DRAINAGE PLAN

NORTH GREENWICH ADDITION

TO

WICHITA, SEDGWICK COUNTY, KANSAS

PREPARED BY

Baughman
ENGINEERING | SURVEYING | PLANNING
LANDSCAPE ARCHITECTURE

15 JANUARY 2009

ENGINEERING | SURVEYING | PLANNING
LANDSCAPE ARCHITECTURE

DRAINAGE PLAN
NORTH GREENWICH ADDITION

FINAL REPORT

Prepared by Baughman Company, P.A.
15 January 2009

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

REPORT CONTENTS

EXISTING CONDITIONS

The site is located between 29th Street North and 37th Street North along the east side of Greenwich Road in Wichita, Sedgwick County, Kansas. The site is approximately 30 acres and is agricultural farmland and open space. The site is accessed directly off of Greenwich Road. The site drains from the southwest corner to the northeast corner of the property. The site slopes approximately 1.5% from these points and ultimately drains to the northeast and into a Zone A FEMA Floodplain Boundary along a creek.

There is a small amount of offsite runoff encroaching the property from the south from 3 different locations. These areas account for approximately 11.8 acres and appear to be shallow concentrated flow.

The site location is depicted on the USGS Quadrangle Sheet as Exhibit 1. The aerial photograph with existing topography can be seen as Exhibit 2.

There is no FEMA SFHA located on this property as of this report.

PROPOSED CONDITIONS

The proposed site is anticipated to be developed into a school site with associated parking, athletic fields, and utilities. The sites runoff is expected to continue to flow to the northeast corner and onto the adjacent property. There will be a detention pond located within the property at the northeast corner of the property. The detention pond will detain developed runoff from this site, and discharge to the offsite adjacent property as it does today. Internal storm water sewers and ditch sections, where applicable, are expected throughout the site to convey the developed runoff to the detention area.

There is no FEMA SFHA located on this property as of this report.

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

OFFSITE CONDITIONS

As stated earlier, there is approximately 11.8 acres total encroaching the site from the south. This offsite runoff occurs at three different locations along the south line. It appears that the runoff is shallow concentrated flow upon entering the site as no defined channel is apparent. There is a ditch section along the Greenwich ROW which conveys ROW runoff to the north and into the tributary to the north. There is also FEMA Zone A Floodplain located just offsite to the north which this sites runoff ultimately flows.

The proposed site will continue to discharge, after proposed detention, to the adjacent property to the north and into the same channel or swale section. Offsite ditching may be required to obtain positive flow to the tributary.

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.

- Ø STORM SERIES
  - 24-hour; 2-yr, 5-yr, 10-yr, 25-yr, 100-yr Storm Events Modeled
  - 2-yr Rainfall Depth = 3.5 in
  - 5-yr Rainfall Depth = 4.5 in
  - 10-yr Rainfall Depth = 5.3 in
  - 25-yr Rainfall Depth = 6.1 in
  - 100-yr Rainfall Depth = 7.9 in

- Ø FLOW DATA
  - Existing Conditions runoff utilizing SCS Curve Number Method
  - Areas per USGS Quadrangle Sheet, Aerial Photos, and Site Visits
  - SCS Curve Number Method used for all flows
  - SCS CN = 80 (Type C &D Soils, Row Crops and Open Space)
  - Time of Concentration: Lag Method (15 min minimum)

SITE CHARACTERISTICS

The site is currently agricultural farmland and open space. The site slopes to the northeast corner of the site at approximately 1.5%. The site is bounded to the west by Greenwich Road and to the south by a single family home. The north and east boundaries consist of agricultural farmland and open space. There is a tributary located offsite to the north which ultimately drains this site as well as surrounding property. The tributary is located within a FEMA SFHA Zone A.
The Aerial Exhibit can be seen as Exhibit 2.

EXISTING CONDITIONS HYDROLOGIC ANALYSIS

The site was analyzed for pre-development conditions using the SCS Curve Number Method for the 2, 5, 10, 25, and 100-year storm events. The curve number used, 80, was based on open space as well agricultural row crops in Type C & D soils. The time of concentration was calculated using the Lag Method with a minimum time of concentration of 15 minutes. The offsite runoff from the south was calculated using the same methods described above.

DOWNSTREAM DRAINAGE CAPACITY

The site ultimately drains to the north and into the tributary, located approximately 1000 feet to the north. The site drains across the adjacent agricultural farmland and into the tributary. The downstream tributary appears to drain approximately 1600 acres of undeveloped area.

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.

Ø STORM SERIES
- 24-hour; 2-yr, 5-yr, 10-yr, 25-yr, 100-yr Storm Events Modeled
- HydraFlow Hydrographs software for existing flows
- SCS Curve Number Method; CN = 98 (Impervious Areas)
- SCS Curve Number Method; CN = 75 (Open Space / Parks)
- Time of Concentration; Lag method, minimum Tc = 15min

Ø GRADING CONSTRAINTS
- Match grades along site perimeter
- Convey offsite runoff to the detention area
- Emergency Overflows for 24-hr, 100-yr Storm Event

DETENTION FACILITIES

There is a proposed detention area located near the northeast corner of the property. This area will be located in a drainage easement and will likely be used as detention as well as for athletic fields or playground areas. The detention facility will be dry, with a grassed bottom and 5:1 sideslopes, where applicable. The bottom of the detention pond will have at least a 1% slope to drain to the outlet structure, a 42" RCP. The proposed structure will outlet offsite, to the north, and into the adjacent channel/swale. We expect some minor offsite ditching/channelization to ensure positive flow to the tributary.
The dry detention area is described in more detail below.

Ø PROPOSED POND

The proposed pond will have a bottom elevation of a 1368 and will have a primary outlet as a 42" RCP at the same elevation. The ponds bottom will then slope up to a 1373 top elevation at a 1% slope. This will allow the grass bottomed storage area to effectively drain to the outlets end section. The 42" RCP will convey developed runoff to the north and into an improved channel section and into the north tributary. The detention area will have a 100-year water surface elevation of a 1372.4. This area is also expected to be used for athletic fields and/or playground equipment. The size and location of the area will be located in an easement and may change shape and location upon development. However, the overall storage volume will need to remain equivalent to the as-shown area herein.

DETENTION SUMMARY

As stated earlier, detention will be provided on-site and will consist of a dry detention pond. The proposed detention will limit the developed runoff to less than or equal to the existing conditions. The following tables represents the pond systems inflow and outflow for the 24-hour, 100-yr storm event.

POND

POND	INFLOW	OUTFLOW	100-yr WSE	OUTLET
Existing	146 cfs	357 cfs	1372.4	42" RCP

*The total inflow and outflow accounts for the undeveloped offsite runoff from the south adjacent property

DISCHARGE POINTS SUMMARY

The site primarily discharges its runoff at the northeast corner via detention facility with an outlet pipe. The site currently discharges at this point and flows into a channel/swale section. This sites runoff, along with adjacent runoff and offsite runoff, then flows north and into the tributary. The tributary is natural and meanders from the west to the east. The tributary is also located in a FEMA SFHA Zone A.

We expect minor re-grading or re-ditching to allow positive slope to the tributary. This re-grading will be done offsite and will need the permission from the adjacent owners to the north.

POTENTIAL UPSTREAM/DOWNSTREAM IMPACTS

There does not appear to be any negative impact with the development of this property. The site will detain its developed runoff before discharging to the north. Re-grading is expected on the property to the north. The runoff will continue to flow to the adjacent tributary and is not expected to have any negative impact to the property to the north.

The offsite flow from the south is expected to be conveyed, on the proposed property, via a grass lined channel. This channel is expected to run along the south and east property lines and discharge directly into the proposed detention area. The channel will be sized to accommodate the 100-year runoff. Due to the acceptance of all the adjacent runoff from the south, no negative impacts upstream are expected with this development.

SOURCE OF FLOODPLAIN INFORMATION

There is no FEMA SFHA located on this property as of this report. The location of the property, on FEMA FIRM Panel 377 of 700 for Sedgwick County, Kansas, effective date February 2, 2007 is attached as Exhibit 5.

FEDERAL, STATE, & LOCAL PERMITTING

US ARMY CORPS OF ENGINEERS
We do not expect any USACOE permitting at this time.

KANSAS DEPT OF AGRICULTURE – DWR PERMITTING
We do not expect any DWR permitting at this time.

FEMA
No FEMA SFHA exists on this property and we do not expect any FEMA permitting at this time.

KANSAS DEPT OF TRANSPORTATION
There does not appear to be any KDOT permitting needed on the proposed project.

SEDGWICK COUNTY ROW
We do not expect any Sedgwick County permits at this time.

EXHIBIT 1: Site Location Map

EXHIBIT 2: Aerial Photo Exhibit with Topography

EXHIBIT 3: Plat – Half Scale

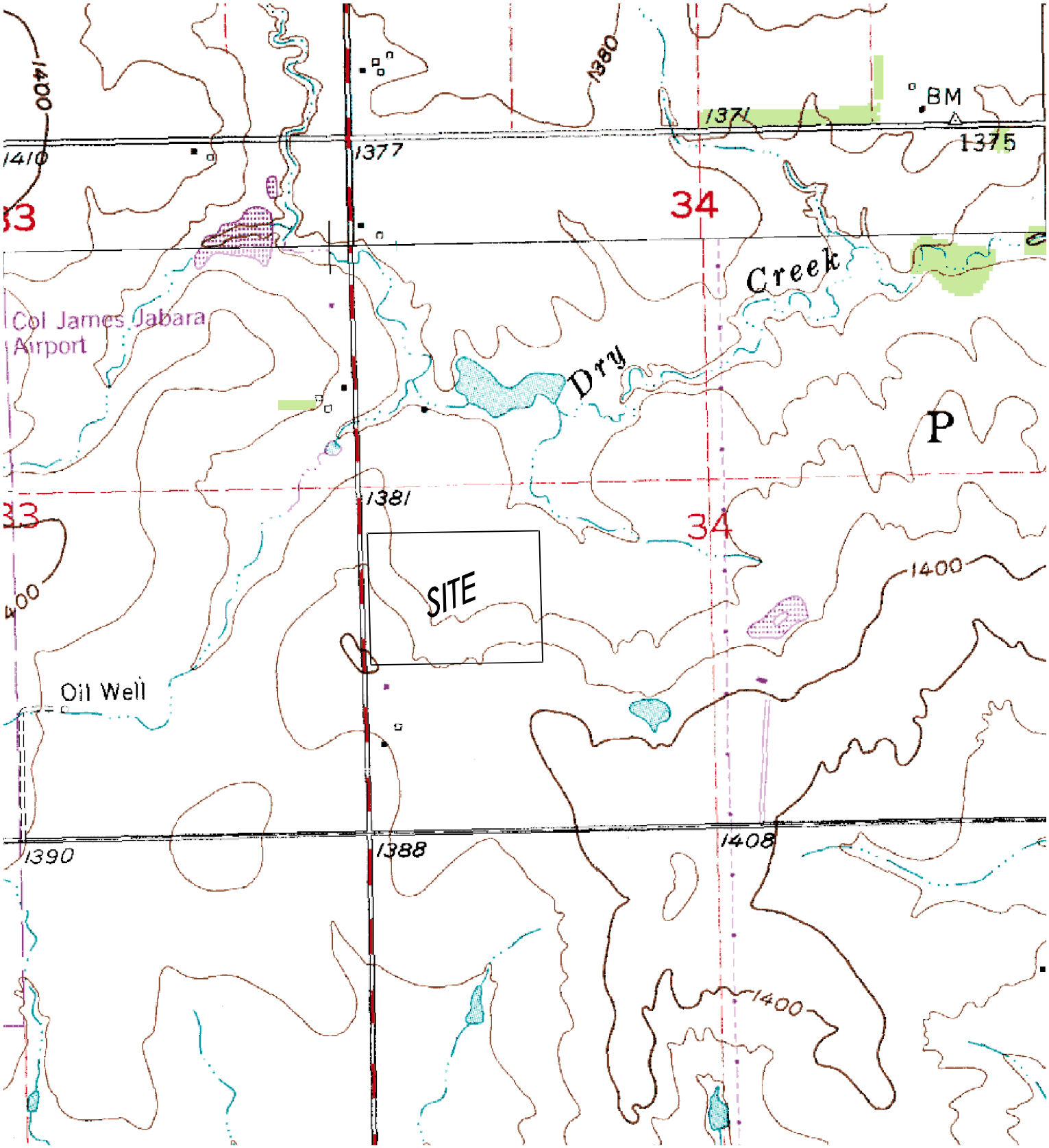
EXHIBIT 4: Drainage & Grading Plan – Half Scale

EXHIBIT 5: Floodplain Location (FIRM)

SITE LOCATION EXHIBIT

NORTH GREENWICH ADDITION

WICHITA, SEDGWICK COUNTY, KANSAS



0 500 1000

DATE OF PREPARATION: 16 JAN 2009

EXHIBIT 1
NORTH GREENWICH ADDITION
16 JAN 2009

Baughman Company , P.A.
315 Ellis St. Wichita, KS 67211 P 316-262-7271 F 3162620149
Baughman ENGINEERING | SURVEYING | PLANNING | LANDSCAPE ARCHITECTURE

AERIAL EXHIBIT

NORTH GREENWICH ADDITION

WICHITA, SEDGWICK COUNTY, KANSAS

0 250 500

DATE OF PREPARATION: 16 JAN 2009

EXHIBIT 2
NORTH GREENWICH ADDITION
16 JAN 2009

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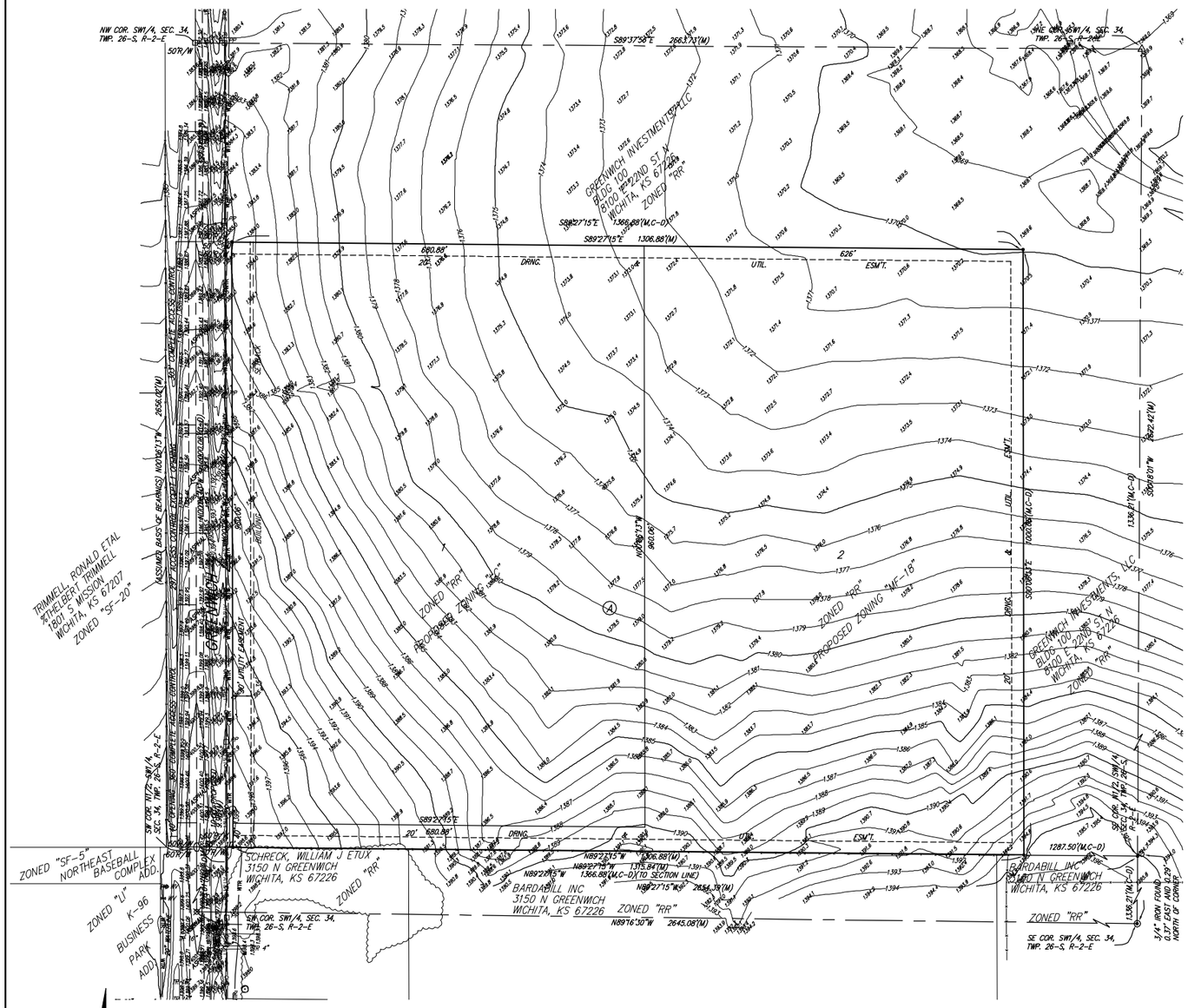
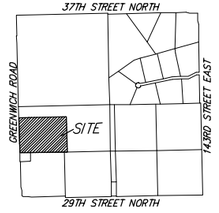
315 Ellis St. Wichita, KS 67211 P 316-262-7271 F 3162620149
Baughman ENGINEERING | SURVEYING | PLANNING | LANDSCAPE ARCHITECTURE

ONE-STEP FINAL PLAT

NORTH GREENWICH ADDITION

WICHITA, SEDGWICK COUNTY, KANSAS





VICINITY MAP
SEC. 34, T26S, R2E

0 100 200

DATE OF PREPARATION: 12 JANUARY 2009
DATE OF TOPOGRAPHY: 12 DECEMBER 2008
CONTOUR INTERVALS = 1 FOOT

PP ☐ = Power Pole
FH ○- = Fire Hydrant
WV ⋈ = Water Valve

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.

GREENWICH INVESTMENTS, LLC
8100 E 22ND ST N
BLDG. 1000
WICHITA, KS 67226
316-648-7300

BENCHMARK:
RR SPIKE IN ASPHALT SW COR. N1/2, SW1/4, SEC. 34, TWP.26-S, R-2-E
ELEV. = 1400.59 NAVD88

RR SPIKE IN EAST FACE OF POWER POLE 174'± NORTH AND 10' WEST OF SW COR OF PLAT
ELEV. = 1398.64 NAVD88

NOTE:
ADDITIONAL BUILDING SETBACK REQUIREMENTS AND RESTRICTIONS PER NORTH GREENWICH DEVELOPMENT COMMUNITY UNIT PLAN DP-316.

• = #4 REBAR W/ "BAUGHMAN" CAP (SET)
⊛ = #5 REBAR OVER STONE (FOUND)
⊠ = 3/4" IRON IN THIMBLE (FOUND)
○ = 3/4" IRON (FOUND)
□ = #6 REBAR (FOUND)
⋈ = 1/2" IRON (FOUND)
() = RAILROAD SPIKE (FOUND)
△ = STONE (FOUND)

(M) = MEASURED
(C-D) = CALCULATED PER DESCRIBED
(R) = RECORD

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 "NORTH GREENWICH ADDITION", Wichita, Sedgwick County, Kansas and that the accompanying plat is a true and correct exhibit of the property surveyed, described as the south 1000.00 feet of the west 1366.80 feet of the N1/2 of the SW1/4 of Sec. 34, Twp. 26-S, R-2-E of the 6th P.M., Sedgwick County, Kansas, subject to road rights-of-way of record.

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 certificate to be platted into Lots, a Block, and Streets, to be known as "NORTH GREENWICH 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 streets are hereby dedicated to and for the use of the public. 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.

Greenwich Investments, LLC
a Kansas limited liability company

Ritchie Associates, Inc., Manager

_____, Vice-President
Rob Ramseyer

State of Kansas) SS
Sedgwick County)

The foregoing instrument acknowledged before me, this____day of_____, 2009, by Rob Ramseyer, Vice-President of Ritchie Associates, Inc., as Manager of Greenwich Investments, LLC, a Kansas limited liabilty company, on behalf of the corporation.

_____ Notary Public

My App't. Exp. _____

We the undersigned holders of a mortgage on the above described property, do hereby consent to this plat of "NORTH GREENWICH ADDITION", Wichita, Sedgwick County, Kansas.

INTRUST Bank, N.A.

_____, _____
(Title)

State of Kansas)
Sedgwick County) SS

The foregoing instrument acknowledged before me, this____day of_____, 2009, by_____, _____of INTRUST Bank, N.A., on behalf of the bank.
(Title)

_____, Notary Public

My App't. Exp._____

This plat of "NORTH GREENWICH 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 _____, 2009.
Wichita-Sedgwick County Metropolitan Area Planning Commission

_____, Chair
Darrell Downing

_____, 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 _____, 2009.

_____, Mayor
Carl Brewer

_____, City Clerk
Karen Sublett

Reviewed in accordance with K.S.A. 58-2005 on this_____day of _____, 2009.

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

Entered on transfer record this_____day of _____, 2009.

_____, County Clerk
Kelly Arnold

State of Kansas)
Sedgwick County) SS

This is to certify that this plat has been filed for record in the office of the Register of Deeds, this____day of_____, 2009 at_____o'clock__M; and is duly recorded.

_____, Register of Deeds
Bill Meek

_____, Deputy
Tonya Buckingham

NORTH GREENWICH ADDITION

12 JANUARY 2009

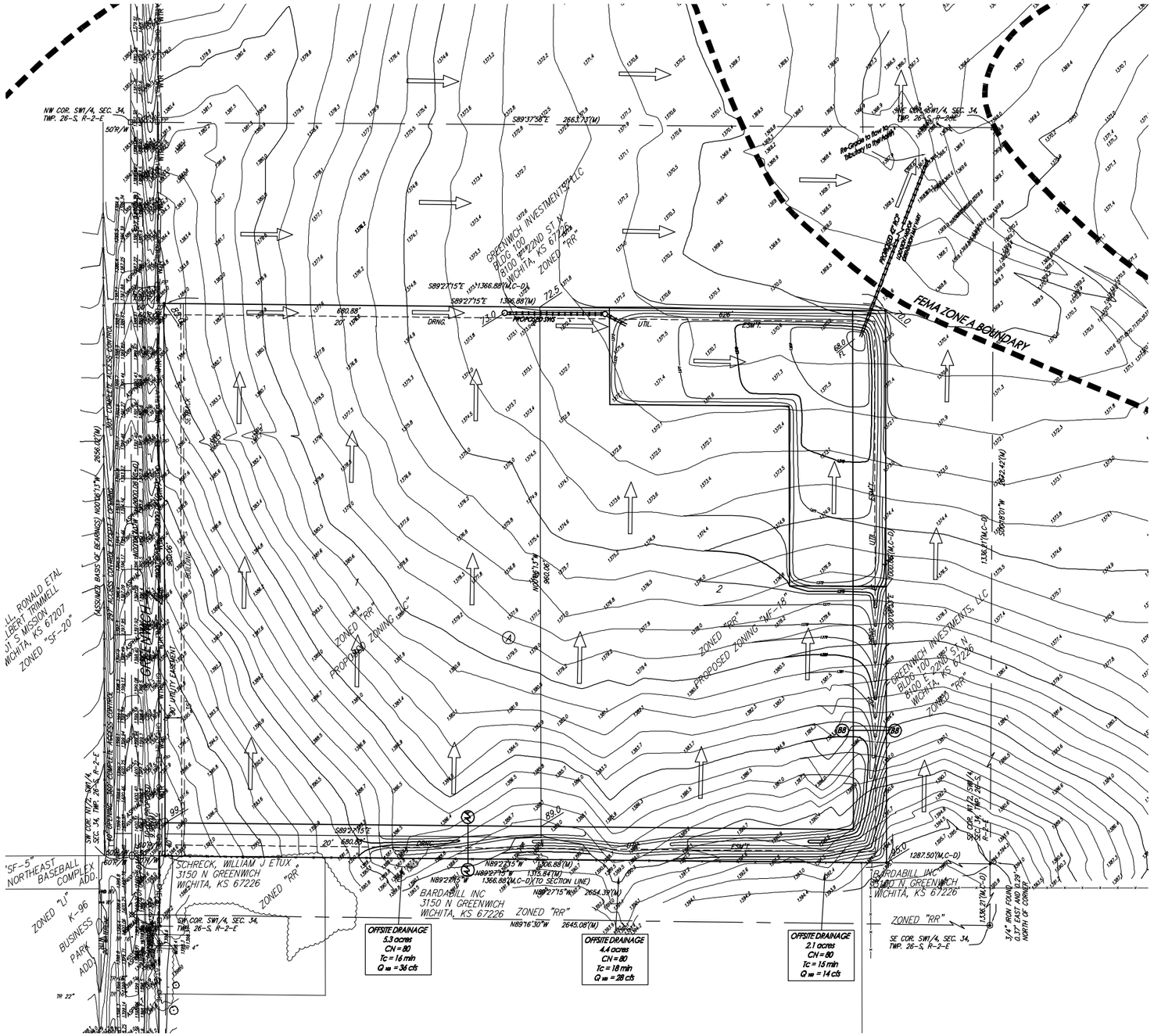
Baughman Company, P.A.
315 Ellis St. Wichita, KS 67211 P 316-262-7271 F 316-262-0149
ENGINEERING | SURVEYING | PLANNING | LANDSCAPE ARCHITECTURE

F:/PLAT/ / DWG-RKR

DRAINAGE & GRADING PLAN

NORTH GREENWICH ADDITION

WICHITA, SEDGWICK COUNTY, KANSAS



EXISTING
DA = 41.3
Tc = 55 min
CN = 75
Q 2 = 30 cfs
Q 5 = 49 cfs
Q 10 = 65 cfs
Q 25 = 81 cfs
Q 100 = 120 cfs
These flow values also include 11.8 acres of offsite flow.

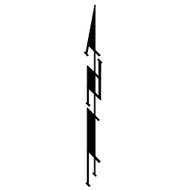
DEVELOPED	DEVELOPED
DA = 8 acres	DA = 32 acres
Tc = 20 min	Tc = 42 min
CN = 98	CN = 75
IMPERVIOUS	PERVIOUS
Q 2 = 27 cfs	Q 2 = 29 cfs
Q 5 = 35 cfs	Q 5 = 46 cfs
Q 10 = 41 cfs	Q 10 = 61 cfs
Q 25 = 47 cfs	Q 25 = 76 cfs
Q 100 = 62 cfs	Q 100 = 113 cfs
These flow values are for developed area of rooftop/pavement.	These flow values are for areas of athletic fields and undeveloped offsite flow

PROPOSED DRY DETENTION (Bottom = 1368.0)

STAGE	INFLOW	OUTFLOW	ELEVATION
2 yr	45 cfs	27 cfs	1370.10
5 yr	66 cfs	36 cfs	1370.70
100 yr	146 cfs	57 cfs	1372.40

PROPOSED POND

ELEVATION	AREA (sq ft)
1368	1000
1369	17500
1370	45000
1371	78000
1372	122000
1373	125000



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8100 E 22ND ST N
BLDG. 1000
WICHITA, KS 67226
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BENCHMARK:
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RR SPIKE IN EAST FACE OF POWER POLE 174'± NORTH AND 10' WEST OF SW COR OF PLAT
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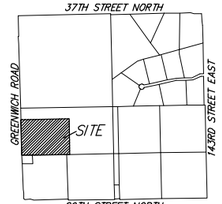


VICINITY MAP
SEC. 34, T26S, R2E

TYPICAL DETAIL — PROPOSED DITCH SECTION SOUTH LINE
AA
SLOPE = 0.5%
Grass lined
1391.0
1388.0
5:1 SS
5'
Capacity @ 1.0' = 59 cfs
Capacity @ 1.5' = 91 cfs
Capacity @ 2.0' = 130 cfs
NOT TO SCALE

TYPICAL DETAIL — PROPOSED DITCH SECTION EAST LINE
BB
SLOPE = 3%
Grass lined
1388.0
1385.0
5:1 SS
5'
Capacity @ 1.0' = 59 cfs
Capacity @ 1.5' = 91 cfs
Capacity @ 2.0' = 130 cfs
NOT TO SCALE

NOTE: There is no FEMA SFHA located on this property as of this report per FEMA FIRM Panel 377 of 700 for Sedgwick County, Kansas, effective February 2, 2007. The FEMA Zone A Boundary, located just offsite to the north and east is scaled per location per FEMA FIRM Panel 377.

