

DRAINAGE PLAN
FIRST UNITED PENTECOSTAL
CHURCH ADDITION
TO
WICHITA, SEDGWICK COUNTY, KANSAS

PREPARED BY



18 APRIL 2008



DRAINAGE PLAN FIRST PENTECOSTAL CHURCH ADDITION

FINAL REPORT

Prepared by Baughman Company, P.A.
18 April 2008

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PROJECT NARRATIVE

EXISTING CONDITIONS

The site is located at the southeast corner of MacArthur Road and Hydraulic Ave. in Wichita, Sedgwick County, Kansas. The 25 acre site is currently a church with associated parking lots on 5 acres with the remaining 20 acres being open space. The site is bordered on the west by Hydraulic Ave. and to the north by MacArthur Road. The First Pentecostal Church is located at the northwest corner of the property and the site is bordered by existing residential homes and trailer homes to the south and east.

There does not appear to be any significant offsite drainage encroaching the site. The proposed site appears relatively flat and drains generally to the south.

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 Special Flood Hazard Area located on the property as of this report. Existing trees, which bound the property to the south, will be retained at existing grades.

PROPOSED CONDITIONS

The proposed First United Pentecostal Addition will consist of 4 commercial lots. A dry detention pond is proposed as part of the site's development.

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

OFFSITE CONDITIONS

The majority of the site drains to the south into the proposed dry detention pond.

The pond will then drain via a 15" RCP into an existing stormwater system adjacent to Hydraulic Avenue. A small portion of the site is proposed to drain to the north into an existing storm sewer system along MacArthur Road. There does not appear to be any offsite runoff encroaching upon the property.

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 modeled in HydraFlow Hydrographs
- Areas per Surveyed Topography, USGS Quadrangle Sheet, Aerial Photos, and Site Visits
- HydraFlow Hydrograph software for existing offsite flows
- Runoff Coefficient: $C = 0.43$ (Type B Soils, Agricultural and Pasture)
- Time of Concentration: Lag method (15 min minimum)

SITE CHARACTERISTICS

The majority of the proposed site is currently classified as open space, agricultural farmland and pasture. The primary soil type is Type B soil. There is an existing structure and associated parking on the northwest portion of the property. The site is generally flat, but gradually slopes to the south. There are existing trees bounding the property along the south. The northern portion of the site drains to the existing SWS adjacent to MacArthur Road. The Aerial Exhibit can be seen as Exhibit 2.

EXISTING CONDITIONS HYDROLOGIC ANALYSIS

The site was analyzed for pre-development conditions using the hydrograph method for the 2, 5, 10, 25, and 100-year storm events. A runoff coefficient was used for existing conditions assuming undeveloped agricultural land use (open space) with Type B soils on the undeveloped portion of the property. The time of concentration was calculated using the TR-55 time of concentration method with a minimum time of concentration of 15 minutes.

DOWNSTREAM DRAINAGE CAPACITY

Currently, the area downstream appears to be already developed residential and commercial areas. The site currently drains into two existing stormwater sewer systems; one to the west along Hydraulic Avenue, and one to the north along MacArthur Road.

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 proposed flows
 - Runoff Coefficient; C = 0.80 (Type B Soils, Business)
 - Time of Concentration; TR-55 Tc method, minimum Tc = 15min

- Ø POND ROUTING / GRADING
 - HydraFlow Hydrographs software utilized for pond routing

DETENTION FACILITIES

There is one dry detention pond proposed in this addition. This can be seen on the half-scale Drainage & Grading Plan in Exhibit 4. The pond is described in more detail below.

Ø DRY DETENTION POND

The detention pond is preliminarily located near the south east corner of the proposed site. This pond, as shown on the Drainage and Grading Plan, is sized for detention of the developed runoff. The proposed dry detention pond is proposed to have a bottom elevation of a 1268.6 with a 15" RCP outlet with a flow line of 1268.6.

DETENTION SUMMARY

Detention will be provided on the proposed site to 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
Detention	101 cfs	4.1 cfs	1269.9	15" RCP

DISCHARGE SUMMARY

The area that comprises Lot 1 will continue to drain as it does today. The flow will not be increased in this area. There are 2 main areas of discharge for the undeveloped areas of this site. A small portion of the site drains north into the MacArthur Rd. ROW and is picked up by an existing storm water sewer system along MacArthur Rd. The majority of the undeveloped portion of the site drains to the south into the Hydraulic Ave. ROW; either directly, or it appears to go through the adjacent property to the south, eventually into the Hydraulic Ave ROW. This flow is conveyed by a storm water sewer system along Hydraulic Ave. These areas are summarized below. All flows are peak flows for the 24-hour, 100-yr storm events.

LOCATION	STRUCTURE	EXIST RUNOFF	PROP RUNOFF
SWS along MacArthur Rd - West	12" RCP	4.1 cfs	4.1 cfs
SWS along MacArthur Rd - East	12" RCP	8.6 cfs	605 cfs
SWS-Hydraulic Ave. ROW	24" RCP	42 cfs	4.1 cfs

POTENTIAL UPSTREAM/DOWNSTREAM IMPACTS

No potential upstream impacts are expected with this development.

Due to detention on the proposed site, there are no downstream impacts expected. Proposed peak flows will be limited to an amount either equal to or less than existing flows.

FLOODPLAIN SUBMITTAL

SOURCE OF FLOODPLAIN INFORMATION

The site lies within a FEMA Zone X. The site is not located within a mapped FEMA SFHA. The location of the property, on FEMA FIRM Panels 505 of 700, is attached as Exhibit 5 (for Sedgwick County, Kansas; effective February 2, 2007).

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

There does not appear to be any DWR permitting needed on the proposed site at this time.

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 ROW

There does not appear to be any discharge into the county ROW. No permit is expected at this time.

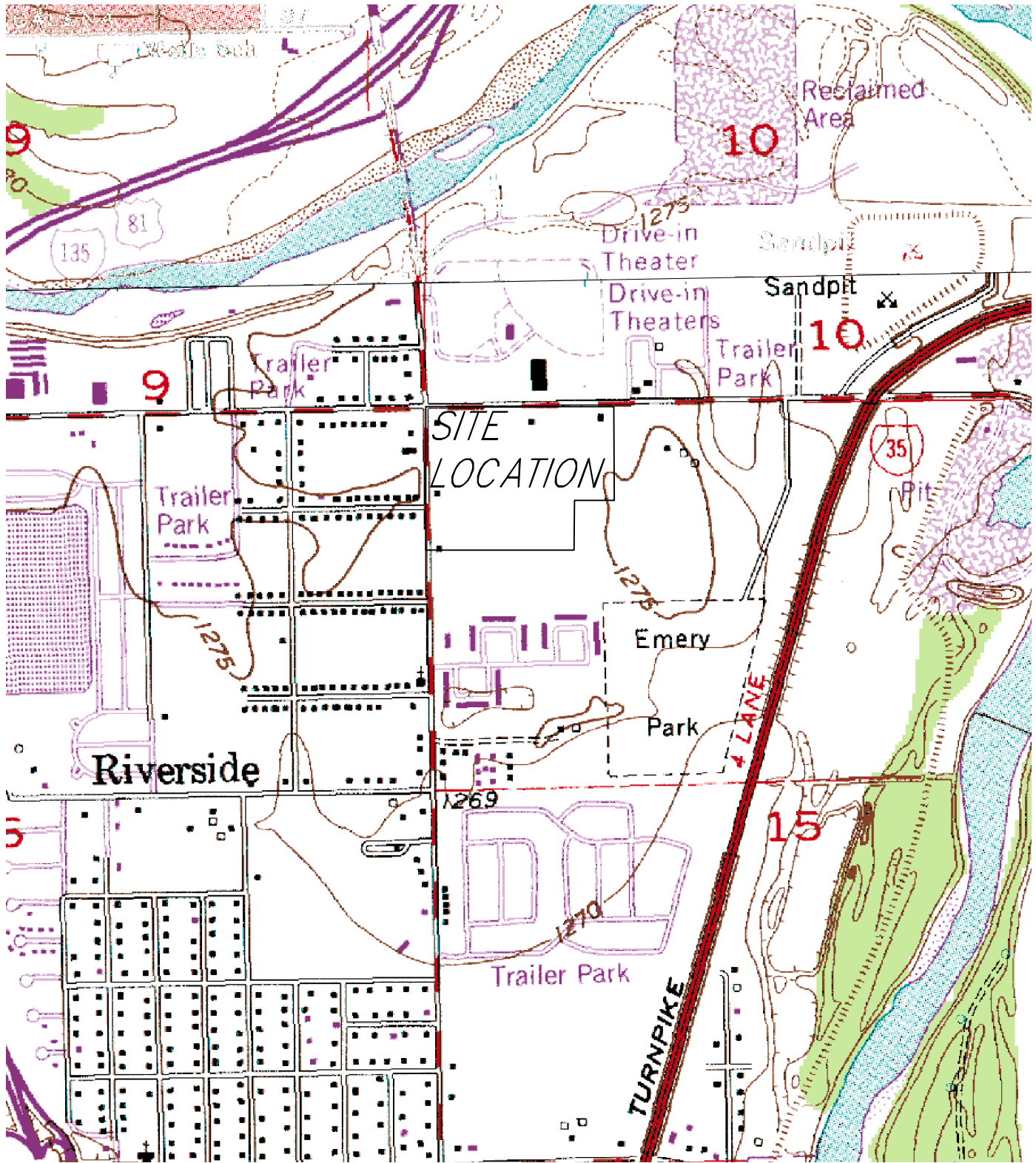
EXHIBITS

- 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)

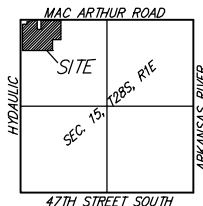
SITE LOCATION MAP

FIRST UNITED PENTECOSTAL ADDITION

WICHITA, SEDGWICK COUNTY, KANSAS



DATE OF PREPARATION: 14 MARCH, 2008



VICINITY MAP

SITE LOCATION MAP
FIRST UNITED PENTECOSTAL

16 APRIL 2008

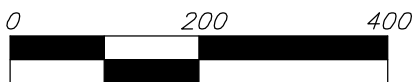

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 315 Ella St. Wichita, KS 67211 P 316-262-7271 F 316-262-0149
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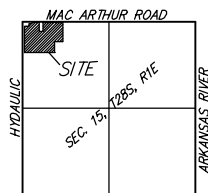
AERIAL EXHIBIT

FIRST UNITED PENTECOSTAL ADDITION

WICHITA, SEDGWICK COUNTY, KANSAS



DATE OF PREPARATION: 14 MARCH, 2008



VICINITY MAP

AERIAL EXHIBIT
FIRST UNITED PENTECOSTAL

16 APRIL 2008

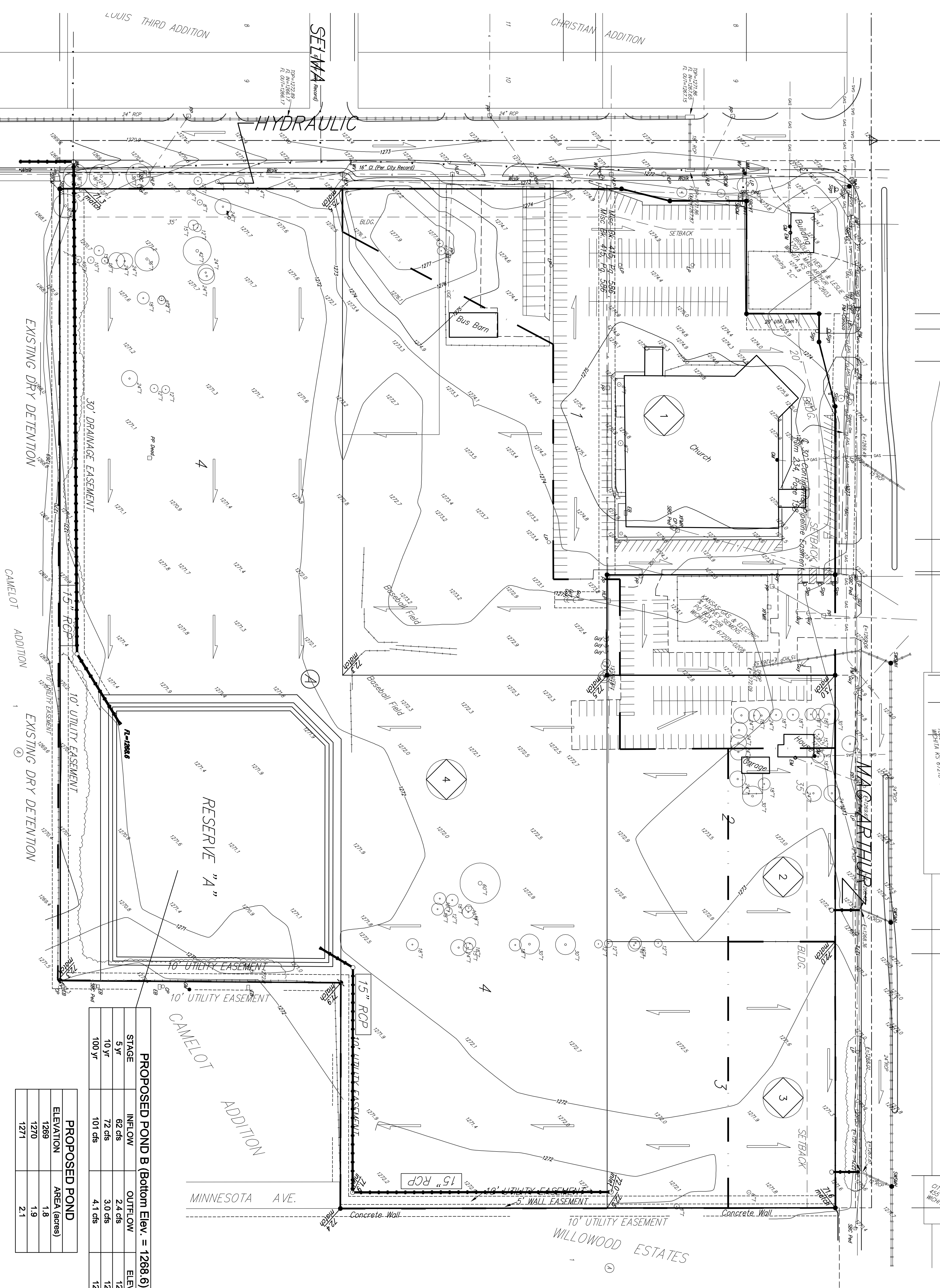
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GRADING AND DRAINAGE PLAN

FIRST PENTECOSTAL CHURCH ADDITION

WICHITA, SEDGWICK COUNTY, KANSAS

1186 S. WASHINGTON - 4172
WICHITA, KS 67218-4172



PROPOSED POND B (Bottom Elev. = 1268.6)

STAGE	INFLOW	OUTFLOW	ELEVATION
5 Yr	62 cfs	2.4 cfs	1269.4
10 Yr	72 cfs	3.0 cfs	1269.5
100 Yr	101 cfs	4.1 cfs	1269.9

PROPOSED POND

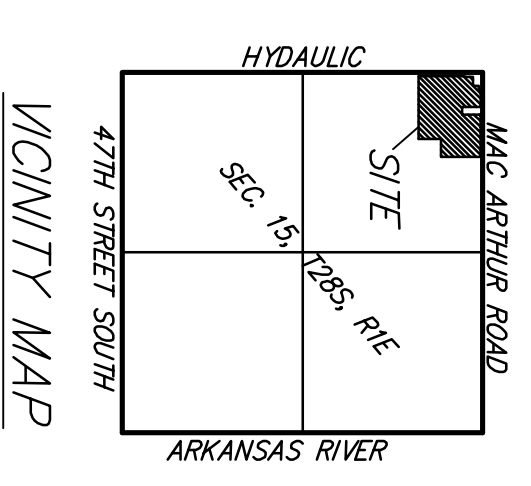
ELEVATION	AREA (acres)
1269	1.8
1270	1.9
1271	2.1

Developed Intensity Rational C	5Yr	10Yr	100Yr
	4.50	2.22	1.73
	0.91	0.73	0.3

Basin ID	Area	Developed Footcandle
	acres	5-yr 10-yr 100-yr
	cfs	cfs cfs
1	5.3	17.3 21.0 32.4
2	0.7	2.2 2.7 4.1
3	1.0	3.1 3.5 5.9
4	15.1	59.3 69.0 109.7
TOTAL	22.3	80 90 149

NOTE: Upon site development, all developed lot drainage for Basin 4 shall be conveyed to the proposed dry detention pond via internal SWS, swale, or other approved method.

NOTE: Site currently located in FEMA Zone X per FEMA FIRI Panel 505 of 700, for Sedgewick County, Kansas. Map number 2017300505E, Effective February 2, 2007.



DRAINAGE & GRADING PLAN

FIRST PENTECOSTAL CHURCH ADDITION

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16 APRIL 2008

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SUPPORTING CALCULATIONS

APPENDIX A: USGS Soils Survey

APPENDIX B: HydraFlow Hydrographs Routing
- Existing Conditions & Proposed Pond


USGS Soils Survey

Hydrologic Soil Group—Sedgwick County, Kansas



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


Municipalities

 Cities

 Urban Areas

Water Features

 Oceans

 Streams and Canals

Transportation


 Rails


Roads

 Interstate Highways

 US Routes

 State Highways

 Local Roads

 Other Roads

MAP INFORMATION

Original soil survey map sheets were prepared at publication scale. Viewing scale and printing scale, however, may vary from the original. Please rely on the bar scale on each map sheet for proper map measurements.

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

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 4, Dec 29, 2007

Date(s) aerial images were photographed: 3/20/1996

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
6224	Canadian fine sandy loam, rarely flooded	B	32.8	100.0%
Totals for Area of Interest (AOI)			32.8	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

Component Percent Cutoff: None Specified

Tie-break Rule: Lower

HydraFlow Hydrographs Routing

EXISTING CONDITIONS
PROPOSED DETENTION POND

Watershed Model Schematic

Hydraflow Hydrographs by Intelisolve v9.02



Legend

<u>Hyd.</u>	<u>Origin</u>	<u>Description</u>
1	Rational	Prop South DA
2	Reservoir	Prop SE Pond
3	Rational	Exist North 1
4	Rational	Exist North 2
5	Rational	Exist South DA
6	Rational	Prop North 1
7	Rational	Prop North 2

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2 - Year	
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Hydrograph No. 2, Reservoir, Prop SE Pond	4
Pond Report - Prop Pond 15_RCP	5
Hydrograph No. 3, Rational, Exist North 1	6
Hydrograph No. 4, Rational, Exist North 2	7
Hydrograph No. 5, Rational, Exist South DA	8
Hydrograph No. 6, Rational, Prop North 1	9
Hydrograph No. 7, Rational, Prop North 2	10
5 - Year	
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Hydrograph No. 7, Rational, Prop North 2	42

Hydrograph Return Period Recap

Hydraflow Hydrographs by Intelisolve v9.02

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	Rational	-----	-----	52.57	-----	62.34	71.67	-----	93.21	101.37	Prop South DA
2	Reservoir	1	-----	1.840	-----	2.426	3.009	-----	4.046	4.087	Prop SE Pond
3	Rational	-----	-----	2.151	-----	2.543	2.918	-----	3.788	4.117	Exist North 1
4	Rational	-----	-----	4.468	-----	5.282	6.061	-----	7.868	8.551	Exist North 2
5	Rational	-----	-----	21.28	-----	25.55	29.54	-----	38.65	42.14	Exist South DA
6	Rational	-----	-----	2.155	-----	2.547	2.924	-----	3.795	4.124	Prop North 1
7	Rational	-----	-----	3.079	-----	3.639	4.177	-----	5.421	5.892	Prop North 2

Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.02

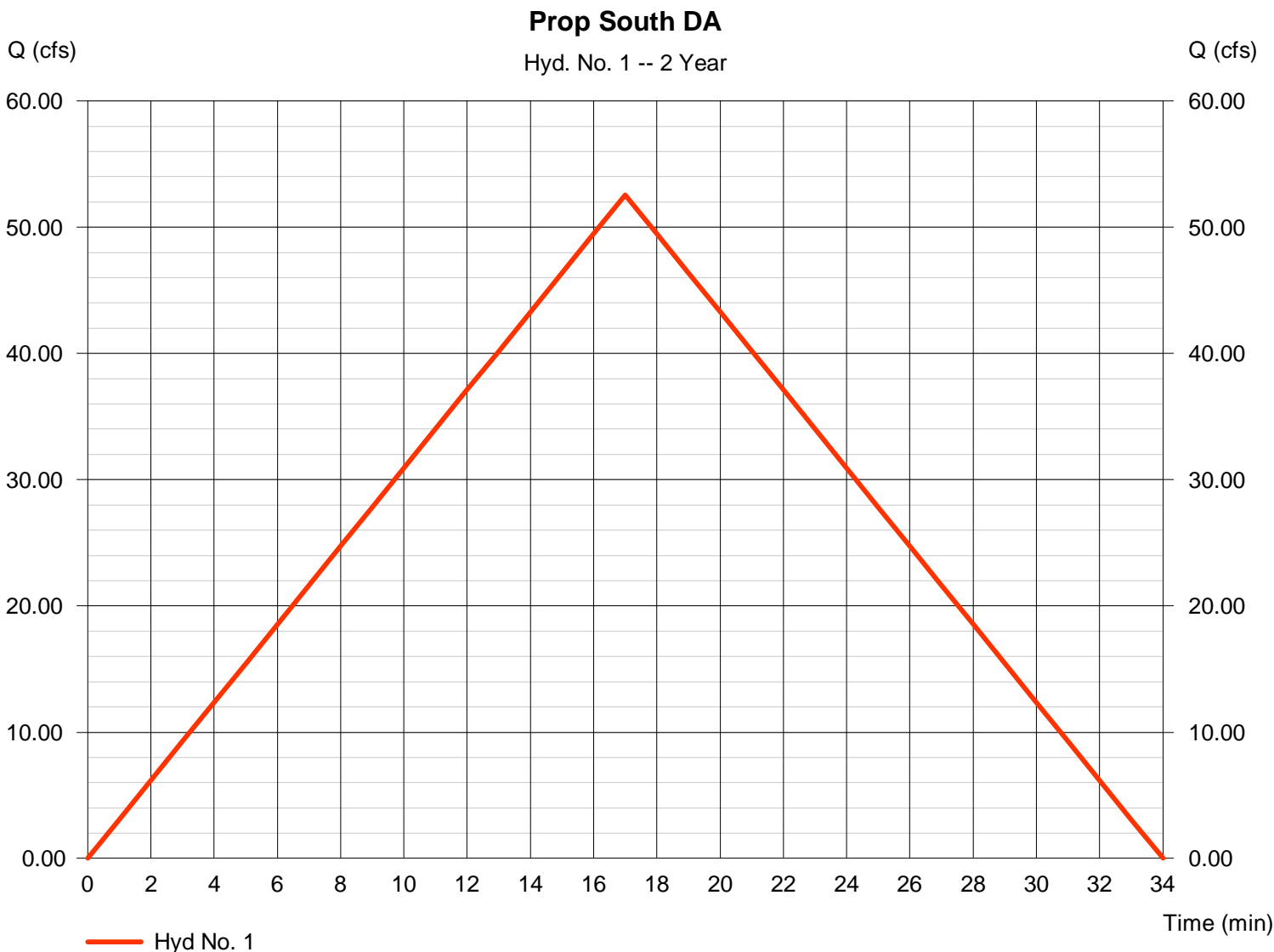
Thursday, Apr 17, 2008

Hyd. No. 1

Prop South DA

Hydrograph type = Rational
Storm frequency = 2 yrs
Time interval = 1 min
Drainage area = 18.100 ac
Intensity = 3.630 in/hr
IDF Curve = wichita.IDF

Peak discharge = 52.57 cfs
Time to peak = 17 min
Hyd. volume = 1.231 acft
Runoff coeff. = 0.8
Tc by TR55 = 17.00 min
Asc/Rec limb fact = 1/1



Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.02

Thursday, Apr 17, 2008

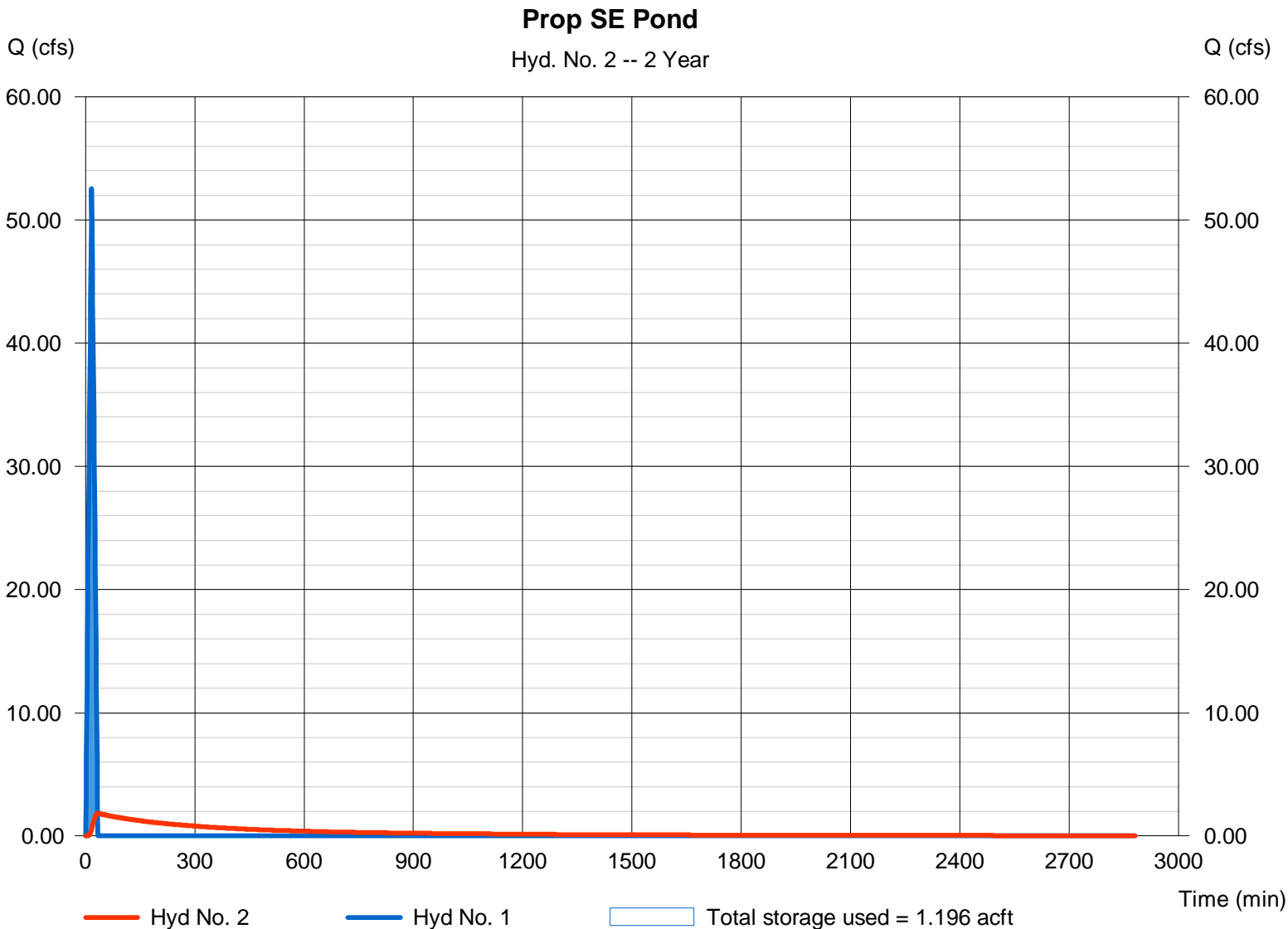
Hyd. No. 2

Prop SE Pond

Hydrograph type = Reservoir
 Storm frequency = 2 yrs
 Time interval = 1 min
 Inflow hyd. No. = 1 - Prop South DA
 Reservoir name = Prop Pond 15_RCP

Peak discharge = 1.840 cfs
 Time to peak = 33 min
 Hyd. volume = 1.088 acft
 Max. Elevation = 1269.26 ft
 Max. Storage = 1.196 acft

Storage Indication method used.



Pond No. 2 - Prop Pond 15_RCP

Pond Data

Contours - User-defined contour areas. Conic method used for volume calculation. Beginning Elevation = 1268.60 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (acft)	Total storage (acft)
0.00	1268.60	75,535	0.000	0.000
0.40	1269.00	78,247	0.706	0.706
1.40	1270.00	83,864	1.860	2.566
2.40	1271.00	89,672	1.991	4.558

Culvert / Orifice Structures

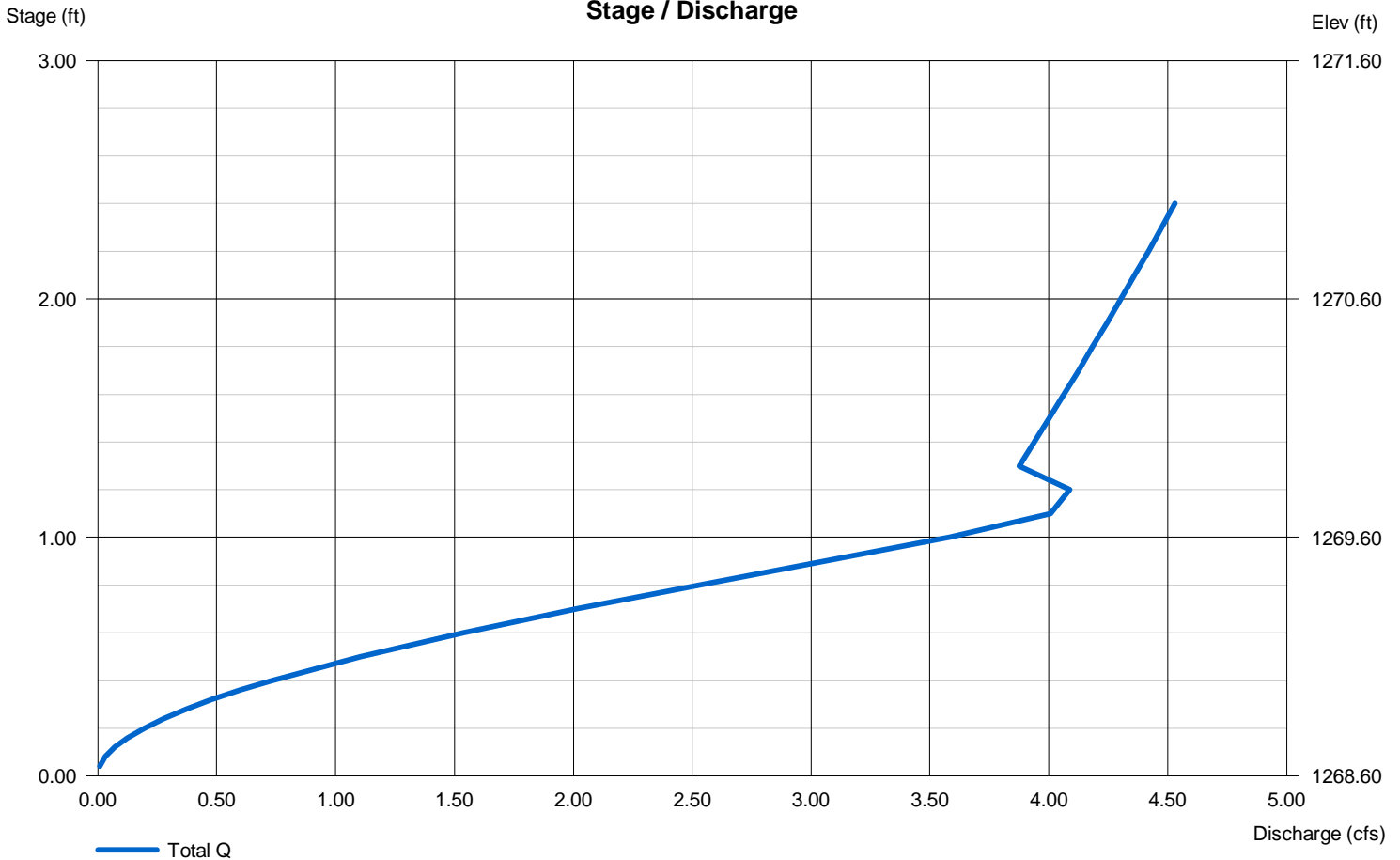
	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 15.00	0.00	0.00	0.00
Span (in)	= 15.00	0.00	0.00	0.00
No. Barrels	= 1	0	0	0
Invert El. (ft)	= 1268.60	0.00	0.00	0.00
Length (ft)	= 775.00	0.00	0.00	0.00
Slope (%)	= 0.38	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	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	= ---	---	---	---
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 and outlet control. Weir risers are checked for orifice conditions.

Stage / Discharge



Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.02

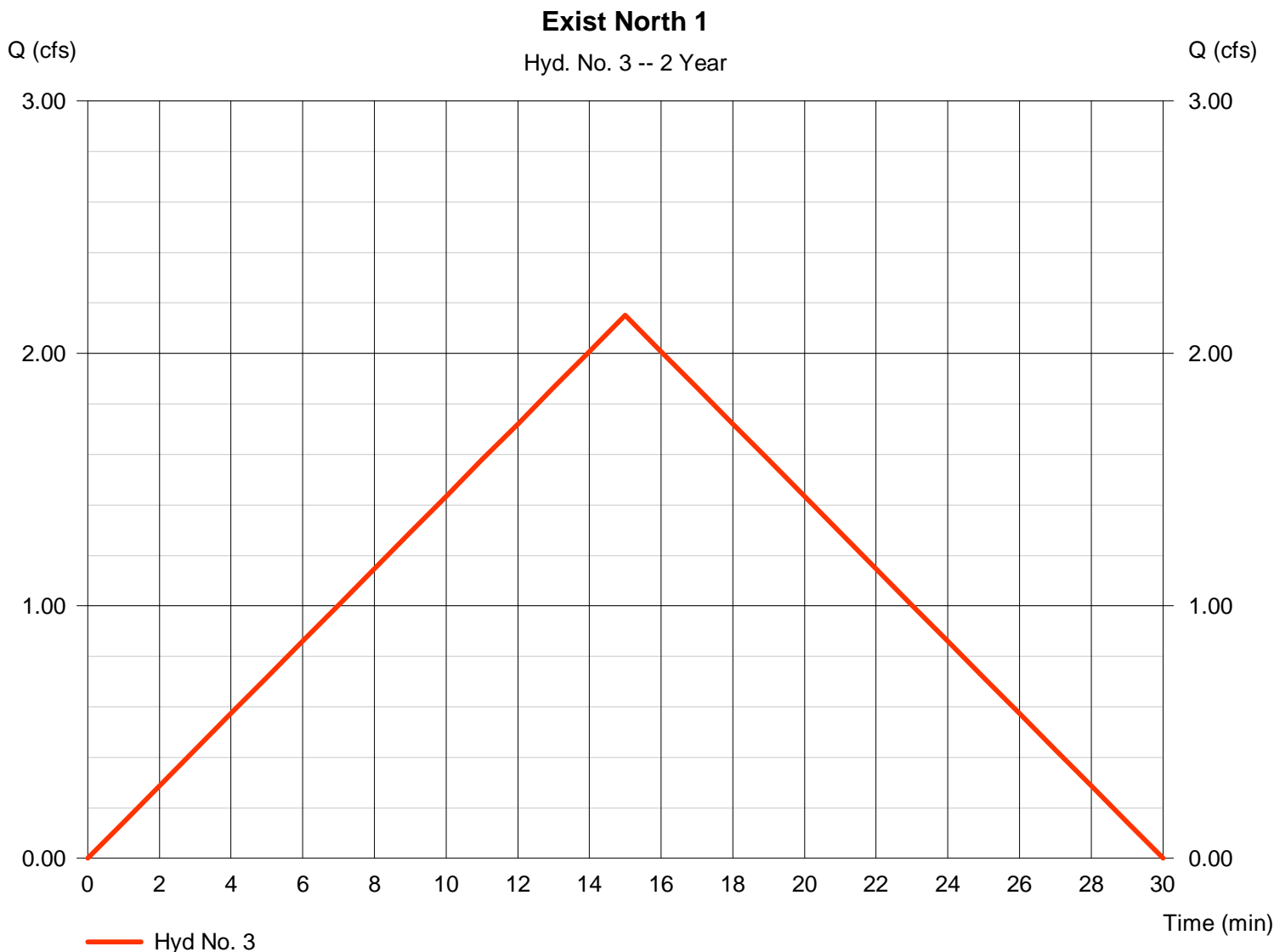
Thursday, Apr 17, 2008

Hyd. No. 3

Exist North 1

Hydrograph type = Rational
 Storm frequency = 2 yrs
 Time interval = 1 min
 Drainage area = 1.300 ac
 Intensity = 3.849 in/hr
 IDF Curve = wichita.IDF

Peak discharge = 2.151 cfs
 Time to peak = 15 min
 Hyd. volume = 0.044 acft
 Runoff coeff. = 0.43
 Tc by User = 15.00 min
 Asc/Rec limb fact = 1/1



Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.02

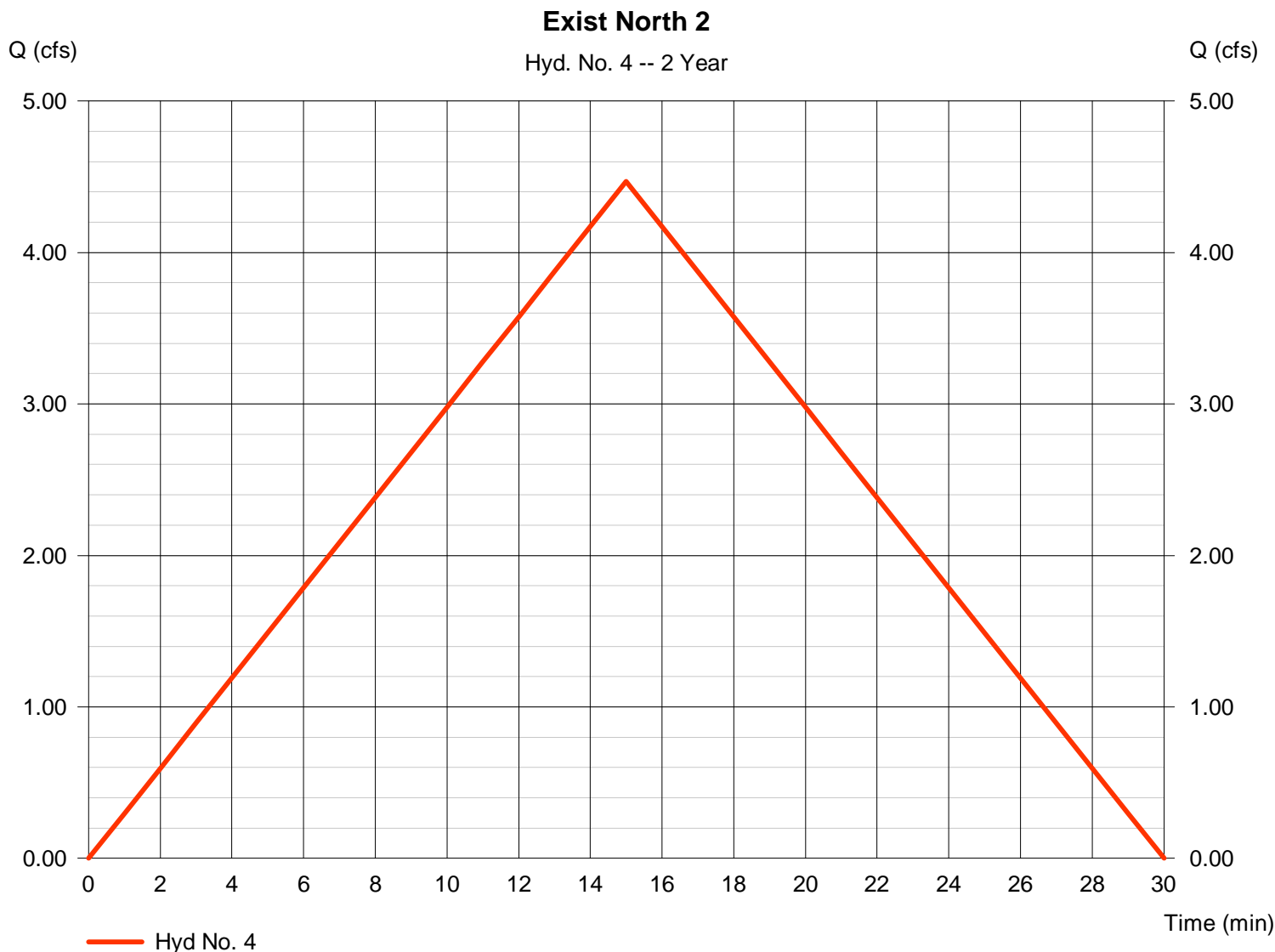
Thursday, Apr 17, 2008

Hyd. No. 4

Exist North 2

Hydrograph type = Rational
 Storm frequency = 2 yrs
 Time interval = 1 min
 Drainage area = 2.700 ac
 Intensity = 3.849 in/hr
 IDF Curve = wichita.IDF

Peak discharge = 4.468 cfs
 Time to peak = 15 min
 Hyd. volume = 0.092 acft
 Runoff coeff. = 0.43
 Tc by User = 15.00 min
 Asc/Rec limb fact = 1/1



Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.02

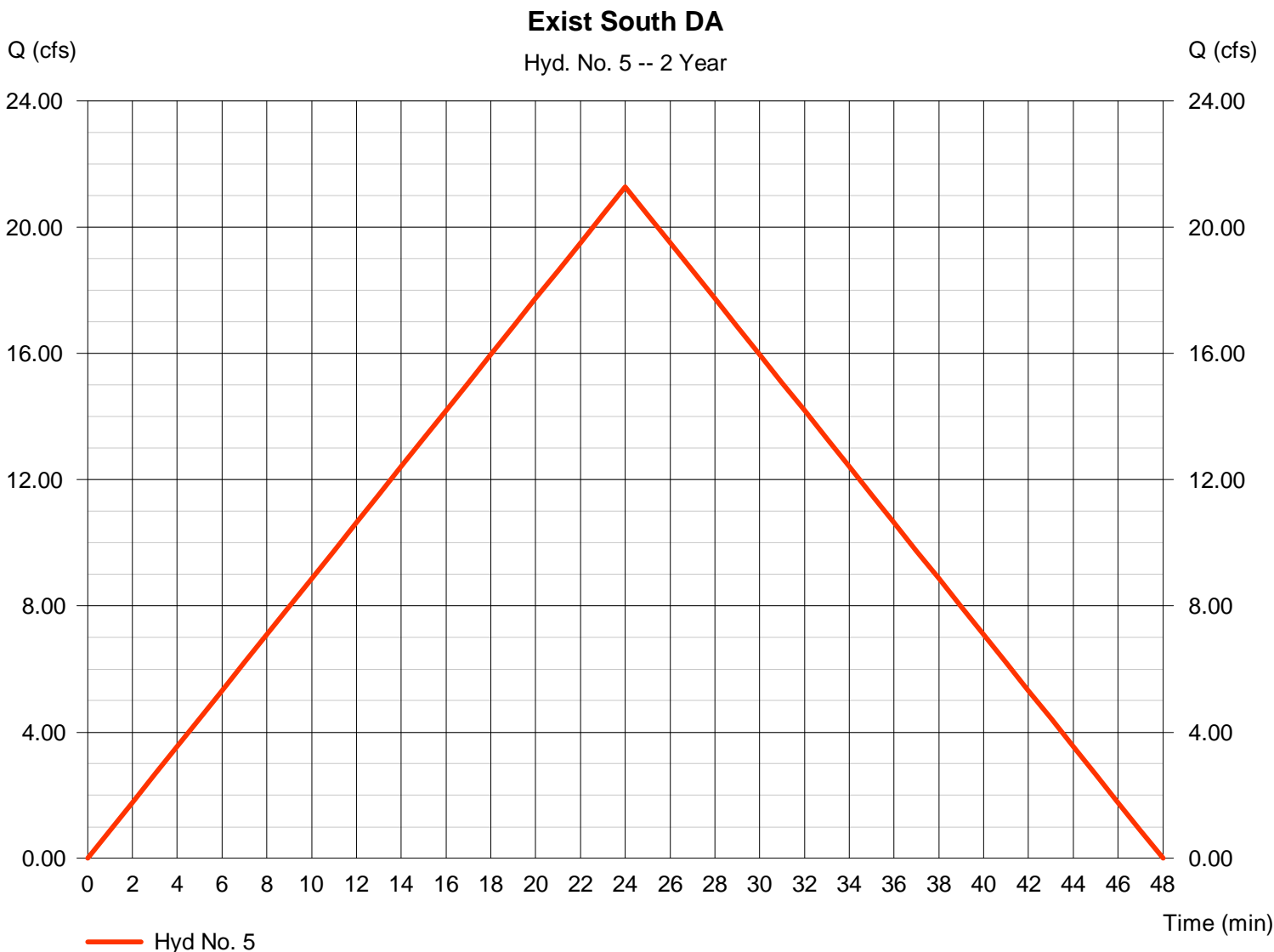
Thursday, Apr 17, 2008

Hyd. No. 5

Exist South DA

Hydrograph type = Rational
 Storm frequency = 2 yrs
 Time interval = 1 min
 Drainage area = 16.300 ac
 Intensity = 3.037 in/hr
 IDF Curve = wichita.IDF

Peak discharge = 21.28 cfs
 Time to peak = 24 min
 Hyd. volume = 0.704 acft
 Runoff coeff. = 0.43
 Tc by TR55 = 24.00 min
 Asc/Rec limb fact = 1/1



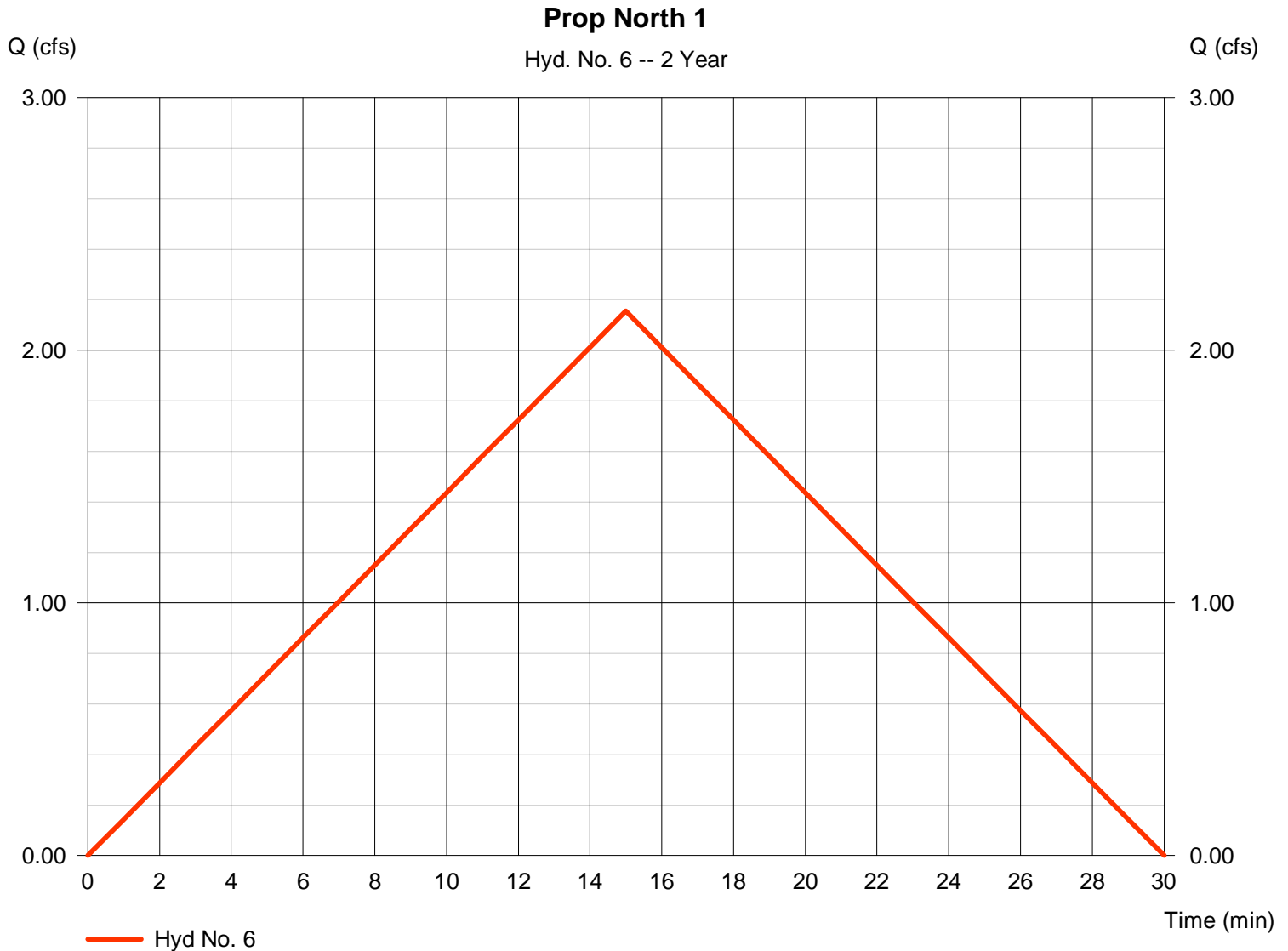
Hydrograph Report

Hyd. No. 6

Prop North 1

Hydrograph type = Rational
Storm frequency = 2 yrs
Time interval = 1 min
Drainage area = 0.700 ac
Intensity = 3.849 in/hr
IDF Curve = wichita.IDF

