STORMWATER MANAGEMENT REPORT

Proposed Warehouse Facility
10 Russell Road
East Granby, CT

Prepared For:

Joneser's Express Transportation (aka JET)
Windsor Locks, CT

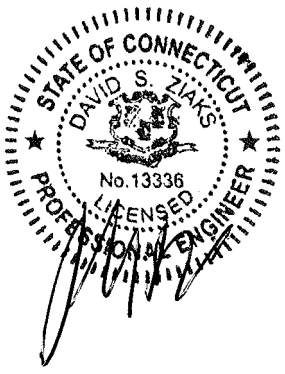
Prepared By:

F. A. Hesketh & Associates, Inc.
3 Creamery Brook
East Granby, CT 06026

F. A. Hesketh
& Associates, Inc.

FAHA Project #23145

September 29, 2023
Revised Through December 22, 2023



1. Introduction

This Stormwater Management Report has been prepared to demonstrate that the stormwater management practices for the proposed development follow sound engineering practices, adhere to the Town of East Granby Stormwater Management Plan and Town Engineering Guidelines, CT DEEP Stormwater Treatment Practices for capture and treatment of the minimum recommended water quality volume and protect adjacent landowners and the downstream watershed from adverse stormwater impacts. The East Granby Stormwater Management Plan incorporates the requirement to implement Low Impact Development (LID) practices. Several of the recommended practices have been incorporated in this design.

This report presents hydrologic analysis of both pre- and post-developed conditions to demonstrate that the development of the parcel will result in no net increase in peak rates of runoff or total volume of runoff from the development for storms of return periods of 2, 5, 10, 25, 50 and 100 years.

This report also presents a pipe-to-pipe design analysis to demonstrate that all proposed storm-drain systems have adequate capacity to convey runoff from the site for a 25-year return period storm event.

2. Project Description

The proposed development site is comprised of three parcels totaling 12.44-acres located on southeasterly side of the intersection of Russell Road and East Street and is located in the CP-T Zone. Except for an existing single-family house and garage, the site is currently an open undeveloped mowed meadow grass lot. The site had been used for many years as a seasonal weekly classic car auto show ground. A combination of open space, residential, industrial, warehouses and commercial uses surround the site. See attached existing topographic conditions survey Sheet ILP-1.

The proposal includes construction of a single-story warehouse facility consisting of one 40,000 SF building with truck loading docks and truck and employee vehicle parking areas. Driveway access will be from two new paved drives off Russell Road. Utility service lines will then be extended underground to the northerly side of the new building from existing public utility services in Russell Road. The site will have private well, fire water storage tank and a conventional septic system.

Storm water management systems proposed for the development will consist of storm drain systems comprised of roof drains, catch basins and culverts and three excavated Water Quality/Detention Basins. Stormwater runoff from the roof, all on-site paved drives and parking area will be directed to the basins where stormwater will be captured, detained/retained, and treated before discharge. Catch basins will have 2-ft. sumps and outlets will be hooded prior to discharge to the basins.

Outflow from the three basins will be controlled by an individual concrete outlet structure with a controlling concrete orifice and overflow weir. Rip rap protection designed using CTDOT standards is proposed at all outfalls to control downgradient erosion.

For the overall drainage analysis presented, two Design Points (East and South) serve as the focal point of the overall site hydrologic analysis, as discussed below and shown on the attached Sheets DA-1 and DA-2.

3. Hydrologic Analysis

A comprehensive hydrologic analysis was conducted for both the existing condition and the proposed developed condition of the site to determine peak flow of runoff under both conditions. Hydraflow Hydrographs computer software was utilized in the runoff analysis. The SCS Method was used to model peak flows for pre- and post-redeveloped conditions including the sizing for the three basins.

For purposes of the hydrologic analysis, it is assumed that all site runoff, under both existing and proposed conditions flows to the two Design Points as shown on Sheets DA-1 and DA-2. Watershed maps used in the analysis are attached.

Approximately 2/3's of the development site currently drains overland southerly towards the flagged wetlands and unnamed intermittent watercourse that follows along the southerly property line as shown on Sheet DA-1. The watercourse which flows to the east is abutting Town Open Space. The 1/3 portion located in the northeasterly portion of the site drains overland to the abutting parcel and is then directed to the south and east to join up with flow coming from the intermittent watercourse. This receiving wetland and watercourse are all part of the overall watershed associated with DeGrayes Brook. DeGrayes Brook flows north and east of the site crossing under Russell Road approximately 750 feet to the east of the project site. The brook is one of the smaller tributaries making up the much larger watershed of Stony Brook. See the attached town watershed map.

In the existing conditions analysis, the time of concentration (Tc) was determined using TR-55 methodologies for the aggregate of flow components consisting of overland sheet flow and shallow concentrated flow as shown on Sheet DA-1. Based on the NRCS Soil Survey, the upland soils within the proposed developed portion of the site are made up of moderate to well-draining silt loams typically found in the surrounding former farmlands. The soil type 25B-Brancroft silt loam falls in Hydrologic Group C. The soil type 82B/C-Broadbrook silt loam falls in the Hydrologic Group C as well. Portions of the developed area located in the southwesterly portion of the site fall into a mixture of the soil types 5-Wilbraham silt loam and 9-Scitico, Shaker and Maybid soil which are poorly drained and tend to be siltier with some clay. See Attachment B.

In the proposed analysis, the site is divided into sub-catchment areas in the developed portion of the parcel represented by relatively small watersheds as shown on Sheets DA-2 . A starting Tc of 5 minutes was used for pavement and roof surfaces with an average travel time of 2 additional minutes added resulting in a final design Tc of 7 min. for pipe sizing.

SCS Runoff Curves Numbers were based on the following values. Detailed calculation sheets for each of the sub-catchment areas are attached.

In general:

- For impervious areas (i.e. rooftops and paved areas), CN=98 was used.
- For open meadow grass land, CN=58 to 71 was used.
- For moderately sloped wooded portions of the site, CN=77 was used.

Analysis was performed for the 2-, 5-, 10-, 25-, 50-, and 100-year return period storm events using the 24-hour duration storm event for East Granby using the NOAA Atlas 14 data, which is required by current CT DOT Drainage Manual design standards. See Attachment C.

The hydrologic analysis presents a comparison of pre-and post-developed conditions for each of the two design points East and South.

Existing Conditions Analysis

The existing conditions watershed area was utilized to model existing site conditions and to develop a baseline for comparison. The two delineated areas represent the total contributory watersheds that flow to the two points of analysis which are ultimately captured and routed through water quality/detention basin systems in the post developed model. The limits of the watersheds were determined by reviewing on-site topography from the existing conditions survey and field inspection. The limits of the modeled two sub-watersheds are depicted on Sheet DA-1.

The existing conditions watershed consists of essentially the entire property down to the south property line and over to the easterly boundary line. Final times of concentration (Tc) ranging between 7.5 and 9.1 minutes were calculated for the existing conditions sub-watersheds. Peak rates of flow for the sub-watersheds and the overall Existing Conditions Watershed for the various modeled storms (2 to 100-year return period events) are summarized in Table 1 and included in Attachment D.

Proposed Conditions Analysis

For proposed conditions, the sub-catchment areas were utilized to model proposed site conditions. For comparison, the total area modeled under the proposed site conditions is essentially equal to that modeled under the existing site conditions. There are a total of two discharge points from the proposed basins following the general patterns of runoff from the site to the downstream wetlands and off-site intermittent watercourse under current conditions.

The limits of the modeled watersheds, as well as the locations of the three-water quality/detention basins are depicted on Sheet DA-2. To remain conservative in the analysis, the beneficial impacts of flow and volume reduction through possible infiltration and inflow within the basins are not included in the proposed hydrologic modeling. Because an

increase in impervious area results in increases of peak rates of runoff, storm water detention is proposed. The water quality/detention basins will mitigate increases in peak rates of runoff through use of containment and outlet methods designed to throttle back peak rates of flow.

The hydraulic model combines the overflow outflow from the two discharge points and adds to the flow from the un-detained watershed for a total proposed conditions peak rate of flow. The peak rates of discharge for the existing and proposed site conditions for the modeled watersheds for the 2-, 5-, 10-, 25-, 50- and 100-year storm events were computed by the program. The design goal was to be below pre-development flow conditions at each of the two design points. Results of the combined analysis are presented below in Table 1.

TABLE 1

Design Point East	**Existing Conditions**	**Proposed Conditions**
Return Period (years)	**Peak Rate of Discharge (CFS)**	**Peak Rate of Discharge (CFS)**
2-Year	3.13	0.63
5-Year	5.59	1.07
10-Year	7.70	1.44
25-Year	10.94	2.00
50-Year	13.56	2.44
100-Year	15.96	2.85

Design Point South	**Existing Conditions**	**Proposed Conditions**
Return Period (years)	**Peak Rate of Discharge (CFS)**	**Peak Rate of Discharge (CFS)**
2-Year	10.29	7.69
5-Year	18.43	12.43
10-Year	25.42	16.90
25-Year	36.18	23.06
50-Year	44.85	27.62
100-Year	52.82	31.68

The model indicates that the stormwater management methods proposed will reduce peak flows in each sub-watershed and overall, when combined flow is compared at the design points. Details of the analysis of the Hydraflow model, including model input and output are included in Attachment D.

4. Pipe to Pipe Design Analysis

The proposed development will employ conventional on-site storm drain systems. These systems convey runoff to the water quality/detention basins for peak flow attenuation and water quality purposes. A detailed, pipe-to-pipe analysis was conducted for all of the proposed on-site storm drain systems. All roof leaders will be piped to the systems as well.

The storm drain systems have been designed to handle the peak flow for the 25-year storm event, in accordance with town requirements. To design and analyze the pipe systems, a pipe-to-pipe analysis was conducted using Hydraflow Storm Sewers for Windows software. This software uses the Rational Method and Manning's Formula to compute peak flow to each basin, and to calculate the capacity of individual culverts.

Input data includes the geometry and configuration of the storm drain system, catchment area of each inlet, weighted runoff coefficients, and times to inlet. Catchment areas were calculated based on proposed topography utilizing polyline delineations in AutoCAD. The catchment areas are depicted graphically on Sheet DA-3.

Weighted runoff coefficients were calculated based on percentages of impervious and pervious areas within each catchment area, as determined by areas of pavement, rooftops, landscaped and wooded areas. The following runoff coefficients were used in the post-development conditions hydrologic model: For impervious areas, C=0.9 was used. For landscaped areas, C=0.30 was used.

Rainfall intensity data was taken from NOAA Atlas 14 rates off of the NOAA website for East Granby. A copy of the Rainfall Intensity Curve is presented in Attachment C. All inlets are small and highly urbanized, therefore, the time to inlet for all inlets is assumed to be five minutes. Manning's roughness coefficient of 0.013 was used for specified N-12 CPE and RCP pipe.

The model calculates the capacity of each culvert and accounts for loss coefficients at bends and inlet and outlet control, whichever governs. Input data includes basin geometry, longitudinal slope, cross slope, and basin depression. Standard size CT DOT 'Type-C' and Double catch basins were modeled for all basins, as appropriate.

Results of analysis are attached and include summaries of system design based on CT DOT output formats. Program input and output data reports are presented in Attachment E. The analysis indicates that all storm drain culverts are designed to adequately convey the 25-year storm event.

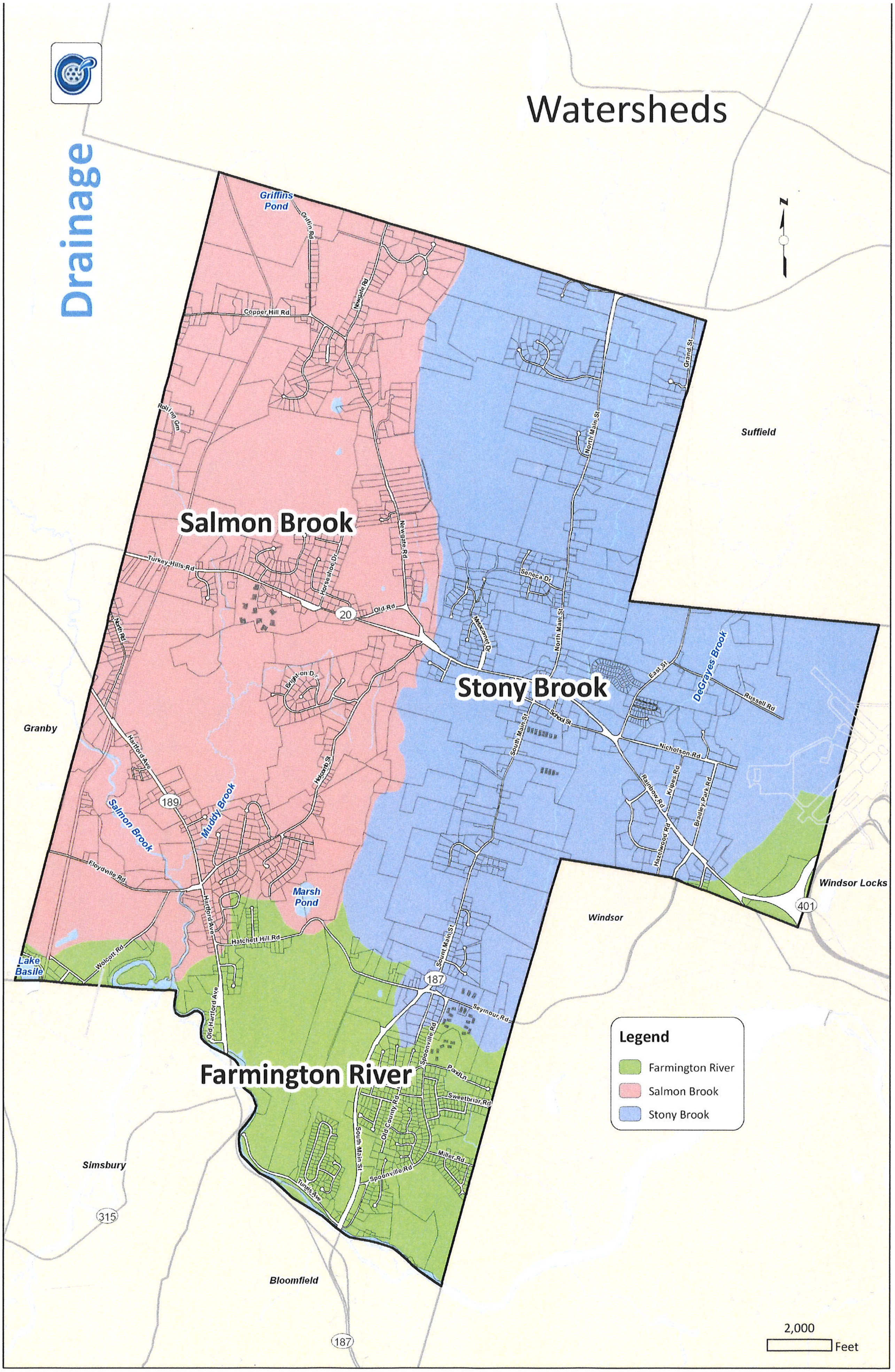
5. Water Quality Treatment Practices

The treatment practice employed for the paved surfaces consists of a treatment train starting with catch basins with 2-foot sumps, hooded outlets, discharge to water quality /detention basins, and then discharge to riprap outlet aprons sized per CTDOT design standards.

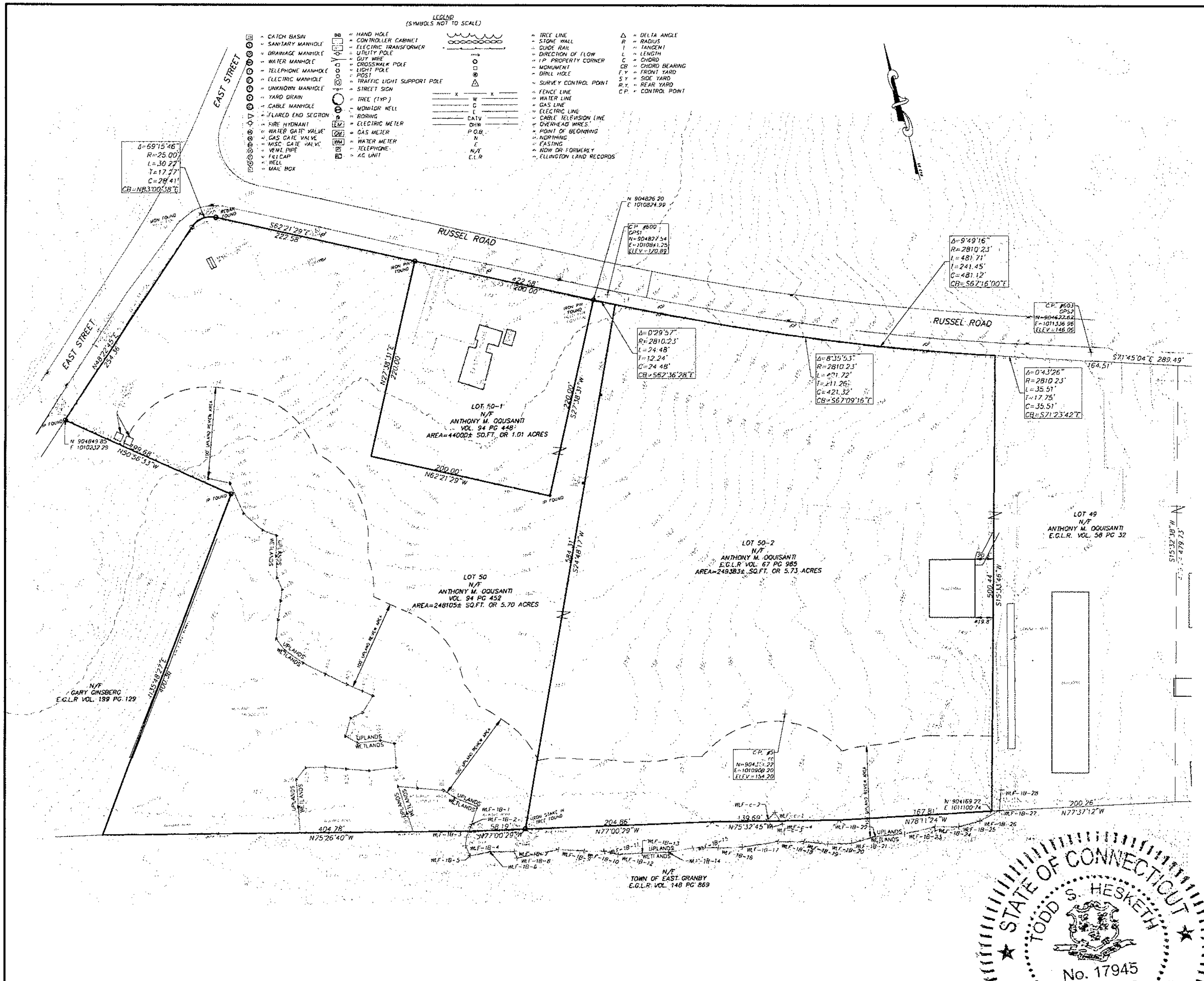
Water Quality volume (WQV), Sediment Forbay, and Rip Rap Level spreader calculations were completed following the Stormwater Treatment Practice Sizing Criteria per Chapter 13 of the 2023 Connecticut Stormwater Quality Manual (SWQM). The three-water quality/detention basins are proposed as an integral part of the stormwater management of the site runoff. The water quality/detention basins are designed to capture and treat more than the minimum required Water Quality Volume (WQV) recommended by the 2023 Connecticut Stormwater Manual (SWQM). The WQV calculations are included in Attachment F.

6. Summary

Both the hydrologic and pipe-to-pipe analyses demonstrate that the goals of the design effort have been met. More than the minimum recommended WQV is provided and peak flows have been reduced below peak existing conditions.



Drainage
Watersheds
Salmon Brook
Stony Brook
Farmington River
Griffins Pond
Marsh Pond
Lake Basile
Salmon Brook
Muddy Brook
DeGrayes Brook
Suffield
Granby
Windsor
Windsor Locks
Simsbury
Bloomfield
Legend
Farmington River
Salmon Brook
Stony Brook
2,000
Feet



COMMERCE PARK TRANSITION ZONE

ZONING DISTRICT	MINIMUM REQUIRED LOT AREA (S.F.)	MAXIMUM PERMITTED LOT WIDTH (FT)	MINIMUM REQUIRED YARDS (FT.) FRONT	SIDE	REAR	MAX. BLDG. COVERAGE	MAX. PERMITTED HEIGHT
CPT	80,000	N/A	100	30	30	65%	45 FT

*NON-CONFORMING TO CURRENT ZONING REGULATIONS, SEE CT GENERAL STATUE 8-13a

NOTES:

1. THIS SURVEY HAS BEEN PREPARED PURSUANT TO THE REGULATIONS OF CONNECTICUT STATE AGENCIES SECTIONS 20-300b-1 THROUGH 20-300b-20, AS AMENDED.
2. IT IS A PROPERTY/TOPOGRAPHIC SURVEY INTENDED TO BE USED FOR PRELIMINARY PLANNING PURPOSES AND TO LOCATE WETLAND FLAGS SET BY A CERTIFIED WETLANDS SOIL SCIENTIST
3. THIS SURVEY FALLS INTO THE BOUNDARY RESURVEY DETERMINATION CATEGORY
4. THIS SURVEY CONFORMS TO CLASS A-2 HORIZONTAL ACCURACY STANDARDS AND T-D TOPOGRAPHIC ACCURACY STANDARDS
5. THE SUBJECT PARCELS ARE CURRENTLY OWNED BY ANTHONY M. OQUISANTI VOL. 67 PG. 985, VOL. 94 PG. 448, AND VOL. 94 PG. 452.
6. THE SUBJECT PARCEL IS LOCATED IN THE COMMERCE PARK TRANSITION ZONE IN THE TOWN OF EAST GRANBY, CT, BASED THE TOWN OF EAST GRANBY ZONING MAP, ADOPTED ON APRIL 30, 1993 WITH AMENDMENTS TO OCTOBER 2022.
7. BEARINGS AND COORDINATES DEPICTED HEREON REFER TO THE NORTH AMERICAN DATUM OF 1983 (NAD 83). ELEVATIONS (IF ANY) DEPICTED HEREON REFER TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 88) AND ARE BASED UPON OPUS RAPID STATIC OBSERVATIONS PERFORMED ON AUGUST 1, 2023 ,RESULTING IN THE FOLLOWING VALUES CONTROL POINT #600 N=904827.54, E=1010841.25, ELEV =170.89' AND CONTROL POINT #603 N=904627.62, E=1011366.96, ELEV =146.06'
8. WETLAND FLAGS A-1 TO A-30 AND B-1 TO B-4 DEPICTED HEREON ARE BASED UPON MAP REFERENCE #2. WETLAND DELINEATION FLAG SERIES 1B-1 TO 1B-28 AND C-1 TO C-4 WERE PLACED BY WILLIAM A. JACKSON, L.E.P. ON 7/15/2023 AND 7/20/2023
9. UNDERGROUND UTILITY, STRUCTURE AND FACILITY LOCATIONS (IF ANY) DEPICTED AND NOTED HEREON HAVE BEEN COMPILED, IN PART, FROM RECORD MAPPING, PAROLE TESTIMONY, VISIBLE FEATURES AND OTHER SOURCES. THESE LOCATIONS MUST BE CONSIDERED AS APPROXIMATE IN NATURE. ADDITIONALLY, OTHER SUCH FEATURES MAY EXIST ON THE SITE, THE EXISTENCE OF WHICH ARE UNKNOWN TO THIS SURVEYOR. THE SIZE, LOCATION AND EXISTENCE OF ALL SUCH FEATURES MUST BE FIELD DETERMINED AND VERIFIED BY THE APPROPRIATE AUTHORITIES PRIOR TO CONSTRUCTION. CALL BEFORE YOU DIG 1-800-922-4455.

MAP REFERENCES:

1. AGRICULTURAL ZONE PROPERTY OF JENNIE M. CAGUE ESTATE OF MAITLAND J. CAGUE 10 RUSSELL ROAD EAST GRANBY, CONNECTICUT SCALE 1" = 50' FEBRUARY 1989 SANDERSON & WASHBURN
2. SITE PLAN ANTHONY M. OQUISANTI 22 RUSSELL ROAD EAST GRANBY, CONNECTICUT SCALE 1" = 40' MAY 1984 SANDERSON AND WASHBURN
3. LOT LINE REVISION PROPERTY OF ANTHONY M. OQUISANTI & MARK OQUISANTI 18-22 & 30 RUSSELL ROAD EAST GRANBY, CONNECTICUT SCALE 1" = 50' DECEMBER 5, 2018 BARRESI ASSOCIATES, LLC
4. PROPERTY SURVEY PROPERTY OF RONCARI INDUSTRIES, INC.RUSSELL ROAD EAST GRANBY, CONNECTICUT SCALE 1" = 50' 9/23/03 CLOSE JENSON & MILLER, P.C.

GRAPHIC SCALE

(IN FEET)
1 inch = 50 ft.

TO MY KNOWLEDGE AND BELIEF THIS MAP IS SUBSTANTIALLY CORRECT AS NOTED HEREON

THIS MAP IS NOT VALID WITHOUT THE LIVE SIGNATURE AND IMPRESSION TYPE SEAL OF THE LAND SURVEYOR WHOSE NAME APPEARS HEREON

TODD S. HESKETH LS 17945

Revisions:		
No.	Date	Description

PROPERTY/TOPOGRAPHIC SURVEY
property of
ANTHONY M. OQUSANTI
RUSSELL ROAD
EAST GRANBY, CONNECTICUT

Date: 05-25-2023 | Drawn by: NJD | Job no.: 23145
Scale: 1" = 50' | Checked by: TSH | Sheet no.: 1 OF 1

ILP-1

FAH

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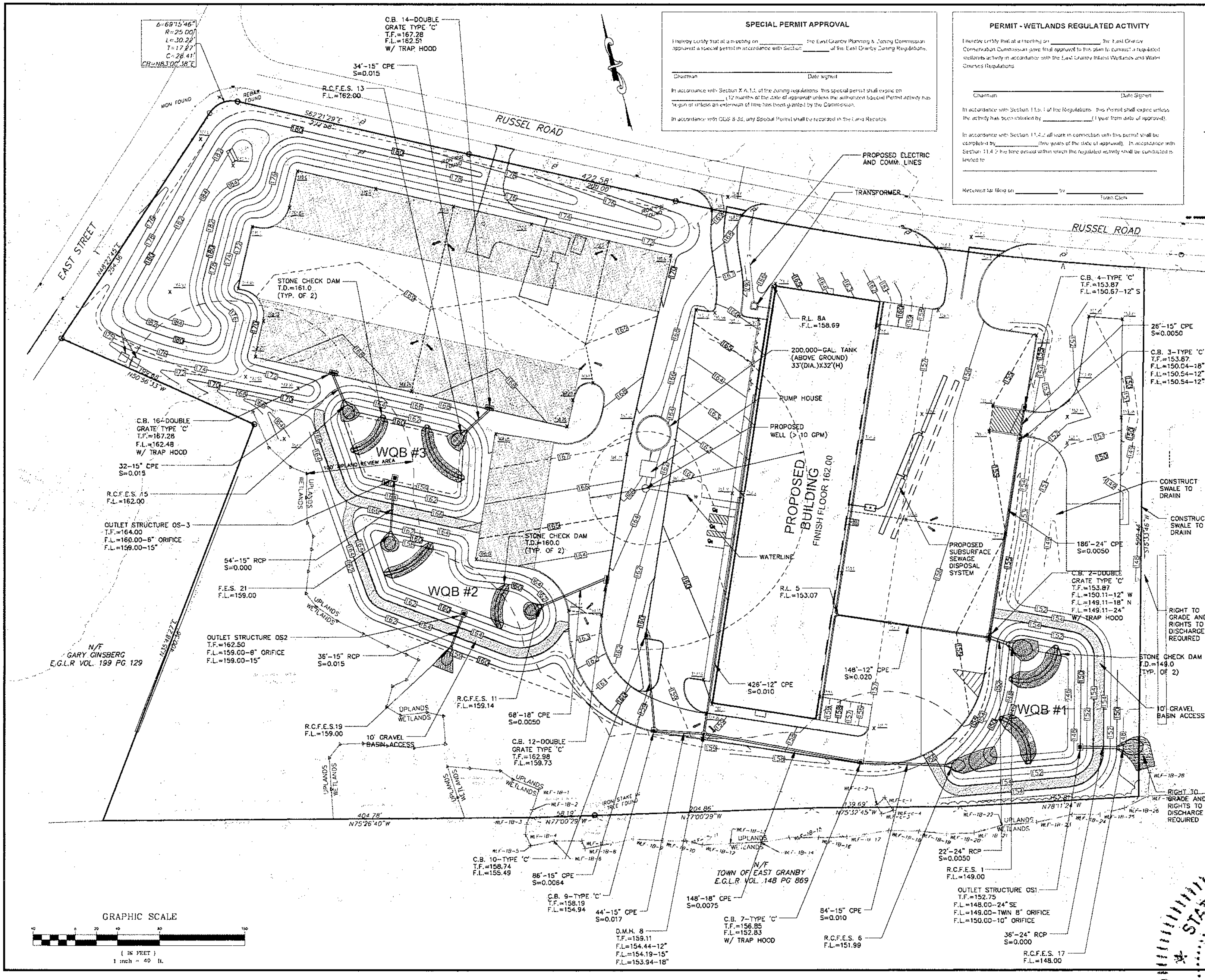
3 Creamery Brook, East Granby, CT 06026
Phone (860) 653-8000 Fax (860) 844-8600
Civil & Traffic Engineers · Surveyors · Planners · Landscape Architects www.fahesketh.com · mail@fahesketh.com



SPECIAL PERMIT APPROVAL

I hereby certify that at a meeting on ______________ the East Granby Planning & Zoning Commission approved a special permit in accordance with Section ________ of the East Granby Zoning Regulations.

____
Chairman | Date signed

In accordance with Section X.A.1.c. of the zoning regulations, this special permit shall expire on ________________ (12 months of the date of approval) unless the authorized Special Permit activity has begun or unless an extension of time has been granted by the Commission.

In accordance with CGS 8-3d, any Special Permit shall be recorded in the Land Records.

PERMIT - WETLANDS REGULATED ACTIVITY

I hereby certify that at a meeting on ______________ the East Granby Conservation Commission gave final approval to this plan to conduct a regulated wetlands activity in accordance with the East Granby Inland Wetlands and Water Courses Regulations.

____
Chairman | Date Signed

In accordance with Section 11.6.1 of the Regulations, this Permit shall expire unless the activity has been initiated by ______________ (1 year from date of approval).

In accordance with Section 11.4.2 all work in connection with this permit shall be completed by ______________ (five years of the date of approval). In accordance with Section 11.4.2 the time period within which the regulated activity shall be conducted is limited to

____

Received for filing on ____________ by ____________
Town Clerk

LEGEND

- = PROPOSED DRAINAGE MANHOLE
- = PROPOSED SANITARY MANHOLE
- = PROPOSED CATCH BASIN
- = PROPOSED STORM DRAIN CULVERT
- = PROPOSED OUTLET STRUCTURE
- = PROPOSED SPOT GRADE
- = PROPOSED CONTOUR
- = PROPOSED DRAINAGE DIVIDE
- = EXISTING CONTOUR

GENERAL GRADING NOTES:

1. SET/RAISE FRAMES OF ALL MANHOLES, CATCH BASINS, GAS AND WATER GATES, HAND HOLES, METER BOXES, AND ALL OTHER UTILITY APPURTENANCES TO MATCH PROPOSED FINISH GRADE.
2. MILL AND SAW CUT EXISTING PAVEMENT ALONG LIMITS OF WORK. CONSTRUCT APPROPRIATE PAVEMENT MATCH TREATMENT. BLEND ALL NEW WORK TO MATCH EXISTING.
3. GRADE ALL AREAS TO PRECLUDE PONDING
4. GRADE TRANSITIONS TO ROADWAYS TO MAINTAIN GUTTER FLOW AND PRECLUDE PONDING.

DRAINAGE SYSTEM NOTES:

1. CPE = CORRUGATED POLYETHYLENE PIPE CONFORMING TO CT DOT FORM 818, M.08.01-18, SMOOTH INTERIOR.
2. CATCH BASINS AND OTHER DRAINAGE STRUCTURES SHALL CONFORM TO CT DOT FORM 818, M.08.02.
3. CONNECT ALL ROOF LEADERS TO STORM DRAIN SYSTEMS AS SHOWN. COORDINATE DOWNSPOUT LOCATIONS WITH PROJECT ARCHITECT/M.E.P.
4. EXISTING UTILITIES DEPICTED ARE FROM FIELD SURVEY DATA AND OTHER READILY-AVAILABLE INFORMATION. NOT ALL UTILITIES MAY BE SHOWN, AND THOSE SHOWN MAY NOT BE ACCURATE. THE CONTRACTOR SHALL VERIFY ALL UTILITY LOCATIONS PRIOR TO START OF CONSTRUCTION OF UTILITIES. CONDUCT TEST PITS AT ALL UTILITY CROSSINGS AND POINT OF CONNECTIONS WITH EXISTING UTILITIES. NOTIFY DESIGN ENGINEER OF POTENTIAL CONFLICTS WITH PROPOSED ALIGNMENT AND GRADE.
5. CONTACT "CALL BEFORE YOU DIG" BY CALLING 811 OR 1-800-922-4455 TO MARK THE LOCATION OF ALL UNDERGROUND UTILITIES AT LEAST 72 HOURS PRIOR TO START OF CONSTRUCTION.
6. ALL MATERIALS AND INSTALLATION PER TOWN OF EAST GRANBY, CT DOT FORM 818, OR MANUFACTURER'S SPECIFICATION, AS APPROPRIATE.

GENERAL SITE DATA:

1. TOTAL SITE AREA = 12.44 ACRES
2. TOTAL SITE DISTURBANCE = 9.20 ACRES
3. TOTAL WETLANDS AREA = 1.37 ACRES
4. WETLANDS AREA DISTURBED= 0 ACRES
5. WATERCOURSE DISTURBED = 0 L.F.
6. TOTAL 100' URA = 2.60 ACRES
7. TOTAL 100' URA DISTURBED = 1.58 ACRES

OWNER: Anthony Oquisanti
P.O. Box Z
East Granby, CT 06026
(860) 653-2551

APPLICANT: Joneser's Express Transportation
P.O. Box 872
Windsor Locks, CT 06096
(877) 966-3796

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Civil & Traffic Engineers · Surveyors · Planners · Landscape Architects www.fahesketh.com · mail@fahesketh.com

No	Date	Description

Revisions:

GRADING, DRAINAGE AND UTILITY PLAN
PREPARED FOR
Jonser's Express Transportation
10 RUSSELL ROAD
EAST GRANBY, CONNECTICUT

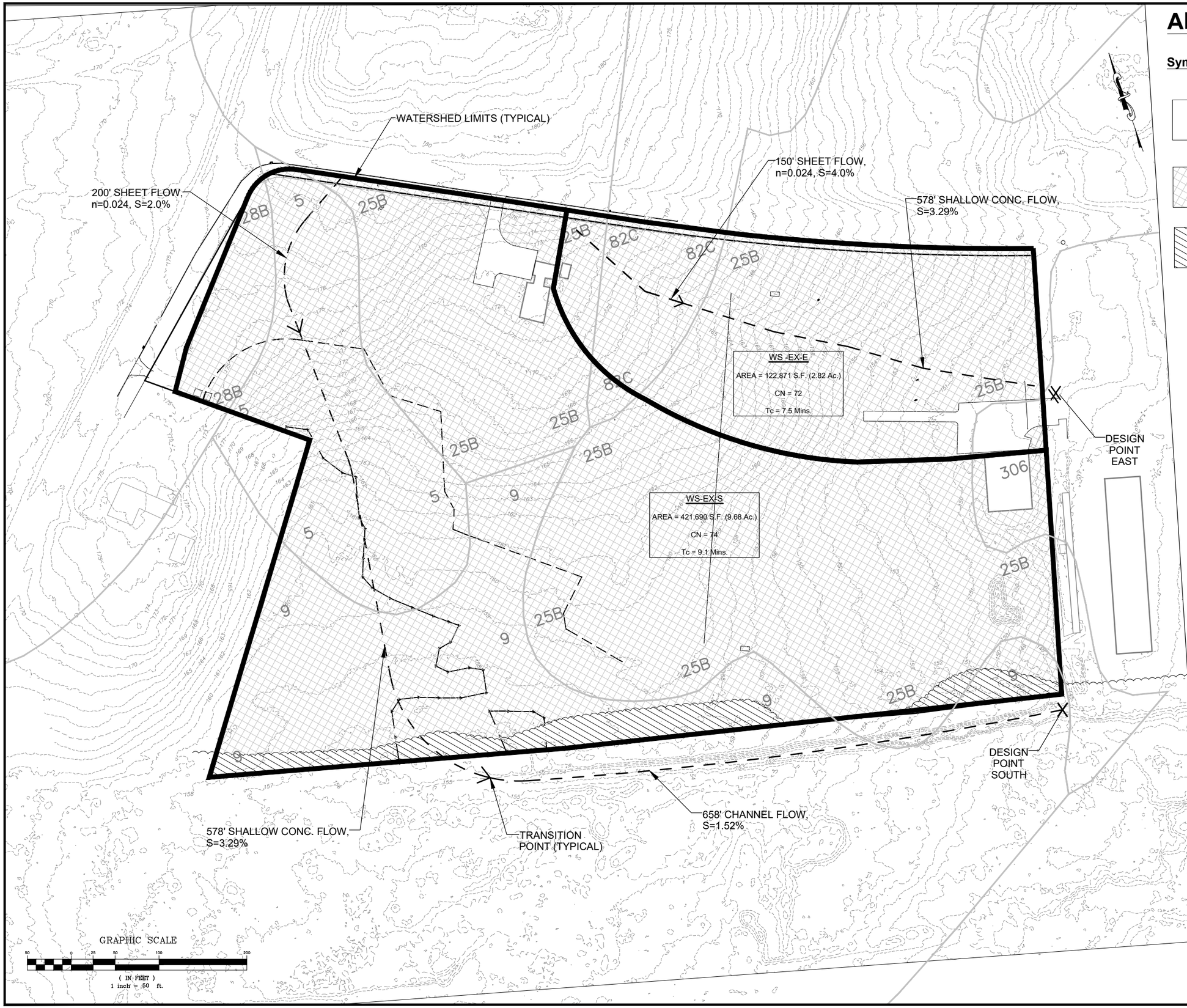
Date: 09-29-2023	Job no: 23145
Drawn by: DRT	
Scale: 1" = 40'	Checked by: GAH	Sheet no: 1 OF 1

GR-1

STATE OF CONNECTICUT
DAVID S. ZIAKS
No. 13336
LICENSED
PROFESSIONAL ENGINEER

Attachment A

Watershed Area Maps



AREA TYPE LEGEND

Symbol Type

- Impervious Surface
- Landscaping
- Wooded

SOIL TYPE LEGEND

5 - Wilbraham Silt Loam, (0-3%) - Rating: C/D
9 - Scitico, Shaker, and Maybid Soils - Rating: D
25B- Brandcroft Silt Loam, (3-8%) - Rating: C
28B- Elmridge Fine Sandy Loam, (3-8%) - Rating: C
82B- Broadbrook Silt Loam, (3-8%) - Rating: C
82C- Broadbrook Silt Loam, (8-15%) - Rating: C
306- Udorthents-Urban Land - Rating: B

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Revisions:

No.	Date	Description
1.	12-22-2023	Town Comments

DRAINAGE ANALYSIS MAP
EXISTING CONDITIONS WATERSHED AREAS
PREPARED FOR
Jonser's Express Transportation
10 RUSSELL ROAD
EAST GRANBY, CONNECTICUT

Date: 09-29-2023 | Drawn by: DRT | Job no: 23145
Scale: 1" = 50' | Checked by: GAH | Sheet no: 1 OF 1

DA-1

WATERSHED LIMITS (TYPICAL)

WS -PR-UNDET.-S
AREA = 169,516 S.F. (3.65 Ac.)
CN = 79
Tc =10 Mins

WS-PR-S -1
AREA = 99,788 S.F. (2.29 Ac.)
CN = 88
Tc = 5 Mins

WS -PR-S-2
AREA = 49,138 S.F. (1.13 Ac.)
CN = 88
Tc = 10 Mins

WS -PR-UNDET.-S
AREA = 169,516 S.F. (3.65 Ac.)
CN = 79
Tc = 10 Mins

WS -PR-UNDET.-E
AREA = 18,611 S.F. (0.43 Ac.)
CN = 79
Tc = 5 Mins

WS-PR-S-3
AREA = 209,989 S.F. (4.82 Ac.)
CN = 89
Tc = 10 Mins

WS -PR-UNDET.-S
AREA = 169,516 S.F. (3.65 Ac.)
CN = 79
Tc = 10 Mins

DESIGN POINT EAST

DESIGN POINT SOUTH

GRAPHIC SCALE
50 0 25 50 100 200
(IN FEET)
1 inch = 50 ft.

AREA TYPE LEGEND

Symbol Type

Impervious Surface

Landscaping

Wooded

SOIL TYPE LEGEND

5 - Wilbraham Silt Loam, (0-3%) - Rating: C/D
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Revisions:

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1.	12-22-2023	Town Comments

DRAINAGE ANALYSIS MAP
PROPOSED CONDITIONS WATERSHED AREAS
PREPARED FOR
Jonser's Express Transportation
10 RUSSELL ROAD
EAST GRANBY, CONNECTICUT

Date: 09-29-2023 | Drawn by: DRT | Job no: 23145
Scale: 1" = 50' | Checked by: GAH | Sheet no: 1 OF 1

DA-2

G:\2023\23145 - East Russell Road\Submittal 2023\2023-12-22 TP2\DA-1 2023-12-22.dwg, DA-2, Dec. 22, 2023 - 9:34:25 AM

AREA TYPE LEGEND

Symbol Type

- Impervious Surface
- Landscaping
- Wooded

C.B. 10
TOTAL AREA = 1.16 Ac.
Weighted C = 0.67
Tc = 10 Mins.

R.L. 8A
TOTAL AREA = 0.46 Ac.
Weighted C = 0.90
Tc = 5 Mins.

R.L. 5
TOTAL AREA = 0.46 Ac.
Weighted C = 0.90
Tc = 5 Mins.

C.B. 14
TOTAL AREA = 0.76 Ac.
Weighted C = 0.80
Tc = 5 Mins.

C.B. 16
TOTAL AREA = 1.15 Ac.
Weighted C = 0.65
Tc = 5 Mins.

C.B. 4
TOTAL AREA = 0.62 Ac.
Weighted C = 0.62
Tc = 10 Mins.

C.B. 10
TOTAL AREA = 1.16 Ac.
Weighted C = 0.67
Tc = 10 Mins.

C.B. 3
TOTAL AREA = 0.32 Ac.
Weighted C = 0.88
Tc = 5 Mins.

C.B. 12
TOTAL AREA = 0.74 Ac.
Weighted C = 0.80
Tc = 5 Mins.

C.B. 2
TOTAL AREA = 1.28 Ac.
Weighted C = 0.87
Tc = 5 Mins.

C.B. 9
TOTAL AREA = 0.24 Ac.
Weighted C = 0.77
Tc = 5 Mins.

C.B. 7
TOTAL AREA = 0.10 Ac.
Weighted C = 0.72
Tc = 5 Mins.

GRAPHIC SCALE
50 0 25 50 100 200
(IN FEET)
1 inch = 50 ft.

F. A. Hesketh & Associates, Inc.
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www.fahesketh.com - mail@fahesketh.com

Revisions:

No.	Date	Description
1.	12-22-2023	Town Comments

DRAINAGE ANALYSIS MAP
PIPE-TO-PIPE ANAYLSIS
PREPARED FOR
Jonser's Express Transportation
10 RUSSELL ROAD
EAST GRANBY, CONNECTICUT

Date: 09-29-2023 | Drawn by: DRT | Job no: 23145
Scale: 1" = 50' | Checked by: GAH | Sheet no: 1 OF 1

DA-3

G:\2023\23145 - East Russell Road\Submittal 2023\2023-12-22 TP210A-1 2023-12-22.dwg, DA-3, Dec. 22, 2023 - 9:34:30 AM

Attachment B

Soil Type Maps

Soil Map—State of Connecticut
(J.E.T. - EAST RUSSELL ROAD)

Map Scale: 1:3,000 if printed on A landscape (11" x 8.5") sheet.

N

Meters
0 40 80 160 240

Feet
0 100 200 400 600

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

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

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

Background
- Aerial Photography

MAP INFORMATION

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

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

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

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

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

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

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

Soil Survey Area: State of Connecticut
Survey Area Data: Version 22, Sep 12, 2022

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

Date(s) aerial images were photographed: Jun 14, 2022—Oct 6, 2022

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

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
5	Wilbraham silt loam, 0 to 3 percent slopes	1.6	13.1%
9	Scitico, Shaker, and Maybid soils	1.9	16.1%
25B	Brancroft silt loam, 3 to 8 percent slopes	5.5	46.0%
28B	Elmridge fine sandy loam, 3 to 8 percent slopes	0.5	4.1%
82B	Broadbrook silt loam, 3 to 8 percent slopes	1.7	14.1%
82C	Broadbrook silt loam, 8 to 15 percent slopes	0.5	4.1%
306	Udorthents-Urban land complex	0.3	2.5%
Totals for Area of Interest		**11.9**	**100.0%**

State of Connecticut

5—Wilbraham silt loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 2wh26
Elevation: 0 to 770 feet
Mean annual precipitation: 36 to 53 inches
Mean annual air temperature: 41 to 54 degrees F
Frost-free period: 140 to 220 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Wilbraham and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Wilbraham

Setting

Landform: Ground moraines, drumlins, hills, drainageways, depressions
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Head slope, base slope
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Red coarse-loamy lodgment till derived from basalt and/or sandstone and shale

Typical profile

Ap - 0 to 8 inches: silt loam
Bw1 - 8 to 19 inches: silt loam
Bw2 - 19 to 25 inches: silt loam
Cd - 25 to 61 inches: gravelly loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: 16 to 35 inches to densic material
Drainage class: Poorly drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.14 in/hr)
Depth to water table: About 0 to 10 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 5.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: C/D

Ecological site: F144AY009CT - Wet Till Depressions
Hydric soil rating: Yes

Minor Components

Ludlow

Percent of map unit: 10 percent
Landform: Hills, drumlins
Landform position (two-dimensional): Summit, footslope
Landform position (three-dimensional): Base slope, crest
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Menlo

Percent of map unit: 5 percent
Landform: Drainageways, depressions
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Data Source Information

Soil Survey Area: State of Connecticut
Survey Area Data: Version 22, Sep 12, 2022

State of Connecticut

9—Scitico, Shaker, and Maybid soils

Map Unit Setting

National map unit symbol: 9lrq
Elevation: 0 to 1,200 feet
Mean annual precipitation: 43 to 50 inches
Mean annual air temperature: 45 to 55 degrees F
Frost-free period: 140 to 185 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Scitico and similar soils: 40 percent
Shaker and similar soils: 30 percent
Maybid and similar soils: 15 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Scitico

Setting

Landform: Terraces, drainageways, depressions
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Clayey glaciolacustrine deposits

Typical profile

Ap - 0 to 8 inches: silt loam
Eg - 8 to 11 inches: silt loam
Bg1 - 11 to 18 inches: silty clay loam
Bg2 - 18 to 30 inches: silty clay loam
Bg3 - 30 to 38 inches: silty clay
Cg1 - 38 to 52 inches: silty clay loam
Cg2 - 52 to 65 inches: silty clay

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: About 0 to 12 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: High (about 11.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w

Hydrologic Soil Group: D
Ecological site: F145XY004CT - Wet Lake Plain
Hydric soil rating: Yes

Description of Shaker

Setting

Landform: Terraces, drainageways, depressions
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Coarse-loamy eolian deposits over clayey glaciolacustrine deposits

Typical profile

Oe - 0 to 2 inches: moderately decomposed plant material
Ap - 2 to 6 inches: fine sandy loam
Bg - 6 to 20 inches: sandy loam
Bw - 20 to 30 inches: sandy loam
2C - 30 to 65 inches: silty clay

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately high (0.00 to 0.20 in/hr)
Depth to water table: About 0 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: High (about 9.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: C/D
Ecological site: F144AY019NH - Wet Lake Plain
Hydric soil rating: Yes

Description of Maybid

Setting

Landform: Terraces, drainageways, depressions
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Clayey glaciolacustrine deposits

Typical profile

A - 0 to 9 inches: silt loam
Bg1 - 9 to 18 inches: silty clay loam
Bg2 - 18 to 26 inches: silty clay loam
Cg1 - 26 to 36 inches: silty clay loam
Cg2 - 36 to 60 inches: silty clay loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately high (0.00 to 0.20 in/hr)
Depth to water table: About 0 to 6 inches
Frequency of flooding: None
Frequency of ponding: Occasional
Available water supply, 0 to 60 inches: High (about 11.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6w
Hydrologic Soil Group: C/D
Ecological site: F145XY003CT - Very Wet Inland Lake Plain
Hydric soil rating: Yes

Minor Components

Brancroft

Percent of map unit: 5 percent
Landform: Terraces
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Elmridge

Percent of map unit: 5 percent
Landform: Terraces
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Unnamed, sand or gravel substratum

Percent of map unit: 3 percent
Hydric soil rating: No

Unnamed, red parent material

Percent of map unit: 2 percent

Data Source Information

Soil Survey Area: State of Connecticut
Survey Area Data: Version 22, Sep 12, 2022

State of Connecticut

25B—Brancroft silt loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 9ll7
Elevation: 0 to 1,200 feet
Mean annual precipitation: 43 to 52 inches
Mean annual air temperature: 45 to 55 degrees F
Frost-free period: 140 to 185 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Brancroft and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Brancroft

Setting

Landform: Terraces
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Fine-silty glaciolacustrine deposits

Typical profile

Ap - 0 to 6 inches: silt loam
Bw1 - 6 to 17 inches: silt loam
Bw2 - 17 to 22 inches: silty clay loam
Bw3 - 22 to 32 inches: silt loam
C1 - 32 to 43 inches: silty clay loam
C2 - 43 to 66 inches: silt loam

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately high (0.00 to 0.57 in/hr)
Depth to water table: About 18 to 30 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: High (about 12.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C
Ecological site: F145XY006CT - Semi-Rich Moist Lake Plain
Hydric soil rating: No

Minor Components

Berlin
Percent of map unit: 5 percent
Landform: Terraces
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Elmridge
Percent of map unit: 5 percent
Landform: Terraces
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Maybid
Percent of map unit: 3 percent
Landform: Terraces, drainageways, depressions
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Unnamed, till substratum
Percent of map unit: 2 percent
Hydric soil rating: No

Scitico
Percent of map unit: 2 percent
Landform: Terraces, drainageways, depressions
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Unnamed, sand or gravel substratum
Percent of map unit: 2 percent
Hydric soil rating: No

Belgrade
Percent of map unit: 1 percent
Landform: Terraces
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Data Source Information

Soil Survey Area: State of Connecticut
Survey Area Data: Version 22, Sep 12, 2022

State of Connecticut

28B—Elmridge fine sandy loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 9lm1
Elevation: 0 to 1,200 feet
Mean annual precipitation: 43 to 54 inches
Mean annual air temperature: 45 to 55 degrees F
Frost-free period: 140 to 185 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Elmridge and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Elmridge

Setting

Landform: Terraces
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Coarse-loamy eolian sands over clayey glaciolacustrine deposits

Typical profile

Ap - 0 to 6 inches: fine sandy loam
Bw1 - 6 to 10 inches: fine sandy loam
Bw2 - 10 to 18 inches: fine sandy loam
Bw3 - 18 to 25 inches: sandy loam
2C - 25 to 65 inches: silty clay

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: About 18 to 30 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 9.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: C
Ecological site: F145XY006CT - Semi-Rich Moist Lake Plain

Hydric soil rating: No

Minor Components

Brancroft

Percent of map unit: 5 percent
Landform: Terraces
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Shaker

Percent of map unit: 3 percent
Landform: Terraces, drainageways, depressions
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Unnamed, red parent material

Percent of map unit: 2 percent
Hydric soil rating: No

Scitico

Percent of map unit: 2 percent
Landform: Terraces, drainageways, depressions
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Sudbury

Percent of map unit: 2 percent
Landform: Terraces, outwash plains
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Belgrade

Percent of map unit: 2 percent
Landform: Terraces
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Ninigret

Percent of map unit: 2 percent
Landform: Terraces, outwash plains
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: No

Berlin

Percent of map unit: 1 percent
Landform: Terraces
Down-slope shape: Linear
Across-slope shape: Linear

Hydric soil rating: No

Maybid

Percent of map unit: 1 percent
Landform: Terraces, drainageways, depressions
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Data Source Information

Soil Survey Area: State of Connecticut
Survey Area Data: Version 22, Sep 12, 2022

State of Connecticut

82B—Broadbrook silt loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 9lr3
Elevation: 0 to 1,200 feet
Mean annual precipitation: 40 to 54 inches
Mean annual air temperature: 45 to 55 degrees F
Frost-free period: 140 to 185 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Broadbrook and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Broadbrook

Setting

Landform: Till plains, hills, drumlins
Down-slope shape: Linear
Across-slope shape: Concave
Parent material: Eolian deposits over coarse-loamy lodgment till derived from gneiss and/or schist and/or sandstone and/or basalt

Typical profile

Ap - 0 to 8 inches: silt loam
Bw1 - 8 to 14 inches: silt loam
Bw2 - 14 to 25 inches: silt loam
2Cd - 25 to 65 inches: gravelly fine sandy loam

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: 20 to 40 inches to densic material
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately high (0.00 to 0.20 in/hr)
Depth to water table: About 18 to 30 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 4.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C
Ecological site: F145XY012CT - Well Drained Dense Till Uplands
Hydric soil rating: No

Minor Components

Rainbow

Percent of map unit: 5 percent
Landform: Hills, drumlins
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: No

Wethersfield

Percent of map unit: 5 percent
Landform: Hills, drumlins
Down-slope shape: Linear
Across-slope shape: Convex
Hydric soil rating: No

Holyoke

Percent of map unit: 3 percent
Landform: Ridges, hills
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Wilbraham

Percent of map unit: 3 percent
Landform: Drainageways, depressions
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Menlo

Percent of map unit: 2 percent
Landform: Drainageways, depressions
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Narragansett

Percent of map unit: 2 percent
Landform: Till plains, hills
Down-slope shape: Linear
Across-slope shape: Convex
Hydric soil rating: No

Data Source Information

Soil Survey Area: State of Connecticut
Survey Area Data: Version 22, Sep 12, 2022

State of Connecticut

82C—Broadbrook silt loam, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 9lr4
Elevation: 0 to 1,200 feet
Mean annual precipitation: 40 to 54 inches
Mean annual air temperature: 45 to 55 degrees F
Frost-free period: 140 to 185 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Broadbrook and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Broadbrook

Setting

Landform: Till plains, hills, drumlins
Down-slope shape: Linear
Across-slope shape: Concave
Parent material: Eolian deposits over coarse-loamy lodgment till derived from gneiss and/or schist and/or sandstone and/or basalt