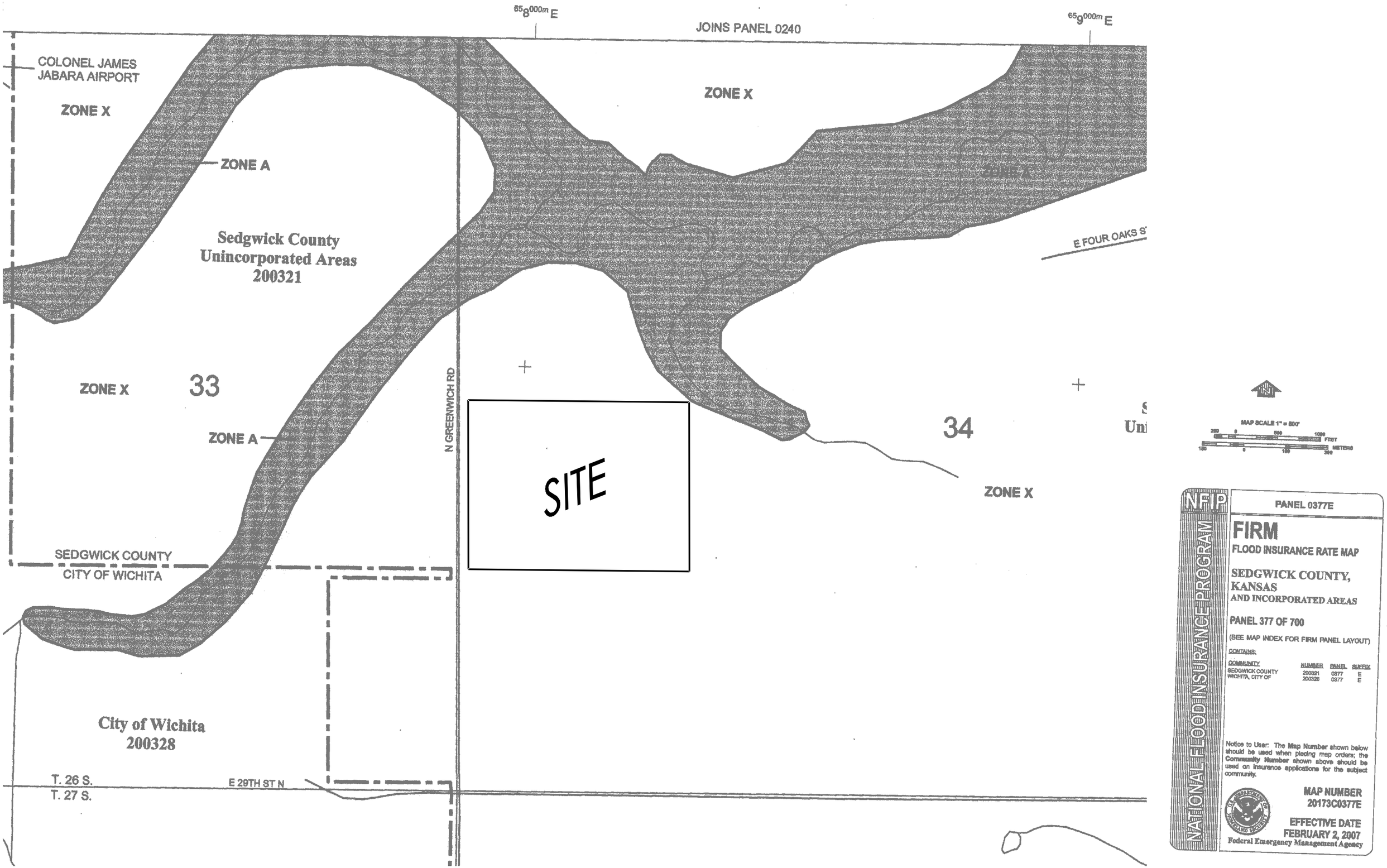
NOTE: The location of the proposed outlet is subject to change location and orientation based on final site plans. There will also be offsite grading to allow for positive drainage to the north and into the tributary. The pond orientation and shape may also change during final site plans - but will still provide equal stage-storage shown here.

DRAINAGE & GRADING PLAN
NORTH GREENWICH ADDITION

15 JANUARY 2009

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

I:\HYDRO\Projects\North Greenwich Development - Wichita\NORTH GREENWICH-#_drain-grade1.dwg



NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0377E

FIRM

FLOOD INSURANCE RATE MAP

SEDGWICK COUNTY, KANSAS
AND INCORPORATED AREAS

PANEL 377 OF 700

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
SEDGWICK COUNTY	200321	0377	E
WICHITA, CITY OF	200328	0377	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
20173C0377E

EFFECTIVE DATE
FEBRUARY 2, 2007

Federal Emergency Management Agency

APPENDIX A: USGS Soils Survey

APPENDIX B: HydraFlow Hydrographs
-Existing & Proposed Runoff / Detention Pond

APPENDIX C: HydraFlow Express
-Proposed South Channel Section

USGS Soils Survey

Hydrologic Soil Group—Sedgwick County, Kansas
(Greenwich Commercial)

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

- Oceans
- Streams and Canals

Transportation

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

MAP INFORMATION

Map Scale: 1:2,780 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 5, Dec 3, 2008

Date(s) aerial images were photographed: Data not available.

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				
Map unit symbol	**Map unit name**	**Rating**	**Acres in AOI**	**Percent of AOI**
3858	Goessel silty clay, 1 to 3 percent slopes	D	12.0	39.2%
3911	Rosehill silty clay, 1 to 3 percent slopes	D	0.1	0.5%
4570	Clime silty clay, 3 to 7 percent slopes	C	18.5	60.3%
Totals for Area of Interest			**30.6**	**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: Lower

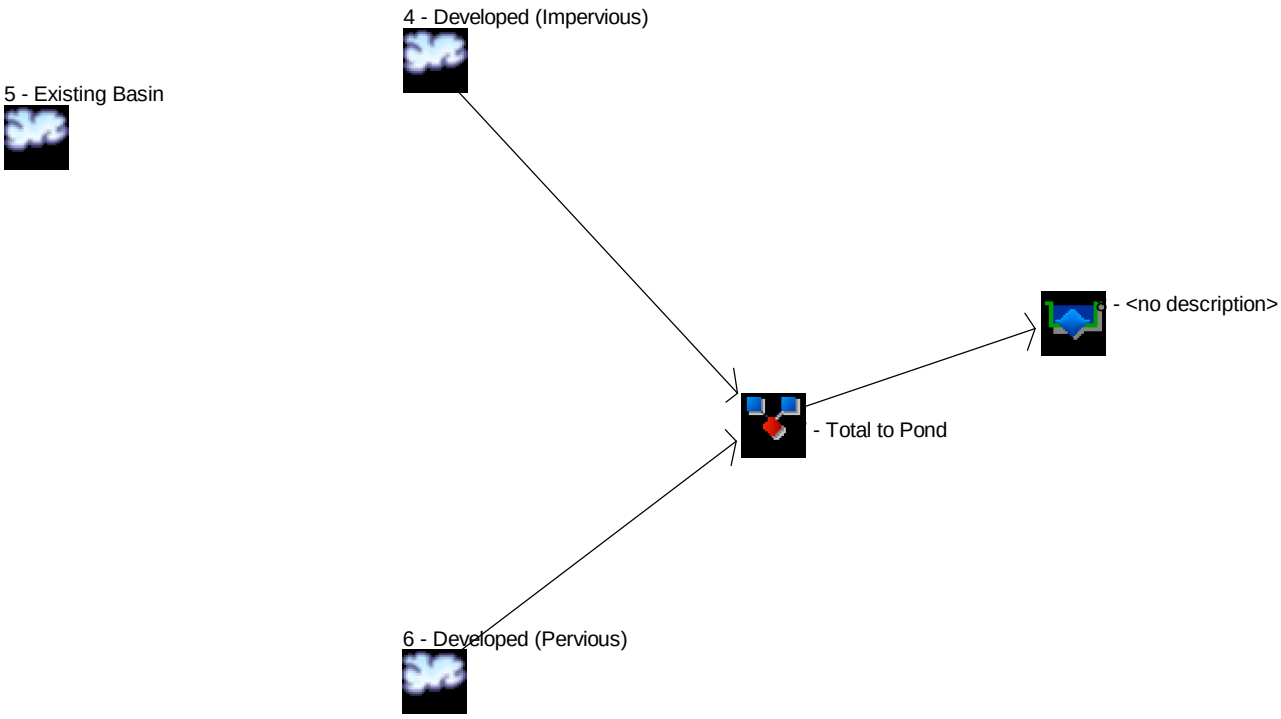
The tie-break rule indicates which value should be selected from a set of multiple candidate values, or which value should be selected in the event of a percent composition tie.

HydraFlow Hydrographs

-Existing & Proposed Conditions
Detention Pond

Watershed Model Schematic

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066



1 - Offsite S (Westernmost)

2 - Offsite S (Centralmost)

3 - Offsite S (Easternmost)

Legend

Hyd.	Origin	Description
1	SCS Runoff	Offsite S (Westernmost)
2	SCS Runoff	Offsite S (Centralmost)
3	SCS Runoff	Offsite S (Easternmost)
4	SCS Runoff	Developed (Impervious)
5	SCS Runoff	Existing Basin
6	SCS Runoff	Developed (Pervious)
7	Combine	Total to Pond
8	Reservoir	<no description>

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	------	-------	10.90	-------	16.47	21.07	25.74	-------	36.36	Offsite S (Westernmost)
2	SCS Runoff	------	-------	8.297	-------	12.57	16.11	19.71	-------	27.88	Offsite S (Centralmost)
3	SCS Runoff	------	-------	4.320	-------	6.526	8.350	10.20	-------	14.41	Offsite S (Easternmost)
4	SCS Runoff	------	-------	27.16	-------	35.08	41.40	47.71	-------	61.90	Developed (Impervious)
5	SCS Runoff	------	-------	47.38	-------	72.08	92.59	113.60	-------	161.52	Existing Basin
6	SCS Runoff	------	-------	24.28	-------	39.53	52.54	66.00	-------	97.25	Developed (Pervious)
7	Combine	4, 6	-------	39.31	-------	56.47	70.97	86.06	-------	121.00	Total to Pond
8	Reservoir	7	-------	25.26	-------	33.63	39.76	41.77	-------	55.32	<no description>

Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066

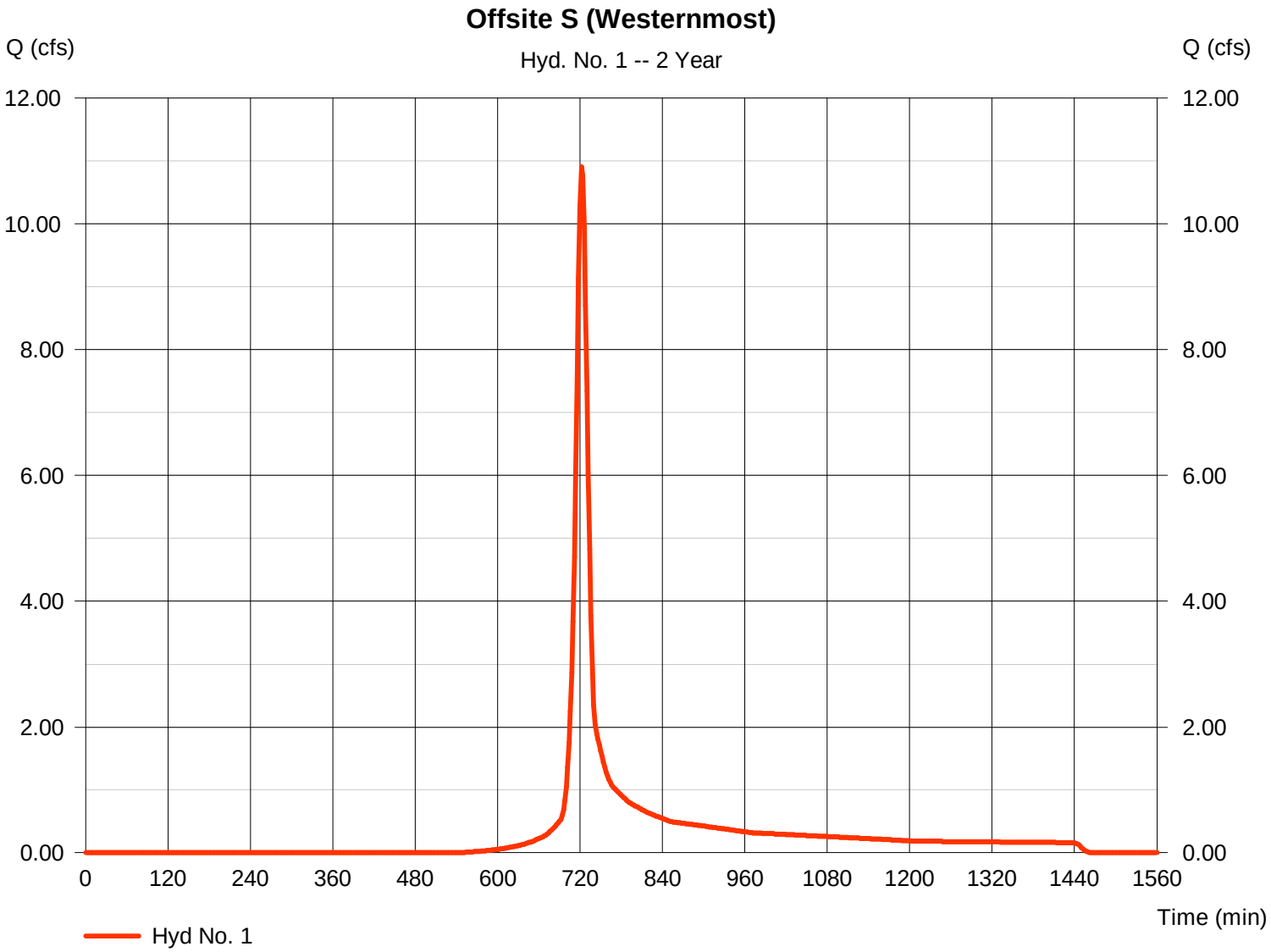
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph description
1	SCS Runoff	10.90	2	722	30,695	------	------	------	Offsite S (Westernmost)
2	SCS Runoff	8.297	2	724	26,136	------	------	------	Offsite S (Centralmost)
3	SCS Runoff	4.320	2	722	12,162	------	------	------	Offsite S (Easternmost)
4	SCS Runoff	27.16	2	724	94,858	------	------	------	Developed (Impervious)
5	SCS Runoff	47.38	2	740	247,681	------	------	------	Existing Basin
6	SCS Runoff	24.28	2	746	152,399	------	------	------	Developed (Pervious)
7	Combine	39.31	2	726	247,257	4, 6	------	------	Total to Pond
8	Reservoir	25.26	2	756	247,248	7	1370.03	39,782	<no description>

Hydrograph Report

Hyd. No. 1

Offsite S (Westernmost)

Hydrograph type	=	SCS Runoff	Peak discharge	=	10.90 cfs
Storm frequency	=	2 yrs	Time to peak	=	722 min
Time interval	=	2 min	Hyd. volume	=	30,695 cuft
Drainage area	=	5.300 ac	Curve number	=	80
Basin Slope	=	1.7 %	Hydraulic length	=	575 ft
Tc method	=	LAG	Time of conc. (Tc)	=	15.68 min
Total precip.	=	3.50 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

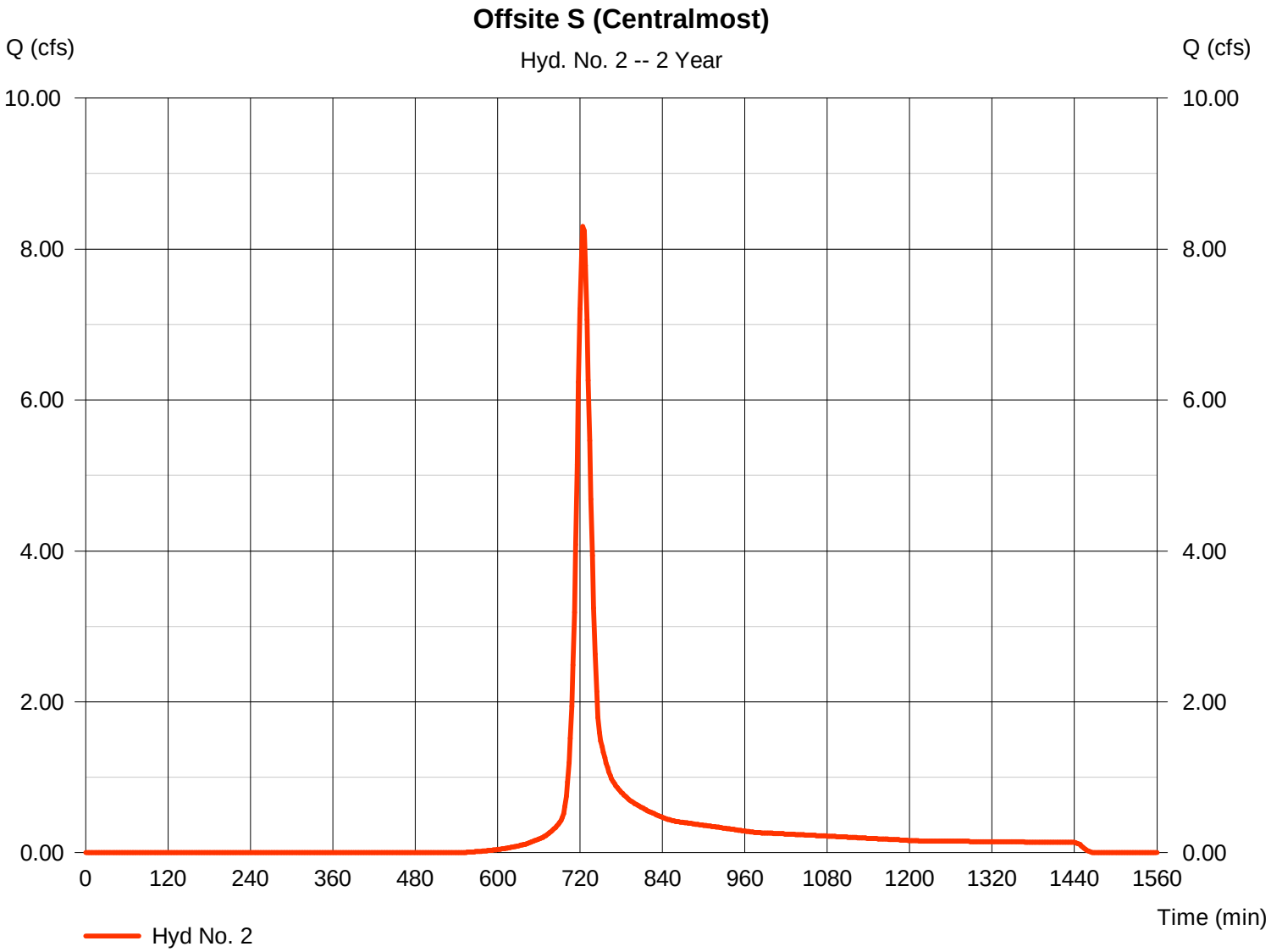


Hydrograph Report

Hyd. No. 2

Offsite S (Centralmost)

Hydrograph type	=	SCS Runoff	Peak discharge	=	8.297 cfs
Storm frequency	=	2 yrs	Time to peak	=	724 min
Time interval	=	2 min	Hyd. volume	=	26,136 cuft
Drainage area	=	4.400 ac	Curve number	=	80
Basin Slope	=	1.5 %	Hydraulic length	=	650 ft
Tc method	=	LAG	Time of conc. (Tc)	=	18.42 min
Total precip.	=	3.50 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

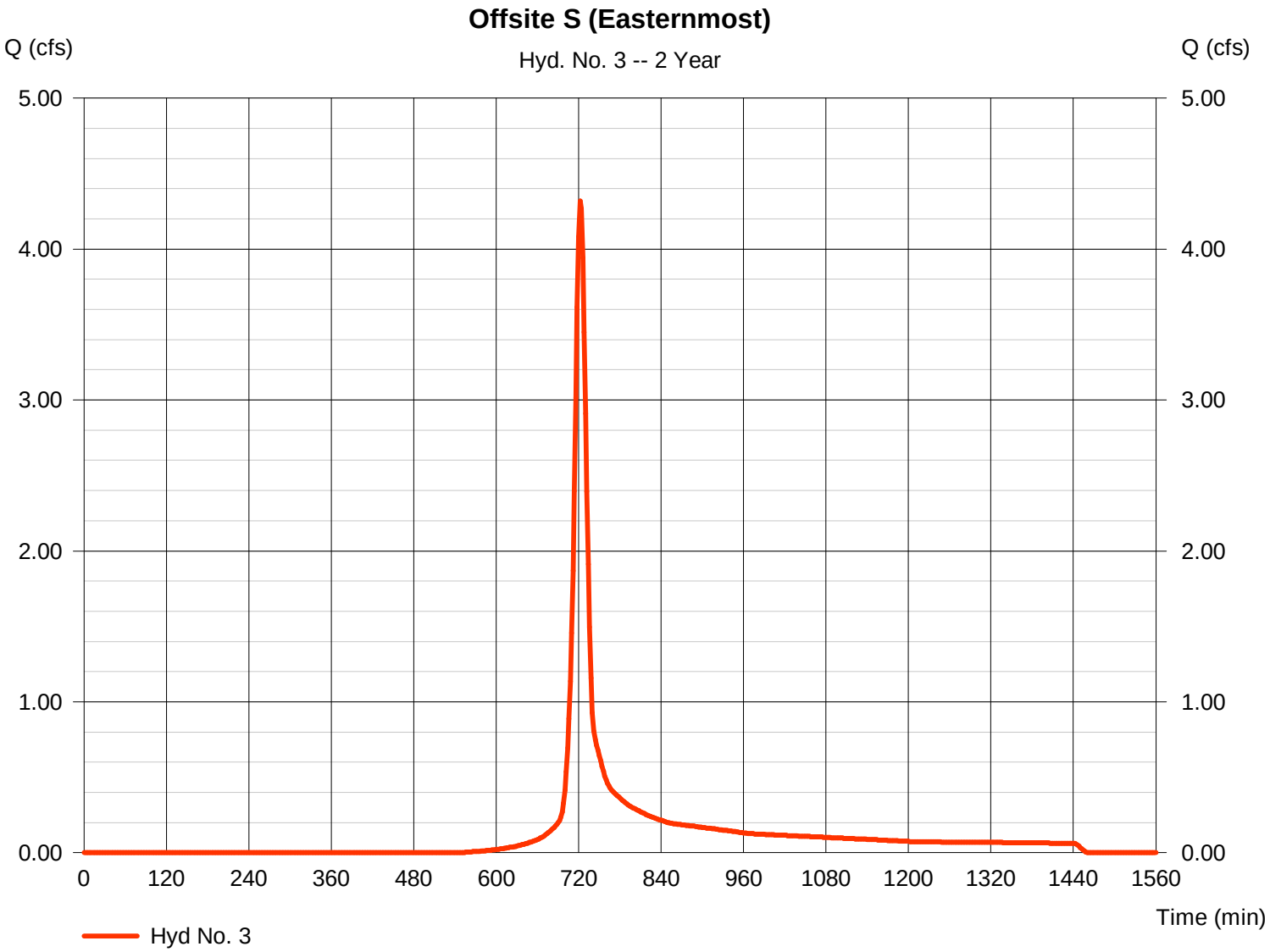


Hydrograph Report

Hyd. No. 3

Offsite S (Easternmost)

Hydrograph type	=	SCS Runoff	Peak discharge	=	4.320 cfs
Storm frequency	=	2 yrs	Time to peak	=	722 min
Time interval	=	2 min	Hyd. volume	=	12,162 cuft
Drainage area	=	2.100 ac	Curve number	=	80
Basin Slope	=	1.6 %	Hydraulic length	=	370 ft
Tc method	=	USER	Time of conc. (Tc)	=	15.00 min
Total precip.	=	3.50 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

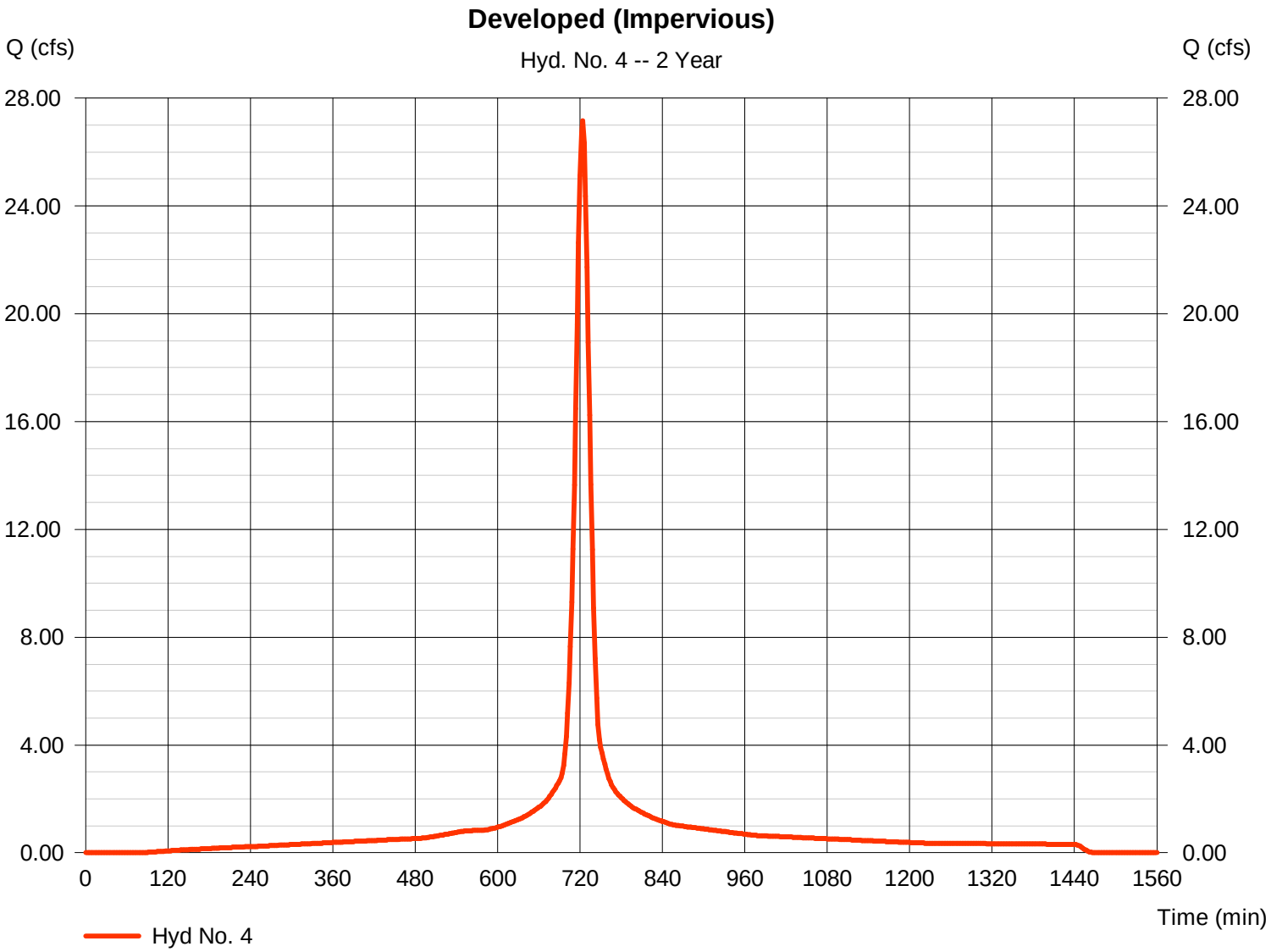


Hydrograph Report

Hyd. No. 4

Developed (Impervious)