Peak discharge = 2.155 cfs
Time to peak = 15 min
Hyd. volume = 0.045 acft
Runoff coeff. = 0.8
Tc by User = 15.00 min
Asc/Rec limb fact = 1/1



Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.02

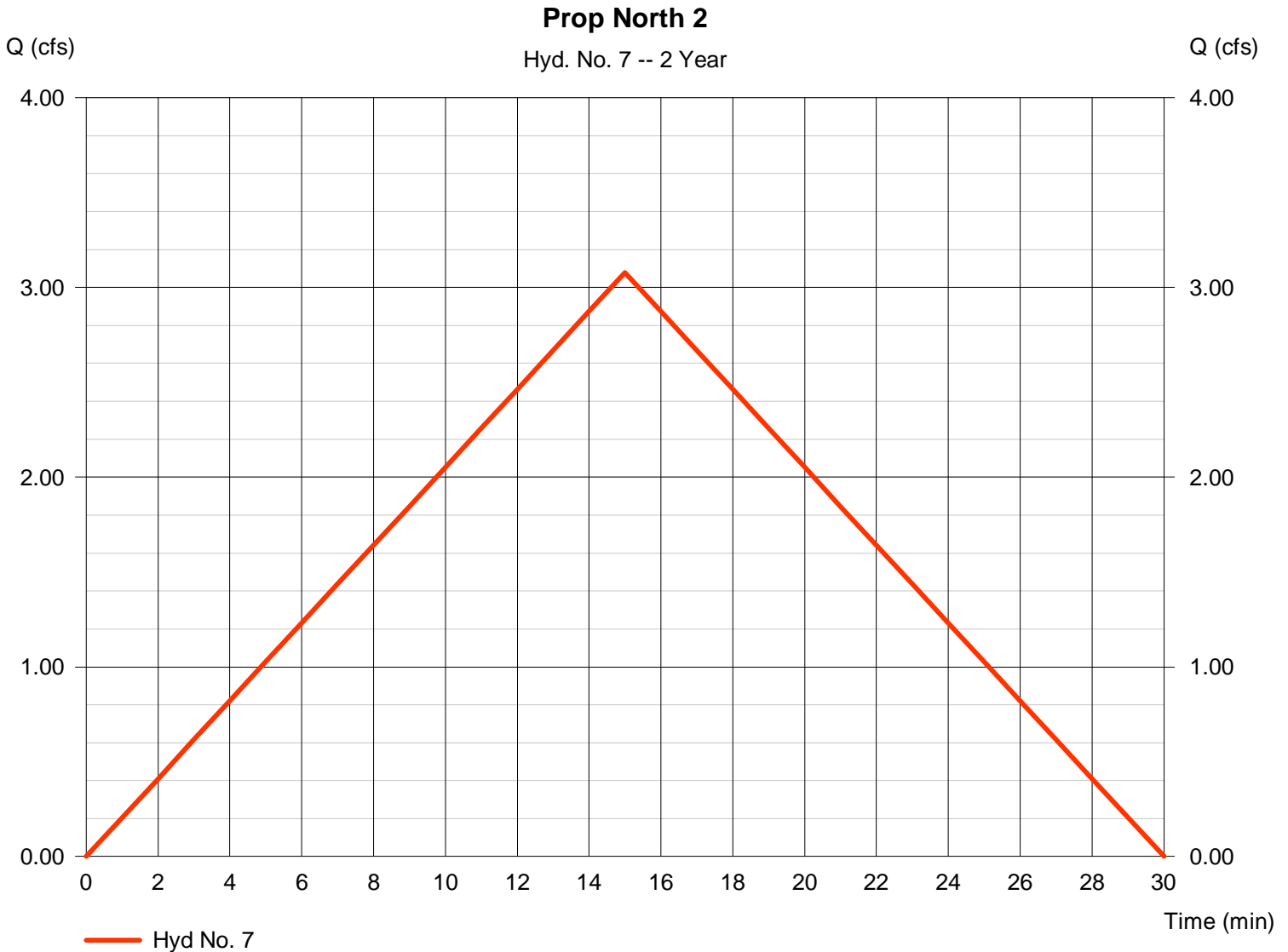
Thursday, Apr 17, 2008

Hyd. No. 7

Prop North 2

Hydrograph type = Rational
Storm frequency = 2 yrs
Time interval = 1 min
Drainage area = 1.000 ac
Intensity = 3.849 in/hr
IDF Curve = wichita.IDF

Peak discharge = 3.079 cfs
Time to peak = 15 min
Hyd. volume = 0.064 acft
Runoff coeff. = 0.8
Tc by User = 15.00 min
Asc/Rec limb fact = 1/1



Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.02

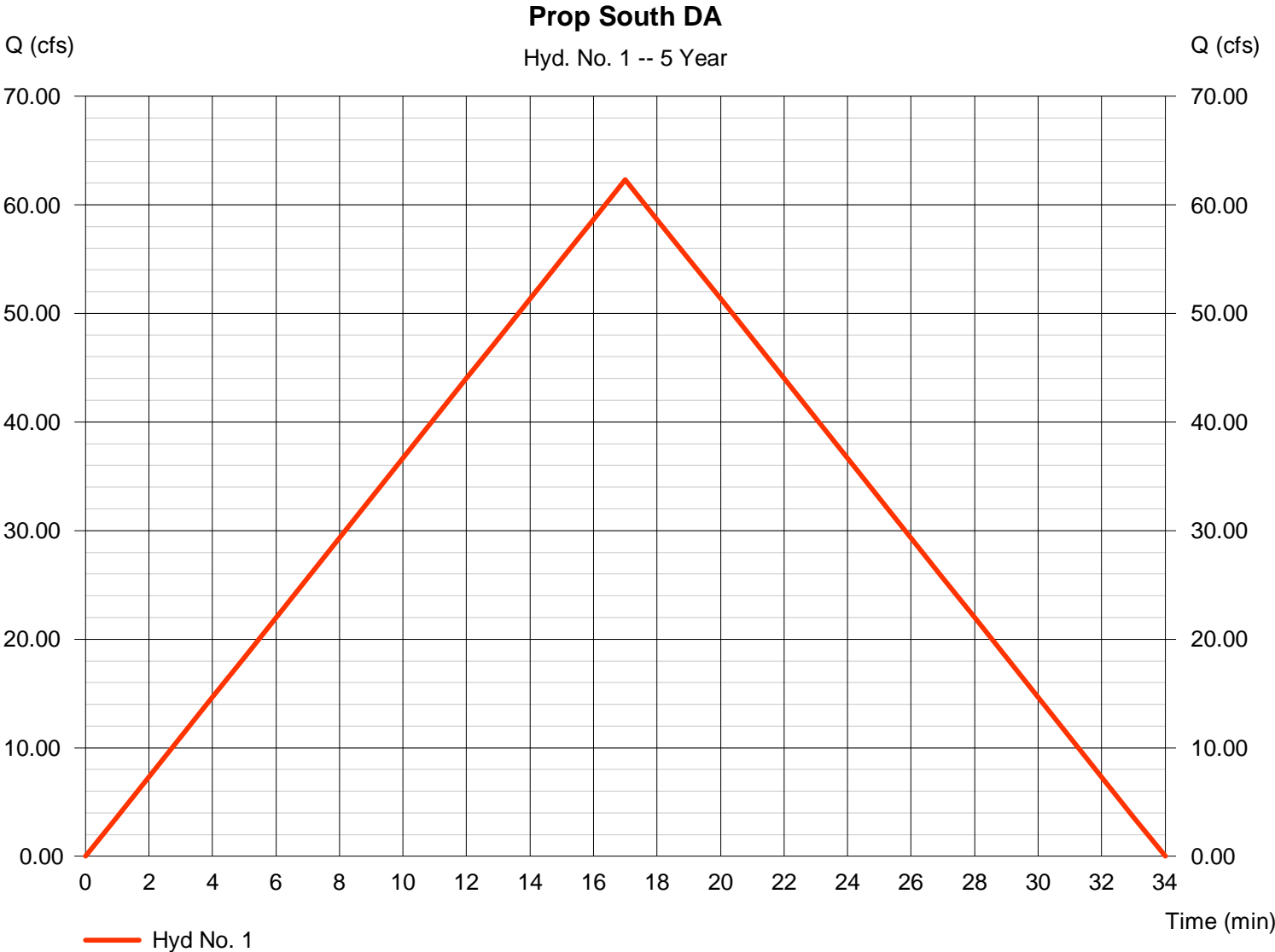
Thursday, Apr 17, 2008

Hyd. No. 1

Prop South DA

Hydrograph type = Rational
Storm frequency = 5 yrs
Time interval = 1 min
Drainage area = 18.100 ac
Intensity = 4.305 in/hr
IDF Curve = wichita.IDF

Peak discharge = 62.34 cfs
Time to peak = 17 min
Hyd. volume = 1.460 acft
Runoff coeff. = 0.8
Tc by TR55 = 17.00 min
Asc/Rec limb fact = 1/1



Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.02

Thursday, Apr 17, 2008

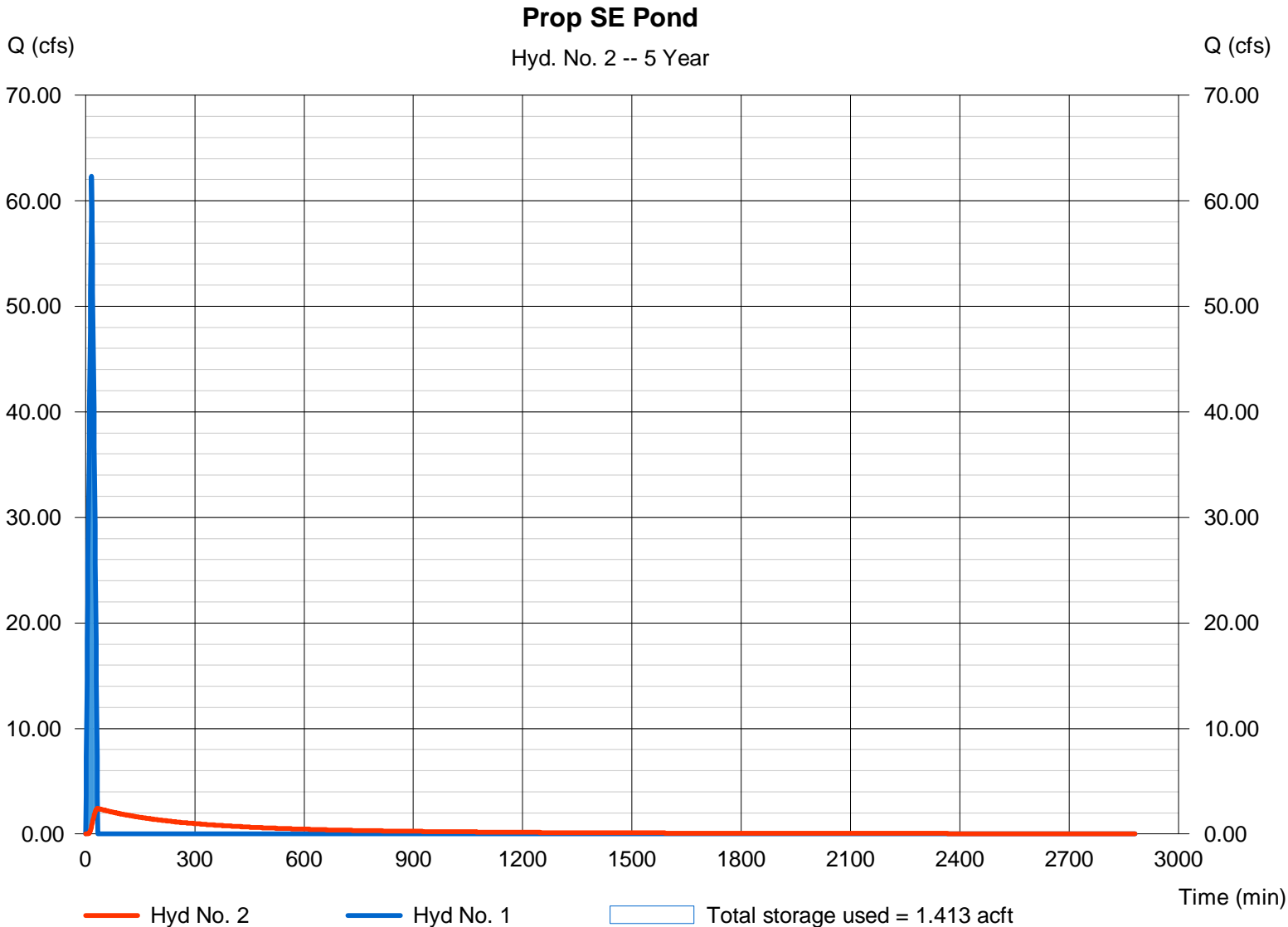
Hyd. No. 2

Prop SE Pond

Hydrograph type = Reservoir
Storm frequency = 5 yrs
Time interval = 1 min
Inflow hyd. No. = 1 - Prop South DA
Reservoir name = Prop Pond 15_RCP

Peak discharge = 2.426 cfs
Time to peak = 33 min
Hyd. volume = 1.314 acft
Max. Elevation = 1269.38 ft
Max. Storage = 1.413 acft

Storage Indication method used.



Pond No. 2 - Prop Pond 15_RCP

Pond Data

Contours - User-defined contour areas. Conic method used for volume calculation. Beginning Elevation = 1268.60 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (acft)	Total storage (acft)
0.00	1268.60	75,535	0.000	0.000
0.40	1269.00	78,247	0.706	0.706
1.40	1270.00	83,864	1.860	2.566
2.40	1271.00	89,672	1.991	4.558

Culvert / Orifice Structures

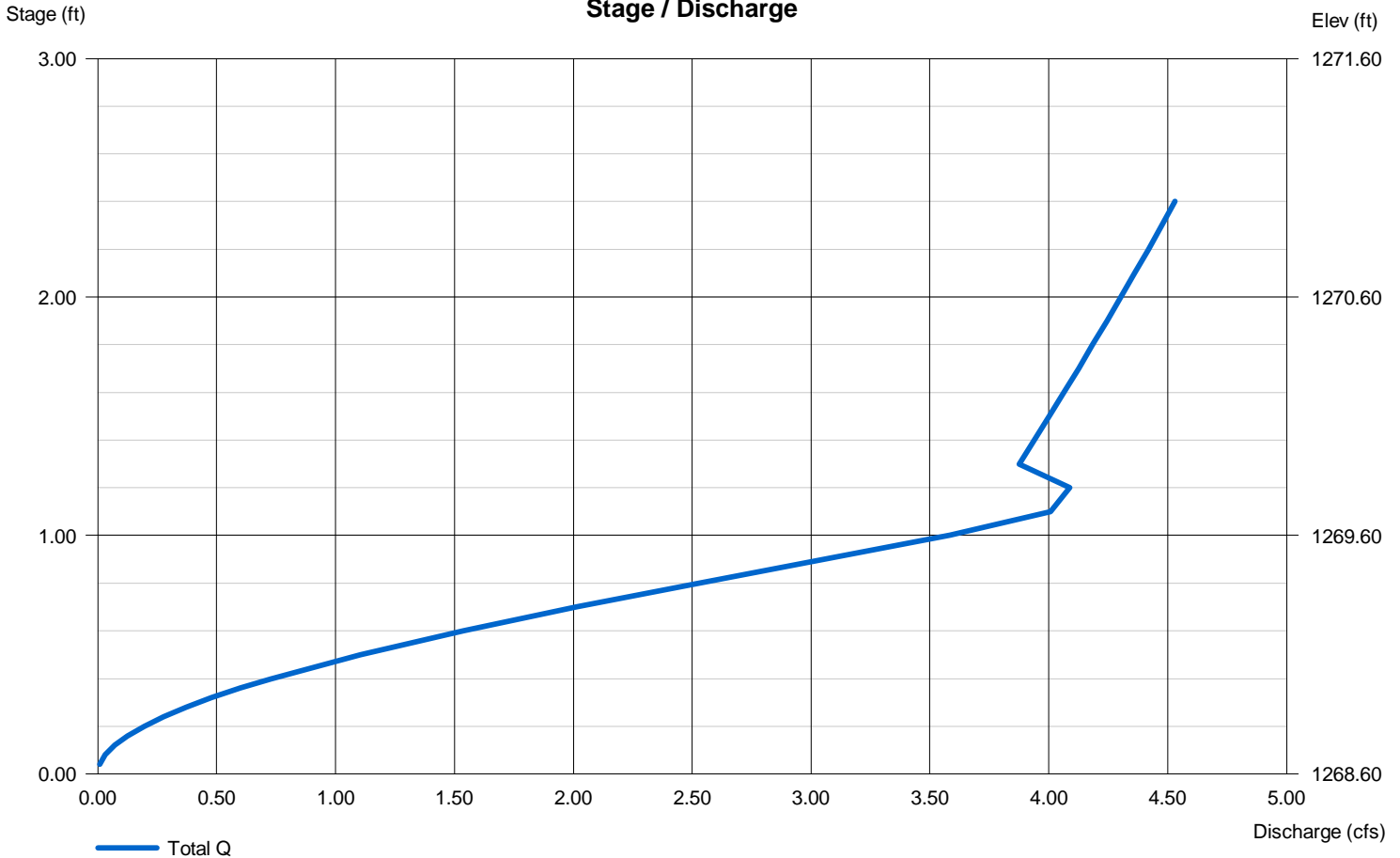
	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 15.00	0.00	0.00	0.00
Span (in)	= 15.00	0.00	0.00	0.00
No. Barrels	= 1	0	0	0
Invert El. (ft)	= 1268.60	0.00	0.00	0.00
Length (ft)	= 775.00	0.00	0.00	0.00
Slope (%)	= 0.38	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	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	= ---	---	---	---
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 and outlet control. Weir risers are checked for orifice conditions.

Stage / Discharge



Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.02

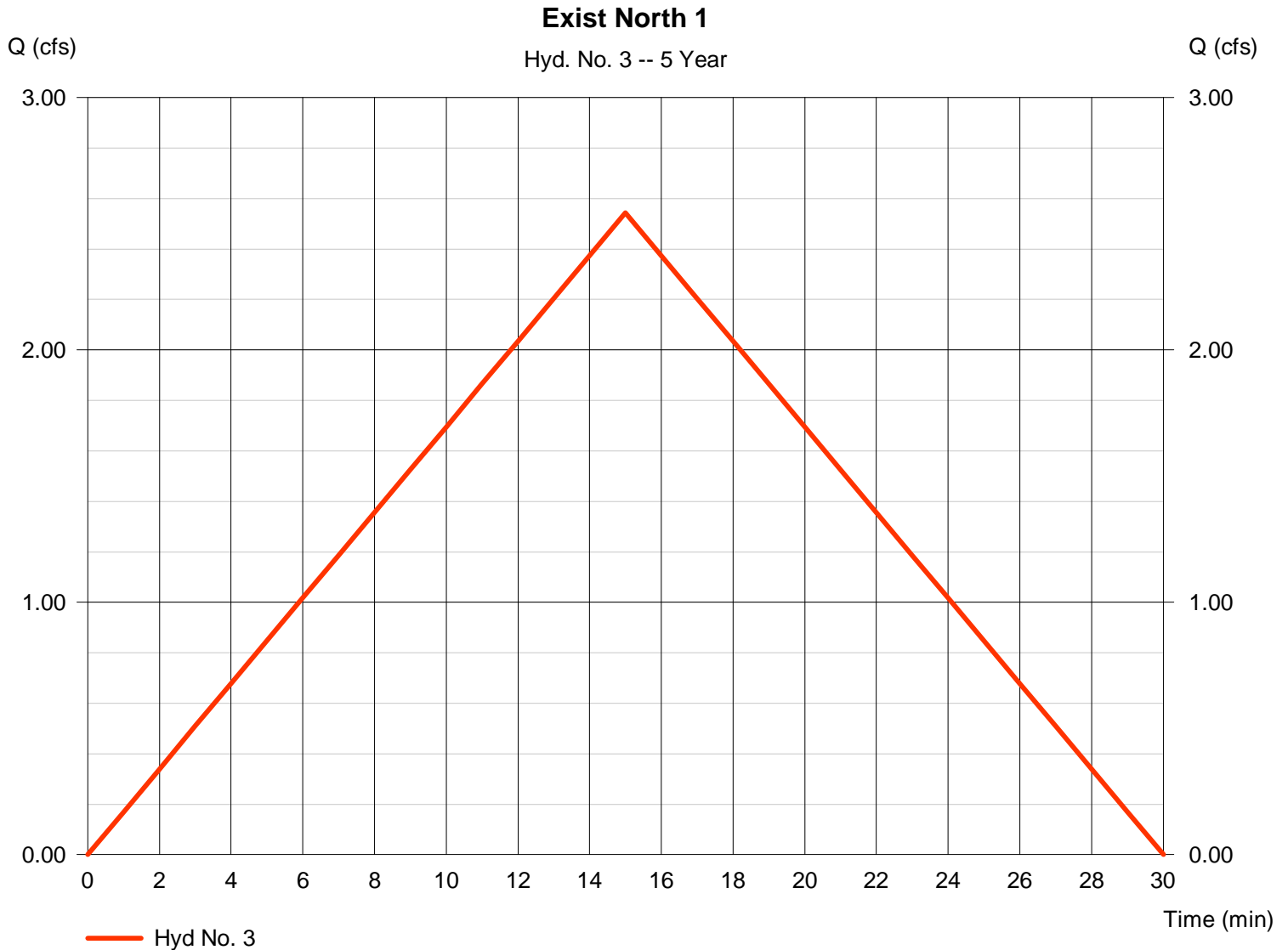
Thursday, Apr 17, 2008

Hyd. No. 3

Exist North 1

Hydrograph type = Rational
Storm frequency = 5 yrs
Time interval = 1 min
Drainage area = 1.300 ac
Intensity = 4.549 in/hr
IDF Curve = wichita.IDF

Peak discharge = 2.543 cfs
Time to peak = 15 min
Hyd. volume = 0.053 acft
Runoff coeff. = 0.43
Tc by User = 15.00 min
Asc/Rec limb fact = 1/1



Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.02

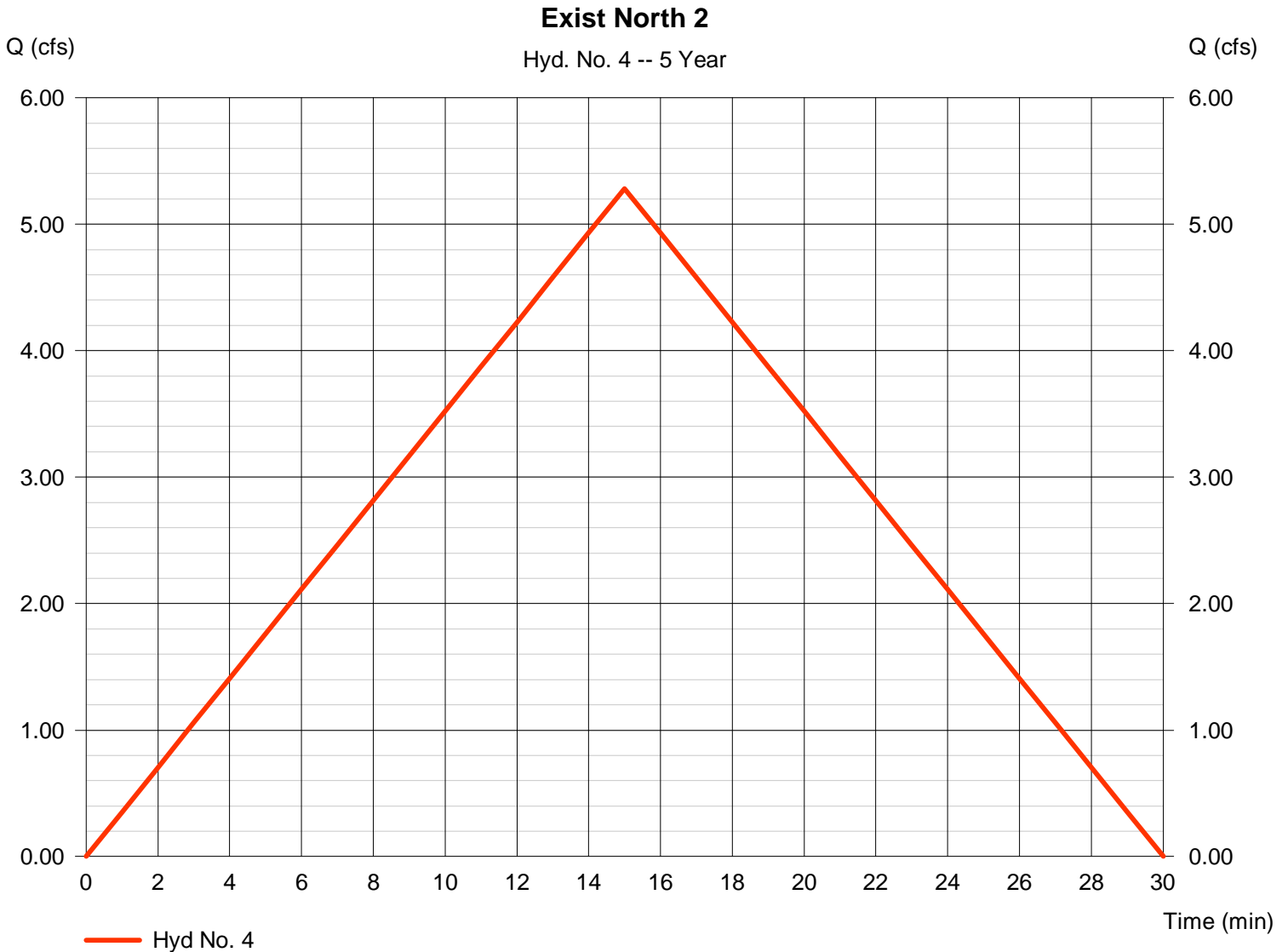
Thursday, Apr 17, 2008

Hyd. No. 4

Exist North 2

Hydrograph type = Rational
Storm frequency = 5 yrs
Time interval = 1 min
Drainage area = 2.700 ac
Intensity = 4.549 in/hr
IDF Curve = wichita.IDF

Peak discharge = 5.282 cfs
Time to peak = 15 min
Hyd. volume = 0.109 acft
Runoff coeff. = 0.43
Tc by User = 15.00 min
Asc/Rec limb fact = 1/1



Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.02

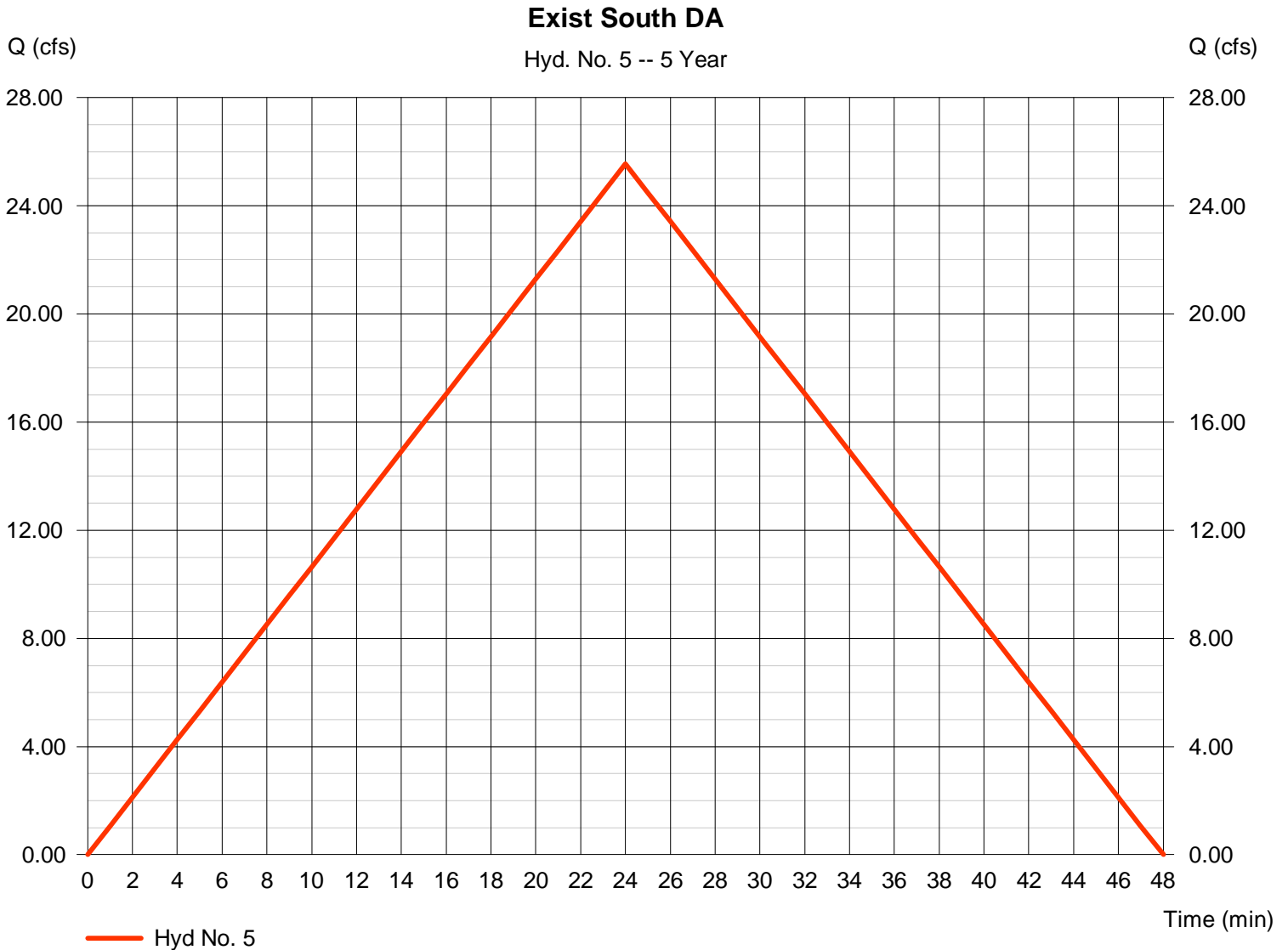
Thursday, Apr 17, 2008

Hyd. No. 5

Exist South DA

Hydrograph type = Rational
Storm frequency = 5 yrs
Time interval = 1 min
Drainage area = 16.300 ac
Intensity = 3.646 in/hr
IDF Curve = wichita.IDF

Peak discharge = 25.55 cfs
Time to peak = 24 min
Hyd. volume = 0.845 acft
Runoff coeff. = 0.43
Tc by TR55 = 24.00 min
Asc/Rec limb fact = 1/1



Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.02

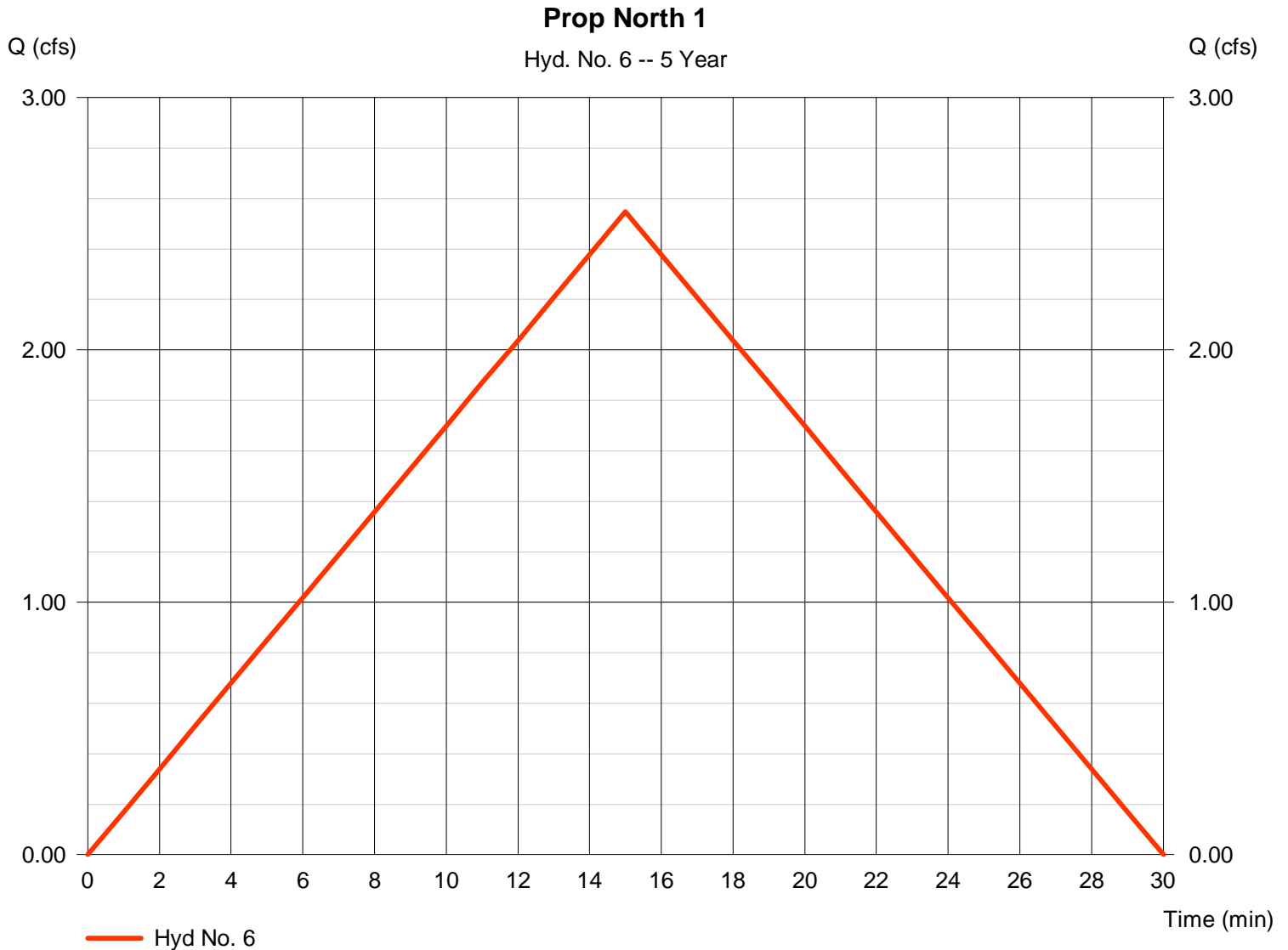
Thursday, Apr 17, 2008

Hyd. No. 6

Prop North 1

Hydrograph type = Rational
Storm frequency = 5 yrs
Time interval = 1 min
Drainage area = 0.700 ac
Intensity = 4.549 in/hr
IDF Curve = wichita.IDF

Peak discharge = 2.547 cfs
Time to peak = 15 min
Hyd. volume = 0.053 acft
Runoff coeff. = 0.8
Tc by User = 15.00 min
Asc/Rec limb fact = 1/1



Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.02

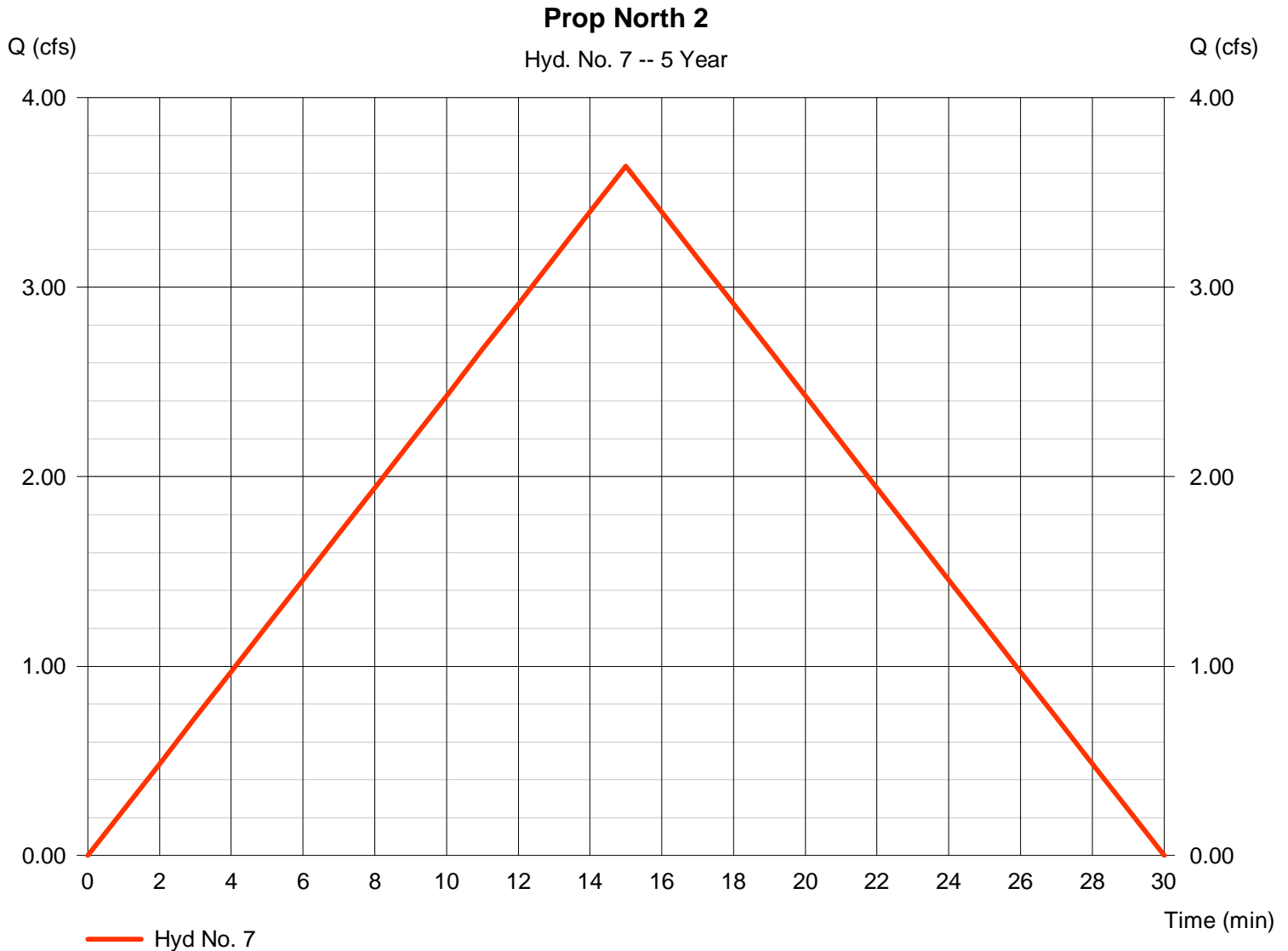
Thursday, Apr 17, 2008

Hyd. No. 7

Prop North 2

Hydrograph type = Rational
Storm frequency = 5 yrs
Time interval = 1 min
Drainage area = 1.000 ac
Intensity = 4.549 in/hr
IDF Curve = wichita.IDF

Peak discharge = 3.639 cfs
Time to peak = 15 min
Hyd. volume = 0.075 acft
Runoff coeff. = 0.8
Tc by User = 15.00 min
Asc/Rec limb fact = 1/1



Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.02

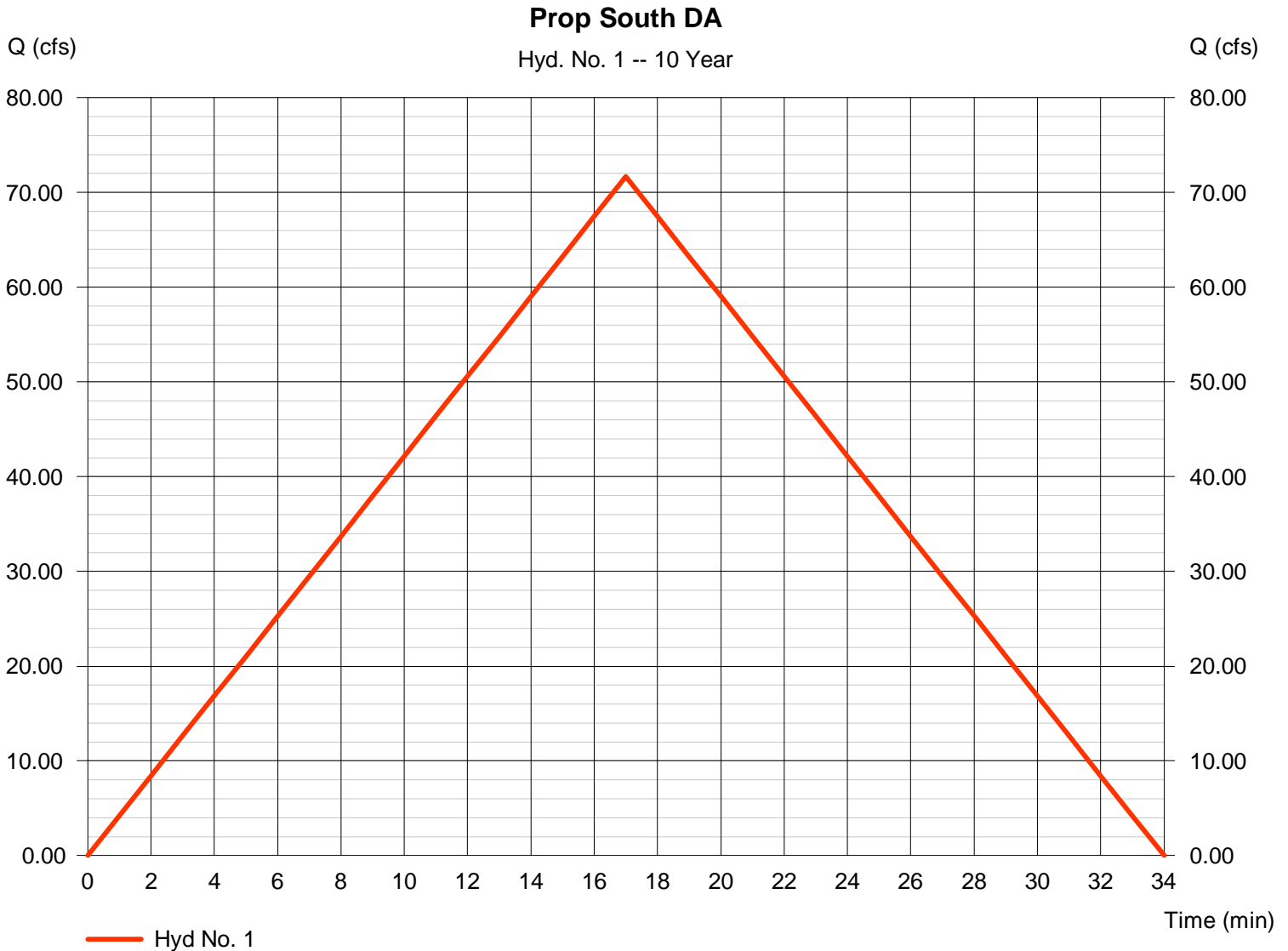
Thursday, Apr 17, 2008

Hyd. No. 1

Prop South DA

Hydrograph type = Rational
Storm frequency = 10 yrs
Time interval = 1 min
Drainage area = 18.100 ac
Intensity = 4.950 in/hr
IDF Curve = wichita.IDF

Peak discharge = 71.67 cfs
Time to peak = 17 min
Hyd. volume = 1.678 acft
Runoff coeff. = 0.8
Tc by TR55 = 17.00 min
Asc/Rec limb fact = 1/1



Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.02

Thursday, Apr 17, 2008

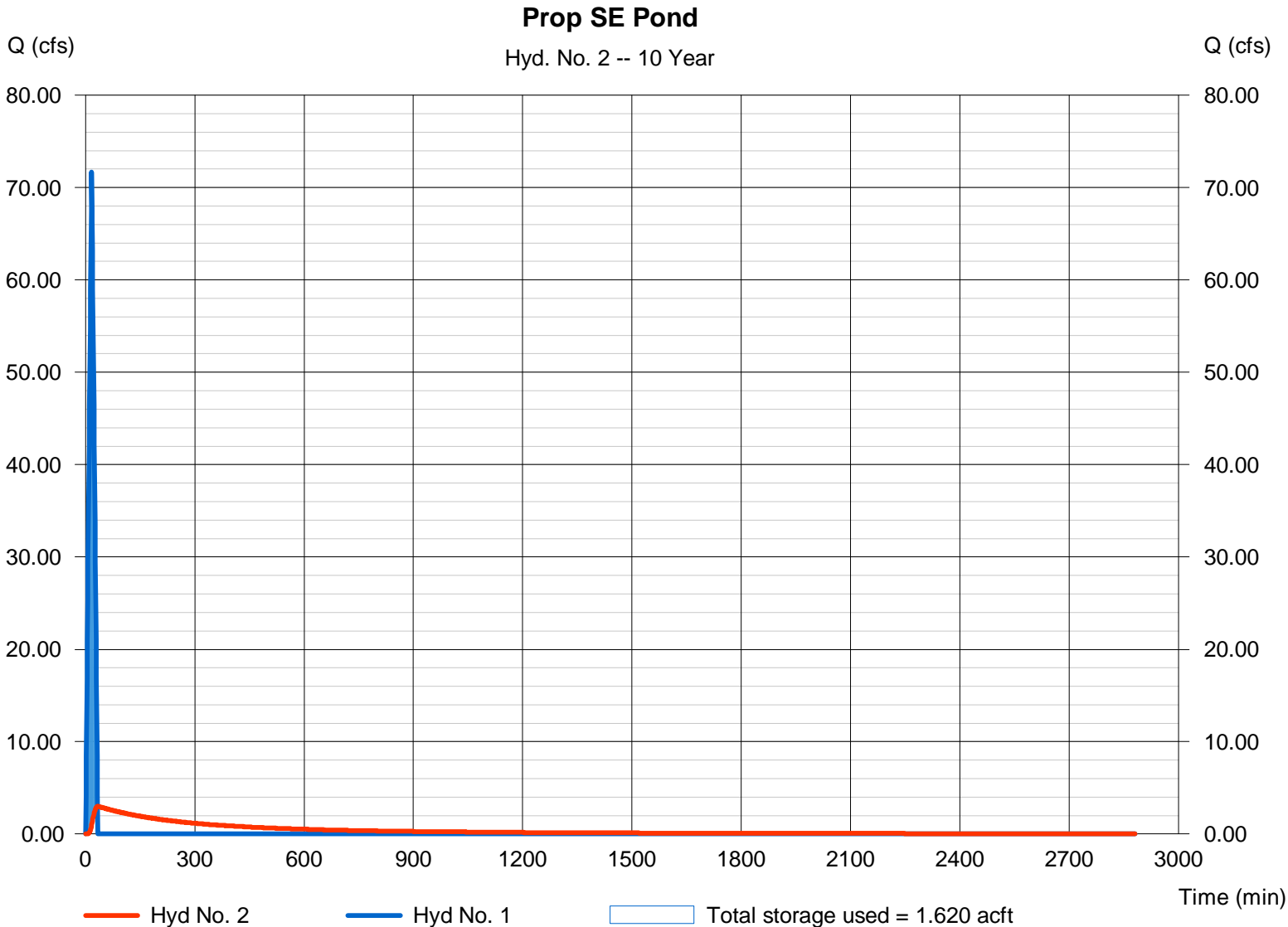
Hyd. No. 2

Prop SE Pond

Hydrograph type = Reservoir
Storm frequency = 10 yrs
Time interval = 1 min
Inflow hyd. No. = 1 - Prop South DA
Reservoir name = Prop Pond 15_RCP

Peak discharge = 3.009 cfs
Time to peak = 33 min
Hyd. volume = 1.529 acft
Max. Elevation = 1269.49 ft
Max. Storage = 1.620 acft

Storage Indication method used.



