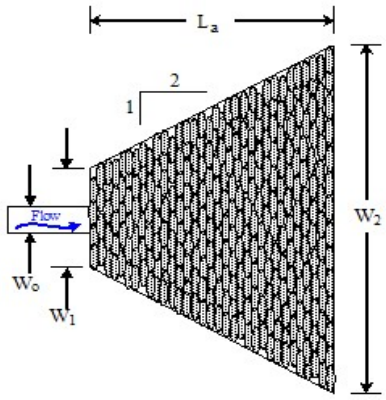
Unit Dicharge, $q = Q/D_o$ = 2.11 cfs per foot

- **Case I: $TW < 1/2\ D_o$**

  Apron Length, $L_a = \frac{1.8q}{D_o^{1/2}} + 7D_o$ = **L_a =**

  Width, $W_1 = 3W_o$ = **W_1 =**

  Width, $W_2 = 3W_o + L_a$ = **W_2 =**

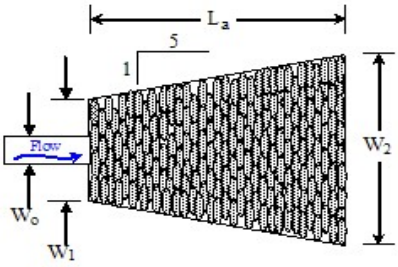


- **Case II: $TW \geq 1/2\ D_o$**

  Apron Length, $L_a = \frac{3q}{D_o^{1/2}}$ = 8.94 ft or **L_a = 9 ft**

  Width, $W_1 = 3W_o$ = 12. ft or **W_1 = 12 ft**

  Width, $W_2 = 3W_o + 0.4L_a$ = 15.57 ft or **W_2 = 16 ft**



Rip Rap Stone Size Calculations:

Median Stone, $d_{50} = \frac{0.02q^{1.33}}{TW}$ = 0.28 in **d_{50} = 6 in**

Notes:

1. Where there is a well-defined channel downstream of the apron, the bottom width of the apron shall be at least equal to the bottom width of the channel and the structural lining shall extend at least one foot above the tailwater elevation, but no lower than two-thirds of the vertical conduit dimension above the conduit invert.
2. The side slopes shall be 2:1 or flatter.
3. The bottom grade shall be 0.0% (level).
4. There shall be no overfall at the end of the apron or at the end of the culvert.
5. Fifty (50) percent by weight of the rip-rap mixture shall be smaller than the median size stone designated as d_{50}. The largest stone size in the mixture shall be 1.5 times the d_{50} size. The rip-rap shall be reasonably well graded.
6. The thickness of the rip-rap apron may be two (2) times the median stone diameter provided that the apron is constructed on a bedding of four (4) inches of 3/4 inch clean stone on approved filter fabric material.
7. Rip-rap and filter fabric shall meet the standards of the governing Soil Conservation District as well as the requirements of the local municipality.
8. No bends or curves at the intersection of the conduit and apron will be permitted.

Footnote:

1. Tailwater depth shall be the 2-year storm if discharging into a detention basin. For areas where tailwater cannot be computed, use $TW = 0.2D_o$.
2. For multiple pipes, increase rip-rap sizes by 25% when pipe spacing is greater than or equal to $1/4W_o$.

DYNAMIC ENGINEERING

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

Date: 4/7/2023
Project: Residential Dev
Project No: 1279-99-010

Calculated By: JMH
Checked By: TAZ

Conduit Outlet Protection Calculations

Rip Rap Pad # 9

Design Parameters:

Design Storm Flow for 25 Year, Q	29.07	cfs
Vertical Dimension of Outlet Pipe, D_o	30	in
Horizontal Dimension of Outlet Pipe, W_o	30	in
Tailwater Depth, TW[1]	2.30	ft

Apron Dimension Calculations:

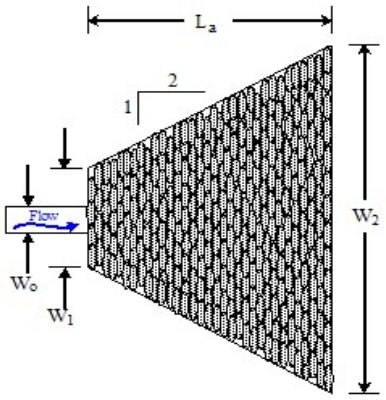
Unit Dicharge, $q = Q/D_o$ = 11.63 cfs per foot

- **Case I: $TW < 1/2\ D_o$**

  Apron Length, $L_a = \frac{1.8q}{D_o^{1/2}} + 7D_o$ = L_a =

  Width, $W_1 = 3W_o$ = W_1 =

  Width, $W_2 = 3W_o + L_a$ = W_2 =

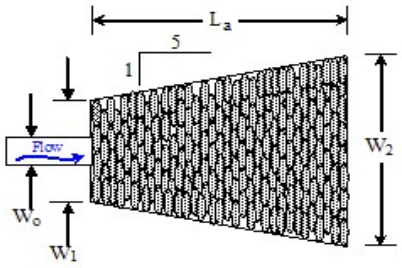


- **Case II: $TW \geq 1/2\ D_o$**

  Apron Length, $L_a = \frac{3q}{D_o^{1/2}}$ = 22.06 ft or L_a = **23 ft**

  Width, $W_1 = 3W_o$ = 7.5 ft or W_1 = **8 ft**

  Width, $W_2 = 3W_o + 0.4L_a$ = 16.33 ft or W_2 = **17 ft**



Rip Rap Stone Size Calculations:

Median Stone, $d_{50} = \frac{0.02q^{1.33}}{TW}$ = 2.73 in d_{50} = **6 in**

Notes:

1. Where there is a well-defined channel downstream of the apron, the bottom width of the apron shall be at least equal to the bottom width of the channel and the structural lining shall extend at least one foot above the tailwater elevation, but no lower than two-thirds of the vertical conduit dimension above the conduit invert.
2. The side slopes shall be 2:1 or flatter.
3. The bottom grade shall be 0.0% (level).
4. There shall be no overfall at the end of the apron or at the end of the culvert.
5. Fifty (50) percent by weight of the rip-rap mixture shall be smaller than the median size stone designated as d_{50}. The largest stone size in the mixture shall be 1.5 times the d_{50} size. The rip-rap shall be reasonably well graded.
6. The thickness of the rip-rap apron may be two (2) times the median stone diameter provided that the apron is constructed on a bedding of four (4) inches of 3/4 inch clean stone on approved filter fabric material.
7. Rip-rap and filter fabric shall meet the standards of the governing Soil Conservation District as well as the requirements of the local municipality.
8. No bends or curves at the intersection of the conduit and apron will be permitted.

Footnote:

1. Tailwater depth shall be the 2-year storm if discharging into a detention basin. For areas where tailwater cannot be computed, use $TW = 0.2D_o$.
2. For multiple pipes, increase rip-rap sizes by 25% when pipe spacing is greater than or equal to $1/4W_o$.

GROUNDWATER RECHARGE CALCULATIONS

New Jersey Groundwater Recharge Spreadsheet Version 2.0 November 2003

Annual Groundwater Recharge Analysis (based on GSR-32)

Select Township ↓	Average Annual P (in)	Climatic Factor
MERCER CO., LAWRENCE TWP	44.9	1.43

Project Name:	1279-99-010
Description:	Prop Residential Development
Analysis Date:	11/17/23

Pre-Developed Conditions

Land Segment	Area (acres)	TR-55 Land Cover	Soil	Annual Recharge (in)	Annual Recharge (cu.ft)
1	3.46	Open space	Udorthents	0.0	-
2	0.11	Woods	Udorthents	0.0	-
3	0.05	Gravel, dirt	Udorthents	0.0	-
4	0.38	Impervious areas	Udorthents	0.0	-
5					
6					
7	0				
8	0				
9	0				
10	0				
11	0				
12	0				
13	0				
14	0				
15	0				
Total =	4.0			Total Annual Recharge (in)	Total Annual Recharge (cu-ft)
				0.0	-

Post-Developed Conditions

Land Segment	Area (acres)	TR-55 Land Cover	Soil	Annual Recharge (in)	Annual Recharge (cu.ft)
1	2.29	Impervious areas	Udorthents	0.0	-
2	0.61	Open space	Udorthents	0.0	-
3	1.1	Woods	Udorthents	0.0	-
4					
5	0				
6	0				
7	0				
8	0				
9	0				
10	0				
11	0				
12	0				
13	0				
14	0				
15	0				
Total =	4.0			Total Annual Recharge (in)	Total Annual Recharge (cu.ft)
				0.0	-

Annual Recharge Requirements Calculation ↓

% of Pre-Developed Annual Recharge to Preserve =	100%	Total Impervious Area (sq.ft)	99,752
Post-Development Annual Recharge Deficit=	*0*	(cubic feet)	

Recharge Efficiency Parameters Calculations (area averages)

RWC=	0.00	(in)	DRWC=	0.00	(in)
ERWC =	0.00	(in)	EDRWC=	0.00	(in)

Procedure to fill the Pre-Development and Post-Development Conditions Tables

For each land segment, first enter the area, then select TR-55 Land Cover, then select Soil. Start from the top of the table and proceed downward. Don't leave blank rows (with A=0) in between your segment entries. Rows with A=0 will not be displayed or used in calculations. For impervious areas outside of standard lots select "Impervious Areas" as the Land Cover. Soil type for impervious areas are only required if an infiltration facility will be built within these areas.

DRAINAGE DITCH STABILITY ANALYSIS

North American Green
5401 St. Wendel-Cynthiana Rd.
Poseyville, Indiana 47633
Tel. 800.772.2040
>Fax 812.867.0247
www.nagreen.com
ECMDS v7.0

CHANNEL ANALYSIS

> > > Ditch

Name	Ditch
Discharge	29.07
Channel Slope	0.0145
Channel Bottom Width	40
Left Side Slope	44
Right Side Slope	44
Low Flow Liner	
Retardence Class	C 6-12 in
Vegetation Type	Sod Former
Vegetation Density	Very Good 80-95%
Soil Type	Silt Loam (SM)

Unreinforced Vegetation

Phase	Reach	Discharge	Velocity	Normal Depth	Mannings N	Permissible Shear Stress	Calculated Shear Stress	Safety Factor	Remarks	Staple Pattern
Unreinforced Vegetation	Straight	29.07 cfs	2.14 ft/s	0.26 ft	0.03	4 lbs/ft2	0.24 lbs/ft2	16.8	STABLE	--
Underlying Substrate	Straight	29.07 cfs	2.14 ft/s	0.26 ft	0.03	4 lbs/ft2	0.19 lbs/ft2	20.58	STABLE	--

STORMWATER BASIN AREA INVESTIGATION REPORT, PREPARED BY DYNAMIC EARTH, LLC

SUPPLEMENTAL STORMWATER BASIN AREA INVESTIGATION REPORT

PROPOSED SITE DEVELOPMENT
2495 Brunswick Pike
Block 2001, Lots 3, 60-66, & 68
Lawrence Township, Mercer County, New Jersey

Prepared for:

RPM DEVELOPMENT GROUP, LLC
77 Park Street
Montclair, New Jersey 07042

Prepared by:

245 Main Street, Suite 110
Chester, New Jersey 07930

Gregory Fritts
Principal

Francis Van Cleve, P.E.
Principal
NJ PE License No. 24GE05534500

Project #1279-99-010EC
April 5, 2023

STORMWATER BASIN AREA INVESTIGATION REPORT

Proposed Site Development
2495 Brunswick Pike
Block 2001, Lots 3, 60-66, & 68
Lawrence Township, Mercer County, New Jersey

TABLE OF CONTENTS

1.0 PROJECT DESCRIPTION 1

2.0 SCOPE OF SERVICES.....1

3.0 UNITED STATES DEPARTMENT OF AGRICULTURE (USDA) SOIL SURVEY 2

4.0 SUMMARY OF FINDINGS & RESULTS.....3

4.1 Subsurface Soil Profile 3

4.2 Seasonal High Groundwater 3

5.0 GENERAL COMMENTS AND LIMITATIONS 5

APPENDICES

Supplemental Test Location Plan
Records of Subsurface Exploration - 2023
Records of Subsurface Exploration - 2020
Laboratory Test Results – 2023
Laboratory Test Results – 2020
NRCS – USDA Custom Soil Report for Mercer County, New Jersey

1.0 PROJECT DESCRIPTION

Dynamic Earth, LLC (Dynamic Earth) has completed a supplemental exploration and evaluation for the proposed stormwater management facilities to be located at 2495 Brunswick Pike in Lawrence Township, Mercer County, New Jersey. The site is identified as Block 2001, Lots 3, 60 thru 66, and 68 and is shown on the *Supplemental Test Location Plan* included within the Appendix of this report.

Dynamic Earth previously performed a subsurface investigation at the site and the results were issued in a March 6, 2020 *Stormwater Basin Area Investigation Report*. Subsequent to our previous investigation, site plans were updated and supplemental testing was requested within the area of proposed stormwater management facilities. The results of the supplemental testing are included herein.

At the time of our supplemental investigation, the subject site consisted of an existing grass-covered area located within the northern portion of an overall larger shopping center development. The northern perimeter of the subject site was lined with trees. The proposed site development will include construction of a residential development with associated pavements and utilities. Stormwater management facilities are proposed throughout the site; although details regarding these facilities were not finalized at the time of this report. Based on the grading plan, earth fills typically on the order of approximately five to nine feet are required to achieve proposed subgrade elevations throughout the majority of the site. Site development details were provided on a December 9, 2022 (latest revised) *Grading Plan* prepared by Dynamic Engineering Consultants, PC (Dynamic).

The subject site is bound to the north by Texas Avenue and residential property beyond; to the east by entrance drive of the existing shopping center with commercial properties beyond; to the south by the existing shopping center with Brunswick Avenue beyond; and to the west by the residential property.

Based on a June 6, 2019 *Topographic Survey* prepared by Dynamic Survey, LLC, topography across the subject site generally slopes downward toward the south from a high elevation of approximately 69 feet within the northern portion of the property to a low elevation of approximately 57 feet within the southern portion of the property. The elevations included herein reference the North American Vertical Datum of 1988 (NAVD88), unless otherwise noted.

2.0 SCOPE OF SERVICES

Dynamic Earth's scope of services pertaining to this supplemental investigation included evaluating the subsurface conditions at soil profile pit locations to estimate the apparent seasonal high groundwater level. A total of 16 soil profile pits (identified as SPP-101 through SPP-116) were

excavated utilizing a track-mounted excavator within the potential stormwater management facility areas. A total of eight soil profile pits (identified as SPP-1 through SPP-8) were previously performed as part of our initial investigation in February of 2020. Test locations were located within the area of anticipated stormwater management facilities and were backfilled to the surface with excavated soils at completion.

The soils encountered were classified in general conformance with the United States Department of Agriculture (USDA) Classification System. Observations were made for groundwater and/or redoximorphic features indicative of zones of saturation or seasonal high groundwater. Soil logs are included in the Appendix of this report.

Undisturbed tube permeability samples collected in general accordance with New Jersey Department of Environmental Protection (N.J.D.E.P.) *Stormwater Best Practices Manual – Chapter 12: Soil Testing Criteria* test methods and obtained from anticipated stormwater management facility infiltration depths.

Environmental conditions were not evaluated by Dynamic Earth.

3.0 UNITED STATES DEPARTMENT OF AGRICULTURE (USDA) SOIL SURVEY

Based on a review of the United States Department of Agriculture – Natural Resources Conservation Services (USDA-NRCS) soil survey, the following soil resources are mapped within the area of the proposed site improvements:

Udorthents, stratified substratum, zero to eight percent slopes (UdstB): Udorthents stratified substratum with zero to eight percent slopes is mapped within the majority of the proposed stormwater management facility. The typical soil profile of this series soil (as reported in the soil survey) consists of sand to a depth of 10 inches underlain by gravelly coarse sand to a depth of 72 inches below the natural ground surface (limit of report). The depth to the water table is reported to be more than 80 inches below the natural ground surface.

Othello silt loams, zero to two percent slopes, northern coastal plain (OthA): Orthello silt loams with zero to two percent slopes is mapped within the southwestern portion of the proposed stormwater management facility. The typical soil profile of this series soil (as reported in the soil survey) consists of silt loam to a depth of 29 inches, with a sandy loam to a depth of 34 inches, underlain by loamy sand to a depth of 80 inches below the natural ground surface (limit of report). The depth to the water table is reported to be more between 10 and 20 inches below the natural ground surface.

4.0 SUMMARY OF FINDINGS & RESULTS

Detailed descriptions of the subsurface conditions encountered at each location are provided on the *Records of Subsurface Exploration* included herein. A summary of the subsurface conditions encountered is included below.

4.1 Subsurface Soil Profile

Supplemental soil profile pit locations were performed within existing landscaped areas and encountered approximately four inches to 12 inches of topsoil at the surface. Beneath the surficial cover, existing fill material was encountered that generally consisted of loamy sand and sandy loam with variable amounts of debris. The debris encountered included concrete, brick, wood, porcelain, roots, crushed stone, and asphalt. The existing fill material was encountered to depths ranging between approximately 0.7 feet and 2.8 feet below the ground surface, corresponding to elevations ranging between 60.7 feet and 55.0 feet. Beneath the existing fill material (where encountered) natural coastal plain deposits were encountered that generally consisted of loamy sand, sandy loam, sandy clay loam, clay loam, and loam with variable amounts of gravel. The natural coastal plain deposits were encountered soil profile pit termination depths ranging between approximately four feet and 12.0 feet below the ground surface; corresponding to elevations ranging between 53.8 feet and 47.1 feet. The relatively shallow refusal depths encountered were due to apparent cemented sand stratums encountered.

4.2 Seasonal High Groundwater and Permeability Results

Indicators of seasonal high groundwater (i.e. based on soil mottling) were encountered at the test locations at depths ranging between approximately 0.4 feet and 5.5 feet below the ground surface, corresponding to elevations ranging between 60.2 feet and 52.3 feet. Groundwater was encountered at the test locations at depths ranging between approximately 1.3 feet and nine feet below the ground surface, corresponding to elevations ranging between 60.2 feet and 51.1 feet. Seepage associated with an apparent perched zone of saturation within the fill material was encountered within SPP-101 through SPP-105, SPP-113 and SPP-114 at depths ranging between zero feet (at the surface) and two feet below the ground surface. Groundwater levels are expected to fluctuate seasonally, and following significant periods of precipitation.

A summary of the seasonal high groundwater levels, and permeability test results is presented in the following table:

SEASONAL HIGH GROUNDWATER, GROUNDWATER, AND PERMEABILITY TEST SUMMARY						
Location	Surface Elevation (feet)	Estimated Seasonal High Groundwater		Permeability Test Results		
		Depth (feet)	Elevation (feet)	Sample Depth (inches)	Permeability (in/hr)	
					A	B
SPP-101	61.5	2.0	59.5	16	0.4	<0.2
SPP-102[1]	58.8	0.5	58.3	24	<0.2	<0.2
SPP-103	59.1	1.3	57.8	40	<0.2	<0.2
SPP-104	60.1	2.3	57.8	20	0.2	1.1
SPP-105	61.7	2.3	59.4	18	<0.2	<0.2
SPP-106	63.5	3.3	60.2	20	8.3	>20.0
SPP-107	60.2	1.8	58.4	28	1.2	3.4
SPP-108	60.5	3.5	57.0	22	12.4	>20.0
SPP-109	59.8	2.5	57.3	22	8.2	3.6
SPP-110	60.2	2.5	57.7	36	<0.2	<0.2
SPP-111	60.1	2.0	58.1	40	<0.2	<0.2
SPP-112	59.1	2.2	56.9	36	<0.2	<0.2
SPP-113[1]	56.9	1.4	55.5	20	<0.2	<0.2
SPP-114	57.8	0.7	57.1	16	1.0	1.1
SPP-115[1]	57.8	5.5	52.3	28	16.5	15.5
SPP-116	57.8	4.4	53.4	40	8.6	4.3
SPP-1	60.1	5.0	55.1	36	Not Tested	
SPP-2	60.1	2.9	54.1	30	Not Tested	
SPP-3[1]	59.2	3.3	55.9	28	Not Tested	
SPP-4	58.4	3.2	55.2	30	Not Tested	
SPP-5	58.5	0.4	58.1	5	Not Tested	
SPP-6[1]	56.6	2.0	54.6	20	Not Tested	
SPP-7	57.1	0.8	56.3	7	Not Tested	

SEASONAL HIGH GROUNDWATER, GROUNDWATER, AND PERMEABILITY TEST SUMMARY						
Location	**Surface Elevation (feet)**	**Estimated Seasonal High Groundwater**		**Permeability Test Results**		
		Depth (feet)	**Elevation (feet)**	**Sample Depth (inches)**	**Permeability (in/hr)**	
					A	**B**
SPP-8	57.4	2.7	54.7	28	Not Tested	

[1]Machine refusal encountered due to apparent cemented sand stratum

5.0 GENERAL COMMENTS AND LIMITATIONS

Supplemental recommendations will be required upon finalization of conceptual site plans or if significant changes are made in the characteristics or location of the proposed stormwater management facilities. Dynamic Earth should be included as a consultant to the design team and should be provided final plans for review to confirm these criteria apply or to modify recommendations as necessary.

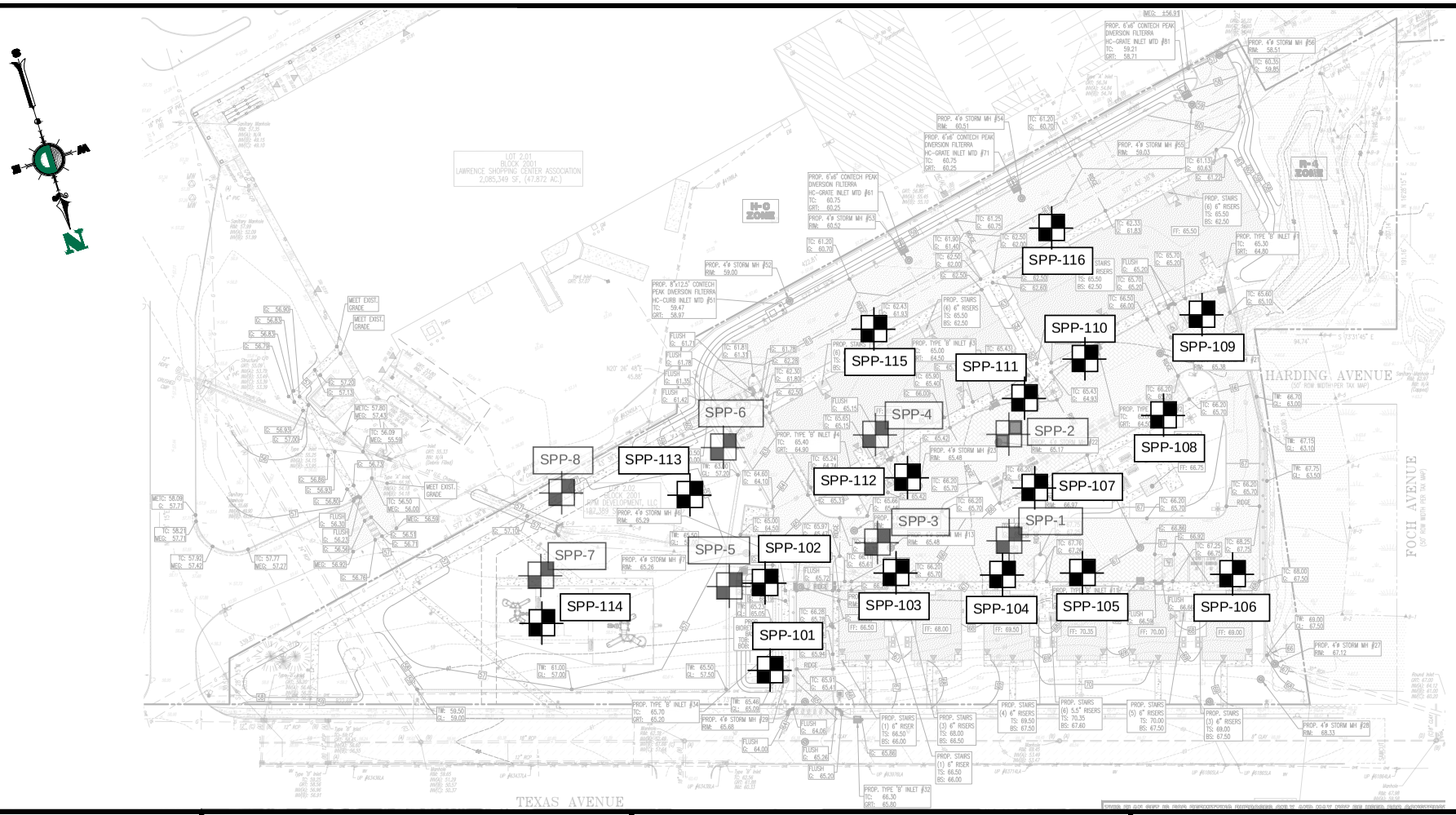
The results presented herein should be utilized by a qualified engineer in preparing preliminary design concepts and site grading. The engineer should consider these results as minimum physical standards that may be superseded by local and regional building codes and structural considerations. These results are prepared for the use of the client for the specific project detailed and should not be used by any third party. These recommendations are relevant to the preliminary design phase and should not be substituted for construction specifications.