Hydrograph type	=	SCS Runoff	Peak discharge	=	27.16 cfs
Storm frequency	=	2 yrs	Time to peak	=	724 min
Time interval	=	2 min	Hyd. volume	=	94,858 cuft
Drainage area	=	8.000 ac	Curve number	=	98
Basin Slope	=	1.8 %	Hydraulic length	=	2000 ft
Tc method	=	LAG	Time of conc. (Tc)	=	19.86 min
Total precip.	=	3.50 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

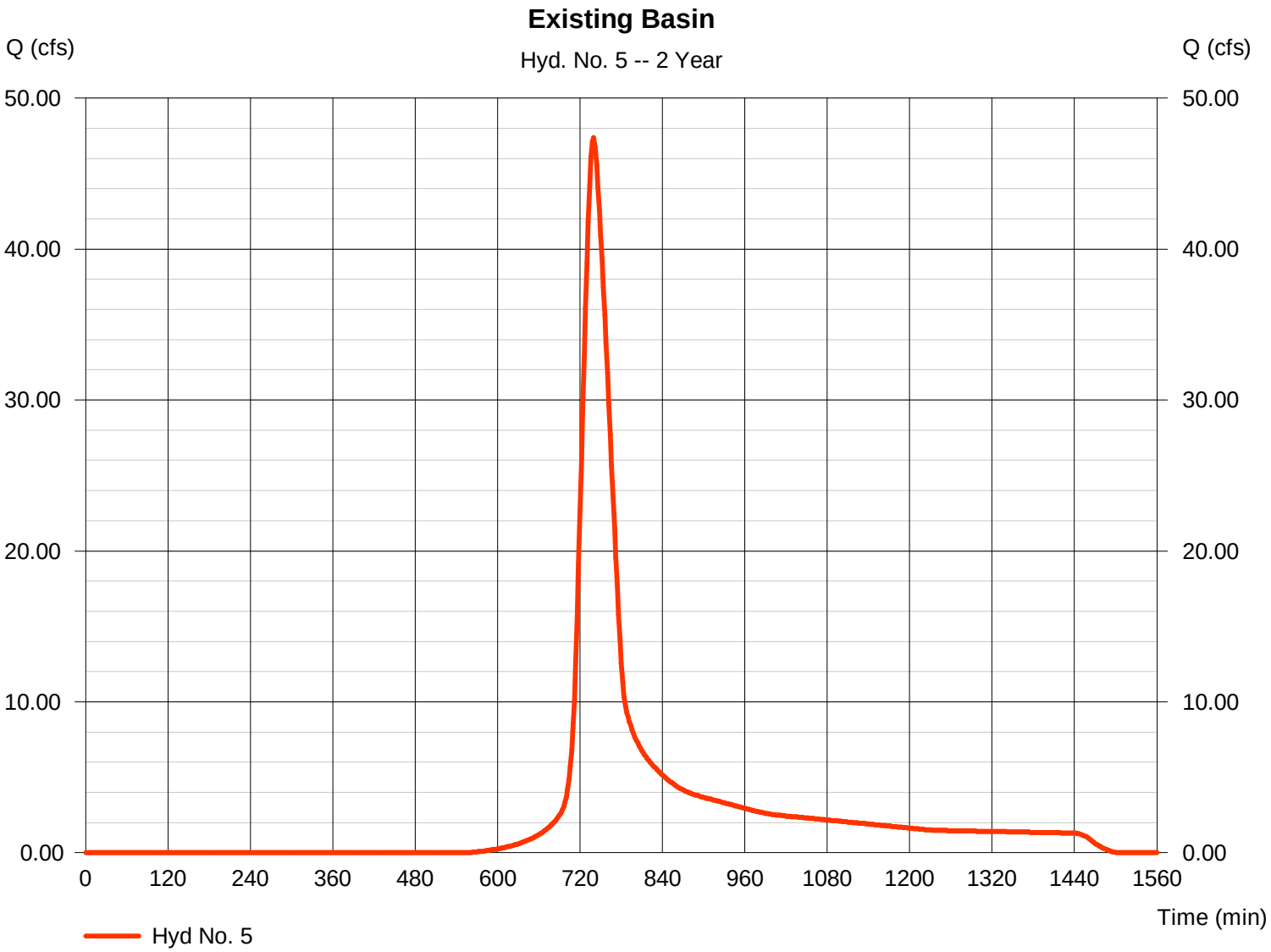


Hydrograph Report

Hyd. No. 5

Existing Basin

Hydrograph type	=	SCS Runoff	Peak discharge	=	47.38 cfs
Storm frequency	=	2 yrs	Time to peak	=	740 min
Time interval	=	2 min	Hyd. volume	=	247,681 cuft
Drainage area	=	41.300 ac	Curve number	=	80
Basin Slope	=	1.8 %	Hydraulic length	=	2000 ft
Tc method	=	LAG	Time of conc. (Tc)	=	41.91 min
Total precip.	=	3.50 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

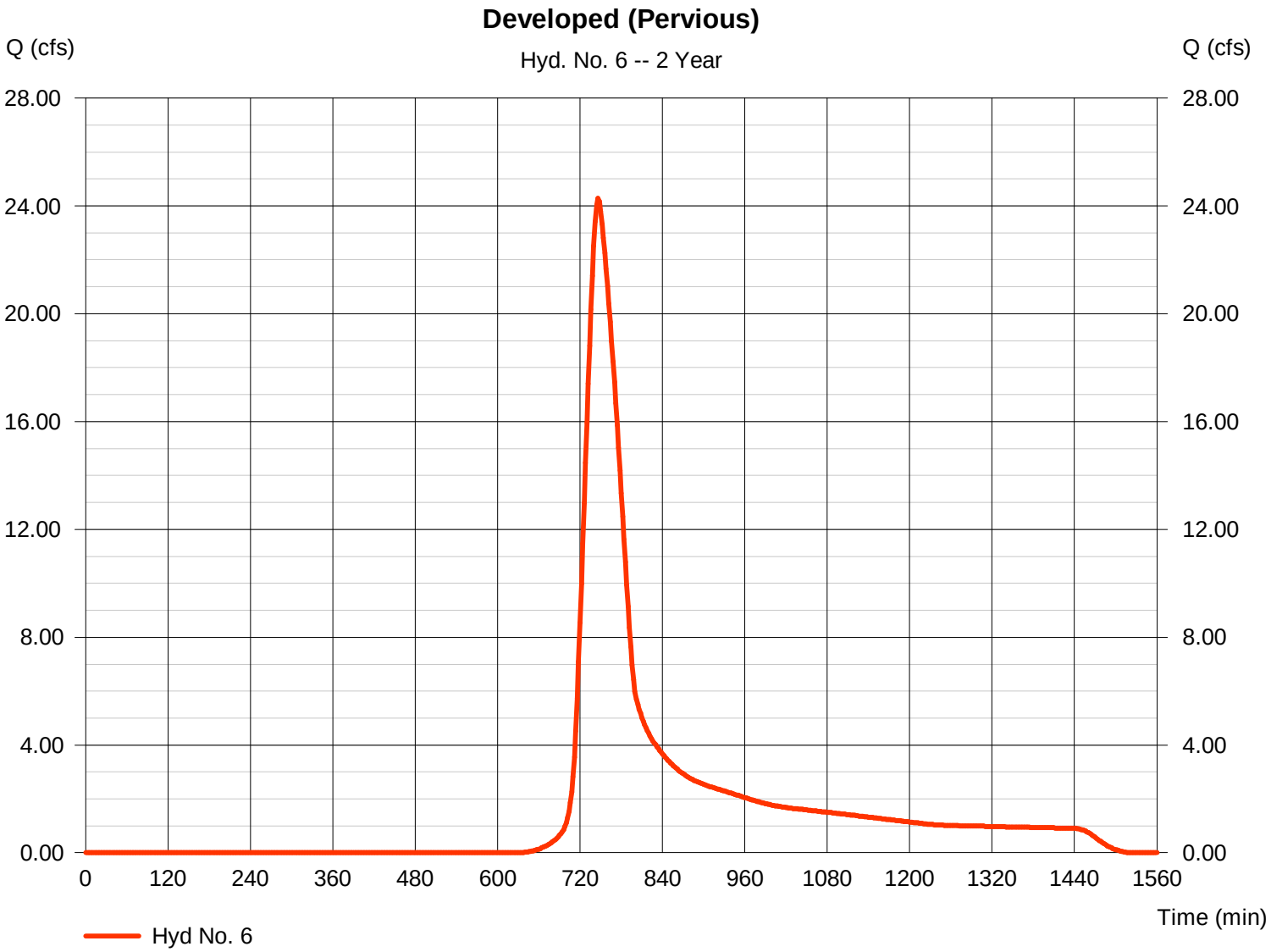


Hydrograph Report

Hyd. No. 6

Developed (Pervious)

Hydrograph type	=	SCS Runoff	Peak discharge	=	24.28 cfs
Storm frequency	=	2 yrs	Time to peak	=	746 min
Time interval	=	2 min	Hyd. volume	=	152,399 cuft
Drainage area	=	32.000 ac	Curve number	=	75
Basin Slope	=	1.5 %	Hydraulic length	=	2000 ft
Tc method	=	LAG	Time of conc. (Tc)	=	52.56 min
Total precip.	=	3.50 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

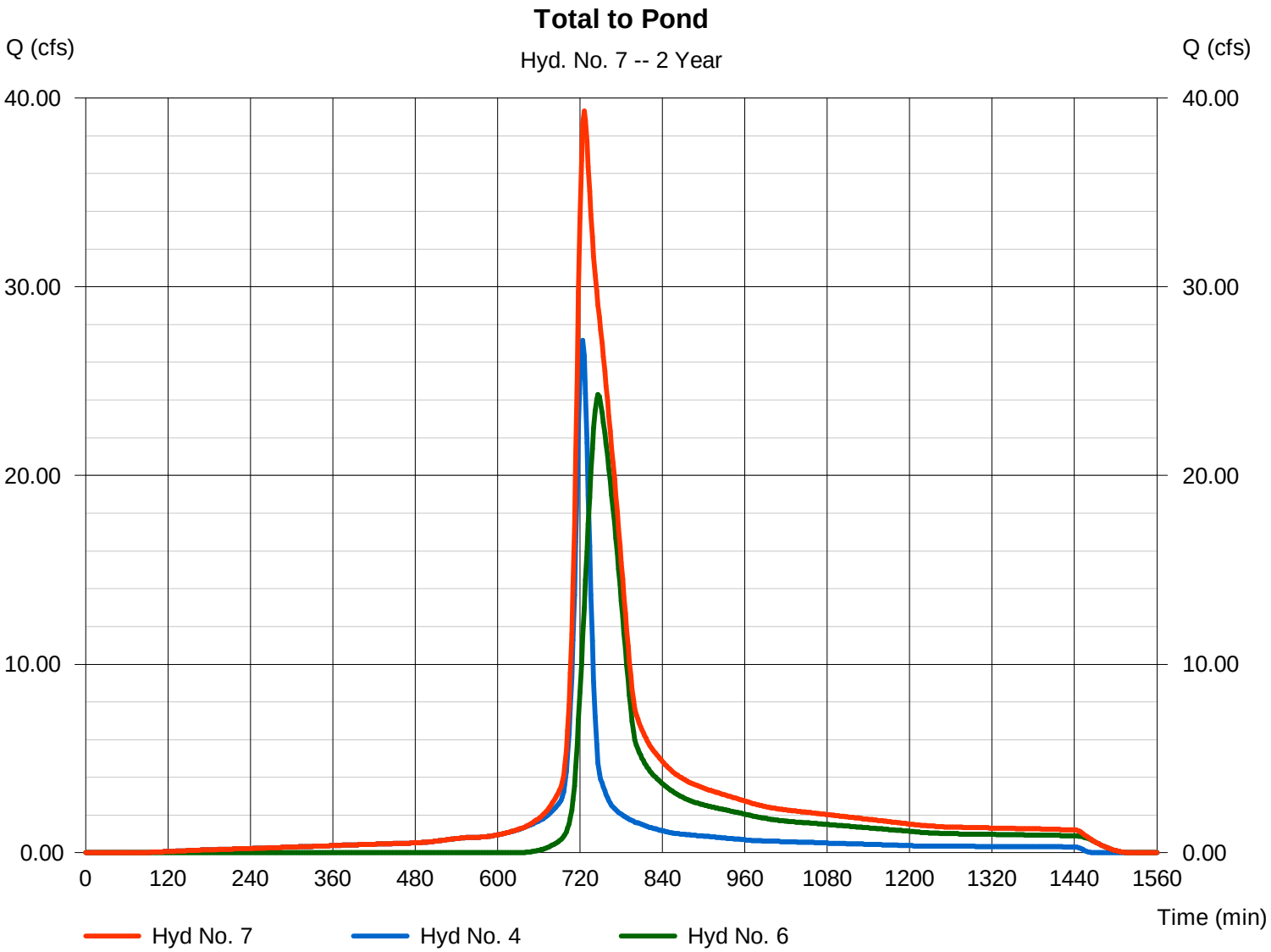


Hydrograph Report

Hyd. No. 7

Total to Pond

Hydrograph type	= Combine	Peak discharge	= 39.31 cfs
Storm frequency	= 2 yrs	Time to peak	= 726 min
Time interval	= 2 min	Hyd. volume	= 247,257 cuft
Inflow hyds.	= 4, 6	Contrib. drain. area	= 40.000 ac



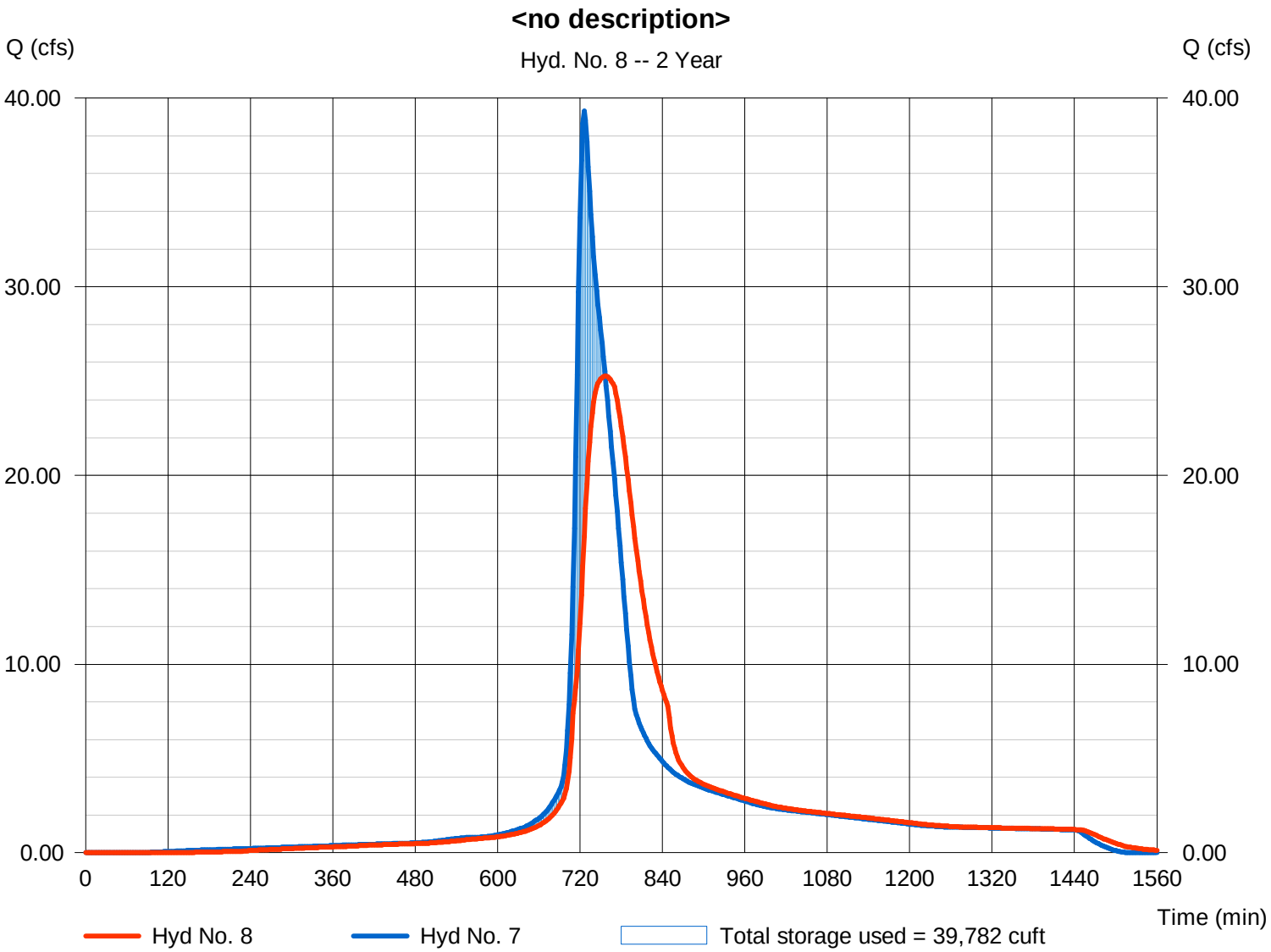
Hydrograph Report

Hyd. No. 8

<no description>

Hydrograph type	=	Reservoir	Peak discharge	=	25.26 cfs
Storm frequency	=	2 yrs	Time to peak	=	756 min
Time interval	=	2 min	Hyd. volume	=	247,248 cuft
Inflow hyd. No.	=	7 - Total to Pond	Max. Elevation	=	1370.03 ft
Reservoir name	=	Proposed Pond	Max. Storage	=	39,782 cuft

Storage Indication method used.



Pond Report

Pond No. 1 - Proposed Pond

Pond Data

Contours - User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 1368.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	1368.00	1,000	0	0
1.00	1369.00	17,500	7,560	7,560
2.00	1370.00	45,000	30,184	37,745
3.00	1371.00	78,000	60,742	98,487
4.00	1372.00	122,000	99,173	197,661
5.00	1373.00	125,000	123,485	321,145

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 42.00	0.00	0.00	0.00
Span (in)	= 42.00	0.00	0.00	0.00
No. Barrels	= 1	0	0	0
Invert El. (ft)	= 1368.00	0.00	0.00	0.00
Length (ft)	= 300.00	0.00	0.00	0.00
Slope (%)	= 0.30	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

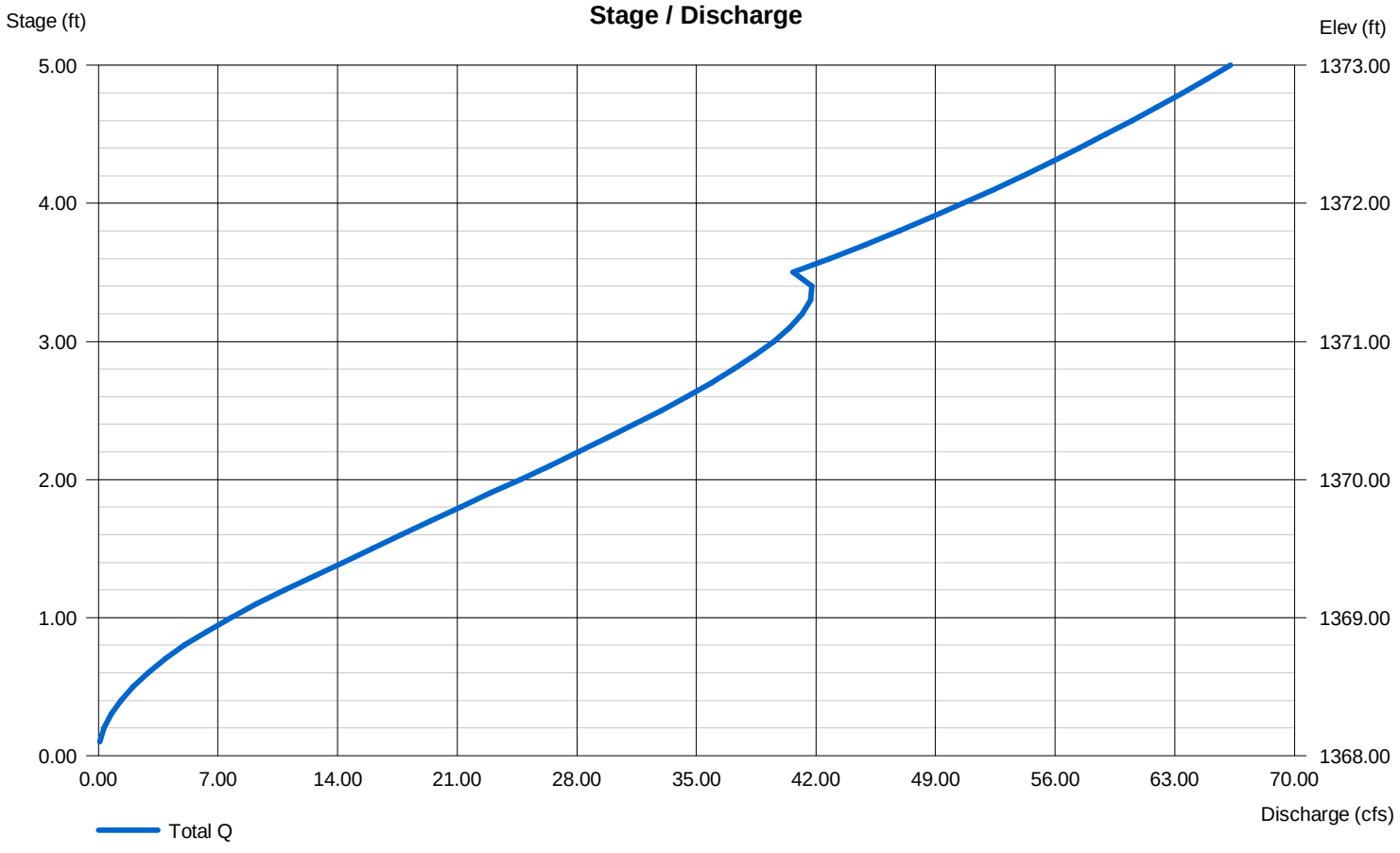
Weir Structures

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

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

TW Elev. (ft) = 0.00

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



Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066

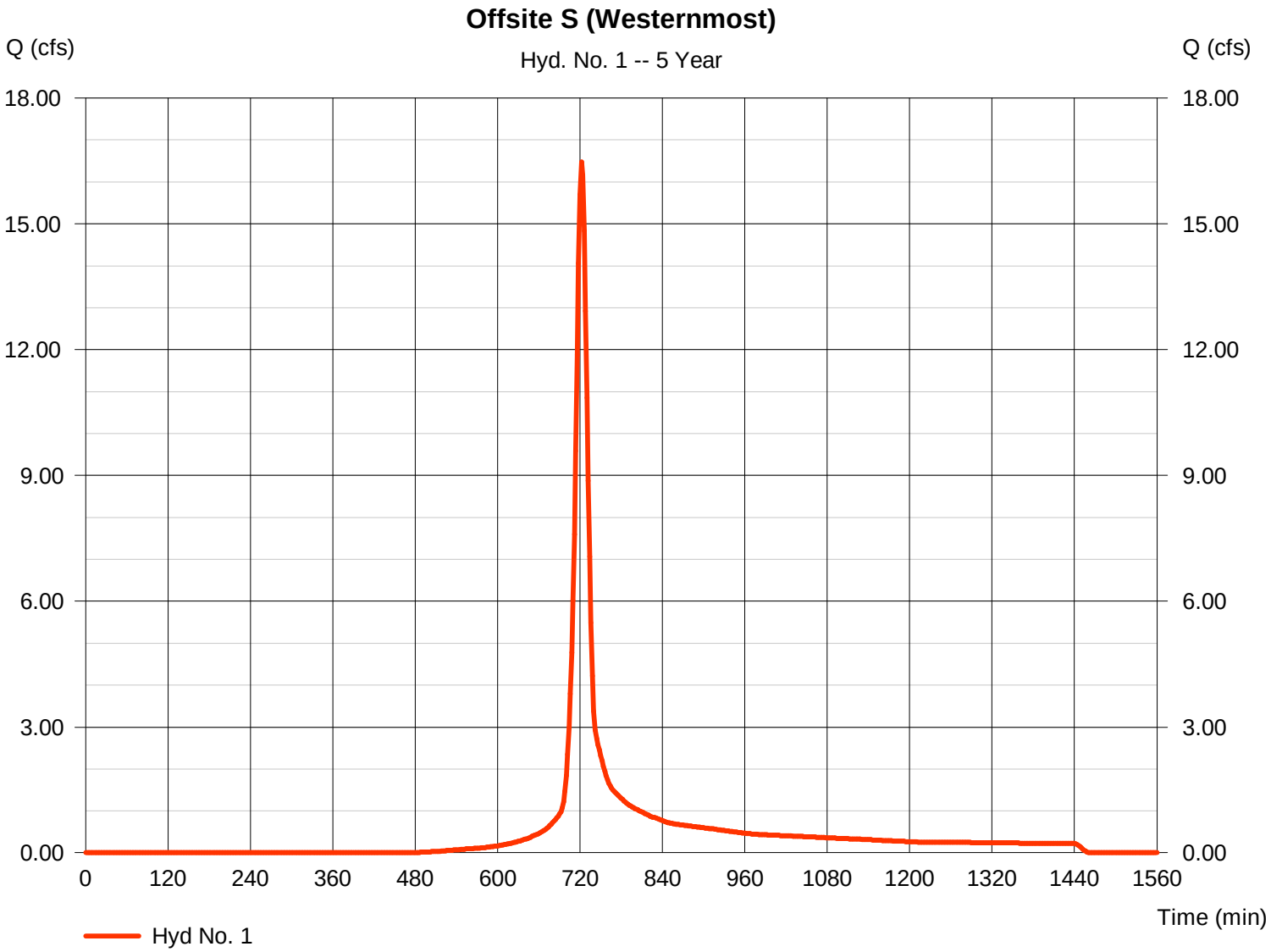
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph description
1	SCS Runoff	16.47	2	722	46,174	------	------	------	Offsite S (Westernmost)
2	SCS Runoff	12.57	2	724	39,316	------	------	------	Offsite S (Centralmost)
3	SCS Runoff	6.526	2	722	18,295	------	------	------	Offsite S (Easternmost)
4	SCS Runoff	35.08	2	724	123,828	------	------	------	Developed (Impervious)
5	SCS Runoff	72.08	2	740	372,580	------	------	------	Existing Basin
6	SCS Runoff	39.53	2	746	240,034	------	------	------	Developed (Pervious)
7	Combine	56.47	2	726	363,861	4, 6	------	------	Total to Pond
8	Reservoir	33.63	2	766	363,852	7	1370.55	70,947	<no description>

Hydrograph Report

Hyd. No. 1

Offsite S (Westernmost)

Hydrograph type	=	SCS Runoff	Peak discharge	=	16.47 cfs
Storm frequency	=	5 yrs	Time to peak	=	722 min
Time interval	=	2 min	Hyd. volume	=	46,174 cuft
Drainage area	=	5.300 ac	Curve number	=	80
Basin Slope	=	1.7 %	Hydraulic length	=	575 ft
Tc method	=	LAG	Time of conc. (Tc)	=	15.68 min
Total precip.	=	4.50 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

