STORMWATER MANAGEMENT, GROUNDWATER RECHARGE AND WATER QUALITY ANALYSIS

For

Pallu Associates, LLC
Hyde Park Residential Development

Texas Road & Falson Lane
Block 146, Lot 25 & 26
Township of Marlboro
Monmouth County, NJ

Prepared by:

DYNAMIC ENGINEERING

826 Newtown Yardley Road Suite 201
Newtown, PA 18940
(267) 685-0276

Steven R. Cattani, PE
NJ Professional Engineer License #40014

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DEC# 2841-99-001

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APPENDIX

I. SITE DESCRIPTION

The project site consists of Block 146, Lots 25 & 26, located on the western side of Texas Road in the Township of Marlboro, Monmouth County, New Jersey. Currently the site is vacant and mostly forested with grassed areas through the center of the property off of Texas road for JCP&L's high-power tension line easement. The subject site is 1,653,232 square feet (38.95 acres). The site is bordered to the north by vacant forested land; to the east by a commercial warehouse use (Life Storage); to the south by a residential use; and the west by a residential use and a commercial use (Insurance Auto Auctions). The project consists of developing the parcel with sixteen (16) multi-family residential dwelling units and one (1) community building, with eight hundred and eight (808) total vehicle parking spaces, driveways, landscaping, stormwater management facilities, and other related site improvements and structures. The developed area will be completed outside wetlands, and wetland buffers of the unnamed tributary.

The existing conditions of the tract have been verified by Boundary and Topographic Survey, prepared by Dynamic Survey, LLC, dated 7/31/2020.

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 146, Lots 25 & 26 in the Township of Marlboro, Monmouth County, New Jersey. The project includes new stormwater management facilities to address applicable aspects of the Township of Marlboro Stormwater Management rules, NJAC 5:21, and NJAC 7:8.

Based upon the fact that the proposed improvements will result in more than one (1) acre of land disturbance and increase the amount or impervious coverage by more than 0.25 acres, this project is classified as a "major development"; and therefore, has been designed to meet the stormwater runoff quantity, quality and groundwater recharge standards, set forth by the Township of Marlboro Land Use Ordinance, NJAC 5:21, and NJAC 7:8. Accordingly, the following items are addressed within this report:

- Erosion control, groundwater recharge and runoff quantity standards (7:8-5.4)
- Stormwater runoff quality standards (7:8-5.5)
- Calculation of stormwater runoff and groundwater recharge (7:8-5.6)
- Standards for structural stormwater management measures (7:8-5.7)

The scope of the report includes the proposed sixteen (16) multi-family dwelling units, basins, driveways, parking areas, landscaping and other related site improvements as shown on the engineering drawings. The proposed site plan has 32.5% impervious lot coverage. The storm systems on site have been designed using this coverage.

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

NJAC 7:8-5.4(a)3 states the stormwater quantity impacts can be calculating to meet one the of the following below:

i. Demonstrate through hydrologic and hydraulic analysis that for stormwater leaving the site, post-construction runoff hydrographs for the 2, 10 and 100-year storm events do not exceed, at any point in time, the pre-construction runoff hydrographs for the same storm events;

ii. Demonstrate through hydrologic and hydraulic analysis that there is no increase, as compared to the pre-construction condition, in the peak runoff rates of stormwater leaving the site for the two, 10 and 100-year storm events and that the increased volume or change in timing of stormwater runoff will not increase flood damage at or downstream of the site. This analysis shall include the analysis of impacts of existing land uses and projected land uses assuming full development under existing zoning and land use ordinances in the drainage area;

iii. Design stormwater management measures so that the post-construction peak runoff rates for the two, 10 and 100-year storm events are 50, 75 and 80 percent, respectively, of the pre-construction peak runoff rates. The percentages apply only to the post-construction stormwater runoff that is attributable to the portion of the site on which the proposed development or project is to be constructed.

Per the above requirements, Study Point 1 (SP 1), the existing 'B' inlet, will have runoff that will comply with the flow reductions indicated under iii as follows:

2-year:	50% reduction
10-year:	25% reduction
100-year:	20% reduction

This facility will comply with the Stormwater Management Best Management Practices.

It is important to note that the aforementioned flow reduction requirements are only required to be applied to onsite drainage areas within the limit of disturbance to satisfy the Township of Marlboro and NJDEP flow reduction requirements. Therefore, the proposed development satisfies the flow reduction requirements by applying the peak rate reduction requirements only to the onsite area that is to be disturbed.

III. EXISTING DRAINAGE CONDITIONS

The tract has been evaluated with the following drainage sub-watershed areas as depicted on the Existing Conditions Drainage Area Map. Each sub-watershed area has been calculated as a separate point of analysis.

Existing Study Area A (Disturbed): This study area is comprised of mostly wooded area. It is analyzed as an area to be disturbed as a result of the proposed development. Currently, the stormwater runoff in this area, flows from the eastern side of the property to the wetlands located on the western side of the property, also known as Study Point 1.

Existing Study Area B: This study area is comprised of mostly wooded area. It is analyzed as an area to be disturbed as a result of the proposed development. Currently, the stormwater runoff in this area flows from the eastern side of the property to a small depression located at the southern central portion of the property, also known as Study Point 3.

Existing Study Area C: This study area is located on the southwestern portion of the property and is comprised of mostly wooded area. It is analyzed as an area to be disturbed as a result of the proposed development. Currently, the stormwater runoff flows offsite onto the adjacent lot 27 also known as Study Point 2.

Existing Study Area D: This study area is located on the northeastern portion of the property and is comprised of mostly wooded area. It is analyzed as an area to be minimally disturbed as a result of the proposed development. Currently, the stormwater runoff flows offsite to the adjacent lot 24.

Existing Study Area B – Stability: This study area is located on the southeastern corner of the site. It is analyzed as an area to be partially disturbed as a result of the proposed development. Currently, the stormwater runoff from this area flows naturally to the existing ditch located at Study Point 3.

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

MONMOUTH COUNTY SOIL SURVEY INFORMATION		
SOIL TYPE (SYMBOL)	**SOIL TYPE (NAME)**	**HYDROLOGIC SOIL GROUP**
AtsA	Atsion Sand	D
EveB	Evesbror	A
KemB	Keyport Sandy Loam	C/D
LakB	Lakehurst Sand	A
LasB	Lakewood Sand	A
LasC	Lakewood Sand	A
MakAt	Manahawkin Muck	D
SacE	Sassafrass Sandy Loam	B

Per the soil investigation completed by Dynamic Earth, LLC, the soil profile pits were performed within existing landscaped areas and encountered approximately three to six inches of topsoil at the surface. Beneath the surface cover, natural coastal plain deposits were encountered that generally consisted of sand, loamy sand, sandy loam, sandy clay loam, clay loam, and clay with variable amounts of gravel. The natural coastal plain deposits were encountered to termination/refusal depths ranging between approximately 8.3 feet and 12.0 feet below the ground surface; corresponding to elevations ranging between 96.0 feet and 83.5 feet.

Evidence of seasonal high groundwater (based on soil mottling) was encountered within the soil profile pits at depths ranging between 3 feet and 11.1 feet below the ground surface; corresponding to elevations ranging between 99.9 and 89.4 feet.

SEASONAL HIGH GROUNDWATER AND PERMEABILITY SUMMARY						
Location	Approximate Surface Elevation	Estimated Seasonal High Groundwater		Permeability Test Results		
		Depth (Feet)	Elevation	Sample Depth (Inches)	Permeability (Inches/Hour)	
					Replicate A	Replicate B
SPP-1	103.8	4.0	99.8	12	6.7	4.9
				36	< 0.14	< 0.14
				98	< 0.14	< 0.14
SPP-2	106.7	Not Encountered		24	< 0.14	< 0.14
				96	< 0.14	< 0.14
SPP-3	100.0	3.5	96.5	60	--	--
SPP-4	96.7	3.0	93.7	24	2.6	1.8
				48	< 0.14	< 0.14
				100	< 0.14	< 0.14
SPP-5	93.5	3.7	89.8	36	< 0.14	< 0.14
SPP-6	94.3	3.8	90.5	36	--	--
SPP-7	95.2	3.3	91.9	36	5.6	7.2
				60	> 20.0	> 20.0
SPP-8	93.5	4.1	89.4	35	--	--
SPP-9	106.0	6.1	99.9	30	0.3	0.3
				80	1.8	2.0
SPP-10	103.0	3.3	99.7	35	< 0.14	< 0.14
				50	5.4	1.1

IV. PROPOSED DRAINAGE CONDITIONS

The tract has been evaluated with the following drainage sub-watershed areas as depicted on the Proposed Conditions Drainage Area Map. Each sub-watershed area has been calculated as a separate point of analysis.

Proposed Study Area A1: This portion of the site consists of dwelling unit buildings # 1 & 2 and the northeastern portion of the impervious asphalt drive aisles and parking lots. Stormwater runoff from this area is collected by a series of roof drains and inlets which then flow to the proposed above ground infiltration basin A1. Stormwater runoff discharged from basin A1 flows through the stormwater conveyance systems to the proposed detention basin A3 which ultimately discharges into the wetlands located on-site at Study Point 1.

Proposed Study Area A2: This portion of the site consists of dwelling unit buildings # 9 – 11 and the southwestern portion of the impervious asphalt drive aisles and parking lots. Stormwater runoff from this area is collected by a series of roof drains and inlets which flows to the proposed above ground detention basin A2. Stormwater runoff discharged from basin A2 flows through the stormwater conveyance systems to the existing wetlands located on-site at Study Point 1.

Proposed Study Area A3: This portion of the site consists of dwelling unit buildings # 12 – 16, the northwestern portion of the impervious asphalt drive aisles and parking lots, and the community sport courts, pool area, and community clubhouse. Stormwater runoff from this area is collected by a series of roof drains and inlets which then flows to the proposed above ground detention basin A3. Additionally, stormwater runoff that drains from basin A1 flows into basin A3 as well. Stormwater from basin A3 ultimately discharges into the wetlands located on-site at Study Point 1.

Proposed Study Area B1: This portion of the site consists of dwelling unit buildings # 3 – 8 and the southeastern portion of the impervious asphalt drive aisles and parking lots. Stormwater runoff from this area is collected by a series of roof drains and inlets which flows to the proposed above ground detention basin B1. Stormwater runoff discharged from basin B1 flows through the stormwater conveyance system to the existing Study Point 3.

Proposed Study Area D: This portion of the site is located at the northeastern corner of the site and is to remain mostly wooded with some areas proposed to be grassed and graded. Stormwater runoff from this area is uncontrolled and flows over land to the adjacent lot 24 as it does today.

Proposed Study Area Swale: This portion of the site is located at the southeastern portion of the property behind Study Area B1. Runoff from this area flows to Study Point 3 by means of a vegetated swale. Flows from this area combine with the discharge of basin B1 and flow to the existing ditch known as Study Point 3.

V. DESIGN METHODOLOGY

The intention of the proposed stormwater management facilities for this project is to provide applicable, required measures from the Township of Marlboro Land Use Ordinance, NJAC 5:21, and NJAC 7:8. In order to prepare the stormwater calculations for the subject project, an investigation of the property and topography was performed. An on-site review of the tract was performed by Dynamic Engineering Consultants, PC, verifying the existing site conditions and land cover characteristics. Dynamic Survey was contracted to prepare the Boundary and Topographic Survey for the existing site.

Based on our review of the existing site conditions and the Topographic Survey, the Drainage Area Maps for the existing and proposed site conditions as defined within this report were established. A grading plan was developed for the proposed site improvements with consideration to the existing drainage patterns. The plan was then designed to ensure runoff from the proposed development could be directed to stormwater management facilities to the maximum extent practicable in order to address the applicable sections of the Township of Marlboro Stormwater Management rules, NJAC 5: 21, and NJAC 7:8.

The detention basin will temporarily store and attenuate stormwater runoff from the site. An outlet control structure for each basin has been implemented to release stormwater runoff at a controlled rate to satisfy the

stormwater quantity requirements. Overflow from basins A2 and A3 is routed via the emergency spillways to the downstream Study Point 1. Overflow from basin B1 is routed via the emergency spillway to the downstream Study Point 2.

According to the NJAC 7:8-5.5(a), a TSS removal rate of 80% is required for stormwater runoff generated as a result of a major development. Stormwater runoff generated by the water quality design storm is directed through the outlet control structures in basins A2, A3, and B1 to a proposed manufactured treatment device (MTD) prior to discharging to the various study points. This MTD serves to provide 80% removal rate of total suspended solids (TSS).

The vegetated swale has been designed per the Standards for Soil Erosion and Sediment Control in New Jersey Section 18: Standards for Grassed Waterways. The flow rate in the proposed vegetated swale area is 1.55 cfs for the 10-year storm. This flow is based on the maximum flow area to the swale. The swale was analyzed to have a 6-foot-wide base, 3:1 side slopes, and a running slope of 2%. This creates a velocity of approximately 2 fps which complies the max design standards of 2 fps for the 10-year storm for a seeded vegetated swale per Table 18-1 Maximum Allowable Velocities by Soil Texture.

VI. STORMWATER MANAGEMENT BASIN DESIGN AND RUNOFF QUANTITY STANDARDS

In order to meet the stormwater runoff quantity and water quality requirements set forth in NJAC 7:8, the site design incorporates three (3) manufactured treatment devices and four (4) above ground basins. The basins accept stormwater runoff from the proposed parking areas, driveways, and tributary yard areas. The runoff flows over land by sheet flow and is then collected by inlets and transported by the stormwater conveyance systems to the basins.

A summary of the pre and post development flows are shown in the charts below:

Pre-development and Post Development Peak Runoff Results

Summary POA 'A' to Study Point 1: Wetlands

Design Storm	Existing Runoff Rate from Disturbed Areas (CFS)	Runoff Rate Required Reduction	Maximum Allowable Runoff Rate (CFS)	Proposed Runoff Rate (CFS)
2 Year	0.19	50%	0.09	0.60*
10 Year	3.12	25%	2.34	2.34
25 Year	7.82	N/A	7.82	4.95
100 Year	20.09	20%	16.07	14.24

***** Di minimis exception requested

Summary POA 'B1' to Study Point 3

Design Storm	Existing Runoff Rate from Disturbed Areas (CFS)	Runoff Rate Required Reduction	Maximum Allowable Runoff Rate (CFS)	Proposed Runoff Rate (CFS)
2 Year	0.4	50%	0.17	0.51*
10 Year	3.23	25%	2.34	2.35*
25 Year	6.4	N/A	N/A	5.08
100 Year	13.67	20%	11.22	10.48

***** Di minimis exception requested

Summary POA 'D' Offsite

Design Storm	Existing Runoff Rate from Disturbed Areas (CFS)	Runoff Rate Required Reduction	Maximum Allowable Runoff Rate (CFS)	Proposed Runoff Rate (CFS)
2 Year	0.00	50%	0.00	0.00
10 Year	0.12	25%	0.09	0.00
25 Year	0.36	N/A	0.36	0.01
100 Year	1.03	20%	0.83	0.12

Summary POA Swale and 'B1' to Study Point 2

Design Storm	Existing Runoff Rate from Disturbed Areas (CFS)	Runoff Rate Required Reduction	Maximum Allowable Runoff Rate (CFS)	Proposed Runoff Rate Swale (CFS)	Proposed Runoff Rate Swale w/ Basin B1 (CFS)
2 Year	4.74	50%	2.37	0.77	1.28
10 Year	10.17	25%	7.63	1.55	3.90
25 Year	14.27	N/A	14.27	2.13	7.21
100 Year	22.12	20%	17.70	3.23	13.71

VII. GROUNDWATER RECHARGE & WATER QUALITY

As required by NJAC 7:8-5.5, a TSS removal rate of 80% is required for stormwater generated by the water quality design storm as a result of a major development. The design for the subject development meets the obligation for TSS removal by one (1) infiltration basin, three (3) detention basins, and three (3) water quality manufactured treatment devices (MTD).

Stormwater collected from the site is directed into onsite inlets and pipes and directed towards one of the on-site basins. Once collected, the detention basins, temporarily store and attenuate stormwater runoff from the development. The outlet control structures are implemented in each basin to release stormwater runoff at a controlled rate to satisfy the stormwater quantity and quality requirements. The Post-Development Annual Recharge Deficit has been calculated using the New Jersey Groundwater Recharge Spreadsheet. Recharge requirements are satisfied by the use of recharge pits at various locations as well as the infiltration basin A1. These recharge pits are typically 40' by 20' and 4' deep and collect clean roof runoff from the nearby buildings. Each building will be able to recharge 26,000 cuft. Nine (9) buildings are proposed to discharge their roof runoff to these pits. This equates to approximately 234,000 cuft of recharge. According to the design of infiltration basin A1, 148,500 cuft of recharge is proposed therein. A total of 382,500 cuft of recharge is proposed for the site. According to the NJGRS Spreadsheet, a total of 616,533 cuft of recharge is required for

this development; however, based on the soil borings done by Dynamic Earth, LLC, only the top layer of soil, approximately 6", is permeable. Knowing this, the volume from the NJGRS Spreadsheet is calculating a recharge volume much greater than what is actually occurring. Please refer to the Stormwater Basin Area Investigation Report by Dynamic Earth, LLC for additional clarification.

The stormwater management design for the project satisfies the requirements set forth in NJAC 7:8-5.5(a) by utilizing a Jellyfish MTD certified by the NJDEP to provide a minimum TSS removal rate of 80%. Basins A2, A3, and B1 each have an 80% Water Quality Manhole after each outlet control structure before discharging offsite. As a result, the water quality requirements of the Township of Marlboro Land Use Ordinance and NJAC 7:8 are met. A copy of the NJDEP Certification Letter and sizing requirements for the Jellyfish MTD has been provided within the appendix of this report.

VIII. NON-STRUCTURAL STORMWATER MANAGEMENT STRATEGIES

The proposed project has been designed to the maximum extent practicable by incorporating the nonstructural stormwater management strategies set forth in NJAC 7:8-5.3 as follows:

1. **Protect areas that provide water quality benefits or areas particularly susceptible to erosion and sediment lost:** The proposed impervious surface is minimized wherever possible under the proposed condition, therefore, increasing the water quality benefits on the site. By implementation of the detention basins, the proposed development meets the water quality requirements set forth by NJAC 7:8.
2. **Minimize impervious surfaces and break up or disconnect the flow of runoff over impervious surfaces:** The impervious surfaces have been minimized wherever possible. Impervious surfaces have been diverted to multiple structural BMPs capable of providing water quality treatment.
3. **Maximize the protection of natural drainage features and vegetation:** In the proposed condition, there is a 32.5% increase in impervious coverage. The drainage pattern will remain unchanged from pre-developed to post-developed conditions. A Landscaping Plan and a Demolition and Tree Management Plan has been prepared to partially compensate for the loss of existing vegetation due to the development.
4. **Minimize the decrease in the "time of concentration" from pre-construction to post-construction. "Time of concentration" is defined as the time it takes for runoff to travel from the hydraulically most distant point of the drainage area to the point of interest within a watershed:** The decrease in the time of concentration has been minimized by maintaining existing overland flow slopes to the maximum extent practical.
5. **Minimize land disturbance including clearing and grading:** Land disturbance has been minimized where feasible. The site disturbance is limited to the development area.

6. **Minimize soil compaction:** Soil compaction will be minimized in the basins and proposed lawn and landscape areas.
7. **Provide low-maintenance landscaping that encourages retention and planting of native vegetation and minimizes the use of lawns, fertilizers and pesticides:** The project proposes low-maintenance trees, shrubs, and ground cover on the site. Refer to the Landscape Plan for plant information.
8. **Provide vegetated open-channel conveyance systems discharging into and through stable vegetated areas:** A vegetated swale is proposed on the grassed areas starting at the driveway located on Falson Lane, and continues behind the proposed buildings on the eastern portion of the site. The swale will then flow naturally as it does today to a rip-rap located at the eastern driveway on Texas Road. Runoff from here will travel down to the proposed inlets on Texas Road that discharge to the recharge basin in study area B2.
9. **Provide other source controls to prevent or minimize the use or exposure of pollutants at the site in order to prevent or minimizes the release of those pollutants into stormwater runoff:** The proposed detention and infiltration basins will detain the runoff from the site. The site also utilizes three (3) manufactured treatment devices to remove pollutants from stormwater prior to discharging to Study Areas 1 and 2.

IX. CONCLUSION

The proposed overall development has been designed with provisions for the safe and efficient control of stormwater runoff in a manner that will not adversely impact the existing drainage patterns, adjacent roadways, or adjacent parcels. The TSS removal obligations set forth by NJAC 7:8 have been satisfied by utilizing four (4) above ground basins and three (3) manufactured treatment devices to achieve the 80% TSS required removal rate for the development. Recharge requirements are met by the use of recharge pits at various locations on site.

With this stated, it is evident that the proposed development will not have a negative impact on the existing drainage pattern, water quality, or groundwater recharge on site or within the vicinity of the subject parcel.

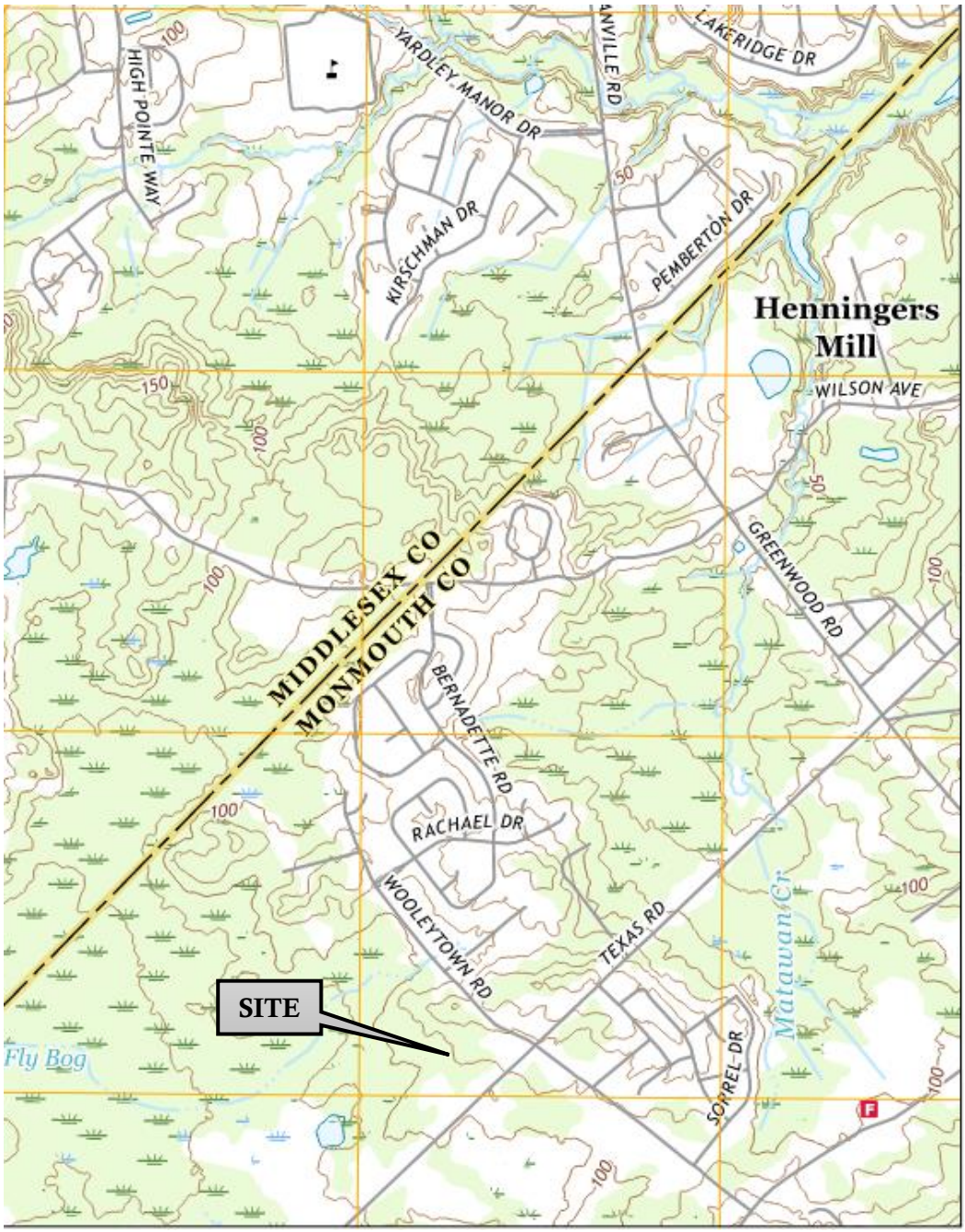
APPENDIX

1. USGS MAP

Dynamic Engineering Consultants, PC
www.dynamicec.com
826 Newtown Yardley Road, Suite 201
Newtown, PA 18940
T. 267-685-0276

USGS Map

South Amboy Quad



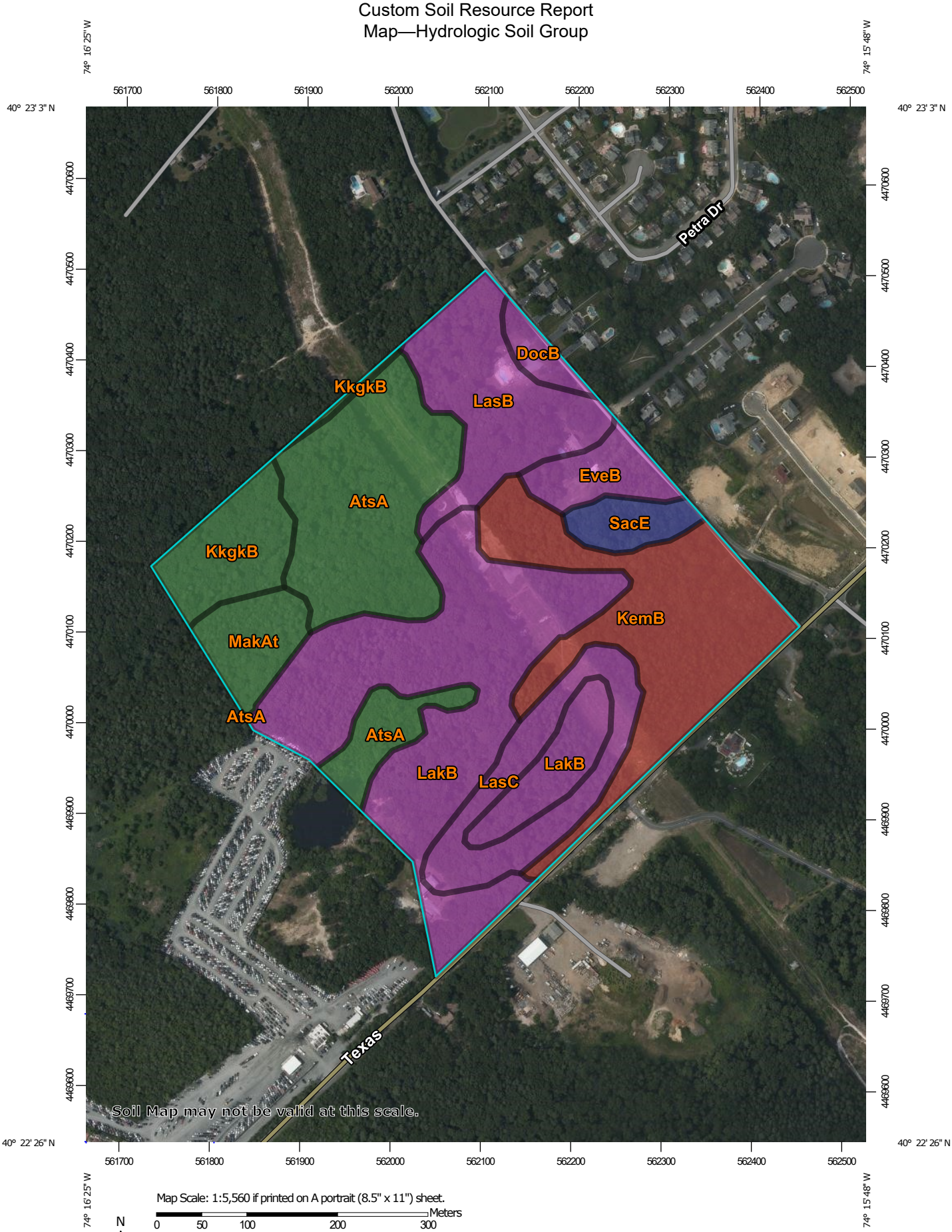
1904 Main Street, Lake Como, NJ 07719 T. 732-974-0198

245 Main Street, Suite 110, Chester, NJ 07930 T. 908-879-9229
8 Robbins Street, Suite 102, Toms River, NJ 08753 T. 732-974-0198
826 Newtown Yardley Rd., Suite 201, Newtown, PA 18940 T. 267-685-0276
50 Park Place, Mezzanine Level, Newark, NJ 07102 T. 973-755-7200

100 NE 5th Avenue, Suite B2, Delray Beach, FL 33483 T. 561-921-8570
6925 Portwest Drive, Suite 100, Houston, TX 77024 T. 281-789-6400
714 S. Greenville Avenue, Suite 100, Allen, TX 75002 T. 972-534-2100
100 North 18th Street, Suite 300, Philadelphia, PA 19103 T. 215-253-4888

2. NRCS SOILS MAPS

Map—Hydrologic Soil Group



Map Scale: 1:5,560 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 50 100 200 300

Feet: 0 250 500 1000 1500

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

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Soil Rating Lines

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Soil Rating Points

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Water Features

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

Background

Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

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

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

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

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

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

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

Soil Survey Area: Monmouth County, New Jersey
Survey Area Data: Version 14, Jun 1, 2020

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

Date(s) aerial images were photographed: Jun 29, 2019—Jul 16, 2019

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

Table—Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
AtsA	Atsion sand, 0 to 2 percent slopes, Northern Coastal Plain	A/D	12.3	18.2%
DocB	Downer loamy sand, 0 to 5 percent slopes, Northern Coastal Plain	A	1.0	1.5%
EveB	Evesboro sand, 0 to 5 percent slopes	A	2.3	3.4%
KemB	Keyport sandy loam, 2 to 5 percent slopes	D	11.9	17.5%
KkgkB	Klej loamy sand, clayey substratum, 0 to 5 percent slopes	A/D	4.0	6.0%
LakB	Lakehurst sand, 0 to 5 percent slopes	A	19.5	28.7%
LasB	Lakewood sand, 0 to 5 percent slopes	A	7.0	10.4%
LasC	Lakewood sand, 5 to 10 percent slopes	A	5.3	7.8%
MakAt	Manahawkin muck, 0 to 2 percent slopes, frequently flooded	A/D	2.7	4.0%
SacE	Sassafras sandy loam, 15 to 25 percent slopes	B	1.7	2.6%
Totals for Area of Interest			**67.8**	**100.0%**

Rating Options—Hydrologic Soil Group

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

3. RUNOFF CURVE NUMBER (CN) CALCULATIONS- EXISTING

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

Project: Hyde Park Residential Development
Job #: 2841-99-001
Location: 7 Falson Lane, Marlboro, NJ

Computed By: SMM
Checked By: SRC
Date: 11/5/2020

Drainage Area	Impervious Area (acre)	Impervious Area (sf)	Curve Number (CN) Used	HSG A - Open Space Area (acre)	HSG A - Open Space Area (sf)	Curve Number (CN) Used	HSG A - Wooded Area (acre)	HSG A - Wooded Area (sf)	Curve Number (CN) Used	HSG B - Wooded Area (acre)	HSG B - Wooded 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 Perviou Area (acres)	Total Area (acres)	TC (Min.)
Study Area A (Disturbed)	0.00	-	98	2.13	92,783	39	9.09	395,960	30	0.47	20,473	55	0.48	20,909	80	4.29	186,735	77	46	16.46	16.46	22
Study Area B (Disturbed)	0.00	-	98	0.00	-	39	4.86	211,702	30	0.00	-	55	0.32	13,939	80	3.52	153,331	77	51	8.70	8.70	20
Study Area D	0.00	-	98	0.00	-	39	0.46	20,081	30	0.46	20,081	55	0.00	-	80	0.00	-	77	43	0.92	0.92	10
Total	**0.00**	**-**		**2.13**	**92,783**		**14.41**	**627,743**		**0.93**	**40,554**		**0.80**	**34,848**		**7.81**	**340,066**			**26.08**	**26.08**	

Per Monmouth County Soil Survey -	AtsA	HSG	A/D	Soil	Atsion sand
Per Monmouth County Soil Survey -	EveB	HSG	A	Soil	Evesboro sand
Per Monmouth County Soil Survey -	KemB	HSG	D	Soil	Keyport sandy loam
Per Monmouth County Soil Survey -	LakB	HSG	A	Soil	Lakehurst sand
Per Monmouth County Soil Survey -	LasB	HSG	A	Soil	Lakewood sand
Per Monmouth County Soil Survey -	LasC	HSG	A	Soil	Lakewood sand
Per Monmouth County Soil Survey -	SacE	HSG	B	Soil	Sassafras sandy loam

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

4. RUNOFF CURVE NUMBER (CN) CALCULATIONS- PROPOSED

DYNAMIC ENGINEERING

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

Project: Hyde Park Residential Development
Job #: 2841-99-001
Location: 7 Falson Lane, Marlboro, NJ

Computed By: SMM
Checked By: SRC
Date: 11/5/2020

Drainage Area	Impervious Area (acre)	Impervious Area (sf)	Curve Number (CN) Used	HSG A - Open Space Area (acre)	HSG A - Open Space Area (sf)	Curve Number (CN) Used	HSG A - Wooded Area (acre)	HSG A - Wooded Area (sf)	Curve Number (CN) Used	HSG B - Open Space Area (acre)	HSG B - Open Space 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)	TC (Min.)
Study Area to Basin A1	2.10	91,476	98	0.74	32,234	39	0.00	-	30	0.31	13,504	61	0.33	14,157	80	0.00	-	77	54	1.38	3.48	10
Study Area to Basin A2	3.04	132,422	98	2.25	98,010	39	0.00	-	30	0.00	-	61	0.00	-	80	0.00	-	77	39	2.25	5.29	10
Study Area to Basin A3	3.85	167,706	98	3.98	173,187	39	0.00	-	30	0.00	-	61	1.66	72,524	80	0.87	37,858	77	55	6.51	10.36	10
Study Area to Basin B1	2.80	121,968	98	0.00	-	39	0.00	-	30	0.00	-	61	0.00	-	80	0.76	33,106	77	77	0.76	3.56	10
Study Area to Basin B2	0.06	2,614	98	0.45	19,602	39	0.60	26,136	30	0.30	13,068	61	0.25	10,890	80	0.40	17,424	77	52	2.00	2.06	10
Study Aread D Undisturbed	0.00	-	98	0.00	-	39	0.60	26,267	30	0.00	-	61	0.00	-	80	0.00	-	77	30	0.60	0.60	10
Study Area Veg. Swale	0.00	-	97	0.00	-	39	0.00	-	30	0.00	-	61	0.73	31,799	80	0.00	-	77	80	0.73	0.73	10
Total	**11.85**	**516,186**		**7.42**	**323,033**		**1.20**	**52,403**		**0.61**	**26,572**		**2.97**	**129,370**		**2.03**	**88,388**			**14.23**	**26.08**	

Per Monmouth County Soil Survey -	AtsA	HSG	A/D	Soil	Atsion sand
Per Monmouth County Soil Survey -	EveB	HSG	A	Soil	Evesboro sand
Per Monmouth County Soil Survey -	KemB	HSG	D	Soil	Keyport sandy loam
Per Monmouth County Soil Survey -	LakB	HSG	A	Soil	Lakehurst sand
Per Monmouth County Soil Survey -	LasB	HSG	A	Soil	Lakewood sand
Per Monmouth County Soil Survey -	LasC	HSG	A	Soil	Lakewood sand
Per Monmouth County Soil Survey -	SacE	HSG	B	Soil	Sassafras sandy loam

5. EXISTING TIME OF CONCENTRATION (Tc) CALCULATIONS

DYNAMIC ENGINEERING

826 Newtown-Yardley Road, Suite 201, Newtown, PA 18940
(267) 685-0276

Date: 11/5/2020
Project: Pallu Associates, LLC
Project No: 2841-99-001

Calculated By: SMM
Checked By: SRC

Worksheet 3: Time of Concentration (T_c) Calculations

Land Condition: Existing
Drainage Area: 16.77

• ***Sheet Flow*** :		C						
1. Surface Description		Woods, Light Underbrush						
2. Manning's Roughness Coefficient, *n*		0.4						
3. Flow Length, *L* { *total L ≤ 100 ft* }		100.0 ft						
4. Two-Year 24-hour Rainfall, p_2 for . . .	Monmouth County	3.38 in		3.38 in		3.38 in		
5. Land Slope, *s (ft/ft)*		0.055 ft/ft						
6. Travel Time, $T_t = \frac{0.007\,(n\,L)^{0.8}}{p_2^{0.5}\,s^{0.4}}$		0.232 hr	+	0.000 hr	+	0.000 hr	=	0.232 hr
• ***Shallow Concentrated Flow*** :								
7. Surface Description		Unpaved						
8. Flow Length, *L*		1308.0 ft						
9. Watercourse Slope, *s*		0.028 ft/ft						
10. Average velocity, *V* { *see Figure 3.1)*		2.71 ft/s						
11. Travel Time, $T_t = \frac{L}{3600\,V}$		0.134 hr	+	0.000 hr	+	0.000 hr	=	0.134 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* }								0.366 hr
								22.0 min

DYNAMIC ENGINEERING

826 Newtown-Yardley Road, Suite 201, Newtown, PA 18940
(267) 685-0276

Date: 11/5/2020
Project: Pallu Associates, LLC
Project No: 2841-99-001

Calculated By: SMM
Checked By: SRC

Worksheet 3: Time of Concentration (T_c) Calculations

Land Condition: Existing
Drainage Area: 4.99

• ***Sheet Flow*** :										
1. Surface Description		Woods, Light Underbrush								
2. Manning's Roughness Coefficient, n		0.4								
3. Flow Length, L { *total* $L \le 100$ *ft* }		100.0 ft								
4. Two-Year 24-hour Rainfall, p_2 for . . .	Monmouth County	3.38 in		3.38 in		3.38 in				
5. Land Slope, s *(ft/ft)*		0.060 ft/ft								
6. Travel Time, $T_t = \frac{0.007\,(n\,L)^{0.8}}{p_2^{0.5}\,s^{0.4}}$		0.224 hr	+	0.000 hr	+	0.000 hr	=	0.224 hr		
• ***Shallow Concentrated Flow*** :										
7. Surface Description		Unpaved								
8. Flow Length, L		880.0 ft								
9. Watercourse Slope, s		0.023 ft/ft								
10. Average velocity, V { *see Figure 3.1)*		2.43 ft/s								
11. Travel Time, $T_t = \frac{L}{3600\,V}$		0.101 hr	+	0.000 hr	+	0.000 hr	=	0.101 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* }								0.325 hr		
								19.5 min		

DYNAMIC ENGINEERING

826 Newtown-Yardley Road, Suite 201, Newtown, PA 18940
(267) 685-0276

Date: 11/5/2020
Project: Pallu Associates, LLC
Project No: 2841-99-001

Calculated By: SMM
Checked By: SRC

Worksheet 3: Time of Concentration (T_c) Calculations

Land Condition: Existing
Drainage Area: 0.86

• ***Sheet Flow*** :	C							
1. Surface Description	Woods, Light Underbrush							
2. Manning's Roughness Coefficient, n	0.4							
3. Flow Length, L { *total* $L \le 100$ *ft* }	100.0 ft							
4. Two-Year 24-hour Rainfall, p_2 for . . . Monmouth County	3.38 in	3.38 in		3.38 in				
5. Land Slope, s *(ft/ft)*	0.125 ft/ft							
6. Travel Time, $T_t = \frac{0.007\,(n\,L)^{0.8}}{p_2^{0.5}\,s^{0.4}}$	0.167 hr	+	0.000 hr	+	0.000 hr	=	0.167 hr	
• ***Shallow Concentrated Flow*** :								
7. Surface Description	Unpaved							
8. Flow Length, L	54.0 ft							
9. Watercourse Slope, s	0.056 ft/ft							
10. Average velocity, V { *see Figure 3.1)*	3.80 ft/s							
11. Travel Time, $T_t = \frac{L}{3600\,V}$	0.004 hr	+	0.000 hr	+	0.000 hr	=	0.004 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* }							0.171 hr	
							10.3 min	

6. HYDROGRAPH SUMMARY REPORTS – EXISTING & PROPOSED 2 YR., 10 YR., 25 YR. & 100 YR.

Watershed Model Schematic

Hydraflow Hydrographs by Intelisolve v9.1

Legend

Hyd.	Origin	Description
1	SCS Runoff	EXIST DISTURBED AREA A
2	SCS Runoff	EXIST DISTURBED AREA B
3	SCS Runoff	EXIST AREA D DISTURBED WOODS-BRUSH
4	SCS Runoff	AREA A1-IMPERVIOUS
5	SCS Runoff	AREA A1-PERV
6	Combine	BASIN A1 INFLOW
7	SCS Runoff	AREA A2-IMP
8	SCS Runoff	AREA A2-PERV
9	Combine	BASIN A2-INFLOW
10	SCS Runoff	AREA A3-WOODS
11	SCS Runoff	AREA A3 Open Space D
12	SCS Runoff	AREA A3-IMP
13	SCS Runoff	AREA A3- Open Space A
14	Combine	BASIN A3-INFLOW
15	SCS Runoff	BASIN B1-IMP
16	SCS Runoff	BASIN B1-PERV
17	Combine	BASIN B-INFLOW
18	Reservoir	BASIN A1 ROUTING
19	Reservoir	BASIN A2 ROUTING
20	Reservoir	BASIN B1 ROUTING
21	Combine	COMBINED TO BASIN A3
22	Reservoir	BASIN A3 ROUTING
23	Combine	COMBINED TO SA A
24	SCS Runoff	BASIN B2 PERV
25	SCS Runoff	BASIN B2 IMP
26	Combine	COMBINED TO BASIN B2
27	SCS Runoff	PROP AREA D UNDISTURBED
28	Reservoir	BASIN B2 ROUTING
29	SCS Runoff	EXIST BASIN B STABILITY
30	SCS Runoff	PROPOSED VEG. SWALE

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	0.188	5	905	5,134	----	------	------	EXIST DISTURBED AREA A
2	SCS Runoff	0.340	5	775	6,253	----	------	------	EXIST DISTURBED AREA B
3	SCS Runoff	0.004	5	945	126	----	------	------	EXIST AREA D DISTURBED WOOD
4	SCS Runoff	4.150	5	730	23,837	----	------	------	AREA A1-IMPERVIOUS
5	SCS Runoff	0.126	5	750	1,372	----	------	------	AREA A1-PERV
6	Combine	4.191	5	730	25,209	4, 5	------	------	BASIN A1 INFLOW
7	SCS Runoff	6.008	5	730	34,506	----	------	------	AREA A2-IMP
8	SCS Runoff	0.002	5	1330	32	----	------	------	AREA A2-PERV
9	Combine	6.008	5	730	34,539	7, 8	------	------	BASIN A2-INFLOW
10	SCS Runoff	0.547	5	750	4,211	----	------	------	AREA A3-WOODS
11	SCS Runoff	1.454	5	745	9,573	----	------	------	AREA A3 Open Space D
12	SCS Runoff	7.609	5	730	43,700	----	------	------	AREA A3-IMP
13	SCS Runoff	0.000	5	n/a	0	----	------	------	AREA A3- Open Space A
14	Combine	9.265	5	735	57,485	10, 11, 12, 13	------	------	BASIN A3-INFLOW
15	SCS Runoff	5.534	5	730	31,782	----	------	------	BASIN B1-IMP
16	SCS Runoff	0.684	5	735	3,679	----	------	------	BASIN B1-PERV
17	Combine	6.193	5	730	35,461	15, 16	------	------	BASIN B-INFLOW
18	Reservoir	0.201	5	995	25,106	6	104.10	17,776	BASIN A1 ROUTING
19	Reservoir	0.342	5	935	34,538	9	95.95	20,691	BASIN A2 ROUTING
20	Reservoir	0.513	5	870	35,459	17	103.68	18,353	BASIN B1 ROUTING
21	Combine	9.414	5	735	82,590	14, 18,	------	------	COMBINED TO BASIN A3
22	Reservoir	0.264	5	1460	82,578	21	93.84	52,464	BASIN A3 ROUTING
23	Combine	0.598	5	1080	117,115	19, 22	------	------	COMBINED TO SA A
24	SCS Runoff	0.114	5	755	1,569	----	------	------	BASIN B2 PERV
25	SCS Runoff	0.119	5	730	681	----	------	------	BASIN B2 IMP
26	Combine	0.192	5	745	2,250	24, 25	------	------	COMBINED TO BASIN B2
27	SCS Runoff	0.000	5	n/a	0	----	------	------	PROP AREA D UNDISTURBED
28	Reservoir	0.019	5	1425	42	26	96.25	2,211	BASIN B2 ROUTING
29	SCS Runoff	4.744	5	745	31,676	----	------	------	EXIST BASIN B STABILITY
30	SCS Runoff	0.766	5	735	4,060	----	------	------	PROPOSED VEG. SWALE

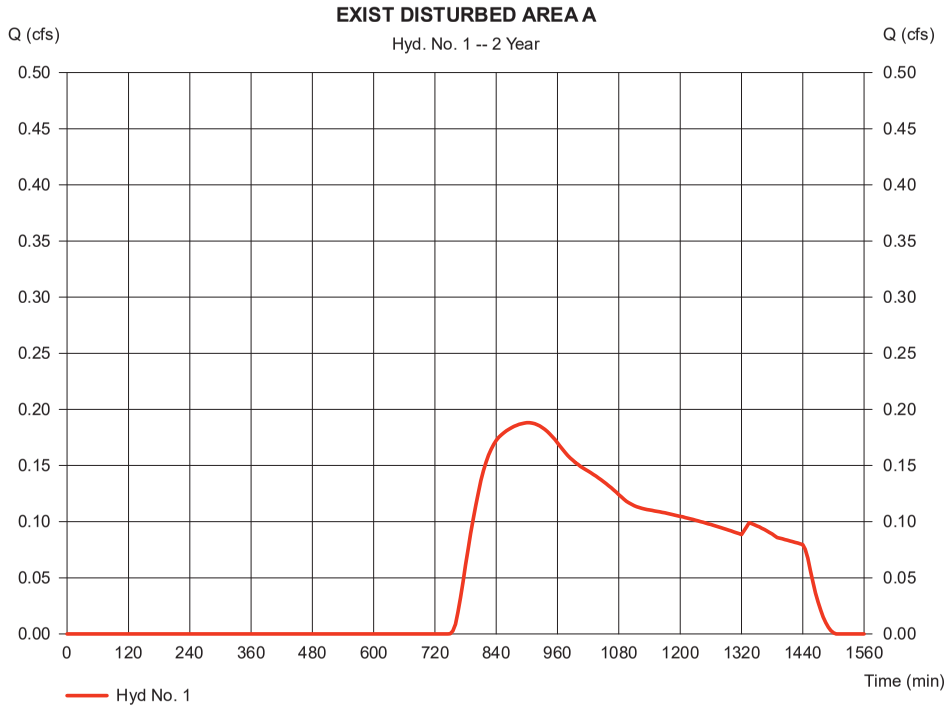
Hydrograph Report

Hyd. No. 1

EXIST DISTURBED AREA A

Hydrograph type	= SCS Runoff	Peak discharge	= 0.188 cfs
Storm frequency	= 2 yrs	Time to peak	= 905 min
Time interval	= 5 min	Hyd. volume	= 5,134 cuft
Drainage area	= 16.460 ac	Curve number	= 46*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 22.00 min
Total precip.	= 3.38 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

* Composite (Area/CN) = [(9.090 x 30) + (0.470 x 55) + (0.480 x 80) + (2.130 x 39) + (4.290 x 77)] / 16.460



Hydrograph Report

Hyd. No. 2

EXIST DISTURBED AREA B

Hydrograph type	= SCS Runoff	Peak discharge	= 0.340 cfs
Storm frequency	= 2 yrs	Time to peak	= 775 min
Time interval	= 5 min	Hyd. volume	= 6,253 cuft
Drainage area	= 8.700 ac	Curve number	= 51*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 20.00 min
Total precip.	= 3.38 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

* Composite (Area/CN) = [(4.860 x 30) + (0.320 x 80) + (3.520 x 77)] / 8.700

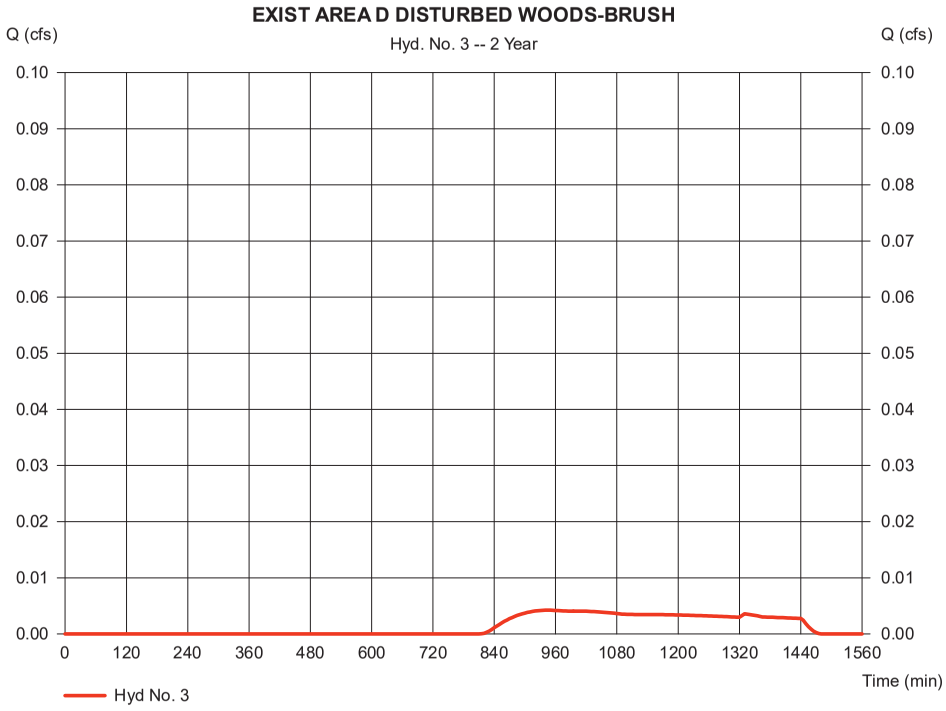
Hydrograph Report

Hyd. No. 3

EXIST AREA D DISTURBED WOODS-BRUSH

Hydrograph type	= SCS Runoff	Peak discharge	= 0.004 cfs
Storm frequency	= 2 yrs	Time to peak	= 945 min
Time interval	= 5 min	Hyd. volume	= 126 cuft
Drainage area	= 0.920 ac	Curve number	= 43*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 10.00 min
Total precip.	= 3.38 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

* Composite (Area/CN) = [(0.461 x 30) + (0.461 x 55)] / 0.920

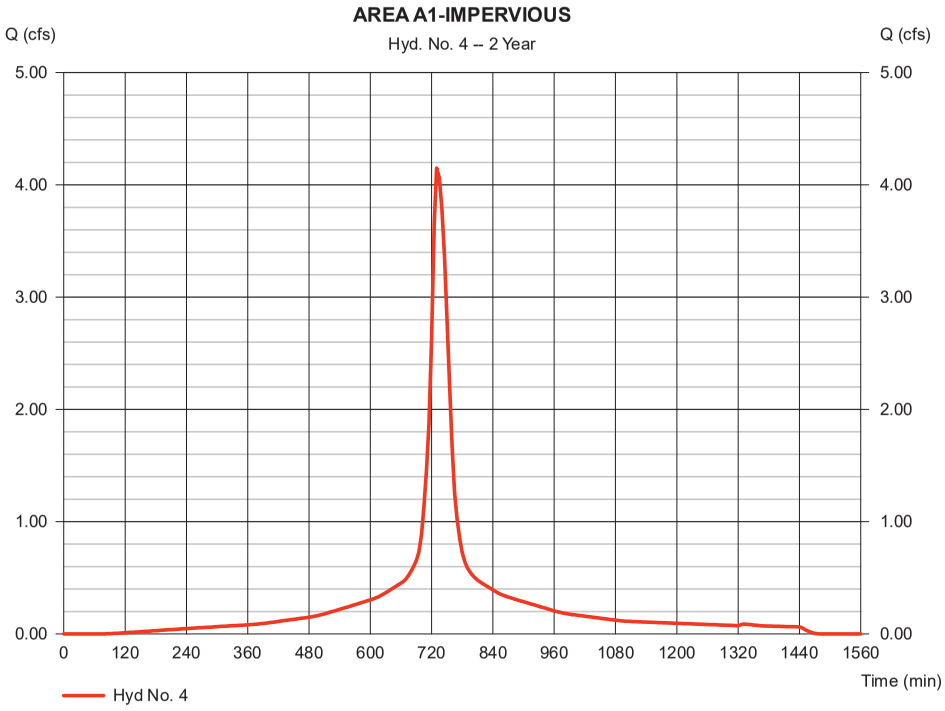


Hydrograph Report

Hyd. No. 4

AREA A1-IMPERVIOUS

Hydrograph type	= SCS Runoff	Peak discharge	= 4.150 cfs
Storm frequency	= 2 yrs	Time to peak	= 730 min
Time interval	= 5 min	Hyd. volume	= 23,837 cuft
Drainage area	= 2.100 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 10.00 min
Total precip.	= 3.38 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

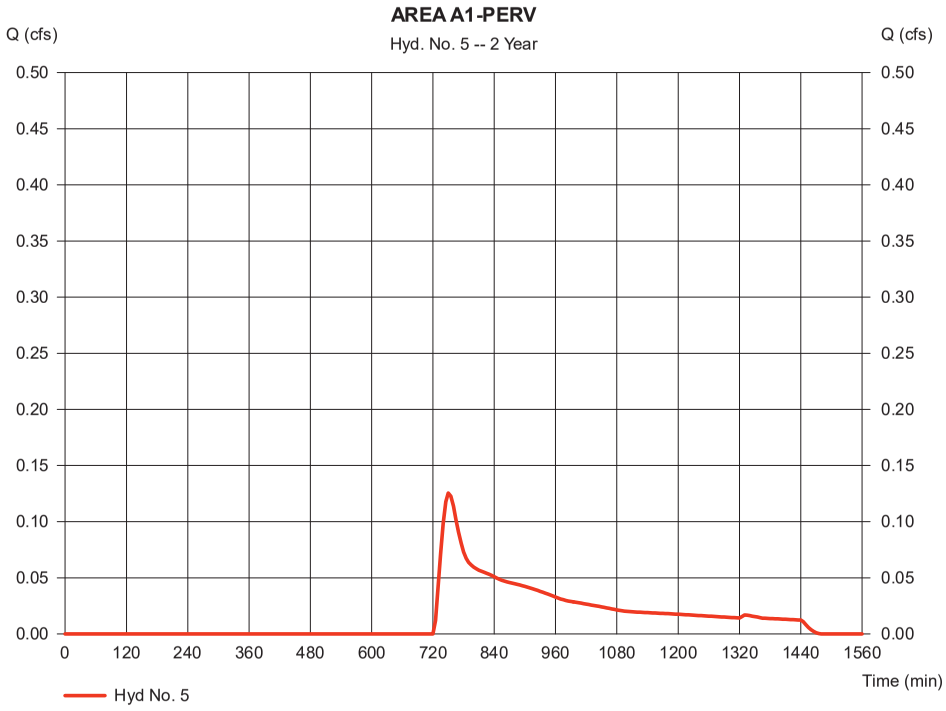


Hydrograph Report

Hyd. No. 5

AREA A1-PERV

Hydrograph type	= SCS Runoff	Peak discharge	= 0.126 cfs
Storm frequency	= 2 yrs	Time to peak	= 750 min
Time interval	= 5 min	Hyd. volume	= 1,372 cuft
Drainage area	= 1.380 ac	Curve number	= 54
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 10.00 min
Total precip.	= 3.38 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

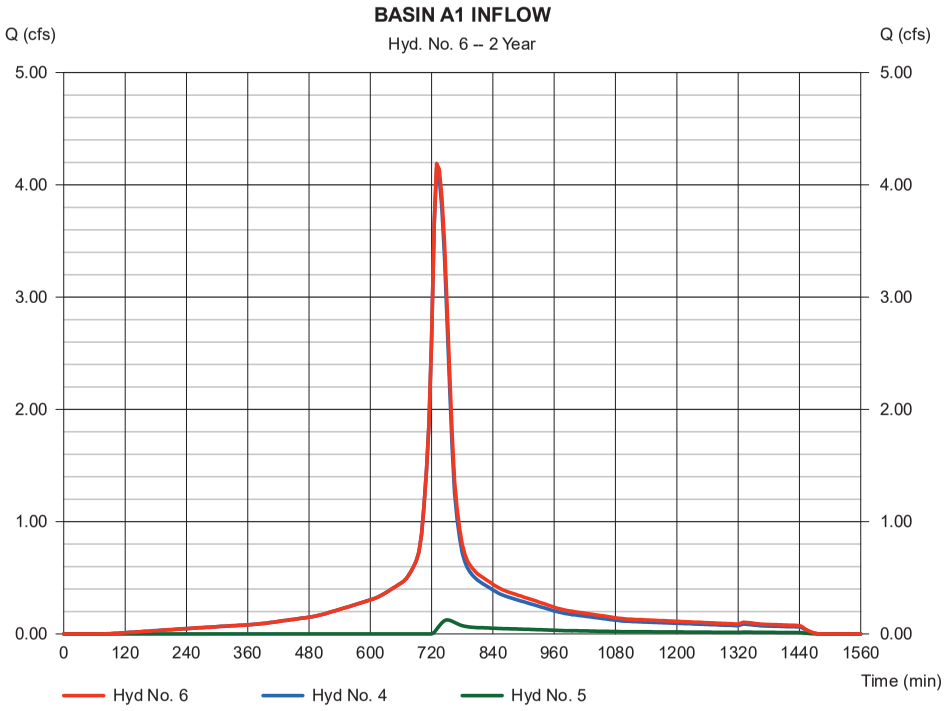


Hydrograph Report

Hyd. No. 6

BASIN A1 INFLOW

Hydrograph type	= Combine	Peak discharge	= 4.191 cfs
Storm frequency	= 2 yrs	Time to peak	= 730 min
Time interval	= 5 min	Hyd. volume	= 25,209 cuft
Inflow hyds.	= 4, 5	Contrib. drain. area	= 3.480 ac

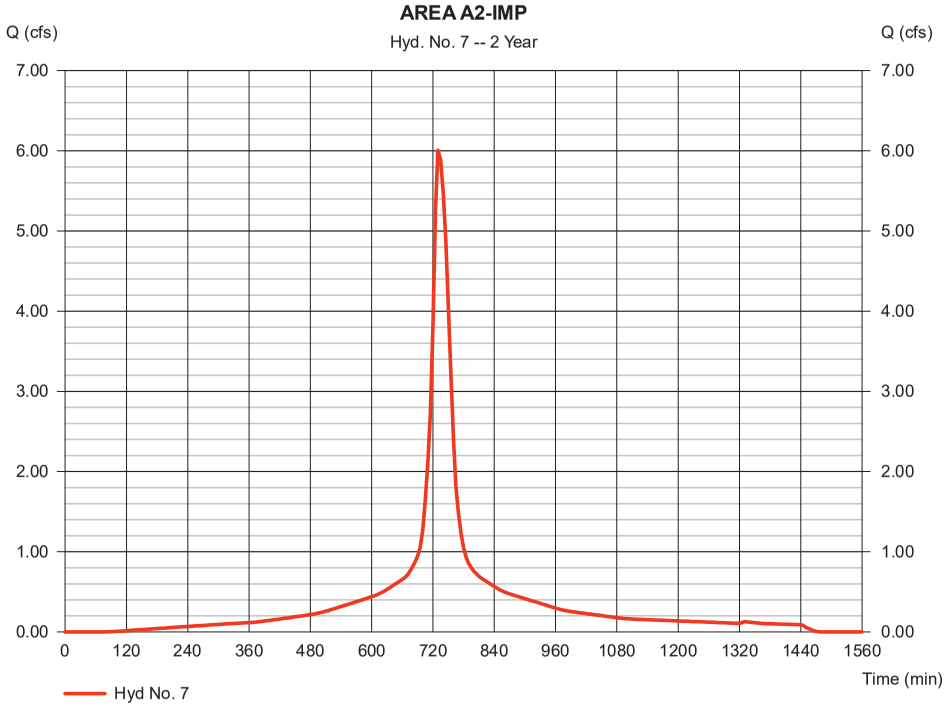


Hydrograph Report

Hyd. No. 7

AREA A2-IMP

Hydrograph type	= SCS Runoff	Peak discharge	= 6.008 cfs
Storm frequency	= 2 yrs	Time to peak	= 730 min
Time interval	= 5 min	Hyd. volume	= 34,506 cuft
Drainage area	= 3.040 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 10.00 min
Total precip.	= 3.38 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285



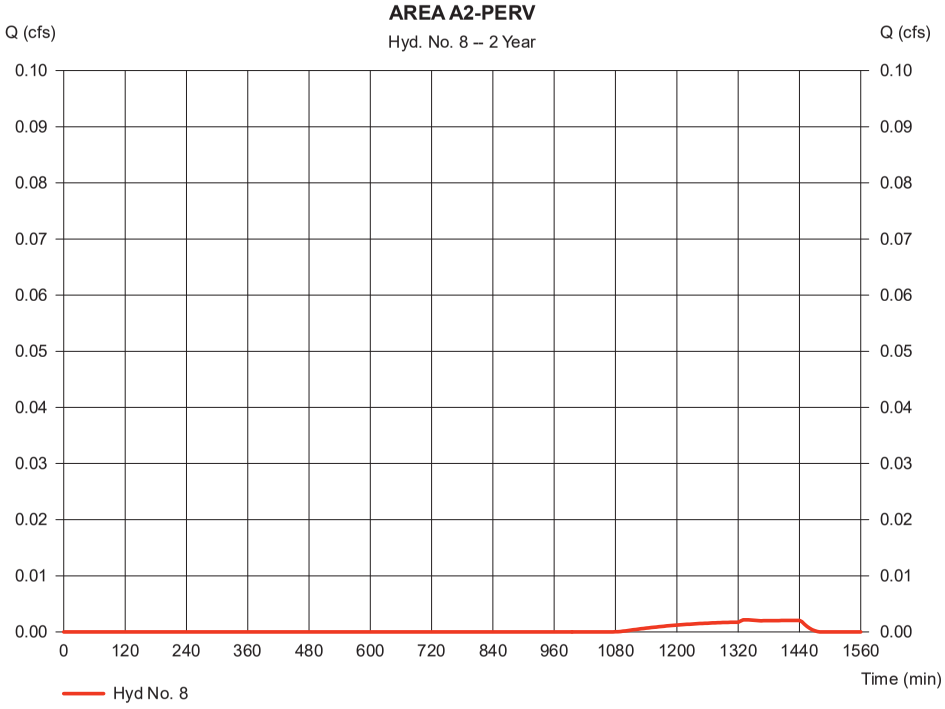
Hydrograph Report

Hyd. No. 8

AREA A2-PERV

Hydrograph type	= SCS Runoff	Peak discharge	= 0.002 cfs
Storm frequency	= 2 yrs	Time to peak	= 1330 min
Time interval	= 5 min	Hyd. volume	= 32 cuft
Drainage area	= 2.250 ac	Curve number	= 39*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 10.00 min
Total precip.	= 3.38 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

* Composite (Area/CN) = [(0.840 x 80) + (0.390 x 61)] / 2.250

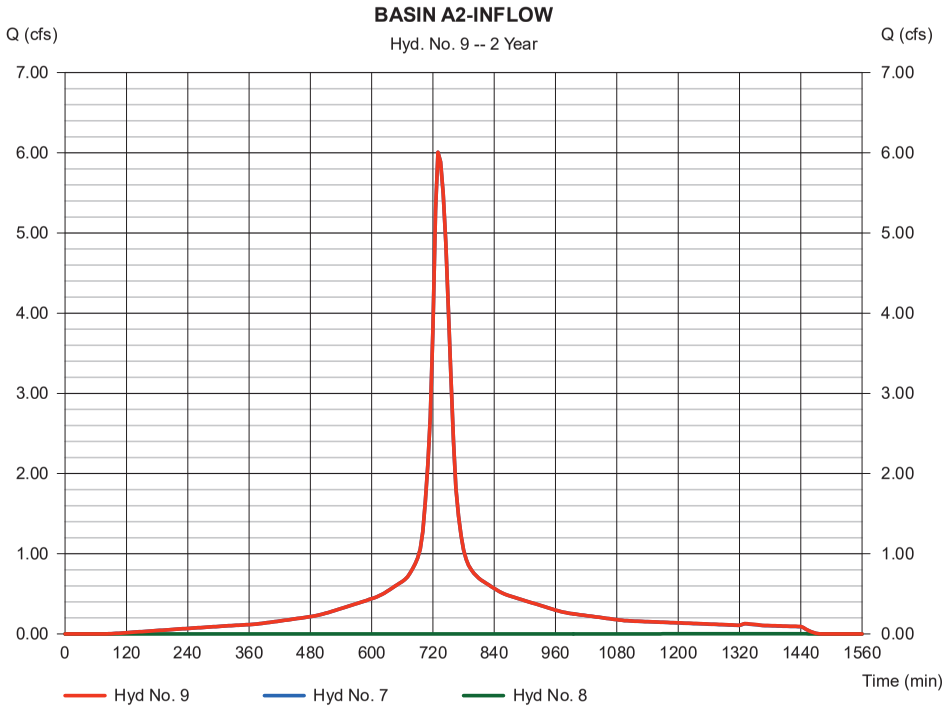


Hydrograph Report

Hyd. No. 9

BASIN A2-INFLOW

Hydrograph type	= Combine	Peak discharge	= 6.008 cfs
Storm frequency	= 2 yrs	Time to peak	= 730 min
Time interval	= 5 min	Hyd. volume	= 34,539 cuft
Inflow hyds.	= 7, 8	Contrib. drain. area	= 5.290 ac

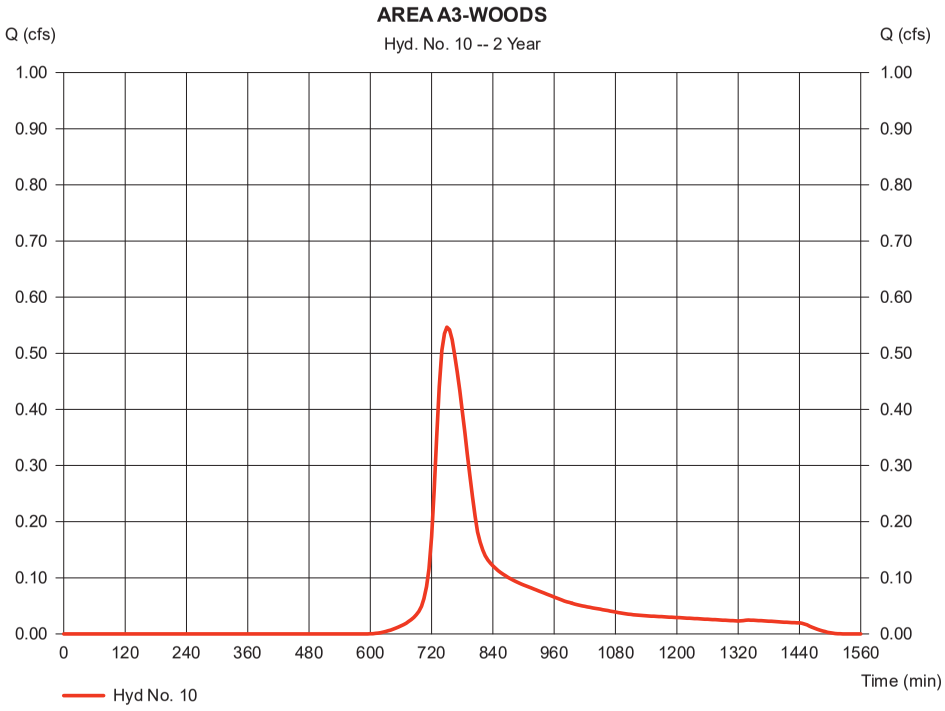


Hydrograph Report

Hyd. No. 10

AREA A3-WOODS

Hydrograph type	= SCS Runoff	Peak discharge	= 0.547 cfs
Storm frequency	= 2 yrs	Time to peak	= 750 min
Time interval	= 5 min	Hyd. volume	= 4,211 cuft
Drainage area	= 0.870 ac	Curve number	= 77
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 25.00 min
Total precip.	= 3.38 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

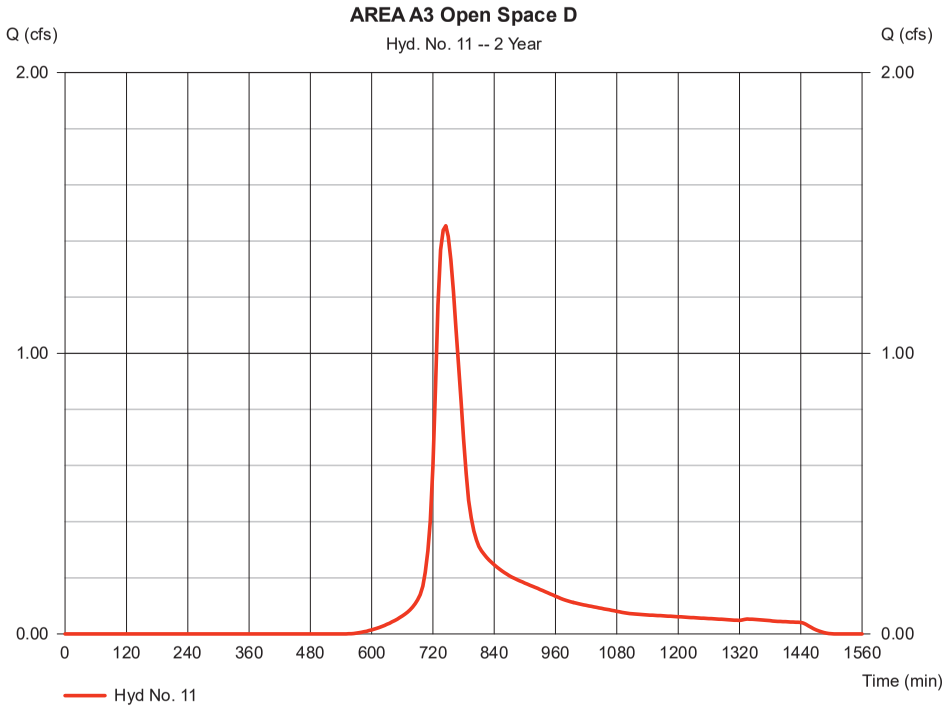


Hydrograph Report

Hyd. No. 11

AREA A3 Open Space D

Hydrograph type	= SCS Runoff	Peak discharge	= 1.454 cfs
Storm frequency	= 2 yrs	Time to peak	= 745 min
Time interval	= 5 min	Hyd. volume	= 9,573 cuft
Drainage area	= 1.660 ac	Curve number	= 80
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 20.00 min
Total precip.	= 3.38 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

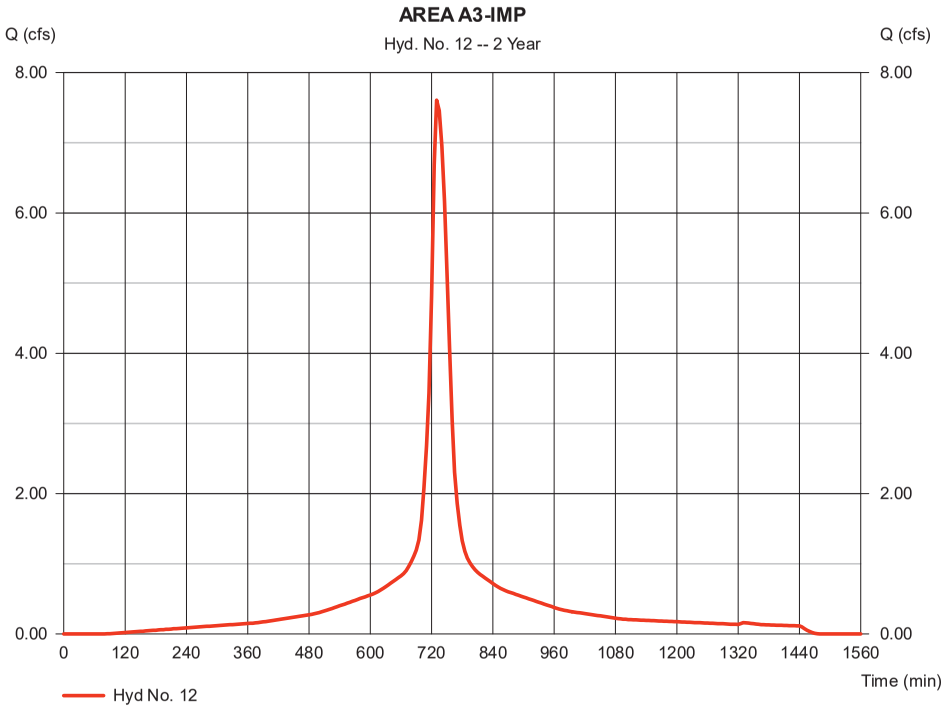


Hydrograph Report

Hyd. No. 12

AREA A3-IMP

Hydrograph type	= SCS Runoff	Peak discharge	= 7.609 cfs
Storm frequency	= 2 yrs	Time to peak	= 730 min
Time interval	= 5 min	Hyd. volume	= 43,700 cuft
Drainage area	= 3.850 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 10.00 min
Total precip.	= 3.38 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

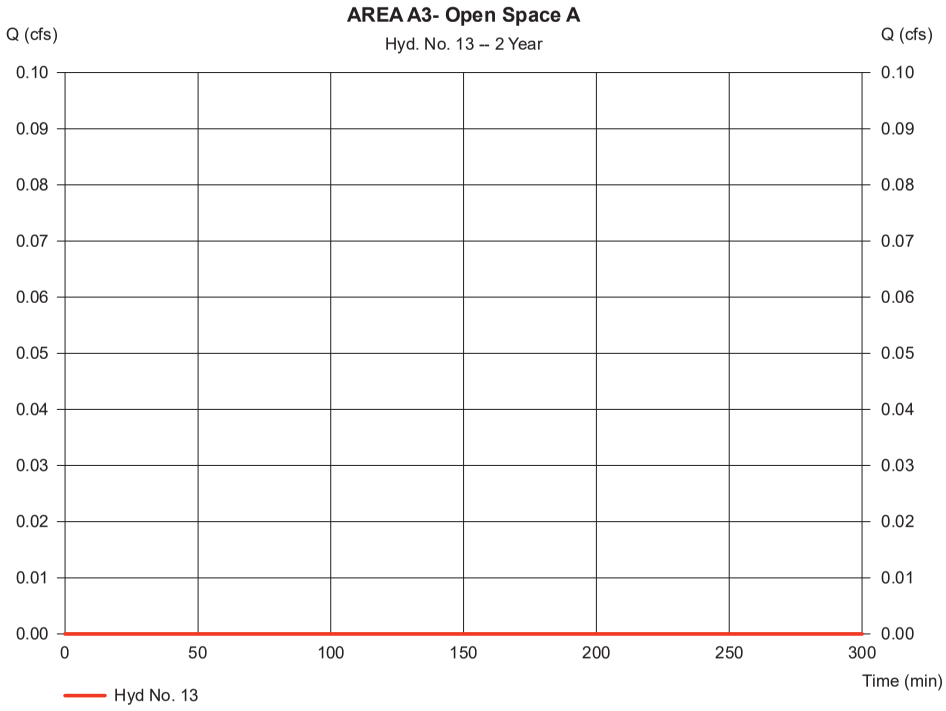


Hydrograph Report

Hyd. No. 13

AREA A3- Open Space A

Hydrograph type	= SCS Runoff	Peak discharge	= 0.000 cfs
Storm frequency	= 2 yrs	Time to peak	= n/a
Time interval	= 5 min	Hyd. volume	= 0 cuft
Drainage area	= 3.980 ac	Curve number	= 30
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 10.00 min
Total precip.	= 3.38 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

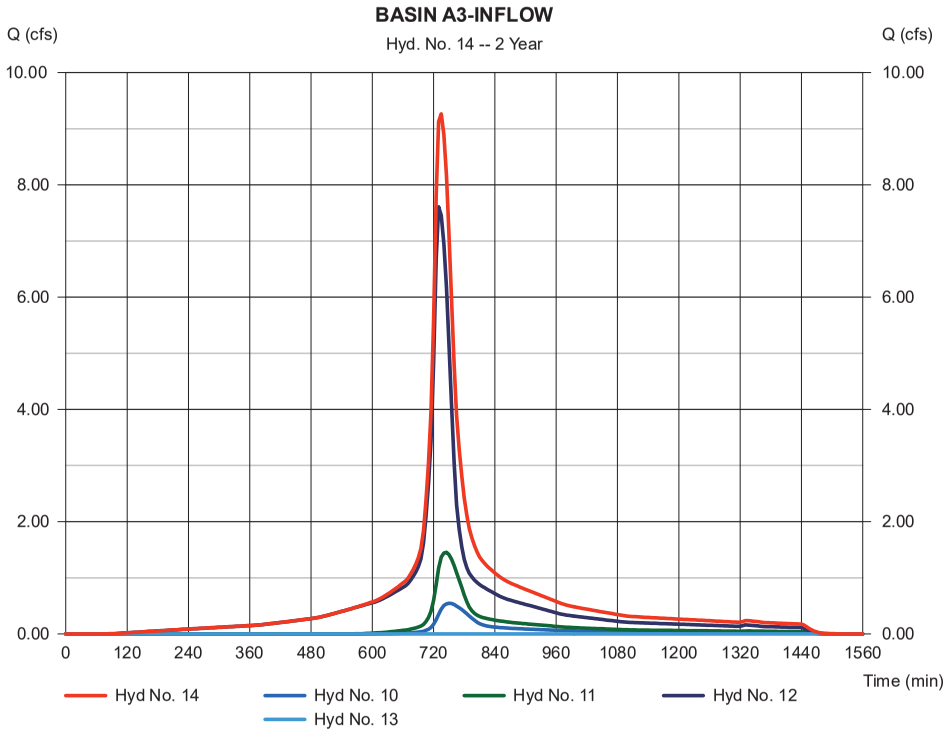


Hydrograph Report

Hyd. No. 14

BASIN A3-INFLOW

Hydrograph type	= Combine	Peak discharge	= 9.265 cfs
Storm frequency	= 2 yrs	Time to peak	= 735 min
Time interval	= 5 min	Hyd. volume	= 57,485 cuft
Inflow hyds.	= 10, 11, 12, 13	Contrib. drain. area	= 10.360 ac

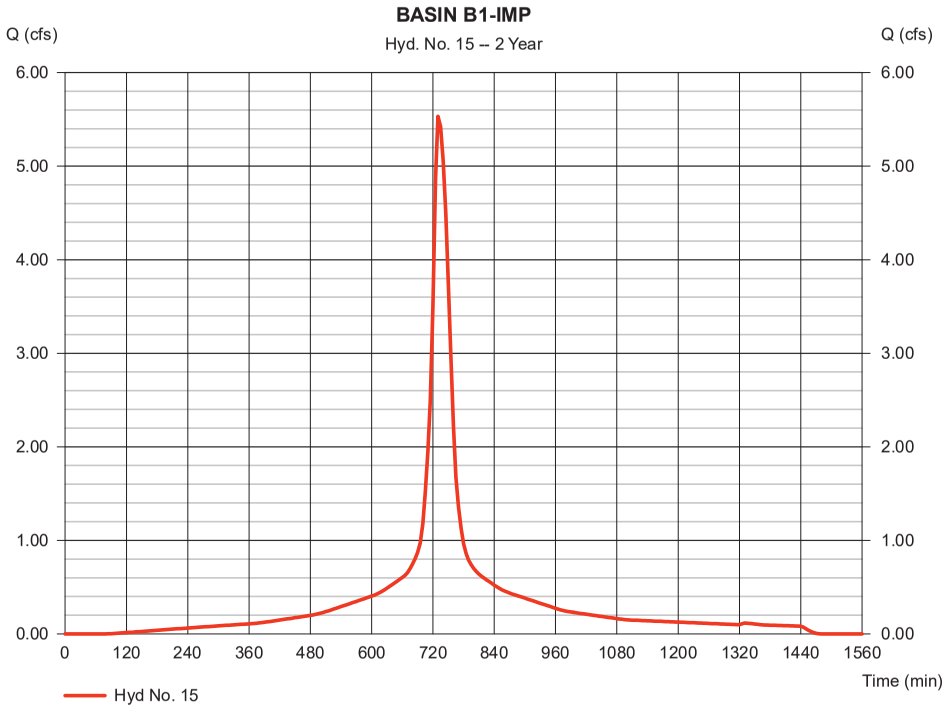


Hydrograph Report

Hyd. No. 15

BASIN B1-IMP

Hydrograph type	= SCS Runoff	Peak discharge	= 5.534 cfs
Storm frequency	= 2 yrs	Time to peak	= 730 min
Time interval	= 5 min	Hyd. volume	= 31,782 cuft
Drainage area	= 2.800 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 10.00 min
Total precip.	= 3.38 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

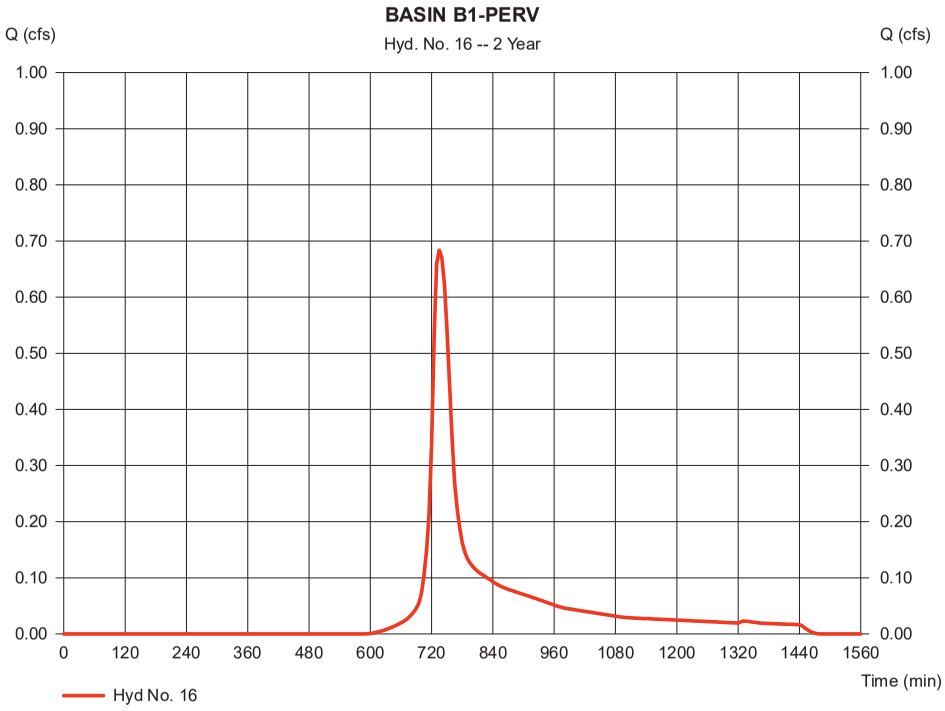


Hydrograph Report

Hyd. No. 16

BASIN B1-PERV

Hydrograph type	= SCS Runoff	Peak discharge	= 0.684 cfs
Storm frequency	= 2 yrs	Time to peak	= 735 min
Time interval	= 5 min	Hyd. volume	= 3,679 cuft
Drainage area	= 0.760 ac	Curve number	= 77
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 10.00 min
Total precip.	= 3.38 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

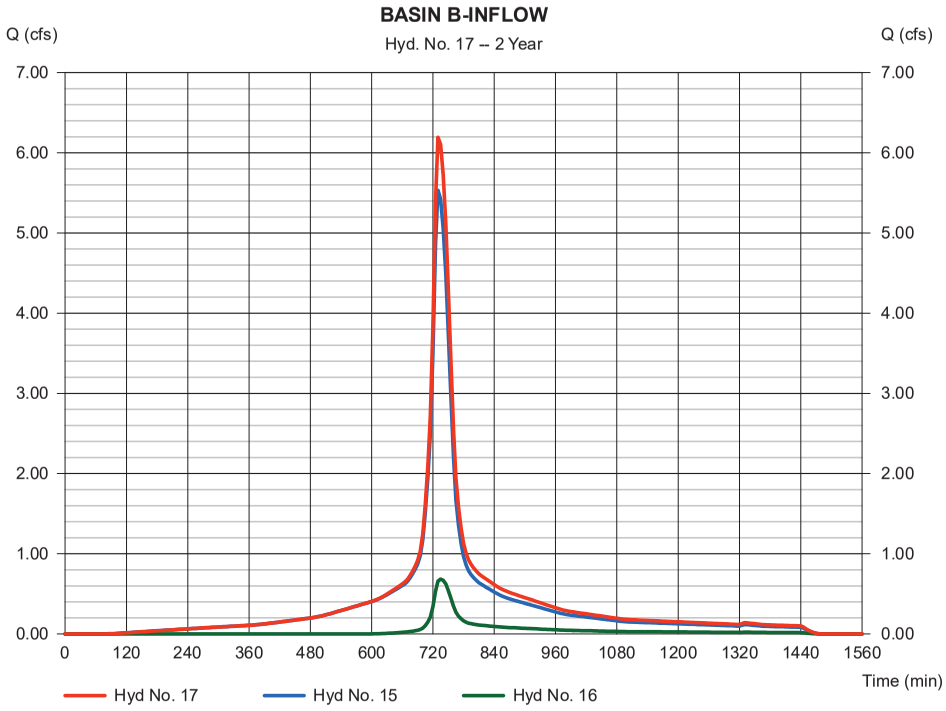


Hydrograph Report

Hyd. No. 17

BASIN B-INFLOW

Hydrograph type	= Combine	Peak discharge	= 6.193 cfs
Storm frequency	= 2 yrs	Time to peak	= 730 min
Time interval	= 5 min	Hyd. volume	= 35,461 cuft
Inflow hyds.	= 15, 16	Contrib. drain. area	= 3.560 ac



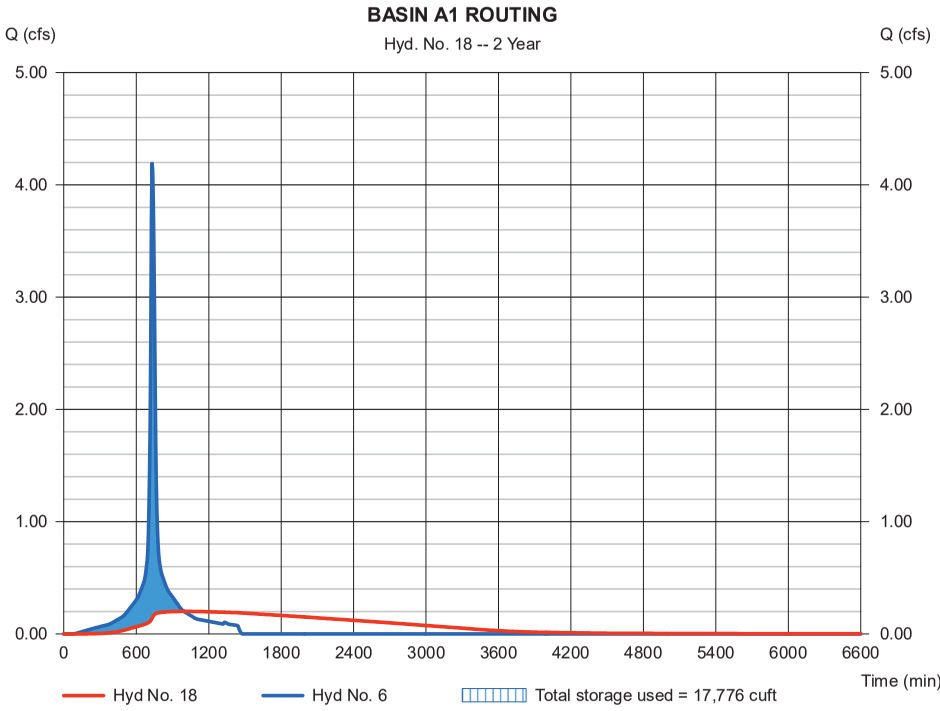
Hydrograph Report

Hyd. No. 18

BASIN A1 ROUTING

Hydrograph type	= Reservoir	Peak discharge	= 0.201 cfs
Storm frequency	= 2 yrs	Time to peak	= 995 min
Time interval	= 5 min	Hyd. volume	= 25,106 cuft
Inflow hyd. No.	= 6 - BASIN A1 INFLOW	Max. Elevation	= 104.10 ft
Reservoir name	= Inf. Basin A1	Max. Storage	= 17,776 cuft

Storage Indication method used.