Typical profile

Ap - 0 to 8 inches: silt loam
Bw1 - 8 to 14 inches: silt loam
Bw2 - 14 to 25 inches: silt loam
2Cd - 25 to 65 inches: gravelly fine sandy loam

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: 20 to 40 inches to densic material
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately high (0.00 to 0.20 in/hr)
Depth to water table: About 18 to 30 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 4.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Ecological site: F145XY012CT - Well Drained Dense Till Uplands
Hydric soil rating: No

Minor Components

Rainbow

Percent of map unit: 5 percent
Landform: Hills, drumlins
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: No

Wethersfield

Percent of map unit: 5 percent
Landform: Hills, drumlins
Down-slope shape: Linear
Across-slope shape: Convex
Hydric soil rating: No

Wilbraham

Percent of map unit: 3 percent
Landform: Drainageways, depressions
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Holyoke

Percent of map unit: 3 percent
Landform: Ridges, hills
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Narragansett

Percent of map unit: 2 percent
Landform: Till plains, hills
Down-slope shape: Linear
Across-slope shape: Convex
Hydric soil rating: No

Menlo

Percent of map unit: 2 percent
Landform: Drainageways, depressions
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Data Source Information

Soil Survey Area: State of Connecticut
Survey Area Data: Version 22, Sep 12, 2022

State of Connecticut

306—Udorthents-Urban land complex

Map Unit Setting

National map unit symbol: 9lmg
Elevation: 0 to 2,000 feet
Mean annual precipitation: 43 to 56 inches
Mean annual air temperature: 45 to 55 degrees F
Frost-free period: 120 to 185 days
Farmland classification: Not prime farmland

Map Unit Composition

Udorthents and similar soils: 50 percent
Urban land: 35 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Udorthents

Setting

Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Drift

Typical profile

A - 0 to 5 inches: loam
C1 - 5 to 21 inches: gravelly loam
C2 - 21 to 80 inches: very gravelly sandy loam

Properties and qualities

Slope: 0 to 25 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Very low to high (0.00 to 1.98 in/hr)
Depth to water table: About 54 to 72 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 6.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Hydric soil rating: No

Description of Urban Land

Typical profile

H - 0 to 6 inches: material

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydrologic Soil Group: D
Hydric soil rating: Unranked

Minor Components

Unnamed, undisturbed soils

Percent of map unit: 8 percent
Hydric soil rating: No

Udorthents, wet substratum

Percent of map unit: 5 percent
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

Rock outcrop

Percent of map unit: 2 percent
Hydric soil rating: No

Data Source Information

Soil Survey Area: State of Connecticut
Survey Area Data: Version 22, Sep 12, 2022

Attachment C

NOAA Rainfall Data

NOAA Atlas 14, Volume 10, Version 3
Location name: East Granby, Connecticut, USA*
Latitude: 41.9443°, Longitude: -72.7107°
Elevation: 172 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sandra Pavlovic, Michael St. Laurent, Carl Trypaluk, Dale Unruh, Orlan Wilhite

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/hour)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	**4.18** (3.19-5.44)	**5.00** (3.83-6.52)	**6.36** (4.85-8.32)	**7.48** (5.66-9.83)	**9.01** (6.64-12.4)	**10.2** (7.36-14.3)	**11.4** (8.03-16.6)	**12.7** (8.54-19.0)	**14.7** (9.50-22.7)	**16.3** (10.3-25.7)
10-min	**2.96** (2.26-3.85)	**3.55** (2.71-4.62)	**4.50** (3.43-5.89)	**5.29** (4.01-6.97)	**6.38** (4.70-8.78)	**7.21** (5.21-10.1)	**8.07** (5.68-11.8)	**9.04** (6.05-13.5)	**10.4** (6.73-16.1)	**11.5** (7.30-18.2)
15-min	**2.32** (1.78-3.02)	**2.78** (2.12-3.62)	**3.53** (2.69-4.62)	**4.15** (3.15-5.46)	**5.01** (3.69-6.89)	**5.65** (4.09-7.95)	**6.33** (4.46-9.23)	**7.08** (4.74-10.6)	**8.16** (5.28-12.6)	**9.05** (5.73-14.3)
30-min	**1.56** (1.19-2.03)	**1.88** (1.44-2.45)	**2.40** (1.83-3.14)	**2.83** (2.15-3.72)	**3.43** (2.52-4.71)	**3.88** (2.80-5.44)	**4.34** (3.06-6.33)	**4.87** (3.26-7.27)	**5.61** (3.63-8.69)	**6.22** (3.93-9.82)
60-min	**0.978** (0.748-1.27)	**1.18** (0.904-1.54)	**1.52** (1.16-1.98)	**1.79** (1.36-2.36)	**2.17** (1.60-2.99)	**2.46** (1.78-3.46)	**2.76** (1.94-4.03)	**3.10** (2.07-4.62)	**3.57** (2.31-5.52)	**3.96** (2.50-6.25)
2-hr	**0.631** (0.486-0.816)	**0.759** (0.584-0.982)	**0.967** (0.742-1.26)	**1.14** (0.870-1.49)	**1.38** (1.02-1.89)	**1.56** (1.13-2.18)	**1.75** (1.24-2.55)	**1.97** (1.32-2.92)	**2.29** (1.49-3.53)	**2.56** (1.63-4.03)
3-hr	**0.484** (0.374-0.623)	**0.582** (0.449-0.750)	**0.742** (0.571-0.961)	**0.876** (0.670-1.14)	**1.06** (0.789-1.45)	**1.20** (0.875-1.67)	**1.34** (0.959-1.96)	**1.52** (1.02-2.24)	**1.78** (1.16-2.73)	**2.00** (1.27-3.13)
6-hr	**0.304** (0.236-0.389)	**0.369** (0.286-0.472)	**0.474** (0.367-0.610)	**0.562** (0.433-0.727)	**0.682** (0.512-0.929)	**0.771** (0.569-1.08)	**0.868** (0.627-1.27)	**0.988** (0.668-1.45)	**1.17** (0.764-1.79)	**1.33** (0.849-2.07)
12-hr	**0.184** (0.144-0.235)	**0.227** (0.178-0.289)	**0.297** (0.231-0.379)	**0.355** (0.275-0.456)	**0.434** (0.328-0.589)	**0.493** (0.366-0.685)	**0.557** (0.405-0.811)	**0.638** (0.433-0.934)	**0.765** (0.500-1.16)	**0.875** (0.560-1.35)
24-hr	**0.107** (0.084-0.135)	**0.134** (0.106-0.170)	**0.179** (0.140-0.227)	**0.215** (0.168-0.275)	**0.266** (0.202-0.359)	**0.303** (0.227-0.420)	**0.344** (0.253-0.501)	**0.397** (0.270-0.579)	**0.483** (0.316-0.728)	**0.558** (0.358-0.858)
2-day	**0.059** (0.047-0.075)	**0.076** (0.060-0.095)	**0.102** (0.081-0.129)	**0.124** (0.097-0.157)	**0.154** (0.118-0.208)	**0.176** (0.133-0.244)	**0.201** (0.149-0.293)	**0.234** (0.160-0.339)	**0.289** (0.190-0.433)	**0.338** (0.217-0.516)
3-day	**0.043** (0.034-0.054)	**0.055** (0.044-0.069)	**0.074** (0.059-0.094)	**0.091** (0.071-0.114)	**0.113** (0.087-0.152)	**0.129** (0.098-0.178)	**0.147** (0.110-0.214)	**0.172** (0.117-0.248)	**0.213** (0.140-0.318)	**0.249** (0.161-0.380)
4-day	**0.035** (0.028-0.043)	**0.044** (0.035-0.055)	**0.060** (0.048-0.075)	**0.073** (0.058-0.092)	**0.091** (0.070-0.122)	**0.104** (0.079-0.143)	**0.118** (0.088-0.172)	**0.138** (0.095-0.199)	**0.171** (0.113-0.256)	**0.201** (0.130-0.306)
7-day	**0.024** (0.019-0.030)	**0.030** (0.024-0.037)	**0.040** (0.032-0.050)	**0.049** (0.039-0.061)	**0.060** (0.047-0.080)	**0.069** (0.052-0.094)	**0.078** (0.059-0.113)	**0.091** (0.063-0.131)	**0.112** (0.074-0.167)	**0.131** (0.085-0.199)
10-day	**0.019** (0.015-0.024)	**0.024** (0.019-0.030)	**0.032** (0.025-0.039)	**0.038** (0.030-0.047)	**0.047** (0.036-0.062)	**0.053** (0.040-0.072)	**0.060** (0.045-0.086)	**0.069** (0.048-0.099)	**0.085** (0.056-0.126)	**0.098** (0.064-0.149)
20-day	**0.014** (0.011-0.017)	**0.016** (0.013-0.020)	**0.020** (0.016-0.025)	**0.024** (0.019-0.029)	**0.028** (0.022-0.037)	**0.032** (0.024-0.042)	**0.035** (0.026-0.050)	**0.040** (0.028-0.057)	**0.047** (0.031-0.069)	**0.054** (0.035-0.080)
30-day	**0.012** (0.009-0.014)	**0.013** (0.011-0.016)	**0.016** (0.013-0.020)	**0.018** (0.015-0.023)	**0.021** (0.016-0.028)	**0.024** (0.018-0.031)	**0.026** (0.019-0.036)	**0.029** (0.020-0.041)	**0.033** (0.022-0.049)	**0.037** (0.024-0.056)
45-day	**0.010** (0.008-0.012)	**0.011** (0.009-0.013)	**0.013** (0.010-0.016)	**0.014** (0.011-0.018)	**0.016** (0.013-0.021)	**0.018** (0.014-0.024)	**0.020** (0.014-0.027)	**0.021** (0.015-0.030)	**0.024** (0.016-0.035)	**0.026** (0.017-0.039)
60-day	**0.008** (0.007-0.010)	**0.009** (0.008-0.011)	**0.011** (0.009-0.013)	**0.012** (0.010-0.015)	**0.014** (0.011-0.017)	**0.015** (0.011-0.020)	**0.016** (0.012-0.022)	**0.017** (0.012-0.025)	**0.019** (0.013-0.028)	**0.020** (0.013-0.030)

[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.

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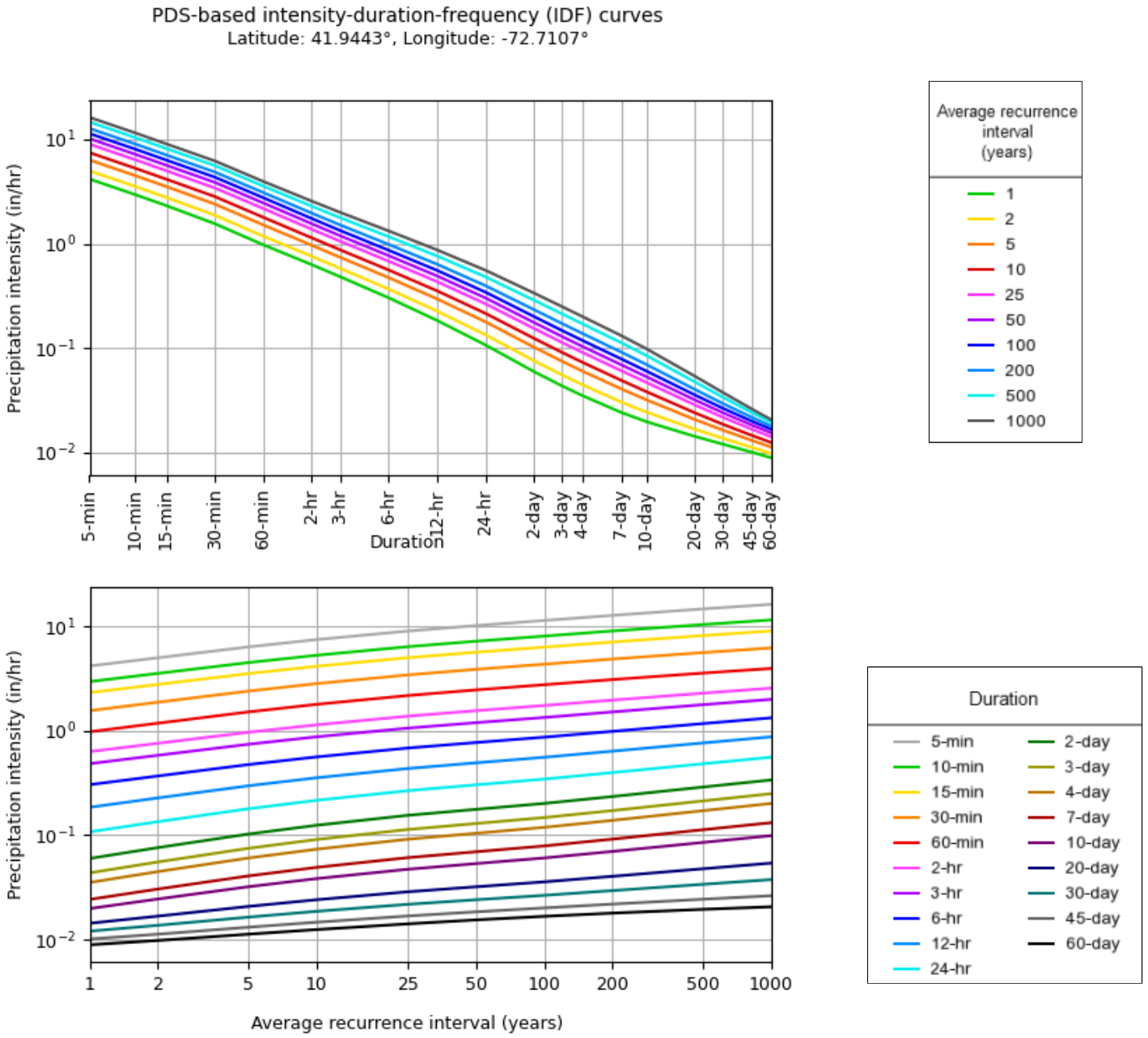
Back to Top

PF graphical



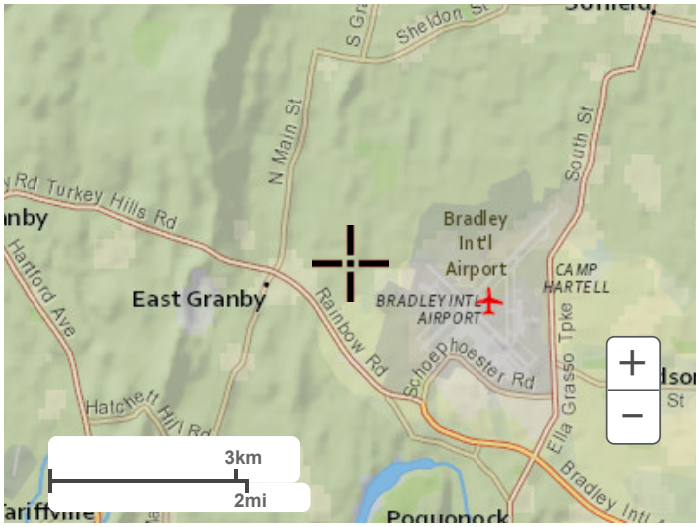
NOAA Atlas 14, Volume 10, Version 3

Created (GMT): Wed Sep 20 12:30:59 2023

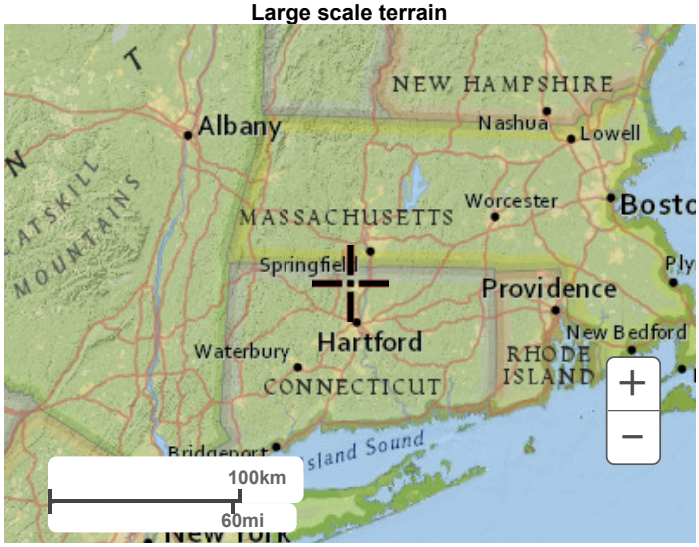
Back to Top

Maps & aerials

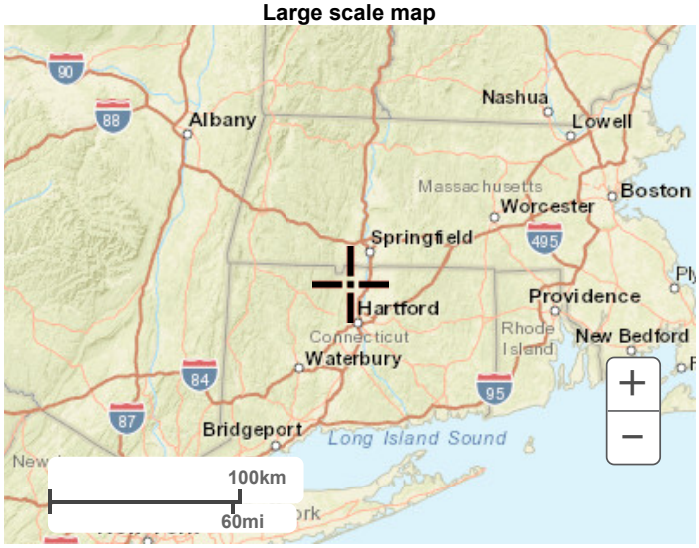
Small scale terrain



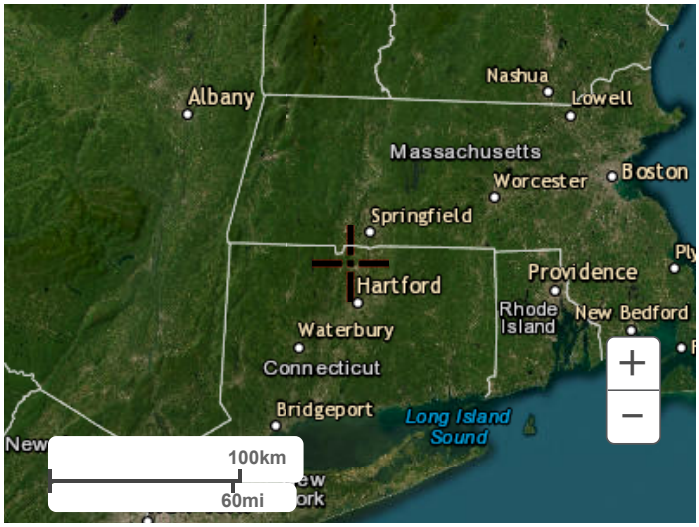
Large scale terrain



Large scale map



Large scale aerial



Back to Top

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NOAA Atlas 14, Volume 10, Version 3
Location name: East Granby, Connecticut, USA*
Latitude: 41.9443°, Longitude: -72.7107°
Elevation: 172 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sandra Pavlovic, Michael St. Laurent, Carl Trypaluk, Dale Unruh, Orlan Wilhite

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	**0.348** (0.266-0.453)	**0.417** (0.319-0.543)	**0.530** (0.404-0.693)	**0.623** (0.472-0.819)	**0.751** (0.553-1.03)	**0.848** (0.613-1.19)	**0.949** (0.669-1.38)	**1.06** (0.712-1.59)	**1.22** (0.792-1.90)	**1.36** (0.859-2.14)
10-min	**0.493** (0.377-0.642)	**0.591** (0.452-0.770)	**0.750** (0.572-0.982)	**0.882** (0.669-1.16)	**1.06** (0.784-1.46)	**1.20** (0.868-1.69)	**1.34** (0.947-1.96)	**1.51** (1.01-2.25)	**1.74** (1.12-2.68)	**1.92** (1.22-3.04)
15-min	**0.580** (0.444-0.755)	**0.695** (0.531-0.906)	**0.883** (0.673-1.16)	**1.04** (0.787-1.36)	**1.25** (0.922-1.72)	**1.41** (1.02-1.99)	**1.58** (1.11-2.31)	**1.77** (1.19-2.64)	**2.04** (1.32-3.16)	**2.26** (1.43-3.57)
30-min	**0.779** (0.596-1.01)	**0.939** (0.718-1.22)	**1.20** (0.915-1.57)	**1.42** (1.07-1.86)	**1.71** (1.26-2.36)	**1.94** (1.40-2.72)	**2.17** (1.53-3.17)	**2.43** (1.63-3.63)	**2.80** (1.82-4.34)	**3.11** (1.97-4.91)
60-min	**0.978** (0.748-1.27)	**1.18** (0.904-1.54)	**1.52** (1.16-1.98)	**1.79** (1.36-2.36)	**2.17** (1.60-2.99)	**2.46** (1.78-3.46)	**2.76** (1.94-4.03)	**3.10** (2.07-4.62)	**3.57** (2.31-5.52)	**3.96** (2.50-6.25)
2-hr	**1.26** (0.972-1.63)	**1.52** (1.17-1.96)	**1.94** (1.48-2.51)	**2.28** (1.74-2.98)	**2.76** (2.05-3.78)	**3.12** (2.27-4.36)	**3.49** (2.48-5.10)	**3.94** (2.64-5.84)	**4.58** (2.97-7.06)	**5.13** (3.26-8.06)
3-hr	**1.45** (1.12-1.87)	**1.75** (1.35-2.26)	**2.23** (1.72-2.89)	**2.63** (2.01-3.42)	**3.18** (2.37-4.35)	**3.59** (2.63-5.02)	**4.03** (2.88-5.88)	**4.55** (3.07-6.74)	**5.34** (3.47-8.20)	**6.01** (3.82-9.41)
6-hr	**1.82** (1.42-2.33)	**2.21** (1.72-2.83)	**2.84** (2.20-3.66)	**3.37** (2.60-4.36)	**4.09** (3.07-5.56)	**4.62** (3.41-6.45)	**5.20** (3.76-7.58)	**5.92** (4.00-8.71)	**7.02** (4.58-10.7)	**7.97** (5.09-12.4)
12-hr	**2.23** (1.74-2.83)	**2.74** (2.14-3.49)	**3.58** (2.79-4.58)	**4.28** (3.32-5.50)	**5.24** (3.96-7.10)	**5.94** (4.42-8.26)	**6.72** (4.89-9.77)	**7.69** (5.22-11.3)	**9.22** (6.03-14.0)	**10.6** (6.75-16.3)
24-hr	**2.58** (2.04-3.26)	**3.23** (2.55-4.09)	**4.30** (3.37-5.45)	**5.18** (4.04-6.61)	**6.40** (4.87-8.64)	**7.28** (5.46-10.1)	**8.27** (6.08-12.0)	**9.55** (6.50-13.9)	**11.6** (7.60-17.5)	**13.4** (8.60-20.6)
2-day	**2.87** (2.28-3.60)	**3.65** (2.89-4.58)	**4.92** (3.89-6.21)	**5.98** (4.70-7.58)	**7.43** (5.70-10.0)	**8.49** (6.41-11.8)	**9.68** (7.19-14.1)	**11.3** (7.69-16.3)	**13.9** (9.13-20.8)	**16.2** (10.5-24.8)
3-day	**3.13** (2.50-3.91)	**3.99** (3.18-4.99)	**5.39** (4.28-6.77)	**6.56** (5.17-8.28)	**8.16** (6.28-10.9)	**9.31** (7.07-12.9)	**10.6** (7.93-15.5)	**12.4** (8.48-17.9)	**15.3** (10.1-22.9)	**18.0** (11.6-27.4)
4-day	**3.38** (2.70-4.21)	**4.30** (3.43-5.36)	**5.81** (4.62-7.27)	**7.05** (5.58-8.88)	**8.77** (6.77-11.7)	**10.0** (7.62-13.8)	**11.4** (8.54-16.6)	**13.3** (9.13-19.2)	**16.5** (10.9-24.6)	**19.3** (12.5-29.4)
7-day	**4.07** (3.27-5.05)	**5.12** (4.11-6.36)	**6.84** (5.47-8.52)	**8.27** (6.57-10.4)	**10.2** (7.93-13.6)	**11.7** (8.89-15.9)	**13.3** (9.94-19.1)	**15.4** (10.6-22.1)	**19.0** (12.5-28.1)	**22.2** (14.3-33.5)
10-day	**4.76** (3.83-5.87)	**5.88** (4.73-7.26)	**7.70** (6.18-9.55)	**9.22** (7.35-11.5)	**11.3** (8.79-15.0)	**12.8** (9.80-17.4)	**14.5** (10.9-20.8)	**16.8** (11.6-23.9)	**20.5** (13.6-30.2)	**23.8** (15.4-35.8)
20-day	**6.88** (5.58-8.43)	**8.06** (6.53-9.88)	**9.98** (8.06-12.3)	**11.6** (9.29-14.3)	**13.8** (10.7-18.0)	**15.4** (11.8-20.6)	**17.2** (12.8-24.0)	**19.4** (13.5-27.4)	**22.9** (15.3-33.6)	**26.0** (16.9-38.9)
30-day	**8.68** (7.07-10.6)	**9.88** (8.04-12.1)	**11.8** (9.59-14.5)	**13.5** (10.8-16.6)	**15.7** (12.2-20.3)	**17.3** (13.2-23.0)	**19.1** (14.2-26.4)	**21.2** (14.8-29.9)	**24.4** (16.3-35.6)	**27.1** (17.6-40.4)
45-day	**10.9** (8.95-13.3)	**12.2** (9.94-14.8)	**14.2** (11.5-17.3)	**15.9** (12.8-19.5)	**18.2** (14.2-23.2)	**19.9** (15.2-26.0)	**21.7** (16.0-29.4)	**23.7** (16.6-33.1)	**26.3** (17.7-38.2)	**28.4** (18.6-42.3)
60-day	**12.8** (10.5-15.6)	**14.1** (11.6-17.1)	**16.2** (13.2-19.8)	**18.0** (14.6-22.0)	**20.4** (15.9-25.9)	**22.2** (16.9-28.8)	**24.1** (17.6-32.2)	**25.8** (18.1-36.0)	**28.1** (18.9-40.6)	**29.7** (19.4-44.0)

[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.

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Back to Top

PF graphical

PDS-based depth-duration-frequency (DDF) curves
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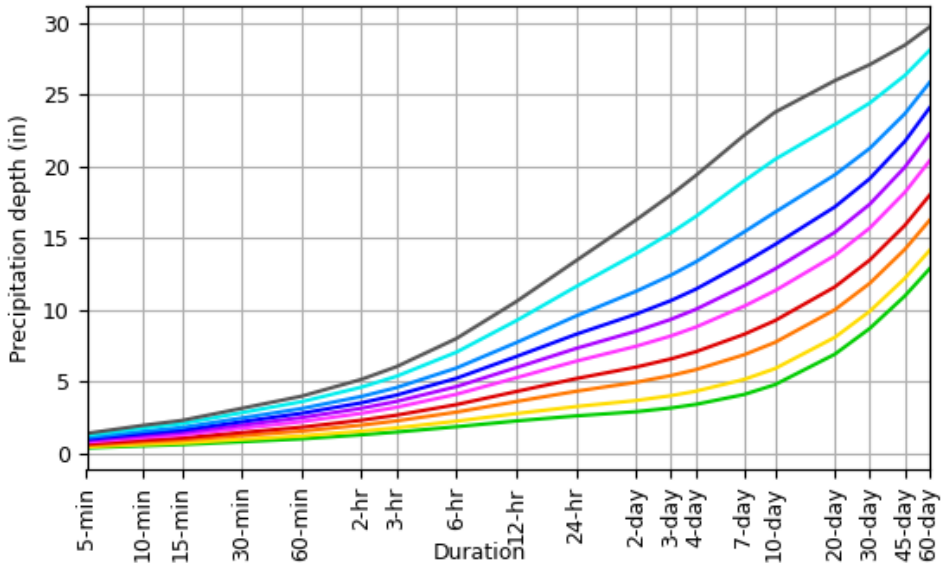
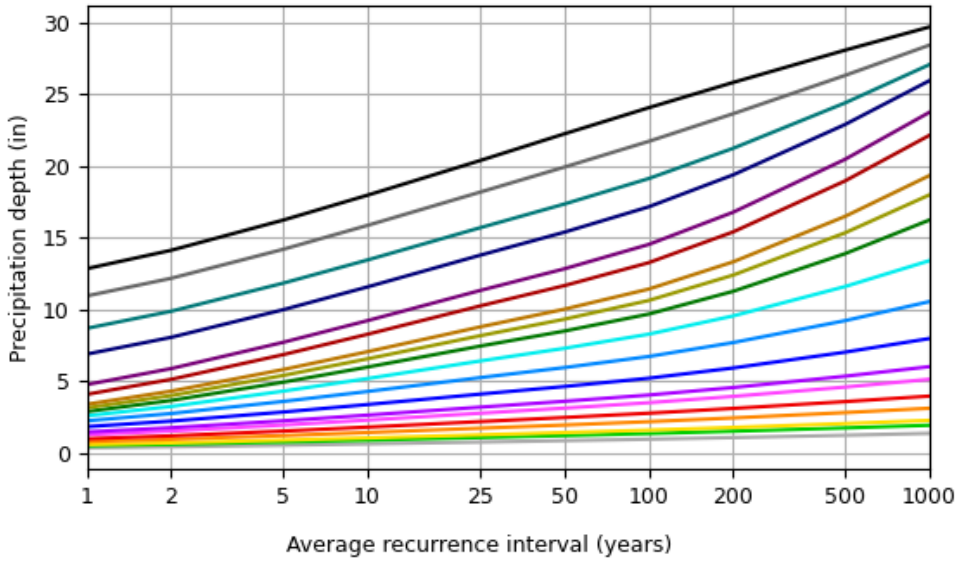




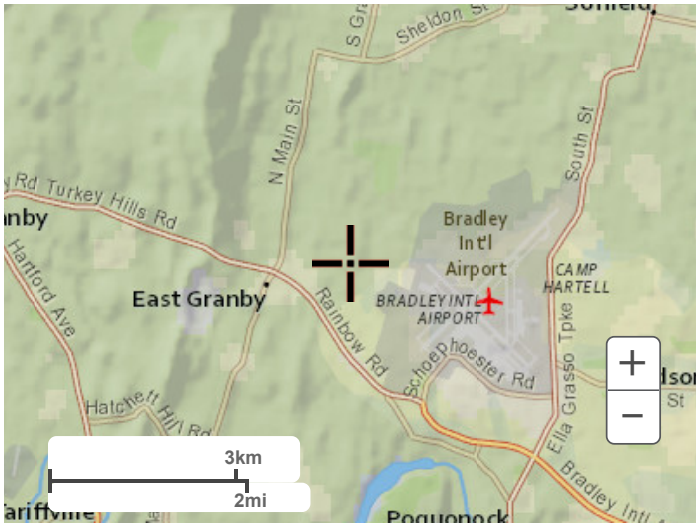
NOAA Atlas 14, Volume 10, Version 3

Created (GMT): Wed Sep 20 12:29:38 2023

Back to Top

Maps & aerials

Small scale terrain



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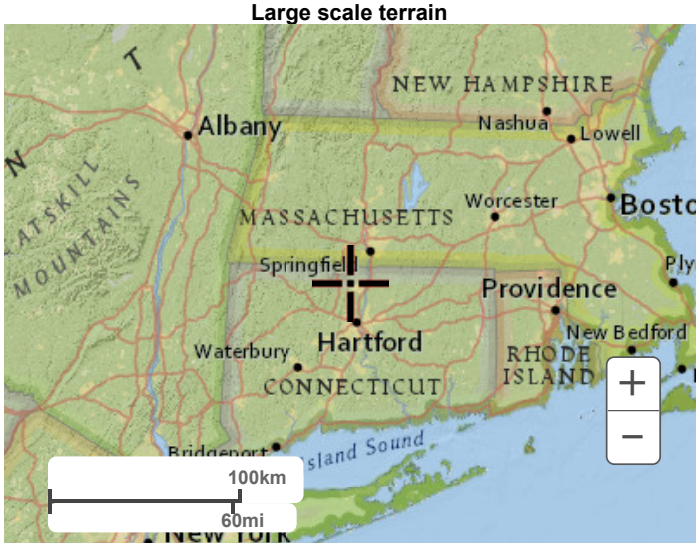
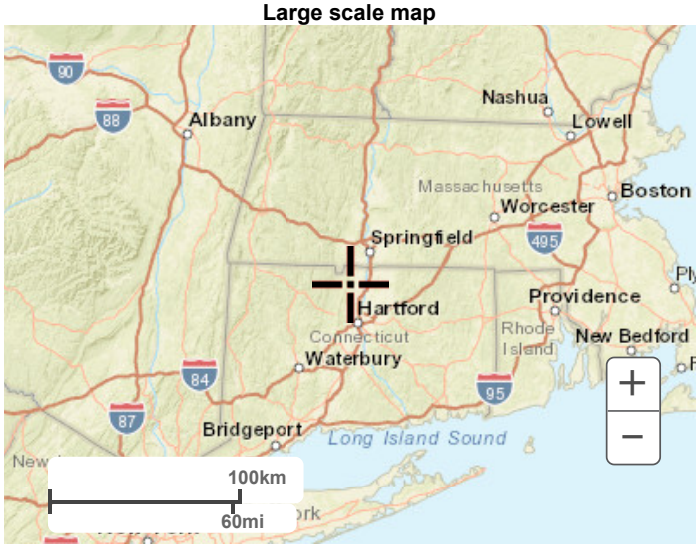
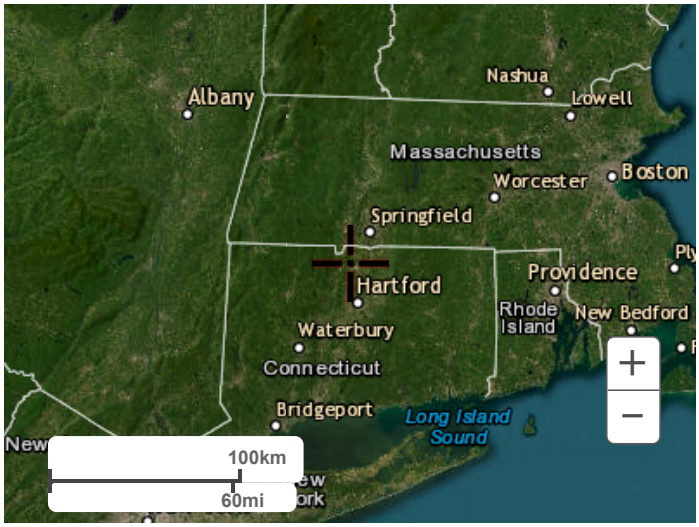


Large scale map



Large scale aerial



Back to Top

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Attachment D

Hydrologic Analysis

Runoff curve number and runoff

Project:	J.E.T. 10 Russell Road	By:	DRT	Date:	12/22/2023
Location:	East Granby, CT.	Checked:	GAH	Date:	
Check one		Present	X	Developed	WS-EX-E

1. Runoff curve number

Soil name and hydrologic group (appendix A)	Cover description (cover type, treatment, and hydrologic condition;percent impervious; unconnected/connected impervious area ratio)	CN	Area ☐ acres ☒ ft^2 ☐ %	Area ☒ acres ☐ mi^2 ☐ %
	IMPERVIOUS (GOOD)	98	6,633	0.15
C	MEADOW : NON-GRAZED (GOOD)	71	116,237	2.67
Use only one CN source per line		**Totals**	122,871	2.82

CN (weighted) = total product / total area = 204.38 / 2.82 = 72.46 **Use CN** **72**

Runoff curve number and runoff

Project:	J.E.T. 10 Russell Road	By:	DRT	Date:	12/22/2023
Location:	East Granby, CT.	Checked:	GAH	Date:	
Check one		Present	X	Developed	WS-EX-S

1. Runoff curve number

Soil name and hydrologic group (appendix A)	Cover description (cover type, treatment, and hydrologic condition;percent impervious; unconnected/connected impervious area ratio)	CN	Area ☐ acres ☒ ft^2 ☐ %	Area ☒ acres ☐ mi^2 ☐ %
	IMPERVIOUS (GOOD)	98	8,295	0.19
B	MEADOW : NON-GRAZED (GOOD)	58	5,495	0.13
C	MEADOW : NON-GRAZED (GOOD)	71	234,754	5.39
D	MEADOW : NON-GRAZED (GOOD)	78	151,066	3.47
C	WOODS (GOOD)	70	1,607	0.04
D	WOODS (GOOD)	77	20,473	0.47
Use only one CN source per line		**Totals**	421,690	9.68

CN (weighted) = $\frac{\text{total product}}{\text{total area}} = \frac{717.89}{9.68} =$ 74.16 **Use CN** **74**

Runoff curve number and runoff

Project:	J.E.T. 10 Russell Road	By:	DRT	Date:	12/22/2023
Location:	East Granby, CT.	Checked:	GAH	Date:	

Check one Present Developed X WS-PR-UNDET-E

1. Runoff curve number

Soil name and hydrologic group (appendix A)	Cover description (cover type, treatment, and hydrologic condition;percent impervious; unconnected/connected impervious area ratio)	CN	Area ☐ acres ☒ ft^2 ☐ %	Area ☒ acres ☐ mi^2 ☐ %	Product of CN x area
	IMPERVIOUS (GOOD)	98	3,837	0.09	8.63
C	MEADOW : NON-GRAZED (GOOD)	71	14,774	0.34	24.08
Use only one CN source per line		**Totals**	18,611	0.43	32.71

CN (weighted) = $\frac{\text{total product}}{\text{total area}} = \frac{32.71}{0.43} =$ 76.57 **Use CN** **77**

Runoff curve number and runoff

Project:	J.E.T. 10 Russell Road	By:	DRT	Date:	12/22/2023
Location:	East Granby, CT.	Checked:	GAH	Date:	
Check one		Present	Developed X	WS-PR-UNDET-S	

1. Runoff curve number

Soil name and hydrologic group (appendix A)	Cover description (cover type, treatment, and hydrologic condition;percent impervious; unconnected/connected impervious area ratio)	CN	Area ☐ acres ☒ ft^2 ☐ %	Area ☒ acres ☐ mi^2 ☐ %	Product of CN x area
	IMPERVIOUS (GOOD)	98	14,088	0.32	31.70
B	MEADOW : NON-GRAZED (GOOD)	58	7,250	0.17	9.65
C	MEADOW : NON-GRAZED (GOOD)	71	41,490	0.95	67.63
D	MEADOW : NON-GRAZED (GOOD)	78	93,845	2.15	168.04
D	WOODS (GOOD)	77	12,841	0.29	22.70
Use only one CN source per line		**Totals**	169,516	3.89	299.72

CN (weighted) = $\frac{\text{total product}}{\text{total area}} = \frac{299.72}{3.89} =$ 77.02 **Use CN** **77**

Runoff curve number and runoff

Project: J.E.T. 10 Russell Road By: DRT Date: 12/22/2023

Location: East Granby, CT. Checked: GAH Date:

Check one Present Developed X WS-PR-S-1

1. Runoff curve number

Soil name and hydrologic group (appendix A)	Cover description (cover type, treatment, and hydrologic condition;percent impervious; unconnected/connected impervious area ratio)	CN	Area ☐ acres ☒ ft² ☐ %	Area ☒ acres ☐ mi² ☐ %	Product of CN x area
B	IMPERVIOUS (GOOD)	98	56,874	1.31	127.95
C	MEADOW : NON-GRAZED (GOOD)	71	21,027	0.48	34.27
D	MEADOW : NON-GRAZED (GOOD)	78	21,887	0.50	39.19
Use only one CN source per line		**Totals**	99,788	2.29	201.42

CN (weighted) = $\frac{\text{total product}}{\text{total area}} = \frac{201.42}{2.29} =$ 87.92 **Use CN** **88**

Runoff curve number and runoff

Project:	J.E.T. 10 Russell Road	By:	DRT	Date:	12/22/2023
Location:	East Granby, CT.	Checked:	GAH	Date:	

Check one Present Developed X WS-PR-S-2

1. Runoff curve number

Soil name and hydrologic group (appendix A)	Cover description (cover type, treatment, and hydrologic condition;percent impervious; unconnected/connected impervious area ratio)	CN	Area ☐ acres ☒ ft² ☐ %	Area ☒ acres ☐ mi² ☐ %
	IMPERVIOUS (GOOD)	98	26,880	0.62
C	MEADOW : NON-GRAZED (GOOD)	71	8,723	0.20
D	MEADOW : NON-GRAZED (GOOD)	78	13,535	0.31
Use only one CN source per line		**Totals**	49,138	1.13

CN (weighted) = total product / total area = 98.93 / 1.13 = 87.70 **Use CN** **88**

Runoff curve number and runoff

Project:	J.E.T. 10 Russell Road	By:	DRT	Date:	12/22/2023
Location:	East Granby, CT.	Checked:	GAH	Date:	

Check one Present Developed X WS-PR-S-3

1. Runoff curve number

Soil name and hydrologic group (appendix A)	Cover description (cover type, treatment, and hydrologic condition;percent impervious; unconnected/connected impervious area ratio)	CN	Area ☐ acres ☒ ft^2 ☐ %	Area ☒ acres ☐ mi^2 ☐ %	Product of CN x area
	IMPERVIOUS (GOOD)	98	133,525	3.07	300.40
C	MEADOW : NON-GRAZED (GOOD)	71	65,374	1.50	106.56
D	MEADOW : NON-GRAZED (GOOD)	78	6,609	0.15	11.83
D	WOODS (GOOD)	77	4,480	0.10	7.92
Use only one CN source per line		**Totals**	209,988	4.82	426.71

CN (weighted) = total product / total area = 426.71 / 4.82 = 88.52 **Use CN** **89**

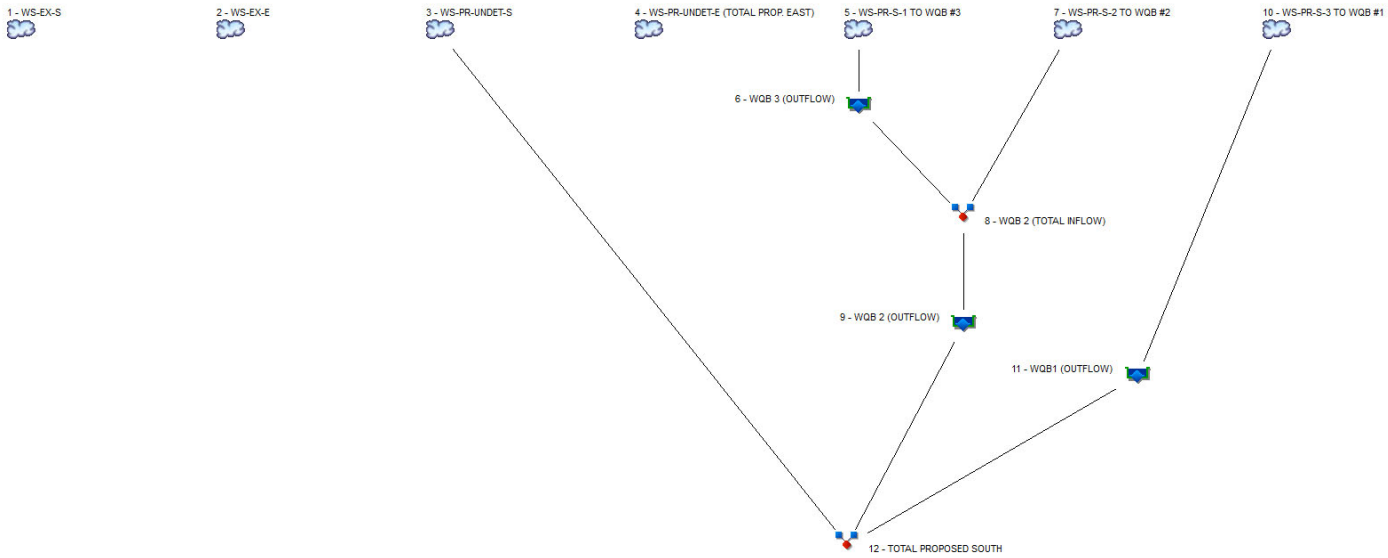
Hydraflow Table of Contents

Macro Model 2023-12-22.gpw

Hydraflow Hydrographs by Intelisolve v9.1

Friday, Dec 22, 2023

Watershed Model Schematic



Legend

Hyd.	Origin	Description
1	SCS Runoff	WS-EX-S
2	SCS Runoff	WS-EX-E
3	SCS Runoff	WS-PR-UNDET-S
4	SCS Runoff	WS-PR-UNDET-E (TOTAL PROP. EAST)
5	SCS Runoff	WS-PR-S-1 TO WQB #3
6	Reservoir	WQB 3 (OUTFLOW)
7	SCS Runoff	WS-PR-S-2 TO WQB #2
8	Combine	WQB 2 (TOTAL INFLOW)
9	Reservoir	WQB 2 (OUTFLOW)
10	SCS Runoff	WS-PR-S-3 TO WQB #1
11	Reservoir	WQB1 (OUTFLOW)
12	Combine	TOTAL PROPOSED SOUTH

Hydrograph Return Period Recap

Hydraflow Hydrographs by Intelisolve v9.1

Hyd. No.	Hydrograph type (origin)	Inflow Hyd(s)	Peak Outflow (cfs)								Hydrograph description
			1-Yr	2-Yr	3-Yr	5-Yr	10-Yr	25-Yr	50-Yr	100-Yr	
1	SCS Runoff	-------	-------	10.29	-------	18.43	25.42	36.18	44.85	52.82	WS-EX-S
2	SCS Runoff	-------	-------	3.128	-------	5.587	7.698	10.94	13.56	15.96	WS-EX-E
3	SCS Runoff	-------	-------	4.955	-------	8.420	11.34	15.77	19.31	22.54	WS-PR-UNDET-S
4	SCS Runoff	-------	-------	0.630	-------	1.068	1.437	1.996	2.442	2.849	WS-PR-UNDET-E (TOTAL PROP. EA
5	SCS Runoff	-------	-------	5.598	-------	8.217	10.31	13.38	15.78	17.94	WS-PR-S-1 TO WQB #3
6	Reservoir	5	-------	0.568	-------	0.948	1.166	1.410	1.567	1.682	WQB 3 (OUTFLOW)
7	SCS Runoff	-------	-------	2.762	-------	4.054	5.088	6.603	7.784	8.852	WS-PR-S-2 TO WQB #2
8	Combine	6, 7	-------	2.777	-------	4.598	5.901	7.653	8.978	10.15	WQB 2 (TOTAL INFLOW)
9	Reservoir	8	-------	0.502	-------	0.851	1.047	1.290	1.441	1.567	WQB 2 (OUTFLOW)
10	SCS Runoff	-------	-------	10.69	-------	15.52	19.35	24.98	29.37	33.33	WS-PR-S-3 TO WQB #1
11	Reservoir	10	-------	3.681	-------	5.713	6.885	8.290	9.190	9.891	WQB1 (OUTFLOW)
12	Combine	3, 9, 11	-------	7.685	-------	12.43	16.90	23.06	27.62	31.68	TOTAL PROPOSED SOUTH

Hydrograph Summary Report

Hydraflow Hydrographs by Intelisolve v9.1

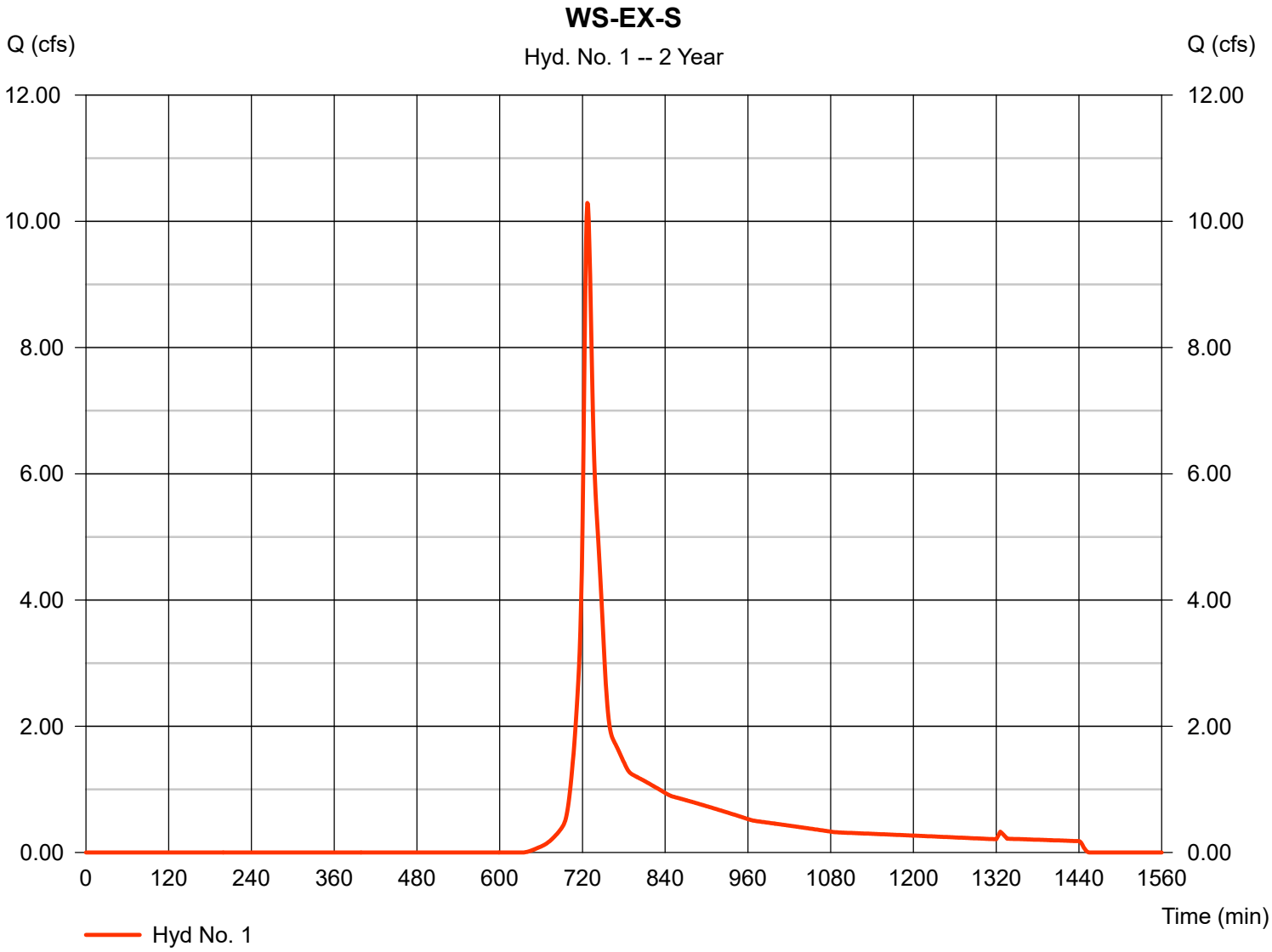
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph description
1	SCS Runoff	10.29	1	727	37,153	----	------	------	WS-EX-S
2	SCS Runoff	3.128	1	726	10,553	----	------	------	WS-EX-E
3	SCS Runoff	4.955	1	727	17,415	----	------	------	WS-PR-UNDET-S
4	SCS Runoff	0.630	1	725	1,985	----	------	------	WS-PR-UNDET-E (TOTAL PROP. EA
5	SCS Runoff	5.598	1	725	17,351	----	------	------	WS-PR-S-1 TO WQB #3
6	Reservoir	0.568	1	775	11,732	5	160.61	9,617	WQB 3 (OUTFLOW)
7	SCS Runoff	2.762	1	725	8,562	----	------	------	WS-PR-S-2 TO WQB #2
8	Combine	2.777	1	725	20,294	6, 7	------	------	WQB 2 (TOTAL INFLOW)
9	Reservoir	0.502	1	919	14,736	8	159.53	9,046	WQB 2 (OUTFLOW)
10	SCS Runoff	10.69	1	727	36,899	----	------	------	WS-PR-S-3 TO WQB #1
11	Reservoir	3.681	1	746	36,887	10	150.31	31,692	WQB1 (OUTFLOW)
12	Combine	7.685	1	728	69,038	3, 9, 11	------	------	TOTAL PROPOSED SOUTH

Hydrograph Report

Hyd. No. 1

WS-EX-S

Hydrograph type	=	SCS Runoff	Peak discharge	=	10.29 cfs
Storm frequency	=	2 yrs	Time to peak	=	727 min
Time interval	=	1 min	Hyd. volume	=	37,153 cuft
Drainage area	=	9.680 ac	Curve number	=	74
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	9.10 min
Total precip.	=	3.23 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484



TR55 Tc Worksheet

Hyd. No. 1

WS-EX-S

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.024		0.011		0.011		
Flow length (ft)	= 100.0		0.0		0.0		
Two-year 24-hr precip. (in)	= 3.34		3.22		0.00		
Land slope (%)	= 2.00		0.00		0.00		
Travel Time (min)	**= 2.21**	**+**	**0.00**	**+**	**0.00**	**=**	**2.21**
Shallow Concentrated Flow							
Flow length (ft)	= 678.00		0.00		0.00		
Watercourse slope (%)	= 3.29		0.00		0.00		
Surface description	= Unpaved		Paved		Paved		
Average velocity (ft/s)	= 2.93		0.00		0.00		
Travel Time (min)	**= 3.86**	**+**	**0.00**	**+**	**0.00**	**=**	**3.86**
Channel Flow							
X sectional flow area (sqft)	= 3.00		0.00		0.00		
Wetted perimeter (ft)	= 3.00		0.00		0.00		
Channel slope (%)	= 1.52		0.00		0.00		
Manning's n-value	= 0.050		0.015		0.015		
Velocity (ft/s)	= 3.67		0.00		0.00		
Flow length (ft)	= 658.0		0.0		0.0		
Travel Time (min)	**= 2.98**	**+**	**0.00**	**+**	**0.00**	**=**	**2.98**