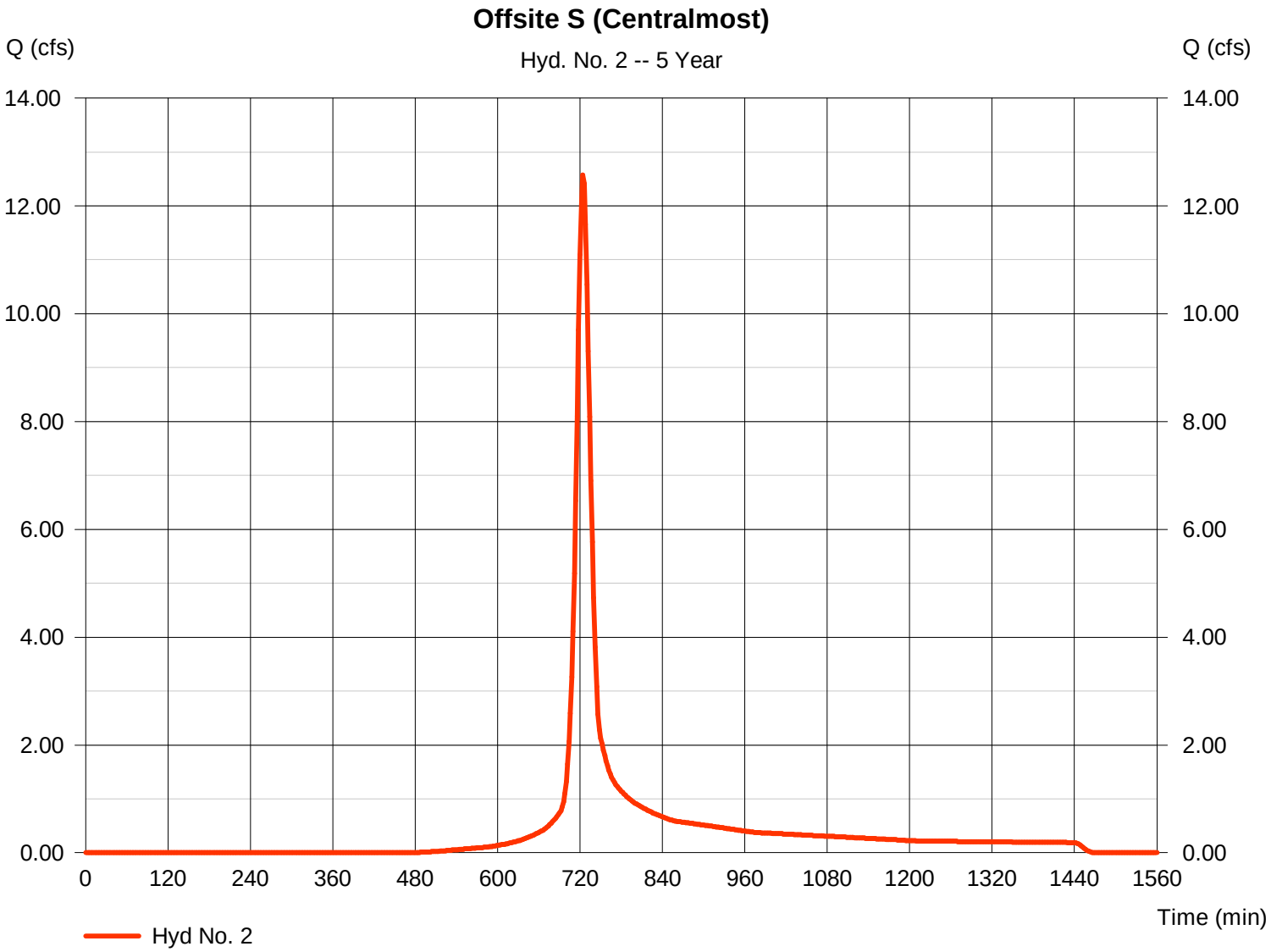


Hydrograph Report

Hyd. No. 2

Offsite S (Centralmost)

Hydrograph type	=	SCS Runoff	Peak discharge	=	12.57 cfs
Storm frequency	=	5 yrs	Time to peak	=	724 min
Time interval	=	2 min	Hyd. volume	=	39,316 cuft
Drainage area	=	4.400 ac	Curve number	=	80
Basin Slope	=	1.5 %	Hydraulic length	=	650 ft
Tc method	=	LAG	Time of conc. (Tc)	=	18.42 min
Total precip.	=	4.50 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

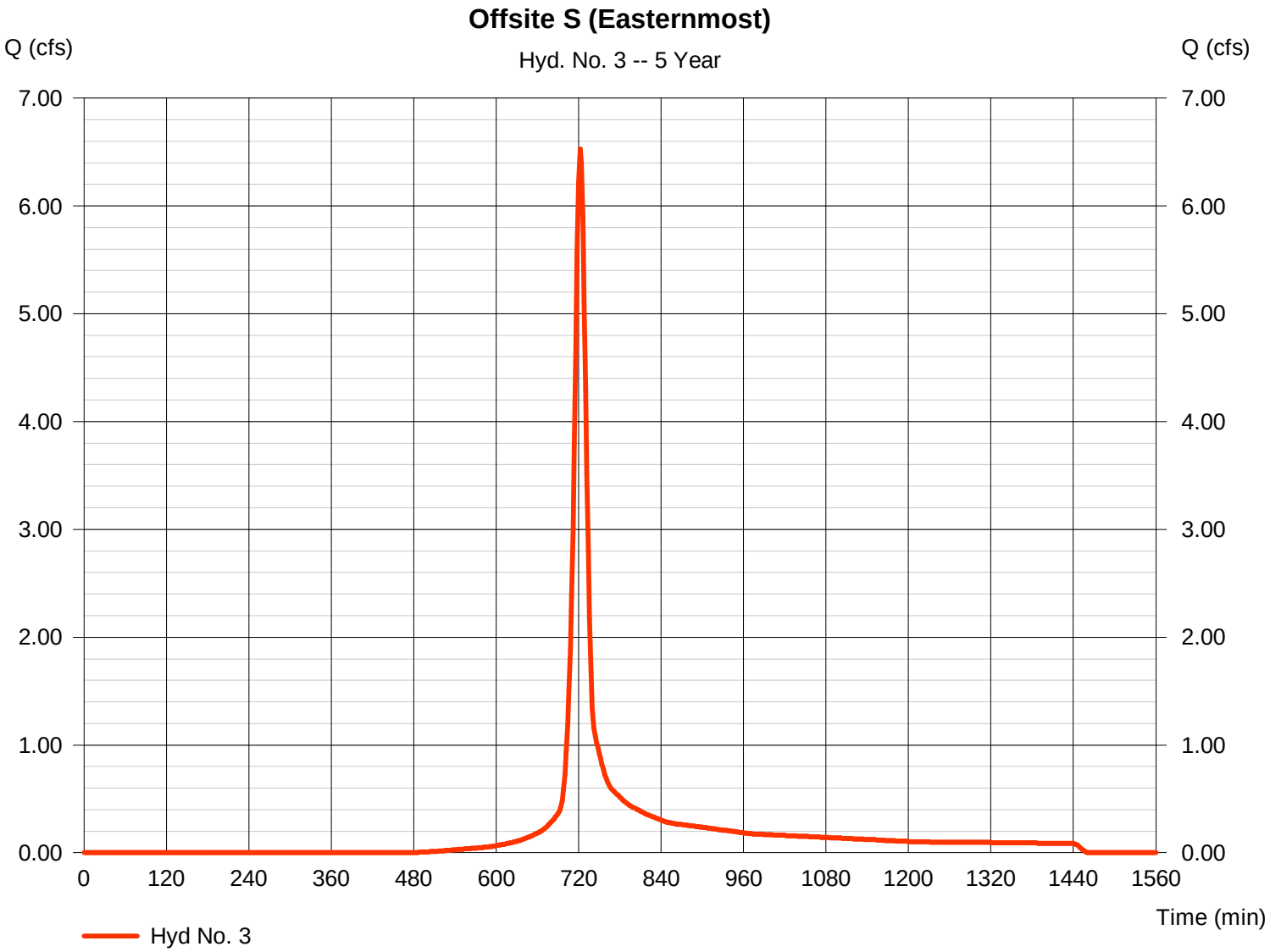


Hydrograph Report

Hyd. No. 3

Offsite S (Easternmost)

Hydrograph type	=	SCS Runoff	Peak discharge	=	6.526 cfs
Storm frequency	=	5 yrs	Time to peak	=	722 min
Time interval	=	2 min	Hyd. volume	=	18,295 cuft
Drainage area	=	2.100 ac	Curve number	=	80
Basin Slope	=	1.6 %	Hydraulic length	=	370 ft
Tc method	=	USER	Time of conc. (Tc)	=	15.00 min
Total precip.	=	4.50 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

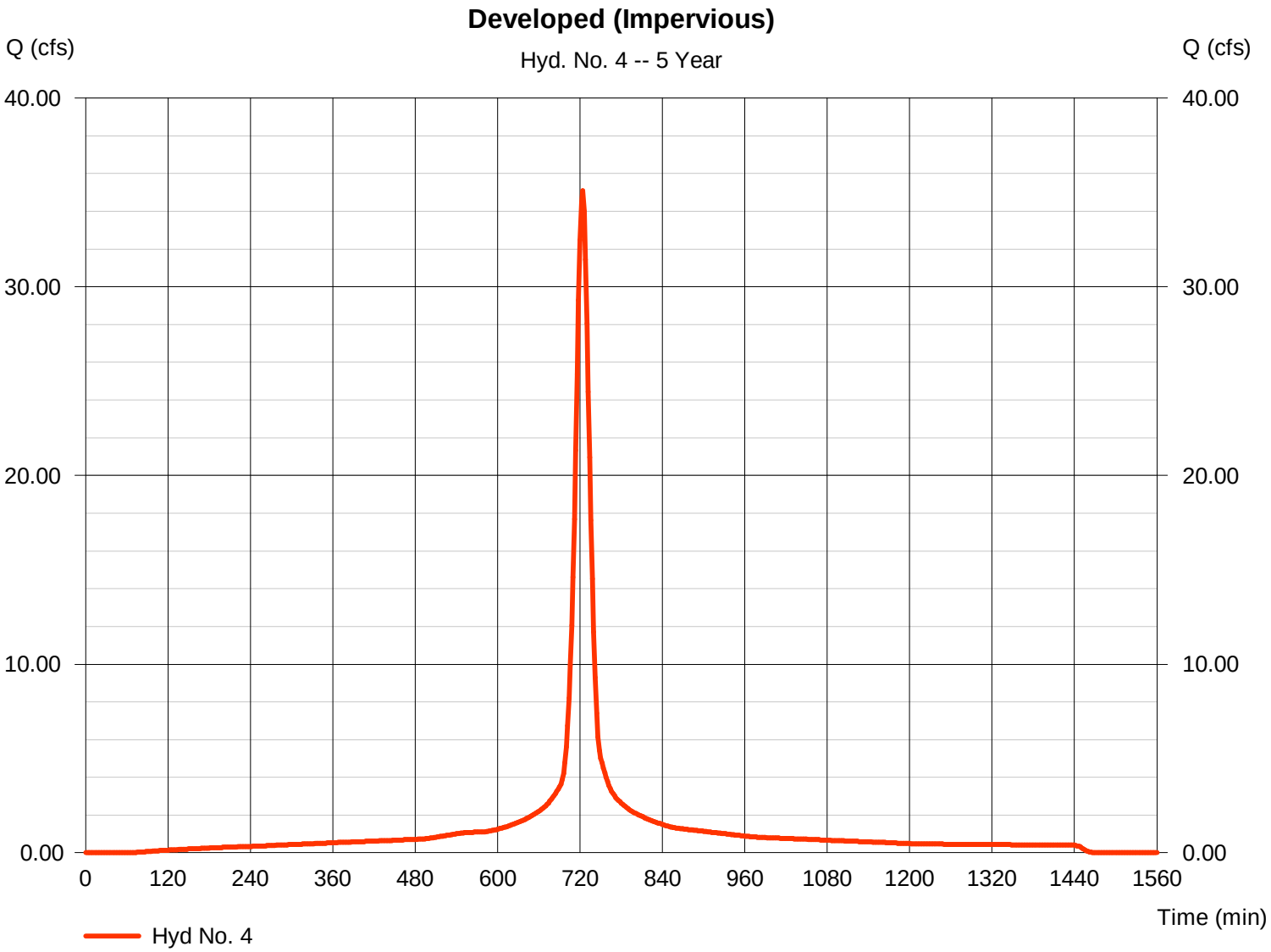


Hydrograph Report

Hyd. No. 4

Developed (Impervious)

Hydrograph type	=	SCS Runoff	Peak discharge	=	35.08 cfs
Storm frequency	=	5 yrs	Time to peak	=	724 min
Time interval	=	2 min	Hyd. volume	=	123,828 cuft
Drainage area	=	8.000 ac	Curve number	=	98
Basin Slope	=	1.8 %	Hydraulic length	=	2000 ft
Tc method	=	LAG	Time of conc. (Tc)	=	19.86 min
Total precip.	=	4.50 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

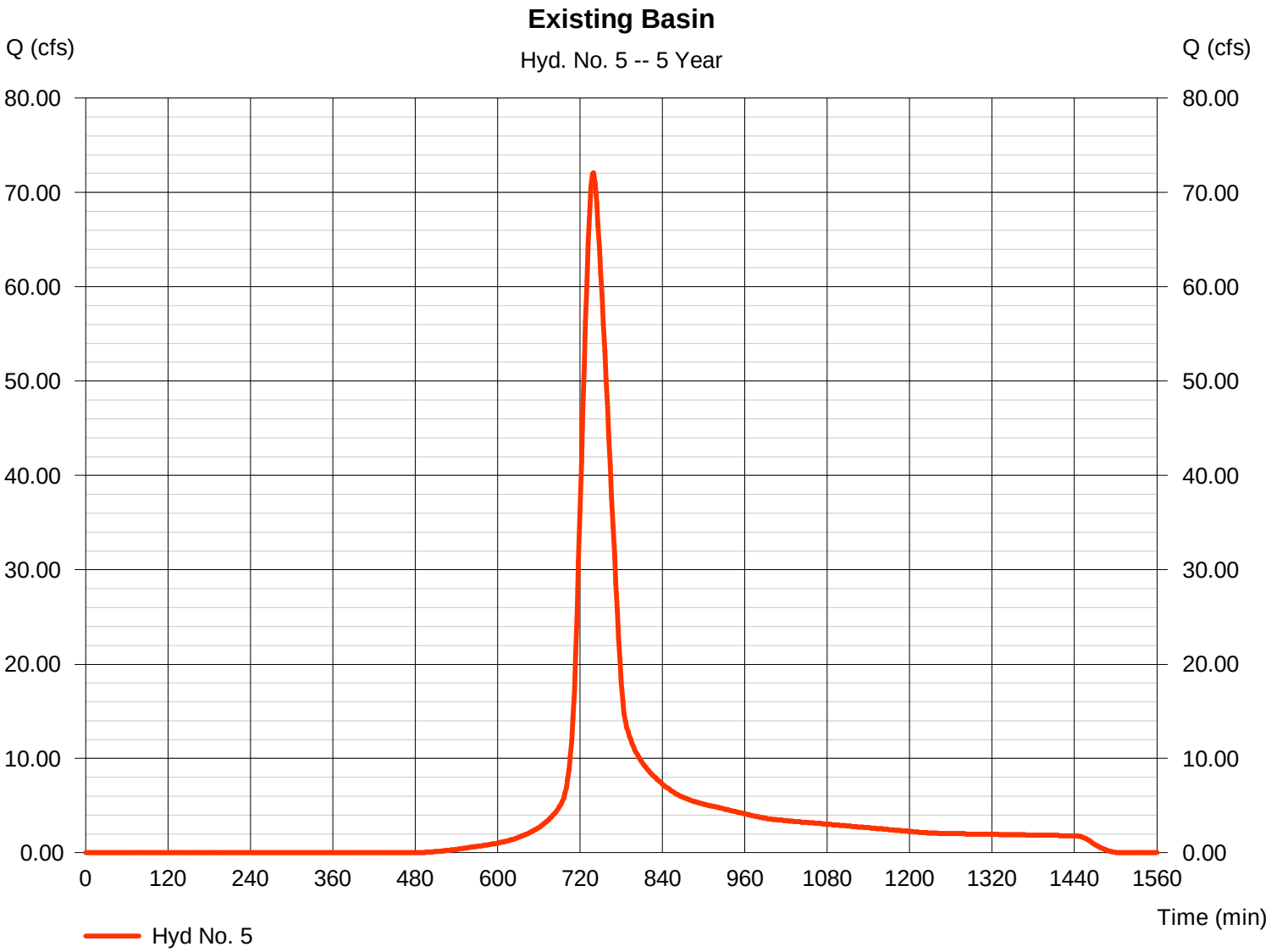


Hydrograph Report

Hyd. No. 5

Existing Basin

Hydrograph type	=	SCS Runoff	Peak discharge	=	72.08 cfs
Storm frequency	=	5 yrs	Time to peak	=	740 min
Time interval	=	2 min	Hyd. volume	=	372,580 cuft
Drainage area	=	41.300 ac	Curve number	=	80
Basin Slope	=	1.8 %	Hydraulic length	=	2000 ft
Tc method	=	LAG	Time of conc. (Tc)	=	41.91 min
Total precip.	=	4.50 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

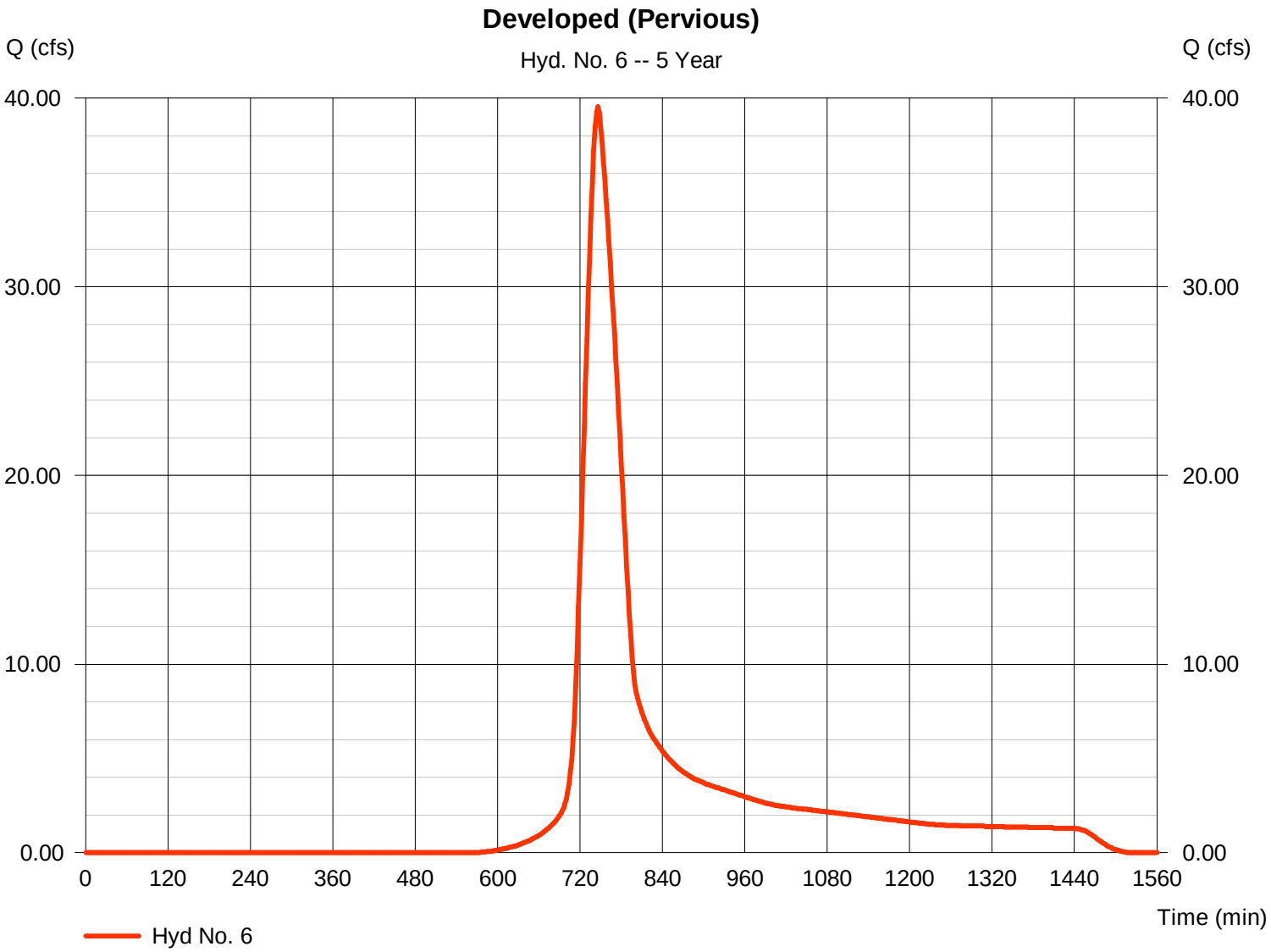


Hydrograph Report

Hyd. No. 6

Developed (Pervious)

Hydrograph type	=	SCS Runoff	Peak discharge	=	39.53 cfs
Storm frequency	=	5 yrs	Time to peak	=	746 min
Time interval	=	2 min	Hyd. volume	=	240,034 cuft
Drainage area	=	32.000 ac	Curve number	=	75
Basin Slope	=	1.5 %	Hydraulic length	=	2000 ft
Tc method	=	LAG	Time of conc. (Tc)	=	52.56 min
Total precip.	=	4.50 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

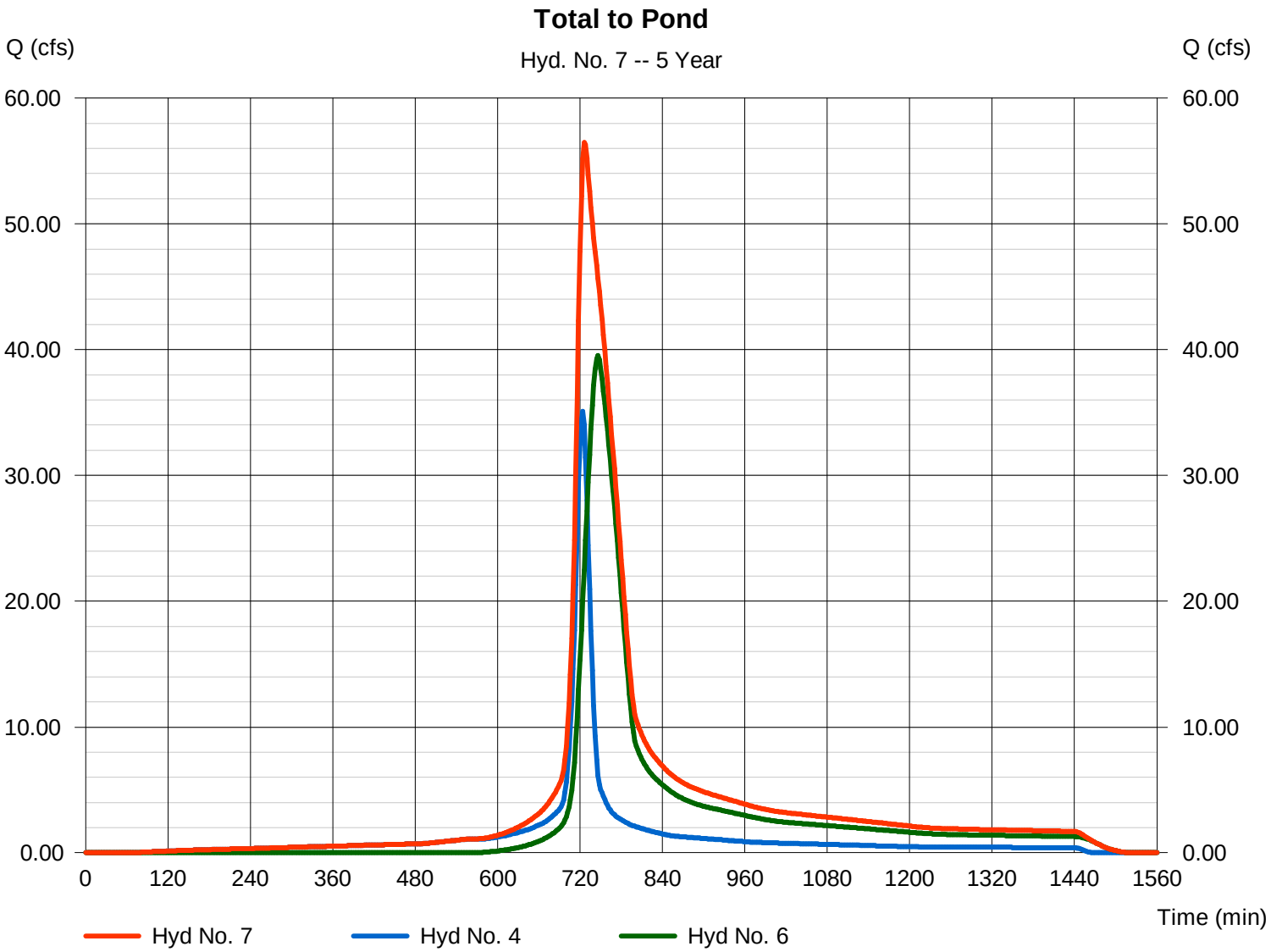


Hydrograph Report

Hyd. No. 7

Total to Pond

Hydrograph type	= Combine	Peak discharge	= 56.47 cfs
Storm frequency	= 5 yrs	Time to peak	= 726 min
Time interval	= 2 min	Hyd. volume	= 363,861 cuft
Inflow hyds.	= 4, 6	Contrib. drain. area	= 40.000 ac



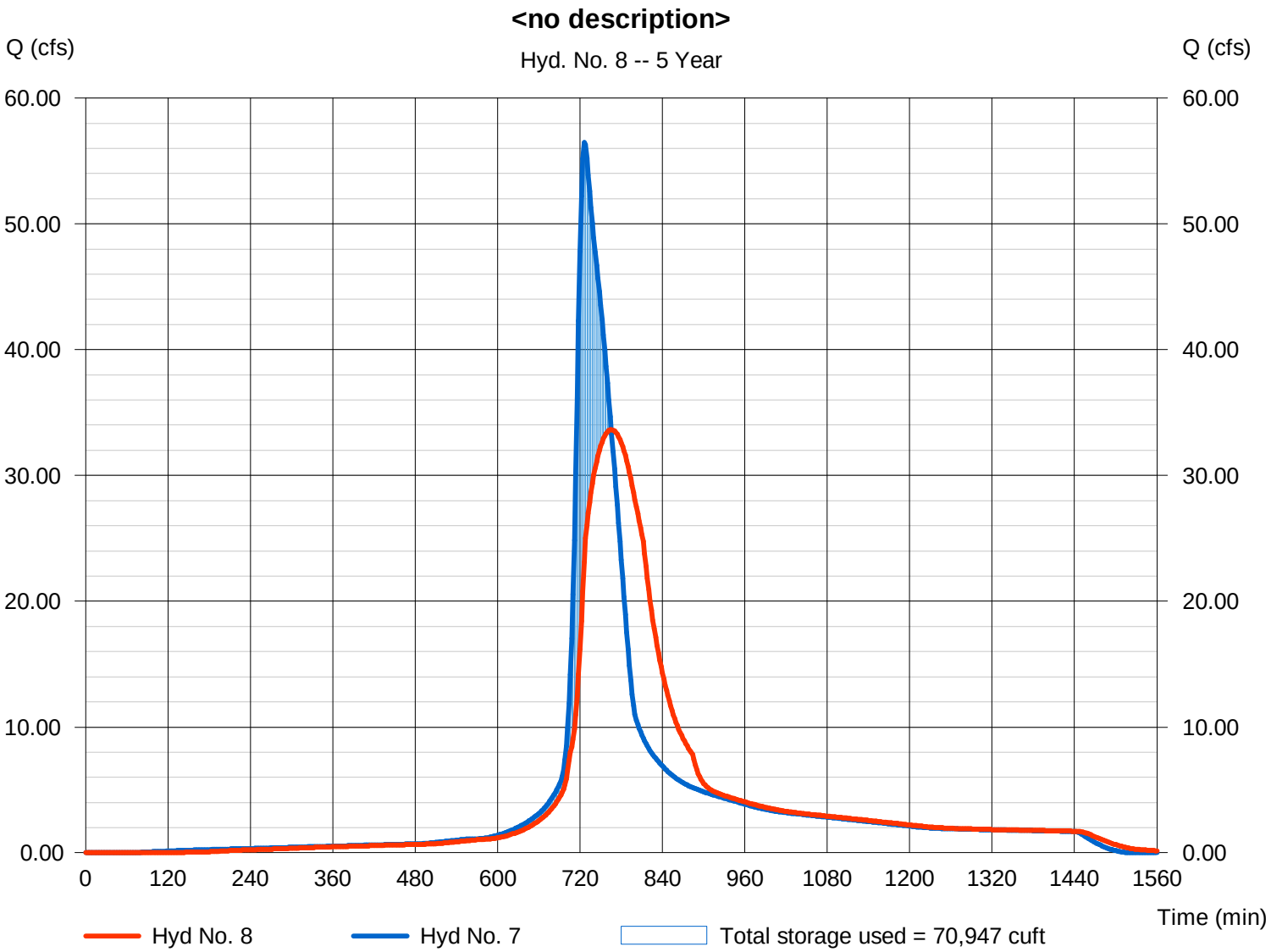
Hydrograph Report

Hyd. No. 8

<no description>

Hydrograph type	=	Reservoir	Peak discharge	=	33.63 cfs
Storm frequency	=	5 yrs	Time to peak	=	766 min
Time interval	=	2 min	Hyd. volume	=	363,852 cuft
Inflow hyd. No.	=	7 - Total to Pond	Max. Elevation	=	1370.55 ft
Reservoir name	=	Proposed Pond	Max. Storage	=	70,947 cuft

Storage Indication method used.



Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066

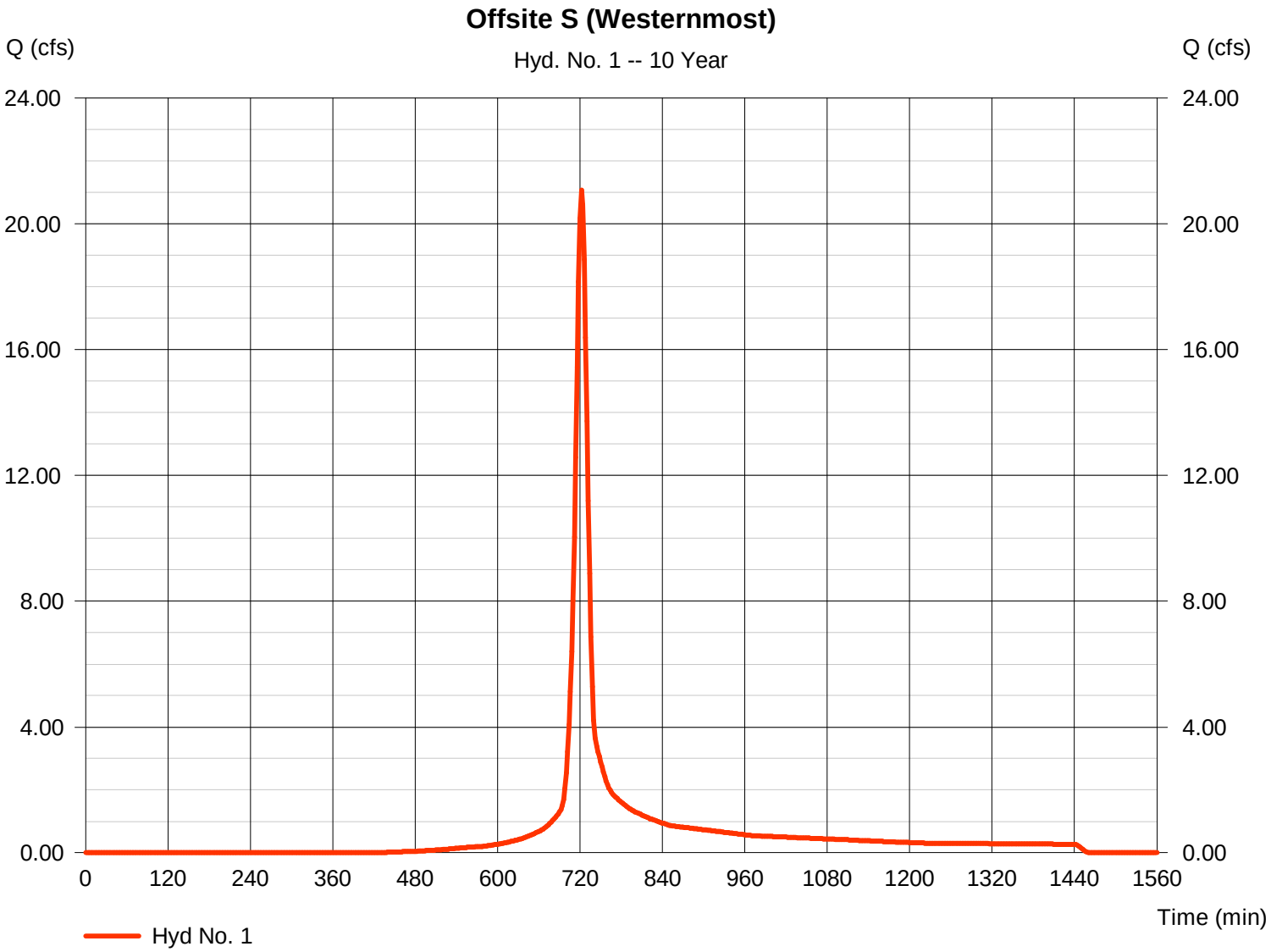
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph description
1	SCS Runoff	21.07	2	722	59,203	------	------	------	Offsite S (Westernmost)
2	SCS Runoff	16.11	2	724	50,410	------	------	------	Offsite S (Centralmost)
3	SCS Runoff	8.350	2	722	23,458	------	------	------	Offsite S (Easternmost)
4	SCS Runoff	41.40	2	724	147,022	------	------	------	Developed (Impervious)
5	SCS Runoff	92.59	2	738	477,719	------	------	------	Existing Basin
6	SCS Runoff	52.54	2	746	315,462	------	------	------	Developed (Pervious)
7	Combine	70.97	2	728	462,483	4, 6	------	------	Total to Pond
8	Reservoir	39.76	2	770	462,474	7	1371.03	101,071	<no description>

Hydrograph Report

Hyd. No. 1

Offsite S (Westernmost)

Hydrograph type	=	SCS Runoff	Peak discharge	=	21.07 cfs
Storm frequency	=	10 yrs	Time to peak	=	722 min
Time interval	=	2 min	Hyd. volume	=	59,203 cuft
Drainage area	=	5.300 ac	Curve number	=	80
Basin Slope	=	1.7 %	Hydraulic length	=	575 ft
Tc method	=	LAG	Time of conc. (Tc)	=	15.68 min
Total precip.	=	5.30 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

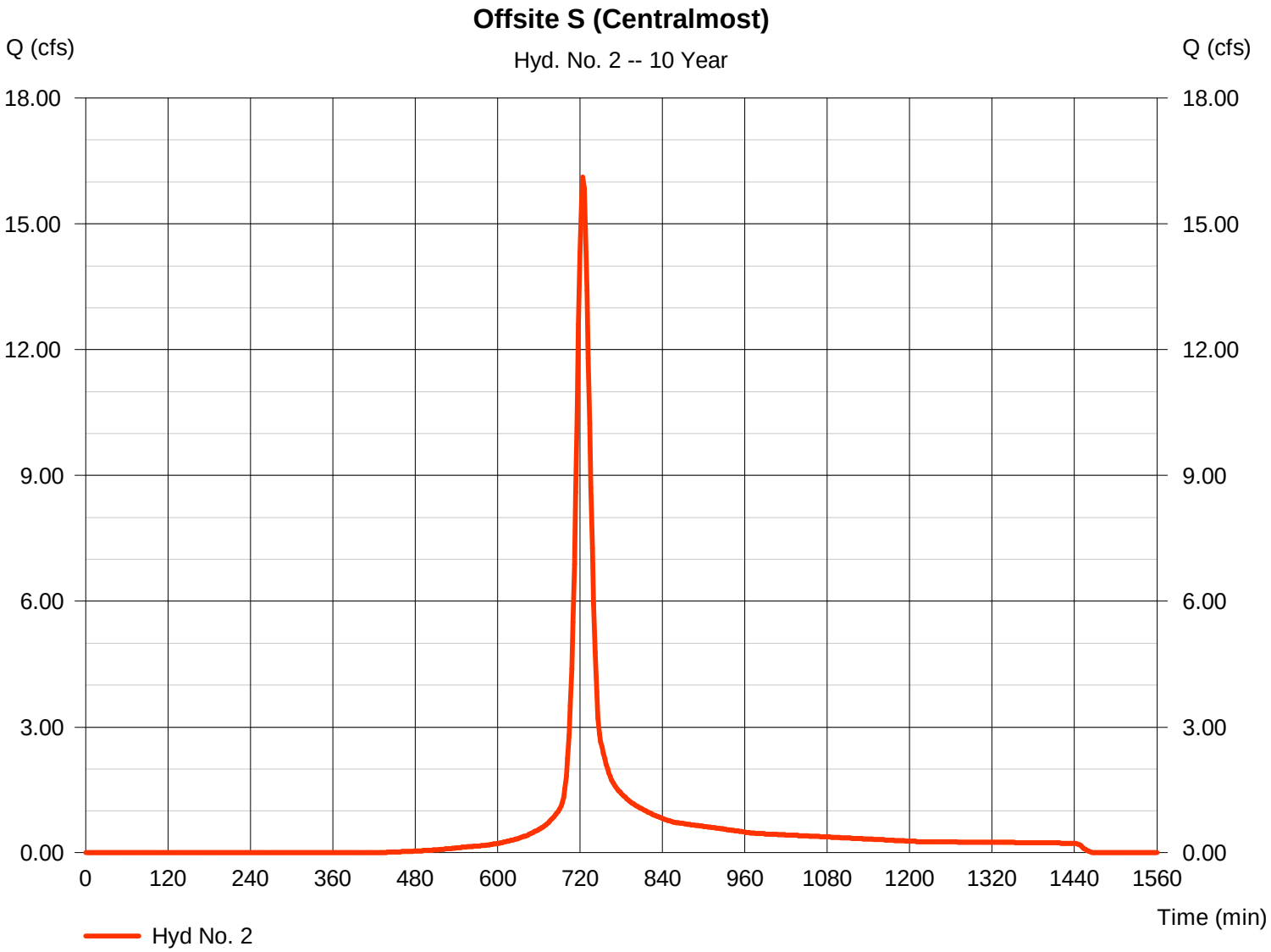


Hydrograph Report

Hyd. No. 2

Offsite S (Centralmost)

Hydrograph type	=	SCS Runoff	Peak discharge	=	16.11 cfs
Storm frequency	=	10 yrs	Time to peak	=	724 min
Time interval	=	2 min	Hyd. volume	=	50,410 cuft
Drainage area	=	4.400 ac	Curve number	=	80
Basin Slope	=	1.5 %	Hydraulic length	=	650 ft
Tc method	=	LAG	Time of conc. (Tc)	=	18.42 min
Total precip.	=	5.30 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

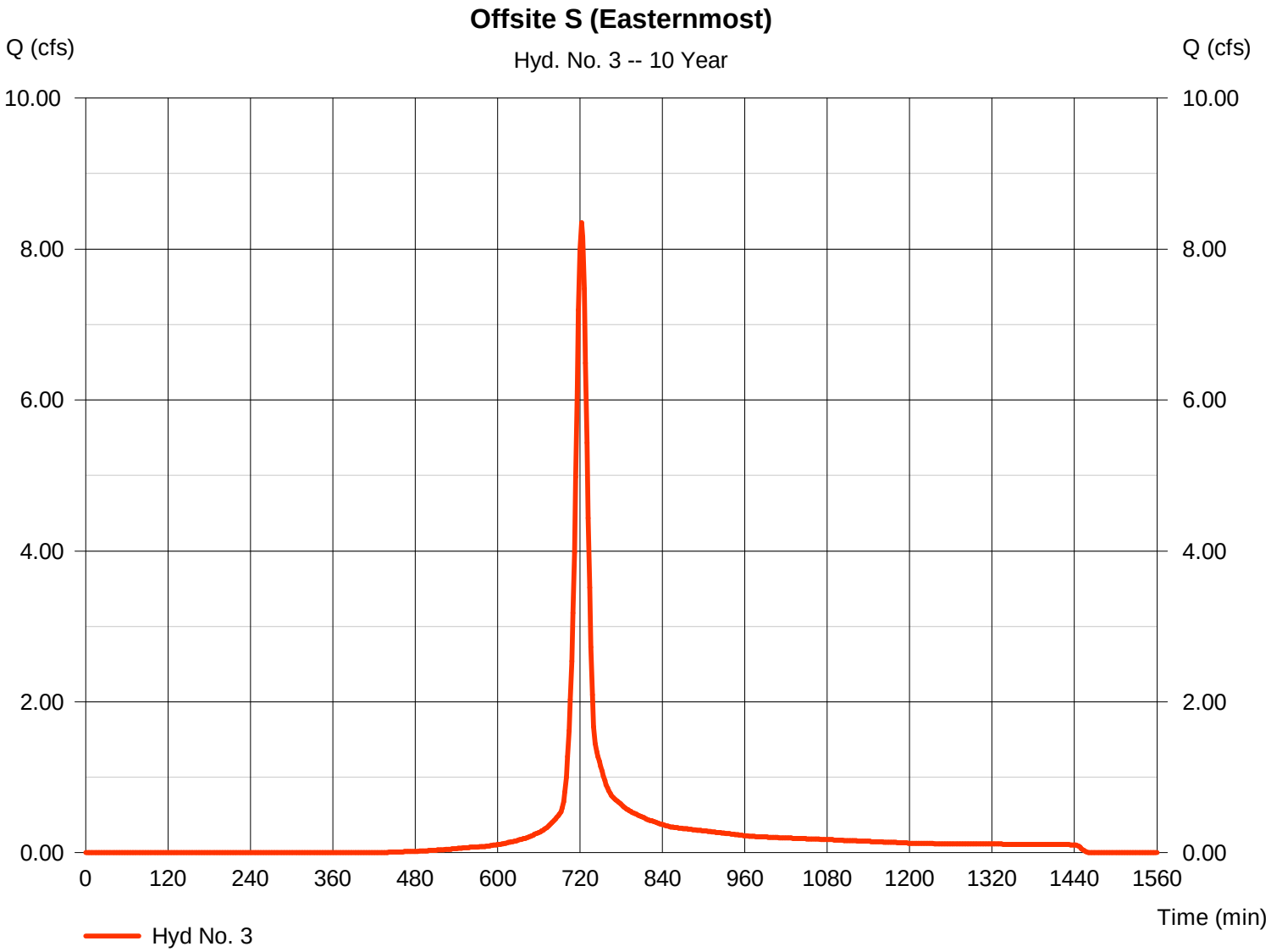


Hydrograph Report

Hyd. No. 3

Offsite S (Easternmost)

Hydrograph type	=	SCS Runoff	Peak discharge	=	8.350 cfs
Storm frequency	=	10 yrs	Time to peak	=	722 min
Time interval	=	2 min	Hyd. volume	=	23,458 cuft
Drainage area	=	2.100 ac	Curve number	=	80
Basin Slope	=	1.6 %	Hydraulic length	=	370 ft
Tc method	=	USER	Time of conc. (Tc)	=	15.00 min
Total precip.	=	5.30 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

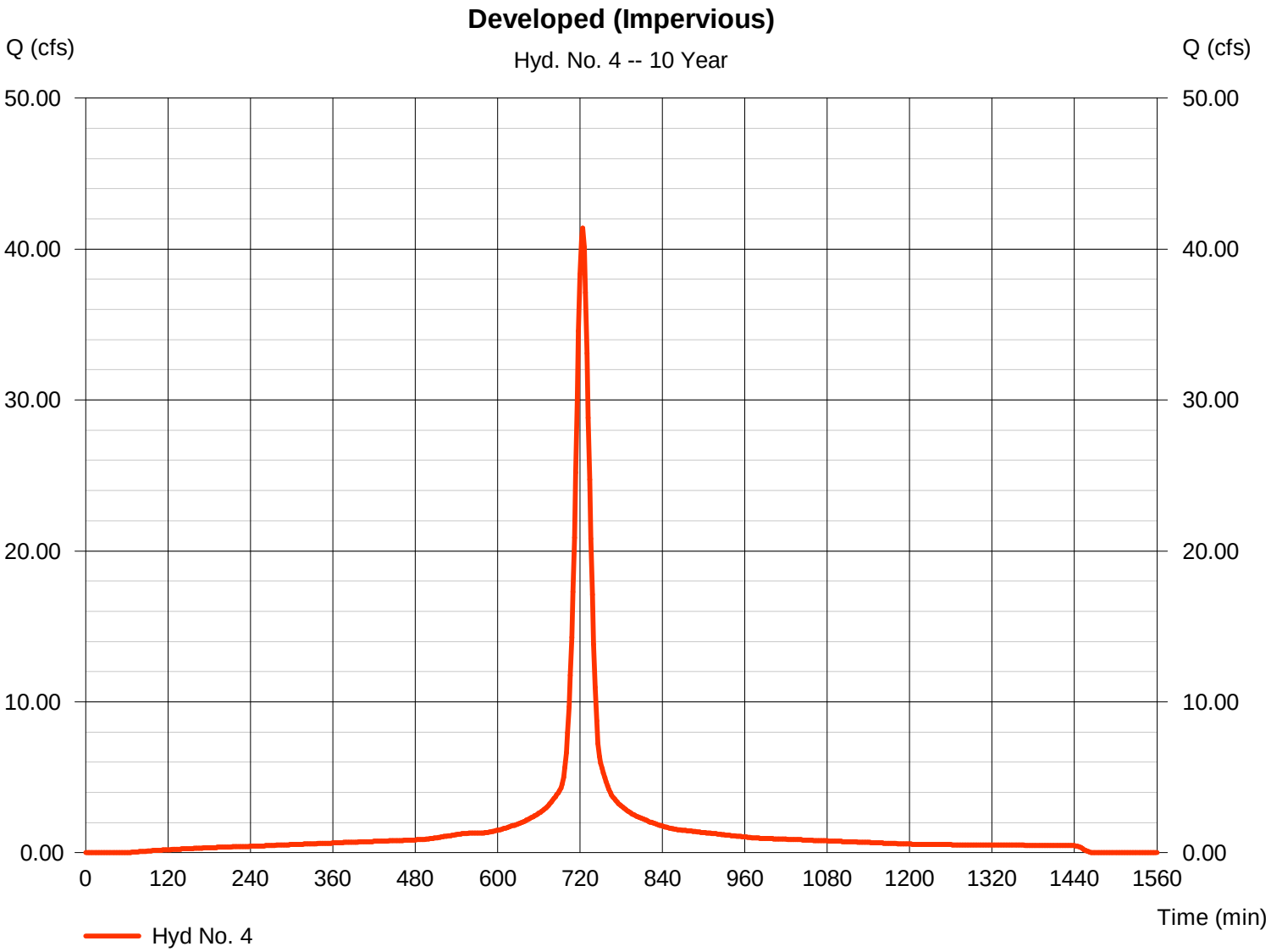


Hydrograph Report

Hyd. No. 4

Developed (Impervious)

Hydrograph type	=	SCS Runoff	Peak discharge	=	41.40 cfs
Storm frequency	=	10 yrs	Time to peak	=	724 min
Time interval	=	2 min	Hyd. volume	=	147,022 cuft
Drainage area	=	8.000 ac	Curve number	=	98
Basin Slope	=	1.8 %	Hydraulic length	=	2000 ft
Tc method	=	LAG	Time of conc. (Tc)	=	19.86 min
Total precip.	=	5.30 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

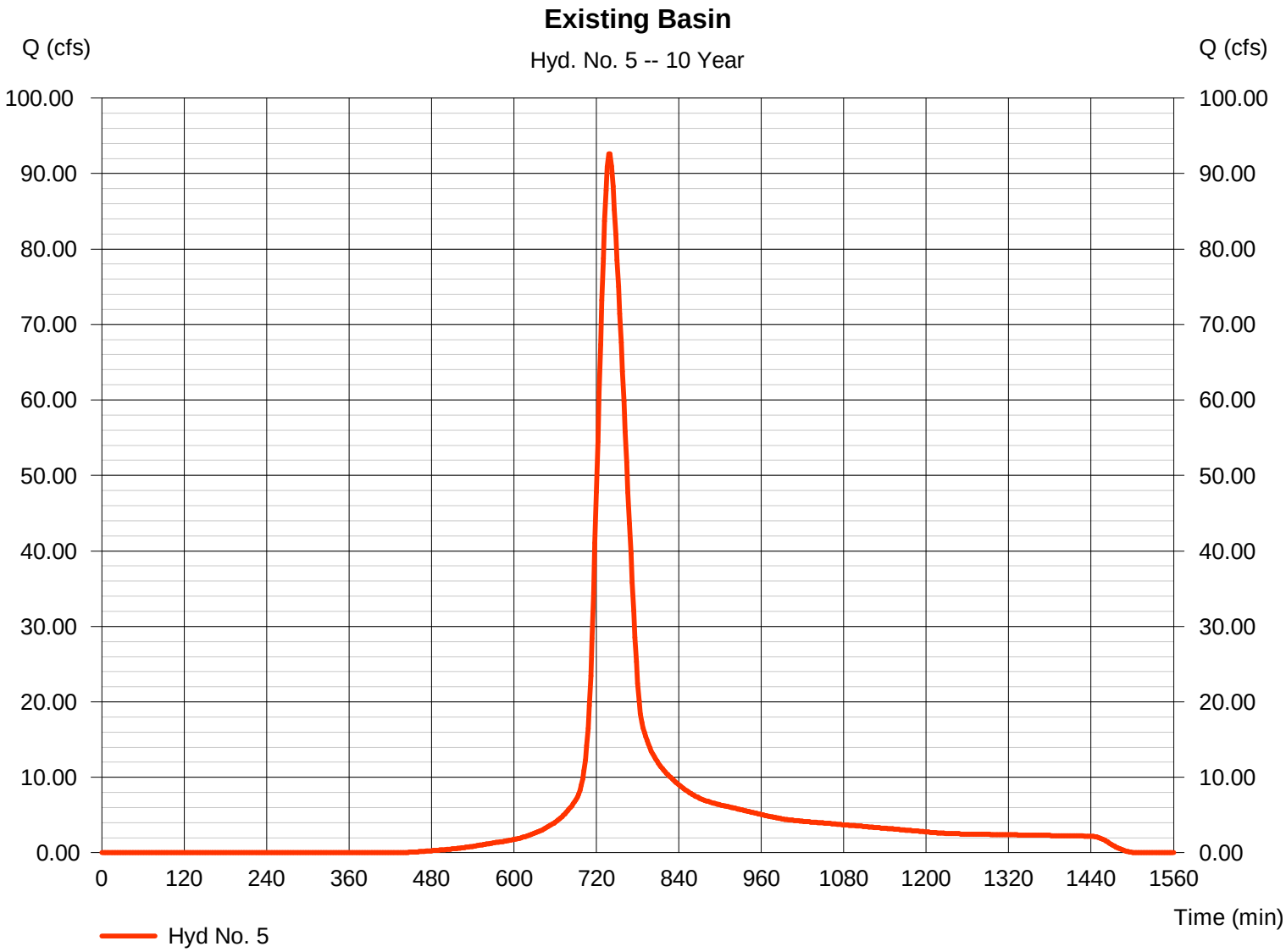


Hydrograph Report

Hyd. No. 5

Existing Basin

Hydrograph type	=	SCS Runoff	Peak discharge	=	92.59 cfs
Storm frequency	=	10 yrs	Time to peak	=	738 min
Time interval	=	2 min	Hyd. volume	=	477,719 cuft
Drainage area	=	41.300 ac	Curve number	=	80
Basin Slope	=	1.8 %	Hydraulic length	=	2000 ft
Tc method	=	LAG	Time of conc. (Tc)	=	41.91 min
Total precip.	=	5.30 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

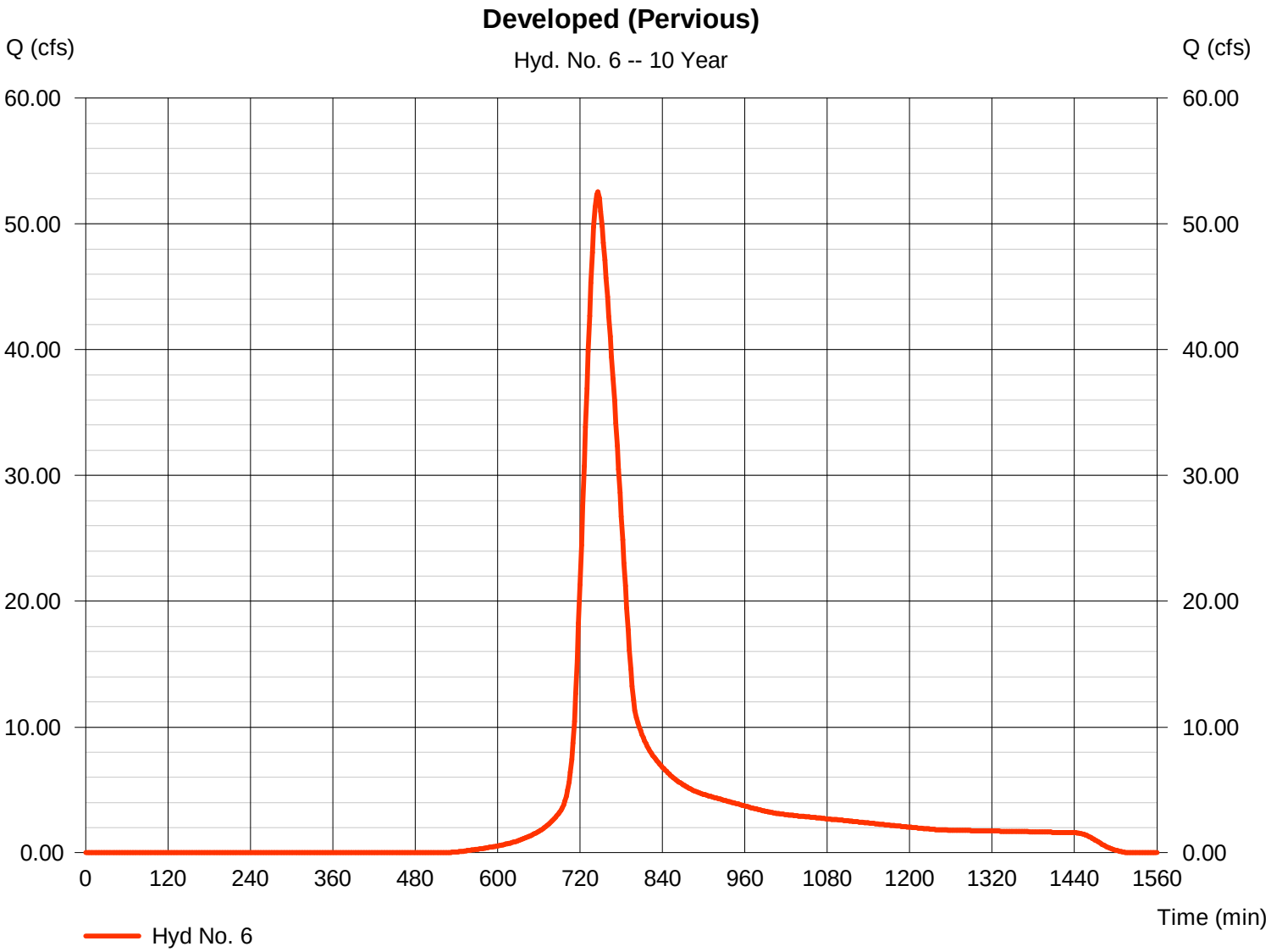


Hydrograph Report

Hyd. No. 6

Developed (Pervious)

Hydrograph type	=	SCS Runoff	Peak discharge	=	52.54 cfs
Storm frequency	=	10 yrs	Time to peak	=	746 min
Time interval	=	2 min	Hyd. volume	=	315,462 cuft
Drainage area	=	32.000 ac	Curve number	=	75
Basin Slope	=	1.5 %	Hydraulic length	=	2000 ft
Tc method	=	LAG	Time of conc. (Tc)	=	52.56 min
Total precip.	=	5.30 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