Pond Report

Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Nov 11, 2020

Pond No. 1 - Inf. Basin A1

Pond Data

Contours - User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 102.50 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	102.50	9,755	0	0
0.50	103.00	10,646	5,098	5,098
1.00	103.50	11,318	5,490	10,588
1.50	104.00	12,253	5,891	16,478
2.00	104.50	12,982	6,307	22,786
2.50	105.00	13,913	6,722	29,507
3.00	105.50	14,701	7,152	36,659
3.50	106.00	15,632	7,581	44,240
4.00	106.50	16,472	8,024	52,265
4.50	107.00	17,543	8,501	60,766
5.00	107.50	18,450	8,996	69,763

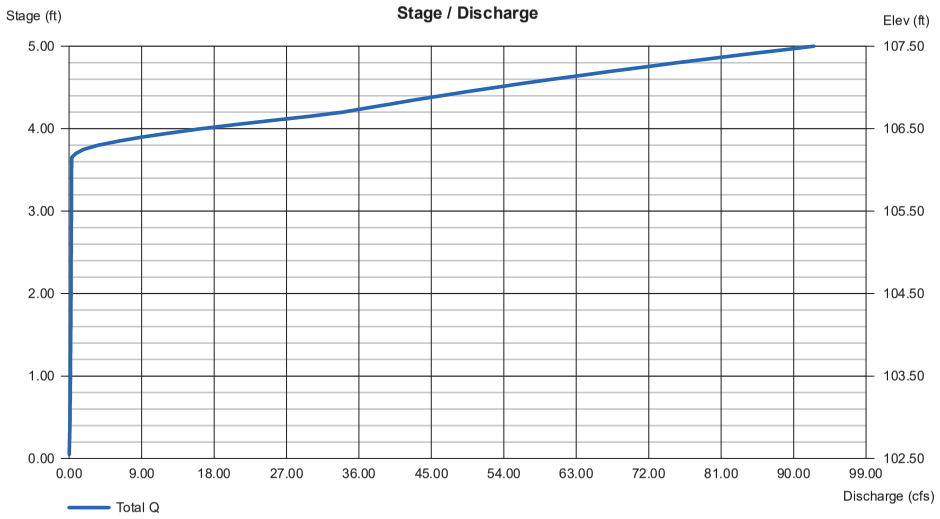
Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 18.00	2.50	0.00	0.00
Span (in)	= 18.00	2.50	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 100.77	102.50	0.00	0.00
Length (ft)	= 147.00	0.00	0.00	0.00
Slope (%)	= 2.00	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)	= 0.00	14.00	20.00	0.00
Crest El. (ft)	= 0.00	106.15	106.25	0.00
Weir Coeff.	= 3.33	3.33	2.60	3.33
Weir Type	= Rect	Rect	Broad	---
Multi-Stage	= Yes	Yes	No	No
Exfil.(in/hr)	= 0.000 (by Wet area)			
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).



Hydrograph Report

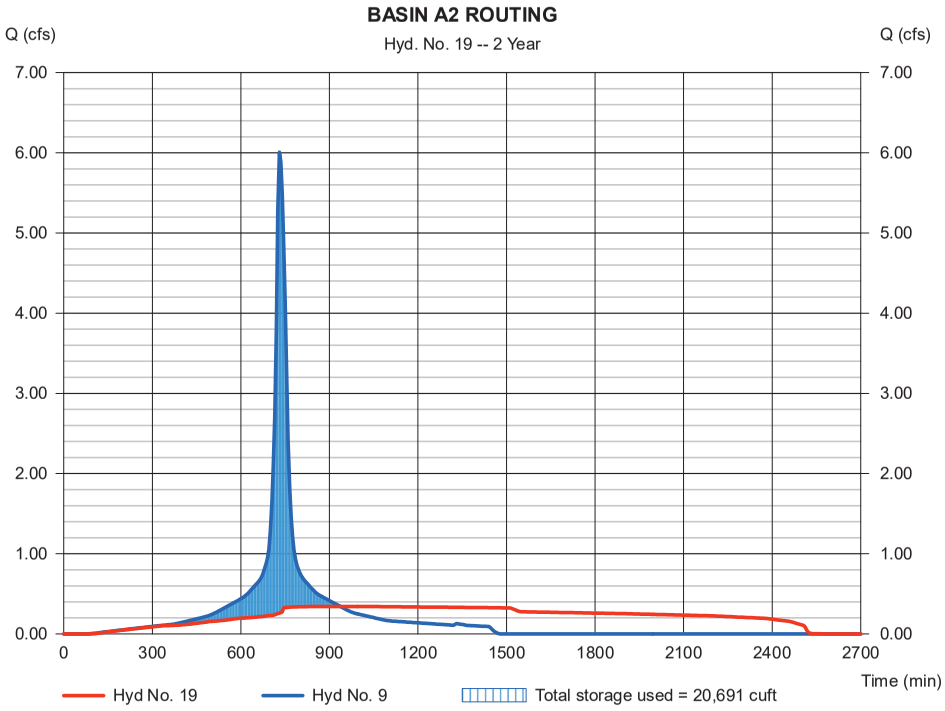
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Nov 11, 2020

Hyd. No. 19

BASIN A2 ROUTING

Hydrograph type	= Reservoir	Peak discharge	= 0.342 cfs
Storm frequency	= 2 yrs	Time to peak	= 935 min
Time interval	= 5 min	Hyd. volume	= 34,538 cuft
Inflow hyd. No.	= 9 - BASIN A2-INFLOW	Max. Elevation	= 95.95 ft
Reservoir name	= Det. Basin A2	Max. Storage	= 20,691 cuft

Storage Indication method used.



Pond Report

Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Nov 11, 2020

Pond No. 2 - Det. Basin A2

Pond Data

Contours - User-defined contour areas. Average end area method used for volume calculation. Begining Elevation = 91.50 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	91.50	00	0	0
0.50	92.00	244	61	61
1.00	92.50	1,238	371	432
1.50	93.00	2,231	867	1,299
2.00	93.50	6,961	2,298	3,597
2.50	94.00	10,801	4,441	8,037
3.00	95.50	13,315	6,029	14,066
3.50	96.00	15,829	7,286	21,352
4.00	96.50	19,404	8,808	30,161
4.50	97.00	15,829	8,808	38,969
5.00	97.50	19,404	8,808	47,777
5.50	98.00	23,674	10,770	58,547
6.00	97.50	28,715	13,097	71,644
6.50	98.00	33,756	15,618	87,262
7.00	98.50	35,449	17,301	104,563

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 18.00	2.50	0.00	0.00
Span (in)	= 18.00	2.50	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 90.69	91.50	0.00	0.00
Length (ft)	= 44.00	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

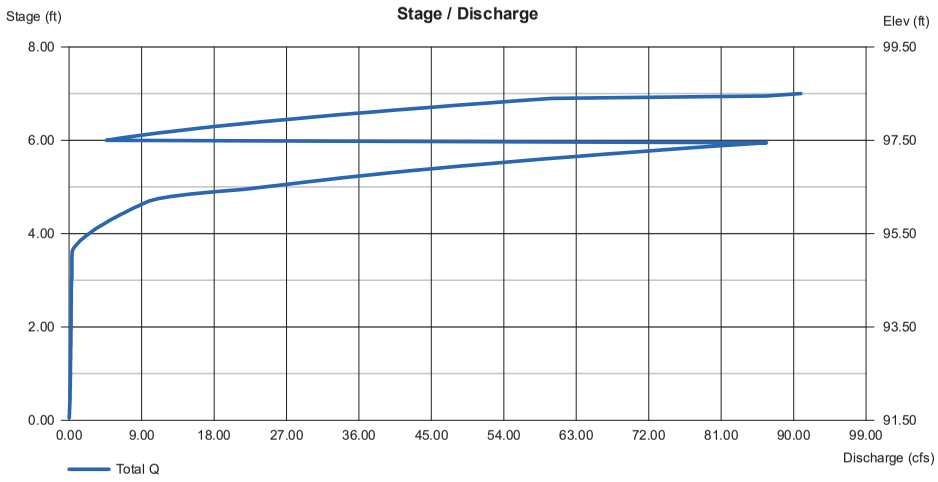
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 2.50	14.00	20.00	0.00
Crest El. (ft)	= 96.10	97.20	97.30	0.00
Weir Coeff.	= 3.33	3.33	2.60	3.33
Weir Type	= Rect	Rect	Broad	---
Multi-Stage	= Yes	Yes	No	No

Exfil.(in/hr) = 0.000 (by Wet area)

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).



Hydrograph Report

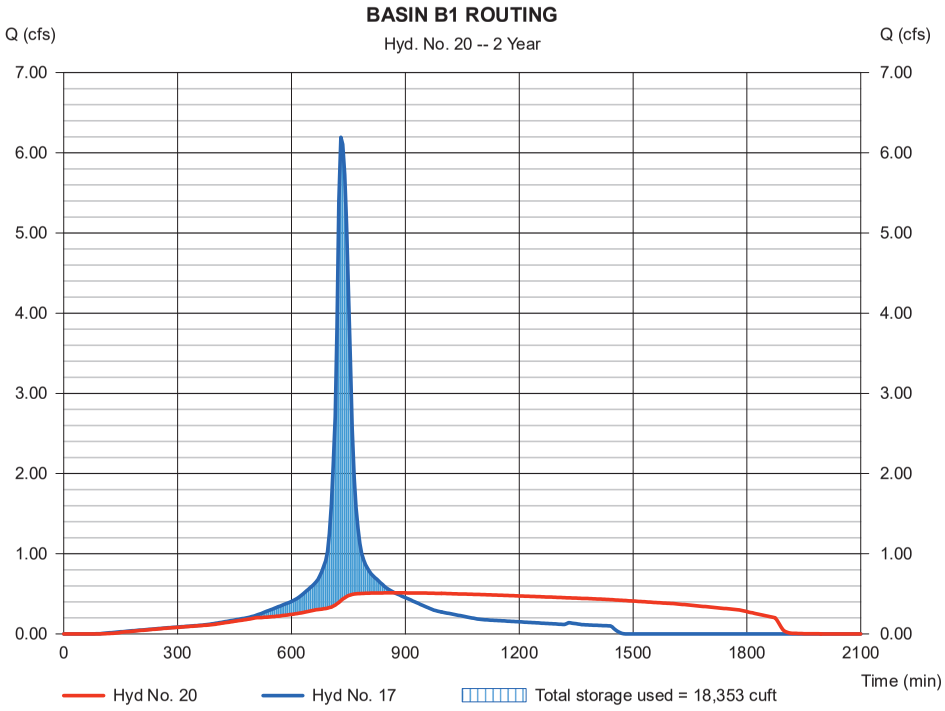
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Nov 11, 2020

Hyd. No. 20

BASIN B1 ROUTING

Hydrograph type	= Reservoir	Peak discharge	= 0.513 cfs
Storm frequency	= 2 yrs	Time to peak	= 870 min
Time interval	= 5 min	Hyd. volume	= 35,459 cuft
Inflow hyd. No.	= 17 - BASIN B-INFLOW	Max. Elevation	= 103.68 ft
Reservoir name	= Det. Basin B1	Max. Storage	= 18,353 cuft

Storage Indication method used.



Pond Report

Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Nov 11, 2020

Pond No. 4 - Det. Basin B1

Pond Data

Contours - User-defined contour areas. Average end area method used for volume calculation. Begining Elevation = 101.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	101.00	00	0	0
0.50	101.50	821	205	205
1.00	102.00	4,907	1,432	1,637
1.50	102.50	8,362	3,317	4,955
2.00	103.00	11,816	5,045	9,999
2.50	103.50	12,455	6,068	16,067
3.00	104.00	13,152	6,402	22,469
3.50	104.50	13,824	6,744	29,213
4.00	105.00	14,591	7,104	36,316
4.50	105.50	15,299	7,473	43,789
5.00	106.00	16,022	7,830	51,619
5.50	106.50	16,758	8,195	59,814

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 18.00	2.50	0.00	0.00
Span (in)	= 18.00	2.50	0.00	0.00
No. Barrels	= 1	2	1	0
Invert El. (ft)	= 100.93	101.00	103.20	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	Yes	No

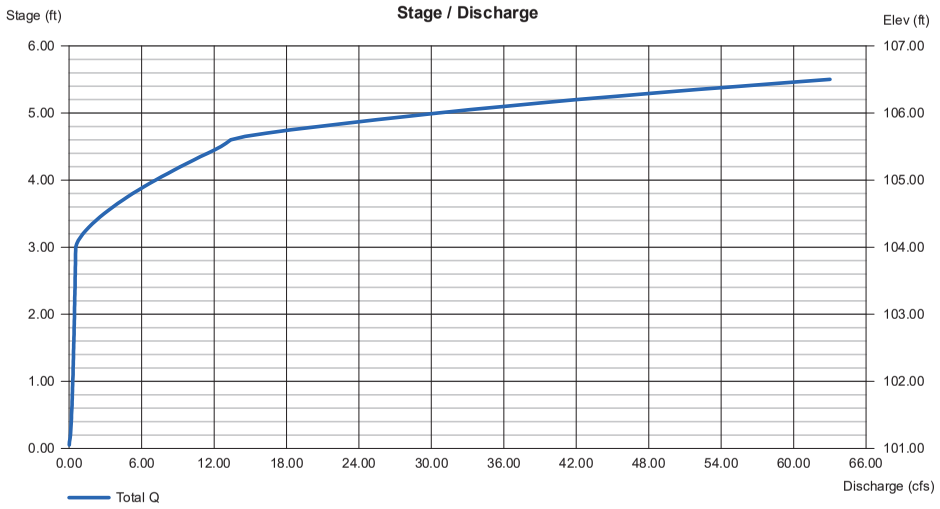
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 14.00	20.00	2.00	0.00
Crest El. (ft)	= 105.60	105.60	104.00	0.00
Weir Coeff.	= 3.33	2.60	3.33	3.33
Weir Type	= Rect	Broad	Rect	---
Multi-Stage	= Yes	No	Yes	No

Exfil.(in/hr) = 0.000 (by Wet area)

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).



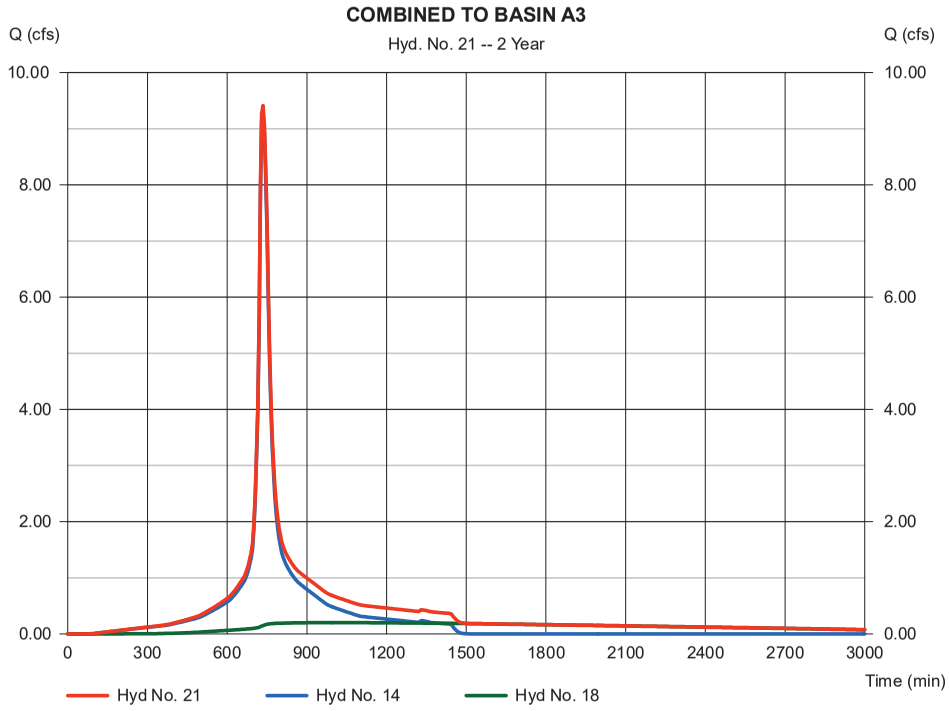
Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Nov 11, 2020

Hyd. No. 21

COMBINED TO BASIN A3

Hydrograph type	= Combine	Peak discharge	= 9.414 cfs
Storm frequency	= 2 yrs	Time to peak	= 735 min
Time interval	= 5 min	Hyd. volume	= 82,590 cuft
Inflow hyds.	= 14, 18	Contrib. drain. area	= 0.000 ac



Hydrograph Report

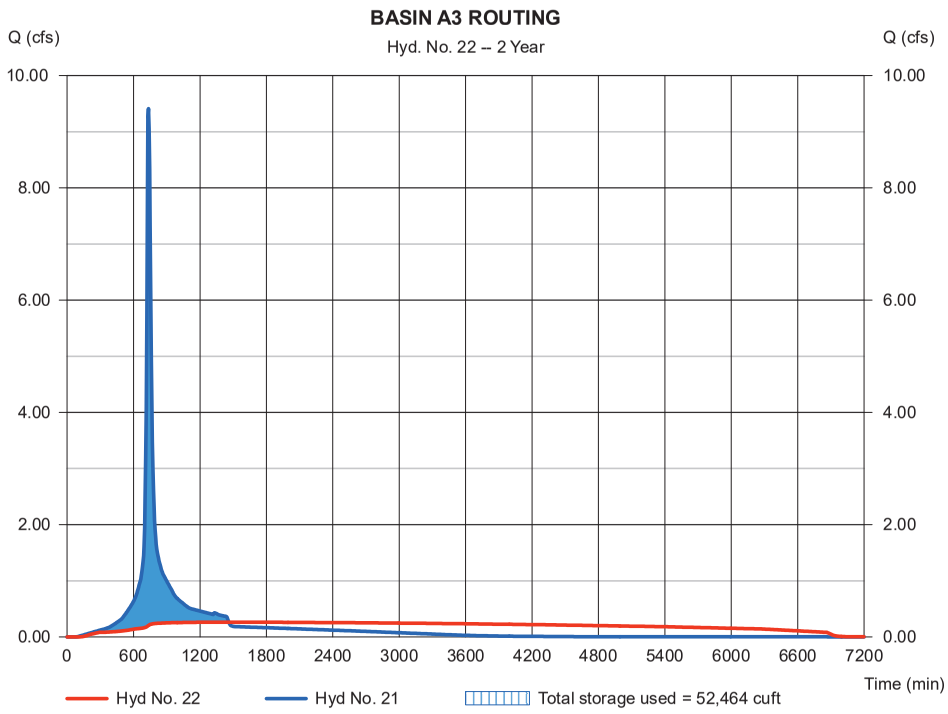
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Nov 11, 2020

Hyd. No. 22

BASIN A3 ROUTING

Hydrograph type	= Reservoir	Peak discharge	= 0.264 cfs
Storm frequency	= 2 yrs	Time to peak	= 1460 min
Time interval	= 5 min	Hyd. volume	= 82,578 cuft
Inflow hyd. No.	= 21 - COMBINED TO BASIN A3	Max. Elevation	= 93.84 ft
Reservoir name	= Det. Basin A3	Max. Storage	= 52,464 cuft

Storage Indication method used.



Pond Report

Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Nov 11, 2020

Pond No. 3 - Det. Basin A3

Pond Data

Contours - User-defined contour areas. Average end area method used for volume calculation. Begining Elevation = 91.15 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	91.15	00	0	0
0.35	91.50	1,788	313	313
0.85	92.00	13,579	3,842	4,155
1.35	92.50	21,050	8,657	12,812
1.85	93.00	28,520	12,393	25,204
2.35	93.50	32,690	15,303	40,507
2.85	94.00	36,859	17,387	57,894
3.35	94.50	39,201	19,015	76,909
3.85	95.00	41,542	20,186	97,095
4.35	95.50	43,314	21,214	118,309
4.85	96.00	45,086	22,100	140,409
5.35	96.50	46,864	22,988	163,396

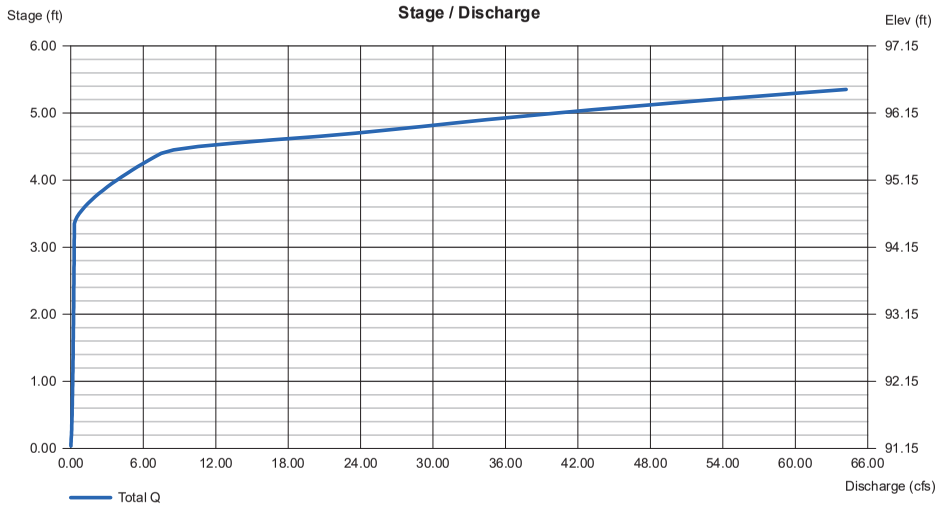
Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 18.00	2.50	0.00	0.00
Span (in)	= 18.00	2.50	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 90.28	91.15	0.00	0.00
Length (ft)	= 62.00	0.50	0.00	0.00
Slope (%)	= 1.00	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	Yes	Yes	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 2.00	14.00	20.00	0.00
Crest El. (ft)	= 94.50	95.55	95.60	0.00
Weir Coeff.	= 3.33	3.33	2.60	3.33
Weir Type	= Rect	Rect	Broad	---
Multi-Stage	= Yes	Yes	No	No
Exfil.(in/hr)	= 0.000 (by Wet area)			
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).

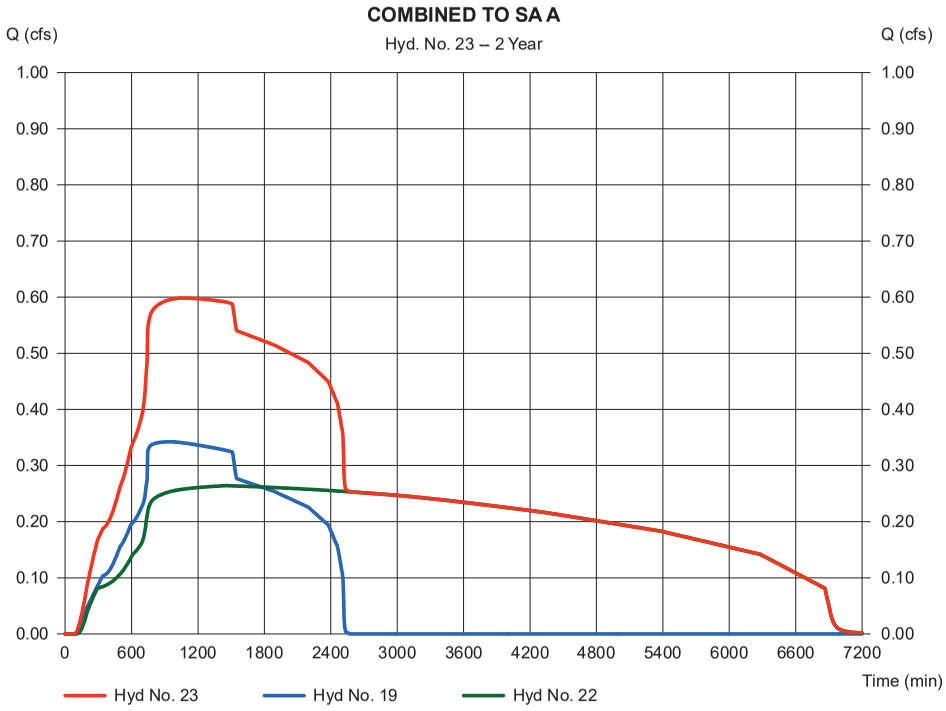


Hydrograph Report

Hyd. No. 23

COMBINED TO SA A

Hydrograph type	= Combine	Peak discharge	= 0.598 cfs
Storm frequency	= 2 yrs	Time to peak	= 1080 min
Time interval	= 5 min	Hyd. volume	= 117,115 cuft
Inflow hyds.	= 19, 22	Contrib. drain. area	= 0.000 ac



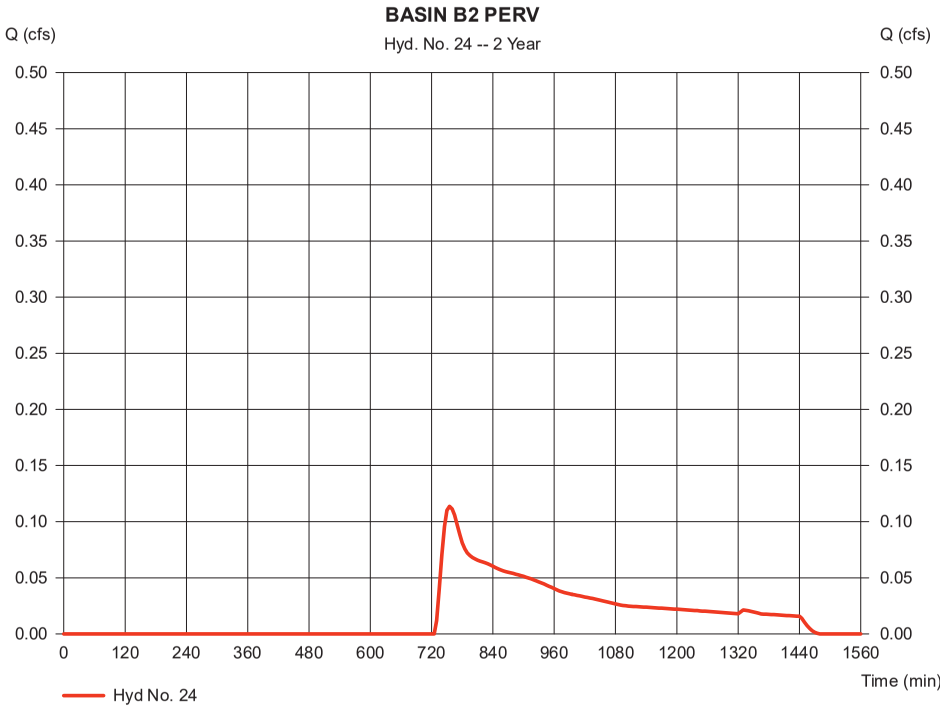
Hydrograph Report

Hyd. No. 24

BASIN B2 PERV

Hydrograph type	= SCS Runoff	Peak discharge	= 0.114 cfs
Storm frequency	= 2 yrs	Time to peak	= 755 min
Time interval	= 5 min	Hyd. volume	= 1,569 cuft
Drainage area	= 2.000 ac	Curve number	= 52*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 10.00 min
Total precip.	= 3.38 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

* Composite (Area/CN) = [(0.300 x 61) + (0.250 x 80) + (0.450 x 39) + (0.600 x 30) + (0.400 x 77)] / 2.000

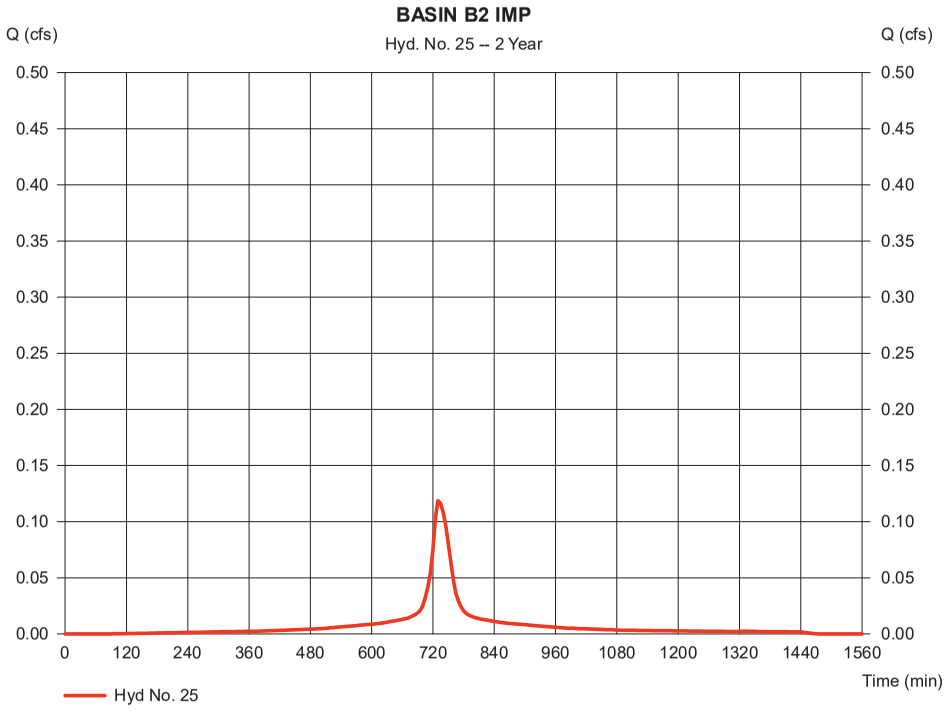


Hydrograph Report

Hyd. No. 25

BASIN B2 IMP

Hydrograph type	= SCS Runoff	Peak discharge	= 0.119 cfs
Storm frequency	= 2 yrs	Time to peak	= 730 min
Time interval	= 5 min	Hyd. volume	= 681 cuft
Drainage area	= 0.060 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 10.00 min
Total precip.	= 3.38 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

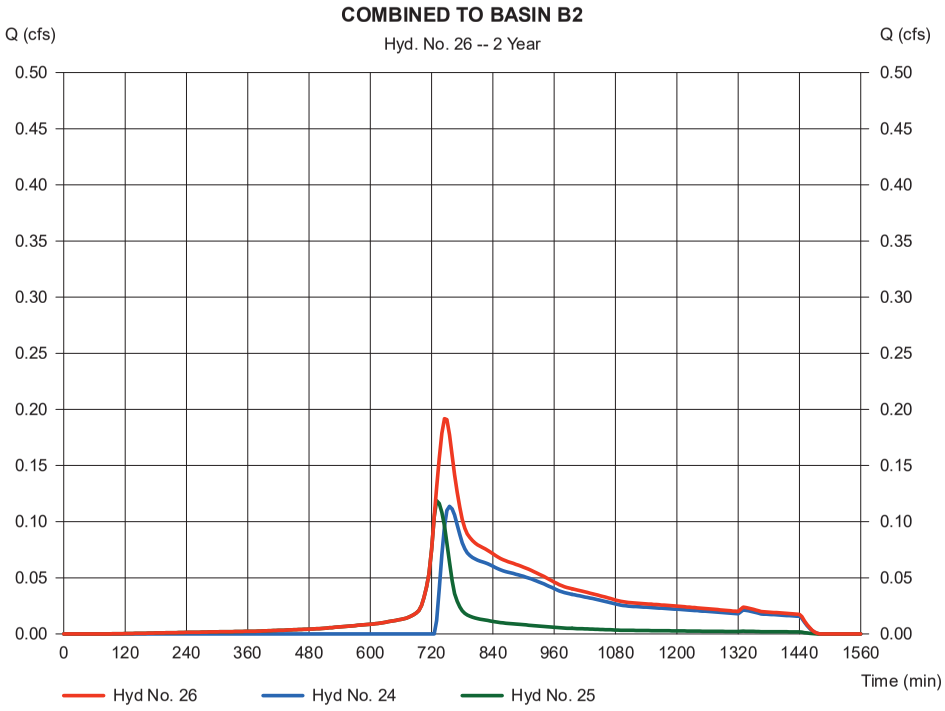


Hydrograph Report

Hyd. No. 26

COMBINED TO BASIN B2

Hydrograph type	= Combine	Peak discharge	= 0.192 cfs
Storm frequency	= 2 yrs	Time to peak	= 745 min
Time interval	= 5 min	Hyd. volume	= 2,250 cuft
Inflow hyds.	= 24, 25	Contrib. drain. area	= 2.060 ac

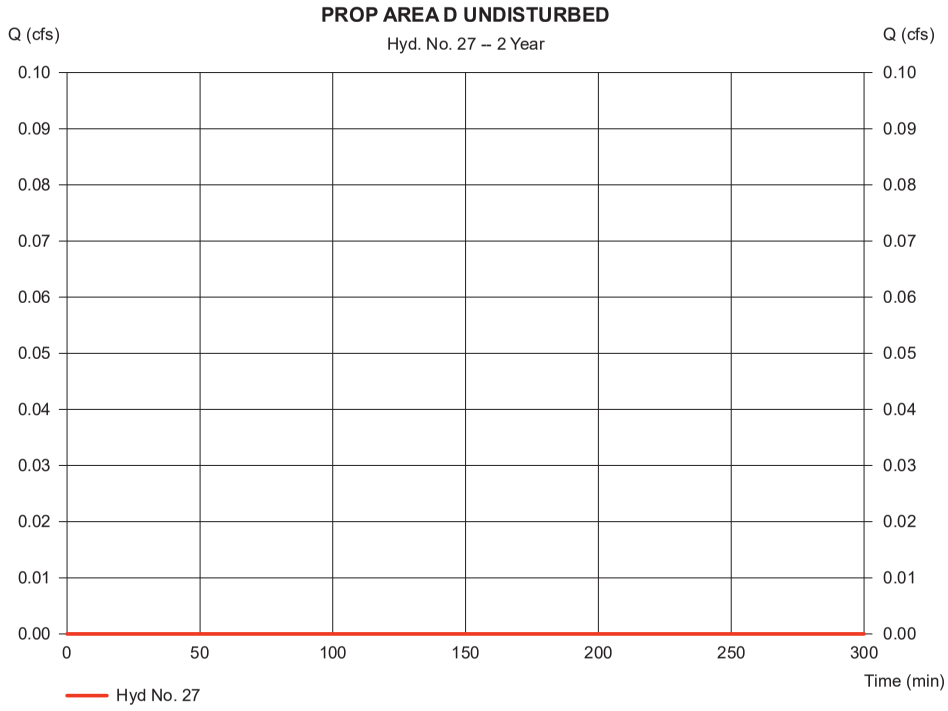


Hydrograph Report

Hyd. No. 27

PROP AREA D UNDISTURBED

Hydrograph type	= SCS Runoff	Peak discharge	= 0.000 cfs
Storm frequency	= 2 yrs	Time to peak	= n/a
Time interval	= 5 min	Hyd. volume	= 0 cuft
Drainage area	= 0.603 ac	Curve number	= 30
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 10.00 min
Total precip.	= 3.38 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285



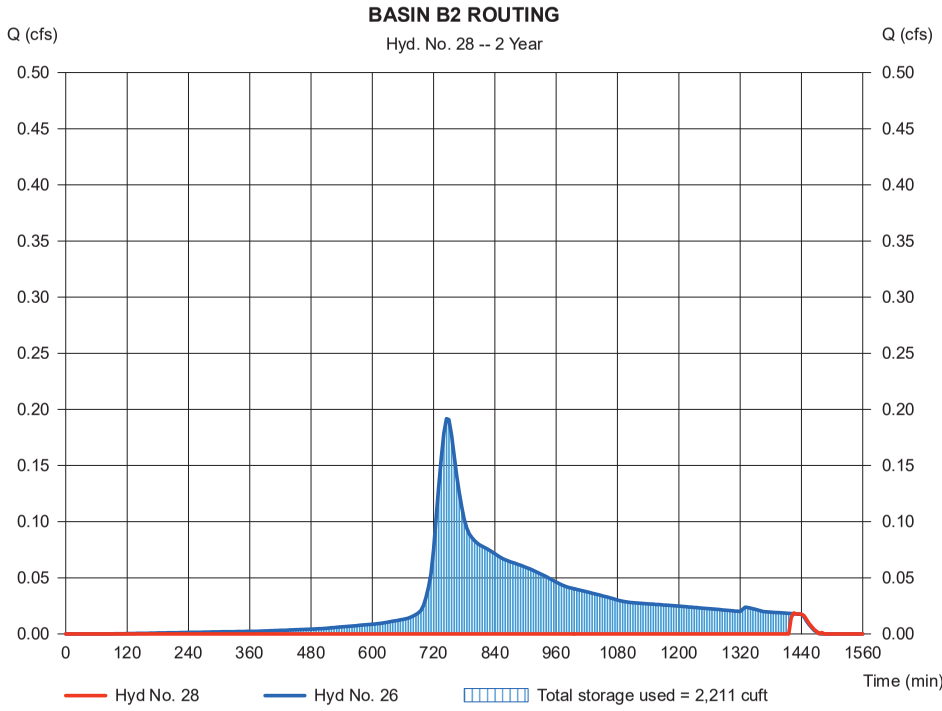
Hydrograph Report

Hyd. No. 28

BASIN B2 ROUTING

Hydrograph type	= Reservoir	Peak discharge	= 0.019 cfs
Storm frequency	= 2 yrs	Time to peak	= 1425 min
Time interval	= 5 min	Hyd. volume	= 42 cuft
Inflow hyd. No.	= 26 - COMBINED TO BASIN B2	Max. Elevation	= 96.25 ft
Reservoir name	= Recharge Basin B2	Max. Storage	= 2,211 cuft

Storage Indication method used.



Pond Report

Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Nov 11, 2020

Pond No. 5 - Recharge Basin B2

Pond Data

Contours - User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 94.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	94.00	00	0	0
0.50	94.50	393	65	65
1.00	95.00	785	289	354
1.50	95.50	1,323	521	875
2.00	96.00	1,861	792	1,667
2.50	96.50	2,486	1,083	2,750

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 0.00	0.00	0.00	0.00
Span (in)	= 0.00	0.00	0.00	0.00
No. Barrels	= 0	0	0	0
Invert El. (ft)	= 0.00	0.00	0.00	0.00
Length (ft)	= 0.00	0.00	0.00	0.00
Slope (%)	= 0.00	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	No	No	No

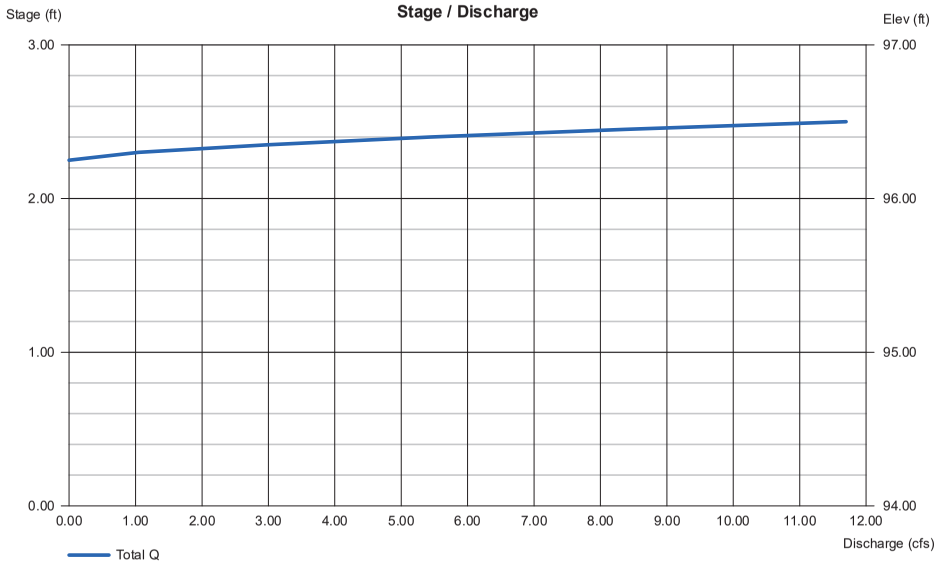
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 36.00	0.00	0.00	0.00
Crest El. (ft)	= 96.25	0.00	0.00	0.00
Weir Coeff.	= 2.60	3.33	3.33	3.33
Weir Type	= Broad	---	---	---
Multi-Stage	= No	No	No	No

Exfil.(in/hr) = 0.000 (by Wet area)

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).



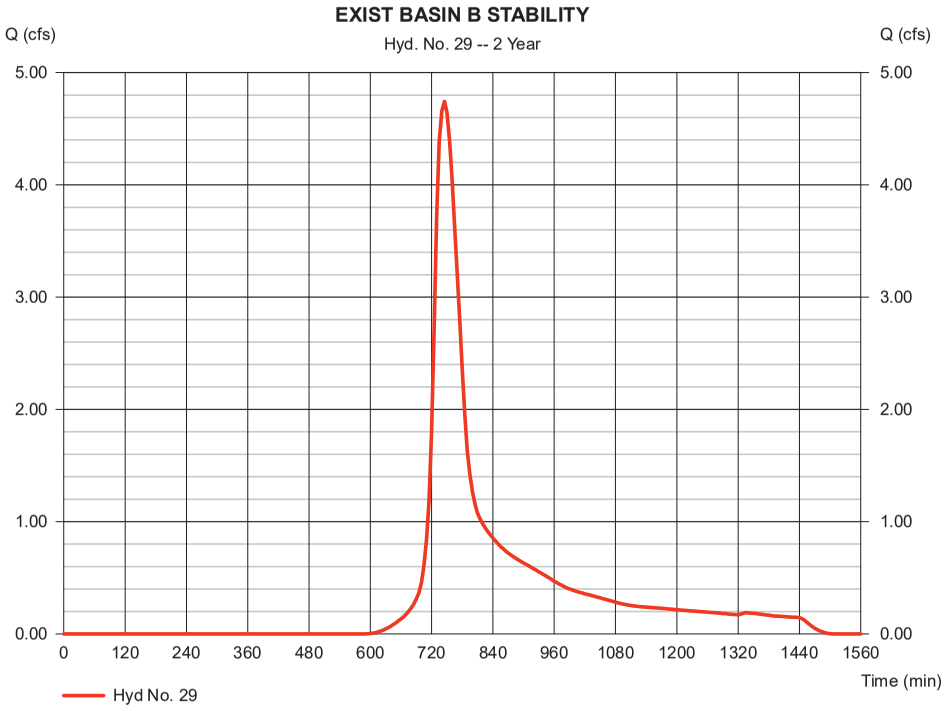
Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Nov 11, 2020

Hyd. No. 29

EXIST BASIN B STABILITY

Hydrograph type	= SCS Runoff	Peak discharge	= 4.744 cfs
Storm frequency	= 2 yrs	Time to peak	= 745 min
Time interval	= 5 min	Hyd. volume	= 31,676 cuft
Drainage area	= 6.310 ac	Curve number	= 77
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 20.00 min
Total precip.	= 3.38 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285



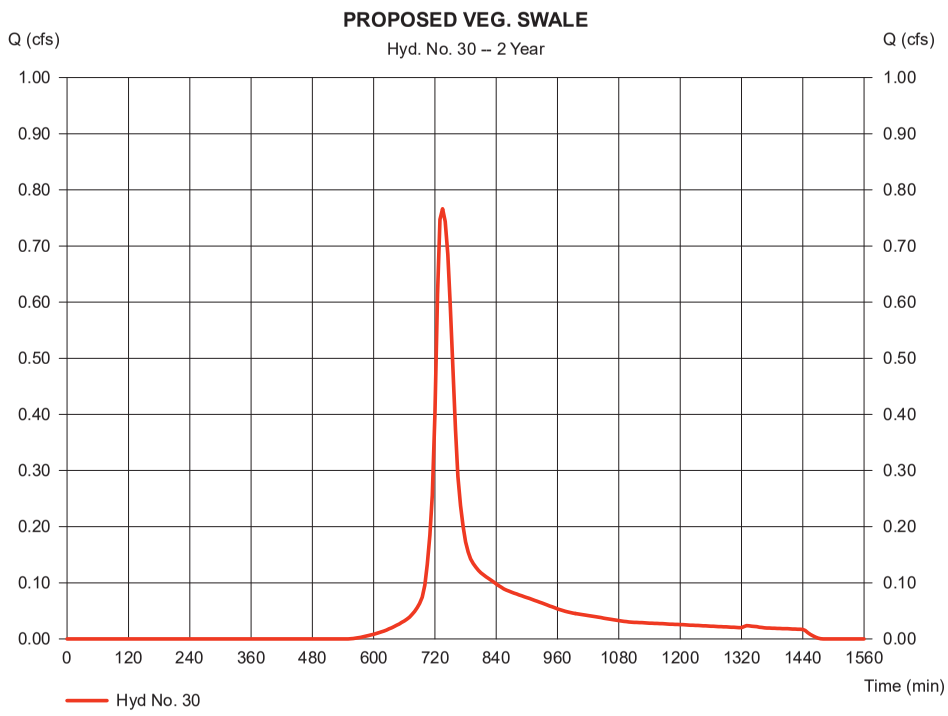
Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Nov 11, 2020

Hyd. No. 30

PROPOSED VEG. SWALE

Hydrograph type	= SCS Runoff	Peak discharge	= 0.766 cfs
Storm frequency	= 2 yrs	Time to peak	= 735 min
Time interval	= 5 min	Hyd. volume	= 4,060 cuft
Drainage area	= 0.730 ac	Curve number	= 80
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 10.00 min
Total precip.	= 3.38 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285



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	3.120	5	755	34,897	----	------	------	EXIST DISTURBED AREA A
2	SCS Runoff	3.122	5	750	27,565	----	------	------	EXIST DISTURBED AREA B
3	SCS Runoff	0.126	5	750	1,393	----	------	------	EXIST AREA D DISTURBED WOOD
4	SCS Runoff	6.473	5	730	37,819	----	------	------	AREA A1-IMPERVIOUS
5	SCS Runoff	0.803	5	740	5,139	----	------	------	AREA A1-PERV
6	Combine	7.139	5	730	42,958	4, 5	------	------	BASIN A1 INFLOW
7	SCS Runoff	9.371	5	730	54,748	----	------	------	AREA A2-IMP
8	SCS Runoff	0.104	5	765	2,017	----	------	------	AREA A2-PERV
9	Combine	9.371	5	730	56,765	7, 8	------	------	BASIN A2-INFLOW
10	SCS Runoff	1.180	5	750	8,839	----	------	------	AREA A3-WOODS
11	SCS Runoff	2.944	5	740	19,215	----	------	------	AREA A3 Open Space D
12	SCS Runoff	11.87	5	730	69,336	----	------	------	AREA A3-IMP
13	SCS Runoff	0.010	5	1330	191	----	------	------	AREA A3- Open Space A
14	Combine	15.47	5	735	97,580	10, 11, 12, 13	------	------	BASIN A3-INFLOW
15	SCS Runoff	8.631	5	730	50,426	----	------	------	BASIN B1-IMP
16	SCS Runoff	1.471	5	735	7,721	----	------	------	BASIN B1-PERV
17	Combine	10.08	5	730	58,147	15, 16	------	------	BASIN B-INFLOW
18	Reservoir	0.262	5	1070	42,855	6	105.16	31,745	BASIN A1 ROUTING
19	Reservoir	2.064	5	775	56,764	9	96.45	29,227	BASIN A2 ROUTING
20	Reservoir	2.347	5	770	58,145	17	104.42	28,111	BASIN B1 ROUTING
21	Combine	15.66	5	735	140,435	14, 18,	------	------	COMBINED TO BASIN A3
22	Reservoir	0.712	5	1185	140,422	21	94.66	83,181	BASIN A3 ROUTING
23	Combine	2.339	5	775	197,186	19, 22	------	------	COMBINED TO SA A
24	SCS Runoff	0.968	5	745	6,548	----	------	------	BASIN B2 PERV
25	SCS Runoff	0.185	5	730	1,081	----	------	------	BASIN B2 IMP
26	Combine	1.130	5	740	7,629	24, 25	------	------	COMBINED TO BASIN B2
27	SCS Runoff	0.001	5	1330	29	----	------	------	PROP AREA D UNDISTURBED
28	Reservoir	0.836	5	760	5,420	26	96.30	2,295	BASIN B2 ROUTING
29	SCS Runoff	10.17	5	745	66,480	----	------	------	EXIST BASIN B STABILITY
30	SCS Runoff	1.552	5	735	8,148	----	------	------	PROPOSED VEG. SWALE

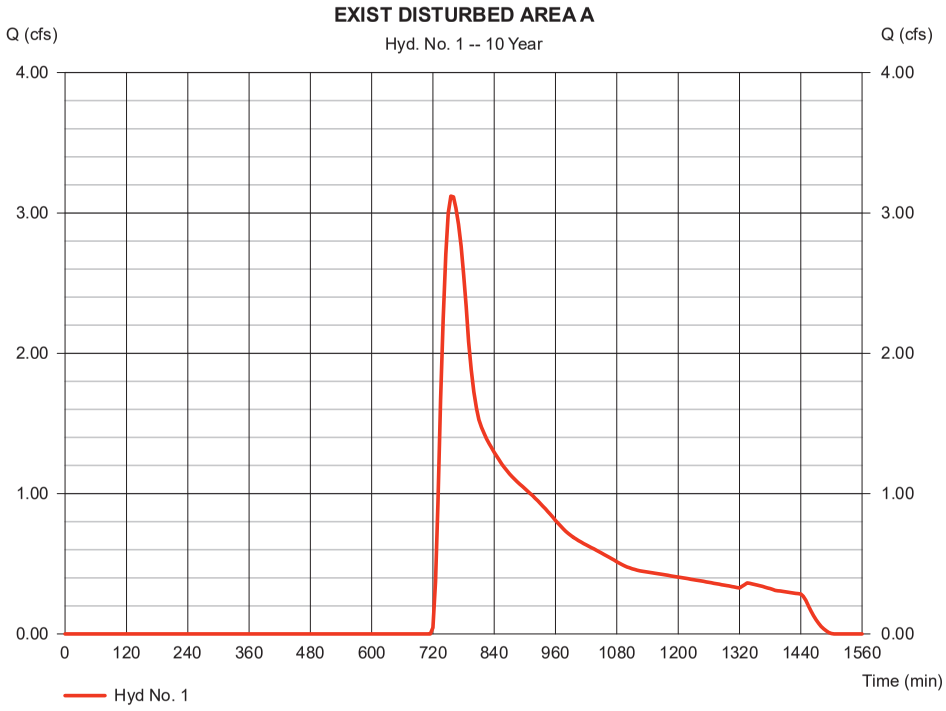
Hydrograph Report

Hyd. No. 1

EXIST DISTURBED AREA A

Hydrograph type	= SCS Runoff	Peak discharge	= 3.120 cfs
Storm frequency	= 10 yrs	Time to peak	= 755 min
Time interval	= 5 min	Hyd. volume	= 34,897 cuft
Drainage area	= 16.460 ac	Curve number	= 46*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 22.00 min
Total precip.	= 5.23 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

* Composite (Area/CN) = [(9.090 x 30) + (0.470 x 55) + (0.480 x 80) + (2.130 x 39) + (4.290 x 77)] / 16.460



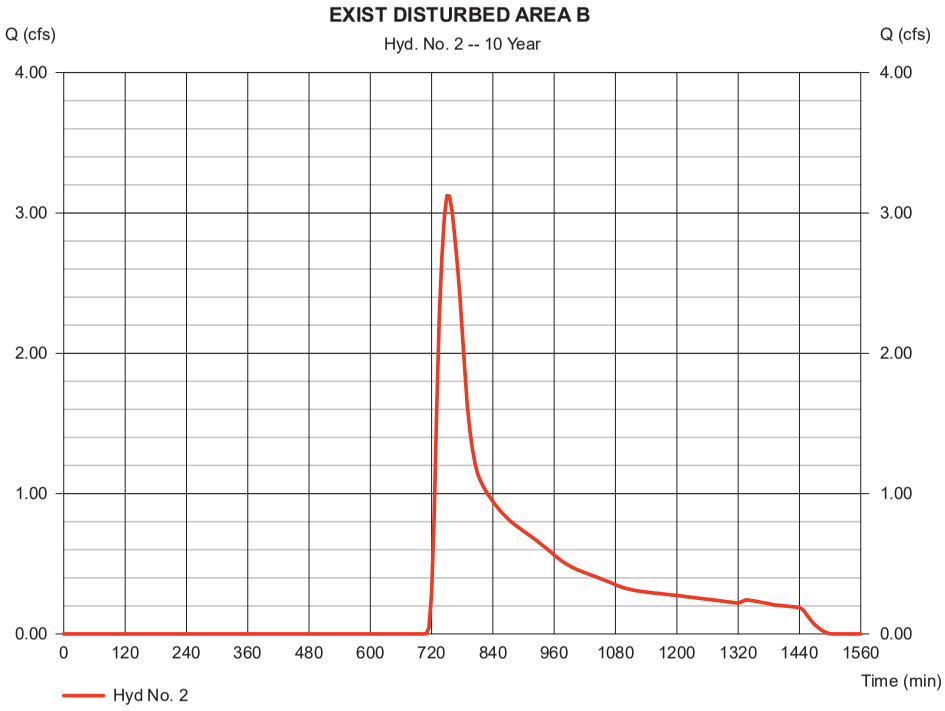
Hydrograph Report

Hyd. No. 2

EXIST DISTURBED AREA B

Hydrograph type	= SCS Runoff	Peak discharge	= 3.122 cfs
Storm frequency	= 10 yrs	Time to peak	= 750 min
Time interval	= 5 min	Hyd. volume	= 27,565 cuft
Drainage area	= 8.700 ac	Curve number	= 51*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 20.00 min
Total precip.	= 5.23 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

* Composite (Area/CN) = [(4.860 x 30) + (0.320 x 80) + (3.520 x 77)] / 8.700



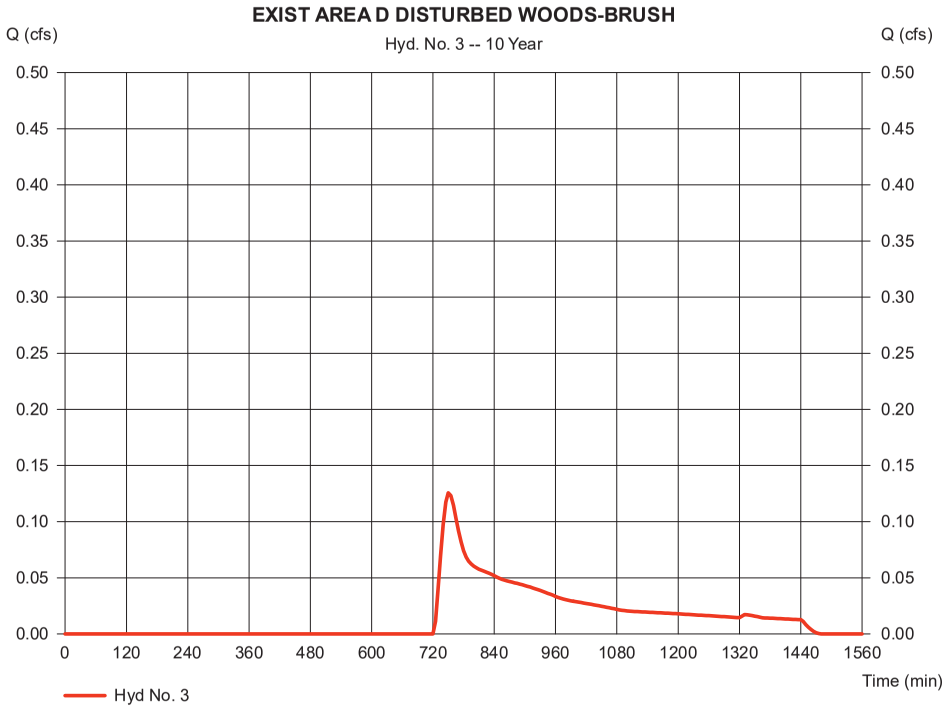
Hydrograph Report

Hyd. No. 3

EXIST AREA D DISTURBED WOODS-BRUSH

Hydrograph type	= SCS Runoff	Peak discharge	= 0.126 cfs
Storm frequency	= 10 yrs	Time to peak	= 750 min
Time interval	= 5 min	Hyd. volume	= 1,393 cuft
Drainage area	= 0.920 ac	Curve number	= 43*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 10.00 min
Total precip.	= 5.23 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

* Composite (Area/CN) = [(0.461 x 30) + (0.461 x 55)] / 0.920

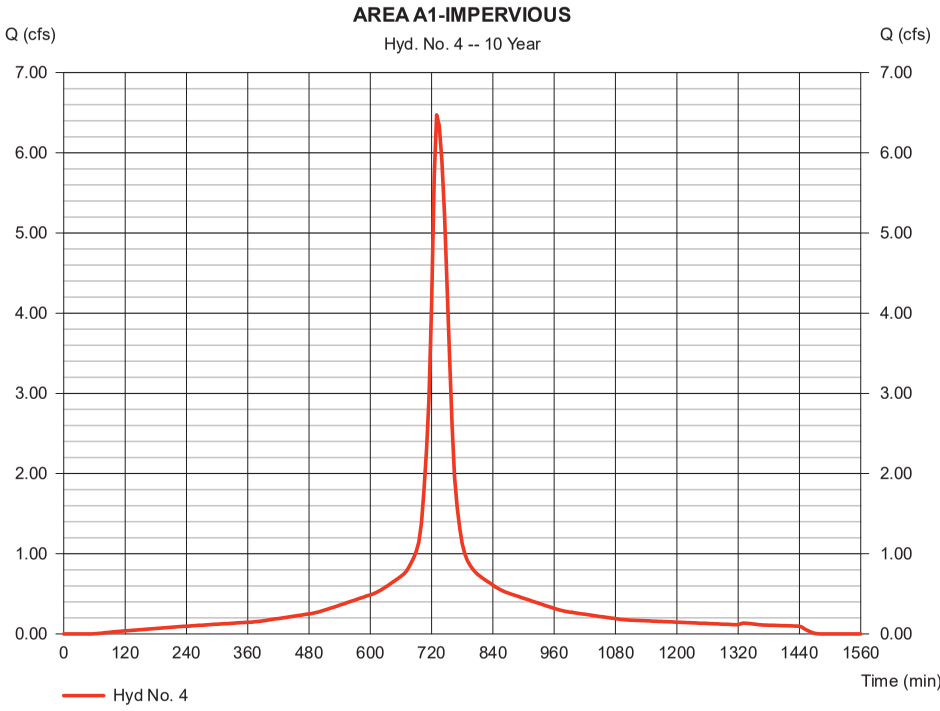


Hydrograph Report

Hyd. No. 4

AREA A1-IMPERVIOUS

Hydrograph type	= SCS Runoff	Peak discharge	= 6.473 cfs
Storm frequency	= 10 yrs	Time to peak	= 730 min
Time interval	= 5 min	Hyd. volume	= 37,819 cuft
Drainage area	= 2.100 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 10.00 min
Total precip.	= 5.23 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

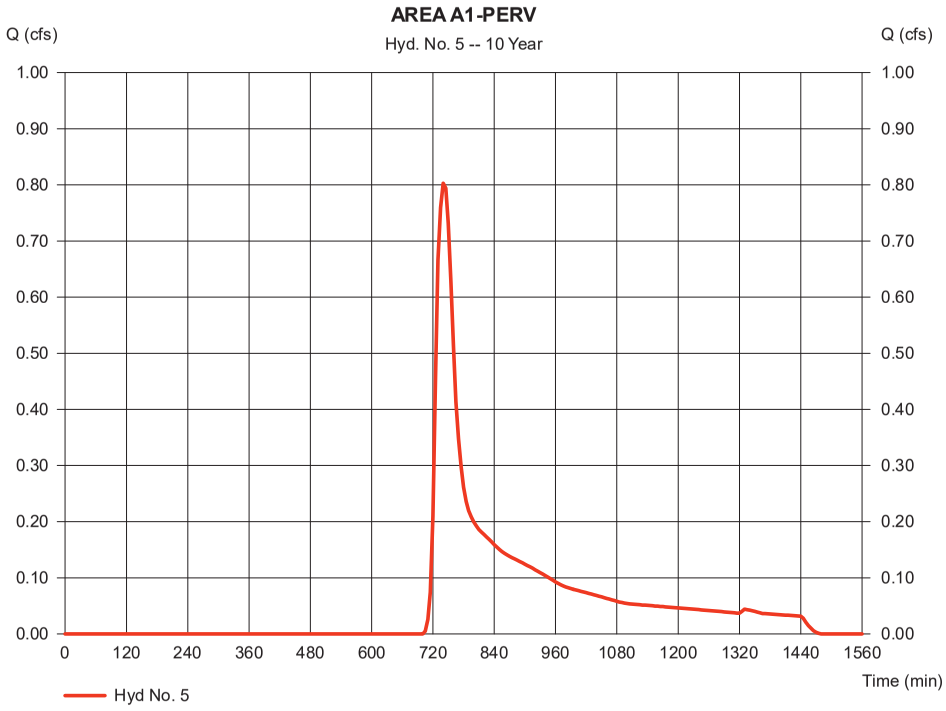


Hydrograph Report

Hyd. No. 5

AREA A1-PERV

Hydrograph type	= SCS Runoff	Peak discharge	= 0.803 cfs
Storm frequency	= 10 yrs	Time to peak	= 740 min
Time interval	= 5 min	Hyd. volume	= 5,139 cuft
Drainage area	= 1.380 ac	Curve number	= 54
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 10.00 min
Total precip.	= 5.23 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

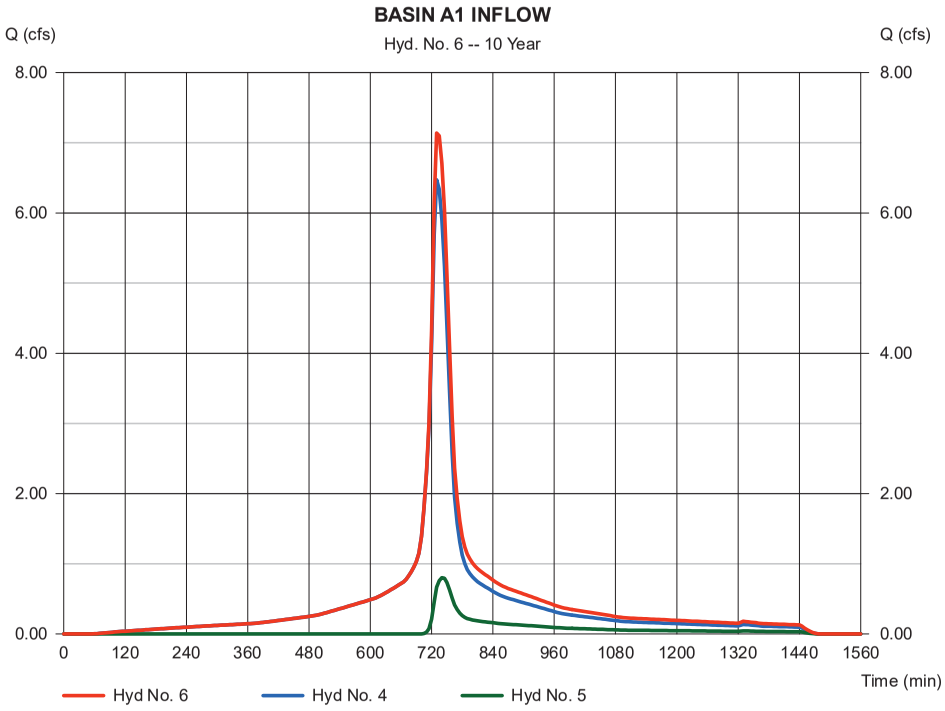


Hydrograph Report

Hyd. No. 6

BASIN A1 INFLOW

Hydrograph type	= Combine	Peak discharge	= 7.139 cfs
Storm frequency	= 10 yrs	Time to peak	= 730 min
Time interval	= 5 min	Hyd. volume	= 42,958 cuft
Inflow hyds.	= 4, 5	Contrib. drain. area	= 3.480 ac

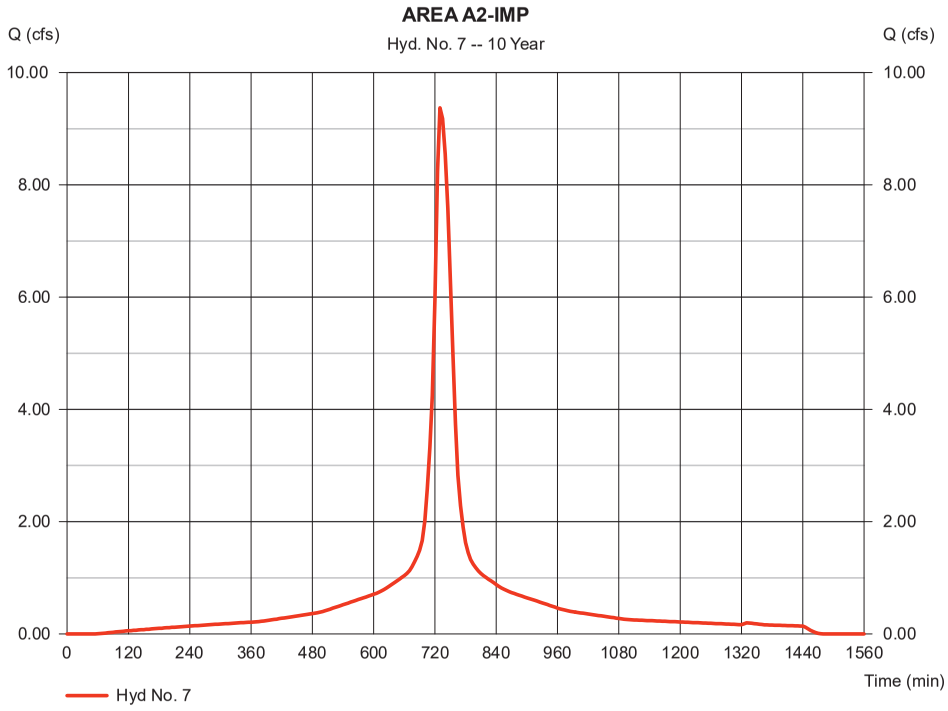


Hydrograph Report

Hyd. No. 7

AREA A2-IMP

Hydrograph type	= SCS Runoff	Peak discharge	= 9.371 cfs
Storm frequency	= 10 yrs	Time to peak	= 730 min
Time interval	= 5 min	Hyd. volume	= 54,748 cuft
Drainage area	= 3.040 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 10.00 min
Total precip.	= 5.23 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285



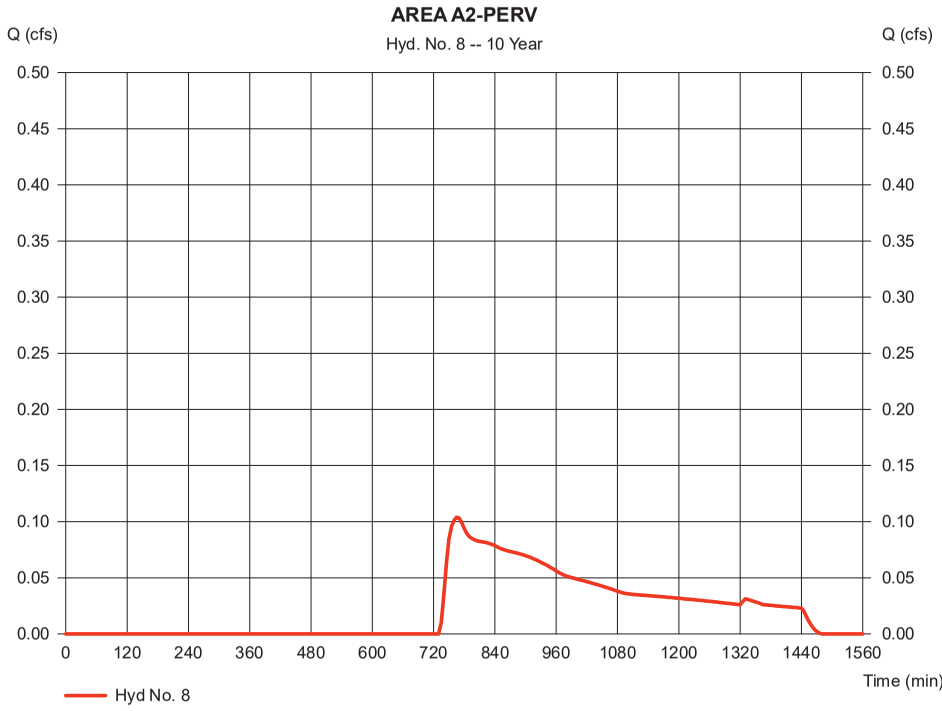
Hydrograph Report

Hyd. No. 8

AREA A2-PERV

Hydrograph type	= SCS Runoff	Peak discharge	= 0.104 cfs
Storm frequency	= 10 yrs	Time to peak	= 765 min
Time interval	= 5 min	Hyd. volume	= 2,017 cuft
Drainage area	= 2.250 ac	Curve number	= 39*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 10.00 min
Total precip.	= 5.23 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

* Composite (Area/CN) = [(0.840 x 80) + (0.390 x 61)] / 2.250

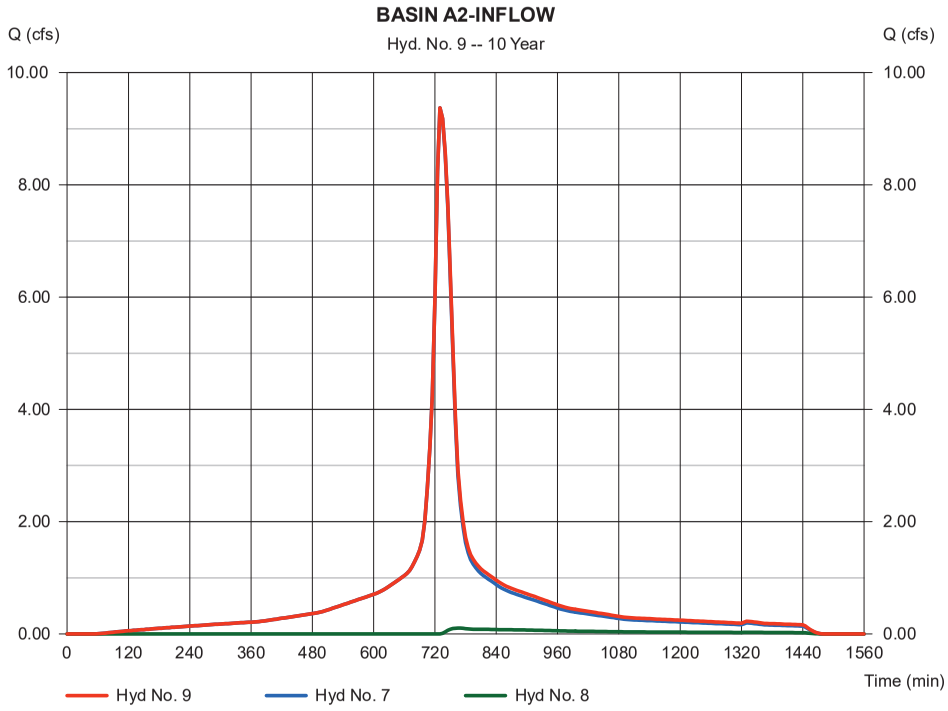


Hydrograph Report

Hyd. No. 9

BASIN A2-INFLOW

Hydrograph type	= Combine	Peak discharge	= 9.371 cfs
Storm frequency	= 10 yrs	Time to peak	= 730 min
Time interval	= 5 min	Hyd. volume	= 56,765 cuft
Inflow hyds.	= 7, 8	Contrib. drain. area	= 5.290 ac

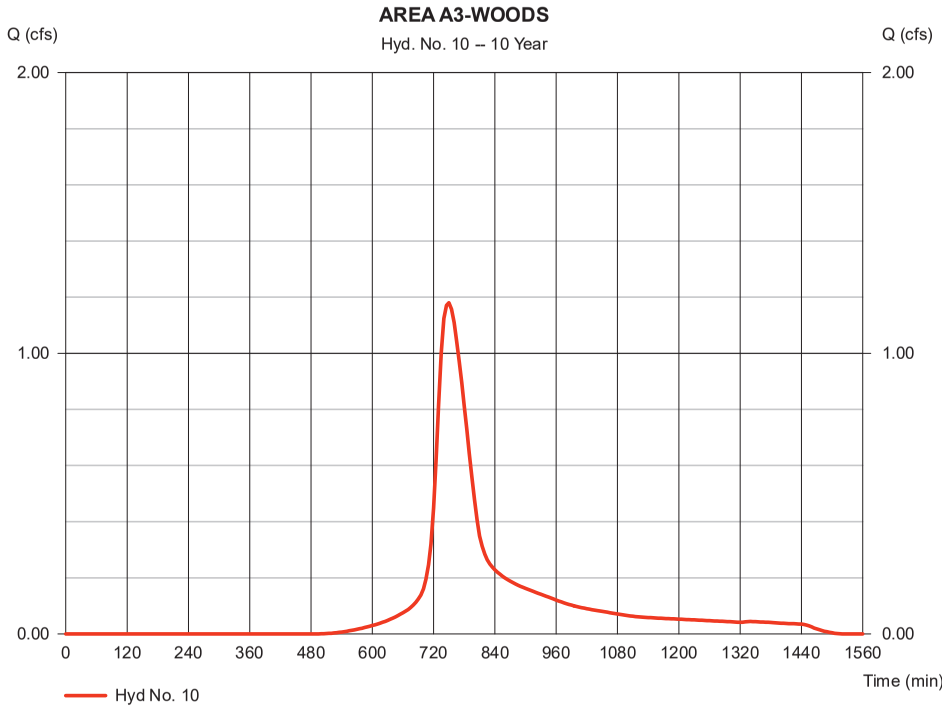


Hydrograph Report

Hyd. No. 10

AREA A3-WOODS

Hydrograph type	= SCS Runoff	Peak discharge	= 1.180 cfs
Storm frequency	= 10 yrs	Time to peak	= 750 min
Time interval	= 5 min	Hyd. volume	= 8,839 cuft
Drainage area	= 0.870 ac	Curve number	= 77
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 25.00 min
Total precip.	= 5.23 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

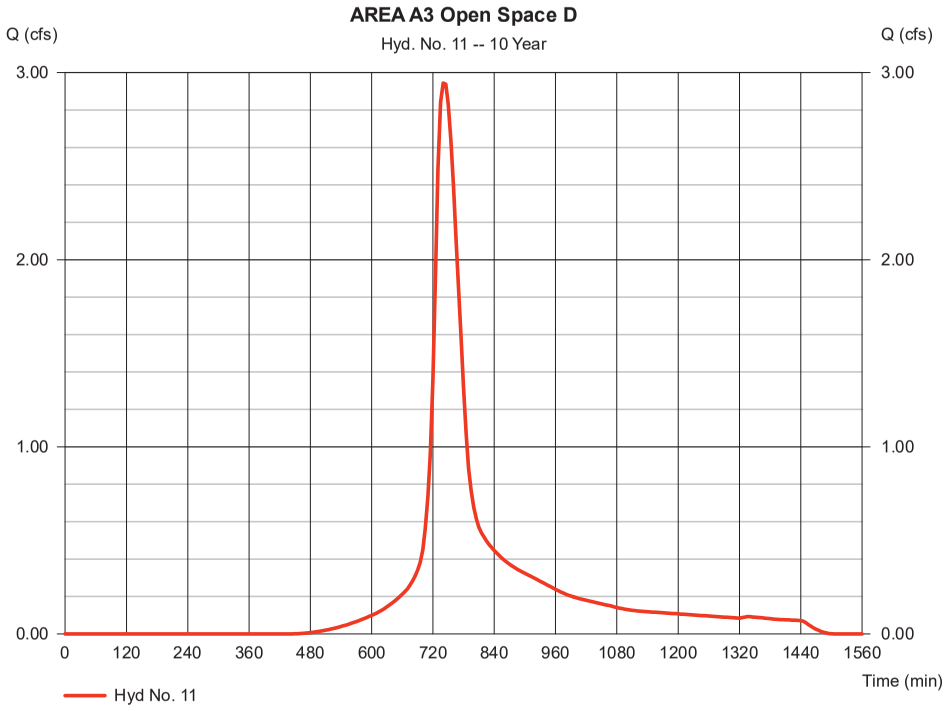


Hydrograph Report

Hyd. No. 11

AREA A3 Open Space D

Hydrograph type	= SCS Runoff	Peak discharge	= 2.944 cfs
Storm frequency	= 10 yrs	Time to peak	= 740 min
Time interval	= 5 min	Hyd. volume	= 19,215 cuft
Drainage area	= 1.660 ac	Curve number	= 80
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 20.00 min
Total precip.	= 5.23 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

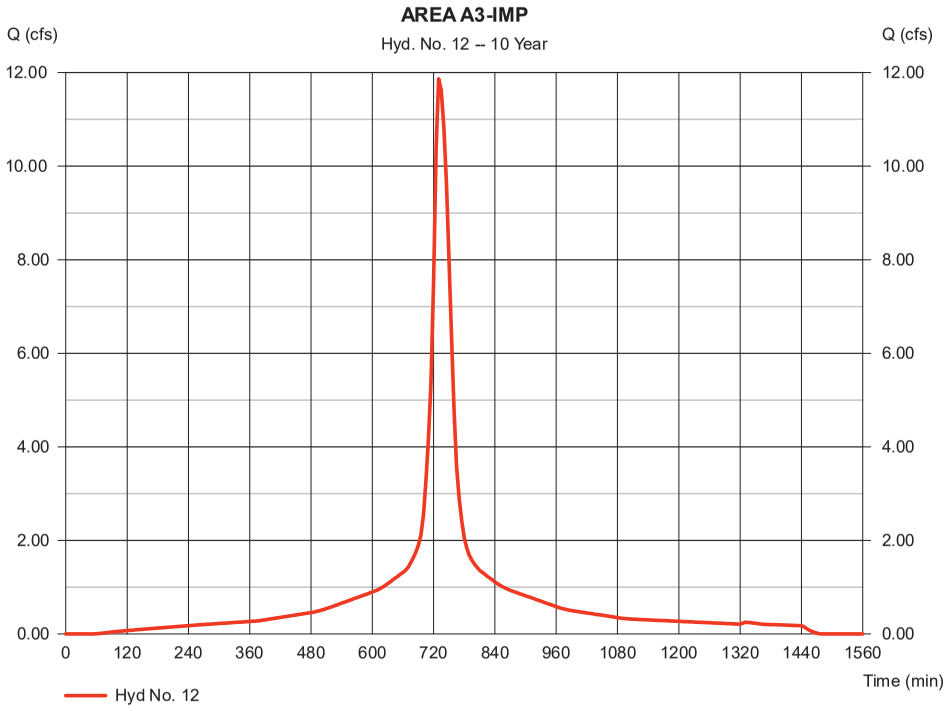


Hydrograph Report

Hyd. No. 12

AREA A3-IMP

Hydrograph type	= SCS Runoff	Peak discharge	= 11.87 cfs
Storm frequency	= 10 yrs	Time to peak	= 730 min
Time interval	= 5 min	Hyd. volume	= 69,336 cuft
Drainage area	= 3.850 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 10.00 min
Total precip.	= 5.23 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

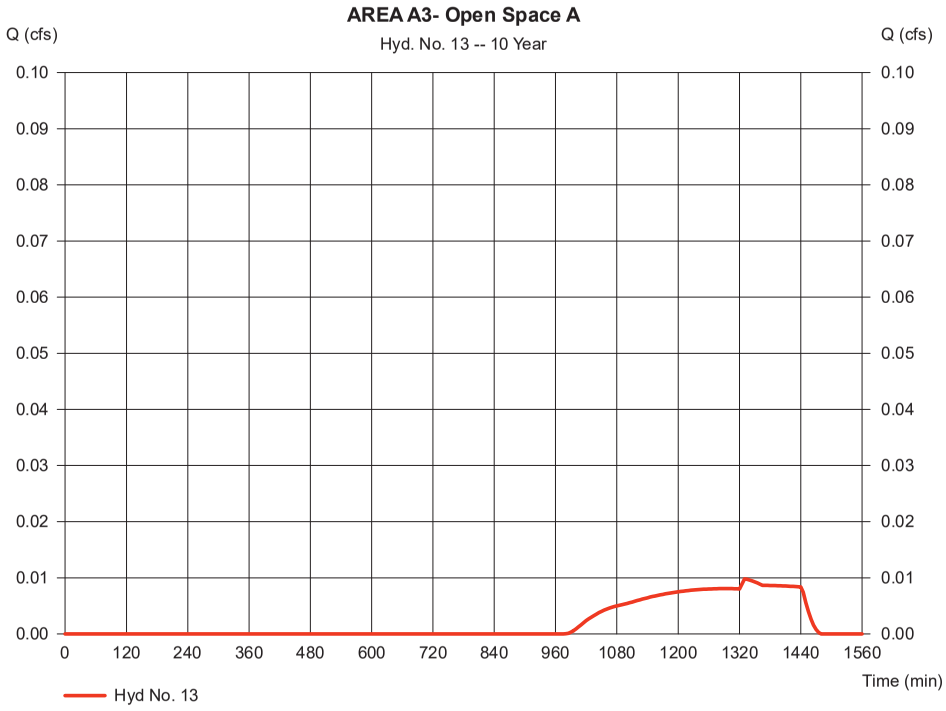


Hydrograph Report

Hyd. No. 13

AREA A3- Open Space A

Hydrograph type	= SCS Runoff	Peak discharge	= 0.010 cfs
Storm frequency	= 10 yrs	Time to peak	= 1330 min
Time interval	= 5 min	Hyd. volume	= 191 cuft
Drainage area	= 3.980 ac	Curve number	= 30
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 10.00 min
Total precip.	= 5.23 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

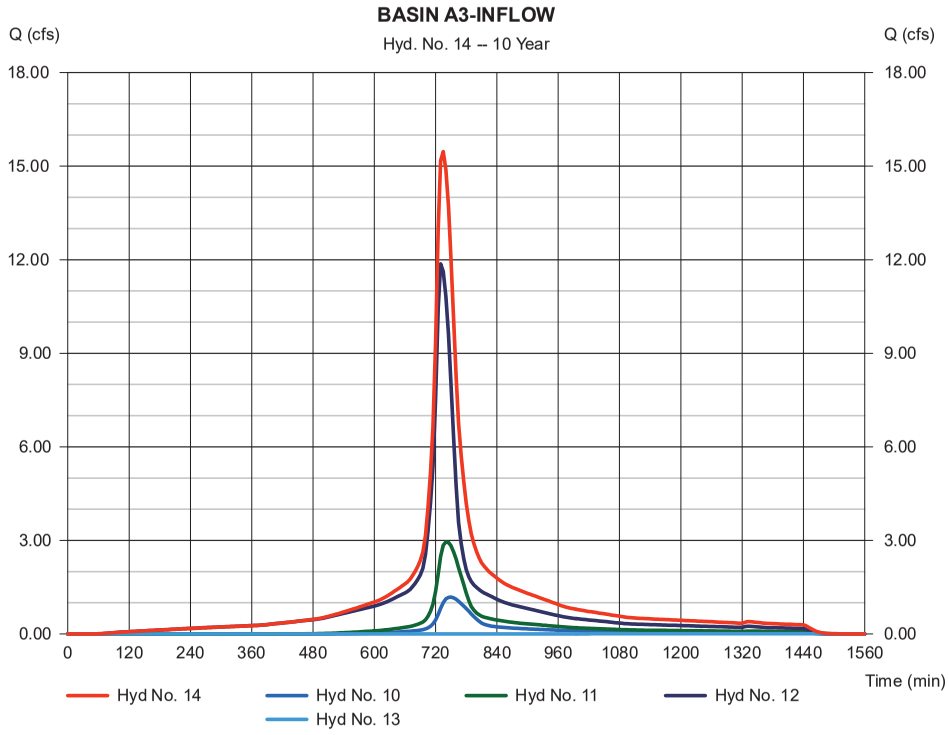


Hydrograph Report

Hyd. No. 14

BASIN A3-INFLOW

Hydrograph type	= Combine	Peak discharge	= 15.47 cfs
Storm frequency	= 10 yrs	Time to peak	= 735 min
Time interval	= 5 min	Hyd. volume	= 97,580 cuft
Inflow hyds.	= 10, 11, 12, 13	Contrib. drain. area	= 10.360 ac

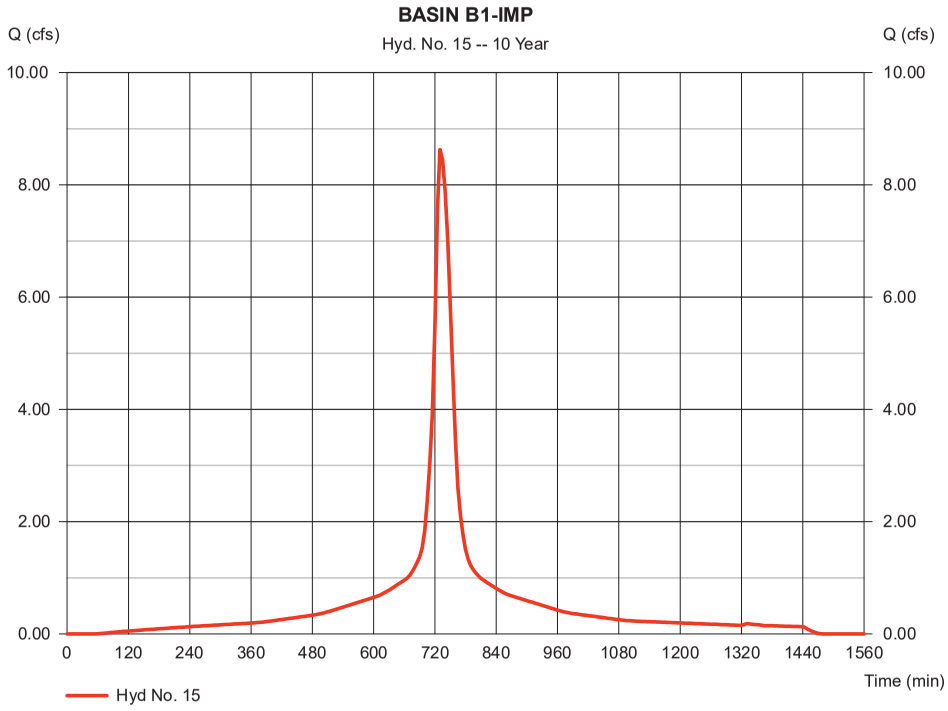


Hydrograph Report

Hyd. No. 15

BASIN B1-IMP

Hydrograph type	= SCS Runoff	Peak discharge	= 8.631 cfs
Storm frequency	= 10 yrs	Time to peak	= 730 min
Time interval	= 5 min	Hyd. volume	= 50,426 cuft
Drainage area	= 2.800 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 10.00 min
Total precip.	= 5.23 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

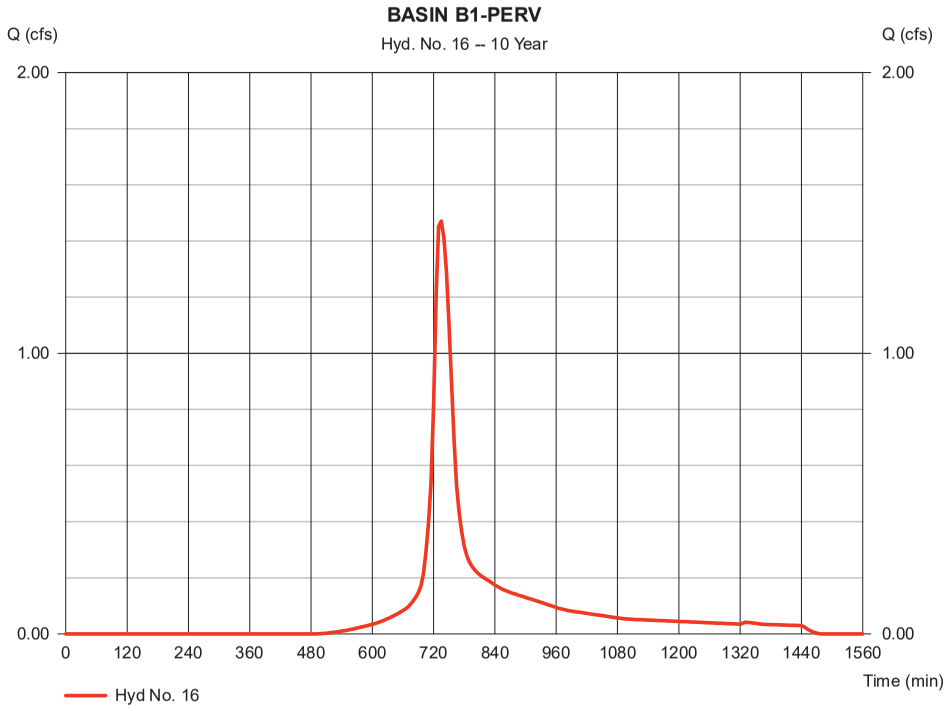


Hydrograph Report

Hyd. No. 16

BASIN B1-PERV

Hydrograph type	= SCS Runoff	Peak discharge	= 1.471 cfs
Storm frequency	= 10 yrs	Time to peak	= 735 min
Time interval	= 5 min	Hyd. volume	= 7,721 cuft
Drainage area	= 0.760 ac	Curve number	= 77
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 10.00 min
Total precip.	= 5.23 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

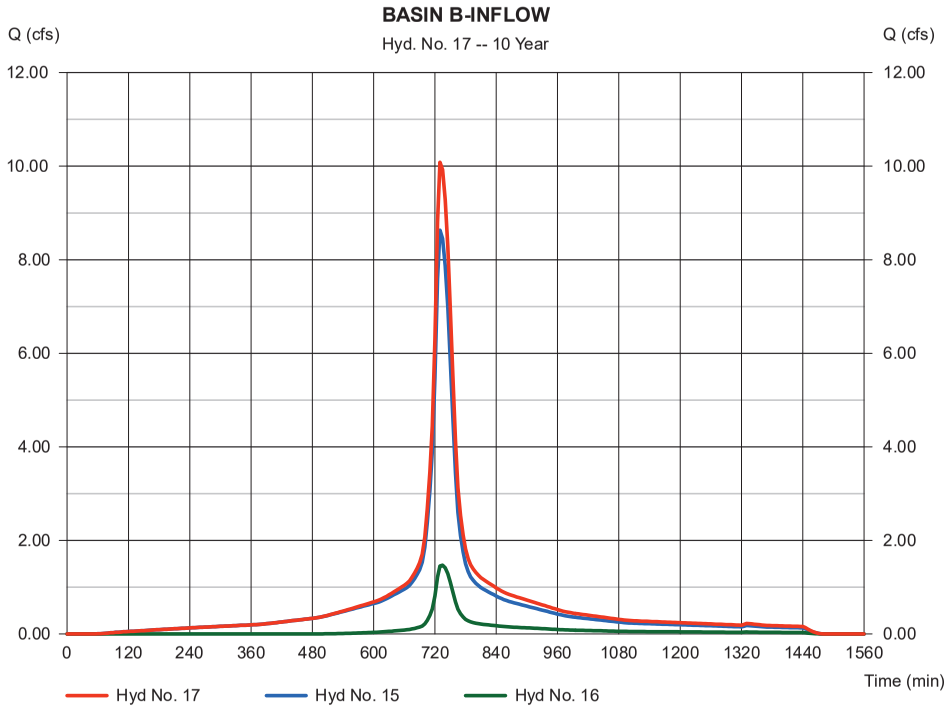


Hydrograph Report

Hyd. No. 17

BASIN B-INFLOW

Hydrograph type	= Combine	Peak discharge	= 10.08 cfs
Storm frequency	= 10 yrs	Time to peak	= 730 min
Time interval	= 5 min	Hyd. volume	= 58,147 cuft
Inflow hyds.	= 15, 16	Contrib. drain. area	= 3.560 ac



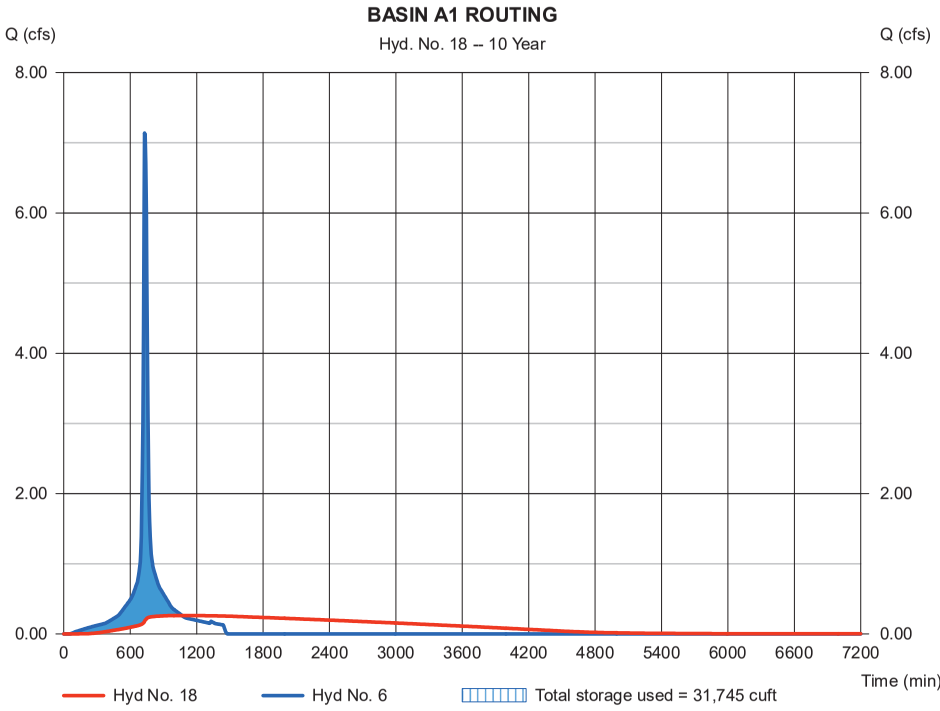
Hydrograph Report

Hyd. No. 18

BASIN A1 ROUTING

Hydrograph type	= Reservoir	Peak discharge	= 0.262 cfs
Storm frequency	= 10 yrs	Time to peak	= 1070 min
Time interval	= 5 min	Hyd. volume	= 42,855 cuft
Inflow hyd. No.	= 6 - BASIN A1 INFLOW	Max. Elevation	= 105.16 ft
Reservoir name	= Inf. Basin A1	Max. Storage	= 31,745 cuft

Storage Indication method used.



