BETHLEHEM LANDFILL COMPANY

Phase V Expansion

LAND DEVELOPMENT AND LOT CONSOLIDATION PLAN SUPPORTING DOCUMENTATION

Volume 2 of 2

September 11, 2023

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SECTION 10

Post Construction Stormwater Management Plan Narrative

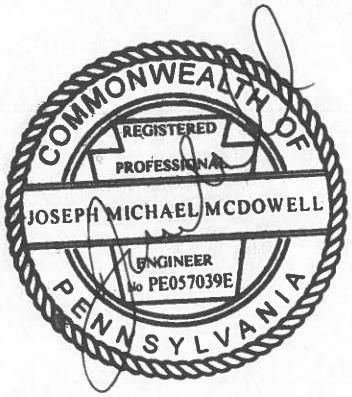
PHASE V EXPANSION

BETHLEHEM LANDFILL COMPANY

"Post Construction Stormwater Management Report"

Lower Saucon Township, Northampton County

Pennsylvania



September 11, 2023

Prepared for:
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1.0 Introduction

This Stormwater Management Plan is submitted on behalf of Bethlehem Landfill Company for the development of the Phase V Expansion at the Bethlehem Landfill. The project is a lateral extension of the existing landfill beyond the current solid waste permit boundary in the northeast and western areas of the existing landfill footprint. The property on which development is proposed is situated in Lower Saucon Township, Northampton County. The area of development or the limits of earth disturbance include 171 acres. Of the 171 acres of disturbance, ±27 acres is proposed within the existing approved landfill disposal footprint and ± acres is located within areas previously developed or approved for development as landfill support activities within the current PADEP Permit Boundary.

Stormwater runoff from the project site will be managed during and following construction through the implementation of various controls and Best Management Practices (BMPs). Those BMPs to be utilized during construction are illustrated on the Erosion and Sediment Control Plans while the BMPs to be utilized following construction are illustrated and described on the Land Development and Post Construction Stormwater Plans. Similarly the design computations for the BMPs to be utilized during construction are contained within the Erosion and Sediment Control Plan Narrative (Form I) and the post construction BMP design computations are contained herein.

The proposed Phase V Expansion entails development within the Saucon Creek Watershed and Fry's Run Watershed. Pursuant to Map 8 of the Act 167 Watershed Management Plan titled "Release Rates – Saucon Creek Watershed," the Bethlehem Landfill appears to be located within Sub-Areas 188, 189 and 196. Pursuant to Map 5 of the Act 167 Watershed Management Plan titled "Release Rates of the Fry's Run Watershed," the Bethlehem Landfill is located with sub-areas 50, 51 and 52. Refer to **Appendix A** for mapping. Multiple reports and design computations have been prepared and approved for various phases of development associated with the Bethlehem Landfill. The first such phase of development to our knowledge which was subject to the release rates prescribed in the Chapter 167 Saucon Creek Watershed Study was Phase III. Thus, for the purposes of this report we conclude the release rates previously approved for each existing BMP (Detention Basin) drainage shed are the required maximum release rates which must be met upon development of the Phase V Expansion. Where there are no existing structural BMP's, a full pre-development rate analysis has been performed to determine maximum release rates in accordance with the Saucon Creek and Fry's Run Act 167 Watershed Studies. Pre-development maximum release rates for each existing drainage shed analyzed for the project are as follows:

Table 1.0 Pre-Development Release Rates for Bethlehem Landfill Drainage Areas (in cubic feet per second)				
Drainage Area	**DESIGN STORM EVENT**			
	2 yr/24 hr	**10 yr/24 hr**	**25 yr/24 hr**	**100 yr/24 hr**
Basin #1*			1.43	
Basin #2**	0.3	1.2	1.6	13.1
Basin #3**	9.5	22.8	31.0	44.3
Basin #4*	3.1	6.7	8.3	10.6
Basin #6**	9.0	20.4	27.1	37.5
Basin #007	0.01	0.13	0.24	0.47
Basin #008	0.16	1.37	2.38	4.42
Basin #009	3.63	11.83	15.99	23.45
Basin #010	3.87	22.81	29.62	41.56
Basin #011	0.00	0.43	3.16	19.93
Basin #012	0.00	0.30	1.25	14.77

*** Obtained from Phase III Form I Document (1993)**
**** Obtained from Phase IV Stormwater and E&S Control Plan Form I Document (2003)**

Basin #1 was modified in 2019. The RNG Project development within the Basin #1 drainage shed slightly increased the drainage area of Basin #1 to 23.04 acres. Prior to that, since Basin #1's original development in the 1990's it has not been altered or modified. Rather with each subsequent phase of development after Phase IV the drainage shed to Basin #1 has been reduced from its prior peak (23.02 ac.) associated with the Phase IV approval (see Exhibit #1 within **Appendix C**). Therefore, the last pre-development analysis of Basin #1 was performed in association with Phase III and thus this is what is provided as "pre-development" for Basin #1.

The drainage areas associated with Basins #2 & #4 were analyzed initially during the Phase III development. Further analysis namely extrapolation of discharge rates for the 2, 10 and 100 year events occurred associated with the Phase IV Stormwater Management Plan which rates are outlined within Table 1.0.

The drainage areas associated with Basins #3 & #6 were analyzed during the development of Phase IV as undeveloped areas without BMPs.

The discharge rates outlined within Table 1.0 are the approved discharge rates for each existing stormwater basin accounting for the release rate criteria outlined within the Saucon Creek Act 167 Plan since all existing stormwater basins are located within the Saucon Creek watershed.

Drainage areas 007 thru 012 are newly identified drainage areas associated with the Phase V Expansion. A full pre-development analysis has been performed and included with **Appendix G** of this report.

2.0 Post Construction Stormwater Management Design Objectives

The objectives of this Post Construction Stormwater Management Plan are as follows:

- To comply with the Lower Saucon Township standards for stormwater management contained within Chapter 137 of the Lower Saucon Township Code including the Saucon Creek and Fry's Run Act 167 Watershed Plans.
- To comply with the Lower Saucon Township Subdivision and Land Development Ordinance Chapter 145 of the Lower Saucon Township Code, as applicable.
- To comply with the whole of 25 Pa. Code Chapter 102.

3.0 Site Description

The subject 503.4 acre property contains an active landfill, woodlands and previously developed landfill support areas. Grades within the active landfill portion of the site change on a daily basis. Additionally, since the 1980's various Stormwater and Erosion and Sediment Control Plans have been prepared for the site as the landfill operations have expanded which makes up almost half the subject property. Therefore, for the purposes of pre-development conditions within the existing landfill portion of the site, appropriate sections of previous reports have been included herein to document the release rates as outlined in Table 1.0. Pre-development drainage area mapping was taken from the latest approved drainage plan for the site. Historical mapping has also been provided for documentation of past design criteria for each drainage basin within **Appendix C**. For those new or expanded areas of the site, pre-development hydrographs were developed to establish new release rates.

All stormwater basins are designed to collect runoff from the landfill development via a series of channels and culverts for management. Upon detention within the approved basins the runoff is released at rates equal to or less than previously approved to be in compliance with Township and Act 167 requirements. Thus if post development discharge rates resulting from development of the Phase V Expansion from existing or proposed basins are less than the approved basin release rates (Table 1.0) compliance with the Ordinance and the Act 167 Plan is achieved regarding rate control.

A NPDES Permit for Stormwater Discharges Associated with Industrial Activities is maintained as part of the landfill operation. The permit includes monitored discharges from the site for each existing basin outfall and upon development of Phase V, the proposed basin outfalls. The new basin outfalls will be added to the permit by modification upon development of the basins. The discharges to the South are tributary to unnamed tributaries of the East Branch of Saucon Creek which is classified as TSF in Chapter 93. Discharges to the North are tributary to Bull Run which is classified as CWF in Chapter 93. The pre-development drainage area analysis is consistent with the latest approved drainage plan (Northern Realignment Stormwater Plan) along with new delineated areas on which the Phase V expansion is proposed.

According to Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map Number 42095C0335E Panel 0335E, a portion of the 503.4 acre property is located in a mapped floodplain near the confluence of Bull Run and the Lehigh River. **Appendix A** contains a USGS

7.5-minute series location map and a FEMA National Flood Insurance Program Flood Insurance Rate Map of the project area. The Phase V Expansion proposes no development within the mapped floodplain associated with Bull Run.

As outlined on the Act 167 mapping contained within **Appendix A** the subject site is located within two Watersheds (Saucon Creek and Fry's Run). The Southern portion of the subject property is located within several Stormwater Management Districts of Saucon Creek Watershed. Those districts are sub-areas 188, 189 and 196. Sub-areas 189 and 196 are classified as 30/100 dual release rate districts while 188 is a dual release rate district of 30/50. Discharges from Basins #1, #3, #4 and #6 are located within districts 189 and 196 while Basin #2 and proposed Basin #7 are located in district 188. The northern portion of the property is located within the Fry's Run Watershed Analysis where multiple districts are identified. Those districts are 50, 51 and 52. These districts are all identified as 30/100 dual release rate districts. Proposed Basin #8 lies within district 51. As stated previously the prescribed discharge rates (Table 1.0) have been obtained from previous and new analysis. Thus, the rates outlined for these existing and proposed structures account for the dual release rate required. Thus, by not exceeding existing established release rates, compliance is achieved.

Additionally, new pre-development drainage areas were delineated based upon the Phase V Expansion Area of Development. These drainage areas are depicted on the Pre-Development Drainage Mapping contained herein. Weighted curve numbers, times of concentration and rainfall intensities established for the Landfill were calculated to determine existing discharge rates for each storm event analyzed. Upon computation, the appropriate release rate reduction was performed resulting in the release rates outlined in Table 1.0 above. **Appendix G** contains the Hydrograph printouts for the drainage areas analyzed.

4.0 Soils Classifications

Soils classifications were obtained from the Natural Resource Conservation Service National Cooperative Soil Survey (Web Soil Survey) Website. According to NRCS no hydrologic group is exclusive to the site. Developed landfill areas are considered Group "B" while those undeveloped areas are considered "A", "B" or "C" as identified. Hydric soils are not present within the project development area. The following table is a listing of the soil types occurring within the area of the Phase V development. NRCS Soil Classification Maps and Soils reports are attached in **Appendix B**.

Table 4.0 - Soils

Map Symbol	Name	Hydrologic Soil Group	Hydric Soils
GIB	Gladstone Gravelly Loam, 3 to 8 percent slopes	B	No
GIC	Gladstone Gravelly Loam, 8 to 15 percent slopes	B	No
GmF	Gladstone Gravelly Loam, 25 to 55 percent slopes	A	No
GnD	Gladstone-Parker Gravelly Loam, 15 to 25 percent slopes	A	No
UfB	Udorthents, Sanitary Landfill	B	No
UKaB	Urban Land – 0 to 8 percent slopes	C	No
GmB	Gladstone Gravelly Loam, 0 to 8 percent slopes, very bouldery	A	No
GmD	Gladstone Gravelly Loam, 8 to 25 percent slopes, very bouldery	A	No

As outlined in the table above the existing landfill areas are defined as being of the Hydrologic Soil Group B. This classification is consistent with historical stormwater management plans approved for the landfill based upon the final capping system proposed requiring 24 inches of soil. Thus, for analysis of rate control, all areas proposed for landfill or landfill support activities have been and continue to be considered as part of the Hydrologic Soil Group B.

5.0 Geotechnical Investigation and Infiltration Analysis

Extensive geotechnical studies and investigations have been performed for the site and most recently on the northern portions of the Phase V Expansion as part of the Phase V Preliminary Land Development Plan Application which is provided to the Township within the Land Development Plan Supporting Documents binder. The purpose of the investigation was to map and identify the limits of Carbonate Geology (Karst) along the northern limits of the project. The geotechnical study concludes the landfill including the Phase V Expansion area of development is not underlain with carbonate geology. Carbonate geology was mapped approximately 100 feet north of the limits of the Phase V Expansion along Riverside Drive and Bull Run.

The Bethlehem Landfill is regulated under the NPDES Stormwater Program. A NPDES Permit is maintained onsite which monitors all offsite discharge points. Previous landfill expansions were developed and approved under a prohibition of infiltration contained within the Lower Saucon Code. This prohibition of infiltration was partially lifted via a text amendment to the Lower Saucon Township Stormwater Management Ordinance. The Phase V Expansion proposes additional disposal but a reduction in total impervious area within the property. Stormwater runoff from these areas of expansion will discharge to both existing and proposed Stormwater management facilities.

While the Ordinance prohibition on infiltration for industrial uses including landfills has been lifted, except as prohibited by 137-14.1k, we conclude a cautious approach to infiltration practices given the proposed use and proximity to carbonate geology is required. Therefore, the following hierarchy of design has been employed:

1. Reuse of the stormwater runoff (Dust Control)
2. Non-Structural BMP's (Limit Impervious Area (Phase V Reduction), Amended Soils and Revegetate/Reforest)
3. Conveyance of runoff in vegetated surface BMP's
4. Infiltration BMP's (Infiltration Basin/Raingardens)

Five (5) Dry Extended Detention Basins have been approved for the current landfill for management of stormwater rate and water quality. The Phase V Expansion proposes development within two existing approved detention basins; these being Basin #2 and Basin #6. The Phase V Expansion will result in a reduction of drainage area to Basin #2 and an increase in drainage area to

Basin #6. As outlined herein, these drainage area modifications will not result in exceedances of the prescribed release rates for these structures, thus no design change other than tributary area is proposed. Therefore, the existing design for detention basins (#1, #2, #3, #4 and #6) are to remain without modification.

Two (2) new dry extended detention basins are proposed to manage stormwater runoff from the vast majority of the Phase V Expansion. These detention basins are identified as Basins #7 and #8. As documented in Section 9 of this report, the water quality volume is accounted for using the hierarchy method described above where infiltration is not required. Thus, these new basins are designed as dry extended detention basins.

Therefore, the Phase V expansion proposes no facilities designed for infiltration of stormwater runoff.

6.0 Methods of Analysis and Design

6.1 Watershed Analyses

Contained within the existing Bethlehem Landfill there currently exists six (6) watersheds. Watersheds are as follows:

1. Basin 1
2. Basin 2
3. Basin 3
4. Basin 4
5. Basin 6
6. Lehigh River

These drainage sheds have been analyzed numerous times as the landfill has expanded over time. Historical mapping with each drainage shed can be found within **Appendix C**. The Phase V Expansion proposes development within the watersheds of the Lehigh River (reduction), Basin #2 (reduction) and Basin #6 (increase). The proposed development results in an increase in the Basin #6 drainage area and a decrease in the Basin #2 and Lehigh River drainage areas. Given the watersheds as previously approved met release rate criteria and development is consistent with previous designs, then the watersheds not impacted by the Phase V Expansion, by remaining unchanged, will continue to meet release rate criteria. For the purposes of pre development analysis the following post development calculations are provide herein.

Basin #1	-	Aria Energy RNG Facility Post Development Calculations
Basin #2	-	New Analysis as Described Herein
Basin #3	-	Phase IV Post Development Computations
Basin #4	-	Cell 4F Minor Modification Post Development Computations
Basin #6	-	New Analysis as Described Herein

Basins #2 and #6 have modified drainage areas as a result of development and, thus, require further analysis. Peak Runoff Analyses were performed using the soil cover complex method within the SEDCAD 4 computer program. Drainage Area Mapping specific to Basins #2 and #6 are contained within **Appendix D**. Comprehensive Watershed Analyses are provided in **Appendix G and H**. For reference we have also included pre-development and post development historical computations for each watershed not impacted by the Phase V Expansion.

In addition to the watersheds discussed above, the Phase V project requires analysis of new watersheds not previously modeled. These new watersheds are identified as follows:

7. Area 007
8. Area 008 (Pro. Basin 7)
9. Area 009
10. Area 010
11. Area 011
12. Area 012 (Pro. Basin 8)

These new drainage areas were analyzed using the Hydroflow Computer Modeling software for both pre and post development conditions to ensure compliance with release rates. Refer to **Appendix G and H** for a full analysis.

6.2 Rainfall Depths

Rainfall depths (24-hr) utilized for rate analysis for existing watersheds are as follows:

2 year	=	3.00"
5 year	=	3.60"
10 year	=	4.56"
25 year	=	5.52"
50 year	=	6.48"
100 year	=	7.44"

These rates are the established rates for the historical analysis of Bethlehem Landfill. Thus, for consistency and conformity, the above rates were utilized for existing watershed and basin analysis. For the new drainage areas analyzed, the rates were obtained from NOAA Atlas 14 as provided in **Appendix E**.

6.3 Runoff Curve Numbers

Runoff curve numbers were obtained from Chapter 137 **Appendix C** of the Lower Saucon Township Code. A discussion regarding runoff curve number calculations can be found within **Appendix F** as well as weighted runoff curve number calculations.

6.4 Times of Concentration (T_c)

Times of concentration were calculated using a segmental approach based on flow characteristics approximated through interpretation of existing and proposed topography and

ground surface coverage. Time of concentration calculations is located in **Appendix E**. T_c paths are depicted on the drainage area maps are provided in **Appendix D**.

6.5 Stormwater Detention Basin

As stated previously, the drainage areas to Basin #2 and #6 have changed but the design of Basin #2 presented in the Northern Realignment and Basin #6 in the Cell 4F minor modification remains unchanged. Two (2) new Stormwater detention basins are proposed, Basin #7 and Basin #8, which collect and treat the vast majority of the Phase V Expansion area. Runoff from the onsite contributory drainage areas were routed through the detention basins under post construction conditions to confirm adequate discharge attenuation from the site. The design of these facilities accounts for all of the site conditions, constraints and design considerations as outlined within the PA Stormwater BMP Manual.

Calculations in **Appendix I** include water quality treatment and dewatering times. Construction details are provided on the Post Construction Stormwater Management Plans.

6.6 Stormwater Channels

Stormwater channels were designed to convey peak runoff generated during a 100-year design storm as derived using the Soil Cover Complex Method within SEDCAD 4 for calculating stormwater runoff. Channel linings were selected based on the governing condition of flow velocity or shear stress occurring when conveying the design peak flow. All calculations pertaining to channel design are located in **Appendix J**. Stormwater facility drainage area maps are located in **Appendix D** for reference.

6.7 Stormwater Culverts

Stormwater culverts were designed to convey peak runoff generated during a 100-year design storm as derived using the Soil Cover Complex Method within SEDCAD 4 for calculating stormwater runoff. Manning's Equation within SedCAD 4 program was used to model the hydraulics of the stormsewer system. All calculations for culvert design are located in **Appendix K**.

7.0 Pre Construction Peak Runoff Analysis (Phase V)

Pre-construction peak runoff volume and peak discharge were analyzed at seven (7) new discharge points (DP007 to DP013). These points of discharge are identified along the Phase V limits of development as shown on the pre-development drainage area mapping in **Appendix D**. Peak runoff rates were calculated at each discharge point for the two (2), ten (10), twenty-five (25), and one-hundred (100) year storm events. Pre-construction hydrograph summaries and detailed hydrographs are provided in **Appendix G** of this report. The following table is a summary of peak discharges from the project site.

Table 7.0 – Pre-construction Peak Discharge Summary
In Cubic Feet per Second

Drainage Area	Design Storm Event			
	2Yr/24Hr	10Yr/24Hr	25Yr/24Hr	100Yr/24Hr
007	0.04	0.25	0.47	0.93
008	0.52	2.73	4.76	8.84
009	12.09	23.66	31.98	46.90
010	12.90	22.81	29.62	41.56
011	0.01	0.43	3.16	19.93
012	0.00	0.30	1.25	14.77

The pre-development rates outlined above are subject to the release rate reductions required by the Act 167 Ordinances governing the Phase V Expansion area. Drainage Areas 008 and 012 relate directly to the discharge locations for the two basins proposed (Basin 7 and 8). The release rates prescribed on table 1.0 are the pre-development rates outlined above within the reduction factors required associated with the approved Act 167 plans.

8.0 Post Construction Peak Rate Management

Post construction peak runoff rates were calculated for the same new discharge points examined in the pre-construction analysis, thus a direct comparison is made. A post construction drainage area map is included within **Appendix D**. Peak runoff rates were calculated for the two (2), ten (10), twenty-five (25), and one-hundred (100) year storm events. Post construction peak discharge rates will be managed through the construction of two (2) stormwater dry extended detention basins to minimize the rate of surface runoff discharged from the project area. Additionally, post construction computations for each drainage area (basin) onsite have been provided as referenced in Section 6.1.

The following table is a summary of proposed post construction peak discharges with stormwater management controls compared to allowable pre-construction release rates from Table 1.0. for each drainage shed. Post construction hydrograph summaries, detailed soil cover complex hydrographs and routing hydrographs are provided in **Appendix H**.

Table 8.0 – Post Construction Peak Discharge Summary
In Cubic Feet per Second – with Stormwater Controls

Drainage Area	DESIGN STORM EVENT (CFS)							
	2 yr/24 hr		10 yr/24 hr		25 yr/24 hr		100 yr/24 hr	
	PRE	POST	PRE	POST	PRE	POST	PRE	POST
Basin #1					1.43	1.43		
Basin #2	0.30	0.22	1.23	0.38	1.61	0.82	13.1	1.46
Basin #3	9.5	0.59	22.8	5.19	31.0	8.25	44.3	12.18
Basin #4	3.1	1.85	6.7	5.54	8.3	8.15	10.6	10.49
Basin #6	9.0	1.65	20.4	5.14	27.1	7.55	37.5	24.43
007	0.01	0.00	0.13	0.00	0.24	0.00	0.47	0.00
008 (Basin 7)	0.16	0.14	1.37	0.44	2.38	0.67	4.42	2.45
009	3.63	3.06	11.83	9.21	15.99	14.07	23.45	23.44
010	3.87	3.77	22.81	12.03	29.62	18.64	41.56	31.42
011	0.00	0.00	0.43	0.00	3.16	0.00	19.93	0.00
012 (Basin 8)	0.00	0.04	0.30	0.23	1.25	1.25	14.77	11.67

As evidenced by the results presented above, post construction peak discharge rates will be equal to or less than pre-construction peak discharge rates or allowable release rates for all storm events analyzed. While the comparison of pre and post development discharge rates for Area 012 indicates a 0.04 cfs increase, this is effectively zero discharge meeting the release rate criteria.

9.0 Post Construction Water Quality Analysis

The area of development associated with the Phase V Expansion is 171 acres. Current conditions yield this area of development to include Woodlands, Grass Cover, Landfill Areas, previously Developed Areas and Impervious Area. Approximately 31 acres of this development area consists of previously developed landfill, landfill support activities and other industrial activities. Upon development of the Phase V Expansion, the area of impact to land cover not currently approved as landfill, landfill support activities or other industrial activities is limited to 140 acres. The proposed land cover within this area will be grass, reforested landscape areas and impervious surface. Based upon this change in natural land cover the Water Quality Volume can be calculated in accordance with Ordinance requirements by the difference between the 2Yr/24Hr volume difference between pre and post development of this 140 acre area. Therefore, for purposes of water quality volume calculation, the total pre-development 2Yr/24Hr volume was computed by analyzing the land cover within the 140 acre area as woodlands, meadow and 80% of existing impervious within the PADEP PCSM spreadsheet. The volume calculated is 147,438 cubic feet.

This pre-development total volume was compared to the post development volume computed within the PADEP PCSM spreadsheet for the same 140 acre area with post development land cover resulting in a post development volume of 559,657 cubic feet.

Based upon these pre and post development volumes computed, the water quality volume is 412,219 cf.

The water quality volume is accounted for under post development conditions by utilizing the following BMP's.

1. Placement of Amended Soils Media within Basin Bottoms
2. Evapotranspiration from Extended Detention Basins
3. Revegetate/Reforest Areas.
4. Conveyance of Runoff via Vegetated Swales (Bench) to Vegetated Basins.

Refer to **Appendix N** for more details regarding the Water Quality Volume Analysis.

10. Sequence of Construction

The Phase V Expansion is proposed to include the development of ten (10) cells, Cell 5-A to 5-J. Generally, the cell development will begin with developing Cell 5-A and concluding with Cell 5-J. Prior to cell development of Cell 5-A, Basin 8 will be constructed with all associated conveyance facilities to Basin 8. In conjunction with Cell 5-C, development Basin #7 will be constructed including all conveyance facilities to Basin #7. Upon entering post-closure activities onsite, all basins will be converted to the permanent dry extended detention basin.

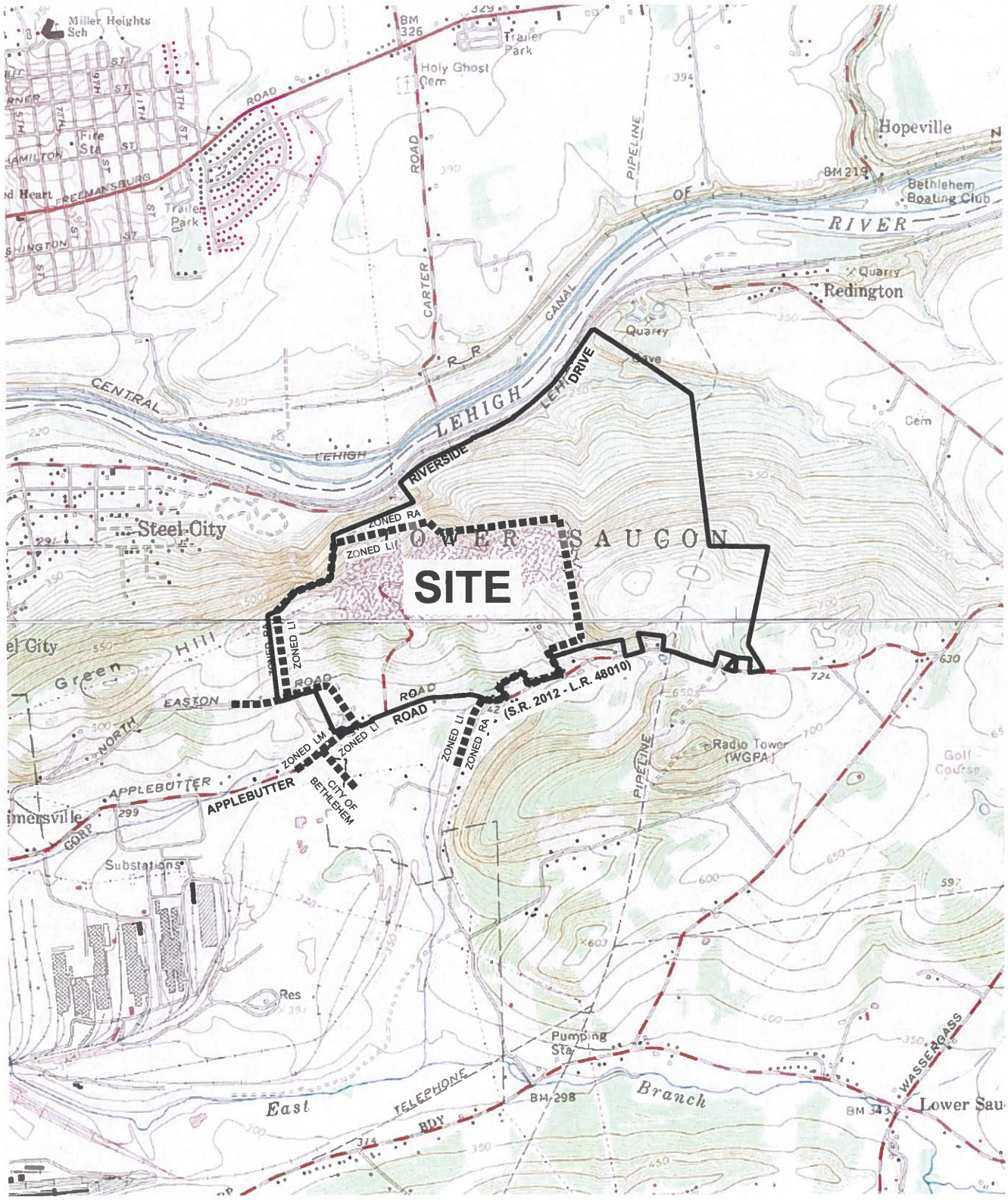
11. Conclusion

We certify that this Stormwater Management Report has been prepared according to accepted professional engineering means, methods and standards. The plan is designed in compliance with Lower Saucon Township Stormwater Management Ordinance. The calculations demonstrate that the objectives stated in Section 2 have been met.

SECTION 10

APPENDIX A

USGS 7.5 Minute Series Location Map
Federal Emergency Management Agency NFIP Map
Watershed Release Rate Mapping



Nazareth, PA Quad
Hellertown, PA Quad

martin and martin incorporated
phone: (717) 264-6759
37 south main street • suite A
chambersburg, pennsylvania . 17201

LOWER SAUCON TWP. NORTHAMPTON COUNTY

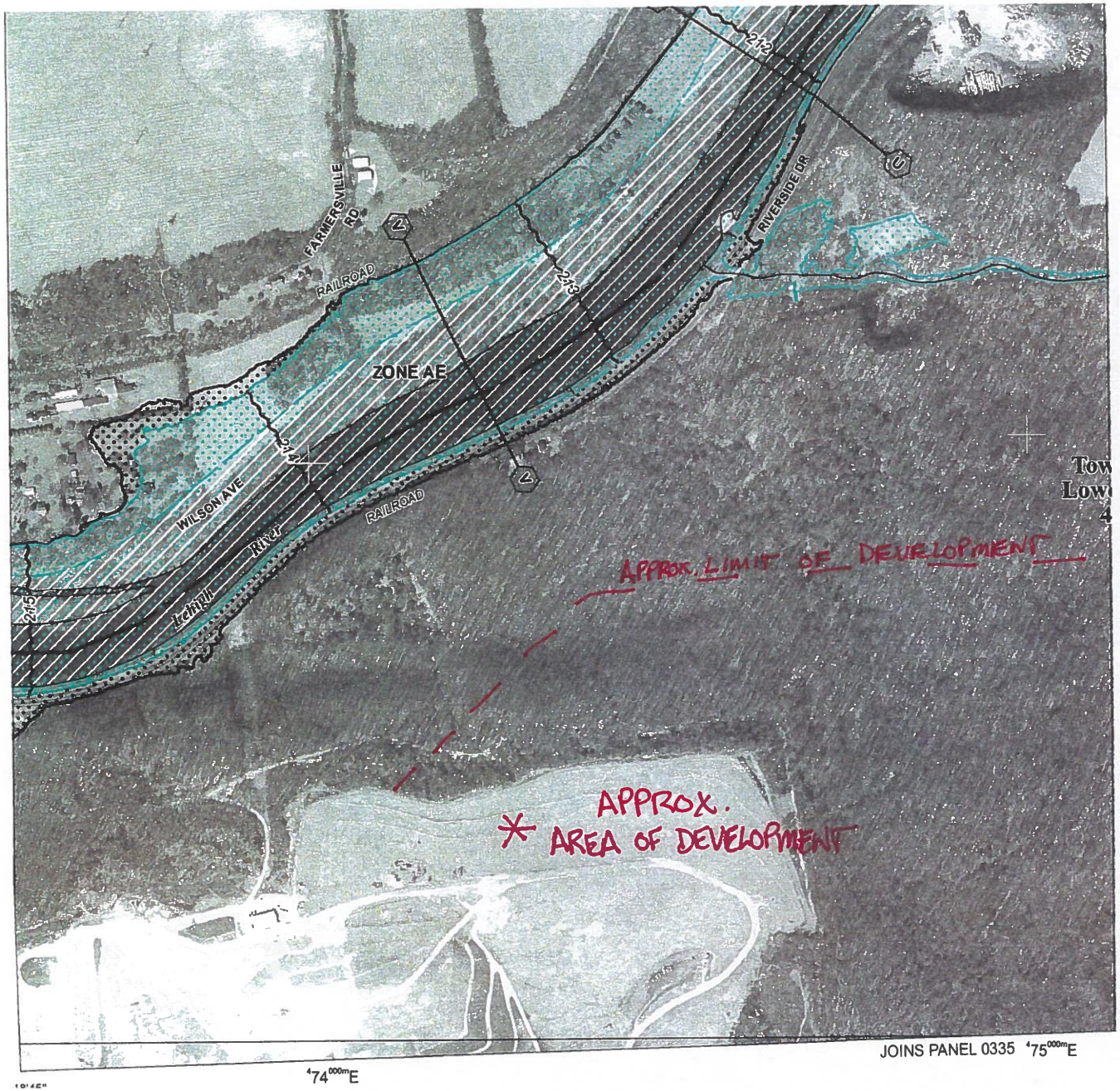
- USGS LOCATION MAP -

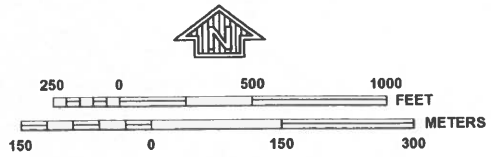
BETHLEHEM LANDFILL PHASE V EXPANSION ZONING APPLICATION PLAN

Bethlehem Landfill Company

PENNSYLVANIA

Scale:	1"=2000'
Job #	1162.6
Date:	12/01/22
By:	DB
Chk'd:	JM





NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0268E

FIRM

FLOOD INSURANCE RATE MAP

NORTHAMPTON COUNTY, PENNSYLVANIA
(ALL JURISDICTIONS)

PANEL 268 OF 355

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
BETHLEHEM, TOWNSHIP OF	420980	0268	E
EASTON, CITY OF	425383	0268	E
LOWER SAUCON, TOWNSHIP OF	420982	0268	E

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
42095C0268E

MAP REVISED
JULY 16, 2014

Federal Emergency Management Agency

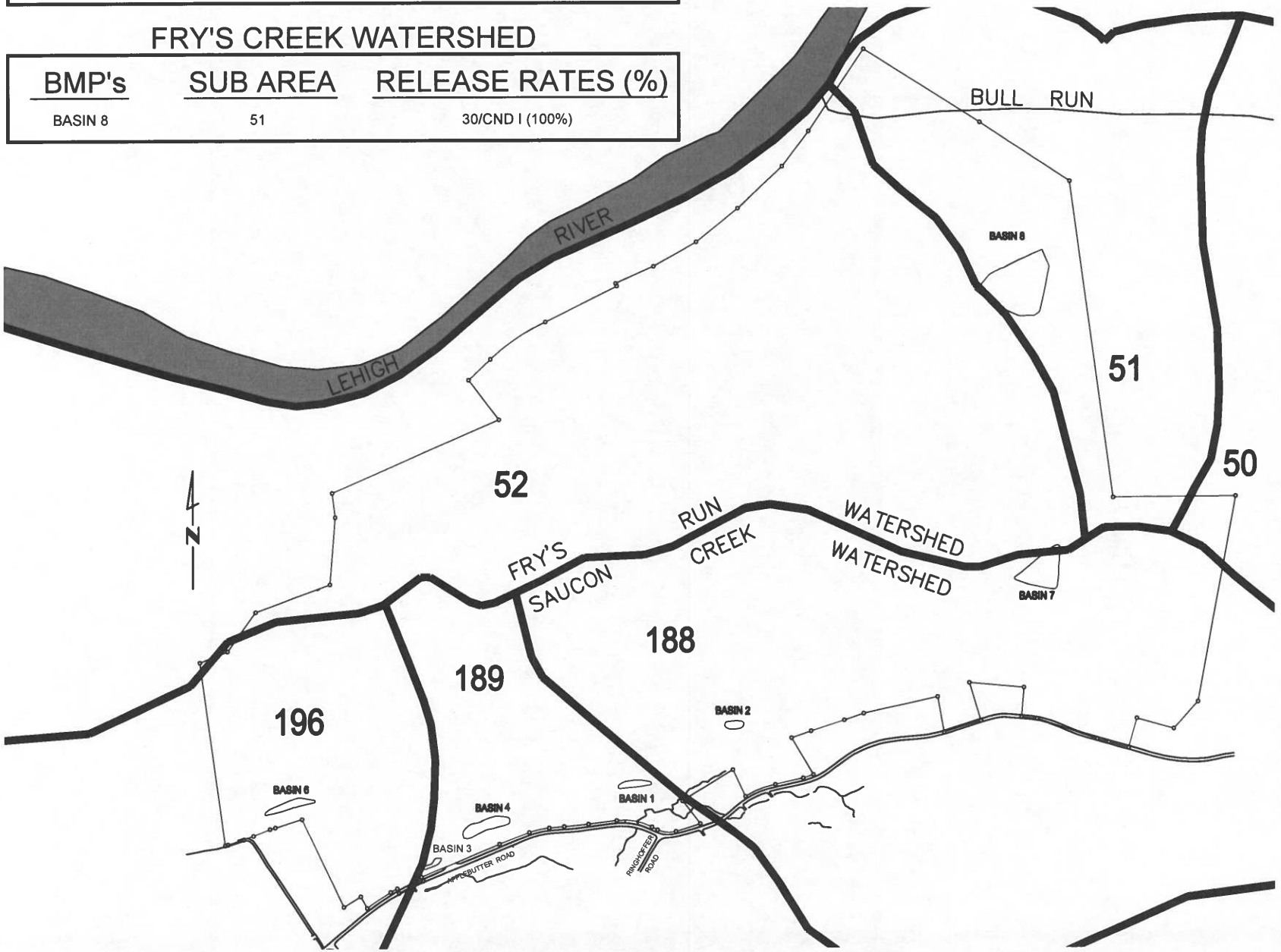
A-2

SAUCON CREEK WATERSHED

BMP's	SUB AREA	RELEASE RATES (%)
BASIN 2	188	30/50
BASINS 1,3 & 4	189	30/100
BASIN 6	196	30/100

FRY'S CREEK WATERSHED

BMP's	SUB AREA	RELEASE RATES (%)
BASIN 8	51	30/CND I (100%)



martin and martin incorporated
37 south main street • suite A
chambersburg, pennsylvania . 17201
phone: (717) 264-6759

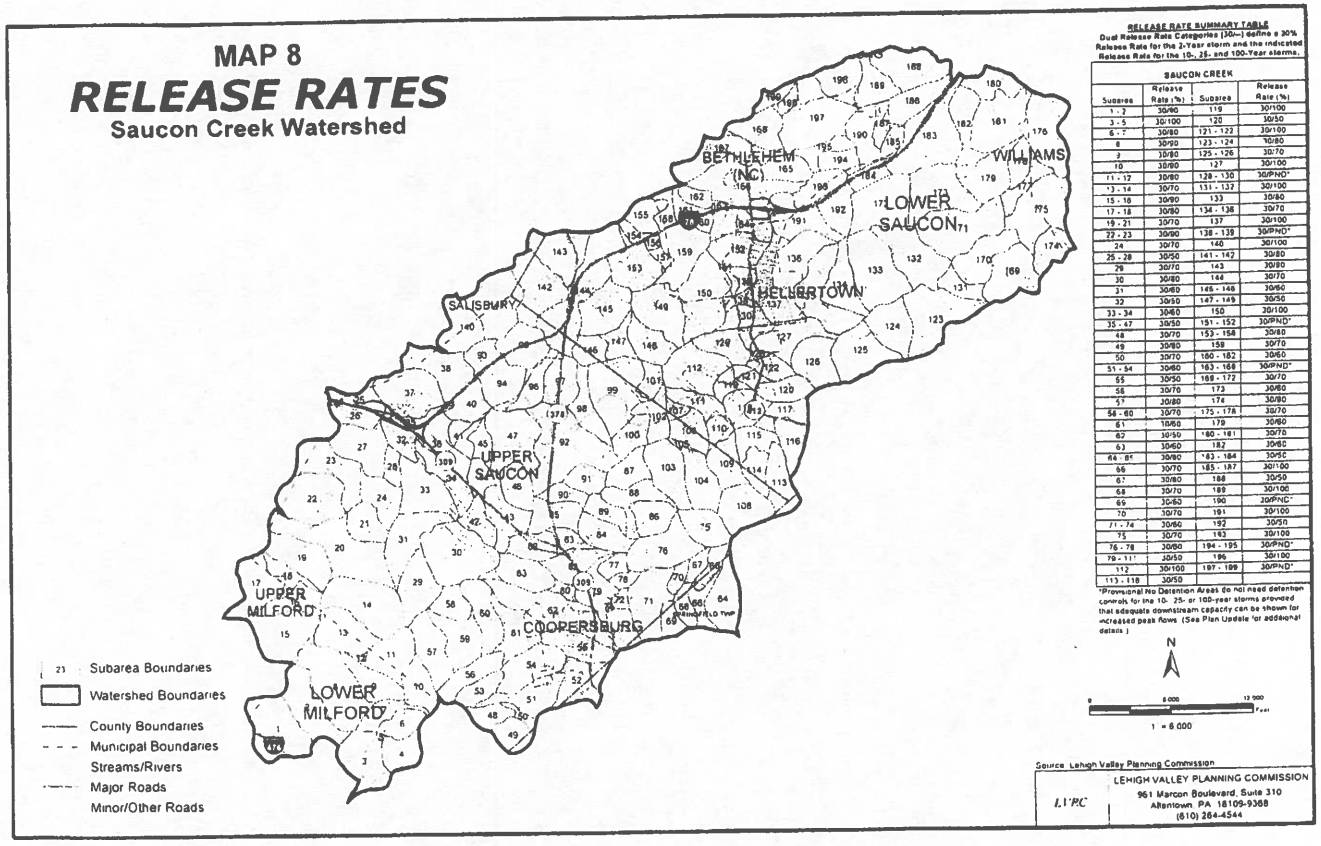
LOWER SAUCON TOWNSHIP
NORTHAMPTON COUNTY
PENNSYLVANIA

Saucon Creek Watershed Release Rate Map

IESI Bethlehem Landfill Corp.

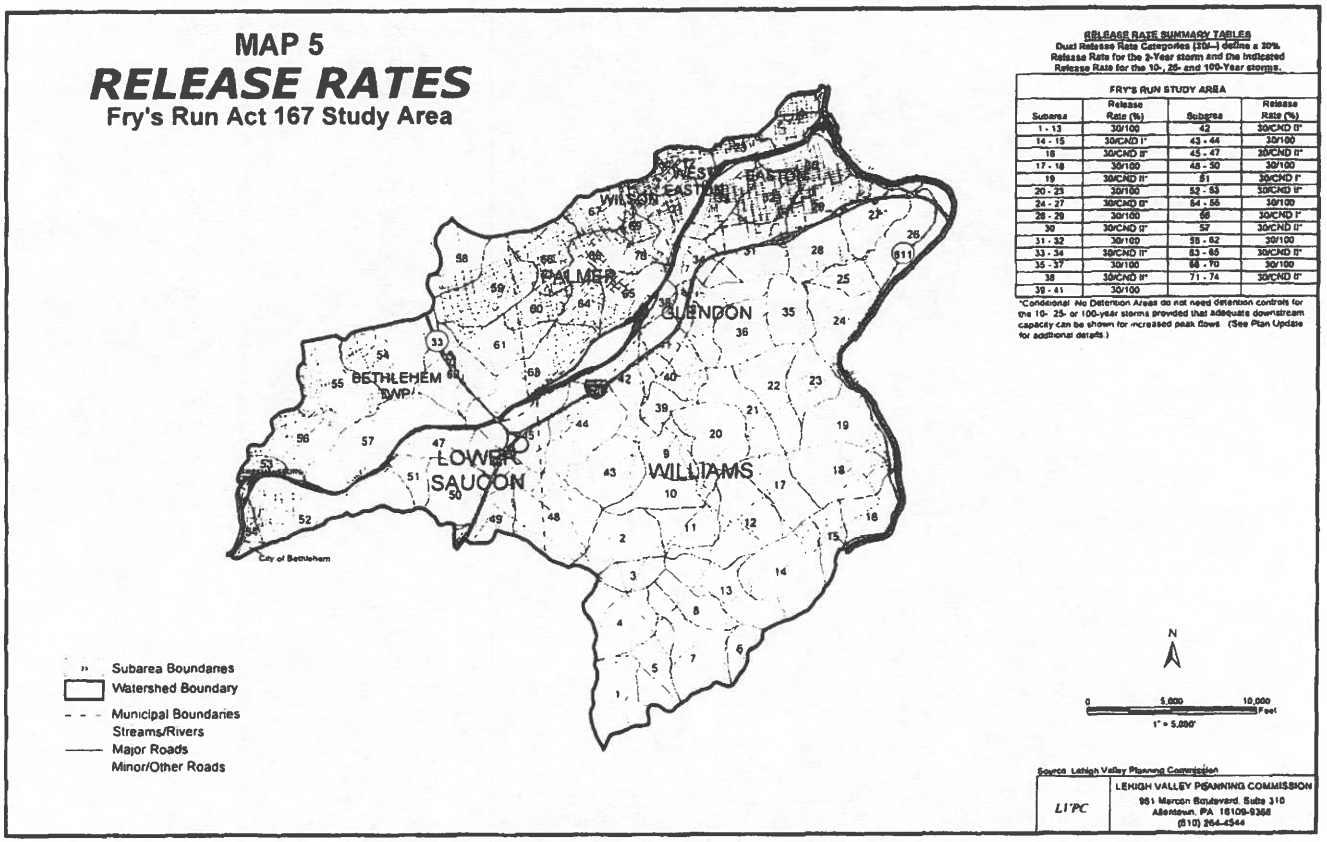
Scale: 1"=1000'
Job # 1162.6
Date: 08/15/23
By: SS
Chk'd: JM

Appendix B-8
Release Rates Map
Saucon Creek Watershed



A-5

Appendix B-9
Release Rates Map
Fry's Run Watershed



RELEASE RATE SUMMARY TABLES
Dual Release Rate Categories (30/--) define a 30% Release Rate for the 2-Year storm and the indicated Release Rate for the 10-, 25- and 100-Year storms.

FRY'S RUN STUDY AREA

Subarea	Release Rate (%)	Subarea	Release Rate (%)
1 - 13	30/100	42	30/CND II*
14 - 15	30/CND I*	43 - 44	30/100
16	30/CND II*	45 - 47	30/CND II*
17 - 18	30/100	48 - 50	30/100
19	30/CND II*	51	30/CND I*
20 - 23	30/100	52 - 53	30/CND II*
24 - 27	30/CND II*	54 - 56	30/100
28 - 29	30/100	58	30/CND I*
30	30/CND II*	57	30/CND II*
31 - 32	30/100	58 - 62	30/100
33 - 34	30/CND II*	63 - 66	30/CND II*
35 - 37	30/100	68 - 70	30/100
38	30/CND II*	71 - 74	30/CND II*
39 - 41	30/100		

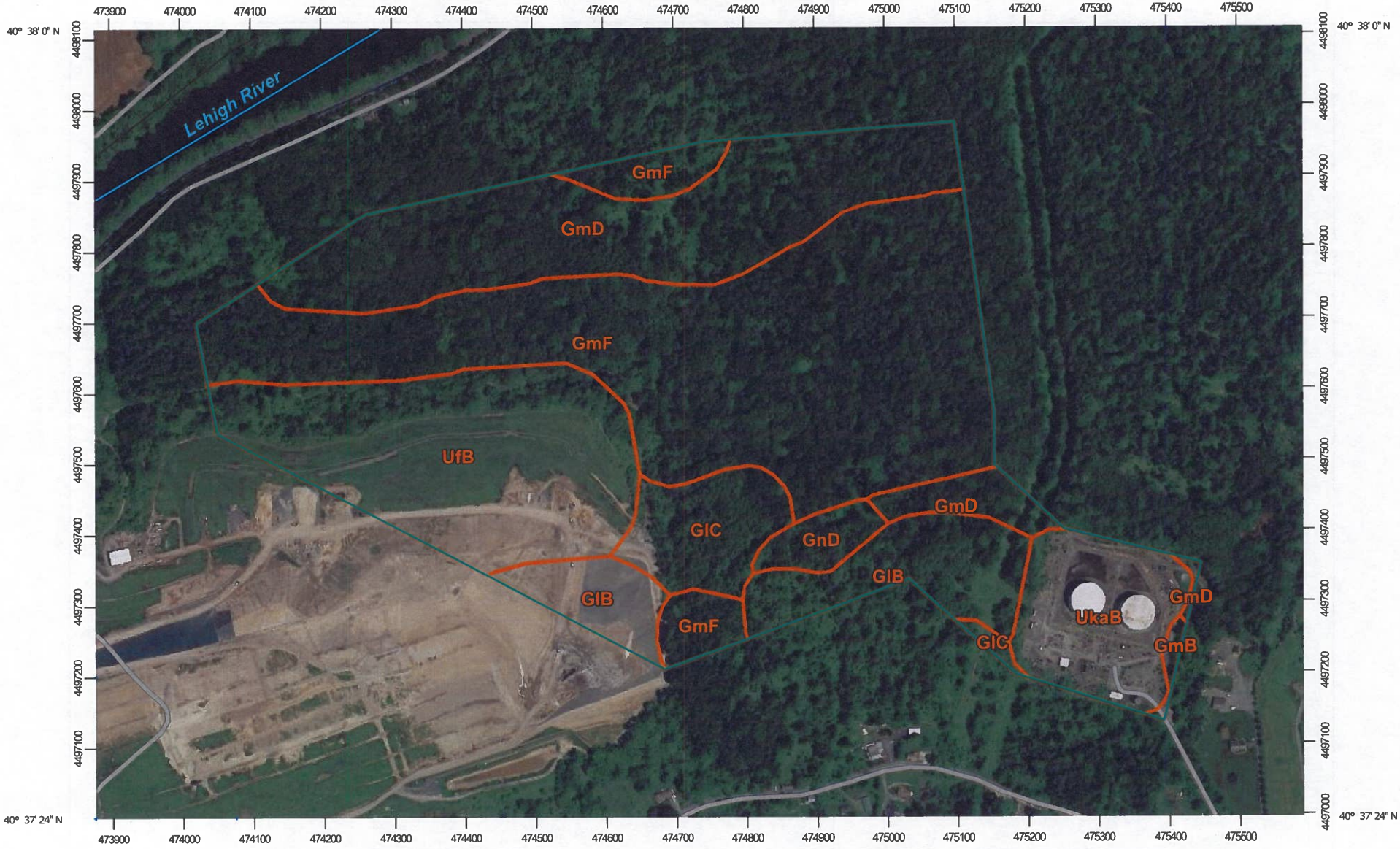
*Conditional: No Detention Areas do not need detention controls for the 10- 25- or 100-year storms provided that adequate downstream capacity can be shown for increased peak flows. (See Plan Update for additional details.)

SECTION 10

APPENDIX B

NRCS Soils Mapping and Reports

Soil Map—Northampton County, Pennsylvania



Map Scale: 1:7,840 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0, 100, 200, 400, 600

Feet: 0, 350, 700, 1400, 2100

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

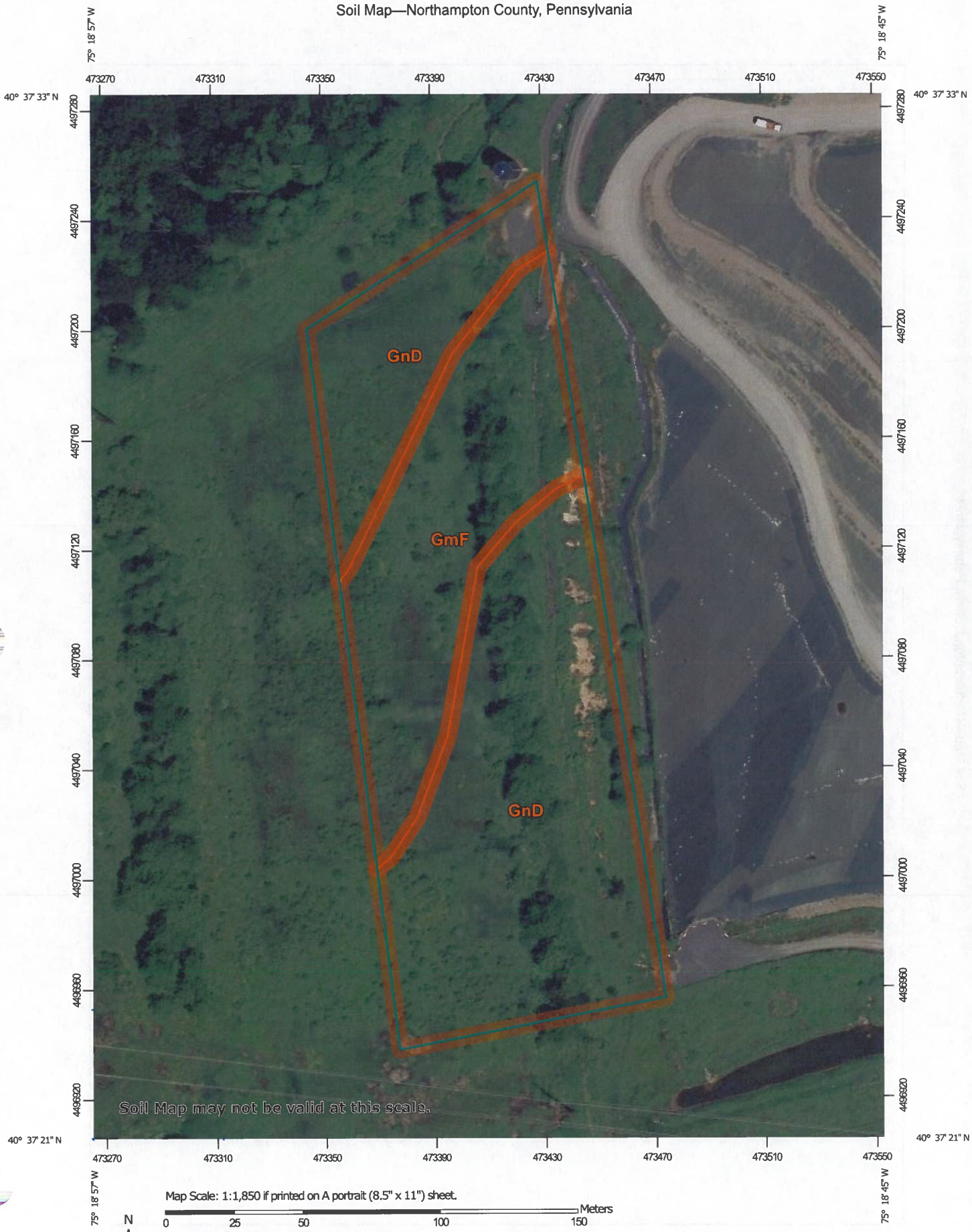
B-1

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
GlB	Gladstone gravelly loam, 3 to 8 percent slopes	14.8	8.7%
GlC	Gladstone gravelly loam, 8 to 15 percent slopes	8.5	5.0%
GmB	Gladstone gravelly loam, 0 to 8 percent slopes, very bouldery	0.6	0.3%
GmD	Gladstone gravelly loam, 8 to 25 percent slopes, very bouldery	34.7	20.4%
GmF	Gladstone gravelly loam, 25 to 55 percent slopes, very bouldery	66.2	38.9%
GnD	Gladstone-Parker gravelly loams, 15 to 25 percent slopes	2.8	1.7%
UfB	Udorthents, sanitary landfill	30.5	17.9%
UkaB	Urban land, 0 to 8 percent slopes	12.1	7.1%
Totals for Area of Interest		**170.2**	**100.0%**

B-2

Soil Map—Northampton County, Pennsylvania



Map Scale: 1:1,850 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 25 50 100 150

Feet: 0 50 100 200 300

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

B-3

Map Unit Legend

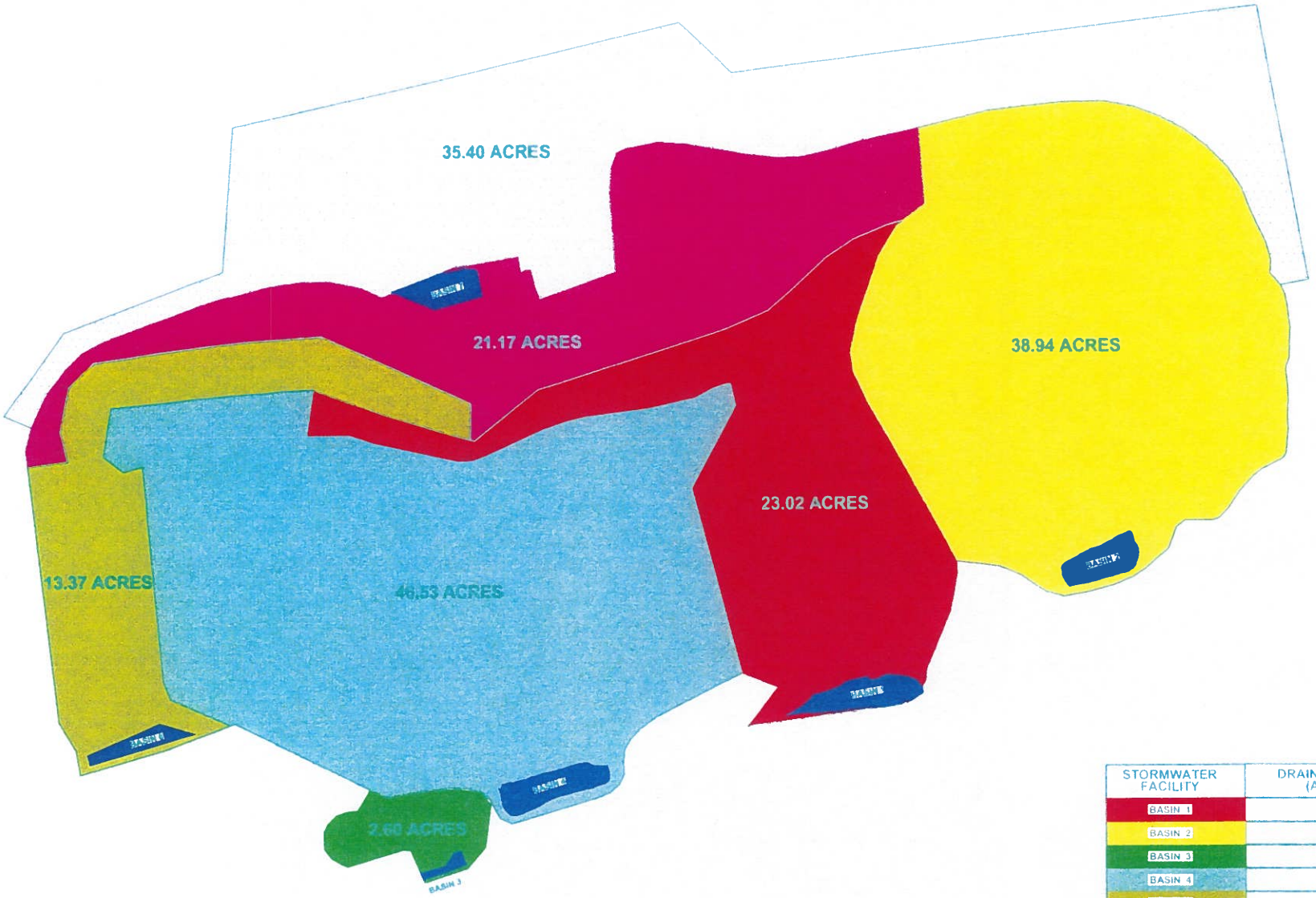
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
GmF	Gladstone gravelly loam, 25 to 55 percent slopes, very bouldery	2.1	32.0%
GnD	Gladstone-Parker gravelly loams, 15 to 25 percent slopes	4.5	68.0%
Totals for Area of Interest		**6.6**	**100.0%**

B-4

SECTION 10

APPENDIX C

Historical Drainage Area Mapping

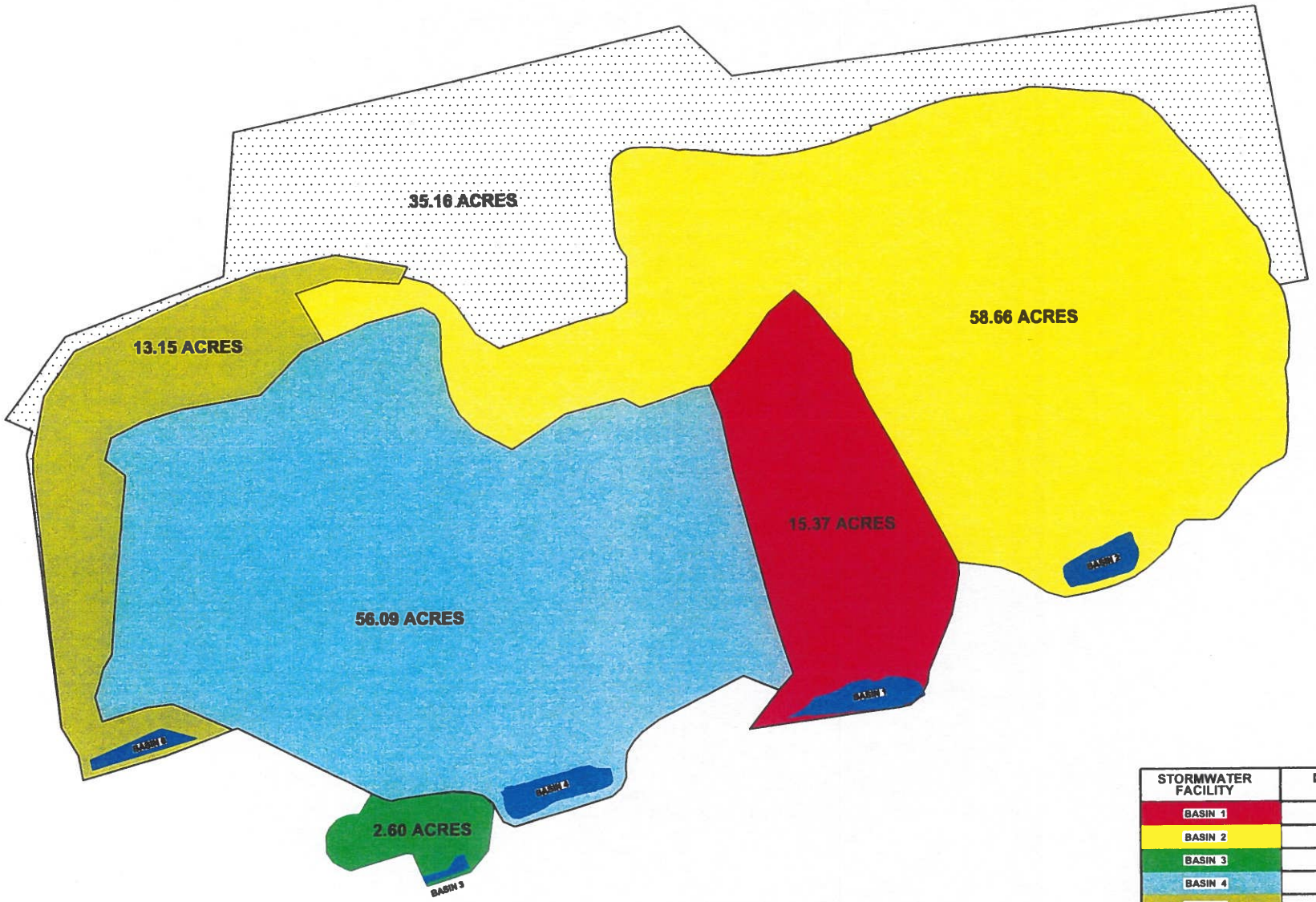


STORMWATER FACILITY	DRAINAGE AREA (ACRES)
BASIN 1	23.02
BASIN 2	38.94
BASIN 3	2.60
BASIN 4	46.53
BASIN 6	13.37
BASIN 7	21.17
LEHIGH RIVER	35.40
TOTAL	181.03

DRAINAGE AREA MAP

APPROVED PHASE IV 2003 PERMIT

EXHIBIT 1

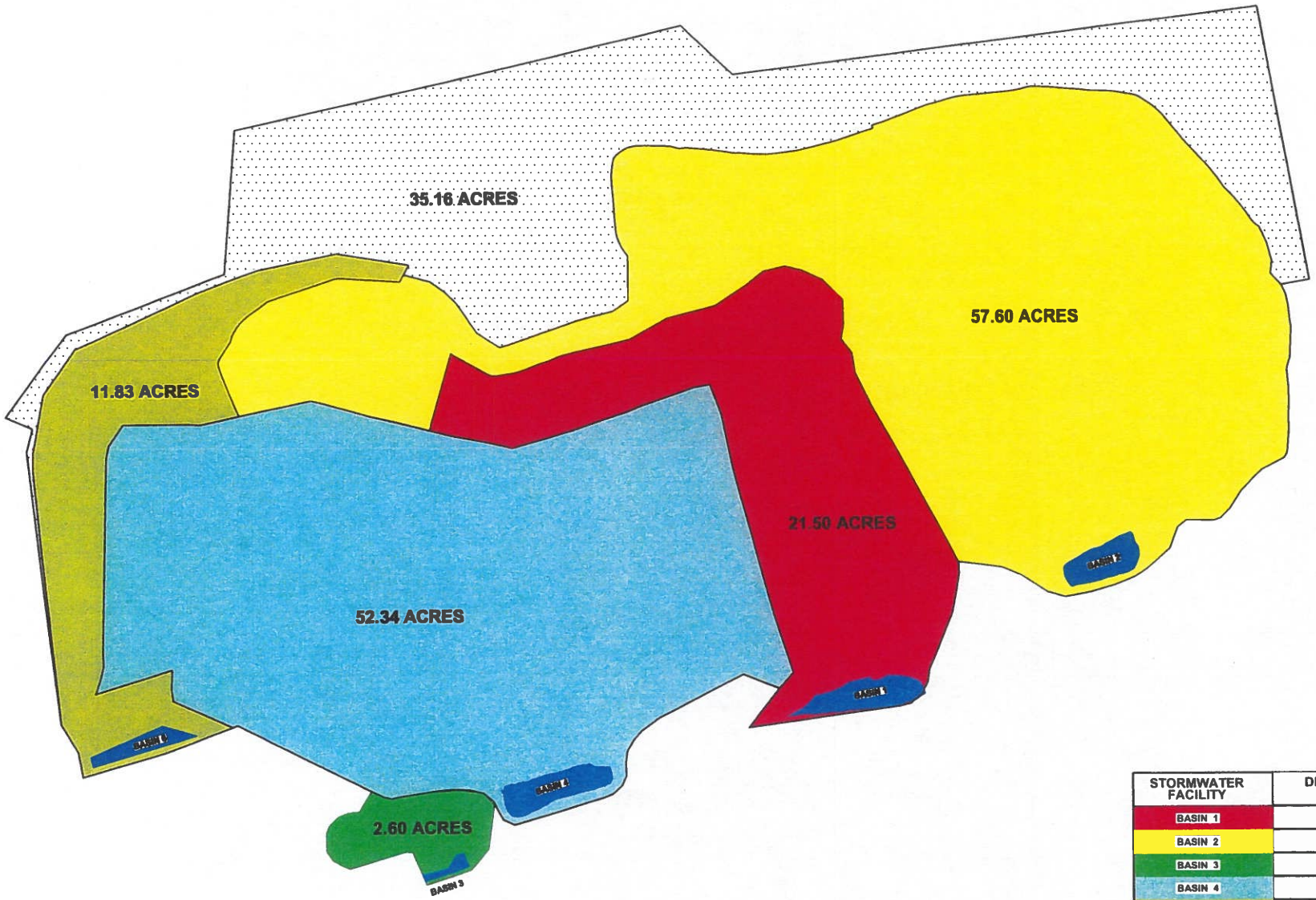


STORMWATER FACILITY	DRAINAGE AREA (ACRES)
BASIN 1	15.37
BASIN 2	58.66
BASIN 3	2.60
BASIN 4	56.09
BASIN 6	13.15
BASIN 7	0.00
LEHIGH RIVER (OFF SITE)	35.16
TOTAL	181.03

DRAINAGE AREA MAP

APPROVED CELL 4F - MINOR MODIFICATION

EXHIBIT 2

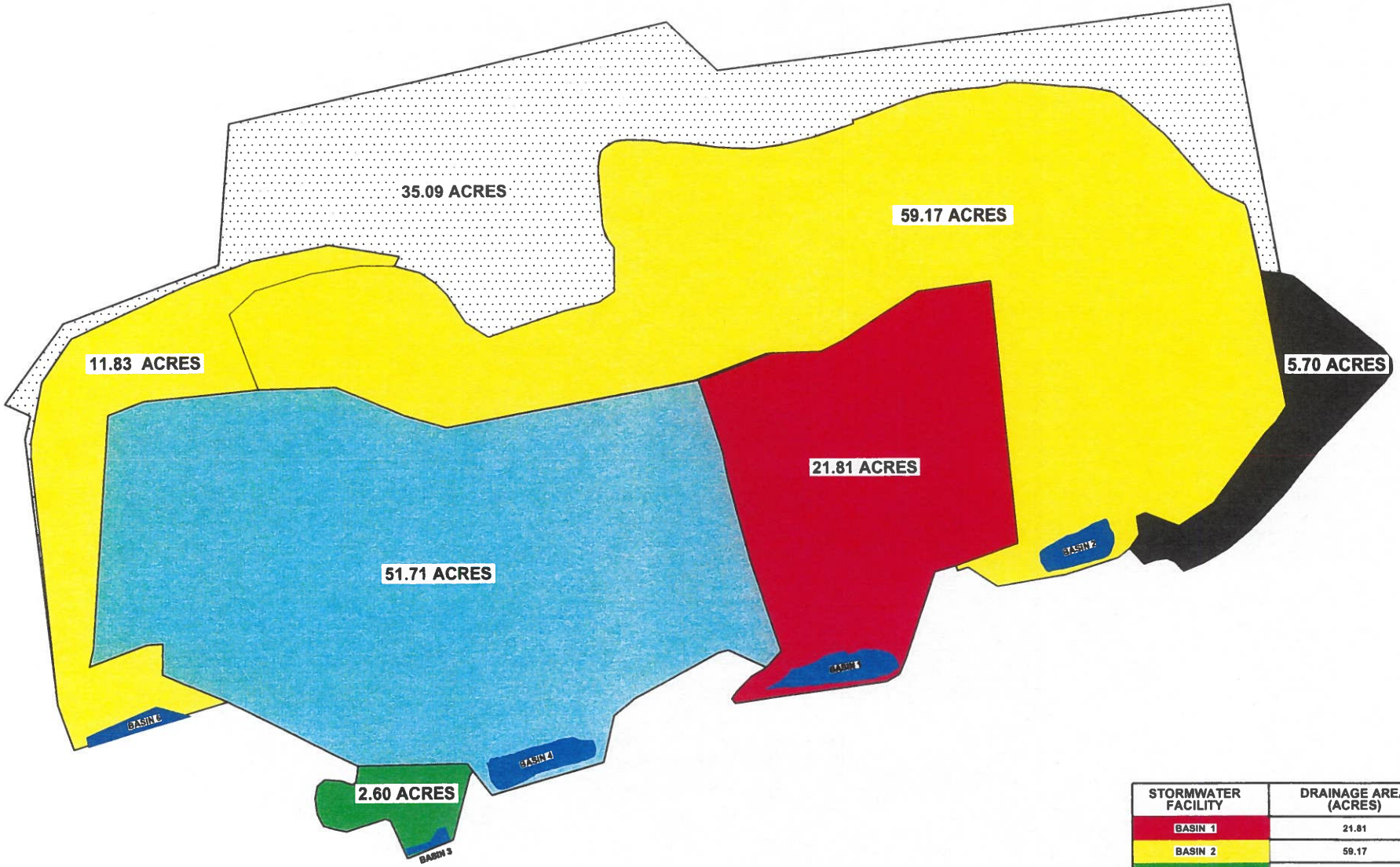


DRAINAGE AREA MAP

APPROVED FINAL GRADE ADJUSTMENT - CAP REMOVAL MINOR MODIFICATION

STORMWATER FACILITY	DRAINAGE AREA (ACRES)
BASIN 1	21.50
BASIN 2	57.58
BASIN 3	2.60
BASIN 4	52.34
BASIN 6	11.83
BASIN 7	0.00
LEHIGH RIVER (OFF SITE)	35.16
TOTAL	181.03

EXHIBIT 3

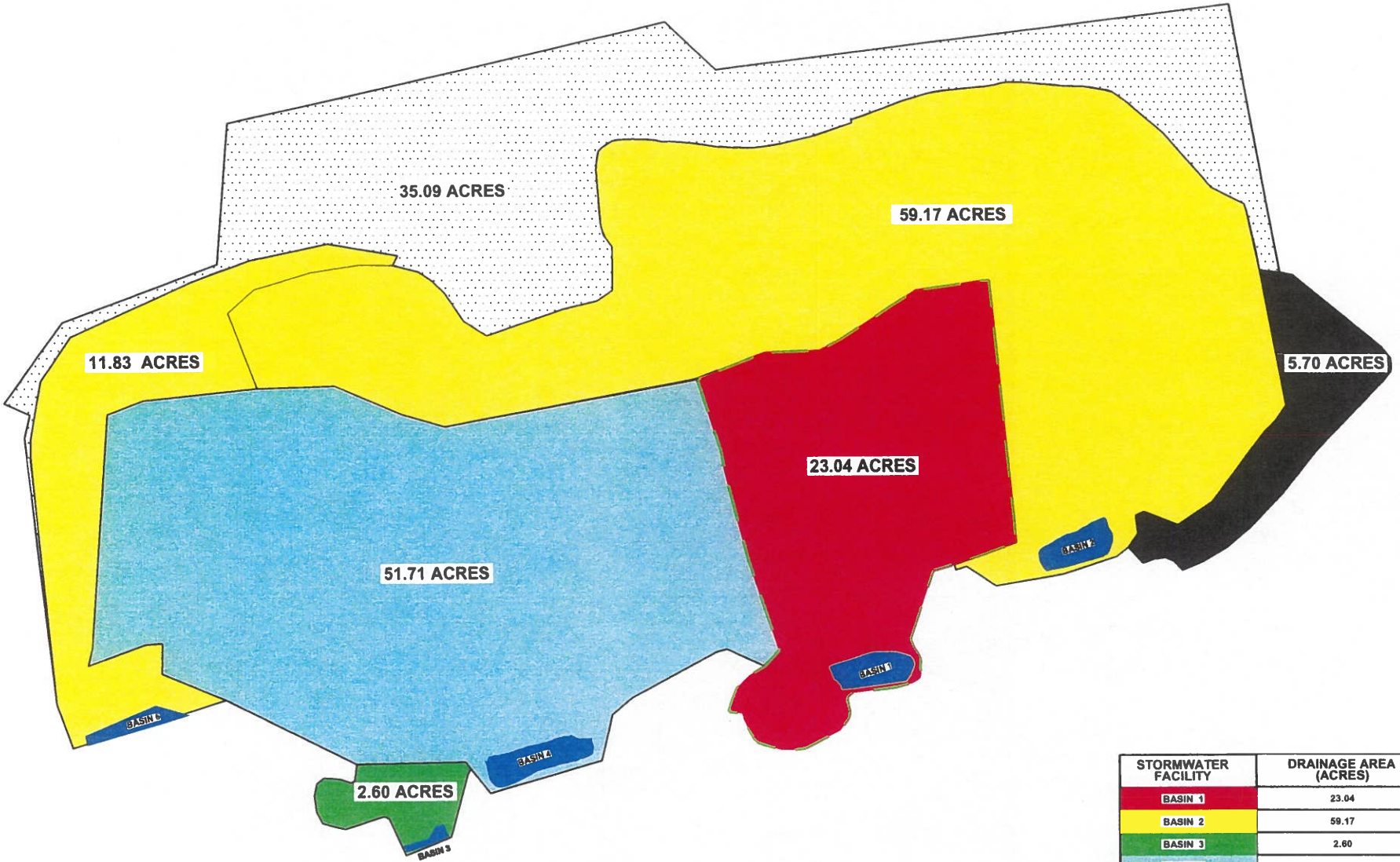


DRAINAGE AREA MAP

APPROVED SOUTHEASTERN REALIGNMENT - MAJOR MODIFICATION

STORMWATER FACILITY	DRAINAGE AREA (ACRES)
BASIN 1	21.81
BASIN 2	59.17
BASIN 3	2.60
BASIN 4	51.71
BASIN 6	11.83
AREA A	5.70
LEHIGH RIVER (OFF SITE)	35.09
TOTAL	187.91

EXHIBIT 4



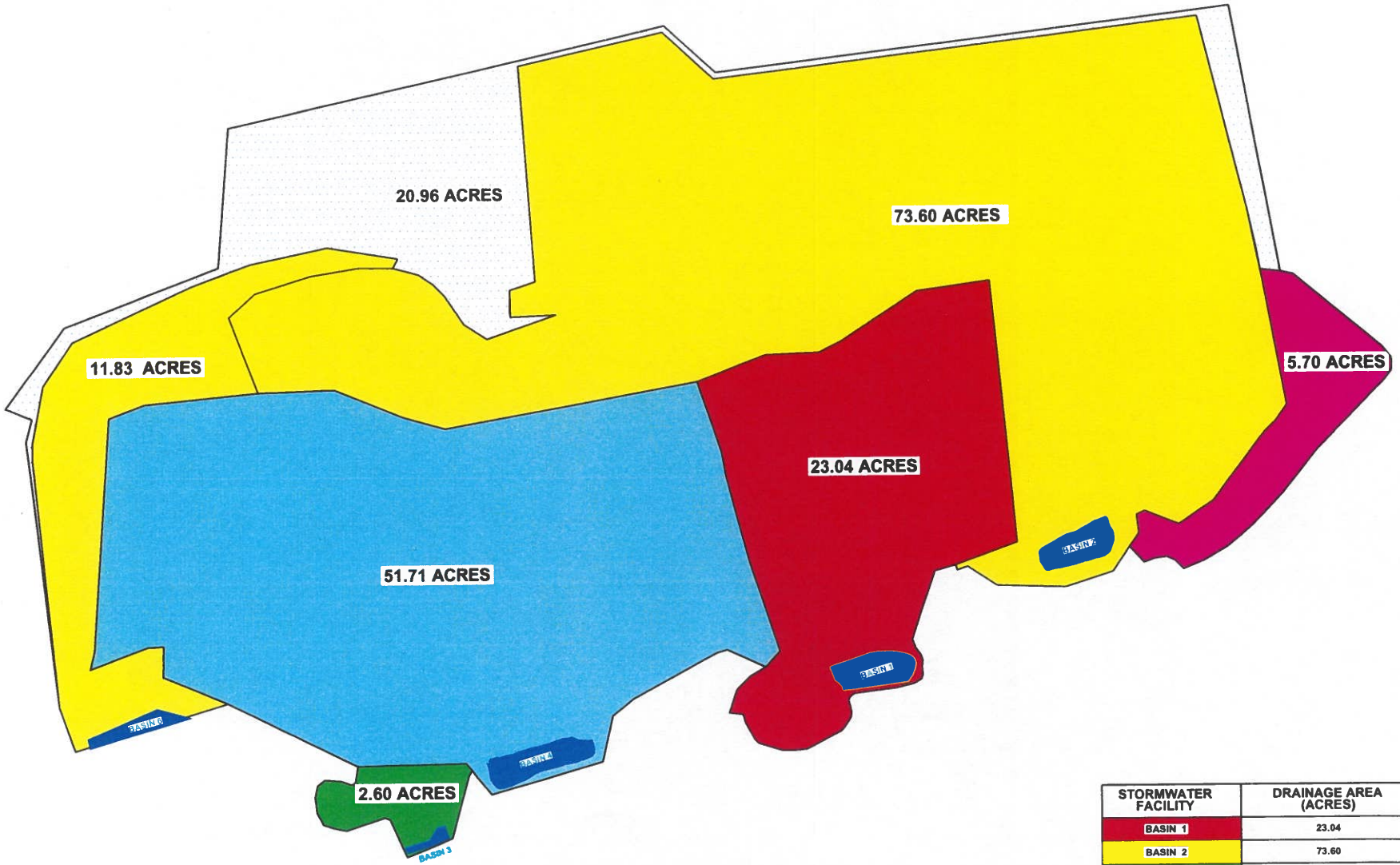
DRAINAGE AREA MAP

PROPOSED RNG FACILITY - MAJOR MODIFICATION

STORMWATER FACILITY	DRAINAGE AREA (ACRES)
BASIN 1	23.04
BASIN 2	59.17
BASIN 3	2.60
BASIN 4	51.71
BASIN 6	11.83
AREA A	5.70
LEHIGH RIVER (OFF SITE)	35.09
TOTAL	189.14

EXHIBIT 5

FILE LOCATION: FILESERVER\DWG\1162.5 (GAS PLAN)\EXHIBIT



DRAINAGE AREA MAP

PROPOSED NORTHERN REALIGNMENT - MAJOR MODIFICATION

STORMWATER FACILITY	DRAINAGE AREA (ACRES)
BASIN 1	23.04
BASIN 2	73.60
BASIN 3	2.60
BASIN 4	51.71
BASIN 6	11.83
AREA A	5.70
LEHIGH RIVER (OFF SITE)	20.96
TOTAL	189.44

EXHIBIT 6

FILE LOCATION: FILESERVER\DWG\1162.4 (NORTHERN EXPANSION)\EXHIBIT

SECTION 10

APPENDIX D

Drainage Area mapping

PROPOSED PRE DEVELOPMENT RELEASE RATE TABLE

DP#	D. A. TO DP#	WT CN #	TC	2 yr STORM Q	10 yr STORM Q	25 yr STORM Q	100 yr STORM Q	30 % 2 yr STORM Q	50%-100% 10 yr STORM Q	50%-100% 25 yr STORM Q	50%-100% 100 yr STORM Q
007	0.47	55	26.8	0.04	0.25	0.47	0.93	0.01	0.13 (50%)	0.24 (50%)	0.47 (50%)
008	3.10	57	17.5	0.52	2.73	4.76	8.84	0.16	1.37 (50%)	2.38 (50%)	4.42 (50%)
009	8.40	78	19.1	12.09	23.66	31.98	46.90	3.63	23.66 (50%)	15.99 (50%)	23.45 (50%)
010	6.62	84	19.7	12.90	22.81	29.62	41.56	3.87	22.81 (100%)	29.62 (100%)	41.56 (100%)
011	26.56	39	12.8	0.01	0.43	3.16	19.93	0.003	0.43 (100%)	3.16 (100%)	19.93 (100%)
012	103.54	33	17.8	0.00	0.30	1.25	14.77	0.00	0.30 (100%)	1.25 (100%)	14.77 (100%)

EXISTING APPROVED PRE DEVELOPMENT RELEASE RATES

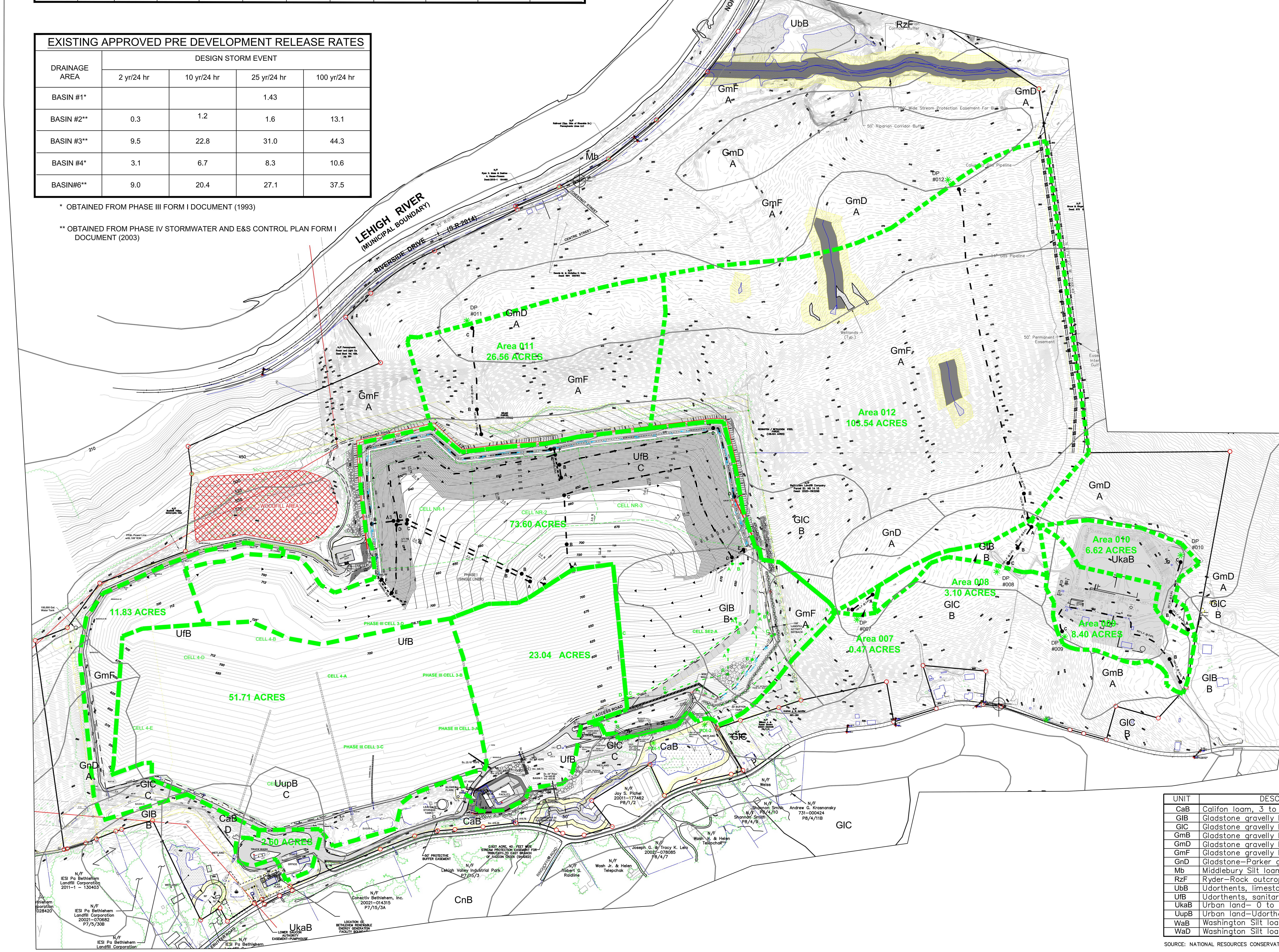
DRAINAGE AREA	DESIGN STORM EVENT			
	2 yr/24 hr	10 yr/24 hr	25 yr/24 hr	100 yr/24 hr
BASIN #1*			1.43	
BASIN #2**	0.3	1.2	1.6	13.1
BASIN #3**	9.5	22.8	31.0	44.3
BASIN #4*	3.1	6.7	8.3	10.6
BASIN#6**	9.0	20.4	27.1	37.5

* OBTAINED FROM PHASE III FORM I DOCUMENT (1993)

** OBTAINED FROM PHASE IV STORMWATER AND E&S CONTROL PLAN FORM I DOCUMENT (2003)

PRE DEVELOPMENT DRAINAGE LEGEND

- PRE-DEVELOPMENT DRAINAGE AREA BOUNDARY
- PRE-DEVELOPMENT SUB WATERSHED DRAINAGE AREA BOUNDARY
- A — B TIME OF CONCENTRATION FLOW PATH
- POINT OF INTEREST



KEY / LEGEND

- LIMIT OF ORIGINAL LANDFILL, PHASE I AND PHASE II DISPOSAL AREAS
- LIMIT OF DISPOSAL PHASE IV (DOUBLE LINER)
- CELL DIVISION
- ADJOINING PROPERTY LINE
- LANDFILL PROPERTY LINE (224 ACRE CONSOLIDATED DEED)
- DEP PERMIT BOUNDARY AS TAKEN FROM MARCH 1994 PERMIT DRAWINGS
- PP&L POWER LINE
- EASEMENT LINE
- RIGHT OF WAY LINE
- BUILDING RESTRICTION LINE (B.R.L.)
- 720 — EX. OR PREVIOUSLY APPROVED CONTOURS
- 700 — PROPOSED CONTOURS
- OVERHEAD UTILITY POLE
- FENCE
- WETLAND AREAS
- RIPARIAN CORRIDOR BUFFER
- STREAM PROTECTION EASEMENT
- WOOD LINES, TREE MASSES
- LANDFILL WOODLAND EASEMENT
- WOODFILL AREA
- NORTHERN REALIGNMENT – MSE BERM
- ACCESS ROAD — NORTHERN REALIGNMENT – ACCESS ROAD
- MAINTENANCE ROAD — NORTHERN REALIGNMENT – MAINTENANCE ROAD
- NORTHERN REALIGNMENT – AREA OF DEVELOPMENT
- SOUTHEASTERN REALIGNMENT – CELL DIVISION
- CHANNEL ℄ (EXISTING OR PREVIOUSLY APPROVED)
- CHANNEL ℄ (PROPOSED)
- CULVERT (EXISTING OR PREVIOUSLY APPROVED)
- CULVERT (PROPOSED)
- INLET (EXISTING OR PREVIOUSLY APPROVED)
- INLET (PROPOSED)
- MANHOLE (EXISTING OR PREVIOUSLY APPROVED)
- MANHOLE (PROPOSED)
- BENCH (PROPOSED)
- SLOPE DRAIN (EXISTING OR PREVIOUSLY APPROVED)
- SLOPE DRAIN (PROPOSED)
- NORTHERN REALIGNMENT – LIMIT OF DISPOSAL
- DEED DIVISION LINE
- PROP. WOOD LINE

MAPPING COMPILED BY PHOTOGRAMMETRIC METHODS FROM AERIAL PHOTOGRAPHY EXPOSED 05/30/13.
BY: LAND & MAPPING SERVICES 300 NORTH SECOND STREET CLEARFIELD, PA 16830 1-888-LMS-0027.
MAPPING HAS BEEN FIELD VERIFIED.

SOILS

UNIT	DESCRIPTION
CaB	Califon loam, 3 to 8 percent slopes
GlB	Gladstone gravelly loam, 3 to 8 percent slopes
GlC	Gladstone gravelly loam, 8 to 15 percent slopes
GmB	Gladstone gravelly loam, 0 to 8 percent slopes, very bouldery
GmD	Gladstone gravelly loam, 8 to 25 percent slopes, very bouldery
GmF	Gladstone gravelly loam, 25 to 55 percent slopes, very bouldery
GnD	Gladstone–Parker gravelly loam, 15 to 25 percent slopes
Mb	Middlebury Silt loam
RzF	Ryder–Rock outcrop complex, 25 to 75 percent slopes
UbB	Udorthents, limestone, 0 to 8 percent slopes
UfB	Udorthents, sanitary landfill
UkaB	Urban land– 0 to 8 percent slopes
UupB	Urban land–Udorthents, schist and gneiss complex, 0 to 8 percent slopes
WaB	Washington Silt loam, 3 to 8 percent slopes
WaD	Washington Silt loam, 15 to 25 percent slopes

SOURCE: NATIONAL RESOURCES CONSERVATION SERVICE WEB SOIL SURVEY AND NRCS SOIL DATA MART.

COMMONWEALTH OF PENNSYLVANIA REGISTERED PROFESSIONAL ENGINEER JOSEPH MICHAEL MACDOWELL NO.057039E

NO.	REVISION	DATE

PRE DEVELOPMENT DRAINAGE AREA PLAN

LOWER SAUCON TWP. — PRELIMINARY / FINAL LAND DEVELOPMENT PLAN & SITE PLAN — NORTHAMPTON CO.

Bethlehem Landfill Company
PENNSYLVANIA

MM martin and martin incorporated
37 south main street . suite A
chambersburg, pennsylvania . 17201
phone: (717) 264-6759

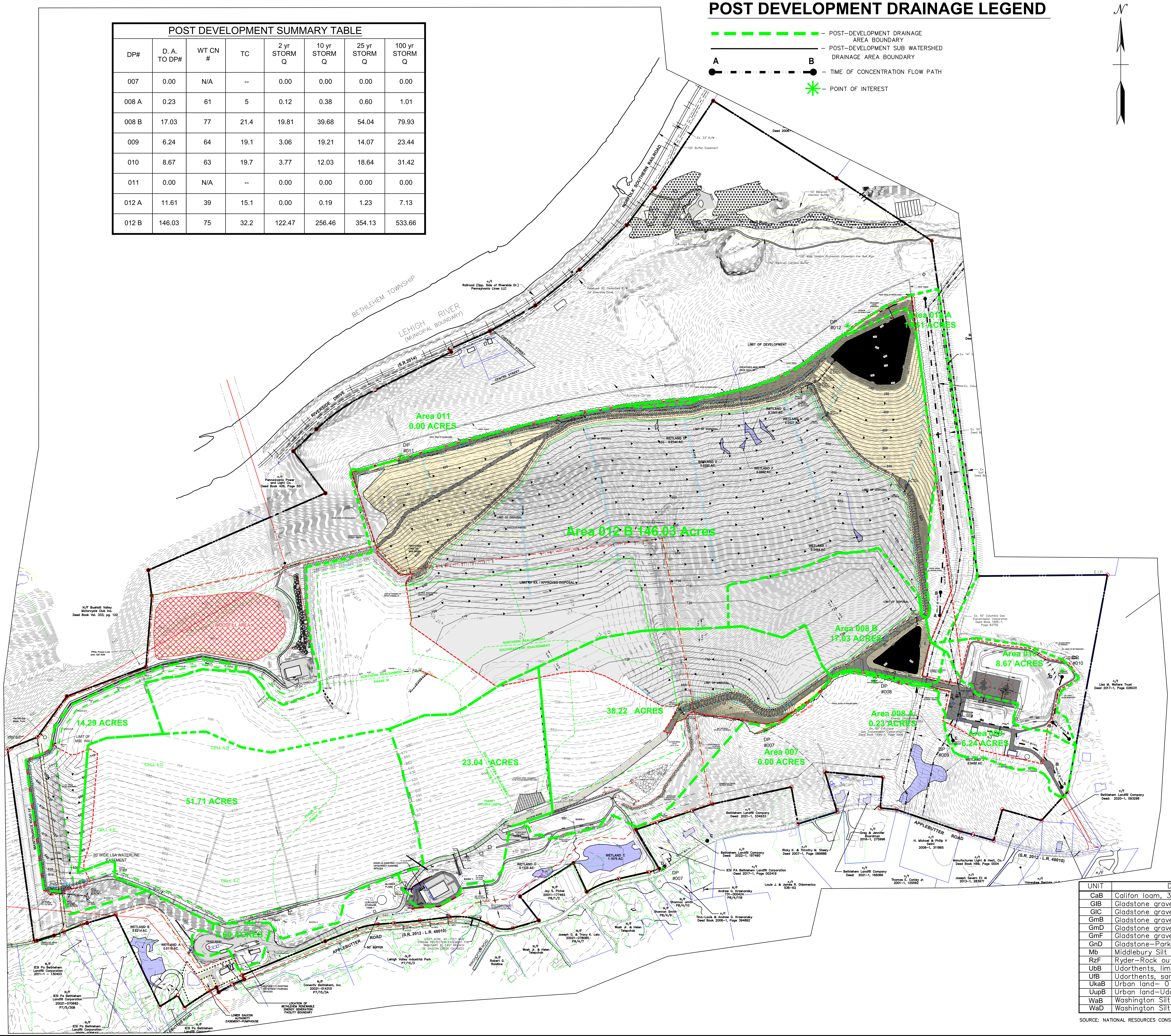
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DATE: 08/31/23
SCALE: 1" = 300'
DRAWING NO. **SW-1**

FILE: 1162.6 (PHASE V ZONING PLAN) 1162.6-SW-1.dwg

POST DEVELOPMENT SUMMARY TABLE

DP#	D. A. TO DP#	WT CN #	TC	2 yr STORM Q	10 yr STORM Q	25 yr STORM Q	100 yr STORM Q
007	0.00	N/A	--	0.00	0.00	0.00	0.00
008 A	0.23	61	5	0.12	0.38	0.60	1.01
008 B	17.03	77	21.4	19.81	39.68	54.04	79.93
009	6.24	64	19.1	3.06	19.21	14.07	23.44
010	8.67	63	19.7	3.77	12.03	18.64	31.42
011	0.00	N/A	--	0.00	0.00	0.00	0.00
012 A	11.61	39	15.1	0.00	0.19	1.23	7.13
012 B	146.03	75	32.2	122.47	256.46	354.13	533.66



POST DEVELOPMENT DRAINAGE LEGEND

- POST-DEVELOPMENT DRAINAGE AREA BOUNDARY
- POST-DEVELOPMENT SUB WATERSHED DRAINAGE AREA BOUNDARY
- A — B TIME OF CONCENTRATION FLOW PATH
- POINT OF INTEREST

KEY / LEGEND

- LIMIT OF ORIGINAL LANDFILL, PHASE I AND PHASE II DISPOSAL AREAS
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- INLET (PROPOSED)
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- MANHOLE (PROPOSED)
- BENCH (PROPOSED)
- SLOPE DRAIN (EXISTING OR PREVIOUSLY APPROVED)
- SLOPE DRAIN (PROPOSED)
- NORTHERN REALIGNMENT – LIMIT OF DISPOSAL
- DEED DIVISION LINE
- PROP. WOOD LINE

MAPPING COMPILED BY PHOTOGRAMMETRIC METHODS FROM AERIAL PHOTOGRAPHY EXPOSED 05/30/13.
BY: LAND & MAPPING SERVICES 300 NORTH SECOND STREET CLEARFIELD, PA 16830 1-888-LMS-0027.
MAPPING HAS BEEN FIELD VERIFIED.

SOILS

UNIT	DESCRIPTION
CaB	Califon loam, 3 to 8 percent slopes
GlB	Gladstone gravelly loam, 3 to 8 percent slopes
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SOURCE: NATIONAL RESOURCES CONSERVATION SERVICE WEB SOIL SURVEY AND NRCS SOIL DATA MART.

NO.	REVISION	DATE

POST DEVELOPMENT DRAINAGE AREA PLAN

PRELIMINARY / FINAL LAND DEVELOPMENT PLAN & SITE PLAN

Bethlehem Landfill Company

LOWER SAUCON TWP. NORTHAMPTON CO. PENNSYLVANIA

martin and martin incorporated
37 south main street . suite A
chambersburg, pennsylvania . 17201
phone: (717) 264-6759

SCALE: 1" = 300'

PROJ. NO. 1162.6 | DWN. BY: DB | CHK. BY: JM | DSN. BY: JM

CADD FILE: old-1162.6-SW-2.dwg

DATE: 08/31/23

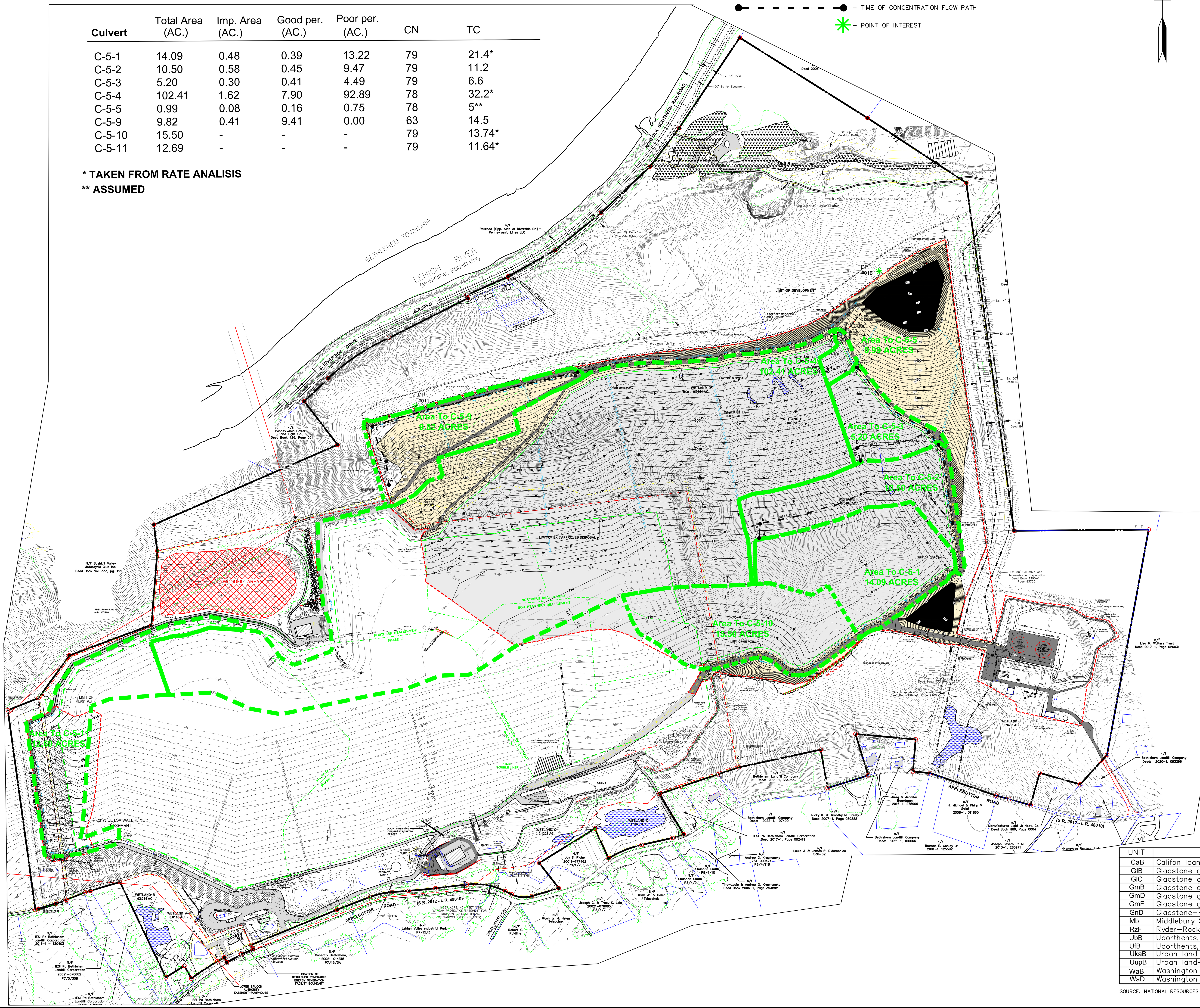
SCALE: 1" = 300'

DRAWING NO. **SW-2**

FILE: 1162.6 (PHASE V ZONING PLAN) 1162.6-SW-2.dwg

Culvert	Total Area (AC.)	Imp. Area (AC.)	Good per. (AC.)	Poor per. (AC.)	CN	TC
C-5-1	14.09	0.48	0.39	13.22	79	21.4*
C-5-2	10.50	0.58	0.45	9.47	79	11.2
C-5-3	5.20	0.30	0.41	4.49	79	6.6
C-5-4	102.41	1.62	7.90	92.89	78	32.2*
C-5-5	0.99	0.08	0.16	0.75	78	5**
C-5-9	9.82	0.41	9.41	0.00	63	14.5
C-5-10	15.50	-	-	-	79	13.74*
C-5-11	12.69	-	-	-	79	11.64*

*** TAKEN FROM RATE ANALISIS**
**** ASSUMED**



POST DEVELOPMENT DRAINAGE LEGEND

- POST–DEVELOPMENT DRAINAGE AREA BOUNDARY
- POST–DEVELOPMENT SUB WATERSHED DRAINAGE AREA BOUNDARY
- A — B TIME OF CONCENTRATION FLOW PATH
- POINT OF INTEREST

KEY / LEGEND

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- CHANNEL ℄ (EXISTING OR PREVIOUSLY APPROVED)
- CHANNEL ℄ (PROPOSED)
- CULVERT (EXISTING OR PREVIOUSLY APPROVED)
- CULVERT (PROPOSED)
- INLET (EXISTING OR PREVIOUSLY APPROVED)
- INLET (PROPOSED)
- MANHOLE (EXISTING OR PREVIOUSLY APPROVED)
- MANHOLE (PROPOSED)
- BENCH (PROPOSED)
- SLOPE DRAIN (EXISTING OR PREVIOUSLY APPROVED)
- SLOPE DRAIN (PROPOSED)
- NORTHERN REALIGNMENT – LIMIT OF DISPOSAL
- DEED DIVISION LINE
- PROP. WOOD LINE

MAPPING COMPILED BY PHOTOGRAMMETRIC METHODS FROM AERIAL PHOTOGRAPHY EXPOSED 05/30/13.
BY: LAND & MAPPING SERVICES 300 NORTH SECOND STREET CLEARFIELD, PA 16830 1–888–LMS–0027.
MAPPING HAS BEEN FIELD VERIFIED.

SOILS

UNIT	DESCRIPTION
CaB	Califon loam, 3 to 8 percent slopes
GlB	Gladstone gravelly loam, 3 to 8 percent slopes
GlC	Gladstone gravelly loam, 8 to 15 percent slopes
GmB	Gladstone gravelly loam, 0 to 8 percent slopes, very bouldery
GmD	Gladstone gravelly loam, 8 to 25 percent slopes, very bouldery
GmF	Gladstone gravelly loam, 25 to 55 percent slopes, very bouldery
GnD	Gladstone–Parker gravelly loam, 15 to 25 percent slopes
Mb	Middlebury Silt loam
RzF	Ryder–Rock outcrop complex, 25 to 75 percent slopes
UbB	Udorthents, limestone, 0 to 8 percent slopes
UfB	Udorthents, sanitary landfill
UkaB	Urban land– 0 to 8 percent slopes
UupB	Urban land–Udorthents, schist and gneiss complex, 0 to 8 percent slopes
WaB	Washington Silt loam, 3 to 8 percent slopes
WaD	Washington Silt loam, 15 to 25 percent slopes

SOURCE: NATIONAL RESOURCES CONSERVATION SERVICE WEB SOIL SURVEY AND NRCS SOIL DATA MART.

COMMONWEALTH OF PENNSYLVANIA REGISTERED PROFESSIONAL ENGINEER JOSEPH MICHAEL MAXWELL NO.057039E

NO.	REVISION	DATE

POST DEVELOPMENT DRAINAGE AREA INLET PLAN

LOWER SAUCON TWP. — NORTHAMPTON CO.
PRELIMINARY / FINAL LAND DEVELOPMENT PLAN & SITE PLAN
Bethlehem Landfill Company
PENNSYLVANIA

martin and martin incorporated
37 south main street · suite A
chambersburg, pennsylvania . 17201
phone: (717) 264–6759

PROJ. NO. 1162.6 | DWN. BY: DB | DSN. BY: JM | CHK. BY: JM
SCALE: Scale: 1" = 300'

CADD FILE: old–1162.6–SW–3.dwg
DATE: 09/01/23
SCALE: 1" = 300'
DRAWING NO. **SW-3**

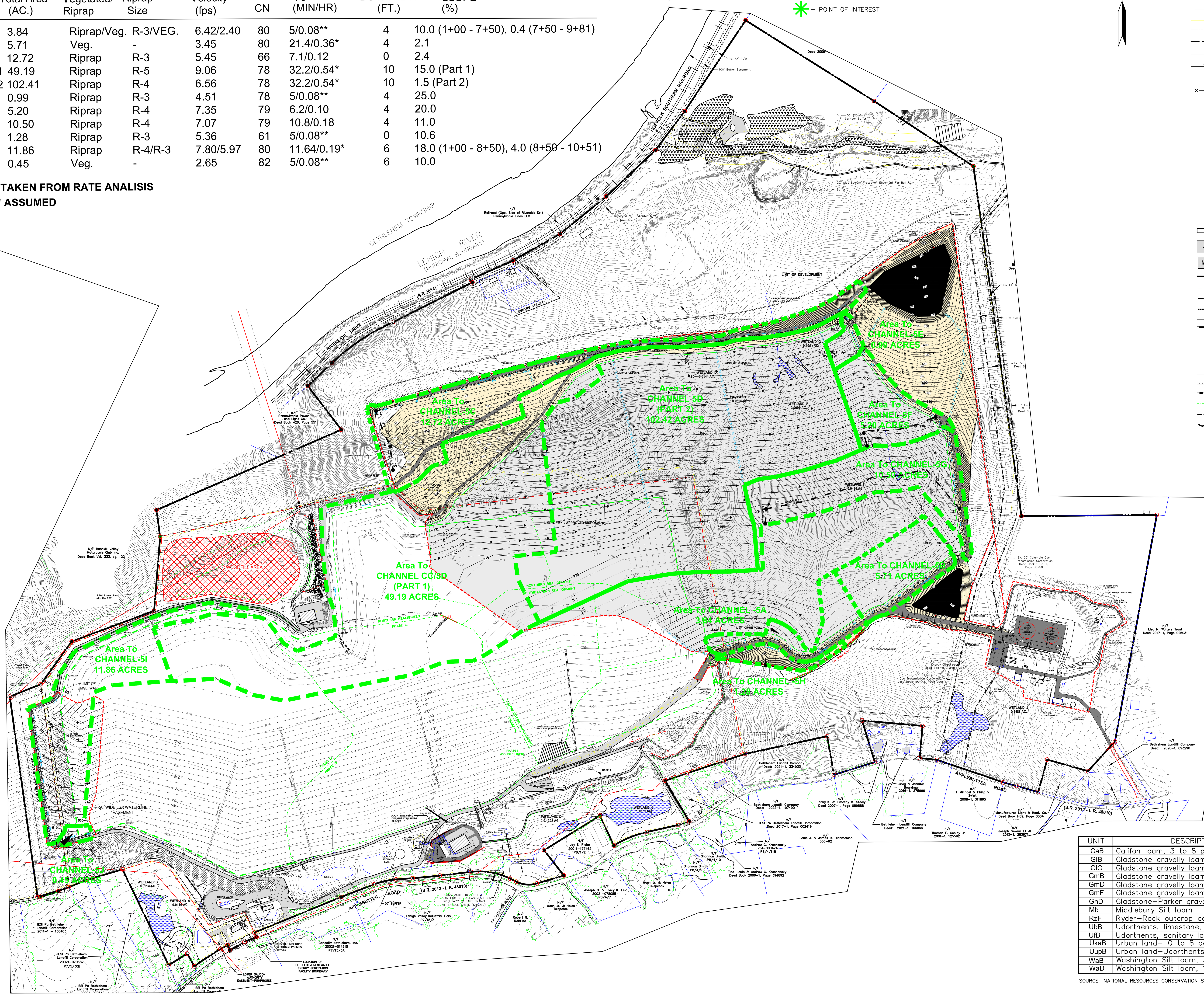
FILE: 1162.6 (PHASE V ZONING PLAN) 1162.6–SW–3.dwg

Channel	Total Area (AC.)	Vegetated/ Riprap	Riprap Size	Velocity (fps)	CN	TC (MIN/HR)	BOT. WIDTH (FT.)	SLOPE (%)
Channel 5A	3.84	Riprap/Veg.	R-3/VEG.	6.42/2.40	80	5/0.08**	4	10.0 (1+00 - 7+50), 0.4 (7+50 - 9+81)
Channel 5B	5.71	Veg.	-	3.45	80	21.4/0.36*	4	2.1
Channel 5C	12.72	Riprap	R-3	5.45	66	7.1/0.12	0	2.4
Channel 5D Part 1	49.19	Riprap	R-5	9.06	78	32.2/0.54*	10	15.0 (Part 1)
Channel 5D Part 2	102.41	Riprap	R-4	6.56	78	32.2/0.54*	10	1.5 (Part 2)
Channel 5E	0.99	Riprap	R-3	4.51	78	5/0.08**	4	25.0
Channel 5F	5.20	Riprap	R-4	7.35	79	6.2/0.10	4	20.0
Channel 5G	10.50	Riprap	R-4	7.07	79	10.8/0.18	4	11.0
Channel 5H	1.28	Riprap	R-3	5.36	61	5/0.08**	0	10.6
Channel 5I	11.86	Riprap	R-4/R-3	7.80/5.97	80	11.64/0.19*	6	18.0 (1+00 - 8+50), 4.0 (8+50 - 10+51)
Channel 5J	0.45	Veg.	-	2.65	82	5/0.08**	6	10.0

*** TAKEN FROM RATE ANALISIS**
**** ASSUMED**

POST DEVELOPMENT DRAINAGE LEGEND

- POST-DEVELOPMENT DRAINAGE AREA BOUNDARY
- POST-DEVELOPMENT SUB WATERSHED DRAINAGE AREA BOUNDARY
- A B - TIME OF CONCENTRATION FLOW PATH
- POINT OF INTEREST



KEY / LEGEND

- LIMIT OF ORIGINAL LANDFILL, PHASE I AND PHASE II DISPOSAL AREAS
- LIMIT OF DISPOSAL PHASE IV (DOUBLE LINER)
- CELL DIVISION
- ADJOINING PROPERTY LINE
- LANDFILL PROPERTY LINE (224 ACRE CONSOLIDATED DEED)
- DEP PERMIT BOUNDARY AS TAKEN FROM MARCH 1994 PERMIT DRAWINGS
- PP&L POWER LINE
- EASEMENT LINE
- RIGHT OF WAY LINE
- BUILDING RESTRICTION LINE (B.R.L.)
- 720 - EX. OR PREVIOUSLY APPROVED CONTOURS
- 700 - PROPOSED CONTOURS
- OVERHEAD UTILITY POLE
- FENCE
- WETLAND AREAS
- RIPARIAN CORRIDOR BUFFER
- STREAM PROTECTION EASEMENT
- WOOD LINES, TREE MASSES
- LANDFILL WOODLAND EASEMENT
- WOODFILL AREA
- NORTHERN REALIGNMENT - MSE BERM
- ACCESS ROAD - NORTHERN REALIGNMENT - ACCESS ROAD
- MAINTENANCE ROAD - NORTHERN REALIGNMENT - MAINTENANCE ROAD
- NORTHERN REALIGNMENT - AREA OF DEVELOPMENT
- SOUTHEASTERN REALIGNMENT - CELL DIVISION
- CHANNEL ℄ (EXISTING OR PREVIOUSLY APPROVED)
- CHANNEL ℄ (PROPOSED)
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WaD	Washington Silt loam, 15 to 25 percent slopes

SOURCE: NATIONAL RESOURCES CONSERVATION SERVICE WEB SOIL SURVEY AND NRCS SOIL DATA MART.

POST DEVELOPMENT CHANNEL DRAINAGE AREA PLAN

LOWER SAUCON TWP. NORTHAMPTON CO.

PRELIMINARY / FINAL LAND DEVELOPMENT PLAN & SITE PLAN

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SCALE: 1" = 300'

CADD FILE: old-1162.6-SW-4.dwg

DATE: 09/01/23

SCALE: 1" = 300'

DRAWING NO. SW-4

FILE: 1162.6 (PHASE V ZONING PLAN) 1162.6-SW-4.dwg

SECTION 10

APPENDIX E

Time of Concentration Calculations/Rainfall Data

APPENDIX E

TIME OF CONCENTRATION FLOW PATH CALCULATION

Times of concentration calculation were computed within the SEDCAD 4 program for Basin #6 and Basin #2 and the Hydroflow Hydrograph Program was utilized for the new drainage areas for both pre and post development. The printouts attached show the time of concentration for each watershed analyzed (modified) as part of the Phase V Expansion. When combining or accumulating watersheds for structure design, a combined hydrograph of the tributary upslope sub-watersheds is used. Since the travel time between structures is rapid, the routing analysis between the structures considers the travel time to be zero (0) and the combined hydrograph of the tributary sub-watershed is utilized.

RAINFALL DATA

The rainfall data utilized within the Basins 1, 2, 3, 4 and 6 analysis is consistent with historical reports such that a direct comparison can be made to established discharge rates. For areas of new analysis, the NOAA Atlas 14 data included within this appendix was utilized.

TR55 Tc Worksheet

PRE-DEV

Hydraflow Hydrographs by Intelisolve

Hyd. No. 1

Area 007

Description	A	B	C	Totals
Sheet Flow				
Manning's n-value	= 0.400	0.011	0.011	
Flow length (ft)	= 150.0	0.0	0.0	
Two-year 24-hr precip. (in)	= 3.18	0.00	0.00	
Land slope (%)	= 2.60	0.00	0.00	
Travel Time (min)	**= 26.83** +	**0.00** +	**0.00** =	**26.83**
Shallow Concentrated Flow				
Flow length (ft)	= 0.00	0.00	0.00	
Watercourse slope (%)	= 0.00	0.00	0.00	
Surface description	= Unpaved	Paved	Paved	
Average velocity (ft/s)	= 0.00	0.00	0.00	
Travel Time (min)	**= 0.00** +	**0.00** +	**0.00** =	**0.00**
Channel Flow				
X sectional flow area (sqft)	= 0.00	0.00	0.00	
Wetted perimeter (ft)	= 0.00	0.00	0.00	
Channel slope (%)	= 0.00	0.00	0.00	
Manning's n-value	= 0.015	0.015	0.015	
Velocity (ft/s)	= 0.00	0.00	0.00	
Flow length (ft)	= 0.0	0.0	0.0	
Travel Time (min)	**= 0.00** +	**0.00** +	**0.00** =	**0.00**

Total Travel Time, Tc ..... **26.83 min**

TR55 Tc Worksheet

PRE-DEV

Hydraflow Hydrographs by Intelisolve

Hyd. No. 2

Area 008

Description	A	B	C	Totals
Sheet Flow				
Manning's n-value	= 0.400	0.011	0.011	
Flow length (ft)	= 150.0	0.0	0.0	
Two-year 24-hr precip. (in)	= 3.18	0.00	0.00	
Land slope (%)	= 8.00	0.00	0.00	
Travel Time (min)	**= 17.11** +	**0.00** +	**0.00** =	**17.11**
Shallow Concentrated Flow				
Flow length (ft)	= 105.00	0.00	0.00	
Watercourse slope (%)	= 7.60	0.00	0.00	
Surface description	= Unpaved	Paved	Paved	
Average velocity (ft/s)	= 4.45	0.00	0.00	
Travel Time (min)	**= 0.39** +	**0.00** +	**0.00** =	**0.39**
Channel Flow				
X sectional flow area (sqft)	= 0.00	0.00	0.00	
Wetted perimeter (ft)	= 0.00	0.00	0.00	
Channel slope (%)	= 0.00	0.00	0.00	
Manning's n-value	= 0.015	0.015	0.015	
Velocity (ft/s)	= 0.00	0.00	0.00	
Flow length (ft)	= 0.0	0.0	0.0	
Travel Time (min)	**= 0.00** +	**0.00** +	**0.00** =	**0.00**

Total Travel Time, Tc ..... **17.51 min**

TR55 Tc Worksheet

PRE-DEV

Hydraflow Hydrographs by Intelisolve

Hyd. No. 3

Area 009

Description	A	B	C	Totals
Sheet Flow				
Manning's n-value	= 0.240	0.011	0.011	
Flow length (ft)	= 150.0	0.0	0.0	
Two-year 24-hr precip. (in)	= 3.18	0.00	0.00	
Land slope (%)	= 4.00	0.00	0.00	
Travel Time (min)	**= 15.01 +**	**0.00 +**	**0.00 =**	**15.01**
Shallow Concentrated Flow				
Flow length (ft)	= 927.00	0.00	0.00	
Watercourse slope (%)	= 5.60	0.00	0.00	
Surface description	= Unpaved	Paved	Paved	
Average velocity (ft/s)	= 3.82	0.00	0.00	
Travel Time (min)	**= 4.05 +**	**0.00 +**	**0.00 =**	**4.05**
Channel Flow				
X sectional flow area (sqft)	= 0.00	0.00	0.00	
Wetted perimeter (ft)	= 0.00	0.00	0.00	
Channel slope (%)	= 0.00	0.00	0.00	
Manning's n-value	= 0.015	0.015	0.015	
Velocity (ft/s)	= 0.00	0.00	0.00	
Flow length (ft)	= 0.0	0.0	0.0	
Travel Time (min)	**= 0.00 +**	**0.00 +**	**0.00 =**	**0.00**

Total Travel Time, Tc ..... 19.05 min

TR55 Tc Worksheet

PRE-DEV.

Hydraflow Hydrographs by Intelisolve

Hyd. No. 4

Area 010

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.400		0.011		0.011		
Flow length (ft)	= 150.0		0.0		0.0		
Two-year 24-hr precip. (in)	= 3.18		0.00		0.00		
Land slope (%)	= 6.60		0.00		0.00		
Travel Time (min)	**= 18.48**	**+**	**0.00**	**+**	**0.00**	**=**	**18.48**
Shallow Concentrated Flow							
Flow length (ft)	= 310.00		0.00		0.00		
Watercourse slope (%)	= 6.90		0.00		0.00		
Surface description	= Unpaved		Paved		Paved		
Average velocity (ft/s)	= 4.24		0.00		0.00		
Travel Time (min)	**= 1.22**	**+**	**0.00**	**+**	**0.00**	**=**	**1.22**
Channel Flow							
X sectional flow area (sqft)	= 0.00		0.00		0.00		
Wetted perimeter (ft)	= 0.00		0.00		0.00		
Channel slope (%)	= 0.00		0.00		0.00		
Manning's n-value	= 0.015		0.015		0.015		
Velocity (ft/s)	= 0.00		0.00		0.00		
Flow length (ft)	= 0.0		0.0		0.0		
Travel Time (min)	**= 0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

Total Travel Time, Tc ..... 19.70 min

TR55 Tc Worksheet

PRE-DEV.

Hydraflow Hydrographs by Intelisolve

Hyd. No. 5

Area 011

Description	A	B	C	Totals
Sheet Flow				
Manning's n-value	= 0.400	0.011	0.011	
Flow length (ft)	= 150.0	0.0	0.0	
Two-year 24-hr precip. (in)	= 3.18	0.00	0.00	
Land slope (%)	= 20.00	0.00	0.00	
Travel Time (min)	**= 11.86** +	**0.00** +	**0.00** =	**11.86**
Shallow Concentrated Flow				
Flow length (ft)	= 490.00	0.00	0.00	
Watercourse slope (%)	= 26.90	0.00	0.00	
Surface description	= Unpaved	Paved	Paved	
Average velocity (ft/s)	= 8.37	0.00	0.00	
Travel Time (min)	**= 0.98** +	**0.00** +	**0.00** =	**0.98**
Channel Flow				
X sectional flow area (sqft)	= 0.00	0.00	0.00	
Wetted perimeter (ft)	= 0.00	0.00	0.00	
Channel slope (%)	= 0.00	0.00	0.00	
Manning's n-value	= 0.015	0.015	0.015	
Velocity (ft/s)	= 0.00	0.00	0.00	
Flow length (ft)	= 0.0	0.0	0.0	
Travel Time (min)	**= 0.00** +	**0.00** +	**0.00** =	**0.00**

Total Travel Time, Tc ..... **12.84 min**

TR55 Tc Worksheet

PRE-DEV.

Hydraflow Hydrographs by Intelisolve

Hyd. No. 6

Area 012

Description	A	B	C	Totals
Sheet Flow				
Manning's n-value	= 0.400	0.011	0.011	
Flow length (ft)	= 150.0	0.0	0.0	
Two-year 24-hr precip. (in)	= 3.18	0.00	0.00	
Land slope (%)	= 15.30	0.00	0.00	
Travel Time (min)	**= 13.20** +	**0.00** +	**0.00** =	**13.20**
Shallow Concentrated Flow				
Flow length (ft)	= 1877.00	0.00	0.00	
Watercourse slope (%)	= 17.90	0.00	0.00	
Surface description	= Unpaved	Paved	Paved	
Average velocity (ft/s)	= 6.83	0.00	0.00	
Travel Time (min)	**= 4.58** +	**0.00** +	**0.00** =	**4.58**
Channel Flow				
X sectional flow area (sqft)	= 0.00	0.00	0.00	
Wetted perimeter (ft)	= 0.00	0.00	0.00	
Channel slope (%)	= 0.00	0.00	0.00	
Manning's n-value	= 0.015	0.015	0.015	
Velocity (ft/s)	= 0.00	0.00	0.00	
Flow length (ft)	= 0.0	0.0	0.0	
Travel Time (min)	**= 0.00** +	**0.00** +	**0.00** =	**0.00**

Total Travel Time, Tc ..... **17.79 min**

TR55 Tc Worksheet

POST

Hydraflow Hydrographs by Intelisolve

Hyd. No. 3

Area 008 B

Description	A	B	C	Totals
Sheet Flow				
Manning's n-value	= 0.240	0.011	0.011	
Flow length (ft)	= 150.0	0.0	0.0	
Two-year 24-hr precip. (in)	= 3.18	0.00	0.00	
Land slope (%)	= 3.00	0.00	0.00	
Travel Time (min)	**= 16.84** +	**0.00** +	**0.00** =	**16.84**
Shallow Concentrated Flow				
Flow length (ft)	= 630.00	0.00	0.00	
Watercourse slope (%)	= 2.00	0.00	0.00	
Surface description	= Unpaved	Paved	Paved	
Average velocity (ft/s)	= 2.28	0.00	0.00	
Travel Time (min)	**= 4.60** +	**0.00** +	**0.00** =	**4.60**
Channel Flow				
X sectional flow area (sqft)	= 0.00	0.00	0.00	
Wetted perimeter (ft)	= 0.00	0.00	0.00	
Channel slope (%)	= 0.00	0.00	0.00	
Manning's n-value	= 0.015	0.015	0.015	
Velocity (ft/s)	= 0.00	0.00	0.00	
Flow length (ft)	= 0.0	0.0	0.0	
Travel Time (min)	**= 0.00** +	**0.00** +	**0.00** =	**0.00**

Total Travel Time, Tc ..... **21.44 min**

TR55 Tc Worksheet

POST

Hydraflow Hydrographs by Intelisolve

Hyd. No. 4

Area 009

Description	A	B	C	Totals
Sheet Flow				
Manning's n-value	= 0.240	0.011	0.011	
Flow length (ft)	= 150.0	0.0	0.0	
Two-year 24-hr precip. (in)	= 3.18	0.00	0.00	
Land slope (%)	= 4.00	0.00	0.00	
Travel Time (min)	**= 15.01 +**	**0.00 +**	**0.00 =**	**15.01**
Shallow Concentrated Flow				
Flow length (ft)	= 927.00	0.00	0.00	
Watercourse slope (%)	= 5.60	0.00	0.00	
Surface description	= Unpaved	Paved	Paved	
Average velocity (ft/s)	= 3.82	0.00	0.00	
Travel Time (min)	**= 4.05 +**	**0.00 +**	**0.00 =**	**4.05**
Channel Flow				
X sectional flow area (sqft)	= 0.00	0.00	0.00	
Wetted perimeter (ft)	= 0.00	0.00	0.00	
Channel slope (%)	= 0.00	0.00	0.00	
Manning's n-value	= 0.040	0.015	0.015	
Velocity (ft/s)	= 0.00	0.00	0.00	
Flow length (ft)	= 0.0	0.0	0.0	
Travel Time (min)	**= 0.00 +**	**0.00 +**	**0.00 =**	**0.00**

Total Travel Time, Tc ..... 19.05 min

TR55 Tc Worksheet

POST

Hydraflow Hydrographs by Intelisolve

Hyd. No. 5

Area 010

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.400		0.011		0.011		
Flow length (ft)	= 150.0		0.0		0.0		
Two-year 24-hr precip. (in)	= 3.18		0.00		0.00		
Land slope (%)	= 6.60		0.00		0.00		
Travel Time (min)	**= 18.48**	**+**	**0.00**	**+**	**0.00**	**=**	**18.48**
Shallow Concentrated Flow							
Flow length (ft)	= 301.00		0.00		0.00		
Watercourse slope (%)	= 6.90		0.00		0.00		
Surface description	= Unpaved		Paved		Paved		
Average velocity (ft/s)	= 4.24		0.00		0.00		
Travel Time (min)	**= 1.18**	**+**	**0.00**	**+**	**0.00**	**=**	**1.18**
Channel Flow							
X sectional flow area (sqft)	= 0.00		0.00		0.00		
Wetted perimeter (ft)	= 0.00		0.00		0.00		
Channel slope (%)	= 0.00		0.00		0.00		
Manning's n-value	= 0.015		0.015		0.015		
Velocity (ft/s)	= 0.00		0.00		0.00		
Flow length (ft)	= 0.0		0.0		0.0		
Travel Time (min)	**= 0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

Total Travel Time, Tc ..... 19.67 min

TR55 Tc Worksheet

POST

Hydraflow Hydrographs by Intelisolve

Hyd. No. 7

Area 012 A

Description	A	B	C	Totals
Sheet Flow				
Manning's n-value	= 0.400	0.011	0.011	
Flow length (ft)	= 150.0	0.0	0.0	
Two-year 24-hr precip. (in)	= 3.18	0.00	0.00	
Land slope (%)	= 14.60	0.00	0.00	
Travel Time (min)	**= 13.45** +	**0.00** +	**0.00** =	**13.45**
Shallow Concentrated Flow				
Flow length (ft)	= 591.00	0.00	0.00	
Watercourse slope (%)	= 13.50	0.00	0.00	
Surface description	= Unpaved	Paved	Paved	
Average velocity (ft/s)	= 5.93	0.00	0.00	
Travel Time (min)	**= 1.66** +	**0.00** +	**0.00** =	**1.66**
Channel Flow				
X sectional flow area (sqft)	= 0.00	0.00	0.00	
Wetted perimeter (ft)	= 0.00	0.00	0.00	
Channel slope (%)	= 0.00	0.00	0.00	
Manning's n-value	= 0.015	0.015	0.015	
Velocity (ft/s)	= 0.00	0.00	0.00	
Flow length (ft)	= 0.0	0.0	0.0	
Travel Time (min)	**= 0.00** +	**0.00** +	**0.00** =	**0.00**

Total Travel Time, Tc ..... **15.11 min**

TR55 Tc Worksheet

POST

Hydraflow Hydrographs by Intelisolve

Hyd. No. 8

Area 012 B

Description	A	B	C	Totals
Sheet Flow				
Manning's n-value	= 0.240	0.011	0.011	
Flow length (ft)	= 150.0	0.0	0.0	
Two-year 24-hr precip. (in)	= 3.18	0.00	0.00	
Land slope (%)	= 3.00	0.00	0.00	
Travel Time (min)	**= 16.84 +**	**0.00 +**	**0.00 =**	**16.84**
Shallow Concentrated Flow				
Flow length (ft)	= 0.00	0.00	0.00	
Watercourse slope (%)	= 0.00	0.00	0.00	
Surface description	= Unpaved	Paved	Paved	
Average velocity (ft/s)	= 0.00	0.00	0.00	
Travel Time (min)	**= 0.00 +**	**0.00 +**	**0.00 =**	**0.00**
Channel Flow				
X sectional flow area (sqft)	= 1.93	3.14	16.67	
Wetted perimeter (ft)	= 6.66	11.83	17.72	
Channel slope (%)	= 1.00	28.00	1.00	
Manning's n-value	= 0.025	0.020	0.025	
Velocity (ft/s)	= 2.60	16.21	5.72	
Flow length (ft)	= 1000.0	200.0	3000.0	
Travel Time (min)	**= 6.41 +**	**0.21 +**	**8.74 =**	**15.36**

Total Travel Time, Tc ..... 32.19 min

NOAA Atlas 14, Volume 2, Version 3
Location name: Hellertown, Pennsylvania, USA*
Latitude: 40.627°, Longitude: -75.3036°
Elevation: m/ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

G.M. Bonnin, D. Martin, B. Lin, T. Parzybok, M.Yekta, and D. Riley

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.321 (0.288-0.357)	0.382 (0.343-0.426)	0.450 (0.404-0.501)	0.501 (0.449-0.557)	0.565 (0.503-0.626)	0.612 (0.541-0.679)	0.661 (0.581-0.734)	0.709 (0.618-0.789)	0.772 (0.665-0.861)	0.823 (0.702-0.923)
10-min	0.513 (0.460-0.570)	0.611 (0.549-0.681)	0.721 (0.647-0.802)	0.802 (0.718-0.891)	0.900 (0.801-0.998)	0.975 (0.861-1.08)	1.05 (0.923-1.17)	1.12 (0.979-1.25)	1.22 (1.05-1.36)	1.30 (1.11-1.45)
15-min	0.641 (0.574-0.713)	0.768 (0.690-0.856)	0.912 (0.818-1.01)	1.01 (0.908-1.13)	1.14 (1.02-1.26)	1.24 (1.09-1.37)	1.33 (1.17-1.47)	1.42 (1.24-1.58)	1.54 (1.33-1.72)	1.63 (1.39-1.82)
30-min	0.879 (0.788-0.978)	1.06 (0.953-1.18)	1.30 (1.16-1.44)	1.47 (1.32-1.63)	1.69 (1.50-1.87)	1.86 (1.64-2.06)	2.03 (1.79-2.26)	2.21 (1.92-2.46)	2.45 (2.11-2.73)	2.64 (2.25-2.95)
60-min	1.10 (0.982-1.22)	1.33 (1.20-1.48)	1.66 (1.49-1.85)	1.91 (1.71-2.13)	2.25 (2.00-2.50)	2.52 (2.23-2.79)	2.80 (2.46-3.11)	3.10 (2.70-3.44)	3.51 (3.02-3.92)	3.85 (3.28-4.31)
2-hr	1.32 (1.18-1.47)	1.59 (1.43-1.78)	2.00 (1.79-2.23)	2.31 (2.07-2.57)	2.76 (2.46-3.07)	3.13 (2.77-3.48)	3.53 (3.10-3.92)	3.96 (3.45-4.41)	4.60 (3.94-5.13)	5.13 (4.34-5.74)
3-hr	1.45 (1.30-1.62)	1.75 (1.58-1.96)	2.19 (1.96-2.44)	2.53 (2.26-2.81)	3.02 (2.68-3.35)	3.42 (3.02-3.79)	3.85 (3.37-4.27)	4.31 (3.74-4.79)	4.98 (4.27-5.56)	5.55 (4.70-6.21)
6-hr	1.84 (1.66-2.04)	2.21 (2.00-2.46)	2.74 (2.47-3.04)	3.18 (2.86-3.52)	3.81 (3.40-4.21)	4.34 (3.85-4.79)	4.93 (4.32-5.44)	5.58 (4.84-6.16)	6.54 (5.58-7.24)	7.36 (6.19-8.16)
12-hr	2.26 (2.05-2.52)	2.72 (2.47-3.03)	3.39 (3.06-3.76)	3.95 (3.56-4.39)	4.79 (4.27-5.30)	5.52 (4.87-6.09)	6.33 (5.52-6.98)	7.23 (6.24-7.98)	8.60 (7.28-9.51)	9.78 (8.14-10.8)
24-hr	2.64 (2.45-2.86)	3.18 (2.95-3.44)	3.98 (3.69-4.29)	4.64 (4.30-5.00)	5.62 (5.17-6.04)	6.44 (5.89-6.92)	7.33 (6.66-7.86)	8.29 (7.48-8.89)	9.71 (8.65-10.4)	10.9 (9.60-11.7)
2-day	3.09 (2.86-3.36)	3.73 (3.45-4.05)	4.67 (4.31-5.07)	5.44 (5.01-5.90)	6.54 (6.00-7.08)	7.45 (6.80-8.05)	8.43 (7.65-9.10)	9.47 (8.54-10.2)	11.0 (9.81-11.9)	12.2 (10.8-13.2)
3-day	3.26 (3.02-3.53)	3.92 (3.64-4.26)	4.90 (4.53-5.32)	5.70 (5.26-6.17)	6.84 (6.29-7.40)	7.79 (7.12-8.41)	8.80 (8.00-9.49)	9.88 (8.93-10.7)	11.4 (10.2-12.3)	12.7 (11.3-13.7)
4-day	3.42 (3.17-3.71)	4.12 (3.82-4.47)	5.14 (4.75-5.56)	5.96 (5.51-6.45)	7.15 (6.57-7.72)	8.13 (7.44-8.77)	9.18 (8.35-9.88)	10.3 (9.32-11.1)	11.9 (10.7-12.8)	13.2 (11.8-14.3)
7-day	4.03 (3.74-4.37)	4.83 (4.48-5.24)	5.95 (5.52-6.45)	6.88 (6.37-7.45)	8.21 (7.57-8.89)	9.32 (8.56-10.1)	10.5 (9.60-11.4)	11.8 (10.7-12.7)	13.6 (12.2-14.7)	15.1 (13.5-16.4)
10-day	4.63 (4.32-4.99)	5.53 (5.15-5.95)	6.72 (6.27-7.23)	7.69 (7.16-8.27)	9.05 (8.40-9.71)	10.2 (9.38-10.9)	11.3 (10.4-12.1)	12.5 (11.4-13.4)	14.2 (12.9-15.3)	15.6 (14.0-16.7)
20-day	6.23 (5.85-6.63)	7.39 (6.93-7.86)	8.79 (8.24-9.36)	9.90 (9.27-10.5)	11.4 (10.7-12.1)	12.6 (11.7-13.4)	13.8 (12.8-14.7)	15.1 (13.9-16.0)	16.7 (15.4-17.8)	18.0 (16.5-19.3)
30-day	7.79 (7.36-8.22)	9.18 (8.67-9.69)	10.7 (10.1-11.3)	11.9 (11.2-12.5)	13.4 (12.6-14.1)	14.6 (13.7-15.4)	15.8 (14.8-16.7)	16.9 (15.8-17.9)	18.5 (17.2-19.6)	19.6 (18.2-20.8)
45-day	9.88 (9.37-10.4)	11.6 (11.0-12.2)	13.3 (12.6-14.0)	14.6 (13.8-15.4)	16.3 (15.4-17.1)	17.5 (16.5-18.4)	18.7 (17.6-19.7)	19.8 (18.7-20.9)	21.2 (20.0-22.4)	22.3 (20.9-23.6)
60-day	11.8 (11.3-12.5)	13.9 (13.2-14.6)	15.8 (15.0-16.7)	17.3 (16.4-18.2)	19.1 (18.1-20.1)	20.4 (19.4-21.5)	21.7 (20.5-22.9)	22.9 (21.7-24.2)	24.4 (23.0-25.8)	25.5 (24.0-26.9)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

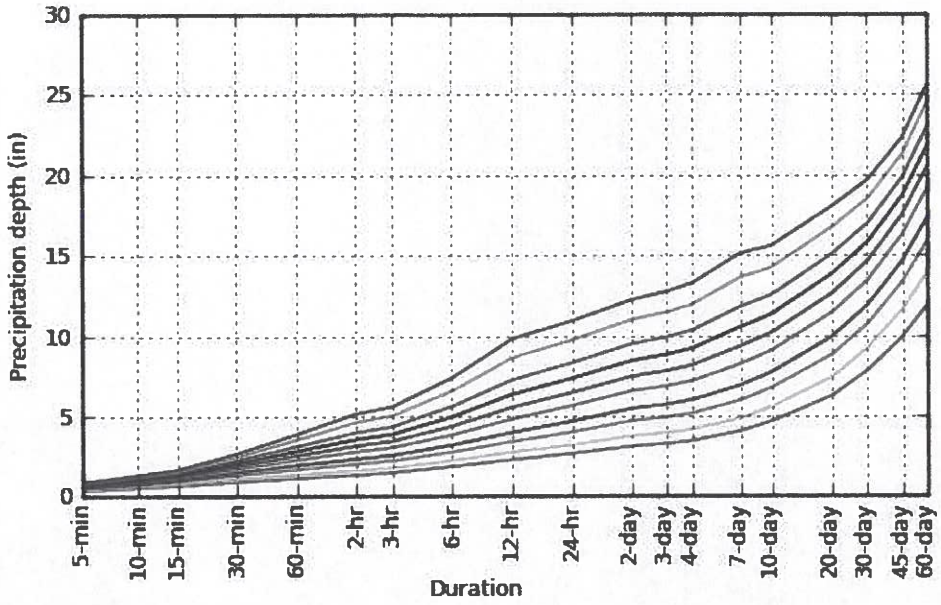
Please refer to NOAA Atlas 14 document for more information.

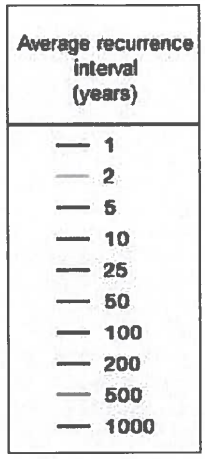
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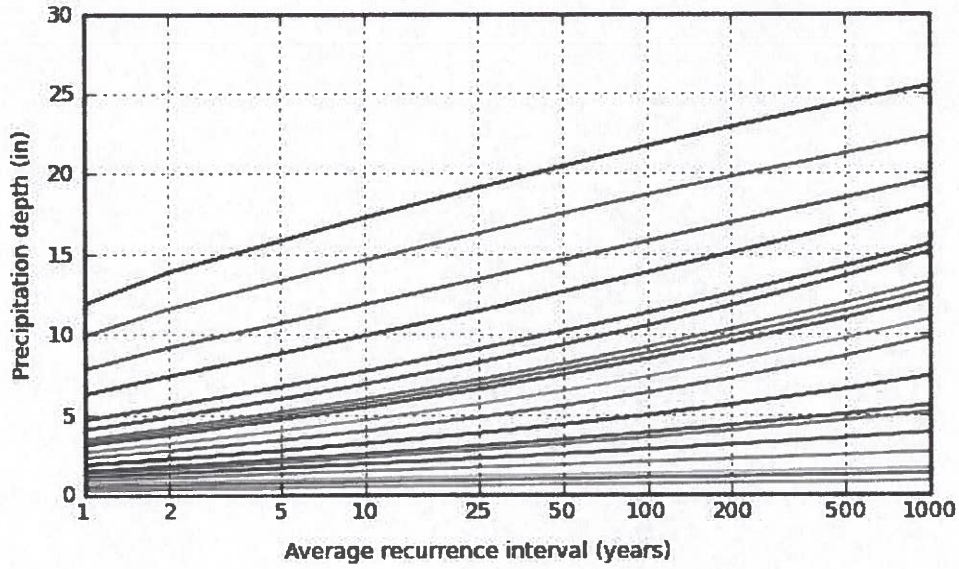
PF graphical

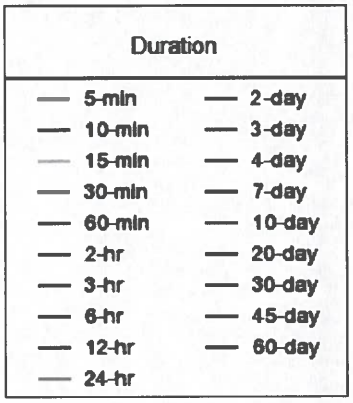
E-13

PDS-based depth-duration-frequency (DDF) curves
Latitude: 40.6270°, Longitude: -75.3036°









NOAA Atlas 14, Volume 2, Version 3

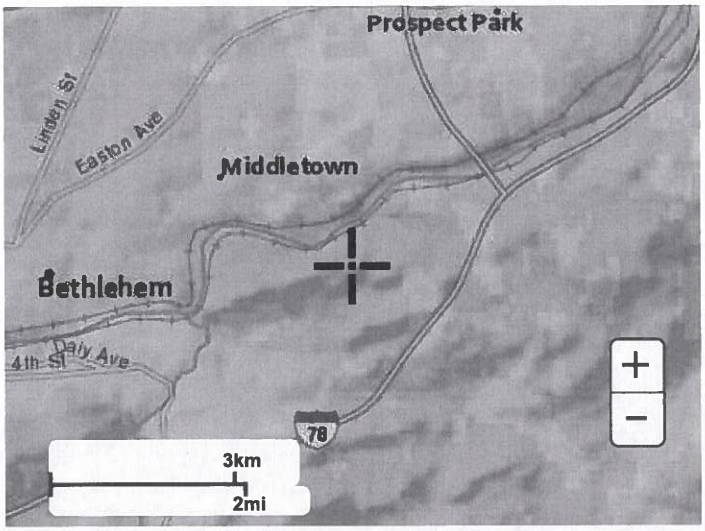
Created (GMT): Tue May 9 19:26:54 2023

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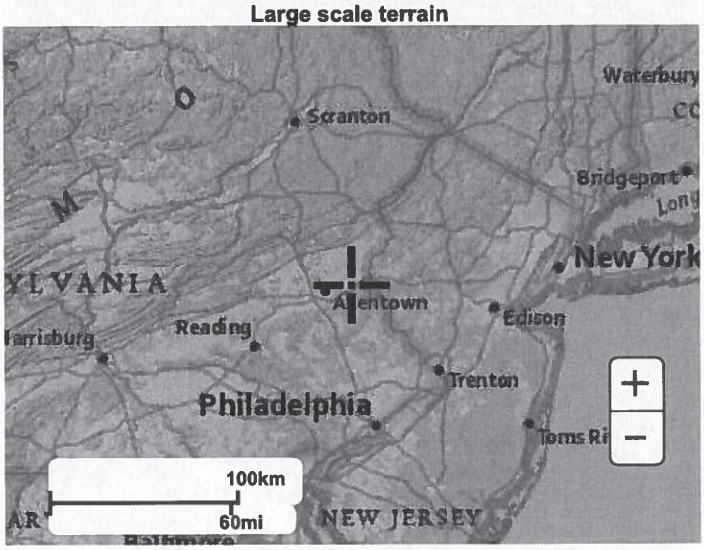
Maps & aerials

Small scale terrain

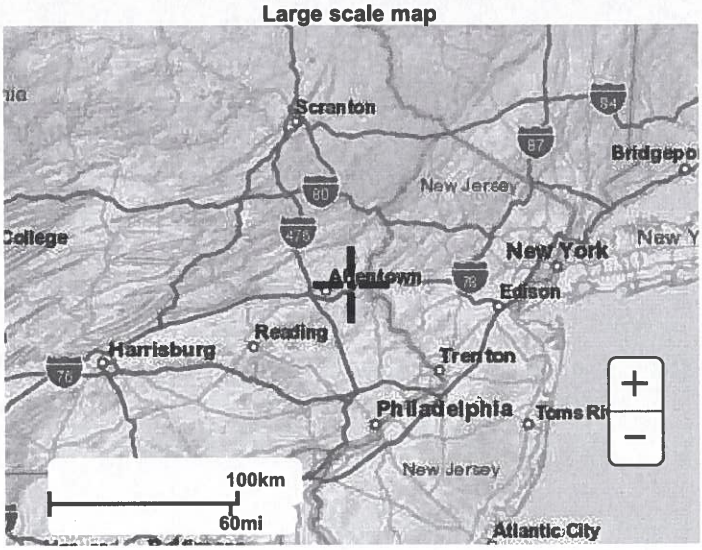
E-14



Large scale terrain

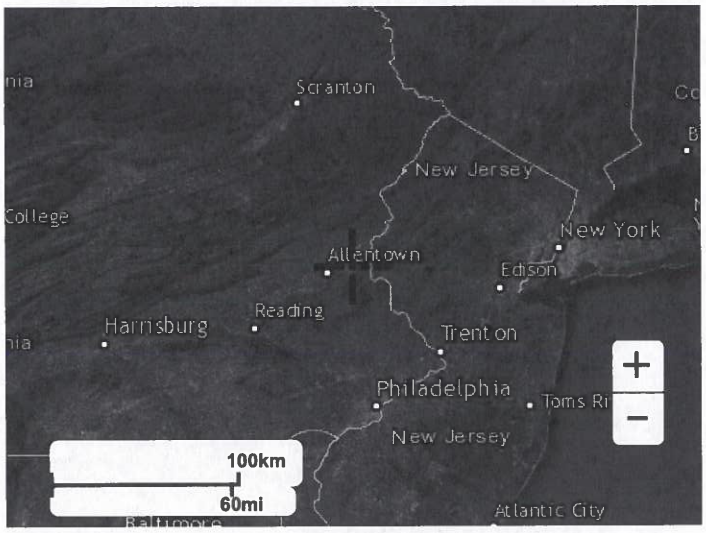


Large scale map



Large scale aerial

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US Department of Commerce
National Oceanic and Atmospheric Administration
National Weather Service
National Water Center
1325 East West Highway
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

Disclaimer

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SECTION 10

Appendix F

Runoff Curve Numbers (CN)/Weighted CN Calculations

SECTION 10

APPENDIX F

Runoff Curve Numbers (CN)/Weighted CN Calculations

APPENDIX F

RUNOFF CURVE NUMBER (CN) CALCULATION

Runoff curve numbers for the project were obtained from Appendix C-3 of the Lower Saucon Township Stormwater Ordinance. A copy is attached hereto. Under pre-development conditions three (3) distinct land covers exist within the area of analysis. These are woods, paved/impervious and open space.

Historical pre-development analysis for Basins 1, 2, 3, 4 and 6 were taken from the Phases III and IV analysis and as such the previously utilized CN numbers have been maintained. Pre-development weighted curve numbers for new drainage areas (007 thru 012) were computed based upon actual land cover or assumed land cover for each soil type consistent with the Lower Saucon Township Ordinance and PADEP Chapter 102 requirements. Four (4) land covers exist within the new analyzed areas. Those four (4) land covers are meadow, woods, open space grass and impervious. For the purposes of pre-development weighted curve number computation, all existing open space grass was assumed meadow and 20% of existing impervious was considered meadow. Spreadsheets contained in this Appendix provide the computation.

Post development conditions yield five (5) land covers consisting of woods (undisturbed), meadow (undisturbed), paved/impervious, open space grass within the disposal footprint and open space grass outside the disposal footprint. As was done within the Phases III, IV, Southeastern and Northern analysis, open space grass was broken into two categories. Good for areas outside the disposal footprint and poor for those areas to a capped for final closure grades. Additionally, all areas within the disturbed Phase V area are considered Soil Group B with a CN of 79 or 61. Thus, the curve numbers utilized within the analysis are as follows:

Soil Group		A	B	C
Woods	=	30	55	70
Meadow	=	30	58	71
Grass – Open Space (Good)	=		61	
Grass – Open Space (Poor)	=		79	
Impervious	=	98	98	98

Each sub-watershed weighted CN is calculated as outlined on the spreadsheets included herein.

BETHLEHEM LANDFILL COMPANY
PRE Development Weighted Curve Number Calculation

AREA 007 **Runoff Curve Number**

Cover Type	Soil Class	Area (sq. ft.)	Area (acres)	Runoff CN	Wt CN
WOODS	B	20473.20	0.47	55	25.85
		Total:	0.47	Total:	25.85

Weighted Runoff Curve Number = 55

AREA 008 **Runoff Curve Number**

Cover Type	Soil Class	Area (sq. ft.)	Area (acres)	Runoff CN	Wt CN
WOODS	B	102801.60	2.36	55	129.80
MEADOW	B	27442.80	0.63	58	36.54
80% Ex Impervious	-	3484.80	0.08	98	7.84
ASSUMED MEADOW	B	1306.80	0.03	58	1.74
		Total:	3.10	Total:	175.92

Weighted Runoff Curve Number = 57

AREA 009 **Runoff Curve Number**

Cover Type	Soil Class	Area (sq. ft.)	Area (acres)	Runoff CN	Wt CN
WOODS	A	32670.00	0.75	30	22.50
WOODS	B	3049.20	0.07	55	3.85
WOODS	C	1742.40	0.04	70	2.80
MEADOW	A	15246.00	0.35	30	10.50
MEADOW	B	19166.40	0.44	58	25.52
MEADOW	C	74487.60	1.71	71	121.41
80% Ex Impervious	-	175982.40	4.04	98	395.92
ASSUMED MEADOW	A	1742.40	0.04	30	1.20
ASSUMED MEADOW	C	41817.60	0.96	71	68.16
		Total:	8.40	Total:	651.86

Weighted Runoff Curve Number = 78

AREA 010 **Runoff Curve Number**

Cover Type	Soil Class	Area (sq. ft.)	Area (acres)	Runoff CN	Wt CN
WOODS	A	13068.00	0.30	30	9.00
WOODS	B	5227.20	0.12	55	6.60
MEADOW	A	9147.60	0.21	30	6.30
MEADOW	B	3049.20	0.07	58	4.06
MEADOW	C	29185.20	0.67	71	47.57
80% Ex Impervious	-	182952.00	4.20	98	411.60
ASSUMED MEADOW	A	2178.00	0.05	30	1.50
ASSUMED MEADOW	C	43560.00	1.00	71	71.00
		Total:	6.62	Total:	557.63

Weighted Runoff Curve Number = 84

AREA 011 **Runoff Curve Number**

Cover Type	Soil Class	Area (sq. ft.)	Area (acres)	Runoff CN	Wt CN
WOODS	A	932619.60	21.41	30	642.30
WOODS	C	184694.40	4.24	70	296.80
80% Ex Impervious	-	31798.80	0.73	98	71.54
ASSUMED MEADOW	A	871.20	0.02	30	0.60
ASSUMED MEADOW	C	6969.60	0.16	71	11.36
		Total:	26.56	Total:	1022.60

Weighted Runoff Curve Number = 39

AREA 012 **Runoff Curve Number**

Cover Type	Soil Class	Area (sq. ft.)	Area (acres)	Runoff CN	Wt CN
WOODS	A	3687354.00	84.65	30	2539.50
WOODS	B	499197.60	11.46	55	630.30
MEADOW	A	269636.40	6.19	30	185.70
MEADOW	B	30056.40	0.69	58	40.02
80% Ex Impervious	-	19166.40	0.44	98	43.12
ASSUMED MEADOW	A	435.60	0.01	30	0.30
ASSUMED MEADOW	B	435.60	0.01	58	0.58
ASSUMED MEADOW	C	3920.40	0.09	71	6.39
		Total:	103.54	Total:	3445.91

Weighted Runoff Curve Number = 33

BETHLEHEM LANDFILL COMPANY
Post Development Weighted Curve Number Calculation

AREA 007 **Runoff Curve Number**

Cover Type	Soil Class	Area (sq. ft.)	Area (acres)	Runoff CN	Wt CN
TOTAL AREA = 0	-	0.00	0.00	98	0.00
		Total:	0.00	Total:	0.00

Weighted Runoff Curve Number = #DIV/0!

AREA 008 A **Runoff Curve Number**

Cover Type	Soil Class	Area (sq. ft.)	Area (acres)	Runoff CN	Wt CN
GOOD OPEN SPACE	B	10018.80	0.23	61	14.03
		Total:	0.23	Total:	14.03

Weighted Runoff Curve Number = 61

AREA 008 B **Runoff Curve Number**

Cover Type	Soil Class	Area (sq. ft.)	Area (acres)	Runoff CN	Wt CN
POOR OPEN SPACE	B	561924.00	12.90	79	1019.10
GOOD OPEN SPACE	B	139392.00	3.20	61	195.20
IMPERVIOUS	-	40510.80	0.93	98	91.14
		Total:	17.03	Total:	1305.44

Weighted Runoff Curve Number = 77

AREA 009 **Runoff Curve Number**

Cover Type	Soil Class	Area (sq. ft.)	Area (acres)	Runoff CN	Wt CN
WOODS	A	32670.00	0.75	30	22.50
WOODS	B	3049.20	0.07	55	3.85
WOODS	C	1742.40	0.04	70	2.80
MEADOW	A	15246.00	0.35	30	10.50
MEADOW	B	19166.40	0.44	58	25.52
GOOD OPEN SPACE	B	134600.40	3.09	61	188.49
IMPERVOIUS	-	65340.00	1.50	98	147.00
		Total:	6.24	Total:	400.66

Weighted Runoff Curve Number = 64

AREA 010 **Runoff Curve Number**

Cover Type	Soil Class	Area (sq. ft.)	Area (acres)	Runoff CN	Wt CN
WOODS	A	13068.00	0.30	30	9.00
WOODS	B	5227.20	0.12	55	6.60
MEADOW	A	9147.60	0.21	30	6.30
MEADOW	B	435.60	0.01	58	0.58
GOOD OPEN SPACE	B	306226.80	7.03	61	428.83
IMPERVIOUS	-	43560.00	1.00	98	98.00
		Total:	8.67	Total:	549.31

Weighted Runoff Curve Number = 63

AREA 011 **Runoff Curve Number**

Cover Type	Soil Class	Area (sq. ft.)	Area (acres)	Runoff CN	Wt CN
TOTAL AREA = 0	-	0.00	0.00	98	0.00
		Total:	0.00	Total:	0.00

Weighted Runoff Curve Number = #DIV/0!

AREA 012 A **Runoff Curve Number**

Cover Type	Soil Class	Area (sq. ft.)	Area (acres)	Runoff CN	Wt CN
WOODS	A	97138.80	2.23	30	66.90
WOODS	B	2178.00	0.05	55	2.75
MEADOW	A	253954.80	5.83	30	174.90
MEADOW	B	435.60	0.01	58	0.58
GOOD OPEN SPACE	B	152024.40	3.49	61	212.89
		Total:	11.61	Total:	458.02

Weighted Runoff Curve Number = 39

AREA 012 B **Runoff Curve Number**

Cover Type	Soil Class	Area (sq. ft.)	Area (acres)	Runoff CN	Wt CN
WOODS	A	28314.00	0.65	30	19.50
POOR OPEN SPACE	B	4758494.40	109.24	79	8629.96
GOOD OPEN SPACE	B	1376060.40	31.59	61	1926.99
IMPERVIOUS	-	198198.00	4.55	98	445.90
		Total:	146.03	Total:	11022.35

Weighted Runoff Curve Number = 75

Appendix C-3
Runoff Curve Numbers and Percent Imperviousness Values*

Cover Description		Curve numbers for hydrologic soil group**			
Land Use/Cover Type	**Average percent impervious area**	**A**	**B**	**C**	**D**
Open space (lawns, parks, golf courses, cemeteries, etc.):					
Good condition (grass cover greater than 75%)		39	61	74	80
Impervious areas:					
Paved parking lots, roofs, driveways, etc. (excluding right-of-way)		98	98	98	98
Streets and roads:					
Paved; curbs and storm sewers (excluding right-of-way)		98	98	98	98
Paved; open ditches (including right-of-way)		83	89	92	93
Gravel (including right-of-way)		76	85	89	91
Urban districts:					
Commercial and business	85	89	92	94	95
Industrial	72	81	88	91	93
Residential districts by average lot size:					
c acre or less (townhouses)	65	77	85	90	92
1/4 acre	38	61	75	83	87
a acre	30	57	72	81	86
1/2 acre	25	54	70	80	85
1 acre	20	51	68	79	84
2 acres	12	46	65	77	82
Woods		30	55	70	77
Agriculture	Refer to Table 2-2b in source document (TR55) by crop type and treatment.				

MEADOW 30 58 71

* Source: Natural Resources Conservation Service Technical Release No. 55, Second Edition, June 1986.

** Hydrologic soil group based on the county soil survey, latest edition.

REFER TO Table 2.2 OF TR-55 FOR OPEN SPACE "POOR" CONDITION CN = 79 FOR USE WITHIN LANDFILL FOOTPRINT AND PRE-DEV. ASSUMED MEADOW CONDITIONS.

Table 2-2a Runoff curve numbers for urban areas [1/]

Cover description		Curve numbers for hydrologic soil group			
Cover type and hydrologic condition	Average percent impervious area [2/]	A	B	C	D
Fully developed urban areas (vegetation established)					
Open space (lawns, parks, golf courses, cemeteries, etc.) [3/]:					
Poor condition (grass cover < 50%)		68	79	86	89
Fair condition (grass cover 50% to 75%)		49	69	79	84
Good condition (grass cover > 75%)		39	61	74	80
Impervious areas:					
Paved parking lots, roofs, driveways, etc. (excluding right-of-way)		98	98	98	98
Streets and roads:					
Paved; curbs and storm sewers (excluding right-of-way)		98	98	98	98
Paved; open ditches (including right-of-way)		83	89	92	93
Gravel (including right-of-way)		76	85	89	91
Dirt (including right-of-way)		72	82	87	89
Western desert urban areas:					
Natural desert landscaping (pervious areas only) [4/]		63	77	85	88
Artificial desert landscaping (impervious weed barrier, desert shrub with 1- to 2-inch sand or gravel mulch and basin borders)		96	96	96	96
Urban districts:					
Commercial and business	85	89	92	94	95
Industrial	72	81	88	91	93
Residential districts by average lot size:					
1/8 acre or less (town houses)	65	77	85	90	92
1/4 acre	38	61	75	83	87
1/3 acre	30	57	72	81	86
1/2 acre	25	54	70	80	85
1 acre	20	51	68	79	84
2 acres	12	46	65	77	82
Developing urban areas					
Newly graded areas (pervious areas only, no vegetation) [5/]		77	86	91	94
Idle lands (CN's are determined using cover types similar to those in table 2-2c).					

[1] Average runoff condition, and $I_a = 0.2S$.

[2] The average percent impervious area shown was used to develop the composite CN's. Other assumptions are as follows: impervious areas are directly connected to the drainage system, impervious areas have a CN of 98, and pervious areas are considered equivalent to open space in good hydrologic condition. CN's for other combinations of conditions may be computed using figure 2-3 or 2-4.

[3] CN's shown are equivalent to those of pasture. Composite CN's may be computed for other combinations of open space cover type.

[4] Composite CN's for natural desert landscaping should be computed using figures 2-3 or 2-4 based on the impervious area percentage (CN = 98) and the pervious area CN. The pervious area CN's are assumed equivalent to desert shrub in poor hydrologic condition.

[5] Composite CN's to use for the design of temporary measures during grading and construction should be computed using figure 2-3 or 2-4 based on the degree of development (impervious area percentage) and the CN's for the newly graded pervious areas.

SECTION 10

APPENDIX G

Pre-Construction Watershed Calculations

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IESI PA Bethlehem Landfill

Phase III

Basin #1 Analysis

From

Gannett Fleming 1993 Report

JMM

Martin & Martin Inc.
37 South Main Street
Suite A
Chambersburg, PA

Phone: 717-264-6759

CITY OF BETHLEHEM - SANITARY LANDFILL - 3-5-93
PHASE 3 (CELLS 3-A, 3-B, 3-C, AND 3-D)
CLOSURE GRADES : 25-YR, 24-HR STORM EVENT

COMBINED HYDROGRAPH

INCLUDES SUBAREAS: 17, 18, 19, 20, 21, 22, 23, 24, 25

TOTAL AREA - 0.0270 SQ.MI.

STORM VOLUME - 5.72 INCHES

RUNOFF VOLUME - 3.27 INCHES

- 4.71 ACRE-FEET

PEAK DISCHARGE - 85.18 CFS

TIME (HOURS)	FLOW (CFS)	TIME (HOURS)	FLOW (CFS)
11.00	2.11	12.70	6.64
11.50	4.48	12.80	6.25
11.70	19.93	12.90	6.05
11.80	85.18	13.00	5.77
11.90	65.31	13.20	4.63
12.00	42.68	13.50	4.25
12.10	21.71	14.00	3.45
12.20	14.31	14.50	2.92
12.30	12.17	15.00	2.57
12.40	10.96	16.00	2.12
12.50	9.95	18.00	1.59
12.60	7.65	20.00	1.24

```
NTIT= 6
 TITLE( 1 )=THE CITY OF BETHLEHEM  -  SANITARY LANDFILL    3-30-93          FILE NAME: MODBAS1.25Y
 TITLE( 2 )=ROUTING OF THE 25-YEAR, 24-HOUR SCS TYPE II STORM THROUGH EXISTING SEDIMENT BASIN NO. 1 (FINAL CLOSURE GRADES)
 TITLE( 3 )=EXISTING 36" CMP RISER WITH 4 ROWS OF HOLES (18 HOLES IN A ROW) SPACED 12" VERT. STARTING AT EL. 441.5
 TITLE( 4 )=TOP OF RISER @ EL. 447.34, SPILLWAY @ EL. 447.85, TOP OF EMBANKMENT @ EL. 450.3
 TITLE( 5 )=EXISTING OUTLET IS A 24" CMP - 110' @ 13.0%,  BASIN INVERT @ EL. 435.00
 TITLE( 6 )=ASSUME THAT THE BASIN IS FULL UP TO THE FIRST ROW OF PERFORATIONS (EL. 441.50)
NSD= 13      NSS= 6      NQIN= 24
   STAGE-DISCHARGE CURVE
       441.50                0.00
       442.50                0.47
       443.50                0.79
       444.50                1.11
       447.34                1.83
       447.85               12.57
       447.90               14.48
       448.00               19.17
       448.10               24.63
       448.20               30.78
       448.30               37.48
       448.50               52.43
       449.00               78.65
   STAGE-STORAGE CURVE
       441.50                0.00
       442.00            19265.00
       444.00            77914.00
       446.00           149386.00
       448.00           236037.00
       450.00           338320.00
   INFLOW HYDROGRAPH
       11.00                 2.11
       11.50                 4.48
       11.70                19.93
       11.80                85.18
       11.90                65.31
       12.00                42.68
       12.10                21.71
       12.20                14.31
       12.30                12.17
       12.40                10.96
       12.50                 9.95
       12.60                 7.65
       12.70                 6.64
       12.80                 6.25
       12.90                 6.05
       13.00                 5.77
       13.20                 4.63
       13.50                 4.25
       14.00                 3.45
       14.50                 2.92
       15.00                 2.57
       16.00                 2.12
       18.00                 1.59
       20.00                 1.24
```

THE CITY OF BETHLEHEM - SANITARY LANDFILL 3-30-93 FILE NAME: MODBAS1.25Y

ROUTING OF THE 25-YEAR, 24-HOUR SCS TYPE II STORM THROUGH EXISTING SEDIMENT BASIN NO. 1 (FINAL CLOSURE GRADES)

EXISTING 36" CMP RISER WITH 4 ROWS OF HOLES (18 HOLES IN A ROW) SPACED 12" VERT. STARTING AT EL. 441.5

TOP OF RISER @ EL. 447.34, SPILLWAY @ EL. 447.85, TOP OF EMBANKMENT @ EL. 450.3

EXISTING OUTLET IS A 24" CMP - 110' @ 13.0%, BASIN INVERT @ EL. 435.00

ASSUME THAT THE BASIN IS FULL UP TO THE FIRST ROW OF PERFORATIONS (EL. 441.50)

TIME (HOURS)	INFLOW (CFS)	AVERAGE INFLOW (CFS)	INFLOW VOLUME (CF)	STORAGE CARRYOVER (CF)	TOTAL IN (CF)	TRIAL W.S. ELEVATION (FT)	OUTFLOW RATE (CFS)	AVERAGE OUTFLOW (CFS)	VOLUME OUT (CF)	BAL. IN STORAGE (CF)	CORRES. W.S. ELEVATION (FT)
11.00	2.11					441.50	0.00				
		3.29						0.04			
11.50	4.48		5931	0	5931	441.65	0.07		64	5867	441.65
		12.21						0.12			
11.70	19.93		8788	5867	14654	441.88	0.18		90	14564	441.88
		52.55						0.32			
11.80	85.18		18920	14564	33484	442.48	0.46		115	33369	442.48
		75.25						0.61			
11.90	65.31		27088	33369	60457	443.40	0.76		219	60238	443.40
		54.00						0.86			
12.00	42.68		19438	60238	79676	444.04	0.96		310	79367	444.04
		32.20						1.01			
12.10	21.71		11590	79367	90957	444.35	1.06		365	90592	444.35
		18.01						1.09			
12.20	14.31		6484	90592	97076	444.53	1.12		392	96683	444.53
		13.24						1.13			
12.30	12.17		4766	96683	101450	444.65	1.15		407	101042	444.65
		11.56						1.16			
12.40	10.96		4163	101042	105206	444.75	1.17		418	104788	444.75
		10.46						1.19			
12.50	9.95		3764	104788	108552	444.85	1.20		427	108125	444.85
		8.80						1.21			
12.60	7.65		3168	108125	111293	444.92	1.22		435	110858	444.92
		7.15						1.22			
12.70	6.64		2572	110858	113430	444.98	1.23		441	112990	444.98
		6.45						1.24			
12.80	6.25		2320	112990	115310	445.03	1.25		446	114864	445.03
		6.15						1.25			
12.90	6.05		2214	114864	117078	445.08	1.26		451	116627	445.08
		5.91						1.26			
13.00	5.77		2128	116627	118755	445.13	1.27		455	118300	445.13
		5.20						1.28			
13.20	4.63		3744	118300	122044	445.21	1.29		921	121123	445.21
		4.44						1.30			
13.50	4.25		4795	121123	125918	445.30	1.31		1406	124512	445.30
		3.85						1.33			
14.00	3.45		6930	124512	131442	445.43	1.35		2394	129048	445.43
		3.19						1.36			
14.50	2.92		5733	129048	134781	445.52	1.37		2444	132337	445.52
		2.75						1.38			
15.00	2.57		4941	132337	137278	445.59	1.39		2481	134798	445.59
		2.34						1.40			
16.00	2.12		8442	134798	143240	445.69	1.41		5036	138204	445.69
		1.85						1.42			
18.00	1.59		13356	138204	151560	445.77	1.43		10238	141321	445.77
		1.41						1.43			
20.00	1.24		10188	141321	151509	445.77	1.43		10315	141194	445.77
TOTALS			181463						40269		
PEAKS	85.18					445.77	1.43			141321	

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IESI PA Bethlehem Landfill
Sedimentation Basin 2

Pre-Development

TAKEN FROM PHASE IV ANALYSIS

JMM

Martin & Martin, Inc.
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Chambersburg, PA 17201

Phone: 717-264-6759
Email: martinmartin@innernet.net

MODIFIED PULS BASIN ROUTING FOR BASIN &... BASIN #2 - PHASE III

INFLOW HYDROGRAPH FILENAME: B:B22YR.HYD
BASIN STORAGE-ELEVATION DATA FILENAME: B:BASIN2.ES
OUTLET STRUCTURE DISCHARGE/ELEVATION DATA FILENAME: B:BASIN2.EO

TIME hrs.	HYDROGRAPH INFLOW,cfs	BASIN INFLOW,cfs	STORAGE acre-ft	ELEVATION ft.ABOVE msl	BASIN OUTFLOW,cfs	OUTFLOW TOTAL,cfs	REGION TIME,
1100.00	1.30	1.30	0.000	460.00	0.00	0.00	
1100.10	1.4	1.40	0.011	460.16	0.00	0.00	
1100.20	1.60	1.60	0.024	460.34	0.00	0.00	
1100.30	1 30	1.30	0.039	460 54	0.00		
1100.40	10	1.10	0.054	460.77	0.00		
1100.50	2.40	2.40	0.072	461.03	0.00		
1100.60	2.70	2.70	0.093	461 33	0.00		
1100.70	7.90	7.90	0.137	461 96	0.00		
1100.80	13 10	13.10	0.224	462.20	0.00		
1100.90	18.30	13.30	0.354	462.52	0.00	0.00	
1101.00	40.00	40.00	0 595	463.10	0.00		
1101..	66.60	66.60	1.035	464.08	0 0		
1101.2	48.60	48.60	1.511	464.70	0.00		
1101.30	22.50	22 50	1.805	465.08	0 00		
1101.40	14.00	14 00	1.956	4 5 17	0 0		
1101.50	10.30	10.30	2 053	465.40	0 00		
1101.60	8 90	8.90	2.139	465.51	0 05		
1101 3	7.30	7.30	2.206	465.59	0.03		
1101.80	6 40	6.40	2.262	465.67	0.11		
1101 90	5.90	5.90	2.311	465.73	0 16		
1102 00	5.50	5.50	2 357	465 79	0 16		
1102 10	5 10	5.10	2 399	4 5.84	0 21		
1102.20	4.90	4.90	2.438	465.89	0 25		
1102.30	4.50	4.50	2.475	465.94	0.25	0 25	
1102.40	4.30	4.30	2 509	465.99	0.27		
1102.50	4.10	4.10	2.541	466.02	0.29		
1102 60	3.90	3.90	2.571	4 6.05	0.31		

TOTAL ROUTING MASS BALANCE DISCREPANCY = - 75

PEAK INFLOW = 6...60 cfs. PEAK OUTFLOW = 0 0 cfs.