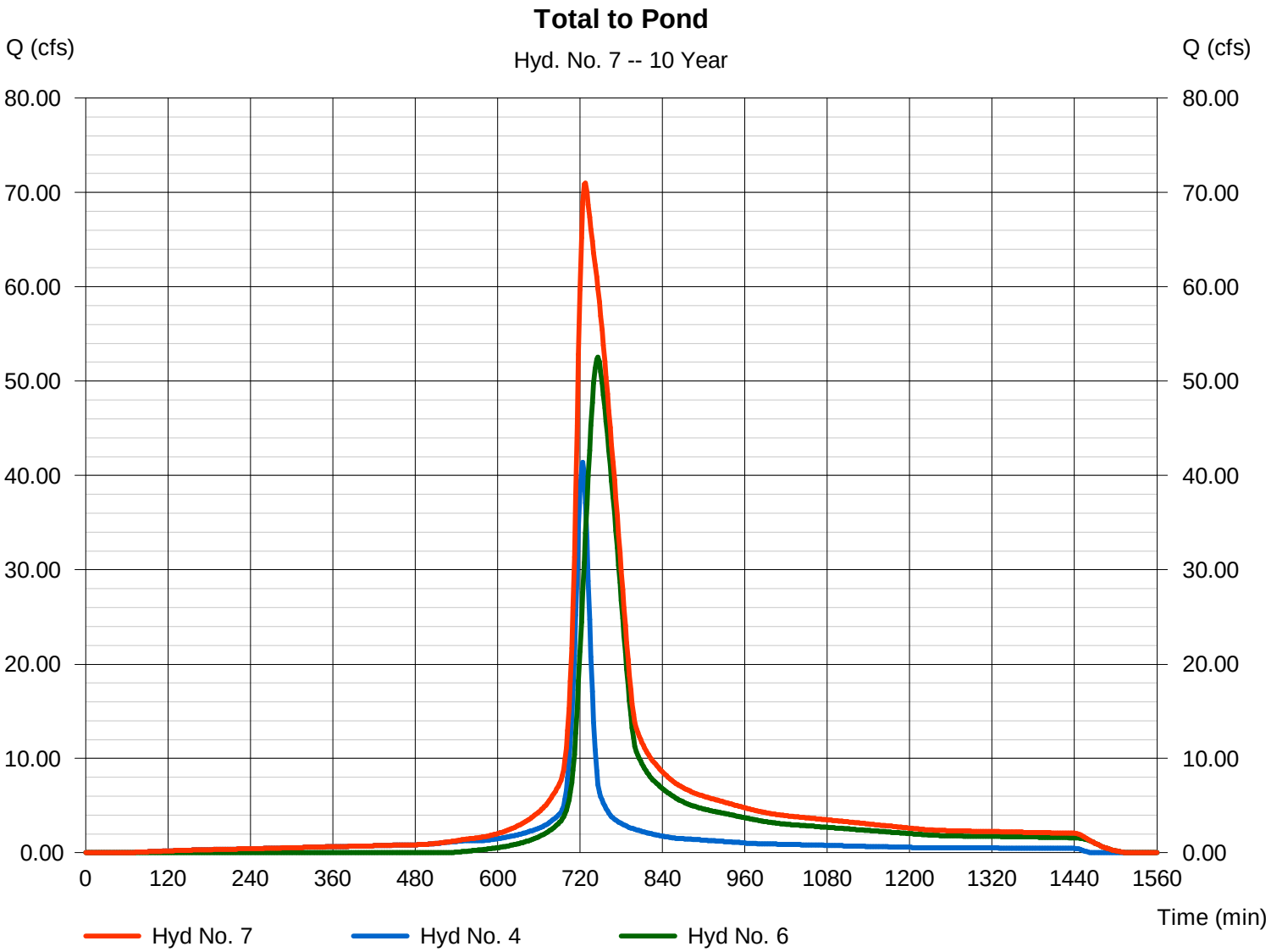


Hydrograph Report

Hyd. No. 7

Total to Pond

Hydrograph type	= Combine	Peak discharge	= 70.97 cfs
Storm frequency	= 10 yrs	Time to peak	= 728 min
Time interval	= 2 min	Hyd. volume	= 462,483 cuft
Inflow hyds.	= 4, 6	Contrib. drain. area	= 40.000 ac



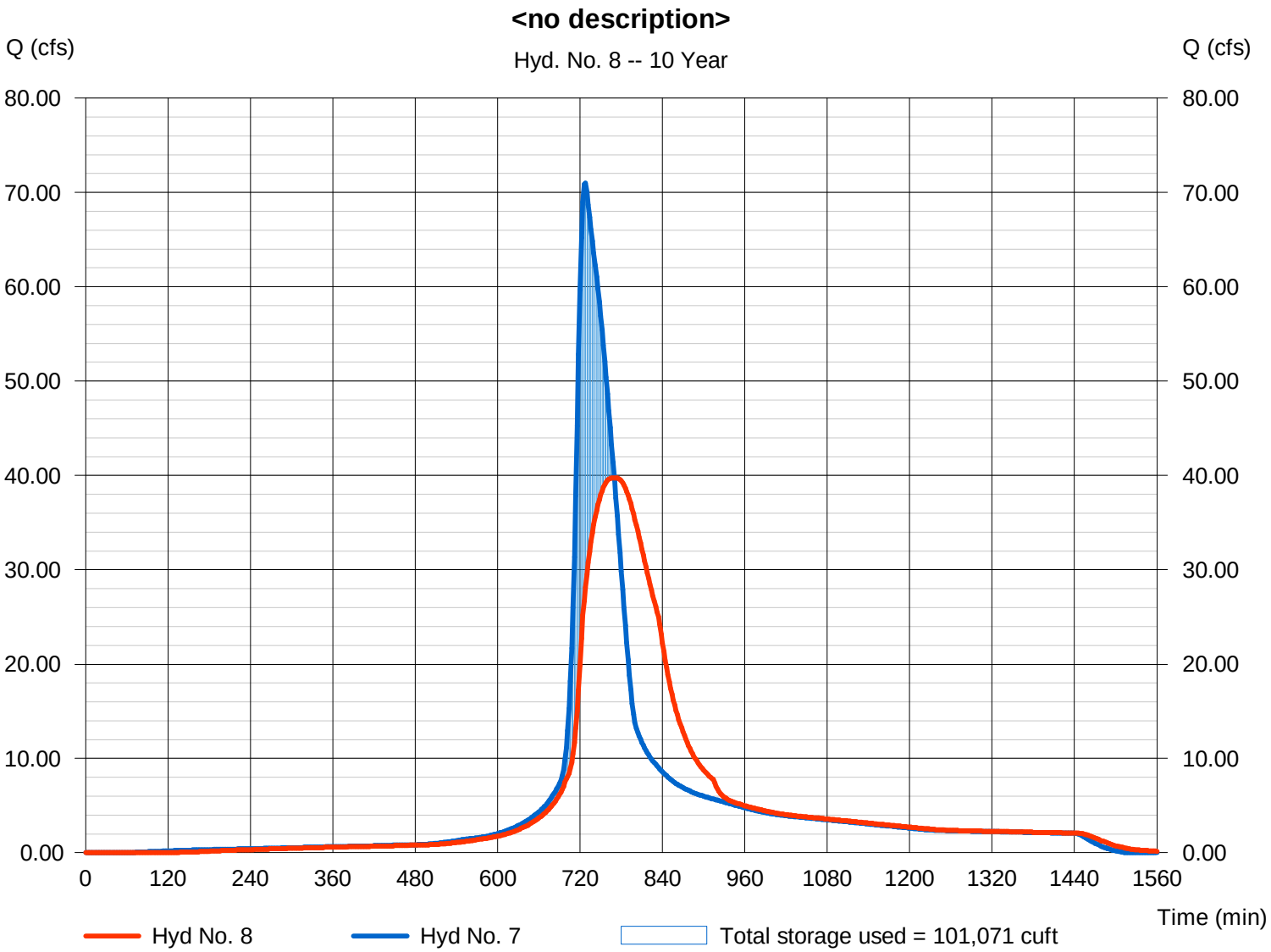
Hydrograph Report

Hyd. No. 8

<no description>

Hydrograph type	=	Reservoir	Peak discharge	=	39.76 cfs
Storm frequency	=	10 yrs	Time to peak	=	770 min
Time interval	=	2 min	Hyd. volume	=	462,474 cuft
Inflow hyd. No.	=	7 - Total to Pond	Max. Elevation	=	1371.03 ft
Reservoir name	=	Proposed Pond	Max. Storage	=	101,071 cuft

Storage Indication method used.



Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066

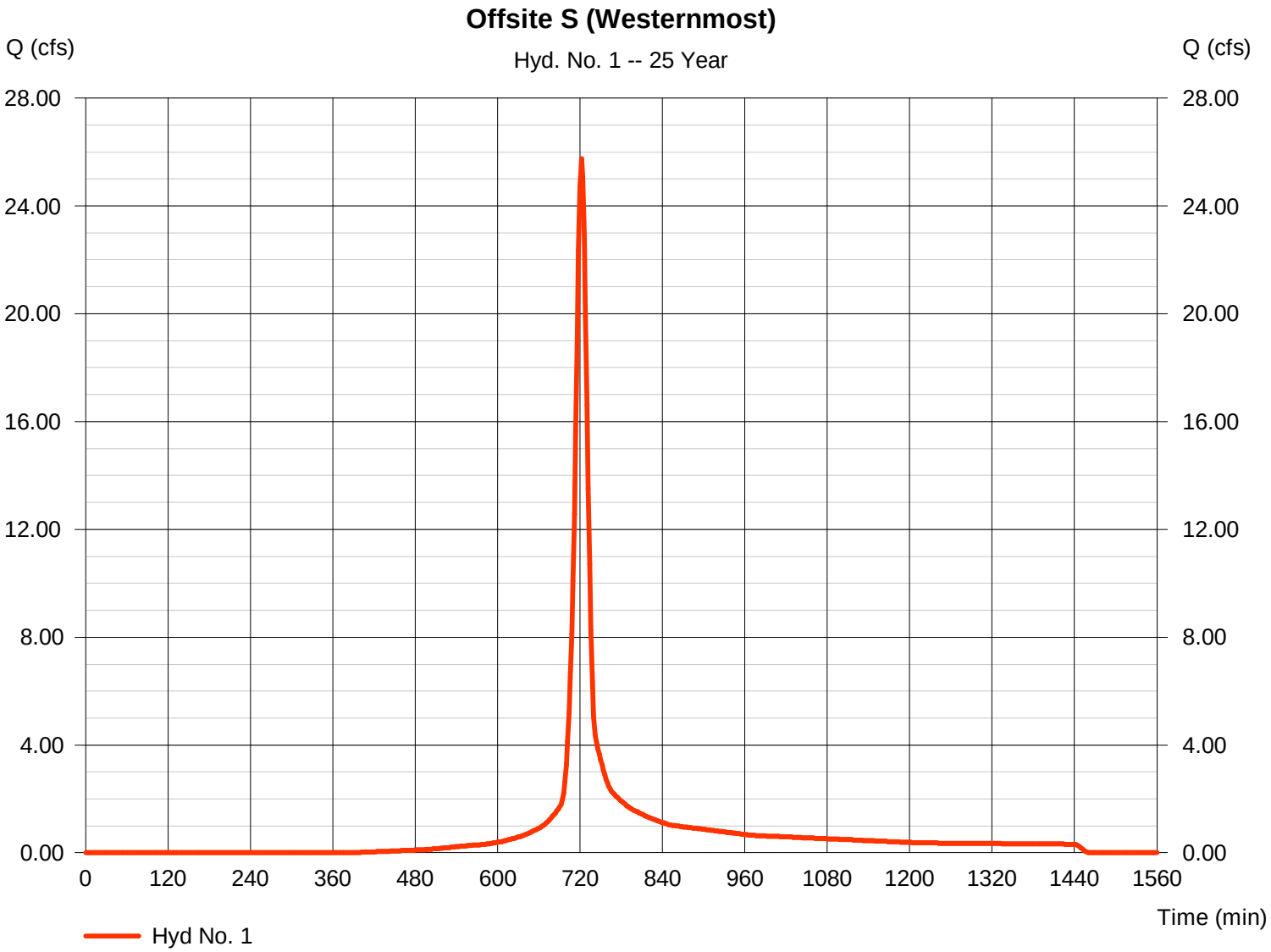
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph description
1	SCS Runoff	25.74	2	722	72,624	------	------	------	Offsite S (Westernmost)
2	SCS Runoff	19.71	2	724	61,837	------	------	------	Offsite S (Centralmost)
3	SCS Runoff	10.20	2	722	28,775	------	------	------	Offsite S (Easternmost)
4	SCS Runoff	47.71	2	724	170,225	------	------	------	Developed (Impervious)
5	SCS Runoff	113.60	2	738	586,008	------	------	------	Existing Basin
6	SCS Runoff	66.00	2	746	394,216	------	------	------	Developed (Pervious)
7	Combine	86.06	2	728	564,441	4, 6	------	------	Total to Pond
8	Reservoir	41.77	2	768	564,432	7	1371.42	140,221	<no description>

Hydrograph Report

Hyd. No. 1

Offsite S (Westernmost)

Hydrograph type	=	SCS Runoff	Peak discharge	=	25.74 cfs
Storm frequency	=	25 yrs	Time to peak	=	722 min
Time interval	=	2 min	Hyd. volume	=	72,624 cuft
Drainage area	=	5.300 ac	Curve number	=	80
Basin Slope	=	1.7 %	Hydraulic length	=	575 ft
Tc method	=	LAG	Time of conc. (Tc)	=	15.68 min
Total precip.	=	6.10 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

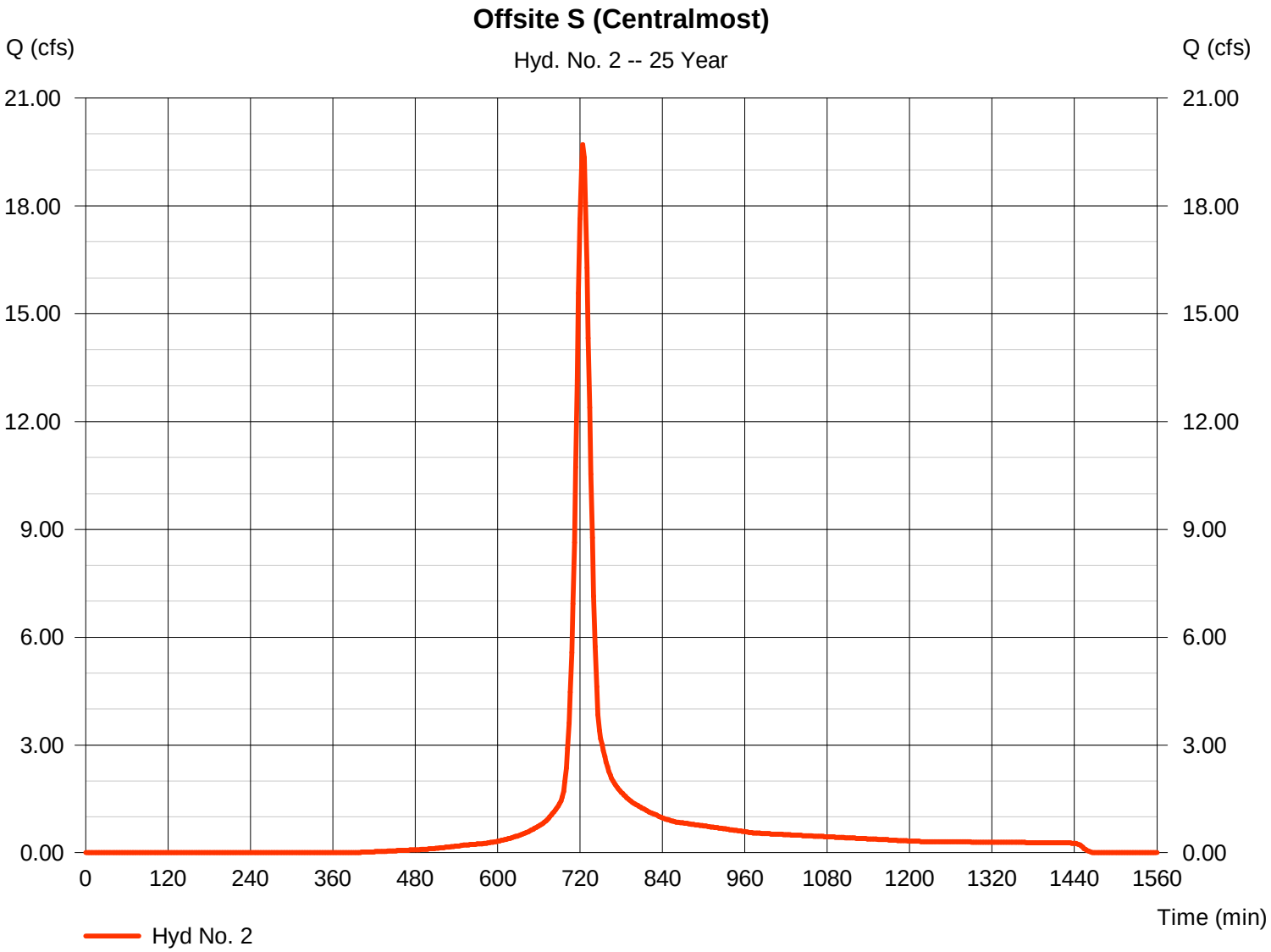


Hydrograph Report

Hyd. No. 2

Offsite S (Centralmost)

Hydrograph type	=	SCS Runoff	Peak discharge	=	19.71 cfs
Storm frequency	=	25 yrs	Time to peak	=	724 min
Time interval	=	2 min	Hyd. volume	=	61,837 cuft
Drainage area	=	4.400 ac	Curve number	=	80
Basin Slope	=	1.5 %	Hydraulic length	=	650 ft
Tc method	=	LAG	Time of conc. (Tc)	=	18.42 min
Total precip.	=	6.10 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

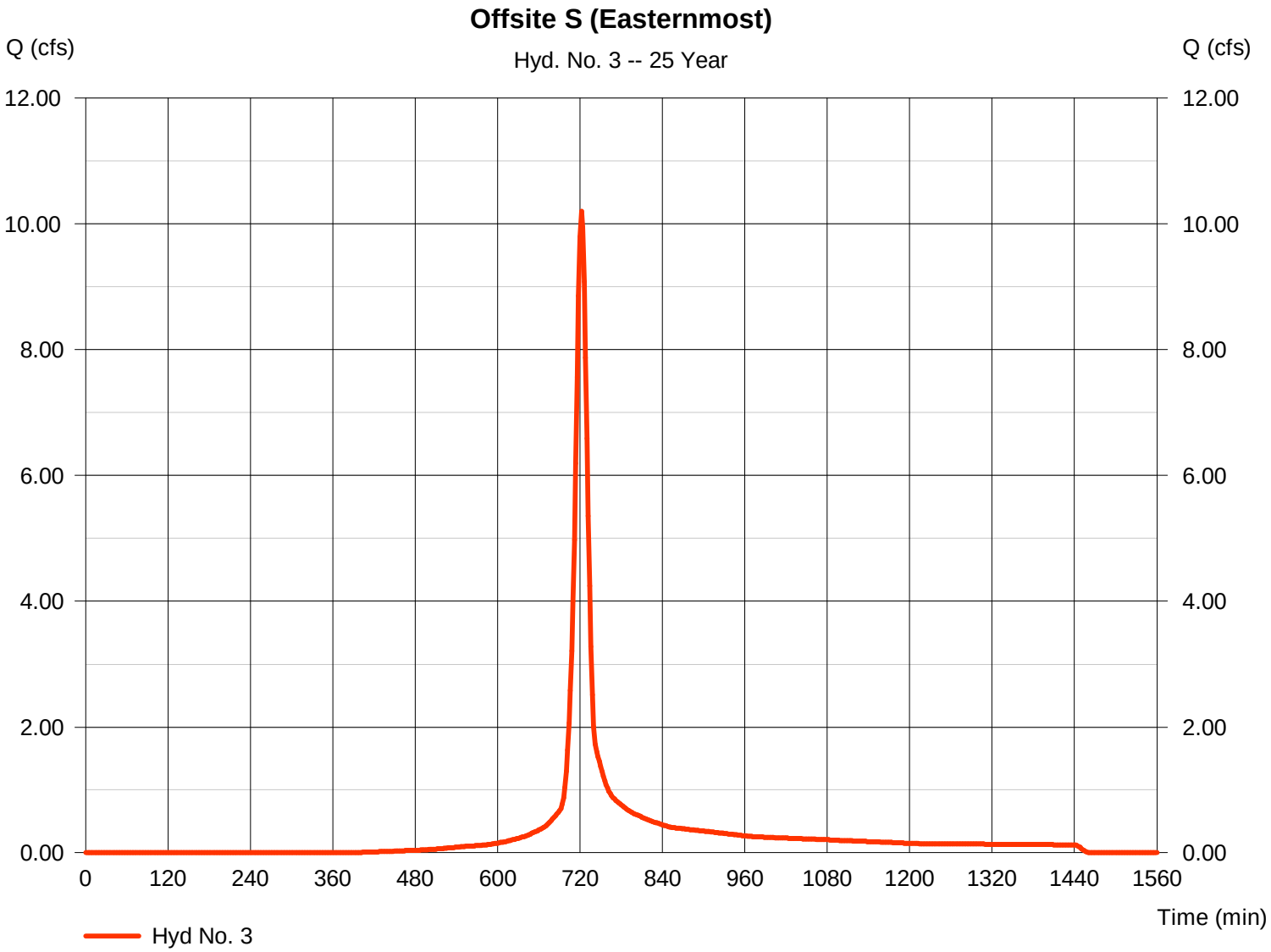


Hydrograph Report

Hyd. No. 3

Offsite S (Easternmost)

Hydrograph type	=	SCS Runoff	Peak discharge	=	10.20 cfs
Storm frequency	=	25 yrs	Time to peak	=	722 min
Time interval	=	2 min	Hyd. volume	=	28,775 cuft
Drainage area	=	2.100 ac	Curve number	=	80
Basin Slope	=	1.6 %	Hydraulic length	=	370 ft
Tc method	=	USER	Time of conc. (Tc)	=	15.00 min
Total precip.	=	6.10 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

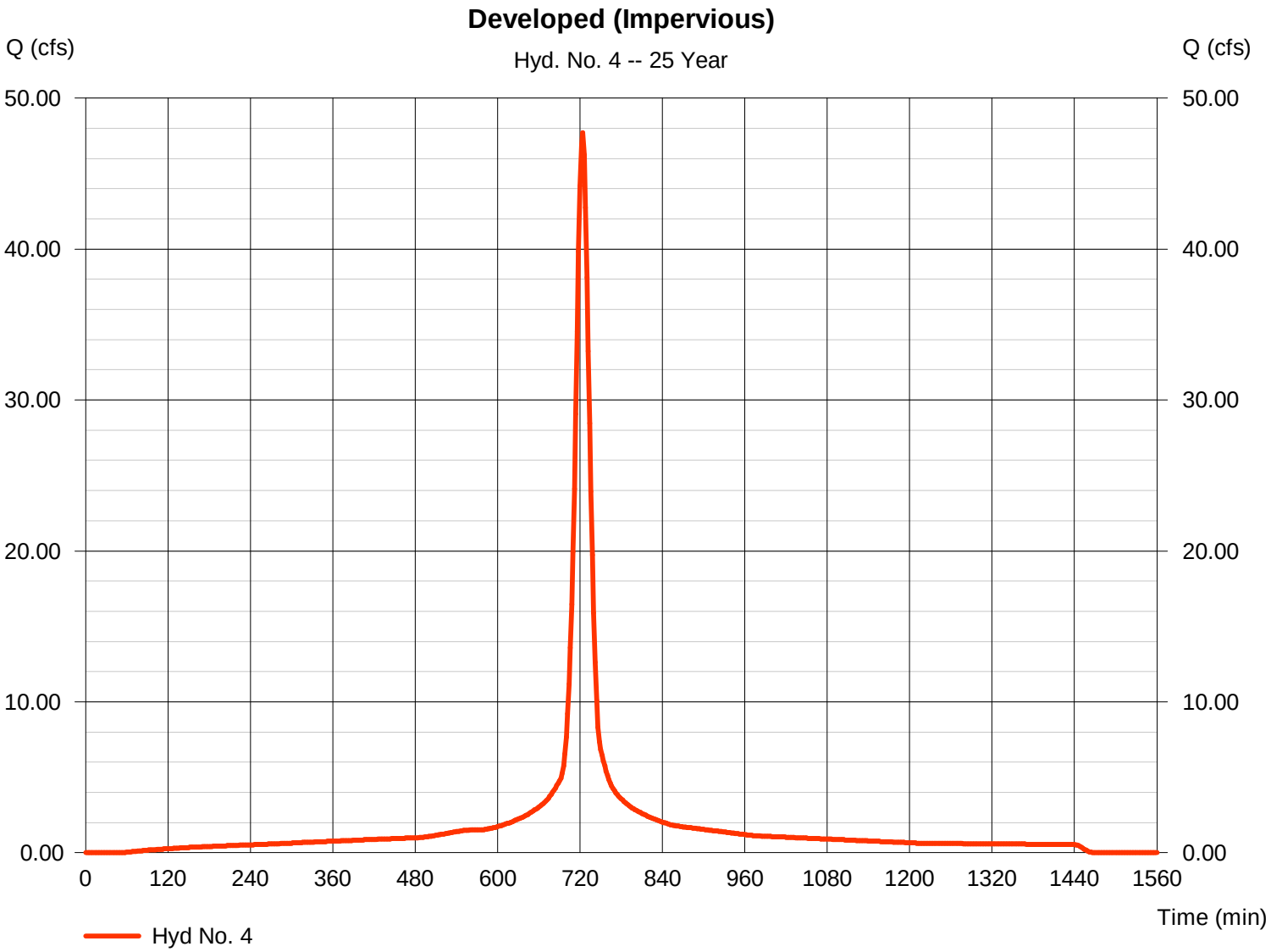


Hydrograph Report

Hyd. No. 4

Developed (Impervious)

Hydrograph type	=	SCS Runoff	Peak discharge	=	47.71 cfs
Storm frequency	=	25 yrs	Time to peak	=	724 min
Time interval	=	2 min	Hyd. volume	=	170,225 cuft
Drainage area	=	8.000 ac	Curve number	=	98
Basin Slope	=	1.8 %	Hydraulic length	=	2000 ft
Tc method	=	LAG	Time of conc. (Tc)	=	19.86 min
Total precip.	=	6.10 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