The possibility exists that conditions between test locations may differ from those at specific soil profile pit locations, and conditions may not be as anticipated by the designers or contractors. In addition, the construction process may itself alter soil conditions. Therefore, Dynamic Earth Geotechnical Engineers or their representatives should observe and document the final construction procedures used and the conditions encountered, as well as conduct testing and inspection to ensure the design criteria are met or recommendations to address deviations are implemented.

Dynamic Earth assumes that a qualified contractor will be employed to perform the construction work, and that the contractor will be required to exercise care to ensure all excavations are performed in accordance with applicable regulations and good practice. Particular attention should be paid to avoiding damaging or undermining adjacent properties and maintaining slope stability. Deviations from the noted subsurface conditions encountered during construction should be brought to the attention of the geotechnical engineer.

The geotechnical engineer warrants that the findings, recommendations, specifications, or professional advice contained herein have been promulgated after being prepared in accordance with generally accepted professional engineering practice in the fields of foundation engineering, soil mechanics, and engineering geology. No other warranties are implied or expressed.

Supplemental Test Location Plan



SCALE: N.T.S.	JOB No: 1279-99-010EC
SHEET No: 1 OF 1	DRAWN BY: LS DESIGNED BY: -- CHECKED BY: FVC DATE: 03/08/2023

TITLE:
SUPPLEMENTAL TEST LOCATION PLAN

PROJECT: **RPM DEVELOPMENT GROUP**
PROPOSED SITE DEVELOPMENT
2495 Brunswick Pike
Block 2001, Lots 3, 60-66 & 68
Township of Lawrence, Mercer County, New Jersey

Rev. # 0 | DEC Client Code: 1279

LEGEND:

SPP-10X — APPROXIMATE LOCATION OF SOIL PROFILE PIT - FEBRUARY 2023

SPP-X — APPROXIMATE LOCATION OF SOIL PROFILE PIT - FEBRUARY 2020

NOTES:
1. THIS PLAN IS NOT FOR CONSTRUCTION AND WAS PREPARED TO ILLUSTRATE TEST LOCATIONS ONLY AND MAY NOT REFLECT THE MOST CURRENT REVISION OF THE BASE PLAN.
2. BASE PLAN OBTAINED FROM AN DECEMBER 9, 2022 (REVISION 3) GRADING PLAN PREPARED BY DYNAMIC ENGINEERING CONSULTANTS, PC.

DYNAMIC EARTH, LLC
245 Main Street - Suite 110
Chester, NJ 07930
T: 908.879.7095 - F: 908.879.0222
www.dynamic-earth.com

Records of Subsurface Exploration - 2023

DYNAMIC EARTH

SOIL PROFILE PIT LOG

Soil Profile Pit: SPP-101

Project: Proposed Site Development
Project No.: 1279-99-010EC
Location: 2495 Brunswick Pike, Township of Lawrence, Mercer County, New Jersey
Client: RMP Development Group, LLC

Surface Elevation (ft):	61.5	**Date Started:**	2/28/23	**Groundwater Data**	**Depth (ft)**	**EL (ft)**	**Groundwater Comments**
Termination Depth (ft):	10.5	**Date Completed:**	2/28/23	**Seepage**	2.0	59.5	
Proposed Location:	SWM	**Logged by:**	G. Seselgis	**Groundwater**	NE	-	Light gray (10YR 7/1) mottles at 24 inches to 126 inches
Excavation / Test Method:	Visual Observation	**Contractor:**	Neighbors Property Management	**Seasonal High Groundwater**	2.0	59.5	
		Rig Type:	Bobcat E60				

DEPTH (IN)	COLOR	SOIL TEXTURE	COARSE FRAGMENTS (%)				STRUCTURE			WATER CONTENT	CONSISTENCY			BOUNDARY		ROOTS		MOTTLING			SAMPLING				LAB RESULTS
							Shape	Grade	Size		Resistance to Rupture	Stickiness	Plasticity	Distinctness	Topography			Quantity	Size	Contrast	Type	Depth (in)	No.	
0-12	TOPSOIL Dark Gray (10YR 4/1)	LOAMY SAND	GRAVEL 0	COBBLES 0	STONES 0	BOULDERS 0	SUBANGULAR BLOCKY	MODERATE	MEDIUM	MOIST	FRIABLE	SLIGHTLY STICKY	SLIGHTLY PLASTIC	CLEAR <2.5"	SMOOTH	CMN (20% MAX)	MEDIUM	NONE						
12-24	Brown (10YR 3/3)	CLAY LOAM	GRAVEL 10	COBBLES 0	STONES 0	BOULDERS 0	SUBANGULAR BLOCKY	MODERATE	MEDIUM	MOIST	FRIABLE	SLIGHTLY STICKY	SLIGHTLY PLASTIC	CLEAR <2.5"	SMOOTH	CMN (20% MAX)	MEDIUM	NONE			BAG TUBE	16 16	S-1 T-1	A = 0.4 iph B < 0.2 iph
24-48	Yellowish Brown (10YR 5/6)	SANDY LOAM	GRAVEL 0	COBBLES 0	STONES 0	BOULDERS 0	SUBANGULAR BLOCKY	MODERATE	MEDIUM	MOIST	FRIABLE	SLIGHTLY STICKY	SLIGHTLY PLASTIC	CLEAR <2.5"	WAVY	NONE		CMN 2%-20%	MEDIUM 5MM-15MM	DISTINCT	BAG	36	S-2	
48-126	Reddish Brown (2.5YR 5/4)	CLAY LOAM	GRAVEL 5	COBBLES 0	STONES 0	BOULDERS 0	SUBANGULAR BLOCKY	STRONG	COARSE	MOIST	FIRM	VERY STICKY	VERY PLASTIC			NONE		CMN 2%-20%	MEDIUM 5MM-15MM	DISTINCT	BAG	54	S-3	

Additional Remarks: Perched water seepage at 24 inches. Soil profile pit SPP-101 was terminated at approximately 10.5 feet below the ground surface.

DYNAMIC EARTH

SOIL PROFILE PIT LOG

Soil Profile Pit: SPP-102

Project: Proposed Site Development
Project No.: 1279-99-010EC
Location: 2495 Brunswick Pike, Township of Lawrence, Mercer County, New Jersey
Client: RMP Development Group, LLC

Surface Elevation (ft):	58.8	**Date Started:**	2/28/23	**Groundwater Data**	**Depth (ft)** / **El. (ft)**
Termination Depth (ft):	8.0	**Date Completed:**	2/28/23	**Seepage**	0.5 / 58.3
Proposed Location:	SWM	**Logged by:**	G. Seselgis	**Groundwater**	4.2 / 54.6
Excavation / Test Method:	Visual Observation	**Contractor:**	Neighbors Property Management	**Seasonal High Groundwater**	0.5 / 58.3
		Rig Type:	Bobcat E60		

Groundwater Comments: Light gray (10YR 7/1) mottles at 6 inches to 96 inches

DEPTH (IN)	COLOR	SOIL TEXTURE	COARSE FRAGMENTS (%)				STRUCTURE			WATER CONTENT	CONSISTENCY			BOUNDARY		ROOTS		MOTTLING			SAMPLING			LAB RESULTS
							Shape	Grade	Size		Resistance to Rupture	Stickiness	Plasticity	Distinctness	Topography			Quantity	Size	Contrast	Type	Depth (in)	No.	
			GRAVEL	COBBLES	STONES	BOULDERS																		
0-6	TOPSOIL Dark Gray (10YR 4/1)	GRAVELLY SANDY LOAM	20	0	0	0	SUBANGULAR BLOCKY	MODERATE	MEDIUM	MOIST	FRIABLE	SLIGHTLY STICKY	SLIGHTLY PLASTIC	CLEAR <2.5"	WAVY	CMN (20% MAX)	FINE	NONE						
6-50	Reddish Brown (2.5YR 5/4)	CLAY LOAM	0	0	0	0	SUBANGULAR BLOCKY	STRONG	COARSE	MOIST	FIRM	MODERATELY STICKY	VERY PLASTIC	CLEAR <2.5"	SMOOTH	NONE		CMN 2%-20%	MEDIUM 5MM-15MM	DISTINCT	BAG TUBE	24 24	S-1 T-1	A < 0.2 iph B < 0.2 iph
50-84	Reddish Brown (2.5YR 5/4)	CLAY LOAM	5	0	0	0	SUBANGULAR BLOCKY	STRONG	COARSE	WET	FIRM	MODERATELY STICKY	VERY PLASTIC	CLEAR <2.5"	SMOOTH	NONE		CMN 2%-20%	MEDIUM 5MM-15MM	DISTINCT	BAG	56	S-2	
84-96	Yellowish Brown (10YR 5/6)	LOAMY SAND	0	0	0	0	SUBANGULAR BLOCKY	STRONG	COARSE	WET	HARD	NONSTICKY	NONPLASTIC			NONE		CMN 2%-20%	MEDIUM 5MM-15MM	DISTINCT	BAG	96	S-3	

Additional Remarks: Iron cemented sand encountered at seven feet. Soil profile pit SPP-102 encountered refusal at approximately eight feet below the ground surface in iron cemented sand.

DYNAMIC EARTH

SOIL PROFILE PIT LOG

Soil Profile Pit: SPP-103

Project: Proposed Site Development — **Project No.:** 1279-99-010EC

Location: 2495 Brunswick Pike, Township of Lawrence, Mercer County, New Jersey — **Client:** RMP Development Group, LLC

Surface Elevation (ft):	59.1	**Date Started:**	2/28/23	**Groundwater Data**	**Depth (ft)** / **El. (ft)**
Termination Depth (ft):	11.5	**Date Completed:**	2/28/23	**Seepage**	0.5 / 58.6
Proposed Location:	SWM	**Logged by:**	G. Seselgis	**Groundwater**	1.3 / 57.8
Excavation / Test Method:	Visual Observation	**Contractor:**	Neighbors Property Management	**Seasonal High Groundwater**	1.3 / 57.8
		Rig Type:	Bobcat E60		

Groundwater Comments: Light gray (10YR 7/1) mottles at 16 inches to 138 inches

DEPTH (IN)	COLOR	SOIL TEXTURE	COARSE FRAGMENTS (%)				STRUCTURE			WATER CONTENT	CONSISTENCY			BOUNDARY		ROOTS		MOTTLING			SAMPLING			LAB RESULTS
							Shape	Grade	Size		Resistance to Rupture	Stickiness	Plasticity	Distinctness	Topography			Quantity	Size	Contrast	Type	Depth (in)	No.	
			GRAVEL	COBBLES	STONES	BOULDERS																		
0-6	TOPSOIL Dark Gray (10YR 4/1)	GRAVELLY SANDY LOAM	20	0	0	0	SUBANGULAR BLOCKY	WEAK	MEDIUM	MOIST	FRIABLE	SLIGHTLY STICKY	SLIGHTLY PLASTIC	CLEAR <2.5"	SMOOTH	CMN (20% MAX)	FINE	NONE						
6-16	FILL Dark Gray (10YR 4/1)	EXTREMELY GRAVELLY LOAMY SAND	65	0	0	0	SINGLE GRAIN	STRUCTURELESS		MOIST	LOOSE	NONSTICKY	NONPLASTIC	CLEAR <2.5"	WAVY	FEW (5% MAX)	FINE	NONE			BAG	10	S-1	
16-138	Reddish Brown (2.5YR 5/4)	CLAY LOAM	5	0	0	0	SUBANGULAR BLOCKY	STRONG	MEDIUM	WET	FIRM	MODERATELY STICKY	VERY PLASTIC			NONE		CMN 2%-20%	MEDIUM 5MM-15MM	DISTINCT	BAG TUBE BAG	40 40 108	S-2 T-1 S-3	A < 0.2 iph B < 0.2 iph

Additional Remarks: Fill encountered to 16 inches consisting of angular gravel and crush rock. Soil profile pit SPP-103 was terminated at approximately 11.5 feet below the ground surface.

DYNAMIC EARTH

SOIL PROFILE PIT LOG

Soil Profile Pit: SPP-104

Project: Proposed Site Development
Project No.: 1279-99-010EC
Location: 2495 Brunswick Pike, Township of Lawrence, Mercer County, New Jersey
Client: RMP Development Group, LLC

Surface Elevation (ft): 60.1
Termination Depth (ft): 11.0
Proposed Location: SWM
Excavation / Test Method: Visual Observation

Date Started: 2/28/23
Date Completed: 2/28/23
Logged by: G. Seselgis
Contractor: Neighbors Property Management
Rig Type: Bobcat E60

Groundwater Data	Depth (ft)	El. (ft)	Groundwater Comments
Seepage	0.9	59.2	
Groundwater	9.0	51.1	Strong brown (7.5YR 5/6) mottles from 28 inches to 108 inches.
Seasonal High Groundwater	2.3	57.8	

DEPTH (IN)	COLOR	SOIL TEXTURE	COARSE FRAGMENTS (%)				STRUCTURE			WATER CONTENT	CONSISTENCY			BOUNDARY		ROOTS		MOTTLING			SAMPLING			LAB RESULTS
							Shape	Grade	Size		Resistance to Rupture	Stickiness	Plasticity	Distinctness	Topography			Quantity	Size	Contrast	Type	Depth (in)	No.	
			GRAVEL	COBBLES	STONES	BOULDERS																		
0-5	TOPSOIL Dark Gray (10YR 4/1)	GRAVELLY SANDY LOAM	15	0	0	0	SUBANGULAR BLOCKY	MODERATE	MEDIUM	MOIST	FRIABLE	SLIGHTLY STICKY	SLIGHTLY PLASTIC	CLEAR <2.5"	SMOOTH	CMN (20% MAX)	MEDIUM	NONE						
5-11	FILL Dark Gray (10YR 4/1)	EXTREMELY GRAVELLY LOAMY SAND	70	0	0	0	SINGLE GRAIN	STRUCTURELESS		MOIST	LOOSE	NONSTICKY	NONPLASTIC	CLEAR <2.5"	SMOOTH	FEW (5% MAX)	FINE	NONE			BAG	8	S-1	
11-28	Light Yellowish Brown (10YR 6/4)	LOAM	0	0	0	0	SUBANGULAR BLOCKY	WEAK	MEDIUM	MOIST	FRIABLE	NONSTICKY	NONPLASTIC	CLEAR <2.5"	WAVY	NONE		NONE			BAG TUBE	20 20	S-2 T-1	A = 0.2 iph B = 1.1 iph
28-108	Pale Brown (10YR 6/3)	LOAMY SAND	5	0	0	0	SUBANGULAR BLOCKY	MODERATE	MEDIUM	MOIST	FIRM	NONSTICKY	NONPLASTIC	CLEAR <2.5"	SMOOTH	NONE		FEW 2%	MEDIUM 5MM-15MM	DISTINCT	BAG	48	S-3	
108-132	Gray (10YR 6/1)	SANDY LOAM	0	0	0	0	SUBANGULAR BLOCKY	STRONG	COARSE	WET	VERY FIRM	NONSTICKY	NONPLASTIC			NONE		CMN 2%-20%	MEDIUM 5MM-15MM	DISTINCT	BAG	120	S-4	

Additional Remarks: Fill encountered to 11 inches and included coarse angular gravel and crushed stone. Iron cemented sand at 28 inches to 132 inches. Soil profile pit SPP-104 was terminated at approximately 11 feet below the ground surface.

DYNAMIC EARTH

SOIL PROFILE PIT LOG

Soil Profile Pit: SPP-105

Project: Proposed Site Development
Project No.: 1279-99-010EC
Location: 2495 Brunswick Pike, Township of Lawrence, Mercer County, New Jersey
Client: RMP Development Group, LLC

Surface Elevation (ft): 61.7
Termination Depth (ft): 11.0
Proposed Location: SWM
Excavation / Test Method: Visual Observation
Date Started: 2/28/23
Date Completed: 2/28/23
Logged by: G. Seselgis
Contractor: Neighbors Property Management
Rig Type: Bobcat E60

Groundwater Data	Depth (ft)	El. (ft)
Seepage	1.0	60.7
Groundwater	9.0	52.7
Seasonal High Groundwater	2.3	59.4

Groundwater Comments: Strong brown (7.5YR 5/6) mottles from 27 inches to 132 inches.

DEPTH (IN)	COLOR	SOIL TEXTURE	COARSE FRAGMENTS (%)				STRUCTURE			WATER CONTENT	CONSISTENCY			BOUNDARY		ROOTS		MOTTLING			SAMPLING			LAB RESULTS
							Shape	Grade	Size		Resistance to Rupture	Stickiness	Plasticity	Distinctness	Topography			Quantity	Size	Contrast	Type	Depth (in)	No.	
			GRAVEL	COBBLES	STONES	BOULDERS																		
0-4	TOPSOIL Dark Gray (10YR 4/1)	GRAVELLY SANDY LOAM	15	0	0	0	SUBANGULAR BLOCKY	MODERATE	MEDIUM	MOIST	FRIABLE	SLIGHTLY STICKY	SLIGHTLY PLASTIC	CLEAR <2.5"	SMOOTH	CMN (20% MAX)	MEDIUM	NONE						
4-12	FILL Dark Gray (10YR 4/1)	EXTREMELY GRAVELLY LOAMY SAND	70	0	0	0	SINGLE GRAIN	STRUCTURELESS		MOIST	LOOSE	NONSTICKY	NONPLASTIC	CLEAR <2.5"	SMOOTH	FEW (5% MAX)	FINE	NONE			BAG	8	S-1	
12-27	Pale Brown (10YR 6/3)	CLAY LOAM	0	0	0	0	SUBANGULAR BLOCKY	MODERATE	MEDIUM	MOIST	FIRM	SLIGHTLY STICKY	SLIGHTLY PLASTIC	CLEAR <2.5"	SMOOTH	NONE		NONE			BAG TUBE	18 18	S-2 T-1	A < 0.2 iph B < 0.2 iph
27-53	Light Yellowish Brown (10YR 6/4)	LOAMY SAND	5	0	0	0	SUBANGULAR BLOCKY	WEAK	MEDIUM	MOIST	FRIABLE	NONSTICKY	NONPLASTIC	CLEAR <2.5"	SMOOTH	NONE		CMN 2%-20%	MEDIUM 5MM-15MM	DISTINCT	BAG	40	S-3	
53-108	Pale Brown (10YR 6/3)	LOAMY SAND	0	0	0	0	SUBANGULAR BLOCKY	MODERATE	MEDIUM	MOIST	FIRM	NONSTICKY	NONPLASTIC	CLEAR <2.5"	SMOOTH	NONE		CMN 2%-20%	MEDIUM 5MM-15MM	DISTINCT	BAG	72	S-4	
108-132	Pale Brown (10YR 6/3)	LOAMY SAND	0	0	0	0	SUBANGULAR BLOCKY	MODERATE	MEDIUM	WET	FIRM	NONSTICKY	NONPLASTIC			NONE		CMN 2%-20%	MEDIUM 5MM-15MM	DISTINCT	BAG	120	S-5	

Additional Remarks: Fill encountered to 12 inches and included debris of coarse angular gravel and crushed stone. Iron cemented sand at 53 inches to 132 inches. Perched water seepage at 12 inches. Soil profile pit SPP-105 was terminated at approximately 11 feet below the ground surface.

DYNAMIC EARTH

SOIL PROFILE PIT LOG

Soil Profile Pit: SPP-106

Project: Proposed Site Development
Project No.: 1279-99-010EC
Location: 2495 Brunswick Pike, Township of Lawrence, Mercer County, New Jersey
Client: RMP Development Group, LLC

Surface Elevation (ft):	63.5	**Date Started:**	2/27/23	**Groundwater Data**	**Depth (ft)**	**El. (ft)**
Termination Depth (ft):	11.0	**Date Completed:**	2/27/23	**Seepage**	NE	-
Proposed Location:	SWM	**Logged by:**	G. Seselgis	**Groundwater**	3.3	60.2
Excavation / Test Method:	Visual Observation	**Contractor:**	Neighbors Property Management	**Seasonal High Groundwater**	3.3	60.2
		Rig Type:	Bobcat E60			

Groundwater Comments: Strong brown (7.5YR 5/6) mottles from 39 inches to 132 inches.

DEPTH (IN)	COLOR	SOIL TEXTURE	COARSE FRAGMENTS (%)				STRUCTURE			WATER CONTENT	CONSISTENCY			BOUNDARY		ROOTS		MOTTLING			SAMPLING			LAB RESULTS
							Shape	Grade	Size		Resistance to Rupture	Stickiness	Plasticity	Distinctness	Topography			Quantity	Size	Contrast	Type	Depth (in)	No.	
			GRAVEL	COBBLES	STONES	BOULDERS																		
0-8	TOPSOIL Dark Gray (10YR 4/1)	GRAVELLY SANDY LOAM	15	0	0	0	SUBANGULAR BLOCKY	MODERATE	MEDIUM	MOIST	FIRM	SLIGHTLY STICKY	SLIGHTLY PLASTIC	CLEAR <2.5"	SMOOTH	CMN (20% MAX)	FINE	NONE						
8-39	Dark Yellowish Brown (10YR 4/4)	GRAVELLY LOAMY SAND	30	0	0	0	SUBANGULAR BLOCKY	WEAK	MEDIUM	MOIST	FRIABLE	NONSTICKY	NONPLASTIC	CLEAR <2.5"	SMOOTH	NONE		NONE			BAG TUBE	20 20	S-1 T-2	A = 8.3 iph B > 20.0 iph
39-72	Yellowish Brown (10YR 5/6)	SANDY LOAM	5	0	0	0	SUBANGULAR BLOCKY	WEAK	MEDIUM	WET	FRIABLE	NONSTICKY	NONPLASTIC	CLEAR <2.5"	SMOOTH	NONE		FEW (5% MAX)	MEDIUM 5MM-15MM	FAINT	BAG	44	S-2	
72-132	Light Gray (10YR 7/1)	LOAMY SAND	5	0	0	0	SUBANGULAR BLOCKY	WEAK	MEDIUM	WET	FRIABLE	NONSTICKY	NONPLASTIC			NONE		CMN 2%-20%	MEDIUM 5MM-15MM	DISTINCT	BAG	84	S-3	

Additional Remarks: Soil profile pit SPP-106 was terminated at approximately 11 feet below the ground surface.

DYNAMIC EARTH

SOIL PROFILE PIT LOG

Soil Profile Pit: SPP-107

Project: Proposed Site Development
Project No.: 1279-99-010EC
Location: 2495 Brunswick Pike, Township of Lawrence, Mercer County, New Jersey
Client: RMP Development Group, LLC

Surface Elevation (ft):	60.2	**Date Started:**	2/27/23	**Groundwater Data**	**Depth (ft)** / **El. (ft)**
Termination Depth (ft):	11.0	**Date Completed:**	2/27/23	**Seepage**	NE / -
Proposed Location:	SWM	**Logged by:**	G. Seselgis	**Groundwater**	2.7 / 57.5
Excavation / Test Method:	Visual Observation	**Contractor:**	Neighbors Property Management	**Seasonal High Groundwater**	1.8 / 58.4
		Rig Type:	Bobcat E60		

Groundwater Comments: Strong brown (7.5YR 5/6) mottles from 22 inches to 32 inches. Light gray (10YR 7/1) mottles from 32 inches to 132 inches.