ROUTING TIME STEP = 0 10 hours NUMBER OF OUTFLOW HYDROGRAPH POINTS =

PSUAM MODULE <5-B> - SCS TR-55 TABULAR METHOD

WATERSHED TITLE: BASIN #1

10 YR. STORM: PRECIPITATION = 3.20 in.

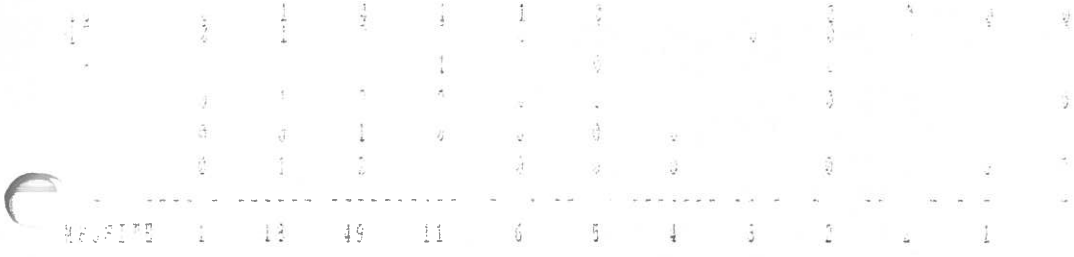
SUMMARY OF INPUT PARAMETERS

PLANE	AREA (sq mi)	CURVE NUMBER	IA/P	RUNOFF (in)	TC (hrs)	ADJ. TC (hrs)	TT (hrs)	ADJ. TT (hrs)
	.12	80	0.156	1.40	0.190	0.200	0.000	0.000
1	0.05	80	0.156	1.40	0.100	0.100	0.000	0.000
	0.002	80	0.156	1.40	0.100	0.200	0.000	0.000
	0.002	80	0.156	1.40	0.070	0.100	0.000	0.000
	0.001	80	0.156	1.40	0.050	0.100	0.000	0.000
	0.1	80	0.156	1.40	0.070	0.100	0.000	0.000
		80	0.156	1.40	0.040	0.100	0.000	0.000
	0.	80	0.156	1.40	0.070	0.100	0.000	0.000
	.0	80	0.156	1.40	0.030	0.100	0.000	0.000
	.01	80	0.156	1.40	0.090	0.100	0.000	0.000
	0	80	0.156	1.40	0.020	0.100	0.000	0.000
	0.0	80	0.156	1.40	0.040	0.100	0.000	0.000
	0.001	80	0.156	1.40	0.060	0.100	0.000	0.000
	0.001	80	0.156	1.40	0.080	0.100	0.000	0.000
		80	0.156	1.40	0.100	0.100	.000	0.000
	0. 4	80	0.156	1.40	0.120	0.100	0.000	0.020
	. 0	80	0.156	1.40	0. 90	0.100	0.000	0.000
	0.001	80	0.156	1.40	0.110	0.100	000	0.010
	0.001	80	0.156	1.40	0.090	0.100	0.000	0.000
	0.01	80	0.156	1.40	0.080	0.100	0.000	0.000
	0.001	80	0.156	1.40	0.110	0.100	0.000	0.010
TOTAL	0.51	80		1.40				

INDIVIDUAL SUBAREA & COMPOSITE HYDROGRAPHS

TIME (hrs)

	11.0	12.0	12.5	13.0	13.5	13.8	14.0	15.0	17.0	20.0	25
	0	13	3	1	1	1	1	0	0	0	
	0	1	1	0	0	0	0	0	0	0	
	0	2	0	0	0	0	0	0	0	0	
	1	1		0	0	0	0	0	0	0	
	1	1	0	0	0	0	0	0	0	0	
0	0	1	0	0	0	0	0	0	0	0	
0	0	1	0	0		0	1	0	0		
	1	1	1	0	0	0	0	0	0		0
			1		0	0		0	0	0	
0			0						0		



THE PEAK FLOW IS 6c.6 cfs - OCCURS AT 12.1 hrs

[illegible] MODULE <3-B> - SCS TR-55 TABULAR METHOD

WATERSHED TITLE: BASIN #2

10 YR. STORM: PRECIPITATION = 4.83 in

SUMMARY OF INPUT PARAMETERS

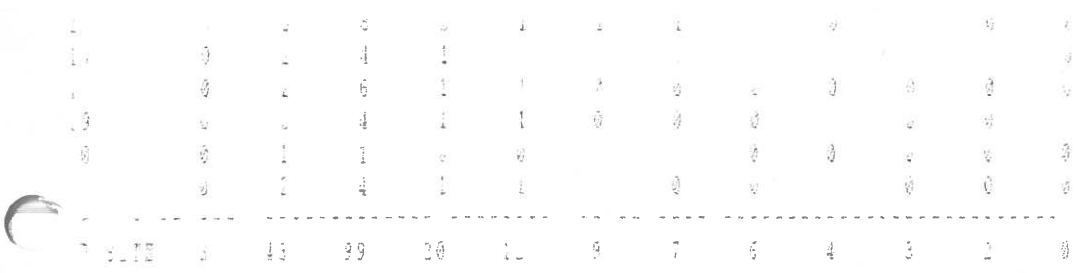
SUBAREA	AREA (sqmi)	CURVE NUMBER	IA/P	RUNOFF (in)	TC (hrs)	ADJ. TC (hrs)	TT (hrs)	ADJ. TT (hrs)
1	[illegible]	80	0.104	2.75	0.190	0.200	0.000	0.000
[illegible]	0.005	80	0.104	2.75	0.100	0.100	0.000	0.000
[illegible]	0.00[illegible]	80	0.104	2.75	0.190	0.200	0.000	0.000
4	0.002	80	0.104	2.75	0.070	0.100	0.000	0.000
5	0.001	80	0.104	2.75	0.050	0.100	0.000	0.000
[illegible]	0.001	80	0.104	2.75	0.070	0.100	0.000	0.000
[illegible]	[illegible]001	80	0.104	2.75	0.040	0.100	0.000	0.000
[illegible]	[illegible]04	80	0.104	2.75	0.070	0.100	0.000	0.000
[illegible]	[illegible]	80	0.104	2.75	0.030	0.100	0.000	0.000
[illegible]	[illegible]	80	0.104	2.75	0.090	0.100	0.000	0.000
[illegible]	[illegible]03	80	0.104	2.75	0.030	0.100	0.000	0.000
[illegible]	[illegible]	80	0.104	2.75	0.040	0.100	0.000	0.000
[illegible]	.001	80	0.104	2.75	0.060	0.100	0.000	0.000
[illegible]	[illegible]03	80	0.104	2.75	0.080	0.100	0.000	0.000
15	0.00[illegible]	80	0.104	2.75	0.10[illegible]	0.100	0.000	0.000
[illegible]	[illegible]004	80	0.104	2.75	0.120	0.100	0.000	0.020
[illegible]	[illegible]	80	0.104	2.75	0.080	0.100	0.000	0.000
[illegible]	.003	80	0.104	2.75	0.120	0.100	0.000	0.020
19	.00[illegible]	80	0.104	2.75	0.090	0.100	0.000	0.000
[illegible]	.001	80	0.104	2.75	0.080	0.100	0.000	0.000
[illegible]	0.[illegible]	80	0.104	2.75	0.110	0.100	0.000	0.010
WP.SITE	[illegible]053	80		2.75				

INDIVIDUAL SUBAREA & COMPOSITE HYDROGRAPHS

TIME (hrs)

SUBAREA	11.0	11.9	12.[illegible]	12.5	12.8	13.2	13.6	14.0	15.0	17.0	20.0	26.0
1	1	7	26	5	3	2	[illegible]	1	1	1	0	0
[illegible]	0	5	9	2	1	1	1	1	0	0	0	0
[illegible]	0	[illegible]	4	1	0	0	0	0	0	0	0	0
4	0	[illegible]	[illegible]	1	0	0	0	0	0	0	0	0
[illegible]	0	1	2	0	0	[illegible]	0	0	0	0	0	0
[illegible]	0		2	0	0	0	0	0	0	0	0	0
[illegible]	0	1	[illegible]	0	0	0	0	0	0	0	0	0
8	0	[illegible]	[illegible]	1	1	1	0	0	0	0	0	0
9	0	[illegible]	1	0	0	[illegible]	0	[illegible]	0	0	0	
10	[illegible]	[illegible]	[illegible]	0		0	0	0	0	0	0	0
[illegible]	[illegible]		4	1	[illegible]				0	[illegible]	0	[illegible]
[illegible]	[illegible]		[illegible]	[illegible]				[illegible]	[illegible]	[illegible]	0	

G-9



THE PEAK FLOW IS 134.5 cfs - OCCURS AT 12.1 hrs

MODIFIED PULS BASIN ROUTING FOR BASIN #_ - -BASIN #_ - PHASE III

INFLOW HYDROGRAPH FILENAME: B:B_10YR.HYD
BASIN STORAGE/ELEVATION DATA FILENAME: B:BASIN2 BS
OUTLET STRUCTURE DISCHARGE/ELEVATION DATA FILENAME: B:BASIN2.BO

TIME hrs.	HYDROGRAPH INFLOW,cfs	BASIN INFLOW,cfs	STORAGE acre-ft	ELEVATION ft.ABOVE msl	BASIN OUTFLOW,cfs	OUTFLOW TOTAL,cfs	RETENT TIME,
1100.00	3.40	3.40	0.000	460.00	0.00	0.0	
1100.10	3.80	3.80	0.030	460.43	0.00	0 0	
1100.20	4.30	4.30	0.083	460.90	0.00	0.00	
1100.30	4.70	4.70	0.100	461.43	0.00	0.00	
1100.40	5.60	5.60	0.143	462.01	0.00	0.00	
1100.50	6.50	6.50	0.193	462.13	0.00	0.00	
1100.60	7.30	7.30	0.250	462.27	0.00	0.00	
1100.70	19.10	19.10	0.359	462 53	0.00	0.00	
1100.80	30.80	30.80	0.565	463.02	0.00	0	
1100.90	42.60	42.60	0.909	463.76	0.00	0.00	
1101.00	83.00	83.00	1 385	464 54	0.00	.1	
1101 10	134.50	134.50	2.296	465.70	0 14	2.14	
1101.20	99.10	99.10	3.248	466.77	0.60	2 3	
1101.30	44.10	44.10	3.834	467.38	0 77	0 7	
1101.40	26.60	26.60	4.119	467.68	0 87	.97	
1101.50	20 20	20.20	4 305	467.88	0.93	9.	
1101.60	16.40	16.40	4 449	468.03	0.96	99	
01.70	13.40	13.40	4 564	468.13	1.01	. .	
1101.80	11.60	11.6	4.659	468.22	1 04	1.04	
1101.90	10.80	10.80	4.742	468.30	1.06	0.	
1102.00	9.90	9.90	4.819	468 37	1.08	1 8	
1102 10	9.20	9.20	4.889	468.44	1.10	1 .	
1102.20	8.60	8 60	4 953	468.50	1 12	1.12	
1102 30	8.10	8.10	5.013	468.56	1.14	1.14	
1102.40	.60	7 60	5 069	468 61	1.15	1 15	

TOTAL ROUTING MASS BALANCE DISCREPANCY= -.19

PEAK INFLOW = 134.50 cfs. PEAK OUTFLOW = 0.00 cfs.

ROUTING TIME STEP = 0 10 hours NUMBER OF OUTFLOW HYDROGRAPH POINTS =

...UDAM M ...ULS <5-B> - SCS TR-55 TABULAR METHOD

WATERSHED TITLE: BASIN #...

25 YR. STORM: PRECIPITATION = 5.7... in.

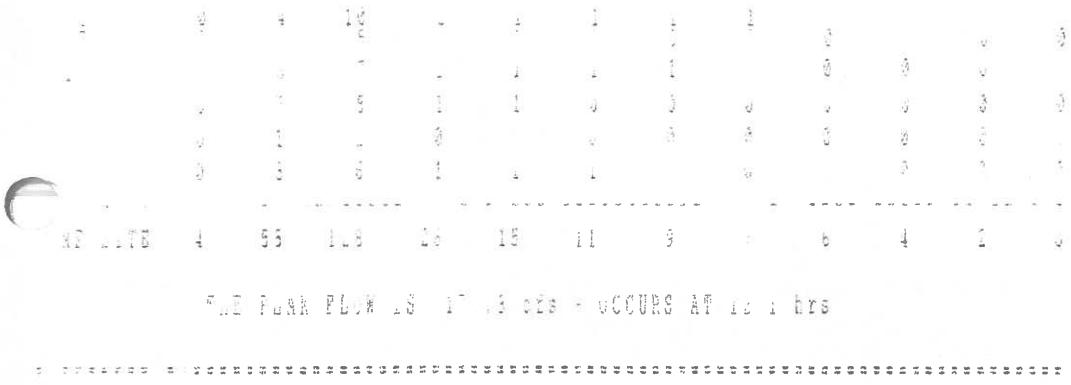
SUMMARY OF INPUT PARAMETERS

SUBAREA	AREA (sq.mi)	CURVE NUMBER	IA/P	RUNOFF (in)	TC (hrs)	ADJ. TC (hrs)	TT hrs)	ADJ. TT hrs)
...	...4...	80	0.100	3.53	0.190	0.200	0.000	0.000
...	...09	80	0.100	3.53	0.100	0.100	.000	0.000
3	0.002	80	0.100	3.53	0.100	0.200	0.000	0.000
4	0. 02	80	0.100	3.53	0.270	0.100	0.000	0.000
5	0.001	80	0.100	3.53	0.050	0.100	0.000	0.000
	...2	80	0.100	3.53	0.070	0.100	0.000	0.000
	...1	80	0.100	3.53	0.040	0.100	0.000	0.000
	4	80	0.100	3.53	0.070	0.100	0.000	0.000
	2	0	0.100	3.53	0. 30	0.100	0.000	0.000
1		5...	0.100	3.53	0.090	0.100	0.000	0.000
		80	0.100	3.53	0.080	0.100	0. 00	0.000
		80	0.100	3.53	0.040	.100	0.000	0.000
	001	80	0.100	3.53	0.050	0.100	0.000	0.000
	...	80	0.100	3.53	0.080	0.100	0.00	0.000
	00	80	.100	3.53	0.100	0.100	0.000	0.000
	0.004	80	0.100	3.53	0.120	0.100	0.000	0.000
	0.00...	80	0.100	3.53	0.080	0.100	0.000	0.000
	003	80	0.100	3.53	0.120	0.100	0.000	0.000
		80	0.100	3.53	0.090	0.100	0.000	0.000
	0.001	80	0.100	3.53	0.090	0.100	0.000	0.000
	...0...	80	0.100	3.53	0.110	0.100	0.00	0.000
COMPOSITE	0. 5...	80		3.53				

INDIVIDUAL SUBAREA & COMPOSITE HYDROGRAPHS

CFS A-

	TIME (hrs)											
	1.0	11.5	12.0	12.5	12.8	13.2	13.6	14.0	15.0	17.0	20.0	26.0
	1	3	34	7	4	2	.	1	1	1	1	0
		0	11	.	1	1	1	1	1	0	0	0
		.		1	1	0	0	0	0	.	0	0
4		.	4	1	1	0	0	0	0	0	0	0
		1	0	.	0	0	0			0	0	0
	0	1	.	0	0	0	0	0	0	0	0	0
	0	1	.	0		0	0	0	0		0	0
	0	1	0		1	1	1	0	0	0	0	0
2		0	.	0	0	0	0	0	0	0	0	0
		1	1		0	0	0	0	0	0	0	0
1				1	.	1	0		0	0	0	0
	0		0		0				0			



G-13

MODIFIED PULS BASIN ROUTING FOR BASIN #1---BASIN #1 - PHASE II.

INFLOW HYDROGRAPH FILENAME: B:B__5YR.HYD
BASIN STORAGE/ELEVATION DATA FILENAME: B:BASIN1.DS
OUTLET STRUCTURE DISCHARGE ELEVATION DATA FILENAME: B:BASIN1.DO

TIME hrs.	HYDROGRAPH INFLOW,cfs	BASIN INFLOW,cfs	STORAGE acre-ft	ELEVATION ft.ABOVE msl	BASIN OUTFLOW,cfs	OUTFLOW TOTAL,cfs	S... FLOW...
1100.00	4.40	4.40	0.000	460.00	0.00		
1100.10	5.00	5.00	0.039	460.55	0.00		
1100.20	5.60	5.60	0.083	461.13	0.00		
1100.30	6.20	6.20	0.131	461.85	0.00		
1100.40	7.30	7.30	0.187	462.11	0.00		
1100.50	8.50	8.50	0.254	462.37	0.00		
1100.60	9.60	9.60	0.327	462.45	0.00		
1100.70	24.80	24.80	0.469	462.79	0.00		
1100.80	40.10	40.10	0.736	463.44	0.00		
1100.90	55.30	55.30	1.132	464.21	0.00		
1101.00	107.10	107.10	1.303	465.07	0.00		
1101.10	175.30	175.30	2.960	466.46	0.50		
1101.20	142.70	142.70	4.198	467.77	0.89		
1101.30	57.70	56.80	4.951	468.50	1.11		
1101.40	54.10	54.10	5.31	468.84	1.23		
1101.50	55.80	55.80	5.554	469.06	1.31		
1101.60	21.00	21.00	5.736	469.24	1.36		
1101.70	17.20	17.20	5.883	469.37	1.41		
1101.80	14.90	14.90	6.003	469.49	1.45		
1101.90	13.80	13.80	6.110	469.59	1.48		
1102.00	12.60	12.60	6.207	469.68	1.50		
1102.10	11.80	11.80	6.295	469.76	1.52		
1102.20	10.9	10.90	6.375	469.84	1.55		
1102.30	10.30	10.30	6.451	469.91	1.56		

TOTAL ROUTING MASS BALANCE DISCREPANCY= -.82 %

PEAK INFLOW = 173.30 cfs. PEAK OUTFLOW = 0.00 cfs.

ROUTING TIME STEP = 0.10 hours NUMBER OF OUTFLOW HYDROGRAPH POINTS =

MODIFIED PULS BASIN ROUTING FOR BASIN #2---BASIN #1 PHASE III

INFLOW HYDROGRAPH FILENAME: B:B211@YR.HYD
BASIN STORAGE ELEVATION DATA FILENAME: B:BASIN1.ES
OUTLET STRUCTURE DISCHARGE/ELEVATION DATA FILENAME: B:BASIN1.EO

TIME hrs.	HYDROGRAPH INFLOW,cfs	BASIN INFLOW,cfs	STORAGE acre-ft	ELEVATION ft.ABOVE msl	BASIN OUTFLOW,cfs	OUTFLOW TOTAL ,cfs	REI
1100.00	6.00	6.00	0.000	460.00	0.00		
1100.10	6.80	6.80	0.053	460.76	0.00		
1100.20	7.60	7.60	0.112	461.61	0.00		
1100.30	8.40	8.40	0.179	462.09	0.00		
1100.40	9.90	9.90	0.264	462.28	0.00		
1100.50	11.40	11.40	0.342	462.49	0.00		
1100.60	12.90	12.90	0.443	462.73	0.00		
1100.70	33.50	33.50	0.634	463.19	0.00		
1100.80	54.10	54.10	0.998	464.03	0.00		
1100.90	74.60	74.60	1.528	464.72	0.00		
1101.00	144.50	144.50	2.473	465.99	0.29		
1101.10	233.70	233.70	3.991	467.55	3.80		
1101.20	172.20	172.20	5.669	469.16	1.34		
1101.30	76.50	76.50	6.675	470.10	1.64		
1101.40	46.00	46.00	7.157	470.54	1.77		
1101.50	34.90	34.50	7.496	470.79	1.85		
1101.60	28.40	28.40	7.751	470.99	1.92		
1101.70	23.10	23.10	7.919	471.15	1.97		
1101.80	20.10	20.10	8.054	471.26	1.96		
1101.90	18.60	18.60	8.154	471.35	2.04		
1102.00	17.00	17.00	8.225	471.41	1.92		
1102.10	15.90	15.90	8.277	471.45	1.91		
1102.20	14.8	14.80	8.299	471.47	1.93		
1102.30	14.0	14.00	8.312	471.48	1.95		

TOTAL ROUTING MASS BALANCE DISCREPANCY= - 3.2 %

PEAK INFLOW = 233.70 cfs PEAK OUTFLOW = 18.05 cfs.

ROUTING TIME STEP = 0.10 hours NUMBER OF OUTFLOW HYDROGRAPH POINTS = 2

PEAK FLOW HYDROGRAPH (TR-55 TABULAR METHOD)

WATERSHED TITLE: BASIN #1

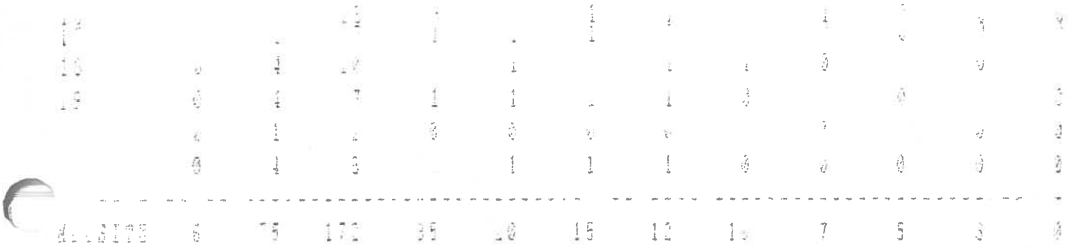
100 YR STORM: PRECIPITATION = 7.00 in

SUMMARY OF INPUT PARAMETERS

SUBAREA	AREA sq mi	CURVE NUMBER	IA/P	RUNOFF (in)	TC (hrs)	ADJ. TC (hrs)	TT (hrs)	ADJ. TT (hrs)
1	0.012	80	0.100	4.76	0.190	0.200	0.000	0.000
2	0.005	80	0.100	4.76	0.100	0.100	0.000	0.000
3	0.002	80	0.100	4.76	0.180	0.200	0.000	0.000
4	0.001	90	0.100	4.76	0.070	0.100	0.000	0.000
5	0.001	80	0.100	4.76	0.050	0.100	0.000	0.000
6	0.001	80	0.100	4.76	0.070	0.100	0.000	0.000
7	0.001	80	0.100	4.76	0.040	0.100	0.000	0.000
8	0.001	80	0.100	4.76	0.070	0.100	0.000	0.000
9	0.001	80	0.100	4.76	0.030	0.100	0.000	0.000
10	0.001	80	0.100	4.76	0.090	0.100	0.000	0.000
11	0.001	80	0.100	4.76	0.080	0.100	0.000	0.000
12	0.001	80	0.100	4.76	0.040	0.100	0.000	0.000
13	0.001	80	0.100	4.76	0.060	0.100	0.000	0.000
14	0.001	80	0.100	4.76	0.080	0.100	0.000	0.000
15	0.001	80	0.100	4.76	0.100	0.100	0.000	0.000
16	0.001	80	0.100	4.76	0.120	0.100	0.000	0.000
17	0.001	80	0.100	4.76	0.080	0.100	0.000	0.000
18	0.001	80	0.100	4.76	0.120	0.100	0.000	0.000
19	0.001	80	0.100	4.76	0.040	0.100	0.000	0.000
20	0.001	80	0.100	4.76	0.110	0.100	0.000	0.000
TOTAL	0.045	80		4.76				

INDIVIDUAL SUBAREA & COMPOSITE HYDROGRAPHS

SUBAREA	TIME (hrs)											
	11.0	11.5	12.0	12.5	12.8	13.2	13.6	14.0	15.0	17.0	20.0	26.0
1	1	11	46	9	5	3	3	2	2	1	1	0
2	1	6	15	3	2	1	1	1	1	0	0	0
3	0	2	6	2	1	1	0	0	0	0	0	0
4		0	0	1	1	1	0	0	0	0	0	0
5	0	1	4	1	0	0	0	0	0	0	0	0
6		1	3	1	0	0	0	0	0	0	0	0
7		1	3	1	0	0	0	0	0	0	0	0
8	0	0	11	3	1	1	1	1	1	0	0	0
9		0	1	0	0	0	0	0	0	0	0	0
10		1	1		0			0	0			
11	0	0	1	0	1	1	1	0	0	0	0	
12			1			0				0	0	0



THE PEAK FLOW IS [illegible] cfs - OCCURS AT 12.1 hrs

IESI PA Bethlehem Landfill

Pre-Development

Basin #3

TAKEN FROM PHASE IV ANALYSIS

JMM

Martin & Martin, Inc.
37 S.Main St. Suite A
Chambersburg, PA 17201

Phone: 717-264-6759
Email: martinmartin@innernet.net

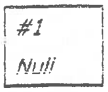
General Information

Storm Information:

Storm Type:	NRCS Type II
Design Storm:	2 yr - 24 hr
Rainfall Depth:	3.200 inches

Structure Networking:

Type	Stru #	(flows into)	Stru #	Musk. K (hrs)	Musk. X	Description
Null	#1	==>	End	0.000	0.000	Ex. Basin #3 Area



Structure Summary:

	Immediate Contributing Area (ac)	Total Contributing Area (ac)	Peak Discharge (cfs)	Total Runoff Volume (ac-ft)
#1	13.500	13.500	9.46	0.88

Structure Detail:

Structure #1 (Null)

Ex. Basin #3 Area

Subwatershed Hydrology Detail:

Stru #	SWS #	SWS Area (ac)	Time of Conc (hrs)	Musk K (hrs)	Musk X	Curve Number	UHS	Peak Discharge (cfs)	Runoff Volume (ac-ft)
#1	1	13.500	0.159	0.000	0.000	69.000	F	9.46	0.877
	Σ	**13.500**						**9.46**	**0.877**

Subwatershed Time of Concentration Details:

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#1	1	3. Short grass pasture	20.00	260.00	1,300.00	3.570	0.101
		6. Grassed waterway	8.00	72.00	900.00	4.240	0.058
#1	**1**	**Time of Concentration:**					**0.159**

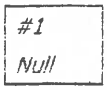
General Information

Storm Information:

Storm Type:	NRCS Type II
Design Storm:	10 yr - 24 hr
Rainfall Depth:	4.830 inches

Structure Networking:

Type	Stru #	(flows into)	Stru #	Musk. K (hrs)	Musk. X	Description
Null	#1	==>	End	0.000	0.000	Ex. Basin #3 Area



Structure Summary:

	Immediate Contributing Area (ac)	Total Contributing Area (ac)	Peak Discharge (cfs)	Total Runoff Volume (ac-ft)
#1	13.500	13.500	22.76	2.06

Structure Detail:

Structure #1 (Null)

Ex. Basin #3 Area

Subwatershed Hydrology Detail:

Stru #	SWS #	SWS Area (ac)	Time of Conc (hrs)	Musk K (hrs)	Musk X	Curve Number	UHS	Peak Discharge (cfs)	Runoff Volume (ac-ft)
#1	1	13.500	0.159	0.000	0.000	69.000	F	22.76	2.064
	Σ	**13.500**						**22.76**	**2.064**

Subwatershed Time of Concentration Details:

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#1	1	3. Short grass pasture	20.00	260.00	1,300.00	3.570	0.101
		6. Grassed waterway	8.00	72.00	900.00	4.240	0.058
#1	**1**	**Time of Concentration:**					**0.159**

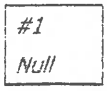
General Information

Storm Information:

Storm Type:	NRCS Type II
Design Storm:	25 yr - 24 hr
Rainfall Depth:	5.720 inches

Structure Networking:

Type	Stru #	(flows into)	Stru #	Musk. K (hrs)	Musk. X	Description
Null	#1	==>	End	0.000	0.000	Ex. Basin #3 Area



Structure Summary:

	Immediate Contributing Area (ac)	Total Contributing Area (ac)	Peak Discharge (cfs)	Total Runoff Volume (ac-ft)
#1	13.500	13.500	31.02	2.81

Structure Detail:

Structure #1 (Null)

Ex. Basin #3 Area

Subwatershed Hydrology Detail:

Stru #	SWS #	SWS Area (ac)	Time of Conc (hrs)	Musk K (hrs)	Musk X	Curve Number	UHS	Peak Discharge (cfs)	Runoff Volume (ac-ft)
#1	1	13.500	0.159	0.000	0.000	69.000	F	31.02	2.808
	Σ	**13.500**						**31.02**	**2.808**

Subwatershed Time of Concentration Details:

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#1	1	3. Short grass pasture	20.00	260.00	1,300.00	3.570	0.101
		6. Grassed waterway	8.00	72.00	900.00	4.240	0.058
#1	**1**	**Time of Concentration:**					**0.159**

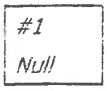
General Information

Storm Information:

Storm Type:	NRCS Type II
Design Storm:	100 yr - 24 hr
Rainfall Depth:	7.070 inches

Structure Networking:

Type	Stru #	(flows into)	Stru #	Musk. K (hrs)	Musk. X	Description
Null	#1	==>	End	0.000	0.000	Ex. Basin #3 Area



Structure Summary:

	Immediate Contributing Area (ac)	Total Contributing Area (ac)	Peak Discharge (cfs)	Total Runoff Volume (ac-ft)
#1	13.500	13.500	44.27	4.02

Structure Detail:

Structure #1 (Null)

Ex. Basin #3 Area

Subwatershed Hydrology Detail:

Stru #	SWS #	SWS Area (ac)	Time of Conc (hrs)	Musk K (hrs)	Musk X	Curve Number	UHS	Peak Discharge (cfs)	Runoff Volume (ac-ft)
#1	1	13.500	0.159	0.000	0.000	69.000	F	44.27	4.018
	Σ	**13.500**						**44.27**	**4.018**

Subwatershed Time of Concentration Details:

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#1	1	3. Short grass pasture	20.00	260.00	1,300.00	3.570	0.101
		6. Grassed waterway	8.00	72.00	900.00	4.240	0.058
#1	**1**	**Time of Concentration:**					**0.159**

IESI PA Bethlehem Landfill

Pre-Development

Basin #4

TAKEN FROM PHASE III ANALYSIS

IMM

Martin & Martin, Inc.
37 S.Main St. Suite A
Chambersburg, PA 17201

Phone: 717-264-6759
Email: martinmartin@innernet.net

****
* PSUHM: MODULE <3-B> - SCS TR-55 TABULAR METHOD *
****

WATERSHED TITLE: BASIN #4

2 YR. STORM: PRECIPITATION = 3.2 in.

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SUMMARY OF INPUT PARAMETERS

SUBAREA	AREA (sqmi)	CURVE NUMBER	IA/P	RUNOFF (in)	TC (hrs)	ADJ. TC (hrs)	TT (hrs)	ADJ. TT (hrs)
1	0.005	71	0.255	0.88	0.119	0.100	0.006	0.025
2	0.004	80	0.156	1.40	0.112	0.100	0.003	0.015
3	0.004	80	0.156	1.40	0.113	0.100	0.003	0.016
4	0.003	80	0.156	1.40	0.105	0.100	0.003	0.008
5	0.004	81	0.147	1.47	0.091	0.100	0.005	0.000
6	0.003	80	0.156	1.40	0.100	0.100	0.004	0.004
7	0.004	80	0.156	1.40	0.095	0.100	0.004	0.000
8	0.006	80	0.156	1.40	0.110	0.100	0.025	0.035
9	0.004	81	0.147	1.47	0.098	0.100	0.008	0.006
10	0.005	80	0.156	1.40	0.145	0.100	0.008	0.053
11	0.011	62	0.383	0.48	0.074	0.100	0.000	0.000
COMPOSITE	0.053	75		1.17				

INDIVIDUAL SUBAREA & COMPOSITE HYDROGRAPHS

SUBAREA	TIME (hrs)											
	11.0	11.9	12.2	12.5	12.8	13.2	13.6	14.0	15.0	17.0	20.0	26.0
1	0	1	3	1	0	0	0	0	0	0	0	0
2	0	1	3	1	0	0	0	0	0	0	0	0
3	0	1	3	1	0	0	0	0	0	0	0	0
4	0	1	3	1	0	0	0	0	0	0	0	0
5	0	2	4	1	0	0	0	0	0	0	0	0
6	0	1	3	1	0	0	0	0	0	0	0	0
7	0	1	3	1	0	0	0	0	0	0	0	0
8	0	2	5	1	1	1	0	0	0	0	0	0
9	0	2	4	1	0	0	0	0	0	0	0	0
10	0	1	5	1	1	0	0	0	0	0	0	0
11	0	0	2	1	1	0	0	0	0	0	0	0
COMPOSITE	1	14	38	9	5	4	3	3	2	1	1	0

THE PEAK FLOW IS 54.4 cfs - OCCURS AT 12.1 hrs

==========

Penn State Urban Hydrology Model
MODULE <4-B> - MODIFIED PULS ROUTING

Name of reservoir or channel: BASIN 4 PHASE III
Filename of inflow hydrograph: B:2YRBASIN.HYD
Filename of rating matrix: B:BASIN4.ESO

Date	Time	Inflow (cfs)	I1+I2 (cfs)	2ST/DT-O (cfs)	2ST/DT+O (cfs)	Outflow (cfs)	Storage (AcFt)	Elevation (ft MSL)
		1.0	2.2	0.0	0.0	0.1	2.28	434.50
00/00/0	0012	1.2	2.8	2.1	2.2	0.1	2.30	434.50
00/00/0	0024	1.6	3.7	4.8	4.9	0.1	2.30	434.50
00/00/0	0036	2.1	12.9	8.4	8.5	0.1	2.30	434.50
00/00/0	0048	10.8	45.4	21.2	21.3	0.1	2.30	434.50
00/00/0	0100	34.6	74.7	66.5	66.6	0.1	2.30	434.50
00/00/0	0112	40.1	52.4	141.1	141.2	0.1	2.30	434.50
00/00/0	0124	12.3	20.1	193.4	193.5	0.1	2.30	434.50
00/00/0	0136	7.8	13.5	213.4	213.5	0.1	2.30	434.50
00/00/0	0148	5.7	10.6	226.8	226.9	0.1	2.30	434.50
00/00/0	0200	4.9	9.2	237.3	237.4	0.1	2.30	434.50
00/00/0	0212	4.3	8.1	246.4	246.5	0.1	2.30	434.50
00/00/0	0224	3.8	7.3	254.4	254.5	0.1	2.30	434.50
00/00/0	0236	3.5	6.8	261.6	261.7	0.1	2.30	434.50
00/00/0	0248	3.3	6.6	268.3	268.4	0.1	2.30	434.50
00/00/0	0300	3.3	6.6	274.8	274.9	0.1	2.30	434.50
00/00/0	0312	3.3	6.6	281.3	281.4	3.3	2.30	434.56

Peak inflow = 40 cfs occurred at 0112 on 00/00/0
Peak outflow = 3 cfs occurred at 0312 on 00/00/0
Number of hydrograph points = 16
Time step = .2 hrs.
Change in storage = 2.28 ac.ft.
Summation of DT * (INFLOW - OUTFLOW) = 2.3

****
* PSUHM: MODULE <3-B> - SCS TR-55 TABULAR METHOD *
****

WATERSHED TITLE: BASIN #4-10YR

10 YR. STORM: PRECIPITATION = 4.83 in.

==========

SUMMARY OF INPUT PARAMETERS

SUBAREA	AREA (sqmi)	CURVE NUMBER	IA/P	RUNOFF (in)	TC (hrs)	ADJ. TC (hrs)	TT (hrs)	ADJ. TT (hrs)
1	0.005	71	0.169	1.99	0.119	0.100	0.006	0.025
2	0.004	80	0.104	2.75	0.112	0.100	0.003	0.015
3	0.004	80	0.104	2.75	0.113	0.100	0.003	0.016
4	0.003	80	0.104	2.75	0.105	0.100	0.003	0.008
5	0.004	81	0.100	2.84	0.091	0.100	0.005	0.000
6	0.003	80	0.104	2.75	0.100	0.100	0.004	0.004
7	0.004	80	0.104	2.75	0.095	0.100	0.004	0.000
8	0.006	80	0.104	2.75	0.110	0.100	0.025	0.035
9	0.004	81	0.100	2.84	0.098	0.100	0.008	0.006
10	0.005	80	0.104	2.75	0.145	0.100	0.008	0.053
11	0.011	62	0.254	1.33	0.074	0.100	0.000	0.000
COMPOSITE	0.053	75		2.39				

INDIVIDUAL SUBAREA & COMPOSITE HYDROGRAPHS

SUBAREA	TIME (hrs) 11.0	11.9	12.2	12.5	12.8	13.2	13.6	14.0	15.0	17.0	20.0	26.0
1	0	2	7	2	1	1	1	0	0	0	0	0
2	0	3	7	1	1	1	0	0	0	0	0	0
3	0	3	6	1	1	1	0	0	0	0	0	0
4	0	3	6	1	1	1	0	0	0	0	0	0
5	0	4	7	1	1	1	1	0	0	0	0	0
6	0	3	6	1	1	1	0	0	0	0	0	0
7	0	3	6	1	1	1	0	0	0	0	0	0
8	0	4	11	2	1	1	1	1	0	0	0	0
9	0	4	7	1	1	1	1	0	0	0	0	0
10	0	3	10	2	1	1	1	1	0	0	0	0
11	0	3	8	2	1	1	1	1	1	0	0	0
COMPOSITE	3	35	82	18	10	8	6	5	4	3	2	0

THE PEAK FLOW IS 115.8 cfs - OCCURS AT 12.1 hrs

==========

Penn State Urban Hydrology Model
MODULE <4-B> - MODIFIED PULS ROUTING

Name of reservoir or channel: BASIN #4 PHASE III
Filename of inflow hydrograph: B:10YRBAS4.HYD
Filename of rating matrix: B:BASIN4.ESO

Date	Time	Inflow (cfs)	I1+I2 (cfs)	2ST/DT-O (cfs)	2ST/DT+O (cfs)	Outflow (cfs)	Storage (AcFt)	Elevation (ft MSL)
		2.6	5.9	0.0	0.0	0.1	2.28	434.50
00/00/0	0012	3.3	7.6	5.8	5.9	0.1	2.30	434.50
00/00/0	0024	4.3	9.9	13.3	13.4	0.1	2.30	434.50
00/00/0	0036	5.6	30.8	23.1	23.2	0.1	2.30	434.50
00/00/0	0048	25.2	97.5	53.8	53.9	0.1	2.30	434.50
00/00/0	0100	72.3	154.0	151.2	151.3	0.1	2.30	434.50
00/00/0	0112	81.7	105.2	305.0	305.2	0.1	2.50	434.82
00/00/0	0124	23.5	38.0	409.5	410.2	0.4	3.40	435.94
00/00/0	0136	14.5	24.8	446.6	447.5	0.5	3.70	436.30
00/00/0	0148	10.3	19.1	470.3	471.4	0.5	3.90	436.52
00/00/0	0200	8.8	16.4	488.3	489.4	0.6	4.00	436.68
00/00/0	0212	7.6	14.4	503.5	504.7	0.6	4.20	436.82
00/00/0	0224	6.8	13.6	516.6	517.9	0.6	4.30	436.94
00/00/0	0236	6.8	13.6	528.9	530.2	0.7	4.40	437.05
00/00/0	0248	6.8	13.6	541.0	542.5	6.8	4.50	437.16

Peak inflow = 82 cfs occurred at 0112 on 00/00/0
Peak outflow = 7 cfs occurred at 0248 on 00/00/0
Number of hydrograph points = 14
Time step = .2 hrs.
Change in storage = 2.28 ac.ft.
Summation of DT * (INFLOW - OUTFLOW) = 4.5 ac.ft.

```
**********************************************************************
*  PSUHM: MODULE <3-B> - SCS TR-55 TABULAR METHOD                    *
**********************************************************************
```

WATERSHED TITLE: BASIN #4 100YR

100 YR. STORM: PRECIPITATION = 7.07 in.

SUMMARY OF INPUT PARAMETERS

SUBAREA	AREA (sqmi)	CURVE NUMBER	IA/P	RUNOFF (in)	TC (hrs)	ADJ. TC (hrs)	TT (hrs)	ADJ. TT (hrs)
1	0.005	71	0.116	3.78	0.119	0.100	0.006	0.025
2	0.004	80	0.100	4.76	0.112	0.100	0.003	0.015
3	0.004	80	0.100	4.76	0.113	0.100	0.003	0.016
4	0.003	80	0.100	4.76	0.105	0.100	0.003	0.008
5	0.004	81	0.100	4.87	0.091	0.100	0.005	0.000
6	0.003	80	0.100	4.76	0.100	0.100	0.004	0.004
7	0.004	80	0.100	4.76	0.095	0.100	0.004	0.000
8	0.006	80	0.100	4.76	0.110	0.100	0.025	0.035
9	0.004	81	0.100	4.87	0.098	0.100	0.008	0.006
10	0.005	80	0.100	4.76	0.145	0.100	0.008	0.053
11	0.011	62	0.173	2.85	0.074	0.100	0.000	0.000
COMPOSITE	0.053	75		4.28				

INDIVIDUAL SUBAREA & COMPOSITE HYDROGRAPHS

SUBAREA	TIME (hrs) 11.0	11.9	12.2	12.5	12.8	13.2	13.6	14.0	15.0	17.0	20.0	26.0
1	0	6	14	3	2	1	1	1	1	0	0	0
2	0	5	12	2	1	1	1	1	1	0	0	0
3	0	5	11	2	1	1	1	1	0	0	0	0
4	0	5	11	2	1	1	1	1	0	0	0	0
5	0	7	12	2	1	1	1	1	1	0	0	0
6	0	5	10	2	1	1	1	1	0	0	0	0
7	0	6	11	2	1	1	1	1	0	0	0	0
8	1	7	19	4	2	2	1	1	1	1	0	0
9	0	6	12	2	1	1	1	1	1	0	0	0
10	1	5	17	4	2	1	1	1	1	0	0	0
11	0	8	19	4	3	2	2	1	1	1	0	0
OMPOSITE	5	66	148	32	18	13	11	9	7	5	3	0

THE PEAK FLOW IS 209.1 cfs - OCCURS AT 12.1 hrs

Penn State Urban Hydrology Model
MODULE <4-B> - MODIFIED PULS ROUTING

Name of reservoir or channel: BASIN #4 PHASE III
Filename of inflow hydrograph: B:100YRBAS.HYD
Filename of rating matrix: B:BASIN4.ESO

Date	Time	Inflow (cfs)	I1+I2 (cfs)	2ST/DT-O (cfs)	2ST/DT+O (cfs)	Outflow (cfs)	Storage (AcFt)	Elevation (ft MSL)
		5.0	11.4	0.0	0.0	0.1	2.28	434.50
00/00/0	0012	6.4	14.7	11.3	11.4	0.1	2.30	434.50
00/00/0	0024	8.3	19.2	25.9	26.0	0.1	2.30	434.50
00/00/0	0036	10.9	58.4	45.0	45.1	0.1	2.30	434.50
00/00/0	0048	47.5	178.7	103.3	103.4	0.1	2.30	434.50
00/00/0	0100	131.2	279.0	281.9	282.0	0.1	2.30	434.57
00/00/0	0112	147.8	189.4	559.3	560.9	0.8	4.60	437.33
00/00/0	0124	41.6	67.2	746.3	748.7	1.2	6.20	438.87
00/00/0	0136	25.6	43.8	810.9	813.5	1.3	6.70	439.36
00/00/0	0148	18.2	33.6	851.8	854.7	1.4	7.10	439.68
00/00/0	0200	15.4	28.7	882.4	885.4	1.5	7.30	439.90
00/00/0	0212	13.3	25.2	908.1	911.1	1.5	7.50	440.09
00/00/0	0224	11.9	23.8	925.8	933.3	3.7	7.70	440.23
00/00/0	0236	11.9	23.8	938.8	949.6	5.4	7.80	440.32
00/00/0	0248	11.9	23.8	949.2	962.6	11.9	7.90	440.40

Peak inflow = 148 cfs occurred at 0112 on 00/00/0
Peak outflow = 12 cfs occurred at 0248 on 00/00/0
Number of hydrograph points = 14
Time step = .2 hrs.
Change in storage = 2.28 ac.ft.
Summation of DT * (INFLOW - OUTFLOW) = 8 ac.

IESI PA Bethlehem Landfill

Phase IV

Pre-Development

BASIN #6 DISCHARGE RATES

TAKEN FROM PHASE IV ANALYSIS

JMM

Martin & Martin, Inc.
37 S. Main Street
Suite A
Chambersburg, PA 17201

Phone: 717-264-6759
Email: martinmartin@innernet.net

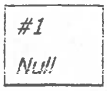
General Information

Storm Information:

Storm Type:	NRCS Type II
Design Storm:	2 yr - 24 hr
Rainfall Depth:	3.200 inches

Structure Networking:

Type	Stru #	(flows into)	Stru #	Musk. K (hrs)	Musk. X	Description
Null	#1	==>	End	0.000	0.000	Ex. Undetained Area



Structure Summary:

	Immediate Contributing Area (ac)	Total Contributing Area (ac)	Peak Discharge (cfs)	Total Runoff Volume (ac-ft)
#1	10.000	10.000	9.04	0.65

Structure Detail:

Structure #1 (Null)

Ex. Undetained Area

Subwatershed Hydrology Detail:

Stru #	SWS #	SWS Area (ac)	Time of Conc (hrs)	Musk K (hrs)	Musk X	Curve Number	UHS	Peak Discharge (cfs)	Runoff Volume (ac-ft)
#1	1	10.000	0.093	0.000	0.000	69.000	F	9.04	0.650
	Σ	**10.000**						**9.04**	**0.650**

Subwatershed Time of Concentration Details:

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#1	1	3. Short grass pasture	40.00	260.00	650.00	5.050	0.035
		6. Grassed waterway	8.00	72.00	900.00	4.240	0.058
#1	**1**	**Time of Concentration:**					**0.093**

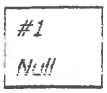
General Information

Storm Information:

Storm Type:	NRCS Type II
Design Storm:	10 yr - 24 hr
Rainfall Depth:	4.830 inches

Structure Networking:

Type	Stru #	(flows into)	Stru #	Musk. K (hrs)	Musk. X	Description
Null	#1	==>	End	0.000	0.000	Ex. Undetained Area



Structure Summary:

	Immediate Contributing Area (ac)	Total Contributing Area (ac)	Peak Discharge (cfs)	Total Runoff Volume (ac-ft)
#1	10.000	10.000	20.38	1.53

Structure Detail:

Structure #1 (Null)

Ex. Undetained Area

Subwatershed Hydrology Detail:

Stru #	SWS #	SWS Area (ac)	Time of Conc (hrs)	Musk K (hrs)	Musk X	Curve Number	UHS	Peak Discharge (cfs)	Runoff Volume (ac-ft)
#1	1	10.000	0.093	0.000	0.000	69.000	F	20.38	1.529
	Σ	**10.000**						**20.38**	**1.529**

Subwatershed Time of Concentration Details:

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#1	1	3. Short grass pasture	40.00	260.00	650.00	5.050	0.035
		6. Grassed waterway	8.00	72.00	900.00	4.240	0.058
#1	**1**	**Time of Concentration:**					**0.093**

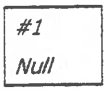
General Information

Storm Information:

Storm Type:	NRCS Type II
Design Storm:	25 yr - 24 hr
Rainfall Depth:	5.720 inches

Structure Networking:

Type	Stru #	(flows into)	Stru #	Musk. K (hrs)	Musk. X	Description
Null	#1	==>	End	0.000	0.000	Ex. Undetained Area



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Subwatershed Hydrology Detail:

Stru #	SWS #	SWS Area (ac)	Time of Conc (hrs)	Musk K (hrs)	Musk X	Curve Number	UHS	Peak Discharge (cfs)	Runoff Volume (ac-ft)
#1	1	10.000	0.093	0.000	0.000	69.000	F	27.11	2.080
	Σ	**10.000**						**27.11**	**2.080**

Subwatershed Time of Concentration Details:

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#1	1	3. Short grass pasture	40.00	260.00	650.00	5.050	0.035
		6. Grassed waterway	8.00	72.00	900.00	4.240	0.058
#1	**1**	**Time of Concentration:**					**0.093**

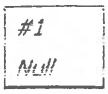
General Information

Storm Information:

Storm Type:	NRCS Type II
Design Storm:	100 yr - 24 hr
Rainfall Depth:	7.040 inches

Structure Networking:

Type	Stru #	(flows into)	Stru #	Musk. K (hrs)	Musk. X	Description
Null	#1	==>	End	0.000	0.000	Ex. Undetained Area



Structure Summary:

	Immediate Contributing Area (ac)	Total Contributing Area (ac)	Peak Discharge (cfs)	Total Runoff Volume (ac-ft)
#1	10.000	10.000	37.45	2.96

Structure Detail:

Structure #1 (Null)

Ex. Undetained Area

Subwatershed Hydrology Detail:

Stru #	SWS #	SWS Area (ac)	Time of Conc (hrs)	Musk K (hrs)	Musk X	Curve Number	UHS	Peak Discharge (cfs)	Runoff Volume (ac-ft)
#1	1	10.000	0.093	0.000	0.000	69.000	F	37.45	2.956
	Σ	**10.000**						**37.45**	**2.956**

Subwatershed Time of Concentration Details:

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#1	1	3. Short grass pasture	40.00	260.00	650.00	5.050	0.035
		6. Grassed waterway	8.00	72.00	900.00	4.240	0.058
#1	**1**	**Time of Concentration:**					**0.093**

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Hydrograph Return Period Recap

Hyd. No.	Hydrograph type (origin)	Inflow Hyd(s)	Peak Outflow (cfs)								Hydrograph description
			1-Yr	2-Yr	3-Yr	5-Yr	10-Yr	25-Yr	50-Yr	100-Yr	
1	SCS Runoff	-------	0.01	0.04	-------	0.14	0.25	0.47	0.68	0.93	Area 007
2	SCS Runoff	-------	0.13	0.52	-------	1.56	2.73	4.76	6.65	8.84	Area 008
3	SCS Runoff	-------	8.27	12.09	-------	18.25	23.66	31.98	39.09	46.90	Area 009
4	SCS Runoff	-------	9.41	12.90	-------	18.28	22.81	29.62	35.34	41.56	Area 010
5	SCS Runoff	-------	0.00	0.01	-------	0.13	0.43	3.16	9.58	19.93	Area 011
6	SCS Runoff	-------	0.00	0.00	-------	0.00	0.30	1.25	4.38	14.77	Area 012

Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
1	SCS Runoff	0.01	3	759	187	----	------	------	Area 007
2	SCS Runoff	0.13	3	738	1,712	----	------	------	Area 008
3	SCS Runoff	8.27	3	726	27,675	----	------	------	Area 009
4	SCS Runoff	9.41	3	723	30,373	----	------	------	Area 010
5	SCS Runoff	0.00	3	0	0	----	------	------	Area 011
6	SCS Runoff	0.00	3	0	0	----	------	------	Area 012

Hydrograph Plot

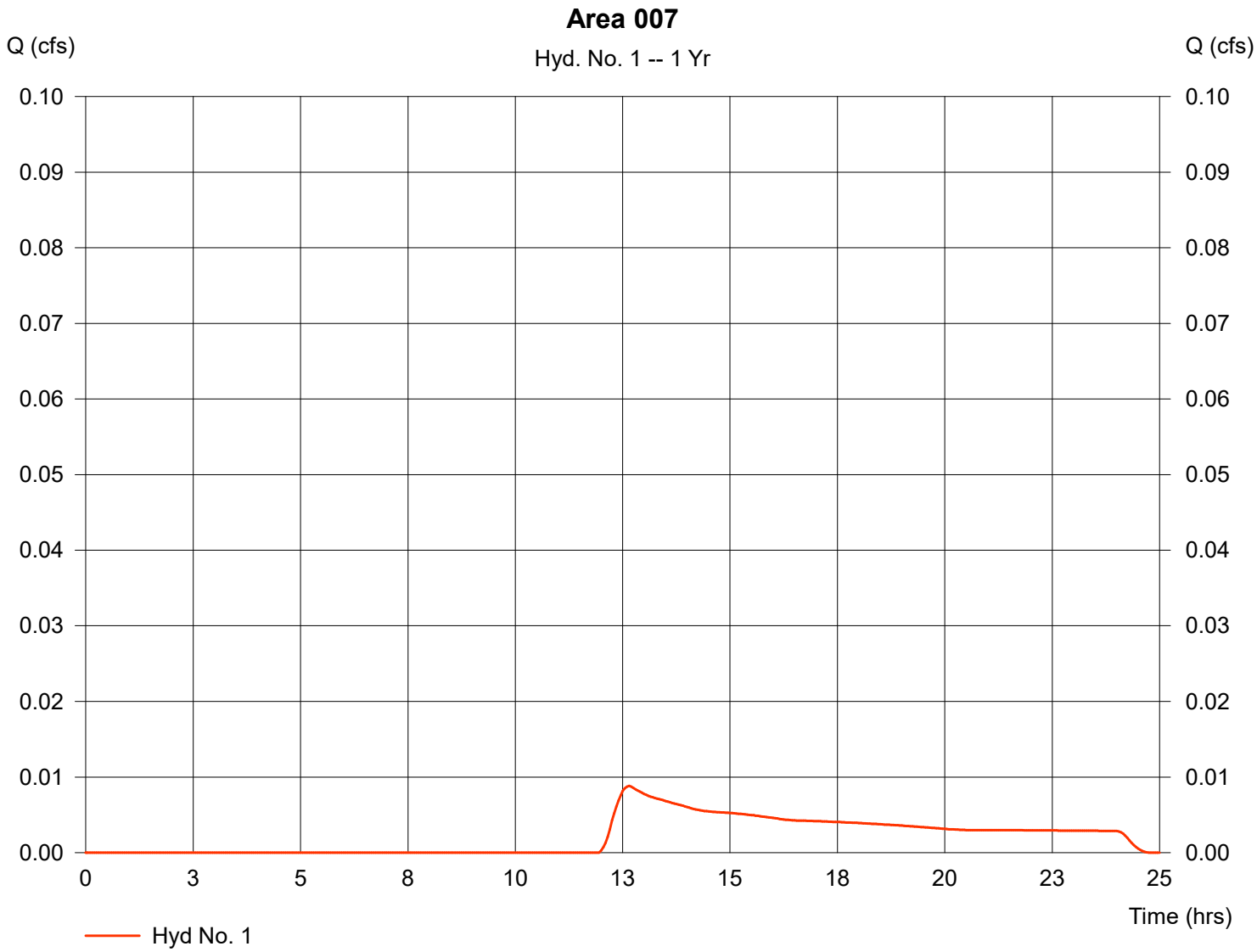
Hydraflow Hydrographs by Intelisolve | Friday, Sep 8 2023, 4:6 PM

Hyd. No. 1

Area 007

Hydrograph type	= SCS Runoff	Peak discharge	= 0.01 cfs
Storm frequency	= 1 yrs	Time interval	= 3 min
Drainage area	= 0.470 ac	Curve number	= 55
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 26.80 min
Total precip.	= 2.64 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 187 cuft



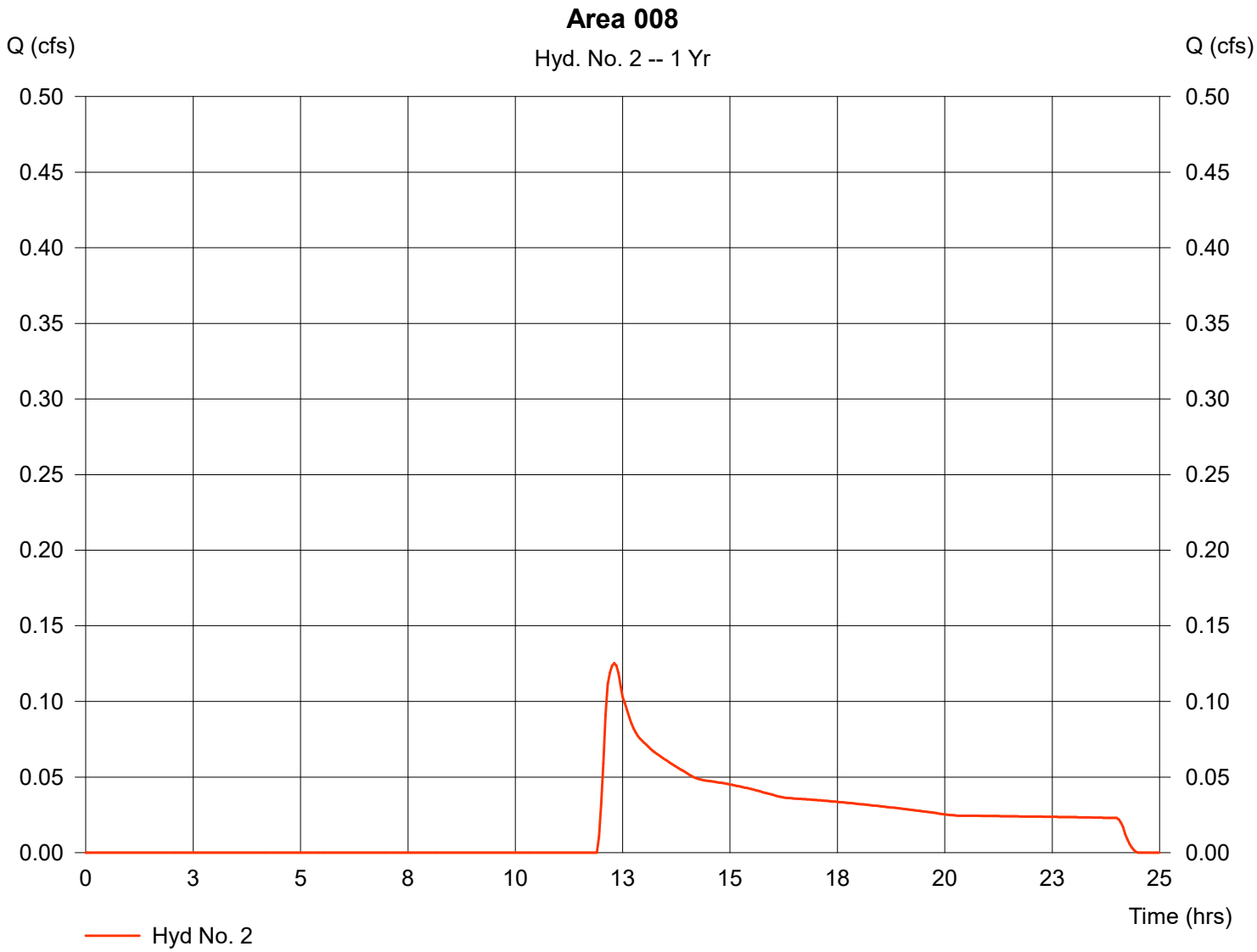
Hydrograph Plot

Hyd. No. 2

Area 008

Hydrograph type	= SCS Runoff	Peak discharge	= 0.13 cfs
Storm frequency	= 1 yrs	Time interval	= 3 min
Drainage area	= 3.100 ac	Curve number	= 57
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 17.50 min
Total precip.	= 2.64 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 1,712 cuft



Hydrograph Plot

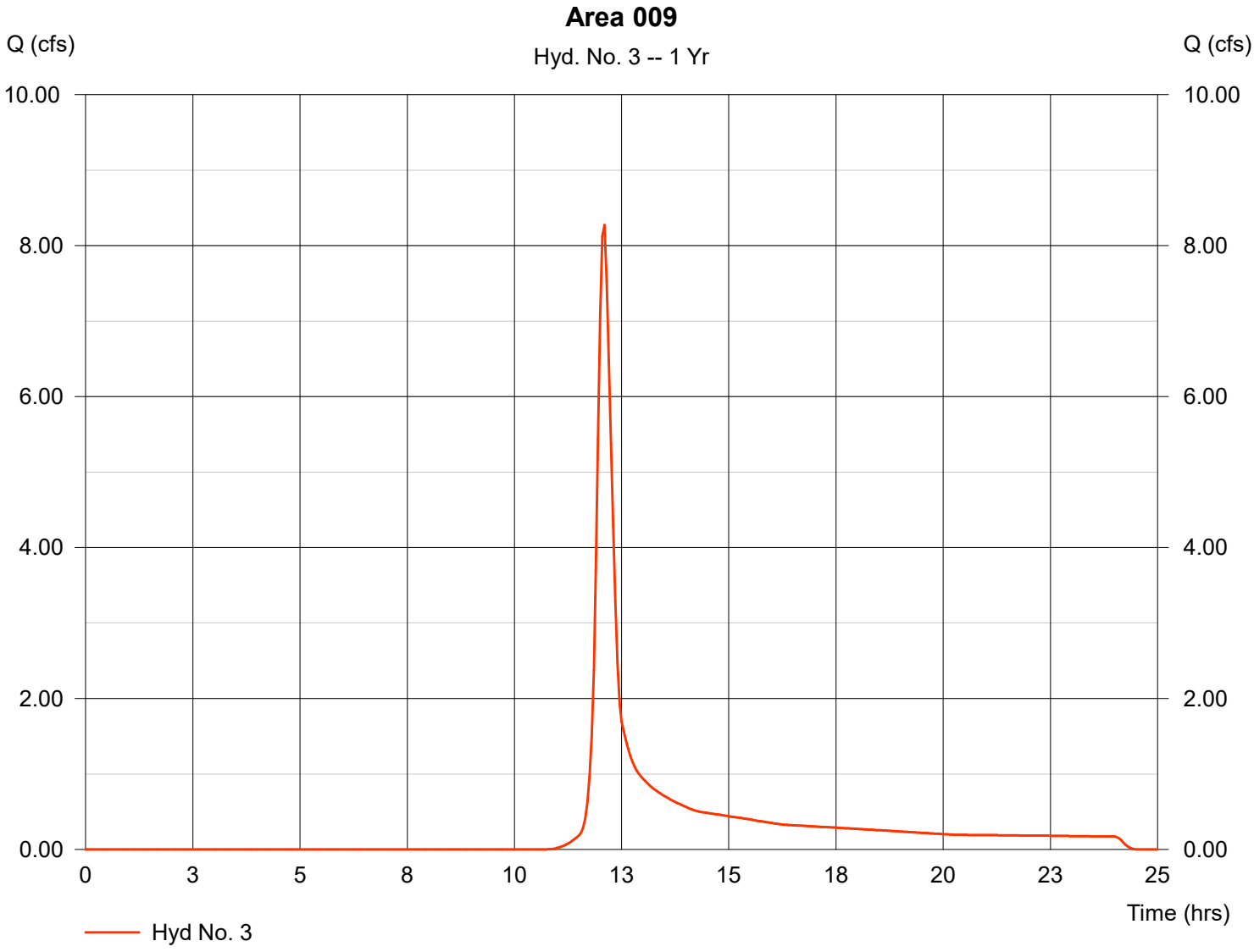
Hydraflow Hydrographs by Intelisolve | Friday, Sep 8 2023, 4:6 PM

Hyd. No. 3

Area 009

Hydrograph type	= SCS Runoff	Peak discharge	= 8.27 cfs
Storm frequency	= 1 yrs	Time interval	= 3 min
Drainage area	= 8.400 ac	Curve number	= 78
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 19.10 min
Total precip.	= 2.64 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 27,675 cuft



Hydrograph Plot

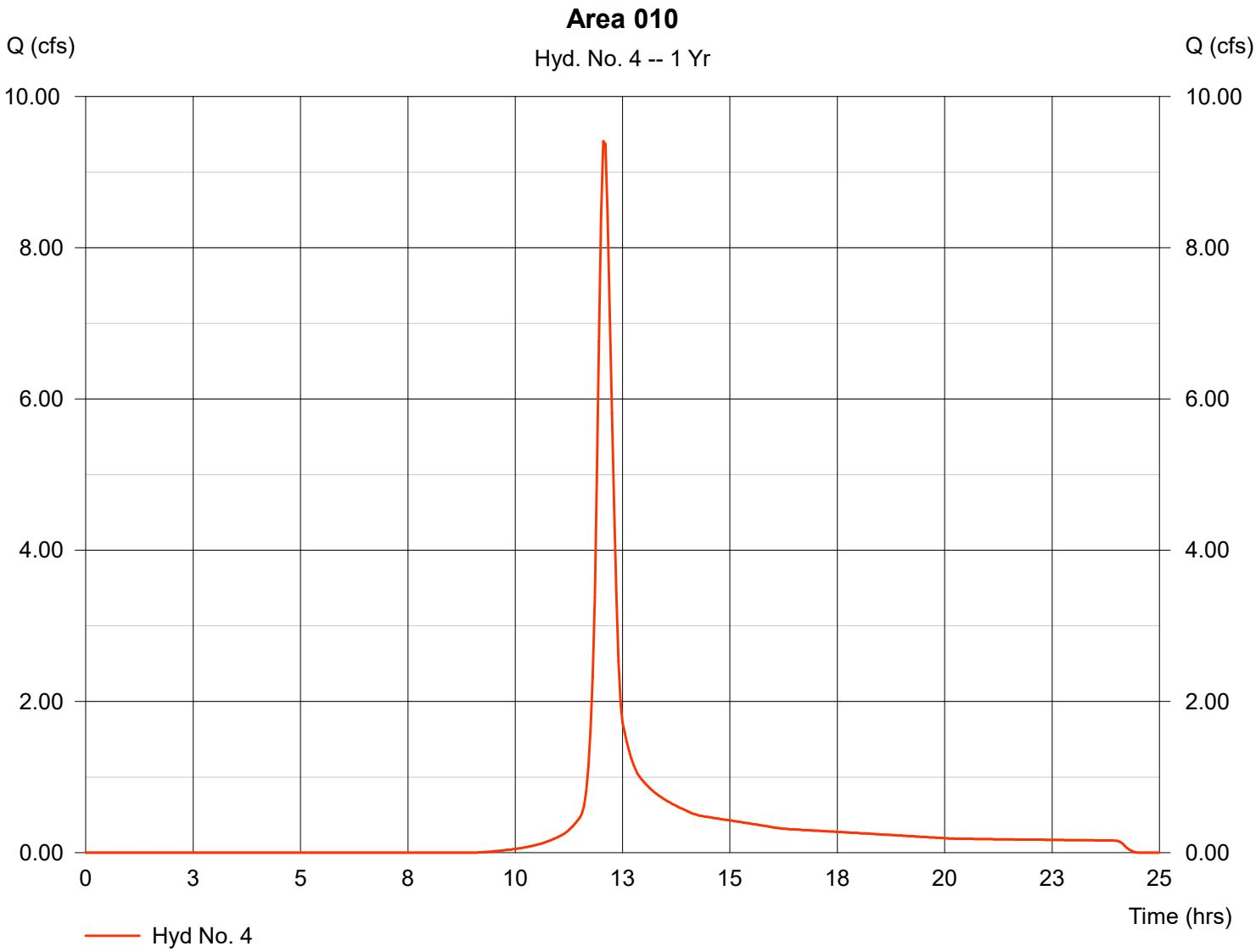
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Hyd. No. 4

Area 010

Hydrograph type	= SCS Runoff	Peak discharge	= 9.41 cfs
Storm frequency	= 1 yrs	Time interval	= 3 min
Drainage area	= 6.620 ac	Curve number	= 84
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 19.70 min
Total precip.	= 2.64 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 30,373 cuft



Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

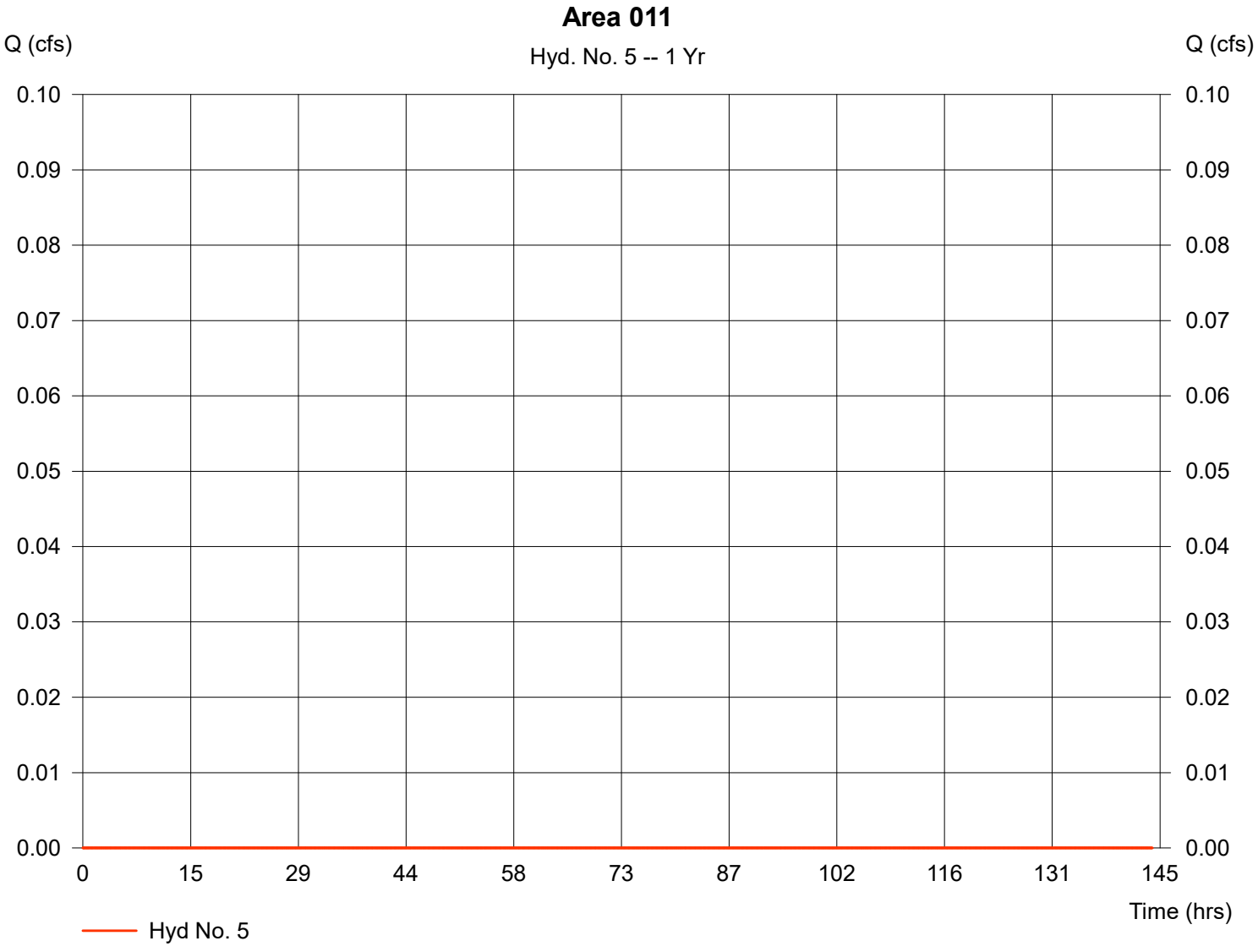
Friday, Sep 8 2023, 4:6 PM

Hyd. No. 5

Area 011

Hydrograph type	= SCS Runoff	Peak discharge	= 0.00 cfs
Storm frequency	= 1 yrs	Time interval	= 3 min
Drainage area	= 26.560 ac	Curve number	= 39
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 12.80 min
Total precip.	= 2.64 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 0 cuft



Hydrograph Plot

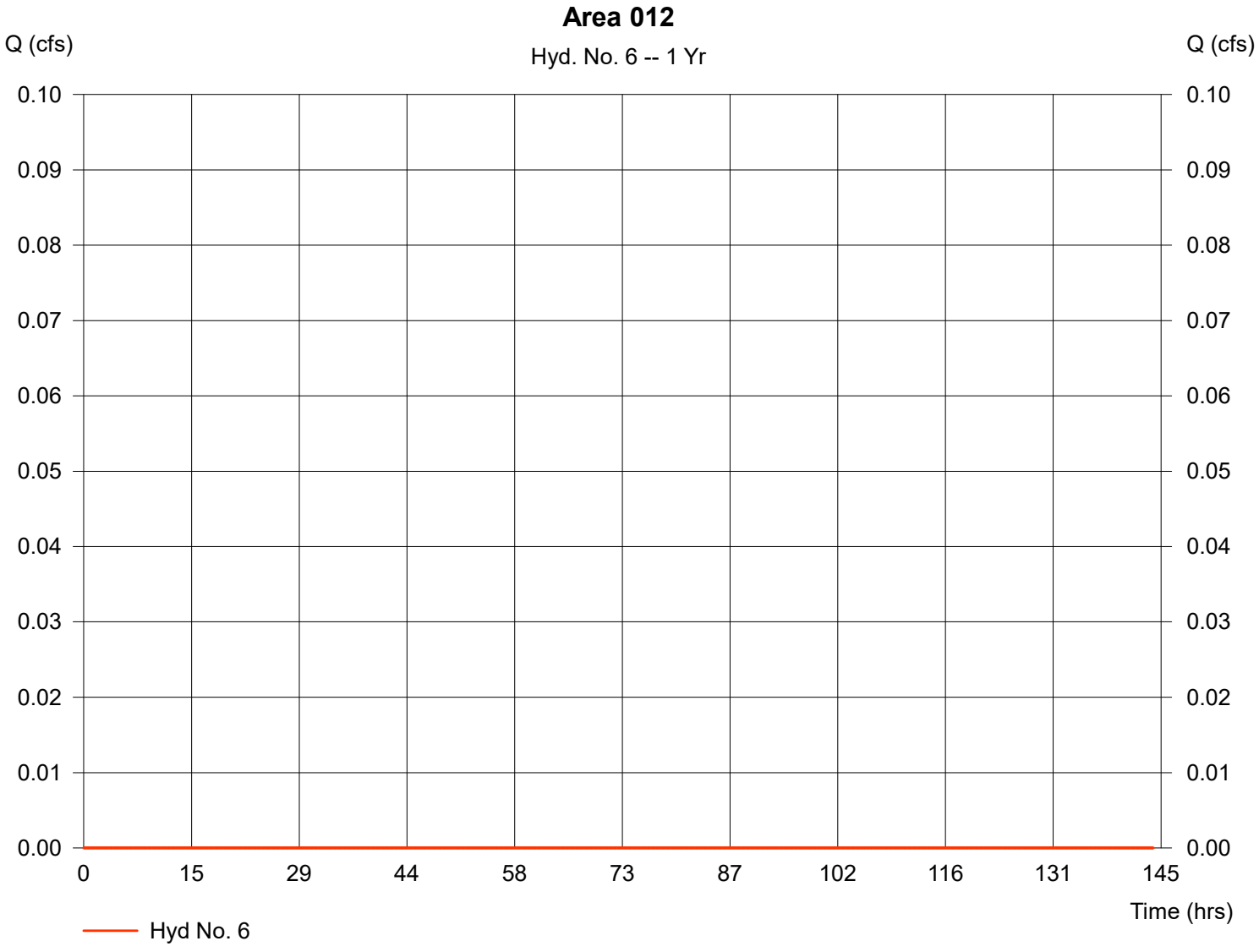
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Hyd. No. 6

Area 012

Hydrograph type	= SCS Runoff	Peak discharge	= 0.00 cfs
Storm frequency	= 1 yrs	Time interval	= 3 min
Drainage area	= 103.540 ac	Curve number	= 33
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 17.80 min
Total precip.	= 2.64 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 0 cuft



Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
1	SCS Runoff	0.04	3	741	417	----	------	------	Area 007
2	SCS Runoff	0.52	3	729	3,513	----	------	------	Area 008
3	SCS Runoff	12.09	3	726	39,580	----	------	------	Area 009
4	SCS Runoff	12.90	3	723	41,276	----	------	------	Area 010
5	SCS Runoff	0.01	3	1440	16	----	------	------	Area 011
6	SCS Runoff	0.00	3	0	0	----	------	------	Area 012

Hydrograph Plot

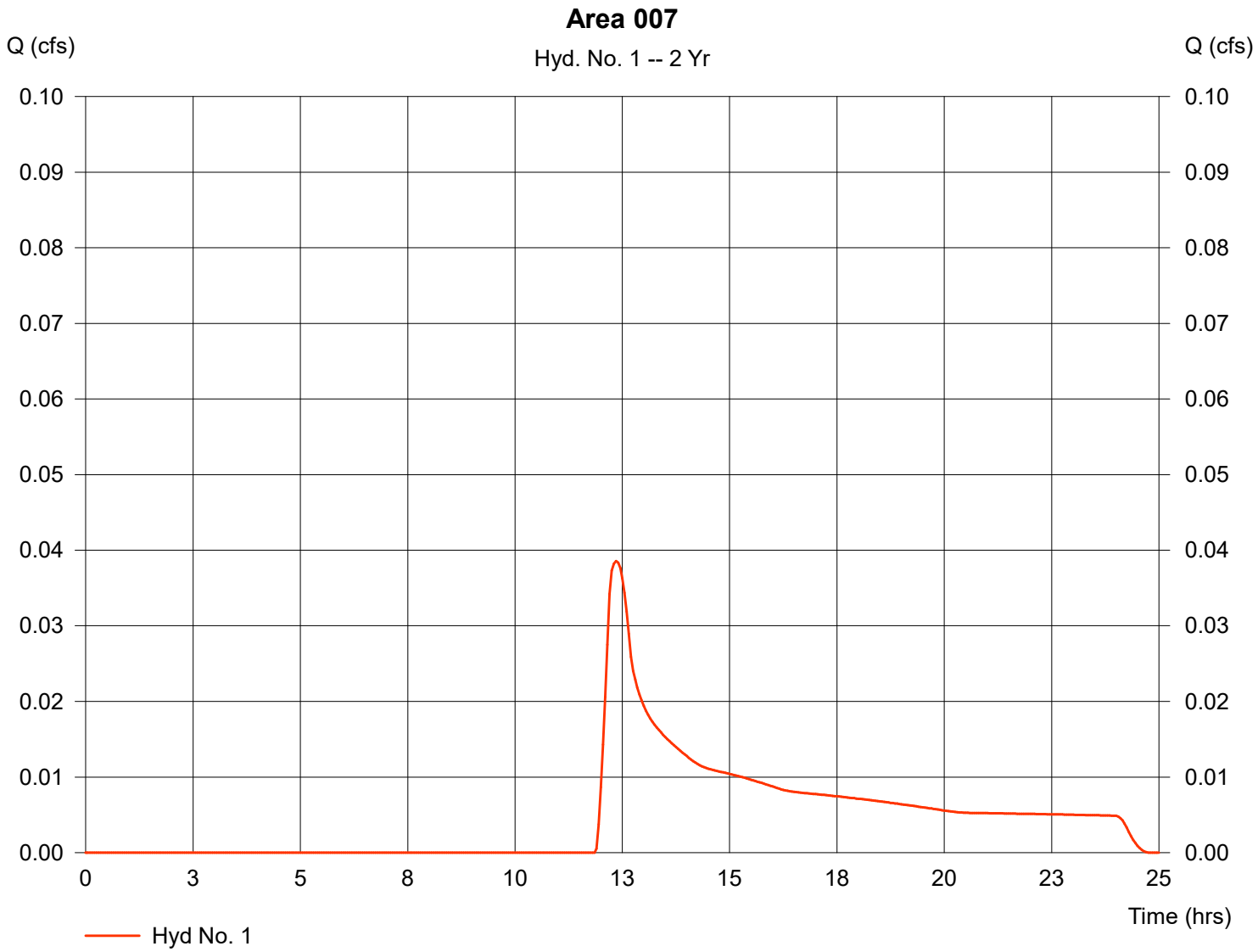
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Hyd. No. 1

Area 007

Hydrograph type	= SCS Runoff	Peak discharge	= 0.04 cfs
Storm frequency	= 2 yrs	Time interval	= 3 min
Drainage area	= 0.470 ac	Curve number	= 55
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 26.80 min
Total precip.	= 3.18 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 417 cuft



Hydrograph Plot

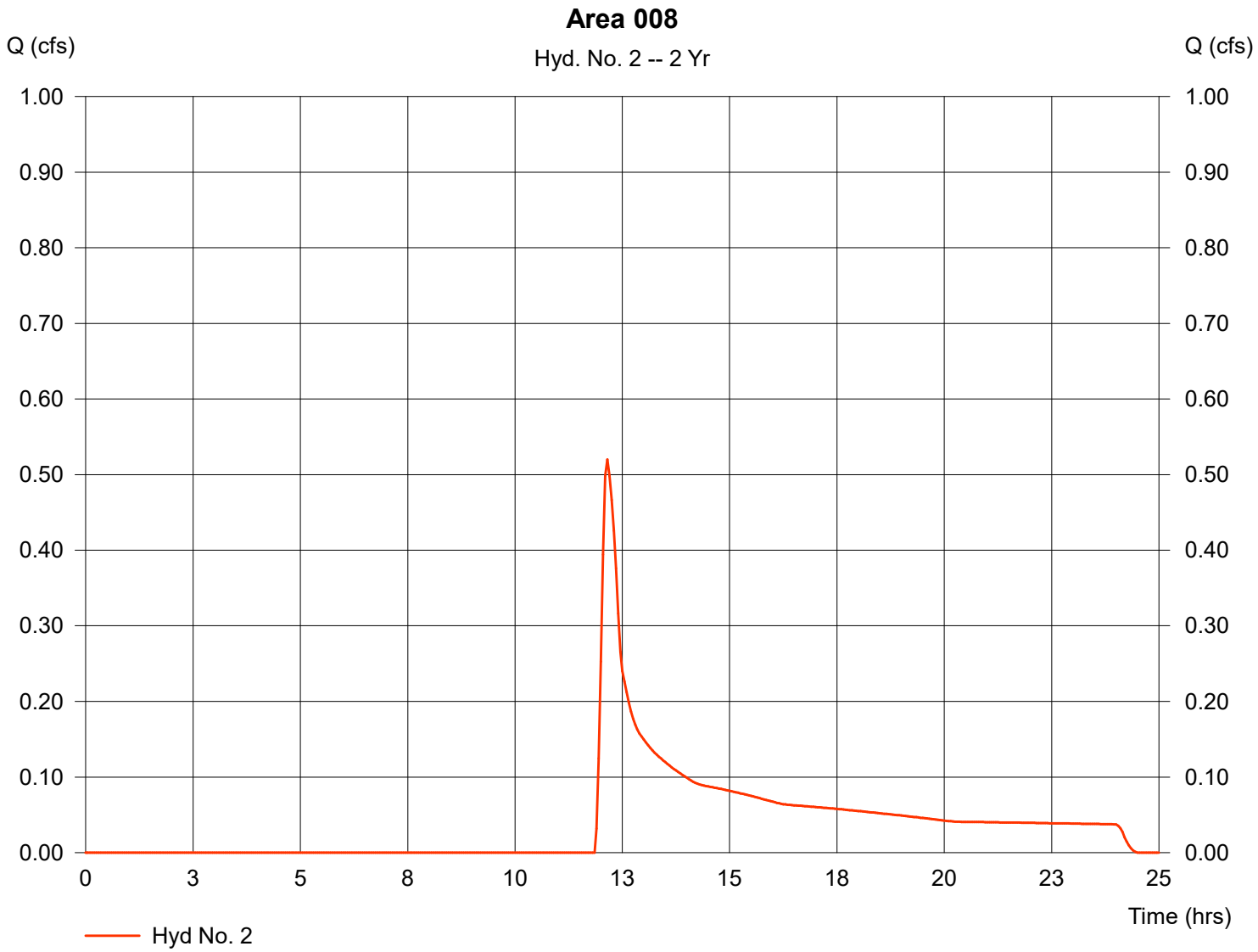
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Hyd. No. 2

Area 008

Hydrograph type	= SCS Runoff	Peak discharge	= 0.52 cfs
Storm frequency	= 2 yrs	Time interval	= 3 min
Drainage area	= 3.100 ac	Curve number	= 57
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 17.50 min
Total precip.	= 3.18 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 3,513 cuft



Hydrograph Plot

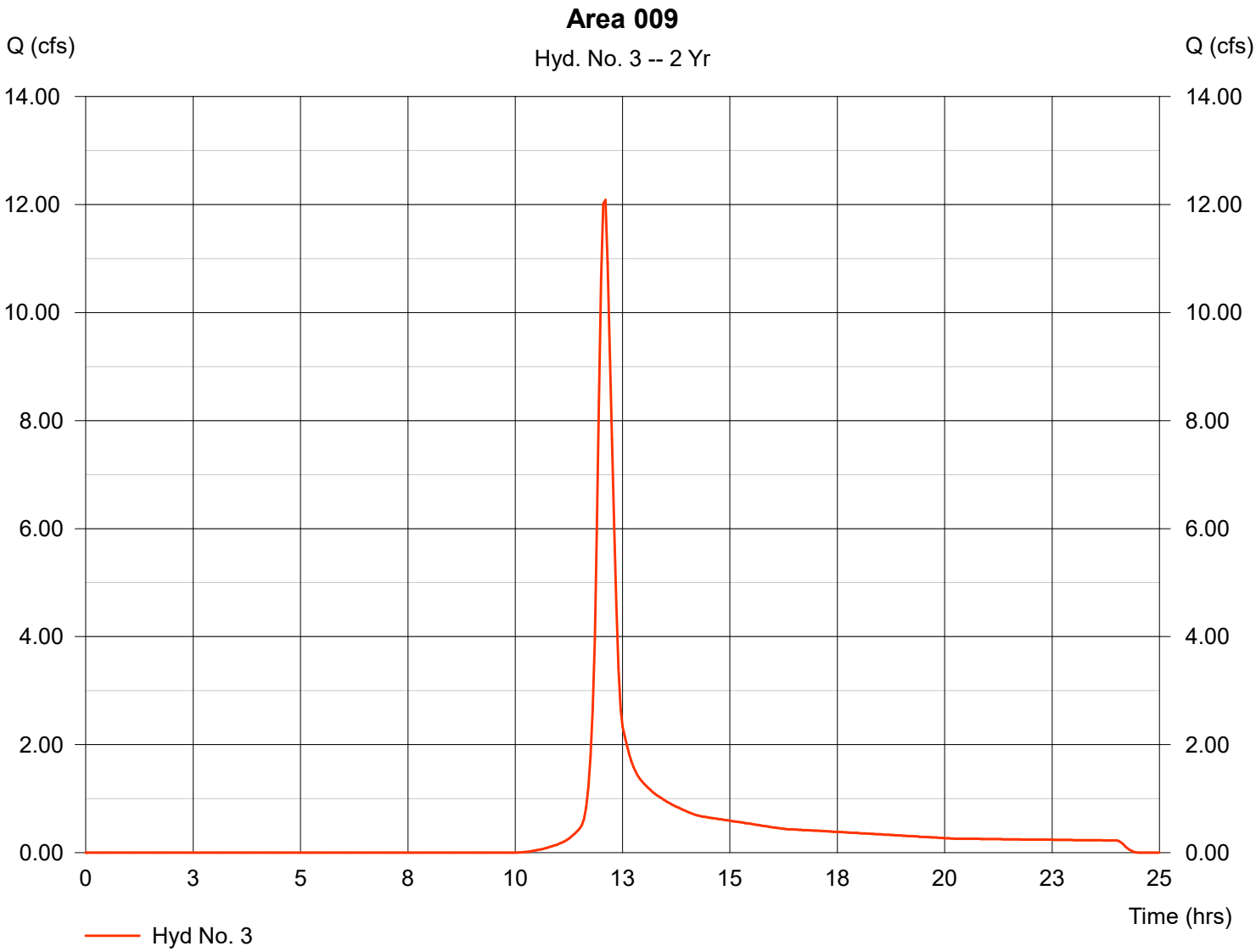
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Hyd. No. 3

Area 009

Hydrograph type	= SCS Runoff	Peak discharge	= 12.09 cfs
Storm frequency	= 2 yrs	Time interval	= 3 min
Drainage area	= 8.400 ac	Curve number	= 78
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 19.10 min
Total precip.	= 3.18 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 39,580 cuft



Hydrograph Plot

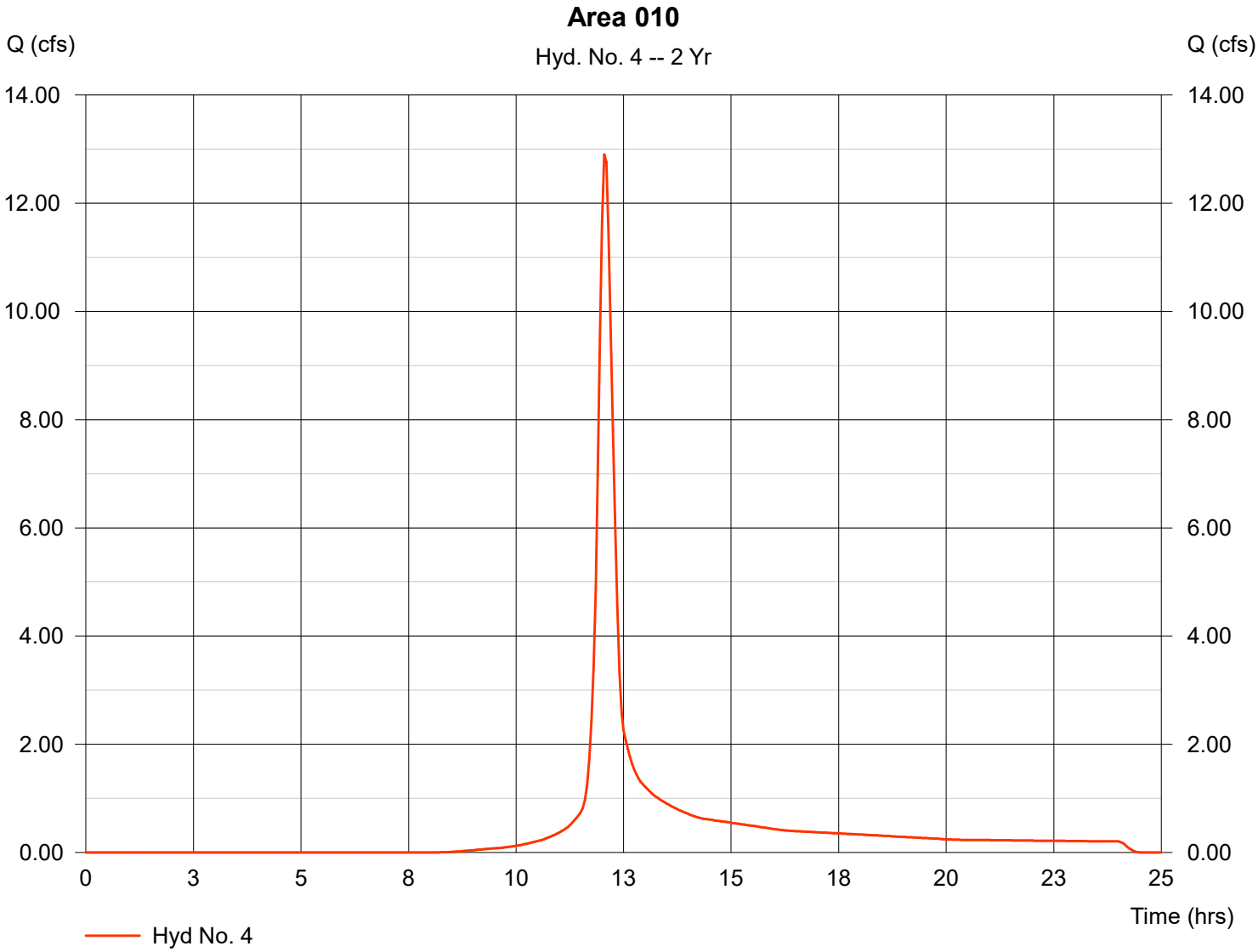
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Hyd. No. 4

Area 010

Hydrograph type	= SCS Runoff	Peak discharge	= 12.90 cfs
Storm frequency	= 2 yrs	Time interval	= 3 min
Drainage area	= 6.620 ac	Curve number	= 84
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 19.70 min
Total precip.	= 3.18 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 41,276 cuft



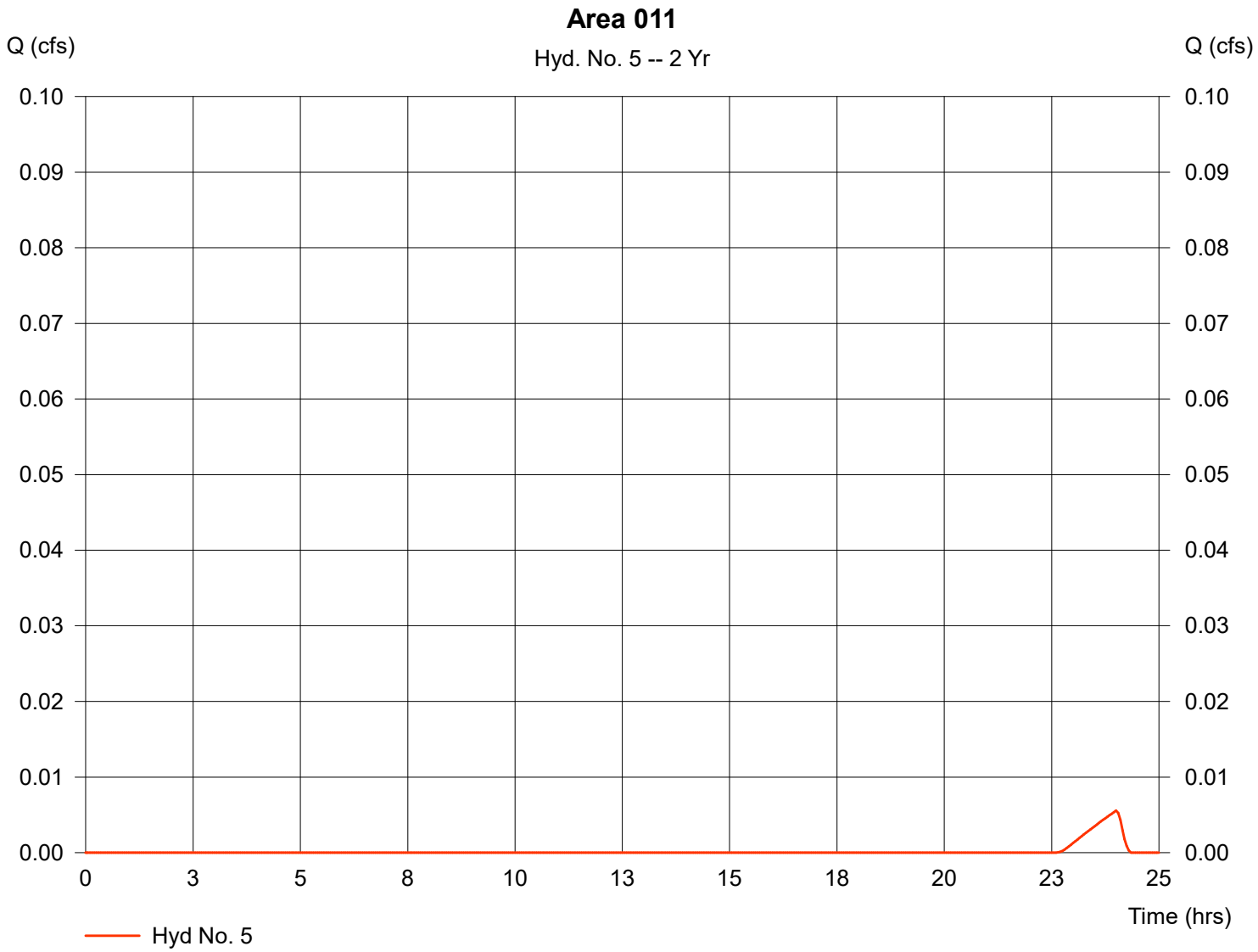
Hydrograph Plot

Hyd. No. 5

Area 011

Hydrograph type	= SCS Runoff	Peak discharge	= 0.01 cfs
Storm frequency	= 2 yrs	Time interval	= 3 min
Drainage area	= 26.560 ac	Curve number	= 39
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 12.80 min
Total precip.	= 3.18 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 16 cuft



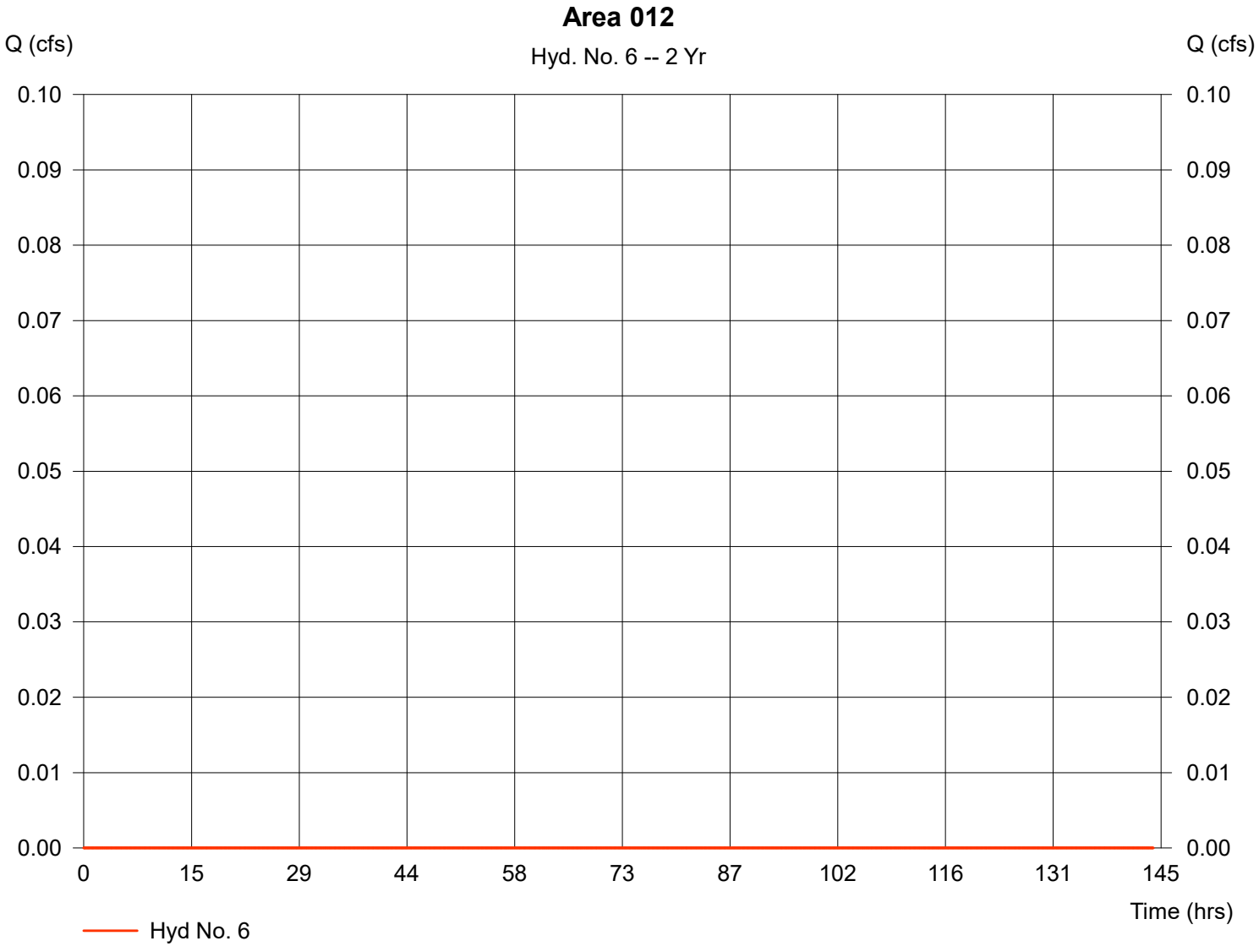
Hydrograph Plot

Hyd. No. 6

Area 012

Hydrograph type	= SCS Runoff	Peak discharge	= 0.00 cfs
Storm frequency	= 2 yrs	Time interval	= 3 min
Drainage area	= 103.540 ac	Curve number	= 33
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 17.80 min
Total precip.	= 3.18 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 0 cuft



Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
1	SCS Runoff	0.14	3	735	889	----	------	------	Area 007
2	SCS Runoff	1.56	3	726	7,075	----	------	------	Area 008
3	SCS Runoff	18.25	3	723	58,833	----	------	------	Area 009
4	SCS Runoff	18.28	3	723	58,323	----	------	------	Area 010
5	SCS Runoff	0.13	3	1077	4,241	----	------	------	Area 011
6	SCS Runoff	0.00	3	0	0	----	------	------	Area 012

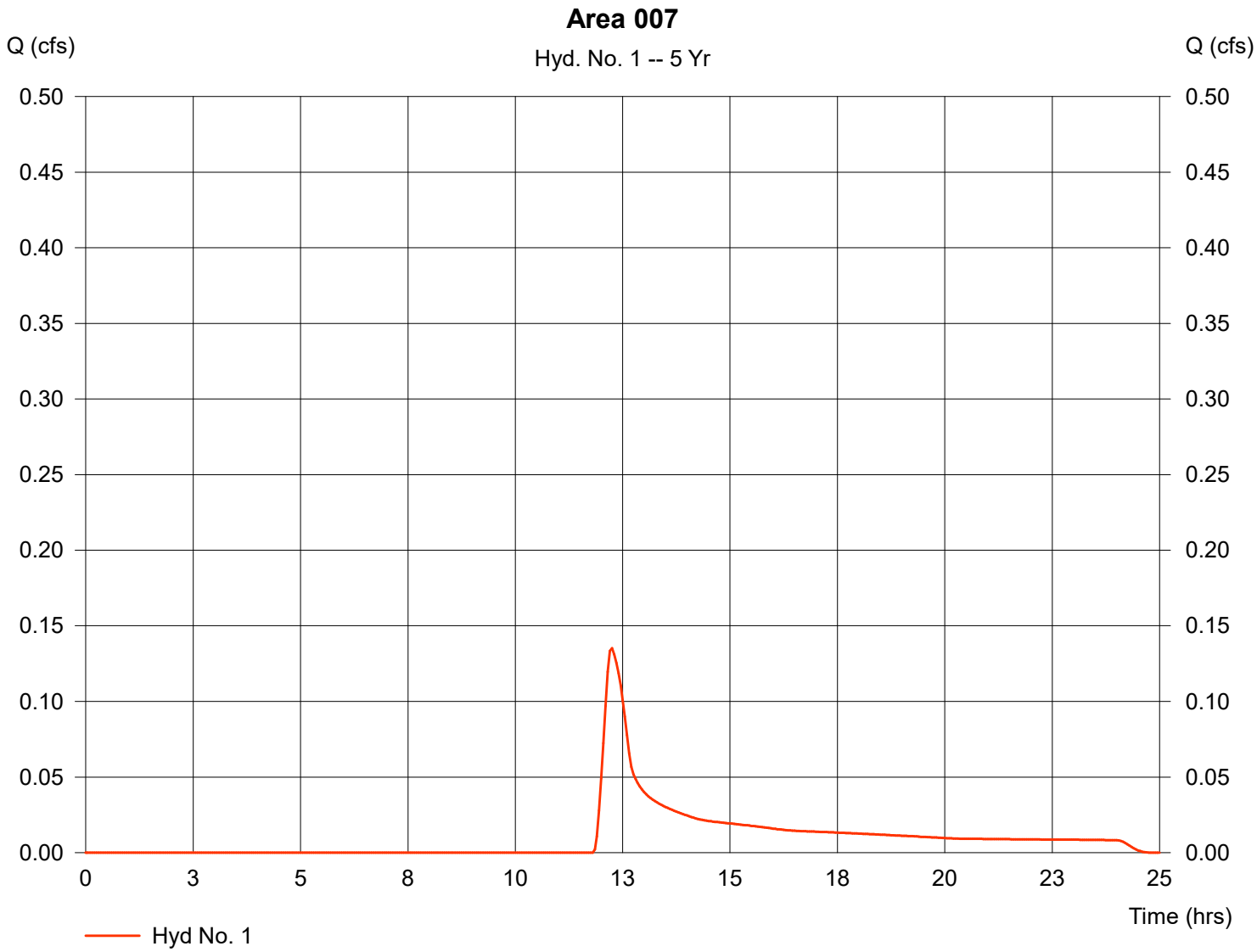
Hydrograph Plot

Hyd. No. 1

Area 007

Hydrograph type	= SCS Runoff	Peak discharge	= 0.14 cfs
Storm frequency	= 5 yrs	Time interval	= 3 min
Drainage area	= 0.470 ac	Curve number	= 55
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 26.80 min
Total precip.	= 3.98 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 889 cuft



Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

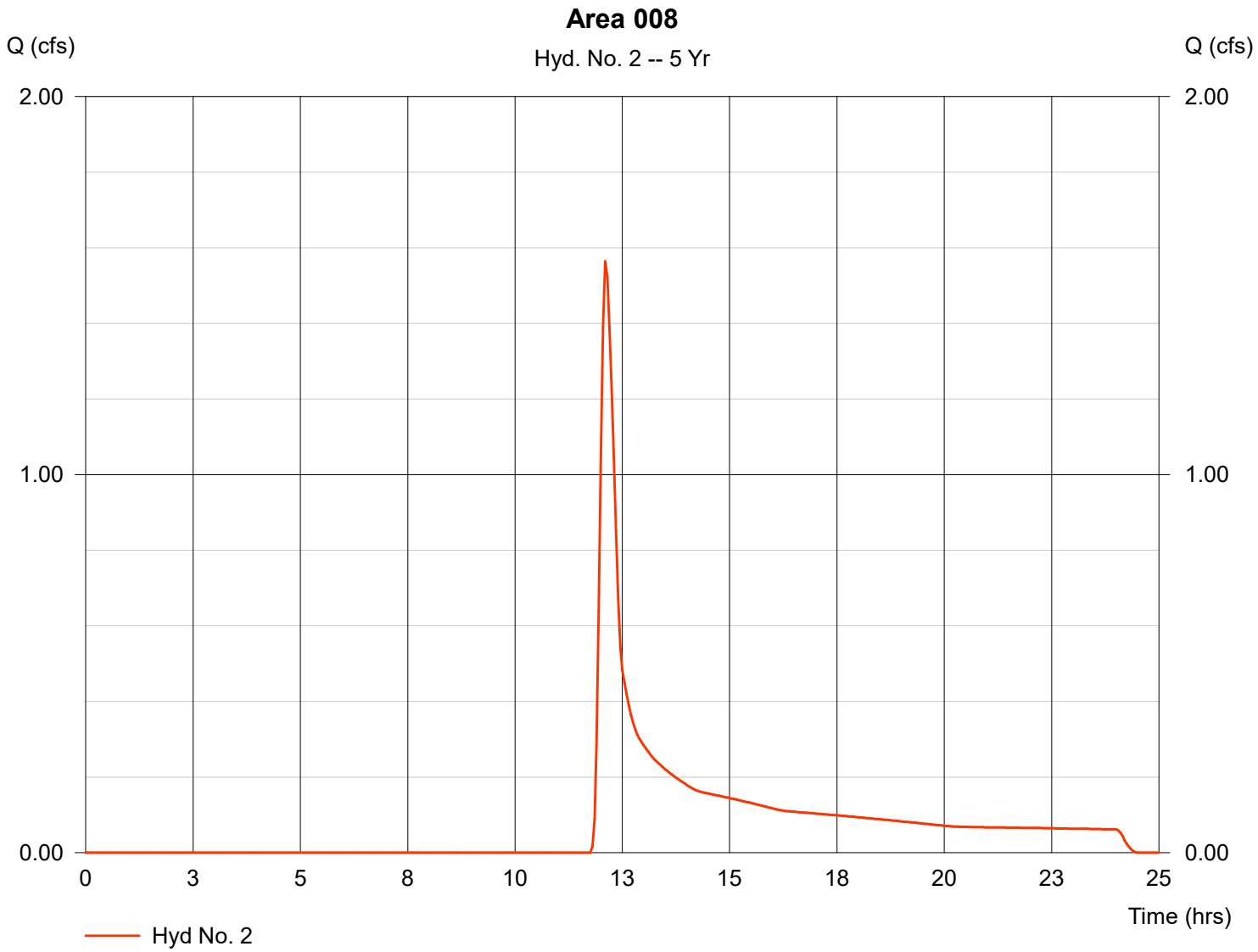
Friday, Sep 8 2023, 4:7 PM

Hyd. No. 2

Area 008

Hydrograph type	= SCS Runoff	Peak discharge	= 1.56 cfs
Storm frequency	= 5 yrs	Time interval	= 3 min
Drainage area	= 3.100 ac	Curve number	= 57
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 17.50 min
Total precip.	= 3.98 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 7,075 cuft



Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

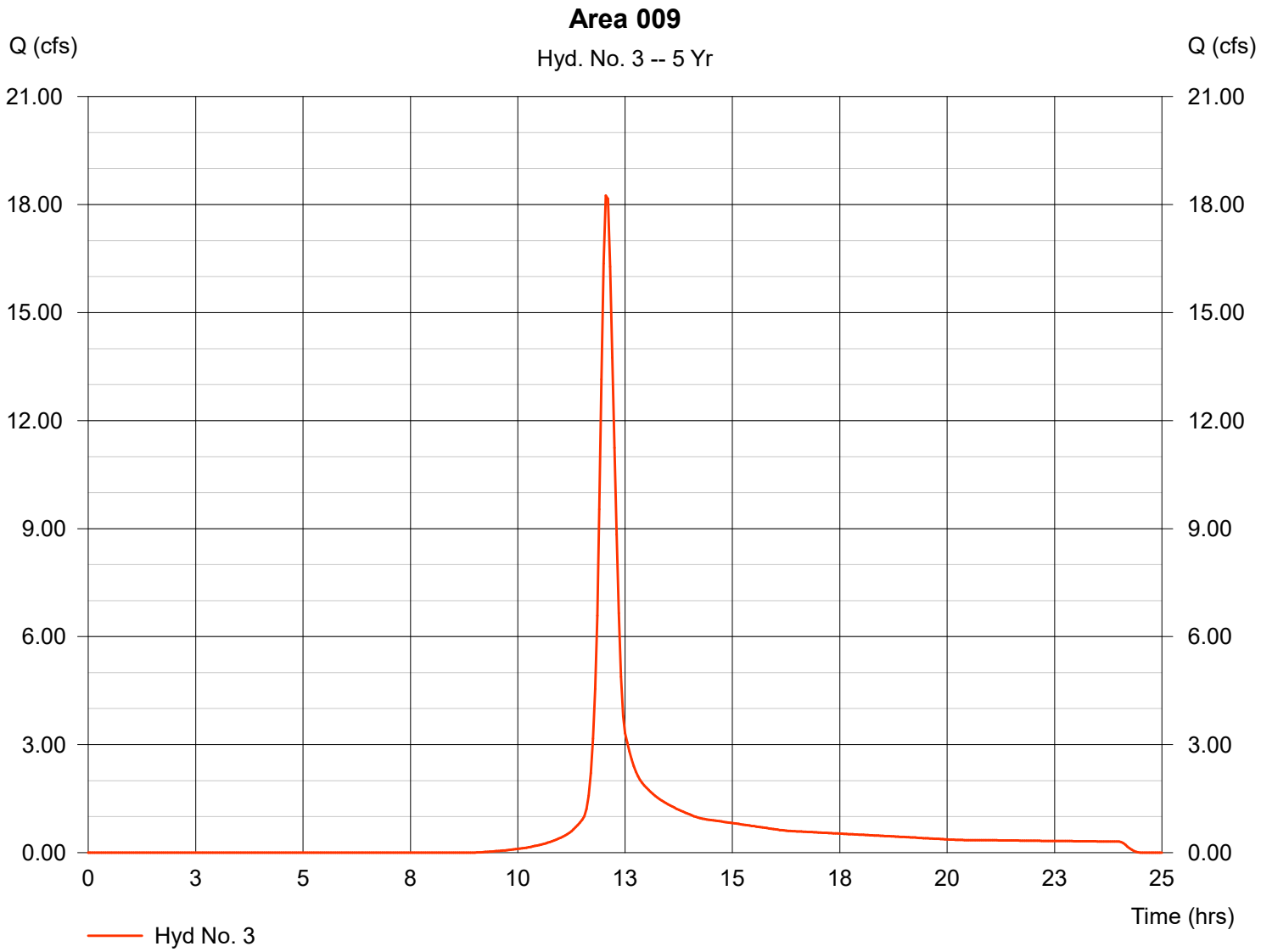
Friday, Sep 8 2023, 4:7 PM

Hyd. No. 3

Area 009

Hydrograph type	= SCS Runoff	Peak discharge	= 18.25 cfs
Storm frequency	= 5 yrs	Time interval	= 3 min
Drainage area	= 8.400 ac	Curve number	= 78
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 19.10 min
Total precip.	= 3.98 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 58,833 cuft



Hydrograph Plot

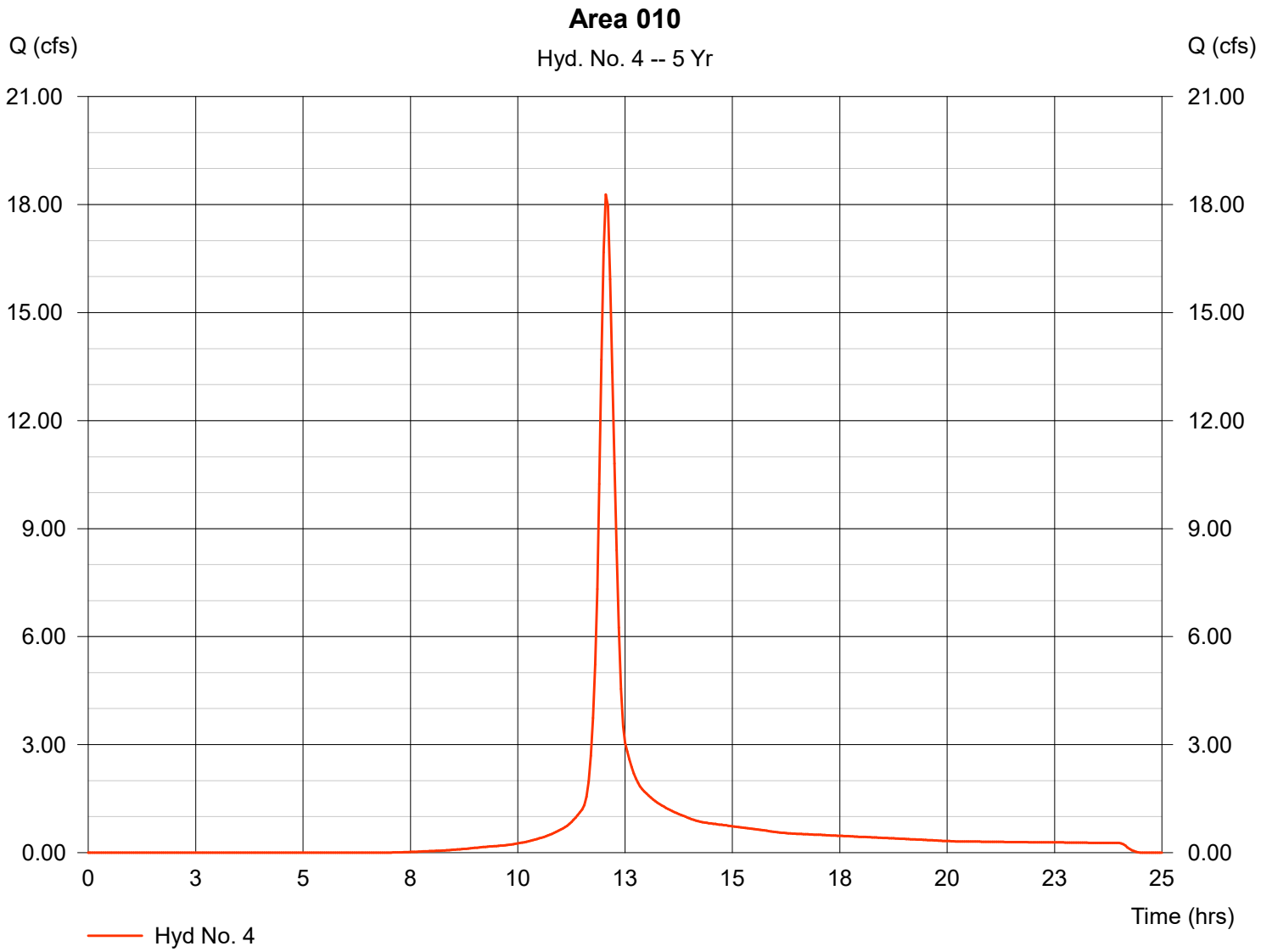
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Hyd. No. 4

Area 010

Hydrograph type	= SCS Runoff	Peak discharge	= 18.28 cfs
Storm frequency	= 5 yrs	Time interval	= 3 min
Drainage area	= 6.620 ac	Curve number	= 84
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 19.70 min
Total precip.	= 3.98 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 58,323 cuft



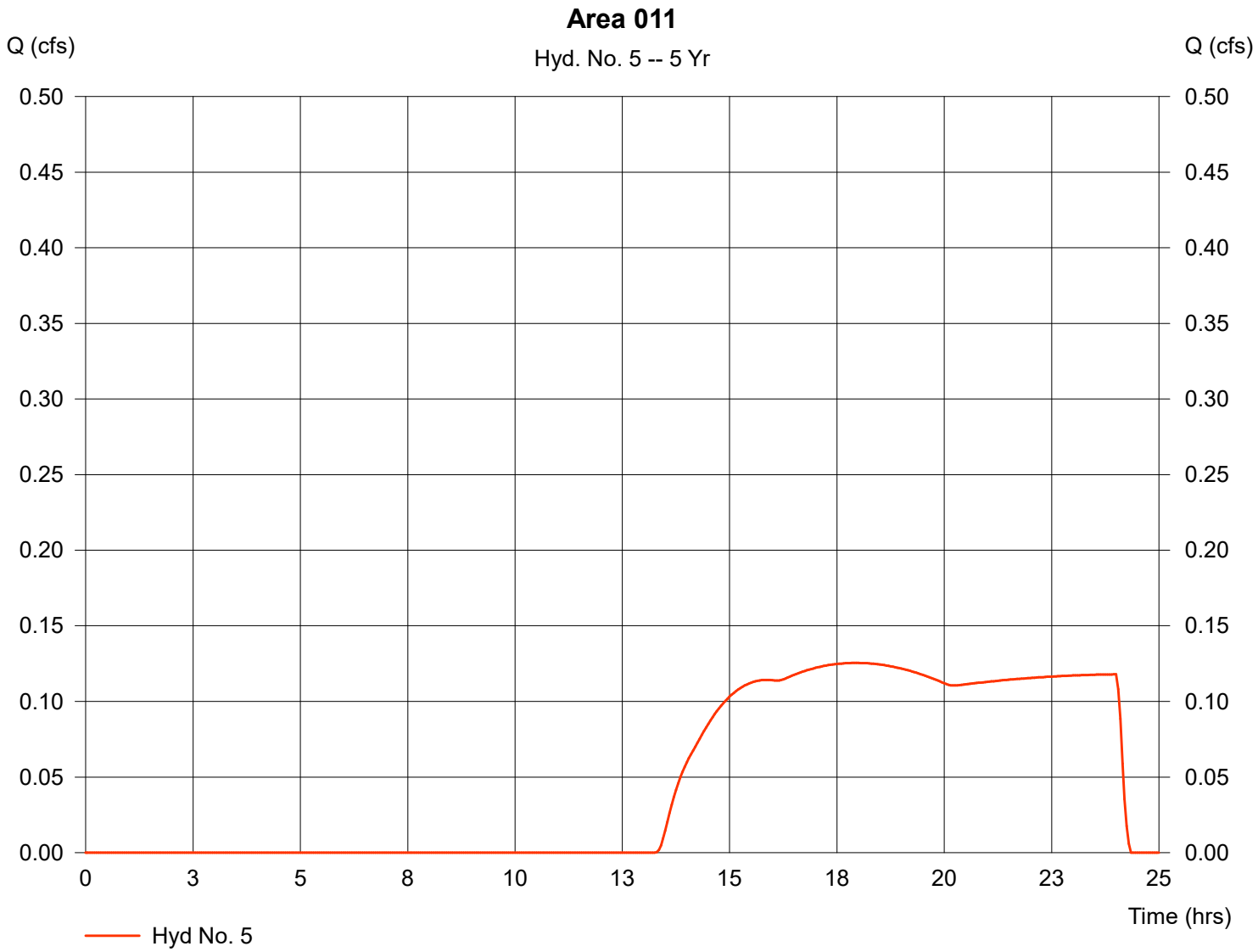
Hydrograph Plot

Hyd. No. 5

Area 011

Hydrograph type	= SCS Runoff	Peak discharge	= 0.13 cfs
Storm frequency	= 5 yrs	Time interval	= 3 min
Drainage area	= 26.560 ac	Curve number	= 39
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 12.80 min
Total precip.	= 3.98 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 4,241 cuft



Hydrograph Plot

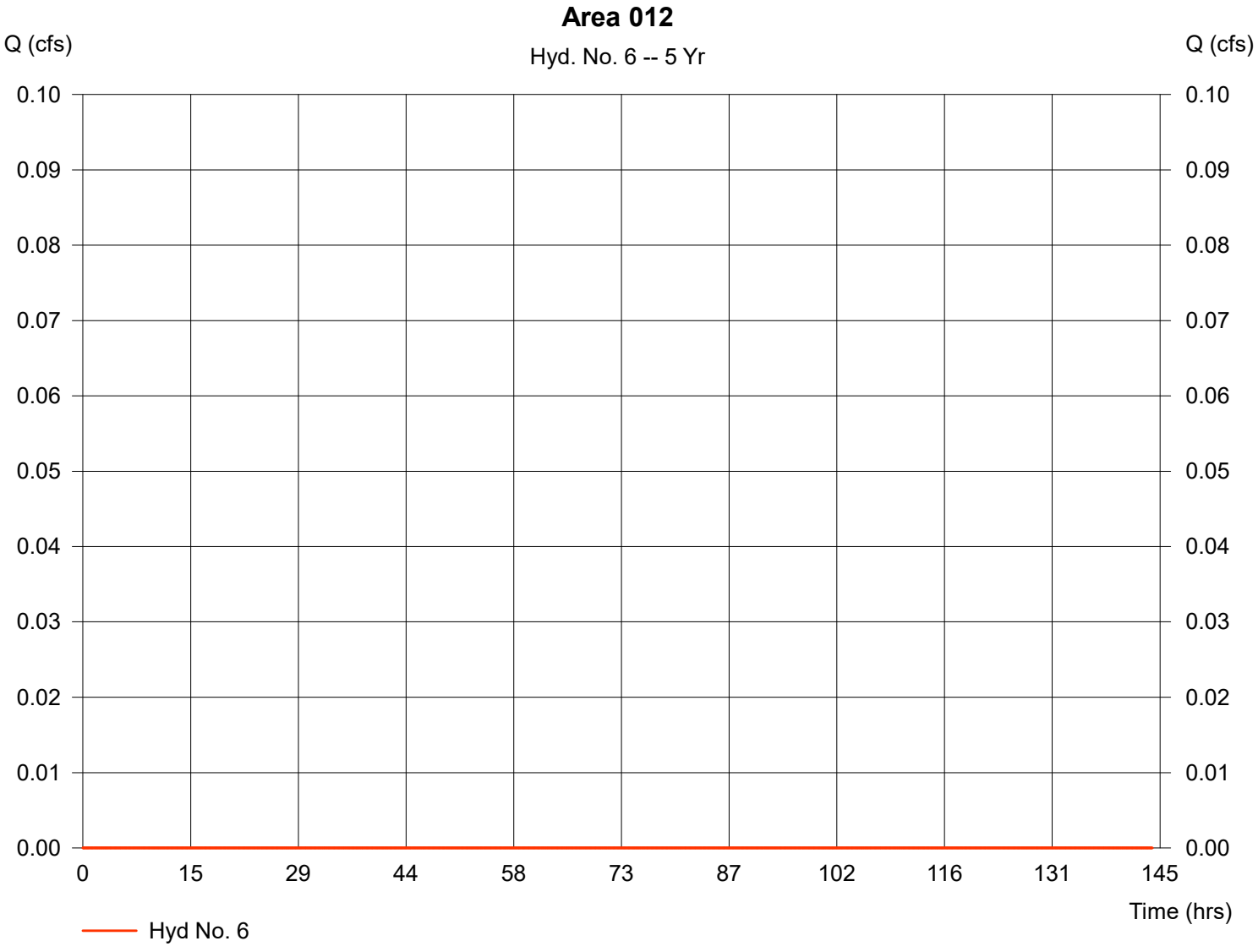
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Hyd. No. 6

Area 012

Hydrograph type	= SCS Runoff	Peak discharge	= 0.00 cfs
Storm frequency	= 5 yrs	Time interval	= 3 min
Drainage area	= 103.540 ac	Curve number	= 33
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 17.80 min
Total precip.	= 3.98 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 0 cuft



Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
1	SCS Runoff	0.25	3	732	1,376	----	------	------	Area 007
2	SCS Runoff	2.73	3	726	10,658	----	------	------	Area 008
3	SCS Runoff	23.66	3	723	75,748	----	------	------	Area 009
4	SCS Runoff	22.81	3	723	72,930	----	------	------	Area 010
5	SCS Runoff	0.43	3	780	12,846	----	------	------	Area 011
6	SCS Runoff	0.30	3	1440	6,231	----	------	------	Area 012

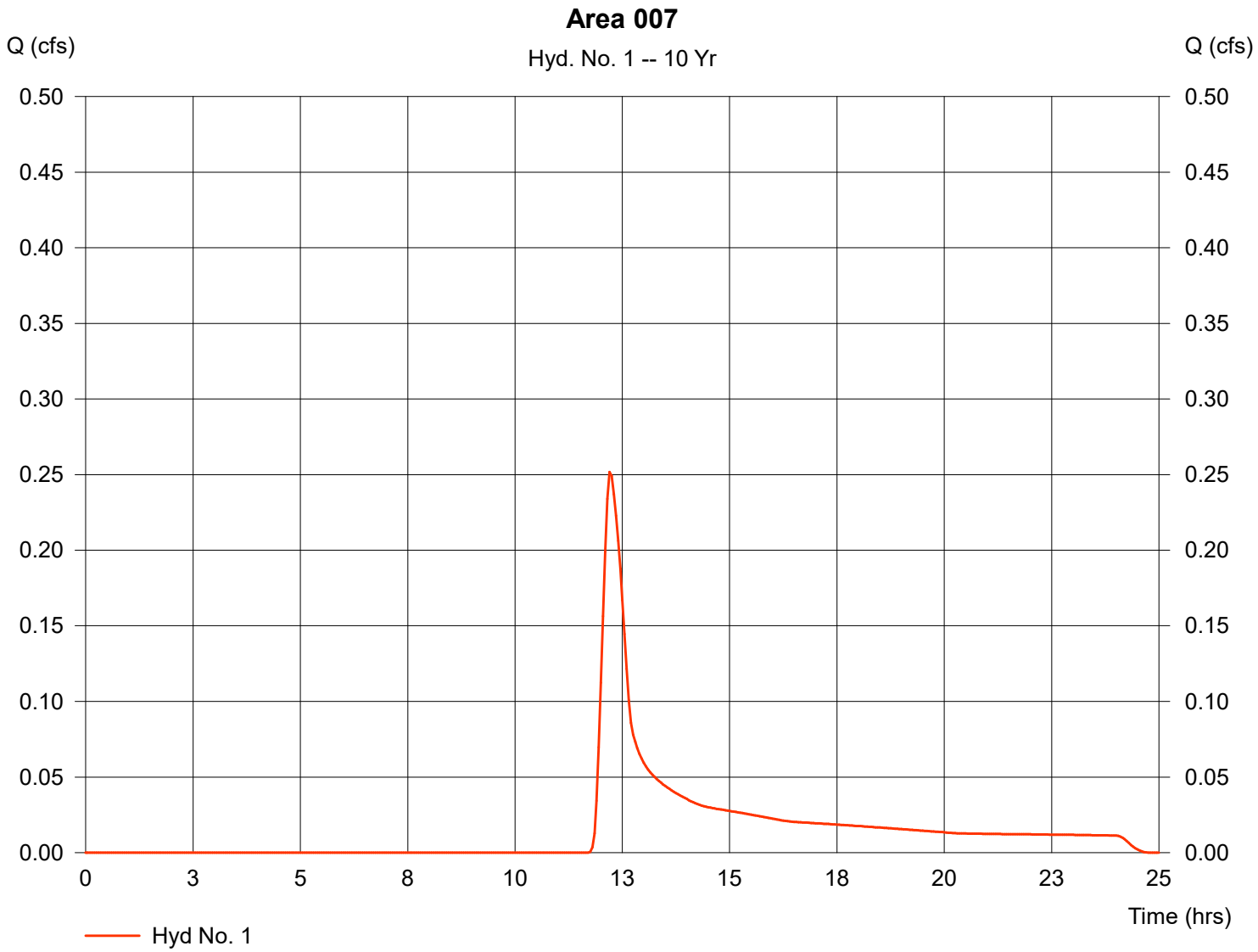
Hydrograph Plot

Hyd. No. 1

Area 007

Hydrograph type	= SCS Runoff	Peak discharge	= 0.25 cfs
Storm frequency	= 10 yrs	Time interval	= 3 min
Drainage area	= 0.470 ac	Curve number	= 55
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 26.80 min
Total precip.	= 4.64 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 1,376 cuft



Hydrograph Plot

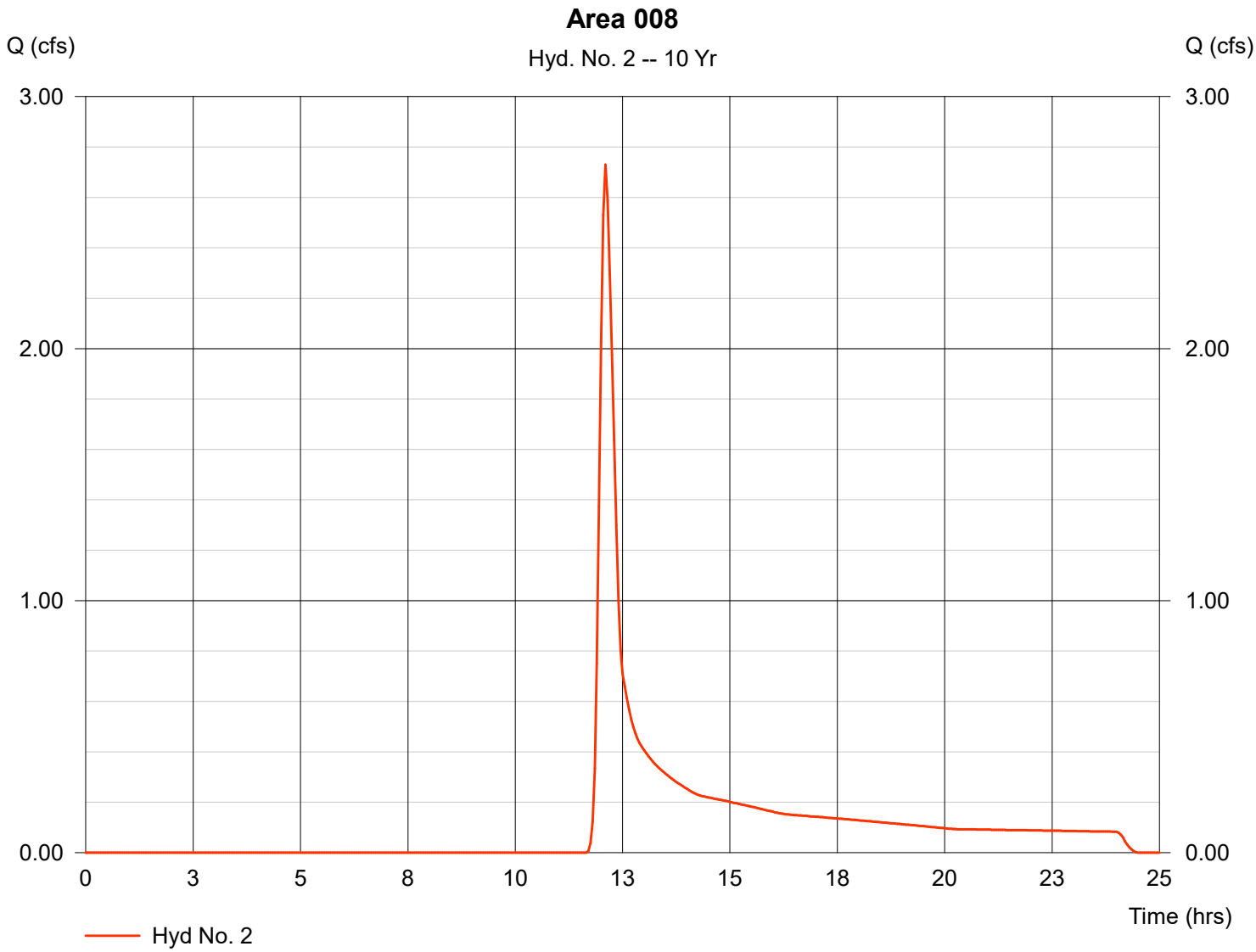
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Hyd. No. 2

Area 008

Hydrograph type	= SCS Runoff	Peak discharge	= 2.73 cfs
Storm frequency	= 10 yrs	Time interval	= 3 min
Drainage area	= 3.100 ac	Curve number	= 57
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 17.50 min
Total precip.	= 4.64 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 10,658 cuft



Hydrograph Plot

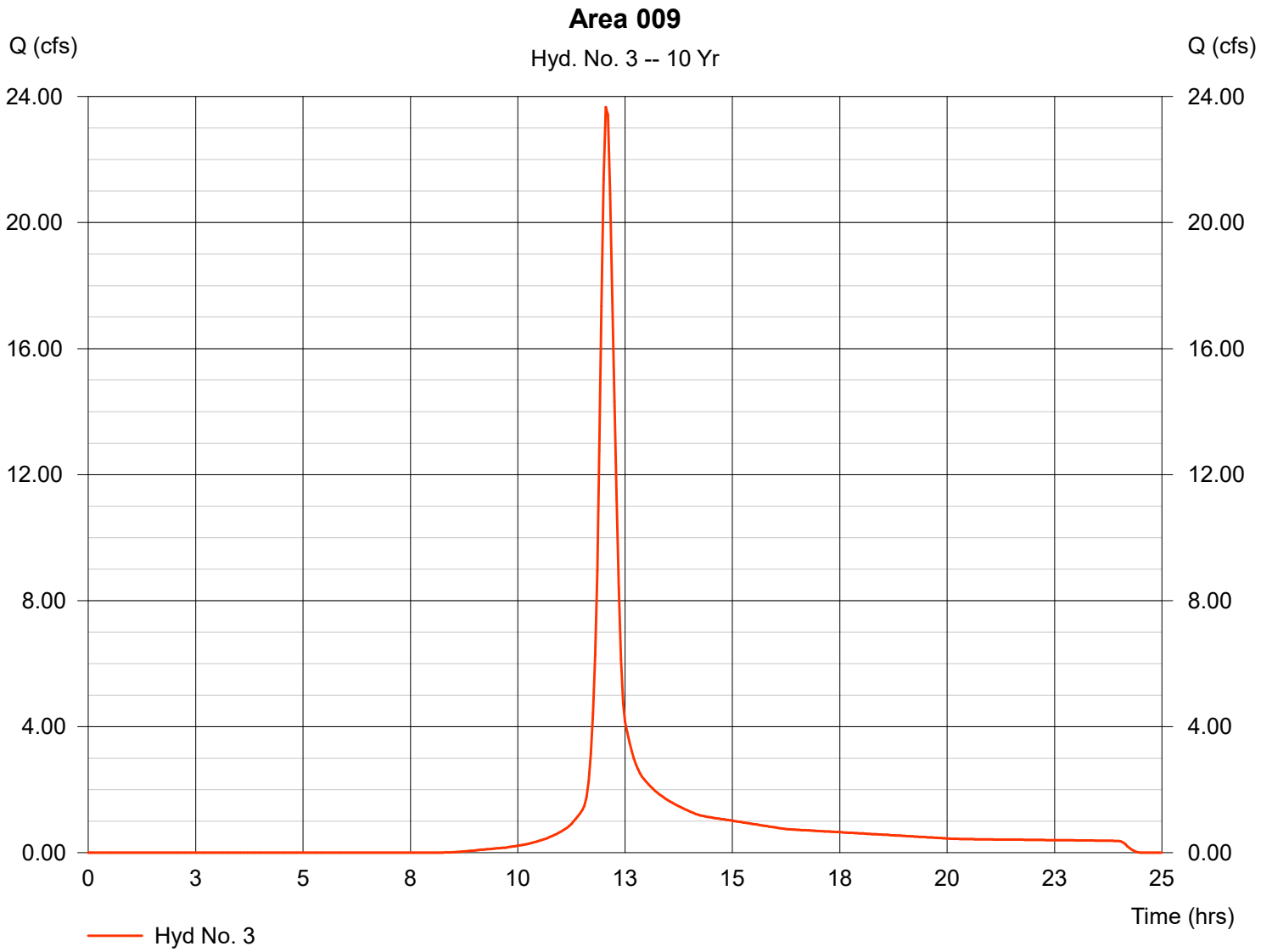
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Hyd. No. 3

Area 009

Hydrograph type	= SCS Runoff	Peak discharge	= 23.66 cfs
Storm frequency	= 10 yrs	Time interval	= 3 min
Drainage area	= 8.400 ac	Curve number	= 78
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 19.10 min
Total precip.	= 4.64 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 75,748 cuft



Hydrograph Plot

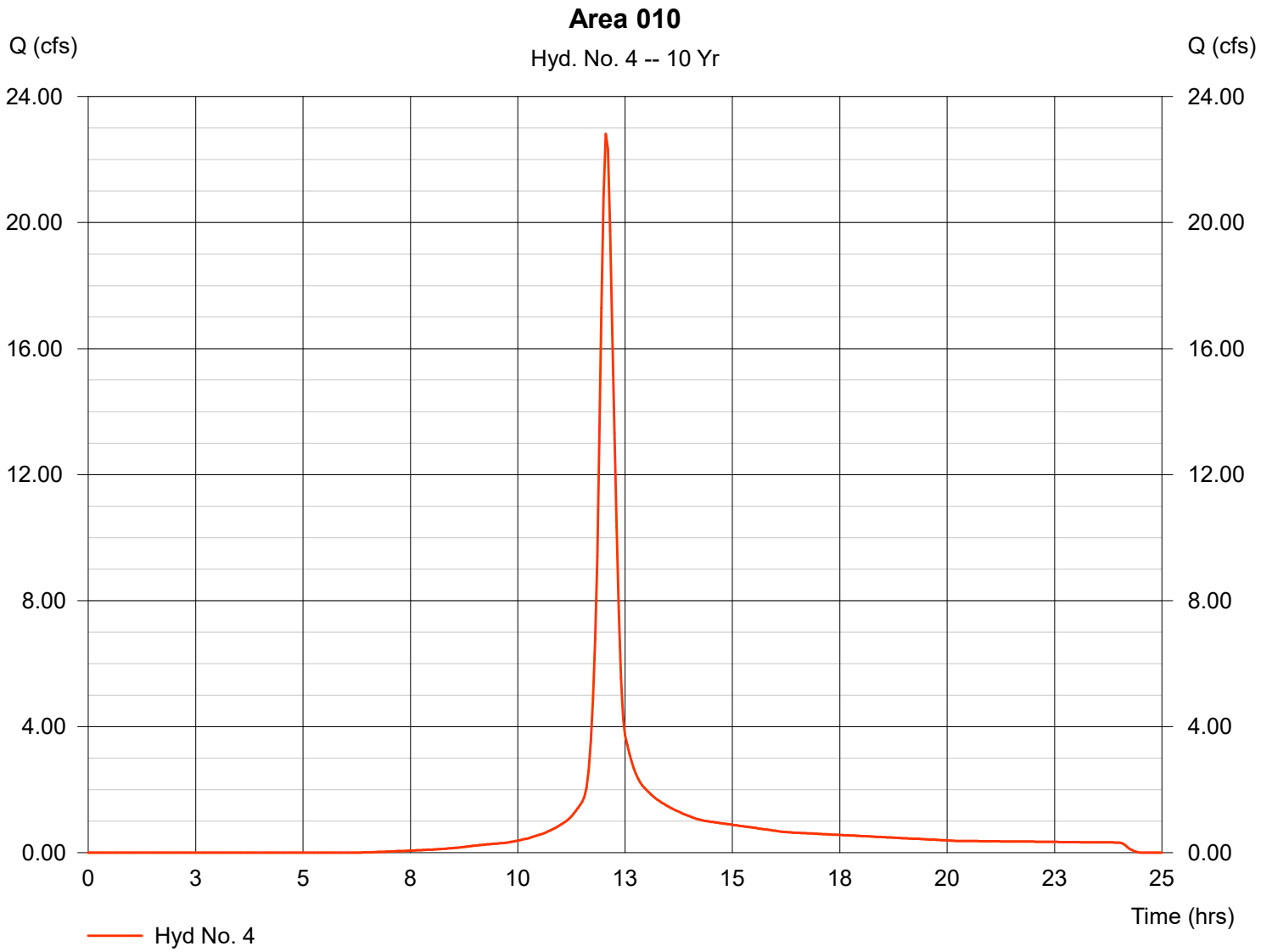
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Hyd. No. 4

Area 010

Hydrograph type	= SCS Runoff	Peak discharge	= 22.81 cfs
Storm frequency	= 10 yrs	Time interval	= 3 min
Drainage area	= 6.620 ac	Curve number	= 84
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 19.70 min
Total precip.	= 4.64 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 72,930 cuft



Hydrograph Plot

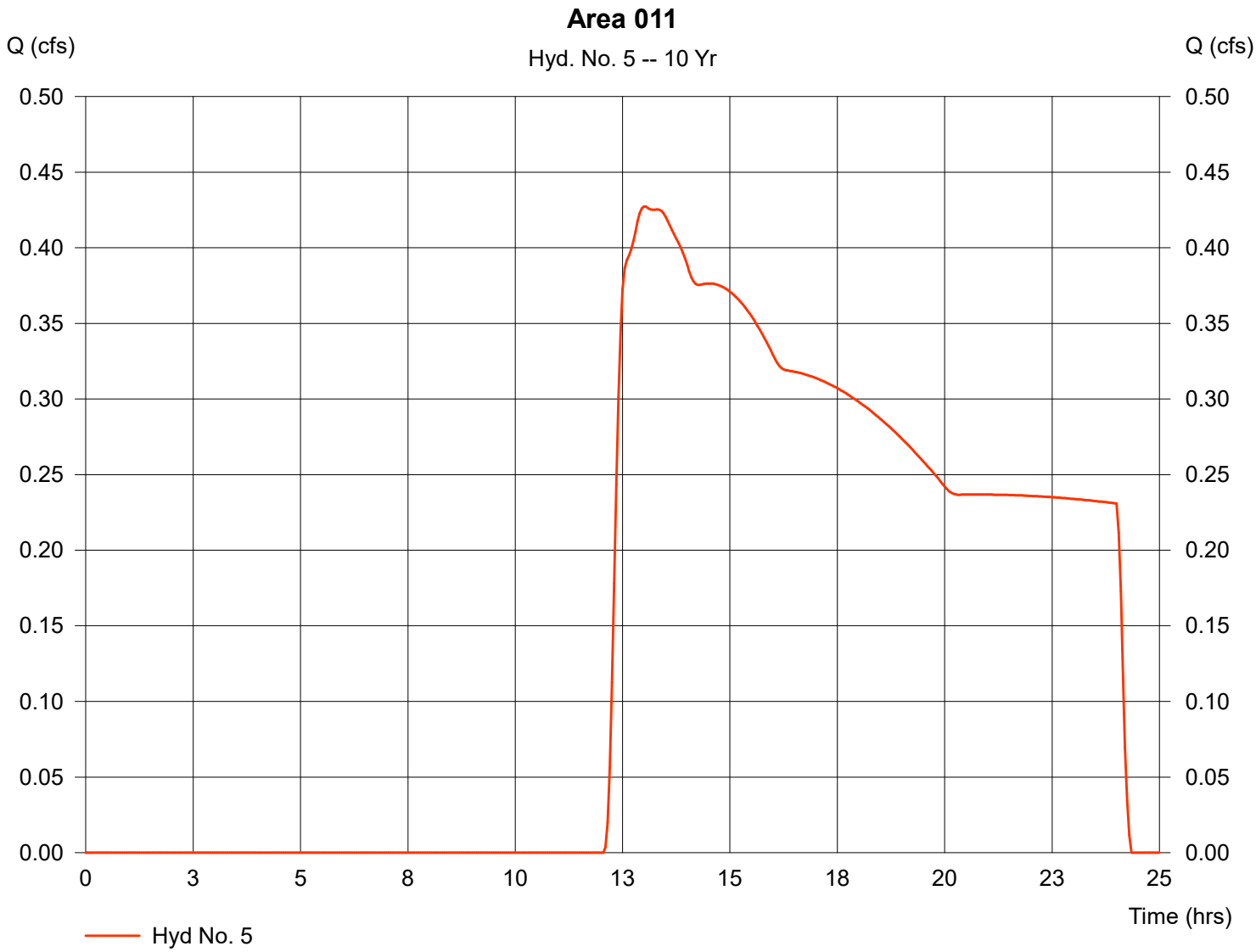
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Hyd. No. 5

Area 011

Hydrograph type	= SCS Runoff	Peak discharge	= 0.43 cfs
Storm frequency	= 10 yrs	Time interval	= 3 min
Drainage area	= 26.560 ac	Curve number	= 39
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 12.80 min
Total precip.	= 4.64 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 12,846 cuft



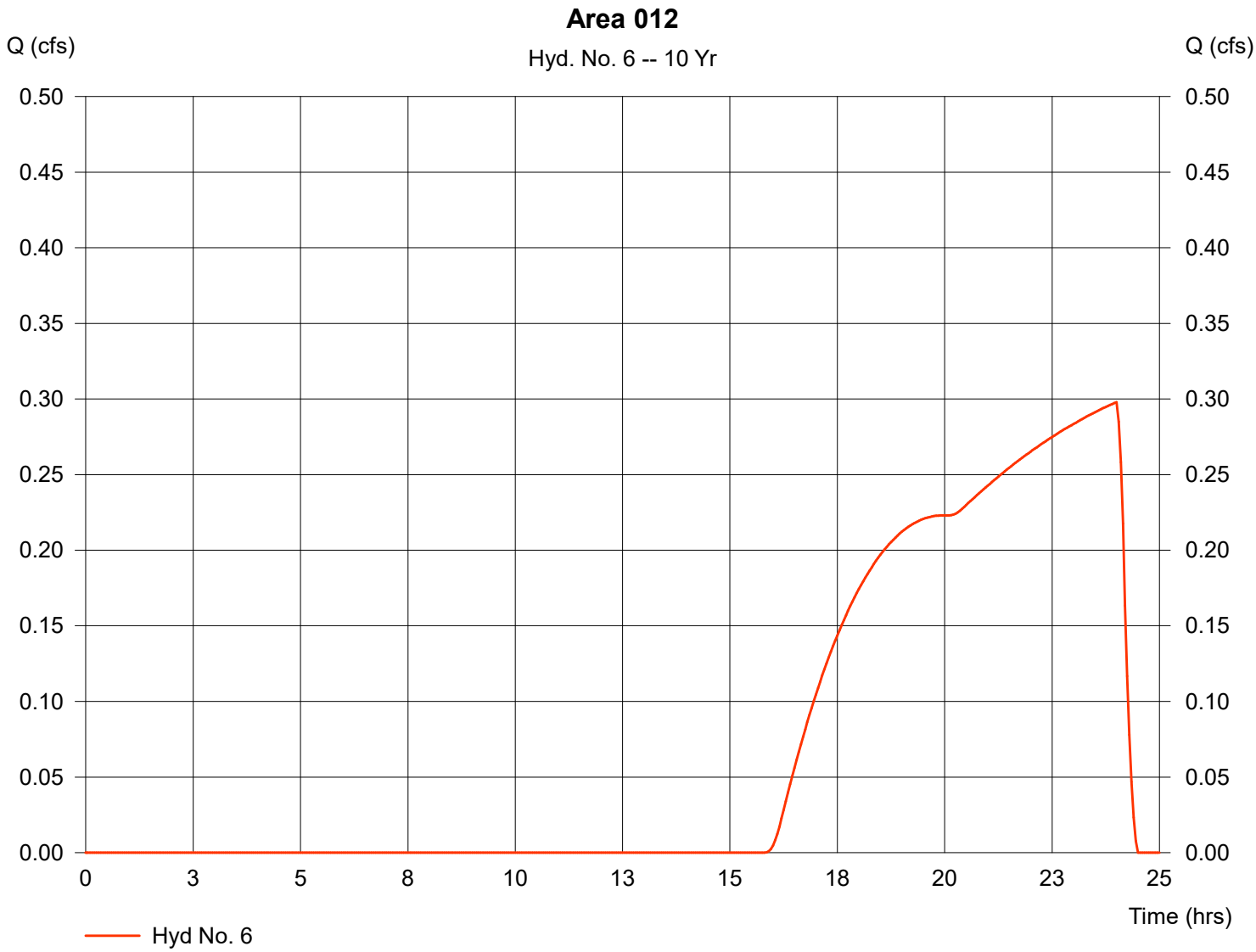
Hydrograph Plot

Hyd. No. 6

Area 012

Hydrograph type	= SCS Runoff	Peak discharge	= 0.30 cfs
Storm frequency	= 10 yrs	Time interval	= 3 min
Drainage area	= 103.540 ac	Curve number	= 33
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 17.80 min
Total precip.	= 4.64 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 6,231 cuft



Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
1	SCS Runoff	0.47	3	732	2,226	----	------	------	Area 007
2	SCS Runoff	4.76	3	726	16,829	----	------	------	Area 008
3	SCS Runoff	31.98	3	723	102,051	----	------	------	Area 009
4	SCS Runoff	29.62	3	723	95,215	----	------	------	Area 010
5	SCS Runoff	3.16	3	726	32,989	----	------	------	Area 011
6	SCS Runoff	1.25	3	906	43,107	----	------	------	Area 012

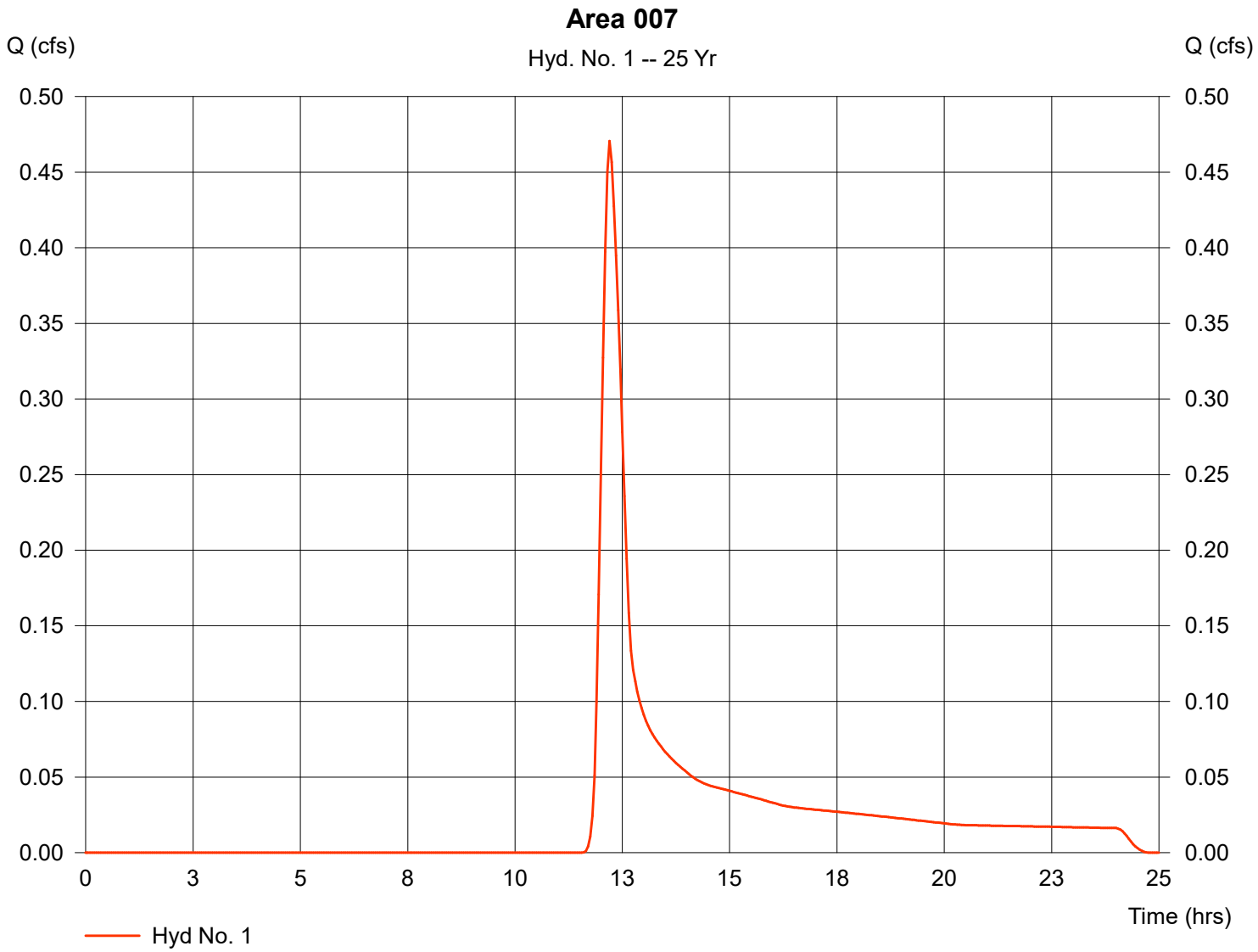
Hydrograph Plot

Hyd. No. 1

Area 007

Hydrograph type	= SCS Runoff	Peak discharge	= 0.47 cfs
Storm frequency	= 25 yrs	Time interval	= 3 min
Drainage area	= 0.470 ac	Curve number	= 55
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 26.80 min
Total precip.	= 5.62 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 2,226 cuft



Hydrograph Plot

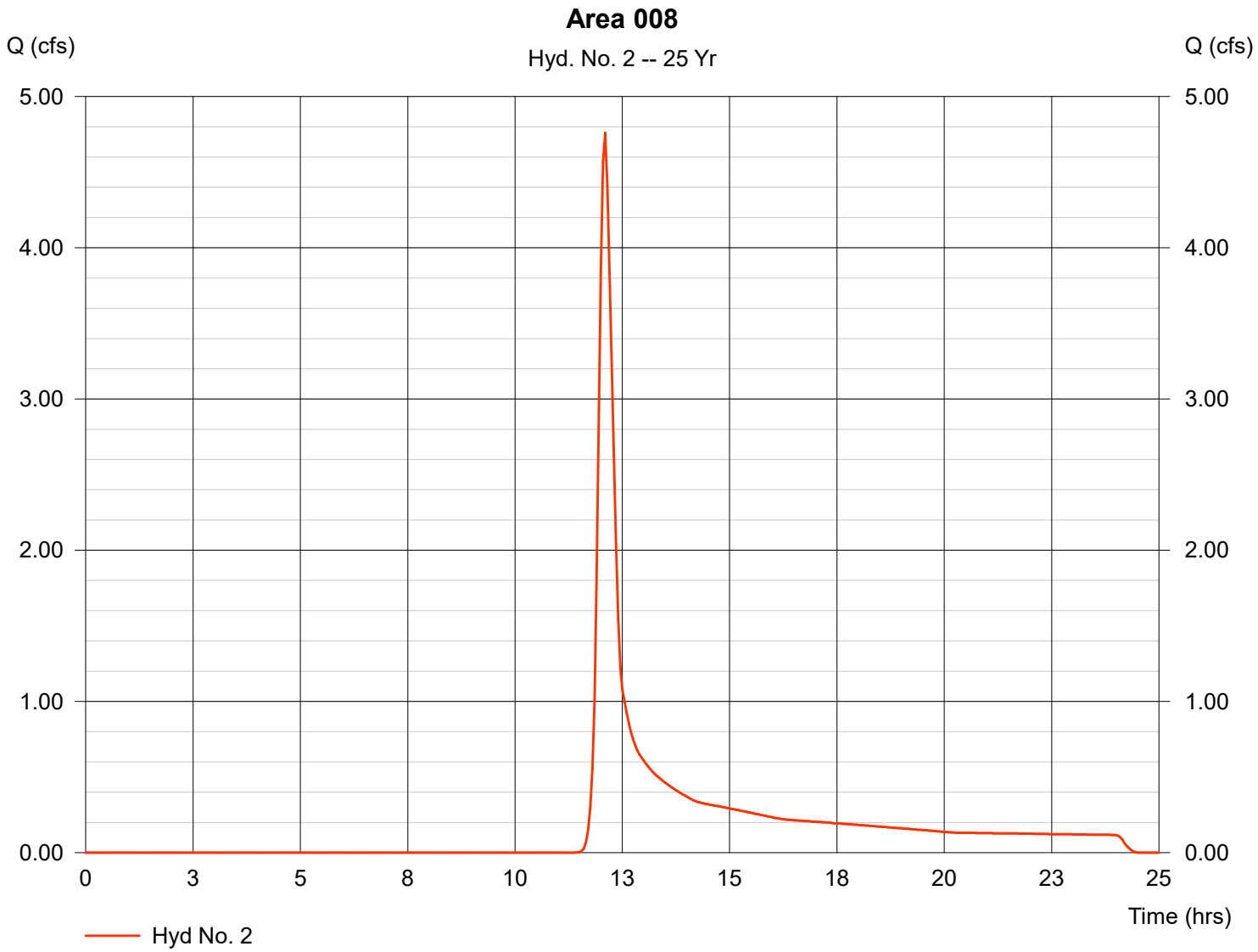
Hydraflow Hydrographs by Intelisolve | Friday, Sep 8 2023, 4:7 PM

Hyd. No. 2

Area 008

Hydrograph type	= SCS Runoff	Peak discharge	= 4.76 cfs
Storm frequency	= 25 yrs	Time interval	= 3 min
Drainage area	= 3.100 ac	Curve number	= 57
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 17.50 min
Total precip.	= 5.62 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 16,829 cuft



Hydrograph Plot

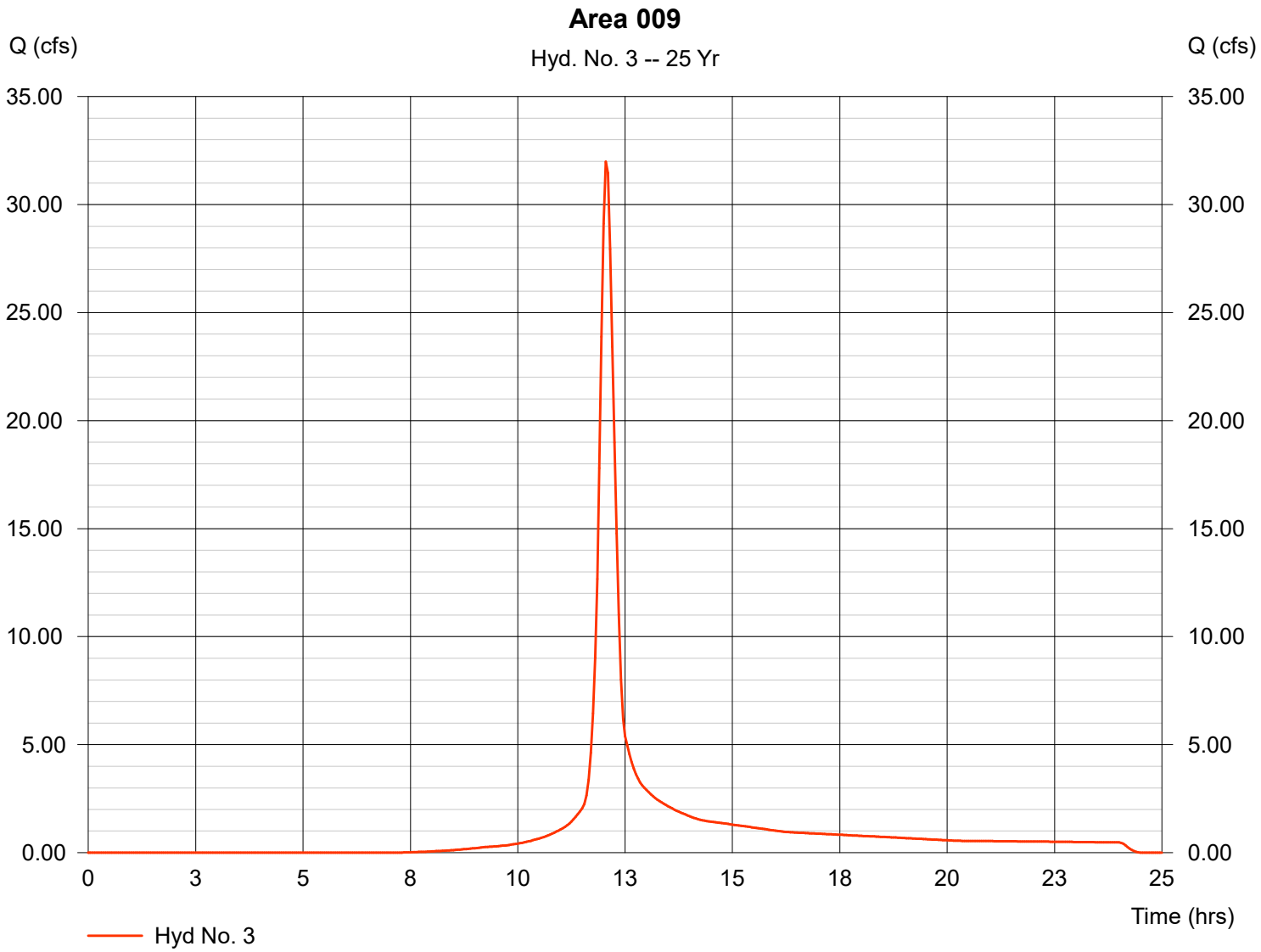
Hydraflow Hydrographs by Intelisolve | Friday, Sep 8 2023, 4:7 PM

Hyd. No. 3

Area 009

Hydrograph type	= SCS Runoff	Peak discharge	= 31.98 cfs
Storm frequency	= 25 yrs	Time interval	= 3 min
Drainage area	= 8.400 ac	Curve number	= 78
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 19.10 min
Total precip.	= 5.62 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 102,051 cuft