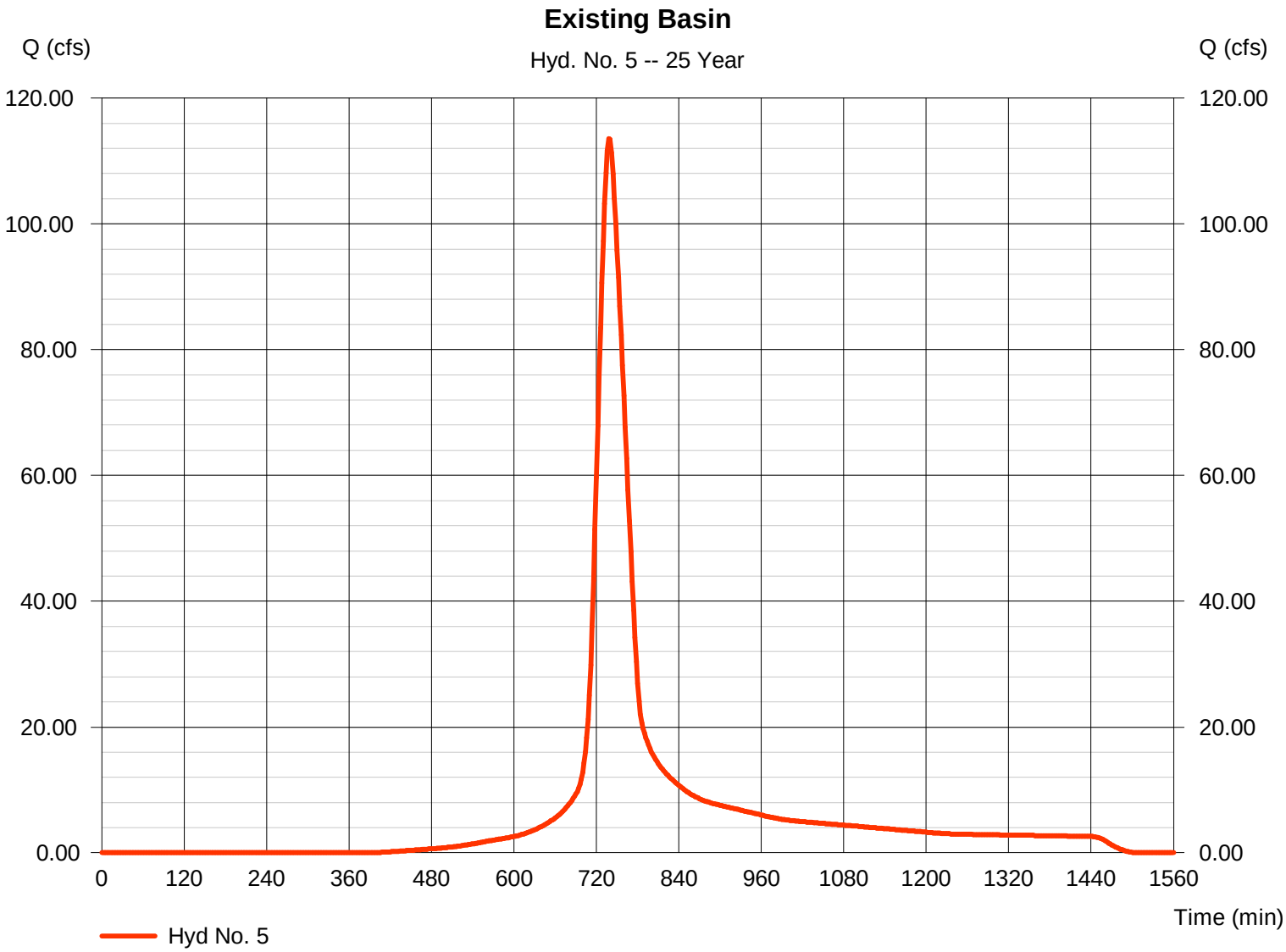


Hydrograph Report

Hyd. No. 5

Existing Basin

Hydrograph type	=	SCS Runoff	Peak discharge	=	113.60 cfs
Storm frequency	=	25 yrs	Time to peak	=	738 min
Time interval	=	2 min	Hyd. volume	=	586,008 cuft
Drainage area	=	41.300 ac	Curve number	=	80
Basin Slope	=	1.8 %	Hydraulic length	=	2000 ft
Tc method	=	LAG	Time of conc. (Tc)	=	41.91 min
Total precip.	=	6.10 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

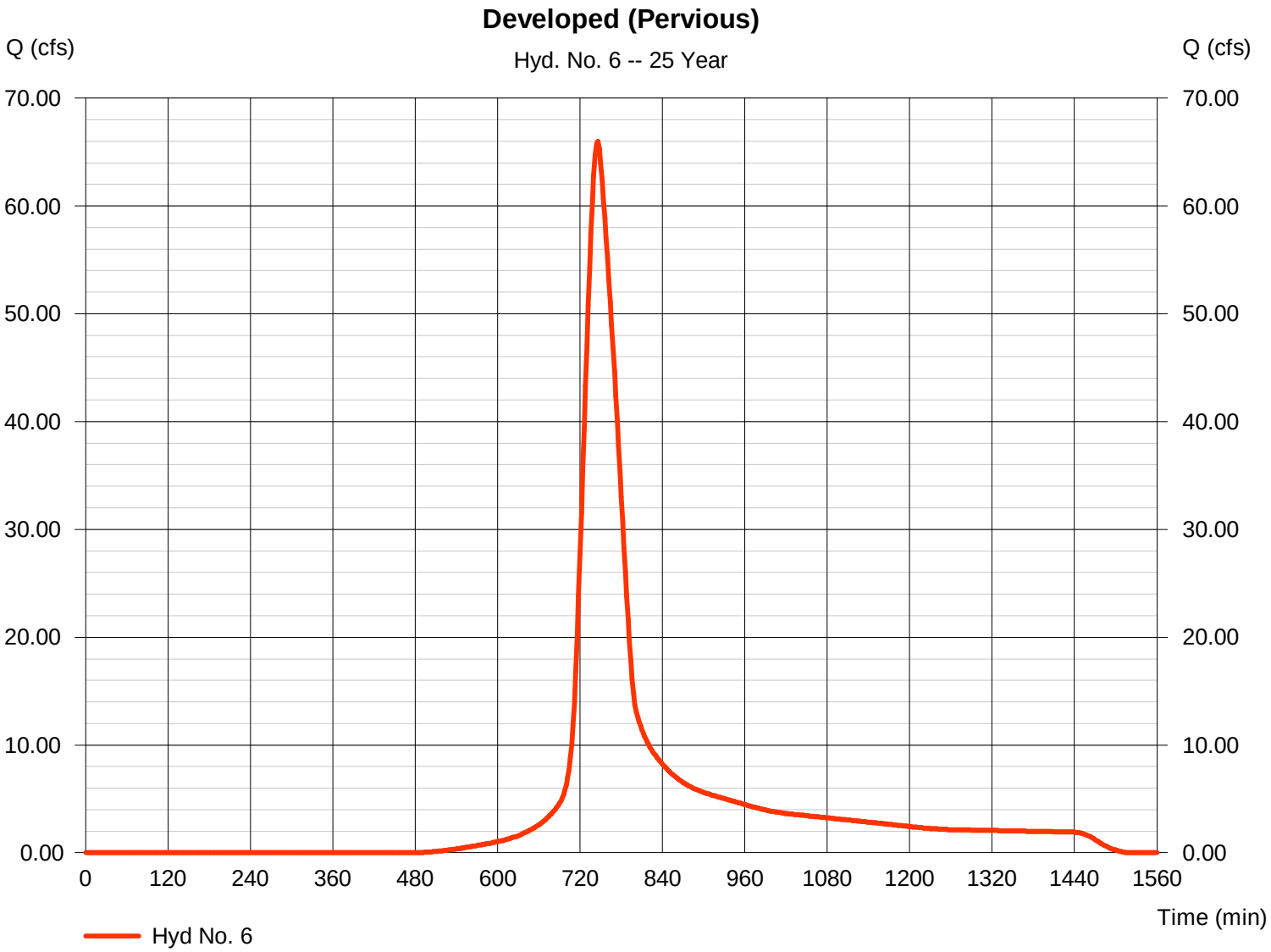


Hydrograph Report

Hyd. No. 6

Developed (Pervious)

Hydrograph type	=	SCS Runoff	Peak discharge	=	66.00 cfs
Storm frequency	=	25 yrs	Time to peak	=	746 min
Time interval	=	2 min	Hyd. volume	=	394,216 cuft
Drainage area	=	32.000 ac	Curve number	=	75
Basin Slope	=	1.5 %	Hydraulic length	=	2000 ft
Tc method	=	LAG	Time of conc. (Tc)	=	52.56 min
Total precip.	=	6.10 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

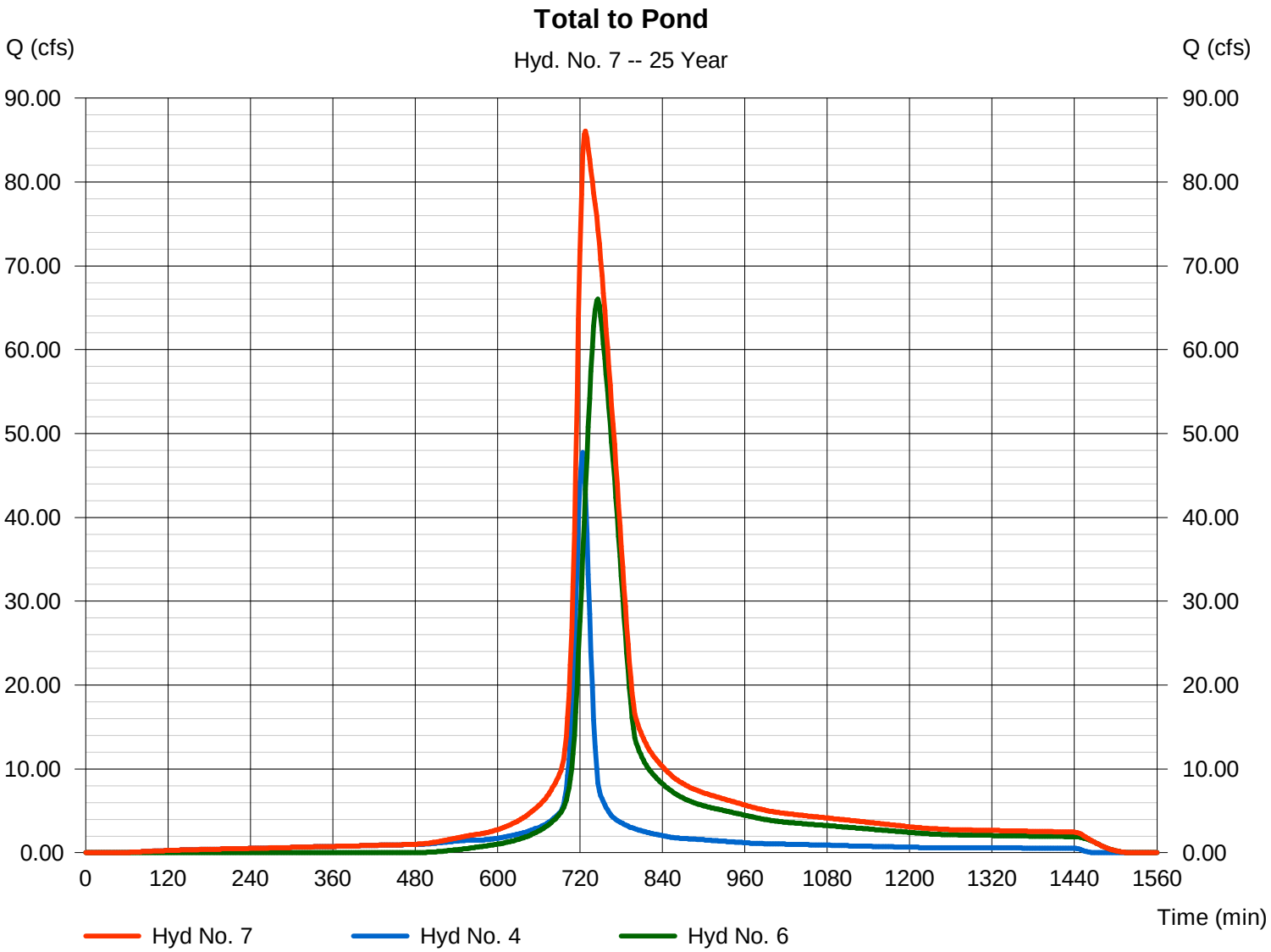


Hydrograph Report

Hyd. No. 7

Total to Pond

Hydrograph type	= Combine	Peak discharge	= 86.06 cfs
Storm frequency	= 25 yrs	Time to peak	= 728 min
Time interval	= 2 min	Hyd. volume	= 564,441 cuft
Inflow hyds.	= 4, 6	Contrib. drain. area	= 40.000 ac



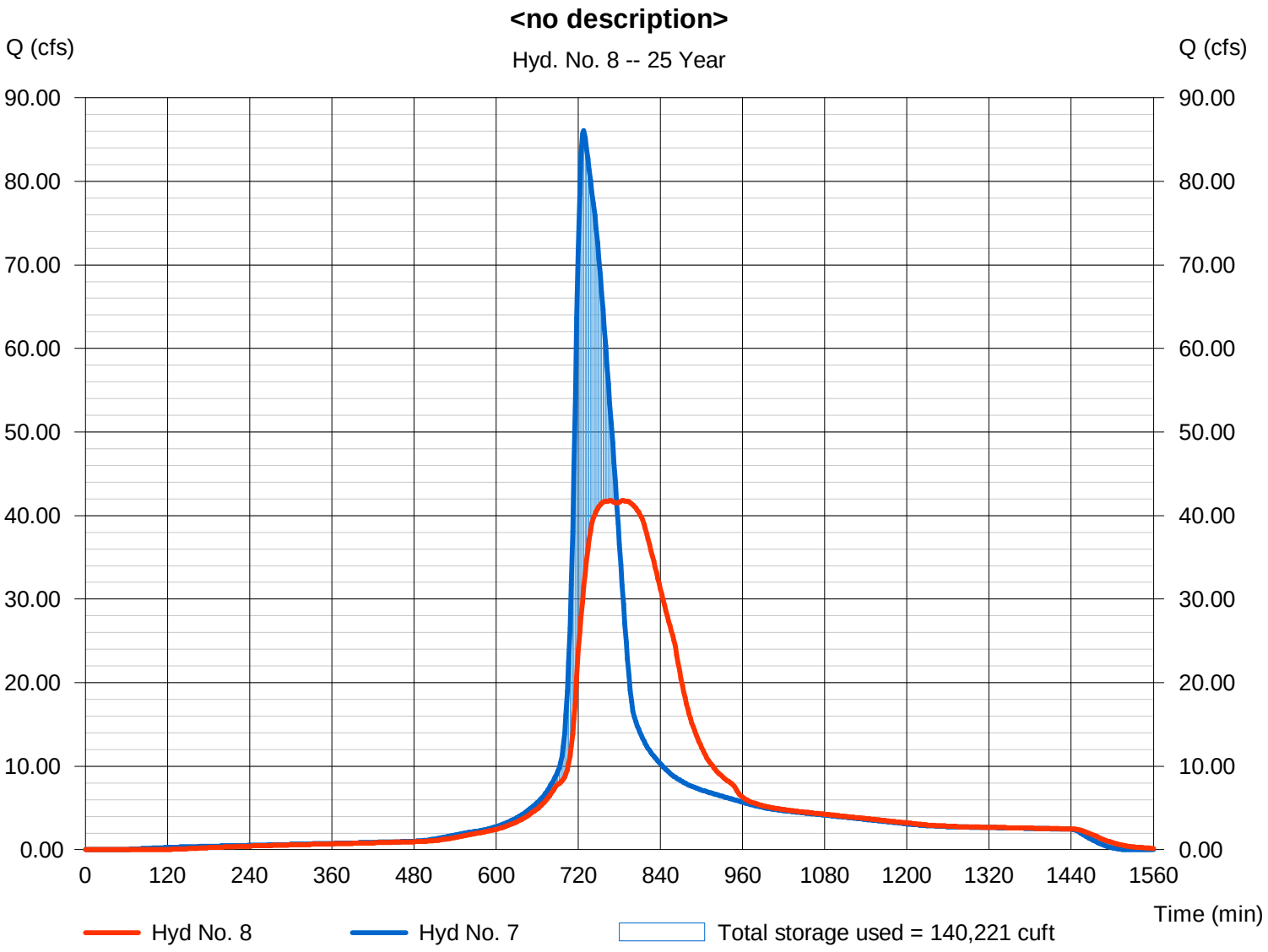
Hydrograph Report

Hyd. No. 8

<no description>

Hydrograph type	=	Reservoir	Peak discharge	=	41.77 cfs
Storm frequency	=	25 yrs	Time to peak	=	768 min
Time interval	=	2 min	Hyd. volume	=	564,432 cuft
Inflow hyd. No.	=	7 - Total to Pond	Max. Elevation	=	1371.42 ft
Reservoir name	=	Proposed Pond	Max. Storage	=	140,221 cuft

Storage Indication method used.



Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066

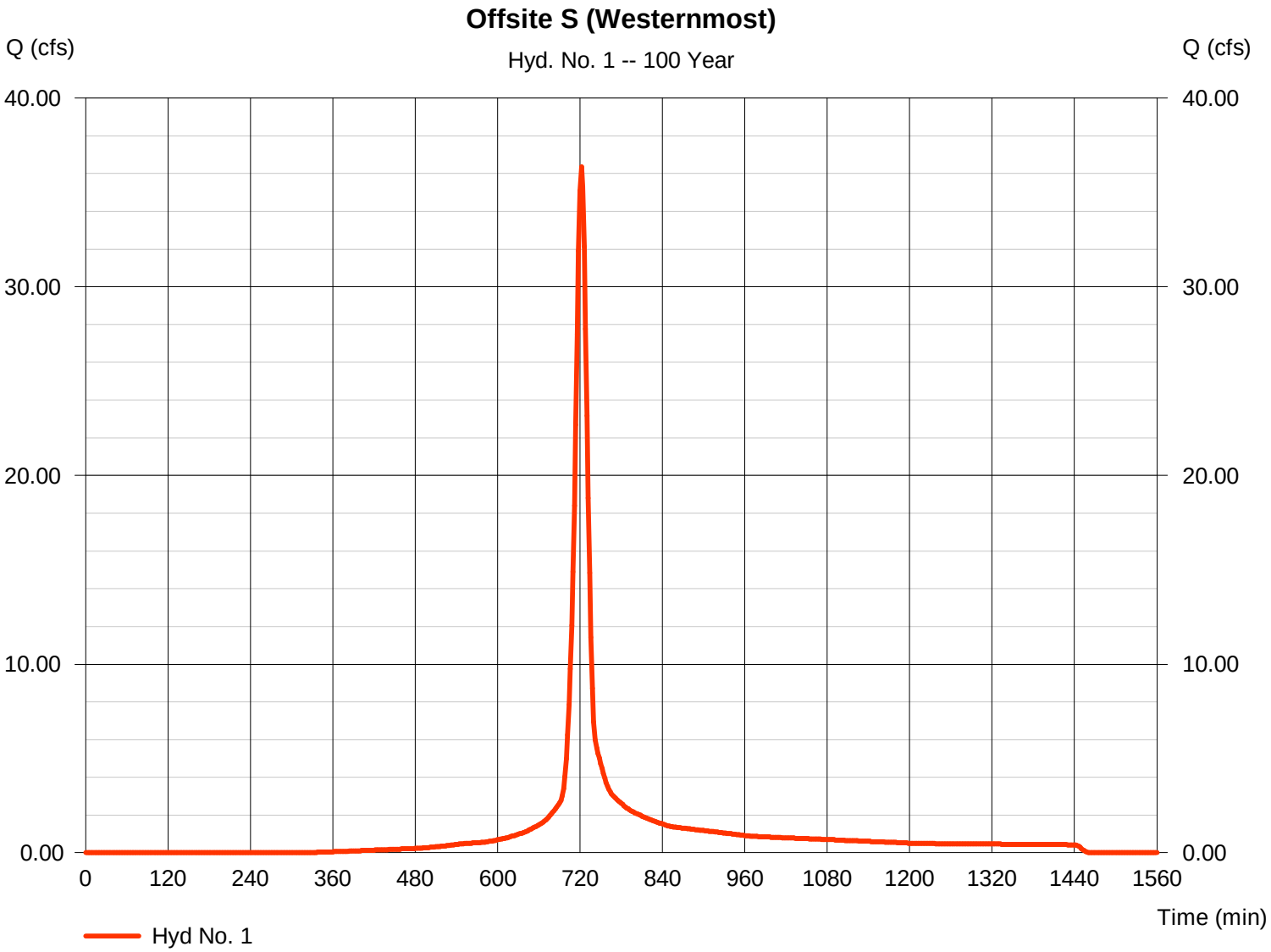
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph description
1	SCS Runoff	36.36	2	722	103,757	------	------	------	Offsite S (Westernmost)
2	SCS Runoff	27.88	2	724	88,346	------	------	------	Offsite S (Centralmost)
3	SCS Runoff	14.41	2	722	41,111	------	------	------	Offsite S (Easternmost)
4	SCS Runoff	61.90	2	724	222,454	------	------	------	Developed (Impervious)
5	SCS Runoff	161.52	2	738	837,222	------	------	------	Existing Basin
6	SCS Runoff	97.25	2	746	579,663	------	------	------	Developed (Pervious)
7	Combine	121.00	2	728	802,116	4, 6	------	------	Total to Pond
8	Reservoir	55.32	2	778	802,107	7	1372.27	231,287	<no description>

Hydrograph Report

Hyd. No. 1

Offsite S (Westernmost)

Hydrograph type	=	SCS Runoff	Peak discharge	=	36.36 cfs
Storm frequency	=	100 yrs	Time to peak	=	722 min
Time interval	=	2 min	Hyd. volume	=	103,757 cuft
Drainage area	=	5.300 ac	Curve number	=	80
Basin Slope	=	1.7 %	Hydraulic length	=	575 ft
Tc method	=	LAG	Time of conc. (Tc)	=	15.68 min
Total precip.	=	7.90 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

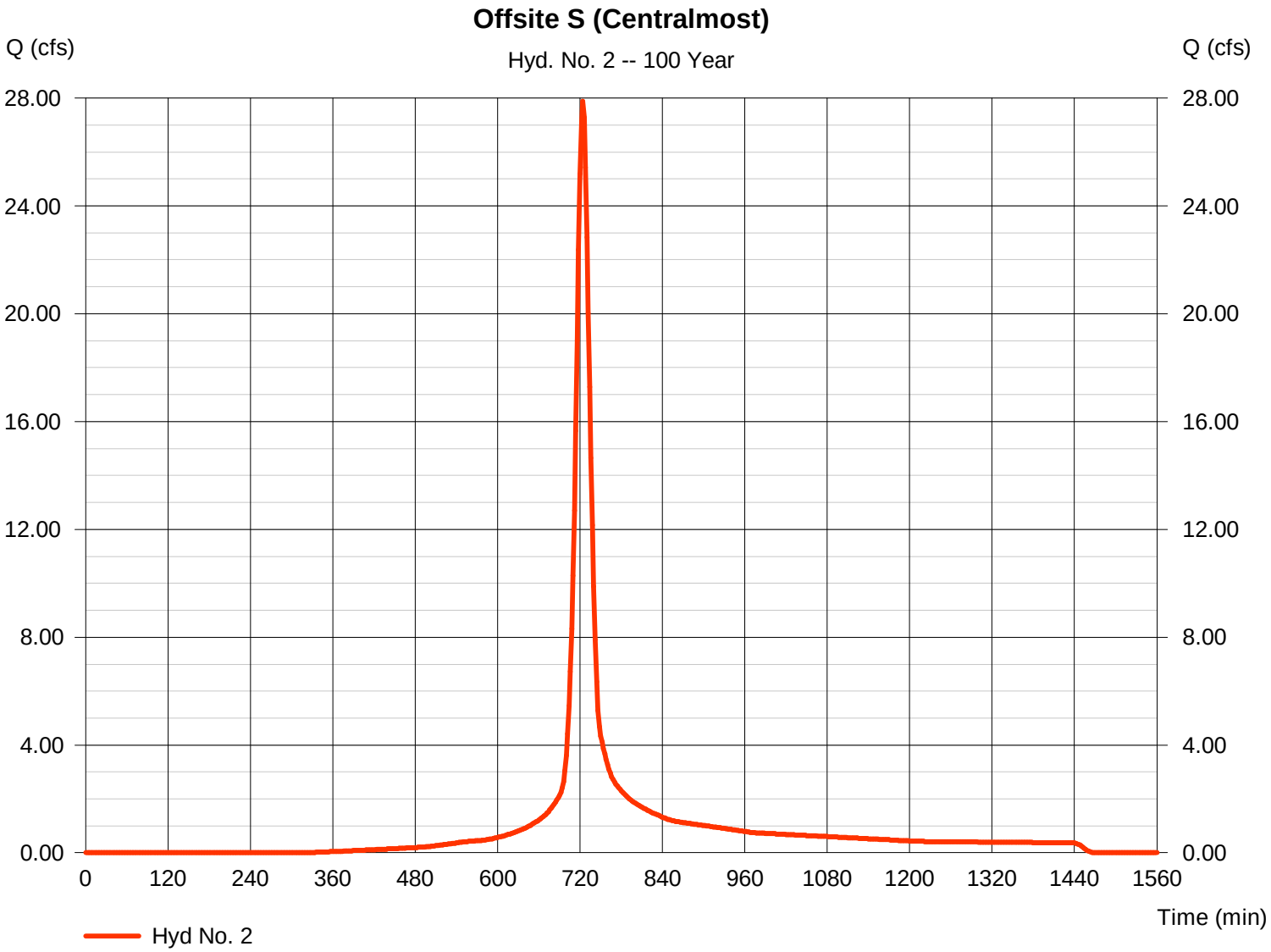


Hydrograph Report

Hyd. No. 2

Offsite S (Centralmost)

Hydrograph type	=	SCS Runoff	Peak discharge	=	27.88 cfs
Storm frequency	=	100 yrs	Time to peak	=	724 min
Time interval	=	2 min	Hyd. volume	=	88,346 cuft
Drainage area	=	4.400 ac	Curve number	=	80
Basin Slope	=	1.5 %	Hydraulic length	=	650 ft
Tc method	=	LAG	Time of conc. (Tc)	=	18.42 min
Total precip.	=	7.90 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

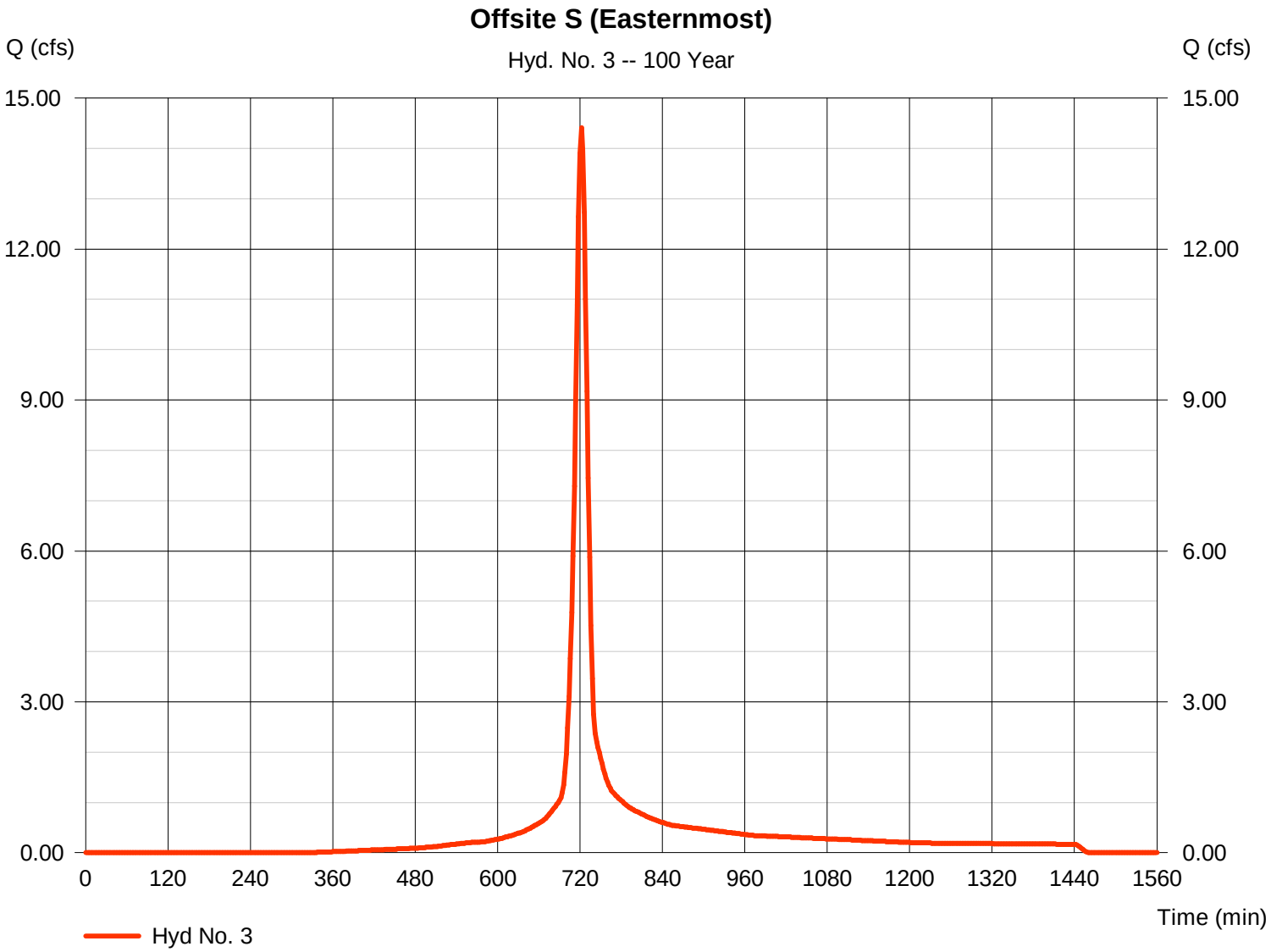


Hydrograph Report

Hyd. No. 3

Offsite S (Easternmost)