Pond No. 2 - Prop Pond 15_RCP

Pond Data

Contours - User-defined contour areas. Conic method used for volume calculation. Beginning Elevation = 1268.60 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (acft)	Total storage (acft)
0.00	1268.60	75,535	0.000	0.000
0.40	1269.00	78,247	0.706	0.706
1.40	1270.00	83,864	1.860	2.566
2.40	1271.00	89,672	1.991	4.558

Culvert / Orifice Structures

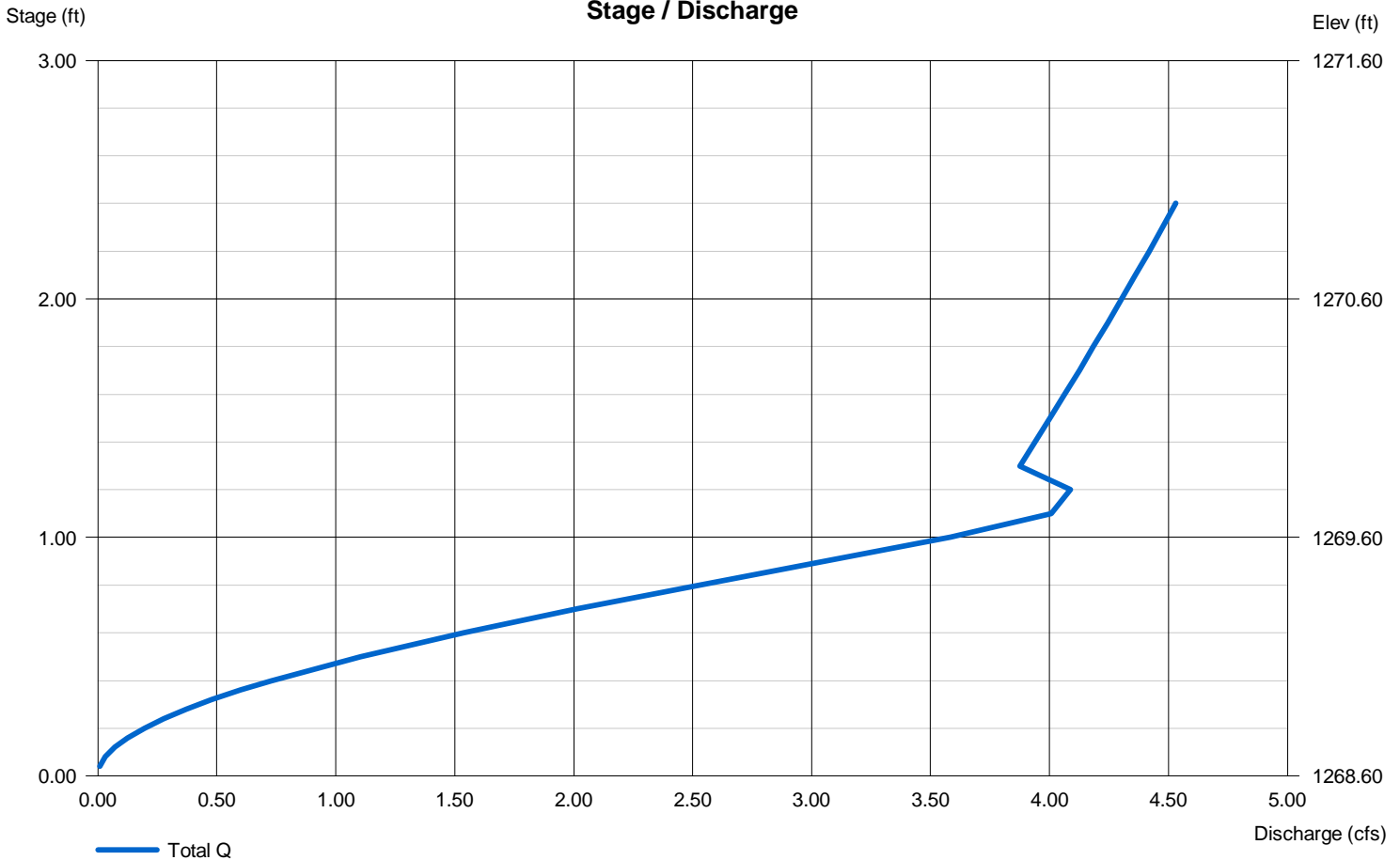
	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 15.00	0.00	0.00	0.00
Span (in)	= 15.00	0.00	0.00	0.00
No. Barrels	= 1	0	0	0
Invert El. (ft)	= 1268.60	0.00	0.00	0.00
Length (ft)	= 775.00	0.00	0.00	0.00
Slope (%)	= 0.38	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	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	= ---	---	---	---
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 and outlet control. Weir risers are checked for orifice conditions.

Stage / Discharge



Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.02

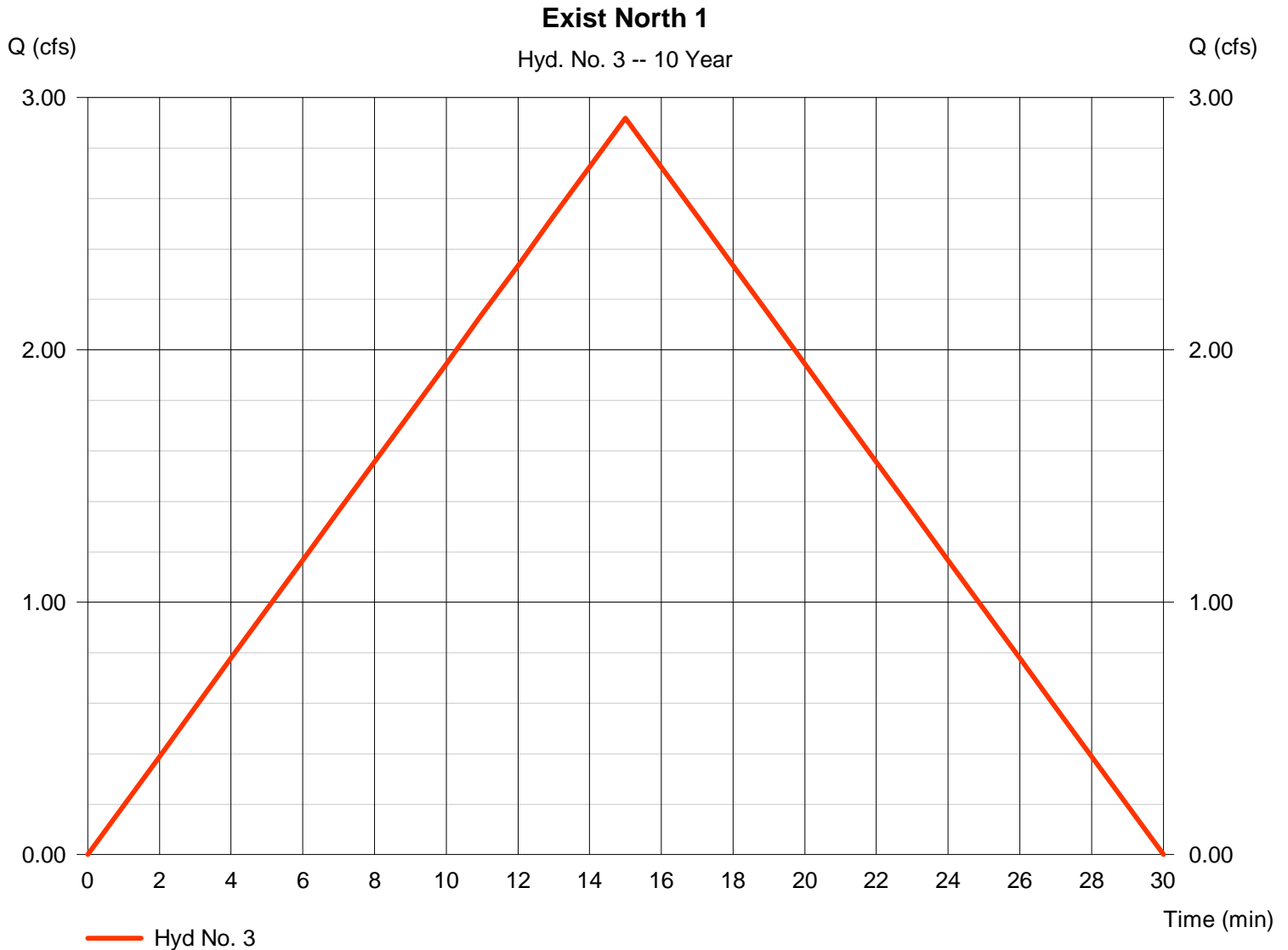
Thursday, Apr 17, 2008

Hyd. No. 3

Exist North 1

Hydrograph type = Rational
Storm frequency = 10 yrs
Time interval = 1 min
Drainage area = 1.300 ac
Intensity = 5.221 in/hr
IDF Curve = wichita.IDF

Peak discharge = 2.918 cfs
Time to peak = 15 min
Hyd. volume = 0.060 acft
Runoff coeff. = 0.43
Tc by User = 15.00 min
Asc/Rec limb fact = 1/1



Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.02

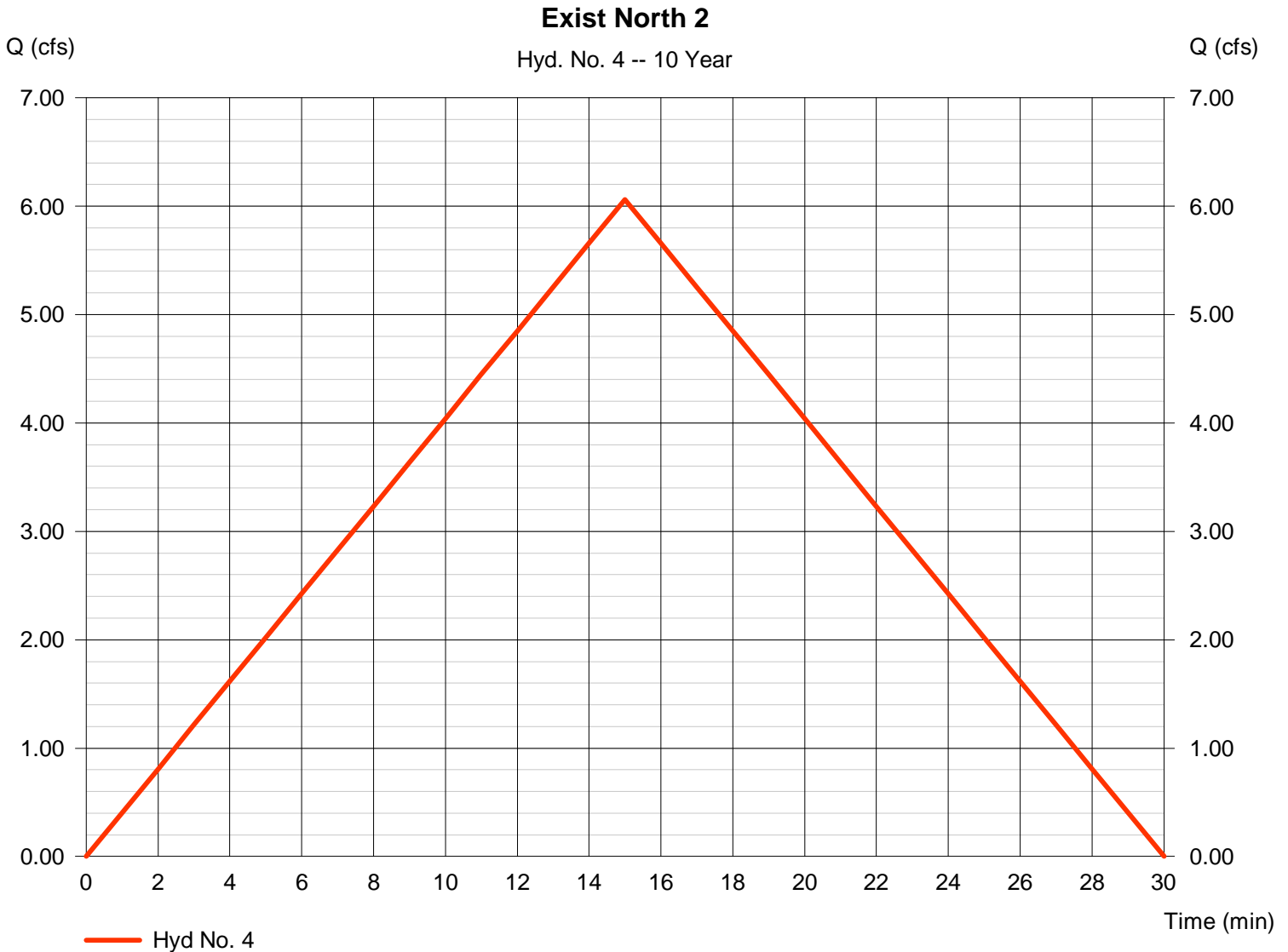
Thursday, Apr 17, 2008

Hyd. No. 4

Exist North 2

Hydrograph type = Rational
Storm frequency = 10 yrs
Time interval = 1 min
Drainage area = 2.700 ac
Intensity = 5.221 in/hr
IDF Curve = wichita.IDF

Peak discharge = 6.061 cfs
Time to peak = 15 min
Hyd. volume = 0.125 acft
Runoff coeff. = 0.43
Tc by User = 15.00 min
Asc/Rec limb fact = 1/1



Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.02

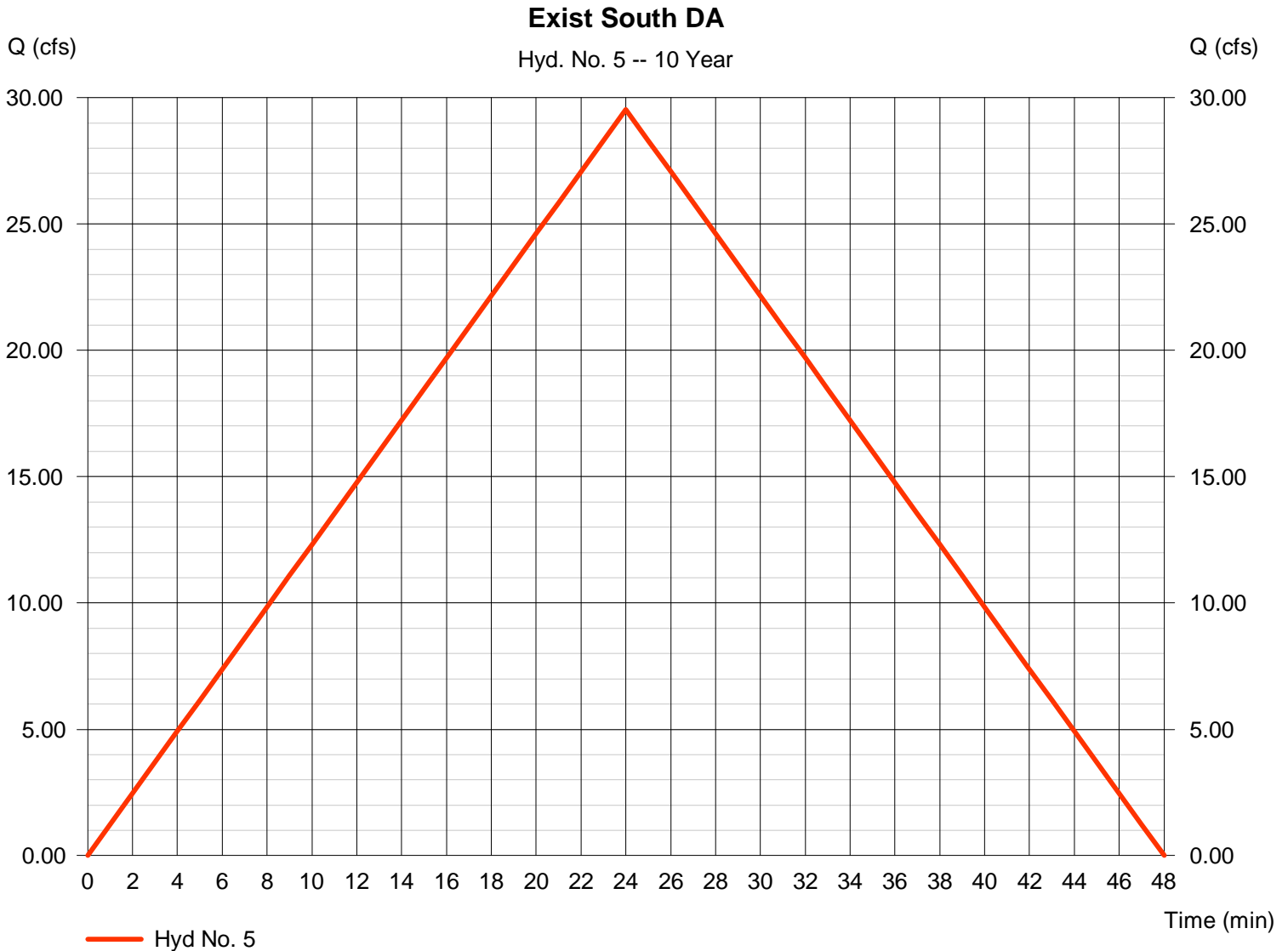
Thursday, Apr 17, 2008

Hyd. No. 5

Exist South DA

Hydrograph type = Rational
Storm frequency = 10 yrs
Time interval = 1 min
Drainage area = 16.300 ac
Intensity = 4.214 in/hr
IDF Curve = wichita.IDF

Peak discharge = 29.54 cfs
Time to peak = 24 min
Hyd. volume = 0.976 acft
Runoff coeff. = 0.43
Tc by TR55 = 24.00 min
Asc/Rec limb fact = 1/1



Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.02

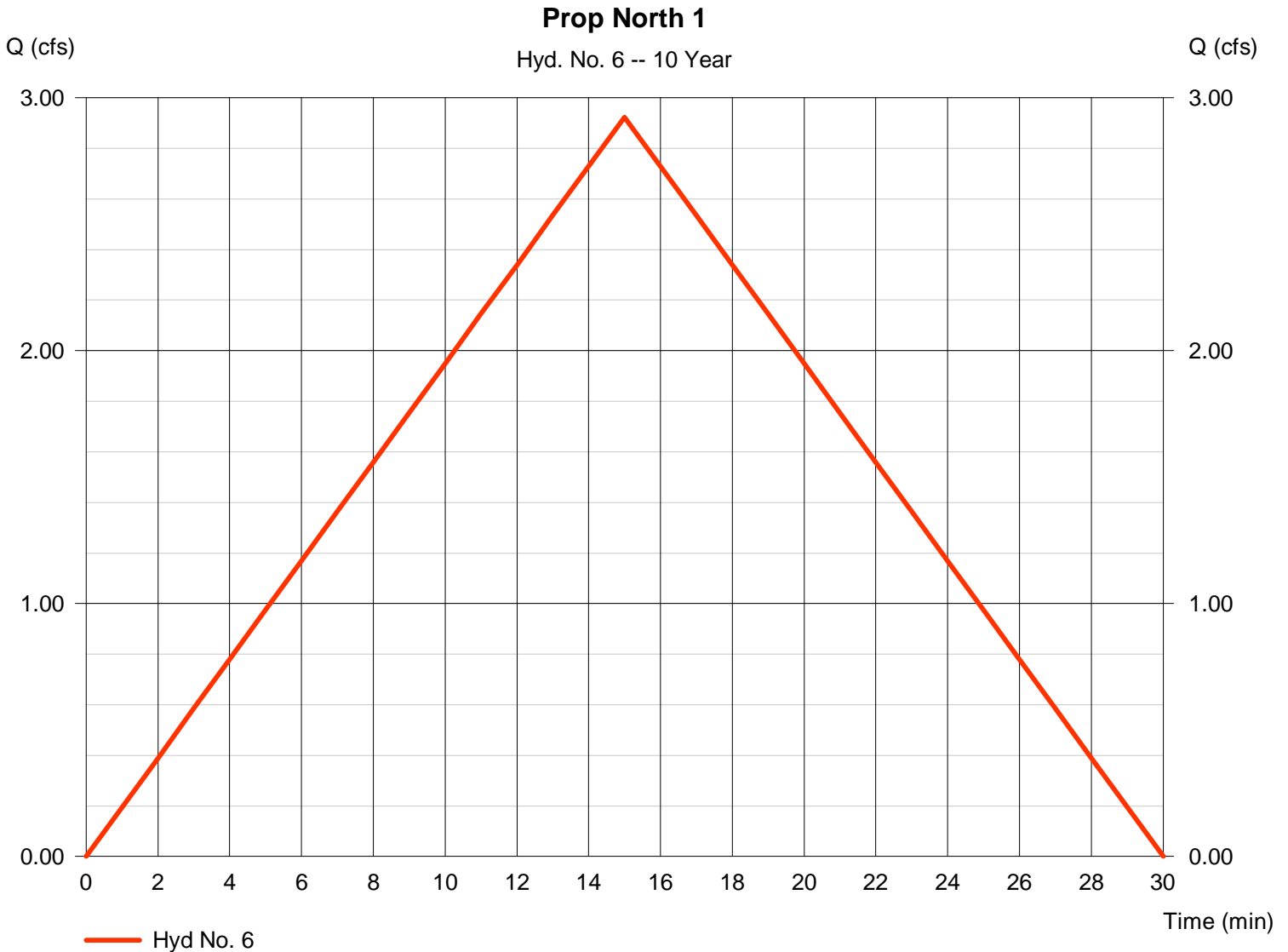
Thursday, Apr 17, 2008

Hyd. No. 6

Prop North 1

Hydrograph type = Rational
Storm frequency = 10 yrs
Time interval = 1 min
Drainage area = 0.700 ac
Intensity = 5.221 in/hr
IDF Curve = wichita.IDF

Peak discharge = 2.924 cfs
Time to peak = 15 min
Hyd. volume = 0.060 acft
Runoff coeff. = 0.8
Tc by User = 15.00 min
Asc/Rec limb fact = 1/1



Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.02

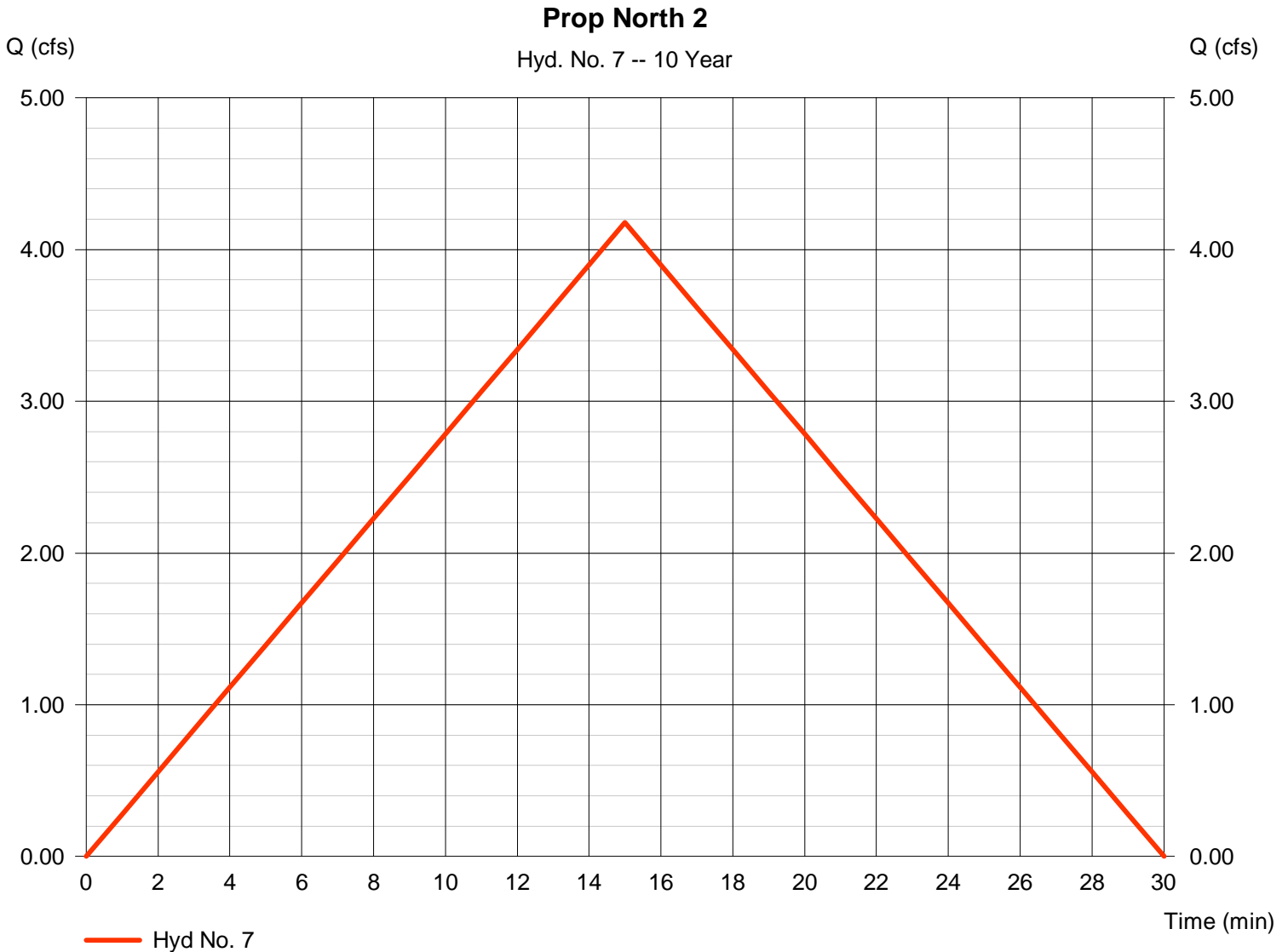
Thursday, Apr 17, 2008

Hyd. No. 7

Prop North 2

Hydrograph type = Rational
Storm frequency = 10 yrs
Time interval = 1 min
Drainage area = 1.000 ac
Intensity = 5.221 in/hr
IDF Curve = wichita.IDF

Peak discharge = 4.177 cfs
Time to peak = 15 min
Hyd. volume = 0.086 acft
Runoff coeff. = 0.8
Tc by User = 15.00 min
Asc/Rec limb fact = 1/1



Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.02

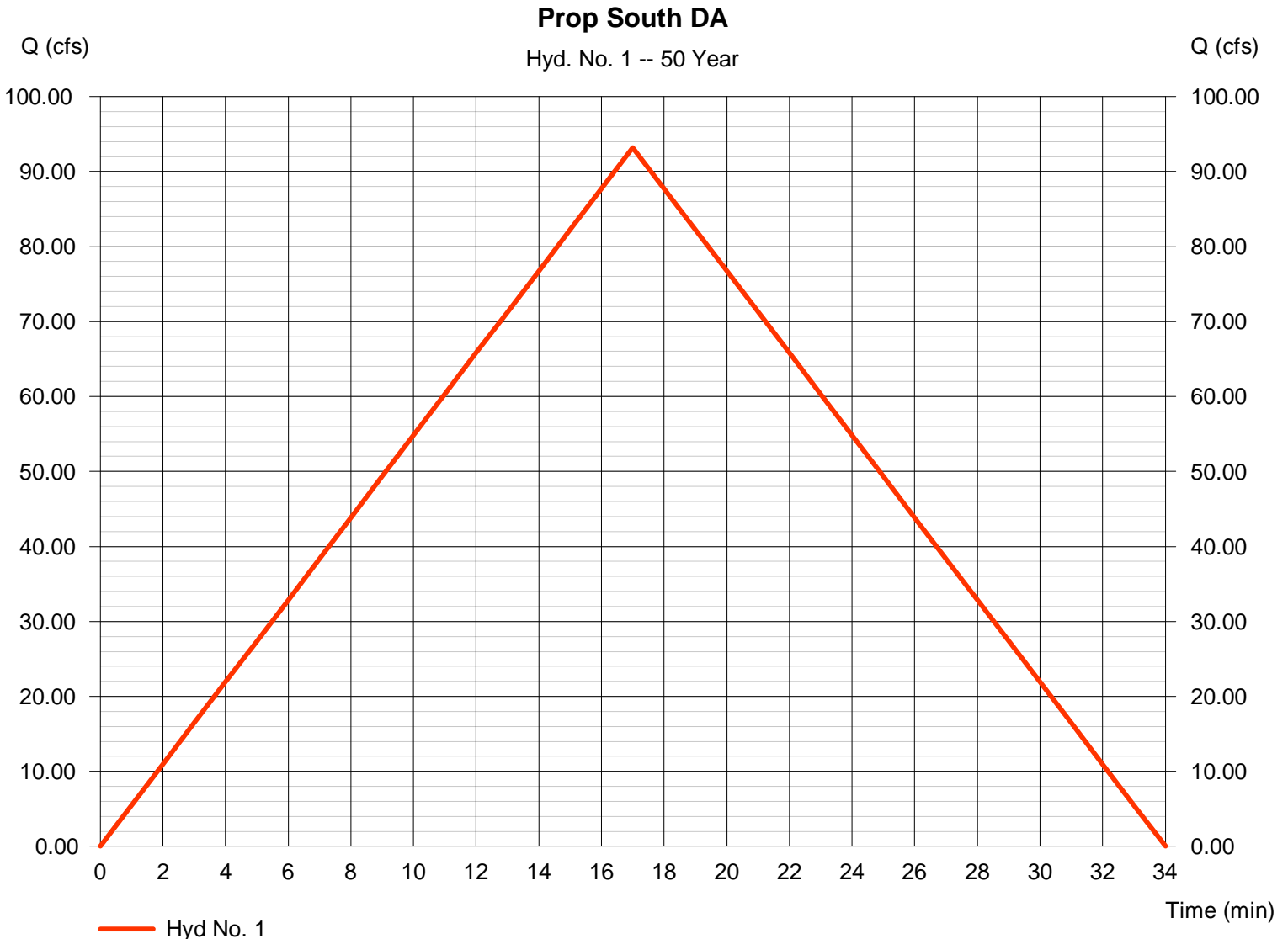
Thursday, Apr 17, 2008

Hyd. No. 1

Prop South DA

Hydrograph type = Rational
Storm frequency = 50 yrs
Time interval = 1 min
Drainage area = 18.100 ac
Intensity = 6.437 in/hr
IDF Curve = wichita.IDF

Peak discharge = 93.21 cfs
Time to peak = 17 min
Hyd. volume = 2.183 acft
Runoff coeff. = 0.8
Tc by TR55 = 17.00 min
Asc/Rec limb fact = 1/1



Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.02

Thursday, Apr 17, 2008

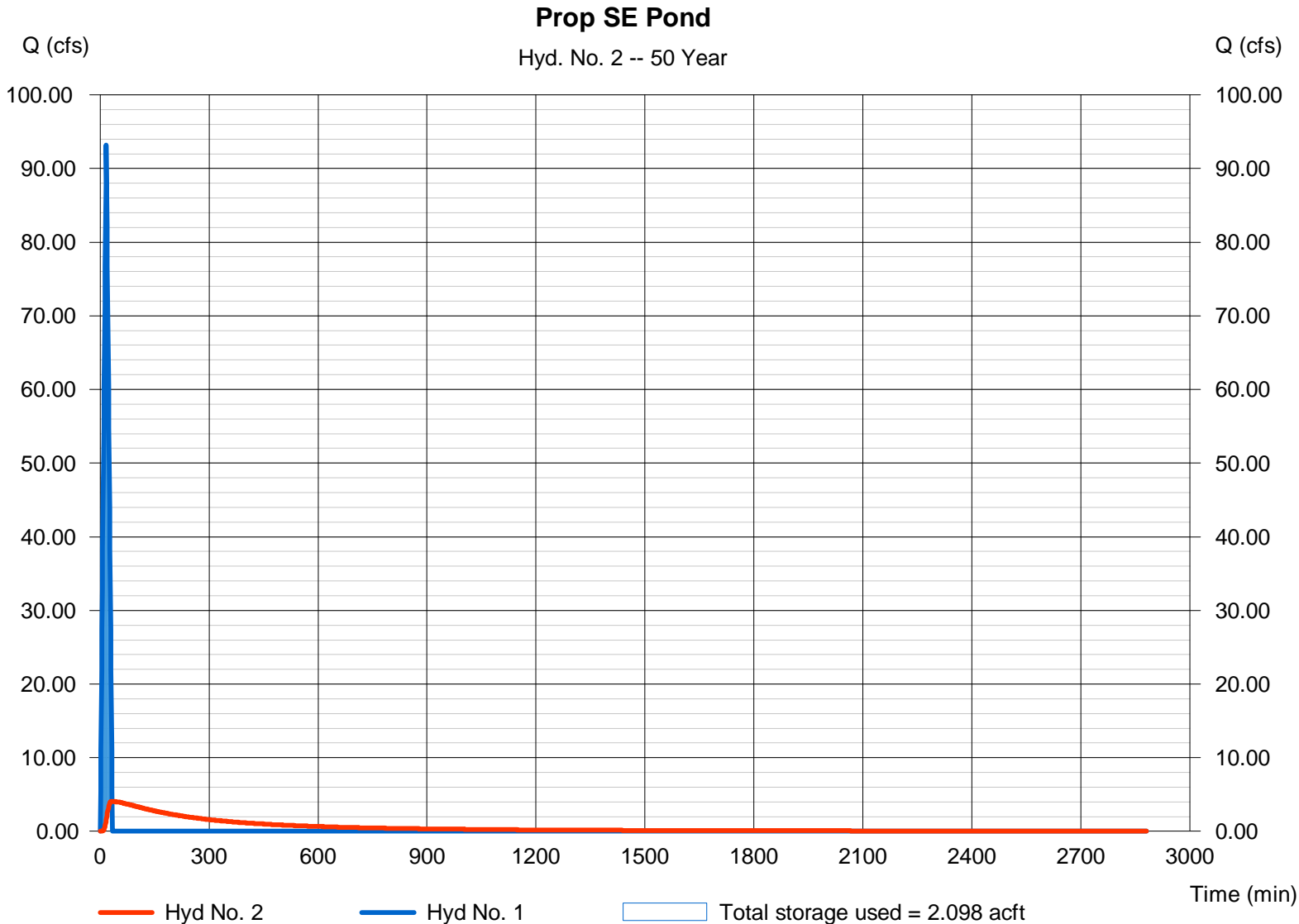
Hyd. No. 2

Prop SE Pond

Hydrograph type = Reservoir
Storm frequency = 50 yrs
Time interval = 1 min
Inflow hyd. No. = 1 - Prop South DA
Reservoir name = Prop Pond 15_RCP

Peak discharge = 4.046 cfs
Time to peak = 33 min
Hyd. volume = 2.029 acft
Max. Elevation = 1269.75 ft
Max. Storage = 2.098 acft

Storage Indication method used.



Pond No. 2 - Prop Pond 15_RCP

Pond Data

Contours - User-defined contour areas. Conic method used for volume calculation. Beginning Elevation = 1268.60 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (acft)	Total storage (acft)
0.00	1268.60	75,535	0.000	0.000
0.40	1269.00	78,247	0.706	0.706
1.40	1270.00	83,864	1.860	2.566
2.40	1271.00	89,672	1.991	4.558

Culvert / Orifice Structures

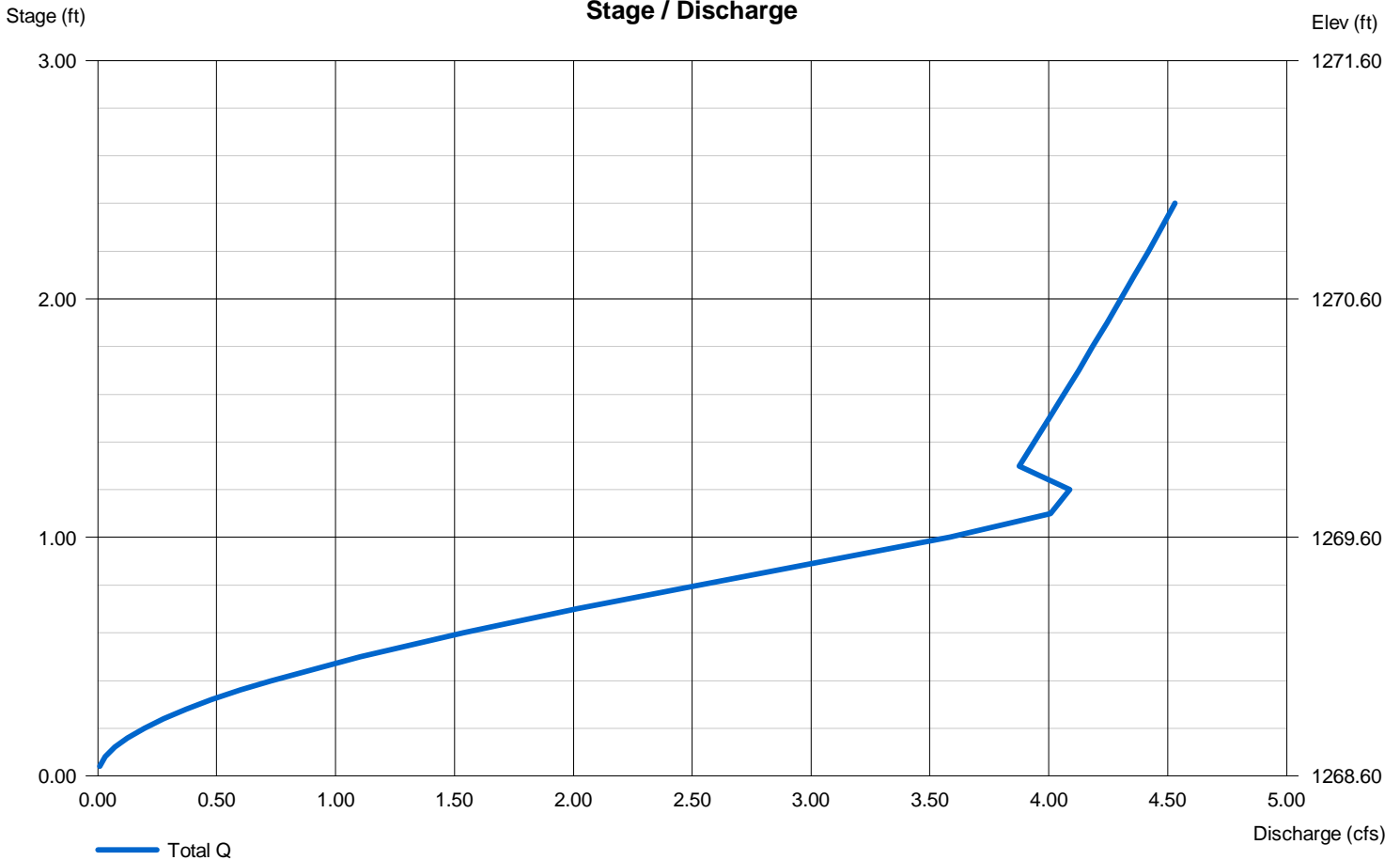
	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 15.00	0.00	0.00	0.00
Span (in)	= 15.00	0.00	0.00	0.00
No. Barrels	= 1	0	0	0
Invert El. (ft)	= 1268.60	0.00	0.00	0.00
Length (ft)	= 775.00	0.00	0.00	0.00
Slope (%)	= 0.38	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	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	= ---	---	---	---
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 and outlet control. Weir risers are checked for orifice conditions.

Stage / Discharge



Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.02

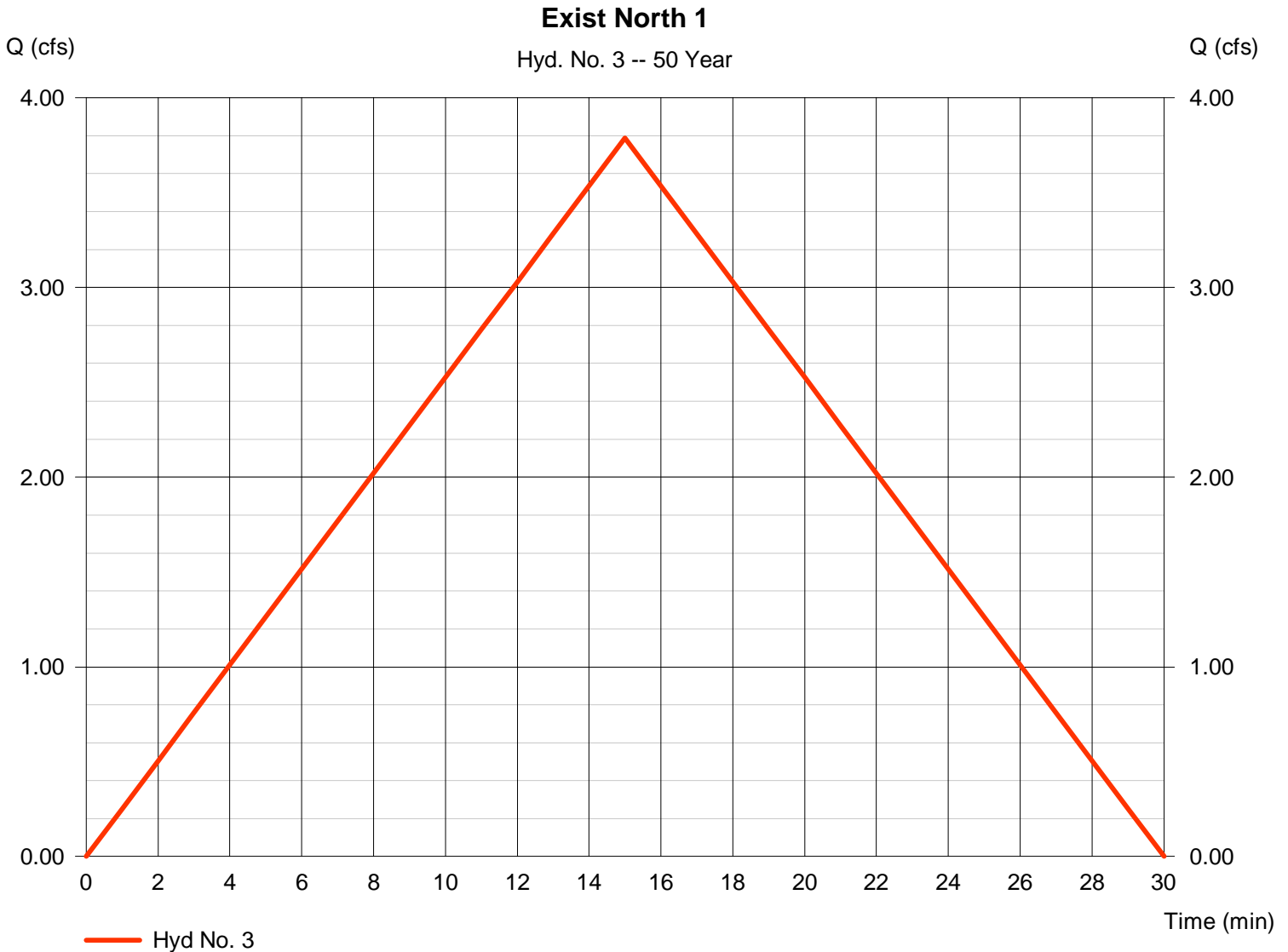
Thursday, Apr 17, 2008

Hyd. No. 3

Exist North 1

Hydrograph type = Rational
Storm frequency = 50 yrs
Time interval = 1 min
Drainage area = 1.300 ac
Intensity = 6.776 in/hr
IDF Curve = wichita.IDF

Peak discharge = 3.788 cfs
Time to peak = 15 min
Hyd. volume = 0.078 acft
Runoff coeff. = 0.43
Tc by User = 15.00 min
Asc/Rec limb fact = 1/1



Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.02

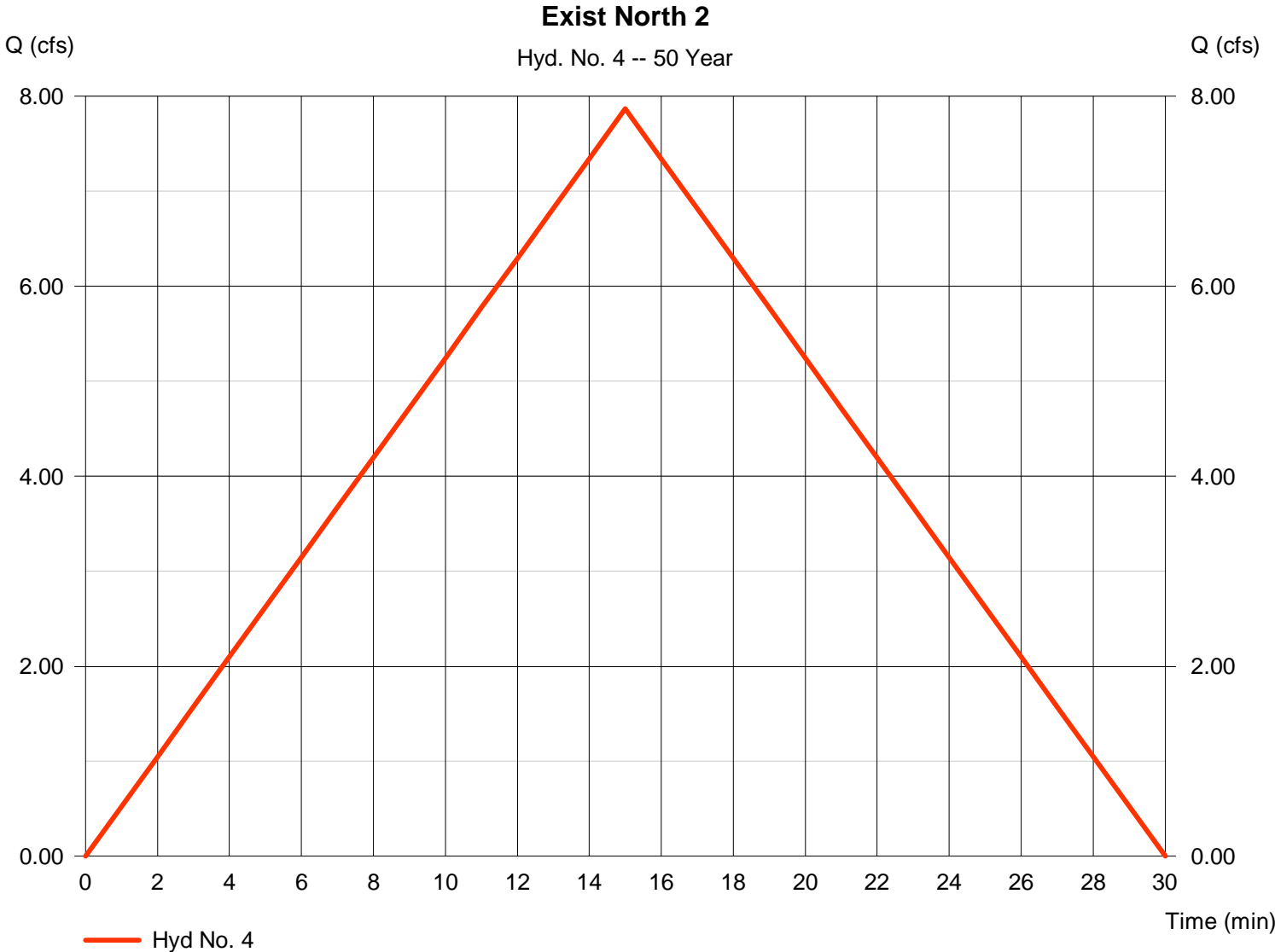
Thursday, Apr 17, 2008

Hyd. No. 4

Exist North 2

Hydrograph type = Rational
Storm frequency = 50 yrs
Time interval = 1 min
Drainage area = 2.700 ac
Intensity = 6.776 in/hr
IDF Curve = wichita.IDF