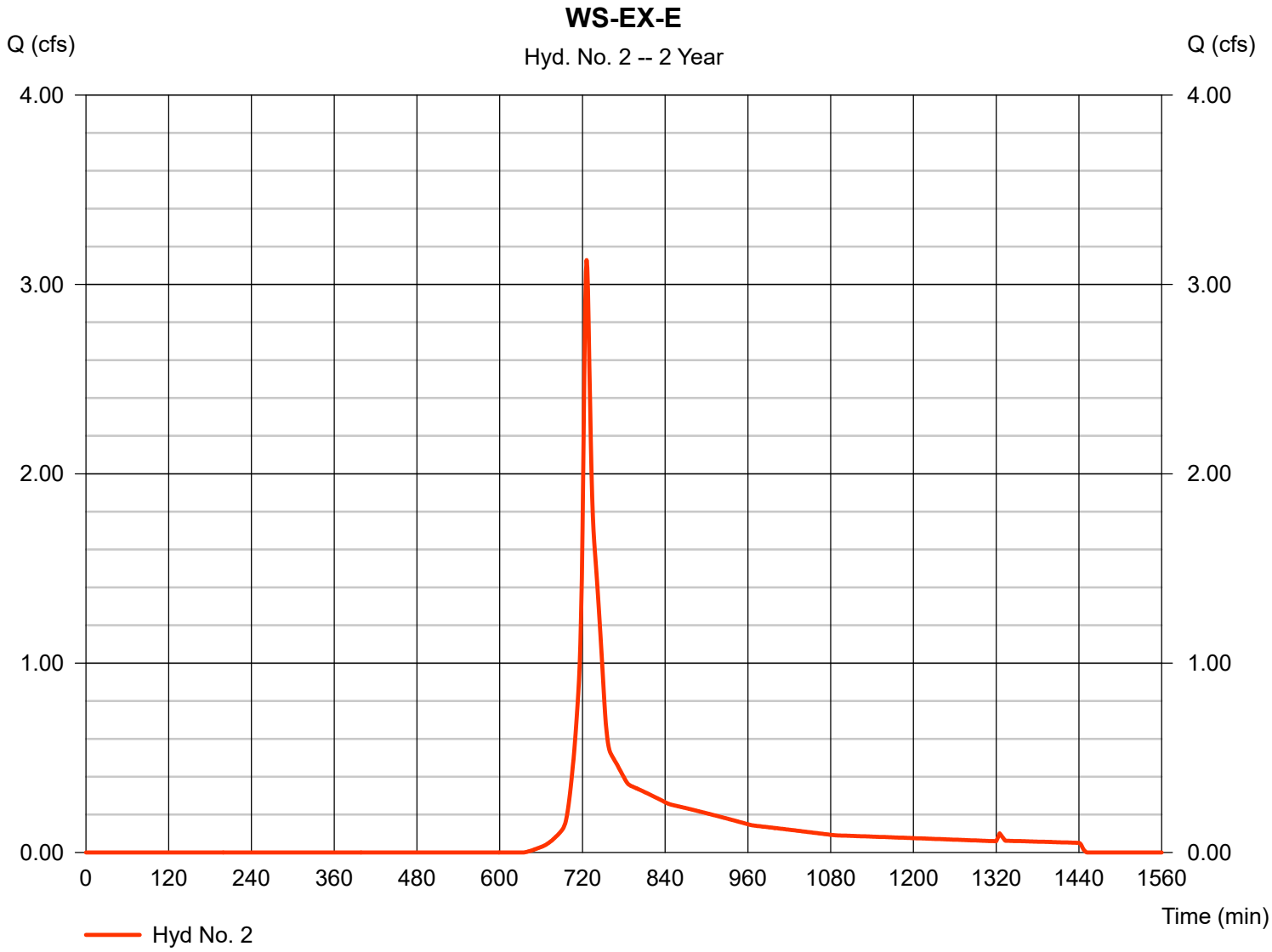
Total Travel Time, Tc ..... 9.10 min

Hydrograph Report

Hyd. No. 2

WS-EX-E

Hydrograph type	=	SCS Runoff	Peak discharge	=	3.128 cfs
Storm frequency	=	2 yrs	Time to peak	=	726 min
Time interval	=	1 min	Hyd. volume	=	10,553 cuft
Drainage area	=	2.820 ac	Curve number	=	74
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	7.50 min
Total precip.	=	3.23 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484



TR55 Tc Worksheet

Hyd. No. 2

WS-EX-E

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.024		0.011		0.011		
Flow length (ft)	= 100.0		0.0		0.0		
Two-year 24-hr precip. (in)	= 3.34		3.22		0.00		
Land slope (%)	= 2.00		0.00		0.00		
Travel Time (min)	**= 2.21**	**+**	**0.00**	**+**	**0.00**	**=**	**2.21**
Shallow Concentrated Flow							
Flow length (ft)	= 678.00		0.00		0.00		
Watercourse slope (%)	= 3.29		0.00		0.00		
Surface description	= Unpaved		Paved		Paved		
Average velocity (ft/s)	= 2.93		0.00		0.00		
Travel Time (min)	**= 3.86**	**+**	**0.00**	**+**	**0.00**	**=**	**3.86**
Channel Flow							
X sectional flow area (sqft)	= 3.00		0.00		0.00		
Wetted perimeter (ft)	= 3.00		0.00		0.00		
Channel slope (%)	= 1.52		0.00		0.00		
Manning's n-value	= 0.024		0.015		0.015		
Velocity (ft/s)	= 7.65		0.00		0.00		
Flow length (ft)	= 658.0		0.0		0.0		
Travel Time (min)	**= 1.43**	**+**	**0.00**	**+**	**0.00**	**=**	**1.43**

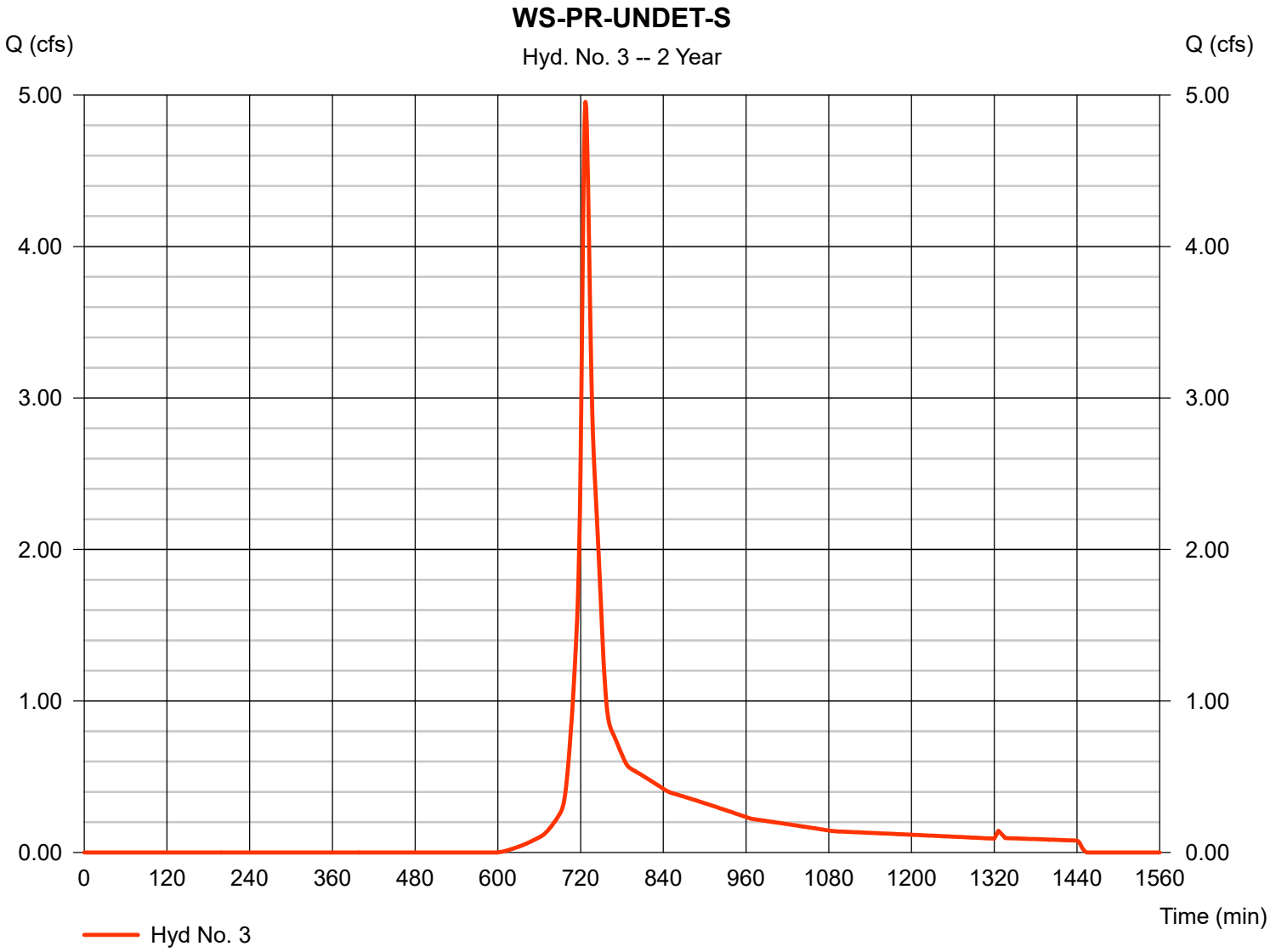
Total Travel Time, Tc ..... 7.50 min

Hydrograph Report

Hyd. No. 3

WS-PR-UNDET-S

Hydrograph type	=	SCS Runoff	Peak discharge	=	4.955 cfs
Storm frequency	=	2 yrs	Time to peak	=	727 min
Time interval	=	1 min	Hyd. volume	=	17,415 cuft
Drainage area	=	3.890 ac	Curve number	=	77
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	10.00 min
Total precip.	=	3.23 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

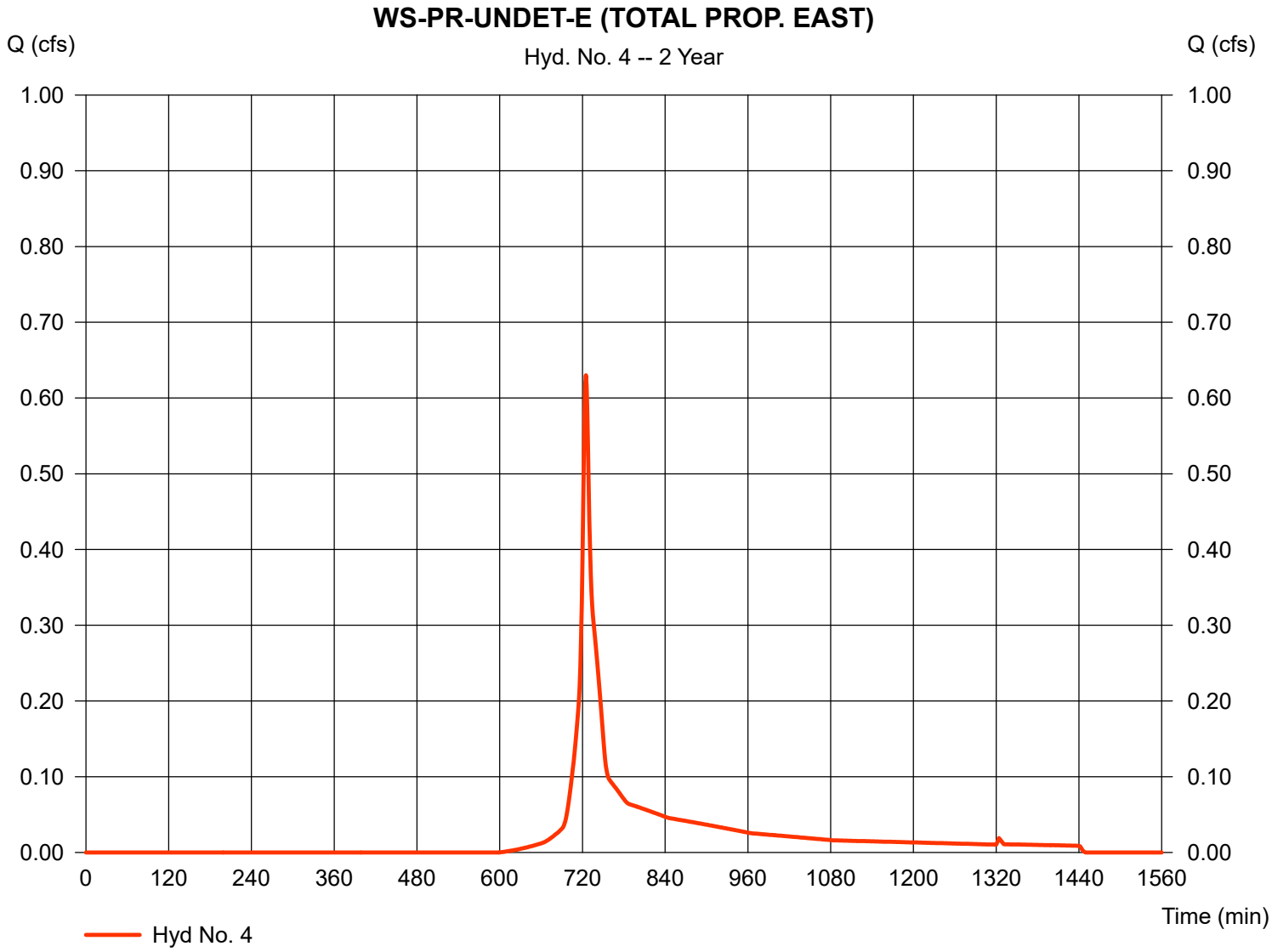


Hydrograph Report

Hyd. No. 4

WS-PR-UNDET-E (TOTAL PROP. EAST)

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.630 cfs
Storm frequency	=	2 yrs	Time to peak	=	725 min
Time interval	=	1 min	Hyd. volume	=	1,985 cuft
Drainage area	=	0.430 ac	Curve number	=	77
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	5.00 min
Total precip.	=	3.23 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

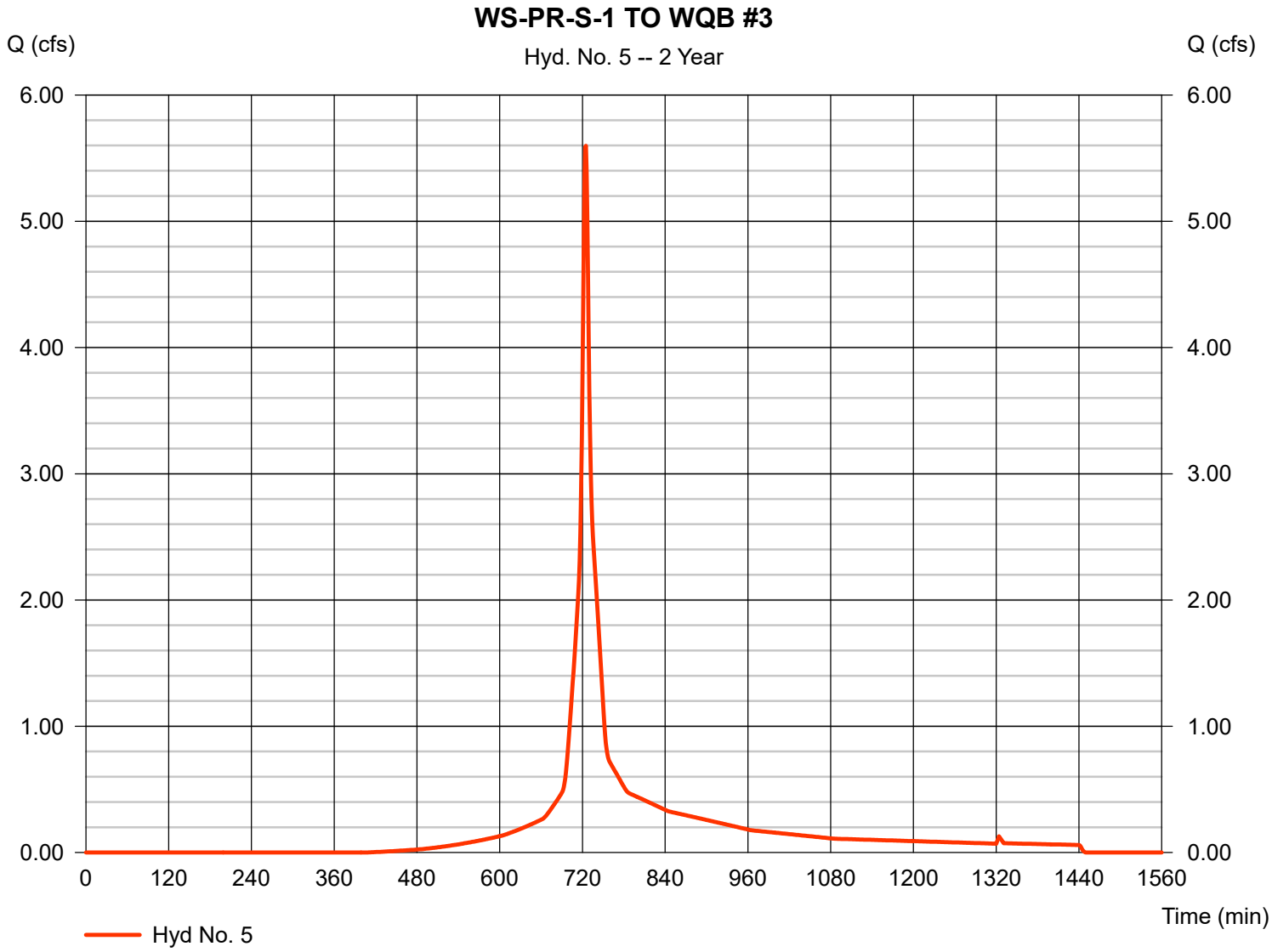


Hydrograph Report

Hyd. No. 5

WS-PR-S-1 TO WQB #3

Hydrograph type	=	SCS Runoff	Peak discharge	=	5.598 cfs
Storm frequency	=	2 yrs	Time to peak	=	725 min
Time interval	=	1 min	Hyd. volume	=	17,351 cuft
Drainage area	=	2.290 ac	Curve number	=	88
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	5.00 min
Total precip.	=	3.23 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484



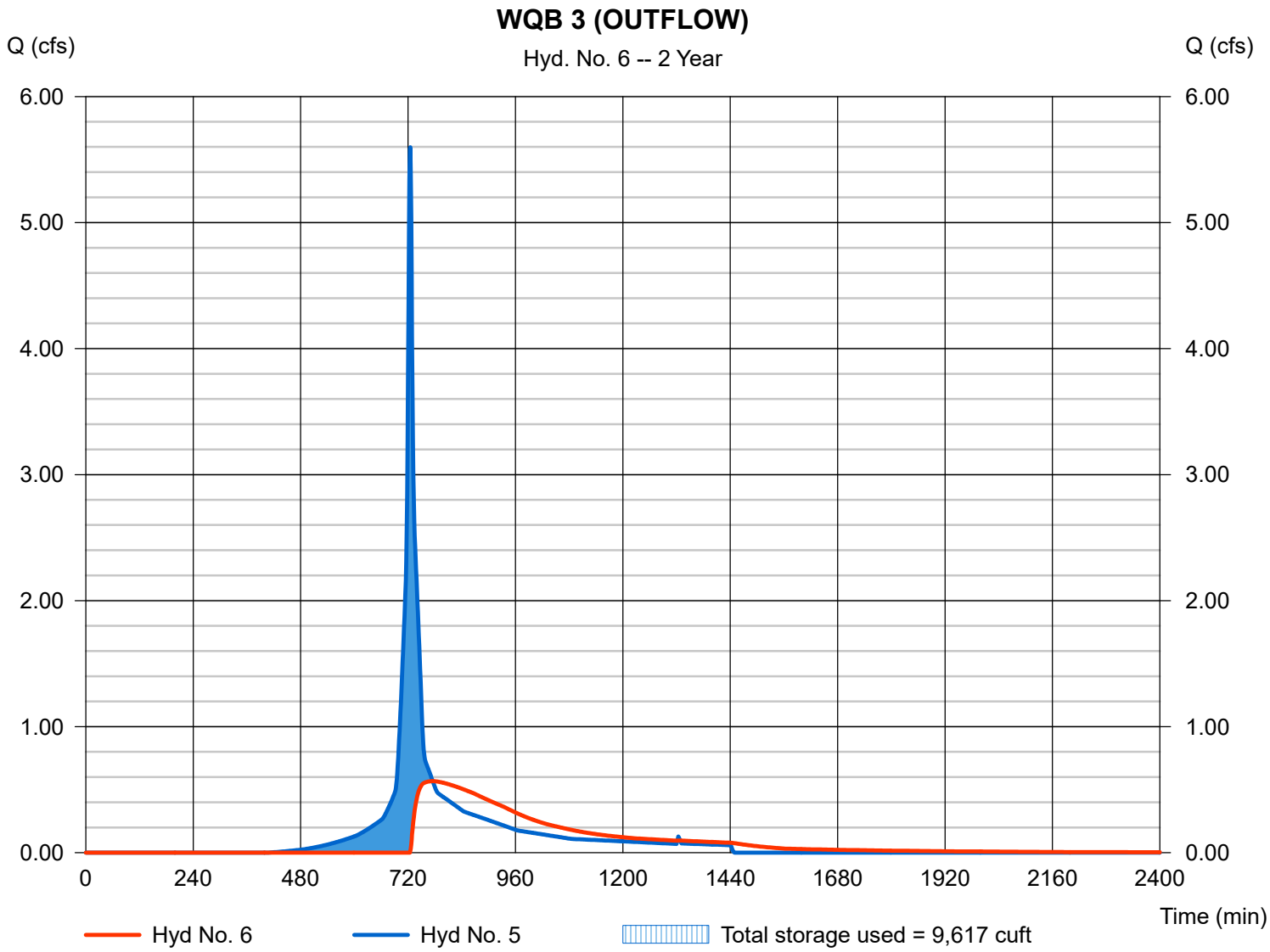
Hydrograph Report

Hyd. No. 6

WQB 3 (OUTFLOW)

Hydrograph type	=	Reservoir	Peak discharge	=	0.568 cfs
Storm frequency	=	2 yrs	Time to peak	=	775 min
Time interval	=	1 min	Hyd. volume	=	11,732 cuft
Inflow hyd. No.	=	5 - WS-PR-S-1 TO WQB #3	Max. Elevation	=	160.61 ft
Reservoir name	=	WQB3	Max. Storage	=	9,617 cuft

Storage Indication method used.



Pond No. 3 - WQB3

Pond Data

Contours - User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 159.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	159.00	5,133	0	0
1.00	160.00	6,076	5,597	5,597
2.00	161.00	7,096	6,579	12,176
3.00	162.00	8,116	7,600	19,776
4.00	163.00	9,249	8,675	28,451
5.00	164.00	10,382	9,809	38,260
6.00	165.00	11,628	10,998	49,258
7.00	166.00	12,874	12,244	61,503

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 15.00	6.00	0.00	0.00
Span (in)	= 15.00	6.00	0.00	0.00
No. Barrels	= 1	1	1	0
Invert El. (ft)	= 159.00	160.00	0.00	0.00
Length (ft)	= 54.00	0.00	0.00	0.00
Slope (%)	= 0.00	0.00	0.00	n/a
N-Value	= .012	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	Yes	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 11.33	0.00	0.00	0.00
Crest El. (ft)	= 164.00	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= Riser	---	---	---
Multi-Stage	= Yes	No	No	No

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

TW Elev. (ft) = 0.00

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

Stage / Storage / Discharge Table

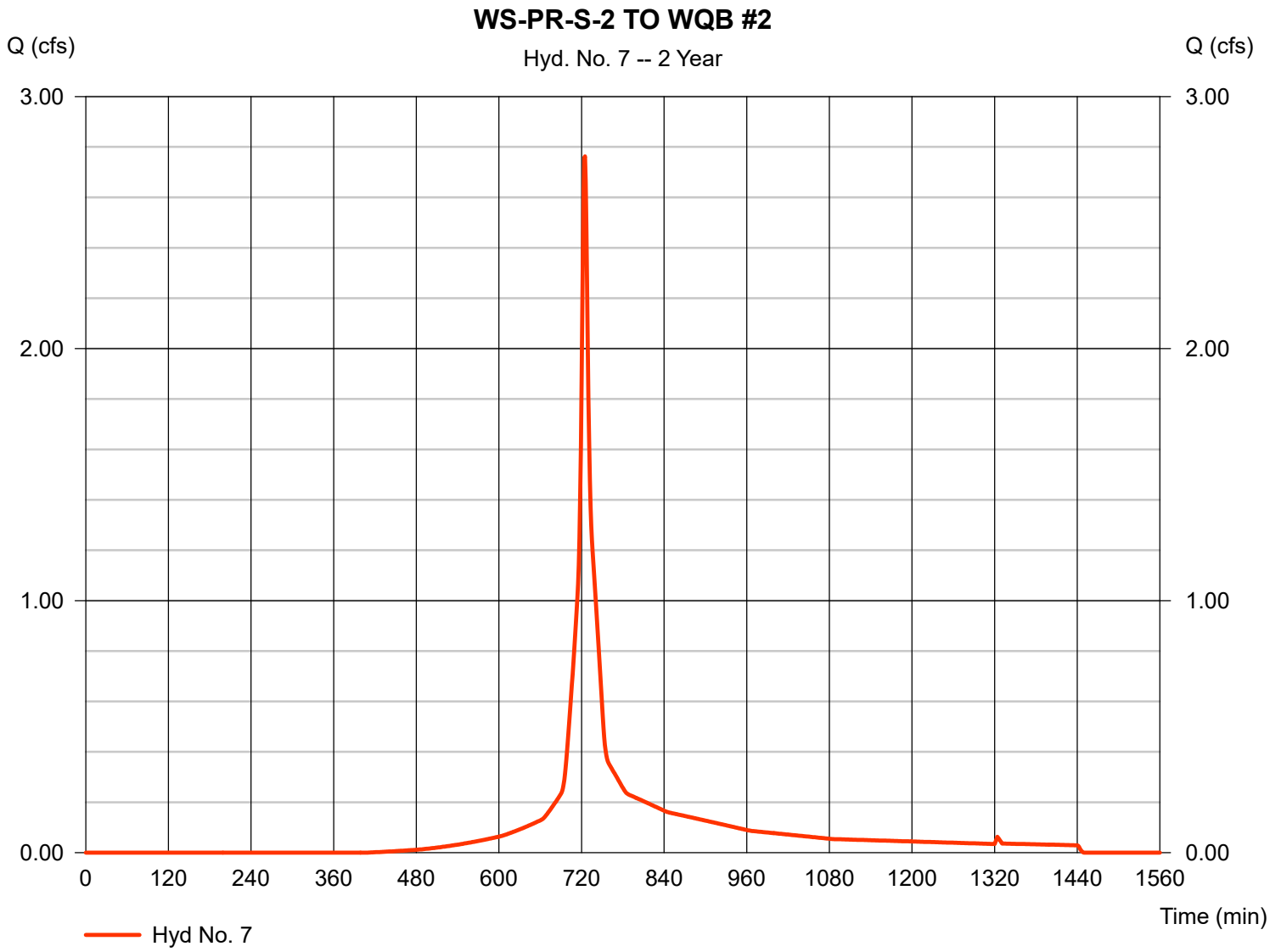
Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	159.00	0.00	0.00	---	---	0.00	---	---	---	---	---	0.00
1.00	5,597	160.00	0.00	0.00	---	---	0.00	---	---	---	---	---	0.00
2.00	12,176	161.00	0.83 ic	0.82 ic	---	---	0.00	---	---	---	---	---	0.82
3.00	19,776	162.00	1.25 ic	1.25 ic	---	---	0.00	---	---	---	---	---	1.25
4.00	28,451	163.00	1.59 ic	1.57 ic	---	---	0.00	---	---	---	---	---	1.57
5.00	38,260	164.00	1.83 ic	1.83 ic	---	---	0.00	---	---	---	---	---	1.83
6.00	49,258	165.00	13.35 oc	0.20 ic	---	---	13.15 s	---	---	---	---	---	13.35
7.00	61,503	166.00	14.75 oc	0.08 ic	---	---	14.63 s	---	---	---	---	---	14.71

Hydrograph Report

Hyd. No. 7

WS-PR-S-2 TO WQB #2

Hydrograph type	=	SCS Runoff	Peak discharge	=	2.762 cfs
Storm frequency	=	2 yrs	Time to peak	=	725 min
Time interval	=	1 min	Hyd. volume	=	8,562 cuft
Drainage area	=	1.130 ac	Curve number	=	88
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	5.00 min
Total precip.	=	3.23 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

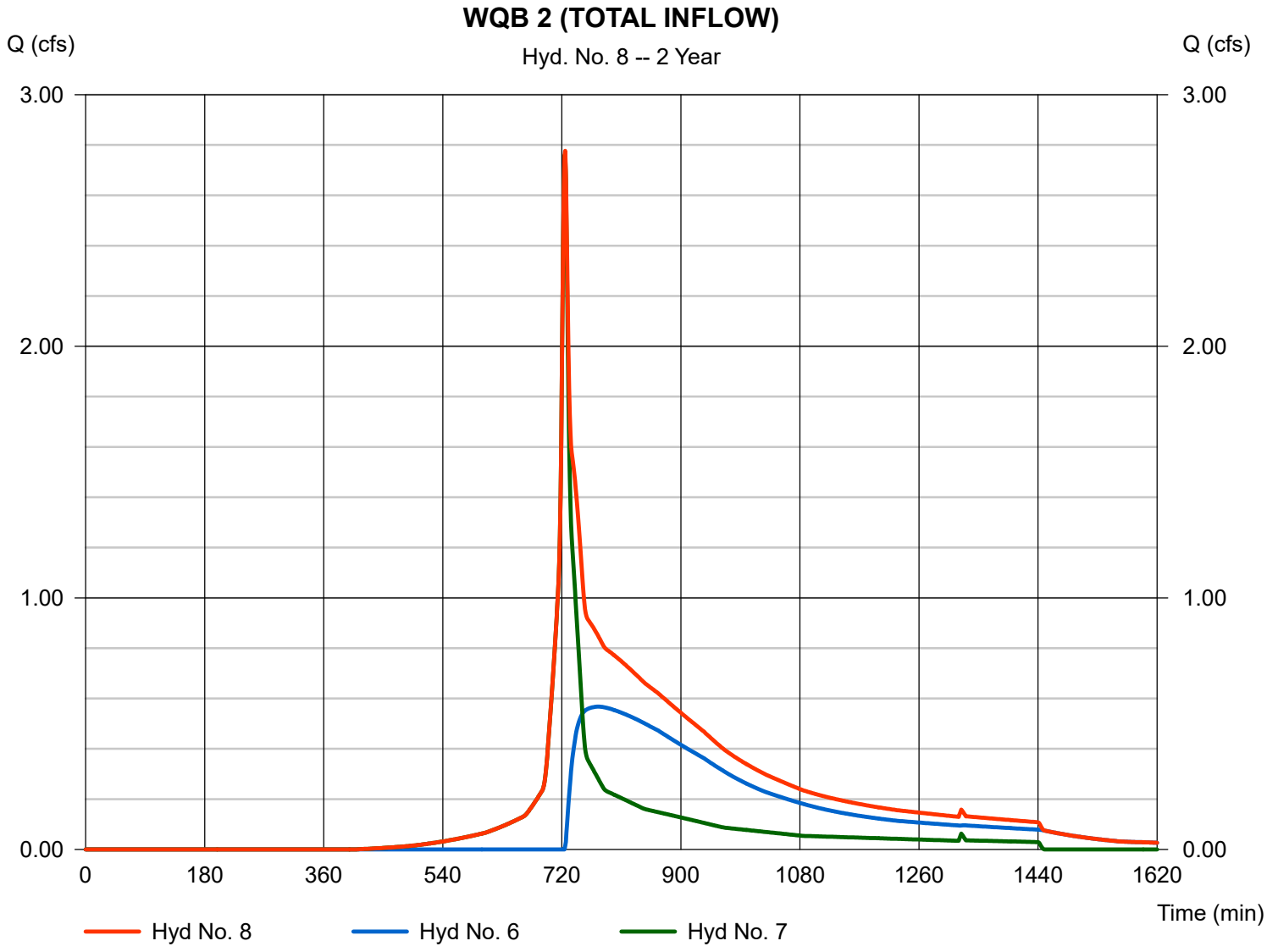


Hydrograph Report

Hyd. No. 8

WQB 2 (TOTAL INFLOW)

Hydrograph type	= Combine	Peak discharge	= 2.777 cfs
Storm frequency	= 2 yrs	Time to peak	= 725 min
Time interval	= 1 min	Hyd. volume	= 20,294 cuft
Inflow hyds.	= 6, 7	Contrib. drain. area	= 1.130 ac



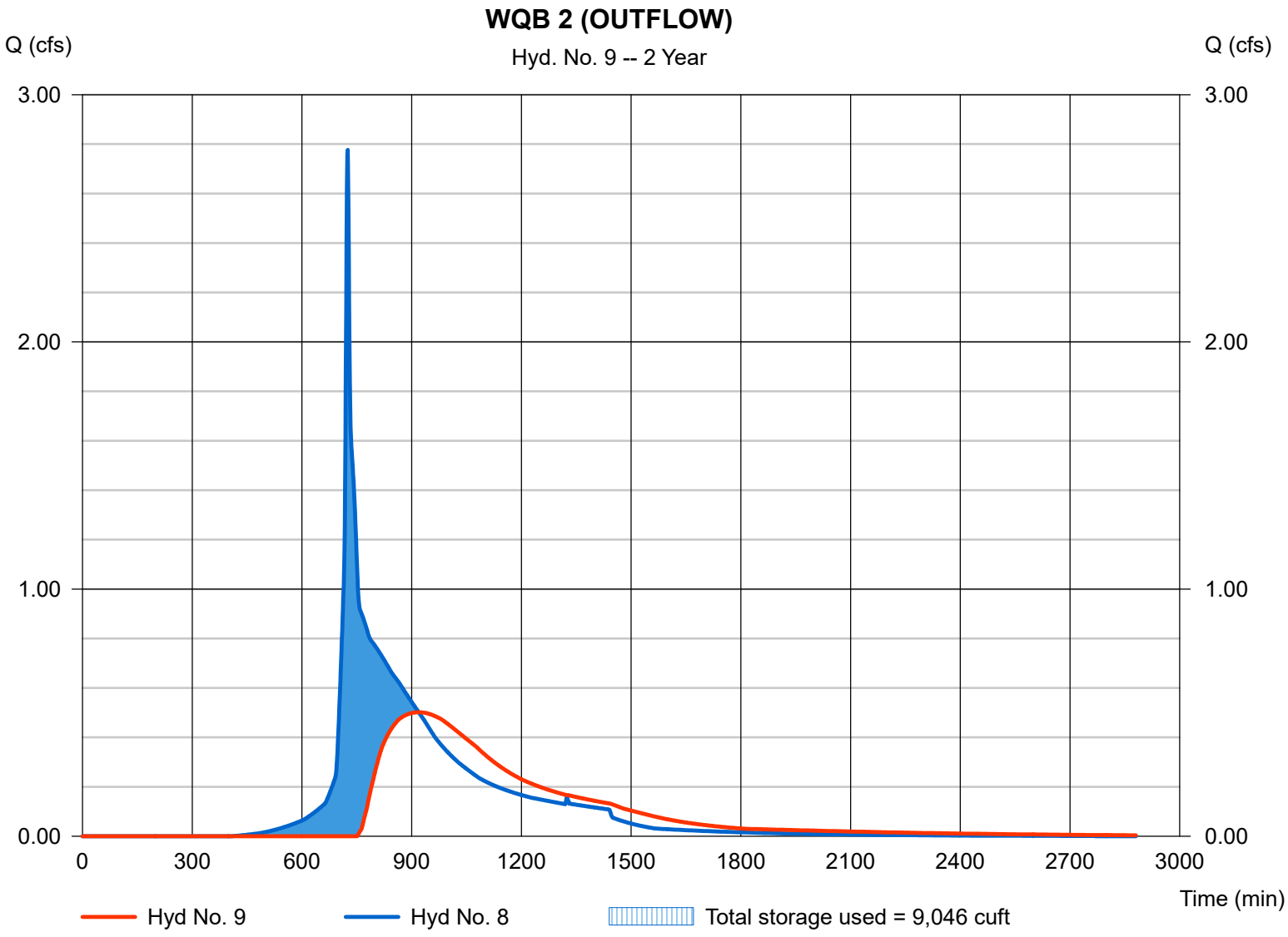
Hydrograph Report

Hyd. No. 9

WQB 2 (OUTFLOW)

Hydrograph type	=	Reservoir	Peak discharge	=	0.502 cfs
Storm frequency	=	2 yrs	Time to peak	=	919 min
Time interval	=	1 min	Hyd. volume	=	14,736 cuft
Inflow hyd. No.	=	8 - WQB 2 (TOTAL INFLOW)	Max. Elevation	=	159.53 ft
Reservoir name	=	WQB2	Max. Storage	=	9,046 cuft

Storage Indication method used.



Pond Report

Pond No. 2 - WQB2

Pond Data

Contours - User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 158.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	158.00	4,878	0	0
1.00	159.00	6,095	5,475	5,475
2.00	160.00	7,311	6,693	12,168
3.00	161.00	8,639	7,965	20,133
4.00	162.00	9,968	9,295	29,427
5.00	163.00	11,471	10,710	40,137
6.00	164.00	12,974	12,214	52,351
7.00	165.00	12,985	12,978	65,329

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 15.00	6.00	0.00	0.00
Span (in)	= 15.00	6.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 159.00	159.00	0.00	0.00
Length (ft)	= 36.00	0.00	0.00	0.00
Slope (%)	= 0.00	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 11.33	0.00	0.00	0.00
Crest El. (ft)	= 162.50	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= Riser	---	---	---
Multi-Stage	= Yes	No	No	No

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

TW Elev. (ft) = 0.00

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

Stage / Storage / Discharge Table

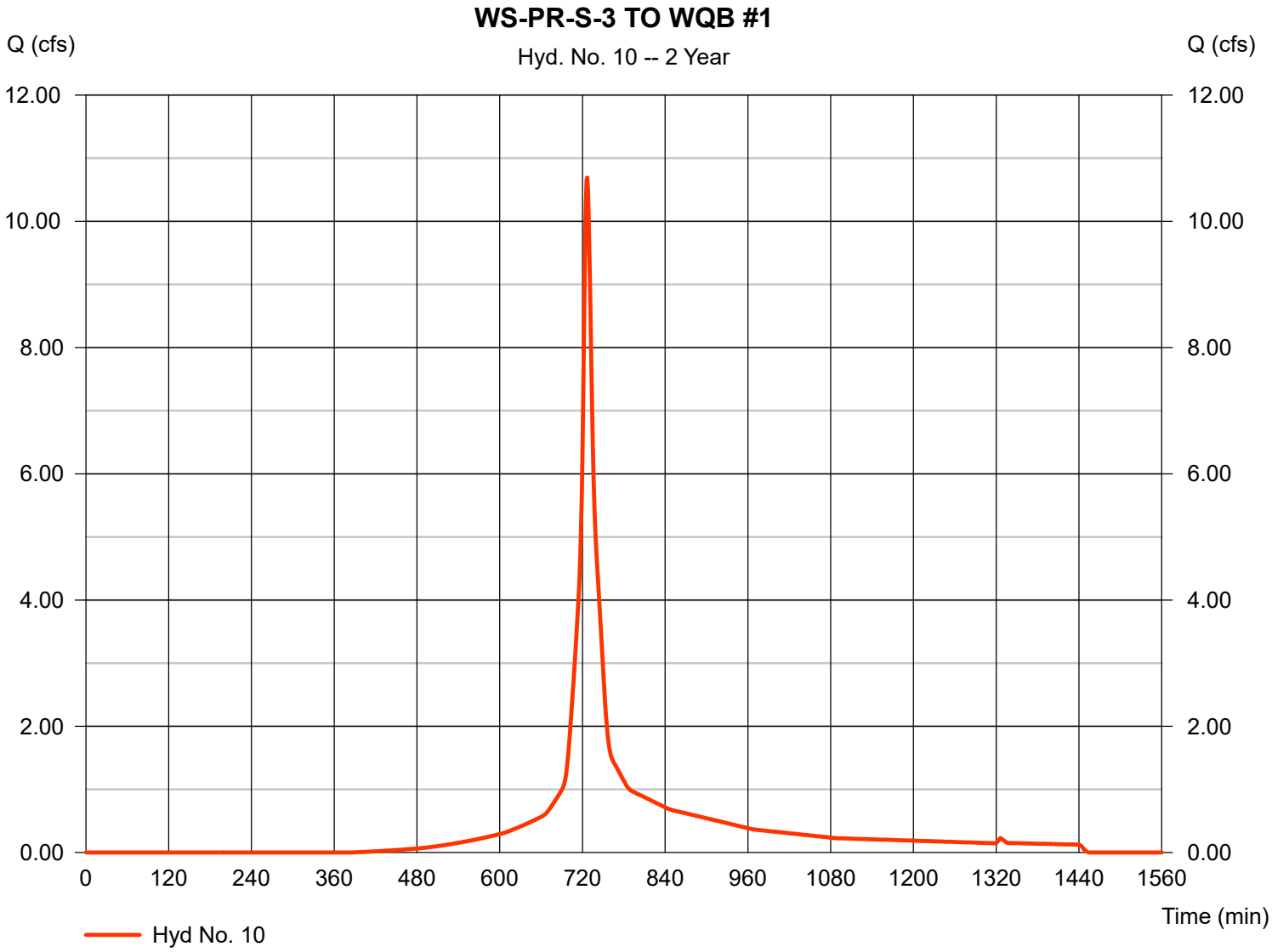
Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	158.00	0.00	0.00	---	---	0.00	---	---	---	---	---	0.00
1.00	5,475	159.00	0.00	0.00	---	---	0.00	---	---	---	---	---	0.00
2.00	12,168	160.00	0.00	0.82 ic	---	---	0.00	---	---	---	---	---	0.82
3.00	20,133	161.00	0.00	1.25 ic	---	---	0.00	---	---	---	---	---	1.25
4.00	29,427	162.00	0.00	1.57 ic	---	---	0.00	---	---	---	---	---	1.57
5.00	40,137	163.00	10.32 oc	1.83 ic	---	---	10.32 s	---	---	---	---	---	12.15
6.00	52,351	164.00	12.34 ic	2.06 ic	---	---	12.31 s	---	---	---	---	---	14.37
7.00	65,329	165.00	13.69 ic	2.27 ic	---	---	13.65 s	---	---	---	---	---	15.91

Hydrograph Report

Hyd. No. 10

WS-PR-S-3 TO WQB #1

Hydrograph type	=	SCS Runoff	Peak discharge	=	10.69 cfs
Storm frequency	=	2 yrs	Time to peak	=	727 min
Time interval	=	1 min	Hyd. volume	=	36,899 cuft
Drainage area	=	4.820 ac	Curve number	=	89
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	10.00 min
Total precip.	=	3.23 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484



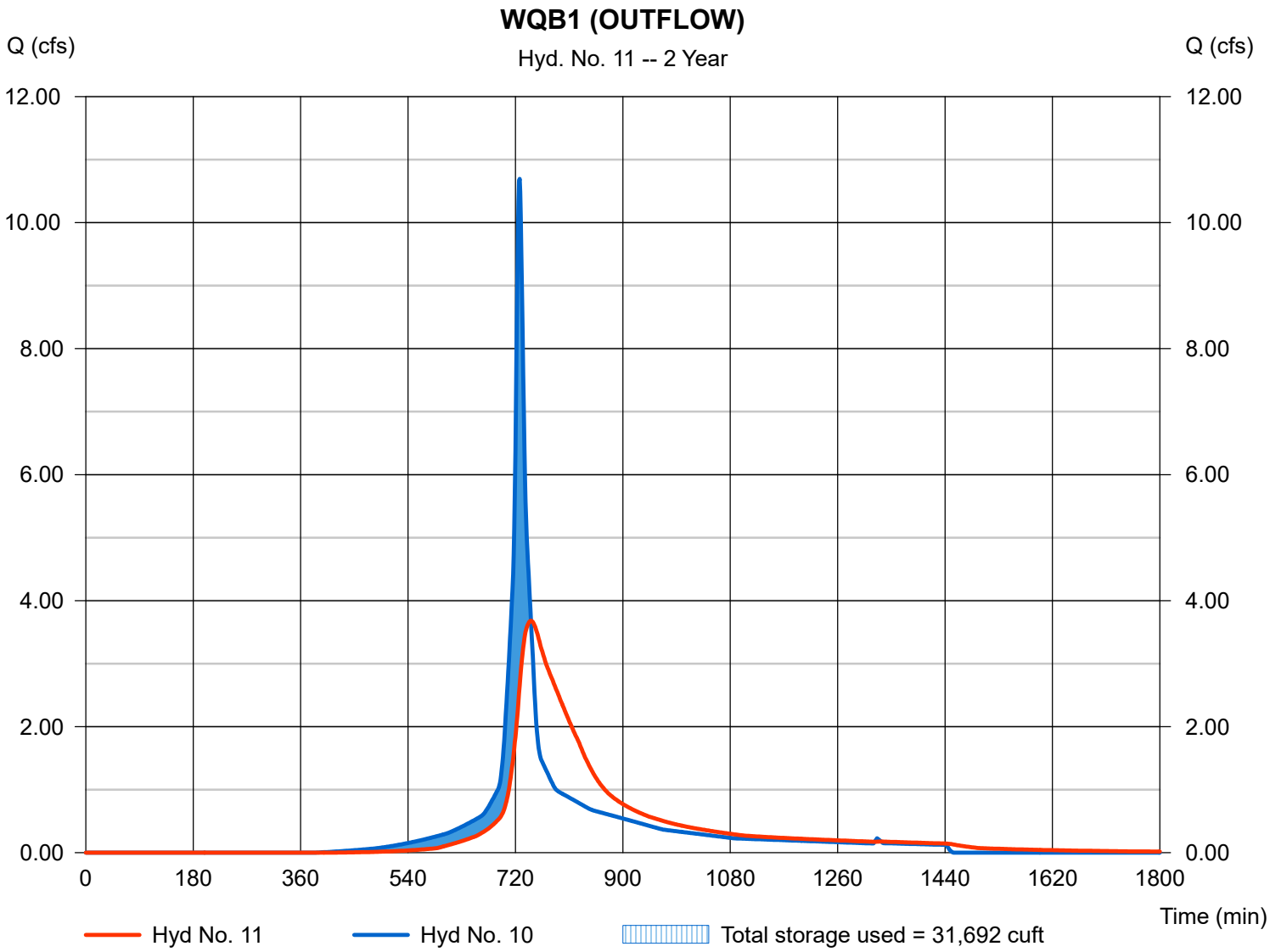
Hydrograph Report

Hyd. No. 11

WQB1 (OUTFLOW)

Hydrograph type	=	Reservoir	Peak discharge	=	3.681 cfs
Storm frequency	=	2 yrs	Time to peak	=	746 min
Time interval	=	1 min	Hyd. volume	=	36,887 cuft
Inflow hyd. No.	=	10 - WS-PR-S-3 TO WQB #1	Max. Elevation	=	150.31 ft
Reservoir name	=	WQB1	Max. Storage	=	31,692 cuft

Storage Indication method used. Wet pond routing start elevation = 149.00 ft.



Pond No. 1 - WQB1

Pond Data

Contours - User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 146.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	146.00	5,069	0	0
1.00	147.00	6,017	5,536	5,536
2.00	148.00	7,066	6,534	12,070
3.00	149.00	8,217	7,634	19,703
4.00	150.00	9,469	8,835	28,538
5.00	151.00	10,801	10,127	38,664
6.00	152.00	12,249	11,516	50,181
7.00	153.00	13,656	12,945	63,126
8.00	154.00	15,120	14,380	77,506

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 24.00	8.00	10.00	0.00
Span (in)	= 24.00	8.00	10.00	0.00
No. Barrels	= 1	2	1	0
Invert El. (ft)	= 148.00	149.00	150.00	0.00
Length (ft)	= 30.00	0.00	0.00	0.00
Slope (%)	= 0.00	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	Yes	Yes	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 11.33	0.00	0.00	0.00
Crest El. (ft)	= 152.75	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= Riser	---	---	---
Multi-Stage	= Yes	No	No	No

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

TW Elev. (ft) = 0.00

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

Stage / Storage / Discharge Table

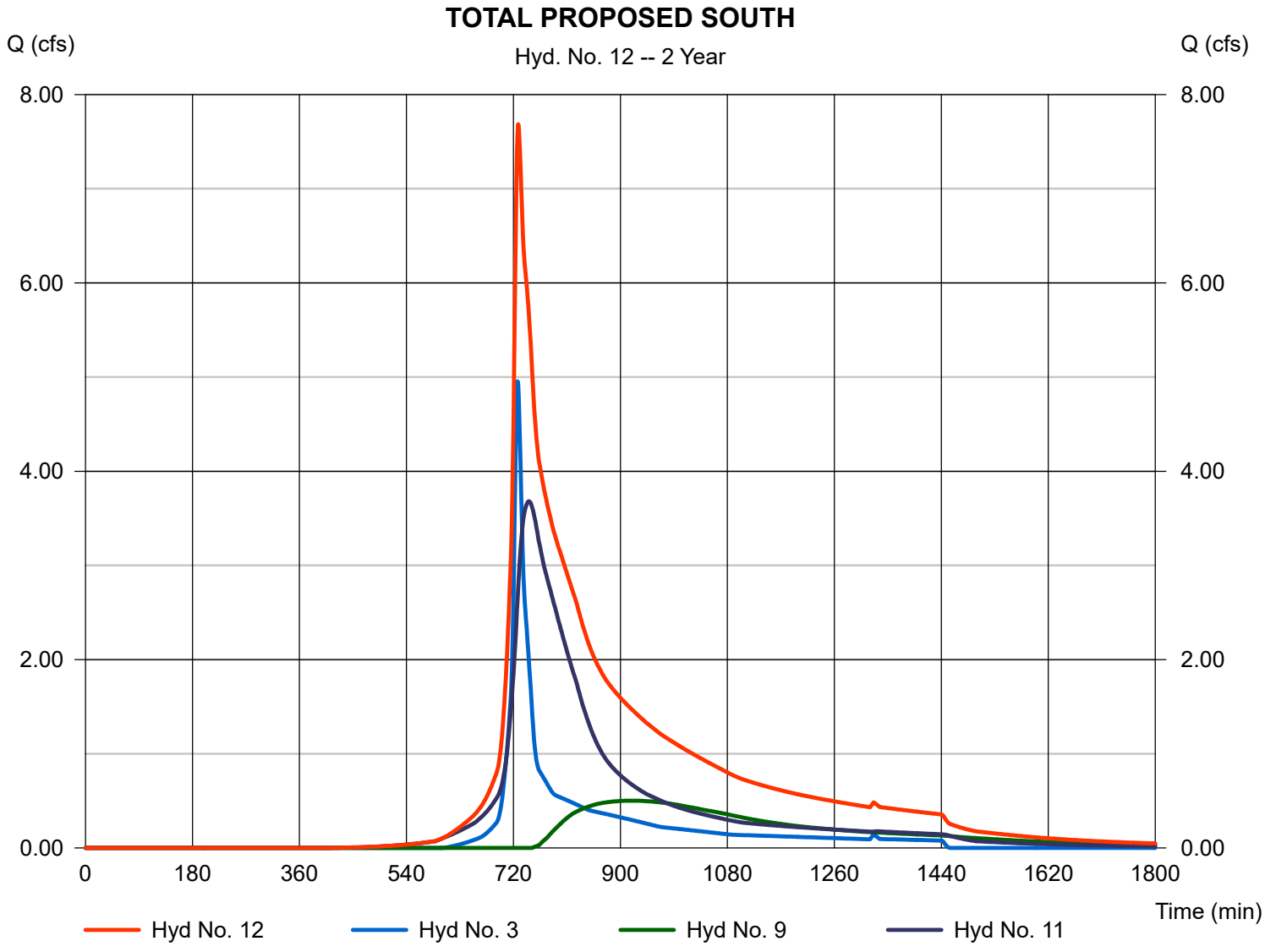
Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	146.00	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.00
1.00	5,536	147.00	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.00
2.00	12,070	148.00	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.00
3.00	19,703	149.00	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.00
4.00	28,538	150.00	2.81 ic	2.74 ic	0.00	---	0.00	---	---	---	---	---	2.74
5.00	38,664	151.00	6.37 ic	4.34 ic	2.01 ic	---	0.00	---	---	---	---	---	6.34
6.00	50,181	152.00	8.79 ic	5.49 ic	3.30 ic	---	0.00	---	---	---	---	---	8.79
7.00	63,126	153.00	14.83 ic	5.87 ic	4.22 ic	---	4.72	---	---	---	---	---	14.81
8.00	77,506	154.00	33.11 ic	1.53 ic	1.20 ic	---	30.38 s	---	---	---	---	---	33.11

Hydrograph Report

Hyd. No. 12

TOTAL PROPOSED SOUTH

Hydrograph type	=	Combine	Peak discharge	=	7.685 cfs
Storm frequency	=	2 yrs	Time to peak	=	728 min
Time interval	=	1 min	Hyd. volume	=	69,038 cuft
Inflow hyds.	=	3, 9, 11	Contrib. drain. area	=	3.890 ac



Hydrograph Summary Report

Hydraflow Hydrographs by Intelisolve v9.1

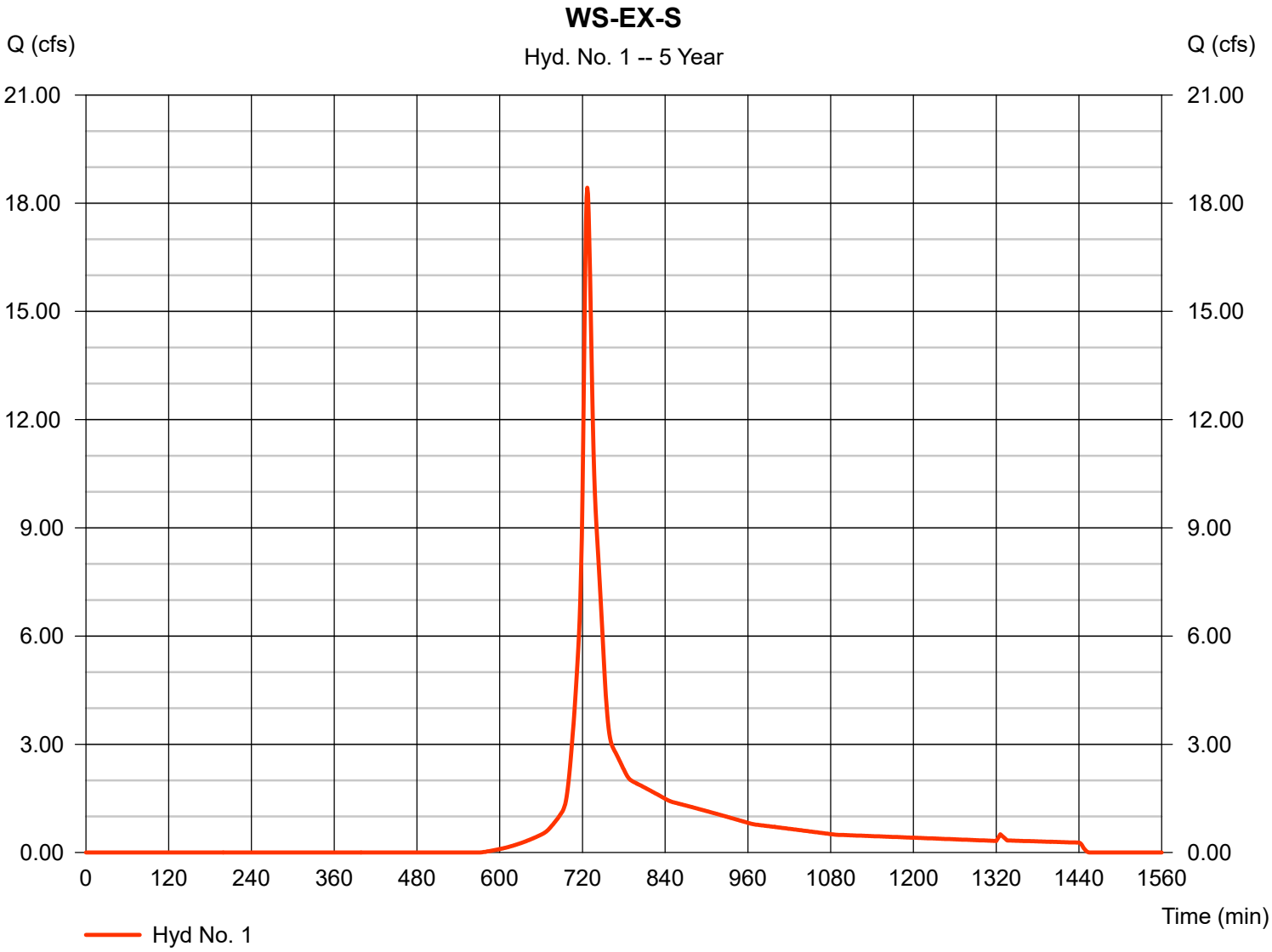
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph description
1	SCS Runoff	18.43	1	727	63,946	----	------	------	WS-EX-S
2	SCS Runoff	5.587	1	726	18,163	----	------	------	WS-EX-E
3	SCS Runoff	8.420	1	727	28,938	----	------	------	WS-PR-UNDET-S
4	SCS Runoff	1.068	1	725	3,299	----	------	------	WS-PR-UNDET-E (TOTAL PROP. EA
5	SCS Runoff	8.217	1	724	25,791	----	------	------	WS-PR-S-1 TO WQB #3
6	Reservoir	0.948	1	765	20,173	5	161.26	14,130	WQB 3 (OUTFLOW)
7	SCS Runoff	4.054	1	724	12,727	----	------	------	WS-PR-S-2 TO WQB #2
8	Combine	4.598	1	725	32,899	6, 7	------	------	WQB 2 (TOTAL INFLOW)
9	Reservoir	0.851	1	926	27,332	8	160.06	12,653	WQB 2 (OUTFLOW)
10	SCS Runoff	15.52	1	727	54,339	----	------	------	WS-PR-S-3 TO WQB #1
11	Reservoir	5.713	1	744	54,327	10	150.80	36,647	WQB1 (OUTFLOW)
12	Combine	12.43	1	729	110,597	3, 9, 11	------	------	TOTAL PROPOSED SOUTH