Hydrograph type	=	SCS Runoff	Peak discharge	=	14.41 cfs
Storm frequency	=	100 yrs	Time to peak	=	722 min
Time interval	=	2 min	Hyd. volume	=	41,111 cuft
Drainage area	=	2.100 ac	Curve number	=	80
Basin Slope	=	1.6 %	Hydraulic length	=	370 ft
Tc method	=	USER	Time of conc. (Tc)	=	15.00 min
Total precip.	=	7.90 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

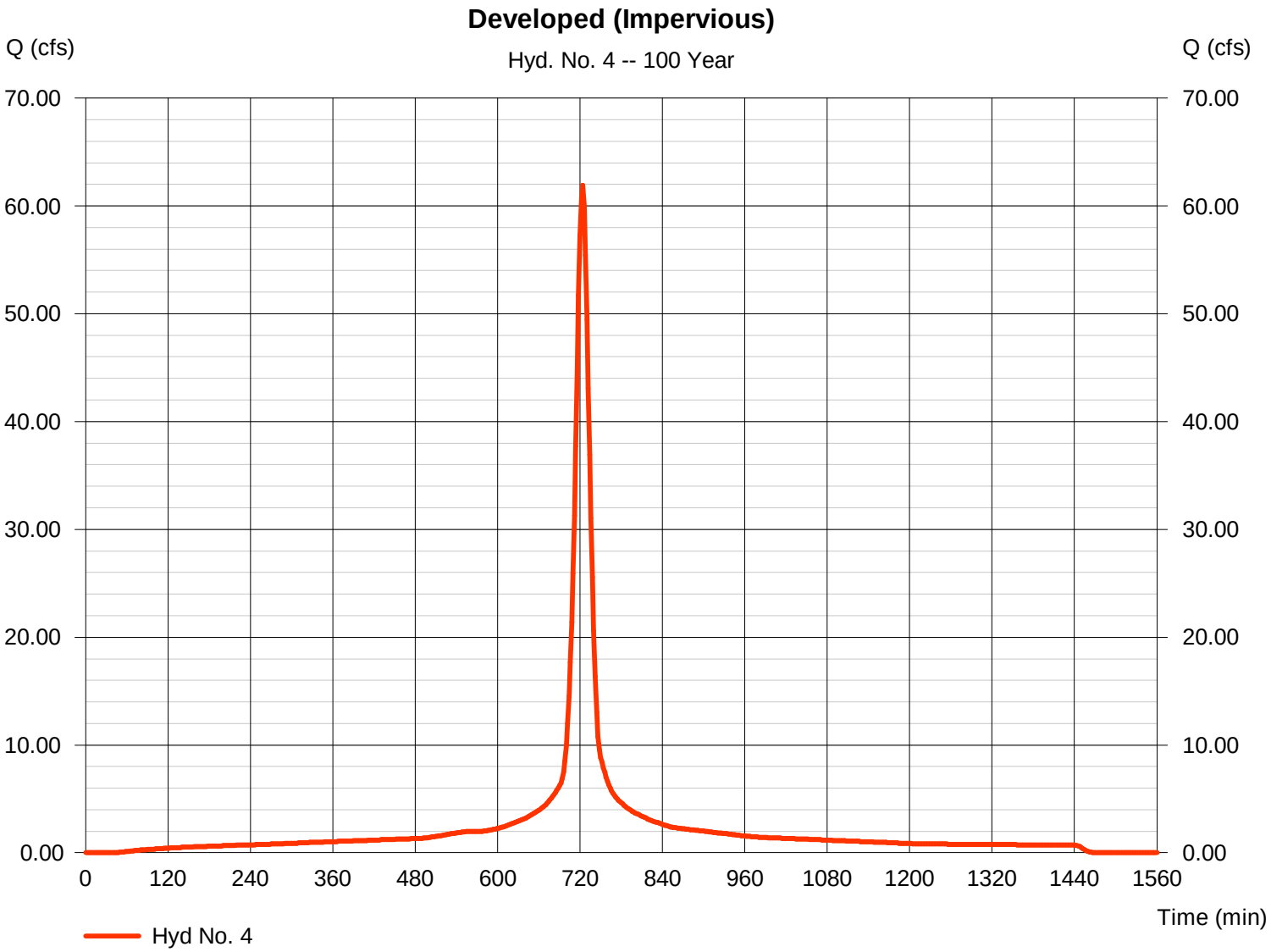


Hydrograph Report

Hyd. No. 4

Developed (Impervious)

Hydrograph type	=	SCS Runoff	Peak discharge	=	61.90 cfs
Storm frequency	=	100 yrs	Time to peak	=	724 min
Time interval	=	2 min	Hyd. volume	=	222,454 cuft
Drainage area	=	8.000 ac	Curve number	=	98
Basin Slope	=	1.8 %	Hydraulic length	=	2000 ft
Tc method	=	LAG	Time of conc. (Tc)	=	19.86 min
Total precip.	=	7.90 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

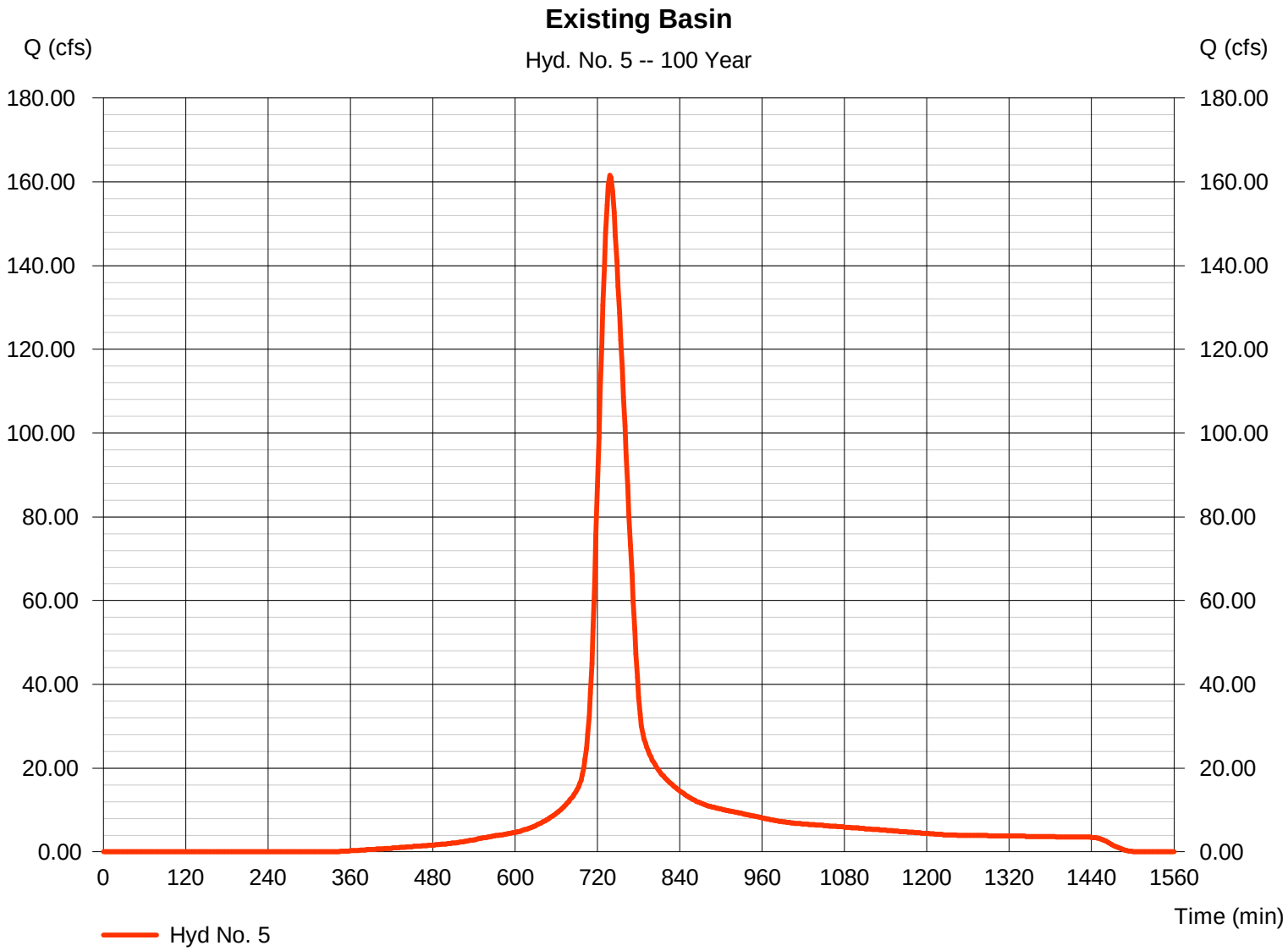


Hydrograph Report

Hyd. No. 5

Existing Basin

Hydrograph type	=	SCS Runoff	Peak discharge	=	161.52 cfs
Storm frequency	=	100 yrs	Time to peak	=	738 min
Time interval	=	2 min	Hyd. volume	=	837,222 cuft
Drainage area	=	41.300 ac	Curve number	=	80
Basin Slope	=	1.8 %	Hydraulic length	=	2000 ft
Tc method	=	LAG	Time of conc. (Tc)	=	41.91 min
Total precip.	=	7.90 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

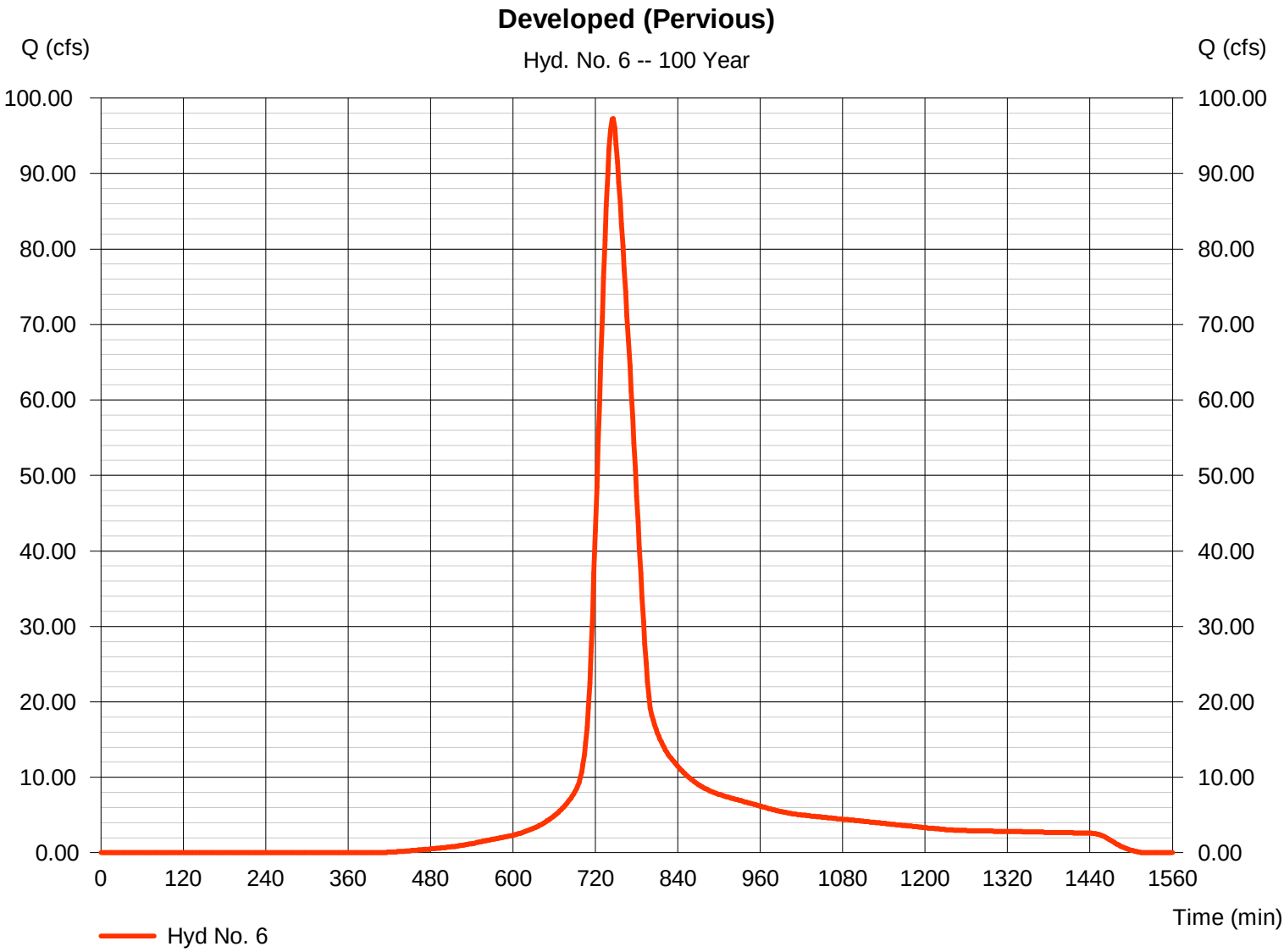


Hydrograph Report

Hyd. No. 6

Developed (Pervious)

Hydrograph type	=	SCS Runoff	Peak discharge	=	97.25 cfs
Storm frequency	=	100 yrs	Time to peak	=	746 min
Time interval	=	2 min	Hyd. volume	=	579,663 cuft
Drainage area	=	32.000 ac	Curve number	=	75
Basin Slope	=	1.5 %	Hydraulic length	=	2000 ft
Tc method	=	LAG	Time of conc. (Tc)	=	52.56 min
Total precip.	=	7.90 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

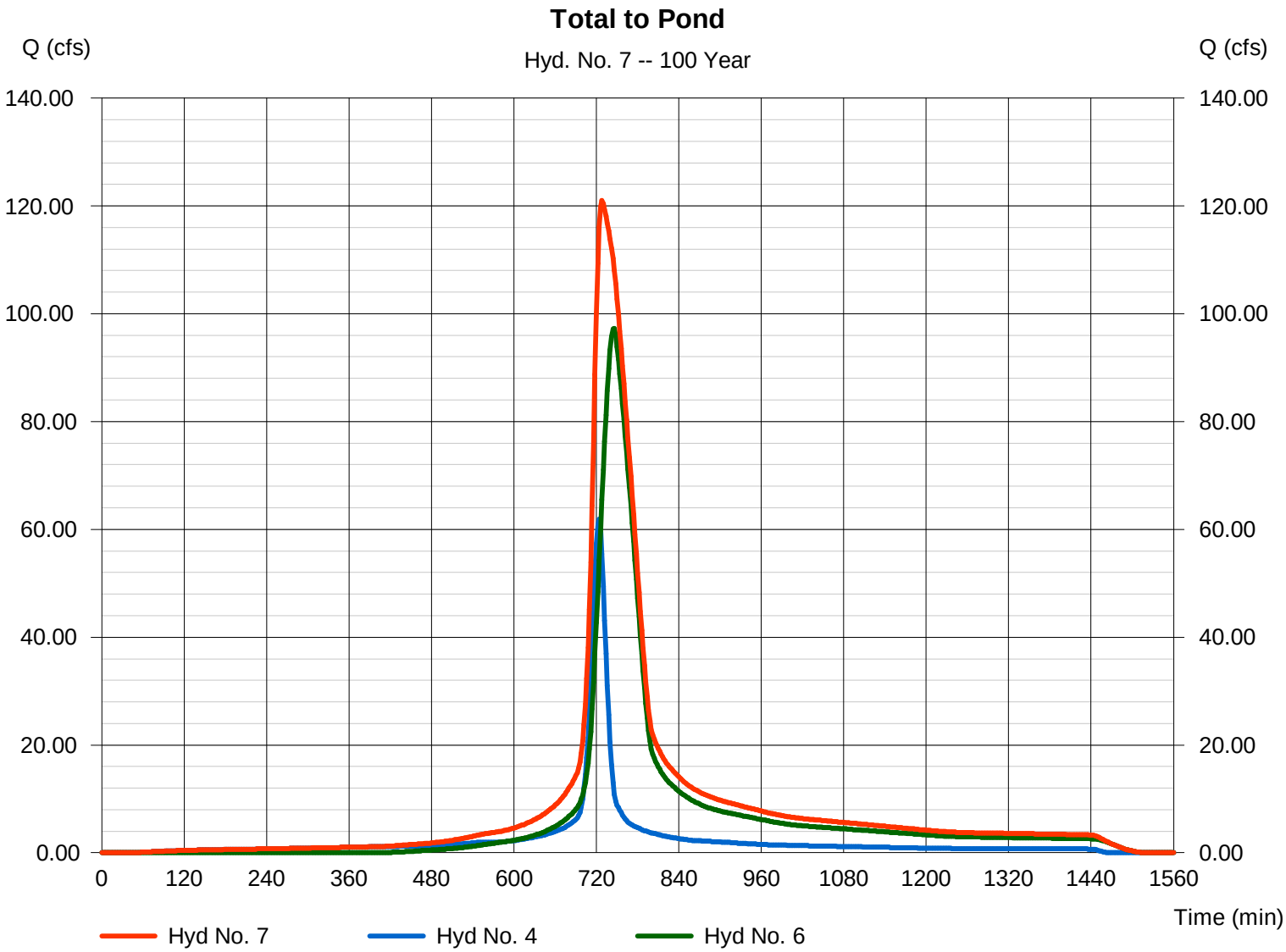


Hydrograph Report

Hyd. No. 7

Total to Pond

Hydrograph type	= Combine	Peak discharge	= 121.00 cfs
Storm frequency	= 100 yrs	Time to peak	= 728 min
Time interval	= 2 min	Hyd. volume	= 802,116 cuft
Inflow hyds.	= 4, 6	Contrib. drain. area	= 40.000 ac



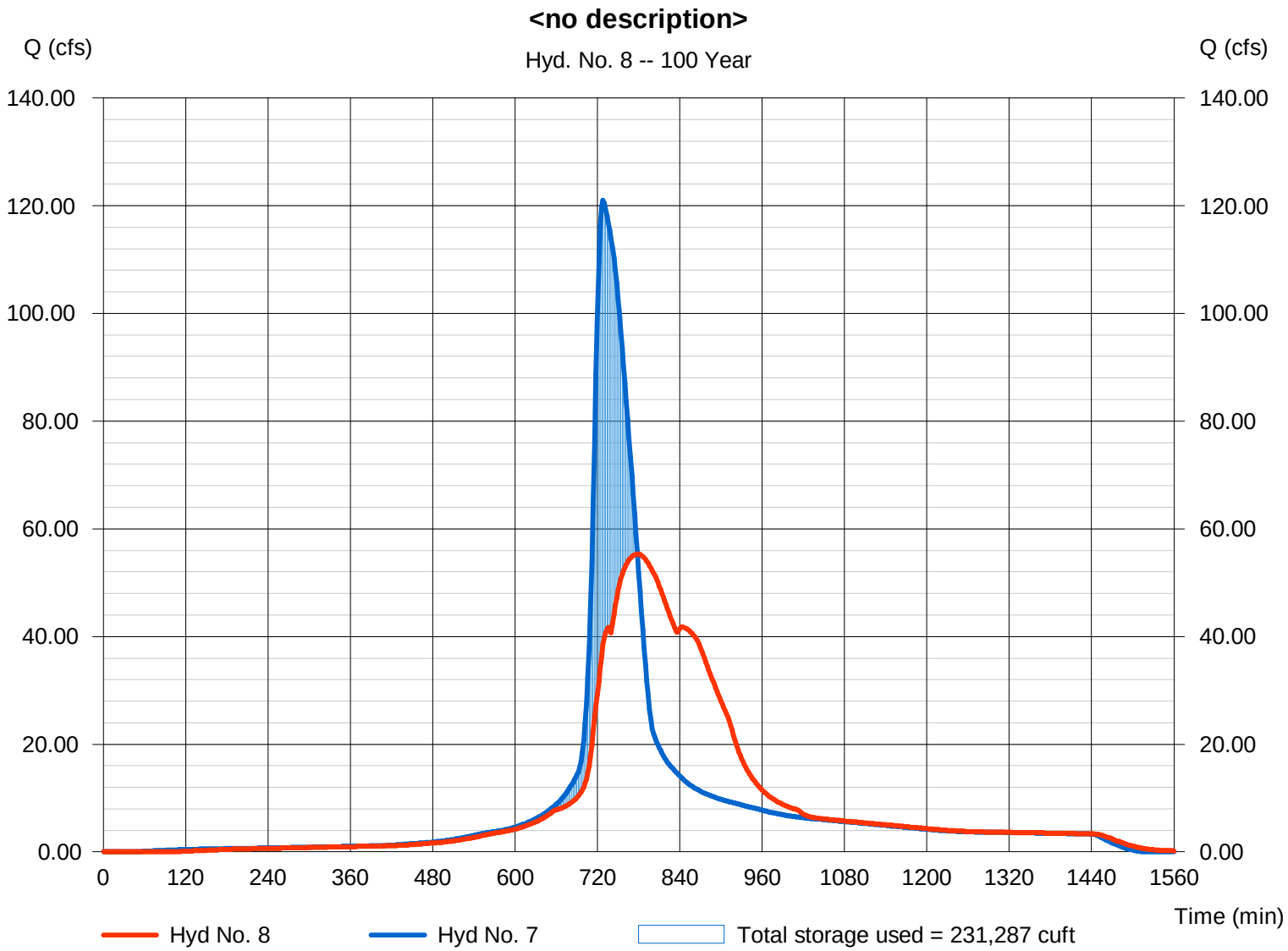
Hydrograph Report

Hyd. No. 8

<no description>

Hydrograph type	=	Reservoir	Peak discharge	=	55.32 cfs
Storm frequency	=	100 yrs	Time to peak	=	778 min
Time interval	=	2 min	Hyd. volume	=	802,107 cuft
Inflow hyd. No.	=	7 - Total to Pond	Max. Elevation	=	1372.27 ft
Reservoir name	=	Proposed Pond	Max. Storage	=	231,287 cuft

Storage Indication method used.



Hydraflow Rainfall Report

Return Period (Yrs)	Intensity-Duration-Frequency Equation Coefficients (FHA)			
	B	D	E	(N/A)
1	0.0000	0.0000	0.0000	--------
2	76.3137	14.3000	0.8844	--------
3	0.0000	0.0000	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: wichita.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	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
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	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	6.52	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	0.00	3.50	0.00	4.50	5.30	6.10	6.80	7.90
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

overall.gpw

HydraFlow Express

-Proposed Channel Section

Channel Report

Hydraflow Express Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. Thursday, Jan 15 2009

<Name>

Trapezoidal

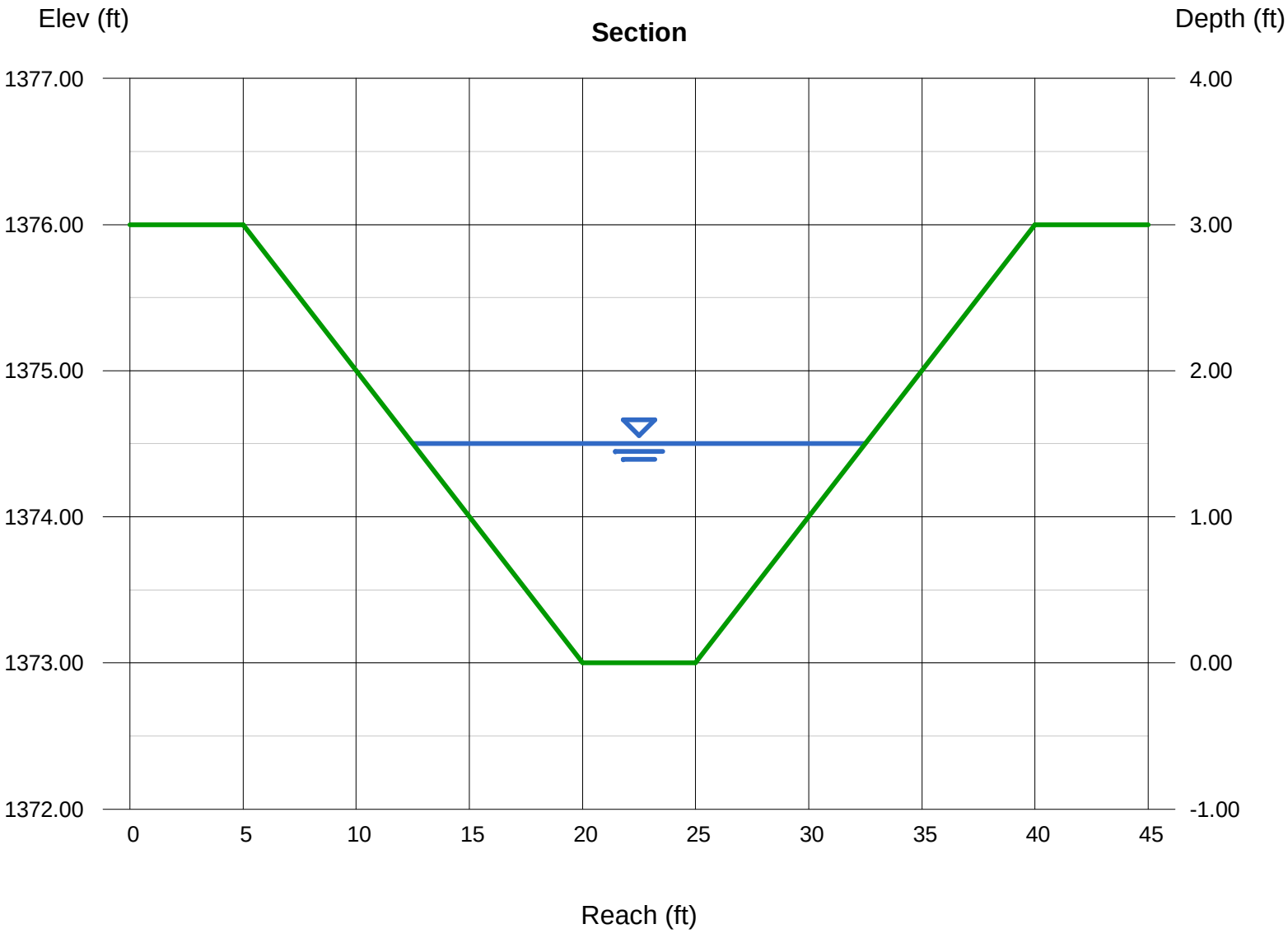
Bottom Width (ft)	= 5.00
Side Slopes (z:1)	= 5.00, 5.00
Total Depth (ft)	= 3.00
Invert Elev (ft)	= 1373.00
Slope (%)	= 0.50
N-Value	= 0.027

Calculations

Compute by:	Q vs Depth
No. Increments	= 30

Highlighted

Depth (ft)	= 1.50
Q (cfs)	= 69.21
Area (sqft)	= 18.75
Velocity (ft/s)	= 3.69
Wetted Perim (ft)	= 20.30
Crit Depth, Yc (ft)	= 1.14
Top Width (ft)	= 20.00
EGL (ft)	= 1.71



DRAINAGE & GRADING PLAN Scale 1:100