DRAINAGE PLAN

SKYWAY WEST 2ND ADDITION

TO

WICHITA, SEDGWICK COUNTY, KANSAS

PREPARED BY

Baughman
ENGINEERING | SURVEYING | PLANNING
LANDSCAPE ARCHITECTURE

REVISED 15 DECEMBER 2011
28 OCTOBER 2011

ENGINEERING | SURVEYING | PLANNING
LANDSCAPE ARCHITECTURE

DRAINAGE PLAN
SKYWAY WEST 2ND ADDITON

FINAL REPORT

Prepared by Baughman Company, P.A.
28 October 2011
Revised 15 December 2011

By Trevor R. Kurth, P.E., CFM
N. Brent Wooten, P.E., L.S.

REPORT CONTENTS

EXISTING CONDITIONS

The site is located at the southeast corner of 31st Street South and 119th Street West in Wichita, Sedgwick County, Kansas. The site consists of approximately 162 acres that is currently farmland.

The area sits on a 'high point' in the topography and drains in four distinct directions. There is a small amount of offsite runoff from the northwest which is conveyed via a 24" RCP under 31st Street. This runoff appears to be located in the ROW ditch and ROW area. The site drains to the west directly into a RCBC under 119th Street, to the south onto a private residence and into an existing pond, to the southeast into a residential subdivision, and to the west through private properties and onto a platted industrial lot.

There is no FEMA SFHA located on this property as of this report. The drainage patterns as defined above can be seen on the Existing Conditions Exhibit.

PROPOSED CONDITIONS

The property is being platted into one large industrial lot. The site will be further defined upon site development. There will be dry detention ponds located near the existing site discharge points that will detain the sites developed runoff as well as provide water quality and downstream channel protection.

We expect the site to be paved with asphalt/concrete or with gravel upon development. The site will likely be graded to minimum grades to account for large industrial users and will likely drain via ditches/swales and overland flow.

For a half-scale copy of the Plat, see Exhibit 3.

OFFSITE CONDITIONS

The proposed site drains to four distinct locations. The western half of the site drains to the 119th Street ROW and box culvert located under the roadway. The northeast portion of the site drains via overland flow and loosely channelizes on the adjacent residential properties to the east until encroaching Skyway West Addition, also located to the east. A small portion of the site drains to the southeast and into the Harvest Ridge Addition SWS system. The remaining portion drains to the south and directly into an adjacent pond located on a platted residential property. The outfall locations of runoff appear to be well defined.

There is one location of offsite runoff that may encroach the property. There is a 24" RCP under 31st Street which conveys runoff from the north to the south ROW. This area appears to drain approximately 41 acres with a large detention pond/area in the middle of the basin. Upon site visits and lidar topography, the runoff drains via the SWS culvert and stays in the ROW ditch section. Upon larger events, if the runoff overtops the roadway, it could encroach on then property while flowing south to the box culvert.

The USGS Quadrangle Sheet can be seen with the site location plotted as Exhibit 1. The Aerial for this area can be viewed as Exhibit 2.

EXISTING CONDITIONS RUNOFF CALCULATIONS

DRAINAGE METHODS & STANDARDS

The following methods and standards, although not a complete list, were used in calculating the existing conditions runoff values.

- STORM SERIES
  - 24-hour; 2-yr, 5-yr, 10-yr, 25-yr, 100-yr Storm Events Modeled
  - 2-yr Rainfall Depth = 3.5 in
  - 10-yr Rainfall Depth = 5.3 in
  - 100-yr Rainfall Depth = 7.9 in

- FLOW DATA
  - Areas per LIDAR data, USGS Quadrangle Sheet, Aerial Photos, and Site Visits
  - SCS Curve Number used for Existing Flows (CN = 80)
  - Time of Concentration: Lag Method (minimum 15 min)

SITE CHARACTERISTICS

The site consists of approximately 162 acres of currently agricultural farmland. The area has a high point in the topography which drains in four distinct directions. The existing site characteristics can be seen from the aerial exhibit (Exhibit 2).

EXISTING CONDITIONS HYDROLOGIC ANALYSIS

The site was analyzed for pre-development conditions using the SCS Curve Number method for the entire storm event series. A Curve Number (CN) of 80 was used for existing conditions due to row crops in a Type C soil condition. Although the CN's for this soil type would be higher utilizing TR-55, a more conservative CN of an 80 was used. This was used based on Table 4-2 in the City of Wichita's storm water manual. A Time of Concentration of 15 minutes was used as is the minimum T, where applicable.

DOWNSTREAM DRAINAGE CAPACITY

The site flows to the west, east, south, and southeast. There is a box culvert located under 119th Street which conveys runoff to the west. This structure is old and partially silted in. We anticipate this structure to have been designed to convey approximately the 5 year storm event, based on common historical Sedgwick County practices. The roadway is not currently paved and overtops in larger storm events. Downstream to the east appears to be a non-uniform channel across two residential lots, then a platted drainage easement and proposed channel section in Sky Way West Addition. To the direct south is a wet pond which accepts this sites runoff with what appears to be a weir section discharging its flow to the south onto the same property. The runoff to the southeast discharges to the residential subdivision and its SWS system. There is an 18" RCP located with an area inlet to capture the offsite runoff at this location in the residential subdivision.

POST-DEVELOPMENT HYDROLOGIC ANALYSIS

DRAINAGE METHODS & STANDARDS

The following methods and standards, although not a complete list, were used in developing the drainage and grading plans.

- STORM SERIES
  - 24-hour; 2-yr, 5-yr, 10-yr, 25-yr, 50-yr, 100-yr Storm Events Modeled
  - 1.2" Water Quality Flow modeled as '3-yr event' in HydraFlow
  - Hydrograph Method utilized for Developed Flows
  - CN = 91 (Soil Type C – Industrial Cover)
  - Time of Concentration; Lag Method, minimum Tc = 15min

- GRADING CONSTRAINTS
  - One foot freeboard between 100-yr WSE and adjacent lot corner
  - Match all existing perimeter grades

DEVELOPED CONDITIONS HYDROLOGIC ANALYSIS

The site is proposed to be platted into a one lot industrial development. There is proposed to be 4 separate detention areas to detain developed runoff to the existing discharge points. A Curve Number of 91 was used for Industrial Lots in a Soil Type C. No specific grading or lot configuration is known at the time of this plat.

Please be aware, that the storm listed as the '3-yr event' in the Hydraflow model is actually the 1.2" rainfall water quality event. This is due to the constraints of the programs naming conventions. All the other storm events correspond to their respective years. The Channel Protection volume is generated using the 1-year event.

DETENTION FACILITIES

There are 4 detention facilities proposed for this plat. Each facility will be dry detention due to the proximity to Wichita's Mid-Continent Airport. These facilities can achieve only 60% of the water quality for the proposed site in each of their respective basins according to the Storm Water Manual design for extended dry detention ponds. Each facility is detailed further below.

- Reserve A

  This pond is located along 119th Street in Reserve A. This area will accept runoff from Basin 1 and will provide detention for the entire storm series. This pond will drain via a 36" pipe riser along with a weir section for larger storm events. The WQ and CP volumes will be discharged via a 4" orifice on the riser installed at the pond bottom elevation.

- Reserve B

  The dry detention located in Reserve B will detain provide detention throughout the storm series as well as provide CP and WQ volumes.

This pond will discharge to the east and into the platted Skyway West Addition. An additional easement will need to be obtained and the drainage channel as proposed in the aforementioned plat will need to be extended to this area. This area will drain via a 36" RCP and a 10' weir section. A 4" orifice will be utilized at the static surface for the WQ and CP extended detention and be installed as a riser system in conjunction with the 36" RCP.

- Reserve C

  Reserve C will feature a dry detention pond that will serve only the peak detention requirements for Basin 3. Due to the large basin and outfall needed, no WQ or CP will be provided in this area. The dry detention area will drain via a 10' weir section at the existing outfall elevation.

- Reserve D

  The dry detention pond located in Reserve D will serve as detention as well as WQ and CP volumes. This area will drain via an 18" RCP with a 3" orifice on a riser system. The outfall pipe will tie directly into the existing SWS located in Harvest Ridge Addition.

DISCHARGE POINTS SUMMARY

The site will continue to discharge to the directions that currently exist on site. The only exception will be Reserve B. The discharge will be moved to the south approximately 500 feet in order to avoid the adjacent residential properties and their respective drives. The new discharge location will be into the Skyway West Addition. The proposed ditch section in that addition will need to be extended to the north and west to accept this new location. We expect the ditch section to remain the same characteristically as proposed in that site's plat and drainage plan and feature a 0.2% slope.

WATER QUALITY

Preliminary water quality calculations have been provided for the basins and detention facilities. The proposed detention facilities in Reserves A, B, and D will provide 60% of the needed water quality volume. Reserve C will not provide any at its current proposed configuration. With that in mind, the remaining volumes needed will need to be achieved at site plan time. The amount needed will depend on the specific site plan and percentage of impervious cover. Since the site plan and cover is not available at this time, additional locations are not provided. At this time, the following chart can be used for a general requirement of the WQ needed on the site.

Total Developed Area	Water Quality Volume Needed	WQv needed per Developed sqft
40.4 acres	76,000 cuft	0.04 cuft

This chart portrays the overall WQv needed per square foot of development. This does not include the 60% of treatment that the dry detention areas will offer to the development. The reason this was not factored in was due to the treatment train calculations can vary based on the method chosen for the additional removal the site will utilize. Upon site plan and development, the engineer should run a

treatment train calculation for the chosen BMP and include the dry detention area in that calculation. For the purpose of this report, the total needed for the site is shown above.

DOWNSTREAM CHANNEL PROTECTION

The downstream channel protection requirement will be met in the current proposed configuration for Reserves A, B, and D. These detention areas will provide extended detention with the use of small orifices and risers for the 1-year storm event on the pond outfalls.

Reserve C will only provide approximately 1 hour of the extended detention requirement. At the time of site planning for this area of the plat (Basin 3) there will need to be channel protection provided as well as storm water quality. Since the site plan and ground cover type is not available at this time, additional locations of water quality and downstream channel are not provided.

POTENTIAL UPSTREAM/DOWNSTREAM IMPACTS

Due to the construction of dry detention ponds, and the utilization of existing outfall elevations, we do not anticipate any downstream impacts with this development. The location of the detention area in Reserve B will require the extension of the drainage easement on Skyway West Addition as well as the extension of the proposed channel section.

Since this site is located on the high point in this particular basin, we do not anticipate any upstream impacts to surrounding properties. The only location of offsite runon is located in the ROW and will continue to flow onto this area after this development.

The existing 41 acres that drains by this property at the northwest property can remain in the ROW and ditch section. At this point, there is currently 60 feet from the platted property line to the asphalt road; which is enough for a ditch section to convey this runoff to the south and under the roadway culvert. Since the main flows stay in the ditch section in the ROW, and there is sufficient room in the ROW for a larger ditch section, there is no need to convey the runoff directly onto this property.

The proposed detention area in Reserve D will greatly reduce the runoff from Basin 4, as shown on the plan sheet. There is an 18" pipe with a grated inlet to pick up existing offsite runoff today. This plan will extend a stub onto this system and regulate the flow through the detention area.

SOURCE OF FLOODPLAIN INFORMATION

The site lies within a FEMA Zone X - Unshaded. The location of the property, on FEMA FIRM Panel 340 of 700 for Sedgwick County, Kansas, effective February 2, 2007, is attached as Exhibit 6.

FEDERAL, STATE, & LOCAL PERMITTING

US ARMY CORPS OF ENGINEERS

There does not appear to be any jurisdictional waters of the US on this site.

KANSAS DEPT OF AGRICULTURE – DWR PERMITTING

There does not appear to be any DWR permitting needed on the proposed site at this time. The areas of discharge do not account for more than 240 acres.

FEMA

There is no mapped floodplain located upon the proposed site. Therefore, no FEMA permitting is expected at this time.

KANSAS DEPT OF TRANSPORTATION

There does not appear to be any KDOT permitting needed on the proposed project.

SEDGWICK COUNTY PERMITTING

There does appear to be Sedgwick County permitting needed at this time due to discharge into the 119th ROW.

EXHIBIT 1: Site Location Map

EXHIBIT 2: Aerial Photo Exhibit with Lidar Topography

EXHIBIT 3: Plat – Half Scale

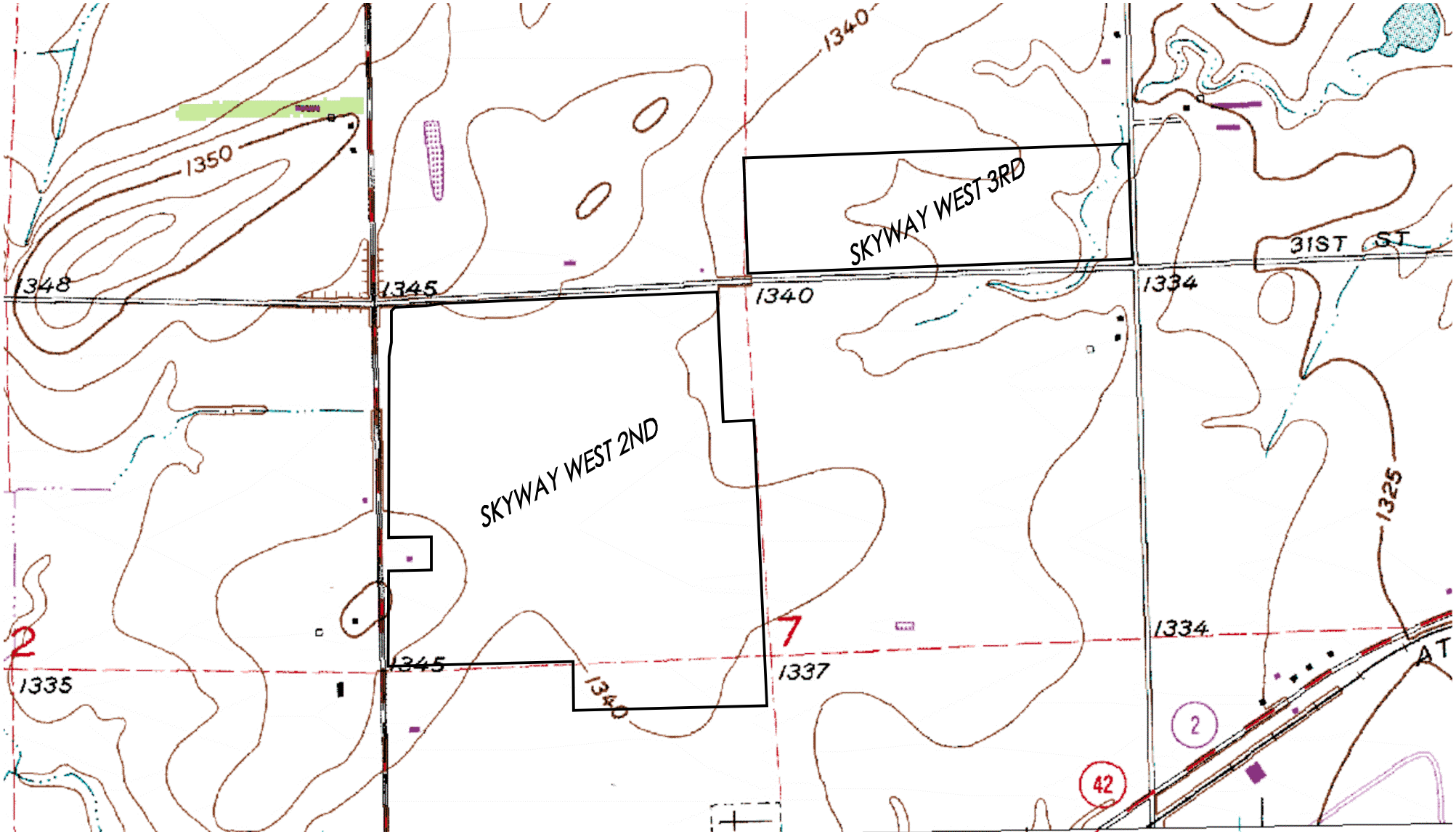
EXHIBIT 4: Drainage Plan – Half Scale

EXHIBIT 5: Floodplain Location (FIRM)

SITE LOCATION EXHIBIT

SKYWAY WEST 2ND & 3RD ADDITIONS

WICHITA, SEDGWICK COUNTY, KANSAS



0 500 1000

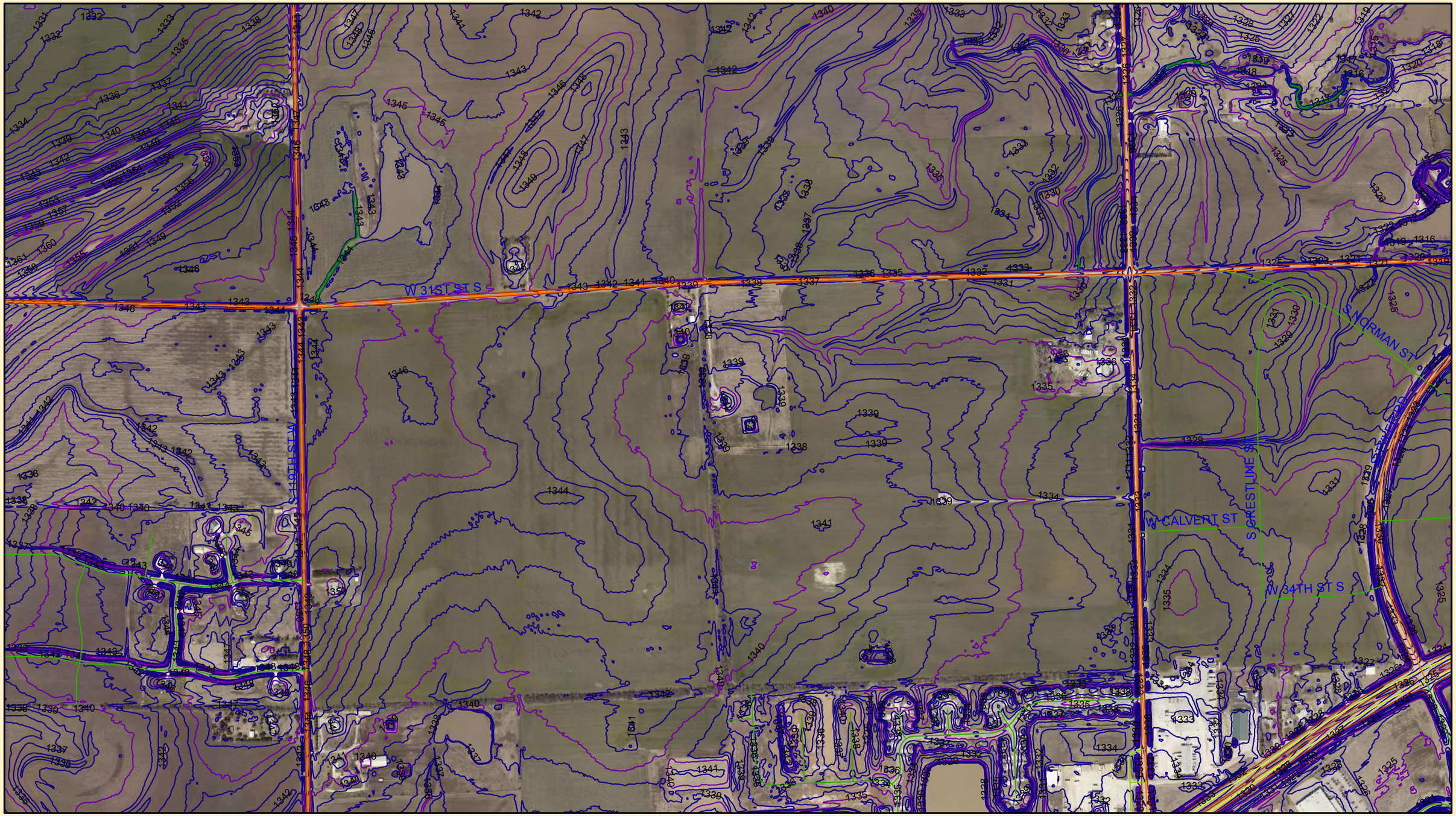
CONTOUR INTERVALS = 10 FOOT

EXHIBIT 1

SKYWAY WEST 2ND & 3RD ADDITIONS

1 NOV 11

Baughman Company , P.A.
315 Ellis St. Wichita, KS 67211 P 316-262-7271 F 316-262-0149
Baughman ENGINEERING | SURVEYING | PLANNING | LANDSCAPE ARCHITECTURE



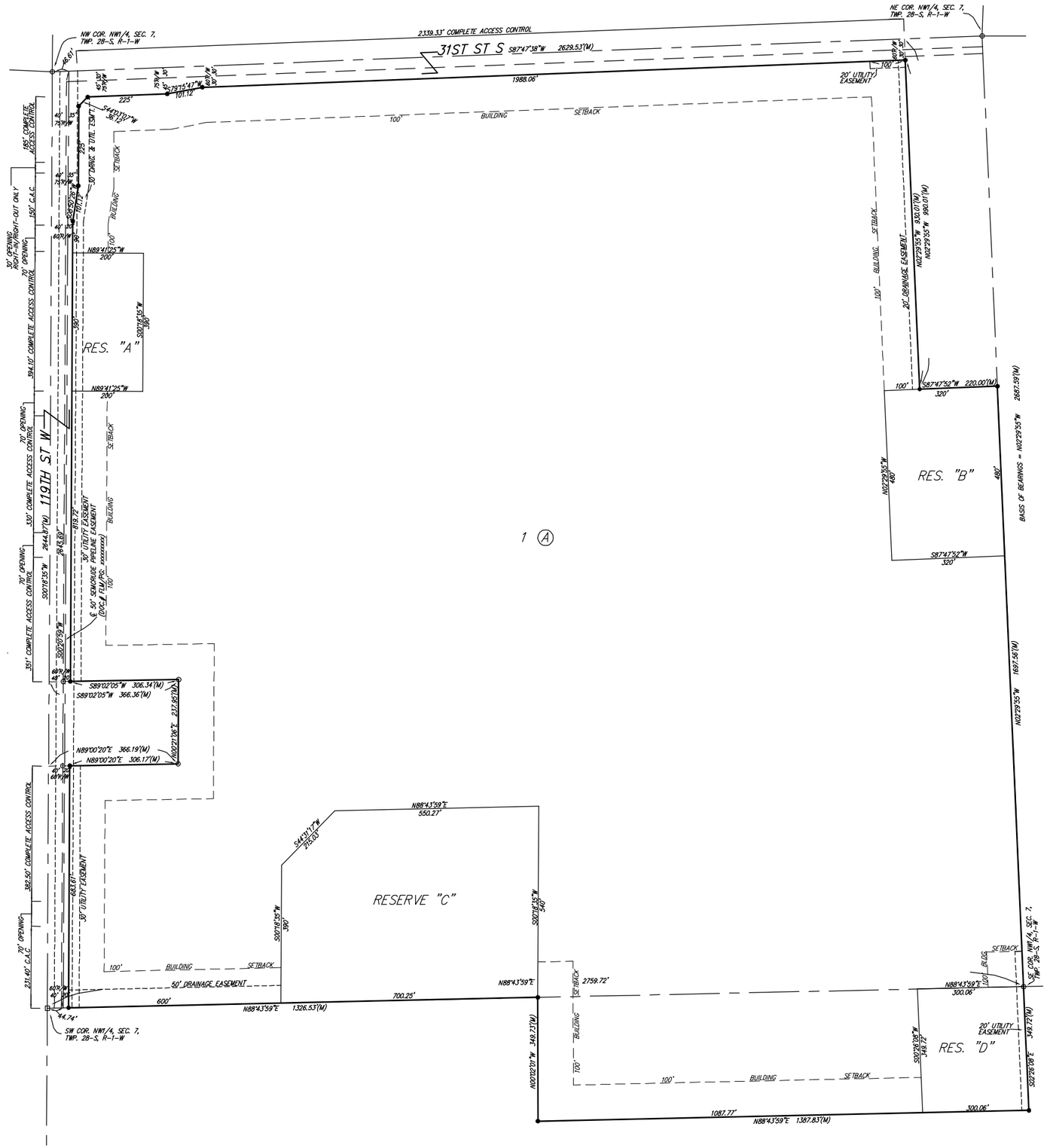
AERIAL EXHIBIT

SKYWAY WEST 2ND & 3RD ADDITIONS

0 300 600 1,200 Feet

Baughman
ENGINEERING | SURVEYING | PLANNING
LANDSCAPE ARCHITECTURE

SKYWAY WEST 2ND ADDITION
WICHITA, SEDGWICK COUNTY, KANSAS



State of Kansas) SS
Sedgwick County)

We, Baughman Company, P.A., Surveyors in aforesaid county and state do hereby certify that we have surveyed and platted "SKYWAY WEST 2ND ADDITION", Wichita, Sedgwick County, Kansas and that the accompanying plat is a true and correct exhibit of the property surveyed, described as the east half of the Northwest Quarter of Section 7, Township 28 South, Range 1 West of the Sixth Principal Meridian, Sedgwick County, Kansas; EXCEPT the East 220 feet of the north 990 feet thereof, TOGETHER with the west half of the Northwest Quarter of Section 7, Township 28 South, Range 1 West of the 6th P.M., Sedgwick County, Kansas, EXCEPT that part described as beginning at a point on the west line of said NW1/4, 683.96 feet north of the southwest corner thereof; thence north on said west line 238 feet; thence east at an interior angle of 91°18', 366.15 feet; thence south at an interior angle 88°42', 238 feet; thence west 366.15 feet to the point of beginning, TOGETHER with the north 349.65 feet of the east half of the Southwest Quarter of Section 7, Township 28 South, Range 1 West of the 6th P.M., Sedgwick County, Kansas.

Existing public easements and dedications being vacated by virtue of K.S.A. 12-512(b).

Baughman Company, P.A.

_____, Surveyor
Michael G. Conrey

Know all men by these presents that we, the undersigned, have caused the land in the surveyors cerlificate to be platted into a Lot, a Block, Streets, and Reserves to be known as "SKYWAY WEST 2ND ADDITION", Wichita, Sedgwick County, Kansas. The utility easements are hereby granted as indicated for the construction and maintenance of all public utilities. The drainage and utility easements are hereby granted as indicated for drainage purposes and for the construction and maintenance of all public utilities. The drainage easements are hereby granted as indicated for drainage purposes. The streets are hereby dedicated to and for the use of the public. Reserves "A", "B", "C", and "D" are reserved for open space, landscaping, berms, lakes, drainage purposes, and utilities as confined to easements. Reserves "A", "B", "C", and "D" shall be owned and maintained by the owner/owners of Lot 1. Access controls shall be as depicted on the face of the plat and are hereby granted to the City of Wichita, Kansas. The permitted opening locations shall be as determined by the City Engineer of the City of Wichita, Kansas. The Minimum Building Pod Elevations for the lowest opening to the structures shall be as indicated on the face of the plat.

John E. Dugan Family Partnership, L.P.

_____, Partner
John E. Dugan

State of Kansas) SS
Sedgwick County)

The foregoing instrument acknowledged before me, this_____day of _____, 2011, by John E. Dugan, Partner of the John E. Dugan Family Partnership, L.P., on behalf of the limited partnership.

_____ Notary Public

My App't. Exp. _____

0 150 300

DATE OF PREPARATION: 24 OCTOBER 2011

MINIMUM BUILDING PAD ELEVATIONS FOR LOWEST OPENING TO THE STRUCTURES		
LOT	BLOCK	ELEVATION NAVD88
1	A	1345.0

• = #4 REBAR W/ "BAUGHMAN" CAP (SET)
⊠ = 3/4" IRON (FOUND)
○ = 1" IRON (FOUND)
□ = 1" IRON PIPE IN THIMBLE (FOUND)

(M) = MEASURED
(D) = DESCRIBED
(P) = PLATTED

BENCHMARK:
MAIZE ROAD & 31ST SOUTH-CITY OF WICHITA BENCHMARK DISC. 200'± WEST OF INTERSECTION, SOUTHEAST CORNER OF HUBGUARD OF R.C.B.C. ELEV. = 1331.82 NGVD88

NOTE:
A drainage plan has been developed for this subdivision and is on file with the City of Wichita, Kansas. Drainage intent shall remain as depicted or as modified with the approval of the City Engineer of the City of Wichita, Kansas. No obstructions which impede the flow of this drainage plan shall be allowed.

This plat of "SKYWAY WEST 2ND ADDITION", Wichita, Sedgwick County, Kansas has been submitted to and approved by the Wichita-Sedgwick County Metropolitan Area Planning Commission, Wichita, Kansas.

Dated this ____ day of _____, 2011.
Wichita-Sedgwick County Metropolitan Area Planning Commission

_____, Chair
Shawn Farney

_____, Secretary
John L. Schlegel

This plat approved and all dedications shown hereon accepted by the City Council of the City of Wichita, Kansas, this ____ day of _____, 2011.

_____, Mayor
Carl Brewer

_____, City Clerk
Karen Sublett

Reviewed in accordance with K.S.A. 58-2005 on this _____ day of _____, 2011.

_____
Tricia L. Robello, L.S. #1246
Deputy County Surveyor
Sedgwick County, Kansas

Entered on transfer record this _____ day of _____, 2011.

_____, County Clerk
Kelly B. Arnold

State of Kansas) SS
Sedgwick County)

This is to certify that this plat has been filed for record in the office of the Register of Deeds, this ____ day of _____, 2011 at _____o'clock __M; and is duly recorded.

_____, Register of Deeds
Bill Meek

_____, Deputy
Tonya Buckingham

SKYWAY WEST 2ND ADDITION

24 OCTOBER 2011

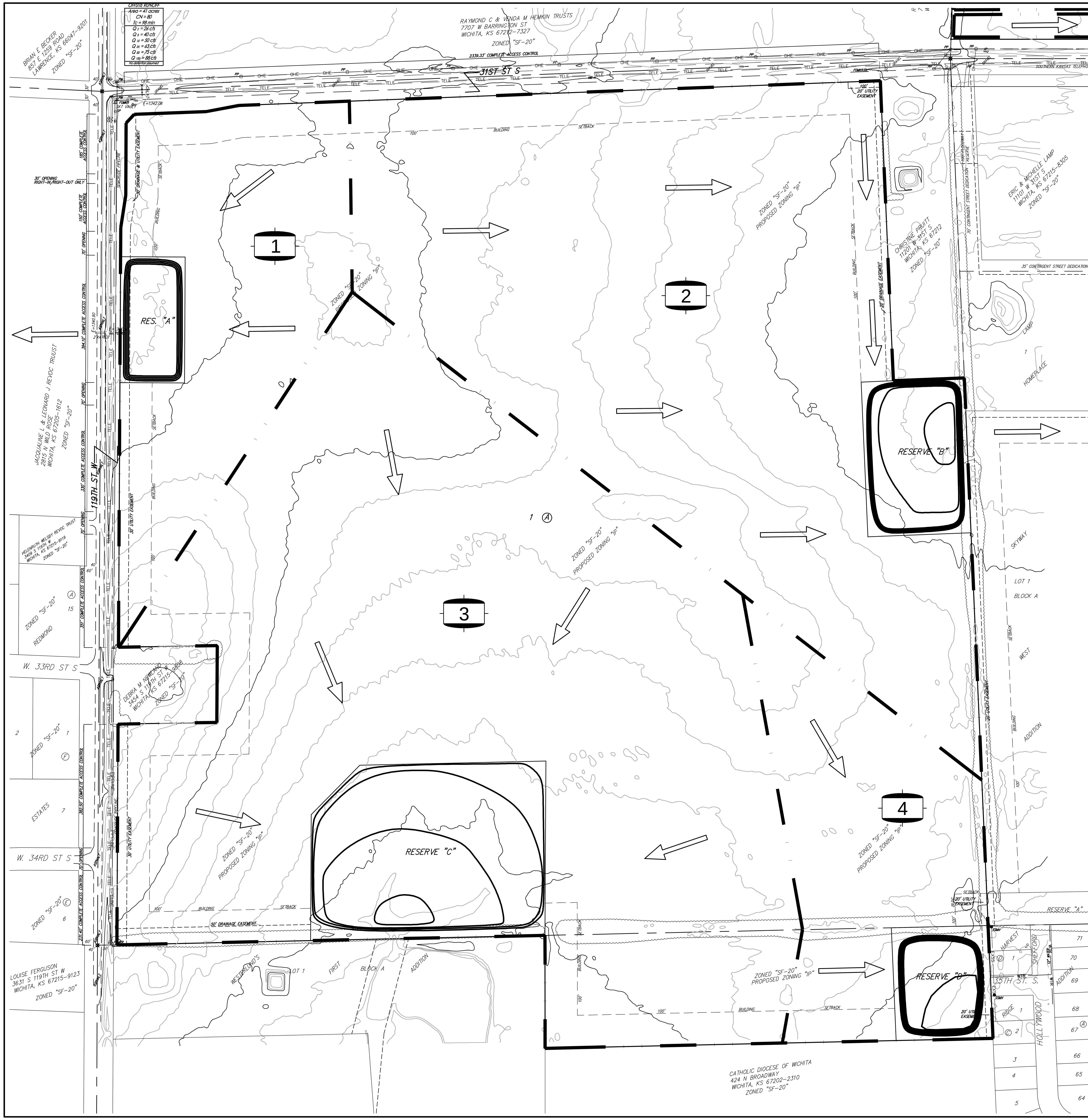
Baughman Company, P.A.
315 Ellis St. Wichita, KS 67211 P 316-262-7271 F 316-262-0149
ENGINEERING | SURVEYING | PLANNING | LANDSCAPE ARCHITECTURE

E:/PROJECTS/SKYWAYWEST2ND/SKYWAY2NDAND3RD_P.DWG-RKR

DRAINAGE PLAN

SKYWAY WEST 2ND ADDITION

WICHITA, SEDGWICK COUNTY, KANSAS



1
EXISTING Discharge Point 1
Area = 18 acres CN = 80 Tc = 25 min
Q_2 = 28 cfs Q_5 = 43 cfs Q_{10} = 54 cfs Q_{25} = 68 cfs Q_{100} = 95 cfs

2
EXISTING Discharge Point 2
Area = 55 acres CN = 80 Tc = 60 min
Q_2 = 50 cfs Q_5 = 76 cfs Q_{10} = 95 cfs Q_{25} = 120 cfs Q_{100} = 168 cfs

3
EXISTING Discharge Point 3
Area = 73 acres CN = 80 Tc = 66 min
Q_2 = 61 cfs Q_5 = 93 cfs Q_{10} = 117 cfs Q_{25} = 147 cfs Q_{100} = 207 cfs

4
EXISTING Discharge Point 4
Area = 15 acres CN = 80 Tc = 66 min
Q_2 = 13 cfs Q_5 = 19 cfs Q_{10} = 24 cfs Q_{25} = 30 cfs Q_{100} = 42 cfs

RESERVE A (Bottom = 1341.0)

STAGE	INFLOW	OUTFLOW	ELEVATION
2 yr	51 cfs	5.1 cfs	1342.8
5 yr	70 cfs	7.4 cfs	1343.3
10 yr	84 cfs	8.6 cfs	1343.8
25 yr	100 cfs	18 cfs	1344.2
100 yr	131 cfs	38 cfs	1344.8

PROPOSED POND

ELEVATION	AREA (sq ft)
1341	52000
1342	56700
1343	62000
1344	67000
1345	72000

RESERVE B (Bottom = 1334.0)

STAGE	INFLOW	OUTFLOW	ELEVATION
2 yr	104 cfs	24 cfs	1337.2
5 yr	141 cfs	54 cfs	1337.8
10 yr	167 cfs	75 cfs	1338.1
25 yr	201 cfs	103 cfs	1338.6
100 yr	263 cfs	153 cfs	1339.3

PROPOSED POND

ELEVATION	AREA (sq ft)
1334	15000
1335	86000
1336	117000
1337	123000
1338	128000
1339	133000
1340	138000

RESERVE C (Bottom = 1338.0)

STAGE	INFLOW	OUTFLOW	ELEVATION
2 yr	124 cfs	66cfs	1339.6
5 yr	168 cfs	89 cfs	1339.9
10 yr	199 cfs	103 cfs	1340.1
25 yr	239 cfs	119 cfs	1340.3
100 yr	314 cfs	153 cfs	1340.8

PROPOSED POND

ELEVATION	AREA (sq ft)
1338	13700
1339	140000
1340	300000
1341	350000

RESERVE D (Bottom = 1333.0)

STAGE	INFLOW	OUTFLOW	ELEVATION
2 yr	39 cfs	4.9 cfs	1335.0
5 yr	49 cfs	8.7 cfs	1335.4
10 yr	58 cfs	10 cfs	1335.8
25 yr	69 cfs	11 cfs	1336.3
100 yr	91 cfs	14 cfs	1337.2

PROPOSED POND

ELEVATION	AREA (sq ft)
1333	23000
1334	61000
1335	65000
1336	69000
1337	73000
1338	77000

0 150 300

DATE OF PREPARATION: 28 FEBRUARY 2011
DATE OF TOPOGRAPHY: 15 DECEMBER 2010
CONTOUR INTERVALS = 1 FOOT (CONTOURS PROVIDED BY SEDGWICK COUNTY)

OWNER:
JOHN E. DUGAN fAMILY PARTNERSHIP, L.P.
ATTN: JOHN DUGAN
2416 MORNING DEW
WICHITA, KS 67205
316-721-2416

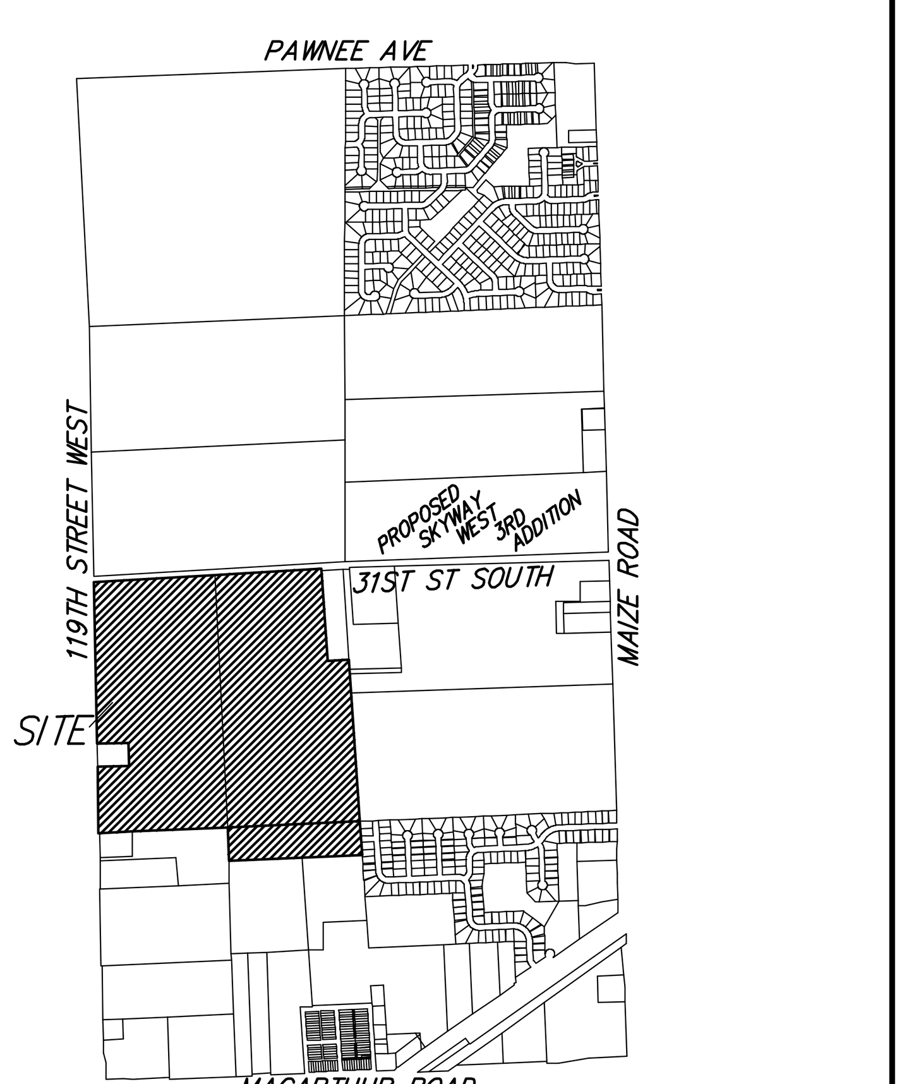
LEGAL DESCRIPTION:
THE EAST HALF OF THE NORTHWEST QUARTER OF SECTION 7, TOWNSHIP 28 SOUTH, RANGE 1 WEST OF THE SIXTH PRINCIPAL MERIDIAN, SEDGWICK COUNTY, KANSAS; EXCEPT THE EAST 220 FEET OF THE NORTH 990 FEET THEREOF, TOGETHER WITH THE WEST HALF OF THE NORTHWEST QUARTER (W1/2 NW1/4) OF SECTION 7, TOWNSHIP 28 SOUTH, RANGE 1 WEST, SEDGWICK COUNTY, KANSAS, EXCEPT A TRACT BEGINNING 683.96 FEET NORTH OF THE SOUTHWEST CORNER OF SAID NORTHWEST QUARTER, THENCE NORTH 238 FET, THENCE EAST 366.15 FEET, THENCE SOUTH 238 FEET, THENCE WEST 366.15 FEET TO BEGINNING.

BENCHMARK:
MAIZE ROAD & 31ST SOUTH-CITY OF WICHITA BENCHMARK DISC. 200'± WEST OF INTERSECTION, SOUTHEAST CORNER OF HUBGUARD OF R.C.B.C.
ELEV. = 1331.82 NGVD88

RESERVES "A", "B", "C", AND "D" ARE RESERVED FOR OPEN SPACE, LANDSCAPING, BERMS, LAKES, DRAINAGE PURPOSES, AND UTILITIES AS CONFINED TO EASEMENTS.

FH = Fire Hydrant
GP = Guy Pole
Guy = Guy Anchor
MB = Mail Box
PM = Pipeline Marker
PP = Power Pole
Sign = Sign
SSMH = Sanitary Sewer Manhole
ATT Ped = ATT Pedestal
WM = Water Meter
WV = Water Valve

WTR — WATER LINE
AT&T — SOUTHWESTERN BELL
GAS — GAS LINE
CaTV — CABLE TV
-x- — FENCE
OHE — OVERHEAD ELECTRIC LINE
EXSS — SANITARY SEWER
PIPELINE — PIPELINE



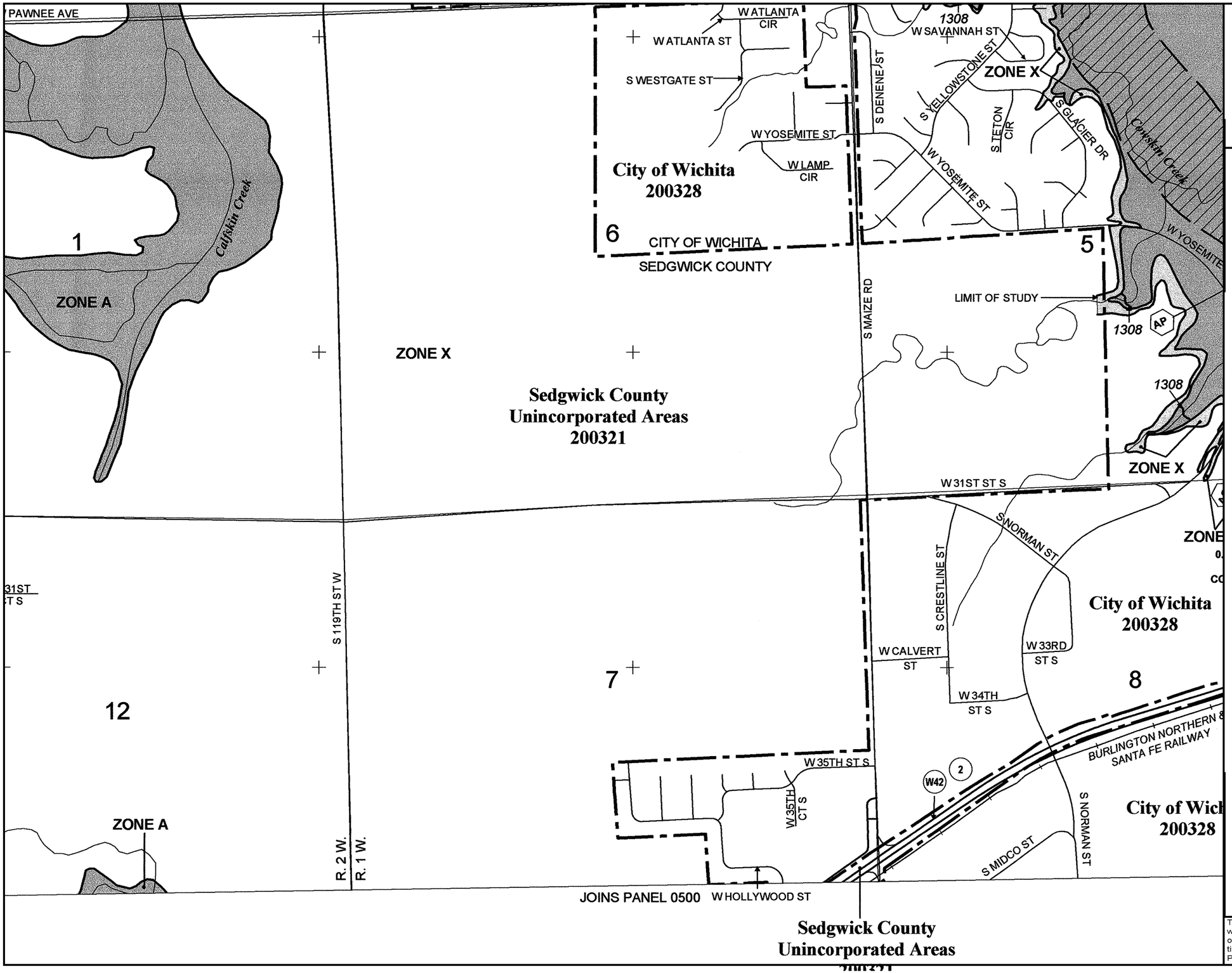
VICINITY MAP
SEC. 6, T28S, R1W
SEC. 7, T28S, R1W

DRAINAGE PLAN
SKYWAY WEST 2ND ADDITION

REV 19 DEC 2011
12 OCT 2011

Baughman Company , P.A.
315 Ellis St. Wichita, KS 67211 P 316-262-7271 F 316-262-0149
ENGINEERING | SURVEYING | PLANNING | LANDSCAPE ARCHITECTURE

E:\Projects\Skyway West 2nd & 3rd Addition_10-01-P589\Water Resources\skyway west 2nd and 3rd_P_draintk.dwg



MAP SCALE 1" = 1000'

NFIP NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0340E

FIRM

FLOOD INSURANCE RATE MAP

SEDGWICK COUNTY, KANSAS
AND INCORPORATED AREAS

PANEL 340 OF 700

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
SEDGWICK COUNTY	200321	0340	E
WICHITA, CITY OF	200328	0340	E

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

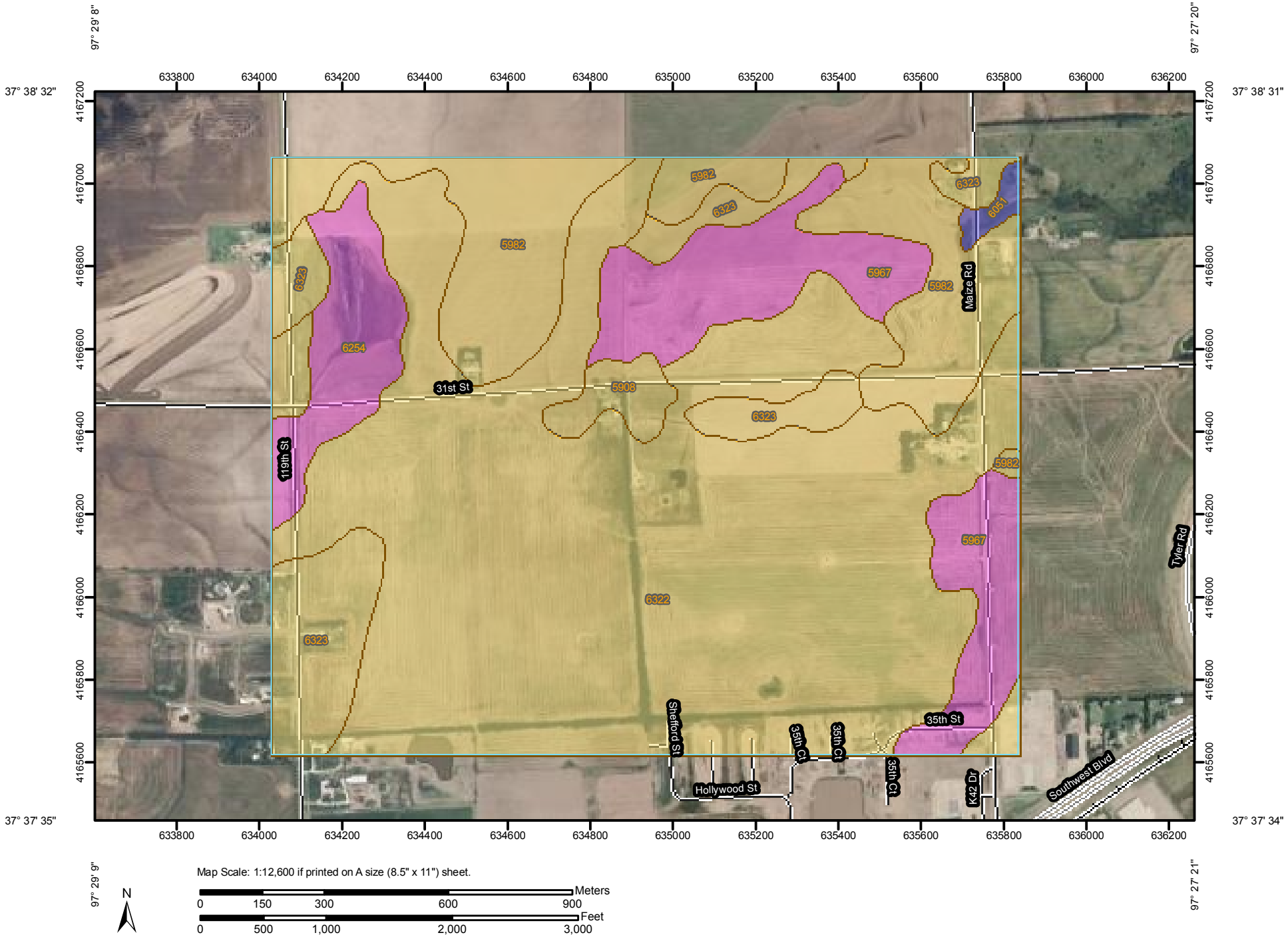
MAP NUMBER
20173C0340E

EFFECTIVE DATE
FEBRUARY 2, 2007
Federal Emergency Management Agency

APPENDIX A: USGS Soils Survey

APPENDIX B : HydraFlow Hydrographs
Site Flow and Pond Routing

USGS Soils Survey


97° 29' 8"
97° 27' 20"
37° 38' 32"
37° 38' 31"
37° 37' 35"
37° 37' 34"
633800
634000
634200
634400
634600
634800
635000
635200
635400
635600
635800
636000
636200
4167200
4167000
4166800
4166600
4166400
4166200
4166000
4165800
4165600
5982
6323
6051
5967
6254
5908
6322
31st St
119th St
Maize Rd
Tyler Rd
Shefford St
35th St
35th Ct
Hollywood St
K42 Dr
Southwest Blvd
Map Scale: 1:12,600 if printed on A size (8.5" x 11") sheet.
N
Meters
0 150 300 600 900
Feet
0 500 1,000 2,000 3,000

MAP LEGEND

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

Soils
- Soil Map Units

Soil Ratings
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Political Features
- Cities

Water Features
- Streams and Canals

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

MAP INFORMATION

Map Scale: 1:12,600 if printed on A size (8.5" × 11") sheet.

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

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

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: UTM Zone 14N NAD83

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

Soil Survey Area: Sedgwick County, Kansas
Survey Area Data: Version 7, Nov 30, 2010

Date(s) aerial images were photographed: 6/30/2006

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

Hydrologic Soil Group

Hydrologic Soil Group— Summary by Map Unit — Sedgwick County, Kansas (KS173)				
Map unit symbol	**Map unit name**	**Rating**	**Acres in AOI**	**Percent of AOI**
5908	Nalim loam, 0 to 1 percent slopes	C	9.9	1.5%
5967	Tabler silty clay loam, 0 to 1 percent slopes	D	70.5	10.9%
5982	Nalim loam, 1 to 3 percent slopes	C	95.7	14.8%
6051	Elandco silt loam, frequently flooded	B	3.4	0.5%
6254	Waurika silt loam, 0 to 1 percent slopes	D	30.6	4.7%
6322	Blanket silt loam, 0 to 1 percent slopes	C	378.2	58.7%
6323	Blanket silt loam, 1 to 3 percent slopes	C	56.3	8.7%
Totals for Area of Interest			**644.6**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Aggregation is the process by which a set of component attribute values is reduced to a single value that represents the map unit as a whole.

A map unit is typically composed of one or more "components". A component is either some type of soil or some nonsoil entity, e.g., rock outcrop. For the attribute being aggregated, the first step of the aggregation process is to derive one attribute value for each of a map unit's components. From this set of component attributes, the next step of the aggregation process derives a single value that represents the map unit as a whole. Once a single value for each map unit is derived, a thematic map for soil map units can be rendered. Aggregation must be done because, on any soil map, map units are delineated but components are not.

For each of a map unit's components, a corresponding percent composition is recorded. A percent composition of 60 indicates that the corresponding component typically makes up approximately 60% of the map unit. Percent composition is a critical factor in some, but not all, aggregation methods.

The aggregation method "Dominant Condition" first groups like attribute values for the components in a map unit. For each group, percent composition is set to the sum of the percent composition of all components participating in that group. These groups now represent "conditions" rather than components. The attribute value associated with the group with the highest cumulative percent composition is returned. If more than one group shares the highest cumulative percent composition, the corresponding "tie-break" rule determines which value should be returned. The "tie-break" rule indicates whether the lower or higher group value should be returned in the case of a percent composition tie.

The result returned by this aggregation method represents the dominant condition throughout the map unit only when no tie has occurred.

Component Percent Cutoff: None Specified

Components whose percent composition is below the cutoff value will not be considered. If no cutoff value is specified, all components in the database will be considered. The data for some contrasting soils of minor extent may not be in the database, and therefore are not considered.

Tie-break Rule: Higher

The tie-break rule indicates which value should be selected from a set of multiple candidate values, or which value should be selected in the event of a percent composition tie.

HydraFlow Hydrographs

Site Flow & Pond Routing

Watershed Model Schematic

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8

Legend

Hyd.	Origin	Description
1	SCS Runoff	Existing Basin 1
2	SCS Runoff	Existing - Basin 2
3	SCS Runoff	Existing - Basin 3
4	SCS Runoff	Existing - Basin 4
5	SCS Runoff	Developed - Basin 1
6	Reservoir	Reserve A Pond
7	SCS Runoff	Developed - Basin 2
8	SCS Runoff	Developed - Basin 3
9	Reservoir	Reserve C Pond
10	SCS Runoff	Developed - Basin 4
11	Reservoir	Reserve D
12	Reservoir	Reserve B
13	SCS Runoff	Offsite North

Hydrograph Return Period Recap

Hyd. No.	Hydrograph type (origin)	Inflow hyd(s)	Peak Outflow (cfs)								Hydrograph Description
			1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr	
1	SCS Runoff	------	18.76	28.37	1.618	43.11	53.78	67.75	80.29	94.46	Existing Basin 1
2	SCS Runoff	------	32.70	49.83	2.833	76.00	95.00	119.90	142.32	167.79	Existing - Basin 2
3	SCS Runoff	------	40.07	61.12	3.503	93.27	116.63	147.25	174.79	206.09	Existing - Basin 3
4	SCS Runoff	------	8.234	12.56	0.720	19.17	23.97	30.26	35.92	42.35	Existing - Basin 4
5	SCS Runoff	------	39.07	52.12	10.35	70.72	83.69	100.27	114.93	131.35	Developed - Basin 1
6	Reservoir	5	2.252	5.097	0.207	7.406	8.552	18.24	28.73	37.84	Reserve A Pond
7	SCS Runoff	------	77.48	103.70	20.26	141.18	167.31	200.76	230.35	263.49	Developed - Basin 2
8	SCS Runoff	------	92.23	123.51	24.07	168.23	199.42	239.34	274.65	314.22	Developed - Basin 3
9	Reservoir	8	51.00	65.93	14.28	88.99	102.52	119.13	134.62	152.71	Reserve C Pond
10	SCS Runoff	------	26.80	35.86	7.021	48.80	57.82	69.36	79.57	91.01	Developed - Basin 4
11	Reservoir	10	1.567	4.903	0.162	8.687	10.17	11.64	12.76	13.88	Reserve D
12	Reservoir	7	6.774	23.92	0.445	53.80	75.34	102.53	126.59	152.61	Reserve B
13	SCS Runoff	------	16.97	25.95	1.547	39.72	49.74	62.89	74.73	88.14	Offsite North

Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8

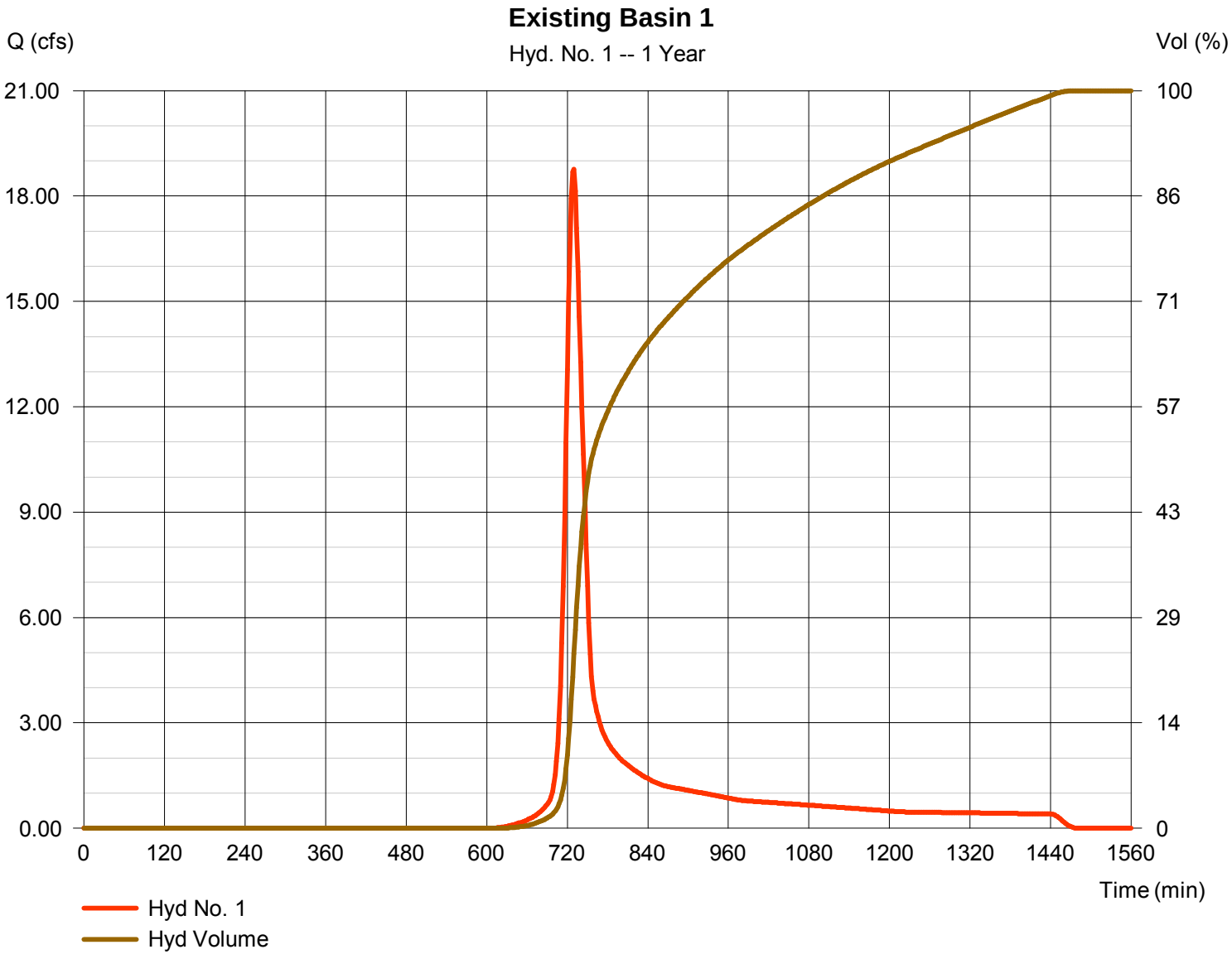
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	18.76	2	730	70,885	------	------	------	Existing Basin 1
2	SCS Runoff	32.70	2	750	220,031	------	------	------	Existing - Basin 2
3	SCS Runoff	40.07	2	754	290,216	------	------	------	Existing - Basin 3
4	SCS Runoff	8.234	2	754	59,633	------	------	------	Existing - Basin 4
5	SCS Runoff	39.07	2	724	123,202	------	------	------	Developed - Basin 1
6	Reservoir	2.252	2	818	113,323	5	1342.43	79,911	Reserve A Pond
7	SCS Runoff	77.48	2	736	376,452	------	------	------	Developed - Basin 2
8	SCS Runoff	92.23	2	740	495,193	------	------	------	Developed - Basin 3
9	Reservoir	51.00	2	766	495,187	8	1339.33	136,416	Reserve C Pond
10	SCS Runoff	26.80	2	734	121,802	------	------	------	Developed - Basin 4
11	Reservoir	1.567	2	886	101,465	10	1334.69	83,995	Reserve D
12	Reservoir	6.774	2	836	300,829	7	1336.82	245,697	Reserve B
13	SCS Runoff	16.97	2	774	163,316	------	------	------	Offsite North

Hydrograph Report

Hyd. No. 1

Existing Basin 1

Hydrograph type	= SCS Runoff	Peak discharge	= 18.76 cfs
Storm frequency	= 1 yrs	Time to peak	= 730 min
Time interval	= 2 min	Hyd. volume	= 70,885 cuft
Drainage area	= 18.000 ac	Curve number	= 80
Basin Slope	= 0.7 %	Hydraulic length	= 600 ft
Tc method	= LAG	Time of conc. (Tc)	= 25.29 min
Total precip.	= 2.80 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

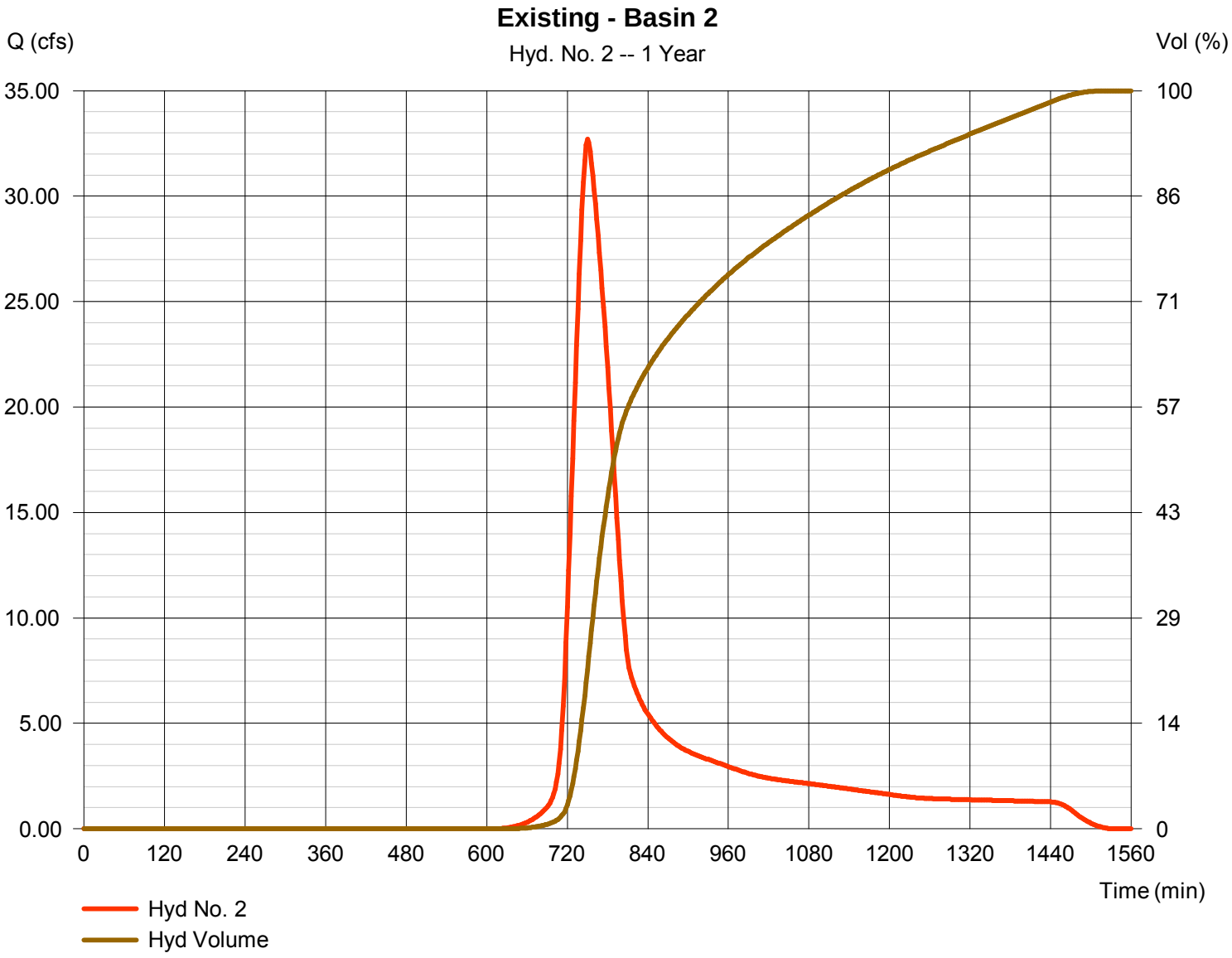


Hydrograph Report

Hyd. No. 2

Existing - Basin 2

Hydrograph type	= SCS Runoff	Peak discharge	= 32.70 cfs
Storm frequency	= 1 yrs	Time to peak	= 750 min
Time interval	= 2 min	Hyd. volume	= 220,031 cuft
Drainage area	= 55.000 ac	Curve number	= 80
Basin Slope	= 0.6 %	Hydraulic length	= 1600 ft
Tc method	= LAG	Time of conc. (Tc)	= 59.87 min
Total precip.	= 2.80 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