Hydrograph Report

Hyd. No. 1

WS-EX-S

Hydrograph type	=	SCS Runoff	Peak discharge	=	18.43 cfs
Storm frequency	=	5 yrs	Time to peak	=	727 min
Time interval	=	1 min	Hyd. volume	=	63,946 cuft
Drainage area	=	9.680 ac	Curve number	=	74
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	9.10 min
Total precip.	=	4.30 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

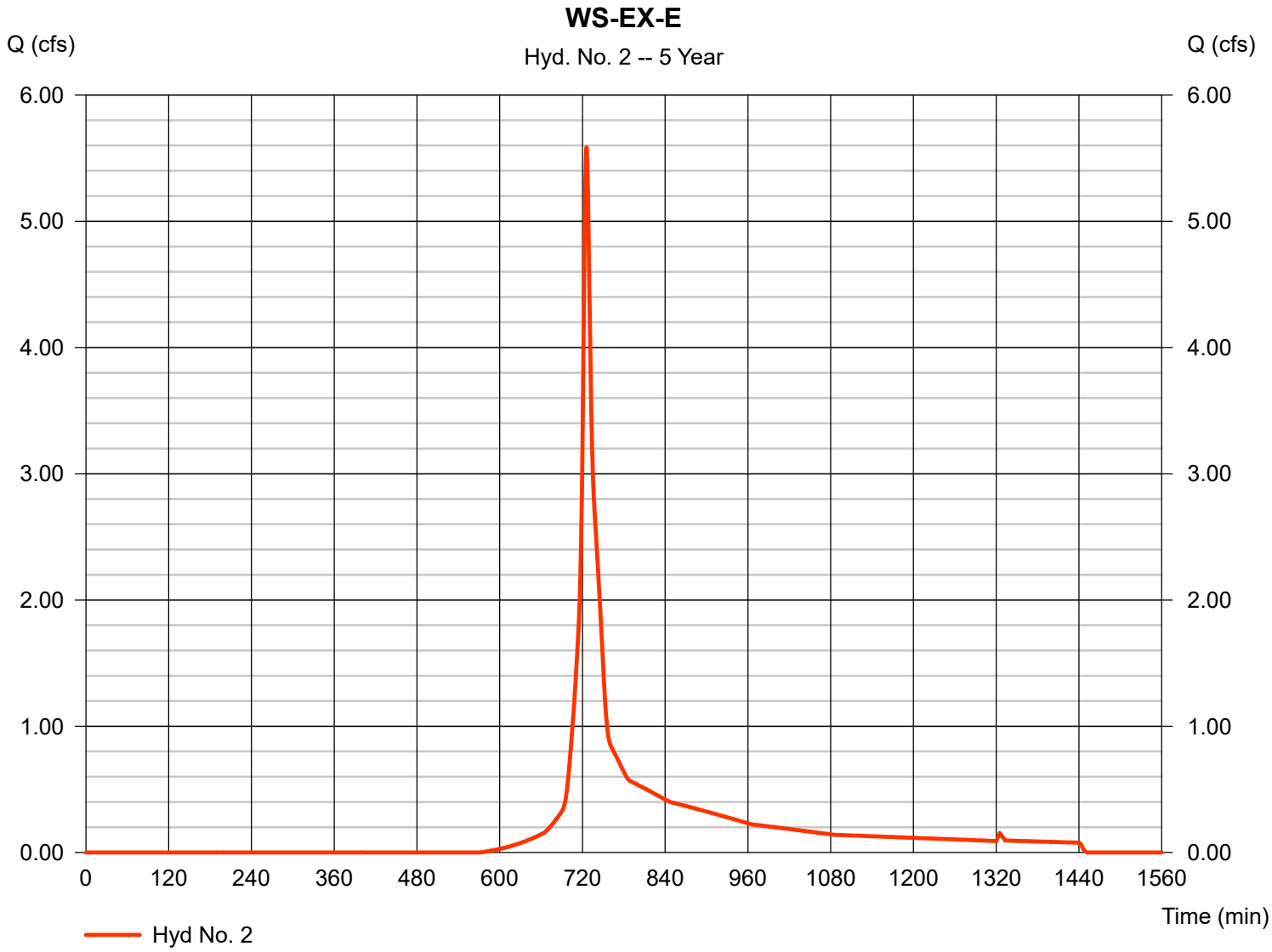


Hydrograph Report

Hyd. No. 2

WS-EX-E

Hydrograph type	=	SCS Runoff	Peak discharge	=	5.587 cfs
Storm frequency	=	5 yrs	Time to peak	=	726 min
Time interval	=	1 min	Hyd. volume	=	18,163 cuft
Drainage area	=	2.820 ac	Curve number	=	74
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	7.50 min
Total precip.	=	4.30 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

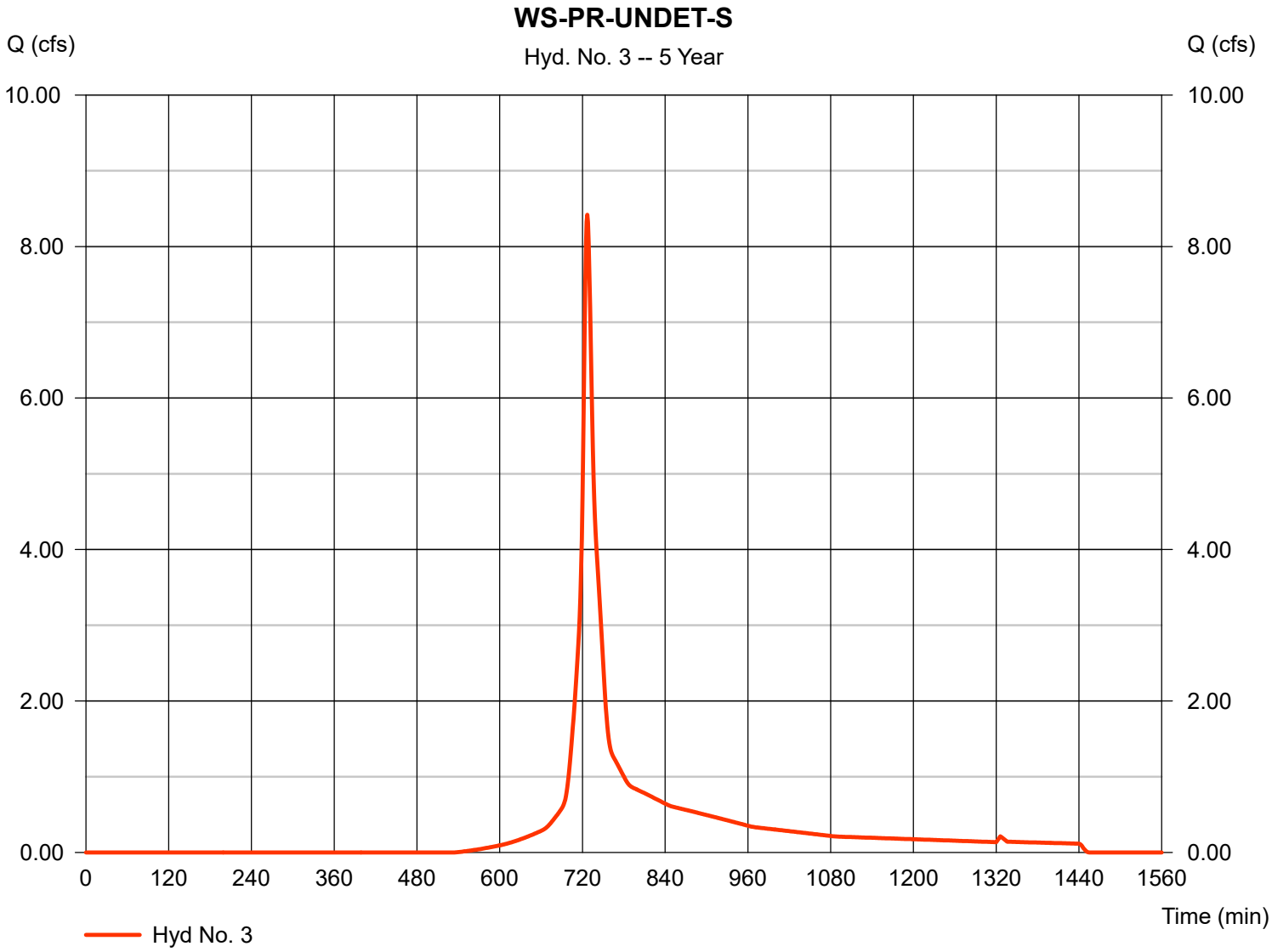


Hydrograph Report

Hyd. No. 3

WS-PR-UNDET-S

Hydrograph type	=	SCS Runoff	Peak discharge	=	8.420 cfs
Storm frequency	=	5 yrs	Time to peak	=	727 min
Time interval	=	1 min	Hyd. volume	=	28,938 cuft
Drainage area	=	3.890 ac	Curve number	=	77
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	10.00 min
Total precip.	=	4.30 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

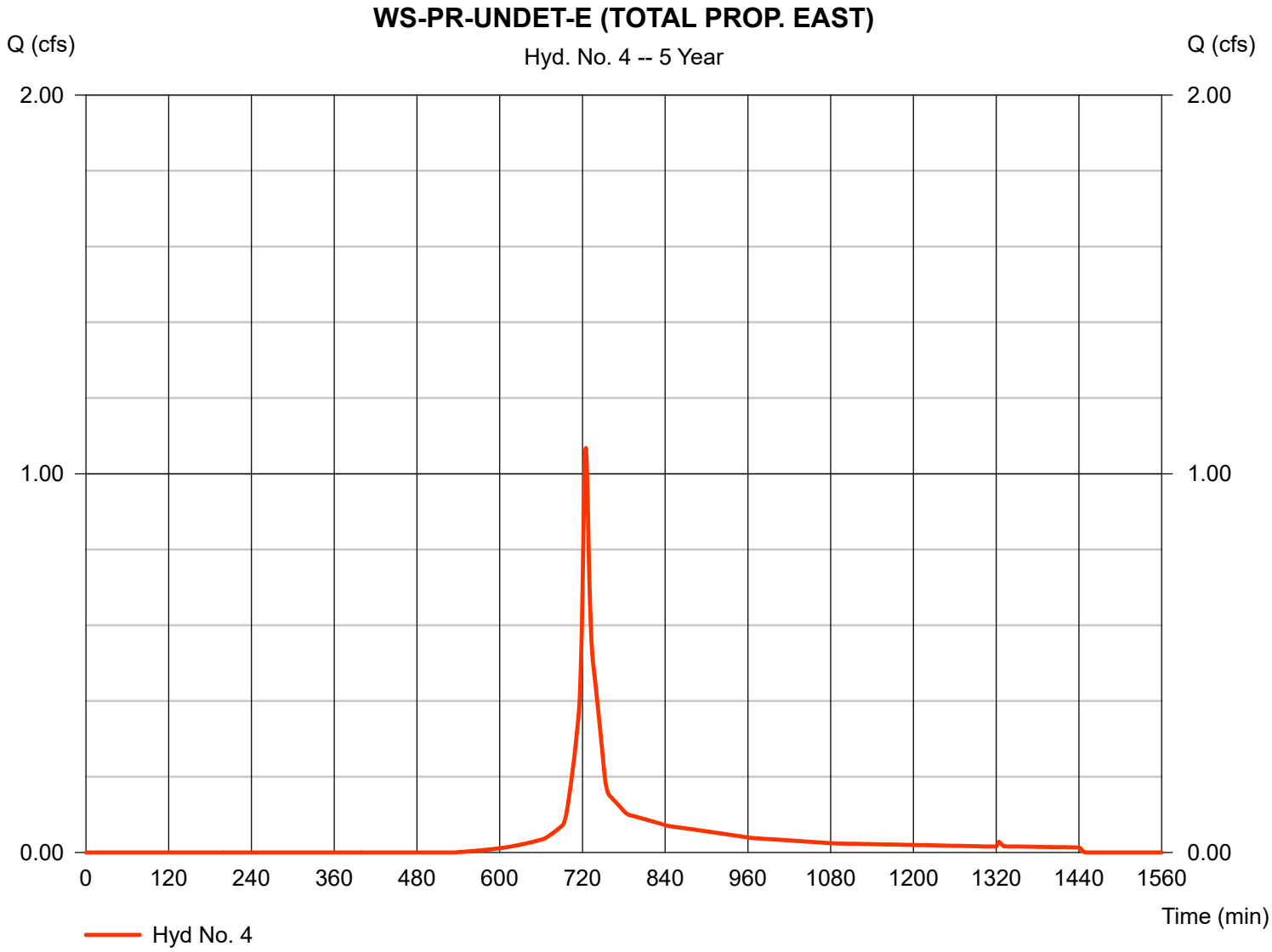


Hydrograph Report

Hyd. No. 4

WS-PR-UNDET-E (TOTAL PROP. EAST)

Hydrograph type	=	SCS Runoff	Peak discharge	=	1.068 cfs
Storm frequency	=	5 yrs	Time to peak	=	725 min
Time interval	=	1 min	Hyd. volume	=	3,299 cuft
Drainage area	=	0.430 ac	Curve number	=	77
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	5.00 min
Total precip.	=	4.30 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

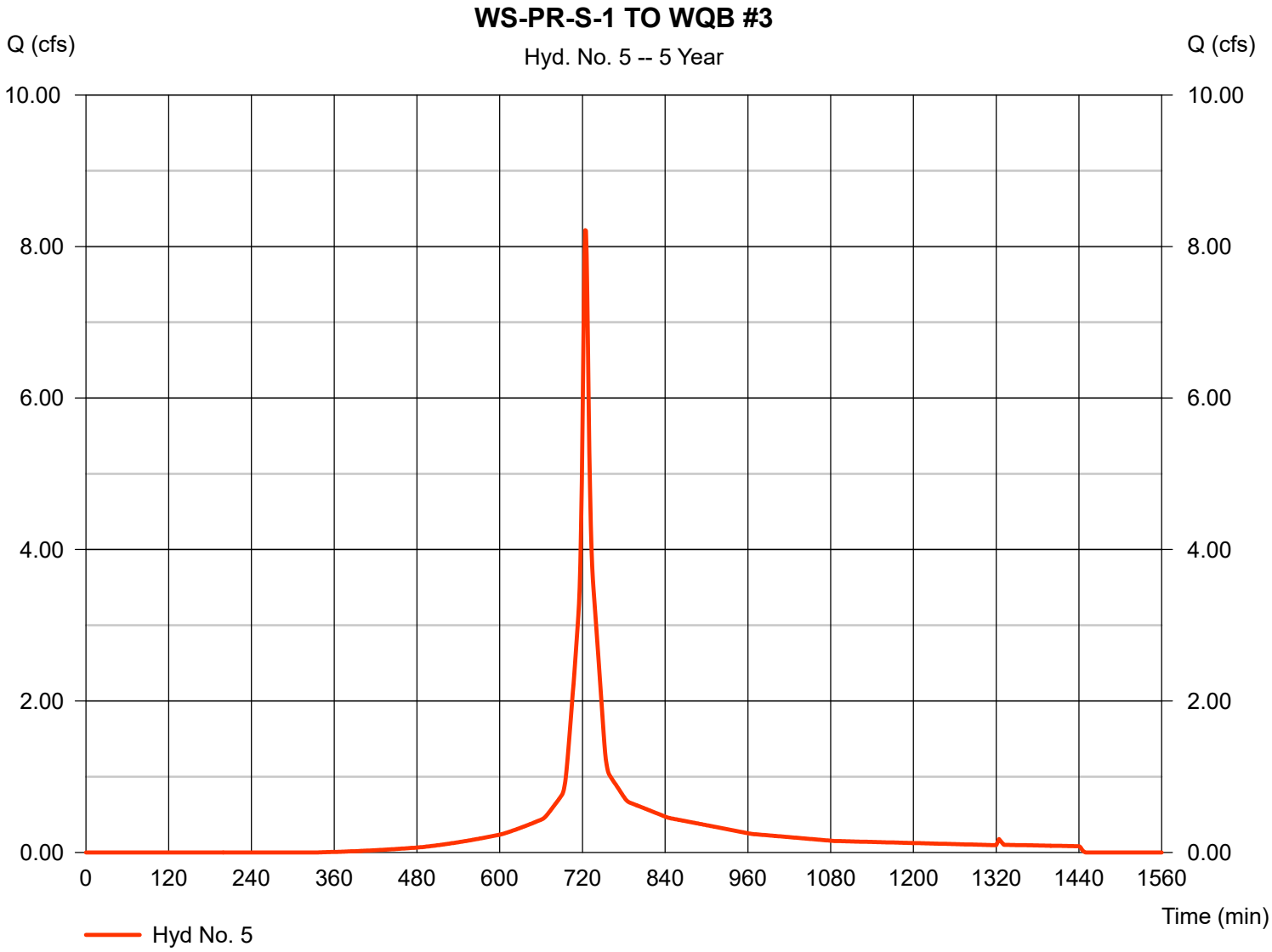


Hydrograph Report

Hyd. No. 5

WS-PR-S-1 TO WQB #3

Hydrograph type	= SCS Runoff	Peak discharge	= 8.217 cfs
Storm frequency	= 5 yrs	Time to peak	= 724 min
Time interval	= 1 min	Hyd. volume	= 25,791 cuft
Drainage area	= 2.290 ac	Curve number	= 88
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 5.00 min
Total precip.	= 4.30 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



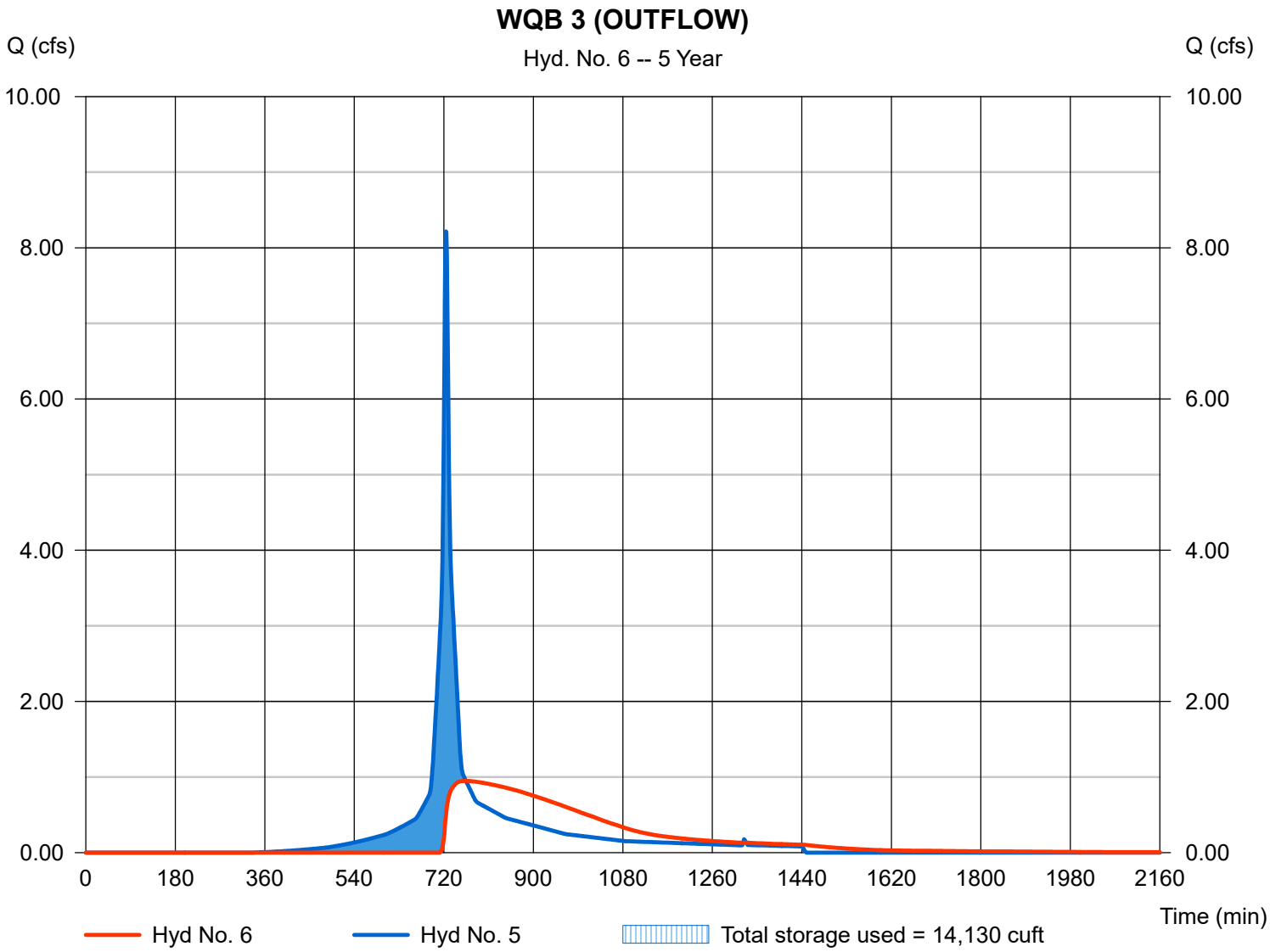
Hydrograph Report

Hyd. No. 6

WQB 3 (OUTFLOW)

Hydrograph type	=	Reservoir	Peak discharge	=	0.948 cfs
Storm frequency	=	5 yrs	Time to peak	=	765 min
Time interval	=	1 min	Hyd. volume	=	20,173 cuft
Inflow hyd. No.	=	5 - WS-PR-S-1 TO WQB #3	Max. Elevation	=	161.26 ft
Reservoir name	=	WQB3	Max. Storage	=	14,130 cuft

Storage Indication method used.

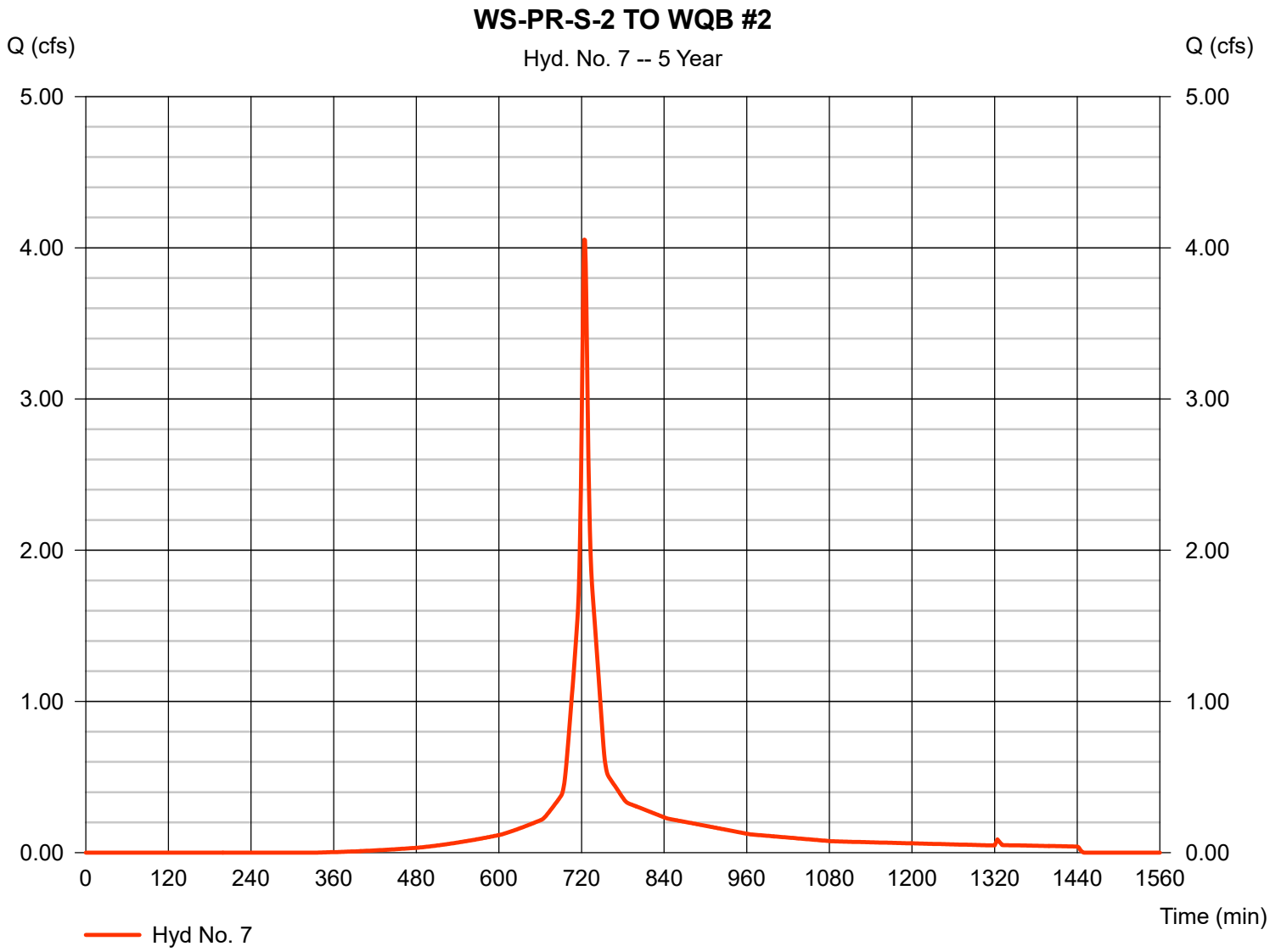


Hydrograph Report

Hyd. No. 7

WS-PR-S-2 TO WQB #2

Hydrograph type	=	SCS Runoff	Peak discharge	=	4.054 cfs
Storm frequency	=	5 yrs	Time to peak	=	724 min
Time interval	=	1 min	Hyd. volume	=	12,727 cuft
Drainage area	=	1.130 ac	Curve number	=	88
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	5.00 min
Total precip.	=	4.30 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

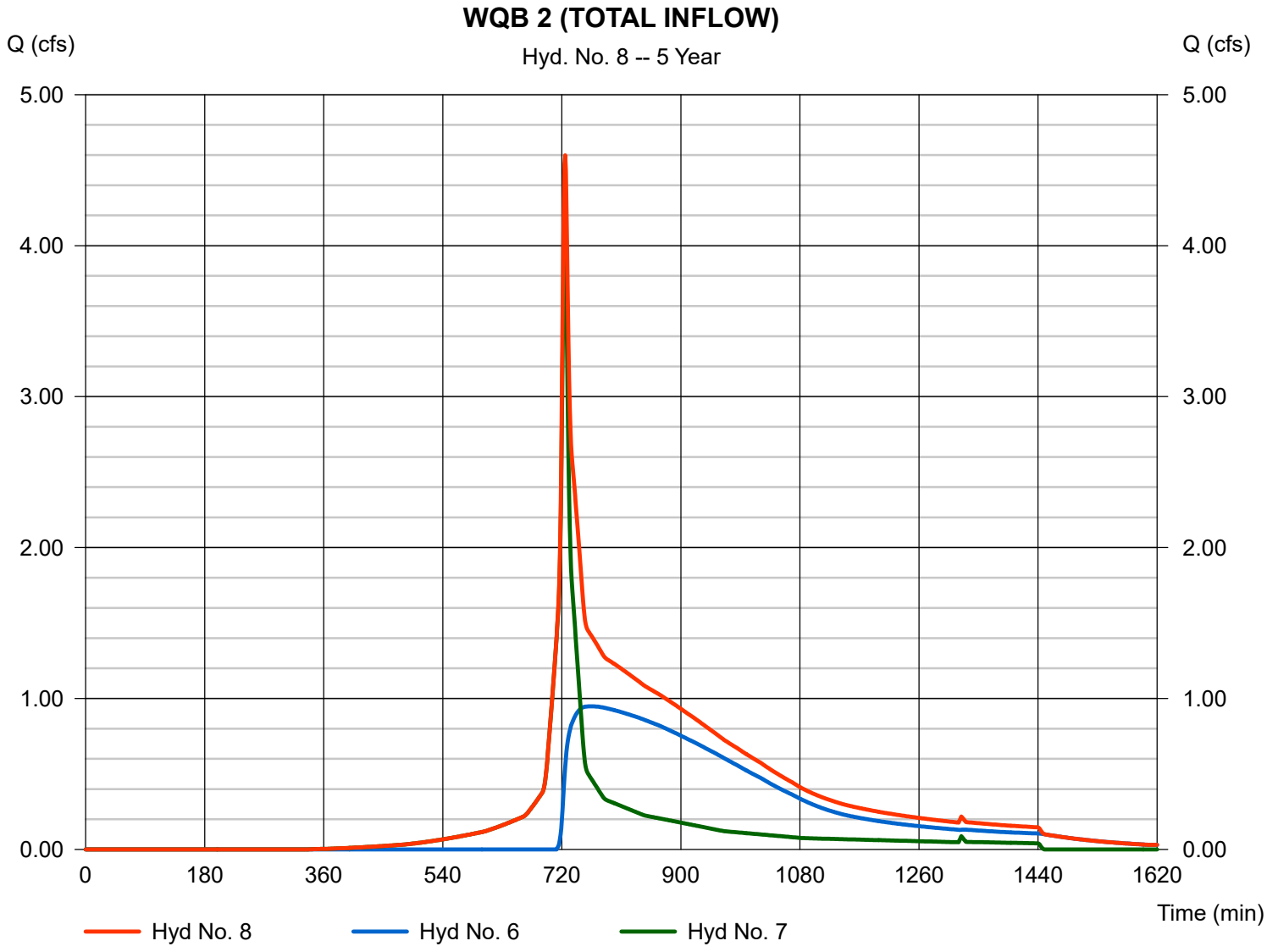


Hydrograph Report

Hyd. No. 8

WQB 2 (TOTAL INFLOW)

Hydrograph type	= Combine	Peak discharge	= 4.598 cfs
Storm frequency	= 5 yrs	Time to peak	= 725 min
Time interval	= 1 min	Hyd. volume	= 32,899 cuft
Inflow hyds.	= 6, 7	Contrib. drain. area	= 1.130 ac



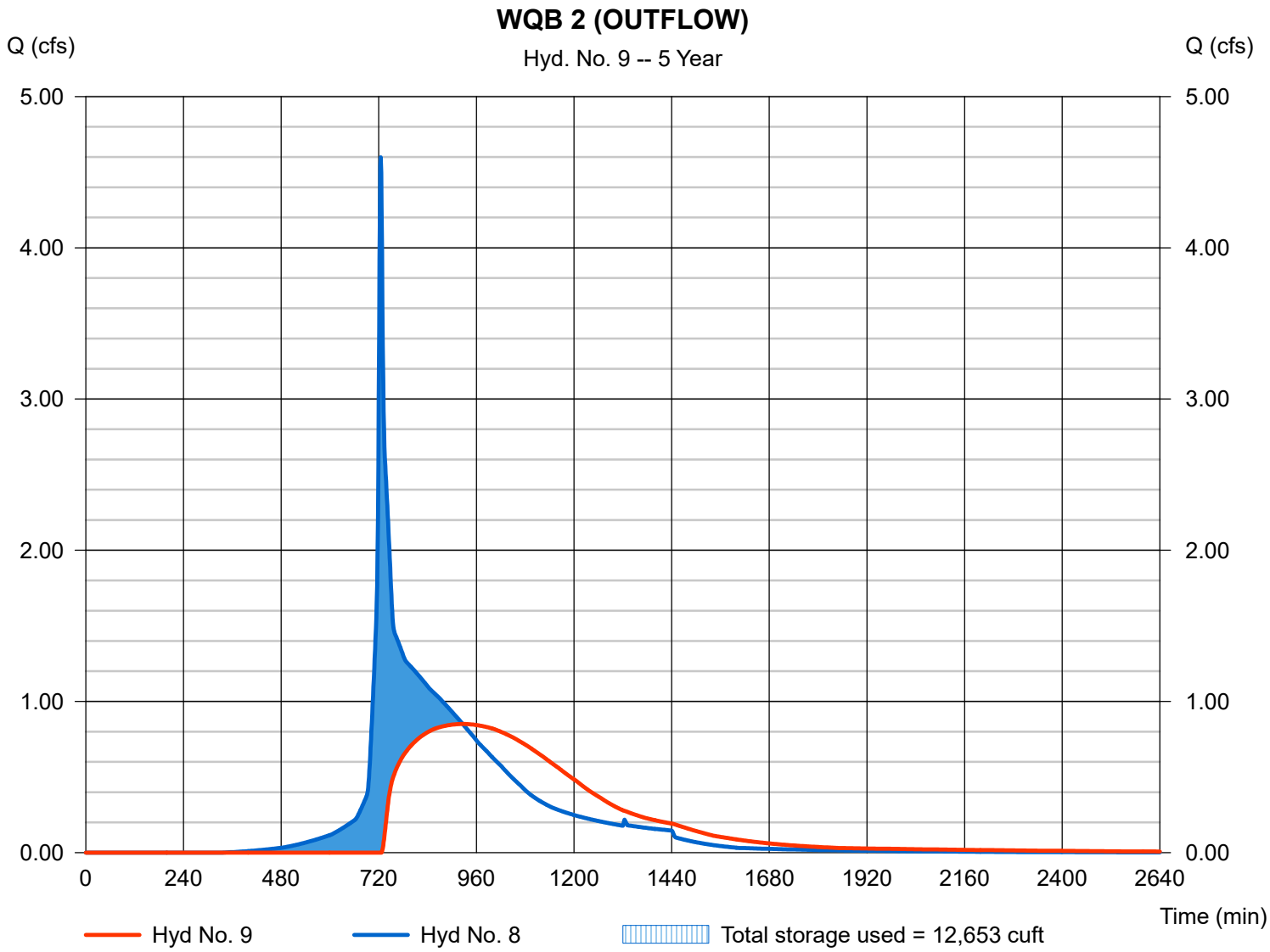
Hydrograph Report

Hyd. No. 9

WQB 2 (OUTFLOW)

Hydrograph type	=	Reservoir	Peak discharge	=	0.851 cfs
Storm frequency	=	5 yrs	Time to peak	=	926 min
Time interval	=	1 min	Hyd. volume	=	27,332 cuft
Inflow hyd. No.	=	8 - WQB 2 (TOTAL INFLOW)	Max. Elevation	=	160.06 ft
Reservoir name	=	WQB2	Max. Storage	=	12,653 cuft

Storage Indication method used.

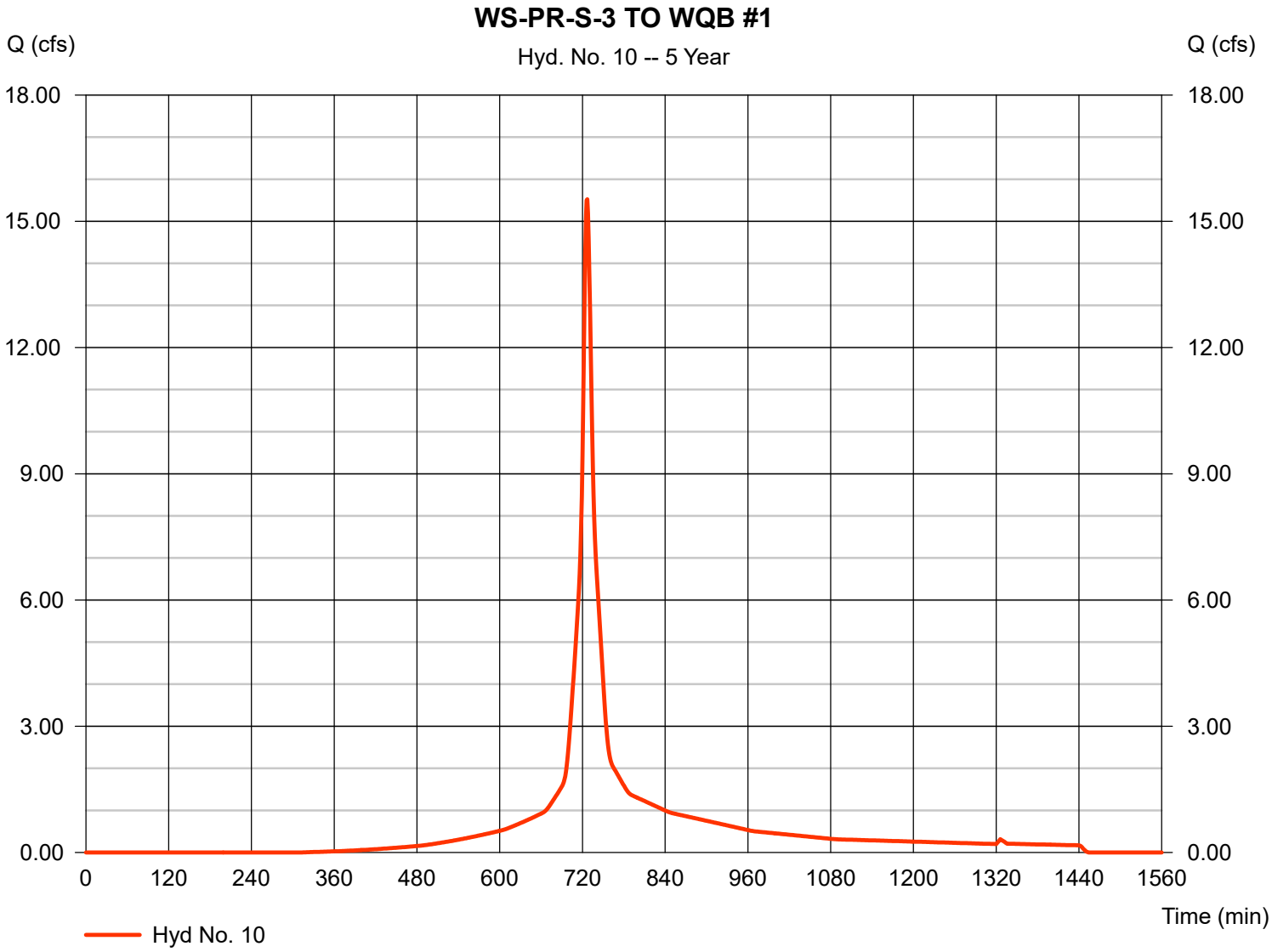


Hydrograph Report

Hyd. No. 10

WS-PR-S-3 TO WQB #1

Hydrograph type	= SCS Runoff	Peak discharge	= 15.52 cfs
Storm frequency	= 5 yrs	Time to peak	= 727 min
Time interval	= 1 min	Hyd. volume	= 54,339 cuft
Drainage area	= 4.820 ac	Curve number	= 89
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 10.00 min
Total precip.	= 4.30 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



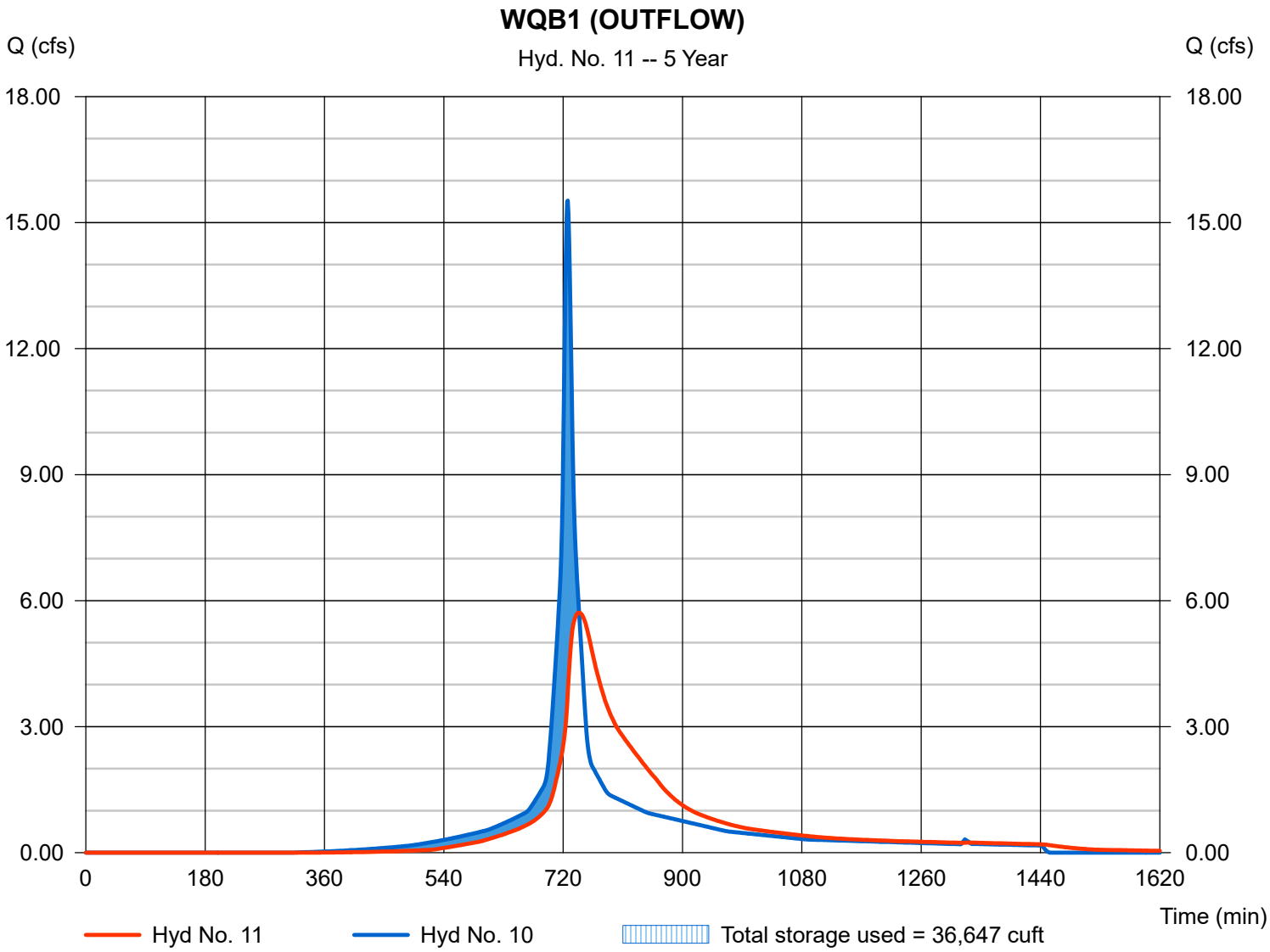
Hydrograph Report

Hyd. No. 11

WQB1 (OUTFLOW)

Hydrograph type	=	Reservoir	Peak discharge	=	5.713 cfs
Storm frequency	=	5 yrs	Time to peak	=	744 min
Time interval	=	1 min	Hyd. volume	=	54,327 cuft
Inflow hyd. No.	=	10 - WS-PR-S-3 TO WQB #1	Max. Elevation	=	150.80 ft
Reservoir name	=	WQB1	Max. Storage	=	36,647 cuft

Storage Indication method used. Wet pond routing start elevation = 149.00 ft.

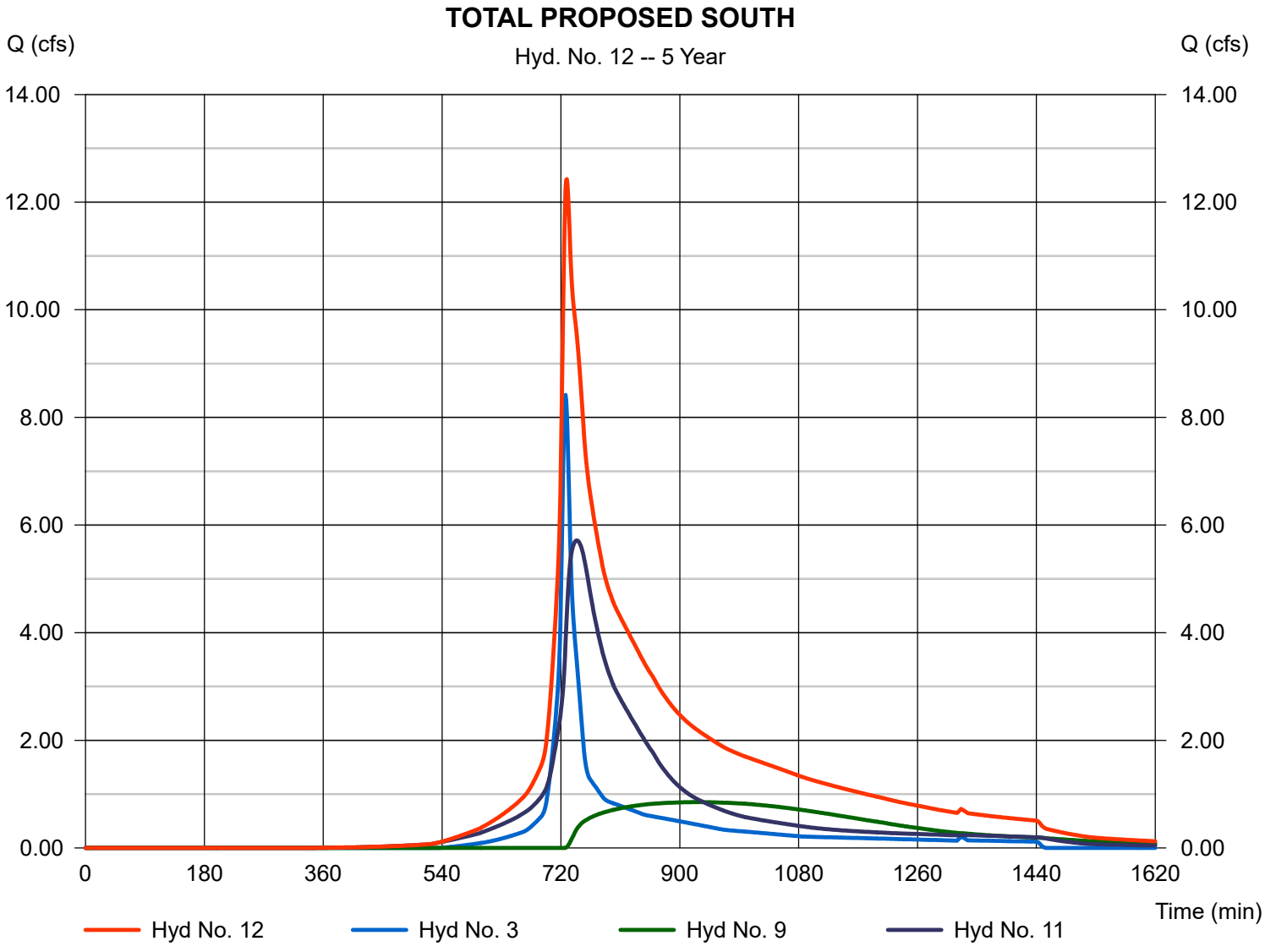


Hydrograph Report

Hyd. No. 12

TOTAL PROPOSED SOUTH

Hydrograph type	= Combine	Peak discharge	= 12.43 cfs
Storm frequency	= 5 yrs	Time to peak	= 729 min
Time interval	= 1 min	Hyd. volume	= 110,597 cuft
Inflow hyds.	= 3, 9, 11	Contrib. drain. area	= 3.890 ac



Hydrograph Summary Report

Hydraflow Hydrographs by Intelisolve v9.1

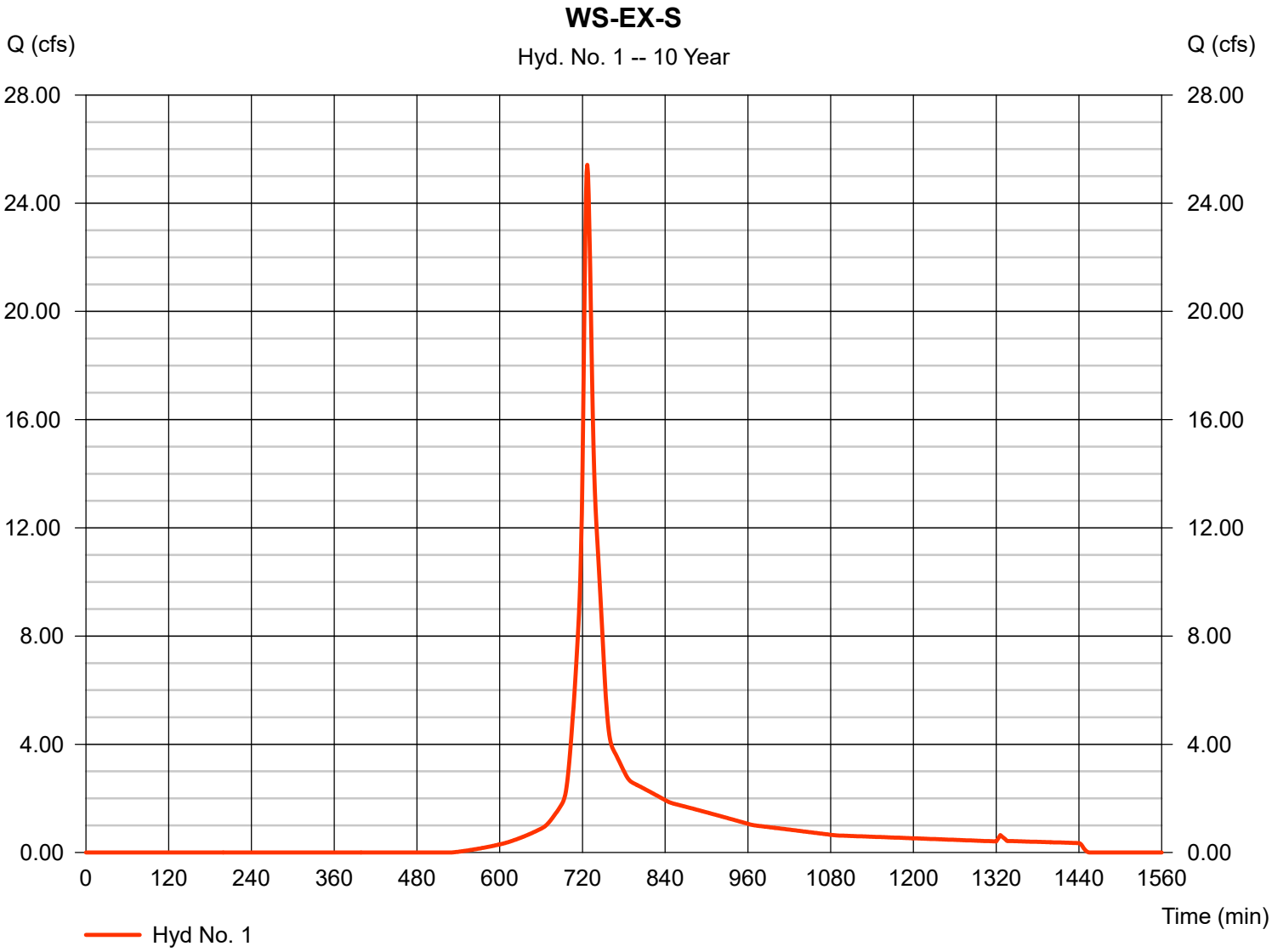
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph description
1	SCS Runoff	25.42	1	727	87,300	----	------	------	WS-EX-S
2	SCS Runoff	7.698	1	726	24,797	----	------	------	WS-EX-E
3	SCS Runoff	11.34	1	727	38,817	----	------	------	WS-PR-UNDET-S
4	SCS Runoff	1.437	1	725	4,425	----	------	------	WS-PR-UNDET-E (TOTAL PROP. EA
5	SCS Runoff	10.31	1	724	32,675	----	------	------	WS-PR-S-1 TO WQB #3
6	Reservoir	1.166	1	765	27,056	5	161.77	18,044	WQB 3 (OUTFLOW)
7	SCS Runoff	5.088	1	724	16,123	----	------	------	WS-PR-S-2 TO WQB #2
8	Combine	5.901	1	725	43,180	6, 7	------	------	WQB 2 (TOTAL INFLOW)
9	Reservoir	1.047	1	947	37,606	8	160.48	15,964	WQB 2 (OUTFLOW)
10	SCS Runoff	19.35	1	727	68,511	----	------	------	WS-PR-S-3 TO WQB #1
11	Reservoir	6.885	1	745	68,499	10	151.19	40,839	WQB1 (OUTFLOW)
12	Combine	16.90	1	728	144,923	3, 9, 11	------	------	TOTAL PROPOSED SOUTH

Hydrograph Report

Hyd. No. 1

WS-EX-S

Hydrograph type	=	SCS Runoff	Peak discharge	=	25.42 cfs
Storm frequency	=	10 yrs	Time to peak	=	727 min
Time interval	=	1 min	Hyd. volume	=	87,300 cuft
Drainage area	=	9.680 ac	Curve number	=	74
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	9.10 min
Total precip.	=	5.15 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