DEPTH (IN)	COLOR	SOIL TEXTURE	COARSE FRAGMENTS (%)				STRUCTURE			WATER CONTENT	CONSISTENCY			BOUNDARY		ROOTS		MOTTLING			SAMPLING			LAB RESULTS
							Shape	Grade	Size		Resistance to Rupture	Stickiness	Plasticity	Distinctness	Topography			Quantity	Size	Contrast	Type	Depth (in)	No.	
			GRAVEL	COBBLES	STONES	BOULDERS																		
0-7	TOPSOIL Dark Gray (10YR 4/1)	SANDY LOAM	12	0	0	0	SUBANGULAR BLOCKY	MODERATE	MEDIUM	MOIST	FRIABLE	SLIGHTLY STICKY	SLIGHTLY PLASTIC	CLEAR <2.5"	SMOOTH	CMN (20% MAX)	FINE	NONE						
7-22	FILL Dark Gray (10YR 4/1)	VERY GRAVELLY SANDY LOAM	40	0	0	0	SUBANGULAR BLOCKY	MODERATE	MEDIUM	MOIST	FIRM	SLIGHTLY STICKY	SLIGHTLY PLASTIC	CLEAR <2.5"	SMOOTH	NONE		NONE			BAG	16	S-1	
22-32	Yellowish Brown (10YR 5/6)	SANDY LOAM	0	0	0	0	SUBANGULAR BLOCKY	WEAK	MEDIUM	MOIST	FRIABLE	NONSTICKY	NONPLASTIC	CLEAR <2.5"	WAVY	NONE		CMN 2%-20%	MEDIUM 5MM-15MM	DISTINCT	BAG TUBE	28 28	S-2 T-1	A = 1.2 iph B = 3.4 iph
32-78	Yellowish Brown (10YR 5/6)	CLAY LOAM	5	0	0	0	SUBANGULAR BLOCKY	STRONG	COARSE	WET	FIRM	MODERATELY STICKY	VERY PLASTIC	GRADUAL <5"	SMOOTH	NONE		CMN 2%-20%	MEDIUM 5MM-15MM	DISTINCT	BAG	42	S-3	
78-132	Reddish Brown (2.5YR 4/4)	CLAY LOAM	10	0	0	0	SUBANGULAR BLOCKY	STRONG	COARSE	WET	FIRM	SLIGHTLY STICKY	MODERATELY PLASTIC			NONE		CMN 2%-20%	MEDIUM 5MM-15MM	DISTINCT	BAG	108	S-4	

Additional Remarks: Fill debris including porcelain, asphalt, wood, brick, and clay clumps encountered to 22 inches below the ground surface. Soil profile pit SPP-107 was terminated at approximately 11 feet below the ground surface.

DYNAMIC EARTH

SOIL PROFILE PIT LOG

Soil Profile Pit: SPP-108

Project: Proposed Site Development
Project No.: 1279-99-010EC
Location: 2495 Brunswick Pike, Township of Lawrence, Mercer County, New Jersey
Client: RMP Development Group, LLC

Surface Elevation (ft): 60.5
Termination Depth (ft): 11.0
Proposed Location: SWM
Excavation / Test Method: Visual Observation

Date Started: 2/27/23
Date Completed: 2/27/23
Logged by: G. Seselgis
Contractor: Neighbors Property Management
Rig Type: Bobcat E60

Groundwater Data	Depth (ft)	El. (ft)
Seepage	NE	-
Groundwater	3.5	57.0
Seasonal High Groundwater	3.5	57.0

Groundwater Comments: Strong brown (7.5YR 5/6) mottles from 42 inches to 108 inches. Reddish brown mottles at 108 inches to 132 inches.

DEPTH (IN)	COLOR	SOIL TEXTURE	COARSE FRAGMENTS (%)				STRUCTURE			WATER CONTENT	CONSISTENCY			BOUNDARY		ROOTS		MOTTLING			SAMPLING			LAB RESULTS
							Shape	Grade	Size		Resistance to Rupture	Stickiness	Plasticity	Distinctness	Topography			Quantity	Size	Contrast	Type	Depth (in)	No.	
			GRAVEL	COBBLES	STONES	BOULDERS																		
0-6	TOPSOIL Dark Gray (10YR 4/1)	SANDY LOAM	10	0	0	0	SUBANGULAR BLOCKY	MODERATE	MEDIUM	MOIST	FIRM	SLIGHTLY STICKY	SLIGHTLY PLASTIC	CLEAR <2.5"	SMOOTH	CMN (20% MAX)	FINE	NONE						
6-20	FILL Dark Gray (10YR 4/1)	GRAVELLY SANDY LOAM	20	0	0	0	SUBANGULAR BLOCKY	MODERATE	MEDIUM	MOIST	FIRM	SLIGHTLY STICKY	SLIGHTLY PLASTIC	CLEAR <2.5"	WAVY	NONE		NONE			BAG	14	S-1	
20-27	Brown (10YR 4/3)	VERY GRAVELLY LOAMY SAND	40	0	0	0	SUBANGULAR BLOCKY	WEAK	MEDIUM	MOIST	FRIABLE	NONSTICKY	NONPLASTIC	CLEAR <2.5"	WAVY	NONE		NONE			BAG TUBE	22 22	S-2 T-1	A = 12.4 iph B > 20.0 iph
27-42	Yellowish Brown (10YR 5/6)	SANDY LOAM	5	0	0	0	SUBANGULAR BLOCKY	WEAK	MEDIUM	MOIST	FRIABLE	NONSTICKY	NONPLASTIC	CLEAR <2.5"	SMOOTH	NONE		NONE			BAG	36	S-3	
42-108	Light Yellowish Brown (10YR 6/4)	SANDY LOAM	5	0	0	0	SUBANGULAR BLOCKY	WEAK	MEDIUM	WET	FRIABLE	NONSTICKY	NONPLASTIC	CLEAR <2.5"	SMOOTH	NONE		MNY >20%	MEDIUM 5MM-15MM	DISTINCT	BAG	48	S-4	
108-132	Light Yellowish Brown (10YR 6/4)	SANDY LOAM	0	0	0	0	SUBANGULAR BLOCKY	WEAK	MEDIUM	WET	FRIABLE	NONSTICKY	NONPLASTIC			NONE		MNY >20%	MEDIUM 5MM-15MM	DISTINCT	BAG	120	S-5	

Additional Remarks: Fill encountered to 20 inches and included debris including asphalt, porcelain, brick, and clay clumps. Soil profile pit SPP-108 was terminated at approximately 11 feet below the ground surface.

DYNAMIC EARTH

SOIL PROFILE PIT LOG

Soil Profile Pit: SPP-109

Project: Proposed Site Development
Project No.: 1279-99-010EC
Location: 2495 Brunswick Pike, Township of Lawrence, Mercer County, New Jersey
Client: RMP Development Group, LLC

Surface Elevation (ft):	59.8	**Date Started:**	2/27/23	**Groundwater Data**	**Depth (ft)**	**El. (ft)**
Termination Depth (ft):	11.0	**Date Completed:**	2/27/23	**Seepage**	NE	-
Proposed Location:	SWM	**Logged by:**	G. Seselgis	**Groundwater**	2.5	57.3
Excavation / Test Method:	Visual Observation	**Contractor:**	Neighbors Property Management	**Seasonal High Groundwater**	2.5	57.3
		Rig Type:	Bobcat E60			

Groundwater Comments: Strong brown (7.5YR 5/6) mottles from 28 inches to 96 inches.

DEPTH (IN)	COLOR	SOIL TEXTURE	COARSE FRAGMENTS (%)				STRUCTURE			WATER CONTENT	CONSISTENCY			BOUNDARY		ROOTS		MOTTLING			SAMPLING			LAB RESULTS
							Shape	Grade	Size		Resistance to Rupture	Stickiness	Plasticity	Distinctness	Topography			Quantity	Size	Contrast	Type	Depth (in)	No.	
			GRAVEL	COBBLES	STONES	BOULDERS																		
0-8	TOPSOIL Dark Gray (10YR 4/1)	GRAVELLY SANDY LOAM	20	0	0	0	SUBANGULAR BLOCKY	MODERATE	MEDIUM	MOIST	FRIABLE	SLIGHTLY STICKY	SLIGHTLY PLASTIC	CLEAR <2.5"	SMOOTH	CMN (20% MAX)	FINE	NONE						
8-16	FILL Dark Gray (10YR 4/1)	VERY GRAVELLY SANDY LOAM	45	0	0	0	SUBANGULAR BLOCKY	MODERATE	MEDIUM	MOIST	FRIABLE	SLIGHTLY STICKY	SLIGHTLY PLASTIC	CLEAR <2.5"	WAVY	NONE		NONE			BAG	10	S-1	
16-30	Brown (10YR 4/3)	GRAVELLY SANDY LOAM	30	0	0	0	SUBANGULAR BLOCKY	MODERATE	MEDIUM	MOIST	FRIABLE	SLIGHTLY STICKY	SLIGHTLY PLASTIC	CLEAR <2.5"	WAVY	NONE		NONE			BAG TUBE	22 22	S-2 T-1	A = 8.2 iph B = 3.6 iph
30-65	Light Yellowish Brown (10YR 6/4)	LOAMY SAND	5	0	0	0	SUBANGULAR BLOCKY	WEAK	MEDIUM	WET	FRIABLE	NONSTICKY	NONPLASTIC	CLEAR <2.5"	WAVY	NONE		CMN (20% MAX)	MEDIUM 5MM-15MM	DISTINCT	BAG	40	S-3	
65-96	Gray (10YR 6/1)	CLAY LOAM	0	0	0	0	SUBANGULAR BLOCKY	STRONG	COARSE	WET	FIRM	MODERATELY STICKY	VERY PLASTIC	GRADUAL <5"	SMOOTH	NONE		CMN (20% MAX)	MEDIUM 5MM-15MM	DISTINCT	BAG	84	S-4	
96-132	Dark Reddish Brown (2.5YR 3/4)	VERY GRAVELLY LOAM	40	0	0	0	SUBANGULAR BLOCKY	WEAK	MEDIUM	WET	FRIABLE	SLIGHTLY STICKY	SLIGHTLY PLASTIC			NONE		NONE			BAG	120	S-5	

Additional Remarks: Fill encountered to 16 inches and debris included asphalt and brick. Soil profile pit SPP-109 was terminated at approximately 11 feet below the ground surface.

DYNAMIC EARTH

SOIL PROFILE PIT LOG

Soil Profile Pit: SPP-110

Project: Proposed Site Development — **Project No.:** 1279-99-010EC

Location: 2495 Brunswick Pike, Township of Lawrence, Mercer County, New Jersey — **Client:** RMP Development Group, LLC

Surface Elevation (ft):	60.2	**Date Started:**	2/27/23	**Groundwater Data**	**Depth (ft)** / **El. (ft)**
Termination Depth (ft):	11.0	**Date Completed:**	2/27/23	**Seepage**	NE / -
Proposed Location:	SWM	**Logged by:**	G. Seselgis	**Groundwater**	2.5 / 57.7
Excavation / Test Method:	Visual Observation	**Contractor:**	Neighbors Property Management	**Seasonal High Groundwater**	2.5 / 57.7
		Rig Type:	Bobcat E60		

Groundwater Comments: Light gray (10YR 7/1) mottles at 30 inches to 132 inches.

DEPTH (IN)	COLOR	SOIL TEXTURE	COARSE FRAGMENTS (%)				STRUCTURE			WATER CONTENT	CONSISTENCY			BOUNDARY		ROOTS		MOTTLING			SAMPLING			LAB RESULTS
							Shape	Grade	Size		Resistance to Rupture	Stickiness	Plasticity	Distinctness	Topography			Quantity	Size	Contrast	Type	Depth (in)	No.	
			GRAVEL	COBBLES	STONES	BOULDERS																		
0-4	TOPSOIL Dark Gray (10YR 4/1)	SANDY LOAM	10	0	0	0	SUBANGULAR BLOCKY	MODERATE	MEDIUM	MOIST	FIRM	SLIGHTLY STICKY	SLIGHTLY PLASTIC	CLEAR <2.5"	SMOOTH	CMN (20% MAX)	FINE	NONE						
4-30	FILL Dark Gray (10YR 4/1)	GRAVELLY SANDY LOAM	30	0	0	0	SUBANGULAR BLOCKY	MODERATE	MEDIUM	MOIST	FIRM	SLIGHTLY STICKY	SLIGHTLY PLASTIC	CLEAR <2.5"	WAVY	NONE		NONE			BAG	16	S-1	
30-38	Brown (10YR 4/3)	GRAVELLY CLAY LOAM	30	0	0	0	SUBANGULAR BLOCKY	MODERATE	MEDIUM	WET	FIRM	NONSTICKY	SLIGHTLY PLASTIC	CLEAR <2.5"	SMOOTH	NONE		FEW (5% MAX)	MEDIUM 5MM-15MM	FAINT	BAG TUBE	36 36	S-2 T-1	A < 0.2 iph B < 0.2 iph
38-132	Reddish Brown (2.5YR 4/4)	CLAY LOAM	0	0	0	0	SUBANGULAR BLOCKY	STRONG	COARSE	WET	VERY FIRM	MODERATELY STICKY	VERY PLASTIC			NONE		CMN (20% MAX)	MEDIUM 5MM-15MM	DISTINCT	BAG BAG	48 120	S-3 S-4	

Additional Remarks: Fill encountered to 30 inches and debris included asphalt, brick, and porcelain. Soil profile pit SPP-110 was terminated at approximately 11 feet below the ground surface.

DYNAMIC EARTH

SOIL PROFILE PIT LOG

Soil Profile Pit: SPP-111

Project: Proposed Site Development
Project No.: 1279-99-010EC
Location: 2495 Brunswick Pike, Township of Lawrence, Mercer County, New Jersey
Client: RMP Development Group, LLC

Surface Elevation (ft):	60.1	**Date Started:**	2/27/23	**Groundwater Data**	**Depth (ft)**	**El. (ft)**
Termination Depth (ft):	11.5	**Date Completed:**	2/27/23	**Seepage**	NE	-
Proposed Location:	SWM	**Logged by:**	G. Seselgis	**Groundwater**	2.0	58.1
Excavation / Test Method:	Visual Observation	**Contractor:**	Neighbors Property Management	**Seasonal High Groundwater**	2.0	58.1
		Rig Type:	Bobcat E60			

Groundwater Comments: Light gray (10YR 7/1) mottles at 24 inches to 138 inches.

DEPTH (IN)	COLOR	SOIL TEXTURE	COARSE FRAGMENTS (%)				STRUCTURE			WATER CONTENT	CONSISTENCY			BOUNDARY		ROOTS		MOTTLING			SAMPLING			LAB RESULTS
							Shape	Grade	Size		Resistance to Rupture	Stickiness	Plasticity	Distinctness	Topography			Quantity	Size	Contrast	Type	Depth (in)	No.	
			GRAVEL	COBBLES	STONES	BOULDERS																		
0-6	TOPSOIL Dark Gray (10YR 4/1)	SANDY LOAM	10	0	0	0	SUBANGULAR BLOCKY	MODERATE	MEDIUM	MOIST	FIRM	SLIGHTLY STICKY	SLIGHTLY PLASTIC	CLEAR <2.5"	SMOOTH	NONE		NONE						
6-24	FILL Dark Gray (10YR 4/1)	GRAVELLY SANDY LOAM	25	0	0	0	SUBANGULAR BLOCKY	MODERATE	MEDIUM	MOIST	FIRM	SLIGHTLY STICKY	SLIGHTLY PLASTIC	CLEAR <2.5"	WAVY	NONE		NONE			BAG	14	S-1	
24-138	Reddish Brown (2.5YR 4/4)	CLAY LOAM	0	0	0	0	SUBANGULAR BLOCKY	STRONG	COARSE	WET	FIRM	MODERATELY STICKY	VERY PLASTIC			NONE		CMN (20% MAX)	MEDIUM 5MM-15MM	DISTINCT	BAG TUBE	40 40	S-2 T-1	A < 0.2 iph B < 0.2 iph

Additional Remarks: Fill encountered to 24 inches and debris included asphalt, brick, and porcelain. Soil profile pit SPP-111 was terminated at approximately 11.5 feet below the ground surface.

DYNAMIC EARTH

SOIL PROFILE PIT LOG

Soil Profile Pit: SPP-112

Project: Proposed Site Development
Project No.: 1279-99-010EC
Location: 2495 Brunswick Pike, Township of Lawrence, Mercer County, New Jersey
Client: RMP Development Group, LLC

Surface Elevation (ft):	59.1	**Date Started:**	2/28/23	**Groundwater Data**	**Depth (ft)** / **El. (ft)**
Termination Depth (ft):	12.0	**Date Completed:**	2/28/23	**Seepage**	0.0 / 59.1
Proposed Location:	SWM	**Logged by:**	G. Seselgis	**Groundwater**	2.2 / 56.9
Excavation / Test Method:	Visual Observation	**Contractor:**	Neighbors Property Management	**Seasonal High Groundwater**	2.2 / 56.9
		Rig Type:	Bobcat E60		

Groundwater Comments: Light gray (10YR 7/1) mottles at 26 inches to 144 inches.

DEPTH (IN)	COLOR	SOIL TEXTURE	COARSE FRAGMENTS (%)				STRUCTURE			WATER CONTENT	CONSISTENCY			BOUNDARY		ROOTS		MOTTLING			SAMPLING			LAB RESULTS
							Shape	Grade	Size		Resistance to Rupture	Stickiness	Plasticity	Distinctness	Topography			Quantity	Size	Contrast	Type	Depth (in)	No.	
			GRAVEL	COBBLES	STONES	BOULDERS																		
0-6	TOPSOIL Dark Gray (10YR 4/1)	SANDY LOAM	5	0	0	0	SUBANGULAR BLOCKY	MODERATE	MEDIUM	MOIST		SLIGHTLY STICKY	MODERATELY PLASTIC	CLEAR <2.5"	SMOOTH	CMN (20% MAX)	FINE	NONE						
6-26	FILL Gray (10YR 6/1)	GRAVELLY SANDY LOAM	30	0	0	0	SUBANGULAR BLOCKY	MODERATE	MEDIUM	WET	FRIABLE	SLIGHTLY STICKY	SLIGHTLY PLASTIC	CLEAR <2.5"	SMOOTH	NONE		NONE			BAG	12	S-1	
26-144	Reddish Brown (2.5YR 5/4)	CLAY LOAM	5	0	0	0	SUBANGULAR BLOCKY	STRONG	COARSE	WET	FIRM	MODERATELY STICKY	MODERATELY PLASTIC			NONE		CMN (20% MAX)	MEDIUM 5MM-15MM	DISTINCT	BAG TUBE	36 36	S-2 T-1	A < 0.2 iph B < 0.2 iph

Additional Remarks: Fill encountered to 26 inches and debris included asphalt, brick, and porcelain. Perched water at surface. Soil profile pit SPP-112 was terminated at approximately 12 feet below the ground surface.

DYNAMIC EARTH

SOIL PROFILE PIT LOG

Soil Profile Pit: SPP-113

Project: Proposed Site Development
Project No.: 1279-99-010EC
Location: 2495 Brunswick Pike, Township of Lawrence, Mercer County, New Jersey
Client: RMP Development Group, LLC

Surface Elevation (ft):	56.9	**Date Started:**	2/28/23	**Groundwater Data**	**Depth (ft)** / **El. (ft)**
Termination Depth (ft):	4.2	**Date Completed:**	2/28/23	**Seepage**	0.0 / 56.9
Proposed Location:	SWM	**Logged by:**	G. Seselgis	**Groundwater**	NE / -
Excavation / Test Method:	Visual Observation	**Contractor:**	Neighbors Property Management		
		Rig Type:	Bobcat E60	**Seasonal High Groundwater**	1.4 / 55.5

Groundwater Comments: Strong brown (7.5YR 5/6) mottles at 17 inches to 50 inches

DEPTH (IN)	COLOR	SOIL TEXTURE	COARSE FRAGMENTS (%)				STRUCTURE			WATER CONTENT	CONSISTENCY			BOUNDARY		ROOTS		MOTTLING			SAMPLING			LAB RESULTS
							Shape	Grade	Size		Resistance to Rupture	Stickiness	Plasticity	Distinctness	Topography			Quantity	Size	Contrast	Type	Depth (in)	No.	
			GRAVEL	COBBLES	STONES	BOULDERS																		
0-6	TOPSOIL Yellow Brown (10YR 5/6)	SANDY CLAY LOAM	5	0	0	0	SUBANGULAR BLOCKY	MODERATE	MEDIUM	MOIST	FIRM	MODERATELY STICKY	MODERATELY PLASTIC	CLEAR <2.5"	SMOOTH	CMN (20% MAX)	FINE	NONE						
6-17	FILL Dark Gray (10 YR 4/1)	SANDY LOAM	10	0	0	0	SUBANGULAR BLOCKY	MODERATE	MEDIUM	MOIST	FRIABLE	SLIGHTLY STICKY	SLIGHTLY PLASTIC	CLEAR <2.5"	SMOOTH	CMN (20% MAX)	FINE	NONE			BAG	11	S-1	
17-40	Yellowish Brown (10YR 5/6)	CLAY LOAM	0	0	0	0	SUBANGULAR BLOCKY	MODERATE	MEDIUM	MOIST	FIRM	SLIGHTLY STICKY	SLIGHTLY PLASTIC	CLEAR <2.5"	WAVY	NONE		CMN (20% MAX)	MEDIUM 5MM-15MM	DISTINCT	BAG TUBE	20 20	S-2 T-1	A < 0.2 iph B < 0.2 iph
40-50	Gray (10 YR 6/1)	LOAMY SAND	0	0	0	0	SUBANGULAR BLOCKY	STRONG	MEDIUM	MOIST	VERY HARD	NONSTICKY	NONPLASTIC			NONE		CMN (20% MAX)	MEDIUM 5MM-15MM	DISTINCT	BAG	50	S-3	

Additional Remarks: Fill encountered to 17 inches and debris included wood, roots and asphalt. Perched water at surface. Iron cemented sand at 17 inches to 50 inches. Soil profile pit SPP-113 encountered refusal at approximately 4.2 feet below the ground surface.

DYNAMIC EARTH

SOIL PROFILE PIT LOG

Soil Profile Pit: SPP-114

Project: Proposed Site Development
Project No.: 1279-99-010EC
Location: 2495 Brunswick Pike, Township of Lawrence, Mercer County, New Jersey
Client: RMP Development Group, LLC

Surface Elevation (ft):	57.8	**Date Started:**	2/28/23	**Groundwater Data**	**Depth (ft)**	**El. (ft)**
Termination Depth (ft):	10.0	**Date Completed:**	2/28/23	**Seepage**	NE	-
Proposed Location:	SWM	**Logged by:**	G. Seselgis	**Groundwater**	2.3	55.6
Excavation / Test Method:	Visual Observation	**Contractor:**	Neighbors Property Management	**Seasonal High Groundwater**	0.7	57.1
		Rig Type:	Bobcat E60			

Groundwater Comments: Strong brown (7.5YR 5/6) mottles at 8 inches to 120 inches

DEPTH (IN)	COLOR	SOIL TEXTURE	COARSE FRAGMENTS (%)				STRUCTURE			WATER CONTENT	CONSISTENCY			BOUNDARY		ROOTS		MOTTLING			SAMPLING			LAB RESULTS
							Shape	Grade	Size		Resistance to Rupture	Stickiness	Plasticity	Distinctness	Topography			Quantity	Size	Contrast	Type	Depth (in)	No.	
			GRAVEL	COBBLES	STONES	BOULDERS																		
0-8	TOPSOIL Dark Gray (10YR 4/1)	SANDY LOAM	5	0	0	0	SUBANGULAR BLOCKY	WEAK	MEDIUM	MOIST	FRIABLE	SLIGHTLY STICKY	SLIGHTLY PLASTIC	CLEAR <2.5"	SMOOTH	CMN (20% MAX)	FINE	NONE						
8-27	Yellowish Brown (10YR 5/6)	LOAM	0	0	0	0	SUBANGULAR BLOCKY	MODERATE	MEDIUM	MOIST	FIRM	NONSTICKY	NONPLASTIC	CLEAR <2.5"	SMOOTH	NONE		CMN (20% MAX)	MEDIUM 5MM-15MM	DISTINCT	BAG TUBE	16 16	S-1 T-1	A = 1.0 iph B = 1.1 iph
27-84	Yellowish Brown (10YR 6/4)	LOAMY SAND	0	0	0	0	SUBANGULAR BLOCKY	MODERATE	MEDIUM	WET	FIRM	NONSTICKY	NONPLASTIC	GRADUAL <5"	SMOOTH	NONE		CMN (20% MAX)	MEDIUM 5MM-15MM	DISTINCT	BAG	42	S-2	
84-120	Pale Brown (10YR 6/3)	LOAMY SAND	0	0	0	0	SUBANGULAR BLOCKY	STRONG	MEDIUM	WET	HARD	NONSTICKY	NONPLASTIC			NONE		CMN (20% MAX)	MEDIUM 5MM-15MM	DISTINCT	BAG	108	S-3	

Additional Remarks: Iron cemented sand at 8 inches to 120 inches. Soil profile pit SPP-114 was terminated at approximately 10 feet below the ground surface.