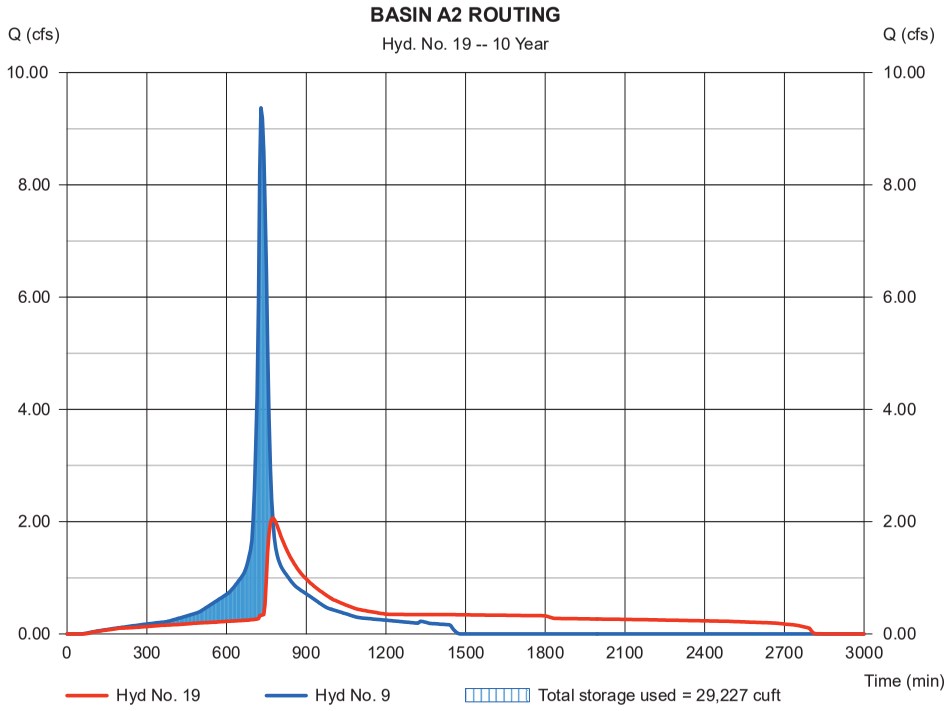
Hydrograph Report

Hyd. No. 19

BASIN A2 ROUTING

Hydrograph type	= Reservoir	Peak discharge	= 2.064 cfs
Storm frequency	= 10 yrs	Time to peak	= 775 min
Time interval	= 5 min	Hyd. volume	= 56,764 cuft
Inflow hyd. No.	= 9 - BASIN A2-INFLOW	Max. Elevation	= 96.45 ft
Reservoir name	= Det. Basin A2	Max. Storage	= 29,227 cuft

Storage Indication method used.



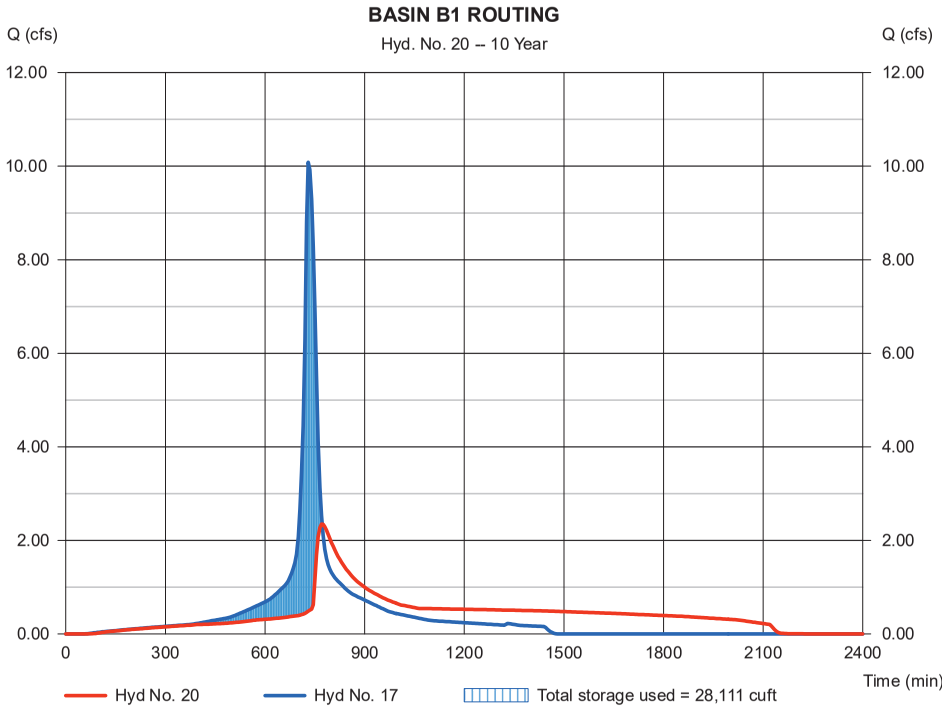
Hydrograph Report

Hyd. No. 20

BASIN B1 ROUTING

Hydrograph type	= Reservoir	Peak discharge	= 2.347 cfs
Storm frequency	= 10 yrs	Time to peak	= 770 min
Time interval	= 5 min	Hyd. volume	= 58,145 cuft
Inflow hyd. No.	= 17 - BASIN B-INFLOW	Max. Elevation	= 104.42 ft
Reservoir name	= Det. Basin B1	Max. Storage	= 28,111 cuft

Storage Indication method used.



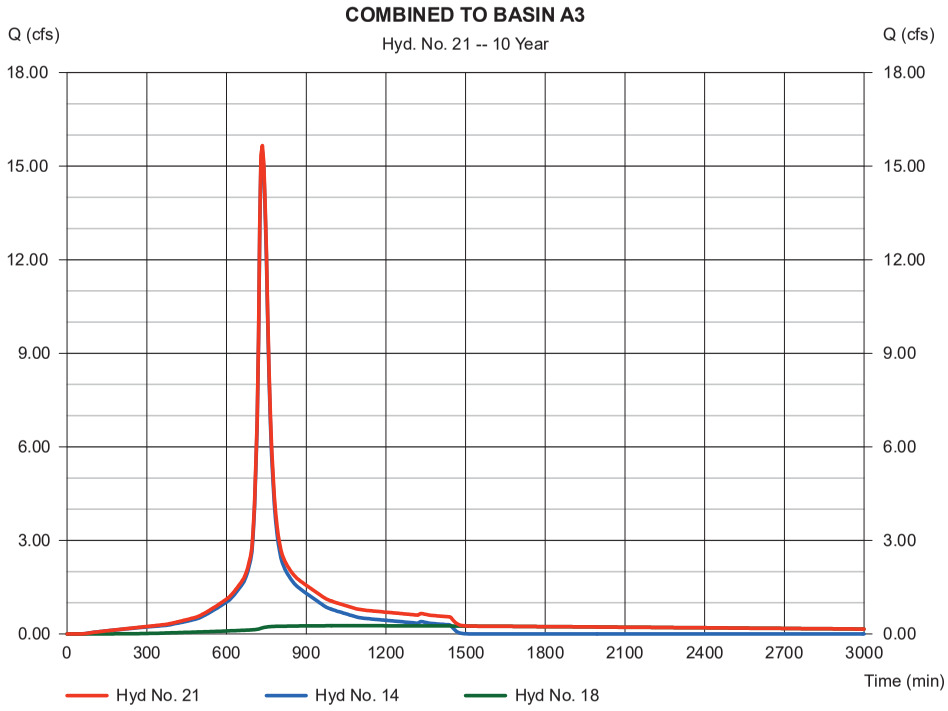
Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Nov 11, 2020

Hyd. No. 21

COMBINED TO BASIN A3

Hydrograph type	= Combine	Peak discharge	= 15.66 cfs
Storm frequency	= 10 yrs	Time to peak	= 735 min
Time interval	= 5 min	Hyd. volume	= 140,435 cuft
Inflow hyds.	= 14, 18	Contrib. drain. area	= 0.000 ac



Hydrograph Report

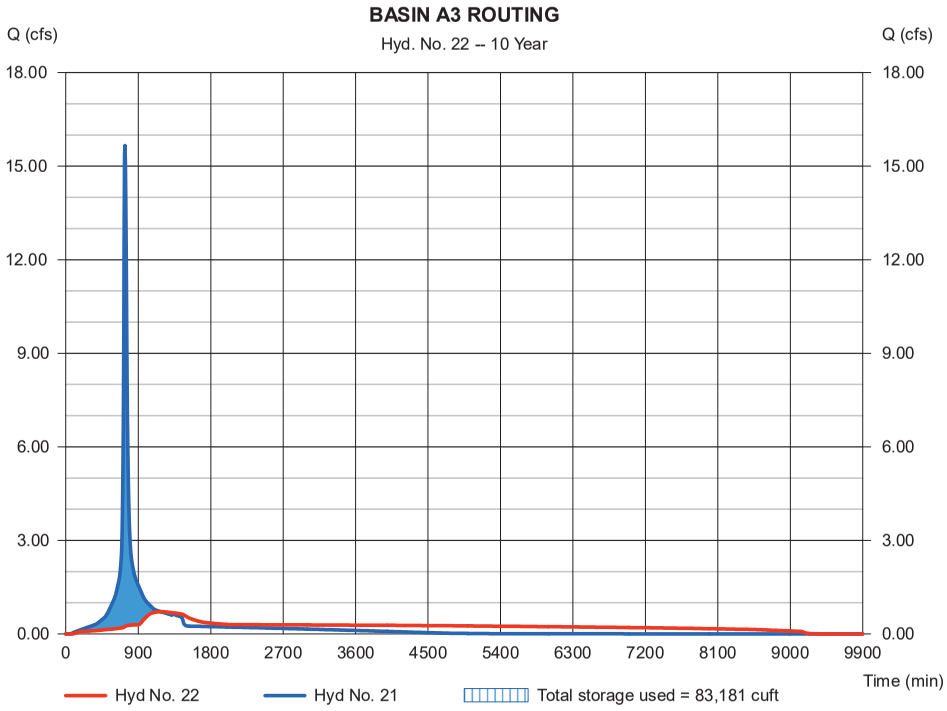
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Nov 11, 2020

Hyd. No. 22

BASIN A3 ROUTING

Hydrograph type	= Reservoir	Peak discharge	= 0.712 cfs
Storm frequency	= 10 yrs	Time to peak	= 1185 min
Time interval	= 5 min	Hyd. volume	= 140,422 cuft
Inflow hyd. No.	= 21 - COMBINED TO BASIN A3	Max. Elevation	= 94.66 ft
Reservoir name	= Det. Basin A3	Max. Storage	= 83,181 cuft

Storage Indication method used.

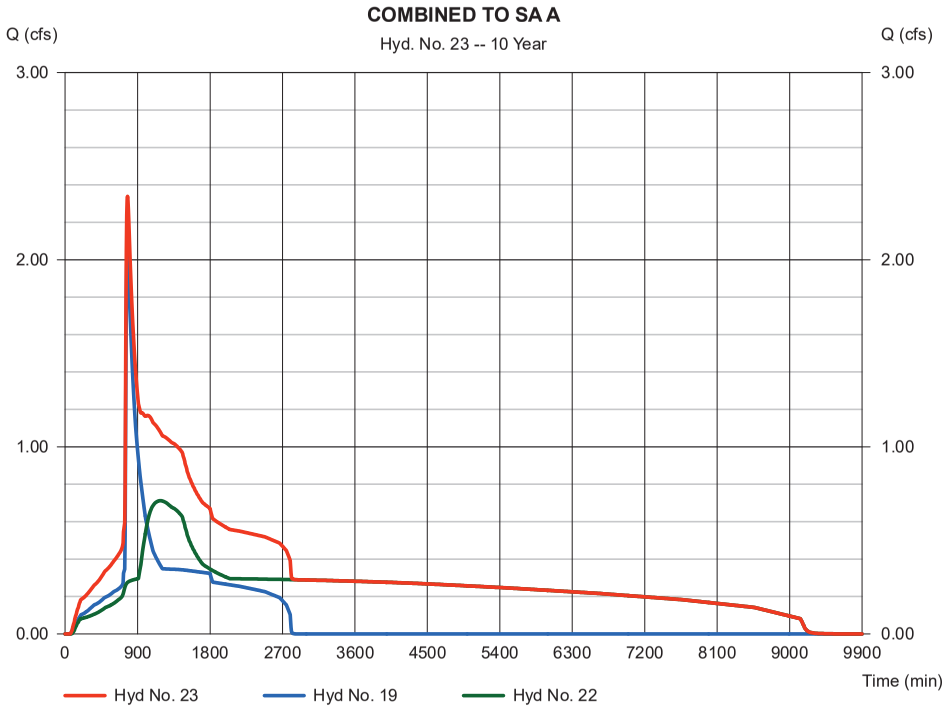


Hydrograph Report

Hyd. No. 23

COMBINED TO SA A

Hydrograph type	= Combine	Peak discharge	= 2.339 cfs
Storm frequency	= 10 yrs	Time to peak	= 775 min
Time interval	= 5 min	Hyd. volume	= 197,186 cuft
Inflow hyds.	= 19, 22	Contrib. drain. area	= 0.000 ac



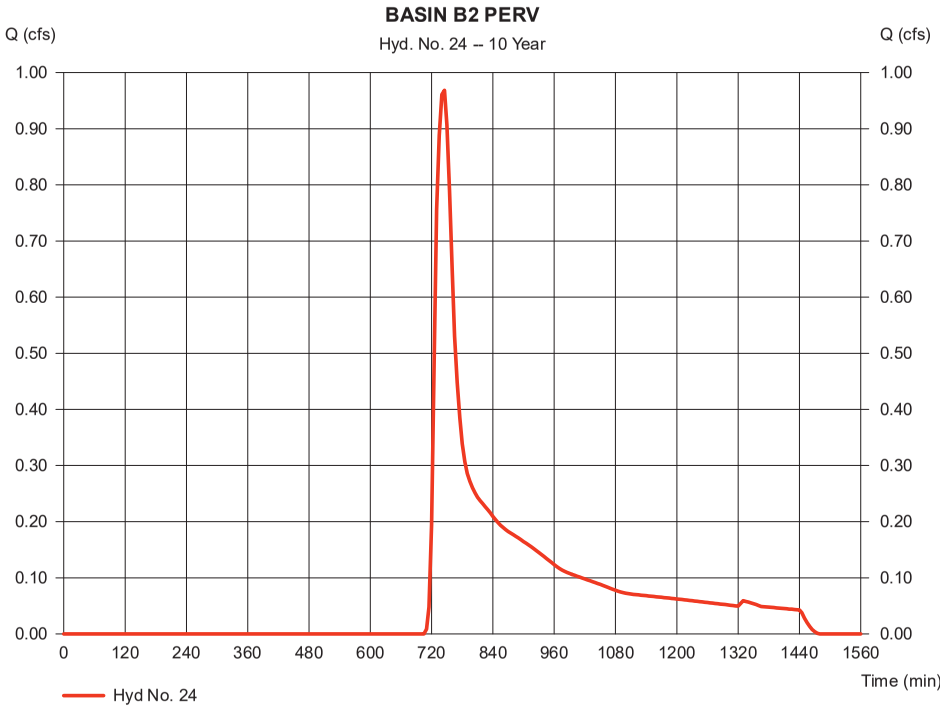
Hydrograph Report

Hyd. No. 24

BASIN B2 PERV

Hydrograph type	= SCS Runoff	Peak discharge	= 0.968 cfs
Storm frequency	= 10 yrs	Time to peak	= 745 min
Time interval	= 5 min	Hyd. volume	= 6,548 cuft
Drainage area	= 2.000 ac	Curve number	= 52*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 10.00 min
Total precip.	= 5.23 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

* Composite (Area/CN) = [(0.300 x 61) + (0.250 x 80) + (0.450 x 39) + (0.600 x 30) + (0.400 x 77)] / 2.000

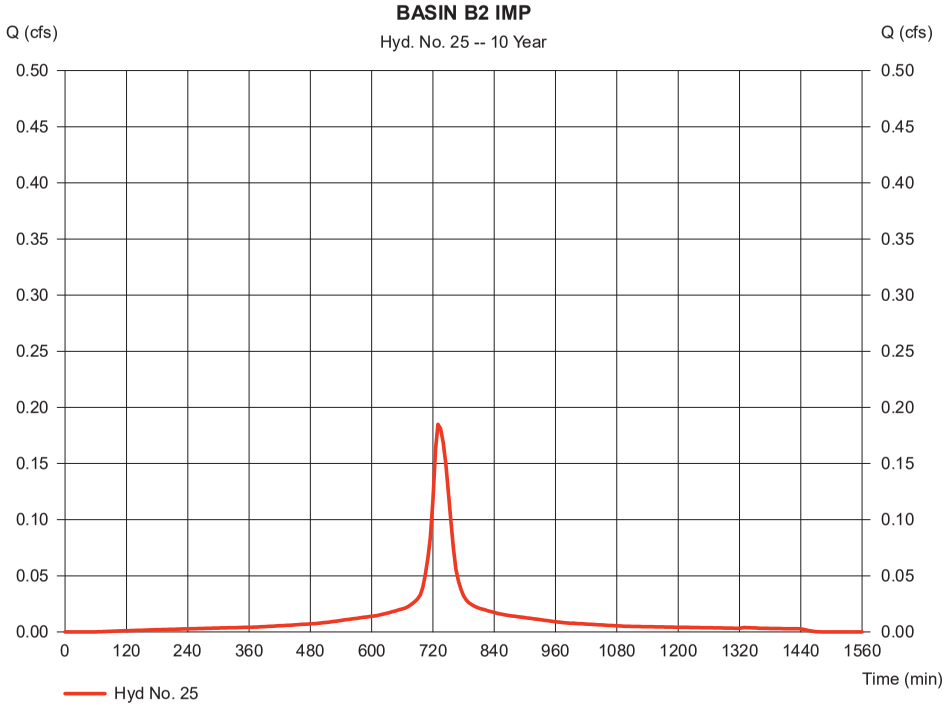


Hydrograph Report

Hyd. No. 25

BASIN B2 IMP

Hydrograph type	= SCS Runoff	Peak discharge	= 0.185 cfs
Storm frequency	= 10 yrs	Time to peak	= 730 min
Time interval	= 5 min	Hyd. volume	= 1,081 cuft
Drainage area	= 0.060 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 10.00 min
Total precip.	= 5.23 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

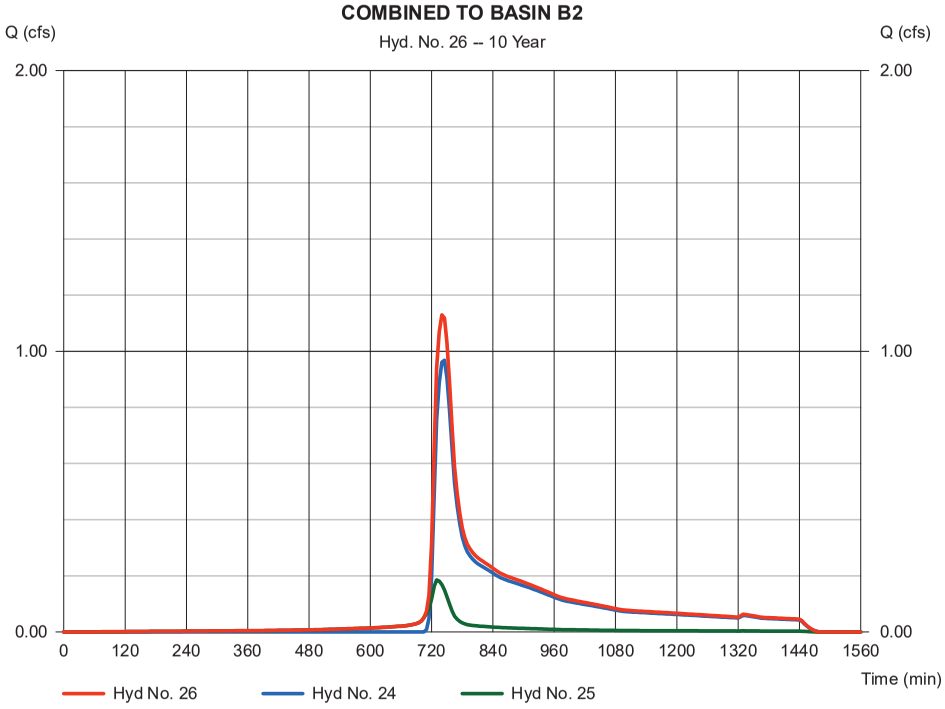


Hydrograph Report

Hyd. No. 26

COMBINED TO BASIN B2

Hydrograph type	= Combine	Peak discharge	= 1.130 cfs
Storm frequency	= 10 yrs	Time to peak	= 740 min
Time interval	= 5 min	Hyd. volume	= 7,629 cuft
Inflow hyds.	= 24, 25	Contrib. drain. area	= 2.060 ac

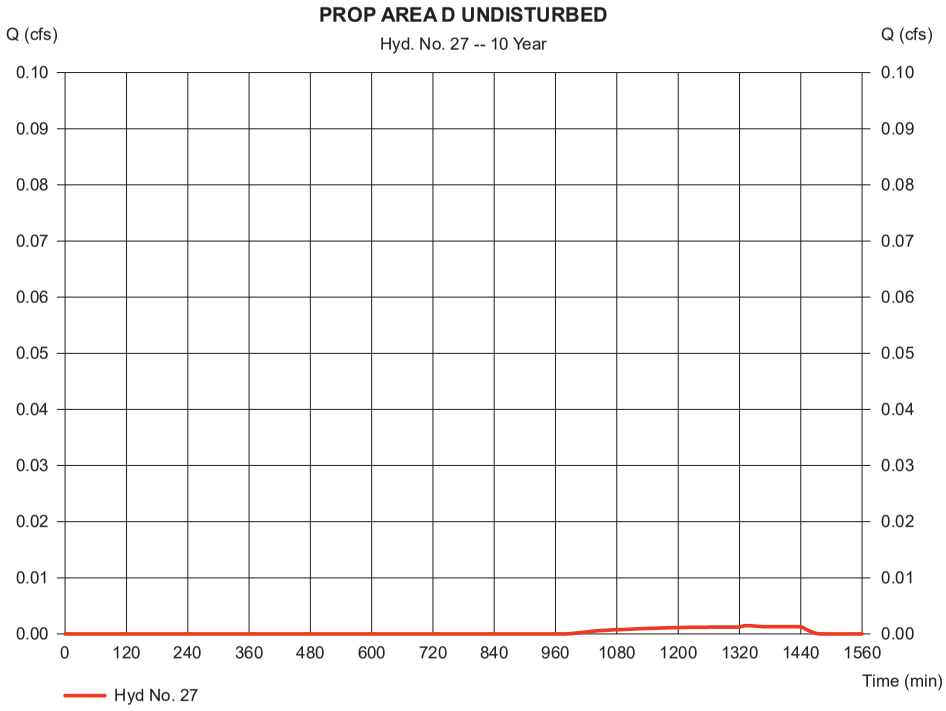


Hydrograph Report

Hyd. No. 27

PROP AREA D UNDISTURBED

Hydrograph type	= SCS Runoff	Peak discharge	= 0.001 cfs
Storm frequency	= 10 yrs	Time to peak	= 1330 min
Time interval	= 5 min	Hyd. volume	= 29 cuft
Drainage area	= 0.603 ac	Curve number	= 30
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 10.00 min
Total precip.	= 5.23 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285



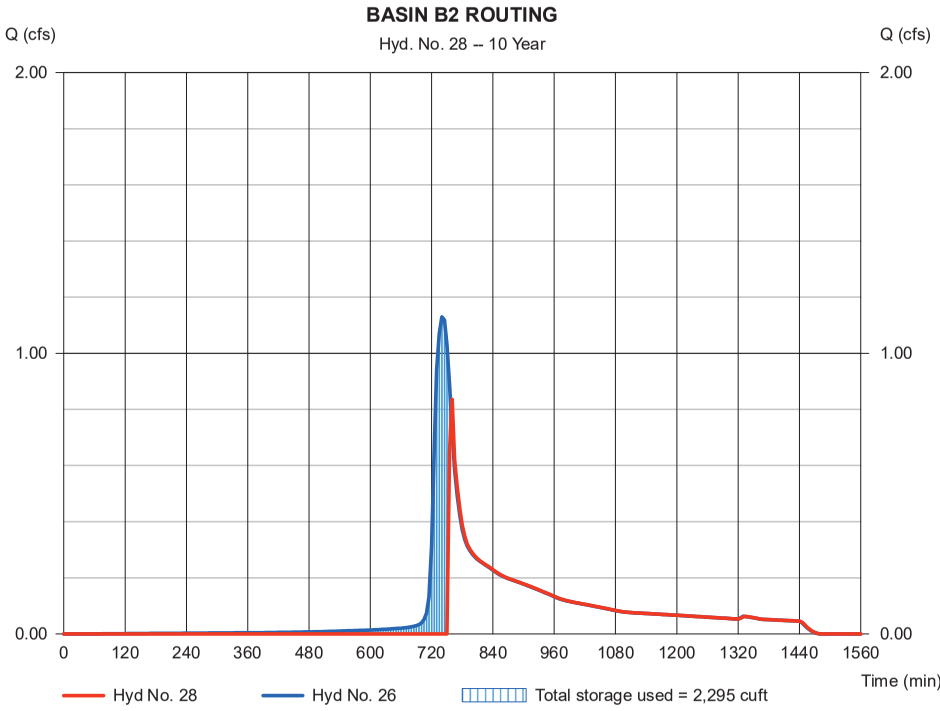
Hydrograph Report

Hyd. No. 28

BASIN B2 ROUTING

Hydrograph type	= Reservoir	Peak discharge	= 0.836 cfs
Storm frequency	= 10 yrs	Time to peak	= 760 min
Time interval	= 5 min	Hyd. volume	= 5,420 cuft
Inflow hyd. No.	= 26 - COMBINED TO BASIN B2	Max. Elevation	= 96.30 ft
Reservoir name	= Recharge Basin B2	Max. Storage	= 2,295 cuft

Storage Indication method used.

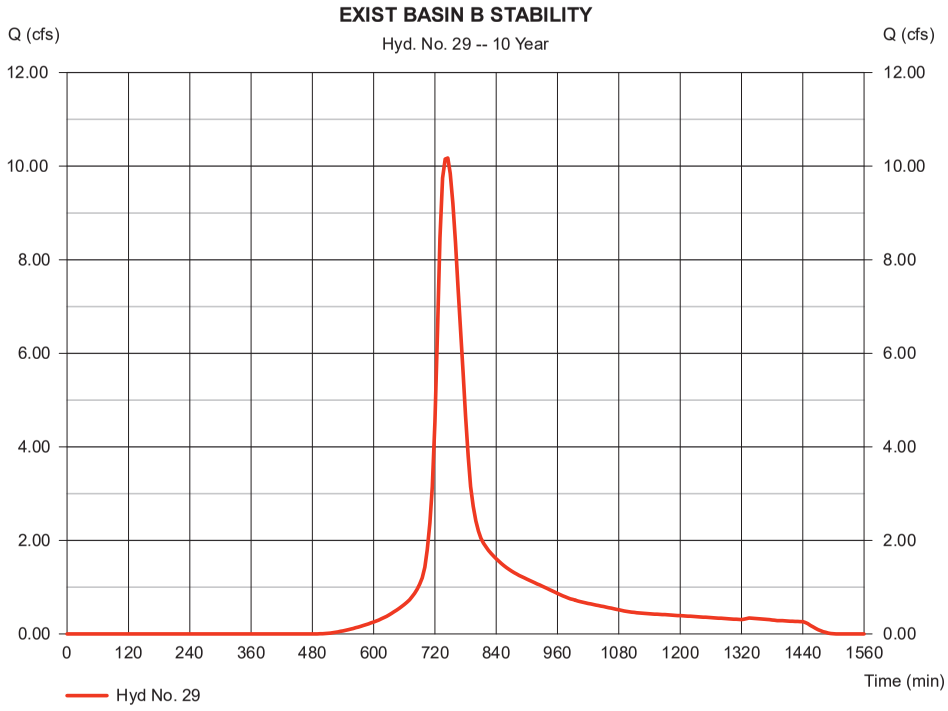


Hydrograph Report

Hyd. No. 29

EXIST BASIN B STABILITY

Hydrograph type	= SCS Runoff	Peak discharge	= 10.17 cfs
Storm frequency	= 10 yrs	Time to peak	= 745 min
Time interval	= 5 min	Hyd. volume	= 66,480 cuft
Drainage area	= 6.310 ac	Curve number	= 77
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 20.00 min
Total precip.	= 5.23 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

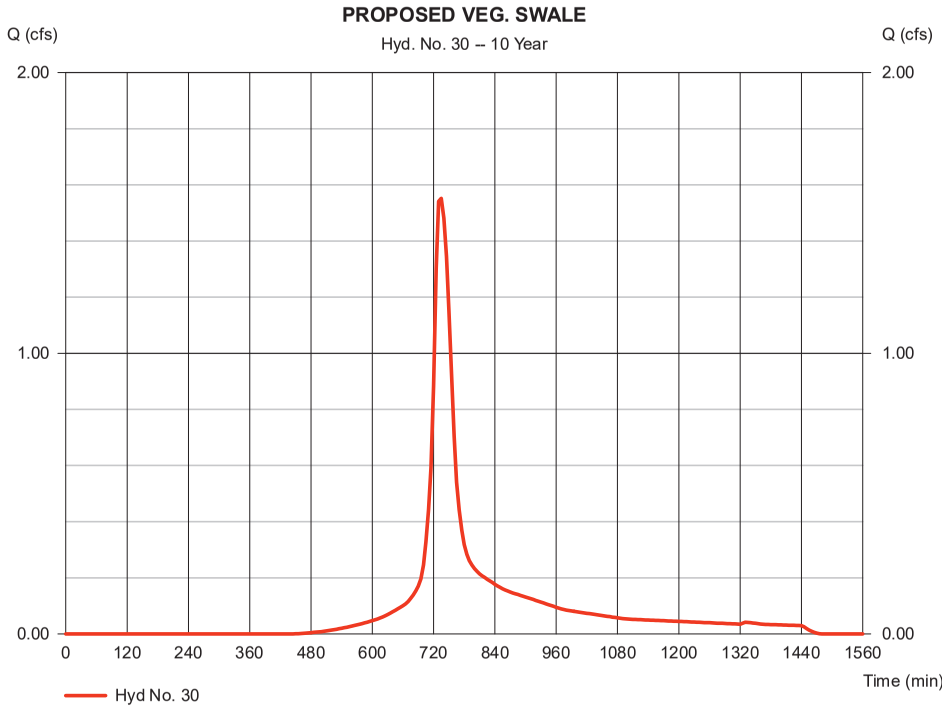


Hydrograph Report

Hyd. No. 30

PROPOSED VEG. SWALE

Hydrograph type	= SCS Runoff	Peak discharge	= 1.552 cfs
Storm frequency	= 10 yrs	Time to peak	= 735 min
Time interval	= 5 min	Hyd. volume	= 8,148 cuft
Drainage area	= 0.730 ac	Curve number	= 80
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 10.00 min
Total precip.	= 5.23 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285



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	7.818	5	750	67,635	----	-----	-----	EXIST DISTURBED AREA A
2	SCS Runoff	6.409	5	750	48,615	----	-----	-----	EXIST DISTURBED AREA B
3	SCS Runoff	0.379	5	745	2,910	----	-----	-----	EXIST AREA D DISTURBED WOOD
4	SCS Runoff	8.100	5	730	47,655	----	-----	-----	AREA A1-IMPERVIOUS
5	SCS Runoff	1.496	5	740	8,688	----	-----	-----	AREA A1-PERV
6	Combine	9.465	5	730	56,343	4, 5	-----	-----	BASIN A1 INFLOW
7	SCS Runoff	11.73	5	730	68,986	----	-----	-----	AREA A2-IMP
8	SCS Runoff	0.502	5	750	4,922	----	-----	-----	AREA A2-PERV
9	Combine	11.93	5	730	73,909	7, 8	-----	-----	BASIN A2-INFLOW
10	SCS Runoff	1.655	5	750	12,383	----	-----	-----	AREA A3-WOODS
11	SCS Runoff	4.050	5	740	26,469	----	-----	-----	AREA A3 Open Space D
12	SCS Runoff	14.85	5	730	87,368	----	-----	-----	AREA A3-IMP
13	SCS Runoff	0.072	5	905	1,978	----	-----	-----	AREA A3- Open Space A
14	Combine	19.90	5	735	128,197	10, 11, 12, 13	-----	-----	BASIN A3-INFLOW
15	SCS Runoff	10.80	5	730	63,540	----	-----	-----	BASIN B1-IMP
16	SCS Runoff	2.059	5	735	10,817	----	-----	-----	BASIN B1-PERV
17	Combine	12.85	5	730	74,357	15, 16	-----	-----	BASIN B-INFLOW
18	Reservoir	0.298	5	1105	56,240	6	105.90	42,735	BASIN A1 ROUTING
19	Reservoir	4.658	5	760	73,907	9	96.75	34,468	BASIN A2 ROUTING
20	Reservoir	5.068	5	760	74,355	17	104.78	33,161	BASIN B1 ROUTING
21	Combine	20.12	5	735	184,437	14, 18,	-----	-----	COMBINED TO BASIN A3
22	Reservoir	1.873	5	920	184,425	21	94.88	92,235	BASIN A3 ROUTING
23	Combine	4.949	5	760	258,332	19, 22	-----	-----	COMBINED TO SA A
24	SCS Runoff	1.908	5	740	11,374	----	-----	-----	BASIN B2 PERV
25	SCS Runoff	0.231	5	730	1,362	----	-----	-----	BASIN B2 IMP
26	Combine	2.120	5	740	12,735	24, 25	-----	-----	COMBINED TO BASIN B2
27	SCS Runoff	0.011	5	905	300	----	-----	-----	PROP AREA D UNDISTURBED
28	Reservoir	2.791	5	740	10,526	26	96.39	2,416	BASIN B2 ROUTING
29	SCS Runoff	14.27	5	740	93,136	----	-----	-----	EXIST BASIN B STABILITY
30	SCS Runoff	2.126	5	735	11,224	----	-----	-----	PROPOSED VEG. SWALE

Hydrograph Report

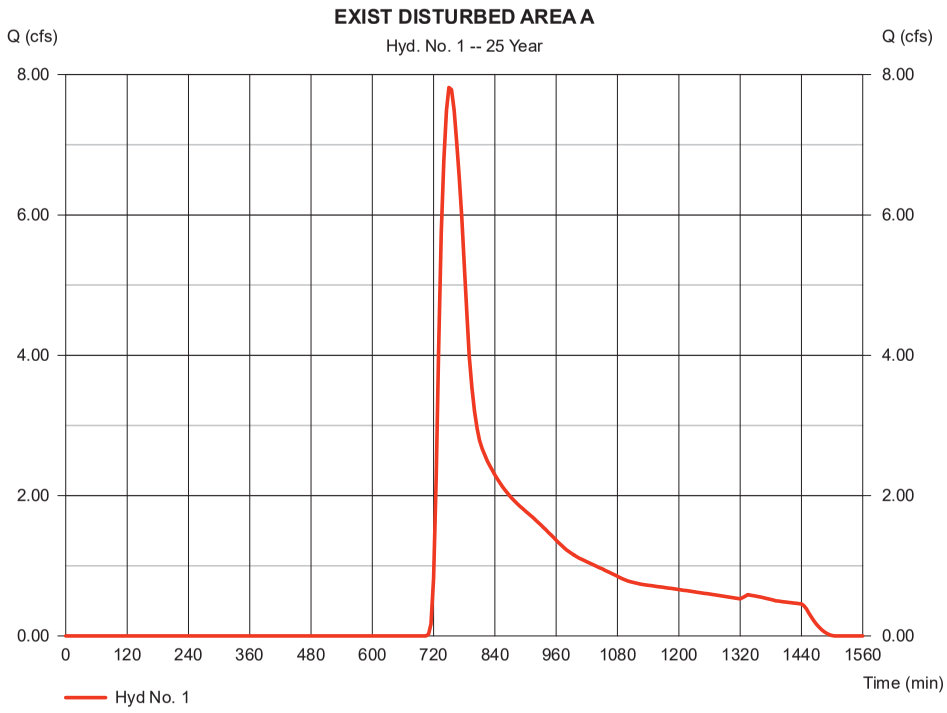
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Nov 11, 2020

Hyd. No. 1

EXIST DISTURBED AREA A

Hydrograph type	= SCS Runoff	Peak discharge	= 7.818 cfs
Storm frequency	= 25 yrs	Time to peak	= 750 min
Time interval	= 5 min	Hyd. volume	= 67,635 cuft
Drainage area	= 16.460 ac	Curve number	= 46*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 22.00 min
Total precip.	= 6.53 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

* Composite (Area/CN) = [(9.090 x 30) + (0.470 x 55) + (0.480 x 80) + (2.130 x 39) + (4.290 x 77)] / 16.460



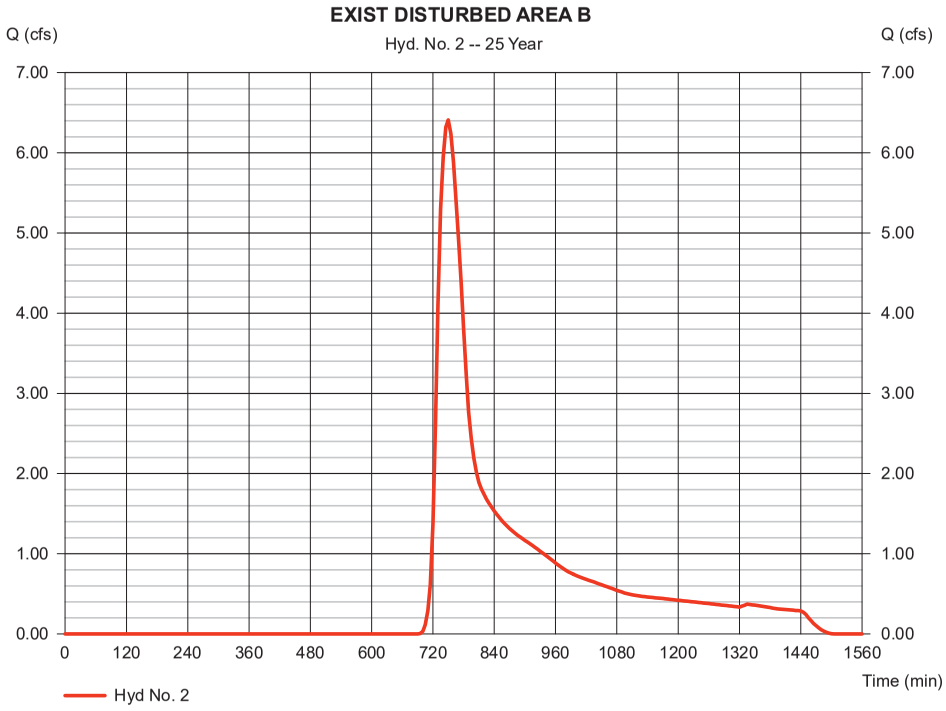
Hydrograph Report

Hyd. No. 2

EXIST DISTURBED AREA B

Hydrograph type	= SCS Runoff	Peak discharge	= 6.409 cfs
Storm frequency	= 25 yrs	Time to peak	= 750 min
Time interval	= 5 min	Hyd. volume	= 48,615 cuft
Drainage area	= 8.700 ac	Curve number	= 51*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 20.00 min
Total precip.	= 6.53 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

* Composite (Area/CN) = [(4.860 x 30) + (0.320 x 80) + (3.520 x 77)] / 8.700



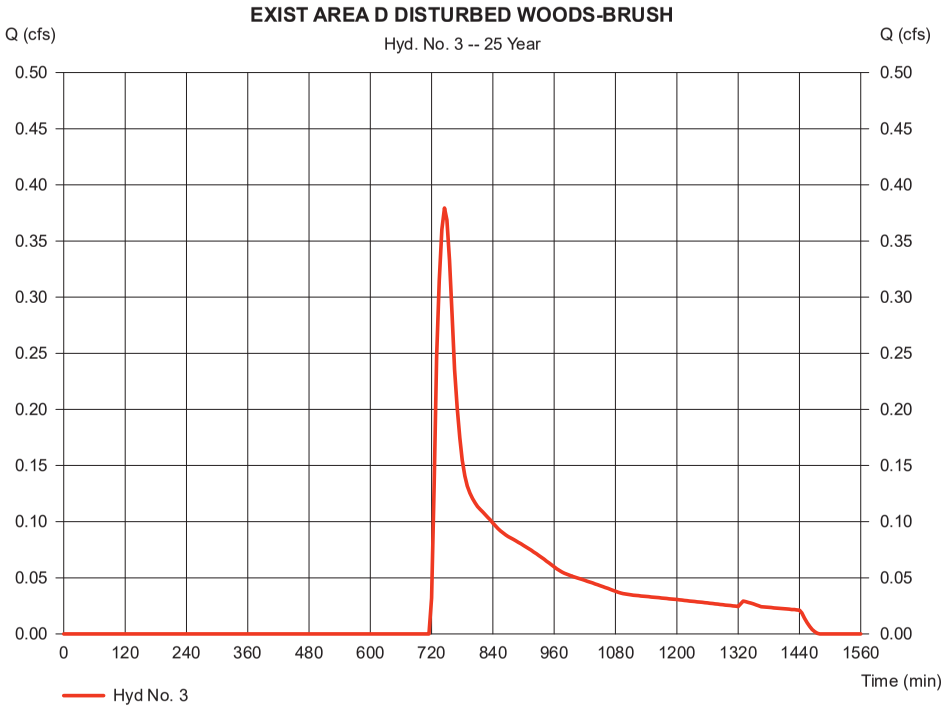
Hydrograph Report

Hyd. No. 3

EXIST AREA D DISTURBED WOODS-BRUSH

Hydrograph type	= SCS Runoff	Peak discharge	= 0.379 cfs
Storm frequency	= 25 yrs	Time to peak	= 745 min
Time interval	= 5 min	Hyd. volume	= 2,910 cuft
Drainage area	= 0.920 ac	Curve number	= 43*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 10.00 min
Total precip.	= 6.53 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

* Composite (Area/CN) = [(0.461 x 30) + (0.461 x 55)] / 0.920

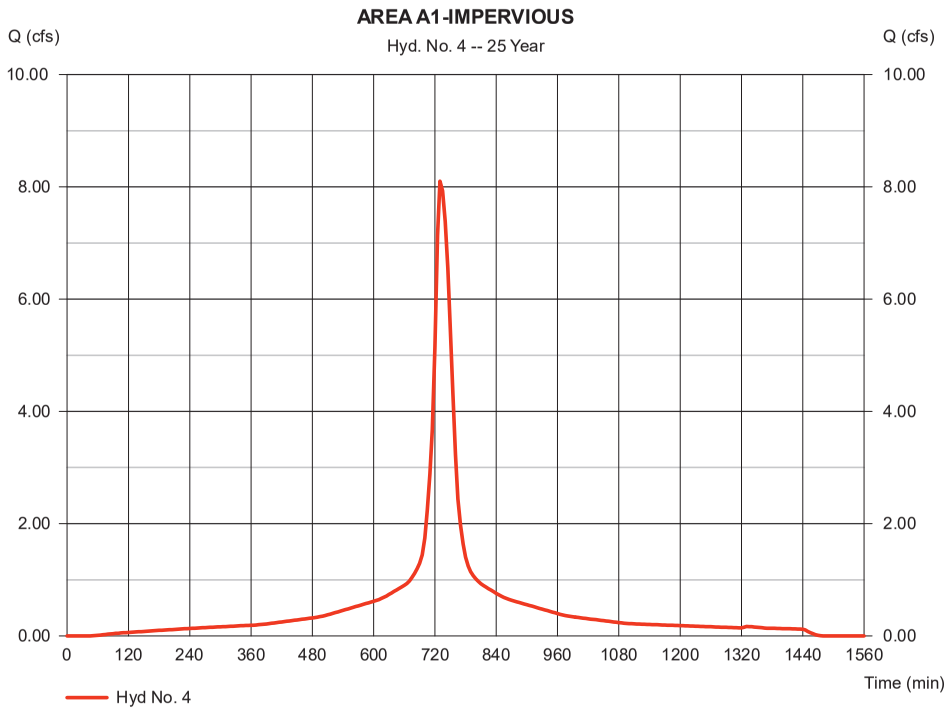


Hydrograph Report

Hyd. No. 4

AREA A1-IMPERVIOUS

Hydrograph type	= SCS Runoff	Peak discharge	= 8.100 cfs
Storm frequency	= 25 yrs	Time to peak	= 730 min
Time interval	= 5 min	Hyd. volume	= 47,655 cuft
Drainage area	= 2.100 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 10.00 min
Total precip.	= 6.53 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

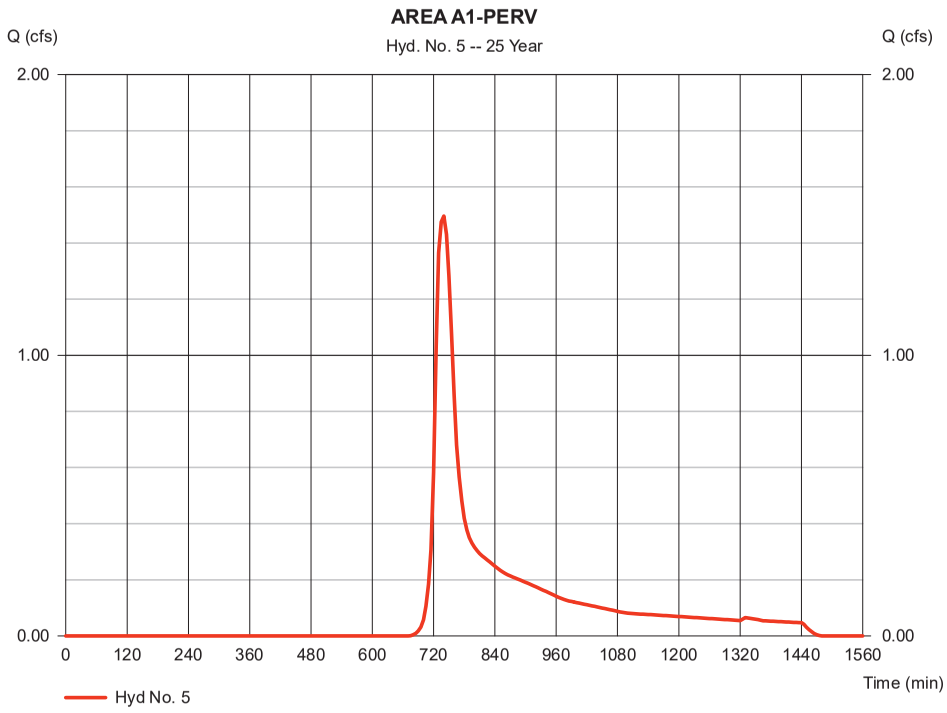


Hydrograph Report

Hyd. No. 5

AREA A1-PERV

Hydrograph type	= SCS Runoff	Peak discharge	= 1.496 cfs
Storm frequency	= 25 yrs	Time to peak	= 740 min
Time interval	= 5 min	Hyd. volume	= 8,688 cuft
Drainage area	= 1.380 ac	Curve number	= 54
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 10.00 min
Total precip.	= 6.53 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

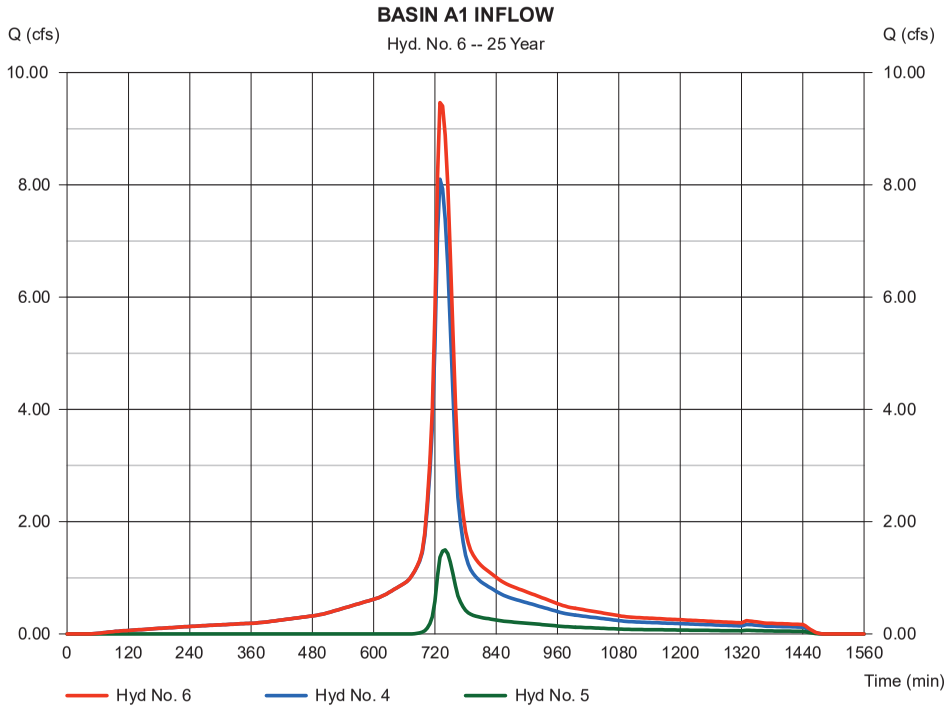


Hydrograph Report

Hyd. No. 6

BASIN A1 INFLOW

Hydrograph type	= Combine	Peak discharge	= 9.465 cfs
Storm frequency	= 25 yrs	Time to peak	= 730 min
Time interval	= 5 min	Hyd. volume	= 56,343 cuft
Inflow hyds.	= 4, 5	Contrib. drain. area	= 3.480 ac

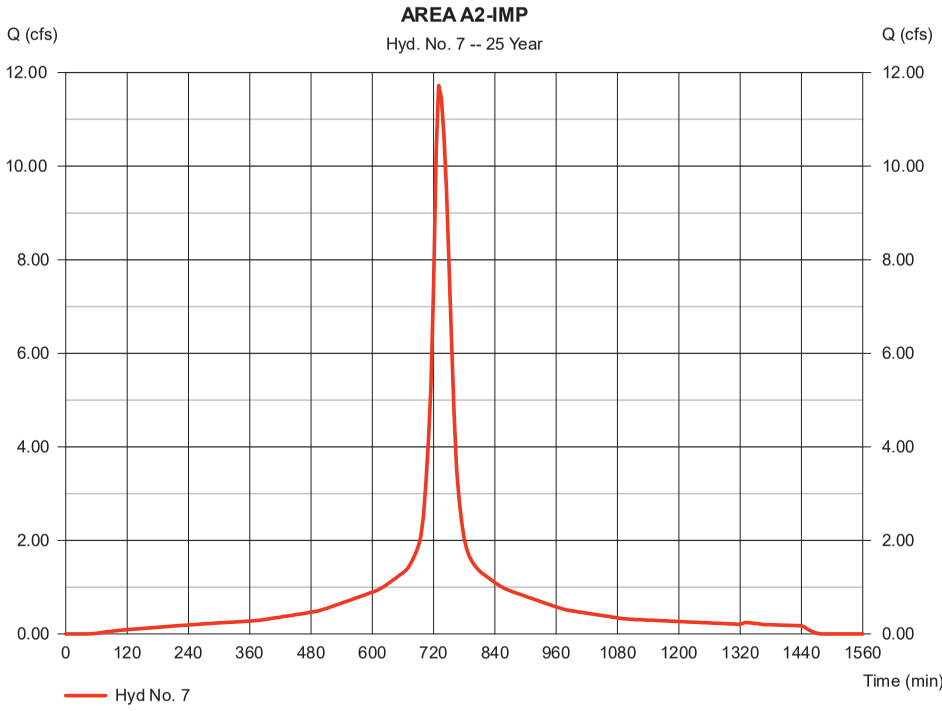


Hydrograph Report

Hyd. No. 7

AREA A2-IMP

Hydrograph type	= SCS Runoff	Peak discharge	= 11.73 cfs
Storm frequency	= 25 yrs	Time to peak	= 730 min
Time interval	= 5 min	Hyd. volume	= 68,986 cuft
Drainage area	= 3.040 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 10.00 min
Total precip.	= 6.53 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285



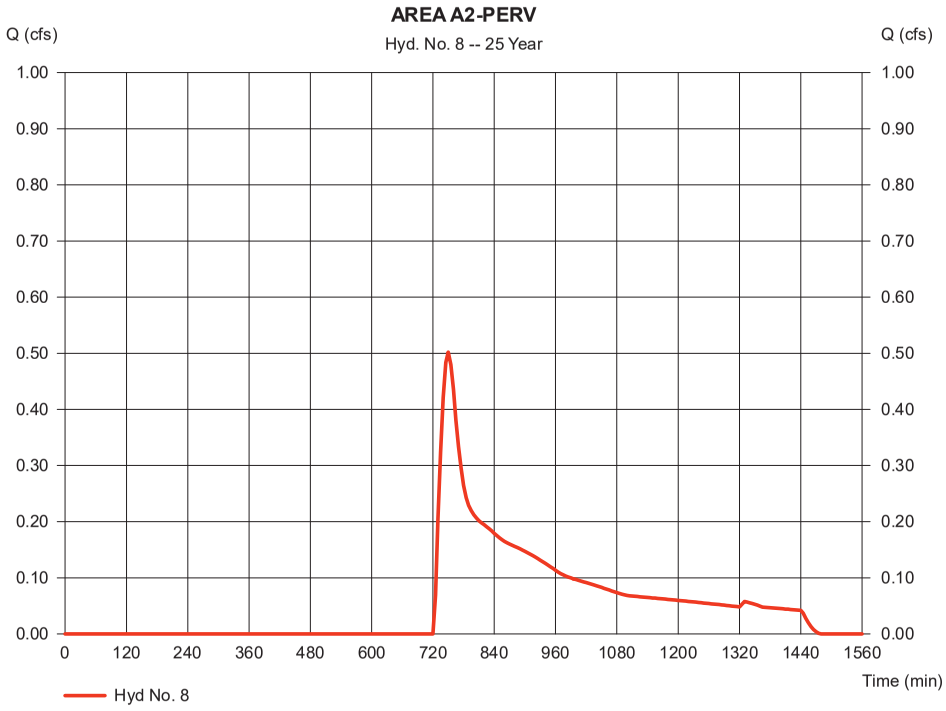
Hydrograph Report

Hyd. No. 8

AREA A2-PERV

Hydrograph type	= SCS Runoff	Peak discharge	= 0.502 cfs
Storm frequency	= 25 yrs	Time to peak	= 750 min
Time interval	= 5 min	Hyd. volume	= 4,922 cuft
Drainage area	= 2.250 ac	Curve number	= 39*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 10.00 min
Total precip.	= 6.53 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

* Composite (Area/CN) = [(0.840 x 80) + (0.390 x 61)] / 2.250

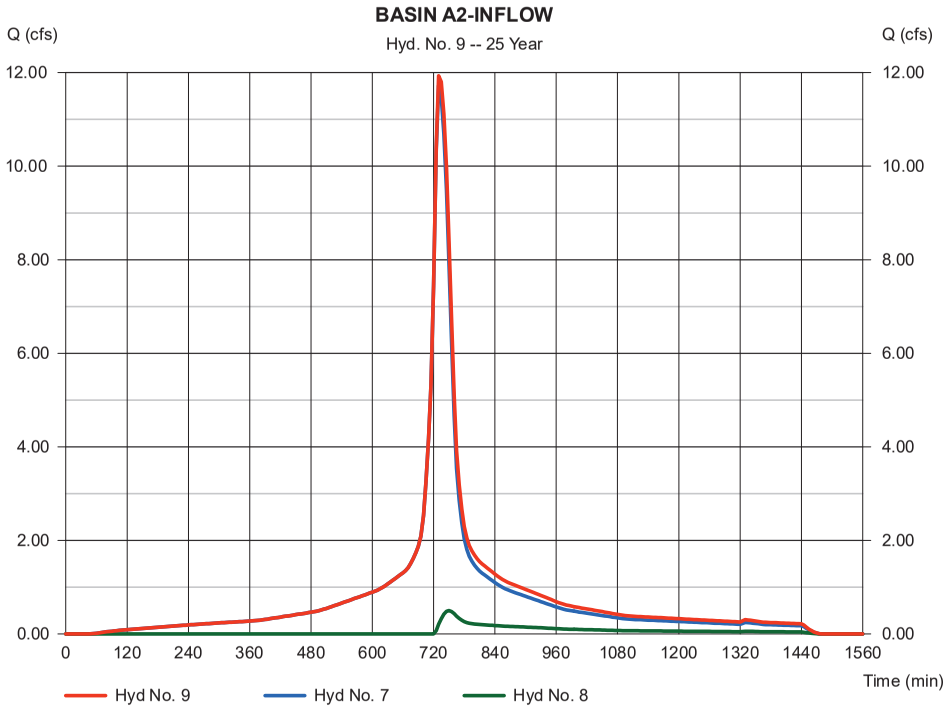


Hydrograph Report

Hyd. No. 9

BASIN A2-INFLOW

Hydrograph type	= Combine	Peak discharge	= 11.93 cfs
Storm frequency	= 25 yrs	Time to peak	= 730 min
Time interval	= 5 min	Hyd. volume	= 73,909 cuft
Inflow hyds.	= 7, 8	Contrib. drain. area	= 5.290 ac

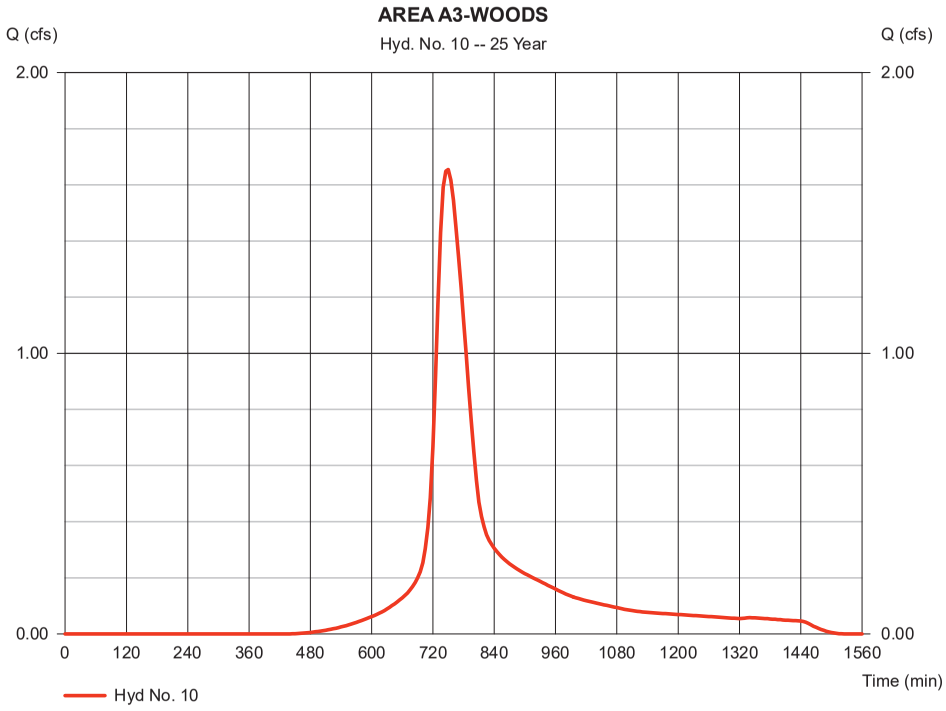


Hydrograph Report

Hyd. No. 10

AREA A3-WOODS

Hydrograph type	= SCS Runoff	Peak discharge	= 1.655 cfs
Storm frequency	= 25 yrs	Time to peak	= 750 min
Time interval	= 5 min	Hyd. volume	= 12,383 cuft
Drainage area	= 0.870 ac	Curve number	= 77
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 25.00 min
Total precip.	= 6.53 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

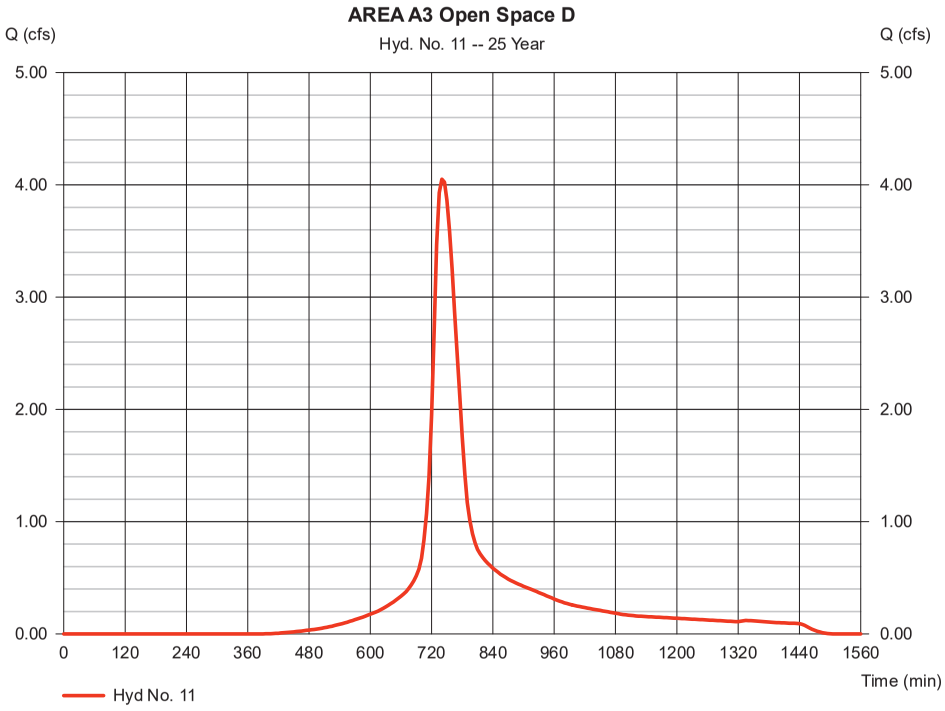


Hydrograph Report

Hyd. No. 11

AREA A3 Open Space D

Hydrograph type	= SCS Runoff	Peak discharge	= 4.050 cfs
Storm frequency	= 25 yrs	Time to peak	= 740 min
Time interval	= 5 min	Hyd. volume	= 26,469 cuft
Drainage area	= 1.660 ac	Curve number	= 80
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 20.00 min
Total precip.	= 6.53 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

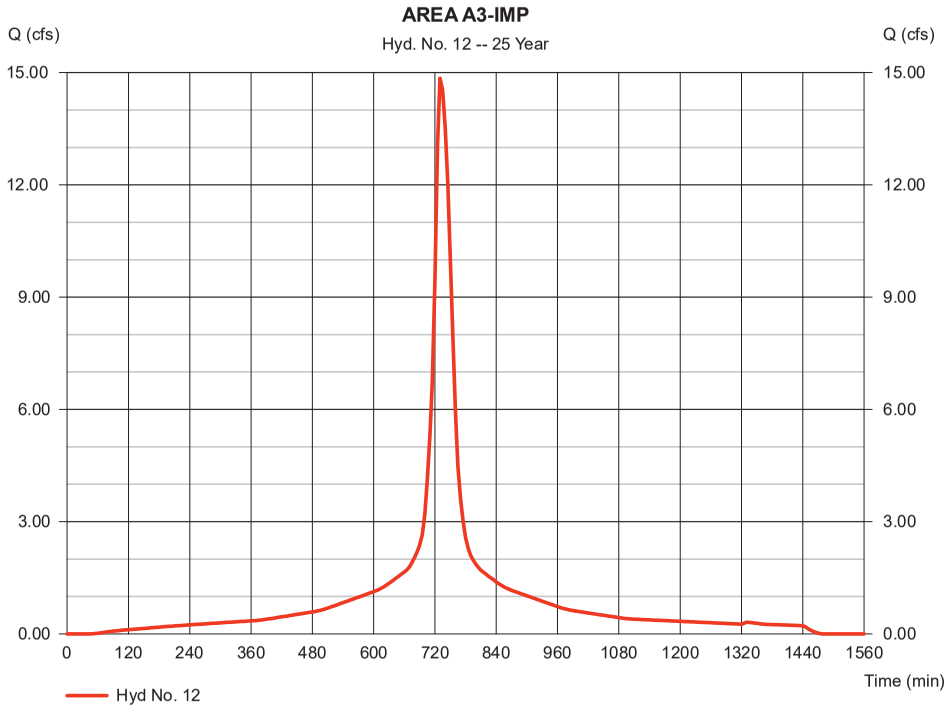


Hydrograph Report

Hyd. No. 12

AREA A3-IMP

Hydrograph type	= SCS Runoff	Peak discharge	= 14.85 cfs
Storm frequency	= 25 yrs	Time to peak	= 730 min
Time interval	= 5 min	Hyd. volume	= 87,368 cuft
Drainage area	= 3.850 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 10.00 min
Total precip.	= 6.53 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

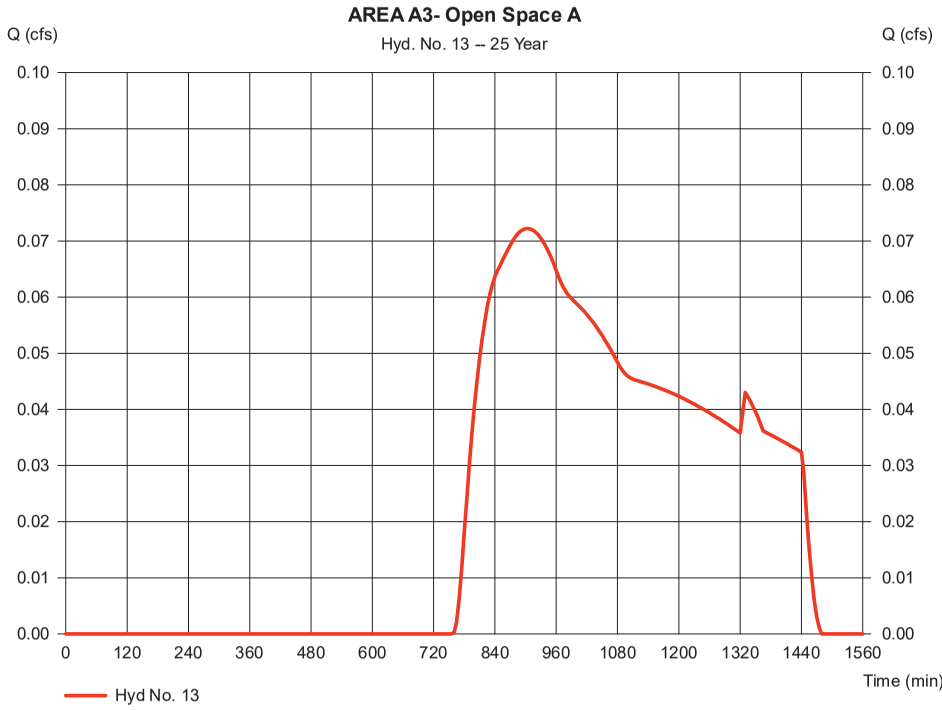


Hydrograph Report

Hyd. No. 13

AREA A3- Open Space A

Hydrograph type	= SCS Runoff	Peak discharge	= 0.072 cfs
Storm frequency	= 25 yrs	Time to peak	= 905 min
Time interval	= 5 min	Hyd. volume	= 1,978 cuft
Drainage area	= 3.980 ac	Curve number	= 30
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 10.00 min
Total precip.	= 6.53 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

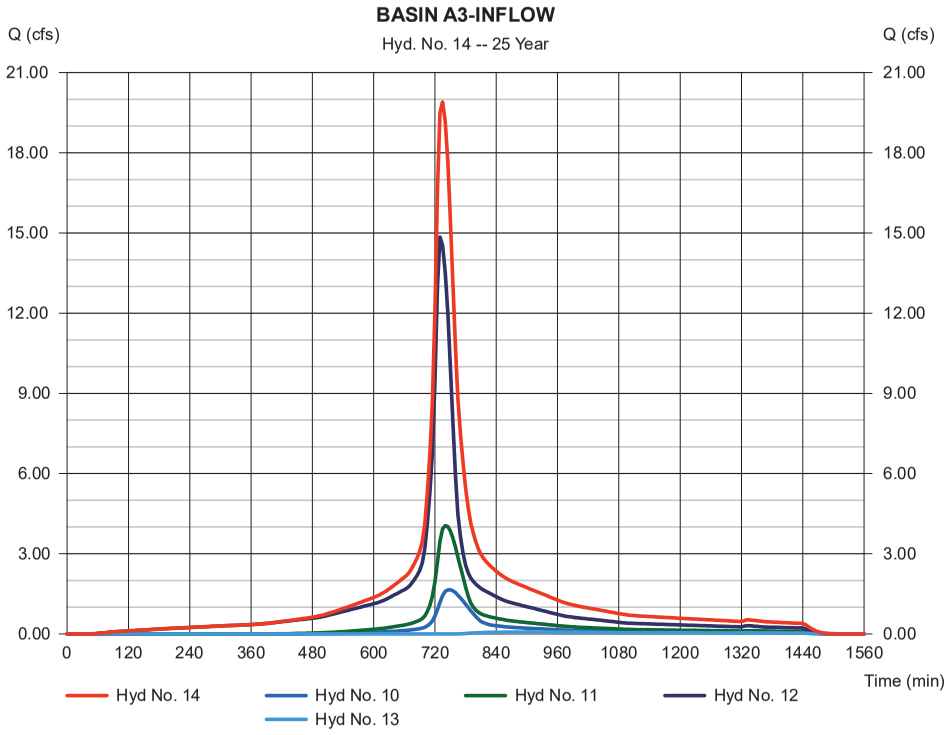


Hydrograph Report

Hyd. No. 14

BASIN A3-INFLOW

Hydrograph type	= Combine	Peak discharge	= 19.90 cfs
Storm frequency	= 25 yrs	Time to peak	= 735 min
Time interval	= 5 min	Hyd. volume	= 128,197 cuft
Inflow hyds.	= 10, 11, 12, 13	Contrib. drain. area	= 10.360 ac

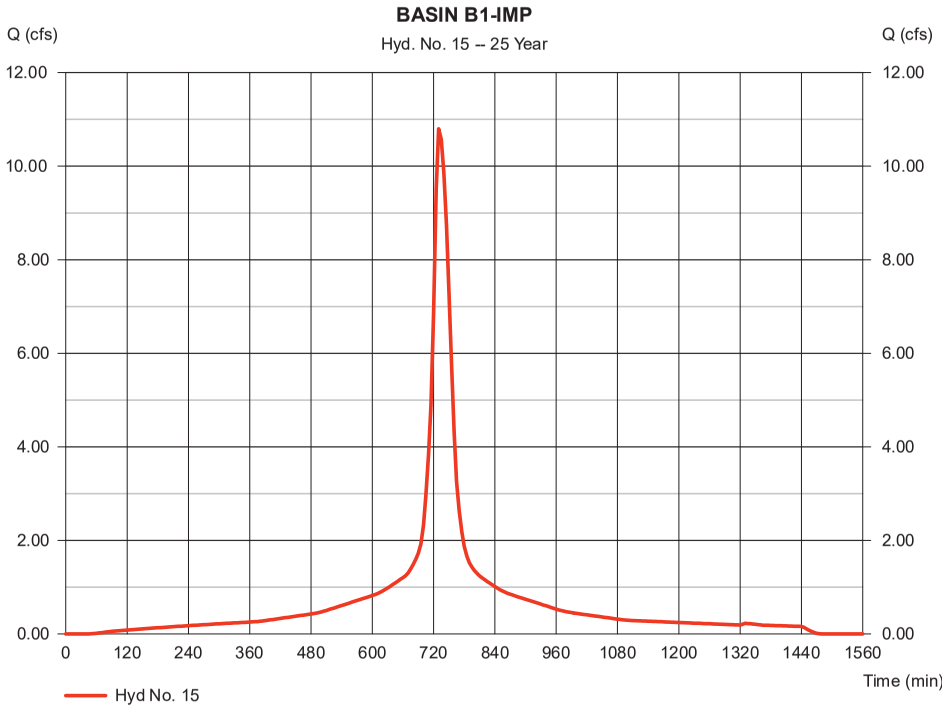


Hydrograph Report

Hyd. No. 15

BASIN B1-IMP

Hydrograph type	= SCS Runoff	Peak discharge	= 10.80 cfs
Storm frequency	= 25 yrs	Time to peak	= 730 min
Time interval	= 5 min	Hyd. volume	= 63,540 cuft
Drainage area	= 2.800 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 10.00 min
Total precip.	= 6.53 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

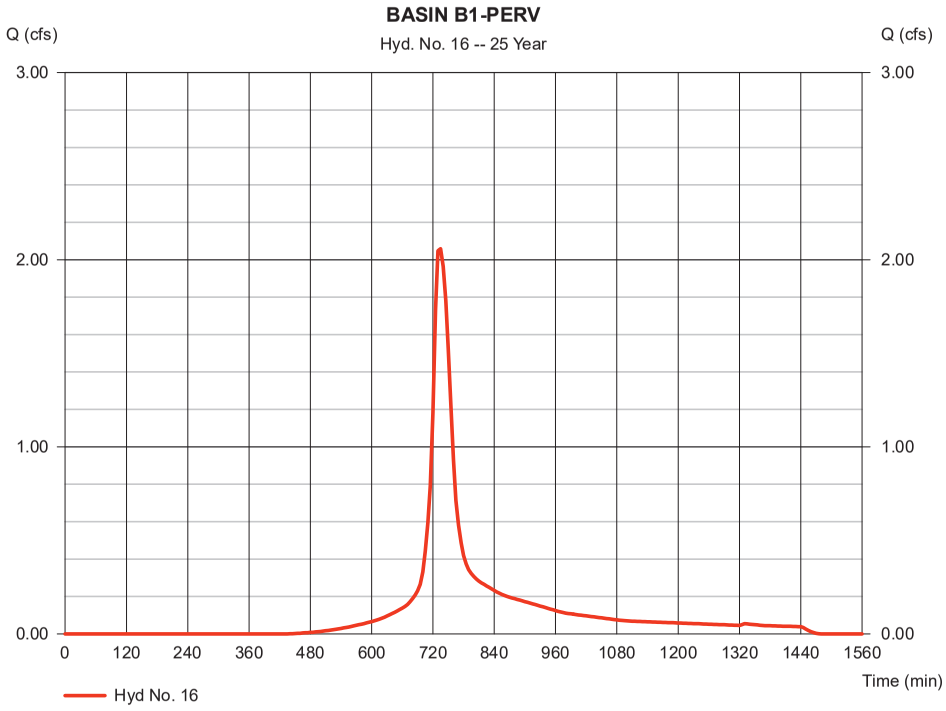


Hydrograph Report

Hyd. No. 16

BASIN B1-PERV

Hydrograph type	= SCS Runoff	Peak discharge	= 2.059 cfs
Storm frequency	= 25 yrs	Time to peak	= 735 min
Time interval	= 5 min	Hyd. volume	= 10,817 cuft
Drainage area	= 0.760 ac	Curve number	= 77
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 10.00 min
Total precip.	= 6.53 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

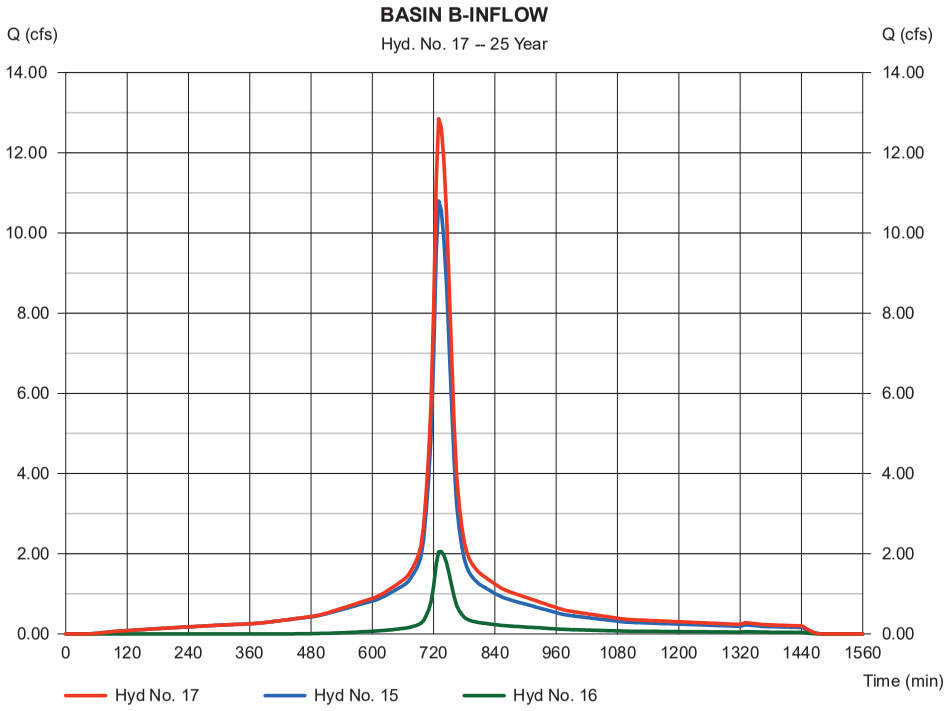


Hydrograph Report

Hyd. No. 17

BASIN B-INFLOW

Hydrograph type	= Combine	Peak discharge	= 12.85 cfs
Storm frequency	= 25 yrs	Time to peak	= 730 min
Time interval	= 5 min	Hyd. volume	= 74,357 cuft
Inflow hyds.	= 15, 16	Contrib. drain. area	= 3.560 ac



Hydrograph Report

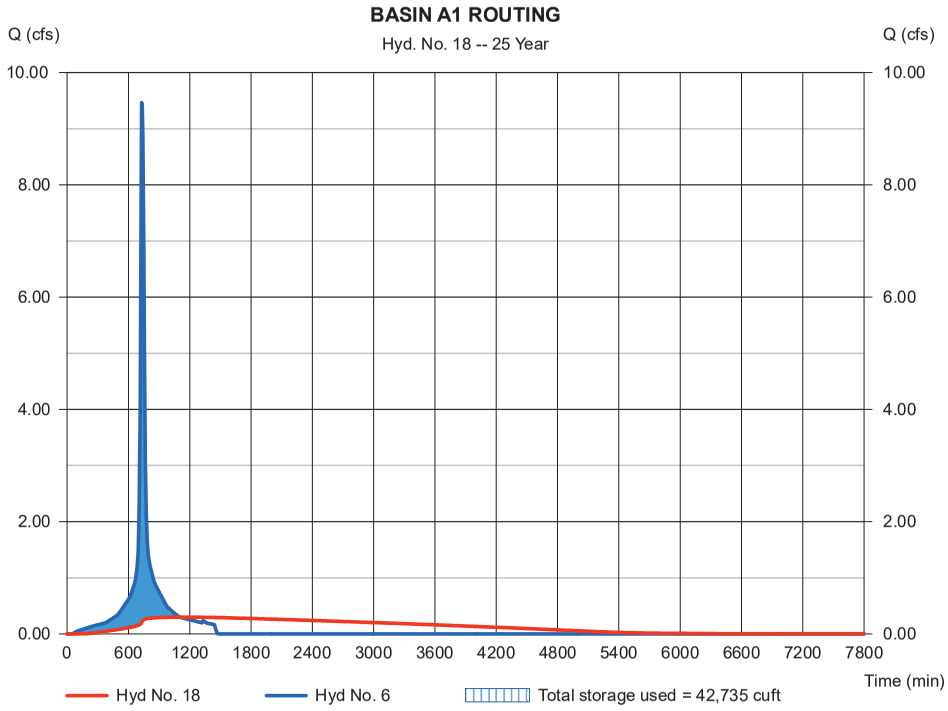
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Nov 11, 2020

Hyd. No. 18

BASIN A1 ROUTING

Hydrograph type	= Reservoir	Peak discharge	= 0.298 cfs
Storm frequency	= 25 yrs	Time to peak	= 1105 min
Time interval	= 5 min	Hyd. volume	= 56,240 cuft
Inflow hyd. No.	= 6 - BASIN A1 INFLOW	Max. Elevation	= 105.90 ft
Reservoir name	= Inf. Basin A1	Max. Storage	= 42,735 cuft

Storage Indication method used.