Hydrograph Plot

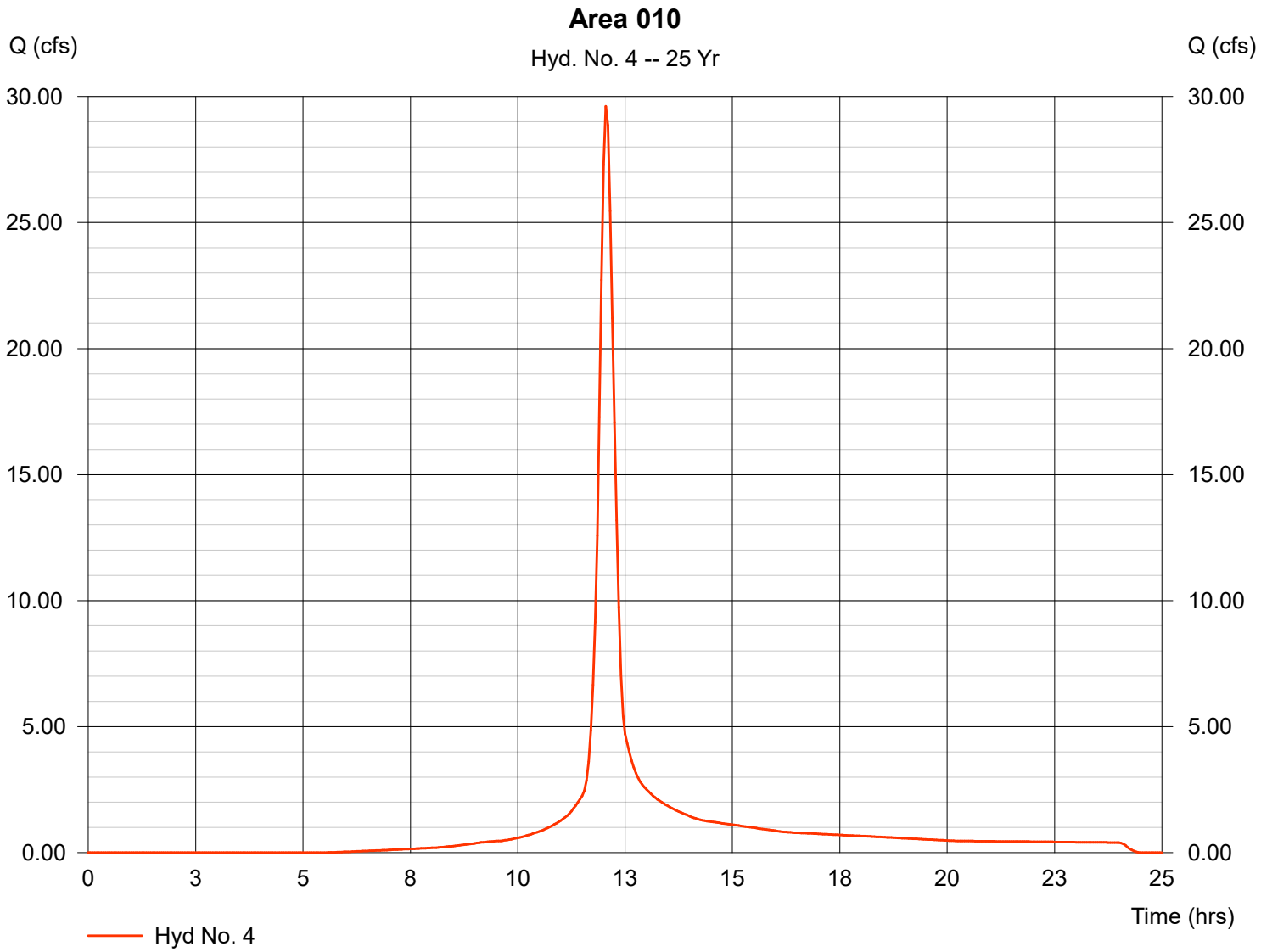
Hydraflow Hydrographs by Intelisolve | Friday, Sep 8 2023, 4:7 PM

Hyd. No. 4

Area 010

Hydrograph type	= SCS Runoff	Peak discharge	= 29.62 cfs
Storm frequency	= 25 yrs	Time interval	= 3 min
Drainage area	= 6.620 ac	Curve number	= 84
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 19.70 min
Total precip.	= 5.62 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 95,215 cuft



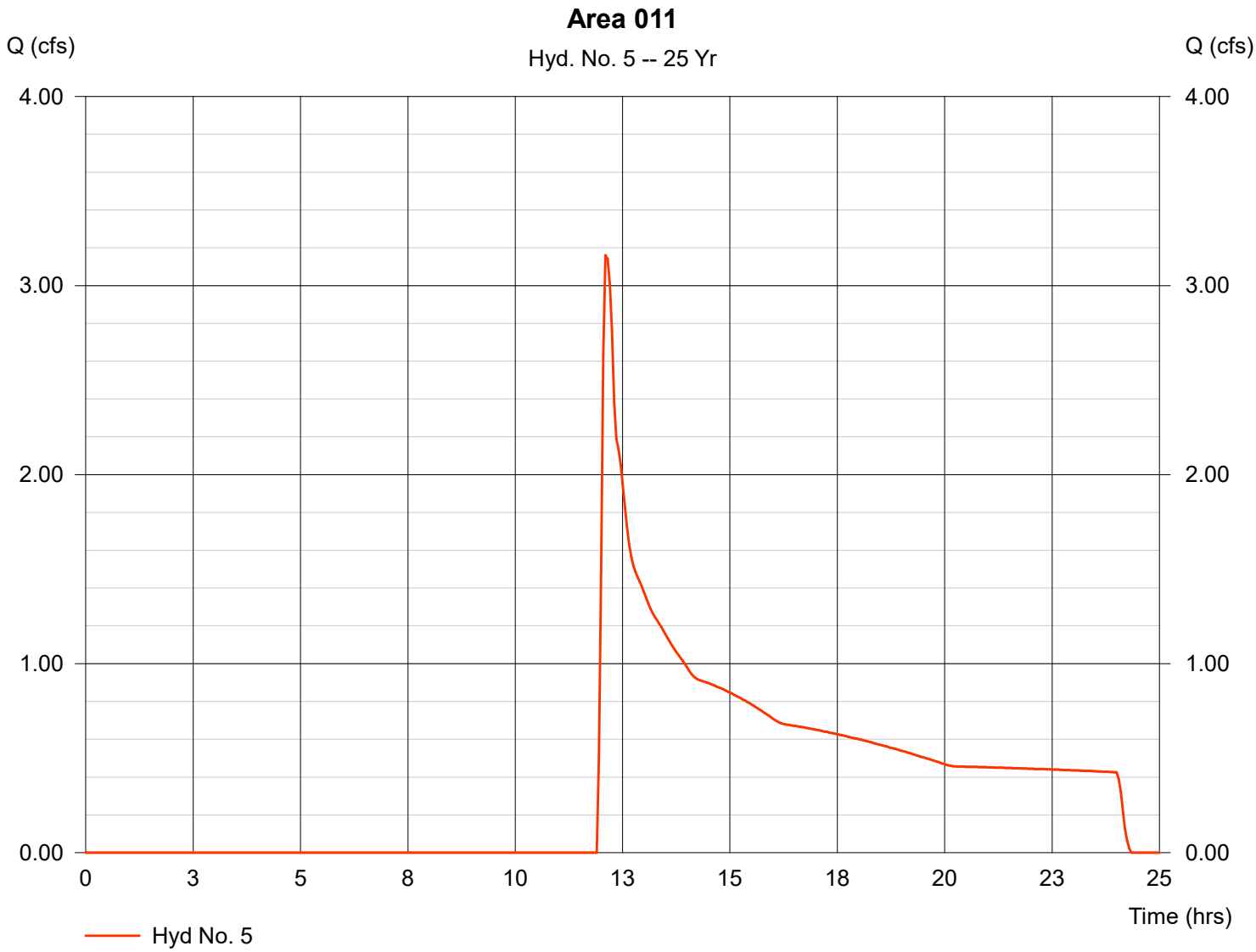
Hydrograph Plot

Hyd. No. 5

Area 011

Hydrograph type	= SCS Runoff	Peak discharge	= 3.16 cfs
Storm frequency	= 25 yrs	Time interval	= 3 min
Drainage area	= 26.560 ac	Curve number	= 39
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 12.80 min
Total precip.	= 5.62 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 32,989 cuft



Hydrograph Plot

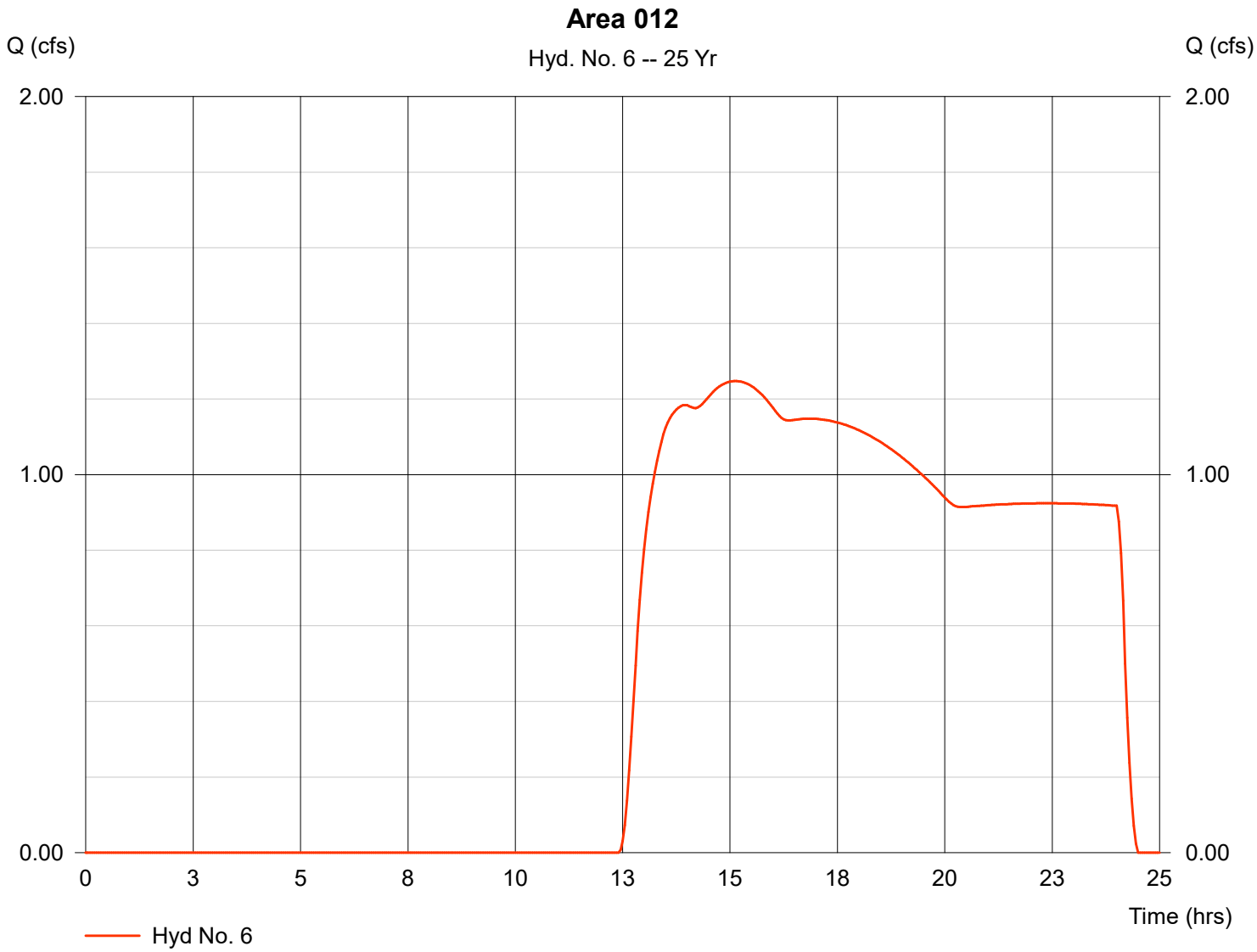
Hydraflow Hydrographs by Intelisolve | Friday, Sep 8 2023, 4:7 PM

Hyd. No. 6

Area 012

Hydrograph type	= SCS Runoff	Peak discharge	= 1.25 cfs
Storm frequency	= 25 yrs	Time interval	= 3 min
Drainage area	= 103.540 ac	Curve number	= 33
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 17.80 min
Total precip.	= 5.62 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 43,107 cuft



Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
1	SCS Runoff	0.68	3	732	3,032	----	------	------	Area 007
2	SCS Runoff	6.65	3	726	22,620	----	------	------	Area 008
3	SCS Runoff	39.09	3	723	124,841	----	------	------	Area 009
4	SCS Runoff	35.34	3	723	114,240	----	------	------	Area 010
5	SCS Runoff	9.58	3	726	55,787	----	------	------	Area 011
6	SCS Runoff	4.38	3	750	96,733	----	------	------	Area 012

Hydrograph Plot

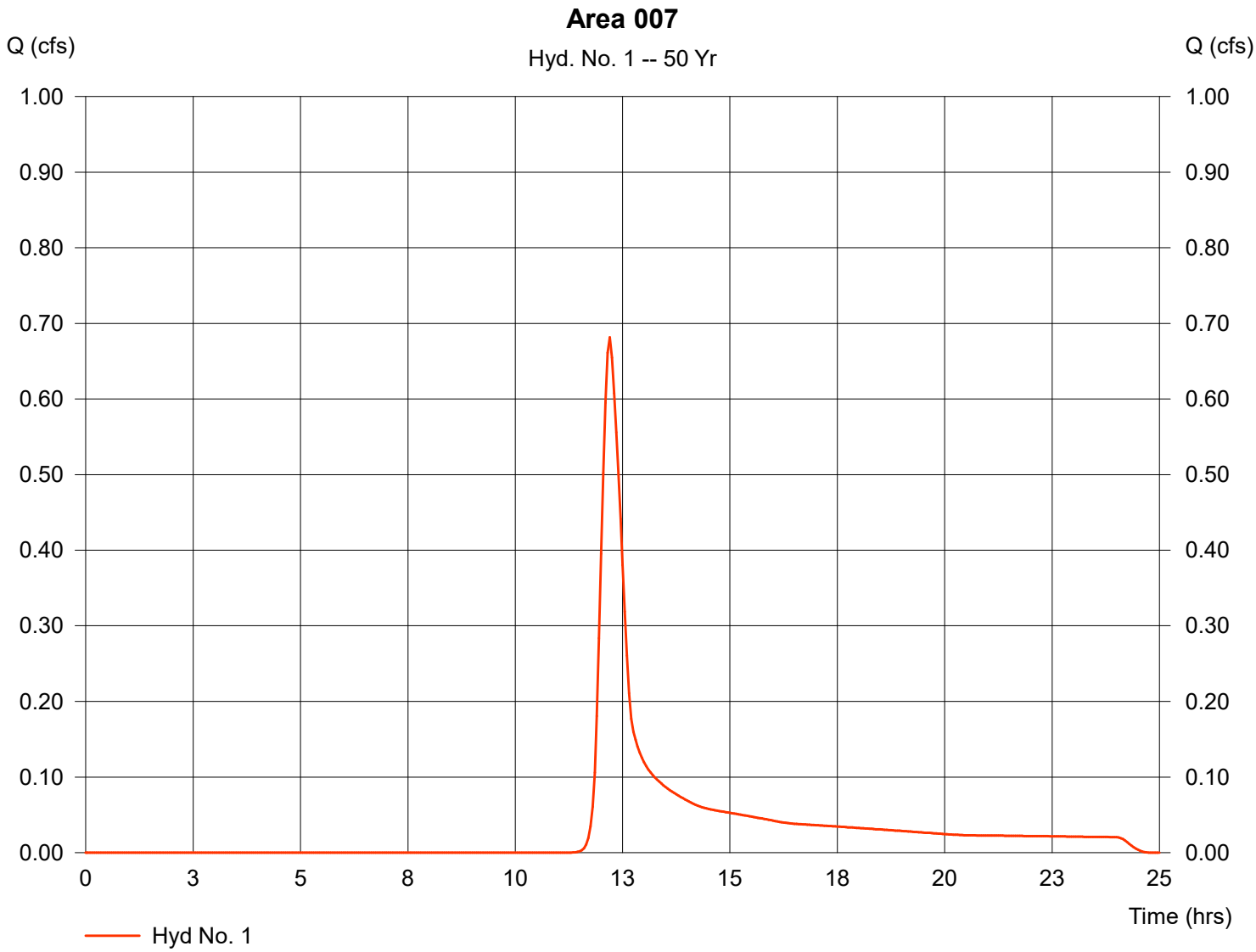
Hydraflow Hydrographs by Intelisolve | Friday, Sep 8 2023, 4:7 PM

Hyd. No. 1

Area 007

Hydrograph type	= SCS Runoff	Peak discharge	= 0.68 cfs
Storm frequency	= 50 yrs	Time interval	= 3 min
Drainage area	= 0.470 ac	Curve number	= 55
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 26.80 min
Total precip.	= 6.44 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 3,032 cuft



Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

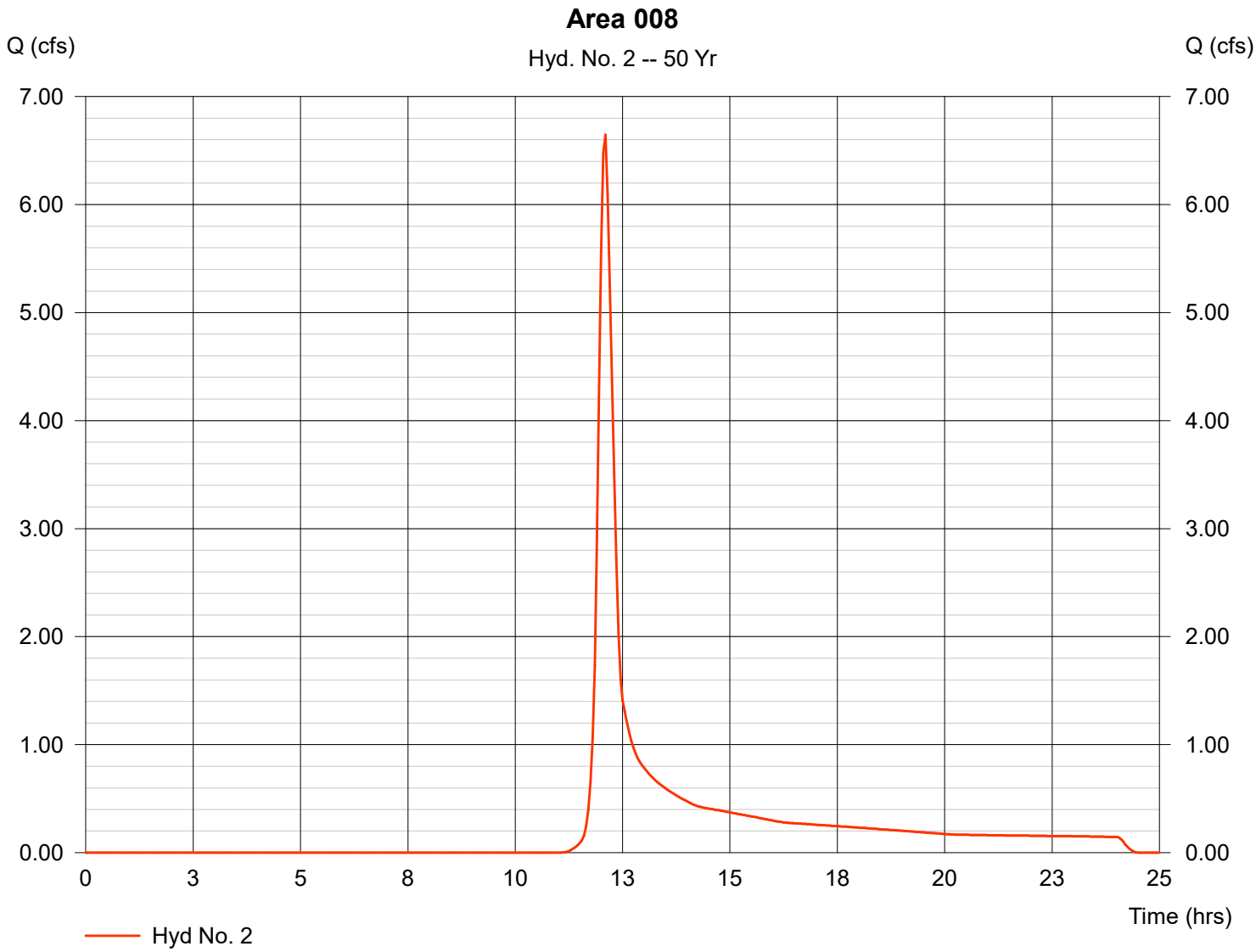
Friday, Sep 8 2023, 4:7 PM

Hyd. No. 2

Area 008

Hydrograph type	= SCS Runoff	Peak discharge	= 6.65 cfs
Storm frequency	= 50 yrs	Time interval	= 3 min
Drainage area	= 3.100 ac	Curve number	= 57
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 17.50 min
Total precip.	= 6.44 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 22,620 cuft



Hydrograph Plot

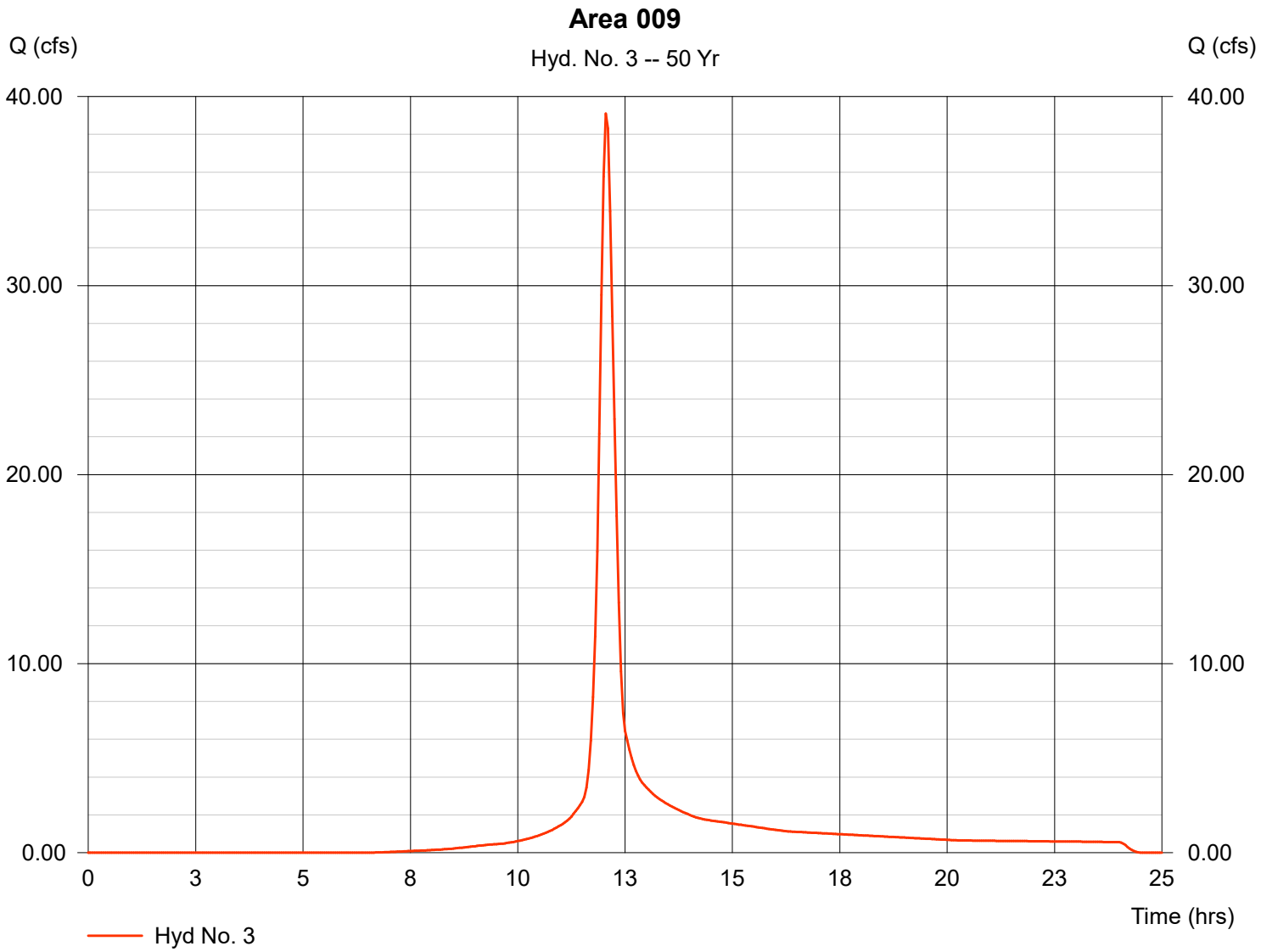
Hydraflow Hydrographs by Intelisolve | Friday, Sep 8 2023, 4:7 PM

Hyd. No. 3

Area 009

Hydrograph type	= SCS Runoff	Peak discharge	= 39.09 cfs
Storm frequency	= 50 yrs	Time interval	= 3 min
Drainage area	= 8.400 ac	Curve number	= 78
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 19.10 min
Total precip.	= 6.44 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 124,841 cuft



Hydrograph Plot

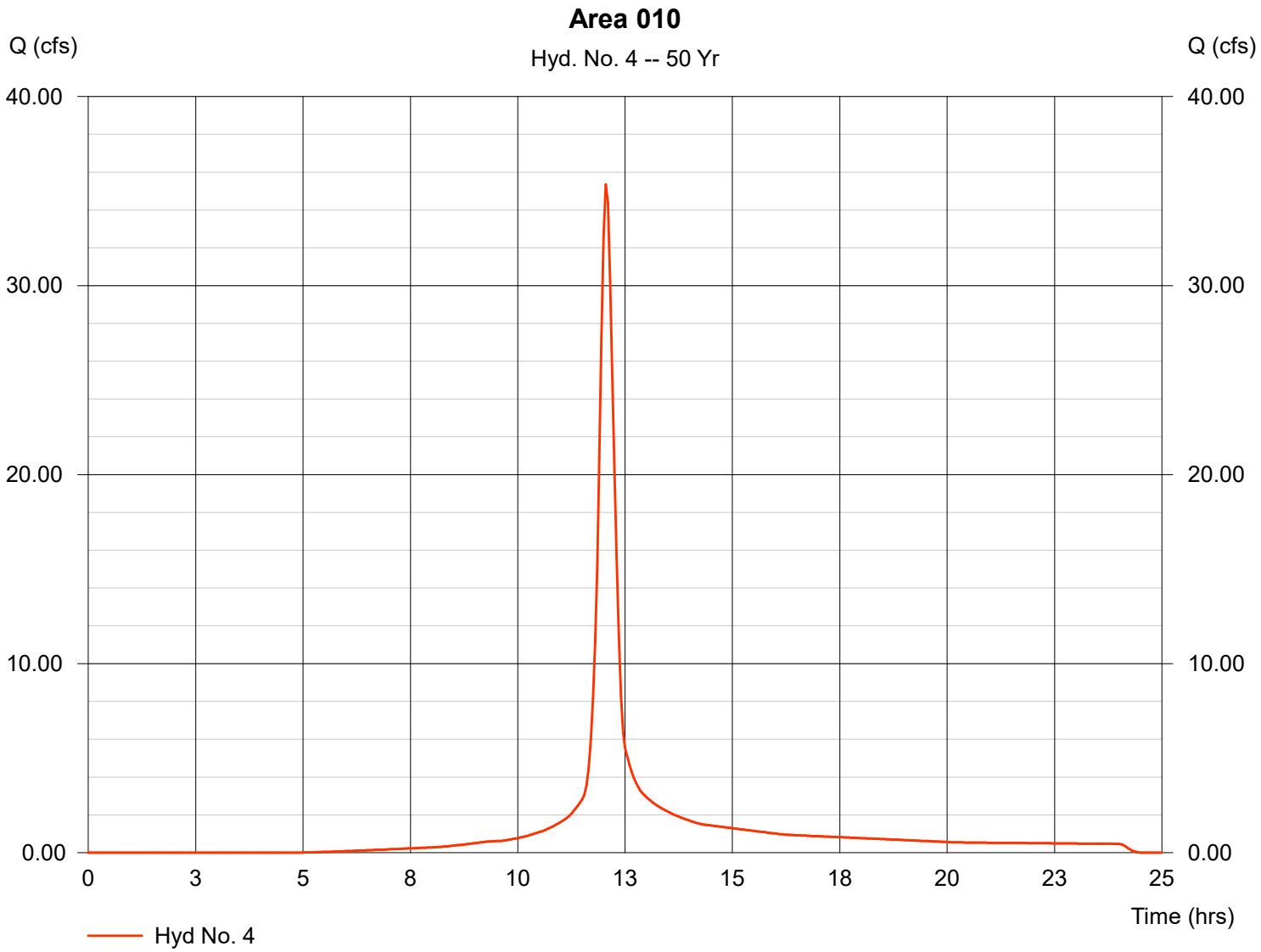
Hydraflow Hydrographs by Intelisolve | Friday, Sep 8 2023, 4:8 PM

Hyd. No. 4

Area 010

Hydrograph type	= SCS Runoff	Peak discharge	= 35.34 cfs
Storm frequency	= 50 yrs	Time interval	= 3 min
Drainage area	= 6.620 ac	Curve number	= 84
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 19.70 min
Total precip.	= 6.44 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 114,240 cuft



Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

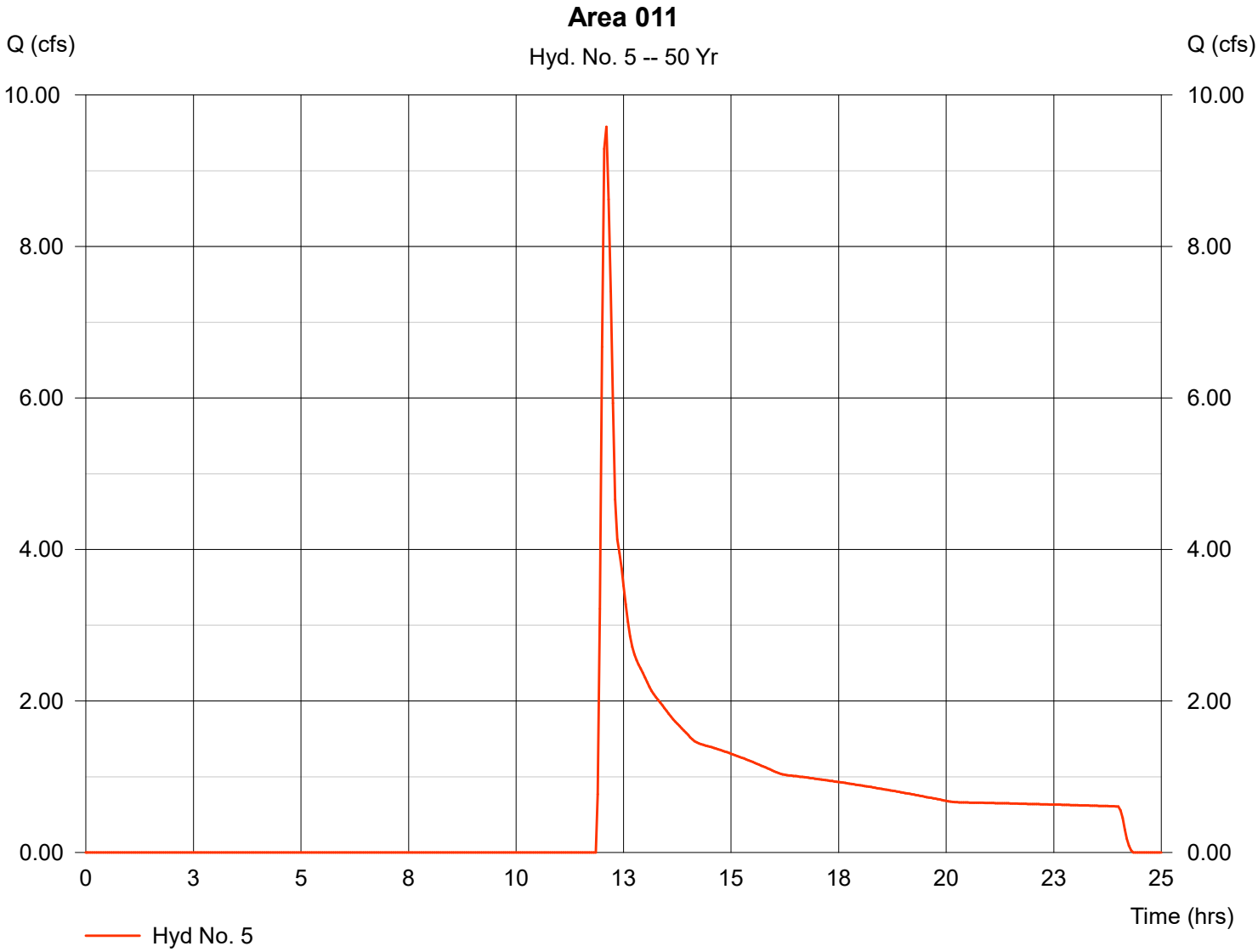
Friday, Sep 8 2023, 4:8 PM

Hyd. No. 5

Area 011

Hydrograph type	= SCS Runoff	Peak discharge	= 9.58 cfs
Storm frequency	= 50 yrs	Time interval	= 3 min
Drainage area	= 26.560 ac	Curve number	= 39
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 12.80 min
Total precip.	= 6.44 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 55,787 cuft



Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

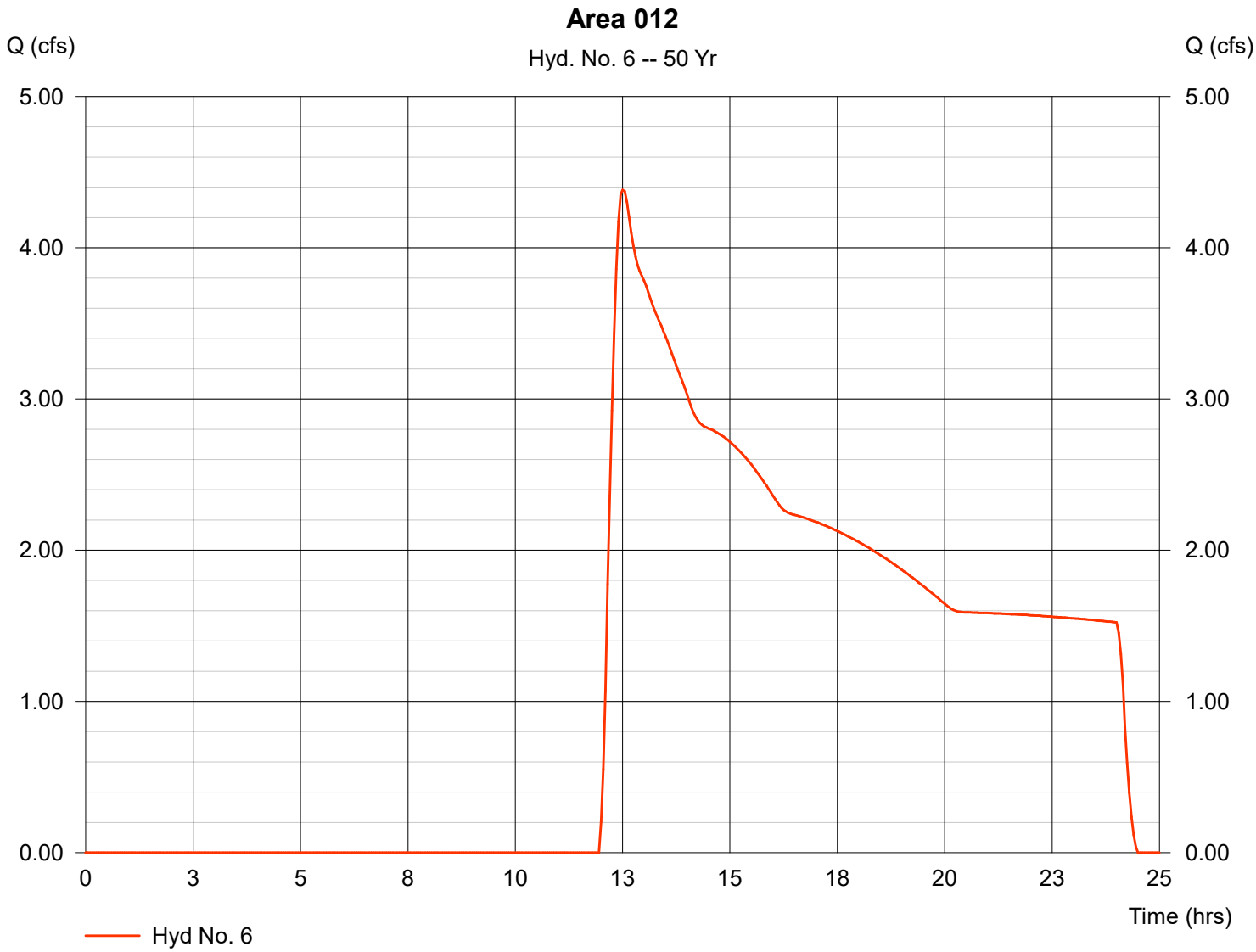
Friday, Sep 8 2023, 4:8 PM

Hyd. No. 6

Area 012

Hydrograph type	= SCS Runoff	Peak discharge	= 4.38 cfs
Storm frequency	= 50 yrs	Time interval	= 3 min
Drainage area	= 103.540 ac	Curve number	= 33
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 17.80 min
Total precip.	= 6.44 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 96,733 cuft



Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
1	SCS Runoff	0.93	3	732	3,986	----	------	------	Area 007
2	SCS Runoff	8.84	3	726	29,423	----	------	------	Area 008
3	SCS Runoff	46.90	3	723	150,157	----	------	------	Area 009
4	SCS Runoff	41.56	3	723	135,160	----	------	------	Area 010
5	SCS Runoff	19.93	3	723	85,778	----	------	------	Area 011
6	SCS Runoff	14.77	3	735	175,560	----	------	------	Area 012

Hydrograph Plot

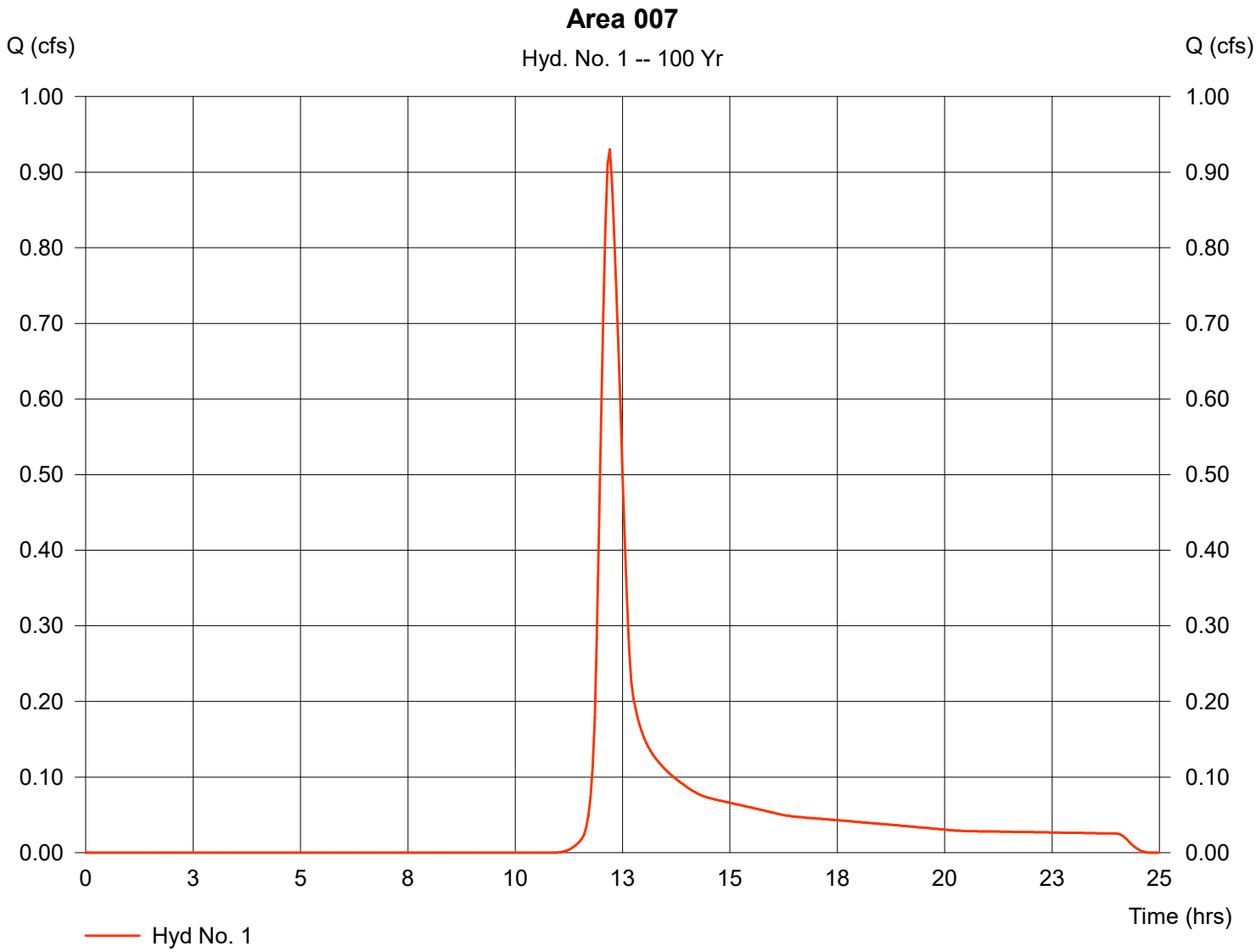
Hydraflow Hydrographs by Intelisolve | Friday, Sep 8 2023, 4:8 PM

Hyd. No. 1

Area 007

Hydrograph type	= SCS Runoff	Peak discharge	= 0.93 cfs
Storm frequency	= 100 yrs	Time interval	= 3 min
Drainage area	= 0.470 ac	Curve number	= 55
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 26.80 min
Total precip.	= 7.33 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 3,986 cuft



Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

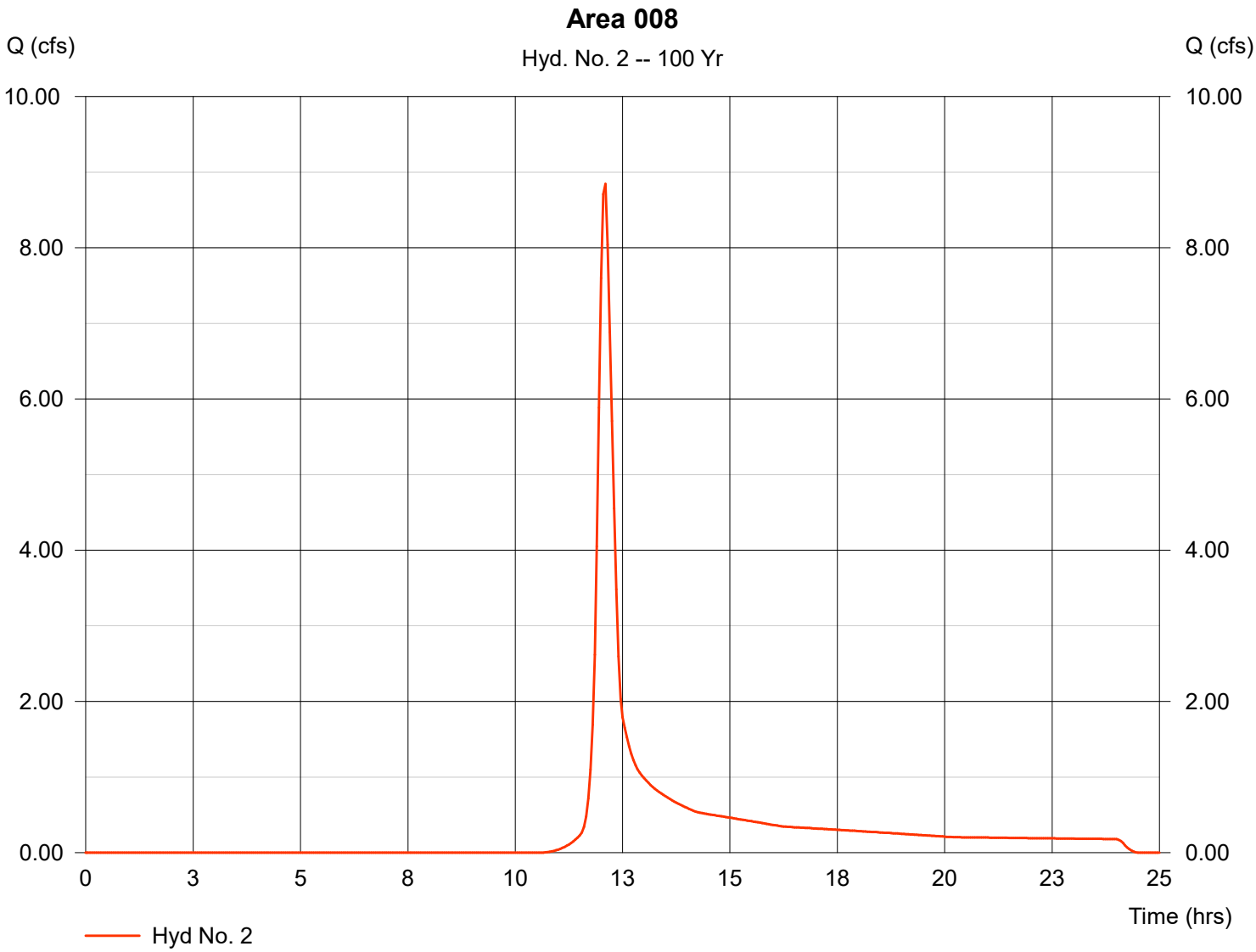
Friday, Sep 8 2023, 4:8 PM

Hyd. No. 2

Area 008

Hydrograph type	= SCS Runoff	Peak discharge	= 8.84 cfs
Storm frequency	= 100 yrs	Time interval	= 3 min
Drainage area	= 3.100 ac	Curve number	= 57
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 17.50 min
Total precip.	= 7.33 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 29,423 cuft



Hydrograph Plot

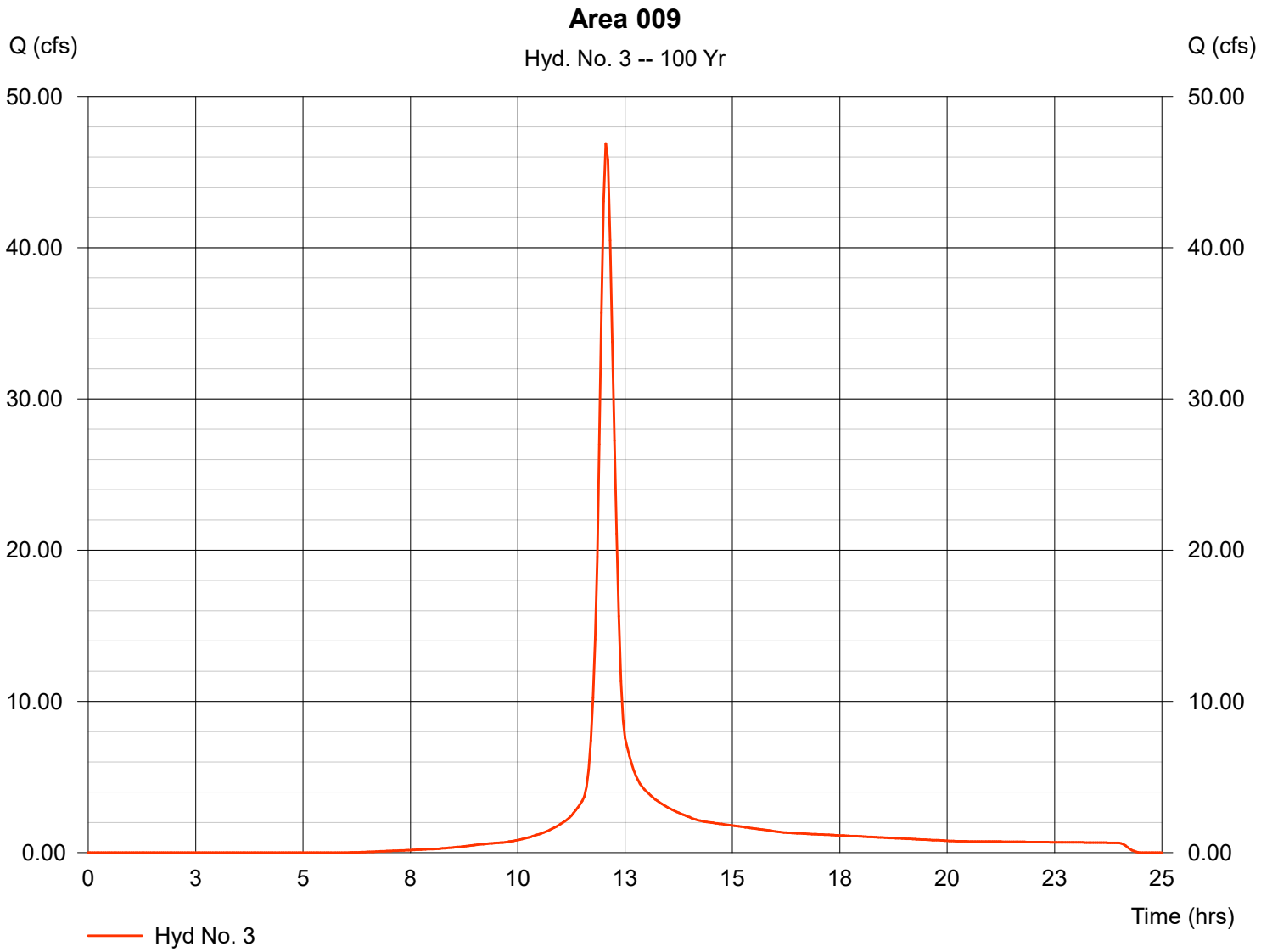
Hydraflow Hydrographs by Intelisolve | Friday, Sep 8 2023, 4:8 PM

Hyd. No. 3

Area 009

Hydrograph type	= SCS Runoff	Peak discharge	= 46.90 cfs
Storm frequency	= 100 yrs	Time interval	= 3 min
Drainage area	= 8.400 ac	Curve number	= 78
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 19.10 min
Total precip.	= 7.33 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 150,157 cuft



Hydrograph Plot

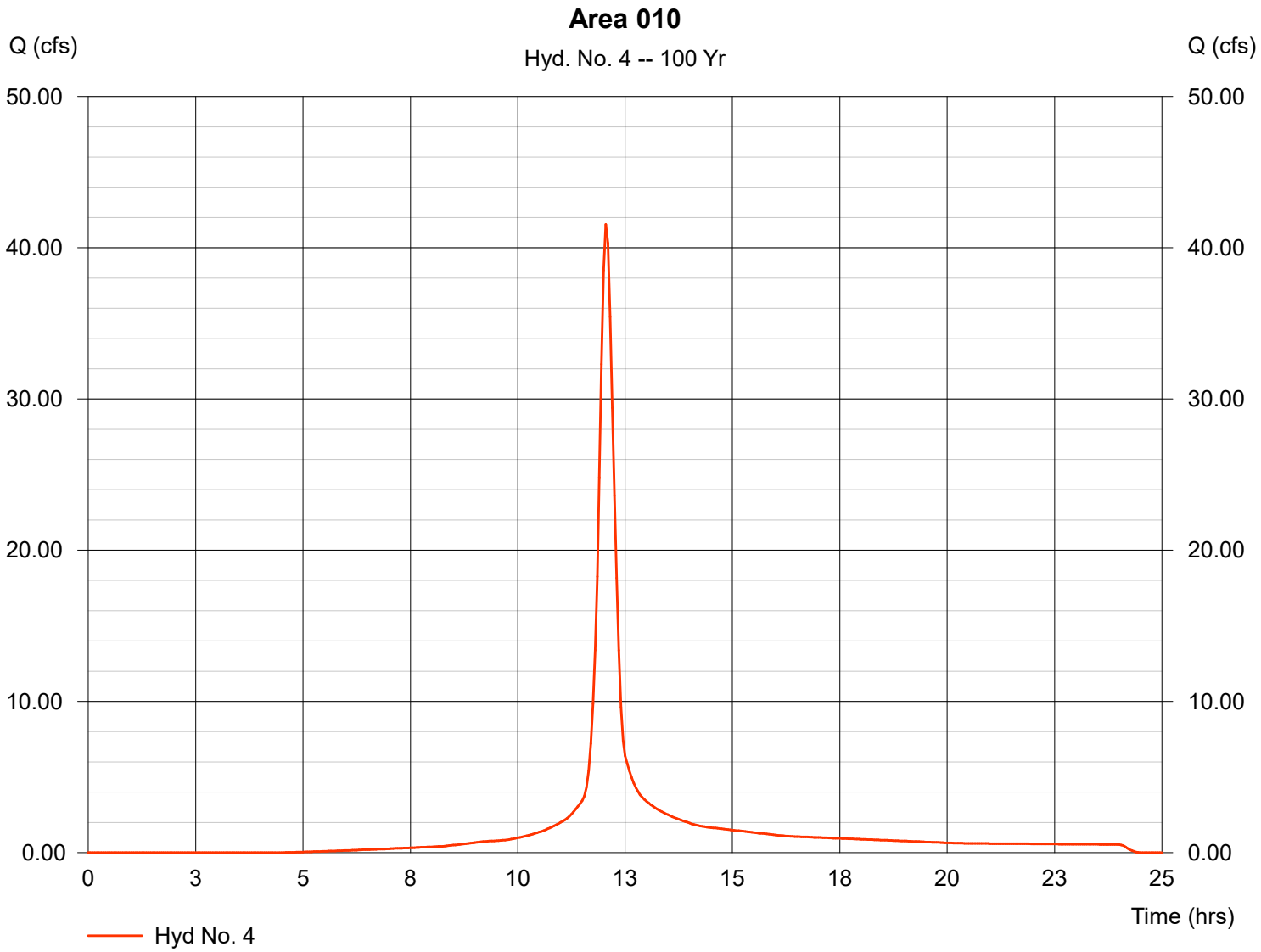
Hydraflow Hydrographs by Intelisolve | Friday, Sep 8 2023, 4:8 PM

Hyd. No. 4

Area 010

Hydrograph type	= SCS Runoff	Peak discharge	= 41.56 cfs
Storm frequency	= 100 yrs	Time interval	= 3 min
Drainage area	= 6.620 ac	Curve number	= 84
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 19.70 min
Total precip.	= 7.33 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 135,160 cuft



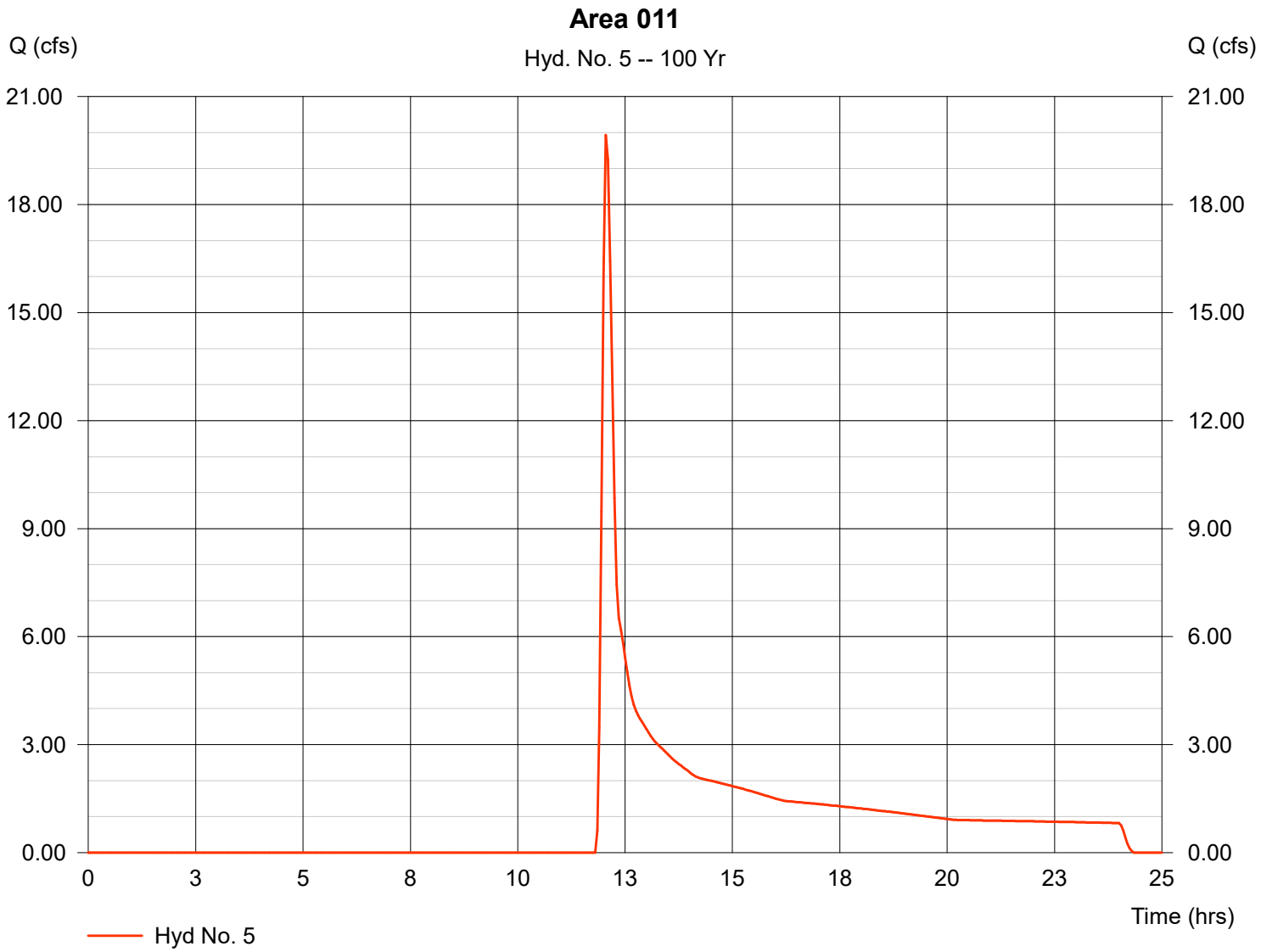
Hydrograph Plot

Hyd. No. 5

Area 011

Hydrograph type	= SCS Runoff	Peak discharge	= 19.93 cfs
Storm frequency	= 100 yrs	Time interval	= 3 min
Drainage area	= 26.560 ac	Curve number	= 39
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 12.80 min
Total precip.	= 7.33 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 85,778 cuft



Hydrograph Plot

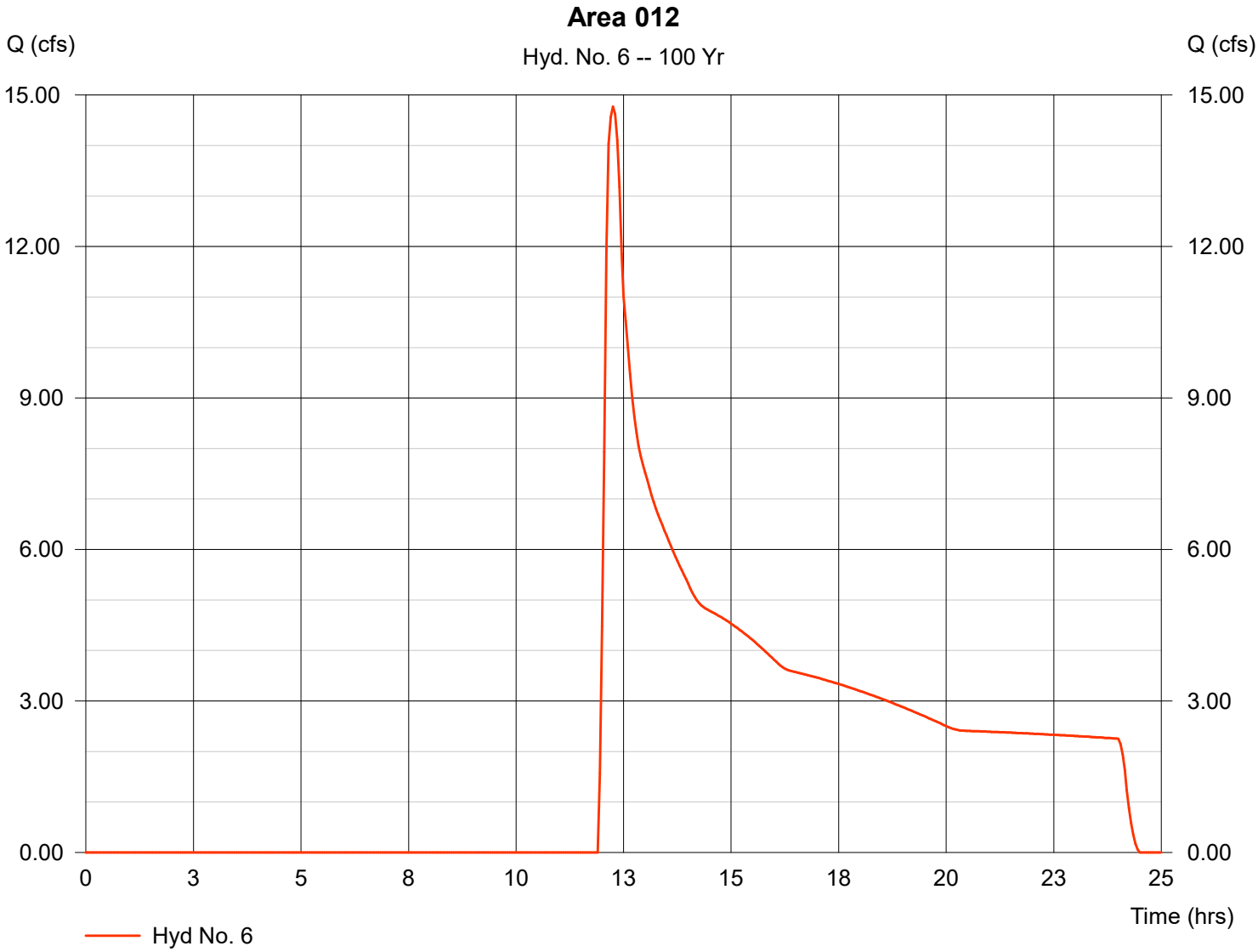
Hydraflow Hydrographs by Intelisolve | Friday, Sep 8 2023, 4:8 PM

Hyd. No. 6

Area 012

Hydrograph type	= SCS Runoff	Peak discharge	= 14.77 cfs
Storm frequency	= 100 yrs	Time interval	= 3 min
Drainage area	= 103.540 ac	Curve number	= 33
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 17.80 min
Total precip.	= 7.33 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 175,560 cuft



SECTION 10

APPENDIX H

Post Construction Watershed Calculations

Bethlehem Landfill Company

Sedimentation Basin #1
Post Development

Taken from ARIA Energy
East RNG Facility Development
(July 2019)

Hydrograph Return Period Recap

Hyd.	Hydrograph type (origin)	Inflow Hyd(s)	Peak Outflow (cfs)								Hydrograph description
			1-Yr	2-Yr	3-Yr	5-Yr	10-Yr	25-Yr	50-Yr	100-Yr	
1	SCS Runoff	-------	22.16	34.54	-------	47.77	70.58	94.21	118.25	142.46	Basin 1 Subarea 2
2	SCS Runoff	-------	2.79	4.72	-------	6.84	10.49	14.40	18.51	22.68	Basin 1 Subarea 1
3	SCS Runoff	-------	4.98	6.36	-------	7.73	9.92	12.09	14.25	16.41	Basin 1 Subarea 3
4	Combine	1, 2, 3	29.17	45.01	-------	61.98	90.54	120.09	150.13	180.41	Combined Discharge to Pro. Basin 1
5	Reservoir	4	0.70	0.87	-------	1.02	1.21	1.36	2.12	7.90	B1DA to Mod Basin 1

Hydrograph Summary Report

Hyd.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
1	SCS Runoff	22.16	2	720	51,340	----	------	------	Basin 1 Subarea 2
2	SCS Runoff	2.79	2	718	5,776	----	------	------	Basin 1 Subarea 1
3	SCS Runoff	4.98	2	716	10,892	----	------	------	Basin 1 Subarea 3
4	Combine	29.17	2	718	68,007	1, 2, 3	------	------	Combined Discharge to Pro. Basin 1
5	Reservoir	0.70	2	1032	67,967	4	437.60	42,552	B1DA to Mod Basin 1

Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

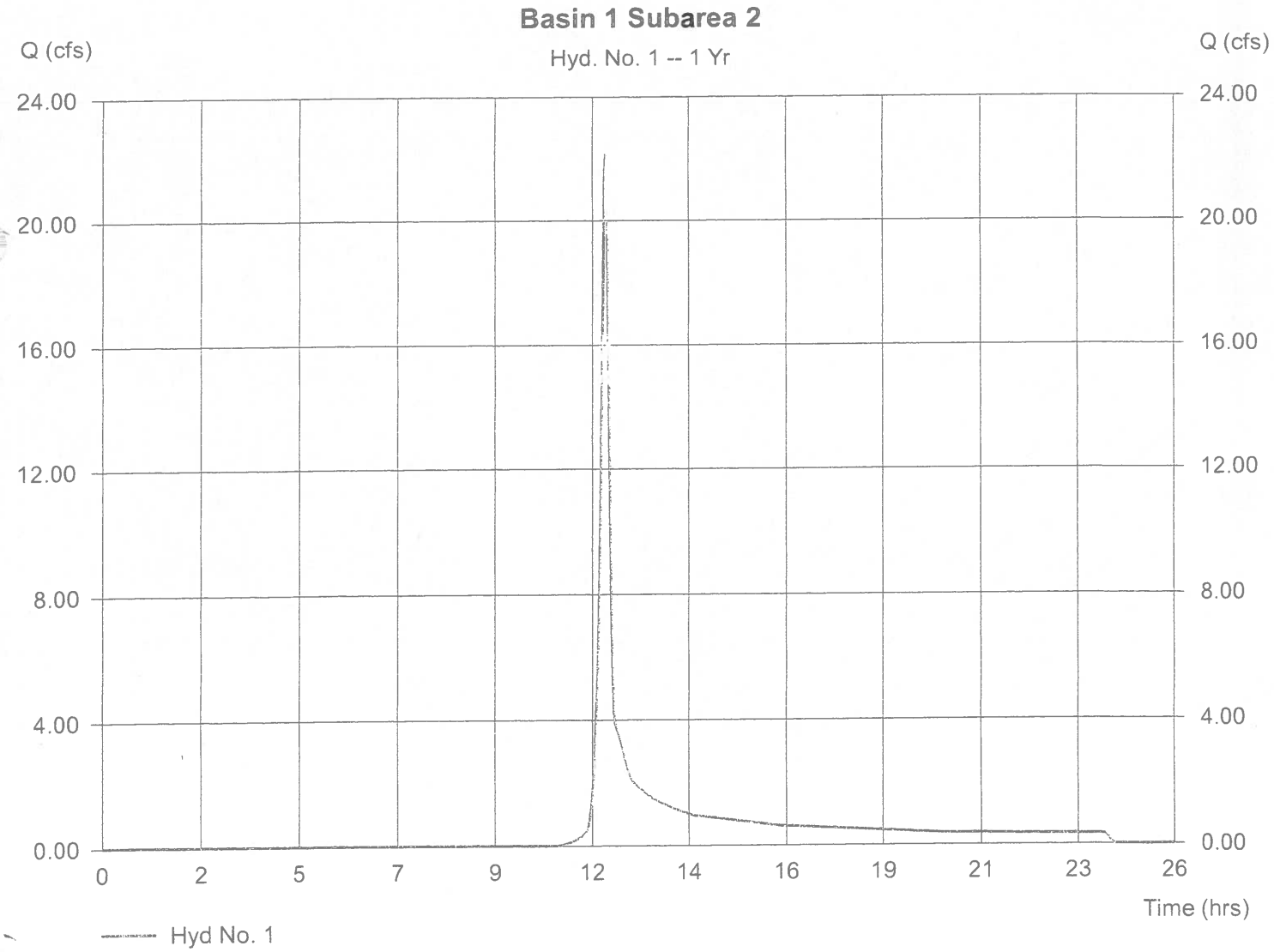
Wednesday, Sep 4 2019, 6:47 PM

Hyd. No. 1

Basin 1 Subarea 2

Hydrograph type	= SCS Runoff	Peak discharge	= 22.16 cfs
Storm frequency	= 1 yrs	Time interval	= 2 min
Drainage area	= 18.340 ac	Curve number	= 79
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 9.40 min
Total precip.	= 2.40 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 51,340 cuft



TR55 Tc Worksheet

Hyd. No. 1

Basin 1 Subarea 2

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.130		0.011		0.011		
Flow length (ft)	= 120.0		0.0		0.0		
Two-year 24-hr precip. (in)	= 3.00		0.00		0.00		
Land slope (%)	= 33.00		0.00		0.00		
Travel Time (min)	**= 3.40**	**+**	**0.00**	**+**	**0.00**	**=**	**3.40**
Shallow Concentrated Flow							
Flow length (ft)	= 786.00		0.00		0.00		
Watercourse slope (%)	= 3.00		0.00		0.00		
Surface description	= Unpaved		Paved		Paved		
Average velocity (ft/s)	= 2.79		0.00		0.00		
Travel Time (min)	**= 4.69**	**+**	**0.00**	**+**	**0.00**	**=**	**4.69**
Channel Flow							
X sectional flow area (sqft)	= 4.50		3.53		0.00		
Wetted perimeter (ft)	= 6.50		4.71		0.00		
Channel slope (%)	= 33.00		33.00		0.00		
Manning's n-value	= 0.070		0.010		0.015		
Velocity (ft/s)	= 9.56		70.56		0.00		
Flow length (ft)	= 686.0		372.0		0.0		
Travel Time (min)	**= 1.20**	**+**	**0.09**	**+**	**0.00**	**=**	**1.28**

Total Travel Time, Tc ..... **9.40 min**

Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

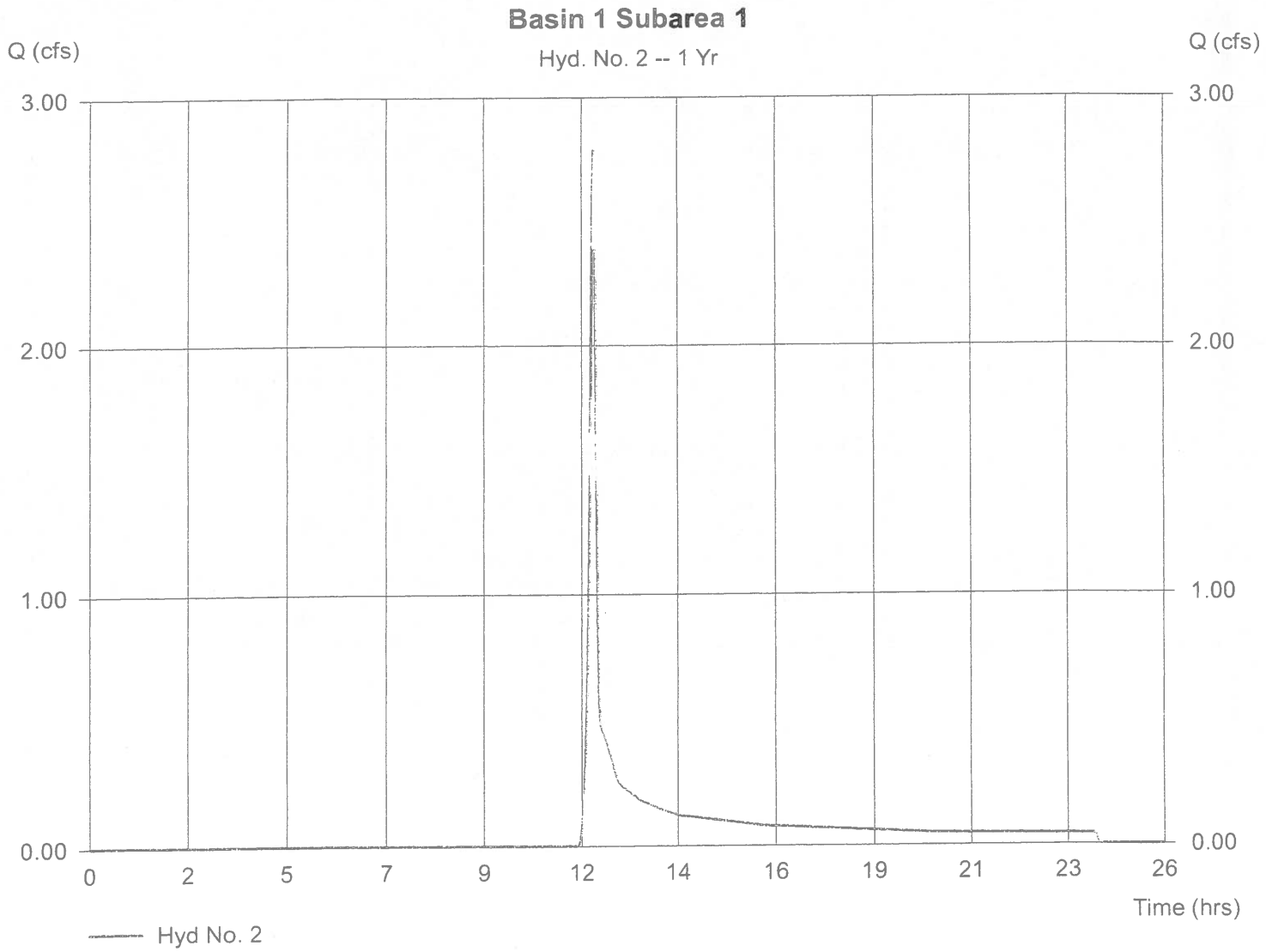
Wednesday, Sep 4 2019, 6:47 PM

Hyd. No. 2

Basin 1 Subarea 1

Hydrograph type	= SCS Runoff	Peak discharge	= 2.79 cfs
Storm frequency	= 1 yrs	Time interval	= 2 min
Drainage area	= 3.070 ac	Curve number	= 74
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 5.00 min
Total precip.	= 2.40 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 5,776 cuft



Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

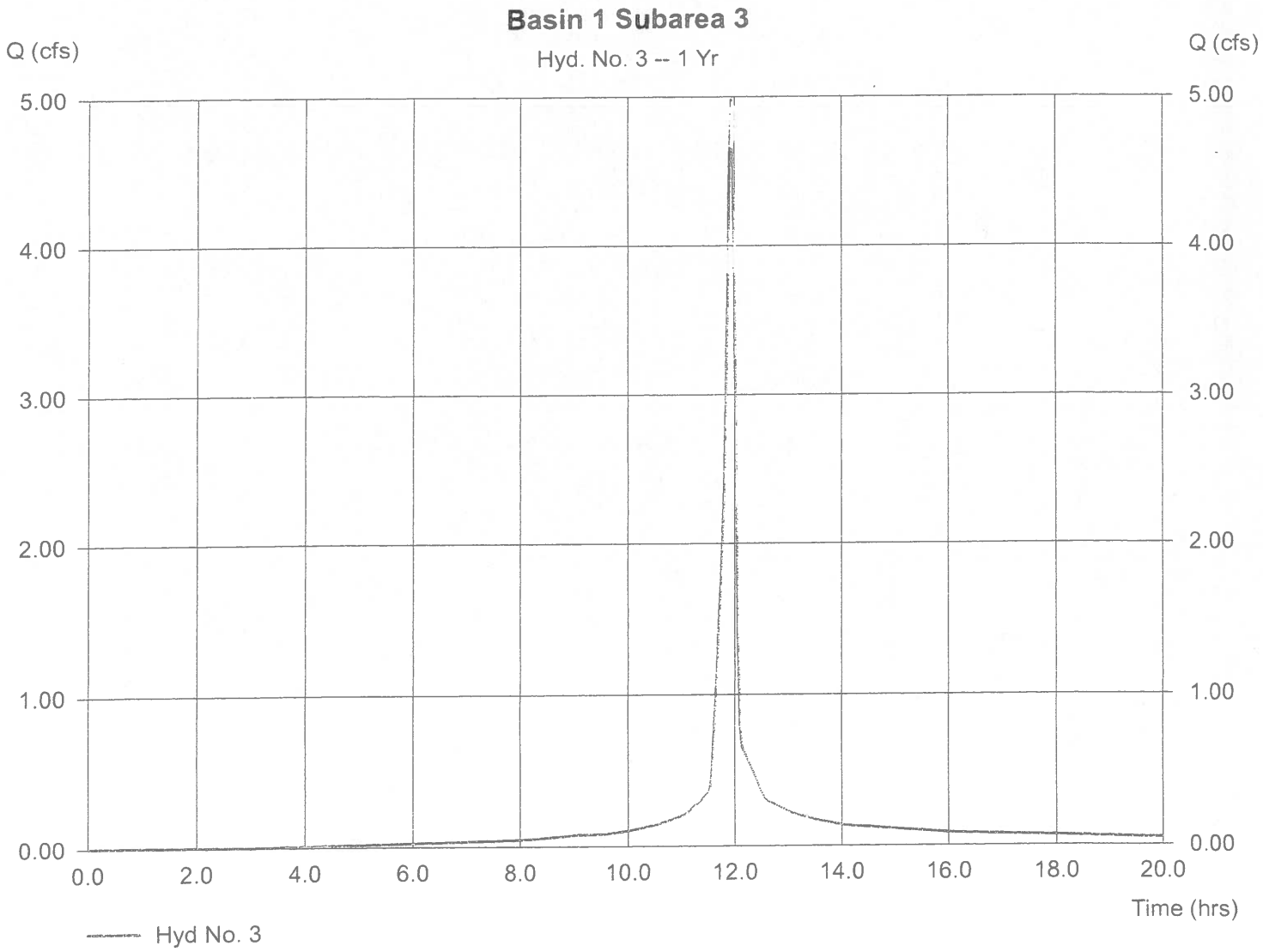
Wednesday, Sep 4 2019, 6:47 PM

Hyd. No. 3

Basin 1 Subarea 3

Hydrograph type	= SCS Runoff	Peak discharge	= 4.98 cfs
Storm frequency	= 1 yrs	Time interval	= 2 min
Drainage area	= 1.630 ac	Curve number	= 96
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 5.00 min
Total precip.	= 2.40 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 10,892 cuft



Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

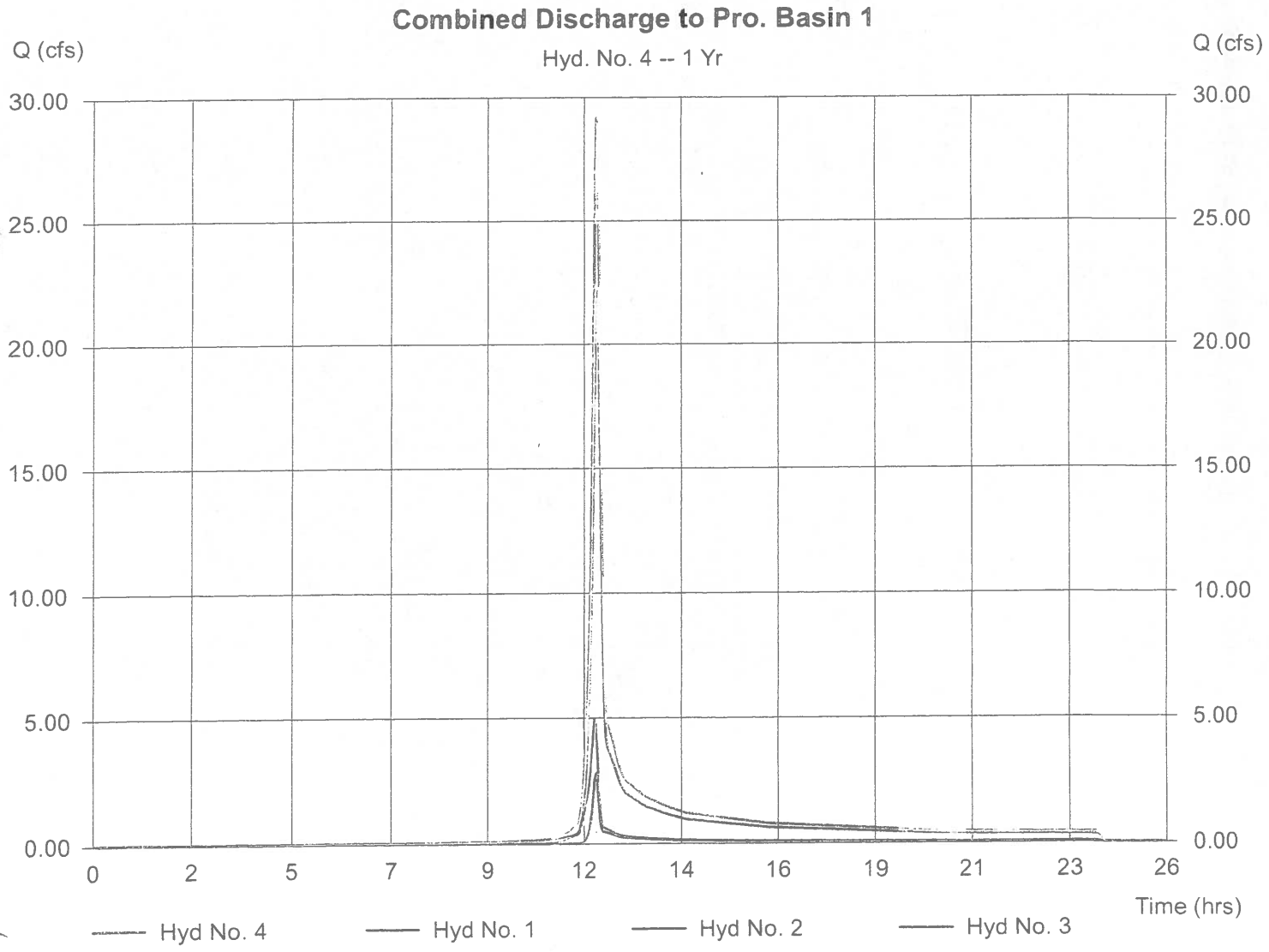
Wednesday, Sep 4 2019, 6:47 PM

Hyd. No. 4

Combined Discharge to Pro. Basin 1

Hydrograph type	= Combine	Peak discharge	= 29.17 cfs
Storm frequency	= 1 yrs	Time interval	= 2 min
Inflow hyds.	= 1, 2, 3		

Hydrograph Volume = 68,007 cuft



Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

Wednesday, Sep 4 2019, 6:47 PM

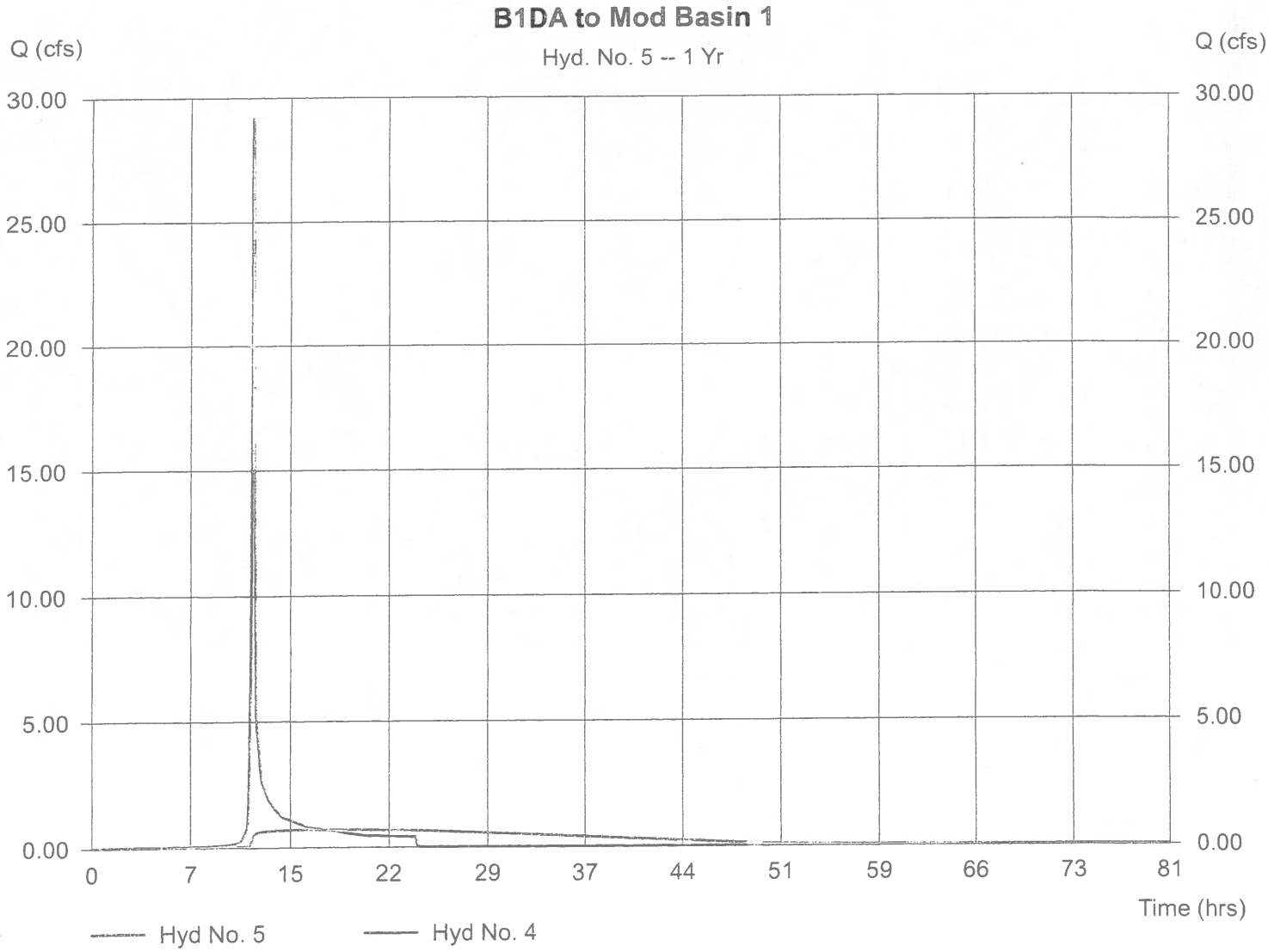
Hyd. No. 5

B1DA to Mod Basin 1

Hydrograph type	= Reservoir	Peak discharge	= 0.70 cfs
Storm frequency	= 1 yrs	Time interval	= 2 min
Inflow hyd. No.	= 4	Max. Elevation	= 437.60 ft
Reservoir name	= Pro. SW Basin 1 wPond	Max. Storage	= 42,552 cuft

Storage Indication method used.

Hydrograph Volume = 67,967 cuft



Pond Report

Pond No. 1 - Pro. SW Basin 1 wPond

Pond Data

Pond storage is based on known contour areas. Average end area method used.

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	434.50	12,000	0	0
1.50	436.00	13,571	19,178	19,178
3.50	438.00	15,671	29,242	48,420
5.50	440.00	18,793	34,464	82,884
7.50	442.00	22,056	40,849	123,733
9.50	444.00	25,164	47,220	170,953
11.50	446.00	28,700	53,864	224,817
13.50	448.00	32,338	61,038	285,855
15.50	450.00	38,138	70,476	356,331

Culvert / Orifice Structures

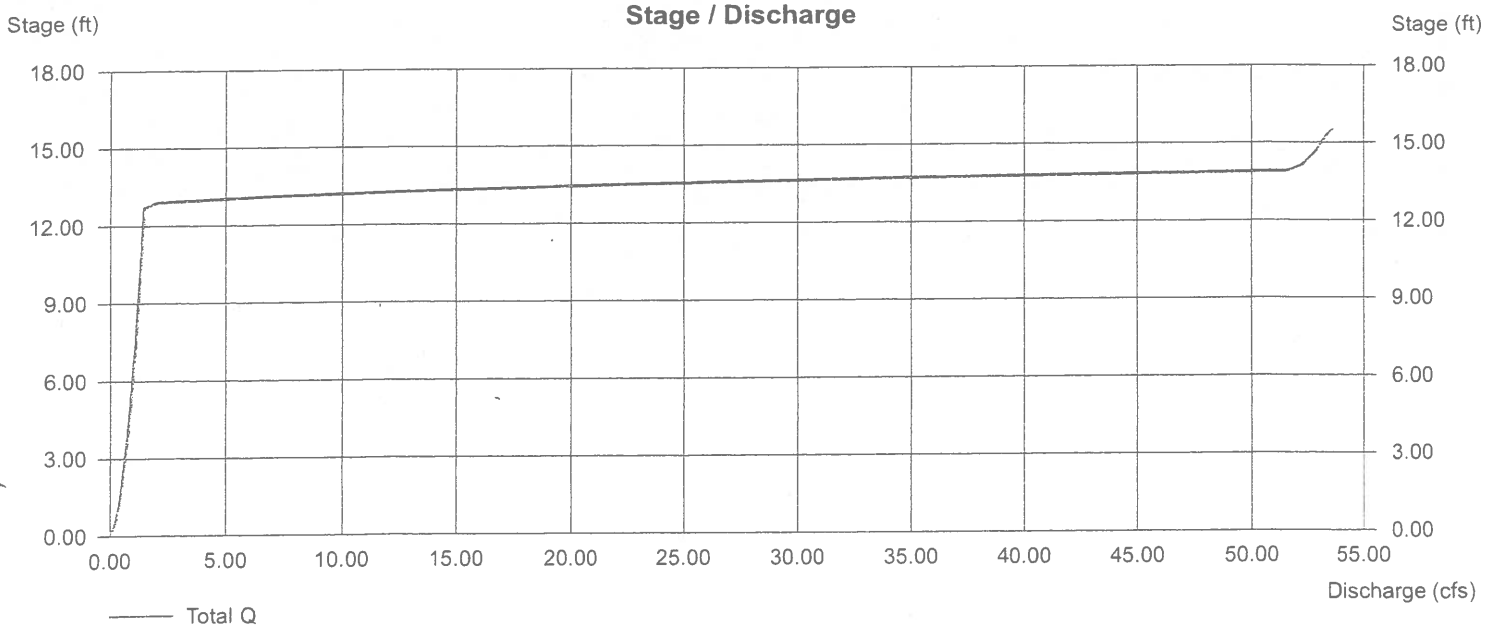
	[A]	[B]	[C]	[D]
Rise (in)	= 24.00	4.00	0.00	0.00
Span (in)	= 24.00	4.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 434.50	434.50	0.00	0.00
Length (ft)	= 110.00	0.00	0.00	0.00
Slope (%)	= 13.00	0.00	0.00	0.00
N-Value	= .024	.013	.013	.013
Orif. Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	Yes	Yes	Yes

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 12.00	30.00	0.00	0.00
Crest El. (ft)	= 447.34	448.13	0.00	0.00
Weir Coeff.	= 3.33	3.33	0.00	0.00
Weir Type	= Riser	Ciplti	---	---
Multi-Stage	= Yes	Yes	No	No

Exfiltration = 0.000 in/hr (Contour) Tailwater Elev. = 0.00 ft

Note: Culvert/Orifice outflows have been analyzed under inlet and outlet control. Weir riser checked for orifice conditions.



Hydrograph Summary Report

Hyd.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
1	SCS Runoff	34.54	2	720	79,121	----	------	------	Basin 1 Subarea 2
2	SCS Runoff	4.72	2	718	9,489	----	------	------	Basin 1 Subarea 1
3	SCS Runoff	6.36	2	716	14,157	----	------	------	Basin 1 Subarea 3
4	Combine	45.01	2	718	102,767	1, 2, 3	------	------	Combined Discharge to Pro. Basin 1
5	Reservoir	0.87	2	1090	102,669	4	439.20	69,012	B1DA to Mod Basin 1

Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

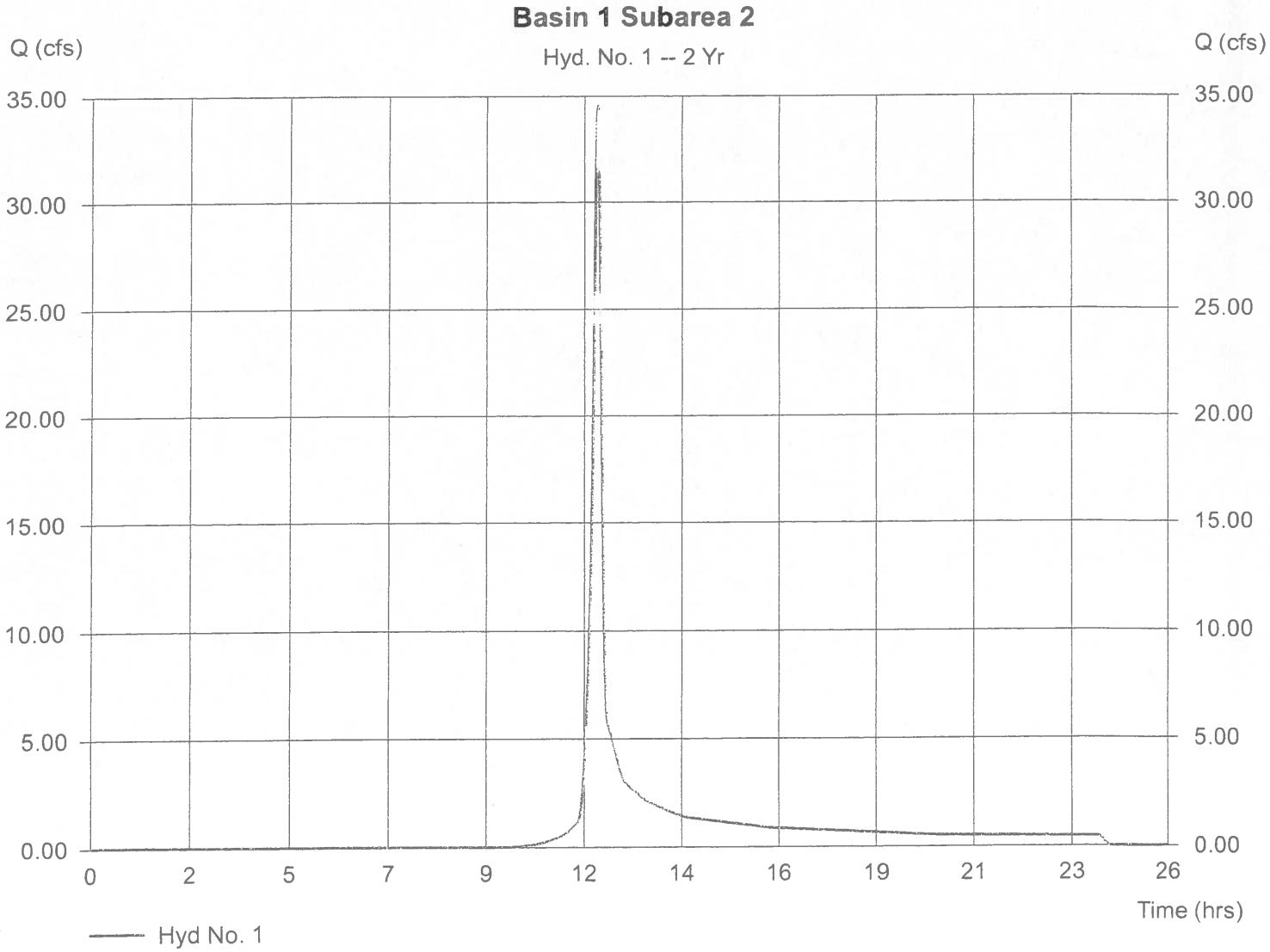
Wednesday, Sep 4 2019, 6:47 PM

Hyd. No. 1

Basin 1 Subarea 2

Hydrograph type	= SCS Runoff	Peak discharge	= 34.54 cfs
Storm frequency	= 2 yrs	Time interval	= 2 min
Drainage area	= 18.340 ac	Curve number	= 79
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 9.40 min
Total precip.	= 3.00 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 79,121 cuft



TR55 Tc Worksheet

Hyd. No. 1

Basin 1 Subarea 2

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.130		0.011		0.011		
Flow length (ft)	= 120.0		0.0		0.0		
Two-year 24-hr precip. (in)	= 3.00		0.00		0.00		
Land slope (%)	= 33.00		0.00		0.00		
Travel Time (min)	**= 3.40**	**+**	**0.00**	**+**	**0.00**	**=**	**3.40**
Shallow Concentrated Flow							
Flow length (ft)	= 786.00		0.00		0.00		
Watercourse slope (%)	= 3.00		0.00		0.00		
Surface description	= Unpaved		Paved		Paved		
Average velocity (ft/s)	= 2.79		0.00		0.00		
Travel Time (min)	**= 4.69**	**+**	**0.00**	**+**	**0.00**	**=**	**4.69**
Channel Flow							
X sectional flow area (sqft)	= 4.50		3.53		0.00		
Wetted perimeter (ft)	= 6.50		4.71		0.00		
Channel slope (%)	= 33.00		33.00		0.00		
Manning's n-value	= 0.070		0.010		0.015		
Velocity (ft/s)	= 9.56		70.56		0.00		
Flow length (ft)	= 686.0		372.0		0.0		
Travel Time (min)	**= 1.20**	**+**	**0.09**	**+**	**0.00**	**=**	**1.28**

Total Travel Time, Tc ..... 9.40 min

Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

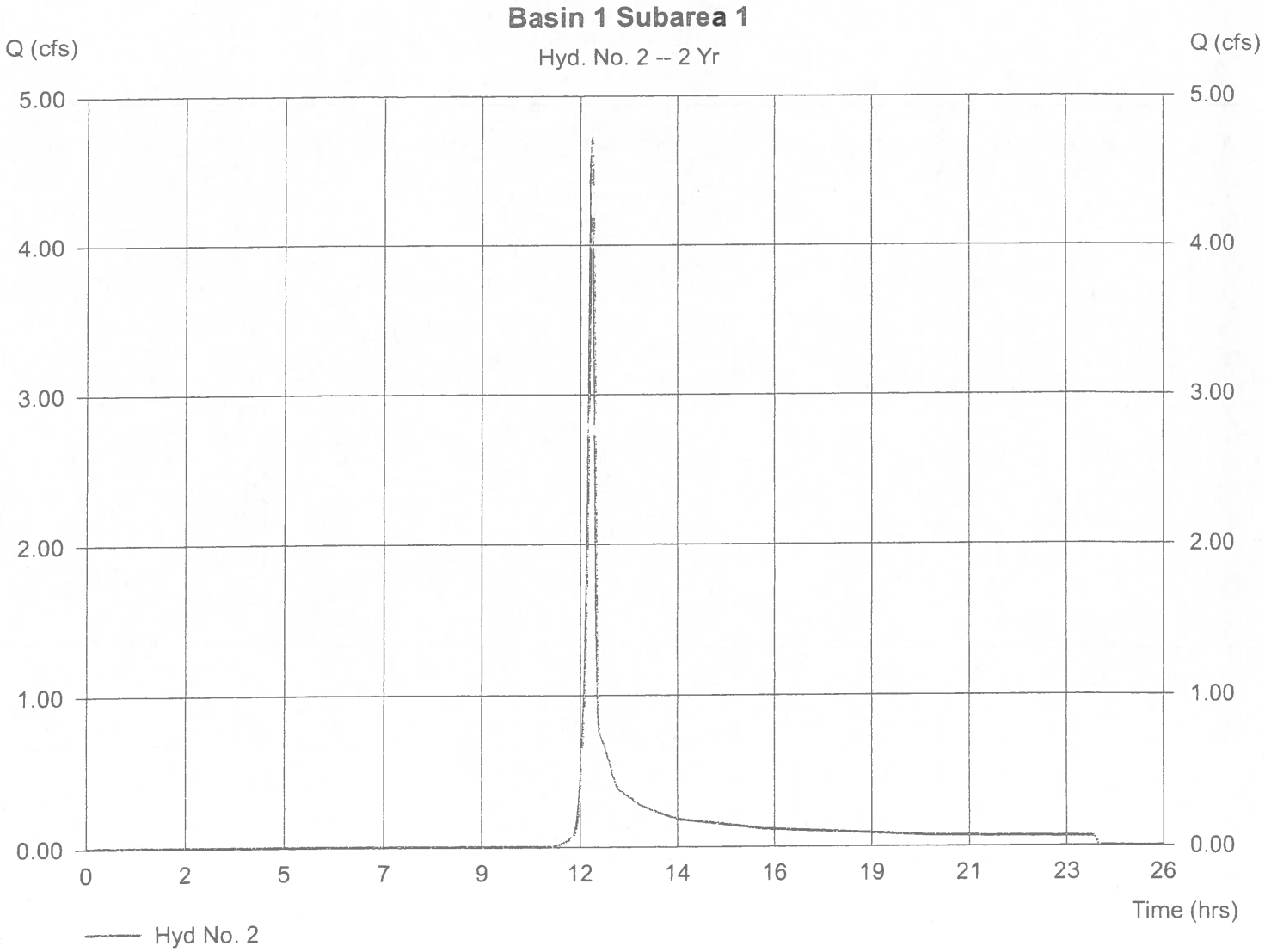
Wednesday, Sep 4 2019, 6:47 PM

Hyd. No. 2

Basin 1 Subarea 1

Hydrograph type	= SCS Runoff	Peak discharge	= 4.72 cfs
Storm frequency	= 2 yrs	Time interval	= 2 min
Drainage area	= 3.070 ac	Curve number	= 74
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 5.00 min
Total precip.	= 3.00 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 9,489 cuft



Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

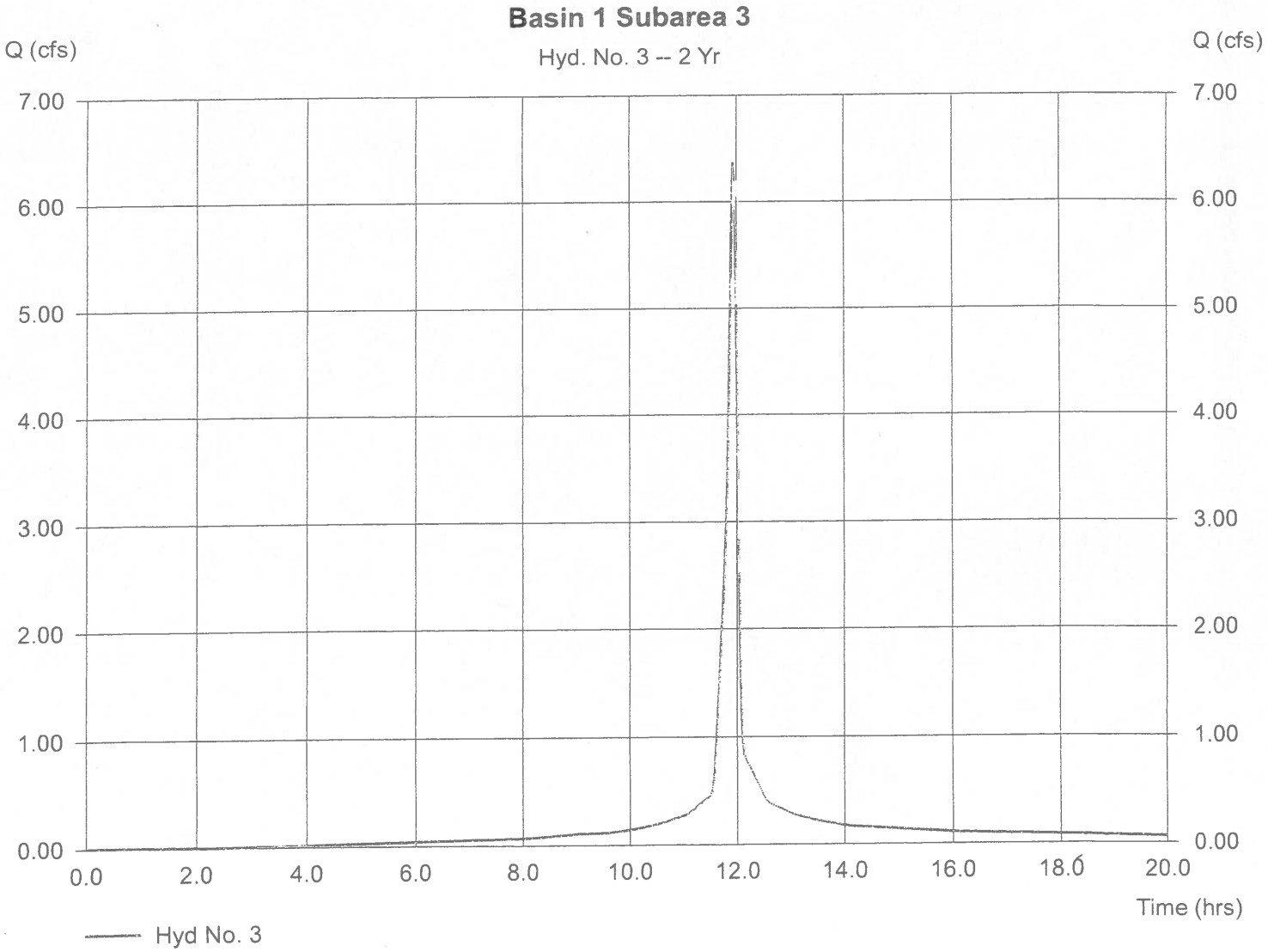
Wednesday, Sep 4 2019, 6:47 PM

Hyd. No. 3

Basin 1 Subarea 3

Hydrograph type	= SCS Runoff	Peak discharge	= 6.36 cfs
Storm frequency	= 2 yrs	Time interval	= 2 min
Drainage area	= 1.630 ac	Curve number	= 96
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 5.00 min
Total precip.	= 3.00 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 14,157 cuft



Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

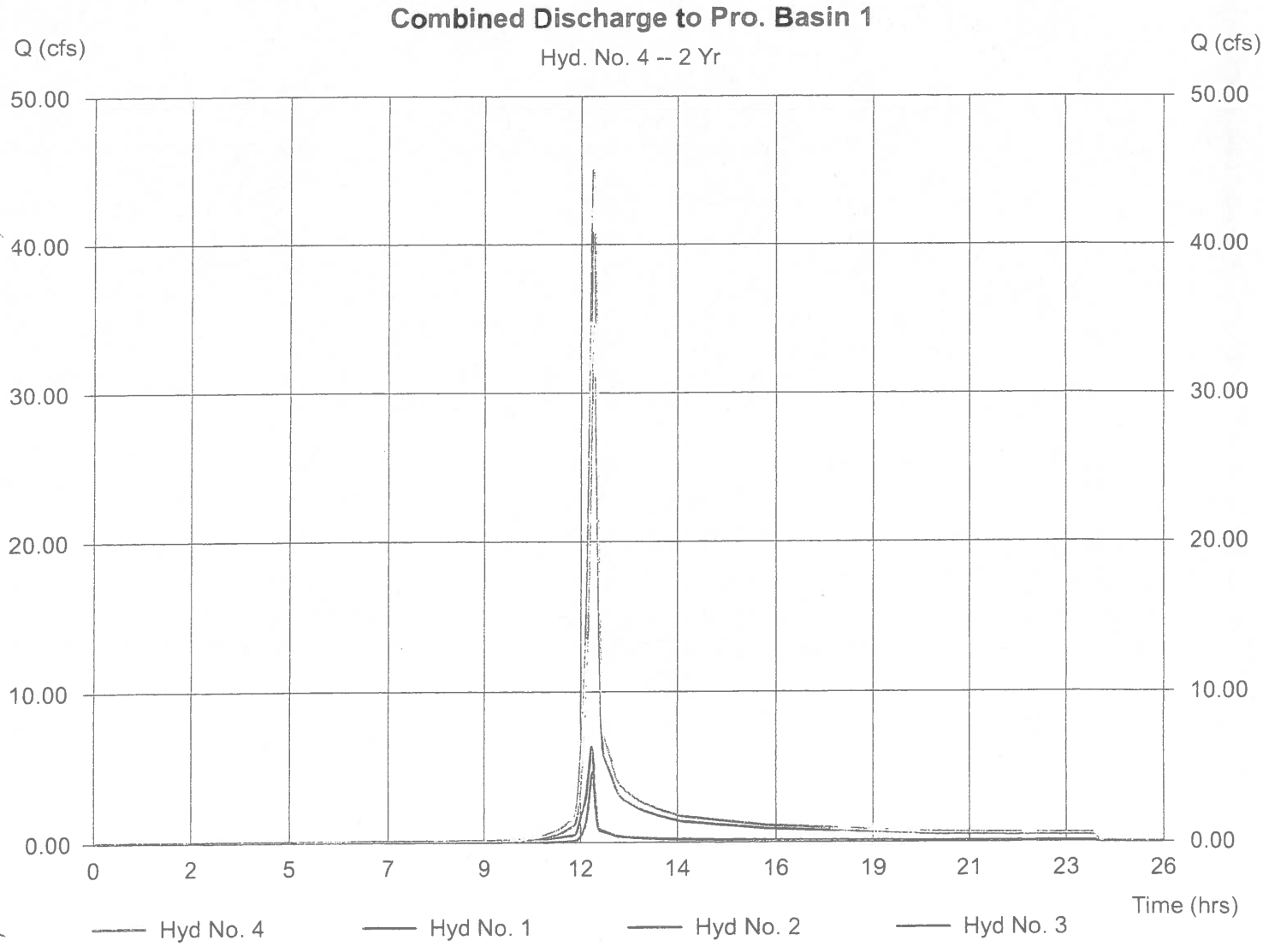
Wednesday, Sep 4 2019, 6:47 PM

Hyd. No. 4

Combined Discharge to Pro. Basin 1

Hydrograph type	= Combine	Peak discharge	= 45.01 cfs
Storm frequency	= 2 yrs	Time interval	= 2 min
Inflow hyds.	= 1, 2, 3		

Hydrograph Volume = 102,767 cuft



Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

Wednesday, Sep 4 2019, 6:47 PM

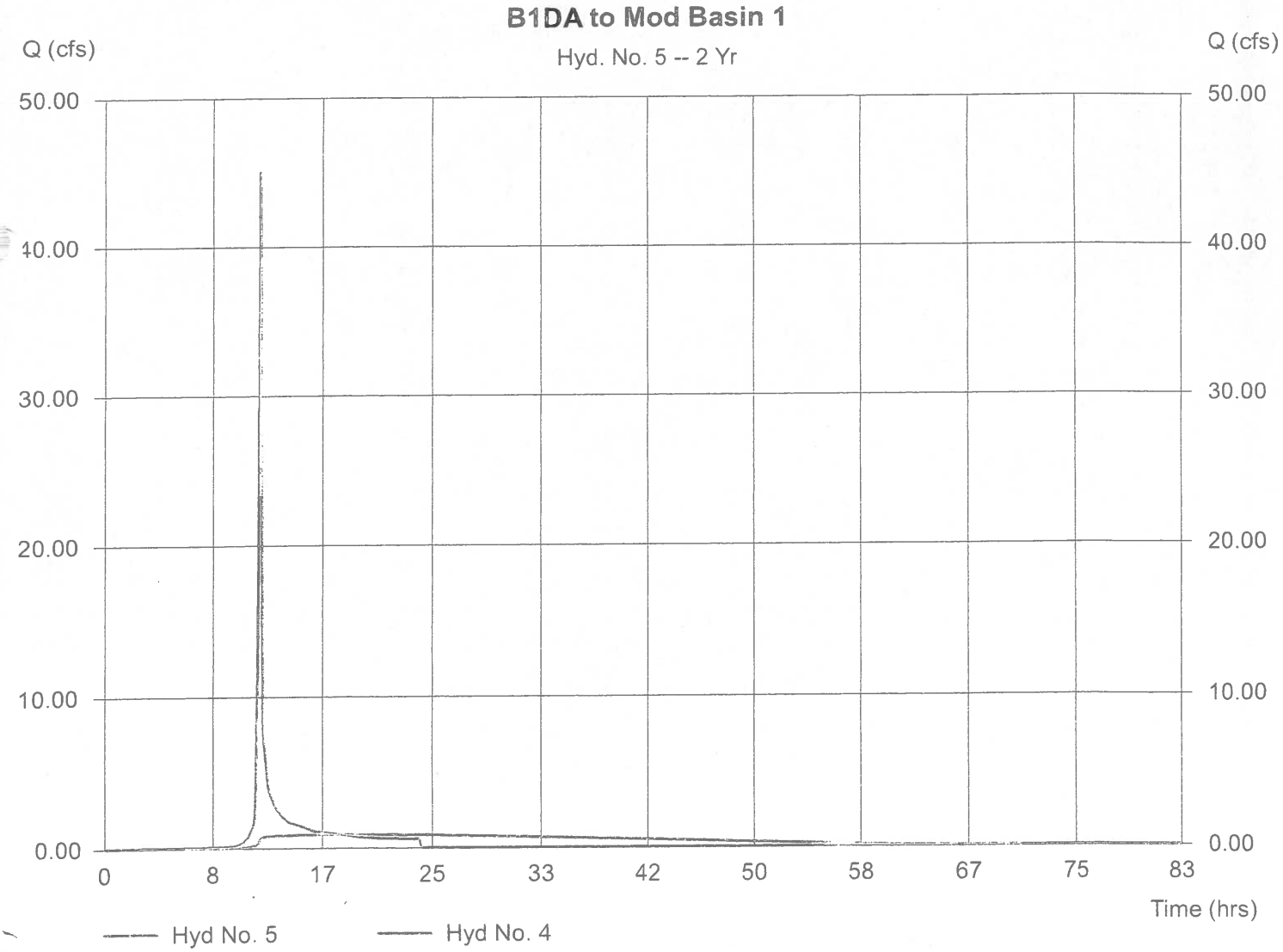
Hyd. No. 5

B1DA to Mod Basin 1

Hydrograph type	= Reservoir	Peak discharge	= 0.87 cfs
Storm frequency	= 2 yrs	Time interval	= 2 min
Inflow hyd. No.	= 4	Max. Elevation	= 439.20 ft
Reservoir name	= Pro. SW Basin 1 wPond	Max. Storage	= 69,012 cuft

Storage Indication method used.

Hydrograph Volume = 102,669 cuft



Pond Report

Hydraflow Hydrographs by Intelisolve

Wednesday, Sep 4 2019, 6:47 PM

Pond No. 1 - Pro. SW Basin 1 wPond

Pond Data

Pond storage is based on known contour areas. Average end area method used.

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	434.50	12,000	0	0
1.50	436.00	13,571	19,178	19,178
3.50	438.00	15,671	29,242	48,420
5.50	440.00	18,793	34,464	82,884
7.50	442.00	22,056	40,849	123,733
9.50	444.00	25,164	47,220	170,953
11.50	446.00	28,700	53,864	224,817
13.50	448.00	32,338	61,038	285,855
15.50	450.00	38,138	70,476	356,331

Culvert / Orifice Structures

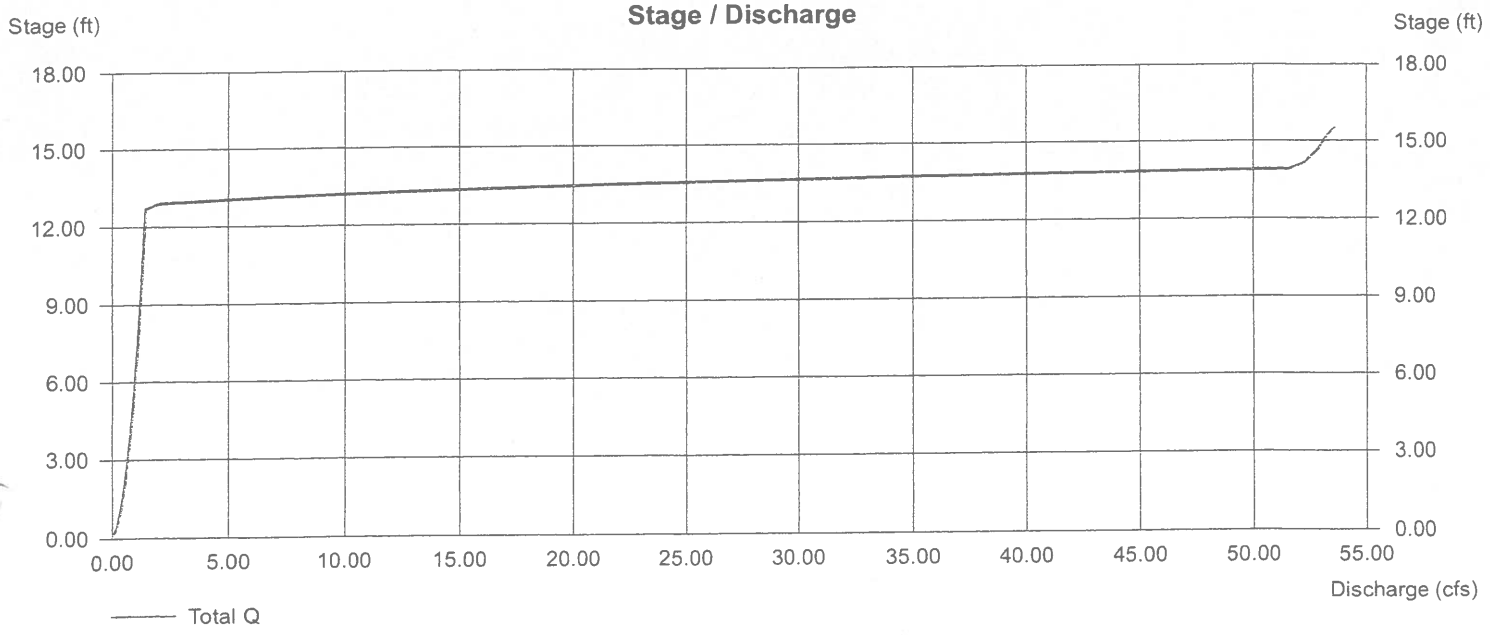
	[A]	[B]	[C]	[D]
Rise (in)	= 24.00	4.00	0.00	0.00
Span (in)	= 24.00	4.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 434.50	434.50	0.00	0.00
Length (ft)	= 110.00	0.00	0.00	0.00
Slope (%)	= 13.00	0.00	0.00	0.00
N-Value	= .024	.013	.013	.013
Orif. Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	Yes	Yes	Yes

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 12.00	30.00	0.00	0.00
Crest El. (ft)	= 447.34	448.13	0.00	0.00
Weir Coeff.	= 3.33	3.33	0.00	0.00
Weir Type	= Riser	Ciplti	---	---
Multi-Stage	= Yes	Yes	No	No

Exfiltration = 0.000 in/hr (Contour) Tailwater Elev. = 0.00 ft

Note: Culvert/Orifice outflows have been analyzed under inlet and outlet control. Weir riser checked for orifice conditions.



Hydrograph Summary Report

Hyd.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
1	SCS Runoff	47.77	2	720	109,452	----	------	------	Basin 1 Subarea 2
2	SCS Runoff	6.84	2	718	13,680	----	------	------	Basin 1 Subarea 1
3	SCS Runoff	7.73	2	716	17,441	----	------	------	Basin 1 Subarea 3
4	Combine	61.98	2	718	140,572	1, 2, 3	------	------	Combined Discharge to Pro. Basin 1
5	Reservoir	1.02	2	1132	140,348	4	440.80	99,169	B1DA to Mod Basin 1

Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

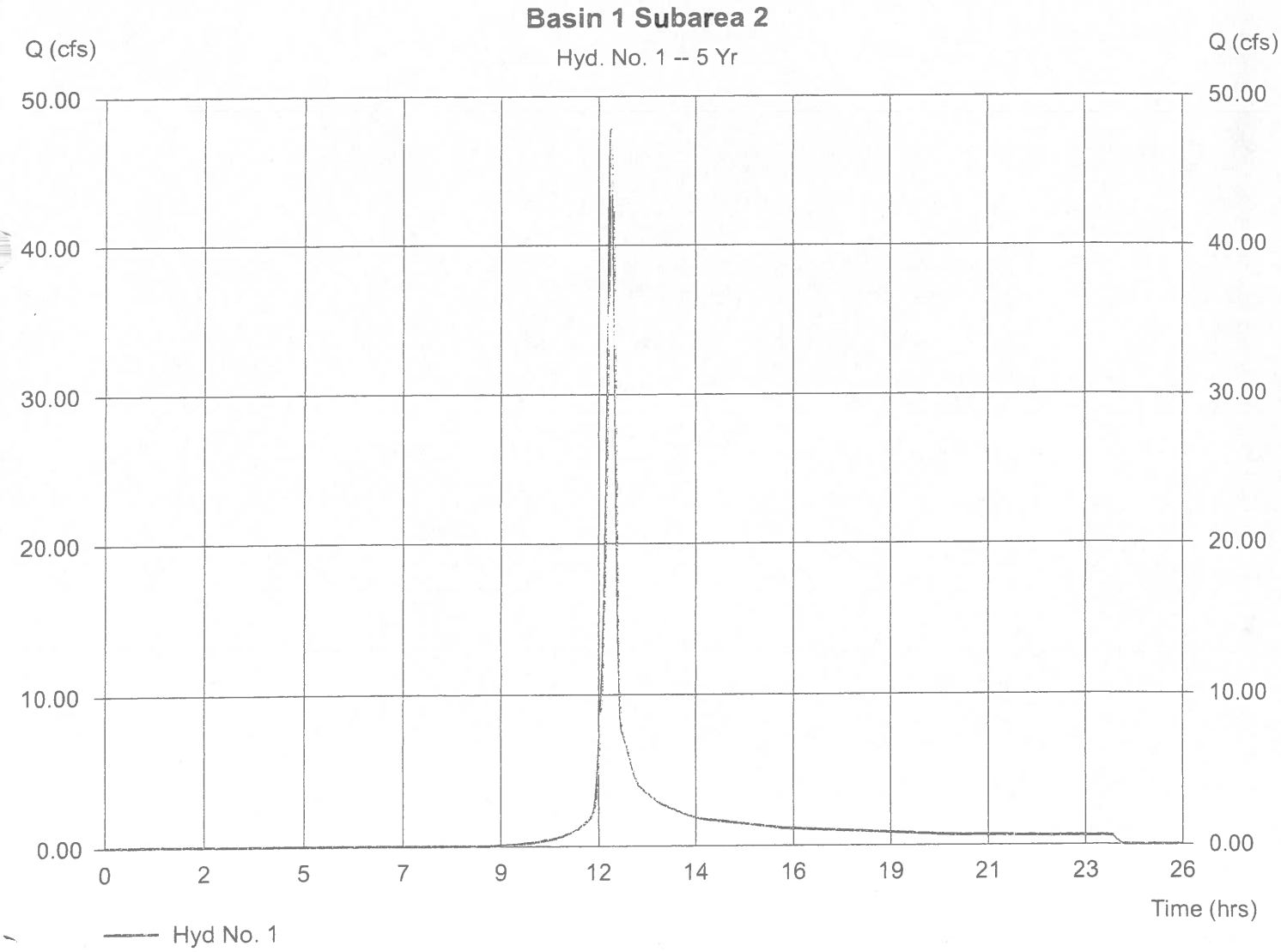
Wednesday, Sep 4 2019, 6:47 PM

Hyd. No. 1

Basin 1 Subarea 2

Hydrograph type	= SCS Runoff	Peak discharge	= 47.77 cfs
Storm frequency	= 5 yrs	Time interval	= 2 min
Drainage area	= 18.340 ac	Curve number	= 79
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 9.40 min
Total precip.	= 3.60 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 109,452 cuft



TR55 Tc Worksheet

Hyd. No. 1

Basin 1 Subarea 2

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.130		0.011		0.011		
Flow length (ft)	= 120.0		0.0		0.0		
Two-year 24-hr precip. (in)	= 3.00		0.00		0.00		
Land slope (%)	= 33.00		0.00		0.00		
Travel Time (min)	**= 3.40**	**+**	**0.00**	**+**	**0.00**	**=**	**3.40**
Shallow Concentrated Flow							
Flow length (ft)	= 786.00		0.00		0.00		
Watercourse slope (%)	= 3.00		0.00		0.00		
Surface description	= Unpaved		Paved		Paved		
Average velocity (ft/s)	= 2.79		0.00		0.00		
Travel Time (min)	**= 4.69**	**+**	**0.00**	**+**	**0.00**	**=**	**4.69**
Channel Flow							
X sectional flow area (sqft)	= 4.50		3.53		0.00		
Wetted perimeter (ft)	= 6.50		4.71		0.00		
Channel slope (%)	= 33.00		33.00		0.00		
Manning's n-value	= 0.070		0.010		0.015		
Velocity (ft/s)	= 9.56		70.56		0.00		
Flow length (ft)	= 686.0		372.0		0.0		
Travel Time (min)	**= 1.20**	**+**	**0.09**	**+**	**0.00**	**=**	**1.28**

Total Travel Time, Tc ..... **9.40 min**

Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

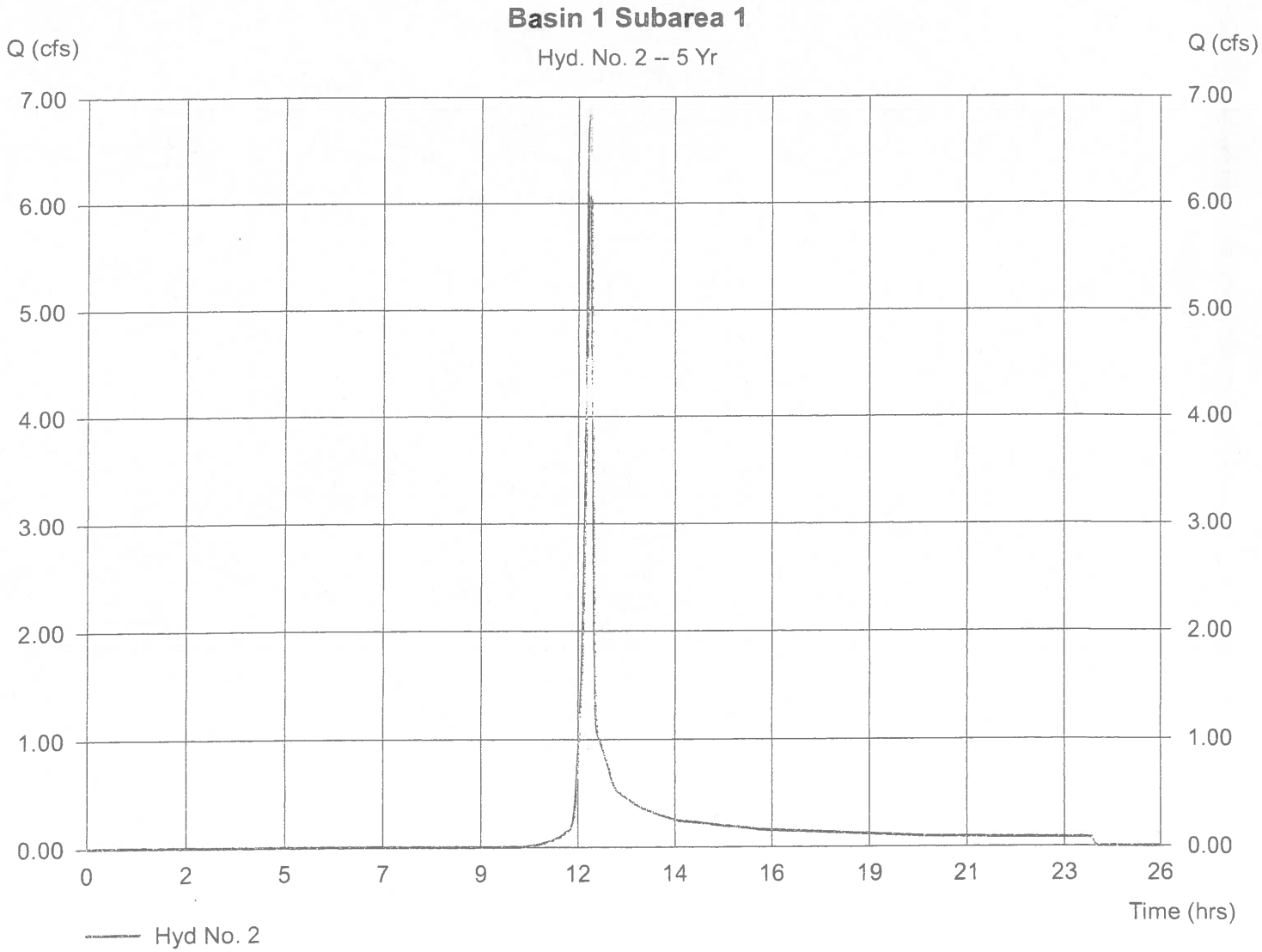
Wednesday, Sep 4 2019, 6:47 PM

Hyd. No. 2

Basin 1 Subarea 1

Hydrograph type	= SCS Runoff	Peak discharge	= 6.84 cfs
Storm frequency	= 5 yrs	Time interval	= 2 min
Drainage area	= 3.070 ac	Curve number	= 74
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 5.00 min
Total precip.	= 3.60 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 13,680 cuft



Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

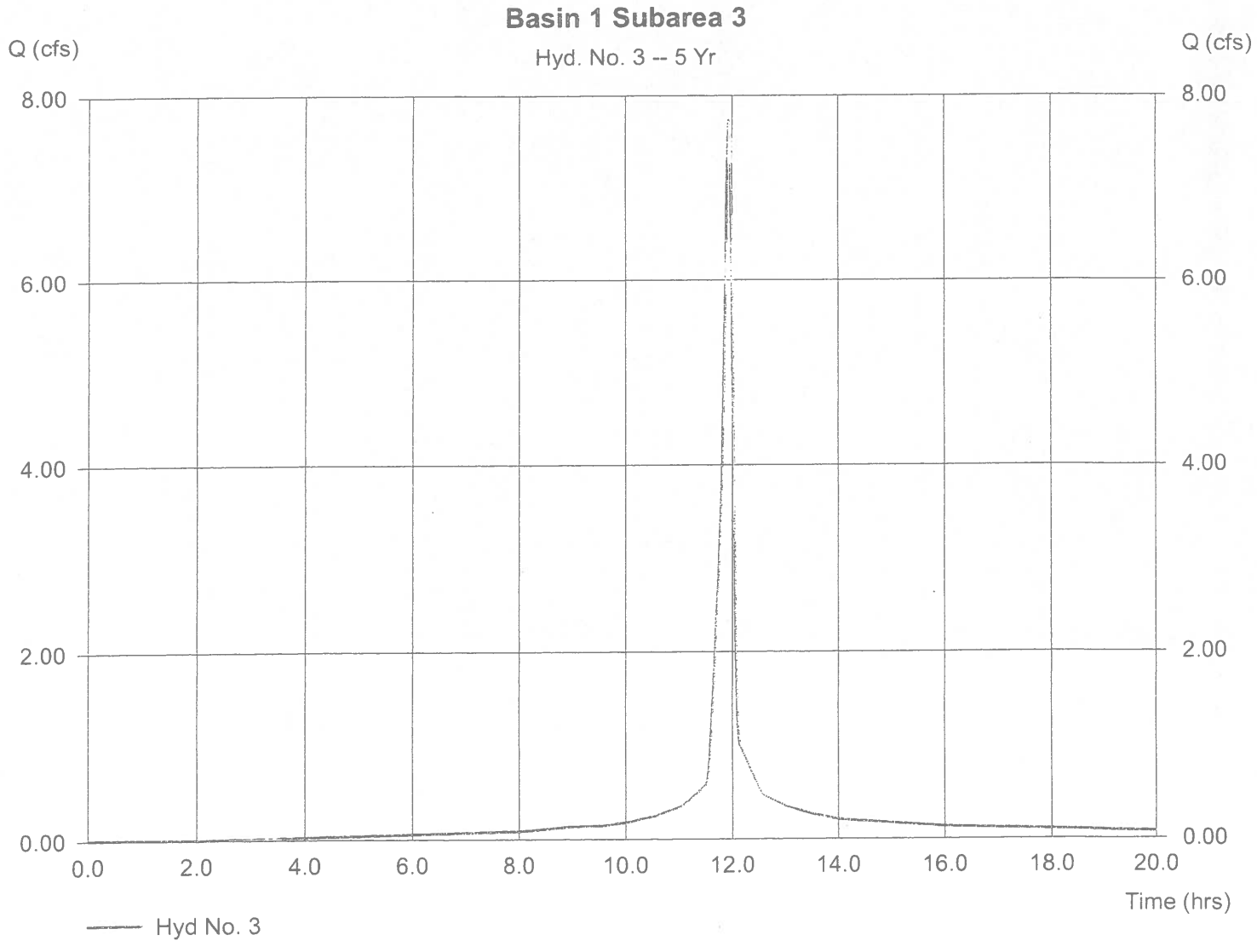
Wednesday, Sep 4 2019, 6:47 PM

Hyd. No. 3

Basin 1 Subarea 3

Hydrograph type	= SCS Runoff	Peak discharge	= 7.73 cfs
Storm frequency	= 5 yrs	Time interval	= 2 min
Drainage area	= 1.630 ac	Curve number	= 96
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 5.00 min
Total precip.	= 3.60 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 17,441 cuft



Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

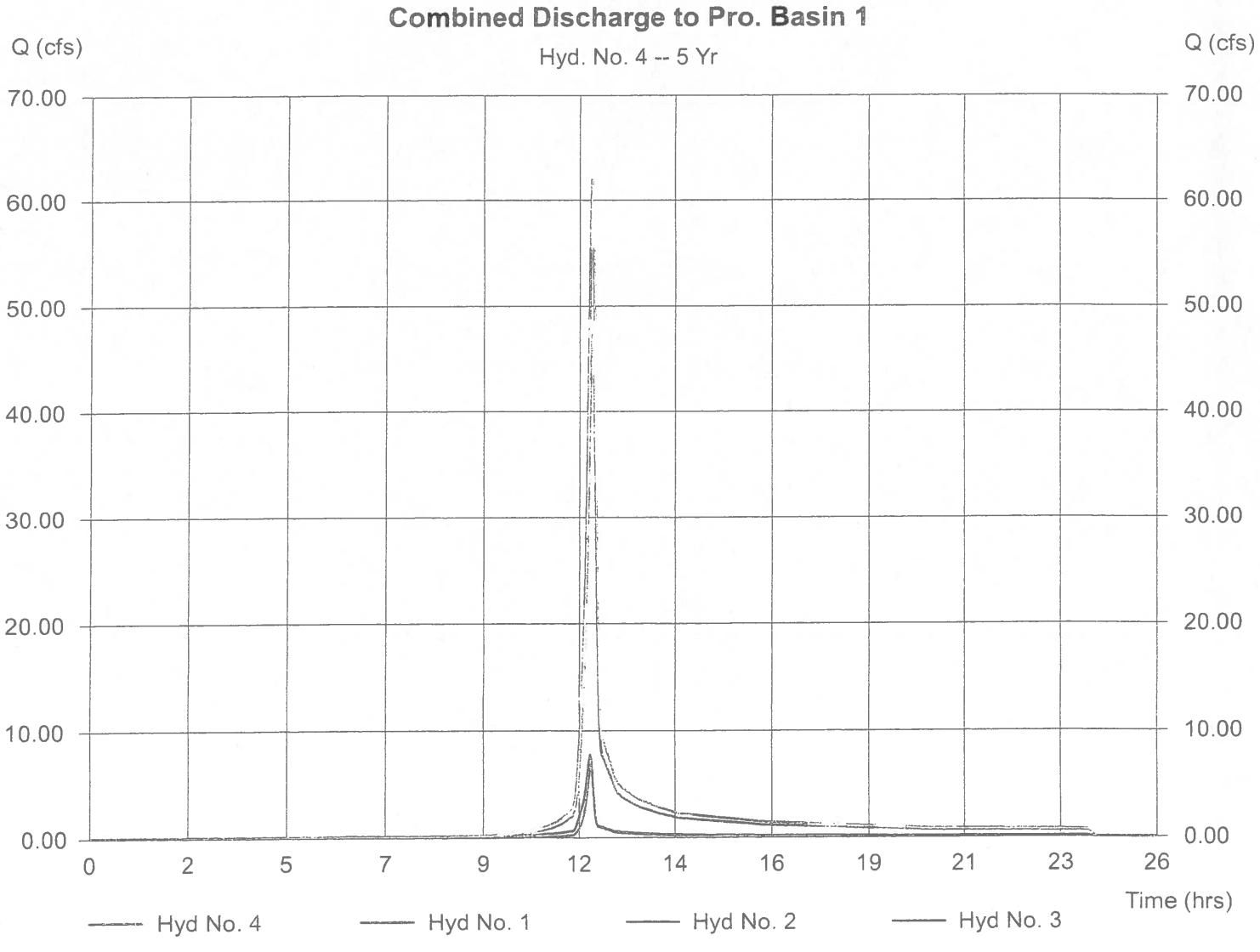
Wednesday, Sep 4 2019, 6:47 PM

Hyd. No. 4

Combined Discharge to Pro. Basin 1

Hydrograph type	= Combine	Peak discharge	= 61.98 cfs
Storm frequency	= 5 yrs	Time interval	= 2 min
Inflow hyds.	= 1, 2, 3		

Hydrograph Volume = 140,572 cuft



Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

Wednesday, Sep 4 2019, 6:47 PM

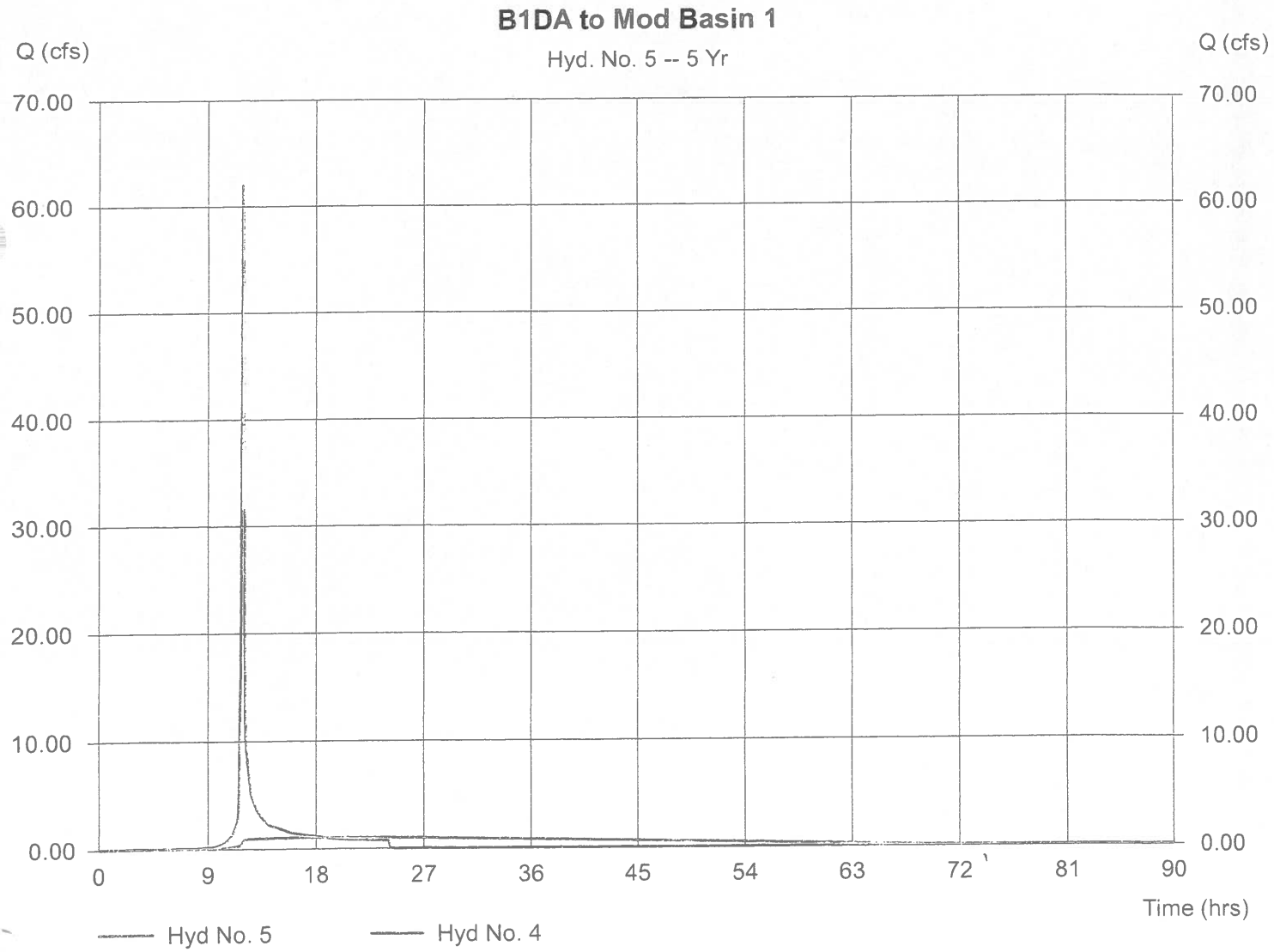
Hyd. No. 5

B1DA to Mod Basin 1

Hydrograph type	= Reservoir	Peak discharge	= 1.02 cfs
Storm frequency	= 5 yrs	Time interval	= 2 min
Inflow hyd. No.	= 4	Max. Elevation	= 440.80 ft
Reservoir name	= Pro. SW Basin 1 wPond	Max. Storage	= 99,169 cuft

Storage Indication method used.

Hydrograph Volume = 140,348 cuft



Pond Report

Hydraflow Hydrographs by Intelisolve

Wednesday, Sep 4 2019, 6:47 PM

Pond No. 1 - Pro. SW Basin 1 wPond

Pond Data

Pond storage is based on known contour areas. Average end area method used.

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	434.50	12,000	0	0
1.50	436.00	13,571	19,178	19,178
3.50	438.00	15,671	29,242	48,420
5.50	440.00	18,793	34,464	82,884
7.50	442.00	22,056	40,849	123,733
9.50	444.00	25,164	47,220	170,953
11.50	446.00	28,700	53,864	224,817
13.50	448.00	32,338	61,038	285,855
15.50	450.00	38,138	70,476	356,331

Culvert / Orifice Structures

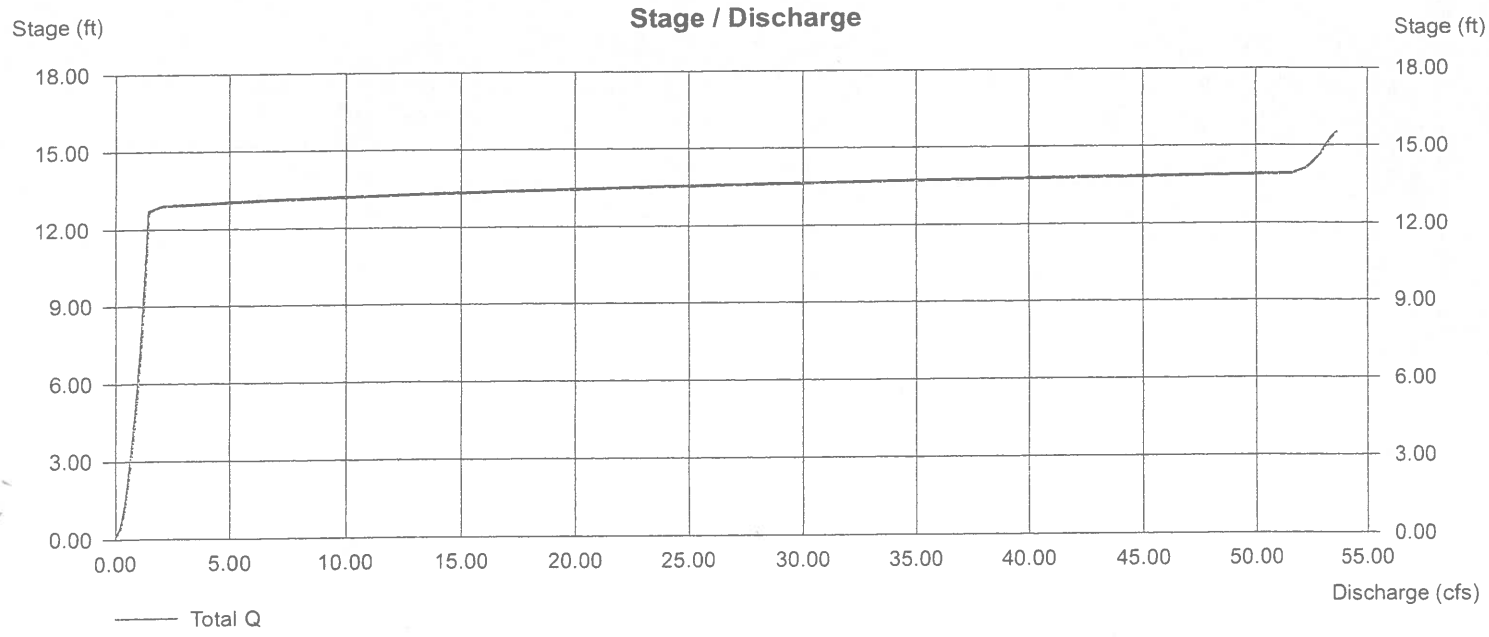
	[A]	[B]	[C]	[D]
Rise (in)	= 24.00	4.00	0.00	0.00
Span (in)	= 24.00	4.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 434.50	434.50	0.00	0.00
Length (ft)	= 110.00	0.00	0.00	0.00
Slope (%)	= 13.00	0.00	0.00	0.00
N-Value	= .024	.013	.013	.013
Orif. Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	Yes	Yes	Yes

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 12.00	30.00	0.00	0.00
Crest El. (ft)	= 447.34	448.13	0.00	0.00
Weir Coeff.	= 3.33	3.33	0.00	0.00
Weir Type	= Riser	Ciplti	---	---
Multi-Stage	= Yes	Yes	No	No

Exfiltration = 0.000 in/hr (Contour) Tailwater Elev. = 0.00 ft

Note: Culvert/Orifice outflows have been analyzed under inlet and outlet control. Weir riser checked for orifice conditions.



Hydrograph Summary Report

Hyd.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
1	SCS Runoff	70.58	2	718	161,569	----	------	------	Basin 1 Subarea 2
2	SCS Runoff	10.49	2	718	21,090	----	------	------	Basin 1 Subarea 1
3	SCS Runoff	9.92	2	716	22,718	----	------	------	Basin 1 Subarea 3
4	Combine	90.54	2	718	205,376	1, 2, 3	------	------	Combined Discharge to Pro. Basin 1
5	Reservoir	1.21	2	1184	204,593	4	443.24	153,007	B1DA to Mod Basin 1

Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

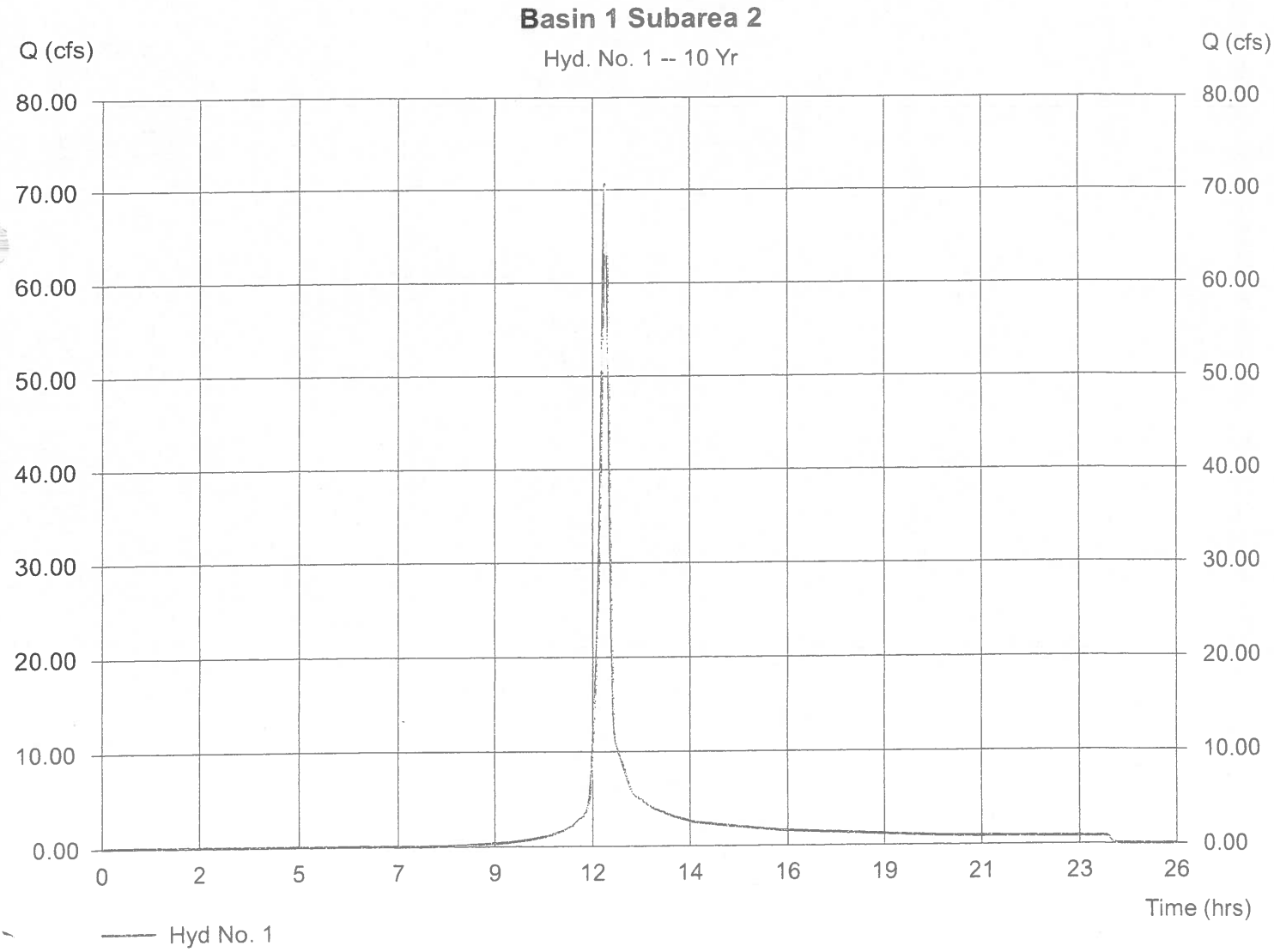
Wednesday, Sep 4 2019, 6:47 PM

Hyd. No. 1

Basin 1 Subarea 2

Hydrograph type	= SCS Runoff	Peak discharge	= 70.58 cfs
Storm frequency	= 10 yrs	Time interval	= 2 min
Drainage area	= 18.340 ac	Curve number	= 79
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 9.40 min
Total precip.	= 4.56 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 161,569 cuft



TR55 Tc Worksheet

Hyd. No. 1

Basin 1 Subarea 2

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.130		0.011		0.011		
Flow length (ft)	= 120.0		0.0		0.0		
Two-year 24-hr precip. (in)	= 3.00		0.00		0.00		
Land slope (%)	= 33.00		0.00		0.00		
Travel Time (min)	**= 3.40**	**+**	**0.00**	**+**	**0.00**	**=**	**3.40**
Shallow Concentrated Flow							
Flow length (ft)	= 786.00		0.00		0.00		
Watercourse slope (%)	= 3.00		0.00		0.00		
Surface description	= Unpaved		Paved		Paved		
Average velocity (ft/s)	= 2.79		0.00		0.00		
Travel Time (min)	**= 4.69**	**+**	**0.00**	**+**	**0.00**	**=**	**4.69**
Channel Flow							
X sectional flow area (sqft)	= 4.50		3.53		0.00		
Wetted perimeter (ft)	= 6.50		4.71		0.00		
Channel slope (%)	= 33.00		33.00		0.00		
Manning's n-value	= 0.070		0.010		0.015		
Velocity (ft/s)	= 9.56		70.56		0.00		
Flow length (ft)	= 686.0		372.0		0.0		
Travel Time (min)	**= 1.20**	**+**	**0.09**	**+**	**0.00**	**=**	**1.28**

Total Travel Time, Tc ..... 9.40 min

Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

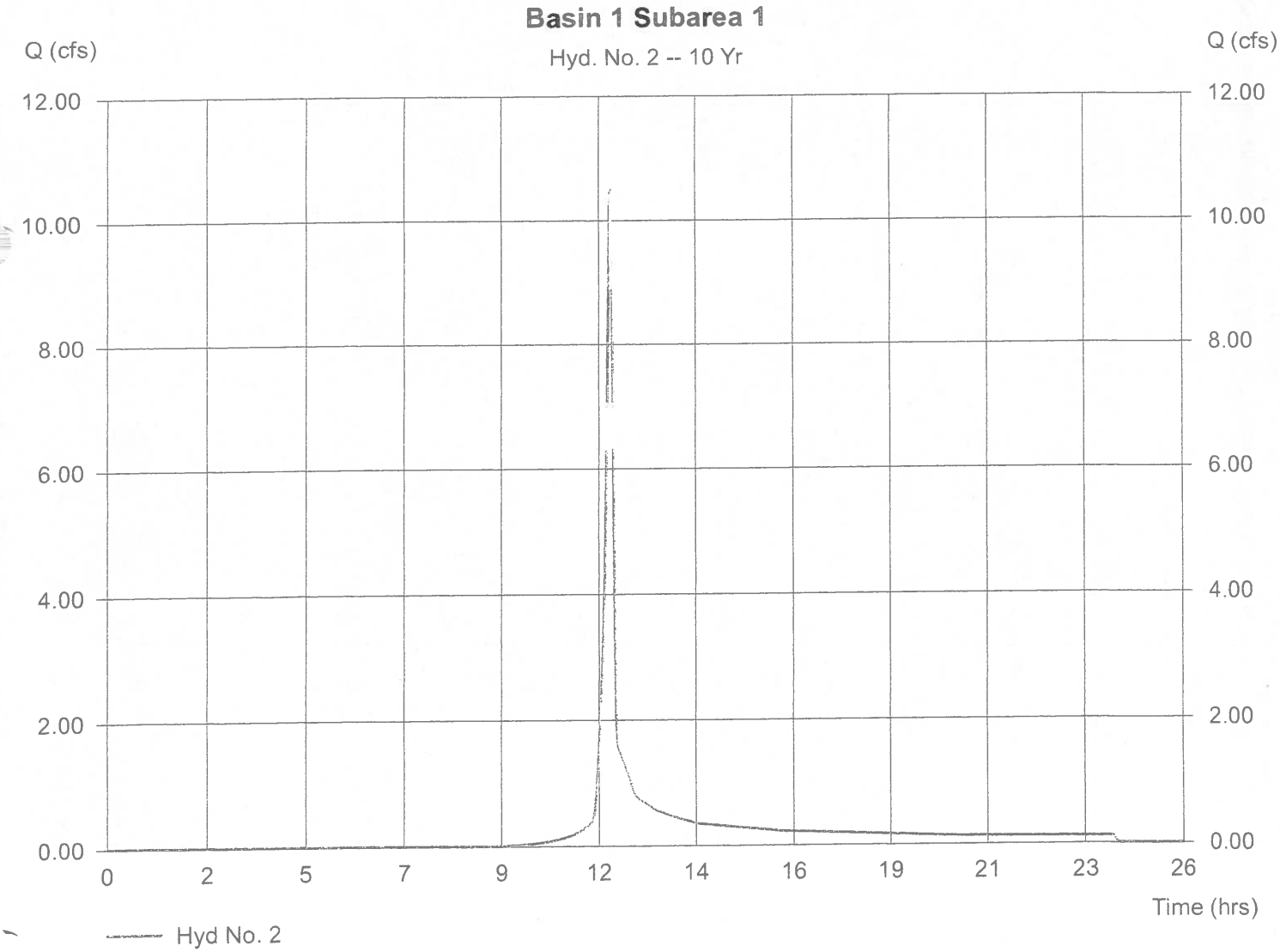
Wednesday, Sep 4 2019, 6:47 PM

Hyd. No. 2

Basin 1 Subarea 1

Hydrograph type	= SCS Runoff	Peak discharge	= 10.49 cfs
Storm frequency	= 10 yrs	Time interval	= 2 min
Drainage area	= 3.070 ac	Curve number	= 74
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 5.00 min
Total precip.	= 4.56 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 21,090 cuft



Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

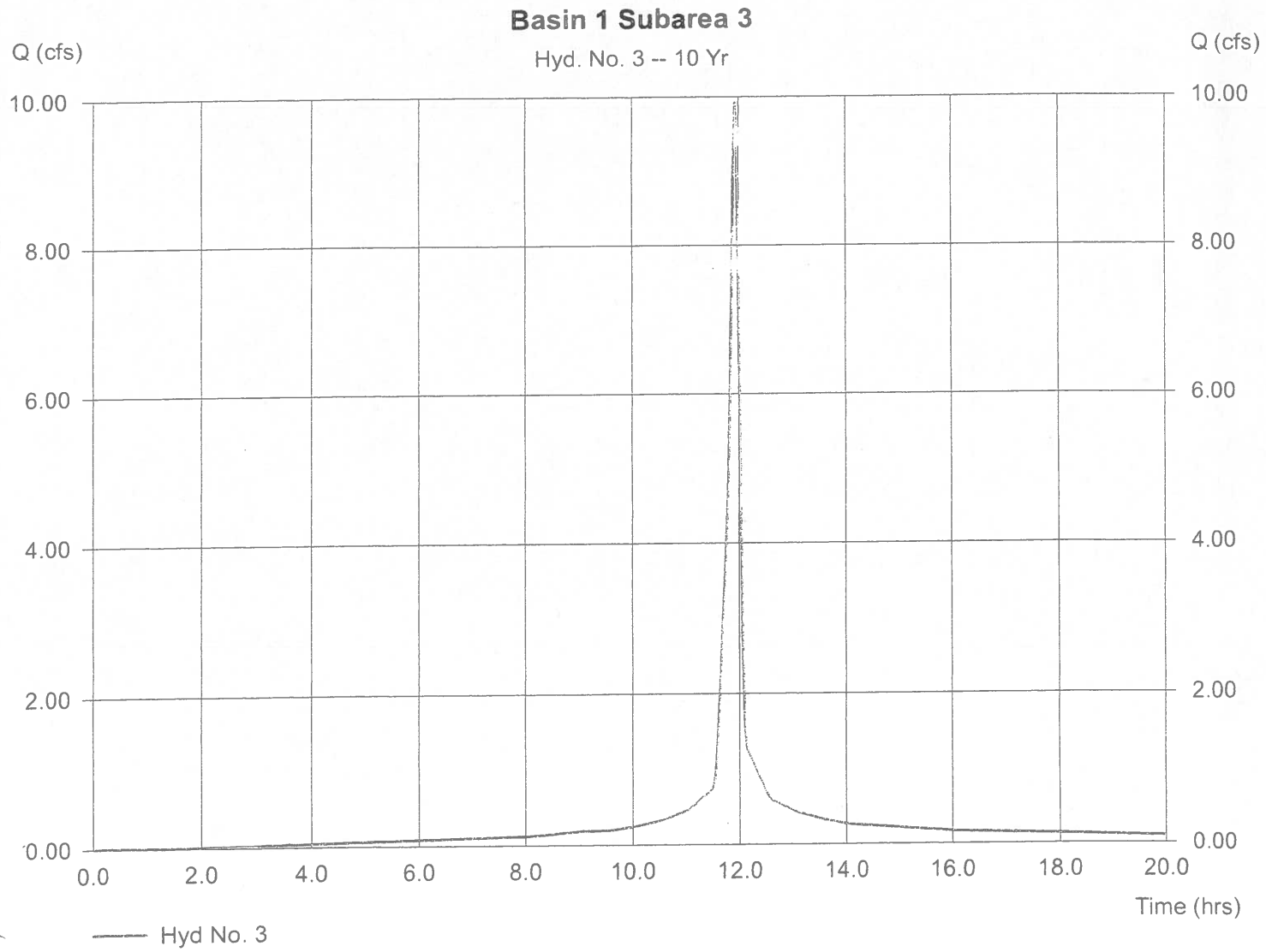
Wednesday, Sep 4 2019, 6:47 PM

Hyd. No. 3

Basin 1 Subarea 3

Hydrograph type	= SCS Runoff	Peak discharge	= 9.92 cfs
Storm frequency	= 10 yrs	Time interval	= 2 min
Drainage area	= 1.630 ac	Curve number	= 96
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 5.00 min
Total precip.	= 4.56 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 22,718 cuft



Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

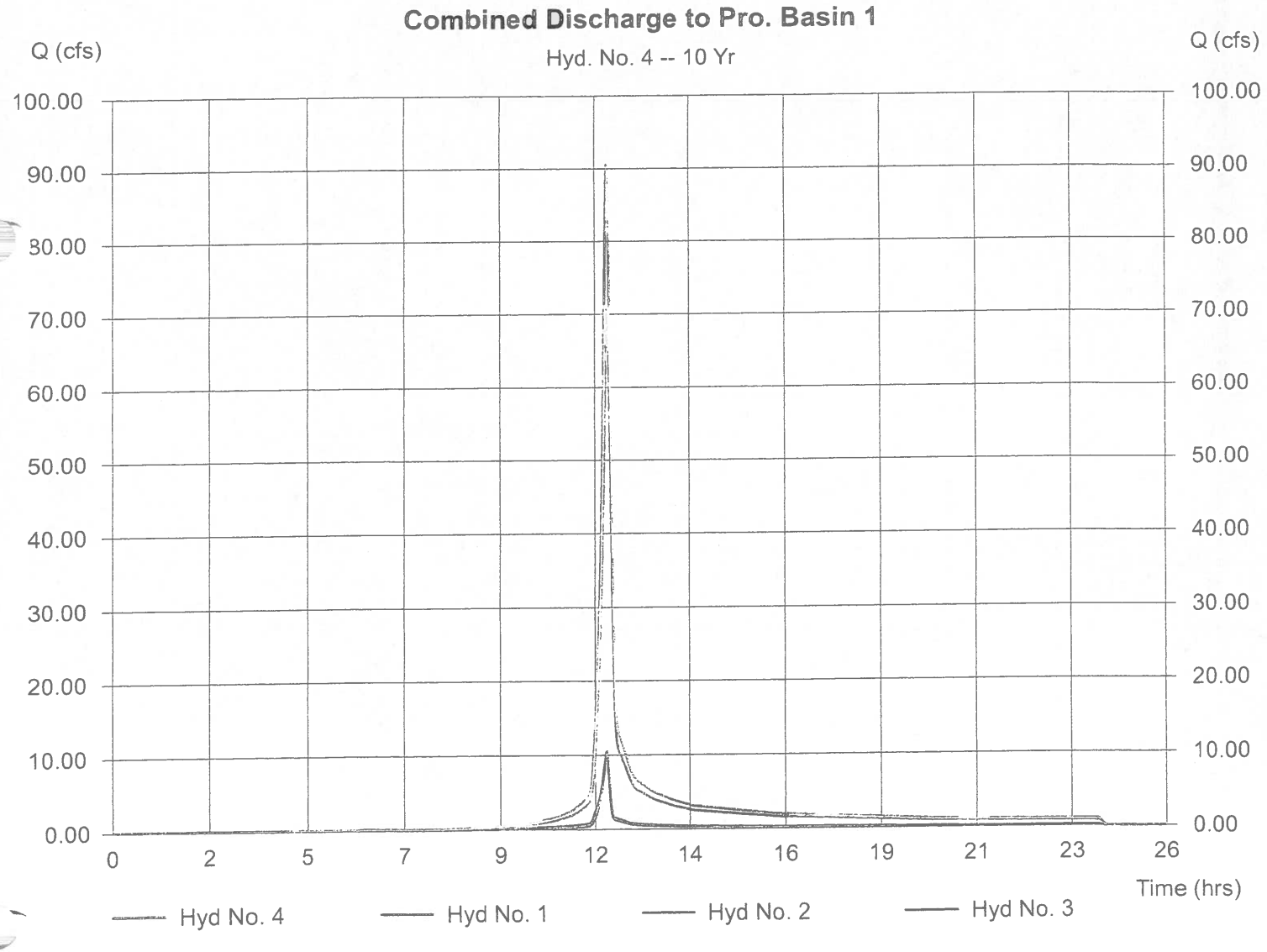
Wednesday, Sep 4 2019, 6:47 PM

Hyd. No. 4

Combined Discharge to Pro. Basin 1

Hydrograph type	= Combine	Peak discharge	= 90.54 cfs
Storm frequency	= 10 yrs	Time interval	= 2 min
Inflow hyds.	= 1, 2, 3		

Hydrograph Volume = 205,376 cuft



Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

Wednesday, Sep 4 2019, 6:47 PM

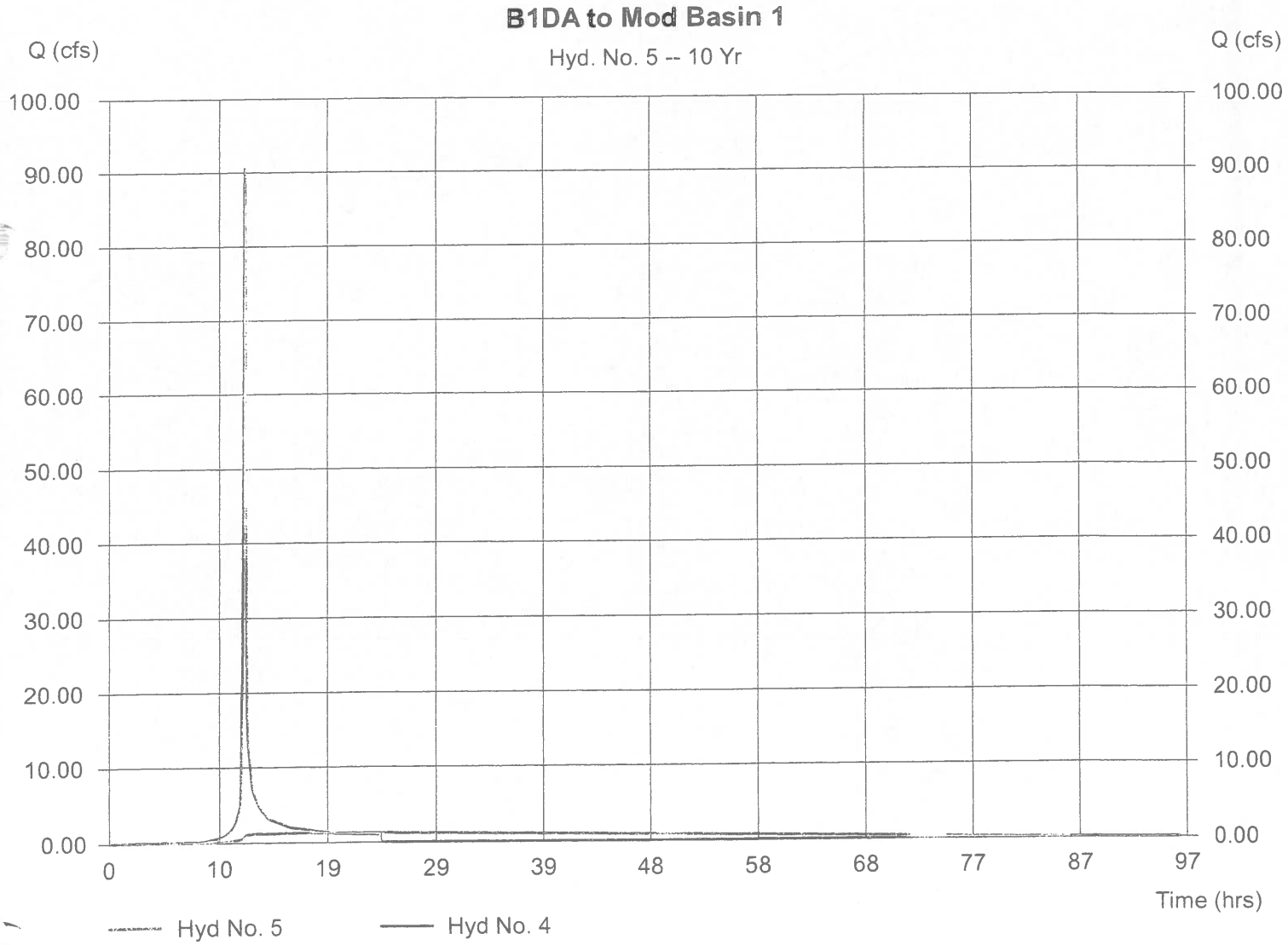
Hyd. No. 5

B1DA to Mod Basin 1

Hydrograph type	= Reservoir	Peak discharge	= 1.21 cfs
Storm frequency	= 10 yrs	Time interval	= 2 min
Inflow hyd. No.	= 4	Max. Elevation	= 443.24 ft
Reservoir name	= Pro. SW Basin 1 wPond	Max. Storage	= 153,007 cuft

Storage Indication method used.