Peak discharge = 7.868 cfs
Time to peak = 15 min
Hyd. volume = 0.163 acft
Runoff coeff. = 0.43
Tc by User = 15.00 min
Asc/Rec limb fact = 1/1



Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.02

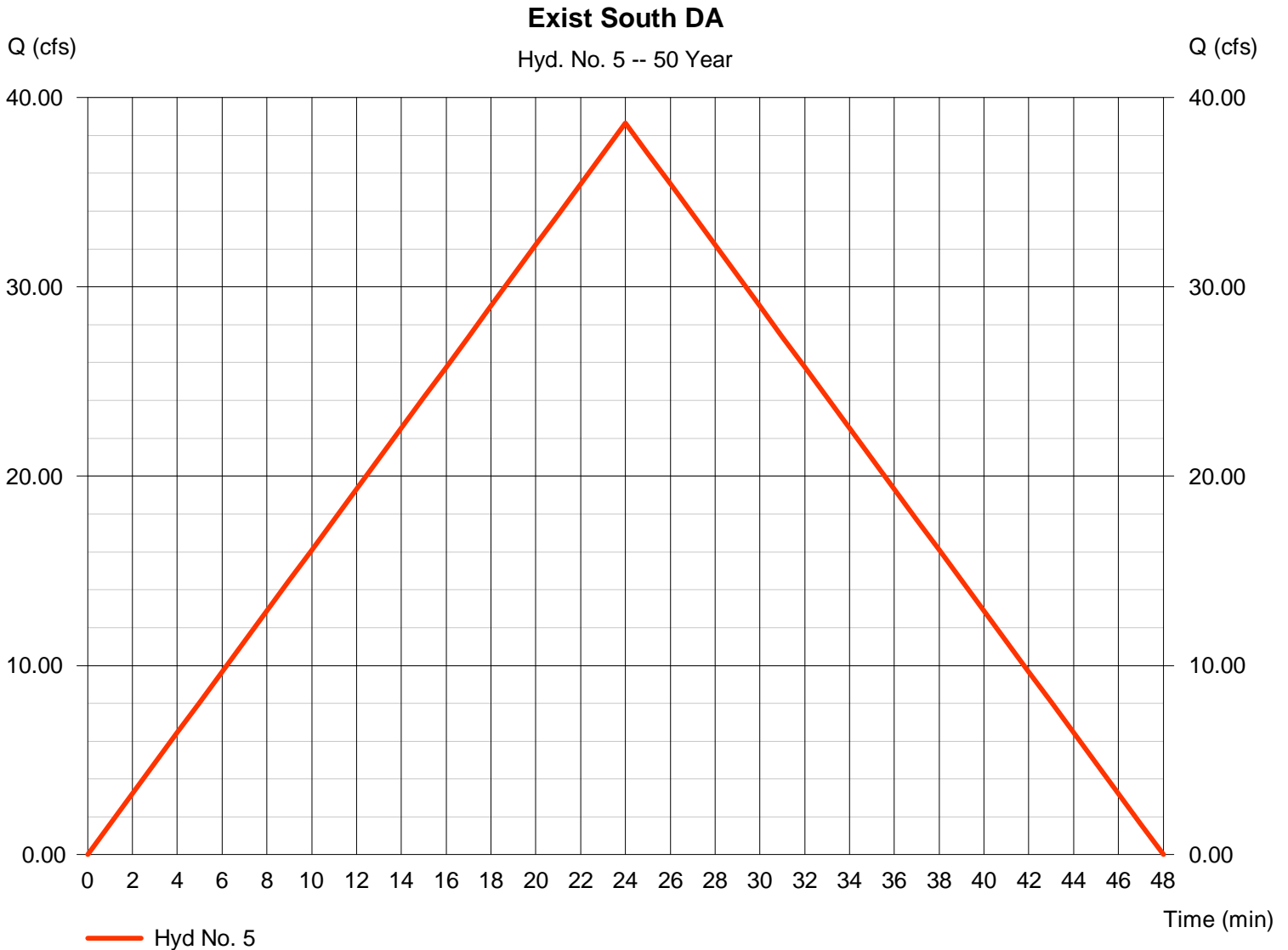
Thursday, Apr 17, 2008

Hyd. No. 5

Exist South DA

Hydrograph type = Rational
Storm frequency = 50 yrs
Time interval = 1 min
Drainage area = 16.300 ac
Intensity = 5.514 in/hr
IDF Curve = wichita.IDF

Peak discharge = 38.65 cfs
Time to peak = 24 min
Hyd. volume = 1.278 acft
Runoff coeff. = 0.43
Tc by TR55 = 24.00 min
Asc/Rec limb fact = 1/1



Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.02

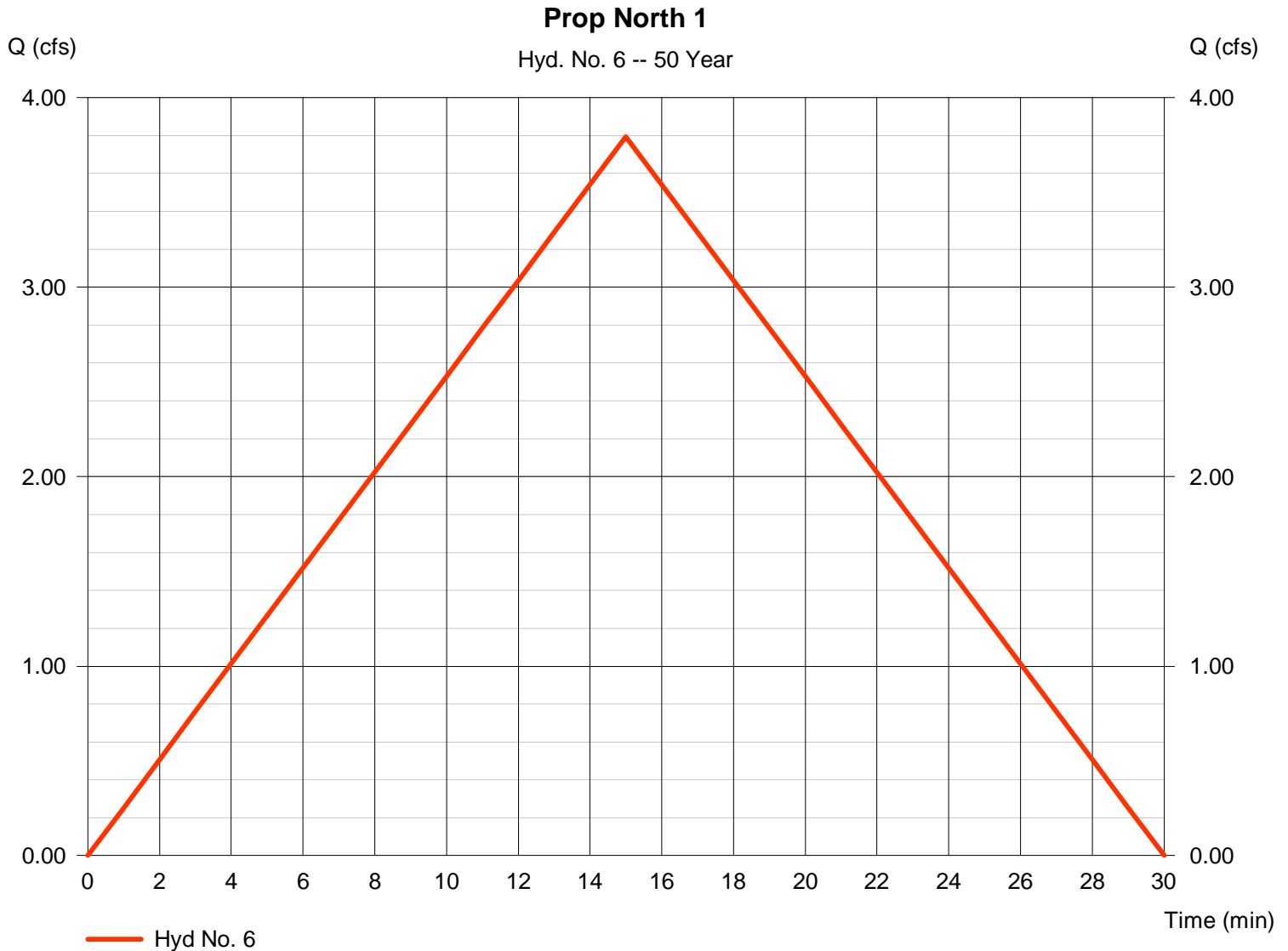
Thursday, Apr 17, 2008

Hyd. No. 6

Prop North 1

Hydrograph type = Rational
Storm frequency = 50 yrs
Time interval = 1 min
Drainage area = 0.700 ac
Intensity = 6.776 in/hr
IDF Curve = wichita.IDF

Peak discharge = 3.795 cfs
Time to peak = 15 min
Hyd. volume = 0.078 acft
Runoff coeff. = 0.8
Tc by User = 15.00 min
Asc/Rec limb fact = 1/1



Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.02

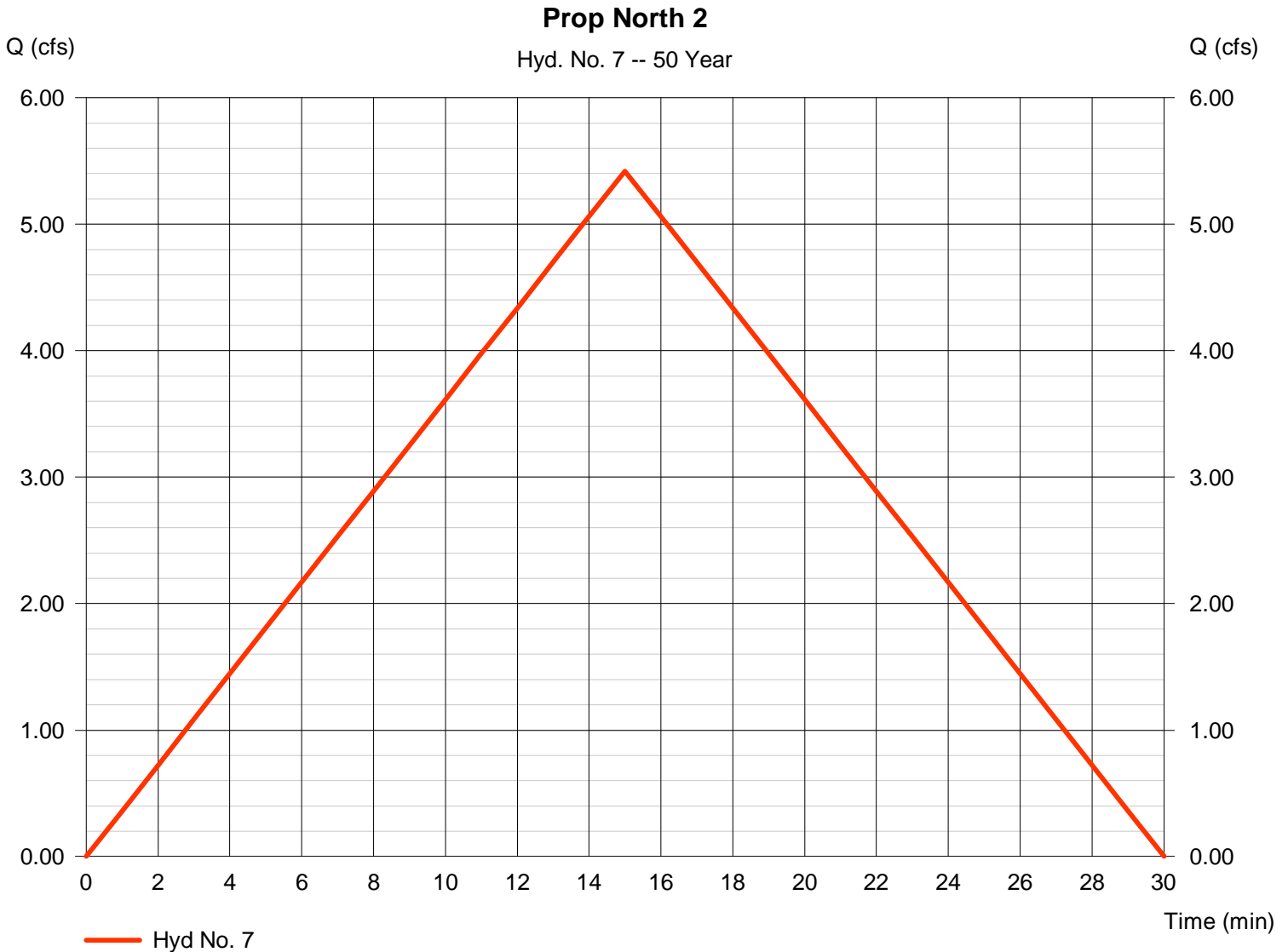
Thursday, Apr 17, 2008

Hyd. No. 7

Prop North 2

Hydrograph type = Rational
Storm frequency = 50 yrs
Time interval = 1 min
Drainage area = 1.000 ac
Intensity = 6.776 in/hr
IDF Curve = wichita.IDF

Peak discharge = 5.421 cfs
Time to peak = 15 min
Hyd. volume = 0.112 acft
Runoff coeff. = 0.8
Tc by User = 15.00 min
Asc/Rec limb fact = 1/1



Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.02

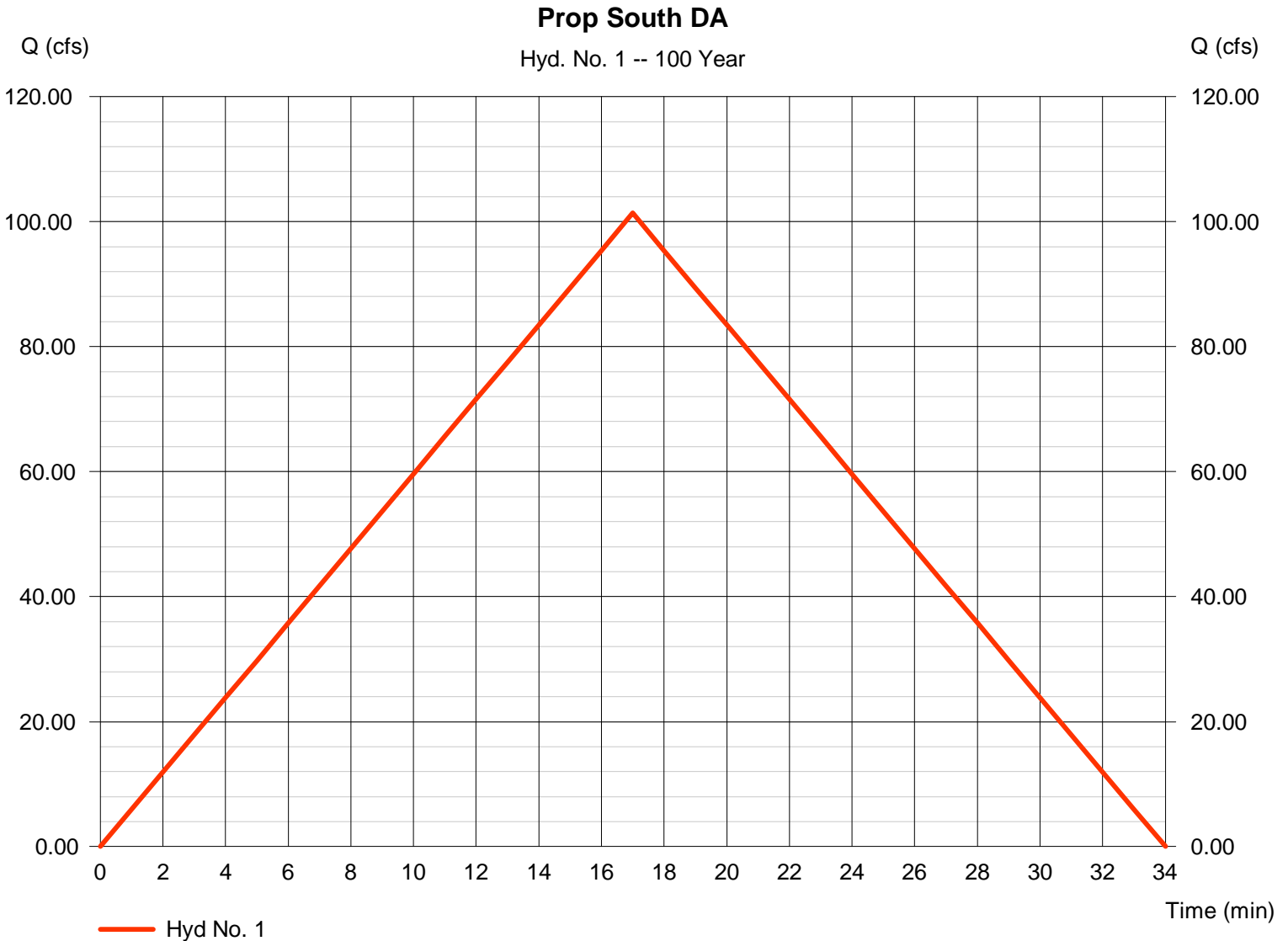
Thursday, Apr 17, 2008

Hyd. No. 1

Prop South DA

Hydrograph type = Rational
Storm frequency = 100 yrs
Time interval = 1 min
Drainage area = 18.100 ac
Intensity = 7.000 in/hr
IDF Curve = wichita.IDF

Peak discharge = 101.37 cfs
Time to peak = 17 min
Hyd. volume = 2.374 acft
Runoff coeff. = 0.8
Tc by TR55 = 17.00 min
Asc/Rec limb fact = 1/1



Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.02

Thursday, Apr 17, 2008

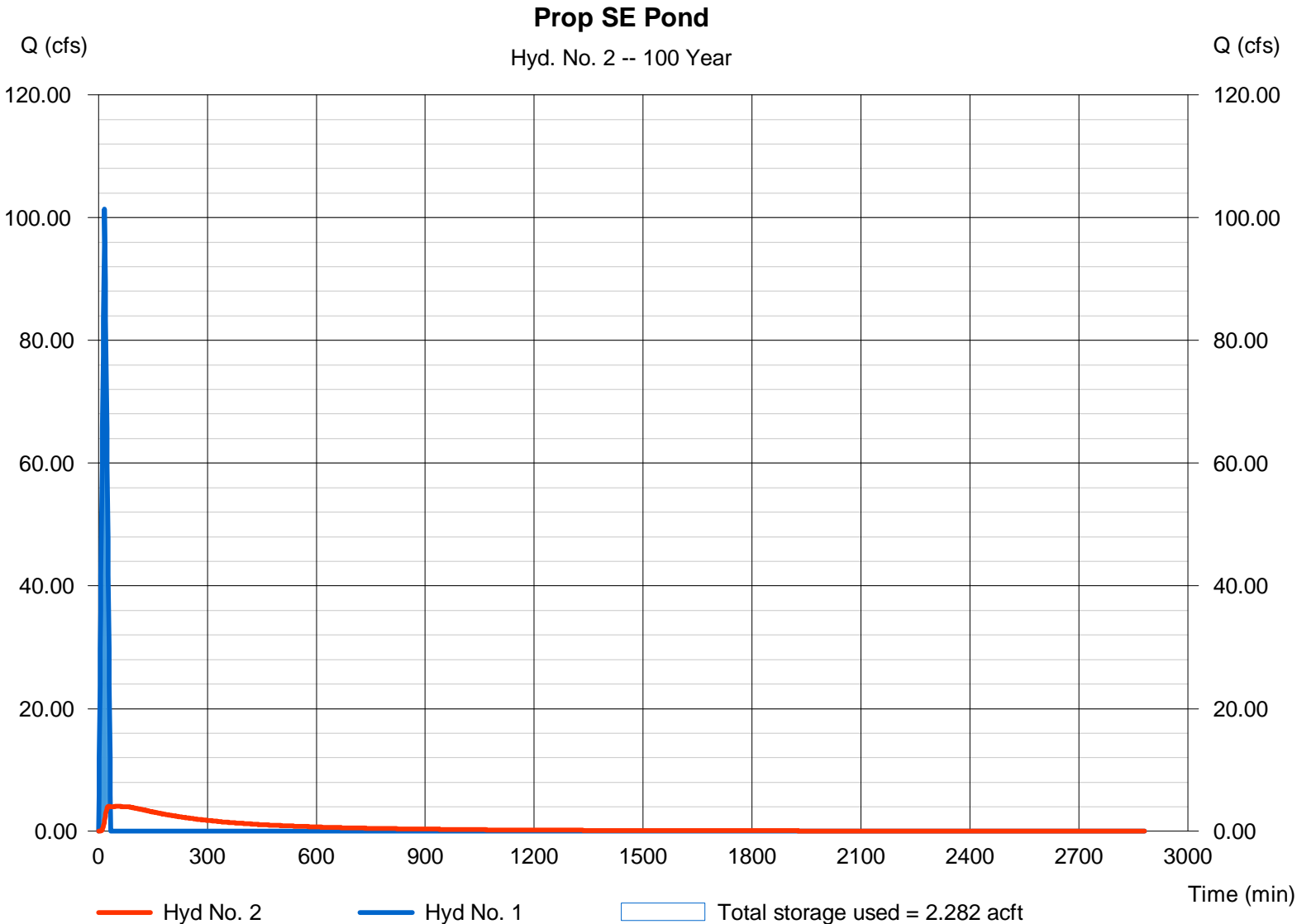
Hyd. No. 2

Prop SE Pond

Hydrograph type = Reservoir
Storm frequency = 100 yrs
Time interval = 1 min
Inflow hyd. No. = 1 - Prop South DA
Reservoir name = Prop Pond 15_RCP

Peak discharge = 4.087 cfs
Time to peak = 50 min
Hyd. volume = 2.218 acft
Max. Elevation = 1269.85 ft
Max. Storage = 2.282 acft

Storage Indication method used.