DYNAMIC EARTH

SOIL PROFILE PIT LOG

Soil Profile Pit: SPP-115

Project: Proposed Site Development
Project No.: 1279-99-010EC
Location: 2495 Brunswick Pike, Township of Lawrence, Mercer County, New Jersey
Client: RMP Development Group, LLC

Surface Elevation (ft):	57.8	**Date Started:**	2/27/23	**Groundwater Data**	**Depth (ft)**	**El. (ft)**
Termination Depth (ft):	7.5	**Date Completed:**	2/27/23	**Seepage**	NE	-
Proposed Location:	SWM	**Logged by:**	G. Seselgis	**Groundwater**	5.5	52.3
Excavation / Test Method:	Visual Observation	**Contractor:**	Neighbors Property Management	**Seasonal High Groundwater**	5.5	52.3
		Rig Type:	Bobcat E60			

Groundwater Comments: Strong brown (7.5YR 5/6) mottles at 66 inches to 90 inches

DEPTH (IN)	COLOR	SOIL TEXTURE	COARSE FRAGMENTS (%)				STRUCTURE			WATER CONTENT	CONSISTENCY			BOUNDARY		ROOTS		MOTTLING			SAMPLING			LAB RESULTS
							Shape	Grade	Size		Resistance to Rupture	Stickiness	Plasticity	Distinctness	Topography			Quantity	Size	Contrast	Type	Depth (in)	No.	
			GRAVEL	COBBLES	STONES	BOULDERS																		
0-4	TOPSOIL Dark Gray (10YR 4/1)	SANDY LOAM	10	0	0	0		MODERATE	MEDIUM	MOIST	FIRM	SLIGHTLY STICKY	SLIGHTLY PLASTIC	GRADUAL <5"	SMOOTH	CMN (20% MAX)	MEDIUM	NONE						
4-22	FILL Dark Gray (10YR 4/1)	GRAVELLY SANDY LOAM	30	0	0	0		MODERATE	MEDIUM	MOIST	FIRM	SLIGHTLY STICKY	SLIGHTLY PLASTIC	CLEAR <2.5"	SMOOTH	NONE		NONE			BAG	16	S-1	
22-66	Yellowish Brown (10YR 5/6)	LOAMY SAND	5	0	0	0	SUBANGULAR BLOCKY	MODERATE	MEDIUM	MOIST	FIRM	NONSTICKY	NONPLASTIC	CLEAR <2.5"	SMOOTH	NONE		NONE			BAG TUBE	28 28	S-2 T-1	A = 16.5 iph B = 15.5 iph
66-90	Light Gray (10YR 7/1)	LOAMY SAND	10	0	0	0	SUBANGULAR BLOCKY	MODERATE	MEDIUM	WET	FRIABLE	NONSTICKY	NONPLASTIC			NONE		FEW (5% MAX)	MEDIUM 5MM-15MM	DISTINCT	BAG	70	S-3	

Additional Remarks: Fill encountered to 22 inches and debris included asphalt, brick, and porcelain. Iron cemented sand at 22 inches to 90 inches. Soil profile pit SPP-115 encountered refusal at approximately 7.5 feet below the ground surface in cemented sand.

DYNAMIC EARTH

SOIL PROFILE PIT LOG

Soil Profile Pit: SPP-116

Project: Proposed Site Development
Project No.: 1279-99-010EC
Location: 2495 Brunswick Pike, Township of Lawrence, Mercer County, New Jersey
Client: RMP Development Group, LLC

Surface Elevation (ft):	57.8	**Date Started:**	2/27/23	**Groundwater Data**	**Depth (ft)**	**El. (ft)**
Termination Depth (ft):	10.5	**Date Completed:**	2/27/23	**Seepage**	1.8	56.0
Proposed Location:	SWM	**Logged by:**	G. Seselgis	**Groundwater**	4.4	53.4
Excavation / Test Method:	Visual Observation	**Contractor:**	Neighbors Property Management	**Seasonal High Groundwater**	4.4	53.4
		Rig Type:	Bobcat E60			

Groundwater Comments: Strong brown (7.5YR 5/6) mottles at 53 inches to 90 inches

DEPTH (IN)	COLOR	SOIL TEXTURE	COARSE FRAGMENTS (%)				STRUCTURE			WATER CONTENT	CONSISTENCY			BOUNDARY		ROOTS		MOTTLING			SAMPLING			LAB RESULTS
							Shape	Grade	Size		Resistance to Rupture	Stickiness	Plasticity	Distinctness	Topography			Quantity	Size	Contrast	Type	Depth (in)	No.	
			GRAVEL	COBBLES	STONES	BOULDERS																		
0-6	TOPSOIL Dark Gray (10YR 4/1)	SANDY LOAM	10	0	0	0	SUBANGULAR BLOCKY	MODERATE	MEDIUM	MOIST	FIRM	SLIGHTLY STICKY	SLIGHTLY PLASTIC	CLEAR <2.5"	SMOOTH	CMN (20% MAX)	FINE	NONE						
6-34	FILL Dark Gray (10YR 4/1)	GRAVELLY SANDY CLAY LOAM	30	0	0	0	SUBANGULAR BLOCKY	MODERATE	MEDIUM	MOIST	FIRM	SLIGHTLY STICKY	MODERATELY PLASTIC	CLEAR <2.5"	WAVY	NONE		NONE			BAG	20	S-1	
34-53	Light Yellowish Brown (10YR 6/4)	LOAMY SAND	5	0	0	0	SUBANGULAR BLOCKY	MODERATE	MEDIUM	MOIST	FIRM	NONSTICKY	NONPLASTIC	CLEAR <2.5"	SMOOTH	NONE		NONE			BAG TUBE	40 40	S-2 T-1	A = 8.6 iph B = 4.3 iph
53-90	Light Gray (10YR 7/1)	LOAMY SAND	5	0	0	0	SUBANGULAR BLOCKY	MODERATE	MEDIUM	WET	FIRM	NONSTICKY	NONPLASTIC	CLEAR <2.5"	SMOOTH	NONE		FEW (5% MAX)	MEDIUM 5MM-15MM	DISTINCT	BAG	60	S-3	
90-126	Yellowish Brown (10YR 5/6)	LOAMY SAND	10	0	0	0	SUBANGULAR BLOCKY	MODERATE	MEDIUM	WET	FIRM	NONSTICKY	NONPLASTIC			NONE		NONE			BAG	120	S-4	

Additional Remarks: Fill encountered to 29 inches and debris included asphalt, clay clumps, and porcelain. Iron cemented sand at 34 inches to 126 inches. Perched water encountered at 22 inches. Soil profile pit SPP-116 was terminated at approximately 10.5 feet below the ground surface.

Records of Subsurface Exploration - 2020

DYNAMIC EARTH

SOIL PROFILE PIT LOG

Soil Profile Pit: SPP- 1

Project: Proposed Multifamily Development — **Project No.:** 1279-99-010E

Location: 2495 Brunswick Pike, Township of Lawrence, Mercer County, New Jersey — **Client:** RPM Development

Surface Elevation (ft):
Termination Depth (ft): 11.0
Proposed Location: SWM
Excavation / Test Method: Visual Observation

Date Started: 5/6/19
Date Completed: 5/6/19
Logged by: D. Richardson
Contractor: Pennyweight
Rig Type: Case 510L

Groundwater Data	Depth (ft)	El. (msl)
Seepage	8.5	-8.5
Groundwater	6.0	-6.0
Seasonal High Groundwater	5.0	-5.0

Groundwater Comments: Iron accumulation approximately five feet below the ground surface.

DEPTH (IN)	COLOR	SOIL TEXTURE	COARSE FRAGMENTS (%)				STRUCTURE			WATER CONTENT	CONSISTENCY			BOUNDARY		ROOTS		MOTTLING			SAMPLING			LAB RESULTS
							Shape	Grade	Size		Resistance to Rupture	Stickiness	Plasticity	Distinctness	Topography			Quantity	Size	Contrast	Type	Depth (in)	No.	
0 - 22	FILL Strong Brown (7.5YR 5/8)	SILT LOAM	GRAVEL 15	COBBLES 5	STONES	BOULDERS	MASSIVE	STRUCTURELESS		WET	SOFT	SLIGHTLY STICKY	SLIGHTLY PLASTIC	ABRUPT <1"	WAVY	CMN (20% MAX)	FINE	NONE			BAG	5	S -1	
22 - 60	Brown (7.5YR 5/3)	LOAMY SAND	GRAVEL 5	COBBLES	STONES	BOULDERS	SINGLE GRAIN	STRUCTURELESS		MOIST	LOOSE	SLIGHTLY STICKY	NONPLASTIC	CLEAR <2.5"	WAVY	FEW (5% MAX)	FINE	NONE			BAG TUBE	36	S-2 T-1	
60 - 72	Brown (7.5YR 5/3)	LOAMY SAND	GRAVEL 5	COBBLES	STONES	BOULDERS	SINGLE GRAIN	STRUCTURELESS		MOIST	LOOSE	NONSTICKY	NONPLASTIC	CLEAR <2.5"	WAVY	FEW (5% MAX)	FINE	CMN 2%-20%	MEDIUM 5MM-15MM	PROMINENT	BAG	60	S-3	
72- 103	Light Brownish Gray (10YR 6/2)	LOAMY SAND	GRAVEL 5	COBBLES	STONES	BOULDERS	SINGLE GRAIN	STRUCTURELESS		WET	FRIABLE	SLIGHTLY STICKY	SLIGHTLY PLASTIC	CLEAR <2.5"	WAVY	NONE		CMN 2%-20%	MEDIUM 5MM-15MM	PROMINENT	BAG	103	S-4	
103 - 132	Brown (7.5YR 5/3)	LOAMY SAND	GRAVEL 10	COBBLES <5	STONES	BOULDERS	SINGLE GRAIN	STRUCTURELESS		WET	FRIABLE	SLIGHTLY STICKY	SLIGHTLY PLASTIC			NONE		CMN 2%-20%	MEDIUM 5MM-15MM	PROMINENT	BAG	132	S-5	

Additional Remarks: S-1 encountered debris at the surface. Debris included porcelain tile and polyvinyl chloride. SPP-1 was terminated approximately at 11.3 feet below the ground surface. SPP-1 encountered wet-cave-in to a depth of 6.3 feet below the ground surface.

DYNAMIC EARTH

SOIL PROFILE PIT LOG

Soil Profile Pit: SPP- 2

Project: Proposed Multifamily Development — **Project No.:** 1279-99-010E

Location: 2495 Brunswick Pike, Township of Lawrence, Mercer County, New Jersey — **Client:** RPM Development

Surface Elevation (ft):		**Date Started:**	5/6/19		
Termination Depth (ft):	11.3	**Date Completed:**	5/6/19		
Proposed Location:	SWM	**Logged by:**	D. Richardson		
Excavation / Test Method:	Visual Observation	**Contractor:**	Pennyweight		
		Rig Type:	Case 510L		

Groundwater Data	Depth (ft)	EL (msl)	Groundwater Comments
Seepage	10.5	-10.5	
Groundwater	4.4	-4.4	Iron accumulation approximately 2.9 feet below the ground surface.
Seasonal High Groundwater	2.9	-2.9	

DEPTH (IN)	COLOR	SOIL TEXTURE	COARSE FRAGMENTS (%)				STRUCTURE			WATER CONTENT	CONSISTENCY			BOUNDARY		ROOTS		MOTTLING			SAMPLING			LAB RESULTS
							Shape	Grade	Size		Resistance to Rupture	Stickiness	Plasticity	Distinctness	Topography			Quantity	Size	Contrast	Type	Depth (in)	No.	
0 - 9	FILL Strong Brown (7.5YR 5/8)	SILT LOAM	GRAVEL 15	COBBLES 5	STONES	BOULDERS	MASSIVE	STRUCTURELESS		WET	SOFT	SLIGHTLY STICKY	SLIGHTLY PLASTIC	ABRUPT <1"	WAVY	CMN (20% MAX)	FINE	NONE			BAG	5	S -1	
9 - 35	Reddish Brown (5YR 4/3)	SILTY CLAY LOAM	GRAVEL 5	COBBLES	STONES	BOULDERS	SUBANGULAR BLOCKY	WEAK	FINE	MOIST	FRIABLE	SLIGHTLY STICKY	SLIGHTLY PLASTIC	CLEAR <2.5"	WAVY	FEW (5% MAX)	FINE	NONE			BAG TUBE	30	S-2 T-1	
35 - 53	Reddish Brown (5YR 4/3)	SILT LOAM	GRAVEL 5	COBBLES	STONES	BOULDERS	SUBANGULAR BLOCKY	WEAK	FINE	MOIST	FRIABLE	SLIGHTLY STICKY	SLIGHTLY PLASTIC	CLEAR <2.5"	WAVY	FEW (5% MAX)	FINE	CMN 2%-20%	MEDIUM 5MM-15MM	PROMINENT	BAG	53	S-3	
53 - 126	Reddish Brown (5YR 4/3)	SANDY LOAM	GRAVEL 10	COBBLES <5	STONES	BOULDERS	SUBANGULAR BLOCKY	MODERATE	MEDIUM	WET	FRIABLE	SLIGHTLY STICKY	SLIGHTLY PLASTIC	CLEAR <2.5"	WAVY	NONE		CMN 2%-20%	MEDIUM 5MM-15MM	PROMINENT	BAG	96	S-4	
126 - 136	Reddish Brown (5YR 4/3)	LOAMY SAND	GRAVEL 15	COBBLES 5	STONES	BOULDERS	SINGLE GRAIN	STRUCTURELESS		WET	LOOSE	NONSTICKY	NONPLASTIC			NONE		CMN 2%-20%	MEDIUM 5MM-15MM	PROMINENT	BAG	136	S-5	

Additional Remarks: S-1 encountered debris at the surface. Debris included porcelain tile and polyvinyl chloride. SPP-2 was terminated approximately at 11.3 feet below the ground surface.

DYNAMIC EARTH

SOIL PROFILE PIT LOG

Soil Profile Pit: SPP- 3

Project: Proposed Multifamily Development — **Project No.:** 1279-99-010E

Location: 2495 Brunswick Pike, Township of Lawrence, Mercer County, New Jersey — **Client:** RPM Development

Surface Elevation (ft):
Termination Depth (ft): 11.3
Proposed Location: SWM
Excavation / Test Method: Visual Observation

Date Started: 5/6/19
Date Completed: 5/6/19
Logged by: D. Richardson
Contractor: Pennyweight
Rig Type: Case 510L

Groundwater Data	Depth (ft)	EL (msl)
Seepage	NE	#VALUE!
Groundwater	4.0	-4.0
Seasonal High Groundwater	3.3	-3.3

Groundwater Comments: Iron accumulation approximately 3.25 feet below the ground surface.

DEPTH (IN)	COLOR	SOIL TEXTURE	COARSE FRAGMENTS (%)				STRUCTURE			WATER CONTENT	CONSISTENCY			BOUNDARY		ROOTS		MOTTLING			SAMPLING			LAB RESULTS
							Shape	Grade	Size		Resistance to Rupture	Stickiness	Plasticity	Distinctness	Topography			Quantity	Size	Contrast	Type	Depth (in)	No.	
0 - 8	FILL Strong Brown (7.5YR 5/8)	SILT LOAM	GRAVEL 15	COBBLES 5	STONES	BOULDERS	MASSIVE	STRUCTURELESS		WET	SOFT	SLIGHTLY STICKY	SLIGHTLY PLASTIC	ABRUPT <1"	WAVY	CMN (20% MAX)	FINE	NONE			BAG	2	S -1	
8 - 39	Reddish Brown (5YR 4/3)	SILTY CLAY LOAM	GRAVEL 5	COBBLES	STONES	BOULDERS	SUBANGULAR BLOCKY	WEAK	FINE	MOIST	FRIABLE	SLIGHTLY STICKY	SLIGHTLY PLASTIC	CLEAR <2.5"	WAVY	FEW (5% MAX)	FINE	NONE			BAG TUBE	28	S-2 T-1	
39 - 48	Reddish Brown (5YR 4/3)	SILT LOAM	GRAVEL 5	COBBLES	STONES	BOULDERS	SUBANGULAR BLOCKY	WEAK	FINE	MOIST	FRIABLE	SLIGHTLY STICKY	SLIGHTLY PLASTIC	CLEAR <2.5"	WAVY	NONE	FINE	CMN 2%-20%	MEDIUM 5MM-15MM	PROMINENT	BAG	48	S-3	
48 - 126	Reddish Brown (5YR 4/3)	SANDY LOAM	GRAVEL 10	COBBLES <5	STONES	BOULDERS	SUBANGULAR BLOCKY	WEAK	FINE	WET	FRIABLE	SLIGHTLY STICKY	SLIGHTLY PLASTIC			NONE		CMN 2%-20%	MEDIUM 5MM-15MM	PROMINENT	BAG	96	S-4	

Additional Remarks: S-1 encountered debris at the surface. Debris included porcelain tile and polyvinyl chloride. SPP-3 encountered refusal approximately at 10.5 feet below the ground surface.

DYNAMIC EARTH

SOIL PROFILE PIT LOG

Soil Profile Pit: SPP- 4

Project: Proposed Multifamily Development — **Project No.:** 1279-99-010E

Location: 2495 Brunswick Pike, Township of Lawrence, Mercer County, New Jersey — **Client:** RPM Development

Surface Elevation (ft):
Termination Depth (ft): 5.4
Proposed Location: SWM
Excavation / Test Method: Visual Observation

Date Started: 5/6/19
Date Completed: 5/6/19
Logged by: D. Richardson
Contractor: Pennyweight
Rig Type: Case 510L

Groundwater Data	Depth (ft)	EL (msl)
Seepage	NE	#VALUE!
Groundwater	4.3	-4.3
Seasonal High Groundwater	3.2	-3.2

Groundwater Comments: Iron accumulation approximately 2.9 feet below the ground surface.

DEPTH (IN)	COLOR	SOIL TEXTURE	COARSE FRAGMENTS (%)				STRUCTURE			WATER CONTENT	CONSISTENCY			BOUNDARY		ROOTS		MOTTLING			SAMPLING			LAB RESULTS
							Shape	Grade	Size		Resistance to Rupture	Stickiness	Plasticity	Distinctness	Topography			Quantity	Size	Contrast	Type	Depth (in)	No.	
0 - 8	FILL Strong Brown (7.5YR 5/8)	SILT LOAM	GRAVEL 15	COBBLES 5	STONES	BOULDERS	MASSIVE	STRUCTURELESS		WET	SOFT	SLIGHTLY STICKY	SLIGHTLY PLASTIC	ABRUPT <1"	WAVY	CMN (20% MAX)	FINE	NONE			BAG	2	S -1	
8 - 38	Reddish Brown (5YR 4/3)	SILTY CLAY LOAM	GRAVEL 5	COBBLES	STONES	BOULDERS	SUBANGULAR BLOCKY	WEAK	FINE	MOIST	FRIABLE	SLIGHTLY STICKY	SLIGHTLY PLASTIC	CLEAR <2.5"	WAVY	FEW (5% MAX)	FINE	NONE			BAG TUBE	30	S-2 T-1	
38 - 51	Reddish Brown (5YR 4/3)	SILT LOAM	GRAVEL 5	COBBLES	STONES	BOULDERS	SUBANGULAR BLOCKY	WEAK	FINE	MOIST	FRIABLE	SLIGHTLY STICKY	SLIGHTLY PLASTIC	CLEAR <2.5"	WAVY	FEW (5% MAX)	FINE	CMN 2%-20%	MEDIUM 5MM-15MM	PROMINENT	BAG	40	S-3	
51 - 60	Brown (7.5YR 5/3)	SILTY CLAY	GRAVEL 10	COBBLES <5	STONES	BOULDERS	SUBANGULAR BLOCKY	MODERATE	FINE	WET	FRIABLE	SLIGHTLY STICKY	SLIGHTLY PLASTIC	CLEAR <2.5"	WAVY	NONE		CMN 2%-20%	MEDIUM 5MM-15MM	PROMINENT	BAG	55	S-4	
60 - 65	Brown (7.5YR 5/3)	SILT LOAM	GRAVEL 15	COBBLES 5	STONES	BOULDERS	PLATY	MODERATE	FINE	WET	HARD	NONSTICKY	NONPLASTIC			NONE		CMN 2%-20%	MEDIUM 5MM-15MM	PROMINENT	BAG	65	S-5	

Additional Remarks: S-1 encountered debris at the surface. Debris included porcelain tile and polyvinyl chloride. SPP-3 encountered refusal approximately at 5.4 feet below the ground surface.

DYNAMIC EARTH

SOIL PROFILE PIT LOG

Soil Profile Pit: SPP- 5

Project: Proposed Multifamily Development — **Project No.:** 1279-99-010E

Location: 2495 Brunswick Pike, Township of Lawrence, Mercer County, New Jersey — **Client:** RPM Development

Surface Elevation (ft):
Termination Depth (ft): 4.7
Proposed Location: SWM
Excavation / Test Method: Visual Observation

Date Started: 5/6/19
Date Completed: 5/6/19
Logged by: D. Richardson
Contractor: Pennyweight
Rig Type: Case 510L

Groundwater Data	Depth (ft)	EL (msl)	Groundwater Comments
Seepage	4.0	-4.0	
Groundwater	3.0	-3.0	Iron accumulation approximately 0.5 feet below the ground surface.
Seasonal High Groundwater	0.4	-0.4	

DEPTH (IN)	COLOR	SOIL TEXTURE	COARSE FRAGMENTS (%)				STRUCTURE			WATER CONTENT	CONSISTENCY			BOUNDARY		ROOTS		MOTTLING			SAMPLING			LAB RESULTS
							Shape	Grade	Size		Resistance to Rupture	Stickiness	Plasticity	Distinctness	Topography			Quantity	Size	Contrast	Type	Depth (in)	No.	
0 - 3	TOPSOIL Dark Brown (7.5YR 3/3)	SILT LOAM	GRAVEL 15	COBBLES 5	STONES	BOULDERS	MASSIVE	STRUCTURELESS		WET	SOFT	SLIGHTLY STICKY	SLIGHTLY PLASTIC	ABRUPT <1"	WAVY	CMN (20% MAX)	FINE	NONE			BAG	1	S -1	
3 - 6	Reddish Brown (5YR 4/3)	SILTY CLAY LOAM	GRAVEL	COBBLES	STONES	BOULDERS	SUBANGULAR BLOCKY	WEAK	FINE	MOIST	FRIABLE	SLIGHTLY STICKY	SLIGHTLY PLASTIC	CLEAR <2.5"	WAVY	FEW (5% MAX)	FINE	NONE			BAG TUBE	5	S-2 T-1	
			5																					
6 - 26	Reddish Brown (5YR 4/3)	SILT LOAM	GRAVEL	COBBLES	STONES	BOULDERS	SUBANGULAR BLOCKY	WEAK	FINE	MOIST	FRIABLE	SLIGHTLY STICKY	SLIGHTLY PLASTIC	CLEAR <2.5"	WAVY	FEW (5% MAX)	FINE	CMN 2%-20%	MEDIUM 5MM-15MM	PROMINENT	BAG	23	S-3	
			5																					
26 - 36	Light Brownish Gray (10YR 6/2)	SILT LOAM	GRAVEL	COBBLES	STONES	BOULDERS	SUBANGULAR BLOCKY	WEAK	FINE	MOIST	FRIABLE	SLIGHTLY STICKY	SLIGHTLY PLASTIC	CLEAR <2.5"	WAVY	FEW (5% MAX)	FINE	CMN 2%-20%	MEDIUM 5MM-15MM	PROMINENT	BAG	36	S-4	
			5																					
36 - 42	Brown (7.5YR 5/3)	SILT LOAM	GRAVEL	COBBLES	STONES	BOULDERS	SUBANGULAR BLOCKY	WEAK	FINE	WET	FRIABLE	SLIGHTLY STICKY	SLIGHTLY PLASTIC	CLEAR <2.5"	WAVY	FEW (5% MAX)	FINE	CMN 2%-20%	MEDIUM 5MM-15MM	PROMINENT	BAG	42	S-5	
			5																					
42 - 56	Brown (7.5YR 5/3)	LOAMY SAND	GRAVEL	COBBLES	STONES	BOULDERS	SINGLE GRAIN	STRUCTURELESS		WET	LOOSE	NONSTICKY	NONPLASTIC			NONE		CMN 2%-20%	MEDIUM 5MM-15MM	PROMINENT	BAG	56	S-6	
			15	5																				

Additional Remarks: SPP-5 was terminated approximately at 4.7 feet below the ground surface.

DYNAMIC EARTH

SOIL PROFILE PIT LOG

Soil Profile Pit: SPP- 6

Project: Proposed Multifamily Development — **Project No.:** 1279-99-010E

Location: 2495 Brunswick Pike, Township of Lawrence, Mercer County, New Jersey — **Client:** RPM Development

Surface Elevation (ft):
Termination Depth (ft): 5.5
Proposed Location: SWM
Excavation / Test Method: Visual Observation

Date Started: 5/6/19
Date Completed: 5/6/19
Logged by: D. Richardson
Contractor: Pennyweight
Rig Type: Case 510L

Groundwater Data	Depth (ft)	EL (msl)
Seepage	3.0	-3.0
Groundwater	4.0	-4.0
Seasonal High Groundwater	2.0	-2.0

Groundwater Comments: Iron accumulation approximately two feet below the ground surface.