Hydrograph Volume = 204,593 cuft



Pond Report

Hydraflow Hydrographs by Intelisolve

Wednesday, Sep 4 2019, 6:47 PM

Pond No. 1 - Pro. SW Basin 1 wPond

Pond Data

Pond storage is based on known contour areas. Average end area method used.

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	434.50	12,000	0	0
1.50	436.00	13,571	19,178	19,178
3.50	438.00	15,671	29,242	48,420
5.50	440.00	18,793	34,464	82,884
7.50	442.00	22,056	40,849	123,733
9.50	444.00	25,164	47,220	170,953
11.50	446.00	28,700	53,864	224,817
13.50	448.00	32,338	61,038	285,855
15.50	450.00	38,138	70,476	356,331

Culvert / Orifice Structures

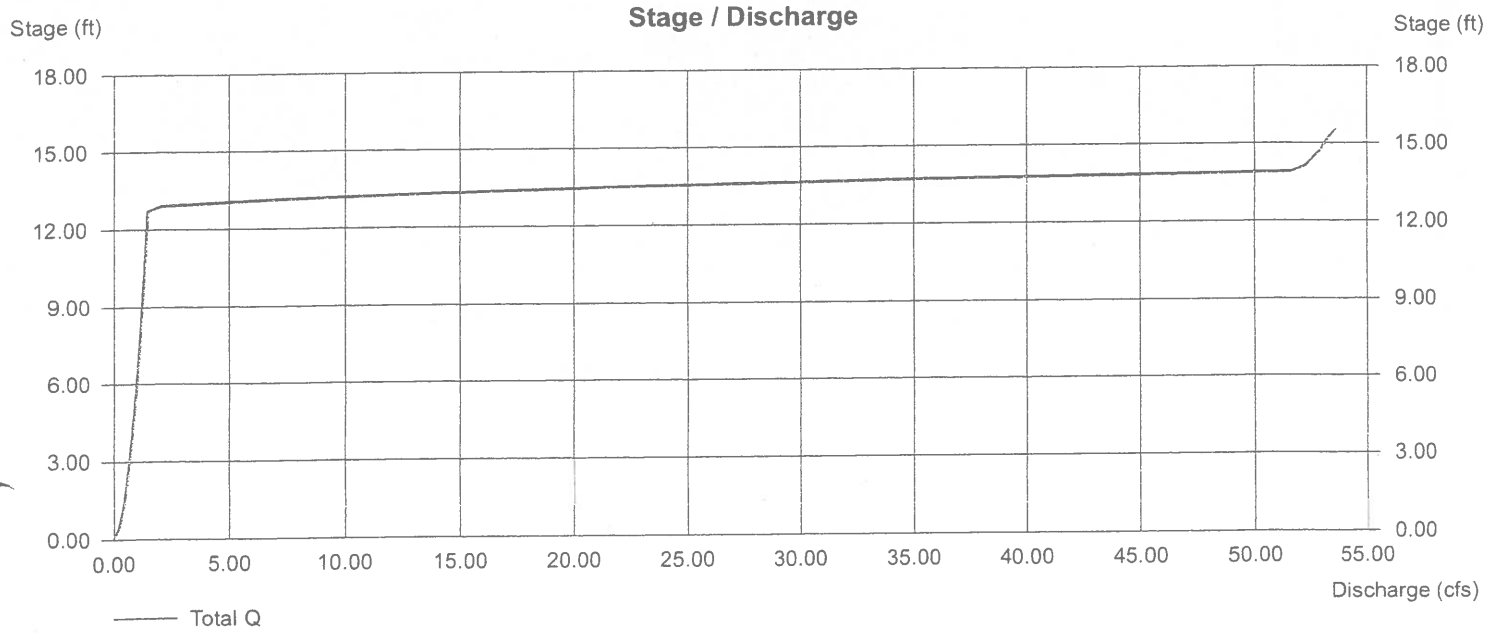
	[A]	[B]	[C]	[D]
Rise (in)	= 24.00	4.00	0.00	0.00
Span (in)	= 24.00	4.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 434.50	434.50	0.00	0.00
Length (ft)	= 110.00	0.00	0.00	0.00
Slope (%)	= 13.00	0.00	0.00	0.00
N-Value	= .024	.013	.013	.013
Orif. Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	Yes	Yes	Yes

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 12.00	30.00	0.00	0.00
Crest El. (ft)	= 447.34	448.13	0.00	0.00
Weir Coeff.	= 3.33	3.33	0.00	0.00
Weir Type	= Riser	CipIti	---	---
Multi-Stage	= Yes	Yes	No	No

Exfiltration = 0.000 in/hr (Contour) Tailwater Elev. = 0.00 ft

Note: Culvert/Orifice outflows have been analyzed under inlet and outlet control. Weir riser checked for orifice conditions.



Hydrograph Summary Report

Hyd.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
1	SCS Runoff	94.21	2	718	216,647	----	------	------	Basin 1 Subarea 2
2	SCS Runoff	14.40	2	716	29,103	----	------	------	Basin 1 Subarea 1
3	SCS Runoff	12.09	2	716	28,011	----	------	------	Basin 1 Subarea 3
4	Combine	120.09	2	718	273,761	1, 2, 3	------	------	Combined Discharge to Pro. Basin 1
5	Reservoir	1.36	2	1286	271,105	4	445.52	211,780	B1DA to Mod Basin 1

Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

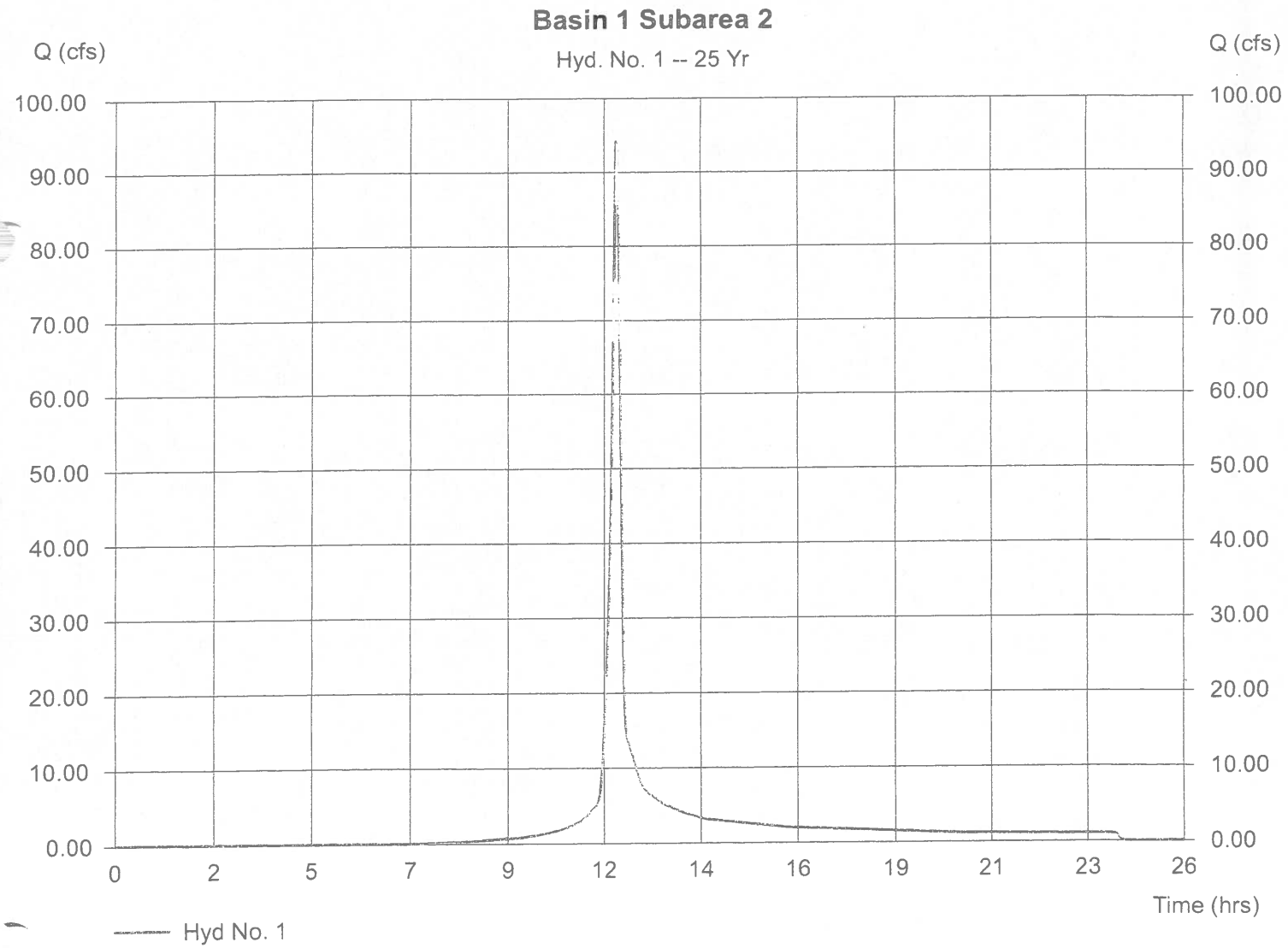
Wednesday, Sep 4 2019, 6:47 PM

Hyd. No. 1

Basin 1 Subarea 2

Hydrograph type	= SCS Runoff	Peak discharge	= 94.21 cfs
Storm frequency	= 25 yrs	Time interval	= 2 min
Drainage area	= 18.340 ac	Curve number	= 79
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 9.40 min
Total precip.	= 5.52 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 216,647 cuft



TR55 Tc Worksheet

Hyd. No. 1

Basin 1 Subarea 2

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.130		0.011		0.011		
Flow length (ft)	= 120.0		0.0		0.0		
Two-year 24-hr precip. (in)	= 3.00		0.00		0.00		
Land slope (%)	= 33.00		0.00		0.00		
Travel Time (min)	**= 3.40**	**+**	**0.00**	**+**	**0.00**	**=**	**3.40**
Shallow Concentrated Flow							
Flow length (ft)	= 786.00		0.00		0.00		
Watercourse slope (%)	= 3.00		0.00		0.00		
Surface description	= Unpaved		Paved		Paved		
Average velocity (ft/s)	= 2.79		0.00		0.00		
Travel Time (min)	**= 4.69**	**+**	**0.00**	**+**	**0.00**	**=**	**4.69**
Channel Flow							
X sectional flow area (sqft)	= 4.50		3.53		0.00		
Wetted perimeter (ft)	= 6.50		4.71		0.00		
Channel slope (%)	= 33.00		33.00		0.00		
Manning's n-value	= 0.070		0.010		0.015		
Velocity (ft/s)	= 9.56		70.56		0.00		
Flow length (ft)	= 686.0		372.0		0.0		
Travel Time (min)	**= 1.20**	**+**	**0.09**	**+**	**0.00**	**=**	**1.28**

Total Travel Time, Tc ..... 9.40 min

Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

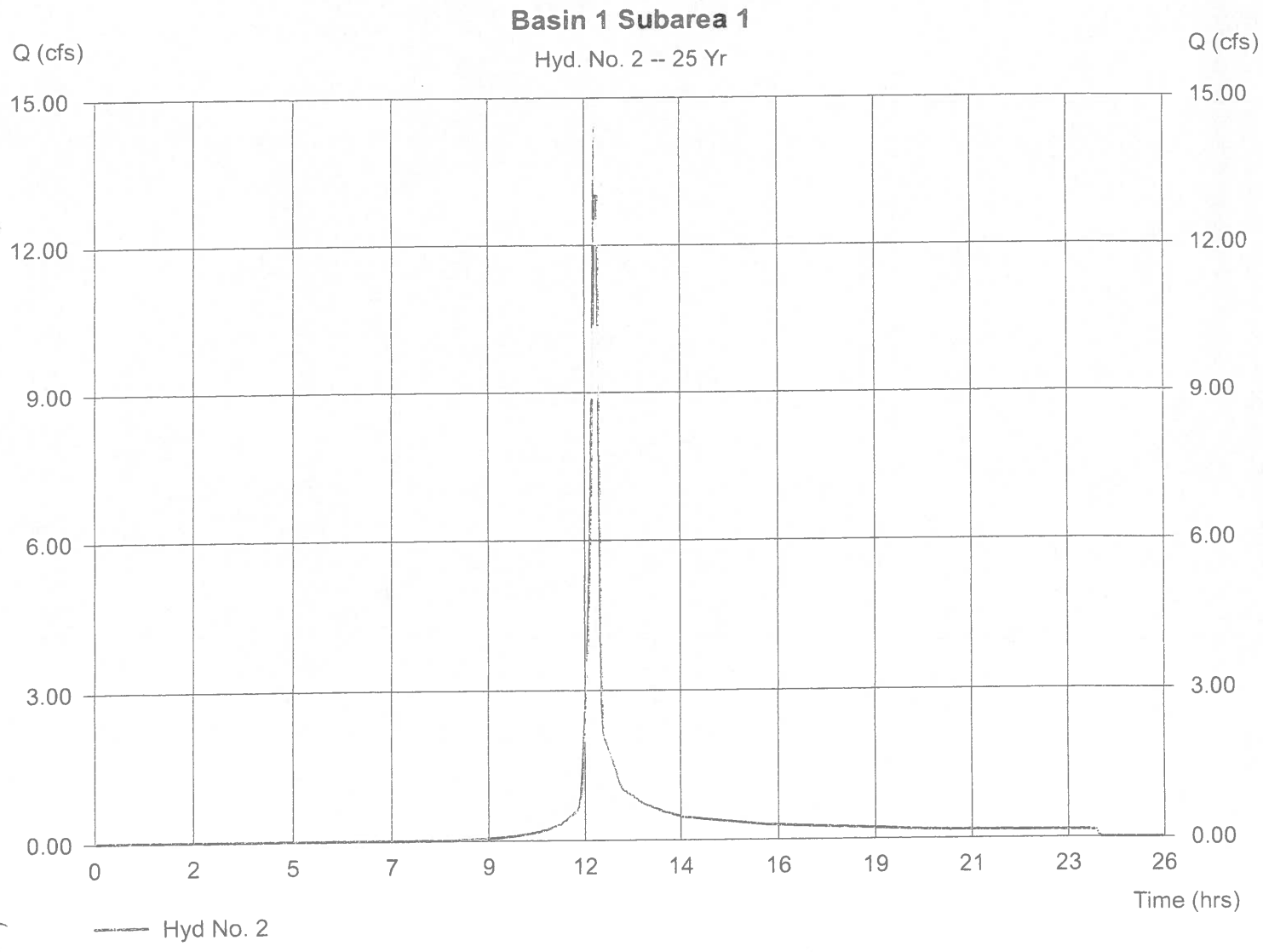
Wednesday, Sep 4 2019, 6:47 PM

Hyd. No. 2

Basin 1 Subarea 1

Hydrograph type	= SCS Runoff	Peak discharge	= 14.40 cfs
Storm frequency	= 25 yrs	Time interval	= 2 min
Drainage area	= 3.070 ac	Curve number	= 74
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 5.00 min
Total precip.	= 5.52 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 29,103 cuft



Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

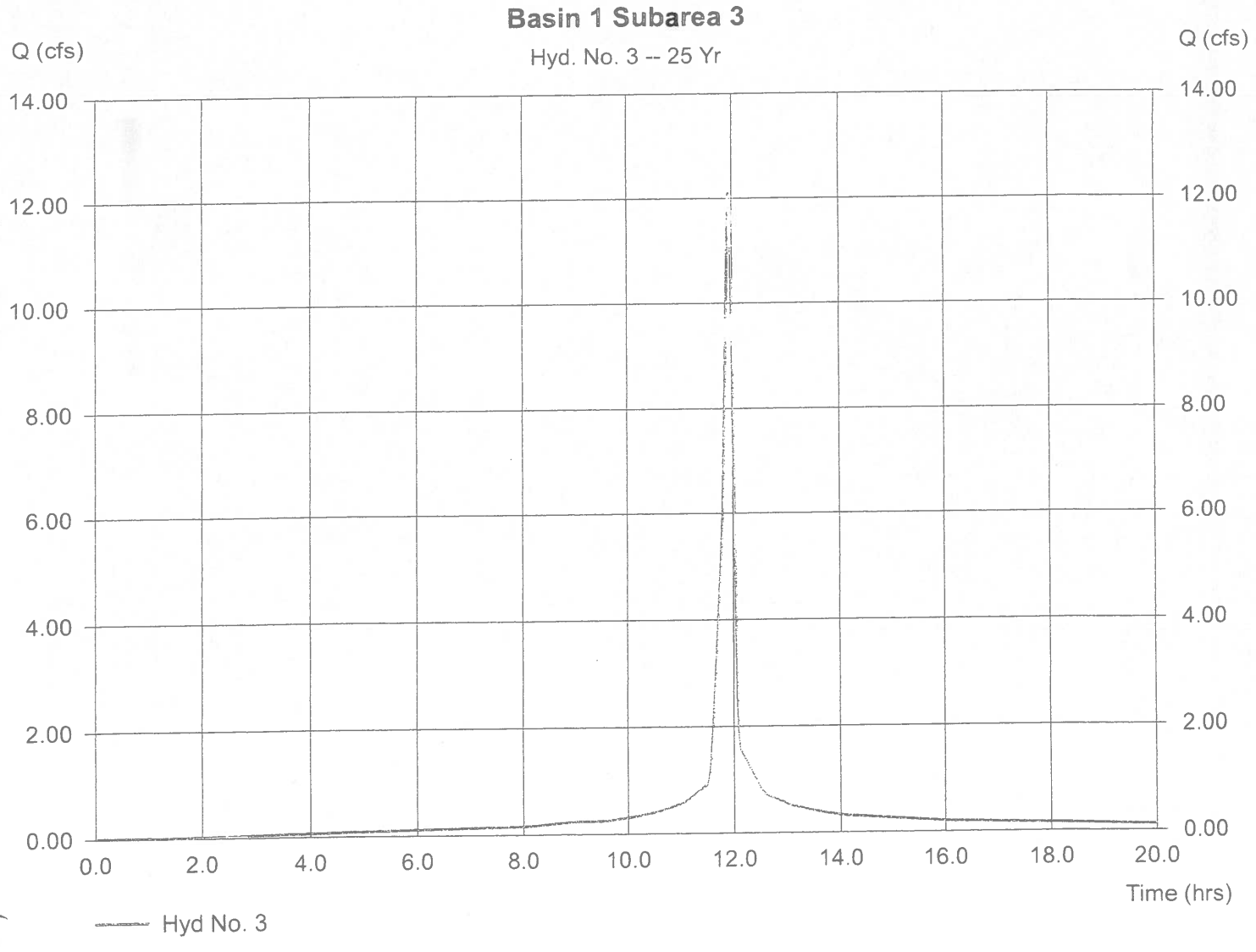
Wednesday, Sep 4 2019, 6:47 PM

Hyd. No. 3

Basin 1 Subarea 3

Hydrograph type	= SCS Runoff	Peak discharge	= 12.09 cfs
Storm frequency	= 25 yrs	Time interval	= 2 min
Drainage area	= 1.630 ac	Curve number	= 96
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 5.00 min
Total precip.	= 5.52 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 28,011 cuft



Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

Wednesday, Sep 4 2019, 6:47 PM

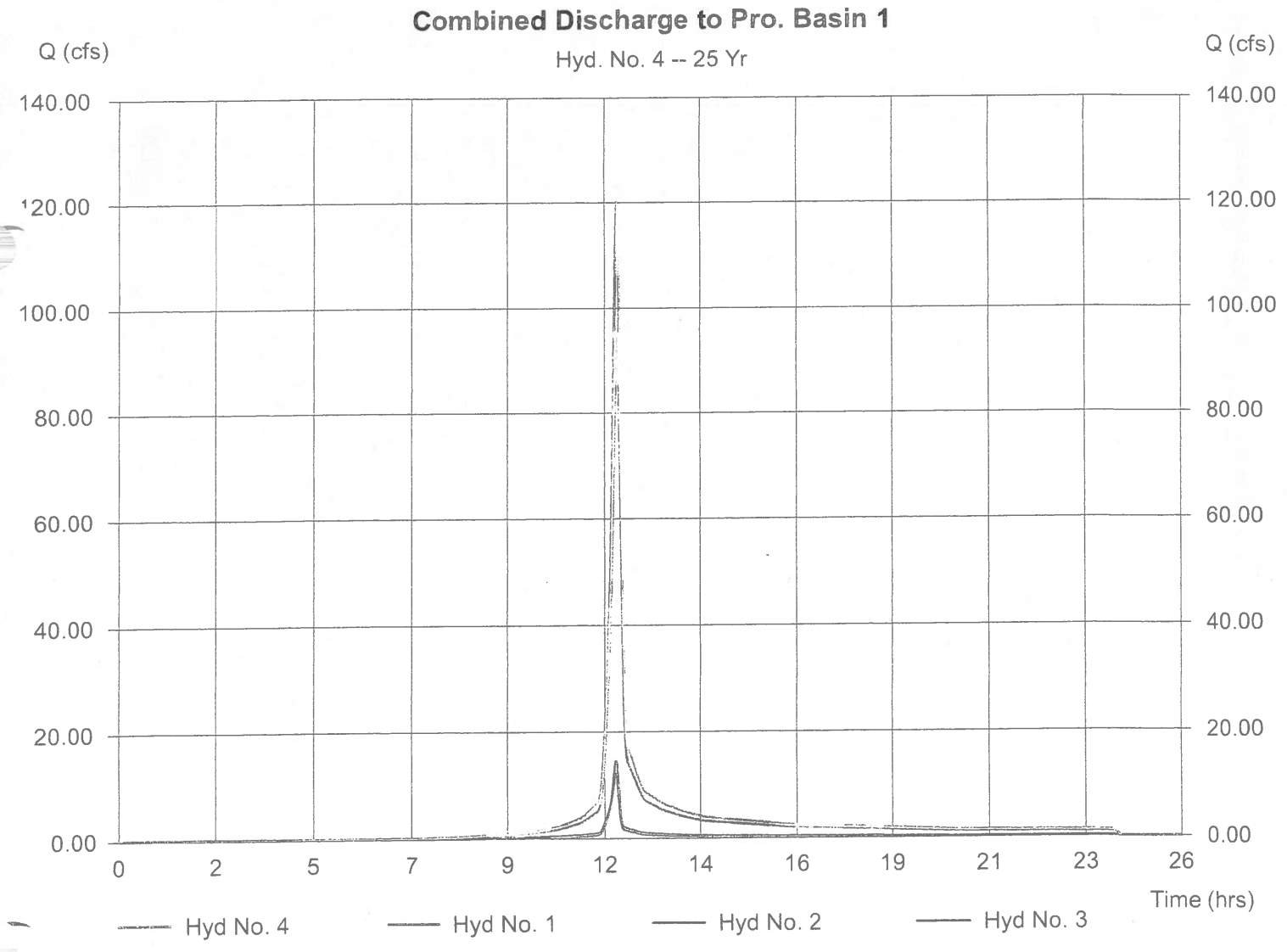
Hyd. No. 4

Combined Discharge to Pro. Basin 1

Hydrograph type = Combine
Storm frequency = 25 yrs
Inflow hyds. = 1, 2, 3

Peak discharge = 120.09 cfs
Time interval = 2 min

Hydrograph Volume = 273,761 cuft



Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

Wednesday, Sep 4 2019, 6:47 PM

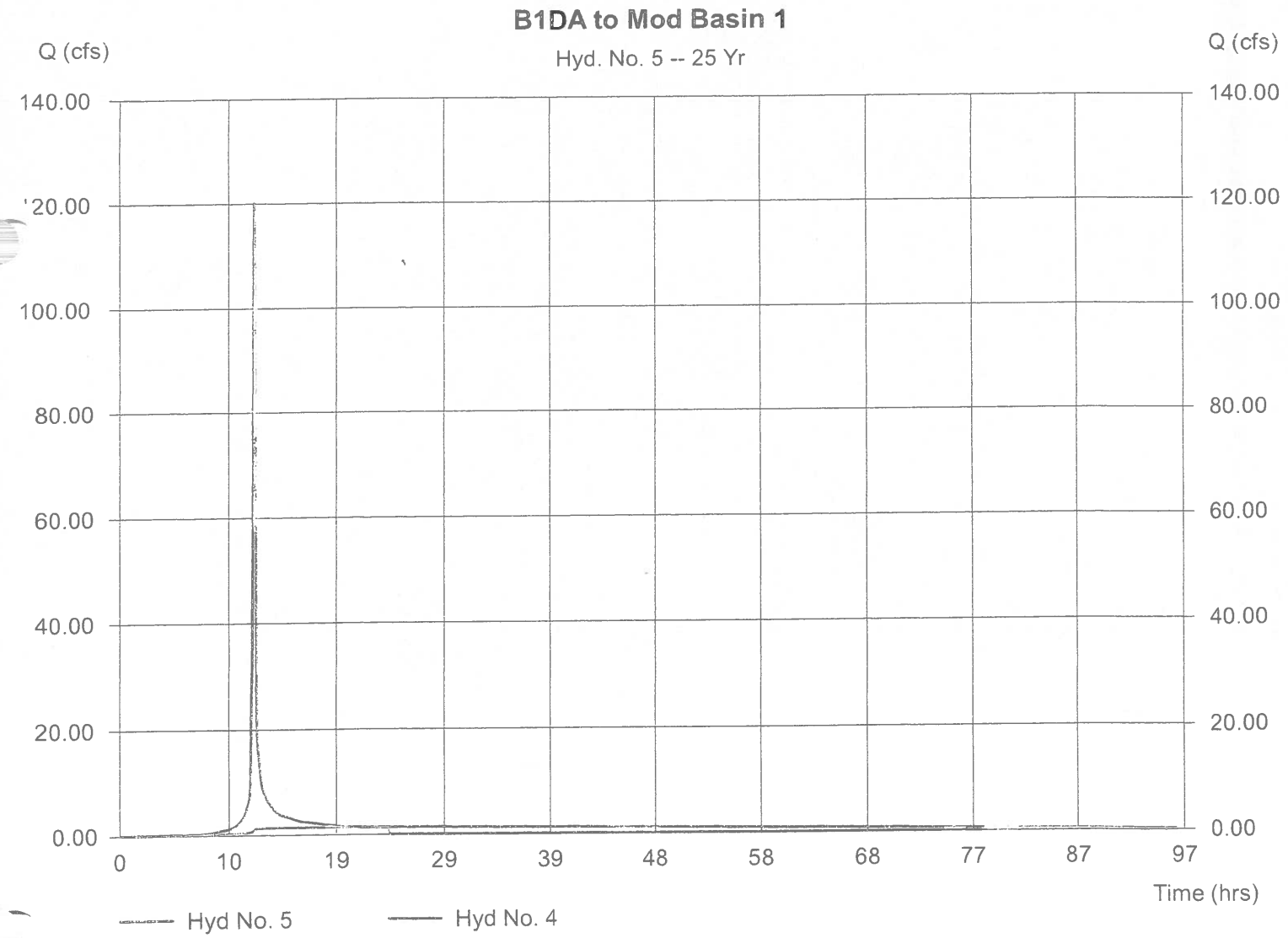
Hyd. No. 5

B1DA to Mod Basin 1

Hydrograph type	= Reservoir	Peak discharge	= 1.36 cfs
Storm frequency	= 25 yrs	Time interval	= 2 min
Inflow hyd. No.	= 4	Max. Elevation	= 445.52 ft
Reservoir name	= Pro. SW Basin 1 wPond	Max. Storage	= 211,780 cuft

Storage Indication method used.

Hydrograph Volume = 271,105 cuft



Pond Report

Hydraflow Hydrographs by Intelisolve — Wednesday, Sep 4 2019, 6:47 PM

Pond No. 1 - Pro. SW Basin 1 wPond

Pond Data

Pond storage is based on known contour areas. Average end area method used.

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	434.50	12,000	0	0
1.50	436.00	13,571	19,178	19,178
3.50	438.00	15,671	29,242	48,420
5.50	440.00	18,793	34,464	82,884
7.50	442.00	22,056	40,849	123,733
9.50	444.00	25,164	47,220	170,953
11.50	446.00	28,700	53,864	224,817
13.50	448.00	32,338	61,038	285,855
15.50	450.00	38,138	70,476	356,331

Culvert / Orifice Structures

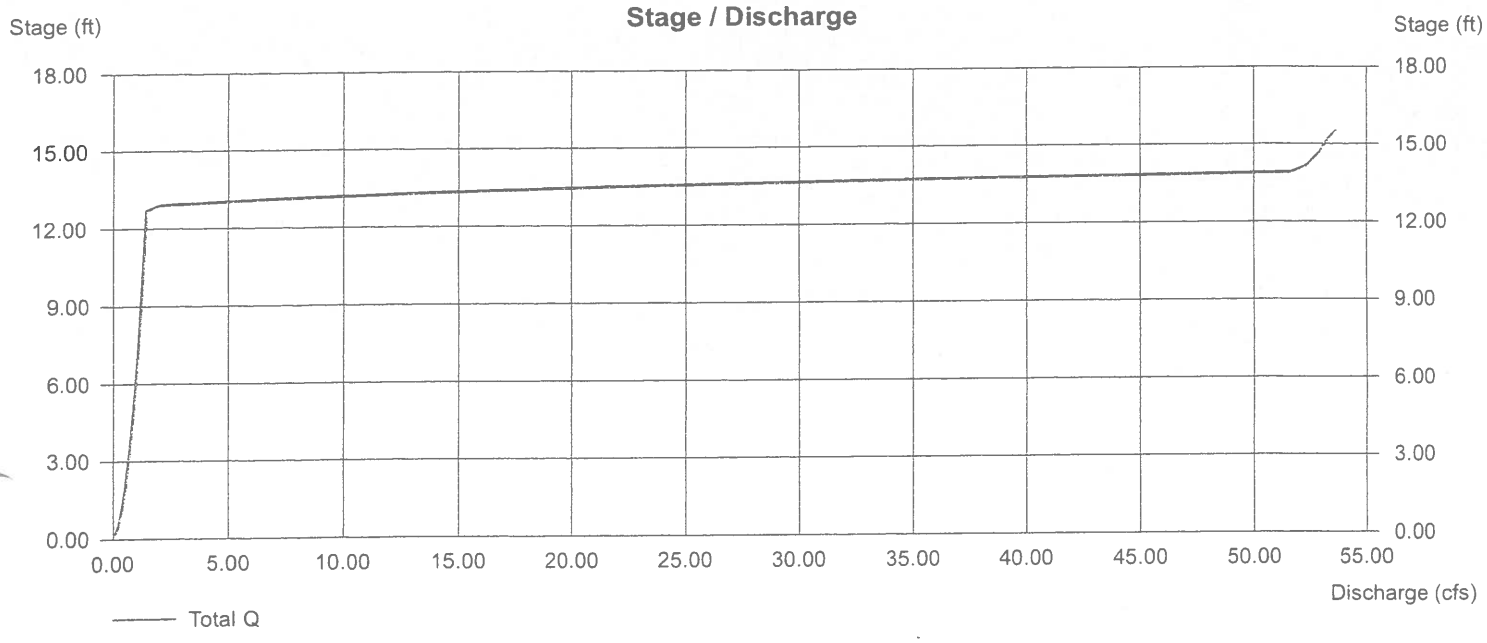
	[A]	[B]	[C]	[D]
Rise (in)	= 24.00	4.00	0.00	0.00
Span (in)	= 24.00	4.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 434.50	434.50	0.00	0.00
Length (ft)	= 110.00	0.00	0.00	0.00
Slope (%)	= 13.00	0.00	0.00	0.00
N-Value	= .024	.013	.013	.013
Orif. Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	Yes	Yes	Yes

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 12.00	30.00	0.00	0.00
Crest El. (ft)	= 447.34	448.13	0.00	0.00
Weir Coeff.	= 3.33	3.33	0.00	0.00
Weir Type	= Riser	Ciplti	---	---
Multi-Stage	= Yes	Yes	No	No

Exfiltration = 0.000 in/hr (Contour) Tailwater Elev. = 0.00 ft

Note: Culvert/Orifice outflows have been analyzed under inlet and outlet control. Weir riser checked for orifice conditions.



Hydrograph Summary Report

Hyd.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
1	SCS Runoff	118.25	2	718	273,696	----	-------	-------	Basin 1 Subarea 2
2	SCS Runoff	18.51	2	716	37,533	----	-------	-------	Basin 1 Subarea 1
3	SCS Runoff	14.25	2	716	33,313	----	-------	-------	Basin 1 Subarea 3
4	Combine	150.13	2	718	344,542	1, 2, 3	-------	-------	Combined Discharge to Pro. Basin 1
5	Reservoir	2.12	2	1134	334,432	4	447.40	267,625	B1DA to Mod Basin 1

Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

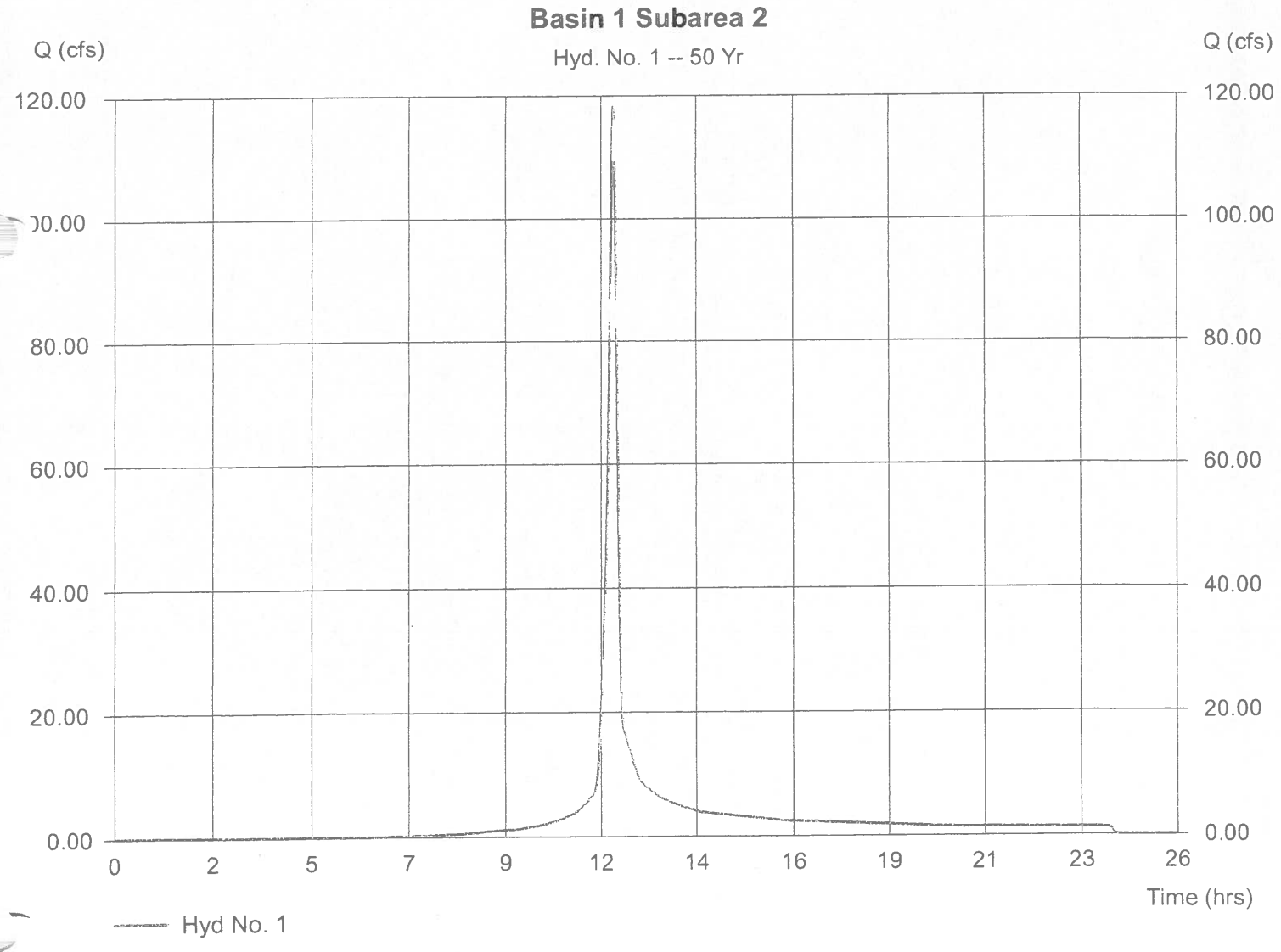
Wednesday, Sep 4 2019, 6:47 PM

Hyd. No. 1

Basin 1 Subarea 2

Hydrograph type	= SCS Runoff	Peak discharge	= 118.25 cfs
Storm frequency	= 50 yrs	Time interval	= 2 min
Drainage area	= 18.340 ac	Curve number	= 79
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 9.40 min
Total precip.	= 6.48 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 273,696 cuft



TR55 Tc Worksheet

Hyd. No. 1

Basin 1 Subarea 2

Description	A	B	C	Totals
Sheet Flow				
Manning's n-value	= 0.130	0.011	0.011	
Flow length (ft)	= 120.0	0.0	0.0	
Two-year 24-hr precip. (in)	= 3.00	0.00	0.00	
Land slope (%)	= 33.00	0.00	0.00	
Travel Time (min)	**= 3.40** +	**0.00** +	**0.00** =	**3.40**
Shallow Concentrated Flow				
Flow length (ft)	= 786.00	0.00	0.00	
Watercourse slope (%)	= 3.00	0.00	0.00	
Surface description	= Unpaved	Paved	Paved	
Average velocity (ft/s)	= 2.79	0.00	0.00	
Travel Time (min)	**= 4.69** +	**0.00** +	**0.00** =	**4.69**
Channel Flow				
X sectional flow area (sqft)	= 4.50	3.53	0.00	
Wetted perimeter (ft)	= 6.50	4.71	0.00	
Channel slope (%)	= 33.00	33.00	0.00	
Manning's n-value	= 0.070	0.010	0.015	
Velocity (ft/s)	= 9.56	70.56	0.00	
Flow length (ft)	= 686.0	372.0	0.0	
Travel Time (min)	**= 1.20** +	**0.09** +	**0.00** =	**1.28**

Total Travel Time, Tc ..... **9.40 min**

Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

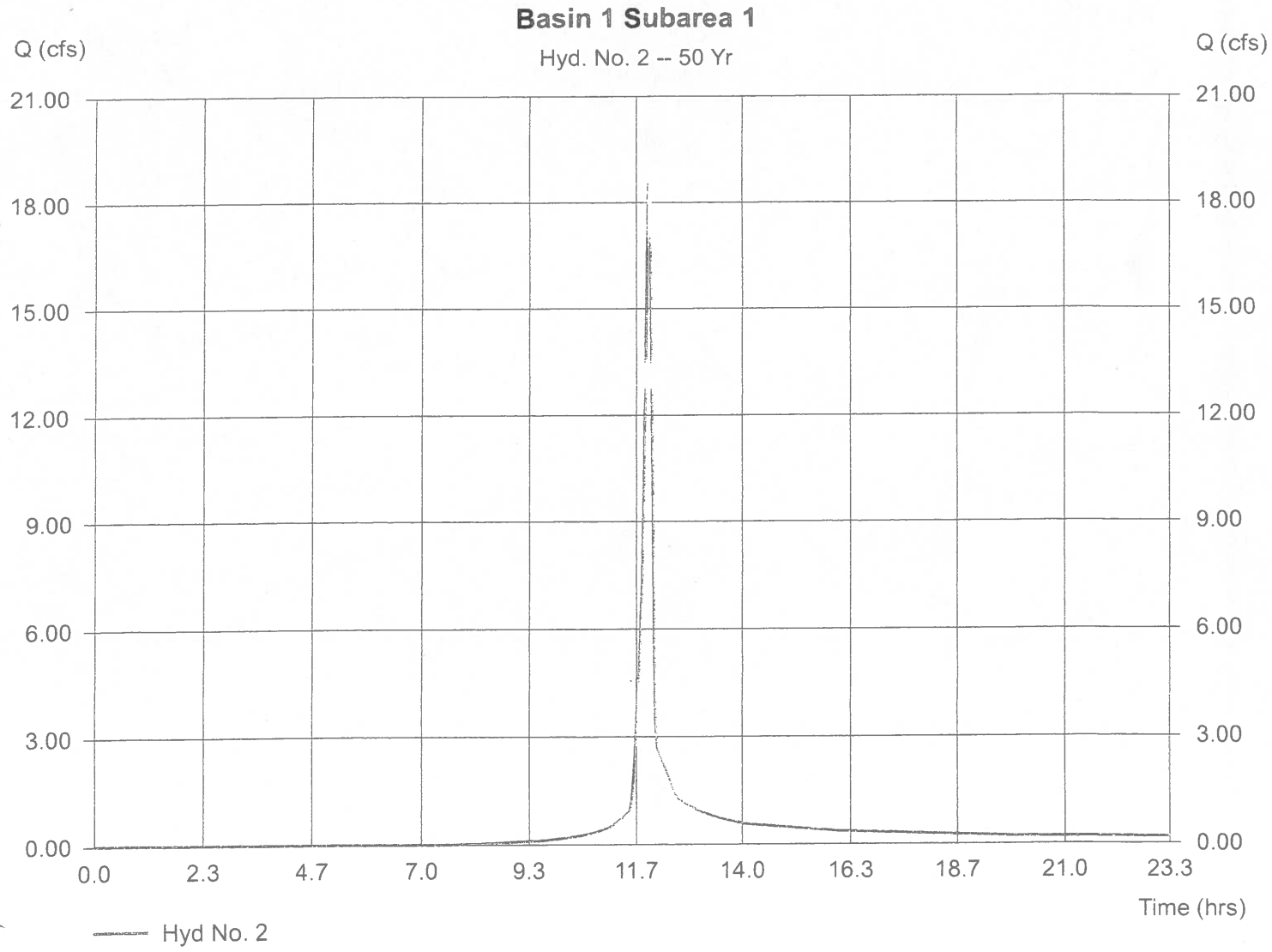
Wednesday, Sep 4 2019, 6:47 PM

Hyd. No. 2

Basin 1 Subarea 1

Hydrograph type	= SCS Runoff	Peak discharge	= 18.51 cfs
Storm frequency	= 50 yrs	Time interval	= 2 min
Drainage area	= 3.070 ac	Curve number	= 74
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 5.00 min
Total precip.	= 6.48 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 37,533 cuft



Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

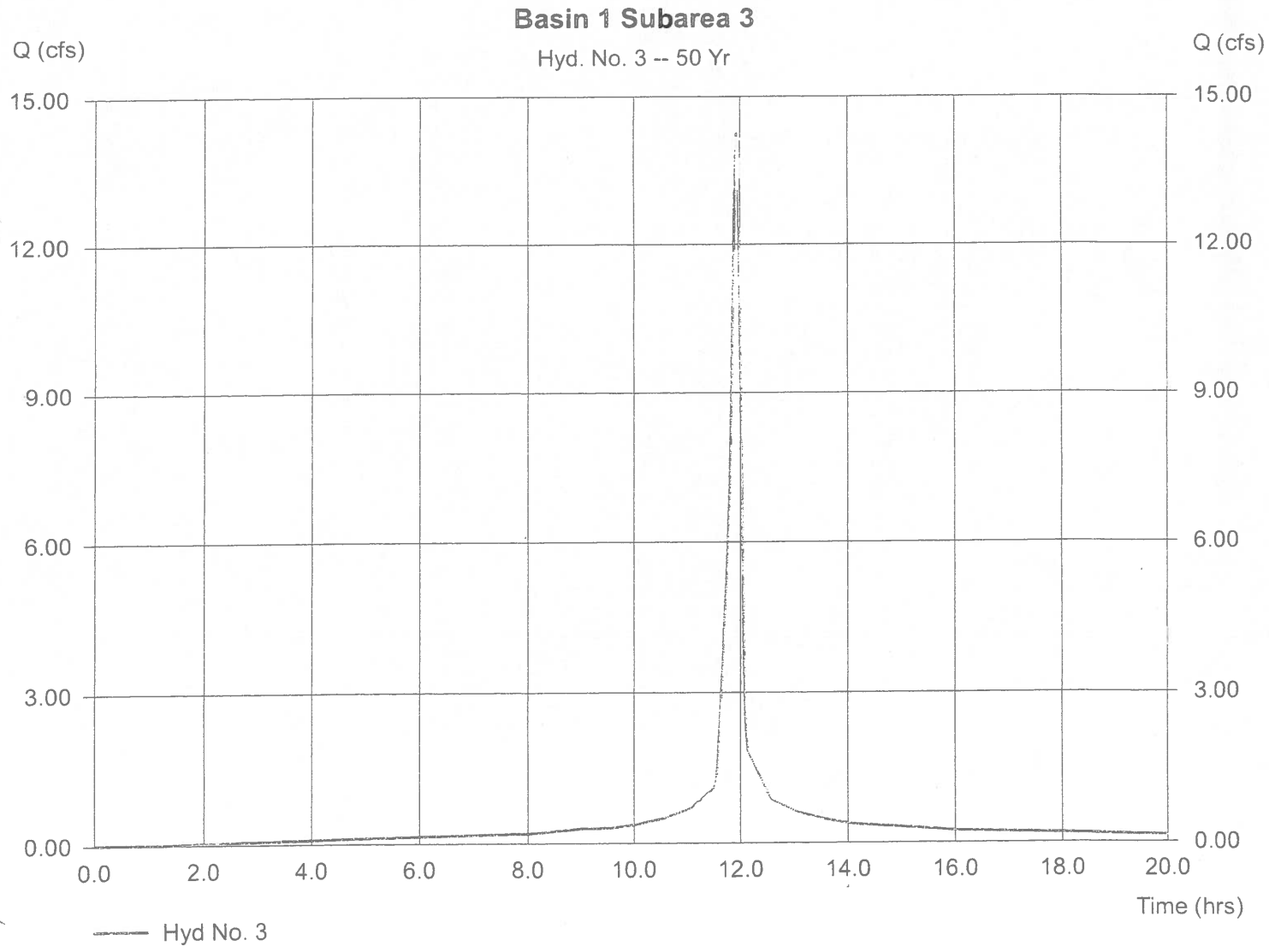
Wednesday, Sep 4 2019, 6:47 PM

Hyd. No. 3

Basin 1 Subarea 3

Hydrograph type	= SCS Runoff	Peak discharge	= 14.25 cfs
Storm frequency	= 50 yrs	Time interval	= 2 min
Drainage area	= 1.630 ac	Curve number	= 96
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 5.00 min
Total precip.	= 6.48 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 33,313 cuft



Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

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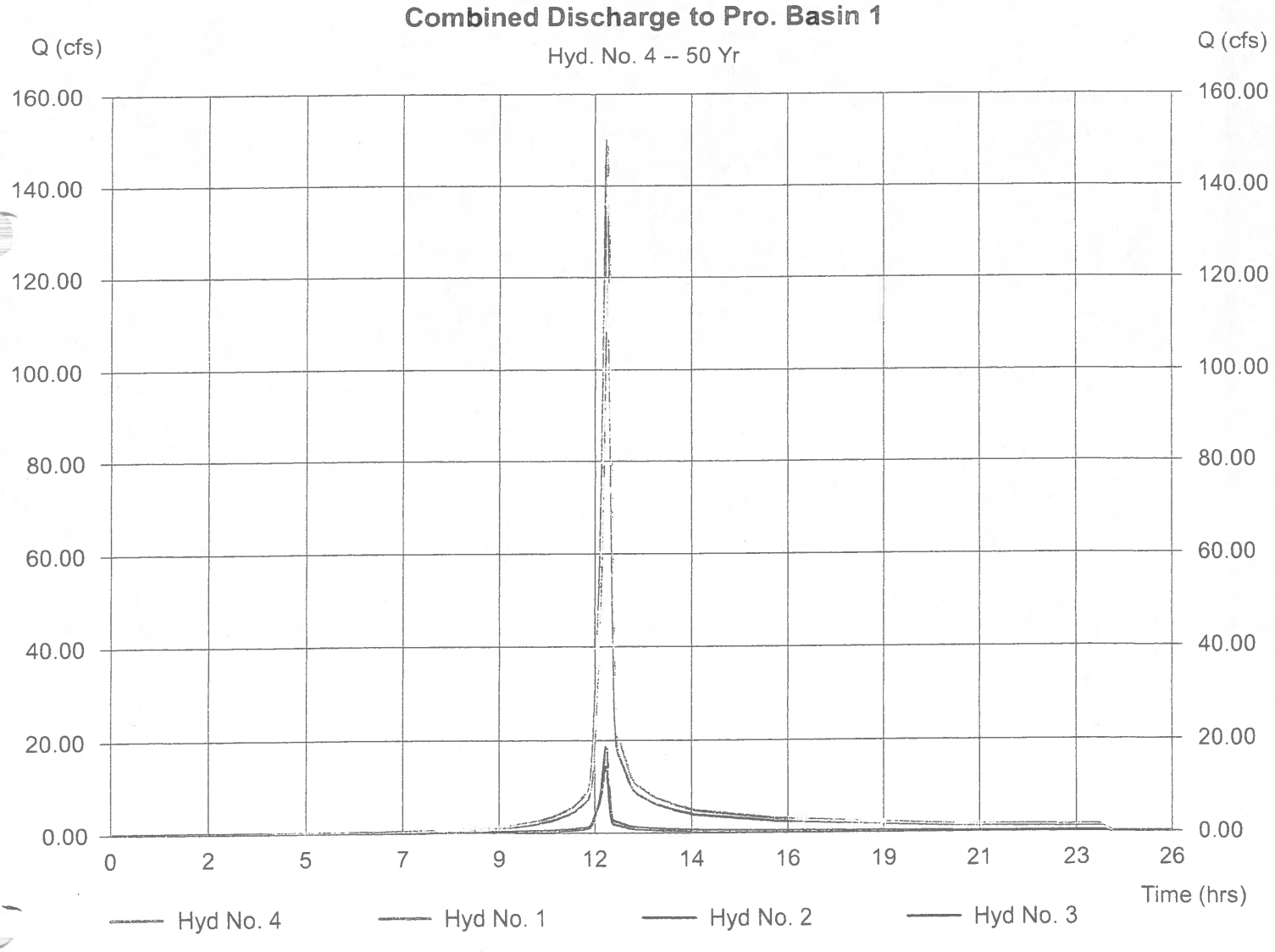
Hyd. No. 4

Combined Discharge to Pro. Basin 1

Hydrograph type = Combine
Storm frequency = 50 yrs
Inflow hyds. = 1, 2, 3

Peak discharge = 150.13 cfs
Time interval = 2 min

Hydrograph Volume = 344,542 cuft



Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

Wednesday, Sep 4 2019, 6:47 PM

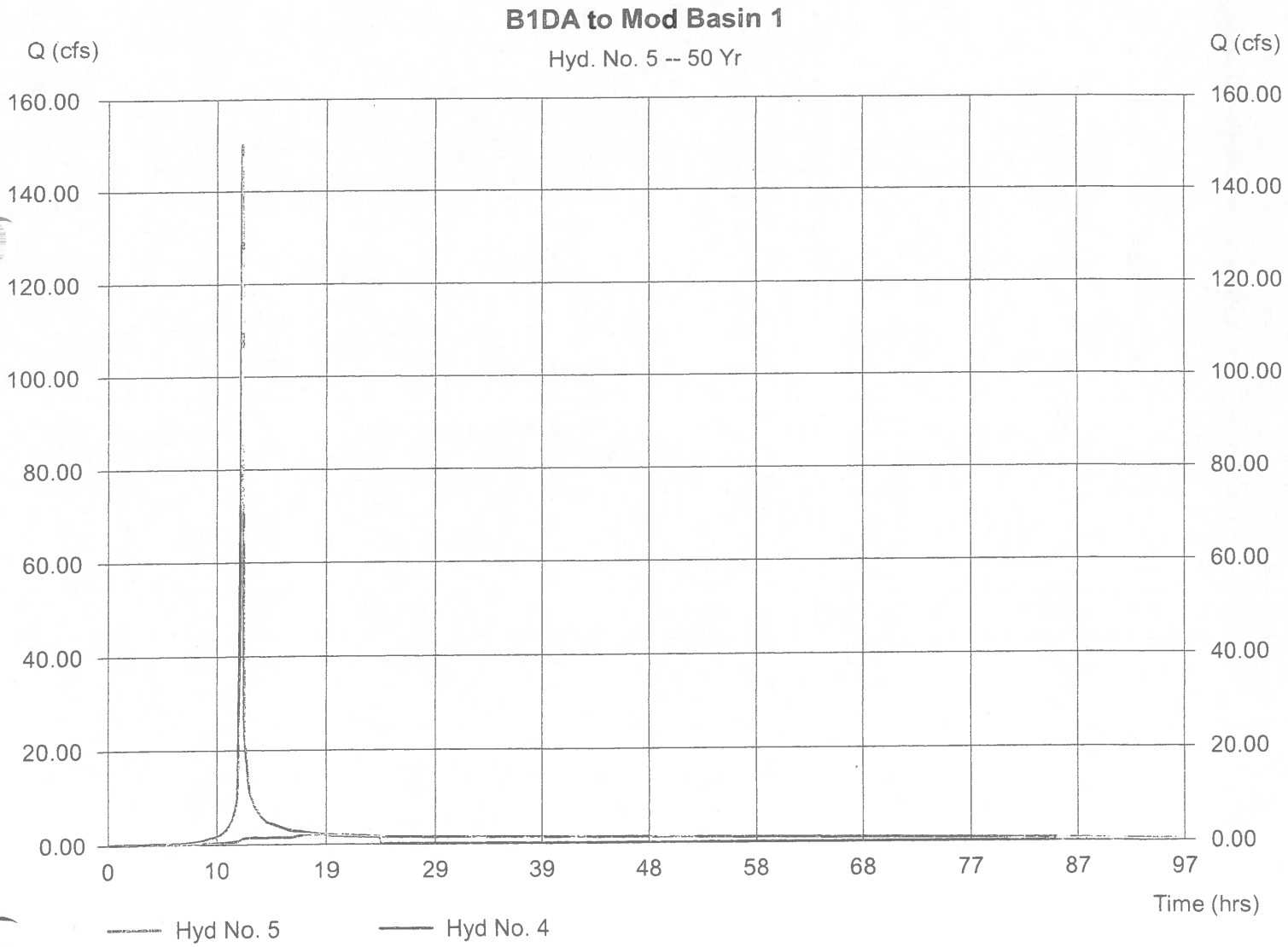
Hyd. No. 5

B1DA to Mod Basin 1

Hydrograph type	= Reservoir	Peak discharge	= 2.12 cfs
Storm frequency	= 50 yrs	Time interval	= 2 min
Inflow hyd. No.	= 4	Max. Elevation	= 447.40 ft
Reservoir name	= Pro. SW Basin 1 wPond	Max. Storage	= 267,625 cuft

Storage Indication method used.

Hydrograph Volume = 334,432 cuft



Pond Report

Hydraflow Hydrographs by Intelisolve

Wednesday, Sep 4 2019, 6:47 PM

Pond No. 1 - Pro. SW Basin 1 wPond

Pond Data

Pond storage is based on known contour areas. Average end area method used.

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	434.50	12,000	0	0
1.50	436.00	13,571	19,178	19,178
3.50	438.00	15,671	29,242	48,420
5.50	440.00	18,793	34,464	82,884
7.50	442.00	22,056	40,849	123,733
9.50	444.00	25,164	47,220	170,953
11.50	446.00	28,700	53,864	224,817
13.50	448.00	32,338	61,038	285,855
15.50	450.00	38,138	70,476	356,331

Culvert / Orifice Structures

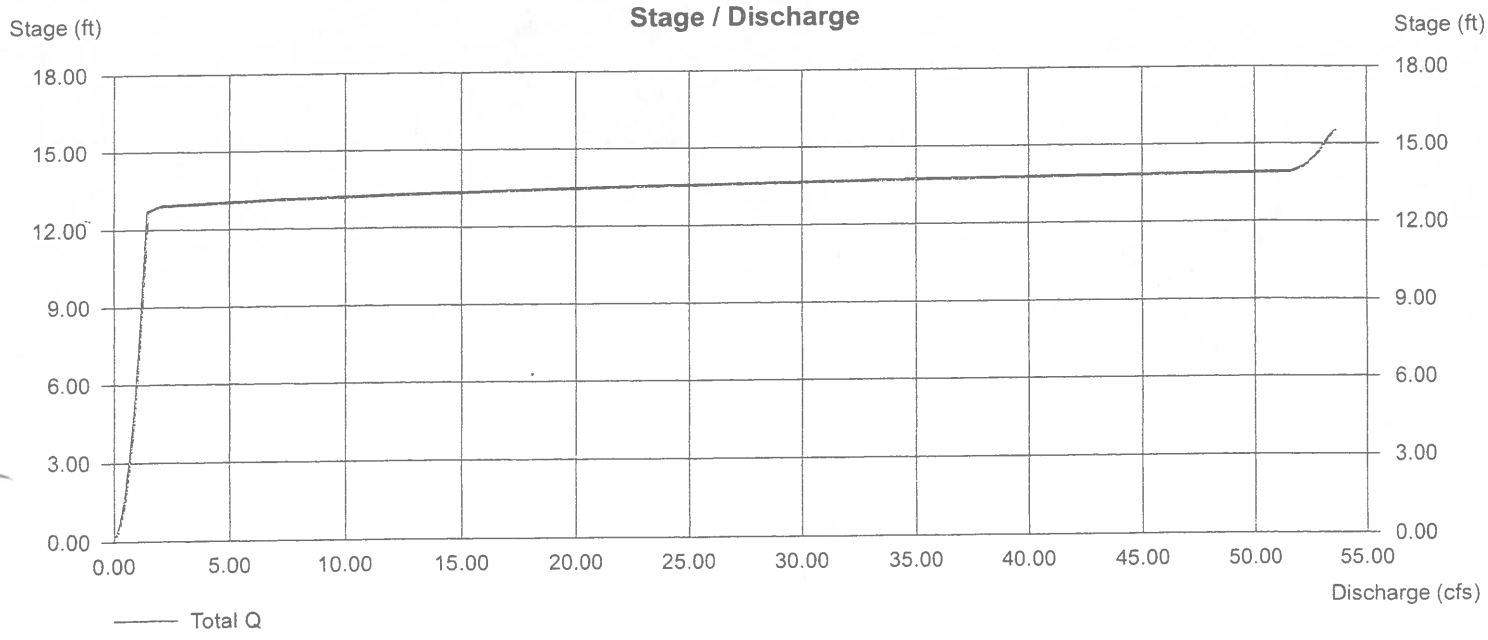
	[A]	[B]	[C]	[D]
Rise (in)	= 24.00	4.00	0.00	0.00
Span (in)	= 24.00	4.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 434.50	434.50	0.00	0.00
Length (ft)	= 110.00	0.00	0.00	0.00
Slope (%)	= 13.00	0.00	0.00	0.00
N-Value	= .024	.013	.013	.013
Orif. Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	Yes	Yes	Yes

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 12.00	30.00	0.00	0.00
Crest El. (ft)	= 447.34	448.13	0.00	0.00
Weir Coeff.	= 3.33	3.33	0.00	0.00
Weir Type	= Riser	Ciplti	---	---
Multi-Stage	= Yes	Yes	No	No

Exfiltration = 0.000 in/hr (Contour) Tailwater Elev. = 0.00 ft

Note: Culvert/Orifice outflows have been analyzed under inlet and outlet control. Weir riser checked for orifice conditions.



Hydrograph Summary Report

Hyd.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
1	SCS Runoff	142.46	2	718	332,123	----	------	------	Basin 1 Subarea 2
2	SCS Runoff	22.68	2	716	46,263	----	------	------	Basin 1 Subarea 1
3	SCS Runoff	16.41	2	716	38,621	----	------	------	Basin 1 Subarea 3
4	Combine	180.41	2	718	417,006	1, 2, 3	------	------	Combined Discharge to Pro. Basin 1
5	Reservoir	7.90	2	806	406,496	4	447.63	274,626	B1DA to Mod Basin 1

Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

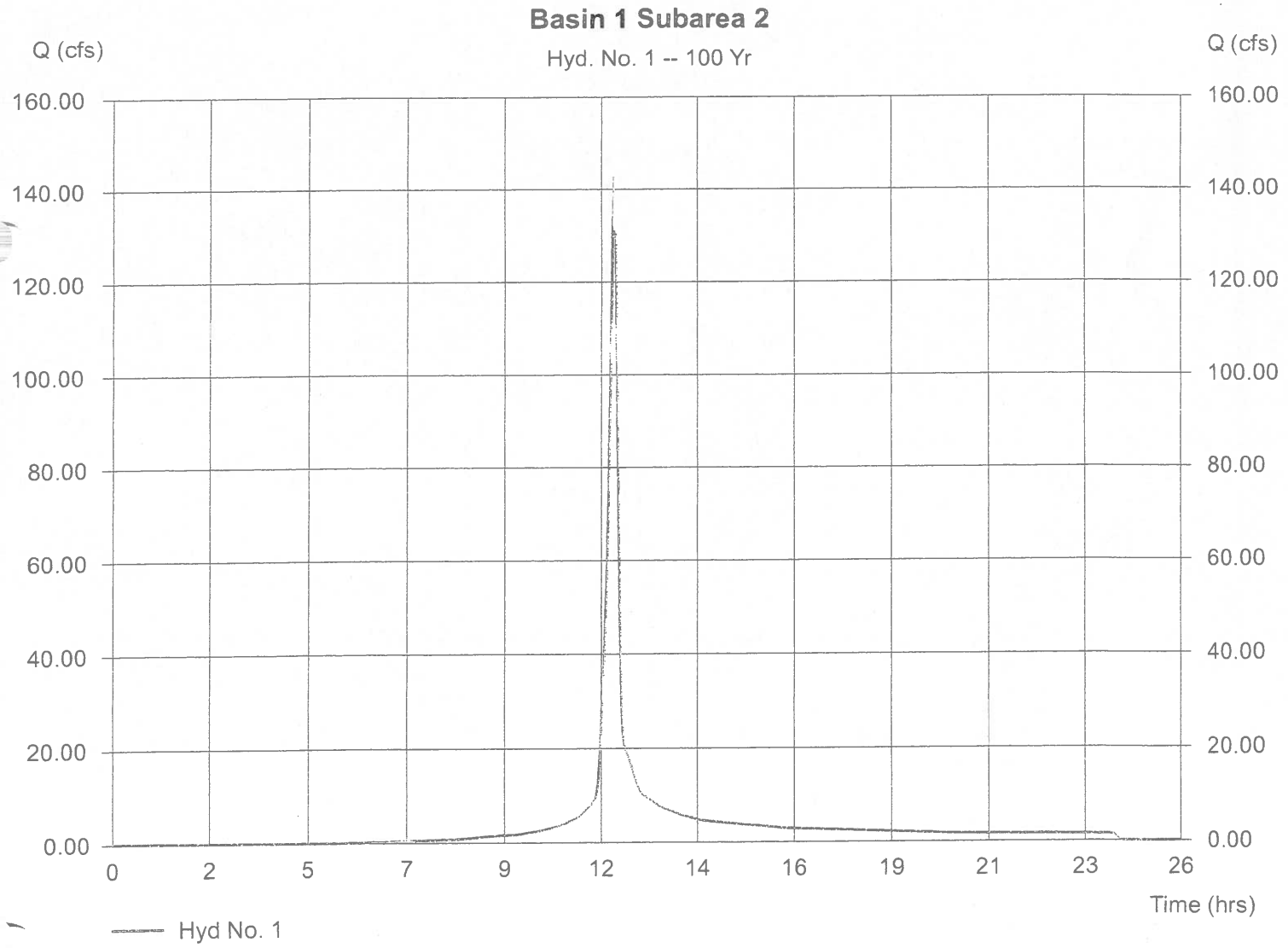
Wednesday, Sep 4 2019, 6:47 PM

Hyd. No. 1

Basin 1 Subarea 2

Hydrograph type	= SCS Runoff	Peak discharge	= 142.46 cfs
Storm frequency	= 100 yrs	Time interval	= 2 min
Drainage area	= 18.340 ac	Curve number	= 79
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 9.40 min
Total precip.	= 7.44 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 332,123 cuft



TR55 Tc Worksheet

Hyd. No. 1

Basin 1 Subarea 2

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.130		0.011		0.011		
Flow length (ft)	= 120.0		0.0		0.0		
Two-year 24-hr precip. (in)	= 3.00		0.00		0.00		
Land slope (%)	= 33.00		0.00		0.00		
Travel Time (min)	**= 3.40**	**+**	**0.00**	**+**	**0.00**	**=**	**3.40**
Shallow Concentrated Flow							
Flow length (ft)	= 786.00		0.00		0.00		
Watercourse slope (%)	= 3.00		0.00		0.00		
Surface description	= Unpaved		Paved		Paved		
Average velocity (ft/s)	= 2.79		0.00		0.00		
Travel Time (min)	**= 4.69**	**+**	**0.00**	**+**	**0.00**	**=**	**4.69**
Channel Flow							
X sectional flow area (sqft)	= 4.50		3.53		0.00		
Wetted perimeter (ft)	= 6.50		4.71		0.00		
Channel slope (%)	= 33.00		33.00		0.00		
Manning's n-value	= 0.070		0.010		0.015		
Velocity (ft/s)	= 9.56		70.56		0.00		
Flow length (ft)	= 686.0		372.0		0.0		
Travel Time (min)	**= 1.20**	**+**	**0.09**	**+**	**0.00**	**=**	**1.28**

Total Travel Time, Tc ..... 9.40 min

Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

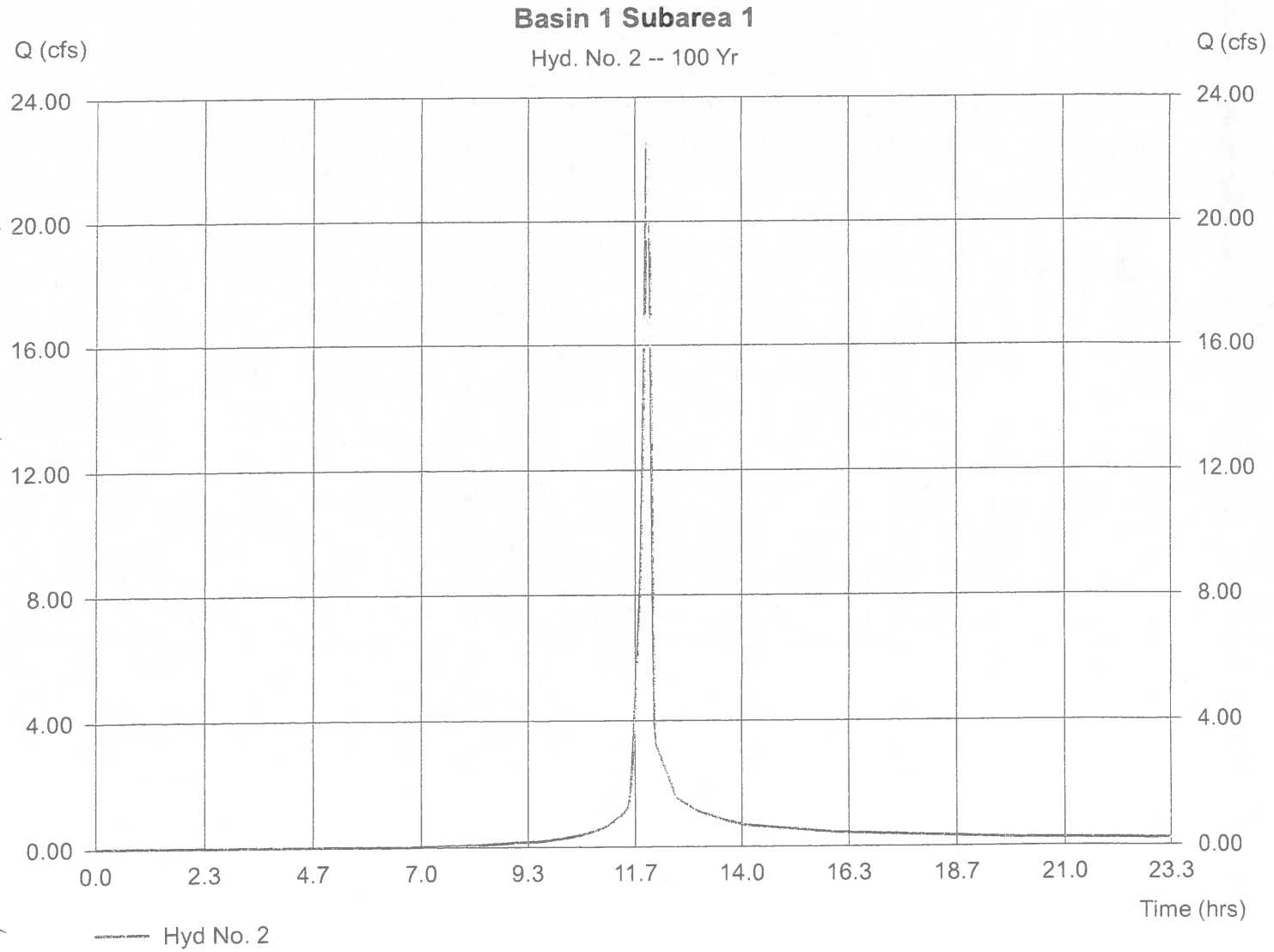
Wednesday, Sep 4 2019, 6:47 PM

Hyd. No. 2

Basin 1 Subarea 1

Hydrograph type	= SCS Runoff	Peak discharge	= 22.68 cfs
Storm frequency	= 100 yrs	Time interval	= 2 min
Drainage area	= 3.070 ac	Curve number	= 74
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 5.00 min
Total precip.	= 7.44 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 46,263 cuft



Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

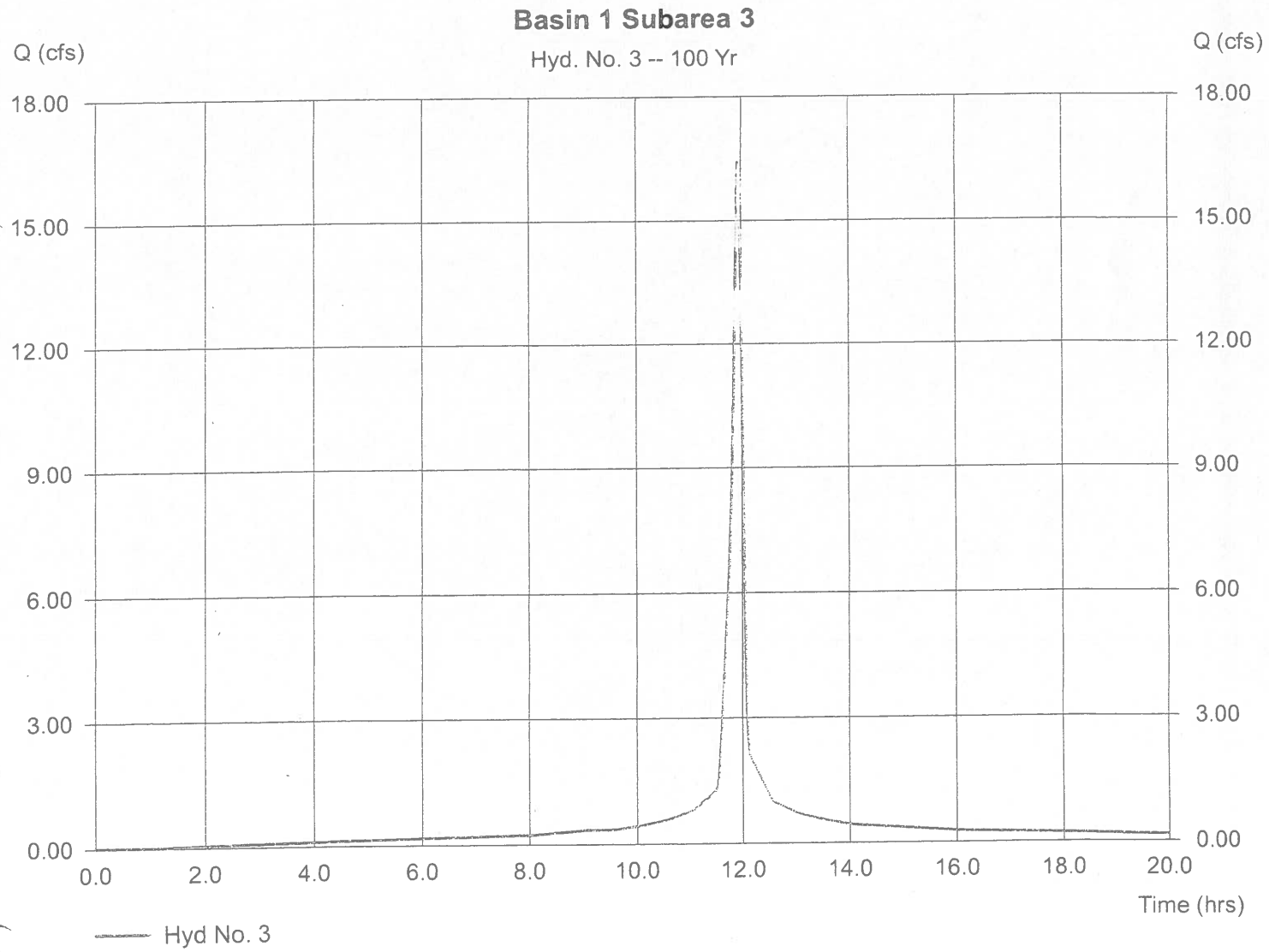
Wednesday, Sep 4 2019, 6:47 PM

Hyd. No. 3

Basin 1 Subarea 3

Hydrograph type	= SCS Runoff	Peak discharge	= 16.41 cfs
Storm frequency	= 100 yrs	Time interval	= 2 min
Drainage area	= 1.630 ac	Curve number	= 96
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 5.00 min
Total precip.	= 7.44 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 38,621 cuft



Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

Wednesday, Sep 4 2019, 6:47 PM

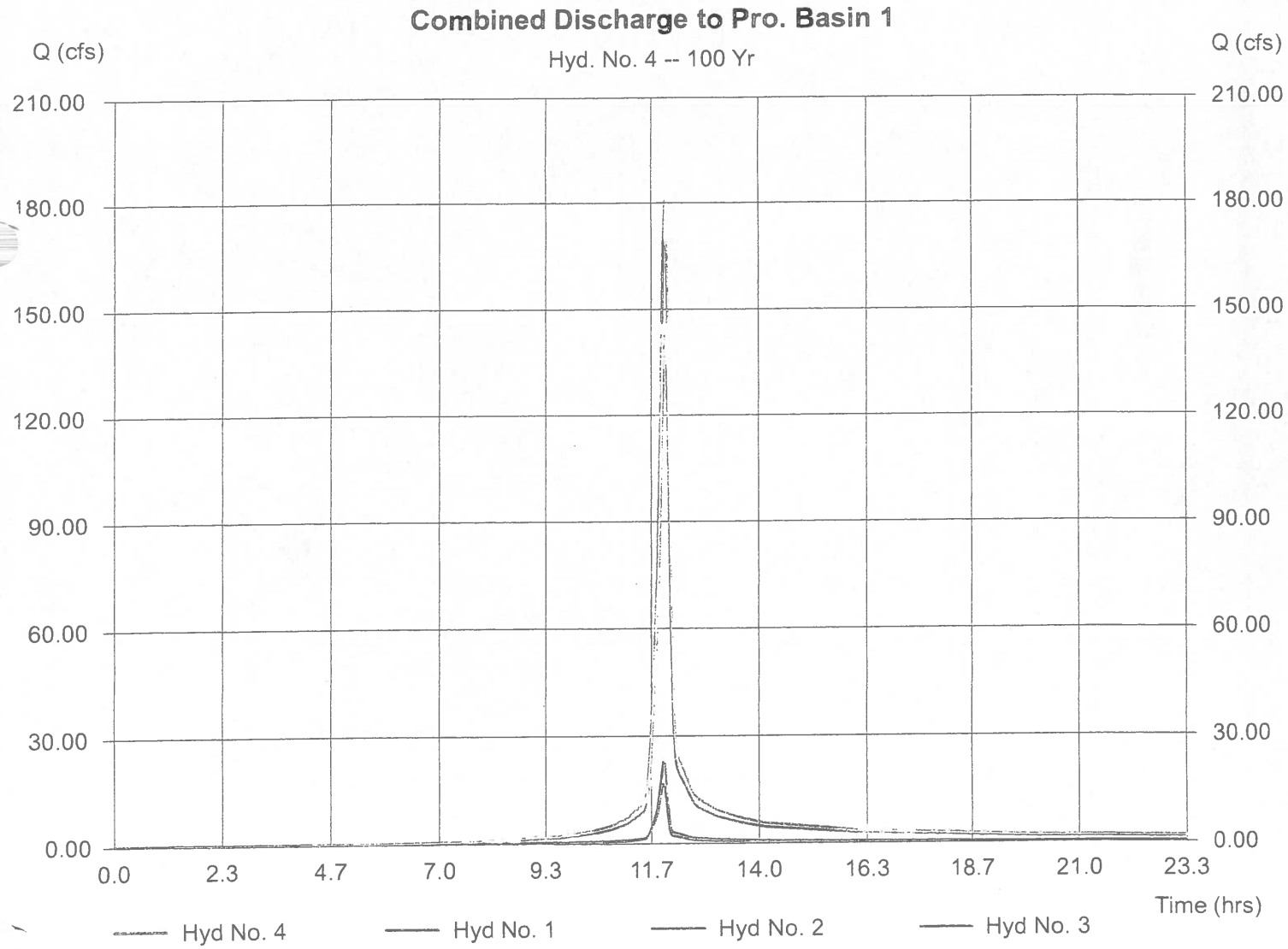
Hyd. No. 4

Combined Discharge to Pro. Basin 1

Hydrograph type = Combine
Storm frequency = 100 yrs
Inflow hyds. = 1, 2, 3

Peak discharge = 180.41 cfs
Time interval = 2 min

Hydrograph Volume = 417,006 cuft



Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

Wednesday, Sep 4 2019, 6:47 PM

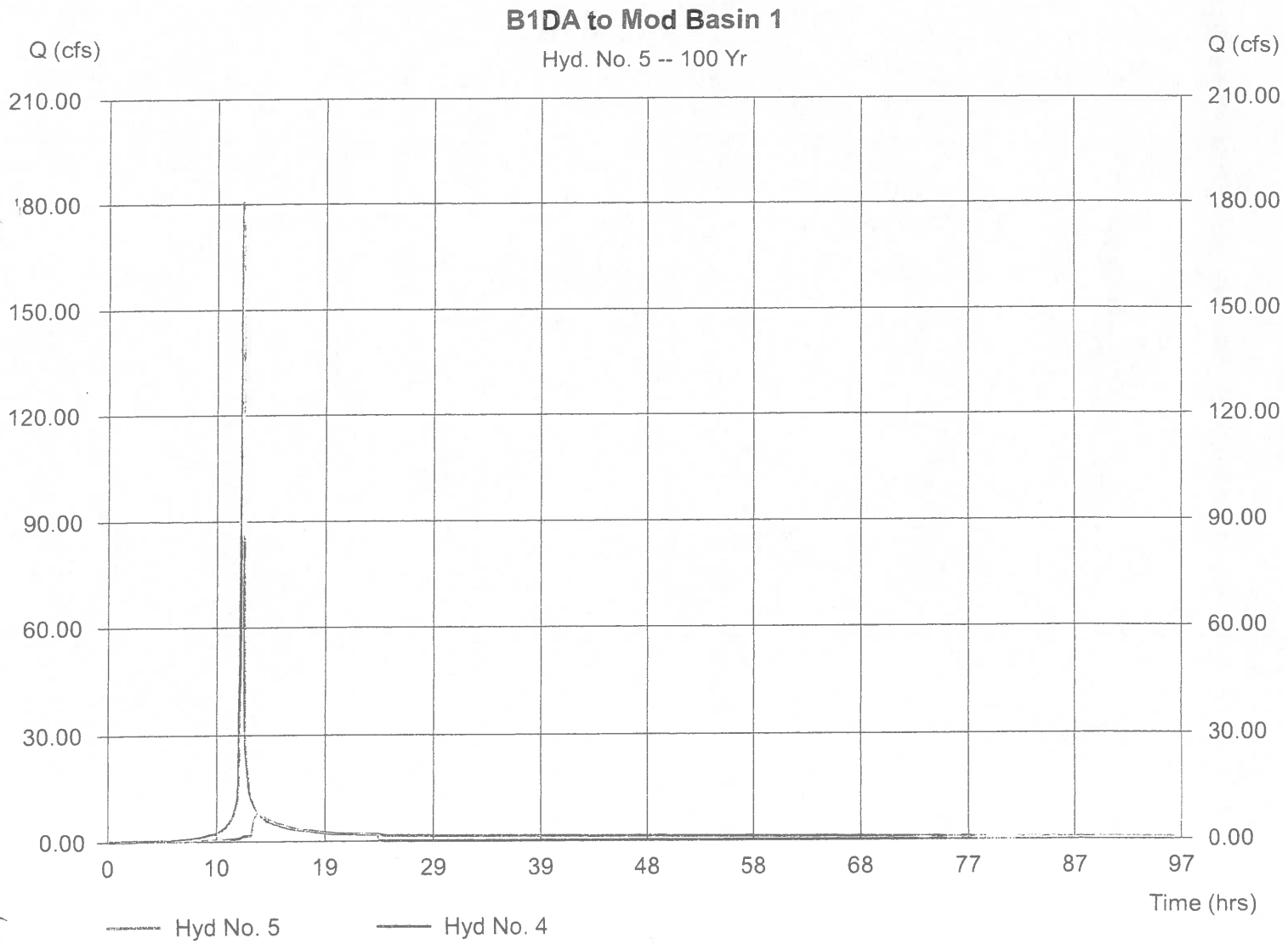
Hyd. No. 5

B1DA to Mod Basin 1

Hydrograph type	= Reservoir	Peak discharge	= 7.90 cfs
Storm frequency	= 100 yrs	Time interval	= 2 min
Inflow hyd. No.	= 4	Max. Elevation	= 447.63 ft
Reservoir name	= Pro. SW Basin 1 wPond	Max. Storage	= 274,626 cuft

Storage Indication method used.

Hydrograph Volume = 406,496 cuft



Pond Report

Pond No. 1 - Pro. SW Basin 1 wPond

Pond Data

Pond storage is based on known contour areas. Average end area method used.

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	434.50	12,000	0	0
1.50	436.00	13,571	19,178	19,178
3.50	438.00	15,671	29,242	48,420
5.50	440.00	18,793	34,464	82,884
7.50	442.00	22,056	40,849	123,733
9.50	444.00	25,164	47,220	170,953
11.50	446.00	28,700	53,864	224,817
13.50	448.00	32,338	61,038	285,855
15.50	450.00	38,138	70,476	356,331

Culvert / Orifice Structures

	[A]	[B]	[C]	[D]
Rise (in)	= 24.00	4.00	0.00	0.00
Span (in)	= 24.00	4.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 434.50	434.50	0.00	0.00
Length (ft)	= 110.00	0.00	0.00	0.00
Slope (%)	= 13.00	0.00	0.00	0.00
N-Value	= .024	.013	.013	.013
Orif. Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	Yes	Yes	Yes

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 12.00	30.00	0.00	0.00
Crest El. (ft)	= 447.34	448.13	0.00	0.00
Weir Coeff.	= 3.33	3.33	0.00	0.00
Weir Type	= Riser	Ciplti	---	---
Multi-Stage	= Yes	Yes	No	No

Exfiltration = 0.000 in/hr (Contour) Tailwater Elev. = 0.00 ft

Note: Culvert/Orifice outflows have been analyzed under inlet and outlet control. Weir riser checked for orifice conditions.

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Total cfs
0.00	0	434.50	0.00	0.00	---	---	0.00	0.00	---	---	---	0.00
0.15	1,918	434.65	0.05	0.05	---	---	0.00	0.00	---	---	---	0.05
0.30	3,836	434.80	0.16	0.15	---	---	0.00	0.00	---	---	---	0.15
0.45	5,753	434.95	0.22	0.22	---	---	0.00	0.00	---	---	---	0.22
0.60	7,671	435.10	0.27	0.27	---	---	0.00	0.00	---	---	---	0.27
0.75	9,589	435.25	0.32	0.31	---	---	0.00	0.00	---	---	---	0.31
0.90	11,507	435.40	0.35	0.34	---	---	0.00	0.00	---	---	---	0.34
1.05	13,425	435.55	0.38	0.38	---	---	0.00	0.00	---	---	---	0.38
1.20	15,343	435.70	0.41	0.41	---	---	0.00	0.00	---	---	---	0.41
1.35	17,260	435.85	0.44	0.44	---	---	0.00	0.00	---	---	---	0.44
1.50	19,178	436.00	0.48	0.47	---	---	0.00	0.00	---	---	---	0.47
1.70	22,102	436.20	0.52	0.50	---	---	0.00	0.00	---	---	---	0.50
1.90	25,027	436.40	0.56	0.53	---	---	0.00	0.00	---	---	---	0.53
2.10	27,951	436.60	0.56	0.56	---	---	0.00	0.00	---	---	---	0.56
2.30	30,875	436.80	0.60	0.59	---	---	0.00	0.00	---	---	---	0.59
2.50	33,799	437.00	0.64	0.62	---	---	0.00	0.00	---	---	---	0.62
2.70	36,723	437.20	0.65	0.65	---	---	0.00	0.00	---	---	---	0.65
2.90	39,648	437.40	0.69	0.67	---	---	0.00	0.00	---	---	---	0.67
3.10	42,572	437.60	0.73	0.70	---	---	0.00	0.00	---	---	---	0.70
3.30	45,496	437.80	0.73	0.72	---	---	0.00	0.00	---	---	---	0.72
3.50	48,420	438.00	0.75	0.75	---	---	0.00	0.00	---	---	---	0.75
3.70	51,867	438.20	0.78	0.77	---	---	0.00	0.00	---	---	---	0.77
3.90	55,313	438.40	0.79	0.79	---	---	0.00	0.00	---	---	---	0.79
4.10	58,759	438.60	0.84	0.81	---	---	0.00	0.00	---	---	---	0.81
4.30	62,206	438.80	0.84	0.83	---	---	0.00	0.00	---	---	---	0.83
4.50	65,652	439.00	0.89	0.85	---	---	0.00	0.00	---	---	---	0.85
4.70	69,099	439.20	0.89	0.87	---	---	0.00	0.00	---	---	---	0.87
4.90	72,545	439.40	0.89	0.89	---	---	0.00	0.00	---	---	---	0.89
5.10	75,991	439.60	0.95	0.91	---	---	0.00	0.00	---	---	---	0.91

Continues on next page...

Pro. SW Basin 1 wPond

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Total cfs
5.30	79,438	439.80	0.95	0.93	---	---	0.00	0.00	---	---	---	0.93
5.50	82,884	440.00	0.95	0.95	---	---	0.00	0.00	---	---	---	0.95
5.70	86,969	440.20	1.00	0.97	---	---	0.00	0.00	---	---	---	0.97
5.90	91,054	440.40	1.00	0.99	---	---	0.00	0.00	---	---	---	0.99
6.10	95,139	440.60	1.00	1.00	---	---	0.00	0.00	---	---	---	1.00
6.30	99,224	440.80	1.02	1.02	---	---	0.00	0.00	---	---	---	1.02
6.50	103,309	441.00	1.07	1.04	---	---	0.00	0.00	---	---	---	1.04
6.70	107,394	441.20	1.07	1.05	---	---	0.00	0.00	---	---	---	1.05
6.90	111,479	441.40	1.07	1.07	---	---	0.00	0.00	---	---	---	1.07
7.10	115,563	441.60	1.13	1.09	---	---	0.00	0.00	---	---	---	1.09
7.30	119,648	441.80	1.13	1.10	---	---	0.00	0.00	---	---	---	1.10
7.50	123,733	442.00	1.13	1.12	---	---	0.00	0.00	---	---	---	1.12
7.70	128,455	442.20	1.13	1.13	---	---	0.00	0.00	---	---	---	1.13
7.90	133,177	442.40	1.20	1.15	---	---	0.00	0.00	---	---	---	1.15
8.10	137,899	442.60	1.20	1.16	---	---	0.00	0.00	---	---	---	1.16
8.30	142,621	442.80	1.20	1.18	---	---	0.00	0.00	---	---	---	1.18
8.50	147,343	443.00	1.20	1.19	---	---	0.00	0.00	---	---	---	1.19
8.70	152,065	443.20	1.21	1.21	---	---	0.00	0.00	---	---	---	1.21
8.90	156,787	443.40	1.26	1.22	---	---	0.00	0.00	---	---	---	1.22
9.10	161,509	443.60	1.26	1.24	---	---	0.00	0.00	---	---	---	1.24
9.30	166,231	443.80	1.26	1.25	---	---	0.00	0.00	---	---	---	1.25
9.50	170,953	444.00	1.26	1.26	---	---	0.00	0.00	---	---	---	1.26
9.70	176,340	444.20	1.28	1.28	---	---	0.00	0.00	---	---	---	1.28
9.90	181,726	444.40	1.34	1.29	---	---	0.00	0.00	---	---	---	1.29
10.10	187,113	444.60	1.34	1.30	---	---	0.00	0.00	---	---	---	1.30
10.30	192,499	444.80	1.34	1.32	---	---	0.00	0.00	---	---	---	1.32
10.50	197,885	445.00	1.34	1.33	---	---	0.00	0.00	---	---	---	1.33
10.70	203,272	445.20	1.34	1.34	---	---	0.00	0.00	---	---	---	1.34
10.90	208,658	445.40	1.41	1.36	---	---	0.00	0.00	---	---	---	1.36
11.10	214,045	445.60	1.41	1.37	---	---	0.00	0.00	---	---	---	1.37
11.30	219,431	445.80	1.41	1.38	---	---	0.00	0.00	---	---	---	1.38
11.50	224,817	446.00	1.41	1.39	---	---	0.00	0.00	---	---	---	1.39
11.70	230,921	446.20	1.41	1.41	---	---	0.00	0.00	---	---	---	1.41
11.90	237,025	446.40	1.42	1.42	---	---	0.00	0.00	---	---	---	1.42
12.10	243,129	446.60	1.48	1.43	---	---	0.00	0.00	---	---	---	1.43
12.30	249,232	446.80	1.48	1.44	---	---	0.00	0.00	---	---	---	1.44
12.50	255,336	447.00	1.48	1.46	---	---	0.00	0.00	---	---	---	1.46
12.70	261,440	447.20	1.48	1.47	---	---	0.00	0.00	---	---	---	1.47
12.90	267,544	447.40	2.08	1.47	---	---	0.59	0.00	---	---	---	2.06
13.10	273,648	447.60	6.85	1.45	---	---	5.30	0.00	---	---	---	6.75
13.30	279,752	447.80	13.90	1.42	---	---	12.47	0.00	---	---	---	13.89
13.50	285,855	448.00	22.77	1.34	---	---	21.43	0.00	---	---	---	22.77
13.70	292,903	448.20	34.86	1.14	---	---	31.87	1.85	---	---	---	34.86
13.90	299,950	448.40	51.61	0.31	---	---	37.28	14.02	---	---	---	51.61
14.10	306,998	448.60	52.21	0.16	---	---	28.68	23.36	---	---	---	52.20
14.30	314,046	448.80	52.48	0.11	---	---	25.63	26.73	---	---	---	52.46
14.50	321,093	449.00	52.71	0.09	---	---	22.81	29.80	---	---	---	52.70
14.70	328,141	449.20	52.92	0.07	---	---	20.12	32.72	---	---	---	52.91
14.90	335,188	449.40	53.12	0.06	---	---	17.98	35.01	---	---	---	53.05
15.10	342,236	449.60	53.32	0.05	---	---	16.27	36.90	---	---	---	53.22
15.30	349,284	449.80	53.52	0.05	---	---	14.86	38.47	---	---	---	53.37
15.50	356,331	450.00	53.72	0.04	---	---	13.70	39.90	---	---	---	53.64

...End

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Bethlehem Landfill Company
Phase V Expansion

Post Construction Stormwater Management - Extended Basin #2

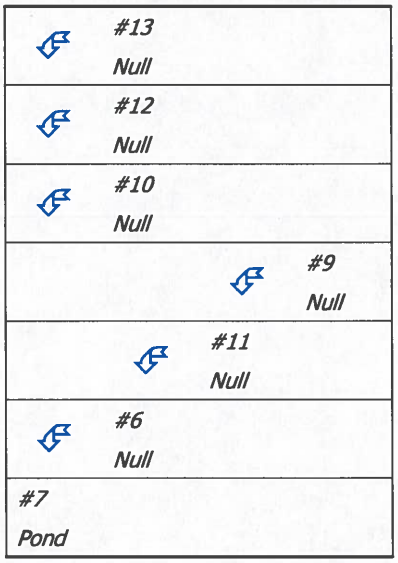
DA = 38.22ac.

Initial Basin El. 460.00

JMM

Structure Networking:

Type	Stru #	(flows into)	Stru #	Musk. K (hrs)	Musk. X	Description
Null	#6	==>	#7	0.000	0.000	CHANNEL N
Pond	#7	==>	End	0.000	0.000	BASIN 2
Null	#9	==>	#11	0.000	0.000	DS 5-A
Null	#10	==>	#7	0.000	0.000	DS-6
Null	#11	==>	#6	0.000	0.000	CHANNEL Z
Null	#12	==>	#7	0.000	0.000	CHANNEL M
Null	#13	==>	#7	0.000	0.000	I-19



General Information

Storm Information:

Storm Type:	NRCS Type II
Design Storm:	2 yr - 24 hr
Rainfall Depth:	3.000 inches

Structure Summary:

		Immediate Contributing Area (ac)	Total Contributing Area (ac)	Peak Discharge (cfs)	Total Runoff Volume (ac-ft)
#13		0.770	0.770	0.45	0.03
#12		2.960	2.960	4.91	0.39
#10		14.680	14.680	19.26	1.45
#9		15.500	15.500	8.65	1.03
#11		0.710	16.210	8.81	1.09
#6		1.530	17.740	9.13	1.20
#7	In	2.070	38.220	35.01	3.17
	Out			0.22	0.67

Structure Detail:

Structure #13 (Null)

I-19

Structure #12 (Null)

CHANNEL M

Structure #10 (Null)

DS-6

Structure #9 (Null)

DS 5-A

Structure #11 (Null)

CHANNEL Z

Structure #6 (Null)

CHANNEL N

Structure #7 (Pond)

BASIN 2

Pond Inputs:

Initial Pool Elev:	460.01 ft
Initial Pool:	0.01 ac-ft

Perforated Riser

Riser Diameter (in)	Riser Height (ft)	Barrel Diameter (in)	Barrel Length (ft)	Barrel Slope (%)	Manning's n	Spillway Elev (ft)	Number of Holes per Elev
36.00	16.25	30.00	100.00	4.50	0.0240	476.25	1

Emergency Spillway

Spillway Elev	Crest Length (ft)	Left Sideslope	Right Sideslope	Bottom Width (ft)
476.95	20.00	4.00:1	4.00:1	60.00

Pond Results:

Peak Elevation:	464.54 ft

Dewater Time:	10.26 days

Dewatering time is calculated from peak stage to lowest spillway

Elevation-Capacity-Discharge Table

Elevation	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	Dewater Time (hrs)	
460.00	0.600	0.000	0.000		
460.01	0.600	0.006	0.000		Low hole SPW #1
460.50	0.602	0.300	0.074	48.46*	
461.00	0.604	0.602	0.105	34.90*	
461.50	0.606	0.904	0.128	28.54*	
462.00	0.608	1.208	0.148	24.78*	
462.50	0.638	1.519	0.166	22.74*	
463.00	0.669	1.846	0.182	21.76*	
463.50	0.701	2.189	0.196	21.12*	
464.00	0.733	2.547	0.210	20.67*	
464.50	0.766	2.922	0.223	20.95	
464.54	0.823	2.956	0.224	2.25	Peak Stage
465.00	0.900	3.338	0.235		
465.50	0.828	3.770	0.246		
466.00	0.856	4.191	0.257		
466.50	0.885	4.626	0.268		
467.00	0.914	5.076	0.278		
467.50	0.944	5.540	0.287		
468.00	0.974	6.020	0.371		
468.50	1.005	6.514	0.411		
469.00	1.036	7.025	0.444		
469.50	1.068	7.551	0.472		
470.00	1.100	8.093	0.795		
470.50	1.128	8.650	0.942		
471.00	1.157	9.221	1.059		
471.50	1.186	9.807	1.160		
472.00	1.216	10.407	1.251		
472.50	1.300	11.036	1.334		
473.00	1.276	11.680	1.411		
473.50	1.306	12.325	1.484		
474.00	1.337	12.986	1.552		
474.50	1.368	13.662	1.617		
474.53	1.370	13.703	1.621		
474.75	1.384	14.006	1.649		
475.00	1.400	14.354	1.680		
475.33	1.416	14.819	6.607		

Elevation	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	Dewater Time (hrs)	
475.50	1.425	15.060	7.756		
475.54	1.427	15.117	7.997		
475.75	1.437	15.418	9.138		
475.80	1.440	15.490	9.385		
476.00	1.450	15.779	10.306		
476.25	1.462	16.143	11.339		Spillway #1
476.50	1.475	16.510	12.274		
476.75	1.487	16.880	13.137		
476.95	1.497	17.179	17.112		Spillway #2
477.00	1.500	17.254	19.962		
477.50	1.550	18.016	48.891		
478.00	1.600	18.804	187.682		
478.50	1.650	19.616	341.764		
478.53	1.660	19.666	342.103		

**Designates time(s) to dewater have been extrapolated beyond the 50 hour hydrograph limit.*

Detailed Discharge Table

Elevation (ft)	Perf. Riser (cfs)	Emergency Spillway (cfs)	Combined Total Discharge (cfs)
460.00	0.000	0.000	0.000
460.01	2.00>0.000	0.000	0.000
460.50	0.074	0.000	0.074
461.00	0.105	0.000	0.105
461.50	0.128	0.000	0.128
462.00	0.148	0.000	0.148
462.50	0.166	0.000	0.166
463.00	0.182	0.000	0.182
463.50	0.196	0.000	0.196
464.00	0.210	0.000	0.210
464.50	0.223	0.000	0.223
465.00	0.235	0.000	0.235
465.50	0.246	0.000	0.246
466.00	0.257	0.000	0.257
466.50	0.268	0.000	0.268
467.00	0.278	0.000	0.278
467.50	2.00>0.287	0.000	0.287
468.00	0.371	0.000	0.371
468.50	0.411	0.000	0.411

Elevation (ft)	Perf. Riser (cfs)	Emergency Spillway (cfs)	Combined Total Discharge (cfs)
469.00	0.444	0.000	0.444
469.50	4.00>0.472	0.000	0.472
470.00	0.795	0.000	0.795
470.50	0.942	0.000	0.942
471.00	1.059	0.000	1.059
471.50	1.160	0.000	1.160
472.00	1.251	0.000	1.251
472.50	1.334	0.000	1.334
473.00	1.411	0.000	1.411
473.50	1.484	0.000	1.484
474.00	1.552	0.000	1.552
474.50	1.617	0.000	1.617
474.53	1.621	0.000	1.621
474.75	1.649	0.000	1.649
475.00	18.00>1.680	0.000	1.680
475.33	6.607	0.000	6.607
475.50	7.756	0.000	7.756
475.54	7.997	0.000	7.997
475.75	9.138	0.000	9.138
475.80	9.385	0.000	9.385
476.00	10.306	0.000	10.306
476.25	11.339	0.000	11.339
476.50	12.274	0.000	12.274
476.75	13.137	0.000	13.137
476.95	17.112	0.000	17.112
477.00	18.977	0.985	19.962
477.50	38.052	10.838	48.891
478.00	45.024	142.658	187.682
478.50	51.053	290.711	341.764
478.53	51.392	290.711	342.103

Subwatershed Hydrology Detail:

Stru #	SWS #	SWS Area (ac)	Time of Conc (hrs)	Musk K (hrs)	Musk X	Curve Number	UHS	Peak Discharge (cfs)	Runoff Volume (ac-ft)
#13	1	0.770	0.120	0.000	0.000	65.000	S	0.45	0.032
	Σ	**0.770**						**0.45**	**0.032**
#12	1	2.960	0.045	0.000	0.000	85.000	M	4.91	0.391
	Σ	**2.960**						**4.91**	**0.391**
#10	1	14.680	0.116	0.000	0.000	79.000	S	19.26	1.452
	Σ	**14.680**						**19.26**	**1.452**
#9	1	15.500	0.229	0.000	0.000	79.000	S	8.65	1.029
	Σ	**15.500**						**8.65**	**1.029**
#11	1	0.710	0.023	0.000	0.000	75.000	M	0.77	0.057
	Σ	**16.210**						**8.81**	**1.086**
#6	1	1.530	0.027	0.000	0.000	74.000	M	1.59	0.116
	Σ	**17.740**						**9.13**	**1.202**
#7	1	2.070	0.015	0.000	0.000	66.000	M	1.31	0.094
	Σ	**38.220**						**35.01**	**3.171**

Subwatershed Time of Concentration Details:

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#6	1	6. Grassed waterway	40.00	80.00	200.00	9.480	0.005
		6. Grassed waterway	20.00	80.00	400.00	6.700	0.016
#6	**1**	**Time of Concentration:**					**0.027**
#7	1	3. Short grass pasture	5.00	5.00	100.00	1.780	0.015
#7	**1**	**Time of Concentration:**					**0.015**
#9	1	3. Short grass pasture	2.83	4.23	149.46	1.340	0.030
		3. Short grass pasture	3.90	11.50	294.87	1.570	0.052
		6. Grassed waterway	3.05	41.93	1,374.75	2.610	0.146
		8. Large gullies, diversions, and low flowing streams	26.83	22.00	81.99	15.530	0.001
#9	**1**	**Time of Concentration:**					**0.229**
#10	1	3. Short grass pasture	33.00	24.75	75.00	4.590	0.004
		6. Grassed waterway	3.00	30.00	1,000.00	2.590	0.107
		8. Large gullies, diversions, and low flowing streams	33.00	115.50	350.00	17.230	0.005
#10	**1**	**Time of Concentration:**					**0.116**

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#11	1	3. Short grass pasture	33.00	23.10	70.00	4.590	0.004
		6. Grassed waterway	2.00	3.00	150.00	2.120	0.019
#11	**1**	**Time of Concentration:**					**0.023**
#12	1	3. Short grass pasture	33.00	16.49	49.96	4.590	0.003
		6. Grassed waterway	12.00	96.00	800.00	5.190	0.042
#12	**1**	**Time of Concentration:**					**0.045**

General Information

Storm Information:

Storm Type:	NRCS Type II
Design Storm:	5 yr - 24 hr
Rainfall Depth:	3.600 inches

Structure Summary:

		Immediate Contributing Area (ac)	Total Contributing Area (ac)	Peak Discharge (cfs)	Total Runoff Volume (ac-ft)
#13		0.770	0.770	0.72	0.05
#12		2.960	2.960	6.33	0.52
#10		14.680	14.680	26.00	2.01
#9		15.500	15.500	12.17	1.42
#11		0.710	16.210	12.38	1.50
#6		1.530	17.740	13.08	1.67
#7	In	2.070	38.220	48.19	4.40
	Out			0.26	0.78

Structure Detail:

Structure #13 (Null)

I-19

Structure #12 (Null)

CHANNEL M

Structure #10 (Null)

DS-6

Structure #9 (Null)

DS 5-A

Structure #11 (Null)

CHANNEL Z

Structure #6 (Null)

CHANNEL N

Structure #7 (Pond)

BASIN 2

Pond Inputs:

Initial Pool Elev:	460.01 ft
Initial Pool:	0.01 ac-ft

Perforated Riser

Riser Diameter (in)	Riser Height (ft)	Barrel Diameter (in)	Barrel Length (ft)	Barrel Slope (%)	Manning's n	Spillway Elev (ft)	Number of Holes per Elev
36.00	16.25	30.00	100.00	4.50	0.0240	476.25	1

Emergency Spillway

Spillway Elev	Crest Length (ft)	Left Sideslope	Right Sideslope	Bottom Width (ft)
476.95	20.00	4.00:1	4.00:1	60.00

Pond Results:

Peak Elevation:	465.95 ft

Dewater Time:	12.69 days

Dewatering time is calculated from peak stage to lowest spillway

Elevation-Capacity-Discharge Table

Elevation	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	Dewater Time (hrs)	
460.00	0.600	0.000	0.000		
460.01	0.600	0.006	0.000		Low hole SPW #1
460.50	0.602	0.300	0.074	48.46*	
461.00	0.604	0.602	0.105	34.90*	
461.50	0.606	0.904	0.128	28.54*	
462.00	0.608	1.208	0.148	24.78*	
462.50	0.638	1.519	0.166	22.74*	
463.00	0.669	1.846	0.182	21.76*	
463.50	0.701	2.189	0.196	21.12*	
464.00	0.733	2.547	0.210	20.67*	
464.50	0.766	2.922	0.223	20.37*	
465.00	0.900	3.338	0.235	21.45*	
465.50	0.828	3.770	0.246	21.23*	
465.95	0.858	4.145	0.256	18.45	Peak Stage
466.00	0.856	4.191	0.257		
466.50	0.885	4.626	0.268		
467.00	0.914	5.076	0.278		
467.50	0.944	5.540	0.287		
468.00	0.974	6.020	0.371		
468.50	1.005	6.514	0.411		
469.00	1.036	7.025	0.444		
469.50	1.068	7.551	0.472		
470.00	1.100	8.093	0.795		
470.50	1.128	8.650	0.942		
471.00	1.157	9.221	1.059		
471.50	1.186	9.807	1.160		
472.00	1.216	10.407	1.251		
472.50	1.300	11.036	1.334		
473.00	1.276	11.680	1.411		
473.50	1.306	12.325	1.484		
474.00	1.337	12.986	1.552		
474.50	1.368	13.662	1.617		
474.53	1.370	13.703	1.621		
474.75	1.384	14.006	1.649		
475.00	1.400	14.354	1.680		
475.33	1.416	14.819	6.607		

Elevation	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	Dewater Time (hrs)	
475.50	1.425	15.060	7.756		
475.54	1.427	15.117	7.997		
475.75	1.437	15.418	9.138		
475.80	1.440	15.490	9.385		
476.00	1.450	15.779	10.306		
476.25	1.462	16.143	11.339		Spillway #1
476.50	1.475	16.510	12.274		
476.75	1.487	16.880	13.137		
476.95	1.497	17.179	17.112		Spillway #2
477.00	1.500	17.254	19.962		
477.50	1.550	18.016	48.891		
478.00	1.600	18.804	187.682		
478.50	1.650	19.616	341.764		
478.53	1.660	19.666	342.103		

**Designates time(s) to dewater have been extrapolated beyond the 50 hour hydrograph limit.*

Detailed Discharge Table

Elevation (ft)	Perf. Riser (cfs)	Emergency Spillway (cfs)	Combined Total Discharge (cfs)
460.00	0.000	0.000	0.000
460.01	2.00>0.000	0.000	0.000
460.50	0.074	0.000	0.074
461.00	0.105	0.000	0.105
461.50	0.128	0.000	0.128
462.00	0.148	0.000	0.148
462.50	0.166	0.000	0.166
463.00	0.182	0.000	0.182
463.50	0.196	0.000	0.196
464.00	0.210	0.000	0.210
464.50	0.223	0.000	0.223
465.00	0.235	0.000	0.235
465.50	0.246	0.000	0.246
466.00	0.257	0.000	0.257
466.50	0.268	0.000	0.268
467.00	0.278	0.000	0.278
467.50	2.00>0.287	0.000	0.287
468.00	0.371	0.000	0.371
468.50	0.411	0.000	0.411

Elevation (ft)	Perf. Riser (cfs)	Emergency Spillway (cfs)	Combined Total Discharge (cfs)
469.00	0.444	0.000	0.444
469.50	4.00>0.472	0.000	0.472
470.00	0.795	0.000	0.795
470.50	0.942	0.000	0.942
471.00	1.059	0.000	1.059
471.50	1.160	0.000	1.160
472.00	1.251	0.000	1.251
472.50	1.334	0.000	1.334
473.00	1.411	0.000	1.411
473.50	1.484	0.000	1.484
474.00	1.552	0.000	1.552
474.50	1.617	0.000	1.617
474.53	1.621	0.000	1.621
474.75	1.649	0.000	1.649
475.00	18.00>1.680	0.000	1.680
475.33	6.607	0.000	6.607
475.50	7.756	0.000	7.756
475.54	7.997	0.000	7.997
475.75	9.138	0.000	9.138
475.80	9.385	0.000	9.385
476.00	10.306	0.000	10.306
476.25	11.339	0.000	11.339
476.50	12.274	0.000	12.274
476.75	13.137	0.000	13.137
476.95	17.112	0.000	17.112
477.00	18.977	0.985	19.962
477.50	38.052	10.838	48.891
478.00	45.024	142.658	187.682
478.50	51.053	290.711	341.764
478.53	51.392	290.711	342.103

Subwatershed Hydrology Detail:

Stru #	SWS #	SWS Area (ac)	Time of Conc (hrs)	Musk K (hrs)	Musk X	Curve Number	UHS	Peak Discharge (cfs)	Runoff Volume (ac-ft)
#13	1	0.770	0.120	0.000	0.000	65.000	S	0.72	0.052
	Σ	**0.770**						**0.72**	**0.052**
#12	1	2.960	0.045	0.000	0.000	85.000	M	6.33	0.518
	Σ	**2.960**						**6.33**	**0.518**
#10	1	14.680	0.116	0.000	0.000	79.000	S	26.00	2.009
	Σ	**14.680**						**26.00**	**2.009**
#9	1	15.500	0.229	0.000	0.000	79.000	S	12.17	1.424
	Σ	**15.500**						**12.17**	**1.424**
#11	1	0.710	0.023	0.000	0.000	75.000	M	1.08	0.081
	Σ	**16.210**						**12.38**	**1.505**
#6	1	1.530	0.027	0.000	0.000	74.000	M	2.24	0.167
	Σ	**17.740**						**13.08**	**1.672**
#7	1	2.070	0.015	0.000	0.000	66.000	M	2.05	0.147
	Σ	**38.220**						**48.19**	**4.398**

Subwatershed Time of Concentration Details:

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#6	1	6. Grassed waterway	40.00	80.00	200.00	9.480	0.005
		6. Grassed waterway	20.00	80.00	400.00	6.700	0.016
#6	**1**	**Time of Concentration:**					**0.027**
#7	1	3. Short grass pasture	5.00	5.00	100.00	1.780	0.015
#7	**1**	**Time of Concentration:**					**0.015**
#9	1	3. Short grass pasture	2.83	4.23	149.46	1.340	0.030
		3. Short grass pasture	3.90	11.50	294.87	1.570	0.052
		6. Grassed waterway	3.05	41.93	1,374.75	2.610	0.146
		8. Large gullies, diversions, and low flowing streams	26.83	22.00	81.99	15.530	0.001
#9	**1**	**Time of Concentration:**					**0.229**
#10	1	3. Short grass pasture	33.00	24.75	75.00	4.590	0.004
		6. Grassed waterway	3.00	30.00	1,000.00	2.590	0.107
		8. Large gullies, diversions, and low flowing streams	33.00	115.50	350.00	17.230	0.005
#10	**1**	**Time of Concentration:**					**0.116**

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#11	1	3. Short grass pasture	33.00	23.10	70.00	4.590	0.004
		6. Grassed waterway	2.00	3.00	150.00	2.120	0.019
#11	**1**	**Time of Concentration:**					**0.023**
#12	1	3. Short grass pasture	33.00	16.49	49.96	4.590	0.003
		6. Grassed waterway	12.00	96.00	800.00	5.190	0.042
#12	**1**	**Time of Concentration:**					**0.045**

General Information

Storm Information:

Storm Type:	NRCS Type II
Design Storm:	10 yr - 24 hr
Rainfall Depth:	4.560 inches

Structure Summary:

		Immediate Contributing Area (ac)	Total Contributing Area (ac)	Peak Discharge (cfs)	Total Runoff Volume (ac-ft)
#13		0.770	0.770	1.20	0.09
#12		2.960	2.960	8.64	0.73
#10		14.680	14.680	37.14	2.97
#9		15.500	15.500	18.12	2.10
#11		0.710	16.210	18.43	2.23
#6		1.530	17.740	19.96	2.48
#7	In	2.070	38.220	70.31	6.51
	Out			0.38	1.04

Structure Detail:

Structure #13 (Null)

I-19

Structure #12 (Null)

CHANNEL M

Structure #10 (Null)

DS-6

Structure #9 (Null)

DS 5-A

Structure #11 (Null)

CHANNEL Z

Structure #6 (Null)

CHANNEL N

Structure #7 (Pond)

BASIN 2

Pond Inputs:

Initial Pool Elev:	460.01 ft
Initial Pool:	0.01 ac-ft

Perforated Riser

Riser Diameter (in)	Riser Height (ft)	Barrel Diameter (in)	Barrel Length (ft)	Barrel Slope (%)	Manning's n	Spillway Elev (ft)	Number of Holes per Elev
36.00	16.25	30.00	100.00	4.50	0.0240	476.25	1

Emergency Spillway

Spillway Elev	Crest Length (ft)	Left Sideslope	Right Sideslope	Bottom Width (ft)
476.95	20.00	4.00:1	4.00:1	60.00

Pond Results:

Peak Elevation:	468.16 ft

Dewater Time:	16.16 days

Dewatering time is calculated from peak stage to lowest spillway

Elevation-Capacity-Discharge Table

Elevation	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	Dewater Time (hrs)	
460.00	0.600	0.000	0.000		
460.01	0.600	0.006	0.000		Low hole SPW #1
460.50	0.602	0.300	0.074	48.46*	
461.00	0.604	0.602	0.105	34.90*	
461.50	0.606	0.904	0.128	28.54*	
462.00	0.608	1.208	0.148	24.78*	
462.50	0.638	1.519	0.166	22.74*	
463.00	0.669	1.846	0.182	21.76*	
463.50	0.701	2.189	0.196	21.12*	
464.00	0.733	2.547	0.210	20.67*	
464.50	0.766	2.922	0.223	20.37*	
465.00	0.900	3.338	0.235	21.45*	
465.50	0.828	3.770	0.246	21.23*	
466.00	0.856	4.191	0.257	19.81*	
466.50	0.885	4.626	0.268	19.68*	
467.00	0.914	5.076	0.278	19.59*	
467.50	0.944	5.540	0.287	19.55*	
468.00	0.974	6.020	0.371	17.75	
468.16	0.984	6.180	0.384	5.45	Peak Stage
468.50	1.005	6.514	0.411		
469.00	1.036	7.025	0.444		
469.50	1.068	7.551	0.472		
470.00	1.100	8.093	0.795		
470.50	1.128	8.650	0.942		
471.00	1.157	9.221	1.059		
471.50	1.186	9.807	1.160		
472.00	1.216	10.407	1.251		
472.50	1.300	11.036	1.334		
473.00	1.276	11.680	1.411		
473.50	1.306	12.325	1.484		
474.00	1.337	12.986	1.552		
474.50	1.368	13.662	1.617		
474.53	1.370	13.703	1.621		
474.75	1.384	14.006	1.649		
475.00	1.400	14.354	1.680		
475.33	1.416	14.819	6.607		

Elevation	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	Dewater Time (hrs)	
475.50	1.425	15.060	7.756		
475.54	1.427	15.117	7.997		
475.75	1.437	15.418	9.138		
475.80	1.440	15.490	9.385		
476.00	1.450	15.779	10.306		
476.25	1.462	16.143	11.339		Spillway #1
476.50	1.475	16.510	12.274		
476.75	1.487	16.880	13.137		
476.95	1.497	17.179	17.112		Spillway #2
477.00	1.500	17.254	19.962		
477.50	1.550	18.016	48.891		
478.00	1.600	18.804	187.682		
478.50	1.650	19.616	341.764		
478.53	1.660	19.666	342.103		

**Designates time(s) to dewater have been extrapolated beyond the 50 hour hydrograph limit.*

Detailed Discharge Table

Elevation (ft)	Perf. Riser (cfs)	Emergency Spillway (cfs)	Combined Total Discharge (cfs)
460.00	0.000	0.000	0.000
460.01	2.00>0.000	0.000	0.000
460.50	0.074	0.000	0.074
461.00	0.105	0.000	0.105
461.50	0.128	0.000	0.128
462.00	0.148	0.000	0.148
462.50	0.166	0.000	0.166
463.00	0.182	0.000	0.182
463.50	0.196	0.000	0.196
464.00	0.210	0.000	0.210
464.50	0.223	0.000	0.223
465.00	0.235	0.000	0.235
465.50	0.246	0.000	0.246
466.00	0.257	0.000	0.257
466.50	0.268	0.000	0.268
467.00	0.278	0.000	0.278
467.50	2.00>0.287	0.000	0.287
468.00	0.371	0.000	0.371
468.50	0.411	0.000	0.411

Elevation (ft)	Perf. Riser (cfs)	Emergency Spillway (cfs)	Combined Total Discharge (cfs)
469.00	0.444	0.000	0.444
469.50	4.00>0.472	0.000	0.472
470.00	0.795	0.000	0.795
470.50	0.942	0.000	0.942
471.00	1.059	0.000	1.059
471.50	1.160	0.000	1.160
472.00	1.251	0.000	1.251
472.50	1.334	0.000	1.334
473.00	1.411	0.000	1.411
473.50	1.484	0.000	1.484
474.00	1.552	0.000	1.552
474.50	1.617	0.000	1.617
474.53	1.621	0.000	1.621
474.75	1.649	0.000	1.649
475.00	18.00>1.680	0.000	1.680
475.33	6.607	0.000	6.607
475.50	7.756	0.000	7.756
475.54	7.997	0.000	7.997
475.75	9.138	0.000	9.138
475.80	9.385	0.000	9.385
476.00	10.306	0.000	10.306
476.25	11.339	0.000	11.339
476.50	12.274	0.000	12.274
476.75	13.137	0.000	13.137
476.95	17.112	0.000	17.112
477.00	18.977	0.985	19.962
477.50	38.052	10.838	48.891
478.00	45.024	142.658	187.682
478.50	51.053	290.711	341.764
478.53	51.392	290.711	342.103

Subwatershed Hydrology Detail:

Stru #	SWS #	SWS Area (ac)	Time of Conc (hrs)	Musk K (hrs)	Musk X	Curve Number	UHS	Peak Discharge (cfs)	Runoff Volume (ac-ft)
#13	1	0.770	0.120	0.000	0.000	65.000	S	1.20	0.088
	Σ	**0.770**						**1.20**	**0.088**
#12	1	2.960	0.045	0.000	0.000	85.000	M	8.64	0.730
	Σ	**2.960**						**8.64**	**0.730**
#10	1	14.680	0.116	0.000	0.000	79.000	S	37.14	2.966
	Σ	**14.680**						**37.14**	**2.966**
#9	1	15.500	0.229	0.000	0.000	79.000	S	18.12	2.102
	Σ	**15.500**						**18.12**	**2.102**
#11	1	0.710	0.023	0.000	0.000	75.000	M	1.60	0.124
	Σ	**16.210**						**18.43**	**2.226**
#6	1	1.530	0.027	0.000	0.000	74.000	M	3.35	0.257
	Σ	**17.740**						**19.96**	**2.483**
#7	1	2.070	0.015	0.000	0.000	66.000	M	3.38	0.247
	Σ	**38.220**						**70.31**	**6.514**

Subwatershed Time of Concentration Details:

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#6	1	6. Grassed waterway	40.00	80.00	200.00	9.480	0.005
		6. Grassed waterway	20.00	80.00	400.00	6.700	0.016
#6	**1**	**Time of Concentration:**					**0.027**
#7	1	3. Short grass pasture	5.00	5.00	100.00	1.780	0.015
#7	**1**	**Time of Concentration:**					**0.015**
#9	1	3. Short grass pasture	2.83	4.23	149.46	1.340	0.030
		3. Short grass pasture	3.90	11.50	294.87	1.570	0.052
		6. Grassed waterway	3.05	41.93	1,374.75	2.610	0.146
		8. Large gullies, diversions, and low flowing streams	26.83	22.00	81.99	15.530	0.001
#9	**1**	**Time of Concentration:**					**0.229**
#10	1	3. Short grass pasture	33.00	24.75	75.00	4.590	0.004
		6. Grassed waterway	3.00	30.00	1,000.00	2.590	0.107
		8. Large gullies, diversions, and low flowing streams	33.00	115.50	350.00	17.230	0.005
#10	**1**	**Time of Concentration:**					**0.116**

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#11	1	3. Short grass pasture	33.00	23.10	70.00	4.590	0.004
		6. Grassed waterway	2.00	3.00	150.00	2.120	0.019
#11	**1**	**Time of Concentration:**					**0.023**
#12	1	3. Short grass pasture	33.00	16.49	49.96	4.590	0.003
		6. Grassed waterway	12.00	96.00	800.00	5.190	0.042
#12	**1**	**Time of Concentration:**					**0.045**

General Information

Storm Information:

Storm Type:	NRCS Type II
Design Storm:	25 yr - 24 hr
Rainfall Depth:	5.520 inches

Structure Summary:

		Immediate Contributing Area (ac)	Total Contributing Area (ac)	Peak Discharge (cfs)	Total Runoff Volume (ac-ft)
#13		0.770	0.770	1.73	0.13
#12		2.960	2.960	10.93	0.95
#10		14.680	14.680	48.48	3.98
#9		15.500	15.500	24.31	2.82
#11		0.710	16.210	24.72	2.99
#6		1.530	17.740	27.18	3.34
#7	In	2.070	38.220	93.14	8.76
	Out			0.82	1.72

Structure Detail:

Structure #13 (Null)

I-19

Structure #12 (Null)

CHANNEL M

Structure #10 (Null)

DS-6

Structure #9 (Null)

DS 5-A

Structure #11 (Null)

CHANNEL Z

Structure #6 (Null)

CHANNEL N

Structure #7 (Pond)

BASIN 2

Pond Inputs:

Initial Pool Elev:	460.01 ft
Initial Pool:	0.01 ac-ft

Perforated Riser

Riser Diameter (in)	Riser Height (ft)	Barrel Diameter (in)	Barrel Length (ft)	Barrel Slope (%)	Manning's n	Spillway Elev (ft)	Number of Holes per Elev
36.00	16.25	30.00	100.00	4.50	0.0240	476.25	1

Emergency Spillway

Spillway Elev	Crest Length (ft)	Left Sideslope	Right Sideslope	Bottom Width (ft)
476.95	20.00	4.00:1	4.00:1	60.00

Pond Results:

Peak Elevation:	470.08 ft

Dewater Time:	18.11 days

Dewatering time is calculated from peak stage to lowest spillway

Elevation-Capacity-Discharge Table

Elevation	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	Dewater Time (hrs)	
460.00	0.600	0.000	0.000		
460.01	0.600	0.006	0.000		Low hole SPW #1
460.50	0.602	0.300	0.074	48.46*	
461.00	0.604	0.602	0.105	34.90*	
461.50	0.606	0.904	0.128	28.54*	
462.00	0.608	1.208	0.148	24.78*	
462.50	0.638	1.519	0.166	22.74*	
463.00	0.669	1.846	0.182	21.76*	
463.50	0.701	2.189	0.196	21.12*	
464.00	0.733	2.547	0.210	20.67*	
464.50	0.766	2.922	0.223	20.37*	
465.00	0.900	3.338	0.235	21.45*	
465.50	0.828	3.770	0.246	21.23*	
466.00	0.856	4.191	0.257	19.81*	
466.50	0.885	4.626	0.268	19.68*	
467.00	0.914	5.076	0.278	19.59*	
467.50	0.944	5.540	0.287	19.55*	
468.00	0.974	6.020	0.371	15.63*	
468.50	1.005	6.514	0.411	14.56*	
469.00	1.036	7.025	0.444	13.92*	
469.50	1.068	7.551	0.472	13.48*	
470.00	1.100	8.093	0.795	10.60	
470.08	1.103	8.186	0.820	1.75	Peak Stage
470.50	1.128	8.650	0.942		
471.00	1.157	9.221	1.059		
471.50	1.186	9.807	1.160		
472.00	1.216	10.407	1.251		
472.50	1.300	11.036	1.334		
473.00	1.276	11.680	1.411		
473.50	1.306	12.325	1.484		
474.00	1.337	12.986	1.552		
474.50	1.368	13.662	1.617		
474.53	1.370	13.703	1.621		
474.75	1.384	14.006	1.649		
475.00	1.400	14.354	1.680		
475.33	1.416	14.819	6.607		

Elevation	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	Dewater Time (hrs)	
475.50	1.425	15.060	7.756		
475.54	1.427	15.117	7.997		
475.75	1.437	15.418	9.138		
475.80	1.440	15.490	9.385		
476.00	1.450	15.779	10.306		
476.25	1.462	16.143	11.339		Spillway #1
476.50	1.475	16.510	12.274		
476.75	1.487	16.880	13.137		
476.95	1.497	17.179	17.112		Spillway #2
477.00	1.500	17.254	19.962		
477.50	1.550	18.016	48.891		
478.00	1.600	18.804	187.682		
478.50	1.650	19.616	341.764		
478.53	1.660	19.666	342.103		

**Designates time(s) to dewater have been extrapolated beyond the 50 hour hydrograph limit.*

Detailed Discharge Table

Elevation (ft)	Perf. Riser (cfs)	Emergency Spillway (cfs)	Combined Total Discharge (cfs)
460.00	0.000	0.000	0.000
460.01	2.00>0.000	0.000	0.000
460.50	0.074	0.000	0.074
461.00	0.105	0.000	0.105
461.50	0.128	0.000	0.128
462.00	0.148	0.000	0.148
462.50	0.166	0.000	0.166
463.00	0.182	0.000	0.182
463.50	0.196	0.000	0.196
464.00	0.210	0.000	0.210
464.50	0.223	0.000	0.223
465.00	0.235	0.000	0.235
465.50	0.246	0.000	0.246
466.00	0.257	0.000	0.257
466.50	0.268	0.000	0.268
467.00	0.278	0.000	0.278
467.50	2.00>0.287	0.000	0.287
468.00	0.371	0.000	0.371
468.50	0.411	0.000	0.411

Elevation (ft)	Perf. Riser (cfs)	Emergency Spillway (cfs)	Combined Total Discharge (cfs)
469.00	0.444	0.000	0.444
469.50	4.00>0.472	0.000	0.472
470.00	0.795	0.000	0.795
470.50	0.942	0.000	0.942
471.00	1.059	0.000	1.059
471.50	1.160	0.000	1.160
472.00	1.251	0.000	1.251
472.50	1.334	0.000	1.334
473.00	1.411	0.000	1.411
473.50	1.484	0.000	1.484
474.00	1.552	0.000	1.552
474.50	1.617	0.000	1.617
474.53	1.621	0.000	1.621
474.75	1.649	0.000	1.649
475.00	18.00>1.680	0.000	1.680
475.33	6.607	0.000	6.607
475.50	7.756	0.000	7.756
475.54	7.997	0.000	7.997
475.75	9.138	0.000	9.138
475.80	9.385	0.000	9.385
476.00	10.306	0.000	10.306
476.25	11.339	0.000	11.339
476.50	12.274	0.000	12.274
476.75	13.137	0.000	13.137
476.95	17.112	0.000	17.112
477.00	18.977	0.985	19.962
477.50	38.052	10.838	48.891
478.00	45.024	142.658	187.682
478.50	51.053	290.711	341.764
478.53	51.392	290.711	342.103

Subwatershed Hydrology Detail:

Stru #	SWS #	SWS Area (ac)	Time of Conc (hrs)	Musk K (hrs)	Musk X	Curve Number	UHS	Peak Discharge (cfs)	Runoff Volume (ac-ft)
#13	1	0.770	0.120	0.000	0.000	65.000	S	1.73	0.129
	Σ	**0.770**						**1.73**	**0.129**
#12	1	2.960	0.045	0.000	0.000	85.000	M	10.93	0.949
	Σ	**2.960**						**10.93**	**0.949**
#10	1	14.680	0.116	0.000	0.000	79.000	S	48.48	3.977
	Σ	**14.680**						**48.48**	**3.977**
#9	1	15.500	0.229	0.000	0.000	79.000	S	24.31	2.819
	Σ	**15.500**						**24.31**	**2.819**
#11	1	0.710	0.023	0.000	0.000	75.000	M	2.14	0.170
	Σ	**16.210**						**24.72**	**2.989**
#6	1	1.530	0.027	0.000	0.000	74.000	M	4.50	0.355
	Σ	**17.740**						**27.18**	**3.343**
#7	1	2.070	0.015	0.000	0.000	66.000	M	4.81	0.360
	Σ	**38.220**						**93.14**	**8.758**

Subwatershed Time of Concentration Details:

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#6	1	6. Grassed waterway	40.00	80.00	200.00	9.480	0.005
		6. Grassed waterway	20.00	80.00	400.00	6.700	0.016
#6	**1**	**Time of Concentration:**					**0.027**
#7	1	3. Short grass pasture	5.00	5.00	100.00	1.780	0.015
#7	**1**	**Time of Concentration:**					**0.015**
#9	1	3. Short grass pasture	2.83	4.23	149.46	1.340	0.030
		3. Short grass pasture	3.90	11.50	294.87	1.570	0.052
		6. Grassed waterway	3.05	41.93	1,374.75	2.610	0.146
		8. Large gullies, diversions, and low flowing streams	26.83	22.00	81.99	15.530	0.001
#9	**1**	**Time of Concentration:**					**0.229**
#10	1	3. Short grass pasture	33.00	24.75	75.00	4.590	0.004
		6. Grassed waterway	3.00	30.00	1,000.00	2.590	0.107
		8. Large gullies, diversions, and low flowing streams	33.00	115.50	350.00	17.230	0.005
#10	**1**	**Time of Concentration:**					**0.116**

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#11	1	3. Short grass pasture	33.00	23.10	70.00	4.590	0.004
		6. Grassed waterway	2.00	3.00	150.00	2.120	0.019
#11	**1**	**Time of Concentration:**					**0.023**
#12	1	3. Short grass pasture	33.00	16.49	49.96	4.590	0.003
		6. Grassed waterway	12.00	96.00	800.00	5.190	0.042
#12	**1**	**Time of Concentration:**					**0.045**

General Information

Storm Information:

Storm Type:	NRCS Type II
Design Storm:	50 yr - 24 hr
Rainfall Depth:	6.480 inches

Structure Summary:

		Immediate Contributing Area (ac)	Total Contributing Area (ac)	Peak Discharge (cfs)	Total Runoff Volume (ac-ft)
#13		0.770	0.770	2.28	0.17
#12		2.960	2.960	13.22	1.17
#10		14.680	14.680	59.89	5.02
#9		15.500	15.500	30.62	3.56
#11		0.710	16.210	31.14	3.78
#6		1.530	17.740	34.61	4.24
#7	In	2.070	38.220	116.31	11.09
	Out			1.20	3.12

Structure Detail:

Structure #13 (Null)

I-19

Structure #12 (Null)

CHANNEL M

Structure #10 (Null)

DS-6

Structure #9 (Null)

DS 5-A

Structure #11 (Null)

CHANNEL Z

Structure #6 (Null)

CHANNEL N

Structure #7 (Pond)

BASIN 2

Pond Inputs:

Initial Pool Elev:	460.01 ft
Initial Pool:	0.01 ac-ft

Perforated Riser

Riser Diameter (in)	Riser Height (ft)	Barrel Diameter (in)	Barrel Length (ft)	Barrel Slope (%)	Manning's n	Spillway Elev (ft)	Number of Holes per Elev
36.00	16.25	30.00	100.00	4.50	0.0240	476.25	1

Emergency Spillway

Spillway Elev	Crest Length (ft)	Left Sideslope	Right Sideslope	Bottom Width (ft)
476.95	20.00	4.00:1	4.00:1	60.00

Pond Results:

Peak Elevation:	471.71 ft
Dewater Time:	18.94 days

Dewatering time is calculated from peak stage to lowest spillway

Elevation-Capacity-Discharge Table

Elevation	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	Dewater Time (hrs)	
460.00	0.600	0.000	0.000		
460.01	0.600	0.006	0.000		Low hole SPW #1
460.50	0.602	0.300	0.074	48.46*	
461.00	0.604	0.602	0.105	34.90*	
461.50	0.606	0.904	0.128	28.54*	
462.00	0.608	1.208	0.148	24.78*	
462.50	0.638	1.519	0.166	22.74*	
463.00	0.669	1.846	0.182	21.76*	
463.50	0.701	2.189	0.196	21.12*	
464.00	0.733	2.547	0.210	20.67*	
464.50	0.766	2.922	0.223	20.37*	
465.00	0.900	3.338	0.235	21.45*	
465.50	0.828	3.770	0.246	21.23*	
466.00	0.856	4.191	0.257	19.81*	
466.50	0.885	4.626	0.268	19.68*	
467.00	0.914	5.076	0.278	19.59*	
467.50	0.944	5.540	0.287	19.55*	
468.00	0.974	6.020	0.371	15.63*	
468.50	1.005	6.514	0.411	14.56*	
469.00	1.036	7.025	0.444	13.92*	
469.50	1.068	7.551	0.472	13.48*	
470.00	1.100	8.093	0.795	8.25*	
470.50	1.128	8.650	0.942	7.80	
471.00	1.157	9.221	1.059	6.90	
471.50	1.186	9.807	1.160	6.40	
471.71	1.199	10.062	1.199	2.90	Peak Stage
472.00	1.216	10.407	1.251		
472.50	1.300	11.036	1.334		
473.00	1.276	11.680	1.411		
473.50	1.306	12.325	1.484		
474.00	1.337	12.986	1.552		
474.50	1.368	13.662	1.617		
474.53	1.370	13.703	1.621		
474.75	1.384	14.006	1.649		
475.00	1.400	14.354	1.680		
475.33	1.416	14.819	6.607		
475.50	1.425	15.060	7.756		
475.54	1.427	15.117	7.997		
475.75	1.437	15.418	9.138		
475.80	1.440	15.490	9.385		
476.00	1.450	15.779	10.306		

Elevation	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	Dewater Time (hrs)	
476.25	1.462	16.143	11.339		Spillway #1
476.50	1.475	16.510	12.274		
476.75	1.487	16.880	13.137		
476.95	1.497	17.179	17.112		Spillway #2
477.00	1.500	17.254	19.962		
477.50	1.550	18.016	48.891		
478.00	1.600	18.804	187.682		
478.50	1.650	19.616	341.764		
478.53	1.660	19.666	342.103		

**Designates time(s) to dewater have been extrapolated beyond the 50 hour hydrograph limit.*

Detailed Discharge Table

Elevation (ft)	Perf. Riser (cfs)	Emergency Spillway (cfs)	Combined Total Discharge (cfs)
460.00	0.000	0.000	0.000
460.01	2.00>0.000	0.000	0.000
460.50	0.074	0.000	0.074
461.00	0.105	0.000	0.105
461.50	0.128	0.000	0.128
462.00	0.148	0.000	0.148
462.50	0.166	0.000	0.166
463.00	0.182	0.000	0.182
463.50	0.196	0.000	0.196
464.00	0.210	0.000	0.210
464.50	0.223	0.000	0.223
465.00	0.235	0.000	0.235
465.50	0.246	0.000	0.246
466.00	0.257	0.000	0.257
466.50	0.268	0.000	0.268
467.00	0.278	0.000	0.278
467.50	2.00>0.287	0.000	0.287
468.00	0.371	0.000	0.371
468.50	0.411	0.000	0.411
469.00	0.444	0.000	0.444
469.50	4.00>0.472	0.000	0.472
470.00	0.795	0.000	0.795
470.50	0.942	0.000	0.942
471.00	1.059	0.000	1.059
471.50	1.160	0.000	1.160

Elevation (ft)	Perf. Riser (cfs)	Emergency Spillway (cfs)	Combined Total Discharge (cfs)
472.00	1.251	0.000	1.251
472.50	1.334	0.000	1.334
473.00	1.411	0.000	1.411
473.50	1.484	0.000	1.484
474.00	1.552	0.000	1.552
474.50	1.617	0.000	1.617
474.53	1.621	0.000	1.621
474.75	1.649	0.000	1.649
475.00	18.00>1.680	0.000	1.680
475.33	6.607	0.000	6.607
475.50	7.756	0.000	7.756
475.54	7.997	0.000	7.997
475.75	9.138	0.000	9.138
475.80	9.385	0.000	9.385
476.00	10.306	0.000	10.306
476.25	11.339	0.000	11.339
476.50	12.274	0.000	12.274
476.75	13.137	0.000	13.137
476.95	17.112	0.000	17.112
477.00	18.977	0.985	19.962
477.50	38.052	10.838	48.891
478.00	45.024	142.658	187.682
478.50	51.053	290.711	341.764
478.53	51.392	290.711	342.103

Subwatershed Hydrology Detail:

Stru #	SWS #	SWS Area (ac)	Time of Conc (hrs)	Musk K (hrs)	Musk X	Curve Number	UHS	Peak Discharge (cfs)	Runoff Volume (ac-ft)
#13	1	0.770	0.120	0.000	0.000	65.000	S	2.28	0.173
	Σ	**0.770**						**2.28**	**0.173**
#12	1	2.960	0.045	0.000	0.000	85.000	M	13.22	1.172
	Σ	**2.960**						**13.22**	**1.172**
#10	1	14.680	0.116	0.000	0.000	79.000	S	59.89	5.025
	Σ	**14.680**						**59.89**	**5.025**
#9	1	15.500	0.229	0.000	0.000	79.000	S	30.62	3.561
	Σ	**15.500**						**30.62**	**3.561**
#11	1	0.710	0.023	0.000	0.000	75.000	M	2.69	0.218
	Σ	**16.210**						**31.14**	**3.779**
#6	1	1.530	0.027	0.000	0.000	74.000	M	5.67	0.457
	Σ	**17.740**						**34.61**	**4.237**
#7	1	2.070	0.015	0.000	0.000	66.000	M	6.31	0.483
	Σ	**38.220**						**116.31**	**11.090**

Subwatershed Time of Concentration Details:

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#6	1	6. Grassed waterway	40.00	80.00	200.00	9.480	0.005
		6. Grassed waterway	20.00	80.00	400.00	6.700	0.016
#6	**1**	**Time of Concentration:**					**0.027**
#7	1	3. Short grass pasture	5.00	5.00	100.00	1.780	0.015
#7	**1**	**Time of Concentration:**					**0.015**
#9	1	3. Short grass pasture	2.83	4.23	149.46	1.340	0.030
		3. Short grass pasture	3.90	11.50	294.87	1.570	0.052
		6. Grassed waterway	3.05	41.93	1,374.75	2.610	0.146
		8. Large gullies, diversions, and low flowing streams	26.83	22.00	81.99	15.530	0.001
#9	**1**	**Time of Concentration:**					**0.229**
#10	1	3. Short grass pasture	33.00	24.75	75.00	4.590	0.004
		6. Grassed waterway	3.00	30.00	1,000.00	2.590	0.107
		8. Large gullies, diversions, and low flowing streams	33.00	115.50	350.00	17.230	0.005
#10	**1**	**Time of Concentration:**					**0.116**
#11	1	3. Short grass pasture	33.00	23.10	70.00	4.590	0.004

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
		6. Grassed waterway	2.00	3.00	150.00	2.120	0.019
#11	**1**	**Time of Concentration:**					**0.023**
#12	1	3. Short grass pasture	33.00	16.49	49.96	4.590	0.003
		6. Grassed waterway	12.00	96.00	800.00	5.190	0.042
#12	**1**	**Time of Concentration:**					**0.045**

General Information

Storm Information:

Storm Type:	NRCS Type II
Design Storm:	100 yr - 24 hr
Rainfall Depth:	7.440 inches

Structure Summary:

		Immediate Contributing Area (ac)	Total Contributing Area (ac)	Peak Discharge (cfs)	Total Runoff Volume (ac-ft)
#13		0.770	0.770	2.85	0.22
#12		2.960	2.960	15.50	1.40
#10		14.680	14.680	71.30	6.10
#9		15.500	15.500	37.00	4.32
#11		0.710	16.210	37.62	4.59
#6		1.530	17.740	42.14	5.15
#7	In	2.070	38.220	139.66	13.48
	Out			1.46	4.07

Structure Detail:

Structure #13 (Null)

I-19

Structure #12 (Null)

CHANNEL M

Structure #10 (Null)

DS-6

Structure #9 (Null)

DS 5-A

Structure #11 (Null)

CHANNEL Z

Structure #6 (Null)

CHANNEL N

Structure #7 (Pond)

BASIN 2

Pond Inputs:

Initial Pool Elev:	460.01 ft
Initial Pool:	0.01 ac-ft

Perforated Riser

Riser Diameter (in)	Riser Height (ft)	Barrel Diameter (in)	Barrel Length (ft)	Barrel Slope (%)	Manning's n	Spillway Elev (ft)	Number of Holes per Elev
36.00	16.25	30.00	100.00	4.50	0.0240	476.25	1

Emergency Spillway

Spillway Elev	Crest Length (ft)	Left Sideslope	Right Sideslope	Bottom Width (ft)
476.95	20.00	4.00:1	4.00:1	60.00

Pond Results:

Peak Elevation:	473.35 ft
Dewater Time:	19.67 days

Dewatering time is calculated from peak stage to lowest spillway

Elevation-Capacity-Discharge Table

Elevation	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	Dewater Time (hrs)	
460.00	0.600	0.000	0.000		
460.01	0.600	0.006	0.000		Low hole SPW #1
460.50	0.602	0.300	0.074	48.46*	
461.00	0.604	0.602	0.105	34.90*	
461.50	0.606	0.904	0.128	28.54*	
462.00	0.608	1.208	0.148	24.78*	
462.50	0.638	1.519	0.166	22.74*	
463.00	0.669	1.846	0.182	21.76*	
463.50	0.701	2.189	0.196	21.12*	
464.00	0.733	2.547	0.210	20.67*	
464.50	0.766	2.922	0.223	20.37*	
465.00	0.900	3.338	0.235	21.45*	
465.50	0.828	3.770	0.246	21.23*	
466.00	0.856	4.191	0.257	19.81*	
466.50	0.885	4.626	0.268	19.68*	
467.00	0.914	5.076	0.278	19.59*	
467.50	0.944	5.540	0.287	19.55*	
468.00	0.974	6.020	0.371	15.63*	
468.50	1.005	6.514	0.411	14.56*	
469.00	1.036	7.025	0.444	13.92*	
469.50	1.068	7.551	0.472	13.48*	
470.00	1.100	8.093	0.795	8.25*	
470.50	1.128	8.650	0.942	7.15*	
471.00	1.157	9.221	1.059	6.52*	
471.50	1.186	9.807	1.160	6.11*	
472.00	1.216	10.407	1.251	6.05	
472.50	1.300	11.036	1.334	5.90	
473.00	1.276	11.680	1.411	5.65	
473.35	1.305	12.132	1.462	4.10	Peak Stage
473.50	1.306	12.325	1.484		
474.00	1.337	12.986	1.552		
474.50	1.368	13.662	1.617		
474.53	1.370	13.703	1.621		
474.75	1.384	14.006	1.649		
475.00	1.400	14.354	1.680		
475.33	1.416	14.819	6.607		
475.50	1.425	15.060	7.756		
475.54	1.427	15.117	7.997		
475.75	1.437	15.418	9.138		
475.80	1.440	15.490	9.385		
476.00	1.450	15.779	10.306		

Elevation	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	Dewater Time (hrs)	
476.25	1.462	16.143	11.339		Spillway #1
476.50	1.475	16.510	12.274		
476.75	1.487	16.880	13.137		
476.95	1.497	17.179	17.112		Spillway #2
477.00	1.500	17.254	19.962		
477.50	1.550	18.016	48.891		
478.00	1.600	18.804	187.682		
478.50	1.650	19.616	341.764		
478.53	1.660	19.666	342.103		

**Designates time(s) to dewater have been extrapolated beyond the 50 hour hydrograph limit.*

Detailed Discharge Table

Elevation (ft)	Perf. Riser (cfs)	Emergency Spillway (cfs)	Combined Total Discharge (cfs)
460.00	0.000	0.000	0.000
460.01	2.00>0.000	0.000	0.000
460.50	0.074	0.000	0.074
461.00	0.105	0.000	0.105
461.50	0.128	0.000	0.128
462.00	0.148	0.000	0.148
462.50	0.166	0.000	0.166
463.00	0.182	0.000	0.182
463.50	0.196	0.000	0.196
464.00	0.210	0.000	0.210
464.50	0.223	0.000	0.223
465.00	0.235	0.000	0.235
465.50	0.246	0.000	0.246
466.00	0.257	0.000	0.257
466.50	0.268	0.000	0.268
467.00	0.278	0.000	0.278
467.50	2.00>0.287	0.000	0.287
468.00	0.371	0.000	0.371
468.50	0.411	0.000	0.411
469.00	0.444	0.000	0.444
469.50	4.00>0.472	0.000	0.472
470.00	0.795	0.000	0.795
470.50	0.942	0.000	0.942
471.00	1.059	0.000	1.059
471.50	1.160	0.000	1.160

Elevation (ft)	Perf. Riser (cfs)	Emergency Spillway (cfs)	Combined Total Discharge (cfs)
472.00	1.251	0.000	1.251
472.50	1.334	0.000	1.334
473.00	1.411	0.000	1.411
473.50	1.484	0.000	1.484
474.00	1.552	0.000	1.552
474.50	1.617	0.000	1.617
474.53	1.621	0.000	1.621
474.75	1.649	0.000	1.649
475.00	18.00>1.680	0.000	1.680
475.33	6.607	0.000	6.607
475.50	7.756	0.000	7.756
475.54	7.997	0.000	7.997
475.75	9.138	0.000	9.138
475.80	9.385	0.000	9.385
476.00	10.306	0.000	10.306
476.25	11.339	0.000	11.339
476.50	12.274	0.000	12.274
476.75	13.137	0.000	13.137
476.95	17.112	0.000	17.112
477.00	18.977	0.985	19.962
477.50	38.052	10.838	48.891
478.00	45.024	142.658	187.682
478.50	51.053	290.711	341.764
478.53	51.392	290.711	342.103

Subwatershed Hydrology Detail:

Stru #	SWS #	SWS Area (ac)	Time of Conc (hrs)	Musk K (hrs)	Musk X	Curve Number	UHS	Peak Discharge (cfs)	Runoff Volume (ac-ft)
#13	1	0.770	0.120	0.000	0.000	65.000	S	2.85	0.221
	Σ	**0.770**						**2.85**	**0.221**
#12	1	2.960	0.045	0.000	0.000	85.000	M	15.50	1.398
	Σ	**2.960**						**15.50**	**1.398**
#10	1	14.680	0.116	0.000	0.000	79.000	S	71.30	6.098
	Σ	**14.680**						**71.30**	**6.098**
#9	1	15.500	0.229	0.000	0.000	79.000	S	37.00	4.321
	Σ	**15.500**						**37.00**	**4.321**
#11	1	0.710	0.023	0.000	0.000	75.000	M	3.24	0.268
	Σ	**16.210**						**37.62**	**4.589**
#6	1	1.530	0.027	0.000	0.000	74.000	M	6.86	0.564
	Σ	**17.740**						**42.14**	**5.153**
#7	1	2.070	0.015	0.000	0.000	66.000	M	7.85	0.612
	Σ	**38.220**						**139.66**	**13.482**

Subwatershed Time of Concentration Details:

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#6	1	6. Grassed waterway	40.00	80.00	200.00	9.480	0.005
		6. Grassed waterway	20.00	80.00	400.00	6.700	0.016
#6	**1**	**Time of Concentration:**					**0.027**
#7	1	3. Short grass pasture	5.00	5.00	100.00	1.780	0.015
#7	**1**	**Time of Concentration:**					**0.015**
#9	1	3. Short grass pasture	2.83	4.23	149.46	1.340	0.030
		3. Short grass pasture	3.90	11.50	294.87	1.570	0.052
		6. Grassed waterway	3.05	41.93	1,374.75	2.610	0.146
		8. Large gullies, diversions, and low flowing streams	26.83	22.00	81.99	15.530	0.001
#9	**1**	**Time of Concentration:**					**0.229**
#10	1	3. Short grass pasture	33.00	24.75	75.00	4.590	0.004
		6. Grassed waterway	3.00	30.00	1,000.00	2.590	0.107
		8. Large gullies, diversions, and low flowing streams	33.00	115.50	350.00	17.230	0.005
#10	**1**	**Time of Concentration:**					**0.116**
#11	1	3. Short grass pasture	33.00	23.10	70.00	4.590	0.004

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
		6. Grassed waterway	2.00	3.00	150.00	2.120	0.019
#11	**1**	**Time of Concentration:**					**0.023**
#12	1	3. Short grass pasture	33.00	16.49	49.96	4.590	0.003
		6. Grassed waterway	12.00	96.00	800.00	5.190	0.042
#12	**1**	**Time of Concentration:**					**0.045**

IESI PA Bethlehem Landfill
Sedimentation Basin 3

Post Development

TAKEN FROM PHASE IV ANALYSIS

JMM

Martin & Martin, Inc.
37 S. Main Street
Suite A
Chambersburg, PA 17201

Phone: 717-264-6759
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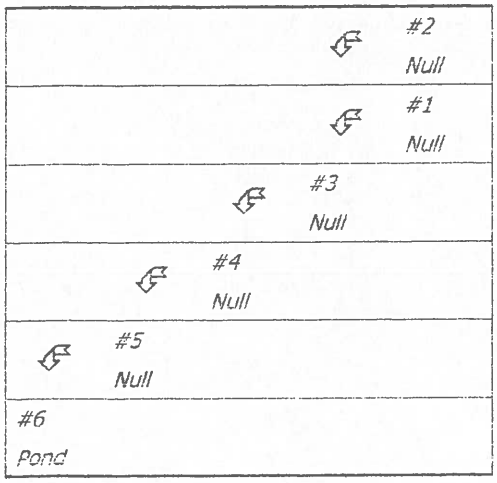
General Information

Storm Information:

Storm Type:	NRCS Type II
Design Storm:	2 yr - 24 hr
Rainfall Depth:	3.200 inches

Structure Networking:

Type	Stru #	(flows into)	Stru #	Musk. K (hrs)	Musk. X	Description
Null	#1	==>	#3	0.000	0.000	Channel H
Null	#2	==>	#3	0.000	0.000	Channel G
Null	#3	==>	#4	0.000	0.000	I-6
Null	#4	==>	#5	0.000	0.000	I-7
Null	#5	==>	#6	0.000	0.000	I-8
Pond	#6	==>	End	0.000	0.000	Sed. Basin 3



Structure Summary:

		Immediate Contributing Area (ac)	Total Contributing Area (ac)	Peak Discharge (cfs)	Total Runoff Volume (ac-ft)
#2		0.250	0.250	0.47	0.04
#1		0.600	0.600	1.13	0.09
#3		0.830	1.680	3.61	0.34
#4		0.400	2.080	4.58	0.43
#5		0.400	2.480	5.56	0.53
#6	In	0.400	2.880	6.31	0.59
	Out			0.59	0.59

Structure Detail:

Structure #2 (Null)

Channel G

Structure #1 (Null)

Channel H

Structure #3 (Null)

I-6

Structure #4 (Null)

I-7

Structure #5 (Null)

I-8

Structure #6 (Pond)

Sed. Basin 3

Pond Inputs:

Initial Pool Elev:	420.01
Initial Pool:	0.00 ac-ft

Perforated Riser

Riser Diameter (in)	Riser Height (ft)	Barrel Diameter (in)	Barrel Length (ft)	Barrel Slope (%)	Manning's n	Spillway Elev	Number of Holes per Elev
24.00	2.50	18.00	50.00	1.00	0.0150	422.50	6

Emergency Spillway

Spillway Elev	Crest Length (ft)	Left Sideslope	Right Sideslope	Bottom Width (ft)
423.50	10.00	2.00:1	2.00:1	20.00

Pond Results:

Peak Elevation:	422.22
H'graph Detention Time:	7.37 hrs
Dewater Time:	1.06 days

Dewatering time is calculated from peak stage to lowest spillway

Elevation-Capacity-Discharge Table

Elevation	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	Dewater Time (hrs)	
420.00	0.100	0.000	0.000		
420.01	0.110	0.001	0.000		Low hole SPW #1
420.50	0.128	0.059	0.110	6.38*	
421.00	0.147	0.128	0.157	6.30	
421.50	0.168	0.206	0.304	5.75	
422.00	0.190	0.296	0.491	4.60	
422.22	0.200	0.341	0.590	2.50	Peak Stage
422.50	0.213	0.396	0.711		Spillway #1
423.00	0.238	0.509	6.886		
423.50	0.264	0.634	14.718		Spillway #2
424.00	0.291	0.773	19.733		
424.50	0.320	0.925	70.471		
425.00	0.350	1.093	129.274		

**Designates time(s) to dewater have been extrapolated beyond the 50 hour hydrograph limit.*

Detailed Discharge Table

Elevation	Perf. Riser (cfs)	Emergency Spillway (cfs)	Combined Total Discharge (cfs)
420.00	0.000	0.000	0.000
420.01	1.00>0.000	0.000	0.000
420.50	0.110	0.000	0.110
421.00	1.00>0.157	0.000	0.157
421.50	1.00>0.304	0.000	0.304
422.00	1.00>0.491	0.000	0.491
422.50	0.711	0.000	0.711
423.00	6.886	0.000	6.886
423.50	14.718	0.000	14.718
424.00	15.611	4.122	19.733
424.50	16.456	54.016	70.471
425.00	17.259	112.015	129.274

Subwatershed Hydrology Detail:

Stru #	SWS #	SWS Area (ac)	Time of Conc (hrs)	Musk K (hrs)	Musk X	Curve Number	UHS	Peak Discharge (cfs)	Runoff Volume (ac-ft)
#2	1	0.250	0.025	0.000	0.000	86.000	TR55	0.47	0.038
	Σ	**0.250**						**0.47**	**0.038**
#1	1	0.600	0.045	0.000	0.000	86.000	TR55	1.13	0.092
	Σ	**0.600**						**1.13**	**0.092**
#3	1	0.830	0.019	0.000	0.000	98.000	TR55	2.02	0.205
	Σ	**1.680**						**3.61**	**0.335**
#4	1	0.400	0.019	0.000	0.000	98.000	TR55	0.97	0.099
	Σ	**2.080**						**4.58**	**0.434**
#5	1	0.400	0.024	0.000	0.000	98.000	TR55	0.97	0.099
	Σ	**2.480**						**5.56**	**0.533**
#6	1	0.400	0.061	0.000	0.000	86.000	TR55	0.75	0.061
	Σ	**2.880**						**6.31**	**0.594**

Subwatershed Time of Concentration Details:

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#1	1	3. Short grass pasture	33.00	33.00	99.99	4.590	0.006
		6. Grassed waterway	2.00	6.00	300.00	2.120	0.039
#1	**1**	**Time of Concentration:**					**0.045**
#2	1	3. Short grass pasture	33.00	33.00	99.99	4.590	0.006
		6. Grassed waterway	2.00	3.00	150.00	2.120	0.019
#2	**1**	**Time of Concentration:**					**0.025**
#3	1	7. Paved area and small upland gullies	2.00	4.00	200.00	2.840	0.019
#3	**1**	**Time of Concentration:**					**0.019**
#4	1	7. Paved area and small upland gullies	2.00	4.00	200.00	2.840	0.019
#4	**1**	**Time of Concentration:**					**0.019**
#5	1	7. Paved area and small upland gullies	2.00	5.00	250.00	2.840	0.024
#5	**1**	**Time of Concentration:**					**0.024**
#6	1	3. Short grass pasture	2.00	5.00	250.00	1.130	0.061
#6	**1**	**Time of Concentration:**					**0.061**

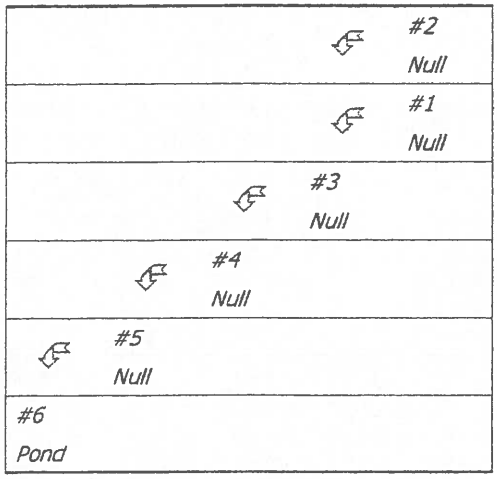
General Information

Storm Information:

Storm Type:	NRCS Type II
Design Storm:	10 yr - 24 hr
Rainfall Depth:	4.830 inches

Structure Networking:

Type	Stru #	(flows into)	Stru #	Musk. K (hrs)	Musk. X	Description
Null	#1	==>	#3	0.000	0.000	Channel H
Null	#2	==>	#3	0.000	0.000	Channel G
Null	#3	==>	#4	0.000	0.000	I-6
Null	#4	==>	#5	0.000	0.000	I-7
Null	#5	==>	#6	0.000	0.000	I-8
Pond	#6	==>	End	0.000	0.000	Sed. Basin 3



Structure Summary:

		Immediate Contributing Area (ac)	Total Contributing Area (ac)	Peak Discharge (cfs)	Total Runoff Volume (ac-ft)
#2		0.250	0.250	0.80	0.07
#1		0.600	0.600	1.92	0.17
#3		0.830	1.680	5.78	0.55
#4		0.400	2.080	7.25	0.71
#5		0.400	2.480	8.72	0.86
#6	In	0.400	2.880	10.00	0.97
	Out			5.19	0.96

Structure Detail:

Structure #2 (Null)

Channel G

Structure #1 (Null)

Channel H

Structure #3 (Null)

I-6

Structure #4 (Null)

I-7

Structure #5 (Null)

I-8

Structure #6 (Pond)

Sed. Basin 3

Pond Inputs:

Initial Pool Elev:	420.01
Initial Pool:	0.00 ac-ft

Perforated Riser

Riser Diameter (in)	Riser Height (ft)	Barrel Diameter (in)	Barrel Length (ft)	Barrel Slope (%)	Manning's n	Spillway Elev	Number of Holes per Elev
24.00	2.50	18.00	50.00	1.00	0.0150	422.50	6

Emergency Spillway

Spillway Elev	Crest Length (ft)	Left Sideslope	Right Sideslope	Bottom Width (ft)
423.50	10.00	2.00:1	2.00:1	20.00

Pond Results:

Peak Elevation:	422.86
H'graph Detention Time:	5.79 hrs
Dewater Time:	1.19 days

Dewatering time is calculated from peak stage to lowest spillway

Elevation-Capacity-Discharge Table

Elevation	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	Dewater Time (hrs)	
420.00	0.100	0.000	0.000		
420.01	0.110	0.001	0.000		Low hole SPW #1
420.50	0.128	0.059	0.110	6.38*	
421.00	0.147	0.128	0.157	6.25	
421.50	0.168	0.206	0.304	4.60	
422.00	0.190	0.296	0.491	5.05	
422.50	0.213	0.396	0.711	4.80	Spillway #1
422.86	0.231	0.478	5.193	1.50	Peak Stage
423.00	0.238	0.509	6.886		
423.50	0.264	0.634	14.718		Spillway #2
424.00	0.291	0.773	19.733		
424.50	0.320	0.925	70.471		
425.00	0.350	1.093	129.274		

**Designates time(s) to dewater have been extrapolated beyond the 50 hour hydrograph limit.*

Detailed Discharge Table

Elevation	Perf. Riser (cfs)	Emergency Spillway (cfs)	Combined Total Discharge (cfs)
420.00	0.000	0.000	0.000
420.01	1.00>0.000	0.000	0.000
420.50	0.110	0.000	0.110
421.00	1.00>0.157	0.000	0.157
421.50	1.00>0.304	0.000	0.304
422.00	1.00>0.491	0.000	0.491
422.50	0.711	0.000	0.711
423.00	6.886	0.000	6.886
423.50	14.718	0.000	14.718
424.00	15.611	4.122	19.733
424.50	16.456	54.016	70.471
425.00	17.259	112.015	129.274

Subwatershed Hydrology Detail:

Stru #	SWS #	SWS Area (ac)	Time of Conc (hrs)	Musk K (hrs)	Musk X	Curve Number	UHS	Peak Discharge (cfs)	Runoff Volume (ac-ft)
#2	1	0.250	0.025	0.000	0.000	86.000	TR55	0.80	0.069
	Σ	**0.250**						**0.80**	**0.069**
#1	1	0.600	0.045	0.000	0.000	86.000	TR55	1.92	0.165
	Σ	**0.600**						**1.92**	**0.165**
#3	1	0.830	0.019	0.000	0.000	98.000	TR55	3.06	0.318
	Σ	**1.680**						**5.78**	**0.552**
#4	1	0.400	0.019	0.000	0.000	98.000	TR55	1.47	0.153
	Σ	**2.080**						**7.25**	**0.705**
#5	1	0.400	0.024	0.000	0.000	98.000	TR55	1.47	0.153
	Σ	**2.480**						**8.72**	**0.858**
#6	1	0.400	0.061	0.000	0.000	86.000	TR55	1.28	0.110
	Σ	**2.880**						**10.00**	**0.969**

Subwatershed Time of Concentration Details:

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#1	1	3. Short grass pasture	33.00	33.00	99.99	4.590	0.006
		6. Grassed waterway	2.00	6.00	300.00	2.120	0.039
#1	**1**	**Time of Concentration:**					**0.045**
#2	1	3. Short grass pasture	33.00	33.00	99.99	4.590	0.006
		6. Grassed waterway	2.00	3.00	150.00	2.120	0.019
#2	**1**	**Time of Concentration:**					**0.025**
#3	1	7. Paved area and small upland gullies	2.00	4.00	200.00	2.840	0.019
#3	**1**	**Time of Concentration:**					**0.019**
#4	1	7. Paved area and small upland gullies	2.00	4.00	200.00	2.840	0.019
#4	**1**	**Time of Concentration:**					**0.019**
#5	1	7. Paved area and small upland gullies	2.00	5.00	250.00	2.840	0.024
#5	**1**	**Time of Concentration:**					**0.024**
#6	1	3. Short grass pasture	2.00	5.00	250.00	1.130	0.061
#6	**1**	**Time of Concentration:**					**0.061**

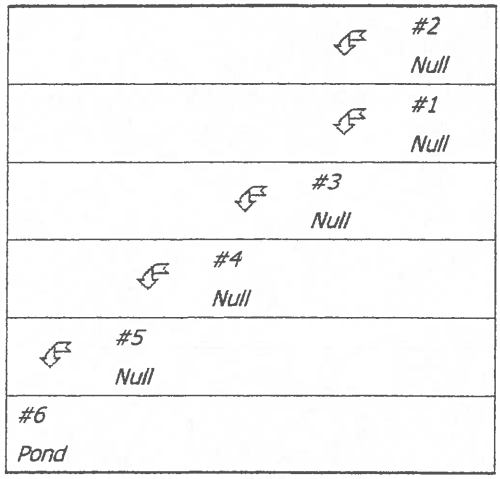
General Information

Storm Information:

Storm Type:	NRCS Type II
Design Storm:	25 yr - 24 hr
Rainfall Depth:	5.720 inches

Structure Networking:

Type	Stru #	(flows into)	Stru #	Musk. K (hrs)	Musk. X	Description
Null	#1	==>	#3	0.000	0.000	Channel H
Null	#2	==>	#3	0.000	0.000	Channel G
Null	#3	==>	#4	0.000	0.000	I-6
Null	#4	==>	#5	0.000	0.000	I-7
Null	#5	==>	#6	0.000	0.000	I-8
Pond	#6	==>	End	0.000	0.000	Sed. Basin 3



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Structure Summary:

		Immediate Contributing Area (ac)	Total Contributing Area (ac)	Peak Discharge (cfs)	Total Runoff Volume (ac-ft)
#2		0.250	0.250	0.98	0.09
#1		0.600	0.600	2.35	0.21
#3		0.830	1.680	6.95	0.67
#4		0.400	2.080	8.70	0.86
#5		0.400	2.480	10.45	1.04
#6	In	0.400	2.880	12.01	1.18
	Out			8.25	1.17

Structure Detail:

Structure #2 (Null)

Channel G

Structure #1 (Null)

Channel H

Structure #3 (Null)

I-6

Structure #4 (Null)

I-7

Structure #5 (Null)

I-8

Structure #6 (Pond)

Sed. Basin 3

Pond Inputs:

Initial Pool Elev:	420.01
Initial Pool:	0.00 ac-ft

Perforated Riser

Riser Diameter (in)	Riser Height (ft)	Barrel Diameter (in)	Barrel Length (ft)	Barrel Slope (%)	Manning's n	Spillway Elev	Number of Holes per Elev
24.00	2.50	18.00	50.00	1.00	0.0150	422.50	6

Emergency Spillway

Spillway Elev	Crest Length (ft)	Left Sideslope	Right Sideslope	Bottom Width (ft)
423.50	10.00	2.00:1	2.00:1	20.00

Pond Results:

Peak Elevation:	423.09
H'graph Detention Time:	5.12 hrs
Dewater Time:	1.22 days

Dewatering time is calculated from peak stage to lowest spillway

Elevation-Capacity-Discharge Table

Elevation	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	Dewater Time (hrs)	
420.00	0.100	0.000	0.000		
420.01	0.110	0.001	0.000		Low hole SPW #1
420.50	0.128	0.059	0.110	6.38*	
421.00	0.147	0.128	0.157	6.25	
421.50	0.168	0.206	0.304	4.30	
422.00	0.190	0.296	0.491	5.20	
422.50	0.213	0.396	0.711	5.25	Spillway #1
423.00	0.238	0.509	6.886	1.85	
423.09	0.243	0.531	8.254	0.05	Peak Stage
423.50	0.264	0.634	14.718		Spillway #2
424.00	0.291	0.773	19.733		
424.50	0.320	0.925	70.471		
425.00	0.350	1.093	129.274		