Pond No. 2 - Prop Pond 15_RCP

Pond Data

Contours - User-defined contour areas. Conic method used for volume calculation. Beginning Elevation = 1268.60 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (acft)	Total storage (acft)
0.00	1268.60	75,535	0.000	0.000
0.40	1269.00	78,247	0.706	0.706
1.40	1270.00	83,864	1.860	2.566
2.40	1271.00	89,672	1.991	4.558

Culvert / Orifice Structures

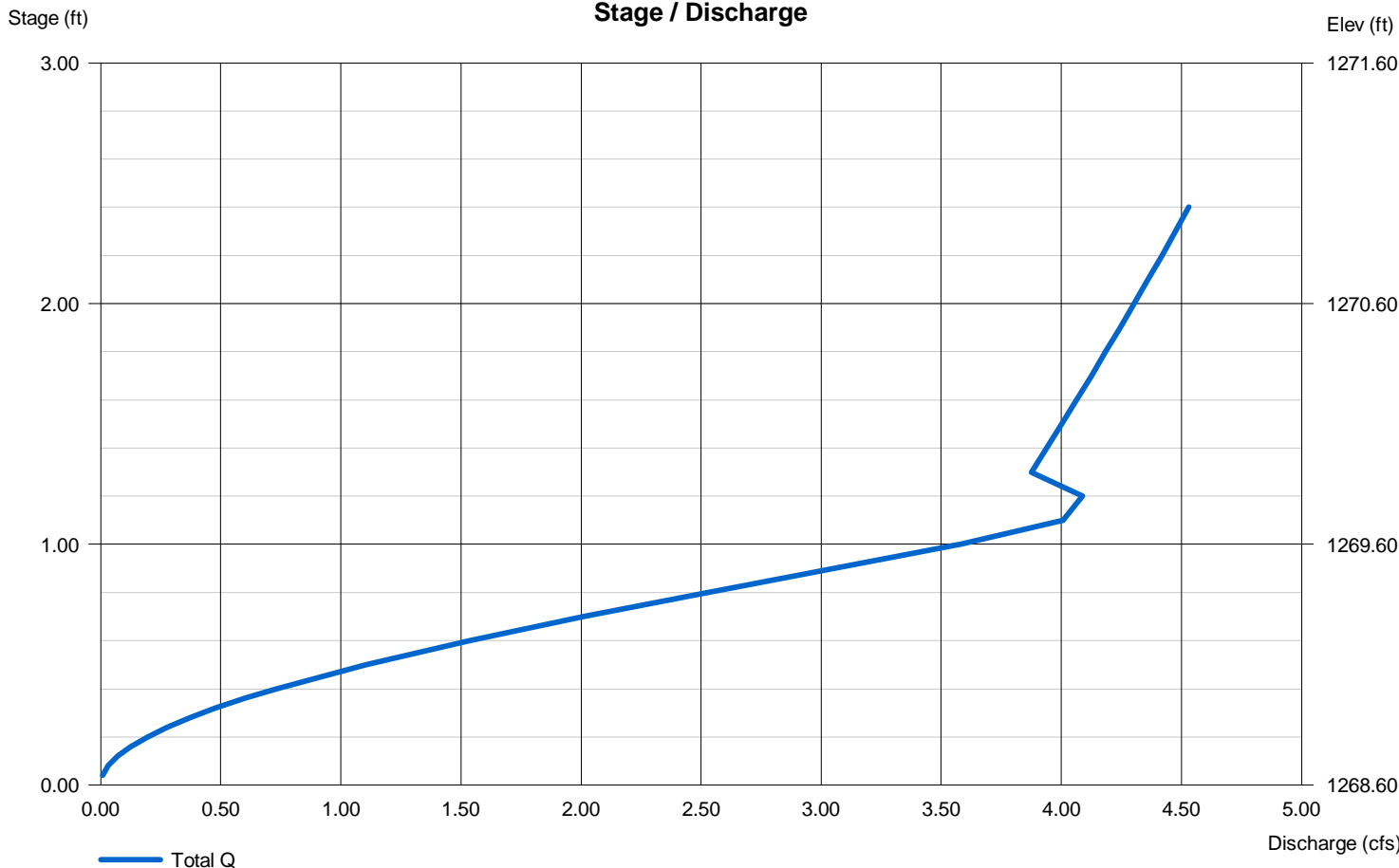
	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 15.00	0.00	0.00	0.00
Span (in)	= 15.00	0.00	0.00	0.00
No. Barrels	= 1	0	0	0
Invert El. (ft)	= 1268.60	0.00	0.00	0.00
Length (ft)	= 775.00	0.00	0.00	0.00
Slope (%)	= 0.38	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	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	= ---	---	---	---
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 and outlet control. Weir risers are checked for orifice conditions.

Stage / Discharge



Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.02

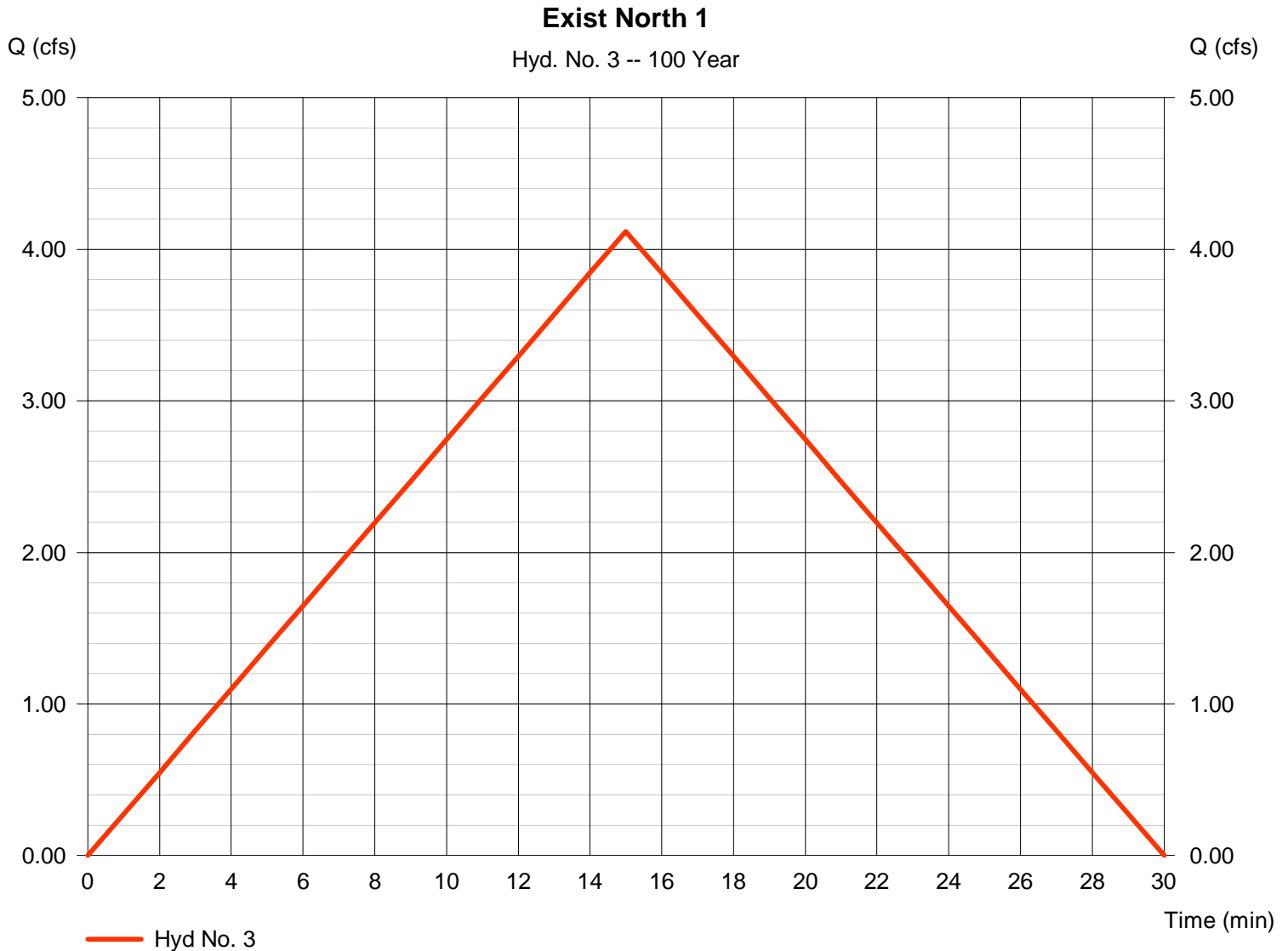
Thursday, Apr 17, 2008

Hyd. No. 3

Exist North 1

Hydrograph type = Rational
Storm frequency = 100 yrs
Time interval = 1 min
Drainage area = 1.300 ac
Intensity = 7.365 in/hr
IDF Curve = wichita.IDF

Peak discharge = 4.117 cfs
Time to peak = 15 min
Hyd. volume = 0.085 acft
Runoff coeff. = 0.43
Tc by User = 15.00 min
Asc/Rec limb fact = 1/1



Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.02

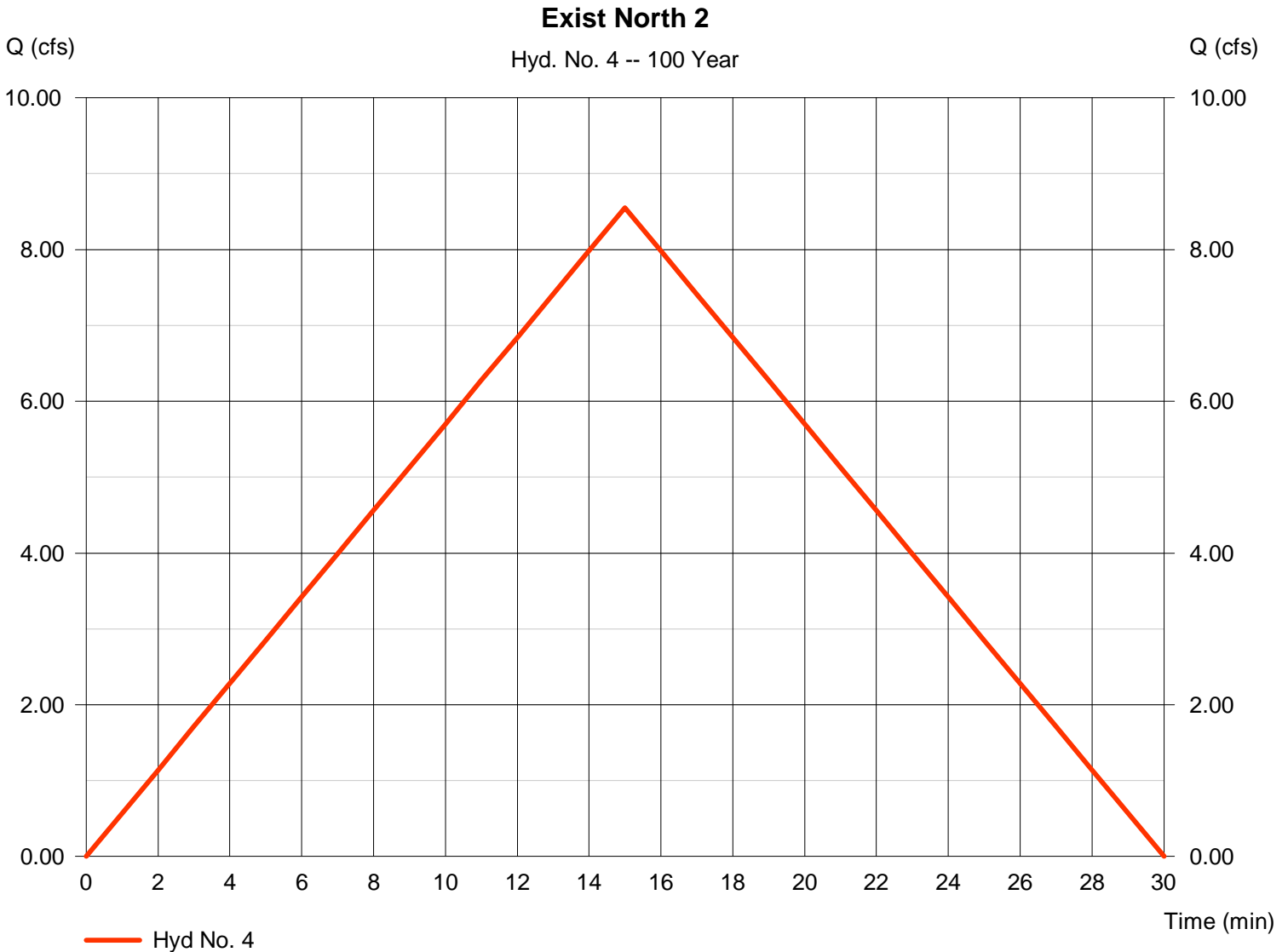
Thursday, Apr 17, 2008

Hyd. No. 4

Exist North 2

Hydrograph type = Rational
Storm frequency = 100 yrs
Time interval = 1 min
Drainage area = 2.700 ac
Intensity = 7.365 in/hr
IDF Curve = wichita.IDF

Peak discharge = 8.551 cfs
Time to peak = 15 min
Hyd. volume = 0.177 acft
Runoff coeff. = 0.43
Tc by User = 15.00 min
Asc/Rec limb fact = 1/1



Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.02

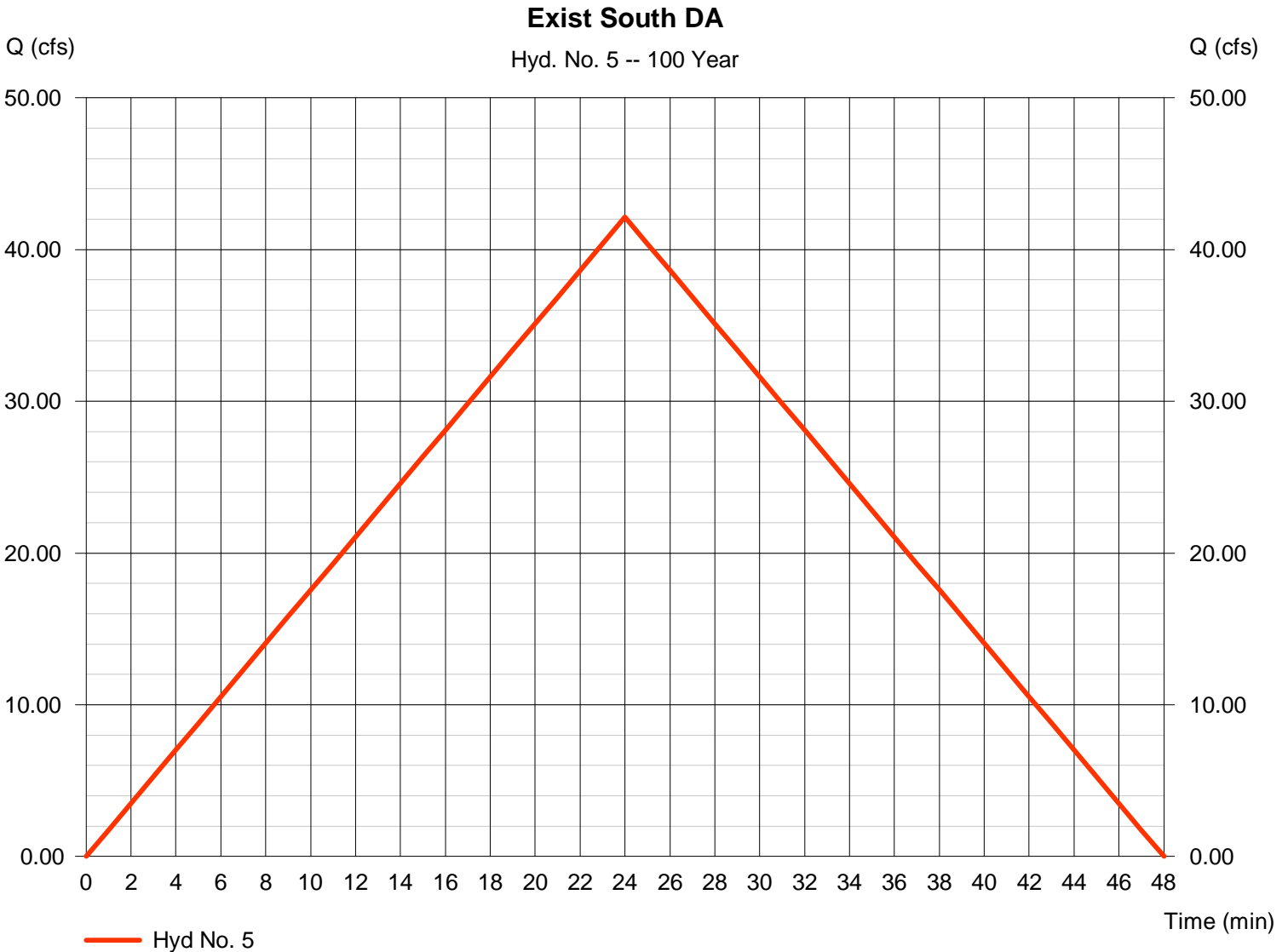
Thursday, Apr 17, 2008

Hyd. No. 5

Exist South DA

Hydrograph type = Rational
Storm frequency = 100 yrs
Time interval = 1 min
Drainage area = 16.300 ac
Intensity = 6.012 in/hr
IDF Curve = wichita.IDF

Peak discharge = 42.14 cfs
Time to peak = 24 min
Hyd. volume = 1.393 acft
Runoff coeff. = 0.43
Tc by TR55 = 24.00 min
Asc/Rec limb fact = 1/1



Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.02

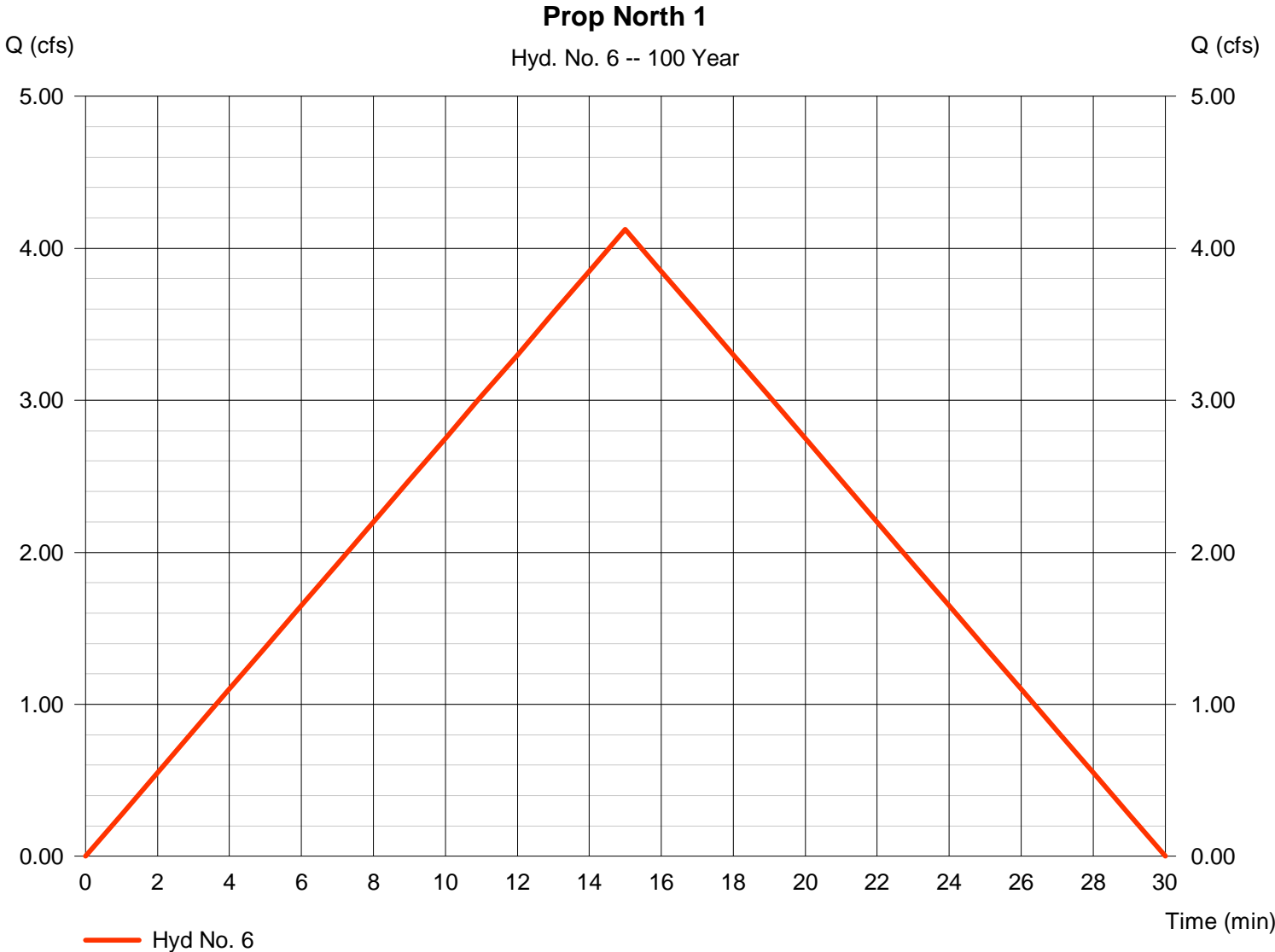
Thursday, Apr 17, 2008

Hyd. No. 6

Prop North 1

Hydrograph type = Rational
Storm frequency = 100 yrs
Time interval = 1 min
Drainage area = 0.700 ac
Intensity = 7.365 in/hr
IDF Curve = wichita.IDF

Peak discharge = 4.124 cfs
Time to peak = 15 min
Hyd. volume = 0.085 acft
Runoff coeff. = 0.8
Tc by User = 15.00 min
Asc/Rec limb fact = 1/1



Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.02

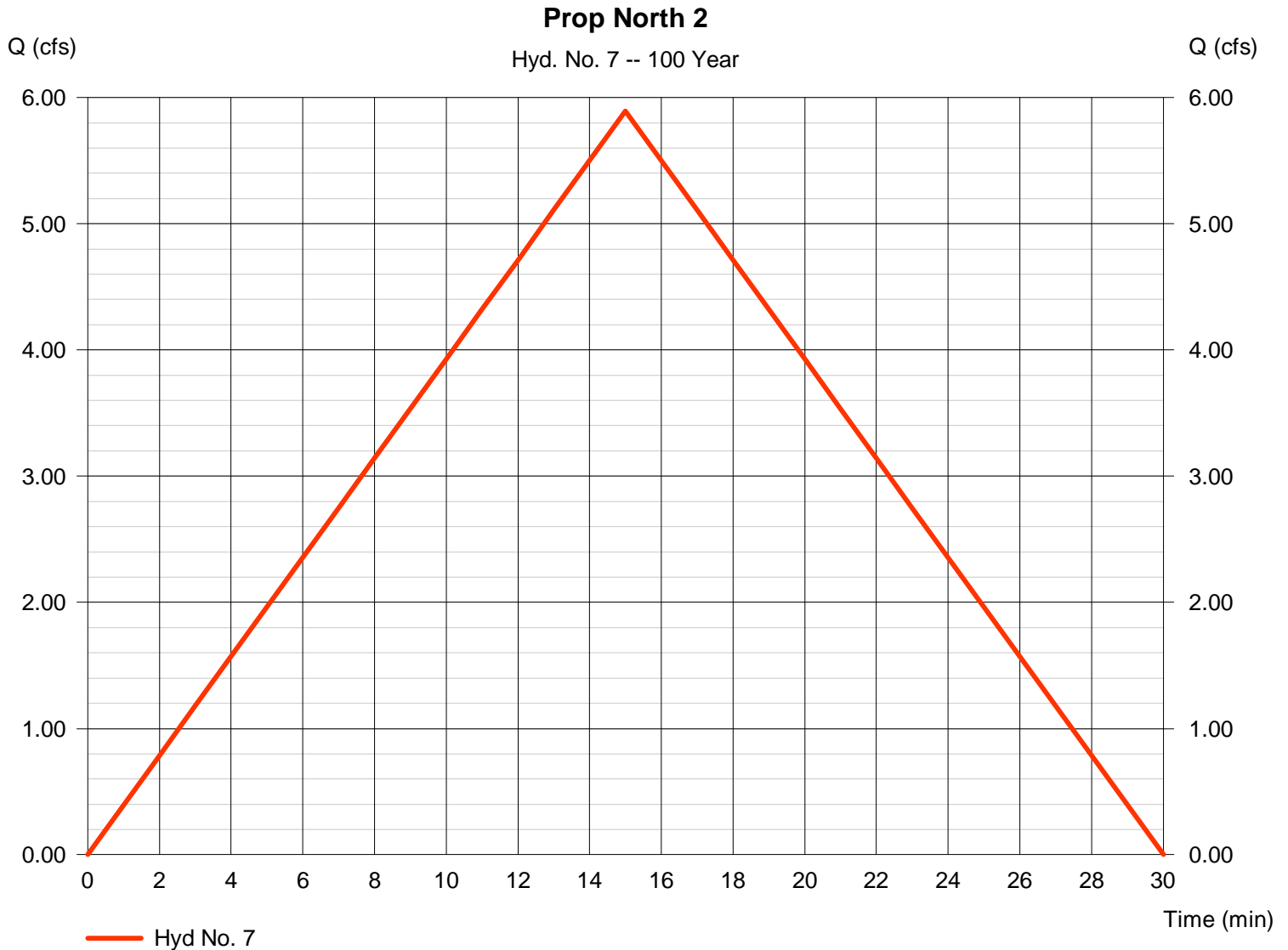
Thursday, Apr 17, 2008

Hyd. No. 7

Prop North 2

Hydrograph type = Rational
Storm frequency = 100 yrs
Time interval = 1 min
Drainage area = 1.000 ac
Intensity = 7.365 in/hr
IDF Curve = wichita.IDF

Peak discharge = 5.892 cfs
Time to peak = 15 min
Hyd. volume = 0.122 acft
Runoff coeff. = 0.8
Tc by User = 15.00 min
Asc/Rec limb fact = 1/1



DRAINAGE & GRADING PLAN

Scale 1:100