DEPTH (IN)	COLOR	SOIL TEXTURE	COARSE FRAGMENTS (%)				STRUCTURE			WATER CONTENT	CONSISTENCY			BOUNDARY		ROOTS		MOTTLING			SAMPLING			LAB RESULTS
							Shape	Grade	Size		Resistance to Rupture	Stickiness	Plasticity	Distinctness	Topography			Quantity	Size	Contrast	Type	Depth (in)	No.	
0 - 9	FILL Strong Brown (7.5YR 5/8)	SILT LOAM	GRAVEL 15	COBBLES 5	STONES	BOULDERS	MASSIVE	STRUCTURELESS		WET	SOFT	SLIGHTLY STICKY	SLIGHTLY PLASTIC	ABRUPT <1"	WAVY	CMN (20% MAX)	FINE	NONE			BAG	1	S -1	
9 - 24	Brown (7.5YR 5/3)	SILT LOAM	GRAVEL 5	COBBLES 5	STONES	BOULDERS	SUBANGULAR BLOCKY	WEAK	FINE	MOIST	FRIABLE	SLIGHTLY STICKY	SLIGHTLY PLASTIC	CLEAR <2.5"	WAVY	FEW (5% MAX)	FINE	NONE			BAG TUBE	20	S-2 T-1	
24 - 39	Brown (7.5YR 5/3)	SILT LOAM	GRAVEL 5	COBBLES	STONES	BOULDERS	SUBANGULAR BLOCKY	WEAK	FINE	MOIST	FRIABLE	SLIGHTLY STICKY	SLIGHTLY PLASTIC	CLEAR <2.5"	WAVY	FEW (5% MAX)	FINE	CMN 2%-20%	MEDIUM 5MM-15MM	PROMINENT	BAG	30	S-3	
39 - 48	Brown (7.5YR 5/3)	SILT	GRAVEL 10	COBBLES <5	STONES	BOULDERS	SUBANGULAR BLOCKY	MODERATE	FINE	MOIST	FRIABLE	SLIGHTLY STICKY	SLIGHTLY PLASTIC	CLEAR <2.5"	WAVY	NONE		CMN 2%-20%	MEDIUM 5MM-15MM	PROMINENT	BAG	40	S-4	
48 - 66	Brown (7.5YR 5/3)	SANDY LOAM	GRAVEL 15	COBBLES 5	STONES	BOULDERS	PLATY	MODERATE	FINE	WET	HARD	NONSTICKY	NONPLASTIC			NONE		CMN 2%-20%	MEDIUM 5MM-15MM	PROMINENT	BAG	60	S-5	

Additional Remarks: S-1 encountered debris at the surface. Debris included porcelain tile and polyvinyl chloride. SPP-6 encountered refusal approximately at 5.5 feet below the ground surface.

DYNAMIC EARTH

SOIL PROFILE PIT LOG

Soil Profile Pit: SPP- 7

Project: Proposed Multifamily Development — **Project No.:** 1279-99-010E

Location: 2495 Brunswick Pike, Township of Lawrence, Mercer County, New Jersey — **Client:** RPM Development

Surface Elevation (ft):
Termination Depth (ft): 4.3
Proposed Location: SWM
Excavation / Test Method: Visual Observation

Date Started: 5/6/19
Date Completed: 5/6/19
Logged by: D. Richardson
Contractor: Pennyweight
Rig Type: Case 510L

Groundwater Data	Depth (ft)	EL (msl)
Seepage	4.0	-4.0
Groundwater	3.0	-3.0
Seasonal High Groundwater	0.8	-0.8

Groundwater Comments: Iron accumulation approximately 0.83 feet below the ground surface.

DEPTH (IN)	COLOR	SOIL TEXTURE	COARSE FRAGMENTS (%)				STRUCTURE			WATER CONTENT	CONSISTENCY			BOUNDARY		ROOTS		MOTTLING			SAMPLING			LAB RESULTS
							Shape	Grade	Size		Resistance to Rupture	Stickiness	Plasticity	Distinctness	Topography			Quantity	Size	Contrast	Type	Depth (in)	No.	
0 - 6	TOPSOIL Dark Brown (7.5YR 3/3)	SILT LOAM	GRAVEL: 15	COBBLES: 5	STONES:	BOULDERS:	MASSIVE	STRUCTURELESS		MOIST	SOFT	SLIGHTLY STICKY	SLIGHTLY PLASTIC	ABRUPT <1"	WAVY	CMN (20% MAX)	FINE	NONE			BAG	2	S -1	
6 - 10	Brown (7.5YR 5/3)	LOAM	GRAVEL: 5	COBBLES:	STONES:	BOULDERS:	SUBANGULAR BLOCKY	MODERATE	FINE	MOIST	LOOSE	NONSTICKY	NONPLASTIC	CLEAR <2.5"	WAVY	FEW (5% MAX)	FINE	NONE			BAG TUBE	7	S-2 T-1	
10 - 36	Brown (7.5YR 5/3)	LOAM	GRAVEL: 5	COBBLES:	STONES:	BOULDERS:	SUBANGULAR BLOCKY	MODERATE	FINE	MOIST	LOOSE	NONSTICKY	NONPLASTIC	CLEAR <2.5"	WAVY	FEW (5% MAX)	FINE	CMN 2%-20%	MEDIUM 5MM-15MM	PROMINENT	BAG	10	S-3	
36 - 52	Brown (7.5YR 5/3)	LOAMY SAND	GRAVEL: 5	COBBLES:	STONES:	BOULDERS:	SINGLE GRAIN	STRUCTURELESS		WET	LOOSE	NONSTICKY	NONPLASTIC			NONE		CMN 2%-20%	MEDIUM 5MM-15MM	PROMINENT	BAG	48	S-4	

Additional Remarks: SPP-1 was terminated approximately at 4.3 feet below the ground surface.

DYNAMIC EARTH

SOIL PROFILE PIT LOG

Soil Profile Pit: SPP- 8

Project: Proposed Multifamily Development — **Project No.:** 1279-99-010E

Location: 2495 Brunswick Pike, Township of Lawrence, Mercer County, New Jersey — **Client:** RPM Development

Surface Elevation (ft):
Termination Depth (ft): 4.0
Proposed Location: SWM
Excavation / Test Method: Visual Observation

Date Started: 5/6/19
Date Completed: 5/6/19
Logged by: D. Richardson
Contractor: Pennyweight
Rig Type: Case 510L

Groundwater Data	Depth (ft)	El. (msl)
Seepage	3.3	-3.3
Groundwater	3.3	-3.3
Seasonal High Groundwater	2.7	-2.7

Groundwater Comments: Iron accumulation approximately 2.7 feet below the ground surface.

DEPTH (IN)	COLOR	SOIL TEXTURE	COARSE FRAGMENTS (%)				STRUCTURE			WATER CONTENT	CONSISTENCY			BOUNDARY		ROOTS		MOTTLING			SAMPLING			LAB RESULTS
							Shape	Grade	Size		Resistance to Rupture	Stickiness	Plasticity	Distinctness	Topography			Quantity	Size	Contrast	Type	Depth (in)	No.	
0 - 24	TOPSOIL Dark Brown (7.5YR 3/3)	SILT LOAM	GRAVEL 15	COBBLES 5	STONES	BOULDERS	MASSIVE	STRUCTURELESS		MOIST	SOFT	SLIGHTLY STICKY	SLIGHTLY PLASTIC	ABRUPT <1"	WAVY	CMN (20% MAX)	FINE	NONE			BAG	2	S -1	
24 - 32	Brown (7.5YR 5/3)	SAND	GRAVEL 5	COBBLES	STONES	BOULDERS	SINGLE GRAIN	STRUCTURELESS		MOIST	LOOSE	NONSTICKY	NONPLASTIC	CLEAR <2.5"	WAVY	FEW (5% MAX)	FINE	NONE			BAG TUBE	28	S-2 T-1	
32 - 39	Brown (7.5YR 5/3)	SAND	GRAVEL 5	COBBLES	STONES	BOULDERS	SINGLE GRAIN	STRUCTURELESS		MOIST	LOOSE	NONSTICKY	NONPLASTIC	CLEAR <2.5"	WAVY	FEW (5% MAX)	FINE	CMN 2%-20%	MEDIUM 5MM-15MM	PROMINENT	BAG	32	S-3	
39 - 48	Brown (7.5YR 5/3)	SAND	GRAVEL 5	COBBLES	STONES	BOULDERS	SINGLE GRAIN	STRUCTURELESS		WET	LOOSE	NONSTICKY	NONPLASTIC			NONE		CMN 2%-20%	MEDIUM 5MM-15MM	PROMINENT	BAG	48	S-4	

Additional Remarks: SPP-1 was terminated approximately at four feet below the ground surface.

Laboratory Test Results - 2023

Tube Permeameter Test Data

Job Number: 1279-99-010E
Project: Proposed Site Development
Client: RPM Development Group, LLC
Lab Tech: M. Stevenson

Sample ID: **Boring/Test Pit No.:** SPP-101 **Sample No.:** T-1 **Depth:** 16"

MUNICIPALITY Township of Lawrence BLOCK 2001 LOTS 3, 60-66, & 68

1. Test Number T-1 Replicate (letter) A Date Collected 2/28/2023

2. Material Tested: _____ Fill x Test in Native Soil-Indicate Depth

3. Type of Sample: x Undisturbed _____ Disturbed

4. Sample Dimensions: Inside Radius of Sample Tube, R, in cm 3.81
   Length of Sample, L, in inches 4.00

5. Bulk Density Determination (Disturbed Samples Only): N/A

6. Sample Weight (Wt. Tube Containing Sample-Wt. of Empty Tube), grams --

7. Sample Volume (L x 2.54 cm./inch x 3.14R2), cc. 463.0984

8. Bulk Density (Sample Wt./Sample Volume), grams/cc. -- > 1.2

9. Standpipe Used: x No _____ Yes, Indicate Internal Radius, cm. N/A

10. Height of Water Level Above Rim of Test Basin, in inches:

    At the Beginning of Each Test Interval, H1 5.00
    At the End of Each Test Interval, H2 4.00

11. Rate of Water Level Drop (Add additional lines if needed):

Time, Start of Test Interval, T1	Time End of Test Interval T2	Length of Test Interval, T, Minutes
		142.0
		142.0
		142.0

12. Calculation of Permeability: K, (in/hr) = 60 min/hr x r2/R2 x L(in)/T(min) x ln (H1/H2) T= 142.0

    K = 0.4 **Classification:** **K1**

13. Defects in the Sample (Check appropriate items):

    x NONE

    _____ Soil/Tube Contact _____Large Gravel _____ Large Roots

    _____ Dry Soil _____Smearing _____ Compaction

    _____ Other - Specify _____

Tube Permeameter Test Data

Job Number: 1279-99-010E
Project: Proposed Site Development
Client: RPM Development Group, LLC
Lab Tech: M. Stevenson

Sample ID: **Boring/Test Pit No.:** SPP-101 **Sample No.:** T-1 **Depth:** 16"

MUNICIPALITY Township of Lawrence BLOCK 2001 LOTS 3, 60-66, & 68

1. Test Number T-1 Replicate (letter) B Date Collected 2/28/2023

2. Material Tested: _____ Fill x Test in Native Soil-Indicate Depth

3. Type of Sample: x Undisturbed _____ Disturbed

4. Sample Dimensions: Inside Radius of Sample Tube, R, in cm 3.81
   Length of Sample, L, in inches 4.00

5. Bulk Density Determination (Disturbed Samples Only): N/A

6. Sample Weight (Wt. Tube Containing Sample-Wt. of Empty Tube), grams --

7. Sample Volume (L x 2.54 cm./inch x 3.14R2), cc. 463.0984

8. Bulk Density (Sample Wt./Sample Volume), grams/cc. -- > 1.2

9. Standpipe Used: x No _____ Yes, Indicate Internal Radius, cm. N/A

10. Height of Water Level Above Rim of Test Basin, in inches:

    At the Beginning of Each Test Interval, H1 5.00
    At the End of Each Test Interval, H2 5.00

11. Rate of Water Level Drop (Add additional lines if needed):

Time, Start of Test Interval, T1	Time End of Test Interval T2	Length of Test Interval, T, Minutes
		>240
		>240
		>240

12. Calculation of Permeability: K, (in/hr) = 60 min/hr x r2/R2 x L(in)/T(min) x ln (H1/H2) T= >240

    K = <0.2 **Classification:** **K0**

13. Defects in the Sample (Check appropriate items):

    x NONE

    _____ Soil/Tube Contact _____Large Gravel _____ Large Roots

    _____ Dry Soil _____Smearing _____ Compaction

    _____ Other - Specify _____

Tube Permeameter Test Data

Job Number: 1279-99-010E
Project: Proposed Site Development
Client: RPM Development Group, LLC
Lab Tech: M. Stevenson

Sample ID: **Boring/Test Pit No.:** SPP-102 **Sample No.:** T-1 **Depth:** 24"

MUNICIPALITY Township of Lawrence BLOCK 2001 LOTS 3, 60-66, & 68

1. Test Number T-1 Replicate (letter) A Date Collected 2/28/2023

2. Material Tested: _____ Fill x Test in Native Soil-Indicate Depth

3. Type of Sample: x Undisturbed _____ Disturbed

4. Sample Dimensions: Inside Radius of Sample Tube, R, in cm 3.81
Length of Sample, L, in inches 4.00

5. Bulk Density Determination (Disturbed Samples Only): N/A

6. Sample Weight (Wt. Tube Containing Sample-Wt. of Empty Tube), grams --

7. Sample Volume (L x 2.54 cm./inch x 3.14R2), cc. 463.0984

8. Bulk Density (Sample Wt./Sample Volume), grams/cc. -- > 1.2

9. Standpipe Used: x No _____ Yes, Indicate Internal Radius, cm. N/A

10. Height of Water Level Above Rim of Test Basin, in inches:

At the Beginning of Each Test Interval, H1 5.00
At the End of Each Test Interval, H2 5.00

11. Rate of Water Level Drop (Add additional lines if needed):

Time, Start of Test Interval, T1	Time End of Test Interval T2	Length of Test Interval, T, Minutes
		>240
		>240
		>240

12. Calculation of Permeability: K, (in/hr) = 60 min/hr x r2/R2 x L(in)/T(min) x ln (H1/H2) T= >240

K = <0.2 **Classification:** **K0**

13. Defects in the Sample (Check appropriate items):

x NONE

_____ Soil/Tube Contact _____Large Gravel _____ Large Roots

_____ Dry Soil _____Smearing _____ Compaction

_____ Other - Specify _____

Tube Permeameter Test Data

Job Number: 1279-99-010E
Project: Proposed Site Development
Client: RPM Development Group, LLC
Lab Tech: M. Stevenson

Sample ID: **Boring/Test Pit No.:** SPP-102 **Sample No.:** T-1 **Depth:** 24"

MUNICIPALITY Township of Lawrence BLOCK 2001 LOTS 3, 60-66, & 68

1. Test Number T-1 Replicate (letter) B Date Collected 2/28/2023

2. Material Tested: _____ Fill x Test in Native Soil-Indicate Depth

3. Type of Sample: x Undisturbed _____ Disturbed

4. Sample Dimensions: Inside Radius of Sample Tube, R, in cm 3.81
   Length of Sample, L, in inches 2.00

5. Bulk Density Determination (Disturbed Samples Only): N/A

6. Sample Weight (Wt. Tube Containing Sample-Wt. of Empty Tube), grams --

7. Sample Volume (L x 2.54 cm./inch x 3.14R2), cc. 231.5492

8. Bulk Density (Sample Wt./Sample Volume), grams/cc. -- > 1.2

9. Standpipe Used: x No _____ Yes, Indicate Internal Radius, cm. N/A

10. Height of Water Level Above Rim of Test Basin, in inches:

    At the Beginning of Each Test Interval, H1 5.00
    At the End of Each Test Interval, H2 5.00

11. Rate of Water Level Drop (Add additional lines if needed):

Time, Start of Test Interval, T1	Time End of Test Interval T2	Length of Test Interval, T, Minutes
		>240
		>240
		>240

12. Calculation of Permeability: K, (in/hr) = 60 min/hr x r2/R2 x L(in)/T(min) x ln (H1/H2) T= >240

    K = <0.2 **Classification:** **K0**

13. Defects in the Sample (Check appropriate items):

    x NONE

    _____ Soil/Tube Contact _____Large Gravel _____ Large Roots

    _____ Dry Soil _____Smearing _____ Compaction

    _____ Other - Specify _____

Tube Permeameter Test Data

Job Number: 1279-99-010E
Project: Proposed Site Development
Client: RPM Development Group, LLC
Lab Tech: M. Stevenson

Sample ID: **Boring/Test Pit No.:** SPP-103 **Sample No.:** T-1 **Depth:** 40"

MUNICIPALITY Township of Lawrence BLOCK 2001 LOTS 3, 60-66, & 68

1. Test Number T-1 Replicate (letter) A Date Collected 2/28/2023

2. Material Tested: _____ Fill x Test in Native Soil-Indicate Depth

3. Type of Sample: x Undisturbed _____ Disturbed

4. Sample Dimensions: Inside Radius of Sample Tube, R, in cm 3.81
Length of Sample, L, in inches 3.50

5. Bulk Density Determination (Disturbed Samples Only): N/A

6. Sample Weight (Wt. Tube Containing Sample-Wt. of Empty Tube), grams --

7. Sample Volume (L x 2.54 cm./inch x 3.14R2), cc. 405.2111

8. Bulk Density (Sample Wt./Sample Volume), grams/cc. -- > 1.2

9. Standpipe Used: x No _____ Yes, Indicate Internal Radius, cm. N/A

10. Height of Water Level Above Rim of Test Basin, in inches:

At the Beginning of Each Test Interval, H1 5.00
At the End of Each Test Interval, H2 5.00

11. Rate of Water Level Drop (Add additional lines if needed):

Time, Start of Test Interval, T1	Time End of Test Interval T2	Length of Test Interval, T, Minutes
		>240
		>240
		>240

12. Calculation of Permeability: K, (in/hr) = 60 min/hr x r2/R2 x L(in)/T(min) x ln (H1/H2) T= >240

K = <0.2 **Classification:** **K0**

13. Defects in the Sample (Check appropriate items):

x NONE

_____ Soil/Tube Contact _____Large Gravel _____ Large Roots

_____ Dry Soil _____Smearing _____ Compaction

_____ Other - Specify _____

Tube Permeameter Test Data

Job Number: 1279-99-010E
Project: Proposed Site Development
Client: RPM Development Group, LLC
Lab Tech: M. Stevenson

Sample ID: **Boring/Test Pit No.:** SPP-103 **Sample No.:** T-1 **Depth:** 40"

MUNICIPALITY Township of Lawrence BLOCK 2001 LOTS 3, 60-66, & 68

1. Test Number T-1 Replicate (letter) B Date Collected 2/28/2023

2. Material Tested: _____ Fill x Test in Native Soil-Indicate Depth

3. Type of Sample: x Undisturbed _____ Disturbed

4. Sample Dimensions: Inside Radius of Sample Tube, R, in cm 3.81
   Length of Sample, L, in inches 4.00

5. Bulk Density Determination (Disturbed Samples Only): N/A

6. Sample Weight (Wt. Tube Containing Sample-Wt. of Empty Tube), grams --

7. Sample Volume (L x 2.54 cm./inch x 3.14R2), cc. 463.0984

8. Bulk Density (Sample Wt./Sample Volume), grams/cc. -- > 1.2

9. Standpipe Used: x No _____ Yes, Indicate Internal Radius, cm. N/A

10. Height of Water Level Above Rim of Test Basin, in inches:

    At the Beginning of Each Test Interval, H1 5.00
    At the End of Each Test Interval, H2 5.00

11. Rate of Water Level Drop (Add additional lines if needed):

Time, Start of Test Interval, T1	Time End of Test Interval T2	Length of Test Interval, T, Minutes
		>240
		>240
		>240

12. Calculation of Permeability: K, (in/hr) = 60 min/hr x r2/R2 x L(in)/T(min) x ln (H1/H2) T= >240

    K = <0.2 **Classification:** **K0**

13. Defects in the Sample (Check appropriate items):

    x NONE

    _____ Soil/Tube Contact _____Large Gravel _____ Large Roots

    _____ Dry Soil _____Smearing _____ Compaction

    _____ Other - Specify _____

Tube Permeameter Test Data

Job Number: 1279-99-010E
Project: Proposed Site Development
Client: RPM Development Group, LLC
Lab Tech: M. Stevenson

Sample ID: **Boring/Test Pit No.:** SPP-104 **Sample No.:** T-1 **Depth:** 20"

MUNICIPALITY Township of Lawrence BLOCK 2001 LOTS 3, 60-66, & 68

1. Test Number T-1 Replicate (letter) A Date Collected 2/28/2023

2. Material Tested: _____ Fill x Test in Native Soil-Indicate Depth

3. Type of Sample: x Undisturbed _____ Disturbed

4. Sample Dimensions: Inside Radius of Sample Tube, R, in cm 3.81
Length of Sample, L, in inches 3.00

5. Bulk Density Determination (Disturbed Samples Only): N/A

6. Sample Weight (Wt. Tube Containing Sample-Wt. of Empty Tube), grams --

7. Sample Volume (L x 2.54 cm./inch x 3.14R2), cc. 347.3238

8. Bulk Density (Sample Wt./Sample Volume), grams/cc. -- > 1.2

9. Standpipe Used: x No _____ Yes, Indicate Internal Radius, cm. N/A

10. Height of Water Level Above Rim of Test Basin, in inches:

At the Beginning of Each Test Interval, H1 5.00
At the End of Each Test Interval, H2 4.00

11. Rate of Water Level Drop (Add additional lines if needed):

Time, Start of Test Interval, T1	Time End of Test Interval T2	Length of Test Interval, T, Minutes
		197.2
		197.2
		197.2

12. Calculation of Permeability: K, (in/hr) = 60 min/hr x r2/R2 x L(in)/T(min) x ln (H1/H2) T= 197.2

K = 0.2 **Classification:** **K1**

13. Defects in the Sample (Check appropriate items):

x NONE

_____ Soil/Tube Contact _____Large Gravel _____ Large Roots

_____ Dry Soil _____Smearing _____ Compaction

_____ Other - Specify _____

Tube Permeameter Test Data

Job Number: 1279-99-010E
Project: Proposed Site Development
Client: RPM Development Group, LLC
Lab Tech: M. Stevenson

Sample ID: **Boring/Test Pit No.:** SPP-104 **Sample No.:** T-1 **Depth:** 20"

MUNICIPALITY Township of Lawrence BLOCK 2001 LOTS 3, 60-66, & 68

1. Test Number T-1 Replicate (letter) B Date Collected 2/28/2023

2. Material Tested: _____ Fill x Test in Native Soil-Indicate Depth

3. Type of Sample: x Undisturbed _____ Disturbed

4. Sample Dimensions: Inside Radius of Sample Tube, R, in cm 3.81
   Length of Sample, L, in inches 3.00

5. Bulk Density Determination (Disturbed Samples Only): N/A

6. Sample Weight (Wt. Tube Containing Sample-Wt. of Empty Tube), grams --

7. Sample Volume (L x 2.54 cm./inch x 3.14R2), cc. 347.3238

8. Bulk Density (Sample Wt./Sample Volume), grams/cc. -- > 1.2

9. Standpipe Used: x No _____ Yes, Indicate Internal Radius, cm. N/A

10. Height of Water Level Above Rim of Test Basin, in inches:

    At the Beginning of Each Test Interval, H1 5.00
    At the End of Each Test Interval, H2 4.00

11. Rate of Water Level Drop (Add additional lines if needed):

Time, Start of Test Interval, T1	Time End of Test Interval T2	Length of Test Interval, T, Minutes
		38.0
		38.0
		38.0

12. Calculation of Permeability: K, (in/hr) = 60 min/hr x r2/R2 x L(in)/T(min) x ln (H1/H2) T= 38.0

    K = 1.1 **Classification:** **K2**

13. Defects in the Sample (Check appropriate items):

    x NONE

    _____ Soil/Tube Contact _____Large Gravel _____ Large Roots

    _____ Dry Soil _____Smearing _____ Compaction

    _____ Other - Specify _____

Tube Permeameter Test Data

Job Number: 1279-99-010E
Project: Proposed Site Development
Client: RPM Development Group, LLC
Lab Tech: M. Stevenson

Sample ID: **Boring/Test Pit No.:** SPP-105 **Sample No.:** T-1 **Depth:** 18"