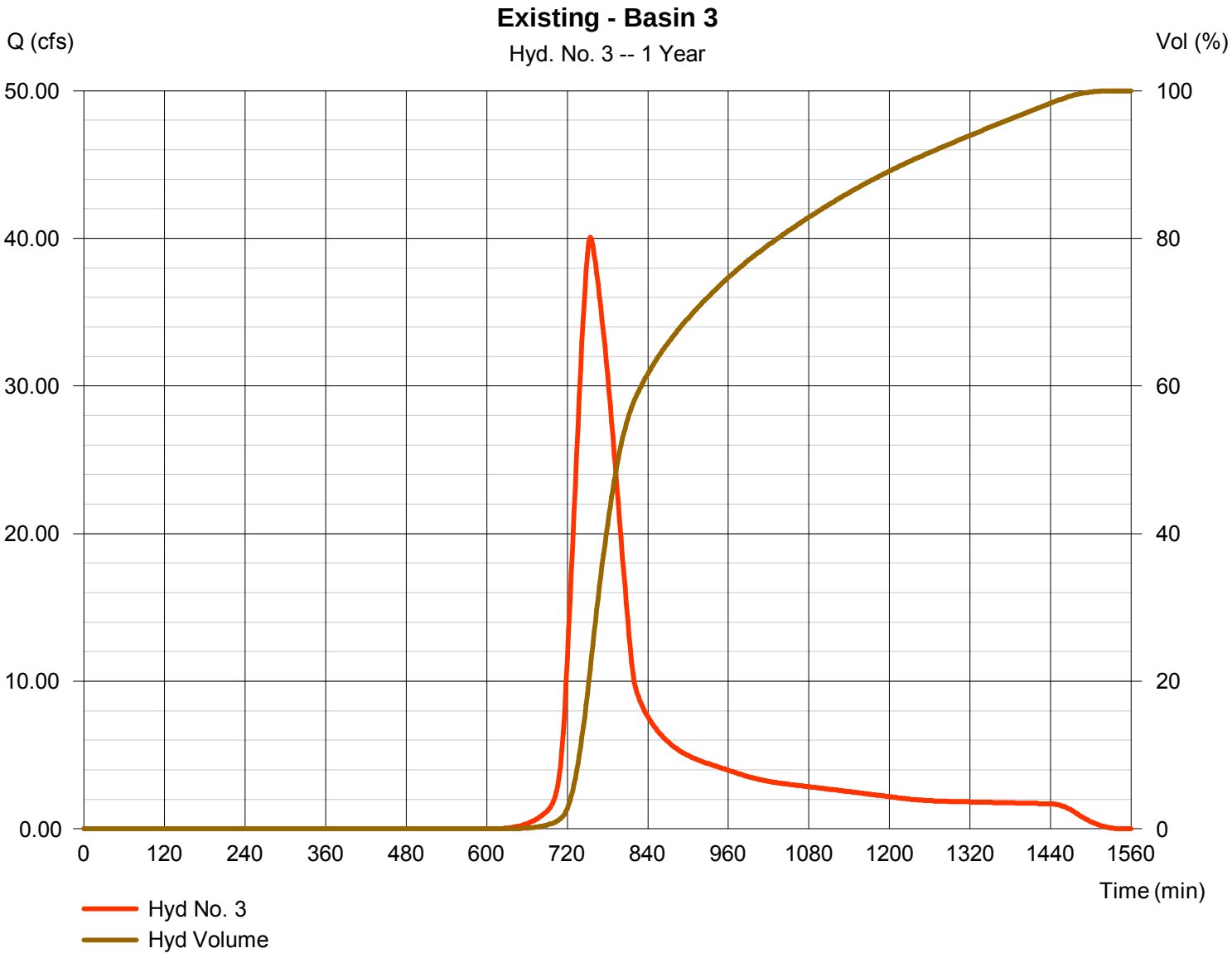


Hydrograph Report

Hyd. No. 3

Existing - Basin 3

Hydrograph type	= SCS Runoff	Peak discharge	= 40.07 cfs
Storm frequency	= 1 yrs	Time to peak	= 754 min
Time interval	= 2 min	Hyd. volume	= 290,216 cuft
Drainage area	= 73.000 ac	Curve number	= 80
Basin Slope	= 0.6 %	Hydraulic length	= 1800 ft
Tc method	= LAG	Time of conc. (Tc)	= 65.78 min
Total precip.	= 2.80 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

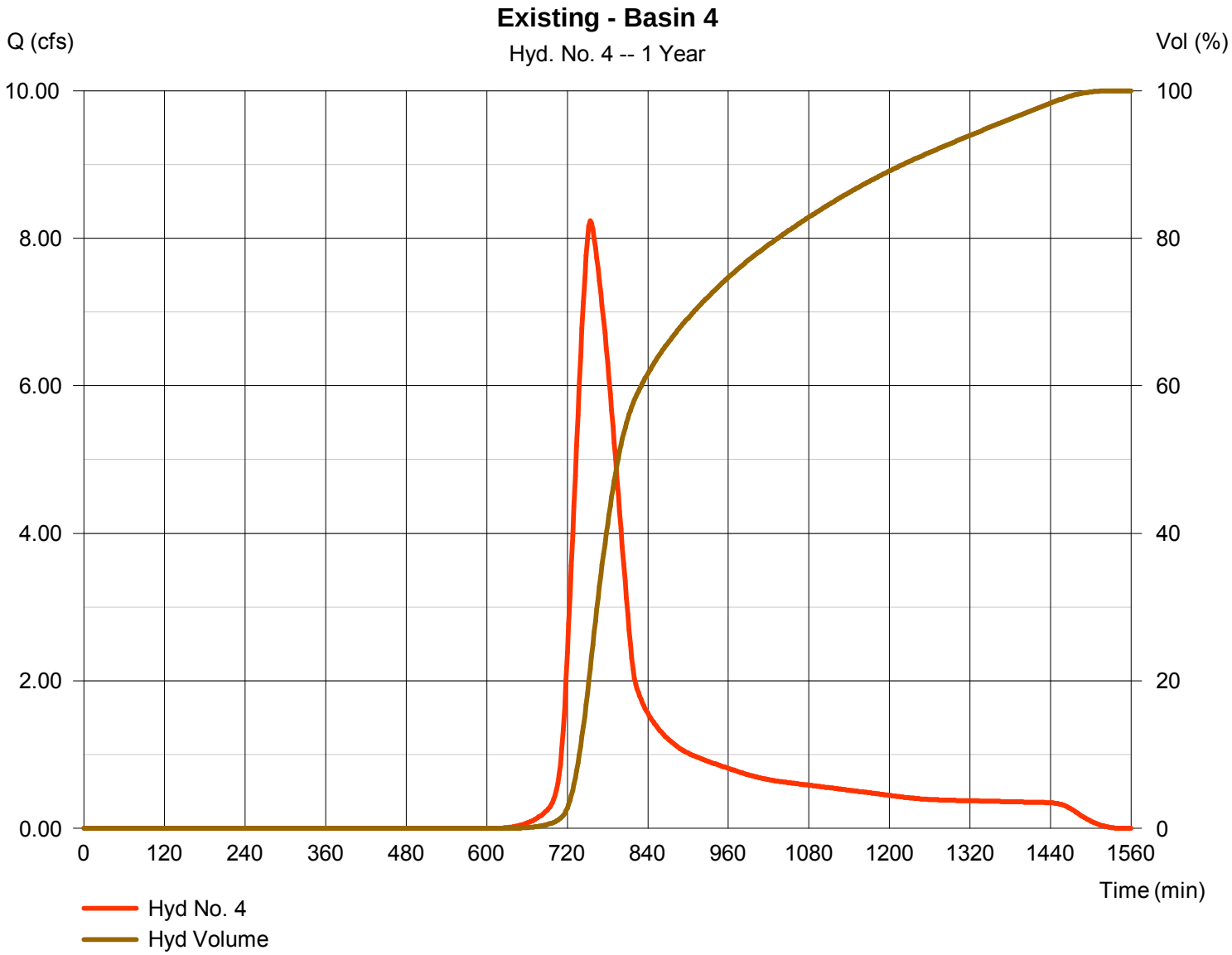


Hydrograph Report

Hyd. No. 4

Existing - Basin 4

Hydrograph type	= SCS Runoff	Peak discharge	= 8.234 cfs
Storm frequency	= 1 yrs	Time to peak	= 754 min
Time interval	= 2 min	Hyd. volume	= 59,633 cuft
Drainage area	= 15.000 ac	Curve number	= 80
Basin Slope	= 0.4 %	Hydraulic length	= 1400 ft
Tc method	= LAG	Time of conc. (Tc)	= 65.89 min
Total precip.	= 2.80 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

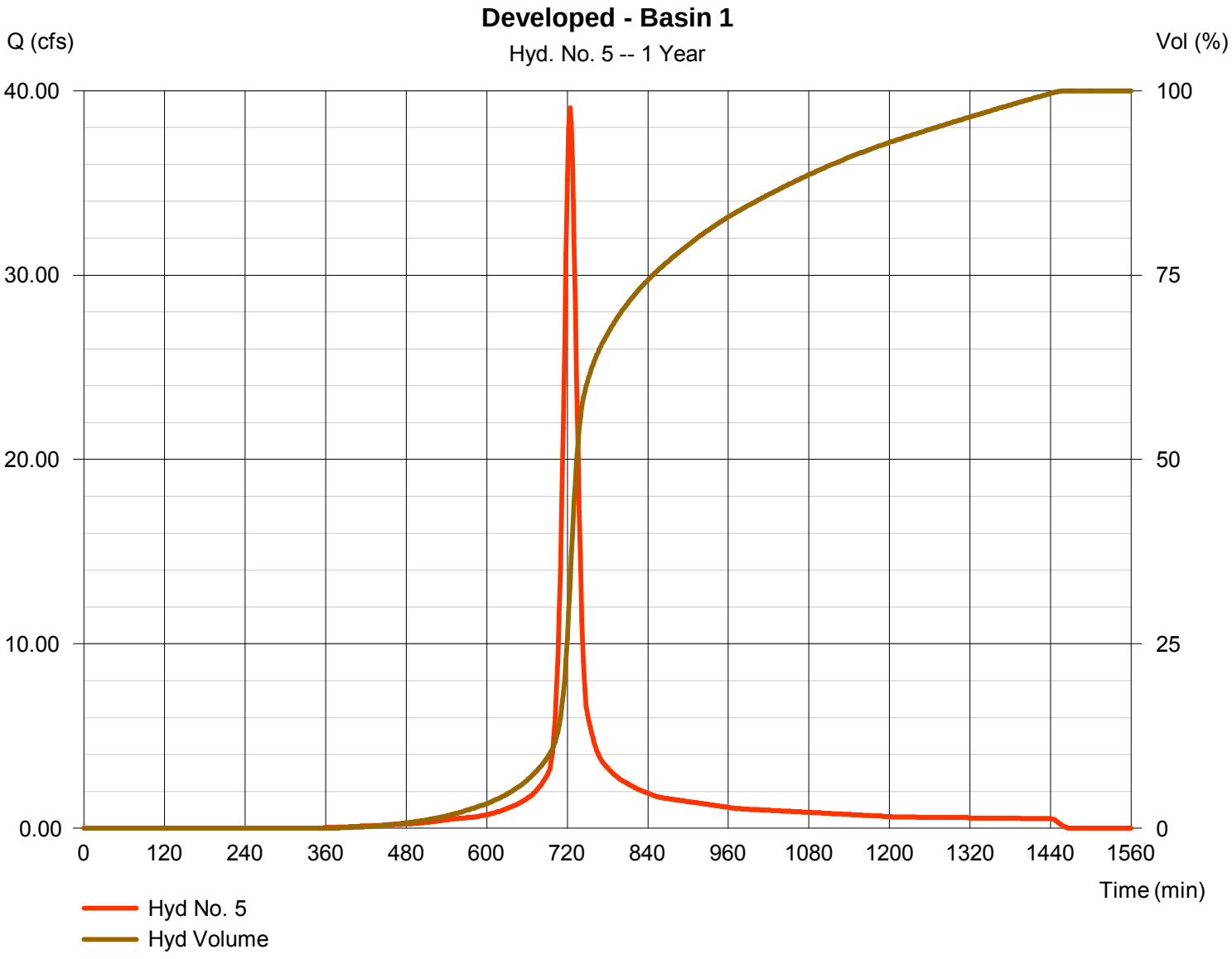


Hydrograph Report

Hyd. No. 5

Developed - Basin 1

Hydrograph type	= SCS Runoff	Peak discharge	= 39.07 cfs
Storm frequency	= 1 yrs	Time to peak	= 724 min
Time interval	= 2 min	Hyd. volume	= 123,202 cuft
Drainage area	= 18.000 ac	Curve number	= 91
Basin Slope	= 0.5 %	Hydraulic length	= 500 ft
Tc method	= LAG	Time of conc. (Tc)	= 17.41 min
Total precip.	= 2.80 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



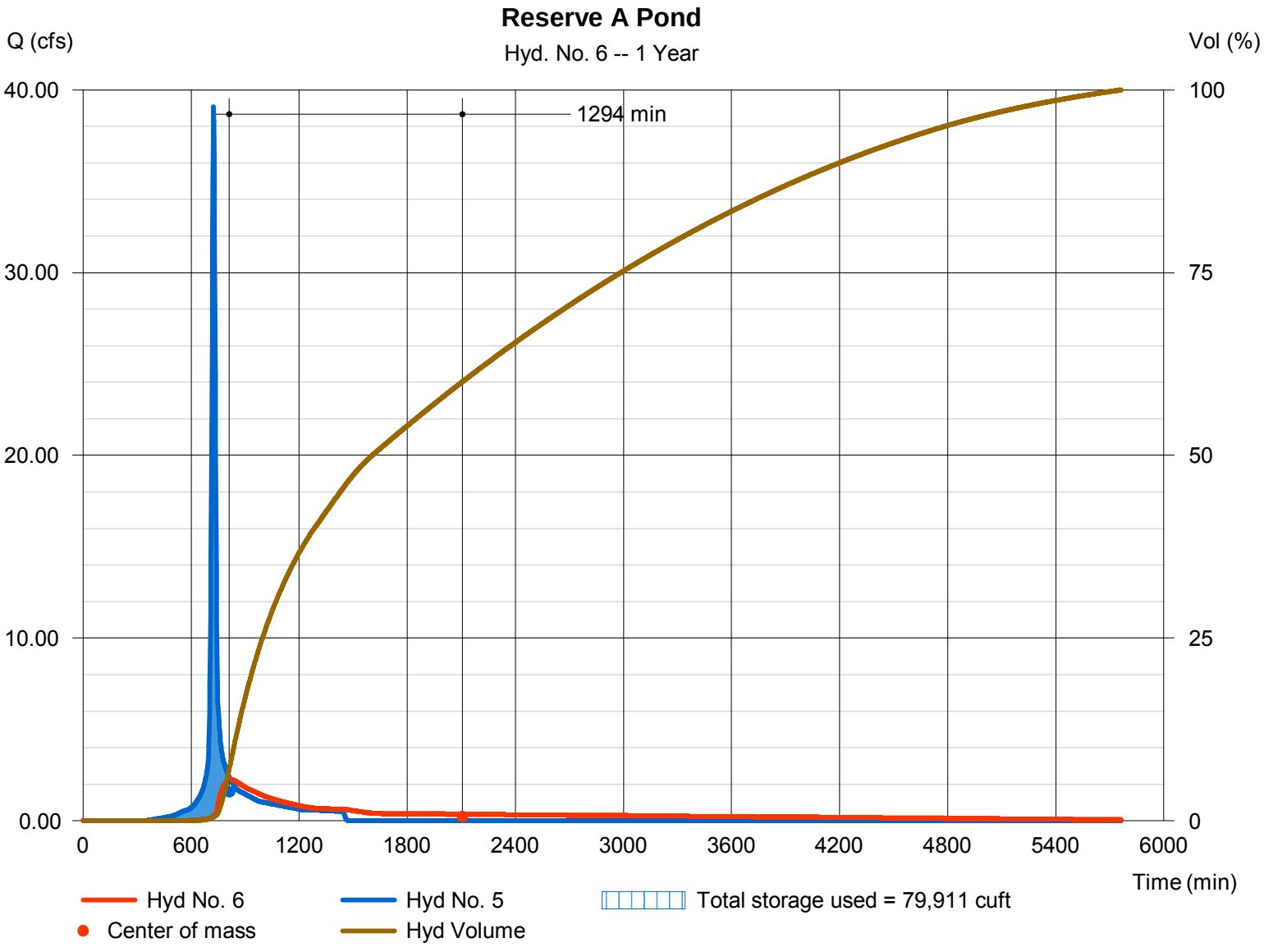
Hydrograph Report

Hyd. No. 6

Reserve A Pond

Hydrograph type	= Reservoir	Peak discharge	= 2.252 cfs
Storm frequency	= 1 yrs	Time to peak	= 818 min
Time interval	= 2 min	Hyd. volume	= 113,323 cuft
Inflow hyd. No.	= 5 - Developed - Basin 1	Max. Elevation	= 1342.43 ft
Reservoir name	= Reserve A	Max. Storage	= 79,911 cuft

Storage Indication method used.



Pond Report

Pond No. 1 - Reserve A

Pond Data

Contours - User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 1341.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	1341.00	52,000	0	0
1.00	1342.00	56,700	54,328	54,328
2.00	1343.00	62,000	59,324	113,652
3.00	1344.00	67,000	64,477	178,129
4.00	1345.00	72,000	69,478	247,607

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 36.00	4.00	0.00	0.00
Span (in)	= 36.00	4.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 1341.00	1341.00	0.00	0.00
Length (ft)	= 20.00	0.00	0.00	0.00
Slope (%)	= 0.20	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	Yes	No	No

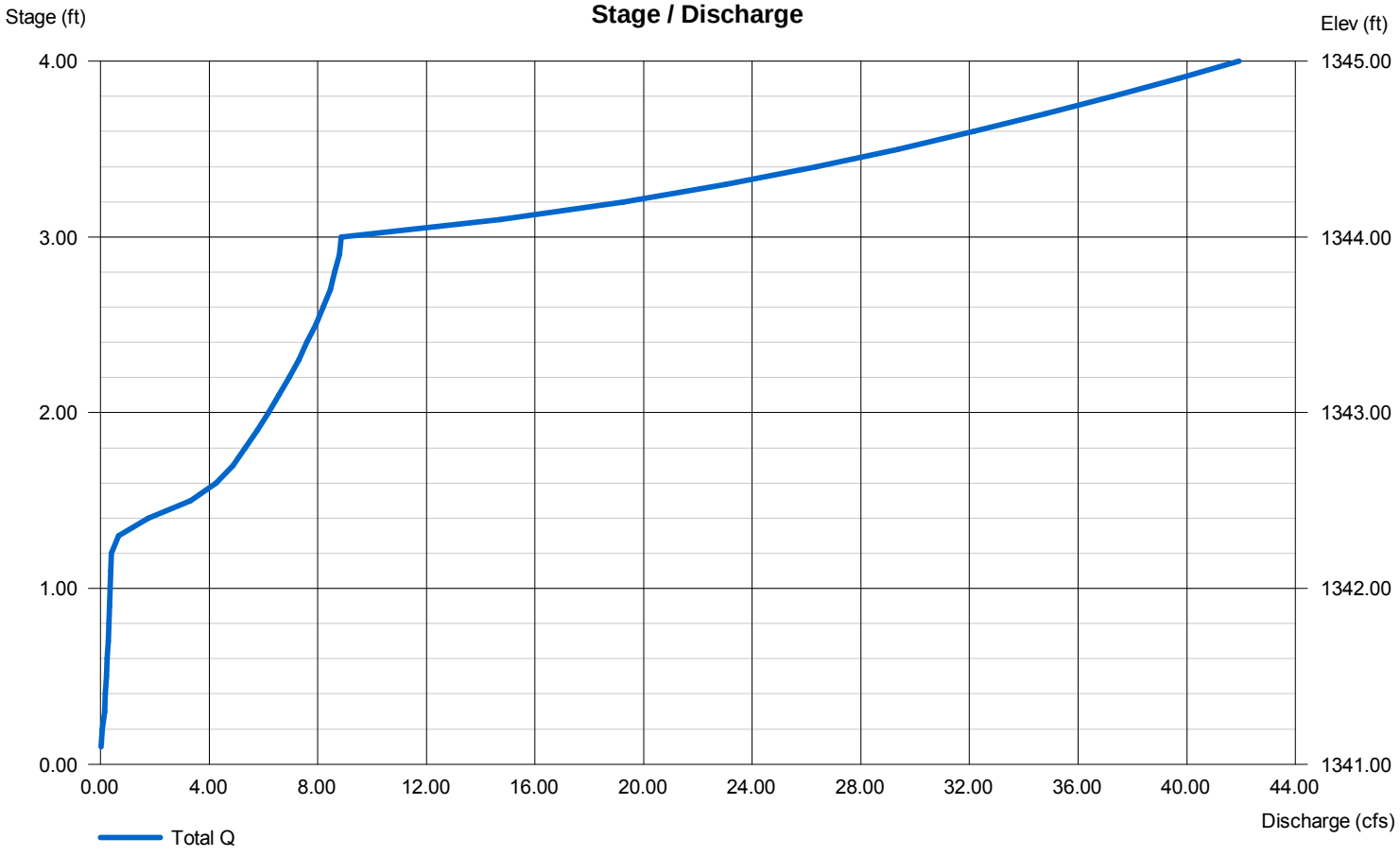
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 9.50	0.00	0.00	0.00
Crest El. (ft)	= 1342.25	0.00	0.00	0.00
Weir Coeff.	= 2.60	3.33	3.33	3.33
Weir Type	= Broad	---	---	---
Multi-Stage	= Yes	No	No	No

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

TW Elev. (ft) = 0.00

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

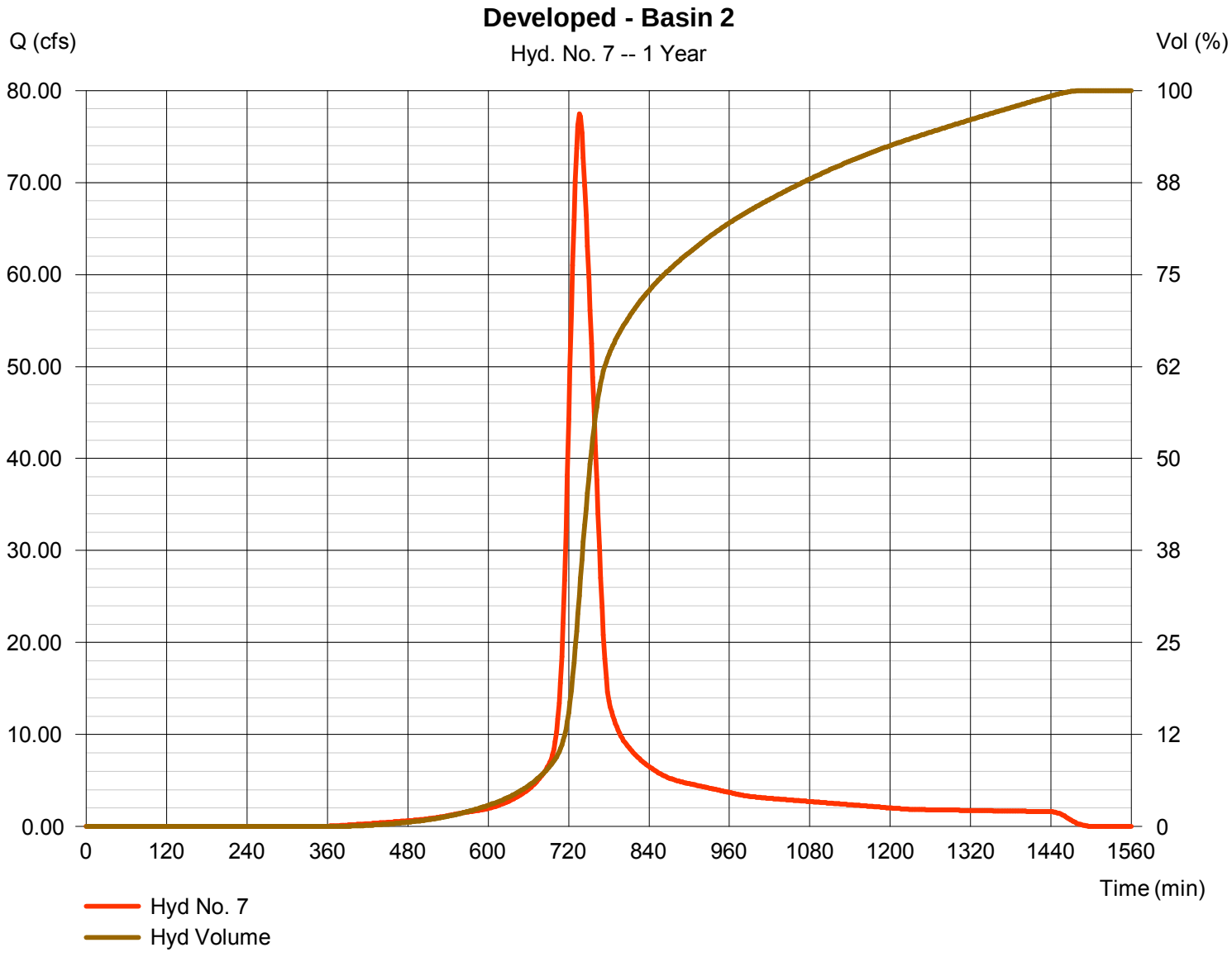


Hydrograph Report

Hyd. No. 7

Developed - Basin 2

Hydrograph type	= SCS Runoff	Peak discharge	= 77.48 cfs
Storm frequency	= 1 yrs	Time to peak	= 736 min
Time interval	= 2 min	Hyd. volume	= 376,452 cuft
Drainage area	= 55.000 ac	Curve number	= 91
Basin Slope	= 0.6 %	Hydraulic length	= 1600 ft
Tc method	= LAG	Time of conc. (Tc)	= 40.31 min
Total precip.	= 2.80 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

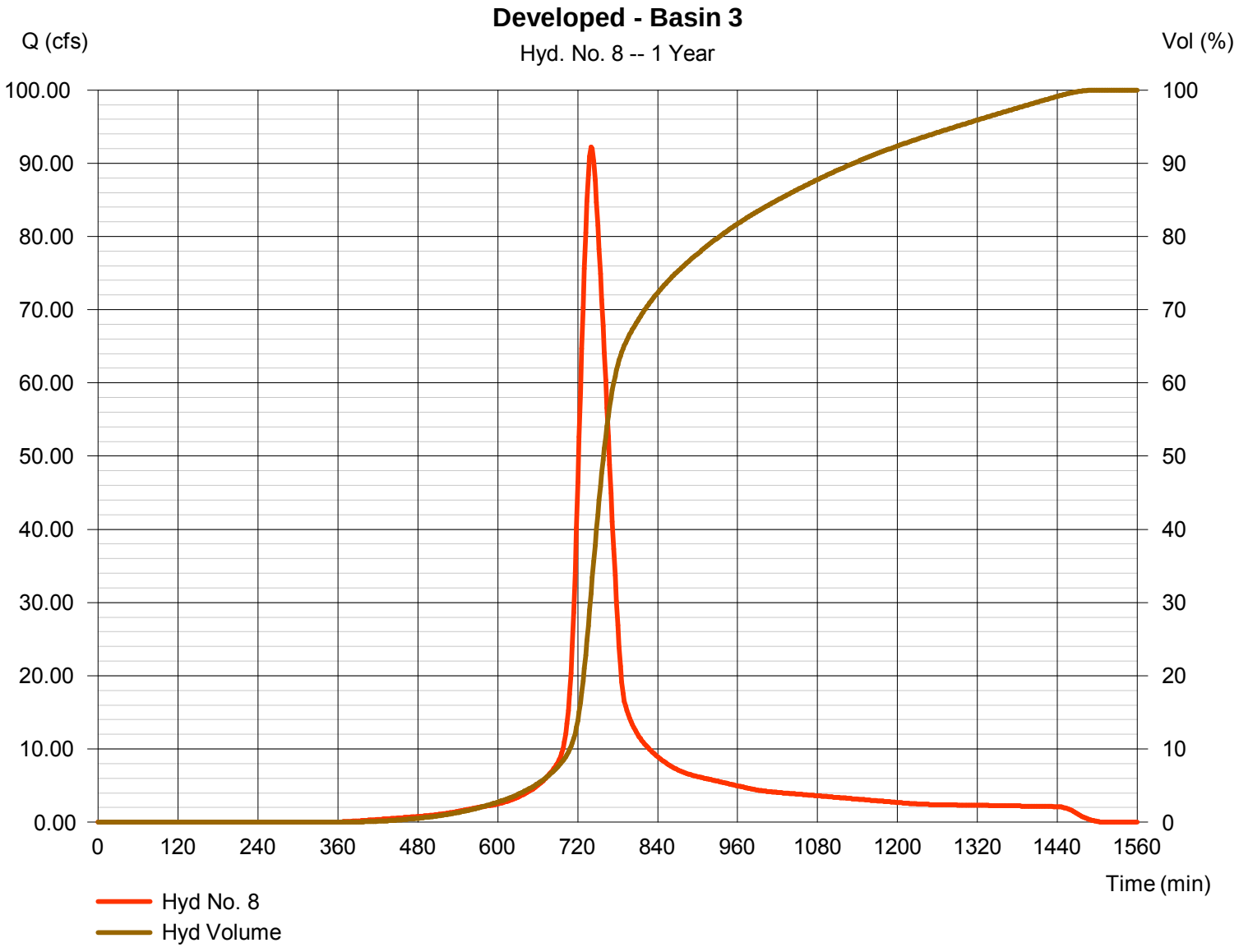


Hydrograph Report

Hyd. No. 8

Developed - Basin 3

Hydrograph type	= SCS Runoff	Peak discharge	= 92.23 cfs
Storm frequency	= 1 yrs	Time to peak	= 740 min
Time interval	= 2 min	Hyd. volume	= 495,193 cuft
Drainage area	= 73.000 ac	Curve number	= 91
Basin Slope	= 0.5 %	Hydraulic length	= 1600 ft
Tc method	= LAG	Time of conc. (Tc)	= 44.15 min
Total precip.	= 2.80 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



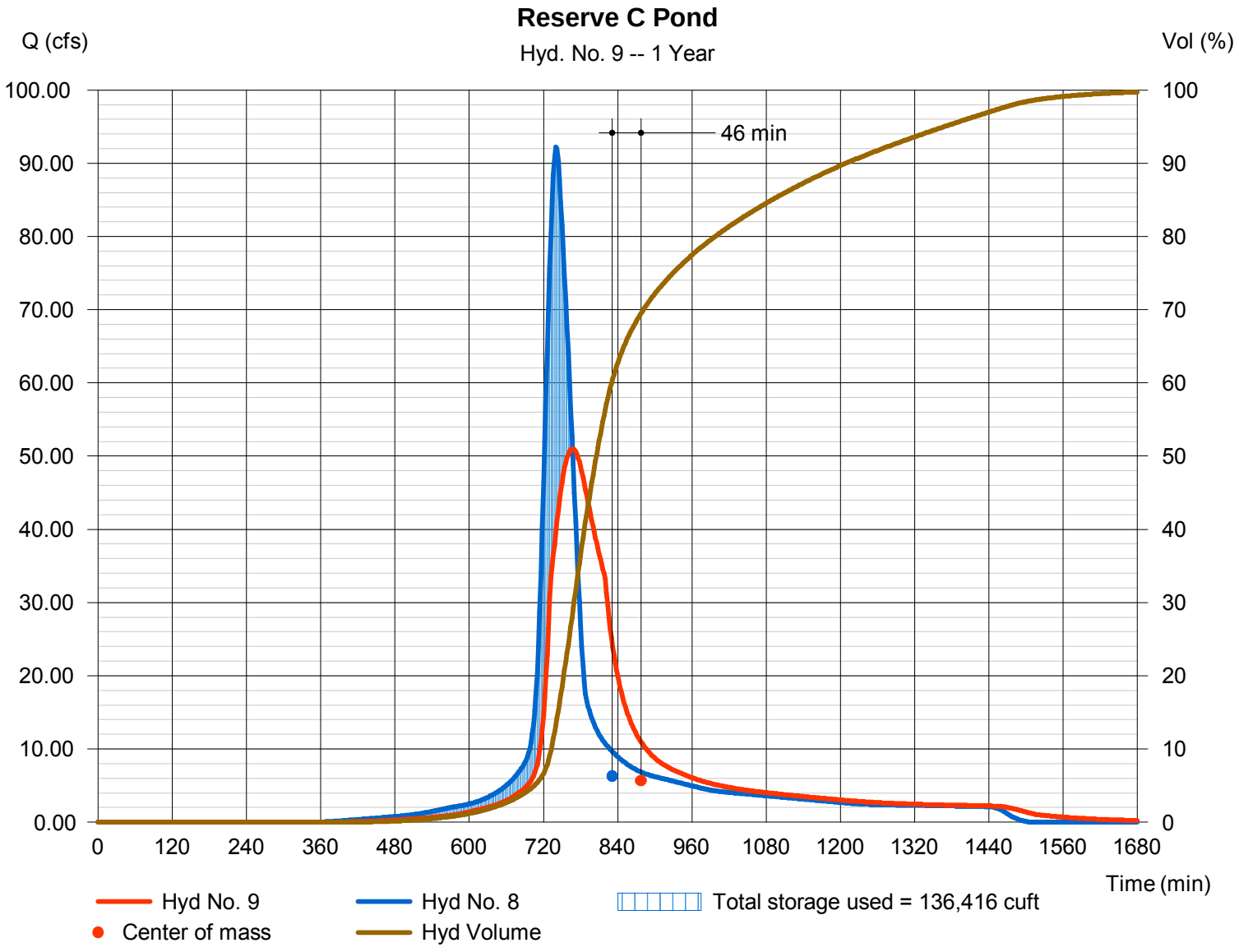
Hydrograph Report

Hyd. No. 9

Reserve C Pond

Hydrograph type	= Reservoir	Peak discharge	= 51.00 cfs
Storm frequency	= 1 yrs	Time to peak	= 766 min
Time interval	= 2 min	Hyd. volume	= 495,187 cuft
Inflow hyd. No.	= 8 - Developed - Basin 3	Max. Elevation	= 1339.33 ft
Reservoir name	= Reserve C Pond	Max. Storage	= 136,416 cuft

Storage Indication method used.



Pond Report

Pond No. 2 - Reserve C Pond

Pond Data

Contours - User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 1338.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	1338.00	13,700	0	0
1.00	1339.00	140,000	65,825	65,825
2.00	1340.00	300,000	214,958	280,783
3.00	1341.00	350,000	324,647	605,430

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 0.00	0.00	0.00	0.00
Span (in)	= 0.00	0.00	0.00	0.00
No. Barrels	= 1	0	0	0
Invert El. (ft)	= 1338.00	0.00	0.00	0.00
Length (ft)	= 30.00	0.00	0.00	0.00
Slope (%)	= 0.50	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

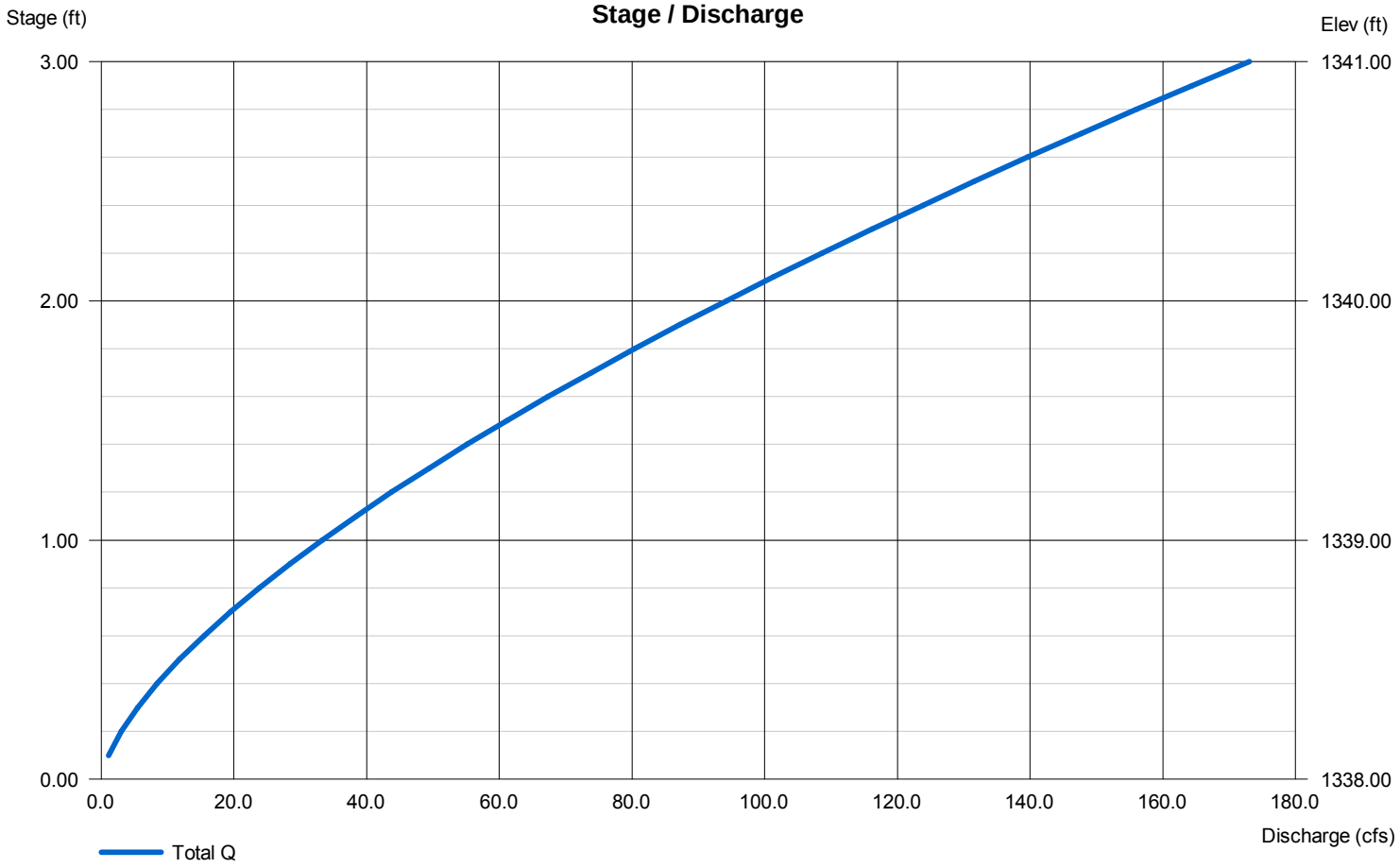
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 10.00	0.00	0.00	0.00
Crest El. (ft)	= 1338.00	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= Rect	Rect	---	---
Multi-Stage	= No	No	No	No

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

TW Elev. (ft) = 0.00

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

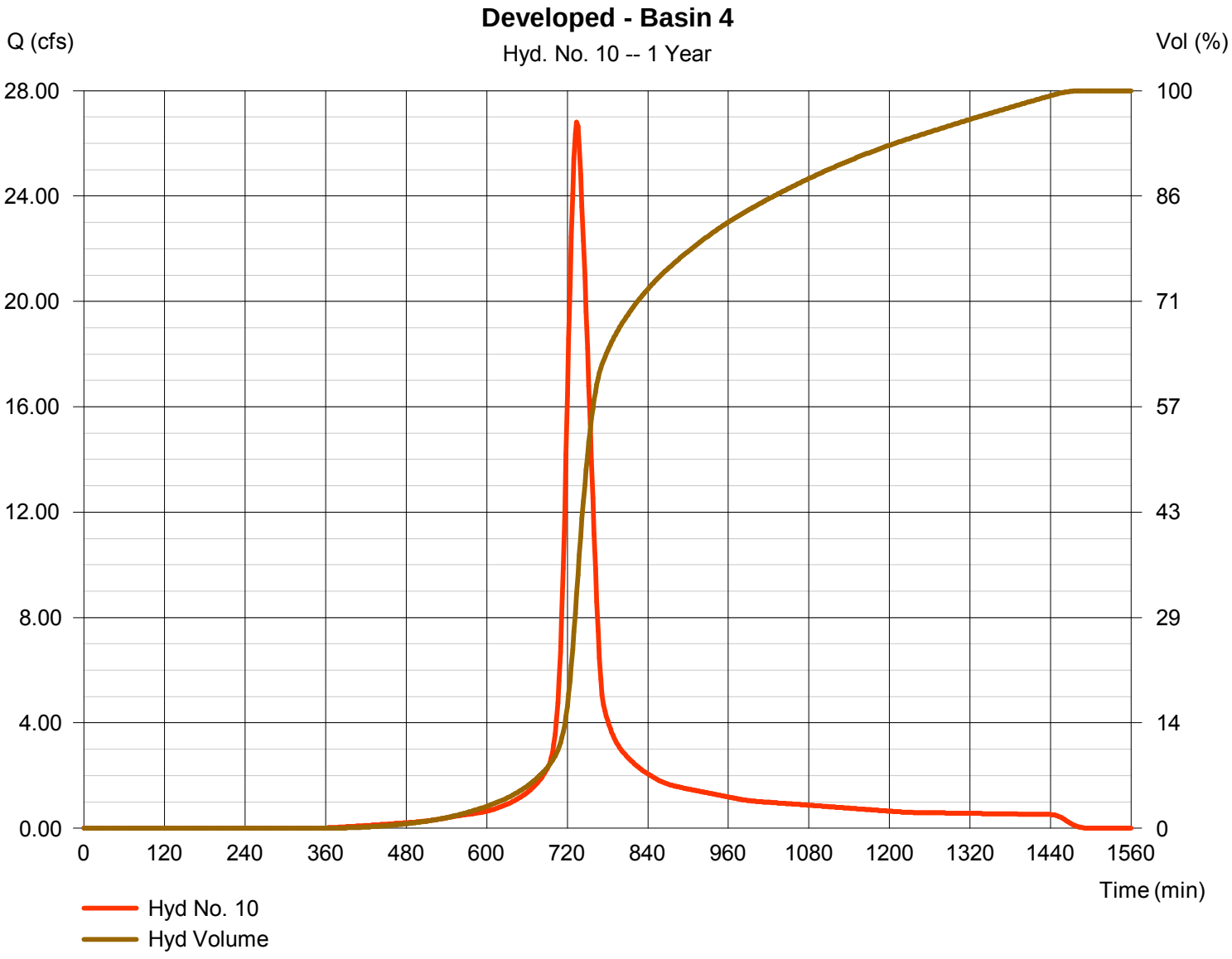


Hydrograph Report

Hyd. No. 10

Developed - Basin 4

Hydrograph type	= SCS Runoff	Peak discharge	= 26.80 cfs
Storm frequency	= 1 yrs	Time to peak	= 734 min
Time interval	= 2 min	Hyd. volume	= 121,802 cuft
Drainage area	= 18.000 ac	Curve number	= 91
Basin Slope	= 0.5 %	Hydraulic length	= 1200 ft
Tc method	= LAG	Time of conc. (Tc)	= 35.08 min
Total precip.	= 2.80 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



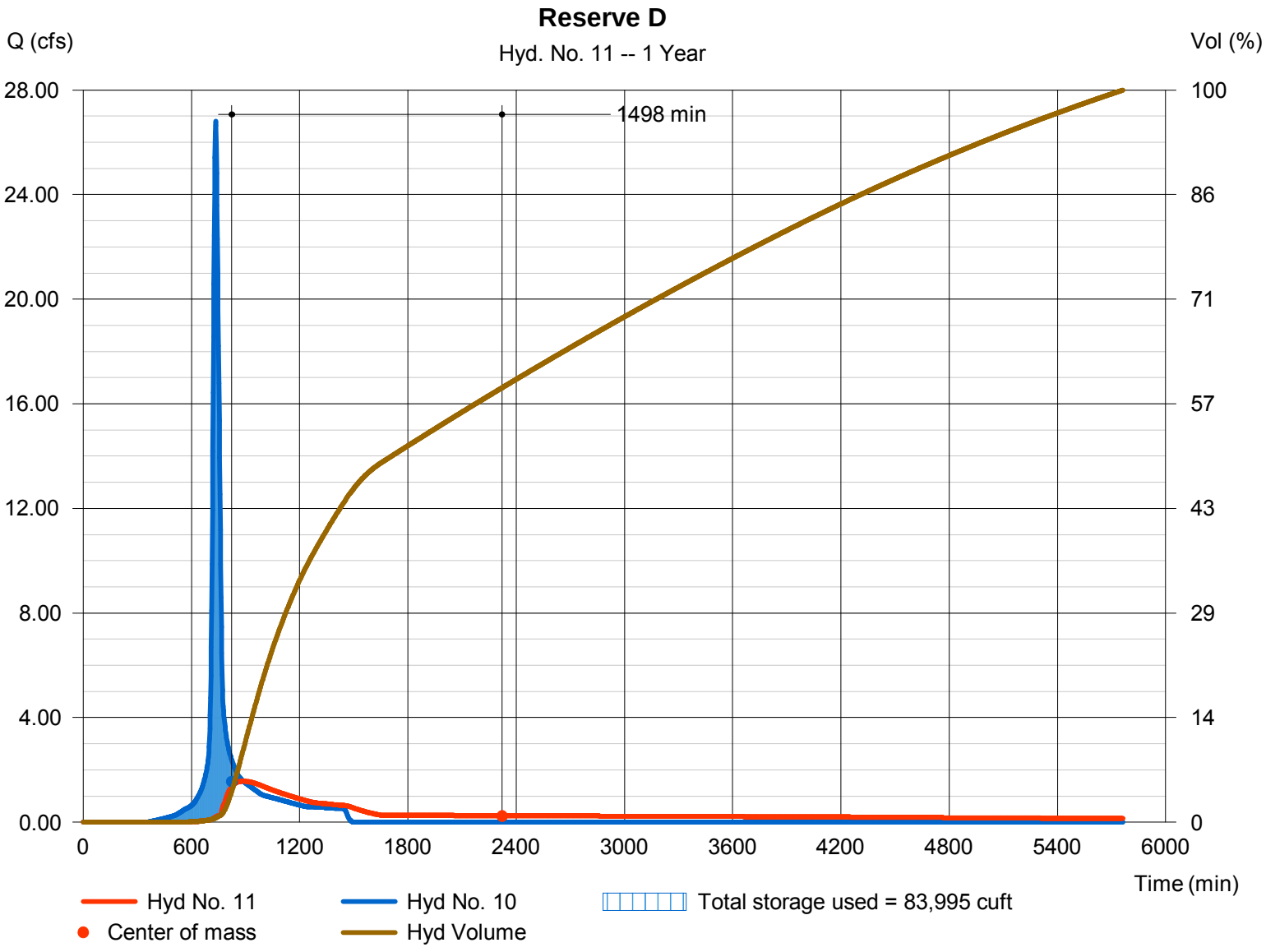
Hydrograph Report

Hyd. No. 11

Reserve D

Hydrograph type	= Reservoir	Peak discharge	= 1.567 cfs
Storm frequency	= 1 yrs	Time to peak	= 886 min
Time interval	= 2 min	Hyd. volume	= 101,465 cuft
Inflow hyd. No.	= 10 - Developed - Basin 4	Max. Elevation	= 1334.69 ft
Reservoir name	= Reserve D	Max. Storage	= 83,995 cuft

Storage Indication method used.



Pond Report

Pond No. 3 - Reserve D

Pond Data

Contours - User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 1333.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	1333.00	23,000	0	0
1.00	1334.00	61,000	40,482	40,482
2.00	1335.00	65,000	62,983	103,465
3.00	1336.00	69,000	66,983	170,448
4.00	1337.00	73,000	70,984	241,432
5.00	1338.00	77,000	74,984	316,415

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 18.00	3.00	0.00	0.00
Span (in)	= 18.00	3.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 1333.00	1333.00	0.00	0.00
Length (ft)	= 100.00	0.00	0.00	0.00
Slope (%)	= 0.50	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	Yes	No	No

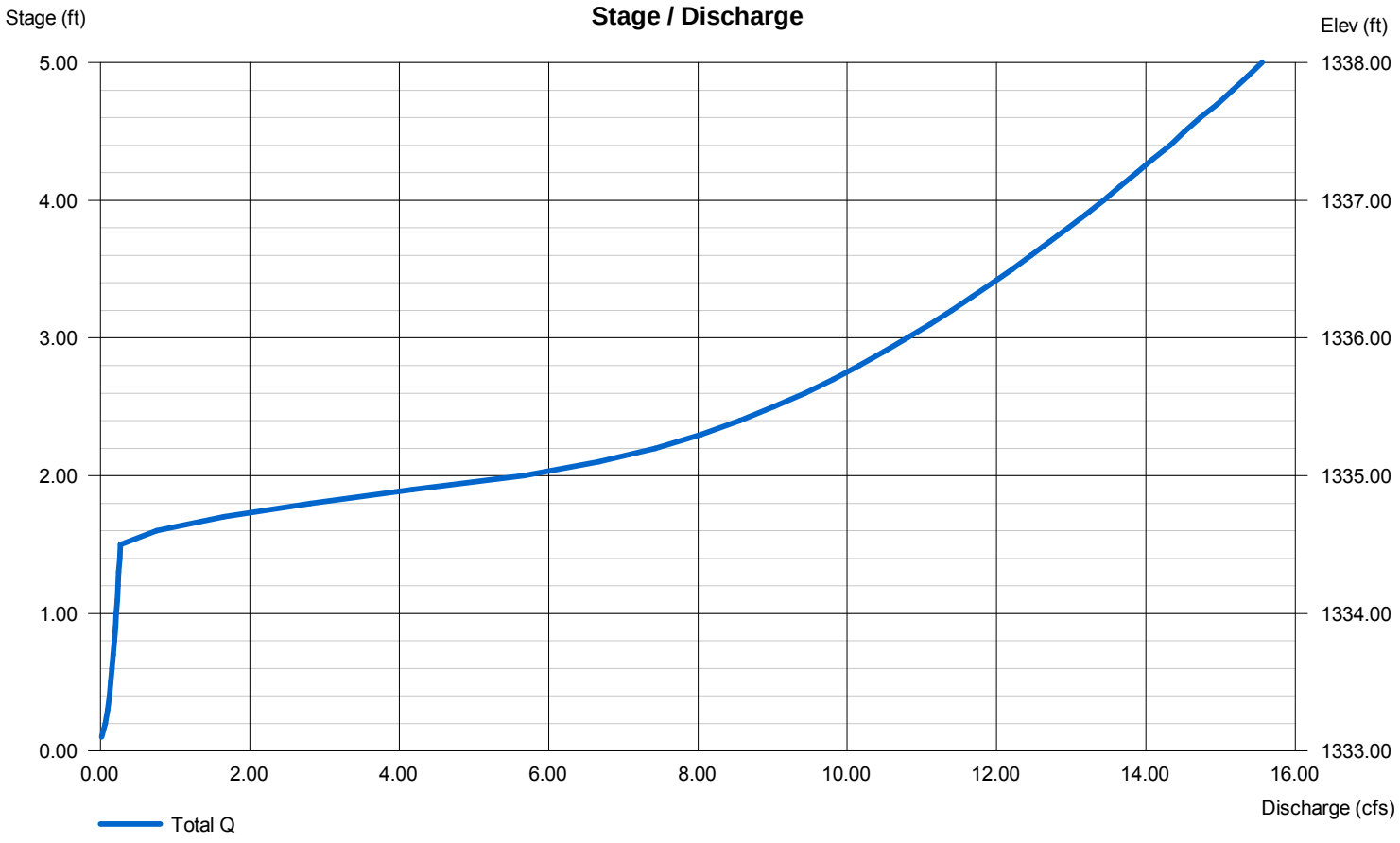
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 4.70	0.00	0.00	0.00
Crest El. (ft)	= 1334.50	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= 1	---	---	---
Multi-Stage	= Yes	No	No	No

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

TW Elev. (ft) = 0.00

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



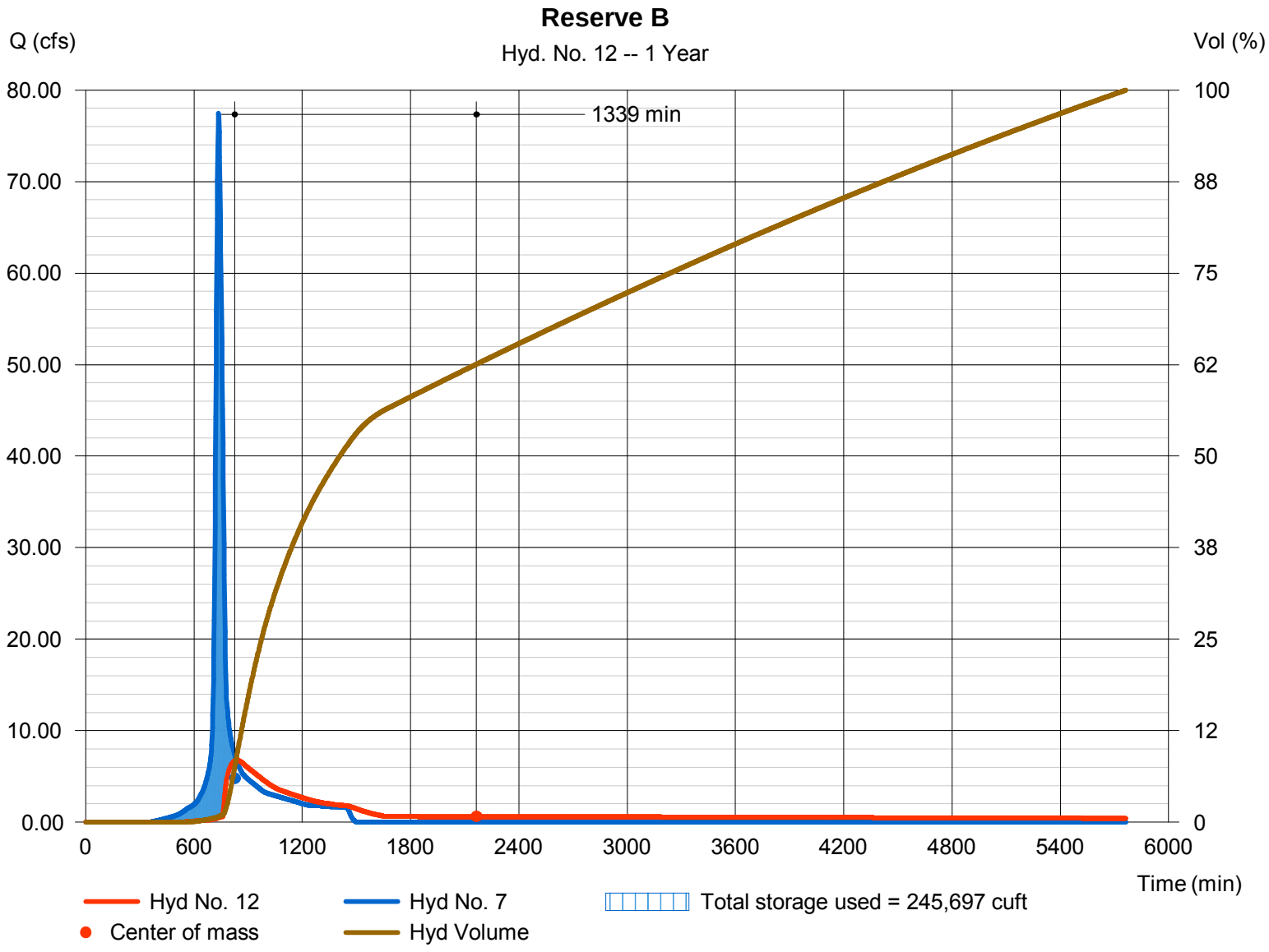
Hydrograph Report

Hyd. No. 12

Reserve B

Hydrograph type	=	Reservoir	Peak discharge	=	6.774 cfs
Storm frequency	=	1 yrs	Time to peak	=	836 min
Time interval	=	2 min	Hyd. volume	=	300,829 cuft
Inflow hyd. No.	=	7 - Developed - Basin 2	Max. Elevation	=	1336.82 ft
Reservoir name	=	Reserve B	Max. Storage	=	245,697 cuft

Storage Indication method used.