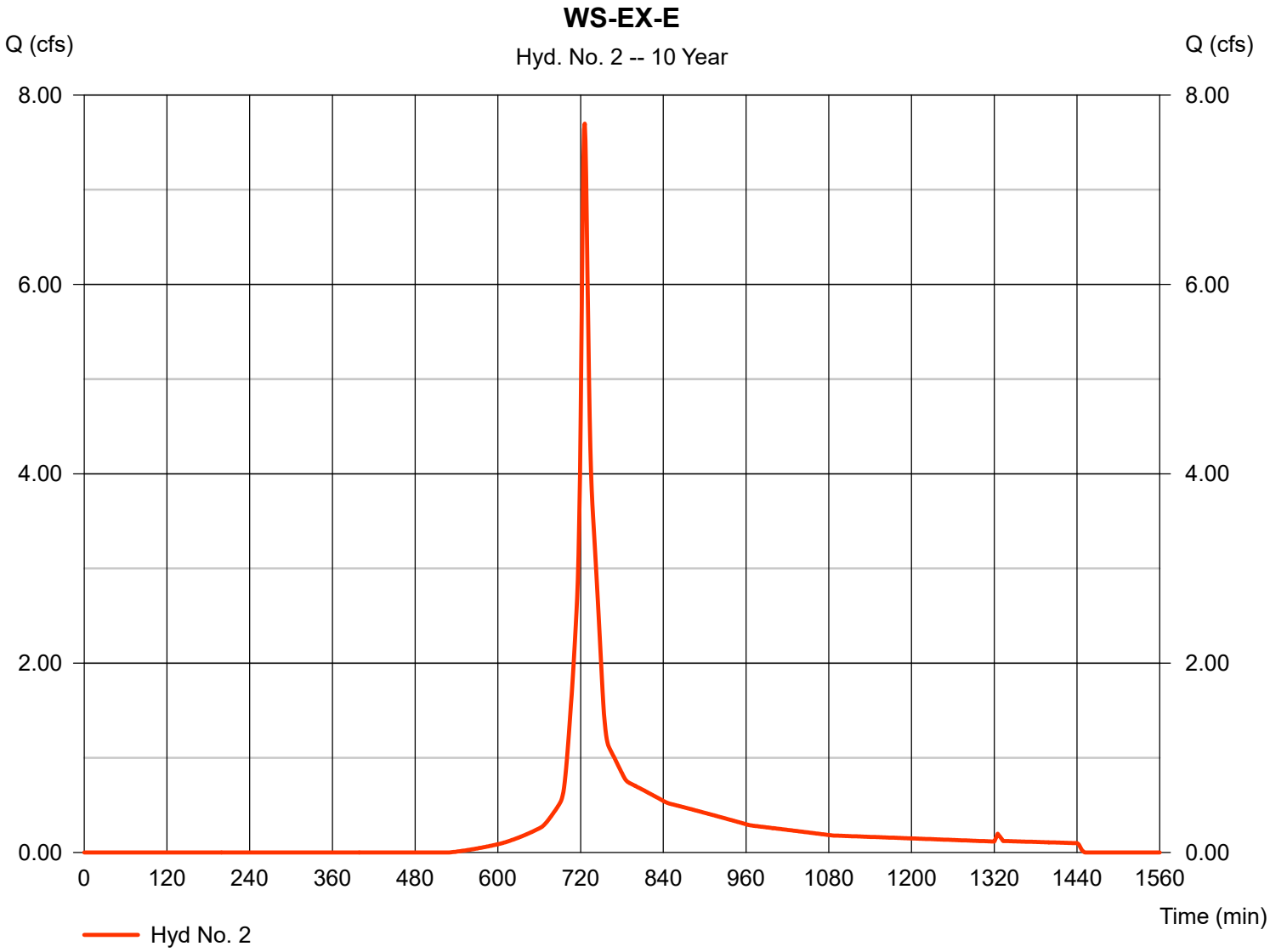


Hydrograph Report

Hyd. No. 2

WS-EX-E

Hydrograph type	=	SCS Runoff	Peak discharge	=	7.698 cfs
Storm frequency	=	10 yrs	Time to peak	=	726 min
Time interval	=	1 min	Hyd. volume	=	24,797 cuft
Drainage area	=	2.820 ac	Curve number	=	74
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	7.50 min
Total precip.	=	5.15 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

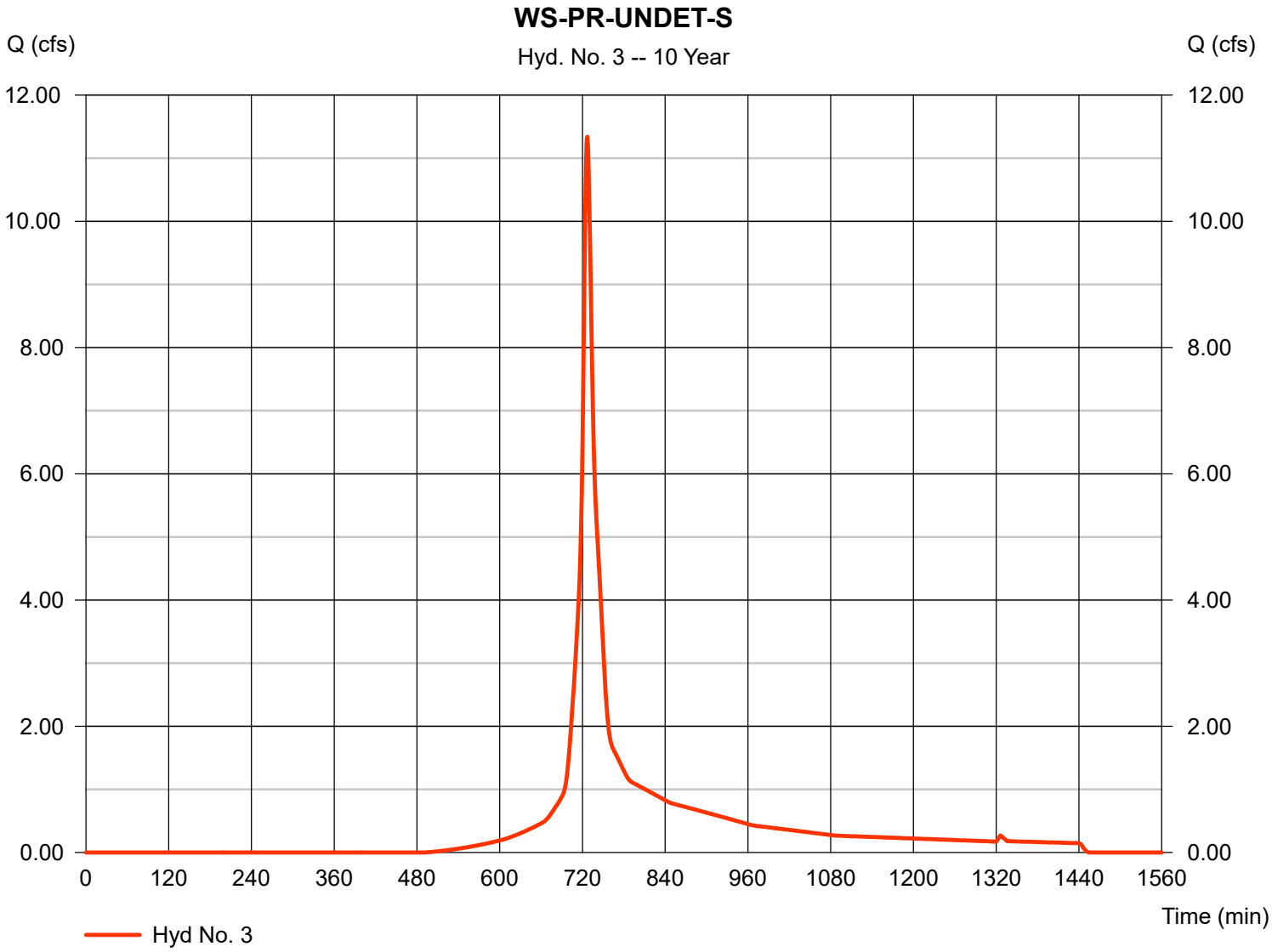


Hydrograph Report

Hyd. No. 3

WS-PR-UNDET-S

Hydrograph type	=	SCS Runoff	Peak discharge	=	11.34 cfs
Storm frequency	=	10 yrs	Time to peak	=	727 min
Time interval	=	1 min	Hyd. volume	=	38,817 cuft
Drainage area	=	3.890 ac	Curve number	=	77
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	10.00 min
Total precip.	=	5.15 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

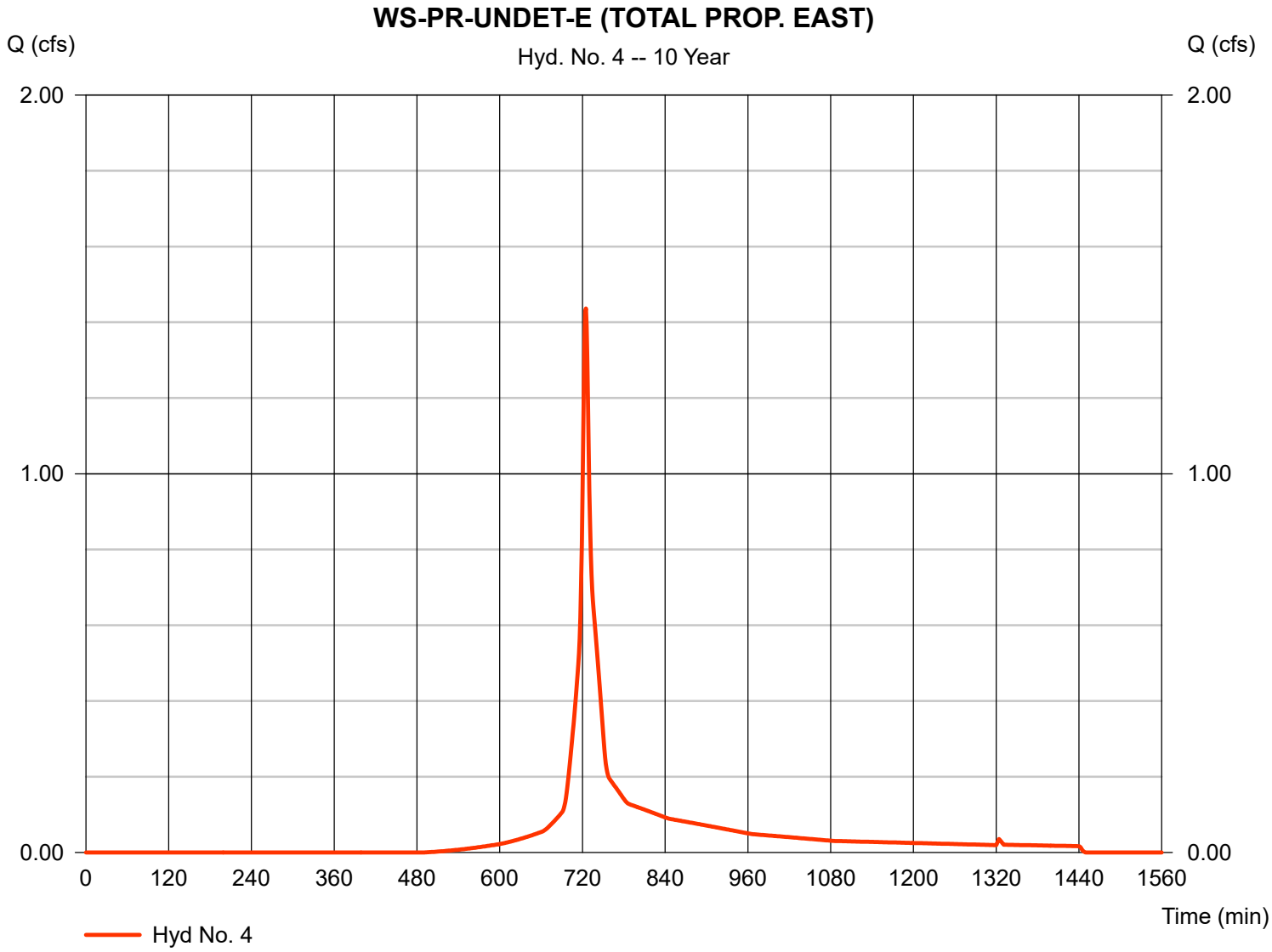


Hydrograph Report

Hyd. No. 4

WS-PR-UNDET-E (TOTAL PROP. EAST)

Hydrograph type	=	SCS Runoff	Peak discharge	=	1.437 cfs
Storm frequency	=	10 yrs	Time to peak	=	725 min
Time interval	=	1 min	Hyd. volume	=	4,425 cuft
Drainage area	=	0.430 ac	Curve number	=	77
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	5.00 min
Total precip.	=	5.15 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

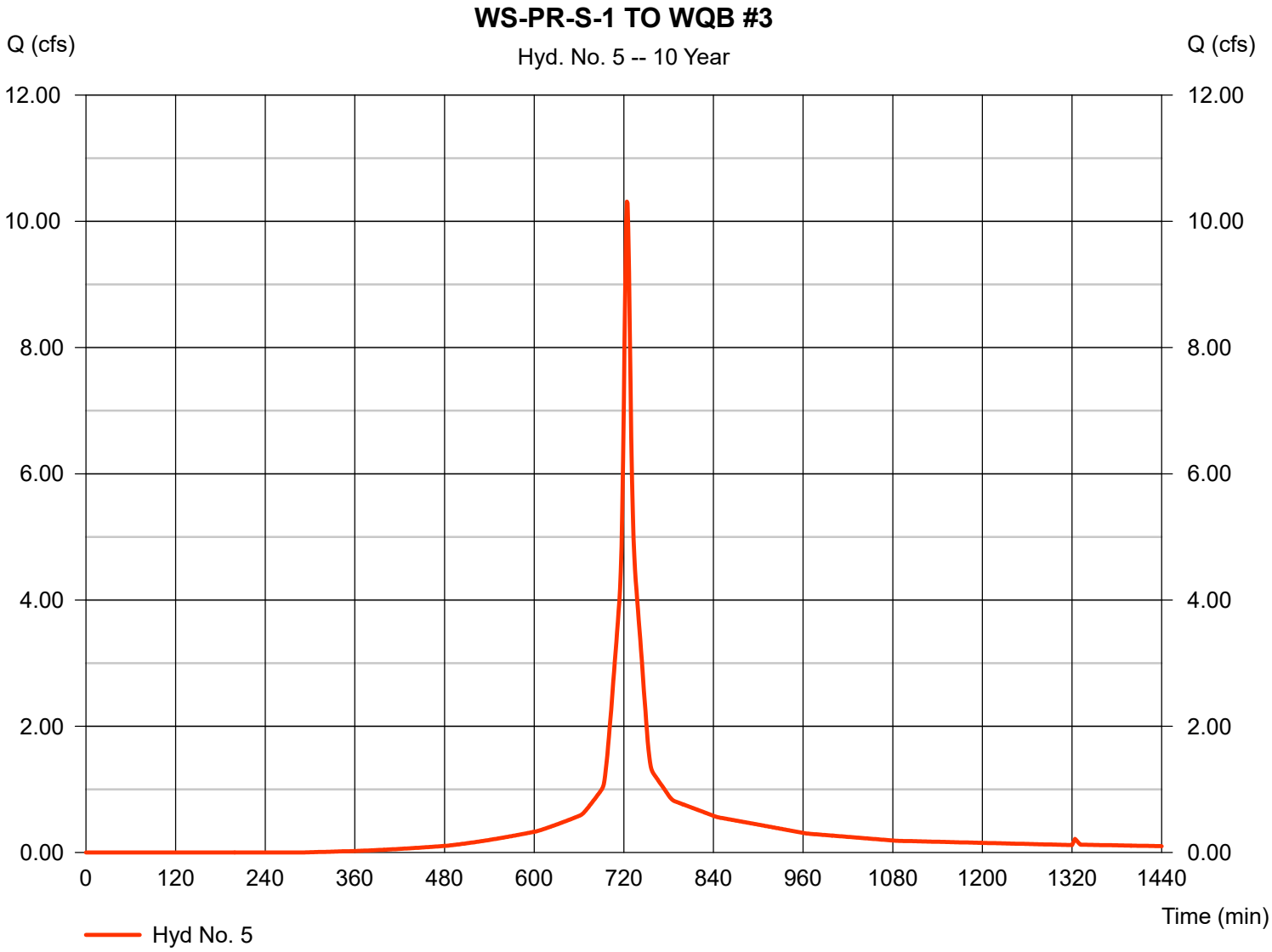


Hydrograph Report

Hyd. No. 5

WS-PR-S-1 TO WQB #3

Hydrograph type	=	SCS Runoff	Peak discharge	=	10.31 cfs
Storm frequency	=	10 yrs	Time to peak	=	724 min
Time interval	=	1 min	Hyd. volume	=	32,675 cuft
Drainage area	=	2.290 ac	Curve number	=	88
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	5.00 min
Total precip.	=	5.15 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484



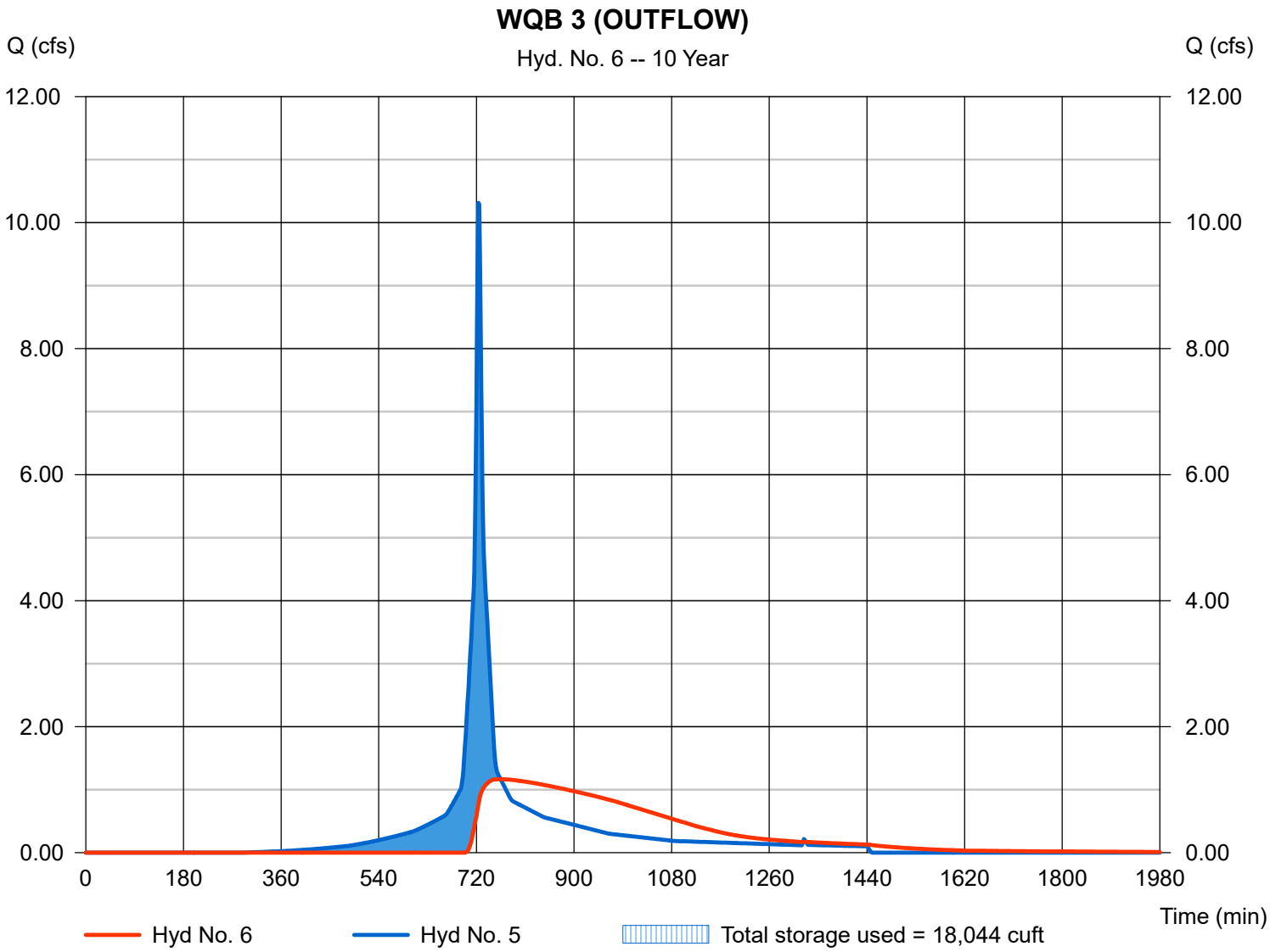
Hydrograph Report

Hyd. No. 6

WQB 3 (OUTFLOW)

Hydrograph type	=	Reservoir	Peak discharge	=	1.166 cfs
Storm frequency	=	10 yrs	Time to peak	=	765 min
Time interval	=	1 min	Hyd. volume	=	27,056 cuft
Inflow hyd. No.	=	5 - WS-PR-S-1 TO WQB #3	Max. Elevation	=	161.77 ft
Reservoir name	=	WQB3	Max. Storage	=	18,044 cuft

Storage Indication method used.

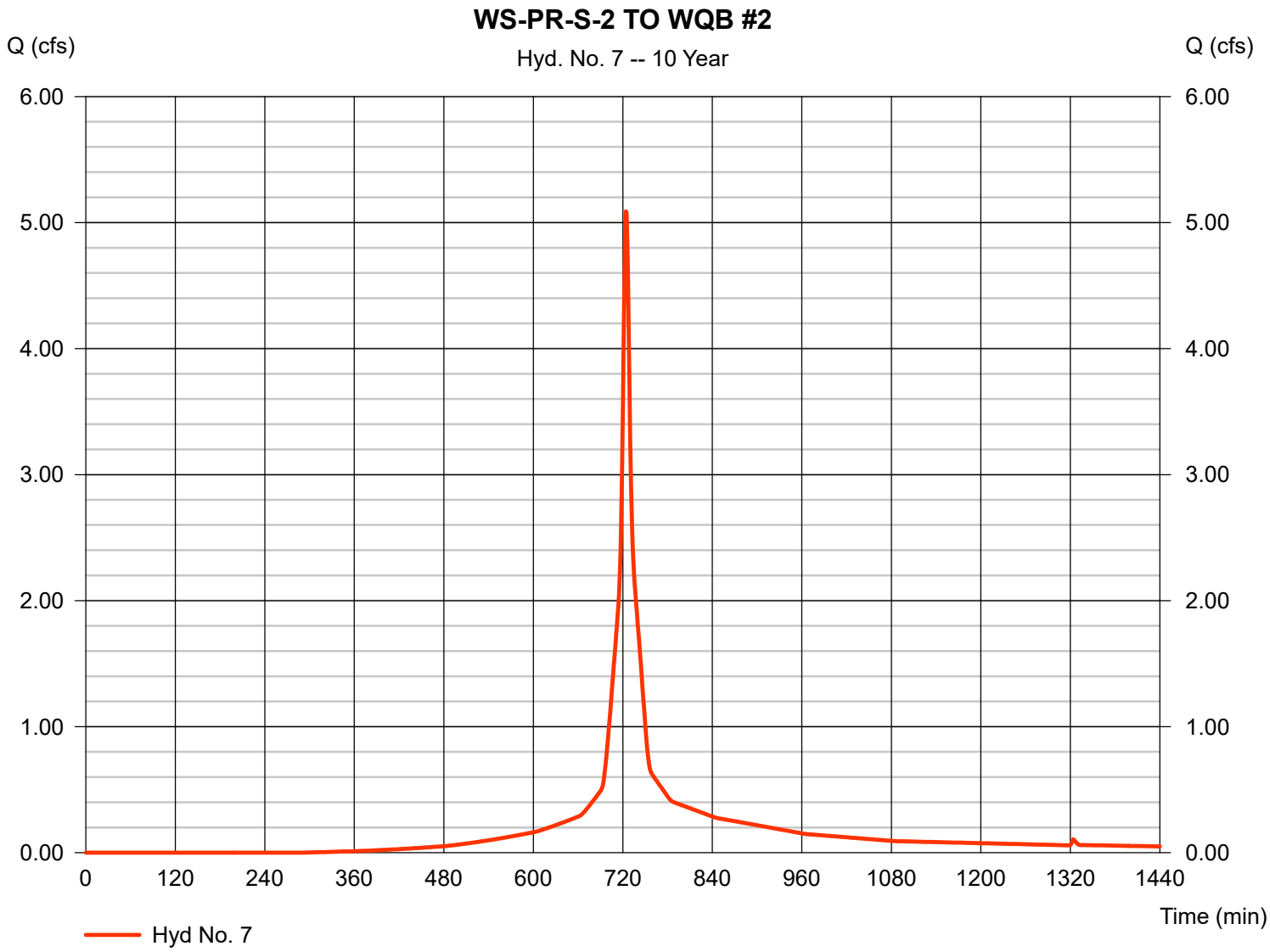


Hydrograph Report

Hyd. No. 7

WS-PR-S-2 TO WQB #2

Hydrograph type	=	SCS Runoff	Peak discharge	=	5.088 cfs
Storm frequency	=	10 yrs	Time to peak	=	724 min
Time interval	=	1 min	Hyd. volume	=	16,123 cuft
Drainage area	=	1.130 ac	Curve number	=	88
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	5.00 min
Total precip.	=	5.15 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

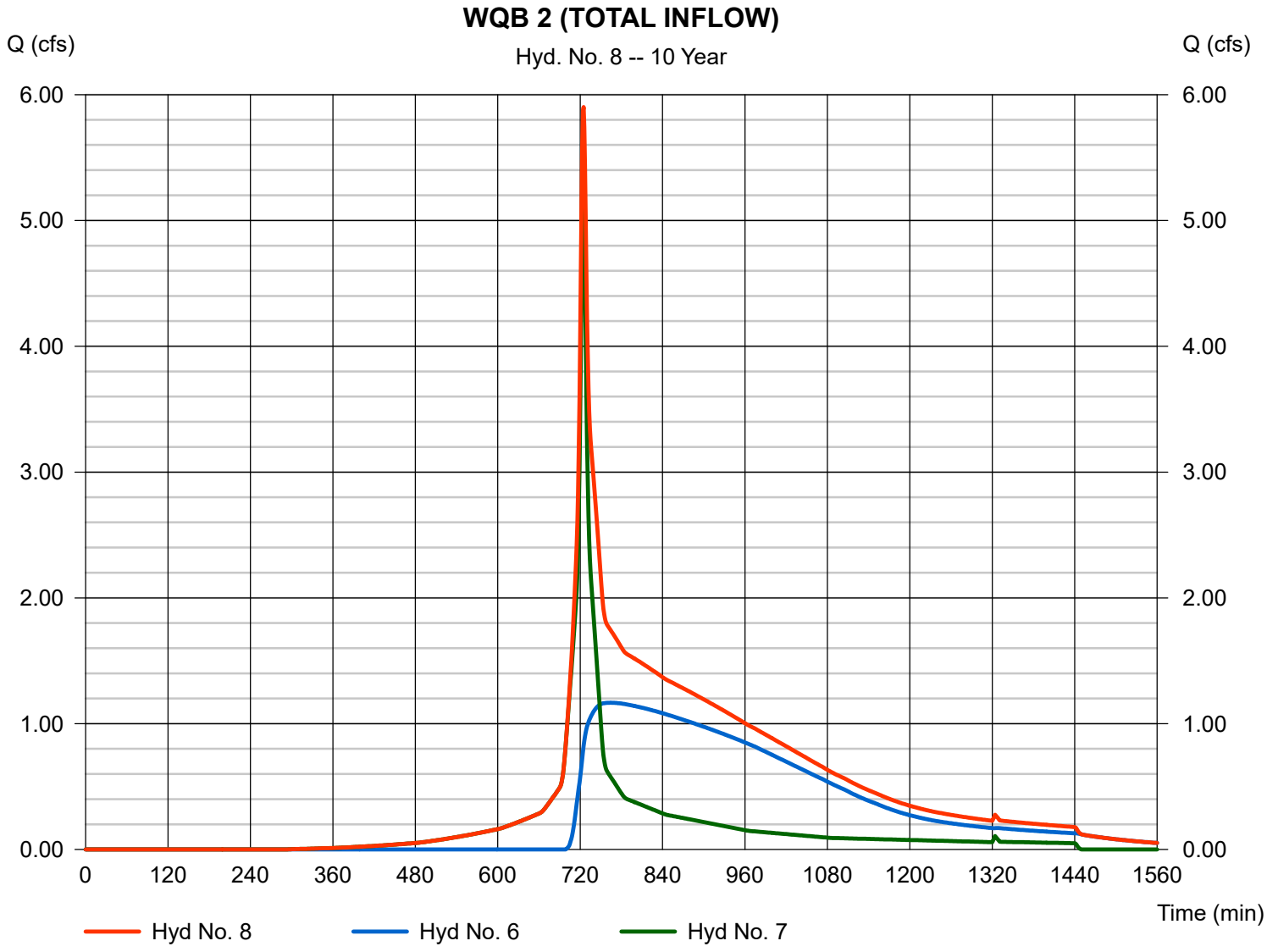


Hydrograph Report

Hyd. No. 8

WQB 2 (TOTAL INFLOW)

Hydrograph type	= Combine	Peak discharge	= 5.901 cfs
Storm frequency	= 10 yrs	Time to peak	= 725 min
Time interval	= 1 min	Hyd. volume	= 43,180 cuft
Inflow hyds.	= 6, 7	Contrib. drain. area	= 1.130 ac



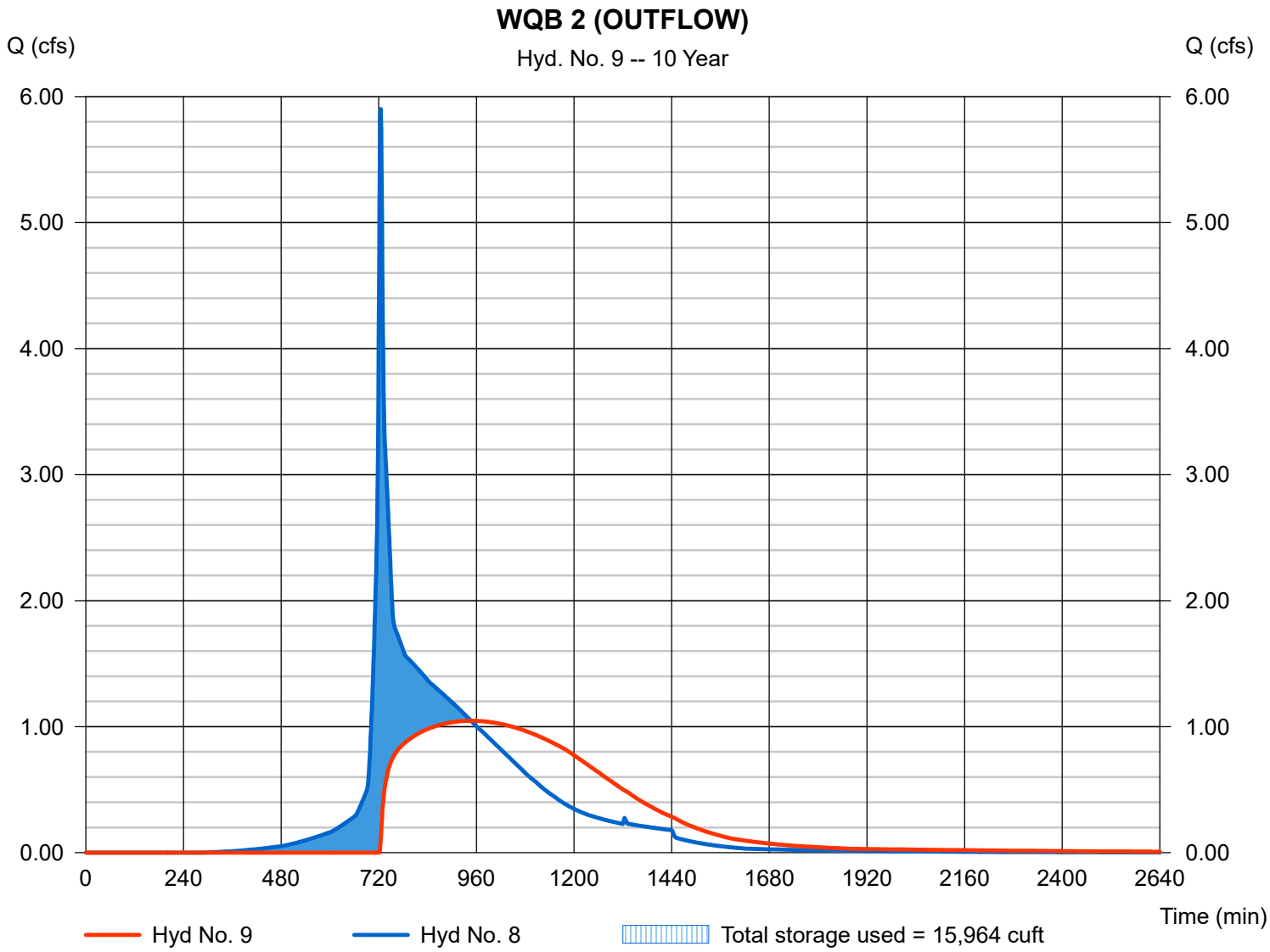
Hydrograph Report

Hyd. No. 9

WQB 2 (OUTFLOW)

Hydrograph type	=	Reservoir	Peak discharge	=	1.047 cfs
Storm frequency	=	10 yrs	Time to peak	=	947 min
Time interval	=	1 min	Hyd. volume	=	37,606 cuft
Inflow hyd. No.	=	8 - WQB 2 (TOTAL INFLOW)	Max. Elevation	=	160.48 ft
Reservoir name	=	WQB2	Max. Storage	=	15,964 cuft

Storage Indication method used.

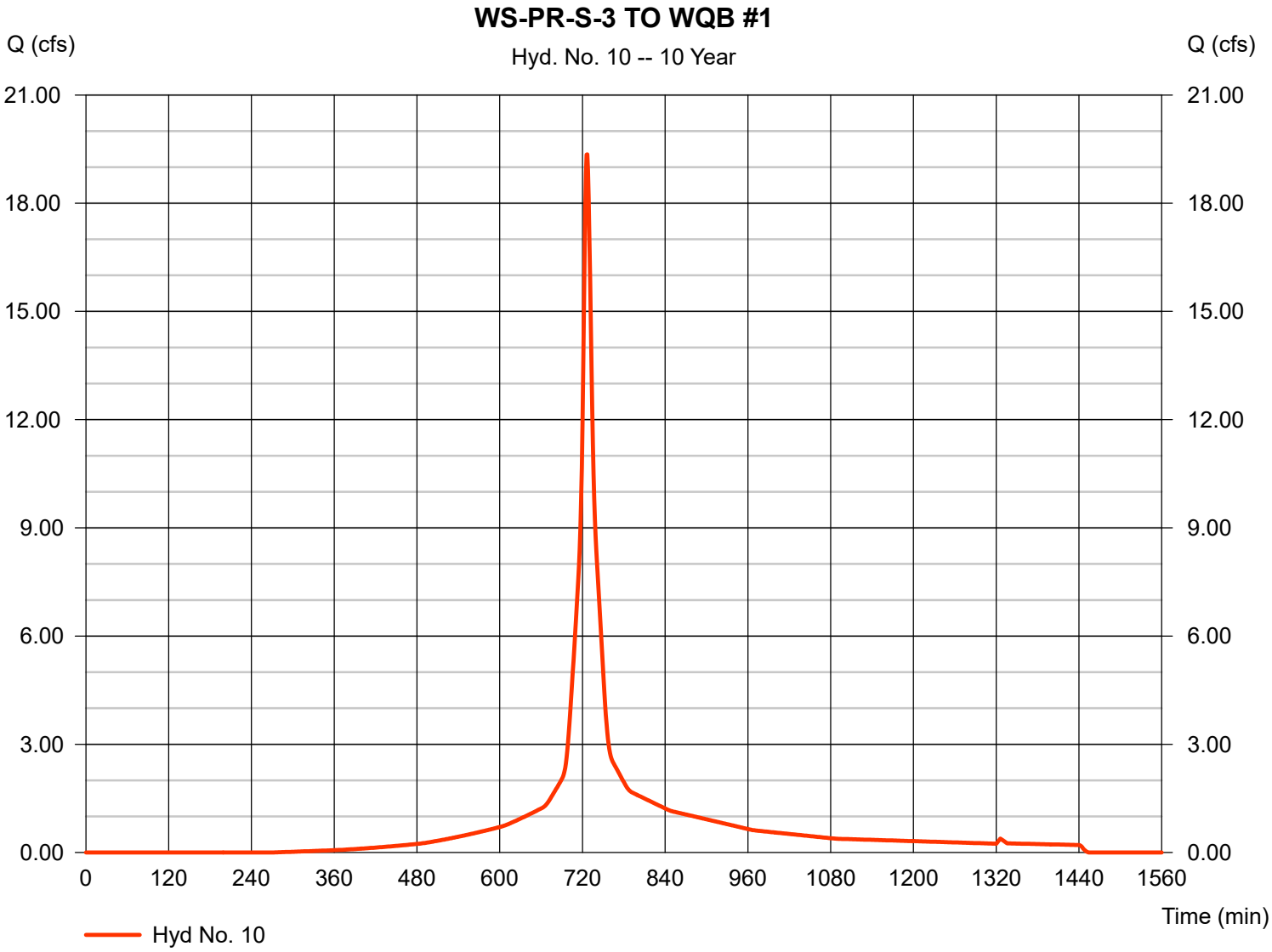


Hydrograph Report

Hyd. No. 10

WS-PR-S-3 TO WQB #1

Hydrograph type	=	SCS Runoff	Peak discharge	=	19.35 cfs
Storm frequency	=	10 yrs	Time to peak	=	727 min
Time interval	=	1 min	Hyd. volume	=	68,511 cuft
Drainage area	=	4.820 ac	Curve number	=	89
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	10.00 min
Total precip.	=	5.15 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484



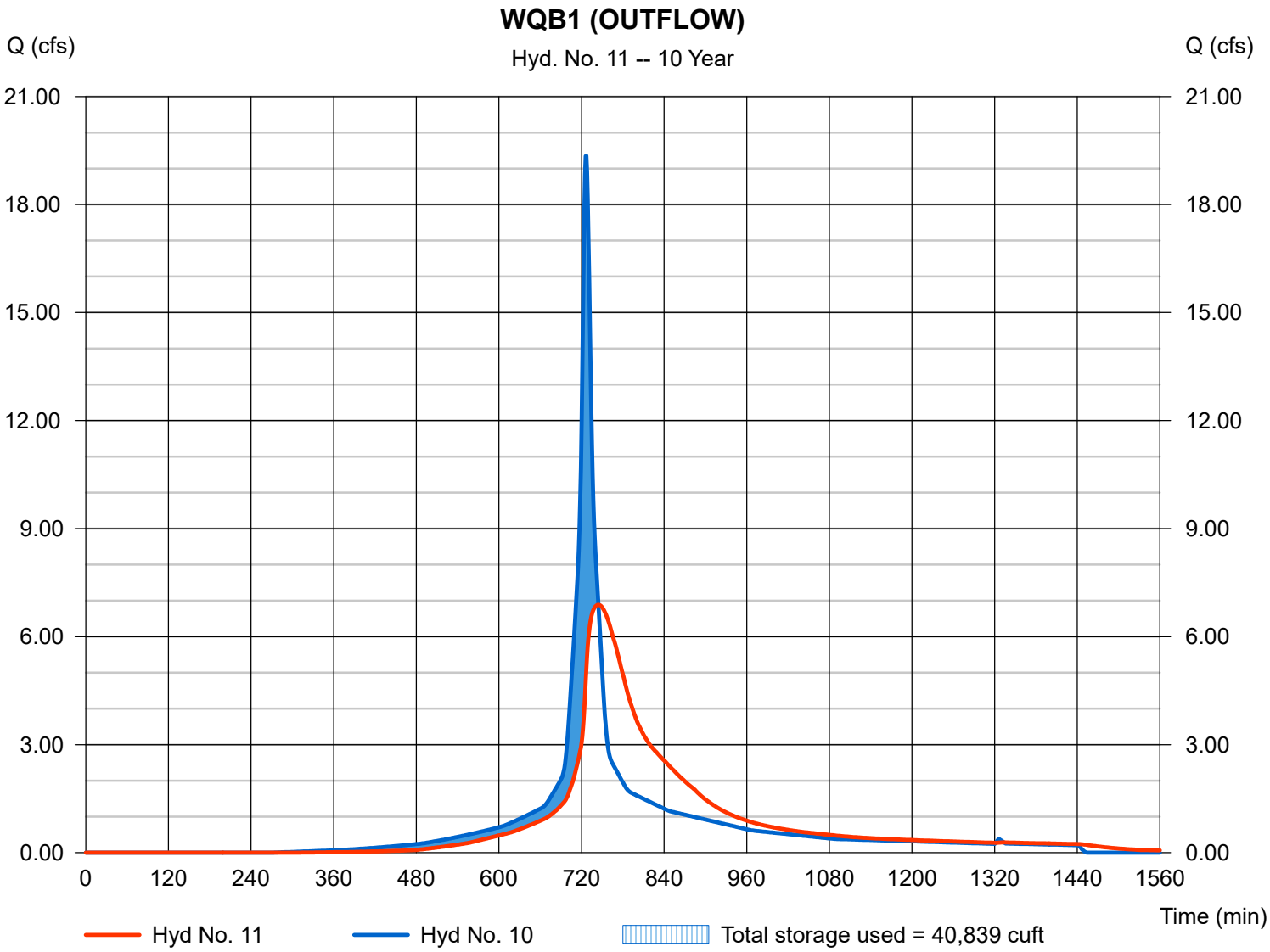
Hydrograph Report

Hyd. No. 11

WQB1 (OUTFLOW)

Hydrograph type	=	Reservoir	Peak discharge	=	6.885 cfs
Storm frequency	=	10 yrs	Time to peak	=	745 min
Time interval	=	1 min	Hyd. volume	=	68,499 cuft
Inflow hyd. No.	=	10 - WS-PR-S-3 TO WQB #1	Max. Elevation	=	151.19 ft
Reservoir name	=	WQB1	Max. Storage	=	40,839 cuft

Storage Indication method used. Wet pond routing start elevation = 149.00 ft.

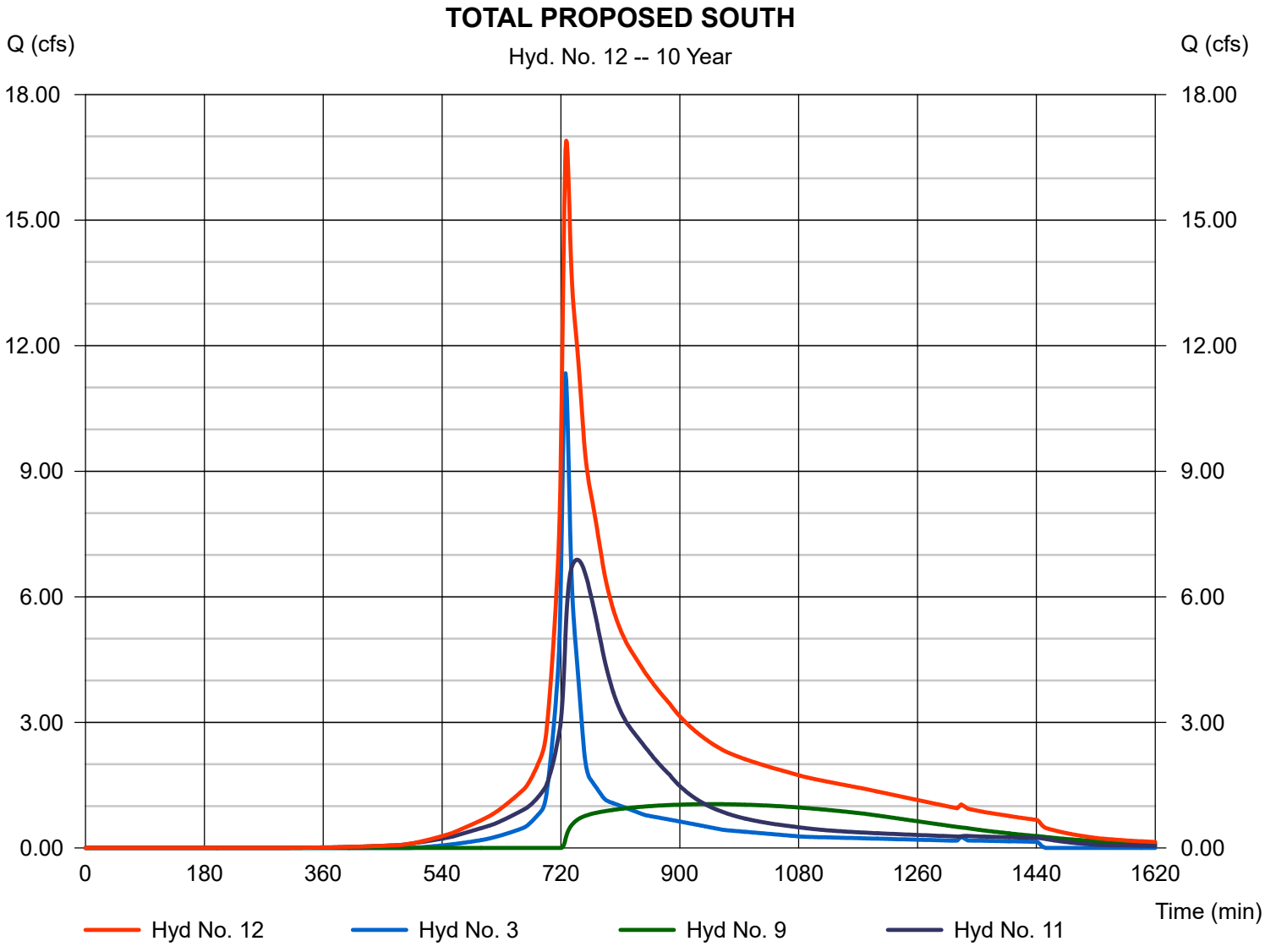


Hydrograph Report

Hyd. No. 12

TOTAL PROPOSED SOUTH

Hydrograph type	= Combine	Peak discharge	= 16.90 cfs
Storm frequency	= 10 yrs	Time to peak	= 728 min
Time interval	= 1 min	Hyd. volume	= 144,923 cuft
Inflow hyds.	= 3, 9, 11	Contrib. drain. area	= 3.890 ac



Hydrograph Summary Report

Hydraflow Hydrographs by Intelisolve v9.1

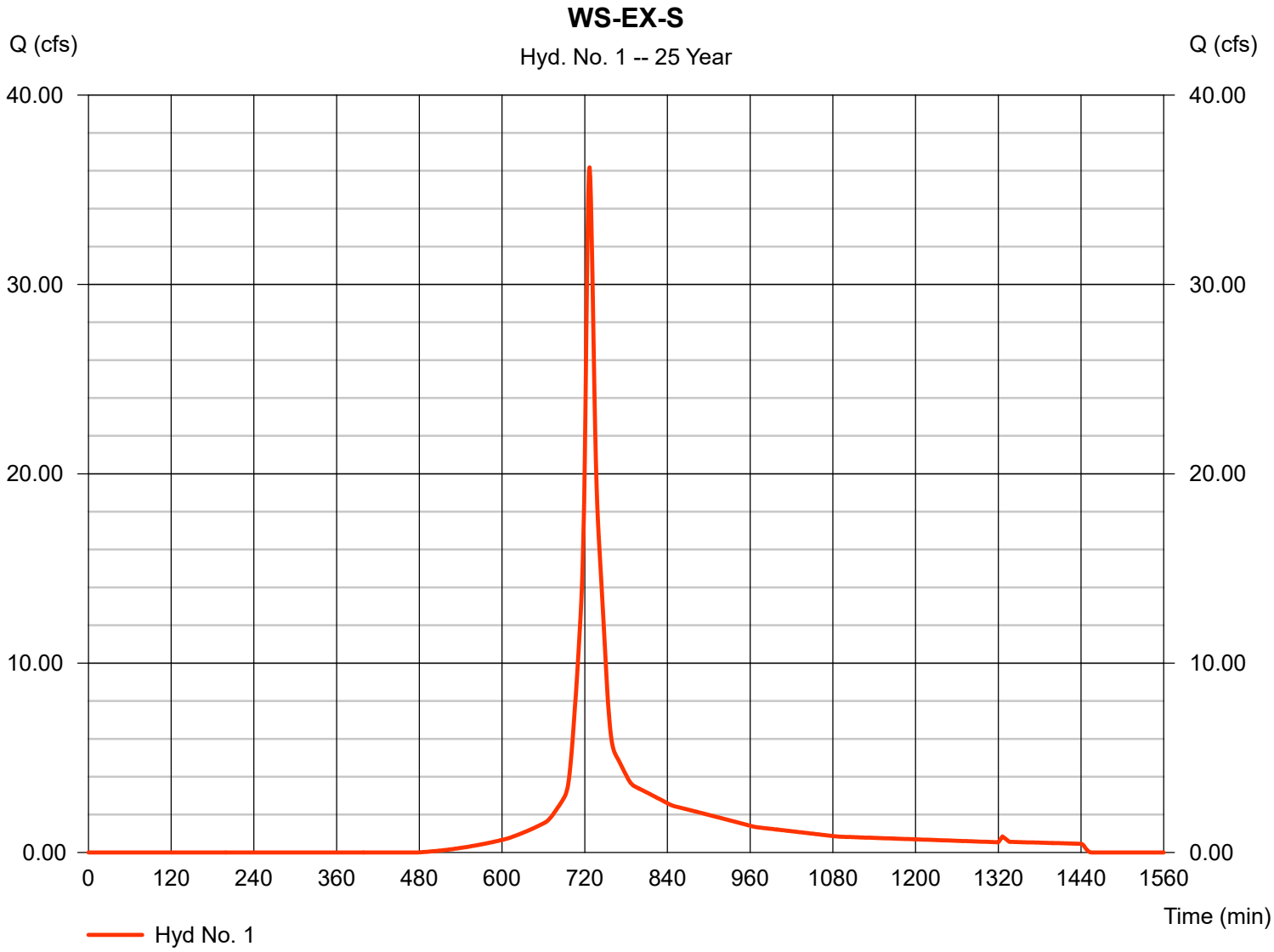
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph description
1	SCS Runoff	36.18	1	727	123,829	----	------	------	WS-EX-S
2	SCS Runoff	10.94	1	726	35,172	----	------	------	WS-EX-E
3	SCS Runoff	15.77	1	727	54,092	----	------	------	WS-PR-UNDET-S
4	SCS Runoff	1.996	1	725	6,166	----	------	------	WS-PR-UNDET-E (TOTAL PROP. EA
5	SCS Runoff	13.38	1	724	42,964	----	------	------	WS-PR-S-1 TO WQB #3
6	Reservoir	1.410	1	768	37,346	5	162.48	23,896	WQB 3 (OUTFLOW)
7	SCS Runoff	6.603	1	724	21,201	----	------	------	WS-PR-S-2 TO WQB #2
8	Combine	7.653	1	725	58,547	6, 7	------	------	WQB 2 (TOTAL INFLOW)
9	Reservoir	1.290	1	968	52,963	8	161.11	21,168	WQB 2 (OUTFLOW)
10	SCS Runoff	24.98	1	726	89,646	----	------	------	WS-PR-S-3 TO WQB #1
11	Reservoir	8.290	1	746	89,633	10	151.77	47,478	WQB1 (OUTFLOW)
12	Combine	23.06	1	728	196,688	3, 9, 11	------	------	TOTAL PROPOSED SOUTH

Hydrograph Report

Hyd. No. 1

WS-EX-S

Hydrograph type	=	SCS Runoff	Peak discharge	=	36.18 cfs
Storm frequency	=	25 yrs	Time to peak	=	727 min
Time interval	=	1 min	Hyd. volume	=	123,829 cuft
Drainage area	=	9.680 ac	Curve number	=	74
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	9.10 min
Total precip.	=	6.40 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

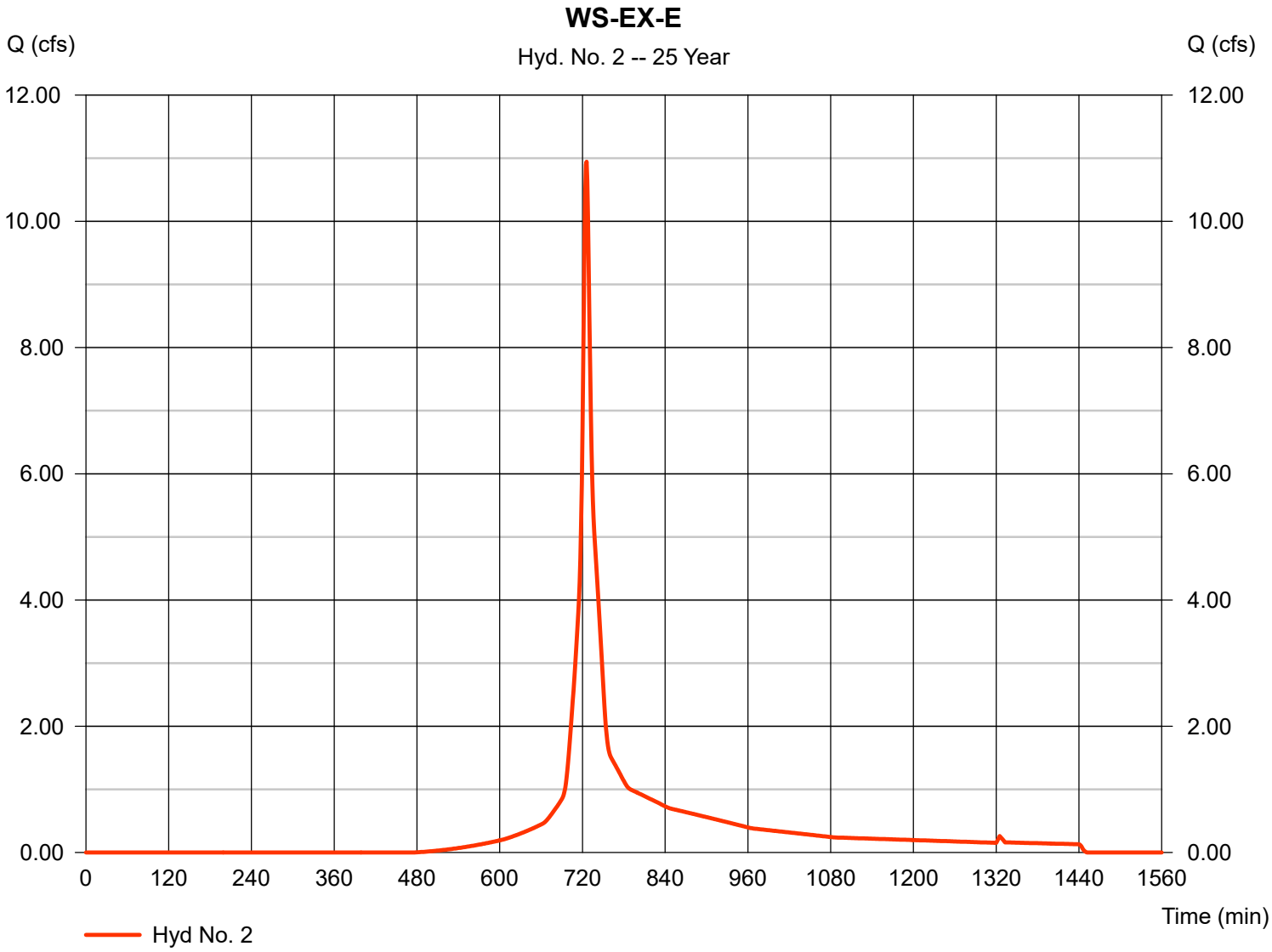


Hydrograph Report

Hyd. No. 2

WS-EX-E

Hydrograph type	=	SCS Runoff	Peak discharge	=	10.94 cfs
Storm frequency	=	25 yrs	Time to peak	=	726 min
Time interval	=	1 min	Hyd. volume	=	35,172 cuft
Drainage area	=	2.820 ac	Curve number	=	74
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	7.50 min
Total precip.	=	6.40 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