Hydrograph Report

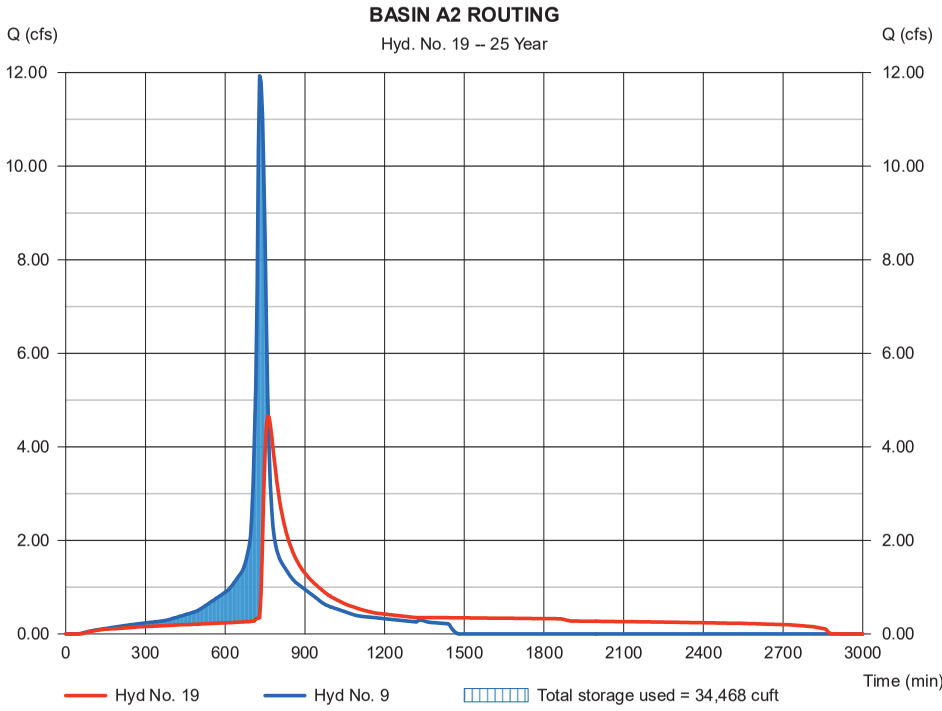
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Nov 11, 2020

Hyd. No. 19

BASIN A2 ROUTING

Hydrograph type	= Reservoir	Peak discharge	= 4.658 cfs
Storm frequency	= 25 yrs	Time to peak	= 760 min
Time interval	= 5 min	Hyd. volume	= 73,907 cuft
Inflow hyd. No.	= 9 - BASIN A2-INFLOW	Max. Elevation	= 96.75 ft
Reservoir name	= Det. Basin A2	Max. Storage	= 34,468 cuft

Storage Indication method used.



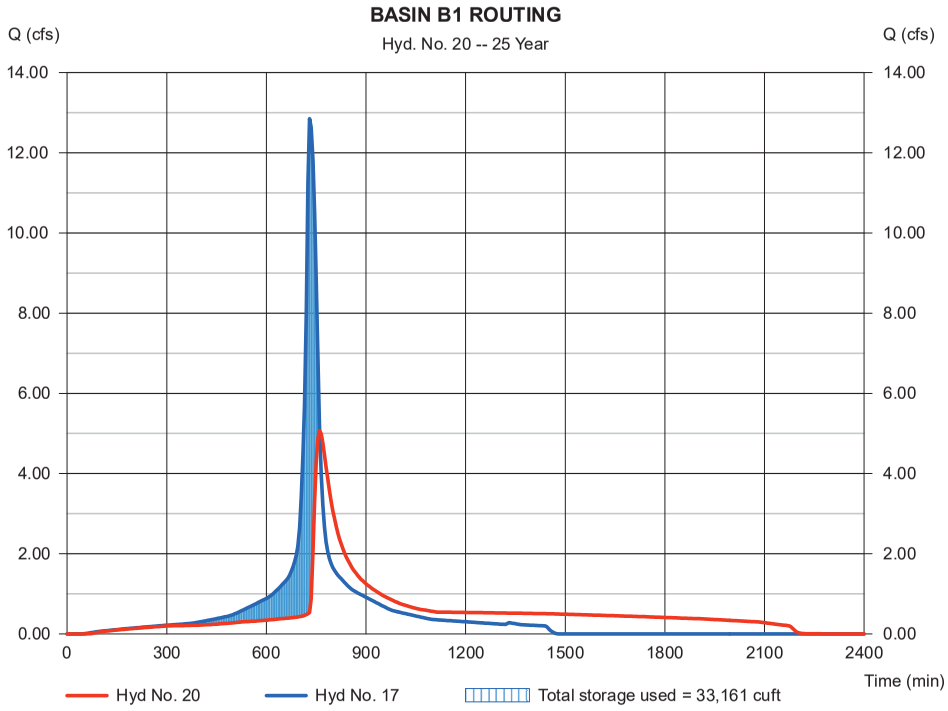
Hydrograph Report

Hyd. No. 20

BASIN B1 ROUTING

Hydrograph type	= Reservoir	Peak discharge	= 5.068 cfs
Storm frequency	= 25 yrs	Time to peak	= 760 min
Time interval	= 5 min	Hyd. volume	= 74,355 cuft
Inflow hyd. No.	= 17 - BASIN B-INFLOW	Max. Elevation	= 104.78 ft
Reservoir name	= Det. Basin B1	Max. Storage	= 33,161 cuft

Storage Indication method used.

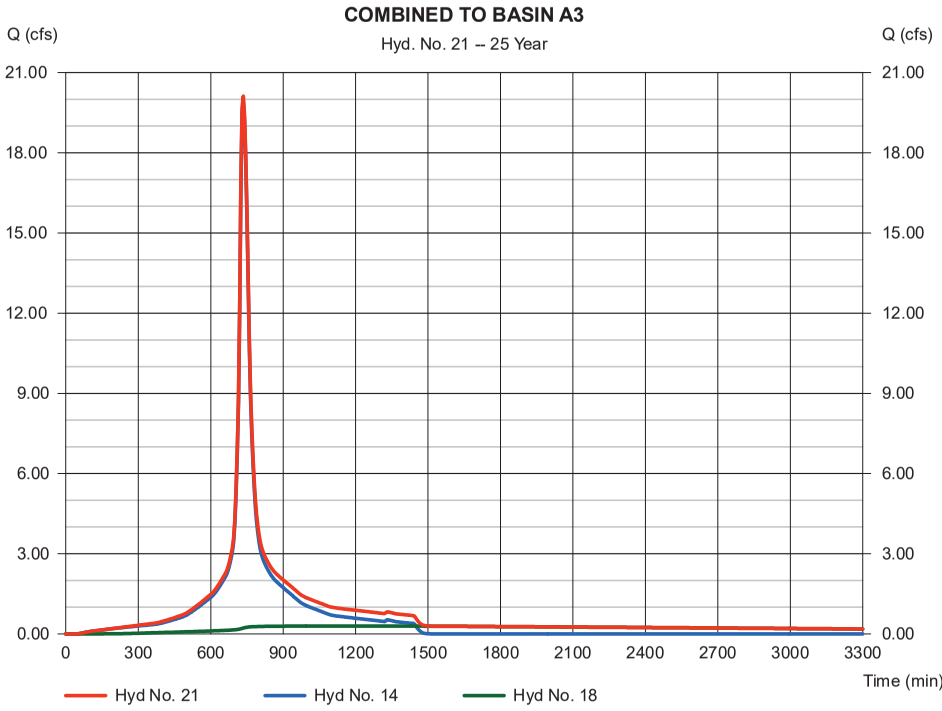


Hydrograph Report

Hyd. No. 21

COMBINED TO BASIN A3

Hydrograph type	= Combine	Peak discharge	= 20.12 cfs
Storm frequency	= 25 yrs	Time to peak	= 735 min
Time interval	= 5 min	Hyd. volume	= 184,437 cuft
Inflow hyds.	= 14, 18	Contrib. drain. area	= 0.000 ac



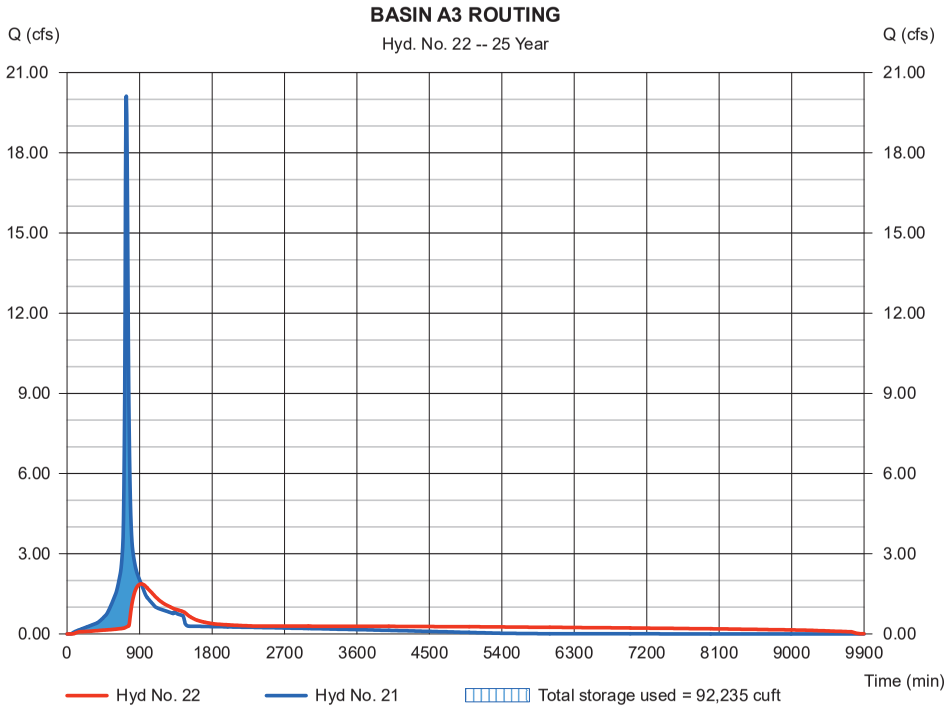
Hydrograph Report

Hyd. No. 22

BASIN A3 ROUTING

Hydrograph type	= Reservoir	Peak discharge	= 1.873 cfs
Storm frequency	= 25 yrs	Time to peak	= 920 min
Time interval	= 5 min	Hyd. volume	= 184,425 cuft
Inflow hyd. No.	= 21 - COMBINED TO BASIN A3	Max. Elevation	= 94.88 ft
Reservoir name	= Det. Basin A3	Max. Storage	= 92,235 cuft

Storage Indication method used.

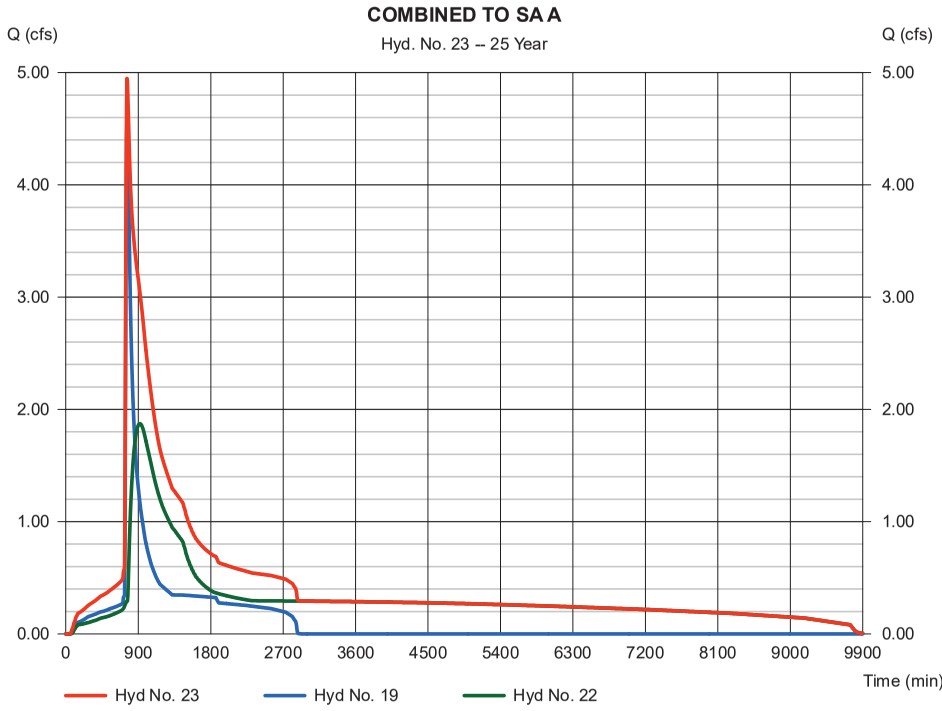


Hydrograph Report

Hyd. No. 23

COMBINED TO SA A

Hydrograph type	= Combine	Peak discharge	= 4.949 cfs
Storm frequency	= 25 yrs	Time to peak	= 760 min
Time interval	= 5 min	Hyd. volume	= 258,332 cuft
Inflow hyds.	= 19, 22	Contrib. drain. area	= 0.000 ac



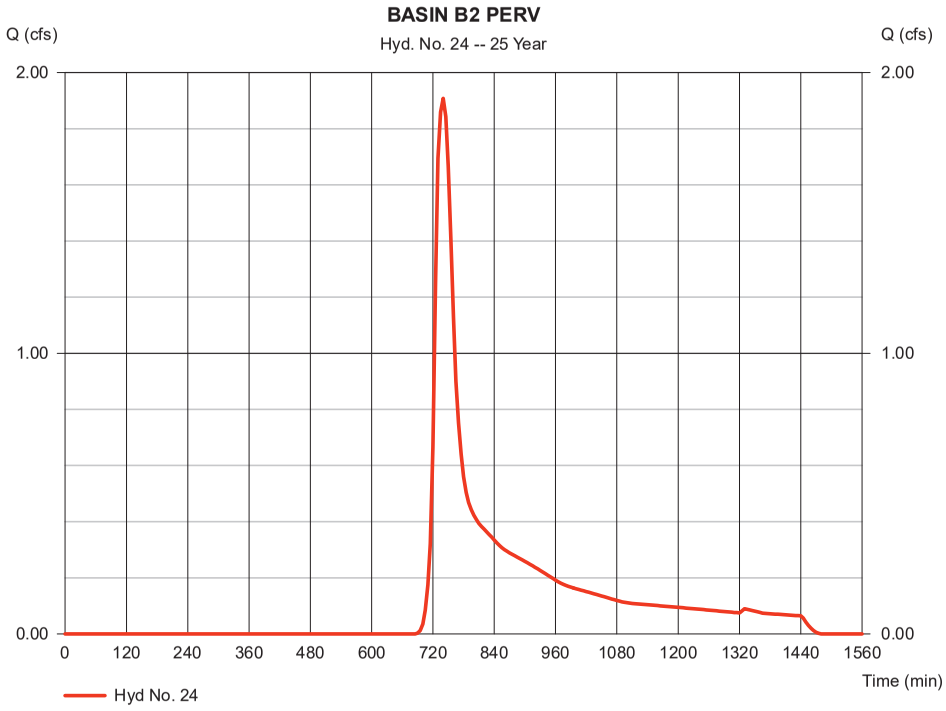
Hydrograph Report

Hyd. No. 24

BASIN B2 PERV

Hydrograph type	= SCS Runoff	Peak discharge	= 1.908 cfs
Storm frequency	= 25 yrs	Time to peak	= 740 min
Time interval	= 5 min	Hyd. volume	= 11,374 cuft
Drainage area	= 2.000 ac	Curve number	= 52*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 10.00 min
Total precip.	= 6.53 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

* Composite (Area/CN) = [(0.300 x 61) + (0.250 x 80) + (0.450 x 39) + (0.600 x 30) + (0.400 x 77)] / 2.000

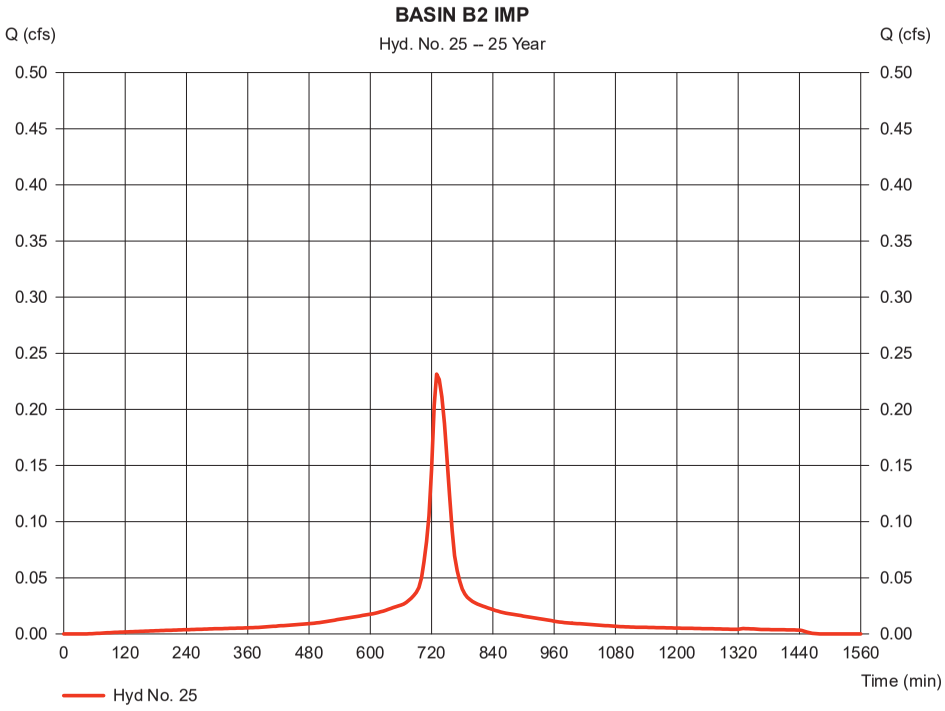


Hydrograph Report

Hyd. No. 25

BASIN B2 IMP

Hydrograph type	= SCS Runoff	Peak discharge	= 0.231 cfs
Storm frequency	= 25 yrs	Time to peak	= 730 min
Time interval	= 5 min	Hyd. volume	= 1,362 cuft
Drainage area	= 0.060 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 10.00 min
Total precip.	= 6.53 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

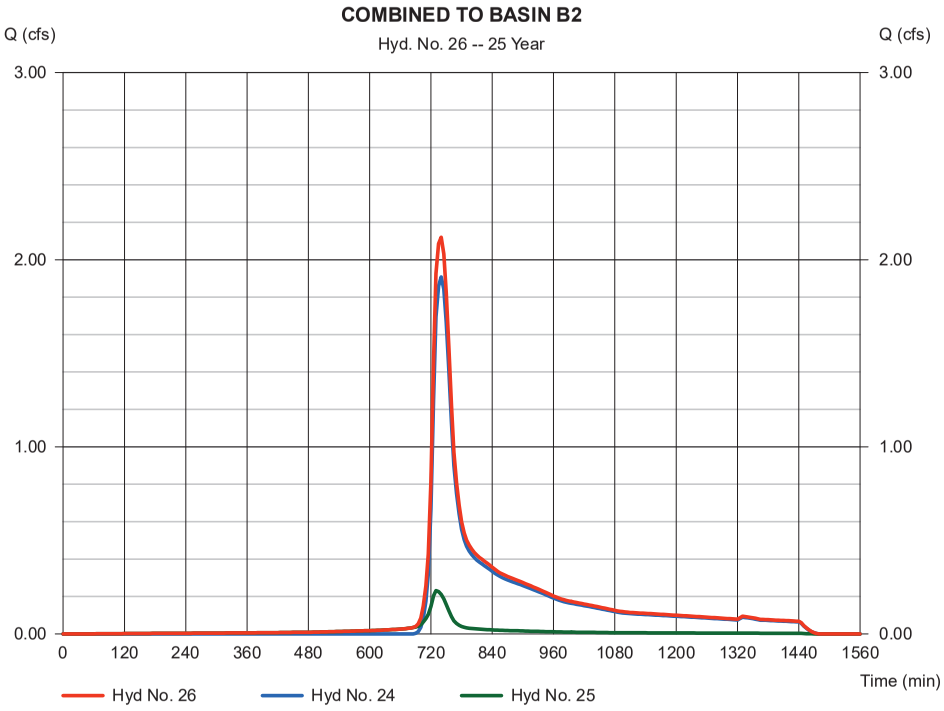


Hydrograph Report

Hyd. No. 26

COMBINED TO BASIN B2

Hydrograph type	= Combine	Peak discharge	= 2.120 cfs
Storm frequency	= 25 yrs	Time to peak	= 740 min
Time interval	= 5 min	Hyd. volume	= 12,735 cuft
Inflow hyds.	= 24, 25	Contrib. drain. area	= 2.060 ac

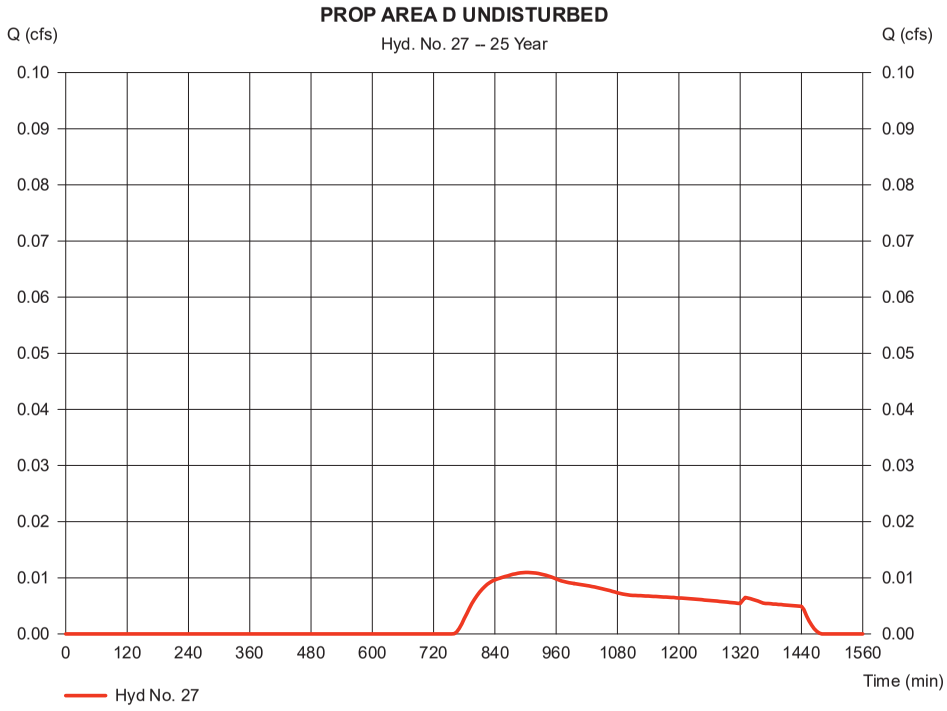


Hydrograph Report

Hyd. No. 27

PROP AREA D UNDISTURBED

Hydrograph type	= SCS Runoff	Peak discharge	= 0.011 cfs
Storm frequency	= 25 yrs	Time to peak	= 905 min
Time interval	= 5 min	Hyd. volume	= 300 cuft
Drainage area	= 0.603 ac	Curve number	= 30
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 10.00 min
Total precip.	= 6.53 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285



Hydrograph Report

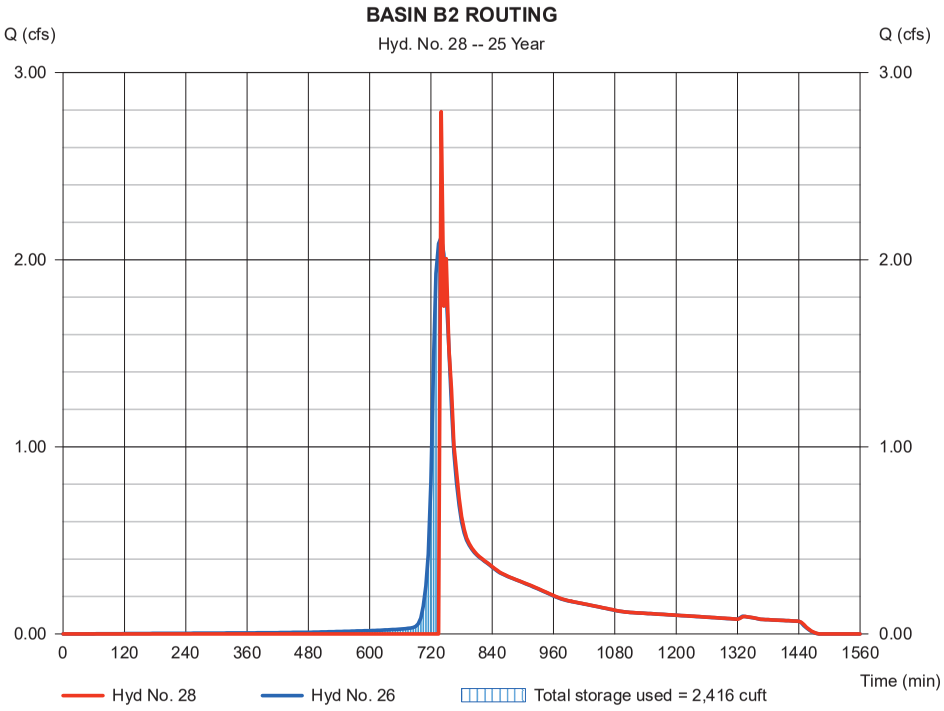
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Nov 11, 2020

Hyd. No. 28

BASIN B2 ROUTING

Hydrograph type	= Reservoir	Peak discharge	= 2.791 cfs
Storm frequency	= 25 yrs	Time to peak	= 740 min
Time interval	= 5 min	Hyd. volume	= 10,526 cuft
Inflow hyd. No.	= 26 - COMBINED TO BASIN B2	Max. Elevation	= 96.39 ft
Reservoir name	= Recharge Basin B2	Max. Storage	= 2,416 cuft

Storage Indication method used.



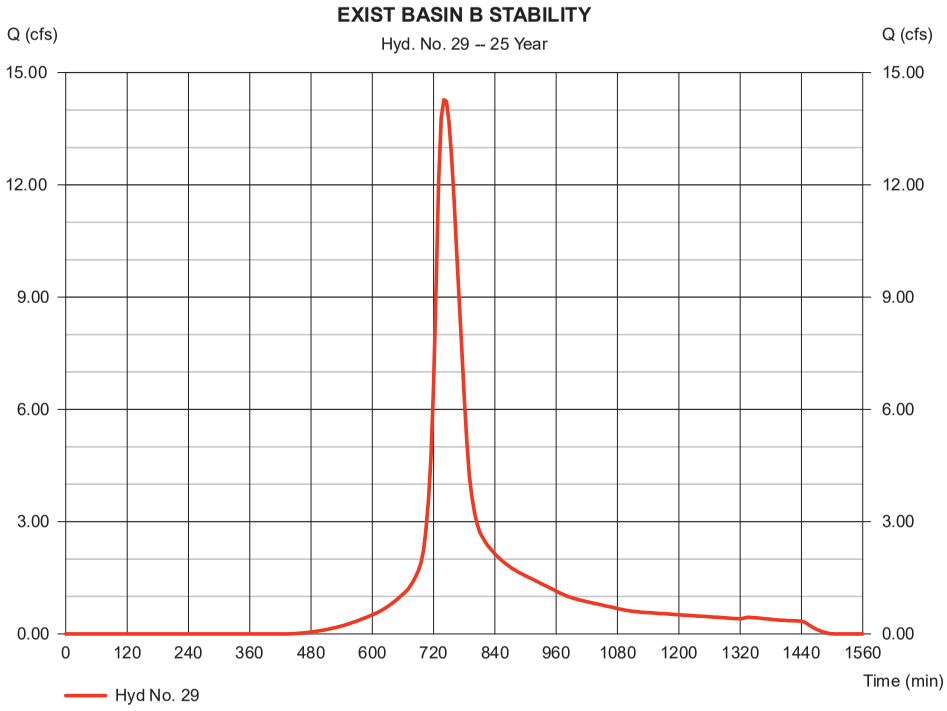
Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Nov 11, 2020

Hyd. No. 29

EXIST BASIN B STABILITY

Hydrograph type	= SCS Runoff	Peak discharge	= 14.27 cfs
Storm frequency	= 25 yrs	Time to peak	= 740 min
Time interval	= 5 min	Hyd. volume	= 93,136 cuft
Drainage area	= 6.310 ac	Curve number	= 77
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 20.00 min
Total precip.	= 6.53 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285



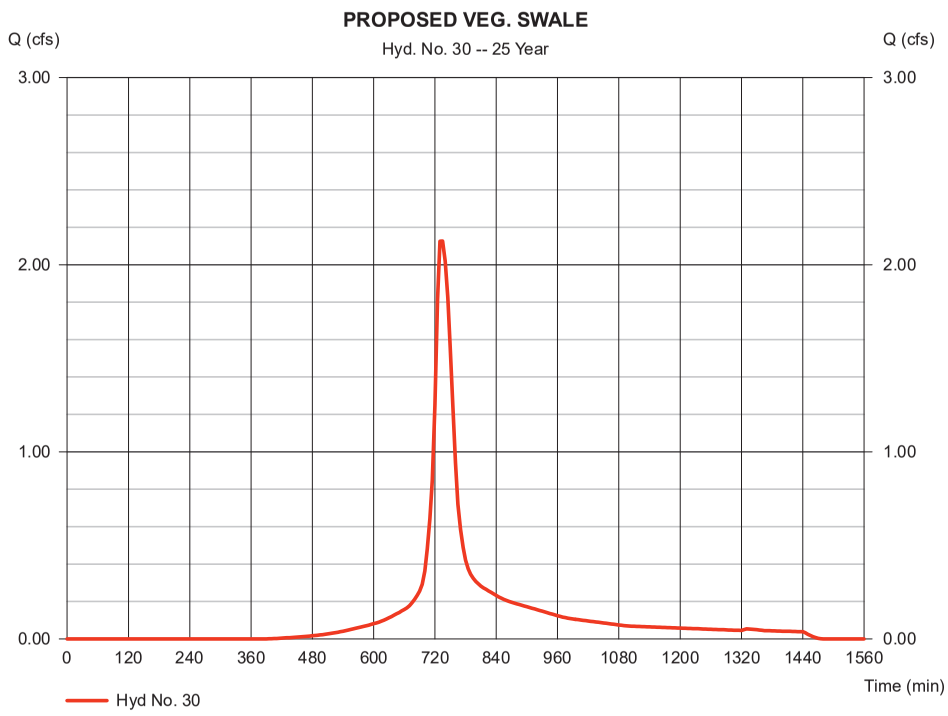
Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Nov 11, 2020

Hyd. No. 30

PROPOSED VEG. SWALE

Hydrograph type	= SCS Runoff	Peak discharge	= 2.126 cfs
Storm frequency	= 25 yrs	Time to peak	= 735 min
Time interval	= 5 min	Hyd. volume	= 11,224 cuft
Drainage area	= 0.730 ac	Curve number	= 80
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 10.00 min
Total precip.	= 6.53 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285



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	20.09	5	750	145,961	----	------	------	EXIST DISTURBED AREA A
2	SCS Runoff	14.02	5	745	96,415	----	------	------	EXIST DISTURBED AREA B
3	SCS Runoff	1.105	5	740	6,715	----	------	------	EXIST AREA D DISTURBED WOOD
4	SCS Runoff	11.11	5	730	65,898	----	------	------	AREA A1-IMPERVIOUS
5	SCS Runoff	3.044	5	735	16,544	----	------	------	AREA A1-PERV
6	Combine	14.03	5	730	82,442	4, 5	------	------	BASIN A1 INFLOW
7	SCS Runoff	16.09	5	730	95,395	----	------	------	AREA A2-IMP
8	SCS Runoff	1.900	5	745	12,777	----	------	------	AREA A2-PERV
9	Combine	17.58	5	730	108,172	7, 8	------	------	BASIN A2-INFLOW
10	SCS Runoff	2.560	5	745	19,278	----	------	------	AREA A3-WOODS
11	SCS Runoff	6.129	5	740	40,431	----	------	------	AREA A3 Open Space D
12	SCS Runoff	20.37	5	730	120,812	----	------	------	AREA A3-IMP
13	SCS Runoff	0.783	5	750	9,472	----	------	------	AREA A3- Open Space A
14	Combine	28.55	5	735	189,994	10, 11, 12, 13	------	------	BASIN A3-INFLOW
15	SCS Runoff	14.82	5	730	87,863	----	------	------	BASIN B1-IMP
16	SCS Runoff	3.183	5	730	16,840	----	------	------	BASIN B1-PERV
17	Combine	18.00	5	730	104,704	15, 16	------	------	BASIN B-INFLOW
18	Reservoir	3.351	5	775	82,339	6	106.30	48,943	BASIN A1 ROUTING
19	Reservoir	10.74	5	755	108,170	9	97.24	43,094	BASIN A2 ROUTING
20	Reservoir	10.48	5	755	104,702	17	105.32	41,013	BASIN B1 ROUTING
21	Combine	28.82	5	735	272,332	14, 18,	------	------	COMBINED TO BASIN A3
22	Reservoir	7.023	5	805	272,319	21	95.50	118,498	BASIN A3 ROUTING
23	Combine	14.24	5	760	380,490	19, 22	------	------	COMBINED TO SA A
24	SCS Runoff	4.036	5	735	22,238	----	------	------	BASIN B2 PERV
25	SCS Runoff	0.317	5	730	1,883	----	------	------	BASIN B2 IMP
26	Combine	4.347	5	735	24,121	24, 25	------	------	COMBINED TO BASIN B2
27	SCS Runoff	0.119	5	750	1,435	----	------	------	PROP AREA D UNDISTURBED
28	Reservoir	4.384	5	735	21,912	26	96.38	2,488	BASIN B2 ROUTING
29	SCS Runoff	22.12	5	740	144,998	----	------	------	EXIST BASIN B STABILITY
30	SCS Runoff	3.225	5	730	17,145	----	------	------	PROPOSED VEG. SWALE

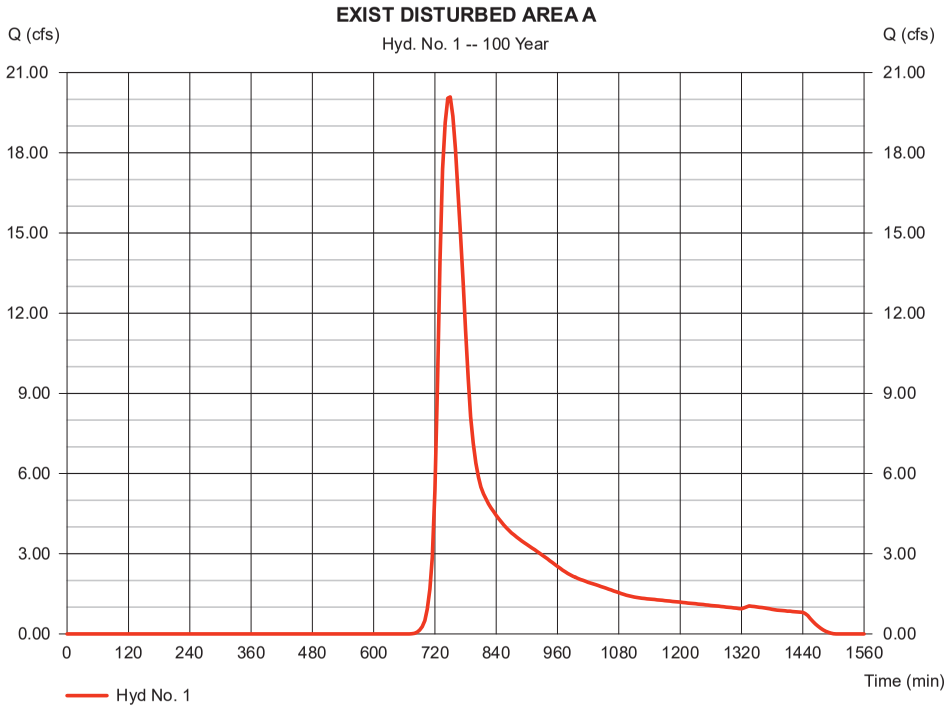
Hydrograph Report

Hyd. No. 1

EXIST DISTURBED AREA A

Hydrograph type	= SCS Runoff	Peak discharge	= 20.09 cfs
Storm frequency	= 100 yrs	Time to peak	= 750 min
Time interval	= 5 min	Hyd. volume	= 145,961 cuft
Drainage area	= 16.460 ac	Curve number	= 46*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 22.00 min
Total precip.	= 8.94 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

* Composite (Area/CN) = [(9.090 x 30) + (0.470 x 55) + (0.480 x 80) + (2.130 x 39) + (4.290 x 77)] / 16.460



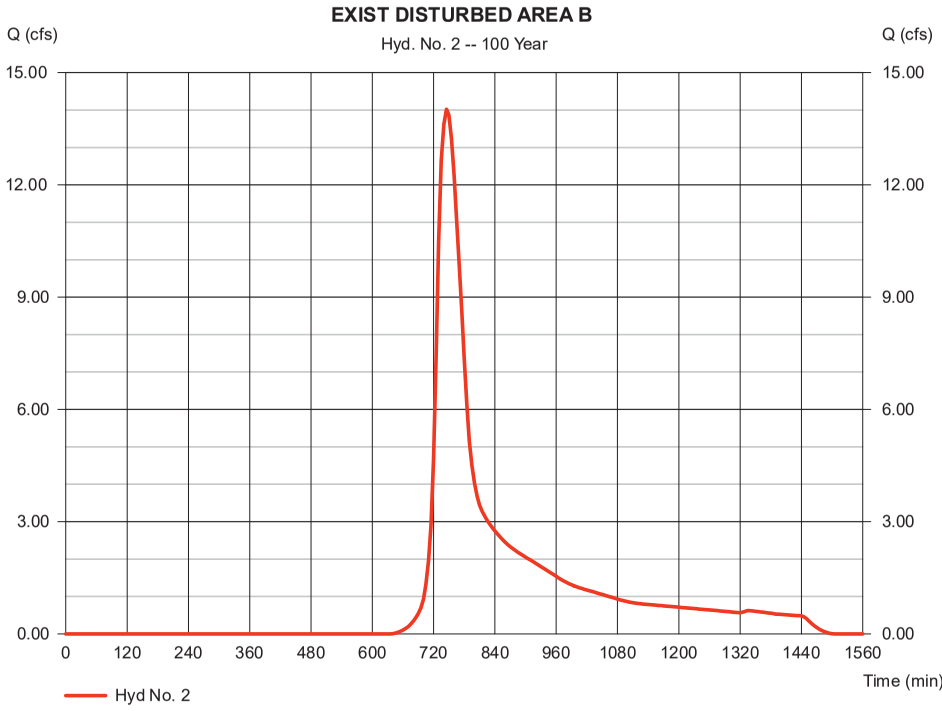
Hydrograph Report

Hyd. No. 2

EXIST DISTURBED AREA B

Hydrograph type	= SCS Runoff	Peak discharge	= 14.02 cfs
Storm frequency	= 100 yrs	Time to peak	= 745 min
Time interval	= 5 min	Hyd. volume	= 96,415 cuft
Drainage area	= 8.700 ac	Curve number	= 51*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 20.00 min
Total precip.	= 8.94 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

* Composite (Area/CN) = [(4.860 x 30) + (0.320 x 80) + (3.520 x 77)] / 8.700



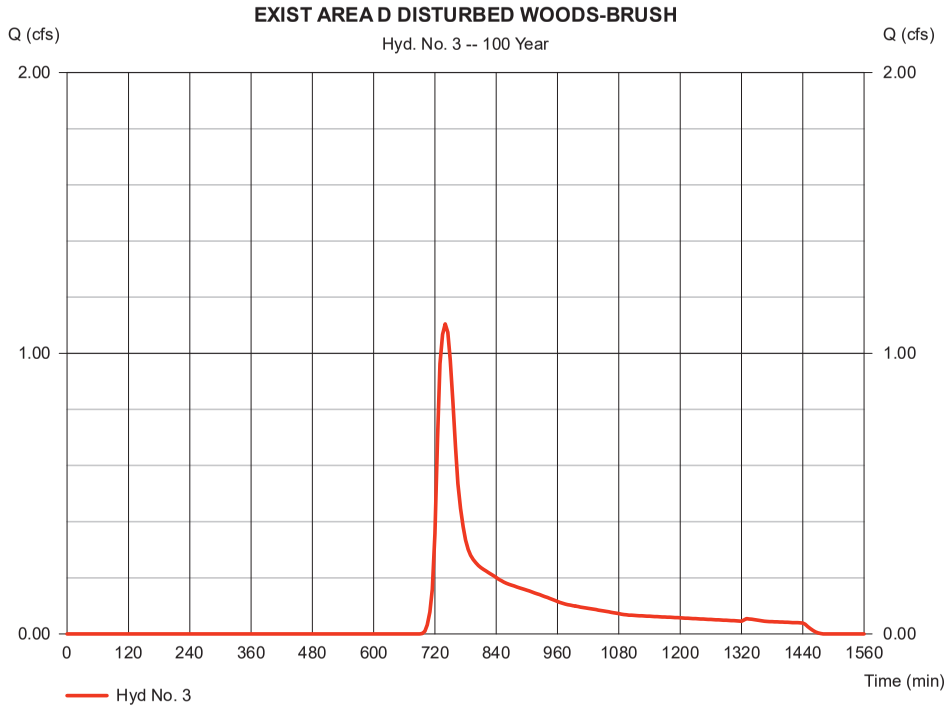
Hydrograph Report

Hyd. No. 3

EXIST AREA D DISTURBED WOODS-BRUSH

Hydrograph type	= SCS Runoff	Peak discharge	= 1.105 cfs
Storm frequency	= 100 yrs	Time to peak	= 740 min
Time interval	= 5 min	Hyd. volume	= 6,715 cuft
Drainage area	= 0.920 ac	Curve number	= 43*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 10.00 min
Total precip.	= 8.94 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

* Composite (Area/CN) = [(0.461 x 30) + (0.461 x 55)] / 0.920

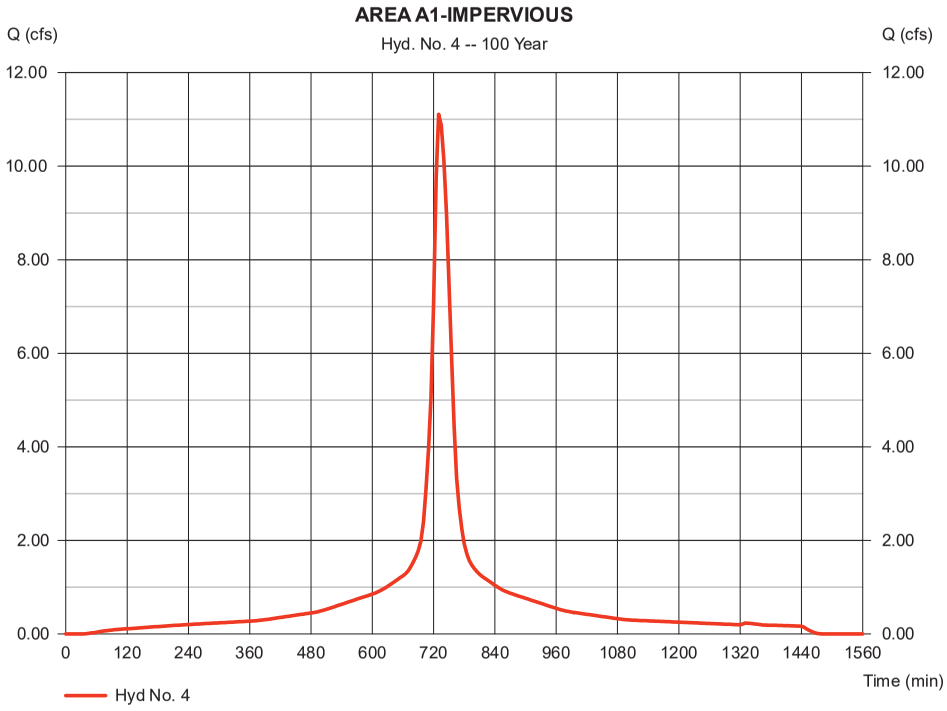


Hydrograph Report

Hyd. No. 4

AREA A1-IMPERVIOUS

Hydrograph type	= SCS Runoff	Peak discharge	= 11.11 cfs
Storm frequency	= 100 yrs	Time to peak	= 730 min
Time interval	= 5 min	Hyd. volume	= 65,898 cuft
Drainage area	= 2.100 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 10.00 min
Total precip.	= 8.94 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

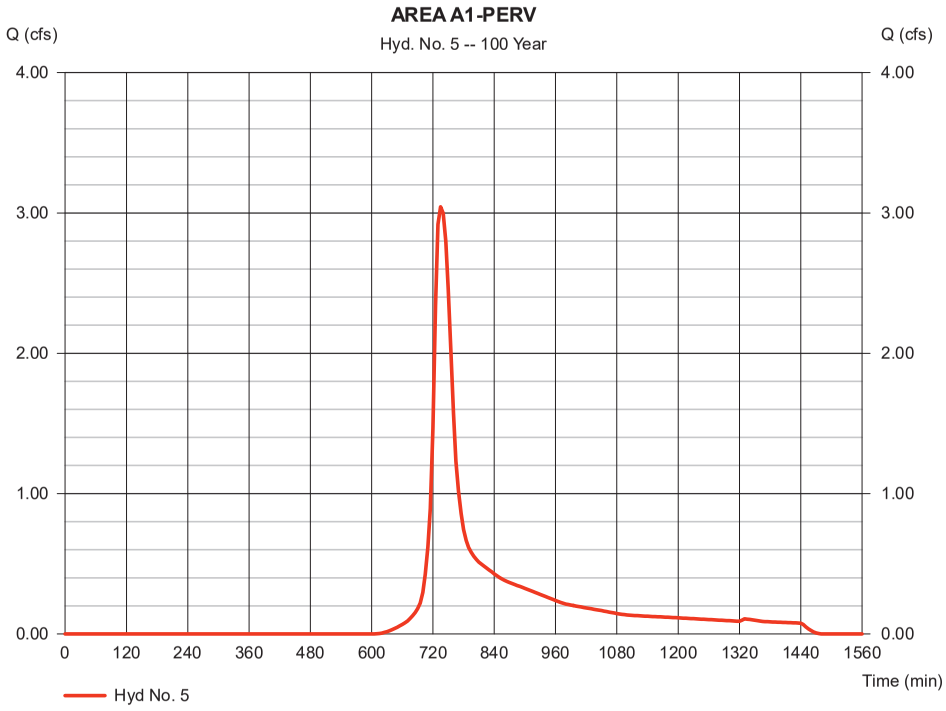


Hydrograph Report

Hyd. No. 5

AREA A1-PERV

Hydrograph type	= SCS Runoff	Peak discharge	= 3.044 cfs
Storm frequency	= 100 yrs	Time to peak	= 735 min
Time interval	= 5 min	Hyd. volume	= 16,544 cuft
Drainage area	= 1.380 ac	Curve number	= 54
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 10.00 min
Total precip.	= 8.94 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

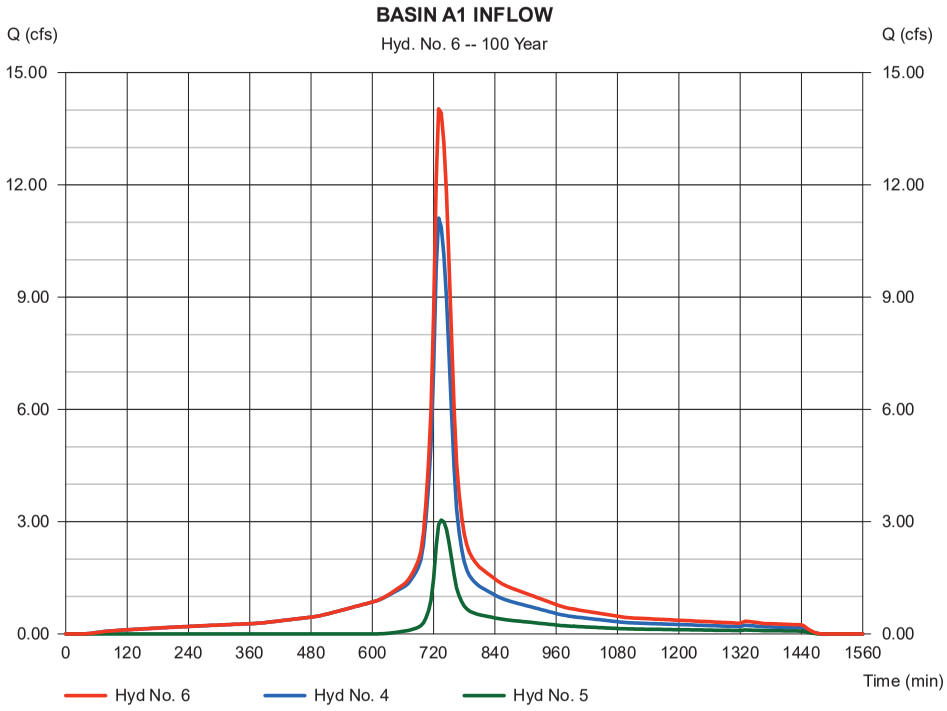


Hydrograph Report

Hyd. No. 6

BASIN A1 INFLOW

Hydrograph type	= Combine	Peak discharge	= 14.03 cfs
Storm frequency	= 100 yrs	Time to peak	= 730 min
Time interval	= 5 min	Hyd. volume	= 82,442 cuft
Inflow hyds.	= 4, 5	Contrib. drain. area	= 3.480 ac

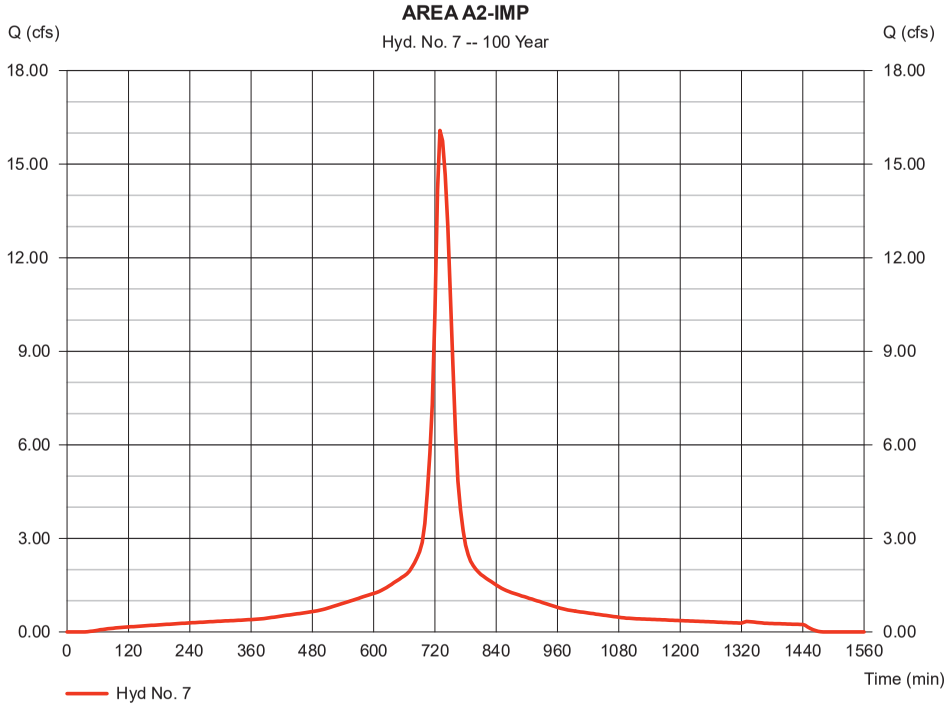


Hydrograph Report

Hyd. No. 7

AREA A2-IMP

Hydrograph type	= SCS Runoff	Peak discharge	= 16.09 cfs
Storm frequency	= 100 yrs	Time to peak	= 730 min
Time interval	= 5 min	Hyd. volume	= 95,395 cuft
Drainage area	= 3.040 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 10.00 min
Total precip.	= 8.94 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285



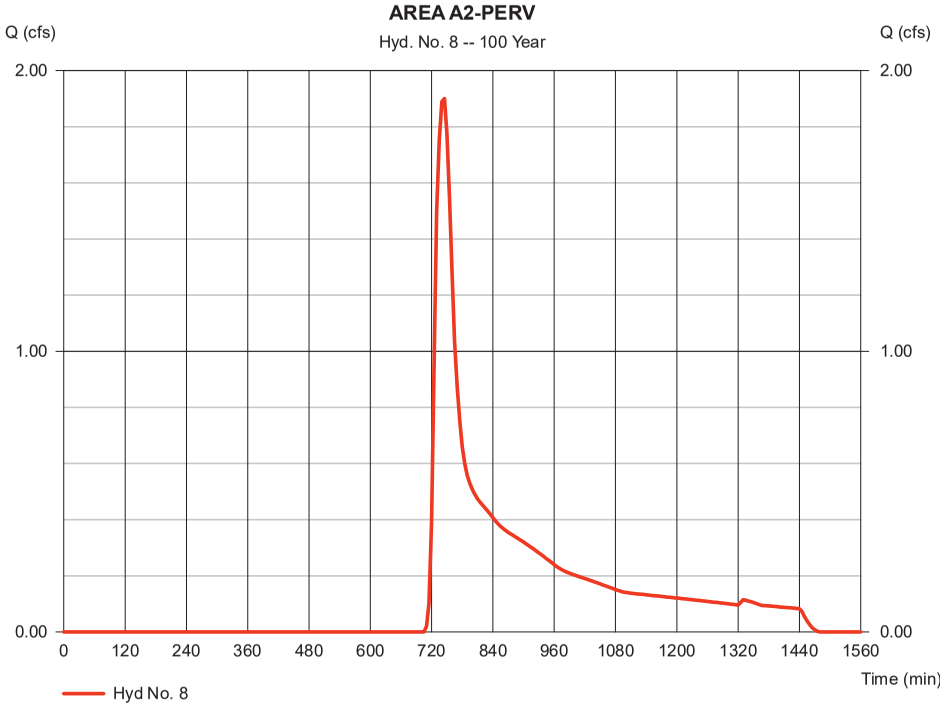
Hydrograph Report

Hyd. No. 8

AREA A2-PERV

Hydrograph type	= SCS Runoff	Peak discharge	= 1.900 cfs
Storm frequency	= 100 yrs	Time to peak	= 745 min
Time interval	= 5 min	Hyd. volume	= 12,777 cuft
Drainage area	= 2.250 ac	Curve number	= 39*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 10.00 min
Total precip.	= 8.94 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

* Composite (Area/CN) = [(0.840 x 80) + (0.390 x 61)] / 2.250

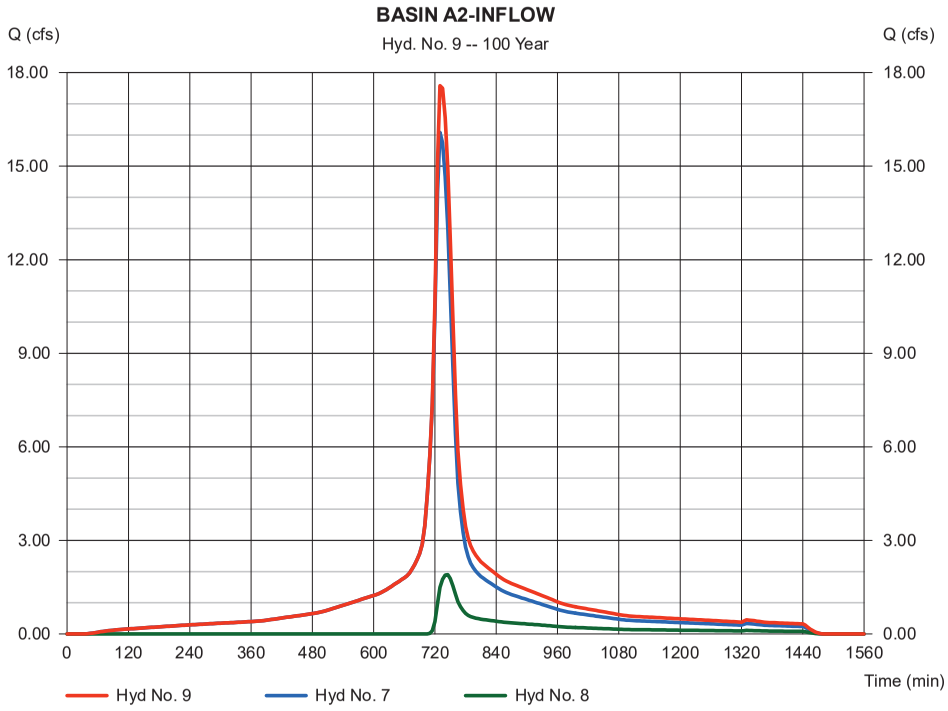


Hydrograph Report

Hyd. No. 9

BASIN A2-INFLOW

Hydrograph type	= Combine	Peak discharge	= 17.58 cfs
Storm frequency	= 100 yrs	Time to peak	= 730 min
Time interval	= 5 min	Hyd. volume	= 108,172 cuft
Inflow hyds.	= 7, 8	Contrib. drain. area	= 5.290 ac

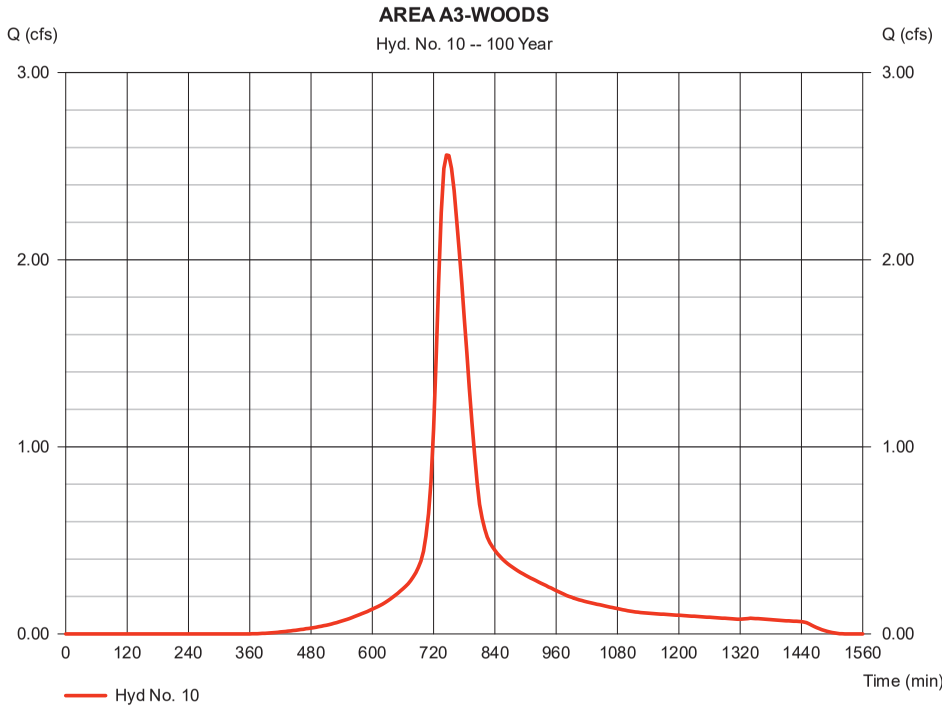


Hydrograph Report

Hyd. No. 10

AREA A3-WOODS

Hydrograph type	= SCS Runoff	Peak discharge	= 2.560 cfs
Storm frequency	= 100 yrs	Time to peak	= 745 min
Time interval	= 5 min	Hyd. volume	= 19,278 cuft
Drainage area	= 0.870 ac	Curve number	= 77
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 25.00 min
Total precip.	= 8.94 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

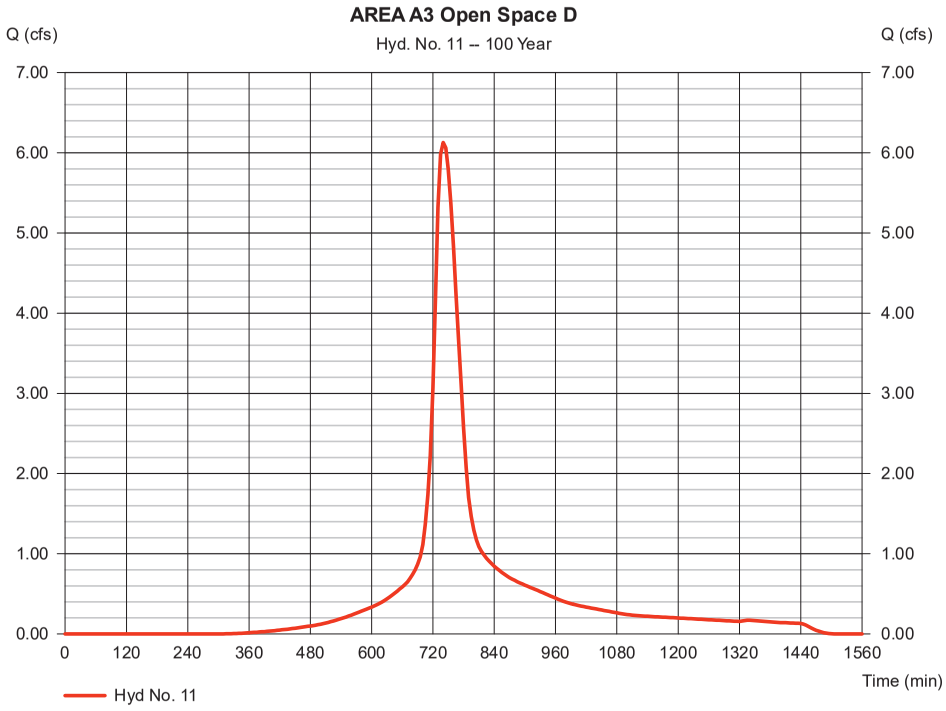


Hydrograph Report

Hyd. No. 11

AREA A3 Open Space D

Hydrograph type	= SCS Runoff	Peak discharge	= 6.129 cfs
Storm frequency	= 100 yrs	Time to peak	= 740 min
Time interval	= 5 min	Hyd. volume	= 40,431 cuft
Drainage area	= 1.660 ac	Curve number	= 80
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 20.00 min
Total precip.	= 8.94 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

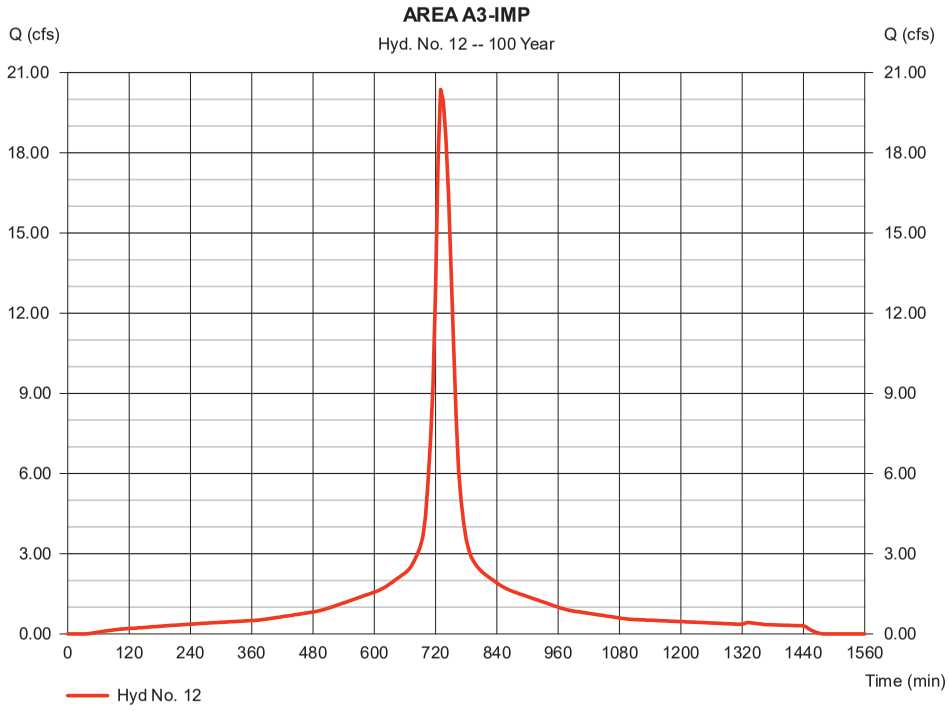


Hydrograph Report

Hyd. No. 12

AREA A3-IMP

Hydrograph type	= SCS Runoff	Peak discharge	= 20.37 cfs
Storm frequency	= 100 yrs	Time to peak	= 730 min
Time interval	= 5 min	Hyd. volume	= 120,812 cuft
Drainage area	= 3.850 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 10.00 min
Total precip.	= 8.94 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

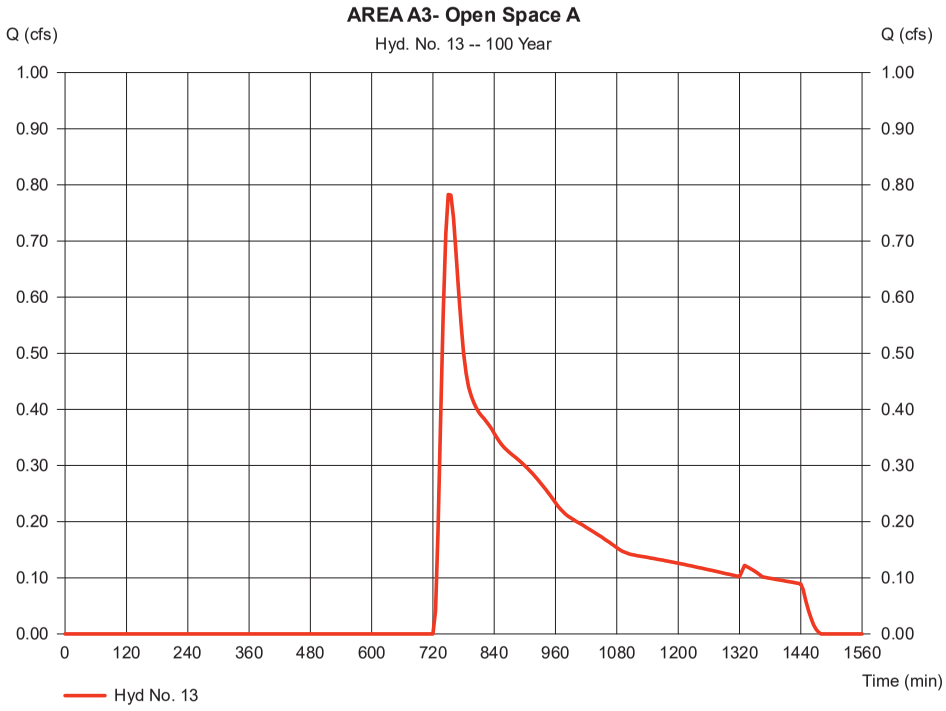


Hydrograph Report

Hyd. No. 13

AREA A3- Open Space A

Hydrograph type	= SCS Runoff	Peak discharge	= 0.783 cfs
Storm frequency	= 100 yrs	Time to peak	= 750 min
Time interval	= 5 min	Hyd. volume	= 9,472 cuft
Drainage area	= 3.980 ac	Curve number	= 30
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 10.00 min
Total precip.	= 8.94 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

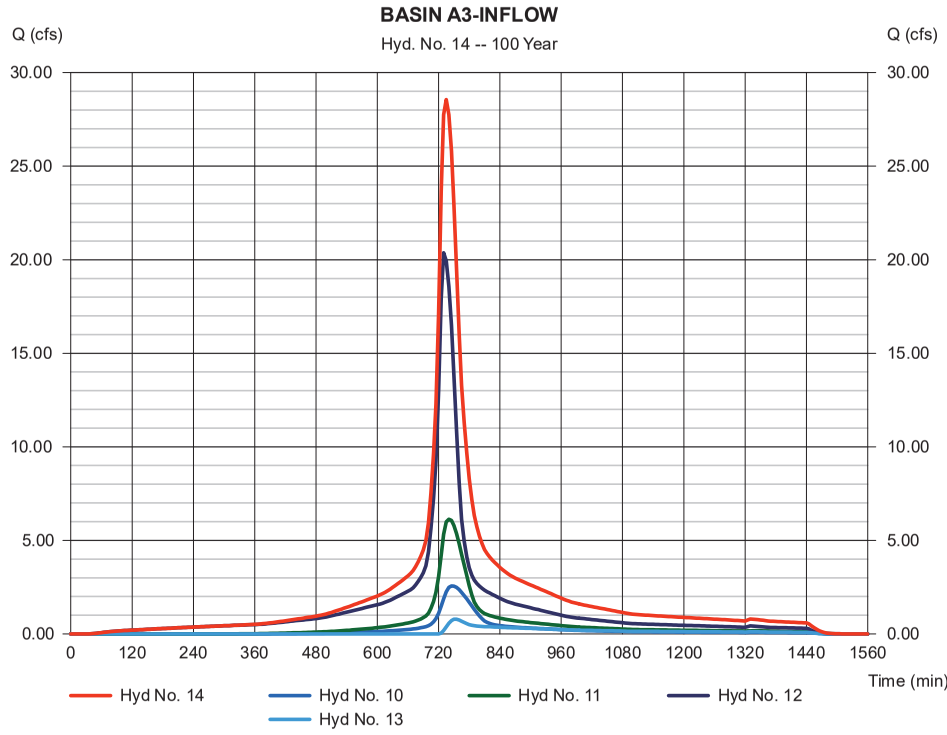


Hydrograph Report

Hyd. No. 14

BASIN A3-INFLOW

Hydrograph type	= Combine	Peak discharge	= 28.55 cfs
Storm frequency	= 100 yrs	Time to peak	= 735 min
Time interval	= 5 min	Hyd. volume	= 189,994 cuft
Inflow hyds.	= 10, 11, 12, 13	Contrib. drain. area	= 10.360 ac

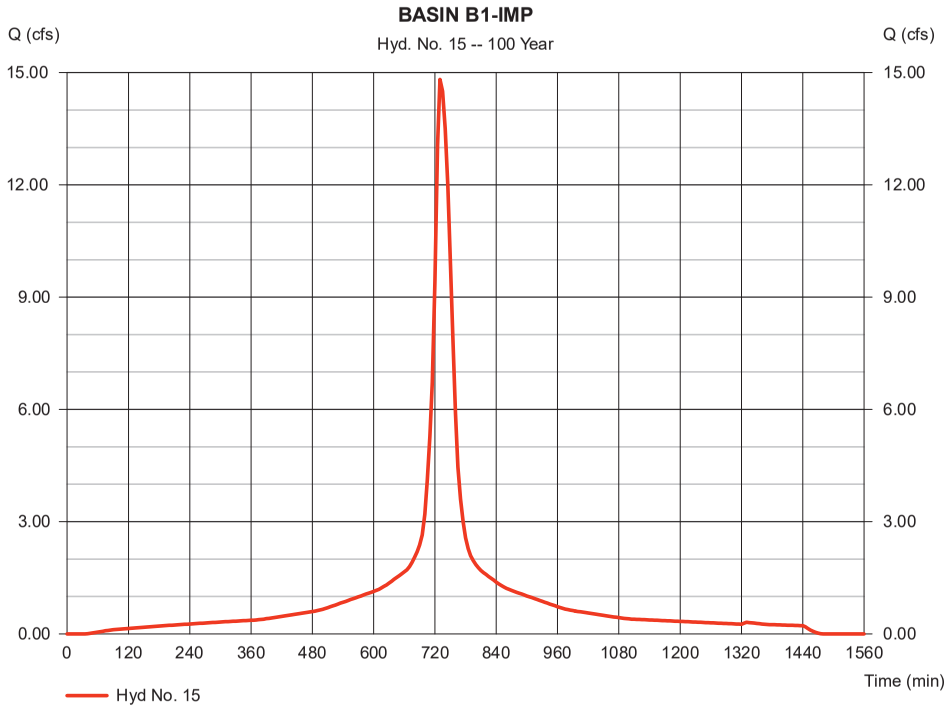


Hydrograph Report

Hyd. No. 15

BASIN B1-IMP

Hydrograph type	= SCS Runoff	Peak discharge	= 14.82 cfs
Storm frequency	= 100 yrs	Time to peak	= 730 min
Time interval	= 5 min	Hyd. volume	= 87,863 cuft
Drainage area	= 2.800 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 10.00 min
Total precip.	= 8.94 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

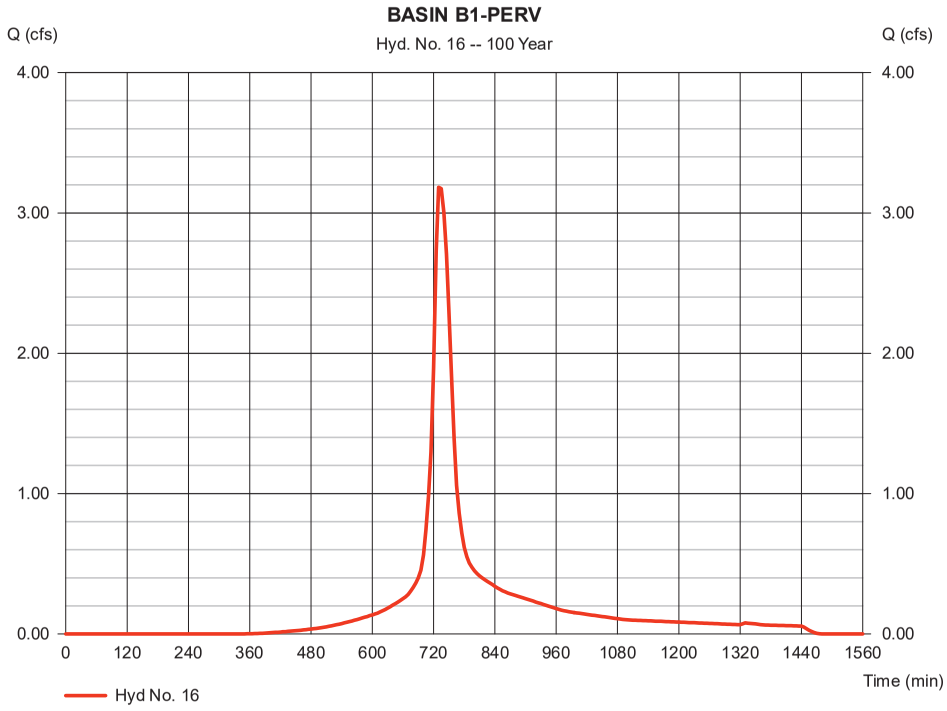


Hydrograph Report

Hyd. No. 16

BASIN B1-PERV

Hydrograph type	= SCS Runoff	Peak discharge	= 3.183 cfs
Storm frequency	= 100 yrs	Time to peak	= 730 min
Time interval	= 5 min	Hyd. volume	= 16,840 cuft
Drainage area	= 0.760 ac	Curve number	= 77
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 10.00 min
Total precip.	= 8.94 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

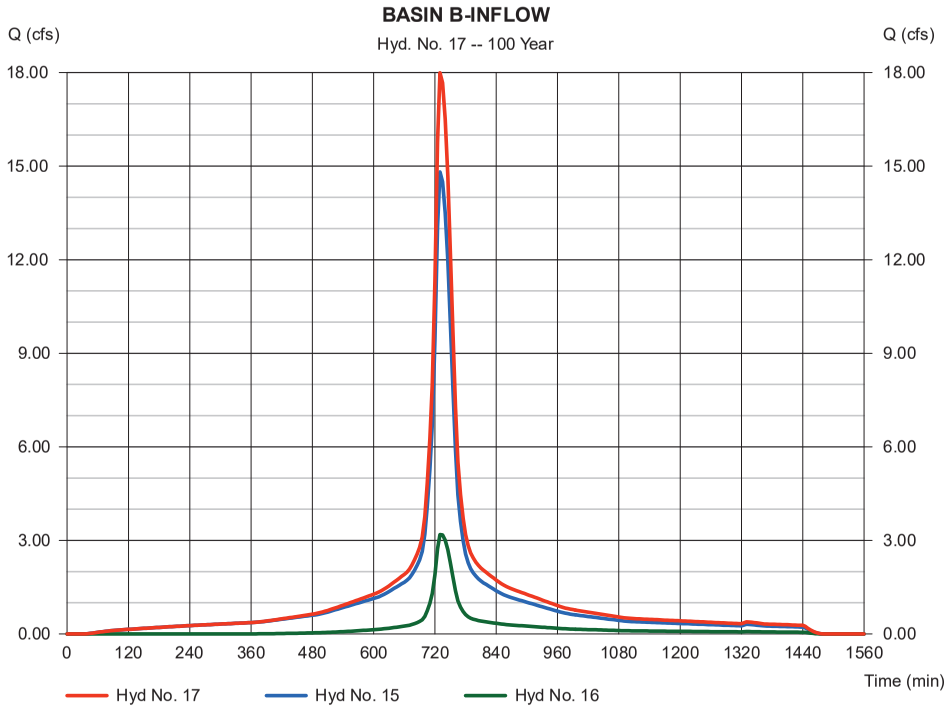


Hydrograph Report

Hyd. No. 17

BASIN B-INFLOW

Hydrograph type	= Combine	Peak discharge	= 18.00 cfs
Storm frequency	= 100 yrs	Time to peak	= 730 min
Time interval	= 5 min	Hyd. volume	= 104,704 cuft
Inflow hyds.	= 15, 16	Contrib. drain. area	= 3.560 ac



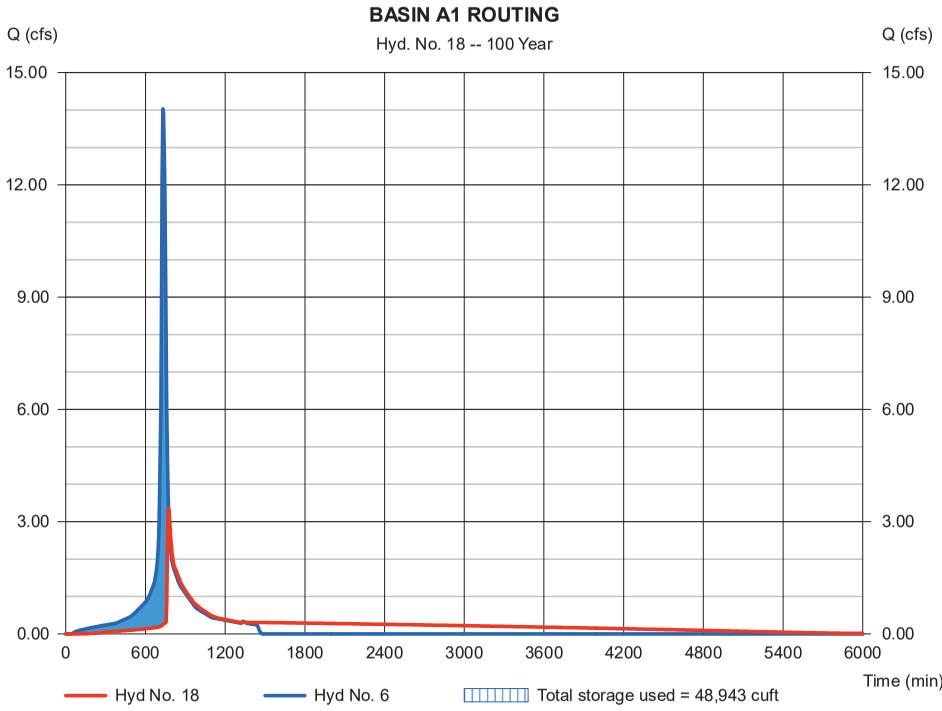
Hydrograph Report

Hyd. No. 18

BASIN A1 ROUTING

Hydrograph type	= Reservoir	Peak discharge	= 3.351 cfs
Storm frequency	= 100 yrs	Time to peak	= 775 min
Time interval	= 5 min	Hyd. volume	= 82,339 cuft
Inflow hyd. No.	= 6 - BASIN A1 INFLOW	Max. Elevation	= 106.30 ft
Reservoir name	= Inf. Basin A1	Max. Storage	= 48,943 cuft

Storage Indication method used.



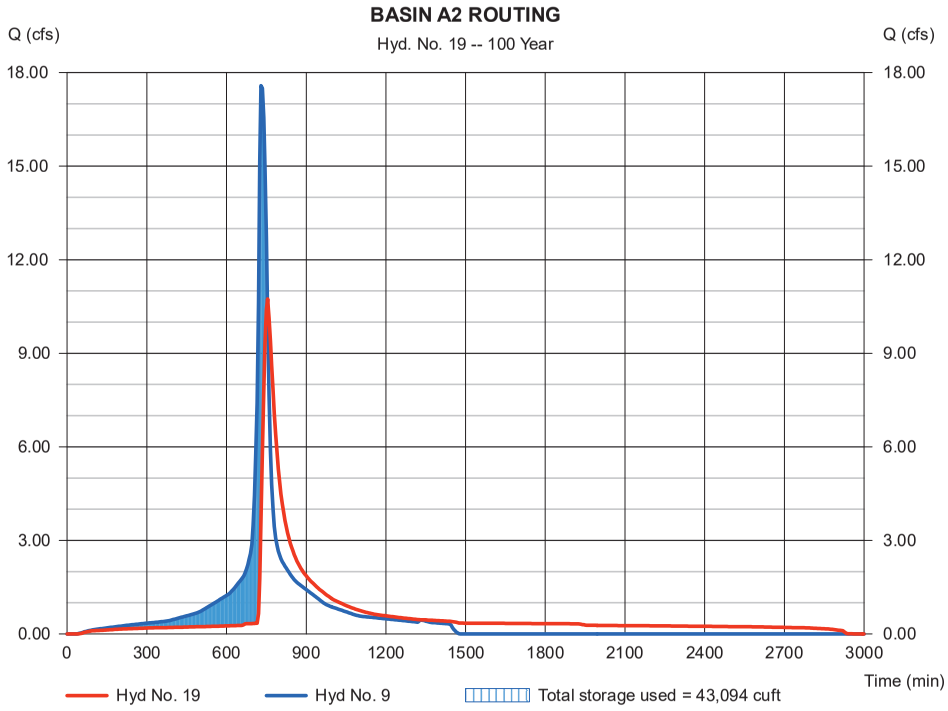
Hydrograph Report

Hyd. No. 19

BASIN A2 ROUTING

Hydrograph type	= Reservoir	Peak discharge	= 10.74 cfs
Storm frequency	= 100 yrs	Time to peak	= 755 min
Time interval	= 5 min	Hyd. volume	= 108,170 cuft
Inflow hyd. No.	= 9 - BASIN A2-INFLOW	Max. Elevation	= 97.24 ft
Reservoir name	= Det. Basin A2	Max. Storage	= 43,094 cuft

Storage Indication method used.



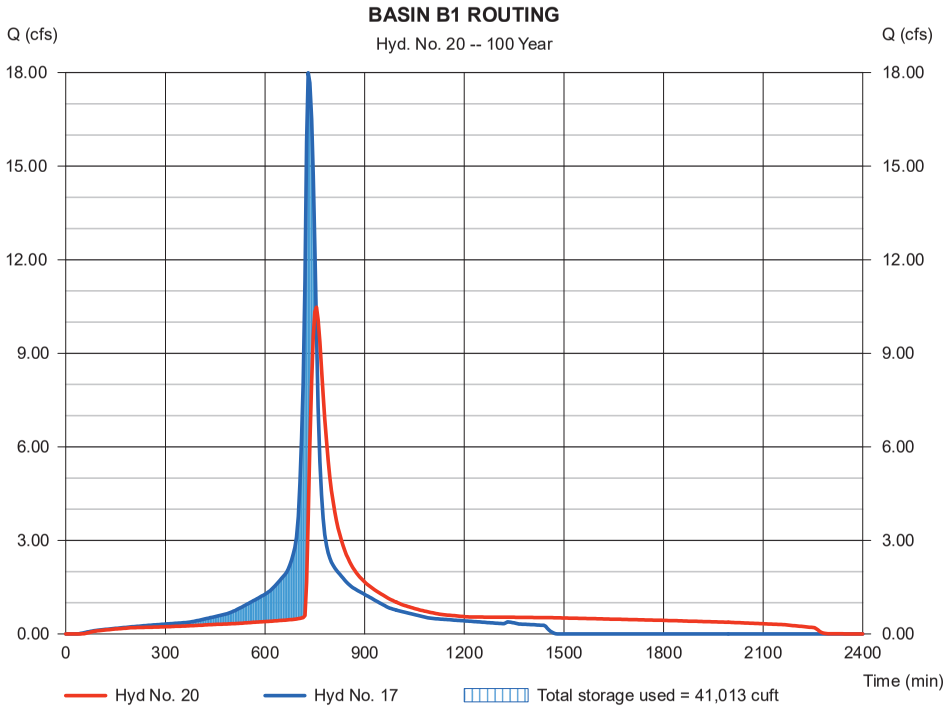
Hydrograph Report

Hyd. No. 20

BASIN B1 ROUTING

Hydrograph type	= Reservoir	Peak discharge	= 10.48 cfs
Storm frequency	= 100 yrs	Time to peak	= 755 min
Time interval	= 5 min	Hyd. volume	= 104,702 cuft
Inflow hyd. No.	= 17 - BASIN B-INFLOW	Max. Elevation	= 105.32 ft
Reservoir name	= Det. Basin B1	Max. Storage	= 41,013 cuft

Storage Indication method used.

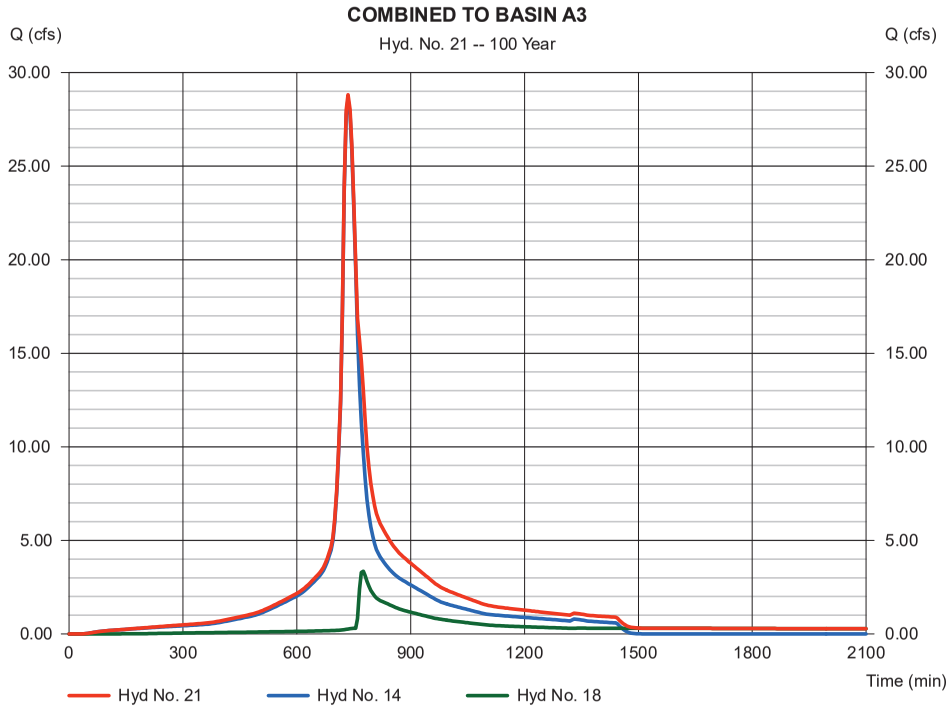


Hydrograph Report

Hyd. No. 21

COMBINED TO BASIN A3

Hydrograph type	= Combine	Peak discharge	= 28.82 cfs
Storm frequency	= 100 yrs	Time to peak	= 735 min
Time interval	= 5 min	Hyd. volume	= 272,332 cuft
Inflow hyds.	= 14, 18	Contrib. drain. area	= 0.000 ac



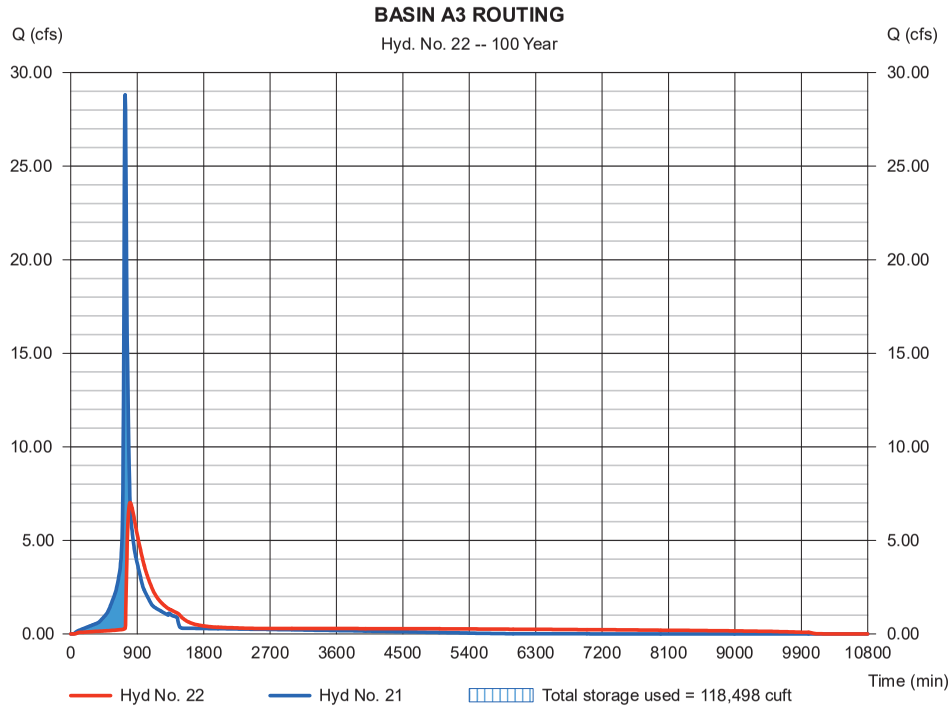
Hydrograph Report

Hyd. No. 22

BASIN A3 ROUTING

Hydrograph type	= Reservoir	Peak discharge	= 7.023 cfs
Storm frequency	= 100 yrs	Time to peak	= 805 min
Time interval	= 5 min	Hyd. volume	= 272,319 cuft
Inflow hyd. No.	= 21 - COMBINED TO BASIN A3	Max. Elevation	= 95.50 ft
Reservoir name	= Det. Basin A3	Max. Storage	= 118,498 cuft

Storage Indication method used.