Pond Report

Pond No. 4 - Reserve B

Pond Data

Contours - User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 1334.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	1334.00	15,000	0	0
1.00	1335.00	86,000	45,634	45,634
2.00	1336.00	117,000	101,093	146,727
3.00	1337.00	123,000	119,976	266,703
4.00	1338.00	128,000	125,479	392,182
5.00	1339.00	133,000	130,479	522,661
6.00	1340.00	138,000	135,479	658,140

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 36.00	4.00	0.00	0.00
Span (in)	= 36.00	4.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 1334.00	1334.00	0.00	0.00
Length (ft)	= 100.00	0.00	0.00	0.00
Slope (%)	= 0.50	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	Yes	No	No

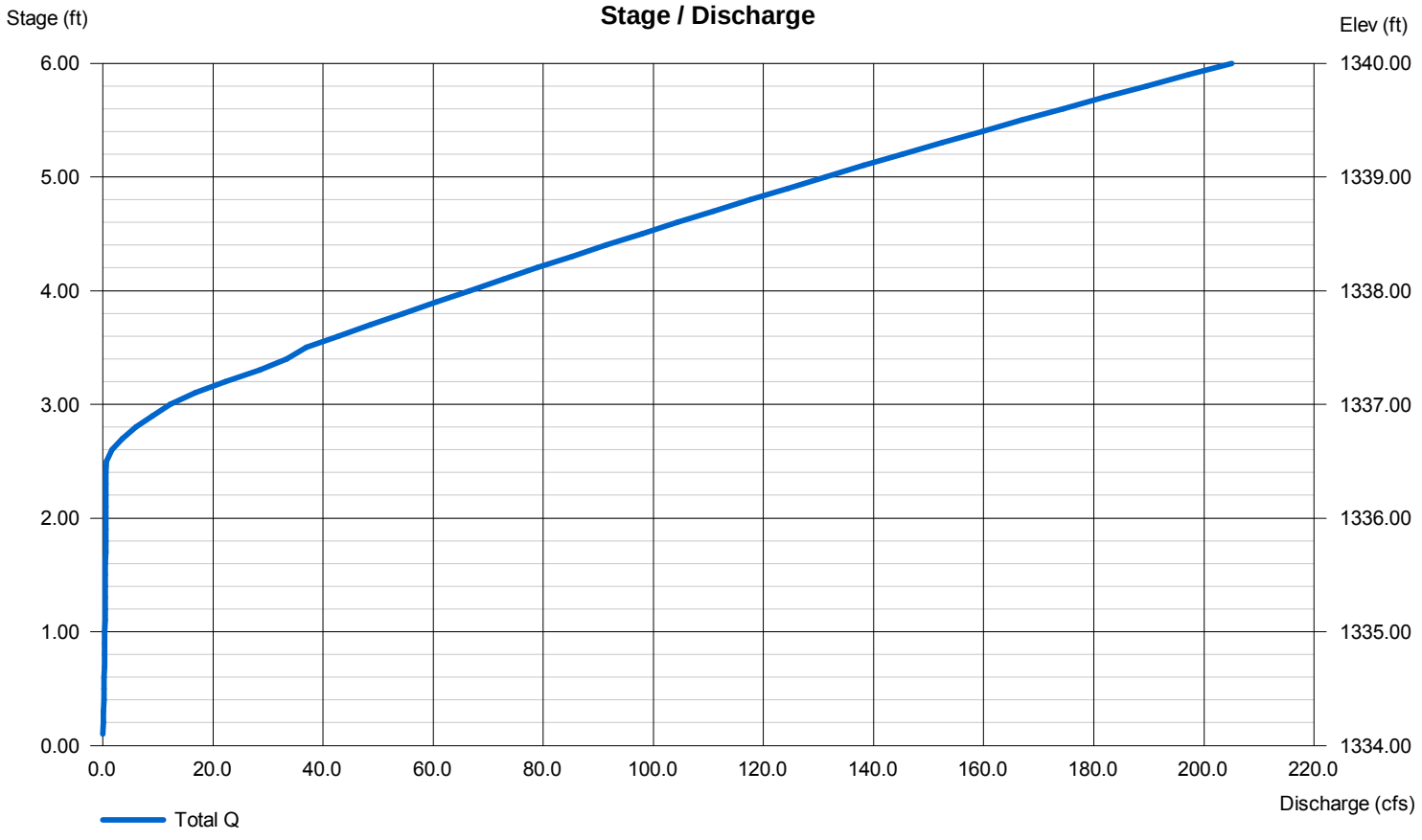
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 10.00	10.00	0.00	0.00
Crest El. (ft)	= 1336.50	1337.00	0.00	0.00
Weir Coeff.	= 3.33	2.60	3.33	3.33
Weir Type	= 1	Broad	---	---
Multi-Stage	= Yes	No	No	No

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

TW Elev. (ft) = 0.00

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

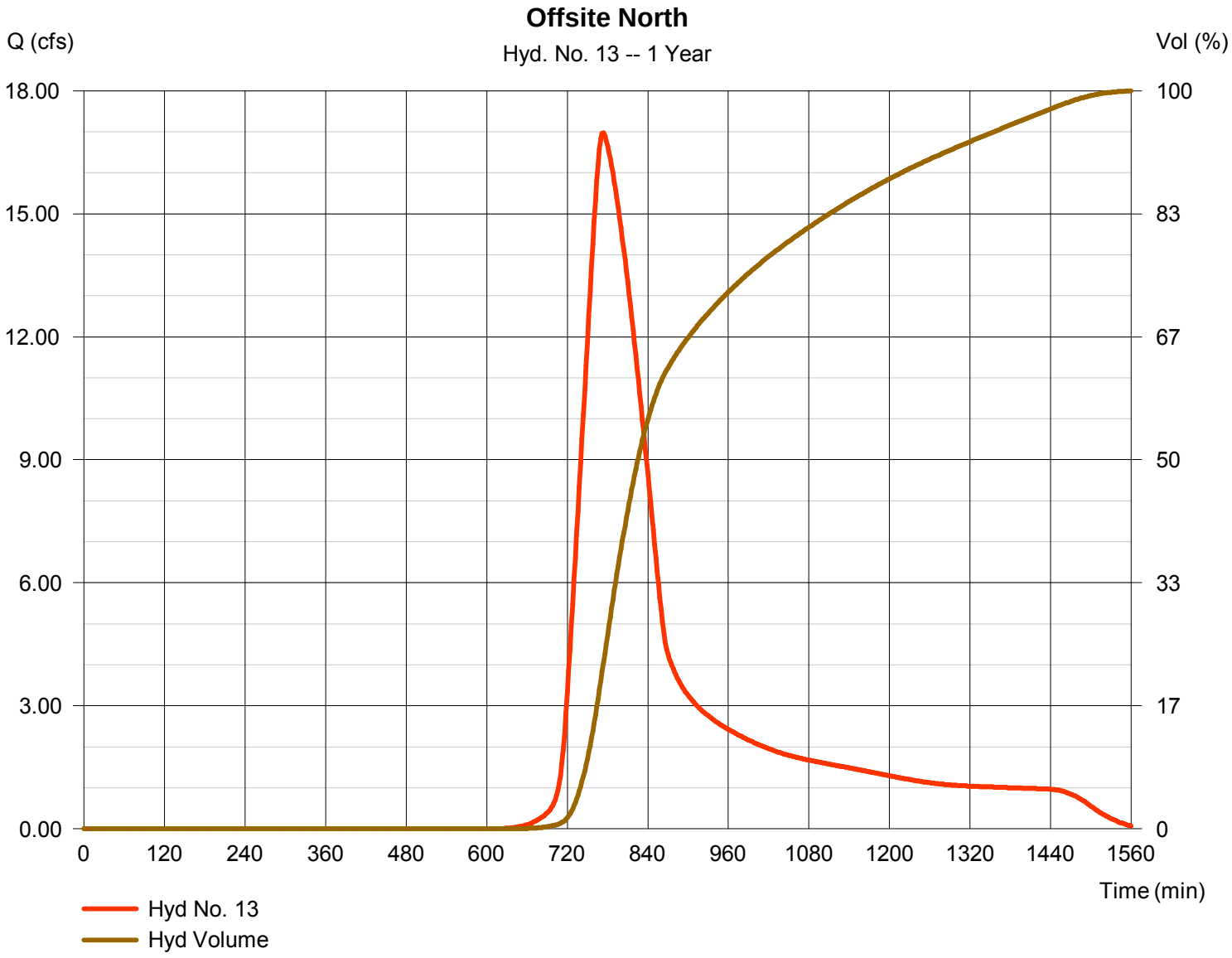


Hydrograph Report

Hyd. No. 13

Offsite North

Hydrograph type	= SCS Runoff	Peak discharge	= 16.97 cfs
Storm frequency	= 1 yrs	Time to peak	= 774 min
Time interval	= 2 min	Hyd. volume	= 163,316 cuft
Drainage area	= 41.000 ac	Curve number	= 80
Basin Slope	= 0.3 %	Hydraulic length	= 1800 ft
Tc method	= LAG	Time of conc. (Tc)	= 98.06 min
Total precip.	= 2.80 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8

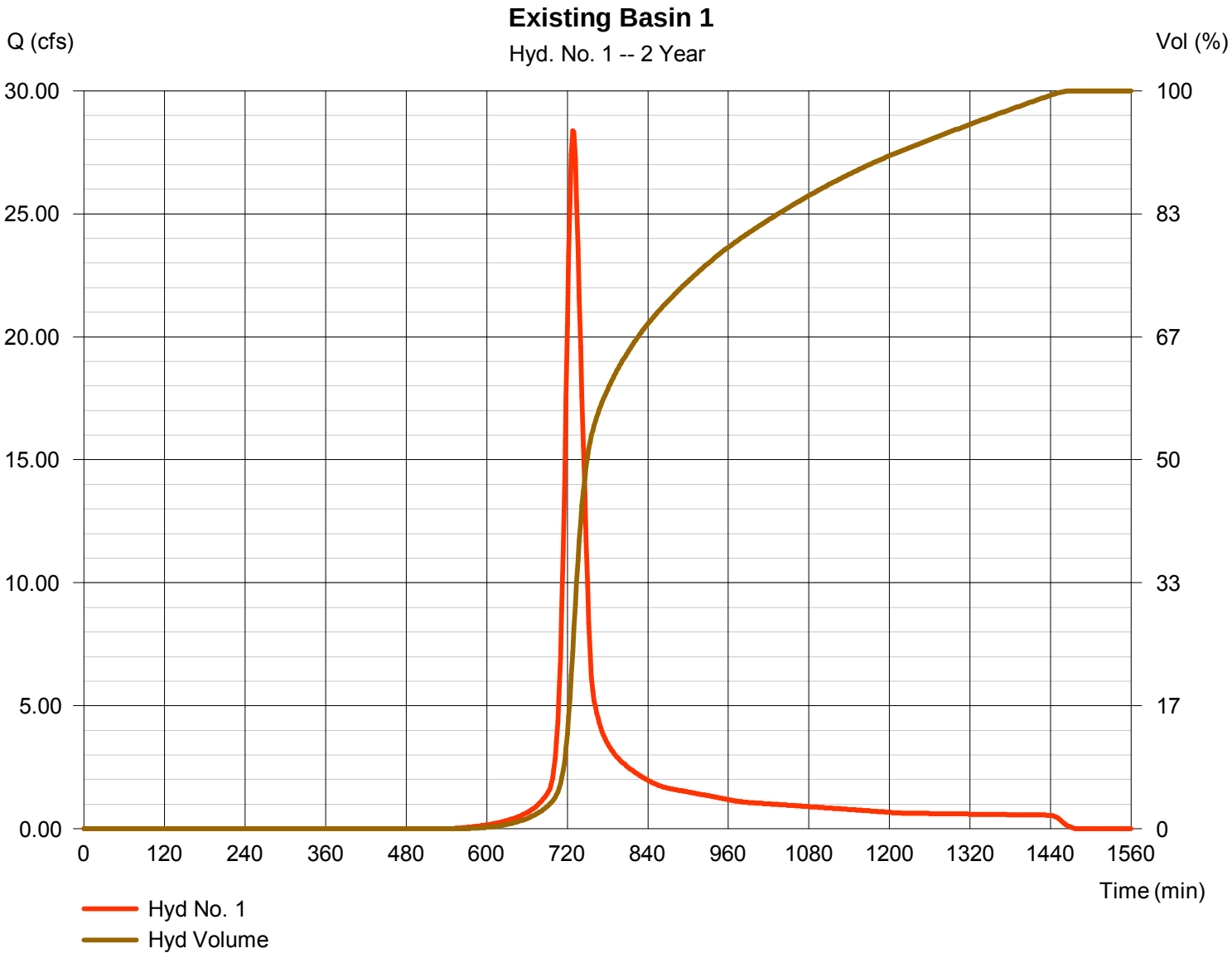
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	28.37	2	728	105,249	------	------	------	Existing Basin 1
2	SCS Runoff	49.83	2	750	326,700	------	------	------	Existing - Basin 2
3	SCS Runoff	61.12	2	754	430,910	------	------	------	Existing - Basin 3
4	SCS Runoff	12.56	2	754	88,543	------	------	------	Existing - Basin 4
5	SCS Runoff	52.12	2	724	166,037	------	------	------	Developed - Basin 1
6	Reservoir	5.097	2	768	156,030	5	1342.75	98,751	Reserve A Pond
7	SCS Runoff	103.70	2	736	507,336	------	------	------	Developed - Basin 2
8	SCS Runoff	123.51	2	740	667,360	------	------	------	Developed - Basin 3
9	Reservoir	65.93	2	768	667,355	8	1339.58	189,778	Reserve C Pond
10	SCS Runoff	35.86	2	734	164,150	------	------	------	Developed - Basin 4
11	Reservoir	4.903	2	784	143,495	10	1334.95	100,230	Reserve D
12	Reservoir	23.92	2	774	431,040	7	1337.23	295,103	Reserve B
13	SCS Runoff	25.95	2	772	242,490	------	------	------	Offsite North

Hydrograph Report

Hyd. No. 1

Existing Basin 1

Hydrograph type	= SCS Runoff	Peak discharge	= 28.37 cfs
Storm frequency	= 2 yrs	Time to peak	= 728 min
Time interval	= 2 min	Hyd. volume	= 105,249 cuft
Drainage area	= 18.000 ac	Curve number	= 80
Basin Slope	= 0.7 %	Hydraulic length	= 600 ft
Tc method	= LAG	Time of conc. (Tc)	= 25.29 min
Total precip.	= 3.50 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

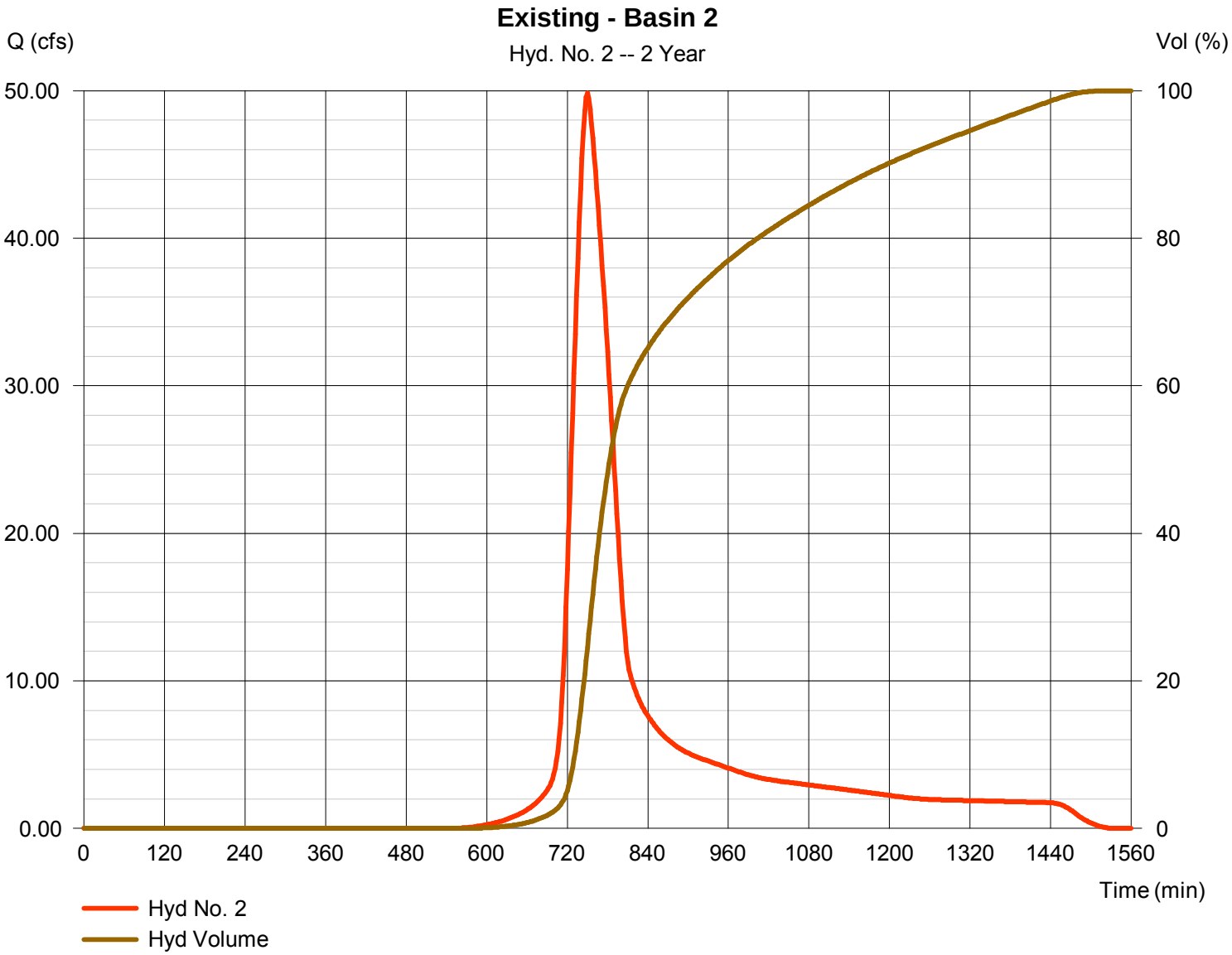


Hydrograph Report

Hyd. No. 2

Existing - Basin 2

Hydrograph type	= SCS Runoff	Peak discharge	= 49.83 cfs
Storm frequency	= 2 yrs	Time to peak	= 750 min
Time interval	= 2 min	Hyd. volume	= 326,700 cuft
Drainage area	= 55.000 ac	Curve number	= 80
Basin Slope	= 0.6 %	Hydraulic length	= 1600 ft
Tc method	= LAG	Time of conc. (Tc)	= 59.87 min
Total precip.	= 3.50 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

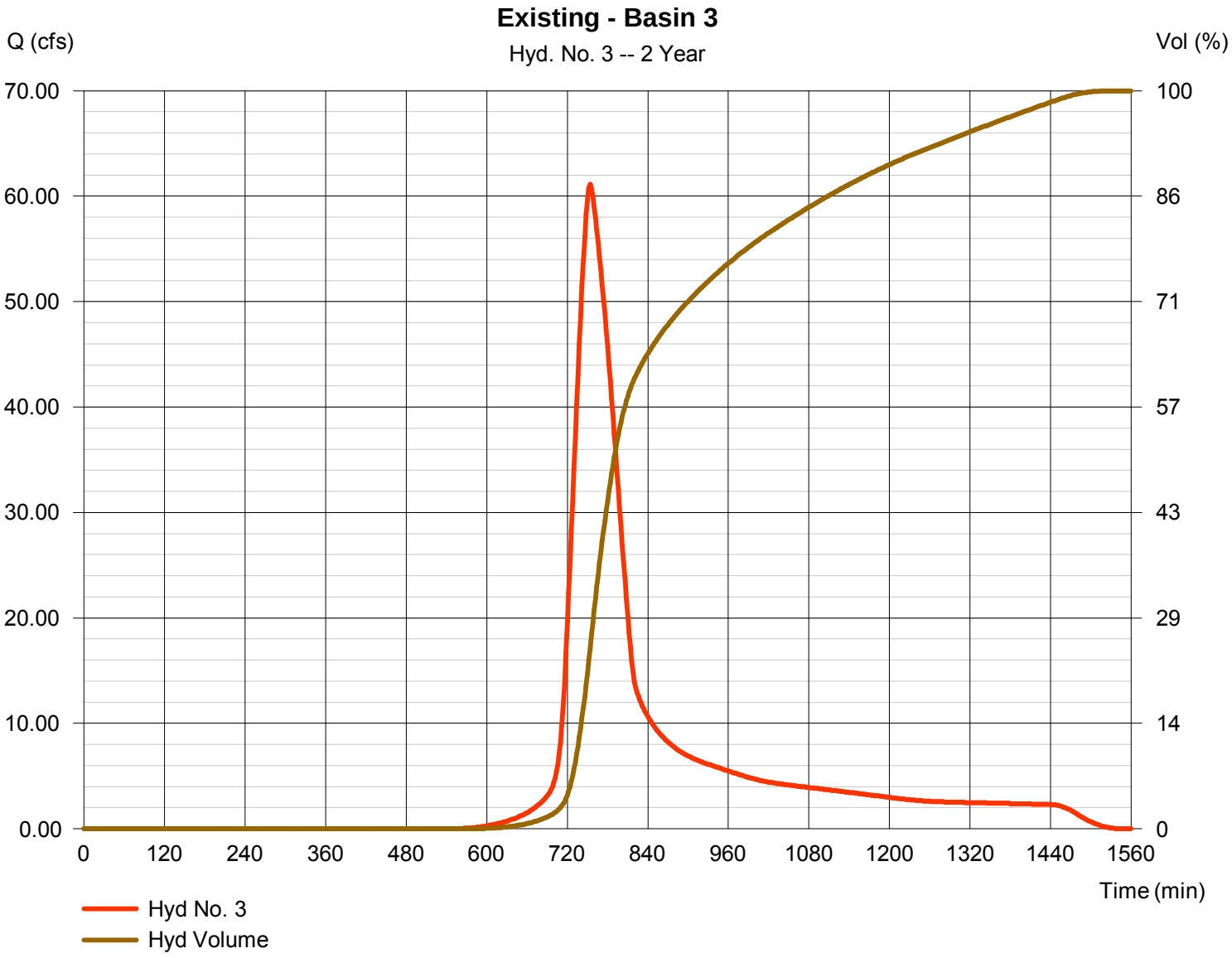


Hydrograph Report

Hyd. No. 3

Existing - Basin 3

Hydrograph type	= SCS Runoff	Peak discharge	= 61.12 cfs
Storm frequency	= 2 yrs	Time to peak	= 754 min
Time interval	= 2 min	Hyd. volume	= 430,910 cuft
Drainage area	= 73.000 ac	Curve number	= 80
Basin Slope	= 0.6 %	Hydraulic length	= 1800 ft
Tc method	= LAG	Time of conc. (Tc)	= 65.78 min
Total precip.	= 3.50 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

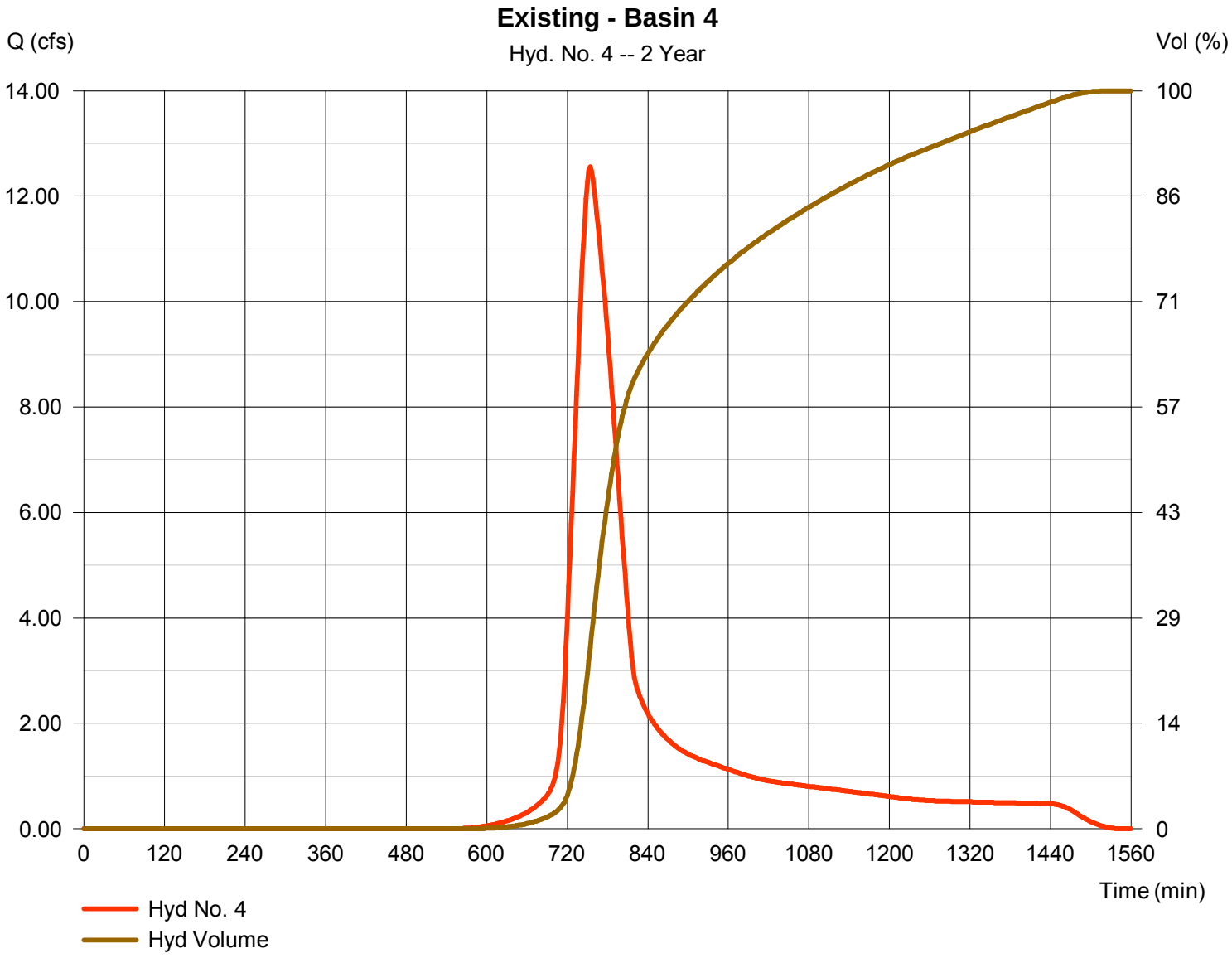


Hydrograph Report

Hyd. No. 4

Existing - Basin 4

Hydrograph type	= SCS Runoff	Peak discharge	= 12.56 cfs
Storm frequency	= 2 yrs	Time to peak	= 754 min
Time interval	= 2 min	Hyd. volume	= 88,543 cuft
Drainage area	= 15.000 ac	Curve number	= 80
Basin Slope	= 0.4 %	Hydraulic length	= 1400 ft
Tc method	= LAG	Time of conc. (Tc)	= 65.89 min
Total precip.	= 3.50 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

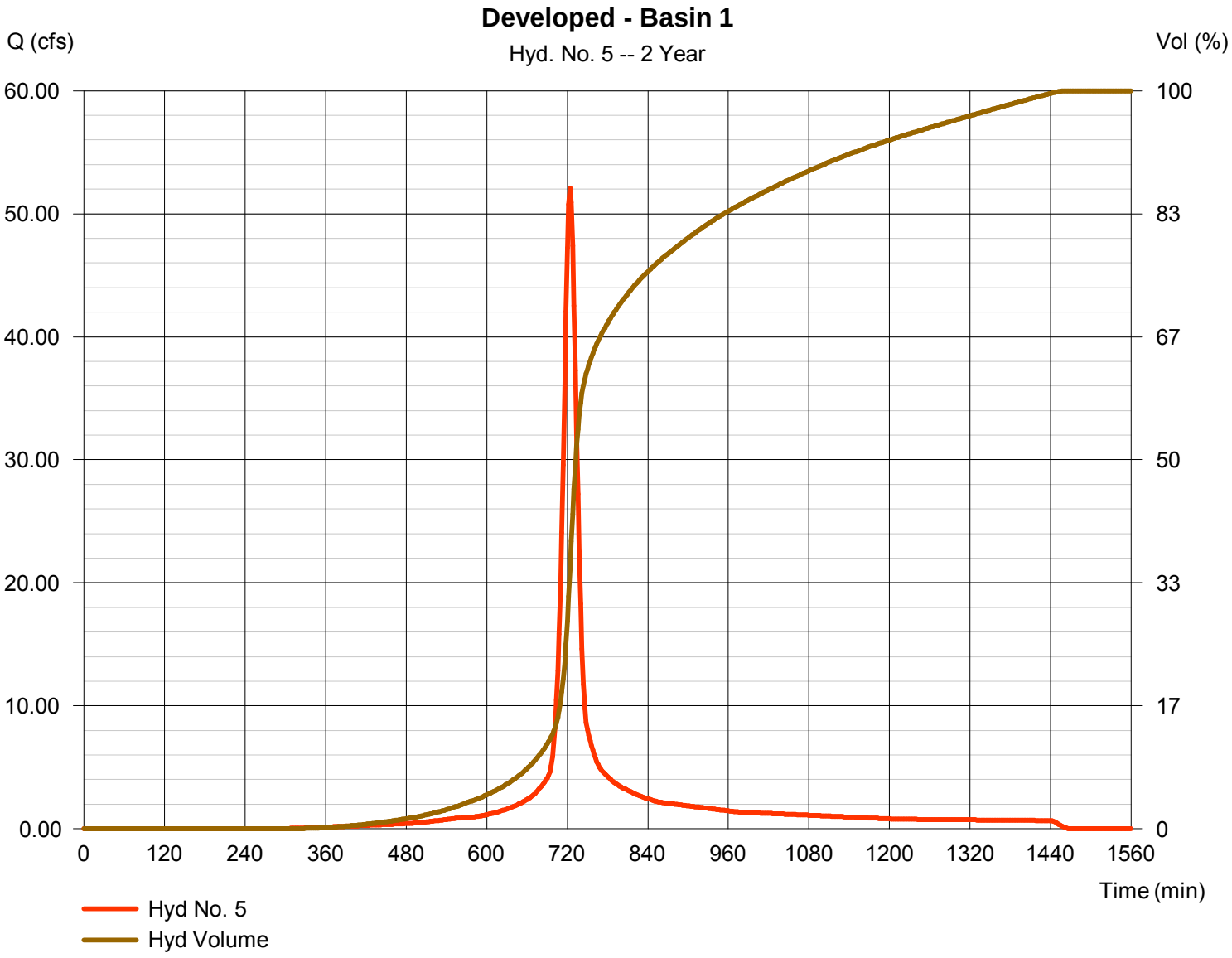


Hydrograph Report

Hyd. No. 5

Developed - Basin 1

Hydrograph type	= SCS Runoff	Peak discharge	= 52.12 cfs
Storm frequency	= 2 yrs	Time to peak	= 724 min
Time interval	= 2 min	Hyd. volume	= 166,037 cuft
Drainage area	= 18.000 ac	Curve number	= 91
Basin Slope	= 0.5 %	Hydraulic length	= 500 ft
Tc method	= LAG	Time of conc. (Tc)	= 17.41 min
Total precip.	= 3.50 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



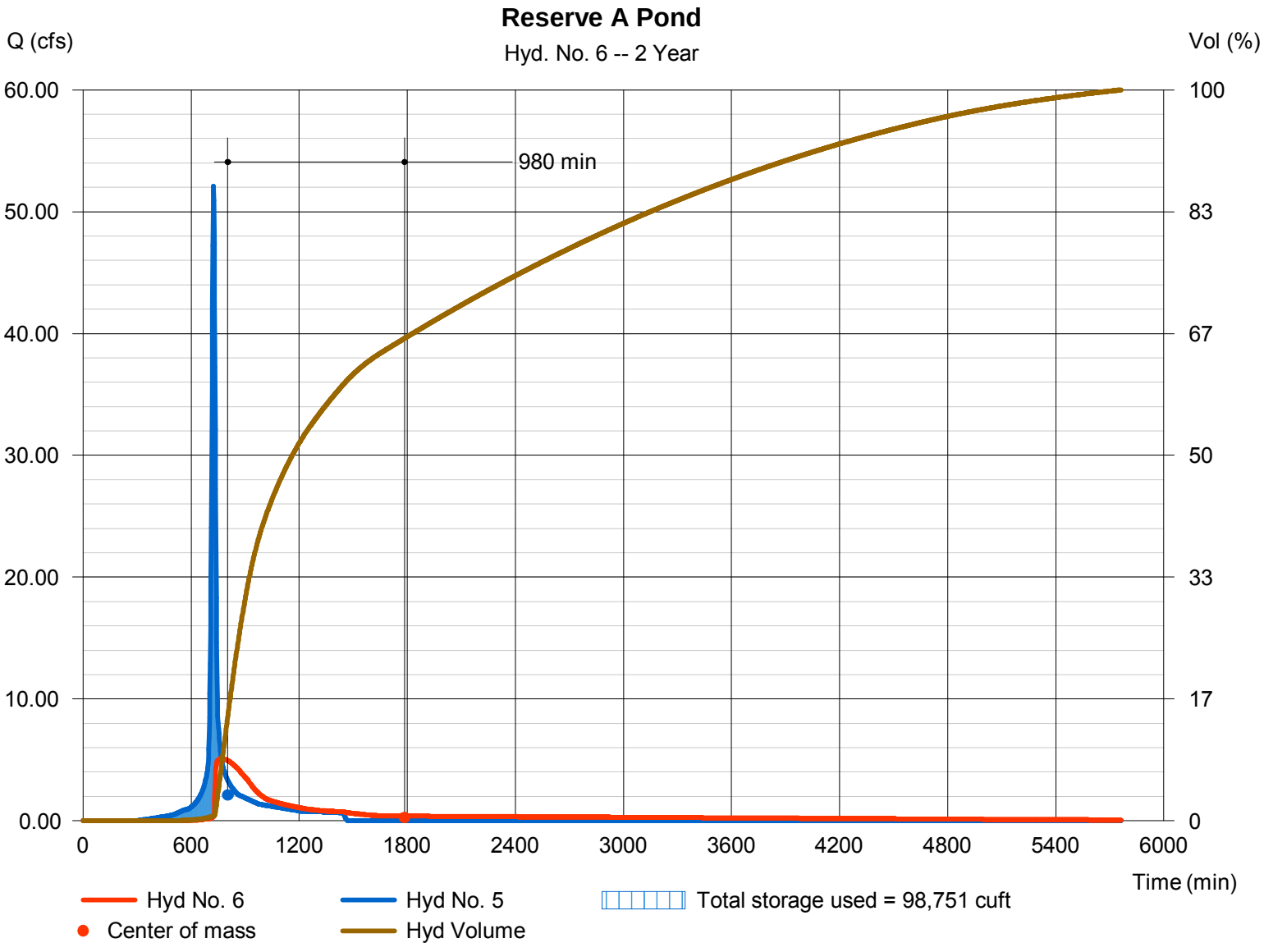
Hydrograph Report

Hyd. No. 6

Reserve A Pond

Hydrograph type	= Reservoir	Peak discharge	= 5.097 cfs
Storm frequency	= 2 yrs	Time to peak	= 768 min
Time interval	= 2 min	Hyd. volume	= 156,030 cuft
Inflow hyd. No.	= 5 - Developed - Basin 1	Max. Elevation	= 1342.75 ft
Reservoir name	= Reserve A	Max. Storage	= 98,751 cuft

Storage Indication method used.

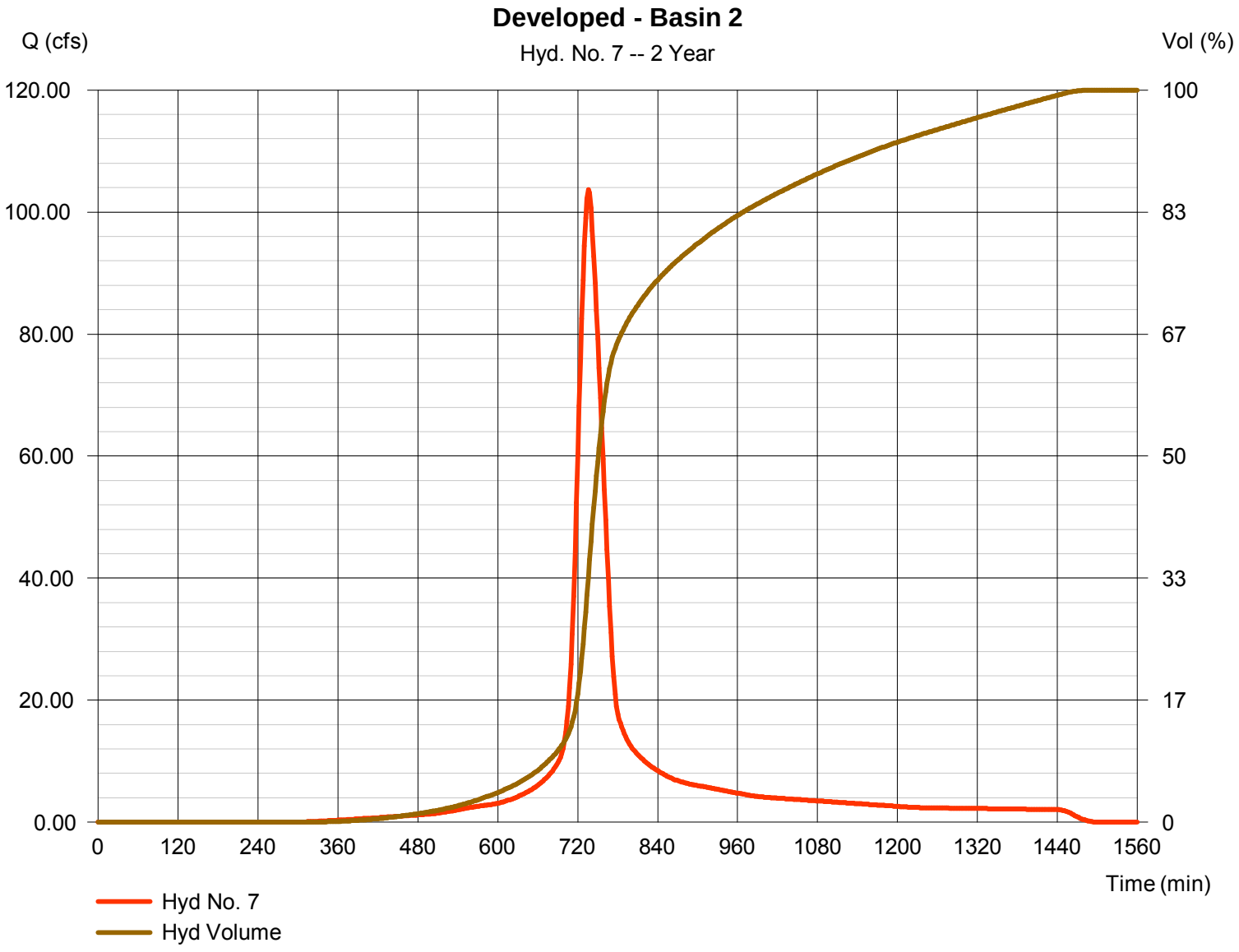


Hydrograph Report

Hyd. No. 7

Developed - Basin 2

Hydrograph type	= SCS Runoff	Peak discharge	= 103.70 cfs
Storm frequency	= 2 yrs	Time to peak	= 736 min
Time interval	= 2 min	Hyd. volume	= 507,336 cuft
Drainage area	= 55.000 ac	Curve number	= 91
Basin Slope	= 0.6 %	Hydraulic length	= 1600 ft
Tc method	= LAG	Time of conc. (Tc)	= 40.31 min
Total precip.	= 3.50 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

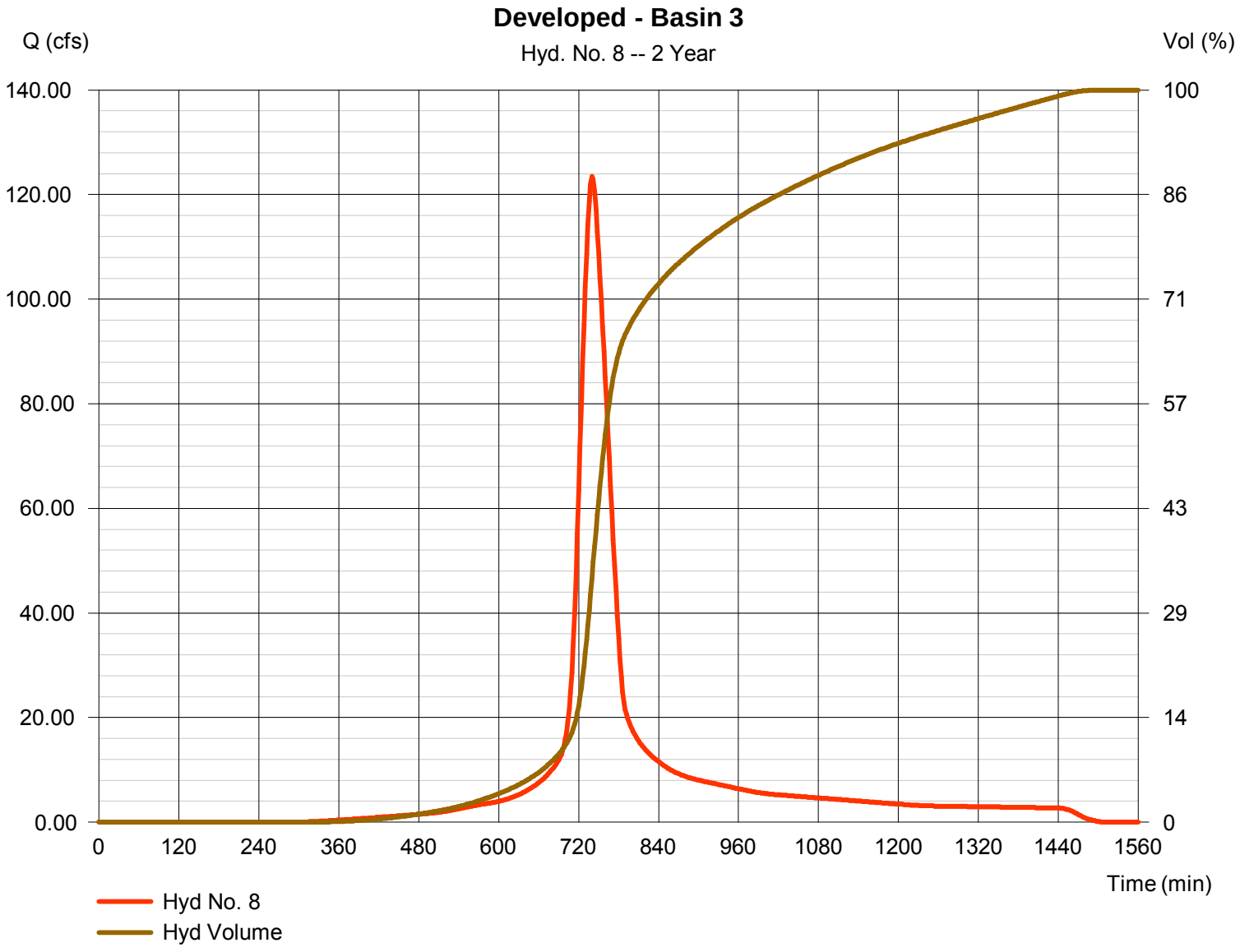


Hydrograph Report

Hyd. No. 8

Developed - Basin 3

Hydrograph type	= SCS Runoff	Peak discharge	= 123.51 cfs
Storm frequency	= 2 yrs	Time to peak	= 740 min
Time interval	= 2 min	Hyd. volume	= 667,360 cuft
Drainage area	= 73.000 ac	Curve number	= 91
Basin Slope	= 0.5 %	Hydraulic length	= 1600 ft
Tc method	= LAG	Time of conc. (Tc)	= 44.15 min
Total precip.	= 3.50 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



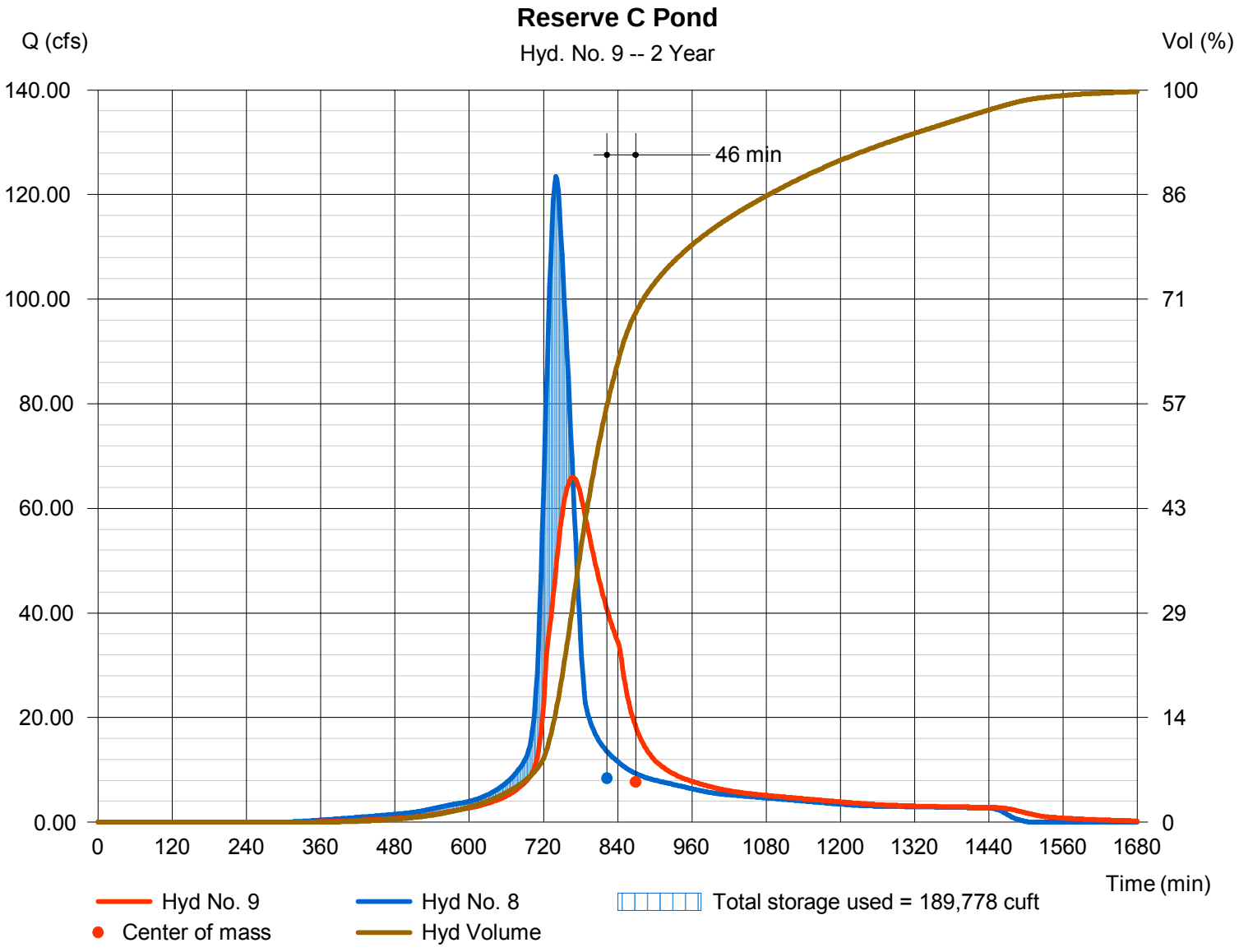
Hydrograph Report

Hyd. No. 9

Reserve C Pond

Hydrograph type	= Reservoir	Peak discharge	= 65.93 cfs
Storm frequency	= 2 yrs	Time to peak	= 768 min
Time interval	= 2 min	Hyd. volume	= 667,355 cuft
Inflow hyd. No.	= 8 - Developed - Basin 3	Max. Elevation	= 1339.58 ft
Reservoir name	= Reserve C Pond	Max. Storage	= 189,778 cuft

Storage Indication method used.

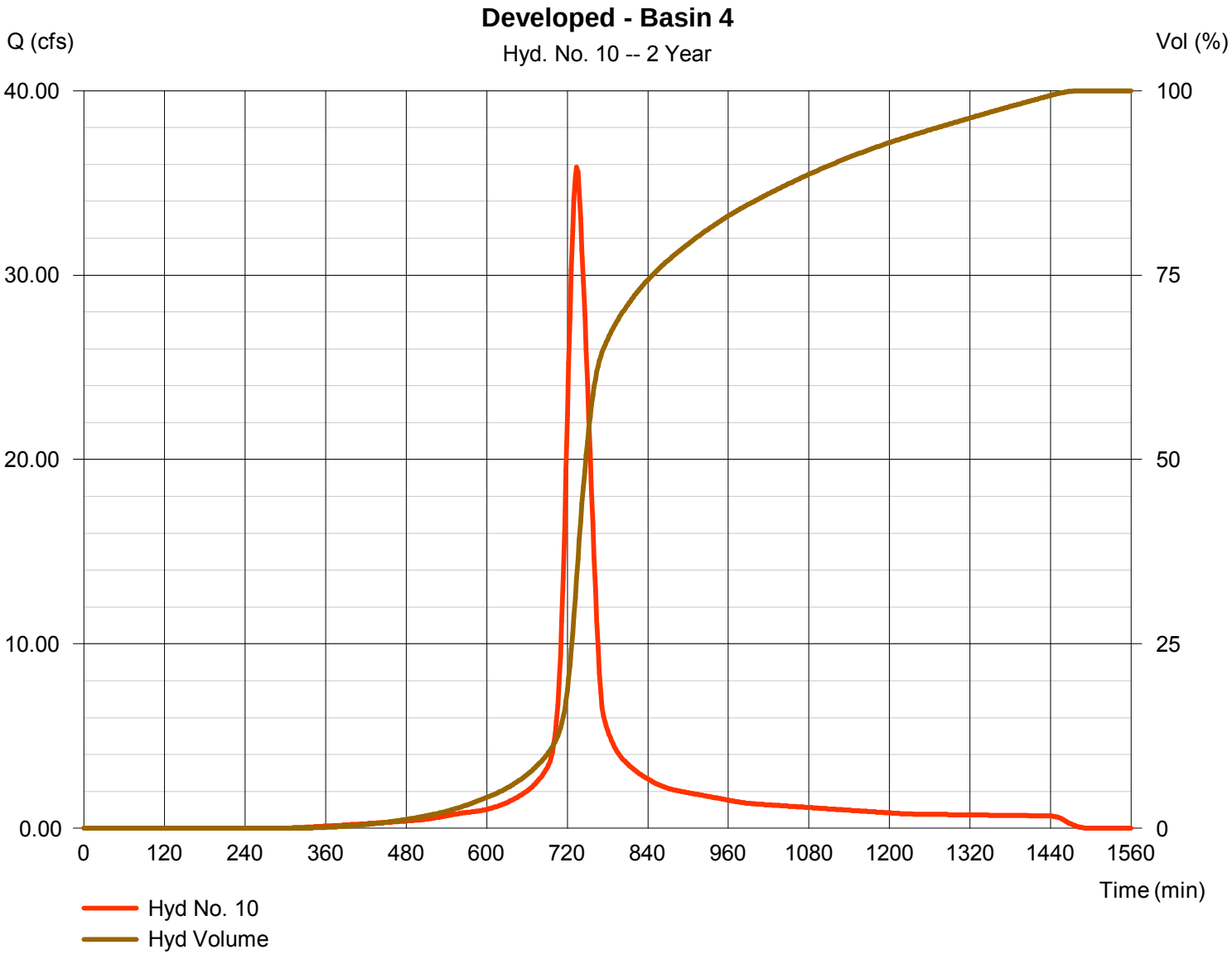


Hydrograph Report

Hyd. No. 10

Developed - Basin 4

Hydrograph type	= SCS Runoff	Peak discharge	= 35.86 cfs
Storm frequency	= 2 yrs	Time to peak	= 734 min
Time interval	= 2 min	Hyd. volume	= 164,150 cuft
Drainage area	= 18.000 ac	Curve number	= 91
Basin Slope	= 0.5 %	Hydraulic length	= 1200 ft
Tc method	= LAG	Time of conc. (Tc)	= 35.08 min
Total precip.	= 3.50 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



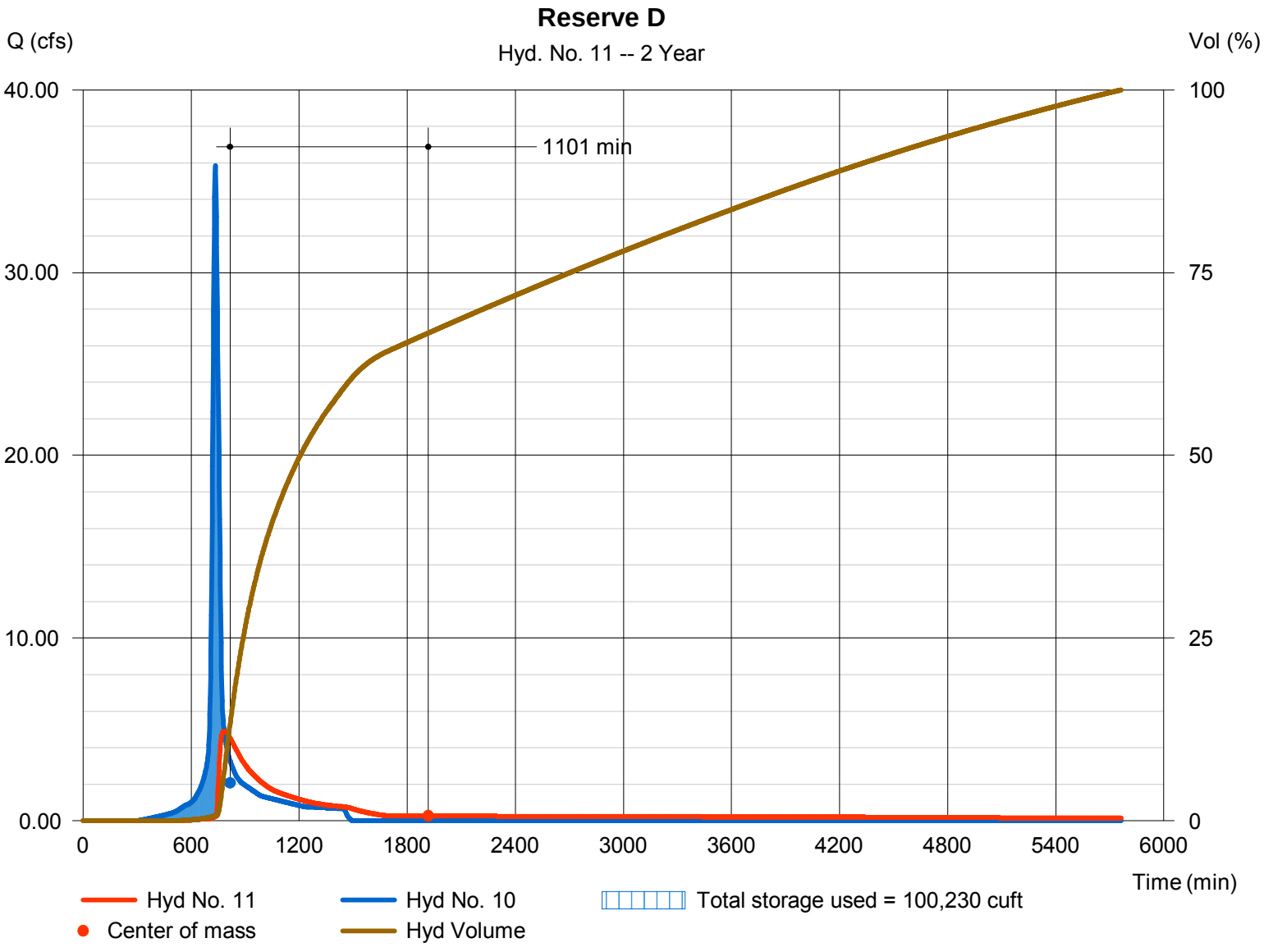
Hydrograph Report

Hyd. No. 11

Reserve D

Hydrograph type	=	Reservoir	Peak discharge	=	4.903 cfs
Storm frequency	=	2 yrs	Time to peak	=	784 min
Time interval	=	2 min	Hyd. volume	=	143,495 cuft
Inflow hyd. No.	=	10 - Developed - Basin 4	Max. Elevation	=	1334.95 ft
Reservoir name	=	Reserve D	Max. Storage	=	100,230 cuft

Storage Indication method used.



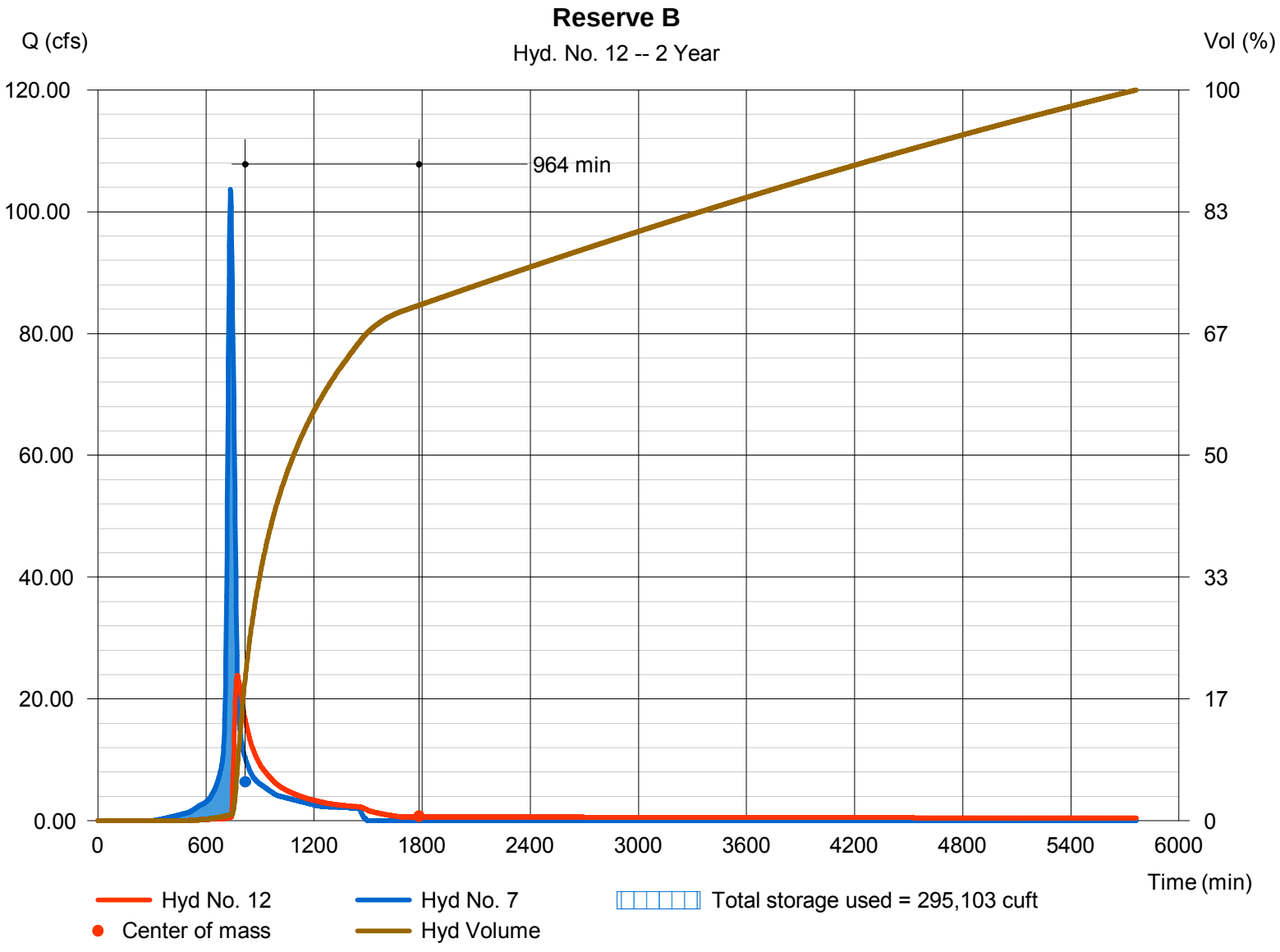
Hydrograph Report

Hyd. No. 12

Reserve B

Hydrograph type	= Reservoir	Peak discharge	= 23.92 cfs
Storm frequency	= 2 yrs	Time to peak	= 774 min
Time interval	= 2 min	Hyd. volume	= 431,040 cuft
Inflow hyd. No.	= 7 - Developed - Basin 2	Max. Elevation	= 1337.23 ft
Reservoir name	= Reserve B	Max. Storage	= 295,103 cuft

Storage Indication method used.

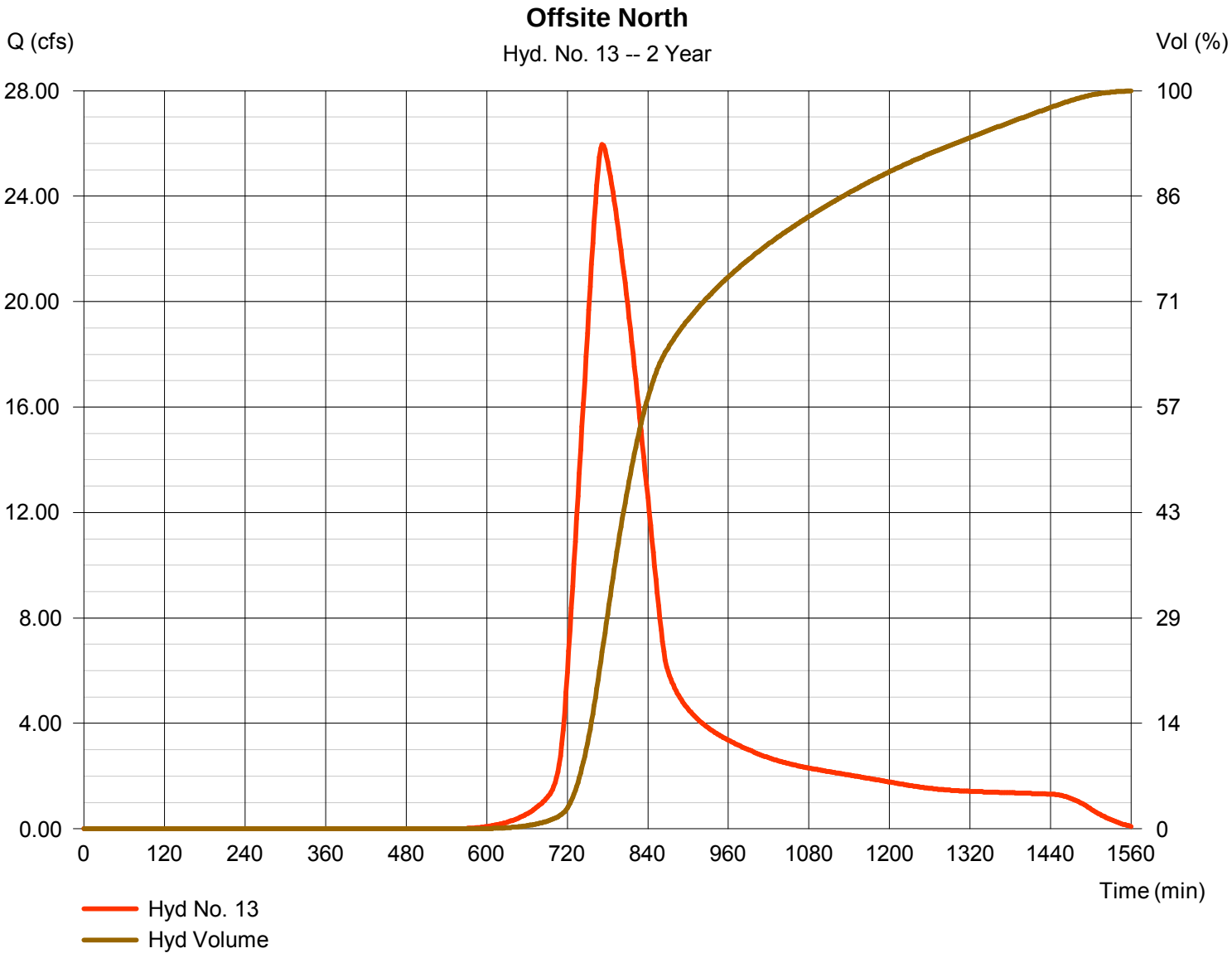


Hydrograph Report

Hyd. No. 13

Offsite North

Hydrograph type	= SCS Runoff	Peak discharge	= 25.95 cfs
Storm frequency	= 2 yrs	Time to peak	= 772 min
Time interval	= 2 min	Hyd. volume	= 242,490 cuft
Drainage area	= 41.000 ac	Curve number	= 80
Basin Slope	= 0.3 %	Hydraulic length	= 1800 ft
Tc method	= LAG	Time of conc. (Tc)	= 98.06 min
Total precip.	= 3.50 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8

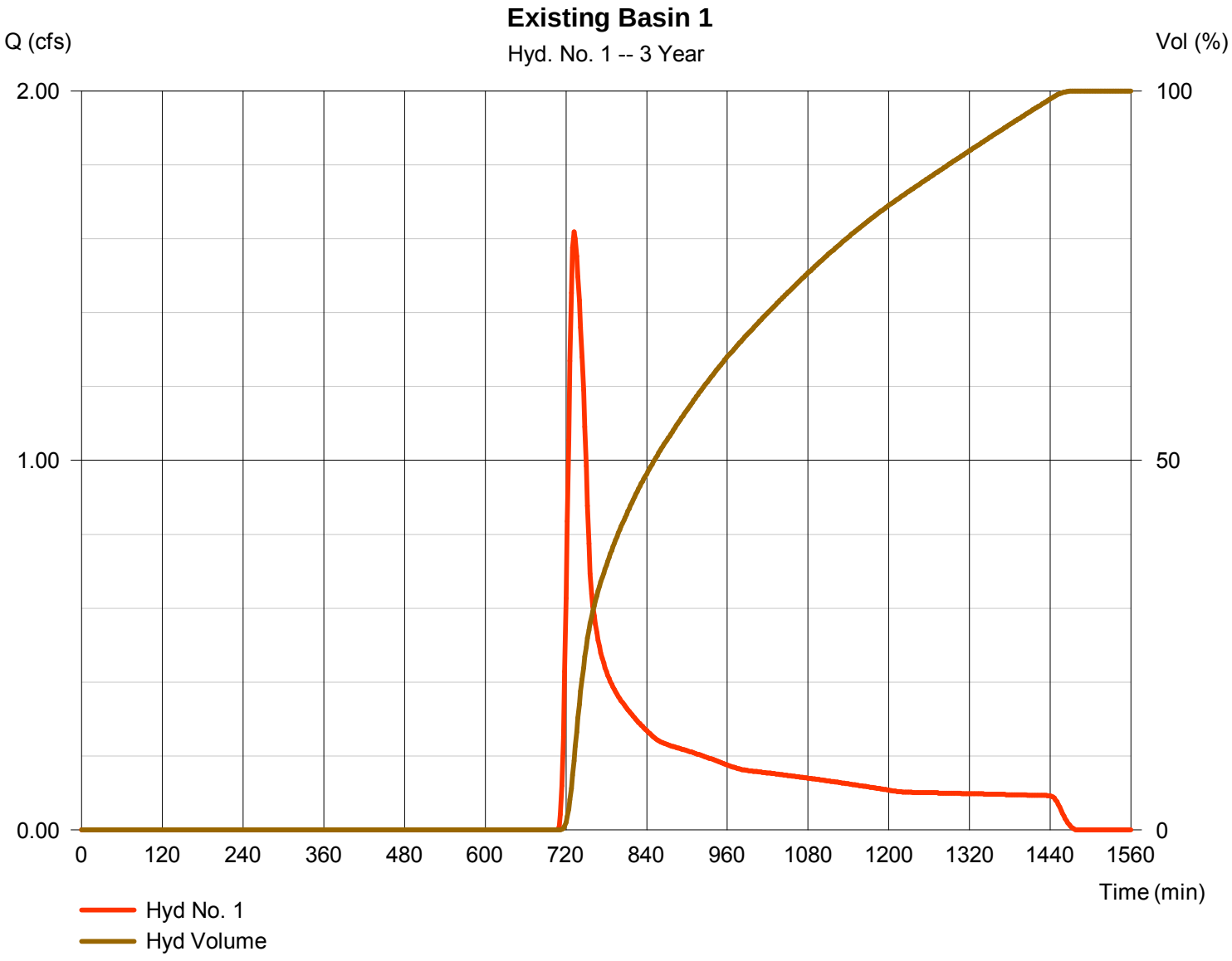
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	1.618	2	732	9,842	------	------	------	Existing Basin 1
2	SCS Runoff	2.833	2	758	30,549	------	------	------	Existing - Basin 2
3	SCS Runoff	3.503	2	764	40,293	------	------	------	Existing - Basin 3
4	SCS Runoff	0.720	2	764	8,279	------	------	------	Existing - Basin 4
5	SCS Runoff	10.35	2	724	32,959	------	------	------	Developed - Basin 1
6	Reservoir	0.207	2	1228	28,260	5	1341.45	24,524	Reserve A Pond
7	SCS Runoff	20.26	2	738	100,707	------	------	------	Developed - Basin 2
8	SCS Runoff	24.07	2	742	132,472	------	------	------	Developed - Basin 3
9	Reservoir	14.28	2	768	132,466	8	1338.57	37,378	Reserve C Pond
10	SCS Runoff	7.021	2	736	32,584	------	------	------	Developed - Basin 4
11	Reservoir	0.162	2	1450	28,303	10	1333.64	25,873	Reserve D
12	Reservoir	0.445	2	1456	92,237	7	1335.36	81,642	Reserve B
13	SCS Runoff	1.547	2	790	22,675	------	------	------	Offsite North

Hydrograph Report

Hyd. No. 1

Existing Basin 1

Hydrograph type	= SCS Runoff	Peak discharge	= 1.618 cfs
Storm frequency	= 3 yrs	Time to peak	= 732 min
Time interval	= 2 min	Hyd. volume	= 9,842 cuft
Drainage area	= 18.000 ac	Curve number	= 80
Basin Slope	= 0.7 %	Hydraulic length	= 600 ft
Tc method	= LAG	Time of conc. (Tc)	= 25.29 min
Total precip.	= 1.20 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

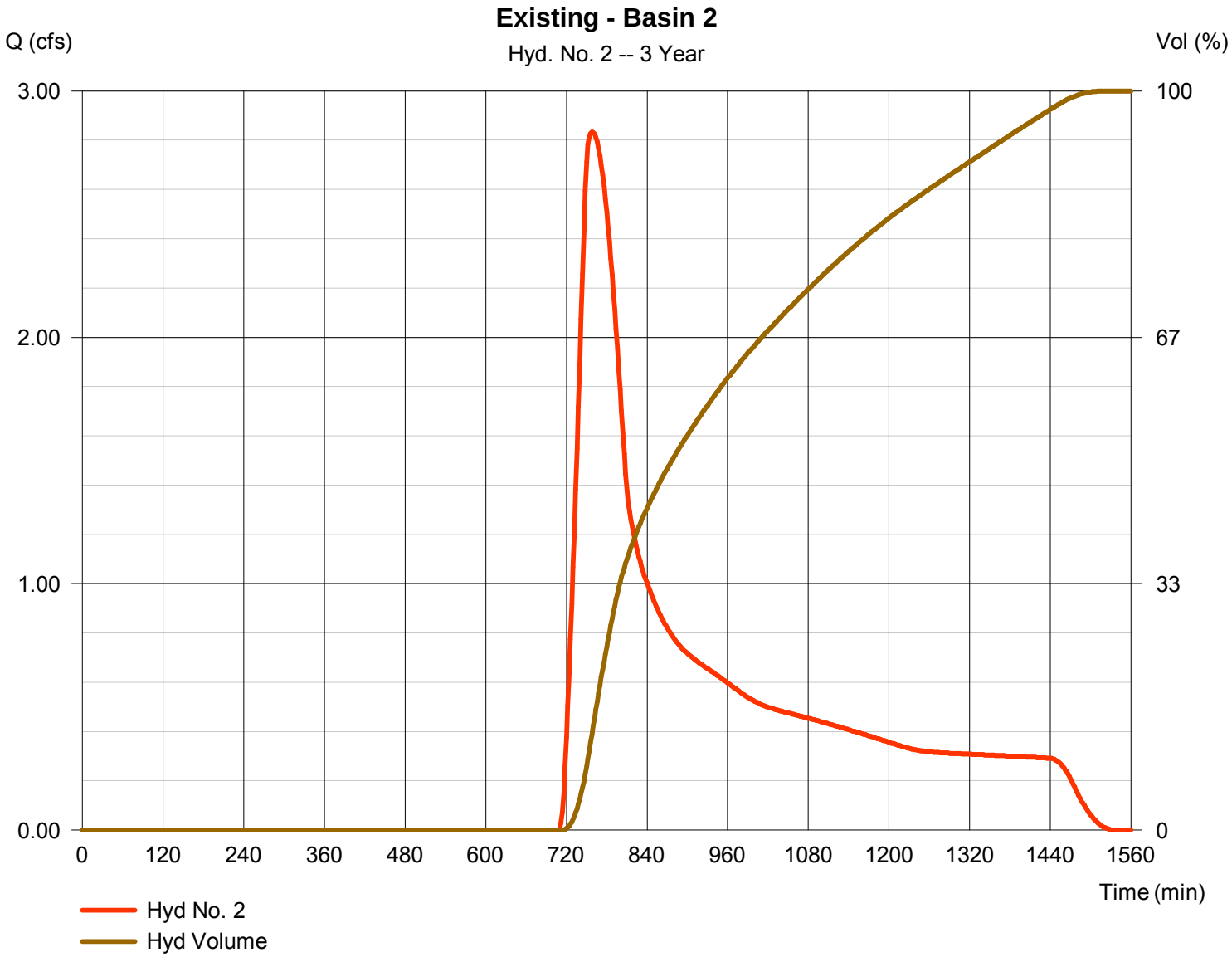


Hydrograph Report

Hyd. No. 2

Existing - Basin 2

Hydrograph type	= SCS Runoff	Peak discharge	= 2.833 cfs
Storm frequency	= 3 yrs	Time to peak	= 758 min
Time interval	= 2 min	Hyd. volume	= 30,549 cuft
Drainage area	= 55.000 ac	Curve number	= 80
Basin Slope	= 0.6 %	Hydraulic length	= 1600 ft
Tc method	= LAG	Time of conc. (Tc)	= 59.87 min
Total precip.	= 1.20 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