**Designates time(s) to dewater have been extrapolated beyond the 50 hour hydrograph limit.*

Detailed Discharge Table

Elevation	Perf. Riser (cfs)	Emergency Spillway (cfs)	Combined Total Discharge (cfs)
420.00	0.000	0.000	0.000
420.01	1.00>0.000	0.000	0.000
420.50	0.110	0.000	0.110
421.00	1.00>0.157	0.000	0.157
421.50	1.00>0.304	0.000	0.304
422.00	1.00>0.491	0.000	0.491
422.50	0.711	0.000	0.711
423.00	6.886	0.000	6.886
423.50	14.718	0.000	14.718
424.00	15.611	4.122	19.733
424.50	16.456	54.016	70.471
425.00	17.259	112.015	129.274

Subwatershed Hydrology Detail:

Stru #	SWS #	SWS Area (ac)	Time of Conc (hrs)	Musk K (hrs)	Musk X	Curve Number	UHS	Peak Discharge (cfs)	Runoff Volume (ac-ft)
#2	1	0.250	0.025	0.000	0.000	86.000	TR55	0.98	0.086
	Σ	**0.250**						**0.98**	**0.086**
#1	1	0.600	0.045	0.000	0.000	86.000	TR55	2.35	0.207
	Σ	**0.600**						**2.35**	**0.207**
#3	1	0.830	0.019	0.000	0.000	98.000	TR55	3.63	0.379
	Σ	**1.680**						**6.95**	**0.673**
#4	1	0.400	0.019	0.000	0.000	98.000	TR55	1.75	0.183
	Σ	**2.080**						**8.70**	**0.855**
#5	1	0.400	0.024	0.000	0.000	98.000	TR55	1.75	0.183
	Σ	**2.480**						**10.45**	**1.038**
#6	1	0.400	0.061	0.000	0.000	86.000	TR55	1.57	0.138
	Σ	**2.880**						**12.01**	**1.176**

Subwatershed Time of Concentration Details:

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#1	1	3. Short grass pasture	33.00	33.00	99.99	4.590	0.006
		6. Grassed waterway	2.00	6.00	300.00	2.120	0.039
#1	**1**	**Time of Concentration:**					**0.045**
#2	1	3. Short grass pasture	33.00	33.00	99.99	4.590	0.006
		6. Grassed waterway	2.00	3.00	150.00	2.120	0.019
#2	**1**	**Time of Concentration:**					**0.025**
#3	1	7. Paved area and small upland gullies	2.00	4.00	200.00	2.840	0.019
#3	**1**	**Time of Concentration:**					**0.019**
#4	1	7. Paved area and small upland gullies	2.00	4.00	200.00	2.840	0.019
#4	**1**	**Time of Concentration:**					**0.019**
#5	1	7. Paved area and small upland gullies	2.00	5.00	250.00	2.840	0.024
#5	**1**	**Time of Concentration:**					**0.024**
#6	1	3. Short grass pasture	2.00	5.00	250.00	1.130	0.061
#6	**1**	**Time of Concentration:**					**0.061**

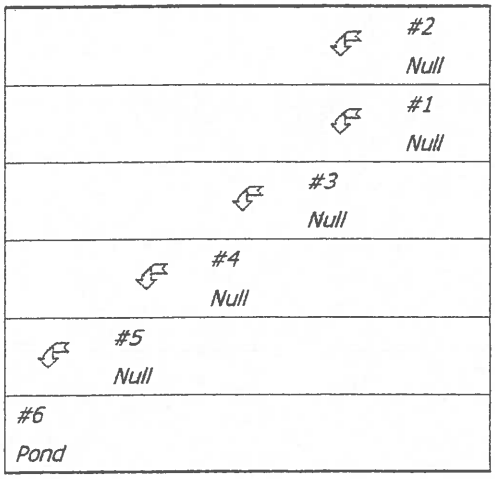
General Information

Storm Information:

Storm Type:	NRCS Type II
Design Storm:	50 yr - 24 hr
Rainfall Depth:	6.410 inches

Structure Networking:

Type	Stru #	(flows into)	Stru #	Musk. K (hrs)	Musk. X	Description
Null	#1	==>	#3	0.000	0.000	Channel H
Null	#2	==>	#3	0.000	0.000	Channel G
Null	#3	==>	#4	0.000	0.000	I-6
Null	#4	==>	#5	0.000	0.000	I-7
Null	#5	==>	#6	0.000	0.000	I-8
Pond	#6	==>	End	0.000	0.000	Sed. Basin 3



Structure Summary:

		Immediate Contributing Area (ac)	Total Contributing Area (ac)	Peak Discharge (cfs)	Total Runoff Volume (ac-ft)
#2		0.250	0.250	1.12	0.10
#1		0.600	0.600	2.68	0.24
#3		0.830	1.680	7.86	0.77
#4		0.400	2.080	9.82	0.97
#5		0.400	2.480	11.78	1.18
#6	In	0.400	2.880	13.57	1.34
	Out			10.43	1.33

Structure Detail:

Structure #2 (Null)

Channel G

Structure #1 (Null)

Channel H

Structure #3 (Null)

I-6

Structure #4 (Null)

I-7

Structure #5 (Null)

I-8

Structure #6 (Pond)

Sed. Basin 3

Pond Inputs:

Initial Pool Elev:	420.01
Initial Pool:	0.00 ac-ft

Perforated Riser

Riser Diameter (in)	Riser Height (ft)	Barrel Diameter (in)	Barrel Length (ft)	Barrel Slope (%)	Manning's n	Spillway Elev	Number of Holes per Elev
24.00	2.50	18.00	50.00	1.00	0.0150	422.50	6

Emergency Spillway

Spillway Elev	Crest Length (ft)	Left Sideslope	Right Sideslope	Bottom Width (ft)
423.50	10.00	2.00:1	2.00:1	20.00

Pond Results:

Peak Elevation:	423.23
H'graph Detention Time:	4.73 hrs
Dewater Time:	1.24 days

Dewatering time is calculated from peak stage to lowest spillway

Elevation-Capacity-Discharge Table

Elevation	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	Dewater Time (hrs)	
420.00	0.100	0.000	0.000		
420.01	0.110	0.001	0.000		Low hole SPW #1
420.50	0.128	0.059	0.110	6.38*	
421.00	0.147	0.128	0.157	6.30	
421.50	0.168	0.206	0.304	4.25	
422.00	0.190	0.296	0.491	5.00	
422.50	0.213	0.396	0.711	5.60	Spillway #1
423.00	0.238	0.509	6.886	2.05	
423.23	0.250	0.565	10.433	0.15	Peak Stage
423.50	0.264	0.634	14.718		Spillway #2
424.00	0.291	0.773	19.733		
424.50	0.320	0.925	70.471		
425.00	0.350	1.093	129.274		

**Designates time(s) to dewater have been extrapolated beyond the 50 hour hydrograph limit.*

Detailed Discharge Table

Elevation	Perf. Riser (cfs)	Emergency Spillway (cfs)	Combined Total Discharge (cfs)
420.00	0.000	0.000	0.000
420.01	1.00>0.000	0.000	0.000
420.50	0.110	0.000	0.110
421.00	1.00>0.157	0.000	0.157
421.50	1.00>0.304	0.000	0.304
422.00	1.00>0.491	0.000	0.491
422.50	0.711	0.000	0.711
423.00	6.886	0.000	6.886
423.50	14.718	0.000	14.718
424.00	15.611	4.122	19.733
424.50	16.456	54.016	70.471
425.00	17.259	112.015	129.274

Subwatershed Hydrology Detail:

Stru #	SWS #	SWS Area (ac)	Time of Conc (hrs)	Musk K (hrs)	Musk X	Curve Number	UHS	Peak Discharge (cfs)	Runoff Volume (ac-ft)
#2	1	0.250	0.025	0.000	0.000	86.000	TR55	1.12	0.100
	Σ	**0.250**						**1.12**	**0.100**
#1	1	0.600	0.045	0.000	0.000	86.000	TR55	2.68	0.240
	Σ	**0.600**						**2.68**	**0.240**
#3	1	0.830	0.019	0.000	0.000	98.000	TR55	4.07	0.427
	Σ	**1.680**						**7.86**	**0.767**
#4	1	0.400	0.019	0.000	0.000	98.000	TR55	1.96	0.206
	Σ	**2.080**						**9.82**	**0.973**
#5	1	0.400	0.024	0.000	0.000	98.000	TR55	1.96	0.206
	Σ	**2.480**						**11.78**	**1.178**
#6	1	0.400	0.061	0.000	0.000	86.000	TR55	1.79	0.160
	Σ	**2.880**						**13.57**	**1.338**

Subwatershed Time of Concentration Details:

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#1	1	3. Short grass pasture	33.00	33.00	99.99	4.590	0.006
		6. Grassed waterway	2.00	6.00	300.00	2.120	0.039
#1	**1**	**Time of Concentration:**					**0.045**
#2	1	3. Short grass pasture	33.00	33.00	99.99	4.590	0.006
		6. Grassed waterway	2.00	3.00	150.00	2.120	0.019
#2	**1**	**Time of Concentration:**					**0.025**
#3	1	7. Paved area and small upland gullies	2.00	4.00	200.00	2.840	0.019
#3	**1**	**Time of Concentration:**					**0.019**
#4	1	7. Paved area and small upland gullies	2.00	4.00	200.00	2.840	0.019
#4	**1**	**Time of Concentration:**					**0.019**
#5	1	7. Paved area and small upland gullies	2.00	5.00	250.00	2.840	0.024
#5	**1**	**Time of Concentration:**					**0.024**
#6	1	3. Short grass pasture	2.00	5.00	250.00	1.130	0.061
#6	**1**	**Time of Concentration:**					**0.061**

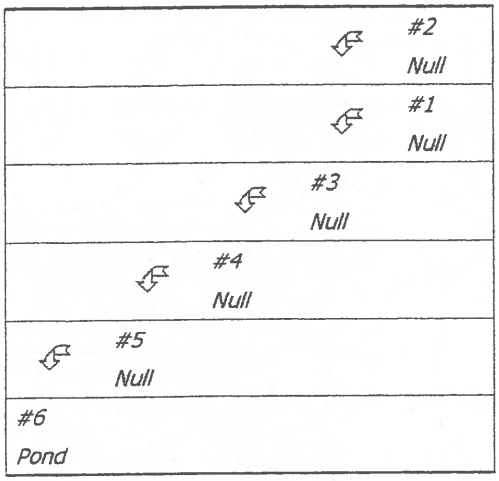
General Information

Storm Information:

Storm Type:	NRCS Type II
Design Storm:	100 yr - 24 hr
Rainfall Depth:	7.040 inches

Structure Networking:

Type	Stru #	(flows into)	Stru #	Musk. K (hrs)	Musk. X	Description
Null	#1	==>	#3	0.000	0.000	Channel H
Null	#2	==>	#3	0.000	0.000	Channel G
Null	#3	==>	#4	0.000	0.000	I-6
Null	#4	==>	#5	0.000	0.000	I-7
Null	#5	==>	#6	0.000	0.000	I-8
Pond	#6	==>	End	0.000	0.000	Sed. Basin 3



Structure Summary:

		Immediate Contributing Area (ac)	Total Contributing Area (ac)	Peak Discharge (cfs)	Total Runoff Volume (ac-ft)
#2		0.250	0.250	1.24	0.11
#1		0.600	0.600	2.98	0.27
#3		0.830	1.680	8.69	0.85
#4		0.400	2.080	10.85	1.08
#5		0.400	2.480	13.00	1.31
#6	In	0.400	2.880	14.99	1.49
	Out			12.18	1.48

Structure Detail:

Structure #2 (Null)

Channel G

Structure #1 (Null)

Channel H

Structure #3 (Null)

I-6

Structure #4 (Null)

I-7

Structure #5 (Null)

I-8

Structure #6 (Pond)

Sed. Basin 3

Pond Inputs:

Initial Pool Elev:	420.01
Initial Pool:	0.00 ac-ft

Perforated Riser

Riser Diameter (in)	Riser Height (ft)	Barrel Diameter (in)	Barrel Length (ft)	Barrel Slope (%)	Manning's n	Spillway Elev	Number of Holes per Elev
24.00	2.50	18.00	50.00	1.00	0.0150	422.50	6

Emergency Spillway

Spillway Elev	Crest Length (ft)	Left Sideslope	Right Sideslope	Bottom Width (ft)
423.50	10.00	2.00:1	2.00:1	20.00

Pond Results:

Peak Elevation:	423.34
H'graph Detention Time:	4.44 hrs
Dewater Time:	1.25 days

Dewatering time is calculated from peak stage to lowest spillway

Elevation-Capacity-Discharge Table

Elevation	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	Dewater Time (hrs)	
420.00	0.100	0.000	0.000		
420.01	0.110	0.001	0.000		Low hole SPW #1
420.50	0.128	0.059	0.110	6.38*	
421.00	0.147	0.128	0.157	6.25	
421.50	0.168	0.206	0.304	4.30	
422.00	0.190	0.296	0.491	4.85	
422.50	0.213	0.396	0.711	5.75	Spillway #1
423.00	0.238	0.509	6.886	2.40	
423.34	0.255	0.593	12.179	0.15	Peak Stage
423.50	0.264	0.634	14.718		Spillway #2
424.00	0.291	0.773	19.733		
424.50	0.320	0.925	70.471		
425.00	0.350	1.093	129.274		

**Designates time(s) to dewater have been extrapolated beyond the 50 hour hydrograph limit.*

Detailed Discharge Table

Elevation	Perf. Riser (cfs)	Emergency Spillway (cfs)	Combined Total Discharge (cfs)
420.00	0.000	0.000	0.000
420.01	1.00>0.000	0.000	0.000
420.50	0.110	0.000	0.110
421.00	1.00>0.157	0.000	0.157
421.50	1.00>0.304	0.000	0.304
422.00	1.00>0.491	0.000	0.491
422.50	0.711	0.000	0.711
423.00	6.886	0.000	6.886
423.50	14.718	0.000	14.718
424.00	15.611	4.122	19.733
424.50	16.456	54.016	70.471
425.00	17.259	112.015	129.274

Subwatershed Hydrology Detail:

Stru #	SWS #	SWS Area (ac)	Time of Conc (hrs)	Musk K (hrs)	Musk X	Curve Number	UHS	Peak Discharge (cfs)	Runoff Volume (ac-ft)
#2	1	0.250	0.025	0.000	0.000	86.000	TR55	1.24	0.113
	Σ	**0.250**						**1.24**	**0.113**
#1	1	0.600	0.045	0.000	0.000	86.000	TR55	2.98	0.270
	Σ	**0.600**						**2.98**	**0.270**
#3	1	0.830	0.019	0.000	0.000	98.000	TR55	4.47	0.470
	Σ	**1.680**						**8.69**	**0.853**
#4	1	0.400	0.019	0.000	0.000	98.000	TR55	2.15	0.227
	Σ	**2.080**						**10.85**	**1.080**
#5	1	0.400	0.024	0.000	0.000	98.000	TR55	2.15	0.227
	Σ	**2.480**						**13.00**	**1.307**
#6	1	0.400	0.061	0.000	0.000	86.000	TR55	1.99	0.180
	Σ	**2.880**						**14.99**	**1.487**

Subwatershed Time of Concentration Details:

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#1	1	3. Short grass pasture	33.00	33.00	99.99	4.590	0.006
		6. Grassed waterway	2.00	6.00	300.00	2.120	0.039
#1	**1**	**Time of Concentration:**					**0.045**
#2	1	3. Short grass pasture	33.00	33.00	99.99	4.590	0.006
		6. Grassed waterway	2.00	3.00	150.00	2.120	0.019
#2	**1**	**Time of Concentration:**					**0.025**
#3	1	7. Paved area and small upland gullies	2.00	4.00	200.00	2.840	0.019
#3	**1**	**Time of Concentration:**					**0.019**
#4	1	7. Paved area and small upland gullies	2.00	4.00	200.00	2.840	0.019
#4	**1**	**Time of Concentration:**					**0.019**
#5	1	7. Paved area and small upland gullies	2.00	5.00	250.00	2.840	0.024
#5	**1**	**Time of Concentration:**					**0.024**
#6	1	3. Short grass pasture	2.00	5.00	250.00	1.130	0.061
#6	**1**	**Time of Concentration:**					**0.061**

DETENTION BASIN 4

TAKEN FROM CELL 4F MODIFICATION

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Detention Basin 4

Post Development

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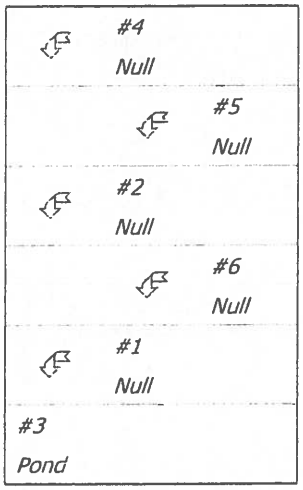
General Information

Storm Information:

Storm Type:	NRCS Type II
Design Storm:	2 yr - 24 hr
Rainfall Depth:	3.200 inches

Structure Networking:

Type	Stru #	(flows into)	Stru #	Musk. K (hrs)	Musk. X	Description
Null	#1	==>	#3	0.000	0.000	DS-1
Null	#2	==>	#3	0.000	0.000	Channel A
Pond	#3	==>	End	0.000	0.000	Sed. Basin 4
Null	#4	==>	#3	0.000	0.000	DS-1A
Null	#5	==>	#2	0.000	0.000	DS-2
Null	#6	==>	#1	0.000	0.000	Channel R



Structure Summary:

		Immediate Contributing Area (ac)	Total Contributing Area (ac)	Peak Discharge (cfs)	Total Runoff Volume (ac-ft)
#4		4.200	4.200	2.12	0.16
#5		12.800	12.800	18.73	1.43
#2		2.200	15.000	21.19	1.61
#6		8.200	8.200	7.91	0.91
#1		25.700	33.900	25.94	3.02
#3	In	3.000	56.100	47.81	4.89
	Out			1.85	4.89

Structure Detail:

Structure #4 (Null)

DS-1A

Structure #5 (Null)

DS-2

Structure #2 (Null)

Channel A

Structure #6 (Null)

Channel R

Structure #1 (Null)

DS-1

Structure #3 (Pond)

Sed. Basin 4

Pond Inputs:

Initial Pool Elev:	429.01
Initial Pool:	0.00 ac-ft

Perforated Riser

Riser Diameter (in)	Riser Height (ft)	Barrel Diameter (in)	Barrel Length (ft)	Barrel Slope (%)	Manning's n	Spillway Elev	Number of Holes per Elev
48.00	13.50	24.00	134.00	10.45	0.0120	442.50	7

Emergency Spillway

Spillway Elev	Crest Length (ft)	Left Sideslope	Right Sideslope	Bottom Width (ft)
443.20	20.00	3.00:1	3.00:1	140.00

Pond Results:

Peak Elevation:	435.02
Dewater Time:	1.22 days

Dewatering time is calculated from peak stage to lowest spillway

Elevation-Capacity-Discharge Table

Elevation	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	Dewater Time (hrs)	
429.00	0.000	0.000	0.000		
429.01	0.001	0.000	0.000		Low hole SPW #1
429.10	0.010	0.000	0.221	0.05	
429.50	0.057	0.012	0.515	0.40	
430.00	0.170	0.067	0.732	1.05	
430.50	0.241	0.169	0.898	1.55	
431.00	0.325	0.310	1.037	1.75	
431.50	0.421	0.496	1.160	2.05	
432.00	0.530	0.734	1.271	2.40	
432.50	0.568	1.008	1.374	2.50	
433.00	0.607	1.302	1.469	2.50	
433.50	0.648	1.616	1.558	2.50	
434.00	0.690	1.950	1.643	2.55	
434.50	0.726	2.304	1.723	2.55	
435.00	0.763	2.677	1.800	6.25	
435.02	0.765	2.693	1.852	1.25	Peak Stage
435.50	0.801	3.068	3.043		
436.00	0.840	3.478	3.599		
436.50	0.879	3.907	4.039		
437.00	0.918	4.357	4.418		
437.50	0.959	4.826	4.759		
438.00	1.000	5.315	5.070		
438.50	1.040	5.825	6.530		
439.00	1.080	6.355	7.288		
439.50	1.121	6.905	7.918		
440.00	1.163	7.476	8.477		
440.20	1.178	7.710	8.687		
440.50	1.204	8.068	8.989		
440.70	1.222	8.310	9.183		
441.00	1.249	8.681	9.464		
441.20	1.267	8.932	9.647		
441.50	1.294	9.316	9.912		
441.70	1.312	9.577	10.084		
441.90	1.331	9.841	10.253		
442.00	1.340	9.975	10.337		
442.20	1.360	10.245	10.501		
442.50	1.391	10.658	10.741		Spillway #1
442.70	1.412	10.938	10.899		
442.75	1.417	11.009	10.937		

Elevation	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	Dewater Time (hrs)	
443.00	1.443	11.366	13.773		
443.20	1.464	11.657	22.816		Spillway #2
443.50	1.496	12.101	120.773		
444.00	1.550	12.863	286.777		

Detailed Discharge Table

Elevation	Perf. Riser (cfs)	Emergency Spillway (cfs)	Combined Total Discharge (cfs)
429.00	0.000	0.000	0.000
429.01	2.00>0.000	0.000	0.000
429.10	0.221	0.000	0.221
429.50	0.515	0.000	0.515
430.00	0.732	0.000	0.732
430.50	0.898	0.000	0.898
431.00	1.037	0.000	1.037
431.50	1.160	0.000	1.160
432.00	1.271	0.000	1.271
432.50	1.374	0.000	1.374
433.00	1.469	0.000	1.469
433.50	1.558	0.000	1.558
434.00	1.643	0.000	1.643
434.50	1.723	0.000	1.723
435.00	3.00>1.800	0.000	1.800
435.50	3.043	0.000	3.043
436.00	3.599	0.000	3.599
436.50	4.039	0.000	4.039
437.00	4.418	0.000	4.418
437.50	4.759	0.000	4.759
438.00	3.00>5.070	0.000	5.070
438.50	6.530	0.000	6.530
439.00	7.288	0.000	7.288
439.50	7.918	0.000	7.918
440.00	8.477	0.000	8.477
440.20	8.687	0.000	8.687
440.50	8.989	0.000	8.989
440.70	9.183	0.000	9.183
441.00	9.464	0.000	9.464

Elevation	Perf. Riser (cfs)	Emergency Spillway (cfs)	Combined Total Discharge (cfs)
441.20	9.647	0.000	9.647
441.50	9.912	0.000	9.912
441.70	10.084	0.000	10.084
441.90	10.253	0.000	10.253
442.00	10.337	0.000	10.337
442.20	10.501	0.000	10.501
442.50	10.741	0.000	10.741
442.70	10.899	0.000	10.899
442.75	10.937	0.000	10.937
443.00	13.773	0.000	13.773
443.20	22.816	0.000	22.816
443.50	38.956	81.818	120.773
444.00	68.591	218.186	286.777

Subwatershed Hydrology Detail:

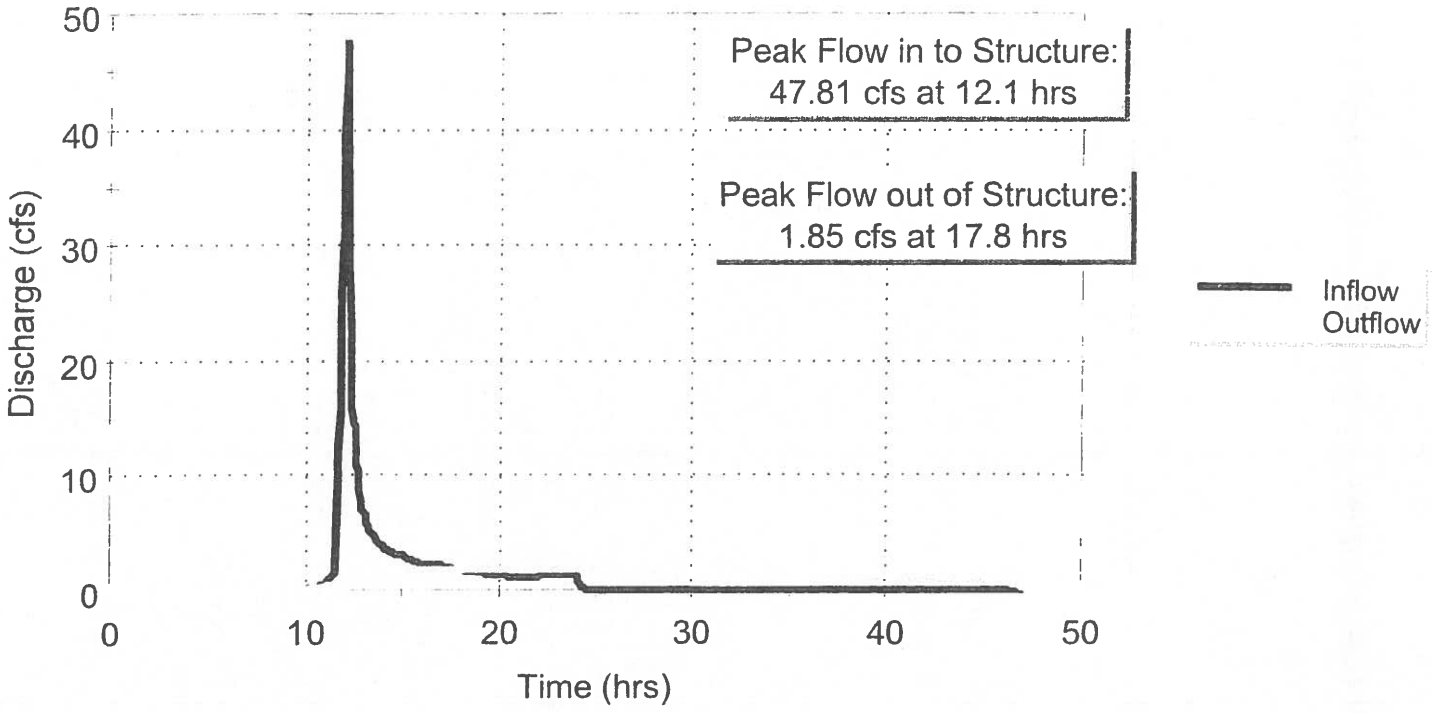
Stru #	SWS #	SWS Area (ac)	Time of Conc (hrs)	Musk K (hrs)	Musk X	Curve Number	UHS	Peak Discharge (cfs)	Runoff Volume (ac-ft)
#4	1	4.200	0.062	0.000	0.000	61.000	M	2.12	0.155
	Σ	**4.200**						**2.12**	**0.155**
#5	1	12.800	0.100	0.000	0.000	79.000	M	18.73	1.426
	Σ	**12.800**						**18.73**	**1.426**
#2	1	2.200	0.103	0.000	0.000	73.000	M	2.46	0.180
	Σ	**15.000**						**21.19**	**1.606**
#6	1	8.200	0.142	0.000	0.000	79.000	M	7.91	0.913
	Σ	**8.200**						**7.91**	**0.913**
#1	1	25.700	0.130	0.000	0.000	73.000	M	18.02	2.105
	Σ	**33.900**						**25.94**	**3.018**
#3	1	3.000	0.030	0.000	0.000	61.000	F	1.52	0.111
	Σ	**56.100**						**47.81**	**4.891**

Subwatershed Time of Concentration Details:

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#1	1	3. Short grass pasture	33.00	33.00	99.99	4.590	0.006
		6. Grassed waterway	28.00	224.00	800.00	7.930	0.028
		6. Grassed waterway	3.00	27.00	900.00	2.590	0.096
#1	**1**	**Time of Concentration:**					**0.130**
#2	1	3. Short grass pasture	33.00	23.10	70.00	4.590	0.004
		6. Grassed waterway	5.00	60.00	1,200.00	3.350	0.099
#2	**1**	**Time of Concentration:**					**0.103**
#3	1	3. Short grass pasture	33.00	33.00	100.00	4.590	0.006
		6. Grassed waterway	5.00	15.00	300.00	3.350	0.024
#3	**1**	**Time of Concentration:**					**0.030**
#4	1	3. Short grass pasture	33.00	29.70	90.00	4.590	0.005
		6. Grassed waterway	3.00	15.00	500.00	2.590	0.053
		8. Large gullies, diversions, and low flowing streams	33.00	82.50	250.00	17.230	0.004
#4	**1**	**Time of Concentration:**					**0.062**
#5	1	3. Short grass pasture	33.00	29.70	90.00	4.590	0.005

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
		8. Large gullies, diversions, and low flowing streams	30.00	180.00	600.00	16.430	0.010
		6. Grassed waterway	3.00	24.00	800.00	2.590	0.085
#5	**1**	**Time of Concentration:**					**0.100**
#6	1	3. Short grass pasture	5.00	15.00	300.00	1.780	0.046
		6. Grassed waterway	3.00	27.00	900.00	2.590	0.096
#6	**1**	**Time of Concentration:**					**0.142**

Inflow/Outflow Hydrographs for Structure # 3



IESI PA Bethlehem Landfill
Detention Basin 4

Post Development

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H-15

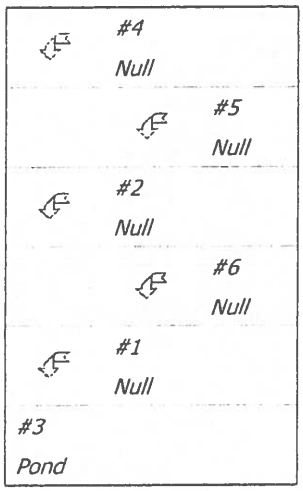
General Information

Storm Information:

Storm Type:	NRCS Type II
Design Storm:	10 yr - 24 hr
Rainfall Depth:	4.830 inches

Structure Networking:

Type	Stru #	(flows into)	Stru #	Musk. K (hrs)	Musk. X	Description
Null	#1	==>	#3	0.000	0.000	DS-1
Null	#2	==>	#3	0.000	0.000	Channel A
Pond	#3	==>	End	0.000	0.000	Sed. Basin 4
Null	#4	==>	#3	0.000	0.000	DS-1A
Null	#5	==>	#2	0.000	0.000	DS-2
Null	#6	==>	#1	0.000	0.000	Channel R



Structure Summary:

		Immediate Contributing Area (ac)	Total Contributing Area (ac)	Peak Discharge (cfs)	Total Runoff Volume (ac-ft)
#4		4.200	4.200	6.15	0.44
#5		12.800	12.800	35.15	2.83
#2		2.200	15.000	40.27	3.23
#6		8.200	8.200	15.53	1.81
#1		25.700	33.900	55.29	6.42
#3	In	3.000	56.100	102.35	10.40
	Out			5.54	10.13

Structure Detail:

Structure #4 (Null)

DS-1A

Structure #5 (Null)

DS-2

Structure #2 (Null)

Channel A

Structure #6 (Null)

Channel R

Structure #1 (Null)

DS-1

Structure #3 (Pond)

Sed. Basin 4

Pond Inputs:

Initial Pool Elev:	429.01
Initial Pool:	0.00 ac-ft

Perforated Riser

Riser Diameter (in)	Riser Height (ft)	Barrel Diameter (in)	Barrel Length (ft)	Barrel Slope (%)	Manning's n	Spillway Elev	Number of Holes per Elev
48.00	13.50	24.00	134.00	10.45	0.0120	442.50	7

Emergency Spillway

Spillway Elev	Crest Length (ft)	Left Sideslope	Right Sideslope	Bottom Width (ft)
443.20	20.00	3.00:1	3.00:1	140.00

Pond Results:

Peak Elevation:	438.16
Dewater Time:	1.60 days

Dewatering time is calculated from peak stage to lowest spillway

H-79

Elevation-Capacity-Discharge Table

Elevation	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	Dewater Time (hrs)	
429.00	0.000	0.000	0.000		
429.01	0.001	0.000	0.000		Low hole SPW #1
429.10	0.010	0.000	0.221	0.02*	
429.50	0.057	0.012	0.515	0.28*	
430.00	0.170	0.067	0.732	0.90*	
430.50	0.241	0.169	0.898	1.38*	
431.00	0.325	0.310	1.037	1.65*	
431.50	0.421	0.496	1.160	2.05	
432.00	0.530	0.734	1.271	2.35	
432.50	0.568	1.008	1.374	2.50	
433.00	0.607	1.302	1.469	2.50	
433.50	0.648	1.616	1.558	2.50	
434.00	0.690	1.950	1.643	2.55	
434.50	0.726	2.304	1.723	2.55	
435.00	0.763	2.677	1.800	2.55	
435.50	0.801	3.068	3.043	2.00	
436.00	0.840	3.478	3.599	1.50	
436.50	0.879	3.907	4.039	1.35	
437.00	0.918	4.357	4.418	2.05	
437.50	0.959	4.826	4.759	2.45	
438.00	1.000	5.315	5.070	3.00	
438.16	1.012	5.478	5.536	2.15	Peak Stage
438.50	1.040	5.825	6.530		
439.00	1.080	6.355	7.288		
439.50	1.121	6.905	7.918		
440.00	1.163	7.476	8.477		
440.20	1.178	7.710	8.687		
440.50	1.204	8.068	8.989		
440.70	1.222	8.310	9.183		
441.00	1.249	8.681	9.464		
441.20	1.267	8.932	9.647		
441.50	1.294	9.316	9.912		
441.70	1.312	9.577	10.084		
441.90	1.331	9.841	10.253		
442.00	1.340	9.975	10.337		
442.20	1.360	10.245	10.501		
442.50	1.391	10.658	10.741		Spillway #1
442.70	1.412	10.938	10.899		
442.75	1.417	11.009	10.937		

Elevation	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	Dewater Time (hrs)	
443.00	1.443	11.366	13.773		
443.20	1.464	11.657	22.816		Spillway #2
443.50	1.496	12.101	120.773		
444.00	1.550	12.863	286.777		

**Designates time(s) to dewater have been extrapolated beyond the 50 hour hydrograph limit.*

Detailed Discharge Table

Elevation	Perf. Riser (cfs)	Emergency Spillway (cfs)	Combined Total Discharge (cfs)
429.00	0.000	0.000	0.000
429.01	2.00>0.000	0.000	0.000
429.10	0.221	0.000	0.221
429.50	0.515	0.000	0.515
430.00	0.732	0.000	0.732
430.50	0.898	0.000	0.898
431.00	1.037	0.000	1.037
431.50	1.160	0.000	1.160
432.00	1.271	0.000	1.271
432.50	1.374	0.000	1.374
433.00	1.469	0.000	1.469
433.50	1.558	0.000	1.558
434.00	1.643	0.000	1.643
434.50	1.723	0.000	1.723
435.00	3.00>1.800	0.000	1.800
435.50	3.043	0.000	3.043
436.00	3.599	0.000	3.599
436.50	4.039	0.000	4.039
437.00	4.418	0.000	4.418
437.50	4.759	0.000	4.759
438.00	3.00>5.070	0.000	5.070
438.50	6.530	0.000	6.530
439.00	7.288	0.000	7.288
439.50	7.918	0.000	7.918
440.00	8.477	0.000	8.477
440.20	8.687	0.000	8.687
440.50	8.989	0.000	8.989
440.70	9.183	0.000	9.183

Elevation	Perf. Riser (cfs)	Emergency Spillway (cfs)	Combined Total Discharge (cfs)
441.00	9.464	0.000	9.464
441.20	9.647	0.000	9.647
441.50	9.912	0.000	9.912
441.70	10.084	0.000	10.084
441.90	10.253	0.000	10.253
442.00	10.337	0.000	10.337
442.20	10.501	0.000	10.501
442.50	10.741	0.000	10.741
442.70	10.899	0.000	10.899
442.75	10.937	0.000	10.937
443.00	13.773	0.000	13.773
443.20	22.816	0.000	22.816
443.50	38.956	81.818	120.773
444.00	68.591	218.186	286.777

Subwatershed Hydrology Detail:

Stru #	SWS #	SWS Area (ac)	Time of Conc (hrs)	Musk K (hrs)	Musk X	Curve Number	UHS	Peak Discharge (cfs)	Runoff Volume (ac-ft)
#4	1	4.200	0.062	0.000	0.000	61.000	M	6.15	0.444
	Σ	**4.200**						**6.15**	**0.444**
#5	1	12.800	0.100	0.000	0.000	79.000	M	35.15	2.833
	Σ	**12.800**						**35.15**	**2.833**
#2	1	2.200	0.103	0.000	0.000	73.000	M	5.12	0.394
	Σ	**15.000**						**40.27**	**3.227**
#6	1	8.200	0.142	0.000	0.000	79.000	M	15.53	1.815
	Σ	**8.200**						**15.53**	**1.815**
#1	1	25.700	0.130	0.000	0.000	73.000	M	39.80	4.600
	Σ	**33.900**						**55.29**	**6.415**
#3	1	3.000	0.030	0.000	0.000	61.000	F	4.39	0.317
	Σ	**56.100**						**102.35**	**10.403**

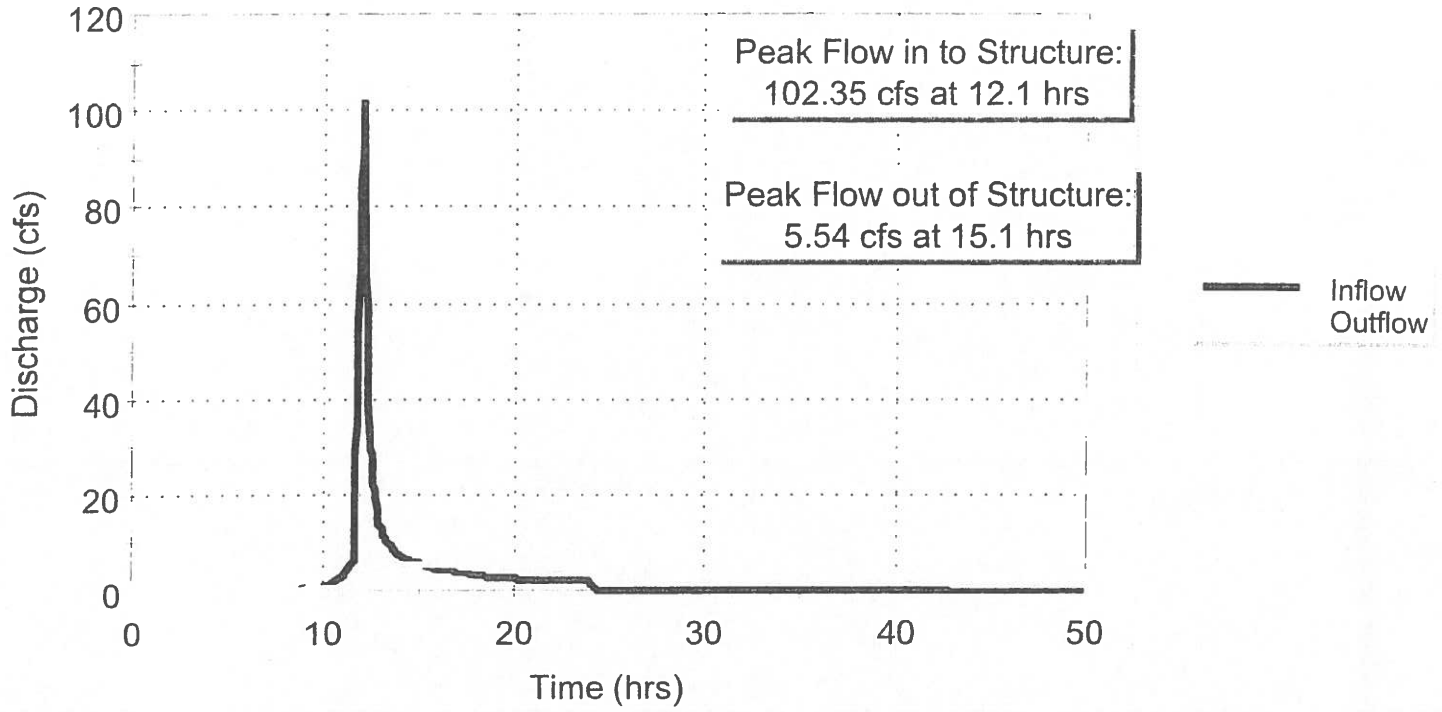
Subwatershed Time of Concentration Details:

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#1	1	3. Short grass pasture	33.00	33.00	99.99	4.590	0.006
		6. Grassed waterway	28.00	224.00	800.00	7.930	0.028
		6. Grassed waterway	3.00	27.00	900.00	2.590	0.096
#1	**1**	**Time of Concentration:**					**0.130**
#2	1	3. Short grass pasture	33.00	23.10	70.00	4.590	0.004
		6. Grassed waterway	5.00	60.00	1,200.00	3.350	0.099
#2	**1**	**Time of Concentration:**					**0.103**
#3	1	3. Short grass pasture	33.00	33.00	100.00	4.590	0.006
		6. Grassed waterway	5.00	15.00	300.00	3.350	0.024
#3	**1**	**Time of Concentration:**					**0.030**
#4	1	3. Short grass pasture	33.00	29.70	90.00	4.590	0.005
		6. Grassed waterway	3.00	15.00	500.00	2.590	0.053
		8. Large gullies, diversions, and low flowing streams	33.00	82.50	250.00	17.230	0.004
#4	**1**	**Time of Concentration:**					**0.062**
#5	1	3. Short grass pasture	33.00	29.70	90.00	4.590	0.005

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Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
		8. Large gullies, diversions, and low flowing streams	30.00	180.00	600.00	16.430	0.010
		6. Grassed waterway	3.00	24.00	800.00	2.590	0.085
#5	**1**	**Time of Concentration:**					**0.100**
#6	1	3. Short grass pasture	5.00	15.00	300.00	1.780	0.046
		6. Grassed waterway	3.00	27.00	900.00	2.590	0.096
#6	**1**	**Time of Concentration:**					**0.142**

Inflow/Outflow Hydrographs for Structure # 3



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Detention Basin 4

Post Development

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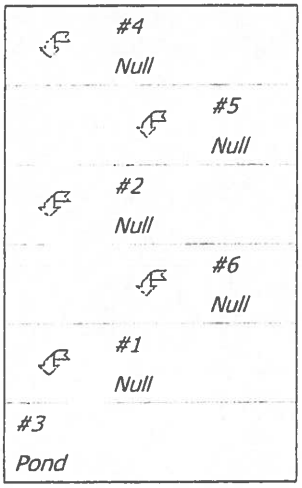
General Information

Storm Information:

Storm Type:	NRCS Type II
Design Storm:	25 yr - 24 hr
Rainfall Depth:	5.720 inches

Structure Networking:

Type	Stru #	(flows into)	Stru #	Musk. K (hrs)	Musk. X	Description
Null	#1	==>	#3	0.000	0.000	DS-1
Null	#2	==>	#3	0.000	0.000	Channel A
Pond	#3	==>	End	0.000	0.000	Sed. Basin 4
Null	#4	==>	#3	0.000	0.000	DS-1A
Null	#5	==>	#2	0.000	0.000	DS-2
Null	#6	==>	#1	0.000	0.000	Channel R



Structure Summary:

		Immediate Contributing Area (ac)	Total Contributing Area (ac)	Peak Discharge (cfs)	Total Runoff Volume (ac-ft)
#4		4.200	4.200	8.68	0.64
#5		12.800	12.800	44.34	3.66
#2		2.200	15.000	50.99	4.18
#6		8.200	8.200	19.94	2.34
#1		25.700	33.900	72.48	8.46
#3	In	3.000	56.100	134.37	13.74
	Out			8.15	13.23

Structure Detail:

Structure #4 (Null)

DS-1A

Structure #5 (Null)

DS-2

Structure #2 (Null)

Channel A

Structure #6 (Null)

Channel R

Structure #1 (Null)

DS-1

Structure #3 (Pond)

Sed. Basin 4

Pond Inputs:

Initial Pool Elev:	429.01
Initial Pool:	0.00 ac-ft

Perforated Riser

Riser Diameter (in)	Riser Height (ft)	Barrel Diameter (in)	Barrel Length (ft)	Barrel Slope (%)	Manning's n	Spillway Elev	Number of Holes per Elev
48.00	13.50	24.00	134.00	10.45	0.0120	442.50	7

Emergency Spillway

Spillway Elev	Crest Length (ft)	Left Sideslope	Right Sideslope	Bottom Width (ft)
443.20	20.00	3.00:1	3.00:1	140.00

Pond Results:

Peak Elevation:	439.71
Dewater Time:	1.72 days

Dewatering time is calculated from peak stage to lowest spillway

H-90

Elevation-Capacity-Discharge Table

Elevation	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	Dewater Time (hrs)	
429.00	0.000	0.000	0.000		
429.01	0.001	0.000	0.000		Low hole SPW #1
429.10	0.010	0.000	0.221	0.02*	
429.50	0.057	0.012	0.515	0.28*	
430.00	0.170	0.067	0.732	0.90*	
430.50	0.241	0.169	0.898	1.38*	
431.00	0.325	0.310	1.037	1.65*	
431.50	0.421	0.496	1.160	1.94*	
432.00	0.530	0.734	1.271	2.35	
432.50	0.568	1.008	1.374	2.50	
433.00	0.607	1.302	1.469	2.55	
433.50	0.648	1.616	1.558	2.50	
434.00	0.690	1.950	1.643	2.50	
434.50	0.726	2.304	1.723	2.55	
435.00	0.763	2.677	1.800	2.55	
435.50	0.801	3.068	3.043	2.00	
436.00	0.840	3.478	3.599	1.50	
436.50	0.879	3.907	4.039	1.40	
437.00	0.918	4.357	4.418	1.25	
437.50	0.959	4.826	4.759	1.25	
438.00	1.000	5.315	5.070	2.20	
438.50	1.040	5.825	6.530	2.10	
439.00	1.080	6.355	7.288	1.85	
439.50	1.121	6.905	7.918	2.20	
439.71	1.139	7.144	8.151	1.90	Peak Stage
440.00	1.163	7.476	8.477		
440.20	1.178	7.710	8.687		
440.50	1.204	8.068	8.989		
440.70	1.222	8.310	9.183		
441.00	1.249	8.681	9.464		
441.20	1.267	8.932	9.647		
441.50	1.294	9.316	9.912		
441.70	1.312	9.577	10.084		
441.90	1.331	9.841	10.253		
442.00	1.340	9.975	10.337		
442.20	1.360	10.245	10.501		
442.50	1.391	10.658	10.741		Spillway #1
442.70	1.412	10.938	10.899		
442.75	1.417	11.009	10.937		

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Elevation	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	Dewater Time (hrs)	
443.00	1.443	11.366	13.773		
443.20	1.464	11.657	22.816		Spillway #2
443.50	1.496	12.101	120.773		
444.00	1.550	12.863	286.777		

**Designates time(s) to dewater have been extrapolated beyond the 50 hour hydrograph limit.*

Detailed Discharge Table

Elevation	Perf. Riser (cfs)	Emergency Spillway (cfs)	Combined Total Discharge (cfs)
429.00	0.000	0.000	0.000
429.01	2.00>0.000	0.000	0.000
429.10	0.221	0.000	0.221
429.50	0.515	0.000	0.515
430.00	0.732	0.000	0.732
430.50	0.898	0.000	0.898
431.00	1.037	0.000	1.037
431.50	1.160	0.000	1.160
432.00	1.271	0.000	1.271
432.50	1.374	0.000	1.374
433.00	1.469	0.000	1.469
433.50	1.558	0.000	1.558
434.00	1.643	0.000	1.643
434.50	1.723	0.000	1.723
435.00	3.00>1.800	0.000	1.800
435.50	3.043	0.000	3.043
436.00	3.599	0.000	3.599
436.50	4.039	0.000	4.039
437.00	4.418	0.000	4.418
437.50	4.759	0.000	4.759
438.00	3.00>5.070	0.000	5.070
438.50	6.530	0.000	6.530
439.00	7.288	0.000	7.288
439.50	7.918	0.000	7.918
440.00	8.477	0.000	8.477
440.20	8.687	0.000	8.687
440.50	8.989	0.000	8.989
440.70	9.183	0.000	9.183

Elevation	Perf. Riser (cfs)	Emergency Spillway (cfs)	Combined Total Discharge (cfs)
441.00	9.464	0.000	9.464
441.20	9.647	0.000	9.647
441.50	9.912	0.000	9.912
441.70	10.084	0.000	10.084
441.90	10.253	0.000	10.253
442.00	10.337	0.000	10.337
442.20	10.501	0.000	10.501
442.50	10.741	0.000	10.741
442.70	10.899	0.000	10.899
442.75	10.937	0.000	10.937
443.00	13.773	0.000	13.773
443.20	22.816	0.000	22.816
443.50	38.956	81.818	120.773
444.00	68.591	218.186	286.777

Subwatershed Hydrology Detail:

Stru #	SWS #	SWS Area (ac)	Time of Conc (hrs)	Musk K (hrs)	Musk X	Curve Number	UHS	Peak Discharge (cfs)	Runoff Volume (ac-ft)
#4	1	4.200	0.062	0.000	0.000	61.000	M	8.68	0.637
	Σ	**4.200**						**8.68**	**0.637**
#5	1	12.800	0.100	0.000	0.000	79.000	M	44.34	3.659
	Σ	**12.800**						**44.34**	**3.659**
#2	1	2.200	0.103	0.000	0.000	73.000	M	6.65	0.524
	Σ	**15.000**						**50.99**	**4.183**
#6	1	8.200	0.142	0.000	0.000	79.000	M	19.94	2.344
	Σ	**8.200**						**19.94**	**2.344**
#1	1	25.700	0.130	0.000	0.000	73.000	M	52.66	6.121
	Σ	**33.900**						**72.48**	**8.465**
#3	1	3.000	0.030	0.000	0.000	61.000	F	6.20	0.455
	Σ	**56.100**						**134.37**	**13.741**

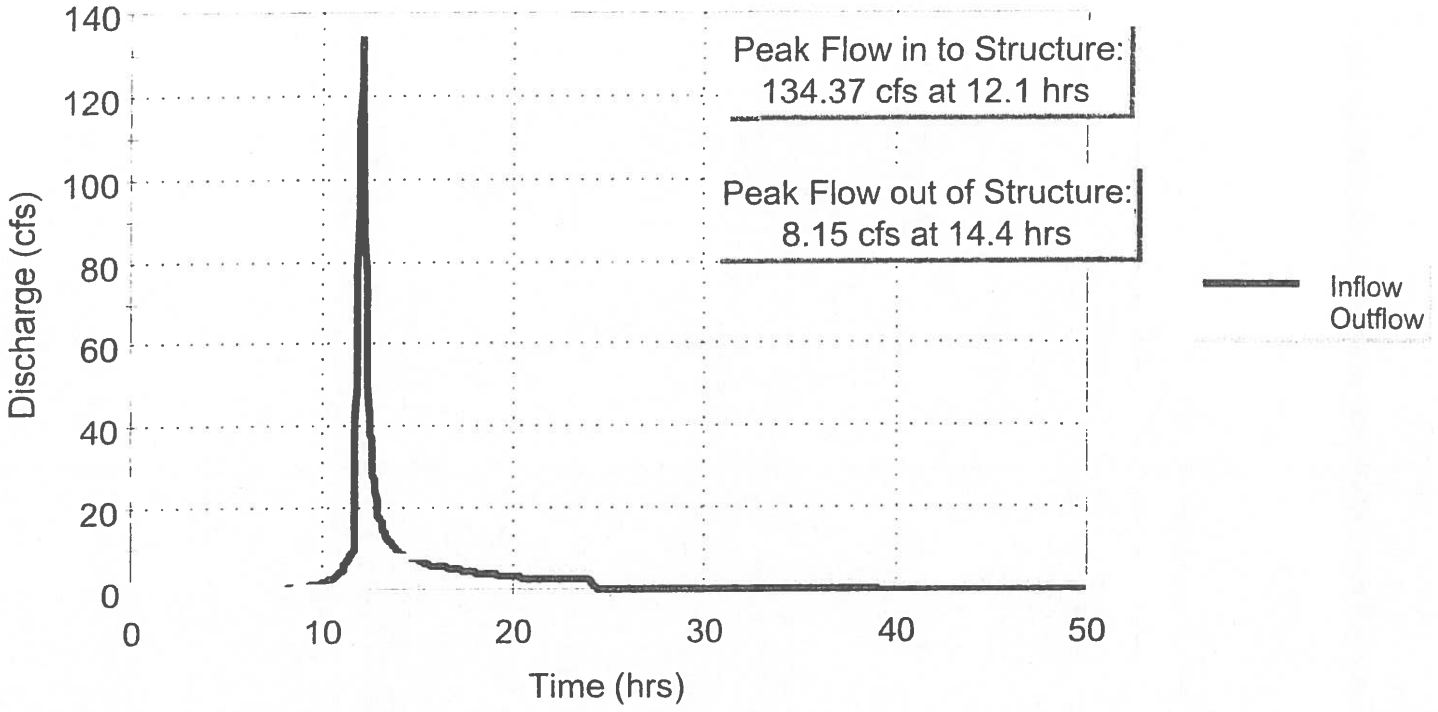
Subwatershed Time of Concentration Details:

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#1	1	3. Short grass pasture	33.00	33.00	99.99	4.590	0.006
		6. Grassed waterway	28.00	224.00	800.00	7.930	0.028
		6. Grassed waterway	3.00	27.00	900.00	2.590	0.096
#1	**1**	**Time of Concentration:**					**0.130**
#2	1	3. Short grass pasture	33.00	23.10	70.00	4.590	0.004
		6. Grassed waterway	5.00	60.00	1,200.00	3.350	0.099
#2	**1**	**Time of Concentration:**					**0.103**
#3	1	3. Short grass pasture	33.00	33.00	100.00	4.590	0.006
		6. Grassed waterway	5.00	15.00	300.00	3.350	0.024
#3	**1**	**Time of Concentration:**					**0.030**
#4	1	3. Short grass pasture	33.00	29.70	90.00	4.590	0.005
		6. Grassed waterway	3.00	15.00	500.00	2.590	0.053
		8. Large gullies, diversions, and low flowing streams	33.00	82.50	250.00	17.230	0.004
#4	**1**	**Time of Concentration:**					**0.062**
#5	1	3. Short grass pasture	33.00	29.70	90.00	4.590	0.005

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Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
		8. Large gullies, diversions, and low flowing streams	30.00	180.00	600.00	16.430	0.010
		6. Grassed waterway	3.00	24.00	800.00	2.590	0.085
#5	**1**	**Time of Concentration:**					**0.100**
#6	1	3. Short grass pasture	5.00	15.00	300.00	1.780	0.046
		6. Grassed waterway	3.00	27.00	900.00	2.590	0.096
#6	**1**	**Time of Concentration:**					**0.142**

Inflow/Outflow Hydrographs for Structure # 3



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Detention Basin 4

Post Development

JMM

H-97

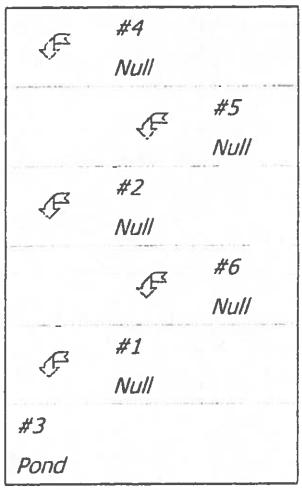
General Information

Storm Information:

Storm Type:	NRCS Type II
Design Storm:	100 yr - 24 hr
Rainfall Depth:	7.070 inches

Structure Networking:

Type	Stru #	(flows into)	Stru #	Musk. K (hrs)	Musk. X	Description
Null	#1	==>	#3	0.000	0.000	DS-1
Null	#2	==>	#3	0.000	0.000	Channel A
Pond	#3	==>	End	0.000	0.000	Sed. Basin 4
Null	#4	==>	#3	0.000	0.000	DS-1A
Null	#5	==>	#2	0.000	0.000	DS-2
Null	#6	==>	#1	0.000	0.000	Channel R



Structure Summary:

		Immediate Contributing Area (ac)	Total Contributing Area (ac)	Peak Discharge (cfs)	Total Runoff Volume (ac-ft)
#4		4.200	4.200	12.80	0.96
#5		12.800	12.800	58.34	4.96
#2		2.200	15.000	67.36	5.69
#6		8.200	8.200	26.72	3.18
#1		25.700	33.900	99.85	11.73
#3	In	3.000	56.100	184.43	19.08
	Out			10.49	18.16

H-100

Structure Detail:

Structure #4 (Null)

DS-1A

Structure #5 (Null)

DS-2

Structure #2 (Null)

Channel A

Structure #6 (Null)

Channel R

Structure #1 (Null)

DS-1

Structure #3 (Pond)

Sed. Basin 4

Pond Inputs:

Initial Pool Elev:	429.01
Initial Pool:	0.00 ac-ft

Perforated Riser

Riser Diameter (in)	Riser Height (ft)	Barrel Diameter (in)	Barrel Length (ft)	Barrel Slope (%)	Manning's n	Spillway Elev	Number of Holes per Elev
36.00	13.50	24.00	134.00	10.45	0.0120	442.50	7

Emergency Spillway

Spillway Elev	Crest Length (ft)	Left Sideslope	Right Sideslope	Bottom Width (ft)
443.20	20.00	3.00:1	3.00:1	140.00

Pond Results:

Peak Elevation:	442.19
Dewater Time:	1.85 days

Dewatering time is calculated from peak stage to lowest spillway

H-101

Elevation-Capacity-Discharge Table

Elevation	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	Dewater Time (hrs)	
429.00	0.000	0.000	0.000		
429.01	0.001	0.000	0.000		Low hole SPW #1
429.10	0.010	0.000	0.221	0.02*	
429.50	0.057	0.012	0.515	0.28*	
430.00	0.170	0.067	0.732	0.90*	
430.50	0.241	0.169	0.898	1.38*	
431.00	0.325	0.310	1.037	1.65*	
431.50	0.421	0.496	1.160	1.94*	
432.00	0.530	0.734	1.271	2.26*	
432.50	0.568	1.008	1.374	2.42*	
433.00	0.607	1.302	1.469	2.50	
433.50	0.648	1.616	1.558	2.50	
434.00	0.690	1.950	1.643	2.55	
434.50	0.726	2.304	1.723	2.55	
435.00	0.763	2.677	1.800	2.55	
435.50	0.801	3.068	3.043	2.00	
436.00	0.840	3.478	3.599	1.50	
436.50	0.879	3.907	4.039	1.35	
437.00	0.918	4.357	4.418	1.30	
437.50	0.959	4.826	4.759	1.25	
438.00	1.000	5.315	5.070	1.20	
438.50	1.040	5.825	6.530	1.05	
439.00	1.080	6.355	7.288	0.95	
439.50	1.121	6.905	7.918	0.95	
440.00	1.163	7.476	8.477	1.50	
440.20	1.178	7.710	8.687	0.60	
440.50	1.204	8.068	8.989	0.80	
440.70	1.222	8.310	9.183	0.55	
441.00	1.249	8.681	9.464	0.85	
441.20	1.267	8.932	9.647	0.55	
441.50	1.294	9.316	9.912	0.95	
441.70	1.312	9.577	10.084	0.70	
441.90	1.331	9.841	10.253	0.85	
442.00	1.340	9.975	10.337	0.50	
442.19	1.359	10.226	10.489	1.60	Peak Stage
442.20	1.360	10.245	10.501		
442.50	1.391	10.658	10.741		Spillway #1
442.70	1.412	10.938	10.899		
442.75	1.417	11.009	10.937		

H-102

Elevation	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	Dewater Time (hrs)	
443.00	1.443	11.366	11.129		
443.20	1.464	11.657	17.112		Spillway #2
443.50	1.496	12.101	111.034		
444.00	1.550	12.863	259.870		

**Designates time(s) to dewater have been extrapolated beyond the 50 hour hydrograph limit.*

Detailed Discharge Table

Elevation	Perf. Riser (cfs)	Emergency Spillway (cfs)	Combined Total Discharge (cfs)
429.00	0.000	0.000	0.000
429.01	2.00>0.000	0.000	0.000
429.10	0.221	0.000	0.221
429.50	0.515	0.000	0.515
430.00	0.732	0.000	0.732
430.50	0.898	0.000	0.898
431.00	1.037	0.000	1.037
431.50	1.160	0.000	1.160
432.00	1.271	0.000	1.271
432.50	1.374	0.000	1.374
433.00	1.469	0.000	1.469
433.50	1.558	0.000	1.558
434.00	1.643	0.000	1.643
434.50	1.723	0.000	1.723
435.00	3.00>1.800	0.000	1.800
435.50	3.043	0.000	3.043
436.00	3.599	0.000	3.599
436.50	4.039	0.000	4.039
437.00	4.418	0.000	4.418
437.50	4.759	0.000	4.759
438.00	3.00>5.070	0.000	5.070
438.50	6.530	0.000	6.530
439.00	7.288	0.000	7.288
439.50	7.918	0.000	7.918
440.00	8.477	0.000	8.477
440.20	8.687	0.000	8.687
440.50	8.989	0.000	8.989
440.70	9.183	0.000	9.183

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Elevation	Perf. Riser (cfs)	Emergency Spillway (cfs)	Combined Total Discharge (cfs)
441.00	9.464	0.000	9.464
441.20	9.647	0.000	9.647
441.50	9.912	0.000	9.912
441.70	10.084	0.000	10.084
441.90	10.253	0.000	10.253
442.00	10.337	0.000	10.337
442.20	10.501	0.000	10.501
442.50	10.741	0.000	10.741
442.70	10.899	0.000	10.899
442.75	10.937	0.000	10.937
443.00	11.129	0.000	11.129
443.20	17.112	0.000	17.112
443.50	29.217	81.818	111.034
444.00	41.684	218.186	259.870

Subwatershed Hydrology Detail:

Stru #	SWS #	SWS Area (ac)	Time of Conc (hrs)	Musk K (hrs)	Musk X	Curve Number	UHS	Peak Discharge (cfs)	Runoff Volume (ac-ft)
#4	1	4.200	0.062	0.000	0.000	61.000	M	12.80	0.963
	Σ	**4.200**						**12.80**	**0.963**
#5	1	12.800	0.100	0.000	0.000	79.000	M	58.34	4.958
	Σ	**12.800**						**58.34**	**4.958**
#2	1	2.200	0.103	0.000	0.000	73.000	M	9.03	0.733
	Σ	**15.000**						**67.36**	**5.691**
#6	1	8.200	0.142	0.000	0.000	79.000	M	26.72	3.176
	Σ	**8.200**						**26.72**	**3.176**
#1	1	25.700	0.130	0.000	0.000	73.000	M	73.12	8.557
	Σ	**33.900**						**99.85**	**11.734**
#3	1	3.000	0.030	0.000	0.000	61.000	F	9.14	0.688
	Σ	**56.100**						**184.43**	**19.076**

Subwatershed Time of Concentration Details:

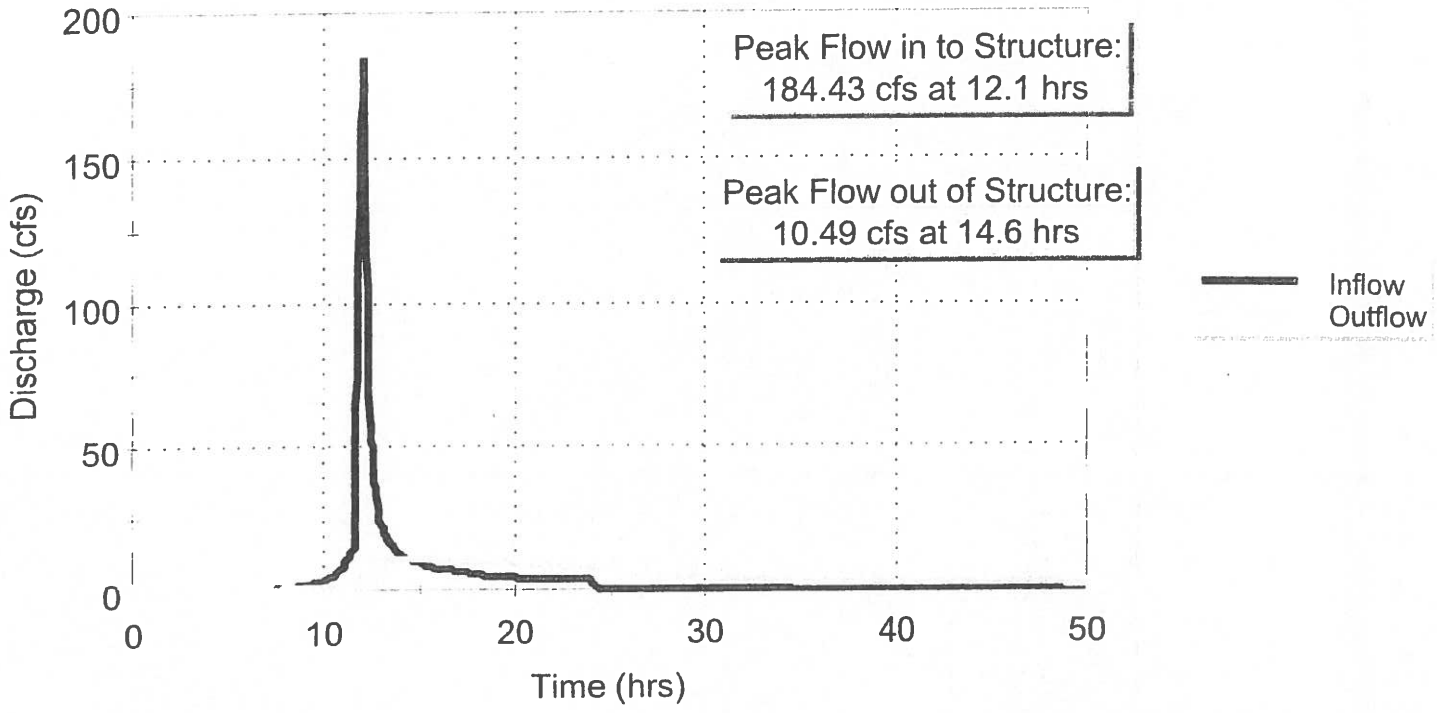
Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#1	1	3. Short grass pasture	33.00	33.00	99.99	4.590	0.006
		6. Grassed waterway	28.00	224.00	800.00	7.930	0.028
		6. Grassed waterway	3.00	27.00	900.00	2.590	0.096
#1	**1**	**Time of Concentration:**					**0.130**
#2	1	3. Short grass pasture	33.00	23.10	70.00	4.590	0.004
		6. Grassed waterway	5.00	60.00	1,200.00	3.350	0.099
#2	**1**	**Time of Concentration:**					**0.103**
#3	1	3. Short grass pasture	33.00	33.00	100.00	4.590	0.006
		6. Grassed waterway	5.00	15.00	300.00	3.350	0.024
#3	**1**	**Time of Concentration:**					**0.030**
#4	1	3. Short grass pasture	33.00	29.70	90.00	4.590	0.005
		6. Grassed waterway	3.00	15.00	500.00	2.590	0.053
		8. Large gullies, diversions, and low flowing streams	33.00	82.50	250.00	17.230	0.004
#4	**1**	**Time of Concentration:**					**0.062**
#5	1	3. Short grass pasture	33.00	29.70	90.00	4.590	0.005

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Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
		8. Large gullies, diversions, and low flowing streams	30.00	180.00	600.00	16.430	0.010
		6. Grassed waterway	3.00	24.00	800.00	2.590	0.085
#5	**1**	**Time of Concentration:**					**0.100**
#6	1	3. Short grass pasture	5.00	15.00	300.00	1.780	0.046
		6. Grassed waterway	3.00	27.00	900.00	2.590	0.096
#6	**1**	**Time of Concentration:**					**0.142**

H-100

Inflow/Outflow Hydrographs for Structure # 3



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Bethlehem Landfill Company
Phase V Expansion

Post Construction Stormwater Management - Extended Basin #6

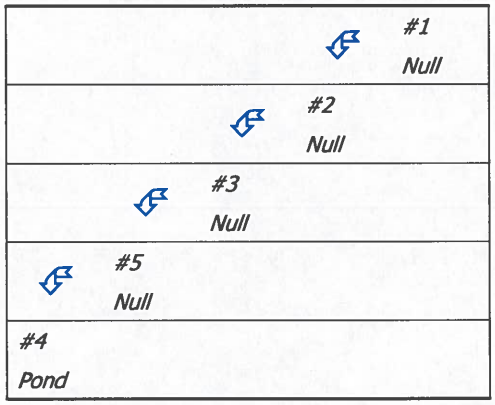
DA = 14.29ac.

Initial Basin El. 460.00

JMM

Structure Networking:

Type	Stru #	(flows into)	Stru #	Musk. K (hrs)	Musk. X	Description
Null	#1	==>	#2	0.000	0.000	Cul 14
Null	#2	==>	#3	0.000	0.000	Cul 15/DS-3 Cul 15/DS-3
Null	#3	==>	#5	0.000	0.000	Cul 16 cul 16
Pond	#4	==>	End	0.000	0.000	Basin 6
Null	#5	==>	#4	0.000	0.000	Channel C



General Information

Storm Information:

Storm Type:	NRCS Type II
Design Storm:	2 yr - 24 hr
Rainfall Depth:	3.000 inches

Structure Summary:

		Immediate Contributing Area (ac)	Total Contributing Area (ac)	Peak Discharge (cfs)	Total Runoff Volume (ac-ft)
#1		0.900	0.900	1.18	0.09
#2		5.000	5.900	7.74	0.58
#3		0.900	6.800	8.92	0.67
#5		5.890	12.690	16.65	1.25
#4	In	1.600	14.290	18.22	1.37
	Out			1.65	0.99

Structure Detail:

Structure #1 (Null)

Cul 14

Structure #2 (Null)

Cul 15/DS-3

Cul 15/DS-3

Structure #3 (Null)

Cul 16

cul 16

Structure #5 (Null)

Channel C

Structure #4 (Pond)

Basin 6

Pond Inputs:

Initial Pool Elev:	460.01 ft
Initial Pool:	0.00 ac-ft

Perforated Riser

Riser Diameter (in)	Riser Height (ft)	Barrel Diameter (in)	Barrel Length (ft)	Barrel Slope (%)	Manning's n	Spillway Elev (ft)	Number of Holes per Elev
36.00	8.40	24.00	450.00	5.00	0.0120	468.40	10

Emergency Spillway

Spillway Elev	Crest Length (ft)	Left Sideslope	Right Sideslope	Bottom Width (ft)
468.90	22.50	3.00:1	3.00:1	125.00

Pond Results:

Peak Elevation:	464.30 ft
Dewater Time:	0.78 days

Dewatering time is calculated from peak stage to lowest spillway

Elevation-Capacity-Discharge Table

Elevation	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	Dewater Time (hrs)	
460.00	0.068	0.000	0.000		
460.01	0.068	0.001	0.000		
460.50	0.085	0.038	0.000		
461.00	0.104	0.085	0.000		
461.50	0.125	0.142	0.000		
462.00	0.148	0.211	0.000		
462.50	0.173	0.291	0.000		
463.00	0.200	0.384	0.000		Low hole SPW #1
463.50	0.229	0.491	0.743	11.65	
464.00	0.260	0.613	1.050	4.10	
464.30	0.280	0.697	1.647	2.85	Peak Stage
464.50	0.292	0.751	2.029		
465.00	0.327	0.906	2.536		
465.50	0.364	1.079	3.690		
466.00	0.402	1.270	4.356		
466.50	0.443	1.481	5.656		
467.00	0.485	1.713	6.456		
467.25	0.507	1.837	7.335		
467.40	0.521	1.915	7.675		
467.50	0.530	1.967	7.884		
467.75	0.553	2.102	8.890		
467.90	0.567	2.186	9.298		
468.00	0.576	2.244	9.548		
468.40	0.615	2.482	10.448		Spillway #1
468.50	0.625	2.544	10.655		
468.90	0.665	2.802	11.431		Spillway #2
469.00	0.675	2.869	26.265		
469.50	0.727	3.219	109.819		
470.00	0.781	3.596	380.004		
470.50	0.844	4.002	696.180		
471.00	0.910	4.440	1,078.654		

Detailed Discharge Table

Elevation (ft)	Perf. Riser (cfs)	Emergency Spillway (cfs)	Combined Total Discharge (cfs)
460.00	0.000	0.000	0.000
460.01	0.000	0.000	0.000
460.50	0.000	0.000	0.000
461.00	0.000	0.000	0.000
461.50	0.000	0.000	0.000
462.00	0.000	0.000	0.000
462.50	0.000	0.000	0.000
463.00	2.00>0.000	0.000	0.000
463.50	0.743	0.000	0.743
464.00	2.00>1.050	0.000	1.050
464.50	2.029	0.000	2.029
465.00	2.00>2.536	0.000	2.536
465.50	3.690	0.000	3.690
466.00	2.00>4.356	0.000	4.356
466.50	5.656	0.000	5.656
467.00	2.00>6.456	0.000	6.456
467.25	7.335	0.000	7.335
467.40	7.675	0.000	7.675
467.50	2.00>7.884	0.000	7.884
467.75	8.890	0.000	8.890
467.90	9.298	0.000	9.298
468.00	9.548	0.000	9.548
468.40	10.448	0.000	10.448
468.50	10.655	0.000	10.655
468.90	11.431	0.000	11.431
469.00	13.579	12.686	26.265
469.50	33.707	76.112	109.819
470.00	43.051	336.952	380.004
470.50	49.322	646.859	696.180
471.00	54.146	1,024.508	1,078.654

Subwatershed Hydrology Detail:

Stru #	SWS #	SWS Area (ac)	Time of Conc (hrs)	Musk K (hrs)	Musk X	Curve Number	UHS	Peak Discharge (cfs)	Runoff Volume (ac-ft)
#1	1	0.900	0.040	0.000	0.000	79.000	F	1.18	0.089
	Σ	**0.900**						**1.18**	**0.089**
#2	1	5.000	0.073	0.000	0.000	79.000	F	6.56	0.495
	Σ	**5.900**						**7.74**	**0.583**
#3	1	0.900	0.041	0.000	0.000	79.000	F	1.18	0.089
	Σ	**6.800**						**8.92**	**0.672**
#5	1	5.890	0.040	0.000	0.000	79.000	M	7.73	0.583
	Σ	**12.690**						**16.65**	**1.255**
#4	1	1.600	0.009	0.000	0.000	73.000	F	1.57	0.114
	Σ	**14.290**						**18.22**	**1.369**

Subwatershed Time of Concentration Details:

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#1	1	3. Short grass pasture	33.00	19.80	60.00	4.590	0.003
		6. Grassed waterway	1.00	2.00	200.00	1.500	0.037
#1	**1**	**Time of Concentration:**					**0.040**
#2	1	3. Short grass pasture	33.00	23.10	70.00	4.590	0.004
		6. Grassed waterway	3.00	19.50	650.00	2.590	0.069
#2	**1**	**Time of Concentration:**					**0.073**
#3	1	3. Short grass pasture	33.00	23.10	70.00	4.590	0.004
		6. Grassed waterway	1.00	2.00	200.00	1.500	0.037
#3	**1**	**Time of Concentration:**					**0.041**
#4	1	3. Short grass pasture	33.00	49.50	150.00	4.590	0.009
#4	**1**	**Time of Concentration:**					**0.009**
#5	1	3. Short grass pasture	33.00	29.70	90.00	4.590	0.005
		6. Grassed waterway	3.00	6.00	200.00	2.590	0.021
		8. Large gullies, diversions, and low flowing streams	20.00	140.00	700.00	13.410	0.014
#5	**1**	**Time of Concentration:**					**0.040**

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General Information

Storm Information:

Storm Type:	NRCS Type II
Design Storm:	5 yr - 24 hr
Rainfall Depth:	3.600 inches

Structure Summary:

		Immediate Contributing Area (ac)	Total Contributing Area (ac)	Peak Discharge (cfs)	Total Runoff Volume (ac-ft)
#1		0.900	0.900	1.59	0.12
#2		5.000	5.900	10.45	0.81
#3		0.900	6.800	12.04	0.93
#5		5.890	12.690	22.48	1.74
#4	In	1.600	14.290	24.72	1.90
	Out			2.80	1.52

Structure Detail:

Structure #1 (Null)

Cul 14

Structure #2 (Null)

Cul 15/DS-3

Cul 15/DS-3

Structure #3 (Null)

Cul 16

cul 16

Structure #5 (Null)

Channel C

Structure #4 (Pond)

Basin 6

Pond Inputs:

Initial Pool Elev:	460.01 ft
Initial Pool:	0.00 ac-ft

Perforated Riser

Riser Diameter (in)	Riser Height (ft)	Barrel Diameter (in)	Barrel Length (ft)	Barrel Slope (%)	Manning's n	Spillway Elev (ft)	Number of Holes per Elev
36.00	8.40	24.00	450.00	5.00	0.0120	468.40	10

Emergency Spillway

Spillway Elev	Crest Length (ft)	Left Sideslope	Right Sideslope	Bottom Width (ft)
468.90	22.50	3.00:1	3.00:1	125.00

Pond Results:

Peak Elevation:	465.11 ft
Dewater Time:	0.82 days

Dewatering time is calculated from peak stage to lowest spillway

Elevation-Capacity-Discharge Table

Elevation	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	Dewater Time (hrs)	
460.00	0.068	0.000	0.000		
460.01	0.068	0.001	0.000		
460.50	0.085	0.038	0.000		
461.00	0.104	0.085	0.000		
461.50	0.125	0.142	0.000		
462.00	0.148	0.211	0.000		
462.50	0.173	0.291	0.000		
463.00	0.200	0.384	0.000		Low hole SPW #1
463.50	0.229	0.491	0.743	10.10	
464.00	0.260	0.613	1.050	4.05	
464.50	0.292	0.751	2.029	2.65	
465.00	0.327	0.906	2.536	1.90	
465.11	0.336	0.945	2.797	1.00	Peak Stage
465.50	0.364	1.079	3.690		
466.00	0.402	1.270	4.356		
466.50	0.443	1.481	5.656		
467.00	0.485	1.713	6.456		
467.25	0.507	1.837	7.335		
467.40	0.521	1.915	7.675		
467.50	0.530	1.967	7.884		
467.75	0.553	2.102	8.890		
467.90	0.567	2.186	9.298		
468.00	0.576	2.244	9.548		
468.40	0.615	2.482	10.448		Spillway #1
468.50	0.625	2.544	10.655		
468.90	0.665	2.802	11.431		Spillway #2
469.00	0.675	2.869	26.265		
469.50	0.727	3.219	109.819		
470.00	0.781	3.596	380.004		
470.50	0.844	4.002	696.180		
471.00	0.910	4.440	1,078.654		

Detailed Discharge Table

Elevation (ft)	Perf. Riser (cfs)	Emergency Spillway (cfs)	Combined Total Discharge (cfs)
460.00	0.000	0.000	0.000
460.01	0.000	0.000	0.000
460.50	0.000	0.000	0.000
461.00	0.000	0.000	0.000
461.50	0.000	0.000	0.000

Elevation (ft)	Perf. Riser (cfs)	Emergency Spillway (cfs)	Combined Total Discharge (cfs)
462.00	0.000	0.000	0.000
462.50	0.000	0.000	0.000
463.00	2.00>0.000	0.000	0.000
463.50	0.743	0.000	0.743
464.00	2.00>1.050	0.000	1.050
464.50	2.029	0.000	2.029
465.00	2.00>2.536	0.000	2.536
465.50	3.690	0.000	3.690
466.00	2.00>4.356	0.000	4.356
466.50	5.656	0.000	5.656
467.00	2.00>6.456	0.000	6.456
467.25	7.335	0.000	7.335
467.40	7.675	0.000	7.675
467.50	2.00>7.884	0.000	7.884
467.75	8.890	0.000	8.890
467.90	9.298	0.000	9.298
468.00	9.548	0.000	9.548
468.40	10.448	0.000	10.448
468.50	10.655	0.000	10.655
468.90	11.431	0.000	11.431
469.00	13.579	12.686	26.265
469.50	33.707	76.112	109.819
470.00	43.051	336.952	380.004
470.50	49.322	646.859	696.180
471.00	54.146	1,024.508	1,078.654

Subwatershed Hydrology Detail:

Stru #	SWS #	SWS Area (ac)	Time of Conc (hrs)	Musk K (hrs)	Musk X	Curve Number	UHS	Peak Discharge (cfs)	Runoff Volume (ac-ft)
#1	1	0.900	0.040	0.000	0.000	79.000	F	1.59	0.123
	Σ	**0.900**						**1.59**	**0.123**
#2	1	5.000	0.073	0.000	0.000	79.000	F	8.86	0.684
	Σ	**5.900**						**10.45**	**0.807**
#3	1	0.900	0.041	0.000	0.000	79.000	F	1.59	0.123
	Σ	**6.800**						**12.04**	**0.930**
#5	1	5.890	0.040	0.000	0.000	79.000	M	10.43	0.806
	Σ	**12.690**						**22.48**	**1.736**
#4	1	1.600	0.009	0.000	0.000	73.000	F	2.24	0.166
	Σ	**14.290**						**24.72**	**1.902**

Subwatershed Time of Concentration Details:

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#1	1	3. Short grass pasture	33.00	19.80	60.00	4.590	0.003
		6. Grassed waterway	1.00	2.00	200.00	1.500	0.037
#1	**1**	**Time of Concentration:**					**0.040**
#2	1	3. Short grass pasture	33.00	23.10	70.00	4.590	0.004
		6. Grassed waterway	3.00	19.50	650.00	2.590	0.069
#2	**1**	**Time of Concentration:**					**0.073**
#3	1	3. Short grass pasture	33.00	23.10	70.00	4.590	0.004
		6. Grassed waterway	1.00	2.00	200.00	1.500	0.037
#3	**1**	**Time of Concentration:**					**0.041**
#4	1	3. Short grass pasture	33.00	49.50	150.00	4.590	0.009
#4	**1**	**Time of Concentration:**					**0.009**
#5	1	3. Short grass pasture	33.00	29.70	90.00	4.590	0.005
		6. Grassed waterway	3.00	6.00	200.00	2.590	0.021
		8. Large gullies, diversions, and low flowing streams	20.00	140.00	700.00	13.410	0.014
#5	**1**	**Time of Concentration:**					**0.040**

General Information

Storm Information:

Storm Type:	NRCS Type II
Design Storm:	10 yr - 24 hr
Rainfall Depth:	4.560 inches

Structure Summary:

		Immediate Contributing Area (ac)	Total Contributing Area (ac)	Peak Discharge (cfs)	Total Runoff Volume (ac-ft)
#1		0.900	0.900	2.28	0.18
#2		5.000	5.900	14.93	1.19
#3		0.900	6.800	17.20	1.37
#5		5.890	12.690	32.10	2.56
#4	In	1.600	14.290	35.49	2.82
	Out			5.14	2.44

Structure Detail:

Structure #1 (Null)

Cul 14

Structure #2 (Null)

Cul 15/DS-3

Cul 15/DS-3

Structure #3 (Null)

Cul 16

cul 16

Structure #5 (Null)

Channel C

Structure #4 (Pond)

Basin 6

Pond Inputs:

Initial Pool Elev:	460.01 ft
Initial Pool:	0.00 ac-ft

Perforated Riser

Riser Diameter (in)	Riser Height (ft)	Barrel Diameter (in)	Barrel Length (ft)	Barrel Slope (%)	Manning's n	Spillway Elev (ft)	Number of Holes per Elev
36.00	8.40	24.00	450.00	5.00	0.0120	468.40	10

Emergency Spillway

Spillway Elev	Crest Length (ft)	Left Sideslope	Right Sideslope	Bottom Width (ft)
468.90	22.50	3.00:1	3.00:1	125.00

Pond Results:

Peak Elevation:	466.30 ft
Dewater Time:	0.86 days

Dewatering time is calculated from peak stage to lowest spillway

Elevation-Capacity-Discharge Table

Elevation	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	Dewater Time (hrs)	
460.00	0.068	0.000	0.000		
460.01	0.068	0.001	0.000		
460.50	0.085	0.038	0.000		
461.00	0.104	0.085	0.000		
461.50	0.125	0.142	0.000		
462.00	0.148	0.211	0.000		
462.50	0.173	0.291	0.000		
463.00	0.200	0.384	0.000		Low hole SPW #1
463.50	0.229	0.491	0.743	8.75	
464.00	0.260	0.613	1.050	4.30	
464.50	0.292	0.751	2.029	2.60	
465.00	0.327	0.906	2.536	1.70	
465.50	0.364	1.079	3.690	1.25	
466.00	0.402	1.270	4.356	1.15	
466.30	0.427	1.398	5.141	0.95	Peak Stage
466.50	0.443	1.481	5.656		
467.00	0.485	1.713	6.456		
467.25	0.507	1.837	7.335		
467.40	0.521	1.915	7.675		
467.50	0.530	1.967	7.884		
467.75	0.553	2.102	8.890		
467.90	0.567	2.186	9.298		
468.00	0.576	2.244	9.548		
468.40	0.615	2.482	10.448		Spillway #1
468.50	0.625	2.544	10.655		
468.90	0.665	2.802	11.431		Spillway #2
469.00	0.675	2.869	26.265		
469.50	0.727	3.219	109.819		
470.00	0.781	3.596	380.004		
470.50	0.844	4.002	696.180		
471.00	0.910	4.440	1,078.654		

Detailed Discharge Table

Elevation (ft)	Perf. Riser (cfs)	Emergency Spillway (cfs)	Combined Total Discharge (cfs)
460.00	0.000	0.000	0.000
460.01	0.000	0.000	0.000
460.50	0.000	0.000	0.000
461.00	0.000	0.000	0.000
461.50	0.000	0.000	0.000

Elevation (ft)	Perf. Riser (cfs)	Emergency Spillway (cfs)	Combined Total Discharge (cfs)
462.00	0.000	0.000	0.000
462.50	0.000	0.000	0.000
463.00	2.00>0.000	0.000	0.000
463.50	0.743	0.000	0.743
464.00	2.00>1.050	0.000	1.050
464.50	2.029	0.000	2.029
465.00	2.00>2.536	0.000	2.536
465.50	3.690	0.000	3.690
466.00	2.00>4.356	0.000	4.356
466.50	5.656	0.000	5.656
467.00	2.00>6.456	0.000	6.456
467.25	7.335	0.000	7.335
467.40	7.675	0.000	7.675
467.50	2.00>7.884	0.000	7.884
467.75	8.890	0.000	8.890
467.90	9.298	0.000	9.298
468.00	9.548	0.000	9.548
468.40	10.448	0.000	10.448
468.50	10.655	0.000	10.655
468.90	11.431	0.000	11.431
469.00	13.579	12.686	26.265
469.50	33.707	76.112	109.819
470.00	43.051	336.952	380.004
470.50	49.322	646.859	696.180
471.00	54.146	1,024.508	1,078.654

Subwatershed Hydrology Detail:

Stru #	SWS #	SWS Area (ac)	Time of Conc (hrs)	Musk K (hrs)	Musk X	Curve Number	UHS	Peak Discharge (cfs)	Runoff Volume (ac-ft)
#1	1	0.900	0.040	0.000	0.000	79.000	F	2.28	0.181
	Σ	**0.900**						**2.28**	**0.181**
#2	1	5.000	0.073	0.000	0.000	79.000	F	12.65	1.010
	Σ	**5.900**						**14.93**	**1.192**
#3	1	0.900	0.041	0.000	0.000	79.000	F	2.28	0.181
	Σ	**6.800**						**17.20**	**1.373**
#5	1	5.890	0.040	0.000	0.000	79.000	M	14.90	1.190
	Σ	**12.690**						**32.10**	**2.563**
#4	1	1.600	0.009	0.000	0.000	73.000	F	3.39	0.258
	Σ	**14.290**						**35.49**	**2.821**

Subwatershed Time of Concentration Details:

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#1	1	3. Short grass pasture	33.00	19.80	60.00	4.590	0.003
		6. Grassed waterway	1.00	2.00	200.00	1.500	0.037
#1	**1**	**Time of Concentration:**					**0.040**
#2	1	3. Short grass pasture	33.00	23.10	70.00	4.590	0.004
		6. Grassed waterway	3.00	19.50	650.00	2.590	0.069
#2	**1**	**Time of Concentration:**					**0.073**
#3	1	3. Short grass pasture	33.00	23.10	70.00	4.590	0.004
		6. Grassed waterway	1.00	2.00	200.00	1.500	0.037
#3	**1**	**Time of Concentration:**					**0.041**
#4	1	3. Short grass pasture	33.00	49.50	150.00	4.590	0.009
#4	**1**	**Time of Concentration:**					**0.009**
#5	1	3. Short grass pasture	33.00	29.70	90.00	4.590	0.005
		6. Grassed waterway	3.00	6.00	200.00	2.590	0.021
		8. Large gullies, diversions, and low flowing streams	20.00	140.00	700.00	13.410	0.014
#5	**1**	**Time of Concentration:**					**0.040**

General Information

Storm Information:

Storm Type:	NRCS Type II
Design Storm:	25 yr - 24 hr
Rainfall Depth:	5.520 inches

Structure Summary:

		Immediate Contributing Area (ac)	Total Contributing Area (ac)	Peak Discharge (cfs)	Total Runoff Volume (ac-ft)
#1		0.900	0.900	2.97	0.24
#2		5.000	5.900	19.48	1.60
#3		0.900	6.800	22.46	1.84
#5		5.890	12.690	41.91	3.44
#4	In	1.600	14.290	46.49	3.80
	Out			7.55	3.41

Structure Detail:

Structure #1 (Null)

Cul 14

Structure #2 (Null)

Cul 15/DS-3

Cul 15/DS-3

Structure #3 (Null)

Cul 16

cul 16

Structure #5 (Null)

Channel C

Structure #4 (Pond)

Basin 6

Pond Inputs:

Initial Pool Elev:	460.01 ft
Initial Pool:	0.00 ac-ft

Perforated Riser

Riser Diameter (in)	Riser Height (ft)	Barrel Diameter (in)	Barrel Length (ft)	Barrel Slope (%)	Manning's n	Spillway Elev (ft)	Number of Holes per Elev
36.00	8.40	24.00	450.00	5.00	0.0120	468.40	10

Emergency Spillway

Spillway Elev	Crest Length (ft)	Left Sideslope	Right Sideslope	Bottom Width (ft)
468.90	22.50	3.00:1	3.00:1	125.00

Pond Results:

Peak Elevation:	467.35 ft
Dewater Time:	0.90 days

Dewatering time is calculated from peak stage to lowest spillway

Elevation-Capacity-Discharge Table

Elevation	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	Dewater Time (hrs)	
460.00	0.068	0.000	0.000		
460.01	0.068	0.001	0.000		
460.50	0.085	0.038	0.000		
461.00	0.104	0.085	0.000		
461.50	0.125	0.142	0.000		
462.00	0.148	0.211	0.000		
462.50	0.173	0.291	0.000		
463.00	0.200	0.384	0.000		Low hole SPW #1
463.50	0.229	0.491	0.743	8.75	
464.00	0.260	0.613	1.050	3.20	
464.50	0.292	0.751	2.029	3.00	
465.00	0.327	0.906	2.536	1.65	
465.50	0.364	1.079	3.690	1.30	
466.00	0.402	1.270	4.356	1.00	
466.50	0.443	1.481	5.656	0.95	
467.00	0.485	1.713	6.456	0.85	
467.25	0.507	1.837	7.335	0.55	
467.35	0.516	1.887	7.553	0.25	Peak Stage
467.40	0.521	1.915	7.675		
467.50	0.530	1.967	7.884		
467.75	0.553	2.102	8.890		
467.90	0.567	2.186	9.298		
468.00	0.576	2.244	9.548		
468.40	0.615	2.482	10.448		Spillway #1
468.50	0.625	2.544	10.655		
468.90	0.665	2.802	11.431		Spillway #2
469.00	0.675	2.869	26.265		
469.50	0.727	3.219	109.819		
470.00	0.781	3.596	380.004		
470.50	0.844	4.002	696.180		
471.00	0.910	4.440	1,078.654		

Detailed Discharge Table

Elevation (ft)	Perf. Riser (cfs)	Emergency Spillway (cfs)	Combined Total Discharge (cfs)
460.00	0.000	0.000	0.000
460.01	0.000	0.000	0.000
460.50	0.000	0.000	0.000
461.00	0.000	0.000	0.000
461.50	0.000	0.000	0.000
462.00	0.000	0.000	0.000
462.50	0.000	0.000	0.000
463.00	2.00>0.000	0.000	0.000
463.50	0.743	0.000	0.743
464.00	2.00>1.050	0.000	1.050
464.50	2.029	0.000	2.029
465.00	2.00>2.536	0.000	2.536
465.50	3.690	0.000	3.690
466.00	2.00>4.356	0.000	4.356
466.50	5.656	0.000	5.656
467.00	2.00>6.456	0.000	6.456
467.25	7.335	0.000	7.335
467.40	7.675	0.000	7.675
467.50	2.00>7.884	0.000	7.884
467.75	8.890	0.000	8.890
467.90	9.298	0.000	9.298
468.00	9.548	0.000	9.548
468.40	10.448	0.000	10.448
468.50	10.655	0.000	10.655
468.90	11.431	0.000	11.431
469.00	13.579	12.686	26.265
469.50	33.707	76.112	109.819
470.00	43.051	336.952	380.004
470.50	49.322	646.859	696.180
471.00	54.146	1,024.508	1,078.654

Subwatershed Hydrology Detail:

Stru #	SWS #	SWS Area (ac)	Time of Conc (hrs)	Musk K (hrs)	Musk X	Curve Number	UHS	Peak Discharge (cfs)	Runoff Volume (ac-ft)
#1	1	0.900	0.040	0.000	0.000	79.000	F	2.97	0.243
	Σ	**0.900**						**2.97**	**0.243**
#2	1	5.000	0.073	0.000	0.000	79.000	F	16.51	1.355
	Σ	**5.900**						**19.48**	**1.598**
#3	1	0.900	0.041	0.000	0.000	79.000	F	2.97	0.243
	Σ	**6.800**						**22.46**	**1.841**
#5	1	5.890	0.040	0.000	0.000	79.000	M	19.45	1.596
	Σ	**12.690**						**41.91**	**3.437**
#4	1	1.600	0.009	0.000	0.000	73.000	F	4.58	0.359
	Σ	**14.290**						**46.49**	**3.796**

Subwatershed Time of Concentration Details:

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#1	1	3. Short grass pasture	33.00	19.80	60.00	4.590	0.003
		6. Grassed waterway	1.00	2.00	200.00	1.500	0.037
#1	**1**	**Time of Concentration:**					**0.040**
#2	1	3. Short grass pasture	33.00	23.10	70.00	4.590	0.004
		6. Grassed waterway	3.00	19.50	650.00	2.590	0.069
#2	**1**	**Time of Concentration:**					**0.073**
#3	1	3. Short grass pasture	33.00	23.10	70.00	4.590	0.004
		6. Grassed waterway	1.00	2.00	200.00	1.500	0.037
#3	**1**	**Time of Concentration:**					**0.041**
#4	1	3. Short grass pasture	33.00	49.50	150.00	4.590	0.009
#4	**1**	**Time of Concentration:**					**0.009**
#5	1	3. Short grass pasture	33.00	29.70	90.00	4.590	0.005
		6. Grassed waterway	3.00	6.00	200.00	2.590	0.021
		8. Large gullies, diversions, and low flowing streams	20.00	140.00	700.00	13.410	0.014
#5	**1**	**Time of Concentration:**					**0.040**

General Information

Storm Information:

Storm Type:	NRCS Type II
Design Storm:	50 yr - 24 hr
Rainfall Depth:	6.480 inches

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Structure Summary:

		Immediate Contributing Area (ac)	Total Contributing Area (ac)	Peak Discharge (cfs)	Total Runoff Volume (ac-ft)
#1		0.900	0.900	3.67	0.31
#2		5.000	5.900	24.07	2.02
#3		0.900	6.800	27.74	2.33
#5		5.890	12.690	51.77	4.34
#4	In	1.600	14.290	57.57	4.81
	Out			10.11	4.42

Structure Detail:

Structure #1 (Null)

Cul 14

Structure #2 (Null)

Cul 15/DS-3

Cul 15/DS-3

Structure #3 (Null)

Cul 16

cul 16

Structure #5 (Null)

Channel C

Structure #4 (Pond)

Basin 6

Pond Inputs:

Initial Pool Elev:	460.01 ft
Initial Pool:	0.00 ac-ft

Perforated Riser

Riser Diameter (in)	Riser Height (ft)	Barrel Diameter (in)	Barrel Length (ft)	Barrel Slope (%)	Manning's n	Spillway Elev (ft)	Number of Holes per Elev
36.00	8.40	24.00	450.00	5.00	0.0120	468.40	10

Emergency Spillway

Spillway Elev	Crest Length (ft)	Left Sideslope	Right Sideslope	Bottom Width (ft)
468.90	22.50	3.00:1	3.00:1	125.00

Pond Results:

Peak Elevation:	468.25 ft
Dewater Time:	0.91 days

Dewatering time is calculated from peak stage to lowest spillway

Elevation-Capacity-Discharge Table

Elevation	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	Dewater Time (hrs)	
460.00	0.068	0.000	0.000		
460.01	0.068	0.001	0.000		
460.50	0.085	0.038	0.000		
461.00	0.104	0.085	0.000		
461.50	0.125	0.142	0.000		
462.00	0.148	0.211	0.000		
462.50	0.173	0.291	0.000		
463.00	0.200	0.384	0.000		Low hole SPW #1
463.50	0.229	0.491	0.743	8.75	
464.00	0.260	0.613	1.050	1.65	
464.50	0.292	0.751	2.029	3.85	
465.00	0.327	0.906	2.536	1.75	
465.50	0.364	1.079	3.690	1.30	
466.00	0.402	1.270	4.356	1.05	
466.50	0.443	1.481	5.656	0.90	
467.00	0.485	1.713	6.456	0.80	
467.25	0.507	1.837	7.335	0.35	
467.40	0.521	1.915	7.675	0.25	
467.50	0.530	1.967	7.884	0.10	
467.75	0.553	2.102	8.890	0.40	
467.90	0.567	2.186	9.298	0.20	
468.00	0.576	2.244	9.548	0.15	
468.25	0.600	2.392	10.111	0.45	Peak Stage
468.40	0.615	2.482	10.448		Spillway #1
468.50	0.625	2.544	10.655		
468.90	0.665	2.802	11.431		Spillway #2
469.00	0.675	2.869	26.265		
469.50	0.727	3.219	109.819		
470.00	0.781	3.596	380.004		
470.50	0.844	4.002	696.180		
471.00	0.910	4.440	1,078.654		

Detailed Discharge Table

Elevation (ft)	Perf. Riser (cfs)	Emergency Spillway (cfs)	Combined Total Discharge (cfs)
460.00	0.000	0.000	0.000
460.01	0.000	0.000	0.000
460.50	0.000	0.000	0.000
461.00	0.000	0.000	0.000
461.50	0.000	0.000	0.000
462.00	0.000	0.000	0.000
462.50	0.000	0.000	0.000
463.00	2.00>0.000	0.000	0.000
463.50	0.743	0.000	0.743
464.00	2.00>1.050	0.000	1.050
464.50	2.029	0.000	2.029
465.00	2.00>2.536	0.000	2.536
465.50	3.690	0.000	3.690
466.00	2.00>4.356	0.000	4.356
466.50	5.656	0.000	5.656
467.00	2.00>6.456	0.000	6.456
467.25	7.335	0.000	7.335
467.40	7.675	0.000	7.675
467.50	2.00>7.884	0.000	7.884
467.75	8.890	0.000	8.890
467.90	9.298	0.000	9.298
468.00	9.548	0.000	9.548
468.40	10.448	0.000	10.448
468.50	10.655	0.000	10.655
468.90	11.431	0.000	11.431
469.00	13.579	12.686	26.265
469.50	33.707	76.112	109.819
470.00	43.051	336.952	380.004
470.50	49.322	646.859	696.180
471.00	54.146	1,024.508	1,078.654

Subwatershed Hydrology Detail:

Stru #	SWS #	SWS Area (ac)	Time of Conc (hrs)	Musk K (hrs)	Musk X	Curve Number	UHS	Peak Discharge (cfs)	Runoff Volume (ac-ft)
#1	1	0.900	0.040	0.000	0.000	79.000	F	3.67	0.308
	Σ	**0.900**						**3.67**	**0.308**
#2	1	5.000	0.073	0.000	0.000	79.000	F	20.40	1.711
	Σ	**5.900**						**24.07**	**2.019**
#3	1	0.900	0.041	0.000	0.000	79.000	F	3.67	0.308
	Σ	**6.800**						**27.74**	**2.327**
#5	1	5.890	0.040	0.000	0.000	79.000	M	24.03	2.016
	Σ	**12.690**						**51.77**	**4.343**
#4	1	1.600	0.009	0.000	0.000	73.000	F	5.81	0.465
	Σ	**14.290**						**57.57**	**4.808**

Subwatershed Time of Concentration Details:

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#1	1	3. Short grass pasture	33.00	19.80	60.00	4.590	0.003
		6. Grassed waterway	1.00	2.00	200.00	1.500	0.037
#1	**1**	**Time of Concentration:**					**0.040**
#2	1	3. Short grass pasture	33.00	23.10	70.00	4.590	0.004
		6. Grassed waterway	3.00	19.50	650.00	2.590	0.069
#2	**1**	**Time of Concentration:**					**0.073**
#3	1	3. Short grass pasture	33.00	23.10	70.00	4.590	0.004
		6. Grassed waterway	1.00	2.00	200.00	1.500	0.037
#3	**1**	**Time of Concentration:**					**0.041**
#4	1	3. Short grass pasture	33.00	49.50	150.00	4.590	0.009
#4	**1**	**Time of Concentration:**					**0.009**
#5	1	3. Short grass pasture	33.00	29.70	90.00	4.590	0.005
		6. Grassed waterway	3.00	6.00	200.00	2.590	0.021
		8. Large gullies, diversions, and low flowing streams	20.00	140.00	700.00	13.410	0.014
#5	**1**	**Time of Concentration:**					**0.040**

General Information

Storm Information:

Storm Type:	NRCS Type II
Design Storm:	100 yr - 24 hr
Rainfall Depth:	7.440 inches

Structure Summary:

		Immediate Contributing Area (ac)	Total Contributing Area (ac)	Peak Discharge (cfs)	Total Runoff Volume (ac-ft)
#1		0.900	0.900	4.37	0.37
#2		5.000	5.900	28.66	2.45
#3		0.900	6.800	33.03	2.82
#5		5.890	12.690	61.64	5.27
#4	In	1.600	14.290	68.68	5.85
	Out			24.43	5.46

Structure Detail:

Structure #1 (Null)

Cul 14

Structure #2 (Null)

Cul 15/DS-3

Cul 15/DS-3

Structure #3 (Null)

Cul 16

cul 16

Structure #5 (Null)

Channel C

Structure #4 (Pond)

Basin 6

Pond Inputs:

Initial Pool Elev:	460.01 ft
Initial Pool:	0.00 ac-ft

Perforated Riser

Riser Diameter (in)	Riser Height (ft)	Barrel Diameter (in)	Barrel Length (ft)	Barrel Slope (%)	Manning's n	Spillway Elev (ft)	Number of Holes per Elev
36.00	8.40	24.00	450.00	5.00	0.0120	468.40	10

Emergency Spillway

Spillway Elev	Crest Length (ft)	Left Sideslope	Right Sideslope	Bottom Width (ft)
468.90	22.50	3.00:1	3.00:1	125.00

Pond Results:

Peak Elevation:	468.99 ft
Dewater Time:	0.95 days

Dewatering time is calculated from peak stage to lowest spillway

Elevation-Capacity-Discharge Table

Elevation	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	Dewater Time (hrs)	
460.00	0.068	0.000	0.000		
460.01	0.068	0.001	0.000		
460.50	0.085	0.038	0.000		
461.00	0.104	0.085	0.000		
461.50	0.125	0.142	0.000		
462.00	0.148	0.211	0.000		
462.50	0.173	0.291	0.000		
463.00	0.200	0.384	0.000		Low hole SPW #1
463.50	0.229	0.491	0.743	8.70	
464.00	0.260	0.613	1.050	1.70	
464.50	0.292	0.751	2.029	3.20	
465.00	0.327	0.906	2.536	1.80	
465.50	0.364	1.079	3.690	1.35	
466.00	0.402	1.270	4.356	1.10	
466.50	0.443	1.481	5.656	0.90	
467.00	0.485	1.713	6.456	0.80	
467.25	0.507	1.837	7.335	0.35	
467.40	0.521	1.915	7.675	0.25	
467.50	0.530	1.967	7.884	0.10	
467.75	0.553	2.102	8.890	0.35	
467.90	0.567	2.186	9.298	0.20	
468.00	0.576	2.244	9.548	0.10	
468.40	0.615	2.482	10.448	0.50	Spillway #1
468.50	0.625	2.544	10.655	0.15	
468.90	0.665	2.802	11.431	0.70	Spillway #2
468.99	0.674	2.860	24.434	0.45	Peak Stage
469.00	0.675	2.869	26.265		
469.50	0.727	3.219	109.819		
470.00	0.781	3.596	380.004		
470.50	0.844	4.002	696.180		
471.00	0.910	4.440	1,078.654		

Detailed Discharge Table

Elevation (ft)	Perf. Riser (cfs)	Emergency Spillway (cfs)	Combined Total Discharge (cfs)
460.00	0.000	0.000	0.000
460.01	0.000	0.000	0.000
460.50	0.000	0.000	0.000
461.00	0.000	0.000	0.000
461.50	0.000	0.000	0.000
462.00	0.000	0.000	0.000
462.50	0.000	0.000	0.000
463.00	2.00>0.000	0.000	0.000
463.50	0.743	0.000	0.743
464.00	2.00>1.050	0.000	1.050
464.50	2.029	0.000	2.029
465.00	2.00>2.536	0.000	2.536
465.50	3.690	0.000	3.690
466.00	2.00>4.356	0.000	4.356
466.50	5.656	0.000	5.656
467.00	2.00>6.456	0.000	6.456
467.25	7.335	0.000	7.335
467.40	7.675	0.000	7.675
467.50	2.00>7.884	0.000	7.884
467.75	8.890	0.000	8.890
467.90	9.298	0.000	9.298
468.00	9.548	0.000	9.548
468.40	10.448	0.000	10.448
468.50	10.655	0.000	10.655
468.90	11.431	0.000	11.431
469.00	13.579	12.686	26.265
469.50	33.707	76.112	109.819
470.00	43.051	336.952	380.004
470.50	49.322	646.859	696.180
471.00	54.146	1,024.508	1,078.654

Subwatershed Hydrology Detail:

Stru #	SWS #	SWS Area (ac)	Time of Conc (hrs)	Musk K (hrs)	Musk X	Curve Number	UHS	Peak Discharge (cfs)	Runoff Volume (ac-ft)
#1	1	0.900	0.040	0.000	0.000	79.000	F	4.37	0.373
	Σ	**0.900**						**4.37**	**0.373**
#2	1	5.000	0.073	0.000	0.000	79.000	F	24.29	2.077
	Σ	**5.900**						**28.66**	**2.450**
#3	1	0.900	0.041	0.000	0.000	79.000	F	4.37	0.373
	Σ	**6.800**						**33.03**	**2.824**
#5	1	5.890	0.040	0.000	0.000	79.000	M	28.61	2.447
	Σ	**12.690**						**61.64**	**5.270**
#4	1	1.600	0.009	0.000	0.000	73.000	F	7.04	0.575
	Σ	**14.290**						**68.68**	**5.845**

Subwatershed Time of Concentration Details:

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#1	1	3. Short grass pasture	33.00	19.80	60.00	4.590	0.003
		6. Grassed waterway	1.00	2.00	200.00	1.500	0.037
#1	**1**	**Time of Concentration:**					**0.040**
#2	1	3. Short grass pasture	33.00	23.10	70.00	4.590	0.004
		6. Grassed waterway	3.00	19.50	650.00	2.590	0.069
#2	**1**	**Time of Concentration:**					**0.073**
#3	1	3. Short grass pasture	33.00	23.10	70.00	4.590	0.004
		6. Grassed waterway	1.00	2.00	200.00	1.500	0.037
#3	**1**	**Time of Concentration:**					**0.041**
#4	1	3. Short grass pasture	33.00	49.50	150.00	4.590	0.009
#4	**1**	**Time of Concentration:**					**0.009**
#5	1	3. Short grass pasture	33.00	29.70	90.00	4.590	0.005
		6. Grassed waterway	3.00	6.00	200.00	2.590	0.021
		8. Large gullies, diversions, and low flowing streams	20.00	140.00	700.00	13.410	0.014
#5	**1**	**Time of Concentration:**					**0.040**

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Hydrograph Return Period Recap

Hyd. No.	Hydrograph type (origin)	Inflow Hyd(s)	Peak Outflow (cfs)								Hydrograph description
			1-Yr	2-Yr	3-Yr	5-Yr	10-Yr	25-Yr	50-Yr	100-Yr	
1	SCS Runoff	-------	0.00	0.00	-------	0.00	0.00	0.00	0.00	0.00	Area 007 (DP 007)
2	SCS Runoff	-------	0.04	0.12	-------	0.25	0.38	0.60	0.79	1.01	Area 008 A
3	SCS Runoff	-------	13.33	19.81	-------	30.37	39.68	54.04	66.37	79.93	Area 008 B
4	SCS Runoff	-------	1.39	3.06	-------	6.23	9.21	14.07	18.44	23.44	Area 009 (DP009)
5	SCS Runoff	-------	1.62	3.77	-------	8.00	12.03	18.64	24.61	31.42	Area 010 (DP010)
6	SCS Runoff	-------	0.00	0.00	-------	0.00	0.00	0.00	0.00	0.00	Area 011 (DP011)
7	SCS Runoff	-------	0.00	0.00	-------	0.06	0.19	1.23	3.50	7.13	Area 012 A
8	SCS Runoff	-------	78.92	122.47	-------	193.64	256.46	354.13	439.08	533.66	Area 012 B
9	Reservoir	3	0.09	0.11	-------	0.14	0.15	0.18	0.99	2.43	Basin #7 Routing
10	Combine	2, 9	0.09	0.14	-------	0.30	0.44	0.67	1.00	2.45	DP 008
11	Reservoir	8	0.02	0.03	-------	0.05	0.06	0.67	1.65	11.22	Basin #8 Routing
12	Combine	7, 11	0.02	0.04	-------	0.10	0.23	1.25	3.53	11.59	DP 012
13	Combine	4, 5,	3.01	6.84	-------	14.22	21.23	32.72	43.06	54.84	Combined 009 + 010
14	Combine	2, 3, 7, 8, 13	92.51	144.34	-------	230.92	307.68	428.66	534.60	652.82	Combined Post WQv

Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
1	SCS Runoff	0.00	3	720	1	----	------	------	Area 007 (DP 007)
2	SCS Runoff	0.04	3	720	187	----	------	------	Area 008 A
3	SCS Runoff	13.33	3	729	49,998	----	------	------	Area 008 B
4	SCS Runoff	1.39	3	729	7,508	----	------	------	Area 009 (DP009)
5	SCS Runoff	1.62	3	729	9,489	----	------	------	Area 010 (DP010)
6	SCS Runoff	0.00	3	720	1	----	------	------	Area 011 (DP011)
7	SCS Runoff	0.00	3	0	0	----	------	------	Area 012 A
8	SCS Runoff	78.92	3	735	395,925	----	------	------	Area 012 B
9	Reservoir	0.09	3	1461	32,681	3	680.79	46,497	Basin #7 Routing
10	Combine	0.09	3	1440	32,868	2, 9	------	------	DP 008
11	Reservoir	0.02	3	1491	8,661	8	324.61	395,522	Basin #8 Routing
12	Combine	0.02	3	1491	8,661	7, 11	------	------	DP 012
13	Combine	3.01	3	729	16,998	4, 5,	------	------	Combined 009 + 010
14	Combine	92.51	3	735	463,108	2, 3, 7, 8, 13	------	------	Combined Post WQv

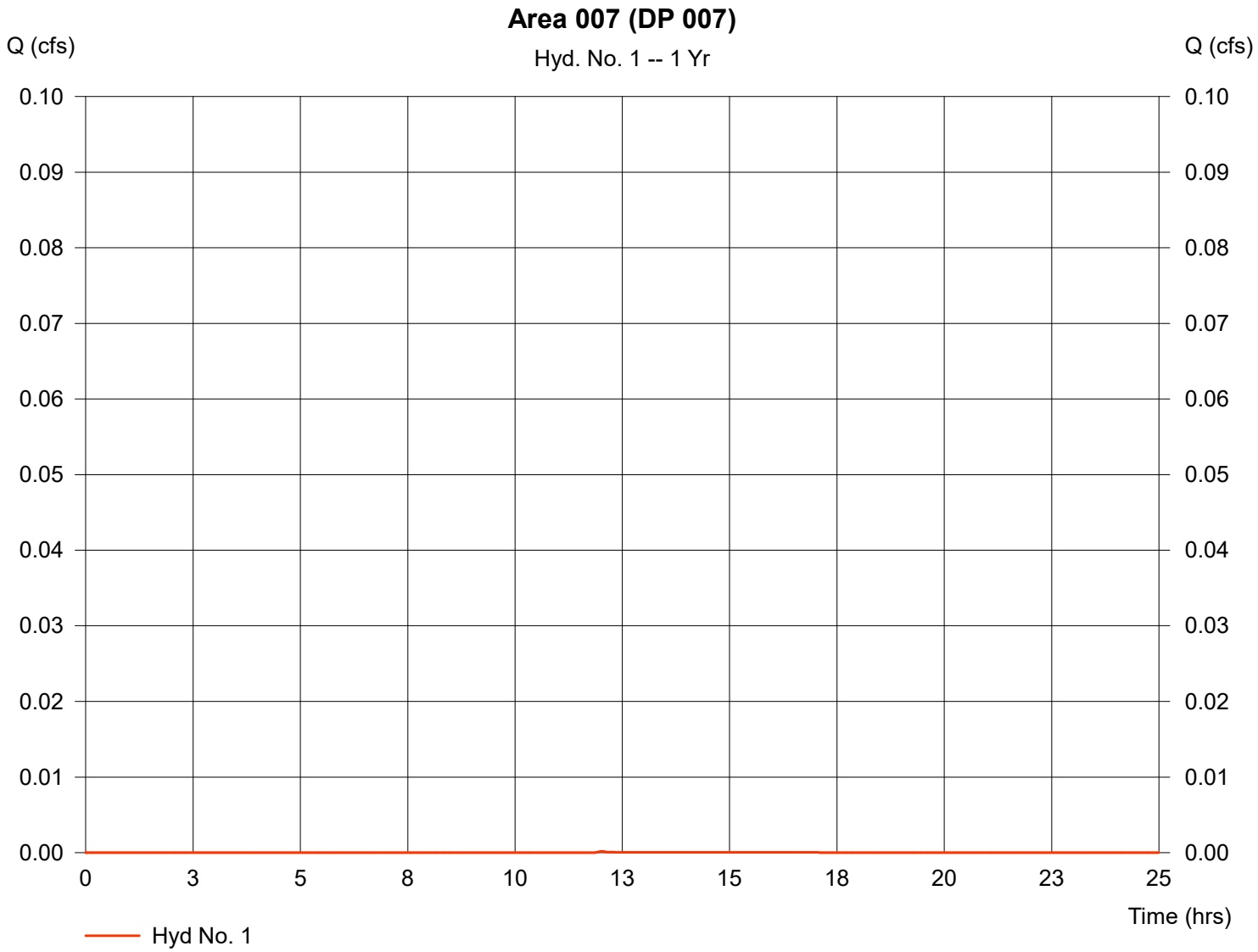
Hydrograph Plot

Hyd. No. 1

Area 007 (DP 007)

Hydrograph type	= SCS Runoff	Peak discharge	= 0.00 cfs
Storm frequency	= 1 yrs	Time interval	= 3 min
Drainage area	= 0.001 ac	Curve number	= 61
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 5.00 min
Total precip.	= 2.64 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 1 cuft



Hydrograph Plot

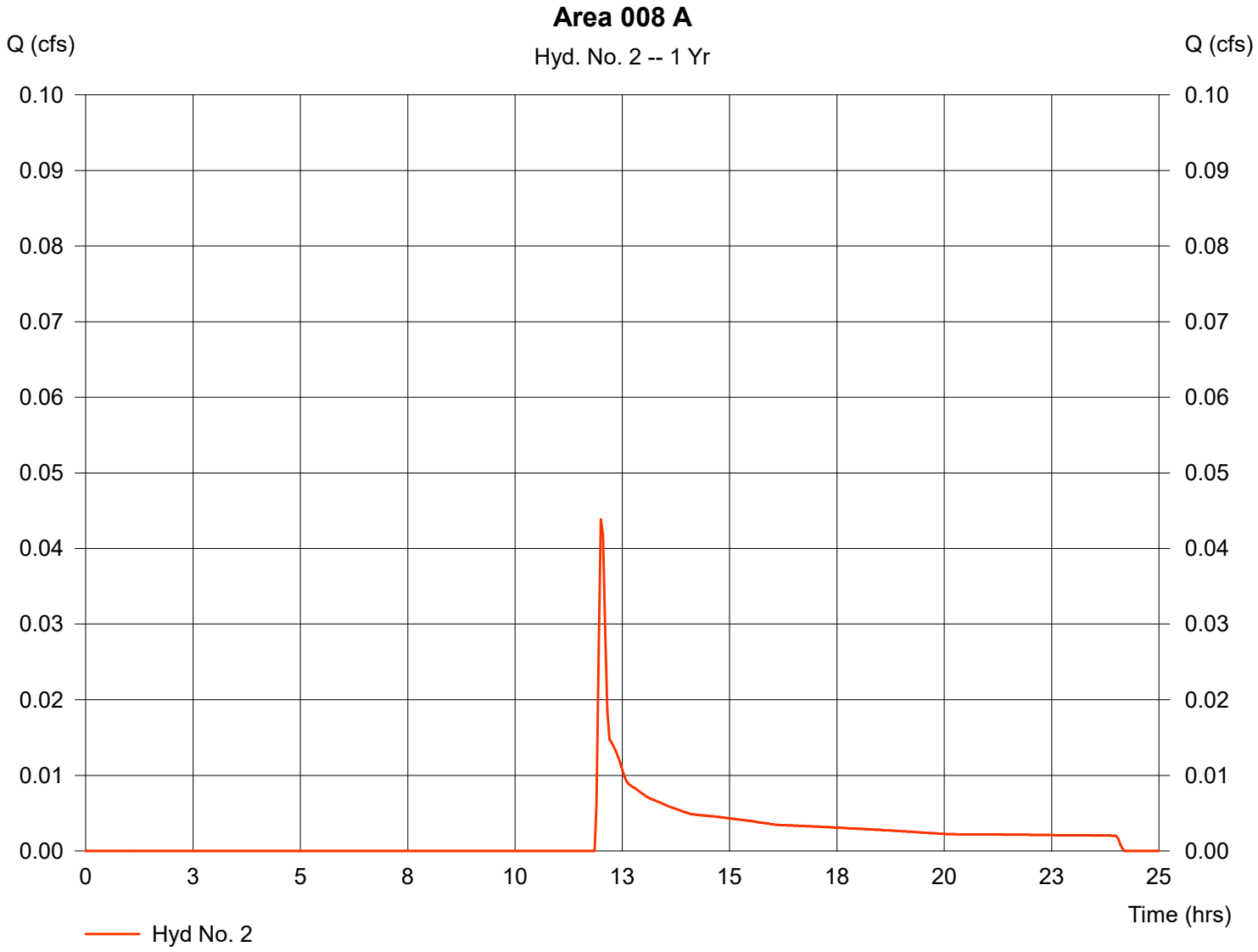
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Hyd. No. 2

Area 008 A

Hydrograph type	= SCS Runoff	Peak discharge	= 0.04 cfs
Storm frequency	= 1 yrs	Time interval	= 3 min
Drainage area	= 0.230 ac	Curve number	= 61
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 5.00 min
Total precip.	= 2.64 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 187 cuft



Hydrograph Plot

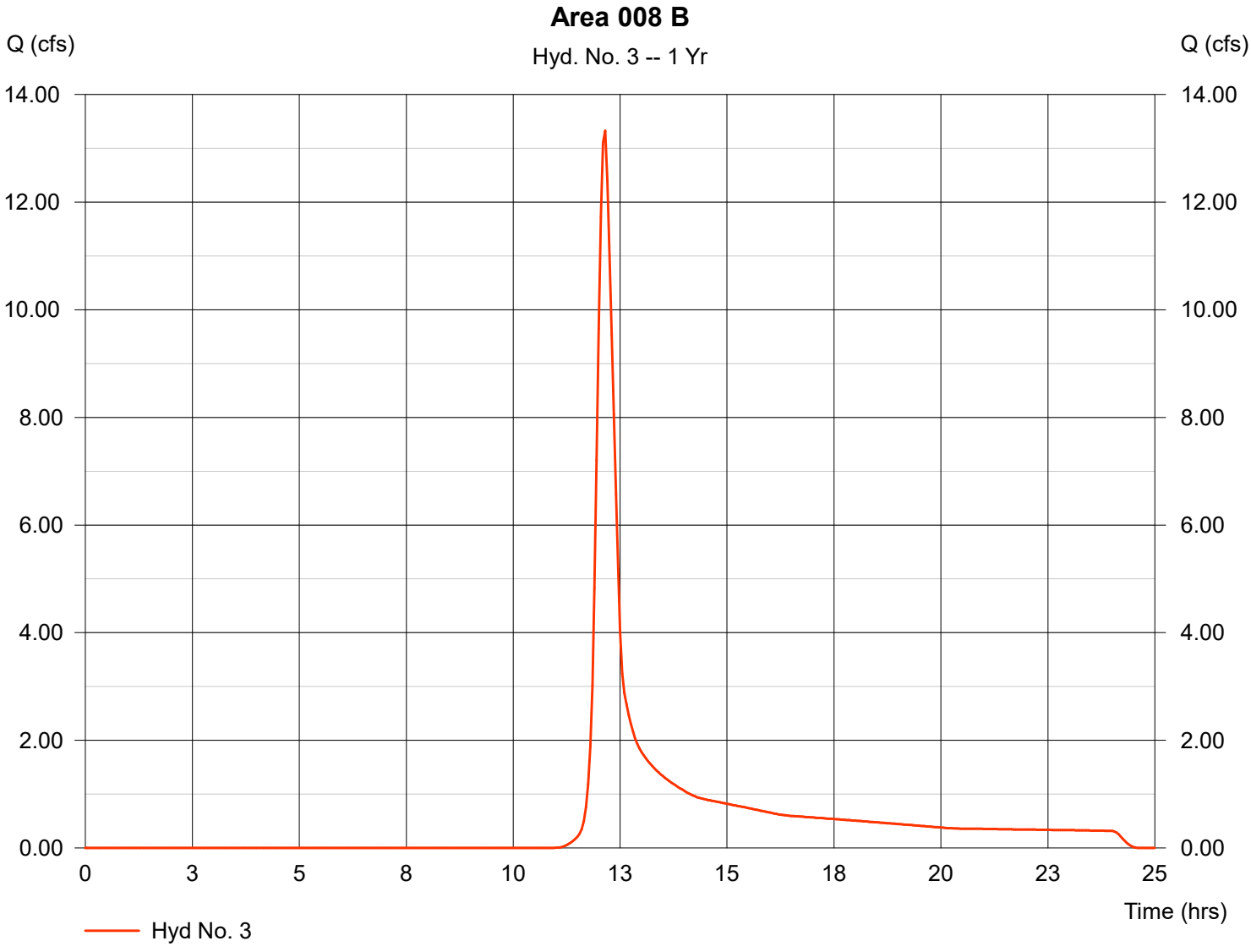
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Hyd. No. 3

Area 008 B

Hydrograph type	= SCS Runoff	Peak discharge	= 13.33 cfs
Storm frequency	= 1 yrs	Time interval	= 3 min
Drainage area	= 17.030 ac	Curve number	= 77
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 21.40 min
Total precip.	= 2.64 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 49,998 cuft



Hydrograph Plot

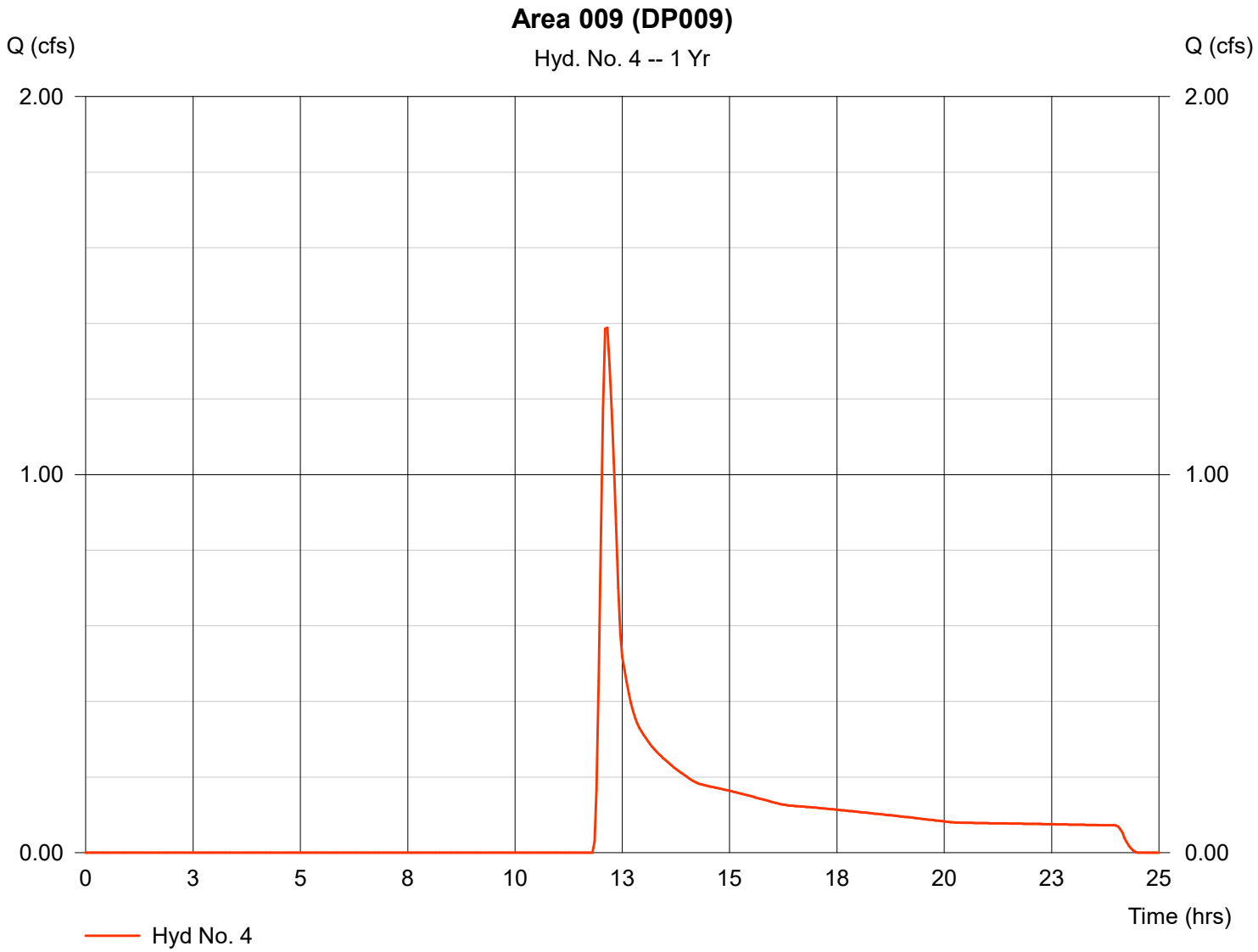
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Hyd. No. 4

Area 009 (DP009)

Hydrograph type	= SCS Runoff	Peak discharge	= 1.39 cfs
Storm frequency	= 1 yrs	Time interval	= 3 min
Drainage area	= 6.240 ac	Curve number	= 64
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 19.10 min
Total precip.	= 2.64 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 7,508 cuft



Hydrograph Plot

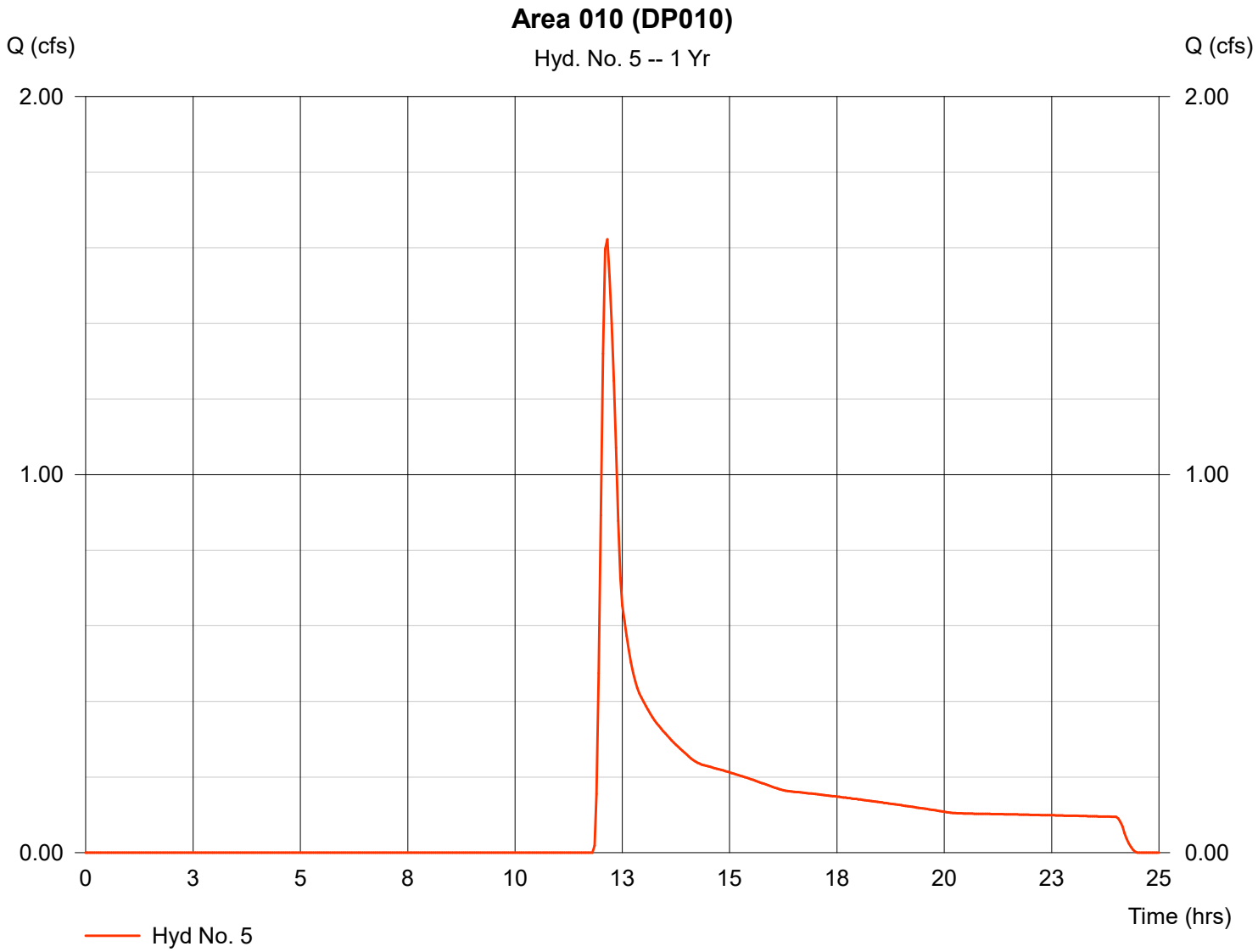
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Hyd. No. 5

Area 010 (DP010)

Hydrograph type	= SCS Runoff	Peak discharge	= 1.62 cfs
Storm frequency	= 1 yrs	Time interval	= 3 min
Drainage area	= 8.670 ac	Curve number	= 63
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 19.70 min
Total precip.	= 2.64 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 9,489 cuft



Hydrograph Plot

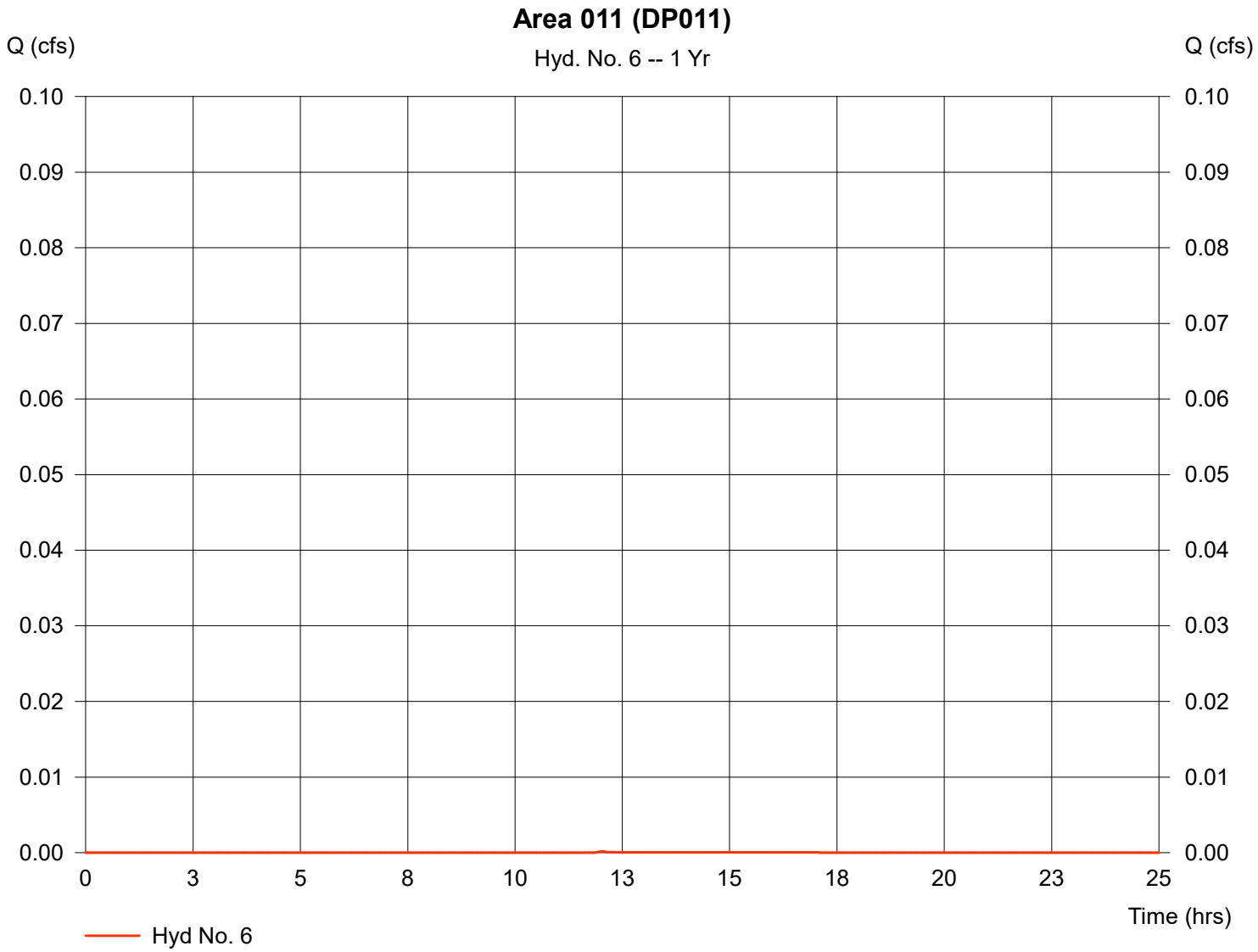
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Hyd. No. 6

Area 011 (DP011)

Hydrograph type	= SCS Runoff	Peak discharge	= 0.00 cfs
Storm frequency	= 1 yrs	Time interval	= 3 min
Drainage area	= 0.001 ac	Curve number	= 61
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 5.00 min
Total precip.	= 2.64 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 1 cuft



Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

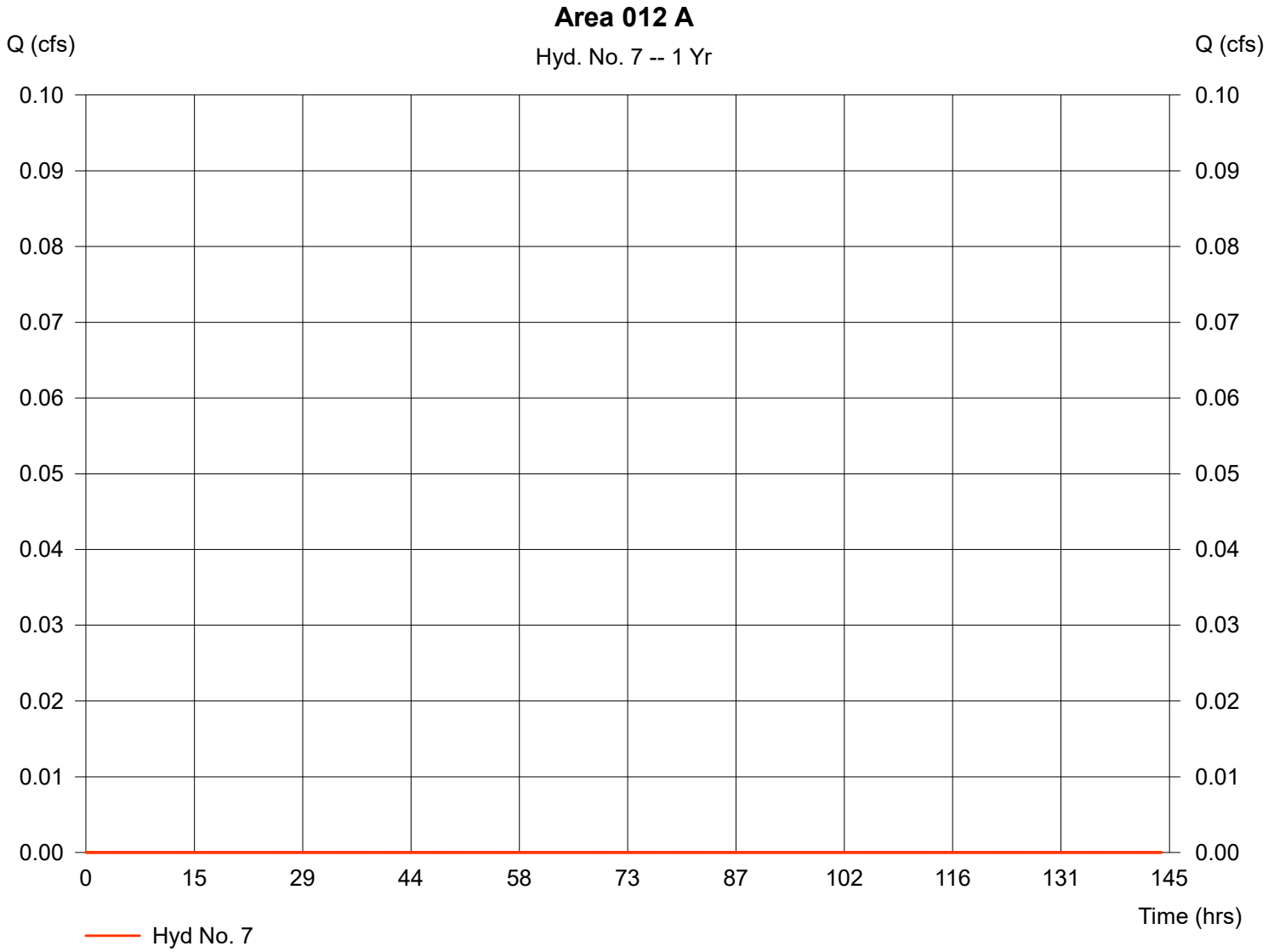
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Hyd. No. 7

Area 012 A

Hydrograph type	= SCS Runoff	Peak discharge	= 0.00 cfs
Storm frequency	= 1 yrs	Time interval	= 3 min
Drainage area	= 11.610 ac	Curve number	= 39
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 15.10 min
Total precip.	= 2.64 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 0 cuft



Hydrograph Plot

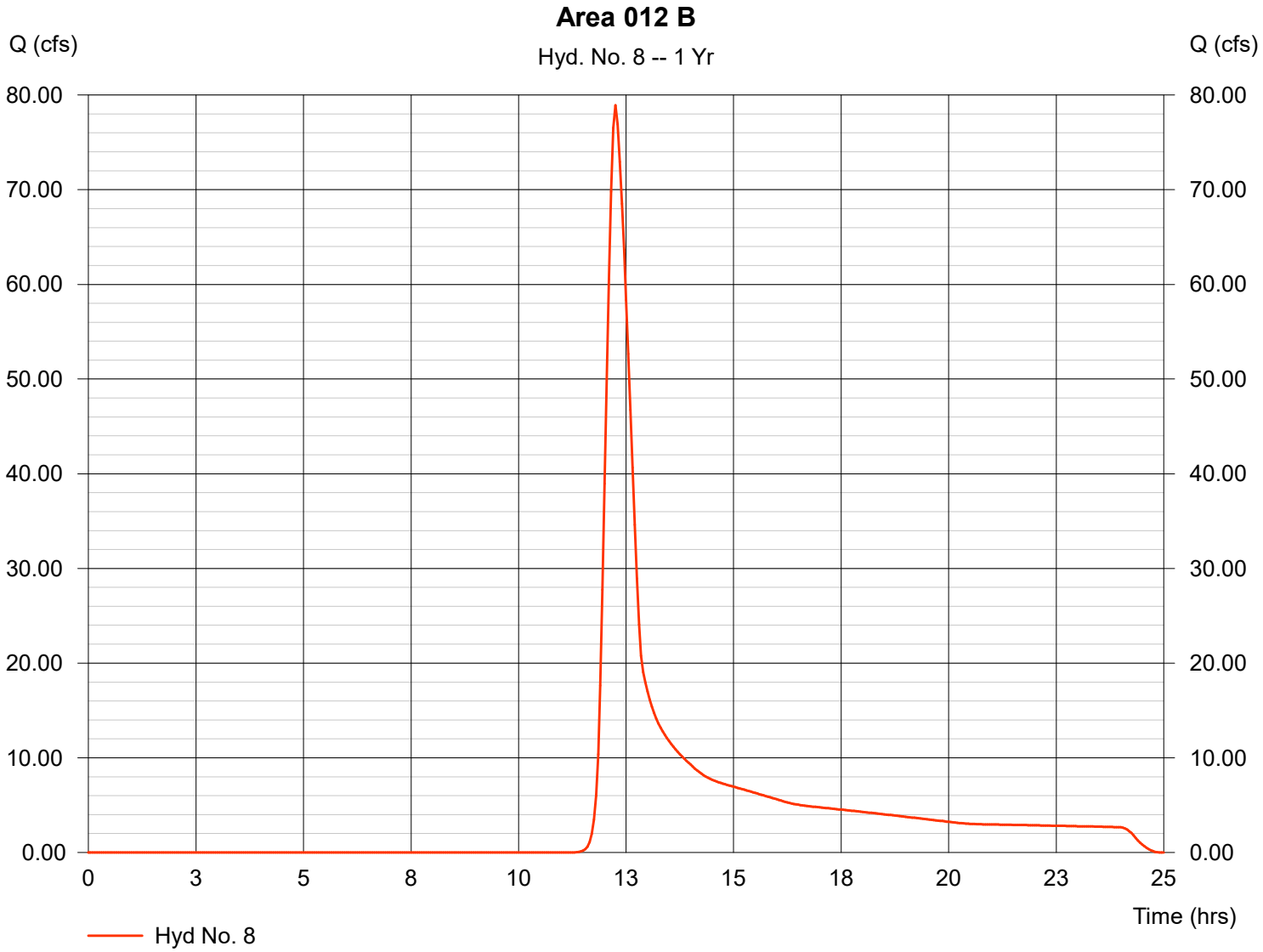
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Hyd. No. 8

Area 012 B

Hydrograph type	= SCS Runoff	Peak discharge	= 78.92 cfs
Storm frequency	= 1 yrs	Time interval	= 3 min
Drainage area	= 146.030 ac	Curve number	= 75
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 32.20 min
Total precip.	= 2.64 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 395,925 cuft



Hydrograph Plot

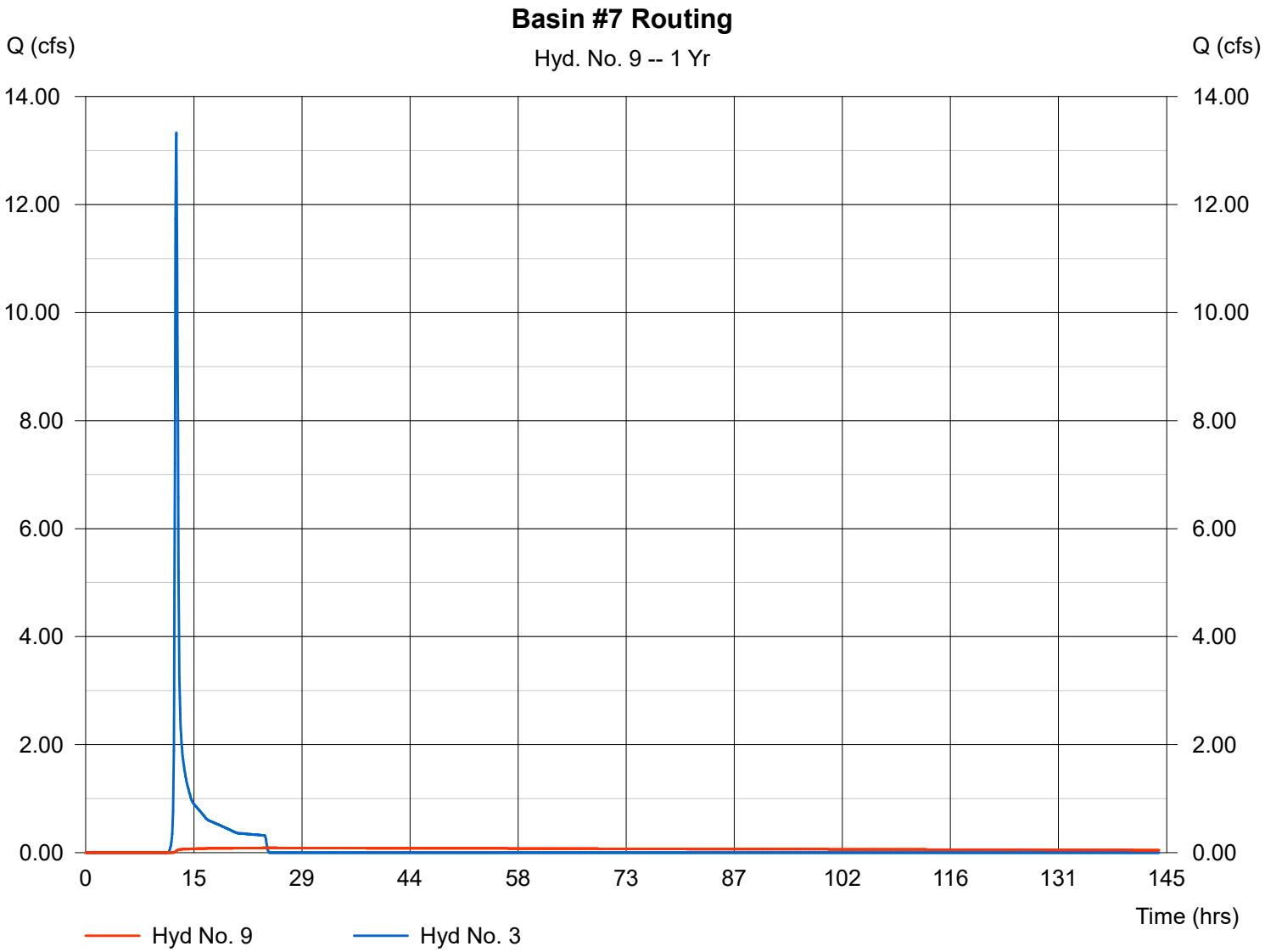
Hydraflow Hydrographs by Intelisolve | Friday, Sep 8 2023, 4:16 PM

Hyd. No. 9

Basin #7 Routing

Hydrograph type	=	Reservoir	Peak discharge	=	0.09 cfs
Storm frequency	=	1 yrs	Time interval	=	3 min
Inflow hyd. No.	=	3	Max. Elevation	=	680.79 ft
Reservoir name	=	Detention Basin #7	Max. Storage	=	46,497 cuft

Storage Indication method used. | Hydrograph Volume = 32,681 cuft



Pond Report

Pond No. 1 - Detention Basin #7

Pond Data

Pond storage is based on known contour areas. Average end area method used.

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	680.00	56,628	0	0
2.00	682.00	60,984	117,612	117,612
4.00	684.00	65,340	126,324	243,936
6.00	686.00	74,052	139,392	383,328

Culvert / Orifice Structures

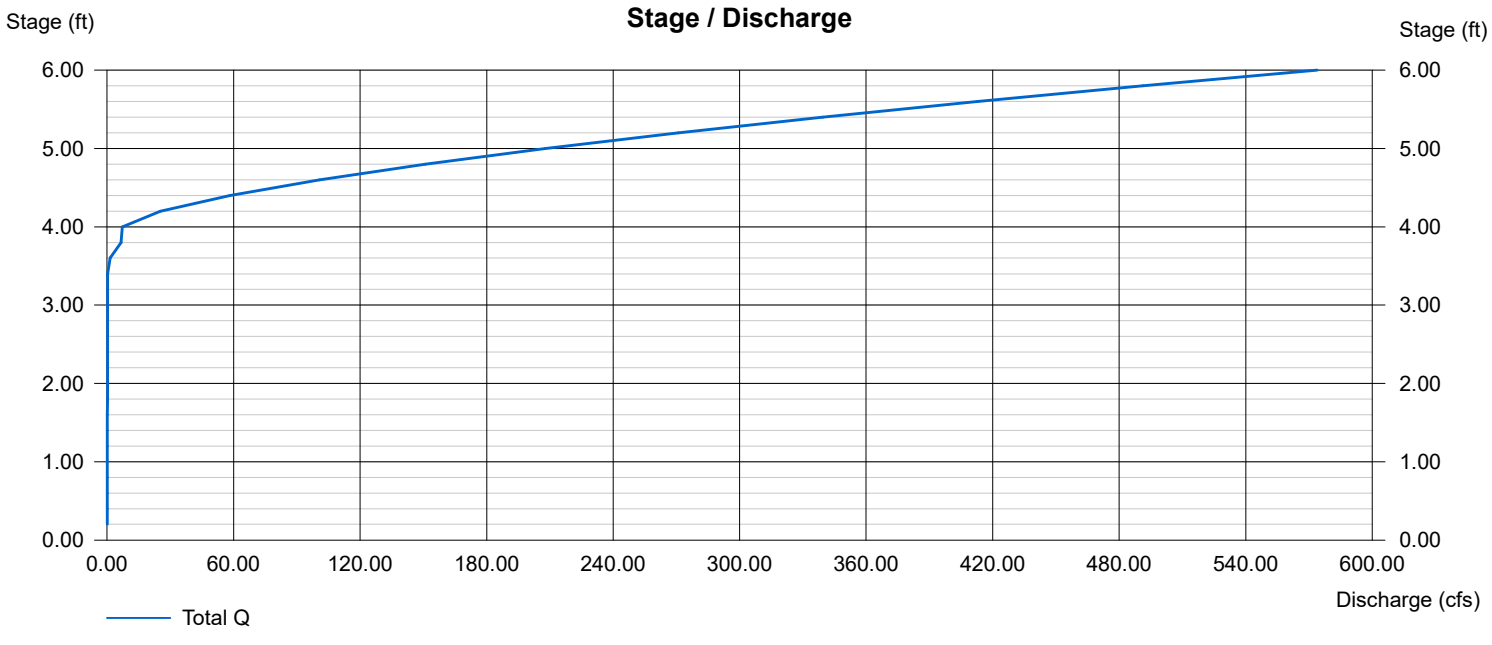
	[A]	[B]	[C]	[D]
Rise (in)	= 12.00	2.00	0.00	0.00
Span (in)	= 12.00	2.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 679.50	680.00	0.00	0.00
Length (ft)	= 48.00	0.00	0.00	0.00
Slope (%)	= 1.04	0.00	0.00	0.00
N-Value	= .013	.013	.000	.000
Orif. Coeff.	= 0.60	0.60	0.00	0.00
Multi-Stage	= n/a	Yes	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 12.00	60.00	0.00	0.00
Crest El. (ft)	= 683.50	684.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	0.00	0.00
Weir Type	= Riser	Ciplti	---	---
Multi-Stage	= Yes	No	No	No

Exfiltration = 0.000 in/hr (Contour) Tailwater Elev. = 0.00 ft

Note: Culvert/Orifice outflows have been analyzed under inlet and outlet control.



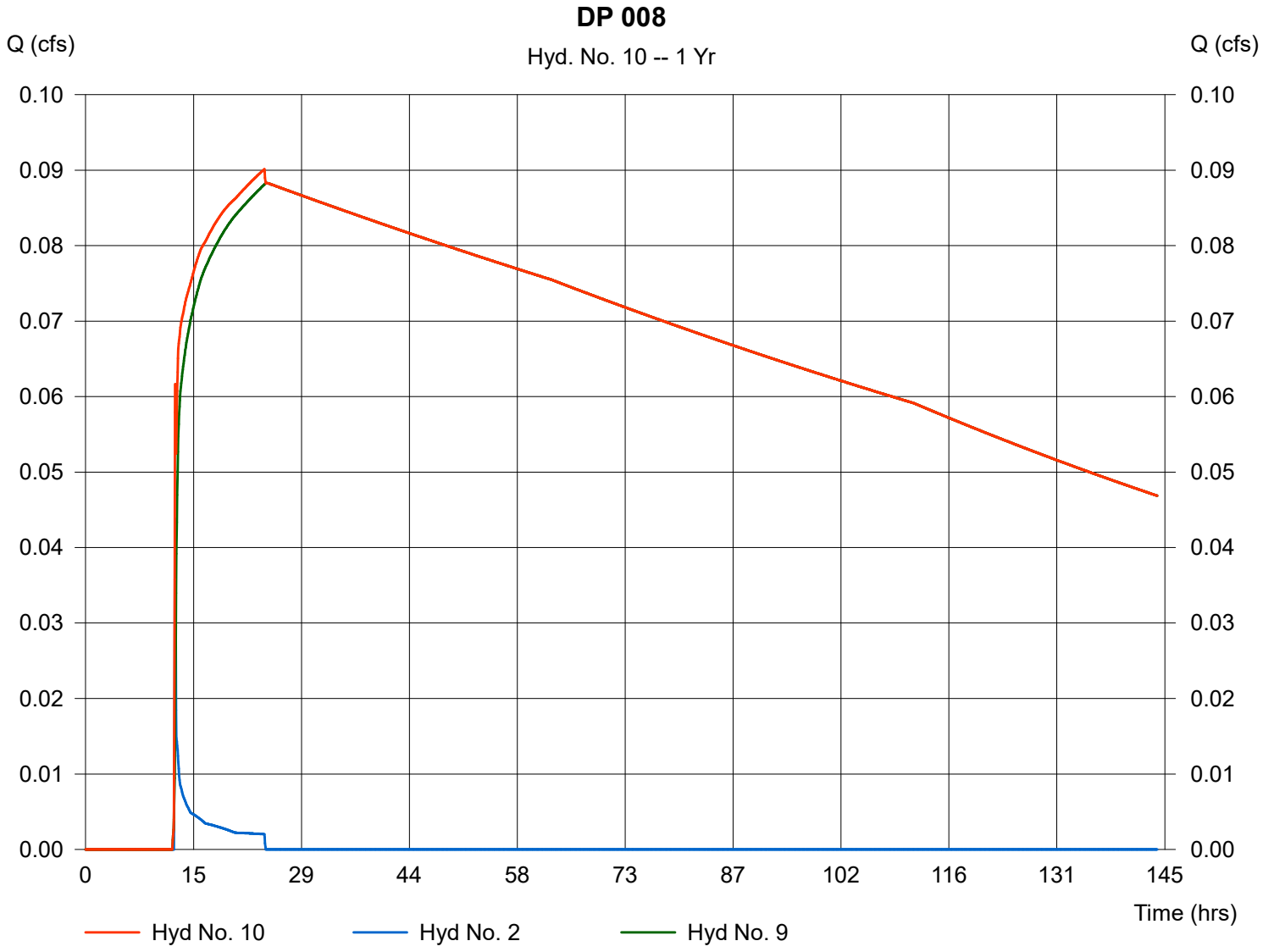
Hydrograph Plot

Hyd. No. 10

DP 008

Hydrograph type	= Combine	Peak discharge	= 0.09 cfs
Storm frequency	= 1 yrs	Time interval	= 3 min
Inflow hyds.	= 2, 9		

Hydrograph Volume = 32,868 cuft



Hydrograph Plot

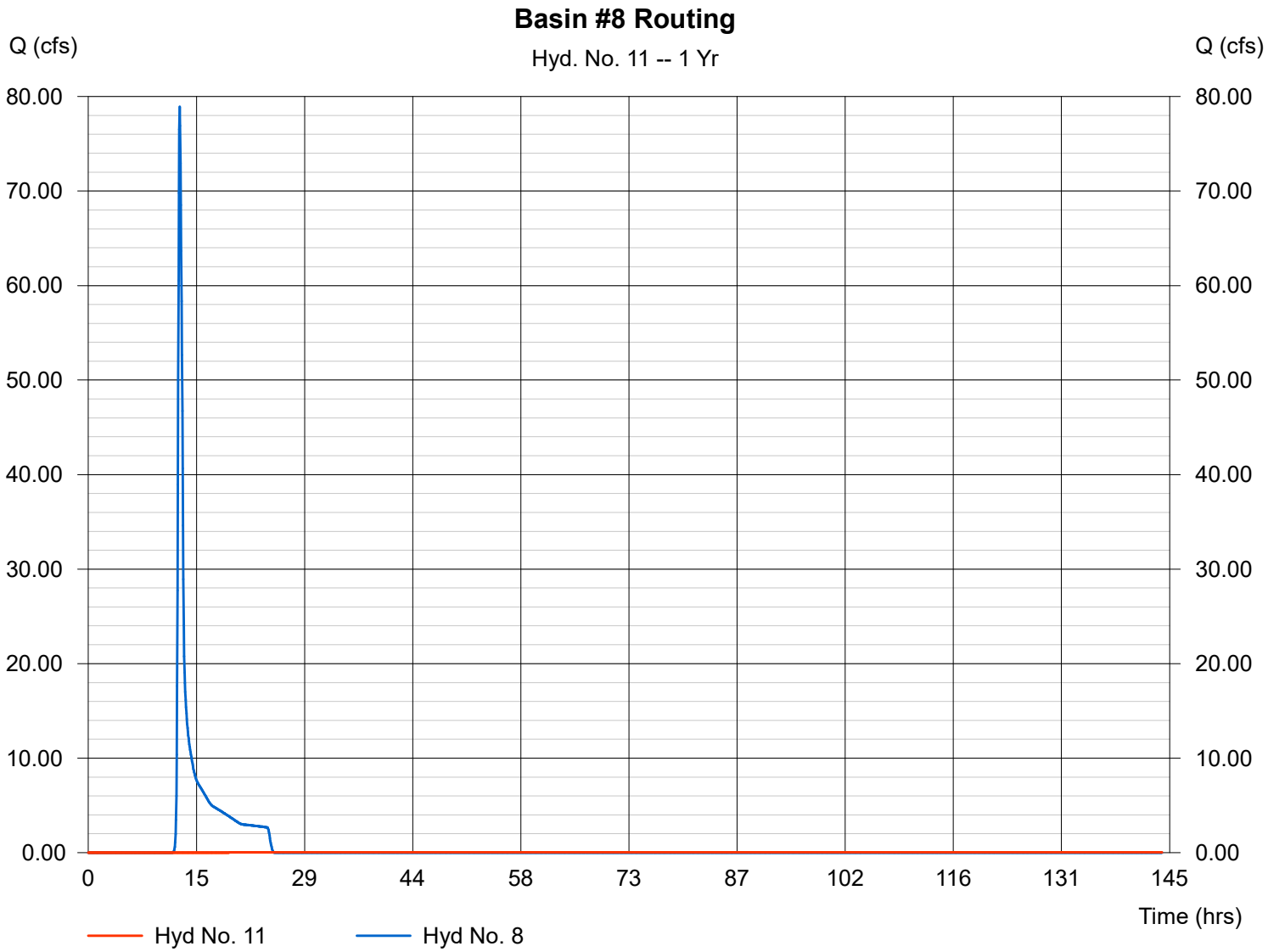
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Hyd. No. 11

Basin #8 Routing

Hydrograph type	=	Reservoir	Peak discharge	=	0.02 cfs
Storm frequency	=	1 yrs	Time interval	=	3 min
Inflow hyd. No.	=	8	Max. Elevation	=	324.61 ft
Reservoir name	=	Detention Basin #8	Max. Storage	=	395,522 cuft

Storage Indication method used. | Hydrograph Volume = 8,661 cuft



Pond Report

Pond No. 2 - Detention Basin #8

Pond Data

Pond storage is based on known contour areas. Average end area method used.

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	322.00	147,153	0	0
2.00	324.00	153,295	300,448	300,448
4.00	326.00	159,553	312,848	613,296
6.00	328.00	165,929	325,482	938,778
8.00	330.00	172,418	338,347	1,277,125
10.00	332.00	179,015	351,433	1,628,558
12.00	334.00	185,718	364,733	1,993,291
14.00	336.00	192,475	378,193	2,371,484

Culvert / Orifice Structures

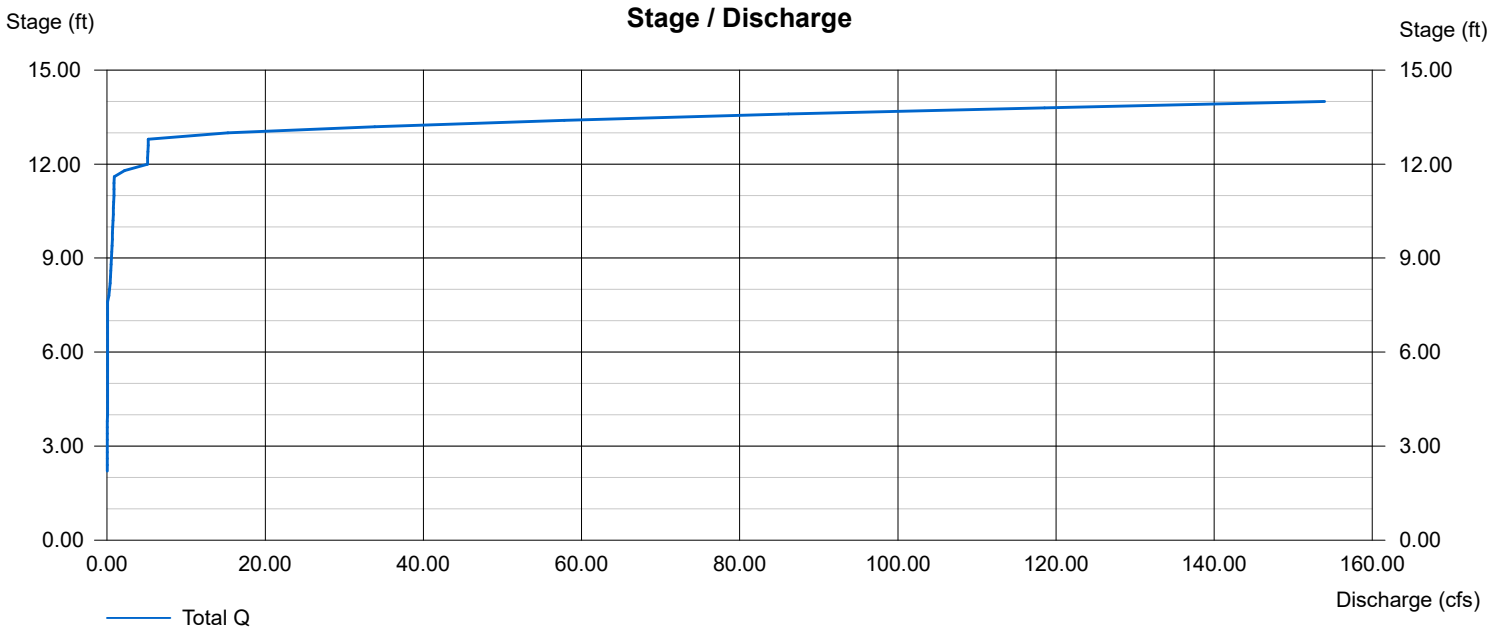
	[A]	[B]	[C]	[D]
Rise (in)	= 8.00	1.00	4.00	0.00
Span (in)	= 8.00	1.00	4.00	0.00
No. Barrels	= 1	1	1	0
Invert El. (ft)	= 320.00	324.00	329.50	0.00
Length (ft)	= 75.00	0.00	0.00	0.00
Slope (%)	= 6.67	0.00	0.00	0.00
N-Value	= .013	.013	.013	.000
Orif. Coeff.	= 0.60	0.60	0.60	0.00
Multi-Stage	= n/a	Yes	Yes	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 12.00	34.00	0.00	0.00
Crest El. (ft)	= 333.70	334.80	0.00	0.00
Weir Coeff.	= 3.33	3.33	0.00	0.00
Weir Type	= Riser	Ciplti	---	---
Multi-Stage	= Yes	No	No	No

Exfiltration = 0.000 in/hr (Contour) Tailwater Elev. = 0.00 ft

Note: Culvert/Orifice outflows have been analyzed under inlet and outlet control.