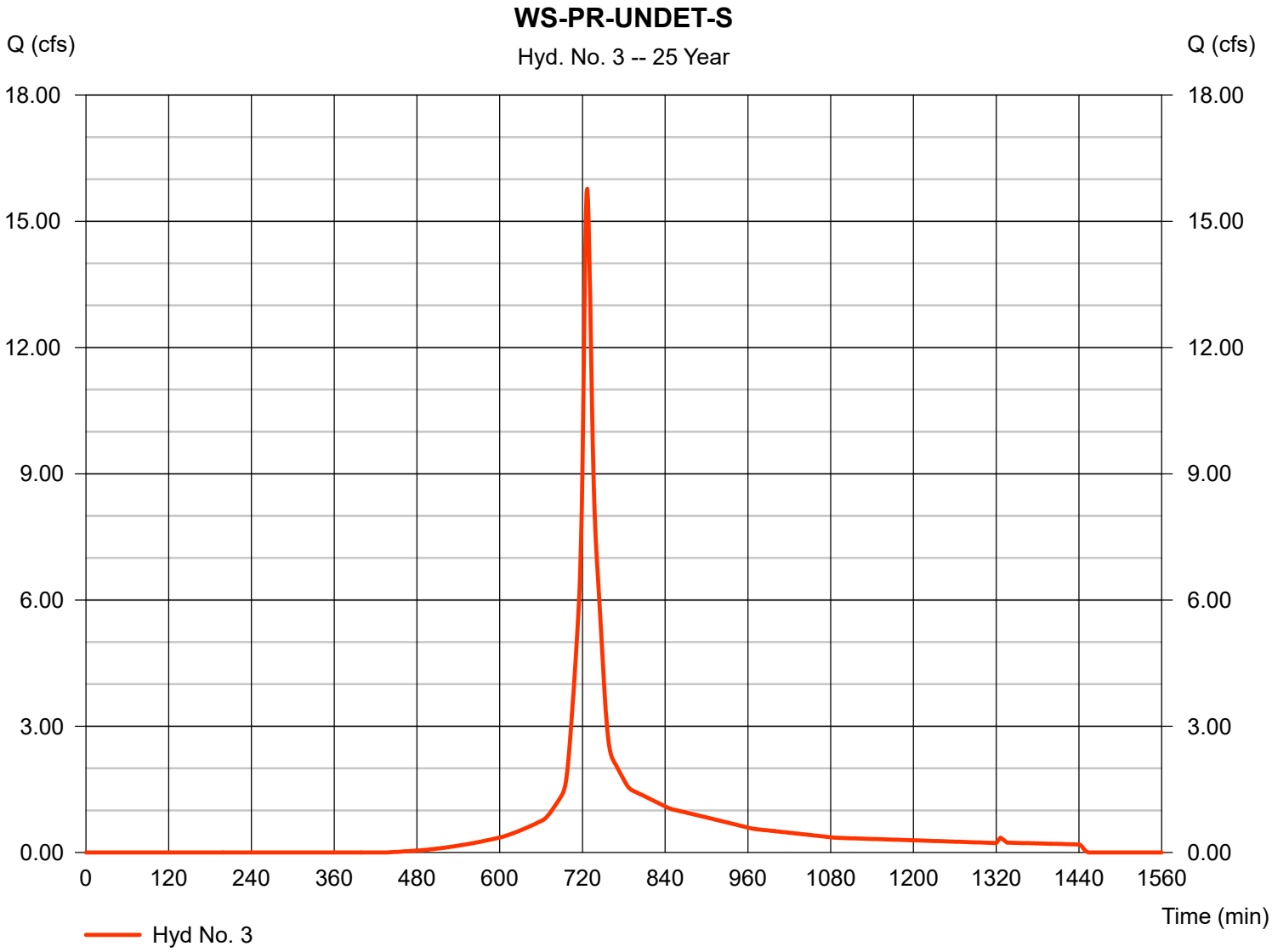


Hydrograph Report

Hyd. No. 3

WS-PR-UNDET-S

Hydrograph type	=	SCS Runoff	Peak discharge	=	15.77 cfs
Storm frequency	=	25 yrs	Time to peak	=	727 min
Time interval	=	1 min	Hyd. volume	=	54,092 cuft
Drainage area	=	3.890 ac	Curve number	=	77
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	10.00 min
Total precip.	=	6.40 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

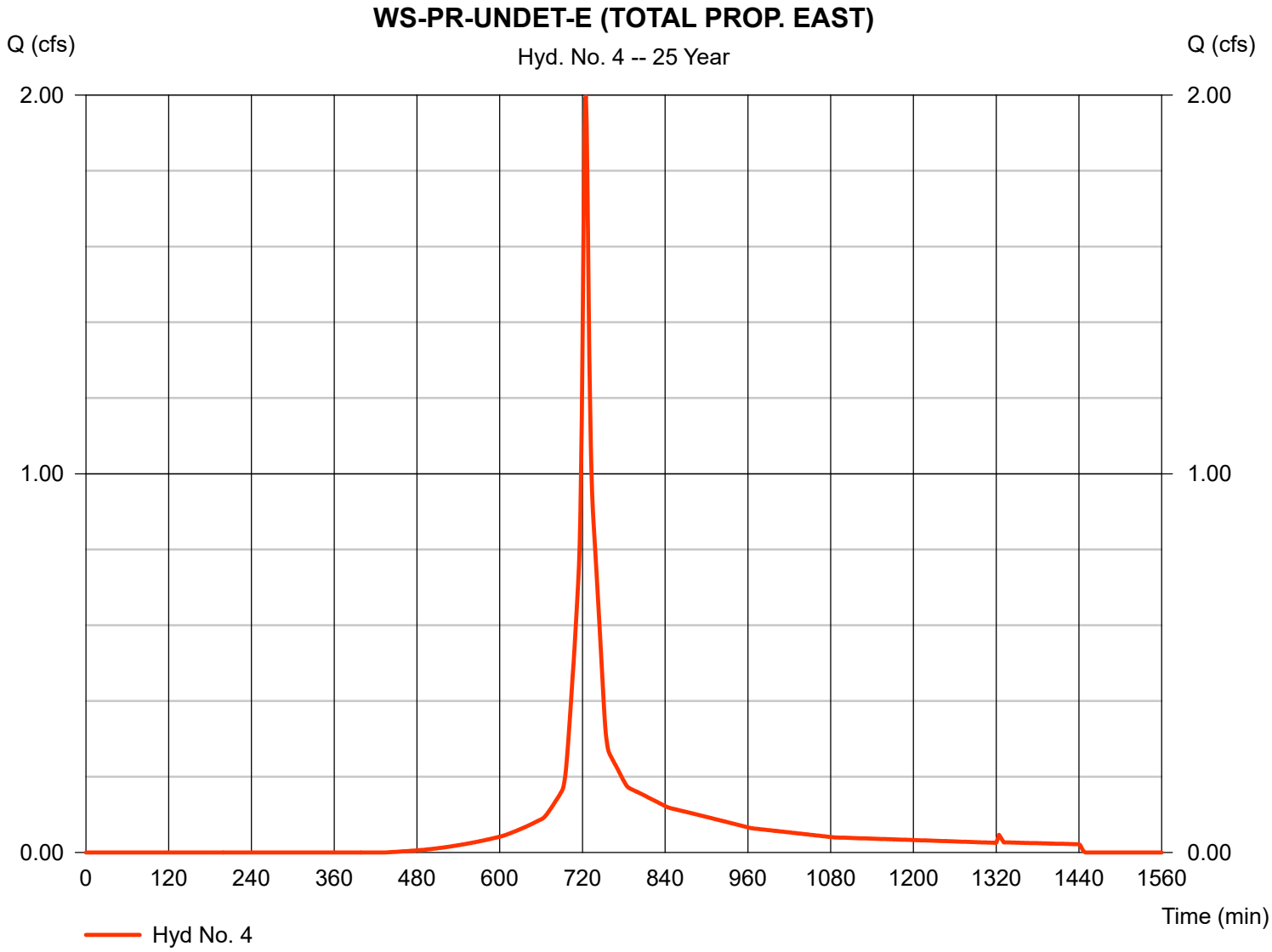


Hydrograph Report

Hyd. No. 4

WS-PR-UNDET-E (TOTAL PROP. EAST)

Hydrograph type	=	SCS Runoff	Peak discharge	=	1.996 cfs
Storm frequency	=	25 yrs	Time to peak	=	725 min
Time interval	=	1 min	Hyd. volume	=	6,166 cuft
Drainage area	=	0.430 ac	Curve number	=	77
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	5.00 min
Total precip.	=	6.40 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

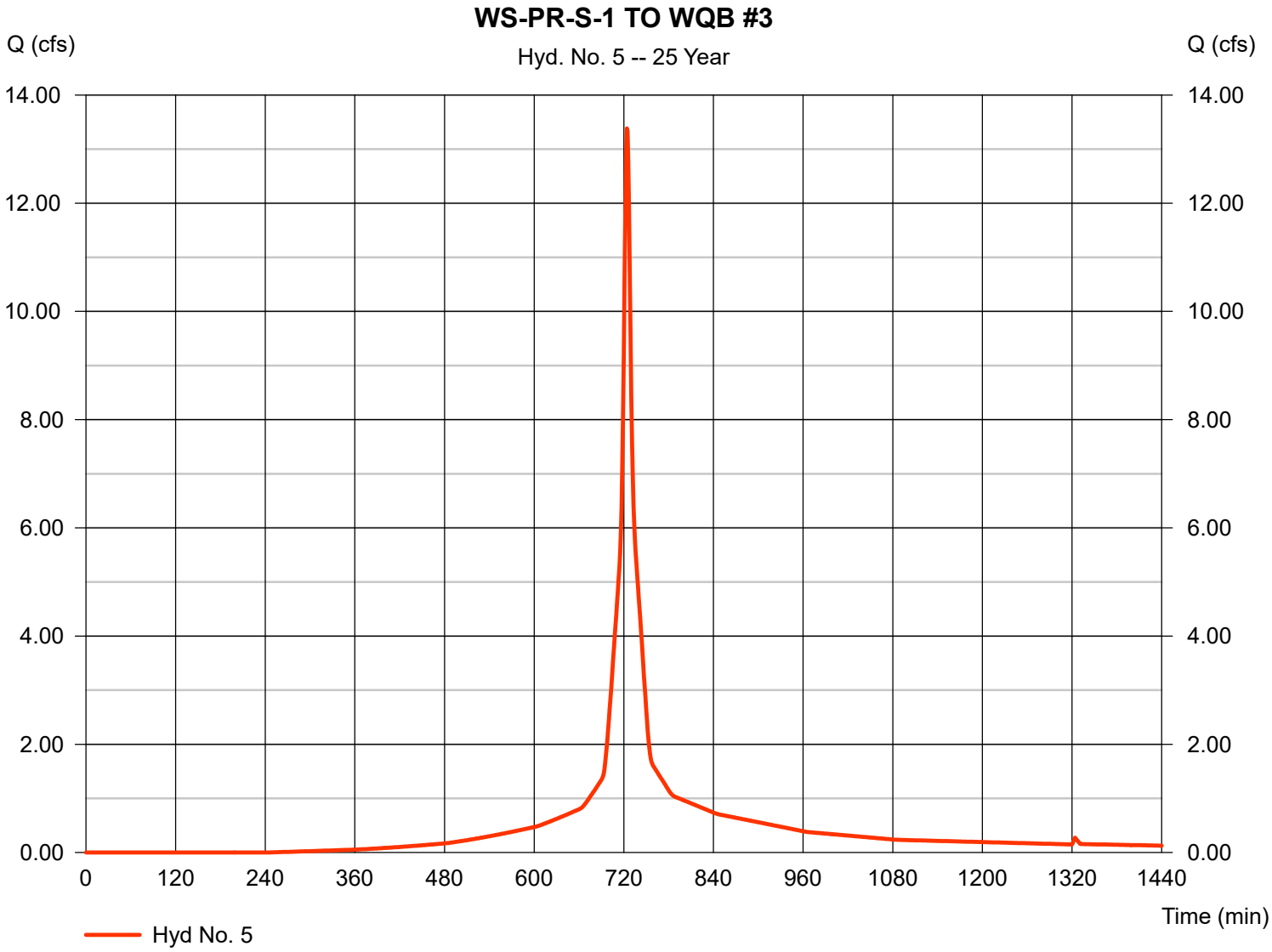


Hydrograph Report

Hyd. No. 5

WS-PR-S-1 TO WQB #3

Hydrograph type	=	SCS Runoff	Peak discharge	=	13.38 cfs
Storm frequency	=	25 yrs	Time to peak	=	724 min
Time interval	=	1 min	Hyd. volume	=	42,964 cuft
Drainage area	=	2.290 ac	Curve number	=	88
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	5.00 min
Total precip.	=	6.40 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484



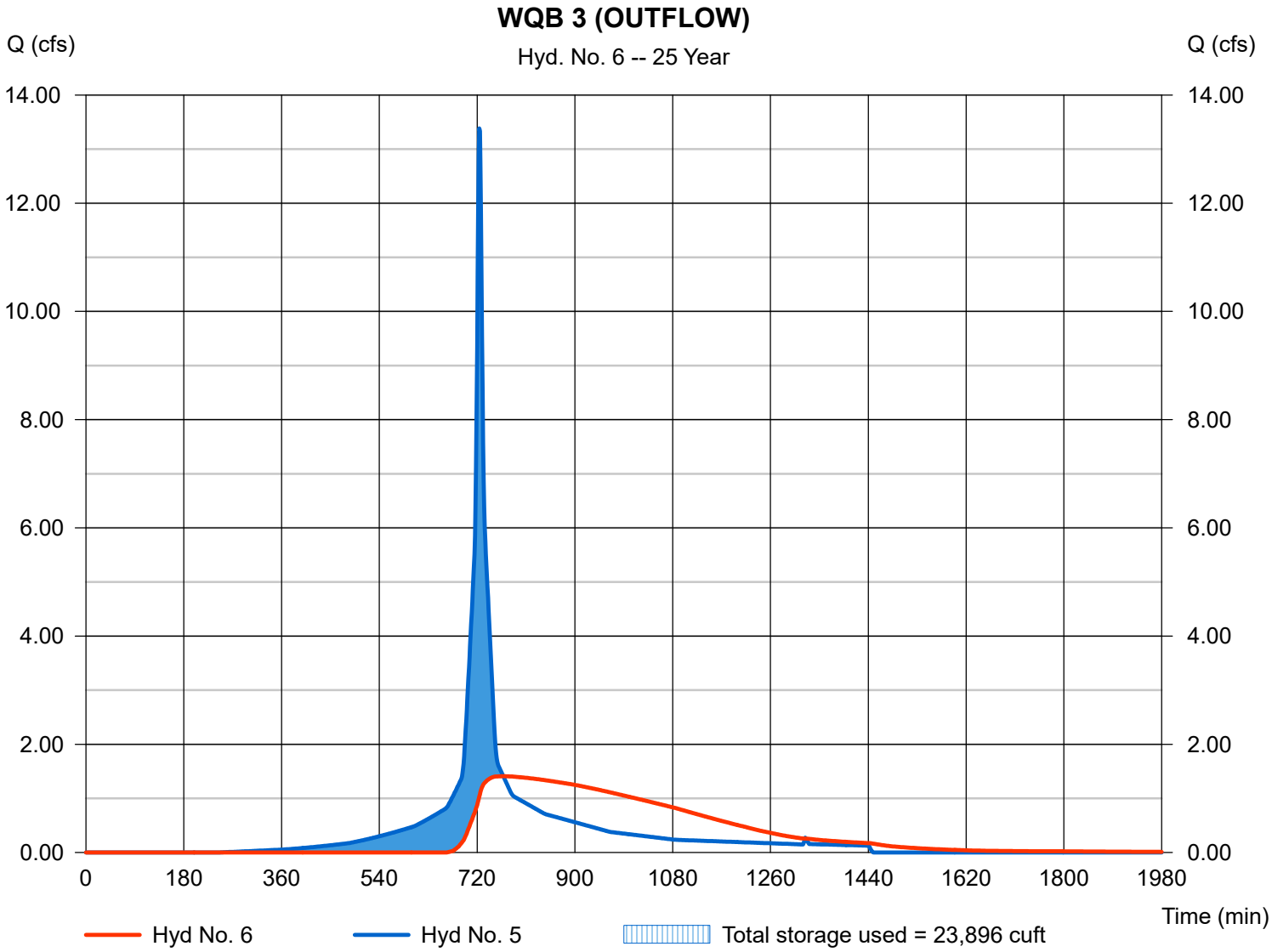
Hydrograph Report

Hyd. No. 6

WQB 3 (OUTFLOW)

Hydrograph type	=	Reservoir	Peak discharge	=	1.410 cfs
Storm frequency	=	25 yrs	Time to peak	=	768 min
Time interval	=	1 min	Hyd. volume	=	37,346 cuft
Inflow hyd. No.	=	5 - WS-PR-S-1 TO WQB #3	Max. Elevation	=	162.48 ft
Reservoir name	=	WQB3	Max. Storage	=	23,896 cuft

Storage Indication method used.

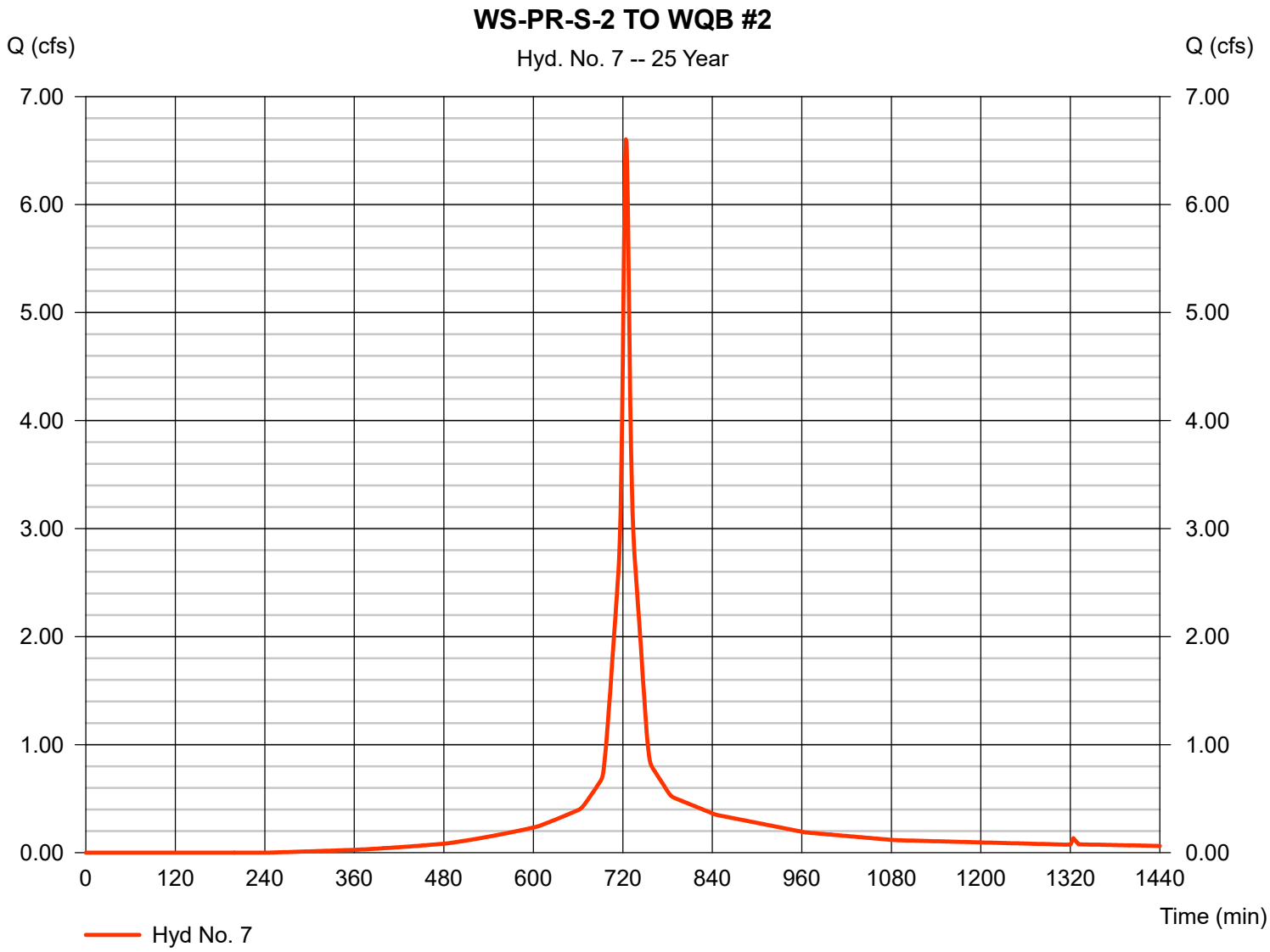


Hydrograph Report

Hyd. No. 7

WS-PR-S-2 TO WQB #2

Hydrograph type	=	SCS Runoff	Peak discharge	=	6.603 cfs
Storm frequency	=	25 yrs	Time to peak	=	724 min
Time interval	=	1 min	Hyd. volume	=	21,201 cuft
Drainage area	=	1.130 ac	Curve number	=	88
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	5.00 min
Total precip.	=	6.40 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

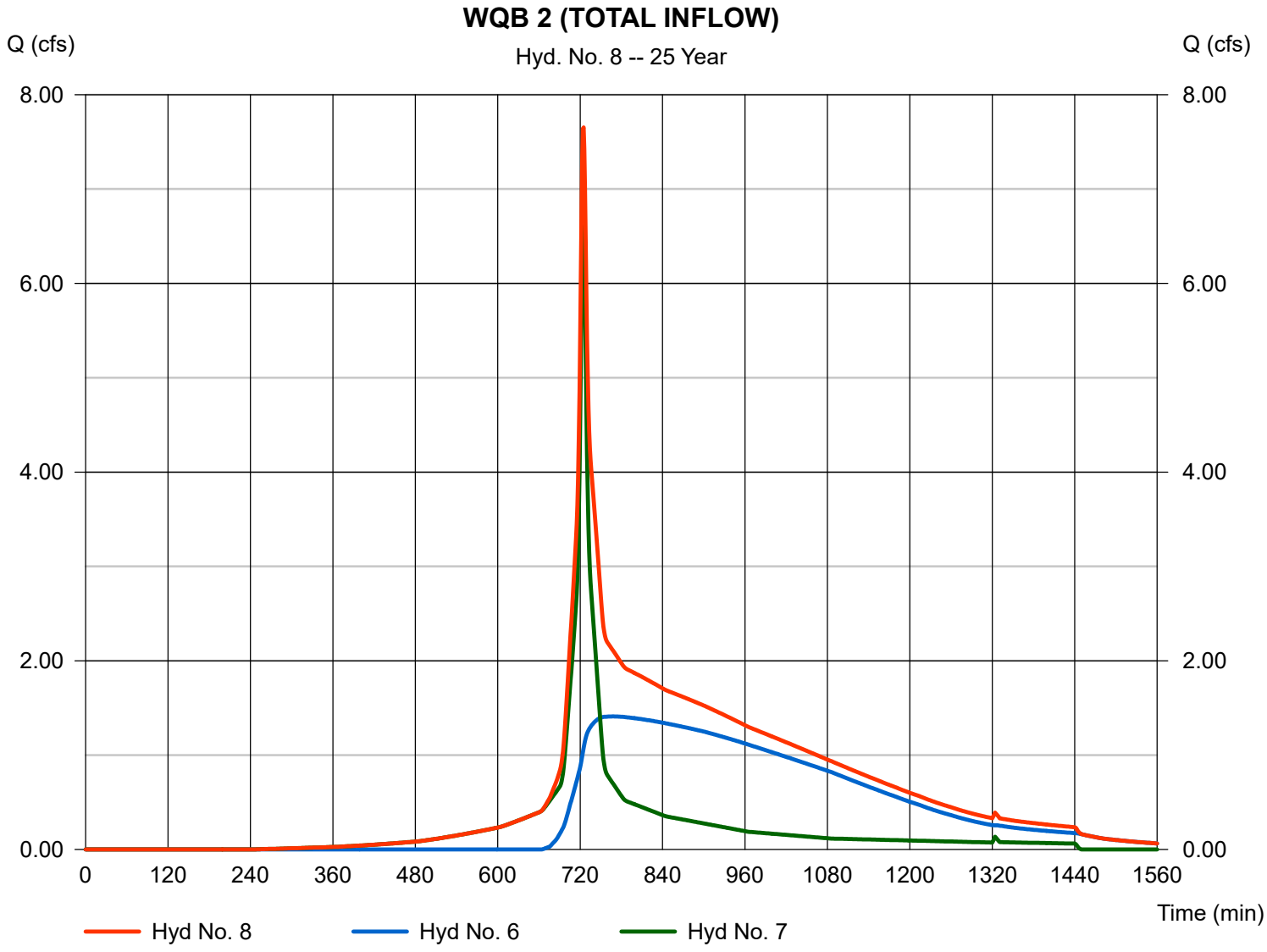


Hydrograph Report

Hyd. No. 8

WQB 2 (TOTAL INFLOW)

Hydrograph type	= Combine	Peak discharge	= 7.653 cfs
Storm frequency	= 25 yrs	Time to peak	= 725 min
Time interval	= 1 min	Hyd. volume	= 58,547 cuft
Inflow hyds.	= 6, 7	Contrib. drain. area	= 1.130 ac



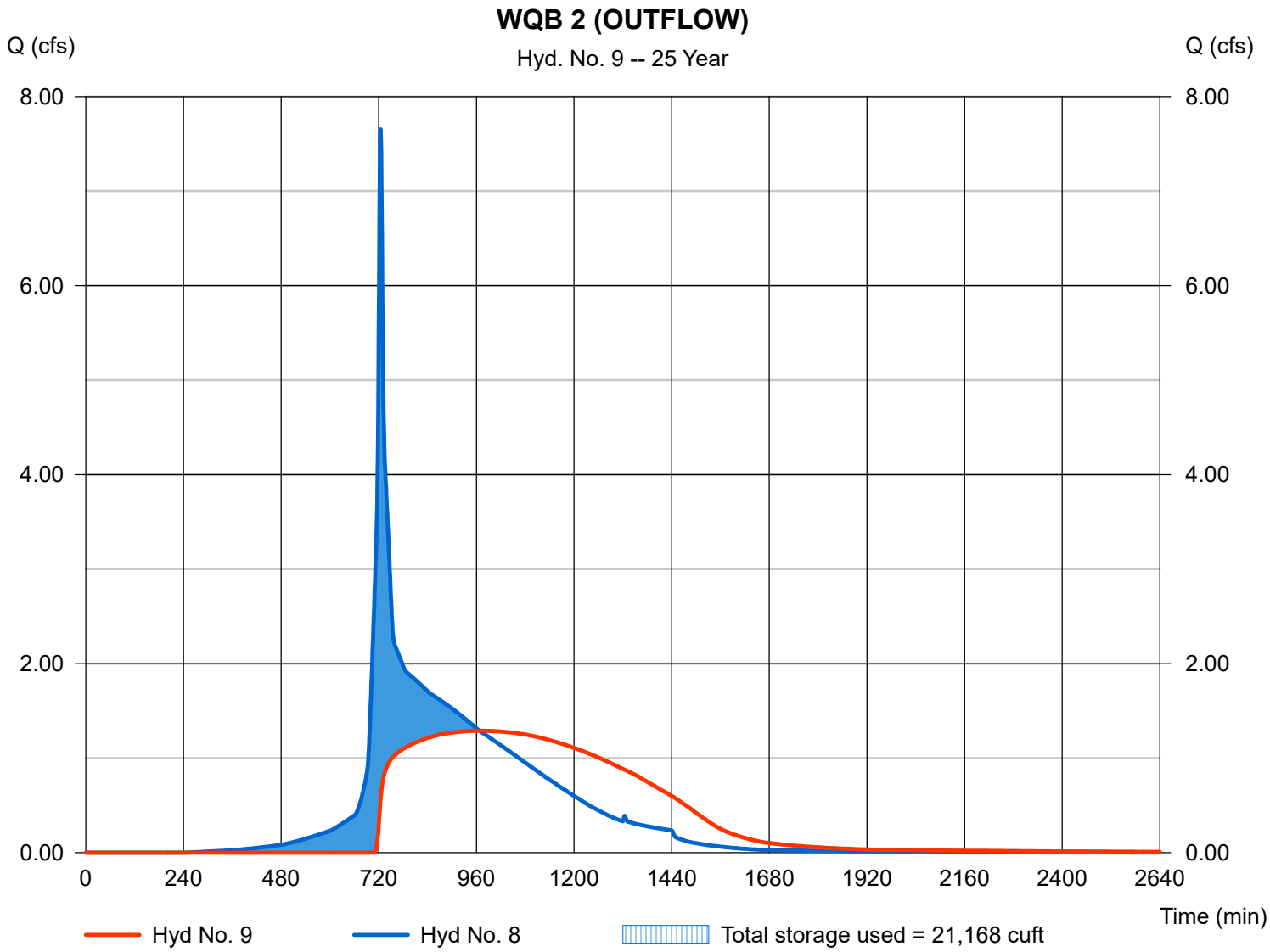
Hydrograph Report

Hyd. No. 9

WQB 2 (OUTFLOW)

Hydrograph type	=	Reservoir	Peak discharge	=	1.290 cfs
Storm frequency	=	25 yrs	Time to peak	=	968 min
Time interval	=	1 min	Hyd. volume	=	52,963 cuft
Inflow hyd. No.	=	8 - WQB 2 (TOTAL INFLOW)	Max. Elevation	=	161.11 ft
Reservoir name	=	WQB2	Max. Storage	=	21,168 cuft

Storage Indication method used.

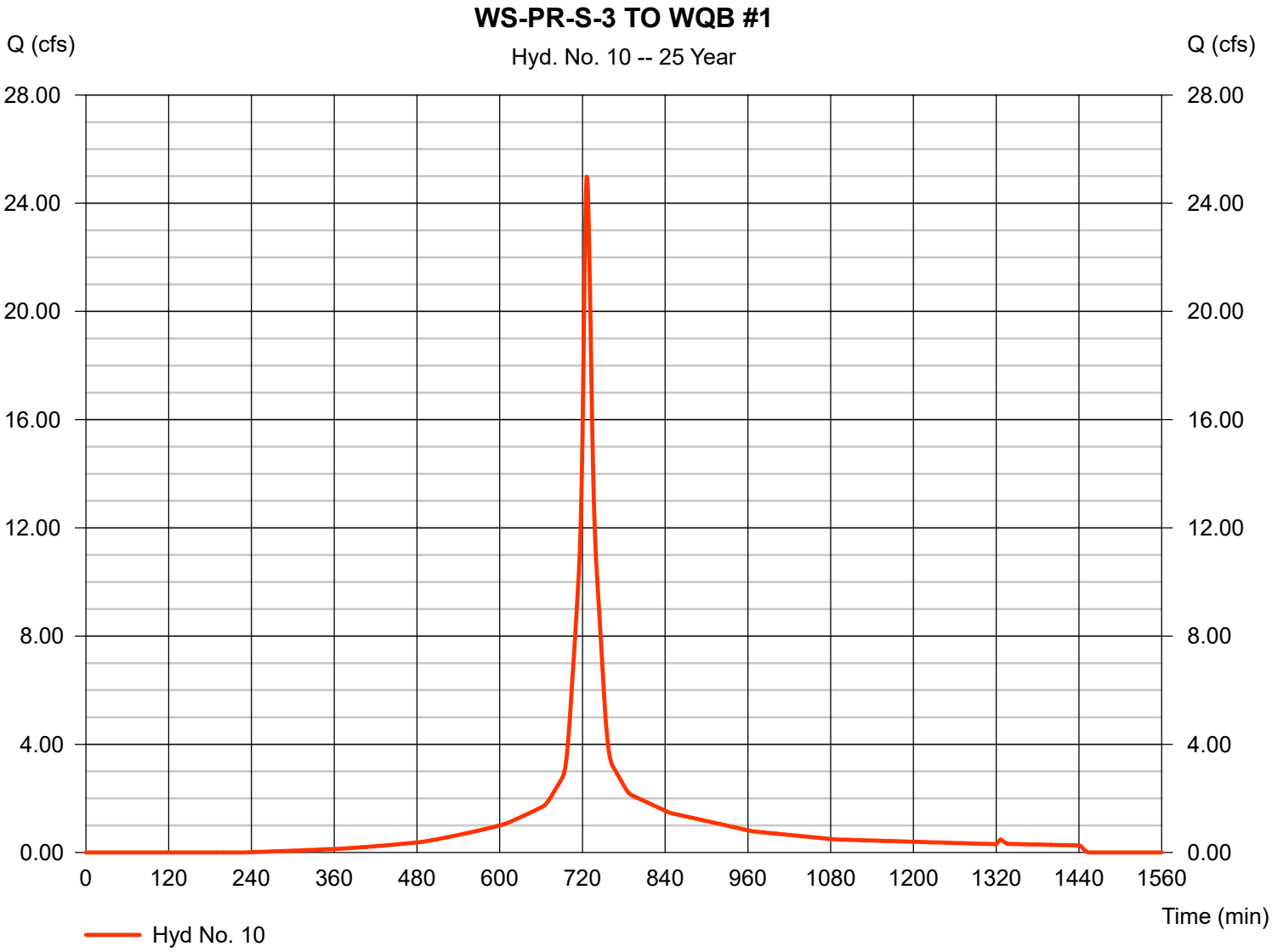


Hydrograph Report

Hyd. No. 10

WS-PR-S-3 TO WQB #1

Hydrograph type	=	SCS Runoff	Peak discharge	=	24.98 cfs
Storm frequency	=	25 yrs	Time to peak	=	726 min
Time interval	=	1 min	Hyd. volume	=	89,646 cuft
Drainage area	=	4.820 ac	Curve number	=	89
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	10.00 min
Total precip.	=	6.40 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484



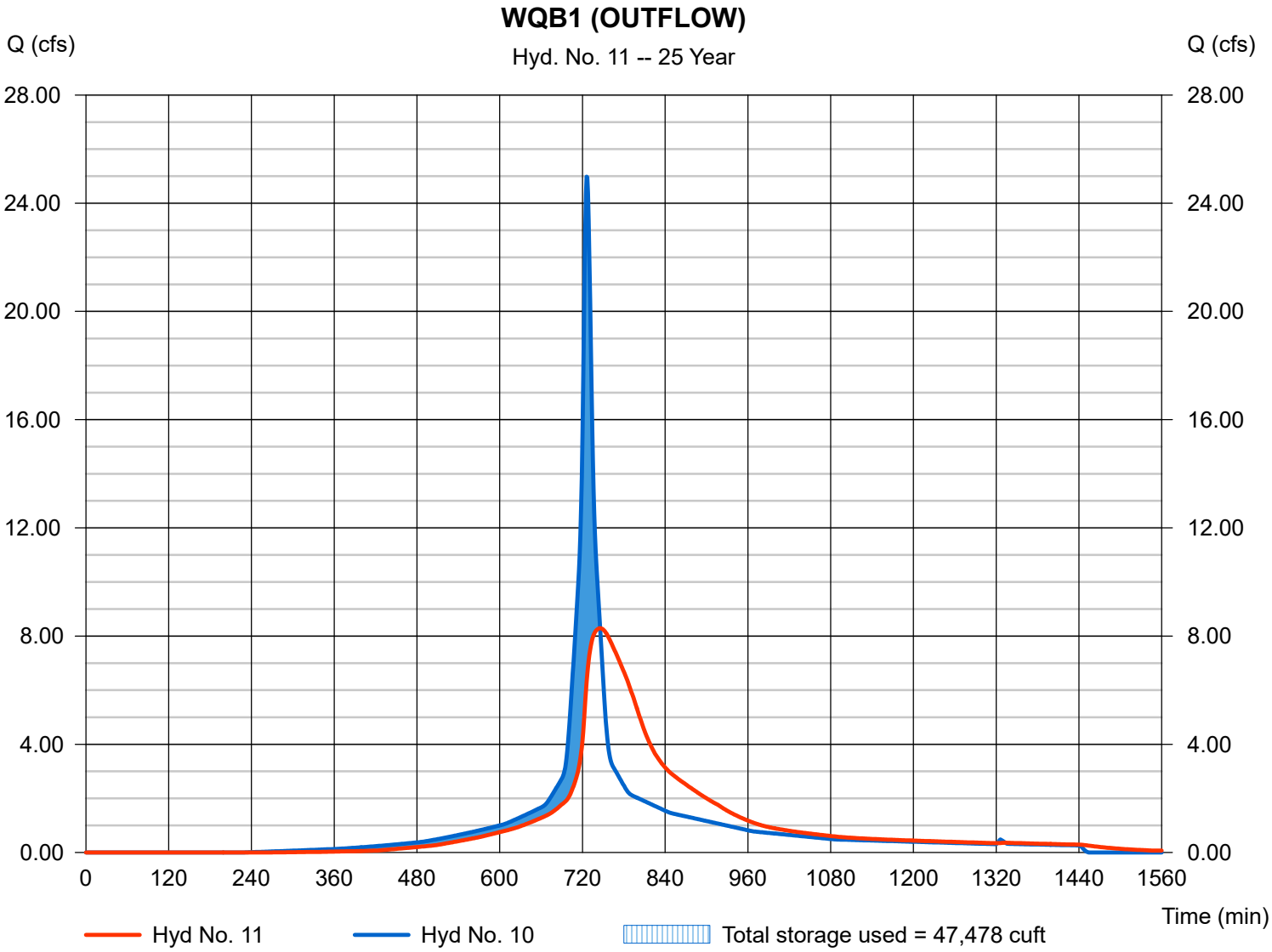
Hydrograph Report

Hyd. No. 11

WQB1 (OUTFLOW)

Hydrograph type	=	Reservoir	Peak discharge	=	8.290 cfs
Storm frequency	=	25 yrs	Time to peak	=	746 min
Time interval	=	1 min	Hyd. volume	=	89,633 cuft
Inflow hyd. No.	=	10 - WS-PR-S-3 TO WQB #1	Max. Elevation	=	151.77 ft
Reservoir name	=	WQB1	Max. Storage	=	47,478 cuft

Storage Indication method used. Wet pond routing start elevation = 149.00 ft.

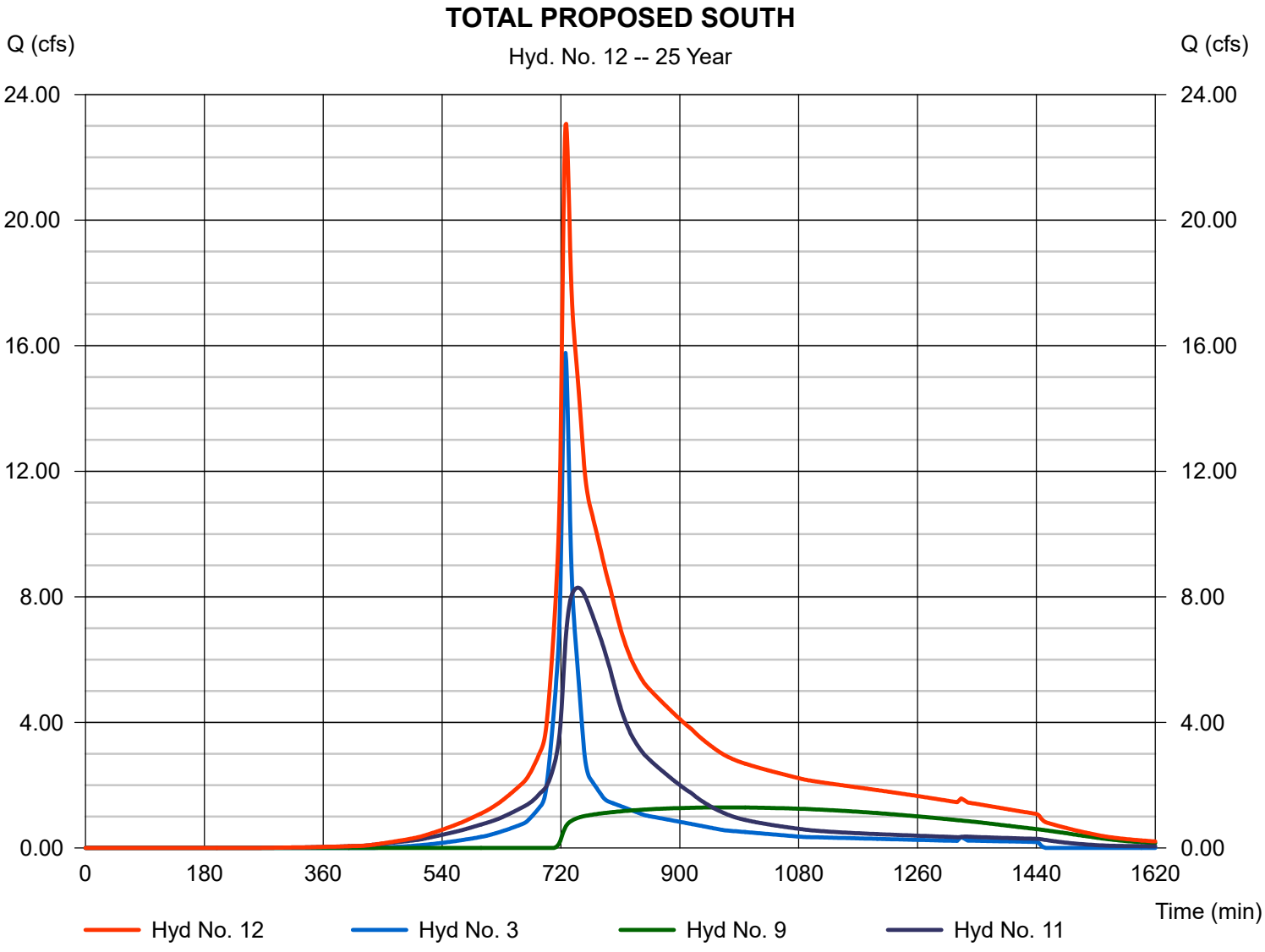


Hydrograph Report

Hyd. No. 12

TOTAL PROPOSED SOUTH

Hydrograph type	=	Combine	Peak discharge	=	23.06 cfs
Storm frequency	=	25 yrs	Time to peak	=	728 min
Time interval	=	1 min	Hyd. volume	=	196,688 cuft
Inflow hyds.	=	3, 9, 11	Contrib. drain. area	=	3.890 ac



Hydrograph Summary Report

Hydraflow Hydrographs by Intelisolve v9.1

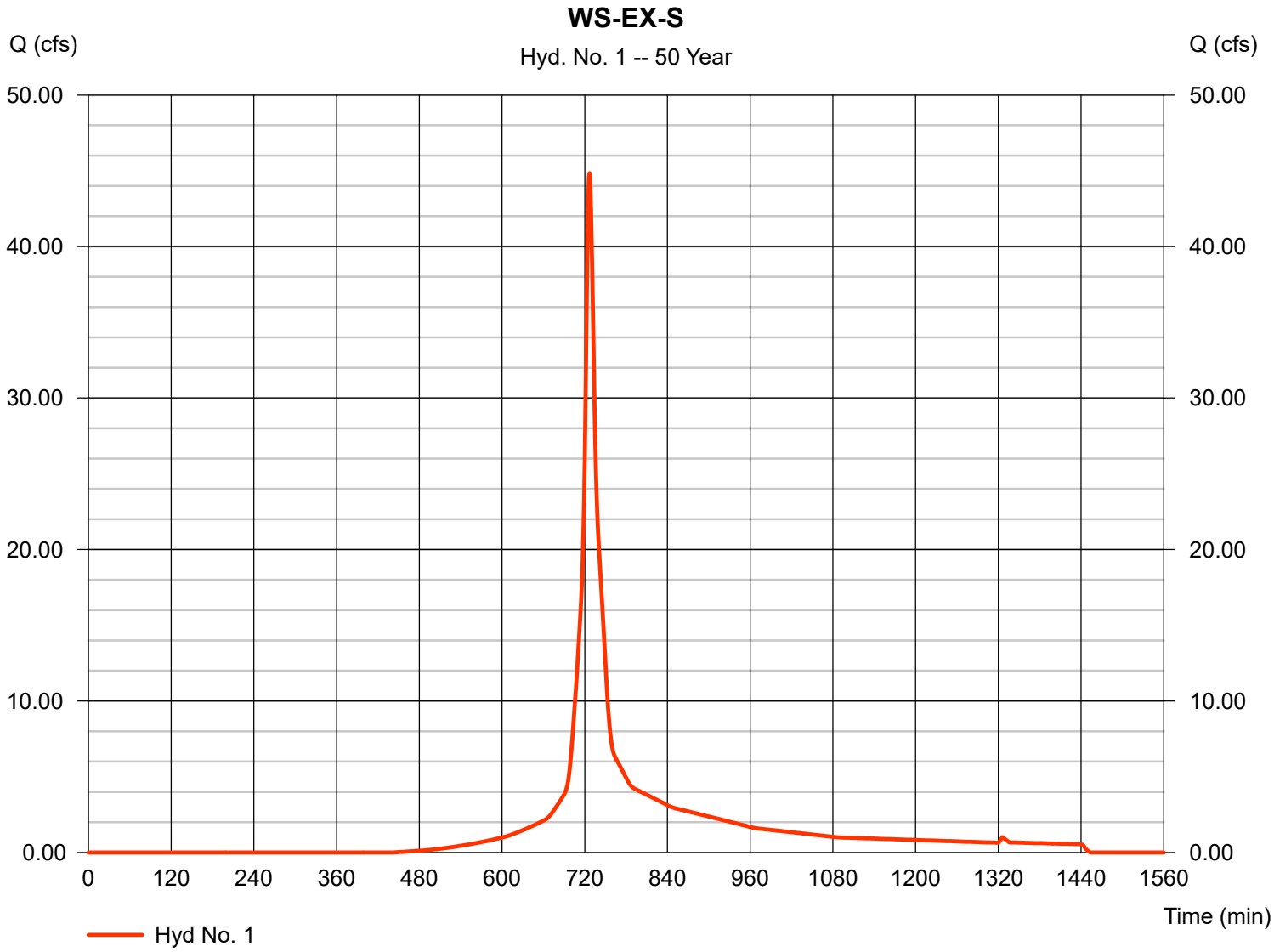
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph description
1	SCS Runoff	44.85	1	727	153,736	----	------	------	WS-EX-S
2	SCS Runoff	13.56	1	726	43,667	----	------	------	WS-EX-E
3	SCS Runoff	19.31	1	727	66,492	----	------	------	WS-PR-UNDET-S
4	SCS Runoff	2.442	1	725	7,580	----	------	------	WS-PR-UNDET-E (TOTAL PROP. EA
5	SCS Runoff	15.78	1	724	51,119	----	------	------	WS-PR-S-1 TO WQB #3
6	Reservoir	1.567	1	771	45,501	5	163.00	28,432	WQB 3 (OUTFLOW)
7	SCS Runoff	7.784	1	724	25,225	----	------	------	WS-PR-S-2 TO WQB #2
8	Combine	8.978	1	725	70,725	6, 7	------	------	WQB 2 (TOTAL INFLOW)
9	Reservoir	1.441	1	991	65,133	8	161.58	25,477	WQB 2 (OUTFLOW)
10	SCS Runoff	29.37	1	726	106,369	----	------	------	WS-PR-S-3 TO WQB #1
11	Reservoir	9.190	1	747	106,356	10	152.22	52,963	WQB1 (OUTFLOW)
12	Combine	27.62	1	727	237,981	3, 9, 11	------	------	TOTAL PROPOSED SOUTH

Hydrograph Report

Hyd. No. 1

WS-EX-S

Hydrograph type	=	SCS Runoff	Peak discharge	=	44.85 cfs
Storm frequency	=	50 yrs	Time to peak	=	727 min
Time interval	=	1 min	Hyd. volume	=	153,736 cuft
Drainage area	=	9.680 ac	Curve number	=	74
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	9.10 min
Total precip.	=	7.38 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

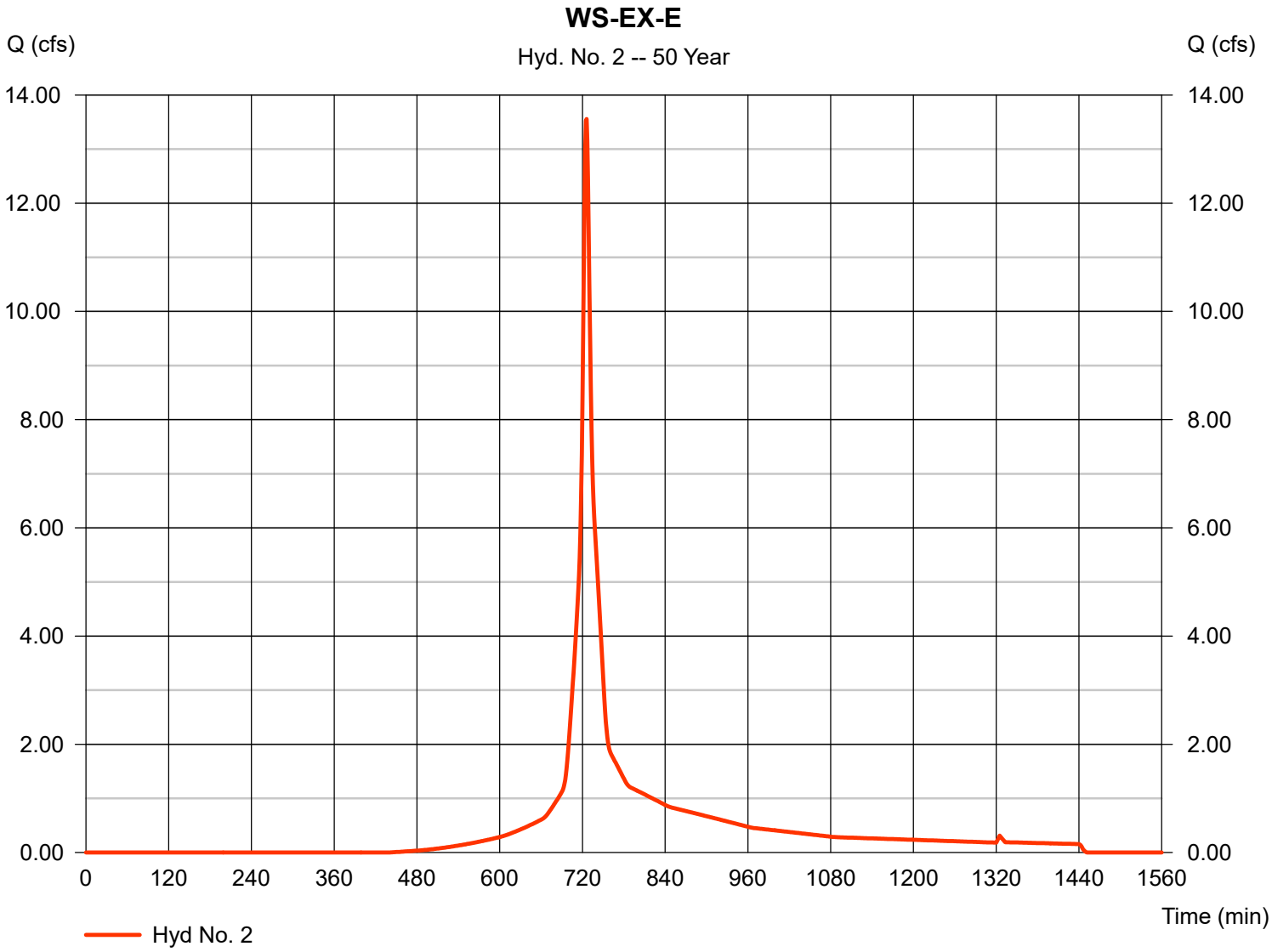


Hydrograph Report

Hyd. No. 2

WS-EX-E

Hydrograph type	=	SCS Runoff	Peak discharge	=	13.56 cfs
Storm frequency	=	50 yrs	Time to peak	=	726 min
Time interval	=	1 min	Hyd. volume	=	43,667 cuft
Drainage area	=	2.820 ac	Curve number	=	74
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	7.50 min
Total precip.	=	7.38 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

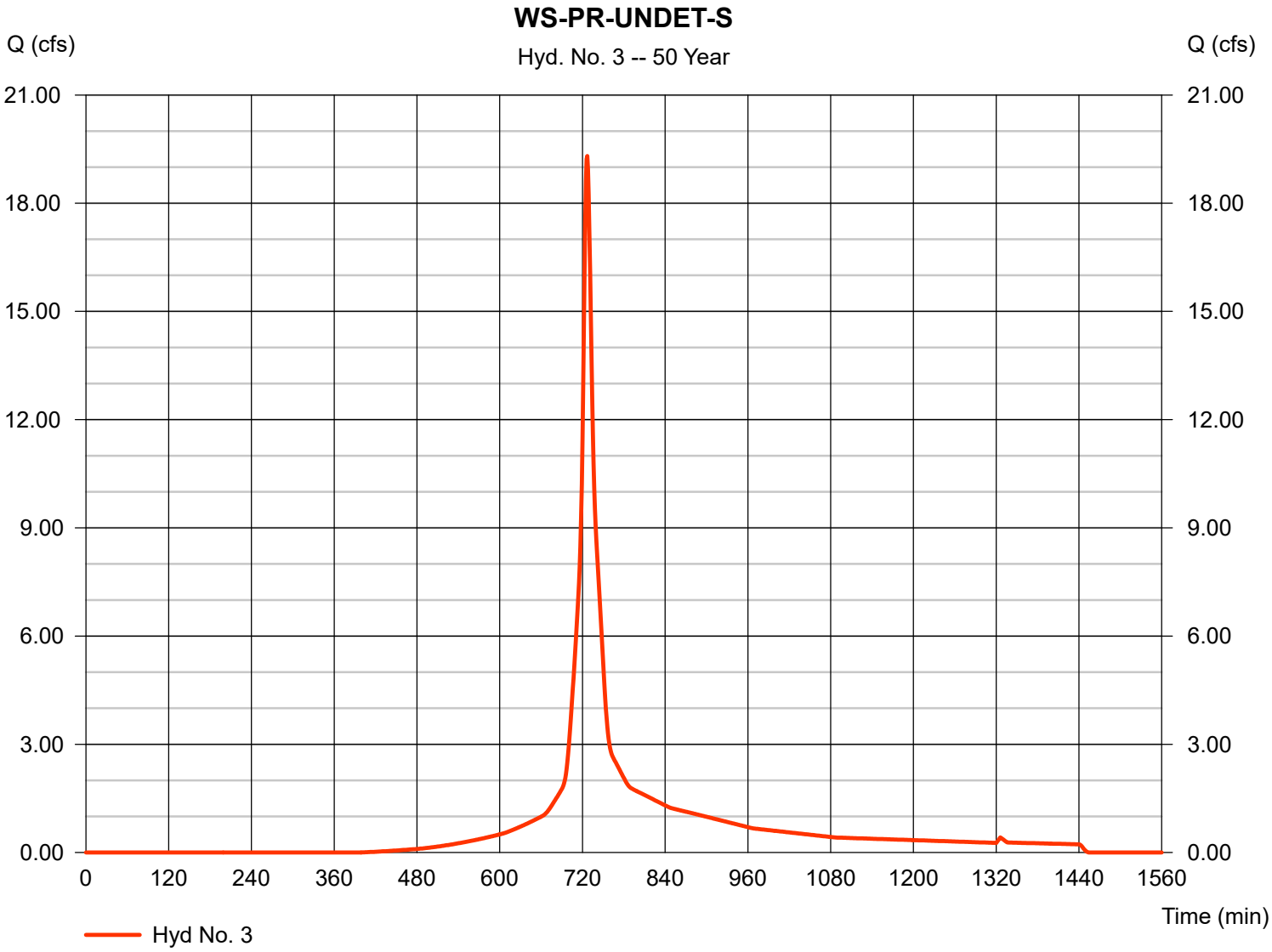


Hydrograph Report

Hyd. No. 3

WS-PR-UNDET-S

Hydrograph type	=	SCS Runoff	Peak discharge	=	19.31 cfs
Storm frequency	=	50 yrs	Time to peak	=	727 min
Time interval	=	1 min	Hyd. volume	=	66,492 cuft
Drainage area	=	3.890 ac	Curve number	=	77
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	10.00 min
Total precip.	=	7.38 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