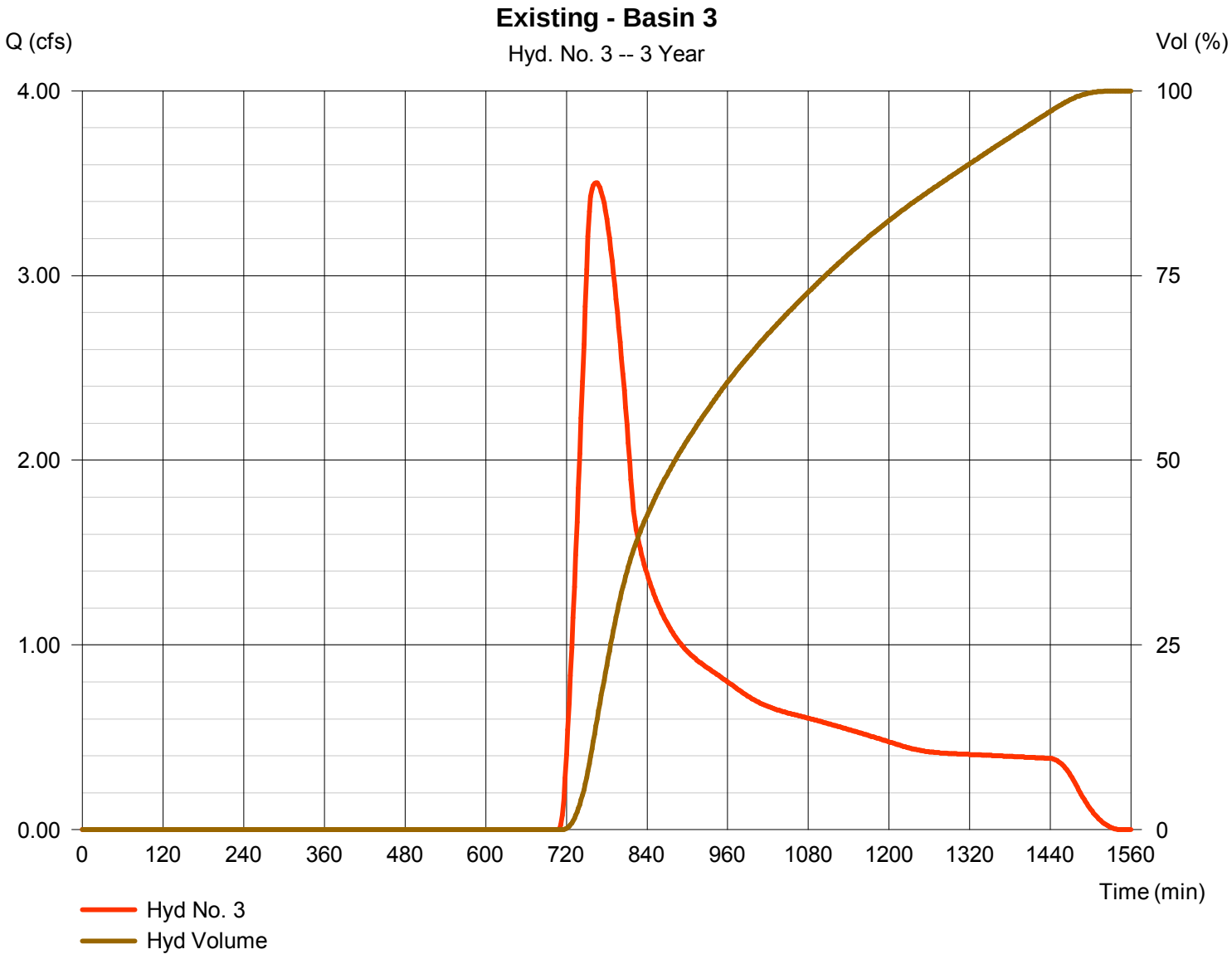


Hydrograph Report

Hyd. No. 3

Existing - Basin 3

Hydrograph type	= SCS Runoff	Peak discharge	= 3.503 cfs
Storm frequency	= 3 yrs	Time to peak	= 764 min
Time interval	= 2 min	Hyd. volume	= 40,293 cuft
Drainage area	= 73.000 ac	Curve number	= 80
Basin Slope	= 0.6 %	Hydraulic length	= 1800 ft
Tc method	= LAG	Time of conc. (Tc)	= 65.78 min
Total precip.	= 1.20 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

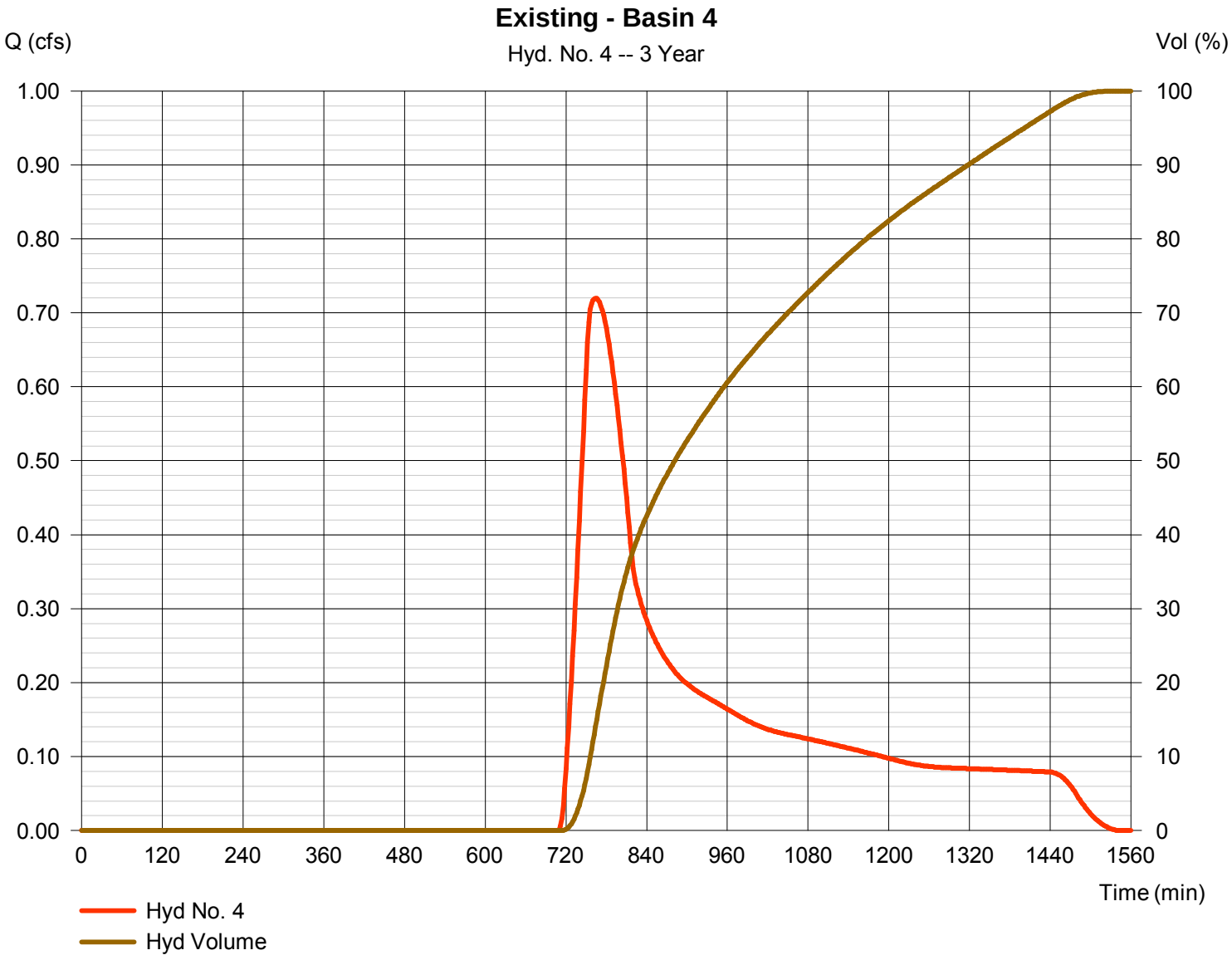


Hydrograph Report

Hyd. No. 4

Existing - Basin 4

Hydrograph type	= SCS Runoff	Peak discharge	= 0.720 cfs
Storm frequency	= 3 yrs	Time to peak	= 764 min
Time interval	= 2 min	Hyd. volume	= 8,279 cuft
Drainage area	= 15.000 ac	Curve number	= 80
Basin Slope	= 0.4 %	Hydraulic length	= 1400 ft
Tc method	= LAG	Time of conc. (Tc)	= 65.89 min
Total precip.	= 1.20 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

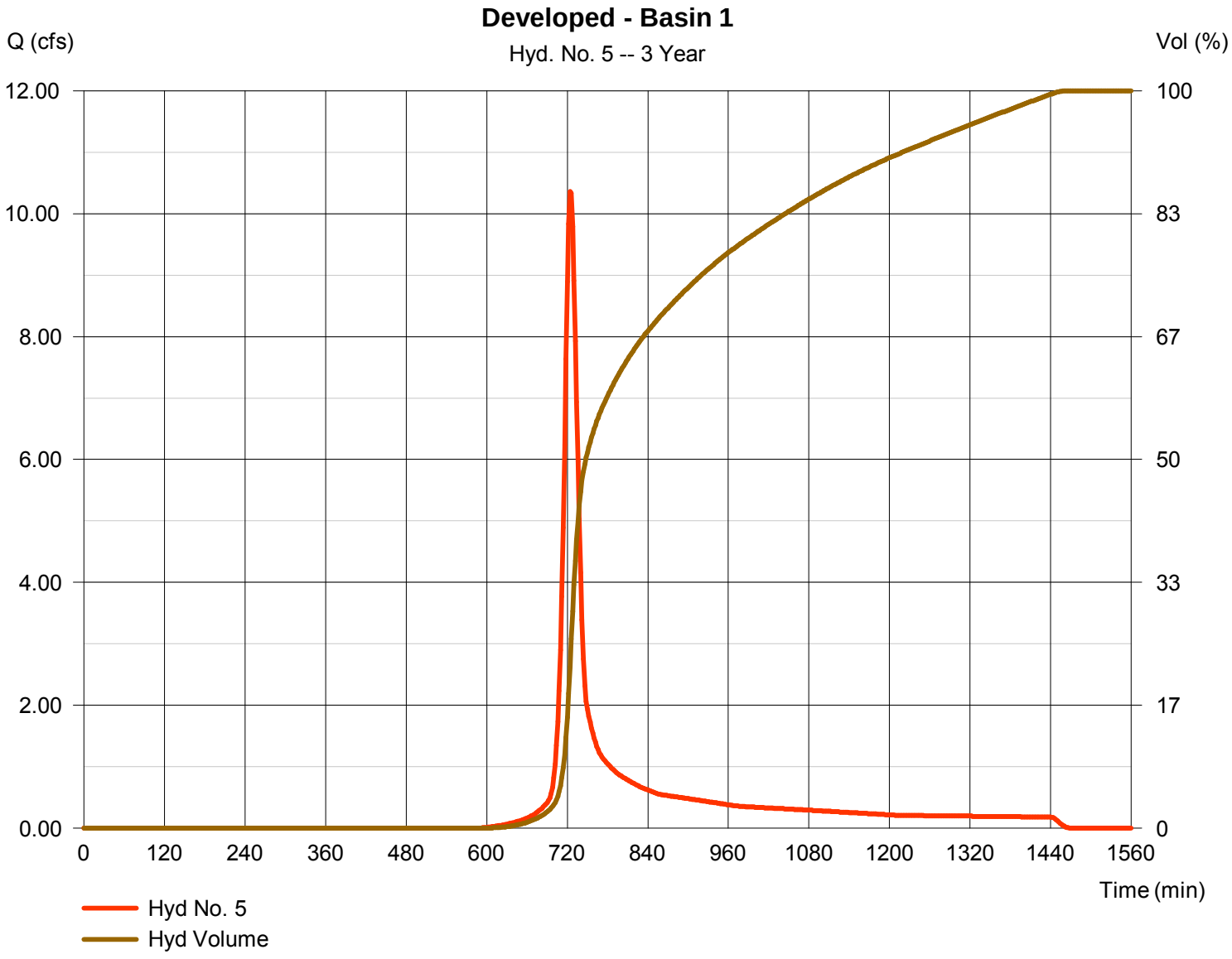


Hydrograph Report

Hyd. No. 5

Developed - Basin 1

Hydrograph type	= SCS Runoff	Peak discharge	= 10.35 cfs
Storm frequency	= 3 yrs	Time to peak	= 724 min
Time interval	= 2 min	Hyd. volume	= 32,959 cuft
Drainage area	= 18.000 ac	Curve number	= 91
Basin Slope	= 0.5 %	Hydraulic length	= 500 ft
Tc method	= LAG	Time of conc. (Tc)	= 17.41 min
Total precip.	= 1.20 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



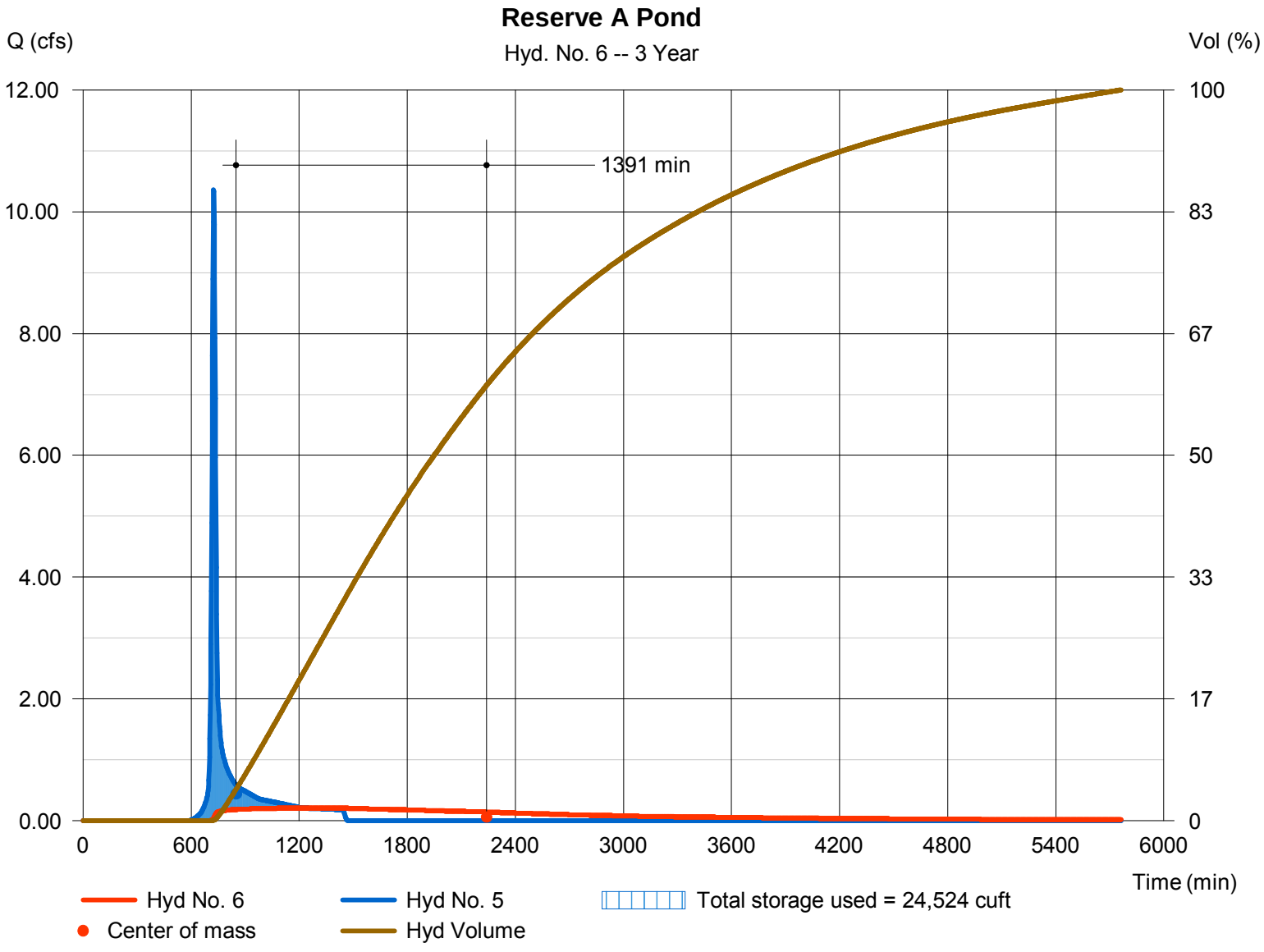
Hydrograph Report

Hyd. No. 6

Reserve A Pond

Hydrograph type	= Reservoir	Peak discharge	= 0.207 cfs
Storm frequency	= 3 yrs	Time to peak	= 1228 min
Time interval	= 2 min	Hyd. volume	= 28,260 cuft
Inflow hyd. No.	= 5 - Developed - Basin 1	Max. Elevation	= 1341.45 ft
Reservoir name	= Reserve A	Max. Storage	= 24,524 cuft

Storage Indication method used.

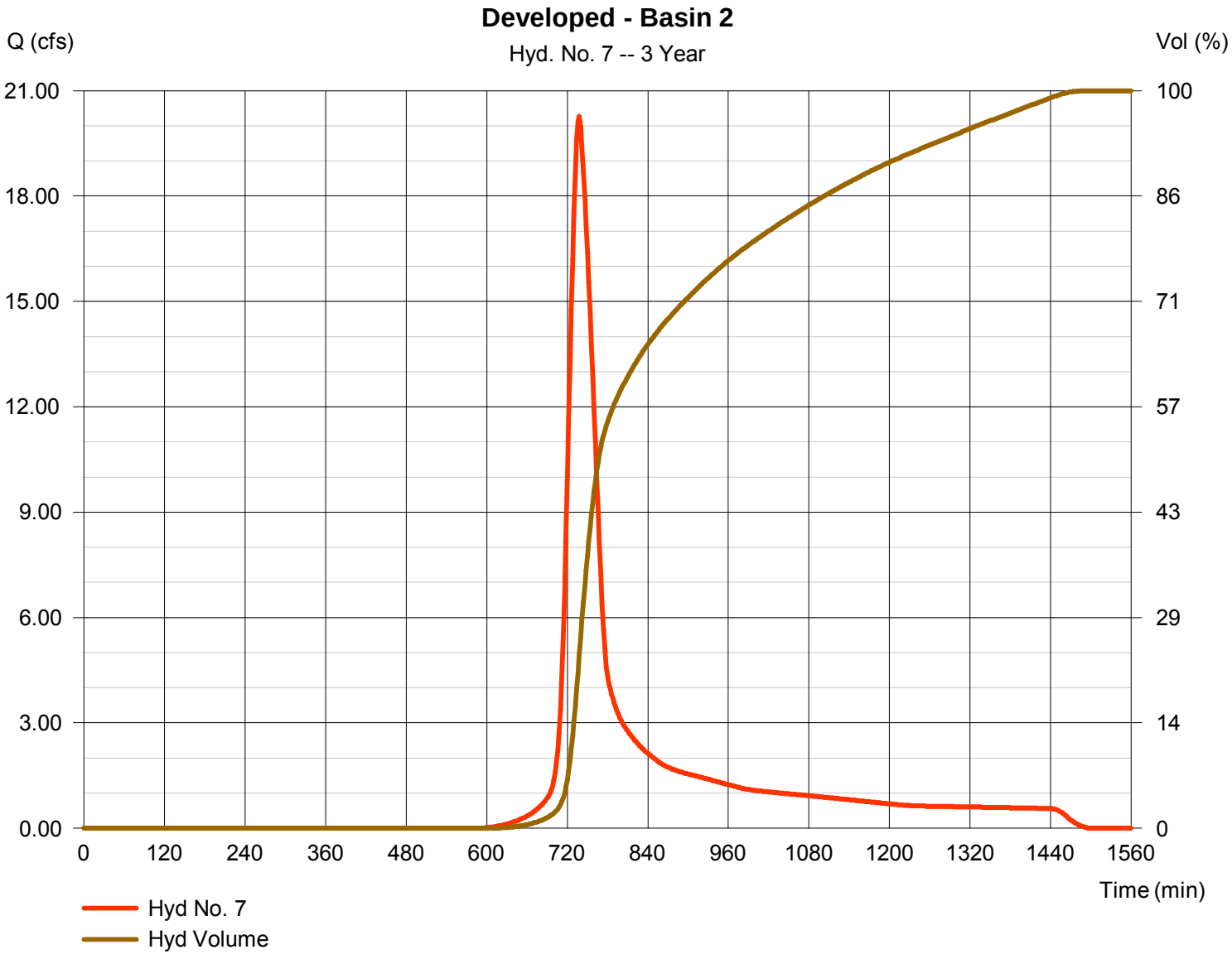


Hydrograph Report

Hyd. No. 7

Developed - Basin 2

Hydrograph type	= SCS Runoff	Peak discharge	= 20.26 cfs
Storm frequency	= 3 yrs	Time to peak	= 738 min
Time interval	= 2 min	Hyd. volume	= 100,707 cuft
Drainage area	= 55.000 ac	Curve number	= 91
Basin Slope	= 0.6 %	Hydraulic length	= 1600 ft
Tc method	= LAG	Time of conc. (Tc)	= 40.31 min
Total precip.	= 1.20 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

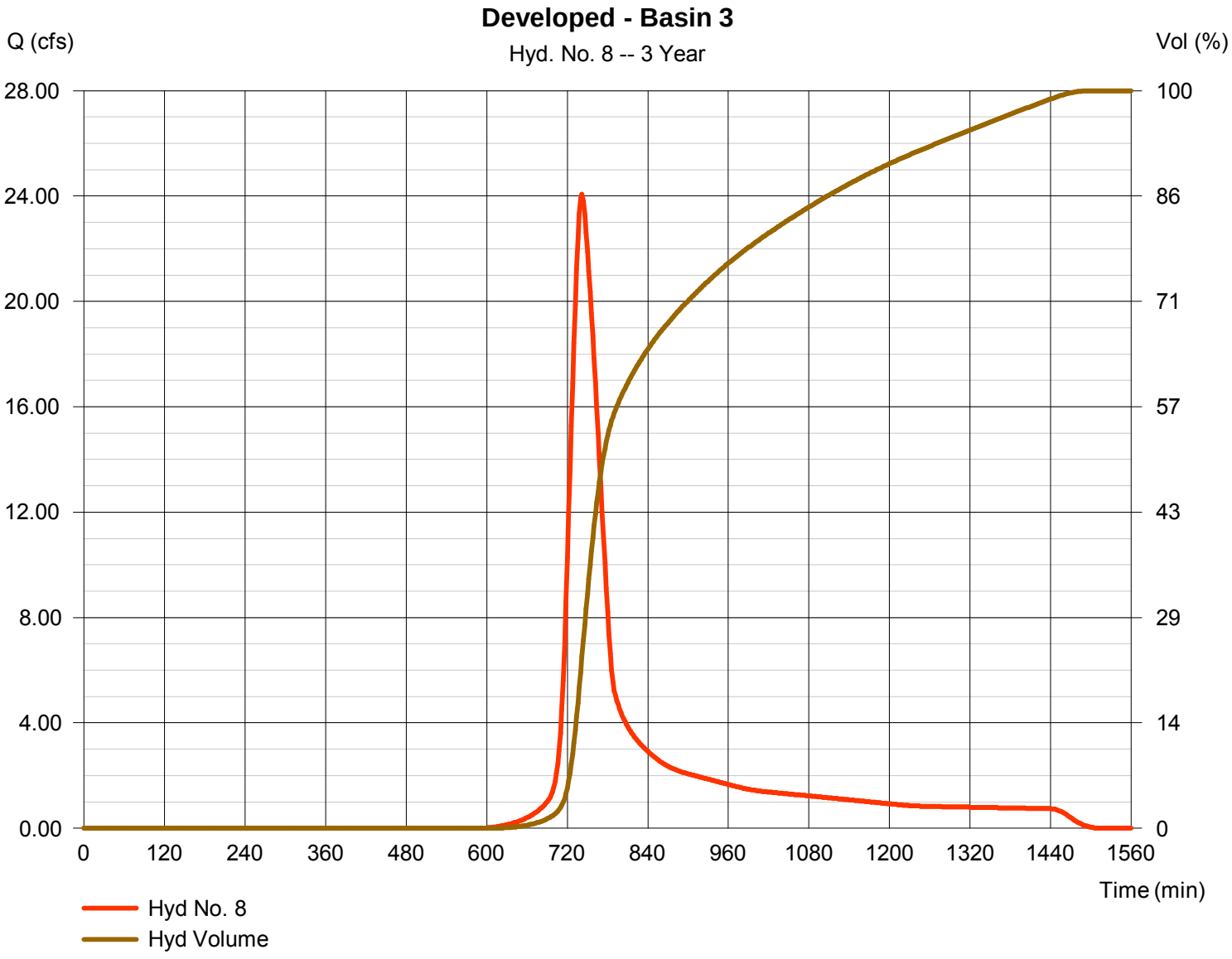


Hydrograph Report

Hyd. No. 8

Developed - Basin 3

Hydrograph type	= SCS Runoff	Peak discharge	= 24.07 cfs
Storm frequency	= 3 yrs	Time to peak	= 742 min
Time interval	= 2 min	Hyd. volume	= 132,472 cuft
Drainage area	= 73.000 ac	Curve number	= 91
Basin Slope	= 0.5 %	Hydraulic length	= 1600 ft
Tc method	= LAG	Time of conc. (Tc)	= 44.15 min
Total precip.	= 1.20 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



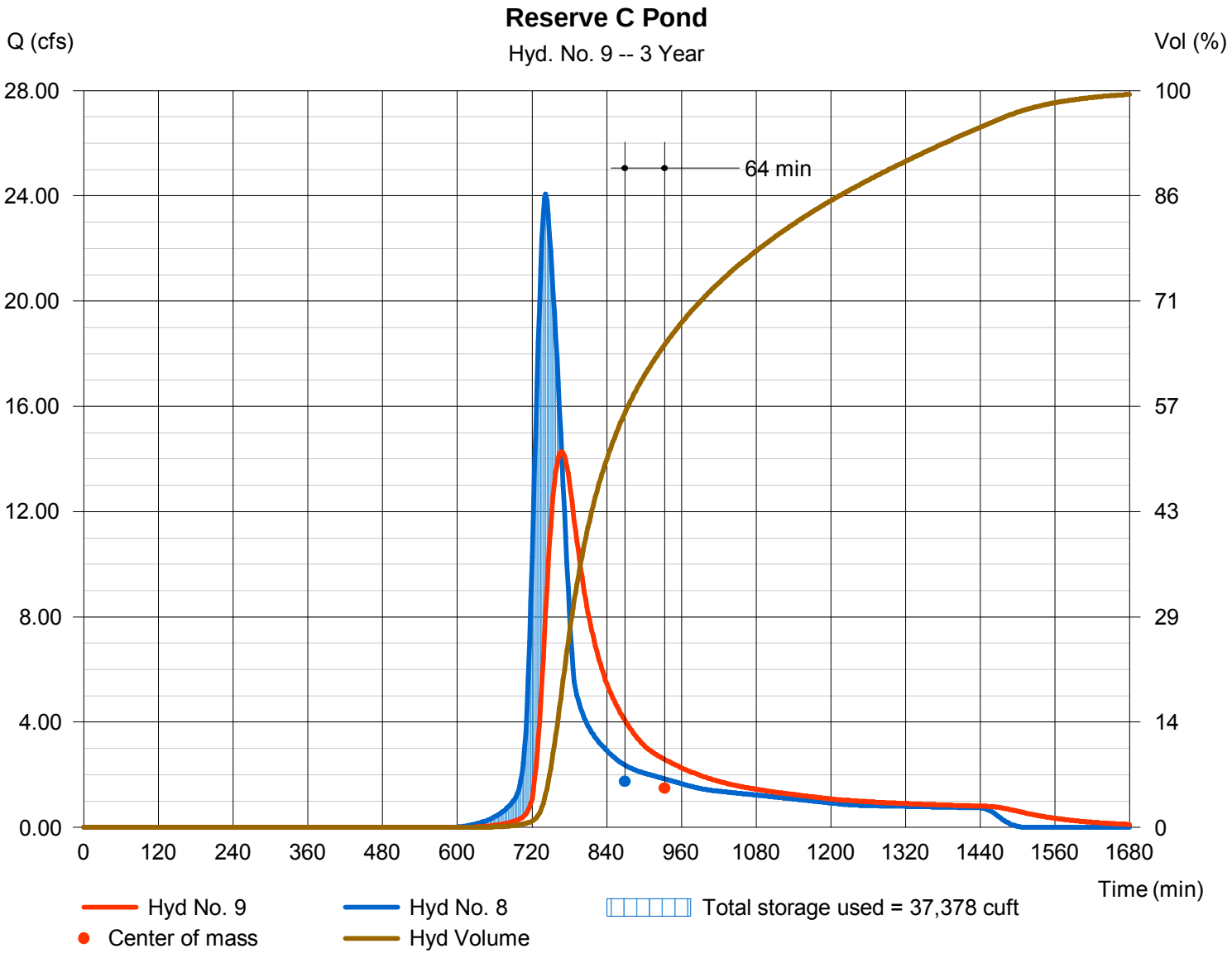
Hydrograph Report

Hyd. No. 9

Reserve C Pond

Hydrograph type	= Reservoir	Peak discharge	= 14.28 cfs
Storm frequency	= 3 yrs	Time to peak	= 768 min
Time interval	= 2 min	Hyd. volume	= 132,466 cuft
Inflow hyd. No.	= 8 - Developed - Basin 3	Max. Elevation	= 1338.57 ft
Reservoir name	= Reserve C Pond	Max. Storage	= 37,378 cuft

Storage Indication method used.

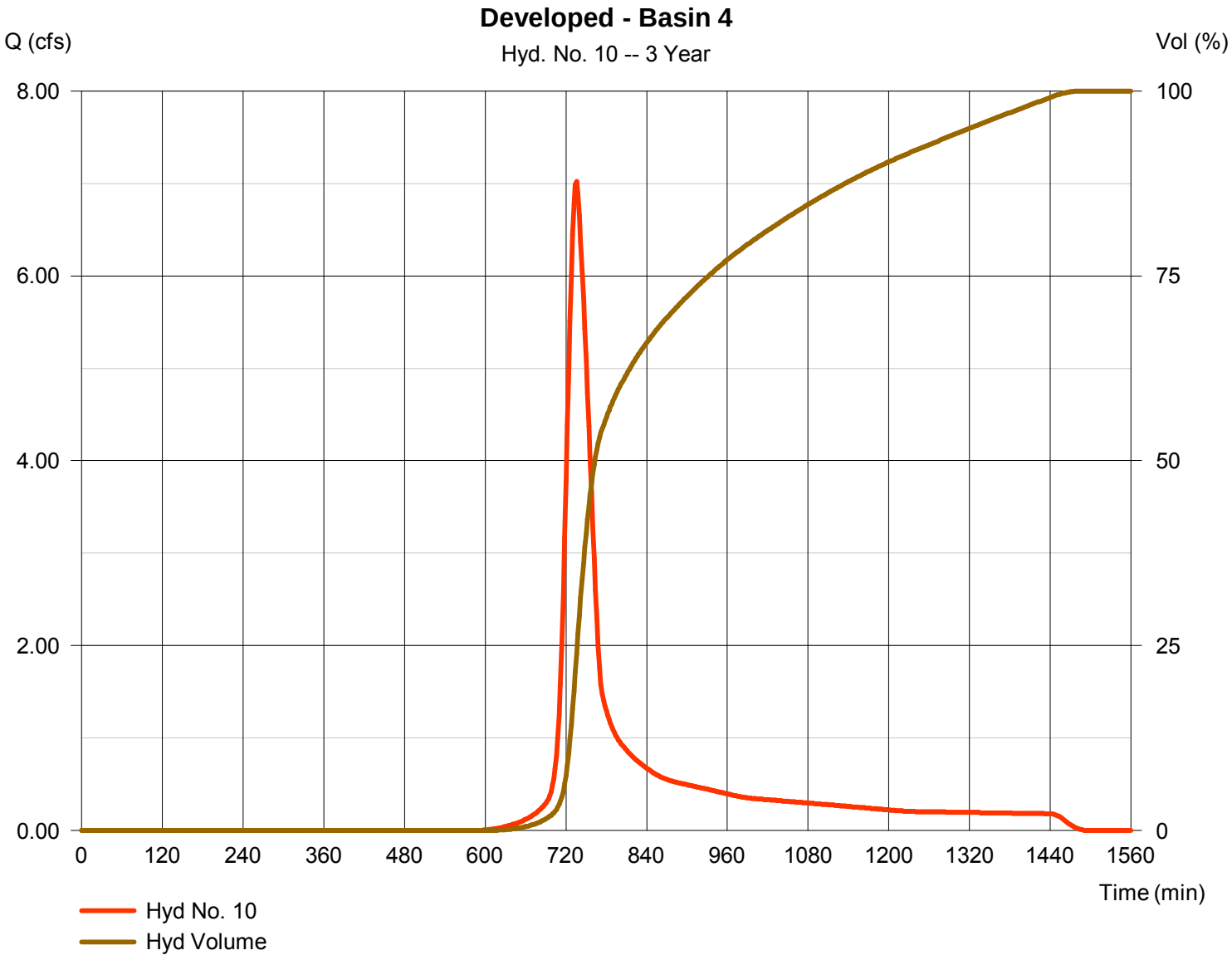


Hydrograph Report

Hyd. No. 10

Developed - Basin 4

Hydrograph type	= SCS Runoff	Peak discharge	= 7.021 cfs
Storm frequency	= 3 yrs	Time to peak	= 736 min
Time interval	= 2 min	Hyd. volume	= 32,584 cuft
Drainage area	= 18.000 ac	Curve number	= 91
Basin Slope	= 0.5 %	Hydraulic length	= 1200 ft
Tc method	= LAG	Time of conc. (Tc)	= 35.08 min
Total precip.	= 1.20 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



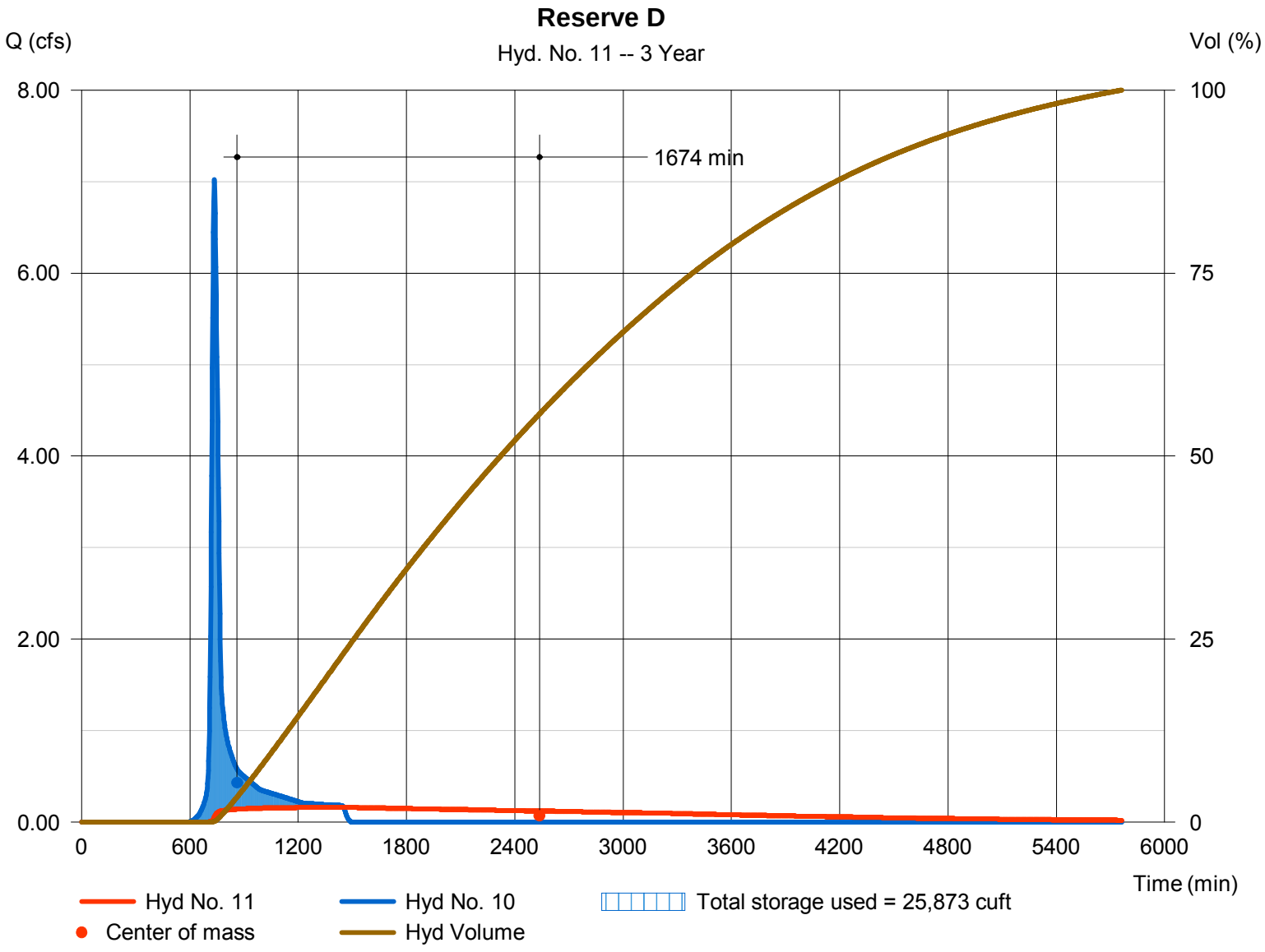
Hydrograph Report

Hyd. No. 11

Reserve D

Hydrograph type	=	Reservoir	Peak discharge	=	0.162 cfs
Storm frequency	=	3 yrs	Time to peak	=	1450 min
Time interval	=	2 min	Hyd. volume	=	28,303 cuft
Inflow hyd. No.	=	10 - Developed - Basin 4	Max. Elevation	=	1333.64 ft
Reservoir name	=	Reserve D	Max. Storage	=	25,873 cuft

Storage Indication method used.



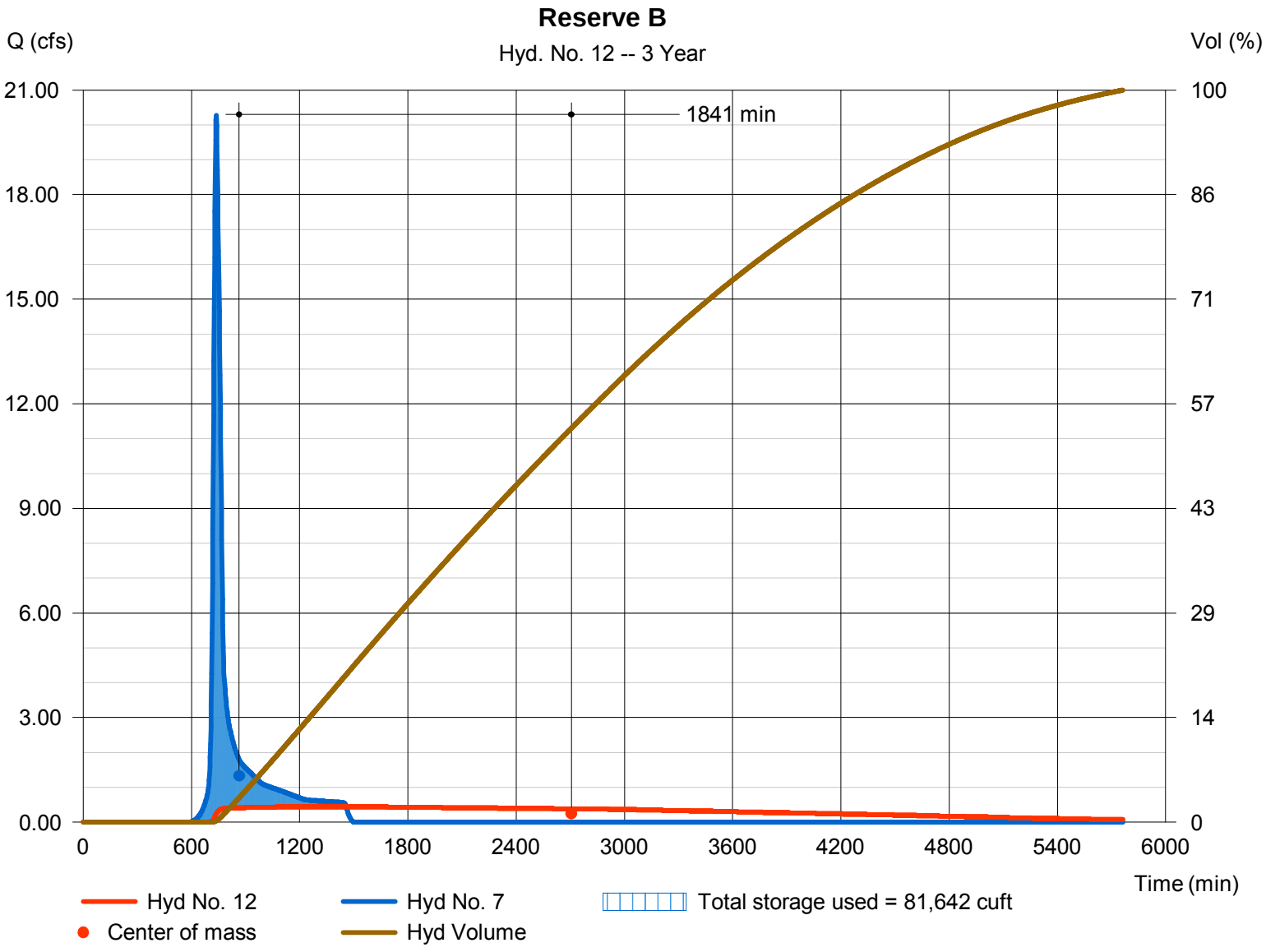
Hydrograph Report

Hyd. No. 12

Reserve B

Hydrograph type	= Reservoir	Peak discharge	= 0.445 cfs
Storm frequency	= 3 yrs	Time to peak	= 1456 min
Time interval	= 2 min	Hyd. volume	= 92,237 cuft
Inflow hyd. No.	= 7 - Developed - Basin 2	Max. Elevation	= 1335.36 ft
Reservoir name	= Reserve B	Max. Storage	= 81,642 cuft

Storage Indication method used.

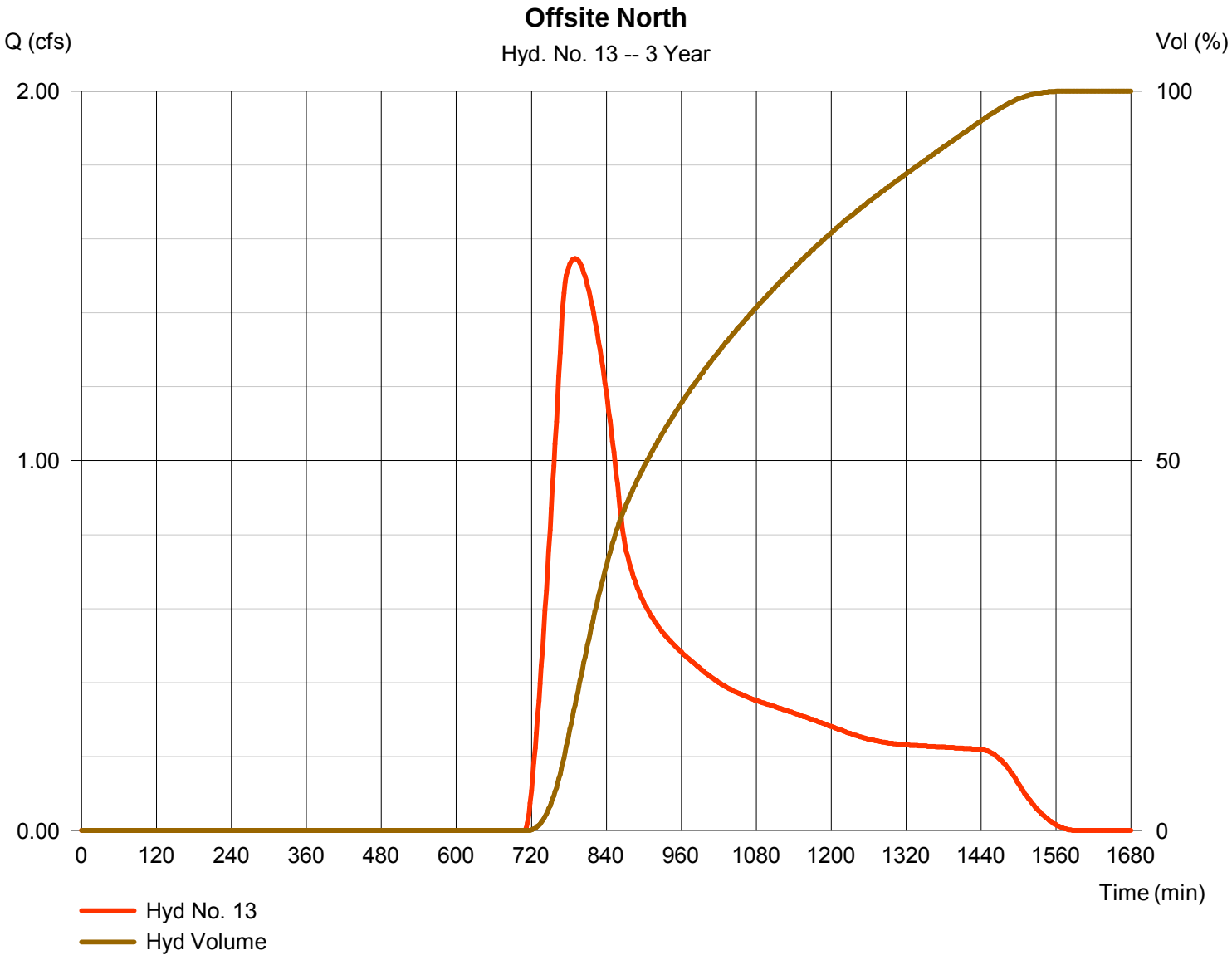


Hydrograph Report

Hyd. No. 13

Offsite North

Hydrograph type	= SCS Runoff	Peak discharge	= 1.547 cfs
Storm frequency	= 3 yrs	Time to peak	= 790 min
Time interval	= 2 min	Hyd. volume	= 22,675 cuft
Drainage area	= 41.000 ac	Curve number	= 80
Basin Slope	= 0.3 %	Hydraulic length	= 1800 ft
Tc method	= LAG	Time of conc. (Tc)	= 98.06 min
Total precip.	= 1.20 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8

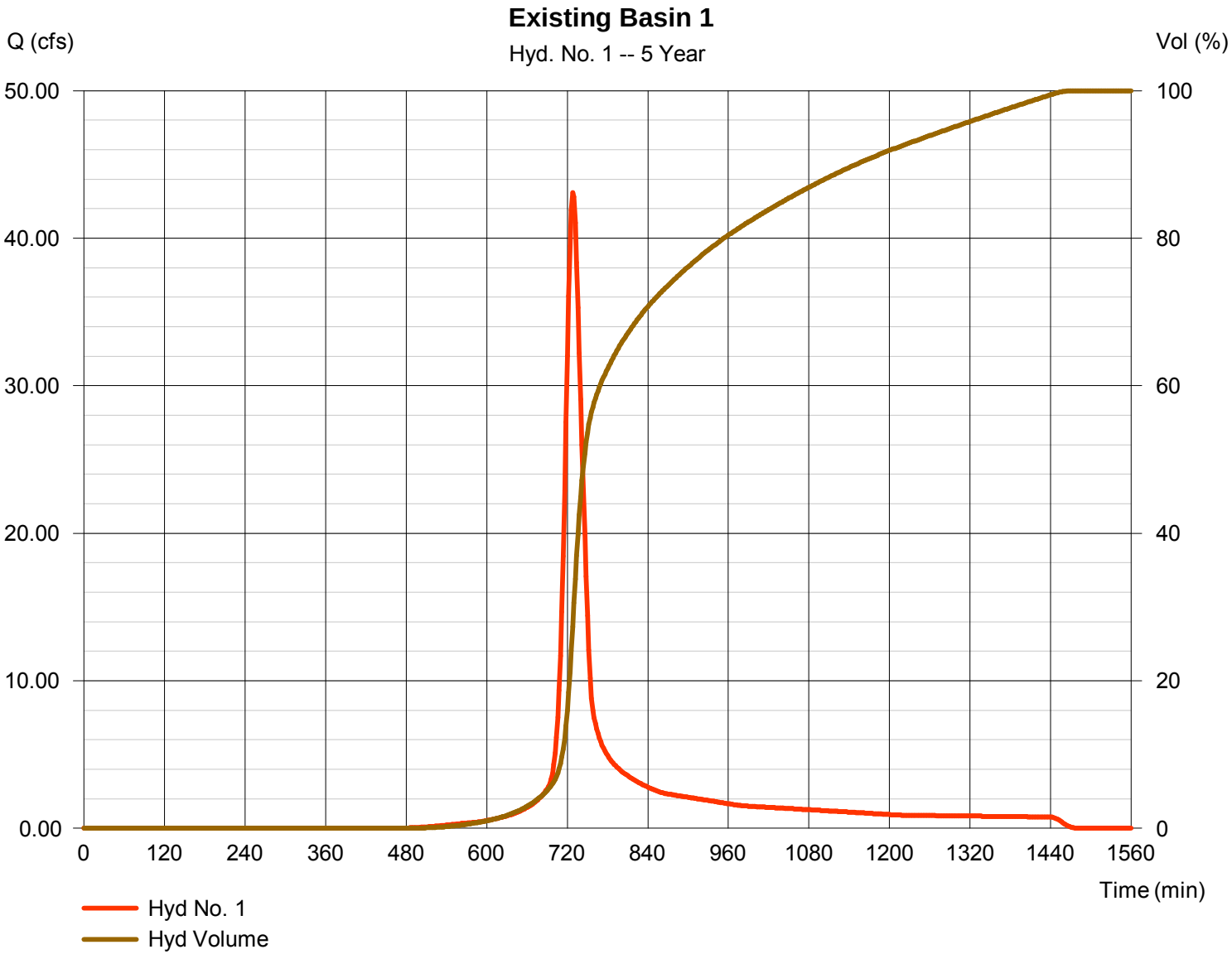
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	43.11	2	728	158,324	------	------	------	Existing Basin 1
2	SCS Runoff	76.00	2	750	491,446	------	------	------	Existing - Basin 2
3	SCS Runoff	93.27	2	754	648,206	------	------	------	Existing - Basin 3
4	SCS Runoff	19.17	2	754	133,193	------	------	------	Existing - Basin 4
5	SCS Runoff	70.72	2	724	228,563	------	------	------	Developed - Basin 1
6	Reservoir	7.406	2	764	218,453	5	1343.33	135,258	Reserve A Pond
7	SCS Runoff	141.18	2	736	698,386	------	------	------	Developed - Basin 2
8	SCS Runoff	168.23	2	740	918,672	------	------	------	Developed - Basin 3
9	Reservoir	88.99	2	768	918,665	8	1339.93	264,803	Reserve C Pond
10	SCS Runoff	48.80	2	734	225,965	------	------	------	Developed - Basin 4
11	Reservoir	8.687	2	772	205,041	10	1335.43	132,102	Reserve D
12	Reservoir	53.80	2	766	621,373	7	1337.79	365,467	Reserve B
13	SCS Runoff	39.72	2	772	364,772	------	------	------	Offsite North

Hydrograph Report

Hyd. No. 1

Existing Basin 1

Hydrograph type	= SCS Runoff	Peak discharge	= 43.11 cfs
Storm frequency	= 5 yrs	Time to peak	= 728 min
Time interval	= 2 min	Hyd. volume	= 158,324 cuft
Drainage area	= 18.000 ac	Curve number	= 80
Basin Slope	= 0.7 %	Hydraulic length	= 600 ft
Tc method	= LAG	Time of conc. (Tc)	= 25.29 min
Total precip.	= 4.50 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

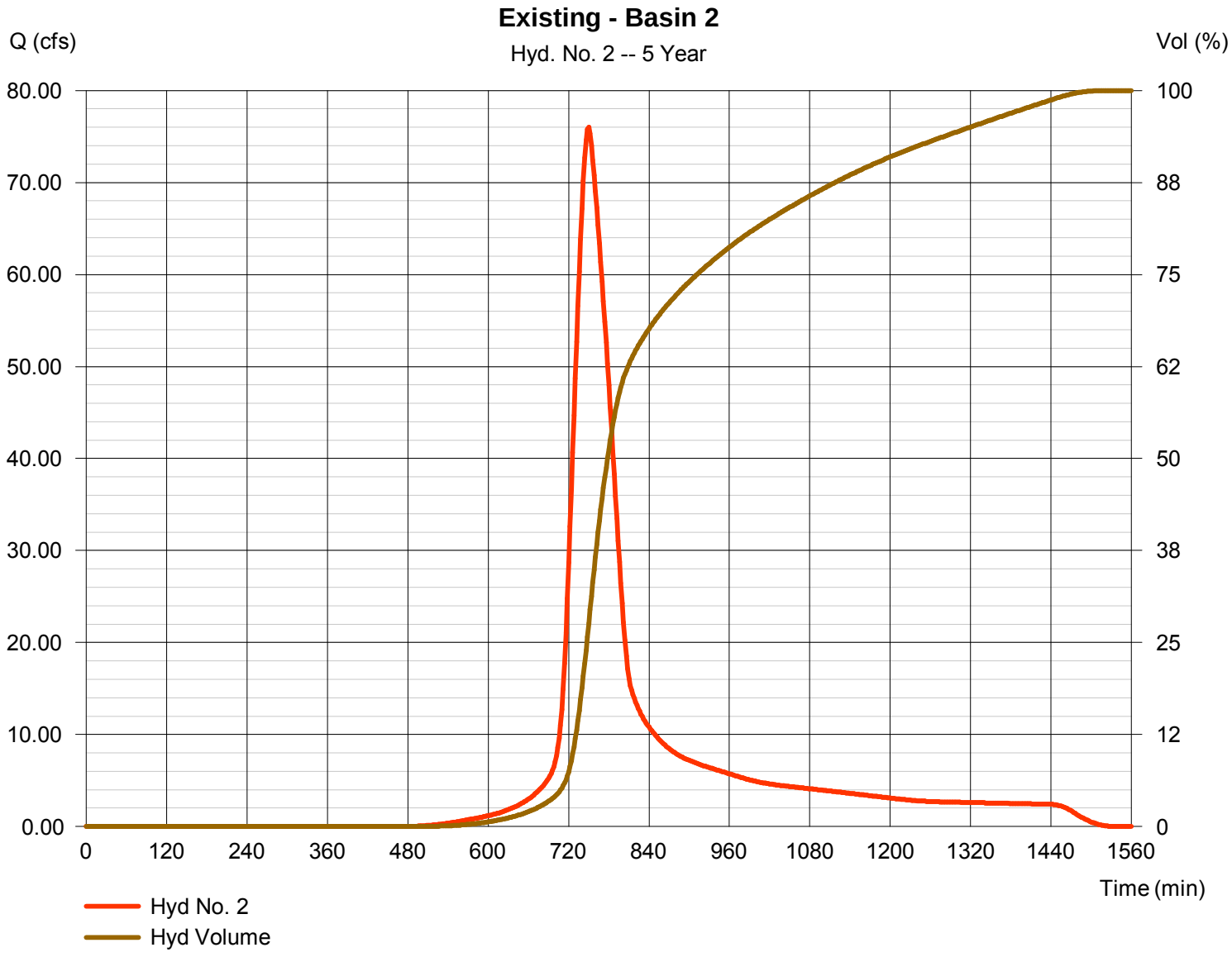


Hydrograph Report

Hyd. No. 2

Existing - Basin 2

Hydrograph type	= SCS Runoff	Peak discharge	= 76.00 cfs
Storm frequency	= 5 yrs	Time to peak	= 750 min
Time interval	= 2 min	Hyd. volume	= 491,446 cuft
Drainage area	= 55.000 ac	Curve number	= 80
Basin Slope	= 0.6 %	Hydraulic length	= 1600 ft
Tc method	= LAG	Time of conc. (Tc)	= 59.87 min
Total precip.	= 4.50 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

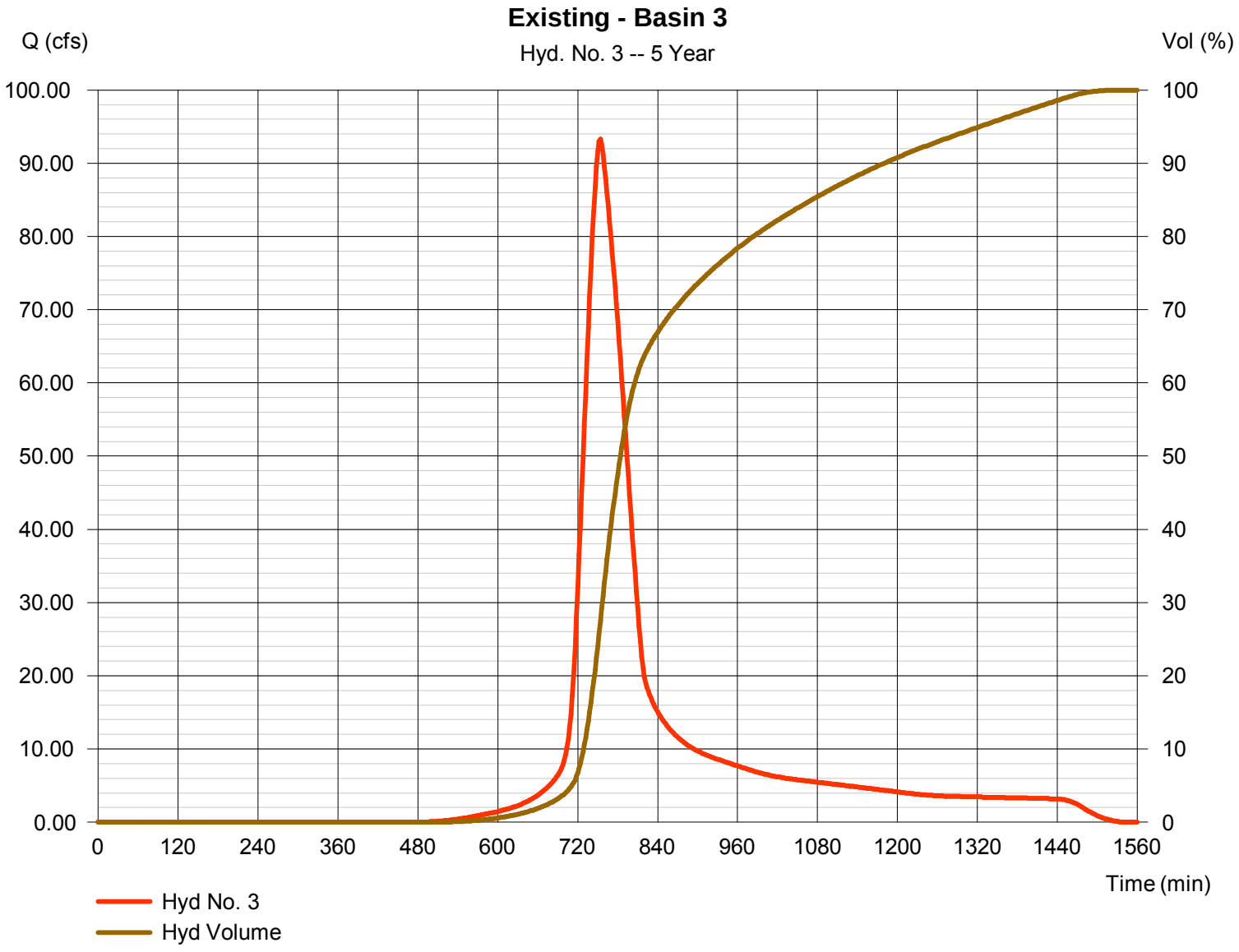


Hydrograph Report

Hyd. No. 3

Existing - Basin 3

Hydrograph type	= SCS Runoff	Peak discharge	= 93.27 cfs
Storm frequency	= 5 yrs	Time to peak	= 754 min
Time interval	= 2 min	Hyd. volume	= 648,206 cuft
Drainage area	= 73.000 ac	Curve number	= 80
Basin Slope	= 0.6 %	Hydraulic length	= 1800 ft
Tc method	= LAG	Time of conc. (Tc)	= 65.78 min
Total precip.	= 4.50 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

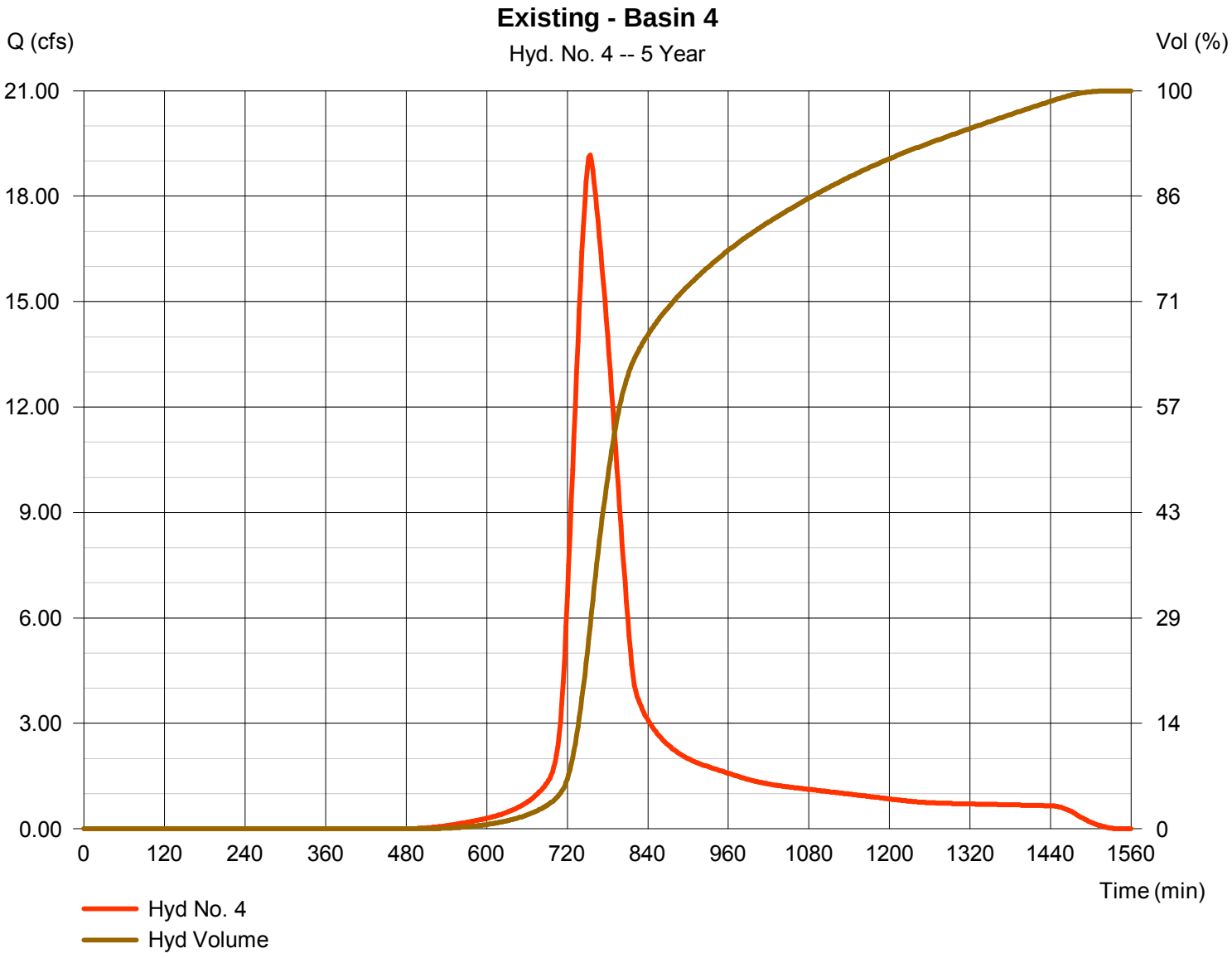


Hydrograph Report

Hyd. No. 4

Existing - Basin 4

Hydrograph type	= SCS Runoff	Peak discharge	= 19.17 cfs
Storm frequency	= 5 yrs	Time to peak	= 754 min
Time interval	= 2 min	Hyd. volume	= 133,193 cuft
Drainage area	= 15.000 ac	Curve number	= 80
Basin Slope	= 0.4 %	Hydraulic length	= 1400 ft
Tc method	= LAG	Time of conc. (Tc)	= 65.89 min
Total precip.	= 4.50 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

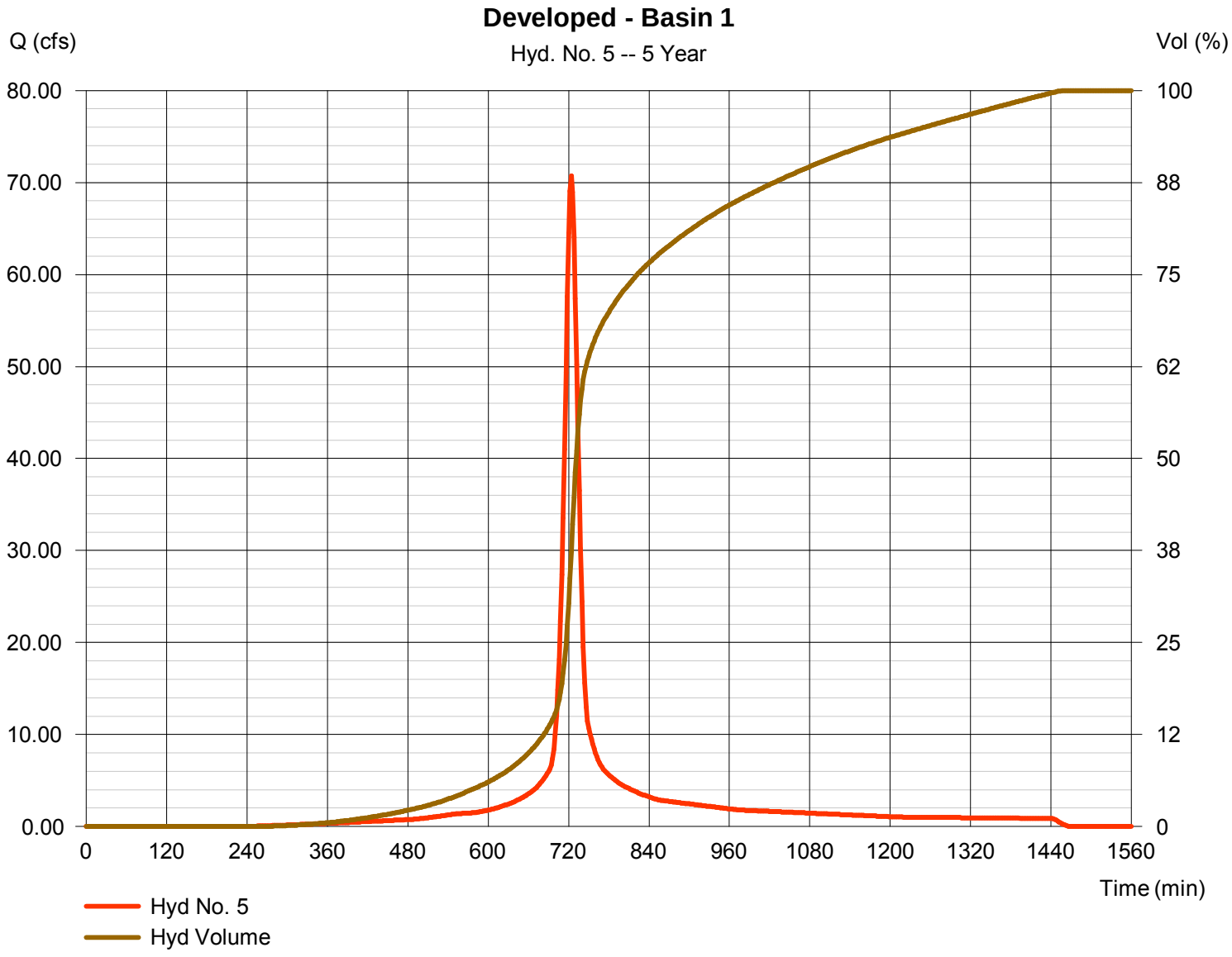


Hydrograph Report

Hyd. No. 5

Developed - Basin 1

Hydrograph type	= SCS Runoff	Peak discharge	= 70.72 cfs
Storm frequency	= 5 yrs	Time to peak	= 724 min
Time interval	= 2 min	Hyd. volume	= 228,563 cuft
Drainage area	= 18.000 ac	Curve number	= 91
Basin Slope	= 0.5 %	Hydraulic length	= 500 ft
Tc method	= LAG	Time of conc. (Tc)	= 17.41 min
Total precip.	= 4.50 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



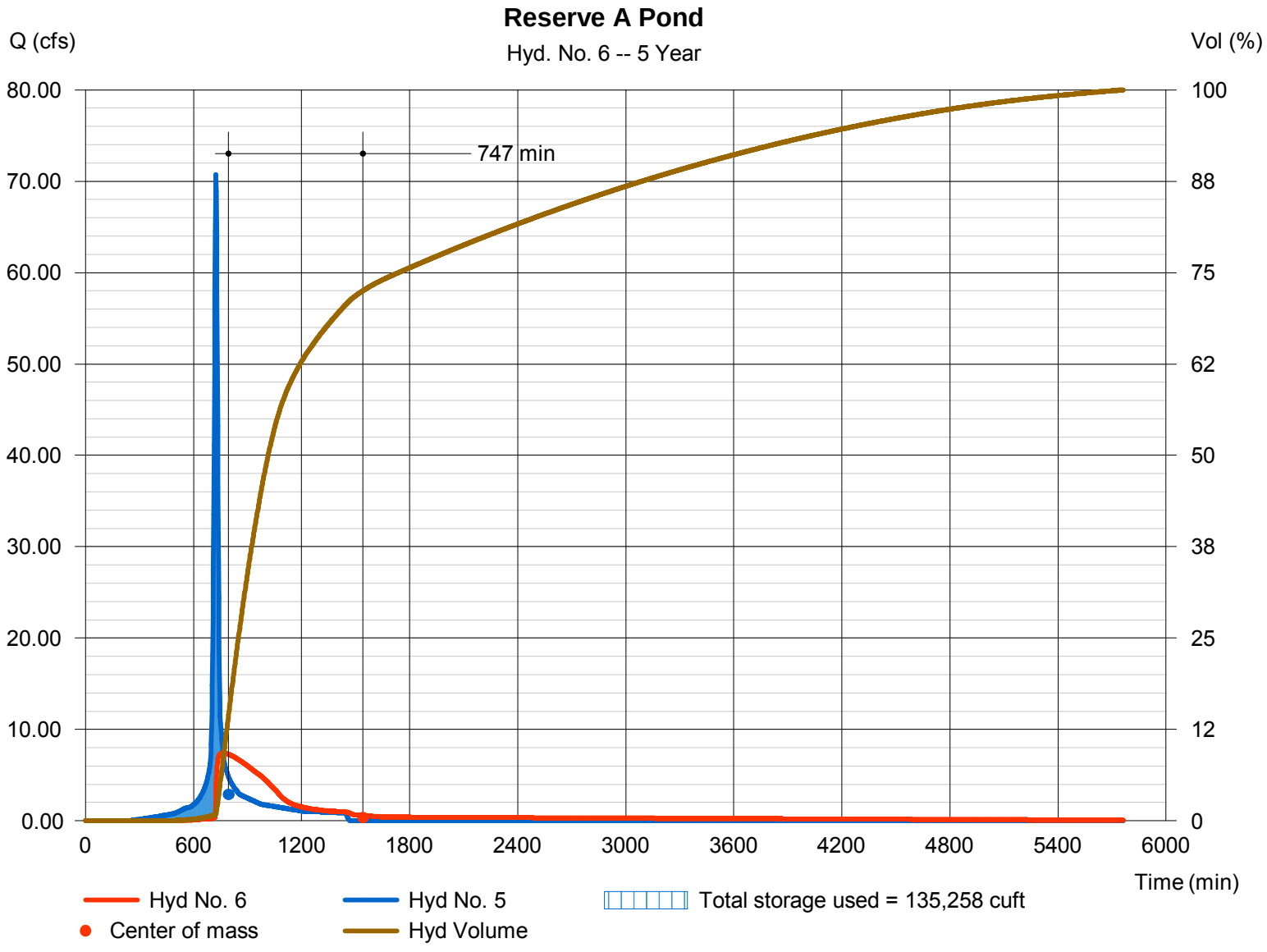
Hydrograph Report

Hyd. No. 6

Reserve A Pond

Hydrograph type	= Reservoir	Peak discharge	= 7.406 cfs
Storm frequency	= 5 yrs	Time to peak	= 764 min
Time interval	= 2 min	Hyd. volume	= 218,453 cuft
Inflow hyd. No.	= 5 - Developed - Basin 1	Max. Elevation	= 1343.33 ft
Reservoir name	= Reserve A	Max. Storage	= 135,258 cuft

Storage Indication method used.