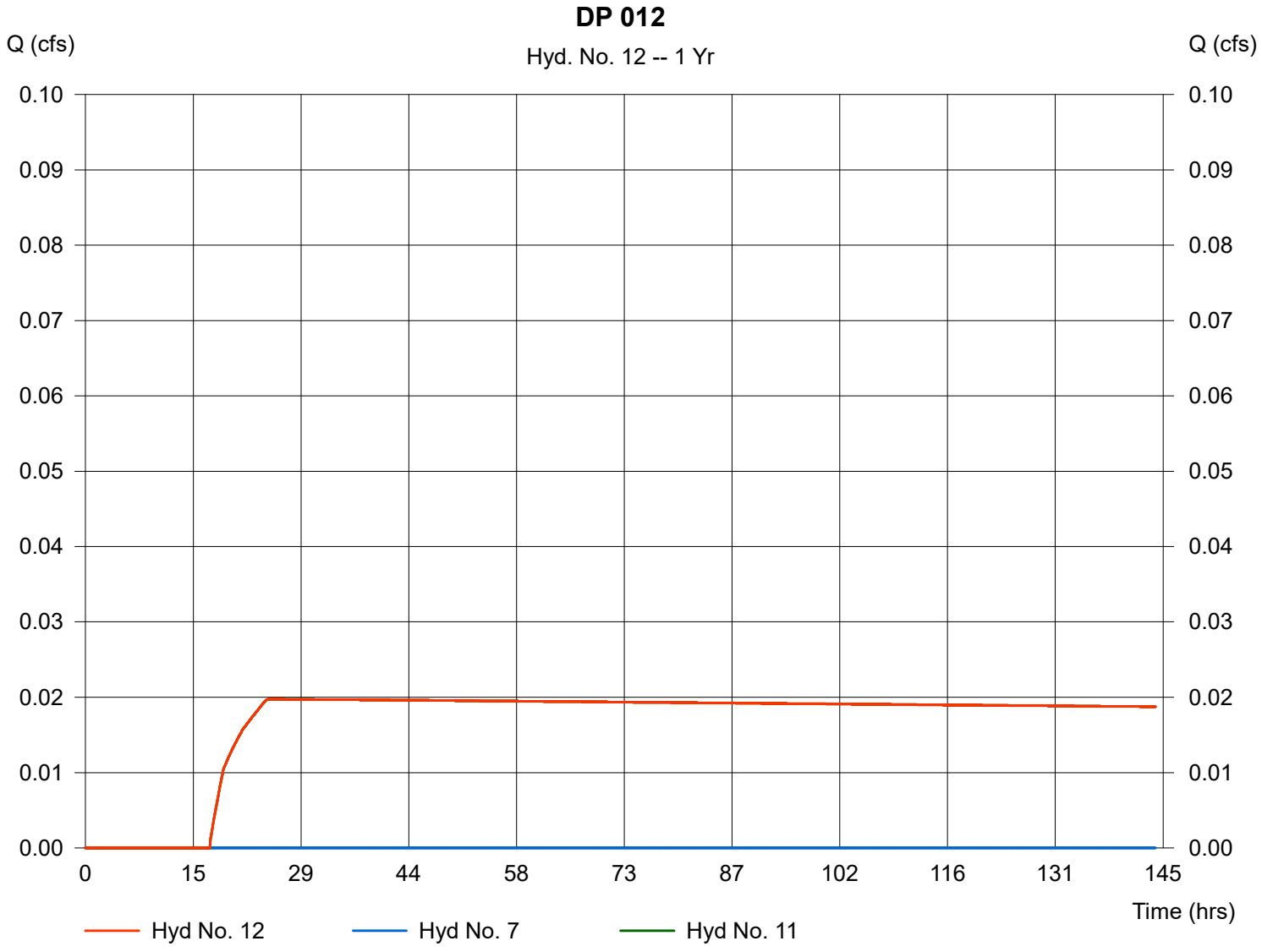
Hydrograph Plot

Hyd. No. 12

DP 012

Hydrograph type	=	Combine	Peak discharge	=	0.02 cfs
Storm frequency	=	1 yrs	Time interval	=	3 min
Inflow hyds.	=	7, 11			

Hydrograph Volume = 8,661 cuft



Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

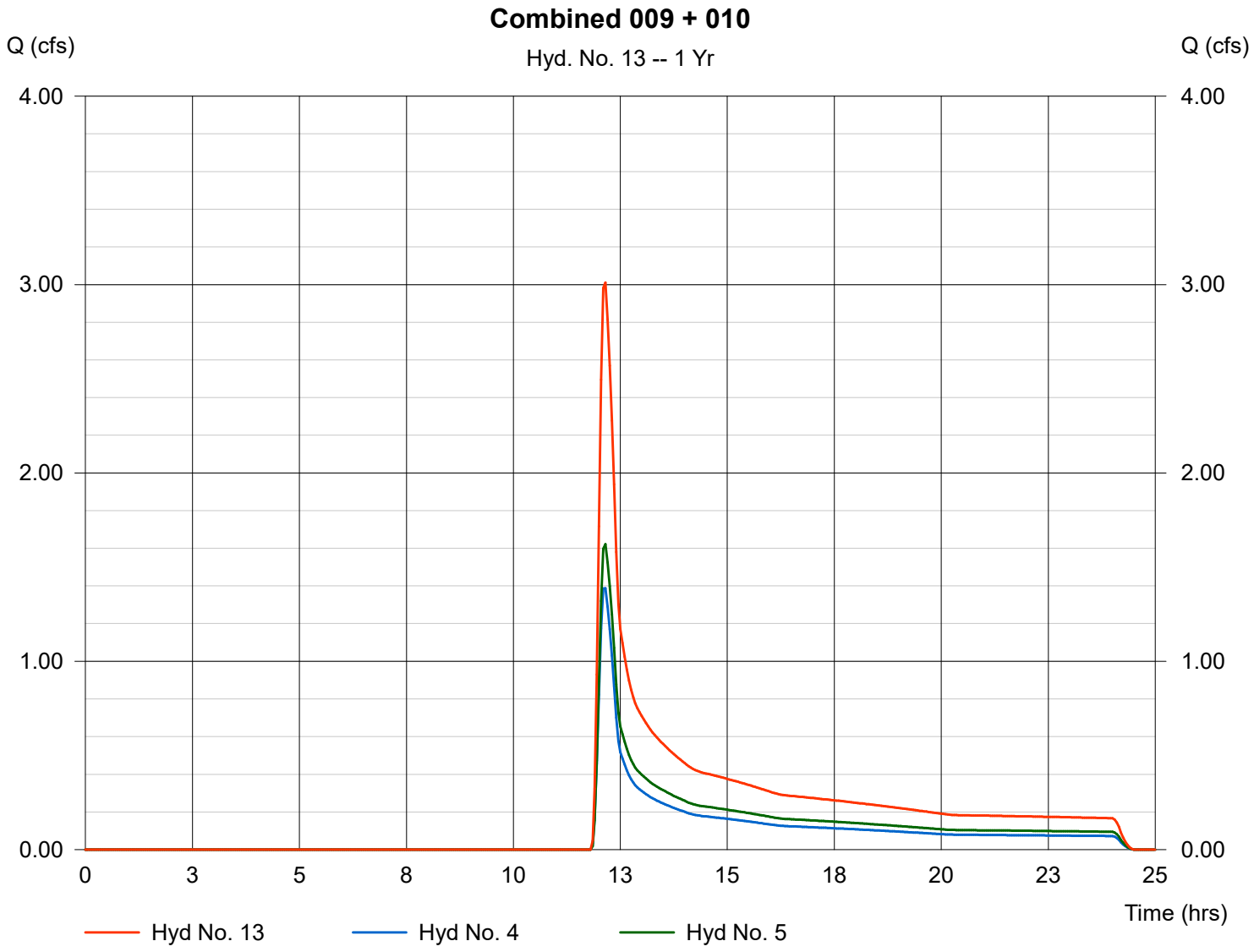
Friday, Sep 8 2023, 4:16 PM

Hyd. No. 13

Combined 009 + 010

Hydrograph type	= Combine	Peak discharge	= 3.01 cfs
Storm frequency	= 1 yrs	Time interval	= 3 min
Inflow hyds.	= 4, 5		

Hydrograph Volume = 16,998 cuft



Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

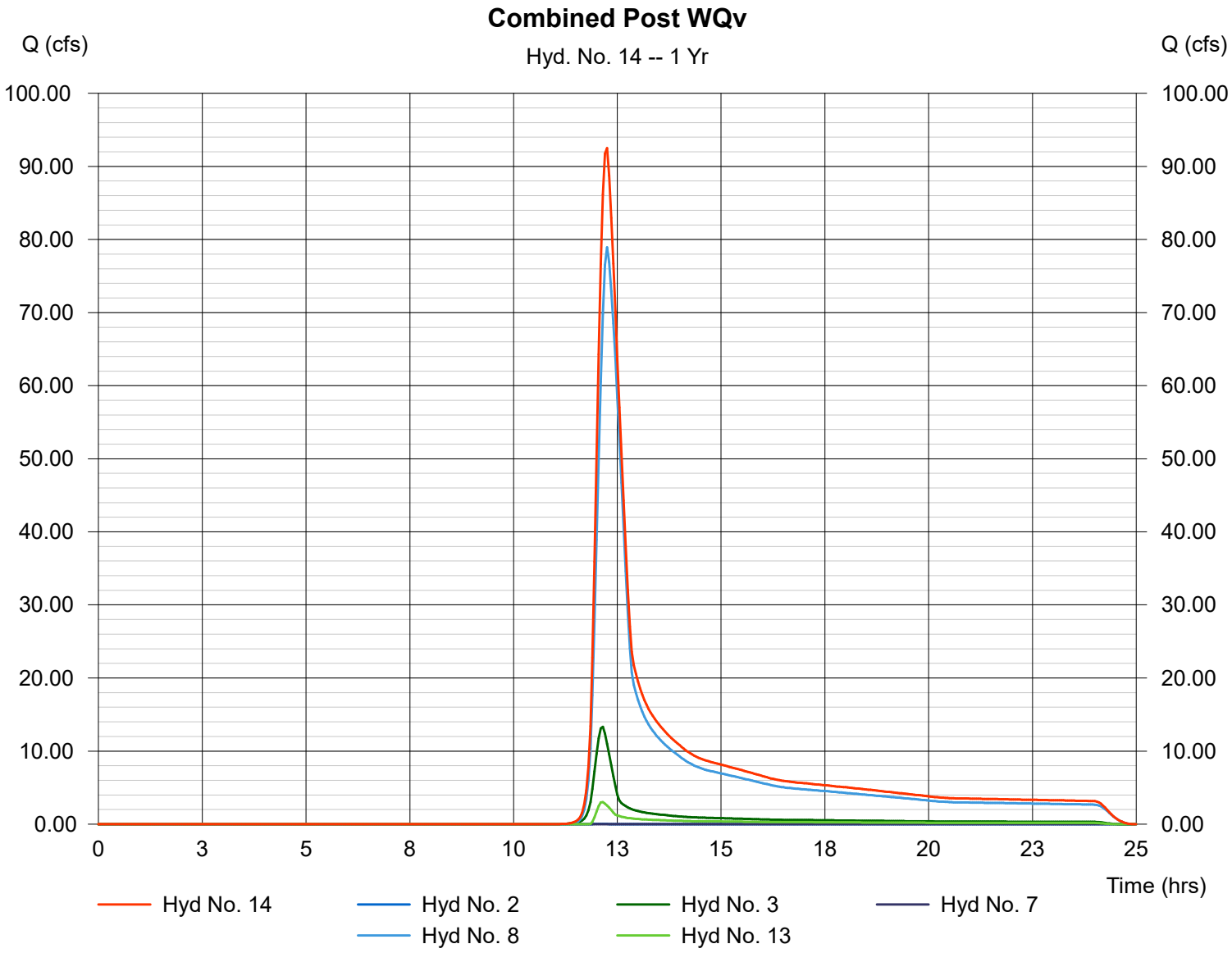
Friday, Sep 8 2023, 4:16 PM

Hyd. No. 14

Combined Post WQv

Hydrograph type	=	Combine	Peak discharge	=	92.51 cfs
Storm frequency	=	1 yrs	Time interval	=	3 min
Inflow hyds.	=	2, 3, 7, 8, 13			

Hydrograph Volume = 463,108 cuft



Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
1	SCS Runoff	0.00	3	720	1	----	------	------	Area 007 (DP 007)
2	SCS Runoff	0.12	3	720	341	----	------	------	Area 008 A
3	SCS Runoff	19.81	3	729	72,179	----	------	------	Area 008 B
4	SCS Runoff	3.06	3	726	12,845	----	------	------	Area 009 (DP009)
5	SCS Runoff	3.77	3	726	16,555	----	------	------	Area 010 (DP010)
6	SCS Runoff	0.00	3	720	1	----	------	------	Area 011 (DP011)
7	SCS Runoff	0.00	3	1440	7	----	------	------	Area 012 A
8	SCS Runoff	122.47	3	735	582,944	----	------	------	Area 012 B
9	Reservoir	0.11	3	1461	42,394	3	681.15	67,792	Basin #7 Routing
10	Combine	0.14	3	720	42,734	2, 9	------	------	DP 008
11	Reservoir	0.03	3	1491	15,892	8	325.80	581,776	Basin #8 Routing
12	Combine	0.04	3	1443	15,899	7, 11	------	------	DP 012
13	Combine	6.84	3	726	29,399	4, 5,	------	------	Combined 009 + 010
14	Combine	144.34	3	732	684,872	2, 3, 7, 8, 13	------	------	Combined Post WQv

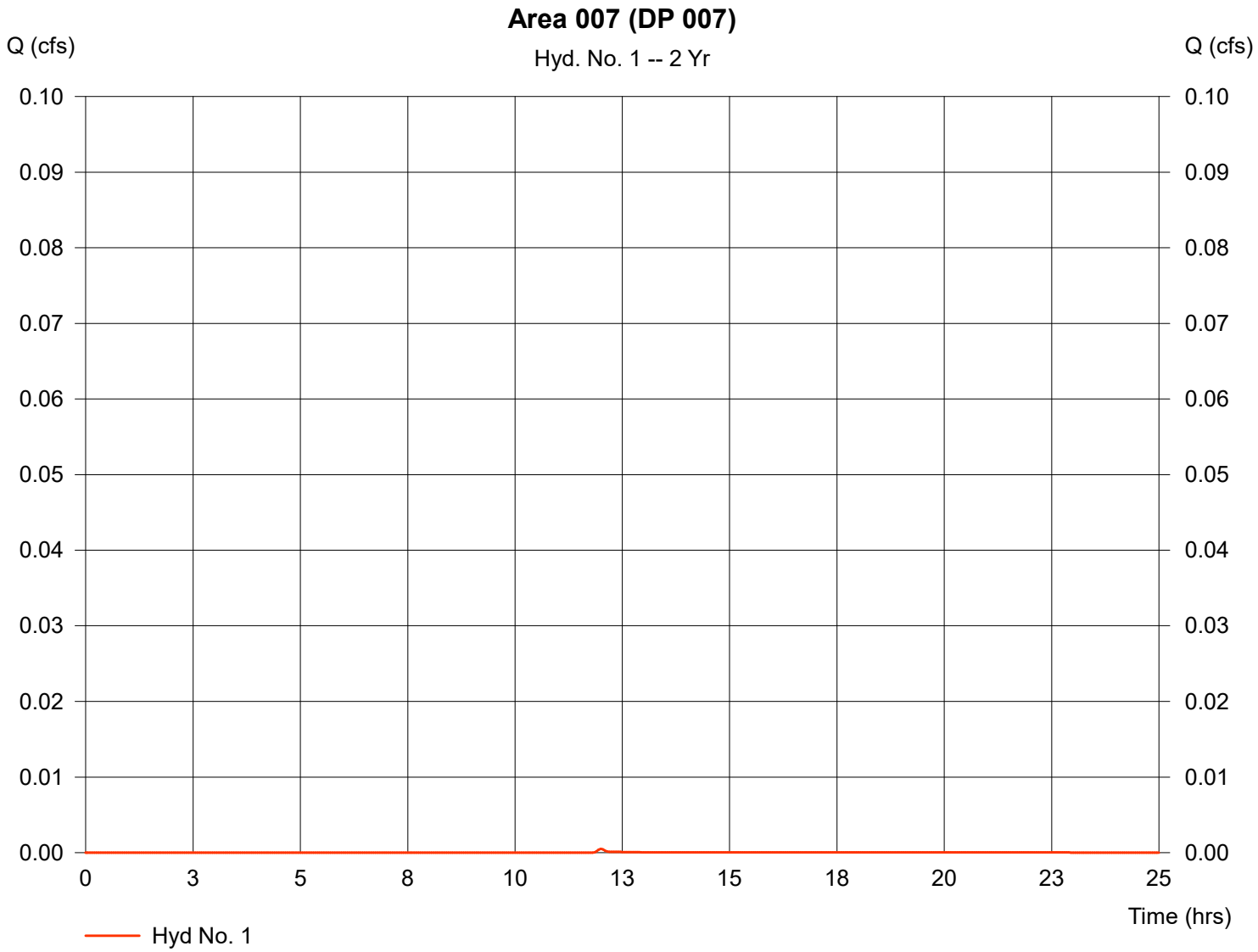
Hydrograph Plot

Hyd. No. 1

Area 007 (DP 007)

Hydrograph type	= SCS Runoff	Peak discharge	= 0.00 cfs
Storm frequency	= 2 yrs	Time interval	= 3 min
Drainage area	= 0.001 ac	Curve number	= 61
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 5.00 min
Total precip.	= 3.18 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 1 cuft



Hydrograph Plot

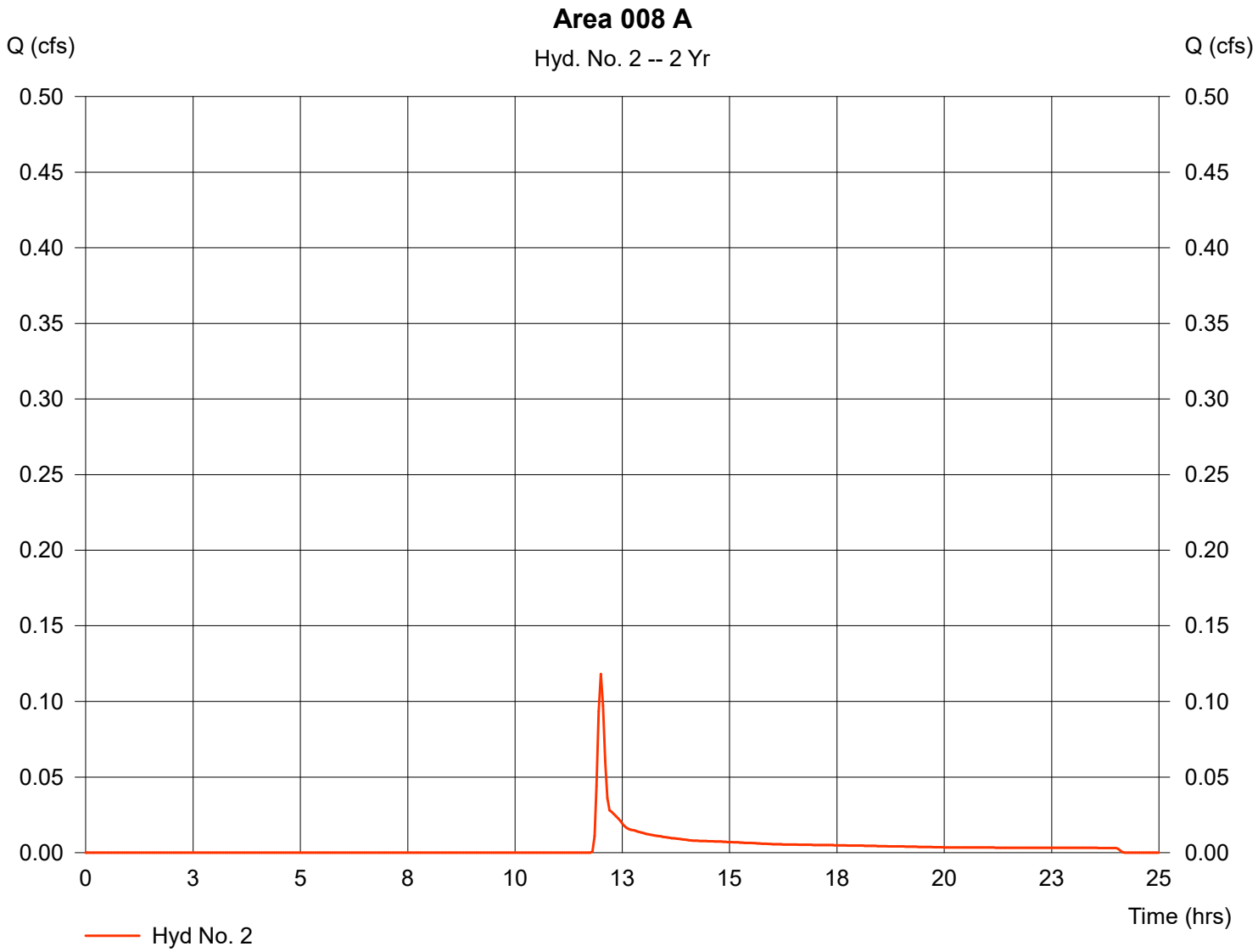
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Hyd. No. 2

Area 008 A

Hydrograph type	= SCS Runoff	Peak discharge	= 0.12 cfs
Storm frequency	= 2 yrs	Time interval	= 3 min
Drainage area	= 0.230 ac	Curve number	= 61
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 5.00 min
Total precip.	= 3.18 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 341 cuft



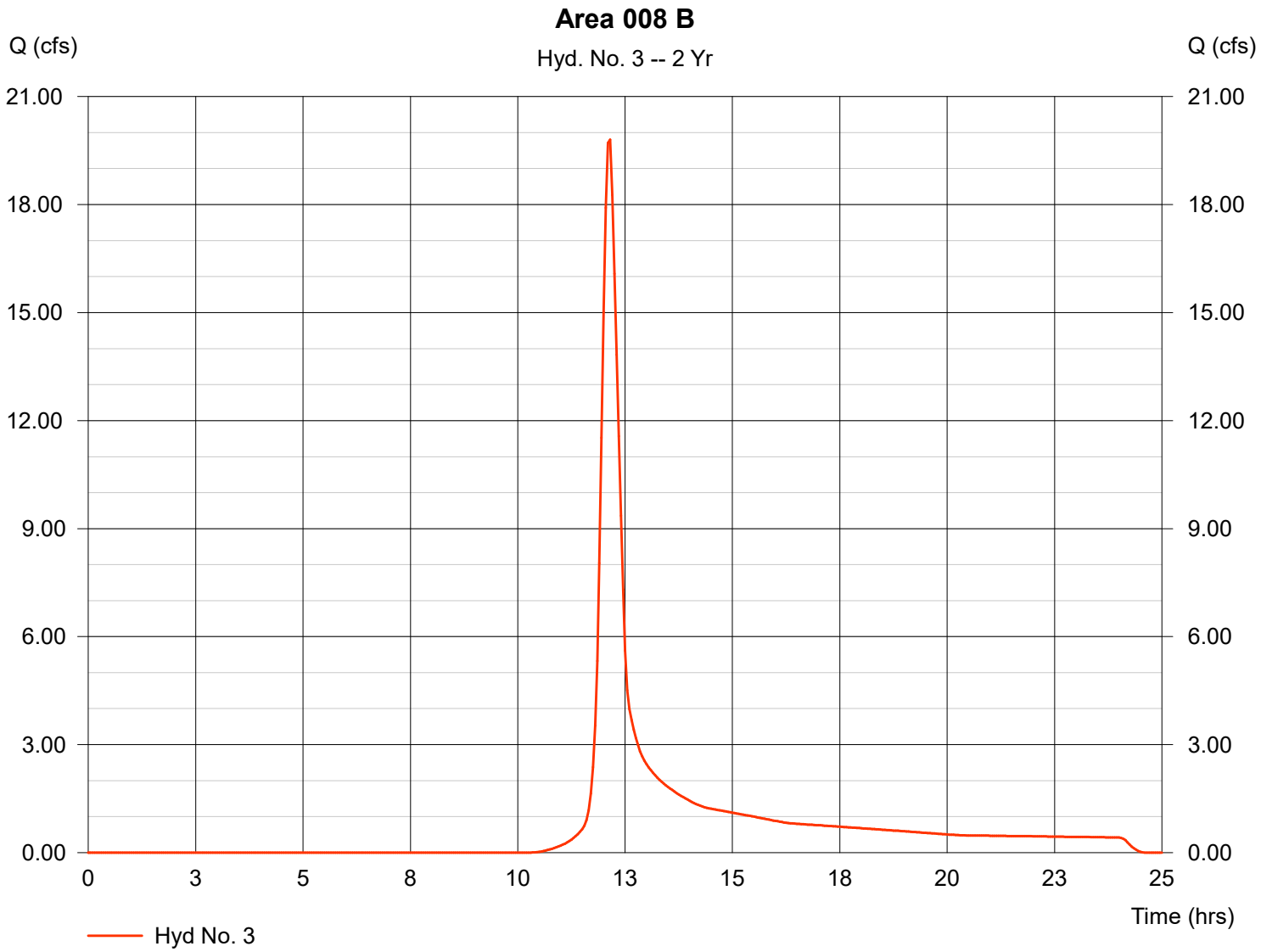
Hydrograph Plot

Hyd. No. 3

Area 008 B

Hydrograph type	= SCS Runoff	Peak discharge	= 19.81 cfs
Storm frequency	= 2 yrs	Time interval	= 3 min
Drainage area	= 17.030 ac	Curve number	= 77
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 21.40 min
Total precip.	= 3.18 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 72,179 cuft



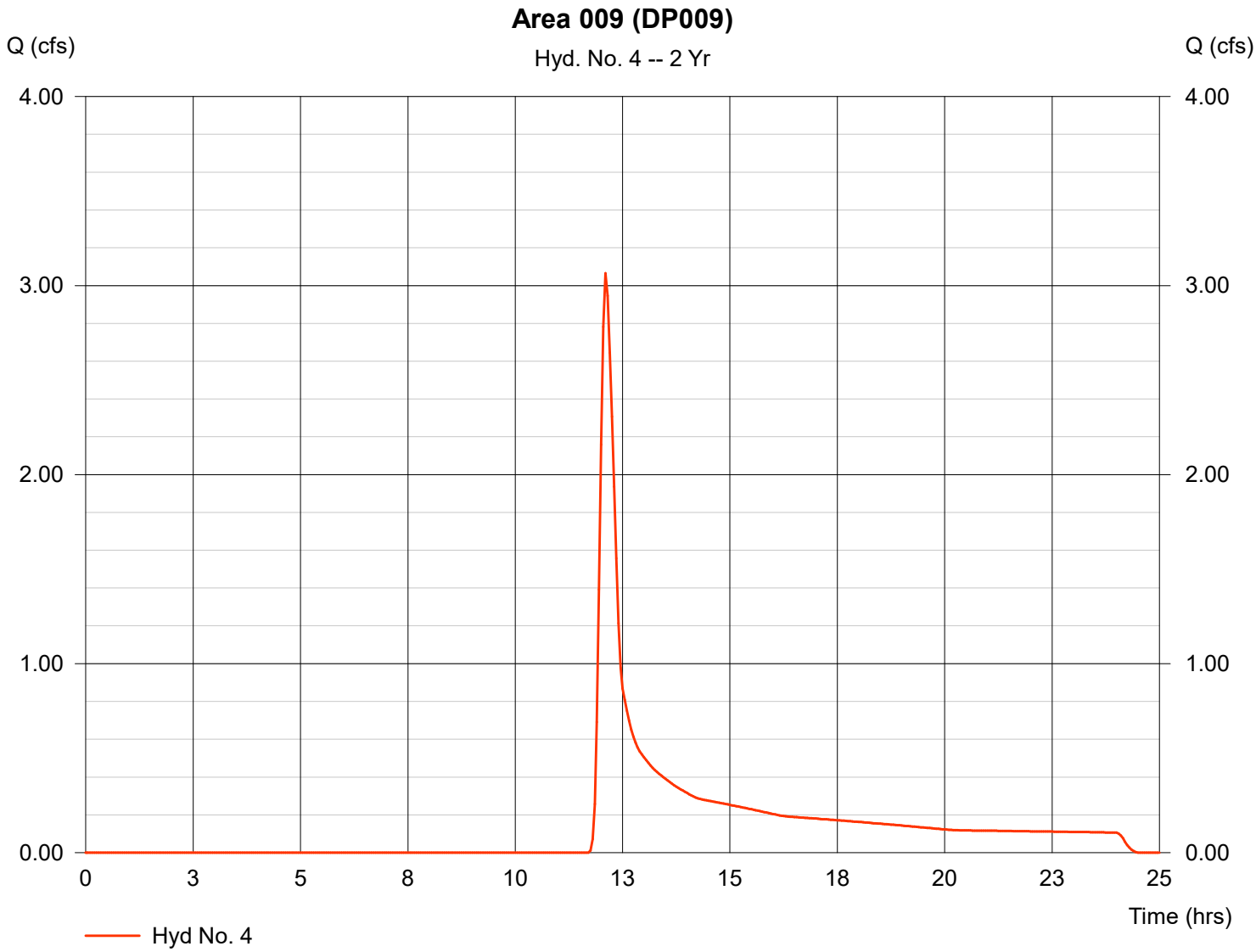
Hydrograph Plot

Hyd. No. 4

Area 009 (DP009)

Hydrograph type	= SCS Runoff	Peak discharge	= 3.06 cfs
Storm frequency	= 2 yrs	Time interval	= 3 min
Drainage area	= 6.240 ac	Curve number	= 64
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 19.10 min
Total precip.	= 3.18 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 12,845 cuft



Hydrograph Plot

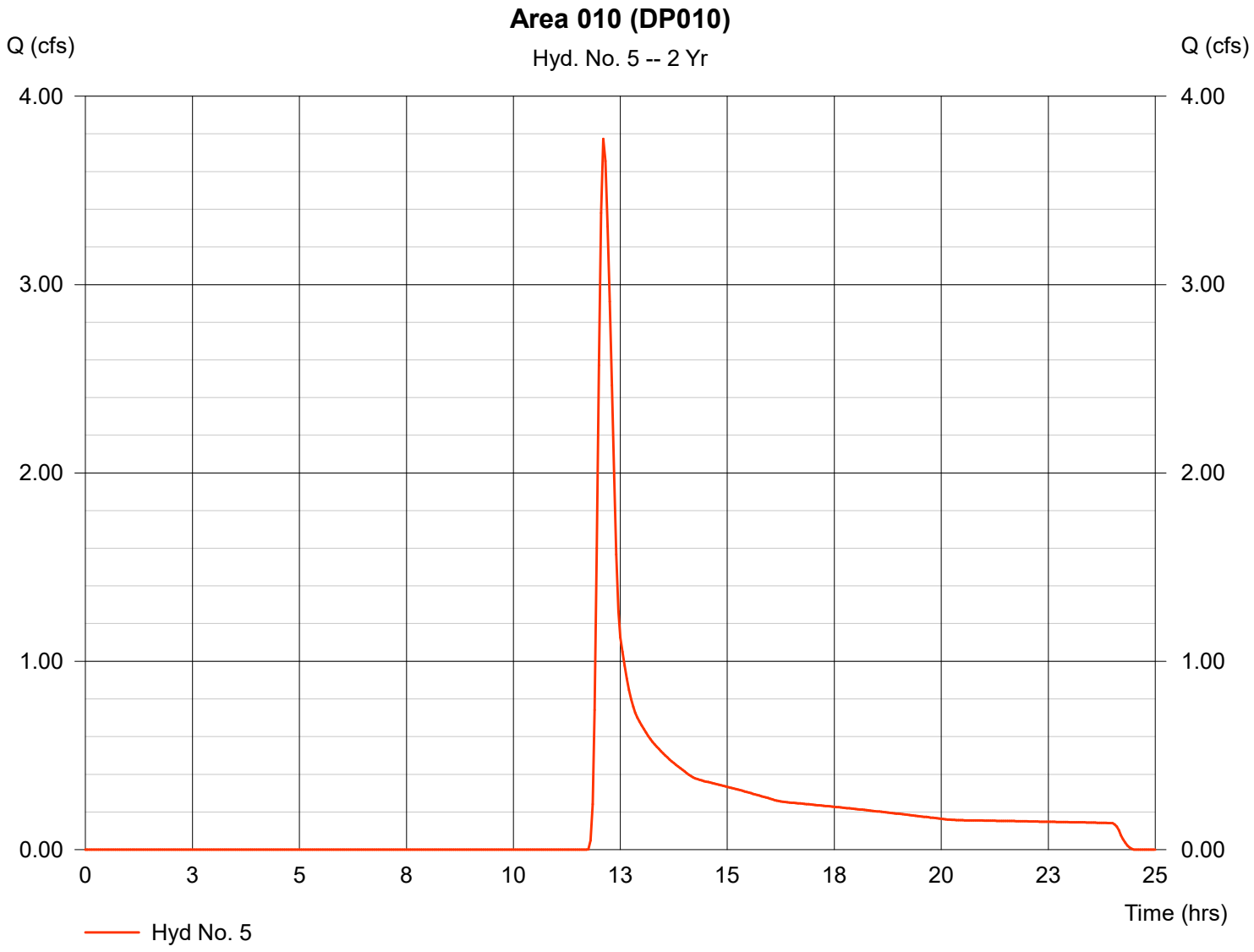
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Hyd. No. 5

Area 010 (DP010)

Hydrograph type	= SCS Runoff	Peak discharge	= 3.77 cfs
Storm frequency	= 2 yrs	Time interval	= 3 min
Drainage area	= 8.670 ac	Curve number	= 63
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 19.70 min
Total precip.	= 3.18 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 16,555 cuft



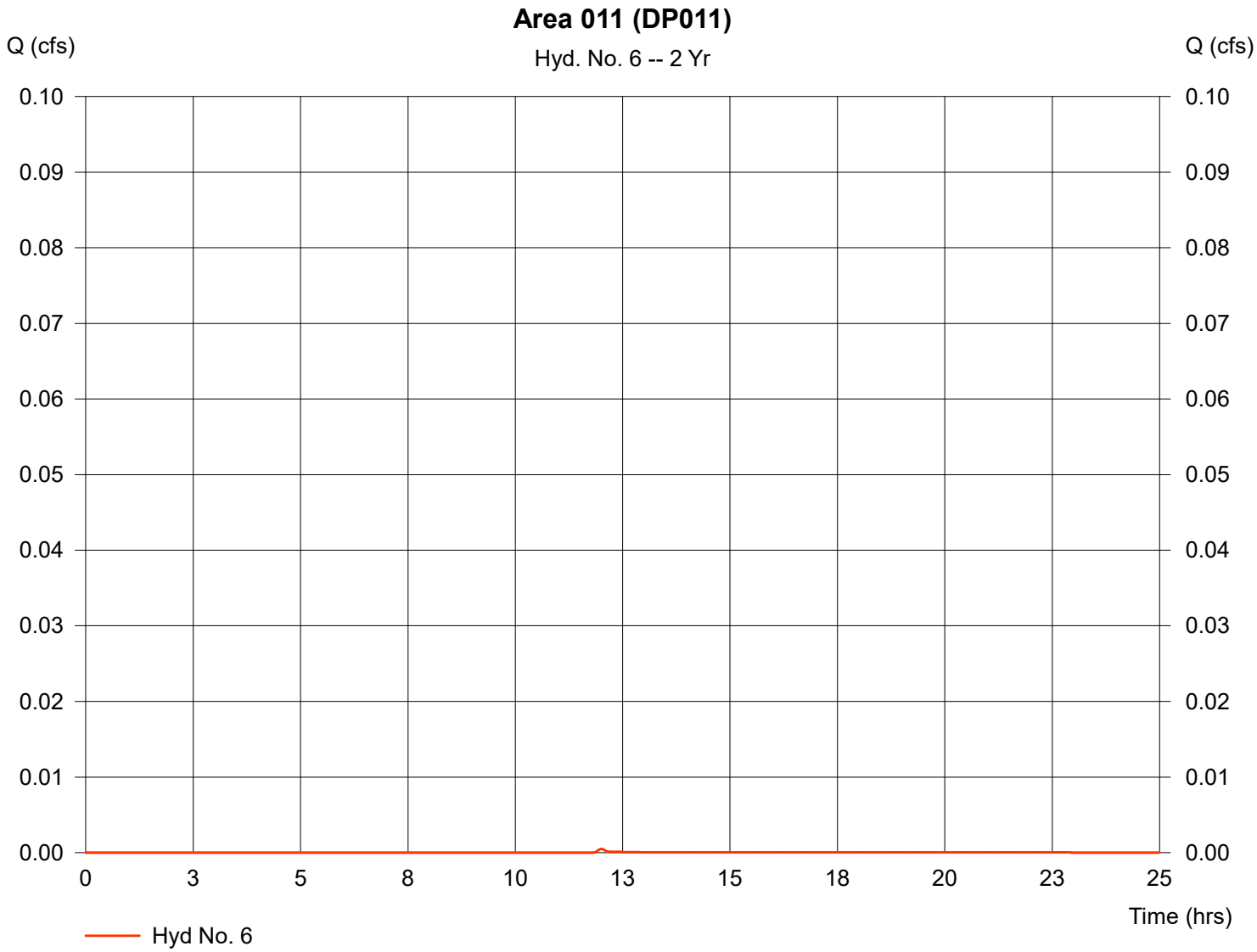
Hydrograph Plot

Hyd. No. 6

Area 011 (DP011)

Hydrograph type	= SCS Runoff	Peak discharge	= 0.00 cfs
Storm frequency	= 2 yrs	Time interval	= 3 min
Drainage area	= 0.001 ac	Curve number	= 61
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 5.00 min
Total precip.	= 3.18 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 1 cuft



Hydrograph Plot

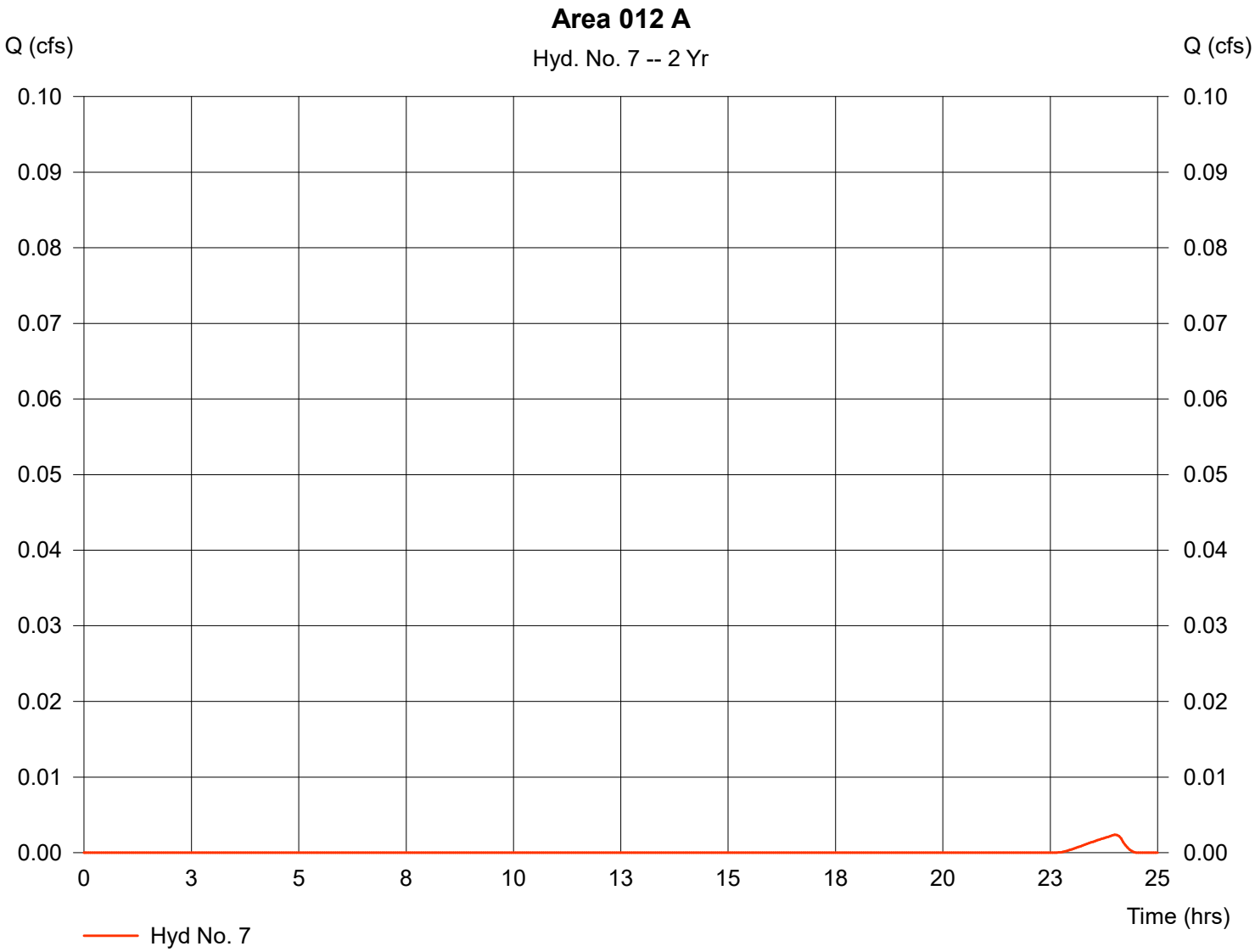
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Hyd. No. 7

Area 012 A

Hydrograph type	= SCS Runoff	Peak discharge	= 0.00 cfs
Storm frequency	= 2 yrs	Time interval	= 3 min
Drainage area	= 11.610 ac	Curve number	= 39
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 15.10 min
Total precip.	= 3.18 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 7 cuft



Hydrograph Plot

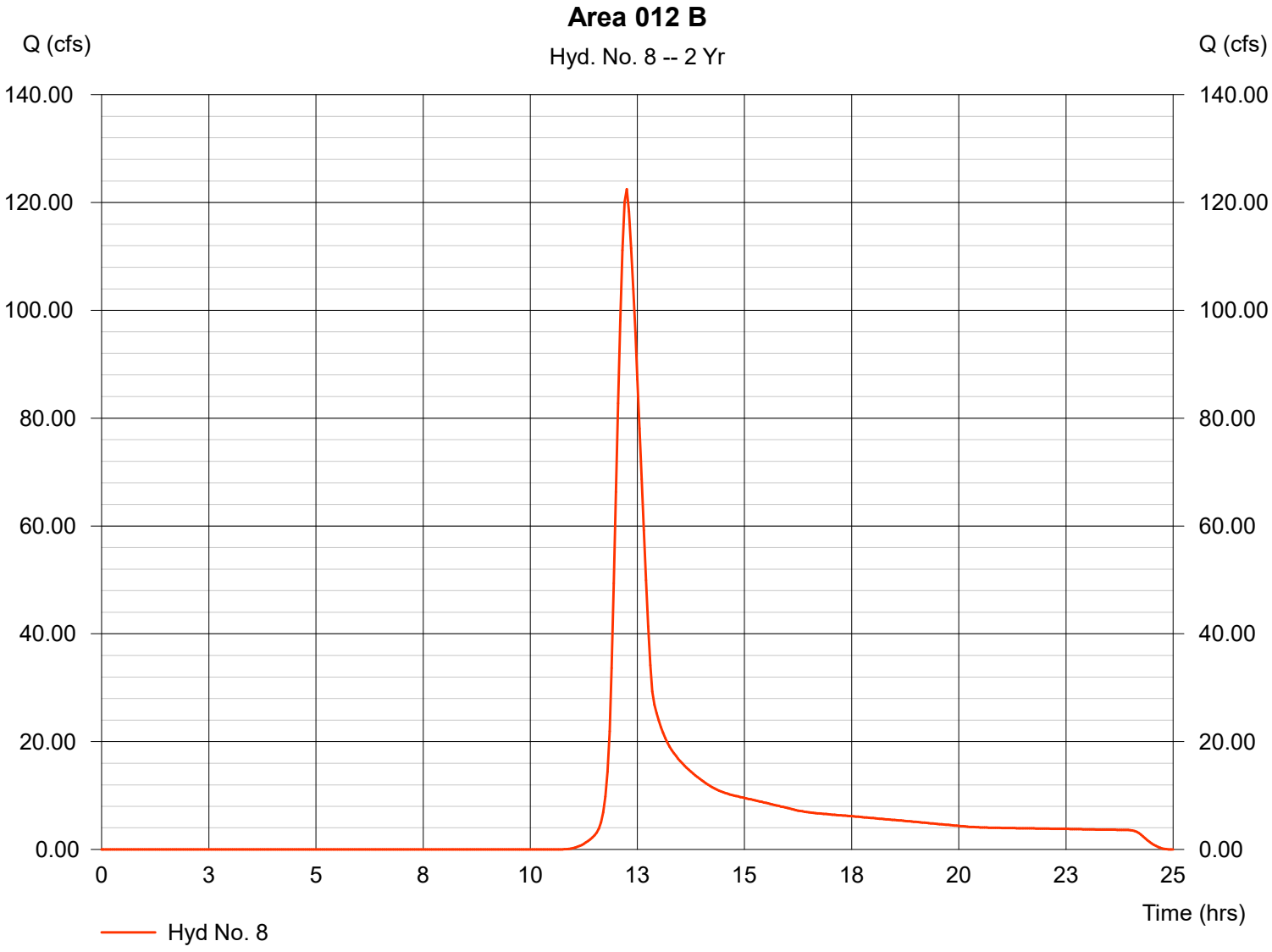
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Hyd. No. 8

Area 012 B

Hydrograph type	= SCS Runoff	Peak discharge	= 122.47 cfs
Storm frequency	= 2 yrs	Time interval	= 3 min
Drainage area	= 146.030 ac	Curve number	= 75
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 32.20 min
Total precip.	= 3.18 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 582,944 cuft



Hydrograph Plot

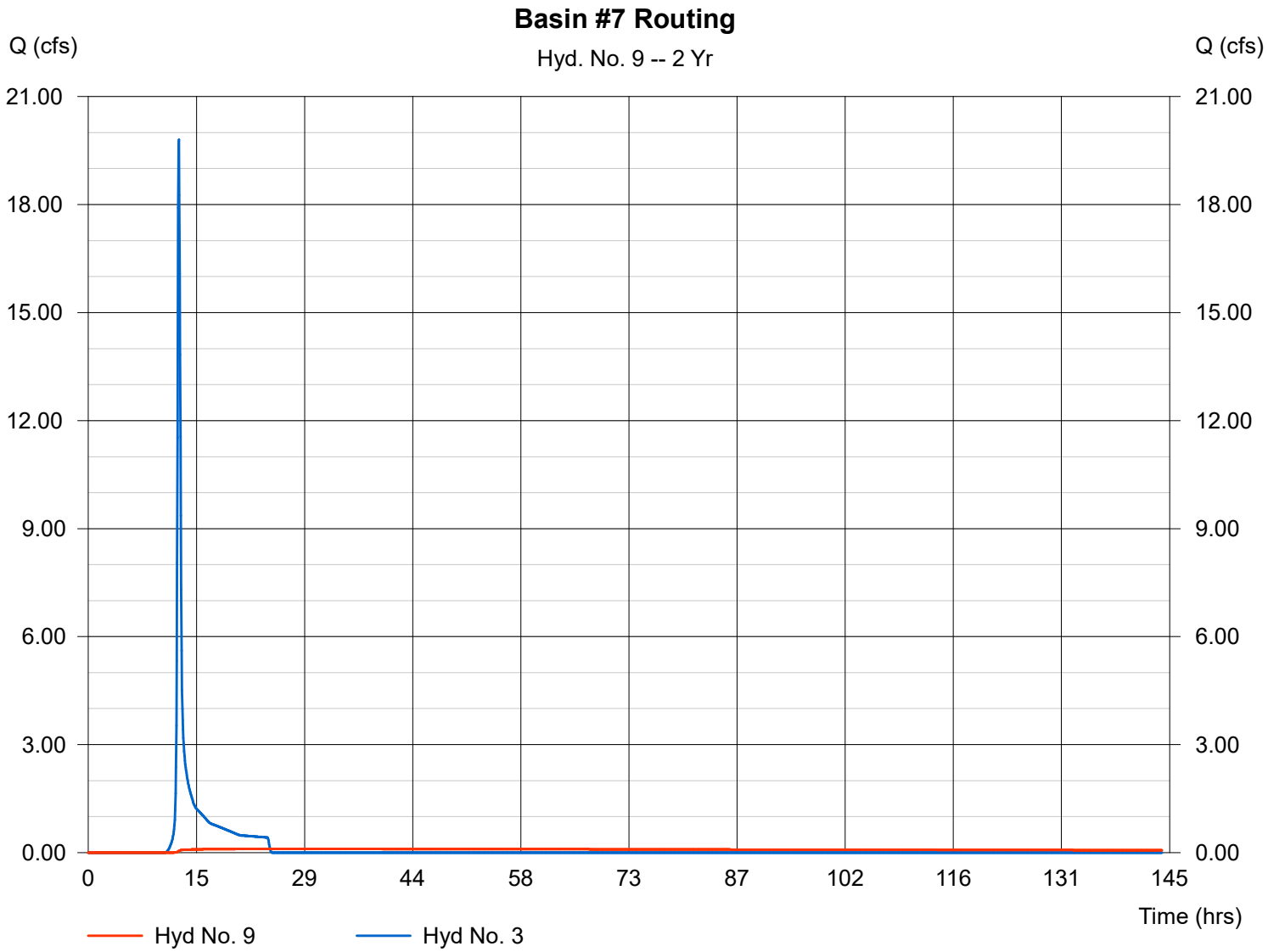
Hyd. No. 9

Basin #7 Routing

Hydrograph type	=	Reservoir	Peak discharge	=	0.11 cfs
Storm frequency	=	2 yrs	Time interval	=	3 min
Inflow hyd. No.	=	3	Max. Elevation	=	681.15 ft
Reservoir name	=	Detention Basin #7	Max. Storage	=	67,792 cuft

Storage Indication method used.

Hydrograph Volume = 42,394 cuft



Pond Report

Pond No. 1 - Detention Basin #7

Pond Data

Pond storage is based on known contour areas. Average end area method used.

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	680.00	56,628	0	0
2.00	682.00	60,984	117,612	117,612
4.00	684.00	65,340	126,324	243,936
6.00	686.00	74,052	139,392	383,328

Culvert / Orifice Structures

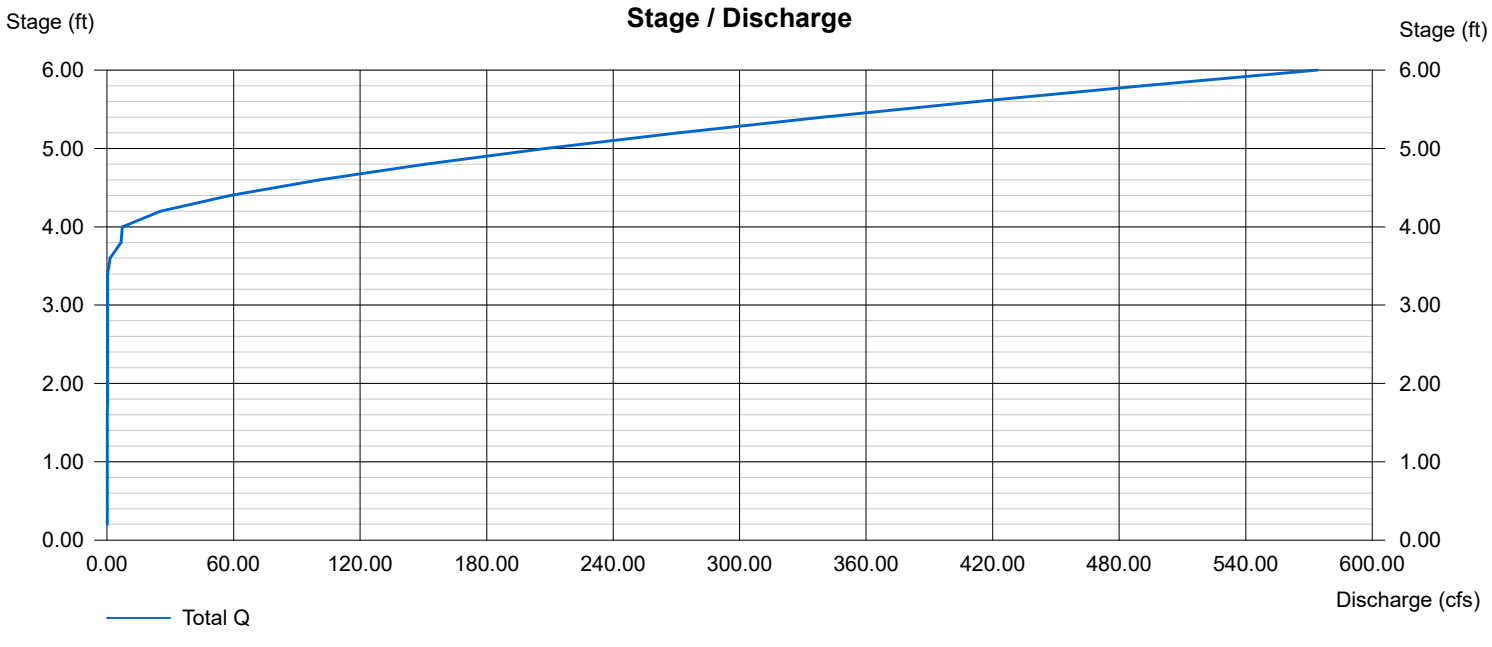
	[A]	[B]	[C]	[D]
Rise (in)	= 12.00	2.00	0.00	0.00
Span (in)	= 12.00	2.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 679.50	680.00	0.00	0.00
Length (ft)	= 48.00	0.00	0.00	0.00
Slope (%)	= 1.04	0.00	0.00	0.00
N-Value	= .013	.013	.000	.000
Orif. Coeff.	= 0.60	0.60	0.00	0.00
Multi-Stage	= n/a	Yes	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 12.00	60.00	0.00	0.00
Crest El. (ft)	= 683.50	684.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	0.00	0.00
Weir Type	= Riser	Ciplti	---	---
Multi-Stage	= Yes	No	No	No

Exfiltration = 0.000 in/hr (Contour) Tailwater Elev. = 0.00 ft

Note: Culvert/Orifice outflows have been analyzed under inlet and outlet control.



Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

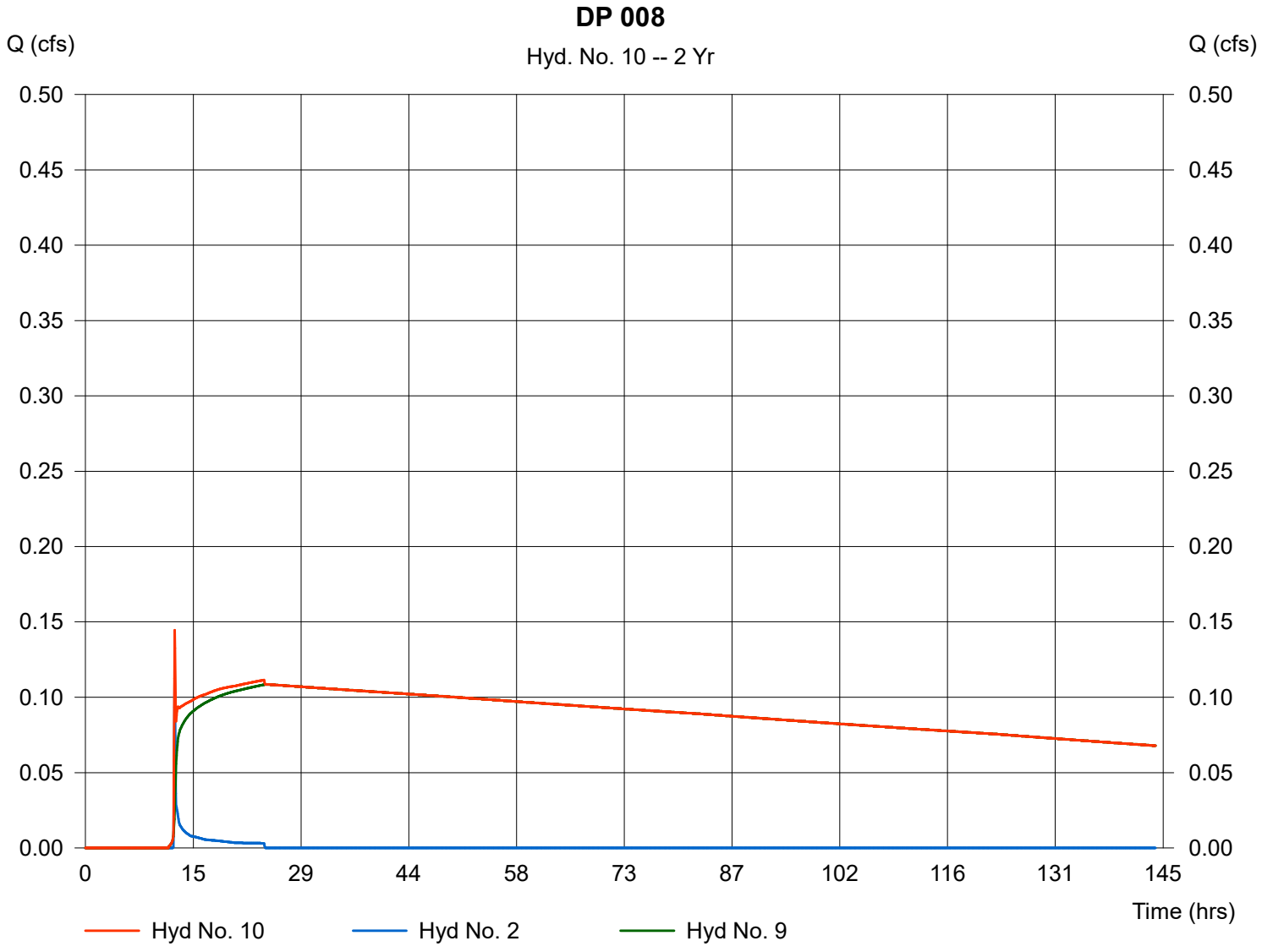
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Hyd. No. 10

DP 008

Hydrograph type	= Combine	Peak discharge	= 0.14 cfs
Storm frequency	= 2 yrs	Time interval	= 3 min
Inflow hyds.	= 2, 9		

Hydrograph Volume = 42,734 cuft



Hydrograph Plot

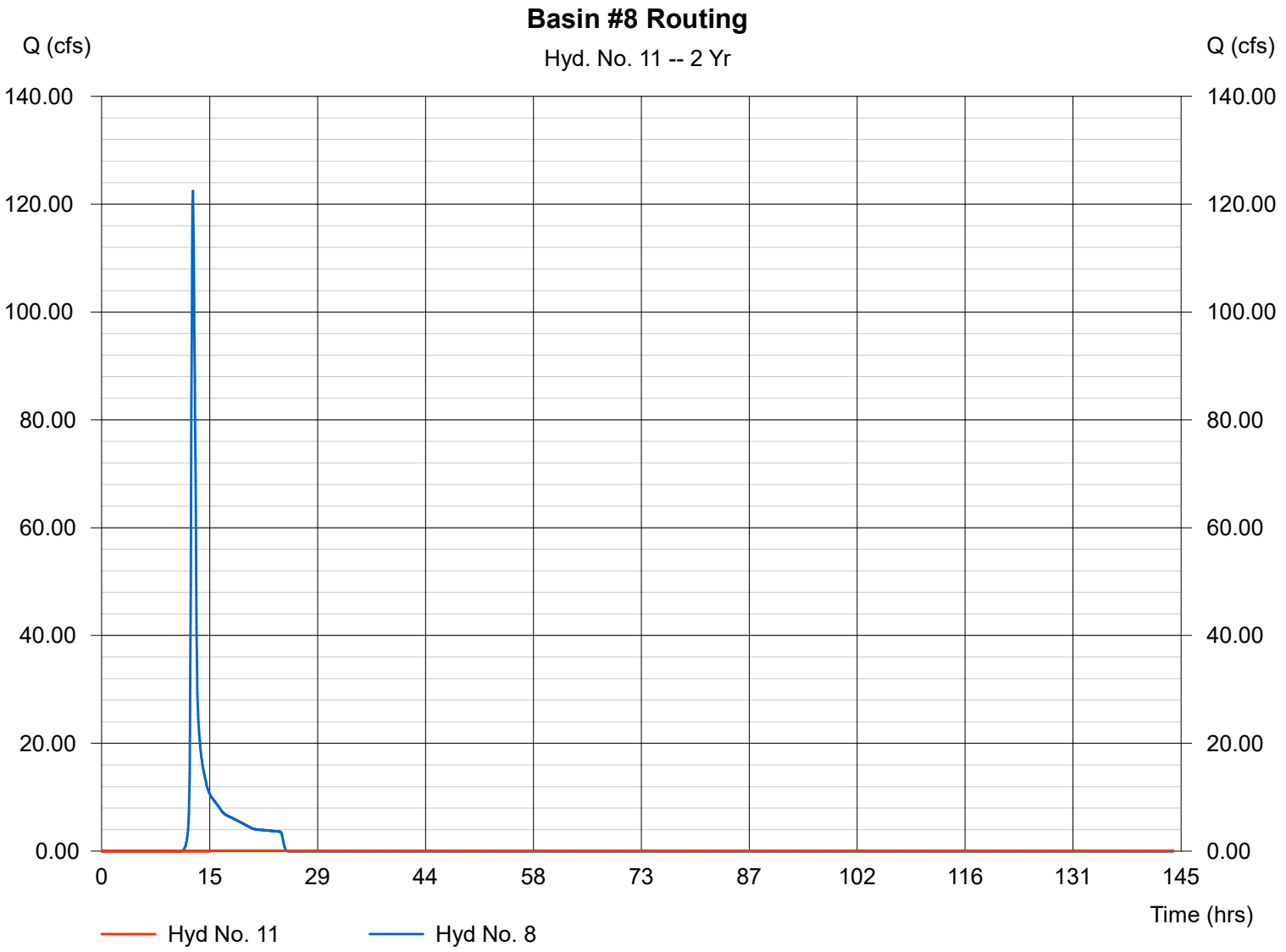
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Hyd. No. 11

Basin #8 Routing

Hydrograph type	=	Reservoir	Peak discharge	=	0.03 cfs
Storm frequency	=	2 yrs	Time interval	=	3 min
Inflow hyd. No.	=	8	Max. Elevation	=	325.80 ft
Reservoir name	=	Detention Basin #8	Max. Storage	=	581,776 cuft

Storage Indication method used. | Hydrograph Volume = 15,892 cuft



Pond Report

Pond No. 2 - Detention Basin #8

Pond Data

Pond storage is based on known contour areas. Average end area method used.

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	322.00	147,153	0	0
2.00	324.00	153,295	300,448	300,448
4.00	326.00	159,553	312,848	613,296
6.00	328.00	165,929	325,482	938,778
8.00	330.00	172,418	338,347	1,277,125
10.00	332.00	179,015	351,433	1,628,558
12.00	334.00	185,718	364,733	1,993,291
14.00	336.00	192,475	378,193	2,371,484

Culvert / Orifice Structures

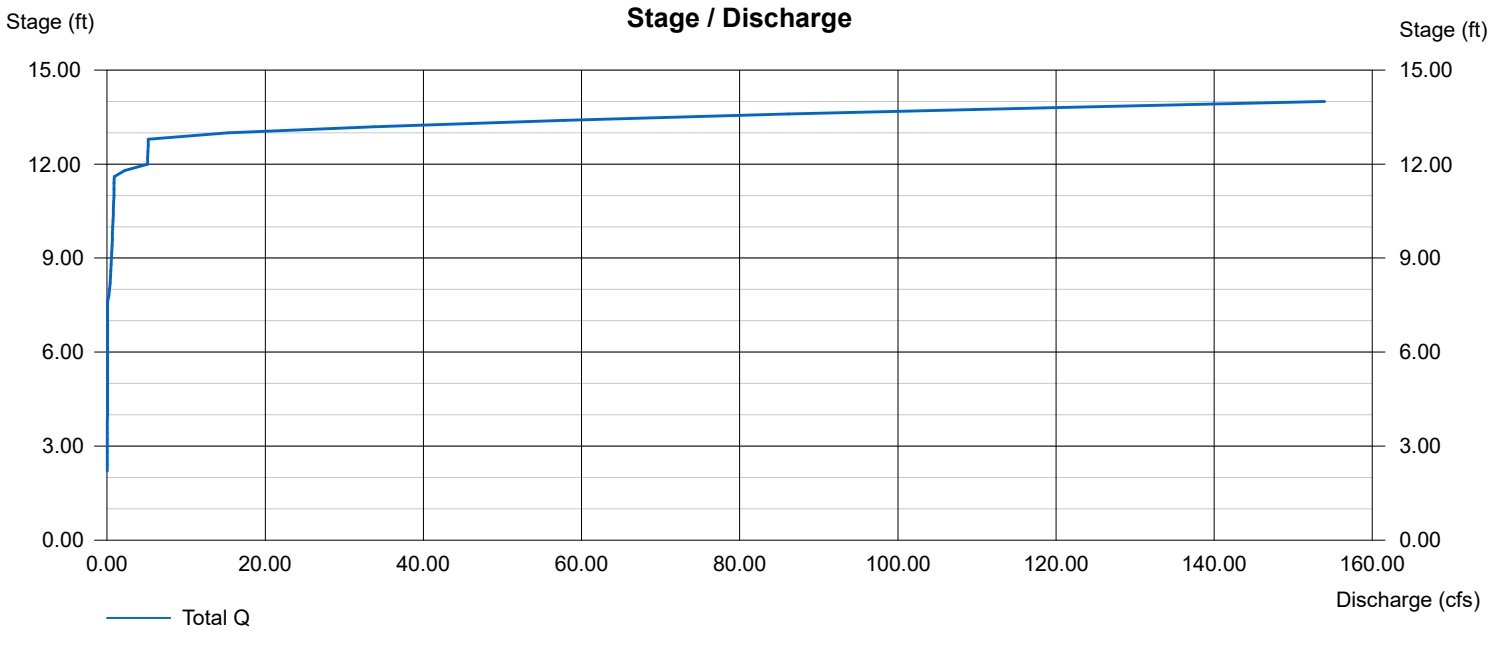
	[A]	[B]	[C]	[D]
Rise (in)	= 8.00	1.00	4.00	0.00
Span (in)	= 8.00	1.00	4.00	0.00
No. Barrels	= 1	1	1	0
Invert El. (ft)	= 320.00	324.00	329.50	0.00
Length (ft)	= 75.00	0.00	0.00	0.00
Slope (%)	= 6.67	0.00	0.00	0.00
N-Value	= .013	.013	.013	.000
Orif. Coeff.	= 0.60	0.60	0.60	0.00
Multi-Stage	= n/a	Yes	Yes	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 12.00	34.00	0.00	0.00
Crest El. (ft)	= 333.70	334.80	0.00	0.00
Weir Coeff.	= 3.33	3.33	0.00	0.00
Weir Type	= Riser	Ciplti	---	---
Multi-Stage	= Yes	No	No	No

Exfiltration = 0.000 in/hr (Contour) Tailwater Elev. = 0.00 ft

Note: Culvert/Orifice outflows have been analyzed under inlet and outlet control.



Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

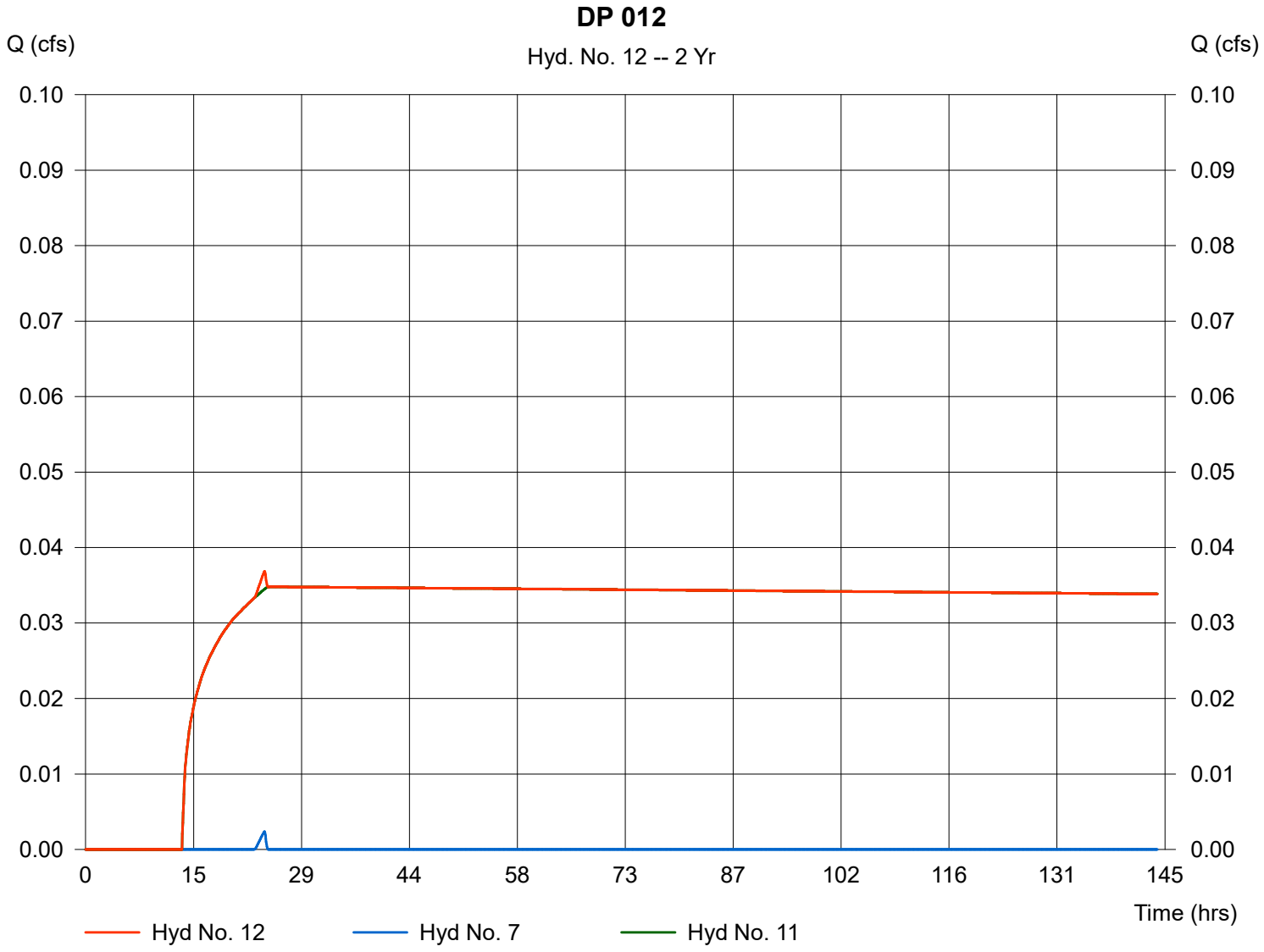
Friday, Sep 8 2023, 4:17 PM

Hyd. No. 12

DP 012

Hydrograph type	=	Combine	Peak discharge	=	0.04 cfs
Storm frequency	=	2 yrs	Time interval	=	3 min
Inflow hyds.	=	7, 11			

Hydrograph Volume = 15,899 cuft



Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

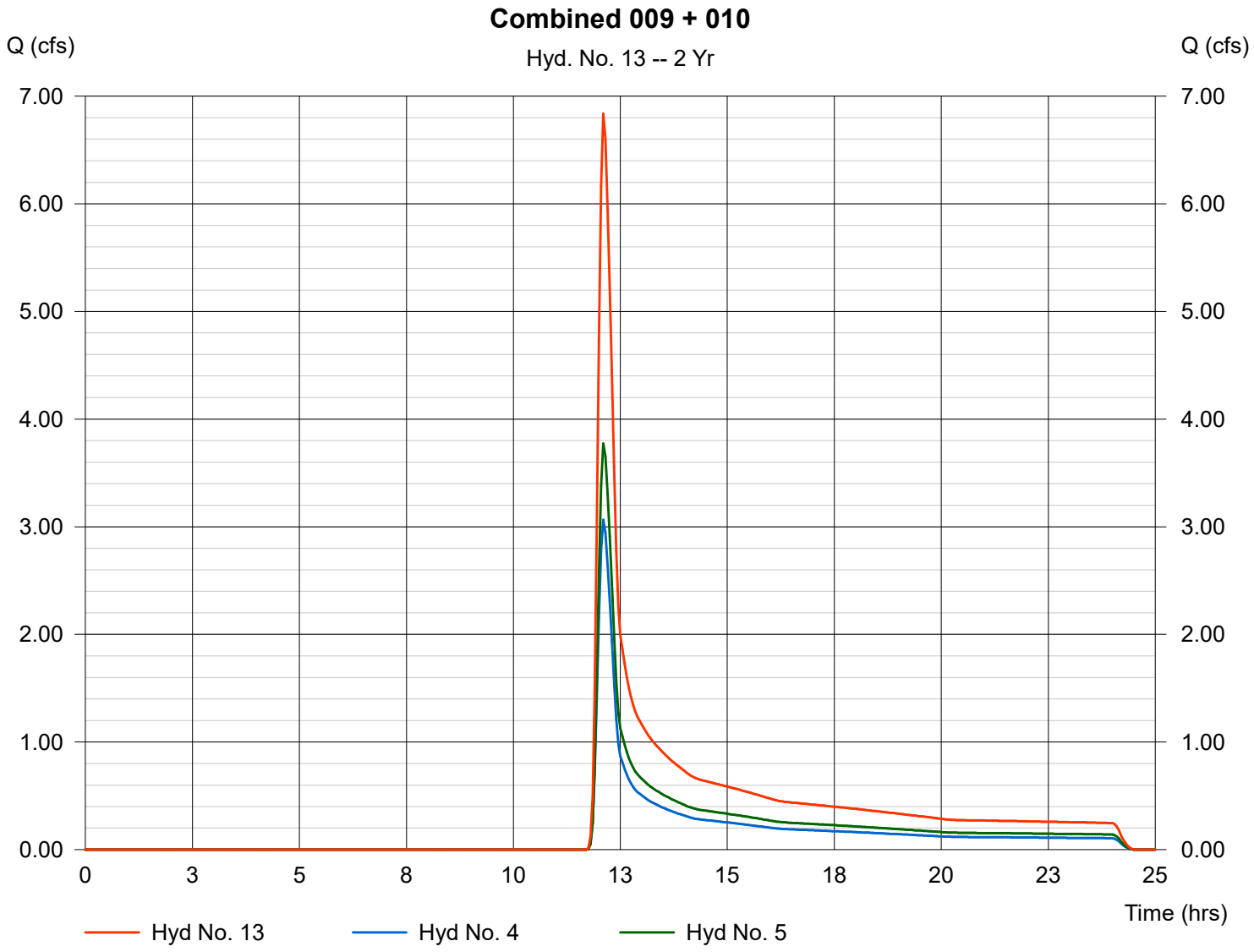
Friday, Sep 8 2023, 4:17 PM

Hyd. No. 13

Combined 009 + 010

Hydrograph type	=	Combine	Peak discharge	=	6.84 cfs
Storm frequency	=	2 yrs	Time interval	=	3 min
Inflow hyds.	=	4, 5			

Hydrograph Volume = 29,399 cuft



Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

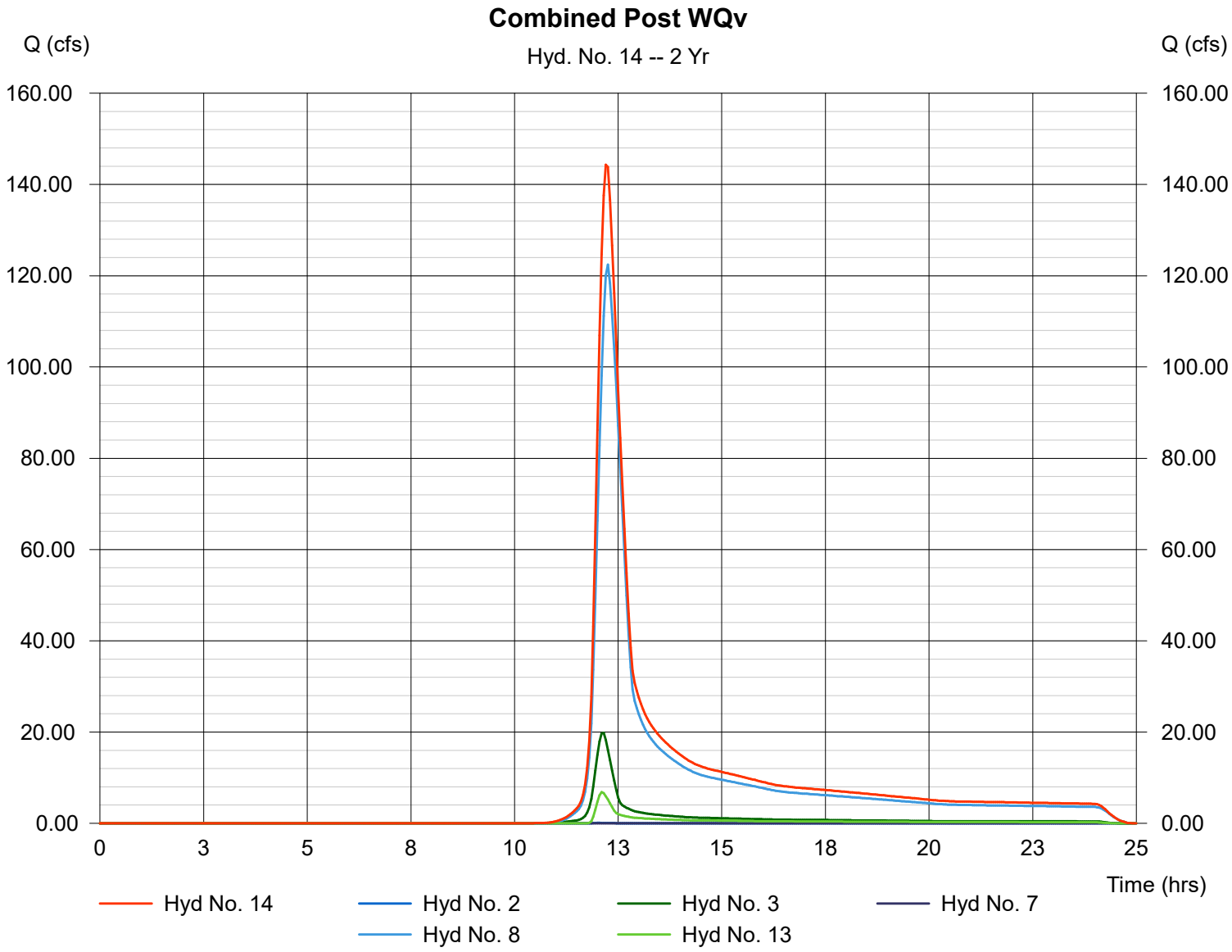
Friday, Sep 8 2023, 4:17 PM

Hyd. No. 14

Combined Post WQv

Hydrograph type	=	Combine	Peak discharge	=	144.34 cfs
Storm frequency	=	2 yrs	Time interval	=	3 min
Inflow hyds.	=	2, 3, 7, 8, 13			

Hydrograph Volume = 684,872 cuft



Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
1	SCS Runoff	0.00	3	720	3	----	------	------	Area 007 (DP 007)
2	SCS Runoff	0.25	3	720	628	----	------	------	Area 008 A
3	SCS Runoff	30.37	3	726	108,271	----	------	------	Area 008 B
4	SCS Runoff	6.23	3	726	22,453	----	------	------	Area 009 (DP009)
5	SCS Runoff	8.00	3	726	29,432	----	------	------	Area 010 (DP010)
6	SCS Runoff	0.00	3	720	3	----	------	------	Area 011 (DP011)
7	SCS Runoff	0.06	3	1080	1,912	----	------	------	Area 012 A
8	SCS Runoff	193.64	3	735	891,172	----	------	------	Area 012 B
9	Reservoir	0.14	3	1464	55,161	3	681.75	102,698	Basin #7 Routing
10	Combine	0.30	3	720	55,789	2, 9	------	------	DP 008
11	Reservoir	0.05	3	1491	23,264	8	327.70	889,243	Basin #8 Routing
12	Combine	0.10	3	1440	25,176	7, 11	------	------	DP 012
13	Combine	14.22	3	726	51,885	4, 5,	------	------	Combined 009 + 010
14	Combine	230.92	3	732	1,053,869	2, 3, 7, 8, 13	------	------	Combined Post WQv

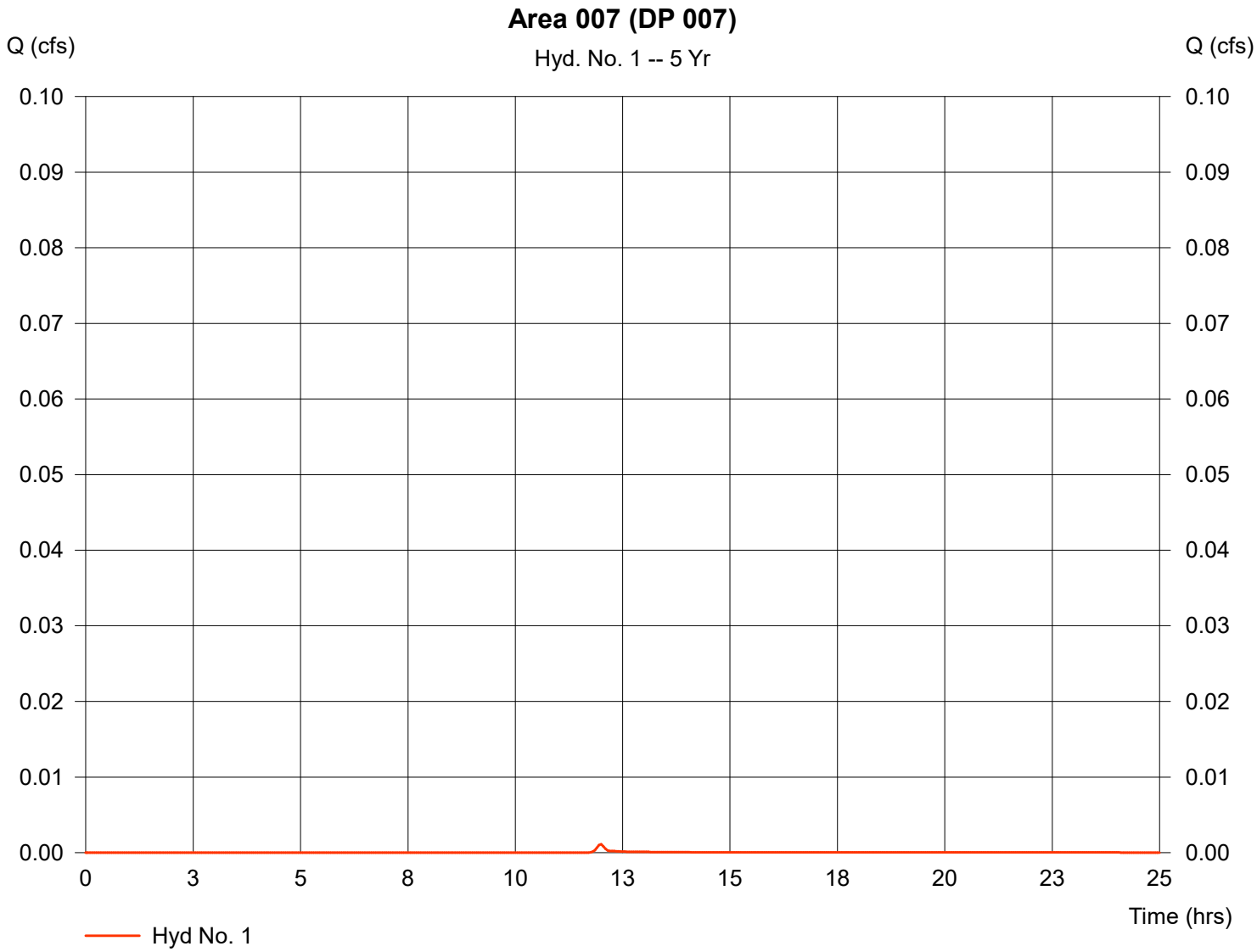
Hydrograph Plot

Hyd. No. 1

Area 007 (DP 007)

Hydrograph type	= SCS Runoff	Peak discharge	= 0.00 cfs
Storm frequency	= 5 yrs	Time interval	= 3 min
Drainage area	= 0.001 ac	Curve number	= 61
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 5.00 min
Total precip.	= 3.98 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 3 cuft



Hydrograph Plot

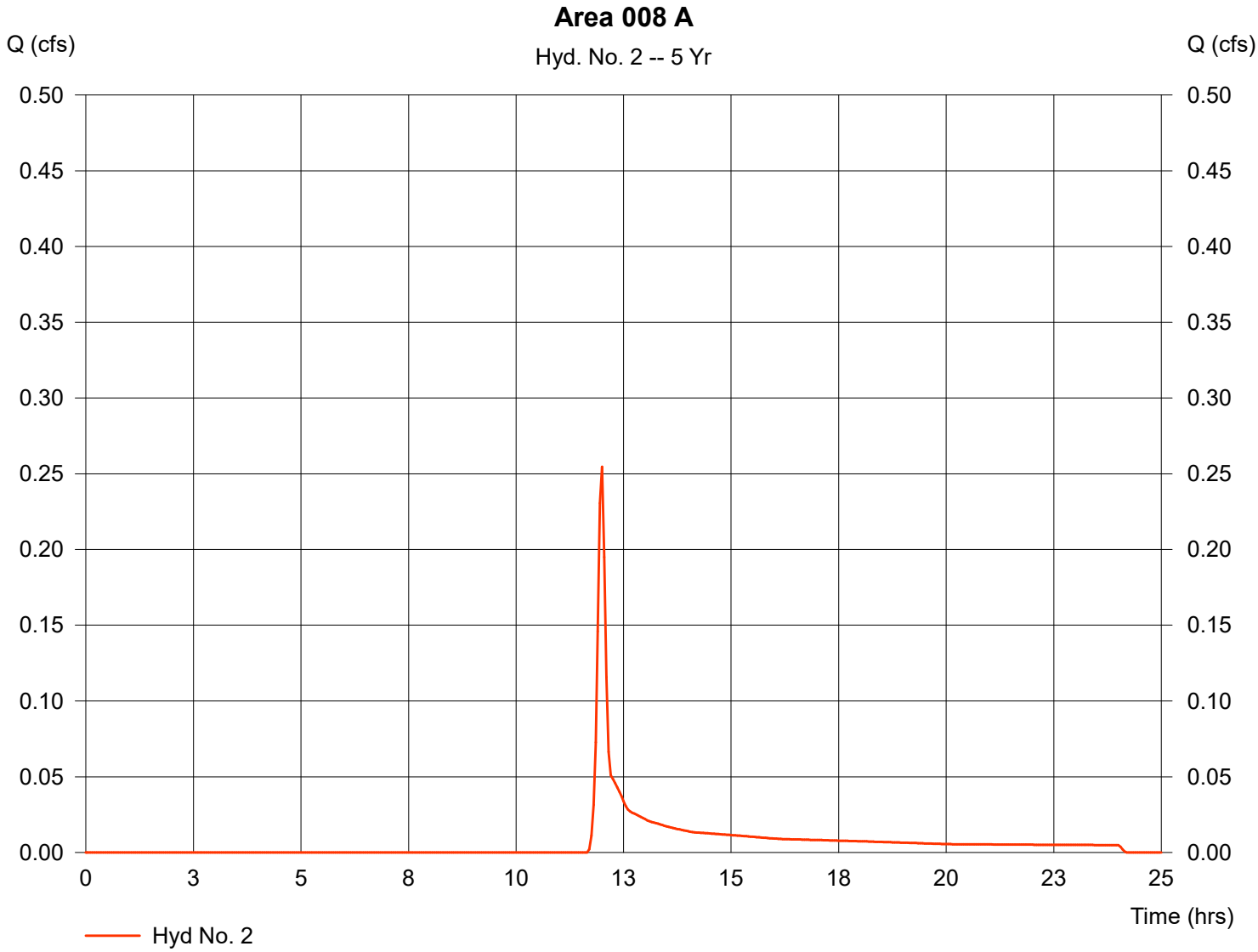
Hydraflow Hydrographs by Intelisolve | Friday, Sep 8 2023, 4:17 PM

Hyd. No. 2

Area 008 A

Hydrograph type	= SCS Runoff	Peak discharge	= 0.25 cfs
Storm frequency	= 5 yrs	Time interval	= 3 min
Drainage area	= 0.230 ac	Curve number	= 61
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 5.00 min
Total precip.	= 3.98 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 628 cuft



Hydrograph Plot

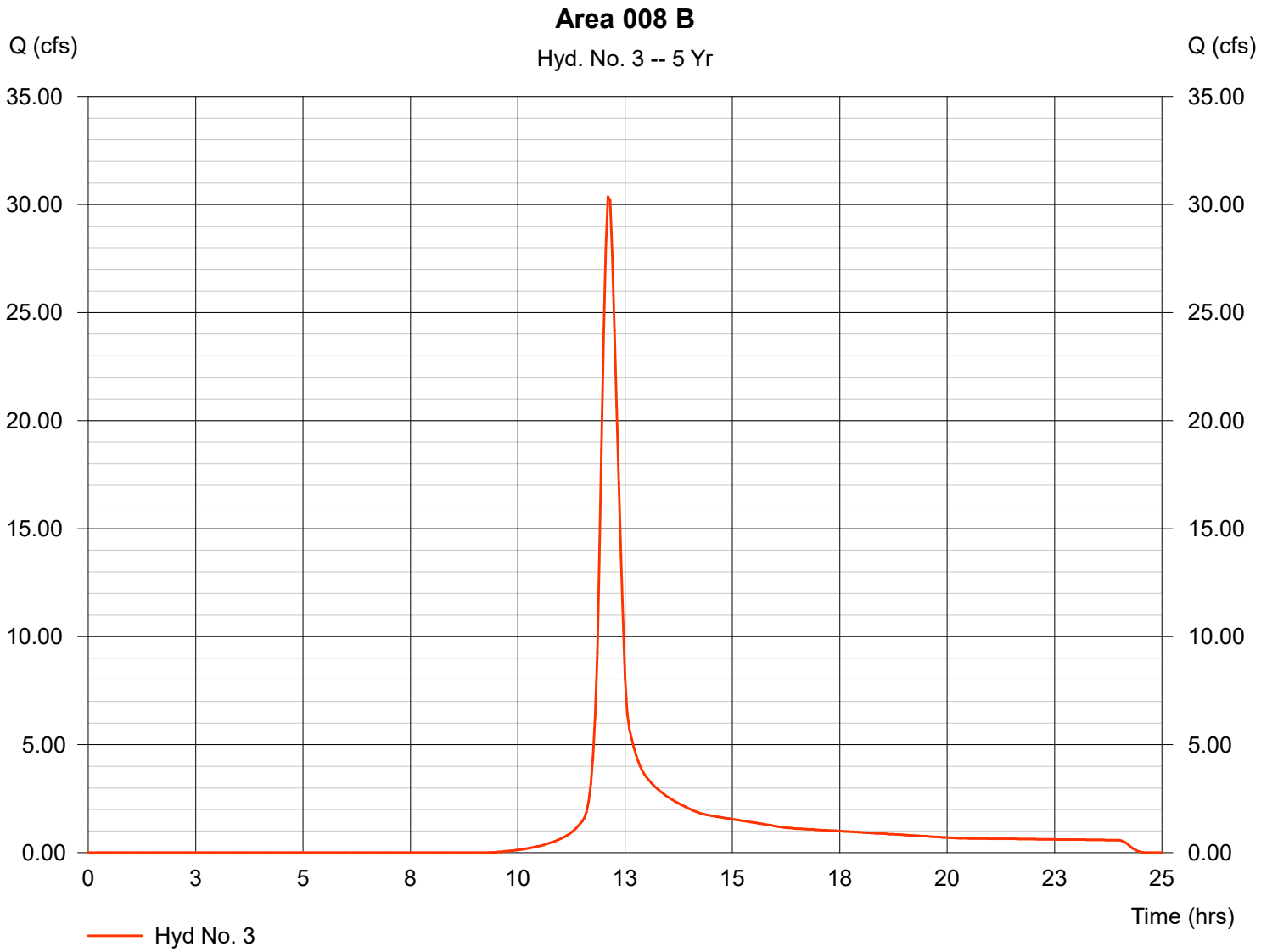
Hydraflow Hydrographs by Intelisolve | Friday, Sep 8 2023, 4:17 PM

Hyd. No. 3

Area 008 B

Hydrograph type	= SCS Runoff	Peak discharge	= 30.37 cfs
Storm frequency	= 5 yrs	Time interval	= 3 min
Drainage area	= 17.030 ac	Curve number	= 77
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 21.40 min
Total precip.	= 3.98 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 108,271 cuft



Hydrograph Plot

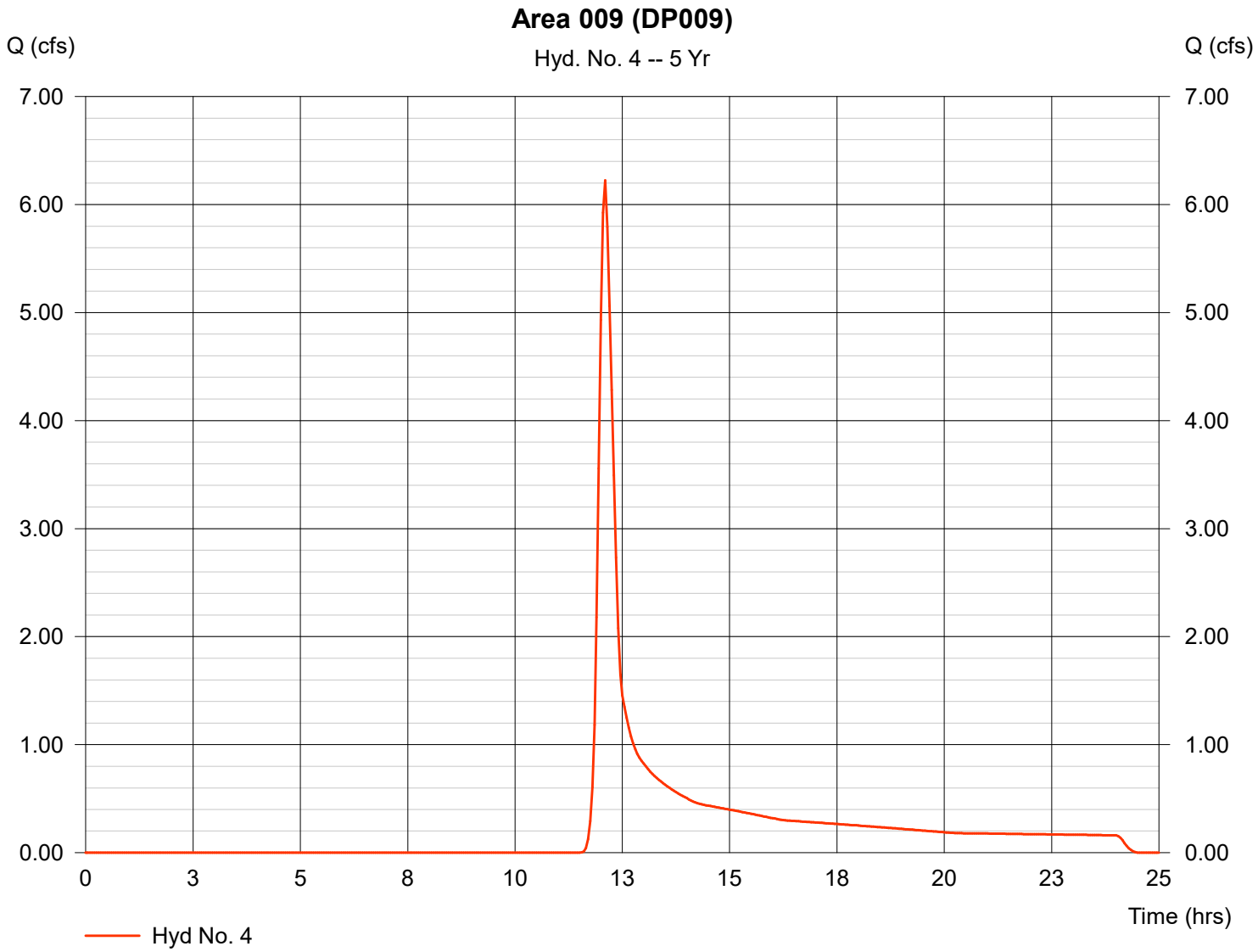
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Hyd. No. 4

Area 009 (DP009)

Hydrograph type	= SCS Runoff	Peak discharge	= 6.23 cfs
Storm frequency	= 5 yrs	Time interval	= 3 min
Drainage area	= 6.240 ac	Curve number	= 64
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 19.10 min
Total precip.	= 3.98 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 22,453 cuft



Hydrograph Plot

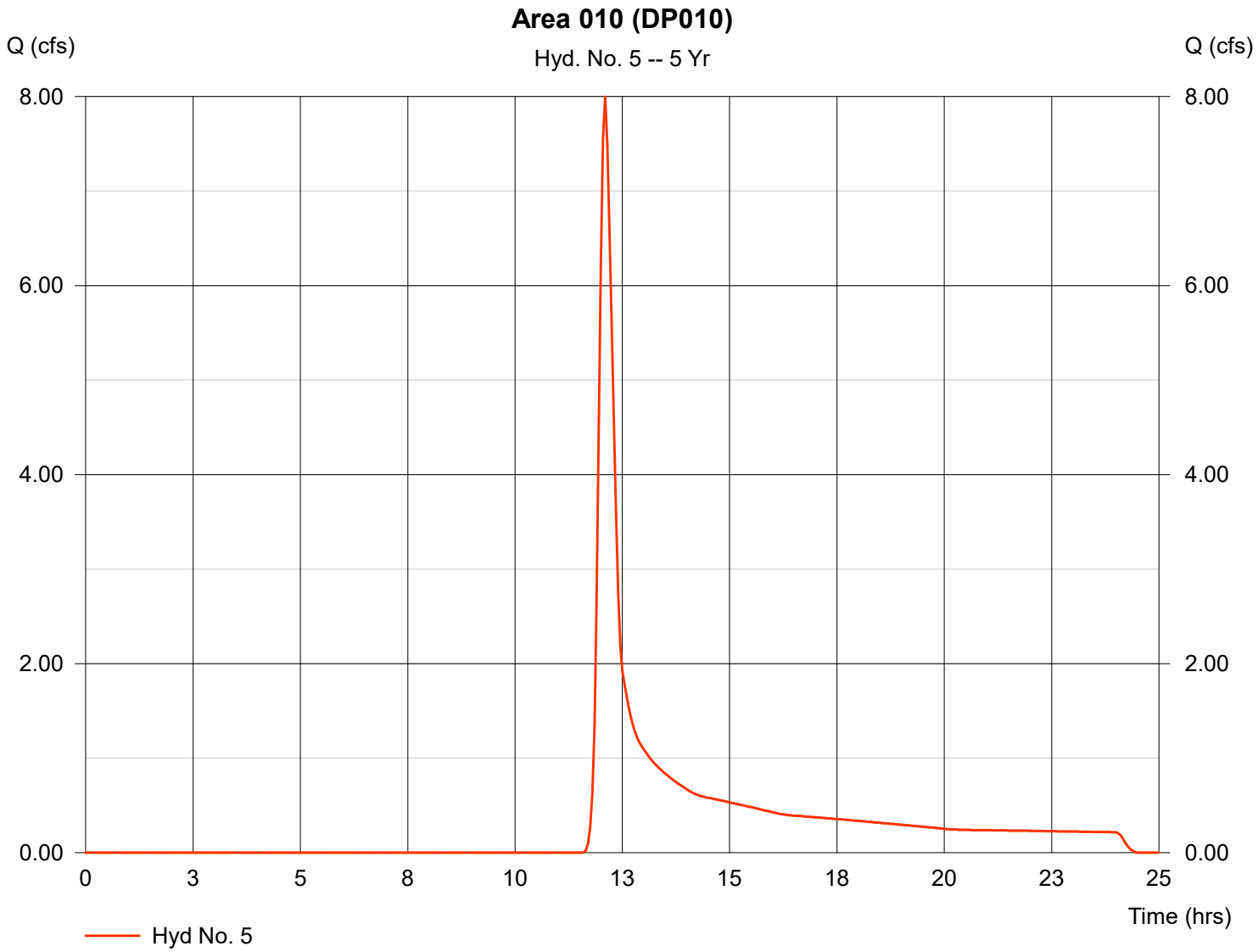
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Hyd. No. 5

Area 010 (DP010)

Hydrograph type	= SCS Runoff	Peak discharge	= 8.00 cfs
Storm frequency	= 5 yrs	Time interval	= 3 min
Drainage area	= 8.670 ac	Curve number	= 63
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 19.70 min
Total precip.	= 3.98 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 29,432 cuft



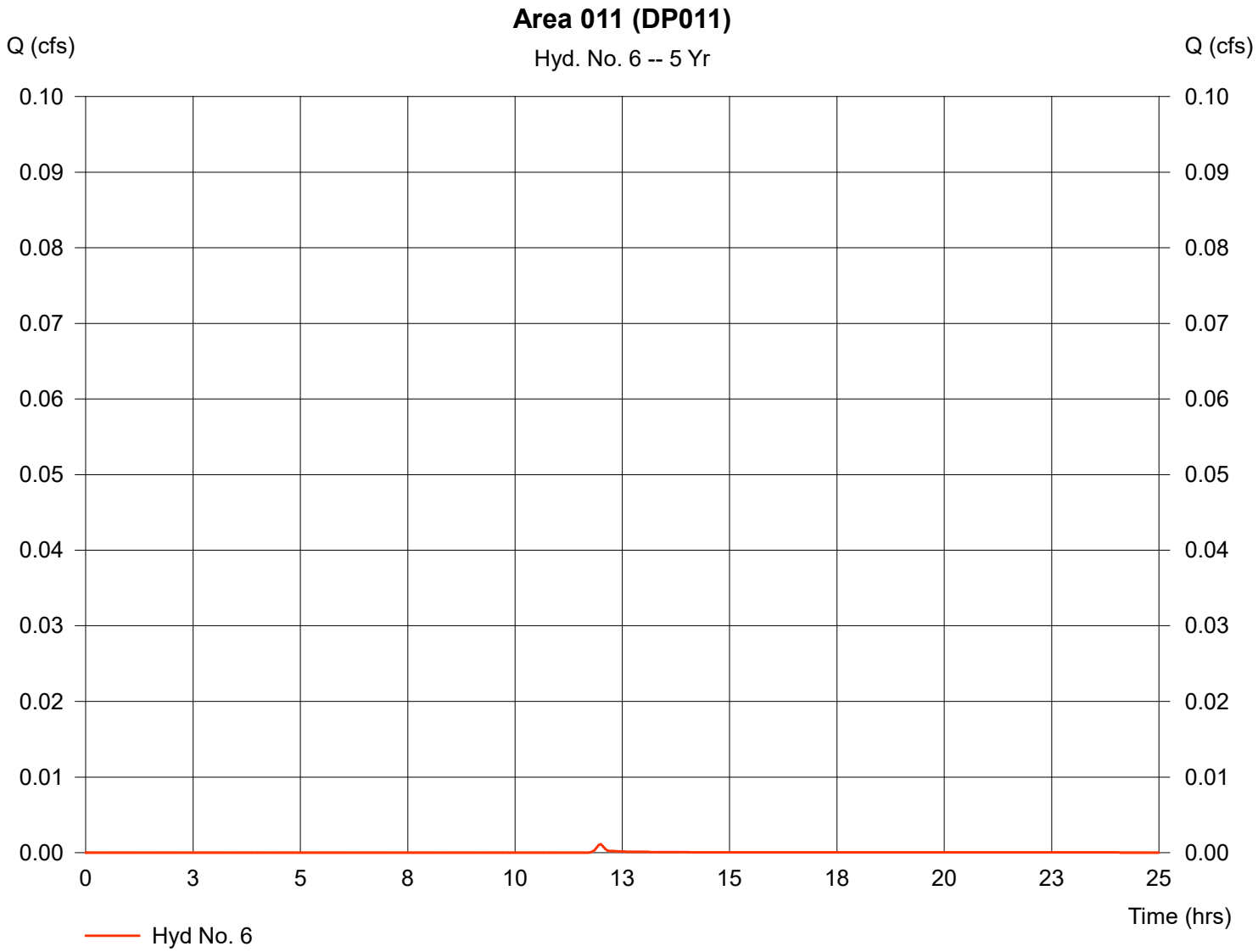
Hydrograph Plot

Hyd. No. 6

Area 011 (DP011)

Hydrograph type	= SCS Runoff	Peak discharge	= 0.00 cfs
Storm frequency	= 5 yrs	Time interval	= 3 min
Drainage area	= 0.001 ac	Curve number	= 61
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 5.00 min
Total precip.	= 3.98 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 3 cuft



Hydrograph Plot

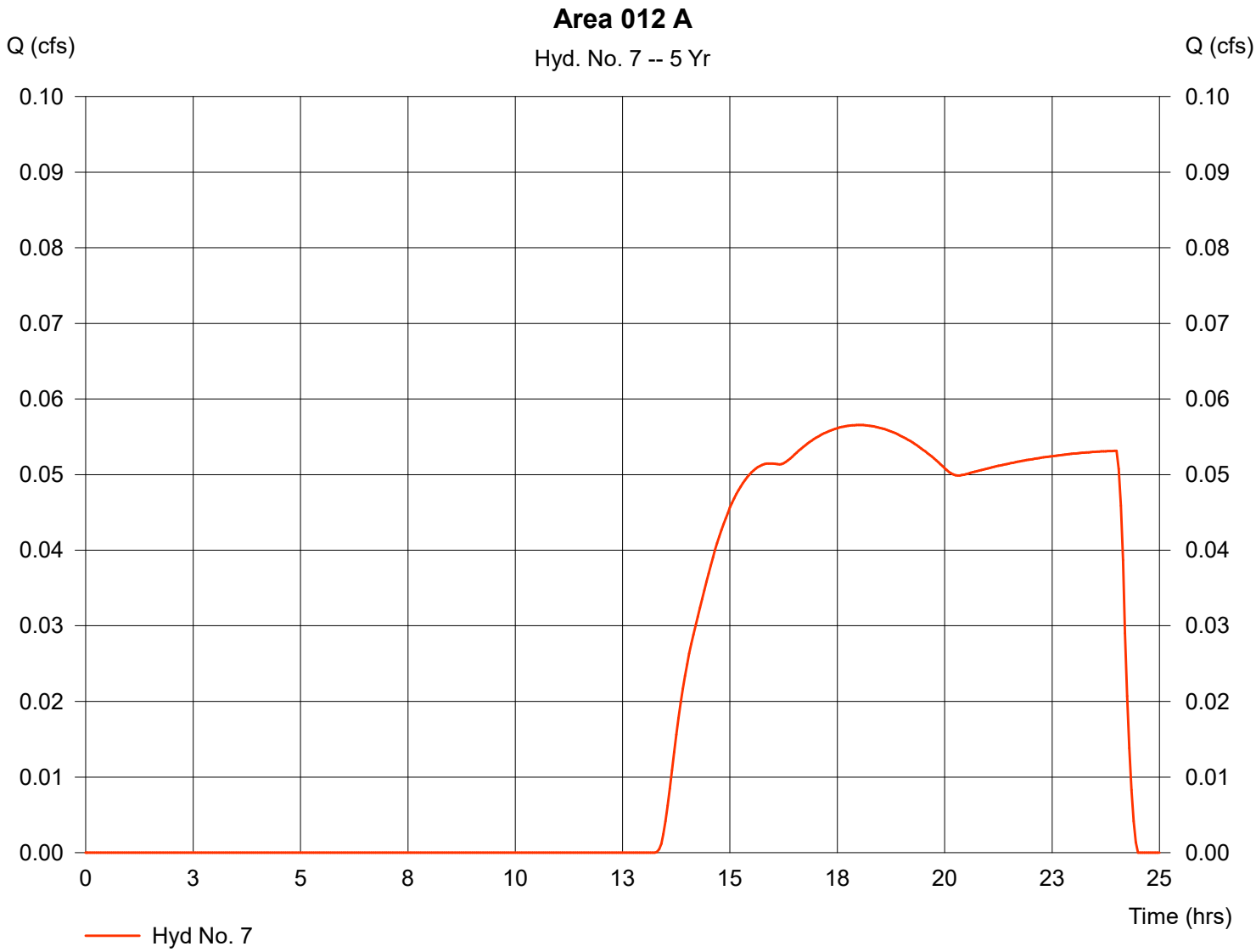
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Hyd. No. 7

Area 012 A

Hydrograph type	= SCS Runoff	Peak discharge	= 0.06 cfs
Storm frequency	= 5 yrs	Time interval	= 3 min
Drainage area	= 11.610 ac	Curve number	= 39
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 15.10 min
Total precip.	= 3.98 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 1,912 cuft



Hydrograph Plot

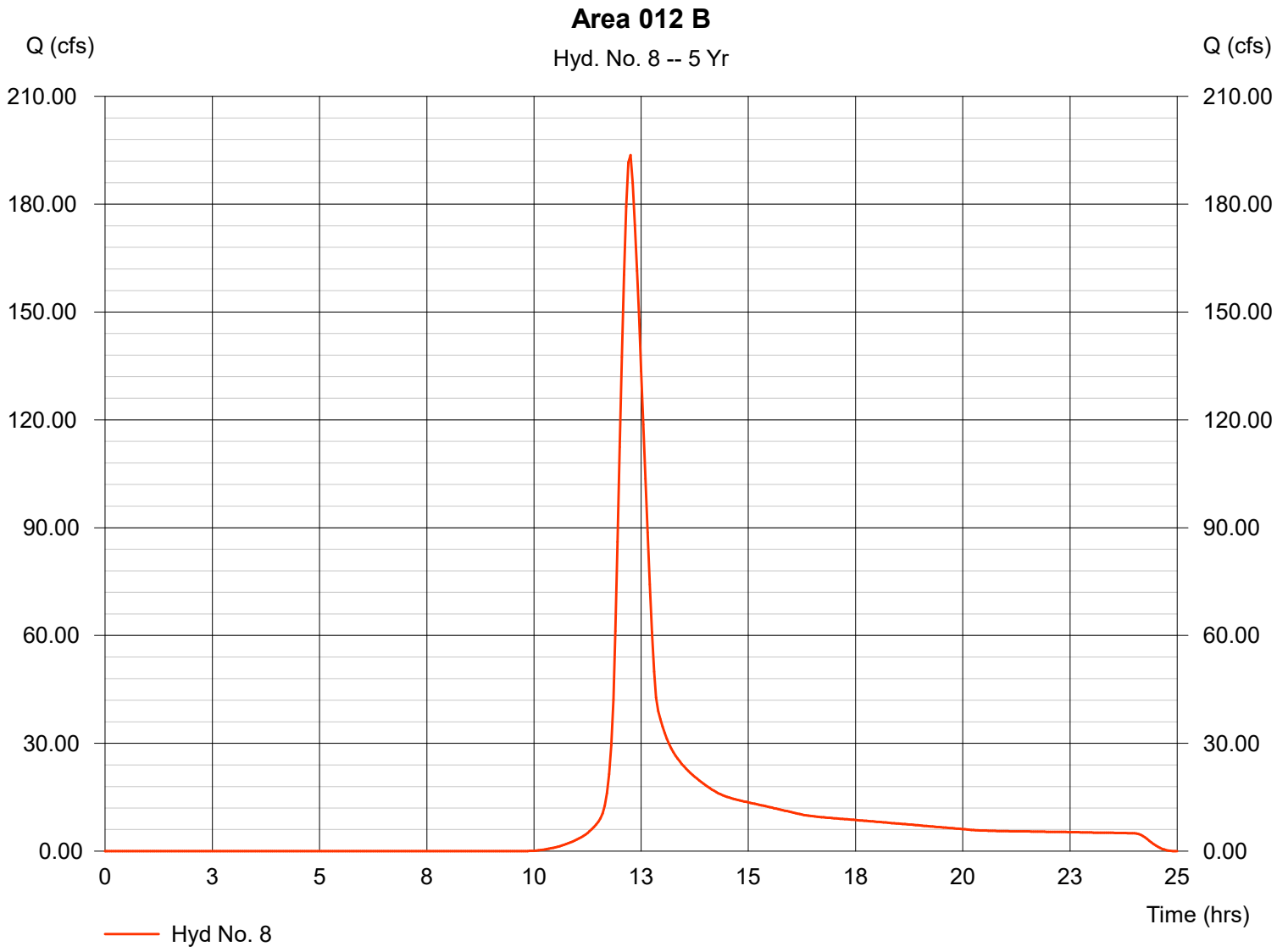
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Hyd. No. 8

Area 012 B

Hydrograph type	= SCS Runoff	Peak discharge	= 193.64 cfs
Storm frequency	= 5 yrs	Time interval	= 3 min
Drainage area	= 146.030 ac	Curve number	= 75
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 32.20 min
Total precip.	= 3.98 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 891,172 cuft



Hydrograph Plot

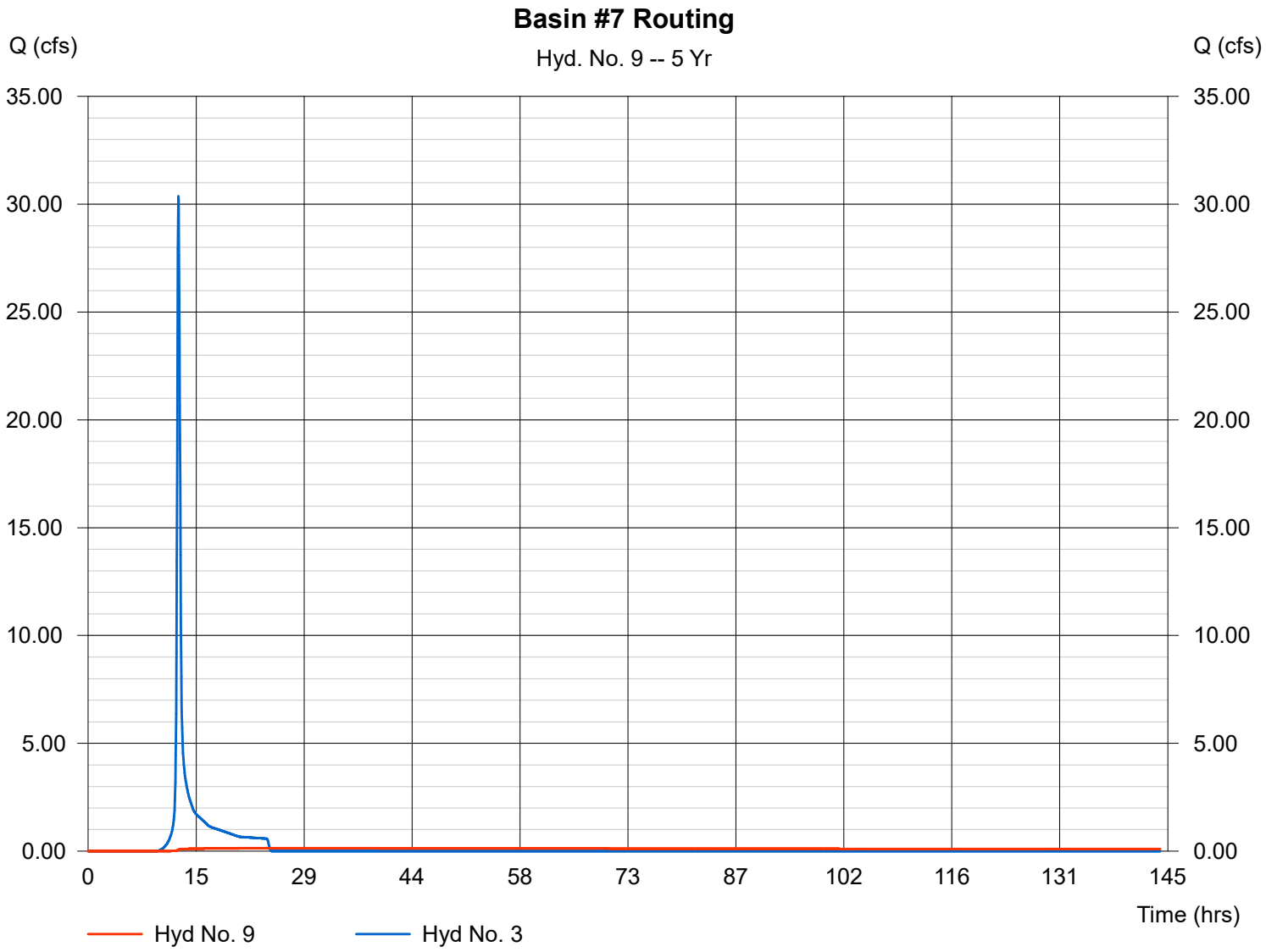
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Hyd. No. 9

Basin #7 Routing

Hydrograph type	=	Reservoir	Peak discharge	=	0.14 cfs
Storm frequency	=	5 yrs	Time interval	=	3 min
Inflow hyd. No.	=	3	Max. Elevation	=	681.75 ft
Reservoir name	=	Detention Basin #7	Max. Storage	=	102,698 cuft

Storage Indication method used. | Hydrograph Volume = 55,161 cuft



Pond Report

Pond No. 1 - Detention Basin #7

Pond Data

Pond storage is based on known contour areas. Average end area method used.

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	680.00	56,628	0	0
2.00	682.00	60,984	117,612	117,612
4.00	684.00	65,340	126,324	243,936
6.00	686.00	74,052	139,392	383,328

Culvert / Orifice Structures

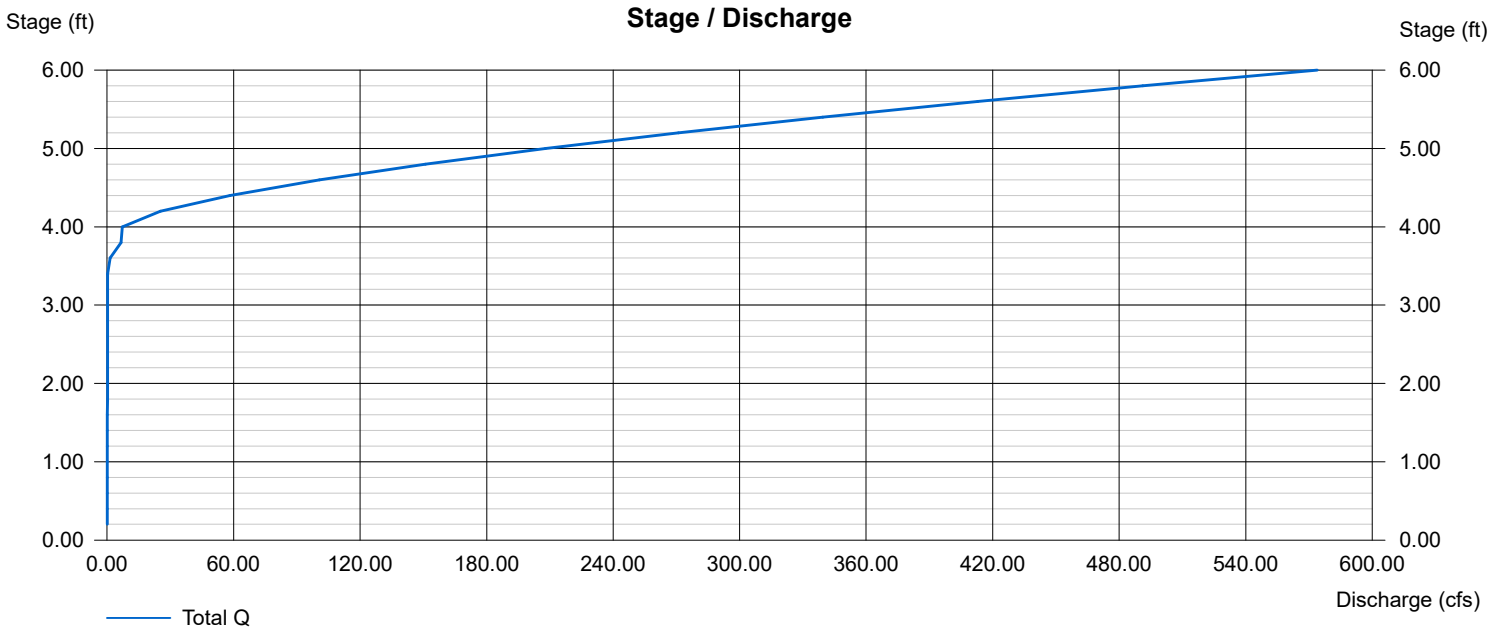
	[A]	[B]	[C]	[D]
Rise (in)	= 12.00	2.00	0.00	0.00
Span (in)	= 12.00	2.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 679.50	680.00	0.00	0.00
Length (ft)	= 48.00	0.00	0.00	0.00
Slope (%)	= 1.04	0.00	0.00	0.00
N-Value	= .013	.013	.000	.000
Orif. Coeff.	= 0.60	0.60	0.00	0.00
Multi-Stage	= n/a	Yes	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 12.00	60.00	0.00	0.00
Crest El. (ft)	= 683.50	684.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	0.00	0.00
Weir Type	= Riser	Ciplti	---	---
Multi-Stage	= Yes	No	No	No

Exfiltration = 0.000 in/hr (Contour) Tailwater Elev. = 0.00 ft

Note: Culvert/Orifice outflows have been analyzed under inlet and outlet control.



Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

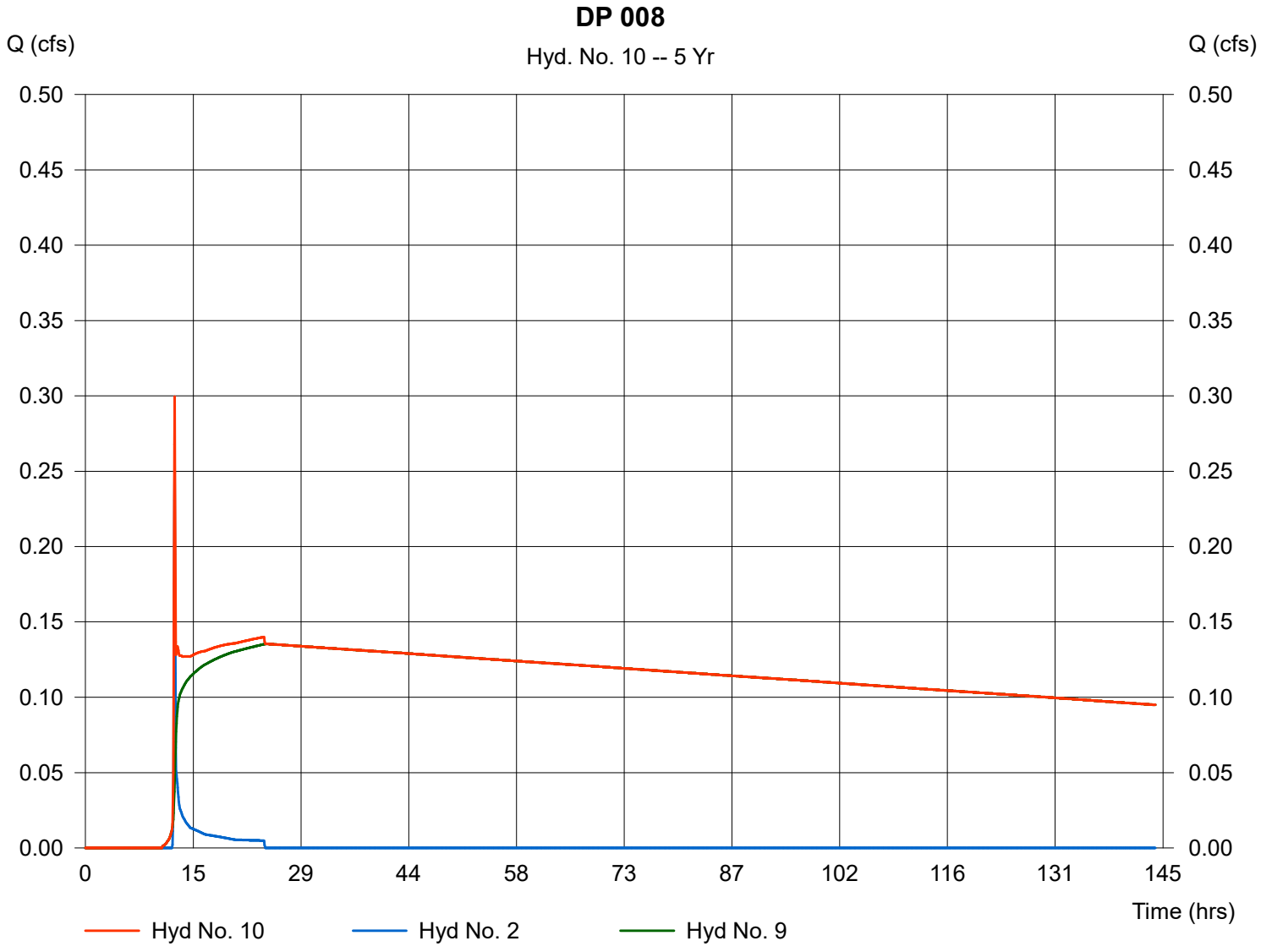
Friday, Sep 8 2023, 4:17 PM

Hyd. No. 10

DP 008

Hydrograph type	=	Combine	Peak discharge	=	0.30 cfs
Storm frequency	=	5 yrs	Time interval	=	3 min
Inflow hyds.	=	2, 9			

Hydrograph Volume = 55,789 cuft



Hydrograph Plot

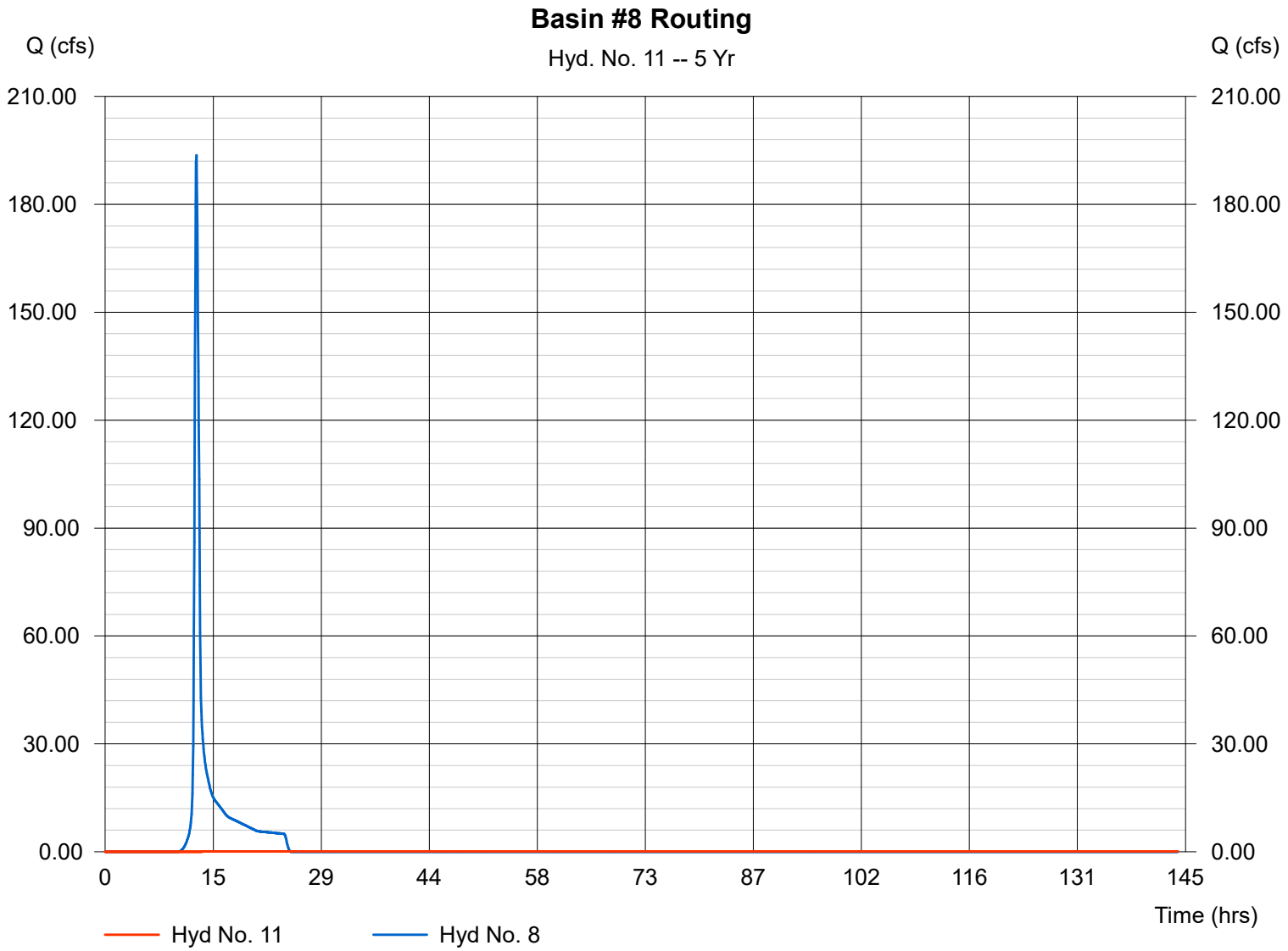
Hydraflow Hydrographs by Intelisolve | Friday, Sep 8 2023, 4:17 PM

Hyd. No. 11

Basin #8 Routing

Hydrograph type	=	Reservoir	Peak discharge	=	0.05 cfs
Storm frequency	=	5 yrs	Time interval	=	3 min
Inflow hyd. No.	=	8	Max. Elevation	=	327.70 ft
Reservoir name	=	Detention Basin #8	Max. Storage	=	889,243 cuft

Storage Indication method used. | Hydrograph Volume = 23,264 cuft



Pond Report

Pond No. 2 - Detention Basin #8

Pond Data

Pond storage is based on known contour areas. Average end area method used.

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	322.00	147,153	0	0
2.00	324.00	153,295	300,448	300,448
4.00	326.00	159,553	312,848	613,296
6.00	328.00	165,929	325,482	938,778
8.00	330.00	172,418	338,347	1,277,125
10.00	332.00	179,015	351,433	1,628,558
12.00	334.00	185,718	364,733	1,993,291
14.00	336.00	192,475	378,193	2,371,484

Culvert / Orifice Structures

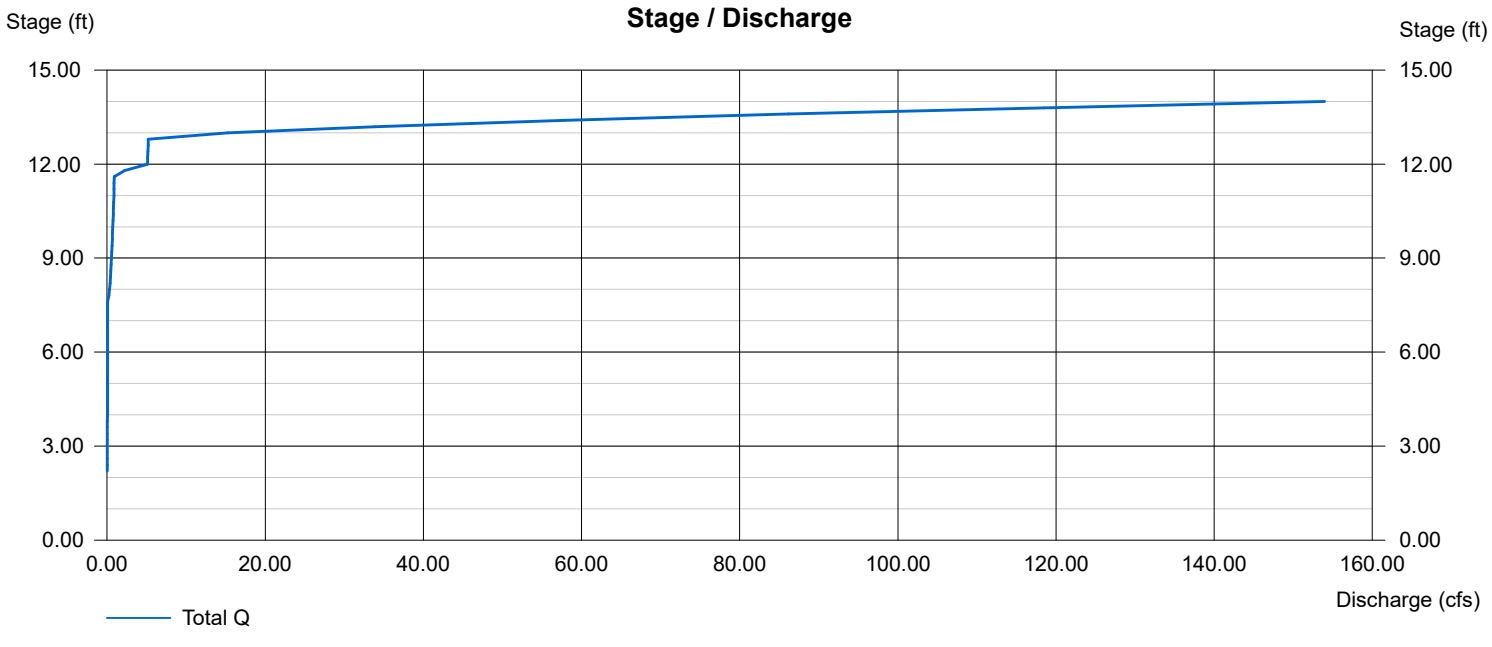
	[A]	[B]	[C]	[D]
Rise (in)	= 8.00	1.00	4.00	0.00
Span (in)	= 8.00	1.00	4.00	0.00
No. Barrels	= 1	1	1	0
Invert El. (ft)	= 320.00	324.00	329.50	0.00
Length (ft)	= 75.00	0.00	0.00	0.00
Slope (%)	= 6.67	0.00	0.00	0.00
N-Value	= .013	.013	.013	.000
Orif. Coeff.	= 0.60	0.60	0.60	0.00
Multi-Stage	= n/a	Yes	Yes	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 12.00	34.00	0.00	0.00
Crest El. (ft)	= 333.70	334.80	0.00	0.00
Weir Coeff.	= 3.33	3.33	0.00	0.00
Weir Type	= Riser	Ciplti	---	---
Multi-Stage	= Yes	No	No	No

Exfiltration = 0.000 in/hr (Contour) Tailwater Elev. = 0.00 ft

Note: Culvert/Orifice outflows have been analyzed under inlet and outlet control.



Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

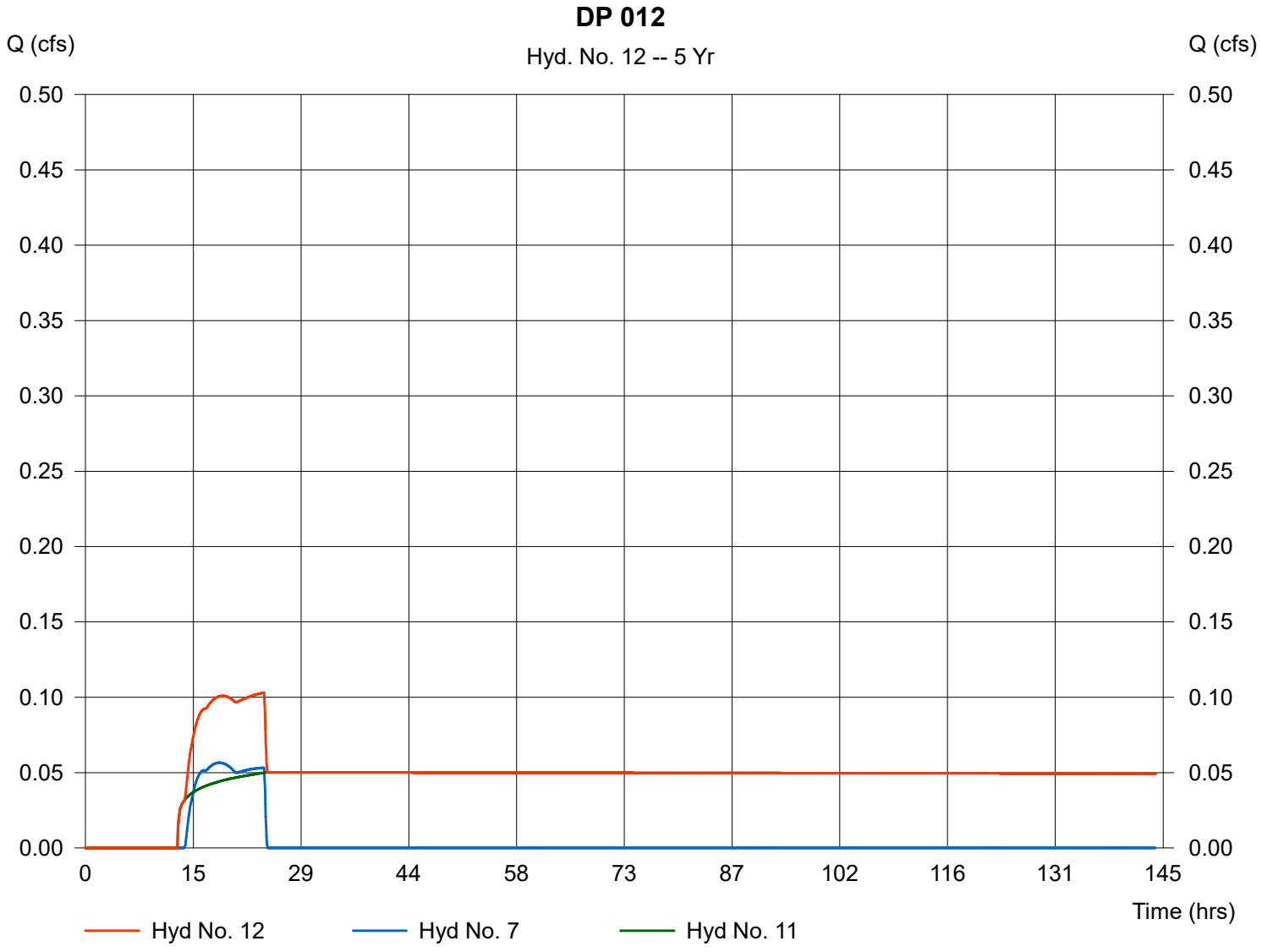
Friday, Sep 8 2023, 4:17 PM

Hyd. No. 12

DP 012

Hydrograph type	= Combine	Peak discharge	= 0.10 cfs
Storm frequency	= 5 yrs	Time interval	= 3 min
Inflow hyds.	= 7, 11		

Hydrograph Volume = 25,176 cuft



Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

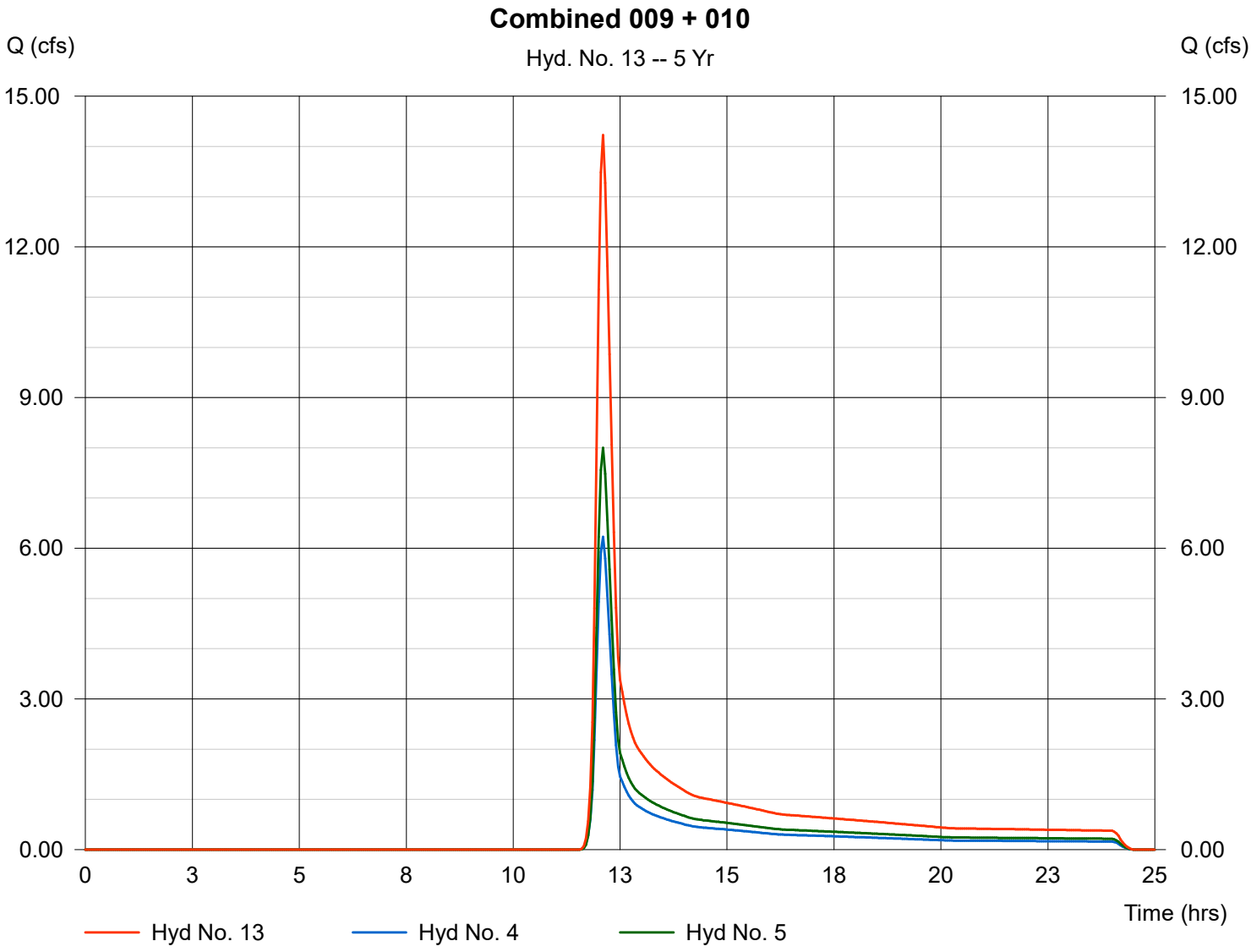
Friday, Sep 8 2023, 4:17 PM

Hyd. No. 13

Combined 009 + 010

Hydrograph type	=	Combine	Peak discharge	=	14.22 cfs
Storm frequency	=	5 yrs	Time interval	=	3 min
Inflow hyds.	=	4, 5			

Hydrograph Volume = 51,885 cuft



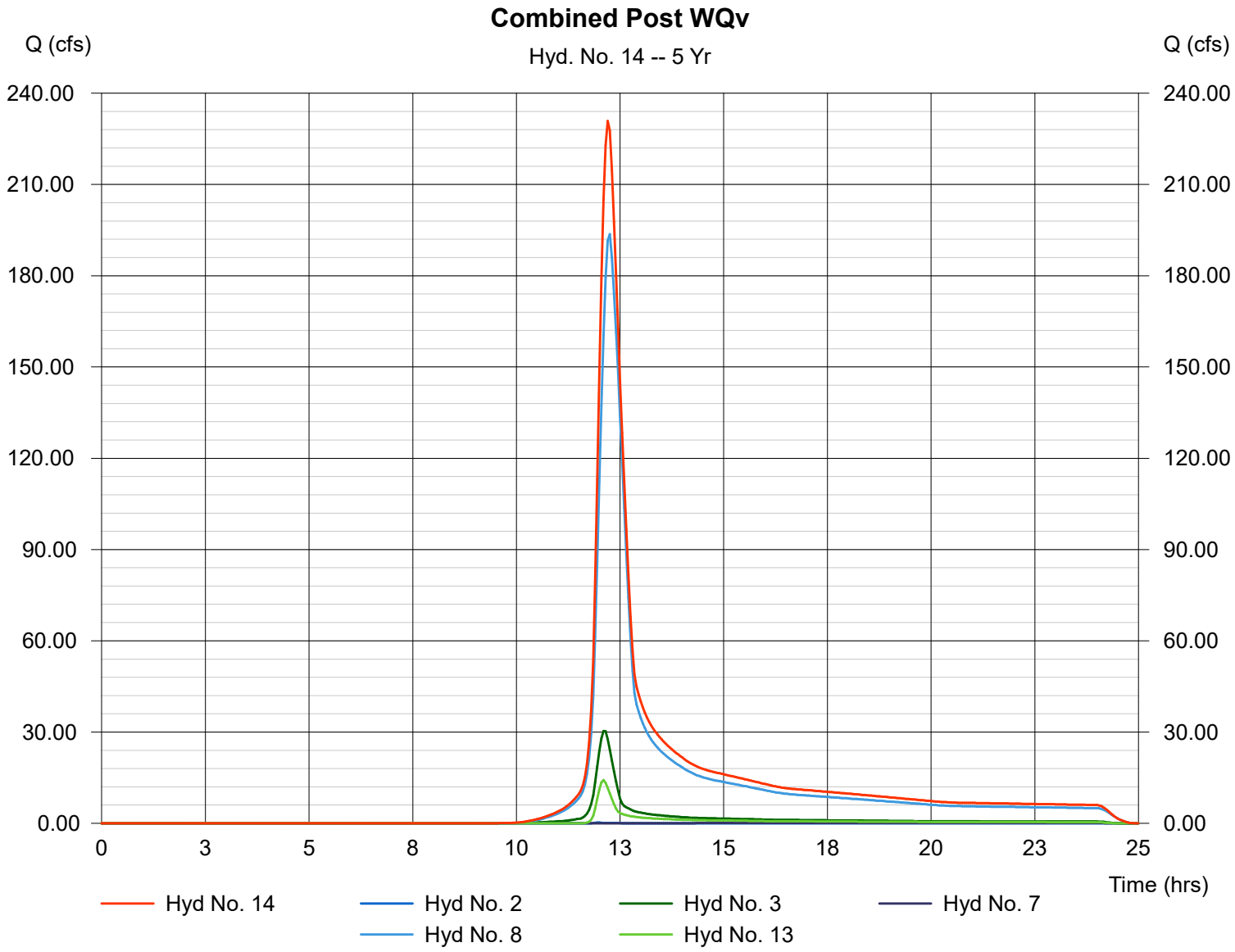
Hydrograph Plot

Hyd. No. 14

Combined Post WQv

Hydrograph type	=	Combine	Peak discharge	=	230.92 cfs
Storm frequency	=	5 yrs	Time interval	=	3 min
Inflow hyds.	=	2, 3, 7, 8, 13			

Hydrograph Volume = 1,053,869 cuft



Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
1	SCS Runoff	0.00	3	720	4	----	------	------	Area 007 (DP 007)
2	SCS Runoff	0.38	3	720	907	----	------	------	Area 008 A
3	SCS Runoff	39.68	3	726	140,125	----	------	------	Area 008 B
4	SCS Runoff	9.21	3	726	31,576	----	------	------	Area 009 (DP009)
5	SCS Runoff	12.03	3	726	41,737	----	------	------	Area 010 (DP010)
6	SCS Runoff	0.00	3	720	4	----	------	------	Area 011 (DP011)
7	SCS Runoff	0.19	3	789	5,791	----	------	------	Area 012 A
8	SCS Runoff	256.46	3	735	1,165,806	----	------	------	Area 012 B
9	Reservoir	0.15	3	1464	64,629	3	682.25	133,660	Basin #7 Routing
10	Combine	0.44	3	720	65,535	2, 9	------	------	DP 008
11	Reservoir	0.06	3	1491	28,115	8	329.33	1,163,399	Basin #8 Routing
12	Combine	0.23	3	804	33,906	7, 11	------	------	DP 012
13	Combine	21.23	3	726	73,313	4, 5,	------	------	Combined 009 + 010
14	Combine	307.68	3	732	1,385,941	2, 3, 7, 8, 13	------	------	Combined Post WQv

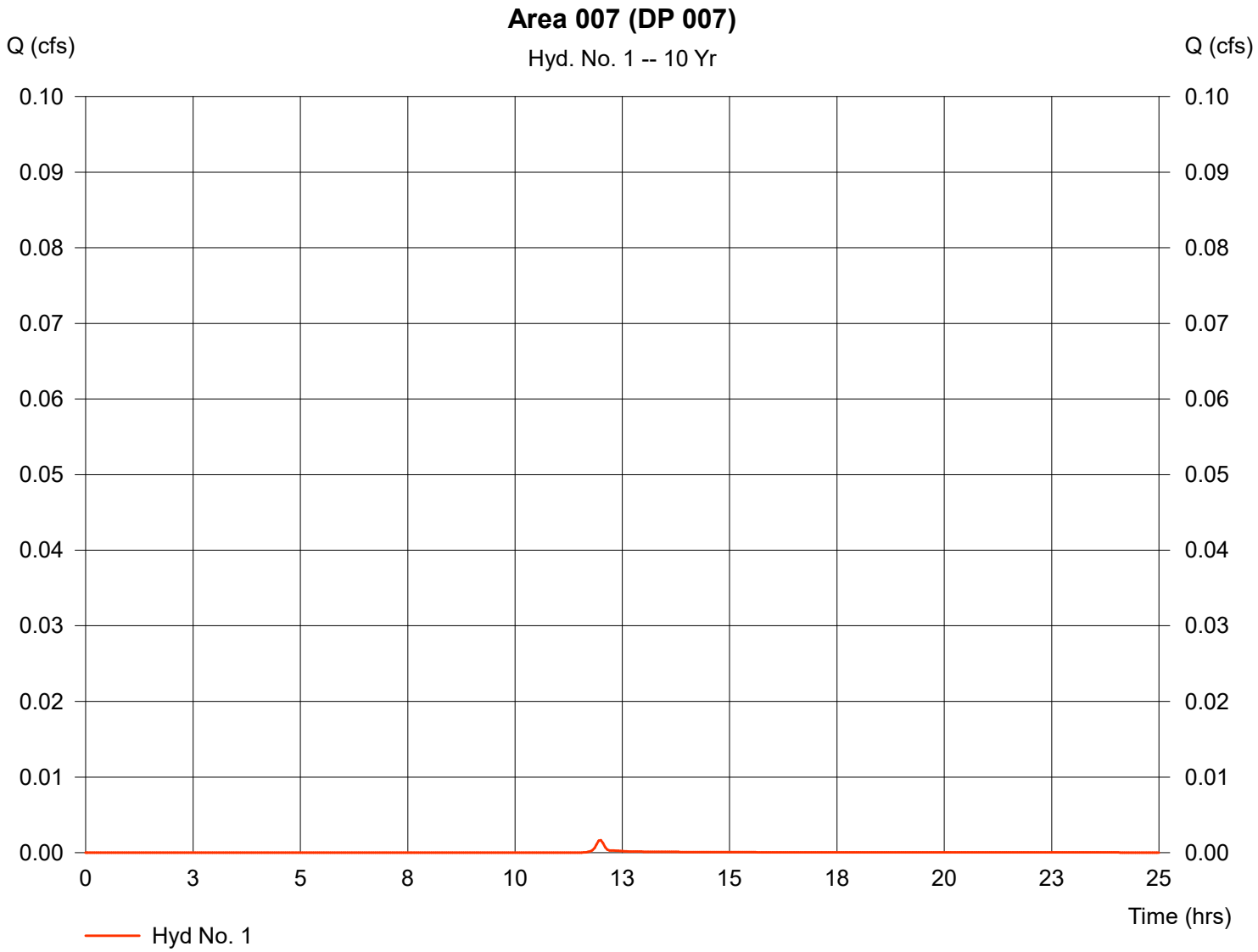
Hydrograph Plot

Hyd. No. 1

Area 007 (DP 007)

Hydrograph type	= SCS Runoff	Peak discharge	= 0.00 cfs
Storm frequency	= 10 yrs	Time interval	= 3 min
Drainage area	= 0.001 ac	Curve number	= 61
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 5.00 min
Total precip.	= 4.64 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 4 cuft



Hydrograph Plot

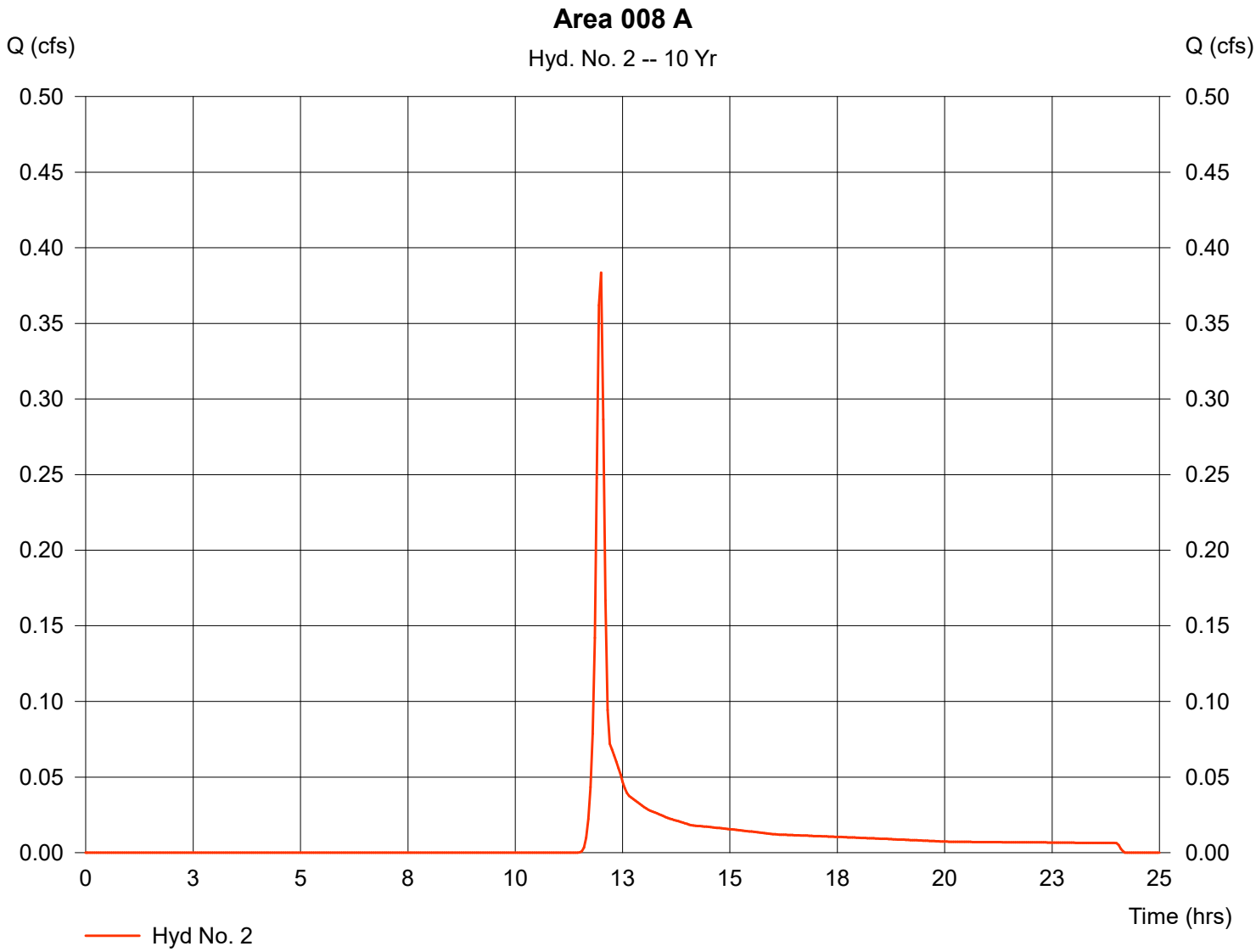
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Hyd. No. 2

Area 008 A

Hydrograph type	= SCS Runoff	Peak discharge	= 0.38 cfs
Storm frequency	= 10 yrs	Time interval	= 3 min
Drainage area	= 0.230 ac	Curve number	= 61
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 5.00 min
Total precip.	= 4.64 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 907 cuft



Hydrograph Plot

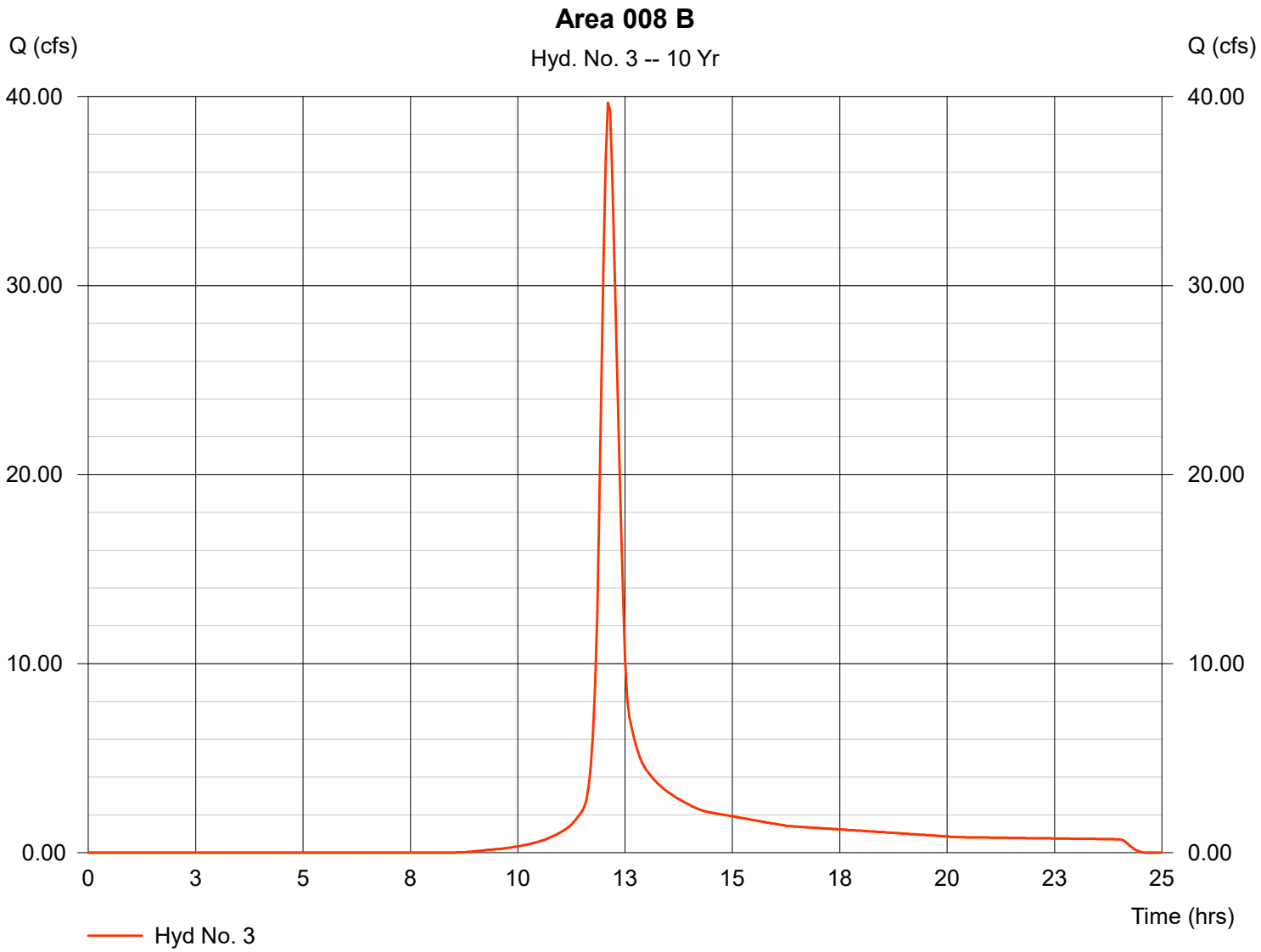
Hydraflow Hydrographs by Intelisolve | Friday, Sep 8 2023, 4:17 PM

Hyd. No. 3

Area 008 B

Hydrograph type	= SCS Runoff	Peak discharge	= 39.68 cfs
Storm frequency	= 10 yrs	Time interval	= 3 min
Drainage area	= 17.030 ac	Curve number	= 77
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 21.40 min
Total precip.	= 4.64 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 140,125 cuft



Hydrograph Plot

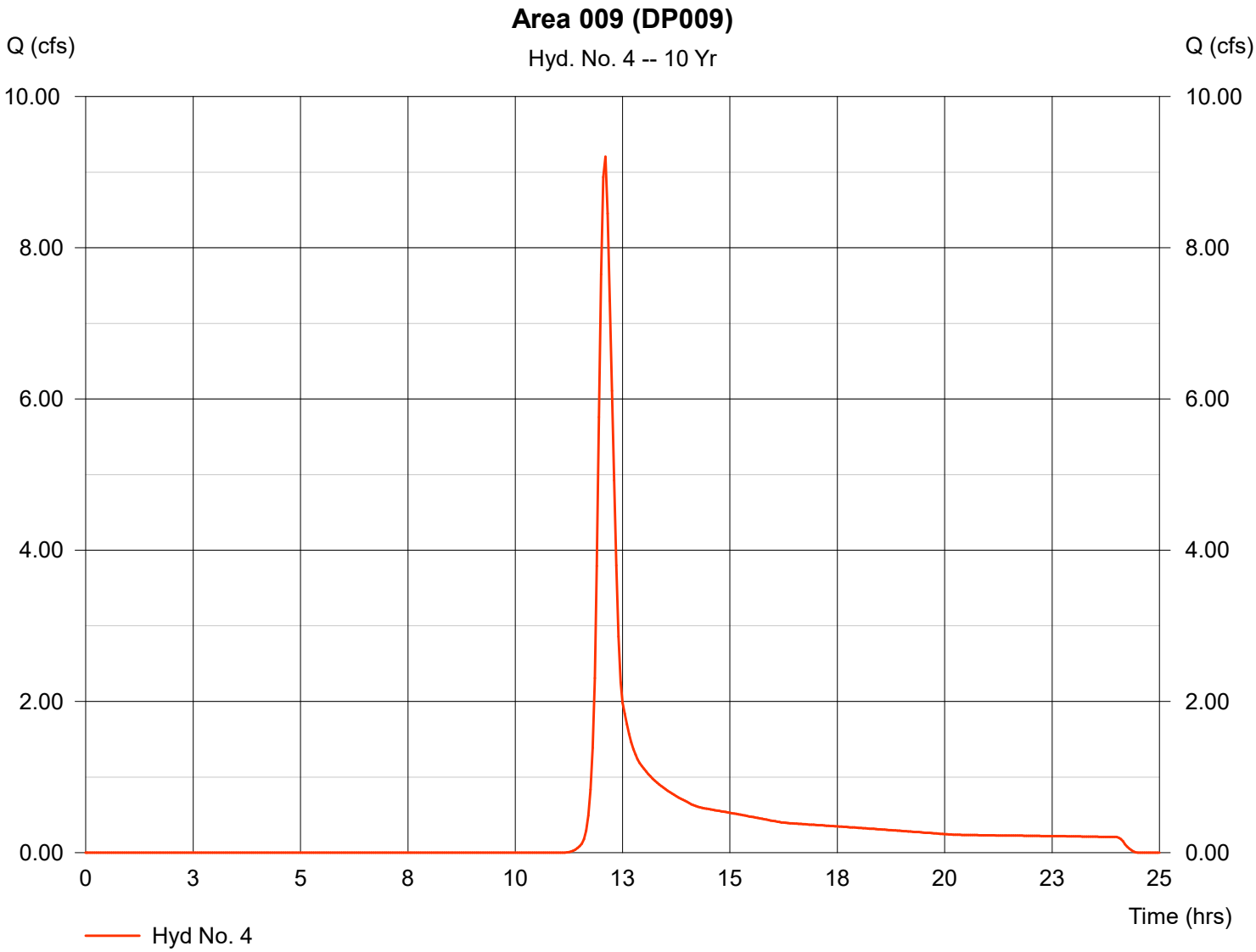
Hydraflow Hydrographs by Intelisolve | Friday, Sep 8 2023, 4:18 PM

Hyd. No. 4

Area 009 (DP009)

Hydrograph type	= SCS Runoff	Peak discharge	= 9.21 cfs
Storm frequency	= 10 yrs	Time interval	= 3 min
Drainage area	= 6.240 ac	Curve number	= 64
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 19.10 min
Total precip.	= 4.64 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 31,576 cuft



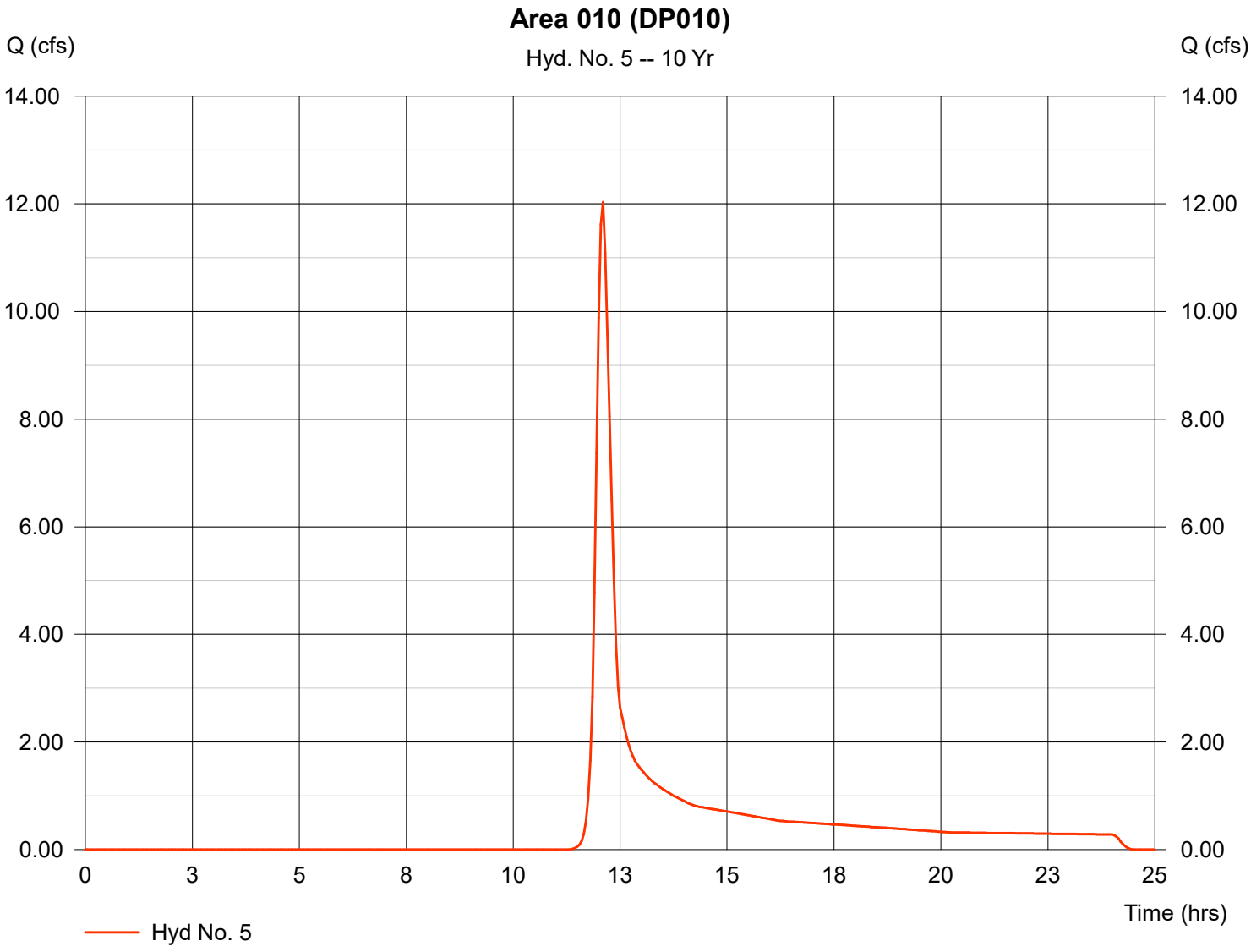
Hydrograph Plot

Hyd. No. 5

Area 010 (DP010)

Hydrograph type	= SCS Runoff	Peak discharge	= 12.03 cfs
Storm frequency	= 10 yrs	Time interval	= 3 min
Drainage area	= 8.670 ac	Curve number	= 63
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 19.70 min
Total precip.	= 4.64 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 41,737 cuft



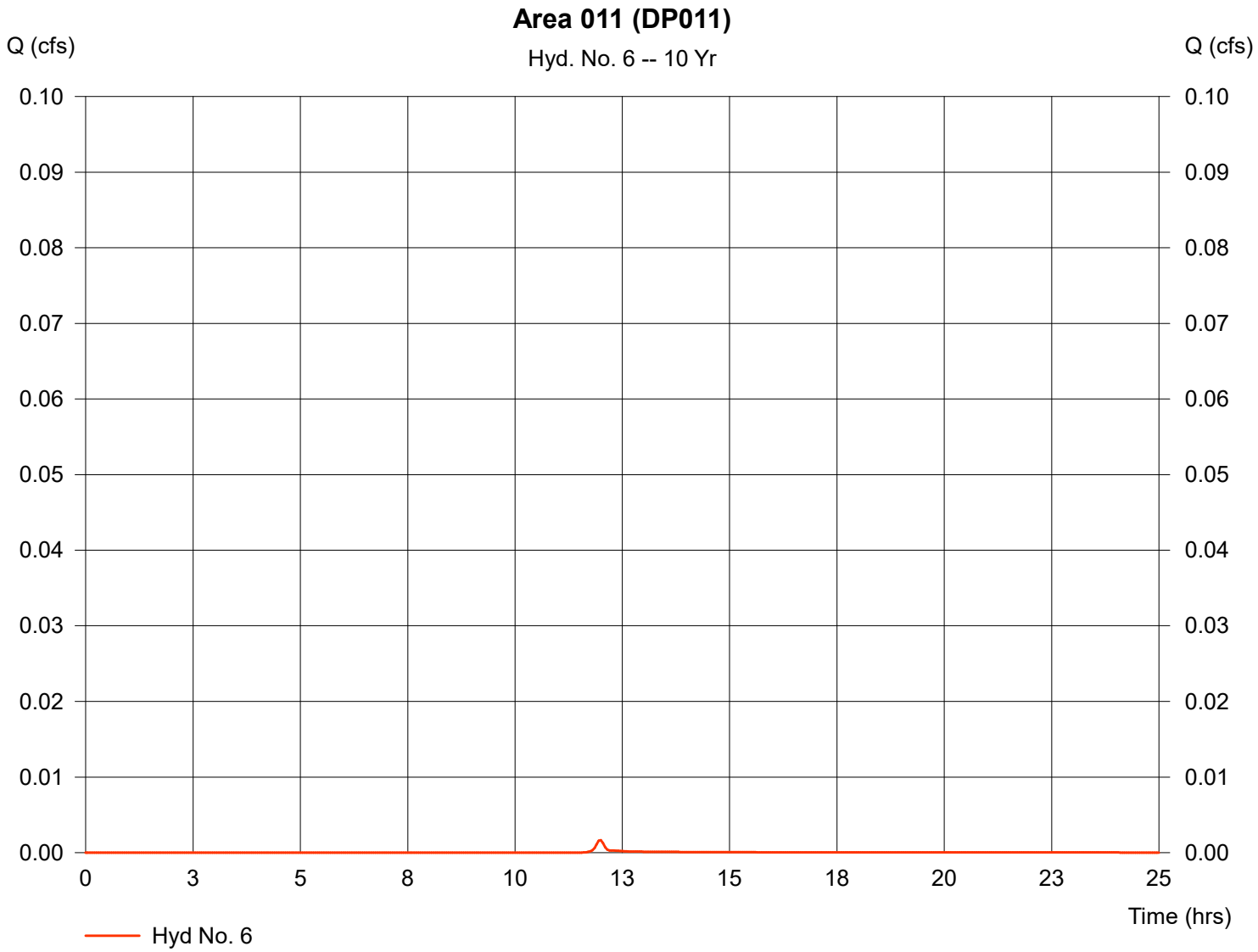
Hydrograph Plot

Hyd. No. 6

Area 011 (DP011)

Hydrograph type	= SCS Runoff	Peak discharge	= 0.00 cfs
Storm frequency	= 10 yrs	Time interval	= 3 min
Drainage area	= 0.001 ac	Curve number	= 61
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 5.00 min
Total precip.	= 4.64 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 4 cuft



Hydrograph Plot

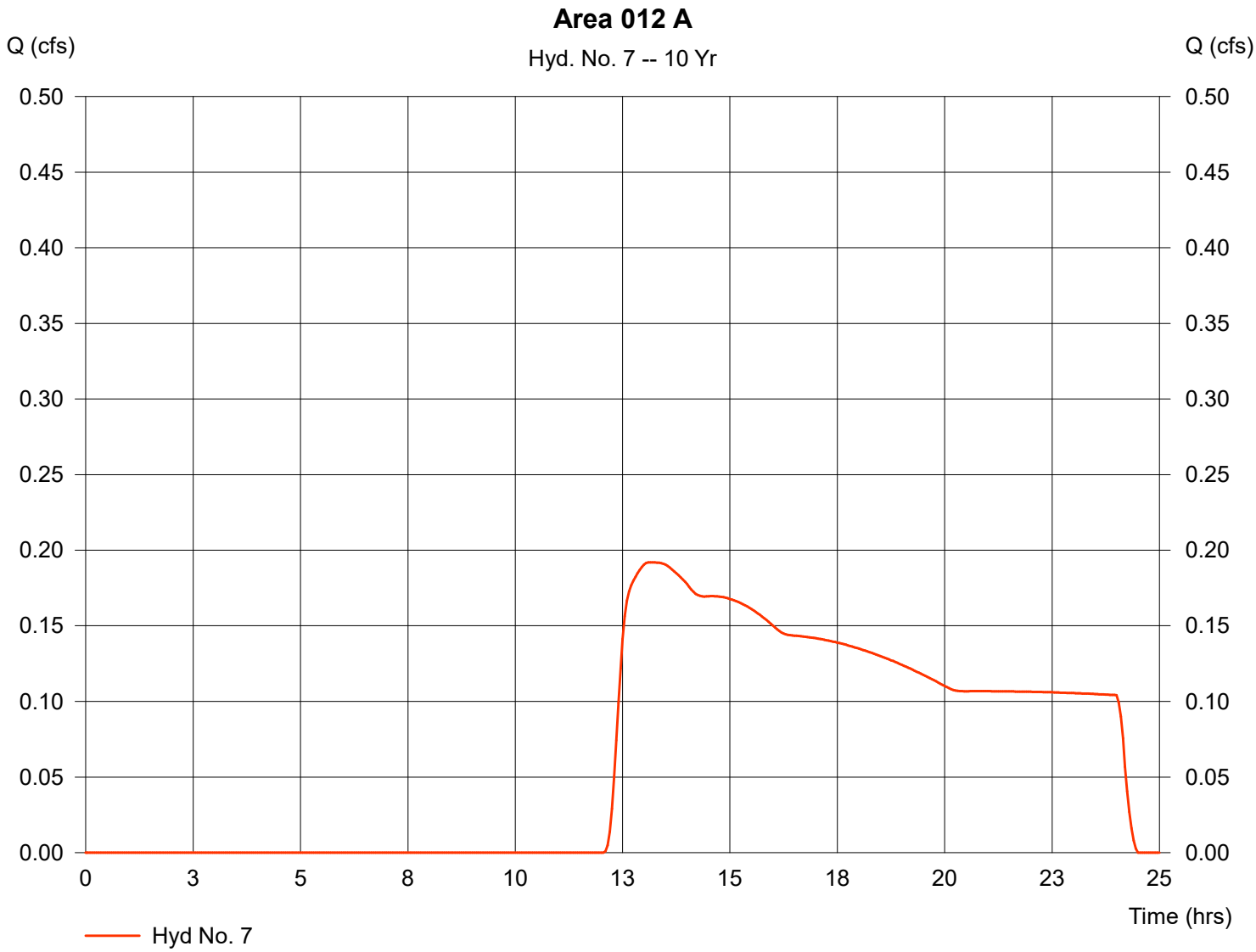
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Hyd. No. 7

Area 012 A

Hydrograph type	= SCS Runoff	Peak discharge	= 0.19 cfs
Storm frequency	= 10 yrs	Time interval	= 3 min
Drainage area	= 11.610 ac	Curve number	= 39
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 15.10 min
Total precip.	= 4.64 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 5,791 cuft



Hydrograph Plot

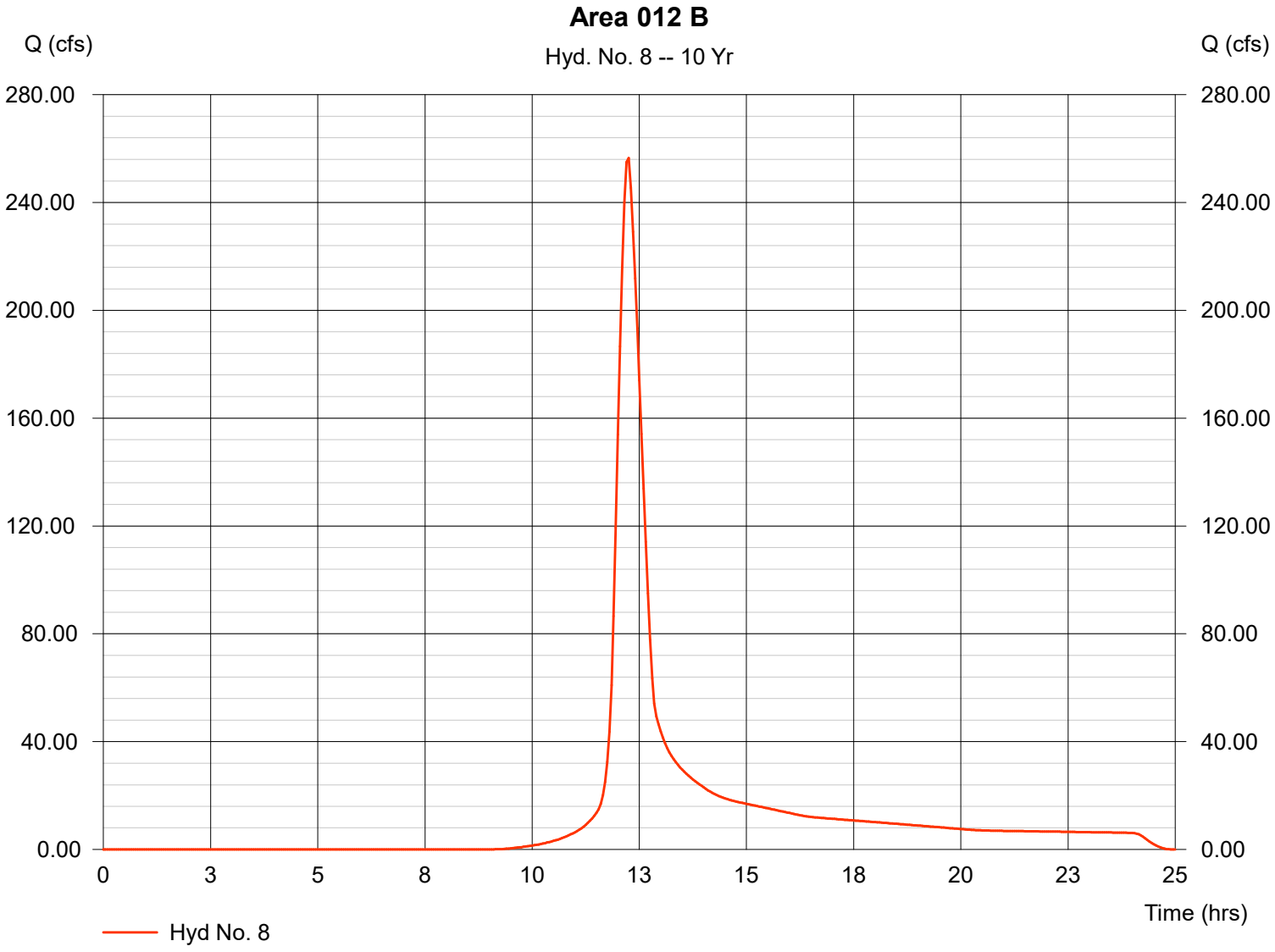
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Hyd. No. 8

Area 012 B

Hydrograph type	= SCS Runoff	Peak discharge	= 256.46 cfs
Storm frequency	= 10 yrs	Time interval	= 3 min
Drainage area	= 146.030 ac	Curve number	= 75
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 32.20 min
Total precip.	= 4.64 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 1,165,806 cuft



Hydrograph Plot

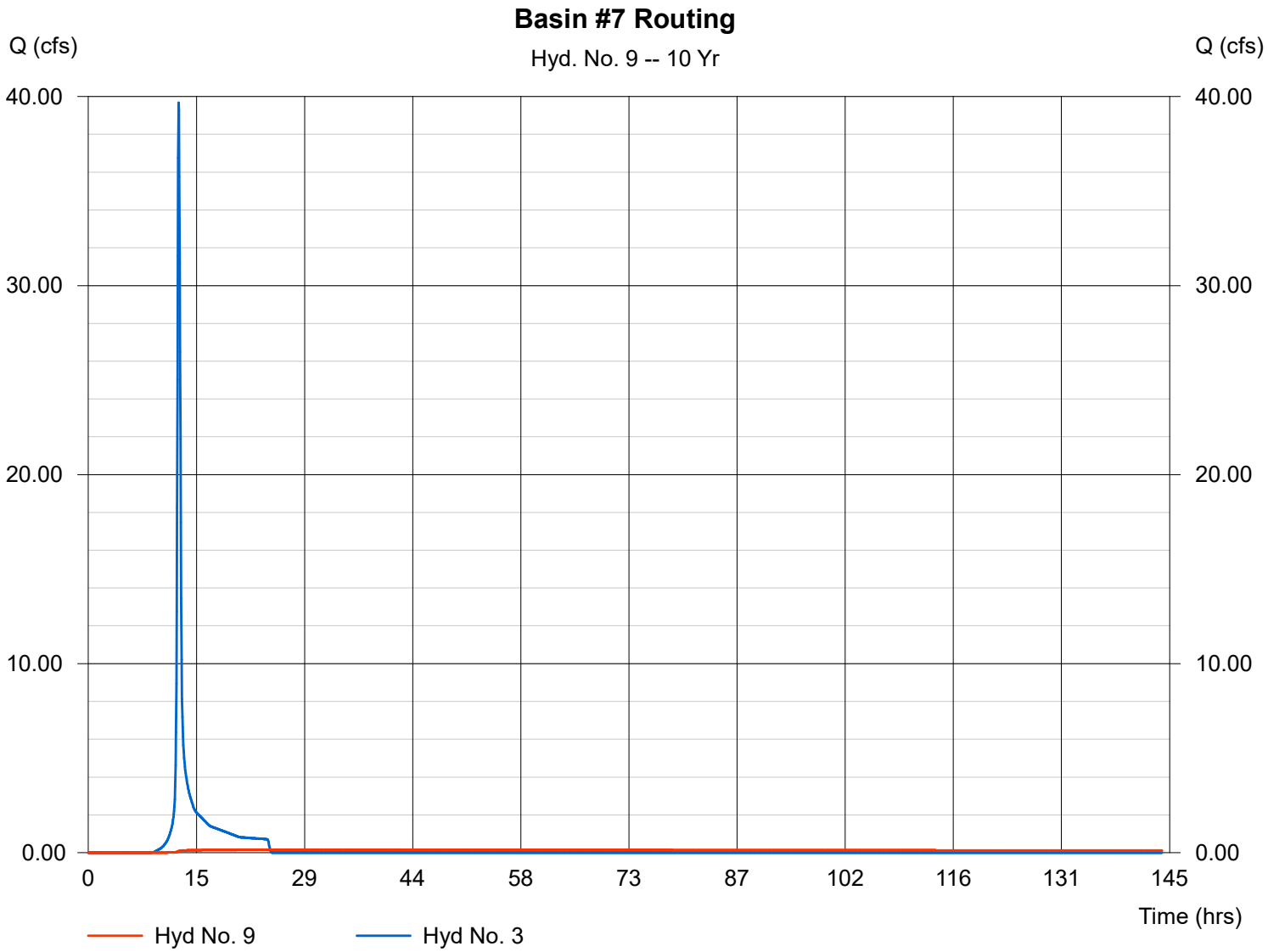
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Hyd. No. 9

Basin #7 Routing

Hydrograph type	=	Reservoir	Peak discharge	=	0.15 cfs
Storm frequency	=	10 yrs	Time interval	=	3 min
Inflow hyd. No.	=	3	Max. Elevation	=	682.25 ft
Reservoir name	=	Detention Basin #7	Max. Storage	=	133,660 cuft

Storage Indication method used. | Hydrograph Volume = 64,629 cuft



Pond Report

Pond No. 1 - Detention Basin #7

Pond Data

Pond storage is based on known contour areas. Average end area method used.