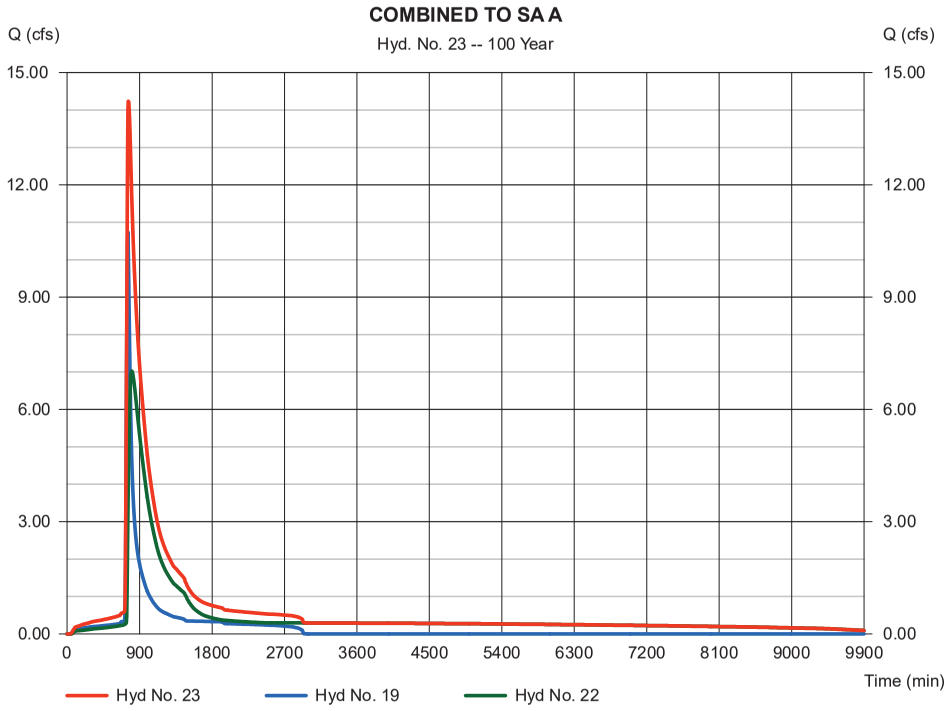


Hydrograph Report

Hyd. No. 23

COMBINED TO SA A

Hydrograph type	= Combine	Peak discharge	= 14.24 cfs
Storm frequency	= 100 yrs	Time to peak	= 760 min
Time interval	= 5 min	Hyd. volume	= 380,490 cuft
Inflow hyds.	= 19, 22	Contrib. drain. area	= 0.000 ac



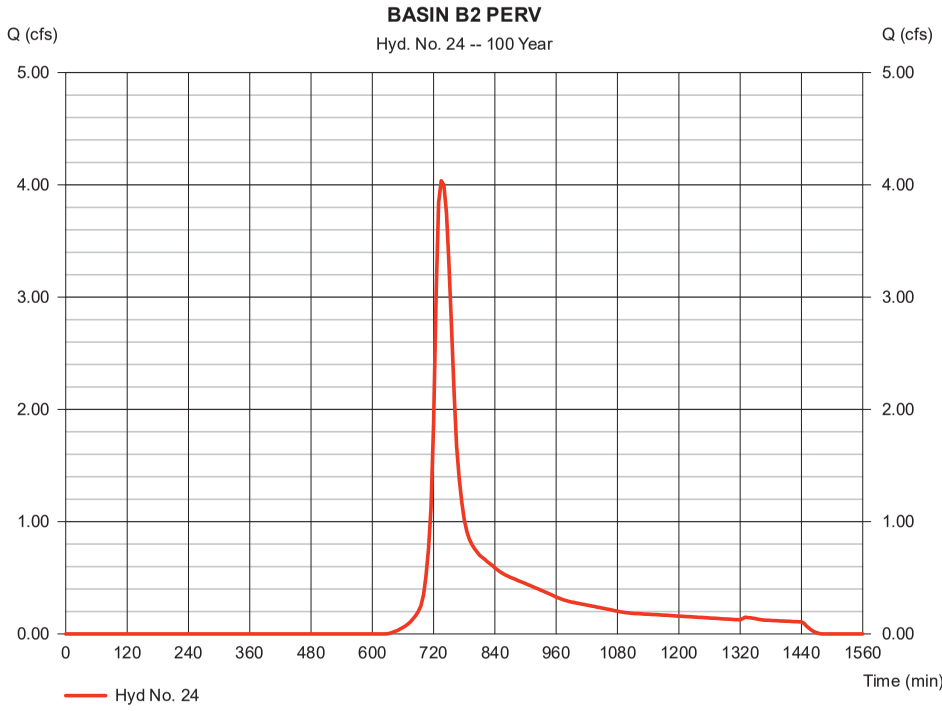
Hydrograph Report

Hyd. No. 24

BASIN B2 PERV

Hydrograph type	= SCS Runoff	Peak discharge	= 4.036 cfs
Storm frequency	= 100 yrs	Time to peak	= 735 min
Time interval	= 5 min	Hyd. volume	= 22,238 cuft
Drainage area	= 2.000 ac	Curve number	= 52*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 10.00 min
Total precip.	= 8.94 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

* Composite (Area/CN) = [(0.300 x 61) + (0.250 x 80) + (0.450 x 39) + (0.600 x 30) + (0.400 x 77)] / 2.000

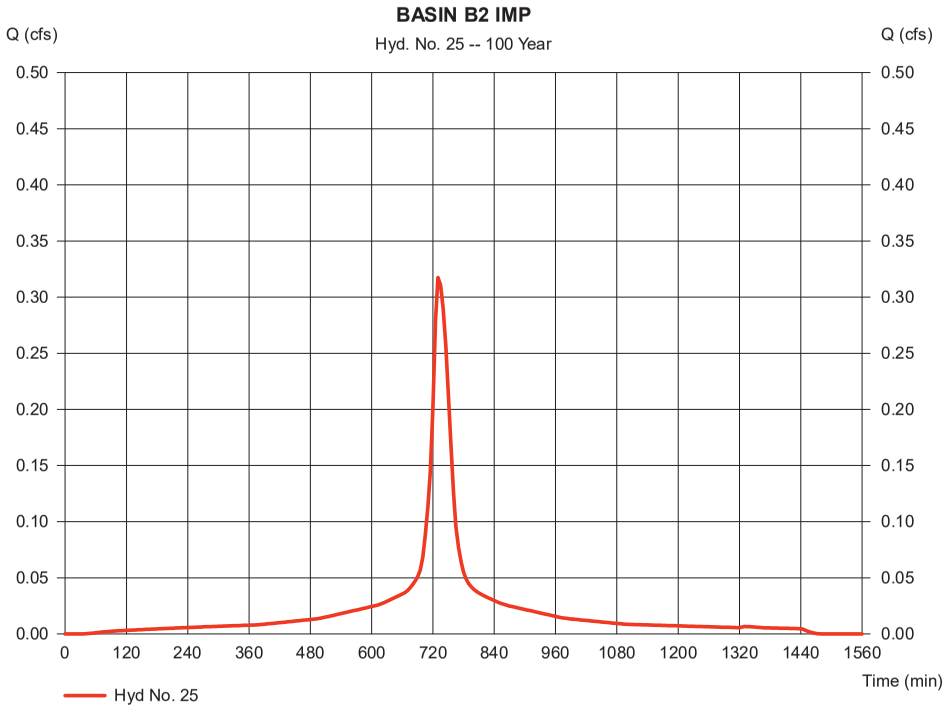


Hydrograph Report

Hyd. No. 25

BASIN B2 IMP

Hydrograph type	= SCS Runoff	Peak discharge	= 0.317 cfs
Storm frequency	= 100 yrs	Time to peak	= 730 min
Time interval	= 5 min	Hyd. volume	= 1,883 cuft
Drainage area	= 0.060 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 10.00 min
Total precip.	= 8.94 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

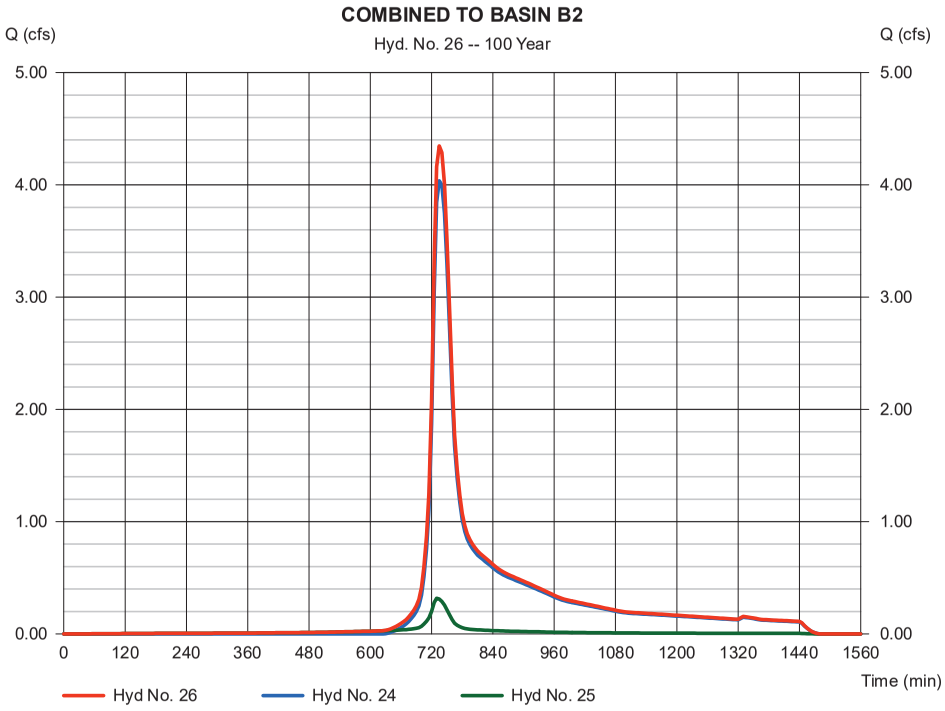


Hydrograph Report

Hyd. No. 26

COMBINED TO BASIN B2

Hydrograph type	= Combine	Peak discharge	= 4.347 cfs
Storm frequency	= 100 yrs	Time to peak	= 735 min
Time interval	= 5 min	Hyd. volume	= 24,121 cuft
Inflow hyds.	= 24, 25	Contrib. drain. area	= 2.060 ac

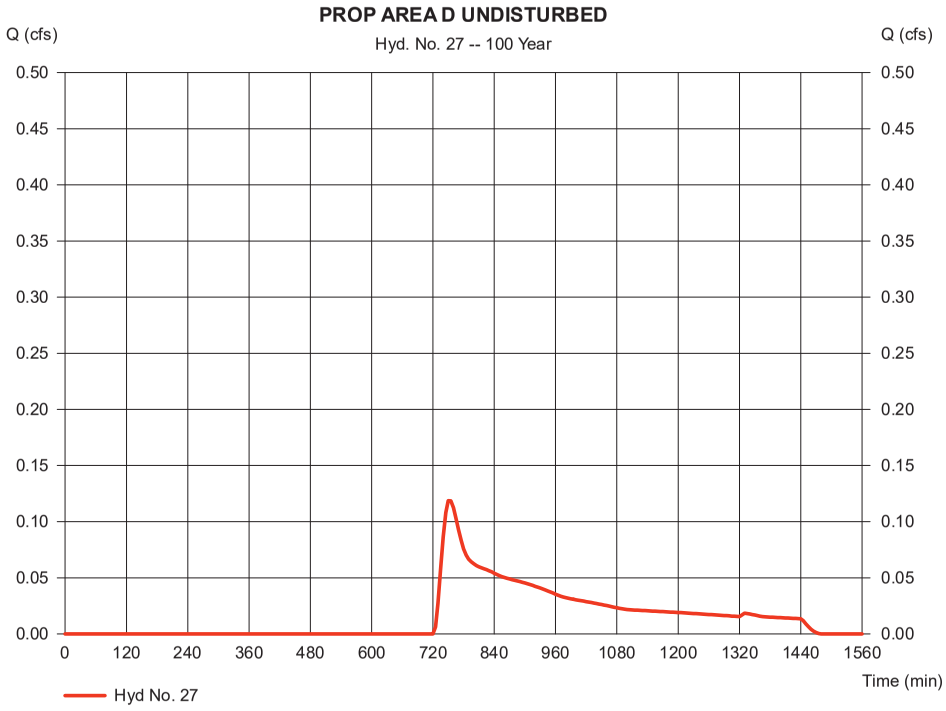


Hydrograph Report

Hyd. No. 27

PROP AREA D UNDISTURBED

Hydrograph type	= SCS Runoff	Peak discharge	= 0.119 cfs
Storm frequency	= 100 yrs	Time to peak	= 750 min
Time interval	= 5 min	Hyd. volume	= 1,435 cuft
Drainage area	= 0.603 ac	Curve number	= 30
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 10.00 min
Total precip.	= 8.94 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285



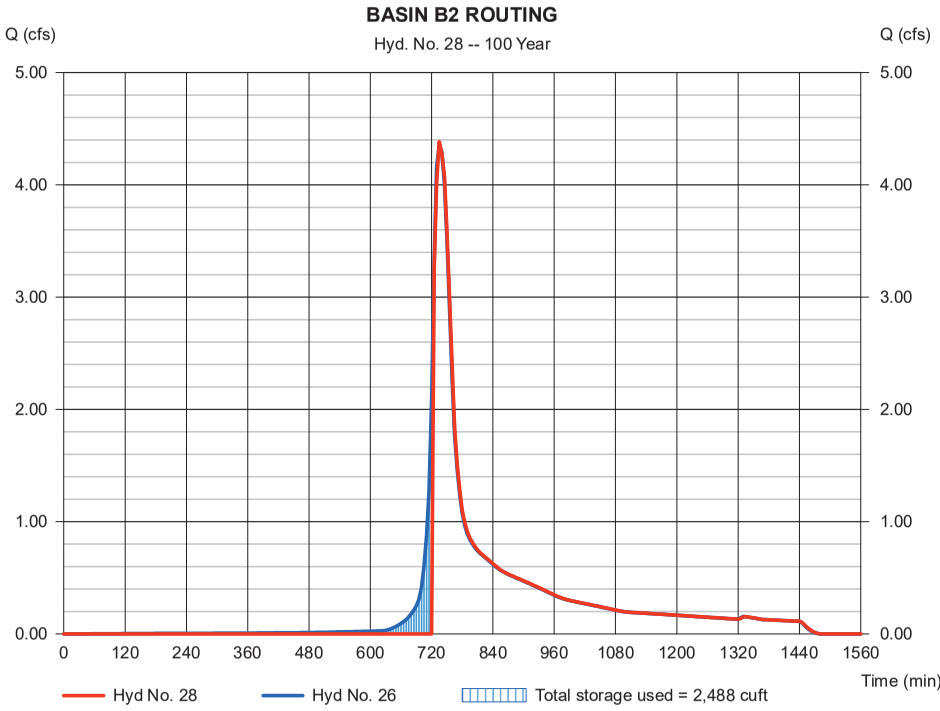
Hydrograph Report

Hyd. No. 28

BASIN B2 ROUTING

Hydrograph type	= Reservoir	Peak discharge	= 4.384 cfs
Storm frequency	= 100 yrs	Time to peak	= 735 min
Time interval	= 5 min	Hyd. volume	= 21,912 cuft
Inflow hyd. No.	= 26 - COMBINED TO BASIN B2	Max. Elevation	= 96.38 ft
Reservoir name	= Recharge Basin B2	Max. Storage	= 2,488 cuft

Storage Indication method used.

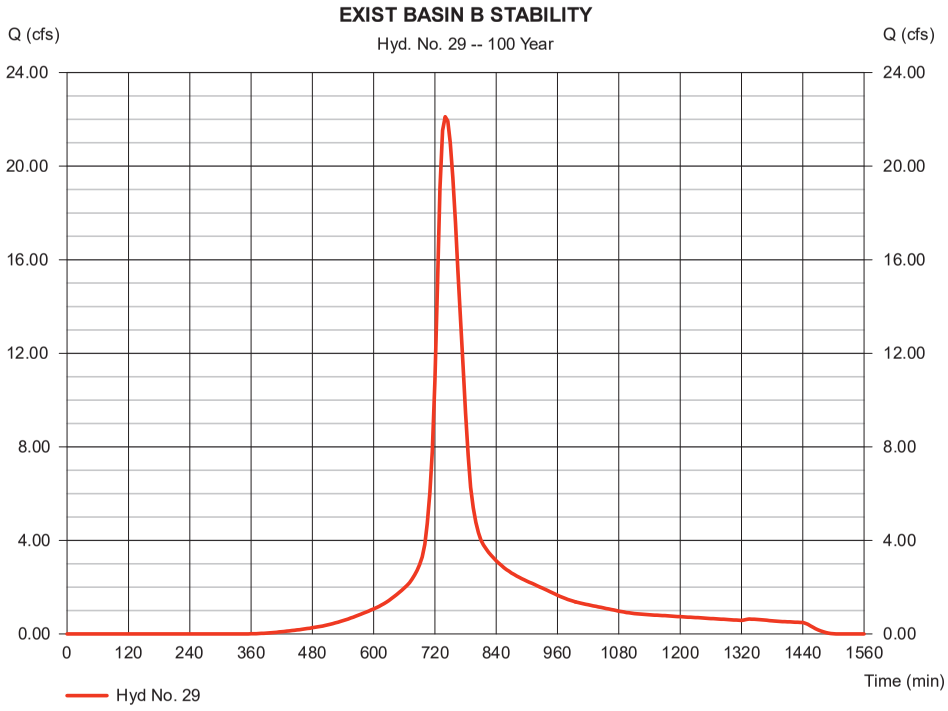


Hydrograph Report

Hyd. No. 29

EXIST BASIN B STABILITY

Hydrograph type	= SCS Runoff	Peak discharge	= 22.12 cfs
Storm frequency	= 100 yrs	Time to peak	= 740 min
Time interval	= 5 min	Hyd. volume	= 144,998 cuft
Drainage area	= 6.310 ac	Curve number	= 77
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 20.00 min
Total precip.	= 8.94 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

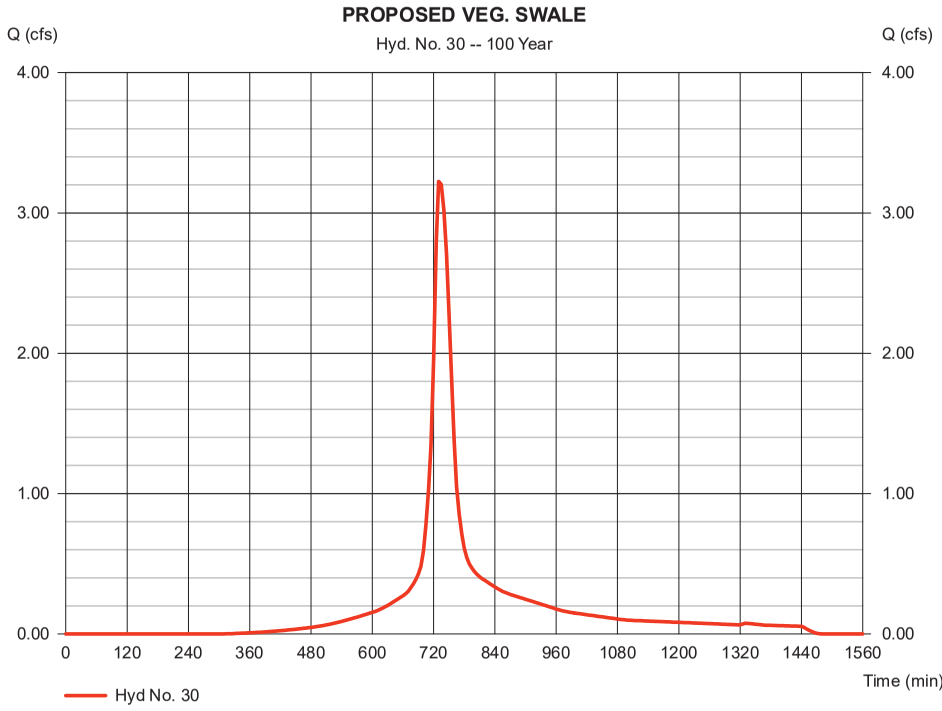


Hydrograph Report

Hyd. No. 30

PROPOSED VEG. SWALE

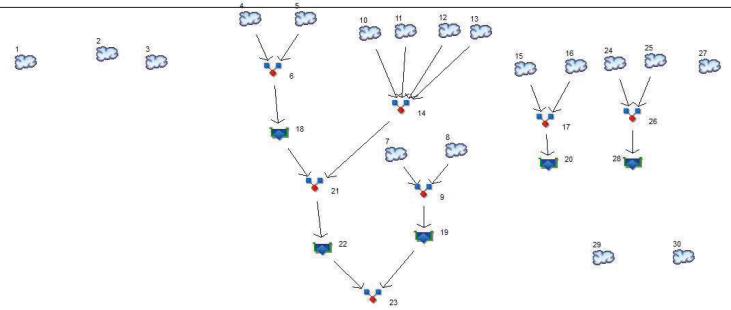
Hydrograph type	= SCS Runoff	Peak discharge	= 3.225 cfs
Storm frequency	= 100 yrs	Time to peak	= 730 min
Time interval	= 5 min	Hyd. volume	= 17,145 cuft
Drainage area	= 0.730 ac	Curve number	= 80
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 10.00 min
Total precip.	= 8.94 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285



7. HYDROGRAPH SUMMARY REPORTS – WATER QUALITY STORM

Watershed Model Schematic

Hydraflow Hydrographs by Intelisolve v9.1



Legend

Hyd.	Origin	Description
1	SCS Runoff	EXIST DISTURBED AREA A
2	SCS Runoff	EXIST DISTURBED AREA B
3	SCS Runoff	EXIST AREA D DISTURBED WOODS-BRUSH
4	SCS Runoff	AREA A1-IMPERVIOUS
5	SCS Runoff	AREA A1-PERV
6	Combine	BASIN A1 INFLOW
7	SCS Runoff	AREA A2-IMP
8	SCS Runoff	AREA A2-PERV
9	Combine	BASIN A2-INFLOW
10	SCS Runoff	AREA A3-WOODS
11	SCS Runoff	AREA A3 Open Space D
12	SCS Runoff	AREA A3-IMP
13	SCS Runoff	AREA A3- Open Space A
14	Combine	BASIN A3-INFLOW
15	SCS Runoff	BASIN B1-IMP
16	SCS Runoff	BASIN B1-PERV
17	Combine	BASIN B-INFLOW
18	Reservoir	BASIN A1 ROUTING
19	Reservoir	BASIN A2 ROUTING
20	Reservoir	BASIN B ROUTING
21	Combine	COMBINED TO BASIN A3
22	Reservoir	BASIN A3 ROUTING
23	Combine	COMBINED TO SA A
24	SCS Runoff	BASIN B2 PERV
25	SCS Runoff	BASIN B2 IMP
26	Combine	COMBINED TO BASIN B2
27	SCS Runoff	PROP AREA D UNDISTURBED
28	Reservoir	BASIN B2 ROUTING
29	SCS Runoff	EXIST BASIN B STABILITY
30	SCS Runoff	PROP. VEG. SWALE

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	0.000	5	n/a	0	---	------	------	EXIST DISTURBED AREA A
2	SCS Runoff	0.000	5	n/a	0	---	------	------	EXIST DISTURBED AREA B
3	SCS Runoff	0.000	5	n/a	0	---	------	------	EXIST AREA D DISTURBED WOOD
4	SCS Runoff	3.400	5	70	7,834	----	------	------	AREA A1-IMPERVIOUS
5	SCS Runoff	0.000	5	n/a	0	---	------	------	AREA A1-PERV
6	Combine	3.400	5	70	7,834	4, 5	------	------	BASIN A1 INFLOW
7	SCS Runoff	4.922	5	70	11,340	----	------	------	AREA A2-IMP
8	SCS Runoff	0.000	5	n/a	0	---	------	------	AREA A2-PERV
9	Combine	4.922	5	70	11,340	7, 8	------	------	BASIN A2-INFLOW
10	SCS Runoff	0.090	5	110	366	----	------	------	AREA A3-WOODS
11	SCS Runoff	0.290	5	95	1,038	----	------	------	AREA A3 Open Space D
12	SCS Runoff	6.234	5	70	14,362	----	------	------	AREA A3-IMP
13	SCS Runoff	0.000	5	n/a	0	---	------	------	AREA A3- Open Space A
14	Combine	6.375	5	70	15,766	10, 11, 12, 13	------	------	BASIN A3-INFLOW
15	SCS Runoff	4.534	5	70	10,445	----	------	------	BASIN B1-IMP
16	SCS Runoff	0.109	5	85	320	----	------	------	BASIN B1-PERV
17	Combine	4.607	5	70	10,765	15, 16	------	------	BASIN B-INFLOW
18	Reservoir	0.127	5	135	7,730	6	103.20	7,310	BASIN A1 ROUTING
19	Reservoir	0.262	5	130	11,339	9	94.16	9,933	BASIN A2 ROUTING
20	Reservoir	0.423	5	125	10,763	17	102.87	8,727	BASIN B ROUTING
21	Combine	6.433	5	70	23,496	14, 18,	------	------	COMBINED TO BASIN A3
22	Reservoir	0.190	5	155	23,484	21	92.60	15,242	BASIN A3 ROUTING
23	Combine	0.452	5	140	34,823	19, 22	------	------	COMBINED TO SA A
24	SCS Runoff	0.000	5	n/a	0	---	------	------	BASIN B2 PERV
25	SCS Runoff	0.097	5	70	224	----	------	------	BASIN B2 IMP
26	Combine	0.097	5	70	224	24, 25	------	------	COMBINED TO BASIN B2
27	SCS Runoff	0.000	5	n/a	0	---	------	------	PROP AREA D UNDISTURBED
28	Reservoir	0.000	5	n/a	0	26	94.77	224	BASIN B2 ROUTING
29	SCS Runoff	0.768	5	100	2,756	----	------	------	EXIST BASIN B STABILITY
30	SCS Runoff	0.000	5	n/a	0	---	------	------	PROP. VEG. SWALE

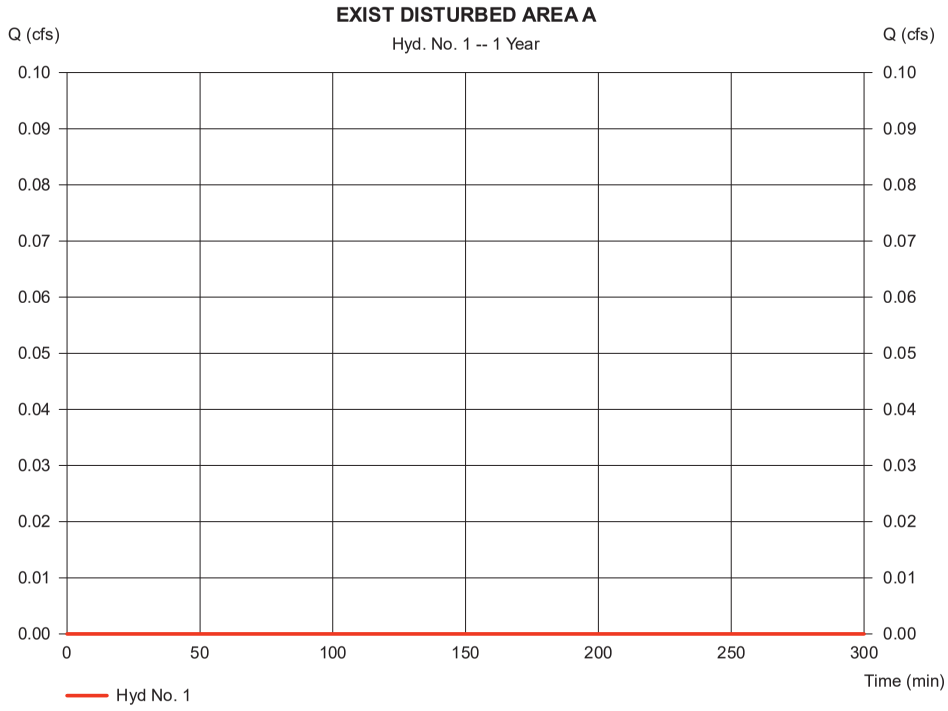
Hydrograph Report

Hyd. No. 1

EXIST DISTURBED AREA A

Hydrograph type	= SCS Runoff	Peak discharge	= 0.000 cfs
Storm frequency	= 1 yrs	Time to peak	= n/a
Time interval	= 5 min	Hyd. volume	= 0 cuft
Drainage area	= 16.460 ac	Curve number	= 46*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 22.00 min
Total precip.	= 1.25 in	Distribution	= Custom
Storm duration	= Water Quality Storm.cds	Shape factor	= 285

* Composite (Area/CN) = [(9.090 x 30) + (0.470 x 55) + (0.480 x 80) + (2.130 x 39) + (4.290 x 77)] / 16.460



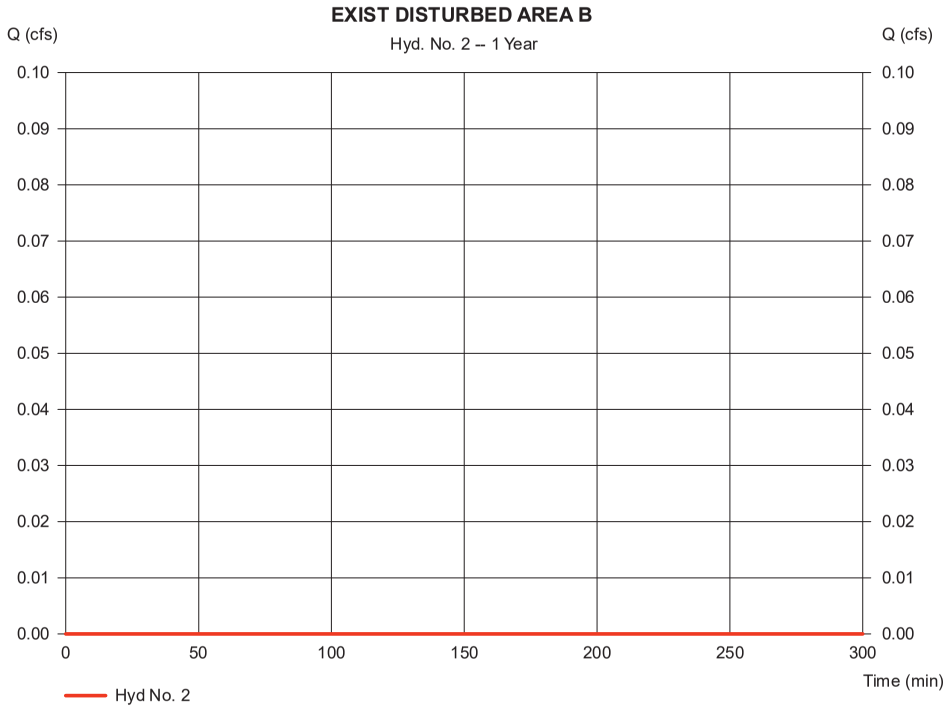
Hydrograph Report

Hyd. No. 2

EXIST DISTURBED AREA B

Hydrograph type	= SCS Runoff	Peak discharge	= 0.000 cfs
Storm frequency	= 1 yrs	Time to peak	= n/a
Time interval	= 5 min	Hyd. volume	= 0 cuft
Drainage area	= 8.700 ac	Curve number	= 51*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 20.00 min
Total precip.	= 1.25 in	Distribution	= Custom
Storm duration	= Water Quality Storm.cds	Shape factor	= 285

* Composite (Area/CN) = [(4.860 x 30) + (0.320 x 80) + (3.520 x 77)] / 8.700



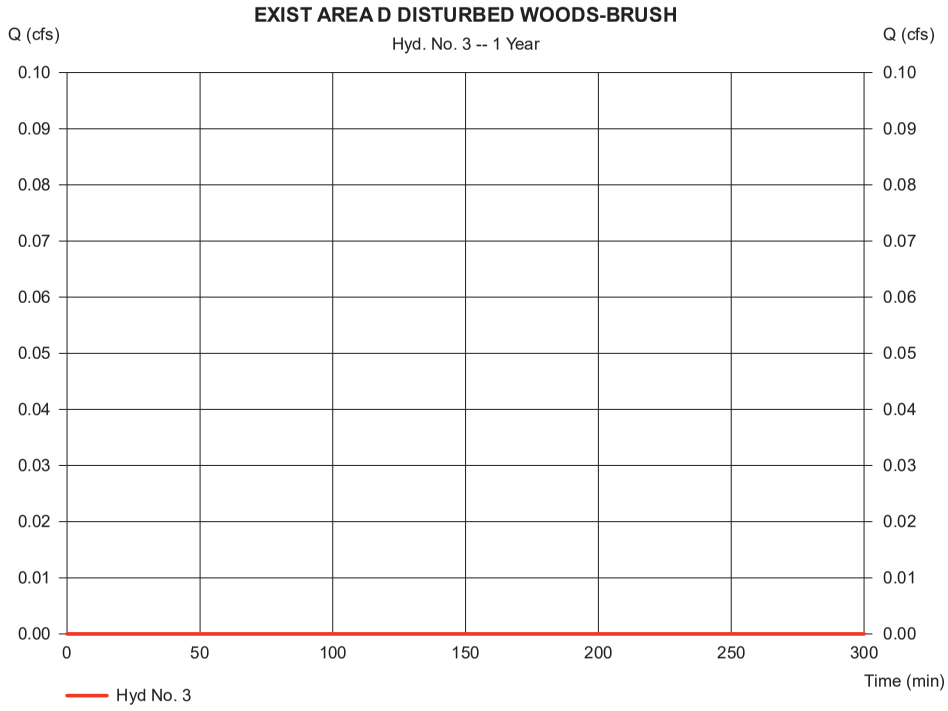
Hydrograph Report

Hyd. No. 3

EXIST AREA D DISTURBED WOODS-BRUSH

Hydrograph type	= SCS Runoff	Peak discharge	= 0.000 cfs
Storm frequency	= 1 yrs	Time to peak	= n/a
Time interval	= 5 min	Hyd. volume	= 0 cuft
Drainage area	= 0.920 ac	Curve number	= 42*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 10.00 min
Total precip.	= 1.25 in	Distribution	= Custom
Storm duration	= Water Quality Storm.cds	Shape factor	= 285

* Composite (Area/CN) = [(0.460 x 30) + (0.460 x 55)] / 0.920

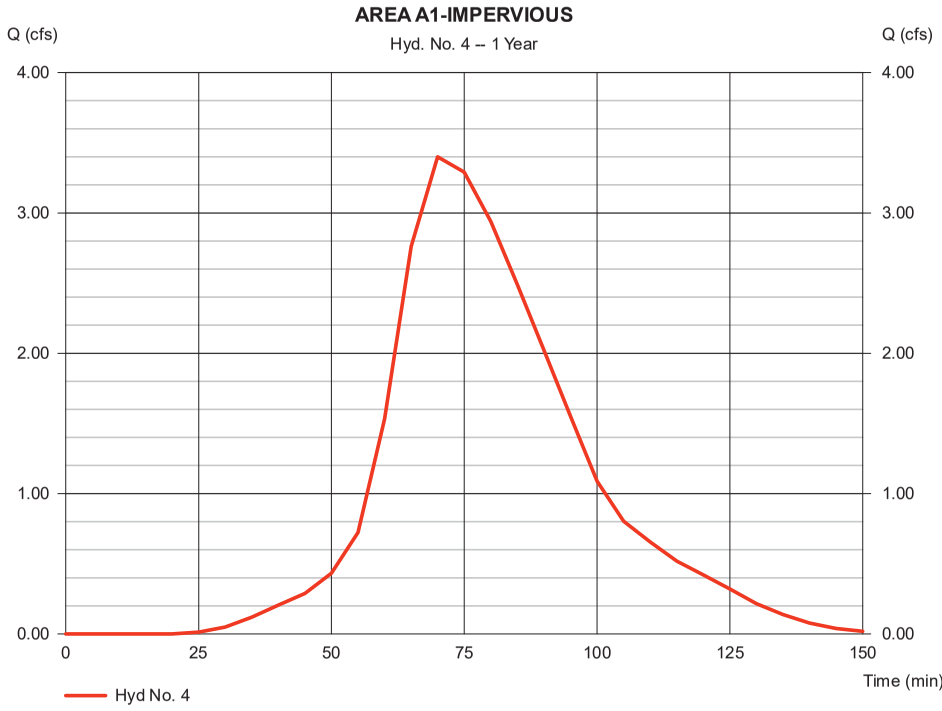


Hydrograph Report

Hyd. No. 4

AREA A1-IMPERVIOUS

Hydrograph type	= SCS Runoff	Peak discharge	= 3.400 cfs
Storm frequency	= 1 yrs	Time to peak	= 70 min
Time interval	= 5 min	Hyd. volume	= 7,834 cuft
Drainage area	= 2.100 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 10.00 min
Total precip.	= 1.25 in	Distribution	= Custom
Storm duration	= Water Quality Storm.cds	Shape factor	= 285

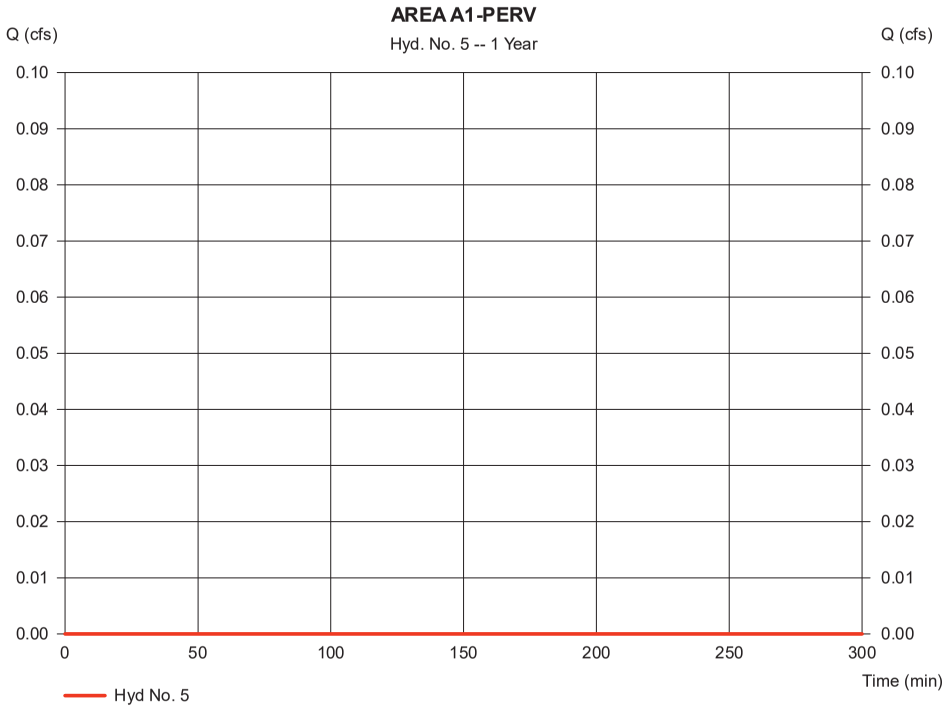


Hydrograph Report

Hyd. No. 5

AREA A1-PERV

Hydrograph type	= SCS Runoff	Peak discharge	= 0.000 cfs
Storm frequency	= 1 yrs	Time to peak	= n/a
Time interval	= 5 min	Hyd. volume	= 0 cuft
Drainage area	= 1.380 ac	Curve number	= 54
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 10.00 min
Total precip.	= 1.25 in	Distribution	= Custom
Storm duration	= Water Quality Storm.cds	Shape factor	= 285

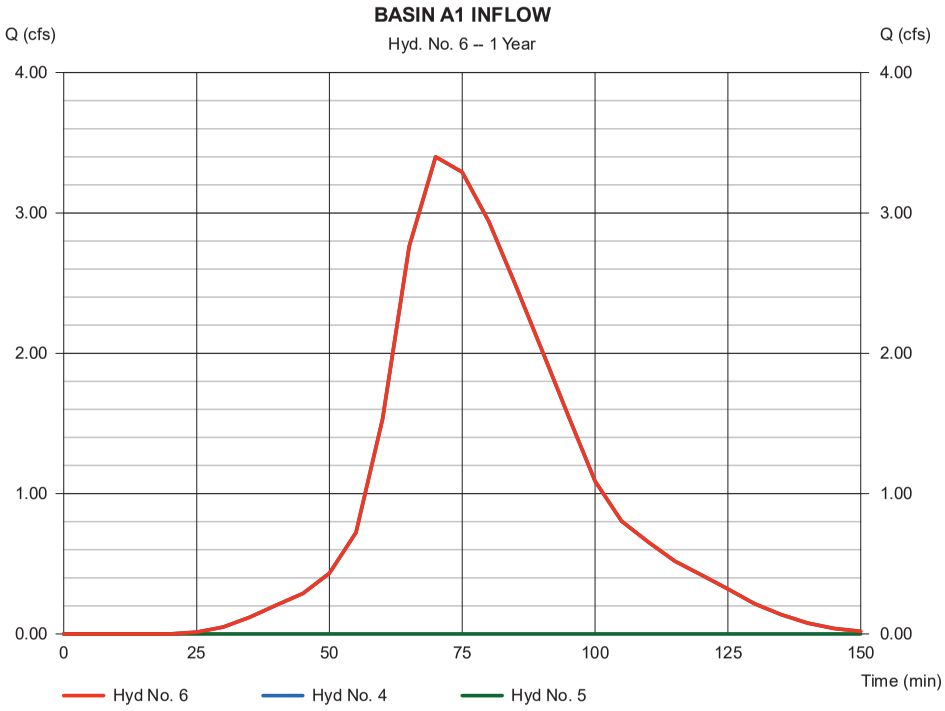


Hydrograph Report

Hyd. No. 6

BASIN A1 INFLOW

Hydrograph type	= Combine	Peak discharge	= 3.400 cfs
Storm frequency	= 1 yrs	Time to peak	= 70 min
Time interval	= 5 min	Hyd. volume	= 7,834 cuft
Inflow hyds.	= 4, 5	Contrib. drain. area	= 3.480 ac

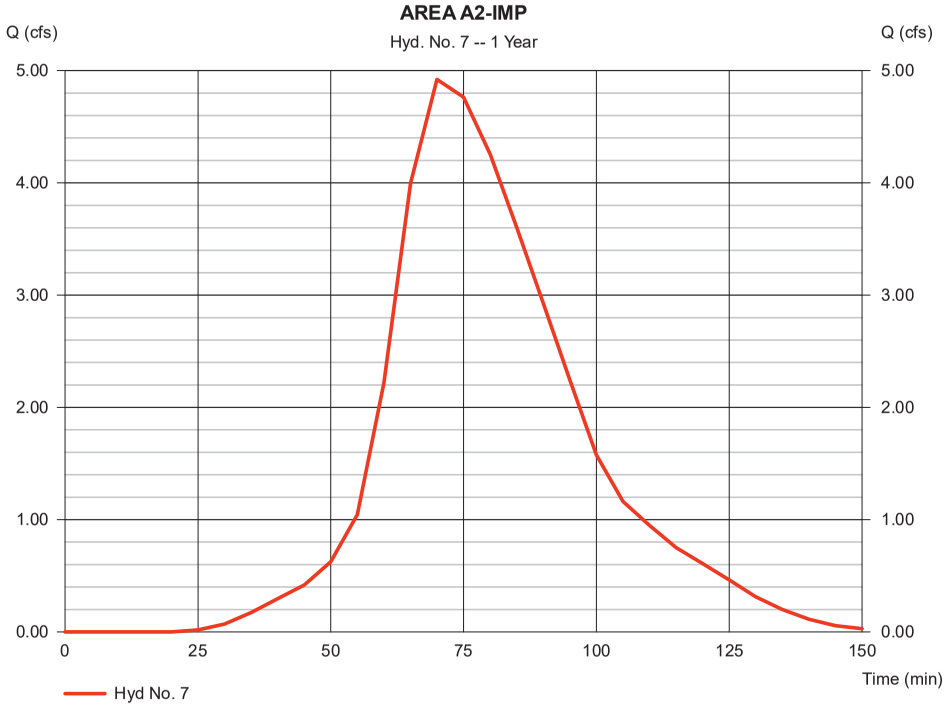


Hydrograph Report

Hyd. No. 7

AREA A2-IMP

Hydrograph type	= SCS Runoff	Peak discharge	= 4.922 cfs
Storm frequency	= 1 yrs	Time to peak	= 70 min
Time interval	= 5 min	Hyd. volume	= 11,340 cuft
Drainage area	= 3.040 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 10.00 min
Total precip.	= 1.25 in	Distribution	= Custom
Storm duration	= Water Quality Storm.cds	Shape factor	= 285



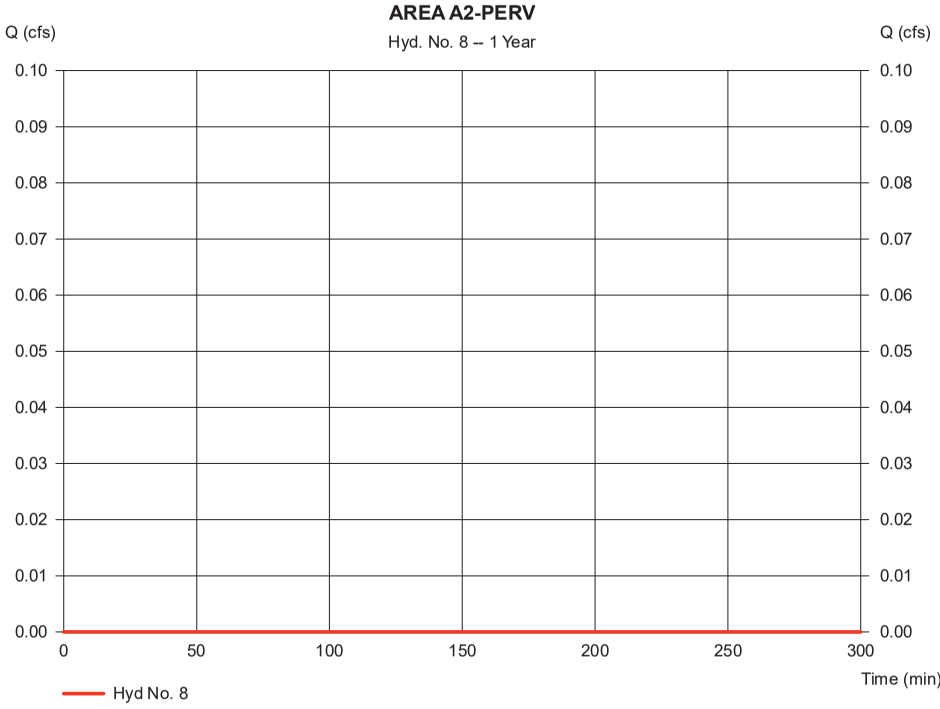
Hydrograph Report

Hyd. No. 8

AREA A2-PERV

Hydrograph type	= SCS Runoff	Peak discharge	= 0.000 cfs
Storm frequency	= 1 yrs	Time to peak	= n/a
Time interval	= 5 min	Hyd. volume	= 0 cuft
Drainage area	= 2.250 ac	Curve number	= 39*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 10.00 min
Total precip.	= 1.25 in	Distribution	= Custom
Storm duration	= Water Quality Storm.cds	Shape factor	= 285

* Composite (Area/CN) = [(0.840 x 80) + (0.390 x 61)] / 2.250

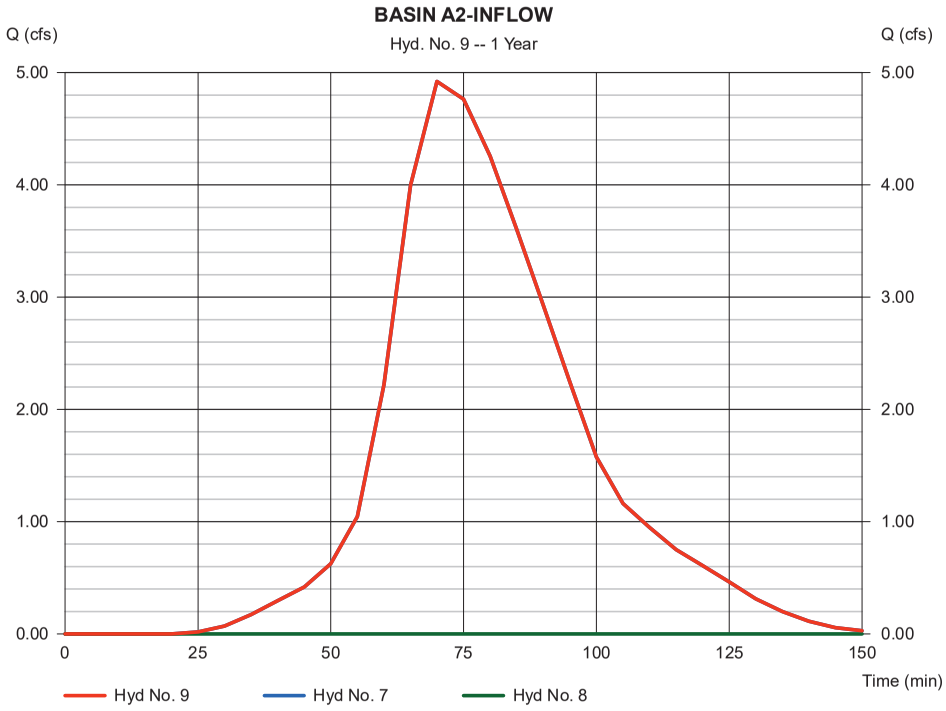


Hydrograph Report

Hyd. No. 9

BASIN A2-INFLOW

Hydrograph type	= Combine	Peak discharge	= 4.922 cfs
Storm frequency	= 1 yrs	Time to peak	= 70 min
Time interval	= 5 min	Hyd. volume	= 11,340 cuft
Inflow hyds.	= 7, 8	Contrib. drain. area	= 5.290 ac

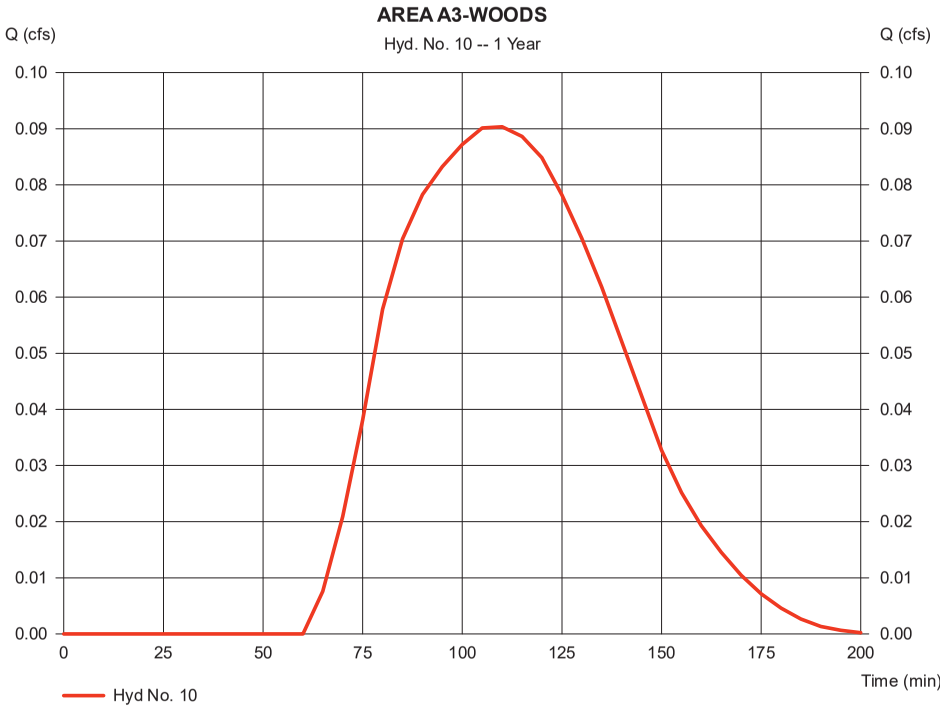


Hydrograph Report

Hyd. No. 10

AREA A3-WOODS

Hydrograph type	= SCS Runoff	Peak discharge	= 0.090 cfs
Storm frequency	= 1 yrs	Time to peak	= 110 min
Time interval	= 5 min	Hyd. volume	= 366 cuft
Drainage area	= 0.870 ac	Curve number	= 77
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 25.00 min
Total precip.	= 1.25 in	Distribution	= Custom
Storm duration	= Water Quality Storm.cds	Shape factor	= 285

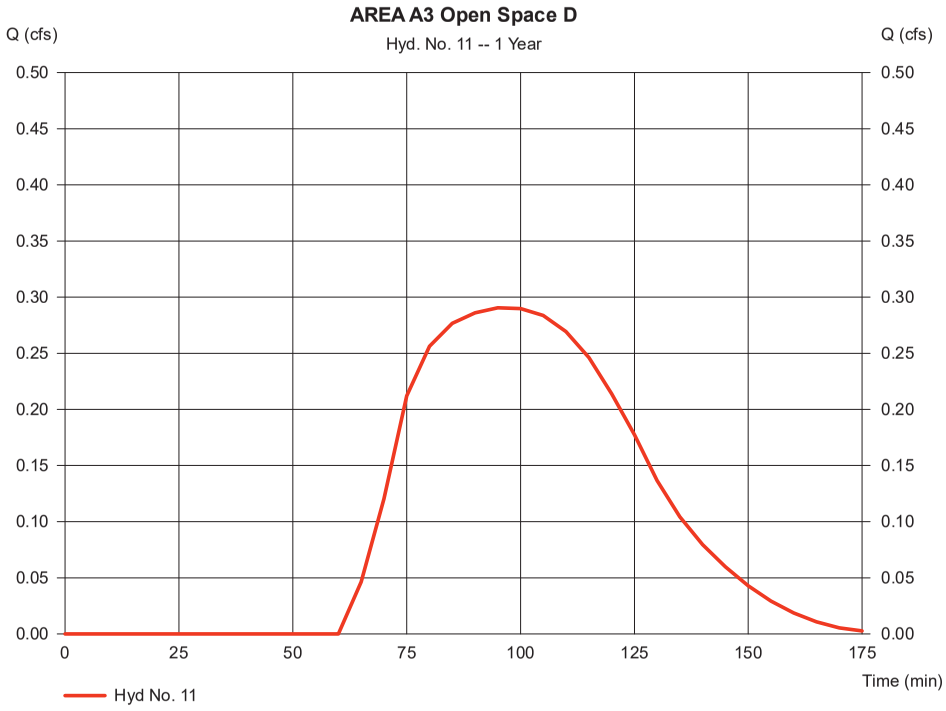


Hydrograph Report

Hyd. No. 11

AREA A3 Open Space D

Hydrograph type	= SCS Runoff	Peak discharge	= 0.290 cfs
Storm frequency	= 1 yrs	Time to peak	= 95 min
Time interval	= 5 min	Hyd. volume	= 1,038 cuft
Drainage area	= 1.660 ac	Curve number	= 80
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 20.00 min
Total precip.	= 1.25 in	Distribution	= Custom
Storm duration	= Water Quality Storm.cds	Shape factor	= 285

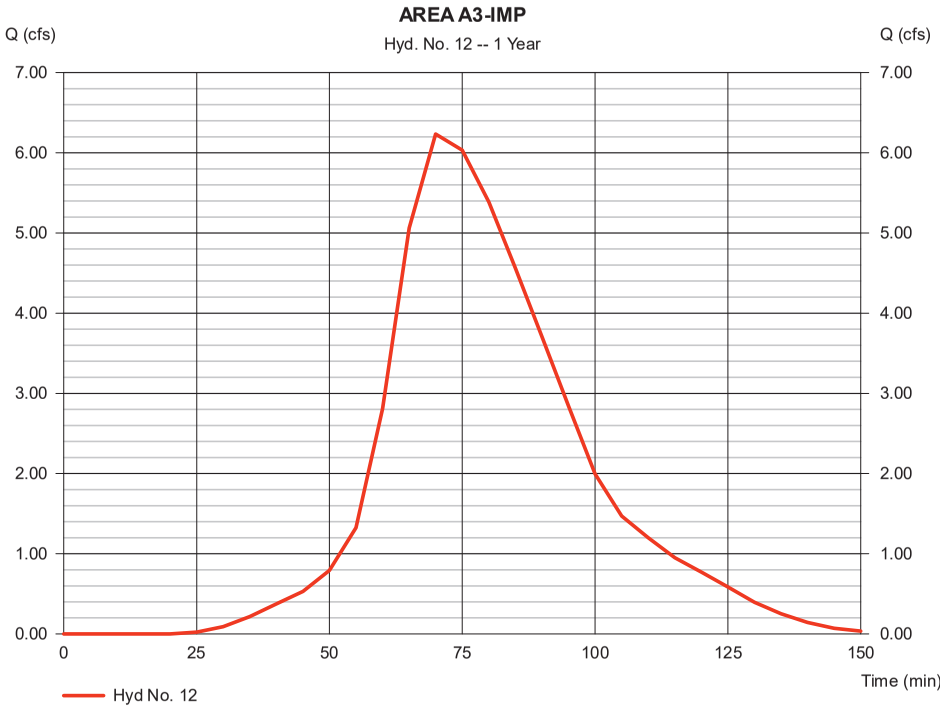


Hydrograph Report

Hyd. No. 12

AREA A3-IMP

Hydrograph type	= SCS Runoff	Peak discharge	= 6.234 cfs
Storm frequency	= 1 yrs	Time to peak	= 70 min
Time interval	= 5 min	Hyd. volume	= 14,362 cuft
Drainage area	= 3.850 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 10.00 min
Total precip.	= 1.25 in	Distribution	= Custom
Storm duration	= Water Quality Storm.cds	Shape factor	= 285

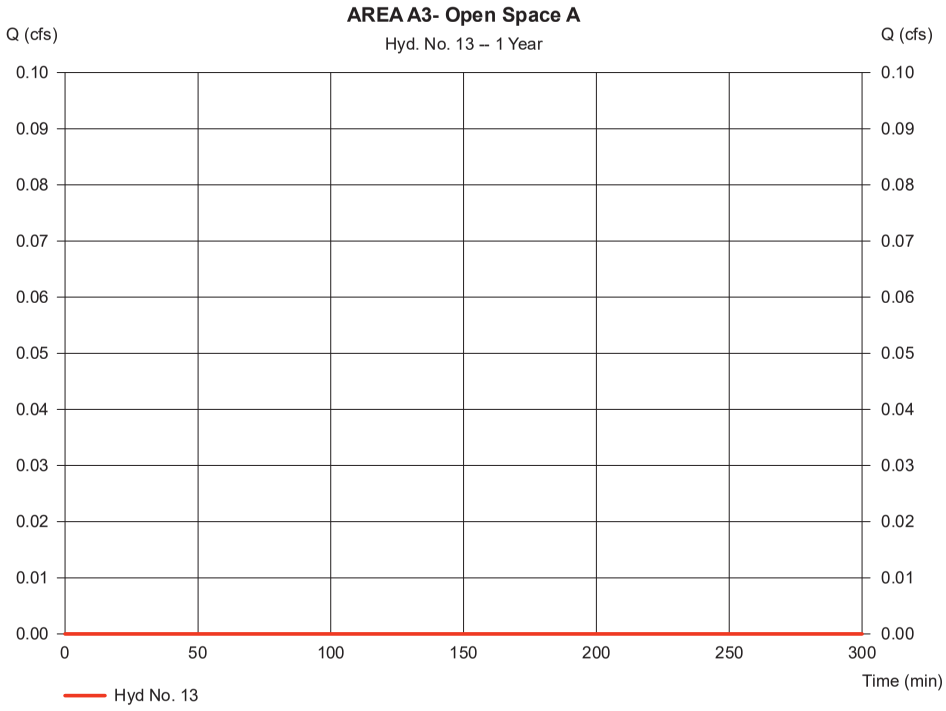


Hydrograph Report

Hyd. No. 13

AREA A3- Open Space A

Hydrograph type	= SCS Runoff	Peak discharge	= 0.000 cfs
Storm frequency	= 1 yrs	Time to peak	= n/a
Time interval	= 5 min	Hyd. volume	= 0 cuft
Drainage area	= 3.980 ac	Curve number	= 30
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 10.00 min
Total precip.	= 1.25 in	Distribution	= Custom
Storm duration	= Water Quality Storm.cds	Shape factor	= 285

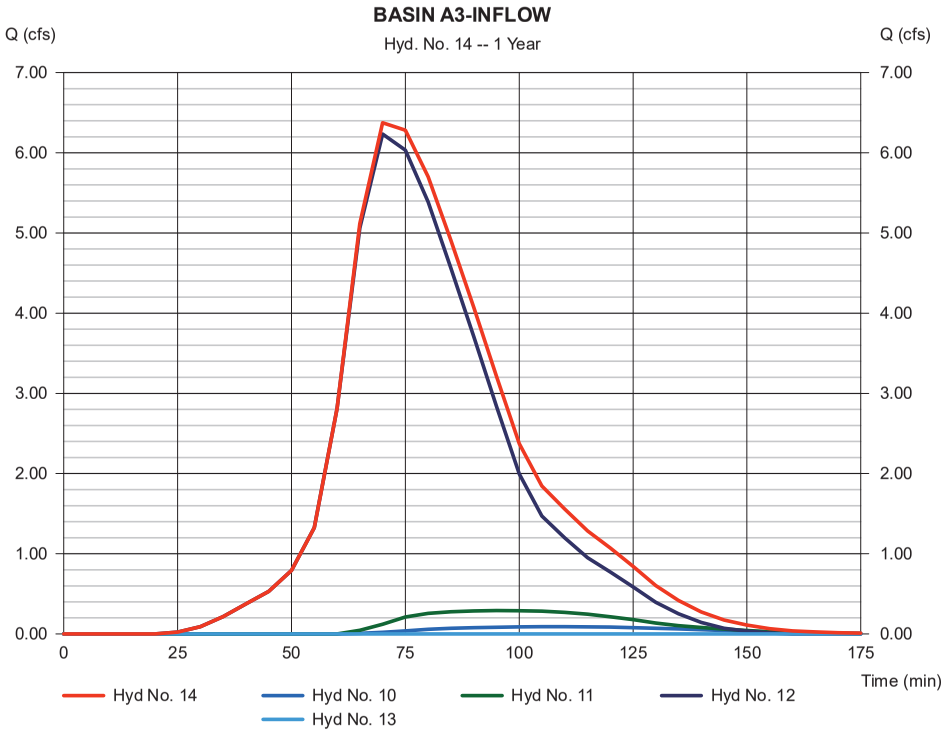


Hydrograph Report

Hyd. No. 14

BASIN A3-INFLOW

Hydrograph type	= Combine	Peak discharge	= 6.375 cfs
Storm frequency	= 1 yrs	Time to peak	= 70 min
Time interval	= 5 min	Hyd. volume	= 15,766 cuft
Inflow hyds.	= 10, 11, 12, 13	Contrib. drain. area	= 10.360 ac

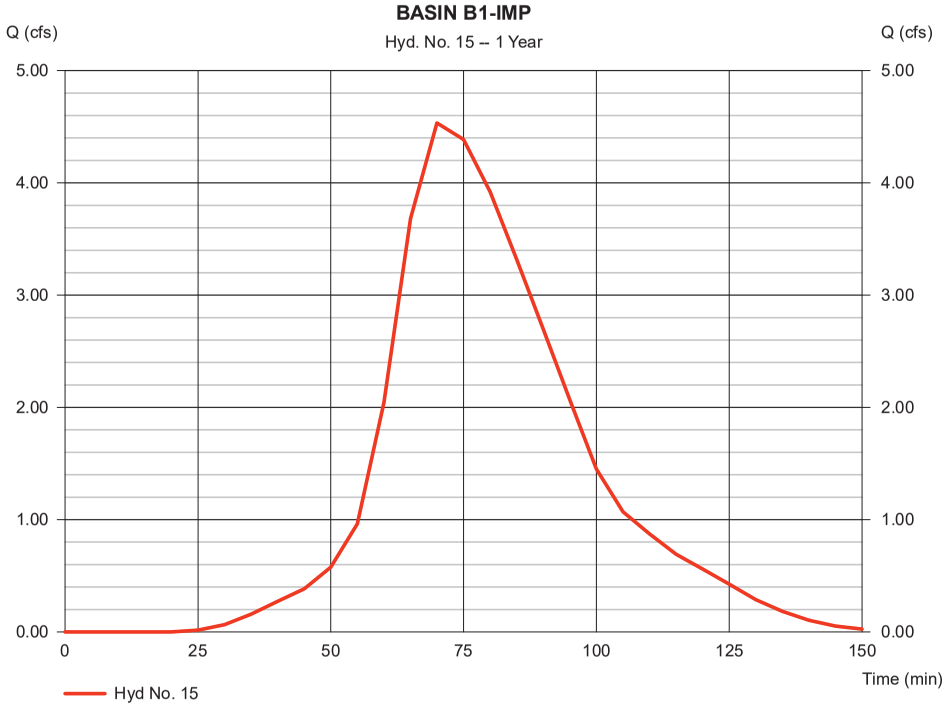


Hydrograph Report

Hyd. No. 15

BASIN B1-IMP

Hydrograph type	= SCS Runoff	Peak discharge	= 4.534 cfs
Storm frequency	= 1 yrs	Time to peak	= 70 min
Time interval	= 5 min	Hyd. volume	= 10,445 cuft
Drainage area	= 2.800 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 10.00 min
Total precip.	= 1.25 in	Distribution	= Custom
Storm duration	= Water Quality Storm.cds	Shape factor	= 285

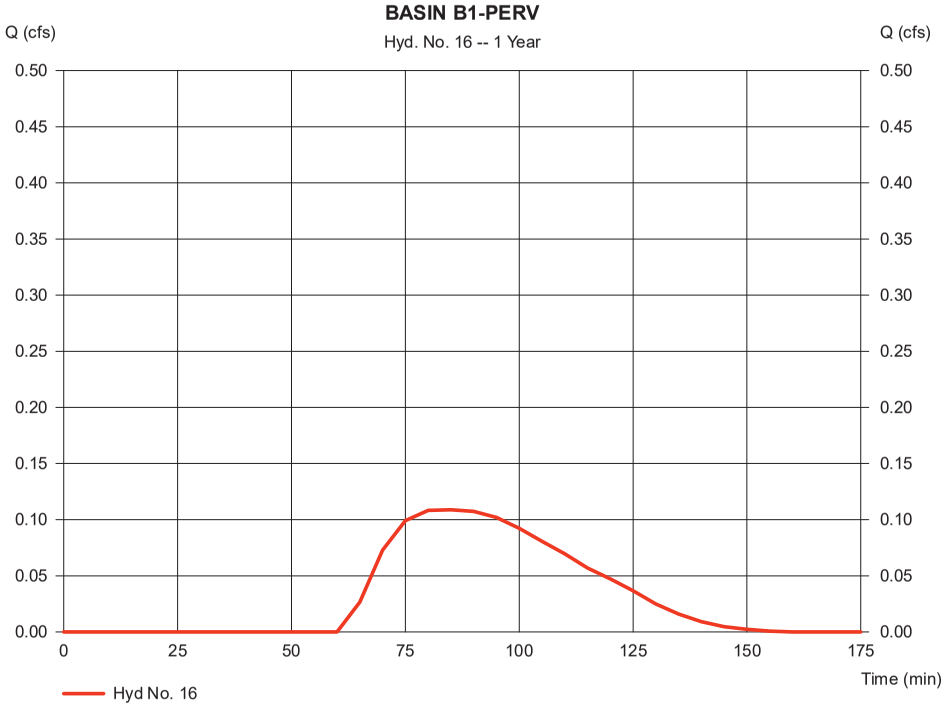


Hydrograph Report

Hyd. No. 16

BASIN B1-PERV

Hydrograph type	= SCS Runoff	Peak discharge	= 0.109 cfs
Storm frequency	= 1 yrs	Time to peak	= 85 min
Time interval	= 5 min	Hyd. volume	= 320 cuft
Drainage area	= 0.760 ac	Curve number	= 77
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 10.00 min
Total precip.	= 1.25 in	Distribution	= Custom
Storm duration	= Water Quality Storm.cds	Shape factor	= 285

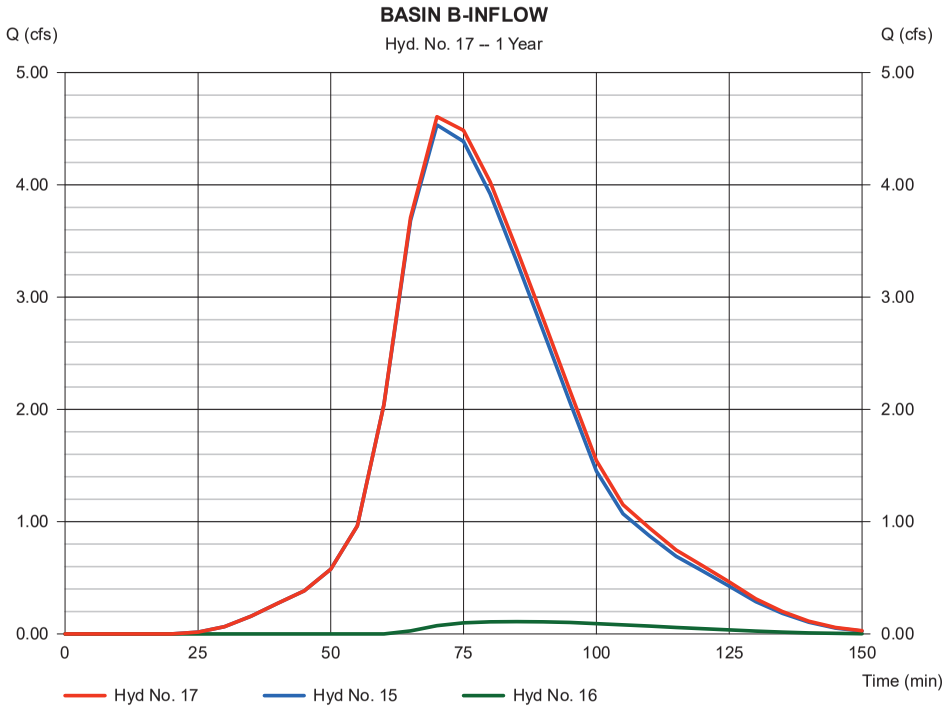


Hydrograph Report

Hyd. No. 17

BASIN B-INFLOW

Hydrograph type	= Combine	Peak discharge	= 4.607 cfs
Storm frequency	= 1 yrs	Time to peak	= 70 min
Time interval	= 5 min	Hyd. volume	= 10,765 cuft
Inflow hyds.	= 15, 16	Contrib. drain. area	= 3.560 ac



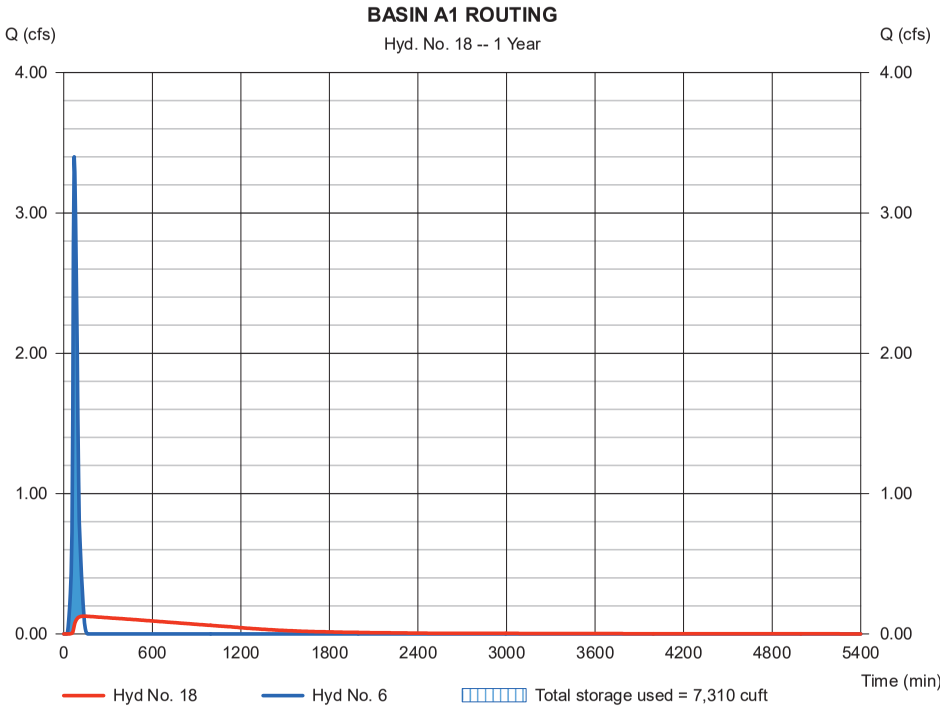
Hydrograph Report

Hyd. No. 18

BASIN A1 ROUTING

Hydrograph type	= Reservoir	Peak discharge	= 0.127 cfs
Storm frequency	= 1 yrs	Time to peak	= 135 min
Time interval	= 5 min	Hyd. volume	= 7,730 cuft
Inflow hyd. No.	= 6 - BASIN A1 INFLOW	Max. Elevation	= 103.20 ft
Reservoir name	= Inf. Basin A1	Max. Storage	= 7,310 cuft

Storage Indication method used.



Pond Report

Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Nov 11, 2020

Pond No. 1 - Inf. Basin A1

Pond Data

Contours - User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 102.50 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	102.50	9,755	0	0
0.50	103.00	10,646	5,098	5,098
1.00	103.50	11,318	5,490	10,588
1.50	104.00	12,253	5,891	16,478
2.00	104.50	12,982	6,307	22,786
2.50	105.00	13,913	6,722	29,507
3.00	105.50	14,701	7,152	36,659
3.50	106.00	15,632	7,581	44,240
4.00	106.50	16,472	8,024	52,265
4.50	107.00	17,543	8,501	60,766
5.00	107.50	18,450	8,996	69,763

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 18.00	2.50	0.00	0.00
Span (in)	= 18.00	2.50	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 100.77	102.50	0.00	0.00
Length (ft)	= 147.00	0.00	0.00	0.00
Slope (%)	= 2.00	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

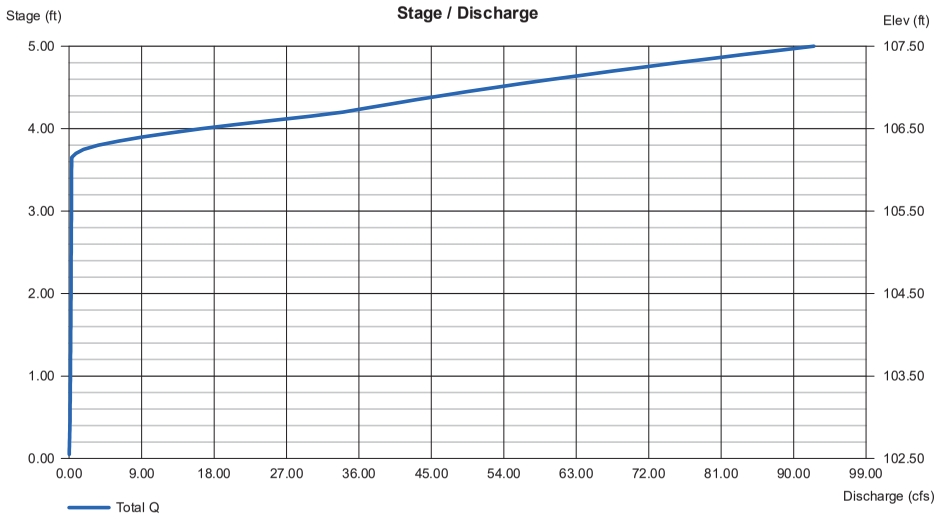
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 0.00	14.00	20.00	0.00
Crest El. (ft)	= 0.00	106.15	106.25	0.00
Weir Coeff.	= 3.33	3.33	2.60	3.33
Weir Type	= Rect	Rect	Broad	---
Multi-Stage	= Yes	Yes	No	No

Exfil.(in/hr) = 0.000 (by Wet area)

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).



Hydrograph Report

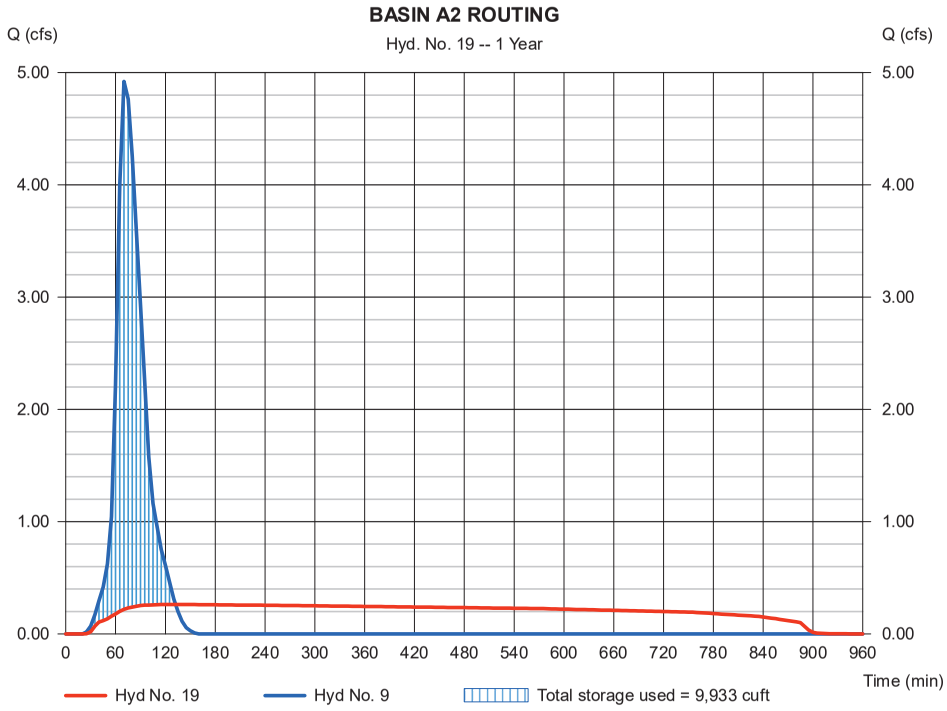
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Nov 11, 2020

Hyd. No. 19

BASIN A2 ROUTING

Hydrograph type	= Reservoir	Peak discharge	= 0.262 cfs
Storm frequency	= 1 yrs	Time to peak	= 130 min
Time interval	= 5 min	Hyd. volume	= 11,339 cuft
Inflow hyd. No.	= 9 - BASIN A2-INFLOW	Max. Elevation	= 94.16 ft
Reservoir name	= Det. Basin A2	Max. Storage	= 9,933 cuft

Storage Indication method used.



Pond Report

Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Nov 11, 2020

Pond No. 2 - Det. Basin A2

Pond Data

Contours - User-defined contour areas. Average end area method used for volume calculation. Begining Elevation = 91.50 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	91.50	00	0	0
0.50	92.00	244	61	61
1.00	92.50	1,238	371	432
1.50	93.00	2,231	867	1,299
2.00	93.50	6,961	2,298	3,597
2.50	94.00	10,801	4,441	8,037
3.00	95.50	13,315	6,029	14,066
3.50	96.00	15,829	7,286	21,352
4.00	96.50	19,404	8,808	30,161
4.50	97.00	15,829	8,808	38,969
5.00	97.50	19,404	8,808	47,777
5.50	98.00	23,674	10,770	58,547
6.00	97.50	28,715	13,097	71,644
6.50	98.00	33,756	15,618	87,262
7.00	98.50	35,449	17,301	104,563

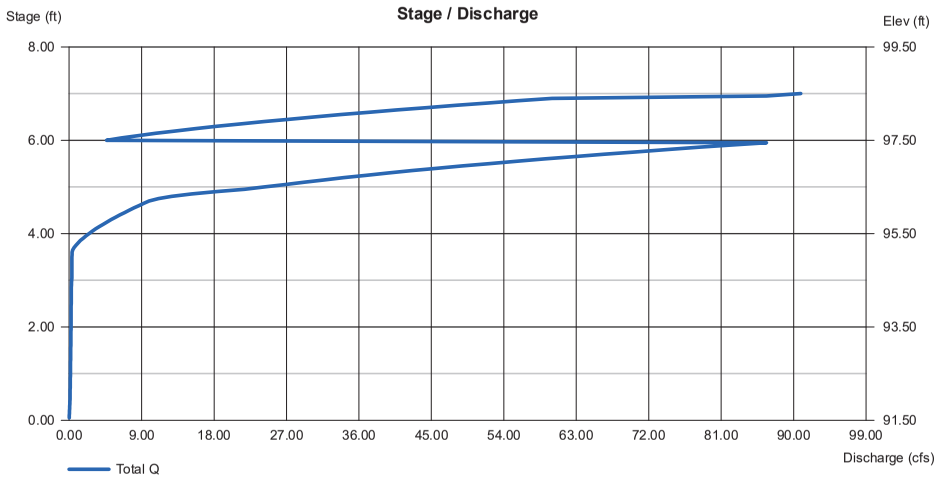
Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 18.00	2.50	0.00	0.00
Span (in)	= 18.00	2.50	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 90.69	91.50	0.00	0.00
Length (ft)	= 44.00	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)	= 2.50	14.00	20.00	0.00
Crest El. (ft)	= 96.10	97.20	97.30	0.00
Weir Coeff.	= 3.33	3.33	2.60	3.33
Weir Type	= Rect	Rect	Broad	---
Multi-Stage	= Yes	Yes	No	No
Exfil.(in/hr)	= 0.000 (by Wet area)			
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).



Hydrograph Report

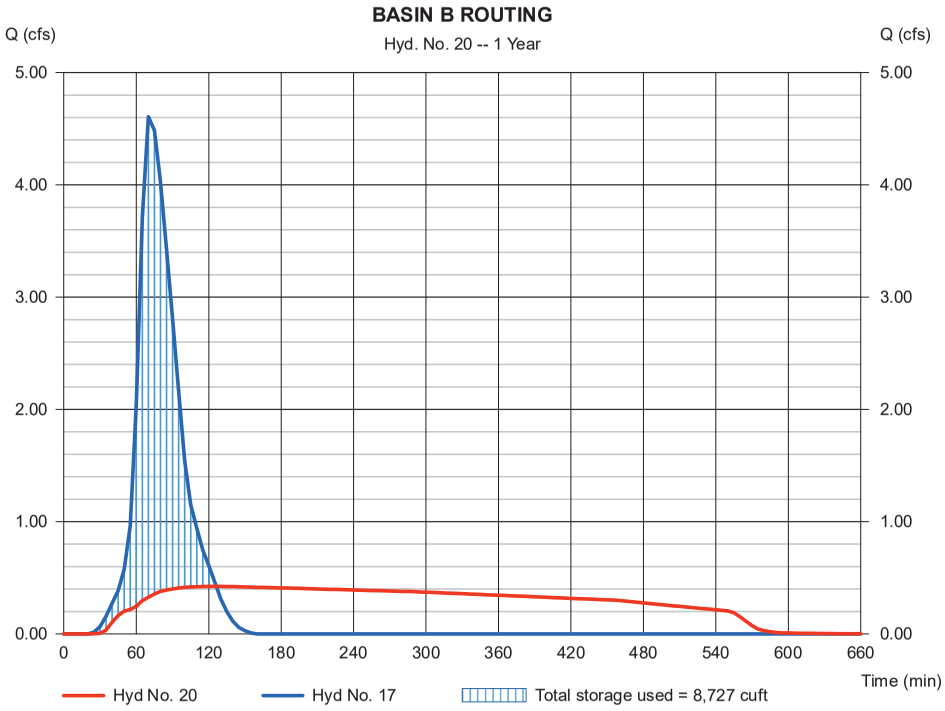
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Nov 11, 2020

Hyd. No. 20

BASIN B ROUTING

Hydrograph type	= Reservoir	Peak discharge	= 0.423 cfs
Storm frequency	= 1 yrs	Time to peak	= 125 min
Time interval	= 5 min	Hyd. volume	= 10,763 cuft
Inflow hyd. No.	= 17 - BASIN B-INFLOW	Max. Elevation	= 102.87 ft
Reservoir name	= Det. Basin B1	Max. Storage	= 8,727 cuft

Storage Indication method used.



Pond Report

Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Nov 11, 2020

Pond No. 4 - Det. Basin B1

Pond Data

Contours - User-defined contour areas. Average end area method used for volume calculation. Begining Elevation = 101.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	101.00	00	0	0
0.50	101.50	821	205	205
1.00	102.00	4,907	1,432	1,637
1.50	102.50	8,362	3,317	4,955
2.00	103.00	11,816	5,045	9,999
2.50	103.50	12,455	6,068	16,067
3.00	104.00	13,152	6,402	22,469
3.50	104.50	13,824	6,744	29,213
4.00	105.00	14,591	7,104	36,316
4.50	105.50	15,299	7,473	43,789
5.00	106.00	16,022	7,830	51,619
5.50	106.50	16,758	8,195	59,814

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 18.00	2.50	0.00	0.00
Span (in)	= 18.00	2.50	0.00	0.00
No. Barrels	= 1	2	1	0
Invert El. (ft)	= 100.93	101.00	103.20	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	Yes	No

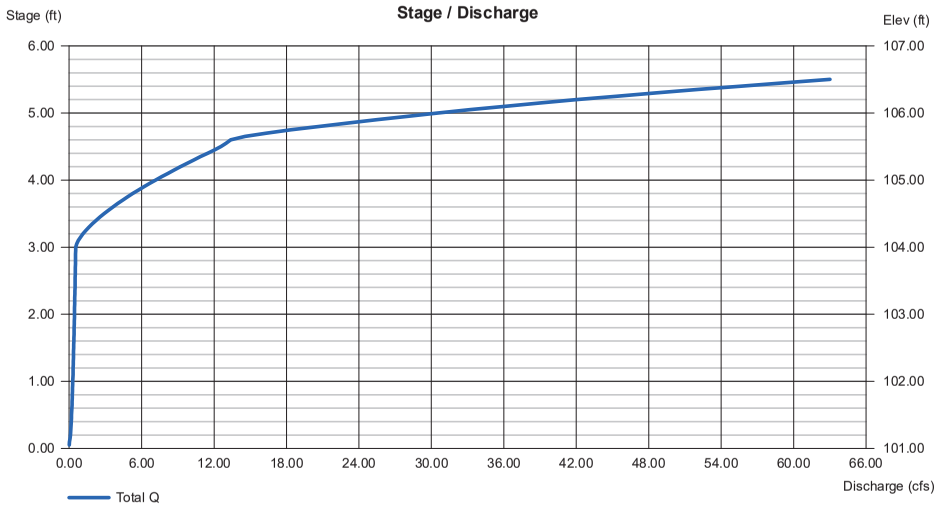
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 14.00	20.00	2.00	0.00
Crest El. (ft)	= 105.60	105.60	104.00	0.00
Weir Coeff.	= 3.33	2.60	3.33	3.33
Weir Type	= Rect	Broad	Rect	---
Multi-Stage	= Yes	No	Yes	No

Exfil.(in/hr) = 0.000 (by Wet area)

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).