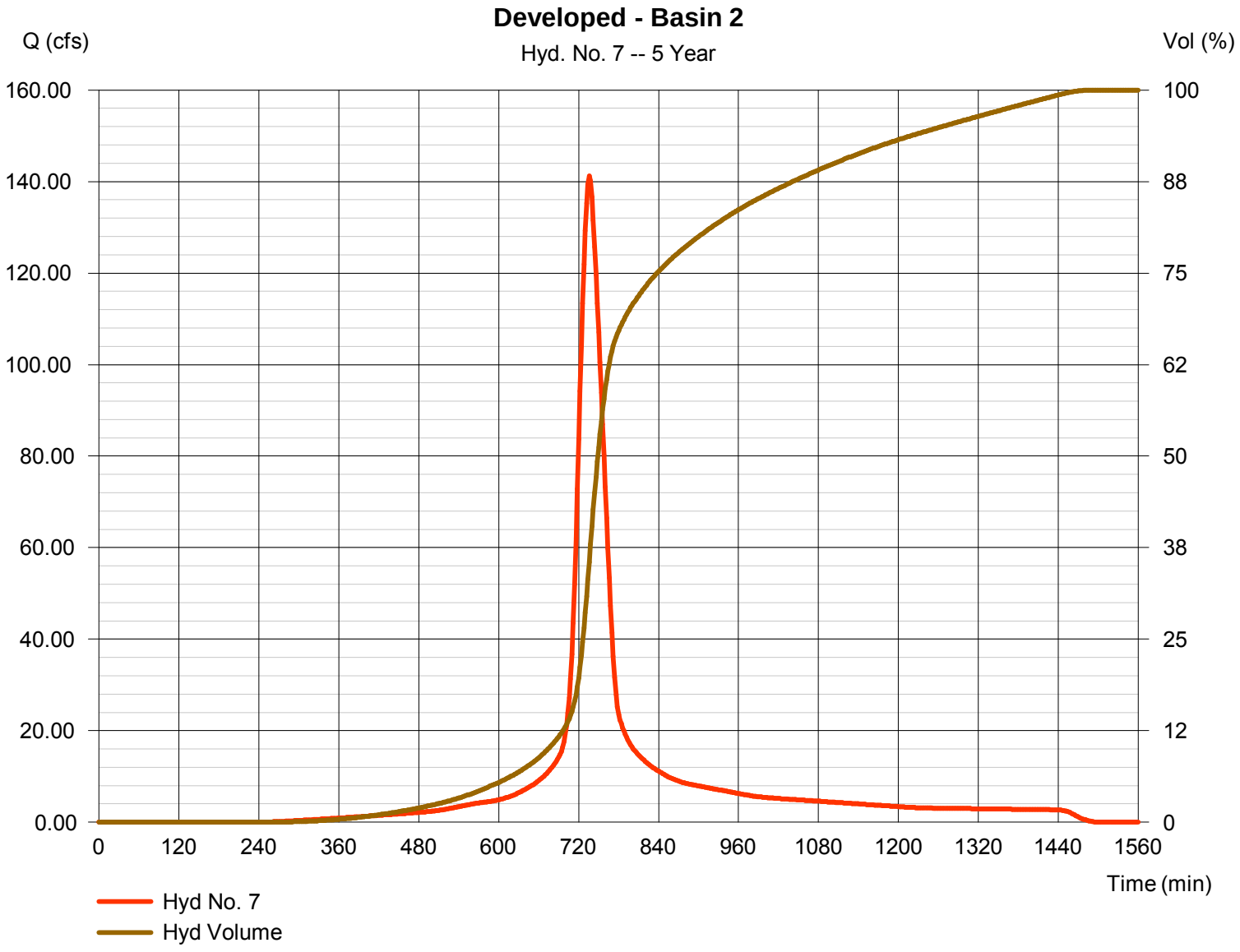


Hydrograph Report

Hyd. No. 7

Developed - Basin 2

Hydrograph type	= SCS Runoff	Peak discharge	= 141.18 cfs
Storm frequency	= 5 yrs	Time to peak	= 736 min
Time interval	= 2 min	Hyd. volume	= 698,386 cuft
Drainage area	= 55.000 ac	Curve number	= 91
Basin Slope	= 0.6 %	Hydraulic length	= 1600 ft
Tc method	= LAG	Time of conc. (Tc)	= 40.31 min
Total precip.	= 4.50 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

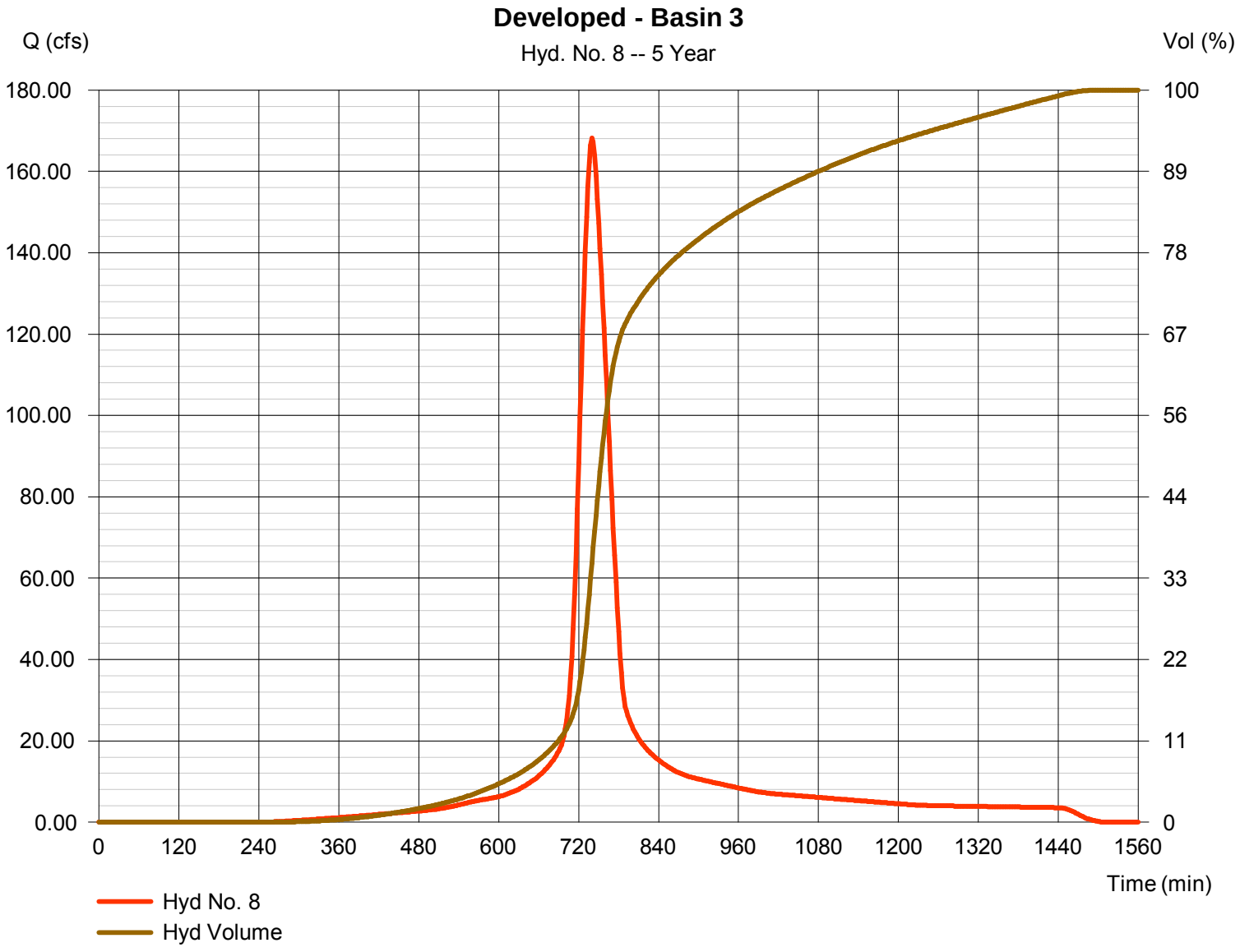


Hydrograph Report

Hyd. No. 8

Developed - Basin 3

Hydrograph type	= SCS Runoff	Peak discharge	= 168.23 cfs
Storm frequency	= 5 yrs	Time to peak	= 740 min
Time interval	= 2 min	Hyd. volume	= 918,672 cuft
Drainage area	= 73.000 ac	Curve number	= 91
Basin Slope	= 0.5 %	Hydraulic length	= 1600 ft
Tc method	= LAG	Time of conc. (Tc)	= 44.15 min
Total precip.	= 4.50 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



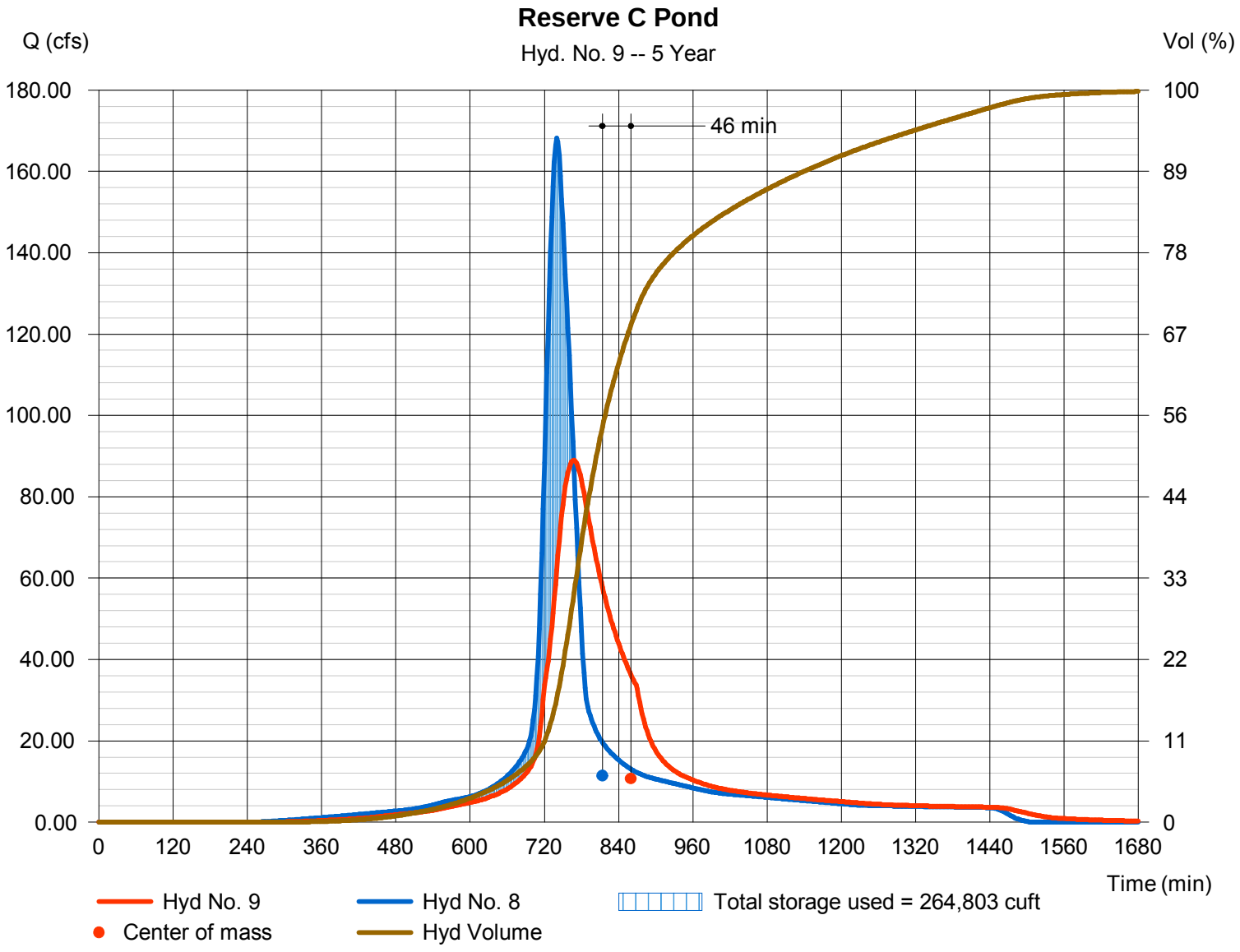
Hydrograph Report

Hyd. No. 9

Reserve C Pond

Hydrograph type	= Reservoir	Peak discharge	= 88.99 cfs
Storm frequency	= 5 yrs	Time to peak	= 768 min
Time interval	= 2 min	Hyd. volume	= 918,665 cuft
Inflow hyd. No.	= 8 - Developed - Basin 3	Max. Elevation	= 1339.93 ft
Reservoir name	= Reserve C Pond	Max. Storage	= 264,803 cuft

Storage Indication method used.

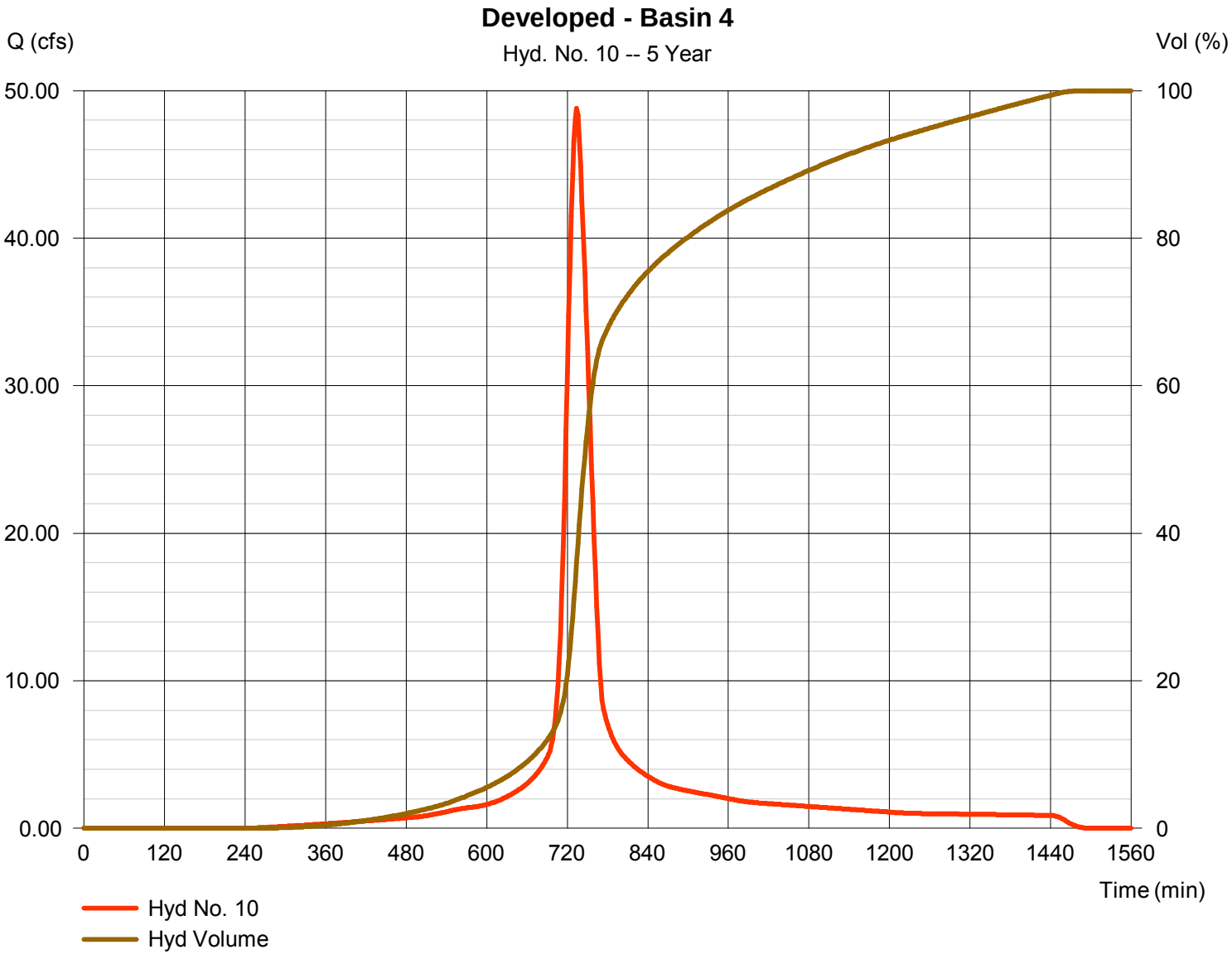


Hydrograph Report

Hyd. No. 10

Developed - Basin 4

Hydrograph type	= SCS Runoff	Peak discharge	= 48.80 cfs
Storm frequency	= 5 yrs	Time to peak	= 734 min
Time interval	= 2 min	Hyd. volume	= 225,965 cuft
Drainage area	= 18.000 ac	Curve number	= 91
Basin Slope	= 0.5 %	Hydraulic length	= 1200 ft
Tc method	= LAG	Time of conc. (Tc)	= 35.08 min
Total precip.	= 4.50 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



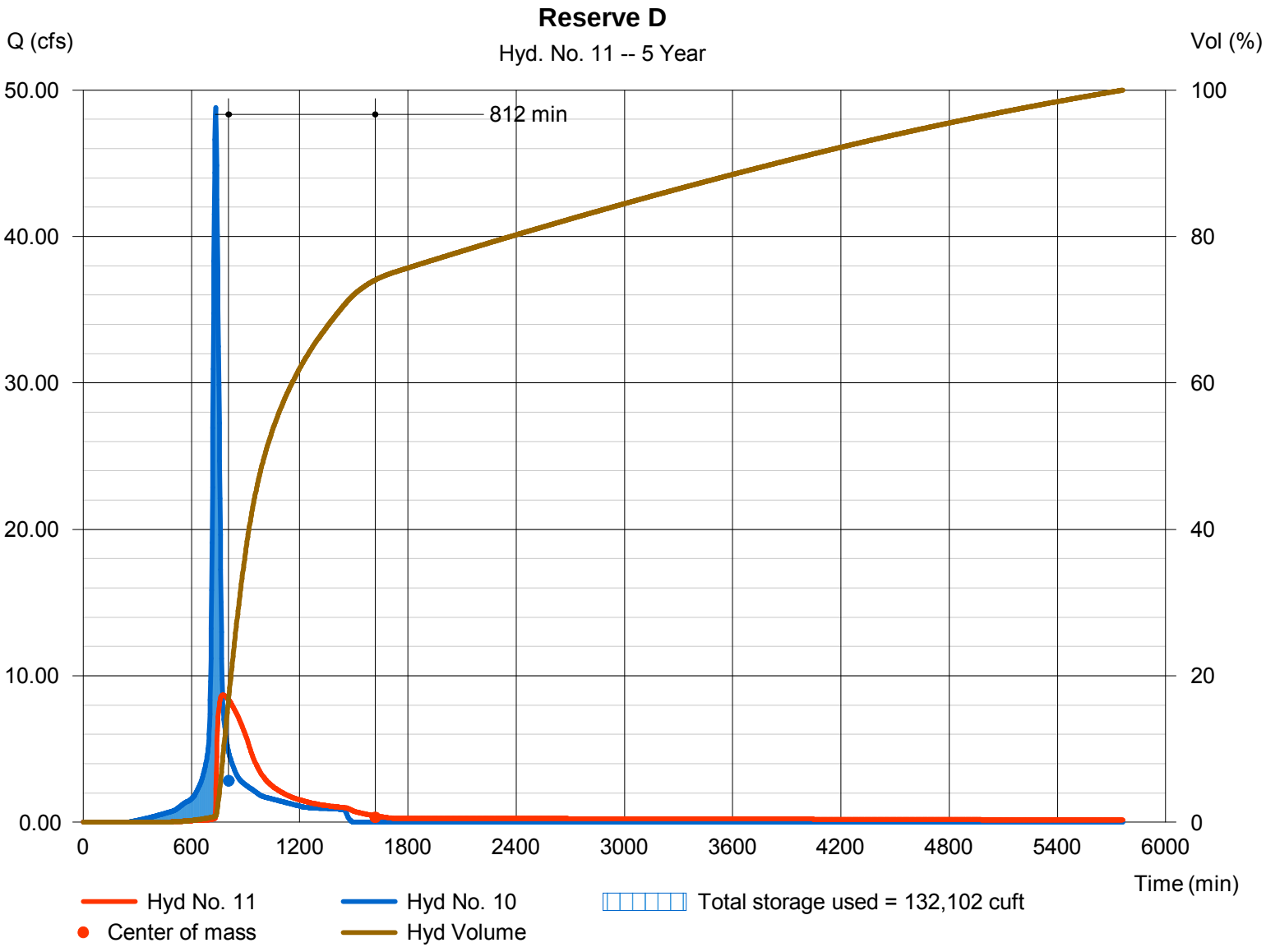
Hydrograph Report

Hyd. No. 11

Reserve D

Hydrograph type	=	Reservoir	Peak discharge	=	8.687 cfs
Storm frequency	=	5 yrs	Time to peak	=	772 min
Time interval	=	2 min	Hyd. volume	=	205,041 cuft
Inflow hyd. No.	=	10 - Developed - Basin 4	Max. Elevation	=	1335.43 ft
Reservoir name	=	Reserve D	Max. Storage	=	132,102 cuft

Storage Indication method used.



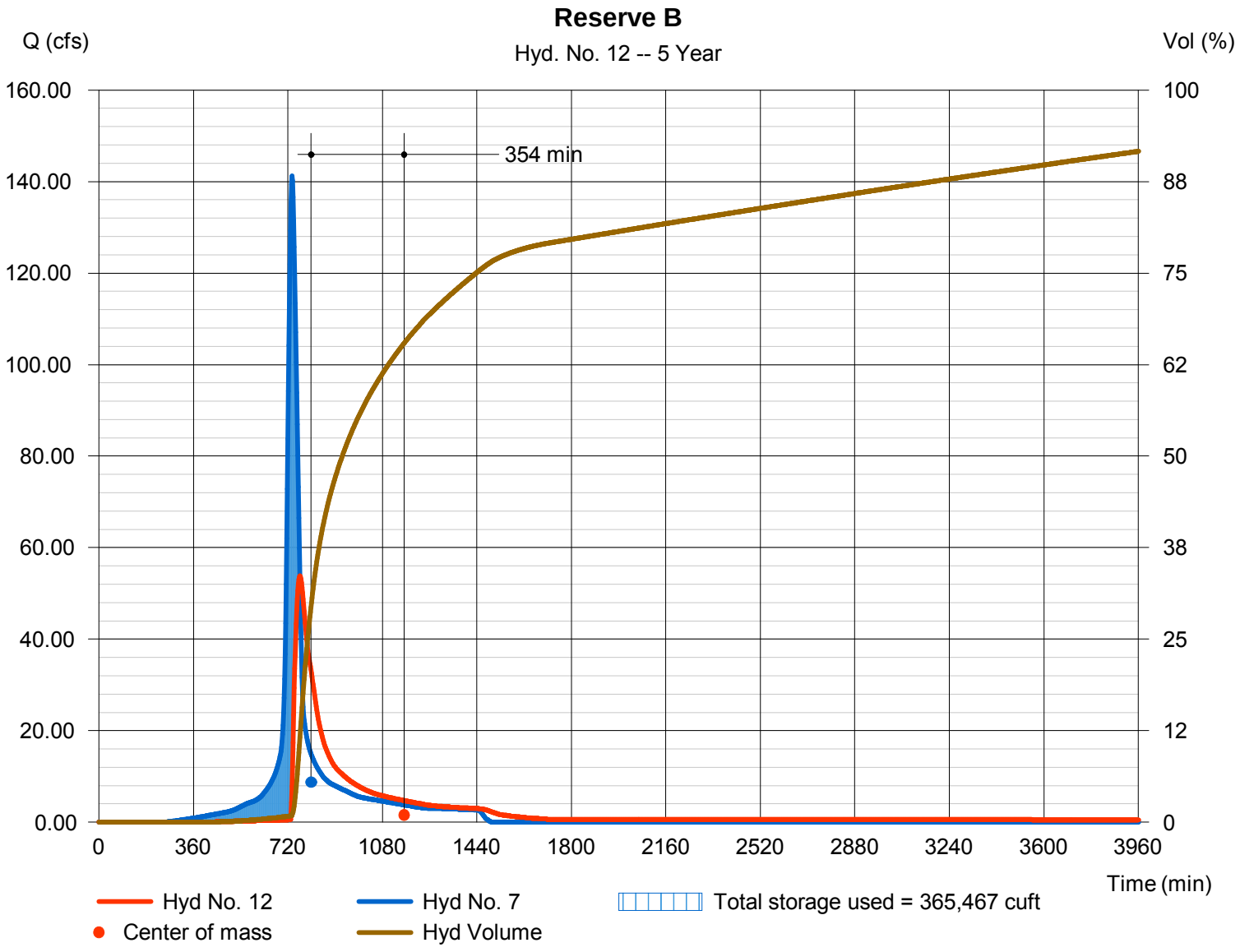
Hydrograph Report

Hyd. No. 12

Reserve B

Hydrograph type	= Reservoir	Peak discharge	= 53.80 cfs
Storm frequency	= 5 yrs	Time to peak	= 766 min
Time interval	= 2 min	Hyd. volume	= 621,373 cuft
Inflow hyd. No.	= 7 - Developed - Basin 2	Max. Elevation	= 1337.79 ft
Reservoir name	= Reserve B	Max. Storage	= 365,467 cuft

Storage Indication method used.

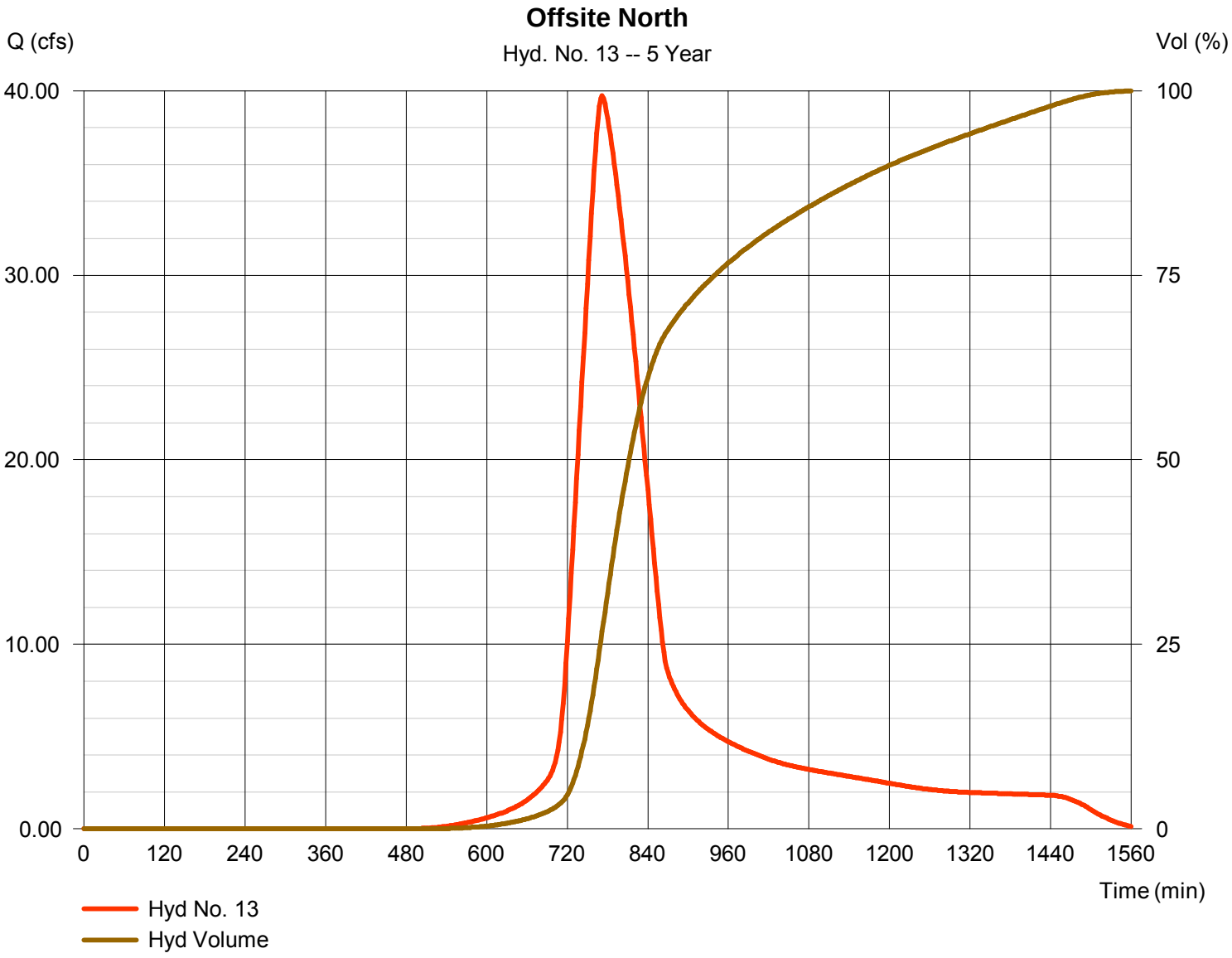


Hydrograph Report

Hyd. No. 13

Offsite North

Hydrograph type	= SCS Runoff	Peak discharge	= 39.72 cfs
Storm frequency	= 5 yrs	Time to peak	= 772 min
Time interval	= 2 min	Hyd. volume	= 364,772 cuft
Drainage area	= 41.000 ac	Curve number	= 80
Basin Slope	= 0.3 %	Hydraulic length	= 1800 ft
Tc method	= LAG	Time of conc. (Tc)	= 98.06 min
Total precip.	= 4.50 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8

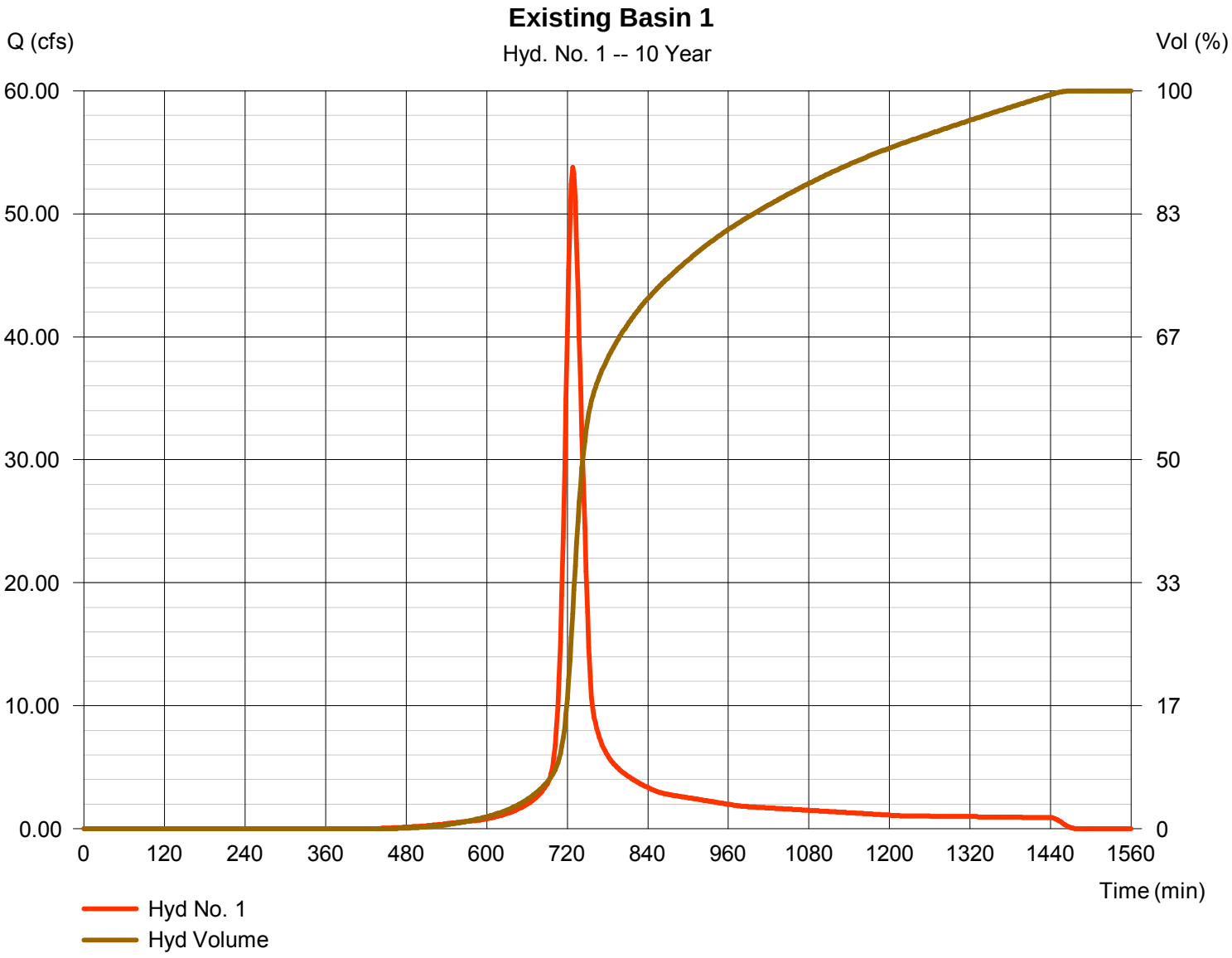
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	53.78	2	728	197,335	------	------	------	Existing Basin 1
2	SCS Runoff	95.00	2	750	612,537	------	------	------	Existing - Basin 2
3	SCS Runoff	116.63	2	754	807,922	------	------	------	Existing - Basin 3
4	SCS Runoff	23.97	2	754	166,012	------	------	------	Existing - Basin 4
5	SCS Runoff	83.69	2	724	272,889	------	------	------	Developed - Basin 1
6	Reservoir	8.552	2	764	262,717	5	1343.76	162,403	Reserve A Pond
7	SCS Runoff	167.31	2	736	833,828	------	------	------	Developed - Basin 2
8	SCS Runoff	199.42	2	740	1,096,836	------	------	------	Developed - Basin 3
9	Reservoir	102.52	2	768	1,096,829	8	1340.12	318,476	Reserve C Pond
10	SCS Runoff	57.82	2	734	269,788	------	------	------	Developed - Basin 4
11	Reservoir	10.17	2	772	248,712	10	1335.80	157,171	Reserve D
12	Reservoir	75.34	2	762	756,425	7	1338.14	410,763	Reserve B
13	SCS Runoff	49.74	2	772	454,651	------	------	------	Offsite North

Hydrograph Report

Hyd. No. 1

Existing Basin 1

Hydrograph type	= SCS Runoff	Peak discharge	= 53.78 cfs
Storm frequency	= 10 yrs	Time to peak	= 728 min
Time interval	= 2 min	Hyd. volume	= 197,335 cuft
Drainage area	= 18.000 ac	Curve number	= 80
Basin Slope	= 0.7 %	Hydraulic length	= 600 ft
Tc method	= LAG	Time of conc. (Tc)	= 25.29 min
Total precip.	= 5.20 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

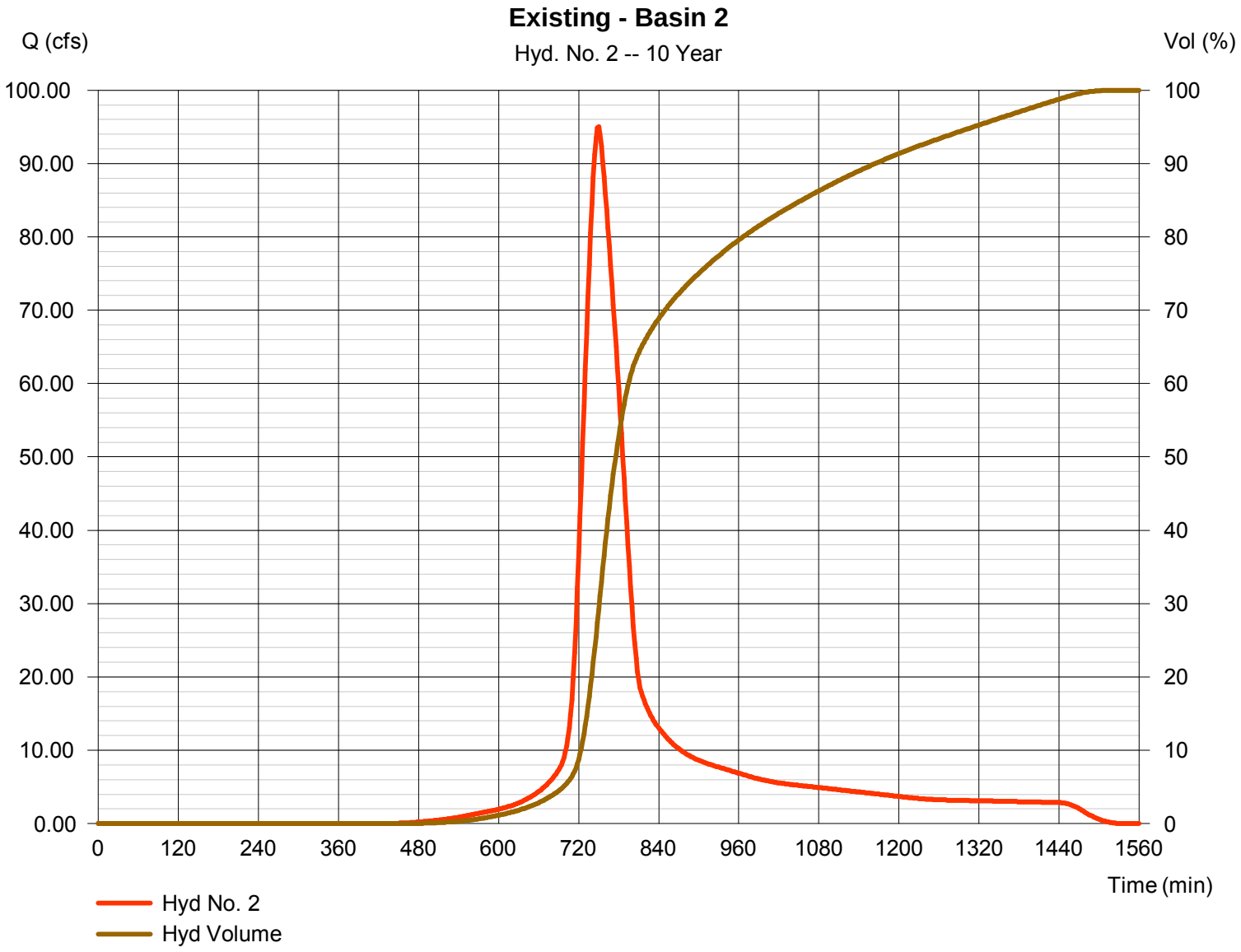


Hydrograph Report

Hyd. No. 2

Existing - Basin 2

Hydrograph type	= SCS Runoff	Peak discharge	= 95.00 cfs
Storm frequency	= 10 yrs	Time to peak	= 750 min
Time interval	= 2 min	Hyd. volume	= 612,537 cuft
Drainage area	= 55.000 ac	Curve number	= 80
Basin Slope	= 0.6 %	Hydraulic length	= 1600 ft
Tc method	= LAG	Time of conc. (Tc)	= 59.87 min
Total precip.	= 5.20 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

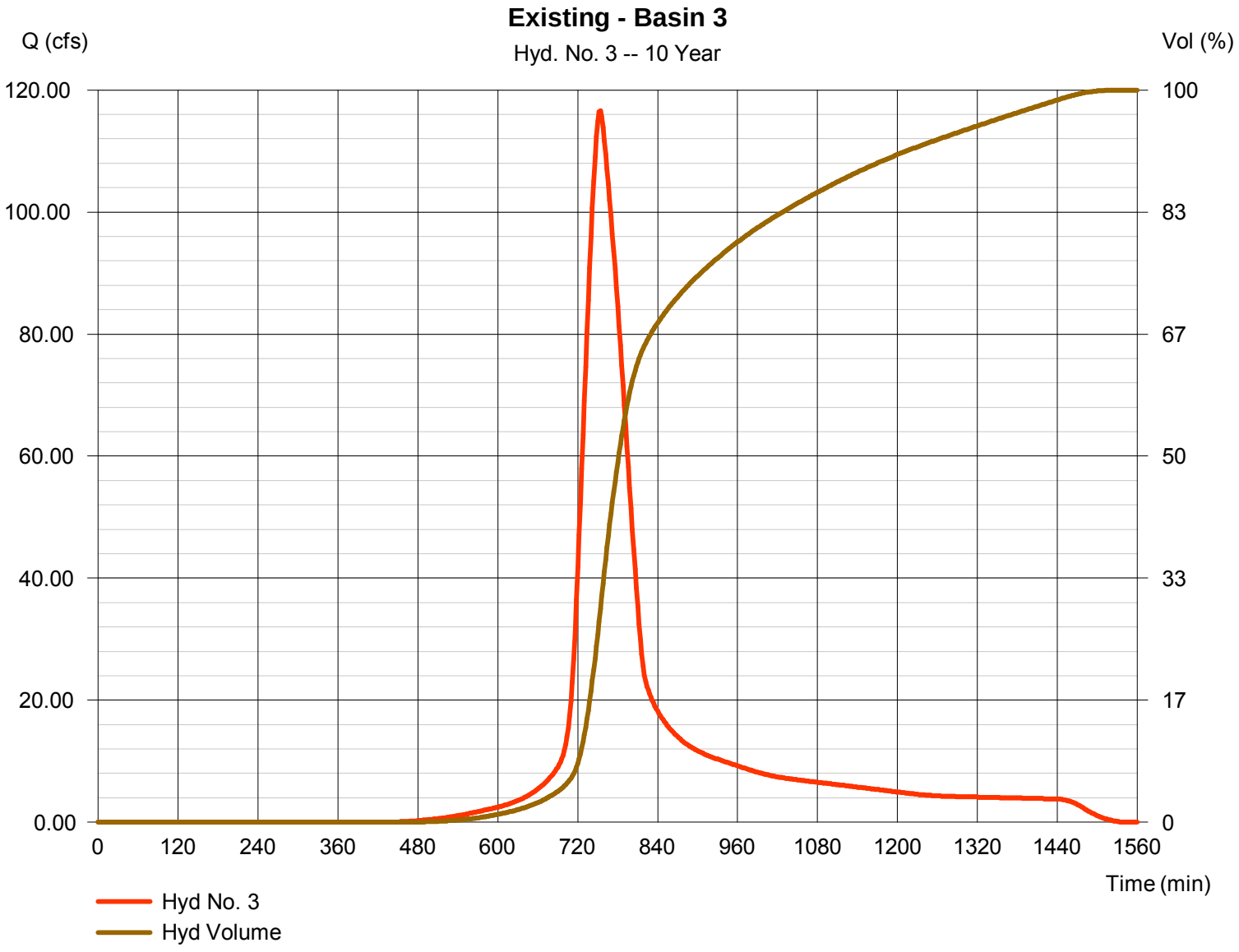


Hydrograph Report

Hyd. No. 3

Existing - Basin 3

Hydrograph type	= SCS Runoff	Peak discharge	= 116.63 cfs
Storm frequency	= 10 yrs	Time to peak	= 754 min
Time interval	= 2 min	Hyd. volume	= 807,922 cuft
Drainage area	= 73.000 ac	Curve number	= 80
Basin Slope	= 0.6 %	Hydraulic length	= 1800 ft
Tc method	= LAG	Time of conc. (Tc)	= 65.78 min
Total precip.	= 5.20 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

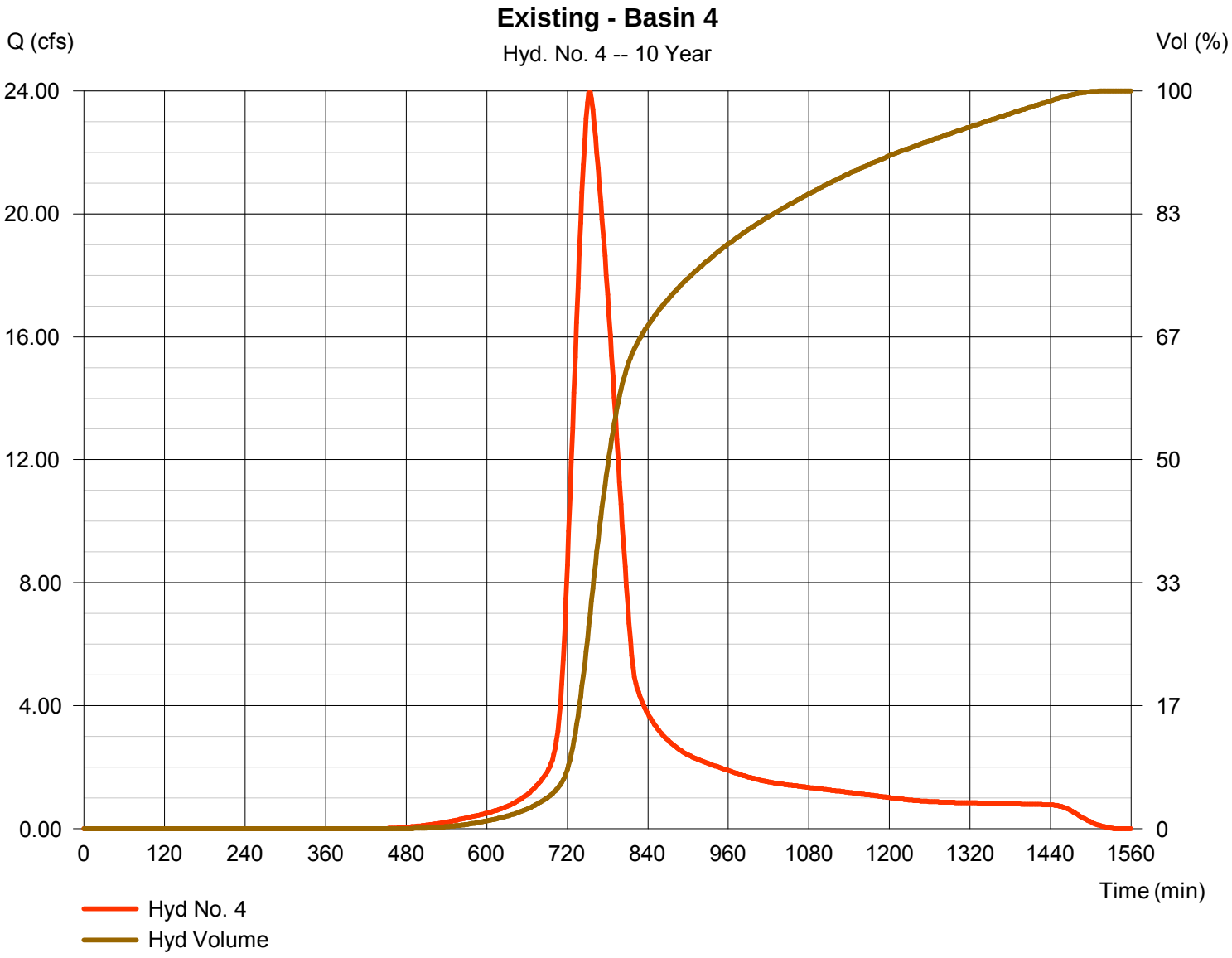


Hydrograph Report

Hyd. No. 4

Existing - Basin 4

Hydrograph type	= SCS Runoff	Peak discharge	= 23.97 cfs
Storm frequency	= 10 yrs	Time to peak	= 754 min
Time interval	= 2 min	Hyd. volume	= 166,012 cuft
Drainage area	= 15.000 ac	Curve number	= 80
Basin Slope	= 0.4 %	Hydraulic length	= 1400 ft
Tc method	= LAG	Time of conc. (Tc)	= 65.89 min
Total precip.	= 5.20 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

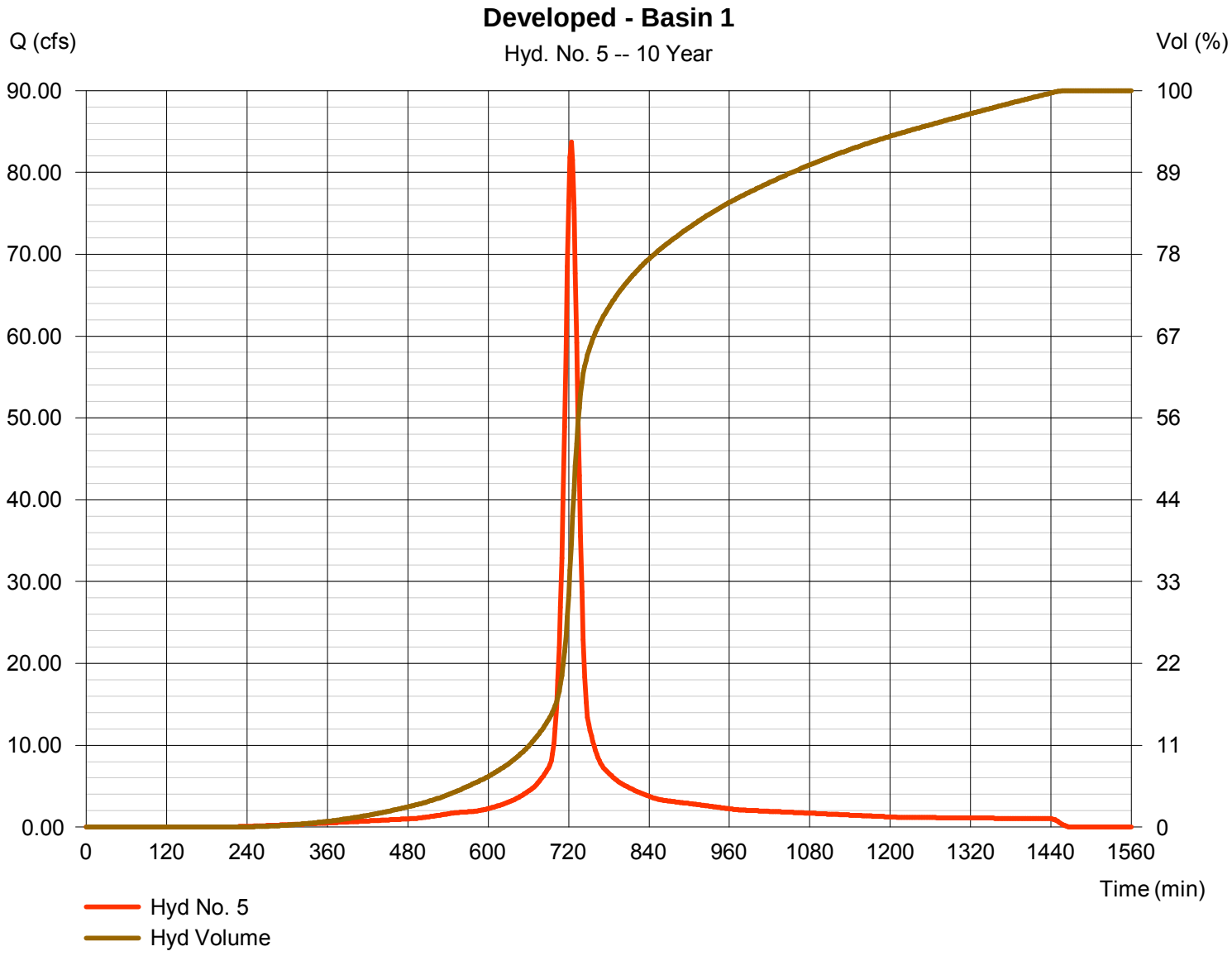


Hydrograph Report

Hyd. No. 5

Developed - Basin 1

Hydrograph type	= SCS Runoff	Peak discharge	= 83.69 cfs
Storm frequency	= 10 yrs	Time to peak	= 724 min
Time interval	= 2 min	Hyd. volume	= 272,889 cuft
Drainage area	= 18.000 ac	Curve number	= 91
Basin Slope	= 0.5 %	Hydraulic length	= 500 ft
Tc method	= LAG	Time of conc. (Tc)	= 17.41 min
Total precip.	= 5.20 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



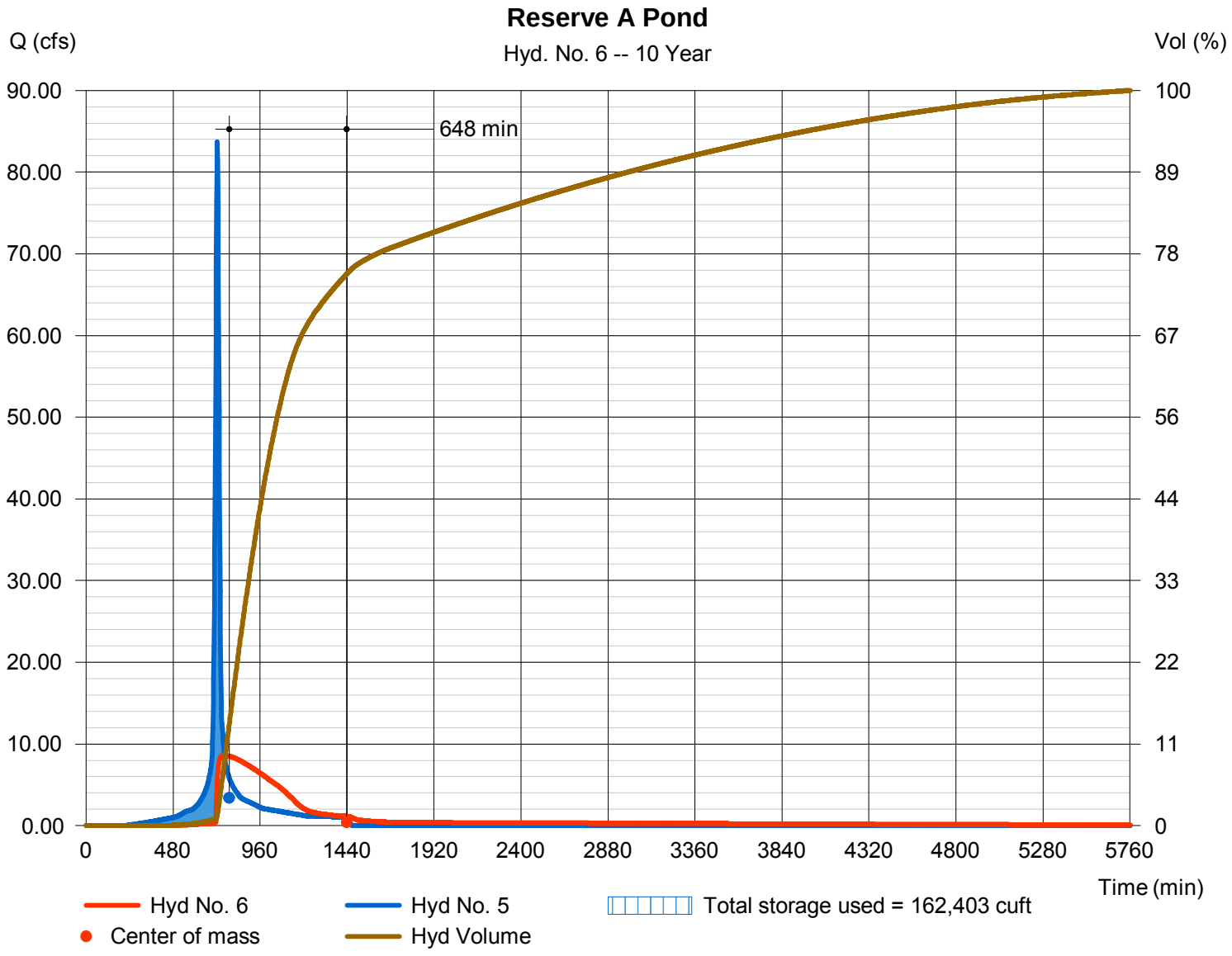
Hydrograph Report

Hyd. No. 6

Reserve A Pond

Hydrograph type	= Reservoir	Peak discharge	= 8.552 cfs
Storm frequency	= 10 yrs	Time to peak	= 764 min
Time interval	= 2 min	Hyd. volume	= 262,717 cuft
Inflow hyd. No.	= 5 - Developed - Basin 1	Max. Elevation	= 1343.76 ft
Reservoir name	= Reserve A	Max. Storage	= 162,403 cuft

Storage Indication method used.