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	680.00	56,628	0	0
2.00	682.00	60,984	117,612	117,612
4.00	684.00	65,340	126,324	243,936
6.00	686.00	74,052	139,392	383,328

Culvert / Orifice Structures

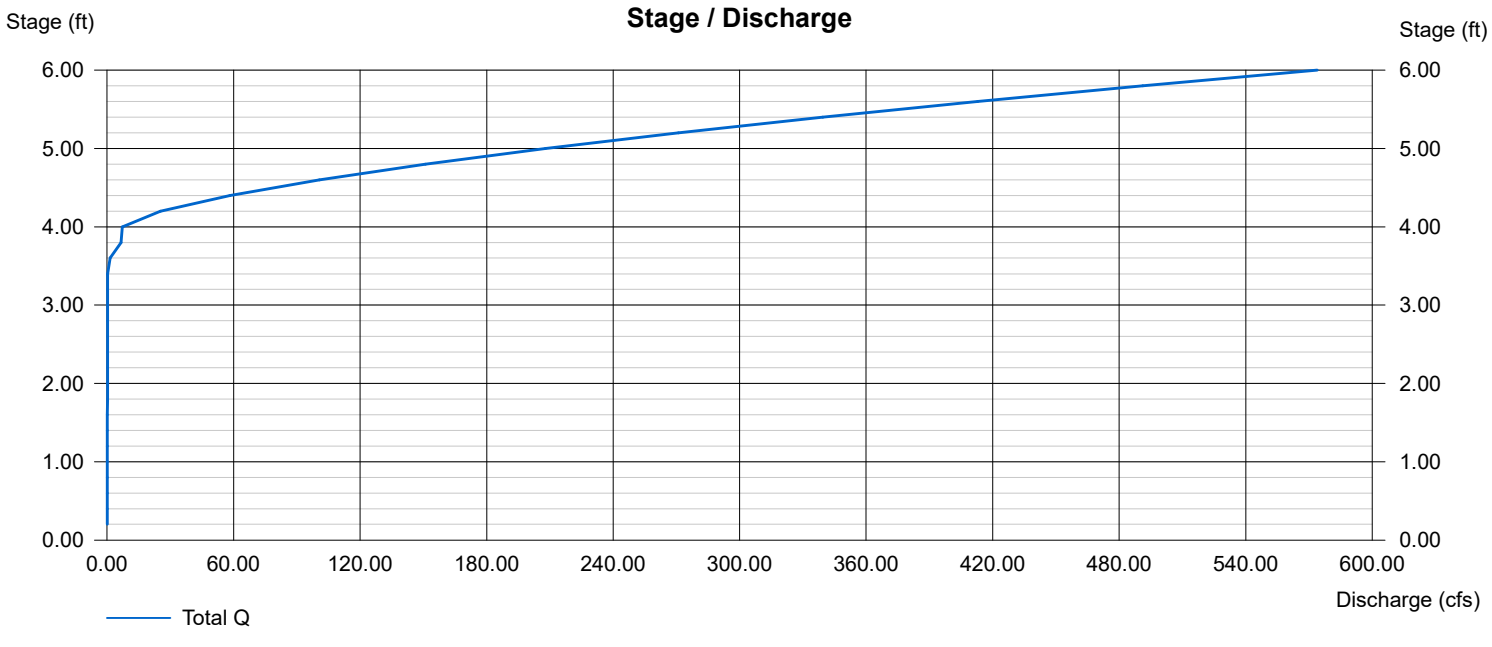
	[A]	[B]	[C]	[D]
Rise (in)	= 12.00	2.00	0.00	0.00
Span (in)	= 12.00	2.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 679.50	680.00	0.00	0.00
Length (ft)	= 48.00	0.00	0.00	0.00
Slope (%)	= 1.04	0.00	0.00	0.00
N-Value	= .013	.013	.000	.000
Orif. Coeff.	= 0.60	0.60	0.00	0.00
Multi-Stage	= n/a	Yes	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 12.00	60.00	0.00	0.00
Crest El. (ft)	= 683.50	684.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	0.00	0.00
Weir Type	= Riser	Ciplti	---	---
Multi-Stage	= Yes	No	No	No

Exfiltration = 0.000 in/hr (Contour) Tailwater Elev. = 0.00 ft

Note: Culvert/Orifice outflows have been analyzed under inlet and outlet control.



Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

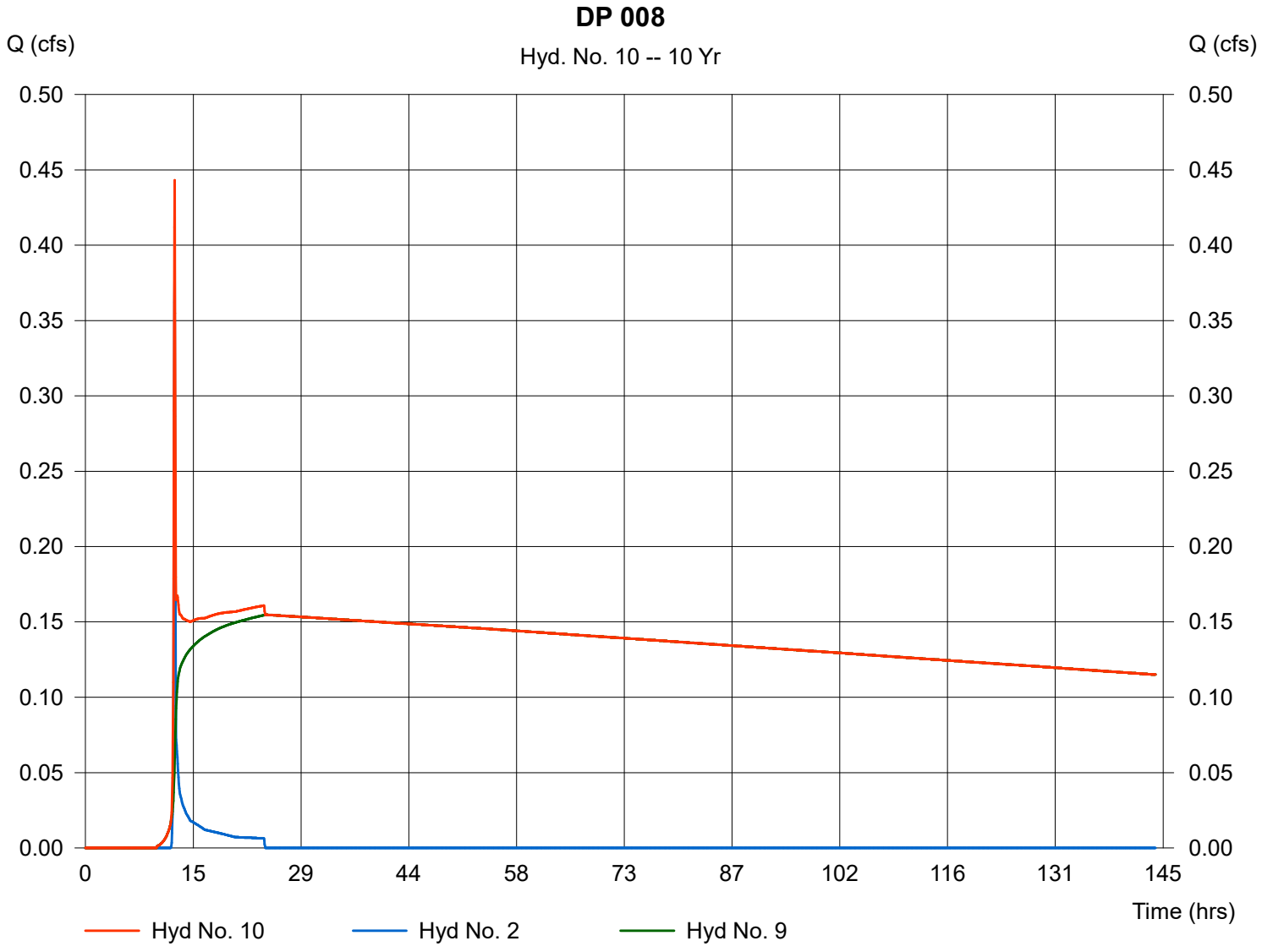
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Hyd. No. 10

DP 008

Hydrograph type	=	Combine	Peak discharge	=	0.44 cfs
Storm frequency	=	10 yrs	Time interval	=	3 min
Inflow hyds.	=	2, 9			

Hydrograph Volume = 65,535 cuft



Hydrograph Plot

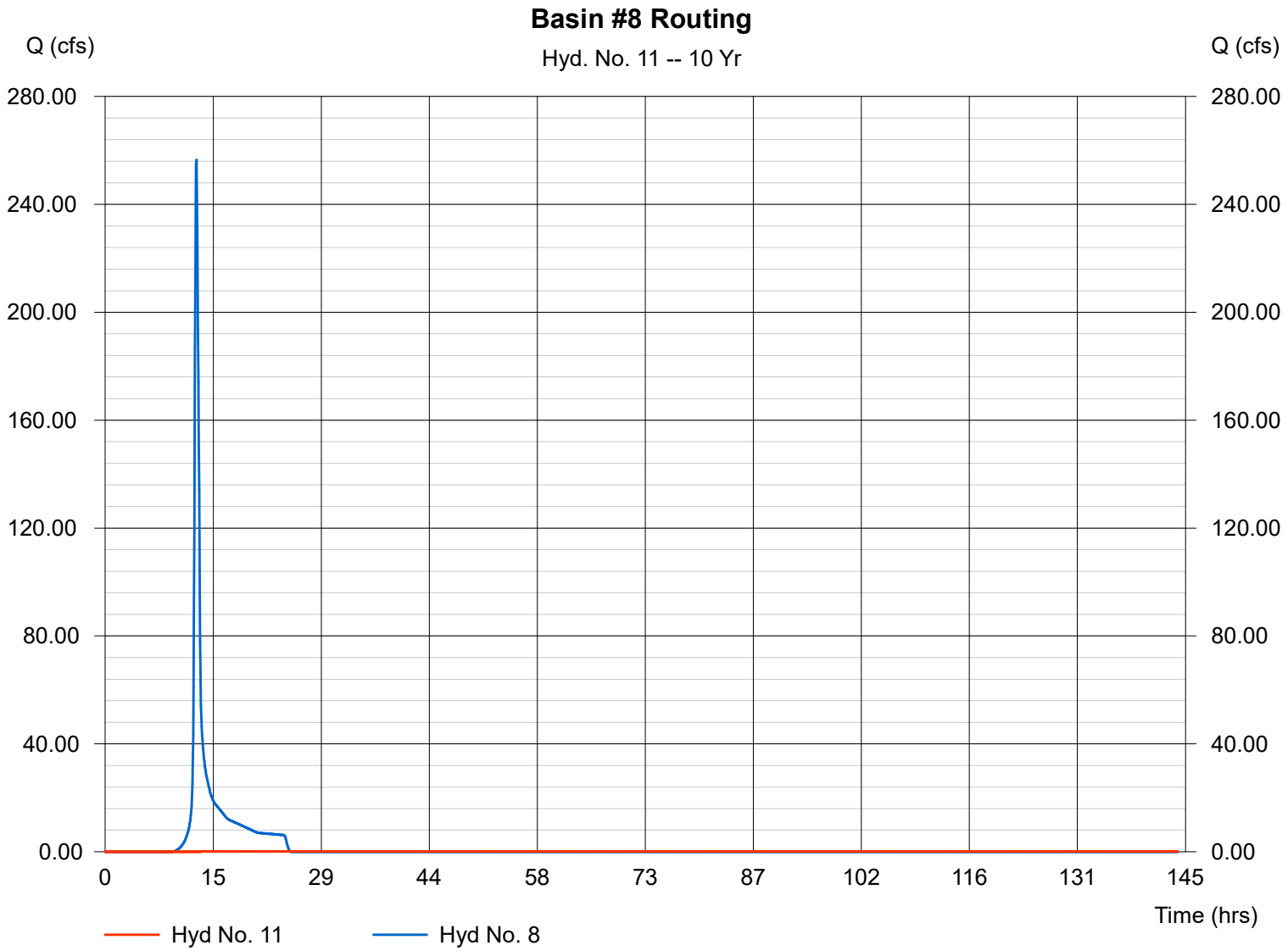
Hydraflow Hydrographs by Intelisolve | Friday, Sep 8 2023, 4:18 PM

Hyd. No. 11

Basin #8 Routing

Hydrograph type	=	Reservoir	Peak discharge	=	0.06 cfs
Storm frequency	=	10 yrs	Time interval	=	3 min
Inflow hyd. No.	=	8	Max. Elevation	=	329.33 ft
Reservoir name	=	Detention Basin #8	Max. Storage	=	1,163,399 cuft

Storage Indication method used. | Hydrograph Volume = 28,115 cuft



Pond Report

Pond No. 2 - Detention Basin #8

Pond Data

Pond storage is based on known contour areas. Average end area method used.

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	322.00	147,153	0	0
2.00	324.00	153,295	300,448	300,448
4.00	326.00	159,553	312,848	613,296
6.00	328.00	165,929	325,482	938,778
8.00	330.00	172,418	338,347	1,277,125
10.00	332.00	179,015	351,433	1,628,558
12.00	334.00	185,718	364,733	1,993,291
14.00	336.00	192,475	378,193	2,371,484

Culvert / Orifice Structures

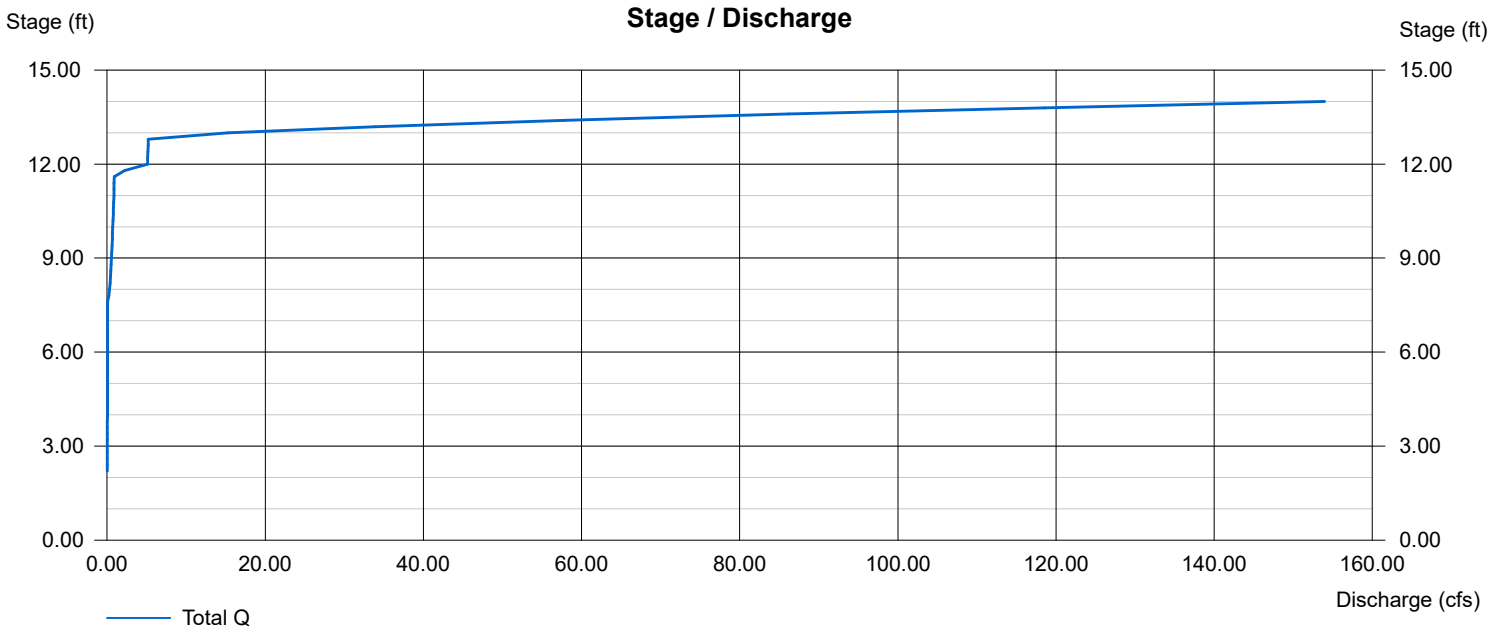
	[A]	[B]	[C]	[D]
Rise (in)	= 8.00	1.00	4.00	0.00
Span (in)	= 8.00	1.00	4.00	0.00
No. Barrels	= 1	1	1	0
Invert El. (ft)	= 320.00	324.00	329.50	0.00
Length (ft)	= 75.00	0.00	0.00	0.00
Slope (%)	= 6.67	0.00	0.00	0.00
N-Value	= .013	.013	.013	.000
Orif. Coeff.	= 0.60	0.60	0.60	0.00
Multi-Stage	= n/a	Yes	Yes	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 12.00	34.00	0.00	0.00
Crest El. (ft)	= 333.70	334.80	0.00	0.00
Weir Coeff.	= 3.33	3.33	0.00	0.00
Weir Type	= Riser	Ciplti	---	---
Multi-Stage	= Yes	No	No	No

Exfiltration = 0.000 in/hr (Contour) Tailwater Elev. = 0.00 ft

Note: Culvert/Orifice outflows have been analyzed under inlet and outlet control.



Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

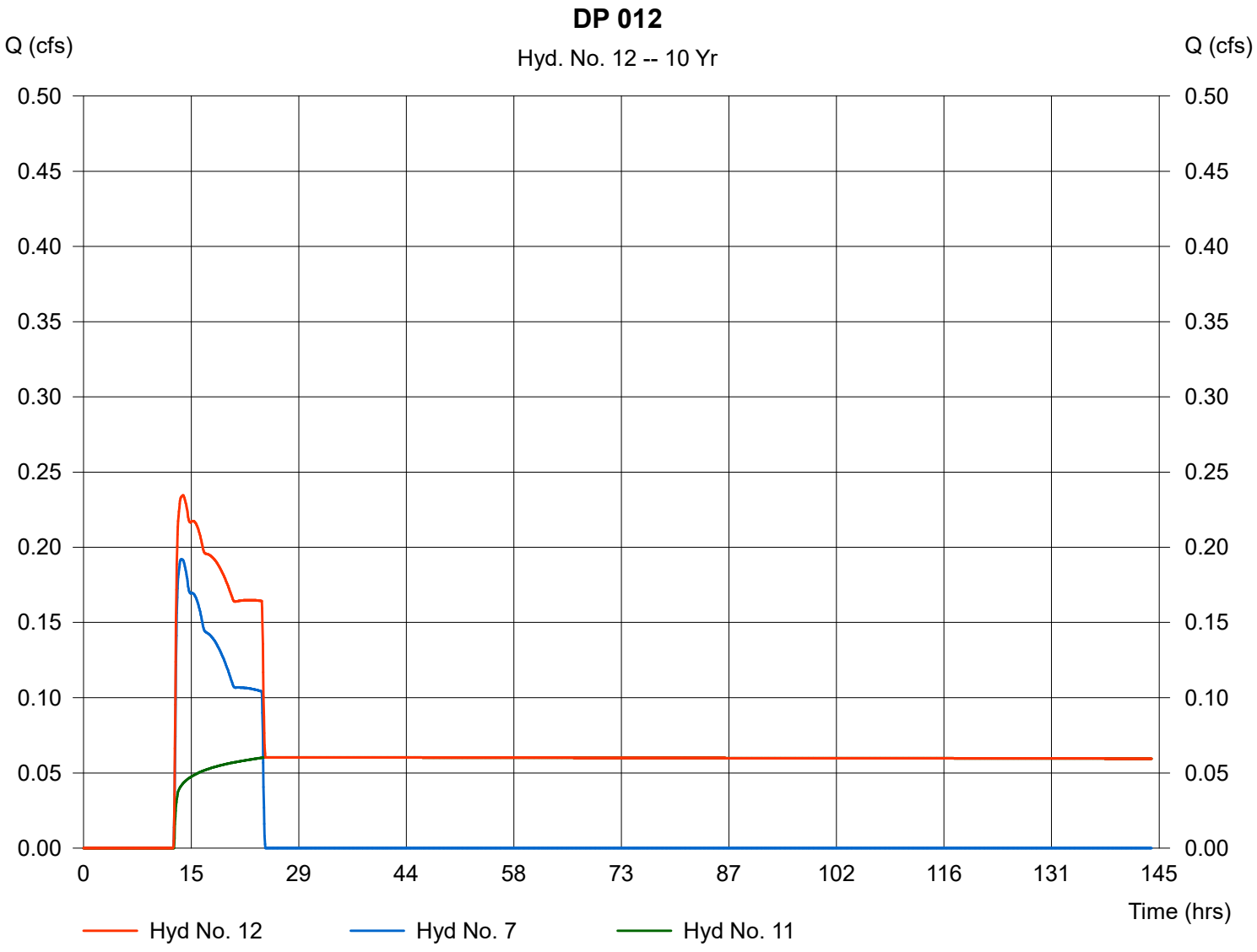
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Hyd. No. 12

DP 012

Hydrograph type	= Combine	Peak discharge	= 0.23 cfs
Storm frequency	= 10 yrs	Time interval	= 3 min
Inflow hyds.	= 7, 11		

Hydrograph Volume = 33,906 cuft



Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

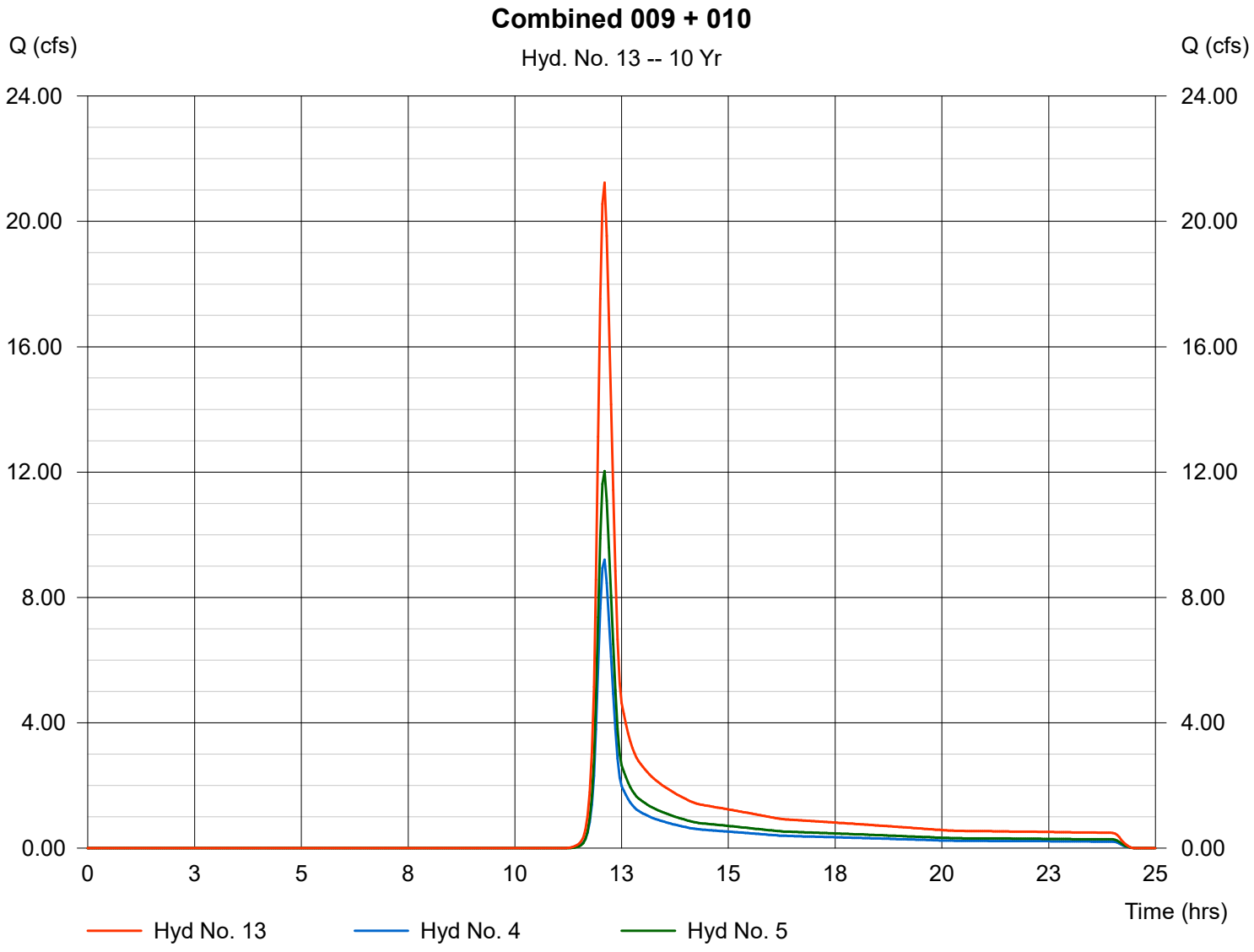
Friday, Sep 8 2023, 4:18 PM

Hyd. No. 13

Combined 009 + 010

Hydrograph type	= Combine	Peak discharge	= 21.23 cfs
Storm frequency	= 10 yrs	Time interval	= 3 min
Inflow hyds.	= 4, 5		

Hydrograph Volume = 73,313 cuft



Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

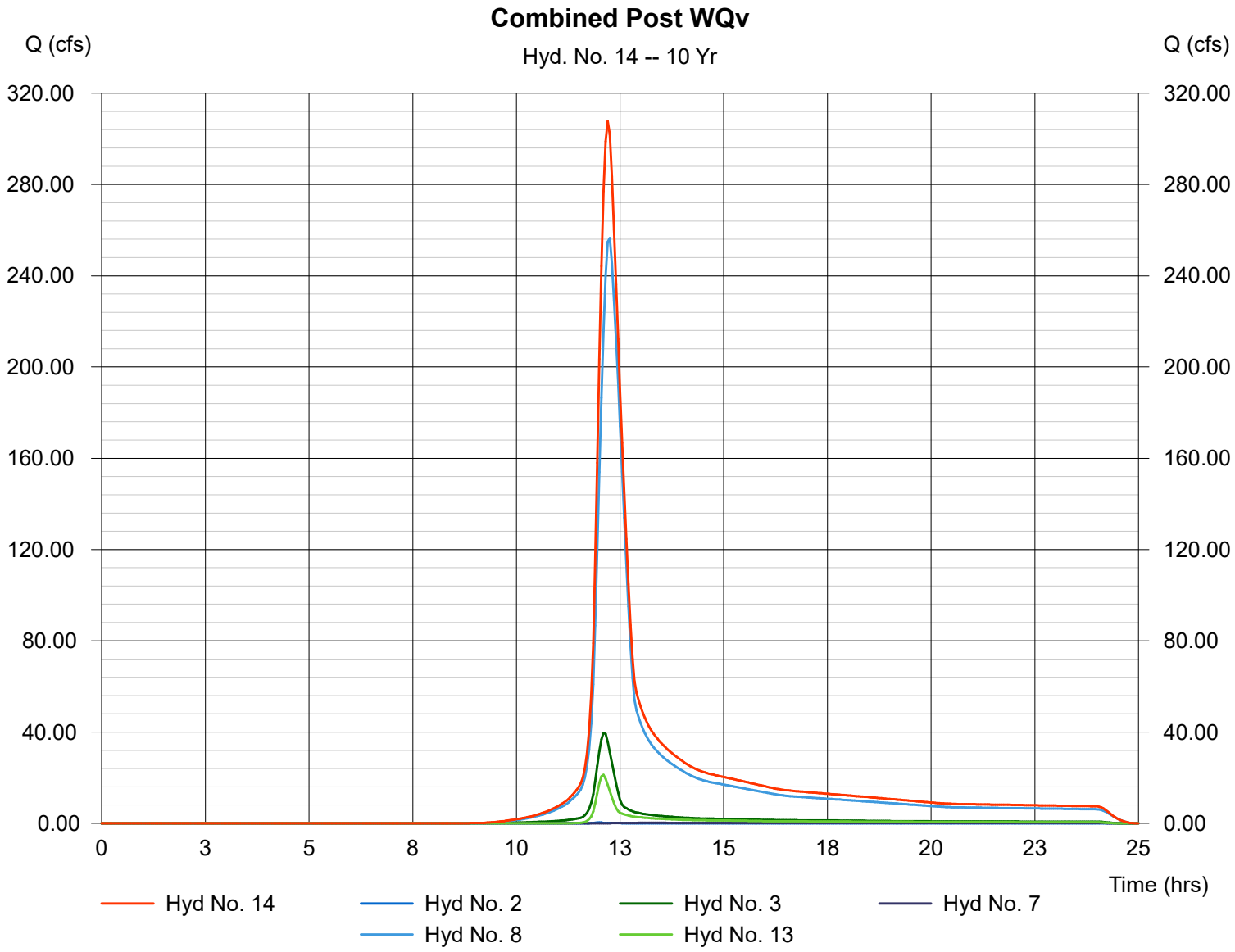
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Hyd. No. 14

Combined Post WQv

Hydrograph type	=	Combine	Peak discharge	=	307.68 cfs
Storm frequency	=	10 yrs	Time interval	=	3 min
Inflow hyds.	=	2, 3, 7, 8, 13			

Hydrograph Volume = 1,385,941 cuft



Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
1	SCS Runoff	0.00	3	720	6	----	------	------	Area 007 (DP 007)
2	SCS Runoff	0.60	3	720	1,374	----	------	------	Area 008 A
3	SCS Runoff	54.04	3	726	189,833	----	------	------	Area 008 B
4	SCS Runoff	14.07	3	726	46,637	----	------	------	Area 009 (DP009)
5	SCS Runoff	18.64	3	726	62,158	----	------	------	Area 010 (DP010)
6	SCS Runoff	0.00	3	720	6	----	------	------	Area 011 (DP011)
7	SCS Runoff	1.23	3	735	14,871	----	------	------	Area 012 A
8	SCS Runoff	354.13	3	735	1,597,536	----	------	------	Area 012 B
9	Reservoir	0.18	3	1464	77,050	3	683.02	182,178	Basin #7 Routing
10	Combine	0.67	3	720	78,424	2, 9	------	------	DP 008
11	Reservoir	0.67	3	1482	253,848	8	331.72	1,579,048	Basin #8 Routing
12	Combine	1.25	3	735	268,719	7, 11	------	------	DP 012
13	Combine	32.72	3	726	108,795	4, 5,	------	------	Combined 009 + 010
14	Combine	428.66	3	732	1,912,410	2, 3, 7, 8, 13	------	------	Combined Post WQv

Hydrograph Plot

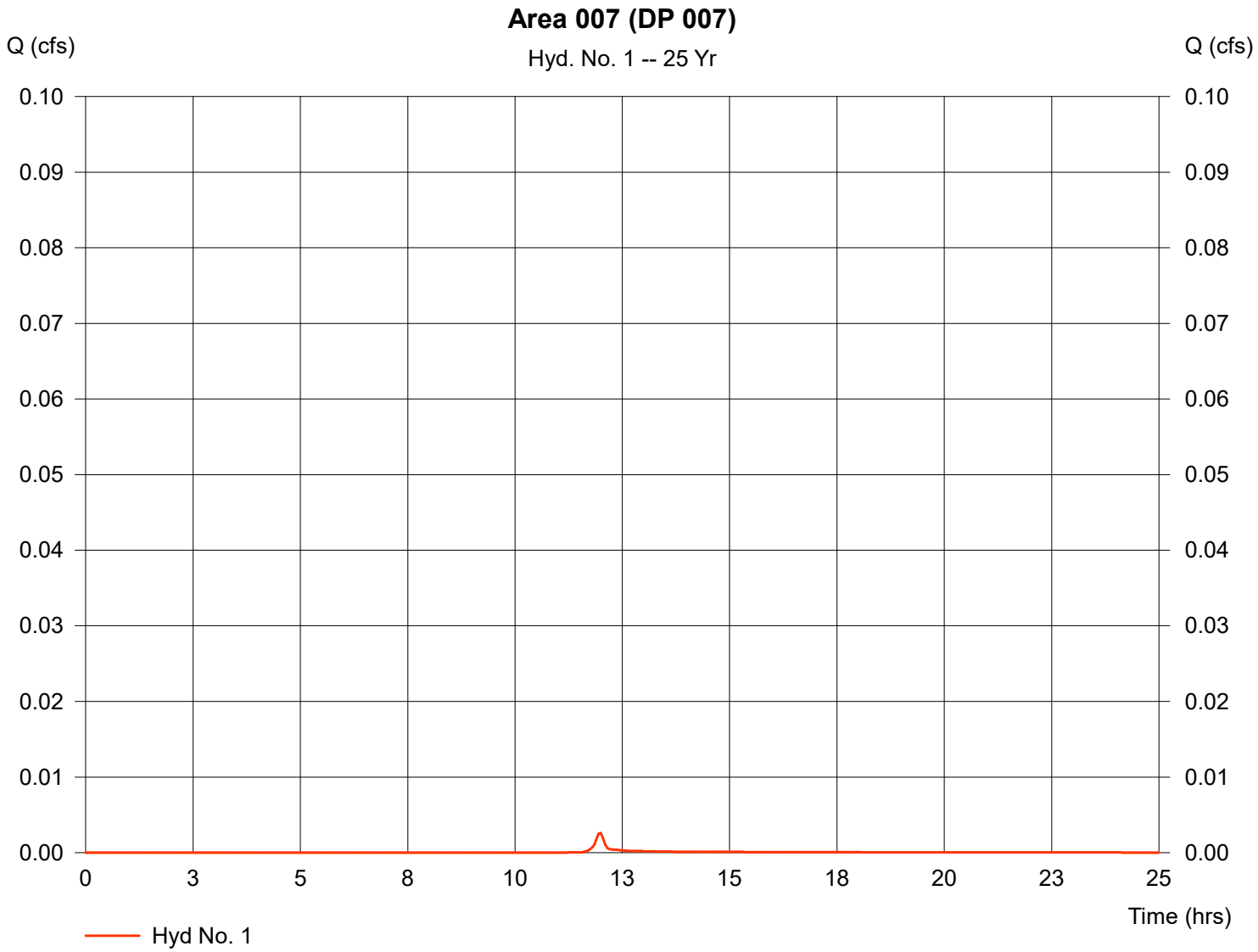
Hydraflow Hydrographs by Intelisolve | Friday, Sep 8 2023, 4:18 PM

Hyd. No. 1

Area 007 (DP 007)

Hydrograph type	= SCS Runoff	Peak discharge	= 0.00 cfs
Storm frequency	= 25 yrs	Time interval	= 3 min
Drainage area	= 0.001 ac	Curve number	= 61
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 5.00 min
Total precip.	= 5.62 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 6 cuft



Hydrograph Plot

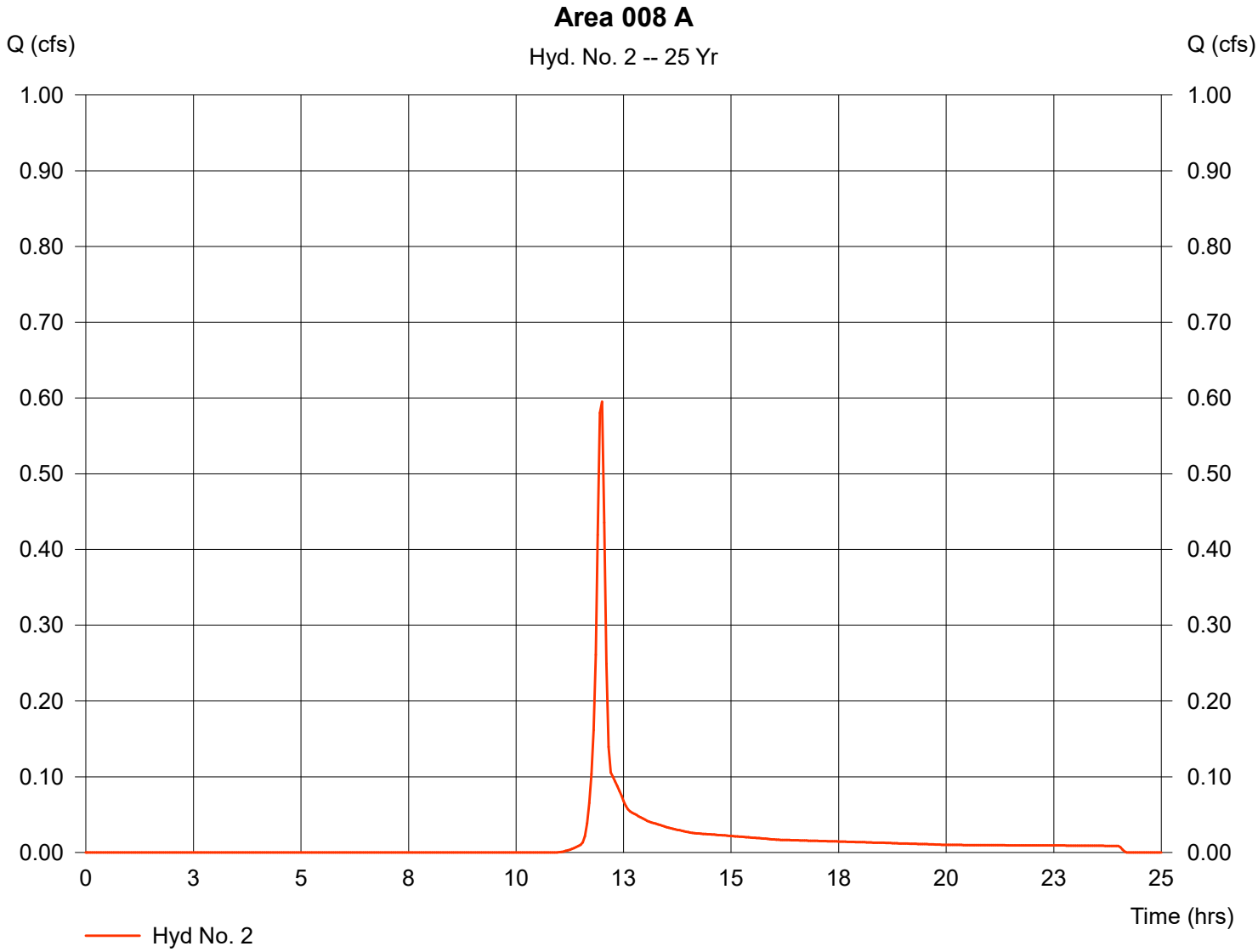
Hydraflow Hydrographs by Intelisolve | Friday, Sep 8 2023, 4:18 PM

Hyd. No. 2

Area 008 A

Hydrograph type	= SCS Runoff	Peak discharge	= 0.60 cfs
Storm frequency	= 25 yrs	Time interval	= 3 min
Drainage area	= 0.230 ac	Curve number	= 61
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 5.00 min
Total precip.	= 5.62 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 1,374 cuft



Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

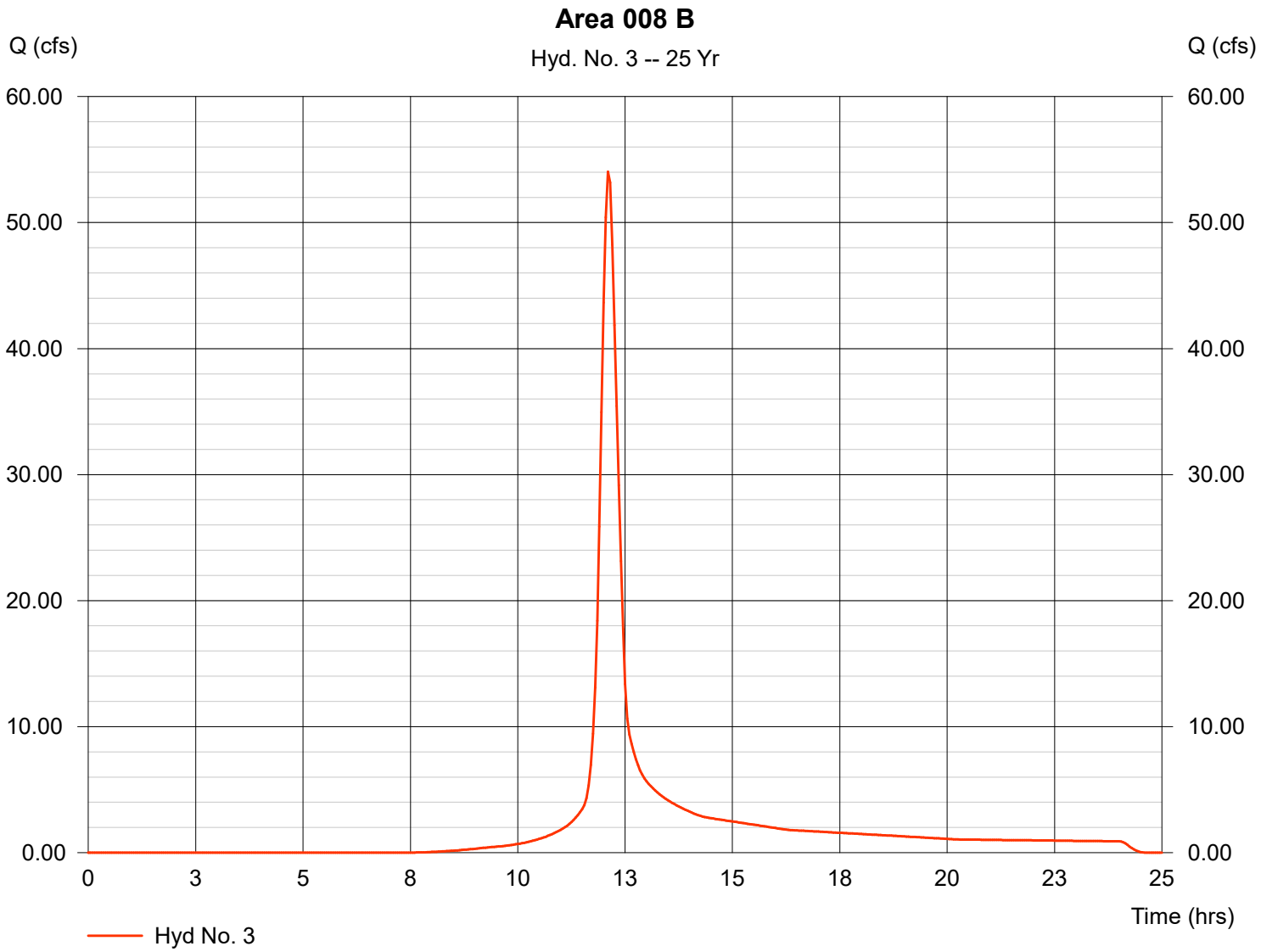
Friday, Sep 8 2023, 4:18 PM

Hyd. No. 3

Area 008 B

Hydrograph type	= SCS Runoff	Peak discharge	= 54.04 cfs
Storm frequency	= 25 yrs	Time interval	= 3 min
Drainage area	= 17.030 ac	Curve number	= 77
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 21.40 min
Total precip.	= 5.62 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 189,833 cuft



Hydrograph Plot

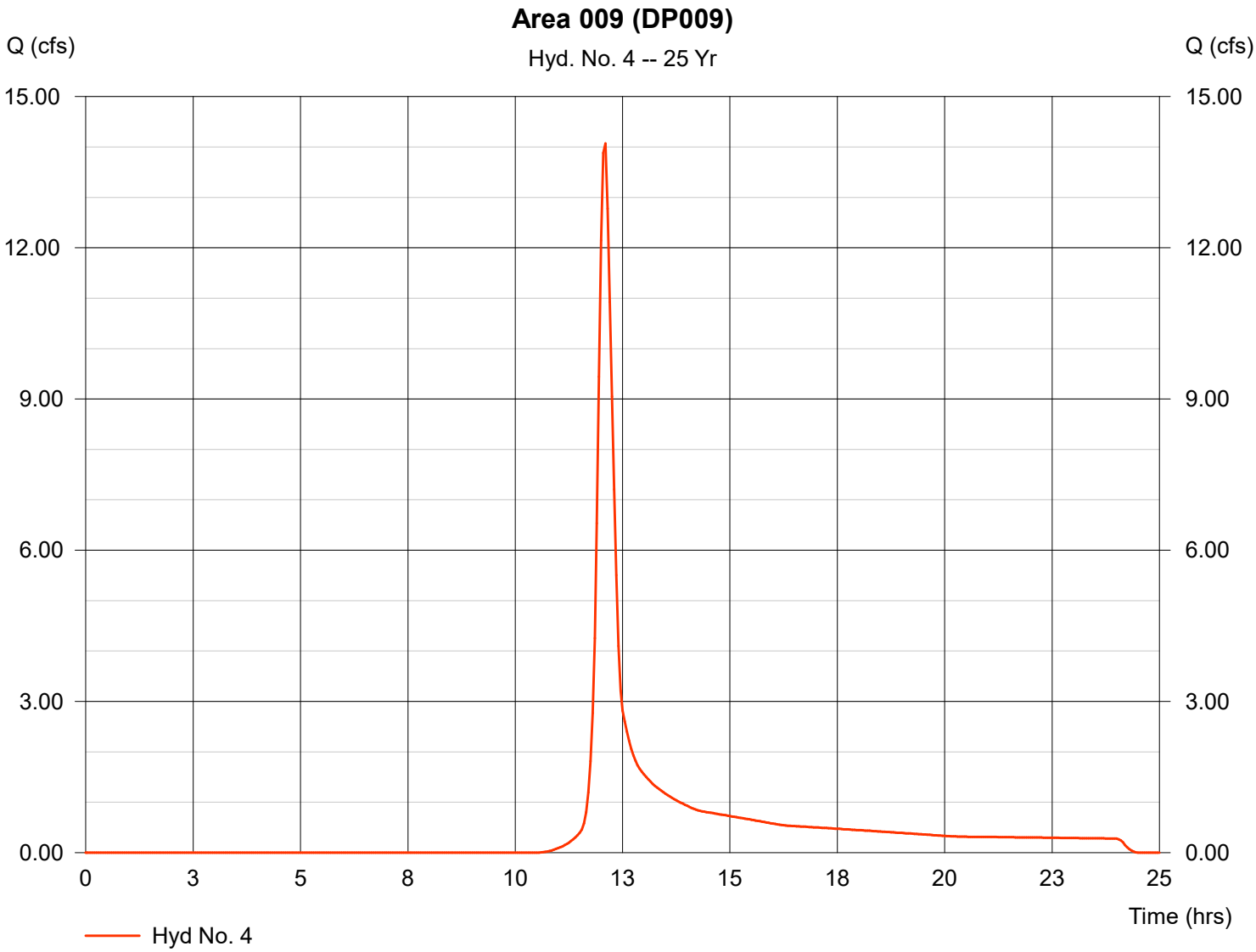
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Hyd. No. 4

Area 009 (DP009)

Hydrograph type	= SCS Runoff	Peak discharge	= 14.07 cfs
Storm frequency	= 25 yrs	Time interval	= 3 min
Drainage area	= 6.240 ac	Curve number	= 64
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 19.10 min
Total precip.	= 5.62 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 46,637 cuft



Hydrograph Plot

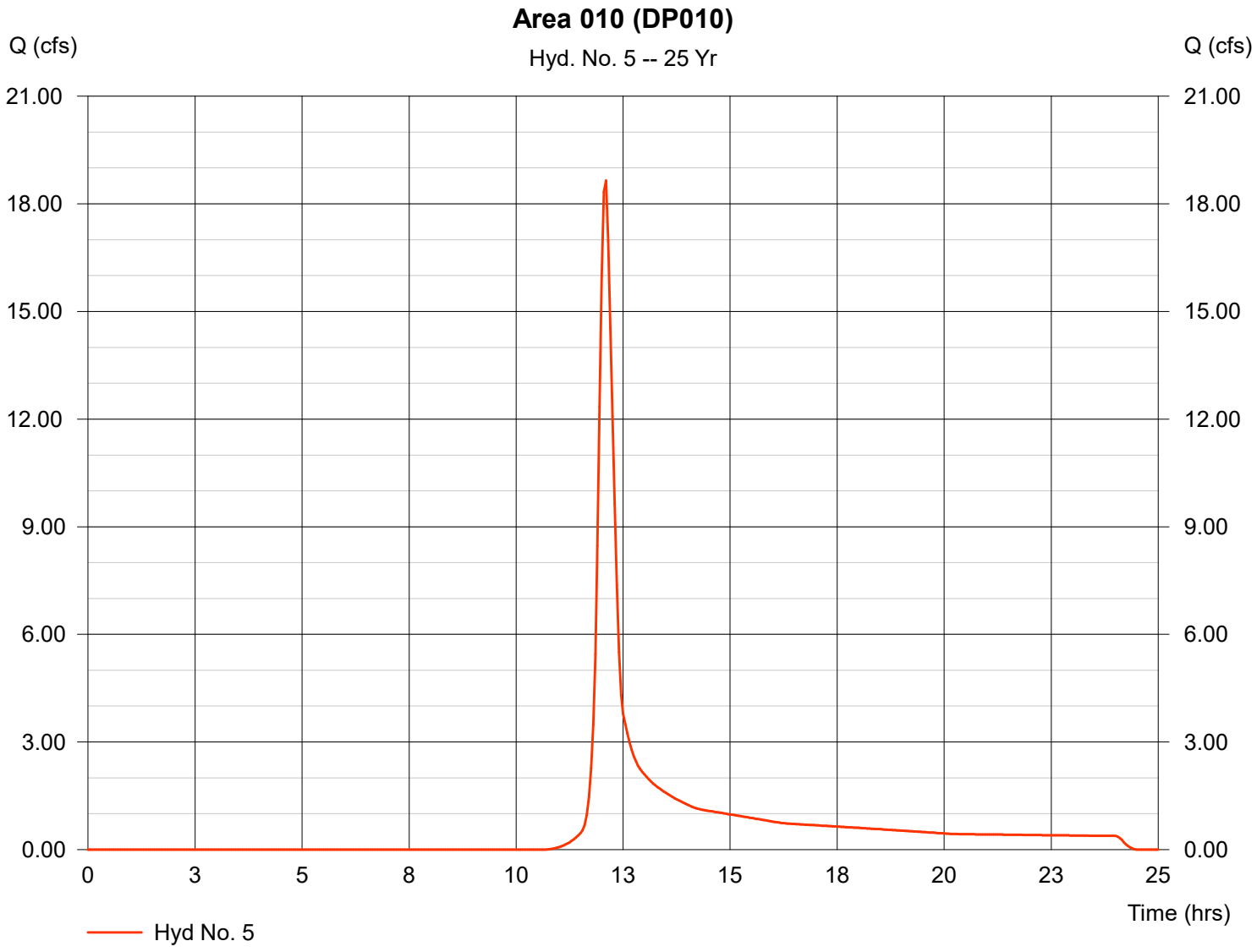
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Hyd. No. 5

Area 010 (DP010)

Hydrograph type	= SCS Runoff	Peak discharge	= 18.64 cfs
Storm frequency	= 25 yrs	Time interval	= 3 min
Drainage area	= 8.670 ac	Curve number	= 63
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 19.70 min
Total precip.	= 5.62 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 62,158 cuft



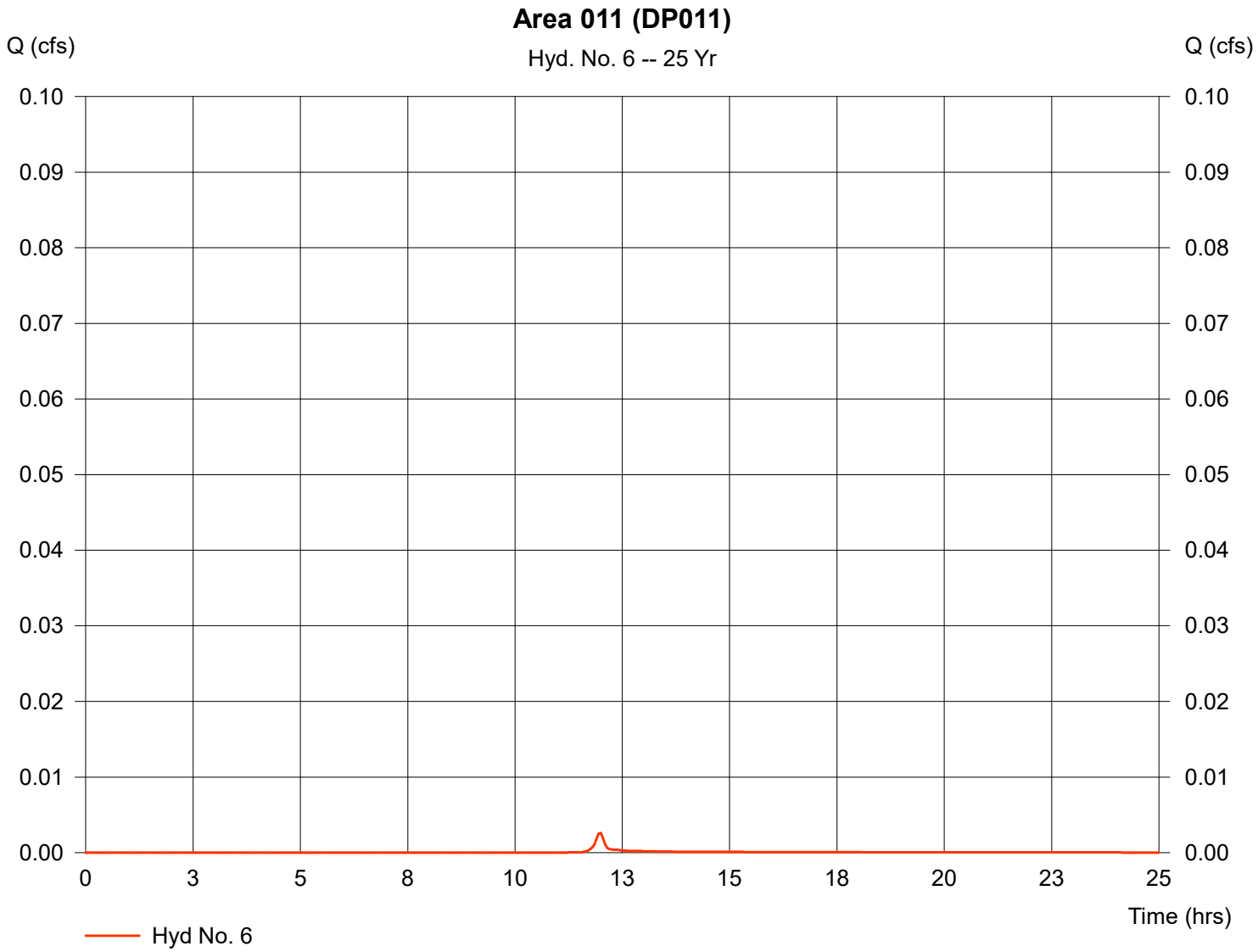
Hydrograph Plot

Hyd. No. 6

Area 011 (DP011)

Hydrograph type	= SCS Runoff	Peak discharge	= 0.00 cfs
Storm frequency	= 25 yrs	Time interval	= 3 min
Drainage area	= 0.001 ac	Curve number	= 61
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 5.00 min
Total precip.	= 5.62 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 6 cuft



Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

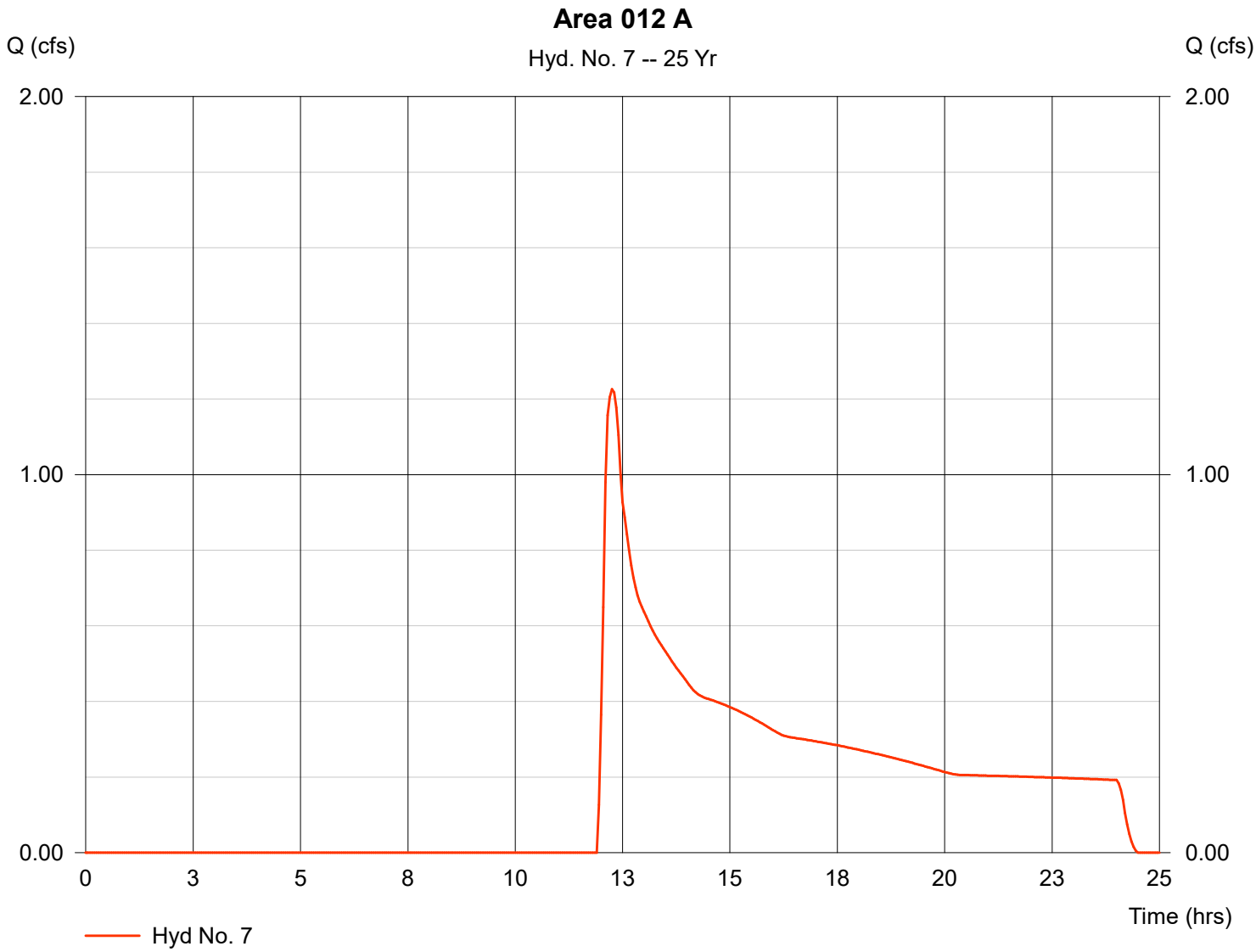
Friday, Sep 8 2023, 4:18 PM

Hyd. No. 7

Area 012 A

Hydrograph type	= SCS Runoff	Peak discharge	= 1.23 cfs
Storm frequency	= 25 yrs	Time interval	= 3 min
Drainage area	= 11.610 ac	Curve number	= 39
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 15.10 min
Total precip.	= 5.62 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 14,871 cuft



Hydrograph Plot

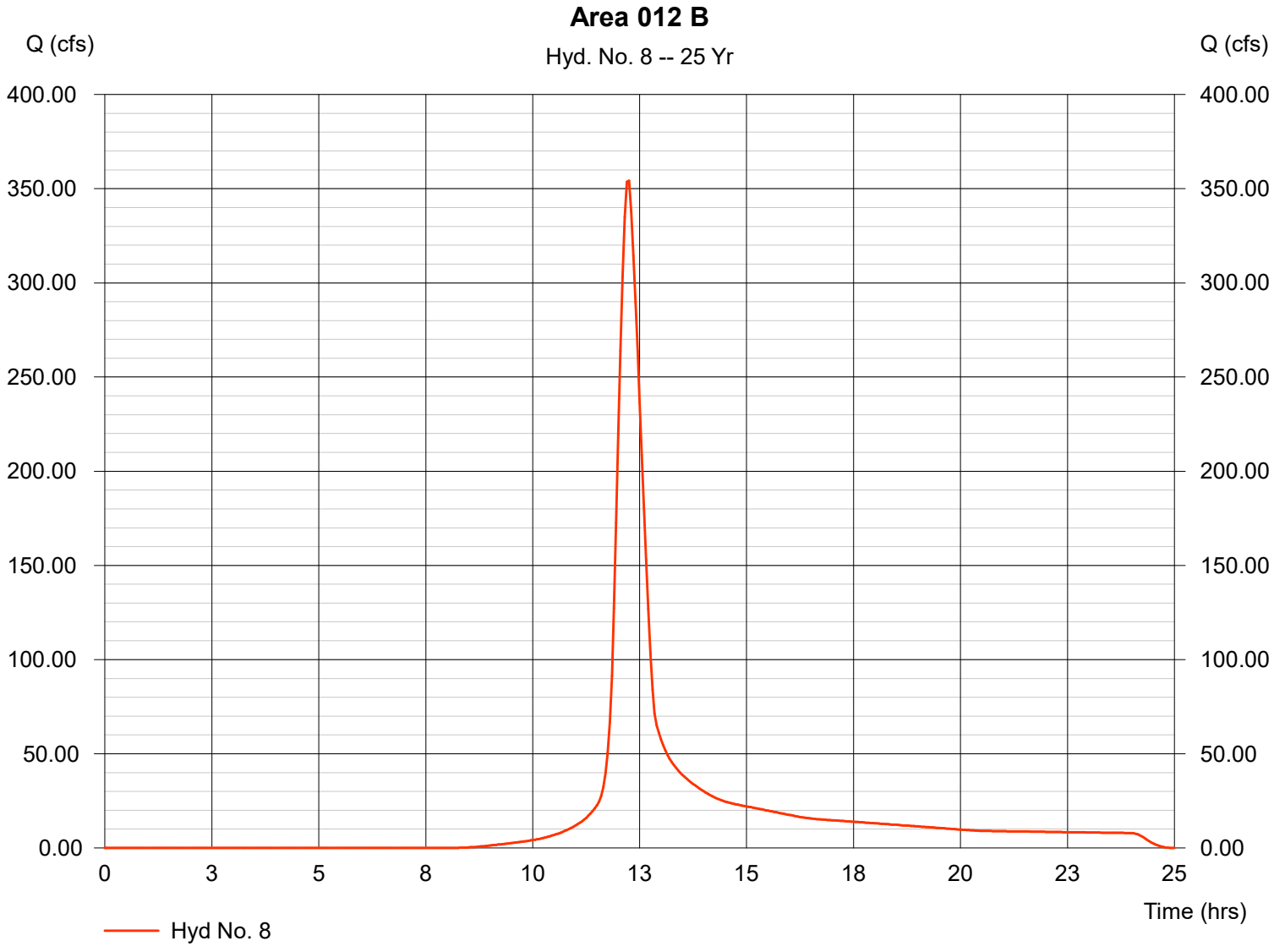
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Hyd. No. 8

Area 012 B

Hydrograph type	= SCS Runoff	Peak discharge	= 354.13 cfs
Storm frequency	= 25 yrs	Time interval	= 3 min
Drainage area	= 146.030 ac	Curve number	= 75
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 32.20 min
Total precip.	= 5.62 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 1,597,536 cuft



Hydrograph Plot

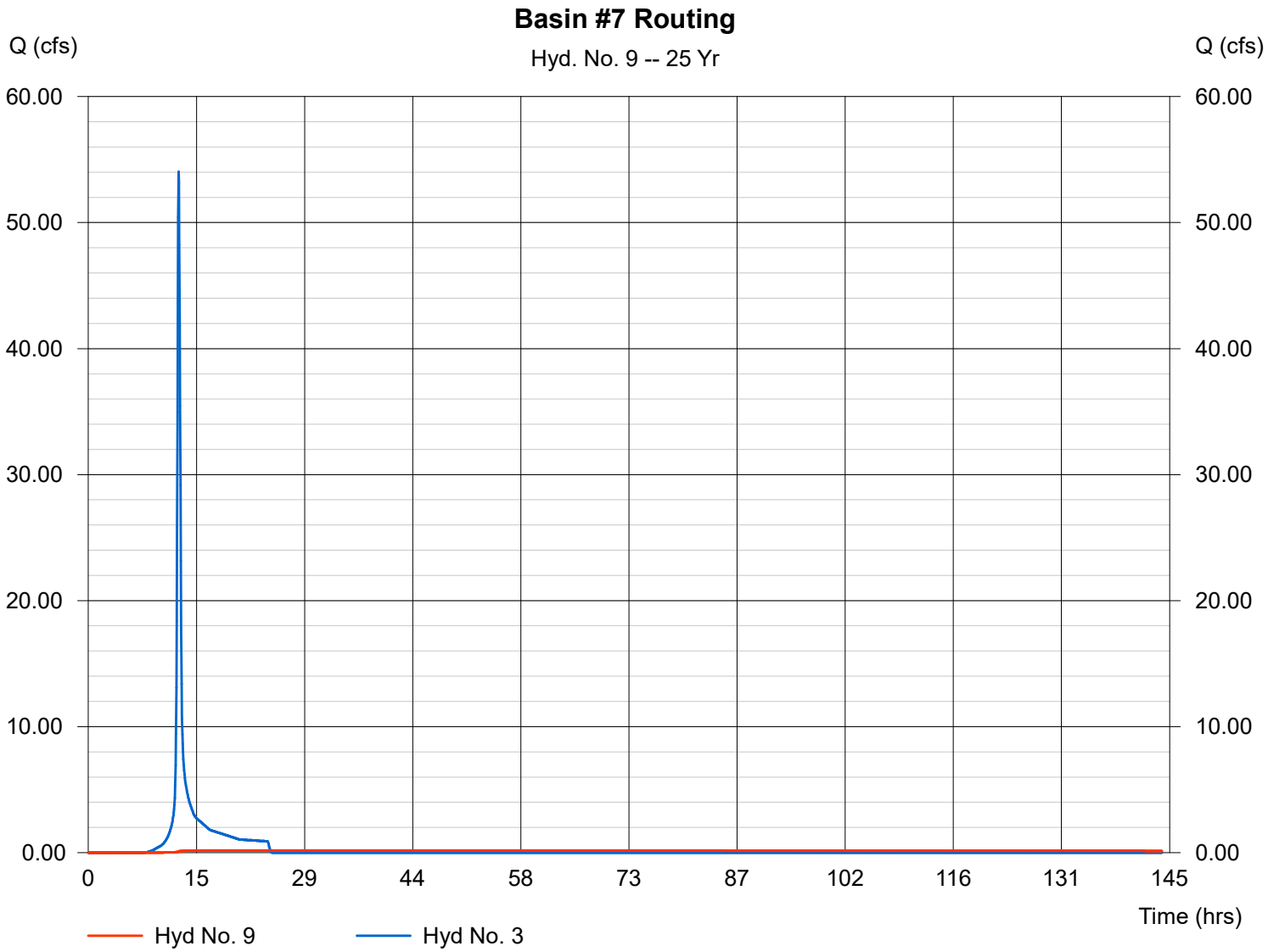
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Hyd. No. 9

Basin #7 Routing

Hydrograph type	=	Reservoir	Peak discharge	=	0.18 cfs
Storm frequency	=	25 yrs	Time interval	=	3 min
Inflow hyd. No.	=	3	Max. Elevation	=	683.02 ft
Reservoir name	=	Detention Basin #7	Max. Storage	=	182,178 cuft

Storage Indication method used. | Hydrograph Volume = 77,050 cuft



Pond Report

Pond No. 1 - Detention Basin #7

Pond Data

Pond storage is based on known contour areas. Average end area method used.

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	680.00	56,628	0	0
2.00	682.00	60,984	117,612	117,612
4.00	684.00	65,340	126,324	243,936
6.00	686.00	74,052	139,392	383,328

Culvert / Orifice Structures

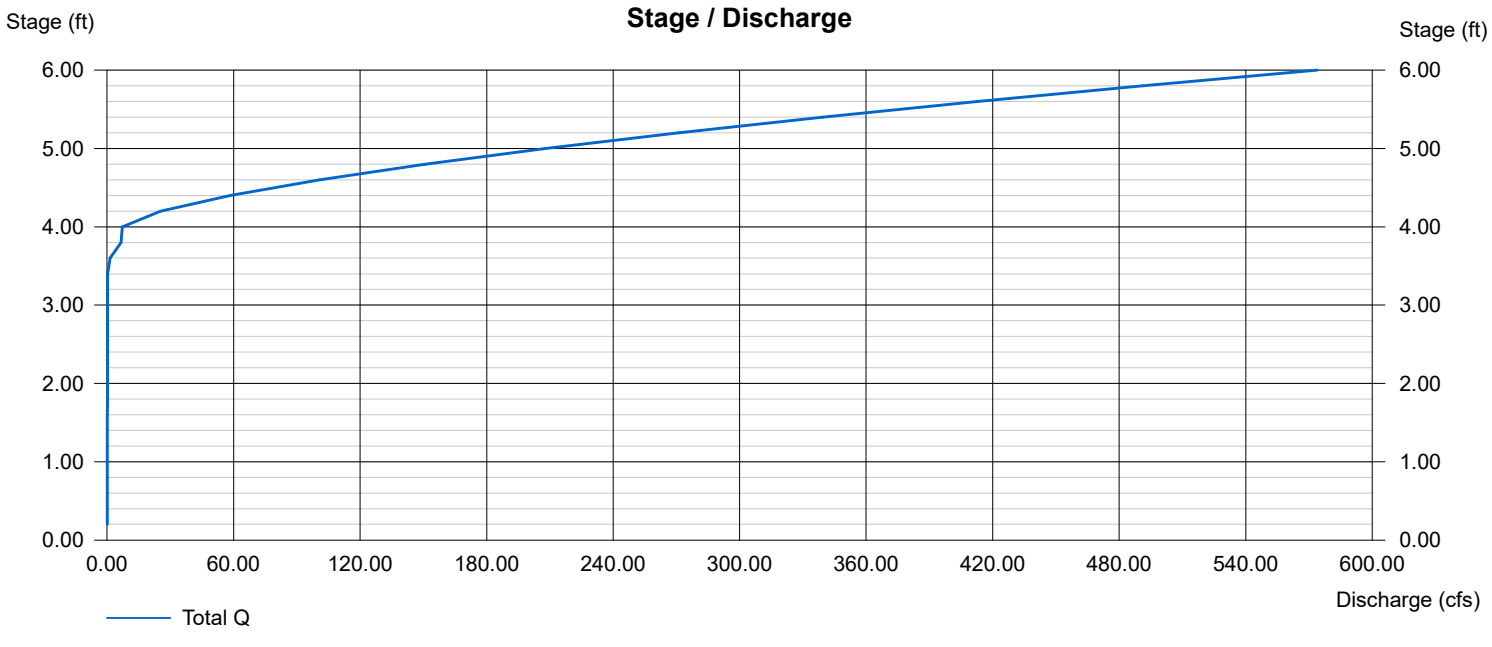
	[A]	[B]	[C]	[D]
Rise (in)	= 12.00	2.00	0.00	0.00
Span (in)	= 12.00	2.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 679.50	680.00	0.00	0.00
Length (ft)	= 48.00	0.00	0.00	0.00
Slope (%)	= 1.04	0.00	0.00	0.00
N-Value	= .013	.013	.000	.000
Orif. Coeff.	= 0.60	0.60	0.00	0.00
Multi-Stage	= n/a	Yes	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 12.00	60.00	0.00	0.00
Crest El. (ft)	= 683.50	684.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	0.00	0.00
Weir Type	= Riser	Ciplti	---	---
Multi-Stage	= Yes	No	No	No

Exfiltration = 0.000 in/hr (Contour) Tailwater Elev. = 0.00 ft

Note: Culvert/Orifice outflows have been analyzed under inlet and outlet control.



Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

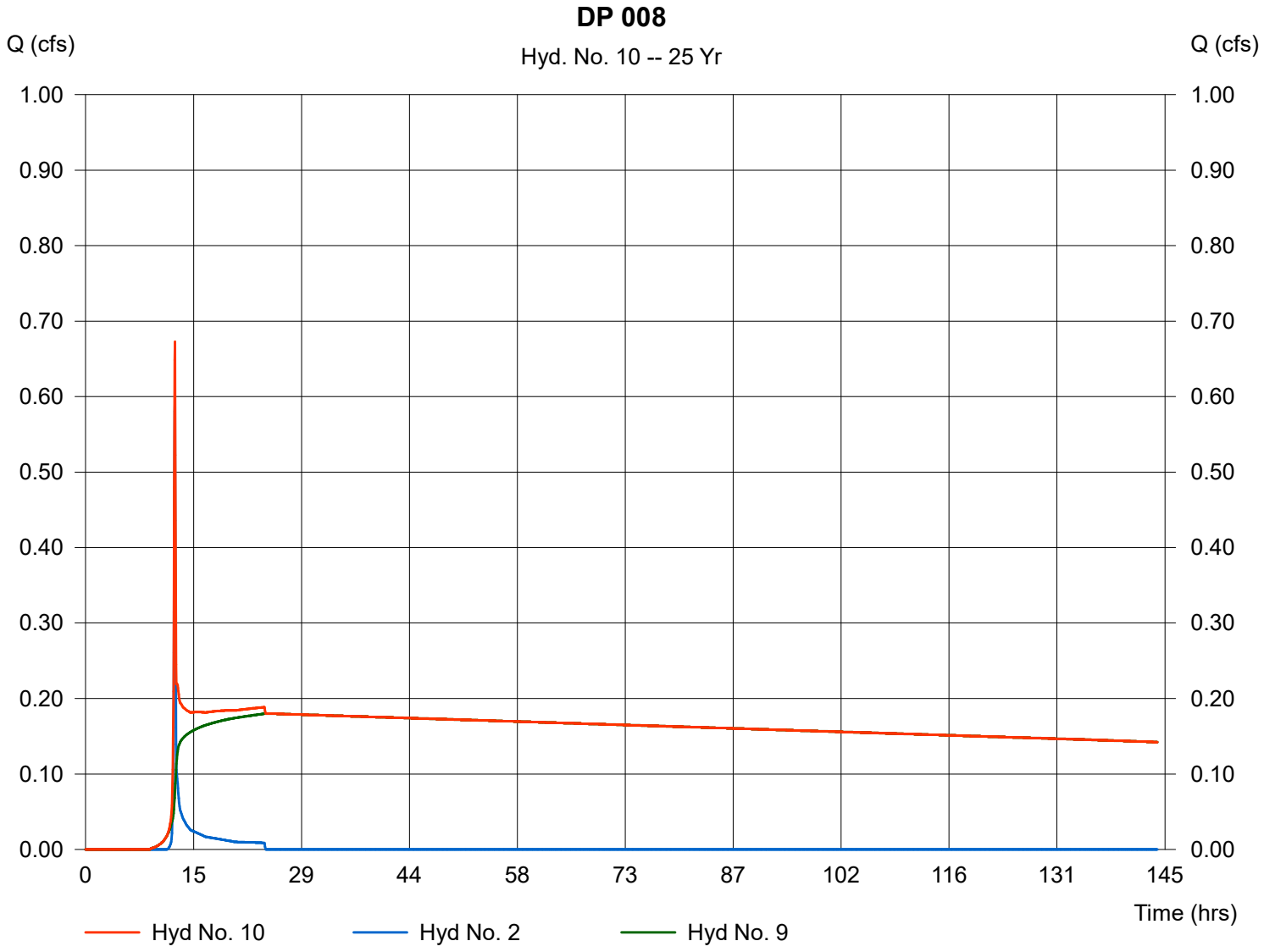
Friday, Sep 8 2023, 4:18 PM

Hyd. No. 10

DP 008

Hydrograph type	=	Combine	Peak discharge	=	0.67 cfs
Storm frequency	=	25 yrs	Time interval	=	3 min
Inflow hyds.	=	2, 9			

Hydrograph Volume = 78,424 cuft



Hydrograph Plot

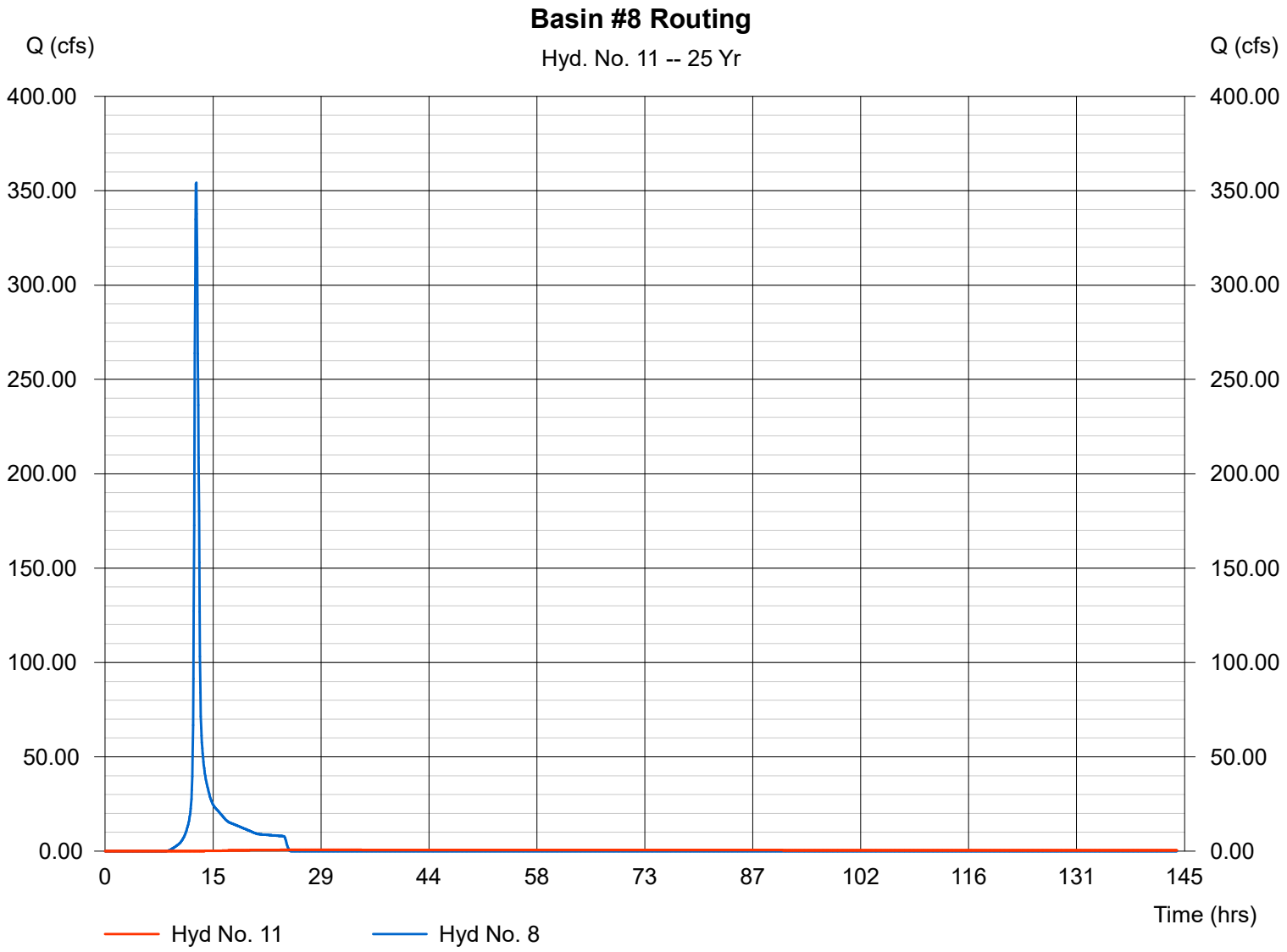
Hydraflow Hydrographs by Intelisolve | Friday, Sep 8 2023, 4:18 PM

Hyd. No. 11

Basin #8 Routing

Hydrograph type	=	Reservoir	Peak discharge	=	0.67 cfs
Storm frequency	=	25 yrs	Time interval	=	3 min
Inflow hyd. No.	=	8	Max. Elevation	=	331.72 ft
Reservoir name	=	Detention Basin #8	Max. Storage	=	1,579,048 cuft

Storage Indication method used. | Hydrograph Volume = 253,848 cuft



Pond Report

Pond No. 2 - Detention Basin #8

Pond Data

Pond storage is based on known contour areas. Average end area method used.

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	322.00	147,153	0	0
2.00	324.00	153,295	300,448	300,448
4.00	326.00	159,553	312,848	613,296
6.00	328.00	165,929	325,482	938,778
8.00	330.00	172,418	338,347	1,277,125
10.00	332.00	179,015	351,433	1,628,558
12.00	334.00	185,718	364,733	1,993,291
14.00	336.00	192,475	378,193	2,371,484

Culvert / Orifice Structures

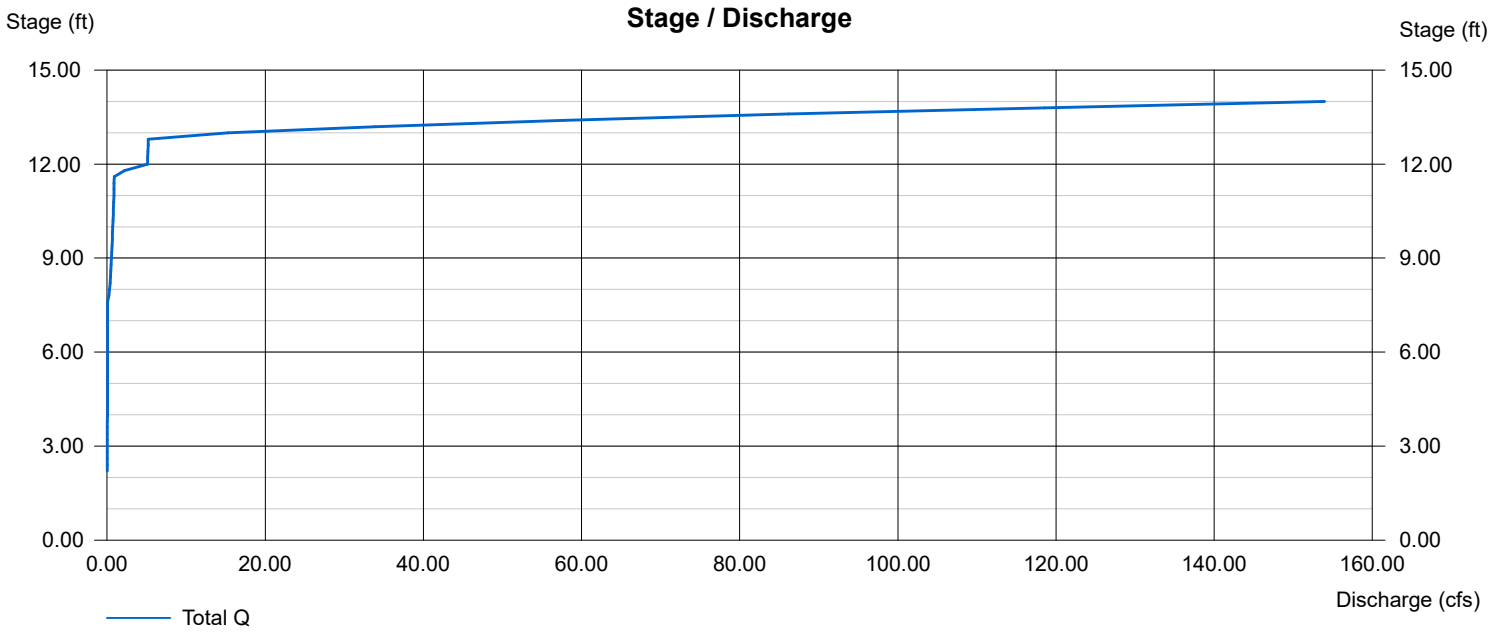
	[A]	[B]	[C]	[D]
Rise (in)	= 8.00	1.00	4.00	0.00
Span (in)	= 8.00	1.00	4.00	0.00
No. Barrels	= 1	1	1	0
Invert El. (ft)	= 320.00	324.00	329.50	0.00
Length (ft)	= 75.00	0.00	0.00	0.00
Slope (%)	= 6.67	0.00	0.00	0.00
N-Value	= .013	.013	.013	.000
Orif. Coeff.	= 0.60	0.60	0.60	0.00
Multi-Stage	= n/a	Yes	Yes	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 12.00	34.00	0.00	0.00
Crest El. (ft)	= 333.70	334.80	0.00	0.00
Weir Coeff.	= 3.33	3.33	0.00	0.00
Weir Type	= Riser	Ciplti	---	---
Multi-Stage	= Yes	No	No	No

Exfiltration = 0.000 in/hr (Contour) Tailwater Elev. = 0.00 ft

Note: Culvert/Orifice outflows have been analyzed under inlet and outlet control.



Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

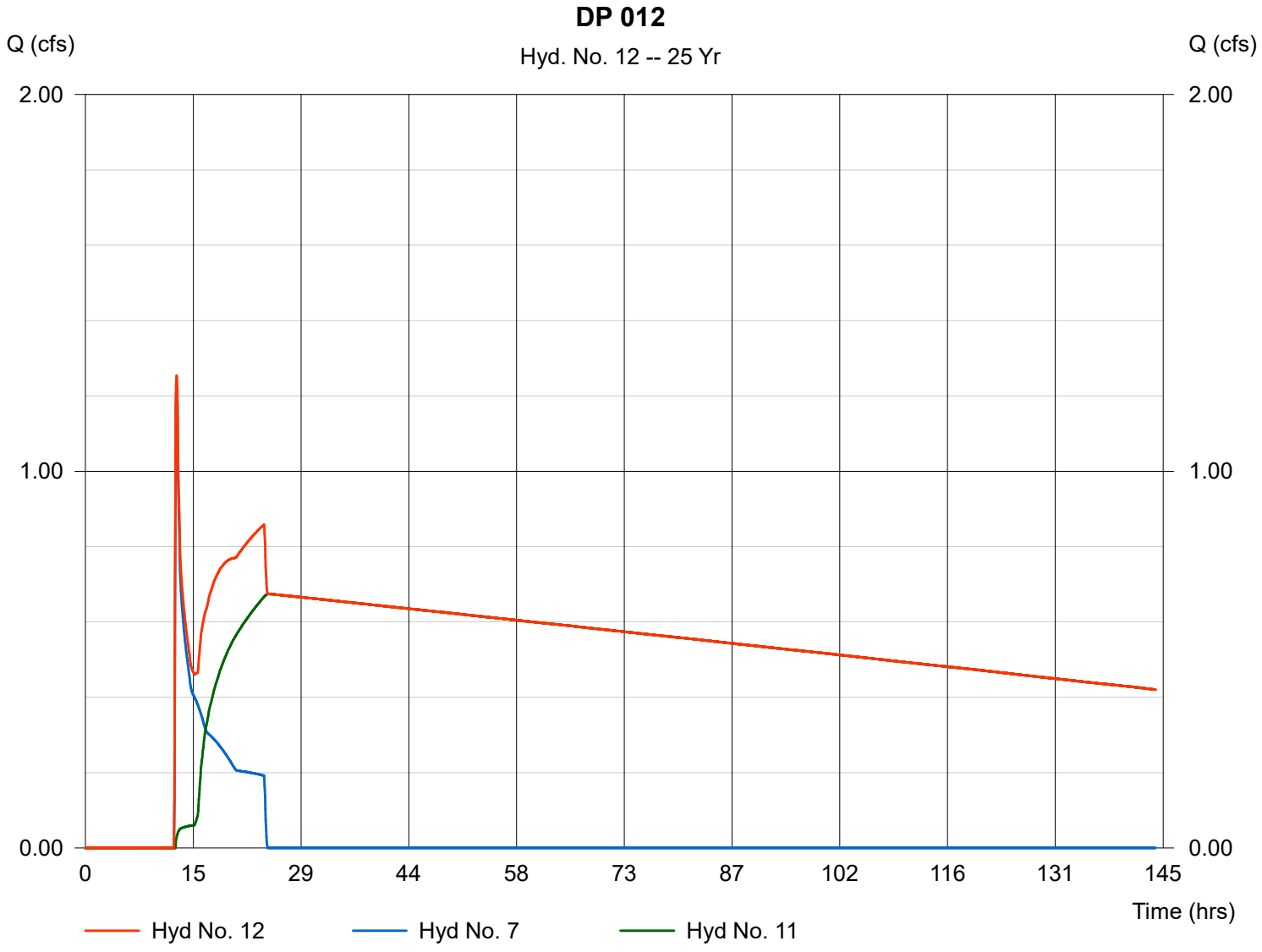
Friday, Sep 8 2023, 4:19 PM

Hyd. No. 12

DP 012

Hydrograph type	=	Combine	Peak discharge	=	1.25 cfs
Storm frequency	=	25 yrs	Time interval	=	3 min
Inflow hyds.	=	7, 11			

Hydrograph Volume = 268,719 cuft



Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

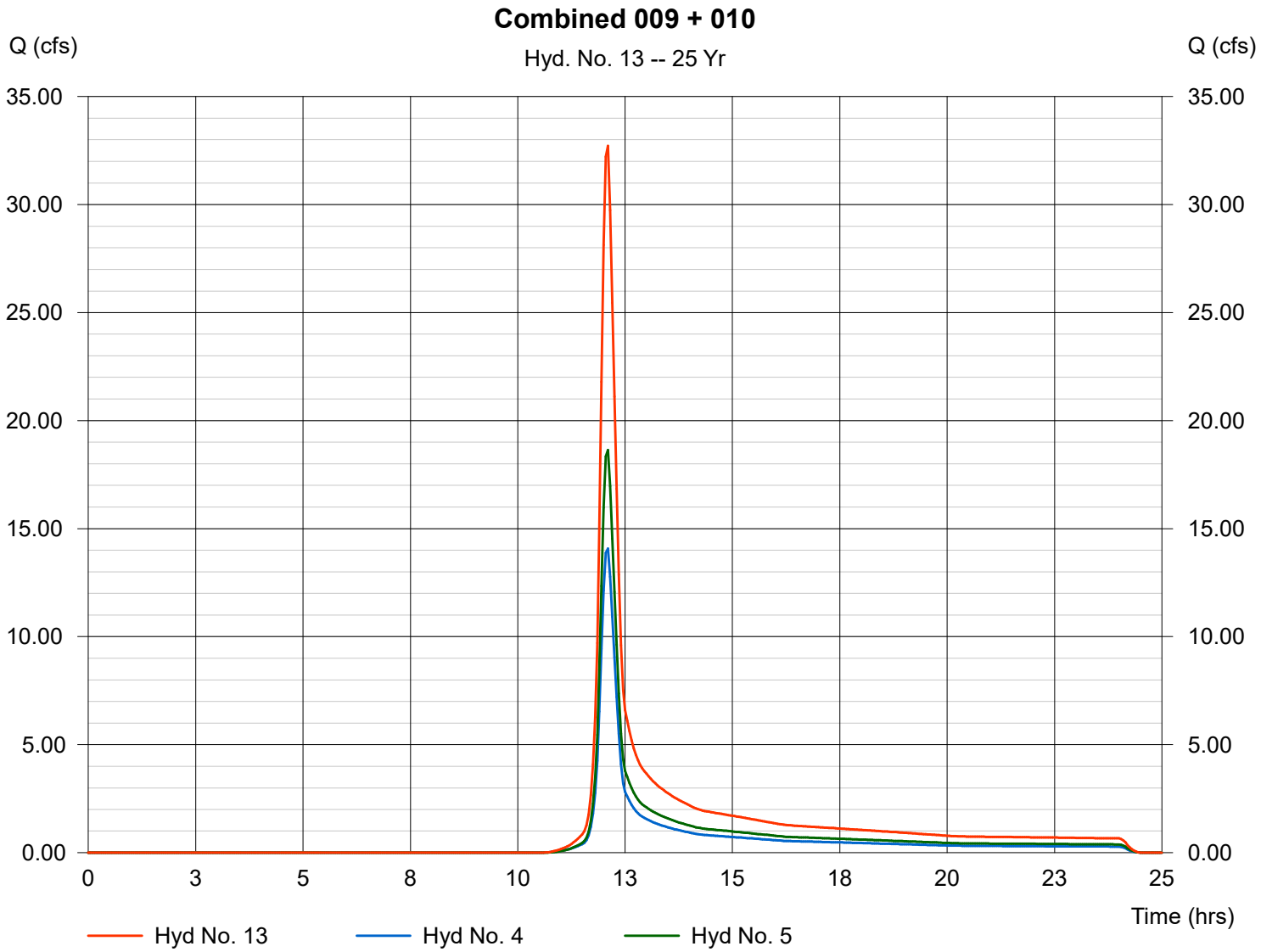
Friday, Sep 8 2023, 4:19 PM

Hyd. No. 13

Combined 009 + 010

Hydrograph type	=	Combine	Peak discharge	=	32.72 cfs
Storm frequency	=	25 yrs	Time interval	=	3 min
Inflow hyds.	=	4, 5			

Hydrograph Volume = 108,795 cuft



Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

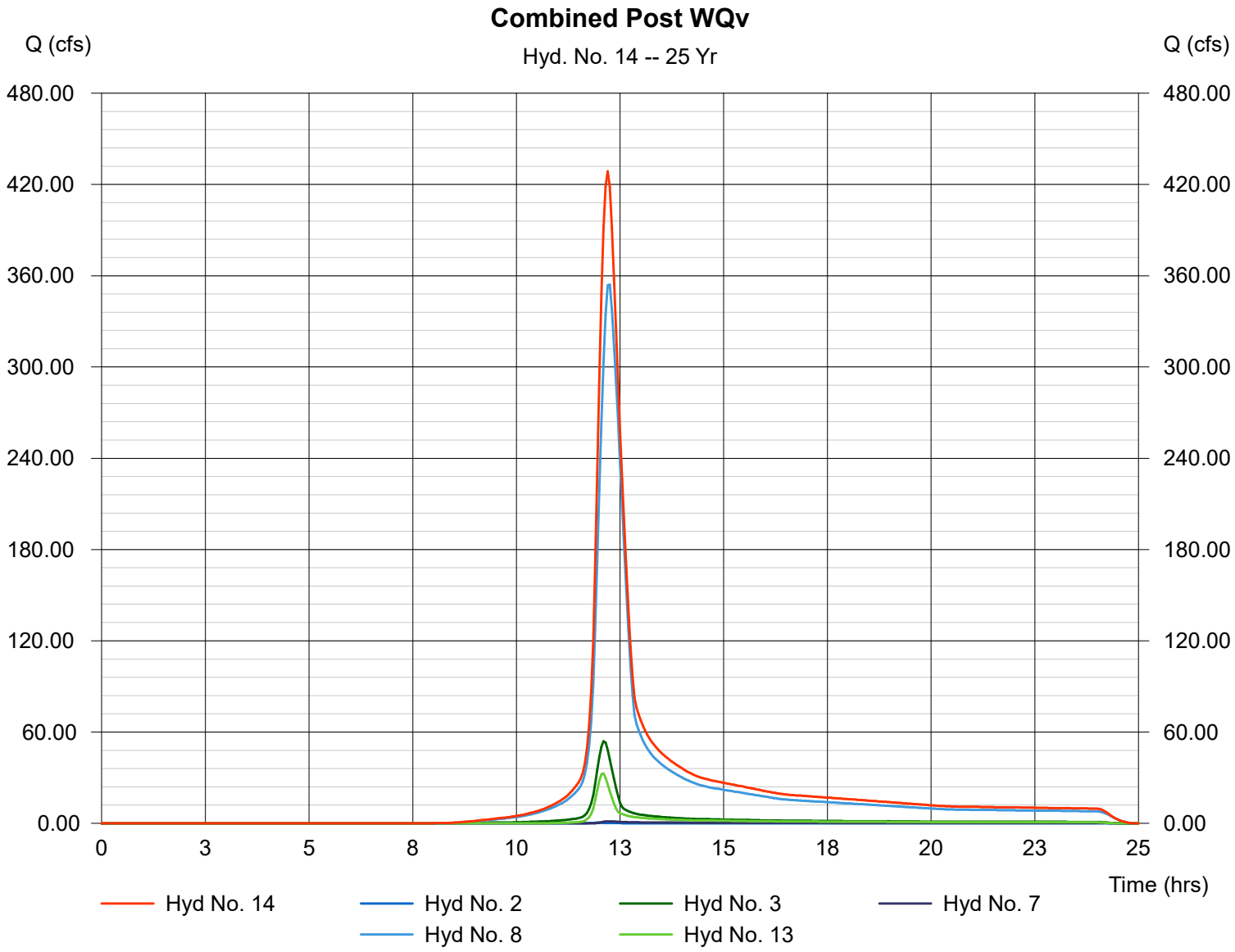
Friday, Sep 8 2023, 4:19 PM

Hyd. No. 14

Combined Post WQv

Hydrograph type	=	Combine	Peak discharge	=	428.66 cfs
Storm frequency	=	25 yrs	Time interval	=	3 min
Inflow hyds.	=	2, 3, 7, 8, 13			

Hydrograph Volume = 1,912,410 cuft



Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
1	SCS Runoff	0.00	3	720	8	----	------	------	Area 007 (DP 007)
2	SCS Runoff	0.79	3	720	1,805	----	------	------	Area 008 A
3	SCS Runoff	66.37	3	726	233,021	----	------	------	Area 008 B
4	SCS Runoff	18.44	3	726	60,318	----	------	------	Area 009 (DP009)
5	SCS Runoff	24.61	3	726	80,785	----	------	------	Area 010 (DP010)
6	SCS Runoff	0.00	3	720	8	----	------	------	Area 011 (DP011)
7	SCS Runoff	3.50	3	729	25,148	----	------	------	Area 012 A
8	SCS Runoff	439.08	3	732	1,974,826	----	------	------	Area 012 B
9	Reservoir	0.99	3	1446	98,787	3	683.53	213,993	Basin #7 Routing
10	Combine	1.00	3	1440	100,591	2, 9	------	------	DP 008
11	Reservoir	1.65	3	1476	384,736	8	333.71	1,941,047	Basin #8 Routing
12	Combine	3.53	3	729	409,884	7, 11	------	------	DP 012
13	Combine	43.06	3	726	141,102	4, 5,	------	------	Combined 009 + 010
14	Combine	534.60	3	732	2,375,905	2, 3, 7, 8, 13	------	------	Combined Post WQv

Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

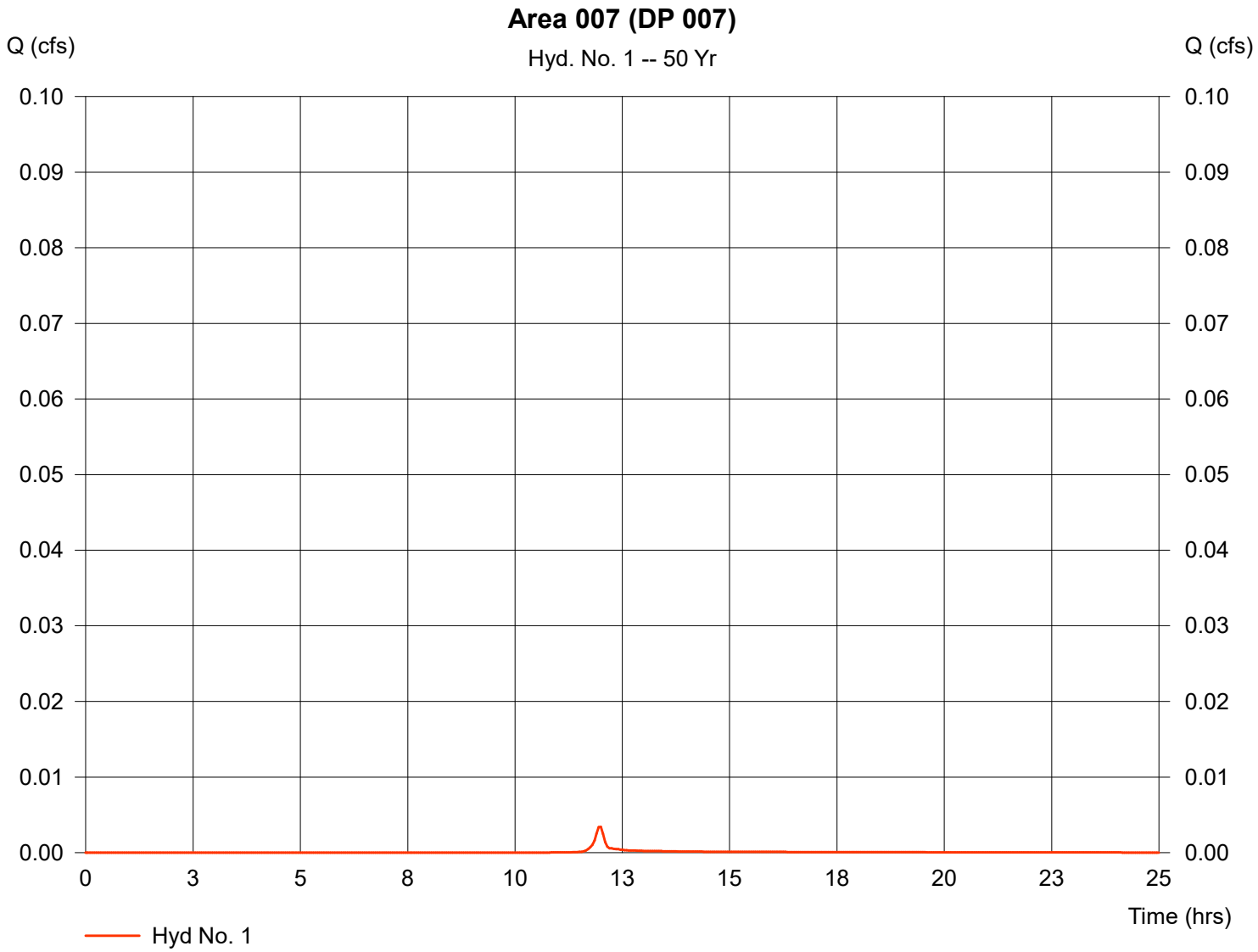
Friday, Sep 8 2023, 4:19 PM

Hyd. No. 1

Area 007 (DP 007)

Hydrograph type	= SCS Runoff	Peak discharge	= 0.00 cfs
Storm frequency	= 50 yrs	Time interval	= 3 min
Drainage area	= 0.001 ac	Curve number	= 61
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 5.00 min
Total precip.	= 6.44 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 8 cuft



Hydrograph Plot

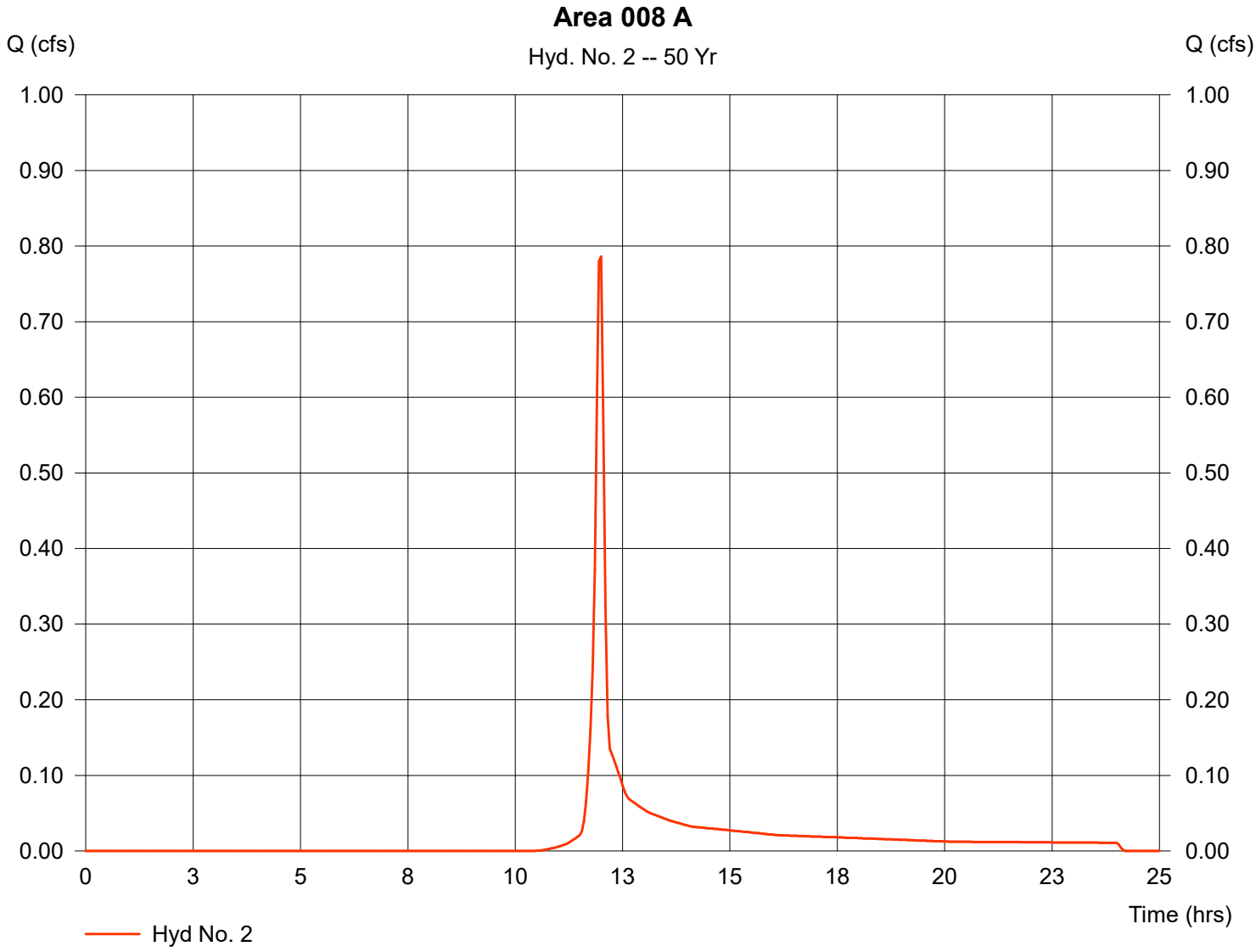
Hydraflow Hydrographs by Intelisolve | Friday, Sep 8 2023, 4:19 PM

Hyd. No. 2

Area 008 A

Hydrograph type	= SCS Runoff	Peak discharge	= 0.79 cfs
Storm frequency	= 50 yrs	Time interval	= 3 min
Drainage area	= 0.230 ac	Curve number	= 61
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 5.00 min
Total precip.	= 6.44 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 1,805 cuft



Hydrograph Plot

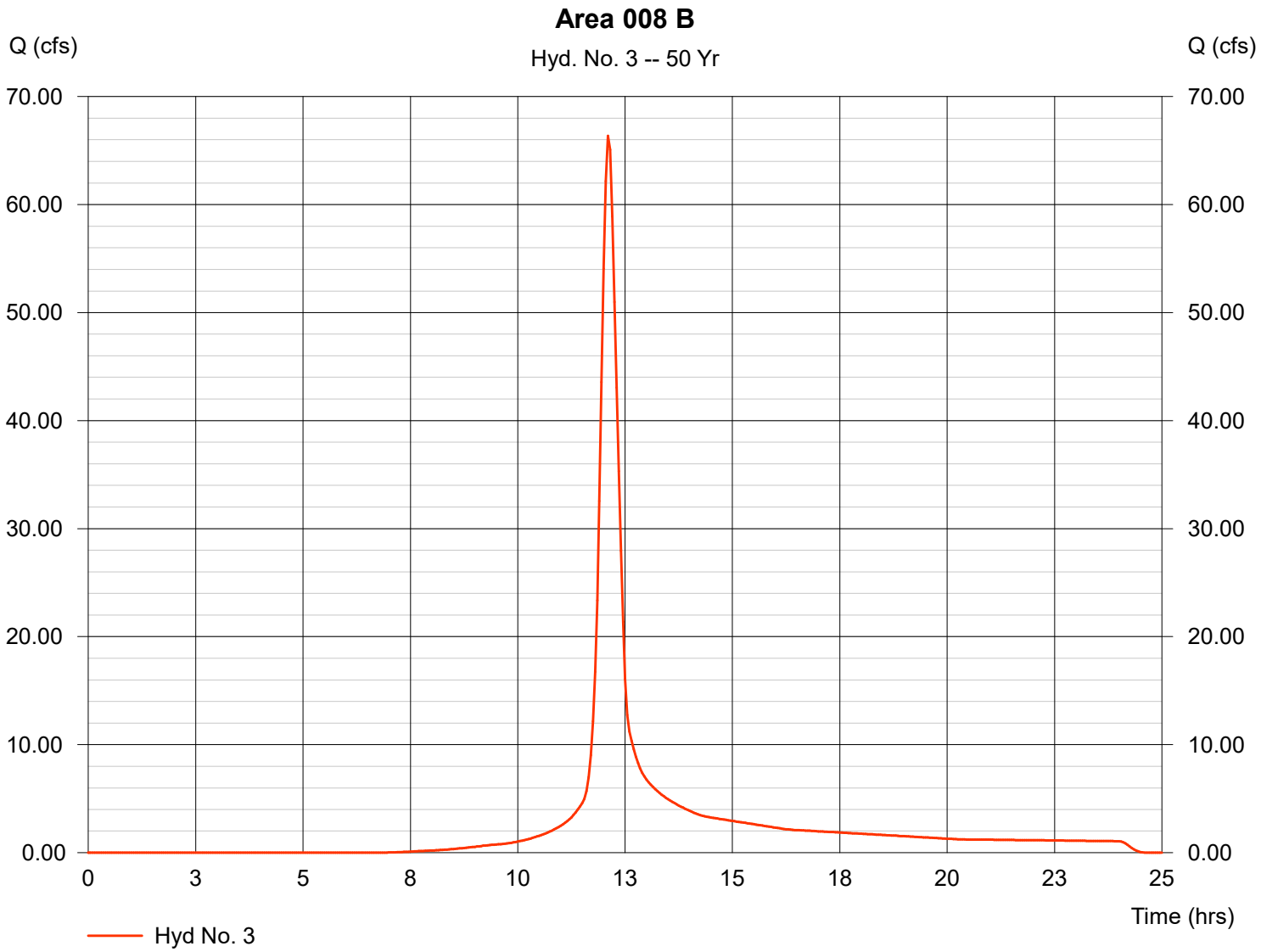
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Hyd. No. 3

Area 008 B

Hydrograph type	= SCS Runoff	Peak discharge	= 66.37 cfs
Storm frequency	= 50 yrs	Time interval	= 3 min
Drainage area	= 17.030 ac	Curve number	= 77
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 21.40 min
Total precip.	= 6.44 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 233,021 cuft



Hydrograph Plot

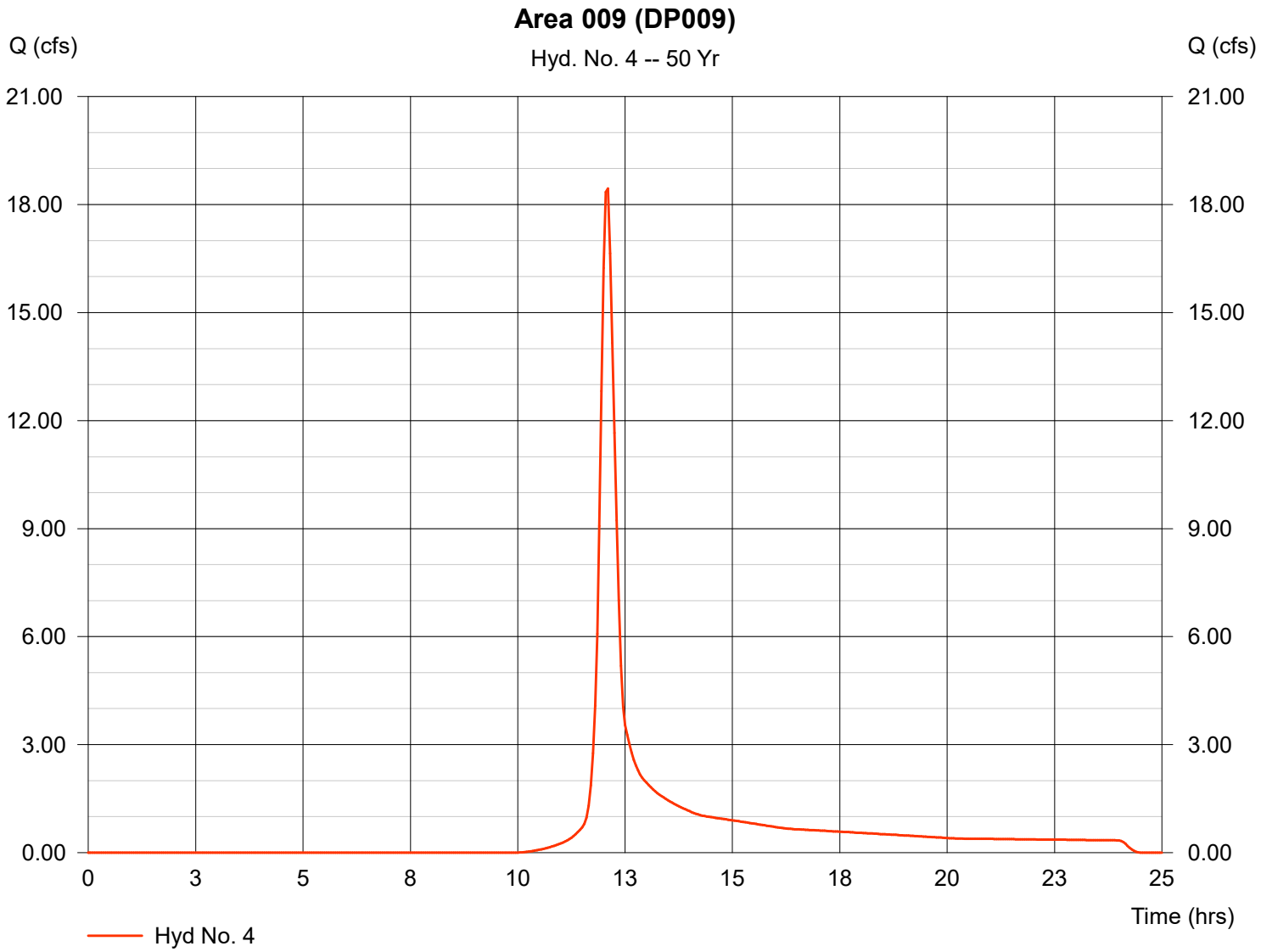
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Hyd. No. 4

Area 009 (DP009)

Hydrograph type	= SCS Runoff	Peak discharge	= 18.44 cfs
Storm frequency	= 50 yrs	Time interval	= 3 min
Drainage area	= 6.240 ac	Curve number	= 64
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 19.10 min
Total precip.	= 6.44 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 60,318 cuft



Hydrograph Plot

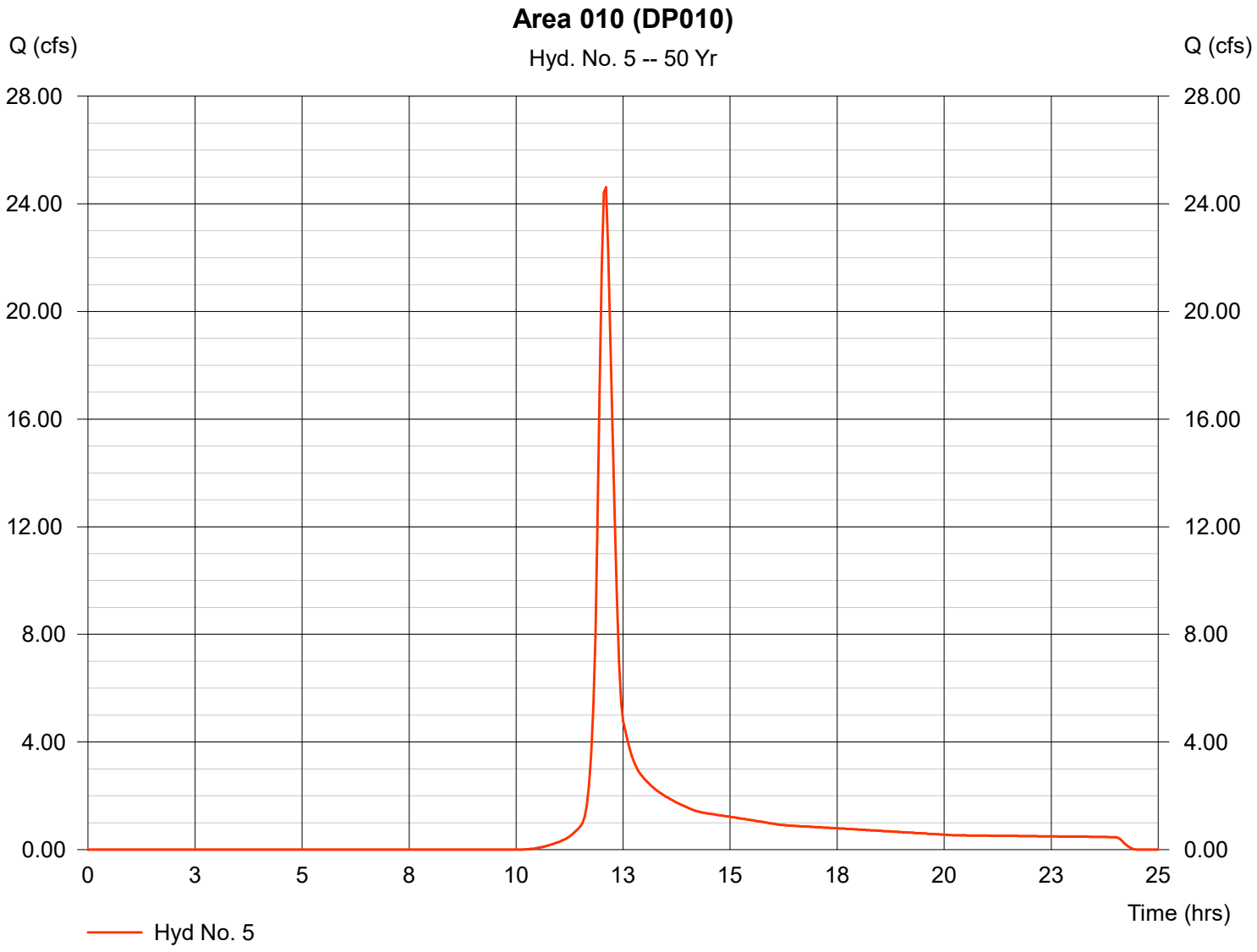
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Hyd. No. 5

Area 010 (DP010)

Hydrograph type	= SCS Runoff	Peak discharge	= 24.61 cfs
Storm frequency	= 50 yrs	Time interval	= 3 min
Drainage area	= 8.670 ac	Curve number	= 63
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 19.70 min
Total precip.	= 6.44 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 80,785 cuft



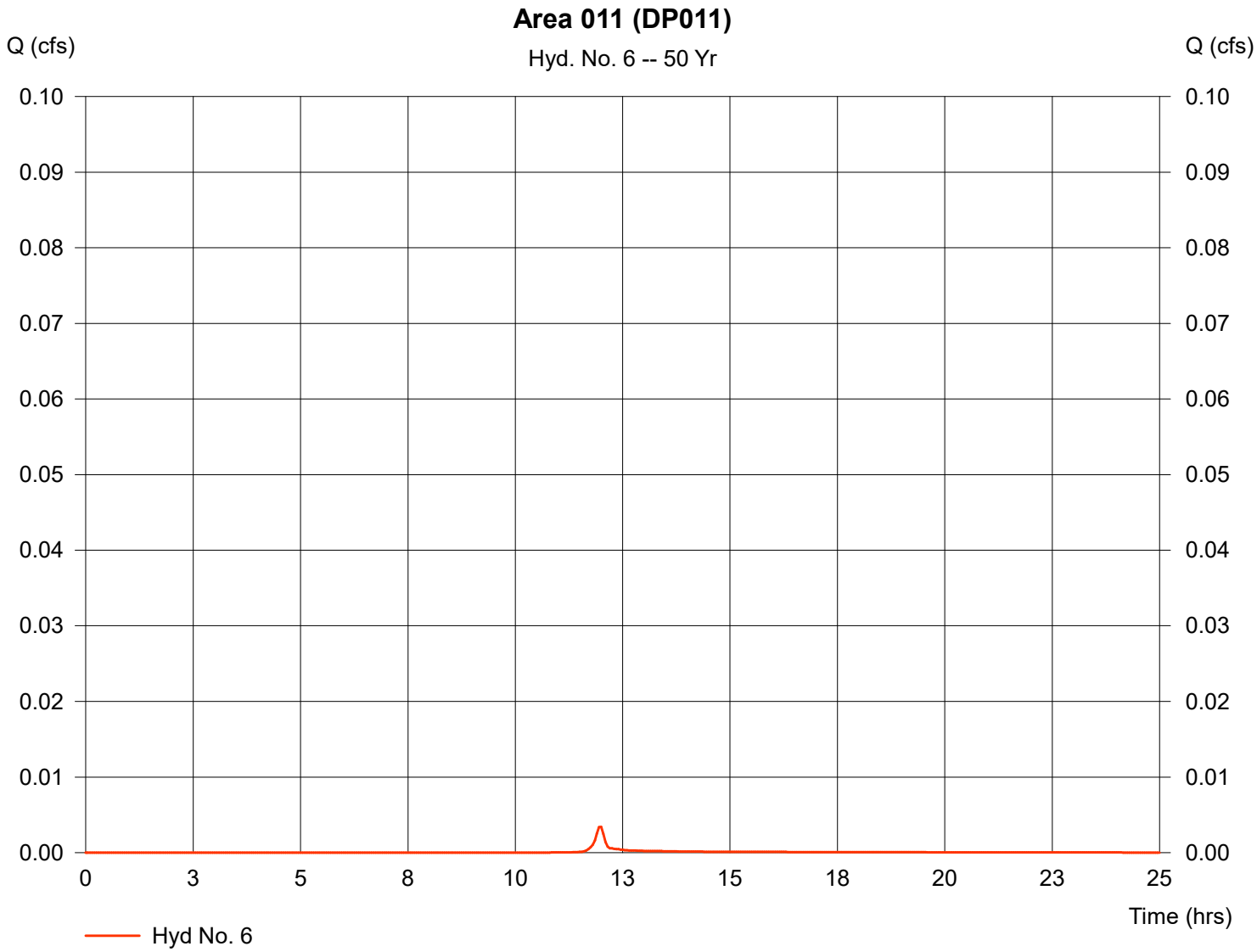
Hydrograph Plot

Hyd. No. 6

Area 011 (DP011)

Hydrograph type	= SCS Runoff	Peak discharge	= 0.00 cfs
Storm frequency	= 50 yrs	Time interval	= 3 min
Drainage area	= 0.001 ac	Curve number	= 61
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 5.00 min
Total precip.	= 6.44 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 8 cuft



Hydrograph Plot

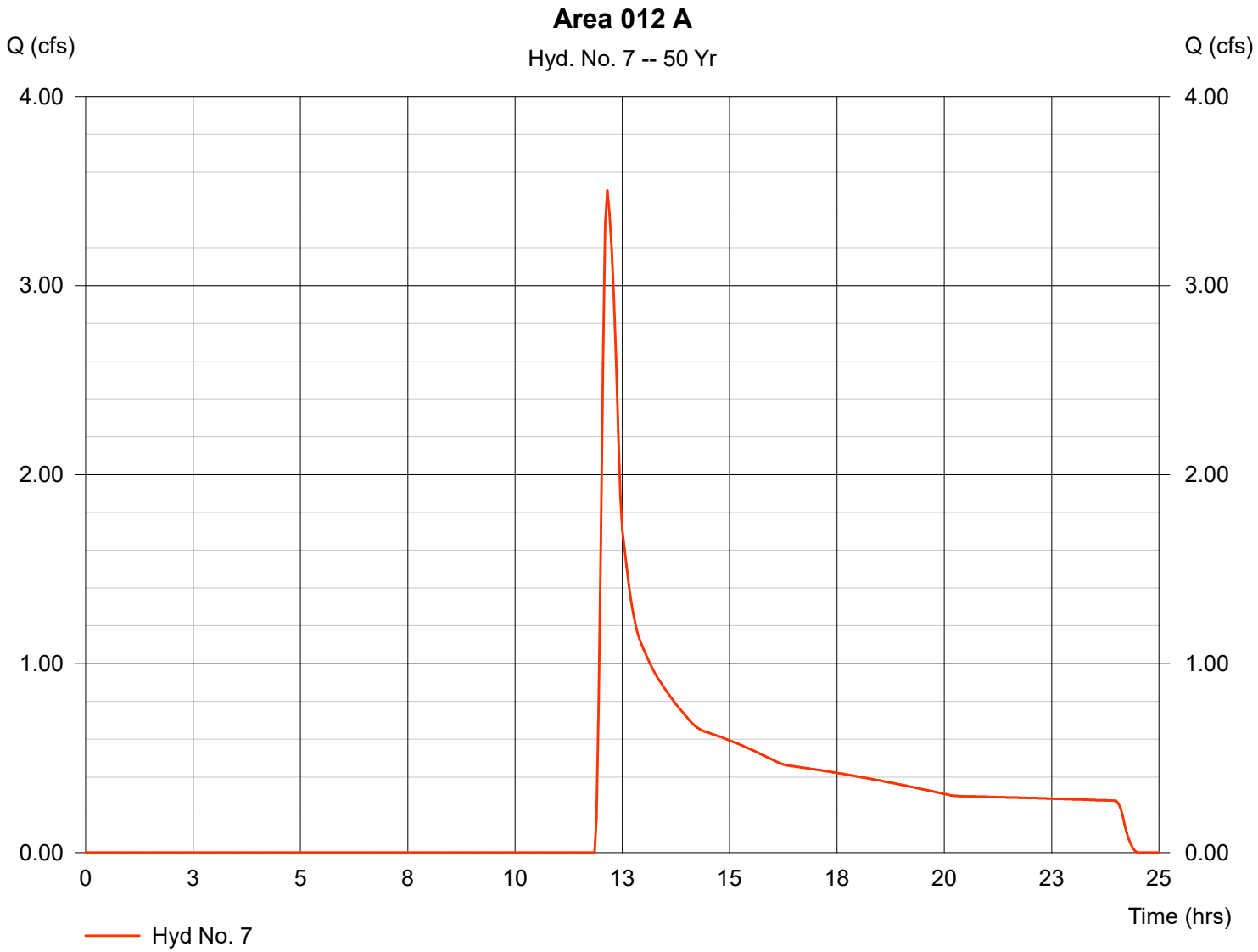
Hydraflow Hydrographs by Intelisolve | Friday, Sep 8 2023, 4:19 PM

Hyd. No. 7

Area 012 A

Hydrograph type	= SCS Runoff	Peak discharge	= 3.50 cfs
Storm frequency	= 50 yrs	Time interval	= 3 min
Drainage area	= 11.610 ac	Curve number	= 39
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 15.10 min
Total precip.	= 6.44 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 25,148 cuft



Hydrograph Plot

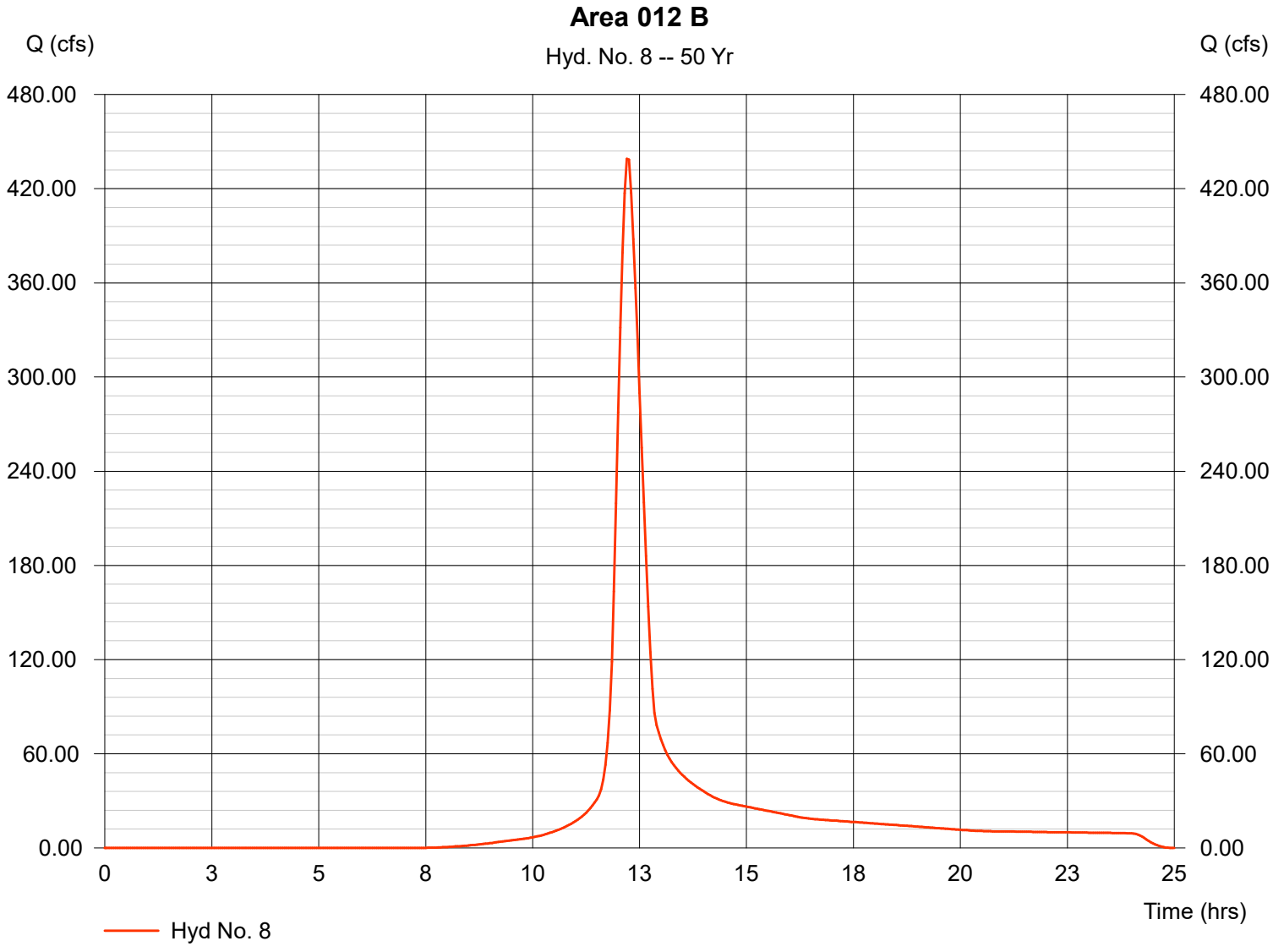
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Hyd. No. 8

Area 012 B

Hydrograph type	= SCS Runoff	Peak discharge	= 439.08 cfs
Storm frequency	= 50 yrs	Time interval	= 3 min
Drainage area	= 146.030 ac	Curve number	= 75
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 32.20 min
Total precip.	= 6.44 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 1,974,826 cuft



Hydrograph Plot

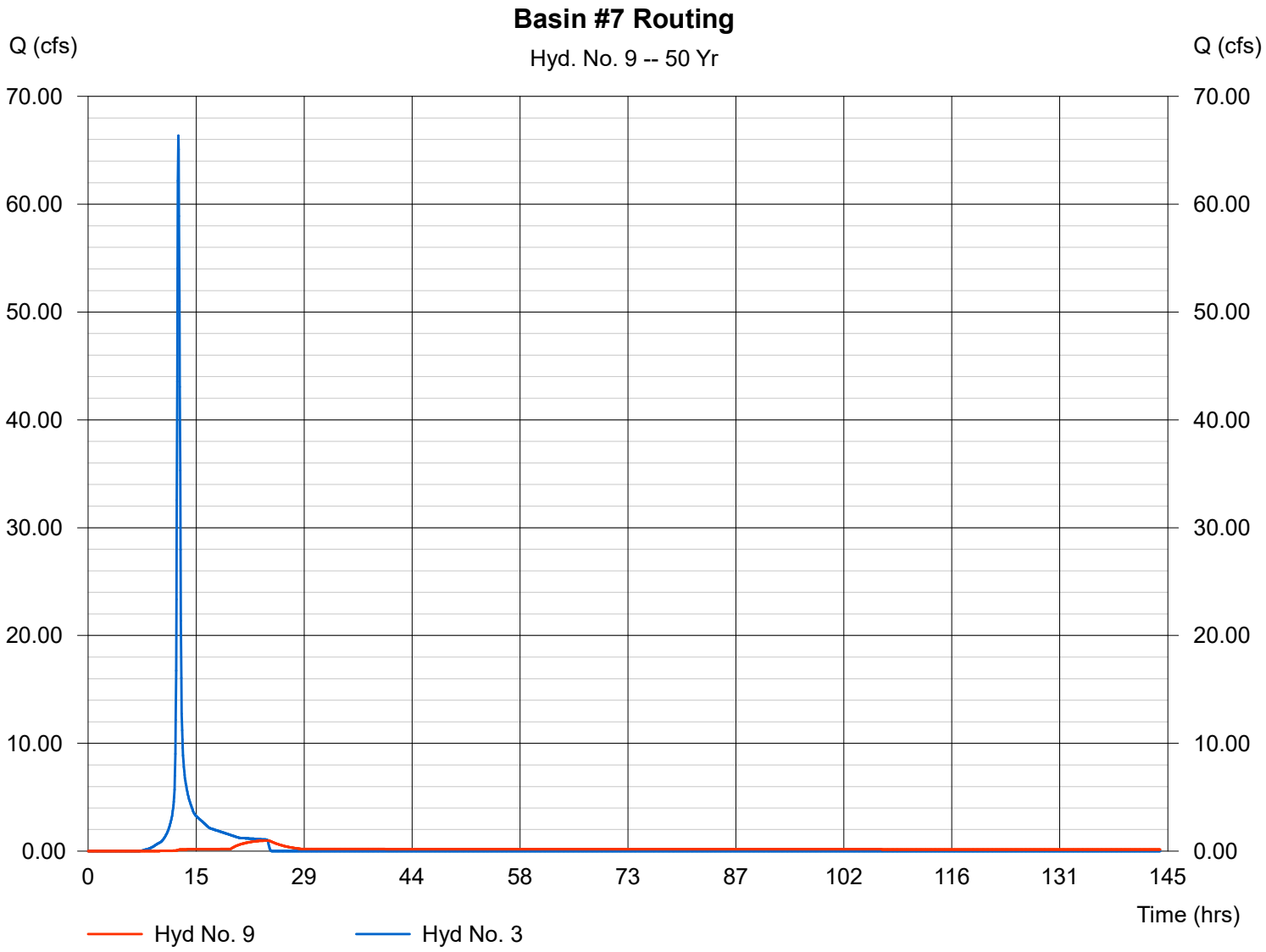
Hydraflow Hydrographs by Intelisolve | Friday, Sep 8 2023, 4:19 PM

Hyd. No. 9

Basin #7 Routing

Hydrograph type	=	Reservoir	Peak discharge	=	0.99 cfs
Storm frequency	=	50 yrs	Time interval	=	3 min
Inflow hyd. No.	=	3	Max. Elevation	=	683.53 ft
Reservoir name	=	Detention Basin #7	Max. Storage	=	213,993 cuft

Storage Indication method used. | Hydrograph Volume = 98,787 cuft



Pond Report

Pond No. 1 - Detention Basin #7

Pond Data

Pond storage is based on known contour areas. Average end area method used.

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	680.00	56,628	0	0
2.00	682.00	60,984	117,612	117,612
4.00	684.00	65,340	126,324	243,936
6.00	686.00	74,052	139,392	383,328

Culvert / Orifice Structures

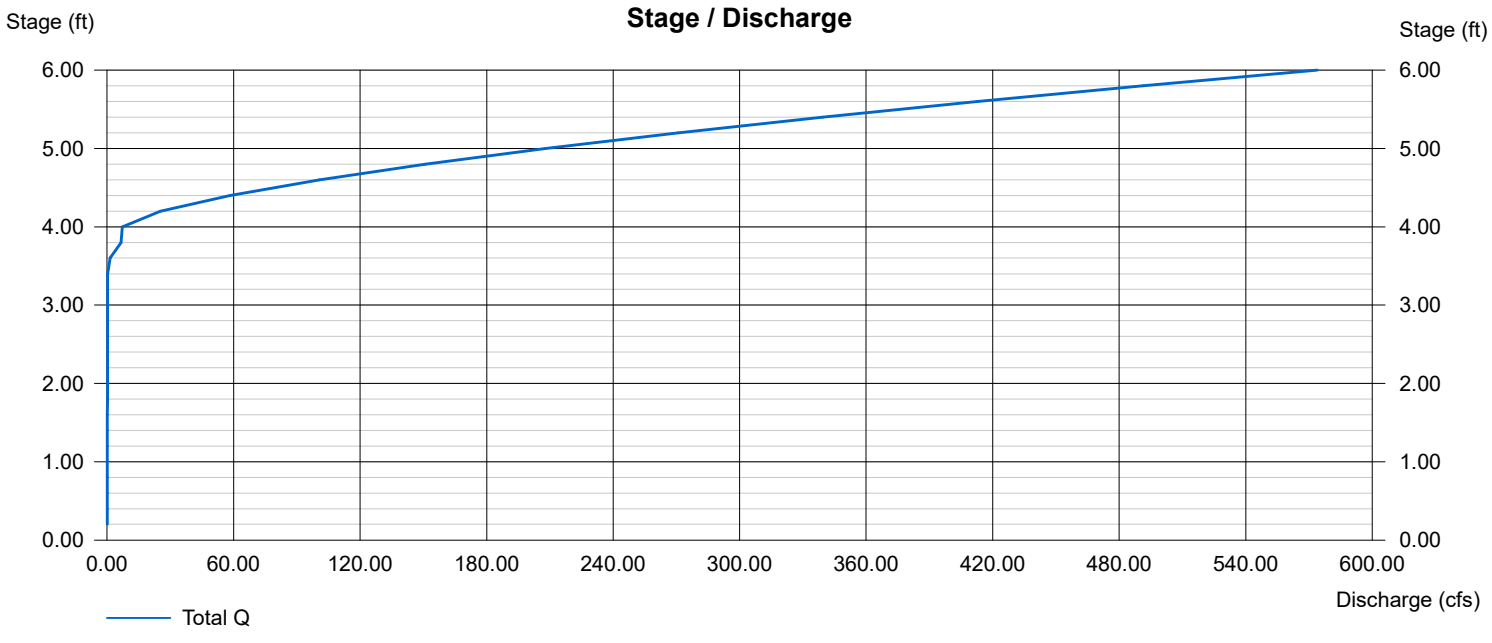
	[A]	[B]	[C]	[D]
Rise (in)	= 12.00	2.00	0.00	0.00
Span (in)	= 12.00	2.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 679.50	680.00	0.00	0.00
Length (ft)	= 48.00	0.00	0.00	0.00
Slope (%)	= 1.04	0.00	0.00	0.00
N-Value	= .013	.013	.000	.000
Orif. Coeff.	= 0.60	0.60	0.00	0.00
Multi-Stage	= n/a	Yes	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 12.00	60.00	0.00	0.00
Crest El. (ft)	= 683.50	684.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	0.00	0.00
Weir Type	= Riser	Ciplti	---	---
Multi-Stage	= Yes	No	No	No

Exfiltration = 0.000 in/hr (Contour) Tailwater Elev. = 0.00 ft

Note: Culvert/Orifice outflows have been analyzed under inlet and outlet control.



Hydrograph Plot

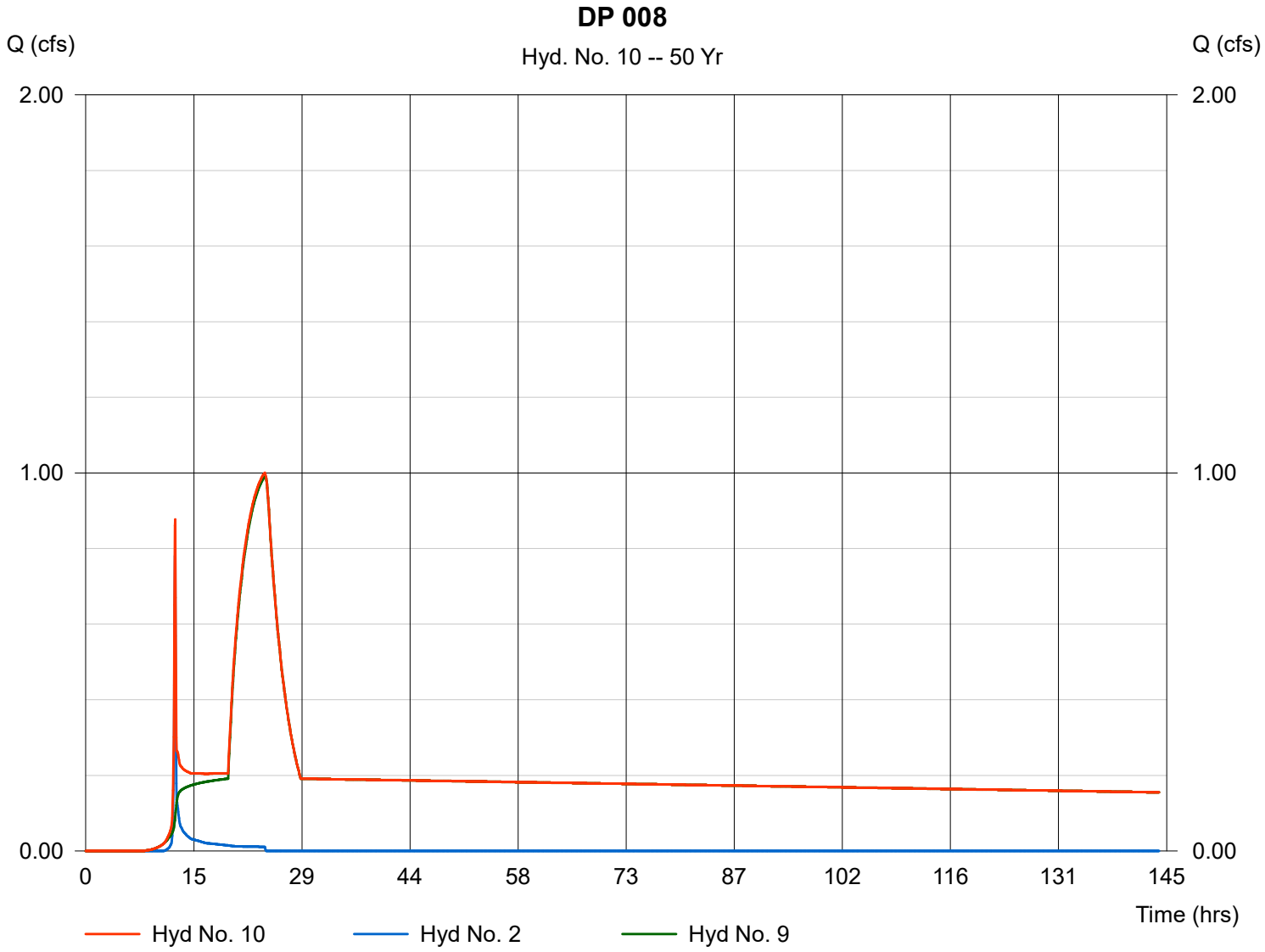
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Hyd. No. 10

DP 008

Hydrograph type	=	Combine	Peak discharge	=	1.00 cfs
Storm frequency	=	50 yrs	Time interval	=	3 min
Inflow hyds.	=	2, 9			

Hydrograph Volume = 100,591 cuft



Hydrograph Plot

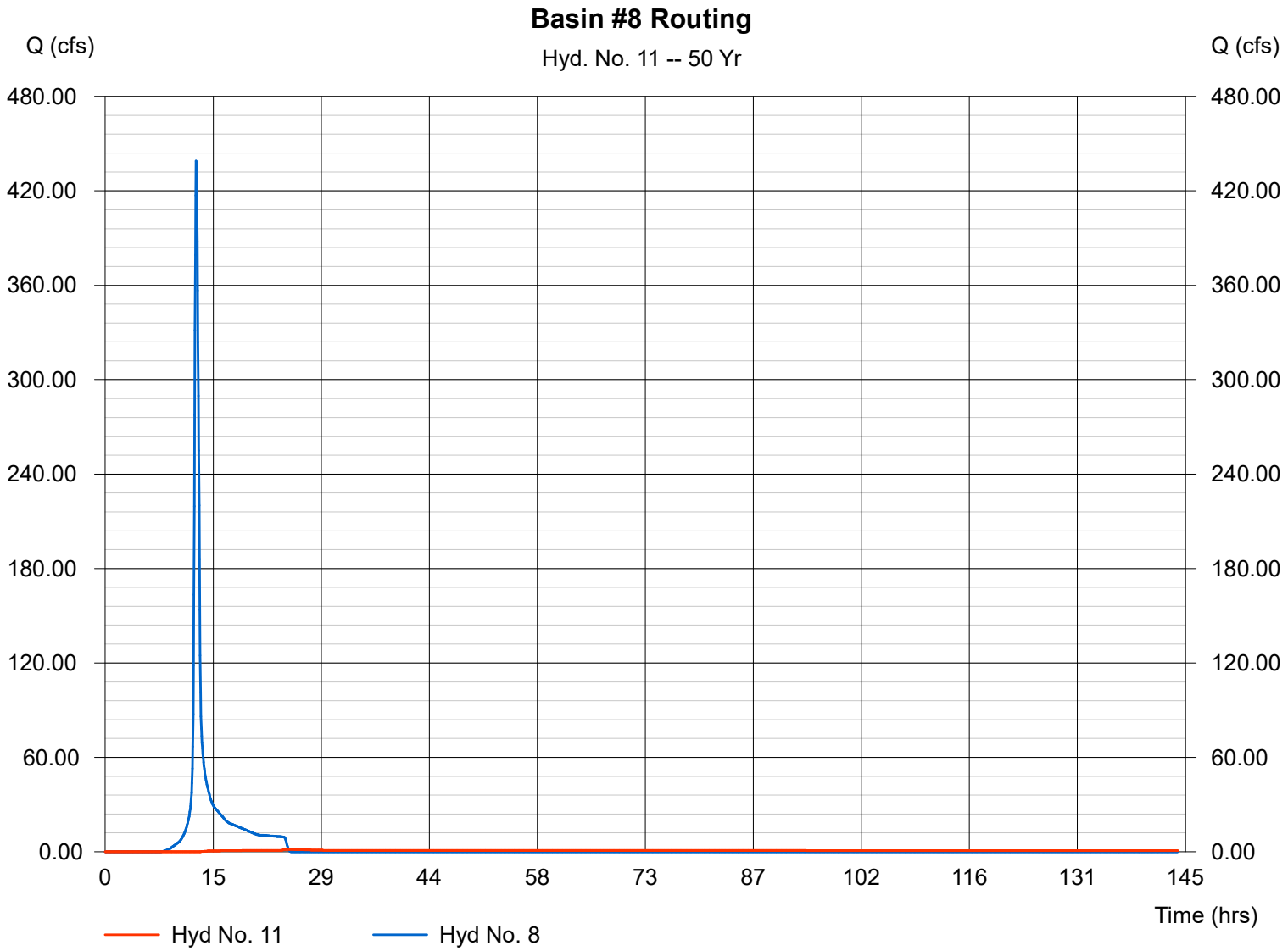
Hydraflow Hydrographs by Intelisolve | Friday, Sep 8 2023, 4:19 PM

Hyd. No. 11

Basin #8 Routing

Hydrograph type	=	Reservoir	Peak discharge	=	1.65 cfs
Storm frequency	=	50 yrs	Time interval	=	3 min
Inflow hyd. No.	=	8	Max. Elevation	=	333.71 ft
Reservoir name	=	Detention Basin #8	Max. Storage	=	1,941,047 cuft

Storage Indication method used. | Hydrograph Volume = 384,736 cuft



Pond Report

Pond No. 2 - Detention Basin #8

Pond Data

Pond storage is based on known contour areas. Average end area method used.