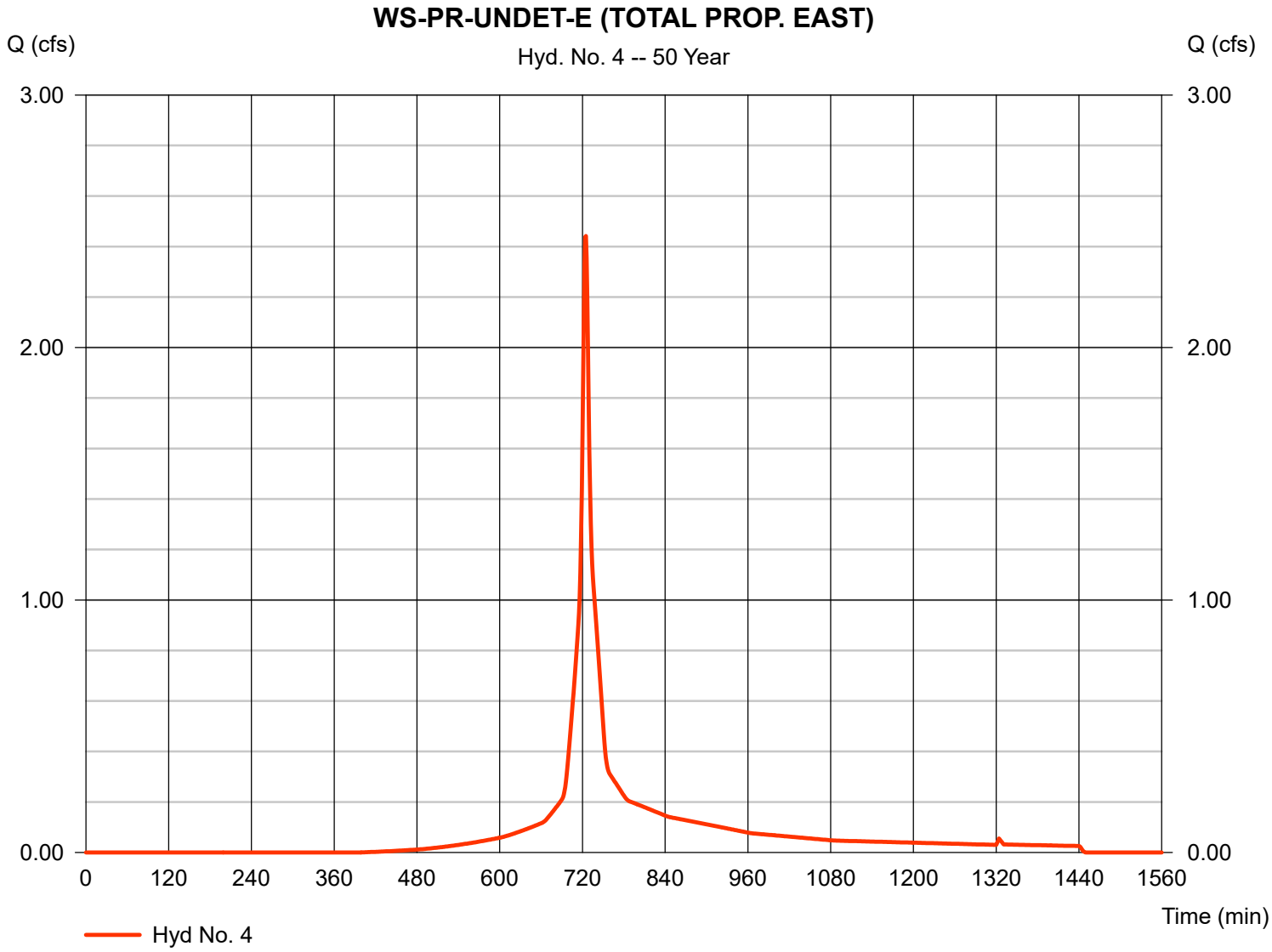


Hydrograph Report

Hyd. No. 4

WS-PR-UNDET-E (TOTAL PROP. EAST)

Hydrograph type	=	SCS Runoff	Peak discharge	=	2.442 cfs
Storm frequency	=	50 yrs	Time to peak	=	725 min
Time interval	=	1 min	Hyd. volume	=	7,580 cuft
Drainage area	=	0.430 ac	Curve number	=	77
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	5.00 min
Total precip.	=	7.38 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

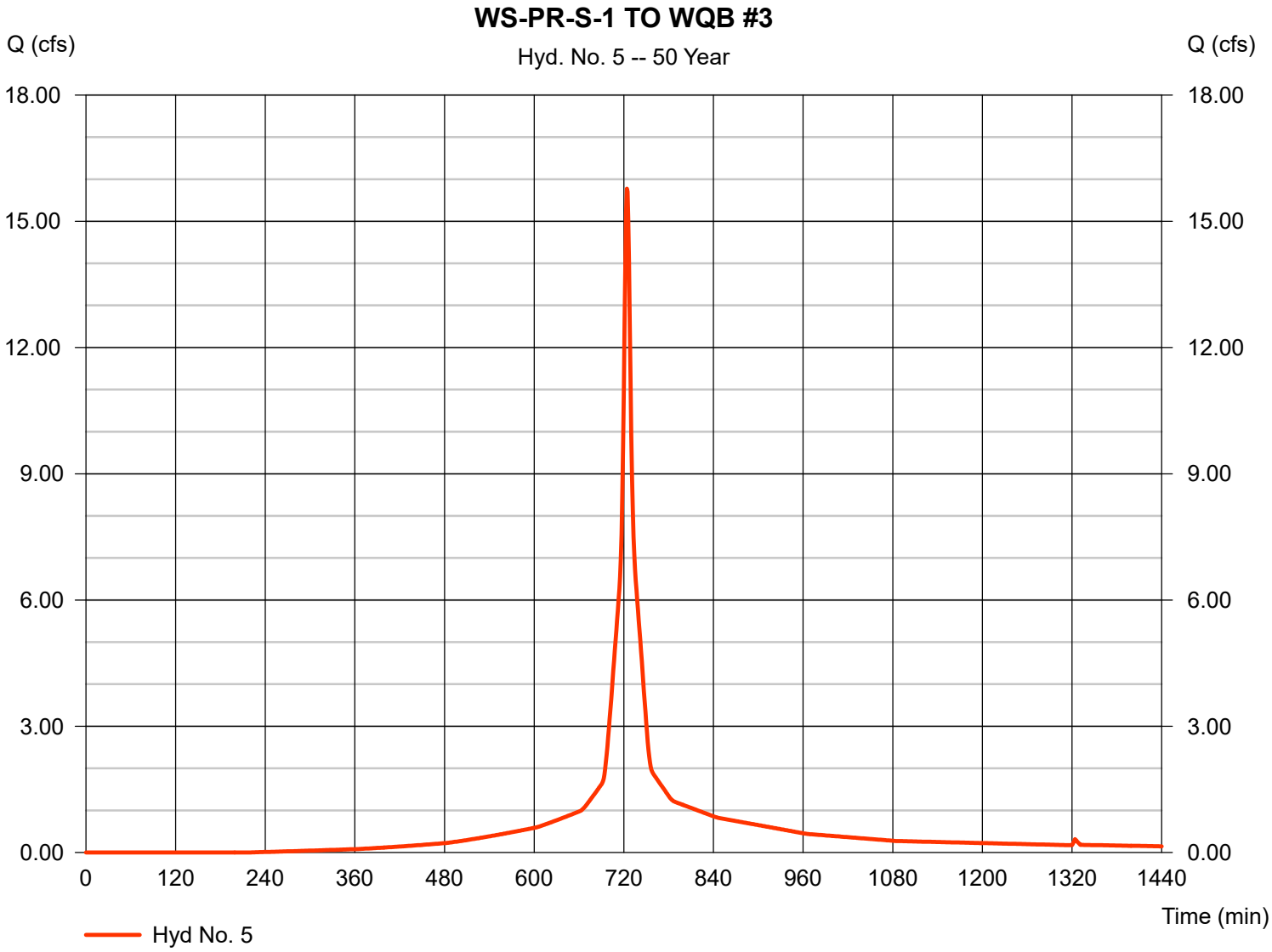


Hydrograph Report

Hyd. No. 5

WS-PR-S-1 TO WQB #3

Hydrograph type	= SCS Runoff	Peak discharge	= 15.78 cfs
Storm frequency	= 50 yrs	Time to peak	= 724 min
Time interval	= 1 min	Hyd. volume	= 51,119 cuft
Drainage area	= 2.290 ac	Curve number	= 88
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 5.00 min
Total precip.	= 7.38 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



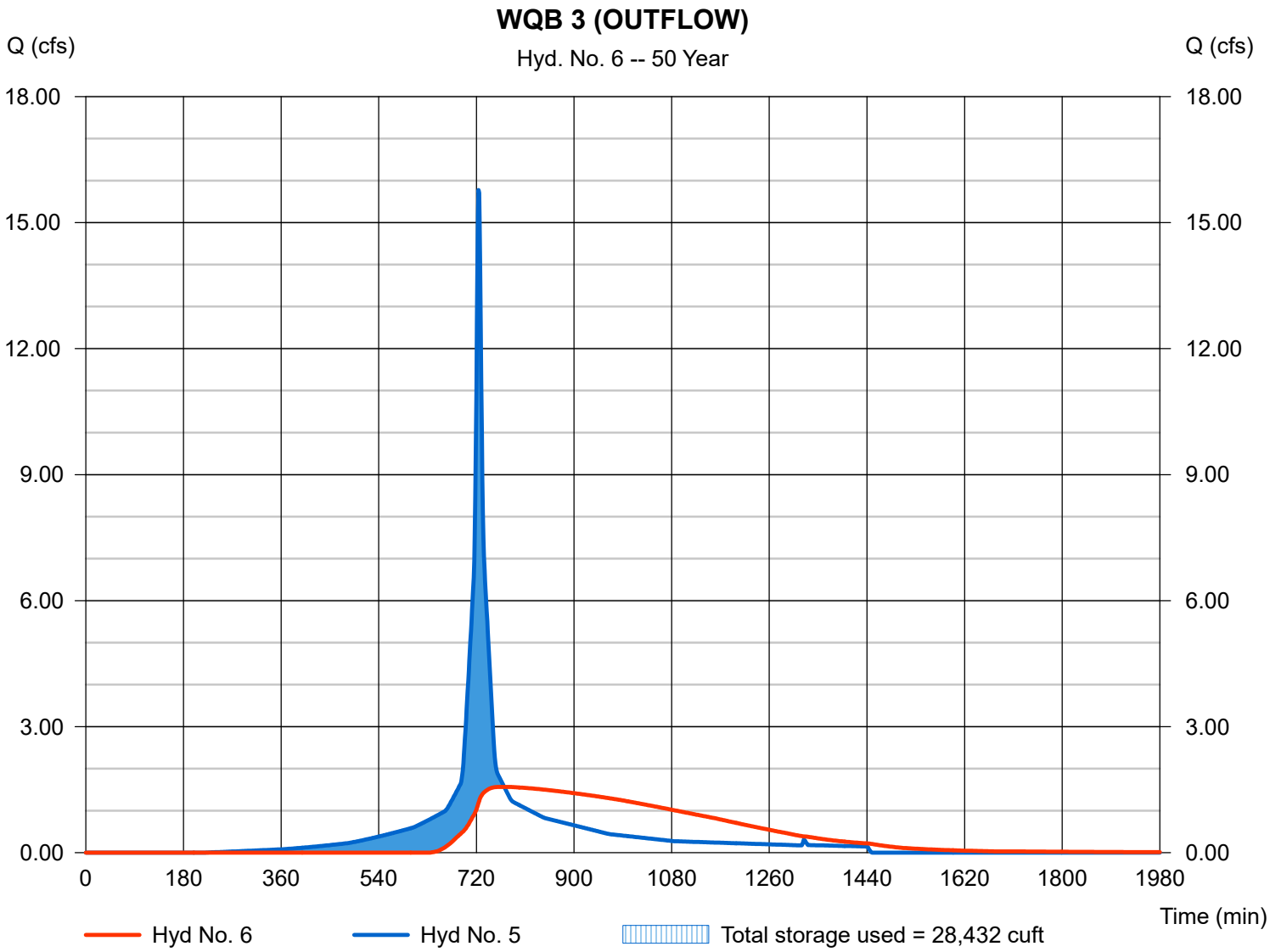
Hydrograph Report

Hyd. No. 6

WQB 3 (OUTFLOW)

Hydrograph type	=	Reservoir	Peak discharge	=	1.567 cfs
Storm frequency	=	50 yrs	Time to peak	=	771 min
Time interval	=	1 min	Hyd. volume	=	45,501 cuft
Inflow hyd. No.	=	5 - WS-PR-S-1 TO WQB #3	Max. Elevation	=	163.00 ft
Reservoir name	=	WQB3	Max. Storage	=	28,432 cuft

Storage Indication method used.

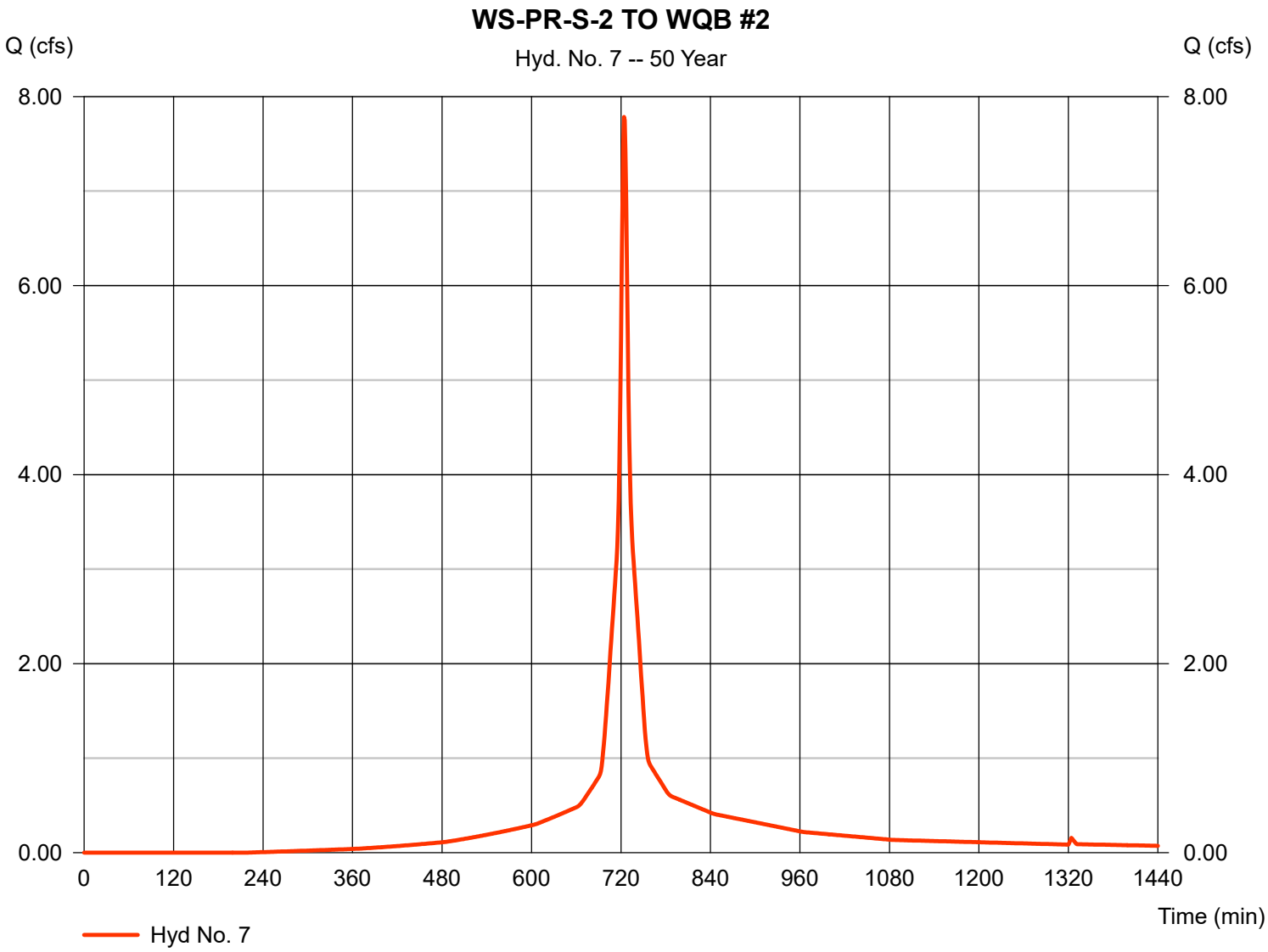


Hydrograph Report

Hyd. No. 7

WS-PR-S-2 TO WQB #2

Hydrograph type	=	SCS Runoff	Peak discharge	=	7.784 cfs
Storm frequency	=	50 yrs	Time to peak	=	724 min
Time interval	=	1 min	Hyd. volume	=	25,225 cuft
Drainage area	=	1.130 ac	Curve number	=	88
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	5.00 min
Total precip.	=	7.38 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

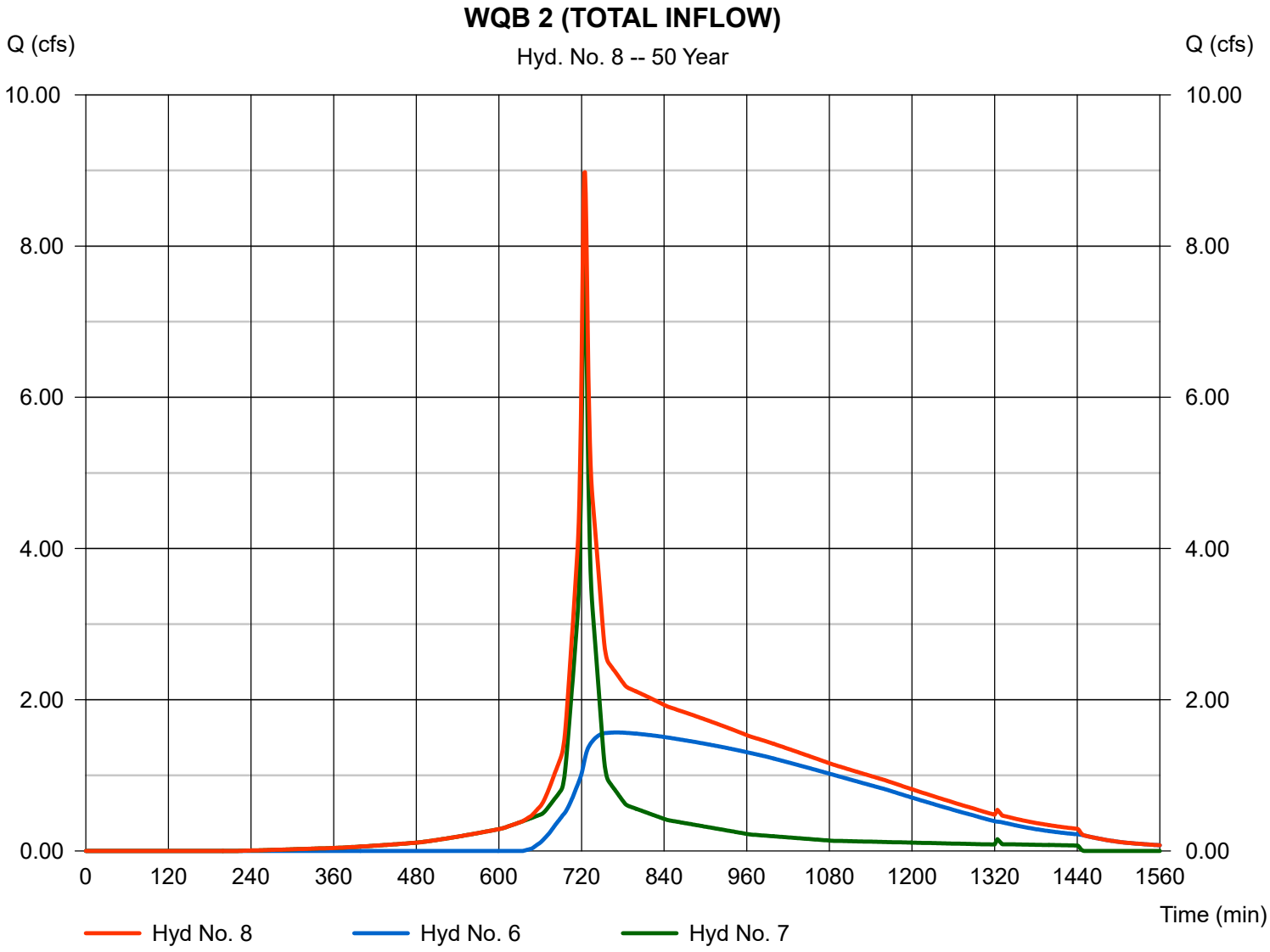


Hydrograph Report

Hyd. No. 8

WQB 2 (TOTAL INFLOW)

Hydrograph type	= Combine	Peak discharge	= 8.978 cfs
Storm frequency	= 50 yrs	Time to peak	= 725 min
Time interval	= 1 min	Hyd. volume	= 70,725 cuft
Inflow hyds.	= 6, 7	Contrib. drain. area	= 1.130 ac



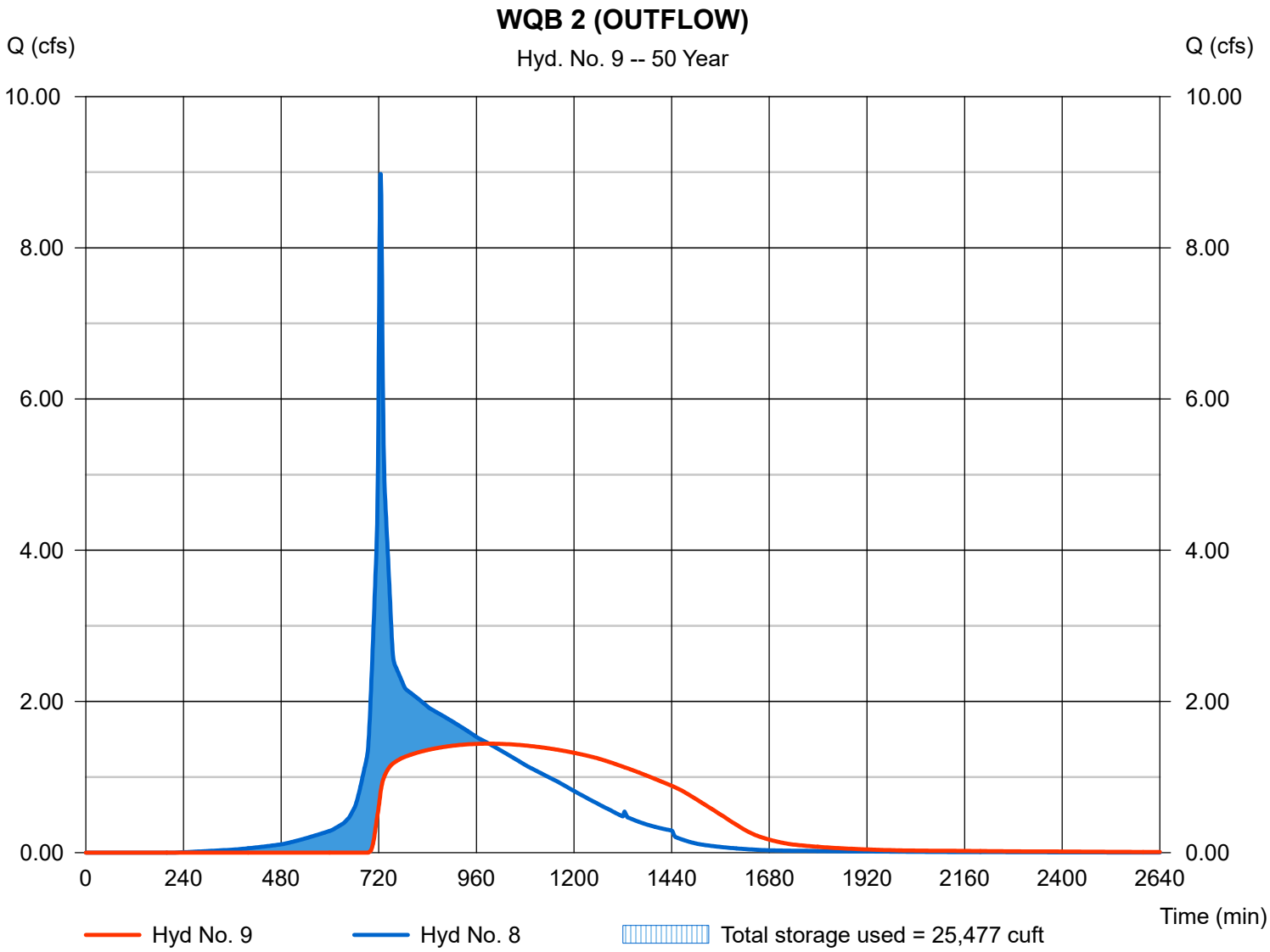
Hydrograph Report

Hyd. No. 9

WQB 2 (OUTFLOW)

Hydrograph type	=	Reservoir	Peak discharge	=	1.441 cfs
Storm frequency	=	50 yrs	Time to peak	=	991 min
Time interval	=	1 min	Hyd. volume	=	65,133 cuft
Inflow hyd. No.	=	8 - WQB 2 (TOTAL INFLOW)	Max. Elevation	=	161.58 ft
Reservoir name	=	WQB2	Max. Storage	=	25,477 cuft

Storage Indication method used.

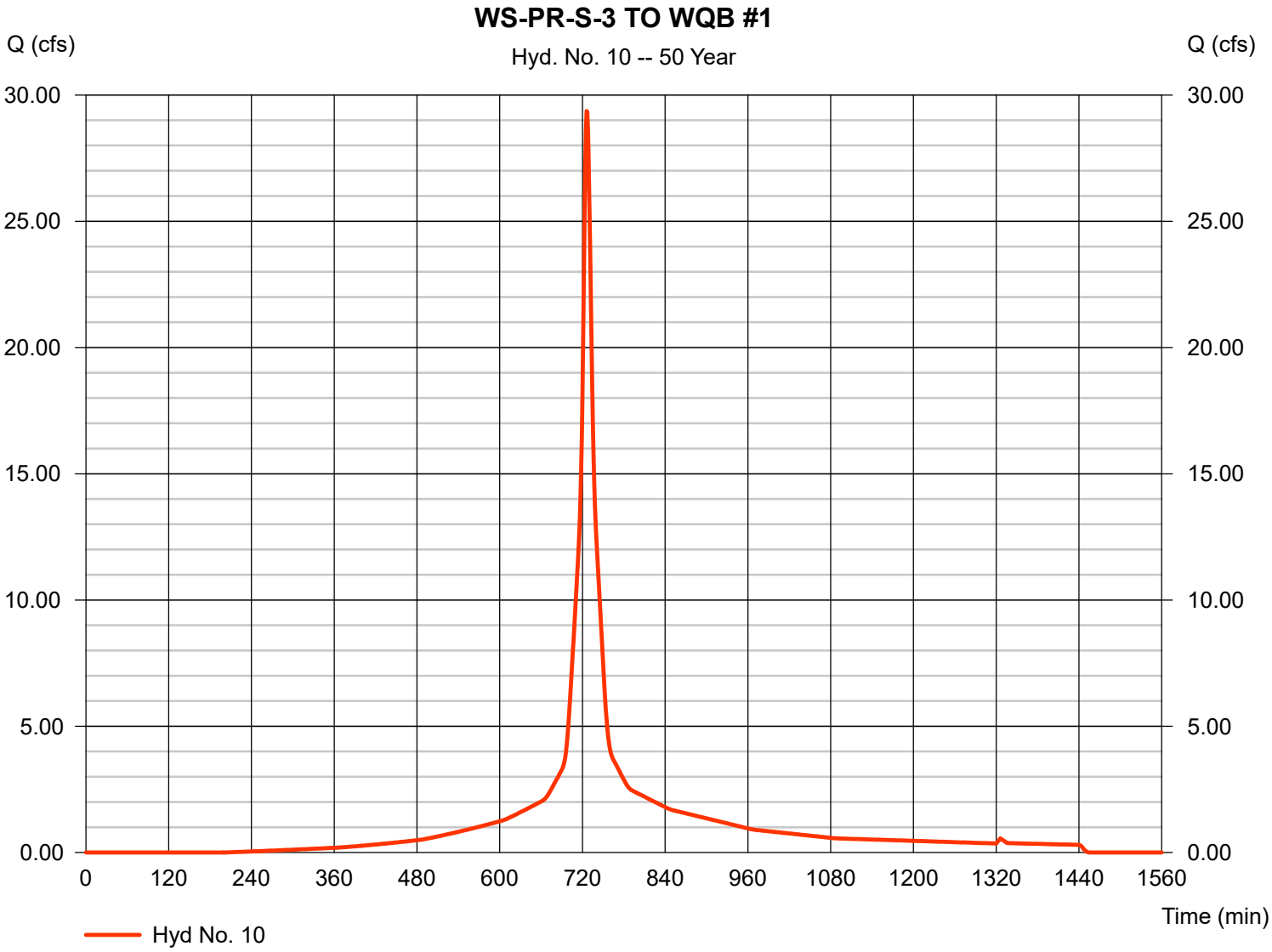


Hydrograph Report

Hyd. No. 10

WS-PR-S-3 TO WQB #1

Hydrograph type	=	SCS Runoff	Peak discharge	=	29.37 cfs
Storm frequency	=	50 yrs	Time to peak	=	726 min
Time interval	=	1 min	Hyd. volume	=	106,369 cuft
Drainage area	=	4.820 ac	Curve number	=	89
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	10.00 min
Total precip.	=	7.38 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484



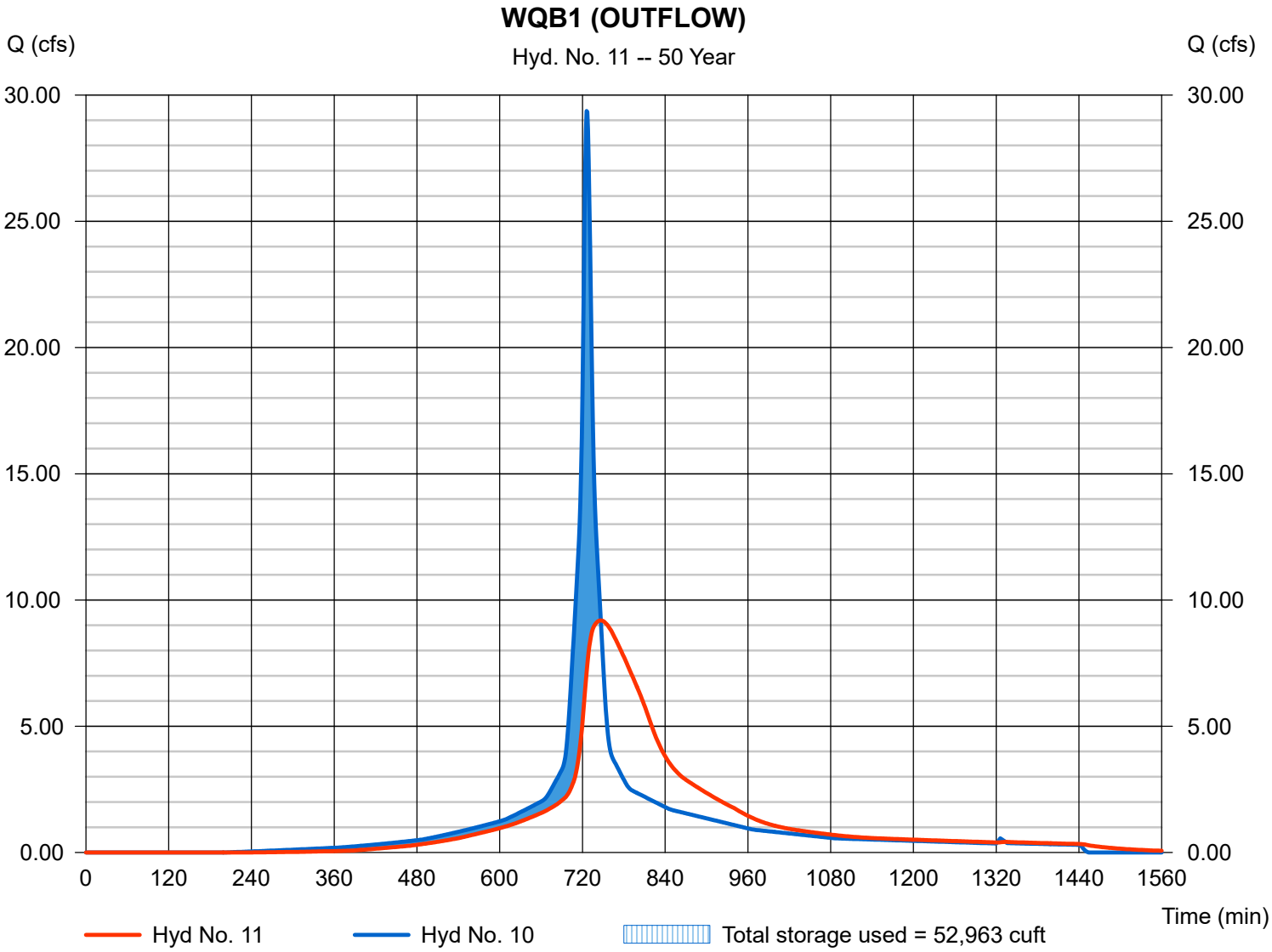
Hydrograph Report

Hyd. No. 11

WQB1 (OUTFLOW)

Hydrograph type	=	Reservoir	Peak discharge	=	9.190 cfs
Storm frequency	=	50 yrs	Time to peak	=	747 min
Time interval	=	1 min	Hyd. volume	=	106,356 cuft
Inflow hyd. No.	=	10 - WS-PR-S-3 TO WQB #1	Max. Elevation	=	152.22 ft
Reservoir name	=	WQB1	Max. Storage	=	52,963 cuft

Storage Indication method used. Wet pond routing start elevation = 149.00 ft.

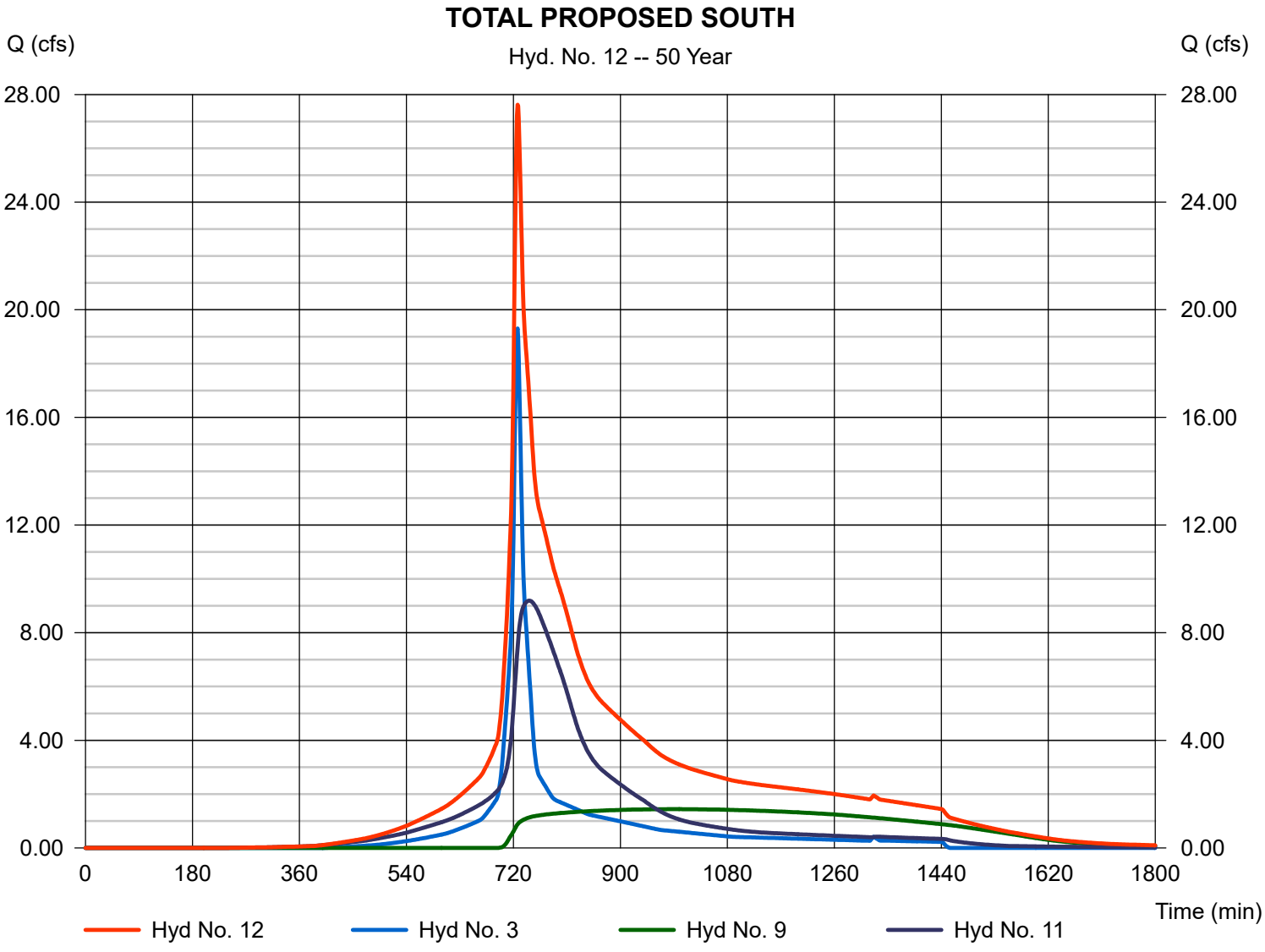


Hydrograph Report

Hyd. No. 12

TOTAL PROPOSED SOUTH

Hydrograph type	=	Combine	Peak discharge	=	27.62 cfs
Storm frequency	=	50 yrs	Time to peak	=	727 min
Time interval	=	1 min	Hyd. volume	=	237,981 cuft
Inflow hyds.	=	3, 9, 11	Contrib. drain. area	=	3.890 ac



Hydrograph Summary Report

Hydraflow Hydrographs by Intelisolve v9.1

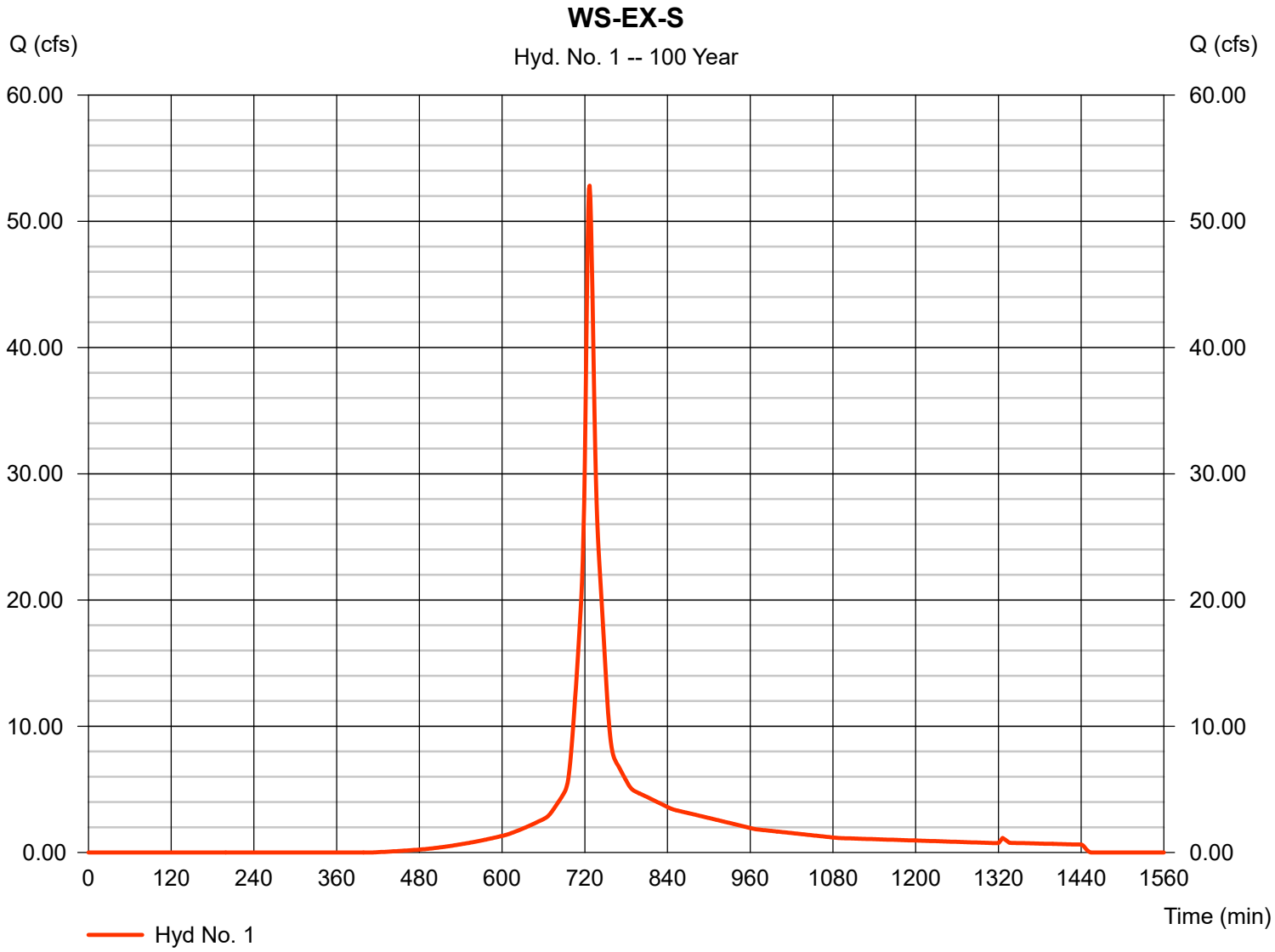
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph description
1	SCS Runoff	52.82	1	727	181,590	----	------	------	WS-EX-S
2	SCS Runoff	15.96	1	726	51,579	----	------	------	WS-EX-E
3	SCS Runoff	22.54	1	727	77,983	----	------	------	WS-PR-UNDET-S
4	SCS Runoff	2.849	1	725	8,890	----	------	------	WS-PR-UNDET-E (TOTAL PROP. EA
5	SCS Runoff	17.94	1	724	58,570	----	------	------	WS-PR-S-1 TO WQB #3
6	Reservoir	1.682	1	774	52,950	5	163.42	32,546	WQB 3 (OUTFLOW)
7	SCS Runoff	8.852	1	724	28,901	----	------	------	WS-PR-S-2 TO WQB #2
8	Combine	10.15	1	724	81,851	6, 7	------	------	WQB 2 (TOTAL INFLOW)
9	Reservoir	1.567	1	1006	76,249	8	162.00	29,400	WQB 2 (OUTFLOW)
10	SCS Runoff	33.33	1	726	121,634	----	------	------	WS-PR-S-3 TO WQB #1
11	Reservoir	9.891	1	748	121,621	10	152.62	58,169	WQB1 (OUTFLOW)
12	Combine	31.68	1	727	275,853	3, 9, 11	------	------	TOTAL PROPOSED SOUTH

Hydrograph Report

Hyd. No. 1

WS-EX-S

Hydrograph type	=	SCS Runoff	Peak discharge	=	52.82 cfs
Storm frequency	=	100 yrs	Time to peak	=	727 min
Time interval	=	1 min	Hyd. volume	=	181,590 cuft
Drainage area	=	9.680 ac	Curve number	=	74
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	9.10 min
Total precip.	=	8.27 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

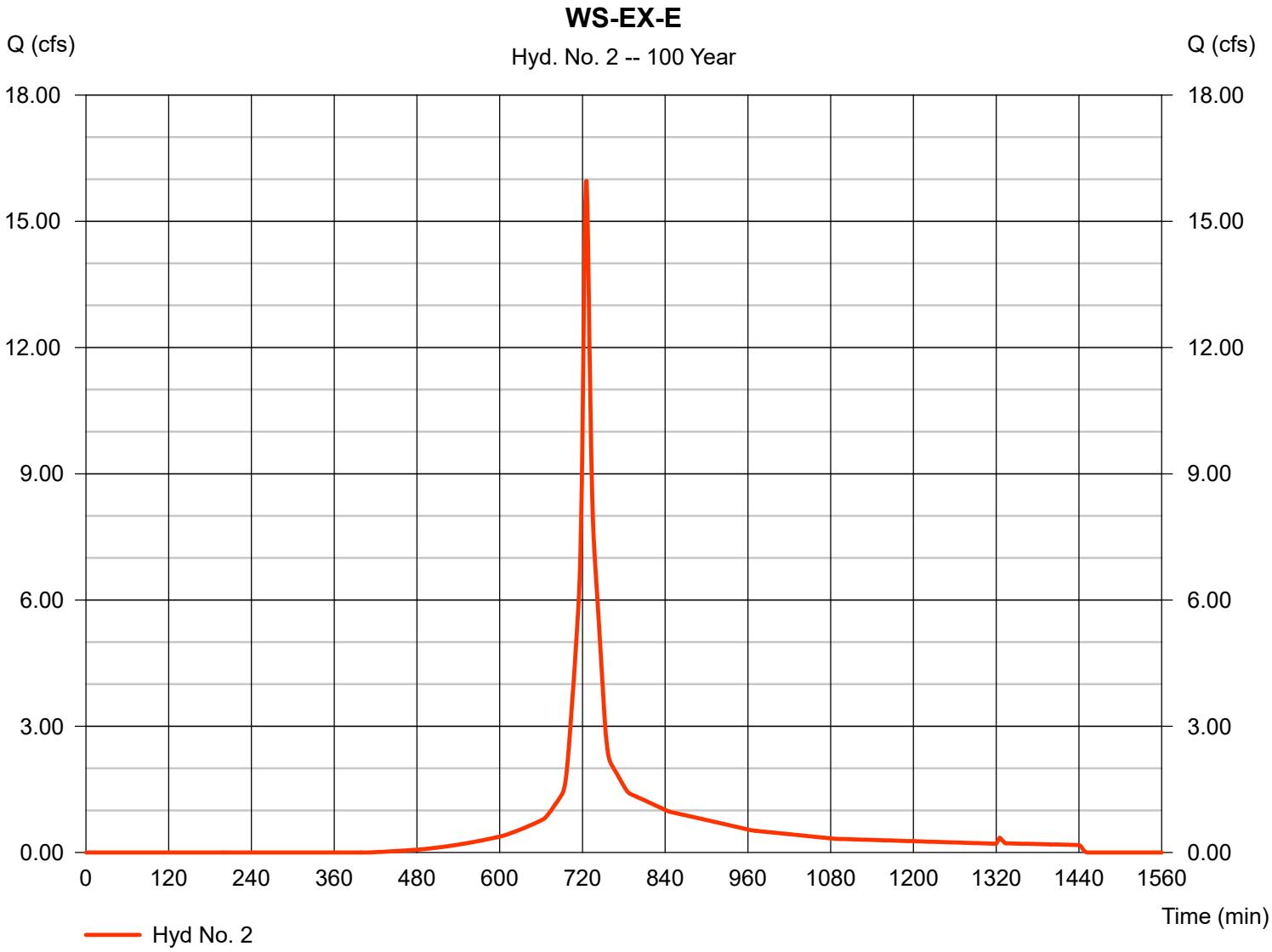


Hydrograph Report

Hyd. No. 2

WS-EX-E

Hydrograph type	=	SCS Runoff	Peak discharge	=	15.96 cfs
Storm frequency	=	100 yrs	Time to peak	=	726 min
Time interval	=	1 min	Hyd. volume	=	51,579 cuft
Drainage area	=	2.820 ac	Curve number	=	74
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	7.50 min
Total precip.	=	8.27 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

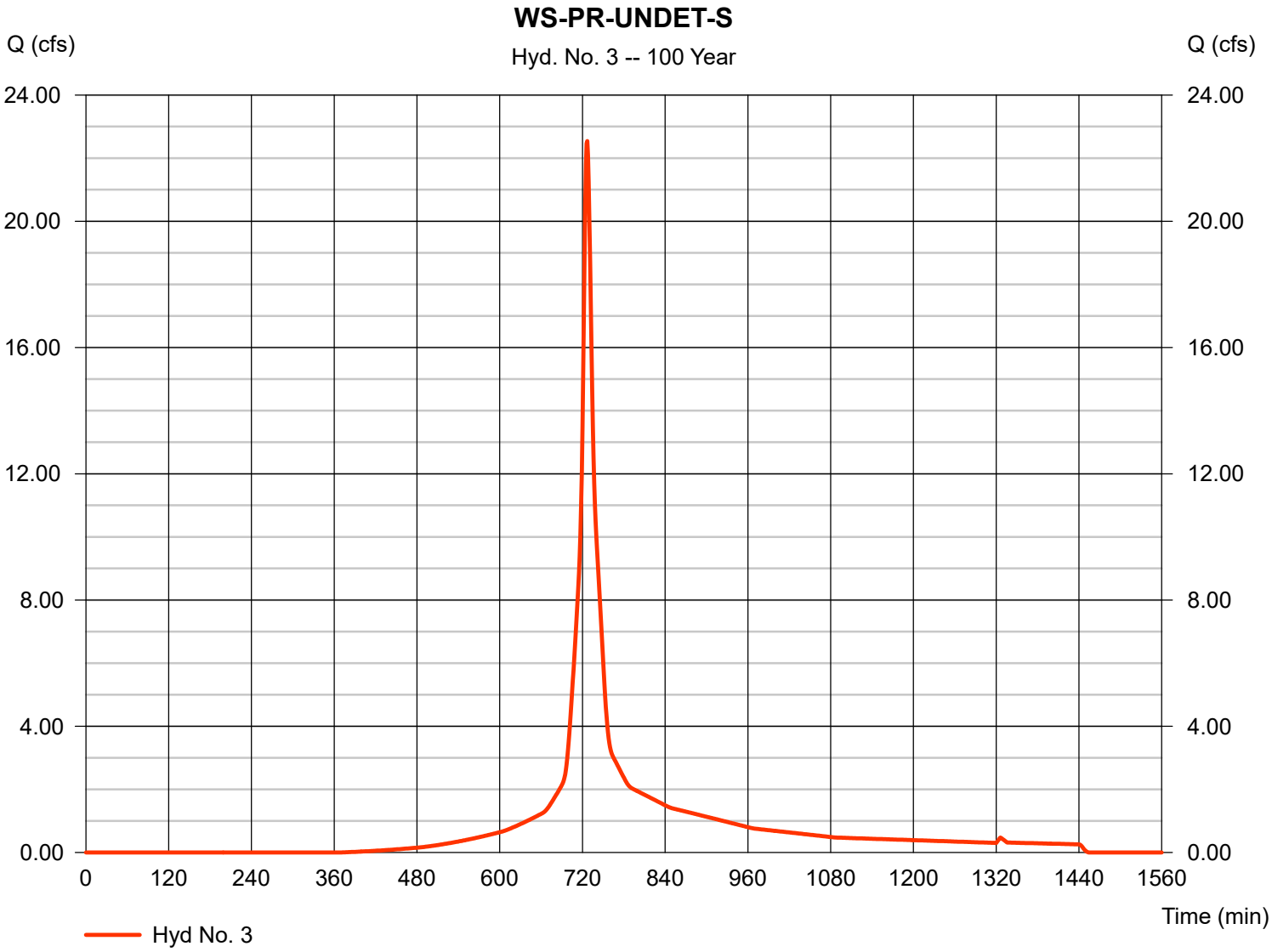


Hydrograph Report

Hyd. No. 3

WS-PR-UNDET-S

Hydrograph type	=	SCS Runoff	Peak discharge	=	22.54 cfs
Storm frequency	=	100 yrs	Time to peak	=	727 min
Time interval	=	1 min	Hyd. volume	=	77,983 cuft
Drainage area	=	3.890 ac	Curve number	=	77
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	10.00 min
Total precip.	=	8.27 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