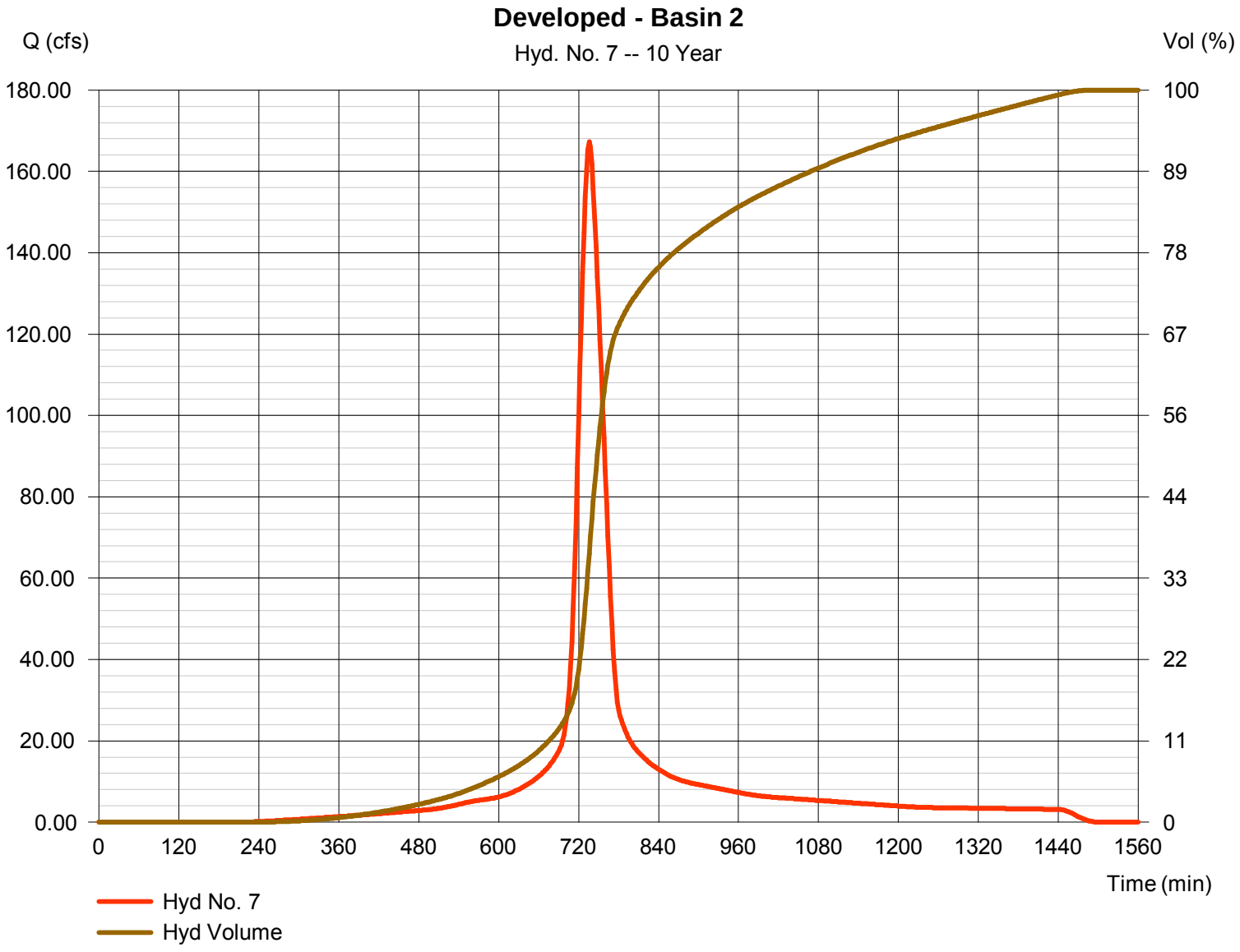


Hydrograph Report

Hyd. No. 7

Developed - Basin 2

Hydrograph type	= SCS Runoff	Peak discharge	= 167.31 cfs
Storm frequency	= 10 yrs	Time to peak	= 736 min
Time interval	= 2 min	Hyd. volume	= 833,828 cuft
Drainage area	= 55.000 ac	Curve number	= 91
Basin Slope	= 0.6 %	Hydraulic length	= 1600 ft
Tc method	= LAG	Time of conc. (Tc)	= 40.31 min
Total precip.	= 5.20 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

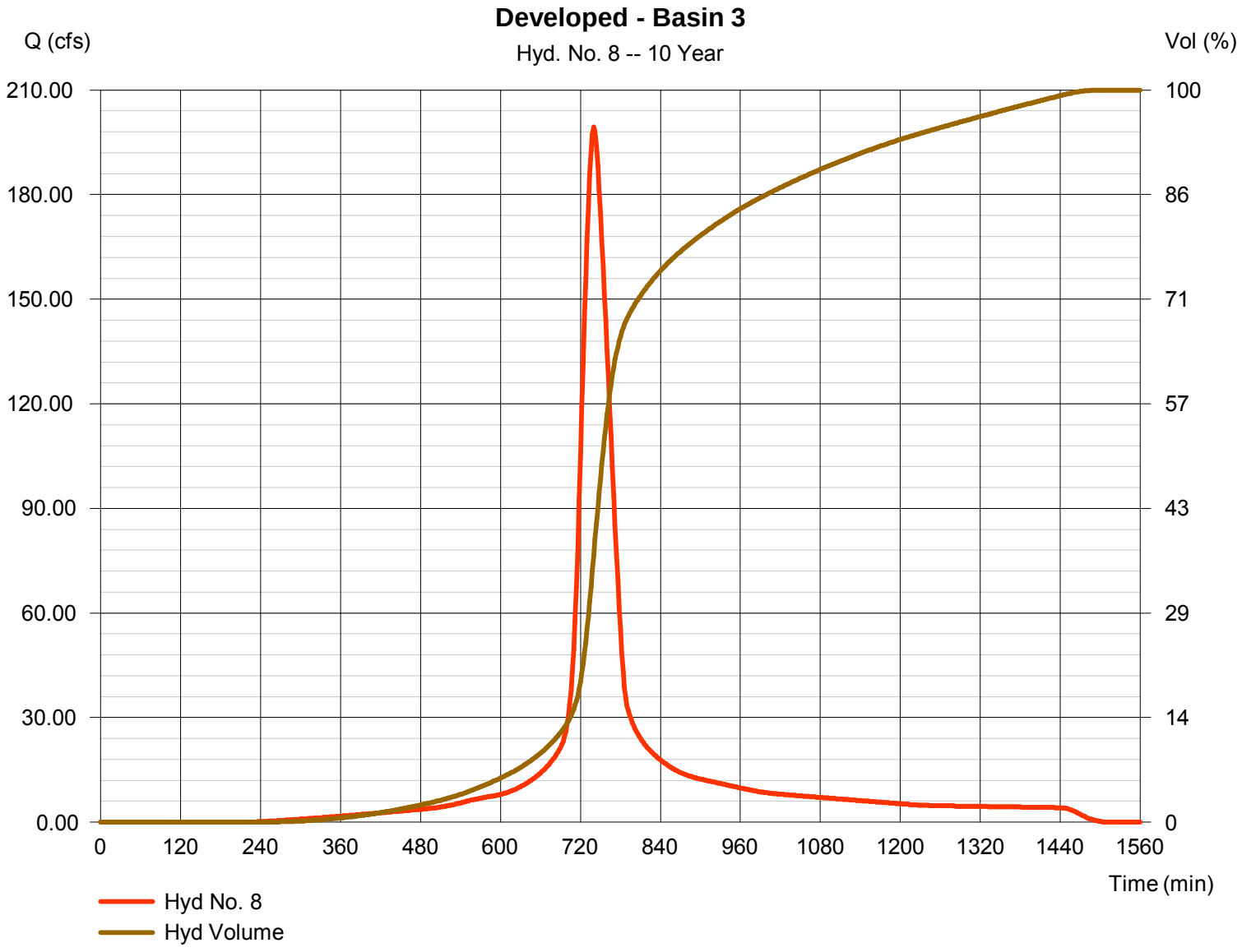


Hydrograph Report

Hyd. No. 8

Developed - Basin 3

Hydrograph type	= SCS Runoff	Peak discharge	= 199.42 cfs
Storm frequency	= 10 yrs	Time to peak	= 740 min
Time interval	= 2 min	Hyd. volume	= 1,096,836 cuft
Drainage area	= 73.000 ac	Curve number	= 91
Basin Slope	= 0.5 %	Hydraulic length	= 1600 ft
Tc method	= LAG	Time of conc. (Tc)	= 44.15 min
Total precip.	= 5.20 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



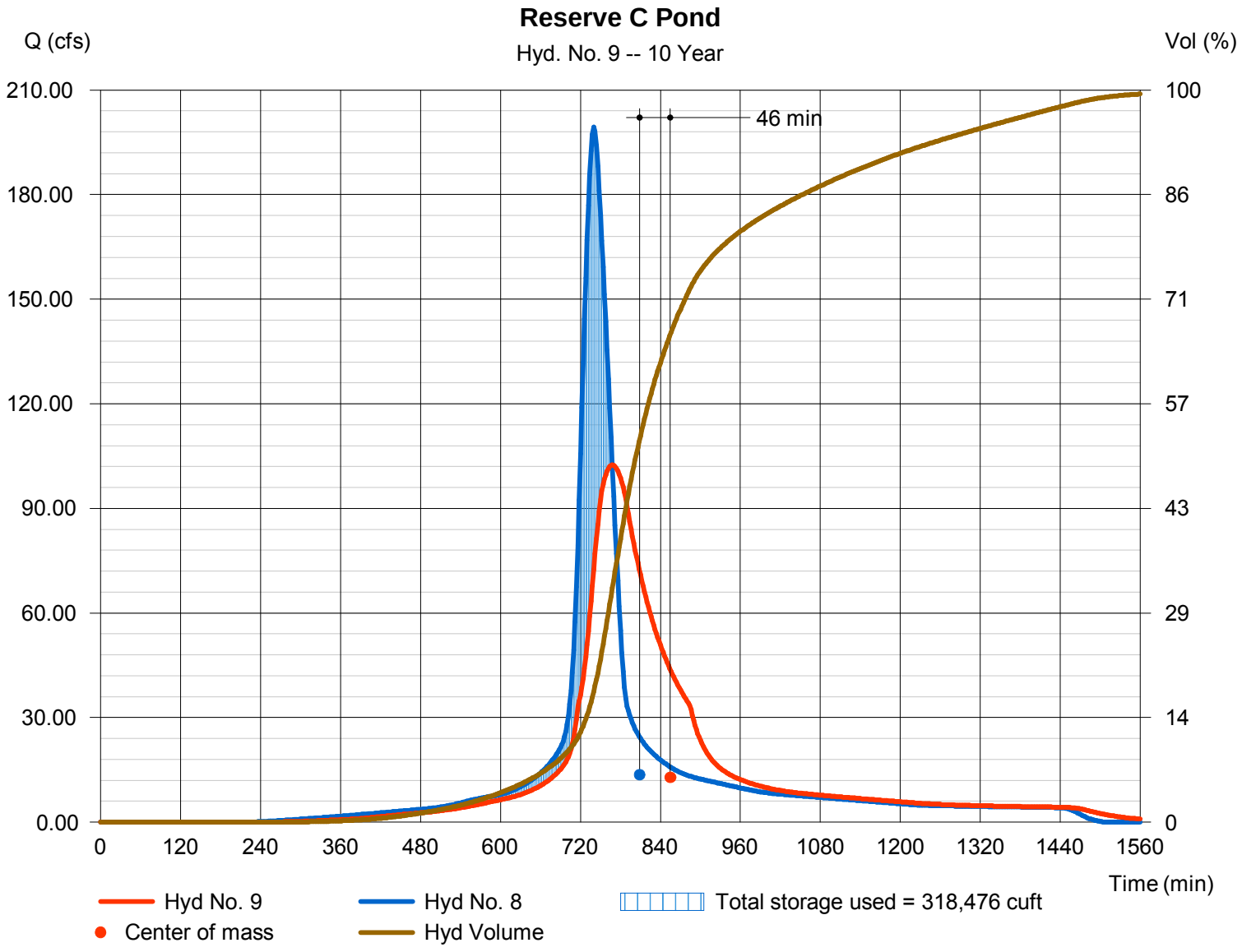
Hydrograph Report

Hyd. No. 9

Reserve C Pond

Hydrograph type	= Reservoir	Peak discharge	= 102.52 cfs
Storm frequency	= 10 yrs	Time to peak	= 768 min
Time interval	= 2 min	Hyd. volume	= 1,096,829 cuft
Inflow hyd. No.	= 8 - Developed - Basin 3	Max. Elevation	= 1340.12 ft
Reservoir name	= Reserve C Pond	Max. Storage	= 318,476 cuft

Storage Indication method used.

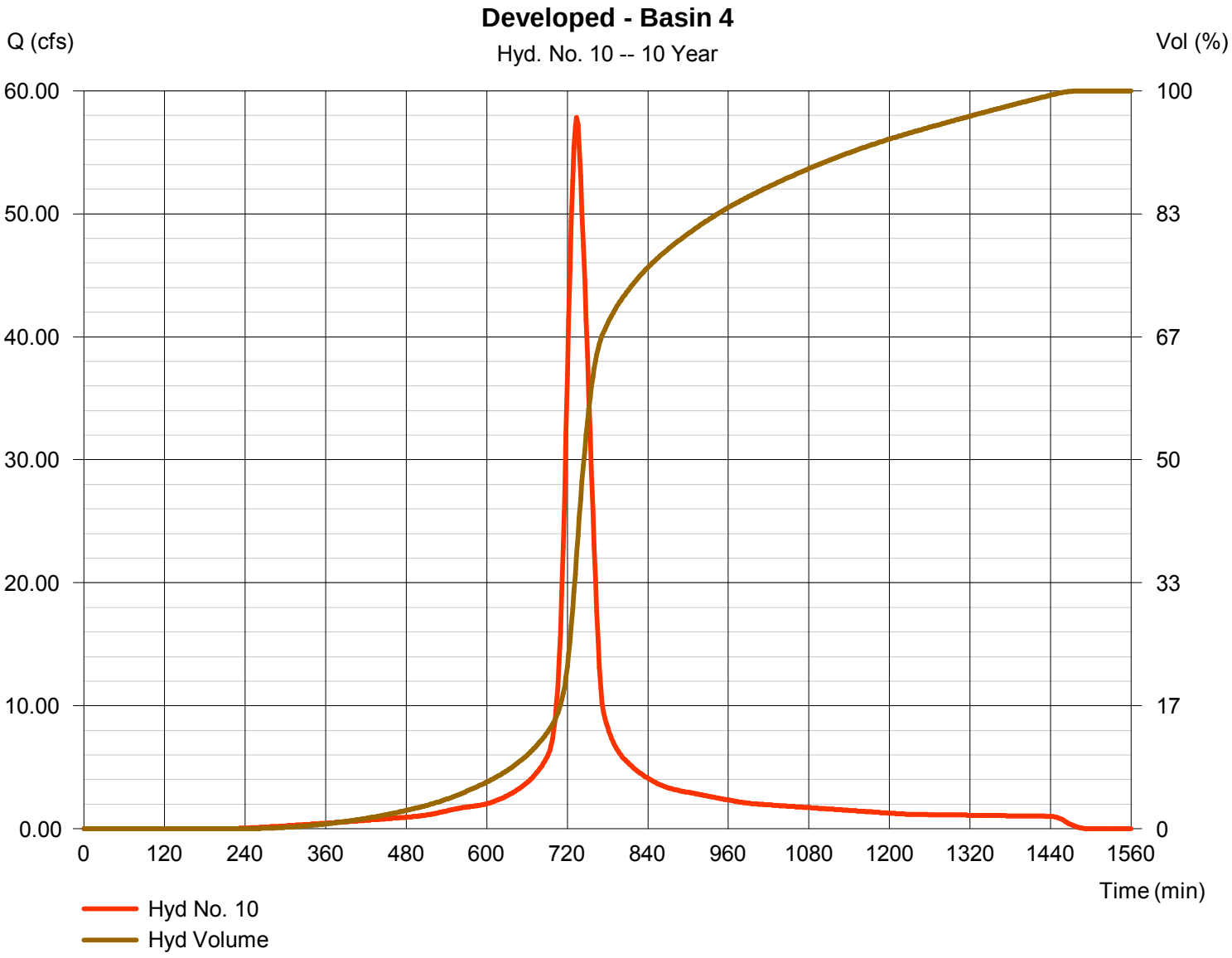


Hydrograph Report

Hyd. No. 10

Developed - Basin 4

Hydrograph type	= SCS Runoff	Peak discharge	= 57.82 cfs
Storm frequency	= 10 yrs	Time to peak	= 734 min
Time interval	= 2 min	Hyd. volume	= 269,788 cuft
Drainage area	= 18.000 ac	Curve number	= 91
Basin Slope	= 0.5 %	Hydraulic length	= 1200 ft
Tc method	= LAG	Time of conc. (Tc)	= 35.08 min
Total precip.	= 5.20 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



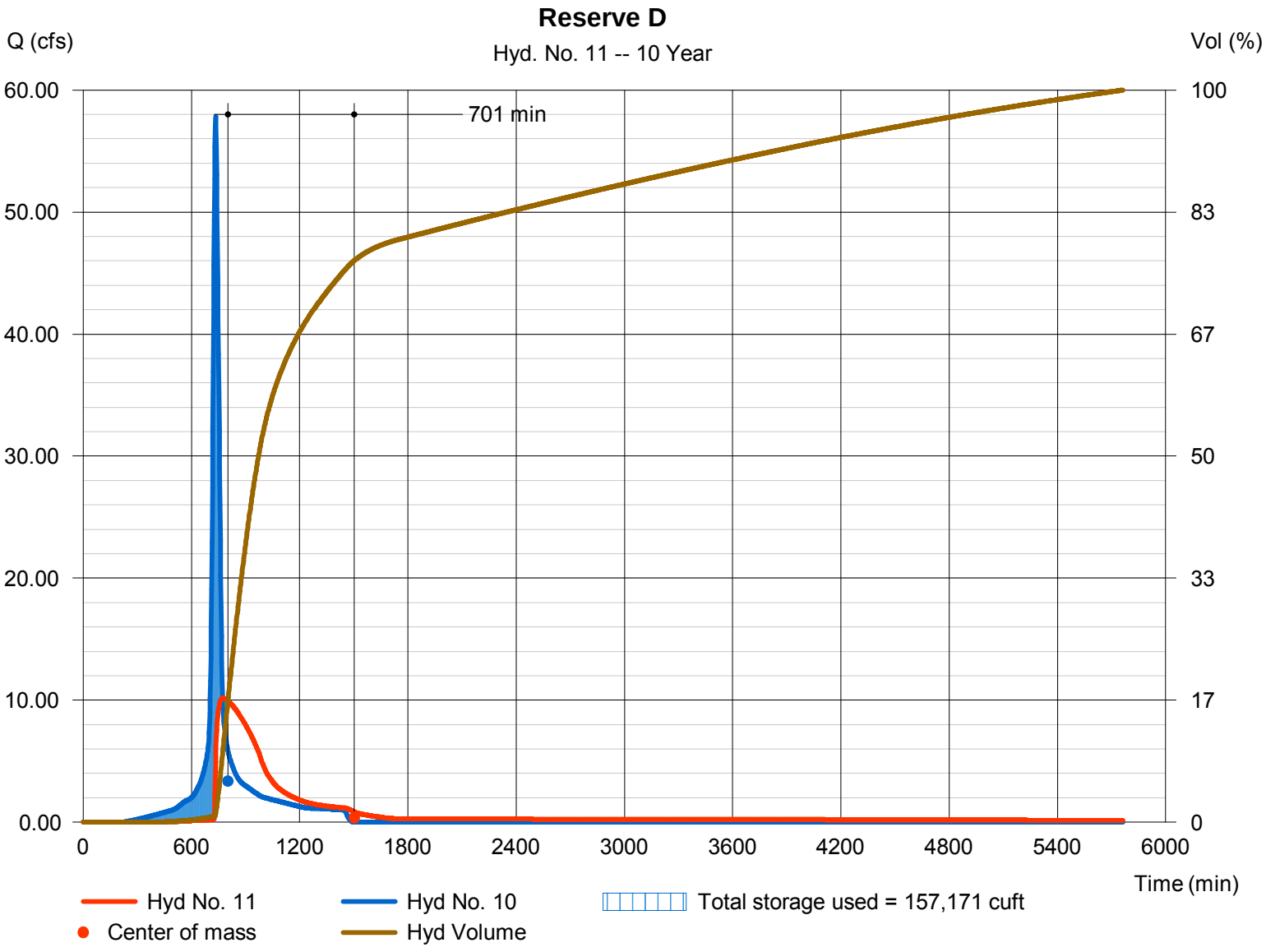
Hydrograph Report

Hyd. No. 11

Reserve D

Hydrograph type	= Reservoir	Peak discharge	= 10.17 cfs
Storm frequency	= 10 yrs	Time to peak	= 772 min
Time interval	= 2 min	Hyd. volume	= 248,712 cuft
Inflow hyd. No.	= 10 - Developed - Basin 4	Max. Elevation	= 1335.80 ft
Reservoir name	= Reserve D	Max. Storage	= 157,171 cuft

Storage Indication method used.



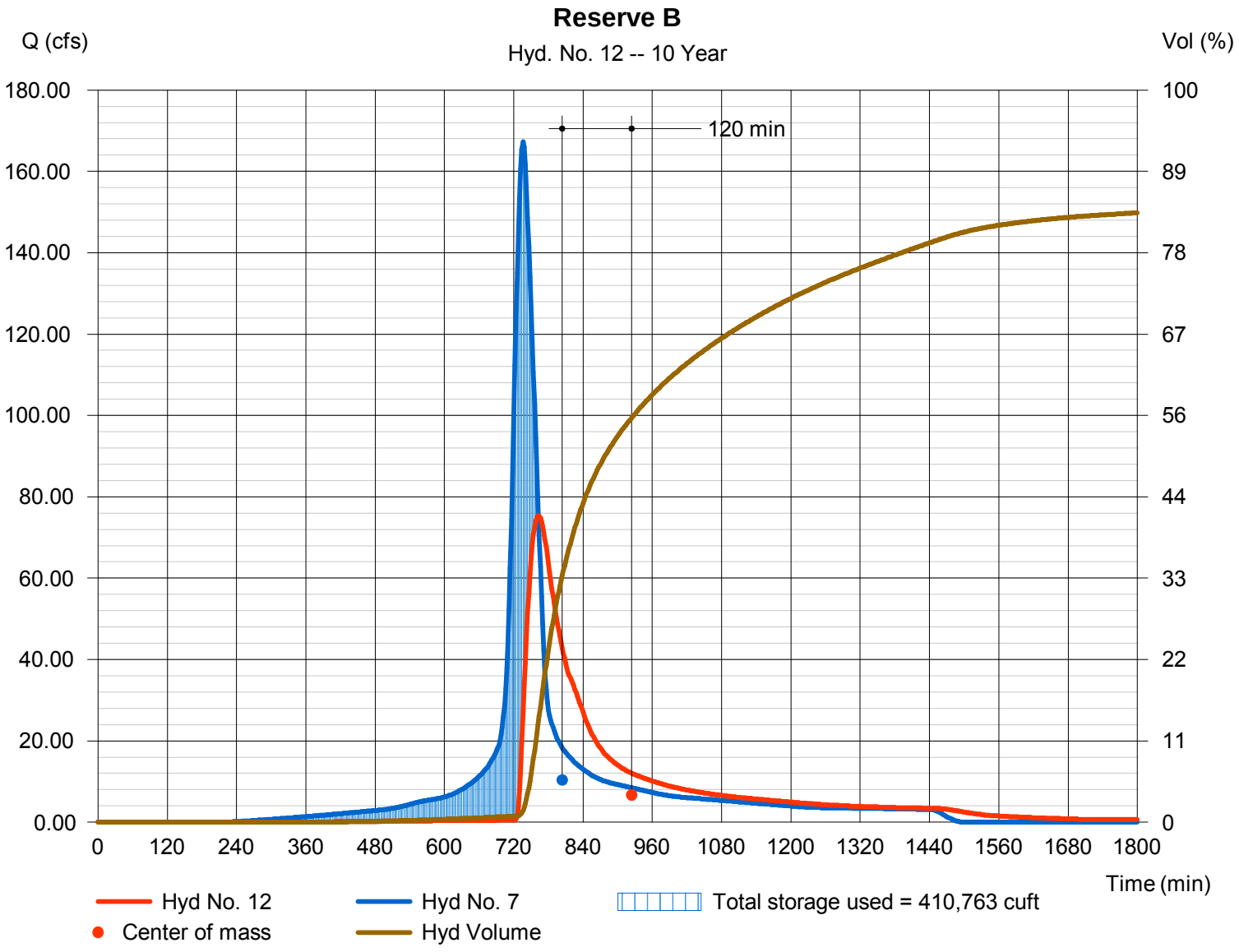
Hydrograph Report

Hyd. No. 12

Reserve B

Hydrograph type	= Reservoir	Peak discharge	= 75.34 cfs
Storm frequency	= 10 yrs	Time to peak	= 762 min
Time interval	= 2 min	Hyd. volume	= 756,425 cuft
Inflow hyd. No.	= 7 - Developed - Basin 2	Max. Elevation	= 1338.14 ft
Reservoir name	= Reserve B	Max. Storage	= 410,763 cuft

Storage Indication method used.

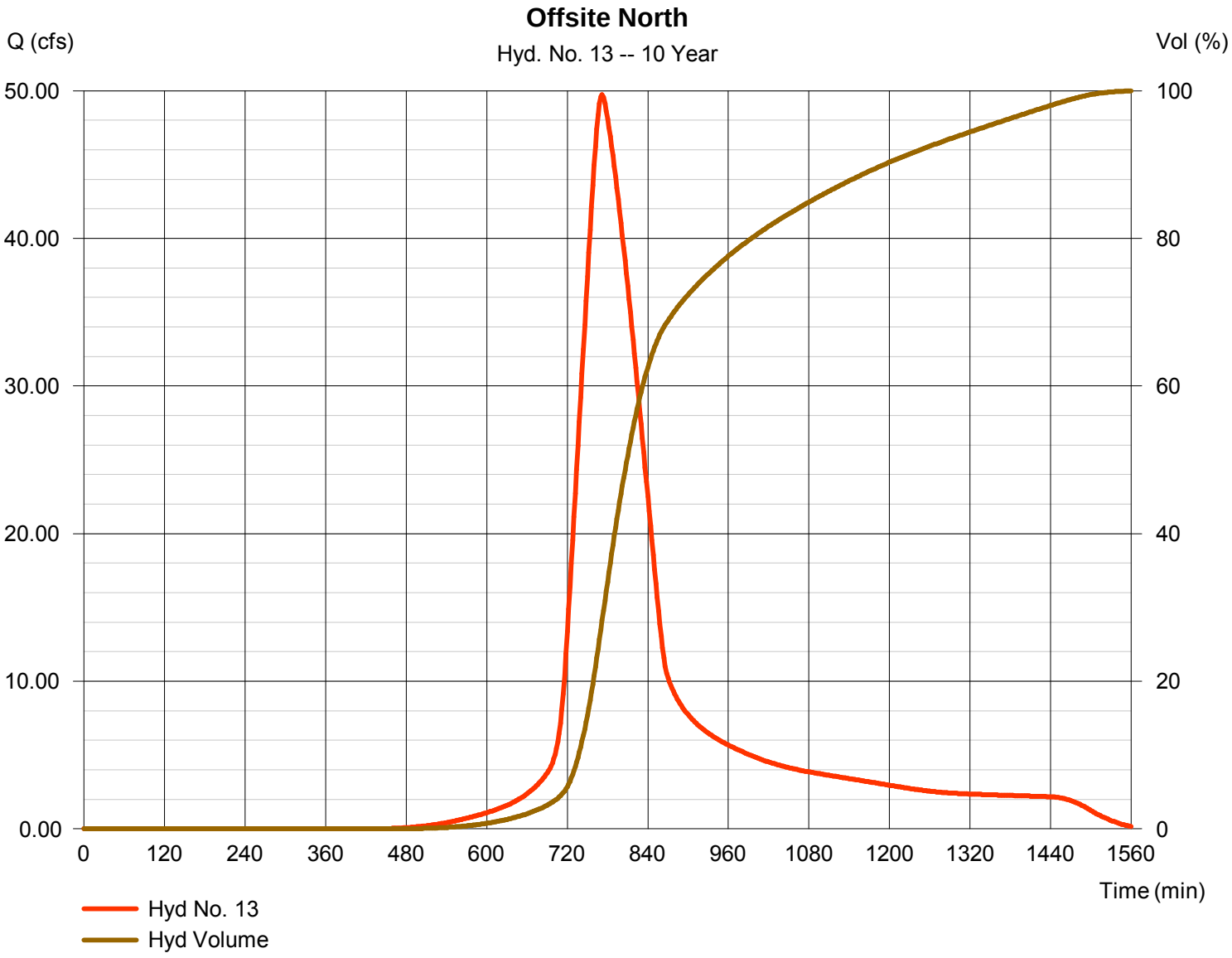


Hydrograph Report

Hyd. No. 13

Offsite North

Hydrograph type	= SCS Runoff	Peak discharge	= 49.74 cfs
Storm frequency	= 10 yrs	Time to peak	= 772 min
Time interval	= 2 min	Hyd. volume	= 454,651 cuft
Drainage area	= 41.000 ac	Curve number	= 80
Basin Slope	= 0.3 %	Hydraulic length	= 1800 ft
Tc method	= LAG	Time of conc. (Tc)	= 98.06 min
Total precip.	= 5.20 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8

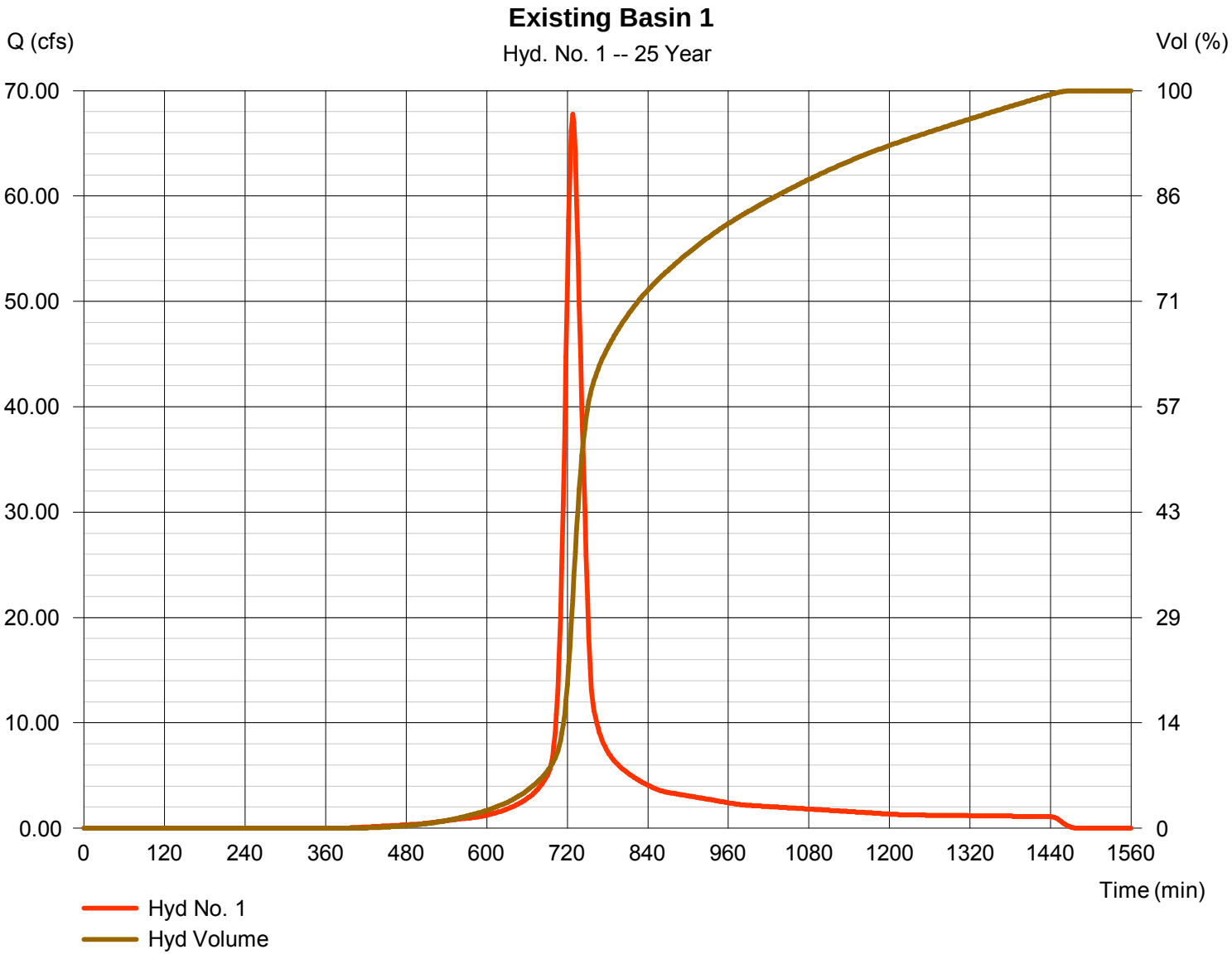
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	67.75	2	728	249,018	------	------	------	Existing Basin 1
2	SCS Runoff	119.90	2	750	772,966	------	------	------	Existing - Basin 2
3	SCS Runoff	147.25	2	754	1,019,524	------	------	------	Existing - Basin 3
4	SCS Runoff	30.26	2	754	209,491	------	------	------	Existing - Basin 4
5	SCS Runoff	100.27	2	724	330,302	------	------	------	Developed - Basin 1
6	Reservoir	18.24	2	746	320,061	5	1344.18	190,462	Reserve A Pond
7	SCS Runoff	200.76	2	736	1,009,256	------	------	------	Developed - Basin 2
8	SCS Runoff	239.34	2	740	1,327,597	------	------	------	Developed - Basin 3
9	Reservoir	119.13	2	768	1,327,591	8	1340.34	390,805	Reserve C Pond
10	SCS Runoff	69.36	2	734	326,549	------	------	------	Developed - Basin 4
11	Reservoir	11.64	2	774	305,305	10	1336.29	190,875	Reserve D
12	Reservoir	102.53	2	760	931,483	7	1338.57	466,715	Reserve B
13	SCS Runoff	62.89	2	772	573,728	------	------	------	Offsite North

Hydrograph Report

Hyd. No. 1

Existing Basin 1

Hydrograph type	= SCS Runoff	Peak discharge	= 67.75 cfs
Storm frequency	= 25 yrs	Time to peak	= 728 min
Time interval	= 2 min	Hyd. volume	= 249,018 cuft
Drainage area	= 18.000 ac	Curve number	= 80
Basin Slope	= 0.7 %	Hydraulic length	= 600 ft
Tc method	= LAG	Time of conc. (Tc)	= 25.29 min
Total precip.	= 6.10 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

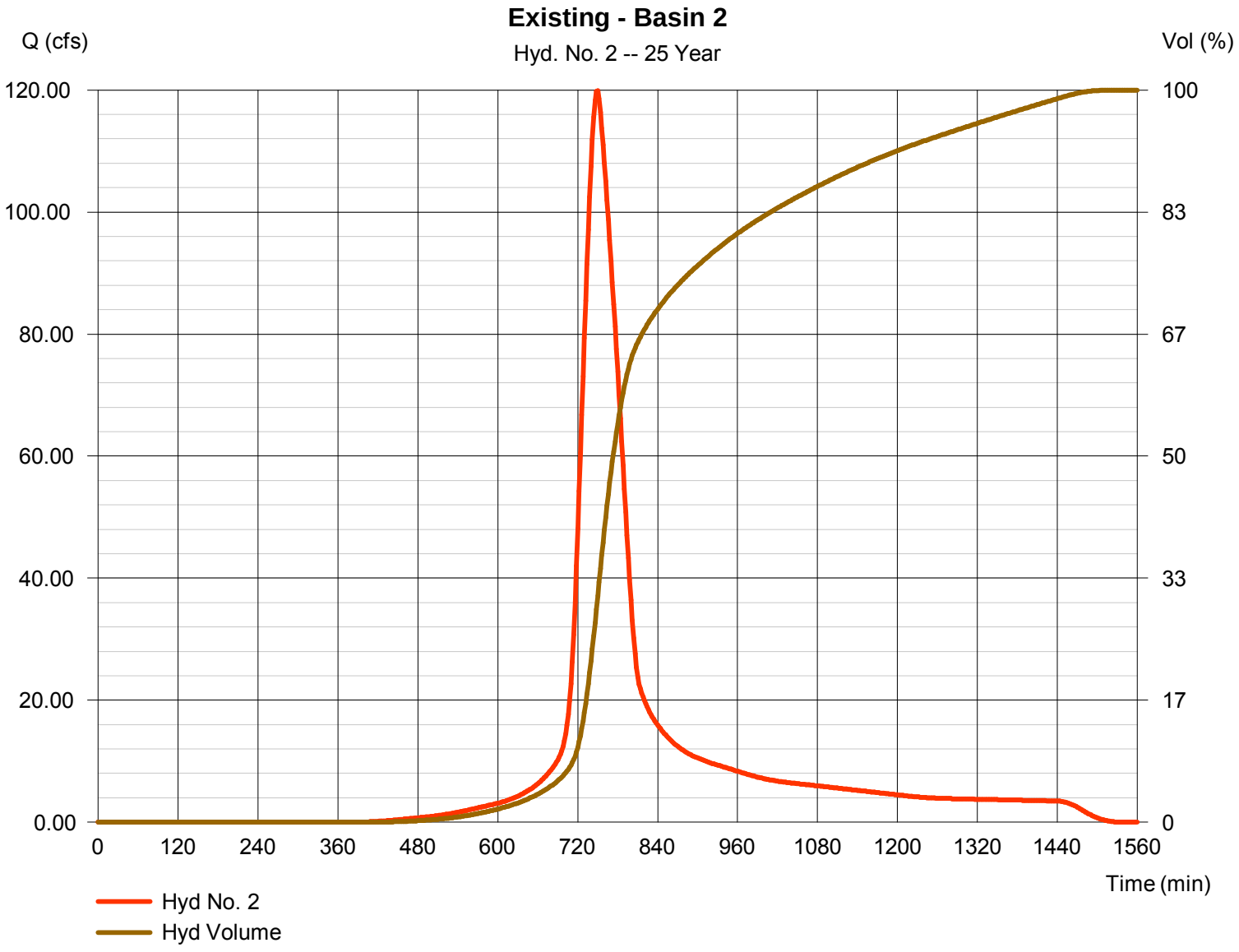


Hydrograph Report

Hyd. No. 2

Existing - Basin 2

Hydrograph type	= SCS Runoff	Peak discharge	= 119.90 cfs
Storm frequency	= 25 yrs	Time to peak	= 750 min
Time interval	= 2 min	Hyd. volume	= 772,966 cuft
Drainage area	= 55.000 ac	Curve number	= 80
Basin Slope	= 0.6 %	Hydraulic length	= 1600 ft
Tc method	= LAG	Time of conc. (Tc)	= 59.87 min
Total precip.	= 6.10 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

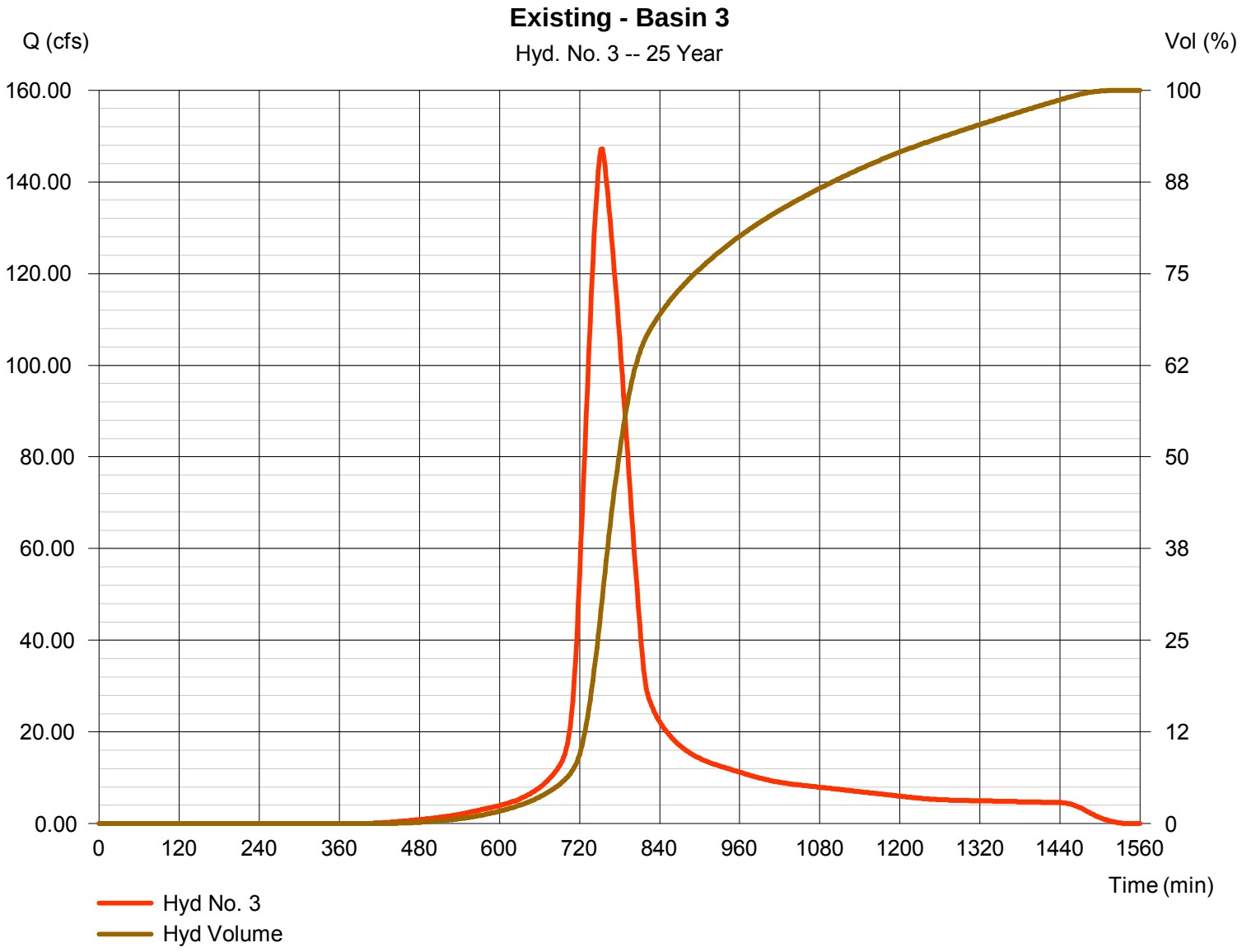


Hydrograph Report

Hyd. No. 3

Existing - Basin 3

Hydrograph type	= SCS Runoff	Peak discharge	= 147.25 cfs
Storm frequency	= 25 yrs	Time to peak	= 754 min
Time interval	= 2 min	Hyd. volume	= 1,019,524 cuft
Drainage area	= 73.000 ac	Curve number	= 80
Basin Slope	= 0.6 %	Hydraulic length	= 1800 ft
Tc method	= LAG	Time of conc. (Tc)	= 65.78 min
Total precip.	= 6.10 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

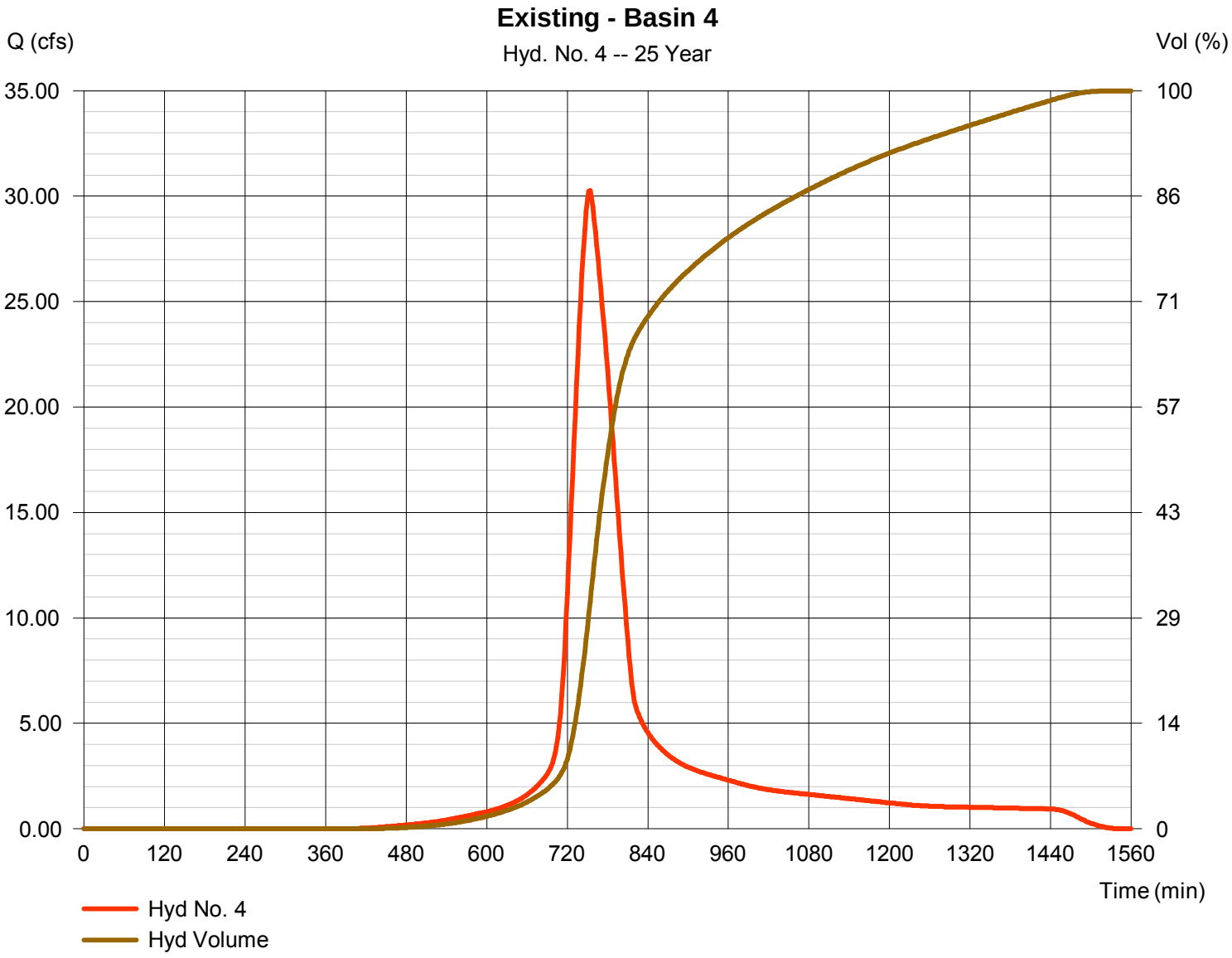


Hydrograph Report

Hyd. No. 4

Existing - Basin 4

Hydrograph type	= SCS Runoff	Peak discharge	= 30.26 cfs
Storm frequency	= 25 yrs	Time to peak	= 754 min
Time interval	= 2 min	Hyd. volume	= 209,491 cuft
Drainage area	= 15.000 ac	Curve number	= 80
Basin Slope	= 0.4 %	Hydraulic length	= 1400 ft
Tc method	= LAG	Time of conc. (Tc)	= 65.89 min
Total precip.	= 6.10 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

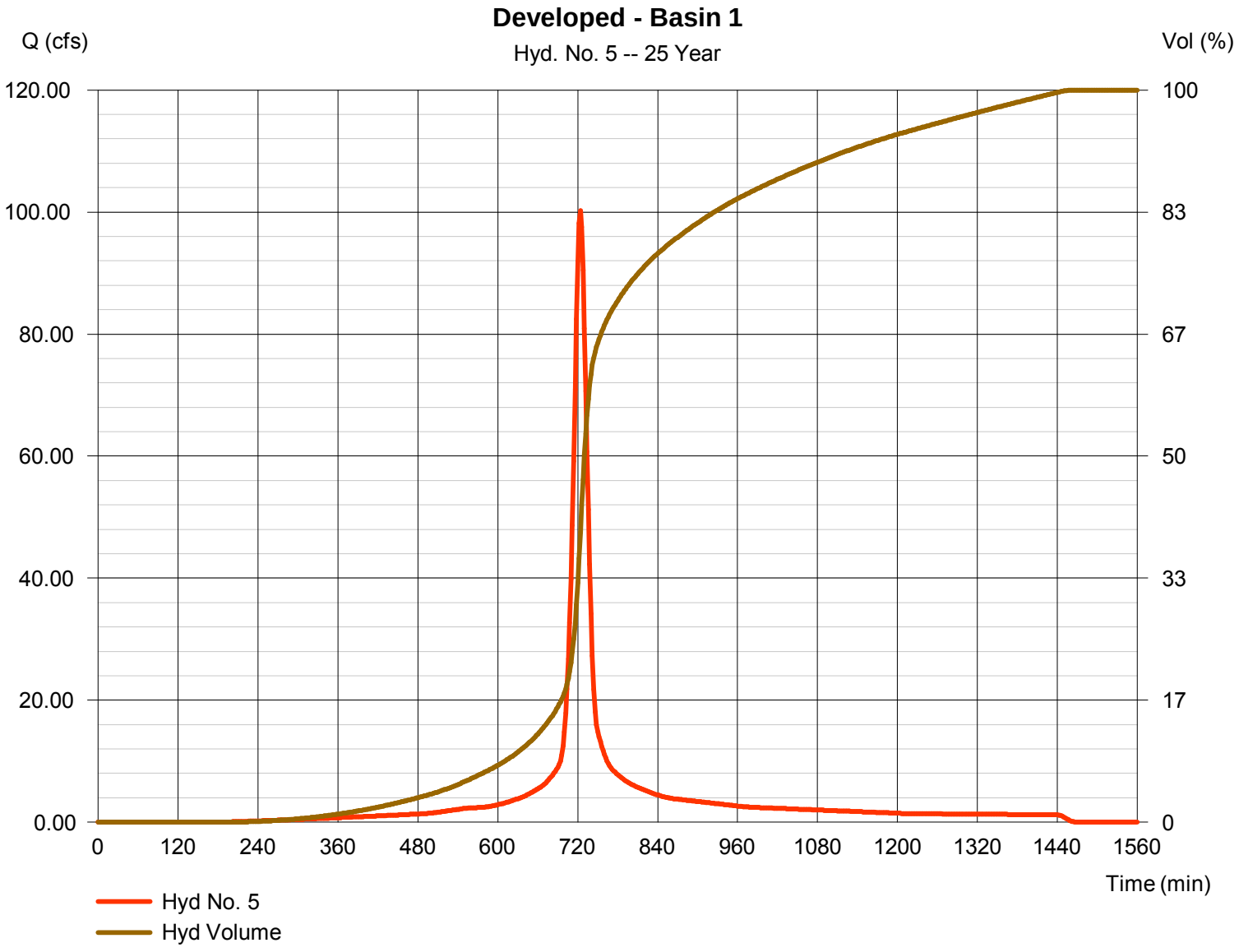


Hydrograph Report

Hyd. No. 5

Developed - Basin 1

Hydrograph type	= SCS Runoff	Peak discharge	= 100.27 cfs
Storm frequency	= 25 yrs	Time to peak	= 724 min
Time interval	= 2 min	Hyd. volume	= 330,302 cuft
Drainage area	= 18.000 ac	Curve number	= 91
Basin Slope	= 0.5 %	Hydraulic length	= 500 ft
Tc method	= LAG	Time of conc. (Tc)	= 17.41 min
Total precip.	= 6.10 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



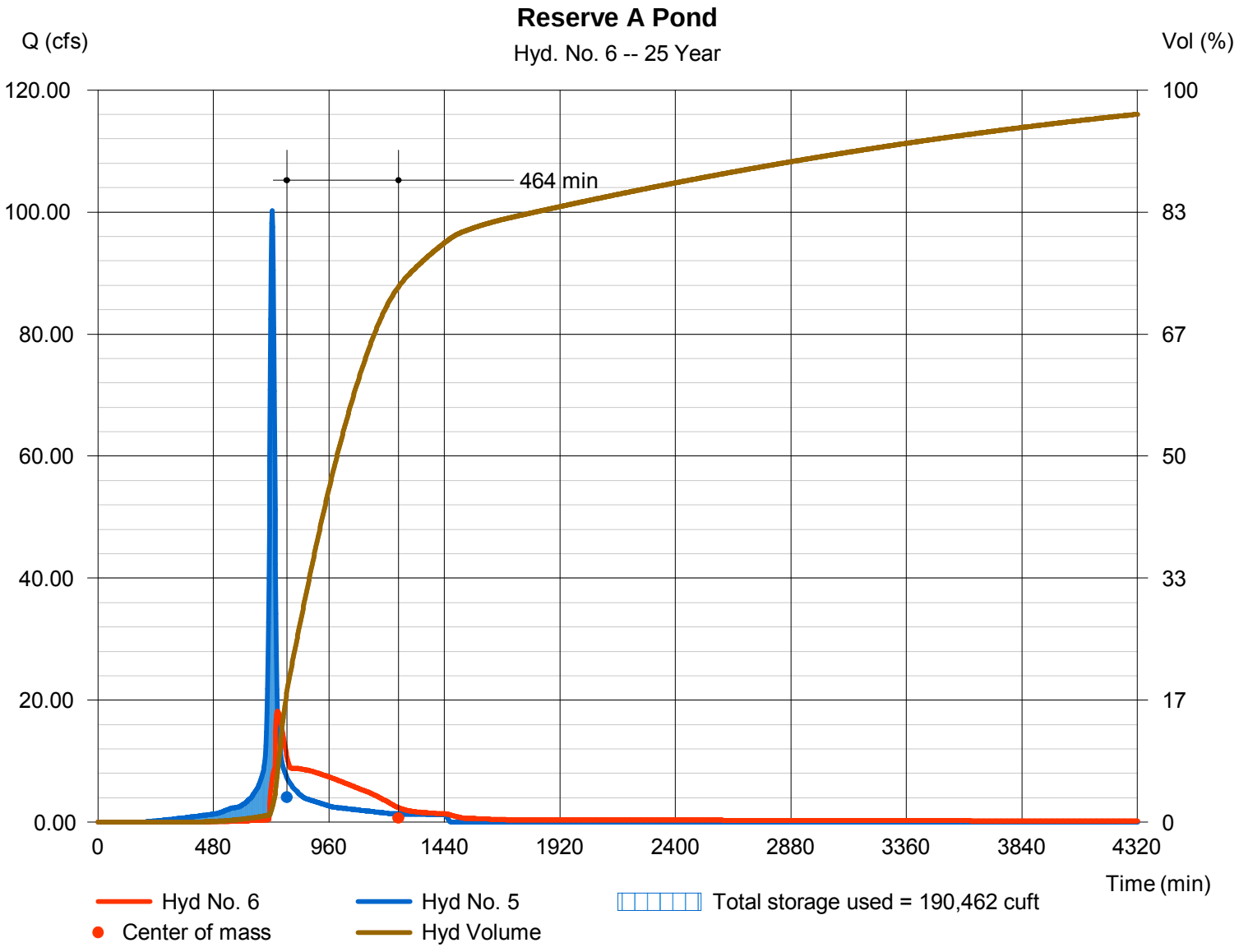
Hydrograph Report

Hyd. No. 6

Reserve A Pond

Hydrograph type	= Reservoir	Peak discharge	= 18.24 cfs
Storm frequency	= 25 yrs	Time to peak	= 746 min
Time interval	= 2 min	Hyd. volume	= 320,061 cuft
Inflow hyd. No.	= 5 - Developed - Basin 1	Max. Elevation	= 1344.18 ft
Reservoir name	= Reserve A	Max. Storage	= 190,462 cuft

Storage Indication method used.

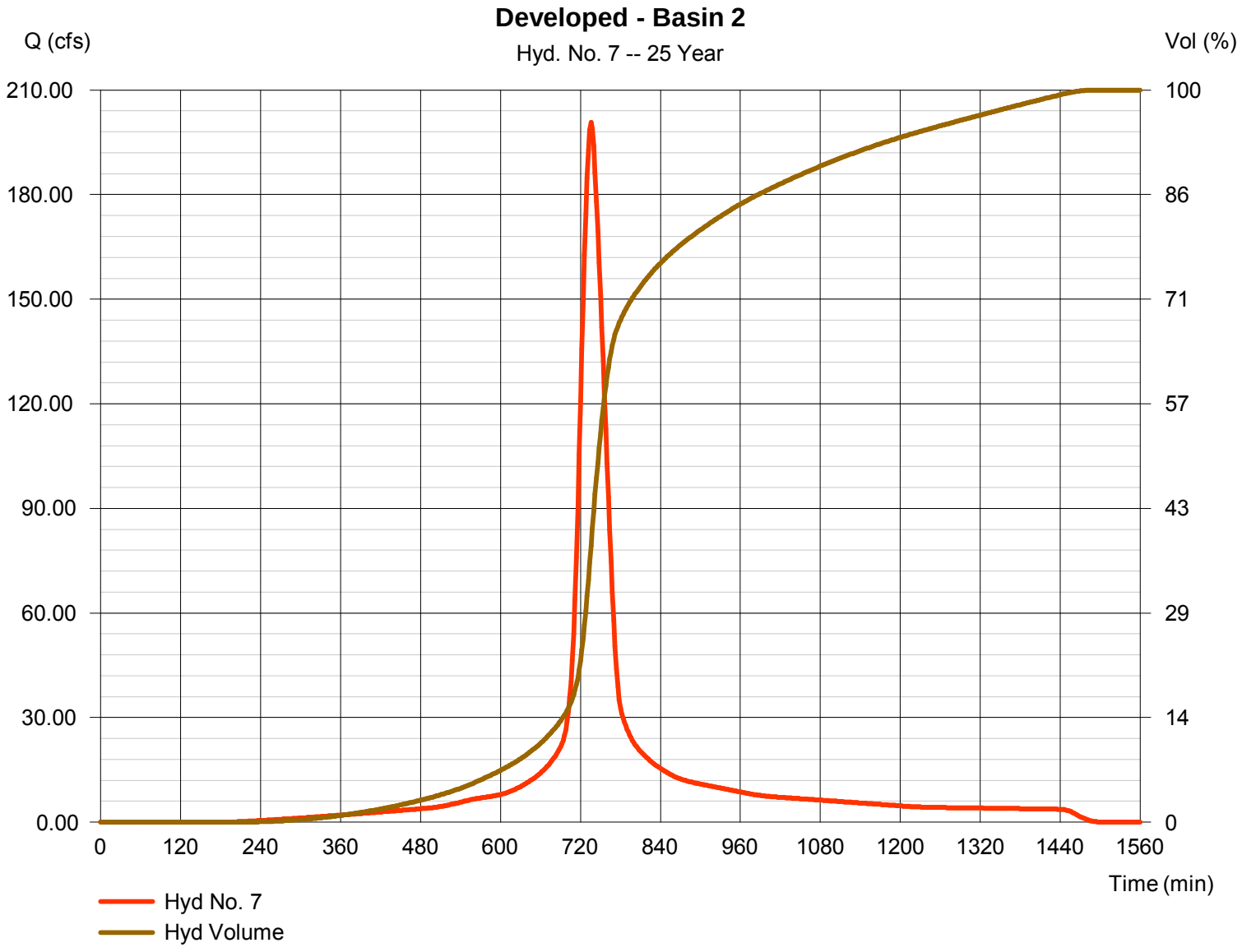


Hydrograph Report

Hyd. No. 7

Developed - Basin 2

Hydrograph type	= SCS Runoff	Peak discharge	= 200.76 cfs
Storm frequency	= 25 yrs	Time to peak	= 736 min
Time interval	= 2 min	Hyd. volume	= 1,009,256 cuft
Drainage area	= 55.000 ac	Curve number	= 91
Basin Slope	= 0.6 %	Hydraulic length	= 1600 ft
Tc method	= LAG	Time of conc. (Tc)	= 40.31 min
Total precip.	= 6.10 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

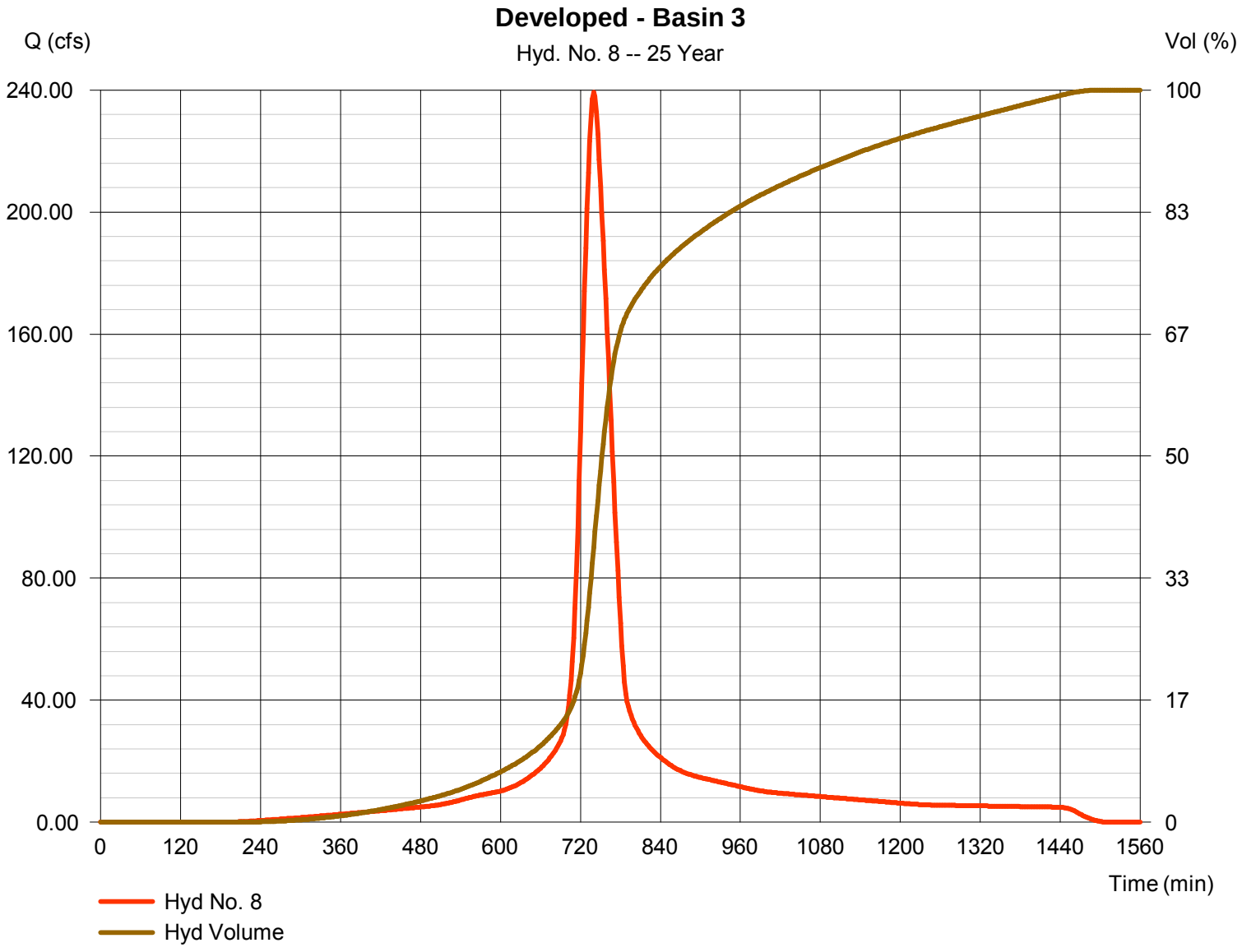


Hydrograph Report

Hyd. No. 8

Developed - Basin 3

Hydrograph type	= SCS Runoff	Peak discharge	= 239.34 cfs
Storm frequency	= 25 yrs	Time to peak	= 740 min
Time interval	= 2 min	Hyd. volume	= 1,327,597 cuft
Drainage area	= 73.000 ac	Curve number	= 91
Basin Slope	= 0.5 %	Hydraulic length	= 1600 ft
Tc method	= LAG	Time of conc. (Tc)	= 44.15 min
Total precip.	= 6.10 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



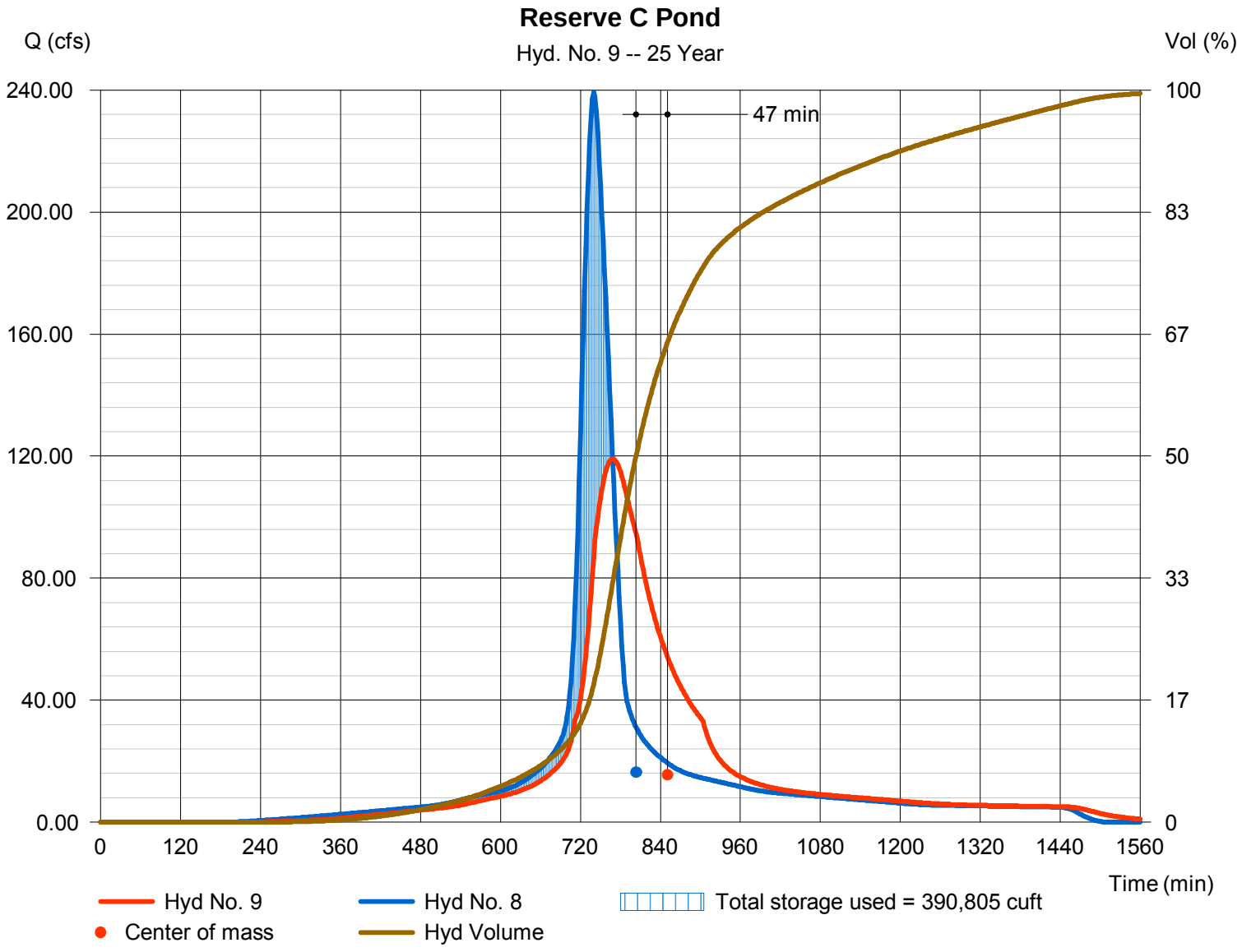
Hydrograph Report

Hyd. No. 9

Reserve C Pond

Hydrograph type	= Reservoir	Peak discharge	= 119.13 cfs
Storm frequency	= 25 yrs	Time to peak	= 768 min
Time interval	= 2 min	Hyd. volume	= 1,327,591 cuft
Inflow hyd. No.	= 8 - Developed - Basin 3	Max. Elevation	= 1340.34 ft
Reservoir name	= Reserve C Pond	Max. Storage	= 390,805 cuft

Storage Indication method used.