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	322.00	147,153	0	0
2.00	324.00	153,295	300,448	300,448
4.00	326.00	159,553	312,848	613,296
6.00	328.00	165,929	325,482	938,778
8.00	330.00	172,418	338,347	1,277,125
10.00	332.00	179,015	351,433	1,628,558
12.00	334.00	185,718	364,733	1,993,291
14.00	336.00	192,475	378,193	2,371,484

Culvert / Orifice Structures

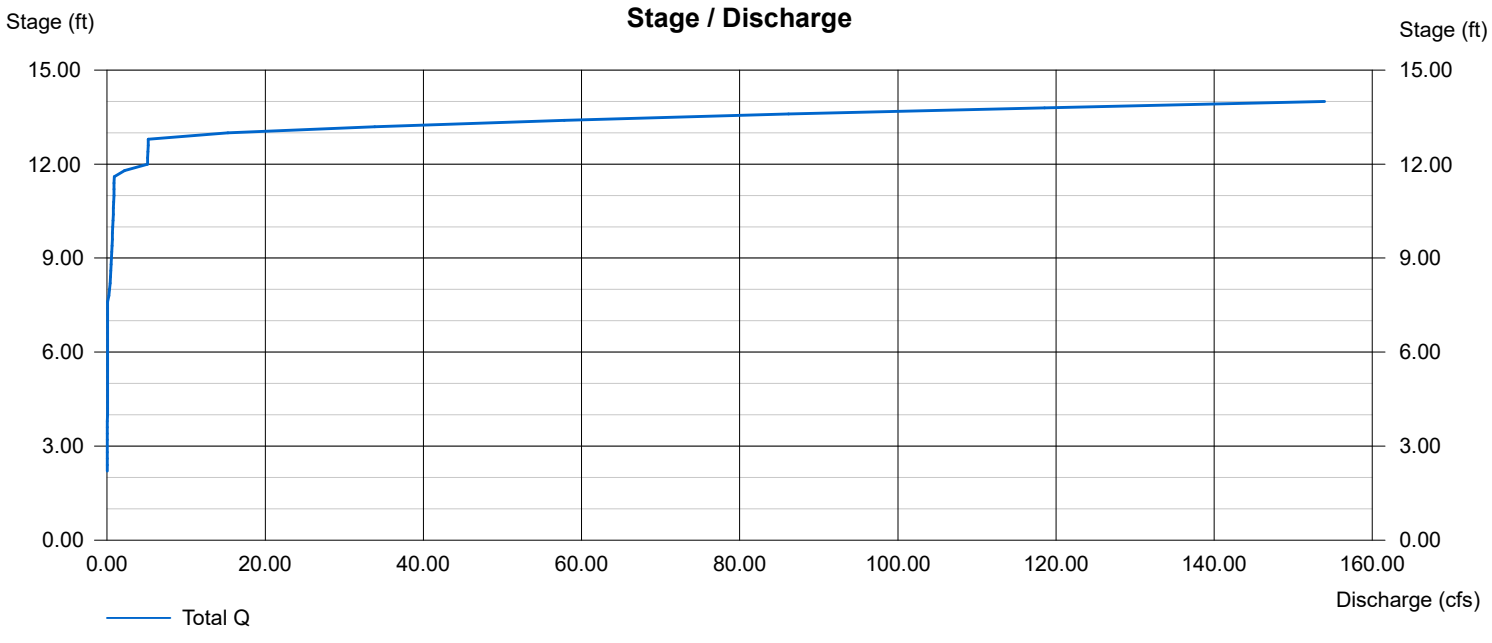
	[A]	[B]	[C]	[D]
Rise (in)	= 8.00	1.00	4.00	0.00
Span (in)	= 8.00	1.00	4.00	0.00
No. Barrels	= 1	1	1	0
Invert El. (ft)	= 320.00	324.00	329.50	0.00
Length (ft)	= 75.00	0.00	0.00	0.00
Slope (%)	= 6.67	0.00	0.00	0.00
N-Value	= .013	.013	.013	.000
Orif. Coeff.	= 0.60	0.60	0.60	0.00
Multi-Stage	= n/a	Yes	Yes	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 12.00	34.00	0.00	0.00
Crest El. (ft)	= 333.70	334.80	0.00	0.00
Weir Coeff.	= 3.33	3.33	0.00	0.00
Weir Type	= Riser	Ciplti	---	---
Multi-Stage	= Yes	No	No	No

Exfiltration = 0.000 in/hr (Contour) Tailwater Elev. = 0.00 ft

Note: Culvert/Orifice outflows have been analyzed under inlet and outlet control.



Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

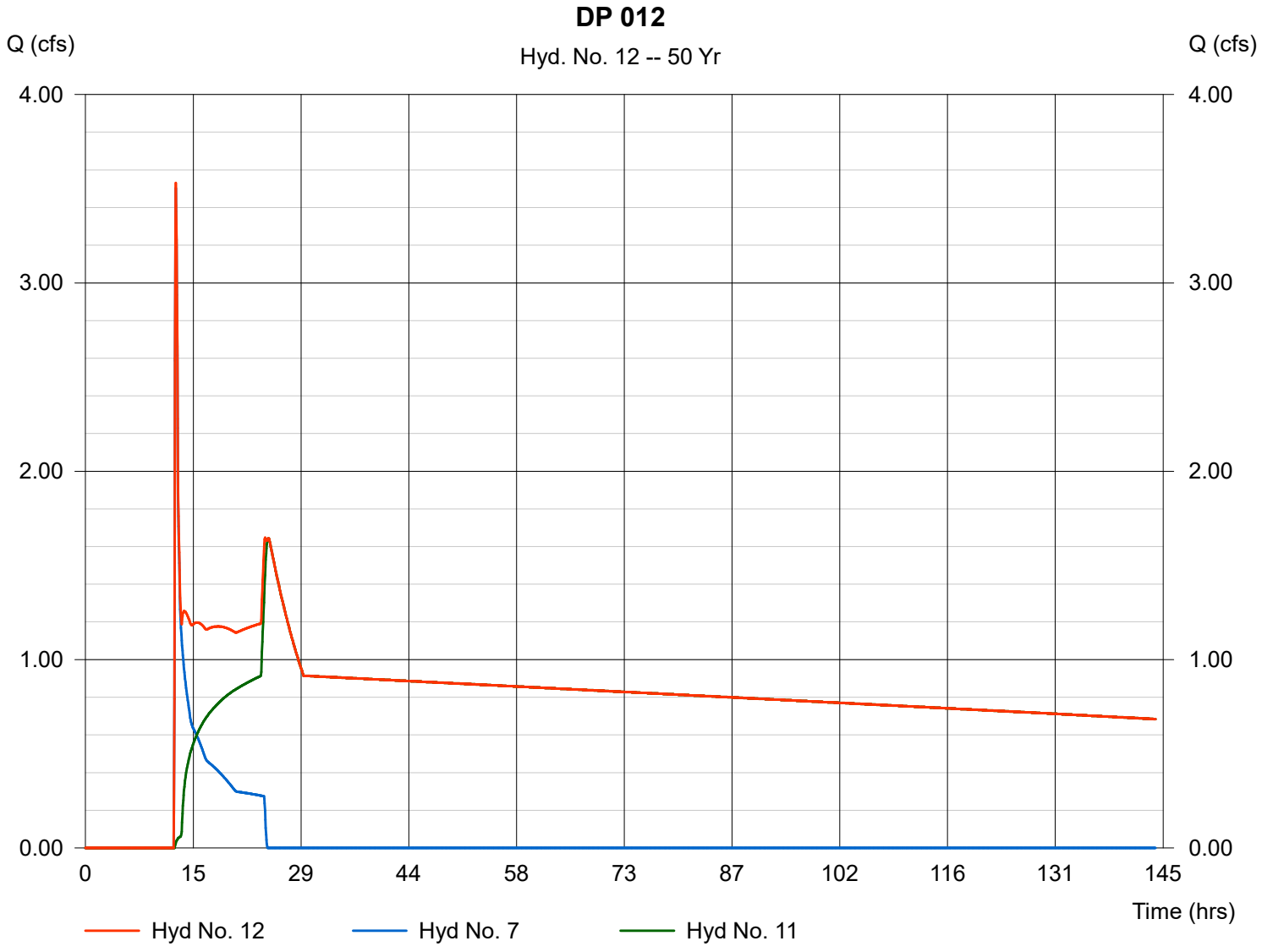
Friday, Sep 8 2023, 4:19 PM

Hyd. No. 12

DP 012

Hydrograph type	=	Combine	Peak discharge	=	3.53 cfs
Storm frequency	=	50 yrs	Time interval	=	3 min
Inflow hyds.	=	7, 11			

Hydrograph Volume = 409,884 cuft



Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

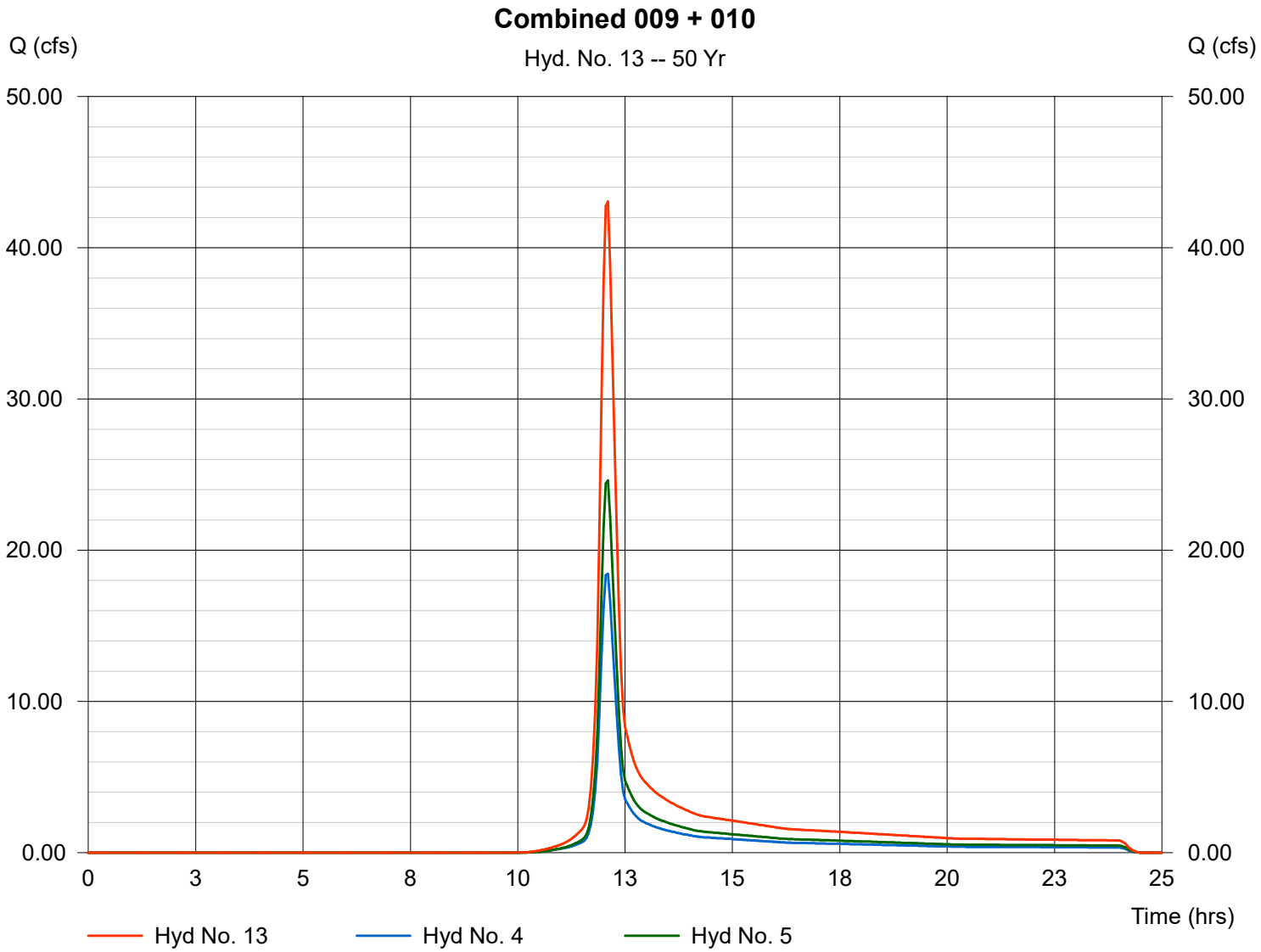
Friday, Sep 8 2023, 4:19 PM

Hyd. No. 13

Combined 009 + 010

Hydrograph type	=	Combine	Peak discharge	=	43.06 cfs
Storm frequency	=	50 yrs	Time interval	=	3 min
Inflow hyds.	=	4, 5			

Hydrograph Volume = 141,102 cuft



Hydrograph Plot

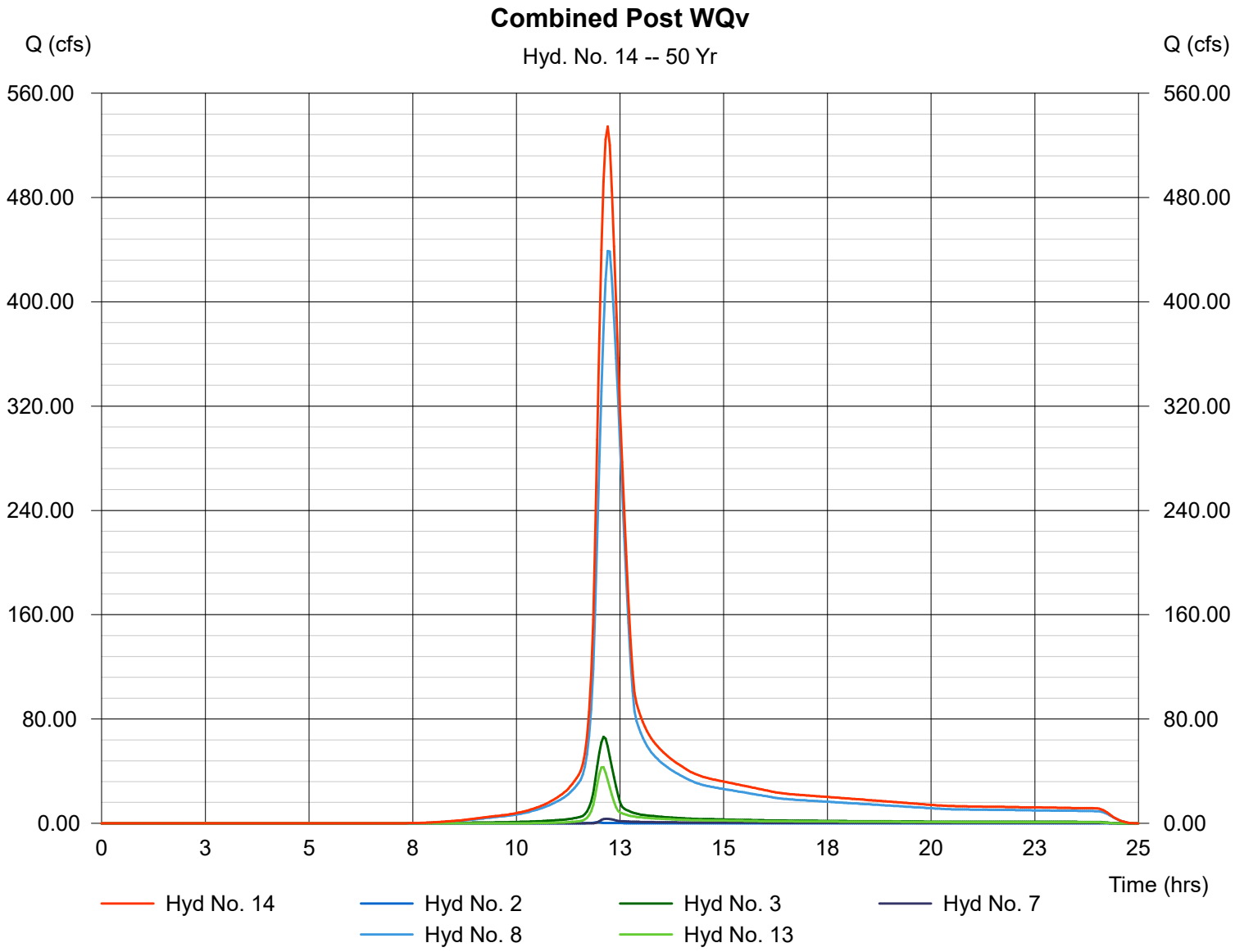
Hydraflow Hydrographs by Intelisolve | Friday, Sep 8 2023, 4:19 PM

Hyd. No. 14

Combined Post WQv

Hydrograph type	=	Combine	Peak discharge	=	534.60 cfs
Storm frequency	=	50 yrs	Time interval	=	3 min
Inflow hyds.	=	2, 3, 7, 8, 13			

Hydrograph Volume = 2,375,905 cuft



Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
1	SCS Runoff	0.00	3	717	10	----	------	------	Area 007 (DP 007)
2	SCS Runoff	1.01	3	717	2,303	----	------	------	Area 008 A
3	SCS Runoff	79.93	3	726	281,088	----	------	------	Area 008 B
4	SCS Runoff	23.44	3	723	76,025	----	------	------	Area 009 (DP009)
5	SCS Runoff	31.42	3	726	102,234	----	------	------	Area 010 (DP010)
6	SCS Runoff	0.00	3	717	10	----	------	------	Area 011 (DP011)
7	SCS Runoff	7.13	3	729	38,667	----	------	------	Area 012 A
8	SCS Runoff	533.66	3	732	2,396,423	----	------	------	Area 012 B
9	Reservoir	2.43	3	993	146,389	3	683.64	221,025	Basin #7 Routing
10	Combine	2.45	3	993	148,692	2, 9	------	------	DP 008
11	Reservoir	11.22	3	1404	771,475	8	334.92	2,167,104	Basin #8 Routing
12	Combine	11.59	3	1401	810,142	7, 11	------	------	DP 012
13	Combine	54.84	3	723	178,258	4, 5,	------	------	Combined 009 + 010
14	Combine	652.82	3	732	2,896,736	2, 3, 7, 8, 13	------	------	Combined Post WQv

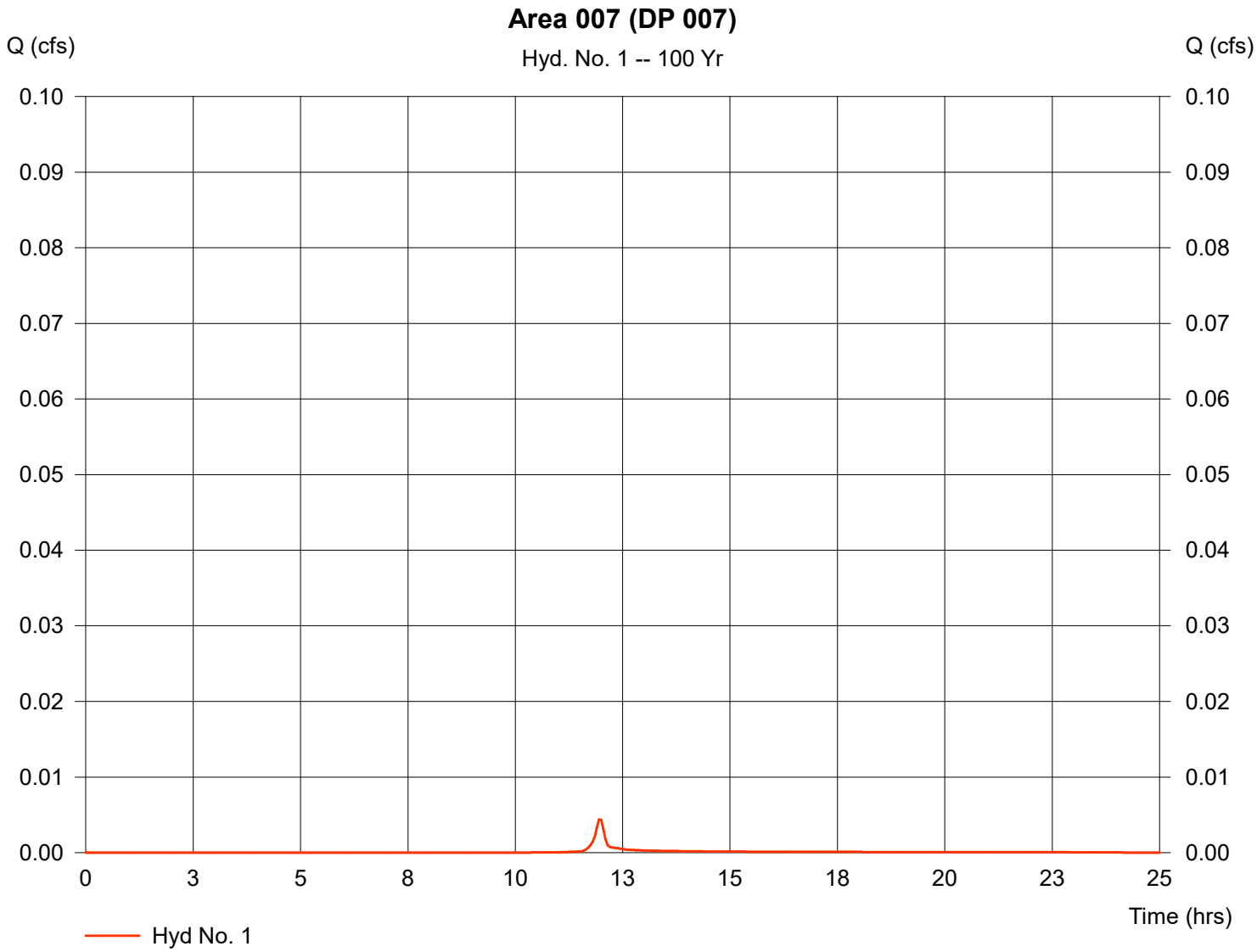
Hydrograph Plot

Hyd. No. 1

Area 007 (DP 007)

Hydrograph type	= SCS Runoff	Peak discharge	= 0.00 cfs
Storm frequency	= 100 yrs	Time interval	= 3 min
Drainage area	= 0.001 ac	Curve number	= 61
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 5.00 min
Total precip.	= 7.33 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 10 cuft



Hydrograph Plot

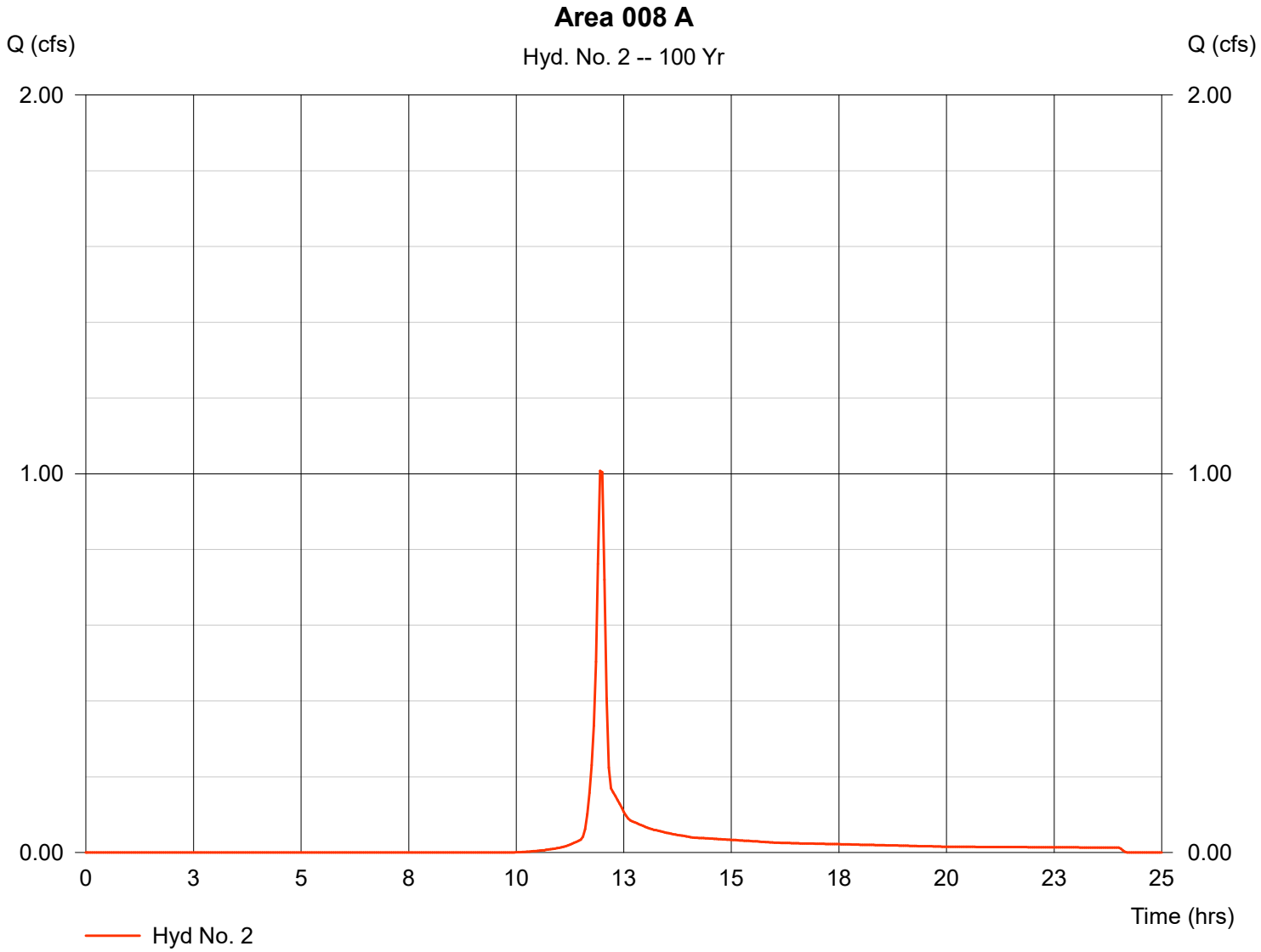
Hydraflow Hydrographs by Intelisolve | Friday, Sep 8 2023, 4:19 PM

Hyd. No. 2

Area 008 A

Hydrograph type	= SCS Runoff	Peak discharge	= 1.01 cfs
Storm frequency	= 100 yrs	Time interval	= 3 min
Drainage area	= 0.230 ac	Curve number	= 61
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 5.00 min
Total precip.	= 7.33 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 2,303 cuft



Hydrograph Plot

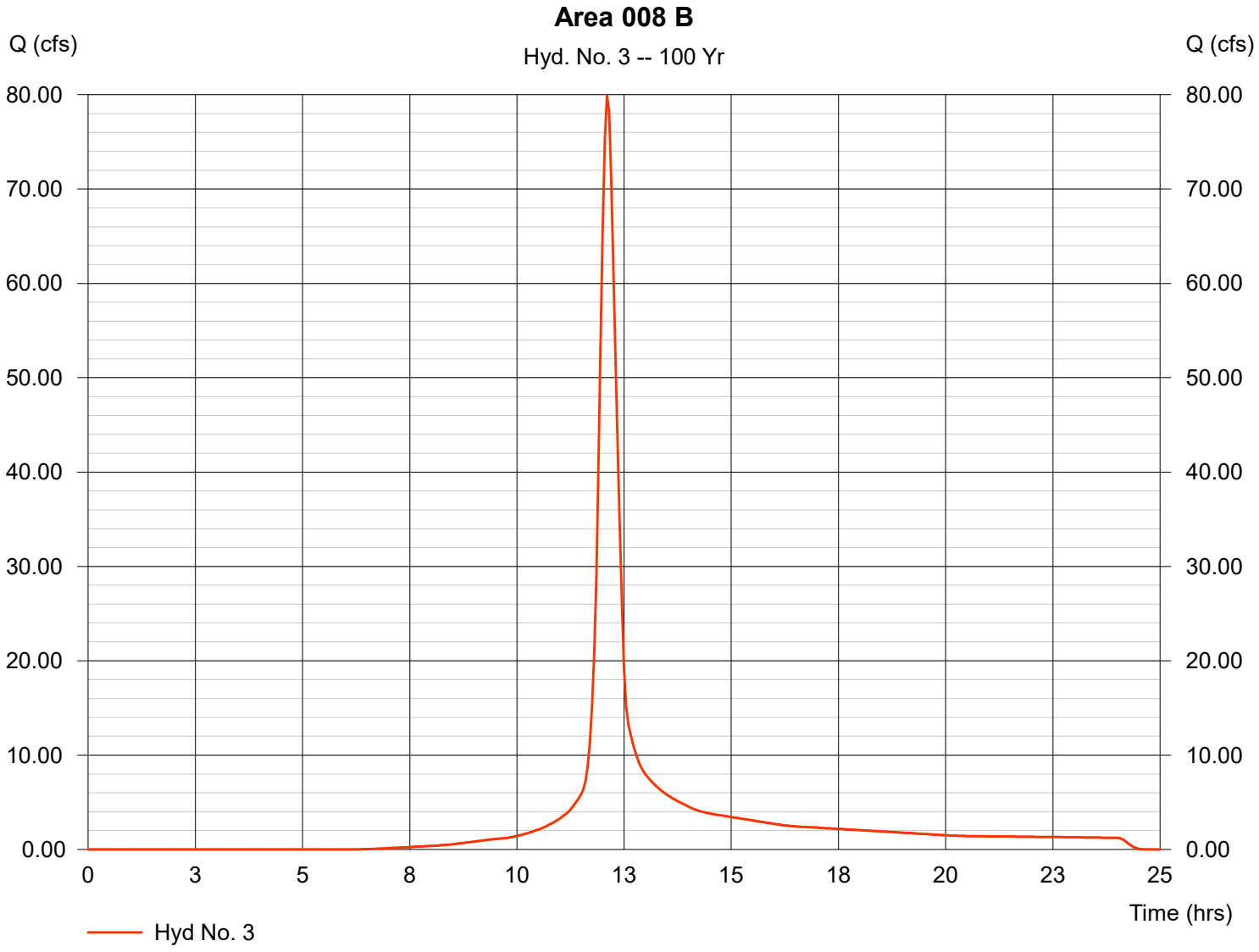
Hydraflow Hydrographs by Intelisolve | Friday, Sep 8 2023, 4:19 PM

Hyd. No. 3

Area 008 B

Hydrograph type	= SCS Runoff	Peak discharge	= 79.93 cfs
Storm frequency	= 100 yrs	Time interval	= 3 min
Drainage area	= 17.030 ac	Curve number	= 77
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 21.40 min
Total precip.	= 7.33 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 281,088 cuft



Hydrograph Plot

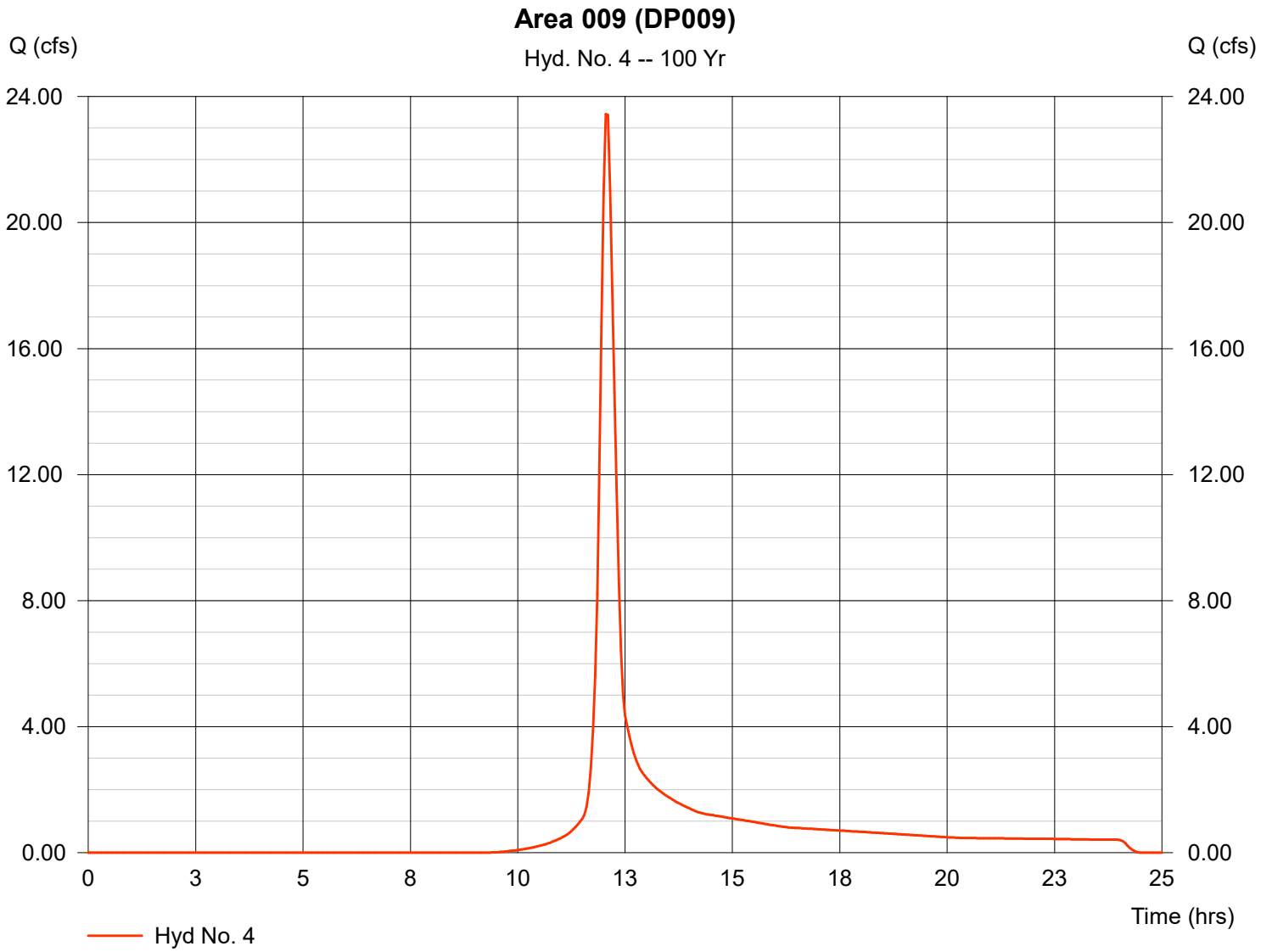
Hydraflow Hydrographs by Intelisolve | Friday, Sep 8 2023, 4:19 PM

Hyd. No. 4

Area 009 (DP009)

Hydrograph type	= SCS Runoff	Peak discharge	= 23.44 cfs
Storm frequency	= 100 yrs	Time interval	= 3 min
Drainage area	= 6.240 ac	Curve number	= 64
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 19.10 min
Total precip.	= 7.33 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 76,025 cuft



Hydrograph Plot

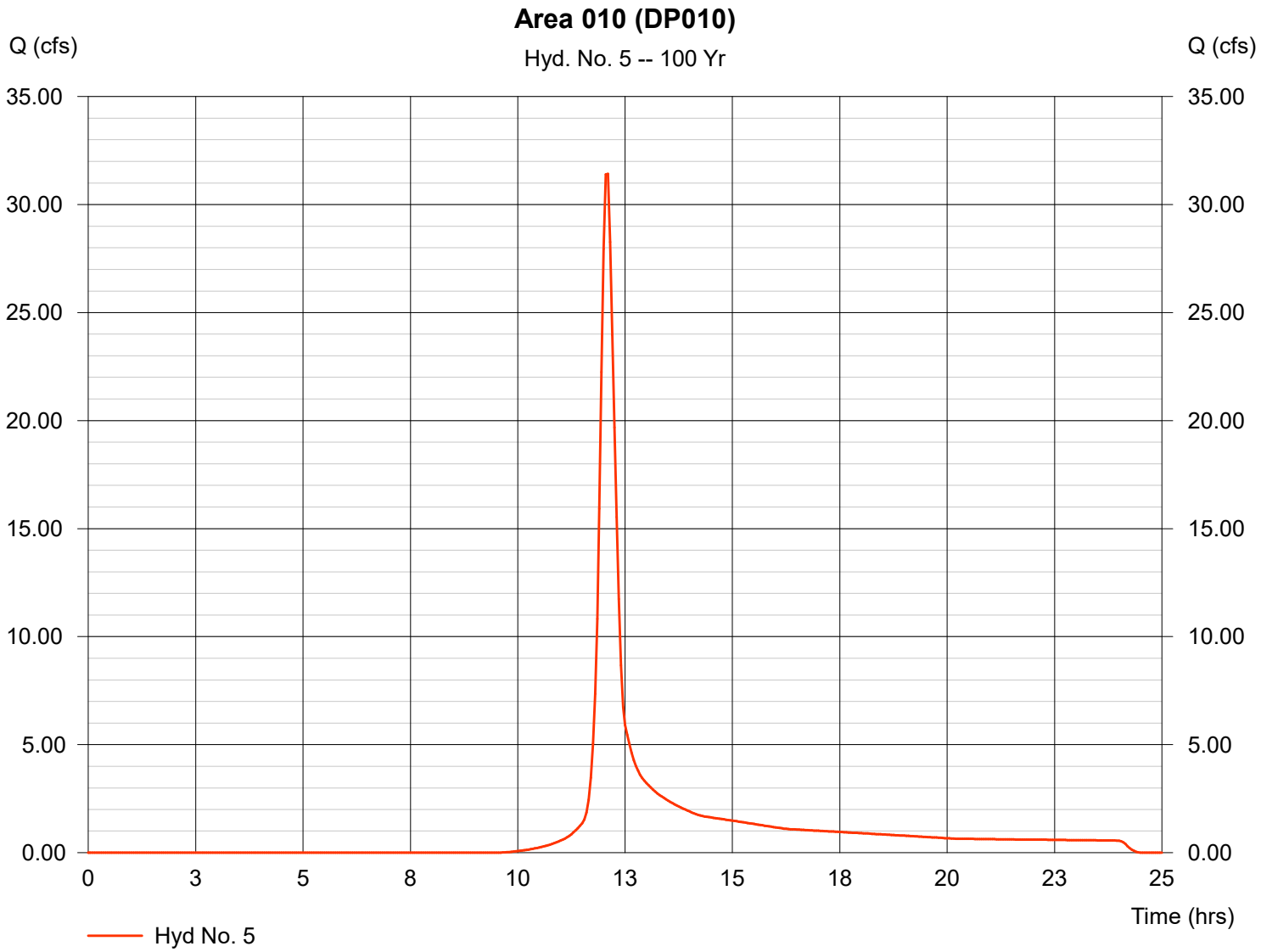
Hydraflow Hydrographs by Intelisolve | Friday, Sep 8 2023, 4:19 PM

Hyd. No. 5

Area 010 (DP010)

Hydrograph type	= SCS Runoff	Peak discharge	= 31.42 cfs
Storm frequency	= 100 yrs	Time interval	= 3 min
Drainage area	= 8.670 ac	Curve number	= 63
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 19.70 min
Total precip.	= 7.33 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 102,234 cuft



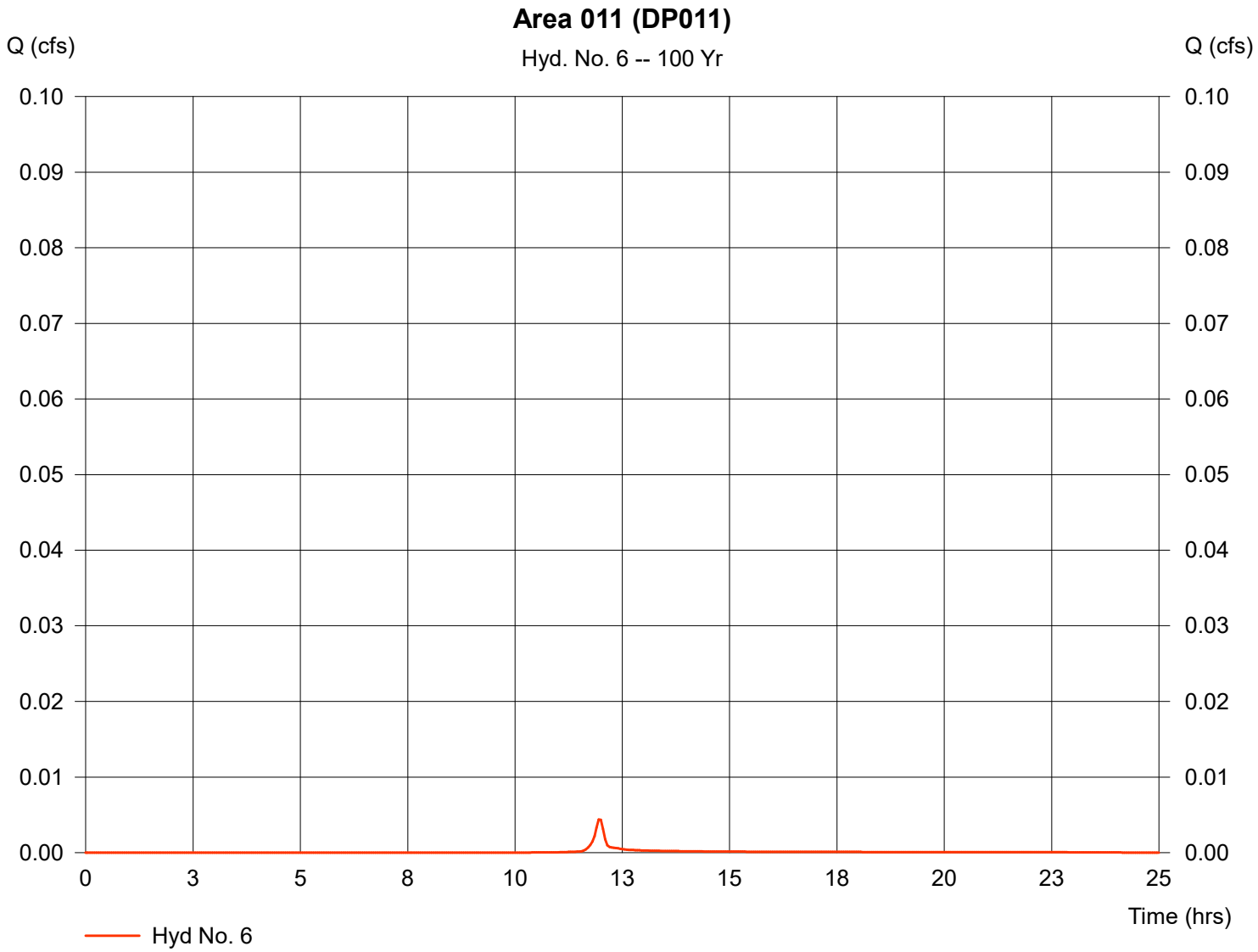
Hydrograph Plot

Hyd. No. 6

Area 011 (DP011)

Hydrograph type	= SCS Runoff	Peak discharge	= 0.00 cfs
Storm frequency	= 100 yrs	Time interval	= 3 min
Drainage area	= 0.001 ac	Curve number	= 61
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 5.00 min
Total precip.	= 7.33 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 10 cuft



Hydrograph Plot

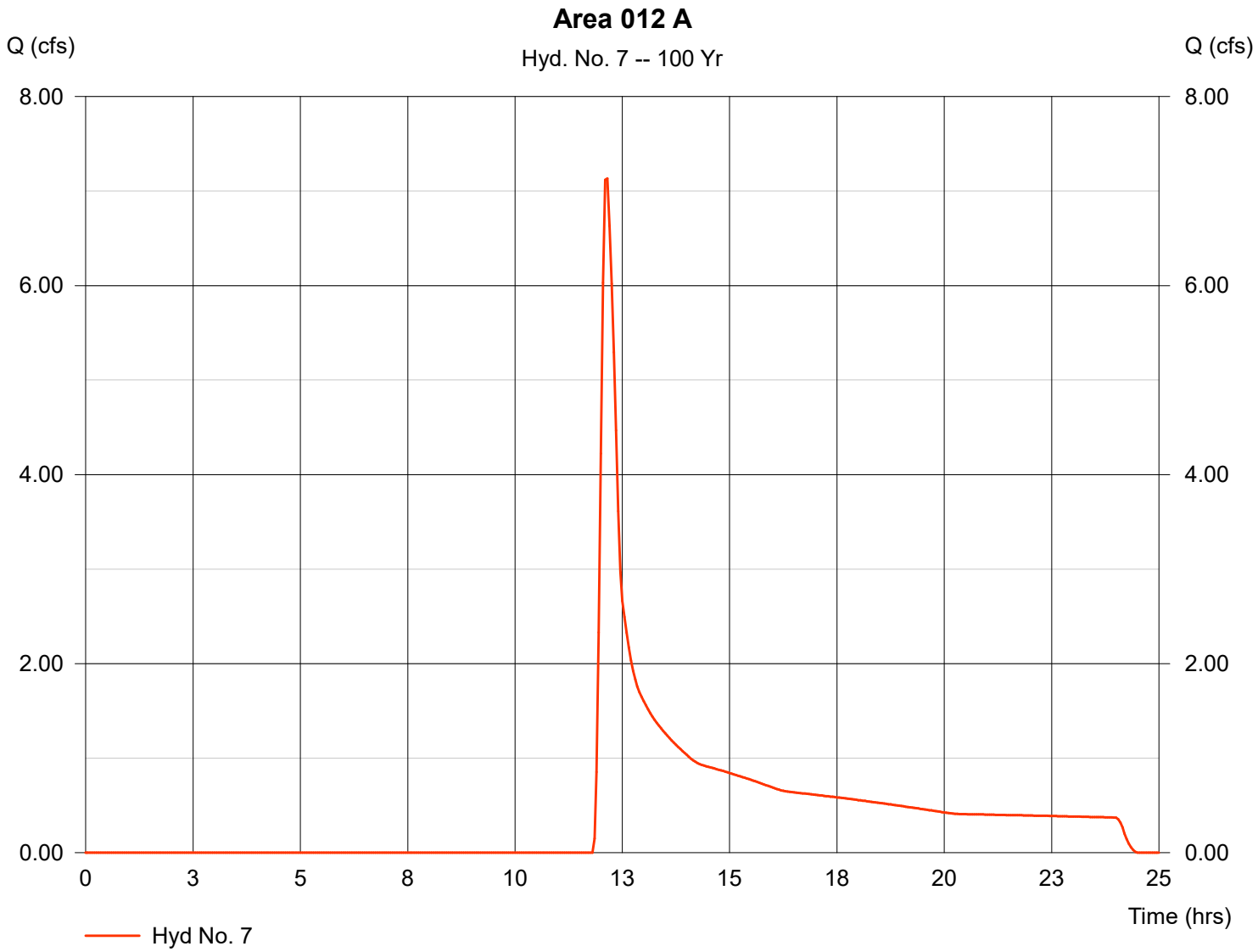
Hydraflow Hydrographs by Intelisolve | Friday, Sep 8 2023, 4:20 PM

Hyd. No. 7

Area 012 A

Hydrograph type	= SCS Runoff	Peak discharge	= 7.13 cfs
Storm frequency	= 100 yrs	Time interval	= 3 min
Drainage area	= 11.610 ac	Curve number	= 39
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 15.10 min
Total precip.	= 7.33 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 38,667 cuft



Hydrograph Plot

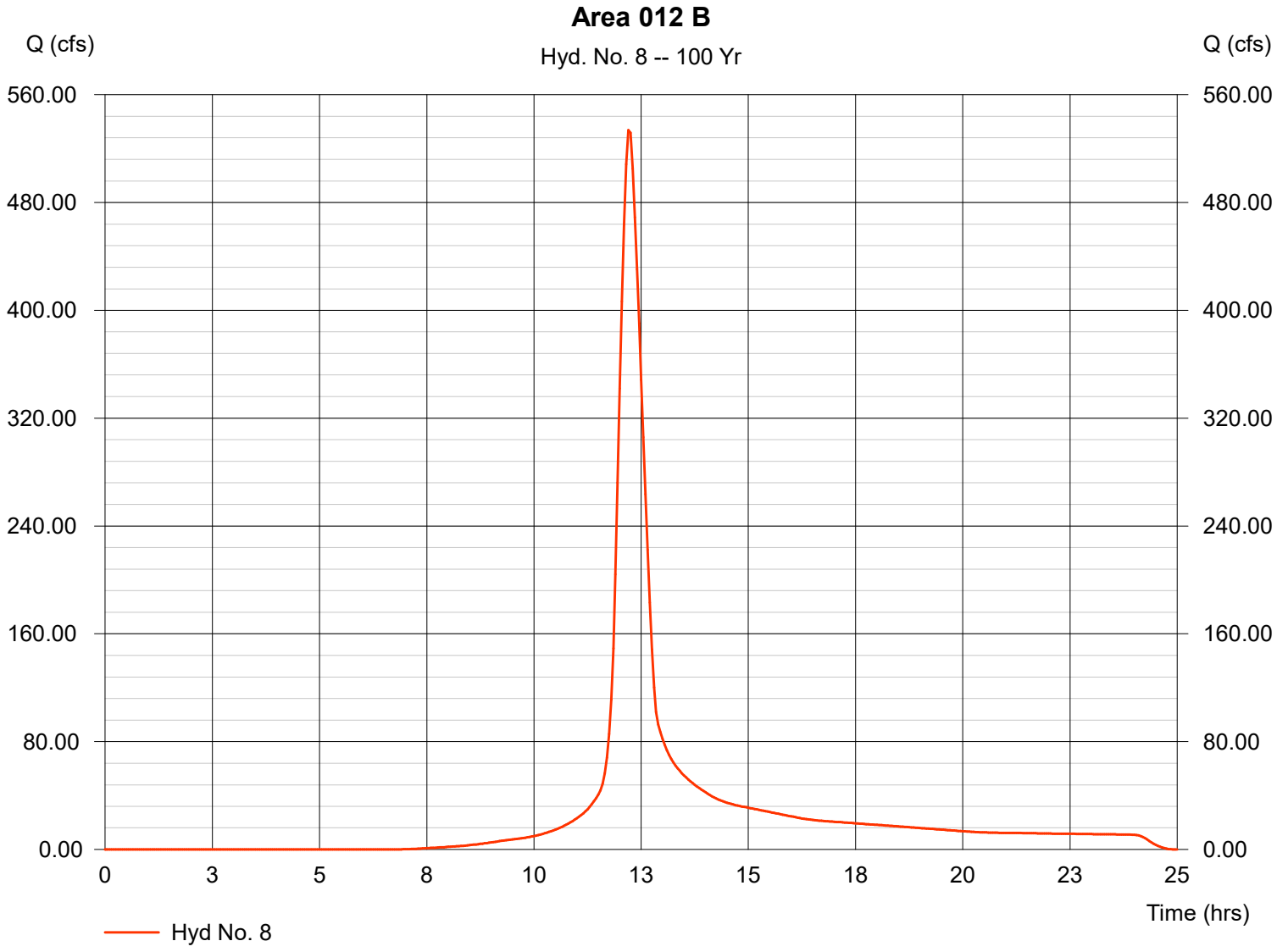
Hydraflow Hydrographs by Intelisolve | Friday, Sep 8 2023, 4:20 PM

Hyd. No. 8

Area 012 B

Hydrograph type	= SCS Runoff	Peak discharge	= 533.66 cfs
Storm frequency	= 100 yrs	Time interval	= 3 min
Drainage area	= 146.030 ac	Curve number	= 75
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 32.20 min
Total precip.	= 7.33 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 2,396,423 cuft



Hydrograph Plot

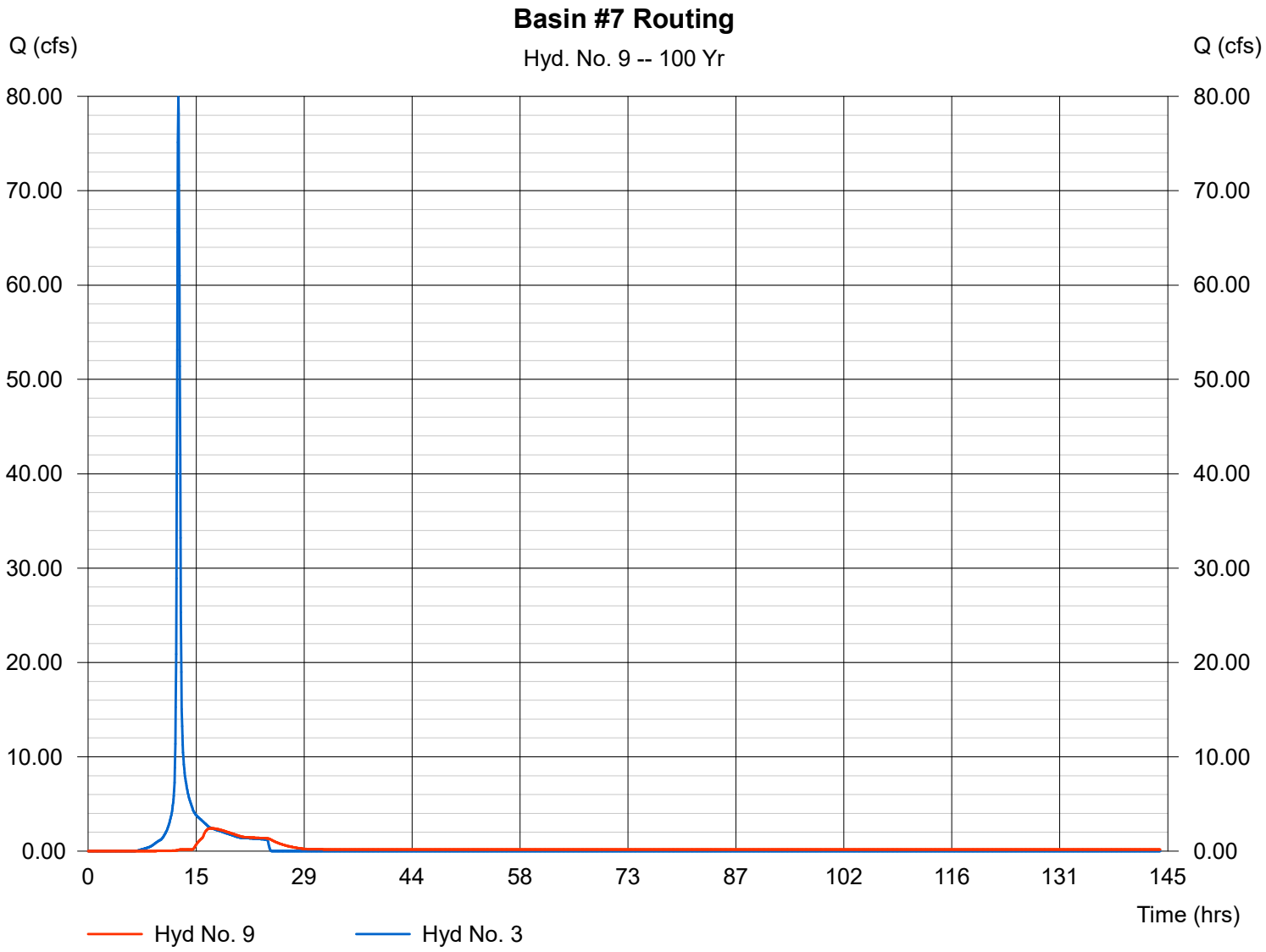
Hydraflow Hydrographs by Intelisolve | Friday, Sep 8 2023, 4:20 PM

Hyd. No. 9

Basin #7 Routing

Hydrograph type	=	Reservoir	Peak discharge	=	2.43 cfs
Storm frequency	=	100 yrs	Time interval	=	3 min
Inflow hyd. No.	=	3	Max. Elevation	=	683.64 ft
Reservoir name	=	Detention Basin #7	Max. Storage	=	221,025 cuft

Storage Indication method used. | Hydrograph Volume = 146,389 cuft



Pond Report

Pond No. 1 - Detention Basin #7

Pond Data

Pond storage is based on known contour areas. Average end area method used.

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	680.00	56,628	0	0
2.00	682.00	60,984	117,612	117,612
4.00	684.00	65,340	126,324	243,936
6.00	686.00	74,052	139,392	383,328

Culvert / Orifice Structures

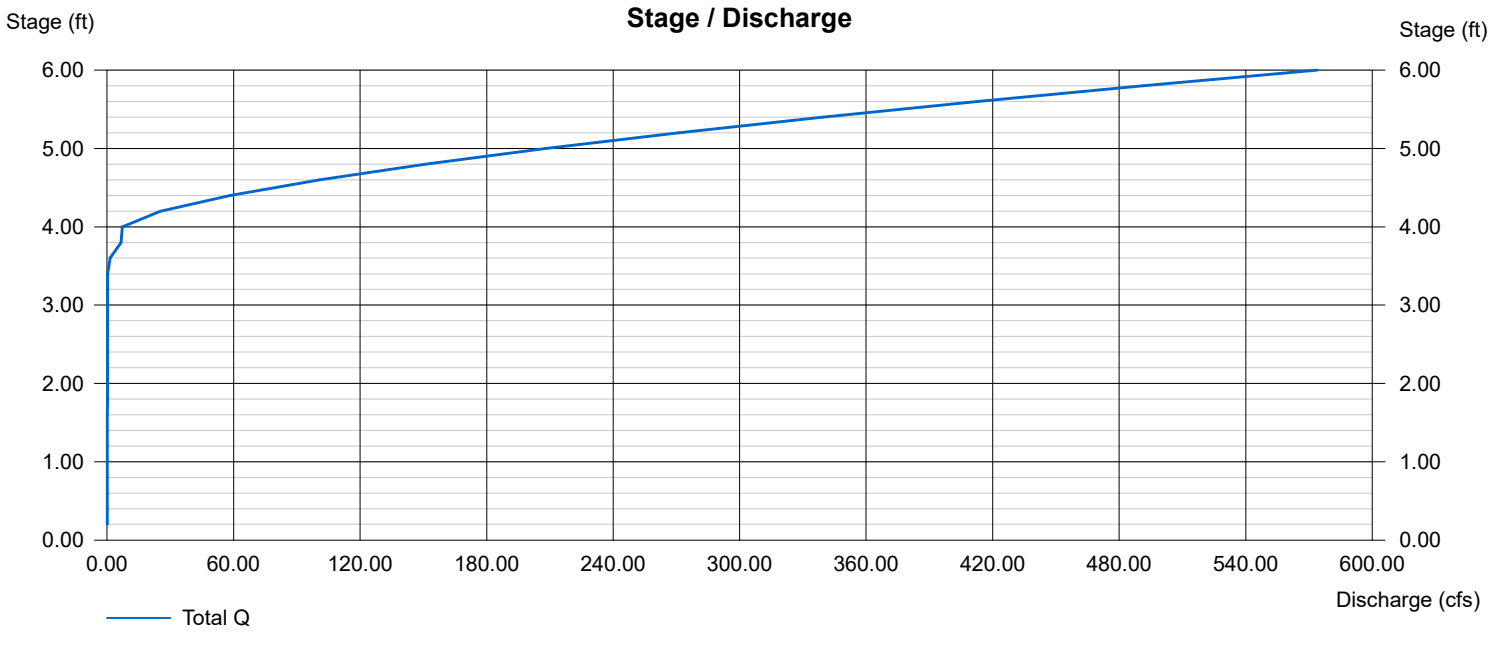
	[A]	[B]	[C]	[D]
Rise (in)	= 12.00	2.00	0.00	0.00
Span (in)	= 12.00	2.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 679.50	680.00	0.00	0.00
Length (ft)	= 48.00	0.00	0.00	0.00
Slope (%)	= 1.04	0.00	0.00	0.00
N-Value	= .013	.013	.000	.000
Orif. Coeff.	= 0.60	0.60	0.00	0.00
Multi-Stage	= n/a	Yes	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 12.00	60.00	0.00	0.00
Crest El. (ft)	= 683.50	684.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	0.00	0.00
Weir Type	= Riser	Ciplti	---	---
Multi-Stage	= Yes	No	No	No

Exfiltration = 0.000 in/hr (Contour) Tailwater Elev. = 0.00 ft

Note: Culvert/Orifice outflows have been analyzed under inlet and outlet control.



Hydrograph Plot

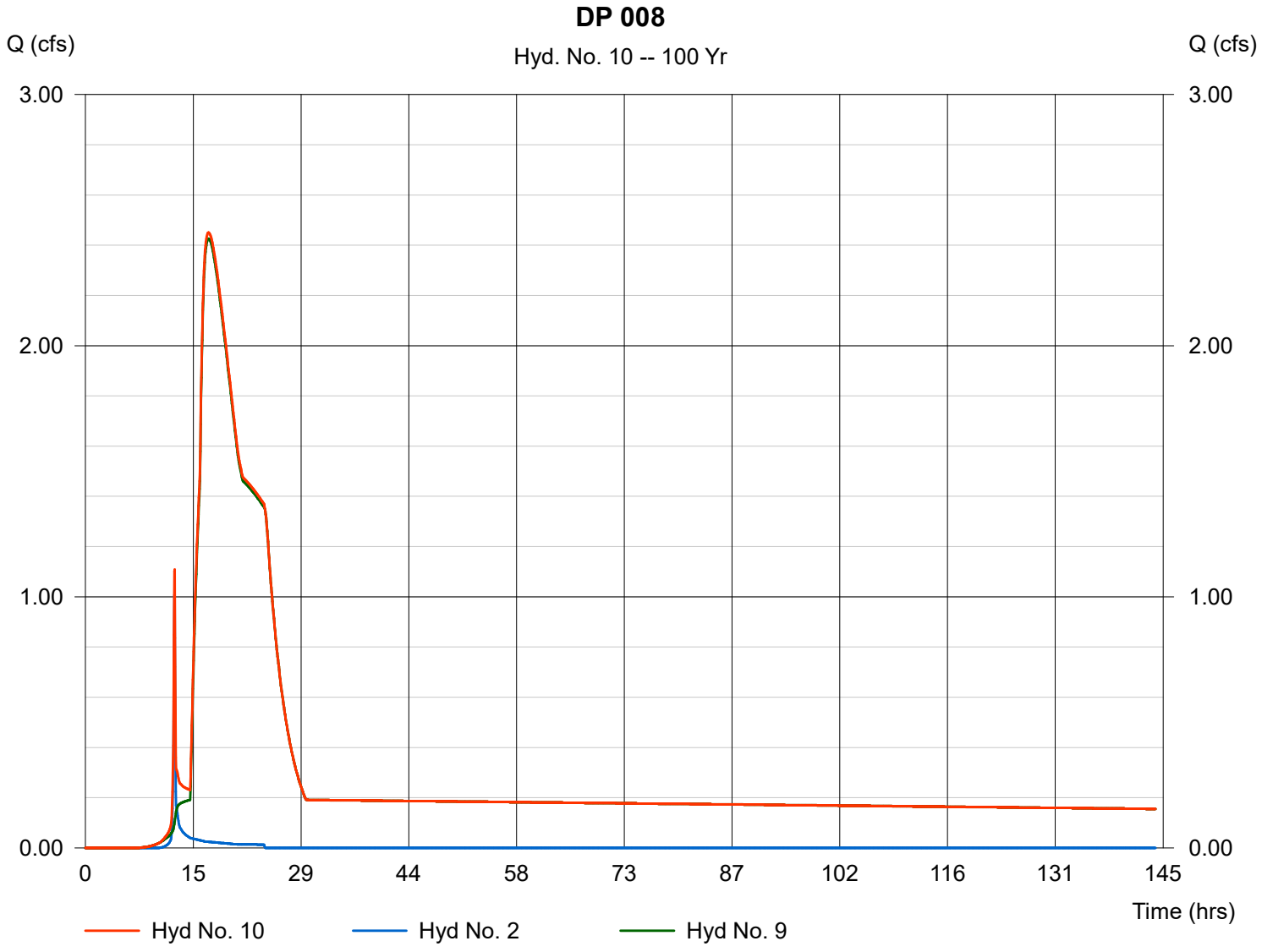
Hydraflow Hydrographs by Intelisolve | Friday, Sep 8 2023, 4:20 PM

Hyd. No. 10

DP 008

Hydrograph type	= Combine	Peak discharge	= 2.45 cfs
Storm frequency	= 100 yrs	Time interval	= 3 min
Inflow hyds.	= 2, 9		

Hydrograph Volume = 148,692 cuft



Hydrograph Plot

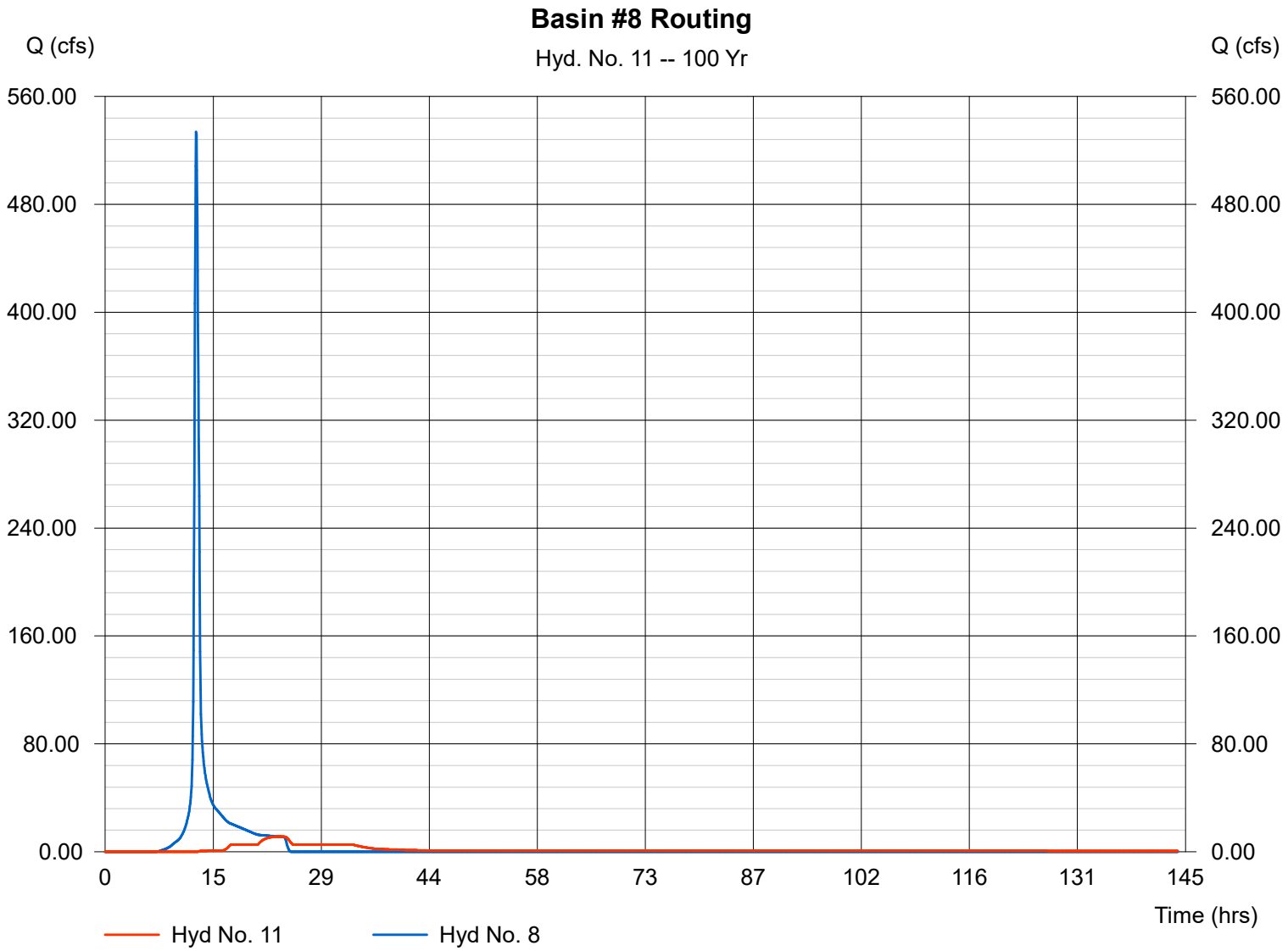
Hydraflow Hydrographs by Intelisolve | Friday, Sep 8 2023, 4:20 PM

Hyd. No. 11

Basin #8 Routing

Hydrograph type	=	Reservoir	Peak discharge	=	11.22 cfs
Storm frequency	=	100 yrs	Time interval	=	3 min
Inflow hyd. No.	=	8	Max. Elevation	=	334.92 ft
Reservoir name	=	Detention Basin #8	Max. Storage	=	2,167,104 cuft

Storage Indication method used. | Hydrograph Volume = 771,475 cuft



Pond Report

Pond No. 2 - Detention Basin #8

Pond Data

Pond storage is based on known contour areas. Average end area method used.

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	322.00	147,153	0	0
2.00	324.00	153,295	300,448	300,448
4.00	326.00	159,553	312,848	613,296
6.00	328.00	165,929	325,482	938,778
8.00	330.00	172,418	338,347	1,277,125
10.00	332.00	179,015	351,433	1,628,558
12.00	334.00	185,718	364,733	1,993,291
14.00	336.00	192,475	378,193	2,371,484

Culvert / Orifice Structures

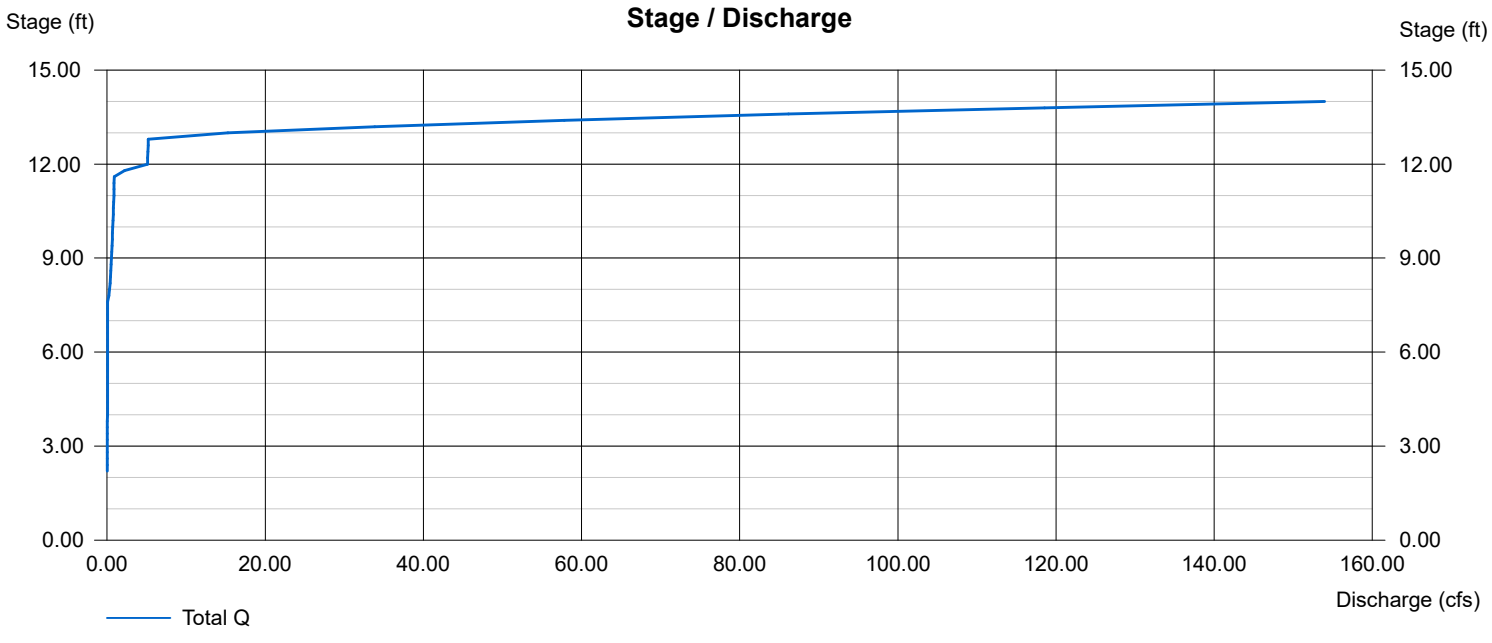
	[A]	[B]	[C]	[D]
Rise (in)	= 8.00	1.00	4.00	0.00
Span (in)	= 8.00	1.00	4.00	0.00
No. Barrels	= 1	1	1	0
Invert El. (ft)	= 320.00	324.00	329.50	0.00
Length (ft)	= 75.00	0.00	0.00	0.00
Slope (%)	= 6.67	0.00	0.00	0.00
N-Value	= .013	.013	.013	.000
Orif. Coeff.	= 0.60	0.60	0.60	0.00
Multi-Stage	= n/a	Yes	Yes	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 12.00	34.00	0.00	0.00
Crest El. (ft)	= 333.70	334.80	0.00	0.00
Weir Coeff.	= 3.33	3.33	0.00	0.00
Weir Type	= Riser	Ciplti	---	---
Multi-Stage	= Yes	No	No	No

Exfiltration = 0.000 in/hr (Contour) Tailwater Elev. = 0.00 ft

Note: Culvert/Orifice outflows have been analyzed under inlet and outlet control.



Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

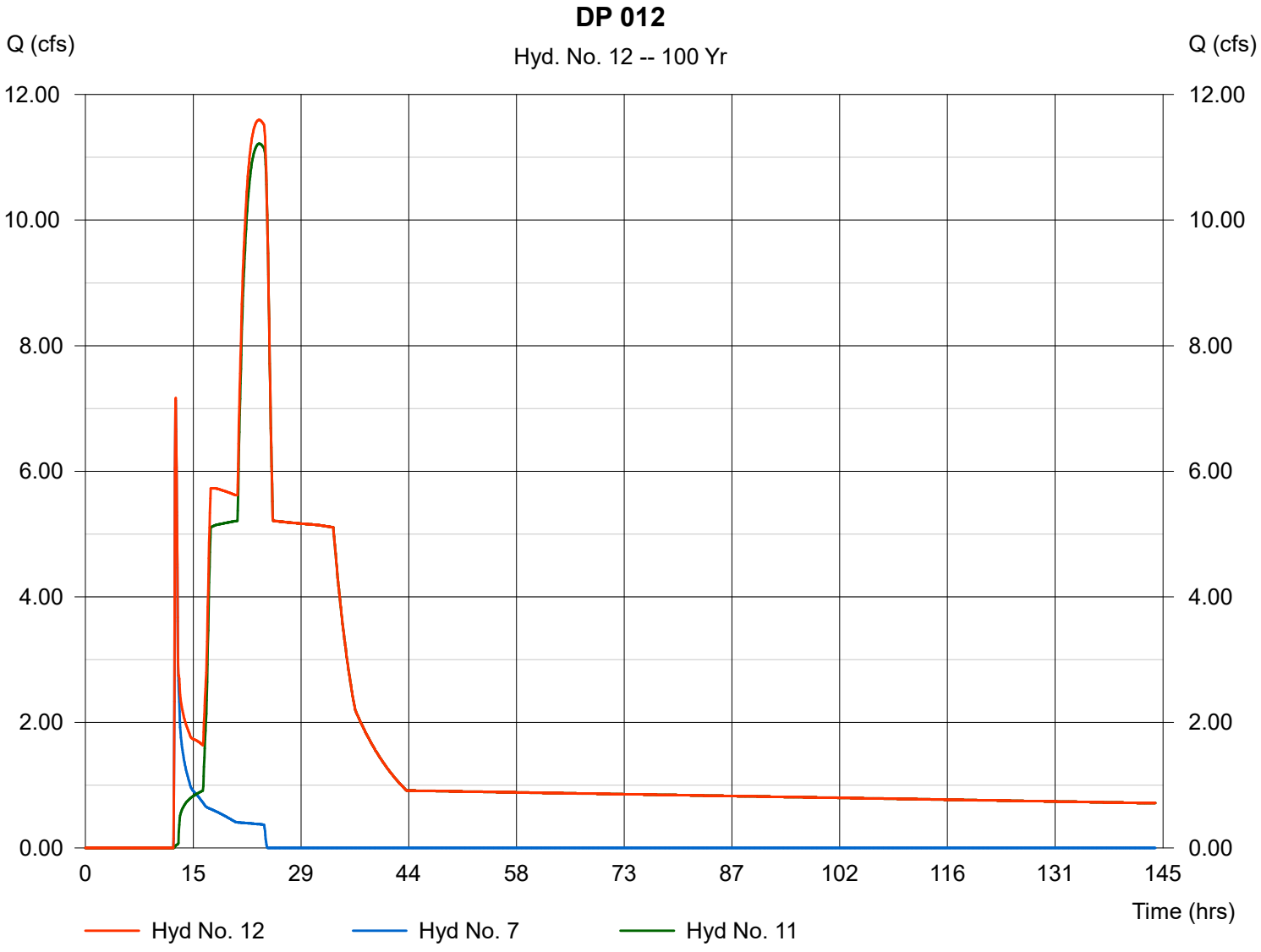
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Hyd. No. 12

DP 012

Hydrograph type	= Combine	Peak discharge	= 11.59 cfs
Storm frequency	= 100 yrs	Time interval	= 3 min
Inflow hyds.	= 7, 11		

Hydrograph Volume = 810,142 cuft



Hydrograph Plot

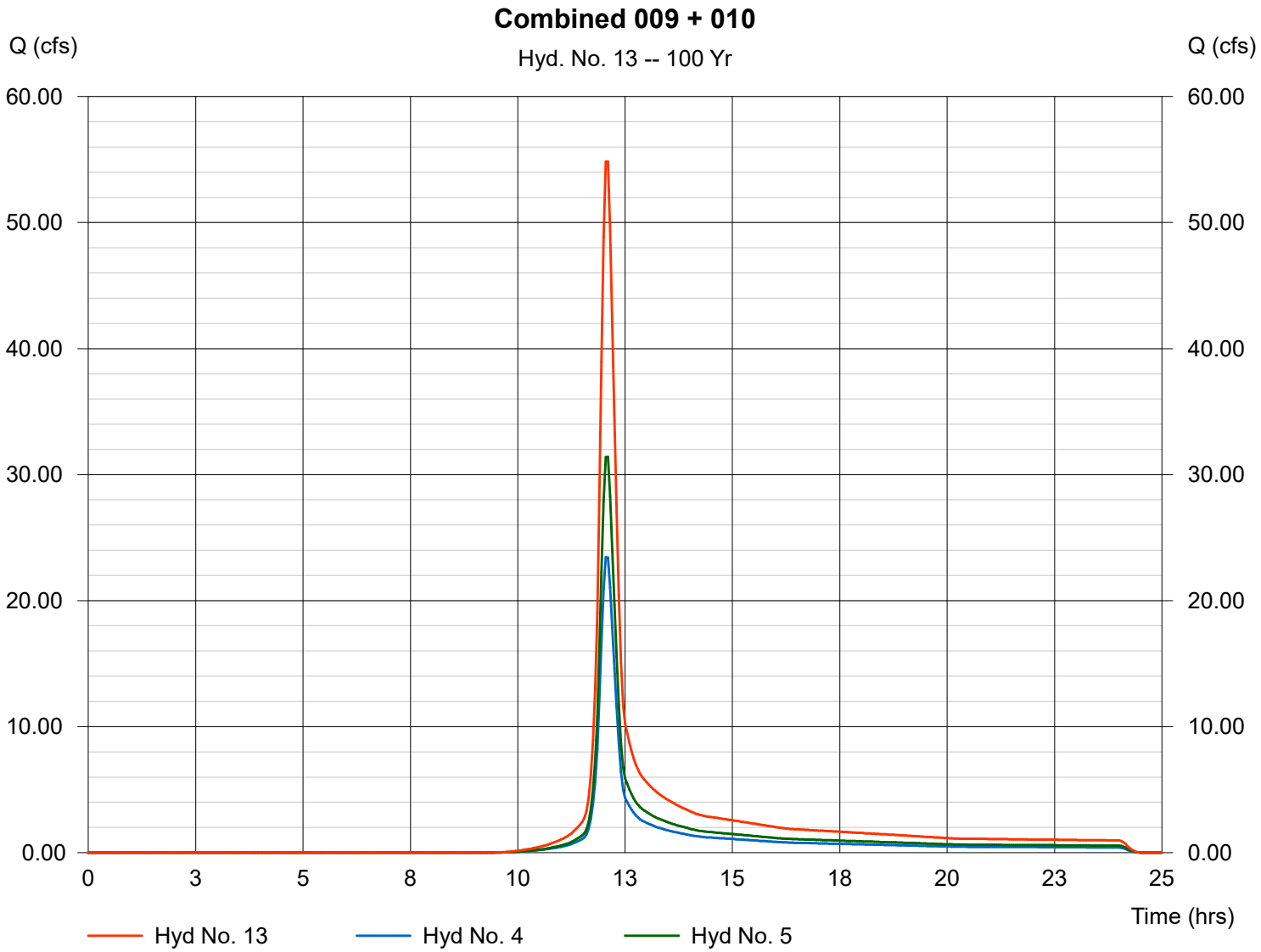
Hydraflow Hydrographs by Intelisolve | Friday, Sep 8 2023, 4:20 PM

Hyd. No. 13

Combined 009 + 010

Hydrograph type	= Combine	Peak discharge	= 54.84 cfs
Storm frequency	= 100 yrs	Time interval	= 3 min
Inflow hyds.	= 4, 5		

Hydrograph Volume = 178,258 cuft



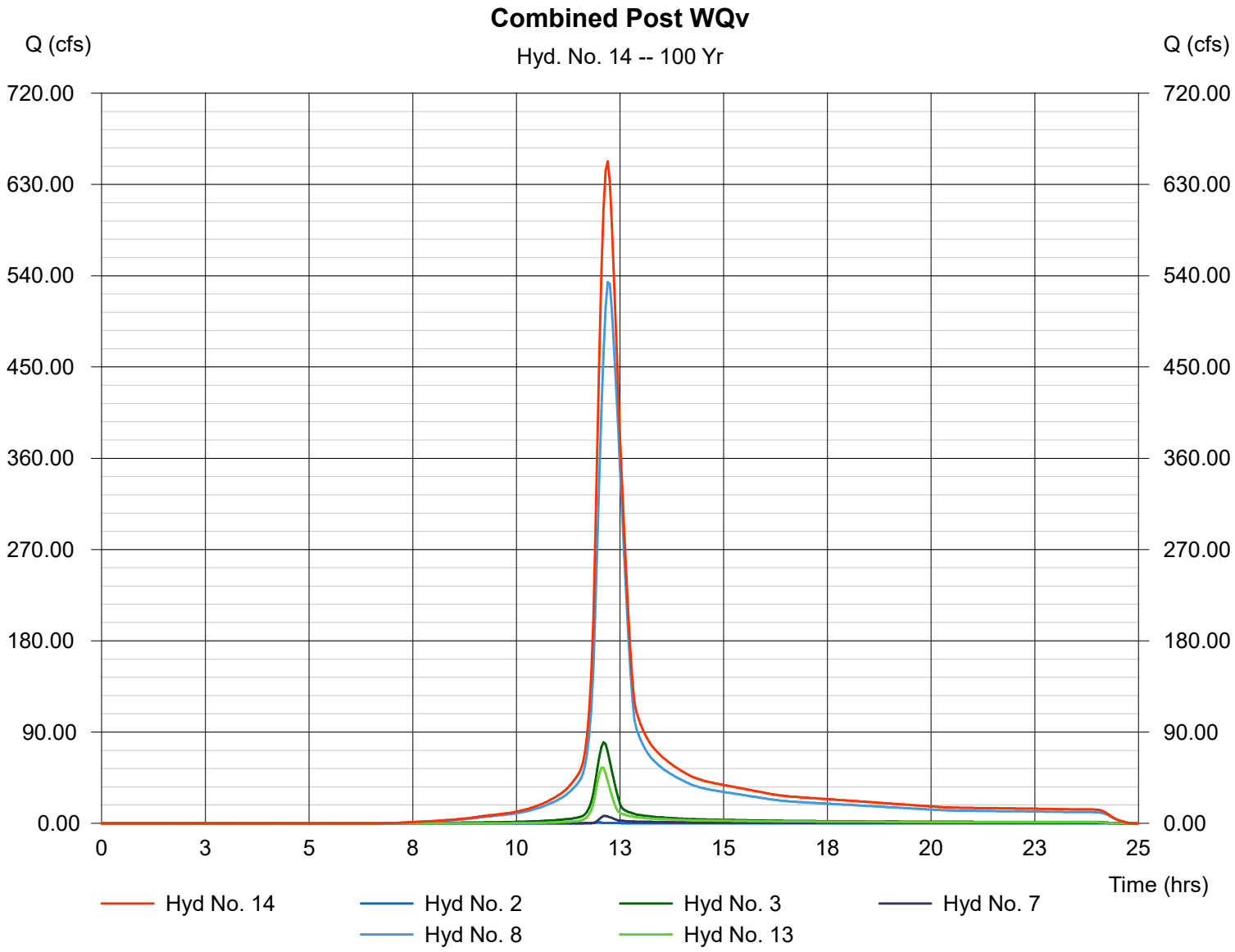
Hydrograph Plot

Hyd. No. 14

Combined Post WQv

Hydrograph type	=	Combine	Peak discharge	=	652.82 cfs
Storm frequency	=	100 yrs	Time interval	=	3 min
Inflow hyds.	=	2, 3, 7, 8, 13			

Hydrograph Volume = 2,896,736 cuft



SECTION 10

APPENDIX I

Stormwater Detention Basin

APPENDIX I

STORMWATER DETENTION BASINS

No modifications are proposed to existing Basins #1, #2, #3, #4 and #6. Two (2) new stormwater dry extended detention basins have been designed to manage runoff from the proposed Phase V Expansion. During construction activities, the basins will serve as sedimentation basins. Details associated with the sedimentation basin are included within the Erosion and Sediment Control Plan Narrative Form I document of the Solid Waste Major Permit Modification Application. Upon completion of landfill operations onsite, the sediment basin will be converted to a dry extended detention basin. The permanent detention basin is the subject of this report and is what is detailed on the Post Construction Stormwater Management Plans. The detention basin will also serve to meet the water quality requirements of the Ordinance.

Based upon the routing calculations provided in Appendix H the following are peak stages within Basins #7 and #8.

Basin #7	
Storm Event	**Peak Stage**
2 yr. – 24 hr.	681.15
10 yr. – 24 hr.	682.25
25 yr. – 24 hr.	683.02
100 yr. – 24 hr.	683.64

Basin #8	
Storm Event	**Peak Stage**
2 yr. – 24 hr.	325.80
10 yr. – 24 hr.	329.33
25 yr. – 24 hr.	331.72
100 yr. – 24 hr.	334.92

Printouts for the routing of each storm event are attached hereto.

Basin Design Requirements and References:

Township of Lower Saucon PA, Part II General Legislation, Stormwater Management, Article III Stormwater Management, SS 137-18 Detention Basins. Section O specifies the following; All stormwater detention facilities shall provide a minimum 1.0 foot freeboard above the maximum pool elevation associated with the two-year through twenty-five-year runoff events. A 0.5 foot freeboard shall be provided above the maximum pool elevation of the one-hundred-year runoff

event. The freeboard shall be measured from the maximum pool elevation to the elevation of the emergency spillway. The two-year through one-hundred-year storm events shall be controlled by the primary outlet structure. An emergency spillway for each basin shall be designed to pass the one-hundred-year return frequency storm peak basin inflow rate, as if the basin were full prior to the storm, with a minimum 0.5 foot freeboard measured to the top of basin. The freeboard criteria shall be met considering any off-site areas tributary to the basin as developed, as applicable. If this detention facility is considered to be a dam as per DEP Chapter 105, the design of the facility must be consistent with the Chapter 105 regulations, and may be required to pass a storm greater than the one-hundred-year event.

Leigh Valley Planning Commission – administering the Saucon Creek and Fry's Run Watershed Act 167 Storm Water Management Ordinance, Article III Stormwater Management Requirements, Section 304 Calculation Methodology, Item C; All storm water detention facilities shall provide a minimum 1.0 foot freeboard above the maximum pool elevation associated with the 2 through 25-year runoff events. An emergency spillway shall be designed to pass the 100-year runoff event with a minimum 0.5 foot freeboard.

The maximum pool elevations as detailed within Basin #7 and #8 Routing Computations and are outlined above. The Basin #7 and #8 Emergency Spillway Elevations are proposed at 684.00 and 334.80, respectively. Thus, 1.0' of freeboard is provided for the 2 – 25-year events (minimum 1.0') and 0.5' of freeboard is provided for the 100-year event (1.08'). All events are passed by the Principle Spillway and the Emergency Spillway is designed to pass the post 100-year rate of runoff with 0.5' of freeboard to the top of the berm as detailed in Appendix M.

Basin Design Requirements are met as detailed within both the PCSM Report Narrative and supporting Appendices.

Refer to attached Basin Pond Reports for all design parameters as detailed on the PCSM Plans.

SECTION 10

APPENDIX J

Stormwater Channels

Structure Detail:

Structure #1 (Vegetated Channel)

MAX BENCH CHANNEL – MAX DRAINAGE AREA TO A BENCH ANALYSIS (2.12 AC.)

Triangular Vegetated Channel Inputs:

Material: Grass mixture

Left Sideslope Ratio	Right Sideslope Ratio	Slope (%)	Retardance Classes	Freeboard Depth (ft)	Freeboard % of Depth	Freeboard Mult. x (VxD)	Limiting Velocity (fps)
3.0:1	5.0:1	3.0	D, D	1.00			4.0

Vegetated Channel Results:

	Stability Class D w/o Freeboard	Stability Class D w/ Freeboard	Capacity Class D w/o Freeboard	Capacity Class D w/ Freeboard
Design Discharge:	6.81 cfs		6.81 cfs	
Depth:	0.84 ft	1.84 ft	0.84 ft	1.84 ft
Top Width:	6.71 ft	14.71 ft	6.71 ft	14.71 ft
Velocity:	2.42 fps		2.42 fps	
X-Section Area:	2.82 sq ft		2.82 sq ft	
Hydraulic Radius:	0.407 ft		0.407 ft	
Froude Number:	0.66		0.66	
Roughness Coefficient:	0.0586		0.0586	

Subwatershed Hydrology Detail:

Stru #	SWS #	SWS Area (ac)	Time of Conc (hrs)	Musk K (hrs)	Musk X	Curve Number	UHS	Peak Discharge (cfs)	Runoff Volume (ac-ft)
#1	1	2.210	0.290	0.000	0.000	79.000	M	6.81	0.734
	Σ	**2.210**						**6.81**	**0.734**

Structure Detail:

Structure #1 (Riprap Channel)

CHANNEL 5A (1+00 - 7+50) (R-3 RIPRAP)

Trapezoidal Riprap Channel Inputs:

Material: Riprap

Bottom Width (ft)	Left Sideslope Ratio	Right Sideslope Ratio	Slope (%)	Freeboard Depth (ft)	Freeboard % of Depth	Freeboard Mult. x (VxD)
4.00	2.0:1	2.0:1	10.0	1.00		

Riprap Channel Results:

PADER Method - Steep Slope Design

	w/o Freeboard	w/ Freeboard
Design Discharge:	18.92 cfs	
Depth:	0.57 ft	1.57 ft
Top Width:	6.29 ft	10.29 ft
Velocity:	6.42 fps	
X-Section Area:	2.94 sq ft	
Hydraulic Radius:	0.449 ft	
Froude Number:	1.65	
Manning's n:	0.0430	
Dmin:	2.00 in	
D50:	3.00 in	
Dmax:	4.50 in	

Structure Detail:

Structure #1 (Vegetated Channel)

CHANNEL 5A (7+50 - 9+81)

Trapezoidal Vegetated Channel Inputs:

Material: Grass mixture

Bottom Width (ft)	Left Sideslope Ratio	Right Sideslope Ratio	Slope (%)	Retardance Classes	Freeboard Depth (ft)	Freeboard % of Depth	Freeboard Mult. x (VxD)	Limiting Velocity (fps)
6.00	2.0:1	2.0:1	0.4	E, E	1.00			5.0

Vegetated Channel Results:

	Stability Class E w/o Freeboard	Stability Class E w/ Freeboard	Capacity Class E w/o Freeboard	Capacity Class E w/ Freeboard
Design Discharge:	18.92 cfs		18.92 cfs	
Depth:	0.99 ft	1.99 ft	0.99 ft	1.99 ft
Top Width:	9.96 ft	13.96 ft	9.96 ft	13.96 ft
Velocity:	2.40 fps		2.40 fps	
X-Section Area:	7.89 sq ft		7.89 sq ft	
Hydraulic Radius:	0.757 ft		0.757 ft	
Froude Number:	0.47		0.47	
Roughness Coefficient:	0.0326		0.0326	

Subwatershed Hydrology Detail:

Stru #	SWS #	SWS Area (ac)	Time of Conc (hrs)	Musk K (hrs)	Musk X	Curve Number	UHS	Peak Discharge (cfs)	Runoff Volume (ac-ft)
#1	1	3.840	0.080	0.000	0.000	80.000	M	18.92	1.631
	Σ	**3.840**						**18.92**	**1.631**

Structure Detail:

Structure #1 (Vegetated Channel)

CHANNEL 5B

Trapezoidal Vegetated Channel Inputs:

Material: Grass mixture

Bottom Width (ft)	Left Sideslope Ratio	Right Sideslope Ratio	Slope (%)	Retardance Classes	Freeboard Depth (ft)	Freeboard % of Depth	Freeboard Mult. x (VxD)	Limiting Velocity (fps)
4.00	2.0:1	2.0:1	2.1	D, D	1.00			5.0

Vegetated Channel Results:

	Stability Class D w/o Freeboard	Stability Class D w/ Freeboard	Capacity Class D w/o Freeboard	Capacity Class D w/ Freeboard
Design Discharge:	17.08 cfs		17.08 cfs	
Depth:	0.86 ft	1.86 ft	0.86 ft	1.86 ft
Top Width:	7.46 ft	11.46 ft	7.46 ft	11.46 ft
Velocity:	3.45 fps		3.45 fps	
X-Section Area:	4.96 sq ft		4.96 sq ft	
Hydraulic Radius:	0.630 ft		0.630 ft	
Froude Number:	0.74		0.74	
Roughness Coefficient:	0.0460		0.0460	

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Subwatershed Hydrology Detail:

Stru #	SWS #	SWS Area (ac)	Time of Conc (hrs)	Musk K (hrs)	Musk X	Curve Number	UHS	Peak Discharge (cfs)	Runoff Volume (ac-ft)
#1	1	5.710	0.360	0.000	0.000	80.000	M	17.08	1.940
	Σ	**5.710**						**17.08**	**1.940**

Structure Detail:

Structure #2 (Riprap Channel)

CHANNEL 5C (R-3 RIPRAP)

Trapezoidal Riprap Channel Inputs:

Material: Riprap

Bottom Width (ft)	Left Sideslope Ratio	Right Sideslope Ratio	Slope (%)	Freeboard Depth (ft)	Freeboard % of Depth	Freeboard Mult. x (VxD)
6.00	2.0:1	2.0:1	2.4	1.00		

Riprap Channel Results:

PADER Method - Steep Slope Design

	w/o Freeboard	w/ Freeboard
Design Discharge:	48.27 cfs	
Depth:	1.08 ft	2.08 ft
Top Width:	10.34 ft	14.34 ft
Velocity:	5.45 fps	
X-Section Area:	8.86 sq ft	
Hydraulic Radius:	0.816 ft	
Froude Number:	1.04	
Manning's n:	0.0370	
Dmin:	2.00 in	
D50:	3.00 in	
Dmax:	4.50 in	

Subwatershed Hydrology Detail:

Stru #	SWS #	SWS Area (ac)	Time of Conc (hrs)	Musk K (hrs)	Musk X	Curve Number	UHS	Peak Discharge (cfs)	Runoff Volume (ac-ft)
#1	1	12.720	0.120	0.000	0.000	66.000	M	48.27	3.763
	Σ	**12.720**						**48.27**	**3.763**

Structure Detail:

Structure #2 (Riprap Channel)

CHANNEL 5D (PART 1) (R-5 RIPRAP)

Trapezoidal Riprap Channel Inputs:

Material: Riprap

Bottom Width (ft)	Left Sideslope Ratio	Right Sideslope Ratio	Slope (%)	Freeboard Depth (ft)	Freeboard % of Depth	Freeboard Mult. x (VxD)
10.00	2.0:1	2.0:1	15.0	1.00		

Riprap Channel Results:

PADER Method - Steep Slope Design

	w/o Freeboard	w/ Freeboard
Design Discharge:	119.99 cfs	
Depth:	1.09 ft	2.09 ft
Top Width:	14.35 ft	18.35 ft
Velocity:	9.06 fps	
X-Section Area:	13.25 sq ft	
Hydraulic Radius:	0.891 ft	
Froude Number:	1.66	
Manning's n:	0.0590	
Dmin:	5.00 in	
D50:	9.00 in	
Dmax:	12.00 in	

Subwatershed Hydrology Detail:

Stru #	SWS #	SWS Area (ac)	Time of Conc (hrs)	Musk K (hrs)	Musk X	Curve Number	UHS	Peak Discharge (cfs)	Runoff Volume (ac-ft)
#2	1	49.190	0.540	0.000	0.000	78.000	M	119.99	15.923
	Σ	**49.190**						**119.99**	**15.923**

Structure Detail:

Structure #2 (Riprap Channel)

CHANNEL 5D (PART 2) (R-4 RIPRAP)

Trapezoidal Riprap Channel Inputs:

Material: Riprap

Bottom Width (ft)	Left Sideslope Ratio	Right Sideslope Ratio	Slope (%)	Freeboard Depth (ft)	Freeboard % of Depth	Freeboard Mult. x (VxD)
10.00	2.0:1	2.0:1	1.5	1.00		

Riprap Channel Results:

PADER Method - Steep Slope Design

	w/o Freeboard	w/ Freeboard
Design Discharge:	249.81 cfs	
Depth:	2.53 ft	3.53 ft
Top Width:	20.12 ft	24.12 ft
Velocity:	6.56 fps	
X-Section Area:	38.10 sq ft	
Hydraulic Radius:	1.788 ft	
Froude Number:	0.84	
Manning's n:	0.0410	
Dmin:	3.00 in	
D50:	6.00 in	
Dmax:	9.00 in	

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Subwatershed Hydrology Detail:

Stru #	SWS #	SWS Area (ac)	Time of Conc (hrs)	Musk K (hrs)	Musk X	Curve Number	UHS	Peak Discharge (cfs)	Runoff Volume (ac-ft)
#2	1	102.410	0.540	0.000	0.000	78.000	M	249.81	33.152
	Σ	**102.410**						**249.81**	**33.152**

Structure Detail:

Structure #2 (Riprap Channel)

CHANNEL 5E (R-3 RIPRAP)

Trapezoidal Riprap Channel Inputs:

Material: Riprap

Bottom Width (ft)	Left Sideslope Ratio	Right Sideslope Ratio	Slope (%)	Freeboard Depth (ft)	Freeboard % of Depth	Freeboard Mult. x (VxD)
4.00	2.0:1	2.0:1	25.0	1.00		

Riprap Channel Results:

PADER Method - Steep Slope Design

	w/o Freeboard	w/ Freeboard
Design Discharge:	4.74 cfs	
Depth:	0.24 ft	1.24 ft
Top Width:	4.94 ft	8.94 ft
Velocity:	4.51 fps	
X-Section Area:	1.05 sq ft	
Hydraulic Radius:	0.208 ft	
Froude Number:	1.72	
Manning's n:	0.0580	
Dmin:	2.00 in	
D50:	3.00 in	
Dmax:	4.50 in	

Subwatershed Hydrology Detail:

Stru #	SWS #	SWS Area (ac)	Time of Conc (hrs)	Musk K (hrs)	Musk X	Curve Number	UHS	Peak Discharge (cfs)	Runoff Volume (ac-ft)
#2	1	0.990	0.080	0.000	0.000	78.000	M	4.74	0.402
	Σ	**0.990**						**4.74**	**0.402**

Structure Detail:

Structure #2 (Riprap Channel)

CHANNEL 5F (R-4 RIPRAP)

Trapezoidal Riprap Channel Inputs:

Material: Riprap

Bottom Width (ft)	Left Sideslope Ratio	Right Sideslope Ratio	Slope (%)	Freeboard Depth (ft)	Freeboard % of Depth	Freeboard Mult. x (VxD)
4.00	2.0:1	2.0:1	20.0	1.00		

Riprap Channel Results:

PADER Method - Steep Slope Design

	w/o Freeboard	w/ Freeboard
Design Discharge:	25.26 cfs	
Depth:	0.65 ft	1.65 ft
Top Width:	6.60 ft	10.60 ft
Velocity:	7.35 fps	
X-Section Area:	3.44 sq ft	
Hydraulic Radius:	0.498 ft	
Froude Number:	1.79	
Manning's n:	0.0570	
Dmin:	3.00 in	
D50:	6.00 in	
Dmax:	9.00 in	

Subwatershed Hydrology Detail:

Stru #	SWS #	SWS Area (ac)	Time of Conc (hrs)	Musk K (hrs)	Musk X	Curve Number	UHS	Peak Discharge (cfs)	Runoff Volume (ac-ft)
#2	1	5.200	0.100	0.000	0.000	79.000	M	25.26	2.160
	Σ	**5.200**						**25.26**	**2.160**

Structure Detail:

Structure #2 (Riprap Channel)

CHANNEL 5G (R-4 RIPRAP)

Trapezoidal Riprap Channel Inputs:

Material: Riprap

Bottom Width (ft)	Left Sideslope Ratio	Right Sideslope Ratio	Slope (%)	Freeboard Depth (ft)	Freeboard % of Depth	Freeboard Mult. x (VxD)
4.00	2.0:1	2.0:1	11.0	1.00		

Riprap Channel Results:

PADER Method - Steep Slope Design

	w/o Freeboard	w/ Freeboard
Design Discharge:	36.13 cfs	
Depth:	0.89 ft	1.89 ft
Top Width:	7.54 ft	11.54 ft
Velocity:	7.07 fps	
X-Section Area:	5.11 sq ft	
Hydraulic Radius:	0.642 ft	
Froude Number:	1.51	
Manning's n:	0.0520	
Dmin:	3.00 in	
D50:	6.00 in	
Dmax:	9.00 in	

Subwatershed Hydrology Detail:

Stru #	SWS #	SWS Area (ac)	Time of Conc (hrs)	Musk K (hrs)	Musk X	Curve Number	UHS	Peak Discharge (cfs)	Runoff Volume (ac-ft)
#2	1	10.500	0.180	0.000	0.000	79.000	M	36.13	3.533
	Σ	**10.500**						**36.13**	**3.533**

CHANNEL 5H (R-3 RIPRAP)

Material: Riprap

Triangular Channel

Left Sideslope Ratio	Right Sideslope Ratio	Slope (%)	Freeboard Depth (ft)	Freeboard % of Depth	Freeboard Mult. x (VxD)
2.0:1	2.0:1	10.6	1.00		

PADER Method - Steep Slope Design

	w/o Freeboard	w/ Freeboard
Design Discharge:	5.00 cfs	
Depth:	0.68 ft	1.68 ft
Top Width:	2.73 ft	6.73 ft
Velocity:	5.36 fps	
X-Section Area:	0.93 sq ft	
Hydraulic Radius:	0.305 ft	
Froude Number:	1.62	
Manning's n:	0.0410	
Dmin:	2.00 in	
D50:	3.00 in	
Dmax:	4.50 in	

Subwatershed Hydrology Detail:

Stru #	SWS #	SWS Area (ac)	Time of Conc (hrs)	Musk K (hrs)	Musk X	Curve Number	UHS	Peak Discharge (cfs)	Runoff Volume (ac-ft)
#1	1	1.280	0.080	0.000	0.000	61.000	M	4.26	0.322
	Σ	**1.280**						**4.26**	**0.322**

Structure Detail:

Structure #2 (Riprap Channel)

CHANNEL 5I (0+00 - 8+50) (R-4 RIPRAP)

Trapezoidal Riprap Channel Inputs:

Material: Riprap

Bottom Width (ft)	Left Sideslope Ratio	Right Sideslope Ratio	Slope (%)	Freeboard Depth (ft)	Freeboard % of Depth	Freeboard Mult. x (VxD)
6.00	2.0:1	2.0:1	18.0	1.00		

Riprap Channel Results:

PADER Method - Steep Slope Design

	w/o Freeboard	w/ Freeboard
Design Discharge:	41.07 cfs	
Depth:	0.71 ft	1.71 ft
Top Width:	8.84 ft	12.84 ft
Velocity:	7.80 fps	
X-Section Area:	5.27 sq ft	
Hydraulic Radius:	0.574 ft	
Froude Number:	1.78	
Manning's n:	0.0560	
Dmin:	3.00 in	
D50:	6.00 in	
Dmax:	9.00 in	

Structure Detail:

Structure #2 (Riprap Channel)

CHANNEL 5I (8+50 - 10+51) (R-3 RIPRAP)

Trapezoidal Riprap Channel Inputs:

Material: Riprap

Bottom Width (ft)	Left Sideslope Ratio	Right Sideslope Ratio	Slope (%)	Freeboard Depth (ft)	Freeboard % of Depth	Freeboard Mult. x (VxD)
6.00	2.0:1	2.0:1	4.0	1.00		

Riprap Channel Results:

PADER Method - Steep Slope Design

	w/o Freeboard	w/ Freeboard
Design Discharge:	41.07 cfs	
Depth:	0.89 ft	1.89 ft
Top Width:	9.54 ft	13.54 ft
Velocity:	5.97 fps	
X-Section Area:	6.88 sq ft	
Hydraulic Radius:	0.691 ft	
Froude Number:	1.24	
Manning's n:	0.0390	
Dmin:	2.00 in	
D50:	3.00 in	
Dmax:	4.50 in	

Subwatershed Hydrology Detail:

Stru #	SWS #	SWS Area (ac)	Time of Conc (hrs)	Musk K (hrs)	Musk X	Curve Number	UHS	Peak Discharge (cfs)	Runoff Volume (ac-ft)
#2	1	11.860	0.190	0.000	0.000	80.000	M	41.07	4.058
	Σ	**11.860**						**41.07**	**4.058**

Structure Detail:

Structure #1 (Vegetated Channel)

CHANNEL 5J

Trapezoidal Vegetated Channel Inputs:

Material: Smooth brome

Bottom Width (ft)	Left Sideslope Ratio	Right Sideslope Ratio	Slope (%)	Retardance Classes	Freeboard Depth (ft)	Freeboard % of Depth	Freeboard Mult. x (VxD)	Limiting Velocity (fps)
6.00	2.0:1	2.0:1	10.0	E, E	1.00			6.0

Vegetated Channel Results:

	Stability Class E w/o Freeboard	Stability Class E w/ Freeboard	Capacity Class E w/o Freeboard	Capacity Class E w/ Freeboard
Design Discharge:	2.28 cfs		2.28 cfs	
Depth:	0.14 ft	1.14 ft	0.14 ft	1.14 ft
Top Width:	6.55 ft	10.55 ft	6.55 ft	10.55 ft
Velocity:	2.65 fps		2.65 fps	
X-Section Area:	0.86 sq ft		0.86 sq ft	
Hydraulic Radius:	0.130 ft		0.130 ft	
Froude Number:	1.29		1.29	
Roughness Coefficient:	0.0453		0.0453	

Subwatershed Hydrology Detail:

Stru #	SWS #	SWS Area (ac)	Time of Conc (hrs)	Musk K (hrs)	Musk X	Curve Number	UHS	Peak Discharge (cfs)	Runoff Volume (ac-ft)
#1	1	0.450	0.080	0.000	0.000	82.000	M	2.28	0.199
	Σ	**0.450**						**2.28**	**0.199**

TABLE 6.6
Riprap Gradation, Filter Blanket Requirements, Maximum Velocities

Percent Passing (Square Openings)						
Class, Size NO. / **Rock Size (Inches)**	**R-8**	**R-7**	**R-6**	**R-5**	**R-4**	**R-3**
42	100					
30		100				
24	15-50		100			
18		15-50		100		
15	0-15					
12		0-15	15-50		100	
9				15-50		
6			0-15		15-50	100
4				0-15		
3					0-15	15-50
2						0-15
Nominal Placement Thickness (inches)	63	45	36	27	18	9
Filter Stone[1]	AASHTO #1	AASHTO #1	AASHTO #1	AASHTO #3	AASHTO #3	AASHTO #57
V_{max} (ft/sec)	17.0	14.5	13.0	11.5	9.0	6.5

Adapted from PennDOT Pub. 408, Section 703.2(c), Table C

1 This is a general standard. Soil conditions at each site should be analyzed to determine actual filter size. A suitable woven or non-woven geotextile underlayment, used according to the manufacturer's recommendations, may be substituted for the filter stone for gradients < 10%.

TABLE 6.7
Comparison of Various Gradations of Coarse Aggregates

Total Percent Passing															
AASHTO NUMBER	**6 ½**	**4"**	**3 ½"**	**2 ½**	**2"**	**1 ½ "**	**1"**	**3/4 "**	**1/2"**	**3/8"**	**#4**	**#8**	**#16**	**#30**	**#100**
1		100	90-100	25-60		0-15		0-5							
3				100	90-100	35-70	0-15		0-5						
5						100	90-100	20-55	0-10	0-5					
57						100	90-100		25-60		0-10	0-5			
67							100	90-100		20-55	0-10	0-5			
7								100	90-100	40-70	0-15	0-5			
8									100	85-100	10-30	0-10	0-5		
10										100	75-100				10-30

PennDOT Publication 408, Section 703.2(c), Table C

Tables 6.6 and 6.7 should be placed on the plan drawings of all sites where riprap channel linings are proposed.

SECTION 10

APPENDIX K

Stormwater Culverts

Structure Detail:

Structure #1 (Culvert)

CULVERT C-5-1 (PRO. 48")

Culvert Inputs:

Length (ft)	Slope (%)	Manning's n	Max. Headwater (ft)	Tailwater (ft)	Entrance Loss Coef. (Ke)
50.00	2.00	0.0120	5.00	0.00	0.20

Culvert Results:

Design Discharge = 41.59 cfs

Minimum pipe diameter: 1 - 30 inch pipe(s) required

Subwatershed Hydrology Detail:

Stru #	SWS #	SWS Area (ac)	Time of Conc (hrs)	Musk K (hrs)	Musk X	Curve Number	UHS	Peak Discharge (cfs)	Runoff Volume (ac-ft)
#1	1	14.090	0.350	0.000	0.000	79.000	M	41.59	4.686
	Σ	**14.090**						**41.59**	**4.686**

Structure Detail:

Structure #1 (Culvert)

CULVERT C-5-2 (PRO. 36")

Culvert Inputs:

Length (ft)	Slope (%)	Manning's n	Max. Headwater (ft)	Tailwater (ft)	Entrance Loss Coef. (Ke)
80.00	3.75	0.0120	4.00	0.00	0.20

Culvert Results:

Design Discharge = 45.89 cfs

Minimum pipe diameter: 1 - 36 inch pipe(s) required

Subwatershed Hydrology Detail:

Stru #	SWS #	SWS Area (ac)	Time of Conc (hrs)	Musk K (hrs)	Musk X	Curve Number	UHS	Peak Discharge (cfs)	Runoff Volume (ac-ft)
#1	1	10.500	0.186	0.000	0.000	79.000	F	45.89	4.171
	Σ	**10.500**						**45.89**	**4.171**

TR55 Tc Worksheet

Hyd. No. 8

C-5-2*

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.240		0.011		0.011		
Flow length (ft)	= 100.0		0.0		0.0		
Two-year 24-hr precip. (in)	= 3.18		0.00		0.00		
Land slope (%)	= 30.00		0.00		0.00		
Travel Time (min)	**= 4.85**	**+**	**0.00**	**+**	**0.00**	**=**	**4.85**
Shallow Concentrated Flow							
Flow length (ft)	= 0.00		0.00		0.00		
Watercourse slope (%)	= 0.00		0.00		0.00		
Surface description	= Paved		Paved		Paved		
Average velocity (ft/s)	= 0.00		0.00		0.00		
Travel Time (min)	**= 0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**
Channel Flow							
X sectional flow area (sqft)	= 3.23		7.51		0.00		
Wetted perimeter (ft)	= 8.28		9.28		0.00		
Channel slope (%)	= 2.00		30.00		0.00		
Manning's n-value	= 0.030		0.030		0.015		
Velocity (ft/s)	= 3.74		23.61		0.00		
Flow length (ft)	= 1340.0		500.0		0.0		
Travel Time (min)	**= 5.97**	**+**	**0.35**	**+**	**0.00**	**=**	**6.33**

Total Travel Time, Tc ..... 11.17 min

Structure Detail:

Structure #1 (Culvert)

CULVERT C-5-3 (PRO. 24")

Culvert Inputs:

Length (ft)	Slope (%)	Manning's n	Max. Headwater (ft)	Tailwater (ft)	Entrance Loss Coef. (Ke)
30.00	3.33	0.0120	4.50	0.00	0.20

Culvert Results:

Design Discharge = 25.26 cfs

Minimum pipe diameter: 1 - 24 inch pipe(s) required

Subwatershed Hydrology Detail:

Stru #	SWS #	SWS Area (ac)	Time of Conc (hrs)	Musk K (hrs)	Musk X	Curve Number	UHS	Peak Discharge (cfs)	Runoff Volume (ac-ft)
#1	1	5.200	0.110	0.000	0.000	79.000	M	25.26	2.160
	Σ	**5.200**						**25.26**	**2.160**

TR55 Tc Worksheet

Hyd. No. 9

C-5-3*

Description	A	B	C	Totals
Sheet Flow				
Manning's n-value	= 0.240	0.011	0.011	
Flow length (ft)	= 80.0	0.0	0.0	
Two-year 24-hr precip. (in)	= 3.18	0.00	0.00	
Land slope (%)	= 30.00	0.00	0.00	
Travel Time (min)	**= 4.05**	**+ 0.00**	**+ 0.00**	**= 4.05**
Shallow Concentrated Flow				
Flow length (ft)	= 0.00	0.00	0.00	
Watercourse slope (%)	= 0.00	0.00	0.00	
Surface description	= Paved	Paved	Paved	
Average velocity (ft/s)	= 0.00	0.00	0.00	
Travel Time (min)	**= 0.00**	**+ 0.00**	**+ 0.00**	**= 0.00**
Channel Flow				
X sectional flow area (sqft)	= 3.23	7.51	0.00	
Wetted perimeter (ft)	= 8.28	9.28	0.00	
Channel slope (%)	= 2.00	30.00	0.00	
Manning's n-value	= 0.030	0.030	0.015	
Velocity (ft/s)	= 3.74	23.61	0.00	
Flow length (ft)	= 480.0	600.0	0.0	
Travel Time (min)	**= 2.14**	**+ 0.42**	**+ 0.00**	**= 2.56**

Total Travel Time, Tc ..... 6.62 min

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Structure Detail:

Structure #1 (Culvert)

CULVERT C-5-4 (PRO. 58"X91" ELLIPTICAL)

Culvert Inputs:

Length (ft)	Slope (%)	Manning's n	Max. Headwater (ft)	Tailwater (ft)	Entrance Loss Coef. (Ke)
60.00	5.00	0.0120	8.00	0.00	0.20

Culvert Results:

Design Discharge = 252.15 cfs

Minimum pipe diameter: 1 - 72 inch pipe(s) required

Subwatershed Hydrology Detail:

Stru #	SWS #	SWS Area (ac)	Time of Conc (hrs)	Musk K (hrs)	Musk X	Curve Number	UHS	Peak Discharge (cfs)	Runoff Volume (ac-ft)
#1	1	102.410	0.530	0.000	0.000	78.000	M	252.15	33.176
	Σ	**102.410**						**252.15**	**33.176**

Structure Detail:

Structure #1 (Culvert)

CULVERT C-5-5, C-5-6, C-5-7, & C-5-8 (PRO. 58"X91" ELLIPTICAL)

Culvert Inputs:

Length (ft)	Slope (%)	Manning's n	Max. Headwater (ft)	Tailwater (ft)	Entrance Loss Coef. (Ke)
80.00	5.00	0.0120	9.00	0.00	0.20

Culvert Results:

Design Discharge = 252.23 cfs

Minimum pipe diameter: 1 - 66 inch pipe(s) required

Subwatershed Hydrology Detail:

Stru #	SWS #	SWS Area (ac)	Time of Conc (hrs)	Musk K (hrs)	Musk X	Curve Number	UHS	Peak Discharge (cfs)	Runoff Volume (ac-ft)
#1	1	103.400	0.540	0.000	0.000	78.000	M	252.23	33.472
	Σ	**103.400**						**252.23**	**33.472**

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Structure Detail:

Structure #1 (Culvert)

CULVERT C-5-9 (PRO. 29"X45" ELLIPTICAL)

Culvert Inputs:

Length (ft)	Slope (%)	Manning's n	Max. Headwater (ft)	Tailwater (ft)	Entrance Loss Coef. (Ke)
160.00	0.50	0.0120	4.00	0.00	0.20

Culvert Results:

Design Discharge = 20.94 cfs

Minimum pipe diameter: 1 - 24 inch pipe(s) required

Subwatershed Hydrology Detail:

Stru #	SWS #	SWS Area (ac)	Time of Conc (hrs)	Musk K (hrs)	Musk X	Curve Number	UHS	Peak Discharge (cfs)	Runoff Volume (ac-ft)
#1	1	9.820	0.240	0.000	0.000	63.000	M	20.94	2.128
	Σ	**9.820**						**20.94**	**2.128**

TR55 Tc Worksheet

Hyd. No. 12

C-5-9*

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.240		0.011		0.011		
Flow length (ft)	= 150.0		0.0		0.0		
Two-year 24-hr precip. (in)	= 3.18		0.00		0.00		
Land slope (%)	= 30.00		0.00		0.00		
Travel Time (min)	**= 6.70**	**+**	**0.00**	**+**	**0.00**	**=**	**6.70**
Shallow Concentrated Flow							
Flow length (ft)	= 204.00		0.00		0.00		
Watercourse slope (%)	= 30.00		0.00		0.00		
Surface description	= Unpaved		Paved		Paved		
Average velocity (ft/s)	= 8.84		0.00		0.00		
Travel Time (min)	**= 0.38**	**+**	**0.00**	**+**	**0.00**	**=**	**0.38**
Channel Flow							
X sectional flow area (sqft)	= 7.51		0.00		0.00		
Wetted perimeter (ft)	= 9.28		0.00		0.00		
Channel slope (%)	= 0.50		0.00		0.00		
Manning's n-value	= 0.030		0.015		0.015		
Velocity (ft/s)	= 3.05		0.00		0.00		
Flow length (ft)	= 1356.0		0.0		0.0		
Travel Time (min)	**= 7.42**	**+**	**0.00**	**+**	**0.00**	**=**	**7.42**

Total Travel Time, Tc ..... 14.50 min

Structure Detail:

Structure #1 (Culvert)

CULVERT C-5-10 (PRO. 36")

Culvert Inputs:

Length (ft)	Slope (%)	Manning's n	Max. Headwater (ft)	Tailwater (ft)	Entrance Loss Coef. (Ke)
45.00	4.44	0.0120	4.00	0.00	0.20

Culvert Results:

Design Discharge = 36.94 cfs

Minimum pipe diameter: 1 - 36 inch pipe(s) required

Subwatershed Hydrology Detail:

Stru #	SWS #	SWS Area (ac)	Time of Conc (hrs)	Musk K (hrs)	Musk X	Curve Number	UHS	Peak Discharge (cfs)	Runoff Volume (ac-ft)
#1	1	15.500	0.230	0.000	0.000	79.000	S	36.94	4.322
	Σ	**15.500**						**36.94**	**4.322**

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Structure Detail:

Structure #1 (Culvert)

CULVERT C-5-11 (PRO. 48")

Culvert Inputs:

Length (ft)	Slope (%)	Manning's n	Max. Headwater (ft)	Tailwater (ft)	Entrance Loss Coef. (Ke)
20.00	2.50	0.0120	6.00	0.00	0.20

Culvert Results:

Design Discharge = 43.13 cfs

Minimum pipe diameter: 1 - 30 inch pipe(s) required

Subwatershed Hydrology Detail:

Stru #	SWS #	SWS Area (ac)	Time of Conc (hrs)	Musk K (hrs)	Musk X	Curve Number	UHS	Peak Discharge (cfs)	Runoff Volume (ac-ft)
#1	1	12.690	0.190	0.000	0.000	79.000	M	43.13	4.246
	Σ	**12.690**						**43.13**	**4.246**

Structure Detail:

Structure #1 (Culvert)

CULVERT C-5-12, C-513, & C-5-14 (PRO. 48")

Culvert Inputs:

Length (ft)	Slope (%)	Manning's n	Max. Headwater (ft)	Tailwater (ft)	Entrance Loss Coef. (Ke)
113.00	0.80	0.0120	6.00	0.00	0.20

Culvert Results:

Design Discharge = 42.30 cfs

Minimum pipe diameter: 1 - 30 inch pipe(s) required

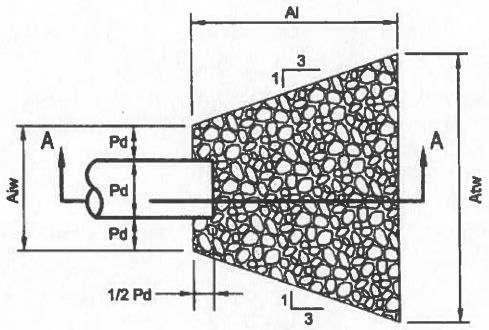
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Subwatershed Hydrology Detail:

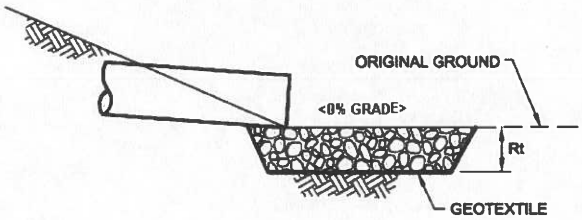
Stru #	SWS #	SWS Area (ac)	Time of Conc (hrs)	Musk K (hrs)	Musk X	Curve Number	UHS	Peak Discharge (cfs)	Runoff Volume (ac-ft)
#1	1	12.690	0.190	0.000	0.000	78.000	M	42.30	4.150
	Σ	**12.690**						**42.30**	**4.150**

STANDARD E&S WORKSHEET # 20
Riprap Apron Outlet Protection

PROJECT NAME: **Bethlehem Landfill**
LOCATION: **2335 Applebutter Road, Bethlehem, PA**
PREPARED BY: **Joseph McDowell** DATE: **9/5/2023**
CHECKED BY: _____ DATE: _____



PLAN VIEW

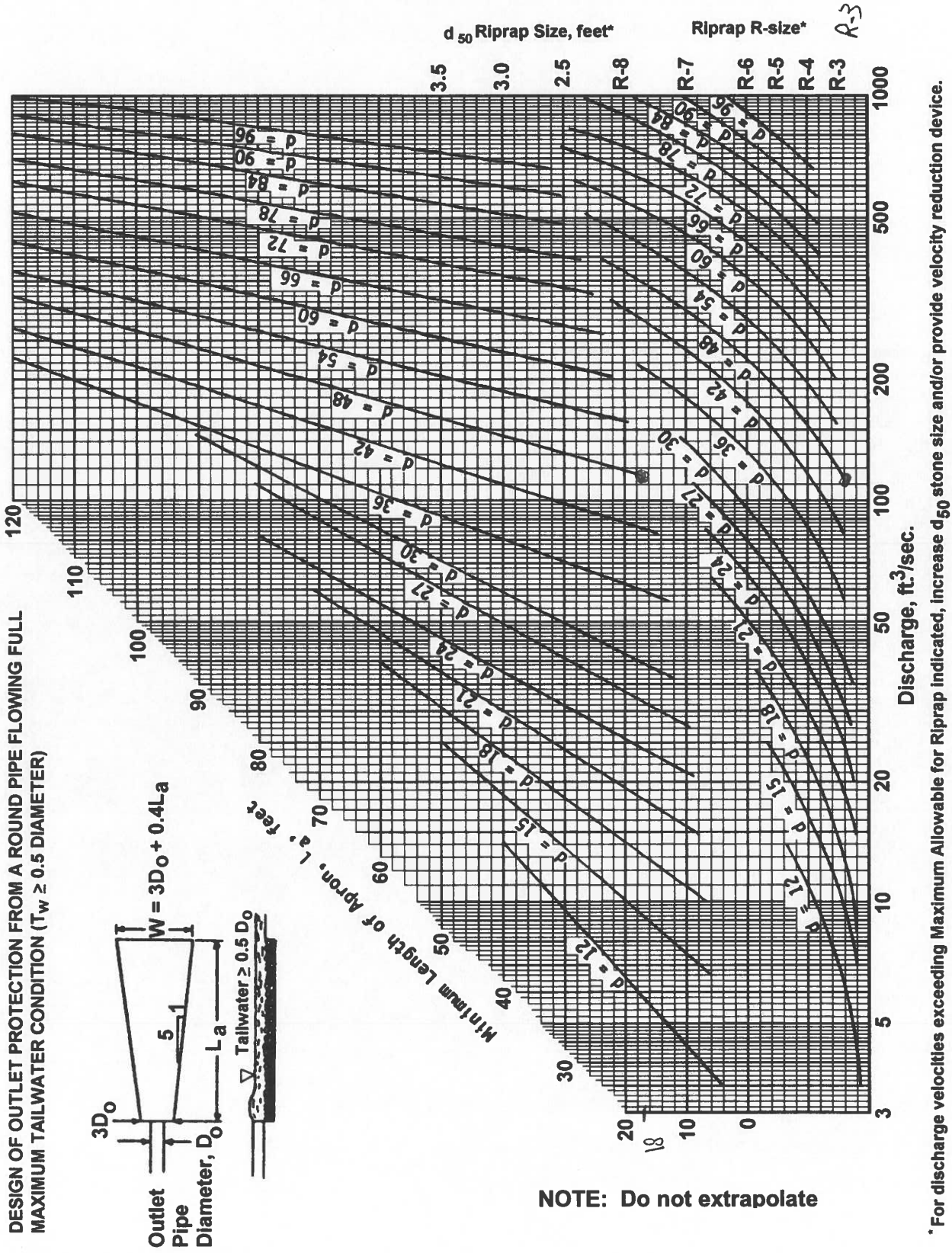


SECTION A - A

NO.	PIPE DIA. Do (in.)	TAIL WATER COND. (Max or Min)	MAN. "n" FOR PIPE	PIPE SLOPE (FT/FT)	Q (CFS)	V* (FPS)	RIPRAP SIZE	Rt (in)	Al (ft)	Aiw (ft)	Atw (ft)
C-5-1	48	Max	.012	2	41.59	3.31	R-3	9	18	12	20
C-5-8	58*91	Max	.012	5	252.23	8.9	R-4	18	26	18	29
C-5-10	34*53	Min	.012	4.4	36.94	3.8	R-5	27	22	11	33
C-5-14	48	Max	.012	.8	42.30	3.3	R-3	9	18	12	20

***:The anticipated velocity (V) should not exceed the maximum permissible shown in Table 6.6 for the proposed riprap protection. Adjust for less than full pipe flow. Use Manning's equation to calculate velocity for pipe slopes ≥ 0.05 ft/ft.**

FIGURE 9.4
Riprap Apron Design, Maximum Tailwater Condition



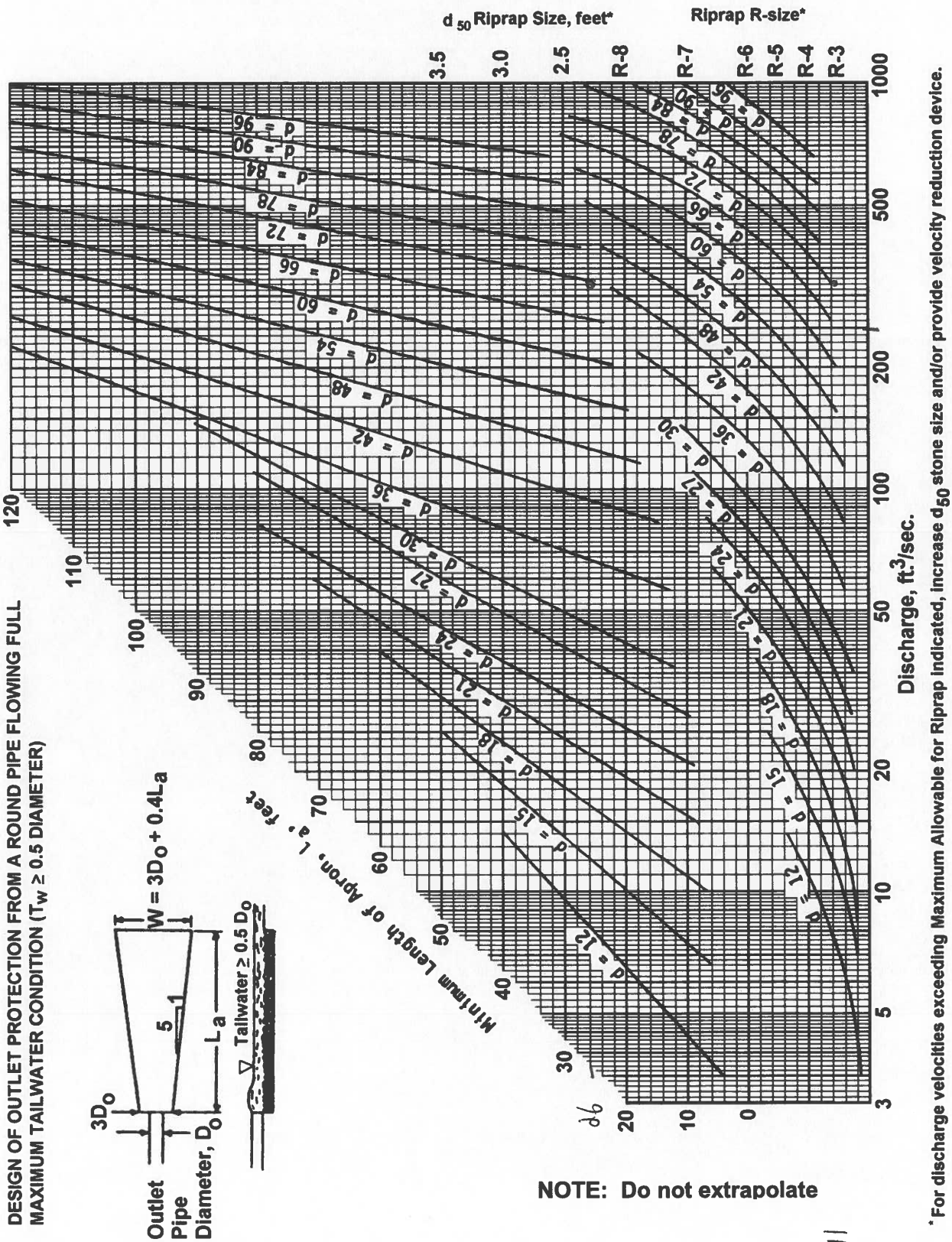
Adapted from USDA - NRCS

Not to be used for Box Culverts

19.2 = W

C-5-1
Q 411.59
d = 48"

FIGURE 9.4
Riprap Apron Design, Maximum Tailwater Condition



NOTE: Do not extrapolate

*For discharge velocities exceeding Maximum Allowable for Riprap indicated, increase d_{50} stone size and/or provide velocity reduction device.

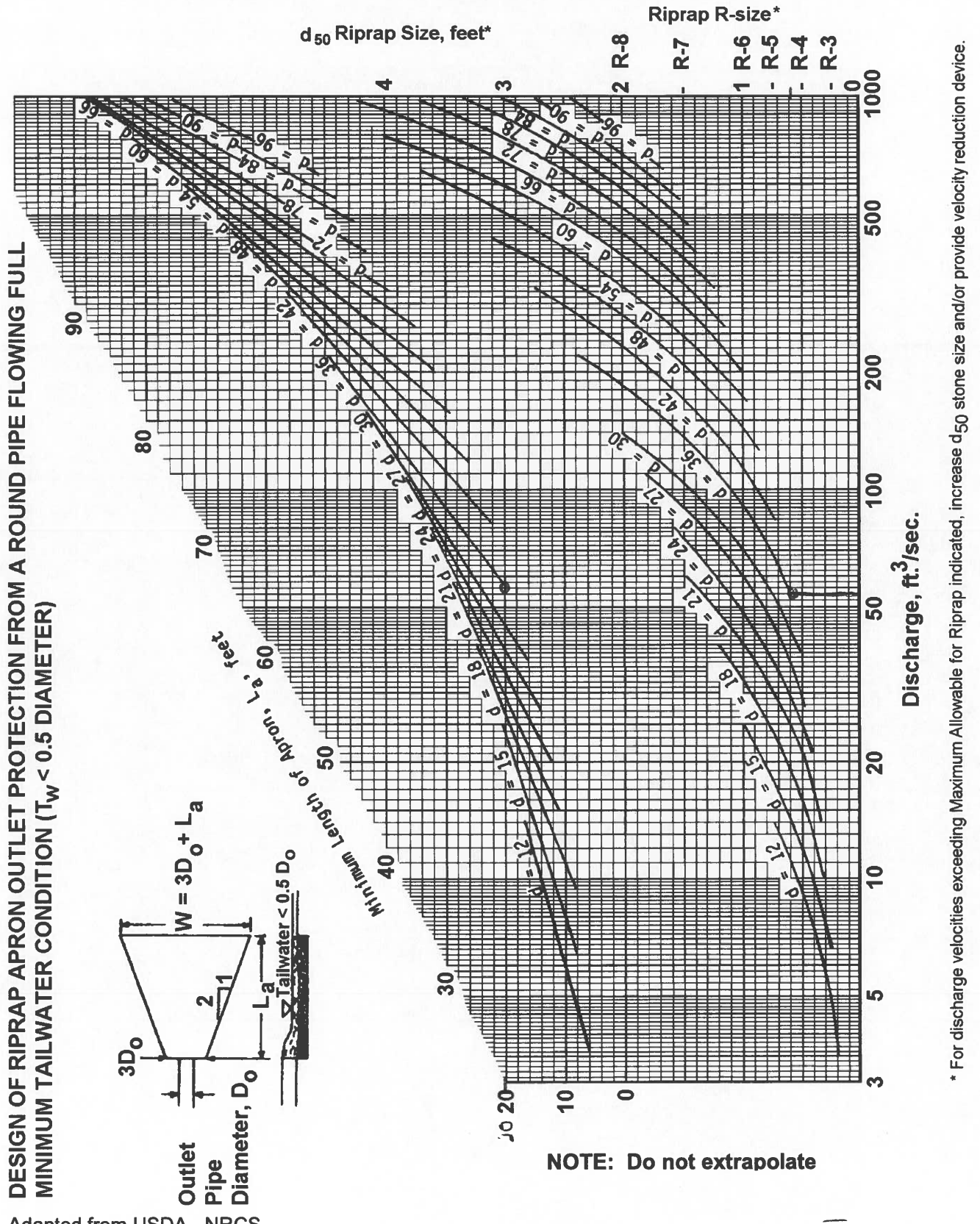
Adapted from USDA - NRCS

Not to be used for Box Culverts

C-5-8
d ≈ 7d 58x91
Q = 45d

R-4

FIGURE 9.3
Riprap Apron Design, Minimum Tailwater Condition



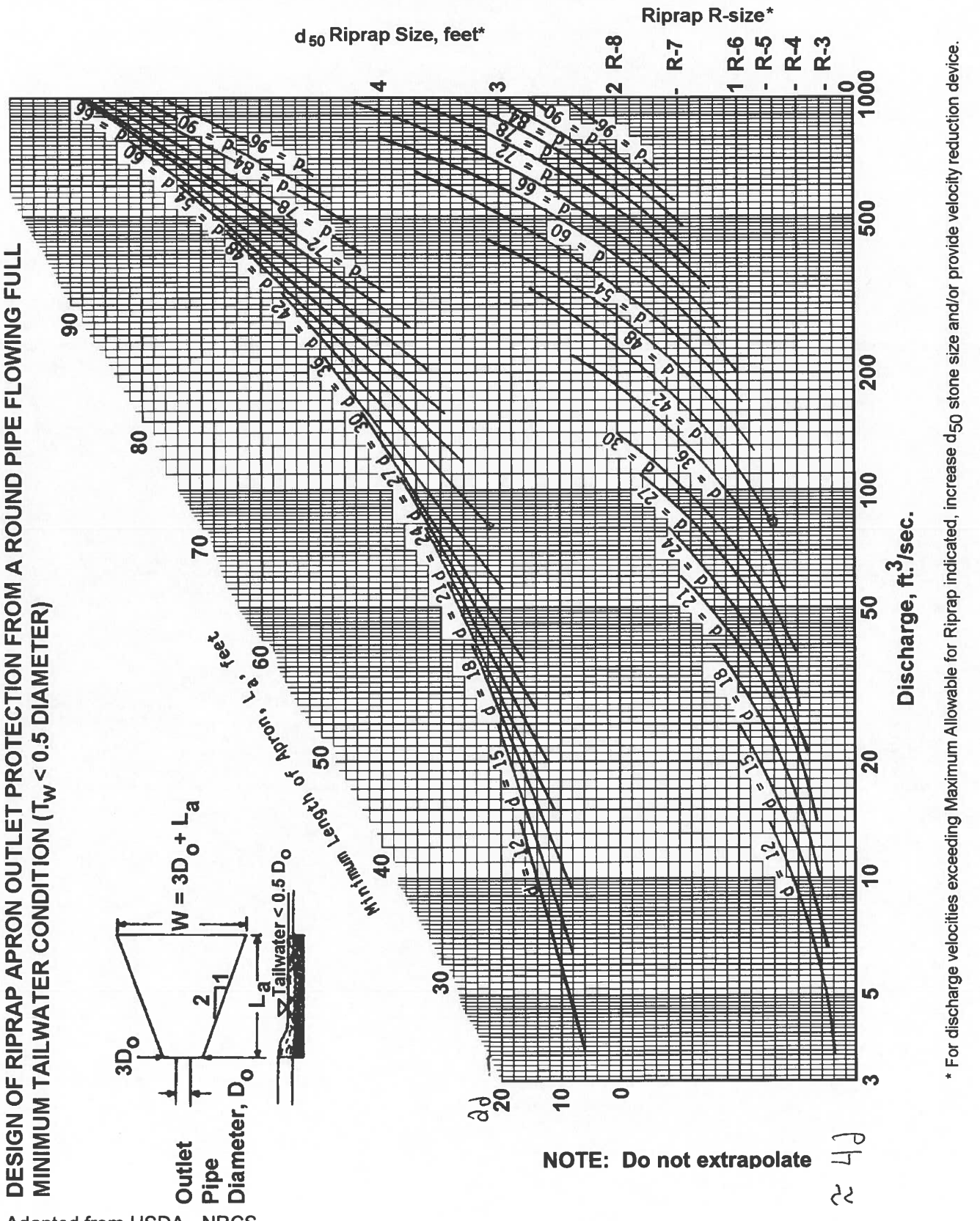
* For discharge velocities exceeding Maximum Allowable for Riprap indicated, increase d_{50} stone size and/or provide velocity reduction device.

Adapted from USDA - NRCS

Not to be used for Box Culverts

7-5-9
D = 36
Q = 20.41
V = 8.96
R-5

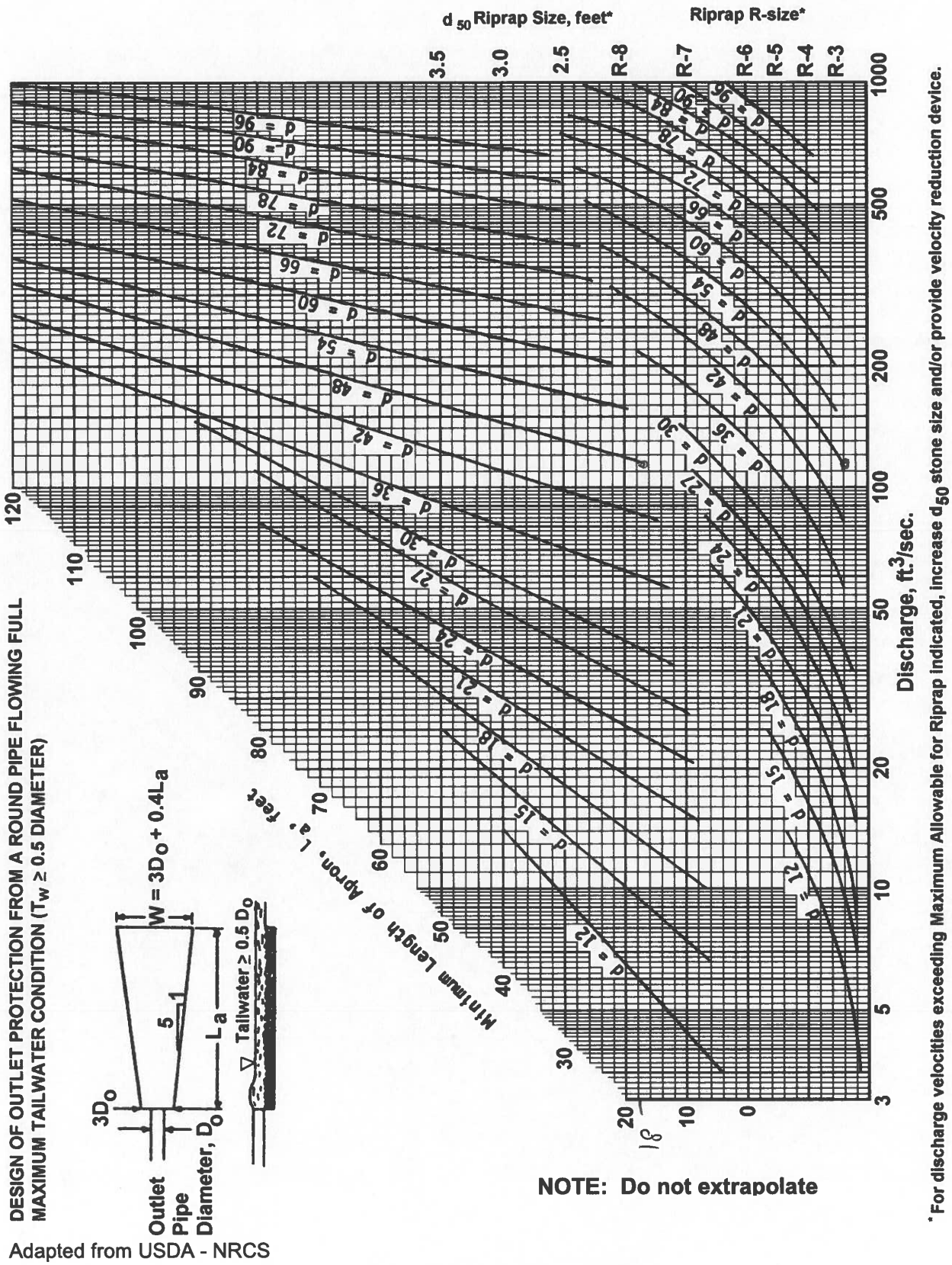
FIGURE 9.3
Riprap Apron Design, Minimum Tailwater Condition



C-5-b
d = 34x53 ≈ 4'
Q = 36.9H

R-5

FIGURE 9.4
Riprap Apron Design, Maximum Tailwater Condition



Adapted from USDA - NRCS

Not to be used for Box Culverts

R-3

7-5-14
Q=41d.3
d = 48"

TABLE 6.6
Riprap Gradation, Filter Blanket Requirements, Maximum Velocities

Percent Passing (Square Openings)						
Class, Size NO. / **Rock Size (Inches)**	**R-8**	**R-7**	**R-6**	**R-5**	**R-4**	**R-3**
42	100					
30		100				
24	15-50		100			
18		15-50		100		
15	0-15					
12		0-15	15-50		100	
9				15-50		
6			0-15		15-50	100
4				0-15		
3					0-15	15-50
2						0-15
Nominal Placement Thickness (inches)	63	45	36	27	18	9
Filter Stone[1]	AASHTO #1	AASHTO #1	AASHTO #1	AASHTO #3	AASHTO #3	AASHTO #57
V_{max} (ft/sec)	17.0	14.5	13.0	11.5	9.0	6.5

Adapted from PennDOT Pub. 408, Section 703.2(c), Table C

1 This is a general standard. Soil conditions at each site should be analyzed to determine actual filter size. A suitable woven or non-woven geotextile underlayment, used according to the manufacturer's recommendations, may be substituted for the filter stone for gradients < 10%.

TABLE 6.7
Comparison of Various Gradations of Coarse Aggregates

Total Percent Passing															
AASHTO NUMBER	**6 ½**	**4"**	**3 ½"**	**2 ½**	**2"**	**1 ½ "**	**1"**	**3/4 "**	**1/2"**	**3/8"**	**#4**	**#8**	**#16**	**#30**	**#100**
1		100	90-100	25-60		0-15		0-5							
3				100	90-100	35-70	0-15		0-5						
5						100	90-100	20-55	0-10	0-5					
57						100	90-100		25-60		0-10	0-5			
67							100	90-100		20-55	0-10	0-5			
7								100	90-100	40-70	0-15	0-5			
8									100	85-100	10-30	0-10	0-5		
10										100	75-100				10-30

PennDOT Publication 408, Section 703.2(c), Table C

Tables 6.6 and 6.7 should be placed on the plan drawings of all sites where riprap channel linings are proposed.

SECTION 10

APPENDIX L

Post Construction Water Quality Analysis

APPENDIX L

POST CONSTRUCTION WATER QUALITY ANALYSIS

As outlined within Section 9.0 of the Narrative the Water Quality Volume associated with the land cover change for the Phase V Expansion is 412,219 cubic feet. The chosen method to address the water quality volume is by the combination of two (2) acceptable BMP's vegetated swales (landfill benches) and dry extended detention Basin #2, revegetate/reforest and amended soil media within basins. The majority of runoff onsite is conveyed from the landfill slope via a vegetated swale (bench) to a down drain and then either piped or conveyed in a riprap swale to the detention basin. It is the combination of the vegetated bench swale having a maximum grade of 3% and the dry extended detention basin which will provide treatment of runoff along with the soil media within each basin. In addition, for the areas outside the area of disposal (fill or cut slopes) amended soil and reforesting these areas will account for the remaining water quality treatment.

Further, we have completed a PaDEP Post Construction Stormwater Worksheet for each watershed (Saucon Creek and Bull Run) for the project area attached herein. As shown on the worksheet the Water Quality Requirement is met by the use of Vegetated Swales and Basins (dry extended detention basin). Almost 40,000 linear feet of vegetated bench swale is proposed for the project along with dry extended detention basins with a vegetated bottom. Further, some 4,000 trees are proposed in landscape areas along with amended soil areas.

The vegetated swale is listed as a BMP within the Pennsylvania Stormwater Best Management Practices Manual as a medium/high Stormwater Quality Function providing water quality treatment of 50% for TSS, 50% for TP and 20% for NO_3. All design parameters for the bench vegetated swales are met including a longitudinal slope of 1 to 6% maximum, side slopes of 3:1, and maintaining adequate freeboard. In addition the bench vegetated swale serves as a pre-treatment facility prior to the detention basin.

The detention basin in series with the bench vegetated swale is listed as a Low Water Quality BMP providing water quality treatment of 60% for TSS, 40% for TP and 20% for NO_3 within the PA Stormwater BMP Manual. Design requirements within the Pennsylvania Best Management Practices Manual for the detention basin are met including the length to width ratio maximizing the flow path from pipe inlets and combining with other BMPs (vegetated swales). Maximum dewatering times are exceeded but this is as a result of the low rate of discharge requirements. In order to meet dewatering time requirements the release rates would need to be increased which would result in non-compliance with the Act 167 Plan. Additionally, a forebay is not proposed given the vegetated swales (benches) and even to a certain extent the riprap channels provide adequate filtering of the runoff prior to discharging to the detention basins.

In summary, the use of a vegetated swale and detention basin in series, revegetate/reforest and amended soils will serve to meet the water quality volume for the Phase V Expansion. Additionally, the site including all existing and proposed basins are monitored under the NPDES Permitting Program to ensure water quality treatment is achieved.

General Information

Instructions | General | Volume | Rate | Quality

Project Name: **Bethlehem LF - Phase V Exp. (Bull Run)**

Application Type: **Other**

County: **Northampton**

Municipality: **Lower Saucon Township**

Project Type: **Other**

○ New Project ◉ Minor / Major Amendment

Area: **127.52** acres
(In Watershed)

Total Earth Disturbance: **127.52** acres
(In Watershed)

No. of Post-Construction Discharge Points: **1**

Start DP Numbering at: **012**

Discharge Point (DP) No.	Drainage Area (DA) (acres)	Earth Disturbance in DA (acres)	Existing Impervious in DA (acres)	Proposed Impervious in DA (acres)	Receiving Waters	Ch. 93 Class	Structural BMP(s)
012	121.80	121.80	1.46	4.55	Bull Run	CWF	No
Undetained Areas	5.72	5.72	5.72	0.00	Bull Run	CWF	
Totals:	**127.52**	**127.52**	**7.18**	**4.55**			

Volume Management

Project: Bethlehem LF - Phase V Exp. (Bull Run)

Instructions | General | *Volume* | Rate | Quality

2-Year / 24-Hour Storm Event (NOAA Atlas 14): **3.18** inches

Alternative 2-Year / 24-Hour Storm Event _____ inches

Alternative Source: _____

Pre-Construction Conditions: *No. Rows:* **10** ☐ *Exempt from Meadow in Good Condition* ☑ *Automatically Calculate CN, Ia, Runoff and Volume*

Land Cover	Area (acres)	Soil Group	CN	Ia (in)	Q Runoff (in)	Runoff Volume (cf)
Forested (Good Condition)	102.57	A	30	4.667	0.00	0
Forested (Good Condition)	11.41	B	55	1.636	0.25	10,148
Forested (Good Condition)	4.24	C	70	0.857	0.82	12,566
Pervious as Meadow	0.36	A	30	4.667	0.00	0
Pervious as Meadow	0.06	B	58	1.448	0.33	73
Pervious as Meadow	1.16	C	71	0.817	0.87	3,647
Impervious as Meadow	0.08	A	30	4.667	0.00	0
Impervious as Meadow	0.01	B	58	1.448	0.33	12
Impervious as Meadow	1.25	C	71	0.817	0.87	3,930
Impervious Areas: Paved Parking Lots, Roofs, Driveways, Etc. (Excluding ROW)	5.37	N/A	98	0.041	2.95	57,457
TOTAL (ACRES):	**126.51**				**TOTAL (CF):**	**87,833**

Post-Construction Conditions: *No. Rows:* 3

Land Cover	Area (acres)	Soil Group	CN	Ia (in)	Q Runoff (in)	Runoff Volume (cf)
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Poor Condition (Grass Cover < 50%)	55.83	B	79	0.532	1.32	267,862
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Good Condition (Grass Cover > 75%)	42.11	B	61	1.279	0.44	66,619
Impervious Areas: Paved Parking Lots, Roofs, Driveways, Etc. (Excluding ROW)	5.55	N/A	98	0.041	2.95	59,383
TOTAL (ACRES):	**103.49**				**TOTAL (CF):**	**393,864**

NET CHANGE IN VOLUME TO MANAGE (CF): **306,031**

Non-Structural BMP Volume Credits:

☐ Tree Planting Credit

☑ Other (attach calculations):

Description: Amended Soils Outside Landfill Disposal Footprint (20.5 acres=37,249cf) + Trees (9,900cf Ded. & 16,500cf Evergreen **CREDIT (CF):** **63,649**

Structural BMP Volume Credits: *No. Structural BMPs:* 2 *Start BMP Numbering at:* 7

DP No.	BMP No.	BMP Name	MRC?	Discharge	Incremental BMP DA (acres)	Volume Routed to BMP (CF)	Infiltration / Vegetated	Infiltration Rate (in/hr)	Infiltration Period (hrs)	Vegetated?	Media Depth (ft)	Storage Volume (CF)	Infiltration Credit (CF)	ET Credit (CF)
012	7	Vegetated Swale	-	to BMP No. 8	55.83	384,815	275,240	0.00	12	Yes	2.0	0	**0**	**144,776**
012	8	Dry Extended Detention Basin	-	Off-Site	68.44	240,039	159,593	0.00	12	Yes	2.0	0	**0**	**83,946**
												Totals:		**228,722**

INFILTRATION & ET CREDITS (CF): **228,722**

NET CHANGE IN VOLUME TO MANAGE (CF): **306,031**

TOTAL CREDITS (CF): **292,371**

VOLUME REQUIREMENT NOT SATISFIED

Water Quality

Project: Bethlehem LF - Phase V Exp. (Bull Run)

PRINT

Instructions | General | Volume | Rate | *Quality*

Pre-Construction Pollutant Loads:

Land Cover (from Volume Worksheet)	Land Cover for Water Quality	Area (acres)	Soil Group	Runoff Volume (cf)	Pollutant Conc. (mg/L)			Pollutant Loads (lbs)		
					TSS	TP	TN	TSS	TP	TN
Forested (Good Condition)	Deciduous Forest/Evergreen Forest/Mixed Forest	102.57	A	0	45.0	0.13	1.05	0.00	0.00	0.00
Forested (Good Condition)	Deciduous Forest/Evergreen Forest/Mixed Forest	11.41	B	10,148	45.0	0.13	1.05	28.51	0.08	0.67
Forested (Good Condition)	Deciduous Forest/Evergreen Forest/Mixed Forest	4.24	C	12,566	45.0	0.13	1.05	35.31	0.10	0.82
Pervious as Meadow	Grassland/Herbaceous	0.36	A	0	48.8	0.22	2.30	0.00	0.00	0.00
Pervious as Meadow	Grassland/Herbaceous	0.06	B	73	48.8	0.22	2.30	0.22	0.00	0.01
Pervious as Meadow	Grassland/Herbaceous	1.16	C	3,647	48.8	0.22	2.30	11.11	0.05	0.52
Impervious as Meadow	Grassland/Herbaceous	0.08	A	0	48.8	0.22	2.30	0.00	0.00	0.00
Impervious as Meadow	Grassland/Herbaceous	0.01	B	12	48.8	0.22	2.30	0.04	0.00	0.00
Impervious as Meadow	Grassland/Herbaceous	1.25	C	3,930	48.8	0.22	2.30	11.98	0.05	0.56
Impervious Areas: Paved Parking Lots, Roofs, Driveways, Etc. (Excluding ROW)	Residential	5.37	N/A	57,457	65.0	0.29	2.05	233.21	1.04	7.35

				TOTAL (ACRES):	6.51			TOTALS:	320.38	1.35	9.94

Post-Construction Pollutant Loads (without BMPs):

Land Cover (from Volume Worksheet)	Land Cover for Water Quality	Area (acres)	Soil Group	Runoff Volume (cf)	Pollutant Conc. (mg/L)			Pollutant Loads (lbs)		
					TSS	TP	TN	TSS	TP	TN
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Poor Condition (Grass Cover < 50%)	Open Space	55.83	B	267,862	78.0	0.25	1.25	######	4.18	20.91
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Good Condition (Grass Cover > 75%)	Open Space	42.11	B	66,619	78.0	0.25	1.25	324.47	1.04	5.20
Impervious Areas: Paved Parking Lots, Roofs, Driveways, Etc. (Excluding ROW)	Residential	5.55	N/A	59,383	65.0	0.29	2.05	241.02	1.08	7.60
		TOTAL (ACRES):	103.49				TOTALS:	######	6.30	33.71

POLLUTANT LOAD REDUCTION REQUIREMENTS (LBS):	######	4.97	23.76

☑ **Characterize Undetained Areas (for Untreated Stormwater)** *No. Rows:* 1

Land Cover	Area (acres)	Soil Group	CN	Ia (in)	Q Runoff (in)	Runoff Volume (cf)
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Good Condition (Grass Cover > 75%)	5.72	B	61	1.279	0.44	9,049

Non-Structural BMP Water Quality Credits:

☑ Pervious Undetained Area Credit

TSS	TP	TN
6.89	0.02	0.19

☑ Other (attach calculations) – TREE PLANTING AND AMENDED SOILS ARE PROPOSED ON THE OPEN SPACE AREAS COVERING 42.11 ACRES - TSS REDUCTION - 85%, TP REDUCTION - 85%

Description: Tree Plantings and Amended Soils on Areas outside LF = 42.11 (19.57 ac. Trees, 22.54 ac. Ar TN REDUCTION - 50%

TSS	TP	TN
276.00	0.88	2.60

Structural BMP Water Quality Credits:

☑ *Use default BMP Outflows and Median BMP Outflow Concentrations*

DP No.	BMP No.	BMP Name	MRC?	BMP DA (acres)	Vol. Routed to BMP (CF)	Inf. & ET Credits (CF)	Capture & Buffer Credits (CF)	Outflow (CF)	Outflow Conc. (mg/L)			Pollutant Loads (lbs)		
									TSS	TP	TN	TSS	TP	TN
012	7	Vegetated Swale	-	55.83	384,815	144,776		240,039	-	-	-	-	-	-
012	8	Dry Extended Detention Basin	-	68.44	240,039	83,946		156,093	22.00	0.19	1.22	214.43	1.85	11.89

	TSS	TP	TN
POLLUTANT LOADS FROM STRUCTURAL BMP (TREATED) OUTFLOWS (LBS):	214.43	1.85	11.89
POLLUTANT LOADS FROM UNTREATED STORMWATER (LBS):	44.07	0.14	0.71
NON-STRUCTURAL BMP WATER QUALITY CREDITS (LBS):	282.89	0.90	2.79
NET POLLUTANT LOADS FROM SITE, POST-CONSTRUCTION (LBS):	0.00	1.09	9.80
POLLUTANT LOADS FROM SITE, PRE-CONSTRUCTION (LBS):	320.38	1.33	9.94

WATER QUALITY REQUIREMENT SATISFIED

CERTIFICATION

I certify under penalty of law and subject to the penalties of 18 Pa.C.S. § 4904 (relating to unsworn falsification to authorities) that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I further certify that the structure, function, and calculations contained in this spreadsheet have not been modified in comparison to the spreadsheet DEP has posted to its website or, if modifications were made, an explanation of the modifications made is attached to this spreadsheet.

Spreadsheet User Name

9/6/23
Date

General Information

Instructions | General | Volume | Rate | Quality

Project Name: **Bethlehem LF - Phase V Saucon Cr.**

Application Type: **Other**

County: **Northampton**

Municipality: **Lower Saucon Township**

Project Type: **Other**

○ New Project ◉ Minor / Major Amendment

Area: **36.51** acres
(In Watershed)

Total Earth Disturbance: **36.51** acres
(In Watershed)

No. of Post-Construction Discharge Points: **3**

Start DP Numbering at: **001**

Discharge Point (DP) No.	Drainage Area (DA) (acres)	Earth Disturbance in DA (acres)	Existing Impervious in DA (acres)	Proposed Impervious in DA (acres)	Receiving Waters	Ch. 93 Class	Structural BMP(s)
001	16.53	16.53	0.11	0.93	Saucon Creek	TSF	Yes
002	12.52	12.17	0.00	1.40	Saucon Creek	TSF	Yes
003	2.77	2.77	0.00	0.34	Saucon Creek	TSF	Yes
Undetained Areas	4.69	4.69	4.69	1.50	Saucon Creek	TSF	
Totals:	**36.51**	**36.16**	**4.8**	**4.17**			

Volume Management

Project: Bethlehem LF - Phase V Saucon Cr.

Instructions | General | *Volume* | Rate | Quality

2-Year / 24-Hour Storm Event (NOAA Atlas 14): **3.18** inches

Alternative 2-Year / 24-Hour Storm Event _____ inches

Alternative Source: _____

Pre-Construction Conditions: *No. Rows:* 7 ☐ *Exempt from Meadow in Good Condition* ☑ *Automatically Calculate CN, Ia, Runoff and Volume*

Land Cover	Area (acres)	Soil Group	CN	Ia (in)	Q Runoff (in)	Runoff Volume (cf)
Forested (Good Condition)	2.94	B	55	1.636	0.25	2,615
Pervious as Meadow	3.69	B	58	1.448	0.33	4,477
Pervious as Meadow	1.71	C	71	0.817	0.87	5,376
Impervious as Meadow	0.04	A	30	4.667	0.00	0
Impervious as Meadow	0.03	B	58	1.448	0.33	36
Impervious as Meadow	0.96	C	71	0.817	0.87	3,018
Impervious Areas: Paved Parking Lots, Roofs, Driveways, Etc. (Excluding ROW)	4.12	N/A	98	0.041	2.95	44,083
TOTAL (ACRES):	**13.49**				**TOTAL (CF):**	**59,605**

Post-Construction Conditions: *No. Rows:* 3

Land Cover	Area (acres)	Soil Group	CN	Ia (in)	Q Runoff (in)	Runoff Volume (cf)
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Poor Condition (Grass Cover < 50%)	24.55	B	79	0.532	1.32	117,786

Open Spac[illegible]wns, Parks, Golf Courses, Cemeteries, Etc.) - Good Condition (Grass Cover > 75%)	[illegible]7	B	61	1.279	0.44	[illegible]874
Impervious Areas: Paved Parking Lots, Roofs, Driveways, Etc. (Excluding ROW)	3.19	B	98	0.041	2.95	34,132
	TOTAL (ACRES):	**36.51**			**TOTAL (CF):**	**165,793**

IET CHANGE IN VOLUME TO MANAGE (CF): **106,188**

Non-Structural BMP Volume Credits:

☑ Tree Planting Credit

Number of new deciduous trees that will be planted within disturbed area: 411 **CREDIT (CF):** **2,466**

Number of new evergreen trees that will be planted within disturbed area: 342 **CREDIT (CF):** **3,420**

☐ Other (attach calculations):

Description: **CREDIT (CF):**

Structural BMP Volume Credits: *No. Structural BMPs:* 6 *Start BMP Numbering at:* 1

DP No.	BMP No.	BMP Name	MRC?	Discharge	Incremental BMP DA (acres)	Volume Routed to BMP (CF)	Infiltration / Vegetated	Infiltration Rate (in/hr)	Infiltration Period (hrs)	Vegeta-ted?	Media Depth (ft)	Storage Volume (CF)	Infiltration Credit (CF)	ET Credit (CF)
001	1	Vegetated Swale	-	to BMP No. 2	14.50	69,568	18,000	0.00	12	Yes	2.0	0	**0**	**9,468**
001	2	Dry Extended Detention Basin	-	Off-Site	16.53	63,251	58,806	0.00	12	Yes	2.0	0	**0**	**30,932**
002	3	Vegetated Swale	-	to BMP No. 4	9.65	46,299	14,700	0.00	12	Yes	2.0	0	**0**	**7,732**
002	4	Dry Extended Detention Basin	-	Off-Site	0.00	50,927	35,850	0.00	12	Yes	2.0	0	**0**	**18,857**
003	5	Vegetated Swale	-	to BMP No. 6	2.00	9,596	3,000	0.00	12	Yes	2.0	0	**0**	**1,578**
003	6	Dry Extended Detention Basin	-	Off-Site	2.77	11,490	12,197	0.00	12	Yes	2.0	0	**0**	**6,416**
												Totals:		**74,983**

INFILTRATION & ET CREDITS (CF): **74,983**

NET CHANGE IN VOLUME TO MANAGE (CF):	108,188
TOTAL CREDITS (CF):	80,869

VOLUME REQUIREMENT NOT SATISFIED

Water Quality

Project: Bethlehem LF - Phase V Saucon Cr.

PRINT

Instructions | General | Volume | Rate | *Quality*

Pre-Construction Pollutant Loads:

Land Cover (from Volume Worksheet)	Land Cover for Water Quality	Area (acres)	Soil Group	Runoff Volume (cf)	Pollutant Conc. (mg/L)			Pollutant Loads (lbs)		
					TSS	TP	TN	TSS	TP	TN
Forested (Good Condition)	Deciduous Forest/Evergreen Forest/Mixed Forest	2.94	B	2,615	45.0	0.13	1.05	7.35	0.02	0.17
Pervious as Meadow	Grassland/Herbaceous	3.69	B	4,477	48.8	0.22	2.30	13.64	0.06	0.64
Pervious as Meadow	Grassland/Herbaceous	1.71	C	5,376	48.8	0.22	2.30	16.38	0.07	0.77
Impervious as Meadow	Grassland/Herbaceous	0.04	A	0	48.8	0.22	2.30	0.00	0.00	0.00
Impervious as Meadow	Grassland/Herbaceous	0.03	B	36	48.8	0.22	2.30	0.11	0.00	0.01
Impervious as Meadow	Grassland/Herbaceous	0.96	C	3,018	48.8	0.22	2.30	9.20	0.04	0.43
Impervious Areas: Paved Parking Lots, Roofs, Driveways, Etc. (Excluding ROW)	Residential	4.12	N/A	44,083	65.0	0.29	2.05	178.92	0.80	5.64
	TOTAL (ACRES):	**13.49**					**TOTALS:**	**225.60**	**1.00**	**7.67**

Post-Construction Pollutant Loads (without BMPs):

Land Cover (from Volume Worksheet)	Land Cover for Water Quality	Area (acres)	Soil Group	Runoff Volume (cf)	Pollutant Conc. (mg/L)			Pollutant Loads (lbs)		
					TSS	TP	TN	TSS	TP	TN

Open S[illegible]e (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Poor Condition (Grass Cover < 50%)	Open Space	24.55	B	117,786	78.0	0.25	1.25	573.68	1.84	9.19
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Good Condition (Grass Cover > 75%)	Open Space	8.77	B	13,874	78.0	0.25	1.25	67.57	0.22	1.08
Impervious Areas: Paved Parking Lots, Roofs, Driveways, Etc. (Excluding ROW)	Residential	3.19	B	34,132	65.0	0.29	2.05	138.53	0.62	4.37
	TOTAL (ACRES):	**36.51**					**TOTALS:**	**779.79**	**2.67**	**14.65**

POLLUTANT LOAD REDUCTION REQUIREMENTS (LBS):	**554.19**	**1.68**	**6.98**

☑ **Characterize Undetained Areas (for Untreated Stormwater)** *No. Rows:* **2**

Land Cover	Area (acres)	Soil Group	CN	Ia (in)	Q Runoff (in)	Runoff Volume (cf)
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Good Condition (Grass Cover > 75%)	**3.69**	**B**	**61**	**1.279**	**0.44**	**5,838**
Impervious Areas: Paved Parking Lots, Roofs, Driveways, Etc. (Excluding ROW)	**1.5**	**N/A**	**98**	**0.041**	**2.95**	**16,049**

Non-Structural BMP Water Quality Credits:

☑ Pervious Undetained Area Credit

TSS	TP	TN
4.45	0.02	0.13

☑ Other (attach calculations) – TREE PLANTING AND AMENDED SOILS ARE PROPOSED ON THE OPEN SPACE AREAS COVERING 8.77 acres (2 ACRES TREES, 6.77 ACRES SOIL AMENDMENTS - TSS-85%, TP 85% TN-50%

Description: **Amended Soil and Tree Plantings on 8.77 acres**

TSS	TP	TN
57.43	0.20	0.07

Structural BMP Water Quality Credits:

☑ *Use default BMP Outflows and Median BMP Outflow Concentrations*

DP No.	BMP No.	BMP Name	MRC?	BMP DA (acres)	Vol. Routed to BMP (CF)	Inf. & ET Credits (CF)	Capture & Buffer Credits (CF)	Outflow (CF)	Outflow Conc. (mg/L)			Pollutant Loads (lbs)		
									TSS	TP	TN	TSS	TP	TN

001	1	Vegetated Swale	-	14.50	69,568	9,468		60,100	-	-	-	-	-	-
001	2	Dry Extended Detention Basin	-	16.53	63,251	30,932		32,319	22.00	0.19	1.22	44.40	0.38	2.46
002	3	Vegetated Swale	-	9.65	46,299	7,732		38,567	-	-	-	-	-	-
002	4	Dry Extended Detention Basin	-	0.00	50,927	18,857		32,070	22.00	0.19	1.22	44.06	0.38	2.44
003	5	Vegetated Swale	-	2.00	9,596	1,578		8,018	-	-	-	-	-	-
003	6	Dry Extended Detention Basin	-	2.77	11,490	6,416		5,074	22.00	0.19	1.22	6.97	0.06	0.39

	TSS	TP	TN
POLLUTANT LOADS FROM STRUCTURAL BMP (TREATED) OUTFLOWS (LBS):	**95.42**	**0.82**	**5.29**
POLLUTANT LOADS FROM UNTREATED STORMWATER (LBS):	**93.57**	**0.38**	**2.51**
NON-STRUCTURAL BMP WATER QUALITY CREDITS (LBS):	**61.88**	**0.22**	**0.20**
NET POLLUTANT LOADS FROM SITE, POST-CONSTRUCTION (LBS):	**127.12**	**0.99**	**7.61**
POLLUTANT LOADS FROM SITE, PRE-CONSTRUCTION (LBS):	**225.60**	**1.00**	**7.67**

WATER QUALITY REQUIREMENT SATISFIED

CERTIFICATION

I certify under penalty of law and subject to the penalties of 18 Pa.C.S. § 4904 (relating to unsworn falsification to authorities) that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I further certify that the structure, function, and calculations contained in this spreadsheet have not been modified in comparison to the spreadsheet DEP has posted to its website or, if modifications were made, an explanation of the modifications made is attached to this spreadsheet.

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Date