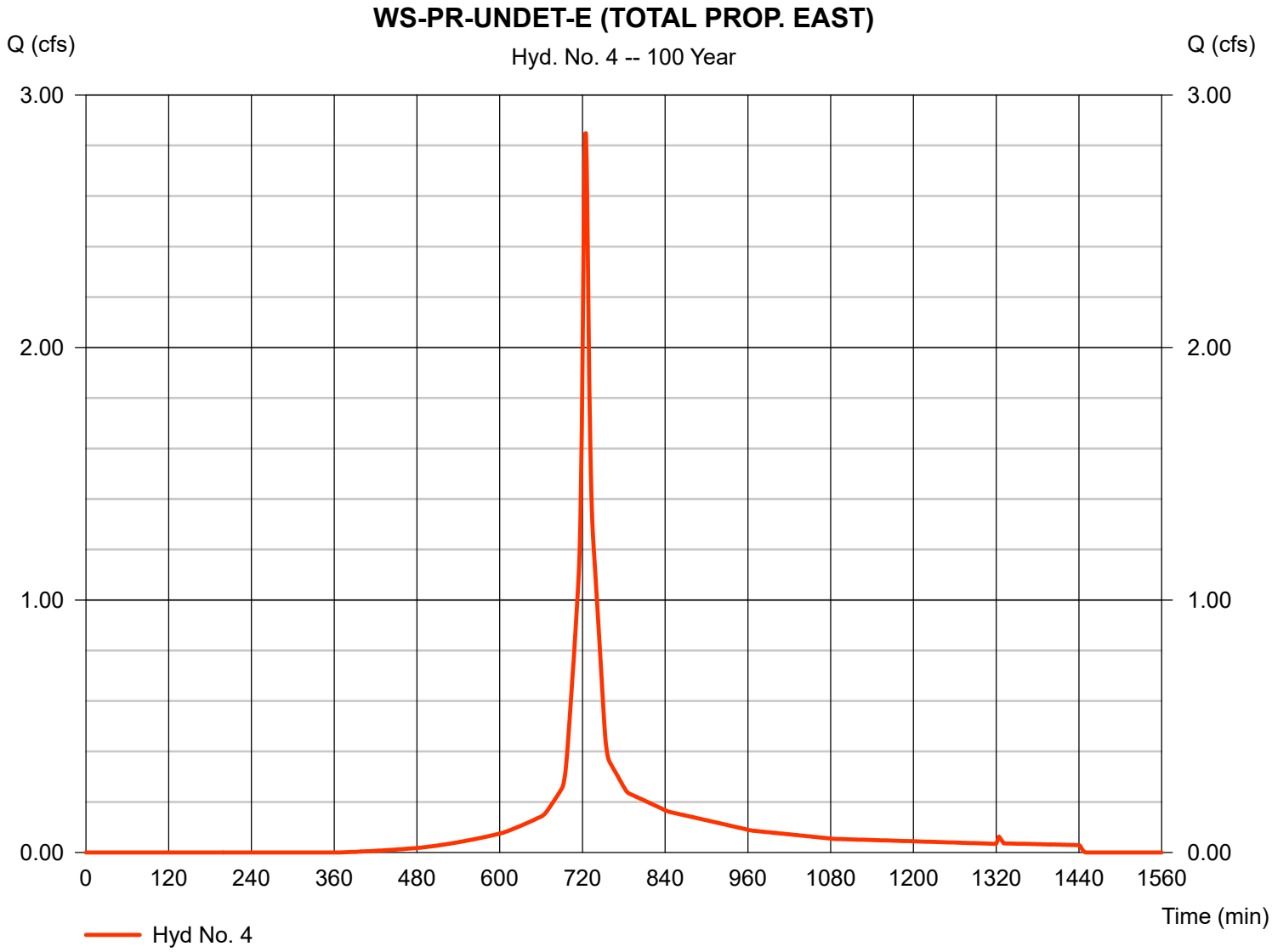


Hydrograph Report

Hyd. No. 4

WS-PR-UNDET-E (TOTAL PROP. EAST)

Hydrograph type	=	SCS Runoff	Peak discharge	=	2.849 cfs
Storm frequency	=	100 yrs	Time to peak	=	725 min
Time interval	=	1 min	Hyd. volume	=	8,890 cuft
Drainage area	=	0.430 ac	Curve number	=	77
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	5.00 min
Total precip.	=	8.27 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

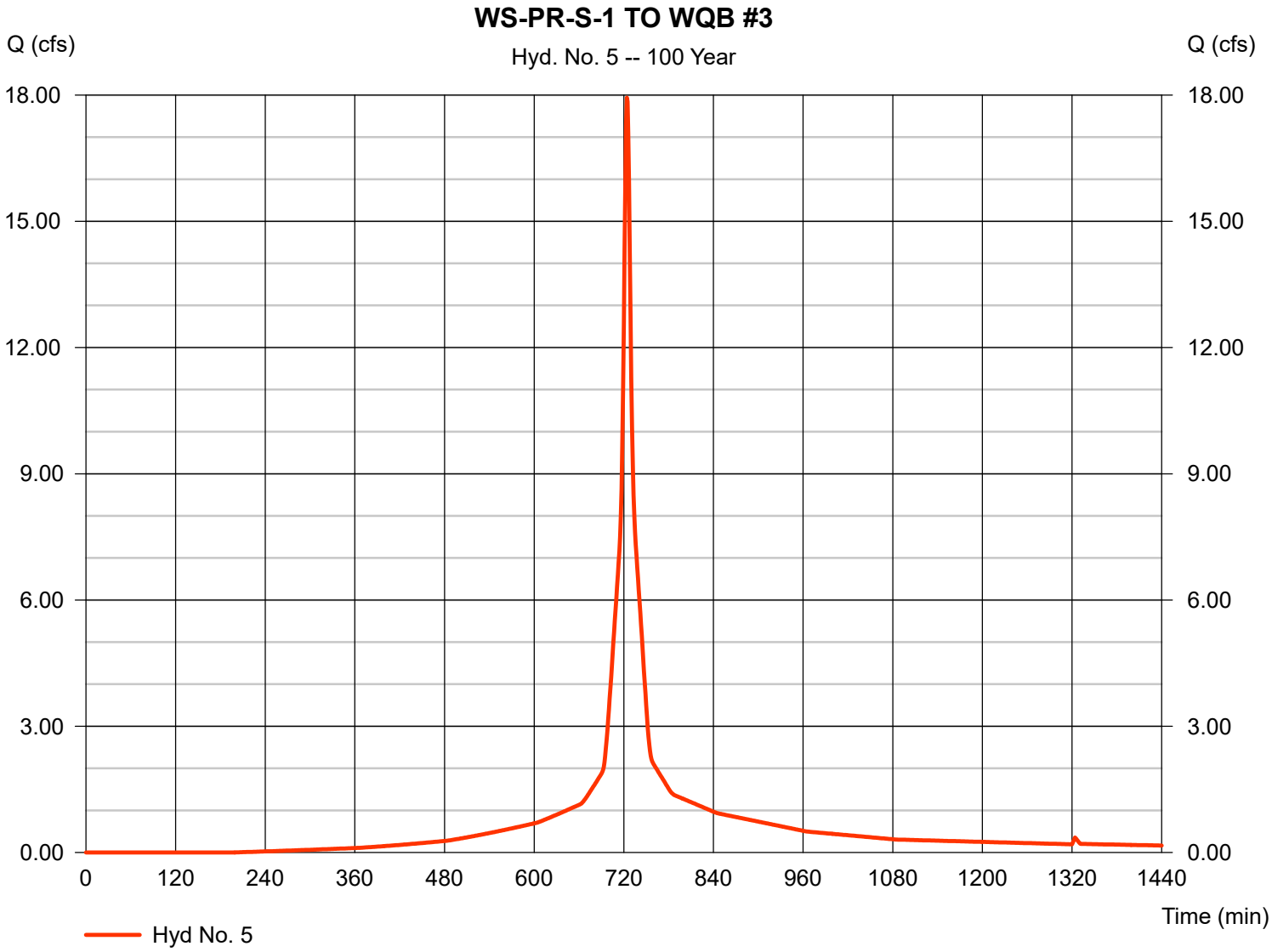


Hydrograph Report

Hyd. No. 5

WS-PR-S-1 TO WQB #3

Hydrograph type	=	SCS Runoff	Peak discharge	=	17.94 cfs
Storm frequency	=	100 yrs	Time to peak	=	724 min
Time interval	=	1 min	Hyd. volume	=	58,570 cuft
Drainage area	=	2.290 ac	Curve number	=	88
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	5.00 min
Total precip.	=	8.27 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484



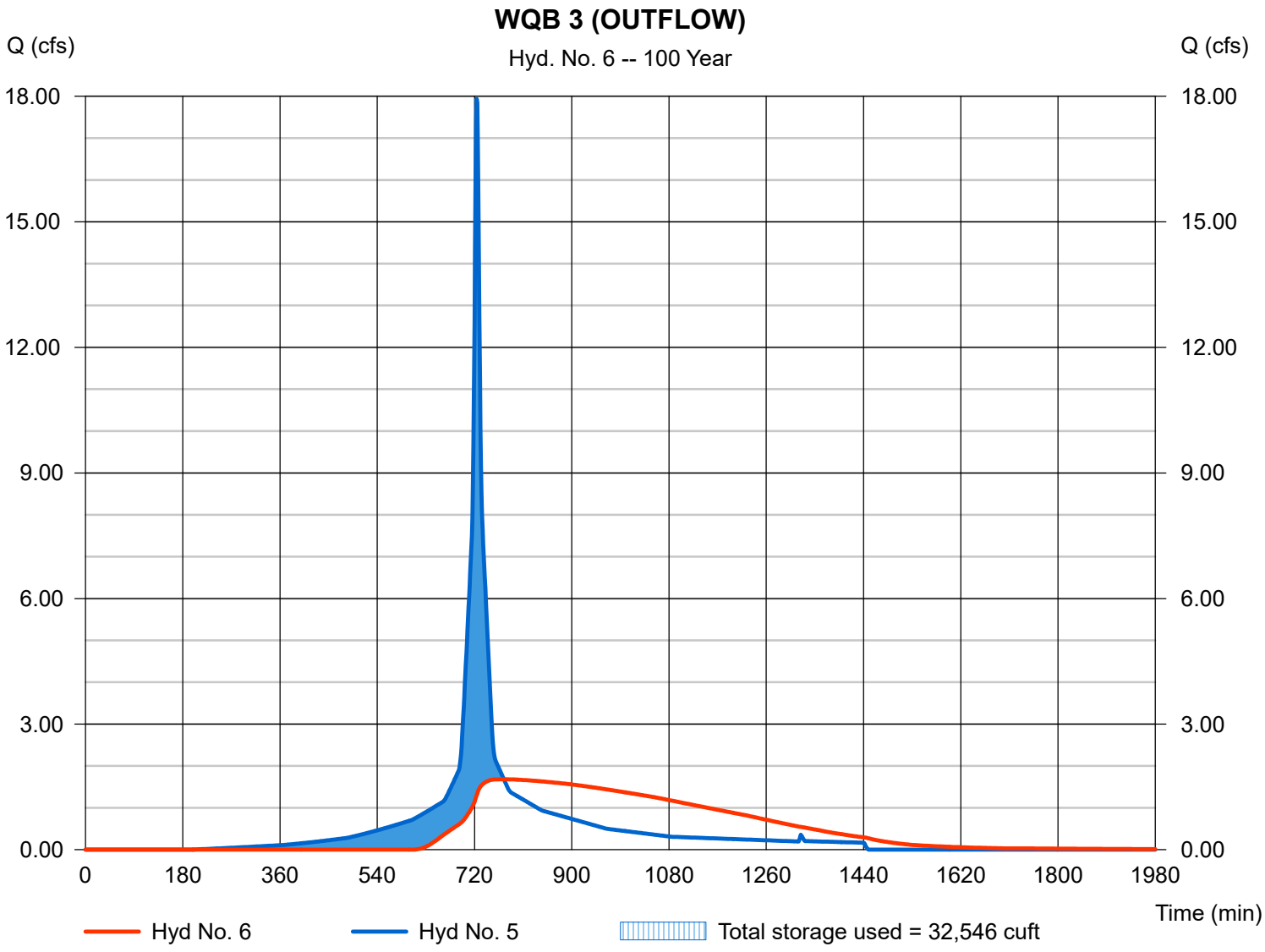
Hydrograph Report

Hyd. No. 6

WQB 3 (OUTFLOW)

Hydrograph type	=	Reservoir	Peak discharge	=	1.682 cfs
Storm frequency	=	100 yrs	Time to peak	=	774 min
Time interval	=	1 min	Hyd. volume	=	52,950 cuft
Inflow hyd. No.	=	5 - WS-PR-S-1 TO WQB #3	Max. Elevation	=	163.42 ft
Reservoir name	=	WQB3	Max. Storage	=	32,546 cuft

Storage Indication method used.

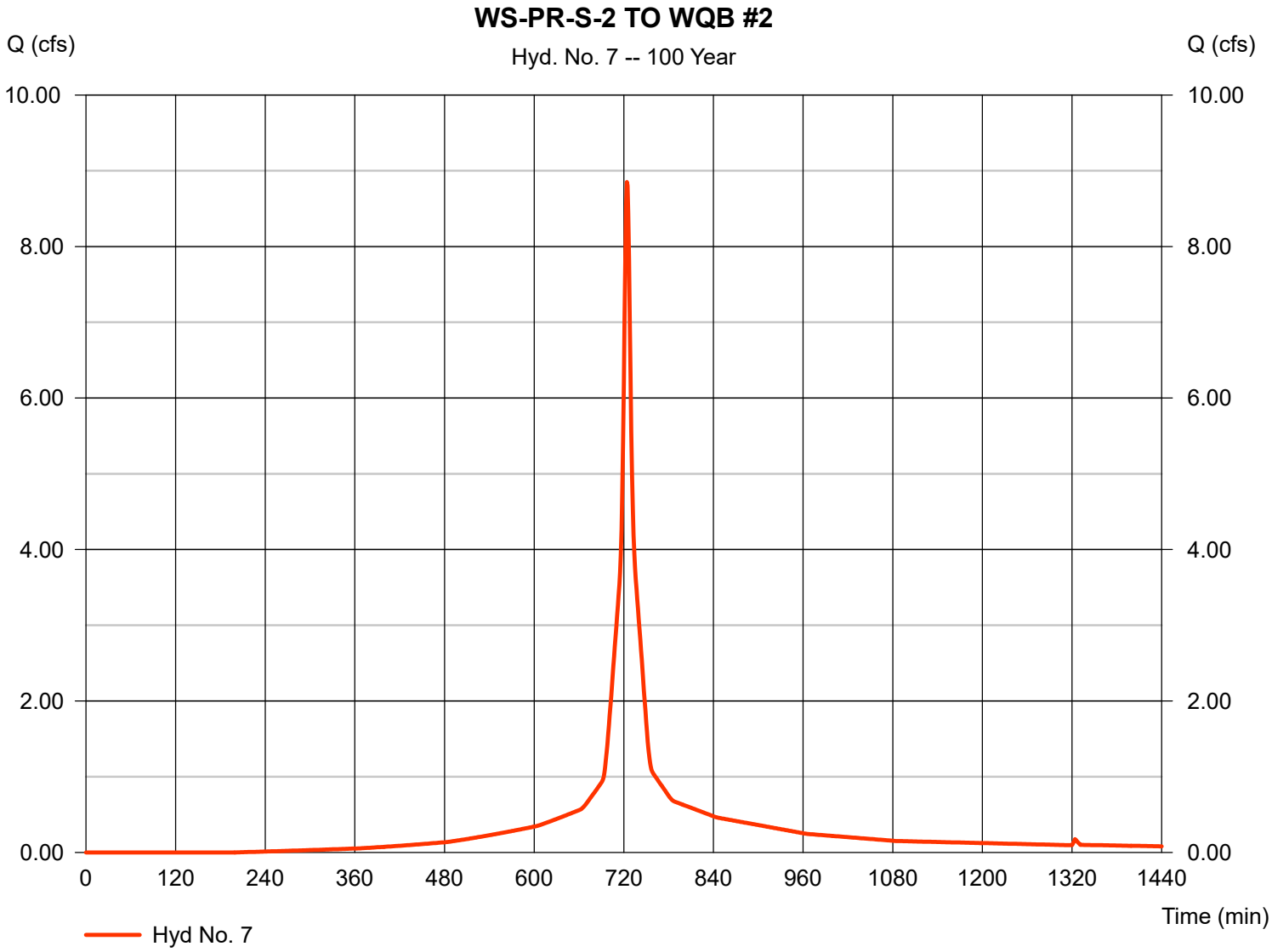


Hydrograph Report

Hyd. No. 7

WS-PR-S-2 TO WQB #2

Hydrograph type	=	SCS Runoff	Peak discharge	=	8.852 cfs
Storm frequency	=	100 yrs	Time to peak	=	724 min
Time interval	=	1 min	Hyd. volume	=	28,901 cuft
Drainage area	=	1.130 ac	Curve number	=	88
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	5.00 min
Total precip.	=	8.27 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

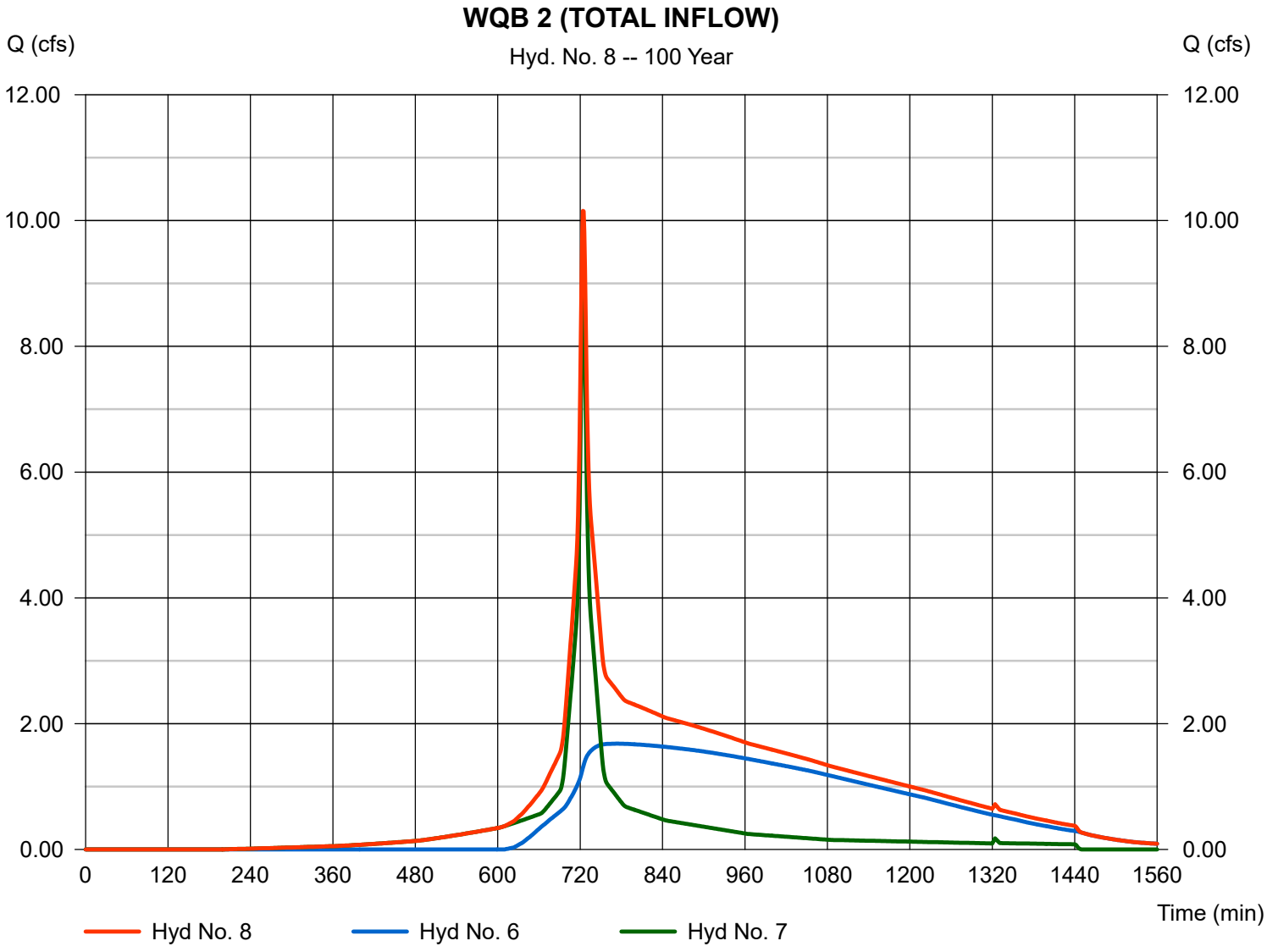


Hydrograph Report

Hyd. No. 8

WQB 2 (TOTAL INFLOW)

Hydrograph type	= Combine	Peak discharge	= 10.15 cfs
Storm frequency	= 100 yrs	Time to peak	= 724 min
Time interval	= 1 min	Hyd. volume	= 81,851 cuft
Inflow hyds.	= 6, 7	Contrib. drain. area	= 1.130 ac



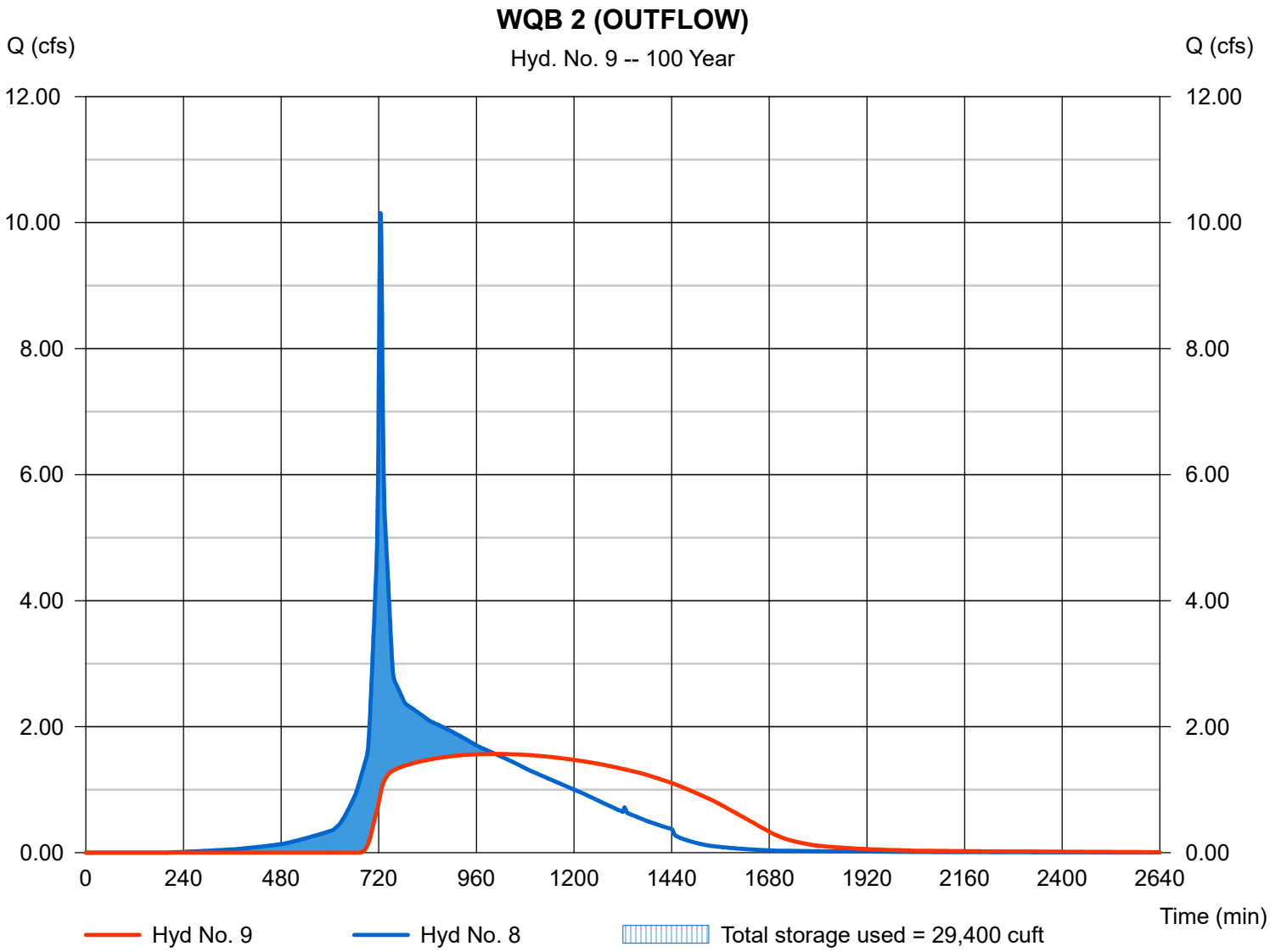
Hydrograph Report

Hyd. No. 9

WQB 2 (OUTFLOW)

Hydrograph type	=	Reservoir	Peak discharge	=	1.567 cfs
Storm frequency	=	100 yrs	Time to peak	=	1006 min
Time interval	=	1 min	Hyd. volume	=	76,249 cuft
Inflow hyd. No.	=	8 - WQB 2 (TOTAL INFLOW)	Max. Elevation	=	162.00 ft
Reservoir name	=	WQB2	Max. Storage	=	29,400 cuft

Storage Indication method used.

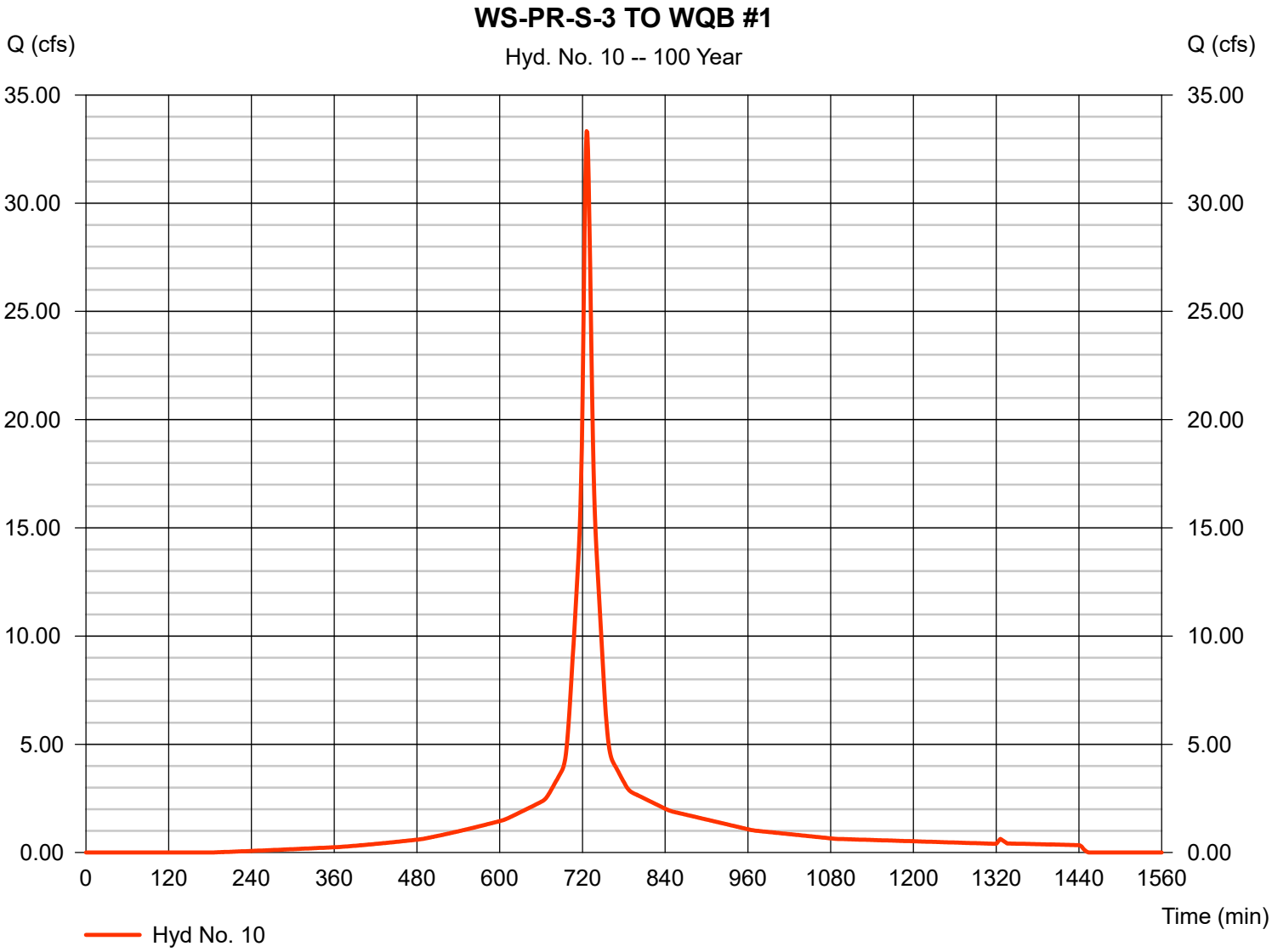


Hydrograph Report

Hyd. No. 10

WS-PR-S-3 TO WQB #1

Hydrograph type	=	SCS Runoff	Peak discharge	=	33.33 cfs
Storm frequency	=	100 yrs	Time to peak	=	726 min
Time interval	=	1 min	Hyd. volume	=	121,634 cuft
Drainage area	=	4.820 ac	Curve number	=	89
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	10.00 min
Total precip.	=	8.27 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484



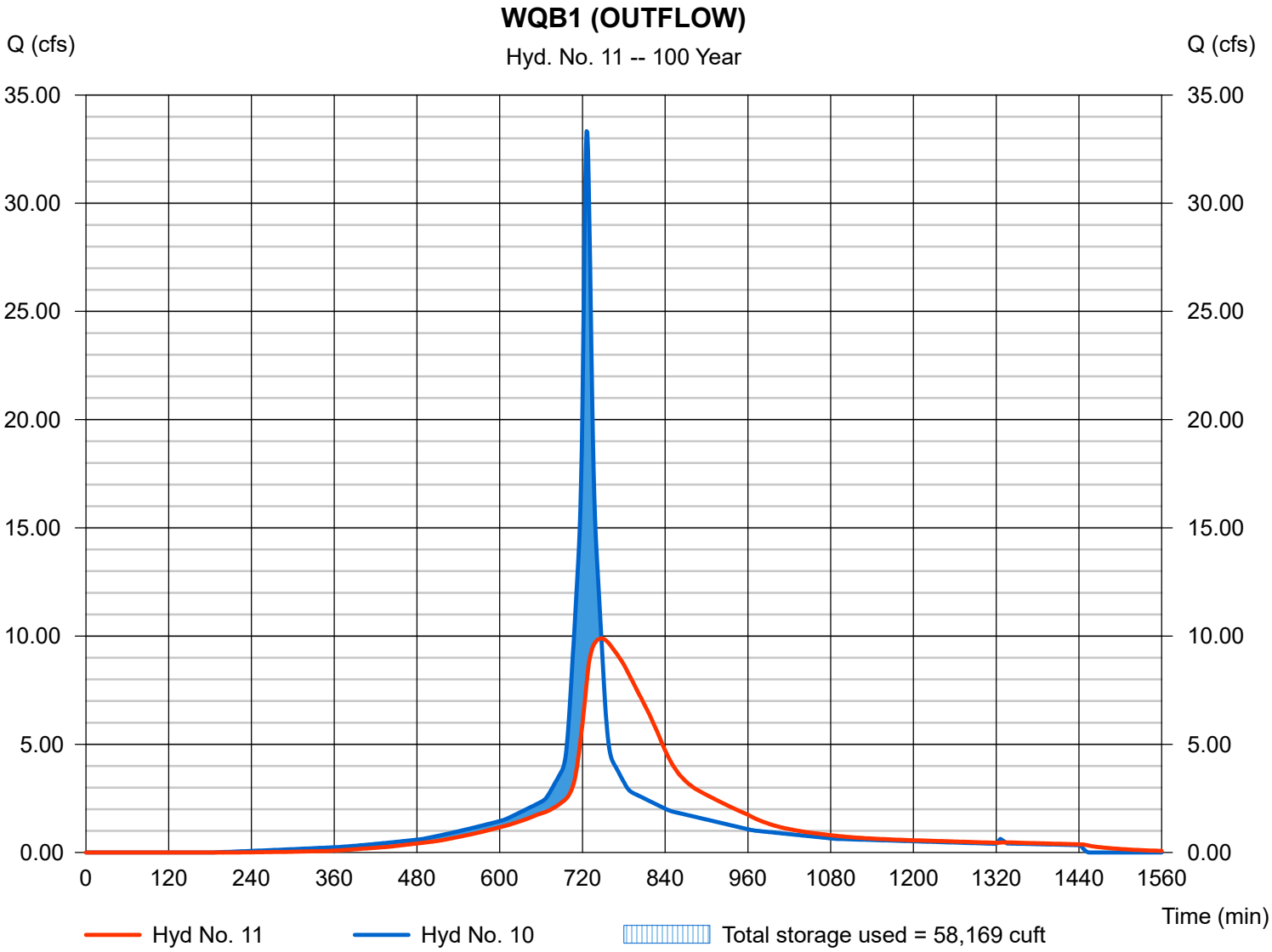
Hydrograph Report

Hyd. No. 11

WQB1 (OUTFLOW)

Hydrograph type	=	Reservoir	Peak discharge	=	9.891 cfs
Storm frequency	=	100 yrs	Time to peak	=	748 min
Time interval	=	1 min	Hyd. volume	=	121,621 cuft
Inflow hyd. No.	=	10 - WS-PR-S-3 TO WQB #1	Max. Elevation	=	152.62 ft
Reservoir name	=	WQB1	Max. Storage	=	58,169 cuft

Storage Indication method used. Wet pond routing start elevation = 149.00 ft.

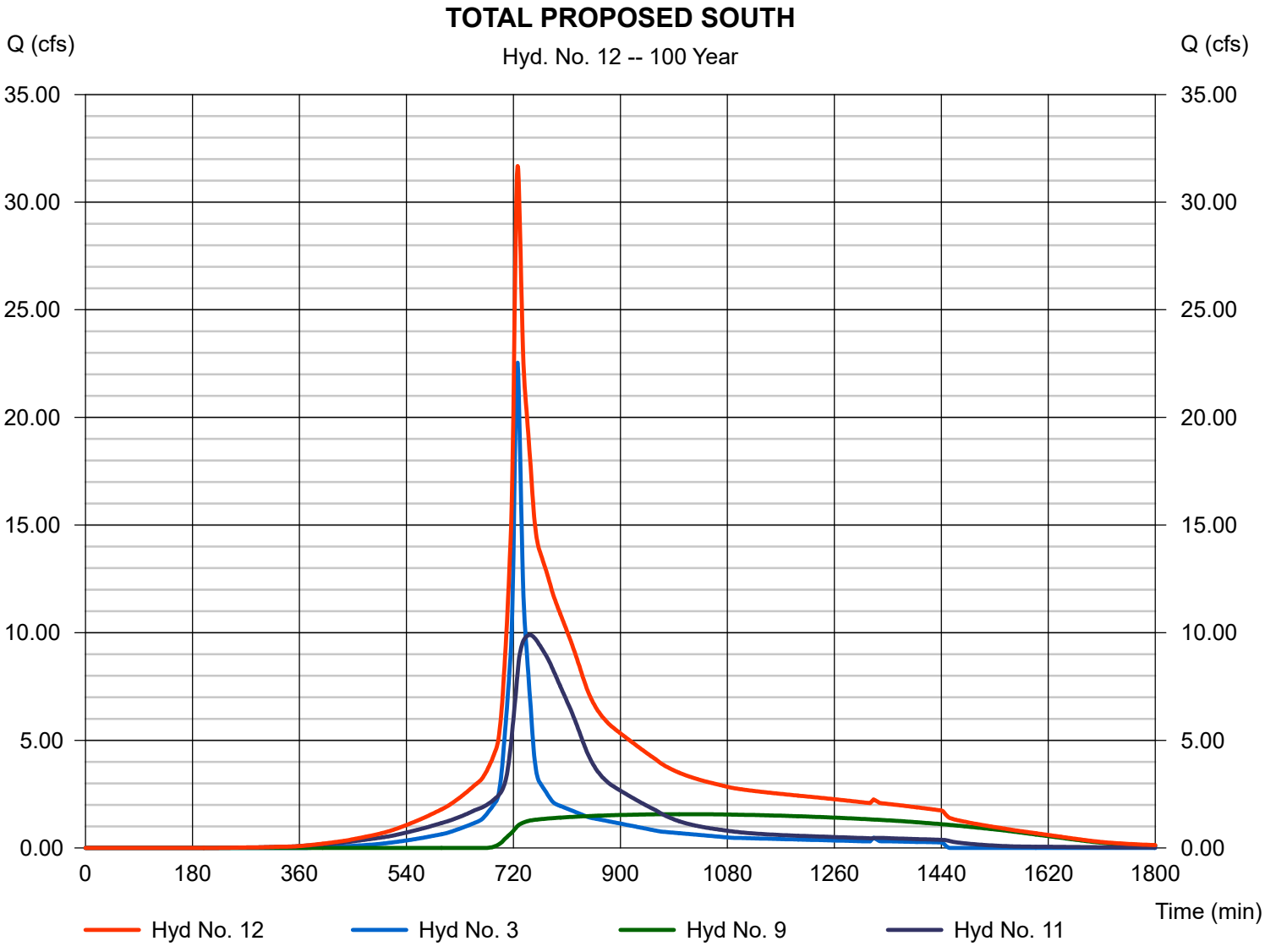


Hydrograph Report

Hyd. No. 12

TOTAL PROPOSED SOUTH

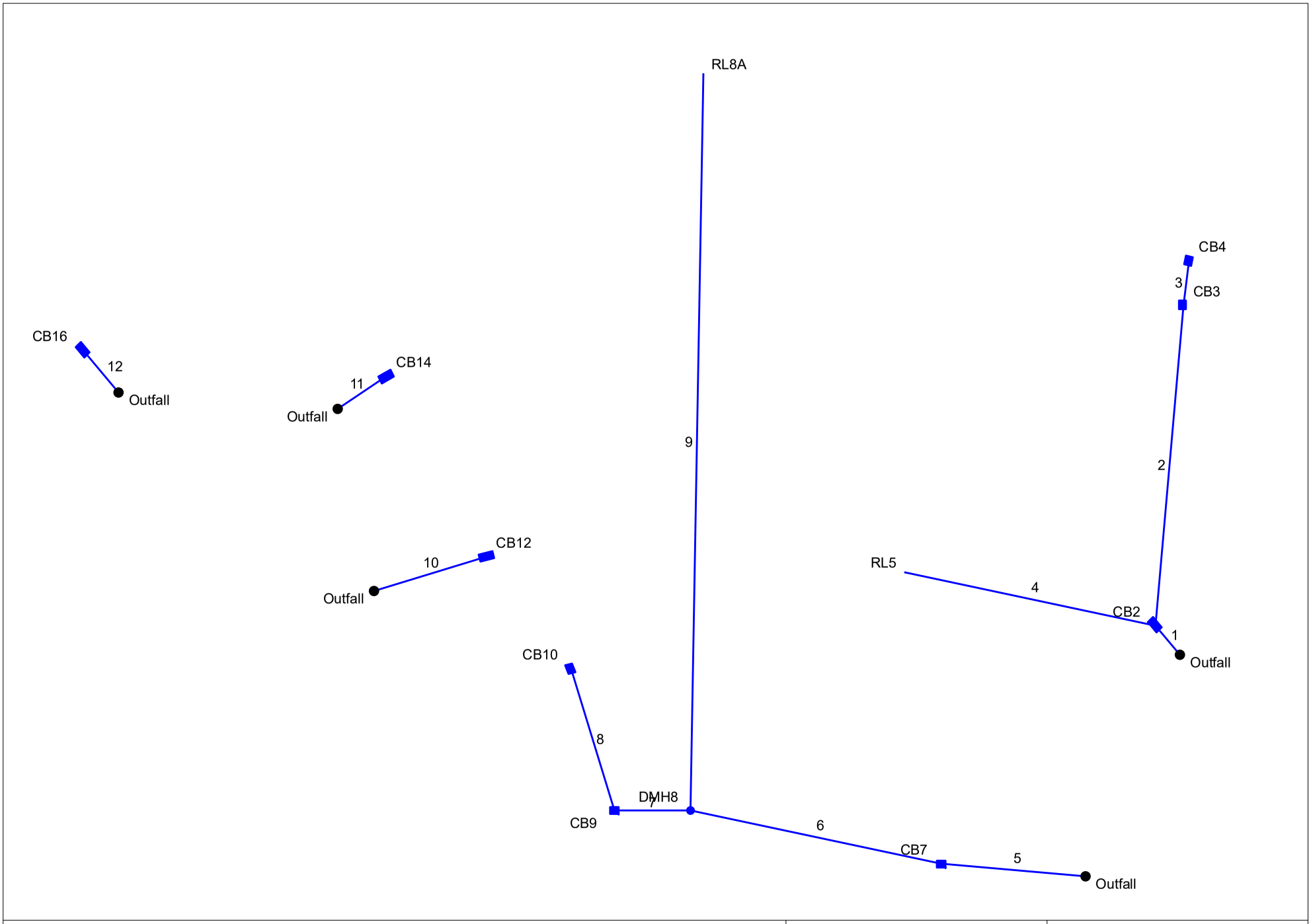
Hydrograph type	= Combine	Peak discharge	= 31.68 cfs
Storm frequency	= 100 yrs	Time to peak	= 727 min
Time interval	= 1 min	Hyd. volume	= 275,853 cuft
Inflow hyds.	= 3, 9, 11	Contrib. drain. area	= 3.890 ac



Attachment E

Pipe to Pipe Analysis

Hydraflow Storm Sewers Plan



Project File: P2P-2023-09-29.stm	Number of lines: 12	Date: 12-22-2023

Storm Sewer Summary Report

Line No.	Line ID	Flow rate (cfs)	Line size (in)	Line shape	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line slope (%)	HGL down (ft)	HGL up (ft)	Minor loss (ft)	HGL Junct (ft)	Dns line No.	Junction Type
1	FES1-CB2	11.26	24	Cir	22	149.00	149.11	0.500	150.24	150.35	0.71	151.06	End	Combination
2	CB2-CB3	4.16	18	Cir	186	149.11	150.04	0.500	151.44*	151.69*	0.04	151.74	1	Combination
3	CB3-CB4	2.34	12	Cir	26	150.54	150.67	0.500	151.74*	151.83*	0.14	151.97	2	Combination
4	CB2-RL5	3.71	12	Cir	148	150.11	153.07	2.000	151.18	153.89	n/a	153.89 j	1	None
5	FES6-CB7	8.64	18	Cir	84	151.99	152.83	1.000	153.11	153.95	0.29	153.95	End	Combination
6	CB7-DMH8	8.18	18	Cir	148	152.83	153.94	0.750	154.20	155.03	n/a	155.03 j	5	Manhole
7	DMH8-CB9	5.50	15	Cir	44	154.19	154.94	1.705	155.27	155.88	n/a	155.88 j	6	Combination
8	CB9-CB10	4.29	15	Cir	86	154.94	155.49	0.640	156.17	156.40	0.31	156.71	7	Combination
9	DMH8-RL8A	3.71	12	Cir	426	154.44	158.69	0.998	155.26	159.51	0.45	159.51	6	None
10	FES11-CB12	5.31	18	Cir	68	159.14	159.48	0.500	160.08	160.42	0.32	160.74	End	Combination
11	FES13-CB14	5.45	15	Cir	34	162.00	162.51	1.500	162.93	163.44	n/a	163.44	End	Combination
12	FES15-CB16	6.70	15	Cir	32	162.00	162.48	1.500	163.04	163.52	0.59	163.52	End	Combination

Project File: P2P-2023-09-29.stm | Number of lines: 12 | Run Date: 12-22-2023

NOTES: Return period = 25 Yrs. ; *Surcharged (HGL above crown). ; j - Line contains hyd. jump.

Inlet Report

Line No	Inlet ID	Q = CIA (cfs)	Q carry (cfs)	Q capt (cfs)	Q byp (cfs)	Junc type	Curb Inlet		Grate Inlet			Gutter							Inlet			Byp line No
							Ht (in)	L (ft)	area (sqft)	L (ft)	W (ft)	So (ft/ft)	W (ft)	Sw (ft/ft)	Sx (ft/ft)	n	Depth (ft)	Spread (ft)	Depth (ft)	Spread (ft)	Depr (in)	
1	CB2	6.08	0.21	6.29	0.00	Comb	3.0	5.83	6.26	4.62	1.35	Sag	2.00	0.030	0.030	0.000	0.27	9.11	0.44	9.11	2.0	Off
2	CB3	2.52	0.00	2.52	0.00	Comb	3.0	2.73	3.13	2.31	1.35	Sag	2.00	0.030	0.030	0.000	0.14	4.78	0.31	4.78	2.0	Off
3	CB4	2.34	0.00	2.34	0.00	Comb	3.0	2.73	3.13	2.31	1.35	Sag	2.00	0.030	0.030	0.000	0.12	4.11	0.29	4.11	2.0	Off
4	RL5	3.71	0.00	0.00	3.71	None	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
5	CB7	0.63	0.00	0.42	0.21	Comb	3.0	2.73	0.00	2.31	1.35	0.030	2.00	0.010	0.010	0.012	0.07	6.90	0.16	1.69	2.0	1
6	DMH8	0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
7	CB9	1.66	0.00	1.66	0.00	Comb	3.0	2.73	3.13	2.31	1.35	Sag	2.00	0.030	0.030	0.000	0.06	2.11	0.23	2.11	2.0	Off
8	CB10	4.29	0.00	4.29	0.00	Comb	3.0	2.73	3.13	2.31	1.35	Sag	2.00	0.030	0.030	0.000	0.27	9.11	0.44	9.11	2.0	Off
9	RL8A	3.71	0.00	0.00	3.71	None	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
10	CB12	5.31	0.00	5.31	0.00	Comb	3.0	5.83	6.26	4.62	1.35	Sag	2.00	0.030	0.030	0.000	0.22	7.44	0.39	7.44	2.0	Off
11	CB14	5.45	0.00	5.45	0.00	Comb	3.0	5.83	6.26	4.62	1.35	Sag	2.00	0.030	0.030	0.000	0.23	7.78	0.40	7.78	2.0	Off
12	CB16	6.70	0.00	6.70	0.00	Comb	3.0	5.83	6.26	4.62	1.35	Sag	2.00	0.030	0.030	0.000	0.29	9.78	0.46	9.78	2.0	Off

Project File: P2P-2023-09-29.stm | Number of lines: 12 | Run Date: 12-22-2023

NOTES: Inlet N-Values = 0.016 ; Intensity = 42.54 / (Inlet time + 3.80) ^ 0.72; Return period = 25 Yrs. ; * Indicates Known Q added. All curb inlets are Horiz throat.

Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line	(ft)	Incr (ac)	Total (ac)	(C)	Incr	Total	Inlet (min)	Syst (min)	(in/hr)	(cfs)	(cfs)	(ft/s)	Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
1	End	22	0.78	2.18	0.87	0.68	1.73	5.0	10.0	6.5	11.26	15.99	5.52	24	0.50	149.00	149.11	150.24	150.35	151.00	153.87	FES1-CB2
2	1	186	0.32	0.94	0.88	0.28	0.64	5.0	10.0	6.5	4.16	8.04	2.36	18	0.50	149.11	150.04	151.44	151.69	153.87	153.87	CB2-CB3
3	2	26	0.62	0.62	0.58	0.36	0.36	10.0	10.0	6.5	2.34	2.73	2.97	12	0.50	150.54	150.67	151.74	151.83	153.87	153.87	CB3-CB4
4	1	148	0.46	0.46	0.90	0.41	0.41	5.0	5.0	9.0	3.71	5.46	5.06	12	2.00	150.11	153.07	151.18	153.89	153.87	158.00	CB2-RL5
5	End	84	0.10	1.96	0.70	0.07	1.33	5.0	10.0	6.5	8.64	10.50	6.09	18	1.00	151.99	152.83	153.11	153.95	154.00	156.85	FES6-CB7
6	5	148	0.00	1.86	0.00	0.00	1.26	0.0	10.0	6.5	8.18	9.85	5.39	18	0.75	152.83	153.94	154.20	155.03	156.85	159.11	CB7-DMH8
7	6	44	0.24	1.40	0.77	0.18	0.85	5.0	10.0	6.5	5.50	9.13	5.22	15	1.70	154.19	154.94	155.27	155.88	159.11	158.19	DMH8-CB9
8	7	86	1.16	1.16	0.57	0.66	0.66	10.0	10.0	6.5	4.29	5.59	3.99	15	0.64	154.94	155.49	156.17	156.40	158.19	158.74	CB9-CB10
9	6	426	0.46	0.46	0.90	0.41	0.41	5.0	5.0	9.0	3.71	3.85	5.40	12	1.00	154.44	158.69	155.26	159.51	159.11	162.00	DMH8-RL8A
10	End	68	0.74	0.74	0.80	0.59	0.59	5.0	5.0	9.0	5.31	7.43	4.57	18	0.50	159.14	159.48	160.08	160.42	161.67	162.98	FES11-CB12
11	End	34	0.76	0.76	0.80	0.61	0.61	5.0	5.0	9.0	5.45	7.91	5.54	15	1.50	162.00	162.51	162.93	163.44	164.00	167.28	FES13-CB14
12	End	32	1.15	1.15	0.65	0.75	0.75	5.0	5.0	9.0	6.70	7.91	6.16	15	1.50	162.00	162.48	163.04	163.52	164.00	167.28	FES15-CB16

Project File: P2P-2023-09-29.stm

Number of lines: 12

Run Date: 12-22-2023

NOTES: Intensity = 42.54 / (Inlet time + 3.80) ^ 0.72; Return period = 25 Yrs. ; Pipe travel time suppressed. ; c = cir e = ellip b = box

Attachment F

WQV Calculations

12/22/2022

RUSSELL ROAD

East Granby, Connecticut

Water Quality Volume Calculations

PROPOSED	Woods	Landscape	Paved/Roof	Total	Woods	Landscape	Paved/Roof	Total
Water Quality Basin	Area (S.F.)	Area (S.F.)	Area (S.F.)	Area (S.F.)	Area (S.F.)	Area (S.F.)	Area (Acre)	Area (Acre)
WS-EX-E	25,476	578,121	14,828	618,425	0.58	13.27	0.34	14.20
WS-PR-S-1	0	42,916	56,874	99,790	0.00	0.99	1.31	2.29
WS-PR-S-2	0	22,251	26,880	49,131	0.00	0.51	0.62	1.13
WS-PR-S-3	4,480	65,947	138,038	215,079	0.10	1.51	3.17	4.79

STORM DRAINAGE SYSTEM DESIGN COMPUTATION SHEET

F. A. Hesketh & Associates, Inc.
Civil & Traffic Engineers - Surveyors
Planners - Landscape Architects

JOB: 23145 - EAST RUSSELL ROAD
CALCULATED BY: DRT DATE: DECEMBER 22, 2023
CHECKED BY: _____ CHECKED BY: _____ DATE: _____ .

EXISTING & PROPOSED CONDITIONS

COVER CONDITION	WOODS		LANDSCAPED		IMPERVIOUS		TOTAL		
RUNOFF 'C'	CN_1=86		CN_2=78		C_3=98				
DRAINAGE AREA (Ac.)	A_1	$(AxC)_1$	A_2	$(AxC)_2$	A_3	$(AxC)_3$	A	AxC	C
WS-EX-E	0.58	50.30	13.27	1035.20	0.34	33.36	14.20	1068.56	75.27
WS-PR-S-1	0.00	0.00	0.99	76.85	1.31	127.95	2.29	204.80	89.40
WS-PR-S-2	0.00	0.00	0.51	39.84	0.62	60.47	1.13	100.32	88.94
WS-PR-S-3	0.00	0.00	1.51	118.09	3.17	310.55	4.68	428.64	91.53

RUSSELL ROAD

12/22/2023

East Granby, Connecticut

Water Quality Volume Size Calculations

December 22, 2023

Minimum-Recommended Water Quality Volume (WQV)

Watershed	Total Area (Ac) A	Impervious Area (Ac)	Impervious (%) I	Runoff (R)	Min. Rec. WQV (ac-ft)	Min. Rec. WQV (Cu.Ft.)
WS-PR-S-1	2.29	1.31	57.0	0.5629	0.10747	4,681
WS-PR-S-2	1.13	0.62	54.7	0.5424	0.05098	2,221
WS-PR-S-3	4.79	3.17	66.2	0.6459	0.25761	11,221

$$WQV = \frac{(1")(R)(A)}{12}$$

WQV = water quality volume (ac-ft)

R = volumetric runoff coefficient
0.05+0.009(I)

I = percent impervious cover

A= Site area (acres)

Provided Water Quality Volume

12/22/2023

Water Quality Basins

Watershed	Elevations (Ft.)	Area (Sq. Ft.)	Avg. Area (Sq. Ft.)	Avg. Depth (FT)	Net. WQV (Cu. Ft.)	Total Provided WQV below outlet (Cu. Ft.)	Total Rec. WQV (Cu. Ft.)
WQ BASIN 1	146	5,069				**19,740**	11,221
			6,068	2.00	**12,135**		
	148	7,066					
			7,604	1.00	**7,604**		
	149	8,143					
			8,268	1.00	**8,268**		
	150	9,469					
			10,859	2.00	**21,718**		
	152	12,249					
			13,684	2.00	**27,369**		
	154	15,120					
WQ BASIN 2	158	4,878				**6,095**	2,221
			6,095	1.00	**6,095**		
	159	6,023					
			7,995	1.00	**7,995**		
	160	7,311					
			8,639	2.00	**17,279**		
	162	9,968					
			11,471	2.00	**22,941**		
	164	12,974					
WQ BASIN 3	159	5,133				**5,604**	4,681
			5,604	1.00	**5,604**		
	160	6,076					
			7,096	2.00	**14,192**		
	162	8,116					
			9,249	2.00	**18,498**		
	164	10,382					
			11,628	2.00	**23,255**		
	166	12,874					

Attachment G

Rip-Rap Level Spreader

Calculations

10 RUSSELL ROAD AKA J.E.T.

Level Spreader Design Calculations

					Minimum Calculated		Design Minimums	
Outlet ID	Q * (CFS)	Do * (Ft)	1/2 Do	TW * (Ft)	La	W	La	W
PR-S-2 (WQB#2)	1.29	1.25	0.625	0.69	11.6	8.4	12	9
PR-S-3 (WQB#1)	8.29	1.25	0.625	0.55	20.1	23.8	21	24

TW=Depth of flow

La = (1.7)*Q/Do^(3/2)+8(Do)

For Tw>(0.5)Do W=3(Do)+0.4(La)

For Tw<(0.5)Do W=3(Do)+(La)

* From Hydrastorm Storm Sewers 2008 Analysis

Attachment H

Sediment Forebay

Calculations

FAH
F. A. Hesketh & Associates, Inc.
6 Creamery Brook
East Granby, CT 06026
Civil & Traffic Engineers • Surveyors • Planners • Landscape Architects

JOB 23145 - 15 RUSSELL ROAD ARA J.E.T
SHEET NO. 1 OF 1
CALCULATED BY DRT DATE 12-22-23
CHECKED BY DRH DATE 12-22-23
SCALE N.T.S.

SEDIMENT FOREBAY CALCULATIONS

$$A = -\frac{Q}{V} LN(1-E) = 5.566 \times \%TQ4$$

WHERE:

A = MINIMUM REQUIRED SURFACE OF SEDIMENT FOREBAY (SF)

Q = DISCHARGE FROM DRAINAGE AREA (CFS)
= %TQ4 / 86,400 SEC.
∴ %TQ4 = PERCENT OF WATER QUALITY REQUIRED FOR SEDIMENT FOREBAY DESIGN (FT^3)

V = 0.0004 FEET PER SECOND PARTICLE SETTLING VELOCITY

E = SEDIMENT REMOVAL EFFICIENCY (ASSUMED 0.9 OR 90%)

WQB#1: $A_1 = -\frac{(11,221/86,400)}{0.0004} LN(1-0.9) = -\frac{.12987}{0.0004} LN(.1) \Rightarrow$
$= -324 LN(.1) = 747.61$ S.F.

WQB#2: $A_2 = -\frac{(2,221/86,400)}{0.0004} LN(1-0.9) = -\frac{.02571}{0.0004} LN(.1) \Rightarrow$
$= -64 LN(.1) = 147.98$ S.F.

WQB#3: $A_3 = -\frac{(4,681/86,400)}{0.0004} LN(1-0.9) = -\frac{.05418}{0.0004} LN(.1) \Rightarrow$
$= -135 LN(.1) = 311.88$ S.F.