MUNICIPALITY Township of Lawrence BLOCK 2001 LOTS 3, 60-66, & 68

1. Test Number T-1 Replicate (letter) A Date Collected 2/28/2023

2. Material Tested: _____ Fill x Test in Native Soil-Indicate Depth

3. Type of Sample: x Undisturbed _____ Disturbed

4. Sample Dimensions: Inside Radius of Sample Tube, R, in cm 3.81
   Length of Sample, L, in inches 4.00

5. Bulk Density Determination (Disturbed Samples Only): N/A

6. Sample Weight (Wt. Tube Containing Sample-Wt. of Empty Tube), grams --

7. Sample Volume (L x 2.54 cm./inch x 3.14R2), cc. 463.0984

8. Bulk Density (Sample Wt./Sample Volume), grams/cc. -- > 1.2

9. Standpipe Used: x No _____ Yes, Indicate Internal Radius, cm. N/A

10. Height of Water Level Above Rim of Test Basin, in inches:

    At the Beginning of Each Test Interval, H1 5.00
    At the End of Each Test Interval, H2 5.00

11. Rate of Water Level Drop (Add additional lines if needed):

Time, Start of Test Interval, T1	Time End of Test Interval T2	Length of Test Interval, T, Minutes
		>240
		>240
		>240

12. Calculation of Permeability: K, (in/hr) = 60 min/hr x r2/R2 x L(in)/T(min) x ln (H1/H2) T= >240

    K = <0.2 **Classification:** **K0**

13. Defects in the Sample (Check appropriate items):

    x NONE

    _____ Soil/Tube Contact _____Large Gravel _____ Large Roots

    _____ Dry Soil _____Smearing _____ Compaction

    _____ Other - Specify _____

Tube Permeameter Test Data

Job Number: 1279-99-010E
Project: Proposed Site Development
Client: RPM Development Group, LLC
Lab Tech: M. Stevenson

Sample ID: **Boring/Test Pit No.:** SPP-105 **Sample No.:** T-1 **Depth:** 18"

MUNICIPALITY Township of Lawrence BLOCK 2001 LOTS 3, 60-66, & 68

1. Test Number T-1 Replicate (letter) B Date Collected 2/28/2023

2. Material Tested: _____ Fill x Test in Native Soil-Indicate Depth

3. Type of Sample: x Undisturbed _____ Disturbed

4. Sample Dimensions: Inside Radius of Sample Tube, R, in cm 3.81
   Length of Sample, L, in inches 3.00

5. Bulk Density Determination (Disturbed Samples Only): N/A

6. Sample Weight (Wt. Tube Containing Sample-Wt. of Empty Tube), grams --

7. Sample Volume (L x 2.54 cm./inch x 3.14R2), cc. 347.3238

8. Bulk Density (Sample Wt./Sample Volume), grams/cc. -- > 1.2

9. Standpipe Used: x No _____ Yes, Indicate Internal Radius, cm. N/A

10. Height of Water Level Above Rim of Test Basin, in inches:

    At the Beginning of Each Test Interval, H1 5.00
    At the End of Each Test Interval, H2 5.00

11. Rate of Water Level Drop (Add additional lines if needed):

Time, Start of Test Interval, T1	Time End of Test Interval T2	Length of Test Interval, T, Minutes
		>240
		>240
		>240

12. Calculation of Permeability: K, (in/hr) = 60 min/hr x r2/R2 x L(in)/T(min) x ln (H1/H2) T= >240

    K = <0.2 **Classification:** **K0**

13. Defects in the Sample (Check appropriate items):

    x NONE

    _____ Soil/Tube Contact _____Large Gravel _____ Large Roots

    _____ Dry Soil _____Smearing _____ Compaction

    _____ Other - Specify _____

Tube Permeameter Test Data

Job Number: 1279-99-010E
Project: Proposed Site Development
Client: RPM Development Group, LLC
Lab Tech: M. Stevenson

Sample ID: **Boring/Test Pit No.:** SPP-106 **Sample No.:** T-1 **Depth:** 20"

MUNICIPALITY Township of Lawrence BLOCK 2001 LOTS 3, 60-66, & 68

1. Test Number T-1 Replicate (letter) A Date Collected 2/28/2023

2. Material Tested: _____ Fill x Test in Native Soil-Indicate Depth

3. Type of Sample: x Undisturbed _____ Disturbed

4. Sample Dimensions: Inside Radius of Sample Tube, R, in cm 3.81
Length of Sample, L, in inches 4.00

5. Bulk Density Determination (Disturbed Samples Only): N/A

6. Sample Weight (Wt. Tube Containing Sample-Wt. of Empty Tube), grams --

7. Sample Volume (L x 2.54 cm./inch x 3.14R2), cc. 463.0984

8. Bulk Density (Sample Wt./Sample Volume), grams/cc. -- > 1.2

9. Standpipe Used: x No _____ Yes, Indicate Internal Radius, cm. N/A

10. Height of Water Level Above Rim of Test Basin, in inches:

At the Beginning of Each Test Interval, H1 5.00
At the End of Each Test Interval, H2 4.00

11. Rate of Water Level Drop (Add additional lines if needed):

Time, Start of Test Interval, T1	Time End of Test Interval T2	Length of Test Interval, T, Minutes
		6.4
		6.4
		6.4

12. Calculation of Permeability: K, (in/hr) = 60 min/hr x r2/R2 x L(in)/T(min) x ln (H1/H2) T= 6.4

K = 8.3 **Classification:** **K4**

13. Defects in the Sample (Check appropriate items):

x NONE

_____ Soil/Tube Contact _____Large Gravel _____ Large Roots

_____ Dry Soil _____Smearing _____ Compaction

_____ Other - Specify _____

Tube Permeameter Test Data

Job Number: 1279-99-010E
Project: Proposed Site Development
Client: RPM Development Group, LLC
Lab Tech: M. Stevenson

Sample ID: **Boring/Test Pit No.:** SPP-106 **Sample No.:** T-1 **Depth:** 20"

MUNICIPALITY Township of Lawrence BLOCK 2001 LOTS 3, 60-66, & 68

1. Test Number T-1 Replicate (letter) B Date Collected 2/28/2023

2. Material Tested: _____ Fill x Test in Native Soil-Indicate Depth

3. Type of Sample: x Undisturbed _____ Disturbed

4. Sample Dimensions: Inside Radius of Sample Tube, R, in cm 3.81
   Length of Sample, L, in inches 4.00

5. Bulk Density Determination (Disturbed Samples Only): N/A

6. Sample Weight (Wt. Tube Containing Sample-Wt. of Empty Tube), grams --

7. Sample Volume (L x 2.54 cm./inch x 3.14R2), cc. 463.0984

8. Bulk Density (Sample Wt./Sample Volume), grams/cc. -- > 1.2

9. Standpipe Used: x No _____ Yes, Indicate Internal Radius, cm. N/A

10. Height of Water Level Above Rim of Test Basin, in inches:

    At the Beginning of Each Test Interval, H1 5.00
    At the End of Each Test Interval, H2 4.00

11. Rate of Water Level Drop (Add additional lines if needed):

Time, Start of Test Interval, T1	Time End of Test Interval T2	Length of Test Interval, T, Minutes
		1.8
		1.8
		1.8

12. Calculation of Permeability: K, (in/hr) = 60 min/hr x r2/R2 x L(in)/T(min) x ln (H1/H2) T= 1.8

    K = >20 **Classification:** **K5**

13. Defects in the Sample (Check appropriate items):

    x NONE

    _____ Soil/Tube Contact _____Large Gravel _____ Large Roots

    _____ Dry Soil _____Smearing _____ Compaction

    _____ Other - Specify _____

Tube Permeameter Test Data

Job Number: 1279-99-010E
Project: Proposed Site Development
Client: RPM Development Group, LLC
Lab Tech: M. Stevenson

Sample ID: **Boring/Test Pit No.:** SPP-107 **Sample No.:** T-1 **Depth:** 28"

MUNICIPALITY Township of Lawrence BLOCK 2001 LOTS 3, 60-66, & 68

1. Test Number T-1 Replicate (letter) A Date Collected 2/28/2023

2. Material Tested: _____ Fill x Test in Native Soil-Indicate Depth

3. Type of Sample: x Undisturbed _____ Disturbed

4. Sample Dimensions: Inside Radius of Sample Tube, R, in cm 3.81
   Length of Sample, L, in inches 3.50

5. Bulk Density Determination (Disturbed Samples Only): N/A

6. Sample Weight (Wt. Tube Containing Sample-Wt. of Empty Tube), grams --

7. Sample Volume (L x 2.54 cm./inch x 3.14R2), cc. 405.2111

8. Bulk Density (Sample Wt./Sample Volume), grams/cc. -- > 1.2

9. Standpipe Used: x No _____ Yes, Indicate Internal Radius, cm. N/A

10. Height of Water Level Above Rim of Test Basin, in inches:

    At the Beginning of Each Test Interval, H1 5.00
    At the End of Each Test Interval, H2 4.00

11. Rate of Water Level Drop (Add additional lines if needed):

Time, Start of Test Interval, T1	Time End of Test Interval T2	Length of Test Interval, T, Minutes
		40.2
		40.2
		40.2

12. Calculation of Permeability: K, (in/hr) = 60 min/hr x r2/R2 x L(in)/T(min) x ln (H1/H2) T= 40.2

    K = 1.2 **Classification:** **K2**

13. Defects in the Sample (Check appropriate items):

    x NONE

    _____ Soil/Tube Contact _____Large Gravel _____ Large Roots

    _____ Dry Soil _____Smearing _____ Compaction

    _____ Other - Specify _____

Tube Permeameter Test Data

Job Number: 1279-99-010E
Project: Proposed Site Development
Client: RPM Development Group, LLC
Lab Tech: M. Stevenson

Sample ID: **Boring/Test Pit No.:** SPP-107 **Sample No.:** T-1 **Depth:** 28"

MUNICIPALITY Township of Lawrence BLOCK 2001 LOTS 3, 60-66, & 68

1. Test Number T-1 Replicate (letter) B Date Collected 2/28/2023

2. Material Tested: _____ Fill x Test in Native Soil-Indicate Depth

3. Type of Sample: x Undisturbed _____ Disturbed

4. Sample Dimensions: Inside Radius of Sample Tube, R, in cm 3.81
   Length of Sample, L, in inches 3.50

5. Bulk Density Determination (Disturbed Samples Only): N/A

6. Sample Weight (Wt. Tube Containing Sample-Wt. of Empty Tube), grams --

7. Sample Volume (L x 2.54 cm./inch x 3.14R2), cc. 405.2111

8. Bulk Density (Sample Wt./Sample Volume), grams/cc. -- > 1.2

9. Standpipe Used: x No _____ Yes, Indicate Internal Radius, cm. N/A

10. Height of Water Level Above Rim of Test Basin, in inches:

At the Beginning of Each Test Interval, H1	5.00
At the End of Each Test Interval, H2	4.00

11. Rate of Water Level Drop (Add additional lines if needed):

Time, Start of Test Interval, T1	Time End of Test Interval T2	Length of Test Interval, T, Minutes
		13.8
		13.8
		13.8

12. Calculation of Permeability: K, (in/hr) = 60 min/hr x r2/R2 x L(in)/T(min) x ln (H1/H2) T= 13.8

K = 3.4 **Classification:** **K3**

13. Defects in the Sample (Check appropriate items):

x NONE

_____ Soil/Tube Contact _____Large Gravel _____ Large Roots

_____ Dry Soil _____Smearing _____ Compaction

_____ Other - Specify _____

Tube Permeameter Test Data

Job Number: 1279-99-010E
Project: Proposed Site Development
Client: RPM Development Group, LLC
Lab Tech: M. Stevenson

Sample ID: **Boring/Test Pit No.:** SPP-108 **Sample No.:** T-1 **Depth:** 22"

MUNICIPALITY Township of Lawrence BLOCK 2001 LOTS 3, 60-66, & 68

1. Test Number T-1 Replicate (letter) A Date Collected 2/28/2023

2. Material Tested: _____ Fill x Test in Native Soil-Indicate Depth

3. Type of Sample: x Undisturbed _____ Disturbed

4. Sample Dimensions: Inside Radius of Sample Tube, R, in cm 3.81
   Length of Sample, L, in inches 3.50

5. Bulk Density Determination (Disturbed Samples Only): N/A

6. Sample Weight (Wt. Tube Containing Sample-Wt. of Empty Tube), grams --

7. Sample Volume (L x 2.54 cm./inch x 3.14R2), cc. 405.2111

8. Bulk Density (Sample Wt./Sample Volume), grams/cc. -- > 1.2

9. Standpipe Used: x No _____ Yes, Indicate Internal Radius, cm. N/A

10. Height of Water Level Above Rim of Test Basin, in inches:

At the Beginning of Each Test Interval, H1	5.00
At the End of Each Test Interval, H2	4.00

11. Rate of Water Level Drop (Add additional lines if needed):

Time, Start of Test Interval, T1	Time End of Test Interval T2	Length of Test Interval, T, Minutes
		3.8
		3.8
		3.8

12. Calculation of Permeability: K, (in/hr) = 60 min/hr x r2/R2 x L(in)/T(min) x ln (H1/H2) T= 3.8

K = 12.4 **Classification:** **K4**

13. Defects in the Sample (Check appropriate items):

x NONE

_____ Soil/Tube Contact _____Large Gravel _____ Large Roots

_____ Dry Soil _____Smearing _____ Compaction

_____ Other - Specify _____

Tube Permeameter Test Data

Job Number: 1279-99-010E
Project: Proposed Site Development
Client: RPM Development Group, LLC
Lab Tech: M. Stevenson

Sample ID: **Boring/Test Pit No.:** SPP-108 **Sample No.:** T-1 **Depth:** 22"

MUNICIPALITY Township of Lawrence BLOCK 2001 LOTS 3, 60-66, & 68

1. Test Number T-1 Replicate (letter) B Date Collected 2/28/2023

2. Material Tested: _____ Fill x Test in Native Soil-Indicate Depth

3. Type of Sample: x Undisturbed _____ Disturbed

4. Sample Dimensions: Inside Radius of Sample Tube, R, in cm 3.81
   Length of Sample, L, in inches 3.50

5. Bulk Density Determination (Disturbed Samples Only): N/A

6. Sample Weight (Wt. Tube Containing Sample-Wt. of Empty Tube), grams --

7. Sample Volume (L x 2.54 cm./inch x 3.14R2), cc. 405.2111

8. Bulk Density (Sample Wt./Sample Volume), grams/cc. -- > 1.2

9. Standpipe Used: x No _____ Yes, Indicate Internal Radius, cm. N/A

10. Height of Water Level Above Rim of Test Basin, in inches:

    At the Beginning of Each Test Interval, H1 5.00
    At the End of Each Test Interval, H2 4.00

11. Rate of Water Level Drop (Add additional lines if needed):

Time, Start of Test Interval, T1	Time End of Test Interval T2	Length of Test Interval, T, Minutes
		2.0
		1.9
		2.0

12. Calculation of Permeability: K, (in/hr) = 60 min/hr x r2/R2 x L(in)/T(min) x ln (H1/H2) T= 2.0

    K = >20.0 **Classification:** **K5**

13. Defects in the Sample (Check appropriate items):

    x NONE

    _____ Soil/Tube Contact _____Large Gravel _____ Large Roots

    _____ Dry Soil _____Smearing _____ Compaction

    _____ Other - Specify _____

Tube Permeameter Test Data

Job Number: 1279-99-010E
Project: Proposed Site Development
Client: RPM Development Group, LLC
Lab Tech: M. Stevenson

Sample ID: **Boring/Test Pit No.:** SPP-109 **Sample No.:** T-1 **Depth:** 22"

MUNICIPALITY Township of Lawrence BLOCK 2001 LOTS 3, 60-66, & 68

1. Test Number T-1 Replicate (letter) A Date Collected 2/28/2023

2. Material Tested: _____ Fill x Test in Native Soil-Indicate Depth

3. Type of Sample: x Undisturbed _____ Disturbed

4. Sample Dimensions: Inside Radius of Sample Tube, R, in cm 3.81
Length of Sample, L, in inches 4.00

5. Bulk Density Determination (Disturbed Samples Only): N/A

6. Sample Weight (Wt. Tube Containing Sample-Wt. of Empty Tube), grams --

7. Sample Volume (L x 2.54 cm./inch x 3.14R2), cc. 463.0984

8. Bulk Density (Sample Wt./Sample Volume), grams/cc. -- > 1.2

9. Standpipe Used: x No _____ Yes, Indicate Internal Radius, cm. N/A

10. Height of Water Level Above Rim of Test Basin, in inches:

At the Beginning of Each Test Interval, H1 5.00
At the End of Each Test Interval, H2 4.00

11. Rate of Water Level Drop (Add additional lines if needed):

Time, Start of Test Interval, T1	Time End of Test Interval T2	Length of Test Interval, T, Minutes
		6.5
		6.5
		6.5

12. Calculation of Permeability: K, (in/hr) = 60 min/hr x r2/R2 x L(in)/T(min) x ln (H1/H2) T= 6.5

K = 8.2 **Classification:** **K4**

13. Defects in the Sample (Check appropriate items):

x NONE

_____ Soil/Tube Contact _____Large Gravel _____ Large Roots

_____ Dry Soil _____Smearing _____ Compaction

_____ Other - Specify _____

Tube Permeameter Test Data

Job Number: 1279-99-010E
Project: Proposed Site Development
Client: RPM Development Group, LLC
Lab Tech: M. Stevenson

Sample ID: **Boring/Test Pit No.:** SPP-109 **Sample No.:** T-1 **Depth:** 22"

MUNICIPALITY Township of Lawrence BLOCK 2001 LOTS 3, 60-66, & 68

1. Test Number T-1 Replicate (letter) B Date Collected 2/28/2023

2. Material Tested: _____ Fill x Test in Native Soil-Indicate Depth

3. Type of Sample: x Undisturbed _____ Disturbed

4. Sample Dimensions: Inside Radius of Sample Tube, R, in cm 3.81
   Length of Sample, L, in inches 3.50

5. Bulk Density Determination (Disturbed Samples Only): N/A

6. Sample Weight (Wt. Tube Containing Sample-Wt. of Empty Tube), grams --

7. Sample Volume (L x 2.54 cm./inch x 3.14R2), cc. 405.2111

8. Bulk Density (Sample Wt./Sample Volume), grams/cc. -- > 1.2

9. Standpipe Used: x No _____ Yes, Indicate Internal Radius, cm. N/A

10. Height of Water Level Above Rim of Test Basin, in inches:

    At the Beginning of Each Test Interval, H1 5.00
    At the End of Each Test Interval, H2 4.00

11. Rate of Water Level Drop (Add additional lines if needed):

Time, Start of Test Interval, T1	Time End of Test Interval T2	Length of Test Interval, T, Minutes
		13.0
		13.0
		13.0

12. Calculation of Permeability: K, (in/hr) = 60 min/hr x r2/R2 x L(in)/T(min) x ln (H1/H2) T= 13.0

    K = 3.6 **Classification:** **K3**

13. Defects in the Sample (Check appropriate items):

    x NONE

    _____ Soil/Tube Contact _____Large Gravel _____ Large Roots

    _____ Dry Soil _____Smearing _____ Compaction

    _____ Other - Specify _____

Tube Permeameter Test Data

Job Number: 1279-99-010E
Project: Proposed Site Development
Client: RPM Development Group, LLC
Lab Tech: M. Stevenson

Sample ID: **Boring/Test Pit No.:** SPP-110 **Sample No.:** T-1 **Depth:** 36"

MUNICIPALITY Township of Lawrence BLOCK 2001 LOTS 3, 60-66, & 68

1. Test Number T-1 Replicate (letter) A Date Collected 2/28/2023

2. Material Tested: _____ Fill x Test in Native Soil-Indicate Depth

3. Type of Sample: x Undisturbed _____ Disturbed

4. Sample Dimensions: Inside Radius of Sample Tube, R, in cm 3.81
Length of Sample, L, in inches 4.00

5. Bulk Density Determination (Disturbed Samples Only): N/A

6. Sample Weight (Wt. Tube Containing Sample-Wt. of Empty Tube), grams --

7. Sample Volume (L x 2.54 cm./inch x 3.14R2), cc. 463.0984

8. Bulk Density (Sample Wt./Sample Volume), grams/cc. -- > 1.2

9. Standpipe Used: x No _____ Yes, Indicate Internal Radius, cm. N/A

10. Height of Water Level Above Rim of Test Basin, in inches:

At the Beginning of Each Test Interval, H1 5.00
At the End of Each Test Interval, H2 5.00

11. Rate of Water Level Drop (Add additional lines if needed):

Time, Start of Test Interval, T1	Time End of Test Interval T2	Length of Test Interval, T, Minutes
		>240
		>240
		>240

12. Calculation of Permeability: K, (in/hr) = 60 min/hr x r2/R2 x L(in)/T(min) x ln (H1/H2) T= >240

K = <0.2 **Classification:** **K0**

13. Defects in the Sample (Check appropriate items):

x NONE

_____ Soil/Tube Contact _____Large Gravel _____ Large Roots

_____ Dry Soil _____Smearing _____ Compaction

_____ Other - Specify _____

Tube Permeameter Test Data

Job Number: 1279-99-010E
Project: Proposed Site Development
Client: RPM Development Group, LLC
Lab Tech: M. Stevenson

Sample ID: **Boring/Test Pit No.:** SPP-110 **Sample No.:** T-1 **Depth:** 36"

MUNICIPALITY Township of Lawrence BLOCK 2001 LOTS 3, 60-66, & 68

1. Test Number T-1 Replicate (letter) B Date Collected 2/28/2023

2. Material Tested: _____ Fill x Test in Native Soil-Indicate Depth

3. Type of Sample: x Undisturbed _____ Disturbed

4. Sample Dimensions: Inside Radius of Sample Tube, R, in cm 3.81
   Length of Sample, L, in inches 4.00

5. Bulk Density Determination (Disturbed Samples Only): N/A

6. Sample Weight (Wt. Tube Containing Sample-Wt. of Empty Tube), grams --

7. Sample Volume (L x 2.54 cm./inch x 3.14R2), cc. 463.0984

8. Bulk Density (Sample Wt./Sample Volume), grams/cc. -- > 1.2

9. Standpipe Used: x No _____ Yes, Indicate Internal Radius, cm. N/A

10. Height of Water Level Above Rim of Test Basin, in inches:

    At the Beginning of Each Test Interval, H1 5.00
    At the End of Each Test Interval, H2 5.00

11. Rate of Water Level Drop (Add additional lines if needed):

Time, Start of Test Interval, T1	Time End of Test Interval T2	Length of Test Interval, T, Minutes
		>240
		>240
		>240

12. Calculation of Permeability: K, (in/hr) = 60 min/hr x r2/R2 x L(in)/T(min) x ln (H1/H2) T= >240

    K = <0.2 **Classification:** **K0**

13. Defects in the Sample (Check appropriate items):

    x NONE

    _____ Soil/Tube Contact _____Large Gravel _____ Large Roots

    _____ Dry Soil _____Smearing _____ Compaction

    _____ Other - Specify _____

Tube Permeameter Test Data

Job Number: 1279-99-010E
Project: Proposed Site Development
Client: RPM Development Group, LLC
Lab Tech: M. Stevenson

Sample ID: **Boring/Test Pit No.:** SPP-111 **Sample No.:** T-1 **Depth:** 40"

MUNICIPALITY Township of Lawrence BLOCK 2001 LOTS 3, 60-66, & 68

1. Test Number T-1 Replicate (letter) A Date Collected 2/28/2023

2. Material Tested: _____ Fill x Test in Native Soil-Indicate Depth

3. Type of Sample: x Undisturbed _____ Disturbed

4. Sample Dimensions: Inside Radius of Sample Tube, R, in cm 3.81
   Length of Sample, L, in inches 3.75

5. Bulk Density Determination (Disturbed Samples Only): N/A

6. Sample Weight (Wt. Tube Containing Sample-Wt. of Empty Tube), grams --

7. Sample Volume (L x 2.54 cm./inch x 3.14R2), cc. 434.1548

8. Bulk Density (Sample Wt./Sample Volume), grams/cc. -- > 1.2

9. Standpipe Used: x No _____ Yes, Indicate Internal Radius, cm. N/A

10. Height of Water Level Above Rim of Test Basin, in inches:

    At the Beginning of Each Test Interval, H1 5.00
    At the End of Each Test Interval, H2 5.00

11. Rate of Water Level Drop (Add additional lines if needed):

Time, Start of Test Interval, T1	Time End of Test Interval T2	Length of Test Interval, T, Minutes
		>240
		>240
		>240

12. Calculation of Permeability: K, (in/hr) = 60 min/hr x r2/R2 x L(in)/T(min) x ln (H1/H2) T= >240

    K = <0.2 **Classification:** **K0**

13. Defects in the Sample (Check appropriate items):

    x NONE

    _____ Soil/Tube Contact _____Large Gravel _____ Large Roots

    _____ Dry Soil _____Smearing _____ Compaction

    _____ Other - Specify _____

Tube Permeameter Test Data

Job Number: 1279-99-010E
Project: Proposed Site Development
Client: RPM Development Group, LLC
Lab Tech: M. Stevenson