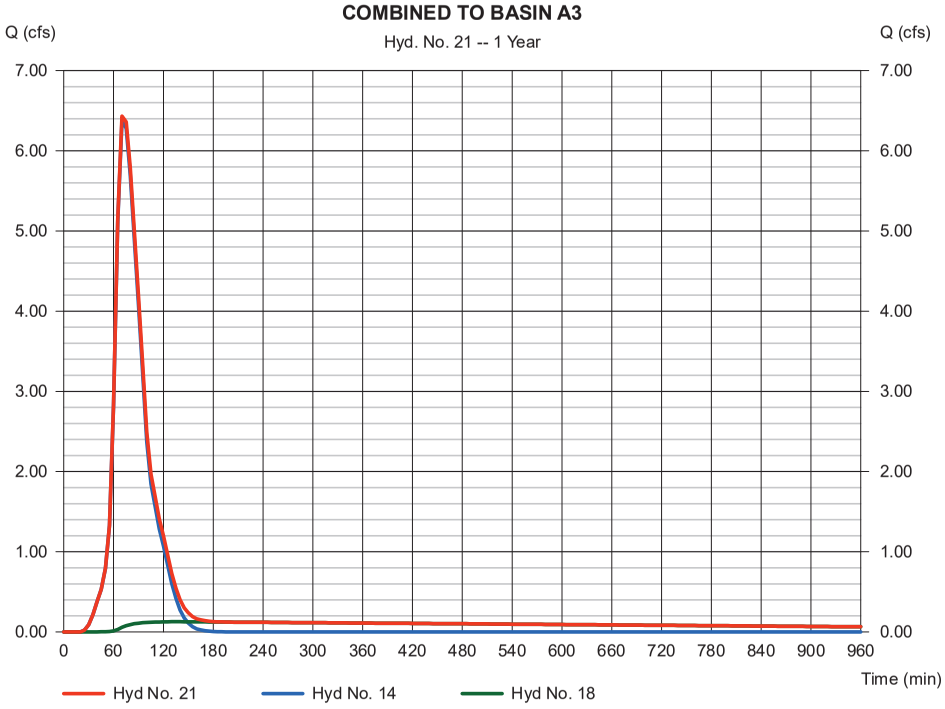
Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Nov 11, 2020

Hyd. No. 21

COMBINED TO BASIN A3

Hydrograph type	= Combine	Peak discharge	= 6.433 cfs
Storm frequency	= 1 yrs	Time to peak	= 70 min
Time interval	= 5 min	Hyd. volume	= 23,496 cuft
Inflow hyds.	= 14, 18	Contrib. drain. area	= 0.000 ac



Hydrograph Report

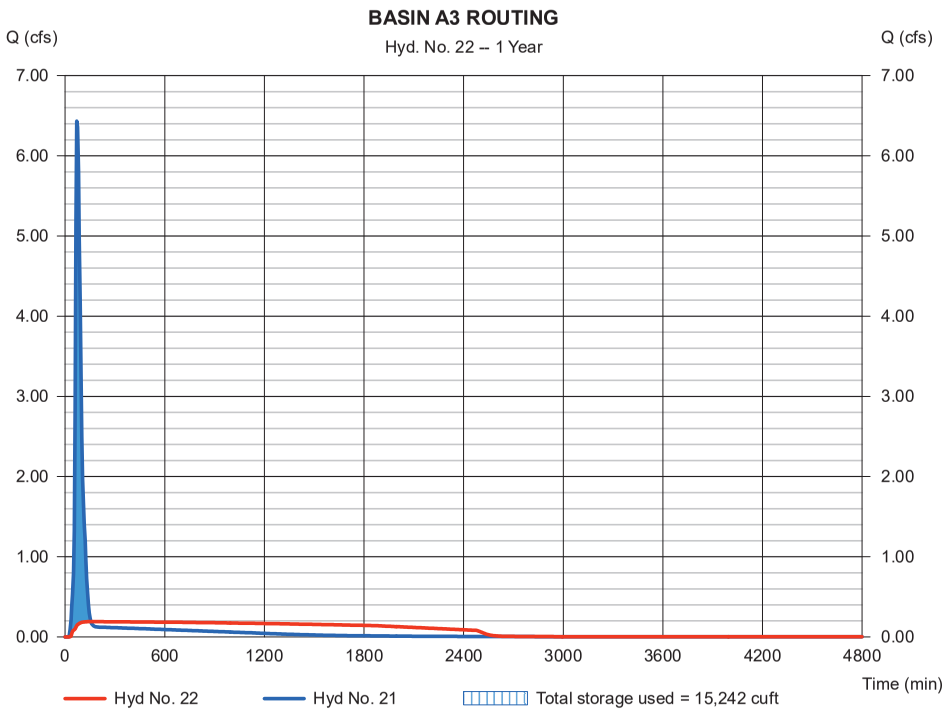
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Nov 11, 2020

Hyd. No. 22

BASIN A3 ROUTING

Hydrograph type	= Reservoir	Peak discharge	= 0.190 cfs
Storm frequency	= 1 yrs	Time to peak	= 155 min
Time interval	= 5 min	Hyd. volume	= 23,484 cuft
Inflow hyd. No.	= 21 - COMBINED TO BASIN A3	Max. Elevation	= 92.60 ft
Reservoir name	= Det. Basin A3	Max. Storage	= 15,242 cuft

Storage Indication method used.



Pond Report

Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Nov 11, 2020

Pond No. 3 - Det. Basin A3

Pond Data

Contours - User-defined contour areas. Average end area method used for volume calculation. Begining Elevation = 91.15 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	91.15	00	0	0
0.35	91.50	1,788	313	313
0.85	92.00	13,579	3,842	4,155
1.35	92.50	21,050	8,657	12,812
1.85	93.00	28,520	12,393	25,204
2.35	93.50	32,690	15,303	40,507
2.85	94.00	36,859	17,387	57,894
3.35	94.50	39,201	19,015	76,909
3.85	95.00	41,542	20,186	97,095
4.35	95.50	43,314	21,214	118,309
4.85	96.00	45,086	22,100	140,409
5.35	96.50	46,864	22,988	163,396

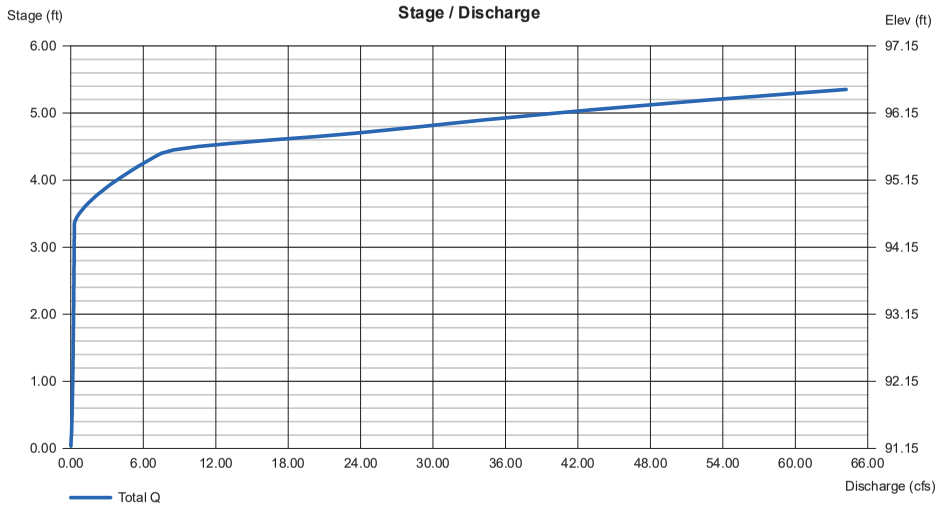
Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 18.00	2.50	0.00	0.00
Span (in)	= 18.00	2.50	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 90.28	91.15	0.00	0.00
Length (ft)	= 62.00	0.50	0.00	0.00
Slope (%)	= 1.00	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	Yes	Yes	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 2.00	14.00	20.00	0.00
Crest El. (ft)	= 94.50	95.55	95.60	0.00
Weir Coeff.	= 3.33	3.33	2.60	3.33
Weir Type	= Rect	Rect	Broad	---
Multi-Stage	= Yes	Yes	No	No
Exfil.(in/hr)	= 0.000 (by Wet area)			
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).

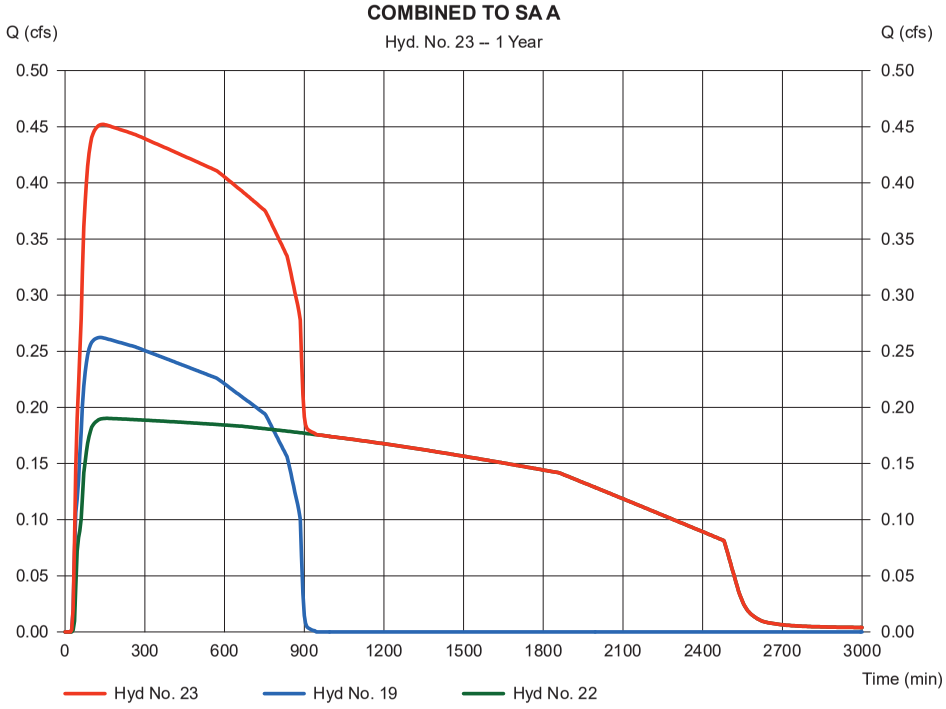


Hydrograph Report

Hyd. No. 23

COMBINED TO SA A

Hydrograph type	= Combine	Peak discharge	= 0.452 cfs
Storm frequency	= 1 yrs	Time to peak	= 140 min
Time interval	= 5 min	Hyd. volume	= 34,823 cuft
Inflow hyds.	= 19, 22	Contrib. drain. area	= 0.000 ac



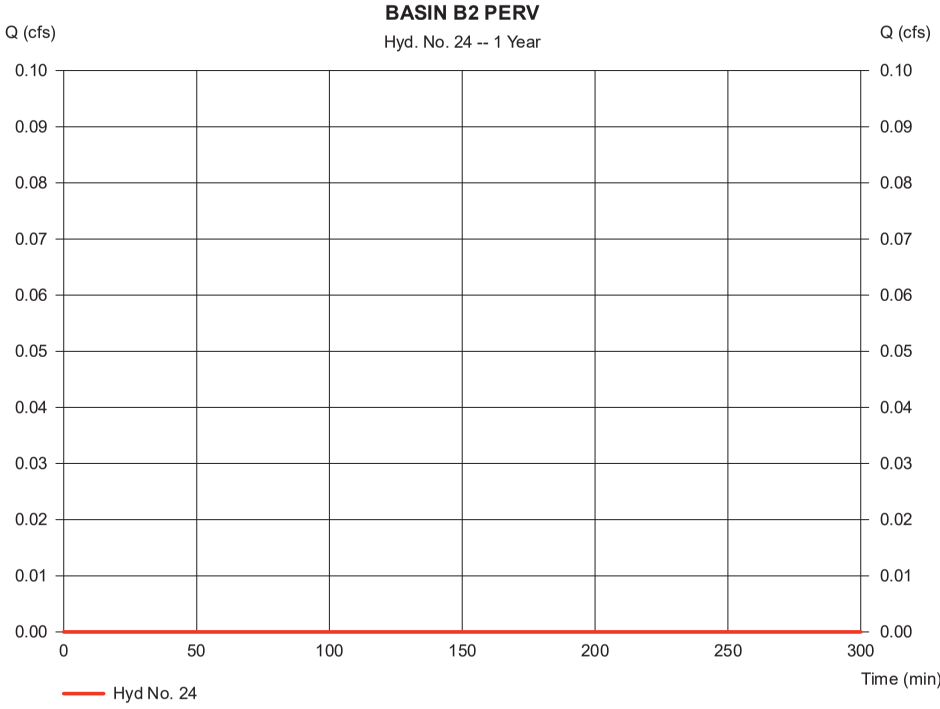
Hydrograph Report

Hyd. No. 24

BASIN B2 PERV

Hydrograph type	= SCS Runoff	Peak discharge	= 0.000 cfs
Storm frequency	= 1 yrs	Time to peak	= n/a
Time interval	= 5 min	Hyd. volume	= 0 cuft
Drainage area	= 2.200 ac	Curve number	= 52*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 10.00 min
Total precip.	= 1.25 in	Distribution	= Custom
Storm duration	= Water Quality Storm.cds	Shape factor	= 285

* Composite (Area/CN) = [(0.300 x 61)] / 2.200

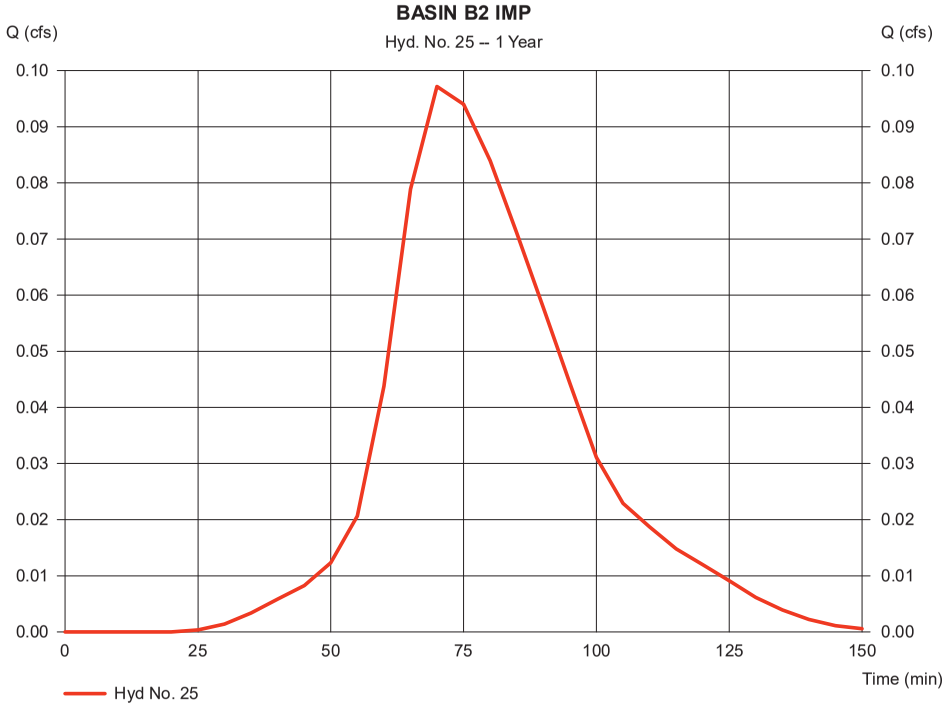


Hydrograph Report

Hyd. No. 25

BASIN B2 IMP

Hydrograph type	= SCS Runoff	Peak discharge	= 0.097 cfs
Storm frequency	= 1 yrs	Time to peak	= 70 min
Time interval	= 5 min	Hyd. volume	= 224 cuft
Drainage area	= 0.060 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 10.00 min
Total precip.	= 1.25 in	Distribution	= Custom
Storm duration	= Water Quality Storm.cds	Shape factor	= 285

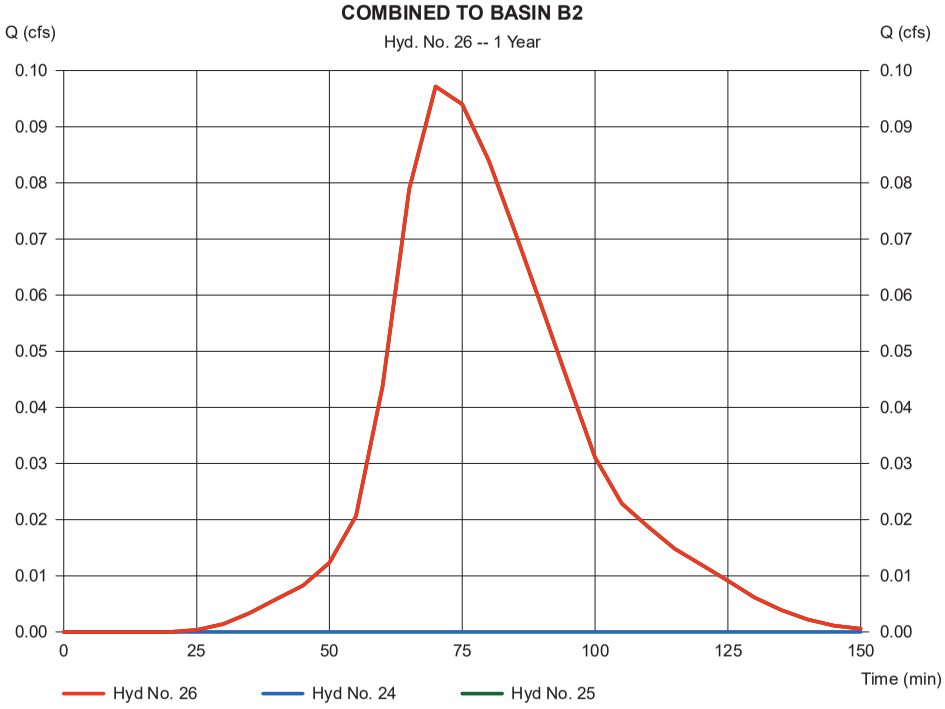


Hydrograph Report

Hyd. No. 26

COMBINED TO BASIN B2

Hydrograph type	= Combine	Peak discharge	= 0.097 cfs
Storm frequency	= 1 yrs	Time to peak	= 70 min
Time interval	= 5 min	Hyd. volume	= 224 cuft
Inflow hyds.	= 24, 25	Contrib. drain. area	= 2.260 ac

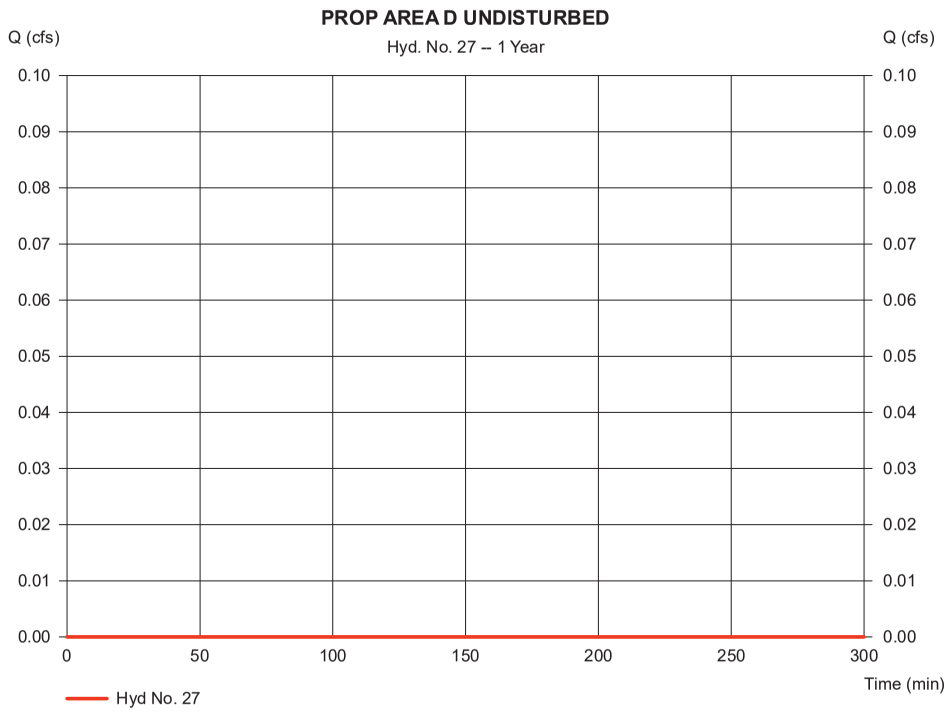


Hydrograph Report

Hyd. No. 27

PROP AREA D UNDISTURBED

Hydrograph type	= SCS Runoff	Peak discharge	= 0.000 cfs
Storm frequency	= 1 yrs	Time to peak	= n/a
Time interval	= 5 min	Hyd. volume	= 0 cuft
Drainage area	= 0.603 ac	Curve number	= 30
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 10.00 min
Total precip.	= 1.25 in	Distribution	= Custom
Storm duration	= Water Quality Storm.cds	Shape factor	= 285



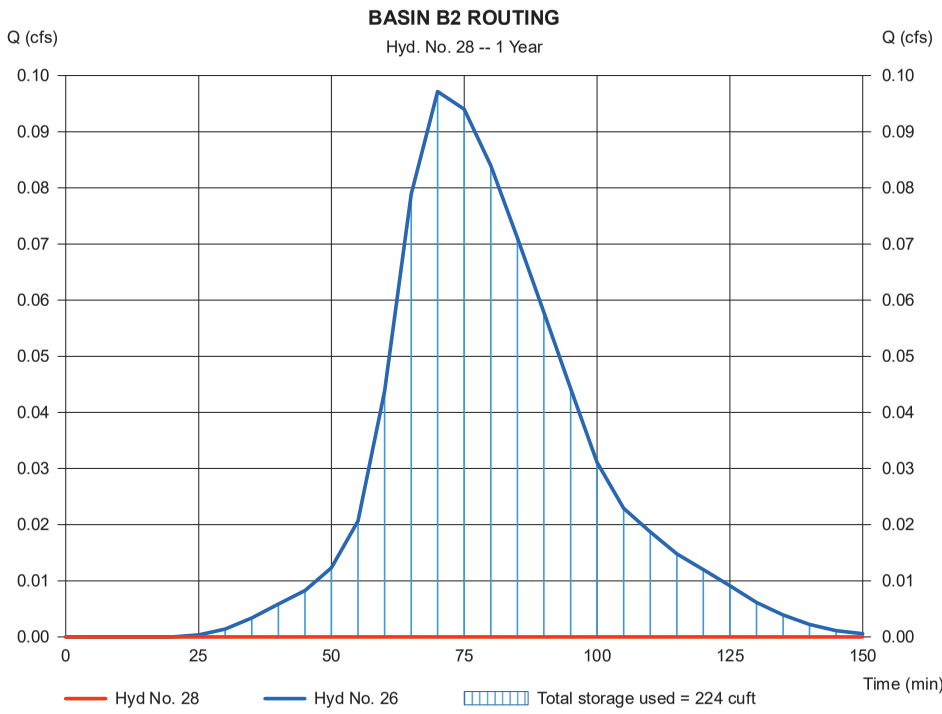
Hydrograph Report

Hyd. No. 28

BASIN B2 ROUTING

Hydrograph type	= Reservoir	Peak discharge	= 0.000 cfs
Storm frequency	= 1 yrs	Time to peak	= n/a
Time interval	= 5 min	Hyd. volume	= 0 cuft
Inflow hyd. No.	= 26 - COMBINED TO BASIN B2	Max. Elevation	= 94.77 ft
Reservoir name	= Recharge Basin B2	Max. Storage	= 224 cuft

Storage Indication method used.



Pond Report

Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Nov 11, 2020

Pond No. 5 - Recharge Basin B2

Pond Data

Contours - User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 94.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	94.00	00	0	0
0.50	94.50	393	65	65
1.00	95.00	785	289	354
1.50	95.50	1,323	521	875
2.00	96.00	1,861	792	1,667
2.50	96.50	2,486	1,083	2,750

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 0.00	0.00	0.00	0.00
Span (in)	= 0.00	0.00	0.00	0.00
No. Barrels	= 0	0	0	0
Invert El. (ft)	= 0.00	0.00	0.00	0.00
Length (ft)	= 0.00	0.00	0.00	0.00
Slope (%)	= 0.00	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	No	No	No

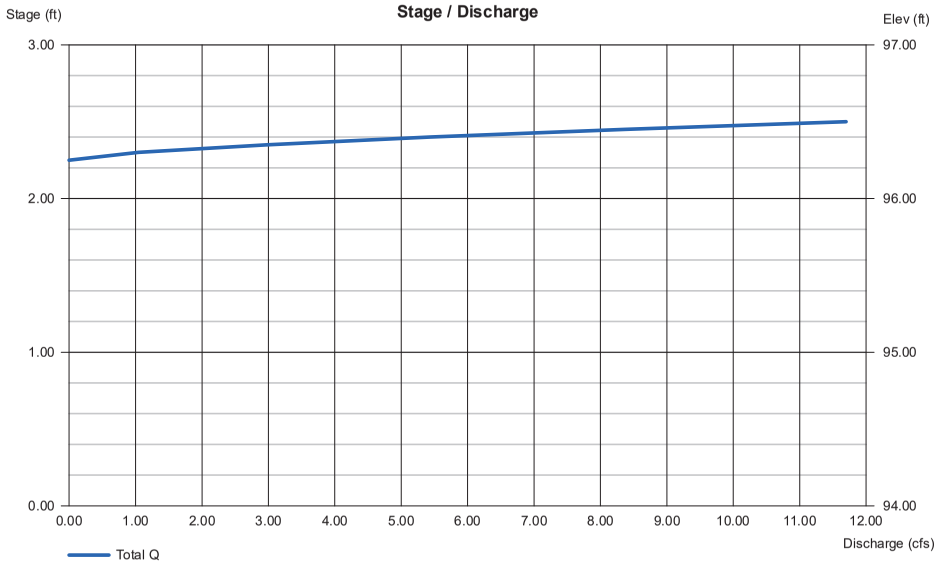
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 36.00	0.00	0.00	0.00
Crest El. (ft)	= 96.25	0.00	0.00	0.00
Weir Coeff.	= 2.60	3.33	3.33	3.33
Weir Type	= Broad	---	---	---
Multi-Stage	= No	No	No	No

Exfil.(in/hr) = 0.000 (by Wet area)

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).



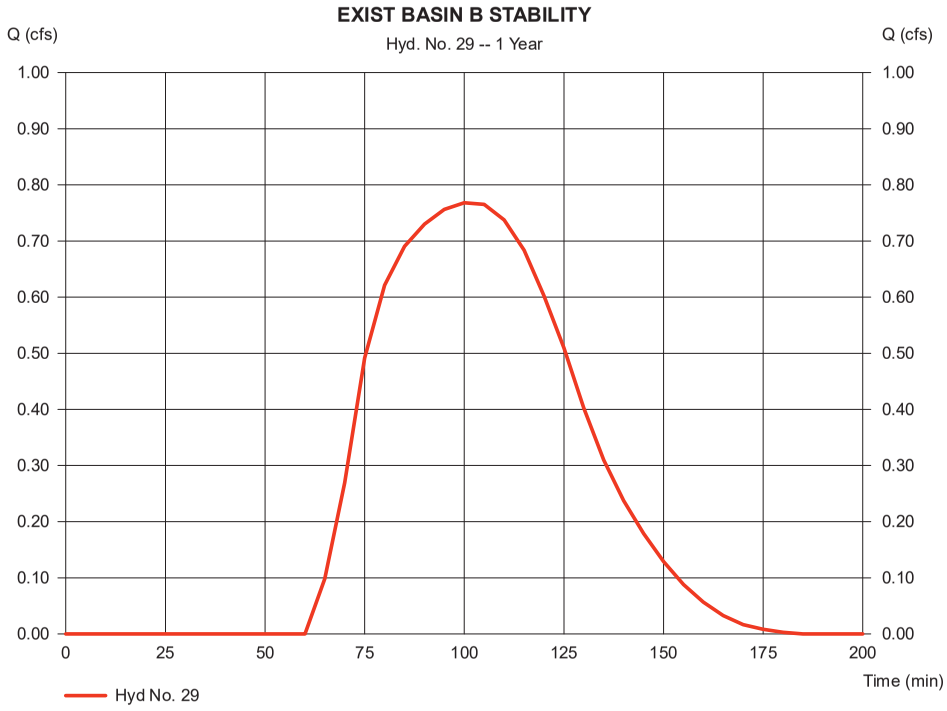
Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Nov 11, 2020

Hyd. No. 29

EXIST BASIN B STABILITY

Hydrograph type	= SCS Runoff	Peak discharge	= 0.768 cfs
Storm frequency	= 1 yrs	Time to peak	= 100 min
Time interval	= 5 min	Hyd. volume	= 2,756 cuft
Drainage area	= 6.310 ac	Curve number	= 77
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 20.00 min
Total precip.	= 1.25 in	Distribution	= Custom
Storm duration	= Water Quality Storm.cds	Shape factor	= 285



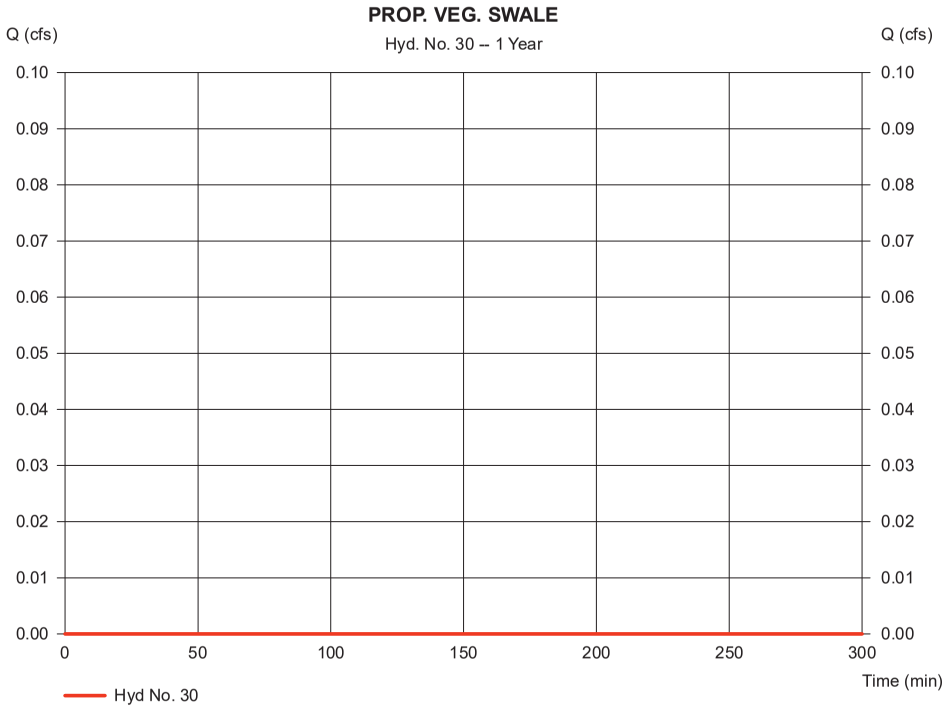
Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Nov 11, 2020

Hyd. No. 30

PROP. VEG. SWALE

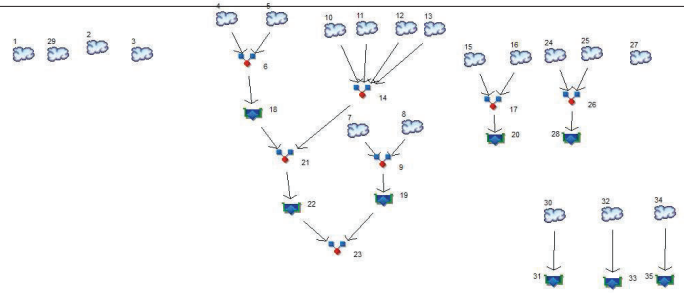
Hydrograph type	= SCS Runoff	Peak discharge	= 0.000 cfs
Storm frequency	= 1 yrs	Time to peak	= n/a
Time interval	= 5 min	Hyd. volume	= 0 cuft
Drainage area	= 0.730 ac	Curve number	= 80
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 10.00 min
Total precip.	= 0.00 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285



8. HYDROGRAPH SUMMARY REPORTS – EMERGENCY SPILLWAY

Watershed Model Schematic

Hydraflow Hydrographs by Intelisolve v9.1



Legend

Hyd.	Origin	Description
1	SCS Runoff	EXIST DISTURBED AREA A
2	SCS Runoff	EXIST DISTURBED AREA B
3	SCS Runoff	EXIST AREA D DISTURBED WOODS-BRUSH
4	SCS Runoff	AREA A1-IMPERVIOUS
5	SCS Runoff	AREA A1-PERV
6	Combine	BASIN A1 INFLOW
7	SCS Runoff	AREA A2-IMP
8	SCS Runoff	AREA A2-PERV
9	Combine	BASIN A2-INFLOW
10	SCS Runoff	AREA A3-WOODS
11	SCS Runoff	AREA A3 Open Space D
12	SCS Runoff	AREA A3-IMP
13	SCS Runoff	AREA A3- Open Space A
14	Combine	BASIN A3-INFLOW
15	SCS Runoff	BASIN B1-IMP
16	SCS Runoff	BASIN B1-PERV
17	Combine	BASIN B-INFLOW
18	Reservoir	BASIN A1 ROUTING
19	Reservoir	BASIN A2 ROUTING
20	Reservoir	BASIN B ROUTING
21	Combine	COMBINED TO BASIN A3
22	Reservoir	BASIN A3 ROUTING
23	Combine	COMBINED TO SA A
24	SCS Runoff	BASIN B2 PERV
25	SCS Runoff	BASIN B2 IMP
26	Combine	COMBINED TO BASIN B2
27	SCS Runoff	PROP AREA D UNDISTURBED
28	Reservoir	BASIN B2 ROUTING
29	SCS Runoff	EXIST BASIN B STABILITY
30	SCS Runoff	150 Year Storm A1
31	Reservoir	A1 150Yr Storm Routing
32	SCS Runoff	150 Yr Storm to Basin A2
33	Reservoir	A2 150Yr Storm Routing
34	SCS Runoff	150 Yr Storm A3
35	Reservoir	A3 150Yr Storm Routing

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	20.09	5	750	145,961	----	------	------	EXIST DISTURBED AREA A
2	SCS Runoff	14.02	5	745	96,415	----	------	------	EXIST DISTURBED AREA B
3	SCS Runoff	1.022	5	740	6,337	----	------	------	EXIST AREA D DISTURBED WOOD
4	SCS Runoff	11.11	5	730	65,898	----	------	------	AREA A1-IMPERVIOUS
5	SCS Runoff	3.044	5	735	16,544	----	------	------	AREA A1-PERV
6	Combine	14.03	5	730	82,442	4, 5	------	------	BASIN A1 INFLOW
7	SCS Runoff	16.09	5	730	95,395	----	------	------	AREA A2-IMP
8	SCS Runoff	1.900	5	745	12,777	----	------	------	AREA A2-PERV
9	Combine	17.58	5	730	108,172	7, 8	------	------	BASIN A2-INFLOW
10	SCS Runoff	2.560	5	745	19,278	----	------	------	AREA A3-WOODS
11	SCS Runoff	6.129	5	740	40,431	----	------	------	AREA A3 Open Space D
12	SCS Runoff	20.37	5	730	120,812	----	------	------	AREA A3-IMP
13	SCS Runoff	0.783	5	750	9,472	----	------	------	AREA A3- Open Space A
14	Combine	28.55	5	735	189,994	10, 11, 12, 13	------	------	BASIN A3-INFLOW
15	SCS Runoff	14.82	5	730	87,863	----	------	------	BASIN B1-IMP
16	SCS Runoff	3.183	5	730	16,840	----	------	------	BASIN B1-PERV
17	Combine	18.00	5	730	104,704	15, 16	------	------	BASIN B-INFLOW
18	Reservoir	5.257	5	765	35,792	6	106.35	49,680	BASIN A1 ROUTING
19	Reservoir	15.22	5	745	65,678	9	97.54	48,592	BASIN A2 ROUTING
20	Reservoir	15.46	5	745	59,348	17	105.90	49,902	BASIN B ROUTING
21	Combine	28.55	5	735	225,786	14, 18,	------	------	COMBINED TO BASIN A3
22	Reservoir	8.469	5	795	105,263	21	95.77	130,217	BASIN A3 ROUTING
23	Combine	15.22	5	745	170,941	19, 22	------	------	COMBINED TO SA A
24	SCS Runoff	4.440	5	735	24,462	----	------	------	BASIN B2 PERV
25	SCS Runoff	0.317	5	730	1,883	----	------	------	BASIN B2 IMP
26	Combine	4.750	5	735	26,345	24, 25	------	------	COMBINED TO BASIN B2
27	SCS Runoff	0.119	5	750	1,435	----	------	------	PROP AREA D UNDISTURBED
28	Reservoir	4.947	5	735	24,136	26	96.40	2,512	BASIN B2 ROUTING
29	SCS Runoff	22.12	5	740	144,998	----	------	------	EXIST BASIN B STABILITY
30	SCS Runoff	21.06	5	730	124,892	----	------	------	150 Year Storm A1
31	Reservoir	19.87	5	740	78,242	30	106.55	53,020	A1 150Yr Storm Routing
32	SCS Runoff	26.35	5	730	156,271	----	------	------	150 Yr Storm to Basin A2
33	Reservoir	25.41	5	735	113,778	32	97.66	51,135	A2 150Yr Storm Routing
34	SCS Runoff	43.23	5	730	256,373	----	------	------	150 Yr Storm A3

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
35	Reservoir	28.15	5	750	135,850	34	96.01	140,835	A3 150Yr Storm Routing

2020-11-10 Emergency Spillway Storm.gpw | Return Period: 100 Year | Wednesday, Nov 11, 2020

Hydrograph Report

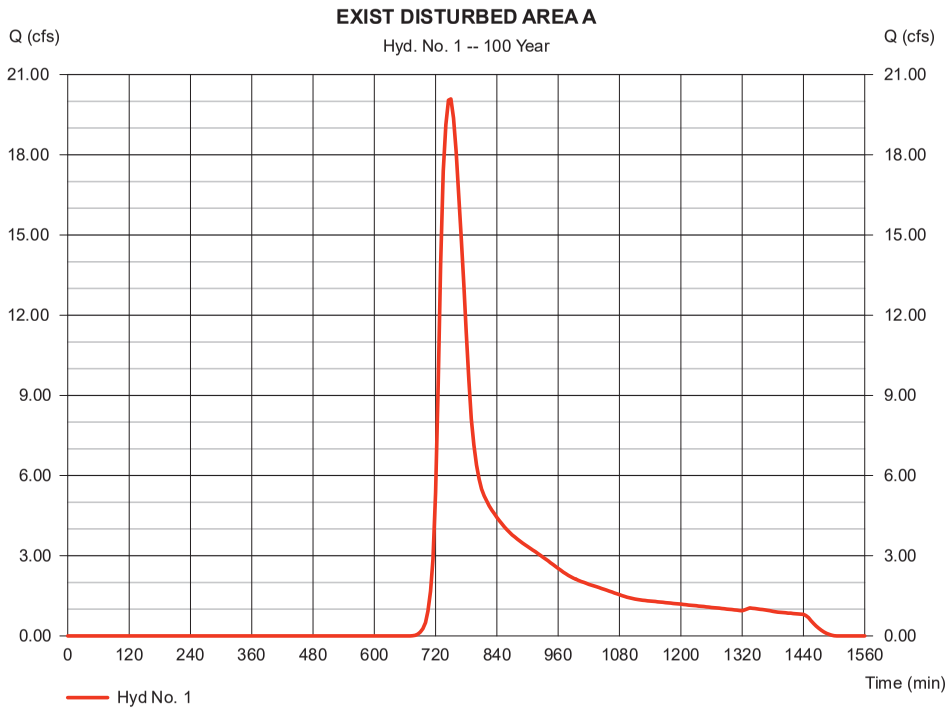
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Nov 11, 2020

Hyd. No. 1

EXIST DISTURBED AREA A

Hydrograph type	= SCS Runoff	Peak discharge	= 20.09 cfs
Storm frequency	= 100 yrs	Time to peak	= 750 min
Time interval	= 5 min	Hyd. volume	= 145,961 cuft
Drainage area	= 16.460 ac	Curve number	= 46*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 22.00 min
Total precip.	= 8.94 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

* Composite (Area/CN) = [(9.090 x 30) + (0.470 x 55) + (0.480 x 80) + (2.130 x 39) + (4.290 x 77)] / 16.460



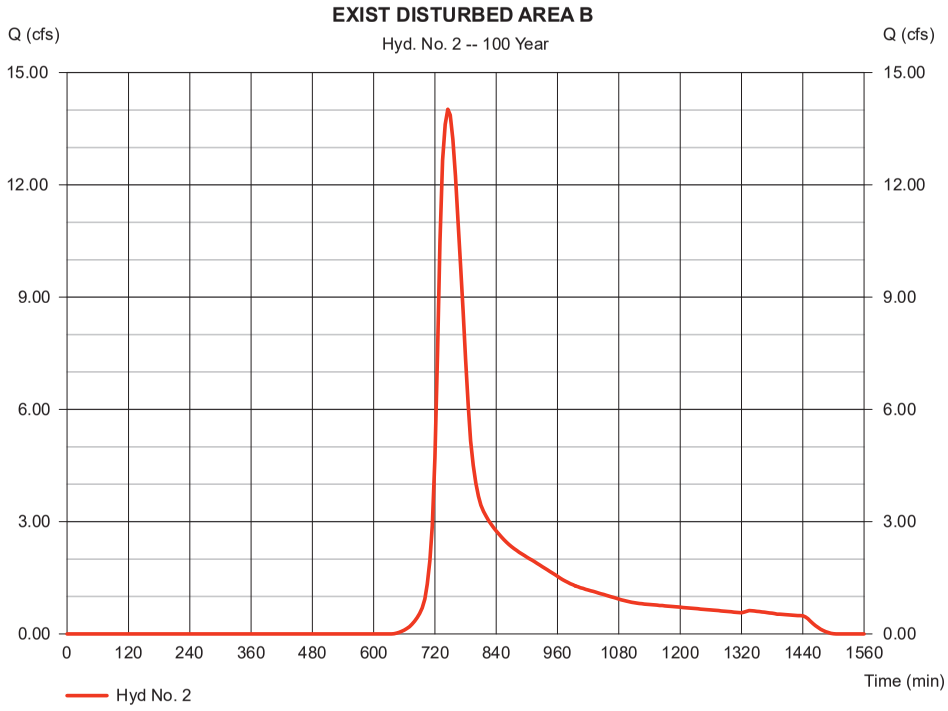
Hydrograph Report

Hyd. No. 2

EXIST DISTURBED AREA B

Hydrograph type	= SCS Runoff	Peak discharge	= 14.02 cfs
Storm frequency	= 100 yrs	Time to peak	= 745 min
Time interval	= 5 min	Hyd. volume	= 96,415 cuft
Drainage area	= 8.700 ac	Curve number	= 51*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 20.00 min
Total precip.	= 8.94 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

* Composite (Area/CN) = [(4.860 x 30) + (0.320 x 80) + (3.520 x 77)] / 8.700



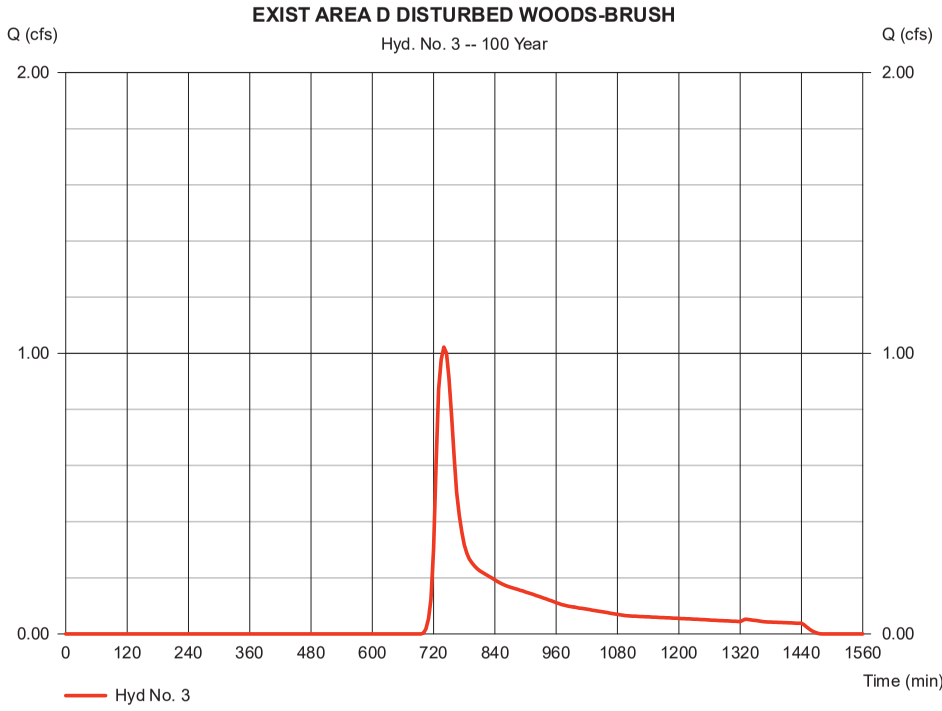
Hydrograph Report

Hyd. No. 3

EXIST AREA D DISTURBED WOODS-BRUSH

Hydrograph type	= SCS Runoff	Peak discharge	= 1.022 cfs
Storm frequency	= 100 yrs	Time to peak	= 740 min
Time interval	= 5 min	Hyd. volume	= 6,337 cuft
Drainage area	= 0.920 ac	Curve number	= 42*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 10.00 min
Total precip.	= 8.94 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

* Composite (Area/CN) = [(0.460 x 30) + (0.460 x 55)] / 0.920

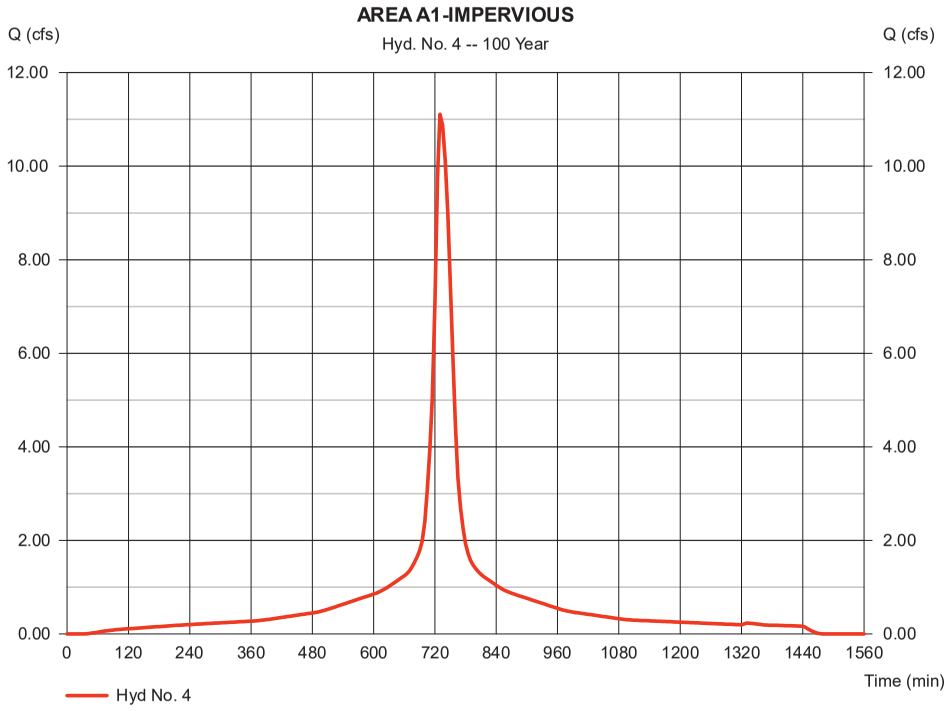


Hydrograph Report

Hyd. No. 4

AREA A1-IMPERVIOUS

Hydrograph type	= SCS Runoff	Peak discharge	= 11.11 cfs
Storm frequency	= 100 yrs	Time to peak	= 730 min
Time interval	= 5 min	Hyd. volume	= 65,898 cuft
Drainage area	= 2.100 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 10.00 min
Total precip.	= 8.94 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

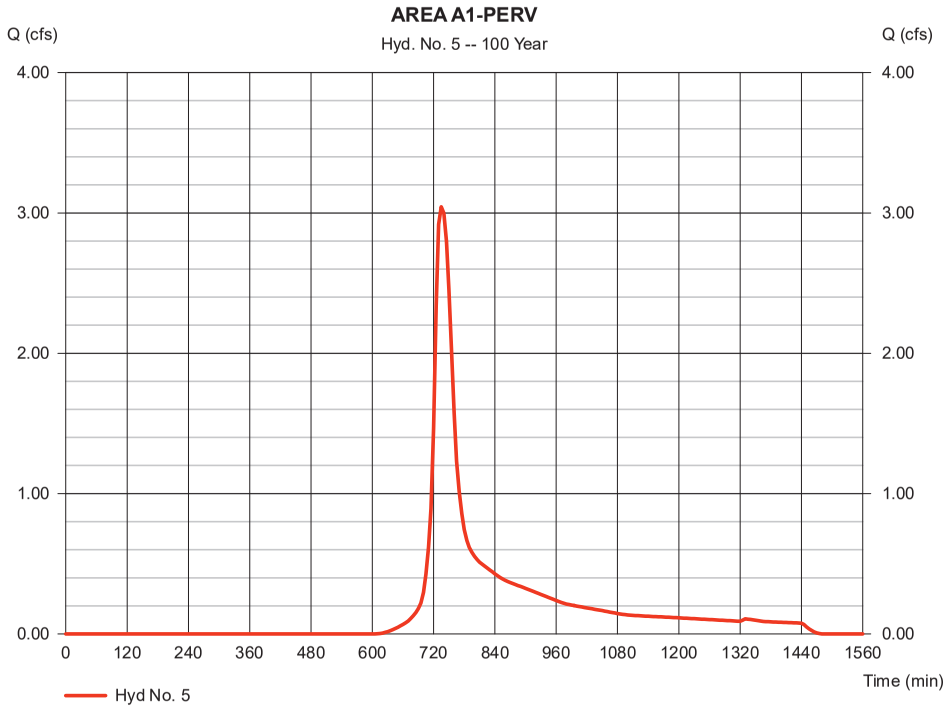


Hydrograph Report

Hyd. No. 5

AREA A1-PERV

Hydrograph type	= SCS Runoff	Peak discharge	= 3.044 cfs
Storm frequency	= 100 yrs	Time to peak	= 735 min
Time interval	= 5 min	Hyd. volume	= 16,544 cuft
Drainage area	= 1.380 ac	Curve number	= 54
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 10.00 min
Total precip.	= 8.94 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

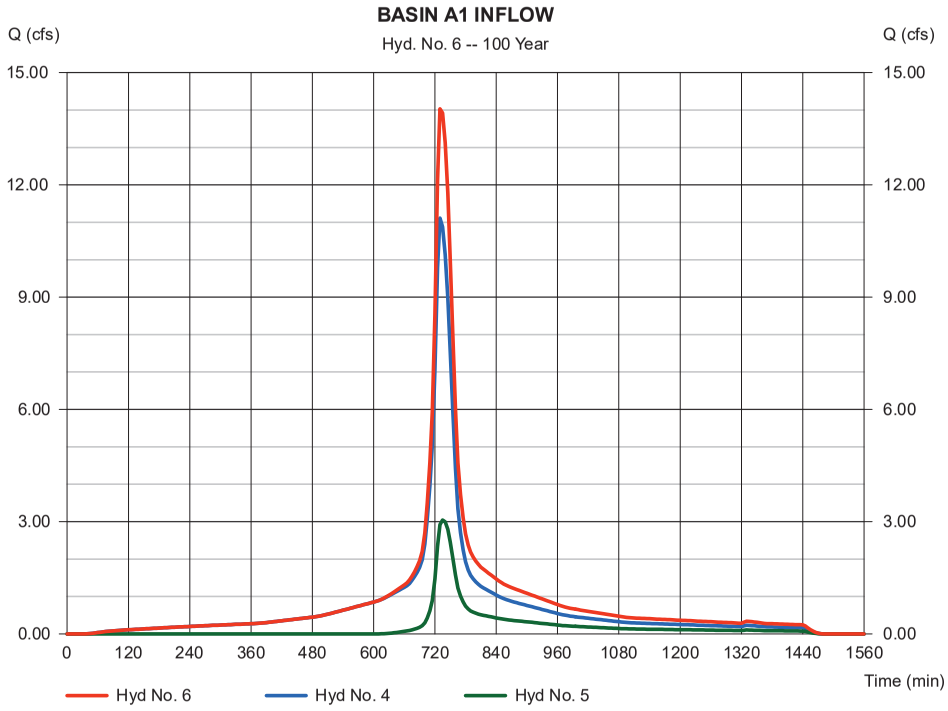


Hydrograph Report

Hyd. No. 6

BASIN A1 INFLOW

Hydrograph type	= Combine	Peak discharge	= 14.03 cfs
Storm frequency	= 100 yrs	Time to peak	= 730 min
Time interval	= 5 min	Hyd. volume	= 82,442 cuft
Inflow hyds.	= 4, 5	Contrib. drain. area	= 3.480 ac

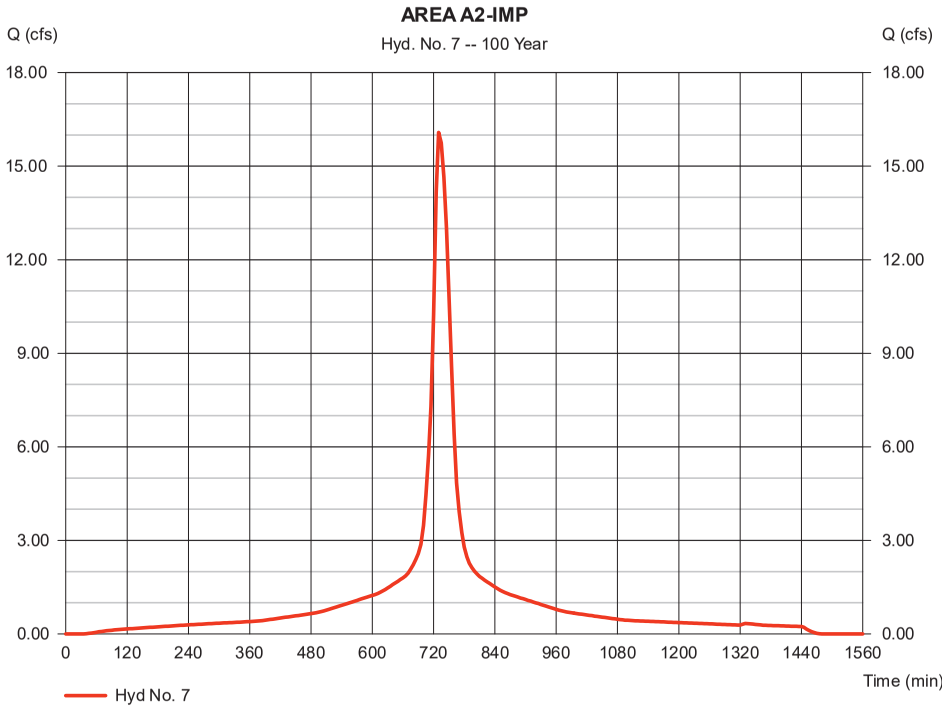


Hydrograph Report

Hyd. No. 7

AREA A2-IMP

Hydrograph type	= SCS Runoff	Peak discharge	= 16.09 cfs
Storm frequency	= 100 yrs	Time to peak	= 730 min
Time interval	= 5 min	Hyd. volume	= 95,395 cuft
Drainage area	= 3.040 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 10.00 min
Total precip.	= 8.94 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285



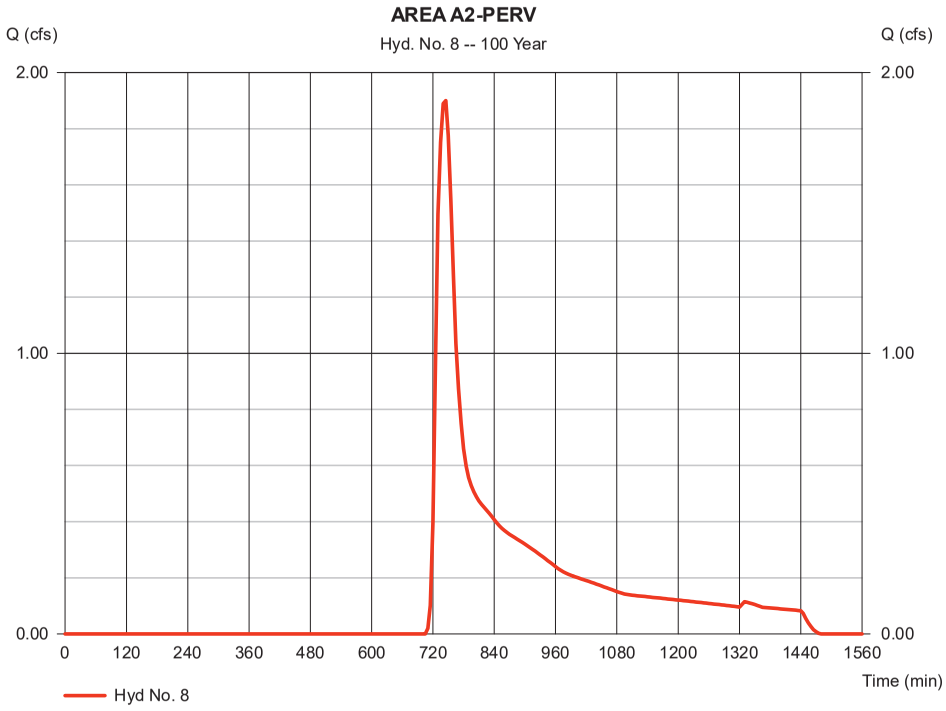
Hydrograph Report

Hyd. No. 8

AREA A2-PERV

Hydrograph type	= SCS Runoff	Peak discharge	= 1.900 cfs
Storm frequency	= 100 yrs	Time to peak	= 745 min
Time interval	= 5 min	Hyd. volume	= 12,777 cuft
Drainage area	= 2.250 ac	Curve number	= 39*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 10.00 min
Total precip.	= 8.94 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

* Composite (Area/CN) = [(0.840 x 80) + (0.390 x 61)] / 2.250

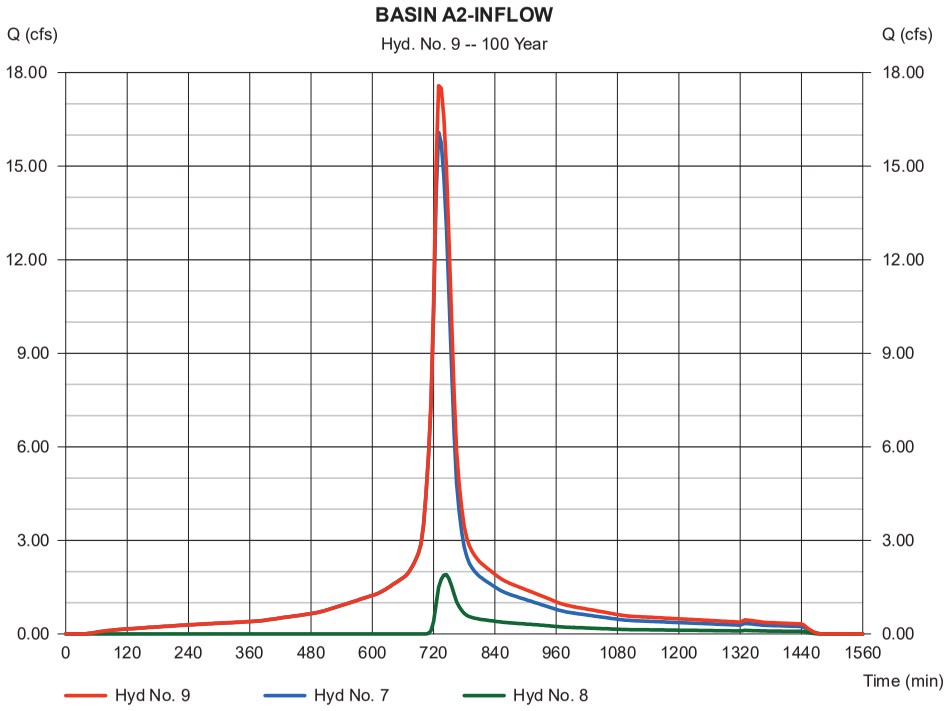


Hydrograph Report

Hyd. No. 9

BASIN A2-INFLOW

Hydrograph type	= Combine	Peak discharge	= 17.58 cfs
Storm frequency	= 100 yrs	Time to peak	= 730 min
Time interval	= 5 min	Hyd. volume	= 108,172 cuft
Inflow hyds.	= 7, 8	Contrib. drain. area	= 5.290 ac

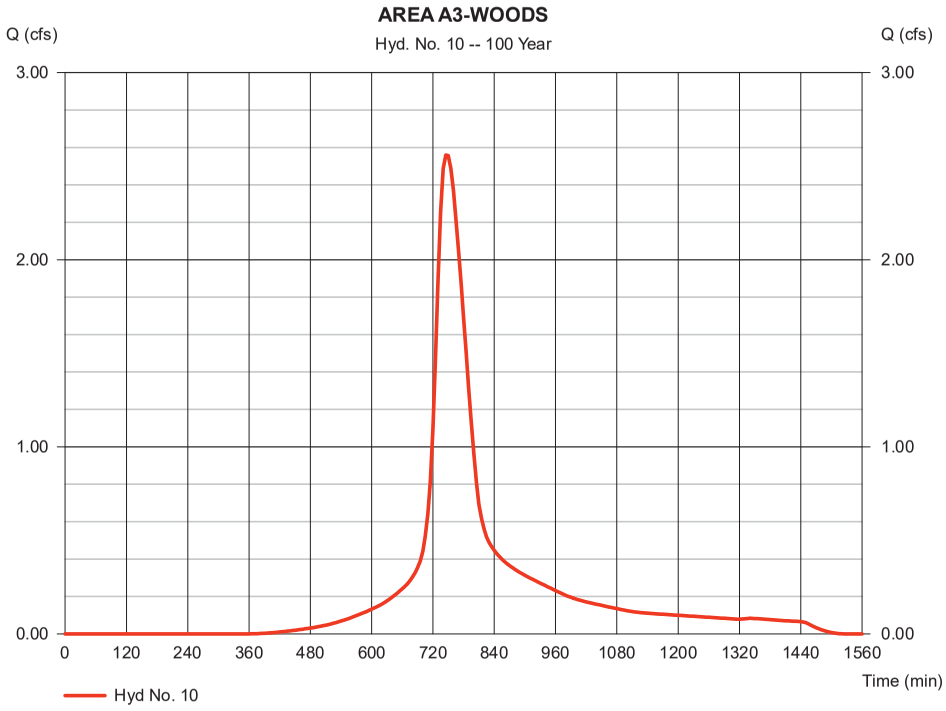


Hydrograph Report

Hyd. No. 10

AREA A3-WOODS

Hydrograph type	= SCS Runoff	Peak discharge	= 2.560 cfs
Storm frequency	= 100 yrs	Time to peak	= 745 min
Time interval	= 5 min	Hyd. volume	= 19,278 cuft
Drainage area	= 0.870 ac	Curve number	= 77
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 25.00 min
Total precip.	= 8.94 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

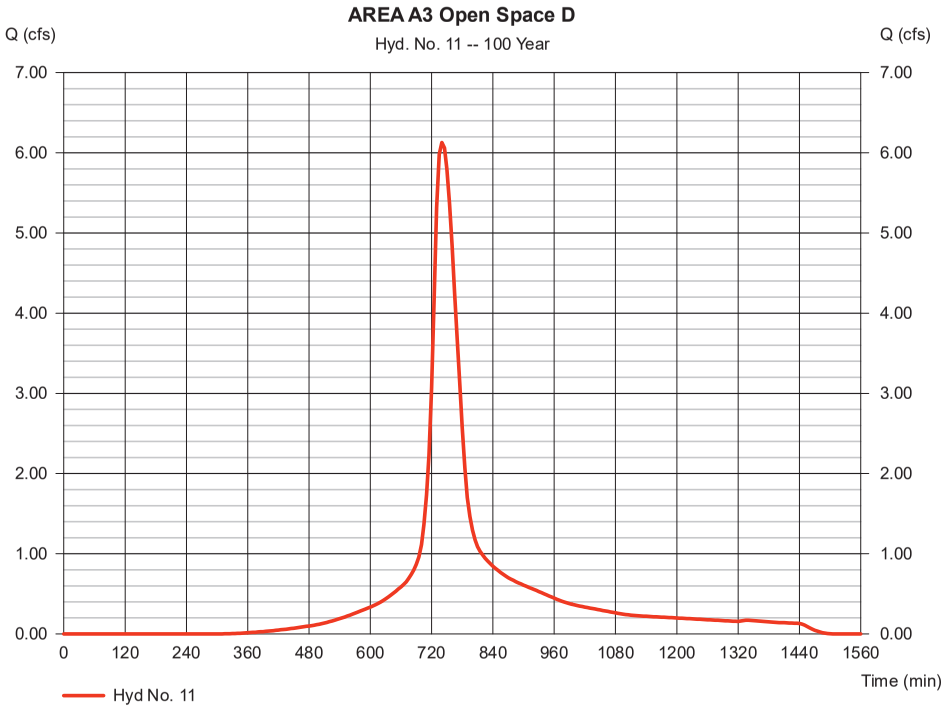


Hydrograph Report

Hyd. No. 11

AREA A3 Open Space D

Hydrograph type	= SCS Runoff	Peak discharge	= 6.129 cfs
Storm frequency	= 100 yrs	Time to peak	= 740 min
Time interval	= 5 min	Hyd. volume	= 40,431 cuft
Drainage area	= 1.660 ac	Curve number	= 80
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 20.00 min
Total precip.	= 8.94 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

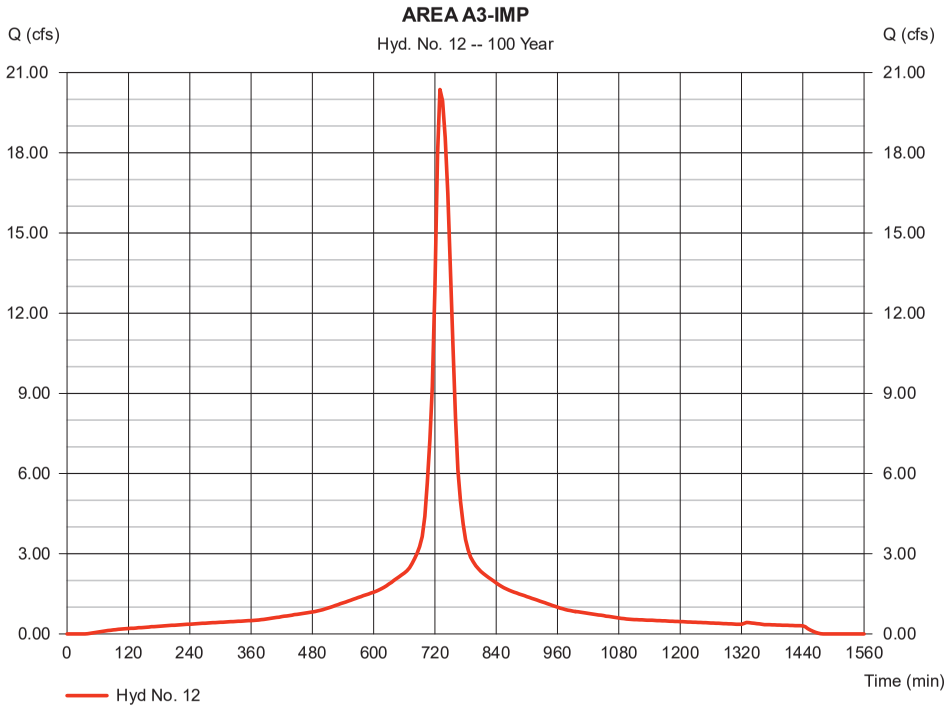


Hydrograph Report

Hyd. No. 12

AREA A3-IMP

Hydrograph type	= SCS Runoff	Peak discharge	= 20.37 cfs
Storm frequency	= 100 yrs	Time to peak	= 730 min
Time interval	= 5 min	Hyd. volume	= 120,812 cuft
Drainage area	= 3.850 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 10.00 min
Total precip.	= 8.94 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

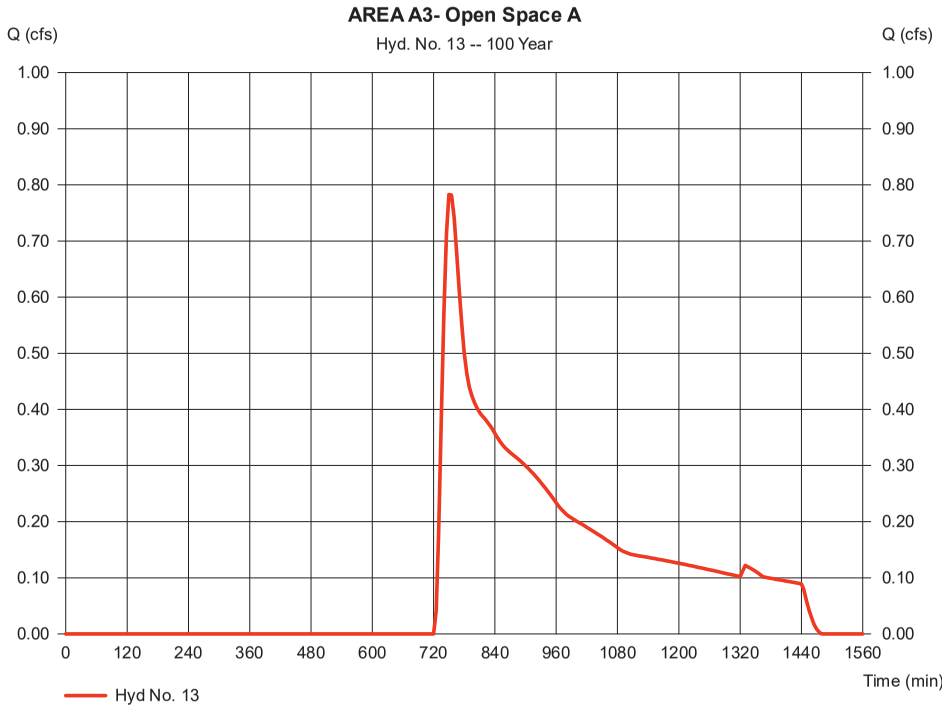


Hydrograph Report

Hyd. No. 13

AREA A3- Open Space A

Hydrograph type	= SCS Runoff	Peak discharge	= 0.783 cfs
Storm frequency	= 100 yrs	Time to peak	= 750 min
Time interval	= 5 min	Hyd. volume	= 9,472 cuft
Drainage area	= 3.980 ac	Curve number	= 30
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 10.00 min
Total precip.	= 8.94 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

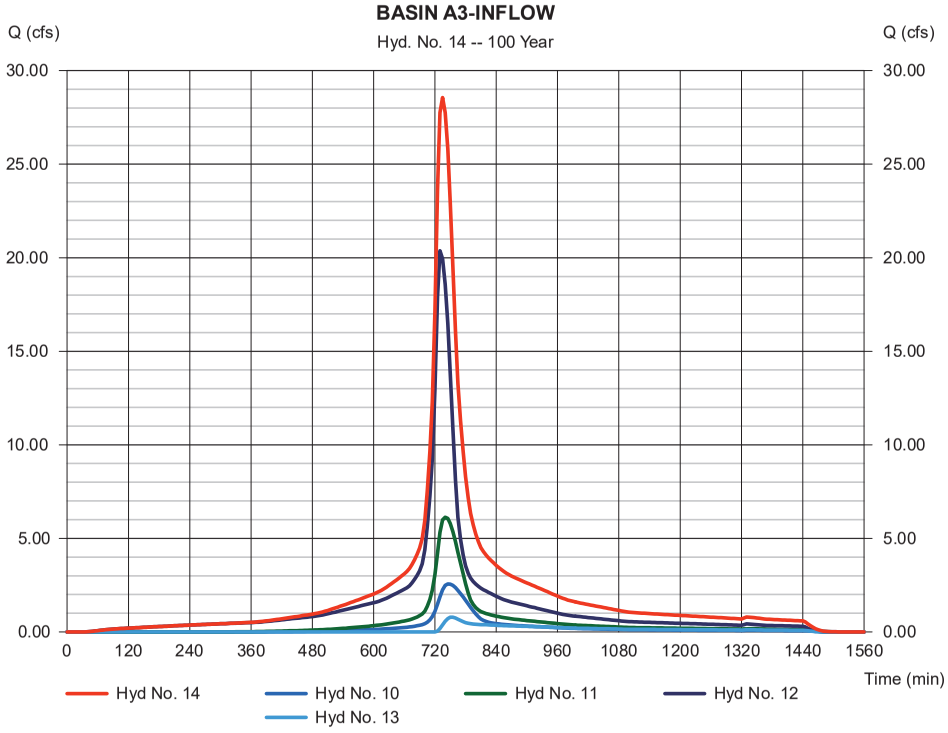


Hydrograph Report

Hyd. No. 14

BASIN A3-INFLOW

Hydrograph type	= Combine	Peak discharge	= 28.55 cfs
Storm frequency	= 100 yrs	Time to peak	= 735 min
Time interval	= 5 min	Hyd. volume	= 189,994 cuft
Inflow hyds.	= 10, 11, 12, 13	Contrib. drain. area	= 10.360 ac

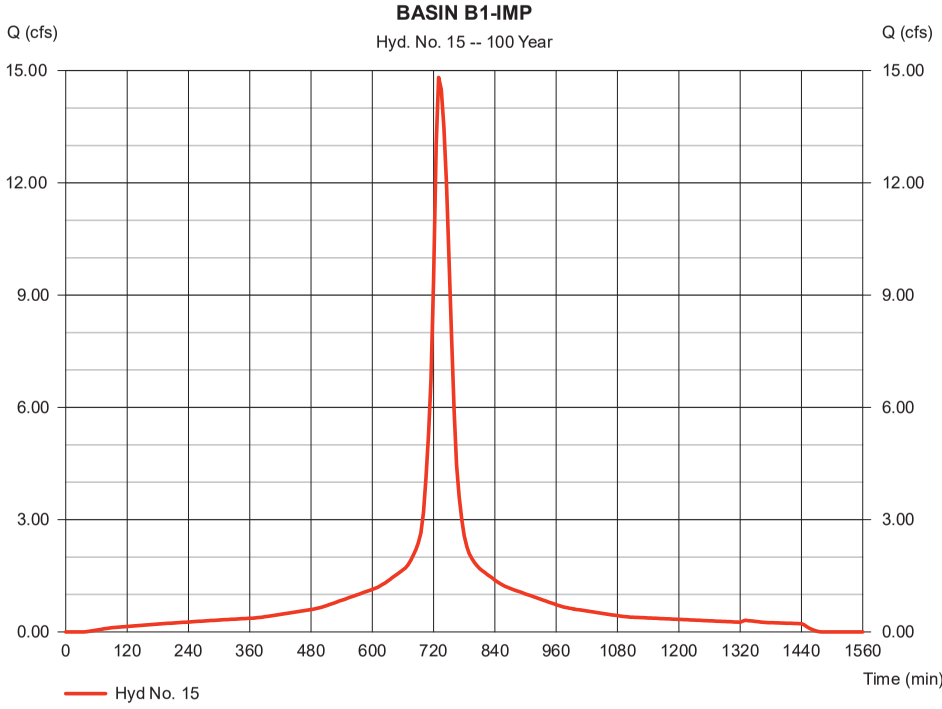


Hydrograph Report

Hyd. No. 15

BASIN B1-IMP

Hydrograph type	= SCS Runoff	Peak discharge	= 14.82 cfs
Storm frequency	= 100 yrs	Time to peak	= 730 min
Time interval	= 5 min	Hyd. volume	= 87,863 cuft
Drainage area	= 2.800 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 10.00 min
Total precip.	= 8.94 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

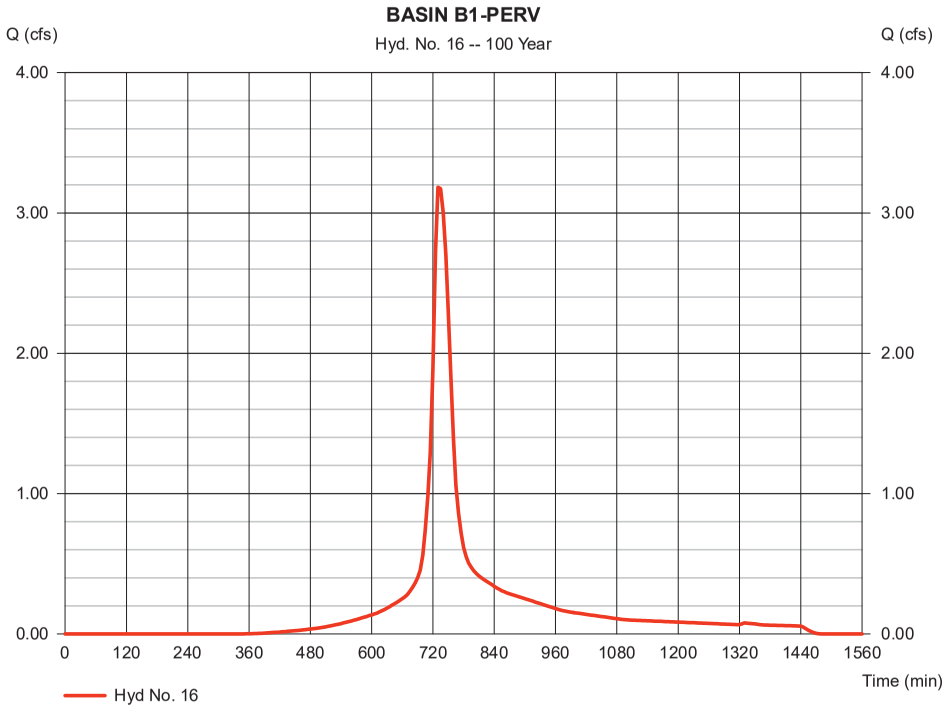


Hydrograph Report

Hyd. No. 16

BASIN B1-PERV

Hydrograph type	= SCS Runoff	Peak discharge	= 3.183 cfs
Storm frequency	= 100 yrs	Time to peak	= 730 min
Time interval	= 5 min	Hyd. volume	= 16,840 cuft
Drainage area	= 0.760 ac	Curve number	= 77
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 10.00 min
Total precip.	= 8.94 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

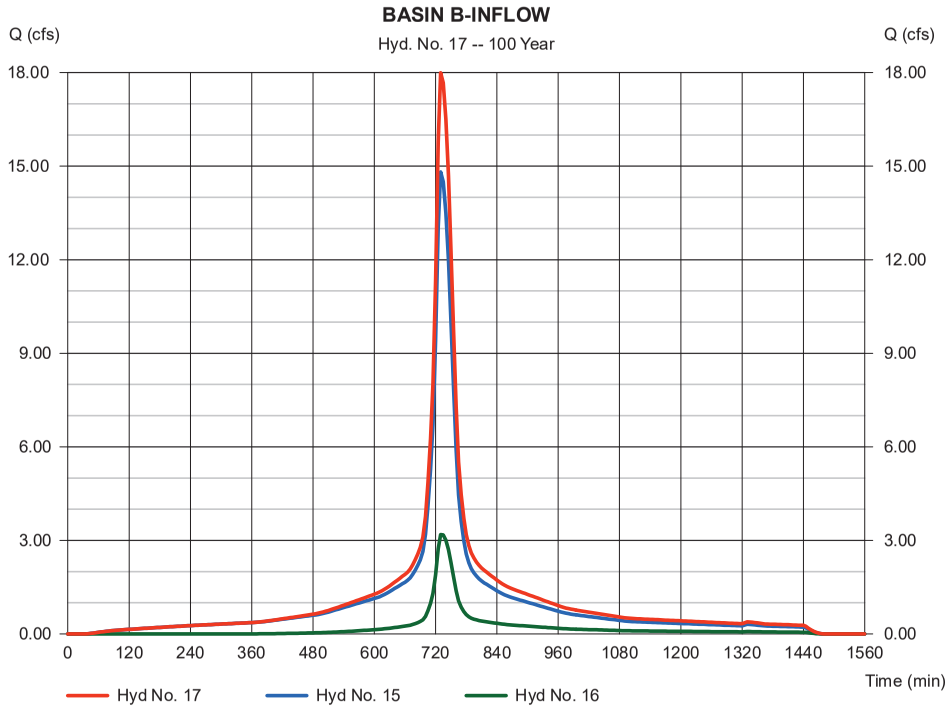


Hydrograph Report

Hyd. No. 17

BASIN B-INFLOW

Hydrograph type	= Combine	Peak discharge	= 18.00 cfs
Storm frequency	= 100 yrs	Time to peak	= 730 min
Time interval	= 5 min	Hyd. volume	= 104,704 cuft
Inflow hyds.	= 15, 16	Contrib. drain. area	= 3.560 ac



Hydrograph Report

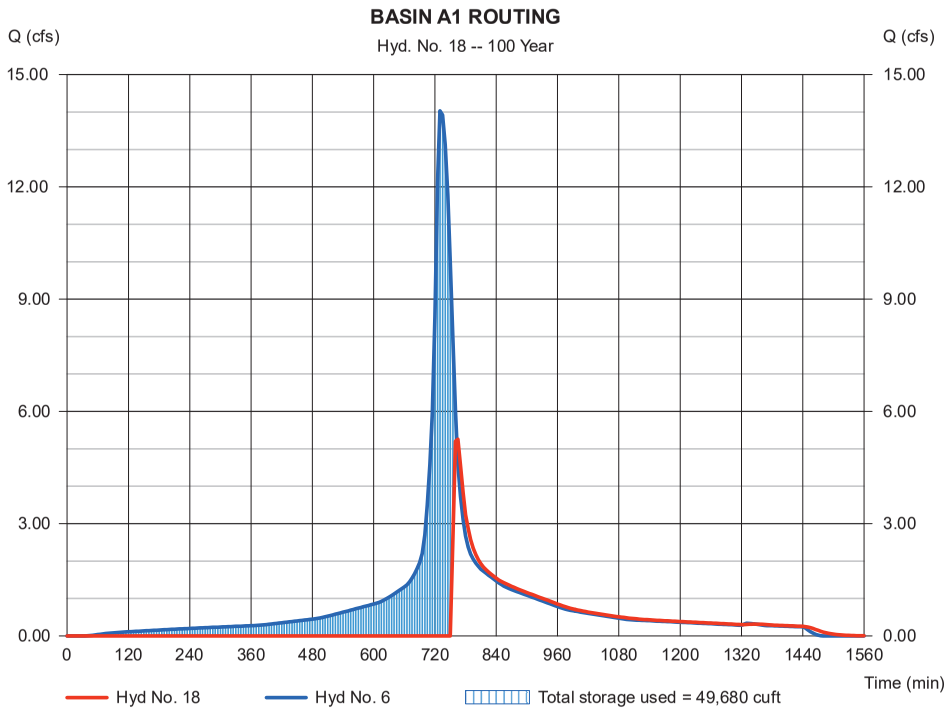
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Nov 11, 2020

Hyd. No. 18

BASIN A1 ROUTING

Hydrograph type	= Reservoir	Peak discharge	= 5.257 cfs
Storm frequency	= 100 yrs	Time to peak	= 765 min
Time interval	= 5 min	Hyd. volume	= 35,792 cuft
Inflow hyd. No.	= 6 - BASIN A1 INFLOW	Max. Elevation	= 106.35 ft
Reservoir name	= Inf. Basin A1	Max. Storage	= 49,680 cuft

Storage Indication method used.



Pond Report

Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Nov 11, 2020

Pond No. 1 - Inf. Basin A1

Pond Data

Contours - User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 102.50 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	102.50	9,755	0	0
0.50	103.00	10,646	5,098	5,098
1.00	103.50	11,318	5,490	10,588
1.50	104.00	12,253	5,891	16,478
2.00	104.50	12,982	6,307	22,786
2.50	105.00	13,913	6,722	29,507
3.00	105.50	14,701	7,152	36,659
3.50	106.00	15,632	7,581	44,240
4.00	106.50	16,472	8,024	52,265
4.50	107.00	17,543	8,501	60,766
5.00	107.50	184,750	43,200	103,966

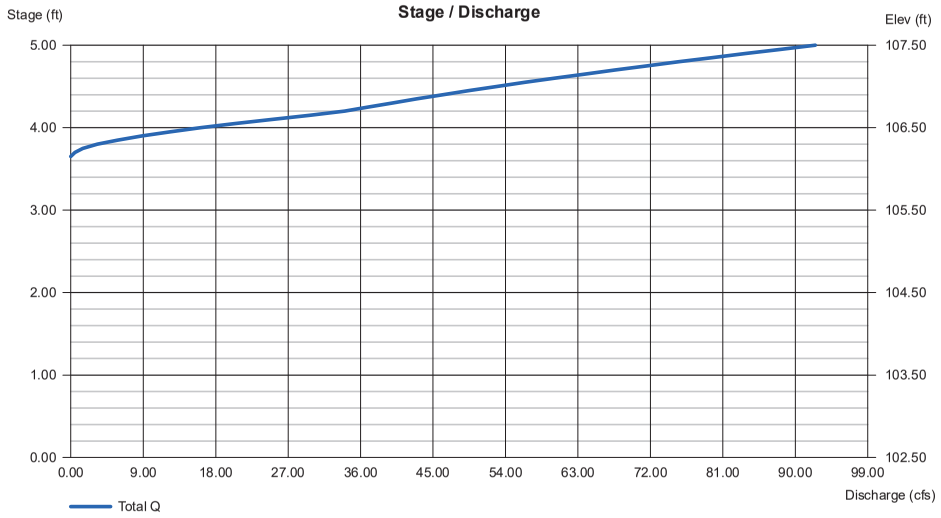
Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 18.00	Inactive	0.00	0.00
Span (in)	= 18.00	2.50	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 100.77	102.50	0.00	0.00
Length (ft)	= 147.00	0.00	0.00	0.00
Slope (%)	= 2.00	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)	Inactive	14.00	20.00	0.00
Crest El. (ft)	= 0.00	106.15	106.25	0.00
Weir Coeff.	= 3.33	3.33	2.60	3.33
Weir Type	= Rect	Rect	Broad	---
Multi-Stage	= Yes	Yes	No	No
Exfil.(in/hr)	= 0.000 (by Wet area)			
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).