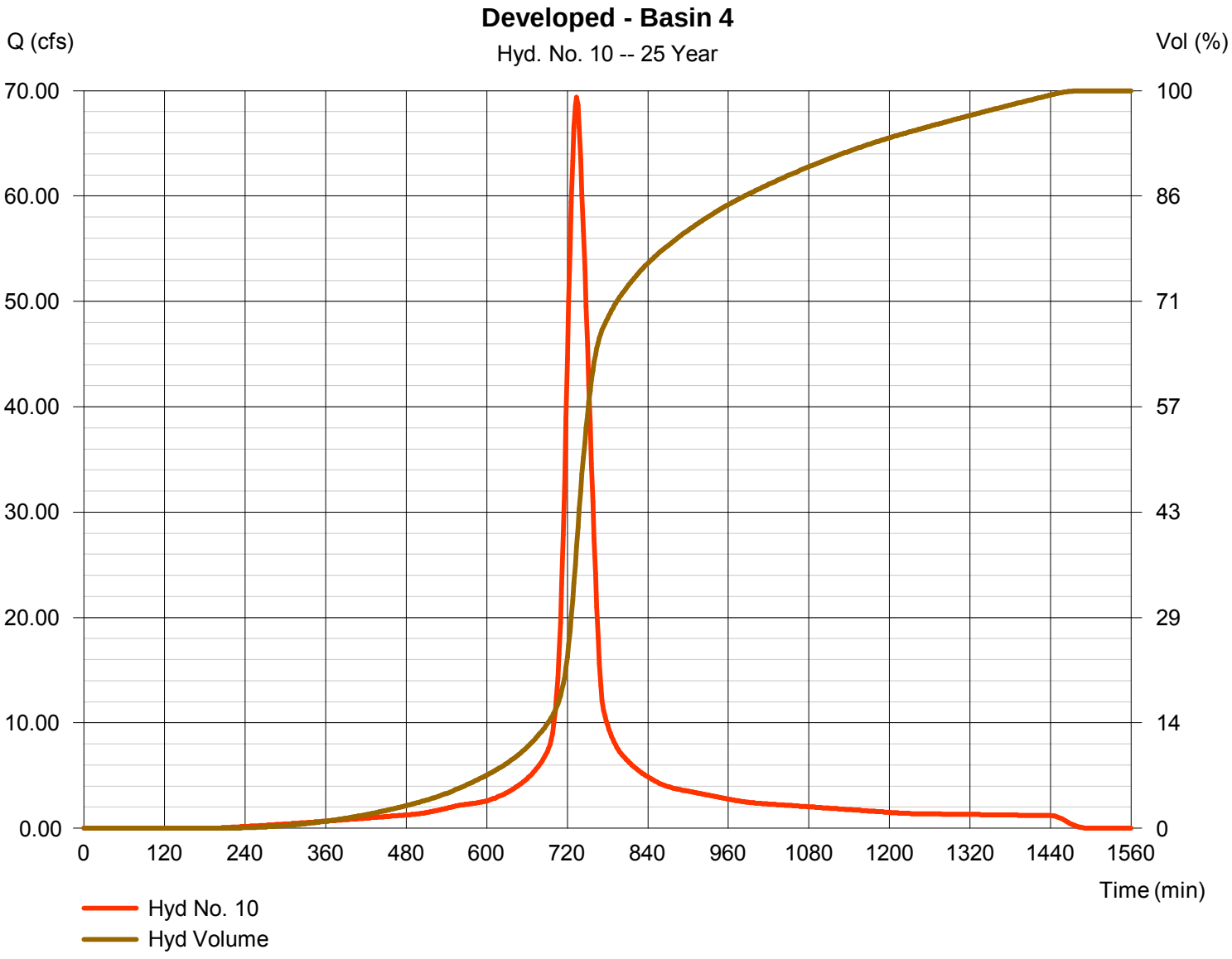


Hydrograph Report

Hyd. No. 10

Developed - Basin 4

Hydrograph type	= SCS Runoff	Peak discharge	= 69.36 cfs
Storm frequency	= 25 yrs	Time to peak	= 734 min
Time interval	= 2 min	Hyd. volume	= 326,549 cuft
Drainage area	= 18.000 ac	Curve number	= 91
Basin Slope	= 0.5 %	Hydraulic length	= 1200 ft
Tc method	= LAG	Time of conc. (Tc)	= 35.08 min
Total precip.	= 6.10 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



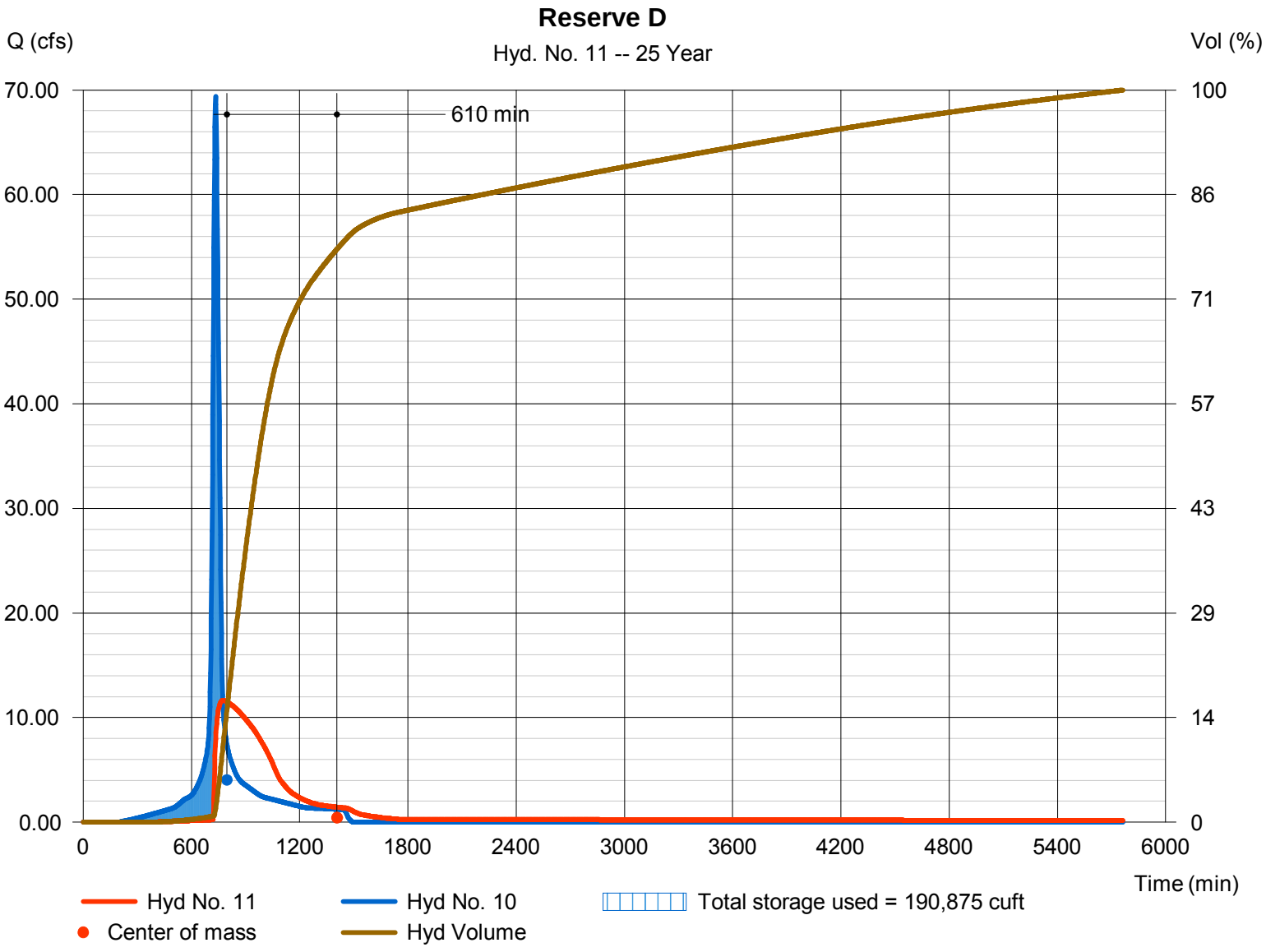
Hydrograph Report

Hyd. No. 11

Reserve D

Hydrograph type	=	Reservoir	Peak discharge	=	11.64 cfs
Storm frequency	=	25 yrs	Time to peak	=	774 min
Time interval	=	2 min	Hyd. volume	=	305,305 cuft
Inflow hyd. No.	=	10 - Developed - Basin 4	Max. Elevation	=	1336.29 ft
Reservoir name	=	Reserve D	Max. Storage	=	190,875 cuft

Storage Indication method used.



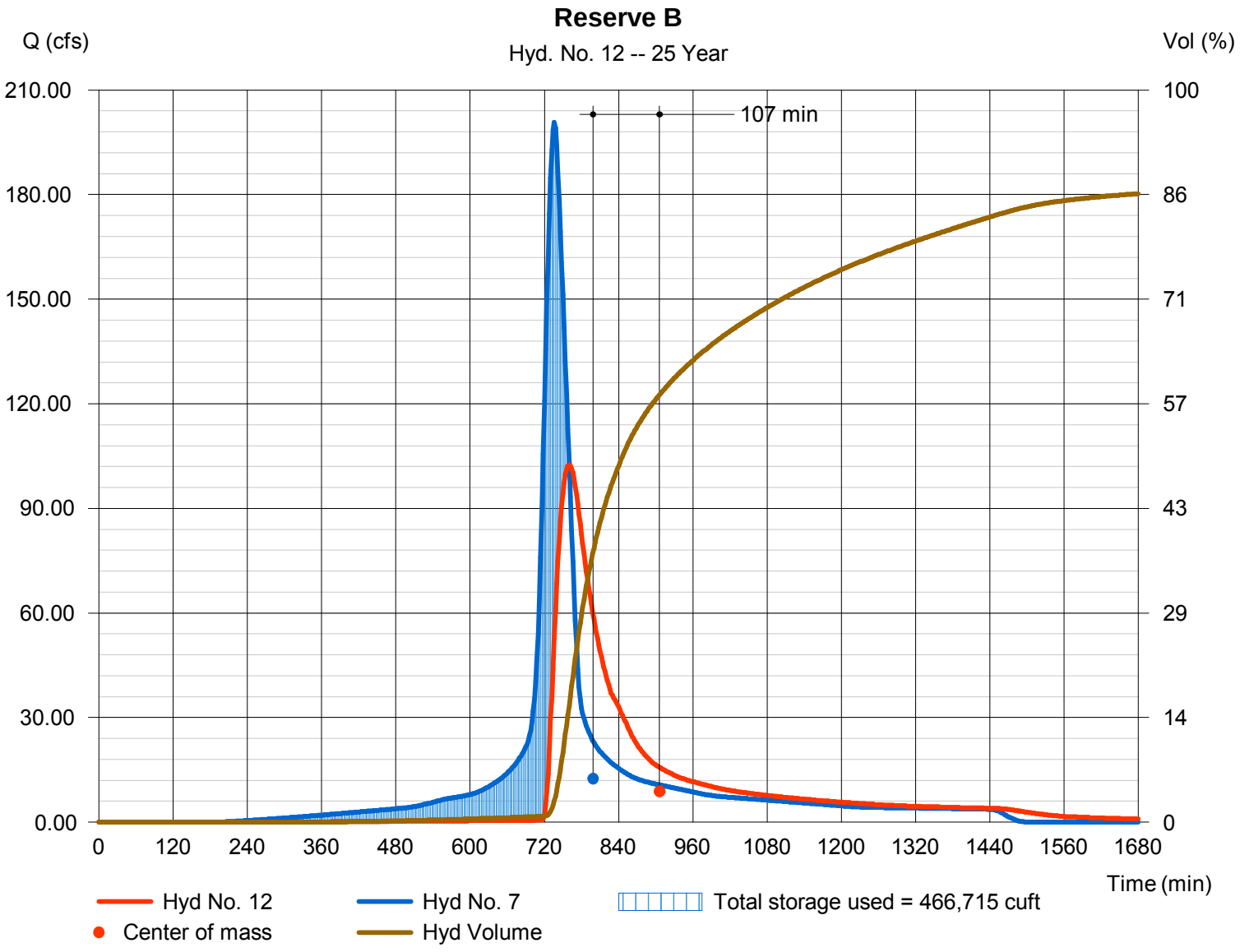
Hydrograph Report

Hyd. No. 12

Reserve B

Hydrograph type	= Reservoir	Peak discharge	= 102.53 cfs
Storm frequency	= 25 yrs	Time to peak	= 760 min
Time interval	= 2 min	Hyd. volume	= 931,483 cuft
Inflow hyd. No.	= 7 - Developed - Basin 2	Max. Elevation	= 1338.57 ft
Reservoir name	= Reserve B	Max. Storage	= 466,715 cuft

Storage Indication method used.

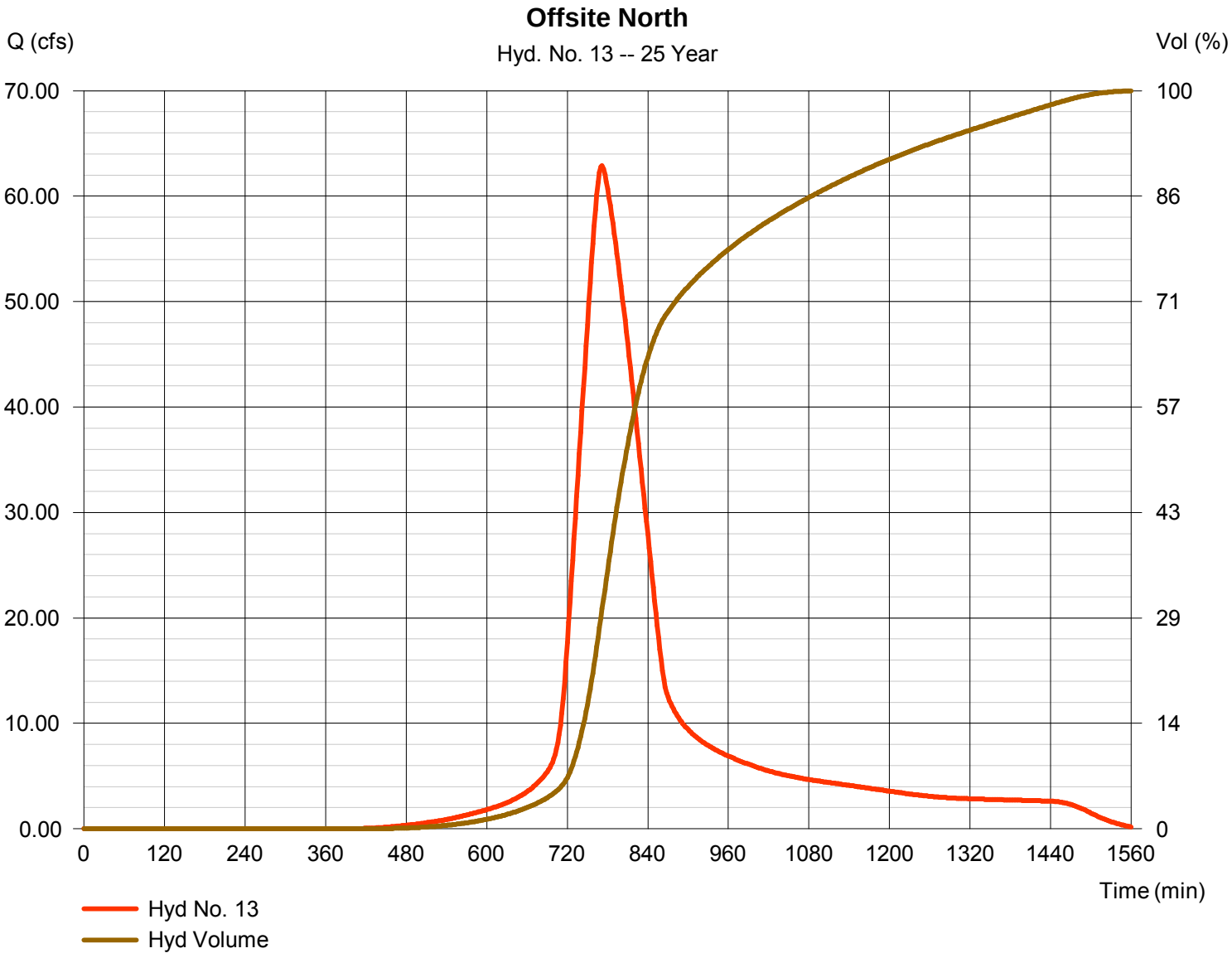


Hydrograph Report

Hyd. No. 13

Offsite North

Hydrograph type	= SCS Runoff	Peak discharge	= 62.89 cfs
Storm frequency	= 25 yrs	Time to peak	= 772 min
Time interval	= 2 min	Hyd. volume	= 573,728 cuft
Drainage area	= 41.000 ac	Curve number	= 80
Basin Slope	= 0.3 %	Hydraulic length	= 1800 ft
Tc method	= LAG	Time of conc. (Tc)	= 98.06 min
Total precip.	= 6.10 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8

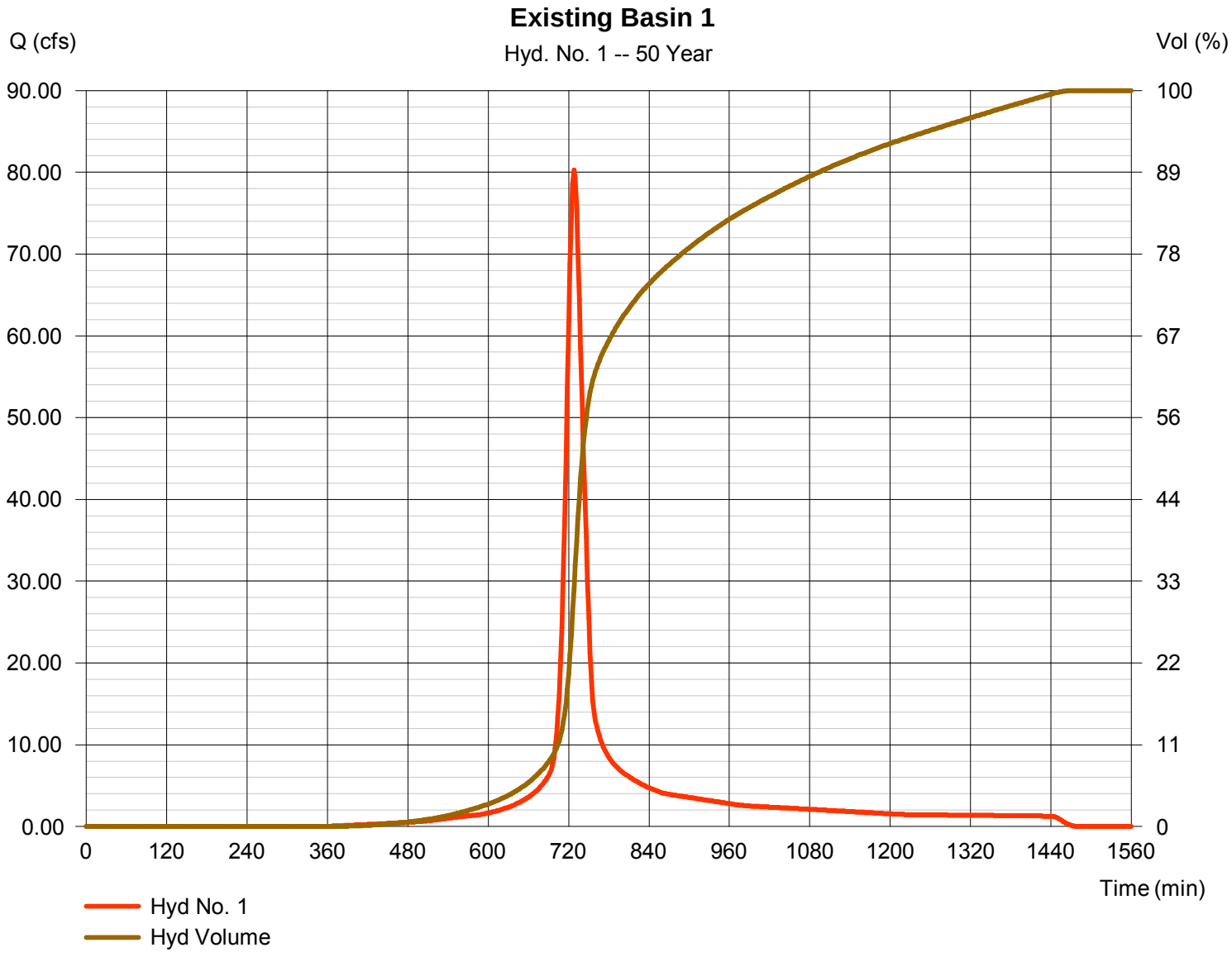
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	80.29	2	728	296,013	------	------	------	Existing Basin 1
2	SCS Runoff	142.32	2	748	918,838	------	------	------	Existing - Basin 2
3	SCS Runoff	174.79	2	754	1,211,927	------	------	------	Existing - Basin 3
4	SCS Runoff	35.92	2	754	249,026	------	------	------	Existing - Basin 4
5	SCS Runoff	114.93	2	724	381,609	------	------	------	Developed - Basin 1
6	Reservoir	28.73	2	742	371,321	5	1344.48	211,443	Reserve A Pond
7	SCS Runoff	230.35	2	736	1,166,029	------	------	------	Developed - Basin 2
8	SCS Runoff	274.65	2	740	1,533,819	------	------	------	Developed - Basin 3
9	Reservoir	134.62	2	768	1,533,814	8	1340.54	455,307	Reserve C Pond
10	SCS Runoff	79.57	2	734	377,273	------	------	------	Developed - Basin 4
11	Reservoir	12.76	2	774	355,902	10	1336.72	221,643	Reserve D
12	Reservoir	126.59	2	758	1,087,986	7	1338.93	513,724	Reserve B
13	SCS Runoff	74.73	2	772	682,001	------	------	------	Offsite North

Hydrograph Report

Hyd. No. 1

Existing Basin 1

Hydrograph type	= SCS Runoff	Peak discharge	= 80.29 cfs
Storm frequency	= 50 yrs	Time to peak	= 728 min
Time interval	= 2 min	Hyd. volume	= 296,013 cuft
Drainage area	= 18.000 ac	Curve number	= 80
Basin Slope	= 0.7 %	Hydraulic length	= 600 ft
Tc method	= LAG	Time of conc. (Tc)	= 25.29 min
Total precip.	= 6.90 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

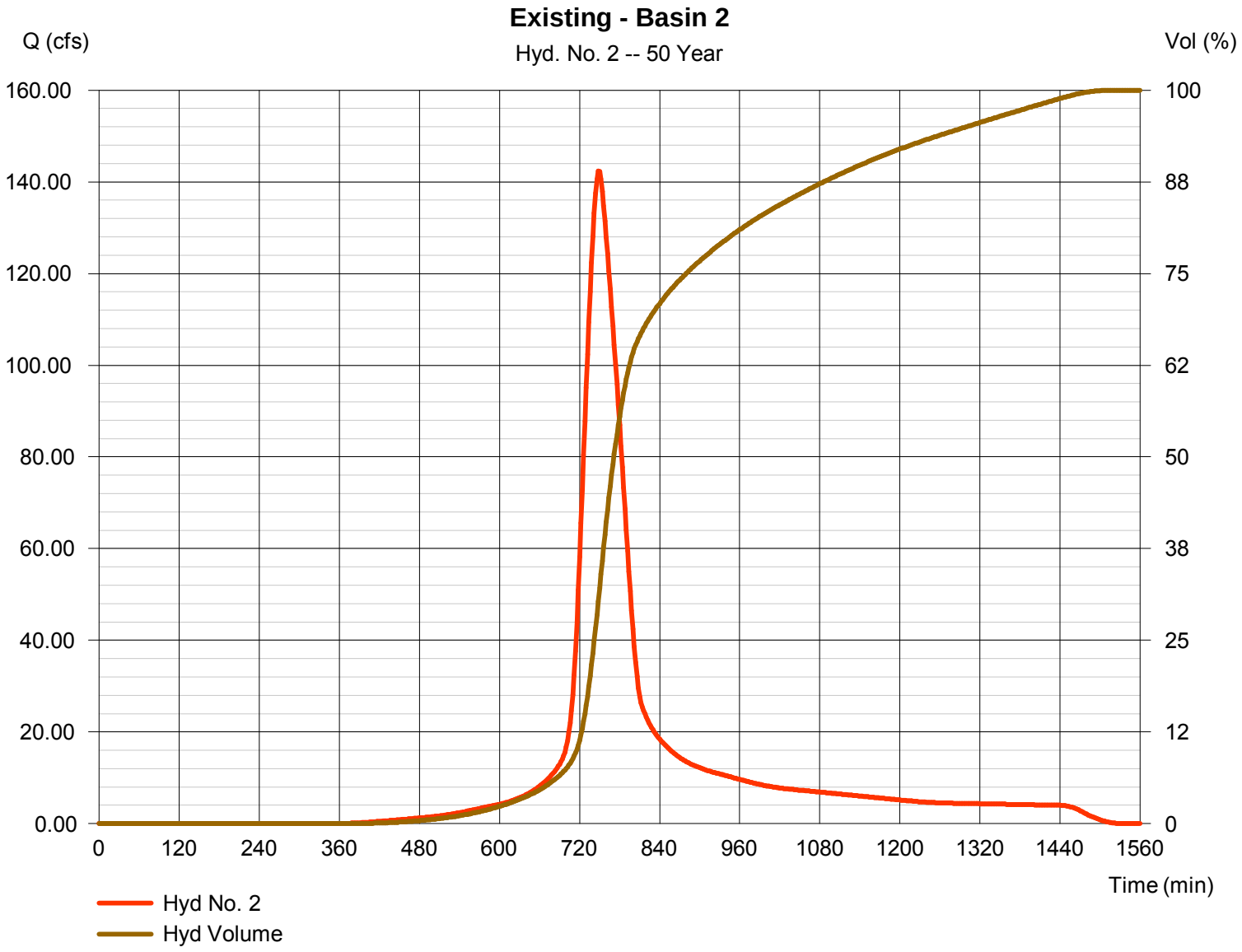


Hydrograph Report

Hyd. No. 2

Existing - Basin 2

Hydrograph type	= SCS Runoff	Peak discharge	= 142.32 cfs
Storm frequency	= 50 yrs	Time to peak	= 748 min
Time interval	= 2 min	Hyd. volume	= 918,838 cuft
Drainage area	= 55.000 ac	Curve number	= 80
Basin Slope	= 0.6 %	Hydraulic length	= 1600 ft
Tc method	= LAG	Time of conc. (Tc)	= 59.87 min
Total precip.	= 6.90 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

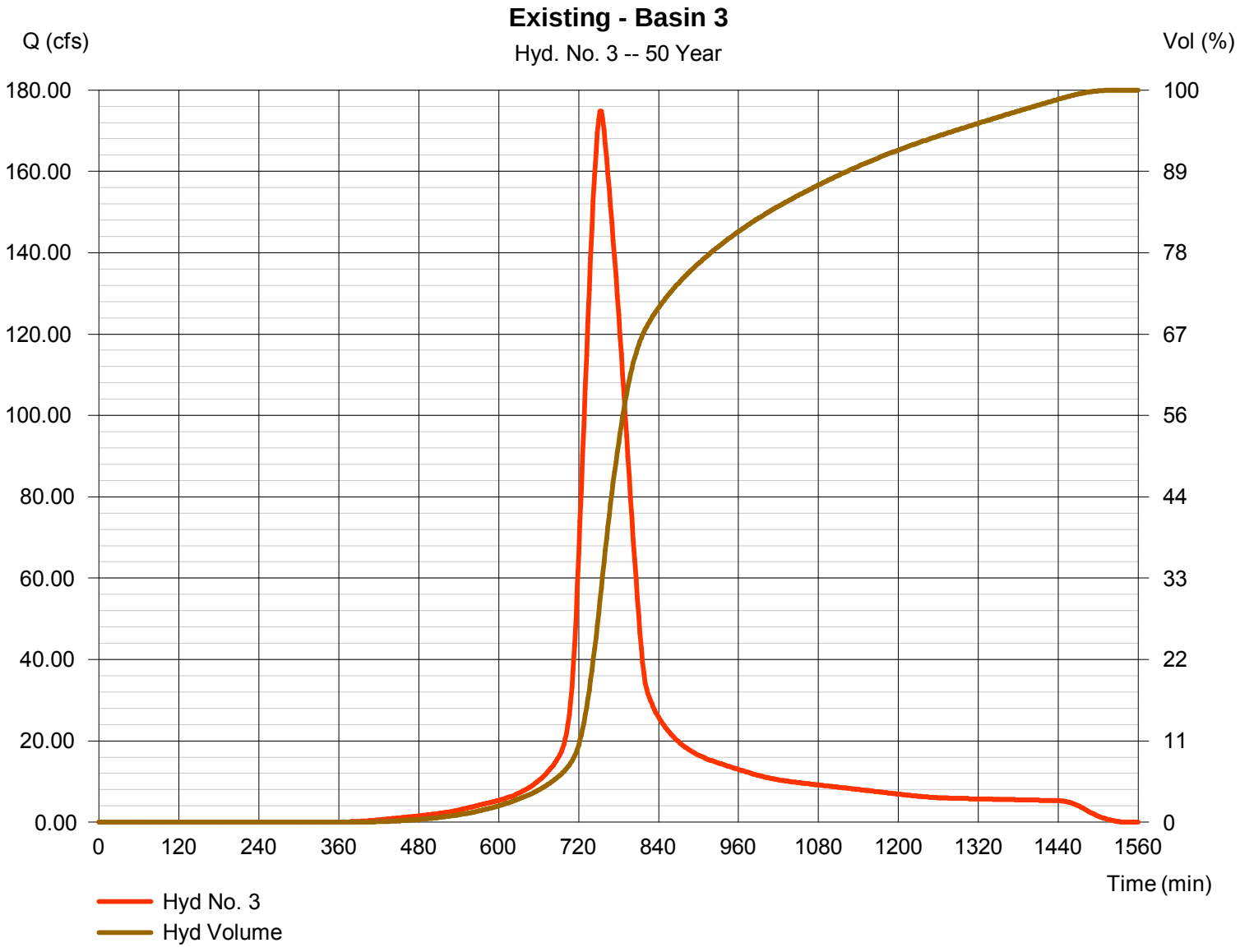


Hydrograph Report

Hyd. No. 3

Existing - Basin 3

Hydrograph type	= SCS Runoff	Peak discharge	= 174.79 cfs
Storm frequency	= 50 yrs	Time to peak	= 754 min
Time interval	= 2 min	Hyd. volume	= 1,211,927 cuft
Drainage area	= 73.000 ac	Curve number	= 80
Basin Slope	= 0.6 %	Hydraulic length	= 1800 ft
Tc method	= LAG	Time of conc. (Tc)	= 65.78 min
Total precip.	= 6.90 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

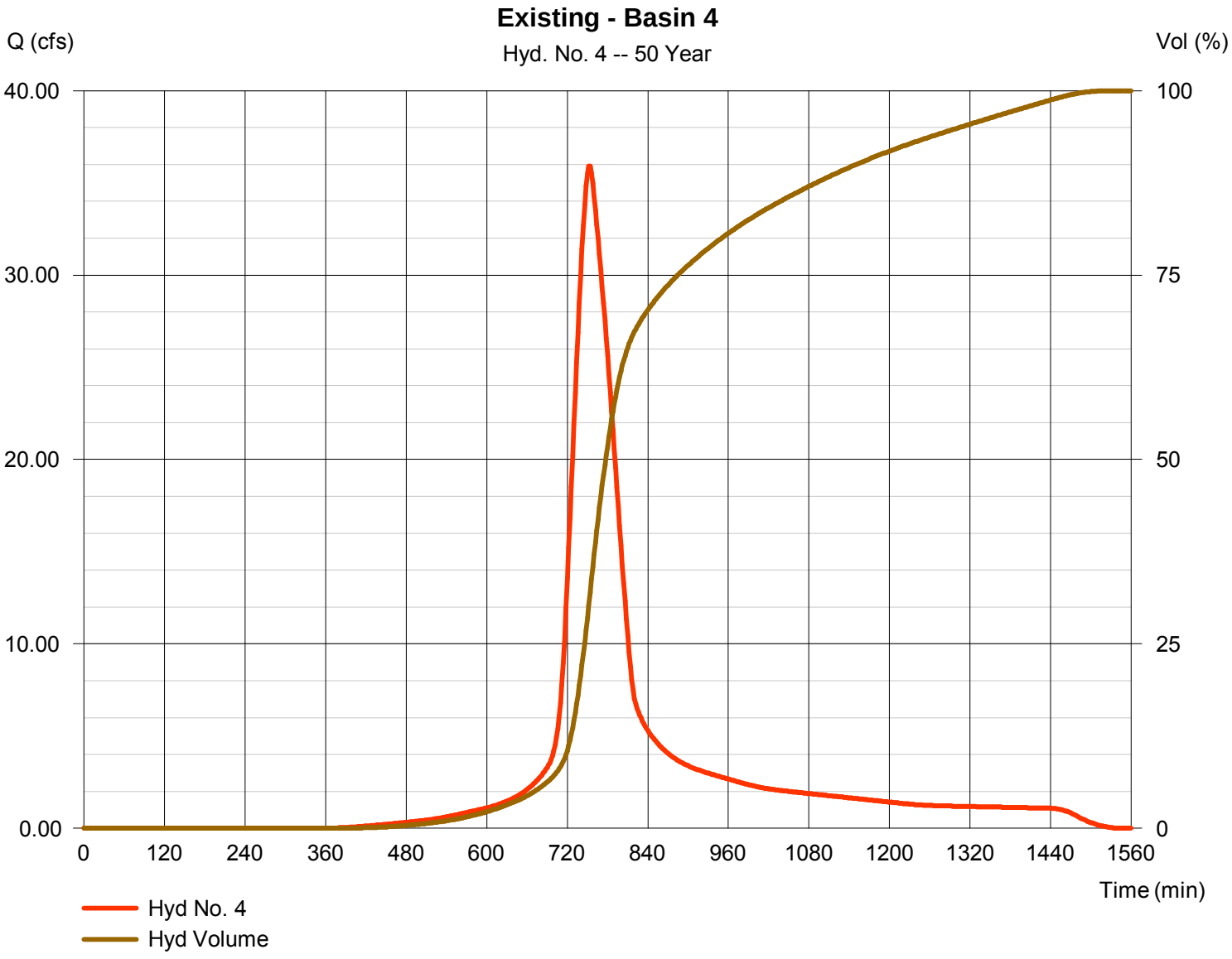


Hydrograph Report

Hyd. No. 4

Existing - Basin 4

Hydrograph type	= SCS Runoff	Peak discharge	= 35.92 cfs
Storm frequency	= 50 yrs	Time to peak	= 754 min
Time interval	= 2 min	Hyd. volume	= 249,026 cuft
Drainage area	= 15.000 ac	Curve number	= 80
Basin Slope	= 0.4 %	Hydraulic length	= 1400 ft
Tc method	= LAG	Time of conc. (Tc)	= 65.89 min
Total precip.	= 6.90 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

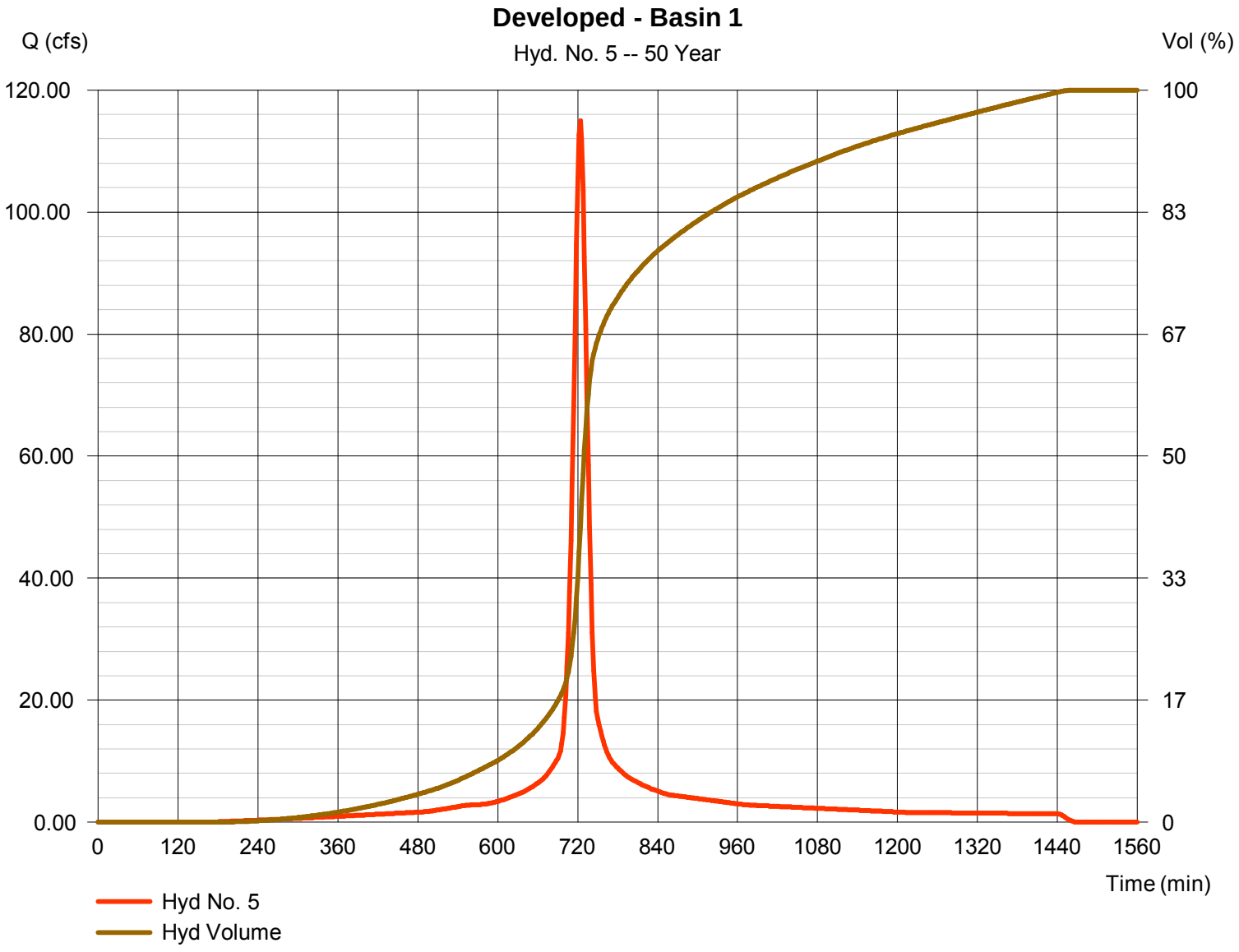


Hydrograph Report

Hyd. No. 5

Developed - Basin 1

Hydrograph type	= SCS Runoff	Peak discharge	= 114.93 cfs
Storm frequency	= 50 yrs	Time to peak	= 724 min
Time interval	= 2 min	Hyd. volume	= 381,609 cuft
Drainage area	= 18.000 ac	Curve number	= 91
Basin Slope	= 0.5 %	Hydraulic length	= 500 ft
Tc method	= LAG	Time of conc. (Tc)	= 17.41 min
Total precip.	= 6.90 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



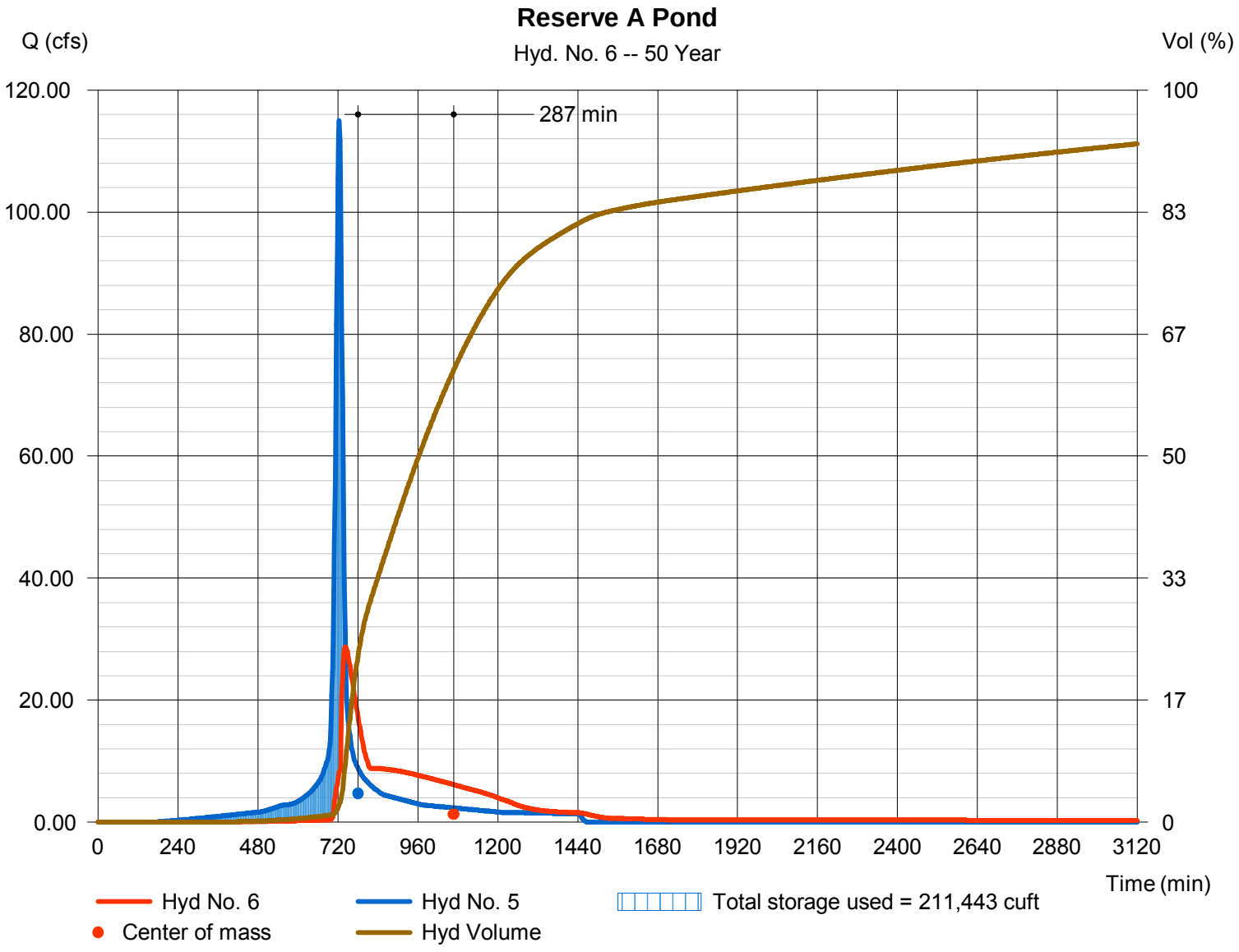
Hydrograph Report

Hyd. No. 6

Reserve A Pond

Hydrograph type	= Reservoir	Peak discharge	= 28.73 cfs
Storm frequency	= 50 yrs	Time to peak	= 742 min
Time interval	= 2 min	Hyd. volume	= 371,321 cuft
Inflow hyd. No.	= 5 - Developed - Basin 1	Max. Elevation	= 1344.48 ft
Reservoir name	= Reserve A	Max. Storage	= 211,443 cuft

Storage Indication method used.

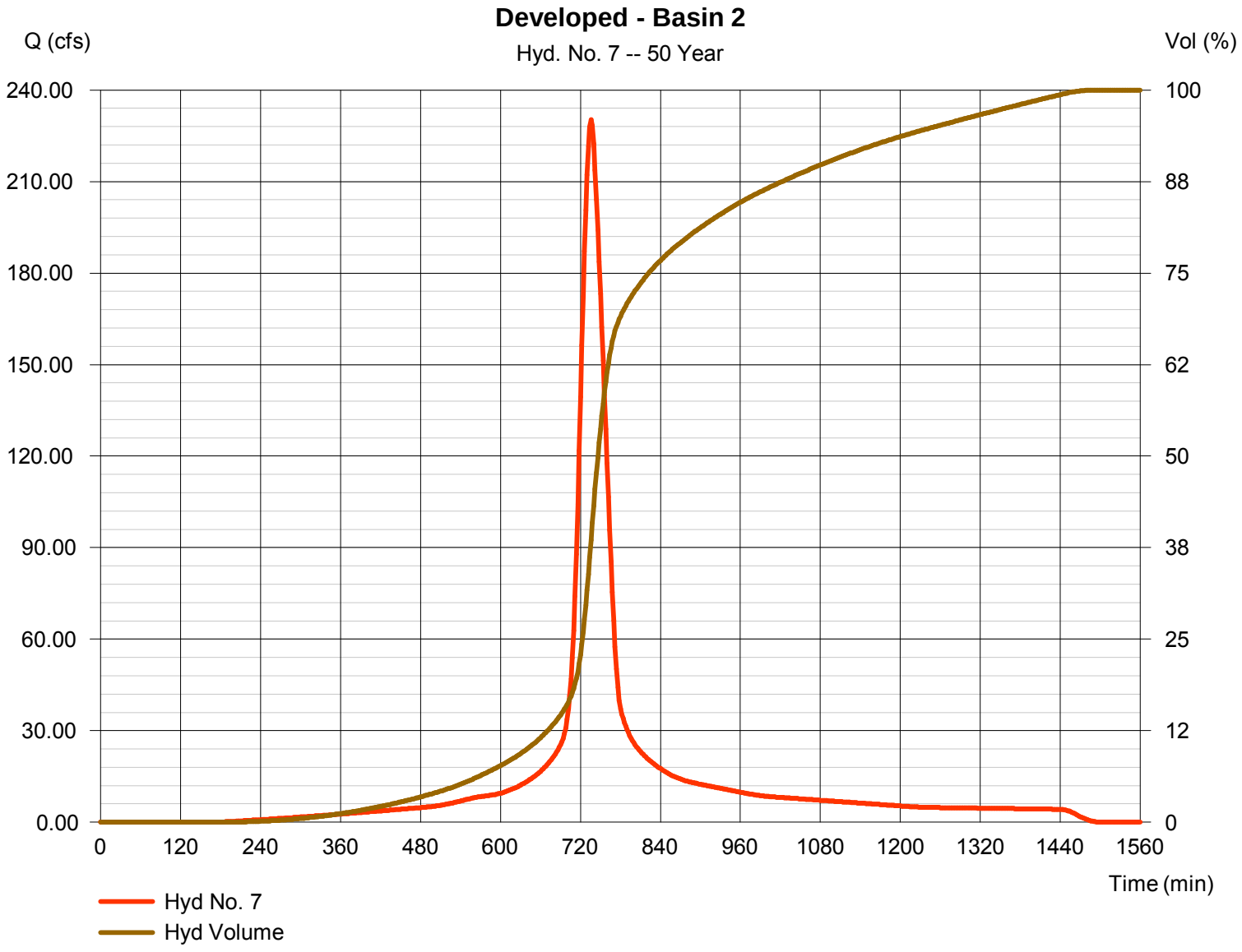


Hydrograph Report

Hyd. No. 7

Developed - Basin 2

Hydrograph type	= SCS Runoff	Peak discharge	= 230.35 cfs
Storm frequency	= 50 yrs	Time to peak	= 736 min
Time interval	= 2 min	Hyd. volume	= 1,166,029 cuft
Drainage area	= 55.000 ac	Curve number	= 91
Basin Slope	= 0.6 %	Hydraulic length	= 1600 ft
Tc method	= LAG	Time of conc. (Tc)	= 40.31 min
Total precip.	= 6.90 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

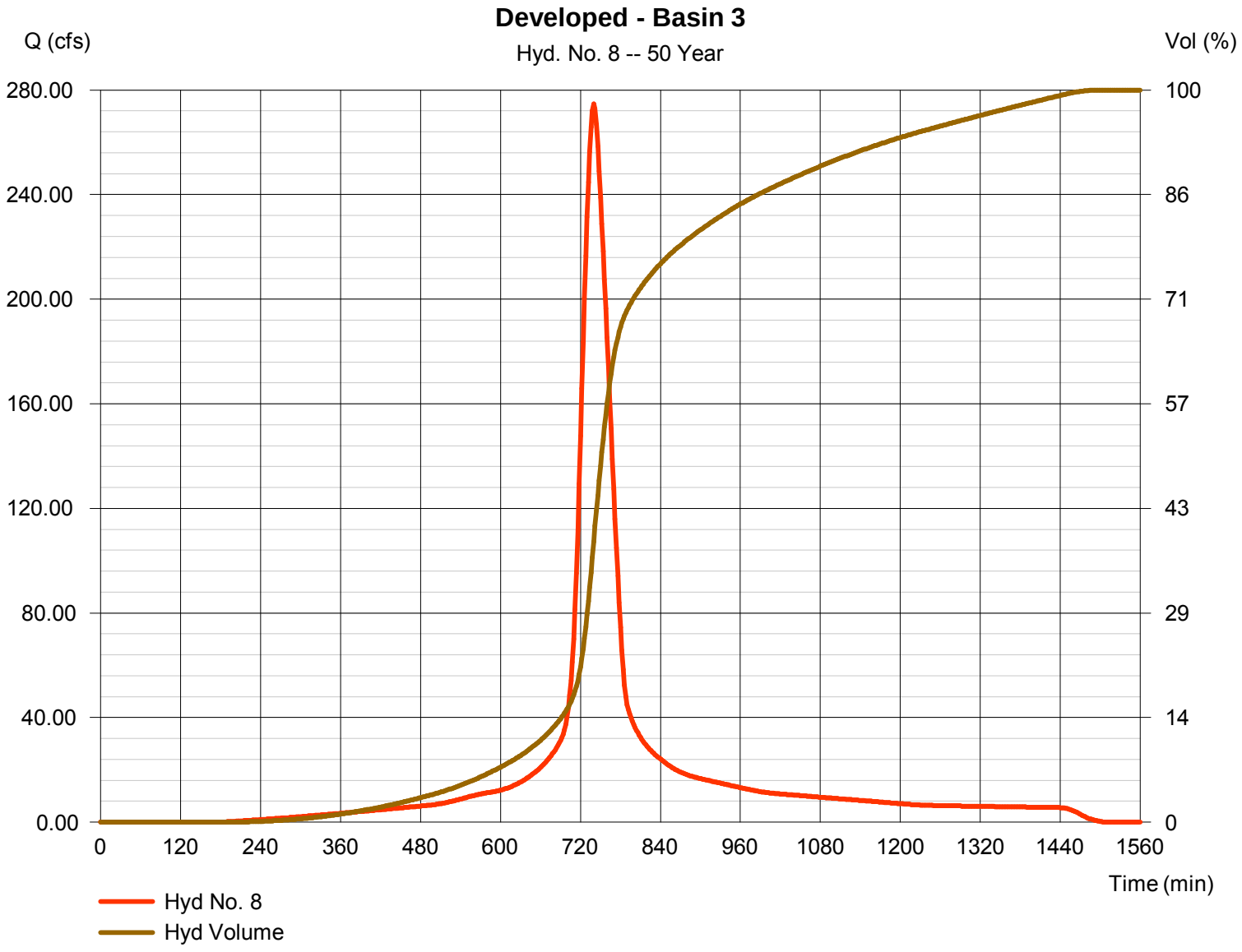


Hydrograph Report

Hyd. No. 8

Developed - Basin 3

Hydrograph type	= SCS Runoff	Peak discharge	= 274.65 cfs
Storm frequency	= 50 yrs	Time to peak	= 740 min
Time interval	= 2 min	Hyd. volume	= 1,533,819 cuft
Drainage area	= 73.000 ac	Curve number	= 91
Basin Slope	= 0.5 %	Hydraulic length	= 1600 ft
Tc method	= LAG	Time of conc. (Tc)	= 44.15 min
Total precip.	= 6.90 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



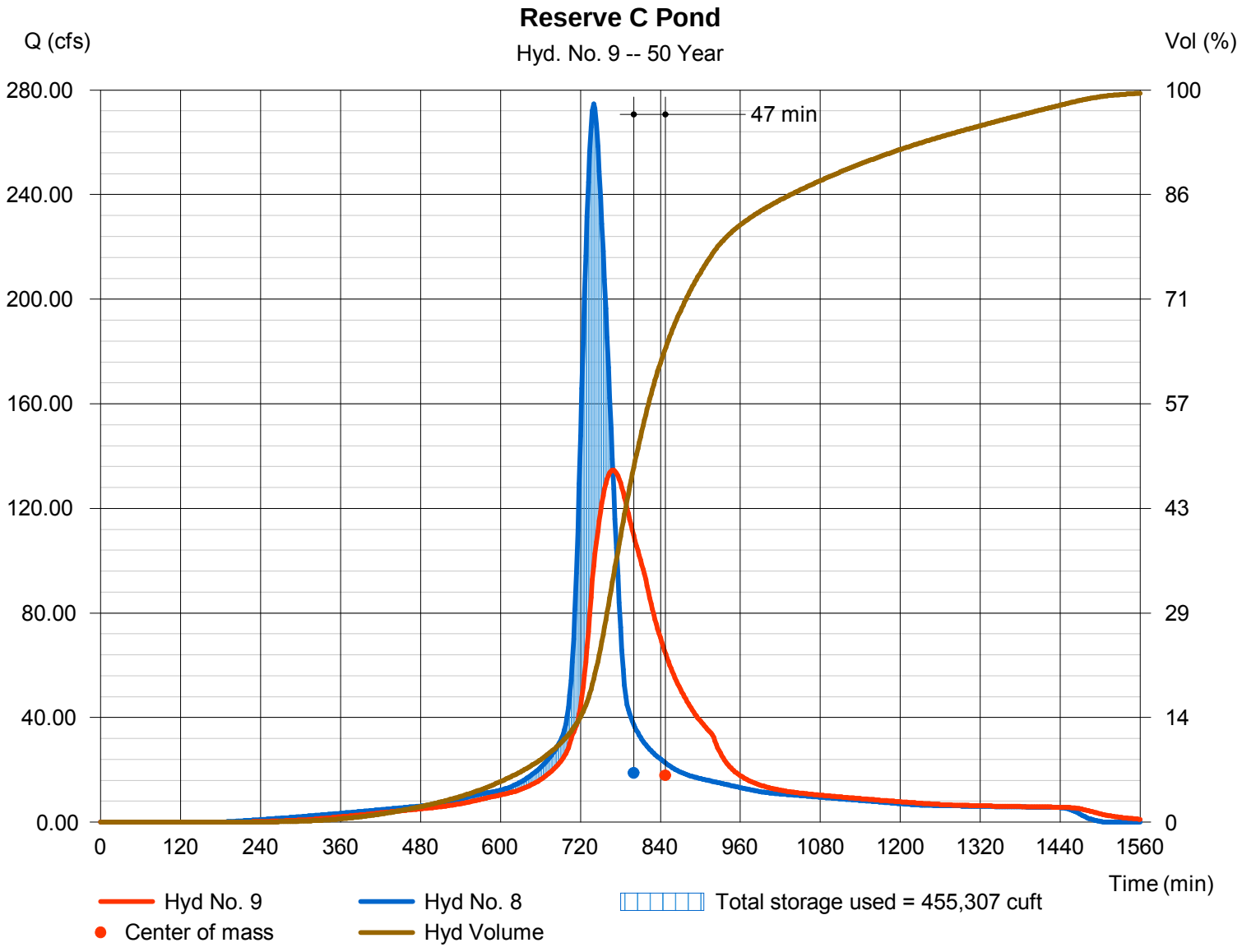
Hydrograph Report

Hyd. No. 9

Reserve C Pond

Hydrograph type	= Reservoir	Peak discharge	= 134.62 cfs
Storm frequency	= 50 yrs	Time to peak	= 768 min
Time interval	= 2 min	Hyd. volume	= 1,533,814 cuft
Inflow hyd. No.	= 8 - Developed - Basin 3	Max. Elevation	= 1340.54 ft
Reservoir name	= Reserve C Pond	Max. Storage	= 455,307 cuft

Storage Indication method used.

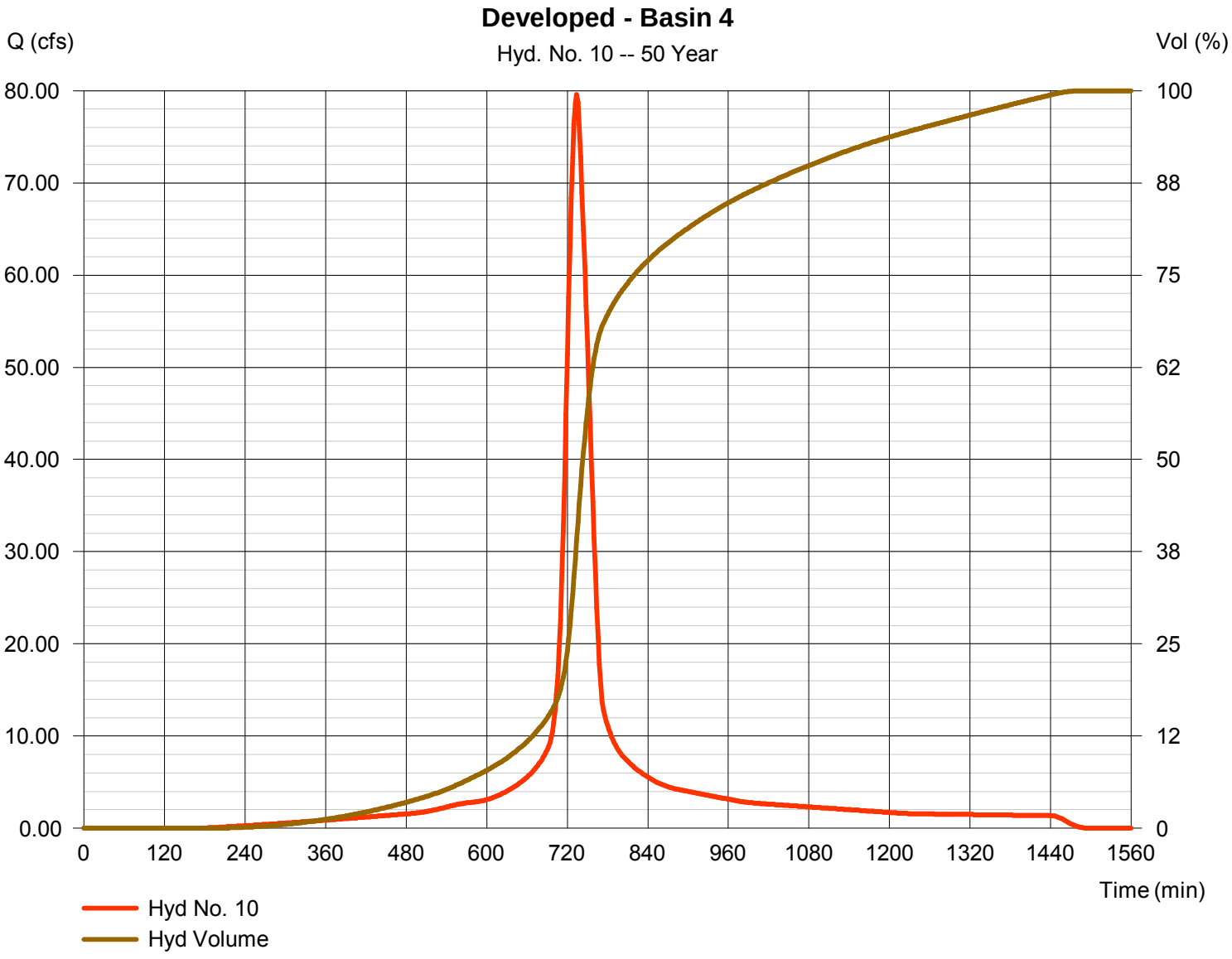


Hydrograph Report

Hyd. No. 10

Developed - Basin 4

Hydrograph type	= SCS Runoff	Peak discharge	= 79.57 cfs
Storm frequency	= 50 yrs	Time to peak	= 734 min
Time interval	= 2 min	Hyd. volume	= 377,273 cuft
Drainage area	= 18.000 ac	Curve number	= 91
Basin Slope	= 0.5 %	Hydraulic length	= 1200 ft
Tc method	= LAG	Time of conc. (Tc)	= 35.08 min
Total precip.	= 6.90 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



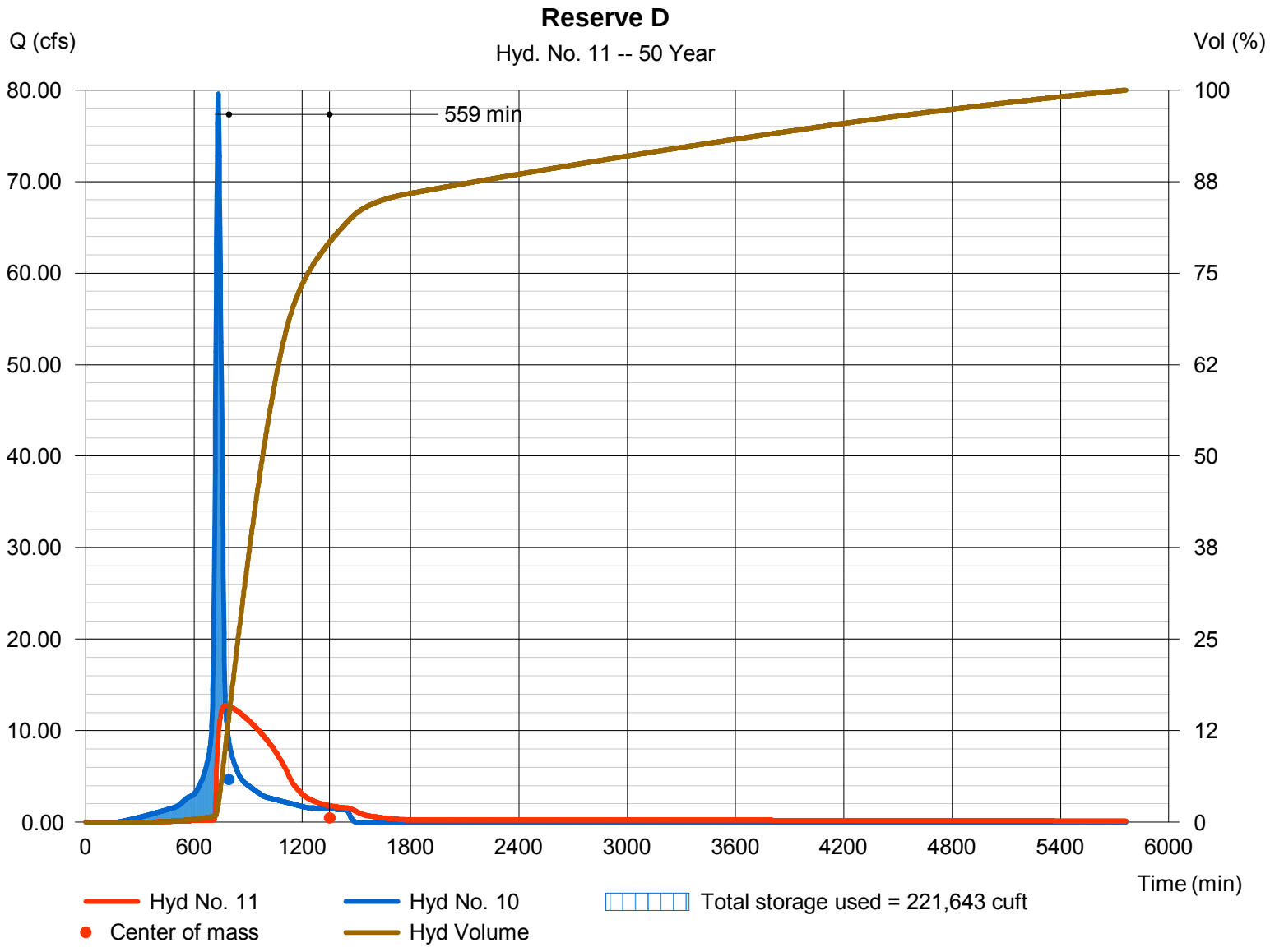
Hydrograph Report

Hyd. No. 11

Reserve D

Hydrograph type	= Reservoir	Peak discharge	= 12.76 cfs
Storm frequency	= 50 yrs	Time to peak	= 774 min
Time interval	= 2 min	Hyd. volume	= 355,902 cuft
Inflow hyd. No.	= 10 - Developed - Basin 4	Max. Elevation	= 1336.72 ft
Reservoir name	= Reserve D	Max. Storage	= 221,643 cuft

Storage Indication method used.