Sample ID: **Boring/Test Pit No.:** SPP-111 **Sample No.:** T-1 **Depth:** 40"

MUNICIPALITY Township of Lawrence BLOCK 2001 LOTS 3, 60-66, & 68

1. Test Number T-1 Replicate (letter) B Date Collected 2/28/2023

2. Material Tested: _____ Fill x Test in Native Soil-Indicate Depth

3. Type of Sample: x Undisturbed _____ Disturbed

4. Sample Dimensions: Inside Radius of Sample Tube, R, in cm 3.81
   Length of Sample, L, in inches 4.00

5. Bulk Density Determination (Disturbed Samples Only): N/A

6. Sample Weight (Wt. Tube Containing Sample-Wt. of Empty Tube), grams --

7. Sample Volume (L x 2.54 cm./inch x 3.14R2), cc. 463.0984

8. Bulk Density (Sample Wt./Sample Volume), grams/cc. -- > 1.2

9. Standpipe Used: x No _____ Yes, Indicate Internal Radius, cm. N/A

10. Height of Water Level Above Rim of Test Basin, in inches:

    At the Beginning of Each Test Interval, H1 5.00
    At the End of Each Test Interval, H2 5.00

11. Rate of Water Level Drop (Add additional lines if needed):

Time, Start of Test Interval, T1	Time End of Test Interval T2	Length of Test Interval, T, Minutes
		>240
		>240
		>240

12. Calculation of Permeability: K, (in/hr) = 60 min/hr x r2/R2 x L(in)/T(min) x ln (H1/H2) T= >240

    K = <0.2 **Classification:** **K0**

13. Defects in the Sample (Check appropriate items):

    x NONE

    _____ Soil/Tube Contact _____Large Gravel _____ Large Roots

    _____ Dry Soil _____Smearing _____ Compaction

    _____ Other - Specify _____

Tube Permeameter Test Data

Job Number: 1279-99-010E
Project: Proposed Site Development
Client: RPM Development Group, LLC
Lab Tech: M. Stevenson

Sample ID: **Boring/Test Pit No.:** SPP-112 **Sample No.:** T-1 **Depth:** 36"

MUNICIPALITY Township of Lawrence BLOCK 2001 LOTS 3, 60-66, & 68

1. Test Number T-1 Replicate (letter) A Date Collected 2/28/2023

2. Material Tested: _____ Fill x Test in Native Soil-Indicate Depth

3. Type of Sample: x Undisturbed _____ Disturbed

4. Sample Dimensions: Inside Radius of Sample Tube, R, in cm 3.81
   Length of Sample, L, in inches 3.75

5. Bulk Density Determination (Disturbed Samples Only): N/A

6. Sample Weight (Wt. Tube Containing Sample-Wt. of Empty Tube), grams --

7. Sample Volume (L x 2.54 cm./inch x 3.14R2), cc. 434.1548

8. Bulk Density (Sample Wt./Sample Volume), grams/cc. -- > 1.2

9. Standpipe Used: x No _____ Yes, Indicate Internal Radius, cm. N/A

10. Height of Water Level Above Rim of Test Basin, in inches:

    At the Beginning of Each Test Interval, H1 5.00
    At the End of Each Test Interval, H2 5.00

11. Rate of Water Level Drop (Add additional lines if needed):

Time, Start of Test Interval, T1	Time End of Test Interval T2	Length of Test Interval, T, Minutes
		>240
		>240
		>240

12. Calculation of Permeability: K, (in/hr) = 60 min/hr x r2/R2 x L(in)/T(min) x ln (H1/H2) T= >240

    K = <0.2 **Classification:** **K0**

13. Defects in the Sample (Check appropriate items):

    x NONE

    _____ Soil/Tube Contact _____Large Gravel _____ Large Roots

    _____ Dry Soil _____Smearing _____ Compaction

    _____ Other - Specify _____

Tube Permeameter Test Data

Job Number: 1279-99-010E
Project: Proposed Site Development
Client: RPM Development Group, LLC
Lab Tech: M. Stevenson

Sample ID: **Boring/Test Pit No.:** SPP-112 **Sample No.:** T-1 **Depth:** 36"

MUNICIPALITY Township of Lawrence BLOCK 2001 LOTS 3, 60-66, & 68

1. Test Number T-1 Replicate (letter) B Date Collected 2/28/2023

2. Material Tested: _____ Fill x Test in Native Soil-Indicate Depth

3. Type of Sample: x Undisturbed _____ Disturbed

4. Sample Dimensions: Inside Radius of Sample Tube, R, in cm 3.81
   Length of Sample, L, in inches 3.25

5. Bulk Density Determination (Disturbed Samples Only): N/A

6. Sample Weight (Wt. Tube Containing Sample-Wt. of Empty Tube), grams --

7. Sample Volume (L x 2.54 cm./inch x 3.14R2), cc. 376.2675

8. Bulk Density (Sample Wt./Sample Volume), grams/cc. -- > 1.2

9. Standpipe Used: x No _____ Yes, Indicate Internal Radius, cm. N/A

10. Height of Water Level Above Rim of Test Basin, in inches:

    At the Beginning of Each Test Interval, H1 5.00
    At the End of Each Test Interval, H2 5.00

11. Rate of Water Level Drop (Add additional lines if needed):

Time, Start of Test Interval, T1	Time End of Test Interval T2	Length of Test Interval, T, Minutes
		>240
		>240
		>240

12. Calculation of Permeability: K, (in/hr) = 60 min/hr x r2/R2 x L(in)/T(min) x ln (H1/H2) T= >240

    K = <0.2 **Classification:** **K0**

13. Defects in the Sample (Check appropriate items):

    x NONE

    _____ Soil/Tube Contact _____Large Gravel _____ Large Roots

    _____ Dry Soil _____Smearing _____ Compaction

    _____ Other - Specify _____

Tube Permeameter Test Data

Job Number: 1279-99-010E
Project: Proposed Site Development
Client: RPM Development Group, LLC
Lab Tech: M. Stevenson

Sample ID: **Boring/Test Pit No.:** SPP-113 **Sample No.:** T-1 **Depth:** 20"

MUNICIPALITY Township of Lawrence BLOCK 2001 LOTS 3, 60-66, & 68

1. Test Number T-1 Replicate (letter) A Date Collected 2/28/2023

2. Material Tested: _____ Fill x Test in Native Soil-Indicate Depth

3. Type of Sample: x Undisturbed _____ Disturbed

4. Sample Dimensions: Inside Radius of Sample Tube, R, in cm 3.81
   Length of Sample, L, in inches 4.00

5. Bulk Density Determination (Disturbed Samples Only): N/A

6. Sample Weight (Wt. Tube Containing Sample-Wt. of Empty Tube), grams --

7. Sample Volume (L x 2.54 cm./inch x 3.14R2), cc. 463.0984

8. Bulk Density (Sample Wt./Sample Volume), grams/cc. -- > 1.2

9. Standpipe Used: x No _____ Yes, Indicate Internal Radius, cm. N/A

10. Height of Water Level Above Rim of Test Basin, in inches:

    At the Beginning of Each Test Interval, H1 5.00
    At the End of Each Test Interval, H2 5.00

11. Rate of Water Level Drop (Add additional lines if needed):

Time, Start of Test Interval, T1	Time End of Test Interval T2	Length of Test Interval, T, Minutes
		>240
		>240
		>240

12. Calculation of Permeability: K, (in/hr) = 60 min/hr x r2/R2 x L(in)/T(min) x ln (H1/H2) T= >240

    K = <0.2 **Classification:** **K0**

13. Defects in the Sample (Check appropriate items):

    x NONE

    _____ Soil/Tube Contact _____Large Gravel _____ Large Roots

    _____ Dry Soil _____Smearing _____ Compaction

    _____ Other - Specify _____

Tube Permeameter Test Data

Job Number: 1279-99-010E
Project: Proposed Site Development
Client: RPM Development Group, LLC
Lab Tech: M. Stevenson

Sample ID: **Boring/Test Pit No.:** SPP-113 **Sample No.:** T-1 **Depth:** 20"

MUNICIPALITY Township of Lawrence BLOCK 2001 LOTS 3, 60-66, & 68

1. Test Number T-1 Replicate (letter) B Date Collected 2/28/2023

2. Material Tested: _____ Fill x Test in Native Soil-Indicate Depth

3. Type of Sample: x Undisturbed _____ Disturbed

4. Sample Dimensions: Inside Radius of Sample Tube, R, in cm 3.81
   Length of Sample, L, in inches 4.00

5. Bulk Density Determination (Disturbed Samples Only): N/A

6. Sample Weight (Wt. Tube Containing Sample-Wt. of Empty Tube), grams --

7. Sample Volume (L x 2.54 cm./inch x 3.14R2), cc. 463.0984

8. Bulk Density (Sample Wt./Sample Volume), grams/cc. -- > 1.2

9. Standpipe Used: x No _____ Yes, Indicate Internal Radius, cm. N/A

10. Height of Water Level Above Rim of Test Basin, in inches:

    At the Beginning of Each Test Interval, H1 5.00
    At the End of Each Test Interval, H2 5.00

11. Rate of Water Level Drop (Add additional lines if needed):

Time, Start of Test Interval, T1	Time End of Test Interval T2	Length of Test Interval, T, Minutes
		>240
		>240
		>240

12. Calculation of Permeability: K, (in/hr) = 60 min/hr x r2/R2 x L(in)/T(min) x ln (H1/H2) T= >240

    K = <0.2 **Classification:** **K0**

13. Defects in the Sample (Check appropriate items):

    x NONE

    _____ Soil/Tube Contact _____Large Gravel _____ Large Roots

    _____ Dry Soil _____Smearing _____ Compaction

    _____ Other - Specify _____

Tube Permeameter Test Data

Job Number: 1279-99-010E
Project: Proposed Site Development
Client: RPM Development Group, LLC
Lab Tech: M. Stevenson

Sample ID: **Boring/Test Pit No.:** SPP-114 **Sample No.:** T-1 **Depth:** 16"

MUNICIPALITY Township of Lawrence BLOCK 2001 LOTS 3, 60-66, & 68

1. Test Number T-1 Replicate (letter) A Date Collected 2/28/2023

2. Material Tested: _____ Fill x Test in Native Soil-Indicate Depth

3. Type of Sample: x Undisturbed _____ Disturbed

4. Sample Dimensions: Inside Radius of Sample Tube, R, in cm 3.81
Length of Sample, L, in inches 3.25

5. Bulk Density Determination (Disturbed Samples Only): N/A

6. Sample Weight (Wt. Tube Containing Sample-Wt. of Empty Tube), grams --

7. Sample Volume (L x 2.54 cm./inch x 3.14R2), cc. 376.2675

8. Bulk Density (Sample Wt./Sample Volume), grams/cc. -- > 1.2

9. Standpipe Used: x No _____ Yes, Indicate Internal Radius, cm. N/A

10. Height of Water Level Above Rim of Test Basin, in inches:

At the Beginning of Each Test Interval, H1 5.00
At the End of Each Test Interval, H2 4.00

11. Rate of Water Level Drop (Add additional lines if needed):

Time, Start of Test Interval, T1	Time End of Test Interval T2	Length of Test Interval, T, Minutes
		42.8
		42.8
		42.8

12. Calculation of Permeability: K, (in/hr) = 60 min/hr x r2/R2 x L(in)/T(min) x ln (H1/H2) T= 42.8

K = 1.0 **Classification:** **K2**

13. Defects in the Sample (Check appropriate items):

x NONE

_____ Soil/Tube Contact _____Large Gravel _____ Large Roots

_____ Dry Soil _____Smearing _____ Compaction

_____ Other - Specify _____

Tube Permeameter Test Data

Job Number: 1279-99-010E
Project: Proposed Site Development
Client: RPM Development Group, LLC
Lab Tech: M. Stevenson

Sample ID: **Boring/Test Pit No.:** SPP-114 **Sample No.:** T-1 **Depth:** 16"

MUNICIPALITY Township of Lawrence BLOCK 2001 LOTS 3, 60-66, & 68

1. Test Number T-1 Replicate (letter) B Date Collected 2/28/2023

2. Material Tested: _____ Fill x Test in Native Soil-Indicate Depth

3. Type of Sample: x Undisturbed _____ Disturbed

4. Sample Dimensions: Inside Radius of Sample Tube, R, in cm 3.81
   Length of Sample, L, in inches 3.50

5. Bulk Density Determination (Disturbed Samples Only): N/A

6. Sample Weight (Wt. Tube Containing Sample-Wt. of Empty Tube), grams --

7. Sample Volume (L x 2.54 cm./inch x 3.14R2), cc. 405.2111

8. Bulk Density (Sample Wt./Sample Volume), grams/cc. -- > 1.2

9. Standpipe Used: x No _____ Yes, Indicate Internal Radius, cm. N/A

10. Height of Water Level Above Rim of Test Basin, in inches:

    At the Beginning of Each Test Interval, H1 5.00
    At the End of Each Test Interval, H2 4.00

11. Rate of Water Level Drop (Add additional lines if needed):

Time, Start of Test Interval, T1	Time End of Test Interval T2	Length of Test Interval, T, Minutes
		42.8
		42.8
		42.8

12. Calculation of Permeability: K, (in/hr) = 60 min/hr x r2/R2 x L(in)/T(min) x ln (H1/H2) T= 42.8

    K = 1.1 **Classification:** **K2**

13. Defects in the Sample (Check appropriate items):

    x NONE

    _____ Soil/Tube Contact _____Large Gravel _____ Large Roots

    _____ Dry Soil _____Smearing _____ Compaction

    _____ Other - Specify _____

Tube Permeameter Test Data

Job Number: 1279-99-010E
Project: Proposed Site Development
Client: RPM Development Group, LLC
Lab Tech: M. Stevenson

Sample ID: **Boring/Test Pit No.:** SPP-115 **Sample No.:** T-1 **Depth:** 28"

MUNICIPALITY Township of Lawrence BLOCK 2001 LOTS 3, 60-66, & 68

1. Test Number T-1 Replicate (letter) A Date Collected 2/28/2023

2. Material Tested: _____ Fill x Test in Native Soil-Indicate Depth

3. Type of Sample: x Undisturbed _____ Disturbed

4. Sample Dimensions: Inside Radius of Sample Tube, R, in cm 3.81
   Length of Sample, L, in inches 3.75

5. Bulk Density Determination (Disturbed Samples Only): N/A

6. Sample Weight (Wt. Tube Containing Sample-Wt. of Empty Tube), grams --

7. Sample Volume (L x 2.54 cm./inch x 3.14R2), cc. 434.1548

8. Bulk Density (Sample Wt./Sample Volume), grams/cc. -- > 1.2

9. Standpipe Used: x No _____ Yes, Indicate Internal Radius, cm. N/A

10. Height of Water Level Above Rim of Test Basin, in inches:

At the Beginning of Each Test Interval, H1	5.00
At the End of Each Test Interval, H2	4.00

11. Rate of Water Level Drop (Add additional lines if needed):

Time, Start of Test Interval, T1	Time End of Test Interval T2	Length of Test Interval, T, Minutes
		3.1
		3.1
		3.1

12. Calculation of Permeability: K, (in/hr) = 60 min/hr x r2/R2 x L(in)/T(min) x ln (H1/H2) T= 3.1

K = 16.5 **Classification:** **K4**

13. Defects in the Sample (Check appropriate items):

x NONE

_____ Soil/Tube Contact _____Large Gravel _____ Large Roots

_____ Dry Soil _____Smearing _____ Compaction

_____ Other - Specify _____

Tube Permeameter Test Data

Job Number: 1279-99-010E
Project: Proposed Site Development
Client: RPM Development Group, LLC
Lab Tech: M. Stevenson

Sample ID: **Boring/Test Pit No.:** SPP-115 **Sample No.:** T-1 **Depth:** 28"

MUNICIPALITY Township of Lawrence BLOCK 2001 LOTS 3, 60-66, & 68

1. Test Number T-1 Replicate (letter) B Date Collected 2/28/2023

2. Material Tested: _____ Fill x Test in Native Soil-Indicate Depth

3. Type of Sample: x Undisturbed _____ Disturbed

4. Sample Dimensions: Inside Radius of Sample Tube, R, in cm 3.81
   Length of Sample, L, in inches 3.75

5. Bulk Density Determination (Disturbed Samples Only): N/A

6. Sample Weight (Wt. Tube Containing Sample-Wt. of Empty Tube), grams --

7. Sample Volume (L x 2.54 cm./inch x 3.14R2), cc. 434.1548

8. Bulk Density (Sample Wt./Sample Volume), grams/cc. -- > 1.2

9. Standpipe Used: x No _____ Yes, Indicate Internal Radius, cm. N/A

10. Height of Water Level Above Rim of Test Basin, in inches:

    At the Beginning of Each Test Interval, H1 5.00
    At the End of Each Test Interval, H2 4.00

11. Rate of Water Level Drop (Add additional lines if needed):

Time, Start of Test Interval, T1	Time End of Test Interval T2	Length of Test Interval, T, Minutes
		3.2
		3.2
		3.2

12. Calculation of Permeability: K, (in/hr) = 60 min/hr x r2/R2 x L(in)/T(min) x ln (H1/H2) T= 3.2

    K = 15.5 **Classification:** **K4**

13. Defects in the Sample (Check appropriate items):

    x NONE

    _____ Soil/Tube Contact _____Large Gravel _____ Large Roots

    _____ Dry Soil _____Smearing _____ Compaction

    _____ Other - Specify _____

Tube Permeameter Test Data

Job Number: 1279-99-010E
Project: Proposed Site Development
Client: RPM Development Group, LLC
Lab Tech: M. Stevenson

Sample ID: **Boring/Test Pit No.:** SPP-116 **Sample No.:** T-1 **Depth:** 40"

MUNICIPALITY Township of Lawrence BLOCK 2001 LOTS 3, 60-66, & 68

1. Test Number T-1 Replicate (letter) A Date Collected 2/28/2023

2. Material Tested: _____ Fill x Test in Native Soil-Indicate Depth

3. Type of Sample: x Undisturbed _____ Disturbed

4. Sample Dimensions: Inside Radius of Sample Tube, R, in cm 3.81
   Length of Sample, L, in inches 4.00

5. Bulk Density Determination (Disturbed Samples Only): N/A

6. Sample Weight (Wt. Tube Containing Sample-Wt. of Empty Tube), grams --

7. Sample Volume (L x 2.54 cm./inch x 3.14R2), cc. 463.0984

8. Bulk Density (Sample Wt./Sample Volume), grams/cc. -- > 1.2

9. Standpipe Used: x No _____ Yes, Indicate Internal Radius, cm. N/A

10. Height of Water Level Above Rim of Test Basin, in inches:

    At the Beginning of Each Test Interval, H1 5.00
    At the End of Each Test Interval, H2 4.00

11. Rate of Water Level Drop (Add additional lines if needed):

Time, Start of Test Interval, T1	Time End of Test Interval T2	Length of Test Interval, T, Minutes
		6.2
		6.2
		6.2

12. Calculation of Permeability: K, (in/hr) = 60 min/hr x r2/R2 x L(in)/T(min) x ln (H1/H2) T= 6.2

    K = 8.6 **Classification:** **K4**

13. Defects in the Sample (Check appropriate items):

    x NONE

    _____ Soil/Tube Contact _____Large Gravel _____ Large Roots

    _____ Dry Soil _____Smearing _____ Compaction

    _____ Other - Specify _____

Tube Permeameter Test Data

Job Number: 1279-99-010E
Project: Proposed Site Development
Client: RPM Development Group, LLC
Lab Tech: M. Stevenson

Sample ID: **Boring/Test Pit No.:** SPP-116 **Sample No.:** T-1 **Depth:** 40"

MUNICIPALITY Township of Lawrence BLOCK 2001 LOTS 3, 60-66, & 68

1. Test Number T-1 Replicate (letter) B Date Collected 2/28/2023

2. Material Tested: _____ Fill x Test in Native Soil-Indicate Depth

3. Type of Sample: x Undisturbed _____ Disturbed

4. Sample Dimensions: Inside Radius of Sample Tube, R, in cm 3.81
   Length of Sample, L, in inches 4.00

5. Bulk Density Determination (Disturbed Samples Only): N/A

6. Sample Weight (Wt. Tube Containing Sample-Wt. of Empty Tube), grams --

7. Sample Volume (L x 2.54 cm./inch x 3.14R2), cc. 463.0984

8. Bulk Density (Sample Wt./Sample Volume), grams/cc. -- > 1.2

9. Standpipe Used: x No _____ Yes, Indicate Internal Radius, cm. N/A

10. Height of Water Level Above Rim of Test Basin, in inches:

    At the Beginning of Each Test Interval, H1 5.00
    At the End of Each Test Interval, H2 4.00

11. Rate of Water Level Drop (Add additional lines if needed):

Time, Start of Test Interval, T1	Time End of Test Interval T2	Length of Test Interval, T, Minutes
		12.4
		12.4
		12.4

12. Calculation of Permeability: K, (in/hr) = 60 min/hr x r2/R2 x L(in)/T(min) x ln (H1/H2) T= 12.4

    K = 4.3 **Classification:** **K3**

13. Defects in the Sample (Check appropriate items):

    x NONE

    _____ Soil/Tube Contact _____Large Gravel _____ Large Roots

    _____ Dry Soil _____Smearing _____ Compaction

    _____ Other - Specify _____

NRCS - USDA Custom Soil Report for Mercer County, New Jersey

United States Department of Agriculture

NRCS

Natural Resources Conservation Service

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

Custom Soil Resource Report for Mercer County, New Jersey



March 29, 2023

Preface

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

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

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

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

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

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

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require

alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

Contents

Preface.....2
How Soil Surveys Are Made.....5
Soil Map.....8
Soil Map.....9
Legend.....10
Map Unit Legend.....11
Map Unit Descriptions.....11
Mercer County, New Jersey.....13
OthA—Othello silt loams, 0 to 2 percent slopes, northern coastal plain.....13
UdstB—Udorthents, stratified substratum, 0 to 8 percent slopes.....15
References.....17

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

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

Custom Soil Resource Report
Soil Map



Map Scale: 1:1,550 if printed on A landscape (11" x 8.5") sheet.

N

Meters
0 20 40 80 120

Feet
0 50 100 200 300

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 Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

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

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

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

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

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

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

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

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

Soil Survey Area: Mercer County, New Jersey
Survey Area Data: Version 18, Aug 30, 2022

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

Date(s) aerial images were photographed: Jun 4, 2022—Jul 22, 2022

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

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
OthA	Othello silt loams, 0 to 2 percent slopes, northern coastal plain	0.9	16.1%
UdstB	Udorthents, stratified substratum, 0 to 8 percent slopes	4.5	83.9%
Totals for Area of Interest		**5.4**	**100.0%**

Map Unit Descriptions

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

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

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

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The

delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

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

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

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

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

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

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

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

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

Mercer County, New Jersey

OthA—Othello silt loams, 0 to 2 percent slopes, northern coastal plain

Map Unit Setting

National map unit symbol: 2thwm
Elevation: 0 to 300 feet
Mean annual precipitation: 40 to 50 inches
Mean annual air temperature: 46 to 64 degrees F
Frost-free period: 190 to 250 days
Farmland classification: Farmland of statewide importance, if drained

Map Unit Composition

Othello, drained, and similar soils: 50 percent
Othello, undrained, and similar soils: 30 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Othello, Drained

Setting

Landform: Flats, depressions, swales
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Talf, dip
Down-slope shape: Linear, concave
Across-slope shape: Linear, concave
Parent material: Silty eolian deposits over fluviomarine deposits

Typical profile

Ap - 0 to 9 inches: silt loam
Btg - 9 to 29 inches: silt loam
2BCg - 29 to 34 inches: sandy loam
2Cg - 34 to 80 inches: loamy sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.57 in/hr)
Depth to water table: About 10 to 20 inches
Frequency of flooding: None
Frequency of ponding: Rare
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 8.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: C/D
Hydric soil rating: Yes

Description of Othello, Undrained

Setting

Landform: Flats, depressions, swales, drainageways

Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Talf, dip
Down-slope shape: Linear, concave
Across-slope shape: Linear, concave
Parent material: Silty eolian deposits over fluviomarine deposits

Typical profile

Oe - 0 to 2 inches: peat
A - 2 to 4 inches: silt loam
Eg - 4 to 10 inches: silt loam
Btg - 10 to 29 inches: silt loam
2BCg - 29 to 35 inches: sandy loam
2Cg - 35 to 80 inches: loamy sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.57 in/hr)
Depth to water table: About 0 to 10 inches
Frequency of flooding: None
Frequency of ponding: Occasional
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: High (about 9.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 5w
Hydrologic Soil Group: C/D
Hydric soil rating: Yes

Minor Components

Fallsington, undrained

Percent of map unit: 8 percent
Landform: Flats, depressions, swales, drainageways
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Talf, dip
Down-slope shape: Linear, concave
Across-slope shape: Linear, concave
Hydric soil rating: Yes

Kentuck, undrained

Percent of map unit: 7 percent
Landform: Flats, depressions, swales
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Talf, dip
Down-slope shape: Linear, concave
Across-slope shape: Linear, concave
Hydric soil rating: Yes

Mattapex

Percent of map unit: 5 percent
Landform: Flats, depressions, swales, broad interstream divides
Landform position (two-dimensional): Summit, footslope
Landform position (three-dimensional): Talf, dip

Down-slope shape: Linear, concave
Across-slope shape: Linear, concave
Hydric soil rating: No

UdstB—Udorthents, stratified substratum, 0 to 8 percent slopes

Map Unit Setting

National map unit symbol: 4jq2
Elevation: 30 to 1,500 feet
Mean annual precipitation: 28 to 59 inches
Mean annual air temperature: 46 to 79 degrees F
Frost-free period: 161 to 231 days
Farmland classification: Not prime farmland

Map Unit Composition

Udorthents, stratified substratum, and similar soils: 95 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Udorthents, Stratified Substratum

Setting

Landform: Low hills
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Loamy lateral spread deposits over gravelly lateral spread deposits

Typical profile

A - 0 to 10 inches: sand
C - 10 to 72 inches: gravelly coarse sand

Properties and qualities

Slope: 0 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): High to very high (6.00 to 20.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 2.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: D
Hydric soil rating: No

Minor Components

Urban land

Percent of map unit: 5 percent
Landform: Low hills
Landform position (three-dimensional): Lower third of mountainflank
Down-slope shape: Linear, convex
Across-slope shape: Linear
Hydric soil rating: Unranked

References

American Association of State Highway and Transportation Officials (AASHTO). 2004. Standard specifications for transportation materials and methods of sampling and testing. 24th edition.