Hydrograph Report

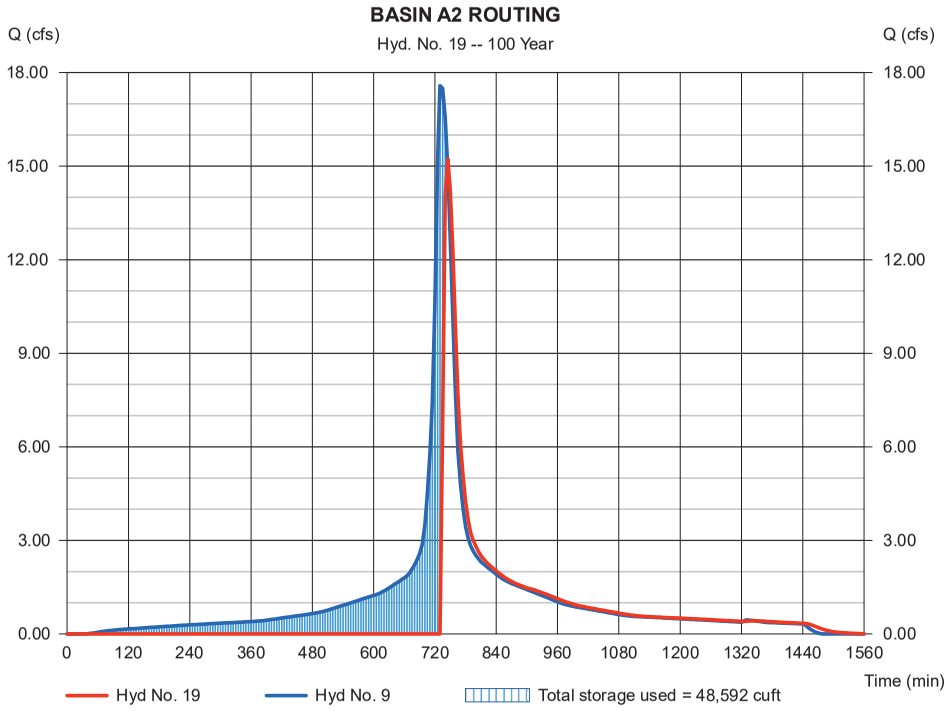
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Nov 11, 2020

Hyd. No. 19

BASIN A2 ROUTING

Hydrograph type	= Reservoir	Peak discharge	= 15.22 cfs
Storm frequency	= 100 yrs	Time to peak	= 745 min
Time interval	= 5 min	Hyd. volume	= 65,678 cuft
Inflow hyd. No.	= 9 - BASIN A2-INFLOW	Max. Elevation	= 97.54 ft
Reservoir name	= Det. Basin A2	Max. Storage	= 48,592 cuft

Storage Indication method used.



Pond Report

Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Nov 11, 2020

Pond No. 2 - Det. Basin A2

Pond Data

Contours - User-defined contour areas. Average end area method used for volume calculation. Begining Elevation = 91.50 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	91.50	00	0	0
0.50	92.00	244	61	61
1.00	92.50	1,238	371	432
1.50	93.00	2,231	867	1,299
2.00	93.50	6,961	2,298	3,597
2.50	94.00	10,801	4,441	8,037
3.00	95.50	13,315	6,029	14,066
3.50	96.00	15,829	7,286	21,352
4.00	96.50	19,404	8,808	30,161
4.50	97.00	15,829	8,808	38,969
5.00	97.50	19,404	8,808	47,777
5.50	98.00	23,674	10,770	58,547
6.00	97.50	28,715	13,097	71,644
6.50	98.00	33,756	15,618	87,262
7.00	98.50	35,449	17,301	104,563

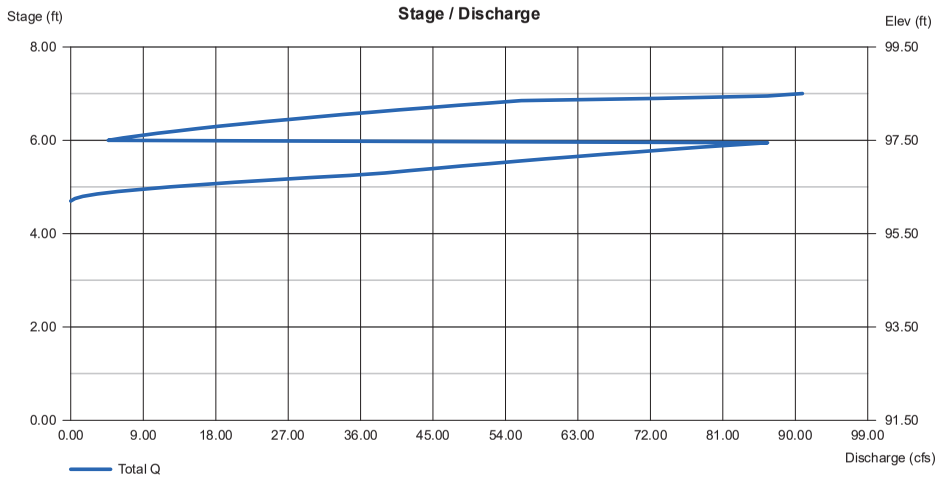
Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 18.00	Inactive	0.00	0.00
Span (in)	= 18.00	2.50	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 90.69	91.50	0.00	0.00
Length (ft)	= 44.00	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)	Inactive	14.00	20.00	0.00
Crest El. (ft)	= 96.10	97.20	97.30	0.00
Weir Coeff.	= 3.33	3.33	2.60	3.33
Weir Type	= Rect	Rect	Broad	---
Multi-Stage	= Yes	Yes	No	No
Exfil.(in/hr)	= 0.000 (by Wet area)			
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).



Hydrograph Report

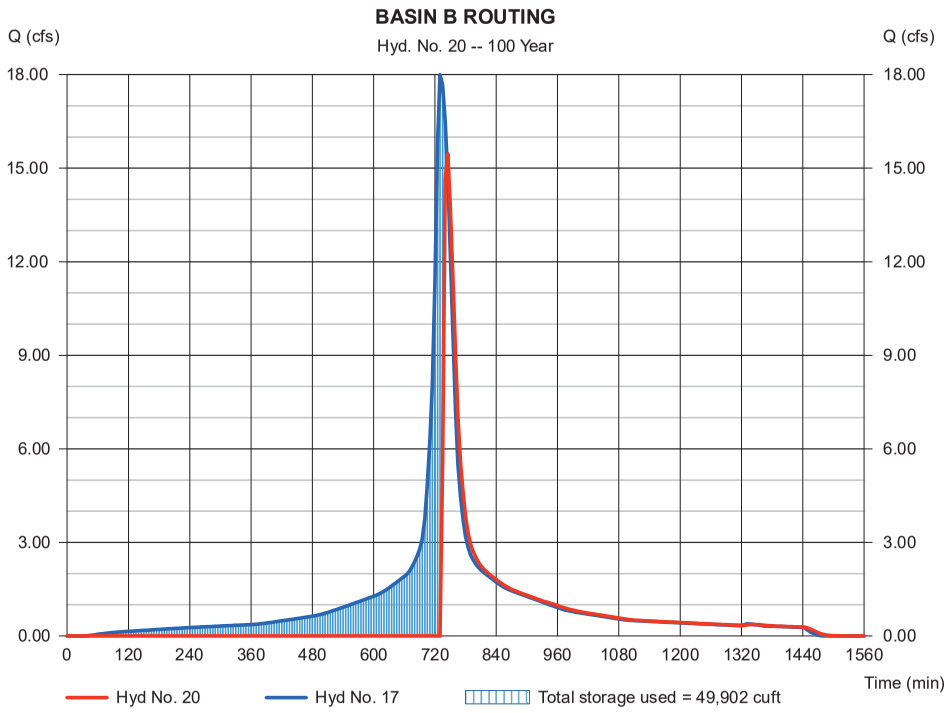
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Nov 11, 2020

Hyd. No. 20

BASIN B ROUTING

Hydrograph type	= Reservoir	Peak discharge	= 15.46 cfs
Storm frequency	= 100 yrs	Time to peak	= 745 min
Time interval	= 5 min	Hyd. volume	= 59,348 cuft
Inflow hyd. No.	= 17 - BASIN B-INFLOW	Max. Elevation	= 105.90 ft
Reservoir name	= Det. Basin B1	Max. Storage	= 49,902 cuft

Storage Indication method used.



Pond Report

Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Nov 11, 2020

Pond No. 4 - Det. Basin B1

Pond Data

Contours - User-defined contour areas. Average end area method used for volume calculation. Begining Elevation = 101.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	101.00	00	0	0
0.50	101.50	821	205	205
1.00	102.00	4,907	1,432	1,637
1.50	102.50	8,362	3,317	4,955
2.00	103.00	11,816	5,045	9,999
2.50	103.50	12,455	6,068	16,067
3.00	104.00	13,152	6,402	22,469
3.50	104.50	13,824	6,744	29,213
4.00	105.00	14,591	7,104	36,316
4.50	105.50	15,299	7,473	43,789
5.00	106.00	16,022	7,830	51,619
5.50	106.50	16,758	8,195	59,814

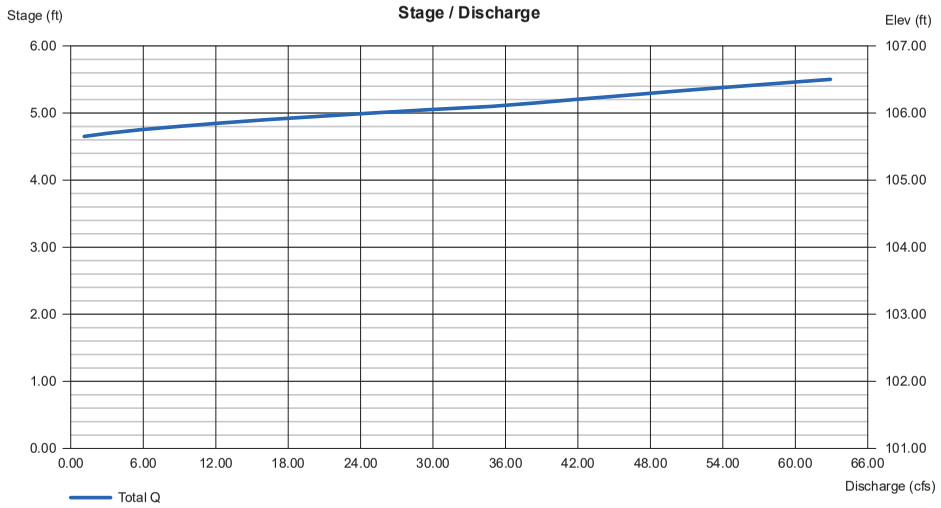
Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 18.00	Inactive	0.00	0.00
Span (in)	= 18.00	2.50	0.00	0.00
No. Barrels	= 1	2	1	0
Invert El. (ft)	= 100.93	101.00	103.20	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	Yes	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 14.00	20.00	Inactive	0.00
Crest El. (ft)	= 105.60	105.60	104.00	0.00
Weir Coeff.	= 3.33	2.60	3.33	3.33
Weir Type	= Rect	Broad	Rect	---
Multi-Stage	= Yes	No	Yes	No
Exfil.(in/hr)	= 0.000 (by Wet area)			
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).

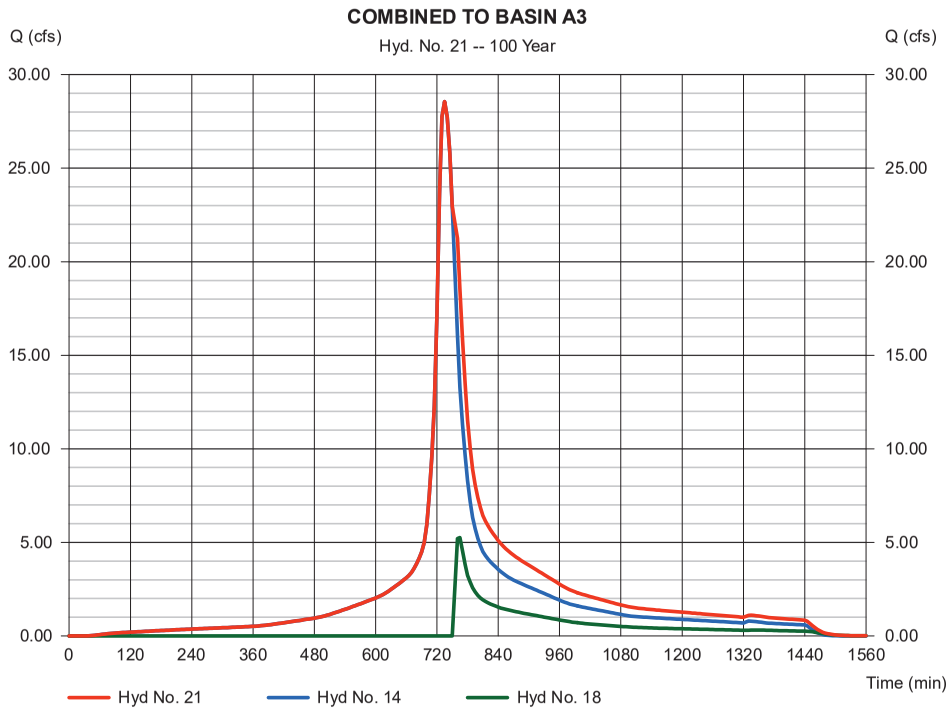


Hydrograph Report

Hyd. No. 21

COMBINED TO BASIN A3

Hydrograph type	= Combine	Peak discharge	= 28.55 cfs
Storm frequency	= 100 yrs	Time to peak	= 735 min
Time interval	= 5 min	Hyd. volume	= 225,786 cuft
Inflow hyds.	= 14, 18	Contrib. drain. area	= 0.000 ac



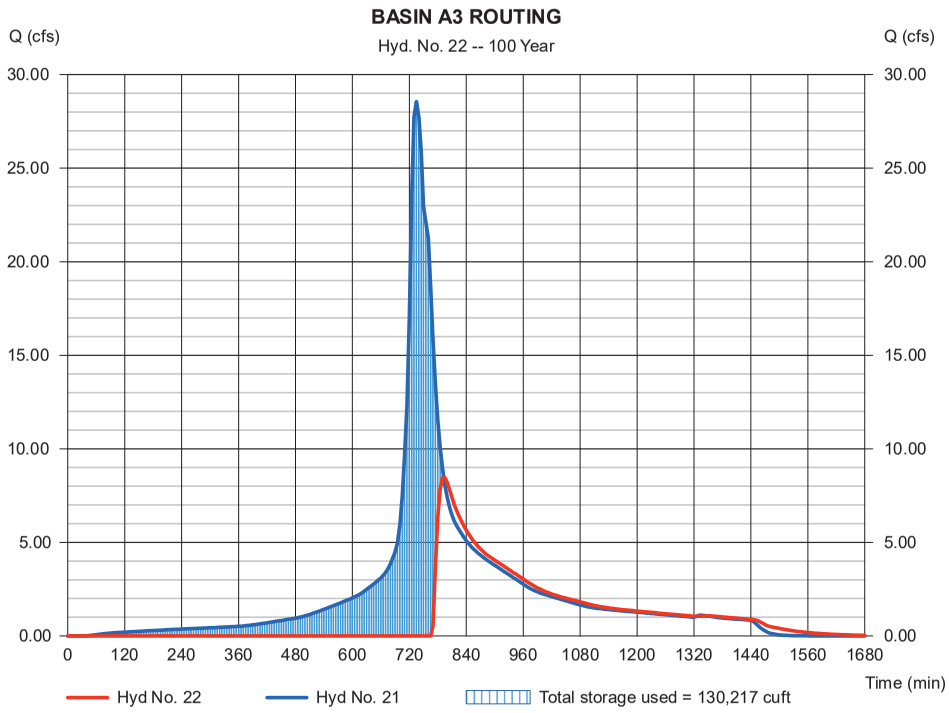
Hydrograph Report

Hyd. No. 22

BASIN A3 ROUTING

Hydrograph type	= Reservoir	Peak discharge	= 8.469 cfs
Storm frequency	= 100 yrs	Time to peak	= 795 min
Time interval	= 5 min	Hyd. volume	= 105,263 cuft
Inflow hyd. No.	= 21 - COMBINED TO BASIN A3	Max. Elevation	= 95.77 ft
Reservoir name	= Det. Basin A3	Max. Storage	= 130,217 cuft

Storage Indication method used.



Pond Report

Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Nov 11, 2020

Pond No. 3 - Det. Basin A3

Pond Data

Contours - User-defined contour areas. Average end area method used for volume calculation. Begining Elevation = 91.15 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	91.15	00	0	0
0.35	91.50	1,788	313	313
0.85	92.00	13,579	3,842	4,155
1.35	92.50	21,050	8,657	12,812
1.85	93.00	28,520	12,393	25,204
2.35	93.50	32,690	15,303	40,507
2.85	94.00	36,859	17,387	57,894
3.35	94.50	39,201	19,015	76,909
3.85	95.00	41,542	20,186	97,095
4.35	95.50	43,314	21,214	118,309
4.85	96.00	45,086	22,100	140,409
5.35	96.50	46,864	22,988	163,396

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 18.00	Inactive	0.00	0.00
Span (in)	= 18.00	2.50	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 90.28	91.15	0.00	0.00
Length (ft)	= 62.00	0.50	0.00	0.00
Slope (%)	= 1.00	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	Yes	Yes	No

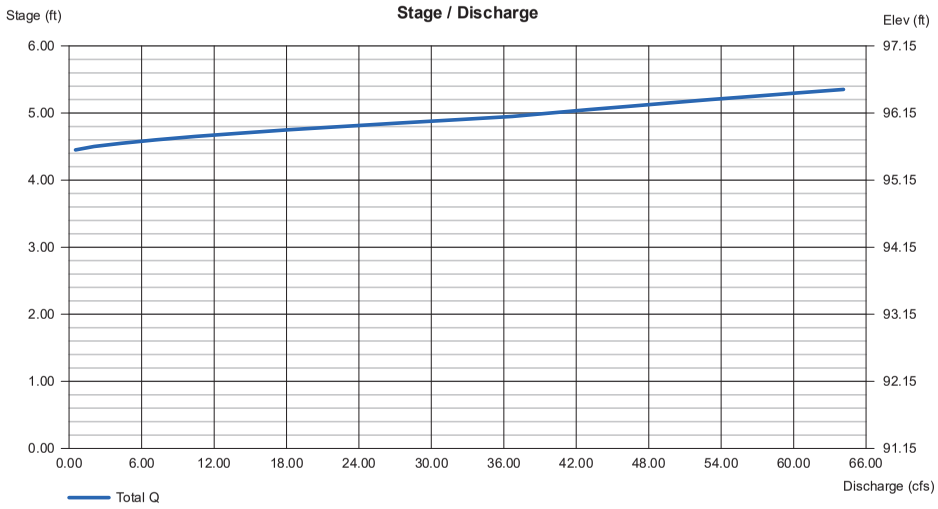
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	Inactive	14.00	20.00	0.00
Crest El. (ft)	= 94.50	95.55	95.60	0.00
Weir Coeff.	= 3.33	3.33	2.60	3.33
Weir Type	= Rect	Rect	Broad	---
Multi-Stage	= Yes	Yes	No	No

Exfil.(in/hr) = 0.000 (by Wet area)

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).



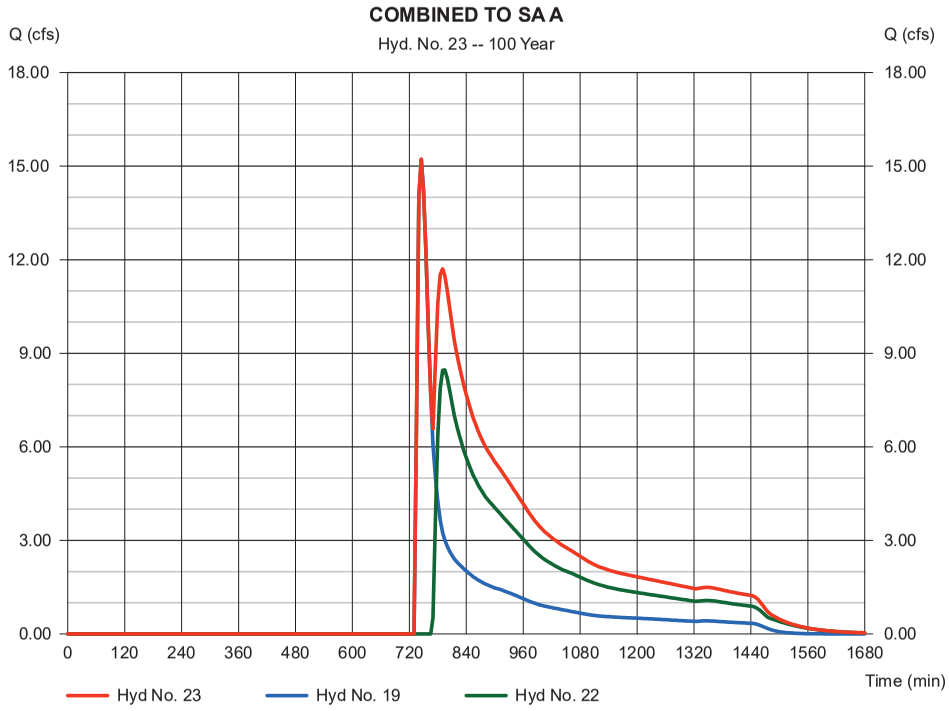
Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Nov 11, 2020

Hyd. No. 23

COMBINED TO SA A

Hydrograph type	= Combine	Peak discharge	= 15.22 cfs
Storm frequency	= 100 yrs	Time to peak	= 745 min
Time interval	= 5 min	Hyd. volume	= 170,941 cuft
Inflow hyds.	= 19, 22	Contrib. drain. area	= 0.000 ac



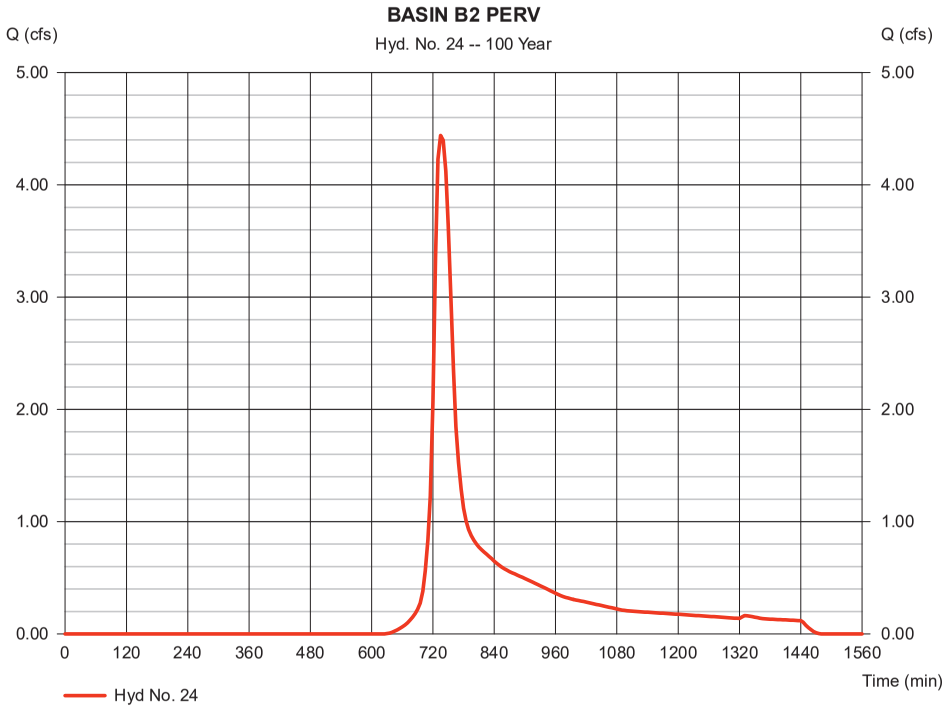
Hydrograph Report

Hyd. No. 24

BASIN B2 PERV

Hydrograph type	= SCS Runoff	Peak discharge	= 4.440 cfs
Storm frequency	= 100 yrs	Time to peak	= 735 min
Time interval	= 5 min	Hyd. volume	= 24,462 cuft
Drainage area	= 2.200 ac	Curve number	= 52*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 10.00 min
Total precip.	= 8.94 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

* Composite (Area/CN) = [(0.300 x 61)] / 2.200

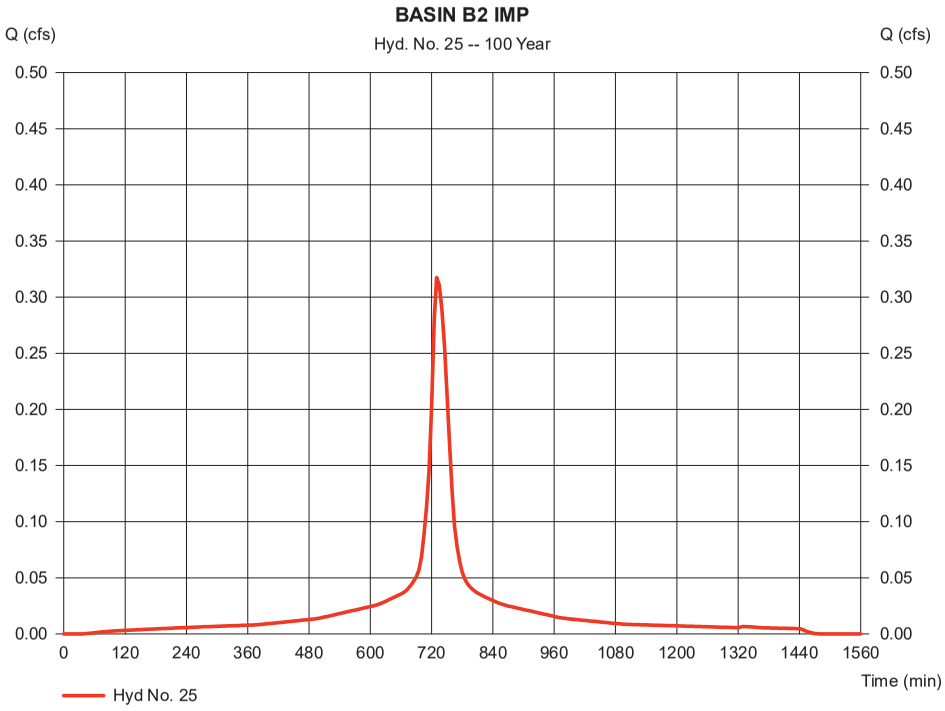


Hydrograph Report

Hyd. No. 25

BASIN B2 IMP

Hydrograph type	= SCS Runoff	Peak discharge	= 0.317 cfs
Storm frequency	= 100 yrs	Time to peak	= 730 min
Time interval	= 5 min	Hyd. volume	= 1,883 cuft
Drainage area	= 0.060 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 10.00 min
Total precip.	= 8.94 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

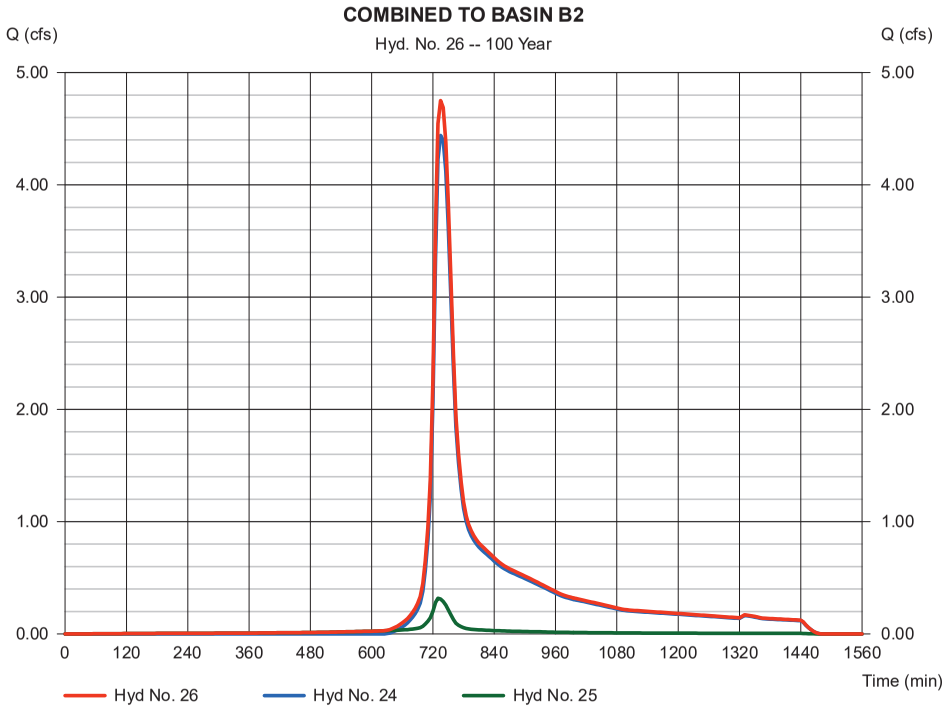


Hydrograph Report

Hyd. No. 26

COMBINED TO BASIN B2

Hydrograph type	= Combine	Peak discharge	= 4.750 cfs
Storm frequency	= 100 yrs	Time to peak	= 735 min
Time interval	= 5 min	Hyd. volume	= 26,345 cuft
Inflow hyds.	= 24, 25	Contrib. drain. area	= 2.260 ac

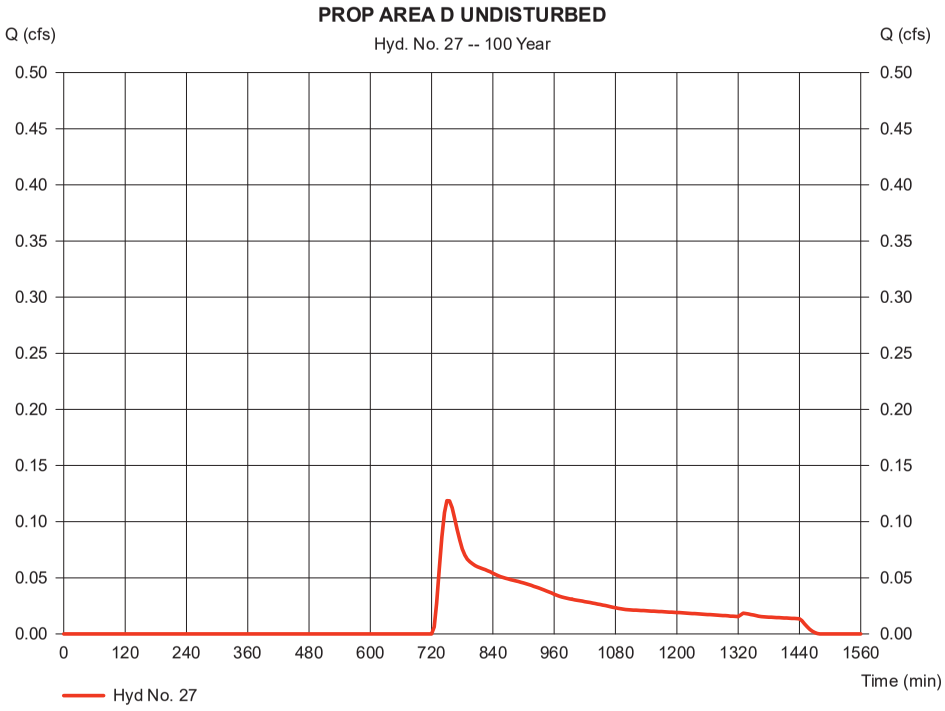


Hydrograph Report

Hyd. No. 27

PROP AREA D UNDISTURBED

Hydrograph type	= SCS Runoff	Peak discharge	= 0.119 cfs
Storm frequency	= 100 yrs	Time to peak	= 750 min
Time interval	= 5 min	Hyd. volume	= 1,435 cuft
Drainage area	= 0.603 ac	Curve number	= 30
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 10.00 min
Total precip.	= 8.94 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285



Hydrograph Report

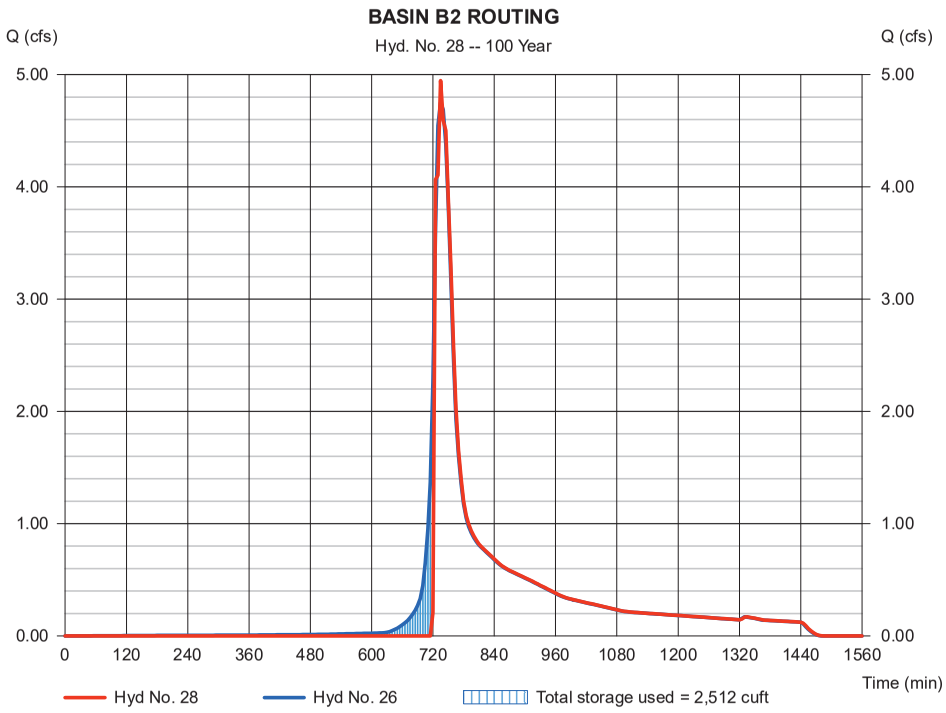
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Nov 11, 2020

Hyd. No. 28

BASIN B2 ROUTING

Hydrograph type	= Reservoir	Peak discharge	= 4.947 cfs
Storm frequency	= 100 yrs	Time to peak	= 735 min
Time interval	= 5 min	Hyd. volume	= 24,136 cuft
Inflow hyd. No.	= 26 - COMBINED TO BASIN B2	Max. Elevation	= 96.40 ft
Reservoir name	= Recharge Basin B2	Max. Storage	= 2,512 cuft

Storage Indication method used.



Pond Report

Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Nov 11, 2020

Pond No. 5 - Recharge Basin B2

Pond Data

Contours - User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 94.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	94.00	00	0	0
0.50	94.50	393	65	65
1.00	95.00	785	289	354
1.50	95.50	1,323	521	875
2.00	96.00	1,861	792	1,667
2.50	96.50	2,486	1,083	2,750

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 0.00	0.00	0.00	0.00
Span (in)	= 0.00	0.00	0.00	0.00
No. Barrels	= 0	0	0	0
Invert El. (ft)	= 0.00	0.00	0.00	0.00
Length (ft)	= 0.00	0.00	0.00	0.00
Slope (%)	= 0.00	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	No	No	No

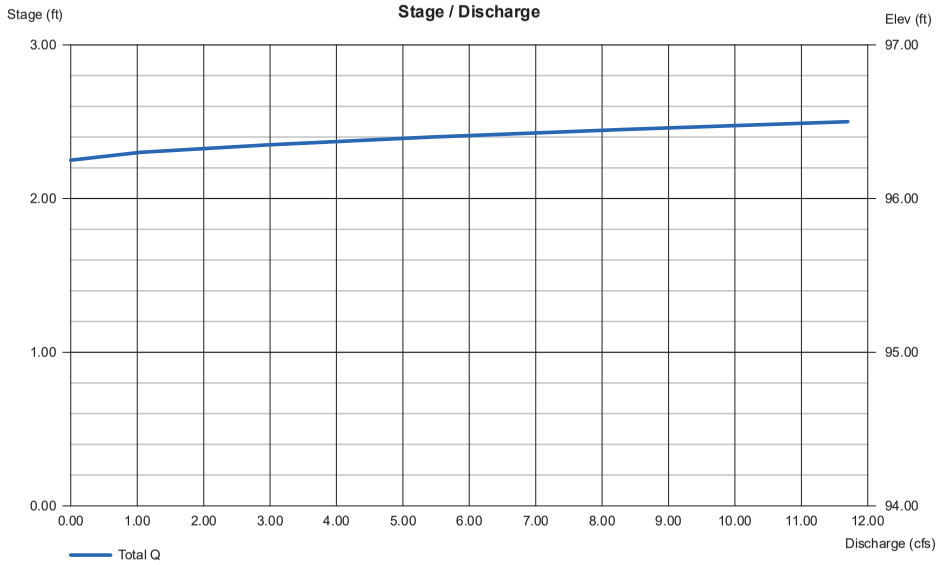
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 36.00	0.00	0.00	0.00
Crest El. (ft)	= 96.25	0.00	0.00	0.00
Weir Coeff.	= 2.60	3.33	3.33	3.33
Weir Type	= Broad	---	---	---
Multi-Stage	= No	No	No	No

Exfil.(in/hr) = 0.000 (by Wet area)

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).

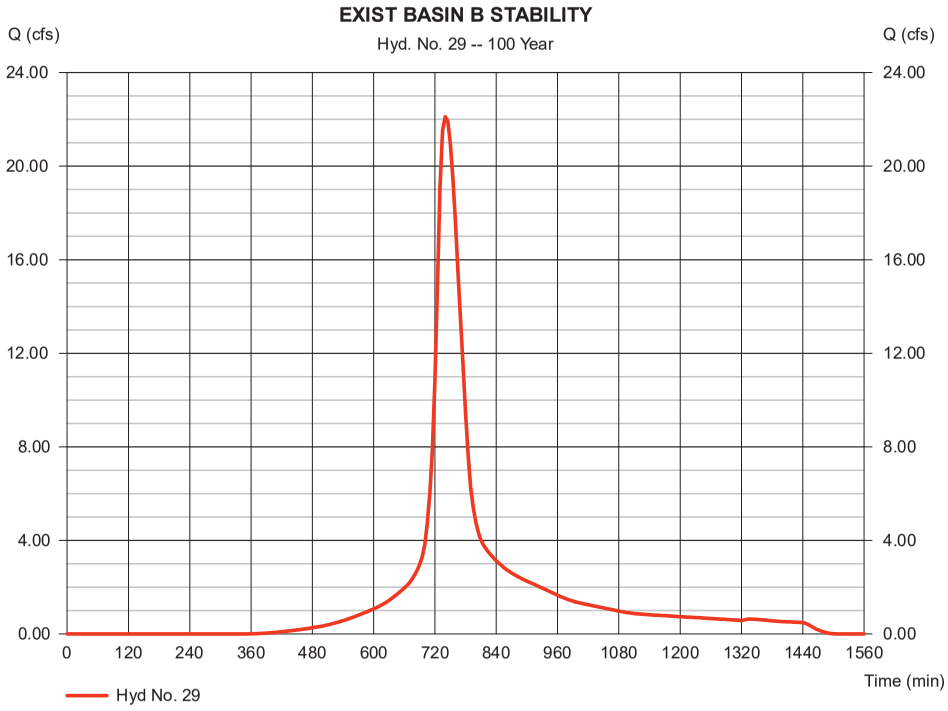


Hydrograph Report

Hyd. No. 29

EXIST BASIN B STABILITY

Hydrograph type	= SCS Runoff	Peak discharge	= 22.12 cfs
Storm frequency	= 100 yrs	Time to peak	= 740 min
Time interval	= 5 min	Hyd. volume	= 144,998 cuft
Drainage area	= 6.310 ac	Curve number	= 77
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 20.00 min
Total precip.	= 8.94 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285

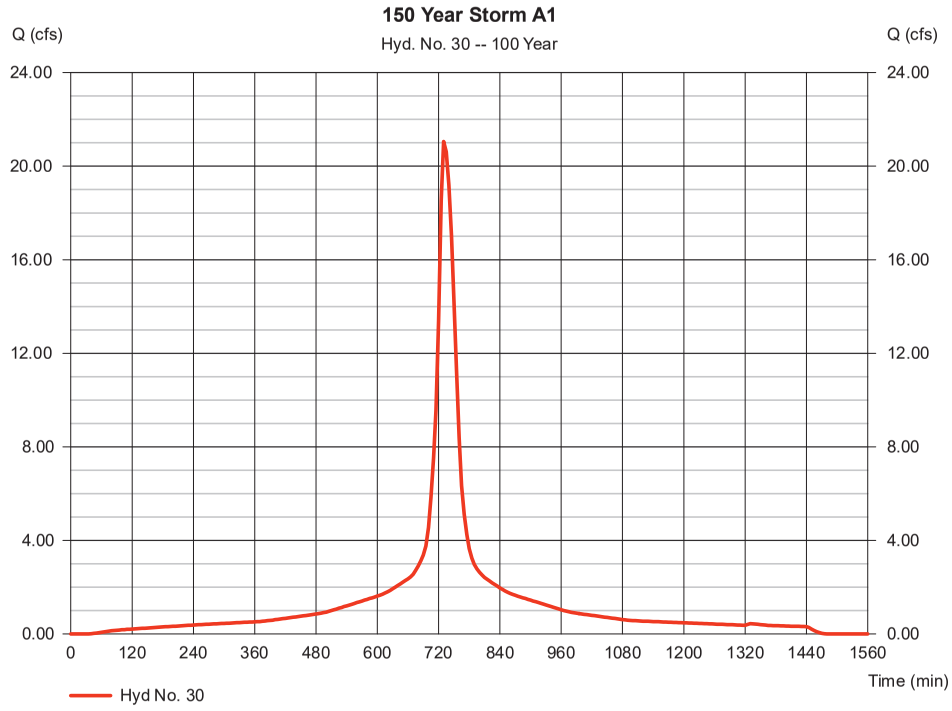


Hydrograph Report

Hyd. No. 30

150 Year Storm A1

Hydrograph type	= SCS Runoff	Peak discharge	= 21.06 cfs
Storm frequency	= 100 yrs	Time to peak	= 730 min
Time interval	= 5 min	Hyd. volume	= 124,892 cuft
Drainage area	= 3.980 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 10.00 min
Total precip.	= 8.94 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285



Hydrograph Report

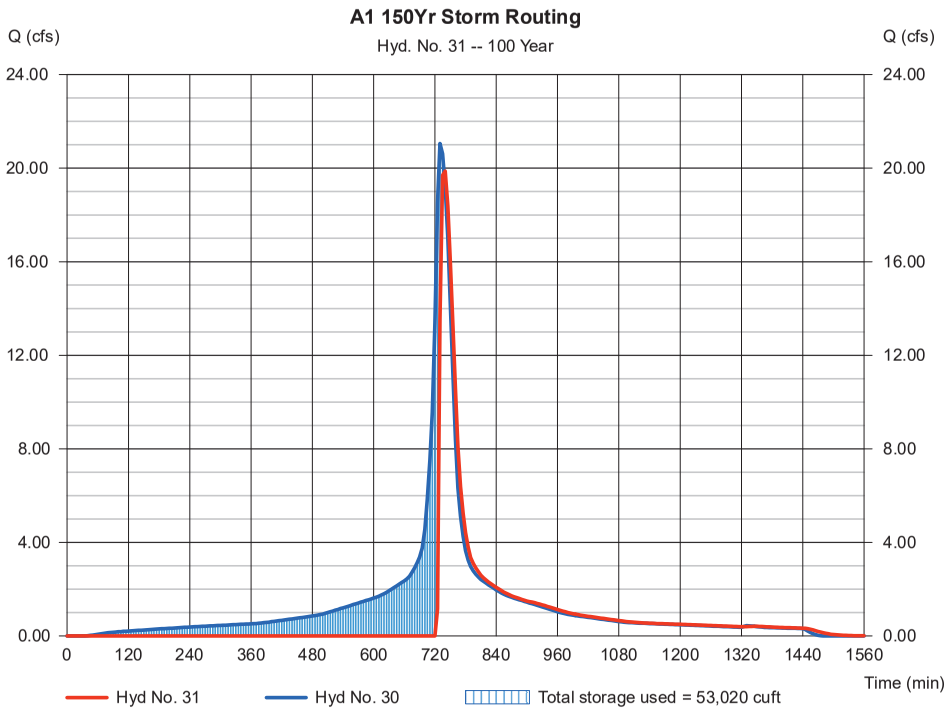
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Nov 11, 2020

Hyd. No. 31

A1 150Yr Storm Routing

Hydrograph type	= Reservoir	Peak discharge	= 19.87 cfs
Storm frequency	= 100 yrs	Time to peak	= 740 min
Time interval	= 5 min	Hyd. volume	= 78,242 cuft
Inflow hyd. No.	= 30 - 150 Year Storm A1	Max. Elevation	= 106.55 ft
Reservoir name	= Inf. Basin A1	Max. Storage	= 53,020 cuft

Storage Indication method used.



Pond Report

Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Nov 11, 2020

Pond No. 1 - Inf. Basin A1

Pond Data

Contours - User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 102.50 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	102.50	9,755	0	0
0.50	103.00	10,646	5,098	5,098
1.00	103.50	11,318	5,490	10,588
1.50	104.00	12,253	5,891	16,478
2.00	104.50	12,982	6,307	22,786
2.50	105.00	13,913	6,722	29,507
3.00	105.50	14,701	7,152	36,659
3.50	106.00	15,632	7,581	44,240
4.00	106.50	16,472	8,024	52,265
4.50	107.00	17,543	8,501	60,766
5.00	107.50	184,750	43,200	103,966

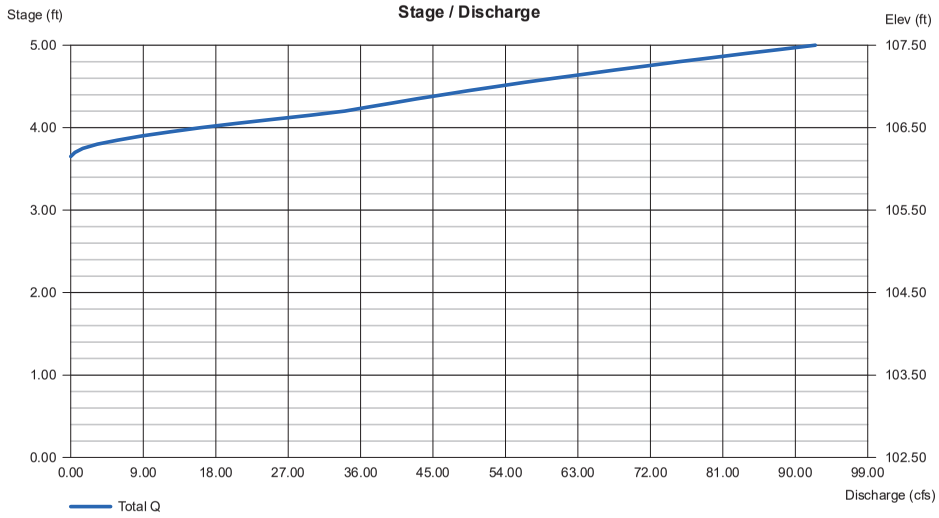
Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 18.00	Inactive	0.00	0.00
Span (in)	= 18.00	2.50	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 100.77	102.50	0.00	0.00
Length (ft)	= 147.00	0.00	0.00	0.00
Slope (%)	= 2.00	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)	Inactive	14.00	20.00	0.00
Crest El. (ft)	= 0.00	106.15	106.25	0.00
Weir Coeff.	= 3.33	3.33	2.60	3.33
Weir Type	= Rect	Rect	Broad	---
Multi-Stage	= Yes	Yes	No	No
Exfil.(in/hr)	= 0.000 (by Wet area)			
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).

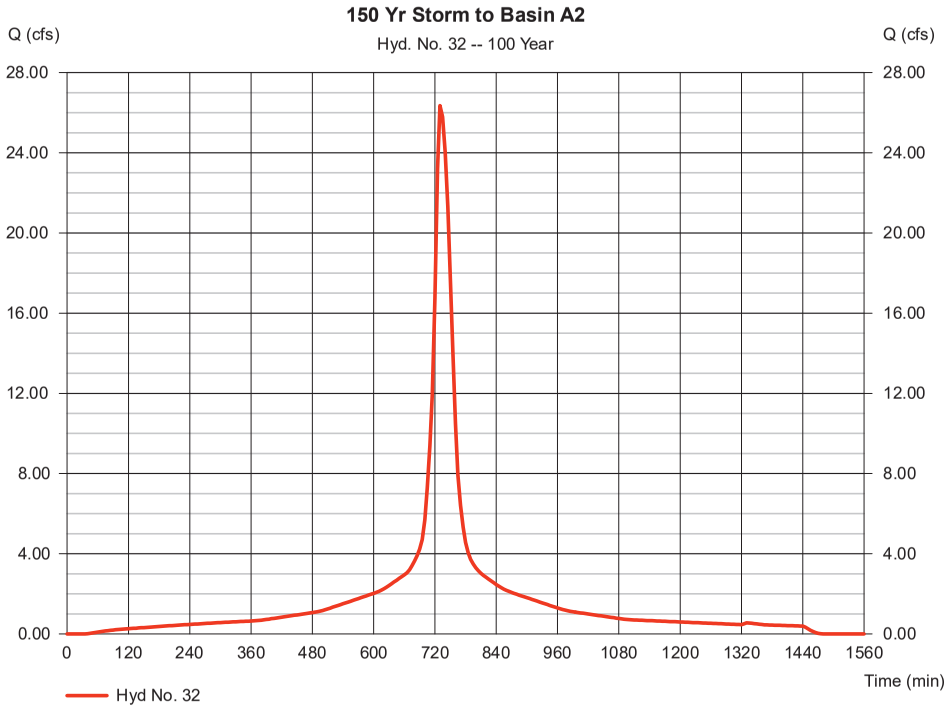


Hydrograph Report

Hyd. No. 32

150 Yr Storm to Basin A2

Hydrograph type	= SCS Runoff	Peak discharge	= 26.35 cfs
Storm frequency	= 100 yrs	Time to peak	= 730 min
Time interval	= 5 min	Hyd. volume	= 156,271 cuft
Drainage area	= 4.980 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 10.00 min
Total precip.	= 8.94 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285



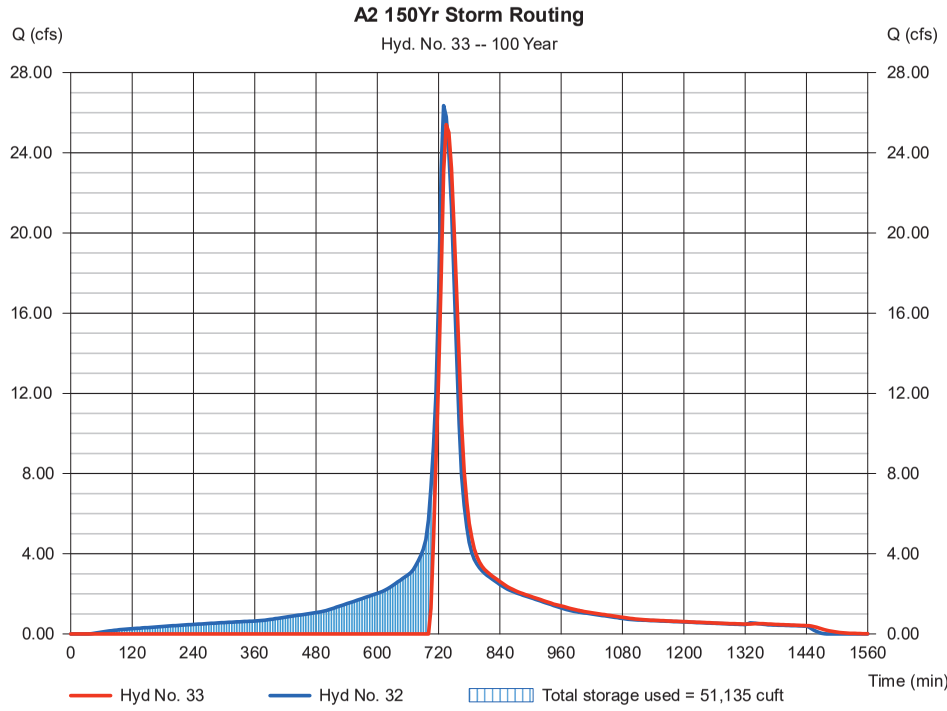
Hydrograph Report

Hyd. No. 33

A2 150Yr Storm Routing

Hydrograph type	= Reservoir	Peak discharge	= 25.41 cfs
Storm frequency	= 100 yrs	Time to peak	= 735 min
Time interval	= 5 min	Hyd. volume	= 113,778 cuft
Inflow hyd. No.	= 32 - 150 Yr Storm to Basin A2	Max. Elevation	= 97.66 ft
Reservoir name	= Det. Basin A2	Max. Storage	= 51,135 cuft

Storage Indication method used.



Pond Report

Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Nov 11, 2020

Pond No. 2 - Det. Basin A2

Pond Data

Contours - User-defined contour areas. Average end area method used for volume calculation. Begining Elevation = 91.50 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	91.50	00	0	0
0.50	92.00	244	61	61
1.00	92.50	1,238	371	432
1.50	93.00	2,231	867	1,299
2.00	93.50	6,961	2,298	3,597
2.50	94.00	10,801	4,441	8,037
3.00	95.50	13,315	6,029	14,066
3.50	96.00	15,829	7,286	21,352
4.00	96.50	19,404	8,808	30,161
4.50	97.00	15,829	8,808	38,969
5.00	97.50	19,404	8,808	47,777
5.50	98.00	23,674	10,770	58,547
6.00	97.50	28,715	13,097	71,644
6.50	98.00	33,756	15,618	87,262
7.00	98.50	35,449	17,301	104,563

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 18.00	Inactive	0.00	0.00
Span (in)	= 18.00	2.50	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 90.69	91.50	0.00	0.00
Length (ft)	= 44.00	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

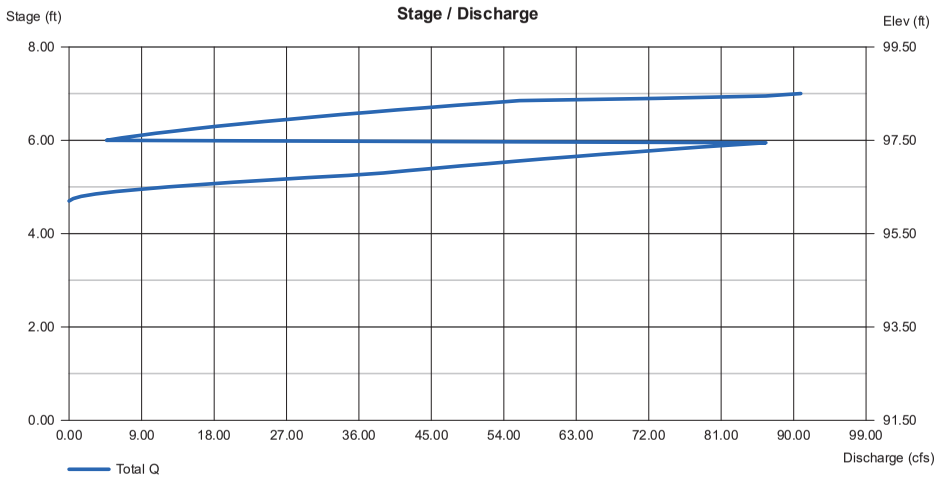
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	Inactive	14.00	20.00	0.00
Crest El. (ft)	= 96.10	97.20	97.30	0.00
Weir Coeff.	= 3.33	3.33	2.60	3.33
Weir Type	= Rect	Rect	Broad	---
Multi-Stage	= Yes	Yes	No	No

Exfil.(in/hr) = 0.000 (by Wet area)

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).



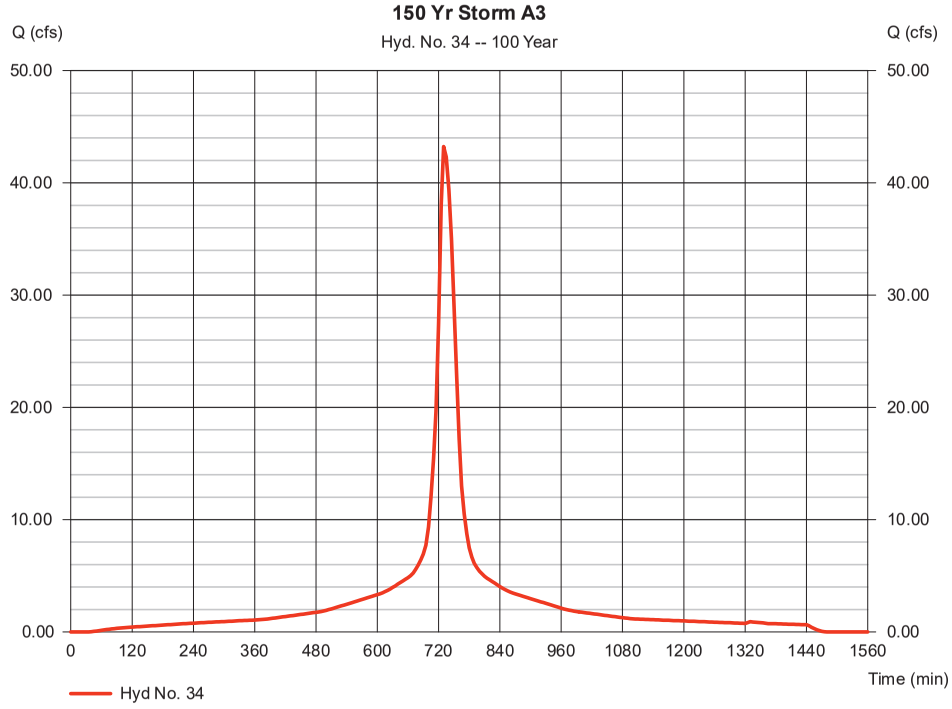
Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Nov 11, 2020

Hyd. No. 34

150 Yr Storm A3

Hydrograph type	= SCS Runoff	Peak discharge	= 43.23 cfs
Storm frequency	= 100 yrs	Time to peak	= 730 min
Time interval	= 5 min	Hyd. volume	= 256,373 cuft
Drainage area	= 8.170 ac	Curve number	= 98
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 10.00 min
Total precip.	= 8.94 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 285



Hydrograph Report

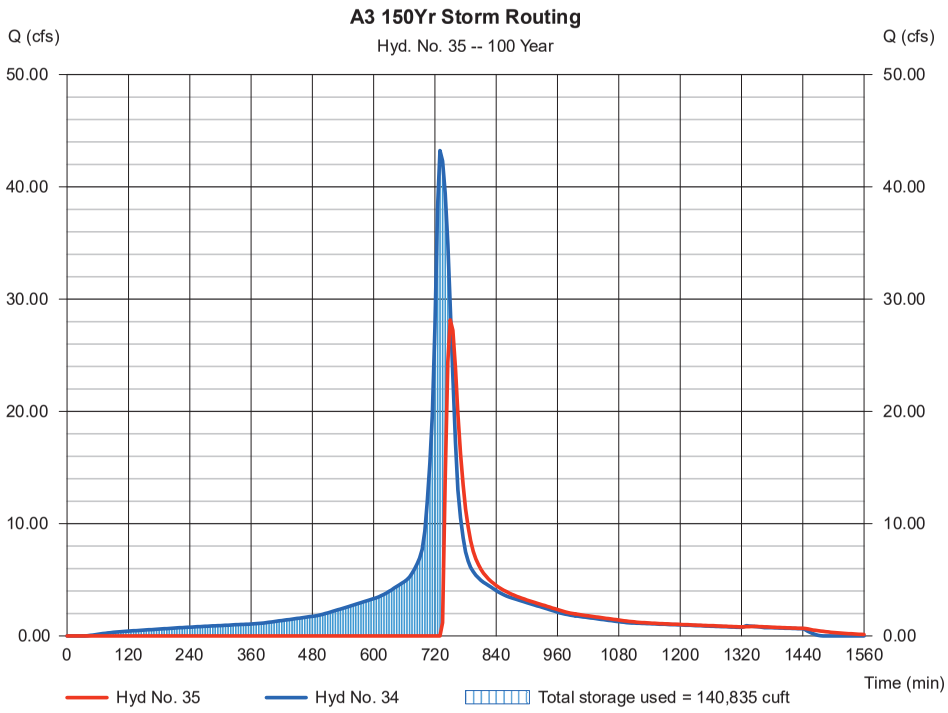
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Nov 11, 2020

Hyd. No. 35

A3 150Yr Storm Routing

Hydrograph type	= Reservoir	Peak discharge	= 28.15 cfs
Storm frequency	= 100 yrs	Time to peak	= 750 min
Time interval	= 5 min	Hyd. volume	= 135,850 cuft
Inflow hyd. No.	= 34 - 150 Yr Storm A3	Max. Elevation	= 96.01 ft
Reservoir name	= Det. Basin A3	Max. Storage	= 140,835 cuft

Storage Indication method used.



Pond Report

Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Nov 11, 2020

Pond No. 3 - Det. Basin A3

Pond Data

Contours - User-defined contour areas. Average end area method used for volume calculation. Begining Elevation = 91.15 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	91.15	00	0	0
0.35	91.50	1,788	313	313
0.85	92.00	13,579	3,842	4,155
1.35	92.50	21,050	8,657	12,812
1.85	93.00	28,520	12,393	25,204
2.35	93.50	32,690	15,303	40,507
2.85	94.00	36,859	17,387	57,894
3.35	94.50	39,201	19,015	76,909
3.85	95.00	41,542	20,186	97,095
4.35	95.50	43,314	21,214	118,309
4.85	96.00	45,086	22,100	140,409
5.35	96.50	46,864	22,988	163,396

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 18.00	Inactive	0.00	0.00
Span (in)	= 18.00	2.50	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 90.28	91.15	0.00	0.00
Length (ft)	= 62.00	0.50	0.00	0.00
Slope (%)	= 1.00	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	Yes	Yes	No

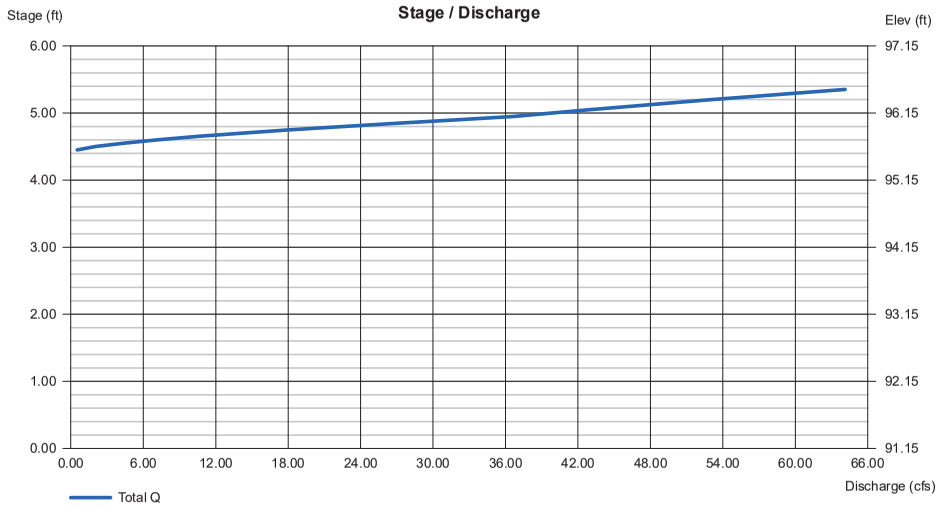
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	Inactive	14.00	20.00	0.00
Crest El. (ft)	= 94.50	95.55	95.60	0.00
Weir Coeff.	= 3.33	3.33	2.60	3.33
Weir Type	= Rect	Rect	Broad	---
Multi-Stage	= Yes	Yes	No	No

Exfil.(in/hr) = 0.000 (by Wet area)

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).



9. STORMWATER COLLECTION CALCULATION (PIPE SIZING)

DYNAMIC ENGINEERING

Stormwater Collection System Calculations

Project: Pallu Associates, LLC
Job #: 2841-99-001
Location: 7 Falson Lane, Marlboro, NJ
Design Storm: 25

Computed By: KS
Checked By: SRC
Date: 11/5/2020
Revised:

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

PIPE SECTION		SUBCATCH MENT 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)	Full Pipe Velocity (fps)	Actual Pipe Velocity (fps)
414	413	0.31	0.89	0.28	0.28	10.00	0.14	10.00	6.80	1.90	1.90	15	161.0	0.011	0.1000	24.13	19.67	6.86
413	412	0.33	0.90	0.30	0.58	10.00	0.34	10.14	6.80	2.04	3.94	18	142.0	0.011	0.0097	12.22	6.92	5.58
412	411	0.12	0.94	0.11	0.69	10.00	0.16	10.48	6.80	0.75	4.69	18	91.0	0.011	0.0186	16.93	9.59	7.18
411	MH409	0.48	0.87	0.42	1.11	10.00	0.25	10.64	6.68	2.81	7.41	18	129.0	0.011	0.0151	15.25	8.63	8.58
410	MH409	0.21	0.95	0.20	0.20	10.00	0.03	10.00	6.80	1.36	1.36	15	98.0	0.011	0.7100	64.30	52.42	7.40
514	513	0.45	0.87	0.39	0.39	10.00	0.55	10.00	6.80	2.65	2.65	15	205.0	0.011	0.0100	7.63	6.22	5.26
513	512	0.57	0.88	0.50	0.89	10.00	0.22	10.55	6.68	3.34	5.95	15	83.0	0.011	0.0100	7.63	6.22	7.10
512	511	0.30	0.88	0.26	1.15	10.00	0.04	10.77	6.68	1.74	7.68	15	131.0	0.011	1.0000	76.31	62.21	25.02
511	A2	0.57	0.85	0.48	1.63	10.00	0.25	10.81	6.68	3.21	10.89	18	131.0	0.011	0.0153	15.35	8.69	9.78
209	208	0.18	0.76	0.14	0.14	10.00	0.12	10.00	6.80	0.95	0.95	15	45.0	0.011	0.0100	7.63	6.22	2.81
208	207	0.04	0.35	0.01	0.15	10.00	0.22	10.12	6.80	0.07	1.02	15	82.0	0.011	0.0100	7.63	6.22	2.95
207	206	0.05	0.35	0.02	0.17	10.00	0.20	10.34	6.80	0.14	1.16	15	76.0	0.011	0.0100	7.63	6.22	3.22
206	205	0.03	0.35	0.01	0.18	10.00	0.31	10.54	6.68	0.07	1.20	15	115.0	0.011	0.0100	7.63	6.22	3.35
205	204	0.59	0.81	0.48	0.66	10.00	0.21	10.85	6.68	3.21	4.41	18	88.0	0.011	0.0100	12.41	7.03	6.03
204	203	0.41	0.85	0.35	1.01	10.00	0.16	11.06	6.56	2.30	6.63	18	133.0	0.011	0.0380	24.19	13.70	10.05
203	202	0.19	0.89	0.17	2.12	10.00	0.16	11.22	6.56	1.12	13.91	24	119.0	0.011	0.0210	38.73	12.33	10.58
202	A1	0.07	0.95	0.07	2.19	10.00	0.12	11.38	6.56	0.46	14.37	24	72.0	0.011	0.0145	32.19	10.25	9.81
115	114	0.99	0.35	0.35	0.35	10.00	0.16	10.00	6.80	2.38	2.38	18	114.0	0.011	0.0290	21.13	11.96	5.11
117	114	0.71	0.56	0.40	0.40	10.00	0.37	10.00	6.80	2.72	2.72	15	98.0	0.011	0.0050	5.40	4.40	4.41
116	114	1.96	0.42	0.82	0.82	10.00	0.38	10.00	6.80	5.58	5.58	18	112.0	0.011	0.0050	8.78	4.97	5.45
114	108	0.27	0.78	0.21	1.78	10.00	0.46	10.38	6.80	1.43	12.10	24	250.0	0.011	0.0113	28.41	9.05	8.47
113	108	0.33	0.88	0.29	0.29	10.00	0.45	10.00	6.80	1.97	1.97	15	168.0	0.011	0.0100	7.63	6.22	4.47
109	108	0.42	0.87	0.37	2.67	10.00	0.46	10.98	6.68	2.47	17.84	24	200.0	0.011	0.0074	22.99	7.32	8.36
108	MH107	0.95	0.87	0.83	5.57	10.00	0.21	11.44	6.56	5.44	36.54	36	104.0	0.011	0.0054	57.92	8.20	8.94
112	109	0.16	0.86	0.14	0.14	10.00	0.10	10.00	6.80	0.95	0.95	15	37.0	0.011	0.0100	7.63	6.22	2.81
407	B1	0.25	0.79	0.20	0.20	10.00	0.07	10.00	6.80	1.36	1.36	15	25.0	0.011	0.0100	7.63	6.22	3.60
MH409	B1	0.00	0.00	0.00	1.31	10.00	0.02	10.89	6.68	0.00	8.75	24	11.0	0.011	0.0101	26.86	8.55	7.01
MH107	A3	0.00	0.00	0.00	5.68	10.00	0.02	11.65	6.44	0.00	36.58	36	11.0	0.011	0.0057	59.51	8.42	9.10
508	MH507	0.47	0.92	0.43	0.61	10.00	0.14	10.60	6.68	2.87	4.07	15	38.0	0.011	0.0050	5.40	4.40	5.00
509	508	0.21	0.85	0.18	0.18	10.00	0.60	10.00	6.80	1.22	1.22	15	158.0	0.011	0.0050	5.40	4.40	2.95
212	211	0.28	0.85	0.24	0.48	10.00	0.24	10.01	6.80	1.63	3.26	15	63.0	0.011	0.0050	5.40	4.40	4.73
211	203	0.51	0.91	0.46	0.94	10.00	0.09	10.25	6.80	3.13	6.39	15	56.0	0.011	0.0300	13.22	10.78	10.61
MH507	A2	0.00	0.00	0.00	0.61	0.00	0.61	10.74	6.68	0.00	4.07	15	161.0	0.011	0.0050	5.40	4.40	5.00
RL14	MH107	0.12	0.95	0.11	0.11	10.00	0.15	10.00	6.80	0.75	0.75	8	40.0	0.010	0.0100	1.57	4.50	4.43
111	110	0.50	0.59	0.30	0.30	10.00	0.33	10.00	6.80	2.04	2.04	15	124.0	0.011	0.0100	7.63	6.22	4.57
110	109	2.70	0.69	1.86	2.16	10.00	0.65	10.33	6.80	12.65	14.69	24	234.0	0.011	0.0050	18.90	6.02	6.87

10.INLET AREA SUMMARY

DYNAMIC ENGINEERING

Inlet Area Summary and Average Coefficient (C) Calculations

Project: Pallu Associates, LLC
Job #: 2841-99-001
Location:Marlboro NJ

Computed By: KS
Checked By: SRC
Date: 11/5/2020

Drainage Area	Impervious Area (sf)	Coefficient (C) Used	Open Space/Woods Area for Soil Group B (SF)	Coefficient (C) Used	Average Coefficient (C) Used	Total Area (SF)	Total Area (acres)
414	12237	0.95	1302	0.35	0.89	13539	0.31
413	13164	0.95	1305	0.35	0.90	14469	0.33
411	16084	0.95	2688	0.35	0.86	18772	0.43
412	5384	0.95	58	0.35	0.94	5442	0.12
410	9320	0.95	0	0.35	0.95	9320	0.21
407	7869	0.95	2813	0.35	0.79	10682	0.25
514	16905	0.95	2690	0.35	0.87	19594	0.45
513	22452	0.95	4064	0.35	0.86	26516	0.61
512	11769	0.95	1454	0.35	0.88	13223	0.30
509	7684	0.95	1542	0.35	0.85	9227	0.21
508	19441	0.95	895	0.35	0.92	20336	0.47
511	20698	0.95	3936	0.35	0.85	24634	0.57
208	0	0.95	1549	0.35	0.35	1549	0.04
207	0	0.95	2369	0.35	0.35	2369	0.05
209	5519	0.95	2476	0.35	0.76	7996	0.18
206	0	0.95	1300	0.35	0.35	1300	0.03
205	19538	0.95	6092	0.35	0.81	25630	0.59
204	14662	0.95	3024	0.35	0.85	17686	0.41
203	7522	0.95	768	0.35	0.89	8290	0.19
202	3002	0.95	0	0.35	0.95	3002	0.07
210	13687	0.95	1919	0.35	0.88	15606	0.36
415	12875	0.95	1371	0.35	0.89	14246	0.33
111	8711	0.95	13225	0.35	0.59	21936	0.50
110	66948	0.95	50849	0.35	0.69	117797	2.70
112	5871	0.95	986	0.35	0.86	6857	0.16
109	16060	0.95	2301	0.35	0.87	18361	0.42
108	35865	0.95	5701	0.35	0.87	41565	0.95
113	12812	0.95	1669	0.35	0.88	14481	0.33
114	8497	0.95	3460	0.35	0.78	11956	0.27
117	11050	0.95	20003	0.35	0.56	31054	0.71
116	10248	0.95	75104	0.35	0.42	85352	1.96
212	10166	0.95	2063	0.35	0.85	12228	0.28
211	20820	0.95	1592	0.35	0.91	22413	0.51
107	5046	0.95	0	0.35	0.95	5046	0.12
115	0	0.95	43208	0.35	0.35	43208	0.99

11. NJGRS Spreadsheets

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
MONMOUTH CO., MARLBORO TWP	44.9	1.44

Project Name:	**Pallu Associates, LLC**
Description:	**Hyde Park Residential Develop.**
Analysis Date:	**11/05/20**

Pre-Developed Conditions

Land Segment	Area (acres)	TR-55 Land Cover	Soil	Annual Recharge (in)	Annual Recharge (cu.ft)
1	0.37	Woods	Atsion	0.0	-
2	0.51	Woods	Evesboro	14.7	27,224
3	9.2	Woods	Keyport	11.9	396,718
4	0.71	Brush	Keyport	13.3	34,354
5	7.1	Woods	Lakehurst	14.7	378,956
6	1.11	Brush	Lakehurst	15.3	61,724
7	5.2	Woods	Lakewood	14.7	277,726
8	0.42	Brush	Lakewood	15.3	23,333
9	1.52	Woods	Sassafras	13.5	74,477
10	0				
11	0				
12	0				
13	0				
14	0				
15	0				
Total =	26.1			Total Annual Recharge (in)	Total Annual Recharge (cu-ft)
				13.4	1,274,512

Post-Developed Conditions

Land Segment	Area (acres)	TR-55 Land Cover	Soil	Annual Recharge (in)	Annual Recharge (cu.ft)
1	12.04	Impervious areas	Lakewood	0.0	-
2	7.94	Open space	Sassafras	13.4	386,633
3	1.82	Woods	Lakewood	14.7	97,204
4	3.42	Woods	Keyport	11.9	147,476
5	0.48	Brush	Lakewood	15.3	26,666
6	0.37	Woods	Atsion	0.0	-
7	0				
8	0				
9	0				
10	0				
11	0				
12	0				
13	0				
14	0				
15	0				
Total =	26.1	Warning: make total area equal to Pre-Developed Conditions		Total Annual Recharge (in)	Total Annual Recharge (cu.ft)
				6.9	657,979

Annual Recharge Requirements Calculation ↓

% of Pre-Developed Annual Recharge to Preserve =	100%	Total Impervious Area (sq.ft)
		524,462
Post-Development Annual Recharge Deficit=	***616,533***	(cubic feet)

Recharge Efficiency Parameters Calculations (area averages)

RWC=	4.16	(in)	DRWC=	4.16	(in)
ERWC =	1.16	(in)	EDRWC=	1.16	(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.

Project Name	Description	Analysis Date	BMP or LID Type
Pallu Associates, LLC	Single Building Recharge	11/11/20	

Recharge BMP Input Parameters

Parameter	Symbol	Value	Unit
BMP Area	ABMP	400.0	sq.ft
BMP Effective Depth, this is the design variable	dBMP	23.0	in
Upper level of the BMP surface (negative if above ground)	dBMPu	12.0	in
Depth of lower surface of BMP, must be>=dBMPu	dEXC	60.0	in
Post-development Land Segment Location of BMP , Input Zero if Location is distributed or undetermined	SegBMP	0	unitless

Root Zone Water capacity Calculated Parameters

Parameter	Symbol	Value	Unit
Empty Portion of RWC under Post-D Natural Recharge	ERWC	0.99	in
ERWC Modified to consider dEXC	EDRWC	0.25	in
Empty Portion of RWC under Infilt. BMP	RERWC	0.20	in

Recharge Design Parameters

Parameter	Symbol	Value	Unit
Inches of Runoff to capture	Qdesign	0.87	in
Inches of Rainfall to capture	Pdesign	1.05	in
Recharge Provided Avg. over Imp. Area		28.2	in
Runoff Captured Avg. over imp. Area		28.8	in

BMP Calculated Size Parameters

ABMP/Aimp	Aratio	0.04	unitless
BMP Volume	VBMP	766	cu.ft

Parameters from Annual Recharge Worksheet

Post-D Deficit Recharge (or desired recharge volume)	Vdef	26,000	cu.ft
Post-D Impervious Area (or target Impervious Area)	Aimp	11,050	sq.ft
Root Zone Water Capacity	RWC	3.55	in
RWC Modified to consider dEXC	DRWC	0.90	in
Climatic Factor	C-factor	1.44	no units
Average Annual P	Pavg	44.9	in
Recharge Requirement over Imp. Area	dr	0.6	in

System Performance Calculated Parameters

Annual BMP Recharge Volume		26,000	cu.ft
Avg BMP Recharge Efficiency		98.0%	Represents % Infiltration Recharged
%Rainfall became Runoff		77.7%	%
%Runoff Infiltrated		82.5%	%
%Runoff Recharged		1.7%	%
%Rainfall Recharged		1.3%	%

CALCULATION CHECK MESSAGES

Volume Balance-> OK
dBMP Check---> OK
dEXC Check---> OK

BMP Location---> Location is selected as distributed or undetermined

OTHER NOTES

Pdesign is accurate only after BMP dimensions are updated to make rech volume= deficit volume. The portion of BMP infiltration prior to filling and the area occupied by BMP are ignored in these calculations. Results are sensetive to dBMP, make sure dBMP selected is small enough for BMP to empty in less than 3 days. For land Segment Location of BMP if you select "impervious areas" RWC will be minimal but not zero as determined by the soil type and a shallow root zone for this Land Cover allowing consideration of lateral flow and other losses.

How to solve for different recharge volumes: By default the spreadsheet assigns the values of total deficit recharge volume "Vdef" and total proposed impervious area "Aimp" from the "Annual Recharge" sheet to "Vdef" and "Aimp" on this page. This allows solution for a single BMP to handle the entire recharge requirement assuming the runoff from entire impervious area is available to the BMP.
To solve for a smaller BMP or a LID-IMP to recharge only part of the recharge requirement, set Vdef to your target value and Aimp to impervious area directly connected to your infiltration facility and then solve for ABMP or dBMP. To go back to the default configuration clik the "Default Vdef & Aimp" button.

Project Name	Description	Analysis Date	BMP or LID Type
Pallu Associates, LLC	Basin A1	11/05/20	

Recharge BMP Input Parameters

Parameter	Symbol	Value	Unit
BMP Area	ABMP	9200.0	sq.ft
BMP Effective Depth, this is the design variable	dBMP	12.0	in
Upper level of the BMP surface (negative if above ground)	dBMPu	-12.0	in
Depth of lower surface of BMP, must be>=dBMPu	dEXC	0.0	in
Post-development Land Segment Location of BMP , Input Zero if Location is distributed or undetermined	SegBMP	0	unitless

Root Zone Water capacity Calculated Parameters

Parameter	Symbol	Value	Unit
Empty Portion of RWC under Post-D Natural Recharge	ERWC	0.99	in
ERWC Modified to consider dEXC	EDRWC	0.99	in
Empty Portion of RWC under Infilt. BMP	RERWC	0.80	in

Recharge Design Parameters

Parameter	Symbol	Value	Unit
Inches of Runoff to capture	Qdesign	1.67	in
Inches of Rainfall to capture	Pdesign	1.90	in
Recharge Provided Avg. over Imp. Area		25.5	in
Runoff Captured Avg. over imp. Area		33.2	in

BMP Calculated Size Parameters

ABMP/Aimp	Aratio	0.13	unitless
BMP Volume	VBMP	9,184	cu.ft

CALCULATION CHECK MESSAGES

Volume Balance-> OK
dBMP Check---> OK
dEXC Check---> OK

BMP Location---> Location is selected as distributed or undetermined

Parameters from Annual Recharge Worksheet

Post-D Deficit Recharge (or desired recharge volume)	Vdef	148,500	cu.ft
Post-D Impervious Area (or target Impervious Area)	Aimp	70,000	sq.ft
Root Zone Water Capacity	RWC	3.55	in
RWC Modified to consider dEXC	DRWC	3.55	in
Climatic Factor	C-factor	1.44	no units
Average Annual P	Pavg	44.9	in
Recharge Requirement over Imp. Area	dr	3.4	in

System Performance Calculated Parameters

Annual BMP Recharge Volume		148,500	cu.ft
Avg BMP Recharge Efficiency		76.7%	Represents % Infiltration Recharged
%Rainfall became Runoff		77.7%	%
%Runoff Infiltrated		95.1%	%
%Runoff Recharged		9.7%	%
%Rainfall Recharged		7.6%	%

OTHER NOTES

Pdesign is accurate only after BMP dimensions are updated to make rech volume= deficit volume. The portion of BMP infiltration prior to filling and the area occupied by BMP are ignored in these calculations. Results are sensetive to dBMP, make sure dBMP selected is small enough for BMP to empty in less than 3 days. For land Segment Location of BMP if you select "impervious areas" RWC will be minimal but not zero as determined by the soil type and a shallow root zone for this Land Cover allowing consideration of lateral flow and other losses

How to solve for different recharge volumes: By default the spreadsheet assigns the values of total deficit recharge volume "Vdef" and total proposed impervious area "Aimp" from the "Annual Recharge" sheet to "Vdef" and "Aimp" on this page. This allows solution for a single BMP to handle the entire recharge requirement assuming the runoff from entire impervious area is available to the BMP.
To solve for a smaller BMP or a LID-IMP to recharge only part of the recharge requirement, set Vdef to your target value and Aimp to impervious area directly connected to your infiltration facility and then solve for ABMP or dBMP. To go back to the default configuration clik the "Default Vdef & Aimp" button.

12. RIP-RAP CALCULATIONS

DYNAMIC ENGINEERING

245 Main Street, Suite 110, Chester, NJ 07930
(908) 879-9229

Date: 10/28/2020
Project: Hyde Park
Project No: 2841-99-001

Calculated By: SMM
Checked By: SRC

Conduit Outlet Protection Calculations

Rip Rap Pad # 1

Design Parameters:

Design Storm Flow for 25 Year, Q	9.47	cfs
Vertical Dimension of Outlet Pipe, D_o	24	in
Horizontal Dimension of Outlet Pipe, W_o	24	in
Tailwater Depth, TW[1]	4.10	ft

Apron Dimension Calculations:

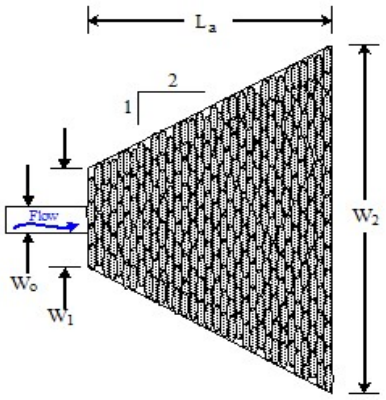
Unit Dicharge, $q = Q/D_o$ = 4.74 cfs per foot

- **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 =

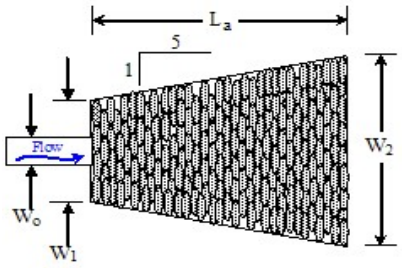


- **Case II: $TW \geq 1/2\ D_o$**

  Apron Length, $L_a = \frac{3q}{D_o^{1/2}}$ = 10.04 ft or L_a = **11 ft**

  Width, $W_1 = 3W_o$ = 6. ft or W_1 = **6 ft**

  Width, $W_2 = 3W_o + 0.4L_a$ = 10.02 ft or W_2 = **11 ft**



Rip Rap Stone Size Calculations:

Median Stone, $d_{50} = \frac{0.02q^{1.33}}{TW}$ = 0.46 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 $1/4W_o$.

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Conduit Outlet Protection Calculations

Rip Rap Pad # 2

Design Parameters:

Design Storm Flow for 25 Year, Q	3.85	cfs
Vertical Dimension of Outlet Pipe, D_o	18	in
Horizontal Dimension of Outlet Pipe, W_o	18	in
Tailwater Depth, TW[1]	5.15	ft

Apron Dimension Calculations:

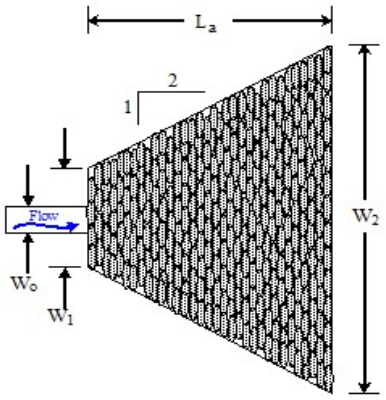
Unit Dicharge, $q = Q/D_o$ = 2.57 cfs per foot

- **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 =

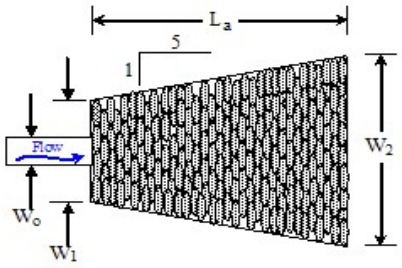


- **Case II: $TW \geq 1/2\ D_o$**

  Apron Length, $L_a = \frac{3q}{D_o^{1/2}}$ = 6.28 ft or L_a = **7 ft**

  Width, $W_1 = 3W_o$ = 4.5 ft or W_1 = **5 ft**

  Width, $W_2 = 3W_o + 0.4L_a$ = 7.01 ft or W_2 = **8 ft**



Rip Rap Stone Size Calculations:

Median Stone, $d_{50} = \frac{0.02q^{1.33}}{TW}$ = 0.16 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 $1/4W_o$.

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Conduit Outlet Protection Calculations

Rip Rap Pad # 3

Design Parameters:

Design Storm Flow for 25 Year, Q	11.08	cfs
Vertical Dimension of Outlet Pipe, D_o	15	in
Horizontal Dimension of Outlet Pipe, W_o	15	in
Tailwater Depth, TW[1]	0.74	ft

Apron Dimension Calculations:

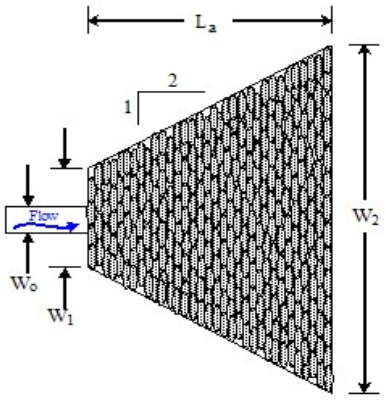
Unit Dicharge, $q = Q/D_o$ = 8.86 cfs per foot

- **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 =

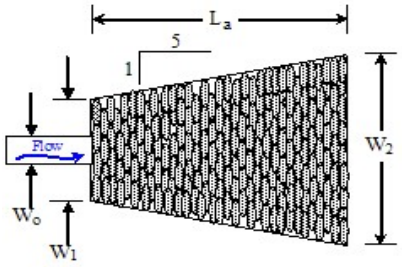


- **Case II: $TW \geq 1/2\ D_o$**

  Apron Length, $L_a = \frac{3q}{D_o^{1/2}}$ = 23.78 ft or L_a = **24 ft**

  Width, $W_1 = 3W_o$ = 3.75 ft or W_1 = **4 ft**

  Width, $W_2 = 3W_o + 0.4L_a$ = 13.26 ft or W_2 = **14 ft**



Rip Rap Stone Size Calculations:

Median Stone, $d_{50} = \frac{0.02q^{1.33}}{TW}$ = 5.91 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 $1/4W_o$.