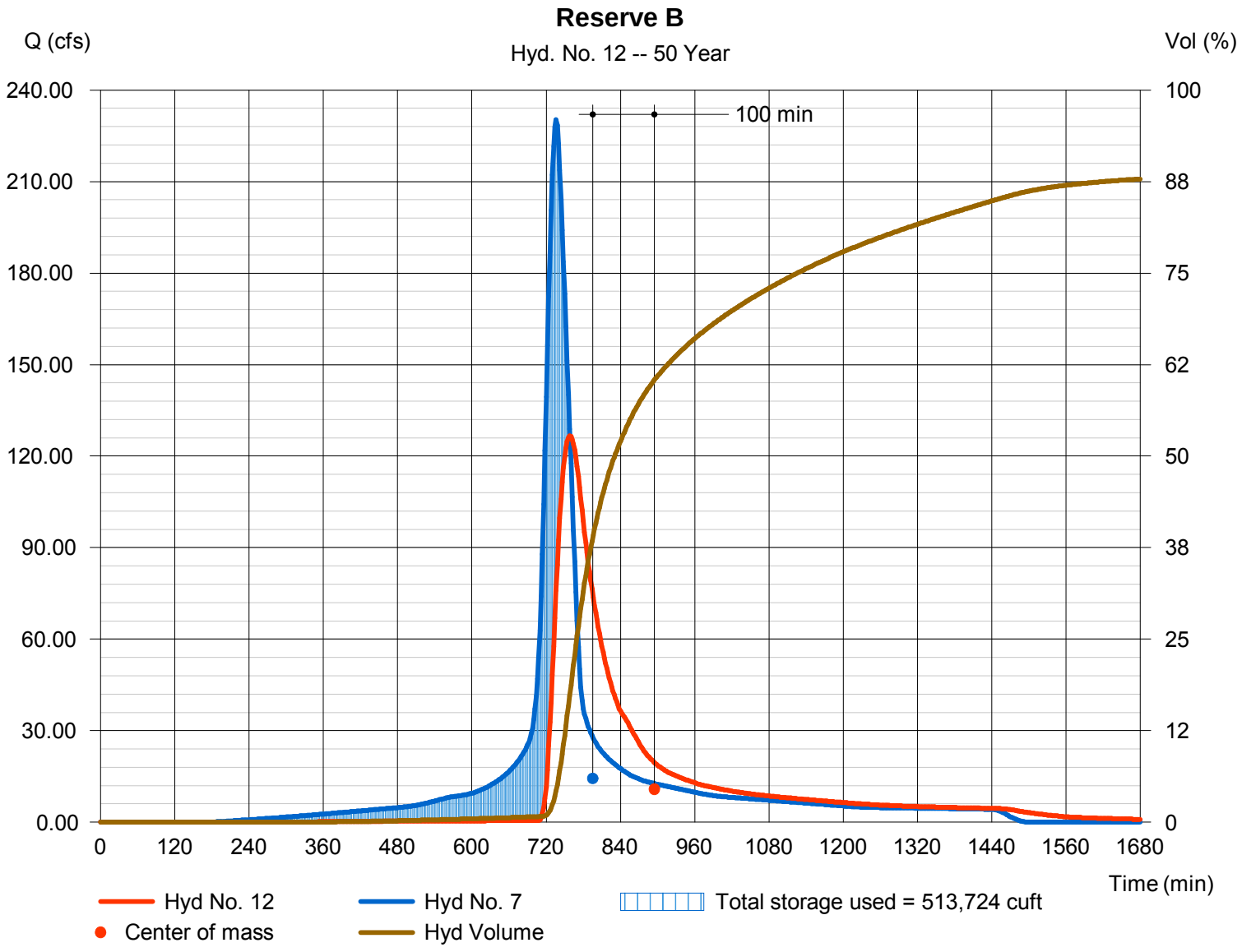
Hydrograph Report

Hyd. No. 12

Reserve B

Hydrograph type	= Reservoir	Peak discharge	= 126.59 cfs
Storm frequency	= 50 yrs	Time to peak	= 758 min
Time interval	= 2 min	Hyd. volume	= 1,087,986 cuft
Inflow hyd. No.	= 7 - Developed - Basin 2	Max. Elevation	= 1338.93 ft
Reservoir name	= Reserve B	Max. Storage	= 513,724 cuft

Storage Indication method used.

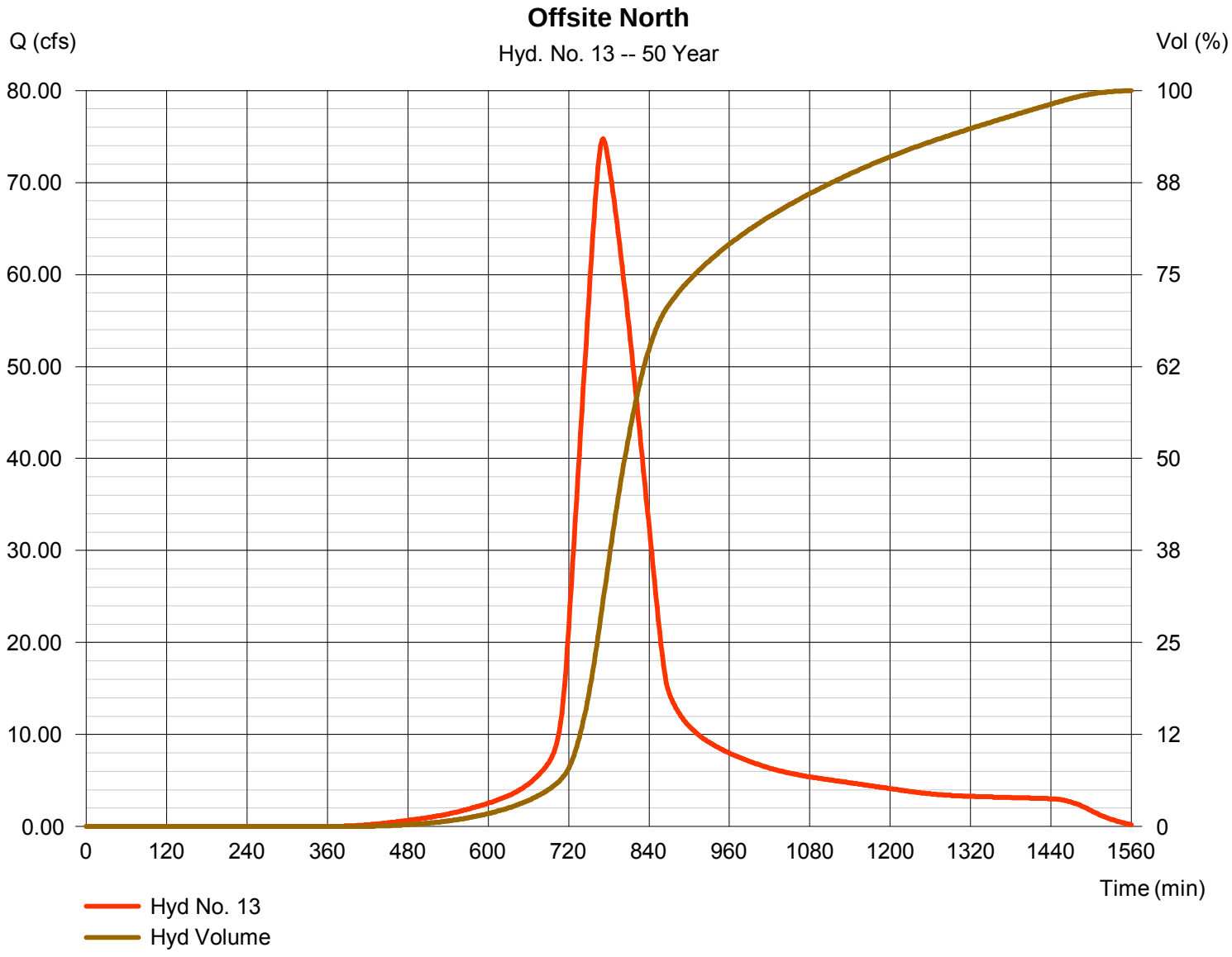


Hydrograph Report

Hyd. No. 13

Offsite North

Hydrograph type	= SCS Runoff	Peak discharge	= 74.73 cfs
Storm frequency	= 50 yrs	Time to peak	= 772 min
Time interval	= 2 min	Hyd. volume	= 682,001 cuft
Drainage area	= 41.000 ac	Curve number	= 80
Basin Slope	= 0.3 %	Hydraulic length	= 1800 ft
Tc method	= LAG	Time of conc. (Tc)	= 98.06 min
Total precip.	= 6.90 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8

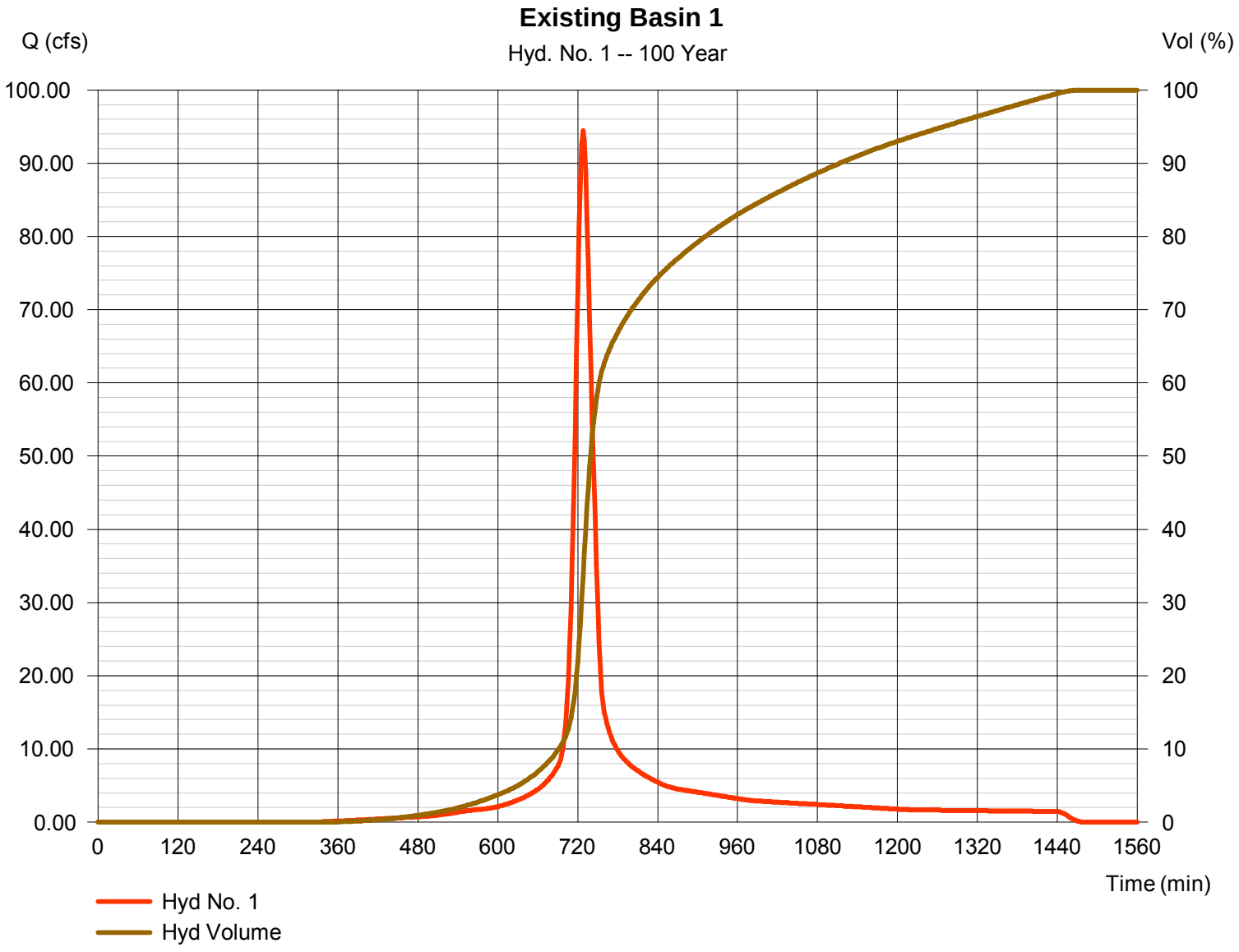
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	94.46	2	728	349,752	------	------	------	Existing Basin 1
2	SCS Runoff	167.79	2	748	1,085,648	------	------	------	Existing - Basin 2
3	SCS Runoff	206.09	2	752	1,431,945	------	------	------	Existing - Basin 3
4	SCS Runoff	42.35	2	752	294,235	------	------	------	Existing - Basin 4
5	SCS Runoff	131.35	2	724	439,545	------	------	------	Developed - Basin 1
6	Reservoir	37.84	2	742	429,211	5	1344.82	235,325	Reserve A Pond
7	SCS Runoff	263.49	2	736	1,343,053	------	------	------	Developed - Basin 2
8	SCS Runoff	314.22	2	740	1,766,682	------	------	------	Developed - Basin 3
9	Reservoir	152.71	2	768	1,766,676	8	1340.76	527,570	Reserve C Pond
10	SCS Runoff	91.01	2	734	434,550	------	------	------	Developed - Basin 4
11	Reservoir	13.88	2	776	413,056	10	1337.20	256,555	Reserve D
12	Reservoir	152.61	2	758	1,264,749	7	1339.31	563,628	Reserve B
13	SCS Runoff	88.14	2	772	805,813	------	------	------	Offsite North

Hydrograph Report

Hyd. No. 1

Existing Basin 1

Hydrograph type	= SCS Runoff	Peak discharge	= 94.46 cfs
Storm frequency	= 100 yrs	Time to peak	= 728 min
Time interval	= 2 min	Hyd. volume	= 349,752 cuft
Drainage area	= 18.000 ac	Curve number	= 80
Basin Slope	= 0.7 %	Hydraulic length	= 600 ft
Tc method	= LAG	Time of conc. (Tc)	= 25.29 min
Total precip.	= 7.80 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

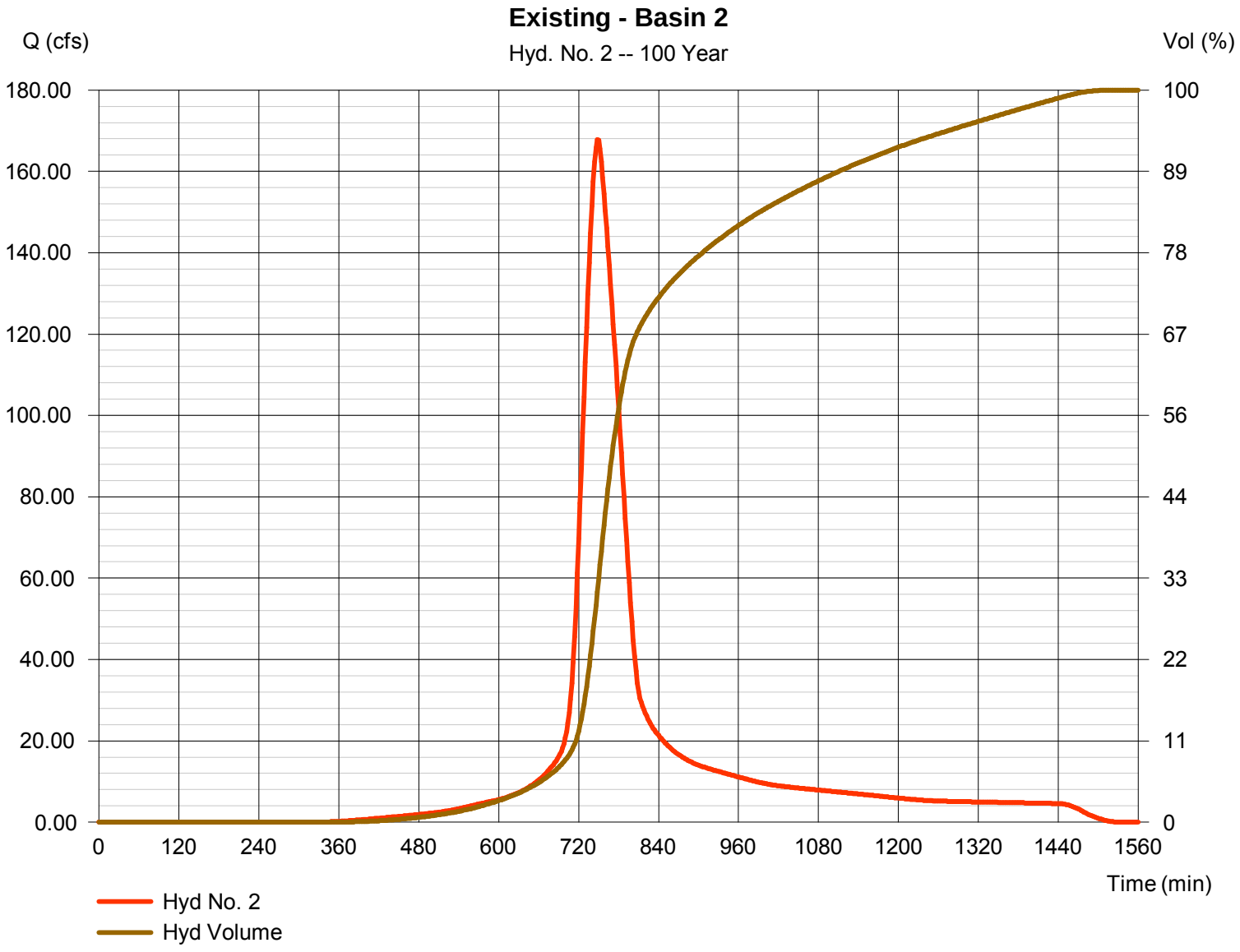


Hydrograph Report

Hyd. No. 2

Existing - Basin 2

Hydrograph type	= SCS Runoff	Peak discharge	= 167.79 cfs
Storm frequency	= 100 yrs	Time to peak	= 748 min
Time interval	= 2 min	Hyd. volume	= 1,085,648 cuft
Drainage area	= 55.000 ac	Curve number	= 80
Basin Slope	= 0.6 %	Hydraulic length	= 1600 ft
Tc method	= LAG	Time of conc. (Tc)	= 59.87 min
Total precip.	= 7.80 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

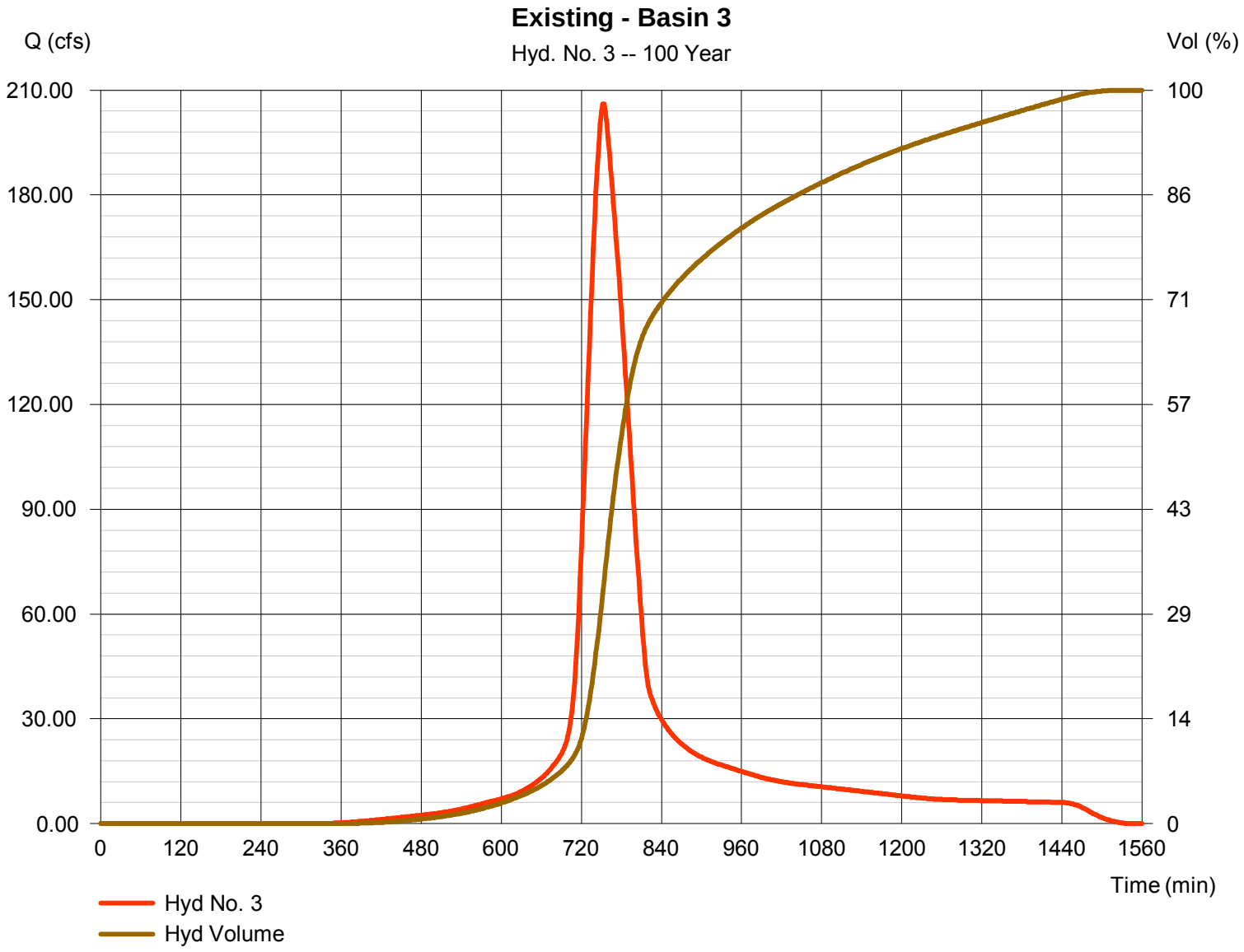


Hydrograph Report

Hyd. No. 3

Existing - Basin 3

Hydrograph type	= SCS Runoff	Peak discharge	= 206.09 cfs
Storm frequency	= 100 yrs	Time to peak	= 752 min
Time interval	= 2 min	Hyd. volume	= 1,431,945 cuft
Drainage area	= 73.000 ac	Curve number	= 80
Basin Slope	= 0.6 %	Hydraulic length	= 1800 ft
Tc method	= LAG	Time of conc. (Tc)	= 65.78 min
Total precip.	= 7.80 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

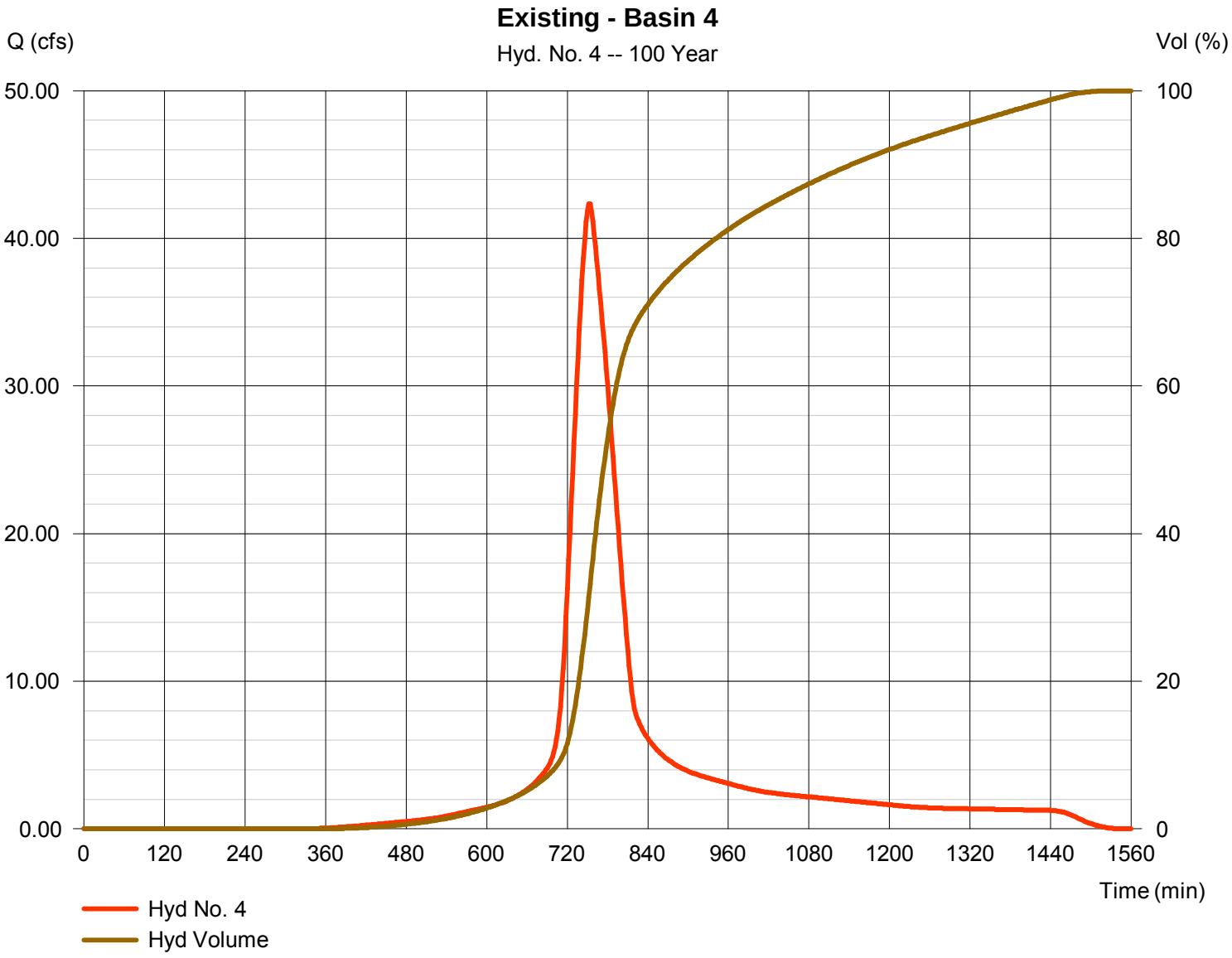


Hydrograph Report

Hyd. No. 4

Existing - Basin 4

Hydrograph type	= SCS Runoff	Peak discharge	= 42.35 cfs
Storm frequency	= 100 yrs	Time to peak	= 752 min
Time interval	= 2 min	Hyd. volume	= 294,235 cuft
Drainage area	= 15.000 ac	Curve number	= 80
Basin Slope	= 0.4 %	Hydraulic length	= 1400 ft
Tc method	= LAG	Time of conc. (Tc)	= 65.89 min
Total precip.	= 7.80 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

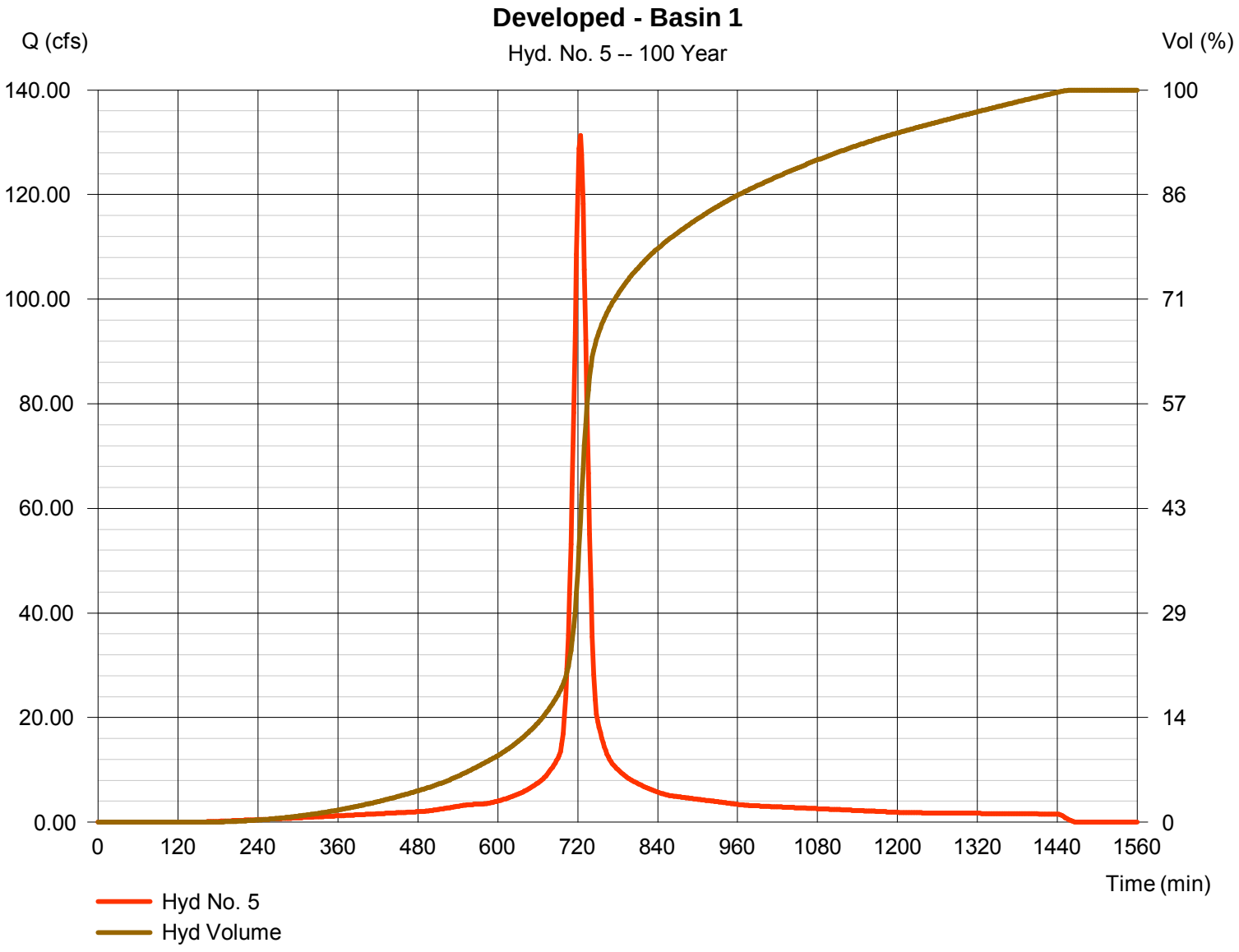


Hydrograph Report

Hyd. No. 5

Developed - Basin 1

Hydrograph type	= SCS Runoff	Peak discharge	= 131.35 cfs
Storm frequency	= 100 yrs	Time to peak	= 724 min
Time interval	= 2 min	Hyd. volume	= 439,545 cuft
Drainage area	= 18.000 ac	Curve number	= 91
Basin Slope	= 0.5 %	Hydraulic length	= 500 ft
Tc method	= LAG	Time of conc. (Tc)	= 17.41 min
Total precip.	= 7.80 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



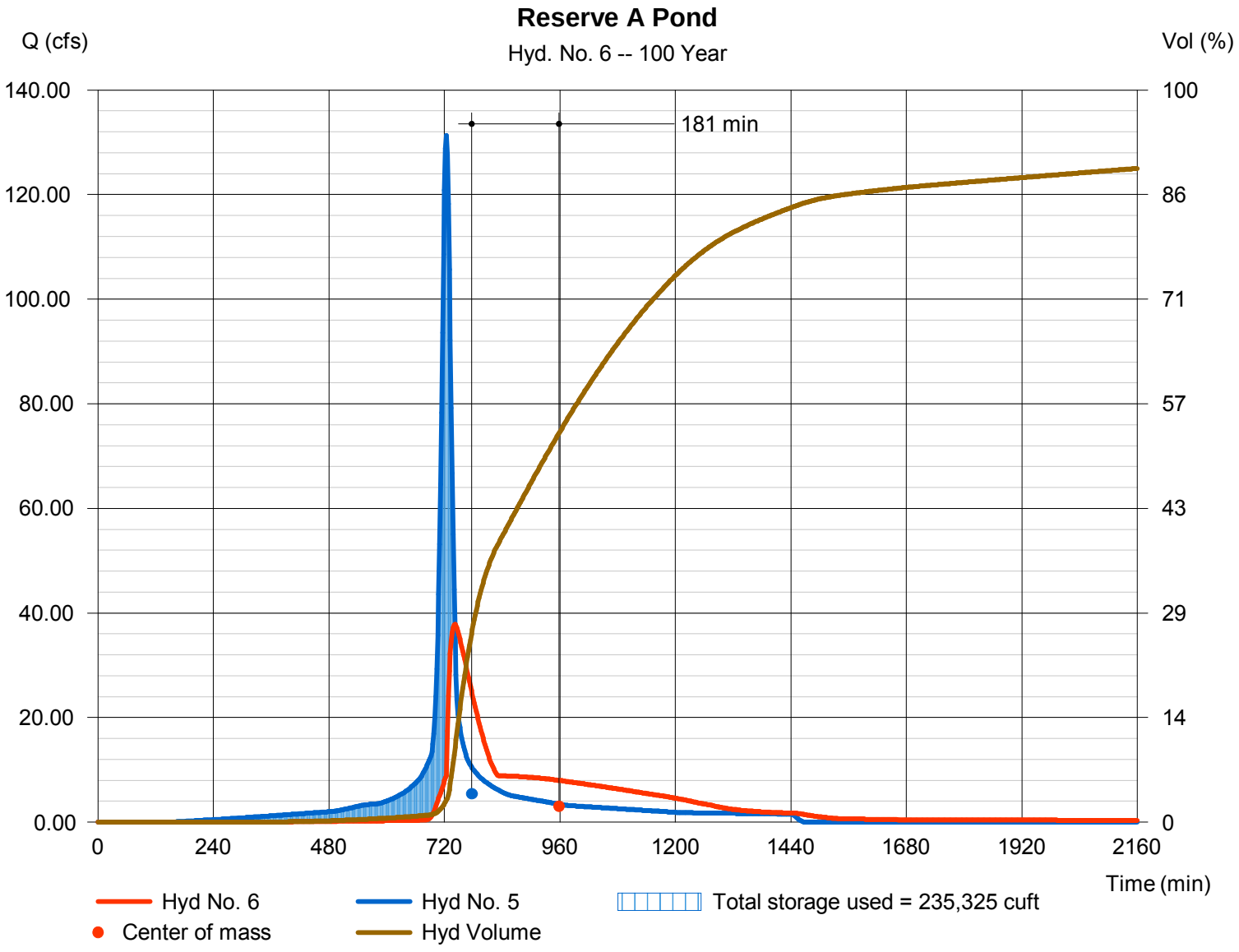
Hydrograph Report

Hyd. No. 6

Reserve A Pond

Hydrograph type	= Reservoir	Peak discharge	= 37.84 cfs
Storm frequency	= 100 yrs	Time to peak	= 742 min
Time interval	= 2 min	Hyd. volume	= 429,211 cuft
Inflow hyd. No.	= 5 - Developed - Basin 1	Max. Elevation	= 1344.82 ft
Reservoir name	= Reserve A	Max. Storage	= 235,325 cuft

Storage Indication method used.

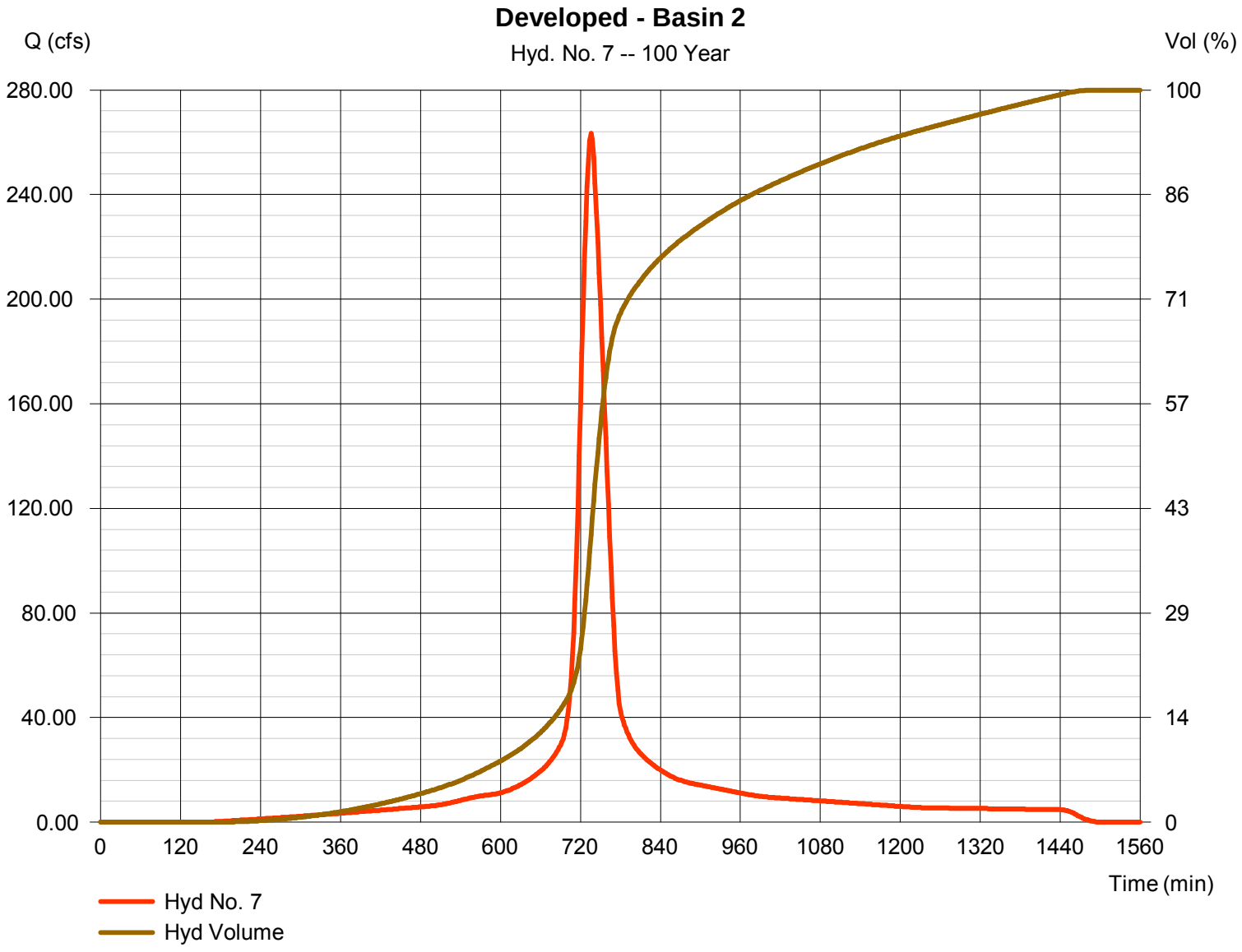


Hydrograph Report

Hyd. No. 7

Developed - Basin 2

Hydrograph type	= SCS Runoff	Peak discharge	= 263.49 cfs
Storm frequency	= 100 yrs	Time to peak	= 736 min
Time interval	= 2 min	Hyd. volume	= 1,343,053 cuft
Drainage area	= 55.000 ac	Curve number	= 91
Basin Slope	= 0.6 %	Hydraulic length	= 1600 ft
Tc method	= LAG	Time of conc. (Tc)	= 40.31 min
Total precip.	= 7.80 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

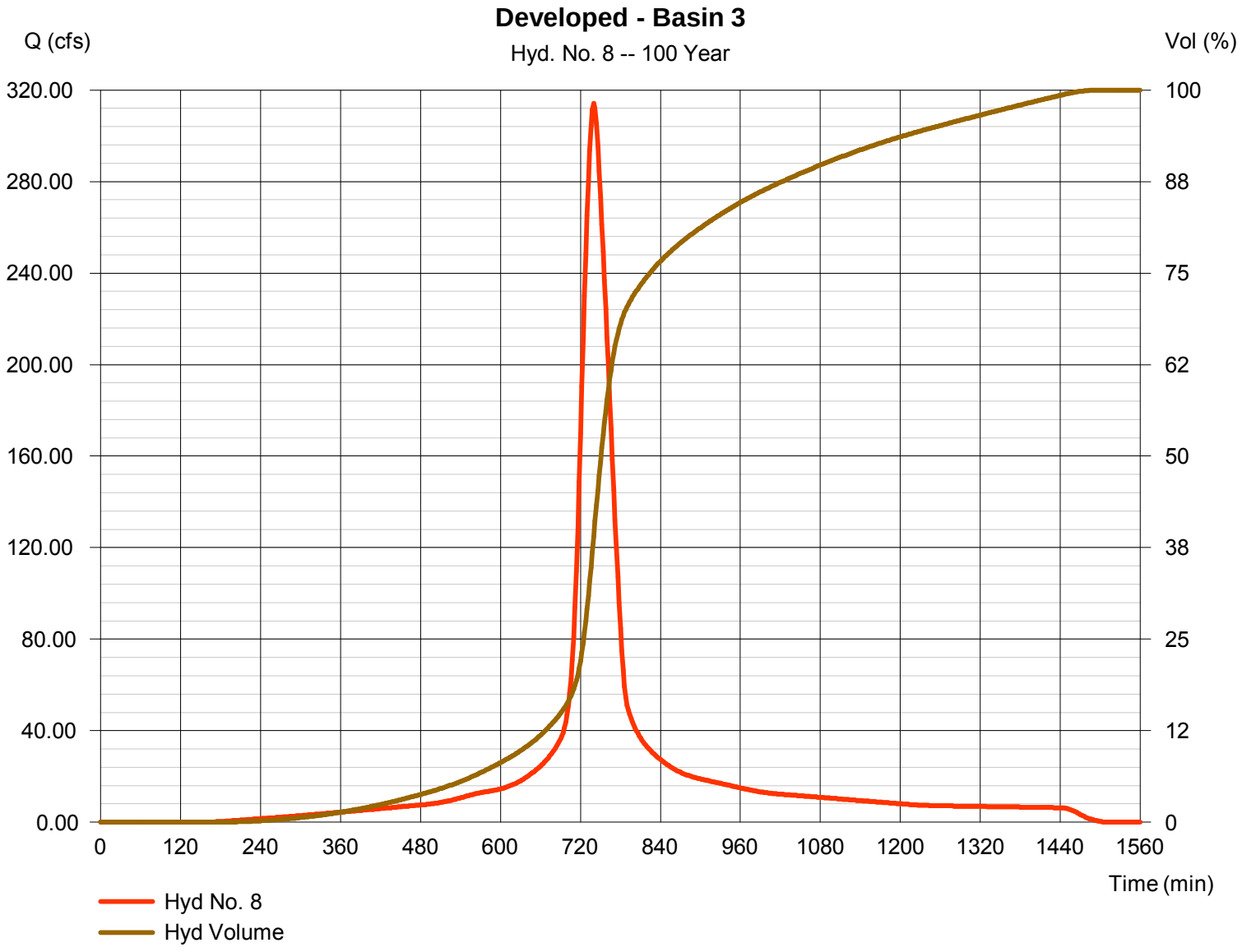


Hydrograph Report

Hyd. No. 8

Developed - Basin 3

Hydrograph type	= SCS Runoff	Peak discharge	= 314.22 cfs
Storm frequency	= 100 yrs	Time to peak	= 740 min
Time interval	= 2 min	Hyd. volume	= 1,766,682 cuft
Drainage area	= 73.000 ac	Curve number	= 91
Basin Slope	= 0.5 %	Hydraulic length	= 1600 ft
Tc method	= LAG	Time of conc. (Tc)	= 44.15 min
Total precip.	= 7.80 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



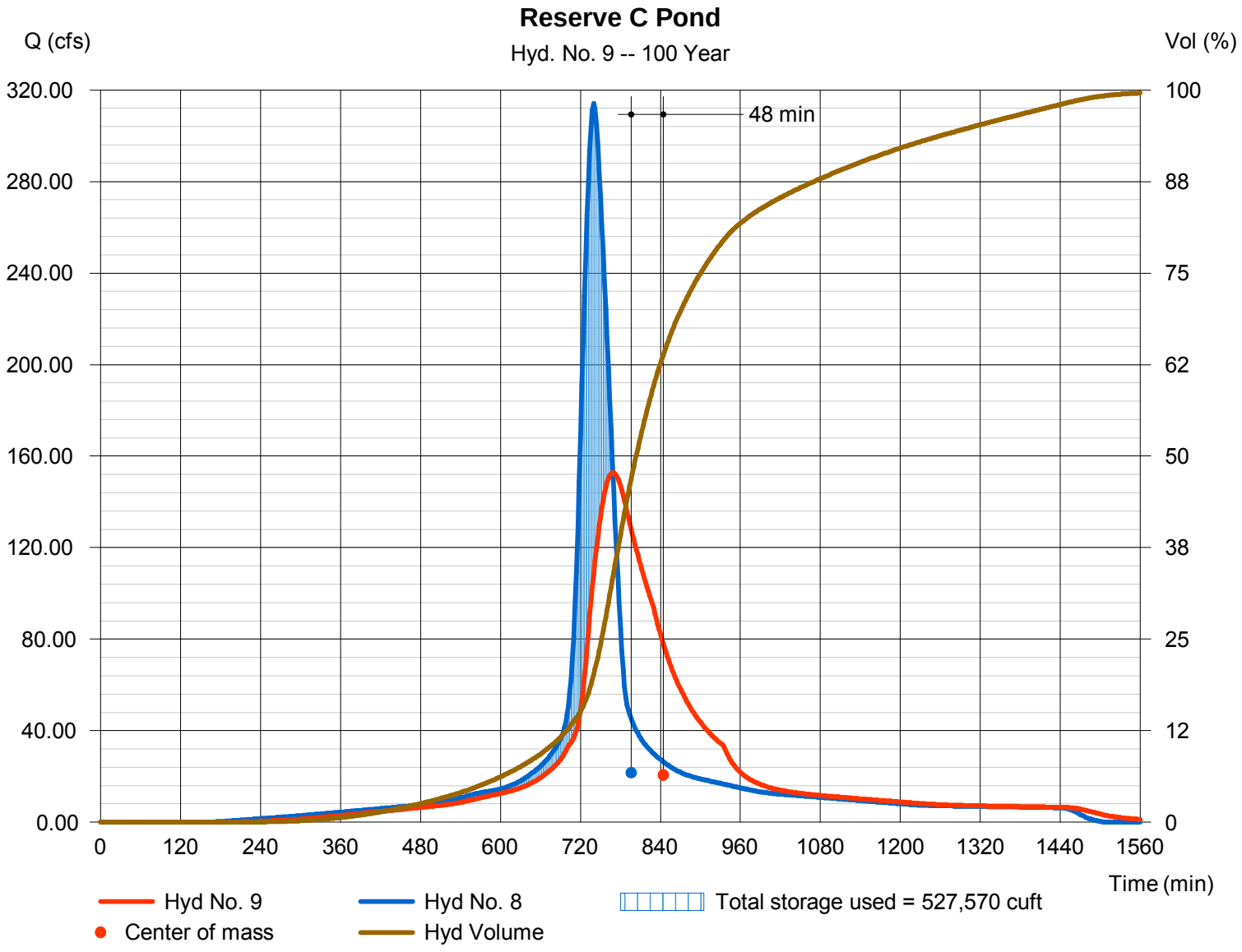
Hydrograph Report

Hyd. No. 9

Reserve C Pond

Hydrograph type	= Reservoir	Peak discharge	= 152.71 cfs
Storm frequency	= 100 yrs	Time to peak	= 768 min
Time interval	= 2 min	Hyd. volume	= 1,766,676 cuft
Inflow hyd. No.	= 8 - Developed - Basin 3	Max. Elevation	= 1340.76 ft
Reservoir name	= Reserve C Pond	Max. Storage	= 527,570 cuft

Storage Indication method used.

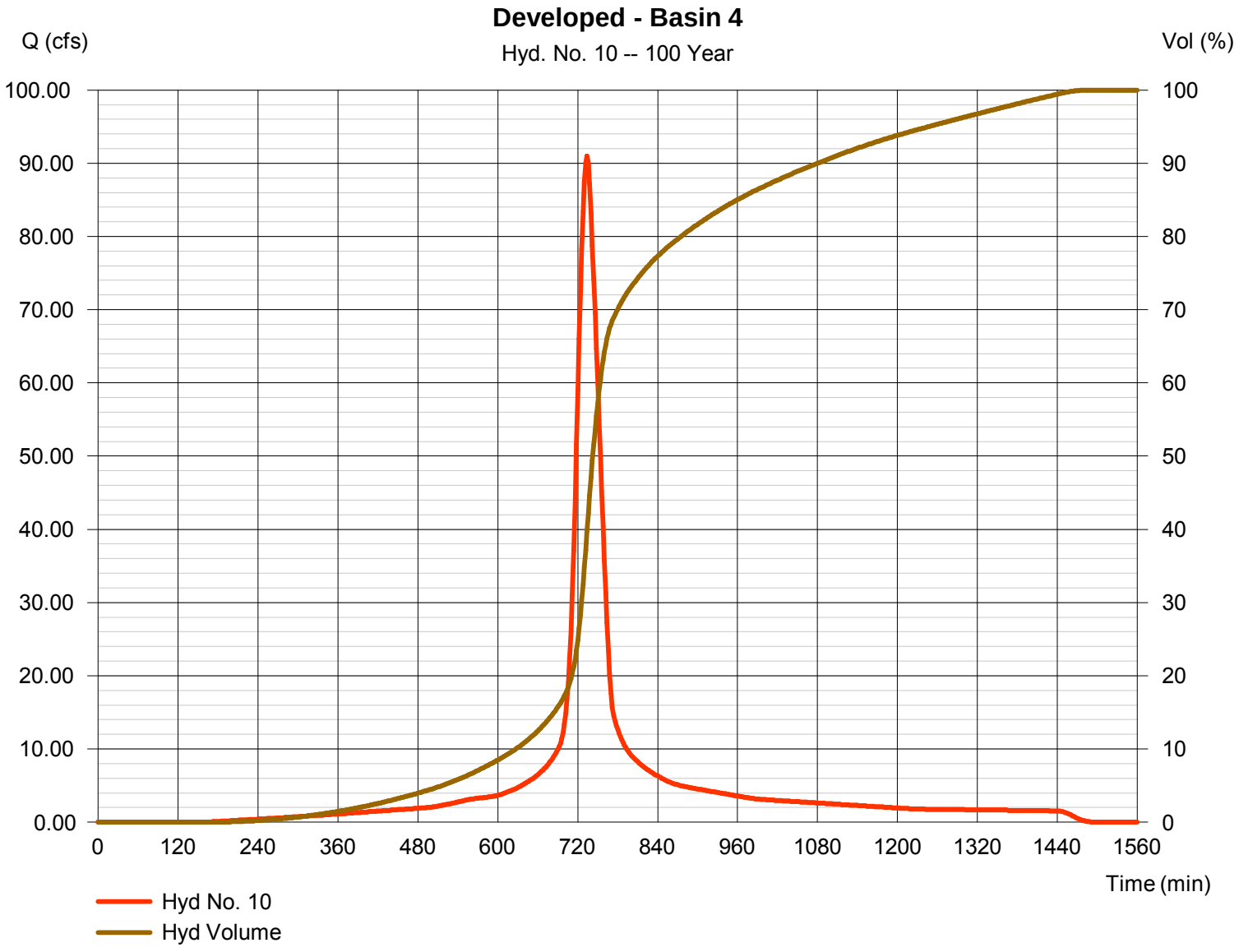


Hydrograph Report

Hyd. No. 10

Developed - Basin 4

Hydrograph type	= SCS Runoff	Peak discharge	= 91.01 cfs
Storm frequency	= 100 yrs	Time to peak	= 734 min
Time interval	= 2 min	Hyd. volume	= 434,550 cuft
Drainage area	= 18.000 ac	Curve number	= 91
Basin Slope	= 0.5 %	Hydraulic length	= 1200 ft
Tc method	= LAG	Time of conc. (Tc)	= 35.08 min
Total precip.	= 7.80 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



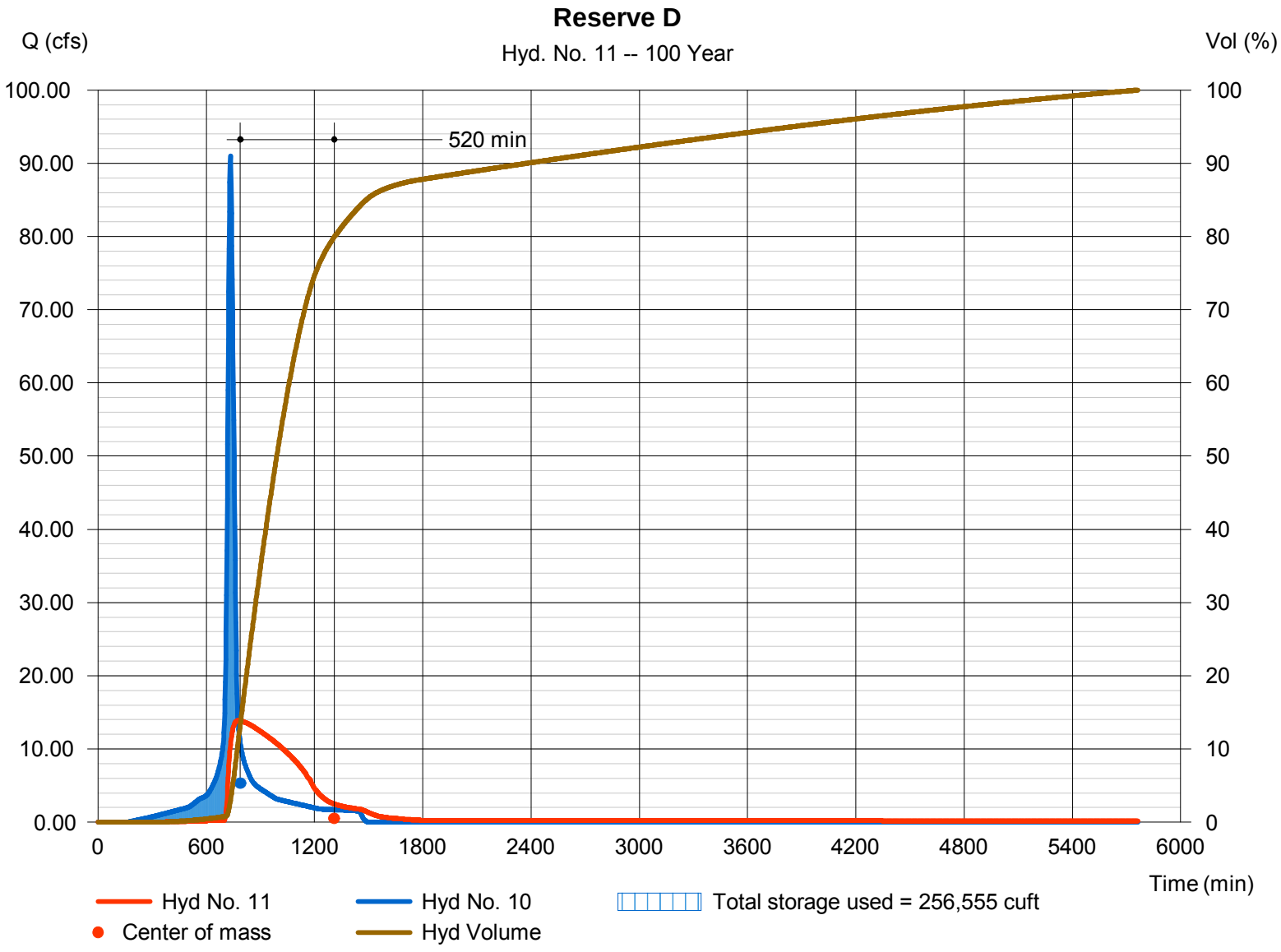
Hydrograph Report

Hyd. No. 11

Reserve D

Hydrograph type	= Reservoir	Peak discharge	= 13.88 cfs
Storm frequency	= 100 yrs	Time to peak	= 776 min
Time interval	= 2 min	Hyd. volume	= 413,056 cuft
Inflow hyd. No.	= 10 - Developed - Basin 4	Max. Elevation	= 1337.20 ft
Reservoir name	= Reserve D	Max. Storage	= 256,555 cuft

Storage Indication method used.



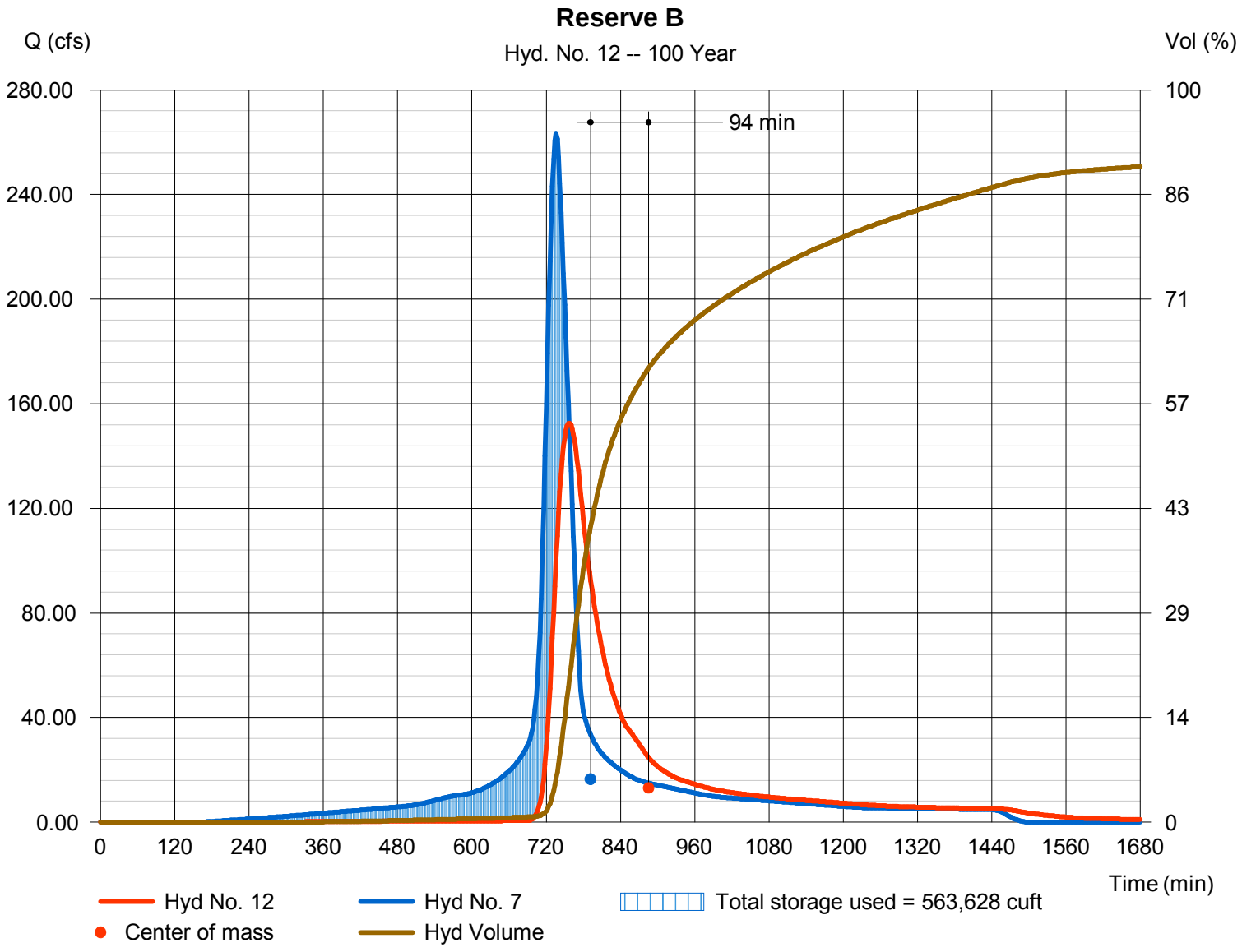
Hydrograph Report

Hyd. No. 12

Reserve B

Hydrograph type	= Reservoir	Peak discharge	= 152.61 cfs
Storm frequency	= 100 yrs	Time to peak	= 758 min
Time interval	= 2 min	Hyd. volume	= 1,264,749 cuft
Inflow hyd. No.	= 7 - Developed - Basin 2	Max. Elevation	= 1339.31 ft
Reservoir name	= Reserve B	Max. Storage	= 563,628 cuft

Storage Indication method used.

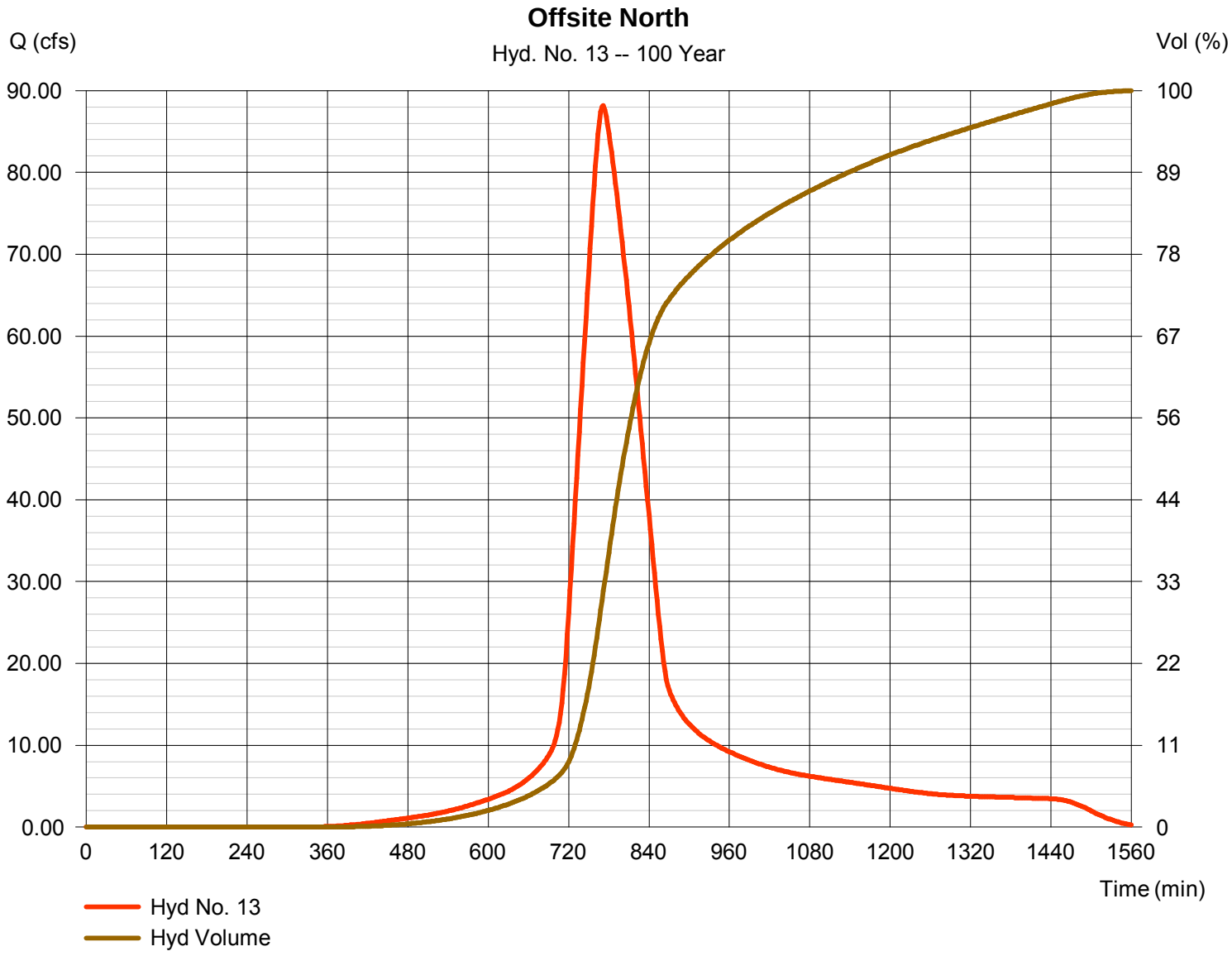


Hydrograph Report

Hyd. No. 13

Offsite North

Hydrograph type	= SCS Runoff	Peak discharge	= 88.14 cfs
Storm frequency	= 100 yrs	Time to peak	= 772 min
Time interval	= 2 min	Hyd. volume	= 805,813 cuft
Drainage area	= 41.000 ac	Curve number	= 80
Basin Slope	= 0.3 %	Hydraulic length	= 1800 ft
Tc method	= LAG	Time of conc. (Tc)	= 98.06 min
Total precip.	= 7.80 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydraflow Rainfall Report

Return Period (Yrs)	Intensity-Duration-Frequency Equation Coefficients (FHA)			
	B	D	E	(N/A)
1	27.8967	9.8000	0.7047	--------
2	76.3137	14.3000	0.8844	--------
3	1.2000	0.1000	0.0000	--------
5	52.6224	11.2000	0.7497	--------
10	55.1841	11.1000	0.7229	--------
25	60.7012	11.1000	0.7068	--------
50	66.9222	11.3000	0.7004	--------
100	62.2794	10.1000	0.6624	--------

File name: wich_IDF.IDF

Intensity = B / (Tc + D)^E

Return Period (Yrs)	Intensity Values (in/hr)											
	5 min	10	15	20	25	30	35	40	45	50	55	60
1	4.18	3.40	2.90	2.55	2.29	2.08	1.91	1.78	1.66	1.56	1.48	1.40
2	5.57	4.54	3.85	3.35	2.97	2.67	2.43	2.23	2.06	1.92	1.80	1.69
3	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20
5	6.52	5.33	4.55	3.99	3.57	3.24	2.97	2.75	2.57	2.41	2.27	2.15
10	7.40	6.09	5.22	4.60	4.13	3.76	3.46	3.21	3.00	2.82	2.67	2.53
25	8.51	7.03	6.05	5.35	4.81	4.39	4.05	3.76	3.52	3.32	3.14	2.98
50	9.47	7.86	6.78	6.00	5.41	4.94	4.56	4.24	3.98	3.75	3.55	3.37
100	10.31	8.53	7.37	6.53	5.90	5.40	5.00	4.66	4.37	4.13	3.92	3.73

Tc = time in minutes. Values may exceed 60.

Precip. file name: wich_24hr.pcp

Storm Distribution	Rainfall Precipitation Table (in)							
	1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr
SCS 24-hour	2.80	3.50	1.20	4.50	5.20	6.10	6.90	7.80
SCS 6-Hr	0.00	1.80	0.00	0.00	2.60	0.00	0.00	4.00
Huff-1st	0.00	1.55	0.00	2.75	4.00	5.38	6.50	8.00
Huff-2nd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-3rd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-4th	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-Indy	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Custom	0.00	1.75	0.00	2.80	3.90	5.25	6.00	7.10

Hydraflow Table of Contents

Total Site.gpw

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8 Monday, Dec 19, 2011

Drainage Plan

1:150 Scale