American Society for Testing and Materials (ASTM). 2005. Standard classification of soils for engineering purposes. ASTM Standard D2487-00.

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of wetlands and deep-water habitats of the United States. U.S. Fish and Wildlife Service FWS/OBS-79/31.

Federal Register. July 13, 1994. Changes in hydric soils of the United States.

Federal Register. September 18, 2002. Hydric soils of the United States.

Hurt, G.W., and L.M. Vasilas, editors. Version 6.0, 2006. Field indicators of hydric soils in the United States.

National Research Council. 1995. Wetlands: Characteristics and boundaries.

Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_054262

Soil Survey Staff. 1999. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. 2nd edition. Natural Resources Conservation Service, U.S. Department of Agriculture Handbook 436. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053577

Soil Survey Staff. 2010. Keys to soil taxonomy. 11th edition. U.S. Department of Agriculture, Natural Resources Conservation Service. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053580

Tiner, R.W., Jr. 1985. Wetlands of Delaware. U.S. Fish and Wildlife Service and Delaware Department of Natural Resources and Environmental Control, Wetlands Section.

United States Army Corps of Engineers, Environmental Laboratory. 1987. Corps of Engineers wetlands delineation manual. Waterways Experiment Station Technical Report Y-87-1.

United States Department of Agriculture, Natural Resources Conservation Service. National forestry manual. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/home/?cid=nrcs142p2_053374

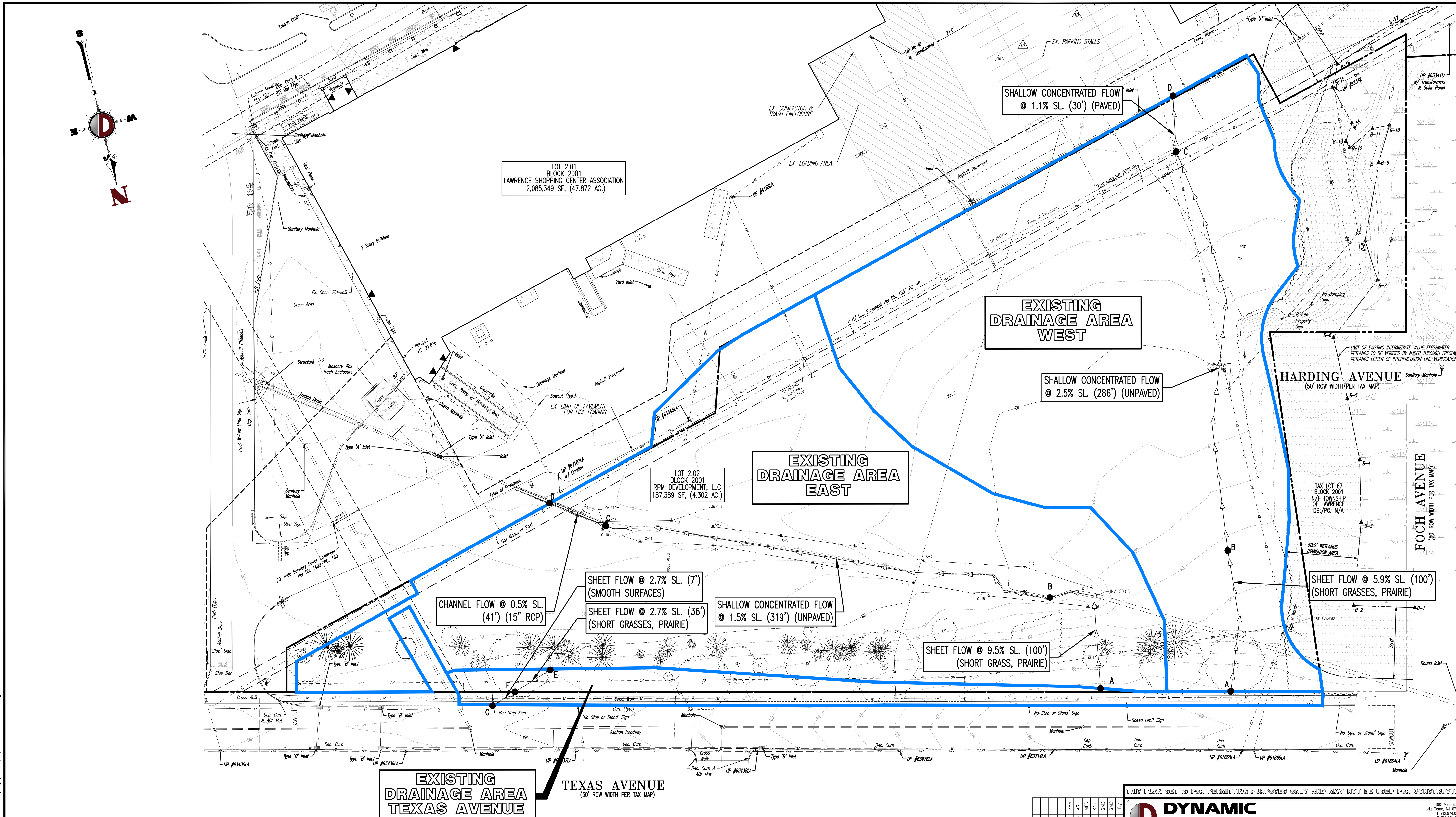
United States Department of Agriculture, Natural Resources Conservation Service. National range and pasture handbook. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/landuse/rangepasture/?cid=stelprdb1043084

United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/scientists/?cid=nrcs142p2_054242

United States Department of Agriculture, Natural Resources Conservation Service. 2006. Land resource regions and major land resource areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053624

United States Department of Agriculture, Soil Conservation Service. 1961. Land capability classification. U.S. Department of Agriculture Handbook 210. http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_052290.pdf

DRAINAGE AREA MAPS



THIS PLAN SET IS FOR PERMITTING PURPOSES ONLY AND MAY NOT BE USED FOR CONSTRUCTION

DYNAMIC ENGINEERING

LAND DEVELOPMENT CONSULTING • PERMITTING • GEOTECHNICAL • ENVIRONMENTAL • SURVEY • PLANNING & ZONING

1904 Main Street
Lake Como, NJ 07719
T: 732.974.0198
F: 732.974.3521
www.dynamicec.com

Offices conveniently located in:
Lake Como, New Jersey T: 732.974.0198 | Chester, New Jersey T: 908.879.9229 | Newark, New Jersey T: 973.755.7200 | Toms River, New Jersey T: 732.974.0198
Allen, Texas T: 972.534.2100 | Austin, Texas T: 512.646.2646 | Houston, Texas T: 281.789.6400
Newtown, Pennsylvania T: 267.685.0276 | Delray Beach, Florida T: 561.921.8570

TITLE:

EXISTING DRAINAGE AREA MAP

PROJECT: **RPM DEVELOPMENT, LLC**
PROPOSED RESIDENTIAL DEVELOPMENT
BLOCK 2001, LOTS 3, 60-66, & 68
2495 BRUNSWICK PIKE (A.K.A. ALT ROUTE 1)
TOWNSHIP OF LAWRENCE, MERCER COUNTY, NEW JERSEY

JOB No:	1279-99-010
DATE:	03/31/2020
DRAWN BY:	GMC
SCALE:	(H) 1"=30' (V)
DESIGNED BY:	LPG
CHECKED BY:	TJM
CHECKED BY:	–
SHEET No:	1 OF 3
Rev. #	5

JOHN A. PALUS
PROFESSIONAL ENGINEER
NEW JERSEY LICENSE No. 41975

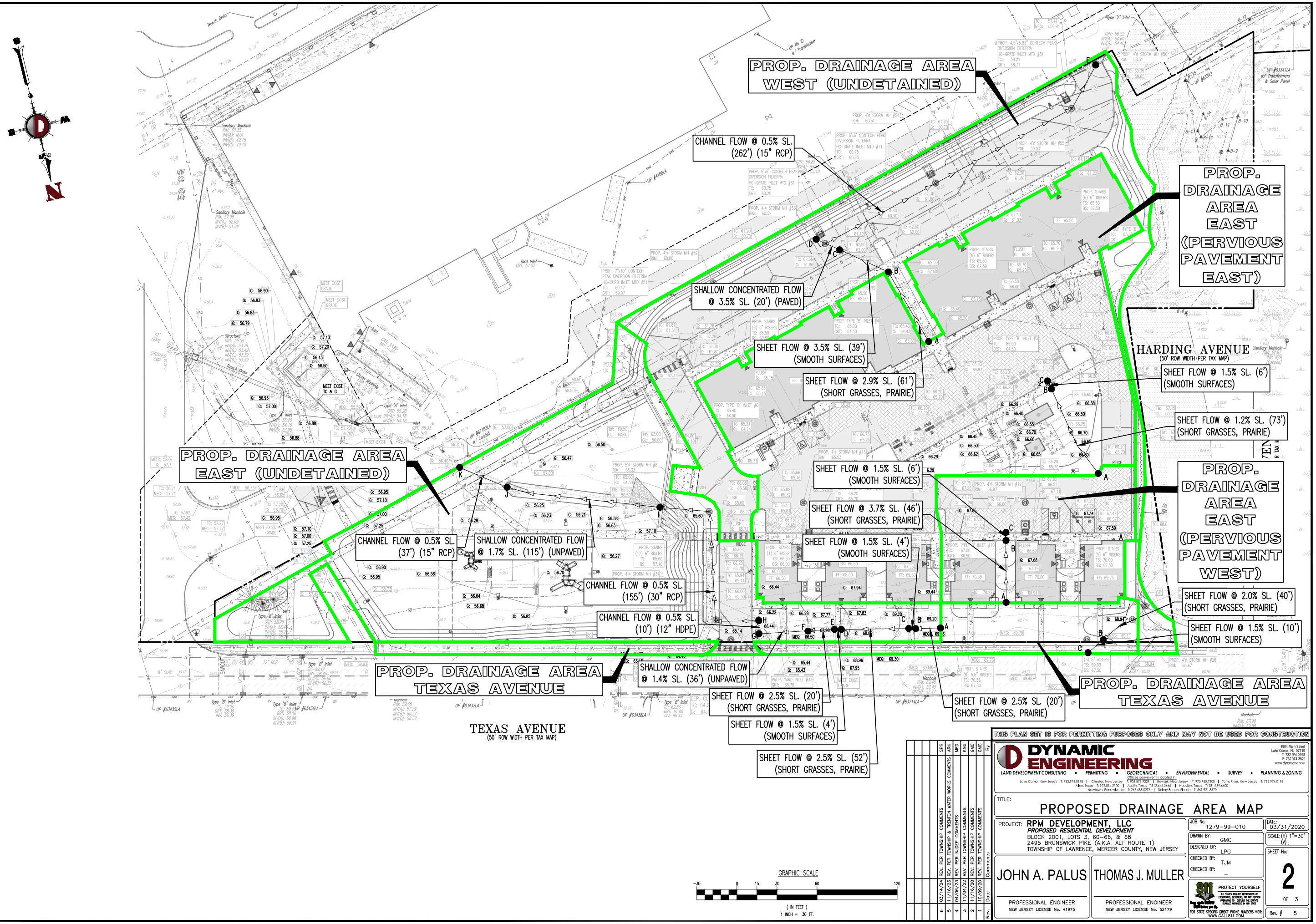
THOMAS J. MULLER
PROFESSIONAL ENGINEER
NEW JERSEY LICENSE No. 52179

811 PROTECT YOURSELF
ALL STATES REQUIRE NOTIFICATION OF EXCAVATORS, DESIGNERS, OR ANY PERSON PREPARING TO DISTURB THE EARTH'S SURFACE ANYWHERE IN ANY STATE
Know what's below. Call before you dig.
FOR STATE SPECIFIC DIRECT PHONE NUMBERS VISIT: WWW.CALL811.COM

Rev.	Date	Comments	By
6	03/14/24	REV. PER TOWNSHIP COMMENTS	SPR
5	11/16/23	REV. PER TOWNSHIP & TRENTON WATER WORKS COMMENTS	ARK
4	04/06/23	REV. PER NJDEP COMMENTS	MFD
3	11/04/22	REV. PER TOWNSHIP COMMENTS	KNG
2	11/16/20	REV. PER TOWNSHIP COMMENTS	GMC
1	10/09/20	REV. PER TOWNSHIP COMMENTS	GMC

Plotted: 03/14/24 – 4:25 PM, By: gzellnock, – Product Ver: 24.3s (LMS Tech)
File: P:\deepc projects\1279 rpm development group\99-010 lawrence\Dwg\DA Maps\01279990010EDA6.dwg, ---> 01 EXISTING DRAINAGE AREA MAP

COPYRIGHT © 2024 – DYNAMIC ENGINEERING CONSULTANTS, PC – ALL RIGHTS RESERVED



THIS PLAN SET IS FOR PERMITTING PURPOSES ONLY AND MAY NOT BE USED FOR CONSTRUCTION

DYNAMIC ENGINEERING
LAND DEVELOPMENT CONSULTING • PERMITTING • GEOTECHNICAL • ENVIRONMENTAL • SURVEY • PLANNING & ZONING
1904 Main Street, Lake Como, NJ 07719 T: 732.974.0198 F: 732.974.3521 www.dynamicec.com
Offices conveniently located in:
Lake Como, New Jersey T: 732.974.0198 | Chester, New Jersey T: 908.879.9229 | Newark, New Jersey T: 973.755.7200 | Toms River, New Jersey T: 732.974.0198
Allen, Texas T: 972.534.2100 | Austin, Texas T:512.646.2646 | Houston, Texas T: 281.789.6400
Newtown, Pennsylvania T: 267.685.0276 | Delray Beach, Florida T: 561.921.8570

TITLE: PROPOSED DRAINAGE AREA MAP

PROJECT: RPM DEVELOPMENT, LLC
PROPOSED RESIDENTIAL DEVELOPMENT
BLOCK 2001, LOTS 3, 60-66, & 68
2495 BRUNSWICK PIKE (A.K.A. ALT ROUTE 1)
TOWNSHIP OF LAWRENCE, MERCER COUNTY, NEW JERSEY

Rev.	Date	Comments	By
6	03/14/24	REV. PER TOWNSHIP COMMENTS	SPR
5	11/16/23	REV. PER TOWNSHIP & TRENTON WATER WORKS COMMENTS	ARK
4	04/06/23	REV. PER NJDEP COMMENTS	MJED
3	11/04/22	REV. PER TOWNSHIP COMMENTS	KNG
2	11/16/20	REV. PER TOWNSHIP COMMENTS	GMC
1	10/09/20	REV. PER TOWNSHIP COMMENTS	GMC

JOB No: 1279-99-010
DATE: 03/31/2020
DRAWN BY: GMC
SCALE: (H) 1"=30' (V)
DESIGNED BY: LPG
SHEET No: 2 OF 3
CHECKED BY: TJM
CHECKED BY: _
Rev. # 5

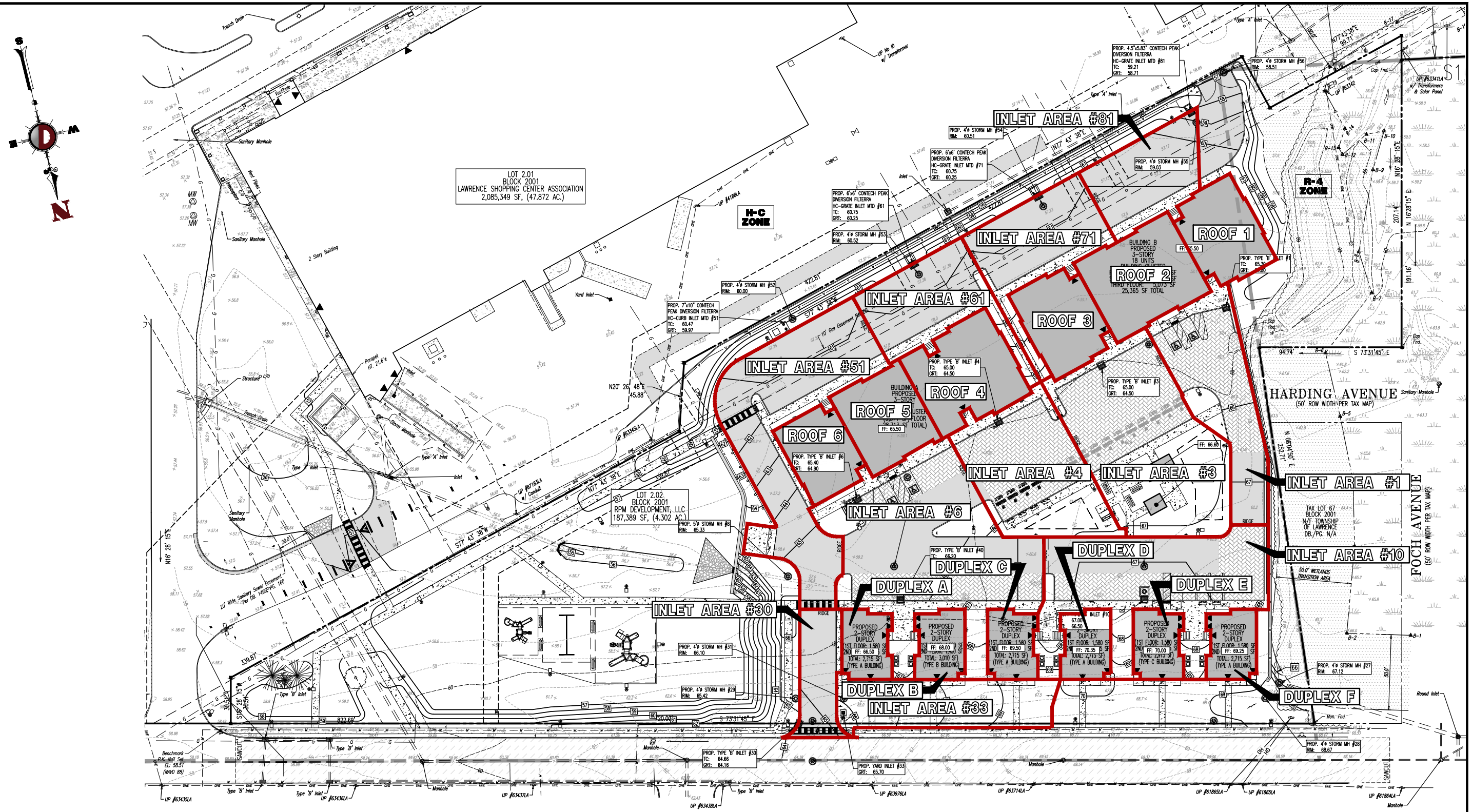
JOHN A. PALUS
PROFESSIONAL ENGINEER
NEW JERSEY LICENSE No. 41975

THOMAS J. MULLER
PROFESSIONAL ENGINEER
NEW JERSEY LICENSE No. 52179

PROTECT YOURSELF
ALL USERS REQUIRE NOTIFICATION OF EXCAVATING, DESIGNERS, OR ANY PERSON PREPARING TO DISTURB THE EARTH'S SURFACE IN ANY WAY.
FOR STATE SPECIFIC DIRECT PHONE NUMBERS VISIT: WWW.CALL811.COM

Plotted: 03/14/24 - 4:26 PM, By: gstilcock, - Product Ver: 24.3s (LMS Tech)
File: P:_deops projects\1279 rpm development group\99-010 (lawrence)\dwg\DA Maps\D1279990100PDA6.dwg, ---> 02 PROPOSED DRAINAGE AREA MAP

COPYRIGHT © 2024 - DYNAMIC ENGINEERING CONSULTANTS, PC - ALL RIGHTS RESERVED



GRAPHIC SCALE

−30 0 15 30 60 120

(IN FEET)

1 INCH = 30 FT.

Rev.	Date	Comments	By
6	03/14/24	REV. PER TOWNSHIP COMMENTS	SPR
5	11/16/23	REV. PER TOWNSHIP & TRENTON WATER WORKS COMMENTS	ARK
4	04/06/23	REV. PER NJDEP COMMENTS	MJFD
3	11/04/22	REV. PER TOWNSHIP COMMENTS	KNG
2	11/16/20	REV. PER TOWNSHIP COMMENTS	GMC
1	10/09/20	REV. PER TOWNSHIP COMMENTS	GMC

THIS PLAN SET IS FOR PERMITTING PURPOSES ONLY AND MAY NOT BE USED FOR CONSTRUCTION

DYNAMIC ENGINEERING
LAND DEVELOPMENT CONSULTING • PERMITTING • GEOTECHNICAL • ENVIRONMENTAL • SURVEY • PLANNING & ZONING
1904 Main Street, Lake Como, NJ 07719 | T: 732.974.0198 | F: 732.974.3521 | www.dynamicec.com
Offices conveniently located in:
Lake Como, New Jersey T: 732.974.0198 | Chester, New Jersey T: 908.879.9229 | Newark, New Jersey T: 973.755.7200 | Toms River, New Jersey T: 732.974.0198
Allen, Texas T: 972.534.2100 | Austin, Texas T:512.646.2646 | Houston, Texas T: 281.789.6400
Newtown, Pennsylvania T: 267.685.0274 | Delray Beach, Florida T: 561.921.8570

TITLE: INLET AREA MAP

PROJECT: RPM DEVELOPMENT, LLC
PROPOSED RESIDENTIAL DEVELOPMENT
BLOCK 2001, LOTS 3, 60–66, & 68
2495 BRUNSWICK PIKE (A.K.A. ALT ROUTE 1)
TOWNSHIP OF LAWRENCE, MERCER COUNTY, NEW JERSEY

JOB No:	1279-99-010
DRAWN BY:	GMC
DESIGNED BY:	LPG
CHECKED BY:	TJM
CHECKED BY:	_
DATE:	03/31/2020
SCALE:	(H) 1"=30' (V)
SHEET No:	3 OF 3
Rev. #	5

JOHN A. PALUS
PROFESSIONAL ENGINEER
NEW JERSEY LICENSE No. 41975

THOMAS J. MULLER
PROFESSIONAL ENGINEER
NEW JERSEY LICENSE No. 52179

811 PROTECT YOURSELF
ALL STATES REQUIRE NOTIFICATION OF EXCAVATORS, DESIGNERS, OR ANY PERSON PLANNING TO DISTURB THE SURFACE OF THE EARTH
Call before you dig
FOR STATE SPECIFIC DIRECT PHONE NUMBERS VISIT: WWW.CALL811.COM

Plotted: 03/14/24 – 4:26 PM, By: gstilcock, – Product Ver: 24.3a (LMS Tech)
File: P:_deops projects\1279 rpm development group\99-010 (lawrence)\dwg\DA Maps\D1279990100MA6.dwg, ----> 03 INLET AREA MAP

COPYRIGHT © 2024 – DYNAMIC ENGINEERING CONSULTANTS, PC – ALL RIGHTS RESERVED