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Conduit Outlet Protection Calculations

Rip Rap Pad # 4

Design Parameters:

Design Storm Flow for 25 Year, Q	2.38	cfs
Vertical Dimension of Outlet Pipe, D_o	15	in
Horizontal Dimension of Outlet Pipe, W_o	15	in
Tailwater Depth, TW[1]	0.74	ft

Apron Dimension Calculations:

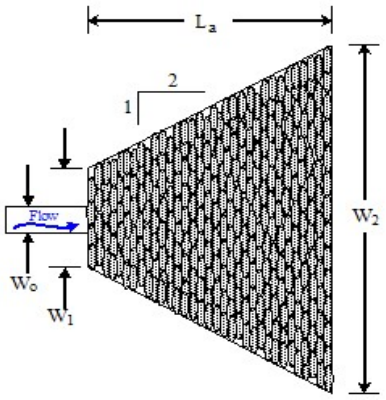
Unit Dicharge, $q = Q/D_o$ = 1.90 cfs per foot

- **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 =

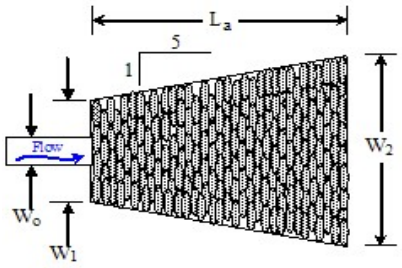


- **Case II: $TW \geq 1/2\ D_o$**

  Apron Length, $L_a = \frac{3q}{D_o^{1/2}}$ = 5.11 ft or L_a = **6 ft**

  Width, $W_1 = 3W_o$ = 3.75 ft or W_1 = **4 ft**

  Width, $W_2 = 3W_o + 0.4L_a$ = 5.79 ft or W_2 = **6 ft**



Rip Rap Stone Size Calculations:

Median Stone, $d_{50} = \frac{0.02q^{1.33}}{TW}$ = 0.76 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

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Conduit Outlet Protection Calculations

Rip Rap Pad # 5

Design Parameters:

Design Storm Flow for 25 Year, Q	8.91	cfs
Vertical Dimension of Outlet Pipe, D_o	24	in
Horizontal Dimension of Outlet Pipe, W_o	24	in
Tailwater Depth, TW[1]	2.03	ft

Apron Dimension Calculations:

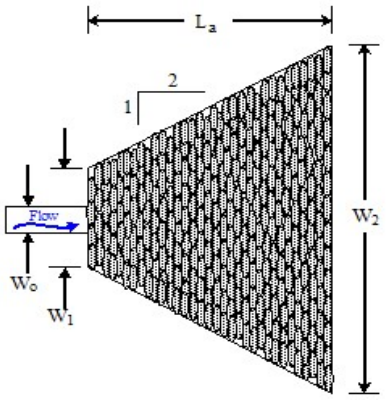
Unit Dicharge, $q = Q/D_o$ = 4.46 cfs per foot

- **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 =

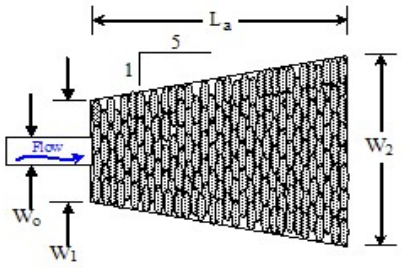


- **Case II: $TW \geq 1/2\ D_o$**

  Apron Length, $L_a = \frac{3q}{D_o^{1/2}}$ = 9.45 ft or L_a = **10 ft**

  Width, $W_1 = 3W_o$ = 6. ft or W_1 = **6 ft**

  Width, $W_2 = 3W_o + 0.4L_a$ = 9.78 ft or W_2 = **10 ft**



Rip Rap Stone Size Calculations:

Median Stone, $d_{50} = \frac{0.02q^{1.33}}{TW}$ = 0.86 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.
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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 $1/4W_o$.

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Conduit Outlet Protection Calculations

Rip Rap Pad # 6

Design Parameters:

Design Storm Flow for 25 Year, Q	1.36	cfs
Vertical Dimension of Outlet Pipe, D_o	15	in
Horizontal Dimension of Outlet Pipe, W_o	15	in
Tailwater Depth, TW[1]	5.80	ft

Apron Dimension Calculations:

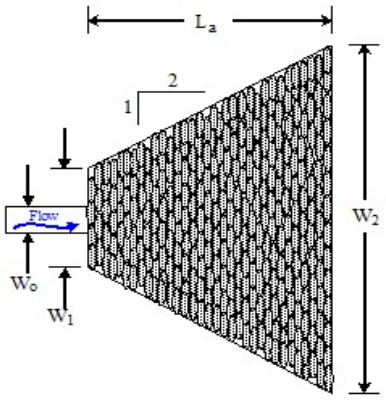
Unit Dicharge, $q = Q/D_o$ = 1.09 cfs per foot

- **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 =

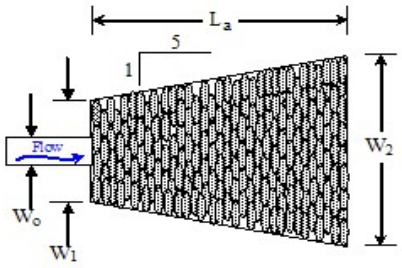


- **Case II: $TW \geq 1/2\ D_o$**

  Apron Length, $L_a = \frac{3q}{D_o^{1/2}}$ = 2.92 ft or L_a = **6 ft**

  Width, $W_1 = 3W_o$ = 3.75 ft or W_1 = **4 ft**

  Width, $W_2 = 3W_o + 0.4L_a$ = 4.92 ft or W_2 = **6 ft**



Rip Rap Stone Size Calculations:

Median Stone, $d_{50} = \frac{0.02q^{1.33}}{TW}$ = 0.05 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 $1/4W_o$.

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Checked By: SRC

Conduit Outlet Protection Calculations

Rip Rap Pad # 7

Design Parameters:

Design Storm Flow for 25 Year, Q	5.06	cfs
Vertical Dimension of Outlet Pipe, D_o	18	in
Horizontal Dimension of Outlet Pipe, W_o	18	in
Tailwater Depth, TW[1]	3.00	ft

Apron Dimension Calculations:

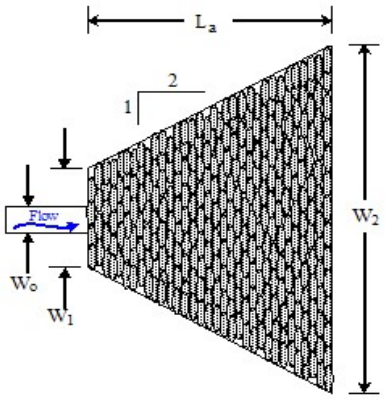
Unit Dicharge, $q = Q/D_o$ = 3.37 cfs per foot

- **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 =

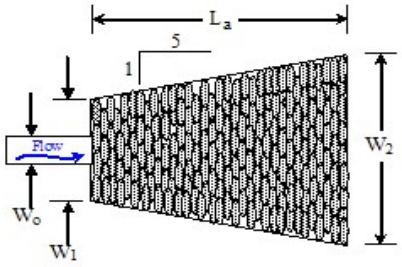


- **Case II: $TW \geq 1/2\ D_o$**

  Apron Length, $L_a = \frac{3q}{D_o^{1/2}}$ = 8.26 ft or L_a = **9 ft**

  Width, $W_1 = 3W_o$ = 4.5 ft or W_1 = **5 ft**

  Width, $W_2 = 3W_o + 0.4L_a$ = 7.81 ft or W_2 = **8 ft**



Rip Rap Stone Size Calculations:

Median Stone, $d_{50} = \frac{0.02q^{1.33}}{TW}$ = 0.40 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

245 Main Street, Suite 110, Chester, NJ 07930
(908) 879-9229

Date: 10/28/2020
Project: Hyde Park
Project No: 2841-99-001

Calculated By: SMM
Checked By: SRC

Conduit Outlet Protection Calculations

Rip Rap Pad # 8

Design Parameters:

Design Storm Flow for 25 Year, Q	39.93	cfs
Vertical Dimension of Outlet Pipe, D_o	36.00	in
Horizontal Dimension of Outlet Pipe, W_o	36.00	in
Tailwater Depth, TW[1]	0.54	ft

Apron Dimension Calculations:

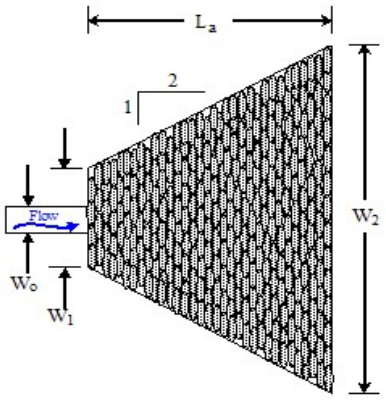
Unit Dicharge, $q = Q/D_o$ = 13.31 cfs per foot

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

Apron Length, $L_a = \frac{1.8q}{D_o^{1/2}} + 7D_o$ = 34.83 ft or **L_a = 35 ft**

Width, $W_1 = 3W_o$ = 9. ft or **W_1 = 9 ft**

Width, $W_2 = 3W_o + L_a$ = 43.83 ft or **W_2 = 44 ft**

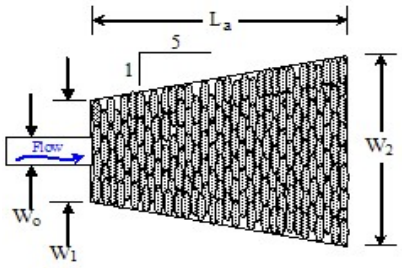


- **Case II: $TW \geq 1/2\ D_o$**

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

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

Width, $W_2 = 3W_o + 0.4L_a$ = **W_2 =**



Rip Rap Stone Size Calculations:

Median Stone, $d_{50} = \frac{0.02q^{1.33}}{TW}$ = ###### **d_{50} = 14 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

245 Main Street, Suite 110, Chester, NJ 07930
(908) 879-9229

Date: 10/28/2020
Project: Hyde Park
Project No: 2841-99-001

Calculated By: SMM
Checked By: SRC

Conduit Outlet Protection Calculations

Rip Rap Pad # 9

Design Parameters:

Design Storm Flow for 25 Year, Q	1.87	cfs
Vertical Dimension of Outlet Pipe, D_o	18	in
Horizontal Dimension of Outlet Pipe, W_o	18	in
Tailwater Depth, TW[1]	3.00	ft

Apron Dimension Calculations:

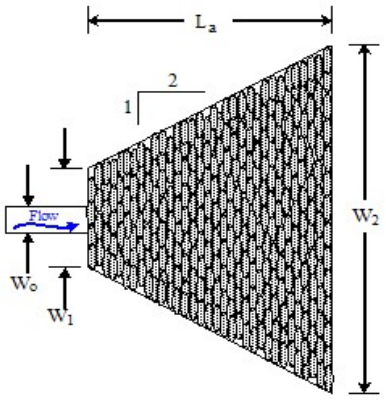
Unit Dicharge, $q = Q/D_o$ = 1.25 cfs per foot

- **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 =

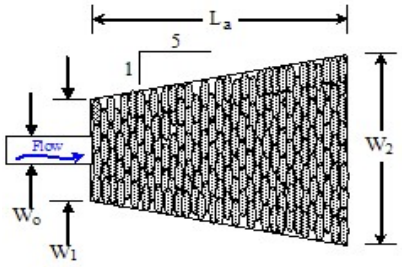


- **Case II: $TW \geq 1/2\ D_o$**

  Apron Length, $L_a = \frac{3q}{D_o^{1/2}}$ = 3.05 ft or L_a = **6 ft**

  Width, $W_1 = 3W_o$ = 4.5 ft or W_1 = **5 ft**

  Width, $W_2 = 3W_o + 0.4L_a$ = 5.72 ft or W_2 = **6 ft**



Rip Rap Stone Size Calculations:

Median Stone, $d_{50} = \frac{0.02q^{1.33}}{TW}$ = 0.11 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 $1/4W_o$.

13. CLASS IV DAM CALCULATIONS

DYNAMIC ENGINEERING

Class IV Dam Calculations

Project: Pallu Associates, LLC
Job #: 2841-99-001
Location: Texas Road and Wooleytown Road
Date: 11/5/2020

Basin	Basin Bottom	Outlet Elev.	Emergency Spillway Elev.	Outlet Pipe Length	Outlet Pipe Slope	Dam Height (ft)	100 -yr Elev.	100-yr Inflow (cfs)	100-yr Plug Elev.	150% 100-yr Plug (cfs)	150% 100-yr Elev.	TOB Elev.
A1	103.00	100.77	106.25	114.00	2.90%	8.79	106.30	14.03	106.35	21.05	106.55	107.55
A2	91.50	90.69	97.30	38.00	1.21%	7.07	97.24	17.58	97.54	26.37	97.66	98.66
A3	91.15	90.28	95.60	129.00	1.00%	6.61	95.53	28.82	95.77	43.23	96.01	97.01
B1	101.00	100.93	104.00	36.00	0.50%	3.25	105.32	18.00	105.90	N/A	-	106.90

14. SWALE DESIGN

Waterway Analysis Input Values

TRAPEZOIDAL WATERWAY

BOTTOM WIDTH = 6.0 FEET

SIDE SLOPES = 3.0 TO 1
BOTTOM SLOPE = 2.00 PERCENT
MANNING'S N = 0.024

Waterway Computed Hydraulic Values

FLOW DEPTH (ft)	FLOW AREA (sq-ft)	FLOW WIDTH (ft)	WETTED PERIMETER (ft)	HYDRAULIC RADIUS	FLOW RATE (cfs)	FLOW VELOCITY (ft/s)	FROUDE NUMBER
0.05	0.31	6.30	6.32	0.05	0.4	1.17	0.93
0.06	0.37	6.36	6.38	0.06	0.5	1.31	0.96
0.07	0.43	6.42	6.44	0.07	0.6	1.45	0.98
0.08	0.50	6.48	6.51	0.08	0.8	1.58	1.00
0.09	0.56	6.54	6.57	0.09	1.0	1.70	1.02
0.10	0.63	6.60	6.63	0.09	1.1	1.82	1.04
0.11	0.70	6.66	6.70	0.10	1.3	1.94	1.06
0.12	0.76	6.72	6.76	0.11	1.6	2.05	1.07
0.13	0.83	6.78	6.82	0.12	1.8	2.15	1.08
0.14	0.90	6.84	6.89	0.13	2.0	2.25	1.10
0.15	0.97	6.90	6.95	0.14	2.3	2.35	1.11
0.16	1.04	6.96	7.01	0.15	2.5	2.45	1.12
0.17	1.11	7.02	7.08	0.16	2.8	2.54	1.13
0.18	1.18	7.08	7.14	0.16	3.1	2.63	1.14
0.19	1.25	7.14	7.20	0.17	3.4	2.72	1.15
0.20	1.32	7.20	7.26	0.18	3.7	2.81	1.16
0.21	1.39	7.26	7.33	0.19	4.0	2.89	1.17
0.22	1.47	7.32	7.39	0.20	4.4	2.98	1.17
0.23	1.54	7.38	7.45	0.21	4.7	3.06	1.18
0.24	1.61	7.44	7.52	0.21	5.1	3.14	1.19

Preferred range = 0.25 < Froude Number > 0.50 Smooth and tranquil flow : subcrit
Critical range = 0.90 < Froude Number > 1.10 Rough and turbulent flow : supercr

The probability for a hydraulic jump to occur is greatest in the critical range.
Critical flow is considered to occur when the Froude Number = 1.00 and
Flow depth = critical depth : Flow velocity = critical velocity

15. JELLYFISH MTD DETAIL AND NJDEP CERTIFICATION

DRAWING NOT TO BE USED FOR CONSTRUCTION

GENERAL NOTES:

1. ALL DIMENSIONS INDICATED ARE IN MILLIMETERS (INCHES) UNLESS OTHERWISE SPECIFIED.
2. JELLYFISH STRUCTURE INLET AND OUTLET PIPE SIZE AND ORIENTATION SHOWN FOR INFORMATIONAL PURPOSES ONLY.
3. UNLESS OTHERWISE NOTED, BYPASS INFRASTRUCTURE, SUCH AS ALL UPSTREAM DIVERSION STRUCTURES, CONNECTING STRUCTURES, OR PIPE CONDUITS CONNECTING TO COMPLETE THE JELLYFISH SYSTEM SHALL BE PROVIDED AND ADDRESSED SEPARATELY.
4. DRAWING FOR INFORMATION PURPOSES ONLY. REFER TO ENGINEER'S SITE/UTILITY PLAN FOR STRUCTURE ORIENTATION.
5. NO PRODUCT SUBSTITUTIONS SHALL BE ACCEPTED UNLESS SUBMITTED 10 DAYS PRIOR PROJECT BID DATE OR AS DIRECTED BY THE ENGINEER OF RECORD.

JELLYFISH STRUCTURE & DESIGN NOTES:

1. 762 MM Ø (30") MAINTENANCE ACCESS WALL TO BE USED FOR CLEANOUT AND ACCESS BELOW CARTRIDGE DECK.
2. CASTINGS OR DOORS OF THE JELLYFISH MANHOLE STRUCTURE TO EXTEND TO DESIGN FINISH GRADE. DEPTHS IN EXCESS OF 3.65 M (12') MAY REQUIRE THE DESIGN AND INSTALLATION OF INTERMEDIATE SAFETY GRATES OR OTHER STRUCTURAL ELEMENTS.
3. CASTINGS AND GRADE RINGS, OR DOORS AND DOOR RISERS, OR BOTH, SHALL BE GROUTED FOR WATERTIGHTNESS.
   STRUCTURE SHALL MEET AASHTO HS-20, ASSUMING EARTH COVER OF 0' - 3', AND GROUNDWATER ELEVATION AT, OR BELOW, THE OUTLET PIPE INVERT ELEVATION. ENGINEER OF RECORD TO CONFIRM ACTUAL GROUNDWATER ELEVATION. CASTINGS SHALL MEET AASHTO M306 LOAD RATING AND BE CAST WITH THE IMBRIUM LOGO.
4. ALL STRUCTURAL SECTIONS AND PARTS TO MEET OR EXCEED ASTM C-478, ASTM C-443, AND ASTM D-4097 CORRESPONDING TO AASHTO SPECIFICATIONS, AND ANY OTHER SITE OR LOCAL STANDARDS.
5. CONCRETE RISER SECTIONS FROM BOTTOM TO TOP WILL BE ADDED AS REQUIRED INCLUDING TRANSITION PIECES TO SMALLER DIAMETER RISERS FOR SURFACE ACCESSES WHERE WARRANTED BY SERVICING DEPTH.
6. IF MINIMUM DEPTH FROM TOP OF CARTRIDGE DECK TO BOTTOM OF STRUCTURAL TOP SLAB CANNOT BE ACHIEVED DUE TO PIPING INVERT ELEVATIONS OR OTHER SITE CONSTRAINTS. ALTERNATIVE HATCH CONFIGURATIONS MAY BE AVAILABLE. HATCH DOORS SHOULD BE SIZED TO PROVIDE FULL ACCESS ABOVE THE CARTRIDGES TO ACCOMMODATE MAINTENANCE.
7. STEPS TO BE APPROXIMATELY 330 MM (13") APART AND DIMENSIONS MUST MEET LOCAL STANDARDS. STEPS MUST BE INSTALLED AFTER CARTRIDGE DECK IS IN PLACE.
8. CONFIGURATION OF INLET AND OUTLET PIPE CAN VARY TO MEET SITE'S NEEDS.
9. IT IS THE RESPONSIBILITY OF OTHERS TO PROPERLY PROTECT THE TREATMENT DEVICE, AND KEEP THE DEVICE OFFLINE DURING CONSTRUCTION. FILTER CARTRIDGES SHALL NOT BE INSTALLED UNTIL THE PROJECT SITE IS CLEAN AND FREE OF DEBRIS, BY OTHERS. THE PROJECT SITE INCLUDES ANY SURFACE THAT CONTRIBUTES STORM DRAINAGE TO THE TREATMENT DEVICE. CARTRIDGES SHALL BE FURNISHED NEW, AT THE TIME OF FINAL ACCEPTANCE.
10. THIS DRAWING MUST BE VIEWED IN CONJUNCTION WITH THE STANDARD JELLYFISH SPECIFICATION, AND STORMWATER QUALITY FILTER TREATMENT JELLYFISH DOCUMENTS.

PEAK DIVERSION JELLYFISH DESIGN NOTES:

1. STRUCTURE SHALL MEET AASHTO HS-20 OR PER APPROVING JURISDICTION REQUIREMENTS; WHICHEVER IS MORE STRINGENT, ASSUMING EARTH COVER OF 0' - 3', AND GROUNDWATER ELEVATION AT, OR BELOW, THE OUTLET PIPE INVERT ELEVATION. ENGINEER OF RECORD TO CONFIRM ACTUAL GROUNDWATER ELEVATION. CASTINGS SHALL MEET AASHTO M306 LOAD RATING AND BE CAST WITH THE IMBRIUM LOGO.
2. STRUCTURE SHALL BE PRECAST CONCRETE CONFORMING TO ASTM C-478 AND AASHTO LOAD FACTOR DESIGN METHOD.
3. INLET HGL NOT TO EXCEED 6" BELOW THE TOP OF THE M.A.W. DURING THE PEAK DESIGN STORM, OR 10-YEAR STORM (WHICHEVER IS GREATER).
4. INLET PIPE INVERT ELEVATION VARIES FROM 1" TO 6" MAXIMUM ABOVE THE OUTLET PIPE INVERT.
5. OUTLET PIPE INVERT IS EQUAL TO THE CARTRIDGE DECK ELEVATION.
6. THE OUTLET PIPE DIAMETER FOR NEW INSTALLATIONS IS TO BE ONE PIPE SIZE LARGER THAN THE INLET PIPE AT EQUAL OR GREATER SLOPE.
7. THE DIFFERENCE IN THE INLET AND OUTLET PIPE ELEVATIONS FOR RETROFIT INSTALLATIONS TO EXISTING STORM DRAIN PIPES SHALL BE EQUAL TO THE SLOPE OVER THE DIAMETER OF THE MANHOLE; NOT THE EXCEED 6" IN VERTICAL DIFFERENTIAL BETWEEN INLET AND OUTLET PIPES.

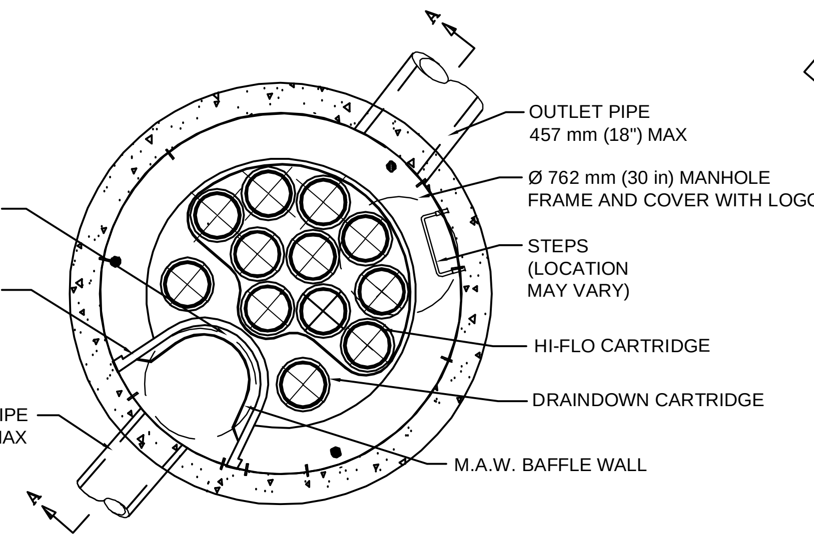
INSTALLATION NOTES

A. ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD.
B. CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE STRUCTURE (LIFTING CLUTCHES PROVIDED)
C. CONTRACTOR WILL INSTALL AND LEVEL THE STRUCTURE, SEALING THE JOINTS, LINE ENTRY AND EXIT POINTS (NON-SHRINK GROUT WITH APPROVED WATERSTOP OR FLEXIBLE BOOT)
D. CONTRACTOR TO TAKE APPROPRIATE MEASURES TO PROTECT CARTRIDGES FROM CONSTRUCTION-RELATED EROSION RUNOFF.
E. CARTRIDGE INSTALLATION, BY IMBRIUM, SHALL OCCUR ONLY AFTER SITE HAS BEEN STABILIZED AND THE JELLYFISH UNIT IS CLEAN AND FREE OF DEBRIS. CONTACT IMBRIUM TO COORDINATE CARTRIDGE INSTALLATION WITH SITE STABILIZATION.

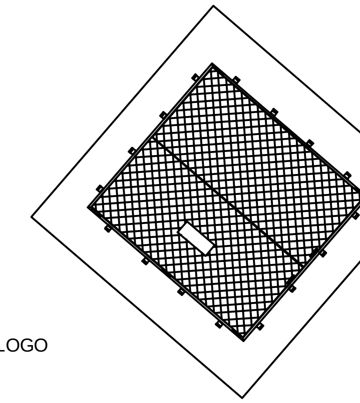
PEAK DIVERSION JELLYFISH RECOMMENDED PIPE DIAMETERS

MODEL DIAMETER (m)	MINIMUM ANGLE INLET/OUTLET PIPES	MINIMUM INLET PIPE DIAMETER (mm)	MAXIMUM INLET PIPE DIAMETER (mm)
1.2	62	150	300
1.8	59	200	300
2.4	52	250	375
3.0	48	300	450
3.6	40	300	450
CONTACT IMBRIUM SYSTEMS FOR ALTERNATE PIPE DIAMETERS			

FOR SITE SPECIFIC DRAWINGS PLEASE CONTACT YOUR LOCAL JELLYFISH FILTER REPRESENTATIVE. SITE SPECIFIC DRAWINGS ARE BASED ON THE BEST AVAILABLE INFORMATION AT THE TIME. SOME FIELD REVISIONS TO THE SYSTEM LOCATION OR CONNECTION PIPING MAY BE NECESSARY BASED ON AVAILABLE SPACE OR SITE CONFIGURATION REVISIONS. ELEVATIONS SHOULD BE MAINTAINED EXCEPT WHERE NOTED ON BYPASS STRUCTURE.

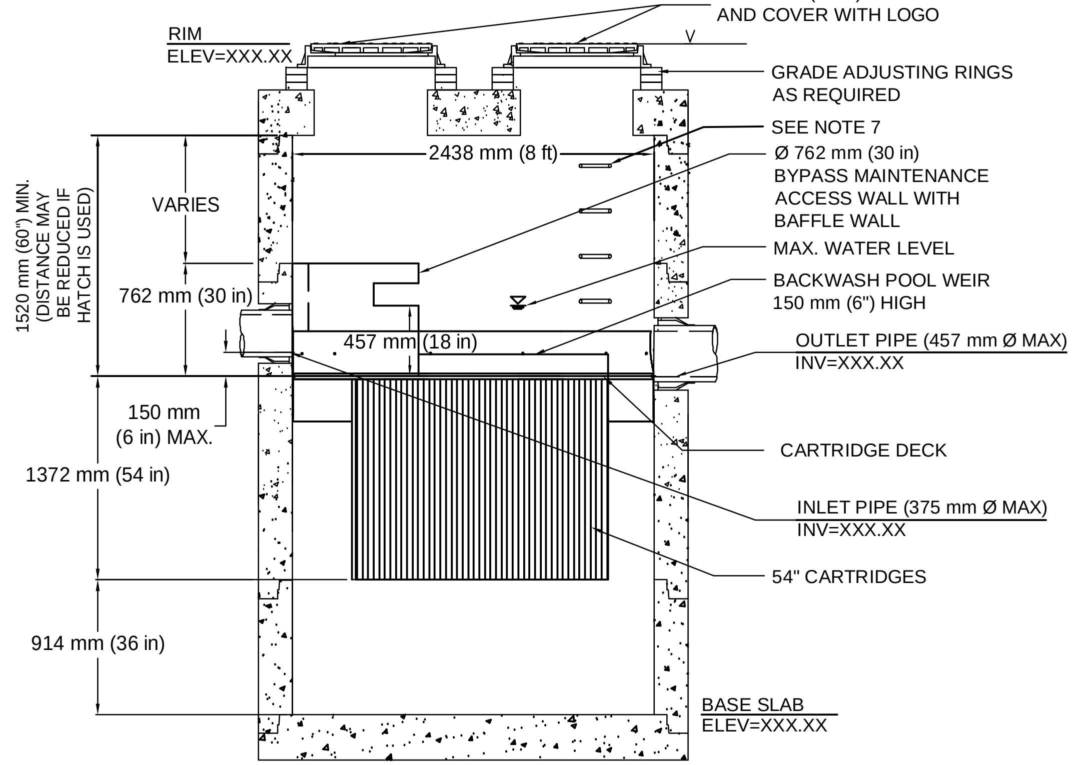


JF8 (PEAK DIVERSION) PLAN VIEW



1829 mm x 1829 mm (72 in. x 72 in.) OPTIONAL HATCH

XXX.XX INFORMATION TO BE SUPPLIED BY ENGINEER OF RECORD



JELLYFISH CROSS SECTION A-A

JELLYFISH DESIGN NOTES

JELLYFISH TREATMENT CAPACITY IS A FUNCTION OF THE CARTRIDGE SELECTION AND THE NUMBER OF CARTRIDGES. THE STANDARD MANHOLE STYLE IS SHOWN. Ø2438 mm (96") MANHOLE JELLYFISH PEAK TREATMENT CAPACITY IS 55.5 L/s (1.96 CFS), AND MAXIMUM BYPASS CAPACITY IS 141.6 L/s (5.00 CFS). IF THE SITE CONDITIONS EXCEED TOTAL CAPACITY, AN UPSTREAM BYPASS STRUCTURE IS REQUIRED. TREATMENT FLOW RATE IS BASED ON 457 MM (18") OF HEAD PRESSURE.

CARTRIDGE SELECTION				
CARTRIDGE DEPTH	54"	40"	27"	15"
OUTLET INVERT TO STRUCTURE BASE SLAB	90"	76"	63"	51"
FLOW RATE HIGH-FLO / DRAINDOWN (L/s) (per cart)	5.09 / 2.55	3.68 / 1.84	2.55 / 1.27	1.41 / 0.71
SEDIMENT CAPACITY HIGH-FLO / DRAINDOWN (kg) (per cart)	57 / 28	42 / 21	28 / 14	16 / 8
MAX. CARTS HIGH-FLO/DRAINDOWN	10 / 2			
MAX. BYPASS (L/s)	141.6			
MAX. SEDIMENT CAPACITY (kg)	626	462	308	176
MAX. TREATMENT (L/s)	55.5	41.6	27.7	15.3
MAX. TREATMENT AND BYPASS (L/s) (TOTAL CAPACITY)	197.1	183.2	169.3	156.9

SITE SPECIFIC DATA REQUIREMENTS

JELLYFISH MODEL	*
STRUCTURE ID	*
WATER QUALITY FLOW RATE (L/s)	*
BYPASS FLOW RATE (L/s)	*
PEAK FLOW RATE (L/s)	*
RETURN PERIOD OF PEAK FLOW (yrs)	*
# OF CARTRIDGES REQUIRED (HF / DD)	*
CARTRIDGE SIZE (inches)	*
MAX BYPASS DESIGN CAPACITY (L/s)	141.6

PIPE DATA:	I.E.	MAT'L	DIA	SLOPE %	HGL
INLET #1	*	*	*	*	*
INLET #2	*	*	*	*	*
OUTLET	*	*	*	*	*

* PER ENGINEER OF RECORD

MARK	DATE	REVISION DESCRIPTION	BY
#	#	#	#
#	#	#	#
#	#	#	#
#	#	#	#
0	4/15/2015	INTIAL RELEASE	BSF

Jellyfish

JF8 PEAK DIVERSION

Scale = 1:50

www.imbriumsystems.com

info@imbriumsystems.com

imbrium
407 FAIRVIEW DRIVE, WHITBY, ON L1N 3A9
TF 800-565-4801 CA 416-960-9900 INTL +1-416-960-9900

Jellyfish® Filter

DATE: ######	
DESIGNED:	DRAWN: BSF
CHECKED: BW	APPROVED: SP
PROJECT #: ######	
SHEET: 1 OF 2	

JELLYFISH® FILTER - SPECIFICATIONS

GENERAL

A. WORK INCLUDED: SPECIFIES REQUIREMENTS FOR CONSTRUCTION AND PERFORMANCE OF AN UNDERGROUND STORMWATER QUALITY, MEMBRANE FILTRATION, AND TREATMENT DEVICE THAT REMOVES POLLUTANTS FROM STORMWATER RUNOFF THROUGH THE UNIT OPERATIONS OF SEDIMENTATION, FLOATATION, AND MEMBRANE FILTRATION.

B. REFERENCE STANDARDS:

ASTM C 891:	SPECIFICATION FOR INSTALLATION OF UNDERGROUND PRECAST CONCRETE UTILITY STRUCTURES
ASTM C 478:	SPECIFICATION FOR PRECAST REINFORCED CONCRETE MANHOLE SECTIONS
ASTM C 990:	SPECIFICATION FOR JOINTS FOR CONCRETE MANHOLES USING PREFORMED FLEXIBLE JOINT SEALANTS
ASTM D 4101:	SPECIFICATION FOR COPOLYMER STEPS CONSTRUCTION

C. SHOP DRAWINGS: SHOP DRAWINGS FOR THE STRUCTURE AND PERFORMANCE ARE TO BE SUBMITTED WITH EACH ORDER TO THE CONTRACTOR. CONTRACTOR SHALL FORWARD SHOP DRAWING SUBMITTAL TO THE CONSULTING ENGINEER FOR APPROVAL. SHOP DRAWINGS ARE TO DETAIL THE STRUCTURE PRECAST CONCRETE AND CALL OUT OR NOTE THE FIBERGLASS (FRP) INTERNALS/COMPONENTS.

D. PRODUCT SUBSTITUTIONS: NO PRODUCT SUBSTITUTIONS SHALL BE ACCEPTED UNLESS SUBMITTED 10 DAYS PRIOR TO PROJECT BID DATE, OR AS DIRECTED BY THE ENGINEER OF RECORD. SUBMISSIONS FOR SUBSTITUTIONS REQUIRE REVIEW AND APPROVAL BY THE ENGINEER OF RECORD, FOR HYDRAULIC PERFORMANCE, IMPACT TO PROJECT DESIGNS, EQUIVALENT TREATMENT PERFORMANCE, AND ANY REQUIRED PROJECT PLAN AND REPORT (HYDROLOGY/HYDRAULIC, WATER QUALITY, STORMWATER POLLUTION) MODIFICATIONS THAT WOULD BE REQUIRED BY THE APPROVING JURISDICTIONS/AGENCIES. CONTRACTOR TO COORDINATE WITH THE ENGINEER OF RECORD ANY APPLICABLE MODIFICATIONS TO THE PROJECT ESTIMATES OF COST, BONDING AMOUNT DETERMINATIONS, PLAN CHECK FEES FOR CHANGES TO APPROVED DOCUMENTS, AND/OR ANY OTHER REGULATORY REQUIREMENTS RESULTING FROM THE PRODUCT SUBSTITUTION.

E. HANDLING AND STORAGE: PREVENT DAMAGE TO MATERIALS DURING STORAGE AND HANDLING.

PRODUCTS

A. THE DEVICE SHALL BE A CYLINDRICAL OR RECTANGULAR, ALL CONCRETE STRUCTURE (INCLUDING RISERS), CONSTRUCTED FROM PRECAST CONCRETE RISER AND SLAB COMPONENTS OR MONOLITHIC PRECAST STRUCTURE(S), INSTALLED TO CONFORM TO ASTM C 891 AND TO ANY REQUIRED STATE HIGHWAY, MUNICIPAL OR LOCAL SPECIFICATIONS; WHICHEVER IS MORE STRINGENT. THE DEVICE SHALL BE WATERTIGHT.

B. THE CYLINDRICAL CONCRETE DEVICE SHALL INCLUDE A FIBERGLASS CARTRIDGE DECK INSERT. THE RECTANGULAR CONCRETE DEVICE SHALL INCLUDE A COATED ALUMINUM INSERT. IN EITHER INSTANCE, THE INSERT SHALL BE BOLTED AND SEALED WATERTIGHT INSIDE THE PRECAST CONCRETE CHAMBER. THE INSERT SHALL SERVE AS: (A) A HORIZONTAL DIVIDER BETWEEN THE LOWER TREATMENT ZONE AND THE UPPER TREATED EFFLUENT ZONE; (B) A DECK FOR ATTACHMENT OF FILTER CARTRIDGES SUCH THAT THE MEMBRANE FILTER ELEMENTS OF EACH CARTRIDGE EXTEND INTO THE LOWER TREATMENT ZONE; (C) A PLATFORM FOR MAINTENANCE WORKERS TO SERVICE THE FILTER CARTRIDGES (MAXIMUM MANNED WEIGHT = 450 POUNDS); (D) A CONDUIT FOR CONVEYANCE OF TREATED WATER TO THE EFFLUENT PIPE.

C. MEMBRANE FILTER CARTRIDGES SHALL BE COMPRISED OF REUSABLE CYLINDRICAL MEMBRANE FILTER ELEMENTS CONNECTED TO A PERFORATED HEAD PLATE. THE NUMBER OF MEMBRANE FILTER ELEMENTS PER CARTRIDGE SHALL BE A MINIMUM OF ELEVEN 2.75-INCH (70-MM) OR GREATER DIAMETER ELEMENTS. THE LENGTH OF EACH FILTER ELEMENT SHALL BE A MINIMUM 15 INCHES (381 MM). EACH CARTRIDGE SHALL BE FITTED INTO THE CARTRIDGE DECK BY INSERTION INTO A CARTRIDGE RECEPTACLE THAT IS PERMANENTLY MOUNTED INTO THE CARTRIDGE DECK. EACH CARTRIDGE SHALL BE SECURED BY A CARTRIDGE LID THAT IS THREADED ONTO THE RECEPTACLE, OR SIMILAR MECHANISM TO SECURE THE CARTRIDGE INTO THE DECK. THE MAXIMUM TREATMENT FLOW RATE OF A FILTER CARTRIDGE SHALL BE CONTROLLED BY AN ORIFICE IN THE CARTRIDGE LID, OR ON THE INDIVIDUAL CARTRIDGE ITSELF, AND BASED ON A DESIGN FLUX RATE (SURFACE LOADING RATE) DETERMINED BY THE MAXIMUM TREATMENT FLOW RATE PER UNIT OF FILTRATION MEMBRANE SURFACE AREA. THE MAXIMUM FLUX RATE SHALL BE 0.21 GPM/FT2 (0.142 LPS/M2). EACH MEMBRANE FILTER CARTRIDGE SHALL ALLOW FOR MANUAL INSTALLATION AND REMOVAL.

D. ALL FILTER CARTRIDGES AND MEMBRANES SHALL BE REUSABLE AND ALLOW FOR THE USE OF FILTRATION MEMBRANE RINSING PROCEDURES TO RESTORE FLOW CAPACITY AND SEDIMENT CAPACITY; EXTENDING CARTRIDGE SERVICE LIFE.

E. ACCESS SHALL HAVE A MINIMUM CLEAR HEIGHT OF 60" OVER ALL OF THE FILTER CARTRIDGES, OR BE ACCESSIBLE BY A HATCH OR OTHER MECHANISM THAT PROVIDES MINIMUM 60" VERTICAL CLEAR SPACE OVER ALL OF THE FILTER CARTRIDGES. FILTER CARTRIDGES SHALL BE ABLE TO BE LIFTED STRAIGHT VERTICALLY OUT OF THE RECEPTACLES AND DECK FOR THE ENTIRE LENGTH OF THE CARTRIDGE.

F. THE DEVICE SHALL INCLUDE A MINIMUM 24 INCHES (610 MM) OF SUMP BELOW THE BOTTOM OF THE CARTRIDGES FOR SEDIMENT ACCUMULATION, UNLESS OTHERWISE SPECIFIED BY THE DESIGN ENGINEER. DEPTHS LESS THAN 24" MAY HAVE AN IMPACT ON THE TOTAL PERFORMANCE AND/OR LONGEVITY BETWEEN CARTRIDGE MAINTENANCE/REPLACEMENT OF THE DEVICE.

G. ALL PRECAST CONCRETE COMPONENTS SHALL BE MANUFACTURED TO A MINIMUM LIVE LOAD OF HS-20 TRUCK LOADING OR GREATER BASED ON LOCAL REGULATORY SPECIFICATIONS, UNLESS OTHERWISE MODIFIED OR SPECIFIED BY THE DESIGN ENGINEER, AND SHALL BE WATERTIGHT.

H. GASKETS AND/OR SEALANTS TO PROVIDE WATER TIGHT SEAL BETWEEN CONCRETE JOINTS. JOINTS SHALL BE SEALED WITH PREFORMED JOINT SEALING COMPOUND CONFORMING TO ASTM C 990.

I. FRAME AND COVERS MUST BE MANUFACTURED FROM CAST-IRON OR OTHER COMPOSITE MATERIAL TESTED TO WITHSTAND H-20 OR GREATER DESIGN LOADS, AND AS APPROVED BY THE LOCAL REGULATORY BODY. FRAMES AND COVERS MUST BE EMBOSSED WITH THE NAME OF THE DEVICE MANUFACTURER OR THE DEVICE BRAND NAME.

J. DOOR AND HATCHES, IF PROVIDED SHALL MEET DESIGNATED LOADING REQUIREMENTS OR AT A MINIMUM FOR INCIDENTAL VEHICULAR TRAFFIC.

K. ALL CONCRETE COMPONENTS SHALL BE MANUFACTURED ACCORDING TO LOCAL SPECIFICATIONS AND SHALL MEET THE REQUIREMENTS OF ASTM C 478.

L. THE FIBERGLASS PORTION OF THE FILTER DEVICE SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE FOLLOWING STANDARD: ASTM D-4097: CONTACT MOLDED GLASS FIBER REINFORCED CHEMICAL RESISTANT TANKS.

M. STEPS SHALL BE CONSTRUCTED ACCORDING TO ASTM D4101 OF COPOLYMER POLYPROPYLENE, AND BE DRIVEN INTO PREFORMED OR PRE-DRILLED HOLES AFTER THE CONCRETE HAS CURED, INSTALLED TO CONFORM TO APPLICABLE SECTIONS OF STATE, PROVINCIAL AND MUNICIPAL BUILDING CODES, HIGHWAY, MUNICIPAL OR LOCAL SPECIFICATIONS FOR THE CONSTRUCTION OF SUCH DEVICES.

N. ALL PRECAST CONCRETE SECTIONS SHALL BE INSPECTED TO ENSURE THAT DIMENSIONS, APPEARANCE AND QUALITY OF THE PRODUCT MEET LOCAL MUNICIPAL SPECIFICATIONS AND ASTM C 478.

PERFORMANCE

A. THE STORMWATER QUALITY FILTER TREATMENT DEVICE SHALL FUNCTION TO REMOVE POLLUTANTS BY THE FOLLOWING UNIT TREATMENT PROCESSES; SEDIMENTATION, FLOATATION, AND MEMBRANE FILTRATION.

B. THE STORMWATER QUALITY FILTER TREATMENT DEVICE SHALL REMOVE OIL, DEBRIS, TRASH, COARSE AND FINE PARTICULATES, PARTICULATE-BOUND POLLUTANTS, METALS AND NUTRIENTS FROM STORMWATER DURING RUNOFF EVENTS.

C. THE STORMWATER QUALITY FILTER TREATMENT DEVICE SHALL TYPICALLY UTILIZE AN EXTERNAL BYPASS TO DIVERT EXCESSIVE FLOWS. INTERNAL BYPASS SYSTEMS SHALL BE EQUIPPED WITH A FLOATABLES BAFFLE, AND MUST PASS WATER OVER THE CARTRIDGE DECK, AND AVOID PASSAGE THROUGH THE SUMP AND/OR CARTRIDGE FILTRATION ZONE.

D. THE STORMWATER QUALITY FILTER TREATMENT DEVICE SHALL TREAT 100% OF THE REQUIRED WATER QUALITY TREATMENT FLOW BASED ON A MAXIMUM TREATMENT FLUX RATE (SURFACE LOADING RATE) ACROSS THE MEMBRANE FILTER CARTRIDGES NOT TO EXCEED 0.21 GPM/FT2 (0.142 LPS/M2).

E. AT A MINIMUM, THE STORMWATER QUALITY FILTER DEVICE SHALL HAVE BEEN FIELD TESTED AND VERIFIED WITH A MINIMUM 25 QUALIFYING STORM EVENTS AND FIELD MONITORING CONDUCTED ACCORDING TO THE TARP TIER II OR TAPE FIELD TEST PROTOCOL, AND HAVE RECEIVED NJCAT VERIFICATION.

F. THE STORMWATER QUALITY FILTER TREATMENT DEVICE SHALL HAVE DEMONSTRATED A MINIMUM MEDIAN TSS REMOVAL EFFICIENCY OF 85% AND A MINIMUM MEDIAN SSC REMOVAL EFFICIENCY OF 95%.

G. THE STORMWATER QUALITY FILTER TREATMENT DEVICE SHALL HAVE DEMONSTRATED THE ABILITY TO CAPTURE FINE PARTICLES AS INDICATED BY A MINIMUM MEDIAN REMOVAL EFFICIENCY OF 75% FOR THE PARTICLE FRACTION LESS THAN 25 MICRONS, AN EFFLUENT D50 OF 15 MICRONS OR LOWER FOR ALL MONITORED STORM EVENTS, AND AN EFFLUENT TURBIDITY OF 15 NTUS OR LOWER.

H. THE STORMWATER QUALITY FILTER TREATMENT DEVICE SHALL HAVE DEMONSTRATED A MINIMUM MEDIAN TOTAL PHOSPHORUS REMOVAL OF 55%, AND A MINIMUM MEDIAN TOTAL NITROGEN REMOVAL OF 50%.

I. THE STORMWATER QUALITY FILTER TREATMENT DEVICE SHALL HAVE DEMONSTRATED A MINIMUM MEDIAN TOTAL ZINC REMOVAL OF 50%, AND A MINIMUM MEDIAN TOTAL COPPER REMOVAL OF 75%.

INSPECTION AND MAINTENANCE

A. DURABILITY OF MEMBRANES ARE SUBJECT TO GOOD HANDLING PRACTICES DURING INSPECTION AND MAINTENANCE (REMOVAL, RINSING, AND REINSERTION) EVENTS, AND SITE SPECIFIC CONDITIONS THAT MAY HAVE HEAVIER OR LIGHTER LOADING ONTO THE CARTRIDGES, AND POLLUTANT VARIABILITY THAT MAY IMPACT THE MEMBRANE STRUCTURAL INTEGRITY. MEMBRANE MAINTENANCE AND REPLACEMENT SHALL BE IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.

B. INSPECTION WHICH INCLUDES TRASH AND FLOATABLES COLLECTION, SEDIMENT DEPTH DETERMINATION, AND VISIBLE DETERMINATION OF BACKWASH POOL DEPTH SHALL BE EASILY CONDUCTED FROM GRADE (OUTSIDE THE STRUCTURE).

C. MANUAL RINSING OF THE REUSABLE FILTER CARTRIDGES SHALL PROMOTE RESTORATION OF THE FLOW CAPACITY AND SEDIMENT CAPACITY OF THE FILTER CARTRIDGES, EXTENDING CARTRIDGE SERVICE LIFE.

D. SEDIMENT REMOVAL FROM THE FILTER TREATMENT DEVICE SHALL BE ABLE TO BE CONDUCTED USING A STANDARD MAINTENANCE TRUCK AND VACUUM APPARATUS, AND A MINIMUM ONE POINT OF ENTRY TO THE SUMP THAT IS UNOBSTRUCTED BY FILTER CARTRIDGES.

E. MAINTENANCE ACCESS SHALL HAVE A MINIMUM CLEAR HEIGHT OF 60" OVER ALL OF THE FILTER CARTRIDGES, OR BE ACCESSIBLE BY A HATCH OR OTHER MECHANISM THAT PROVIDES MINIMUM 60" VERTICAL CLEAR SPACE OVER ALL OF THE FILTER CARTRIDGES. FILTER CARTRIDGES SHALL BE ABLE TO BE LIFTED STRAIGHT VERTICALLY OUT OF THE RECEPTACLES AND DECK FOR THE ENTIRE LENGTH OF THE CARTRIDGE.

F. FILTER CARTRIDGES SHALL BE ABLE TO BE MAINTAINED WITHOUT THE USE OF ADDITIONAL LIFTING EQUIPMENT.

EXECUTION

A. THE INSTALLATION OF A WATERTIGHT PRECAST CONCRETE DEVICE SHOULD CONFORM TO ASTM C 891 AND TO ANY STATE HIGHWAY, MUNICIPAL OR LOCAL SPECIFICATIONS FOR THE CONSTRUCTION OF MANHOLES, WHICHEVER IS MORE STRINGENT. SELECTED SECTIONS OF A GENERAL SPECIFICATION THAT ARE APPLICABLE ARE SUMMARIZED BELOW.

B. THE WATERTIGHT PRECAST CONCRETE DEVICE IS INSTALLED IN SECTIONS IN THE FOLLOWING SEQUENCE:
- AGGREGATE BASE
- BASE SLAB
- TREATMENT CHAMBER AND CARTRIDGE DECK RISER SECTION(S)
- BYPASS SECTION
- CONNECT INLET AND OUTLET PIPES
- CONCRETE RISER SECTION(S) AND/OR TRANSITION SLAB (IF REQUIRED)
- MAINTENANCE RISER SECTION(S) (IF REQUIRED)
- FRAME AND ACCESS COVER

C. INLET AND OUTLET PIPES SHOULD BE SECURELY SET INTO THE DEVICE USING APPROVED PIPE SEALS (FLEXIBLE BOOT CONNECTIONS, WHERE APPLICABLE) SO THAT THE STRUCTURE IS WATERTIGHT, AND SUCH THAT ANY PIPE INTRUSION INTO THE DEVICE DOES NOT IMPACT THE DEVICE FUNCTIONALITY.

D. ADJUSTMENT UNITS (E.G. GRADE RINGS) SHOULD BE INSTALLED TO SET THE FRAME AND COVER AT THE REQUIRED ELEVATION. THE ADJUSTMENT UNITS SHOULD BE LAID IN A FULL BED OF MORTAR WITH SUCCESSIVE UNITS BEING JOINED USING SEALANT RECOMMENDED BY THE MANUFACTURER. FRAMES FOR THE COVER SHOULD BE SET IN A FULL BED OF MORTAR AT THE ELEVATION SPECIFIED.

E. IN SOME INSTANCES THE MAINTENANCE ACCESS WALL, IF PROVIDED, SHALL REQUIRE AN EXTENSION ATTACHMENT AND SEALING TO THE PRECAST WALL AND CARTRIDGE DECK AT THE JOB SITE, RATHER THAN AT THE PRECAST FACILITY. IN THIS INSTANCE, INSTALLATION OF THESE COMPONENTS SHALL BE PERFORMED ACCORDING TO INSTRUCTIONS PROVIDED BY THE MANUFACTURER.

F. FILTER CARTRIDGES SHALL BE INSTALLED IN THE CARTRIDGE DECK AFTER THE CONSTRUCTION SITE IS FULLY STABILIZED AND IN ACCORDANCE WITH THE MANUFACTURERS GUIDELINES AND RECOMMENDATIONS. CONTRACTOR TO CONTACT THE MANUFACTURER TO SCHEDULE CARTRIDGE DELIVERY AND REVIEW PROCEDURES/REQUIREMENTS TO BE COMPLETED TO THE DEVICE PRIOR TO INSTALLATION OF THE CARTRIDGES AND ACTIVATION OF THE SYSTEM.

G. MANUFACTURER SHALL COORDINATE DELIVERY OF FILTER CARTRIDGES AND OTHER INTERNAL COMPONENTS WITH CONTRACTOR. FILTER CARTRIDGES SHALL BE DELIVERED AND INSTALLED COMPLETE AFTER SITE IS STABILIZED AND UNIT IS READY TO ACCEPT CARTRIDGES. UNIT IS READY TO ACCEPT CARTRIDGES AFTER IS HAS BEEN CLEANED OUT AND ANY STANDING WATER, DEBRIS, AND OTHER MATERIALS HAVE BEEN REMOVED. CONTRACTOR SHALL TAKE APPROPRIATE ACTION TO PROTECT THE FILTER CARTRIDGE RECEPTACLES AND FILTER CARTRIDGES FROM DAMAGE DURING CONSTRUCTION, AND IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS AND GUIDANCE. FOR SYSTEMS WITH CARTRIDGES INSTALLED PRIOR TO FULL SITE STABILIZATION AND PRIOR TO SYSTEM ACTIVATION, THE CONTRACTOR CAN PLUG INLET AND OUTLET PIPES TO PREVENT STORMWATER AND OTHER INFLUENT FROM ENTERING THE DEVICE. PLUGS MUST BE REMOVED DURING THE ACTIVATION PROCESS.

H. THE MANUFACTURER SHALL PROVIDE AN OWNER'S MANUAL UPON REQUEST.

I. AFTER CONSTRUCTION AND INSTALLATION, AND DURING OPERATION, THE DEVICE SHALL BE INSPECTED AND CLEANED AS NECESSARY BASED ON THE MANUFACTURER'S RECOMMENDED INSPECTION AND MAINTENANCE GUIDELINES AND THE LOCAL REGULATORY AGENCY/BODY.

J. WHEN REPLACEMENT MEMBRANE FILTER ELEMENTS AND/OR OTHER PARTS ARE REQUIRED, ONLY MEMBRANE FILTER ELEMENTS AND PARTS APPROVED BY THE MANUFACTURER FOR USE WITH THE STORMWATER QUALITY FILTER DEVICE SHALL BE INSTALLED.

END OF SECTION

MARK	DATE	REVISION DESCRIPTION	BY
0	4/15/2015	INTIAL RELEASE	BSF
#	#	#	#
#	#	#	#
#	#	#	#
#	#	#	#

Jellyfish®

JF8 ONLINE

Scale = 1:50

info@imbriumsystems.com

www.imbriumsystems.com

imbrium®

407 FAIRVIEW DRIVE, WHITBY, ON L1N 3A9

Jellyfish® Filter

DATE: #####

DESIGNED:

DRAWN: BSF

CHECKED: BW

APPROVED: SP

PROJECT #: #####

SHEET: 2 OF 2

I:\IMBRIUM\PRODUCTS\JELLYFISH FILTER\40 DRAWINGS & DETAILS\STANDARD DETAILS\JELLYFISH FILTER - PEAK DIVERSION MANHOLE\JELLYFISH FILTER JF8 - PEAK DIVERSION.DWG 4/15/2019 9:41 AM

State of New Jersey

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

CHRIS CHRISTIE
Governor

KIM GUADAGNO
Lt. Governor

BOB MARTIN
Commissioner

May 14, 2012

Joel Garbon
Product Manager
7564 Standish Place
Suite 112
Rockville, MD 20855

Re: Final Certification
Jellyfish® Filter by Imbrium Systems

Expiration Date: December 1, 2016
TSS Removal Rate: 80%

Dear Mr. Garbon:

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). Imbrium Systems. has requested a Final Certification for the Jellyfish® Filter.

This project falls under the "Transition for Manufactured Treatment Devices July 15, 2011". The Jellyfish Filter by Imbrium Systems qualified for Category C. Manufactured Treatment Devices Seeking Final Certifications - In Process which are MTDs that have commenced field testing on or before August 1, 2011.

NJDEP received the required information from signed statement sby the NJCAT Technical Director and the manufacturer listing the indicating that the requirements of the 2009 NJDEP Field Testing Protocols have been met or exceeded. NJDEP also received a signed statement from the third party testing entity, University of Florida, indicating that the testing requirements have been met or exceeded. The NJCAT letter also includes a recommended certification TSS removal rate and the required maintenance plan.

The NJDEP certifies the use of the Jellyfish Filter by Imbrium Systems at TSS removal rate of 80%, subject to the following conditions:

1. The Jellyfish Filter is designed according to the NJ Water Quality Design Storm in N.J.A.C. 7:8-5.5.
2. The peak inflow of the water quality design storm is limited to the following:

For each hi-flow cartridge, the maximum inflow is 1.48 gpm and a maximum inflow drainage area is 0.012 impervious acres, for each inch of cartridge length.

For each draindown cartridge, the maximum inflow 0.74 gpm and the maximum inflow drainage area is 0.006 impervious acres for each inch of cartridge length.

Example: For a 54-inch hi-flo cartridge length, the maximum inflow is 80 gpm and the maximum inflow drainage area is 0.65 impervious acres.

Maximum treatment flow rates for typical Jellyfish Filter models are provided in Table 1.

Maximum treatment flow rates and maximum inflow drainage areas for various cartridge lengths are provided in Table 2.

3. The bottom of the Jellyfish tentacles is a minimum of 2 feet above the bottom of the vault. The sedimentation area in the vault shall be a minimum of 4 ft^2 per cartridge.
4. The Jellyfish Filter is certified as an off-line system only.
5. The Jellyfish Filter cannot be used in series with a settling chamber (such as a hydrodynamic separator) 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.
6. The maintenance plan for sites using this device shall incorporate, at a minimum, the maintenance requirements for the Jellyfish Filter shown in Appendix A below.

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

NJDEP anticipates proposing further adjustments to this process through the readoption of the Stormwater Management Rules. Additional information regarding the implementation of the Stormwater Management Rules, N.J.A.C. 7:8, are available at www.njstormwater.org. If you have any questions regarding the above information, please contact Ms. Sandra Blick of my office at (609) 633-7021.

Sincerely,

Ed Frankel, P.P., Section Chief
Bureau of Nonpoint Pollution Control

C: Chron File
Richard Magee, NJCAT
Mark Pedersen, DLUR
Elizabeth Dragon, BNPC

Table 1
Maximum Treatment Flow Rates for
Standard (54" Cartridge Length) Jellyfish® Filter Models

Manhole Diameter (ft)	Model No.	Hi-Flo Cartridges (54" Length)	Draindown Cartridges (54" Length)	Maximum Treatment Flow Rate (gpm / cfs)
Catch Basin		varies	varies	varies
4	JF4-2-1	2	1	200 / 0.45
6	JF6-3-1	3	1	280 / 0.62
	JF6-4-1	4	1	360 / 0.80
	JF6-5-1	5	1	440 / 0.98
	JF6-6-1	6	1	520 / 1.16
8	JF8-6-2	6	2	560 / 1.25
	JF8-7-2	7	2	640 / 1.43
	JF8-8-2	8	2	720 / 1.60
	JF8-9-2	9	2	800 / 1.78
	JF8-10-2	10	2	880 / 1.96
10 [1]	JF10-11-3	11	3	1000 / 2.23
	JF10-12-3	12	3	1080 / 2.41
	JF10-13-3	13	3	1160 / 2.58
	JF10-14-3	14	3	1240 / 2.76
	JF10-15-3	15	3	1320 / 2.94
	JF10-16-3	16	3	1400 / 3.12
12 [2]	JF12-17-4	17	4	1520 / 3.39
	JF12-18-4	18	4	1600 / 3.57
	JF12-19-4	19	4	1680 / 3.74
	JF12-20-4	20	4	1760 / 3.92
	JF12-21-4	21	4	1840 / 4.10
	JF12-22-4	22	4	1920 / 4.28
	JF12-23-4	23	4	2000 / 4.46
	JF12-24-4	24	4	2080 / 4.63
Vault		varies	varies	varies

[1] The MTFR for a 10-ft diameter unit occurs with Model JF10-16-3. Since this leaves 4 unoccupied cartridge receptacles in the 10-ft diameter deck, the design engineer has the option to add up to 4 additional cartridges to increase the sediment capacity of the system, however may not increase the MTFR above that of the JF10-16-3.

[2] The MTFR for a 12-ft diameter unit occurs with Model JF12-24-4. Since this leaves 4 unoccupied cartridge receptacles in the 12-ft diameter deck, the design engineer has the option to add up to 4 additional cartridges to increase the sediment capacity of the system, however may not increase the MTFR above that of the JF12-24-4.

Table 2
Maximum Treatment Flow Rate and
Maximum Inflow Drainage Area
for Various Jellyfish® Cartridge Lengths

Cartridge Length (inches)	Maximum Treatment Flow Rate (gpm)	Maximum Inflow Drainage Area (impervious acres)
15	Hi-Flo 22 Draindown 11	Hi-Flo 0.18 Draindown 0.09
27	Hi-Flo 40 Draindown 20	Hi-Flo 0.32 Draindown 0.16
40	Hi-Flo 60 Draindown 30	Hi-Flo 0.48 Draindown 0.24
54	Hi-Flo 80 Draindown 40	Hi-Flo 0.65 Draindown 0.32

Appendix A

Imbrium Systems Jellyfish® Filter
Inspection and Maintenance Information

Jellyfish® Filter Inspection and Maintenance
Regular inspection and maintenance are proven, cost-effective ways to maximize water resource protection for all stormwater pollution control practices, and are required to insure proper functioning of the Jellyfish Filter. Inspection of the Jellyfish Filter is easily performed from the surface, while proper maintenance requires a combination of procedures conducted from the surface and with worker entry into the structure. The Jellyfish Filter's patented technology has no moving parts, keeping the process simple.

Please refer to the following information and guidelines before conducting inspection and maintenance activities.

When is inspection needed?

- Post-construction inspection is required prior to putting the Jellyfish Filter into service.
- A minimum of two inspections are required during the first year of operation to accurately assess the sediment and floatable pollutant accumulation, and to ensure that the automatic backwash feature is functioning properly.
- Inspection frequency in subsequent years is based on the maintenance plan developed in the first year.
- Inspections must also be performed immediately after an oil, fuel or other chemical spill.

When is maintenance service needed?

- For optimum performance, the unit must be cleaned out once the sediment depth reaches 12 inches of accumulation. Generally, the minimum cleaning frequency is once annually, although the frequency can be based on historical inspection results.
- Filter cartridges must be cleaned and re-commissioned, or replaced, every 12 months or when the automatic backwash feature no longer functions, whichever occurs first. The automatic backwash function will be disabled if the filter cartridges become saturated with sediment. This saturated condition is indicated if the backwash pool contains more than 3 inches depth of water after 12 or more hours of dry weather have elapsed since the most recent rainfall/runoff event.
- The unit must be cleaned out immediately after an oil, fuel or chemical spill.

What conditions can compromise the Jellyfish Filter's performance?

- If sediment accumulates beyond 12 inches in depth, filter cartridge life and sediment removal efficiency may be reduced.
- If filter cartridges become saturated with sediment, the system may not provide filtration treatment at the designed water quality flow rate, and unfiltered water may bypass the filter cartridges.
- If an oil spill(s) exceeds the oil capacity of the system, subsequent spills may not be captured and may cause fouling of the filter cartridges.
- If debris clogs the inlet of the system, removal efficiency of sediment, hydrocarbons, and gross pollutants may be reduced.
- If a downstream blockage occurs, a backwater condition may occur in the system and removal efficiency of sediment, hydrocarbons, and gross pollutants may be reduced.

What training is required?

The Jellyfish Filter is inspected and maintained by professional vacuum cleaning service providers with experience in the maintenance of underground tanks, sewers and catch basins. Since some of the maintenance procedures require manned entry into the Jellyfish structure, only professional maintenance service providers trained in confined space entry procedures should enter the vessel. Service provider companies typically have personnel who are trained and certified in confined space entry procedures according to local, state, and federal standards.

For typical inspection and maintenance activities, no specific supplemental training is required for the Jellyfish Filter. Information provided in this document or the Jellyfish Filter Owner's Manual contains sufficient guidance to maintain the system properly.

What equipment is typically required for inspection?

- Manhole access cover lifting tool
- Oil dipstick or sampling tool
- Sediment probe
- Flashlight
- Camera
- Data log
- Safety cones and caution tape
- Hard hat, safety shoes, safety glasses, and chemical-resistant gloves

How is the Jellyfish Filter inspected?

- The Jellyfish filter system can be inspected from the surface through the standard surface manhole access cover or custom doors.
- Sediment and oil depth inspections are performed with a sediment probe and oil dipstick. Sediment and oil depth are measured through the maintenance access wall.
- Visual inspection for floatable pollutant accumulation such as litter and hydrocarbons is also performed by shining a flashlight into the maintenance access wall.
- Visual inspection of the backwash pool (6-inch high kidney-shaped or oval-shaped

weir) should also be performed to check for standing water in the pool. If at least 12 hours of dry weather have elapsed since the most recent rainfall/runoff event and the backwash pool contains more than 3 inches of water, this condition indicates that the filter cartridges are saturated with sediment and should be cleaned or replaced.
- Inspections also involve a visual inspection of the internal components of the system for obvious damage.

What equipment is typically required for maintenance?

- Vacuum truck equipped with water hose and jet nozzle
- Small pump and tubing for oil removal, if necessary
- Manhole access cover lifting tool
- Oil dipstick or sampling tool
- Sediment probe
- Flashlight
- Camera
- Data log
- Safety cones and caution tape
- Hard hats, safety shoes, safety glasses, chemical-resistant gloves, and hearing protection for service providers
- Gas analyzer, respiratory gear, and safety harness for specially trained personnel if confined space entry is required
- Replacement cartridges are required if manual cleaning and re-commissioning of existing cartridges is not possible or adequate to restore proper system function.
- Jellyfish Cartridge Backflush Pipe

How is the Jellyfish Filter maintained?

- The Jellyfish Filter can be maintained through the standard surface manhole access cover. All access covers should be removed to provide additional light and ventilation. If custom doors were installed instead of frames and covers, open all doors.
- If the filter cartridges are to be manually backflushed (see procedure below), perform the manual backflush service prior to vacuum removal of sediment, floatable, and water (i.e. perform the manual backflush with the lower chamber full of water).
- Insert the oil dipstick or sampling tool into the maintenance access wall. If oil is present, pump off the oil layer into separate containment using a small pump and tubing. Some maintenance service providers may elect to use the vacuum hose if the oil amount is small.
- Maintenance cleaning of accumulated floatable litter and sediment is performed with a vacuum hose inserted through the maintenance access wall.
- Using the vacuum hose, decant the water from the lower chamber to the sanitary sewer, if permitted by the local regulating authority, or into a separate containment tank.
- Remove the sediment from the bottom of the unit using the vacuum hose.
- For larger Jellyfish Filters, (8-ft, 10-ft, 12-ft diameter), complete sediment removal

may be facilitated by inserting a garden hose sprayer through a hole in the cartridge deck where a blank cartridge lid (no orifice in the cartridge lid) or filter cartridge has been removed. Use the garden hose sprayer to break up sediment on the bottom of vessel that is farthest from the maintenance access wall, being careful not to cut or otherwise damage the filter tentacle membranes with excessive water pressure. (Note: Use of a garden hose sprayer is recommended. Do not use a high pressure jet sprayer or power washer, as excessive water pressure may damage the filter tentacle membranes.) Rinse the loosened sediment toward the maintenance access wall for easy vacuum removal.

- To access the cartridge deck for manual cleaning or replacement of filter cartridges, descend the ladder that is built into structure's sidewall, observing all precautions for safe and proper confined space entry. Note that the cartridge deck may be slippery. Care should be taken to avoid stepping directly onto the backwash pool weir, as damage may result.
- A manual backflush of the cartridges is recommended to remove a high percentage of accumulated sediment from the filtration tentacles, restore flow capacity, and extend the service life of the cartridges. A Jellyfish Cartridge Backflush Pipe (12-inch diameter x 40-inch length aluminum pipe with flapper valve) may be purchased from Imbrium Systems that allows each cartridge to be selectively backwashed using water that is supplied from either (a) the previously decanted water stored in a vactor truck compartment; (b) clean water from a separate water truck delivered to the site; or (c) water from a nearby fire hydrant or other clean water source. NOTE: Manual backflushing of the cartridges is best performed with the lower chamber full of water (i.e. prior to vacuuming out the sediment, floatables, and water). This ensures that a uniform backflush pressure is applied across all of the filter media surface area.
- **Manual backflush procedure**: Twist the threaded cartridge lid on the cartridge receptacle counter-clockwise to remove the lid and expose the cartridge head. (**NOTE: Do not step directly onto an exposed cartridge head when a cartridge lid is removed, as excessive downward force may damage the cartridge receptacle and result in injury if the cartridge head is forced through the receptacle and into the lower chamber.**) Place the Jellyfish Cartridge Backflush Pipe over the cartridge receptacle such that the gasket on the bottom of the Backflush Pipe is seated on the rim of the cartridge receptacle. Fill the Backflush Pipe with water (approximately 16 gallons). Pull the cord to open the flapper valve and backflush the water through the cartridge. Refill the Pipe and backflush a second time. The full Pipe contents should drain down to the top of the open flapper valve (30 inches from the top of the Pipe) within approximately 15 seconds to remove a high percentage of accumulated sediment and restore the flow capacity of the cartridge. Remove the Pipe and re-install the lid hand-tight. For the most thorough backflushing, backflush the Draindown Cartridge(s) first, followed by the Hi-Flo Cartridges, then finish with a final single backflush on the Draindown Cartridge(s). (NOTE: The Hi-Flo Cartridges are those cartridges within the kidney-shaped 6-inch high backwash pool weir. The Draindown Cartridges are those cartridges outside the backwash pool weir. See the diagram below for reference.) When backflushing a cartridge, it is important to keep the lids in place on all other cartridges both as a safety precaution and so that water displaced from the lower chamber during backflushing is properly filtered when discharged to the top of the cartridge deck.

- **Optional manual rinsing procedure**: If manual backwashing using the Jellyfish Cartridge Backflush Pipe is ineffective in restoring adequate cartridge flow capacity, cartridges may be removed, manually rinsed, and re-commissioned. With the threaded cartridge lid removed, slowly and carefully remove the cartridge from the receptacle using the lifting loops in the cartridge head. (NOTE: Should a snag occur, do not force the cartridge upward as this may result in damage to the tentacles. Instead, gently rotate the cartridge with a slight sideways motion to clear the snag and remove the cartridge.) Remove the cartridge from the vessel, as rinsing is best performed outside the vessel. Immediately replace the lid on the exposed receptacle/hole as a safety precaution. Using a garden hose sprayer, direct the water spray at an angle across the tentacle membrane surface, starting at the top of the tentacle and working downward. For most effective rinsing, remove each tentacle from the cartridge head plate by unscrewing the attachment nut, and perform a 360 degree rinse of each tentacle. Re-attach the rinsed tentacles to the head plate and re-commission the cleaned cartridge. If manual rinsing cannot be performed, or if inspection upon rinsing indicates damage to the tentacles, provisions must be made to replace the spent or damaged tentacles with new tentacles. Contact Imbrium Systems to order replacement tentacles.
- New cartridges are lightweight (less than 20 pounds), and can be easily lowered down to a worker on the cartridge deck. Care should be taken not to bend or otherwise damage the tentacles during the handling and installation procedures.
- For maximum safety, it is recommended that each cartridge be removed and replaced one at a time, such that there is never more than one cartridge receptacle/hole exposed.
- After vacuuming out sediment, floatables, and water, re-fill the lower chamber with water where required by the local jurisdiction.

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What is required for proper disposal?

- Disposal requirements for recovered pollutants and spent filter cartridges may vary depending on local guidelines. In most areas the sediment and spent filter cartridges, once dewatered, can be disposed of in a sanitary landfill. It is not anticipated that the sediment would be classified as hazardous waste.

What about oil spills?

- Petroleum-based pollutants captured by the Jellyfish Filter (oil/chemical/fuel spills) should be removed and disposed of by a licensed waste management company.
- Although the Jellyfish Filter captures virtually all free oil, a sheen at the outlet **does not** mean the unit isn't working. A rainbow or sheen can be visible at oil concentrations of less than 10 mg/L (ppm).

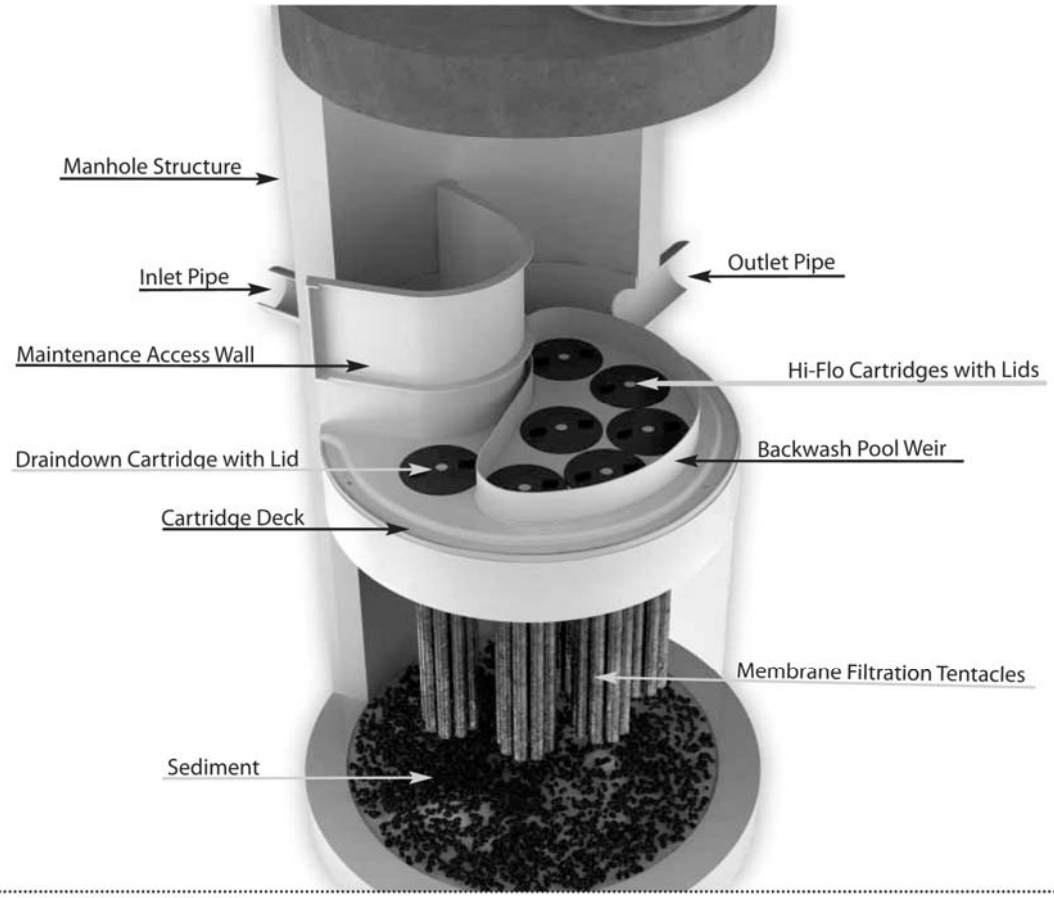
What factors affect the costs involved with inspection/maintenance?

- Inspection and maintenance costs are based on unit size, cartridge count, sediment/oil/hazardous material loads, transportation distances, tipping fees, disposal requirements and other local regulations. Maintenance costs are anticipated to be substantially lower in instances where dirty cartridges are manually cleaned and re-commissioned rather than replaced with new cartridges.

Below is a cut-away schematic of the Jellyfish Filter with key components identified (6-ft diameter manhole configuration is depicted).

FIGURE 1

Jellyfish Filter and Components

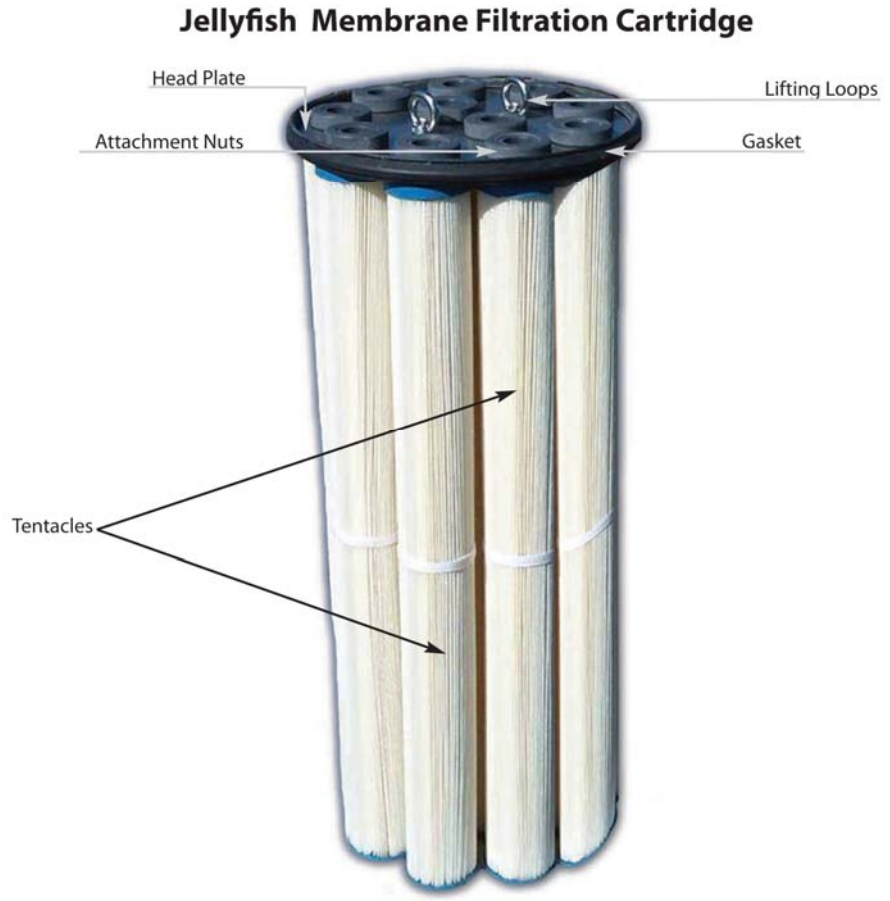


Note: Separator Skirt Not Shown

The Jellyfish Filter has no moving parts to wear out and therefore maintenance activities are generally focused on pollutant removal and filter cartridge service.

Below is a schematic of a Jellyfish Filter membrane filtration cartridge. The extraordinarily high surface area of the membrane filtration tentacles provides superior flow and sediment capacity as well as low head loss. Tentacles can be easily removed from the head plate and replaced.

FIGURE 2



The depth of sediment and oil can be measured from the surface by using a sediment probe or dipstick tube equipped with a ball check valve and inserted through the Jellyfish Filter's maintenance access wall. The large opening in the maintenance access wall provides convenient access for inspection and vacuum removal of water and pollutants.

A maintenance worker stationed on the surface uses a vacuum hose to evacuate water, sediment, and debris from the system.

The benefits of regular inspection and maintenance are many – from ensuring maximum operation efficiency, to keeping maintenance costs low, to the continued protection of natural waterways – and provide the key to the Jellyfish Filter's long and effective service life.

Ordering Replacement Parts

Jellyfish filter cartridges, replacement tentacles, cartridge lids, Jellyfish Cartridge Backflush Pipes (for manual backflushing), and other system components can be ordered by contacting:

Imbrium Systems Corporation
1-888-279-8826
www.imbriumsystems.com

(revised 3-28-12)

16. DRAINAGE AREA MAPS

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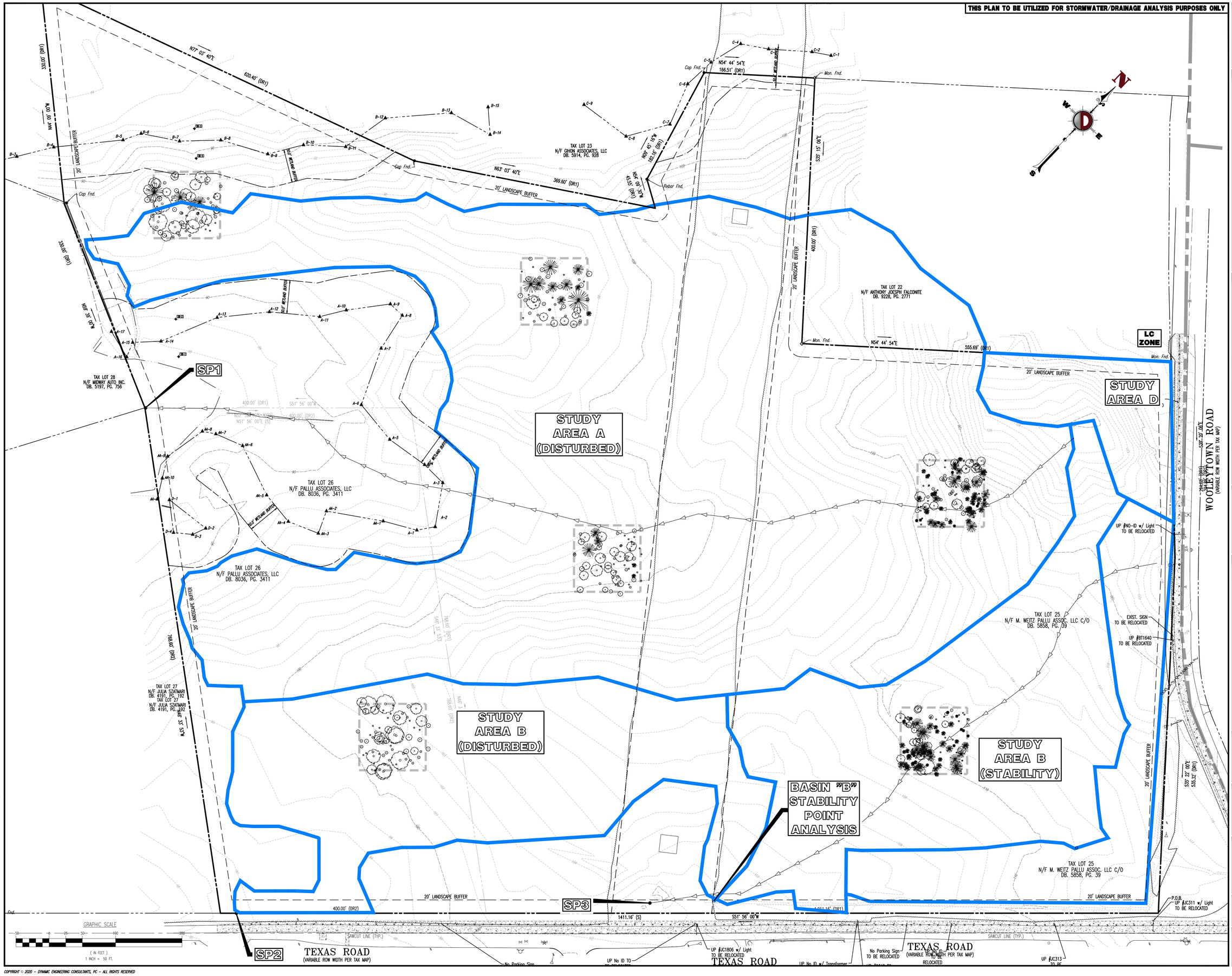

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STEVEN R. CATTANI
PROFESSIONAL ENGINEER
NEW JERSEY LICENSE No. 40014

BRETT W. SKAPINETZ
PROFESSIONAL ENGINEER
NEW JERSEY LICENSE No. 41985

TITLE: EXISTING DRAINAGE AREA MAP

SCALE: (H) 1"=30' (V) | DATE: 11/09/2020
PROJECT No: 2841-99-001
SHEET No: 1 OF 3 | Rev. #: 0

Plotted: 11/10/20 – 2:07 PM, By: bheng
File: P:\DEPC PROJECTS\2841 Pallu Associates, LLC\99-001 Marlboro\Pallu\Dwg\DA Maps\U2841990010DAMO.dwg, ---> 01 EXISTING DRAINAGE AREA MAP

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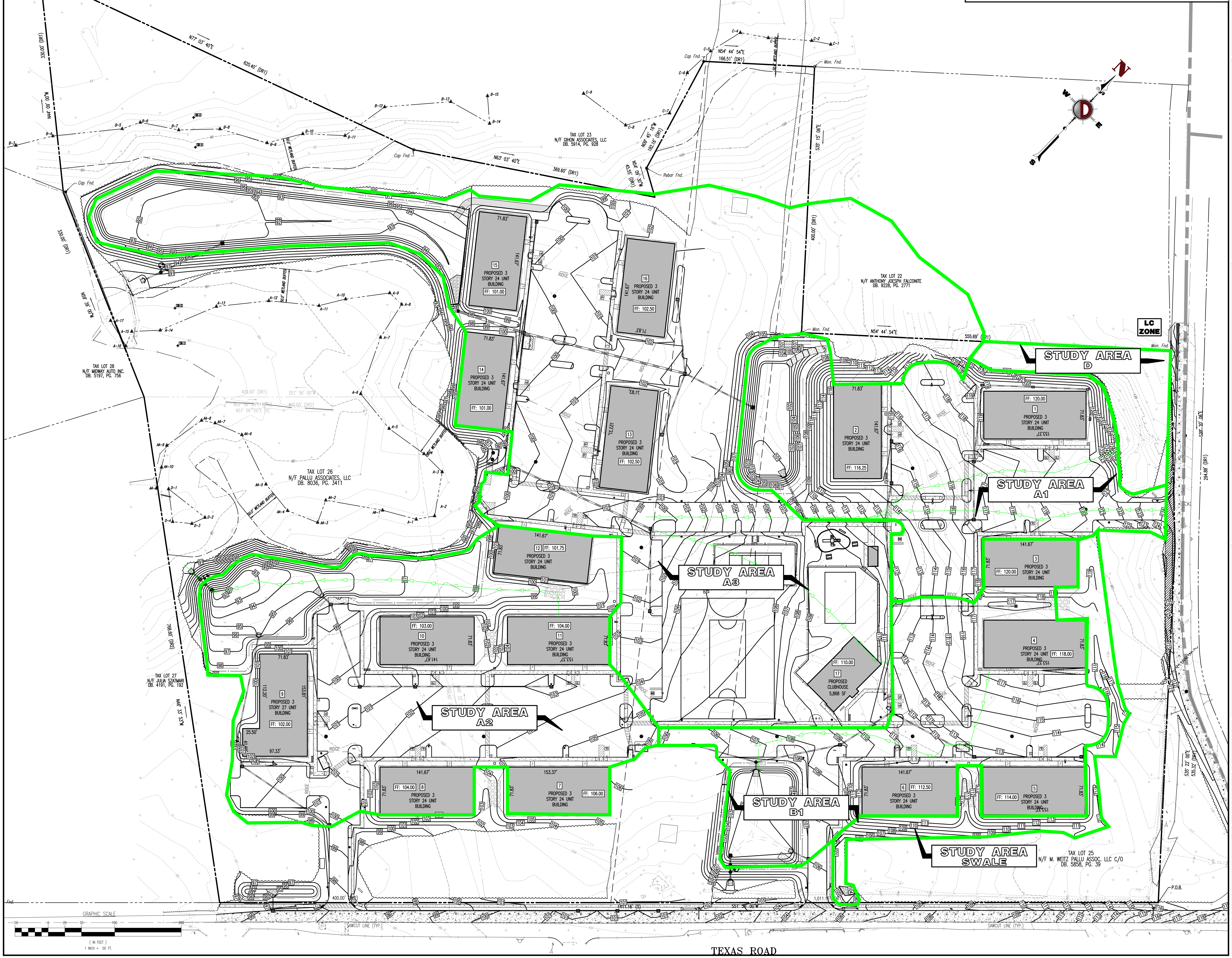

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File: P:\DEPC PROJECTS\2841 Pallu Associates, LLC\99-001 Marlboro\Pallu\Dwg\DA Maps\2841990001PDAMO.dwg, ---> 02 PROPOSED DRAINAGE AREA MAP

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STEVEN R. CATTANI
PROFESSIONAL ENGINEER
NEW JERSEY LICENSE No. 40014

BRETT W. SKAPINETZ
PROFESSIONAL ENGINEER
NEW JERSEY LICENSE No. 41985

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PROPOSED DRAINAGE AREA MAP

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PROJECT No: 2841-99-001

SHEET No: 2 OF 3 | Rev. #: 0

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DB. 5914, PG. 928

TAX LOT 22
N/F ANTHONY JOESPH FALCONITE
DB. 9228, PG. 2771

TAX LOT 28
N/F MIDWAY AUTO INC.
DB. 5197, PG. 756

TAX LOT 26
N/F PALLU ASSOCIATES, LLC
DB. 8036, PG. 3411

TAX LOT 27
N/F JULIA SZATMARI
DB. 4191, PG. 192

TAX LOT 25
N/F M. WEITZ PALLU ASSOC. LLC C/O
DB. 5858, PG. 39

LC ZONE

TEXAS ROAD

GRAPHIC SCALE
50 0 25 50 100 200
(IN FEET)
1 INCH = 50 FT.

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File: P:\DECPC PROJECTS\2841 Pallu Associates, LLC\99-001 Marlboro\Pallu\Dwg\04 Maps\D2841990001MAP.dwg, ----> 03 INLET AREA MAP

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NEW JERSEY LICENSE No. 40014

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TITLE:
INLET AREA MAP

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